

Before the
Federal Communications Commission
Washington, D.C. 20554

CC Docket No. 90-320

In the Matter of

Annual 1990 Access Tariff Filings

MEMORANDUM OPINION AND ORDER

Adopted: September 28, 1990; Released: October 3, 1990

By the Chief, Common Carrier Bureau:

1. In the *1990 Access Tariff Order*,¹ the Common Carrier Bureau (Bureau) used a two-part analysis, consisting of a trend analysis and a cross section analysis, to review the Tier 1 local exchange carriers' (LECs) unseparated costs. The trend analysis of historical unseparated Telephone Plant in Service (TPIS) and Expense Less Depreciation (ELD) identified forecasts that were higher than the historical trend and reduced them, if warranted. The cross section analysis of the disaggregate cost categories that comprise TPIS and ELD compared growth rates of projected costs over historical costs among the 96 Tier 1 company study areas (COSAs), identified anomalously high projections, and reduced them, if warranted. *1990 Access Tariff Order* at para. 197. The Bureau translated the unseparated disallowances produced by these analyses into interstate access disallowances for the Common Line (CL), Switched Traffic Sensitive (TS), and Special Access (SP) categories. *Id.* at para. 241. For various aspects of both analyses, the Bureau stated that it used a 95 percent confidence interval. *Id.* at paras. 205, 206, 221.

2. United Telephone System (United) has filed an application for special permission to file revisions that reflect corrections to the calculations the Bureau used to adjust certain cost and demand forecasts in its companies' 1990 annual access tariff filings. United Application for Special Permission No. 68, filed July 23, 1990. United contends that the confidence intervals actually calculated were higher than 95 percent, thereby resulting in greater disallowances than would otherwise have been made. United maintains that the Bureau incorrectly calculated confidence ranges designed to determine if the LECs' forecasts varied significantly from historical trends. United argues that, as a result of this error, the rate adjustment factors (RAFs) filed by United on June 28, 1990, pursuant to the *1990 Access Tariff Order*, understate interstate revenue requirements by approximately \$1.5 million. *Id.* at 1.

3. United claims that the confidence intervals calculated by the Bureau are incorrect because the Bureau included only the "within-sample" error in the calculation of the forecast error variance, when we should have also included the "out-of-sample" error in the calculation, thereby producing a confidence interval that was too narrow. United contends that, as a result, the Bureau disallowed TPIS in excess of the amount that would have been disallowed if the confidence ranges had been calculated

correctly. United also alleges that the same error occurred in the Bureau's calculation of a trendline for CL and TS minutes of use, thereby resulting in upward adjustments of United's demand forecasts that were greater than warranted. *Id.* at 2.

4. United further asserts that because the Bureau used a two-part approach to analyzing unseparated costs, the second set of tests (cross-sectional analyses) may, in some instances, result in a cost disallowance, while the corrected trendline may show that no adjustment is warranted. United also notes that depreciation expenses totalling \$203,000 on an unseparated basis were excluded from United Inter-Mountain Telephone Company's revenue requirement because of the Bureau's TPIS disallowance. United contends that this disallowance was unwarranted and requests that it be added back into its revenue requirement. *Id.* at 2-3.

5. Centel Telephone Companies (Centel) also contends that the Bureau incorrectly calculated the confidence intervals. Centel Application for Special Permission No. 76, filed July 20, 1990.

6. Upon review, we find that United's arguments are valid. The error made in computing the variance of the forecast had the effect of implying a confidence interval 1 to 2 percent higher than the declared interval of 95 percent. We have calculated the impact of these corrections for all the holding companies and find that it results in approximately a \$22 million increase in allowable costs.

7. The attached charts revise pages contained in the *1990 Access Tariff Order* consistent with the discussion above. The National Exchange Carrier Association and local exchange carriers may file revised tariffs reflecting the rate adjustment factors and other adjustments contained in the appended charts. Carriers electing to file revised tariffs shall make such filings on October 17, 1990. Carriers need not provide further cost support data for these revisions nor file an application for special permission. Such tariff revisions shall be filed to be effective on not less than seven days' notice.

8. Accordingly, IT IS ORDERED that United Telephone Application No. 68, and Centel Telephone Companies Application No. 76, ARE GRANTED to the extent indicated herein.

9. IT IS FURTHER ORDERED that Sections 61.38, 61.56, 61.58 and 61.59 of the Commission's Rules, 47 C.F.R. §§ 61.38, 61.56, 61.58 and 61.59, ARE WAIVED and Special Permission No. 90-748 is assigned for the purpose of compliance with this Order.

FEDERAL COMMUNICATIONS COMMISSION

Richard M. Firestone
Chief, Common Carrier Bureau

FOOTNOTE

¹ Annual 1990 Access Tariff Filings, CC Docket No. 90-320, Memorandum Opinion and Order, DA 90-845, released June 21, 1990 (*1990 Access Tariff Order*), recon. & app. for rev. pending.

A T T A C H M E N T

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MERGED RESULTS OF TREND AND CROSS-SECTION ANALYSES

TIER I REVENUE REQUIREMENT DISALLOWANCE CHART (TPIS & ELD) -- MERGE
4 PARTS

PART A

PAGE 1 SHOWS REVENUE REQUIREMENT DISALLOWANCES BASED ON TREND ANALYSIS
FOR TOTAL PLANT IN SERVICE - TPIS and
FOR EXPENSE LESS DEPRECIATION - ELD
by OPERATING COMPANY

PART B

PAGE 2 SHOWS REVENUE REQUIREMENT DISALLOWANCES BASED ON CROSS-SECTION
ANALYSIS OF INDIVIDUAL COST ITEMS
FOR TOTAL PLANT IN SERVICE - TPIS and
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PART C

PAGE 3 SHOWS FINAL REVENUE REQUIREMENT DISALLOWANCES
FOR TOTAL PLANT IN SERVICE - TPIS and
FOR EXPENSE LESS DEPRECIATION - ELD
by OPERATING COMPANY

THIS CHART CONTAINS THE TPIS AND ELD ROW
FROM EITHER PART A OR PART B THAT HAD THE HIGHEST TOTAL
DISALLOWANCE

PART D

PAGE 4 SUMMARIZES THE INFORMATION IN PART C BY
OPERATING COMPANY and
HOLDING COMPANY

June 7, 1990

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Unseparated Disallowances and
Access Category Disallowances for
Expenses Less Depreciation (ELD)

Operating Company	TRP PYCOS	TRP Forecast	Trend Line PYCOS	Trend Line Forecast	95% Confidence Interval of Trend Line		Trend Line Forecast +/- One Standard Deviation	
					Lower Bound	Upper Bound	Lower Bound	Upper Bound
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
LBIL	\$1,438,090	\$1,527,777	\$1,413,577	\$1,470,873	\$1,373,620	\$1,568,127	\$1,427,223	\$1,514,524
NBIN	\$497,698	\$519,079	\$494,019	\$529,531	\$508,395	\$550,666	\$520,044	\$539,017
MBMI	\$1,230,717	\$1,326,901	\$1,231,852	\$1,267,400	\$1,219,972	\$1,314,827	\$1,246,112	\$1,288,687
OBOH	\$898,893	\$955,268	\$882,206	\$916,328	\$779,510	\$1,053,146	\$854,919	\$977,737
WTWI	\$503,451	\$520,804	\$491,302	\$515,157	\$454,034	\$576,281	\$487,723	\$542,592
CPTC	\$1,949,620	\$2,056,519	\$1,926,607	\$2,018,636	\$1,892,021	\$2,145,251	\$1,961,807	\$2,075,465
DSDE	\$94,334	\$97,497	\$92,284	\$95,624	\$81,721	\$109,528	\$89,384	\$101,865
PAPA	\$1,336,740	\$1,383,559	\$1,309,256	\$1,382,197	\$1,155,500	\$1,608,894	\$1,280,448	\$1,483,946
NUNJ	\$1,334,387	\$1,381,975	\$1,302,325	\$1,300,029	\$1,144,906	\$1,455,151	\$1,230,404	\$1,369,653
SBTC	\$3,246,457	\$3,494,579	\$3,255,096	\$3,399,043	\$3,232,677	\$3,565,409	\$3,324,372	\$3,473,714
SCTC	\$2,181,253	\$2,383,828	\$2,166,983	\$2,214,057	\$2,064,416	\$2,363,697	\$2,146,893	\$2,281,220
NETC	\$1,966,929	\$1,937,812	\$1,964,870	\$2,125,935	\$1,939,117	\$2,312,753	\$2,042,085	\$2,209,785
NYNY	\$3,805,911	\$4,193,664	\$3,800,842	\$3,893,227	\$3,697,681	\$4,088,772	\$3,805,459	\$3,980,994
PTCA	\$3,872,636	\$4,170,857	\$3,839,660	\$3,470,552	\$3,058,224	\$3,882,880	\$3,285,486	\$3,655,618
PTNV	\$92,754	\$85,608	\$89,908	\$103,366	\$73,863	\$132,869	\$90,124	\$116,608
SWTR	\$3,261,143	\$3,399,912	\$3,230,912	\$3,143,603	\$2,906,964	\$3,380,241	\$3,037,391	\$3,249,814
MSTC	\$1,804,230	\$1,790,511	\$1,798,235	\$1,771,987	\$1,606,560	\$1,937,413	\$1,697,737	\$1,846,236
NWTC	\$1,027,733	\$1,031,315	\$1,023,899	\$1,011,522	\$865,608	\$1,157,435	\$946,031	\$1,077,012
PNTC	\$871,269	\$871,775	\$862,742	\$840,092	\$735,250	\$944,934	\$793,035	\$887,149
CEFL	\$80,634	\$87,302	\$78,381	\$84,231	\$71,515	\$96,947	\$78,524	\$89,938
CENV	\$104,883	\$114,545	\$102,401	\$115,001	\$103,175	\$126,826	\$109,693	\$120,308
CBTC	\$238,804	\$265,803	\$229,296	\$237,044	\$188,566	\$285,521	\$215,285	\$258,802
COCA	\$142,262	\$136,363	\$136,962	\$155,661	\$134,894	\$176,428	\$146,340	\$164,982
CONY	\$87,637	\$94,113	\$86,893	\$98,450	\$78,562	\$118,338	\$89,524	\$107,376
COTX	\$77,400	\$79,956	\$76,989	\$85,811	\$74,569	\$97,052	\$80,765	\$90,856
COVA	\$140,969	\$159,864	\$138,511	\$159,699	\$141,162	\$178,236	\$151,379	\$168,019
GTCA	\$1,294,657	\$1,444,208	\$1,284,668	\$1,333,719	\$1,212,983	\$1,454,454	\$1,279,528	\$1,387,909
GTFL	\$582,469	\$594,030	\$590,895	\$659,371	\$618,572	\$700,170	\$641,059	\$677,683
GTNW	\$300,484	\$285,345	\$290,424	\$295,939	\$247,770	\$344,108	\$274,319	\$317,559
GTSO	\$429,005	\$411,575	\$424,467	\$464,163	\$427,516	\$500,810	\$447,715	\$480,611
GTSW	\$550,763	\$533,226	\$543,979	\$559,560	\$511,612	\$607,508	\$538,040	\$581,080
GTMW	\$1,100,824	\$1,096,159	\$1,056,515	\$1,129,730	\$949,949	\$1,309,510	\$1,049,038	\$1,210,421
GTHI	\$193,334	\$184,230	\$180,817	\$195,216	\$146,358	\$244,074	\$173,287	\$217,145
LTNE	\$59,153	\$65,094	\$59,153	\$60,935	\$58,415	\$63,455	\$59,905	\$61,965
RTNY	\$122,278	\$136,619	\$120,921	\$130,832	\$119,468	\$142,197	\$125,732	\$135,933
SNCT	\$750,517	\$755,987	\$752,097	\$794,080	\$758,425	\$829,735	\$778,077	\$810,083
UTFL	\$290,499	\$322,939	\$292,522	\$322,509	\$296,727	\$348,292	\$310,937	\$334,082
UTIN	\$58,507	\$61,713	\$57,788	\$62,275	\$57,066	\$67,484	\$59,937	\$64,613
UTNC	\$203,320	\$222,270	\$202,950	\$213,207	\$190,865	\$235,548	\$203,179	\$223,234
UTOH	\$139,698	\$153,850	\$138,280	\$151,381	\$140,165	\$162,597	\$146,347	\$156,415
UTPA	\$73,113	\$80,466	\$71,034	\$70,460	\$58,342	\$82,579	\$65,021	\$75,900
UTIM	\$69,759	\$76,599	\$70,538	\$77,503	\$69,139	\$85,866	\$73,749	\$81,256
total	\$38,470,096	\$40,491,496	\$38,135,935	\$38,870,139	\$37,449,182	\$40,291,095	\$38,232,366	\$39,507,911
Sum of OPCOs	\$38,505,214	\$40,491,496	\$38,163,053	\$38,925,932				

NOTES: (1) ELD data are from row 310, columns (A) through (R) on Chart COS-2 in the 1990 TRP for 1986 through 1989 and for the test period. Voluntary Employee Benefit Association (VEBA) and VEBA-like amounts are removed from both the historical and the prospective data.
(2) The 'total' row is computed from a trend line regression of total ELD less VEBA and VEBA-like amounts. The 'SUM OF OPCOs' row is the sum of the operating company data reported in this chart.

Unseparated Disallowances and
Access Category Disallowances for
Expenses Less Depreciation (ELD)

Operating Company	Annualized Growth Rates						
	TRP Forecast Over TRP PYCOS	Trend Forecast Over TRP PYCOS	Trend Forecast Over Trend PYCOS	95% CI Lower Bound Over TRP PYCOS	95% CI Upper Bound Over TRP PYCOS	+/- 1 SD Lower Bound Over TRP PYCOS	+/- 1 SD Upper Bound Over TRP PYCOS
	(I)	(J)	(K)	(L)	(M)	(N)	(O)
LBIL	4.12%	1.51%	2.68%	-3.01%	5.94%	-0.50%	3.51%
NBIN	2.84%	4.22%	4.74%	1.43%	6.97%	2.97%	5.46%
MBMI	5.14%	1.98%	1.91%	-0.58%	4.51%	0.83%	3.12%
OBOH	4.14%	1.29%	2.56%	-9.06%	11.14%	-3.29%	5.77%
WTWI	2.28%	1.54%	3.21%	-6.66%	9.43%	-2.09%	5.12%
CPTC	3.62%	2.35%	3.16%	-1.98%	6.58%	0.42%	4.26%
DSDE	2.22%	0.91%	2.40%	-9.13%	10.47%	-3.53%	5.25%
PAPA	2.32%	2.25%	3.68%	-9.26%	13.15%	-2.83%	7.21%
NJNJ	2.36%	-1.72%	-0.12%	-9.71%	5.95%	-5.26%	1.75%
SBTC	5.03%	3.11%	2.93%	-0.28%	6.45%	1.59%	4.61%
SCTC	6.10%	1.00%	1.44%	-3.60%	5.50%	-1.05%	3.03%
NETC	-0.99%	5.32%	5.39%	-0.94%	11.40%	2.53%	8.07%
NYNY	6.68%	1.52%	1.61%	-1.90%	4.90%	-0.01%	3.04%
PTCA	5.07%	-7.05%	-6.52%	-14.56%	0.18%	-10.38%	-3.77%
PTNV	-5.20%	7.49%	9.75%	-14.09%	27.08%	-1.90%	16.48%
SWTR	2.82%	-2.42%	-1.81%	-7.38%	2.42%	-4.63%	-0.23%
MSTC	-0.51%	-1.19%	-0.98%	-7.44%	4.86%	-3.97%	1.55%
NWTC	0.23%	-1.05%	-0.81%	-10.81%	8.25%	-5.37%	3.17%
PNTC	0.04%	-2.40%	-1.76%	-10.70%	5.56%	-6.08%	1.21%
CEFL	5.44%	2.95%	4.92%	-7.69%	13.07%	-1.75%	7.55%
CENV	6.05%	6.33%	8.04%	-1.09%	13.50%	3.03%	9.58%
CBTC	7.40%	-0.49%	2.24%	-14.57%	12.65%	-6.68%	5.51%
COCA	-2.78%	6.18%	8.91%	-3.48%	15.43%	1.90%	10.38%
CONY	4.87%	8.07%	8.68%	-7.03%	22.17%	1.43%	14.50%
COTX	2.19%	7.12%	7.50%	-2.45%	16.28%	2.88%	11.28%
COVA	8.75%	8.67%	9.95%	0.09%	16.93%	4.86%	12.41%
GTCA	7.56%	2.00%	2.53%	-4.25%	8.07%	-0.78%	4.75%
GTFL	1.32%	8.62%	7.58%	4.09%	13.05%	6.60%	10.62%
GTNW	-3.39%	-1.01%	1.26%	-12.07%	9.46%	-5.89%	3.75%
GTSO	-2.73%	5.39%	6.14%	-0.23%	10.87%	2.89%	7.87%
GTSW	-2.13%	1.06%	1.90%	-4.80%	6.76%	-1.55%	3.64%
GTMW	-0.28%	1.74%	4.57%	-9.36%	12.27%	-3.16%	6.53%
GTHI	-3.16%	0.65%	5.24%	-16.94%	16.81%	-7.04%	8.05%
LTNE	6.59%	2.00%	2.00%	-0.83%	4.79%	0.85%	3.14%
RTNY	7.67%	4.61%	5.39%	-1.54%	10.58%	1.87%	7.31%
SNCT	0.49%	3.83%	3.69%	0.70%	6.92%	2.43%	5.22%
UTFL	7.31%	7.22%	6.72%	1.42%	12.86%	4.64%	9.77%
UTIN	3.62%	4.25%	5.11%	-1.65%	9.98%	1.62%	6.84%
UTNC	6.12%	3.22%	3.34%	-4.13%	10.31%	-0.05%	6.43%
UTOH	6.64%	5.50%	6.22%	0.22%	10.65%	3.15%	7.83%
UTPA	6.60%	-2.43%	-0.54%	-13.97%	8.46%	-7.52%	2.53%
UTIM	6.43%	7.27%	6.48%	-0.59%	14.85%	3.78%	10.71%
total	3.47%	0.69%	1.28%	-1.78%	3.13%	-0.41%	1.79%
Sum of OPCOs	3.41%	0.73%	1.33%				

NOTES: (1) The growth rates in columns (I) thru (O) are annualized by raising the ratio of the value listed in the column heading to the 2/3 power, and subtracting one. For example, column (I) equals ((column (B) / column (A)) ^ (2/3)) - 1.

Unseparated Disallowances and
Access Category Disallowances for
Expenses Less Depreciation (ELD)

Operating Company	Total Unseparated ELD Forecast (P)	Common Line ELD Forecast (Q)	CL/TOT Ratio (R)	TS-Switched ELD Forecast (S)	TS-SW/TOT Ratio (T)	Special Access ELD Forecast (U)	SpAc/TOT Ratio (V)
LBIL	\$1,570,112	\$137,597	8.76%	\$155,836	9.93%	\$68,574	4.37%
NBIN	\$526,543	\$49,261	9.36%	\$56,180	10.67%	\$18,838	3.58%
MBMI	\$1,366,614	\$110,794	8.11%	\$92,592	6.78%	\$30,435	2.23%
OBOH	\$1,035,662	\$83,482	8.06%	\$82,546	7.97%	\$33,992	3.28%
WTWI	\$605,652	\$43,962	7.26%	\$53,112	8.77%	\$16,713	2.76%
CPTC	\$2,172,392	\$236,306	10.88%	\$195,452	9.00%	\$83,181	3.83%
DSDE	\$103,696	\$14,538	14.02%	\$11,887	11.46%	\$4,762	4.59%
PAPA	\$1,472,122	\$149,512	10.16%	\$120,383	8.18%	\$48,690	3.31%
NJNJ	\$1,457,844	\$154,428	10.59%	\$161,938	11.11%	\$53,376	3.66%
SBTC	\$3,548,233	\$433,574	12.22%	\$248,303	7.00%	\$112,191	3.16%
SCTC	\$2,405,289	\$257,087	10.69%	\$190,765	7.93%	\$62,518	2.60%
NETC	\$1,989,743	\$197,293	9.92%	\$253,216	12.73%	\$55,931	2.81%
NYNY	\$4,193,664	\$376,821	8.99%	\$508,055	12.11%	\$157,334	3.75%
PTCA	\$4,484,999	\$398,959	8.90%	\$269,477	6.01%	\$112,265	2.50%
PTNV	\$94,089	\$12,245	13.01%	\$14,586	15.50%	\$2,175	2.31%
SWTR	\$3,487,966	\$345,215	9.90%	\$272,776	7.82%	\$117,588	3.37%
MSTC	\$1,869,764	\$209,828	11.22%	\$230,441	12.32%	\$41,848	2.24%
NWTC	\$1,178,795	\$93,595	7.94%	\$129,451	10.98%	\$27,138	2.30%
PNTC	\$1,093,655	\$81,892	7.49%	\$79,821	7.30%	\$21,752	1.99%
CEFL	\$86,761	\$9,685	11.16%	\$6,604	7.61%	\$2,257	2.60%
CENV	\$110,369	\$14,128	12.80%	\$13,441	12.18%	\$4,452	4.03%
CBTC	\$265,724	\$21,170	7.97%	\$18,735	7.05%	\$10,239	3.85%
COCA	\$137,990	\$12,052	8.73%	\$8,260	5.99%	\$1,399	1.01%
CONY	\$94,085	\$9,066	9.64%	\$6,853	7.28%	\$952	1.01%
COTX	\$79,898	\$8,040	10.06%	\$4,489	5.62%	\$396	0.50%
COVA	\$175,033	\$16,385	9.36%	\$13,631	7.79%	\$2,033	1.16%
GTCA	\$1,382,446	\$130,505	9.44%	\$88,695	6.42%	\$24,707	1.79%
GTFL	\$604,183	\$89,278	14.78%	\$45,556	7.54%	\$14,891	2.46%
GTNW	\$309,315	\$37,790	12.22%	\$33,348	10.78%	\$6,973	2.25%
GTSO	\$415,189	\$49,162	11.84%	\$39,104	9.42%	\$11,608	2.80%
GTSW	\$547,139	\$59,666	10.91%	\$39,171	7.16%	\$9,724	1.78%
GTMW	\$1,158,844	\$116,996	10.10%	\$92,442	7.98%	\$19,991	1.73%
GTHI	\$185,230	\$18,065	9.75%	\$22,253	12.01%	\$6,459	3.49%
LTNE	\$64,630	\$4,049	6.26%	\$6,628	10.26%	\$1,942	3.00%
RTNY	\$136,619	\$9,957	7.29%	\$6,714	4.91%	\$4,544	3.33%
SNCT	\$757,488	\$61,453	8.11%	\$76,051	10.04%	\$18,743	2.47%
UTFL	\$331,365	\$49,511	14.94%	\$30,149	9.10%	\$5,058	1.53%
UTIN	\$61,474	\$7,274	11.83%	\$4,749	7.73%	\$1,797	2.92%
UTNC	\$223,588	\$27,024	12.09%	\$15,612	6.98%	\$3,404	1.52%
UTOH	\$163,381	\$15,805	9.67%	\$12,194	7.46%	\$4,389	2.69%
UTPA	\$92,408	\$8,316	9.00%	\$5,323	5.76%	\$1,430	1.55%
UTIM	\$76,692	\$8,489	11.07%	\$5,146	6.71%	\$1,937	2.53%
total							
Sum of OPCos	\$42,116,685	\$4,170,255	9.90%	\$3,721,965	8.84%	\$1,228,626	2.92%

NOTES: (1) The Total Unseparated, Common Line, TS-Switched, and Special Access ELD forecast data are from row 1190 minus row 1180, columns (f), (m), (r), and (s), respectively, on COS-1(P) in the 1990 TRP.
(2) Columns (R), (T), and (V) are computed by dividing columns (Q), (S), and (U), respectively, by Column (P).

Unseparated Disallowances and
Access Category Disallowances for
Expenses Less Depreciation (ELD)

Operating Company	Fail Report Card?	Tentative Unseparated ELD Disallowance	Dis-allowance	Final Unseparated ELD Disallowance	Common Line ELD Disallowance	TS-Switched ELD Disallowance	Special Access ELD Disallowance	Total Interstate ELD Disallowances
			As Percentage of TRP Forecast					
	(W)	(X)	(Y)	(Z)	(AA)	(AB)	(AC)	(AD)
LBIL	Yes	\$13,253	0.87%	\$13,253	\$1,161	\$1,315	\$579	\$3,056
NBIN	Yes							
MBHI	Yes	\$38,214	2.88%	\$38,214	\$3,098	\$2,589	\$851	\$6,538
OBOH	No							
WTWI	No							
CPTC	Yes							
DSDE	Yes							
PAPA	Yes							
NJNJ	Yes	\$12,322	0.89%	\$12,322	\$1,305	\$1,369	\$451	\$3,125
SBTC	No							
SCTC	Yes	\$102,608	4.30%	\$102,608	\$10,967	\$8,138	\$2,667	\$21,772
NETC	No							
NYNY	Yes	\$212,670	5.07%	\$212,670	\$19,109	\$25,765	\$7,979	\$52,853
PTCA	Yes	\$223,664	5.36%	\$223,664	\$19,896	\$13,439	\$5,599	\$38,933
PTNV	No							
SWTR	Yes	\$75,985	2.23%	\$75,985	\$7,520	\$5,942	\$2,562	\$16,024
MSTC	No							
NWTC	No							
PNTC	No							
CEFL	No							
CENV	No							
CBTC	Yes	\$7,001	2.63%					
COCA	No							
CONY	No							
COTX	Yes							
COVA	No							
GTCA	Yes	\$56,299	3.90%	\$56,299	\$5,315	\$3,612	\$1,006	\$9,933
GTFL	Yes							
GTNW	Yes							
GTSO	Yes							
GTSW	Yes							
GTMW	Yes							
GTHI	Yes							
LTNE	Yes	\$3,129	4.81%	\$3,129	\$196	\$321	\$94	\$611
RTNY	No							
SNCT	No							
UTFL	No							
UTIN	Yes							
UTNC	No							
UTOH	No							
UTPA	No							
UTIM	Yes							
total	No							
Sum of OPCOs		\$745,146	1.84%	\$738,145	\$68,568	\$62,490	\$21,787	\$152,845

NOTES: (1) Columns (AA), (AB), and (AC) are computed by multiplying columns (R), (T), and (V), respectively, by column (Z). Column (AD) is the sum of columns (AA), (AB), and (AC).

(2) Column (X) is: the TRP forecast minus the upper bound of the 95% confidence interval if the company passes its report card, or; the TRP forecast minus the upper bound of the trend +/- one standard deviation if the company fails its report card. However, if such an adjustment would take a company's projection below its PYCOS amount, grown at the total trend growth rate, the forecast was adjusted no lower than the PYCOS amount grown at the total trend rate.

Unseparated Disallowances and
Access Category Disallowances for
Telephone Plant in Service (TPIS)

Operating Company	TRP PYCOS	TRP Forecast	Trend Line PYCOS	Trend Line Forecast	95% Confidence Interval of Trend Line Forecast		Trend Line Forecast +/- one Standard Deviation	
					Lower Bound	Upper Bound	Lower Bound	Upper Bound
					(A)	(B)	(C)	(D)
LBIL	\$7,033,298	\$7,623,455	\$7,092,612	\$7,689,465	\$7,539,784	\$7,839,145	\$7,617,503	\$7,761,426
NBIN	\$2,575,054	\$2,749,533	\$2,638,699	\$2,833,557	\$2,707,835	\$2,959,278	\$2,773,114	\$2,894,000
MBMI	\$6,775,103	\$7,233,396	\$6,803,393	\$7,340,781	\$7,244,581	\$7,436,980	\$7,294,531	\$7,387,030
OBOH	\$4,663,894	\$4,956,703	\$4,796,774	\$5,097,676	\$4,889,681	\$5,305,671	\$4,997,679	\$5,197,674
WTWI	\$2,403,505	\$2,501,366	\$2,466,218	\$2,640,118	\$2,506,558	\$2,773,678	\$2,575,906	\$2,704,329
CPTC	\$11,260,487	\$12,225,005	\$11,356,374	\$12,362,407	\$12,010,355	\$12,714,458	\$12,193,151	\$12,531,662
DSDE	\$572,160	\$626,291	\$573,199	\$622,204	\$612,314	\$632,095	\$617,450	\$626,959
PAPA	\$7,632,492	\$8,270,763	\$7,633,403	\$8,272,943	\$8,165,799	\$8,380,087	\$8,221,432	\$8,324,455
NJNJ	\$7,338,919	\$7,958,791	\$7,315,228	\$7,941,414	\$7,881,977	\$8,000,851	\$7,912,838	\$7,969,989
SBTC	\$18,929,637	\$20,315,393	\$18,852,459	\$20,566,069	\$20,372,100	\$20,760,038	\$20,472,814	\$20,659,323
SCTC	\$13,832,882	\$14,848,834	\$13,902,520	\$14,898,513	\$14,747,297	\$15,049,729	\$14,825,813	\$14,971,213
NETC	\$9,680,985	\$10,495,638	\$9,648,533	\$10,392,911	\$10,270,355	\$10,515,468	\$10,333,990	\$10,451,833
NYNY	\$17,480,670	\$17,323,649	\$17,531,126	\$18,759,391	\$18,595,195	\$18,923,586	\$18,680,451	\$18,838,330
PTCA	\$22,663,629	\$22,983,675	\$22,965,678	\$24,837,240	\$24,141,263	\$25,533,218	\$24,502,636	\$25,171,845
PTNV	\$427,975	\$434,839	\$428,114	\$441,934	\$436,425	\$447,442	\$439,285	\$444,582
SWTR	\$22,941,109	\$23,556,689	\$23,274,415	\$25,014,662	\$24,183,437	\$25,845,888	\$24,615,035	\$25,414,290
MSTC	\$10,811,046	\$11,764,826	\$11,075,965	\$11,976,659	\$11,553,773	\$12,399,545	\$11,773,348	\$12,179,970
NWTC	\$6,663,421	\$6,962,898	\$6,674,469	\$7,128,939	\$7,076,960	\$7,180,917	\$7,103,949	\$7,153,928
PNTC	\$5,056,263	\$5,392,257	\$5,079,371	\$5,432,831	\$5,359,745	\$5,505,917	\$5,397,694	\$5,467,969
CEFL	\$446,739	\$494,129	\$449,627	\$502,429	\$469,119	\$535,738	\$486,415	\$518,443
CENV	\$489,575	\$555,793	\$483,682	\$498,779	\$466,755	\$530,803	\$483,953	\$513,605
CBTC	\$1,070,094	\$1,187,385	\$1,083,877	\$1,149,107	\$1,106,497	\$1,191,716	\$1,128,621	\$1,169,592
COCA	\$615,558	\$696,897	\$609,487	\$647,511	\$632,201	\$662,821	\$640,151	\$654,872
CONY	\$429,632	\$473,932	\$429,870	\$465,241	\$457,955	\$472,527	\$461,738	\$468,744
COTX	\$432,176	\$480,860	\$437,738	\$480,903	\$468,006	\$493,800	\$474,703	\$487,103
COVA	\$620,853	\$727,492	\$623,532	\$678,595	\$664,552	\$692,638	\$671,843	\$685,346
GTCA	\$6,949,958	\$7,390,294	\$6,970,016	\$7,577,304	\$7,461,320	\$7,693,288	\$7,521,543	\$7,633,066
GTFL	\$3,307,781	\$3,520,457	\$3,324,858	\$3,624,920	\$3,581,726	\$3,668,115	\$3,604,154	\$3,645,687
GTNW	\$1,957,927	\$2,147,211	\$1,963,754	\$2,150,241	\$2,116,401	\$2,184,081	\$2,133,972	\$2,166,510
GTSO	\$2,457,121	\$2,617,293	\$2,496,976	\$2,847,691	\$2,723,506	\$2,971,877	\$2,787,987	\$2,907,396
GTSW	\$3,438,259	\$3,540,980	\$3,478,470	\$3,784,138	\$3,691,862	\$3,876,414	\$3,739,774	\$3,828,502
GTMW	\$6,534,247	\$6,726,576	\$6,482,061	\$6,795,686	\$6,665,200	\$6,926,171	\$6,732,952	\$6,858,419
GTHI	\$1,154,485	\$1,265,646	\$1,166,140	\$1,234,142	\$1,204,031	\$1,264,253	\$1,219,665	\$1,248,619
LTNE	\$363,521	\$392,638	\$365,836	\$374,659	\$362,002	\$387,316	\$368,978	\$380,340
RTNY	\$680,777	\$753,620	\$671,119	\$709,629	\$688,491	\$730,768	\$699,466	\$719,792
SNCT	\$3,237,582	\$3,622,131	\$3,217,147	\$3,594,030	\$3,486,216	\$3,701,843	\$3,544,116	\$3,643,944
UTFL	\$1,762,686	\$1,994,027	\$1,757,250	\$1,909,122	\$1,828,693	\$1,989,552	\$1,870,455	\$1,947,790
UTIN	\$349,092	\$377,605	\$348,948	\$370,792	\$345,042	\$396,543	\$358,412	\$383,173
UTNC	\$1,191,821	\$1,281,422	\$1,184,437	\$1,236,195	\$1,188,190	\$1,284,200	\$1,213,970	\$1,258,419
UTOH	\$782,952	\$863,773	\$782,720	\$833,087	\$815,162	\$851,013	\$824,789	\$841,386
UTPA	\$462,201	\$506,337	\$457,150	\$489,831	\$466,464	\$513,197	\$479,013	\$500,648
UTIM	\$428,519	\$467,871	\$428,177	\$454,590	\$429,757	\$479,424	\$443,093	\$466,087
total	\$217,906,085	\$230,308,370	\$219,271,903	\$236,460,274	\$233,851,861	\$239,068,686	\$235,206,229	\$237,714,318
SUM OF OPCOS	\$217,906,085	\$230,308,370	\$219,321,419	\$236,658,337				

- NOTES: (1) TPIS data are from row 370, columns (A) through (J) on COS-3 in the 1988 TRP for 1984 and 1985 and from row 370, columns (A) thru (R) on COS-2 in the 1990 TRP for 1986 thru 1989 and for the test period.
- (2) The 'total' row is computed from a trend line regression of total TPIS. The 'SUM OF OPCOS' row is the sum of the operating company data reported in this chart.
- (3) Regression for LTNE was run on data from 4Q/86 forward, as that was the earliest date from which data were available.
- (4) Because of a marked change in trend from 1Q/86, regressions for CENV, SNCT, UTNC, UTOH, UTPA, and UTIM were run on data from that date forward.

Unseparated Disallowances and
Access Category Disallowances for
Telephone Plant in Service (TPIS)

Operating Company	Annualized Growth Rates						
	TRP Forecast Over TRP	Trend Forecast Over TRP	Trend Forecast Over Trend TRP	95% CI Lower Bound Over TRP	95% CI Upper Bound Over TRP	+/- 1 SD Lower Bound Over TRP	+/- 1 SD Upper Bound Over TRP
	PYCOS	PYCOS	PYCOS	PYCOS	PYCOS	PYCOS	PYCOS
	(I)	(J)	(K)	(L)	(M)	(N)	(O)
LBIL	5.52%	6.13%	5.53%	4.74%	7.50%	5.46%	6.79%
NBIN	4.47%	6.59%	4.86%	3.41%	9.72%	5.06%	8.10%
MBMI	4.46%	5.49%	5.20%	4.57%	6.41%	5.05%	5.93%
OBOH	4.14%	6.11%	4.14%	3.20%	8.98%	4.72%	7.49%
WTWI	2.70%	6.46%	4.65%	2.84%	10.02%	4.73%	8.18%
CPIC	5.63%	6.42%	5.82%	4.39%	8.43%	5.45%	7.39%
DSDE	6.21%	5.75%	5.62%	4.63%	6.87%	5.21%	6.29%
PAPA	5.50%	5.52%	5.51%	4.61%	6.43%	5.08%	5.96%
NJNJ	5.55%	5.40%	5.63%	4.87%	5.93%	5.15%	5.65%
SBTC	4.82%	5.68%	5.97%	5.02%	6.35%	5.36%	6.00%
SCIC	4.84%	5.07%	4.72%	4.36%	5.78%	4.73%	5.41%
NETC	5.53%	4.84%	5.08%	4.02%	5.67%	4.45%	5.24%
NYNY	-0.60%	4.82%	4.62%	4.21%	5.43%	4.52%	5.11%
PTCA	0.94%	6.30%	5.36%	4.30%	8.27%	5.34%	7.25%
PTNV	1.07%	2.16%	2.14%	1.31%	3.01%	1.75%	2.57%
SWTR	1.78%	5.94%	4.92%	3.58%	8.27%	4.81%	7.06%
MSTC	5.80%	7.06%	5.35%	4.53%	9.57%	5.85%	8.27%
NWTC	2.97%	4.60%	4.49%	4.10%	5.11%	4.36%	4.85%
PNIC	4.38%	4.91%	4.59%	3.96%	5.84%	4.45%	5.36%
CEFL	6.95%	8.15%	7.68%	3.31%	12.88%	5.84%	10.43%
CENV	8.83%	1.25%	2.07%	-3.13%	5.54%	-0.77%	3.25%
CBTC	7.18%	4.86%	3.97%	2.26%	7.44%	3.61%	6.11%
COCA	8.63%	3.43%	4.12%	1.79%	5.06%	2.65%	4.21%
CONY	6.76%	5.45%	5.41%	4.35%	6.55%	4.92%	5.98%
COTX	7.38%	7.38%	6.47%	5.45%	9.29%	6.46%	8.30%
COVA	11.15%	6.11%	5.80%	4.64%	7.57%	5.40%	6.81%
GTCA	4.18%	5.93%	5.73%	4.85%	7.01%	5.41%	6.45%
GTFL	4.24%	6.29%	5.93%	5.45%	7.14%	5.89%	6.70%
GTNW	6.35%	6.45%	6.23%	5.33%	7.56%	5.91%	6.98%
GTSO	4.30%	10.33%	9.16%	7.10%	13.52%	8.79%	11.87%
GTSW	1.98%	6.60%	5.78%	4.86%	8.32%	5.76%	7.43%
GTMW	1.95%	2.65%	3.20%	1.33%	3.96%	2.02%	3.28%
GTHI	6.32%	4.55%	3.85%	2.84%	6.24%	3.73%	5.36%
LTNE	5.27%	2.03%	1.60%	-0.28%	4.32%	1.00%	3.06%
RTNY	7.01%	2.81%	3.79%	0.75%	4.84%	1.82%	3.79%
SNCT	7.77%	7.21%	7.66%	5.06%	9.34%	6.22%	8.20%
UTFL	8.57%	5.46%	5.68%	2.48%	8.41%	4.04%	6.88%
UTIN	5.37%	4.10%	4.13%	-0.78%	8.87%	1.77%	6.41%
UTNC	4.95%	2.47%	2.89%	-0.20%	5.10%	1.24%	3.69%
UTOH	6.77%	4.22%	4.25%	2.72%	5.71%	3.53%	4.92%
UTPA	6.27%	3.95%	4.71%	0.61%	7.23%	2.41%	5.47%
UTIM	6.03%	4.02%	4.07%	0.19%	7.77%	2.25%	5.76%
total	3.76%	5.60%	5.16%	4.82%	6.37%	5.23%	5.97%
SUM OF OPCOS	3.76%	5.66%	5.20%				

NOTES: (1) The growth rates in columns (I) thru (O) are annualized by raising the ratio of the value listed in the column heading to the 2/3 power, and subtracting one. For example, column (I) equals ((column (B) / column (A)) ^ (2/3)) - 1.

Unseparated Disallowances and
Access Category Disallowances for
Telephone Plant in Service (TPIS)

Operating Company	Total Unseparated TPIS Forecast (P)	Common Line TPIS Forecast (Q)	CL/TOT Ratio (R)	TS-Switched TPIS Forecast (S)	TS-SW/TOT Ratio (T)	Special Access TPIS Forecast (U)	SpAc/TOT Ratio (V)
LBIL	\$7,623,455	\$719,091	9.43%	\$914,409	11.99%	\$341,369	4.48%
NBIN	\$2,749,533	\$297,376	10.82%	\$315,165	11.46%	\$106,451	3.87%
NBMI	\$7,233,396	\$752,783	10.41%	\$586,355	8.11%	\$160,720	2.22%
OBOH	\$4,956,707	\$492,000	9.93%	\$476,155	9.61%	\$172,827	3.49%
WTWI	\$2,501,366	\$260,802	10.43%	\$276,820	11.07%	\$88,955	3.56%
CPTC	\$12,225,005	\$1,537,656	12.58%	\$1,133,237	9.27%	\$531,123	4.34%
DSDE	\$626,291	\$99,826	15.94%	\$67,677	10.81%	\$32,624	5.21%
PAPA	\$8,270,763	\$1,021,500	12.35%	\$698,197	8.44%	\$337,351	4.08%
NJNJ	\$7,958,791	\$993,241	12.48%	\$977,464	12.28%	\$359,871	4.52%
SBTC	\$20,315,393	\$3,186,030	15.68%	\$1,583,262	7.79%	\$729,378	3.59%
SCTC	\$14,848,834	\$1,964,074	13.23%	\$1,316,804	8.87%	\$378,249	2.55%
NETC	\$10,495,638	\$1,228,868	11.71%	\$1,472,478	14.03%	\$248,576	2.37%
NYNY	\$17,323,649	\$1,668,004	9.63%	\$2,487,586	14.36%	\$719,102	4.15%
PTCA	\$22,983,675	\$2,623,873	11.42%	\$1,683,359	7.32%	\$677,073	2.95%
PTNV	\$434,839	\$85,786	19.73%	\$63,585	14.62%	\$12,578	2.89%
SWTR	\$23,556,689	\$2,896,521	12.30%	\$2,203,804	9.36%	\$977,122	4.15%
HSTC	\$11,764,826	\$1,649,389	14.02%	\$1,662,609	14.13%	\$293,368	2.49%
NWTC	\$6,962,898	\$804,608	11.56%	\$955,290	13.72%	\$202,920	2.91%
PNTC	\$5,392,257	\$690,356	12.80%	\$593,796	11.01%	\$152,712	2.83%
CEFL	\$494,129	\$73,101	14.79%	\$38,234	7.74%	\$12,164	2.46%
CENV	\$555,793	\$98,013	17.63%	\$84,784	15.25%	\$13,326	2.40%
CBTC	\$1,187,382	\$106,703	8.99%	\$97,525	8.21%	\$55,439	4.67%
COCA	\$696,897	\$90,011	12.92%	\$46,601	6.69%	\$8,656	1.24%
CONY	\$473,932	\$64,208	13.55%	\$42,167	8.90%	\$6,161	1.30%
COTX	\$480,860	\$69,537	14.46%	\$27,718	5.76%	\$2,487	0.52%
COVA	\$727,492	\$100,139	13.76%	\$76,608	10.53%	\$11,231	1.54%
GTCA	\$7,390,295	\$857,437	11.60%	\$495,718	6.71%	\$99,767	1.35%
GTFL	\$3,520,458	\$611,003	17.36%	\$275,620	7.83%	\$82,107	2.33%
GTHW	\$2,147,214	\$301,591	14.05%	\$266,222	12.40%	\$45,272	2.11%
GTSO	\$2,617,294	\$351,307	13.42%	\$262,925	10.05%	\$68,922	2.63%
GTSW	\$3,540,981	\$486,194	13.73%	\$288,267	8.14%	\$53,532	1.51%
GTHW	\$6,726,580	\$839,310	12.48%	\$610,551	9.08%	\$111,837	1.66%
GTHI	\$1,265,647	\$141,475	11.18%	\$164,145	12.97%	\$34,443	2.72%
LTNE	\$392,638	\$42,155	10.74%	\$55,493	14.13%	\$11,627	2.96%
RTNY	\$753,620	\$79,310	10.52%	\$57,246	7.60%	\$39,651	5.26%
SNCT	\$3,708,628	\$397,683	10.72%	\$444,725	11.99%	\$111,446	3.01%
UTFL	\$1,994,027	\$365,855	18.35%	\$223,964	11.23%	\$35,808	1.80%
UTIN	\$386,424	\$54,630	14.14%	\$32,835	8.50%	\$10,493	2.72%
UTNC	\$1,281,422	\$171,529	13.39%	\$129,102	10.07%	\$23,965	1.87%
UTOH	\$863,773	\$94,714	10.97%	\$80,448	9.31%	\$27,687	3.21%
UTPA	\$521,294	\$64,853	12.44%	\$38,959	7.47%	\$8,617	1.65%
UTIM	\$482,822	\$62,672	12.98%	\$37,837	7.84%	\$12,121	2.51%
total	\$230,433,607	\$28,495,214	12.37%	\$23,345,746	10.13%	\$7,409,128	3.22%
SUM OF OPCOS	\$230,433,607	\$28,495,214	12.37%	\$23,345,746	10.13%	\$7,409,128	3.22%

NOTES: (1) The Total Unseparated, Common Line, TS-Switched, and Special Access TPIS forecast data are from row 1690, columns (f), (m), (r), and (s) on COS-1(P) in the 1990 TRP.
(2) Columns (R), (T), and (V) are computed by dividing columns (Q), (S), and (U), respectively, by Column (P).

Unseparated Disallowances and
Access Category Disallowances for
Telephone Plant in Service (TPIS)

Operating Company	Fail Report Card ? (W)	Tentative Unseparated TPIS Disallowance (X)	Dis- allowance As Percentage of TRP Forecast (Y)	Final Unseparated TPIS Disallowance (Z)	Common Line TPIS Disallowance (AA)	TS-Switched TPIS Disallowance (AB)	Special Access TPIS Disallowance (AC)
LBIL	Yes						
NBIN	Yes						
MBMI	No						
OBOH	No						
WTWI	No						
CPTC	No						
DSDE	Yes						
PAPA	Yes						
NJNJ	Yes						
SBTC	No						
SCTC	No						
NETC	No						
NYNY	No						
PTCA	Yes						
PTNV	Yes						
SWTR	Yes						
MSTC	No						
NWTC	Yes						
PNTC	Yes						
CEFL	No						
CENV	No	\$24,990	4.50%	\$24,990	\$4,407	\$3,812	\$599
CBTC	Yes	\$17,793	1.50%	\$17,793	\$1,599	\$1,461	\$831
COCA	Yes	\$33,086	4.75%	\$33,086	\$4,273	\$2,212	\$411
CONY	Yes	\$5,188	1.09%	\$5,188	\$703	\$462	\$67
COTX	Yes						
COVA	Yes	\$42,146	5.79%	\$42,146	\$5,801	\$4,438	\$651
GTCA	No						
GTFL	No						
GTNW	No						
GTSO	No						
GTSW	No						
GTHW	No						
GTHI	No	\$1,393	0.11%	\$1,393	\$156	\$181	\$38
LTNE	No	\$621	0.16%	\$621	\$67	\$88	\$18
RTNY	Yes	\$19,478	2.58%	\$19,478	\$2,050	\$1,480	\$1,025
SNCT	No						
UTFL	No	\$4,475	0.22%	\$4,475	\$821	\$503	\$80
UTIN	No						
UTNC	No						
UTOH	No	\$12,760	1.48%	\$12,760	\$1,399	\$1,188	\$409
UTPA	No						
UTIM	No						
total	No						
SUM OF OPCOS		\$161,930	0.07%	\$161,930	\$21,276	\$15,825	\$4,129

- NOTES: (1) Column (X), is: the TRP forecast minus the upper bound of the 95% confidence interval if the company passes its report card, or; the TRP forecast minus the upper bound of the trend +/- one standard deviation if the company fails its report card. However, if such an adjustment would take a company's forecast below its PYCOS amount, grown at the total trend growth rate, the forecast was adjusted to the PYCOS amount grown at the total trend growth rate.
- (2) Columns (AA), (AB), and (AC) are computed by multiplying columns (R), (T), and (V), respectively, by column (Z).
- (3) Tentative disallowances for DSDE and NJNJ were deleted in column (Z) because the disallowances were de minimis and because of apparent autocorrelation in the model.

Unseparated Disallowances and
Access Category Disallowances for
Telephone Plant in Service (TPIS)

Operating Company	Revenue Requirement Effect of Common Line TPIS Disallowance	Revenue Requirement Effect of TS-Switched TPIS Disallowance	Revenue Requirement Effect of Special Access TPIS Disallowance	Revenue Requirement Effect of Interstate TPIS Disallowance
	(AD)	(AE)	(AF)	(AG)
LBIL				
NBIN				
MBMI				
OBOH				
WTWI				
CPTC				
DSDE				
PAPA				
NJNJ				
SBTC				
SCTC				
NETC				
NYNY				
PTCA				
PTNV				
SWTR				
HSTC				
NWTC				
PNTC				
CEFL				
CENV	\$801	\$693	\$109	\$1,603
CBTC	\$291	\$266	\$151	\$707
COCA	\$777	\$402	\$75	\$1,254
CONY	\$128	\$84	\$12	\$224
COTX				
COVA	\$1,055	\$807	\$118	\$1,980
GTCA				
GTFL				
GTNW				
GTSO				
GTSW				
GTMW				
GTHI	\$28	\$33	\$7	\$68
LTNE	\$12	\$16	\$3	\$31
RTNY	\$373	\$269	\$186	\$828
SNCT				
UTFL	\$149	\$91	\$15	\$255
UTIN				
UTNC				
UTOH	\$254	\$216	\$74	\$545
UTPA				
UTIM				
total				
SUM OF				
OPCOS	\$3,868	\$2,877	\$751	\$7,496

NOTES: (1) Columns (AD), (AE), and (AF) are computed by multiplying columns (AA), (AB), and (AC), respectively, by $.12 * (1 + (.34 / (1 - .34)))$.
(2) Column (AG) is the sum of columns (AD), (AE), and (AF).

REVENUE REQUIREMENT DISALLOWANCE CHART (\$ TO NEAREST THOUSAND)	TOTL	COMMON LINE A	TS SWITCHED B	SPECIAL ACCESS C	TOTAL D	PERCENT (D / REV) E	
** TOTAL ALL OPERATING COMPANIES	\$19,269,328	\$3,868	\$2,877	\$751	\$7,496	0.04%	TOTL
1 ILLINOIS BELL	LBIL 753,033						
2 INDIANA BELL	NBIN 244,565						
3 MICHIGAN BELL	MBMI 521,331						
4 OHIO BELL	OBOH 426,228						
5 WISCONSIN BELL	WTWI 227,962						
6 CHESAPEAKE & POTOMAC	CPTC 1,102,559						
7 DIAMOND STATE TEL.	DSDE 68,129						
8 BELL OF PENNSYLVANIA	PAPA 703,259						
9 NEW JERSEY BELL	NJNJ 795,160						
10 SOUTHERN BELL	SBTC 1,657,322						
11 SOUTH CENTRAL BELL	SCTC 1,086,150						
12 NEW ENGLAND TELEPHONE	NETC 1,051,233						
13 NEW YORK TELEPHONE	NYNY 2,004,003						
14 PACIFIC BELL	PTCA 1,595,691						
15 NEVADA BELL	PTNV 52,443						
16 SOUTHWESTERN BELL TEL. CO.	SWTR 1,700,079						
17 MOUNTAIN BELL	MSTC 1,065,527						
18 NORTHWESTERN BELL	NWTC 551,702						
19 PACIFIC NORTHWEST BELL	PNTC 401,911						
20 CENTRAL OF FLORIDA	CEFL 26,159						
21 CENTRAL OF NEVADA	CENV 62,251	\$801	\$693	\$109	\$1,603	2.58%	CENV
22 CINCINNATI BELL TELEPHONE	CBTC 106,324	\$291	\$266	\$151	\$707	0.67%	CBTC
23 CONTEL OF CALIFORNIA	COCA 49,790	\$777	\$402	\$75	\$1,254	2.52%	COCA
24 CONTEL OF NEW YORK	CONY 36,556	\$128	\$84	\$12	\$224	0.61%	CONY
25 CONTEL OF TEXAS	COTX 29,288						
26 CONTEL OF VIRGINIA	COVA 61,304	\$1,055	\$807	\$118	\$1,980	3.23%	COVA
27 GTE CALIFORNIA, INC.	GTCA 481,048						
28 GTE FLORIDA, INC.	GTFL 276,067						
29 GTE NORTHWEST, INC.	GTNW 184,074						
30 GTE SOUTH, INC.	GTSO 214,562						
31 GTE SOUTHWEST, INC.	GTSW 227,261						
32 GTE NORTH, INC.	GTMW 511,304						
33 GTE HAWAIIAN, INC.	GTHI 112,402	\$28	\$33	\$7	\$68	0.06%	GTHI
34 LINCOLN TELEPHONE COMPANY	LTNE 34,912	\$12	\$16	\$3	\$31	0.09%	LTNE
35 ROCHESTER TELEPHONE CORPORATION	RTNY 53,614	\$373	\$269	\$186	\$828	1.54%	RTNY
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT 332,872						
37 UNITED OF FLORIDA	UTFL 198,218	\$149	\$91	\$15	\$255	0.13%	UTFL
38 UNITED OF INDIANA	UTIN 31,113						
39 CAROLINA TEL. & TEL.	UTNC 101,653						
40 UNITED OF OHIO	UTOH 66,988	\$254	\$216	\$74	\$545	0.81%	UTOH
41 UNITED OF PENN.	UTPA 31,621						
42 UNITED INTER-MOUNTAIN	UTIM 31,661						
A.2 - EXPENSE LESS DEPRECIATION - ELD							
** TOTAL ALL OPERATING COMPANIES	\$19,269,328	\$68,568	\$62,490	\$21,787	\$152,845	0.79%	TOTL
1 ILLINOIS BELL	LBIL \$753,033	\$1,161	\$1,315	\$579	\$3,056	0.41%	LBIL
2 INDIANA BELL	NBIN \$244,565						
3 MICHIGAN BELL	MBMI \$521,331	\$3,098	\$2,589	\$851	\$6,538	1.25%	MBMI
4 OHIO BELL	OBOH \$426,228						
5 WISCONSIN BELL	WTWI \$227,962						
6 CHESAPEAKE & POTOMAC	CPTC \$1,102,559						
7 DIAMOND STATE TEL.	DSDE \$68,129						
8 BELL OF PENNSYLVANIA	PAPA \$703,259						
9 NEW JERSEY BELL	NJNJ \$795,160	\$1,305	\$1,369	\$451	\$3,125	0.39%	NJNJ
10 SOUTHERN BELL	SBTC \$1,657,322						
11 SOUTH CENTRAL BELL	SCTC \$1,086,150	\$10,967	\$8,138	\$2,667	\$21,772	2.00%	SCTC
12 NEW ENGLAND TELEPHONE	NETC \$1,051,233						
13 NEW YORK TELEPHONE	NYNY \$2,004,003	\$19,109	\$25,765	\$7,979	\$52,853	2.64%	NYNY
14 PACIFIC BELL	PTCA \$1,595,691	\$19,896	\$13,439	\$5,599	\$38,933	2.44%	PTCA
15 NEVADA BELL	PTNV \$52,443						
16 SOUTHWESTERN BELL TEL. CO.	SWTR \$1,700,079	\$7,520	\$5,942	\$2,562	\$16,024	0.94%	SWTR
17 MOUNTAIN BELL	MSTC \$1,065,527						
18 NORTHWESTERN BELL	NWTC \$551,702						
19 PACIFIC NORTHWEST BELL	PNTC \$401,911						
20 CENTRAL OF FLORIDA	CEFL \$26,159						
21 CENTRAL OF NEVADA	CENV \$62,251						
22 CINCINNATI BELL TELEPHONE	CBTC \$106,324						
23 CONTEL OF CALIFORNIA	COCA \$49,790						
24 CONTEL OF NEW YORK	CONY \$36,556						
25 CONTEL OF TEXAS	COTX \$29,288						
26 CONTEL OF VIRGINIA	COVA \$61,304						
27 GTE CALIFORNIA, INC.	GTCA \$481,048	\$5,315	\$3,612	\$1,006	\$9,933	2.06%	GTCA
28 GTE FLORIDA, INC.	GTFL \$276,067						
29 GTE NORTHWEST, INC.	GTNW \$184,074						
30 GTE SOUTH, INC.	GTSO \$214,562						
31 GTE SOUTHWEST, INC.	GTSW \$227,261						
32 GTE NORTH, INC.	GTMW \$511,304						
33 GTE HAWAIIAN, INC.	GTHI \$112,402						
34 LINCOLN TELEPHONE COMPANY	LTNE \$34,912	\$196	\$321	\$94	\$611	1.75%	LTNE
35 ROCHESTER TELEPHONE CORPORATION	RTNY \$53,614						
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT \$332,872						
37 UNITED OF FLORIDA	UTFL \$198,218						
38 UNITED OF INDIANA	UTIN \$31,113						
39 CAROLINA TEL. & TEL.	UTNC \$101,653						
40 UNITED OF OHIO	UTOH \$66,988						
41 UNITED OF PENN.	UTPA \$31,621						
42 UNITED INTER-MOUNTAIN	UTIM \$31,661						

*** TOTAL TPIS & ELD \$160,342 ***

REVENUE REQUIREMENT DISALLOWANCE CHART (\$ TO NEAREST THOUSAND)	CHARGES RECURRING excl ICBs TRP SOURCE: (REV2 R.120-C.H) REV	COMMON				TOTAL D	PERCENT (D / REV) E	
		LINE	TS SWITCHED B	SPECIAL ACCESS C				
		A	B	C	D			
** TOTAL ALL OPERATING COMPANIES	TOTL \$19,269,328	\$14,756	\$41,927	\$12,241	\$68,924	0.36%	TOTL	
1 ILLINOIS BELL	LBIL \$753,033							
2 INDIANA BELL	NBIN \$244,565							
3 MICHIGAN BELL	MBMI \$521,331							
4 OHIO BELL	OBOH \$426,228							
5 WISCONSIN BELL	WTWI \$227,962							
6 CHESAPEAKE & POTOMAC	CPTC \$1,102,559	\$1,245	\$1,437	\$678	\$3,359	0.30%	CPTC	
7 DIAMOND STATE TEL.	DSDE \$68,129							
8 BELL OF PENNSYLVANIA	PAPA \$703,259							
9 NEW JERSEY BELL	NJNJ \$795,160							
10 SOUTHERN BELL	SBTC \$1,657,322	\$4,630	\$103	\$378	\$5,112	0.31%	SBTC	
11 SOUTH CENTRAL BELL	SCTC \$1,086,150	\$804	\$1,461	\$153	\$2,418	0.22%	SCTC	
12 NEW ENGLAND TELEPHONE	NETC \$1,051,233		\$1,808		\$1,808	0.17%	NETC	
13 NEW YORK TELEPHONE	NYNY \$2,004,003		\$4,218	\$1,700	\$5,918	0.30%	NYNY	
14 PACIFIC BELL	PTCA \$1,595,691							
15 NEVADA BELL	PTNV \$52,443							
16 SOUTHWESTERN BELL TEL. CO.	SWTR \$1,700,079	\$86	\$8,562	\$4,254	\$12,902	0.76%	SWTR	
17 MOUNTAIN BELL	MSTC \$1,065,527	\$1,157	\$4,465	\$665	\$6,287	0.59%	MSTC	
18 NORTHWESTERN BELL	NWTC \$551,702	\$324	\$13,546	\$1,794	\$15,664	2.84%	NWTC	
19 PACIFIC NORTHWEST BELL	PNTC \$401,911		\$1,690	\$172	\$1,862	0.46%	PNTC	
20 CENTRAL OF FLORIDA	CEFL \$26,159	\$23	\$11	\$4	\$37	0.14%	CEFL	
21 CENTRAL OF NEVADA	CENV \$62,251							
22 CINCINNATI BELL TELEPHONE	CBTC \$106,324	\$194	\$448	\$261	\$904	0.85%	CBTC	
23 CONTEL OF CALIFORNIA	COCA \$49,790		\$566		\$566	1.14%	COCA	
24 CONTEL OF NEW YORK	CONY \$36,556	\$526	\$194	\$22	\$742	2.03%	CONY	
25 CONTEL OF TEXAS	COTX \$29,288							
26 CONTEL OF VIRGINIA	COVA \$61,304	\$1,372	\$603	\$71	\$2,045	3.34%	COVA	
27 GTE CALIFORNIA, INC.	GTCA \$481,048		\$56	\$230	\$286	0.06%	GTCA	
28 GTE FLORIDA, INC.	GTFL \$276,067	\$2,231	\$810	\$1,243	\$4,285	1.55%	GTFL	
29 GTE NORTHWEST, INC.	GTNW \$184,074	\$611	\$24	\$37	\$671	0.36%	GTNW	
30 GTE SOUTH, INC.	GTSO \$214,562	\$971	\$242	\$63	\$1,275	0.59%	GTSO	
31 GTE SOUTHWEST, INC.	GTSW \$227,261	\$25	\$27	\$3	\$55	0.02%	GTSW	
32 GTE NORTH, INC.	GTMW \$511,304	\$12	\$40	\$61	\$113	0.02%	GTMW	
33 GTE HAWAIIAN, INC.	GTHI \$112,402							
34 LINCOLN TELEPHONE COMPANY	LTNE \$34,912		\$67		\$67	0.19%	LTNE	
35 ROCHESTER TELEPHONE CORPORATION	RTNY \$53,614	\$163	\$425	\$82	\$670	1.25%	RTNY	
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT \$332,872							
37 UNITED OF FLORIDA	UTFL \$198,218	\$203	\$1,121	\$359	\$1,683	0.85%	UTFL	
38 UNITED OF INDIANA	UTIN \$31,113							
39 CAROLINA TEL. & TEL.	UTNC \$101,653							
40 UNITED OF OHIO	UTOH \$66,988	\$179		\$11	\$190	0.28%	UTOH	
41 UNITED OF PENN.	UTPA \$31,621		\$6		\$6	0.02%	UTPA	
42 UNITED INTER-MOUNTAIN	UTIM \$31,661							

B.2 - EXPENSE LESS DEPRECIATION - ELD

** TOTAL ALL OPERATING COMPANIES	TOTL \$19,269,328	\$40,246	\$42,090	\$13,332	\$95,668	0.50%	TOTL
1 ILLINOIS BELL	LBIL \$753,033	\$4,517	\$1,019	\$770	\$6,305	0.84%	LBIL
2 INDIANA BELL	NBIN \$244,565	\$2,607	\$1,354	\$606	\$4,567	1.87%	NBIN
3 MICHIGAN BELL	MBMI \$521,331	\$3,697	\$901	\$284	\$4,882	0.94%	MBMI
4 OHIO BELL	OBOH \$426,228	\$1,829	\$222	\$208	\$2,259	0.53%	OBOH
5 WISCONSIN BELL	WTWI \$227,962						
6 CHESAPEAKE & POTOMAC	CPTC \$1,102,559						
7 DIAMOND STATE TEL.	DSDE \$68,129						
8 BELL OF PENNSYLVANIA	PAPA \$703,259						
9 NEW JERSEY BELL	NJNJ \$795,160						
10 SOUTHERN BELL	SBTC \$1,657,322	\$652	\$148	\$359	\$1,159	0.07%	SBTC
11 SOUTH CENTRAL BELL	SCTC \$1,086,150	\$6,031	\$5,404	\$1,547	\$12,982	1.20%	SCTC
12 NEW ENGLAND TELEPHONE	NETC \$1,051,233	\$1,258	\$4,553	\$777	\$6,588	0.63%	NETC
13 NEW YORK TELEPHONE	NYNY \$2,004,003	\$5,024	\$15,444	\$3,791	\$24,259	1.21%	NYNY
14 PACIFIC BELL	PTCA \$1,595,691	\$5,940	\$3,729	\$1,671	\$11,340	0.71%	PTCA
15 NEVADA BELL	PTNV \$52,443						
16 SOUTHWESTERN BELL TEL. CO.	SWTR \$1,700,079	\$2,720	\$4,476	\$1,958	\$9,155	0.54%	SWTR
17 MOUNTAIN BELL	MSTC \$1,065,527	\$53	\$27	\$46	\$127	0.01%	MSTC
18 NORTHWESTERN BELL	NWTC \$551,702	\$122	\$1,064	\$137	\$1,324	0.24%	NWTC
19 PACIFIC NORTHWEST BELL	PNTC \$401,911	\$5	\$25	\$5	\$35	0.01%	PNTC
20 CENTRAL OF FLORIDA	CEFL \$26,159	\$292	\$199	\$68	\$558	2.13%	CEFL
21 CENTRAL OF NEVADA	CENV \$62,251						
22 CINCINNATI BELL TELEPHONE	CBTC \$106,324	\$891	\$775	\$439	\$2,104	1.98%	CBTC
23 CONTEL OF CALIFORNIA	COCA \$49,790						
24 CONTEL OF NEW YORK	CONY \$36,556	\$128	\$94	\$13	\$236	0.64%	CONY
25 CONTEL OF TEXAS	COTX \$29,288	\$254	\$310	\$28	\$592	2.02%	COTX
26 CONTEL OF VIRGINIA	COVA \$61,304	\$463	\$343	\$63	\$869	1.42%	COVA
27 GTE CALIFORNIA, INC.	GTCA \$481,048	\$1,572	\$729	\$147	\$2,448	0.51%	GTCA
28 GTE FLORIDA, INC.	GTFL \$276,067						
29 GTE NORTHWEST, INC.	GTNW \$184,074	\$14	\$35	\$3	\$52	0.03%	GTNW
30 GTE SOUTH, INC.	GTSO \$214,562	\$40	\$101	\$13	\$154	0.07%	GTSO
31 GTE SOUTHWEST, INC.	GTSW \$227,261						
32 GTE NORTH, INC.	GTMW \$511,304	\$645	\$341	\$101	\$1,086	0.21%	GTMW
33 GTE HAWAIIAN, INC.	GTHI \$112,402						
34 LINCOLN TELEPHONE COMPANY	LTNE \$34,912						
35 ROCHESTER TELEPHONE CORPORATION	RTNY \$53,614	\$242	\$154	\$106	\$503	0.94%	RTNY
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT \$332,872						
37 UNITED OF FLORIDA	UTFL \$198,218	\$349	\$24	\$18	\$391	0.20%	UTFL
38 UNITED OF INDIANA	UTIN \$31,113						
39 CAROLINA TEL. & TEL.	UTNC \$101,653	\$318	\$184	\$40	\$542	0.53%	UTNC
40 UNITED OF OHIO	UTOH \$66,988	\$234	\$169	\$60	\$463	0.69%	UTOH
41 UNITED OF PENN.	UTPA \$31,621	\$155	\$151	\$31	\$338	1.07%	UTPA
42 UNITED INTER-MOUNTAIN	UTIM \$31,661	\$194	\$116	\$40	\$350	1.11%	UTIM

*** TOTAL TPIS & ELD \$164,593 ***

REVENUE REQUIREMENT
DISALLOWANCE CHART
(\$ TO NEAREST THOUSAND)

CHARGES excl ICBS
TRP SOURCE:
(REV2 R.120-C.H)
REV

COMMON TS SPECIAL TOTAL PERCENT SOURCE
LINE SWITCHED ACCESS ACCESS (D / REV) A OR B
A B C D E F

COMPANY	TOTL	REV	A	B	C	D	E	F
** TOTAL ALL OPERATING COMPANIES	TOTL	\$19,269,328	\$16,647	\$42,549	\$12,599	\$71,796	0.37%	TOTL
1 ILLINOIS BELL	LBIL	\$753,033						
2 INDIANA BELL	NBIN	\$244,565						
3 MICHIGAN BELL	MBMI	\$521,331						
4 OHIO BELL	OBOH	\$426,228						
5 WISCONSIN BELL	WTWI	\$227,962						
6 CHESAPEAKE & POTOMAC	CPTC	\$1,102,559	\$1,245	\$1,437	\$678	\$3,359	0.30%	CPTC B
7 DIAMOND STATE TEL.	DSDE	\$68,129						
8 BELL OF PENNSYLVANIA	PAPA	\$703,259						
9 NEW JERSEY BELL	NJNJ	\$795,160						
10 SOUTHERN BELL	SBTC	\$1,657,322	\$4,630	\$103	\$378	\$5,112	0.31%	SBTC B
11 SOUTH CENTRAL BELL	SCTC	\$1,086,150	\$804	\$1,461	\$153	\$2,418	0.22%	SCTC B
12 NEW ENGLAND TELEPHONE	NETC	\$1,051,233		\$1,808		\$1,808	0.17%	NETC B
13 NEW YORK TELEPHONE	NYNY	\$2,004,003		\$4,218	\$1,700	\$5,918	0.30%	NYNY B
14 PACIFIC BELL	PTCA	\$1,595,691						
15 NEVADA BELL	PTNV	\$52,443						
16 SOUTHWESTERN BELL TEL. CO.	SWTR	\$1,700,079	\$86	\$8,562	\$4,254	\$12,902	0.76%	SWTR B
17 MOUNTAIN BELL	MSTC	\$1,065,527	\$1,157	\$4,465	\$665	\$6,287	0.59%	MSTC B
18 NORTHWESTERN BELL	NWTC	\$551,702	\$324	\$13,546	\$1,794	\$15,664	2.84%	NWTC B
19 PACIFIC NORTHWEST BELL	PNTC	\$401,911		\$1,690	\$172	\$1,862	0.46%	PNTC B
20 CENTRAL OF FLORIDA	CEFL	\$26,159	\$23	\$11	\$4	\$37	0.14%	CEFL B
21 CENTRAL OF NEVADA	CENV	\$62,251	\$801	\$693	\$109	\$1,603	2.58%	CENV A
22 CINCINNATI BELL TELEPHONE	CBTC	\$106,324	\$194	\$448	\$261	\$904	0.85%	CBTC B
23 CONTEL OF CALIFORNIA	COCA	\$49,790	\$777	\$402	\$75	\$1,254	2.52%	COCA A
24 CONTEL OF NEW YORK	CONY	\$36,556	\$526	\$194	\$22	\$742	2.03%	CONY B
25 CONTEL OF TEXAS	COTX	\$29,288						
26 CONTEL OF VIRGINIA	COVA	\$61,304	\$1,372	\$603	\$71	\$2,045	3.34%	COVA B
27 GTE CALIFORNIA, INC.	GTCA	\$481,048		\$56	\$230	\$286	0.06%	GTCA B
28 GTE FLORIDA, INC.	GTFL	\$276,067	\$2,231	\$810	\$1,243	\$4,285	1.55%	GTFL B
29 GTE NORTHWEST, INC.	GTNW	\$184,074	\$611	\$24	\$37	\$671	0.36%	GTNW B
30 GTE SOUTH, INC.	GTSO	\$214,562	\$971	\$242	\$63	\$1,275	0.59%	GTSO B
31 GTE SOUTHWEST, INC.	GTSW	\$227,261	\$25	\$27	\$3	\$55	0.02%	GTSW B
32 GTE NORTH, INC.	GTMW	\$511,304	\$12	\$40	\$61	\$113	0.02%	GTMW B
33 GTE HAWAIIAN, INC.	GTHI	\$112,402	\$28	\$33	\$7	\$68	0.06%	GTHI A
34 LINCOLN TELEPHONE COMPANY	LTNE	\$34,912		\$67		\$67	0.19%	LTNE B
35 ROCHESTER TELEPHONE CORPORATION	RTNY	\$53,614	\$373	\$269	\$186	\$828	1.54%	RTNY A
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT	\$332,872						
37 UNITED OF FLORIDA	UTFL	\$198,218	\$203	\$1,121	\$359	\$1,683	0.85%	UTFL B
38 UNITED OF INDIANA	UTIN	\$31,113						
39 CAROLINA TEL. & TEL.	UTNC	\$101,653						
40 UNITED OF OHIO	UTOH	\$66,988	\$254	\$216	\$74	\$545	0.81%	UTOH A
41 UNITED OF PENN.	UTPA	\$31,621		\$6		\$6	0.02%	UTPA B
42 UNITED INTER-MOUNTAIN	UTIM	\$31,661						

C.2 - EXPENSE LESS DEPRECIATION - ELD

COMPANY	TOTL	REV	A	B	C	D	E	F
** TOTAL ALL OPERATING COMPANIES	TOTL	\$19,269,328	\$82,668	\$72,581	\$25,142	\$180,391	0.94%	TOTL
1 ILLINOIS BELL	LBIL	\$753,033	\$4,517	\$1,019	\$770	\$6,305	0.84%	LBIL B
2 INDIANA BELL	NBIN	\$244,565	\$2,607	\$1,354	\$606	\$4,567	1.87%	NBIN B
3 MICHIGAN BELL	MBMI	\$521,331	\$3,098	\$2,589	\$851	\$6,538	1.25%	MBMI A
4 OHIO BELL	OBOH	\$426,228	\$1,829	\$222	\$208	\$2,259	0.53%	OBOH B
5 WISCONSIN BELL	WTWI	\$227,962						
6 CHESAPEAKE & POTOMAC	CPTC	\$1,102,559						
7 DIAMOND STATE TEL.	DSDE	\$68,129						
8 BELL OF PENNSYLVANIA	PAPA	\$703,259						
9 NEW JERSEY BELL	NJNJ	\$795,160	\$1,305	\$1,369	\$451	\$3,125	0.39%	NJNJ A
10 SOUTHERN BELL	SBTC	\$1,657,322	\$652	\$148	\$359	\$1,159	0.07%	SBTC B
11 SOUTH CENTRAL BELL	SCTC	\$1,086,150	\$10,967	\$8,138	\$2,667	\$21,772	2.00%	SCTC A
12 NEW ENGLAND TELEPHONE	NETC	\$1,051,233	\$1,258	\$4,553	\$777	\$6,588	0.63%	NETC B
13 NEW YORK TELEPHONE	NYNY	\$2,004,003	\$19,109	\$25,765	\$7,979	\$52,853	2.64%	NYNY A
14 PACIFIC BELL	PTCA	\$1,595,691	\$19,896	\$13,439	\$5,599	\$38,933	2.44%	PTCA A
15 NEVADA BELL	PTNV	\$52,443						
16 SOUTHWESTERN BELL TEL. CO.	SWTR	\$1,700,079	\$7,520	\$5,942	\$2,562	\$16,024	0.94%	SWTR A
17 MOUNTAIN BELL	MSTC	\$1,065,527	\$53	\$27	\$46	\$127	0.01%	MSTC B
18 NORTHWESTERN BELL	NWTC	\$551,702	\$122	\$1,064	\$137	\$1,324	0.24%	NWTC B
19 PACIFIC NORTHWEST BELL	PNTC	\$401,911	\$5	\$25	\$5	\$35	0.01%	PNTC B
20 CENTRAL OF FLORIDA	CEFL	\$26,159	\$292	\$199	\$68	\$558	2.13%	CEFL B
21 CENTRAL OF NEVADA	CENV	\$62,251						
22 CINCINNATI BELL TELEPHONE	CBTC	\$106,324	\$891	\$775	\$439	\$2,104	1.98%	CBTC B
23 CONTEL OF CALIFORNIA	COCA	\$49,790						
24 CONTEL OF NEW YORK	CONY	\$36,556	\$128	\$94	\$13	\$236	0.64%	CONY B
25 CONTEL OF TEXAS	COTX	\$29,288	\$254	\$310	\$28	\$592	2.02%	COTX B
26 CONTEL OF VIRGINIA	COVA	\$61,304	\$463	\$343	\$63	\$869	1.42%	COVA B
27 GTE CALIFORNIA, INC.	GTCA	\$481,048	\$5,315	\$3,612	\$1,006	\$9,933	2.06%	GTCA A
28 GTE FLORIDA, INC.	GTFL	\$276,067						
29 GTE NORTHWEST, INC.	GTNW	\$184,074	\$14	\$35	\$3	\$52	0.03%	GTNW B
30 GTE SOUTH, INC.	GTSO	\$214,562	\$40	\$101	\$13	\$154	0.07%	GTSO B
31 GTE SOUTHWEST, INC.	GTSW	\$227,261						
32 GTE NORTH, INC.	GTMW	\$511,304	\$645	\$341	\$101	\$1,086	0.21%	GTMW B
33 GTE HAWAIIAN, INC.	GTHI	\$112,402						
34 LINCOLN TELEPHONE COMPANY	LTNE	\$34,912	\$196	\$321	\$94	\$611	1.75%	LTNE A
35 ROCHESTER TELEPHONE CORPORATION	RTNY	\$53,614	\$242	\$154	\$106	\$503	0.94%	RTNY B
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT	\$332,872						
37 UNITED OF FLORIDA	UTFL	\$198,218	\$349	\$24	\$18	\$391	0.20%	UTFL B
38 UNITED OF INDIANA	UTIN	\$31,113						
39 CAROLINA TEL. & TEL.	UTNC	\$101,653	\$318	\$184	\$40	\$542	0.53%	UTNC B
40 UNITED OF OHIO	UTOH	\$66,988	\$234	\$169	\$60	\$463	0.69%	UTOH B
41 UNITED OF PENN.	UTPA	\$31,621	\$155	\$151	\$31	\$338	1.07%	UTPA B
42 UNITED INTER-MOUNTAIN	UTIM	\$31,661	\$194	\$116	\$40	\$350	1.11%	UTIM B

*** TOTAL TPIS & ELD \$252,187 ***

REVENUE REQUIREMENT DISALLOWANCE CHART (\$ TO NEAREST THOUSAND)	CHARGES excl ICBS TRP SOURCE: (REV2 R.120-C.H) REV	PART D GRAND TOTALS TPIS & ELD FROM PART C D.1 OPERATING COMPANY TOTALS				TOTAL D	PERCENT (D / REV)	
		COMMON LINE	TS SWITCHED	SPECIAL ACCESS				
		A	B	C	E			
** TOTAL ALL OPERATING COMPANIES	TOTL	\$19,269,328	\$99,316	\$115,131	\$37,741	\$252,187	1.31%	TOTL
1 ILLINOIS BELL	LBIL	\$753,033	\$4,517	\$1,019	\$770	\$6,305	0.84%	LBIL
2 INDIANA BELL	NBIN	\$244,565	\$2,607	\$1,354	\$606	\$4,567	1.87%	NBIN
3 MICHIGAN BELL	MBMI	\$521,331	\$3,098	\$2,589	\$851	\$6,538	1.25%	MBMI
4 OHIO BELL	OBOH	\$426,228	\$1,829	\$222	\$208	\$2,259	0.53%	OBOH
5 WISCONSIN BELL	WTWI	\$227,962						WTWI
6 CHESAPEAKE & POTOMAC	CPTC	\$1,102,559	\$1,245	\$1,437	\$678	\$3,359	0.30%	CPTC
7 DIAMOND STATE TEL.	DSDE	\$68,129						DSDE
8 BELL OF PENNSYLVANIA	PAPA	\$703,259						PAPA
9 NEW JERSEY BELL	NJNJ	\$795,160	\$1,305	\$1,369	\$451	\$3,125	0.39%	NJNJ
10 SOUTHERN BELL	SBTC	\$1,657,322	\$5,282	\$251	\$738	\$6,270	0.38%	SBTC
11 SOUTH CENTRAL BELL	SCTC	\$1,086,150	\$11,772	\$9,599	\$2,820	\$24,190	2.23%	SCTC
12 NEW ENGLAND TELEPHONE	NETC	\$1,051,233	\$1,258	\$6,361	\$777	\$8,396	0.80%	NETC
13 NEW YORK TELEPHONE	NYNY	\$2,004,003	\$19,109	\$29,982	\$9,679	\$58,771	2.93%	NYNY
14 PACIFIC BELL	PTCA	\$1,595,691	\$19,896	\$13,439	\$5,599	\$38,933	2.44%	PTCA
15 NEVADA BELL	PTNV	\$52,443						PTNV
16 SOUTHWESTERN BELL TEL. CO.	SWTR	\$1,700,079	\$7,607	\$14,504	\$6,816	\$28,926	1.70%	SWTR
17 MOUNTAIN BELL	MSTC	\$1,065,527	\$1,210	\$4,492	\$711	\$6,413	0.60%	MSTC
18 NORTHWESTERN BELL	NWTC	\$551,702	\$447	\$14,610	\$1,931	\$16,989	3.08%	NWTC
19 PACIFIC NORTHWEST BELL	PNTC	\$401,911	\$5	\$1,716	\$177	\$1,897	0.47%	PNTC
20 CENTRAL OF FLORIDA	CEFL	\$26,159	\$314	\$210	\$72	\$596	2.28%	CEFL
21 CENTRAL OF NEVADA	CENV	\$62,251	\$801	\$693	\$109	\$1,603	2.58%	CENV
22 CINCINNATI BELL TELEPHONE	CBTC	\$106,324	\$1,085	\$1,223	\$700	\$3,008	2.83%	CBTC
23 CONTEL OF CALIFORNIA	COCA	\$49,790	\$777	\$402	\$75	\$1,254	2.52%	COCA
24 CONTEL OF NEW YORK	CONY	\$36,556	\$654	\$288	\$36	\$977	2.67%	CONY
25 CONTEL OF TEXAS	COTX	\$29,288	\$254	\$310	\$28	\$592	2.02%	COTX
26 CONTEL OF VIRGINIA	COVA	\$61,304	\$1,835	\$946	\$133	\$2,914	4.75%	COVA
27 GTE CALIFORNIA, INC.	GTCA	\$481,048	\$5,315	\$3,669	\$1,236	\$10,219	2.12%	GTCA
28 GTE FLORIDA, INC.	GTFL	\$276,067	\$2,231	\$810	\$1,243	\$4,285	1.55%	GTFL
29 GTE NORTHWEST, INC.	GTNW	\$184,074	\$624	\$59	\$40	\$723	0.39%	GTNW
30 GTE SOUTH, INC.	GTSO	\$214,562	\$1,010	\$342	\$76	\$1,429	0.67%	GTSO
31 GTE SOUTHWEST, INC.	GTSW	\$227,261	\$25	\$27	\$3	\$55	0.02%	GTSW
32 GTE NORTH, INC.	GTHW	\$511,304	\$656	\$381	\$162	\$1,199	0.23%	GTHW
33 GTE HAWAIIAN, INC.	GTHI	\$112,402	\$28	\$33	\$7	\$68	0.06%	GTHI
34 LINCOLN TELEPHONE COMPANY	LTNE	\$34,912	\$196	\$388	\$94	\$678	1.94%	LTNE
35 ROCHESTER TELEPHONE CORPORATION	RTNY	\$53,614	\$615	\$423	\$292	\$1,331	2.48%	RTNY
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT	\$332,872						SNCT
37 UNITED OF FLORIDA	UTFL	\$198,218	\$552	\$1,145	\$377	\$2,074	1.05%	UTFL
38 UNITED OF INDIANA	UTIN	\$31,113						UTIN
39 CAROLINA TEL. & TEL.	UTNC	\$101,653	\$318	\$184	\$40	\$542	0.53%	UTNC
40 UNITED OF OHIO	UTOH	\$66,988	\$488	\$385	\$135	\$1,008	1.50%	UTOH
41 UNITED OF PENN.	UTPA	\$31,621	\$155	\$157	\$31	\$343	1.09%	UTPA
42 UNITED INTER-MOUNTAIN	UTIM	\$31,661	\$194	\$116	\$40	\$350	1.11%	UTIM

D.2 - HOLDING COMPANY TOTALS

** TOTAL ALL HOLDING COMPANIES		\$19,269,328	\$99,316	\$115,131	\$37,741	\$252,187	1.31%	
1 AMERITECH		\$2,173,119	\$12,051	\$5,184	\$2,435	\$19,670	0.91%	
2 BELL ATLANTIC		\$2,669,107	\$2,550	\$2,805	\$1,129	\$6,484	0.24%	
3 BELL SOUTH		\$2,743,472	\$17,054	\$9,849	\$3,557	\$30,460	1.11%	
4 NYNEX		\$3,055,236	\$20,367	\$36,343	\$10,456	\$67,166	2.20%	
5 PACIFIC TELESIS		\$1,648,134	\$19,896	\$13,439	\$5,599	\$38,933	2.36%	
6 SOUTHWESTERN BELL TEL. CO.		\$1,700,079	\$7,607	\$14,504	\$6,816	\$28,926	1.70%	
7 U.S. WEST		\$2,019,139	\$1,661	\$20,818	\$2,820	\$25,299	1.25%	
8 CENTRAL TELEPHONE CO.		\$88,410	\$1,116	\$903	\$180	\$2,199	2.49%	
9 CINCINNATI BELL TELEPHONE		\$106,324	\$1,085	\$1,223	\$700	\$3,008	2.83%	
10 CONTINENTAL TELEPHONE CO.		\$176,938	\$3,520	\$1,946	\$272	\$5,737	3.24%	
11 GTE		\$2,006,718	\$9,891	\$5,320	\$2,767	\$17,979	0.90%	
12 LINCOLN TELEPHONE CO.		\$34,912	\$196	\$388	\$94	\$678	1.94%	
13 ROCHESTER TELEPHONE CORP.		\$53,614	\$615	\$423	\$292	\$1,331	2.48%	
14 SOUTHERN NEW ENGLAND TELEPHONE		\$332,872						
15 UNITED TELEPHONE SYSTEM		\$461,254	\$1,708	\$1,986	\$623	\$4,317	0.94%	

SUMMARY REVENUE REQUIREMENT DISALLOWANCE CHART (\$ TO NEAREST THOUSAND)		OPERATING COMPANY TOTALS				TOTAL	D	TOTL
		COMMON LINE	TS SWITCHED	SPECIAL ACCESS				
		A	B	C				
** TOTAL ALL OPERATING COMPANIES	TOTL	\$38,620	\$49,162	\$9,333	\$97,115		TOTL	
1 ILLINOIS BELL	LBIL							
2 INDIANA BELL	NBIN							
3 MICHIGAN BELL	MBMI							
4 OHIO BELL	OBOH							
5 WISCONSIN BELL	WTWI							
6 CHESAPEAKE & POTOMAC	CPTC	\$708	\$775	\$332	\$1,815		CPTC	
7 DIAMOND STATE TEL.	DSDE							
8 BELL OF PENNSYLVANIA	PAPA							
9 NEW JERSEY BELL	NJNJ							
10 SOUTHERN BELL	SBTC	\$894	\$630	\$284	\$1,808		SBTC	
11 SOUTH CENTRAL BELL	SCTC	\$413	\$356	\$74	\$843		SCTC	
12 NEW ENGLAND TELEPHONE	NETC	\$26,274	\$35,907	\$5,841	\$68,022		NETC	
13 NEW YORK TELEPHONE	NYNY	\$706	\$1,337	\$363	\$2,406		NYNY	
14 PACIFIC BELL	PTCA							
15 NEVADA BELL	PTNV							
16 SOUTHWESTERN BELL TEL. CO.	SWTR	\$2,603	\$2,013	\$911	\$5,527		SWTR	
17 MOUNTAIN BELL	MSTC	\$1,749	\$3,232	\$540	\$5,521		MSTC	
18 NORTHWESTERN BELL	NWTC	\$1,331	\$1,970	\$371	\$3,672		NWTC	
19 PACIFIC NORTHWEST BELL	PNTC	\$183	\$197	\$35	\$415		PNTC	
20 CENTRAL OF FLORIDA	CEFL	\$476	\$427	\$115	\$1,018		CEFL	
21 CENTRAL OF NEVADA	CENV							
22 CINCINNATI BELL TELEPHONE	CBTC	\$50	\$57	\$31	\$138		CBTC	
23 CONTEL OF CALIFORNIA	COCA	\$279	\$181	\$30	\$490		COCA	
24 CONTEL OF NEW YORK	CONY	\$125	\$109	\$13	\$247		CONY	
25 CONTEL OF TEXAS	COTX							
26 CONTEL OF VIRGINIA	COVA	\$292	\$276	\$35	\$603		COVA	
27 GTE CALIFORNIA, INC.	GTCA							
28 GTE FLORIDA, INC.	GTFL	\$406	\$238	\$72	\$716		GTFL	
29 GTE NORTHWEST, INC.	GTNW	\$80	\$88	\$14	\$182		GTNW	
30 GTE SOUTH, INC.	GTSO	\$1,117	\$805	\$169	\$2,091		GTSO	
31 GTE SOUTHWEST, INC.	GTSW	\$804	\$428	\$89	\$1,321		GTSW	
32 GTE NORTH, INC.	GTMW	\$128	\$133	\$13	\$274		GTMW	
33 GTE HAWAIIAN, INC.	GTHI	\$2	\$3	\$1	\$6		GTHI	
34 LINCOLN TELEPHONE COMPANY	LTNE							
35 ROCHESTER TELEPHONE CORPORATION	RTNY							
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT							
37 UNITED OF FLORIDA	UTFL							
38 UNITED OF INDIANA	UTIN							
39 CAROLINA TEL. & TEL.	UTNC							
40 UNITED OF OHIO	UTOH							
41 UNITED OF PENN.	UTPA							
42 UNITED INTER-MOUNTAIN	UTIM							
		HOLDING COMPANY TOTALS						
** TOTAL ALL HOLDING COMPANIES		\$38,620	\$49,162	\$9,333	\$97,115			
1 AMERITECH								
2 BELL ATLANTIC		\$708	\$775	\$332	\$1,815			
3 BELL SOUTH		\$1,307	\$986	\$358	\$2,651			
4 NYNEX		\$26,980	\$37,244	\$6,204	\$70,428			
5 PACIFIC TELESIS								
6 SOUTHWESTERN BELL TEL. CO.		\$2,603	\$2,013	\$911	\$5,527			
7 U.S. WEST		\$3,263	\$5,399	\$946	\$9,608			
8 CENTRAL TELEPHONE CO.		\$476	\$427	\$115	\$1,018			
9 CINCINNATI BELL TELEPHONE		\$50	\$57	\$31	\$138			
10 CONTINENTAL TELEPHONE CO.		\$696	\$566	\$78	\$1,340			
11 GTE		\$2,537	\$1,695	\$358	\$4,590			
12 LINCOLN TELEPHONE CO.								
13 ROCHESTER TELEPHONE CORP.								
14 SOUTHERN NEW ENGLAND TELEPHONE								
15 UNITED TELEPHONE SYSTEM								

UNSEPARATED DEPRECIATION EXPENSE DISALLOWANCE

(\$ 0 0 0)

	RATE ANALYSIS	STATION CONNECTION AMORTIZATION	PLANT DISALLOWANCE	TOTAL
	(A)	(B)	(C)	(D=A+B+C)
I- AMERITECH :	0	0	0	0
ILLINOIS BELL	0	0	0	0
INDIANA BELL	0	0	0	0
MICHIGAN BELL	0	0	0	0
OHIO BELL	0	0	0	0
WISCONSIN BELL	0	0	0	0
II- BELL ATLANTIC :	2,655	0	3,659	6,314
C & P OF WASHINGTON	0	0	1,692	1,692
C & P OF MARYLAND	0	0	0	0
C & P OF VIRGINIA	0	0	1,313	1,313
C & P OF WEST VIRGINIA	2,655	0	654	3,309
DIAMOND STATE	0	0	0	0
BELL OF PENNSYLVANIA	0	0	0	0
NEW JERSEY BELL	0	0	0	0
III- BELL SOUTH :	0	0	9,886	9,886
SOUTHERN BELL TOTAL :	0	0	6,608	6,608
-FLORIDA	0	0	1,651	1,651
-GEORGIA	0	0	4,210	4,210
-NORTH CAROLINA	0	0	736	736
-SOUTH CAROLINA	0	0	11	11
SOUTH CENTRAL BELL TOTAL	0	0	3,278	3,278
-ALABAMA	0	0	900	900
-KENTUCKY	0	0	143	143
-LOUISIANA	0	0	334	334
-MISSISSIPPI	0	0	1,859	1,859
-TENNESSEE	0	0	43	43
IV- NYNEX :	236,195	0	11,099	247,294
NEW ENGLAND TELEPHONE :	236,195	0	2,776	238,971
-MAINE	16,742	0	1,022	17,764
-MASSACHUSETTS	160,898	0	0	160,898
-NEW HAMPSHIRE	26,188	0	0	26,188
-RHODE ISLAND	21,339	0	0	21,339
-VERMONT	11,028	0	1,755	12,783
NEW YORK TELEPHONE :	0	0	8,322	8,322
V- PACIFIC TELESIS TOTAL :	0	0	0	0
- CALIFORNIA	0	0	0	0
-NEVADA	0	0	0	0

UNSEPARATED DEPRECIATION EXPENSE DISALLOWANCE

(\$ 0 0 0)

	RATE ANALYSIS	STATION CONNECTION AMORTIZATION	PLANT DISALLOWANCE	TOTAL
	(A)	(B)	(C)	(D=A+B+C)
VI- SOUTHWESTERN TOTAL :	0	1,494	22,069	23,563
-ARKANSAS	0	0	0	0
-KANSAS	0	0	220	220
-MISSOURI	0	854	2,870	3,724
-OKLAHOMA	0	0	3,195	3,195
-TEXAS	0	640	15,784	16,424
VII- US WEST :	11,474	0	20,564	32,038
MOUNTAIN BELL TOTAL :	11,474	0	6,490	17,964
-ARIZONA	0	0	0	0
-COLORADO	7,007	0	4,401	11,408
-IDAHO	0	0	1,106	1,106
-MONTANA	0	0	353	353
-NEW MEXICO	1,783	0	281	2,064
-UTAH	2,684	0	0	2,684
-WYOMING	0	0	350	350
NORTHWESTERN BELL :	0	0	12,436	12,436
-IOWA	0	0	2,102	2,102
-MINNESOTA	0	0	2,648	2,648
-NEBRASKA	0	0	4,342	4,342
-NORTH DAKOTA	0	0	2,560	2,560
-SOUTH DAKOTA	0	0	784	784
PACIFIC NORTHWEST BELL :	0	0	1,638	1,638
-IDAHO	0	0	108	108
-OREGON	0	0	0	0
-WASHINGTON	0	0	1,530	1,530
VIII- CONTEL :	0	0	5,797	5,797
-CALIFORNIA	0	0	2,448	2,448
-NEW YORK	0	0	1,020	1,020
-VIRGINIA	0	0	2,329	2,329
IX- CINCINNATI BELL :	0	0	645	645
-KENTUCKY	0	0	106	106
-OHIO	0	0	538	538

UNSEPARATED DEPRECIATION EXPENSE DISALLOWANCE

(\$ 0 0 0)				
	RATE ANALYSIS	STATION CONNECTION AMORTIZATION	PLANT DISALLOWANCE	TOTAL
	(A)	(B)	(C)	(D=A+B+C)
X- GTE TOTAL :	12,438	0	5,112	17,550
GTE NORTH :	947	0	94	1,041
-ILLINOIS	0	0	0	0
-INDIANA	0	0	0	0
-IOWA	0	0	10	10
-MICHIGAN	0	0	30	30
-MINNESOTA	0	0	13	13
-MISSOURI	0	0	30	30
-NEBRASKA	947	0	12	959
-OHIO	0	0	0	0
-PENNSYLVANIA	0	0	0	0
-WISCONSIN	0	0	0	0
GTE SOUTH :	6,099	0	1,705	7,804
-ALABAMA	1,282	0	218	1,500
-GEORGIA	1,458	0	306	1,764
-KENTUCKY	0	0	0	0
-NORTH CAROLINA	0	0	25	25
-SOUTH CAROLINA	2,308	0	684	2,992
-TENNESSEE	1,051	0	164	1,215
-VIRGINIA	0	0	203	203
-WEST VIRGINIA	0	0	103	103
GTE SOUTHWEST :	5,392	0	42	5,434
-ARKANSAS	0	0	0	0
-NEW MEXICO	245	0	33	278
-OKLAHOMA	668	0	9	677
-TEXAS	4,479	0	0	4,479
GTE NORTHWEST :	0	0	614	614
-IDAHO	0	0	13	13
-MONTANA	0	0	42	42
-OREGON	0	0	385	385
-WASHINGTON	0	0	175	175
GTE - CALIFORNIA	0	0	0	0
GTE - FLORIDA	0	0	2,634	2,634
GTE - HAWAII	0	0	23	23
XI- UNITED INTERMOUNTAIN :	0	0	0	0
-TENNESSEE	0	0	0	0
-VIRGINIA	0	0	0	0
XII- SOUTHERN NEW ENGLAND TEL	0	0	0	0
XIII-CENDEL OF FLORIDA :	4,165	0	40	4,205

UNSEPARATED DEPRECIATION EXPENSE DISALLOWANCE

(\$ 0 0 0)				
	RATE ANALYSIS	STATION CONNECTION AMORTIZATION	PLANT DISALLOWANCE	TOTAL
	(A)	(B)	(C)	(D=A+B+C)
TOTAL BOC	250,324	1,494	67,277	319,095
TOTAL GTE	12,438	0	5,112	17,550
TOTAL OTHERS	4,165	0	6,481	10,646
TOTAL INDUSTRY	266,927	1,494	78,871	347,292

Carrier Common Line
Minutes of Use Adjustments

Operating Company	TRP PYCOS	TRP Forecast	Trend Line PYCOS	Trend Line Forecast	95% confidence Interval of Trend Line		Trend Line +/- One Standard Deviation	
					Lower Bound	Upper Bound	Lower Bound	Upper Bound
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
LBIL	11,065,245	12,705,832	11,120,993	13,173,188	12,824,348	13,522,029	12,999,636	13,346,741
NBIN	3,359,501	3,861,219	3,357,826	3,942,963	3,761,756	4,124,170	3,852,810	4,033,116
MBMI	6,749,044	7,700,699	6,738,486	7,933,325	7,638,527	8,228,122	7,786,659	8,079,990
OBOH	5,785,502	6,427,085	5,806,067	6,697,691	6,371,183	7,024,199	6,535,249	6,860,133
WTWI	3,186,583	3,612,188	3,198,757	3,694,578	3,537,745	3,851,412	3,616,552	3,772,605
CPTC	16,012,390	18,103,336	16,067,907	18,791,963	17,753,063	19,830,863	18,275,097	19,308,828
DSDE	1,277,368	1,428,591	1,259,601	1,463,757	1,347,143	1,580,371	1,405,740	1,521,774
PAPA	10,129,332	11,303,075	10,066,989	11,581,378	10,790,223	12,372,532	11,187,768	11,974,987
NJNJ	13,686,039	16,127,291	13,773,008	15,820,991	14,874,764	16,767,217	15,350,231	16,291,750
SBTC	24,455,335	28,108,076	24,396,939	28,713,472	27,996,051	29,430,894	28,356,546	29,070,399
SCTC	15,275,448	16,980,641	15,253,221	17,914,725	17,503,892	18,325,558	17,710,331	18,119,120
NETC	13,772,012	15,307,032	13,849,634	16,129,067	15,792,743	16,465,392	15,961,742	16,296,393
NYNY	22,120,138	24,045,264	22,230,921	25,423,172	24,927,970	25,918,374	25,176,803	25,669,541
PTCA	20,395,594	23,475,543	20,466,461	24,406,153	23,797,897	25,014,410	24,103,538	24,708,769
PTNV	681,886	751,647	673,988	796,104	751,921	840,286	774,123	818,085
SWTR	23,304,610	25,664,980	23,314,295	26,999,654	26,323,956	27,675,352	26,663,486	27,335,822
MSTC	15,230,955	17,277,805	15,140,638	17,499,758	16,583,454	18,416,063	17,043,886	17,955,631
NWTC	7,793,049	8,971,879	7,964,389	9,176,623	8,613,671	9,739,575	8,896,548	9,456,699
PNTC	6,099,222	7,173,533	6,182,636	7,192,580	6,713,728	7,671,432	6,954,345	7,430,815
CEFL	537,291	674,393	549,065	621,849	578,598	665,100	600,331	643,367
CENV	1,353,105	1,515,287	1,353,024	1,617,555	1,535,593	1,699,517	1,576,778	1,658,332
CBTC	1,548,165	1,772,690	1,541,982	1,785,060	1,712,121	1,857,999	1,748,772	1,821,348
COCA	416,462	491,311	400,840	507,413	488,454	526,372	497,981	516,845
CONY	373,756	421,958	370,836	437,689	425,663	449,716	431,706	443,673
COTX	161,562	207,501	159,755	186,390	180,616	192,164	183,517	189,262
COVA	891,197	1,097,595	875,702	1,076,966	1,037,302	1,116,630	1,057,233	1,096,700
GTCA	4,835,399	5,799,522	4,804,799	5,922,541	5,781,234	6,063,848	5,852,239	5,992,843
GTFL	3,672,031	4,226,554	3,667,300	4,269,904	4,066,172	4,473,637	4,168,545	4,371,264
GTNW	1,830,736	2,300,557	1,778,956	2,139,509	2,040,090	2,238,927	2,090,047	2,188,971
GTSO	2,217,278	2,644,105	2,166,062	2,564,285	2,412,356	2,716,215	2,488,699	2,639,872
GTSW	2,080,289	2,714,374	2,118,552	2,497,838	2,363,471	2,632,205	2,430,989	2,564,687
GTMW	5,144,304	5,986,279	5,021,770	5,743,775	5,388,880	6,098,670	5,567,210	5,920,339
GTHI	1,157,776	1,437,197	1,116,016	1,317,969	1,251,634	1,384,304	1,284,966	1,350,972
LTNE	398,453	467,583	395,004	463,669	450,627	476,712	457,181	470,158
RTNY	817,836	931,035	812,139	957,224	924,122	990,325	940,755	973,692
SHCT	5,129,381	5,655,928	5,128,360	5,852,886	5,556,013	6,149,760	5,705,188	6,000,585
UTFL	2,269,055	2,733,149	2,268,070	2,750,627	2,638,332	2,862,922	2,694,759	2,806,495
UTIN	271,131	331,059	264,855	310,831	290,185	331,477	300,559	321,103
UTNC	1,567,253	1,805,133	1,558,832	1,821,801	1,754,190	1,889,412	1,788,164	1,855,438
UTOH	735,241	828,002	727,476	880,587	829,367	931,808	855,105	906,070
UTPA	452,877	515,340	452,620	548,029	526,253	569,805	537,195	558,863
UTIM	532,667	615,565	542,462	647,503	624,616	670,390	636,117	658,890
total	258,772,498	294,197,833	258,937,235	302,273,045	297,438,545	307,107,546	299,867,821	304,678,269
Sum of OPCOs	258,772,498	294,197,833	258,937,235	302,273,045				

NOTES: (1) CCLMOU data are from DMD-1, rows 100 thru 295, column (I) in the 1990 TRP for October 1986 thru December 1989 and for the prospective period, and from rows 100 thru 230, column (I) in the 1989 TRP for July 1984 thru September 1986.

Carrier Common Line
Minutes of Use Adjustments

Annualized Growth Rates

Operating Company	TRP Forecast Over TRP PYCOS	Trend Forecast Over TRP PYCOS	Trend Forecast Over Trend PYCOS	95% CI Lower Bound Over TRP PYCOS	95% CI Upper Bound Over TRP PYCOS	+/- 1 SD Lower Bound Over TRP PYCOS	+/- 1 SD Upper Bound Over TRP PYCOS
	(I)	(J)	(K)	(L)	(M)	(N)	(O)
LBIL	9.65%	12.33%	11.95%	10.34%	14.30%	11.34%	13.31%
NBIN	9.72%	11.27%	11.30%	7.83%	14.65%	9.56%	12.96%
MBMI	9.19%	11.38%	11.50%	8.60%	14.12%	10.00%	12.75%
OBOH	7.26%	10.25%	9.99%	6.64%	13.81%	8.46%	12.03%
WTWI	8.72%	10.36%	10.08%	7.22%	13.47%	8.80%	11.91%
CPTC	8.53%	11.26%	11.00%	7.12%	15.33%	9.21%	13.29%
DSDE	7.74%	9.51%	10.53%	3.61%	15.25%	6.59%	12.38%
PAPA	7.58%	9.34%	9.79%	4.30%	14.27%	6.85%	11.81%
NJNJ	11.56%	10.15%	9.68%	5.71%	14.50%	7.95%	12.32%
SBTC	9.72%	11.29%	11.47%	9.43%	13.14%	10.37%	12.22%
SCTC	7.31%	11.21%	11.32%	9.50%	12.90%	10.36%	12.05%
NETC	7.30%	11.11%	10.69%	9.56%	12.65%	10.34%	11.87%
NYNY	5.72%	9.72%	9.36%	8.29%	11.14%	9.01%	10.43%
PTCA	9.83%	12.71%	12.45%	10.83%	14.58%	11.78%	13.64%
PTNV	6.71%	10.88%	11.74%	6.74%	14.94%	8.83%	12.91%
SWTR	6.64%	10.31%	10.28%	8.46%	12.14%	9.39%	11.22%
MSTC	8.77%	9.70%	10.13%	5.84%	13.50%	7.79%	11.60%
NWTC	9.85%	11.51%	9.91%	6.90%	16.03%	9.23%	13.77%
PNTC	11.42%	11.62%	10.61%	6.61%	16.52%	9.14%	14.07%
CEFL	16.36%	10.23%	8.65%	5.06%	15.29%	7.68%	12.76%
CENV	7.84%	12.64%	12.64%	8.80%	16.41%	10.74%	14.52%
CBTC	9.45%	9.96%	10.25%	6.94%	12.93%	8.46%	11.44%
COCA	11.65%	14.08%	17.02%	11.22%	16.90%	12.66%	15.48%
CONY	8.42%	11.10%	11.68%	9.06%	13.13%	10.09%	12.11%
COTX	18.16%	10.00%	10.83%	7.72%	12.26%	8.87%	11.13%
COVA	14.90%	13.45%	14.79%	10.65%	16.22%	12.06%	14.84%
GTCA	12.89%	14.48%	14.96%	12.65%	16.29%	13.57%	15.38%
GTFL	9.83%	10.58%	10.67%	7.03%	14.07%	8.82%	12.32%
GTNW	16.45%	10.95%	13.09%	7.49%	14.36%	9.23%	12.65%
GTSO	12.45%	10.18%	11.91%	5.78%	14.49%	8.00%	12.33%
GTSW	19.41%	12.97%	11.60%	8.88%	16.99%	10.94%	14.98%
GTMW	10.63%	7.63%	9.37%	3.14%	12.01%	5.41%	9.82%
GTHI	15.50%	9.02%	11.73%	5.33%	12.65%	7.20%	10.84%
LTNE	11.26%	10.63%	11.28%	8.55%	12.70%	9.60%	11.66%
RTNY	9.03%	11.06%	11.58%	8.49%	13.61%	9.78%	12.33%
SNCT	6.73%	9.20%	9.21%	5.47%	12.86%	7.35%	11.02%
UTFL	13.21%	13.69%	13.72%	10.57%	16.76%	12.15%	15.22%
UTIN	14.24%	9.54%	11.26%	4.63%	14.34%	7.11%	11.94%
UTNC	9.88%	10.55%	10.95%	7.80%	13.27%	9.19%	11.91%
UTOH	8.24%	12.78%	13.58%	8.36%	17.11%	10.59%	14.94%
UTPA	9.00%	13.56%	13.60%	10.53%	16.55%	12.06%	15.05%
UTIM	10.12%	13.90%	12.52%	11.20%	16.57%	12.56%	15.23%
total	8.93%	10.91%	10.87%	9.73%	12.09%	10.33%	11.50%
SUM OF OPCOS	8.93%	10.91%	10.87%				

NOTES: (1) The growth rates in columns (I) thru (O) are annualized by raising the ratio of the value listed in the column heading to the 2/3 power, and subtracting one. For example, column (I) equals ((column (B) / column (A)) ^ (2/3)) - 1.

Carrier Common Line
Minutes of Use Adjustments

Operating Company	Fail Report Card?	Tentative CCLMOU Adjustment	Final CCLMOU Adjustment	Percent of TRP Forecast Which Is Adjustment
				(S)
	(P)	(Q)	(R)	(S)
LBIL	Yes	293,804	293,804	2.31%
NBIN	Yes			
MBMI	Yes	85,960	85,960	1.12%
OBOH	Yes	108,164	108,164	1.68%
WTWI	Yes	4,364	4,364	0.12%
CPTC	Yes	171,761	171,761	0.95%
DSDE	Yes			
PAPA	Yes			
NJNJ	No			
SBTC	Yes	248,470	248,470	0.88%
SCTC	Yes	729,690	729,690	4.30%
NETC	Yes	654,710	654,710	4.28%
NYNY	No	882,706	882,706	3.67%
PTCA	Yes	627,995	627,995	2.68%
PTNV	Yes	22,476	22,476	2.99%
SWTR	Yes	998,506	312,606	1.22%
MSTC	Yes			
NWTC	Yes			
PNTC	Yes			
CEFL	Yes			
CENV	No	20,306	20,306	1.34%
CBTC	Yes			
COCA	Yes	6,670	0	0.00%
CONY	Yes	9,748	0	0.00%
COTX	Yes			
COVA	Yes			
GTCA	Yes	52,717	52,717	0.91%
GTFL	No			
GTNW	Yes			
GTSO	Yes			
GTSW	No			
GTMW	No			
GTHI	Yes			
LTNE	Yes			
RTNY	Yes	9,720	9,720	1.04%
SNCT	No			
UTFL	No			
UTIN	Yes			
UTNC	Yes			
UTOH	Yes	27,103	9,404	1.14%
UTPA	Yes	21,855	0	0.00%
UTIM	Yes	20,552	14,617	2.37%
total	Yes			
Sum of OPCOs		4,997,276	4,249,469	1.44%

NOTES: Column (Q) is: the lower bound of the 95% confidence interval minus the TRP forecast, if the company passes its report card; the lower bound of the trend +/- one standard deviation minus the TRP forecast, if the company fails its report card; and is blank otherwise.

Carrier Common Line
Minutes of Use Adjustments

- NOTES: Column (R) reflects the following adjustments:
- (1) SWTR disallowance is reduced by the amount of FGA and FGB minutes reported in SWTR's Reply.
 - (2) COCA, CONY, and UTPA disallowances are reduced to zero because of the switch from STARS to JTSS.
 - (3) UTOH and UTIM have their disallowances reduced because of the switch from STARS to JTSS. The reduction is computed from the amounts reported in United's Reply, Att. A, Col C and Col A. The ratio Col C / Col A is multiplied by the Trend Line forecast to determine the reduction.

Carrier Common Line
Minutes of Use Adjustments

Operating Company	TRP Forecast (T)	Final CCLMOU Adjustment (U)	Adjusted Forecast CCLMOU Demand (V)	Adjustment Factor for Stimulation (W)	Adjusted Stimulated CCLMOU (X)	Final CCLMOU Adjustment Including Demand Stimulation (Y)
LBIL	12,705,832	293,804	12,999,636	1.00776	13,100,448	394,616
NBIN	3,861,219		3,861,219	1.00776	3,891,163	29,944
MBMI	7,700,699	85,960	7,786,659	1.00776	7,847,045	146,346
OBOH	6,427,085	108,164	6,535,249	1.00776	6,585,930	158,845
WTWI	3,612,188	4,364	3,616,552	1.00776	3,644,598	32,410
CPTC	18,103,336	171,761	18,275,097	1.00776	18,416,821	313,485
DSDE	1,428,591		1,428,591	1.00776	1,439,670	11,079
PAPA	11,303,075		11,303,075	1.00776	11,390,730	87,655
NJNJ	16,127,291		16,127,291	1.00776	16,252,358	125,067
SBTC	28,108,076	248,470	28,356,546	1.00776	28,576,451	468,375
SCTC	16,980,641	729,690	17,710,331	1.00776	17,847,674	867,033
NETC	15,307,032	654,710	15,961,742	1.00776	16,085,525	778,493
NYNY	24,045,264	882,706	24,927,970	1.00776	25,121,286	1,076,022
PTCA	23,475,543	627,995	24,103,538	1.00776	24,290,461	814,918
PTNV	751,647	22,476	774,123	1.00776	780,126	28,479
SWTR	25,664,980	312,606	25,977,586	1.00776	26,179,042	514,062
MSTC	17,277,805		17,277,805	1.00776	17,411,794	133,989
NWTC	8,971,879		8,971,879	1.00776	9,041,456	69,577
PNTC	7,173,533		7,173,533	1.00776	7,229,164	55,631
CEFL	674,393		674,393	1.00776	679,623	5,230
CENV	1,515,287	20,306	1,535,593	1.00776	1,547,501	32,214
CBTC	1,772,690		1,772,690	1.00776	1,786,437	13,747
COCA	491,311	0	491,311	1.00776	495,121	3,810
CONY	421,958	0	421,958	1.00776	425,230	3,272
COTX	207,501		207,501	1.00776	209,110	1,609
COVA	1,097,595		1,097,595	1.00776	1,106,107	8,512
GTCA	5,799,522	52,717	5,852,239	1.00776	5,897,623	98,101
GTFL	4,226,554		4,226,554	1.00776	4,259,331	32,777
GTNW	2,300,557		2,300,557	1.00776	2,318,398	17,841
GTSO	2,644,105		2,644,105	1.00776	2,664,610	20,505
GTSW	2,714,374		2,714,374	1.00776	2,735,424	21,050
GTMW	5,986,279		5,986,279	1.00776	6,032,703	46,424
GTHI	1,437,197		1,437,197	1.00776	1,448,342	11,145
LTNE	467,583		467,583	1.00776	471,209	3,626
RTNY	931,035	9,720	940,755	1.00776	948,051	17,016
SNCT	5,655,928		5,655,928	1.00776	5,699,790	43,862
UTFL	2,733,149		2,733,149	1.00776	2,754,345	21,196
UTIN	331,059		331,059	1.00776	333,626	2,567
UTNC	1,805,133		1,805,133	1.00776	1,819,132	13,999
UTOH	828,002	9,404	837,406	1.00776	843,900	15,898
UTPA	515,340	0	515,340	1.00776	519,336	3,996
UTIM	615,565	14,617	630,182	1.00776	635,069	19,504
total	294,197,833					
Sum of OPCOs	294,197,833	4,249,469	298,447,302	1.00776	300,761,761	6,563,928

- NOTES: (1) Column (V) is Column (T) + Column (U).
(2) Column (W) is computed assuming a price elasticity of -0.47
(3) Column (X) is Column (V) * Column (W).
(4) Column (Y) is Column (X) - Column (T).

Traffic Sensitive - Switched
Minutes of Use Adjustments

Operating Company	TRP PYCOS	TRP Forecast	Trend Line PYCOS	Trend Line Forecast	95% confidence Interval of Trend Line		Trend Line +/- One Standard Deviation	
					Lower Bound	Upper Bound	Lower Bound	Upper Bound
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
LBIL	11,969,959	13,236,619	12,106,116	13,801,470	13,210,486	14,392,454	13,530,252	14,072,688
NBIN	3,684,802	4,156,976	3,728,209	4,350,404	4,123,236	4,577,573	4,246,151	4,454,658
MBMI	7,069,039	7,963,494	7,086,172	8,099,127	7,845,751	8,352,504	7,982,846	8,215,408
OBOH	6,310,529	6,815,603	6,312,181	6,926,729	6,676,961	7,176,498	6,812,104	7,041,355
WTWI	3,391,386	3,723,904	3,423,730	3,848,487	3,735,831	3,961,143	3,796,786	3,900,188
CPTC	17,580,093	18,774,281	17,579,647	20,082,144	18,369,885	21,794,403	19,296,343	20,867,944
DSDE	1,410,283	1,525,422	1,432,331	1,659,174	1,454,204	1,864,144	1,565,108	1,753,240
PAPA	11,098,172	12,000,409	11,300,830	12,999,209	11,519,348	14,479,071	12,320,062	13,678,356
NJNJ	14,850,024	16,887,750	14,993,846	16,805,225	15,645,899	17,964,551	16,273,180	17,337,270
SBTC	26,155,892	28,869,461	26,079,580	29,754,667	28,638,447	30,870,887	29,242,404	30,266,929
SCTC	15,822,275	17,462,501	15,808,075	17,867,915	17,301,588	18,434,242	17,608,012	18,127,817
NETC	14,720,560	15,788,294	14,840,897	16,760,409	16,297,698	17,223,120	16,548,059	16,972,759
NVNY	23,195,379	24,632,114	23,287,744	25,785,645	25,281,239	26,290,051	25,554,160	26,017,130
PTCA	21,877,838	24,470,286	21,931,616	25,574,620	24,722,978	26,426,262	25,183,779	25,965,461
PTNV	732,291	816,544	725,463	817,869	769,257	866,481	795,560	840,178
SWTR	24,727,884	26,555,080	24,622,845	27,444,982	26,466,272	28,423,693	26,995,826	27,894,138
MSTC	15,883,083	17,697,998	15,744,771	17,434,049	16,720,057	18,148,042	17,106,379	17,761,719
NWTC	8,635,191	9,365,168	8,693,686	9,431,643	8,965,371	9,897,915	9,217,659	9,645,627
PNTC	6,521,272	7,361,025	6,464,448	7,286,147	6,985,167	7,587,127	7,148,020	7,424,275
CEFL	601,528	688,296	599,343	697,414	663,174	731,653	681,700	713,127
CENV	1,402,465	1,571,988	1,372,037	1,557,743	1,465,205	1,650,281	1,515,275	1,600,211
CBTC	1,681,951	1,861,218	1,664,394	1,839,497	1,749,578	1,929,415	1,798,231	1,880,762
COCA	423,048	499,749	409,110	517,316	474,725	559,907	497,770	536,862
CONY	381,833	430,218	379,452	446,371	422,816	469,926	435,561	457,181
COTX	162,519	209,002	160,662	186,450	176,019	196,882	181,663	191,238
COVA	900,946	1,110,767	889,435	1,095,406	1,036,878	1,153,934	1,068,546	1,122,266
GTCA	5,007,579	5,892,522	4,995,799	6,064,171	5,952,831	6,175,511	6,013,074	6,115,268
GTFL	3,788,260	4,338,997	3,770,581	4,273,786	3,916,743	4,630,829	4,109,930	4,437,643
GTNW	1,955,277	2,352,912	1,908,057	2,290,763	2,170,269	2,411,258	2,235,465	2,346,061
GTSO	2,311,886	2,728,288	2,282,825	2,645,440	2,433,669	2,857,212	2,548,253	2,742,628
GTSW	2,430,810	2,783,799	2,366,070	2,871,891	2,686,452	3,057,330	2,786,788	2,956,993
GTMW	5,475,133	6,165,407	5,404,009	6,165,383	5,742,707	6,588,059	5,971,406	6,359,360
GTHI	1,203,313	1,464,940	1,161,867	1,375,624	1,243,945	1,507,302	1,315,193	1,436,054
LTNE	425,902	481,033	420,294	484,043	460,732	507,353	473,345	494,741
RTNY	840,919	943,535	829,224	950,516	911,347	989,686	932,541	968,492
SNCT	5,608,087	5,911,420	5,609,331	6,266,544	6,085,075	6,448,013	6,183,263	6,349,825
UTFL	2,331,202	2,769,112	2,315,839	2,757,420	2,406,223	3,108,618	2,596,246	2,918,594
UTIN	295,567	346,063	284,756	335,018	296,355	373,682	317,275	352,762
UTNC	1,618,089	1,849,100	1,611,566	1,853,385	1,736,948	1,969,822	1,799,949	1,906,821
UTOH	747,970	849,545	742,826	875,557	798,342	952,772	840,121	910,993
UTPA	469,940	527,288	471,221	558,034	526,424	589,644	543,528	572,541
UTIM	564,498	638,431	574,661	666,784	632,122	701,445	650,877	682,690
total	276,264,674	304,516,559	276,385,549	313,504,472	309,669,350	317,339,593	311,744,434	315,264,509
Sum of OPCOs	276,264,674	304,516,559	276,385,549	313,504,472				

NOTES: (1) TSMOU data are from DMD-1, rows 610 thru 670, column (C) in the 1990 TRP for 1Q 1987 thru 4Q 1989 and for the prospective period, and from rows 750 and 760, column (C) in DMD-1 in the 1988 TRP for 3Q and 4Q 1986.

Traffic Sensitive - Switched
Minutes of Use Adjustments

Operating Company	Annualized Growth Rates						
	TRP Forecast Over TRP PYCOS	Trend Forecast Over TRP PYCOS	Trend Forecast Over Trend PYCOS	95% CI Lower Bound Over TRP PYCOS	95% CI Upper Bound Over TRP PYCOS	+/- 1 SD Lower Bound Over TRP PYCOS	+/- 1 SD Upper Bound Over TRP PYCOS
	(I)	(J)	(K)	(L)	(M)	(N)	(O)
LBIL	6.94%	9.96%	9.13%	6.79%	13.07%	8.51%	11.39%
NBIN	8.37%	11.71%	10.84%	7.78%	15.56%	9.91%	13.48%
MBMI	8.27%	9.49%	9.32%	7.20%	11.76%	8.44%	10.54%
OBOH	5.27%	6.41%	6.39%	3.83%	8.95%	5.23%	7.58%
WTWI	6.43%	8.79%	8.11%	6.66%	10.91%	7.82%	9.77%
CPTC	4.48%	9.28%	9.28%	2.97%	15.40%	6.41%	12.11%
DSDE	5.37%	11.44%	10.30%	2.07%	20.44%	7.19%	15.62%
PAPA	5.35%	11.12%	9.78%	2.51%	19.40%	7.21%	14.95%
NJNJ	8.95%	8.60%	7.90%	3.54%	13.53%	6.29%	10.88%
SBTC	6.80%	8.97%	9.19%	6.23%	11.68%	7.72%	10.22%
SCTC	6.80%	8.44%	8.51%	6.14%	10.72%	7.39%	9.49%
NETC	4.78%	9.04%	8.45%	7.02%	11.03%	8.11%	9.96%
NYNY	4.09%	7.31%	7.03%	5.91%	8.71%	6.67%	7.95%
PTCA	7.75%	10.97%	10.79%	8.49%	13.42%	9.84%	12.10%
PTNV	7.53%	7.65%	8.32%	3.34%	11.87%	5.68%	9.60%
SWTR	4.87%	7.20%	7.50%	4.63%	9.73%	6.02%	8.36%
MSTC	7.48%	6.41%	7.03%	3.48%	9.29%	5.07%	7.74%
NWTC	5.56%	6.06%	5.58%	2.53%	9.53%	4.45%	7.66%
PNTC	8.41%	7.67%	8.30%	4.69%	10.62%	6.31%	9.03%
CEFL	9.40%	10.36%	10.63%	6.72%	13.95%	8.70%	12.01%
CENV	7.90%	7.25%	8.83%	2.96%	11.46%	5.29%	9.19%
CBTC	6.98%	6.15%	6.90%	2.66%	9.58%	4.56%	7.73%
COCA	11.75%	14.35%	16.93%	7.99%	20.55%	11.45%	17.21%
CONY	8.28%	10.97%	11.44%	7.03%	14.84%	9.17%	12.76%
COTX	18.26%	9.59%	10.43%	5.46%	13.64%	7.71%	11.46%
COVA	14.98%	13.92%	14.90%	9.82%	17.94%	12.05%	15.77%
GTCA	11.46%	13.61%	13.79%	12.22%	15.00%	12.97%	14.25%
GTFL	9.47%	8.37%	8.71%	2.25%	14.33%	5.58%	11.12%
GTNW	13.14%	11.13%	12.96%	7.20%	15.00%	9.34%	12.92%
GTSO	11.67%	9.40%	10.33%	3.48%	15.16%	6.70%	12.06%
GTSW	9.46%	11.76%	13.79%	6.89%	16.52%	9.54%	13.95%
GTMW	8.24%	8.24%	9.18%	3.23%	13.13%	5.95%	10.50%
GTHI	14.01%	9.33%	11.92%	2.24%	16.20%	6.11%	12.51%
LTNE	8.45%	8.91%	9.87%	5.38%	12.37%	7.29%	10.50%
RTNY	7.98%	8.51%	9.53%	5.51%	11.47%	7.14%	9.87%
SNCT	3.57%	7.68%	7.67%	5.59%	9.75%	6.73%	8.63%
UTFL	12.16%	11.84%	12.34%	2.13%	21.15%	7.44%	16.16%
UTIN	11.09%	8.71%	11.45%	0.18%	16.92%	4.84%	12.52%
UTNC	9.30%	9.47%	9.77%	4.84%	14.01%	7.36%	11.57%
UTOH	8.86%	11.07%	11.58%	4.44%	17.51%	8.05%	14.05%
UTPA	7.98%	12.14%	11.93%	7.86%	16.33%	10.18%	14.07%
UTIM	8.55%	11.74%	10.42%	7.83%	15.58%	9.96%	13.51%
total	6.71%	8.80%	8.76%				
SUM OF							
OPCOS	6.71%	8.80%	8.76%				

NOTES: (1) The growth rates in columns (I) thru (O) are annualized by raising the ratio of the value listed in the column heading to the 2/3 power, and subtracting one. For example, column (I) equals ((column (B) / column (A)) ^ (2/3)) - 1.

Traffic Sensitive - Switched
Minutes of Use Adjustments

Operating Company	Fail Report Card?	Tentative TSMOU Adjustment	Final TSMOU Adjustment	Percent of TRP Forecast Which Is Adjust-	TS RAF
				ment	
	(P)	(Q)	(R)	(S)	(T)
LBIL	No				
NBIN	Yes	89,175	89,175	2.15%	99.66%
MBMI	Yes	19,352	19,352	0.24%	99.96%
OBOH	No				
WTWI	No	11,927	11,927	0.32%	99.95%
CPTC	Yes	522,062	522,062	2.78%	99.56%
DSDE	Yes	39,686	39,686	2.60%	99.58%
PAPA	Yes	319,653	319,653	2.66%	99.57%
NJNJ	No				
SBTC	Yes	372,943	372,943	1.29%	99.79%
SCTC	No				
NETC	Yes	759,765	759,765	4.81%	99.23%
NYNY	No	649,125	649,125	2.64%	99.58%
PTCA	No	252,692	252,692	1.03%	99.83%
PTNV	No				
SWTR	No				
MSTC	No				
NWTC	No				
PNTC	No				
CEFL	Yes				
CENV	No				
CBTC	No				
COCA	Yes				
CONY	Yes	5,343		0.00%	
COTX	Yes				
COVA	Yes				
GTCA	No	60,309	60,309	1.02%	99.84%
GTFL	No				
GTNW	Yes				
GTSO	No				
GTSW	No				
GTMW	No				
GTHI	Yes				
LTNE	Yes				
RTNY	No				
SNCT	No	173,655	173,655	2.94%	99.53%
UTFL	No				
UTIN	No				
UTNC	Yes				
UTOH	Yes				
UTPA	Yes	16,240		0.00%	
UTIM	Yes	12,446	6,553	1.03%	99.84%
total	No				
Sum of OPCOs		3,304,373	3,276,898	1.08%	

NOTES: (1) Column (Q) is: the upper bound of the 95% confidence interval minus the TRP forecast, if the company passes its report card; the upper bound of the trend +/- one standard deviation, if the company fails its report card; and is blank otherwise.

Traffic Sensitive - Switched
Minutes of Use Adjustments

- NOTES: (1) Column (R) reflects the following adjustments:
- (1) SWTR adjustment is reduced by 213.8 million due to a reduction in the historical base reported in its Reply, page 38.
 - (2) COCA, CONY, and UTPA disallowances are reduced to zero because of the switch from STARS to JTSS.
 - (3) UTIM disallowance is reduced because of the switch from STARS to JTSS. The reduction is computed from the amounts reported in United's Reply, Att. A, Col C and Col A. The ratio Col C / Col A is multiplied by the Trend Line forecast to determine the reduction.
- (2) Column (T) is $1 - (0.16 * \text{column (S)})$

REVENUE REQUIREMENT DISALLOWANCES

MASTER REVENUE REQUIREMENT DISALLOWANCE CHART (\$ TO NEAREST THOUSAND)		OPERATING COMPANY TOTALS				PROSPECTIVE TOTAL ACCESS REVENUE RECURRING TRP SOURCE: (REV2 R.120/C.H)	PERCENT D / E		
		COMMON LINE	TS SWITCHED	SPECIAL ACCESS	TOTAL			E	F
		A	B	C	D				
** TOTAL ALL OPERATING COMPANIES	TOTL	\$277,398	\$203,721	\$56,730	\$537,849	TOTL \$19,269,328	2.79%		
1 ILLINOIS BELL	LBIL	\$4,985	\$1,220	\$850	\$7,056	753,033	0.94%		
2 INDIANA BELL	NBIN	\$3,736	\$2,567	\$1,041	\$7,344	244,565	3.00%		
3 MICHIGAN BELL	MBMI	\$7,148	\$2,612	\$862	\$10,623	521,331	2.04%		
4 OHIO BELL	OBOH	\$3,615	\$856	\$494	\$4,965	426,228	1.16%		
5 WISCONSIN BELL	WTWI	\$208	\$16	\$5	\$229	227,962	0.10%		
6 CHESAPEAKE & POTOMAC	CPTC	\$8,083	\$2,956	\$1,470	\$12,509	1,102,559	1.13%		
7 DIAMOND STATE TEL.	DSDE	\$372	\$6	\$6	\$384	68,129	0.56%		
8 BELL OF PENNSYLVANIA	PAPA	\$7,225	\$68	\$60	\$7,352	703,259	1.05%		
9 NEW JERSEY BELL	NJNJ	\$6,414	\$1,459	\$536	\$8,409	795,160	1.06%		
10 SOUTHERN BELL	SBTC	\$10,196	\$1,173	\$1,191	\$12,561	1,657,322	0.76%		
11 SOUTH CENTRAL BELL	SCTC	\$13,102	\$10,625	\$3,067	\$26,795	1,086,150	2.47%		
12 NEW ENGLAND TELEPHONE	NETC	\$39,773	\$46,483	\$7,388	\$93,644	1,051,233	8.91%		
13 NEW YORK TELEPHONE	NYNY	\$49,417	\$42,117	\$13,287	\$104,822	2,004,003	5.23%		
14 PACIFIC BELL	PTCA	\$66,949	\$22,012	\$9,051	\$98,012	1,595,691	6.14%		
15 NEVADA BELL	PTNV	\$572	\$405	\$67	\$1,044	52,443	1.99%		
16 SOUTHWESTERN BELL TEL. CO.	SWTR	\$22,449	\$16,982	\$7,947	\$47,378	1,700,079	2.79%		
17 MOUNTAIN BELL	MSTC	\$5,856	\$16,986	\$2,250	\$23,092	1,065,527	2.17%		
18 NORTHWESTERN BELL	NWTC	\$2,020	\$16,798	\$2,345	\$21,162	551,702	3.84%		
19 PACIFIC NORTHWEST BELL	PNTC	\$2,157	\$2,049	\$251	\$4,457	401,911	1.11%		
20 CENTRAL OF FLORIDA	CEFL	\$791	\$636	\$186	\$1,613	26,159	6.17%		
21 CENTRAL OF NEVADA	CENV	\$811	\$693	\$109	\$1,612	62,251	2.59%		
22 CINCINNATI BELL TELEPHONE	CBTC	\$983	\$1,139	\$651	\$2,774	106,324	2.61%		
23 CONTEL OF CALIFORNIA	COCA	\$1,058	\$585	\$105	\$1,747	49,790	3.51%		
24 CONTEL OF NEW YORK	CONY	\$780	\$397	\$48	\$1,226	36,556	3.35%		
25 CONTEL OF TEXAS	COTX	\$255	\$310	\$29	\$594	29,288	2.03%		
26 CONTEL OF VIRGINIA	COVA	\$2,128	\$1,224	\$169	\$3,521	61,304	5.74%		
27 GTE CALIFORNIA, INC.	GTCA	\$5,707	\$3,876	\$1,079	\$10,663	481,048	2.22%		
28 GTE FLORIDA, INC.	GTFL	\$2,638	\$239	\$155	\$3,031	276,067	1.10%		
29 GTE NORTHWEST, INC.	GTNW	\$906	\$323	\$90	\$1,319	184,074	0.72%		
30 GTE SOUTH, INC.	GTSO	\$2,130	\$1,148	\$245	\$3,523	214,562	1.64%		
31 GTE SOUTHWEST, INC.	GTSW	\$1,327	\$777	\$172	\$2,276	227,261	1.00%		
32 GTE NORTH, INC.	GTMW	\$1,836	\$1,186	\$327	\$3,348	511,304	0.65%		
33 GTE HAWAIIAN, INC.	GTHI	\$30	\$36	\$8	\$74	112,402	0.07%		
34 LINCOLN TELEPHONE COMPANY	LTNE	\$196	\$320	\$94	\$611	34,912	1.75%		
35 ROCHESTER TELEPHONE CORPORATION	RTNY	\$505	\$300	\$207	\$1,012	53,614	1.89%		
36 SOUTHERN NEW ENGLAND TELEPHONE	SNCT	\$1,330	\$1,488	\$371	\$3,190	332,872	0.96%		
37 UNITED OF FLORIDA	UTFL	\$552	\$812	\$270	\$1,634	198,218	0.82%		
38 UNITED OF INDIANA	UTIN					31,113			
39 CAROLINA TEL. & TEL.	UTNC	\$318	\$184	\$40	\$542	101,653	0.53%		
40 UNITED OF OHIO	UTOH	\$488	\$385	\$134	\$1,007	66,988	1.50%		
41 UNITED OF PENN.	UTPA	\$156	\$156	\$32	\$344	31,621	1.09%		
42 UNITED INTER-MOUNTAIN	UTIM	\$195	\$116	\$40	\$351	31,661	1.11%		
		HOLDING COMPANY TOTALS							
** TOTAL ALL HOLDING COMPANIES		\$277,398	\$203,721	\$56,730	\$537,849	\$19,269,328	2.79%		
1 AMERITECH		\$19,693	\$7,271	\$3,252	\$30,216	\$2,173,119	1.39%		
2 BELL ATLANTIC		\$22,093	\$4,489	\$2,071	\$28,654	\$2,669,107	1.07%		
3 BELL SOUTH		\$23,298	\$11,799	\$4,258	\$39,355	\$2,743,472	1.43%		
4 NYNEX		\$89,190	\$88,600	\$20,675	\$198,466	\$3,055,236	6.50%		
5 PACIFIC TELESIS		\$67,521	\$22,417	\$9,118	\$99,056	\$1,648,134	6.01%		
6 SOUTHWESTERN BELL TEL. CO.		\$22,449	\$16,982	\$7,947	\$47,378	\$1,700,079	2.79%		
7 U.S. WEST		\$8,032	\$35,833	\$4,846	\$48,711	\$2,019,139	2.41%		
8 CENTRAL TELEPHONE CO.		\$1,601	\$1,329	\$295	\$3,225	\$88,410	3.65%		
9 CINCINNATI BELL TELEPHONE		\$983	\$1,139	\$651	\$2,774	\$106,324	2.61%		
10 CONTINENTAL TELEPHONE CO.		\$4,221	\$2,516	\$351	\$7,088	\$176,938	4.01%		
11 GTE		\$14,574	\$7,585	\$2,076	\$24,235	\$2,006,718	1.21%		
12 LINCOLN TELEPHONE CO.		\$196	\$320	\$94	\$611	\$34,912	1.75%		
13 ROCHESTER TELEPHONE CORP.		\$505	\$300	\$207	\$1,012	\$53,614	1.89%		
14 SOUTHERN NEW ENGLAND TELEPHONE		\$1,330	\$1,488	\$371	\$3,190	\$332,872	0.96%		
15 UNITED TELEPHONE SYSTEM		\$1,709	\$1,653	\$517	\$3,878	\$461,254	0.84%		

Summary Chart of Common Line Cost and Demand Adjustments

	COST ADJUSTMENT DOLLARS	DEMAND ADJUSTMENT MINUTES OF USE INCLUDING DEMAND STIMULATION	
	(000 OMITTED)	(000 OMITTED)	
	A	B	
** TOTAL ALL OPERATING COMPANIES	\$276,850	6,563,928	TOTL
1 ILLINOIS BELL	\$4,985	394,616	LBIL
2 INDIANA BELL	\$3,736	29,944	NBIN
3 MICHIGAN BELL	\$7,148	146,346	MBMI
4 OHIO BELL	\$3,615	158,845	OBOH
5 WISCONSIN BELL	\$208	32,410	WTWI
6 CHESAPEAKE & POTOMAC	\$8,084	313,485	CPTC
7 DIAMOND STATE TEL.	\$372	11,079	DSDE
8 BELL OF PENNSYLVANIA	\$7,225	87,655	PAPA
9 NEW JERSEY BELL	\$6,414	125,067	NJNJ
10 SOUTHERN BELL	\$10,196	468,375	SBTC
11 SOUTH CENTRAL BELL	\$13,103	867,033	SCTC
12 NEW ENGLAND TELEPHONE	\$39,773	778,493	NETC
13 NEW YORK TELEPHONE	\$49,417	1,076,022	NYNY
14 PACIFIC BELL	\$66,949	814,918	PTCA
15 NEVADA BELL	\$572	28,479	PTNV
16 SOUTHWESTERN BELL TEL. CO.	\$22,449	514,062	SWTR
17 MOUNTAIN BELL	\$3,855	133,989	MSTC
18 NORTHWESTERN BELL	\$2,020	69,577	NWTC
19 PACIFIC NORTHWEST BELL	\$2,158	55,631	PNTC
20 CENTRAL OF FLORIDA	\$790	5,230	CEFL
21 CENTRAL OF NEVADA	\$288	32,214	CENV
22 CINCINNATI BELL TELEPHONE	\$983	13,747	CBTC
23 CONTEL OF CALIFORNIA	\$1,058	3,810	COCA
24 CONTEL OF NEW YORK	\$780	3,272	CONY
25 CONTEL OF TEXAS	\$255	1,609	COTX
26 CONTEL OF VIRGINIA	\$2,129	8,512	COVA
27 GTE CALIFORNIA, INC.	\$5,708	98,101	GTCA
28 GTE FLORIDA, INC.	\$2,637	32,777	GTFL
29 GTE NORTHWEST, INC.	\$905	17,841	GTNW
30 GTE SOUTH, INC.	\$2,130	20,505	GTSO
31 GTE SOUTHWEST, INC.	\$1,326	21,050	GTSW
32 GTE NORTH, INC.	\$1,835	46,424	GTMW
33 GTE HAWAIIAN, INC.	\$0	11,145	GTHI
34 LINCOLN TELEPHONE COMPANY	\$211	3,626	LTNE
35 ROCHESTER TELEPHONE CORPORATION	\$505	17,016	RTNY
36 SOUTHERN NEW ENGLAND TELEPHONE	\$1,330	43,862	SNCT
37 UNITED OF FLORIDA	\$552	21,196	UTFL
38 UNITED OF INDIANA	\$0	2,567	UTIN
39 CAROLINA TEL. & TEL.	\$318	13,999	UTNC
40 UNITED OF OHIO	\$412	15,898	UTOH
41 UNITED OF PENN.	\$155	3,996	UTPA
42 UNITED INTER-MOUNTAIN	\$261	19,504	UTIM

** TOTAL ALL HOLDING COMPANIES	\$276,850	6,563,928	
1 AMERITECH	\$19,692	762,161	
2 BELL ATLANTIC	\$22,094	537,286	
3 BELL SOUTH	\$23,299	1,335,408	
4 NYNEX	\$89,190	1,854,516	
5 PACIFIC TELESIS	\$67,521	843,397	
6 SOUTHWESTERN BELL TEL. CO.	\$22,449	514,062	
7 U.S. WEST	\$8,033	259,197	
8 CENTRAL TELEPHONE CO.	\$1,079	37,444	
9 CINCINNATI BELL TELEPHONE	\$983	13,747	
10 CONTINENTAL TELEPHONE CO.	\$4,222	17,203	
11 GTE	\$14,542	247,843	
12 LINCOLN TELEPHONE CO.	\$211	3,626	
13 ROCHESTER TELEPHONE CORP.	\$505	17,016	
14 SOUTHERN NEW ENGLAND TELEPHONE	\$1,330	43,862	
15 UNITED TELEPHONE SYSTEM	\$1,699	77,160	

Summary Chart of Traffic-Sensitive RAFs

(\$ TO NEAREST THOUSAND)	COST ADJUSTMENT A	PROSPECTIVE TOTAL ACCESS REVENUE RECURRING TRP SOURCE: (REV2 R.120/C.F.) B	COST R A F C = 1 - (A / B)	DEMAND R A F D	FINAL R A F E = IF D = 0 THEN C ELSE (C x D)	
** TOTAL ALL OPERATING COMPANIES	\$203,084	\$7,898,407				
1 ILLINOIS BELL	\$1,221	301,637	0.9960		0.9960	LBIL
2 INDIANA BELL	\$2,567	98,250	0.9739	0.9966	0.9705	NBIN
3 MICHIGAN BELL	\$2,612	192,758	0.9864	0.9996	0.9861	MBMI
4 OHIO BELL	\$856	162,776	0.9947		0.9947	OBOH
5 WISCONSIN BELL	\$16	90,746	0.9998	0.9995	0.9993	WTWI
6 CHESAPEAKE & POTOMAC	\$2,956	397,431	0.9926	0.9956	0.9881	CPTC
7 DIAMOND STATE TEL.	\$6	24,427	0.9997	0.9958	0.9956	DSDE
8 BELL OF PENNSYLVANIA	\$68	252,488	0.9997	0.9957	0.9955	PAPA
9 NEW JERSEY BELL	\$1,460	335,957	0.9957		0.9957	NJNJ
10 SOUTHERN BELL	\$1,174	537,562	0.9978	0.9979	0.9958	SBTC
11 SOUTH CENTRAL BELL	\$10,626	427,274	0.9751		0.9751	SCTC
12 NEW ENGLAND TELEPHONE	\$46,483	537,725	0.9136	0.9923	0.9065	NETC
13 NEW YORK TELEPHONE	\$42,117	1,020,185	0.9587	0.9958	0.9547	NYNY
14 PACIFIC BELL	\$22,013	550,489	0.9600	0.9983	0.9584	PTCA
15 NEVADA BELL	\$405	24,553	0.9835		0.9835	PTNV
16 SOUTHWESTERN BELL TEL. CO.	\$16,982	625,339	0.9728		0.9728	SWTR
17 MOUNTAIN BELL	\$16,986	511,263	0.9668		0.9668	MSTC
18 NORTHWESTERN BELL	\$16,797	280,791	0.9402		0.9402	NWTC
19 PACIFIC NORTHWEST BELL	\$2,049	176,793	0.9884		0.9884	PNTC
20 CENTRAL OF FLORIDA	\$637	12,843	0.9504		0.9504	CEFL
21 CENTRAL OF NEVADA	\$242	26,331	0.9908		0.9908	CENV
22 CINCINNATI BELL TELEPHONE	\$1,139	37,521	0.9696		0.9696	CBTC
23 CONTEL OF CALIFORNIA	\$584	17,420	0.9665		0.9665	COCA
24 CONTEL OF NEW YORK	\$398	14,432	0.9725		0.9725	CONY
25 CONTEL OF TEXAS	\$310	9,026	0.9656		0.9656	COTX
26 CONTEL OF VIRGINIA	\$1,224	25,278	0.9516		0.9516	COVA
27 GTE CALIFORNIA, INC.	\$3,877	189,985	0.9796	0.9984	0.9780	GTCA
28 GTE FLORIDA, INC.	\$238	96,491	0.9975		0.9975	GTFL
29 GTE NORTHWEST, INC.	\$324	89,158	0.9964		0.9964	GTNW
30 GTE SOUTH, INC.	\$1,147	95,338	0.9880		0.9880	GTSO
31 GTE SOUTHWEST, INC.	\$778	99,598	0.9922		0.9922	GTSW
32 GTE NORTH, INC.	\$1,186	218,674	0.9946		0.9946	GTMW
33 GTE HAWAIIAN, INC.	\$0	52,349	1.0000		1.0000	GTHI
34 LINCOLN TELEPHONE COMPANY	\$346	16,236	0.9787		0.9787	LTNE
35 ROCHESTER TELEPHONE CORPORATION	\$299	18,595	0.9839		0.9839	RTNY
36 SOUTHERN NEW ENGLAND TELEPHONE	\$1,488	156,169	0.9905	0.9953	0.9858	SNCT
37 UNITED OF FLORIDA	\$813	73,745	0.9890		0.9890	UTFL
38 UNITED OF INDIANA		12,063	1.0000		1.0000	UTIN
39 CAROLINA TEL. & TEL.	\$184	40,089	0.9954		0.9954	UTNC
40 UNITED OF OHIO	\$169	26,253	0.9936		0.9936	UTOH
41 UNITED OF PENN.	\$157	11,648	0.9866		0.9866	UTPA
42 UNITED INTER-MOUNTAIN	\$152	10,721	0.9858	0.9984	0.9842	UTIM

** TOTAL ALL HOLDING COMPANIES	\$203,084	\$7,898,407				
1 AMERITECH	\$7,272	\$846,167	0.9914	0.9992	0.9906	
2 BELL ATLANTIC	\$4,490	\$1,010,303	0.9956	0.9963	0.9919	
3 BELL SOUTH	\$11,799	\$964,836	0.9878	0.9984	0.9862	
4 NYNEX	\$88,600	\$1,557,910	0.9431	0.9940	0.9374	
5 PACIFIC TELESIS	\$22,417	\$575,042	0.9610	0.9975	0.9587	
6 SOUTHWESTERN BELL TEL. CO.	\$16,982	\$625,339	0.9728		0.9728	
7 U.S. WEST	\$35,833	\$968,847	0.9630		0.9630	
8 CENTRAL TELEPHONE CO.	\$878	\$39,174	0.9776		0.9776	
9 CINCINNATI BELL TELEPHONE	\$1,139	\$37,521	0.9696		0.9696	
10 CONTINENTAL TELEPHONE CO.	\$2,516	\$66,156	0.9620		0.9620	
11 GTE	\$7,550	\$841,593	0.9910	0.9995	0.9905	
12 LINCOLN TELEPHONE CO.	\$346	\$16,236	0.9787		0.9787	
13 ROCHESTER TELEPHONE CORP.	\$299	\$18,595	0.9839		0.9839	
14 SOUTHERN NEW ENGLAND TELEPHONE	\$1,488	\$156,169	0.9905	0.9945	0.9850	
15 UNITED TELEPHONE SYSTEM	\$1,474	\$174,519	0.9916	0.9998	0.9913	

Summary Chart of Special Access RAFs

(\$ TO NEAREST THOUSAND)	COST ADJUSTMENT A	PROSPECTIVE TOTAL ACCESS REVENUE RECURRING TRP SOURCE: (REV2 R.120/C.G)		R A F C = 1 - (A / B)	TOTL
		B			
** TOTAL ALL OPERATING COMPANIES	\$56,607	\$2,277,616		0.9751	
1 ILLINOIS BELL	\$851	108,804		0.9922	LBIL
2 INDIANA BELL	\$1,041	30,359		0.9657	NBIN
3 MICHIGAN BELL	\$862	62,116		0.9861	MBMI
4 OHIO BELL	\$494	58,851		0.9916	OBOH
5 WISCONSIN BELL	\$5	28,253		0.9998	WTWI
6 CHESAPEAKE & POTOMAC	\$1,470	153,738		0.9904	CPTC
7 DIAMOND STATE TEL.	\$6	9,281		0.9993	DSDE
8 BELL OF PENNSYLVANIA	\$60	96,866		0.9994	PAPA
9 NEW JERSEY BELL	\$535	102,419		0.9948	NJNJ
10 SOUTHERN BELL	\$1,192	222,017		0.9946	SBTC
11 SOUTH CENTRAL BELL	\$3,068	118,219		0.9741	SCTC
12 NEW ENGLAND TELEPHONE	\$7,387	103,346		0.9285	NETC
13 NEW YORK TELEPHONE	\$13,288	284,017		0.9532	NYNY
14 PACIFIC BELL	\$9,052	194,821		0.9535	PTCA
15 NEVADA BELL	\$67	3,942		0.9830	PTNV
16 SOUTHWESTERN BELL TEL. CO.	\$7,947	240,671		0.9670	SWTR
17 MOUNTAIN BELL	\$2,250	80,103		0.9719	MSTC
18 NORTHWESTERN BELL	\$2,344	52,888		0.9557	NWTC
19 PACIFIC NORTHWEST BELL	\$251	41,219		0.9939	PNTC
20 CENTRAL OF FLORIDA	\$187	4,213		0.9557	CEFL
21 CENTRAL OF NEVADA	\$38	6,027		0.9937	CENV
22 CINCINNATI BELL TELEPHONE	\$651	17,613		0.9630	CBTC
23 CONTEL OF CALIFORNIA	\$105	3,006		0.9651	COCA
24 CONTEL OF NEW YORK	\$49	1,708		0.9715	CONY
25 CONTEL OF TEXAS	\$28	741		0.9617	COTX
26 CONTEL OF VIRGINIA	\$169	3,417		0.9507	COVA
27 GTE CALIFORNIA, INC.	\$1,079	35,488		0.9696	GTCA
28 GTE FLORIDA, INC.	\$155	25,077		0.9938	GTFL
29 GTE NORTHWEST, INC.	\$90	13,456		0.9933	GTNW
30 GTE SOUTH, INC.	\$245	22,520		0.9891	GTSO
31 GTE SOUTHWEST, INC.	\$171	17,909		0.9904	GTSW
32 GTE NORTH, INC.	\$327	35,617		0.9908	GTNW
33 GTE HAWAIIAN, INC.	\$0	10,075		1.0000	GTHI
34 LINCOLN TELEPHONE COMPANY	\$101	3,588		0.9717	LTNE
35 ROCHESTER TELEPHONE CORPORATION	\$206	11,199		0.9816	RTNY
36 SOUTHERN NEW ENGLAND TELEPHONE	\$371	36,257		0.9898	SNCT
37 UNITED OF FLORIDA	\$270	12,119		0.9777	UTFL
38 UNITED OF INDIANA	\$0	3,584		1.0000	UTIN
39 CAROLINA TEL. & TEL.	\$40	7,161		0.9944	UTNC
40 UNITED OF OHIO	\$72	8,828		0.9919	UTOH
41 UNITED OF PENN.	\$31	2,595		0.9879	UTPA
42 UNITED INTER-MOUNTAIN	\$51	3,488		0.9854	UTIM

** TOTAL ALL HOLDING COMPANIES	\$56,607	\$2,277,616		0.9751	
1 AMERITECH	\$3,253	\$288,383		0.9887	
2 BELL ATLANTIC	\$2,072	\$362,304		0.9943	
3 BELL SOUTH	\$4,259	\$340,236		0.9875	
4 NYNEX	\$20,675	\$387,363		0.9466	
5 PACIFIC TELESIS	\$9,119	\$198,763		0.9541	
6 SOUTHWESTERN BELL TEL. CO.	\$7,947	\$240,671		0.9670	
7 U.S. WEST	\$4,845	\$174,210		0.9722	
8 CENTRAL TELEPHONE CO.	\$225	\$10,240		0.9781	
9 CINCINNATI BELL TELEPHONE	\$651	\$17,613		0.9630	
10 CONTINENTAL TELEPHONE CO.	\$351	\$8,872		0.9605	
11 GTE	\$2,068	\$160,142		0.9871	
12 LINCOLN TELEPHONE CO.	\$101	\$3,588		0.9717	
13 ROCHESTER TELEPHONE CORP.	\$206	\$11,199		0.9816	
14 SOUTHERN NEW ENGLAND TELEPHONE	\$371	\$36,257		0.9898	
15 UNITED TELEPHONE SYSTEM	\$464	\$37,775		0.9877	

Before the
Federal Communications Commission
Washington, D.C. 20554

GEN Docket No. 89-554

In the Matter of

An Inquiry Relating to Preparation for
the International Telecommunication Union
World Administrative Radio Conference
for Dealing with Frequency Allocations
in Certain Parts of the Spectrum

SECOND NOTICE OF INQUIRY

Adopted: September 19, 1990; Released: October 1, 1990

By the Commission:

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INTRODUCTION

1. This *Second Notice of Inquiry (Second NOI)* summarizes comments and reply comments received in response to the Commission's initial *Notice of Inquiry (NOI)*¹ in this proceeding and solicits comments on preliminary Commission proposals, options, and policies for the World Administrative Radio Conference scheduled for February 3-March 5, 1992 (WARC-92) in Spain. All proposals, options, and policies are subject to modification as a result of comments received to the *Second NOI* or as a result of other information that may become available to the Commission. Comments and any additional information will be used to develop further proceedings, if deemed necessary, and will be used to prepare a Commission report that will recommend proposals to the U.S. Department of State at WARC-92.

BACKGROUND

2. In the *NOI*, the Commission noted that the 13th Plenipotentiary Conference (Plenipot), held in Nice, France, May 23-June 29, 1989, determined that a WARC should be held in 1992 to address frequency allocations in certain parts of the spectrum. Specifically, the Plenipot recommended that WARC-92 should consider the Resolutions and Recommendations of three previous International Telecommunication Union (ITU) conferences: namely, the WARC for the Planning of the High Frequency (HF) Bands Allocated to the Broadcasting Service, Second Session, 1987 (HFBC-87); the WARC for the Mobile Services, 1987 (MOB-87); and the WARC on the use of the Geostationary Satellite Orbit and on the Planning of Space Services Utilizing It, Second Session, 1988 (ORB-88). Additionally, the Plenipot recommended that WARC-92 should review Articles 55 (Rev.) and 56 (Rev.) and Appendix 26 of the Radio Regulations and may consider defining certain new space services and allocations to these services in frequency bands above 20 GHz.

3. The *NOI* sought comment on the above topics. It specifically requested comment on the projected frequency needs of the HF (3-30 MHz) broadcasting service, mobile services in the 500-3000 MHz range, high-quality audio or High Definition Television (HDTV) delivered by the Broadcasting-Satellite Service (BSS), and new space services above 20 GHz. Approximately ninety individuals,

businesses, and organizations, representing most of the various services that could be affected by WARC-92, expressed their views in this proceeding. These comments are discussed below.

4. Additionally, on June 21, 1990, the ITU Administrative Council, agreed to expand the WARC-92 agenda to include issues, such as an allocation for low-earth orbiting satellites, related to those recommended by the Plenipot. The complete WARC-92 agenda is contained in Appendix B. Proposals on the new issues are set forth herein, and we specifically invite interested parties to comment on them. Unless otherwise indicated, the Federal Government has concurred in these proposals. The proposals are discussed below, beginning with the lower frequency bands.

5. We also note that the Steering Committee of the Industry Advisory Committee (IAC) to WARC-92 submitted a detailed report, based upon information received from its various Informal Working Groups, that offered input to the *Second NOI*. However, due to time constraints, this report was not submitted to the IAC for formal endorsement.

6. We believe that the IAC Steering Committee report offers an important private sector contribution to this proceeding. We commend the Steering Committee and Informal Working Groups for the substantial work effort involved. We are inserting the report into the docket file and invite comment on it.

ALLOCATION ISSUES BELOW 30 MHZ

SPECTRUM ISSUES BELOW 3 MHZ

7. Six commenters to the *NOI* request that Resolution 706 from MOB-87 be added to the WARC-92 agenda.² This resolution concerns the protection of phased pulse hyperbolic radionavigation systems (Loran-C) from the fixed service, which operates on a secondary basis in the 90-110 kHz band. It calls for the next competent conference to review the fixed service allocation and consider whether it should be deleted. The commenters stress the need to protect Loran-C from interference because it is a safety service and contend that WARC-92 is the next competent WARC available to address this allocations issue. The Radio Technical Commission for Maritime Services (RTCM) and United Parcel Services, Inc. also request that Resolution 705 from MOB-87, which concerns the development of technical criteria for sharing the 70-130 kHz bands, be added to the WARC-92 agenda because of the interrelationship of the services in these bands.

8. *Discussion.* These resolutions were competent for inclusion in WARC-92 under the guidelines established by the 1989 ITU Plenipotentiary Conference. As a result of comments to the *NOI* and a request by the U.S. Coast Guard, the United States proposed that the last Administrative Council specifically include Resolution 706 on the agenda for WARC-92. This recommendation was not supported by other administrations, and was not included on the agenda prepared by the Council. Similarly, Resolution 705 was not included on the agenda. Thus, we cannot argue that the inclusion of either of these resolutions on the agenda would be consequential to a specific issue on the established agenda. Accordingly, we will not consider these resolutions in the U.S. proposals to WARC-92.

ALLOCATION ISSUES BETWEEN 3 AND 30 MHZ (HF SPECTRUM)

9. Germane to WARC-92 is the allocation of additional spectrum for the HF broadcast service. The *NOI* summarized the results of HFBC-87, set forth the current status of the International Frequency Registration Board's (IFRB's) planning exercise, and identified the additional spectrum that had been allocated by WARC-79. With this as background, the Commission requested comments regarding projected frequency needs of the HF broadcast service, the bases for such projections, whether the projected allocations needed to be exclusive, and whether they should be regional or worldwide. In addition, the Commission sought comment on other issues that would be consequential to the projected allocations and might need to be addressed by WARC-92.

Projected HF Spectrum Needs

10. Of the twenty parties that commented on this portion of the spectrum, fifteen commenters expressly support the need for additional spectrum for HF broadcasting.³ George Jacobs (Jacobs), a consulting engineer, as well as several other commenters, contend that worldwide HF broadcasting requirements greatly exceed the number of available channels in the spectrum currently allocated. In support of this assertion, Jacobs references the results of the planning exercises conducted by the IFRB for consideration by HFBC-87, wherein the IFRB found that more than half of the broadcasting requirements could not be satisfied at a level that would ensure a quality broadcast service.⁴ Jacobs also includes a table extracted from the U.S. Delegation Report from HFBC-87 that shows available channels versus needed number of channels for a particular hour in a particular season. The table shows, depending upon band, that the ratio of needed channels to available channels varies from a high of over 5:1 at 6 MHz to a low of 2:1 at 15 MHz.⁵ Similarly, the Association of North American Radio Clubs (ANARC) includes an excerpt from a report by the IFRB to HFBC-87 regarding the planning exercises, where the IFRB found that the average ratio of needed to available channels over a 24 hour period at 6 MHz was 8.48:1.⁶ Both Jacobs and ANARC conclude that expansion of the current broadcast bands is therefore necessary.

11. Additionally, Jacobs contends that the expansion should be at least 50% of current allocations, or approximately 1500 kilohertz. He proposes that specific band segments be taken from spectrum currently allocated in these bands to the fixed service and argues that this proposal would amount to less than 15% of the approximately 10,000 kilohertz of spectrum currently allocated to the fixed service.⁷ These proposals track very closely with the U.S. proposals at WARC-79. Specifically, Jacobs proposes a new band at 19 MHz and band segments in the 6, 7, 9, 11, 13, 15, and 17 MHz bands that are adjacent to existing HF broadcasting bands. According to Jacobs, these additional segments would provide a total of 1500 kilohertz of new HF broadcast spectrum.⁸

12. The majority of those commenters supporting the need for additional broadcasting spectrum agree with Jacobs's proposal and also point to the fixed bands as a possible source of additional spectrum. Family Stations states that there is an increasing use of the fixed bands by broadcasters under international *Radio Regulation 342* without significant complaints of harmful interference.⁹ It concludes that this activity is indicative of limited use by

the fixed service and has led to a *de facto* expansion of broadcasting into the fixed bands. KUSW Worldwide Radio suggests that due to technological advances in satellite, cable, and microwave communications, there is less need for the frequencies assigned to the fixed service and, therefore, additional broadcast spectrum could come from these bands.

13. Several commenters question the need for additional HF broadcast allocations. Mobile Marine Radio, Inc. (MMR) notes that with the recent political changes in the Soviet bloc and the discontinuance of jamming (intentional harmful interference) the perceived demand may be abating. The American Radio Relay League (ARRL) adds that these changes will result in a reduction in congestion in the broadcast bands. ARRL states that it is now possible for previously jammed broadcasters to reach their target areas with fewer frequencies, that there has been a relaxation of media access restrictions in certain countries which has expanded audience opportunities for a wider range of programming via domestic channels, and that there has been an increased delivery of program material to target audiences by newer communications technologies.

14. A few commenters maintain that spectrum efficiency could be enhanced through technical improvements in the operation of broadcast facilities. Thus, the ARRL asserts that if need indeed exists for additional spectrum, increasing the number of channels could be accomplished by making more efficient use of the present allocations through the use of single-sideband (SSB) emissions. Similarly, the World Christian Broadcasting Corporation (WCBC) proposes that a specific timetable be established by WARC-92 for worldwide conversion to SSB emissions. Further, the ARRL notes that some broadcasters use several frequencies simultaneously to increase the probability of reception in their target areas. It states that this practice can be self-defeating because it produces increased co-channel interference and concludes that if broadcasters were to reduce their number of simulcast transmissions, better reception would result. WCBC adds that broadcasters using 500 kilowatt (kW) transmitters should tightly control their antenna beams so that they are "target-specific," with power limited to no more than is necessary to serve the defined target area.

15. Aeronautical Radio, Inc. and the Air Transport Association of America (ARINC/ATA), MMR, and, more generally, the ARRL assert that if additional spectrum is necessary, it should not come from one or more of the bands allocated to either the aeronautical mobile (R), maritime mobile, or amateur services.¹⁰ MMR contends that a strong and continuing demand for terrestrial maritime service exists and that any additional broadcast allocation cannot come from the maritime mobile spectrum. In particular, MMR states that WARC-79 expanded exclusive maritime mobile allocations in several HF bands and that this expansion was based on the needs and experience of countries throughout the world. Therefore, it argues that any change in the maritime mobile allocations to accommodate broadcasting would be highly disruptive and would require another mobile planning conference. More generally, MMR expresses concern that if additional broadcast spectrum is found to be required by WARC-92, this spectrum may be sought in a variety of bands and, thus, any reallocations could affect numerous

services. In order to limit the impact of any reallocations, it asks whether the needs to be addressed can be limited to certain specific bands, such as those at 6 and 7 MHz.

16. ARINC/ATA argues that any expansion of the broadcast bands must not come at the expense of the aeronautical mobile (R) bands. It states that the aeronautical mobile (R) HF allocations are barely adequate to meet aviation's current needs, and that this service will need additional spectrum in the future. It further contends that while satellite operations will eventually supplant HF as the aeronautical service's primary mode of operation for over-ocean flights, terrestrial HF facilities will continue to be needed as a back-up source.

17. *Discussion.* Inadequate allocations for HF broadcasting have been an issue for many years. This issue was last addressed at WARC-79, where the U.S. requested an additional 1840 kilohertz of spectrum to be taken from spectrum allocated to the fixed service.¹¹ Because of continuing and expanding requirements of the majority of countries for fixed services to meet national needs, only 850 kilohertz was reallocated by the conference to broadcasting. Of that amount, 125 kilohertz was in the 9 MHz band, while the rest was in bands above 10 MHz. As discussed in the *NOI*, the new bands were not to be used until a worldwide HF broadcast planning conference was held.¹² Because there was inadequate spectrum reallocated, with no new allocations in the more popular bands at 6/7 MHz, the U.S. took a formal reservation and reserved its right to take the necessary steps to meet the needs of its HF broadcasting services.¹³

18. At the time of WARC-79, the majority of U.S. HF broadcasting was conducted by the Federal Government, as the Commission had only four licensed (private) HF broadcasters, using a total of approximately 125 frequency-hours.¹⁴ Since that time, there has been tremendous growth in private HF broadcasting, and currently nineteen stations operate approximately 772 frequency-hours daily. This growth has not been easy to accommodate and has not taken place solely in the bands allocated prior to WARC-79. Indeed, a large portion of the growth has been in bands not currently available to broadcasting.¹⁵ The Government began authorizing operations in these bands shortly after WARC-79, in accordance with the U.S. reservations taken at WARC-79. Operation in these bands is on a non-interference basis in accordance with international *Radio Regulation* 342. In view of the foregoing, the Commission agrees that additional broadcasting allocations appear to be warranted.

19. Further, we are not convinced at this time that the recent political changes in the world have eliminated this need for additional HF broadcasting spectrum. At first glance, it would appear that the recent suspension of jamming should reduce the congestion in existing bands and, thereby, the need for additional spectrum, because previously jammed broadcasters should require fewer frequencies. In fact, however, there are likely to be few, if any, benefits that will accrue from the suspension of jamming.¹⁶ First, the suspension of jamming has had little effect on Commission licensed stations, none of which has ever been jammed. Furthermore, it appears that many former jamming stations have been converted to low power broadcast stations, thereby contributing to congestion.¹⁷ More importantly, while the IFRB's planning exercises for HFBC-87 were based upon program requirements and did not take jamming into consideration, they failed to satisfy over 50% of the channel requirements due to

insufficient spectrum. Finally, approximately half of the frequency-hours currently authorized for Commission licenses continue to be in bands not currently available to broadcasting because suitable broadcast frequencies are not available due to congestion.¹⁸ Thus, the recent suspension of jamming will have little positive impact on problems of congestion.

20. Determining the amount of additional spectrum required to meet current and future needs of HF broadcasting is difficult. Variables such as propagation, time of day, intended target (service) area (reception zone), transmitter power, type of antenna, and requirements of other broadcasters all play a role in determining whether a specific requirement will be satisfied. Currently, there are 2,930 kilohertz allocated to broadcasting. HFBC-87 attempted to plan this allocation, but failed, due in part to insufficient spectrum.¹⁹ The majority of the comments support the need for increasing the broadcast spectrum by at least 50% (approximately 1500 kilohertz). In addition, IWG 1 has developed a preliminary allocations proposal calling for an increase of 2455 kilohertz.²⁰ The bands from which this additional spectrum should come are difficult to identify because the same bands in demand for broadcasting are also in demand by other services. Because the commenters and IWG 1 support maintaining the existing allocations for the amateur, aeronautical mobile (R), and maritime mobile services, we propose that any additional spectrum for broadcasting come from the bands allocated to the fixed and (general) mobile services.

21. While the Commission is particularly sensitive to the need for additional spectrum below 9 MHz because of the reservations taken by the U.S. when WARC-79 failed to make any additional allocations in the 6/7 MHz bands, we differ with Jacobs over the 6/7 MHz proposal. These bands are among the most sought after by other services, and so finding additional spectrum for broadcasting will not be easy. Jacobs proposes an addition of 450 kilohertz at 7300-7750 kHz. The amateur community is also interested in the 7 MHz band. WARC-79 maintained the worldwide amateur service allocation at 7000-7100 kHz as well as the amateur service allocation at 7100-7300 kHz in Region 2; however, footnote 528 was added which effectively reduced the amateur status in this band from primary to secondary in relation to the broadcasting service in Regions 1 and 3. ARRL now proposes to correct what it terms the incompatible allocation at 7100-7300 kHz by allocating the band worldwide for the amateur service and shifting the existing Region 1 and 3 broadcasting allocation to 7300-7500 kHz, also on a worldwide basis. Worldwide amateur and broadcasting allocations could provide a mechanism for resolving the problems between these two services. In this regard, ARRL's proposal has merit, except that it fails to add additional allocations to broadcasting in Regions 1 and 3 and it provides for an addition of only 200 kilohertz in Region 2.

22. We believe that this situation can best be addressed by proposing to make the existing amateur and broadcasting allocations worldwide. In our opinion, the best way to accomplish this is for both allocations to shift somewhat. We propose that the amateurs receive 300 kilohertz at 6900-7200 kHz and that the broadcasters receive 200 kilohertz at 7200-7400 kHz. We consider the changes to the amateur allocations to be consequential in nature and thus permissible under the WARC-92 agenda. These proposed allocations fall short of Jacobs's proposal by 250 kilohertz at 7 MHz and do not provide for his request for

100 kilohertz at 6 MHz.²¹ We cannot agree completely to his remaining spectrum requirements (350 kilohertz) because of existing congestion at 6 and 7 MHz, and so we propose that the additional spectrum requested by Jacobs in these bands be reduced by half to 175 kilohertz, and we propose to allocate the 5900-5950 kHz and the 7400-7525 kHz bands for broadcasting. With respect to the other bands, we concur with Jacobs's proposal and, therefore, propose to allocate the bands 9350-9500 kHz, 11550-11650 kHz, 13800-13900 kHz, 15600-15700 kHz, 17450-17550 kHz, and 18900-19300 kHz for broadcasting.

Single-Sideband (SSB)

23. Only ARRL and WCBC discussed SSB. We note that at WARC-79 the United States proposed to discontinue all double-sideband (DSB) transmissions in the HF broadcast bands by January 1, 1995 as a way to increase efficient use of the bands, but the proposal was rejected by the conference. At HFBC-87, the United States supported an early conversion date to SSB. Instead, the conference adopted Resolution 517, which calls for conversion no later than December 31, 2015, due to the concerns of many countries regarding the cost and availability of SSB transmitters and receivers.

24. Resolution 517 refers to Appendix 45 of the international *Radio Regulations*, which specifies the characteristics for SSB in the broadcast service. Appendix 45 does not specify fully suppressed carrier SSB, rather, it specifies reduced carrier SSB (RSSB) with a maximum carrier reduction of 12 decibels and a channel spacing of 5 kilohertz.²² RSSB requires the use of a receiver with a synchronous demodulator, which uses a device for the carrier acquisition that regenerates the carrier by means of a suitable control loop and, thus, locks the receiver onto the incoming carrier (e.g., phase-locked loop). Existing DSB receivers which utilize envelope detection cannot be used with RSSB emissions. Resolution 517 considered the life of a receiver to be approximately ten years and the life of a transmitter to be approximately twenty years. In order to allow use of DSB receivers until 2015, it resolved that all RSSB emissions prior to the 2015 conversion date limit their carrier suppression to 6 dB, which will enable DSB receivers with envelope detection to receive the signal without significant deterioration of reception quality. Although Resolution 517 has not been specifically placed on the WARC-92 agenda, we believe that it can be addressed since it is considered in Recommendation 511, which is on the WARC-92 agenda, in determining the need for additional spectrum.

25. Because a reaccommodation procedure, as discussed in paragraph 32, *infra*, will be required for the new broadcast allocations, and thus limit access to them until a future date is determined by WARC-92, we believe that it is appropriate to require that the proposed additional bands utilize RSSB.²³ In view of the scarcity of HF spectrum, we believe that everything possible should be done to increase the efficient use of this valuable portion of the spectrum. RSSB use would increase the channel capacity over that which would be available using DSB and minimize the amount of additional spectrum needed for HF broadcasting.²⁴ We propose, however, to exempt the proposed allocation at 7200-7400 kHz from this requirement since it involves shifting the current Region 1 and 3 allocation at 7100-7300 kHz, and is therefore only a new allocation for Region 2. The requirement to use RSSB is

identified in the form of a footnote in each of the affected bands. We seek comment regarding this proposal and the impact it would have on HF broadcasting.

26. We further believe that it would be appropriate to change the conversion date in Resolution 517 to the same date that the new broadcast spectrum allocated by WARC-92 would be available. As discussed in paragraph 32, *infra*, we are proposing that the new spectrum be made available July 1, 2007. Therefore, we propose that the conversion date in Resolution 517 be changed to July 1, 2007.²⁵ Although this is eight and one-half years earlier than the existing date, we believe that the need for increased spectrum efficiency and the state of current technology warrant such a change. We seek comment regarding this change and the impact it would have on HF broadcasting.

27. In short, due to the congestion in the HF bands, we are proposing a total of 1325 kilohertz of additional spectrum for the broadcast service, rather than the 1500 kilohertz sought by the majority of commenters or the 2455 kilohertz identified by IWG 1.²⁶ However, since we are proposing that RSSB be used in the new bands, we consider our proposals as essentially greater than or equivalent to what has been requested. Specifically, we are proposing that the broadcast service receive 50 kilohertz with an RSSB requirement at 6 MHz, 125 kilohertz with an RSSB requirement at 7 MHz, 200 kilohertz with no RSSB requirement at 7200-7400 kHz, and 950 kilohertz with an RSSB requirement in the 9, 11, 13, 15, 17, and 19 MHz bands.

Sharing

28. A majority of the commenters address the issue of sharing between broadcast and other services in the 3-30 MHz band. In general, they agree that it is very difficult for other services to share with the broadcasting service in this band because broadcast stations use high power transmitters and highly directional antennas. Commenters therefore generally agree that broadcast allocations should be exclusive and on a worldwide basis.

29. Several commenters, however, contend that, in particular instances, sharing might be feasible and is warranted. ARRL states that although it receives interference from broadcasters in the shared 3900-4000 kHz and 7100-7300 kHz bands, the amateurs make effective use of these bands during certain hours of the day and on narrow frequency gaps between broadcast transmissions. ARRL maintains that loss of access to these bands would cause a severe blow to amateurs' disaster communications capabilities in Region 2. Jacobs states that sharing below 9 MHz could be considered as a means of easing reallocation as long as the fixed and mobile services are secondary to broadcasting. Anna Case (Case) suggests that time sharing may be possible in the lower bands, but admits that it would require constraints on all users.

30. *Discussion.* The commenters contend, and experience shows, that sharing with broadcasting is possible but difficult. Moreover, at WARC-79, the United States proposed to allow existing national fixed operations to continue in most of the bands proposed to be reallocated to broadcasting; both the fixed and broadcast services were to minimize interference to each other, and administrations were urged to establish sharing arrangements. However, these proposals were rejected by the conference, and all new broadcast allocations were established on an exclu-

sive, worldwide basis. Nevertheless, ARRL's comments demonstrate that under some circumstances sharing is possible.²⁷

31. Additionally, we believe that it is essential that as a part of any agreed broadcasting reallocation, non-broadcasting HF services must retain the flexibility to maintain regulatory access to bands of spectrum reallocated to the broadcasting service worldwide. Although we are proposing that all broadcast allocations be exclusive and on a worldwide basis, we are proposing a footnote for each new band, except the 7200-7400 kHz band, that provides for access by the fixed and mobile services on a secondary basis. Comments are requested on this proposal as well as the possibility of time, geographic, or other types of sharing. In addition, we request comment regarding what constraints or limitations may be required for such sharing to be feasible.

Reaccommodation

32. To reallocate spectrum on an exclusive basis from the fixed and mobile services to the broadcast service, we will have to displace hundreds of Commission licensed stations that are authorized by the Private Radio and Common Carrier Bureaus. It is imperative that these displaced stations be accommodated in frequency bands with performance reliabilities and propagation characteristics essentially equivalent to their existing allocations and that this be done within a reasonable time frame. This would minimize the financial impact that reallocation would have on these services. The reaccommodation procedures adopted by WARC-79 are found in Resolution 8, which also specifies a timetable for conversion, and Resolution 9. Using Resolutions 8 and 9 as models, we have developed a proposal, which is shown in Appendix A as Resolution BBB. We believe that the reaccommodation process will be difficult for all services in all bands, and we are therefore proposing a single conversion date of 15 years (July 1, 2007) rather than two dates as specified in Resolution 8. We are also proposing footnotes for the new bands that will refer to the reaccommodation process in Resolution BBB. We request comments from the affected licensees in those bands that we are proposing to reallocate to the broadcast service with regard to their continued need for the bands and, thus, their need to be accommodated. Comments should also address the adequacy of the procedures proposed in Resolution BBB, the adequacy of the proposed timetable for effectuating the reallocation of the bands, as well as the consequences of reduced spectrum for the existing services.

Other HF Spectrum Issues

33. Case suggests that consideration be given to deletion of the portion of the international *Radio Regulations* pertaining to the "tropical zone" because national and international broadcasting requirements will be treated on an equal basis under planning.²⁸ According to Case, elimination of the tropical zone limits would allow bands to be used for broadcasting on a worldwide basis.

34. MMR notes that while MOB-87 did not implement the 4 MHz and 8 MHz maritime allocations that are shared with the fixed service, it did revise Resolution No. 319, which requests the Administrative Council to include these bands on the agenda of the next competent conference. Therefore, it urges the Commission to seek inclusion of these bands on the WARC-92 agenda and suggests

that a change in status to accord maritime mobile either exclusive or sole primary status would enable a future technical conference to integrate these bands into the maritime operating plans. RTCM supports this proposal and adds that Resolution 8, the WARC-79 reaccommodation procedures, should also be placed on the agenda so that it can be updated.

35. National Public Radio (NPR) suggests that international economic, social, and political circumstances appear to support the dedication (set-aside) of a portion of the HF spectrum for the use of public radio entities in order to encourage participation and decrease necessary start-up funds. It urges the Commission to consider the public policy objectives that such an allocation would advance.

36. In addition to its proposal discussed in paragraph 21, *supra*, the ARRL proposes that, if the agenda for WARC-92 permits, the United States pursue the following new amateur allocations: 50-100 kilohertz in the vicinity of 5 MHz, 200 kilohertz near 10.150 MHz, 50 kilohertz near 14.350 MHz, 150 kilohertz near 18.168 MHz, and 150 kilohertz near 24.890 MHz. ARRL also suggests that as propagation changes hour-by-hour, it would be desirable for HF broadcasters to move to real-time, dynamic signal selection methods rather than continue their reliance on propagation predictions and published schedules. According to ARRL, monitoring of reception in the target area for immediate feedback to the broadcaster would reduce interference by deactivating frequencies that cannot be heard in the intended reception area.

37. Brian Cassidy (Cassidy) proposes the creation of an international "Freeband" at 27.410 - 27.970 MHz. Cassidy contends that thousands of U.S. hobbyists currently operate in this band illegally and contribute much to the economy. Cassidy states that the band has been used by hobbyists all over the world for over 15 years and that a U.S. allocation would reduce interference problems and improve the hobby.

38. *Discussion.* No comments were received pertaining to Case's proposal.²⁹ The U.S. position at WARC-79 was to maintain the existing allocations limited to the tropical zone as well as to increase them by 300 kilohertz. Although we make no specific proposal at this time, we request comments on Case's proposal. With regard to the issues raised by MMR and RTCM, because these considerations are outside the WARC-92 agenda, we are rejecting these proposals. With respect to NPR's proposal, the Commission finds it not to be feasible because of congestion in the HF bands. We also find that such an allocation is unnecessary because there is no current rule that prevents public broadcasters from becoming licensed as international broadcasters. Therefore, nothing is proposed in this regard. Finally, we find that, unlike the Commission's proposed changes at 7 MHz, ARRL's and Cassidy's allocation proposals are not consequential and, therefore, are outside the WARC-92 agenda. Accordingly we will consider them no further. Regarding ARRL's dynamic signal selection proposal, we find that as this addresses a service-oriented rather than an allocations issue, it should be considered in the context of preparations for the HFBC planning WARC scheduled for 1993. Thus, we decline to advance this proposal at this time.

ALLOCATION ISSUES BETWEEN 100 AND 3000 MHZ

39. The *NOI* raised three issues from MOB-87 and ORB-88 that the Commission considered potential topics within the 100 to 3000 MHz band for the WARC-92 agenda. In particular, Resolution 208 (MOB-87), Resolution 520 (Com5/1) (ORB-88), and Recommendation 716 (COM6/F) (ORB-88) were mentioned as candidates for the agenda. Resolution 208, entitled "Extension of the Frequency Bands Allocated to the Mobile-Satellite and Mobile Services and Their Conditions of Use," recommends that a WARC be convened no later than 1992 to consider additional allocations for mobile-satellite and other mobile services in the 1-3 GHz range; Resolution 520, entitled "Future Change in Article 8 for the Broadcasting-Satellite Service (Sound) in the Frequency Range 500 MHz to 3000 MHz," recommends that a future conference consider an allocation for satellite sound broadcasting in the 500-3000 MHz range; and Recommendation 716, entitled "Use of Certain Frequency Bands Below 3000 MHz by the Space Research and Space Operation Services," recommends that a WARC examine coordination procedures associated with the space research and space operations services in the 2025-2110/2200-2290 MHz bands. Recommendation 205 (MOB-87) complements Resolution 208 in that it recommends that a suitable band or bands for international use be designated for future public land mobile telecommunications systems taking into account the relevant CCIR Recommendations and Reports.

40. The Industry Advisory Committee recommended to the Commission that additional items on a selective and limited basis be placed on the agenda. These included: a) the mobile satellite service (space-to-Earth) and (Earth-to-space) on a primary basis in the 137-138 MHz and 148-149.9 MHz bands respectively, b) terrestrial broadcasting (sound) in the frequency range 500 to 3000 MHz as complementary to BSS (Sound), and c) radiodetermination satellite service in the 1610-1626.5 MHz and 2483.5-2500 MHz bands on a primary basis in Regions 1 and 3. The United States proposed to the ITU Administrative Council additional agenda items to incorporate these IAC recommendations. The ITU Administrative Council, after considerable debate, included agenda items which provided the conference the capability to address these issues in some manner. The text of the agenda is attached as Appendix B herein.

TERRESTRIAL MOBILE SERVICES

41. The ITU Administrative Council's established agenda includes the following three items related to an allocation of frequency bands to the mobile and mobile-satellite services and associated feederlinks:

"a) in the approximate range 1-3 GHz, as indicated in Resolution 208 (MOB-87);

b) for the development in the approximate range 1-3 GHz of a worldwide system of public correspondence with aircraft, as indicated in *Recommendation* No. 408 (MOB-87), or designate for this use a band already allocated to the mobile service in the same range;

c) for the development of the international use of the mobile service for future public land mobile telecommunication systems, as indicated in *Recom-*

mendation No. 205 (MOB-87) or designate for this use a band already allocated to the mobile service; ..."

In the *NOI*, we noted that European countries seem particularly interested in obtaining additional mobile service allocations because of their desire to develop various Pan-European mobile systems, including international digital mobile services. We also noted that MOB-87 adopted a footnote (RR743A) to the international Table of Frequency Allocations to allow twelve countries in Region 1 to use the 1700-2450 MHz band on a primary basis for land mobile services subject to the coordination requirements of Article 14 of the international Radio Regulations. We stated that as the 1700-2450 MHz band is already allocated to the mobile service on a primary basis in Region 2, this allocation issue does not appear to be a concern for the U.S. private sector. In addition, we posed several questions regarding the spectrum requirements (amount of spectrum, frequency bands, etc.) for mobile and mobile-satellite services.

42. A majority of the commenters to this proceeding address the issue of mobile and mobile-satellite service spectrum requirements. These commenters generally fall into two groups: those entities who wish to obtain additional spectrum for mobile services in the 1700-2450 MHz band³⁰ and those entities who wish to continue the existing services within this band.³¹ Both groups, however, take issue with our view that since Region 2 has already allocated the band 1700-2450 MHz to the mobile service, the reallocation of the band is not a concern to the U.S. private sector.

43. Proponents for providing additional mobile spectrum in the 1700-2450 MHz band point to the considerable emphasis in Europe and Japan for allocations within this band to support new mobile services; e.g., personal communication networks (PCN), Digital European Cordless Telephone (DECT), and Future Public Land Mobile Telecommunications Services (FPLMTS). Several commenting parties note that a significant amount of spectrum would be needed if these services were to be implemented in the United States. Moreover, they argue that this spectrum has to be identified, if the United States desires to maintain competitive economic and technological leadership in the provision of these services worldwide. Indeed, some proponents specifically propose an exclusive worldwide land mobile allocation to support new mobile services. They further contend that a specific allocation in the 1700-2450 MHz band is necessary to promote the development of uniform standards and equipment for an international marketplace. The commenters observe that the international mobile allocations in this frequency range are not implemented in the U.S. domestic allocations table to any great degree and that a significant portion of the 1700-2450 MHz band is primarily used by various types of fixed microwave operations.³²

44. The proponents recognize that, assuming sharing of spectrum is infeasible, if the mobile allocations were to be implemented, new mobile technology would likely require changes in the international Table of Frequency Allocations to reassign some services currently operating in the 1700-2450 MHz band to other bands. These parties suggest that where reassignments are necessary, implementation dates should be set sufficiently far in advance to offset economic hardships to those licensees required to

relocate to other bands. Several of these parties contend that in addition to being provided new allocations, fixed operations could be reallocated as a secondary service in the new mobile bands. Others suggest that fixed operations should be moved to wireline or fiber optic circuits.

45. The proponents differ with regard to the amount of spectrum that should be reallocated. Motorola, Inc. (Motorola) proposes the largest amount of spectrum (800 megahertz) to be allocated for new technology mobile services. Motorola recommends that 200 megahertz of this spectrum be made available immediately, that 300 megahertz be made available in five to seven years, and that an additional 300 megahertz of spectrum be made available in 12 years. Several other proponents, however, propose that only 150 to 200 megahertz be made available, citing studies undertaken within the ITU's CCIR.³³ NYNEX Corporation (NYNEX) specifically disagrees with Motorola's assessment that 200 megahertz is needed immediately for personal portable wireless technologies.

46. Those parties opposing the proposed new mobile service allocations represent diverse user groups. They include the Private Operational Fixed Services (POFS), Instructional Television Fixed Service (ITFS), Multipoint Distribution Service (MDS), Domestic Public Fixed Services, and Broadcast Auxiliary services. POFS licensees provide point-to-point microwave services for a wide variety of users, including public safety, highway maintenance, forestry conservation, fire, emergency medical, local government, utilities, and railroad services. POFS licensees state that 2 GHz point-to-point services are critical to their operations. They contend that there are no suitable alternatives to these operations, that these frequency bands provide the most ideal propagation for long distance communications links to remote areas, that no spectrum alternatives are available, and that replacement of equipment is expensive and would require long procurement cycles. Some opponents assert that the current POFS allocations are barely adequate to meet their current needs and that additional spectrum will be required in the future. POFS licensees therefore maintain that the Commission should not reallocate 2 GHz frequencies to mobile services until we consider whether alternative frequencies are available for POFS licensees, what the cost of relocating POFS users would be, and how much time would be required to permit relocations to occur in a cost-effective manner. In addition, several commenters argue that the mobile services should be required to operate more efficiently within their existing allocations through improvements in operational practices, technical standards, and equipment. They question whether PCN type services and technology should take precedence over the public welfare and safety benefits provided by POFS licensees.

47. ITFS users assert that they need access to the ITFS frequencies in the 2.5-2.7 GHz band and that no suitable frequencies or other adequate transmission alternatives are available. They note that repeated Commission actions since 1963 to reserve frequencies for educational uses constitute a commitment to the educational community.³⁴ ITFS users contend that a reallocation of the 2.5-2.7 GHz band would be contrary to this commitment.

48. The National Association of Broadcasters (NAB) and Rockwell International Corporation (Rockwell) are cautious on allowing mobile services to use the 2 GHz band services. NAB states that the Commission should take account of the extensive congestion of the 900 MHz and 2 GHz bands used for Broadcast Auxiliary Services,

because such congestion is a critical component in any plan to make those frequencies available for mobile services. Rockwell submits that if sharing of the 2 GHz spectrum is to be considered, the Commission should develop as full a record as possible regarding the abilities or inabilities of the fixed and mobile services to coordinate their activities within the same spectrum on a co-equal basis.

49. Finally, McCaw Cellular Communications, Inc. (McCaw) recommends that rather than have U.S. spectrum policies dictated by the differing needs of other countries, the United States should advocate the development of broad allocation categories that would enable the Commission to tailor domestic spectrum allocations to complement the existing telecommunications structure and, thus, best meet the needs of the American consumer. McCaw observes that the majority of commenters fail to address matters relevant to the development of a WARC strategy. The commenters, McCaw notes, have restricted themselves to their own domestic allocation agendas without demonstrating their relevance to the international scene and have failed to identify any means by which the changes may benefit the United States internationally. In particular, McCaw contends that a U.S. domestic allocation plan, especially one that merely paralleled those promulgated in Europe and Japan, could actually present foreign firms with an opportunity to increase their U.S. market share significantly.

50. *Discussion.* The Commission's position in the *NOI* was essentially a statement of the fact that the international Table of Frequency Allocations for Region 2 has a mobile allocation from 1710-2500 MHz on a co-primary basis with the fixed, space research (2290-2300 MHz), radiolocation (2300-2500 MHz), and radiodetermination-satellite (2483.5-2500 MHz) services. Consequently, the United States did not need to make a specific proposal for an international mobile allocation in order to implement any new technology mobile services in the United States. Furthermore, we are not persuaded at this time that an exclusive international allocation for land mobile services would be in the overall best interests of the United States. We concur with the comments of McCaw to the extent that they suggest a policy of flexibility within the allocations. However, we also recognize the benefits that could accrue to U.S. equipment manufacturers if a uniform international allocation were adopted for land mobile services. Nonetheless, on balance we believe that we should continue to have shared co-primary allocations for mobile services with other services in the international Table of Frequency Allocations throughout the 1710-2500 MHz band. This policy would allow any reallocation of the existing spectrum to be accomplished in a domestic Rule Making.³⁵ The debate within the comments highlights the concerns with respect to the technological, economic, and public policy ramifications of personal portable wireless technologies that will need to be addressed within a domestic rule making for any national reallocation of spectrum from existing users to new technology mobile services. We note that on June 14, 1990, the Commission adopted a *Notice of Inquiry* in GEN Docket No. 90-314 to develop a public record on how best to implement new personal communications services in the United States.³⁶

900 MHZ ISSUES

51. GEC Plessey Telecommunications, Ltd. and its affiliate company Stromberg-Carlson Corporation (Plessey) notes the pressing need for spectrum allocations for emerging advanced wireless personal communications, *i.e.* cordless telephones (CT-2). It observes that the United Kingdom (U.K.) is currently providing a public access service operating in the 864-868 MHz band on a shared basis with U.K. Government operations. Plessey notes that this spectrum is not available in the United States and that the Commission is currently considering proposals to introduce CT-2 at 940-941 MHz and later at 941-947 MHz. Plessey recommends that in developing the U.S. position on international allocations, the Commission recognize that CT-2 will likely require at least four megahertz of bandwidth to accommodate business office applications. It states that CT-2 can generally operate within the 800-960 MHz band and that spectrum can be made available in four or five discrete blocks with a separation of no more than eight megahertz spanning a total bandwidth not to exceed 20-25 megahertz. Plessey advocates that the Commission's position ensure that the international frequency allocations adopted at WARC-92 preserve the Commission's ability to facilitate the rapid deployment of this personal communications service in the United States.

52. *Discussion.* We note that the international Table of Frequency Allocations in the 800-960 MHz band has primary shared mobile service allocations in the 860-902/928-942 MHz bands and secondary allocations for mobile services in the 902-928/942-960 MHz bands. It appears from an international perspective that sufficient flexibility in the international allocations is provided to permit the United States to implement this service if we wish to do so within the appropriate domestic proceeding. Indeed, this issue of an allocation for CT-2 is currently under consideration in GEN Docket No. 90-314. Hence, we propose no change in the mobile allocations for the frequency range 806-960 MHz in Region 2.

AIRCRAFT PUBLIC CORRESPONDENCE (APC)

53. Recommendation 408 (MOB-87) requests additional studies on the development of a worldwide system for public correspondence with aircraft and the placement of an item on the agenda of a future WARC at the conclusion of these studies. This Recommendation notes (1) the bands 1593-1594 MHz and 1625.5-1626.5 MHz have been allocated under certain conditions to the aeronautical mobile service to provide the initial allocations for pre-operational and experimental APC systems, and (2) that in some countries, the use of those bands for APC systems would cause considerable difficulty. The *NOI* and commenters did not specifically address this APC issue. The MOB-87 decision to allocate the bands 1593-1594 MHz and 1625-1626.5 MHz to the aeronautical mobile service in accordance with RR 731A, 731B, 731C, and 731D attempts to provide a worldwide allocation for this service. However, some countries assert that this allocation will not sustain an operational worldwide system and that in many areas of the world the service retains a secondary status with respect to other services. Hence, under this agenda item, administrations will seek to upgrade the allocation status of this service worldwide and will seek additional spectrum to meet this perceived demand.

54. Recently, the Commission allocated four megahertz of spectrum at 849-851/894-896 MHz for a terrestrial air-ground public correspondence service to meet United States domestic needs.³⁷ In that *Report and Order*, we stated that the two megahertz of spectrum at 1593-1594/1625.5-1626.5 MHz is insufficient to satisfy both domestic and international air-ground needs.³⁸ We noted, however, that if these bands were to become heavily used for international air-ground telephone communications, then U.S. carriers would likely provide aircraft that fly international routes with equipment capable of using both bands. This, of course, would require a domestic Rule Making and equipment type acceptance. However, we also noted that most U.S. aircraft do not fly international routes.³⁹

55. Based on the above decisions, we do not believe that additional allocations need to be made on a worldwide basis. Consequently, we are not proposing any additional allocations for an aeronautical mobile service to provide aeronautical public correspondence.

MOBILE - SATELLITE SERVICES (MSS)

56. In the *NOI*, we noted that additional land mobile-satellite (LMSS) allocations were adopted at MOB-87 in the frequency bands 1530-1544 MHz, 1555-1559 MHz, and 1626.5-1645.5 MHz. Portions of the 1530-1544/1626.5-1645.5 MHz bands are shared on either a co-primary or secondary basis with the maritime mobile-satellite service (MMSS). The United States took a reservation to MOB-87 with respect to these allocations, indicating its continuing desire to implement MSS in an appropriate manner to satisfy U.S. requirements.⁴⁰ We noted that the Commission subsequently declined to adopt the international allocations for the 1545-1559/1646.5-1660.5 MHz bands and reaffirmed its earlier decision to allocate domestically the bands for the aeronautical mobile-satellite service (AMSS(R)) and other mobile-satellite services.⁴¹

57. ARRL, Communications Satellite Corporation (Comsat), Geostar Corporation (Geostar), and American Mobile Satellite Corporation (AMSC) suggest that additional allocations be provided near the current MSS allocations. Comsat further argues that the International Maritime Satellite Organization (Inmarsat) would require from 16 to 25 megahertz of bandwidth in both the ship-to-shore and the shore-to-ship MMSS. It states that these requirements are based upon traffic forecasts for communications with ships at sea and the provision of two new services--maritime television and medium to high speed maritime data services. Comsat states that the Inmarsat forecast for the Atlantic Ocean Region (AOR) AMSS(R) requirements is six megahertz by the year 2000, and notes that the International Air Transportation Association (IATA) forecasts nine megahertz for such services over the same time period. For LMSS, Comsat states that the Inmarsat international LMSS projection for the AOR is six megahertz by the year 2005. Comsat says that domestic LMSS and domestic AMSS(R) requirements must also be added to these projections. No other commenter provided forecasts for the amount of spectrum required for the MSS.

58. Geostar and AMSC advocate the need for generic allocations for MSS. AMSC recommends that the Commission continue to pursue generic MSS allocations in international fora. Geostar maintains that we should try to satisfy the domestic MSS requirements by limiting any

additional MSS allocations to systems with national or regional satellite antenna coverage patterns. Geostar asserts that this would provide a basis for the long-term development of national MSS systems throughout the world.

59. ARINC/ATA, on the other hand, states that the MOB-87 compromise should be accepted by the United States and that users should be permitted to use the shared bands in this country.⁴² According to ARINC/ATA, the United States should re-examine its generic MSS proposals and "back away from its unilateral attempt to force the rest of the world to accept its proposed and ill-advised non-conforming use of this band especially insofar as aeronautical safety communications are involved." Comsat similarly opposes a generic MSS allocation and proposes to have separate MSS allocations for the land, maritime, and aeronautical services that would be available to satisfy global, national, and regional system requirements. Comsat asserts that while the economic viability of a satellite system may be improved by designing it to support more than a single service, the system need not be operated with all services supported with real-time channel assignments from a single pool of channels common to all services. Comsat states that it is possible to support each service from a separately coordinated frequency pool that is controlled in real-time according to the unique needs and priorities of each service.

60. With regard to the issue of a generic versus specific allocations, Comsat observes that many concerns have been voiced in international fora regarding the potential for interference to safety services and the lack of assurance that sufficient bandwidth would be available when needed. Comsat states that the supposition that safety services can be protected by real-time preemption has not been supported by a demonstration of how this could be achieved easily and reliably and without significant economic penalty to the user community.⁴³

61. Comsat and Orbital Communications Corporation (ORBCOMM) further disagree with the Geostar proposal to the extent it would limit any additional MSS allocations to national or regional systems. Although it recognizes that extensive use of satellite spot beams in the new allocations can facilitate improved orbit spectrum utilization efficiency, Comsat argues that because of the current scarcity of spectrum and the coordination compromises required for both the international and national systems, it is only fair to have the new allocations available for both international and national systems. ORBCOMM asserts that this restriction is not appropriate for low earth orbiting satellite because these systems are inherently global in nature.

62. Geostar and Comsat provide specific proposals for additional allocations. Geostar recommends that the Commission propose that spectrum between 1000-3000 MHz currently allocated to the fixed and mobile services be reallocated on a co-equal primary basis with the existing services and the mobile-satellite services. These allocations, Geostar asserts, would allow individual administrations to effect the appropriate balance between satellite and ground based mobile communications depending upon their individual requirements.

63. Comsat provides several proposals for additional mobile-satellite allocations. In particular, Comsat proposes:

a. To allocate the band 1525-1530 MHz on a primary basis to the MMSS in the satellite-to-mobile direction to satisfy some of the expected new demand for shore-to-ship wideband transmissions;

b. To allocate sufficient new spectrum from bands immediately below 1525 MHz for satellite-to-mobile transmission and immediately below 1626.5 MHz for mobile-to-satellite transmissions for all three mobile satellite services;

c. Alternatively, or additionally as requirements dictate, to allocate the band 2500-2535 MHz for satellite-to-mobile and 2655-2690 MHz for mobile-to-satellite to meet the requirements of three mobile-satellite services;

d. To allocate spectrum for LMSS on a shared basis with terrestrial services, for LMSS not supporting safety-of-life, by applying techniques in the LMSS similar to those utilized by Geostar for its data messaging services;

e. To explore the sharing of the Radiodetermination Satellite Service (RDSS) allocations with LMSS having reasonably compatible characteristics;

f. To modify RR 729A, concerning the provision of aeronautical public correspondence with the AMSS(R) service dependent upon the authorization by administrations, to read:

"Notwithstanding any other provisions of the Radio Regulations relating to restrictions in the use of the bands allocated to the aeronautical mobile satellite (R) service for public correspondence, the bands 1545-1555 MHz and 1646.5-1656.5 MHz may be used for public correspondence with aircraft earth stations. Such communications must cease immediately, if necessary, to permit transmission of messages with priority 1 to 6 in Article 51."

64. Several existing ITFS and multipoint MDS users contend that before any allocations for satellite services are considered for the 2500-2690 MHz portion of the spectrum, the Commission should require the preparation of interference analyses to show that the potential satellite users would not cause harmful interference to the current users in this band.

65. *Discussion.* We believe that the demand for mobile-satellite service is beginning to grow. Until recently, most MSS has been limited to maritime systems, but recent years have seen a significant increase in interest in providing land and aeronautical MSS. This is supported by the implementation of the Qualcomm, Inc. (Qualcomm) and interim Geostar systems, as well as by various other applications before the Commission, for the provision of MSS. In addition, the proliferation of MSS systems being developed by various countries indicates that there will be increasing pressure to accommodate more and more systems within the limited spectrum available for these services. The characteristics used with MSS systems--essentially omnidirectional earth stations with limited discrimination capabilities between satellites--will constrain the number of systems that can operate simultaneously on the same frequencies. Each system will have less spectrum to use as more systems are accommodated in the future.

66. Furthermore, recent studies by the International Civil Aviation Organization's (ICAO's) Aeronautical Mobile Satellite Service Panel forum indicate that, depending on the number of equipped aircraft earth stations being served, approximately 9-13.2 megahertz of spectrum would be required to satisfy the North American AMSS(R) requirement in the year 2010.⁴⁴ If this is true, the other mobile-satellite services that are using this band will need to be satisfied in other bands or in other ways as this AMSS(R) requirement develops over the next 20 years. Accordingly, we believe that it is essential to develop MSS proposals to satisfy these additional spectrum requirements.

67. Initially, we believe that each system that is implemented should use the current spectrum as efficiently as possible to satisfy the broadest range of mobile satellite service requirements. Therefore, we will continue to pursue our generic mobile satellite allocations as proposed at MOB-87. Hence, we again propose a generic mobile satellite service allocation for the 1530-1559/1626.5-1660.5 MHz bands. We are modifying these proposals to take into account some decisions made at MOB-87 and recent Commission decisions to provide priority access for maritime safety and distress communications in the maritime MSS for the Global Maritime Distress and Safety System (GMDSS). Since we are making generic MSS proposals, Comsat's proposal for modification of footnote 729A will not be proposed. The generic MSS allocations with priority and real time pre-emption provided for AMSS(R) in accordance with our proposal for RR Add 730 B would not require such a regulation. Instead, we propose to delete RR 729A and several other Radio Regulations adopted at MOB-87 as consequential to our generic MSS allocation proposal.

68. As for additional spectrum allocations, we believe that Comsat's proposal to allocate five megahertz of additional bandwidth in the 1525-1530 MHz band in the space-to-Earth direction to match the current uplink allocation at 1626.5-1630.5 MHz is appropriate. We propose that this spectrum be an extension of our generic MSS proposals and that it be shared with the space operation service on a co-equal primary basis in all three Regions. We propose to reallocate the Region 1 and 3 terrestrial-fixed service currently operating in the band to secondary status worldwide. We propose that these fixed operations continue on a primary basis until 1997, after which time we expect MSS to be implemented in the 1525-1530 MHz band (See proposal RR Add 723 B). Also, the 1525-1530 MHz band is currently used in the United States for flight test and telemetry stations in accordance with Part 87. Such flight test and telemetry operations would also continue to operate in the band until such mobile satellite services are implemented.

69. With respect to Comsat's proposal to add MSS to the 2500-2535 MHz (satellite-to-mobile) and 2655-2690 MHz (mobile-to-satellite) bands, we are mindful of the comments provided by the ITFS and Multichannel MDS users that operate in these frequency bands. Given the Commission's continuing commitment to the ITFS and the Multichannel MDS users in this part of the spectrum, we believe the proponents of this proposal should provide the necessary analyses, technical sharing criteria, and appropriate coordination arrangements that would be required to have compatible operations between the satellite and existing services in these bands. Similarly, we will require proponents of the Comsat and Geostar proposals

to share MSS on a co-equal, primary basis with similar terrestrial services—*i.e.* fixed and mobile services—to submit interference analyses on a band-specific basis. In addition, we believe that a concept of operations and implementing methodology should be provided to address the dynamic nature of MSS and mobile services currently in the bands to determine the appropriateness of co-equal, primary sharing. These technical analyses and sharing criteria are necessary to assure United States users of the spectrum that compatible operations are possible and to convince administrations at WARC-92 of the appropriateness of such proposals.

70. Even though Geostar notes that the United States has maintained a distinction between MSS and RDSS, we believe there is merit in Comsat's proposal to share the RDSS bands at 1610-1626.5 MHz and 2483.5-2500 MHz on a co-equal, primary basis with mobile-satellite services having systems with compatible characteristics. The original allocation was to permit up to 12 systems using code division multiple access (CDMA) to operate in the RDSS allocations.⁴⁵ This service has not materialized as originally anticipated. We believe that additional use should be made of these allocations. In addition, we note that as MSS systems in other bands have also been providing RDSS type information, the two services appear to complement each other. Therefore, we propose an MSS allocation for all three Regions in the same directions as the RDSS allocations in the 1610-1626.5 MHz and 2483.5-2500 MHz in these bands. We believe the MSS should operate with compatible CDMA modulation characteristics similar to the RDSS. When the Commission implemented the licensing provisions for RDSS, we envisioned a service capable of supporting multiple co-coverage systems using pseudo-random CDMA modulation characteristics. The different codes would be coordinated to insure that the several co-coverage systems would be compatible. We have proposed Add 733Z in order to insure that the MSS and RDSS are implemented with compatible CDMA characteristics. We seek comment on the feasibility of implementing this concept internationally within the ITU Radio Regulations. We believe this is necessary for the successful implementation of the MSS in these bands. MSS systems with different digital or analog modulation appear to be incompatible with the RDSS and would create spectrum inefficiencies in this band. If ADD 733Z is not feasible or if it or some similar regulatory provision is not adopted at WARC-92, we believe these MSS proposals should be withdrawn.

71. Furthermore, MOB-87 adopted in Article 28 RDSS Equivalent Isotropic Radiated Power earth station limits for the 1610-1626.5 MHz band in accordance with RR 2548A and RDSS satellite power flux density limits in accordance with RR 2557 in the 2483.5-2500 MHz band as sharing criteria to protect existing terrestrial services. No criteria were adopted to protect the RDSS services from terrestrial services, but Resolution 708 was adopted for the development of sharing criteria for the RDSS and terrestrial services (aeronautical radionavigation, fixed, mobile, radiolocation, and radio astronomy). This Resolution has been placed on the WARC-92 agenda. In addition, MOB-87 adopted in Article 11 RR 1107.2 a provision to apply the Appendix 28 procedure to the radiodetermination satellite service. We also note that U.S. RDSS licensees operating in the 1610-1626.5 MHz band need to comply with the memorandum of understanding (MOU) with the Radio Astronomy community conduct-

ing observations in the 1610.6-1613.8 MHz band.⁴⁶ We believe that the RDSS sharing criteria, understandings and regulatory provisions need to be applied equally to MSS in these bands. We recognize, however, that these regulatory sharing criteria in Article 28 and the Radio Astronomy MOU could constrain the types of mobile satellite services that could be implemented in these frequency bands. Consequently, these allocations may not be sufficient to satisfy all of the different service requirements within the MSS. Thus, we seek comment on the applicability of these sharing criteria and understandings to MSS to be provided on a shared basis with RDSS in these bands. We also seek comment on any other sharing criteria or regulatory provisions that will be necessary to support this allocation for MSS as a viable proposal to WARC-92.

72. In 1988, the ICAO Future Navigation Systems (FANS) Committee completed development of the future system concept for air navigation services (which, in ICAO terms, includes communication, navigation, and surveillance (CNS) services). The Global Navigation Satellite System (GNSS) capability is a part of this concept. It is to be supported by available radionavigation satellite systems, which would be available to other civil users, in particular other mobile users. Because of the costly nature of providing enough satellites to satisfy the requirements of a sole means civil aviation satellite navigation system, the United States and the U.S.S.R. are investigating the potential benefits of using the U.S. Global Positioning System (GPS) and the U.S.S.R. Global Navigation System (GLONASS) in a compatible manner. In particular, the United States and U.S.S.R. are investigating the possibility of having a user terminal that can take advantage of both GPS and GLONASS system capability to either increase system integrity and reliability, or satisfy the sole means requirement, which could not be satisfied by either system separately. The GLONASS is designed to operate within the 1597-1617 MHz band in addition to other bands. The GLONASS already has a number of satellites in circular low earth orbit with each satellite operating on a separate center frequency with pseudo-random-noise (PRN) code modulation. The Executive Branch is concerned that the additional MSS allocation in the 1610-1626.5 MHz band could result in interference to GLONASS and thus the potential GNSS. Consequently, the Executive Branch believes that the 1610-1626.5 MHz band should be retained for navigation/position location purposes, as exhibited in the Region 2 aeronautical radionavigation and radiodetermination satellite allocations unless detailed sharing studies demonstrate compatible operations between the GLONASS and the MSS. We seek comments on the feasibility of sharing MSS systems with GLONASS as implemented under the proposals herein.

73. We also recognize that all of the MSS proposals contained herein may not be sufficient to satisfy all of the MSS bandwidth requirements for future systems. Due to the competing demands for spectrum in this frequency range, these proposals are the best that we have been able to identify to date. We seek comments that would provide additional viable allocations for the MSS, recognizing that such proposals should address any necessary sharing criteria and regulatory provisions that would make the proposal feasible (*See, also, para. 104, infra.*).

RADIODETERMINATION-SATELLITE SERVICE

74. The WARC-92 Agenda now includes an item to consider ". . . footnotes relating to the radiodetermination satellite service in the frequency range 1.6-2.5 GHz with a view to harmonizing them and allowing administrations to revise the status of their respective allocations to this service and to review the sharing criteria as indicated in Resolution No. 708 (MOB-87)." Geostar proposes that the RDSS allocations be made uniform as a primary service in all three ITU Regions.

75. *Discussion.* We recognize that the WARC-92 agenda did not envision raising RDSS to primary status in all Regions. However, since we are proposing MSS in the RDSS bands on a primary worldwide basis, we concur with Geostar that RDSS should be available on a primary basis in all three Regions. We propose to add the RDSS (Earth-to-space) in the 1610-1626.5 MHz band and RDSS (space-to-Earth) in the 2483.5-2500 MHz band on a primary basis in all three Regions, as a consequential amendment to our proposal to add the mobile-satellite service in these two frequency bands on a primary basis in the three Regions. *See para. 70, supra.* Because the characteristics of the two satellite services are to be compatible and will in most instances operate jointly from a single spacecraft, we believe that both services should operate with the same allocation status. This proposal would provide the opportunity to allow administrations to harmonize the footnotes to a primary allocation. We are also proposing as consequential amendments to suppress RR Nos. 733E, 733F, and 753C.

76. As mentioned above, the sharing criteria for MSS, RDSS, and other services in these frequency bands should be the same as those developed for the RDSS. We have identified the criteria adopted at MOB-87 in para. 71 *supra*. Resolution 708 has been included within the Agenda. It invites the CCIR to continue its studies to obtain more precise results concerning the conditions of sharing in the bands 1610-1626.5 MHz, 2483.5-2500 MHz, and 2500-2526.5 MHz between RDSS and other terrestrial services. We seek comment on any additional criteria, for example constraints on the terrestrial services in Article 27 to protect RDSS and the MSS, or modifications to the existing criteria necessary to make the RDSS and MSS viable services in these bands. These sharing criteria are essential to determine the viability and feasibility of these proposals.

LOW-EARTH ORBITING SATELLITES

77. The ITU Administrative Council addressed MSS low earth orbiting satellites by providing a WARC-92 Agenda item to "consider possible allocations of up to 5 MHz of a frequency band below 1 GHz to low-orbit satellites on the basis of appropriate sharing criteria."

78. ORBCOMM, Starsys, Inc. (Starsys), and Volunteers in Technical Assistance, Inc. (VITA) are interested in obtaining allocations for low earth orbiting (LEO) satellites. ORBCOMM and Starsys have petitioned the Commission for an amendment of Section 2.106 of the Commission's Rules to establish an LEO MSS and request authority to construct such a system. Each seeks changes at WARC-92 to permit the global operation of an LEO system. ORBCOMM's proposed system would use 370 kilohertz of bandwidth in the 137-138 MHz band for space-to-Earth transmissions and 478 kilohertz of bandwidth in the 148-149.9 MHz band for Earth-to-space

transmissions. In addition, ORBCOMM would use 50 kilohertz of bandwidth in the center of the 400.05-400.150 MHz band to transmit time information on a standard frequency. Therefore, ORBCOMM proposes to add a co-equal primary MSS allocation in the 137-138 MHz band for space-to-Earth transmissions and in the 148-149.9 MHz band for Earth-to-space transmissions. No changes would be required for the standard frequency and time signal satellite allocation at 400 MHz. Starsys also proposes that the 137-138 MHz and 148-149.9 MHz bands be reallocated to LEO MSS in the space-to-Earth and Earth-to-space directions, respectively.⁴⁷

79. VITA is interested in the development and global provision of a low-cost store-and-forward satellite-based packet radio system for computer-to-computer information transfer. It requests that we propose a Fixed Satellite Service (FSS) allocation within the 200-800 MHz frequency range for an LEO service. VITA indicates that a 100 kilohertz downlink and a 100 kilohertz uplink with accompanying guard bands of 10 kilohertz per channel would be sufficient to support four communications channels. ORBCOMM indicates general support for the VITA proposal and believes that its satellite constellation would meet VITA's technical requirements. In late-filed comments, VITA responds that it wishes to pursue its own dedicated system and thus, that its and ORBCOMM's proposals should be considered separately.

80. *Discussion.* We believe we should propose allocations to support low earth orbit satellite systems that represent new technologies. However, the potential need and demand for these new LEO services must be balanced against the desires and needs of the current spectrum users to continue operations. With this in mind, we have examined the 137-138 MHz, 148-149.9 MHz, and other frequency bands to determine suitable allocations for this service. The band 137-138 MHz is currently allocated worldwide on a primary basis to the Space Operation, Meteorological Satellite, and Space Research services (space-to-Earth). There are currently 27 non-geostationary satellites and 16 geostationary satellites identified in the ITU Publication List VIIA of Stations in the Space Radiocommunications Services and in the Radio Astronomy Service, (March 1990). Similarly, in the 148-149.9 MHz band, the ITU publication list identifies 30 non-geostationary satellites and 17 geostationary satellites. ORBCOMM, Starsys, and Vita did not adequately address the difficulties of sharing an LEO MSS system--which essentially has continuous global operations with relatively high power--with these other geostationary and non-geostationary satellite systems. We have reservations that the LEO MSS systems could be made compatible with these other satellite systems.

81. In addition to satellite systems, the band 148-149.9 MHz is allocated to the fixed and mobile services on a primary basis. In Region 1, the mobile service allocation excludes the aeronautical mobile (R) allocations. The applications filed by ORBCOMM and Starsys, Inc. do not adequately address the sharing constraints that would be required to share this band on a co-primary basis with these users. In addition, the U.S. Government and other nations use this band extensively for land mobile operations. We believe additional information and study is required to ascertain the possibility of sharing with these existing services. Consequently, we believe that any LEO system allocation should be limited to a secondary status until such sharing studies indicate that these LEO MSS

services can be implemented on a primary basis. We have proposed herein a secondary allocation for the LEO MSS in the 137-138 MHz and 148-149.9 MHz bands.

82. However, we do not believe a secondary allocation for LEO MSS operations enable the systems operators to attract the financial and other resources needed for the construction and implementation of an extensive satellite system. Thus, a primary allocation for LEO MSS systems might be more appropriate. As the conference agenda proposes to address this issue in frequency bands below 1000 MHz, we believe a primary allocation of one megahertz below 1000 MHz in each direction would seem appropriate to satisfy the demand for this service. Therefore, we propose that the bands 420-421 MHz and 930-931 MHz be used for LEO satellites in the MSS.⁴⁸ The 930-931 MHz band would provide the uplink for the 420-421 MHz downlink. Internationally, the 420-430 MHz band is allocated to the fixed and mobile services with the radiolocation service continuing on a primary basis in the United States and other countries in accordance with RR651. The amateur service also operates on a secondary basis in this band in the United States and other countries. We believe the existing users in the lower one megahertz of the band can be accommodated within the 421-430 MHz band. The 930-931 MHz band has been reserved domestically for an advanced paging service, but we have not taken any action beyond the general allocation. We propose to add MSS on a primary basis limited to low earth orbiting satellites by adding footnote RR 705A. Since there are no sharing criteria for this service with existing services, we propose that this service be implemented subject to seeking agreement with other administrations operating radio services in accordance with the international Table of Frequency Allocations, through the Article 14 procedure.

83. We seek comment on these allocation proposals for the provision of LEO satellite systems. In particular we seek comment on accommodation of existing users in the 420-421 MHz band and the coordination and sharing requirements for these LEO services at 930-931 MHz. We also seek comments on any regulatory procedures in addition to Articles 11 and 13 needed to obtain international recognition and protection of LEO satellite systems.

BROADCASTING-SATELLITE SERVICE (SOUND)

84. The Administrative Council adopted an agenda item to consider the allocation of frequency bands to the broadcasting-satellite service and associated feeder links for the broadcasting-satellite service (sound) in the range 500-3000 MHz, as indicated in Resolution 520 (ORB-88), including the accommodation of complementary terrestrial sound broadcasting uses within this allocation.

85. In the *NOI*, we noted that Resolution 520 (Com 5/1) from ORB-88 called for a future conference to consider an allocation for broadcasting-satellite service (sound) within the frequency range 500-3000 MHz, including feeder links. We also noted that such an allocation could be used to provide wide-area high-quality service to listeners using portable and automobile receivers. We posed several questions regarding the requirements for BSS (Sound), including: whether there is a requirement for BSS (Sound) in the United States; what the projected spectrum needs of this service are in light of the fact that use of the UHF television band is not practical in the United States for BSS (Sound); whether any allocations for BSS (Sound) should be exclusive or on a

shared basis; and what other services or existing systems could be affected by reallocations for BSS (Sound), if specific bands are suggested.

86. NPR, Adventist Broadcasting Service, Inc. (ABS), the Voice of America (VOA), Satellite CD Radio, Inc. (SCD Radio), and AFRISPACE Inc. (AFRISPACE) express support for BSS (Sound) allocations in the 500-3000 MHz band in this proceeding.⁴⁹ In addition, the Industry Advisory Committee, prior to the ITU Administrative Council, suggested that the Commission consider the addition of a complementary terrestrial broadcasting service with the satellite allocation for the WARC-92 agenda. The Committee has been actively pursuing spectrum requirement studies and sharing analyses to identify suitable frequency bands for this new service requirement. Further, subsequent to the completion of the *NOI* comment and reply comment period, SCD Radio filed a petition for Rule Making for a domestic allocation in the 1400-1530 MHz band for a new digital quality satellite radio service to be complemented with a terrestrial broadcasting service. Simultaneously, SCD Radio requested authority to construct, launch, and operate a two geostationary satellite system for this service within the United States.⁵⁰ Similarly, AFRISPACE filed a petition for Rule Making for such an allocation; *i.e.* BSS (Sound) in the 1470-1530 MHz band and an application to construct the first of two geostationary satellites to provide an international satellite sound broadcasting system (AFRISTAR) on a non-interference basis to Africa and the Middle East.⁵¹

87. NPR states that BSS (Sound) should be considered for non-commercial public radio usage and that it may present a significant opportunity to achieve total national geographic coverage with signals unattainable by traditional technologies. It recommends that the Commission advocate an exclusive BSS (Sound) allocation or one shared solely with the Inter-satellite Service. NPR contends that its analysis shows that sharing with terrestrial broadcasting ranges from difficult to infeasible. ABS says that it is committed to providing new services to an increasing variety of international audiences and observes that BSS (Sound) presents an opportunity to serve a vast array of worldwide audiences in an efficient and cost effective manner. It proposes the adoption of an exclusive spectrum allocation for this service.

88. In reply comments, VOA maintains that a need exists for BSS (Sound) allocations to support U.S. public diplomacy interests. VOA explains that Europeans, including the Soviet Union, appear to be moving forward with this concept and that the United States will need to cooperate with many nations in order to provide international broadcasting services. VOA's ability to broadcast to other populations directly via satellite will depend upon reciprocity; *i.e.* other administrations' ability to broadcast to audiences in the United States. VOA also notes that BSS (Sound) could become a substantial service internationally and that many different U.S. interests could benefit. It notes the new digital audio broadcasting systems will permit compact disk quality and highly reliable transmission to mobile receivers. VOA questions the Commission's view that use of the UHF television band is not practical in the United States. According to VOA, detailed sharing analyses have begun in the 500-3000 MHz band. Based on its analysis to date, VOA concludes that it appears that geographic exclusivity would be preferred to provide BSS (Sound) frequency assignments. According to VOA's preliminary conclusion, geographic cells with BSS

(Sound) would be determined, frequency reuse at sufficient distances from one cell to another would be defined, and other services could be interleaved and use the unused frequency blocks within all cells.

89. SCD Radio notes its recent filings with the Commission for the broadcasting satellite service (sound) with a new complementary terrestrial broadcasting service. Under its proposal, SCD Radio claims nearly every broadcast licensee would be able to operate on a local, 34 channel capacity, CD quality aural broadcast service. At the same time, SCD Radio believes a new 66 channel CD quality satellite radio service would be made possible throughout the United States.⁵²

90. AFRISPACE claims that it has identified a clear need for a BSS (Sound) service on an international basis. Consequently, AFRISPACE has proposed a radio satellite service to Africa and the Middle East whereby broadcasters would purchase or lease transponder capacity on its system for the transmission of various broadcast programming. AFRISPACE recommends a separate allocation in the 1470-1530 MHz band for BSS (Sound), because 1) its systems, as proposed, would operate in this band, 2) Resolution 505 (WARC-79) encourages the location of BSS (Sound) in the 1425-1530 MHz band, 3) AFRISPACE's studies of worldwide trends for BSS (Sound) implementation suggests the 1470-1530 MHz band is rapidly becoming a consensus choice, and 4) sharing spectrum with satellite-delivered HDTV would cause unacceptable interference to mobile receivers.

91. Comments from Gary Gaulin propose to add a new commercial band for digital quality sound and digital data broadcasting services for the video display of words to music, the time of day, weather, school cancellations, etc.

92. ARRL comments that sharing presents a difficult problem if the receiver can be physically located anywhere and requires a strong signal. Also, ARRL states that if an administration decided not to implement BSS (Sound), it should be free to make use of the band for some other purpose in accordance with its territorial sovereignty.

93. NAB, Utilities Telecommunications Council (UTC), Harris Corporation--Farinon Division (Harris), APCO, and the Association of Maximum Service Telecasters (MST) oppose an allocation for BSS (Sound) in Region 2. They contend that there is no proven demand for this service. Furthermore, they assert that should this service be implemented in Europe or Asia, it must not create interference to current operations in Region 2. The Association of American Railroads (AAR) maintains that such services, to the extent there is any demand for them, can be accommodated through existing allocations.

94. Several commenters express concern regarding the potential reallocation of spectrum for BSS (Sound). ABS states that the bands under consideration already have frequency coordination problems with some space services. ARRL and Amtech express concern about reallocating the 902-928 MHz band and API expresses concern about reallocating the 952-960 MHz and 932-935/941-944 MHz bands. AAR contends that assigned frequency pairs in the 800/900 MHz bands are needed for the nationwide Advanced Train Control System, that six megahertz in the reserve bands should remain for land mobile uses, and that the POFS bands at 2 GHz should not be made available for BSS (Sound). MST asserts that the 500-806 MHz UHF-TV band and the

1990-2110/2450-2483.5 MHz auxiliary broadcast bands should be protected. NAB contends that the entire UHF-TV band at 470-806 MHz should be protected.

95. Harris, Motorola, ARRL, and APCO suggest that the UHF-TV band be considered for other services. Motorola asserts that improvements in television receivers can eliminate many current UHF constraints, resulting in the availability of 156 megahertz of spectrum. Other commenting parties note that the delivery of television programs through cable and satellite make the need for the current amount of UHF-TV spectrum questionable.

96. Aerospace and Flight Test Radio Coordinating Council (AFTRCC), in late-filed comments, specifically opposes the SCD Radio proposal for BSS (Sound) in the 1435-1530 MHz band because "it is based on fundamental misconceptions regarding the way in which flight test operations are conducted; it posits an unrealistic view of the potential for life-threatening interference to test pilots and others; and it fails to balance, or even address, the relative merits of yet another entertainment and advertising vehicle as against the importance of the telemetry allocation to U.S. national security and global competitiveness." AFTRCC cites several recent Commission decisions whereby we decided not to share the flight test and telemetry frequencies with other services (amateur and auxiliary broadcast) on a secondary basis or with unlicensed devices such as garage door openers.

97. *Discussion.* In view of the recent interest that has developed domestically in providing BSS (Sound) or digital audio broadcasting (DAB) services, as it is referred to in the *Notice*, we recently issued a *Notice of Inquiry* in GEN Docket No. 90-357, seeking comment on several issues that have arisen concerning this service.⁵³ While many policy issues remain to be addressed in that proceeding, we believe that in the event we ultimately decide that a satellite or terrestrial DAB service would be in the public interest, the United States should be prepared to advance possible international allocation proposals for the service. The question of where to locate this service is not an easy one given the debate among the commenters. Besides where to locate the spectrum, there is also some question as to the amount of spectrum that is required for BSS (Sound) with a complementary terrestrial broadcasting service. Matters are further complicated by the question of whether or not BSS (Sound) can share with other services.

98. To begin with, we note that some studies have indicated that up to 100 megahertz of spectrum would be required for BSS (Sound) including accommodation of terrestrial sound broadcasting within the same allocation. We will, however, attempt to satisfy the domestic requirement for this service as indicated by SCD Radio. The application and petitions appear to require 20 megahertz of spectrum in any given geographic area for the satellite portion of this service. We have examined several frequency bands in trying to satisfy this BSS (Sound) requirement, and we are proposing three options herein for further consideration. These options propose more than the 20 megahertz specifically for the domestic BSS (Sound) requirement in order to provide for the international BSS (Sound) and complementary terrestrial broadcasting services. We address these options in frequency order without indicating a preference. We also address some of the difficulties associated with each option, and we seek comment on the feasibility of each option and what additional regulations, sharing criteria,

reaccommodation procedures, etc. may be required to make each option viable. We reiterate that all proposals, options, and policies discussed herein are preliminary and subject to modification as a result of comments or other information that we may receive.

99. The first option focuses on the UHF-TV band. Although the *NOI* indicated that we would not consider reallocating spectrum from the UHF-TV spectrum, upon reflection and analysis of the comments, we believe we should re-examine this possibility for BSS (Sound). Since this service may have a complementary terrestrial broadcasting service and some have indicated a need for a terrestrial broadcasting without the satellite service, we believe the UHF-TV spectrum offers some opportunity to satisfy the requirements for this service.⁵⁴

100. Since SCD Radio has proposed 60 megahertz for this service on a shared basis with other services, we believe, as one option, that we should try to satisfy this requirement as a shared primary allocation in a band with a current satellite allocation. To this end, we note that RR 693 provides for a television broadcasting satellite service in the UHF-TV spectrum (620-790 MHz), which has not materialized in the United States. RR 693 of the Radio Regulations states that the implementation of this allocation requires agreement between the administrations concerned and those having services operating in accordance with the Radio Regulations that may be affected. Such a provision is normally required when a shared allocation is proposed. We seek comment on the possibility of adding a BSS (Sound) allocation at 728-788 MHz, with a similar agreement seeking provision, on a shared primary basis with the other services already allocated in the band (UHF television broadcasting in the United States). We are mindful of the NPR comments that indicate that BSS (Sound) sharing with terrestrial broadcasting would be difficult to infeasible. Should further analysis of the feasibility of sharing confirm NPR's view, we recognize that the implementation of this option by the United States or, with our agreement, by neighboring countries such as Canada or Mexico, would require the suspension of television service in those areas of each country with television channels overlapped by signals in the BSS (Sound) directed to the same service areas, and for some yet-to-be established distance beyond. For example, should we decide to implement 12 megahertz of BSS (Sound) in this country, which would provide 40 BSS (Sound) channels under SCD Radio's approach or 48 channels under the Strothers approach, we may need to vacate two UHF TV channels throughout the United States. Similarly, should we agree to a Canadian or Mexican implementation of BSS (Sound) on other channels in the 728-788 MHz band, then, in order to avoid serious interference to U.S. television service, those additional TV channels would need to be vacated for some distance from the international border. We seek comments on the feasibility of this option, any foreseen impact it would have on the implementation of advanced television service in this country, and any applicable sharing criteria that could be used to establish preclusion zones for television broadcasting, in the event that this option is adopted by WARC-92 and implemented by the United States.

101. The second option focuses on the 1435-1530 MHz band, as proposed by SCD Radio and AFRISPACE and one of the five bands mentioned by the Strothers Petition. This frequency band is heavily used for aeronautical mobile telemetering services by both the U.S. Government

and the private sector. For the private sector, the use of this band is coordinated by AFTRCC as recognized in 47 CFR Section 87.305 and is scheduled on a daily basis in many areas of the country, particularly the East and West coasts. These flight tests take place at altitudes to 60,000 feet and above, and within 200 mile operational areas around specific test areas. Consequently, the interference distance to these operations from other services can be substantial. These flight test, telemetry, and telecommand operations are vital to the U.S. aerospace industry to produce, deliver, and operate safe and efficient aircraft and space vehicles. Because the nature of the BSS (Sound) operations is 24 hour a day programming and the test and telemetry operations are in the proximity of many major metropolitan areas, we believe, as AFTRCC asserts, that the BSS (Sound) transmissions will cause interference to these operations and threaten safety of life and property. Consequently, we do not believe it is feasible to share aeronautical mobile telemetering frequencies with BSS (Sound) or terrestrial broadcasting systems. Therefore, we believe that any allocation to BSS (Sound) and a complementary terrestrial broadcasting service must be on an exclusive basis in the 1435-1530 MHz band. Since we are proposing to reallocate to the MSS the 1525-1530 MHz band on a shared basis with the space operations service (*See* para. 68 *supra*), we believe a reallocation of 32 megahertz (1493-1525 MHz) to BSS (Sound) and terrestrial broadcasting on a shared exclusive basis should satisfy this requirement.⁵⁵ This amount of spectrum is less than the 60 megahertz requested, but this would be exclusive spectrum for these two services while the SCD Radio proposal was to share the spectrum with other services.⁵⁶

102. If we were to implement this option, we would need to reaccommodate the flight test and telemetry operations. Therefore, we would propose as a consequential amendment to reallocate the 2390-2420 MHz band to the mobile service for aeronautical telemetering.⁵⁷ This would provide spectrum to reaccommodate the flight test operations for most of the spectrum lost to other services. This reallocation is adjacent to the 2310-2390 MHz band allocated to the flight test and telemetry operations and would provide a larger amount of contiguous spectrum for the flight test and telemetry operations. We propose to displace the fixed, radiolocation, amateur, and amateur satellite services currently operating in the band 2400-2420 MHz to above 2420 MHz. In addition, the band 2400-2500 MHz (center frequency of 2450 MHz, plus or minus 50 megahertz) is allocated to Industrial Scientific and Medical Equipment (ISM). We have previously determined that aeronautical flight test and telemetry operations should not share spectrum with unlicensed devices because of the threat to safety of life.⁵⁸ ISM devices encompass many different types of equipment ranging from microwave ovens to medical diathermy operating with various power levels under widely differing conditions. This equipment is used by the general public without regard to interference circumstances and may be in operation for many years. Any radio services operating in this ISM band must be able to accept interference from ISM equipment. We therefore propose to reduce the ISM band to 2420-2480 MHz. We seek comments on the feasibility of this proposal, particularly the ability to reclaim the 2400-2420 MHz band from existing ISM equipment. What reaccommodation time periods would be feasible to move the flight test and telemetry operations to the 2390-2420 MHz band? We also seek comments on the possibility of

moving the ISM center frequency from 2450 MHz to 2460 MHz or to some other frequency. What time periods would be required for the reaccommodation of ISM equipment to another center frequency and to reduce the ISM band from plus or minus 50 megahertz to plus or minus 30 megahertz? We seek comments on any aspect of this option that would make it feasible.

103. As a third option, we propose to allocate the 2390-2450 MHz band to the broadcasting satellite service (sound) with a complementary terrestrial broadcasting service. We would vacate all other services in this band except ISM equipment, which we would propose to reduce in bandwidth to 2420-2480 MHz. As mentioned above, this ISM band is used extensively in the United States by microwave ovens and other equipment, such as medical diathermy. The Federal Government makes limited use of this band for airport surveillance radars but has no intentions for greater use because of interference from ISM equipment. The band is also allocated to the amateur and amateur satellite services on a secondary basis. This band may offer possibilities to satisfy the broadcasting satellite (sound) allocation, particularly at the low end of the band, recognizing that ten megahertz of spectrum could satisfy 33 multiplexed sound channels. We seek comments on the feasibility of using the 2390-2450 MHz band for BSS (Sound) and reducing the ISM bandwidth. With this option, we also seek comments on the possibility of moving the ISM center frequency. As mentioned in option 2, we seek comments on the time periods associated with reclaiming the 2400-2420 MHz band from ISM equipment or moving the ISM center frequency to 2460 MHz. In this regard, comments are specifically sought on satisfying the broadcasting satellite requirements in the 2390-2420 MHz portion of this band or any other variation of this option which would satisfy the BSS requirement.

104. If the 2390-2450 MHz band is found to be unsuitable for BSS (Sound) or the AFTRCC mobile aeronautical telemetering proposal in option 2, a portion of this band could also offer the possibility of satisfying additional MSS allocations, particularly as an Earth-to-space allocation. If this were considered, we would need to determine an appropriate downlink MSS allocation.

OTHER SPACE SERVICES

105. Recommendation 716 (COM6/F) ORB-88 suggests that a WARC examine the difficulties associated with the tasks of coordination and obtaining agreements required for the development and implementation of stations within the space research and space operation services in the 2025-2110/2200-2290 MHz bands in view of the provisions of Article 14. In the *NOI*, we noted that this recommendation was a potential candidate for the agenda. Subsequently, the ITU Administrative Council included this recommendation as an agenda item. The space research, earth exploration satellite, and space operation service allocations are provided within RRs 747 and 750 for the 2025-2110 MHz and 2200-2290 MHz bands, respectively.

106. Domestically, the band 2025-2110 MHz has been allocated to the fixed and mobile services. It is used by the private sector for the auxiliary broadcast service. Space research and Earth exploration-satellite services are permitted in this band on a case-by-case basis in accordance with footnote US 90 to the international Table of Frequency Allocations. Footnotes US 111, US 219, and US 222 provide specific locations where the space re-

search and Earth exploration-satellite service stations can be operated and under what conditions. In the United States, the 2200-2290 MHz band is allocated to the U.S. Government for fixed (line-of-sight only), mobile (line-of-sight only, including telemetering but excluding the flight testing of manned aircraft), and space research on a co-equal primary basis. Footnote US 303 to the international Table of Frequency Allocations provides for non-Government space stations at 2285-2290 MHz within the space research, space operations and Earth exploration-satellite service. Footnote G101 indicates that the space operations and Earth exploration-satellite services both in the space-to-Earth and space-to-space directions can be accommodated on a co-equal, primary basis with the fixed, mobile, and space research services.

107. The National Aeronautics and Space Administration (NASA) currently operates the Tracking and Data Relay Satellite System (TDRSS) in the 2025-2110 MHz (Earth-to-space and space-to-space) and 2200-2290 MHz (space-to-Earth and space-to-space) bands. This system will support a wide variety of spacecraft, including manned spacecraft, through the year 2000. NASA indicates that coordination in accordance with Article 14 has been a lengthy, expensive, and time-consuming process and that the results are less than satisfactory. Consequently, NASA believes that its safety policy requires that communication links in support of manned space activities be operated in frequency bands with a primary allocation.

108. NASA proposes to upgrade the space research, space operation, and earth exploration-satellite services in the Earth-to-space and space-to-space directions for all three services to primary allocations in the 2025-2110 MHz band. A similar allocation for the three services in the 2200-2290 MHz band is proposed for the space-to-Earth and space-to-space directions. These proposals are essentially the same as the U.S. proposals to the 1979 General World Administrative Radio Conference. Consequential changes to Nos. 747, 750, Appendix 28, and Articles 27 and 28 of the Radio Regulations will be required to provide the appropriate sharing criteria with other services operating in these frequency bands. These proposals, however, are intended as WARC-92 proposals only to eliminate the coordination difficulties that currently exist internationally. NASA indicates that the domestic regulations that currently exist should not be changed. We seek comment on these proposals. We specifically request information on the appropriate sharing criteria that would be needed to make the necessary consequential changes to Appendix 28 and Article 27. Our proposal herein to modify Article 28 limits the space-to-Earth and space-to-space operations to the power flux density values prescribed in RR 2557 through 2560.

Extra-Vehicular Activity (EVA)

109. The WARC-92 agenda includes an item for "the consideration of possible allocations of frequency bands above 20 GHz to the new space service applications." A footnote to this agenda item states: "Communications with manned space vehicles may be defined as a new space application which may require the indication of the space service and the frequency bands that this service may use for this purpose."

110. Extra-vehicular activity is described as work activities undertaken by astronauts outside the shelter of their base space vehicle, protected only by a life support space suit. The purpose of this proposal is to provide a primary

allocation in an appropriate service for communications during scheduled EVA activities. The system is to provide communications between astronauts and base spacecraft such as the Space Shuttle and Space Station Freedom. The new system will be used for the assembly, maintenance and operation of Space Station Freedom as well as other generic EVA operations, e.g., the repair of the Hubble Space Telescope. All of these communications between astronauts and manned space vehicles are essential to the successful and safe operations of the U.S. Space Shuttle and Space Station Programs.

111. EVA communication support consists of voice and data links between the astronauts working outside their base spacecraft and the base spacecraft. Because of electrical power, mass, and volume constraints for the EVA unit, there are limitations on the achievable transmitted power (about 1/4 watt). An omni-directional antenna on the EVA is necessary to provide orientation-independent communication. Operating range for the EVA link would normally be within about 100 meters of the primary spacecraft, although reliable operation at up to one kilometer is required to support contingency operations. The band selected must be between 270-575 MHz to comply with power and size restrictions of the astronaut's suits.

112. Current limited EVA communication activities operate below 300 MHz. However, with the future expansion of EVA activities, the new system will require additional capacity (a 10 megahertz band is required). Frequency support below 400 MHz is not possible. For these reasons, we are proposing that this new space service application concerning manned space vehicles be satisfied with a primary space research (space-to-space) allocation at 410-420 MHz, restricted to these activities. This proposal is based on demonstrating compatibility of EVA communications activities with existing users of the band. In this regard, we request comments on the appropriate power flux density limit that is needed to protect existing users in the band 410-420 MHz. We also note that a sharing study is under review in the U.S. CCIR Study Group 7 on "Science Services." This study is being conducted by the Study Group 7 Interim Working Party 2/2 that is responsible for preparing input documents to the WARC-92 Joint Interim Working Party. Interested parties are encouraged to participate in the development of this sharing study.

OTHER PROPOSALS

113. Several new proposals that were not included within the Resolutions and Recommendations mentioned in the *NOI* as candidates for the agenda were advanced in the comments.

Public Safety Service

114. APCO proposes that a "Public Safety" mobile allocation be made internationally. It states that public safety users have improved the efficiency of use of their allotted spectrum and yet still have a great need for additional spectrum. APCO contends that public safety use should have priority in the allocation of spectrum and that additional spectrum, possibly taken from the UHF-TV bands, could be made available for this purpose.

115. *Discussion.* No commenters specifically support or oppose this proposal. However, as noted above, several commenters maintain that the UHF-TV spectrum should

not be considered for additional allocations. The proposal for this new radio service category is not within the agenda of the conference, and we do not intend to make a proposal for this service. The mobile service discussion above makes it clear that sufficient international allocations for mobile services exist to accommodate additional spectrum needs for public safety purposes.

Low Power Radiolocation Devices

116. Amtech World Corporation (Amtech), a manufacturer of automatic vehicle monitoring (AVM) and RF identification (RFID) systems, offers a proposal for introduction in the event the WARC should propose to alter the 902-928 MHz and 2.4-2.5 GHz bands in a manner that could impair the ability of RFID suppliers to utilize these bands. Specifically, Amtech proposes a footnote to the Table of Frequency Allocations to read:

"The bands 2400-2500 Mhz (sic) and 902-928 MHz in Region 2 may also be used for low power mobile radio location devices on a secondary basis."

117. *Discussion.* Since, as indicated above, we are not proposing any changes to the 902-928 MHz band for mobile services, we do not believe that it is necessary to make a formal proposal on this matter at this time. We will review this decision in light of United States or other administrations' proposals for this frequency band. With respect to 2400-2500 MHz, we seek comment on the ability of the BSS (Sound) to operate in the 2400-2450 MHz band with ISM equipment and low power mobile radiolocation devices. In trying to satisfy the BSS (Sound) requirement, we are proposing to reduce the ISM band to 2420-2480 MHz and to vacate other services from the 2390-2450 MHz band. We are also soliciting comments on moving the ISM center frequency. We will consider the Amtech proposal in conjunction with any decision to provide satellite services or aeronautical mobile telemetering operations in this band and reduce the ISM bandwidth.

Fixed-Satellite Service Proposals

118. Comsat offers proposals to improve the use of the fixed satellite allocations in the frequency bands 3400-3700 MHz and 5850-5925 MHz. Comsat proposes to reallocate the 3400-3600 MHz band from the FSS to the radiolocation service on an exclusive basis and delete RR 784, which calls for the cessation of emissions by the radiolocation systems. It also proposes to delete the radiolocation allocation in the 3600-3700 MHz and 5850-5925 MHz bands in the U.S. Table of Frequency Allocations and to delete U.S. footnote 245, which calls for a case-by-case electromagnetic compatibility analysis for each earth station implementation.

119. *Discussion.* These proposals are not addressed by any resolutions or recommendations from previous WARC's and the subject matter is not on the agenda for this conference. Consequently, it is premature to consider the substance of these proposals.

Radio Astronomy

120. The National Academy of Sciences (NAS), through the National Research Council's Committee on Radio Frequencies (CORF), filed late reply comments addressing several frequency bands used for radio astronomy observa-

tions and other scientific purposes. CORF notes that some of the current allocations for scientific uses of the spectrum need protection from interference from mobile and/or satellite communications systems. CORF states that radio astronomers consider the 1660-1660.5 MHz band extremely important for passive research purposes on star formation related to the spectral lines of the red-shifted hydroxyl (OH) molecule. CORF disputes the AMSC comment concerning the U.S. position at Mobile WARC for the 1660-1660.5 MHz band and the Commission's allocation proceeding for MSS. CORF states that the U.S. position at MOB-87 was that these frequencies should continue to be allocated to the AMSS(R) on a primary basis with no allocation to LMSS and that the Commission subsequently made this allocation domestically.

121. CORF also notes the 1700-1710 MHz band is heavily used by the meteorological-satellite service to transmit atmospheric data and that the United States should avoid proposals that increase the noise levels in these bands. It further notes the importance of the 1718.8-1722.2 MHz band for passive radio astronomy research and states that the bands 1990-2120 MHz, 2025-2120 MHz, and 2200-2300 MHz are heavily used for space research and should be protected.

122. *Discussion.* We note the concerns expressed by CORF. The United States's proposals to MOB-87 did have an AMSS(R) allocation for the 1660-1660.5 MHz band. However, MOB-87 reallocated this spectrum to the land-mobile satellite service and provided that airborne and ship earth stations could also operate within the LMSS allocation (RR 730A). Domestically, the Commission retained the AMSS(R) allocation on a primary basis in the 1660-1660.5 MHz. The proposal for the generic MSS allocation contained herein is essentially the same as the current international allocation in that both would permit the operation of land, ship, and airborne earth stations. As an added precaution, we are proposing RR 736A to limit aeronautical mobile satellite services in the 1660-1660.5 MHz band to AMSS(R) consistent with real time priority and preemption requirements of RR 730B. These proposals should limit the assignment of aircraft earth stations on these frequencies to emergency situations associated with the safety and regularity of flight when additional spectrum is needed. With respect to the other frequency bands, CORF's concern for the scientific community will be given due consideration in our deliberations for additional allocations. We believe that we have satisfied their concern with respect to the space research allocations in the 2025-2110 MHz and 2200-2290 MHz bands with our proposal for primary allocations.

Wind Profiler

123. The WARC-92 agenda invites proposals to develop new recommendations and resolutions in relation to the agenda for the conference including meteorological aids service in frequency bands below 1000 MHz. The wind profiler is a doppler weather radar, operating as a meteorological aid to measure wind direction and speed. Experimental units have been operating near the 406 MHz region and, as such, pose a significant interference problem for the COSPAS-SARSAT system at 406.1 MHz. The United States seeks an allocation on a worldwide basis for this service and therefore recommends that the next competent conference address this issue. Resolution AAA in Appendix A calls for the next competent conference to address allocations for the wind profiler. Rec-

ommendation ZZZ recommends that administrations consider using certain frequencies in making assignments to the wind profiler radars for interim implementation until such time as the CCIR develops applicable recommendations. We request comments on the specific frequencies that should be recommended for the interim implementation of the wind profiler radar.

ALLOCATION ISSUES ABOVE 11 GHZ

124. In the *NOI*, the Commission generally discussed several issues relating to space services in frequency bands above 11 GHz.⁵⁹ We were particularly concerned with the possible need for an allocation for High Definition Television (HDTV) to be delivered via the Broadcasting Satellite Service (BSS). We also inquired about whether HDTV by satellite could share spectrum with other services. Further, we sought information concerning new space services' needs for allocations above 20 GHz and whether these services could share spectrum with other services. Finally, we asked what other issues, consequential to allocating spectrum to space services, might need to be addressed at WARC-92.

HDTV BSS

125. Resolution No. 521 (COM 5/3) of WARC ORB-88 called for a future conference to consider allocations for wide RF-band HDTV broadcasting by satellite, including the necessary feederlinks, preferably on a worldwide basis. Although it noted that certain types of HDTV could be provided in the currently planned 11.7-12.7 GHz band, the resolution cited the 12.7-23 GHz frequency range as the appropriate band from which to select a worldwide allocation. The Resolution also called for further studies on the suitability of the 12 GHz band for wide RF-band HDTV, without prejudice to the existing plans. The ITU Administrative Council clarified that the agenda for WARC-92 would include consideration of the studies on HDTV below 12.7 GHz.

126. We specifically sought comment in the *NOI* on the precise requirement for HDTV by satellite, the projected spectrum needs, and the bases for these projections. Additionally, we asked whether the allocations need be exclusive, what other services might be affected by the allocations, and whether it was necessary to have common worldwide allocations. Finally, we sought comment on whether the current allocations at 12 GHz and 23 GHz would be sufficient to meet projected HDTV needs by satellite.

Requirement for HDTV BSS

127. Few commenters directly address the need for HDTV via satellite. Telecommunications Systems (Telecomm) supports an HDTV BSS and notes that CCIR IWP 10-11/3 has concluded that a need for HDTV BSS exists. In Telecomm's view, spectrum should be allocated for this service, since early implementation of incompatible services may preclude accommodating HDTV later. The Advanced Television Systems Committee (ATSC) concurs, stating that reports prepared for the ITU indicate expected development of significant advances in technology in the next 10 to 15 years that could provide the basis for a future generation of HDTV. According to ATSC, it would be prudent to identify allocations that would permit decisions regarding technological developments to be made.

128. MST states that any allocation provided for BSS HDTV above 20 GHz should be flexible enough to allow Fixed Satellite Service operation in those bands as well. It argues that the BSS currently has 500 megahertz of unused spectrum at 12.2-12.7 GHz and that these frequencies may be sufficient to accommodate the HDTV systems of the foreseeable future without additional spectrum.

129. UTC and NAB contend that the need for an HDTV BSS has not been established. UTC states that as the Commission and industry are studying the feasibility of delivering HDTV in existing broadcast spectrum and others are exploring cable and fiber optic delivery to the home, a satellite service does not appear to be necessary. It further observes that domestic satellites already deliver video and argues that advances in satellite receiving equipment have resulted in a *de facto* Direct Broadcast Satellite (DBS) service in the United States. NAB notes that the DBS service has yet to be implemented eight years after the 12.2-12.7 GHz band was allocated for it. Moreover, UTC maintains that a separate allocation to HDTV BSS would adversely affect the DBS service.

130. *Discussion.* To determine the nature and extent of a BSS HDTV requirement is difficult, particularly in the absence of a precise definition of HDTV. Several commenters question the need for any broadcasting via satellite; others state that HDTV can be provided within the existing allocations at 12 GHz; and some envision a new service that will require spectrum separate from that allocated to the DBS at 12 GHz. The Commission will not be in a position to determine the nature of any HDTV BSS requirement until we have more fully examined the proper place of this proposed service *vis - a - vis* the planned DBS service at 12 GHz. We therefore seek further comment on the nature of this proposed service. Specifically, we seek information concerning whether there are any studies available to demonstrate a need for this service; whether it is a replacement for the BSS at 12 GHz and, if not, whether there are economic analyses that demonstrate the viability of two different satellite broadcasting services; and whether providing an allocation for a new HDTV satellite service requires examination of a large amount of spectrum and consideration of its use probably to the exclusion of all other users. Consideration of the latter issue requires a significant showing of need and public interest by the proponents of such a service.

Sharing Between HDTV BSS and Terrestrial Services

131. There is a broad consensus in the comments that the sharing of spectrum between HDTV BSS and the terrestrial services is not feasible. The view is commonly expressed that each of these services should have spectrum separate from the other. Further, terrestrial fixed operators emphasize both the inequity of removing current fixed allocations from their present locations so as to provide for an HDTV BSS and the importance of the terrestrial fixed service allocations between 12.7-23 GHz to their business operations and to the economy of the country. This view is addressed *infra* in the discussion of the several bands that have been identified as possible allocations for HDTV BSS, with particular emphasis on the history of the 12 GHz band, where existing terrestrial fixed users have been placed in a secondary status to allow for the eventual introduction of BSS.

132. *Discussion.* The Commission concurs with the consensus expressed in the comments that the sharing of spectrum between the BSS and terrestrial fixed and mo-

bile services will be difficult. In further examining potential bands for HDTV BSS, we note that these two types of services are incompatible within the same geographic area. Therefore, any allocation that we consider for HDTV BSS must be viewed from the perspective of relocating terrestrial users, and we must consider the various implications of forcing such a relocation.

Spectrum Needs and Alternatives for HDTV BSS

133. Assuming that there may be a requirement for HDTV BSS, we must address which band(s) might be appropriate for providing the service and how much spectrum to set aside in these band(s). Telecomm states that whatever band is selected should be a worldwide allocation and that there should be common standards for baseband and emission formats to reduce inter-Regional and interservice interference and to increase the likelihood of better receivers marketed at lower prices. UTC and Digital Microwave Corporation (DMC), by contrast, do not believe that worldwide allocations are necessary for this service.

134. With regard to the amount of spectrum required to provide a viable HDTV BSS, ATSC observes that CCIR Report 1075 specifies a required bandwidth of between 50 and 120 megahertz per channel for both digital and analog formats. ATSC anticipates that bandwidth compression techniques can reduce the bandwidth to 54 megahertz channels and that this figure could serve as the basis for determining allocations at WARC-92. ATSC proposes at least 10 HDTV channels per orbital location and states that a 500 megahertz bandwidth would easily accommodate 10 HDTV channels when using both senses of polarization. ATSC also notes that CCIR Report 1075 concludes that approximately 500 megahertz should be allocated for HDTV BSS. Similarly, Telecomm estimates that 500 megahertz would be suitable for a worldwide allocation.

Current BSS Bands

12 GHz Band

135. Commenters are divided on the suitability of this band. AT&T, DMC, and Harris believe that the existing allocation at 12 GHz should be sufficient to meet HDTV BSS requirements. AT&T contends that the BSS could develop into an efficient, high-quality service in the 12 GHz band since the band's relative lack of use permits adoption of technical standards hospitable to HDTV with minimal burden to existing services and since signals in the band experience less rain attenuation than signals at 23 GHz. According to AT&T and Harris, placing HDTV in the existing 12 GHz allocation should not be a problem since the DBS is not yet operational. Finally, NAB notes that DBS is capable of providing HDTV to the home through bandwidth compression techniques such as MUSE-E.

136. ATSC opposes using the 12 GHz band for BSS HDTV because current technology, in its view, can provide only narrow-bandwidth HDTV at 12 GHz. Further, ATSC maintains that the BSS plan at 12 GHz would be very difficult to modify to accommodate the necessary wider bandwidths. It notes that the channeling plans are different between Regions 1 and 3 and Region 2.⁶⁰ It states that the biggest problem, however, is the limited number of channels that would be available to a large

number of countries. ATSC also contends that for most countries, the channels at 12 GHz are not adjacent and therefore cannot be combined into the wide channels that might be needed for HDTV. Telecomm generally concurs with ATSC and adds that as the allocations between Regions at 12 GHz are not identical, there would be inter-Regional sharing problems between the different services.

22.5-23 GHz Band

137. A second potential HDTV BSS band suggested by some commenters is the current BSS allocation at 23 GHz. Because of the current widespread use of the 23 GHz band worldwide for terrestrial fixed systems, the commenters generally agree that this existing BSS allocation would not be a desirable home for any future HDTV BSS and several suggest that the BSS allocation at 23 GHz be deleted from the international Table of Frequency Allocations. In particular, ATSC asserts that the 23 GHz band is heavily used in Regions 1 and 2 for digital microwave service and that those users would suffer serious economic harm if displaced. Similarly, AT&T maintains that the 22.5-23 GHz band forms an integral part of the 21.2-23.6 GHz band that the fixed service currently uses in Region 2 to provide a wide variety of service including short range, digital connectivity, PBX-to-PBX connections between multiple buildings, and connectivity to public communications systems. AT&T asserts that exclusive use of the 23 GHz band by BSS could impair fixed service growth and efficient use of the entire 21.2-23.6 GHz band. ATSC further notes that the band is subject to Article 14 procedures that require the agreement of any country whose services may be affected. Telecomm concurs and adds that propagation conditions in this part of the spectrum are particularly difficult for the BSS. NAS, DMC, and Harris also oppose using the 23 GHz band for HDTV BSS because of the significant embedded terrestrial fixed use. Finally, NAS contends that in the United States, atmospheric water vapor measurements using radiometers that operate at a center frequency of 23.87 GHz are planned, and that the radioastronomy, earth exploration-satellite, and space research services use or are interested in conducting research in portions of this band.

New BSS Bands

17.3-17.7 GHz Band

138. A third potential band, as identified by AAR, NAS, ATSC, DMC, and Telecomm, is the 17.3-17.7 GHz band. ATSC states that this band, which is now allocated for feederlinks to 12 GHz BSS satellites, would meet the desired criteria for HDTV BSS, except for the necessary bandwidth. ATSC maintains that if this allocation were provided for HDTV BSS, then the BSS allocation at 23 GHz could be deleted. Telecomm states that the problems of bi-directional use with feederlinks operating Earth-to-space and BSS operating space-to-Earth in the 17.3-17.7 GHz band can be overcome and would be less serious than problems in any of the other bands considered.

19.7-20.2 GHz Band

139. ATSC offers as a fourth alternative for HDTV BSS the 19.7-20.2 GHz band. It suggests that the FSS currently located in this band could be moved to 23 GHz. Under this scenario, the FSS would share with fixed and mobile services at 23 GHz, and the HDTV BSS would need share

only with fixed and mobile services operating in countries listed in footnote 873 to the international Table of Frequency Allocations. AAR supports ATSC's proposal to use the 19.7-20.2 GHz band for HDTV BSS.

21.4-22 GHz Band

140. The last band identified as a potential home for HDTV BSS is 21.4-22 GHz. ATSC asserts that if this band were to be used for HDTV BSS, current fixed and mobile users of the band could be moved to 20.2-21.2 GHz and share spectrum with FSS and MSS. ATSC notes that the FSS and MSS already share with fixed and mobile users under footnote 873 to the international Table of Frequency Allocations. Nevertheless, ATSC acknowledges that such a reallocation would displace a large number of short haul, digital radio users in the United States and that such a proposal should be considered only as a last resort.

141. *Discussion.* Five specific bands have been mentioned in the comments as potential allocations for a future HDTV BSS. Currently, two of these bands are used extensively by terrestrial microwave systems in the United States and Europe, one is allocated to the fixed-satellite and mobile-satellite services, one is reserved for feederlinks for 12 GHz BSS satellites, and one is allocated to the BSS. Moreover, use of these bands differs among the various regions of the world, and the United States can therefore expect divergent views in international forums on the appropriateness of each band. Accordingly, in light of the difficulties we anticipate in finding suitable spectrum for an HDTV BSS service, the Commission requests further information concerning the need for a common worldwide allocation. In addressing this issue, commenters should distinguish between the common allocations and common technical standards for this service; the latter may be more significant and more easily achieved.

142. In examining the most suitable bands for HDTV BSS within the United States, it is clear from the comments that reallocation of the 21.4-22 GHz and 22.5-23 GHz bands would result in serious displacement of current terrestrial fixed operations. Users in these bands include many who were recently displaced from the 12 GHz band to make room for the DBS service. Thus, we are very reluctant to force another such relocation of terrestrial service licensees absent a very strong public interest showing. To date, such a showing has not been made. We are, therefore, taking the position that the search for spectrum for an HDTV BSS should begin within spectrum whose use will have the smallest impact on existing services, *i.e.* 19.7-20.2 GHz, 17.3-17.7 GHz, and 12.2-12.7 GHz.

143. With regard to the use of the 19.7-20.2 GHz band, one commenter suggests that the FSS in this band be moved to 22.5-23 GHz and that the allocation be shared with existing terrestrial services. However, this band is also allocated to the MSS. While the MSS allocation is only secondary, it was added to the international Table of Frequency Allocations in 1979 and, therefore, fills a requirement that was anticipated at that time. Before further considering this band for possible use by HDTV BSS, the Commission requires additional information on whether BSS and MSS operations can share this spectrum. Commenters should take into account the Advisory Committee's preliminary indication that the MSS allocation in this band should be raised to primary status.

Comments are also sought on the practicality of moving the FSS at 19.7-20.2 GHz to the 22.5-23 GHz band, and on the feasibility of the FSS sharing with the existing terrestrial users and planned inter-satellite service users in the 22.5-23 GHz band.

144. The 17.3-17.7 GHz band, which is currently allocated worldwide to the fixed-satellite service with use restricted to providing feederlinks for the 12 GHz BSS, could be used in a bidirectional mode to provide HDTV BSS. This proposal appears the most promising of those discussed thus far from the standpoint of sharing with existing services. There are numerous CCIR Reports that examine the prospect of bidirectional sharing between space services, and these Reports may provide insight as to how sharing might be accomplished.⁶¹ Two potential problems with this proposal exist: the possible need for mobile or transportable feederlinks for the 12 GHz BSS to provide for news gathering and coverage of sporting events and modifications to the worldwide secondary radiolocation allocation that might be required. Comment is requested on how this band can best be utilized for HDTV BSS, with particular emphasis on the potential problems of sharing with BSS feederlinks and radiolocation.

145. Finally, commenters suggested that the existing Region 2 BSS allocation at 12.2-12.7 GHz be used for HDTV BSS. The corresponding bands in Regions 1 and 3 are 11.7-12.5 GHz and 11.7-12.2 GHz, respectively. These bands have already been planned on a worldwide basis for the BSS and provide for 27 megahertz wide channels in Regions 1 and 3 and 24 megahertz wide channels in Region 2. The commenters argue that the channels in this band would not be wide enough to provide for a wide RF-band HDTV service. WARC ORB-88 Resolution No. 521 identifies a possible range of frequencies for a new HDTV BSS and states that the existing 12 GHz band may be considered so long as it is without prejudice to the existing BSS plan. It appears that the existing BSS bands at 12 GHz would be the most ideal home for an HDTV BSS, if the technical problems of accommodating the service within the framework of the existing plan can be overcome. Terrestrial services have already been removed from the band or are in the process of moving. A wealth of technical information already exists concerning the radio propagation characteristics of this band. From the studies being performed, it appears that a new HDTV BSS service could be provided using a digital format. Bandwidth requirements can be greatly affected by any bandwidth compression, channel encoding, and motion detection techniques employed by this service.⁶² It is conceivable that digital techniques emphasizing reduced transmission bandwidth will improve greatly over the next two decades. For these reasons, we believe that we should seriously consider the existing 12 GHz BSS allocation as a possible home for a future HDTV BSS. Although the existing allocations are not uniform worldwide, they are in the same general range, and there is no reason to believe that common technical standards could not be developed for this service. The Commission seeks comment on the types of technical advancements necessary to accommodate this service at 12 GHz and the projected time frame necessary for achieving such advancements.

146. In conclusion, the Commission believes that both the 12 GHz and 17.3-17.7 GHz bands offer some promise for a future HDTV BSS and that our efforts should be focused on these two bands. While we tentatively con-

clude that the current 12 GHz band is most appropriate for HDTV BSS at this time, we believe that the 17 GHz band should also be considered for possible future generations of HDTV. The 17 GHz band will also provide an alternative allocation for those countries with assignments in the 12 GHz BSS plans that might have difficulty in implementing those assignments in an HDTV format. Sharing difficulties associated with the other identified bands make them untenable absent removal of the existing services from these bands. The tenuous nature and predicted long-term implementation of the HDTV BSS service does not seem to justify the removal of significant embedded investment from those bands at this time. The Commission therefore proposes that the international Table of Frequency Allocations be modified at 12 GHz and 17 GHz to recognize these bands as potential homes for a new HDTV BSS service. See proposals ADD 838A, ADD 868A, and MOD 17.3-17.7 GHz.

Feederlink Bands For HDTV BSS

147. Only two commenters address the issue of feederlinks for a new HDTV BSS service. ATSC suggests the possibility of using the 27-27.5 GHz band currently allocated for FSS in Regions 2 and 3. It notes that the allocation need only be extended to Region 1 with a footnote added restricting use of the band to BSS feederlinks. ATSC further states that if the 27-27.5 GHz band were not available, either of the general purpose FSS uplink bands at 27.5-31 GHz or 42.5-43.5 GHz could be considered. It submits that an allocation from 27.5 GHz upward would protect NASA's proposed allocation for the Advanced Tracking and Data Relay Satellite System (ATDRSS) at 25.25-27.5 GHz. A final possibility identified by ATSC is the band 47.2-49.2 GHz currently reserved for feederlinks to BSS operating at 40 GHz.

148. AT&T does not offer any specific band for HDTV BSS feederlinks, but rather states that it would be appropriate to place such links in FSS bands. It stresses, however, that such use should not be given any preferential consideration in the allocation process. According to AT&T, fixed uses serve important public needs and HDTV BSS feederlinks should not be allowed to displace existing users.

149. *Discussion.* We concur with AT&T that it is appropriate to place feederlinks in the FSS bands. ATSC has identified several possibilities. Comment is sought on those proposals. Additionally, we request comment on whether the existing feederlink allocations at 18 GHz would be sufficient, if we ultimately decide to use the existing 12 GHz BSS allocation for HDTV BSS.

NEW SERVICES ABOVE 20 GHZ

150. The ITU Nice Plenipotentiary Conference in Resolution Plen/8 resolved that the WARC-92 "may consider defining certain new space services and consider allocations to these services in frequency bands above 20 GHz." Additionally, the ITU Administrative Council added that WARC-92 could consider "new space applications above 20 GHz." Several proposals advanced in response to the NOI fall within this broad category.

Radiolocation Satellite Service near 25 GHz

151. The Energetics Satellite Corporation (ESC) proposes an allocation for its experimental SAT/TRAC "geolocation system," which currently uses the

19.2-20.2/24.25-25.25 GHz bands. ESC states that its end user transponder operates in the upper band, which is currently allocated to the radionavigation service. ESC requests that the Commission consider providing an allocation for the radiolocation service in this band to accommodate the SAT/TRAC system.

152. *Discussion.* While ESC has requested an allocation for radiolocation at 24.25-25.25 GHz, radiolocation is defined as a terrestrial service in Article 1 of the Radio Regulations. The service ESC describes appears to fall within the definition of the radiodetermination-satellite service (Earth-to-space), which includes both radiolocation and radionavigation by satellite. Because ESC does not propose to provide a radionavigation service, its system would best be accommodated within a radiolocation-satellite service allocation. While that service is currently not defined in the international Radio Regulations, a definition can be proposed that parallels that of the radionavigation-satellite service. See RR No. 41. ESC's proposal appears to have merit and we will recommend it. See proposal ADD 47bis. We note, however, that we are also considering an allocation in this same band for the Space Research Service (Earth-to-space). Therefore, comment is requested on the feasibility of sharing between these two services.

Future Data Relay Satellite and Space Station (Proximity) Wideband Links

153. As previously indicated, Federal Government agencies are conducting their preparations for WARC-92 within the IRAC. Within this forum, NASA has identified several requirements for space services and space service applications above 20 GHz. The first of these is to provide a primary allocation in an appropriate service, with associated sharing criteria, for wideband space-to-space links. The wideband links would be between low-orbiting user spacecraft and geostationary data relay satellites. The forward (data relay satellite-to-user) links are proposed to operate in the inter-satellite service in the 22.55-23.55 GHz band, based on the availability of bandwidth and the feasibility of sharing. NASA proposes that the return (user-to-data relay satellite) links operate in a new primary allocation in the 25.25-27.50 GHz band. In addition, NASA states that wideband space-to-space links are required between permanent space stations and a variety of co-orbiting space vehicles in close proximity to such space stations. NASA proposes that these "proximity" links operate in the 25.25-25.55 GHz band (space station-to-free-flyer) and the 27.1-27.5 GHz band (free-flyer-to-space station) under the same service allocation as used for the data relay satellite links; *i.e.*, the inter-satellite service. We note that these bands have also been selected for international Data Relay Satellite (DRS) and space station activities. The European Space Agency (ESA) and the Japanese are planning several Data Relay Satellites to operate in these bands. In addition, ESA is planning the Columbus module for the Space Station, and Japan is planning the Japanese Experimental Module. All are scheduled for operation in the 1997 time frame. In view of the foregoing, comments are requested on NASA's proposals.

154. NASA has also proposed a minor modification to the definition of the Inter-Satellite Service (ISS) and has proposed that stations operating in the ISS in the 27-27.5 GHz band be exempt from the provisions of RR No. 2613 (See proposals MOD 24 and ADD 881A). Commenters should give specific attention to the sharing criteria need-

ed between the inter-satellite service and the terrestrial fixed and mobile services, and between the inter-satellite service and the fixed-satellite (Earth-to-space) service.

Narrowband and Wideband Space Research Links for Manned Exploration of the Moon and Mars, and Other Applications

155. A second NASA proposal under consideration in the IRAC concerns frequency bands for wide bandwidth links between the Earth and the Moon or between the Earth and Mars. In addition, NASA adds that in several years a number of other space research activities will require wider bandwidths to operate, such as very large baseline interferometry (VLBI) by satellite. NASA notes that currently no frequencies are allocated in the ITU Radio Regulations for these purposes. In addition, NASA observes that because of the new definition for deep space adopted at WARC ORB-88, the space research service allocations for deep space cannot be utilized to communicate with the Moon. Smaller bandwidth transmissions can occur in near-Earth portions of the space research allocations near 2 and 14 GHz; however, NASA believes that use of the same band for both sets of links (Earth-Moon and Earth-Mars) is desirable because it permits use of common equipment.

156. For these reasons, NASA proposes that at least one pair of bands be allocated to the Space Research Service on a primary basis due to the "safety of life" aspects associated with communications with a lunar or Martian research base or colony. Frequency bands currently under consideration by NASA include 21.4-22 GHz (space-to-Earth), 24.25-25.25 GHz (Earth-to-space), 33.4-34.2 GHz (Earth-to-space), 34.7-35.2 GHz (Earth-to-space), 37.0-37.5 GHz (space-to-Earth), and 39.5-40.5 GHz (Earth-to-space).⁵³ In support of this proposal, NASA has also proposed a minor modification to the definition of the Space Research Service (See proposal MOD 52). Comments are requested on these suggested proposals, particularly with respect to the criteria necessary for sharing with other services in these bands.

Space Research (Deep Space) Near 32/34 GHz

157. The third NASA proposal under consideration in the IRAC is to provide a worldwide allocation to the Space Research Service (deep space) in the vicinity of 32/34 GHz. According to NASA, the nature and status of allocations to the Space Research Service near 32/34 GHz are complex, non-uniform, and not worldwide. For three administrations, the space research allocations are restricted to deep space only. There is a serious potential for interference to national and international deep-space missions because the current allocations allow uplinks and downlinks for space research conducted by earth orbiters to use the same bands as the deep space links. These links are not compatible because of widely different transmission powers and received-signal strengths. The trend toward international cooperative missions for deep space exploration suggests the need for a worldwide primary allocation with direction indicators.

158. NASA is proposing an upgrade of the Space Research Service (deep space) allocation currently contained in Footnotes 890 and 895 to the international Table of Frequency Allocations. The allocations as contained in these footnotes are primary in the bands 31.8-32.3/34.2-34.7 GHz only in the United States, Spain, and Australia. The proposal would upgrade the Space

Research Service (Deep Space) allocations to primary worldwide. See proposals MOD 31.8-32.3 GHz and MOD 34.2-34.7 GHz. This would support increasing space activities in these bands. Comments are requested on this proposal.

FSS Uplink Power Control Beacon

159. Through its participation in the International Telecommunications Satellite Organization (Intelsat), Comsat states that it has become aware of an uplink power control requirement. Comsat notes that at present the band 27-31 GHz is allocated to the FSS for uplink use only. According to Comsat, achievement of customary FSS uplink availability and performance standards in this band, despite the significant propagation impairments present, will require the use of sophisticated uplink power control systems. Because such systems require continuous direct and accurate measurement at the uplink earth stations of path attenuation in the uplink band, Comsat states that the uplink earth station needs to monitor a narrow-band beacon transmission from the satellite. To accommodate this, Comsat states that Intelsat is requesting a footnote to the international Table of Frequency Allocations that will permit the 27-30 GHz band to be used by the FSS for downlink beacon operations in support of uplink power control in that band. While Comsat does not propose a specific band for this purpose, it urges the Commission to accept the principle of downlink allocations in the subject uplink bands and, in particular, requests that the United States take the initiative in proposing that this matter be placed on the WARC-92 agenda.

160. *Discussion.* Comsat's and Intelsat's suggestion appears to be reasonable and might also be applicable to other FSS frequency pairs in bands above 20 GHz. The use of power control beacons above 20 GHz appears to be a new service that we believe falls within the limits of the agenda as contemplated by the Plenipotentiary Conference. As noted earlier in the discussion on HDTV BSS feederlinks, NASA has proposed using the 25.25-27.5 GHz band in its ATDRSS program. Discussions between NASA and Comsat representatives indicate that there would be no problem with restricting the uplink power control operations to frequencies above 27.5 GHz. Therefore, we support the proposal and will propose that a footnote be added to the allocations table in the 27.5-29.5 GHz band for this purpose. See proposal *Add 882A*.

ADDITIONAL ALLOCATIONS

161. In the bands above 11 GHz, several commenting parties suggest changes to the allocations table that were not specifically solicited by the *NOI*. These include provision of additional spectrum for FSS uplinks and modification to Footnote 859 to provide a generic MSS with an addition of a companion downlink.

New FSS Uplinks

162. Comsat states that there is currently an imbalance between uplink and downlink spectrum available in the Ku band. Specifically, there exists a 500 megahertz uplink shortfall in Region 2 and a 250 megahertz shortfall in Regions 1 and 3. It states that this shortfall has resulted in inefficient use of the Ku band. Comsat proposes that the 14.5-15 GHz band be allocated for the general use of the FSS on a shared basis with fixed and mobile services. It

notes that while the band 14.5-14.8 GHz is currently allocated internationally to the FSS, its use is currently limited to feederlinks for the BSS. Comsat indicates that this band is currently allocated for Government use in the United States, but states that NTIA has recently invited examination of greater sharing between Government and non-Government allocations and that it might be a good time to examine this specific case. Comsat notes that there are nineteen countries in Africa and Asia with BSS feederlinks assigned in this band, although some of these also have assignments in the 17.3-18.1 GHz band. Nevertheless, Comsat states that sharing BSS feederlinks with FSS should not be difficult, especially since the orbit locations and frequencies are established in the BSS plan as a matter of record. It adds that allocation of this spectrum to the FSS might alleviate much of the worldwide pressure to use the 3400-3600 MHz band for FSS.

163. CBS, Inc. (CBS) and the IDB Communications Group, Inc. (IDB) support Comsat's general proposal to add additional FSS feederlinks in the Ku band spectrum. CBS and IDB point to a heightened need for such spectrum to support the increasing use of satellite news gathering (SNG). CBS notes that SNG has become an important tool in international news gathering and this technology must be available if U.S. news organizations are to maintain their ability to cover world events. AT&T notes, however, that terrestrial services in Region 1 make significant use of the 14.5-15 GHz band and that these requirements may militate against Comsat's proposed solution. Nonetheless, AT&T believes that the issue of the imbalance of FSS downlinks and feederlinks deserves a place on the WARC-92 agenda.

164. *Discussion.* The issue of additional FSS spectrum to correct the apparent imbalance between uplink and downlink frequencies was addressed at the recently concluded ITU Administrative Council meeting. An item was added to the agenda to consider the band 14.5-14.8 GHz for reallocation to the Fixed-Satellite Service. The United States delegation to that meeting opposed the addition of this item to the agenda with the current band limits because the significant current usage in the band, particularly in Europe and the United States, precludes its use in those areas by the FSS. As such, its use for international Fixed-Satellite Service by Intelsat or any other international consortia is problematic. The Commission, therefore, opposes this suggestion and proposes that the United States formally oppose such a reallocation at WARC-92. To pursue such an allocation change at this point would be counterproductive in that it would divert efforts away from the pursuit of more promising solutions that could meet this legitimate need of the Fixed-Satellite Service.

Mobile-Satellite Service at 11/14 GHz

165. Qualcomm provides a description of its OmniTRACS system and suggests several changes to the international Table of Frequency Allocations that would facilitate expanding its system's use worldwide. According to Qualcomm, the OmniTRACS system currently provides a nationwide, two-way data and position reporting service utilizing existing Ku band satellite transponders and operating pursuant to footnote 859. This footnote was adopted at WARC-79 and provides for land mobile-satellite service (Earth-to-space) in the 14.0-14.5 GHz band on a secondary basis. Qualcomm notes that over 7170 terminals are currently in use in its system without a

single reported case of interference over the last year of operation. It says that it intends to operate a joint venture system in Europe, North Africa, and the Middle East.

166. *Discussion.* The U. S. delegation to the ITU Administrative Council proposed that the 1992 WARC agenda include an item that would accommodate this proposal. However, they did not prevail. As such, this proposal falls outside the scope of the agenda, and the Commission shall not pursue it at this time.

Mobile-Satellite Service near 20/30 GHz

167. The WARC-92 Federal Advisory Committee advised the Commission just prior to the ITU Administrative Council meeting of issues it believed should be included on the WARC-92 agenda. Among those issues was a proposal to include within the agenda an item to consider upgrading the secondary mobile-satellite service allocation at 20/30 GHz to primary. The Commission staff considered this proposal and concluded that such an allocation change could be considered as falling within the currently proposed agenda under the category of new space services above 20 GHz.

168. *Discussion.* The Commission recognizes that there is an increasing tendency to develop and implement space platforms that integrate a wide variety of services.¹⁹⁴ This is particularly so with regard to the mobile-satellite services, but can also include the provision of fixed-satellite services as well. For these systems to be viable, the system developers must be assured that the services they provide will be protected from harmful interference. This requires a primary allocation. In view of the foregoing, the Commission has preliminarily decided to propose a primary allocation for the mobile-satellite service at 20/30 GHz. Comment is requested.

Earth Exploration-Satellite near 18 GHz

169. NAS states that scientists currently use the 18.6-18.8 GHz band for passive sensor measurements of environmental phenomena related to the earth's surface. It contends that this band is critical for these measurements and should not be considered for HDTV BSS. NAS recommends that because the earth exploration-satellite (EES) service is primary in Region 2 but only secondary in Regions 1 and 3 that the United States propose that the Region 1 and 3 allocations be upgraded to primary status.

170. *Discussion.* The U.S. delegation to the ITU Administrative Council proposed that the WARC-92 agenda include an item that would accommodate this proposal. However, they did not prevail. As such, this proposal falls outside the scope of the agenda, and the Commission shall not pursue it at this time.

Earth Exploration-Satellite near 61 GHz and 157 GHz

171. NOAA, through the IRAC forum, has provided information concerning a need for allocations for passive EES operations in the 60 and 160 GHz regions of the spectrum. They have advised us that space sensors have been using the passive bands more substantially in recent years in order to obtain higher quality data as well as data in those areas of the atmosphere that are not available through the use of other bands. Noise temperature resolutions in the area of 0.3 degrees Kelvin are required to make proper use of this data. To avoid the potential of future interference to passive bands now in use or planned for use in the near term, NOAA proposes new

allocations of passive bands. Bands below 61 GHz are affected by Earth's magnetic field when being used to measure mesospheric temperatures at heights between 45 and 75 kilometers. The band at 157 GHz is needed to avoid interference from local oscillators, in the same sensor, measuring temperatures in the 50 GHz and 60 GHz bands.

172. Therefore, NOAA proposes that allocations in the 59-64 GHz band be split to allow a primary allocation for a passive band at 60.7-60.8 GHz. It also proposes that the band 151-164 GHz be split to allow a primary allocation for a passive band at 156-158 GHz. These bands were selected because other bands near the proposed bands do not provide data that is contamination free. The proposal is to provide worldwide primary allocations in order to support passive sensors currently in use and under development. NOAA further notes that studies of the technical sharing criteria for use in these bands are currently under development.

173. *Discussion.* NOAA's request and proposal appear to address a legitimate scientific requirement and should pose no hardship on the services currently allocated in these bands. We have tentatively decided to recommend that such a proposal be forwarded to WARC-92, contingent in part on the results of the above mentioned studies. Comment is requested.

General - Satellite Service

174. In late filed comments, Leslie Taylor Associates (Taylor) suggests that the Commission consider proposing a reallocation of frequency bands above 20 GHz from the Fixed-Satellite Service to a General-Satellite Service, which would permit fixed-, broadcasting-, and mobile-satellite operations in the same frequency band. Taylor describes NASA's plans to pursue its Advanced Technology Satellite (ACTS) program at 20/30 GHz, which envisions providing a broad variety of services, including use for personal access communications. Taylor notes that in order to encourage private investment in a commercial Ka-band satellite system, such a system should be able to offer the range of services likely to be demonstrated by the ACTS program.

175. *Discussion.* The proposal made by Taylor may have merit in opening the way to provide a virtually unlimited variety of services through a single satellite system. We believe that a proposal for General-Satellite Service above 20 GHz, if accepted, would fulfill the requirements identified for upgrading mobile satellite service to primary status at 20 GHz and 30 GHz. Therefore, we believe this proposal to be significant and urge additional comment and discussion on it.

OTHER MATTERS

ARTICLES 55 AND 56

176. The *NOI* discussed Resolution PLEN/8,⁶⁵ wherein the Nice Plenipot instructed the ITU Administrative Council to include on the WARC-92 agenda, consideration of Articles 55 (Rev.) and 56 (Rev.) of the Radio Regulations, as amended by MOB-87, regarding requirements for on-board maintenance of shipborne radio and electronic equipment. Articles 55 (Rev.) and 56 (Rev.) mandate the carriage of personnel certified to maintain such equipment.

177. This action was taken recognizing the desirability of finding an appropriate solution to the problem of the reservations taken by many maritime administrations (including the United States) to these two Articles. It is further noted that the United States supported the decision taken by the International Maritime Organization (IMO) on the maintenance requirements.⁶⁶ The IMO's Safety of Life at Sea (SOLAS) Regulation IV/15 allows at-sea maintenance as one of three equal options available to administrations to ensure the availability of the functional requirements of the Global Maritime Distress and Safety System (GMDSS). At-sea maintenance is mandatory only insofar as it may be one of a minimum of two methods (of three) of maintenance that may be selected by an administration for certain vessels covered by SOLAS in the open sea beyond medium frequency radio coverage and in polar regions, as defined by SOLAS Chapter IV.

178. Incorporation of Articles 55 (Rev.) and 56 (Rev.) on the agenda of WARC-92 was largely an initiative of the [then] Secretary General of the ITU. Facing for the first time in ITU history such a great rejection of technical decisions of an Administrative Conference as occurred in 1987, plus the same rejection by even more countries at the 1989 Plenipot, the Secretary General reported to the Plenipot his concern and suggested the desirability of finding an appropriate solution to the problem.⁶⁷ The Plenipot concluded that reconsideration of these two articles, as amended by WARC MOB-87, would be appropriate for WARC-92.

179. The Radio-Electronics Officers Union and the American Radio Association (ROU/ARA) encourage the United States to adhere to the text of Articles 55 (Rev.) and 56 (Rev.). ROU/ARA maintain that in taking a reservation to these articles, the United States disregarded the importance of international uniformity and failed to consider the inadequacies of the IMO flexible approach. ROU/ARA state that the reservation conflicts with an ITU purpose of promoting the adoption of measures for ensuring the safety of life through international cooperation, and that the reservation effectuates a dual maritime safety and distress system. ROU/ARA suggest that carriage of properly certified on-board maintainers is necessary to maximize the availability of GMDSS equipment.

180. Comsat and the American Institute of Merchant Shipping (AIMS) oppose ROU/ARA's position and support the reservation taken by the U.S. Delegation in 1987. Comsat contends that the U.S. reservation is in accordance with the view of the IMO. Comsat states that the IMO decision reflects the sentiment of the vast majority of the international maritime community.⁶⁸ AIMS, a national trade association representing 21 U.S.-flag carriers owning or operating tankers, dry bulk vessels and other ocean-going vessels engaged in domestic and international trade, asserts that the United States should maintain its reservation to the two articles until they are revised to coincide with the IMO GMDSS decision. AIMS notes that the IMO adopted a flexible set of options for radio maintenance and repair to ensure the availability of distress and safety communications equipment to meet the GMDSS functions. AIMS states that the ITU amendments fail to recognize the importance of providing functional availability through alternative methods. In effect, according to AIMS, the ITU treaty would compel nations to carry on-board maintainers in every case even though this is only one of three options available through the SOLAS

treaty. AIMS believes that the ITU Radio Regulations would force the on-board maintainer to be the sole operator of GMDSS equipment.

181. AIMS states that the issue of a dual distress and safety system enabled by a U.S. reservation should not be of great concern since the world will have a dual communications system in the 1992-1999 transition period from the present manual Morse radiotelegraphy ship-to-ship distress alerting system to the ship-to-shore GMDSS. AIMS states that nations failing to embrace SOLAS by not taking an ITU reservation merely limit their options to ensure functional availability of the GMDSS equipment and notes that uniformity in the GMDSS remains unchanged irrespective of ITU reservations.

182. *Discussion.* The United States took its reservation in 1987 in concert with many maritime nations after much due consideration and evaluation. A lengthy U.S. position paper for the WARC MOB-87 was developed in the years prior to the 1987 conference and included discussion of a U.S. reservation, should one be necessary. The reserving countries in Geneva in 1987 believed that the mandated carriage of personnel certificated for the maintenance of shipborne equipment would be an unnecessary and unacceptable burden and would be inconsistent with actions being taken within the IMO. In November 1988, the IMO conference unanimously adopted SOLAS treaty amendments consistent with previous decisions of the Maritime Safety Committee and its relevant Sub-Committees, as well as with the position reflected in the reservations of the prior year. At present, nations representing a large majority of the world's shipping tonnage have taken explicit reservation to Articles 55 (Rev.) and 56 (Rev.).

183. The Commission believes that the question of international uniformity between the IMO and the ITU treaties is answered within the consistency of the U.S. position over the last decade. The reservation to Articles 55 (Rev.) and 56 (Rev.) allows the U.S. to be consistent since the United States accepts both instruments (SOLAS and the Radio Regulations). It has been the U.S. position that although the SOLAS treaty identifies three maintenance options and equates them, the duplication-of-equipment option provides a greater margin of safety because it provides essentially no outage time. There is an inherent equipment outage time associated with the option of on-board maintenance because there is a finite time necessary for repair of failed equipment. This time could include the inability of an on-board maintainer to fix certain equipment, either as a result of lack of appropriate knowledge or lack of necessary parts. In such case, the vessel is without use of mandated equipment until the next port-of-call. The most effective means of maximizing equipment availability is by duplication-of-equipment, as occurs with avionics installed in aircraft.

184. The purpose of the IMO flexible approach is to provide the greatest margin of maritime safety consistent with operational and economic realities. The ROU/ARA conclusion that shore-side repairs are of limited value must be rejected because shore-side is the repository of the resources of spare parts, supplies, and corporate knowledge of both manufacturers and service repair facilities that are needed to support the shipping industry.

185. As regards a dual distress and safety system, we believe that the "system," as defined by SOLAS, is dual only insofar as the 1992-1999 transition period between the present system and the GMDSS is concerned. The

U.S. position at the IMO SOLAS conference in 1988 was that as short a transition period as possible would be in the best interests of maritime safety, and the United States sought a much shorter period. The IMO conference, weighing the advantages of increased safety inherent in a short transition, decided instead in favor of economically amortizing existing equipment over a longer period. The United States accepts the longer, seven year transition with the inclusion of a "bridge" of medium frequency radiocommunications equipment applicable to both systems so that there is no loss of communications between ships in either system.

186. The Commission believes that it would be in the interests of the United States to revise at WARC-92 Articles 55 and 56 so that they conform with the IMO decisions, as embodied in the SOLAS treaty and incorporated in subsequent guidance and interpretation provided by that international body. Additional guidance consistent with SOLAS is now being developed by the IMO Radiocommunications Sub-Committee for further consideration. This guidance is not expected to be completed by the IMO before the U.S. proposals for WARC-92 are due. The guidance, however, should be completed before the U.S. positions for WARC-92 are needed so they can be appropriately considered as U.S. negotiation strategy is developed. Consequently, proposals for revision of Articles 55 and 56 have been drafted and are incorporated within this *Second NOI*. Comments are requested on the appropriateness of these draft proposals.

ADMINISTRATIVE

187. Authority for this *Second Notice of Inquiry* is contained in Sections 4(i), 303(r), and 403 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303 (r), and 403. Pursuant to Section 1.1204(a)(4) of the Commission's Rules, 47 CFR Section 1.1204(a)(4), no *ex parte* restrictions apply to this proceeding.

188. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, 47 CFR Section 1.415 and 1.419, interested parties may file comments on or before **December 3, 1990** and reply comments on or before **January 7, 1991**. All relevant and timely comments will be considered by the Commission before taking further action in this proceeding. To file formally in this proceeding, participants must file an original and four copies of all comments, reply comments, and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original and nine copies must be filed. Comments and reply comments should be sent to Office of the Secretary, Federal Communications Commission, Washington, DC 20554. Comments and reply comments will be available for public inspection during regular business hours in the Dockets Reference Room (Room 239) of the Federal Communications Commission, 1919 M Street NW, Washington, DC 20554.

189. For further information concerning this *Second Notice of Inquiry*, contact Mr. William Torak, Office of Engineering and Technology, (202) 632-7025.

FEDERAL COMMUNICATIONS COMMISSION

Donna R. Searcy
Secretary

FOOTNOTES

¹ *Notice of Inquiry*, GEN Docket No. 89-554, 4 FCC Rcd 8546 (1989).

² These six commenters are: ARNAV Systems, Inc., Dennis Atkeson, Avionics Engineering Center, Ohio University, Radio Technical Commission for Maritime Services, United Parcel Service, Inc., and Wild Goose Association.

³ The comments and/or reply comments supporting additional allocations for HF broadcasting are: Adventist Broadcasting Service, Association of North American Radio Clubs, Anna Case, Christian Science Monitor Syndicate, Family Stations, High Adventure Ministries, International Monitoring Association for Students & Teachers, George Jacobs & Associates, Consulting Broadcast Engineers, Benjamin Krepp, David Kurlander, KUSW Worldwide Radio, National Association of Shortwave Broadcasters, Daniel Ross, World Christian Broadcasting Corporation, and Philip Yant.

⁴ A recent National Telecommunications and Information Administration (NTIA) technical report, "Spectrum Required for HF Broadcasting", TR90-268, shows that using the IFRB's Improved HFBC Planning Method and double sideband emissions to satisfy all requirements contained in the IFRB's J-90 Tentative High Frequency Broadcast Schedule would require three to four times as much spectrum as that allocated by WARC-79. TR90-268 is available from NTIA.

⁵ The bands considered were those at 17 MHz and below, where the vast majority of broadcasting occurs. The bands above 17 MHz are less crowded because the demand for them is lower.

⁶ Report by the IFRB on the Results of the Planning Exercises, HFBC-87 Document 11-E, 23 February 1987, p. 28.

⁷ Some of the band segments proposed by Jacobs are shared with the mobile service on either a primary (co-equal) or secondary basis.

⁸ See comments of George Jacobs at page 5.

⁹ *Radio Regulation* 342 provides that administrations can make assignments to stations in derogation of the international Table of Frequency Allocations only on the express condition that harmful interference not be caused to those stations operating in accordance with the provisions of the Convention and Radio Regulations.

¹⁰ While it does not directly address additional HF broadcasting spectrum, the RTCM states that HF maritime bands are heavily used and require an additional allocation. Thus, it urges that the spectrum allocations made to the maritime services be maintained.

¹¹ See Proposals for the Allocations Table in the Bands Below 27.5 MHz, WARC-79 Document No. 43-E, April 2, 1979.

¹² A reaccommodation procedure for existing users was adopted by WARC-79 (Resolution 8) that prevented usage by broadcasters until July 1, 1989 for bands above 10 MHz and July 1, 1994 for the 9 MHz band. HFBC-87 adopted Resolution 512, whereby the bands above 10 MHz will not come into use until a date to be established at a future planning conference that is currently scheduled for the first quarter of 1993.

¹³ See Final Protocol Statement Nos. 36 and 38 of the Final Acts of WARC-79.

¹⁴ A frequency-hour is one transmitter using one frequency for one hour on a daily basis. One transmitter can operate a maximum of 24 frequency-hours. There is no limit as to the number of transmitters that each station can use.

¹⁵ This includes the expansion bands, which were identified by WARC-79 to be reallocated from the fixed service to the broadcasting service following a planning conference, and other bands currently allocated to the fixed and mobile services.

¹⁶ Further, it must be recognized that since jamming is a political decision, it can be discontinued one day, and started the next, albeit in different regions.

¹⁷ The IAC's Informal Working Group 1 (IWG 1), document No. 15, page 3, states that the latest edition of the IFRB's Tentative High Frequency Broadcasting Schedule indicates that the Soviet Union has added numerous new 20 kilowatt transmitters that evidently were previously used as jammers. The report includes data collected by Deutsche Welle (Voice of Germany) from previous tentative schedules, indicating that Soviet usage has increased from 2977 to 5011 frequency-hours daily from March 1987 to March 1990, an increase of over 68%.

¹⁸ In accordance with *Radio Regulation* 342, for the current Z-90 (30 March 1990 - 30 September 1990) broadcasting season, of the approximately 771.75 frequency-hours authorized for FCC licensees, 364.25 (47%) are in bands not currently available to broadcasting operations.

¹⁹ This includes the 850 kilohertz allocated by WARC-79, but does not include the 200 kilohertz at 7100-7300 kHz, which can be used only in Regions 1 and 3, subject to strict limits established to protect the Amateur service in Region 2. At this time, only a few Commission licensees with facilities located in Region 3 are able to use this spectrum.

²⁰ Of this amount, 245 kilohertz is presently allocated to broadcasting only in the tropical zone. IWG 1 proposes that this restriction be removed to allow worldwide broadcast use. A comparison between IWG 1's proposal and that of the Commission is shown in Appendix C. Interested parties are requested to consider these alternative proposals and to comment upon them.

²¹ Jacobs specific proposal was to add the segment 5850-5950 kHz to the existing broadcast band which starts at 5950 kHz and ends at 6200 kHz. Since the majority of the spectrum in the band is at 6 MHz, it is referred to as the 6 MHz band.

²² *Radio Regulation* 136 defines reduced carrier SSB as an SSB emission in which the degree of carrier suppression enables the carrier to be reconstituted and to be used for demodulation.

²³ The reaccommodation procedure adopted by WARC-79 effectively postponed use by the broadcast service of the bands above 10 MHz for 10 years and of the bands below 10 MHz for 15 years. If the results of WARC-92 are similar, the new dates would be 2002 and 2007, respectively. Those dates are very close to the current SSB conversion date of 2015.

²⁴ The use of RSSB does not automatically produce twice the number of available channels. Although DSB emissions occupy 10 kilohertz of bandwidth versus 5 kilohertz for RSSB emissions and the nominal channel spacing for DSB is 10 kilohertz versus 5 kilohertz for RSSB, DSB channels are interleaved at 5 kilohertz spacing. Such interleaved emissions are selected on the basis of the facilities available and the specific coverage intended. Thus, DSB stations currently employ a form of increased spectrum efficiency through the 5 kilohertz interleaving. Based on this usage, NTIA report TR90-268 shows that DSB emissions require approximately 1.8 times as much spectrum as RSSB to satisfy a given set of requirements.

²⁵ The actual date in the Resolution is June 30, 2007 at 2359 hours UTC, which is an effective date of July 1, 2007.

²⁶ The total of 1325 kilohertz represents additional allocations of 1125 kilohertz on a worldwide basis as well as an additional allocation of 200 kilohertz at 7200-7400 kHz for Region 2.

²⁷ In preparation for WARC-92, the CCIR Joint Interim Working Party, created to develop sharing criteria between those broadcast, fixed, mobile, and amateur services that operate in the HF bands, will focus on developing compatibility considerations as a result of allocating additional spectrum for broadcasting.

²⁸ *Radio Regulation* (RR) Nos. 406-411 define a geographic area around the equator as the "tropical zone" and RR Nos. 2667-2673 define the specific frequency bands and certain operating constraints. The bands above 3 MHz are: 3200-3400 kHz, 4750-4995 kHz, and 5005-5060 kHz. Although the bands are also allocated to the fixed or fixed and mobile services, broadcasting in the tropical zone has priority. Within these bands broadcasting in the tropical zone is limited to internal national use with a maximum transmitter carrier power of 50 kilowatts.

²⁹ IWG 1 has suggested, however, that the tropical zone regulations be deleted for one band. See Appendix C.

³⁰ The comments and/or reply comments of those parties favoring additional allocations for mobile services are: American Telephone and Telegraph Co., Associated Public Safety Communications Officers, Inc. (APCO), Communications Satellite Corporation, GEC Plessey Telecommunications, Ltd. and Plessey's subsidiary Stromberg-Carlson Corporation, Global-Wulfsberg Systems, GTE Service Corporation, and the Telecommunications Industry Association, Mobile Communications Division. APCO supports additional allocations for mobile services to provide an international public safety service but otherwise opposes the reallocation of the private operational-fixed microwave spectrum that its members use.

³¹ The commenters and/or reply commenters opposing additional allocations for mobile services in the 1700-2450 MHz band or portions thereof are the American Petroleum Institute, American Radio Relay League, Association of American Railroads, Association of Maximum Service Telecasters, State of California, Department of General Services, Telecommunications Division, California Public Safety Radio Association, F. Corporation, George Mason University, Harris Corporation, Farinon Division, Michael R. Kelley, Los Angeles County Sheriff's Department, National Association of State Telecommunications Directors, National ITFS Association, NYNEX Corporation, Ohio Educational Broadcasting Network Commission, Shannondale Wireless, South Carolina Division of Information Resource Management, University of Maryland, Utilities Telecommunications Council, and Wireless Cable Association.

³² Harris delineates the users by frequency band as follows:

1710-1850 MHz Government
 1850-1990 MHz Private Operational-Fixed
 1990-2110 MHz Broadcast Auxiliary
 2110-2130 MHz Domestic Fixed Public
 2130-2150 MHz Private Operational-Fixed
 2150-2160 MHz Multipoint Distribution
 2160-2180 MHz Domestic Public Fixed
 2180-2200 MHz Private Operational-Fixed
 2200-2290 MHz Government
 2290-2300 MHz Government

2300-2310 MHz Government, Amateur

2310-2390 MHz Mobile, Government and Non-Government

2390-2450 MHz Government, Amateur

2450-2483.5 MHz Private Operational-Fixed

³³ Recommendation 205 (MOB-87) "Future Public Land Mobile Telecommunications Systems" invited the CCIR to study, as a matter of urgency, the technical characteristics and suitable frequency bands for equipment and systems providing public land mobile services. In response, the CCIR established an Interim Working Party 8/13 (IWP 8/13) within Study Group 8 to study this matter (Decision 69-2). The results of this work were incorporated into Report M/8 (rev.IWP) Future Public Land Mobile Telecommunication Systems at the final meetings of Study Group 8. In addition, the IWP 8/13 meeting held in Harrogate, England, July 3-12, 1990, estimated, in its Draft Report to IWP 8/15 on WARC 92 Preparation, that the minimum spectrum bandwidth required for voice and non-voice services is approximately 230 megahertz. The personal station will require a common 60 megahertz of this spectrum amount in order to be able to roam internationally.

³⁴ Comments of National ITFS Association document the different Commission proceedings since 1963 wherein the Commission continued to recognize and provide for the particular spectrum needs of the educational community. See pp. 4-6.

³⁵ We, however, are recommending a modification to the frequency bands to accommodate U.S. Government proposals for the space research, space operations, and earth exploration-satellite services at 2025-2110 MHz and 2200-2290 MHz. See para. 108, *infra*. In addition, we have proposed, as one option, an exclusive broadcasting satellite sound service with a complementary broadcasting service in the 2390-2450 MHz band. See para. 103 *infra*.

³⁶ See *Notice of Inquiry*, GEN Docket No. 90-314, 5 FCC Rcd 3995 (1990).

³⁷ See *Report and Order*, GEN Docket No. 88-96, 5 FCC Rcd 3861 (1990).

³⁸ *Id.* at para. 21.

³⁹ *Id.*

⁴⁰ *Notice of Proposed Rule Making*, GEN Docket No. 89-103, 4 FCC Rcd 4173, 4178 (1989). Protocol statement No 58 states:

"The Delegation of the United States of America formally declares that the USA does not, by signature of those Final Acts on its behalf, accept certain decisions taken by this Conference in regard to the Table of Frequency Allocations and the associated footnotes, and therefore, the USA: In view of the fact that the Conference has unduly restricted allocations for the mobile satellite services in the bands 1530-1559 MHz and 1626.5-1660.5 MHz, states its intention to utilize these bands in the way most appropriate to satisfy its particular mobile satellite services requirements recognizing the priority of AMSS(R) and maritime safety communications."

⁴¹ See *Memorandum Opinion and Order*, GEN Docket No. 84-1234, 4 FCC Rcd 6016 (1989); see also *Notice of Proposed Rule Making*, GEN Docket No. 90-56, 5 FCC Rcd 1255 (1990).

⁴² ARINC notes that MOB-87 reduced AMSS(R) allocations to 20 megahertz, allocated 8 megahertz to LMSS on an exclusive basis, allocated 6 megahertz to LMSS on a co-primary basis with MMSS, and allocated 27 megahertz to MMSS on a secondary basis for low data rate use.

⁴³ Commenters in GEN Docket No. 90-56 express similar concerns about the protection of maritime safety services in the 1530-1544/1626-1645.5 MHz bands. As for the aeronautical bands, AMSC and the Commission are of the view that real time priority and preemptive access can be implemented for the AMSS(R) services.

⁴⁴ The Aeronautical Mobile Satellite Service Panel (AMSSP) Working Group of the whole meeting (April 23-27, 1990) forecast that the AMSS(R) spectrum requirement for 2010 will be 8.4-12.1 megahertz (from aircraft) and 9.0-13.2 megahertz (to aircraft) in North America. To this requirement, requirements for Atlantic and Pacific Ocean Region coverage areas must be added in order to obtain the total requirement. This estimate was further refined by the CCIR IWP 8/14 meeting in Melbourne, Australia August 27-September 5, 1990 and the ICAO Communications/Meteorology/Operations Divisional Meeting September 5-28, 1990. The resultant minimum AMSS(R) requirement for each direction worldwide is estimated to be 14.5 megahertz.

⁴⁵ *Second Report and Order*, GEN Docket Nos. 84-689 and 84-690, 104 FCC 2d 650, 660-663 and n. 44 (1986).

⁴⁶ *Report and Order*, GEN Docket Nos. 84-689 and 84-690, 50 FR 39,101 (September 27, 1985) at paras. 12-14 and Appendix D. See also *Second Report and Order*, GEN Docket Nos. 84-689 and 84-690, *supra*, at 668.

⁴⁷ Starsys has filed a similar, although technically different, spectrum allocation proposal for low-earth orbiting satellites. The Starnet system consists of 24 LEO satellites operating in the 137-138 MHz and 148-149.9 MHz bands using as one option pseudo-random-noise code division multiple access (CDMA) techniques. Its alternative option is to provide ten channels using frequency division multiple access (FDMA) and four channels using time division multiple access (TDMA). See RM-7399.

⁴⁸ The Executive Branch does not agree with this option because of the adverse effect on radiolocation operations in the 420-421 MHz band.

⁴⁹ NPR and ABS filed comments; VOA filed reply comments; SCD Radio and AFRISPACE filed late comments.

⁵⁰ See generally, *Notice Of Inquiry*, GEN Docket No. 90-357, 5 FCC Rcd 5237 (1990). SCD Radio proposes 60 megahertz of spectrum in the 1470-1530 MHz band for BSS (Sound) on a primary basis. The same 60 megahertz would be allocated on a secondary basis to the broadcasting service (terrestrial repeaters) and to the mobile service (aeronautical telemetering). Footnotes would limit mobile use to areas outside metropolitan areas. An additional 10.2 megahertz is proposed for an independent terrestrial broadcasting service (1459.8-1470.0 MHz). The 1465.8-1470 MHz band would be an exclusive broadcasting service while the other six megahertz would be shared with the mobile service.

⁵¹ The AFRISTAR system would provide three transponders of 19.8 megahertz for broadcasting in three satellite coverage zones to Africa and the Middle East. Each transponder would support sixty-six 300 kilohertz channels of sound programming. The uplink feeder frequencies are proposed in the 29.9 GHz band with the downlinks to the user population at 1470-1530 MHz. Initially, AFRISTAR would provide three channels of service in each of the three regional coverage zones (2.7 megahertz of bandwidth).

⁵² SCD Radio proposes two geostationary satellites at 103 and 121 degrees West Longitude. Each satellite would provide a total of 99 channels, 33 channels each in the Eastern, Western, and Central beams covering the United States. The two satellites together would therefore provide a total of 66 channels to each of these three regions. Another 34 channels in each beam area would be provided by high-powered terrestrial transmitters to provide coverage in urban canyons. The feeder links (60 megahertz of spectrum) would operate in the 27.5-29.5 GHz band, with the BSS (Sound) transmissions in the 1470-1530 MHz band.

⁵³ See footnote 50, *supra*.

⁵⁴ See Strothers Communications (Strothers) Petition for Rule Making for a Digital Audio Broadcasting service. The general issues implicated in that petition are being addressed in the *Notice of Inquiry* in GEN Docket No. 90-357, referenced in footnote 50, *supra*. We note that Strothers does not propose any specific band, but requests that 48 megahertz be made available from within the band 225-2700 MHz. The UHF TV band is one of five options being considered by Strothers.

⁵⁵ The Executive Branch does not agree with this option because of the adverse effect on aeronautical test and telemetry operations.

⁵⁶ Thirty-two megahertz of spectrum would provide eight transponders of four megahertz each. Ten megahertz of spectrum could satisfy 33 multiplex sound channels under the SCD Radio proposal and eight megahertz could satisfy 32 multiplex sound channels under the Strothers approach.

⁵⁷ The proposal for this consequence of the second option is not included within the proposals attached.

⁵⁸ See *First Report and Order*, GEN Docket No. 87-389, 4 FCC Rcd 3493, 3502 (1989).

⁵⁹ See *NOI, supra*, at para. 20.

⁶⁰ Region 1 and 3 BSS plans are based upon 27 megahertz wide channels, whereas the Region 2 BSS plan is based upon 24 megahertz wide channels.

⁶¹ See e.g., CCIR Report No. 999, "Determination of Bidirectional Coordination Area," CCIR Vol. IV, Part 1 (1986); CCIR Report No. 1005, "Frequency Sharing Between Systems of the Fixed Service and Systems of the Fixed Satellite Service Comprising Forward Band Working (FBW) and Return Band Working (RBW) Networks," CCIR Vols. IV & IX, Part 2 (1986).

⁶² See CCIR Report 801-3 (Mod F), *The Present State of HDTV*.

⁶³ These six frequency bands, as well as the 30-31.3 GHz band, are being examined in the CCIR forum for possibility of sharing between the Space Research Service and existing services in these bands.

⁶⁴ See e.g., *Notice of Proposed Rule Making*, GEN Docket No. 90-56, 5 FCC Rcd 1255 (1990); see also *Report and Order*, GEN Docket Nos. 84-1231, 84-1233, and 84-1234, 2 FCC Rcd 1825 (1986), *recon. denied*, *Memorandum Opinion and Order*, GEN Docket Nos. 84-1231, 84-1233, and 84-1234, 2 FCC Rcd 6830 (1987), *further recon. denied*, *Memorandum Opinion and Order*, GEN Docket No. 84-1234, 4 FCC Rcd 6016 (1989).

⁶⁵ Text of PLEN/8 is included in Appendix A to the *NOI*.

⁶⁶ See Chapter IV, Regulation 15, Maintenance Requirements, Final Text of Amendments to the International Convention for the Safety of Life at Sea (SOLAS) 1974 Concerning Radiocommunications for the Global Maritime Distress and Safety System (GMDSS). These Amendments were accepted February 1, 1990, under IMO Rules of Amendment, and are effective February 1, 1992.

⁶⁷ Document 73 (Secretary-General) Plenipotentiary Conference of the ITU, Nice, France, 1989.

⁶⁸ Romania was the only country in the IMO to object to the GMDSS subsequent to the IMO decision during the 15 month period set-aside for objections and leading to acceptance of SOLAS provisions for the GMDSS on February 1, 1990. Sixty-six governments, including Romania, essentially representing the countries engaged in international shipping commerce in the world and essentially comprising the shipping tonnage listed with Lloyd's of London, participated in the decision by IMO in 1988 to adopt the GMDSS, including the Maintenance Regulation IV/15, *vis-a-vis* the ITU decision on Articles 55 and 56 taken the year before.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

UNITED STATES PROPOSALS
for the
WORLD ADMINISTRATIVE RADIO CONFERENCE
(SPAIN, 1992)

WASHINGTON, D.C.

September, 1990

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

METHOD OF PRESENTATION

1. Services shown in all capital letters (*e.g.*, FIXED) in the Allocation Table are services with primary status.
2. Services shown with an initial capital letter and the remaining letters in lower case (*e.g.*, Fixed) in the Allocation Table are services with secondary status.
3. Underlining (*e.g.*, Underline) indicates new text proposed for adoption.
4. Struck out text (*e.g.*, ~~Strikeout~~) indicates existing text proposed for deletion.
5. NOC indicates provisions for which no change is being proposed.
6. NOC indicates matter of special significance, for which it is important that no changes be made to the current provisions.
7. SUP indicates provisions which are proposed for suppression.
8. MOD indicates a proposed modification to the existing text.
9. (MOD) indicates proposed modifications which are strictly editorial in nature.
10. ADD indicates new provisions which are being proposed for addition.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

PROPOSALS TO AMEND THE RADIO REGULATIONS

CHAPTER I

Terminology

ARTICLE 1

Terms and Definitions

Section III. Radio Services

MOD 24 3.5 Inter-Satellite Service: A space radiocommunication service providing links between ~~artificial earth satellites~~ space stations.

Reasons:

1. The proposed modification provides a more general definition to support other space-to-space communication links which are excluded by the text of the current definition.

2. A modification is required to permit communications such as:

links between deep space spacecraft and Earth-orbiting data relay satellites;

links between Earth-orbiting data relay satellites and data relay satellites orbiting around other celestial bodies.

ADD 47bis 3.28bis Radiolocation-Satellite Service: A radiodetermination-satellite service used for the purpose of radiolocation.

This service may also include feeder links necessary for its operation.

Reason:

To provide a radiodetermination-satellite service that specifically does not include radionavigation and the "safety-of-life" aspects associated with radionavigation.

MOD 52 3.33 Space Research Service: A radiocommunication service in which spacecraft or other objects in space are used or human activities are performed for scientific or technological research purposes, and the information resulting from such research may be distributed to earth stations within the system concerned.

Reason:

The modification adds manned space flight activities to the definition and, in analogy to definition RR 48 (Earth exploration-satellite service), provides for the transmission of data from such research to earth stations.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

CHAPTER III

Frequencies

ARTICLE 8

Frequency Allocations

Section IV. Table of Frequency Allocations

kHz
5730 - 6200

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	5730 - 5950 <u>5900</u> FIXED LAND MOBILE	5730 - 5950 <u>5900</u> FIXED MOBILE except aero- nautical mobile (R)	5730 - 5950 <u>5900</u> FIXED Mobile except aero- nautical mobile (R)
MOD	5730 <u>5900</u> - 5950 FIXED LAND MOBILE <u>BROADCASTING</u> <u>521A</u> <u>521B</u> <u>521C</u>	5730 <u>5900</u> - 5950 FIXED MOBILE except aero- nautical mobile (R) <u>BROADCASTING</u> <u>521A</u> <u>521B</u> <u>521C</u>	5730 <u>5900</u> - 5950 FIXED Mobile except aero- nautical mobile (R) <u>BROADCASTING</u> <u>521A</u> <u>521B</u> <u>521C</u>
NOC	5950 - 6200 BROADCASTING		

Reason:

To provide additional allocations for the broadcasting service, but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

ADD

521A Emissions limited to single-sideband with characteristics specified in Appendix 45 to the Radio Regulations.

Reason:

To promote additional allocations for broadcasting while utilizing current technology.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ADD

521B The band 5900-5950 kHz is allocated to the fixed and mobile services on a primary basis subject to the procedure described in Resolution BBB. Within this band, the date of commencement of operations in the broadcasting service shall not be earlier than the date of completion of satisfactory transfer, according to the procedures described in Resolution BBB, of all assignments to stations in the fixed and mobile services operating in accordance with the Table and other provisions of the Radio Regulations, which are recorded in the Master Register and which may be affected by broadcasting operations.

Reason:

To protect the fixed and mobile bands until the reaccommodation procedure is completed and to facilitate the reaccommodation procedure in the accompanying Resolution BBB.

ADD

521C On condition that harmful interference is not caused to the broadcasting service, frequencies in the bands 5900-5950 kHz, 7400-7525 kHz, 9350-9500 kHz, 11550-11650 kHz, 13800-13900 kHz, 15600-15700 kHz, 17450-17550 kHz, and 18900-19300 kHz may be used by stations in the fixed and mobile services. The broadcasting service will exercise technical constraints that facilitate access to the bands by the fixed and mobile service. Use of these frequency bands by the fixed and mobile services will take appropriate account of broadcast schedules published in accordance with the Radio Regulations.

Reason:

Recognizing the continued need for use of the spectrum by the fixed and mobile services and the necessity of using the HF spectrum in the most efficient manner, this approach allows the broadcasting service to obtain and use additional spectrum while providing for fixed and mobile use where feasible. It is not intended to replace the requirement to accommodate existing fixed and mobile service assignments displaced by the allocation of spectrum to the broadcasting services. Rather, it allows for opportune access to the bands for itinerant fixed and mobile operations that may not require dedicated frequency assignments.

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kHz
6765 - 7300

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	6765 - 7000 <u>6900</u> FIXED Land Mobile 525 524		
MOD	6765 <u>6900</u> - 7000 FIXED <u>AMATEUR 510</u> <u>AMATEUR-SATELLITE</u> Land Mobile 525 <u>525A</u>		
<u>NOC</u>	7000 - 7100 AMATEUR 510 AMATEUR-SATELLITE 526 527		
MOD	7100 - 7300 <u>7200</u> BROADCASTING <u>AMATEUR 510</u> <u>AMATEUR-SATELLITE</u>	7100 - 7300 <u>7200</u> AMATEUR 510 <u>AMATEUR-SATELLITE</u> 528	7100 - 7300 <u>7200</u> BROADCASTING <u>AMATEUR 510</u> <u>AMATEUR-SATELLITE</u>
MOD	7100 <u>7200</u> - 7300 BROADCASTING	7100 <u>7200</u> - 7300 AMATEUR 510 <u>BROADCASTING</u> 528 <u>528A</u>	7100 <u>7200</u> - 7300 BROADCASTING

Reason:

1. To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

2. To expand and realign the exclusive, primary worldwide allocation at 7 MHz for the amateur service as a consequence of the readjustment of the broadcasting service allocations in this part of the spectrum.

ADD 525A The band 6900-7000 kHz is allocated to the fixed service on a primary basis subject to the procedure described in Resolution BBB. Within this band, the date of commencement of operations in the amateur service shall not be earlier than the date of completion of satisfactory transfer, according to the procedures described in Resolution BBB, of all assignments to stations in the fixed service operating in accordance with the Table and other provisions of the Radio Regulations, which are recorded in the Master Register and which may be affected by amateur operations.

Reason:

To protect the fixed service until the reaccommodation procedure is completed.

SUP 528

Reason:

With the change in allocation, the restriction is no longer necessary.

ADD 528A The band 7200-7300 kHz is allocated to the amateur service on a primary basis until 1 July 2007, which is the changeover date for the fixed and mobile services as described in Resolution BBB. Within this band, the commencement of operations in the broadcasting service shall not be earlier than that date.

Reason:

To protect the amateur service until the reaccommodation procedure is completed.

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kHz
7525 - 8100

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	7300 - 8100 <u>7525</u>	<p style="text-align: center;">FIXED</p> <p style="text-align: center;">Land Mobile</p> <p style="text-align: center;"><u>BROADCASTING</u></p> <p style="text-align: center;"><u>521C</u> <u>528B</u> <u>528C</u></p>	
MOD	7300 <u>7525</u> - 8100	<p style="text-align: center;">FIXED</p> <p style="text-align: center;">Land Mobile</p> <p style="text-align: center;">529</p>	

Reason:

To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

ADD 528B Emissions in the band 7400-7525 kHz are limited to single-sideband with characteristics specified in Appendix 45 to the Radio Regulations.

Reason:

To promote additional allocations for broadcasting while utilizing current technology.

ADD 528C The bands 7300-7525 kHz, 9350-9500 kHz, 11550-11650 kHz, 13800-13900 kHz, 15600-15700 kHz, 17450-17550 kHz, and 18900-19300 kHz are allocated to the fixed service on a primary basis subject to the procedure described in Resolution BBB. Within these bands, the date of commencement of operations in the broadcasting service shall not be earlier than the date of completion of satisfactory transfer, according to the procedures described in Resolution BBB, of all assignments to stations in the fixed service operating in accordance with the Table and other provisions of the Radio Regulations, which are recorded in the Master Register and which may be affected by broadcasting operations.

Reason:

To protect the fixed service until the reaccommodation process is completed.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

kHz
9040 - 9900

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	9040 - 9500 <u>9350</u>		
	FIXED		
MOD	9500 <u>9350</u> - 9500		
	FIXED		
	<u>BROADCASTING</u>		
	<u>521A</u> <u>521C</u> <u>528C</u>		
<u>NOC</u>	9500 - 9900		
	BROADCASTING		
	530 531		

Reason:

To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

kHz
11 400 - 12 050

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	11 400 - 11 650 <u>11 550</u>		
	FIXED		
MOD	11 400 <u>11 550</u> - 11 650		
	FIXED		
	<u>BROADCASTING</u>		
	<u>521A</u> <u>521C</u> <u>528C</u>		
<u>NOC</u>	11 650 - 12 050		
	BROADCASTING		
	530 531		

Reason:

To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

kHz
13 600 - 14 000

Allocation to Services			
	Region 1	Region 2	Region 3
<u>NOC</u>	13 600 - 13 800		
	BROADCASTING		
	531		
MOD	13 800 - 14 000 <u>13 900</u>		
	FIXED		
	Mobile except aeronautical mobile (R)		
	<u>BROADCASTING</u>		
	<u>521A</u> <u>521C</u> <u>528C</u>		
MOD	13 800 <u>13 900</u> - 14 000		
	FIXED		
	Mobile except aeronautical mobile (R)		

Reason:

To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

kHz
15 100 - 16 360

Allocation to Services		
Region 1	Region 2	Region 3
<p><u>NOC</u></p> <p>15 100 - 15 600</p>	<p>BROADCASTING</p> <p>531</p>	
<p><u>MOD</u></p> <p>15 600 - 16 360 <u>15 700</u></p>	<p>FIXED</p> <p><u>BROADCASTING</u></p> <p><u>521A</u> <u>521C</u> <u>528C</u></p>	
<p><u>MOD</u></p> <p>15 600 <u>15 700</u> - 16 360</p>	<p>FIXED</p> <p>536</p>	

Reason:

To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

kHz
17 410 - 17 900

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	17 410 - 17 550 <u>17 450</u>		
	FIXED		
MOD	17 410 <u>17 450</u> - 17 550		
	FIXED		
	<u>BROADCASTING</u>		
	<u>521A</u> <u>521C</u> <u>528C</u>		
<u>NOC</u>	17 550 - 17 900		
	BROADCASTING		
	531		

Reason:

To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

kHz
18 900 - 19 680

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	18 900 - 19 680 <u>19 300</u>		
	FIXED		
	<u>BROADCASTING</u>		
	<u>521A</u> <u>521C</u> <u>528C</u>		
MOD	18 900 <u>19300</u> - 19 680		
	FIXED		

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

Reason:

To provide additional allocations for the broadcasting service but only on the basis of SSB while at the same time permitting access for itinerant fixed and mobile use on a secondary basis. Reaccommodation of existing users would have to be accomplished in accordance with Resolution BBB.

MHz
137 - 138

MOD

Allocation to Services		
Region 1	Region 2	Region 3
<p>137 - 138</p> <p style="text-align: center;">SPACE OPERATION (space-to-Earth)</p> <p style="text-align: center;">METEOROLOGICAL-SATELLITE (space-to-Earth)</p> <p style="text-align: center;">SPACE RESEARCH (space-to-Earth)</p> <p style="text-align: center;">Fixed</p> <p style="text-align: center;">Mobile except aeronautical mobile (R)</p> <p style="text-align: center;"><u>Mobile-Satellite (space-to-Earth) 596A</u></p> <p style="text-align: center;">596 597 598 599</p>		

ADD

596A The mobile-satellite service is limited to low earth orbit satellite systems.

Reason:

To provide a mobile-satellite service (space-to-Earth) allocation for low earth orbit satellite systems.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
146 - 149.9

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	146 - 149.9 <u>148</u> FIXED MOBILE except aero- nautical mobile (R) 608	146 - 148 AMATEUR 607	146 - 148 AMATEUR FIXED MOBILE 607
MOD	146 <u>148</u> - 149.9 FIXED MOBILE except aero- nautical mobile (R) <u>Mobile-Satellite</u> <u>(Earth-to-space)</u> <u>596A</u> 608	148 - 149.9 FIXED MOBILE <u>Mobile-Satellite (Earth-to-space) 596A</u> 608	

Reason:

To provide a mobile-satellite service (space-to-Earth) allocation for low earth orbit satellite systems.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
410 - 420

Allocation to Services		
Region 1	Region 2	Region 3
MOD 410 - 420		
FIXED		
MOBILE except aeronautical mobile		
<u>SPACE RESEARCH (Space-to-space) 651A</u>		

ADD 651A Use of this allocation is limited to communication links within 5 km of an orbiting, manned space vehicle. The power flux density produced at the earth's surface shall not exceed [xxx] dBW/m²/4 kHz.

Reason:

To provide an allocation for a new space service application concerning communications with manned space vehicles. The extra-vehicular activity (EVA) system is to provide communications among astronauts and base spacecraft while astronauts are performing activities outside the base spacecraft, e.g., maintenance.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
420 - 430

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	<p>420 - 430 <u>421</u></p> <p style="text-align: center;">FIXED</p> <p style="text-align: center;">MOBILE except aeronautical mobile</p> <p style="text-align: center;">Radiolocation</p> <p style="text-align: center;"><u>MOBILE-SATELLITE (space-to-Earth) 596A</u></p> <p style="text-align: center;">651 MOD 652 653</p>		
MOD	<p>420 <u>421</u> - 430</p> <p style="text-align: center;">FIXED</p> <p style="text-align: center;">MOBILE except aeronautical mobile</p> <p style="text-align: center;">Radiolocation</p> <p style="text-align: center;">MOD 651 MOD 652 653</p>		

MOD 651 Different category of service: in Australia, the United States, India, Japan, and the United Kingdom, the allocation of the bands ~~420~~ 421 -430 MHz and 440 - 450 MHz to the radiolocation service is on a primary basis (see No. 425).

MOD 652 Additional Allocation: in Australia, the United States, Jamaica and the Philippines, the bands ~~420~~ 421 - 430 MHz and 440 - 450 MHz are also allocated to the amateur service on a secondary basis.

Reasons:

1. To provide a mobile-satellite (space-to-Earth) allocation for low earth orbit satellite systems.
2. MOD 651 is consequential to the addition of the mobile-satellite service (space-to-Earth) on an exclusive primary basis.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
470 - 890

Allocation to Services				
Region 1	Region 2	Region 3		
470 - 790 BROADCASTING	470 - 512 BROADCASTING Fixed Mobile 674 675	470 - 585 FIXED MOBILE BROADCASTING		
	512 - 608 BROADCASTING 678	673 677 679 585 - 610 FIXED		
	608 - 614 RADIO ASTRONOMY Mobile-Satellite except aeronautical mobile-satellite (Earth-to-space)	MOBILE BROADCASTING RADIONAVIGATION 688 689 690		
MOD 676 677A 682 683 684 685 686 686A 687 689 693 <u>693A</u> 694	614 - 806 BROADCASTING Fixed Mobile 675 692 692A 693 <u>693A</u>	610 - 890 FIXED MOBILE BROADCASTING		
MOD 790 - 862 FIXED BROADCASTING 694 695 695A 696 697 702	806 - 890 FIXED MOBILE BROADCASTING			
MOD 862 - 890 FIXED MOBILE except aero- nautical mobile BROADCASTING 703 704	692A 700	677 688 689 <u>693A</u> 690 691 693 701		

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ADD 693A The frequency band 728 -788 MHz is also allocated to the broadcasting-satellite service for the provision of sound programs.

Reason:

This proposal is one of three possible proposals to provide an allocation for Broadcasting-Satellite Service (sound).

MHz
890 -942

Allocation to Services		
Region 1	Region 2	Region 3
890 - 942 FIXED MOBILE except aeronautical mobile BROADCASTING 703 Radiolocation	890 - 902 FIXED MOBILE except aeronautical mobile Radiolocation 704A 705 <hr/> 902 - 928 FIXED Amateur Mobile except aeronautical mobile Radiolocation 705 707 707A <hr/> 928 - 942 FIXED MOBILE except aeronautical mobile Radiolocation	890 - 942 FIXED MOBILE BROADCASTING Radiolocation
704 <u>705A</u>	705 <u>705A</u>	706 <u>705A</u>

MOD

ADD 705A The 930 -931 MHz band is allocated on a primary basis to the mobile-satellite service (Earth-to-space) and is limited to low earth orbit satellite systems, subject to agreement obtained under the procedure set forth in Article 14.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

Reason:

To provide a mobile-satellite service (Earth-to-space) allocation for low earth orbit satellite systems.

MHz
1429-1525

Allocation to Services		
	Region 1	Region 2
MOD	1429 - 1525 <u>1493</u> FIXED MOBILE except aero- nautical mobile 722	1429 - 1525 1493 FIXED MOBILE MOD 723 722
MOD	1429 <u>1493</u> - 1525 FIXED MOBILE except aero- nautical mobile <u>BROADCASTING-SATELLITE</u> (sound) <u>BROADCASTING</u> 722	1429 <u>1493</u> - 1525 FIXED MOBILE 723 <u>BROADCASTING-SATELLITE</u> (sound) <u>BROADCASTING</u> 722

MOD 723 In Region 2, in Australia and Papua New Guinea, the use of the band 1435 - ~~1535~~ 1493 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service.

Reason:

This proposal is one of three possible proposals herein attempting to provide an allocation for the Broadcasting-Satellite Service (sound) and a complementary Broadcasting Service. As a consequence to this proposal, we will need to reaccommodate flight, test and telemetry operations. (See Second NOI, ¶ 102)

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
1525 - 1530

MOD

Allocation to Services		
Region 1	Region 2	Region 3
1525 - 1530 SPACE OPERATION (Space-to-Earth) <u>MOBILE-SATELLITE</u> (Space-to-Earth) FIXED <u>Fixed 723B</u> Earth Exploration- Satellite Mobile except aeronautical mobile 724 722 725	1525 - 1530 SPACE OPERATION (Space-to-Earth) <u>MOBILE-SATELLITE</u> (Space-to-Earth) Fixed Earth Exploration- Satellite Mobile 723 722 723A	1525 - 1530 SPACE OPERATION (Space-to-Earth) <u>MOBILE-SATELLITE</u> (Space-to-Earth) FIXED <u>Fixed 723B</u> Earth Exploration- Satellite Mobile 723 724 722

ADD

723B Fixed service operations can continue on a primary basis until January 1, 1997.

Reason:

To provide an allocation for the mobile-satellite service and to ensure the flexibility to stimulate the developing requirements for this service.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
1530 - 1533

MOD

Allocation to Services		
Region 1	Region 2	Region 3
1530 - 1533 SPACE OPERATION (Space-to-Earth) MARITIME MOBILE- SATELLITE (Space to Earth) LAND MOBILE SATELLITE (Space to Earth) <u>MOBILE-SATELLITE</u> <u>(Space-to-Earth)</u> Earth Exploration- Satellite Fixed Mobile except aeronautical mobile 722 726 726A 726C	1530 - 1533 SPACE OPERATION (Space-to-Earth) MARITIME MOBILE SATELLITE (Space to Earth) LAND MOBILE SATELLITE (Space to Earth) <u>MOBILE-SATELLITE</u> <u>(Space-to-Earth)</u> Earth Exploration-Satellite Fixed Mobile 723 722 726 726A 726C	

SUP

726

ADD

726C In the frequency bands 1530-1544 MHz and 1626.5-1645.5 MHz maritime mobile-satellite distress and safety communications, e.g., GMDSS, shall have priority access with real-time preemptive capability in the mobile-satellite service. Communications of mobile-satellite system stations not participating in the GMDSS shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the mobile-satellite service.

Reason:

To provide an allocation for the mobile-satellite service and to ensure the flexibility to stimulate the developing requirements for this service while providing protection for safety and distress communications in the maritime mobile-satellite service. The suppression of RR 726 is consequential to these proposals and the expiration of the effectiveness date.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHZ
1533 - 1544

Allocation to Services		
Region 1	Region 2	Region 3
<p>MOD</p> <p>1533 - 1535 SPACE OPERATION (Space-to-Earth)</p> <p>MARITIME MOBILE-SATELLITE (Space-to-Earth)</p> <p><u>MOBILE-SATELLITE</u> <u>(Space-to-Earth)</u></p> <p>Land Mobile Satellite (Space-to-Earth) 726B</p> <p>Earth Exploration-Satellite</p> <p>Fixed</p> <p>Mobile except aeronautical mobile</p> <p>722 726 726A <u>726C</u></p>	<p>1533 - 1535 SPACE OPERATION (Space-to-Earth)</p> <p>MARITIME MOBILE-SATELLITE (Space-to-Earth)</p> <p><u>MOBILE-SATELLITE (Space-to-Earth)</u></p> <p>Land Mobile Satellite (Space-to-Earth) 726B</p> <p>Earth Exploration-Satellite</p> <p>Fixed</p> <p>Mobile 723</p> <p>722 726 726A <u>726C</u></p>	<p>Region 3</p>
<p>MOD</p> <p>1535 - 1544</p> <p>MARITIME MOBILE-SATELLITE (Space-to-Earth)</p> <p><u>MOBILE-SATELLITE (Space-to-Earth)</u></p> <p>Land Mobile Satellite (Space-to-Earth) 726B</p> <p>722 726A <u>726C</u> 727</p>		

SUP 726B
Mob-87

Reason:

To provide an allocation for the mobile-satellite service and to ensure the flexibility to stimulate the developing requirements for this service while providing protection for safety and distress communications in the maritime mobile-satellite service.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
1545 - 1559

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	1545 - 1555 AERONAUTICAL MOBILE-SATELLITE (R) (Space to Earth) <u>MOBILE-SATELLITE (Space-to-Earth)</u> 722 726A 727 729 729A 730 <u>730B</u>		
MOD	1555 - 1559 LAND MOBILE-SATELLITE (Space to Earth) <u>MOBILE-SATELLITE (Space-to-Earth)</u> 722 726A 727 730 730A <u>730B</u>		

SUP 729A
Mob-87

SUP 730A
Mob-87

ADD 730B The aeronautical mobile-satellite (R) service shall have priority access with real-time preemptive capability over all other communications in the mobile-satellite service. Systems not interoperable with the aeronautical mobile-satellite (R) service shall operate on a secondary basis. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services.

Reason:

To provide an allocation for the mobile-satellite service while maintaining the flexibility to provide for developing requirements in the aeronautical mobile-satellite (R) service while providing protection for safety and distress communications in the aeronautical mobile-satellite (R) service.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
1610 - 1631.5

Allocation to Services		
Region 1	Region 2	Region 3
<p>MOD</p> <p>1610 - 1626.5</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p><u>RADIODETERMINATION- SATELLITE</u> (Earth-to-space) <u>733A</u></p> <p><u>MOBILE-SATELLITE</u> (Earth-to-space)</p> <p>722 727 730 731 731A 731B 731D 732 733 733B 733E 733A 733F 734 <u>733Z</u></p>	<p>1610 - 1626.5</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>RADIODETERMINATION- SATELLITE (Earth-to-space) 733A 733E</p> <p><u>MOBILE-SATELLITE</u> (Earth-to-space)</p> <p>722 731B 731C 732 733 733C 733D 734 <u>733Z</u></p>	<p>1610 - 1626.5</p> <p>AERONAUTICAL RADIONAVIGATION</p> <p>Radiodetermination- Satellite (Earth-to-space) 733A-733E</p> <p><u>RADIODETERMINATION- SATELLITE</u> (Earth-to-space) <u>733A</u></p> <p><u>MOBILE-SATELLITE</u> (Earth-to-space)</p> <p>722 727 730 731B 731C 732 733 733B 734 <u>733Z</u></p>
<p>MOD</p> <p>1626.5 - 1631.5</p> <p style="text-align: center;">MARITIME MOBILE SATELLITE (Earth to space)</p> <p style="text-align: center;"><u>MOBILE-SATELLITE (Earth-to-space)</u></p> <p style="text-align: center;">Land Mobile Satellite (Earth to space) 726B</p> <p style="text-align: center;">722 726A <u>726C</u> 727 730</p>		

MOD 733 The bands ~~1610-1626.5 MHz~~, 5000-5250 MHz, and 15.4-15.7 GHz are also allocated to the aeronautical mobile-satellite (R) service on a primary basis. Such use is subject to agreement obtained under the procedure set forth in Article 14.

SUP 733E
Mob-87

SUP 733F
Mob-87

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ADD 733Z The radiodetermination-satellite service and the mobile-satellite service are limited to using compatible code division multiple access modulation characteristics.

Reason:

To provide additional allocations for the mobile-satellite service. Since the radiodetermination-satellite service and mobile-satellite service will have compatible characteristics it is necessary as a consequence to upgrade the radiodetermination-satellite service in Regions 1 and 3 to a co-primary service with the mobile-satellite service. Further study is required to determine how to regulate the RDSS and MSS to have these characteristics. Additional sharing criteria are also required for other services.

MHz
1631.5 - 1645.5

MOD

Allocation to Services		
Region 1	Region 2	Region 3
1631.5 - 1634.5		
MARITIME MOBILE SATELLITE (Earth to space)		
LAND MOBILE SATELLITE (Earth to space)		
<u>MOBILE-SATELLITE (Earth-to-space)</u>		
722 726A <u>726C</u> 727 730 734A		
1634.5 - 1645.5		
MARITIME MOBILE SATELLITE (Earth to space)		
<u>MOBILE-SATELLITE (Earth-to-space)</u>		
Land Mobile Satellite (Earth to space) 726B		
722 726A <u>726C</u> 727 730		

MOD

Reason:

To provide an allocation for the mobile-satellite service and to ensure the flexibility to stimulate the developing requirements for this service while providing protection for safety and distress communications in the maritime mobile-satellite service.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
1646.5 - 1660.5

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	1646.5 - 1656.5 AERONAUTICAL MOBILE SATELLITE (R) (Earth to space) <u>MOBILE-SATELLITE (Earth-to-space)</u> 722 726A 727 729A 730 <u>730B</u> 735		
MOD	1656.5 - 1660 LAND MOBILE SATELLITE (Earth to space) <u>MOBILE-SATELLITE (Earth-to-space)</u> 722 726A 727 730 730A <u>730B</u> 734A		
MOD	1660 - 1660.5 RADIO ASTRONOMY LAND MOBILE SATELLITE (Earth to space) <u>MOBILE-SATELLITE (Earth-to-space)</u> <u>736A</u> 722 726A 730A 736 <u>730B</u>		

ADD 736A Aeronautical Mobile-Satellite Service (R) is the only aeronautical mobile-satellite service permitted in this band consistent with ADD 730B.

Reason:

To provide an allocation for the mobile-satellite service while maintaining the flexibility to provide for developing requirements in the aeronautical mobile-satellite (R) service.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
1710 - 2200

Allocation to Services		
	Region 1	Region 2
MOD	1710 - 2290 <u>2025</u> FIXED Mobile 722 743A 744 746 747 748 750	1710 - 2290 <u>2025</u> FIXED MOBILE 722 744 745 746 747 748 749 750
MOD	1710 2025 - 2290 <u>2110</u> FIXED <u>SPACE RESEARCH</u> <u>(Earth-to-space)</u> <u>(Space-to-space)</u> <u>SPACE OPERATION</u> <u>(Earth-to-space)</u> <u>(Space-to-space)</u> <u>EARTH EXPLORATION-</u> <u>SATELLITE (Earth-</u> <u>to-space) (Space-</u> <u>to-space)</u> Mobile 722 743A 744 746 747 748 750	1710 2025 - 2290 <u>2110</u> FIXED <u>SPACE RESEARCH (Earth-to-space)</u> <u>(Space-to-space)</u> <u>SPACE OPERATION (Earth-to-space)</u> <u>(Space-to-space)</u> <u>EARTH EXPLORATION-SATELLITE</u> <u>(Earth-to-space) (Space-to-space)</u> MOBILE 722 744 745 746 747 748 749 750
MOD	1710 2110 - 2290 <u>2200</u> FIXED Mobile 722 743A 744 746 747 748 750	1710 2110 - 2290 <u>2200</u> FIXED MOBILE 722 744 745 746 747 748 749 750

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
2200 - 2290

Allocation to Services		
Region 1	Region 2	Region 3
<p>MOD 1710 <u>2200 - 2290</u></p> <p>FIXED</p> <p><u>SPACE RESEARCH</u> <u>(Space-to-Earth)</u> <u>(Space-to-space)</u></p> <p><u>SPACE OPERATION</u> <u>(Space-to-Earth)</u> <u>(Space-to-space)</u></p> <p><u>EARTH EXPLORATION-SATELLITE</u> <u>(Space-to-Earth) (Space-to-space)</u></p> <p>Mobile</p> <p>722 743A 744 746 747 748 750</p>	<p>1710 <u>2200 - 2290</u></p> <p>FIXED</p> <p><u>SPACE RESEARCH (Space-to-Earth)</u> <u>(Space-to-space)</u></p> <p><u>SPACE OPERATION (Space-to-Earth)</u> <u>(Space-to-space)</u></p> <p><u>EARTH EXPLORATION-SATELLITE</u> <u>(Space-to-Earth) (Space-to-space)</u></p> <p>MOBILE</p> <p>722 744 745 746 747 748 749 750</p>	

SUP 747

SUP 750

Reasons:

1. To provide a primary allocation for space services that support safety communications for satellites and manned space flight missions; to eliminate the Article 14 coordination requirement for these services.
2. In order to protect the fixed and mobile operations, the PFD limit in No. 2559 will be extended to these bands.
3. Deletion of footnotes 722, 744, 745, 746, 748, and 749; and the suppression of footnotes 747 and 750 in the various bands is a consequence of the primary allocation to the space research, space operation, and earth exploration-satellite services under the new proposed band limits.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MHz
2300 - 2483.5

Allocation to Services		
	Region 1	Region 2
MOD	2300 - 2450 <u>2390</u> FIXED Amateur Mobile Radiolocation 664 752 743A	2300 - 2450 <u>2390</u> FIXED MOBILE RADIOLOCATION Amateur 664 751 752
MOD	2300 <u>2390</u> - 2450 FIXED Amateur Mobile Radiolocation <u>BROADCASTING-SATELLITE</u> <u>(sound)</u> <u>BROADCASTING</u> 664 MOD 752	2300 <u>2390</u> - 2450 FIXED MOBILE RADIOLOCATION Amateur <u>BROADCASTING-SATELLITE</u> <u>(sound)</u> <u>BROADCASTING</u> 664 751 MOD 752
	2450 - 2483.5 FIXED MOBILE Radiolocation MOD 752 753	2450 - 2483.5 FIXED MOBILE RADIOLOCATION MOD 752

MOD 664 In the bands 435-438 MHz, 1260-1270 MHz, ~~2400-2450 MHz~~, 3400-3410 MHz (in Regions 2 and 3 only), and 5650-5670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table (see No. 435). Administrations authorizing such use shall ensure that any harmful interference caused by emissions from a station in the amateur-satellite service is immediately eliminated in accordance with the provisions of No. 2741. The use of the bands 1260-1270 MHz and 5650-5670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

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MOD 752 The band ~~2400~~ 2420 - ~~2500~~ 2480 MHz (centre frequency 2450 MHz) is designated for industrial, scientific and medical (ISM) applications. Radio services operating within this band must accept harmful interference which may be caused by these applications. ISM equipment operating in this band is subject to the provisions of No. 1815.

Reason:

This proposal is one of three possible proposals to provide an allocation for the Broadcasting-Satellite (sound) Service and a complementary broadcasting service. MOD 752 is a consequential proposal to facilitate the accommodation of this reallocation proposal.

MHz
2483.5 - 2500

Allocation to Services			
Region 1	Region 2	Region 3	
2483.5 - 2500 FIXED MOBILE <u>RADIODETERMINATION-SATELLITE</u> <u>(Space-to-Earth)</u> <u>753A</u> <u>MOBILE-SATELLITE</u> <u>(Space-to-Earth)</u> Radiolocation 733F 752 753A 753B 753E 753E <u>733Z</u>	2483.5 - 2500 FIXED MOBILE RADIODETERMINATION-SATELLITE 753A (Space-to-Earth) <u>MOBILE-SATELLITE</u> <u>(Space-to-Earth)</u> RADIOLOCATION 752 753D <u>733Z</u>	2483.5 - 2500 FIXED MOBILE <u>RADIODETERMINATION-SATELLITE</u> <u>(Space-to-Earth 753A)</u> Radiodetermination-Satellite (Space-to-Earth) 753A <u>MOBILE-SATELLITE</u> <u>(Space-to-Earth)</u> RADIOLOCATION 752 753E <u>733Z</u>	

SUP 753C
Mob-87

Reason:

To provide additional allocations for the mobile-satellite service. Since the radiodetermination-satellite service and the mobile-satellite service will have compatible characteristics, it is necessary as a consequence to upgrade the radiodetermination-satellite service in Regions 1 and 3 to a co-primary service with the mobile-satellite service.

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GHz
11.7 - 12.75

MOD

Allocation to Services			
Region 1	Region 2	Region 3	
11.7 - 12.5 FIXED BROADCASTING BROADCASTING-SATELLITE Mobile except aeronautical mobile	11.7 - 12.1 FIXED 837 FIXED-SATELLITE (space-to-Earth) Mobile except aeronautical mobile 836 839	11.7 - 12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	
	12.1 - 12.2 FIXED-SATELLITE (space-to-Earth) 836 839 842		838 <u>838A</u>
	838 <u>838A</u>	12.2 - 12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	12.2 - 12.5 FIXED MOBILE except aeronautical mobile BROADCASTING 838 845
		839 844 846 <u>838A</u>	12.5 - 12.75
12.5 - 12.75 FIXED-SATELLITE (space-to-Earth) (Earth-to-Space)	12.7 - 12.75 FIXED FIXED-SATELLITE MOBILE except aeronautical mobile	12.5 - 12.75 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 847	
848 849 850			

ADD 838A When implementing broadcasting-satellite systems in this band, administrations should bear in mind the possible use of this band for wide-RF band high definition television via satellite.

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Reason:

To provide for the future development of wide-Rf band high definition television from satellite, in accordance with Resolution No. 521.

GHz
14.5 - 14.8

Allocation to Services		
Region 1	Region 2	Region 3
14.5 - 14.8	FIXED FIXED-SATELLITE (Earth-to-space) 863 MOBILE Space Research	

NOC

NOC

863

Reason:

The current allocations are still required.

GHz
17.3 - 17.7

Allocation to Services		
Region 1	Region 2	Region 3
17.3 - 17.7	FIXED-SATELLITE (Earth-to-space) 869 Radiolocation <u>BROADCASTING-SATELLITE</u> 868A	

MOD

ADD

868A Reserved for wide RF-Band High Definition Television. To be implemented in accordance with the procedures of RES XXX. (to be developed)

Reason:

To provide an alternative allocation to meet HDTV-BSS requirements that may not be able to be satisfied in the 12 GHz BSS allocations.

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GHz
19.7 - 20.2

Allocation to Services		
Region 1	Region 2	Region 3
MOD	19.7 - 20.2	FIXED-SATELLITE (space-to-Earth) Mobile Satellite (space to Earth) <u>MOBILE-SATELLITE (space-to-Earth)</u> 873

Reason:

To provide additional protection for the mobile-satellite service.

GHz
21.4 - 22

Allocation to Services		
Region 1	Region 2	Region 3
MOD	21.4 - 22	FIXED MOBILE except aeronautical mobile <u>SPACE RESEARCH (Space-to-Earth)</u>

Reasons:

1. To enable the communications support necessary to achieve the stated United States goals of manned exploration of the Moon and Mars.
2. To provide for wideband data return links from Very Long Baseline Interferometry (VLBI) observations by satellite.
3. Provisional proposal as appropriate technical sharing criteria are under development; 1 of 6 alternative bands proposed.

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GHz
24.25 - 25.25

Allocation to Services		
Region 1	Region 2	Region 3
24.25 - 25.25		
RADIONAVIGATION		
<u>SPACE RESEARCH (Earth-to-space)</u>		
<u>RADIOLOCATION-SATELLITE (Earth-to-space)</u>		

MOD

Reasons:

1. To enable the communications support necessary to achieve the stated United States goals of manned exploration of the Moon and Mars.
2. To provide for uplinks from Very Long Baseline Interferometry (VLBI) observations by satellite.
3. Provisional proposal as appropriate technical sharing criteria are under development; 2 of 6 alternative bands proposed.
4. To provide for a satellite based location and messaging service.

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GHz
25.25-27.5

Allocation to Services		
Region 1	Region 2	Region 3
<p>MOD 25.25 - 27</p> <p style="text-align: center;">FIXED</p> <p style="text-align: center;">MOBILE</p> <p style="text-align: center;"><u>INTER-SATELLITE</u></p> <p style="text-align: center;">Earth Exploration-Satellite (Space-to-space)</p> <p style="text-align: center;">Standard Frequency and Time Signal-Satellite (Earth-to-space)</p>		
<p>MOD 27 - 27.5</p> <p style="text-align: center;">FIXED</p> <p style="text-align: center;">MOBILE</p> <p style="text-align: center;"><u>INTER-SATELLITE 881A</u></p> <p style="text-align: center;">Earth Exploration-Satellite (Space-to-space)</p>	<p>27 - 27.5</p> <p style="text-align: center;">FIXED</p> <p style="text-align: center;">FIXED-SATELLITE (Earth-to-space)</p> <p style="text-align: center;">MOBILE</p> <p style="text-align: center;"><u>INTER-SATELLITE 881A</u></p> <p style="text-align: center;">Earth Exploration-Satellite (Space-to-space)</p>	

Reasons:

1. To provide a primary allocation for wide bandwidth space-to-space data return links from user spacecraft to the data relay satellite (e.g. US ATDRS) and to provide a primary allocation for wideband links between a permanent Space Station and co-orbiting free flyers.
2. Provisional proposal as appropriate technical sharing criteria are under development.

ADD 881A Non-geostationary space stations operating in the inter-satellite service in the band 27 - 27.5 GHz are exempt from the provisions of RR 2613.

Reason:

RR No. 881A is proposed in order to provide equality to links between non-geostationary and geostationary satellites.

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GHz
27.5 - 29.5

Allocation to Services		
Region 1	Region 2	Region 3
MOD	27.5 - 29.5	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE <u>882A</u>

ADD 882A Beacon transmissions in the Fixed-Satellite Service (space-to-Earth) are also permitted for the purpose of uplink power control.

Reason:

Significant attenuation occurs in the FSS uplinks in this frequency range. Provision of a downlink beacon in this band will allow operators of FSS systems to provide the necessary adjustments in uplink power during these times of signal attenuation.

GHz
29.5 - 30

Allocation to Services		
Region 1	Region 2	Region 3
MOD	29.5 - 30	FIXED-SATELLITE (space-to-Earth) Mobile Satellite (space to Earth) <u>MOBILE-SATELLITE (space-to-Earth)</u> 882 883

Reason:

To provide additional protection for the mobile-satellite service.

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GHz
31.8 - 32.3

Allocation to Services		
Region 1	Region 2	Region 3
MOD 31.8 - 32 RADIONAVIGATION <u>SPACE RESEARCH (Deep Space) (Space-to-Earth)</u> Space Research 890 891 892		
MOD 32 - 32.3 INTER-SATELLITE RADIONAVIGATION <u>SPACE RESEARCH (Deep Space) (Space-to-Earth)</u> Space Research 890 891 892 893		

SUP 890

Reason:

1. The existing primary allocations are applicable only in the United States, Spain and Australia. As support requirements for space activities increase in quantity and complexity, it is becoming critical to be able to use these frequency bands on a worldwide basis for deep space exploration.
2. Provisional proposal as appropriate technical sharing criteria are under development.

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GHz
33.4 - 34.2

MOD

Allocation to Services		
Region 1	Region 2	Region 3
33.4 - 34.2		
RADIOLOCATION		
<u>SPACE RESEARCH (Earth-to-space)</u>		
892 894		

Reasons:

1. To enable the communications support necessary to achieve the stated United States goals of manned exploration of the Moon and Mars.
2. To provide for uplinks from Very Long Baseline Interferometry (VLBI) observations by satellite.
3. Provisional proposal as appropriate technical sharing criteria are under development; 3 of 6 alternative bands proposed.

GHz
34.2 - 34.7

MOD

Allocation to Services		
Region 1	Region 2	Region 3
34.2 - 35.2 <u>34.7</u>		
RADIOLOCATION		
<u>SPACE RESEARCH (Deep Space) (Earth-to-space)</u>		
Space Research 895 896		
894		

SUP

895

Reason:

1. The existing primary allocations are applicable only in the United States, Spain and Australia. As support requirements for space activities increase in quantity and complexity, it is becoming critical to be able to use these frequency bands on a worldwide basis for deep space exploration.
2. Provisional proposal as appropriate technical sharing criteria are under development.

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GHz
34.7 - 35.2

MOD

Allocation to Services		
Region 1	Region 2	Region 3
34.2 <u>34.7</u> - 35.2 RADIOLOCATION <u>SPACE RESEARCH (Earth-to-space)</u> 896 Space Research 895 896 894		

Reasons:

1. To enable the communications support necessary to achieve the stated United States goals of manned exploration of the Moon and Mars.
2. To provide for uplinks from Very Long Baseline Interferometry (VLBI) observations by satellite.
3. Provisional proposal as appropriate technical sharing criteria are under development; 4 of 6 alternative bands proposed.

GHz
37 - 37.5

MOD

Allocation to Services		
Region 1	Region 2	Region 3
37 - 37.5 FIXED MOBILE <u>SPACE RESEARCH (Space-to-Earth)</u> 899		

Reasons:

1. To enable the communications support necessary to achieve the stated United States goals of manned exploration of the Moon and Mars.
2. To provide for wideband data return links from Very Long Baseline

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Interferometry (VLBI) observations by satellite.

3. Provisional proposal as appropriate technical sharing criteria are under development; 5 of 6 alternative bands proposed.

GHz
39.5 - 40.5

MOD

Allocation to Services		
Region 1	Region 2	Region 3
39.5 - 40.5		
FIXED		
FIXED-SATELLITE (Space-to-Earth)		
MOBILE		
MOBILE-SATELLITE (Space-to-Earth)		
SPACE RESEARCH (Earth-to-space)		

Reasons:

1. To enable the communications support necessary to achieve the stated United States goals of manned exploration of the Moon and Mars.
2. To provide for up links from Very Long Baseline Interferometry (VLBI) observations by satellite.
3. Provisional proposal as appropriate technical sharing criteria are under development; 6 of 6 alternative bands proposed.

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GHz
59 - 64

Allocation to Services		
Region 1	Region 2	Region 3
59 - 64 <u>60.7</u>	FIXED INTER-SATELLITE MOBILE 909 RADIOLOCATION 910 911	
59 <u>60.7</u> - 64 <u>60.8</u>	FIXED INTER-SATELLITE MOBILE-909 RADIOLOCATION-910 <u>EARTH EXPLORATION-SATELLITE (passive)</u> 911	
59 <u>60.8</u> - 64	FIXED INTER-SATELLITE MOBILE 909 RADIOLOCATION 910 911	

Reason:

To provide protection for passive microwave sensors observing the oxygen line at 60.792 GHz. This line is vital for the measurement of mesospheric temperatures. Absorption lines in the bands 54 - 59 GHz are too broad and are distorted by the Zeeman effect on the magnetic field. The Zeeman effect on the absorption lines in the 54 - 59 GHz area causes a large error in the temperature retrievals. The Zeeman effect on the line at 60.792 GHz is negligible.

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GHz
151 - 164

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	151 - 164 <u>156</u>	<p style="text-align: center;">FIXED</p> <p style="text-align: center;">FIXED-SATELLITE (space-to-Earth)</p> <p style="text-align: center;">MOBILE</p>	
MOD	151 <u>156</u> - 164 <u>158</u>	<p style="text-align: center;">FIXED</p> <p style="text-align: center;">FIXED-SATELLITE (space-to-Earth)</p> <p style="text-align: center;">MOBILE</p> <p style="text-align: center;"><u>EARTH EXPLORATION-SATELLITE (passive)</u></p>	
MOD	151 <u>158</u> - 164	<p style="text-align: center;">FIXED</p> <p style="text-align: center;">FIXED-SATELLITE (space-to-Earth)</p> <p style="text-align: center;">MOBILE</p>	

Reason:

To provide protection for passive microwave sensors observing the atmospheric window at 157 GHz. The band around 157 GHz is vital for deriving water vapor profiles. Because of on-board transmitters operating at frequencies between 1.5 - 1.7 GHz, the central frequency must have room to be moved to avoid harmonics from these transmitters. The 157 GHz window provides higher quality data than windows in the 150 - 151 GHz or the 164 - 168 GHz bands.

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CHAPTER VIII

Provisions Relating to Groups of Services and to Specific Services and Stations

ARTICLE 28

Space Radiocommunication Services Sharing Frequency Bands with Terrestrial Radiocommunication Services above 1 GHz

Section IV. Limits of Power Flux-Density from Space Stations

MOD 2558 b) The limits given in No. 2557 apply in the frequency bands
Mob-87 listed in No. 2559 which are allocated to the following space radiocommunication services:

- meteorological-satellite service (space-to-Earth);
- space research service (space-to-Earth) (space-to-space);
- space operation service (space-to-Earth) (space-to-space);
- earth exploration-satellite service (space-to-Earth) (space-to-space);

for transmission by space stations where these bands are shared with equal rights with the fixed or mobile service, and to the

- radiodetermination-satellite service (space-to-Earth).

MOD 2559 1 525 - 1 530 MHz¹ (for Regions 1 and 3)
Mob-87 1 530 - 1 535 MHz¹ (for Regions 1 and 3, up to 1st
January 1990)
1 670 - 1 690 MHz
1 690 - 1 700 MHz (on the territory of the countries
mentioned in Nos. 740 and 741)
1 700 - 1 710 MHz
2 025 - 2 110 MHz
2 200 ~~2-290~~ - 2 500 MHz
2 483.5 - 2 500 MHz

Reason:

Consequential modifications as a result of upgrading to primary allocations the space research (space-to-space), space operation (space-to-space) and earth exploration-satellite (Earth-to-space) (space-to-space) services.

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ARTICLE 29

Special Rules Relating to Space Radiocommunication Services

Section II. Control of Interference to Geostationary-Satellite Systems

ADD 2613A

In the frequency bands 22.55-23.55 GHz and 25.25-27.5 GHz, geostationary space stations in the inter-satellite service shall have the following restriction:

Whenever the emissions from geostationary satellites are directed to other geostationary satellites, the angular separation between such geostationary satellites, as measured from the center of the Earth, shall be no more than 120°.

Whenever the emissions from geostationary satellites are directed towards space stations at distances from Earth greater than that of the geostationary-satellite orbit, the boresight of the antenna mainbeam of the geostationary satellite shall not be pointed within 15° of any point on the geostationary-satellite orbit or within 35° of the centre of the Earth.

Reason:

1. The reason for the proposed 120° geocentric angle restriction between geostationary satellites is to protect data relay satellites and permanent space station proximity link operations from interference caused by transmissions between geostationary satellite systems. Most low Earth-orbit spacecraft operate at an altitude between 300 and 1000 km. Current Data Relay Satellites (DRS) are capable of tracking spacecraft in altitudes up to 12,000 km, and interference protection should be provided for these spacecraft. To avoid harmful interference between inter-satellite service (ISS) (geostationary-to-geostationary) links and DRS links when low Earth-orbit spacecraft are at altitudes up to the 12,000 km, the angular separation between two geostationary space stations operating with each other would have to be no greater than approximately 100°. This angular separation is based upon an off-axis angle at the ISS station antenna (geostationary-to-geostationary) that assures sufficient antenna discrimination to protect both ISS (geostationary-to-geostationary) and DRS links. The antenna discrimination was calculated using the antenna pattern given in Figure 13 of CCIR Report 558.

Such a restriction would not permit fixed-satellite service (FSS) type systems with geostationary-to-geostationary links to have full Earth coverage with just three satellites. Therefore, to accommodate the use of geostationary-to-geostationary links by global FSS type systems using three satellites, we are proposing to limit the angular separation to no greater than 120°. In this case, interference would be avoided when low Earth-orbit spacecraft operate with altitudes up to 9,000 km.

2. The reason for the proposed 15° pointing restriction relative to the geostationary-satellite orbit and the 35° pointing restriction relative to the Earth is to protect geostationary inter-satellite

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service space stations from interference due to inter-satellite service space stations communicating with space stations beyond the geostationary-satellite orbit.

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CHAPTER XI

Maritime Mobile Service and Maritime Mobile-Satellite Service

ARTICLE 55

~~Operators~~² Certificates for Personnel of Ship Stations and Ship Earth Stations

Reason: To correct an oversight at the 1987 MWARC so as to align the title of the Article with Section titles.

Section I. General Provisions

SUP 3870

Reason: The Certificates to be used will be held by a number of individuals aboard ship, making it no longer necessary to go to the trouble and expense to have photographs. The personnel who operate radio aboard ship will, for most administrations, not have that responsibility as a sole occupation, except in cases of distress. The radio license in the GMDSS may be an endorsement or a supplement to a deck officer's license so that a separate photo is not needed and in many cases would be duplicative. No. 3873 requires the date of birth.

(MOD) 3871 and 3872

Reason: Renumber as a consequence of SUP 3870.

MOD 3876 d) the issuing or recognizing administration.

Reason:

To eliminate the apparent conflict between Nos. 3860 Mob-87 and 3876.

Mob-87

Section IIA. Categories of Certificates for Personnel of Ship Stations and Ship Earth Stations Using the Frequencies and Techniques Prescribed in Chapter N IX and for Public Correspondence

MOD 3890A § 7A. (1) There are ~~four~~ two categories of certificates for
Mob-87 personnel of ship stations and ship earth stations using the frequencies and techniques
prescribed in Chapter N IX:

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SUP **3890B**
 Mob-87

SUP **3890C**
 Mob-87

(MOD) **3890D** ~~e~~ a) General Operator's Certificate;
 Mob-87

(MOD) **3890E** ~~d~~ b) Restricted Operator's Certificate.
 Mob-87

(MOD) **3890F** (2) The holder of one of the certificates specified in Nos. **3890B**, **3890C**,
 Mob-87 **3890D** and **3890E** may carry out the service of ship stations or ship earth stations
 using the frequencies and techniques prescribed in Chapter N IX.

Reason:

To delete the categories of certificates not recognized or used in the IMO Safety of Life At Sea Convention.

Mob-87

**Section IIIA. Conditions for the Issue of
Certificates for Personnel of Ship Stations
and Ship Earth Stations Using the Frequencies
and Techniques Prescribed in Chapter N IX
and for Public Correspondence**

SUP **3949A**
 Mob-87

SUP **3949AA**
 Mob-87

SUP **3949AB**
 Mob-87

SUP **3949AC**
 Mob-87

SUP **3949AD**
 Mob-87

SUP **3949AE**
 Mob-87

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SUP 3949AF
Mob-87

SUP 3949AG
Mob-87

SUP 3949AH
Mob-87

SUP 3949AI
Mob-87

Reason:

The First-Class Radio Electronic Certificate is not a required part of the Global Maritime Distress and Safety System (GMDSS). Electronic maintenance aboard ship is only an option that will be subject to national decision according to the 1988 SOLAS Amendments. Most (two-thirds of shipping tonnage) of the maritime countries of the world have rejected on-board maintenance as a requirement by presenting protocol statements either to the Final Acts of the World Administrative Radio Conference for the Mobile Services (Mob-87), Geneva, 1987, or to the Final Acts of the Plenipotentiary Conference, Nice, 1989.

SUP 3949B
Mob-87

SUP 3949BA
Mob-87

SUP 3949BB
Mob-87

SUP 3949BC
Mob-87

SUP 3949BD
Mob-87

SUP 3949BE
Mob-87

SUP 3949BF
Mob-87

SUP 3949BG
Mob-87

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SUP 3949BH
Mob-87

SUP 3949BI
Mob-87

Reason:

The Second-Class Radio Electronics Certificate, like the First-Class, is not a required part of the GMDSS and is not included as a requirement of the 1988 SOLAS amendments.

(MOD) 3949C
Mob-87

~~C.~~ A. General Operator's Certificate

(MOD) 3949CA
Mob-87

~~§ 18C.~~ 18A. The General Operator's Certificate is issued to candidates who have given proof of the knowledge and qualifications enumerated below:

NOC 3949CB
Mob-87

NOC 3949CC
Mob-87

NOC 3949CD
Mob-87

NOC 3949CE
Mob-87

(MOD) 3949D
Mob-87

~~D.~~ B. Restricted Operator's Certificate

(MOD) 3949DA
Mob-87

~~§ 18D.~~ 18B. The Restricted Operator's Certificate is issued to candidates who have given proof of the knowledge and qualifications enumerated below:

NOC 3949DB
Mob-87

NOC 3949DC
Mob-87

NOC 3949DD
Mob-87

NOC 3949DE
Mob-87

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ARTICLE 56

Mob-87 Personnel of Stations in the Maritime Mobile and the Maritime Mobile-Satellite Service

Mob-87 Section I. Personnel of Coast Stations and Coast Earth Stations

NOC 3979 § 1. Administrations shall ensure that the staff on duty in coast stations
Mob-87 and in coast earth stations are adequately qualified to operate the stations efficiently.

Reason:

To ensure adequate safety is provided.

Mob-87 Section III. Class and Minimum Number of Personnel for Ship Stations and Ship Earth Stations Using the Frequencies and Techniques Prescribed in Chapter N IX and for Public Correspondence

NOC 3987 § 4. Administrations shall ensure that the personnel of ship stations and
Mob-87 ship earth stations are adequately qualified to enable efficient operation of the station,
and shall take steps to ensure the operational availability and maintenance of equipment
for distress and safety communications in accordance with the relevant international
agreements.

NOC 3988 § 5. An adequately qualified person shall be available to act as a
Mob-87 dedicated communications operator in cases of distress.

Reason:

To ensure adequate safety is provided by qualified individuals.

NOC 3989 § 6. The personnel of ship stations for which a radio installation is
Mob-87 compulsory under international agreements and which use the frequencies and
techniques prescribed in Chapter N IX shall, with respect to the provisions of Article
55, include at least:

Reason:

To ensure the Radio Regulations comport with the Convention on the Safety of Life
At Sea.

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SUP 3990
Mob-87

MOD 3991
Mob-87

~~b)~~ a) for stations on board ships which sail within beyond the range of MF VHF coast stations: a holder of a ~~first or second class radio electronic certificate or a~~ general operator's certificate;

MOD 3992
Mob-87

~~c)~~ b) for ~~ship~~ stations on board ships which sail within the range of VHF coast stations: a holder of a ~~first or second class radio electronic certificate or a~~ general operator's certificate or a restricted operator's certificate.

Reason:

To align the Radio Regulations with the Convention on the Safety of Life at Sea and decisions of the International Maritime Organization.

NOC 3993
Mob-87

§ 7. The personnel of ship stations for which a radio installation is not compulsory under international agreements and which use the frequencies and techniques prescribed in Chapter N IX shall be adequately qualified and certificated in accordance with the administration's requirements.

Reason:

To ensure adequate safety is provided by qualified individuals.

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PROPOSALS WITH REGARD TO RESOLUTIONS AND RECOMMENDATIONS

MOD RESOLUTION NO. 517 (~~HFBC-87~~) (1992 WARC)

**Transition from Double-Sideband (DSB) to
Single-Sideband (SSB) Emissions
in the HF Bands Allocated Exclusively to the
Broadcasting Service**

MOD ~~The World Administrative Radio Conference for the Planning of the HF Bands Allocated to
the Broadcasting Service (Geneva, 1987), Allocation of Spectrum (Spain, 1992),~~

ANNEX TO RESOLUTION NO. 517 (HFBC)

NOC **Procedure for the Transition from Double-Sideband (DSB)
to Single-Sideband (SSB) Emissions in the
HF Bands Allocated Exclusively
to the Broadcasting Service**

MOD 1. ~~The immediate introduction of SSB emissions is encouraged, i.e., the transition period
starts immediately.~~

MOD 2. All DSB emissions shall cease not later than ~~31 December 2015~~ 30 June 2007, at 2359
hours UTC (see also *resolves* 2 in the body of the Resolution).

NOC 3. SSB emissions shall comply with the characteristics specified in Appendix 45 to the
Radio Regulations.

MOD 4. ~~Until 31 December 2015~~ 30 June 2007, 2359 UTC, SSB emissions intended for reception
by DSB receivers with envelope demodulation, as well as by SSB receivers with synchronous
demodulation, shall have a carrier reduction of 6 dB relative to peak envelope power.

MOD 5. ~~After 31 December 2015~~ 30 June 2007, 2359 hours UTC, only SSB emissions with a
carrier reduction of 12 dB relative to peak envelope power.

MOD 6. ~~Until 31 December 2015~~ 30 June 2007, 2359 hours UTC, whenever an administration
replaces its DSB by an SSB emission, it shall ensure that the level of interference is not greater
than that caused by its original DSB emission (see also Appendix 45 to the Radio Regulations
and Recommendation 517 (HFBC-87)).

Reason:

The early use of SSB is essential in order to provide the HFBC spectrum needs while
minimizing the impact upon the fixed service. The use of SSB increases spectrum efficiency
with available technology and responds to *resolves* 2 of Resolution 517. Resolution 517 is on
the 1992 WARC agenda as a part of Recommendation 511.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

MOD

RESOLUTION No. 703

MOD

**Relating to the Calculation Methods and Interference Criteria
Recommended by the CCIR for Sharing Frequency Bands Between
Space Radiocommunication and Terrestrial Radiocommunication Services
or Between Space Radiocommunication Services¹**

MOD

The World Administrative Radio Conference, Geneva, 1979 Spain, 1992,

considering

NOC

a)

NOC

b)

NOC

c)

NOC

d)

NOC

e)

ADD

f) that the CCIR XVIIth Plenary Assembly (Dusseldorf, 1990) has adopted a procedure for the approval of Recommendations between Plenary Assemblies;

(MOD)

~~f) g)~~ that the International Telecommunication Convention....

is of the opinion

MOD

a) that subsequent ~~Plenary Assemblies~~ decisions of the CCIR are likely to make further changes in the recommended calculation methods and interference criteria;

SUP

~~b) that administrations should receive advance information of the drafts of the relevant CCIR recommendations;~~

(MOD)

~~e) b)~~ that the administrations should whenever possible....

SUP

⁺ ~~Replaces Resolution No. Spa2-6 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.~~

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

invites the CCIR

MOD a) to request its Study Groups to prepare, at their final meetings before the Plenary Assembly, a provisional list identifying relevant parts of ~~drafts of~~ revised and new CCIR Recommendations affecting the calculation methods and the interference criteria, and also those specific sections of the Radio Regulations to which they are applicable, relating to sharing between space radiocommunication and terrestrial radiocommunication services, or between space radiocommunication services;

MOD b) to request the Director of the CCIR to forward this list together with texts of these ~~drafts of the~~ revised and new Recommendations to administrations and to the IFRB within thirty days following the final Study Group meetings;

resolves that

MOD 1. the IFRB shall immediately distribute the information mentioned in invites b) above to all administrations, so that it reaches them as soon as possible before the convening of the subsequent Plenary Assembly. This should be accompanied by a notice indicating that the enclosed texts have already been approved by the CCIR or are subject to approval at the next CCIR Plenary Assembly;

MOD 2. a) each CCIR Plenary Assembly, ~~having adopted any or all of the relevant Recommendations and approved the appropriate portions of the list mentioned in invites a) above,~~ should arrange for the Secretary-General to be informed of the list and those Recommendations which affect the appropriate calculation methods and the interference criteria to be employed;

NOC b)

NOC 3.

NOC 4.

NOC 5.

NOC 6.

NOC 7.

NOC 8.

NOC 9.

Reason: To bring Resolution 703 into line with the approval process adopted by the CCIR.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ADD

RESOLUTION NO. AAA

Relating to Implementation of Wind Profiler Radars at Frequencies Near 50 MHz, 400 MHz and 1 GHz

The World Administrative Radio Conference, Spain, 1992

referring to

a request to the Director of the CCIR and Chairman of the IFRB from the Secretary-General of the World Meteorological Organization, in May, 1989, for advice and assistance in the identification of appropriate frequencies near 50 MHz, 400 MHz, and 1 GHz in order to accommodate allocations and assignments for wind profiler radars;

considering

a) that many administrations plan to deploy wind profiler radars at sites dispersed over large geographical areas in order to improve meteorological predictions, support studies of the climate, and enhance the safety of navigation;

b) that the CCIR established Questions [AB/2] and 65/8 to promulgate the relevant studies;

c) that the characteristics of wind profiler radars differ substantially from those of other meteorological aids;

d) that some experiential wind profiler radars are operating in the 402-406 MHz band, but these radars have been found to cause harmful levels of interference to the COSPAS-SARSAT system for distress alerting in the 406.0-406.1 MHz band;

e) that a total wind profiler system may require frequencies not only in the 400 MHz region but also frequencies near 50 MHz and around 1 GHz;

f) Recommendation ZZZ;

considering further

that the International Maritime Organization has incorporated the COSPAS-SARSAT system in the Global Maritime Distress and Safety System;

recognizing

that frequencies in the 400 MHz region are preferred for measurements of winds at altitudes that are of the greatest general interest;

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

resolves

1. that the Administrative Council place on the agenda of the next competent world administrative radio conference the matter of establishing appropriate allocations for accommodation of wind profiler radars;

2. that the CCIR shall continue its studies of the characteristics and requirements of wind profiler radars and make Recommendations as to the technically suitable frequency bands and associated standards and frequency sharing criteria necessary for compatibility with the services that may be affected;

urges administrations

to avoid making frequency assignments to wind profiler radars in the 402-406 MHz band.

Reason:

To call for a future world administrative radio conference to consider frequency allocations to the wind profiler radar systems and continuance of current CCIR studies regarding wind profiler radars.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ADD

RESOLUTION NO. BBB

Relating to Implementation of the Changes in Allocation to the Broadcasting Service in the Bands Between 5 730 kHz and 19 680 kHz

The World Administrative Radio Conference, Spain, 1992,

considering

- a) that parts of frequency bands between 5 730 kHz and 19 680 kHz that were previously allocated on an exclusive or shared basis to the fixed service or fixed and mobile service have been re-allocated to the broadcasting or amateur services;
- b) that existing fixed and mobile assignments must be removed progressively from those re-allocated bands to make way for the broadcasting or amateur services;
- c) that the assignments to be removed termed "displaced assignments", must be re-accommodated in the same frequency band;

recognizing

the difficulties facing administrations and the IFRB during the period of transition from the previous allocations to those made by this Conference;

resolves

1. that the transitional procedure in Annex A to this Resolution shall be used for the purpose of ensuring an orderly and equitable implementation of the changeover from the previous allocations to those made by this Conference;
2. that the provisions of No. 1242 and the associated provisions of Article 12 concerning the examination and recording in the Master Register of assignments in the bands between 5 730 kHz and 19 680 kHz allocated on an exclusive or shared basis to the fixed service or fixed and mobile service shall be suspended from 1 January 1995 to 30 June 1997;
3. that the interim procedure in Annex B to this Resolution shall be used for the purpose of dealing with any urgent new frequency assignments in the relevant bands during the period of suspension of the provisions of Article 17 as specified in resolves 2;
4. that the review procedure in Annex C to this Resolution shall be used for the purpose of examining any urgent new assignment notified during the period of suspension of the provisions of Article 12 as specified in resolves 2;

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

invites administrations

to cooperate by not submitting notices for assignments in the relevant bands during the period of suspension of the provisions of Article 12 as specified in resolves 2, except for urgent new assignments to be dealt with under the interim procedures of Annex B and C.

requests the IFRB

not to examine any notices in the relevant bands under Article 12 during the period of suspension of the provisions of that Article as specified in resolves 2, other than those notices requesting deletions of existing assignments.

ANNEX A TO RESOLUTION NO. BBB

Transitional Procedure for the Selection and Approval of Replacement Assignments

PART I - PREPARATORY PHASE

Section I. Preparation and Publication by the IFRB of Consolidated Proposals for Replacement Assignments

1. For the purpose of this Resolution, the term "displaced assignment" means a frequency assignment to a station in the fixed service or mobile service in the parts of the bands re-allocated from the fixed service or fixed and mobile service to the broadcasting or amateur services for which a replacement assignment shall be found in accordance with this Resolution. The expression "class of operation A (or B or C)" refers to the entry in column 7B of the Master Register (see RR 1222).

2. The Board, as soon as possible after completion of the procedure in Annex D, shall prepare consolidated proposals for replacements for all displaced assignments listed in the Provisional Section of the Master Register (see Annex D) in the bands between 5 730 kHz and 19 680 kHz which the World Administrative Radio Conference, Spain, 1992, has re-allocated from the fixed service or fixed and mobile service to the broadcasting or amateur services.

3. The displaced assignment shall be treated in the order of the date recorded in Column 2d of the Provisional Section of the Master Register. Furthermore, all displaced assignments which have the same Column 2d date shall be treated in the following order:

- 1) assignments for national use;
- 2) assignments for international use.

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In the application of this provision, the displaced assignments shall be processed in batches without any priority being applied to the assignments of any administration.

4. The displaced assignments of class of operation C shall not be treated until all displaced assignments of class of operation A or B have been satisfied.

5. Displaced assignments of class of operation C shall be as far as possible evenly distributed throughout the bands that continue to be allocated to the fixed service or fixed and mobile service.

6. The Board, in complying with the provisions of this Section, shall for the purposes of protecting existing recorded assignments employ only the Master Register reconstructed in accordance with the procedure in Annex D.

7. The Board, on 1 July 1996, shall send to each administration a document listing all the assignments concerning that administration, identifying those that were recorded in the Provisional Section of the Master Register, and those proposed as replacements.

Section II. Examination and Approval of Proposed Assignments

8. Each administration, upon receipt of the document specified in paragraph 7, shall acknowledge receipt and shall then examine the proposed replacement assignments contained therein with regard to their acceptability, following which the administration shall advise the Board as soon as possible

of its agreement; or

which of the proposed assignments it finds unacceptable.

In the latter case, the administration shall inform the Board, as quickly as possible, of its reasons therefor.

9. The Board shall examine the responses under paragraph 8 and shall try, preferably by applying small adjustments, to satisfy the administration concerned with respect to the proposed assignments it found unacceptable. The Board shall do so in the following way:

the Board shall collect all responses received under paragraph 8 within six months after 1 July 1996, and process them together and without any priority being applied to the reply of any administration; and then

the Board shall collect all responses received under paragraph 8 in the period from six months to nine months after 1 July 1996, and then process this second batch in the same manner as described above for the first batch.

10. The procedure described in this Section shall terminate on 1 July 1997.

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Section III. Subsequent Action by the Board

11. The Board, on termination of the procedure prescribed by Sections I and II of this Annex, shall insert in the Master Register all replacement assignments that have been agreed by administrations, with annotations to indicated:

that they shall have the status as provided in Annex D; and

their provisional nature in accordance with No. 1311.

12. The Board shall, for all assignments mentioned in paragraph 11, insert in Column 2d of the Master Register the appropriate date according to Annex D.

13. The Board shall then publish, in recapitulatory supplements to the International Frequency List, all replacement assignments made in accordance with the procedure prescribed in Part I of this Annex.

14. The Board, on publication of the supplements prescribed in paragraph 13, shall inform by telegram any administration having outstanding displaced assignments of class of operation A which have not been satisfied.

Section IV. Implementation of Article 12

15. As from 1 July 1997, the provisions of Article 12 shall apply to frequency bands allocated to the fixed service and fixed and mobile service between 5 730 kHz and 19 680 kHz.

16. Following that date, an administration, having been informed by the Board under paragraph 14 that certain of its displaced assignments have not been replaced under this transitional procedure, shall be free to select new assignments taking into account the assignments recorded in the Master Register under paragraph 11, and shall submit new notices to the Board in accordance with Article 12.

PART II - TRANSFER PHASE

Section V. Subsequent Action by Administrations

17. An administration, having received and accepted replacements for its recorded assignments that were displaced by decisions of the World Administrative Radio Conference, Spain, 1992, shall effect the changeover from the old to the new assignment not later than 1 July 2007.

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18. An administration shall promptly inform the Board of the date on which the changeover from an old to a replacement assignment takes place. The Board shall remove from that replacement assignment the special symbol placed in accordance with No. 1311 (see paragraph 11) in the Master Register, thus indicating that it has been implemented, and shall enter the date of the change over in Column 2c. The date in Column 2c, originally recorded with the displaced assignment, shall be entered in the Remarks Column.

19. 1) An administration having effected the change to a replacement assignment of class of operation A, and having experienced harmful interference or having received a complaint of harmful interference involving another class of operation A assignment:

a) shall make every effort with any other administration concerned to resolve the problem, and, if unsuccessful,

b) may select and submit to the Board an alternative replacement assignment. On request from an administration, the Board shall assist in the application of provision 19.1b) or 19.2.

2) An administration, having effected the change to a replacement assignment of class of operation B and having experienced harmful interference for this class of operation, may select and submit to the Board an alternative replacement assignment. On request from an administration, the Board shall assist in the application of provision 19.1b) or 19.2.

20. Following a favourable finding by the Board on the replacement assignment selected under paragraph 19.1b) or 19.2), the administration shall be entitled to retain the Column 2d date of the Master Register, against that assignment.

Section VI. Relevance of Dates in the Master Register

21. The relevance of the dates related to displaced assignments is referred to in Annex D and Article 12.

ANNEX B TO RESOLUTION NO. BBB

Interim Procedure Concerning Notices Relating to Assignments in the Bands Between 5 730 kHz and 19 680 kHz Allocated to the Fixed Service and Fixed and Mobile Service

1. During the period between 1 January 1995 and 30 June 1997, an administration, having an urgent requirement which cannot possibly be delayed until the end of that period, may notify a new assignment in the bands between 5 730 kHz and 19 680 kHz allocated on an exclusive

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or shared basis to the fixed service. Such notices shall contain the information listed in the appropriate section of Appendix 1.

2. An administration submitting a notice in accordance with paragraph 1 above shall be deemed to accept that its assignment:

- a) shall be of an interim nature; and
- b) shall be subject to the review procedure contained in Annex C to this resolution and shall then be modified if necessary to conform to the results of that review; and
- c) shall not cause harmful interference to any assignments recorded in the Master Register that are entitled to protection.

3. The Board, upon receipt of a complete notice under paragraph 1, shall examine it with respect to No. 1240 and shall return to the notifying administration any notice not complying with that provision together with the reasons for this action.

4. Notices in conformity with No. 1240 shall be included in a special section of the weekly circular, where they shall be annotated to show that they are subject to both the interim and review procedures contained in this Annex and Annex C to this Resolution respectively. Assignments notified under No. 1218 shall additionally be annotated to that effect.

5. The Board shall compile and maintain a Special List of all notices dealt with under paragraph 4.

ANNEX C TO RESOLUTION NO. BBB

Review Procedure Concerning Notices Relating to Assignments for Stations of the Fixed and Mobile Service in the Bands Between 5 730 kHz and 19 680 kHz

1. The Board, commencing on 1 July 1997, shall examine under the appropriate provisions of Article 12 all interim assignments contained in the Special List compiled in accordance with Annex B to this Resolution with a view to recording them in the Master Register.

2. For the purposes of this examination, interim assignments shall be processed without priority being given to the assignments of any administration; however, assignments notified under No. 1218 shall be treated first.

3. All interim assignments shall be examined by the Board with respect to the probability of harmful interference from or to assignments entered in the Master Register on a provisional basis as a result of the application of Annex A to this Resolution. Depending on the findings of the Board subsequent to this examination, further action shall be as follows:

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4. Favourable finding with respect to paragraph 3 above

1) The interim assignments notified under No. 1218 shall be recorded in the Master Register, and the date 1 July 1997 shall be entered in Column 2d.

2) The other interim assignments shall be examined under No. 1242 with respect to frequency assignments recorded in the Master Register at the date of commencement of the interim procedure described in Annex B to the present Resolution. Depending on the findings of the Board, the appropriate provisions of Article 12 shall be applied. When such assignments are to be recorded, the date 1 July 1997 shall be entered in Column 2d.

5. Unfavourable finding with respect to paragraph 3 above

The Board shall, having regard to the class of operation of assignments, and the contents of the reconstructed Master Register, propose suitable replacement assignments and enter them on a provisional basis with the date of 1 July 1997 in Column 2d.

6. The Board shall, upon completion of this review, compile a Temporary List of recorded and proposed replacement assignments and publish it as an Annex to its weekly circular. A copy of this List, together with a national extract thereof, shall be sent to each administration having interim assignments in the Special List mentioned in paragraph 1 of this Annex.

7. An administration, upon receipt of the List mentioned in paragraph 6, shall consider the proposed replacements for its interim assignments and shall, within five months of the date of publication of the Temporary List, inform the Board whether the proposed assignments are acceptable. If the proposed assignments are not acceptable, the administration shall give the reasons therefor.

8. Upon acceptance of a proposed assignment, the administration shall indicate the latest date of bringing into use. This date shall be within one year of the publication of the Temporary List.

9. The Board shall examine the replies under paragraph 7 and shall try, if necessary by applying small adjustments, to satisfy the administration concerned with respect to the proposed assignments it found unacceptable and propose alternative frequencies. Simultaneously, the Board shall replace the appropriate provisional entry by the new proposed frequency.

10. If, on 1 July 1998, provisional entries made under paragraph 5 or 9 have not been accepted by the administration concerned, the Board shall replace these entries by the corresponding interim assign appropriately annotated. As from that date neither the Special List nor the Temporary List shall be taken into consideration.

11. An administration, having an interim assignment for which no acceptable replacement assignment has been found, shall be free to select a new replacement and shall forward a new notice under the provisions of Article 12. Upon request from an administration, the Board shall assist in the application of this provision.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ANNEX D TO RESOLUTION NO. BBB

Procedure for the Revision of Entries in the Master International Frequency Register of Displaced Assignments from Bands Re-Allocated to the Broadcasting Service

1. The Board shall extract from the Master Register and shall, as soon as possible after 1 January 1993, forward to each administration an individual National List¹ of all assignments recorded in the Master Register on behalf of that administration or for which notices have been received prior to that date in the bands re-allocated to the broadcasting service (RR521B and RR528C).

2. Each administration, upon receiving the List mentioned in paragraph-1 above, shall so inform the Board by telegram. An administration not receiving its National List by 1 April 1993 shall promptly inform the Board, which shall forthwith send to that administration a further copy of the National List. The Board shall ensure that every administration has received the National List pertaining to its own assignments.

3. Each administration, after having acknowledged receipt of its National List, shall delete from it any of the entries no longer required and shall return its annotated National List to the Board as quickly as possible and in any event not later than 31 March 1994. The Board shall send to each administration an acknowledgement of receipt of its annotated National List.

4. On 1 October 1993, the Board shall publish a provisional section of the Master Register relating solely to the assignments in the bands allocated exclusively to the fixed and fixed and mobile service in the bands between 5 730 kHz and 19 680 kHz. This section shall contain all assignments shown in the National Lists as updated by administrations and those shown in the National Lists which have not been returned to the Board, excluding those assignments with an unfavourable finding with respect to No. 1240, without reference to No. 342. The assignments in this provisional section shall be annotated as follows:

1) all assignments in the parts of bands re-allocated to the broadcasting service shall bear the symbol "RES BBB" in Column 13c indicating that they are assignments for which replacement assignments shall be found in accordance with this Resolution, retaining the date and status afforded in 4.2) and 4.3), below;

2) for Lists returned to the Board, the date entered in Column 2d shall be same date contained in the Master Register for that assignment;

¹ The Board shall determine by prior enquiries the number of copies of the National List to be sent to each administration. The National List shall be prepared in the format of the International Frequency List but the form in which the List is forwarded may, at the request of individual administrations and with the agreement of the Board, be varied to suit different circumstances.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

1.1.95. 3) for Lists not returned to the Board, the date entered in Column 2d shall be

5. As soon as possible after 1 January 1995, the Board shall:

1) publish a supplement to the provisional section of the Master Register containing those assignments for which notices were received between 1 January 1993 and 31 December 1994 and recorded in the Master Register;

2) send to administrations a copy of their National list;

3) incorporate in the Master Register the provisional section mentioned in paragraph 4 including the assignments in paragraph 5.1) above in replacement of the corresponding entries in the frequency bands concerned.

6. Following completion of the action described in this Annex, the Board shall publish a report showing the results obtained from the operation of this procedure.

Reason:

To provide a reaccommodation procedure for those services displaced by additional allocations for the HF broadcasting service.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ADD

RESOLUTION NO. CCC

Date of Entry Into Force of the Aeronautical Mobile Off-Route (OR) Channelling and Allotment Arrangements

The World Administrative Radio Conference, Spain, 1992,

considering

- a) that the channelization and frequency separations of the bands allocated exclusively to the aeronautical mobile off-route (OR) service contained in Appendix 26 to the Radio Regulations have not been changed since the Administrative Radio Conference, Geneva, 1959;
- b) that the Plenipotentiary Conference, Nice, 1989, adopted Resolution PL-B/2 directing the IFRB to develop a channelling arrangement for the aeronautical mobile OR service and that the IFRB has developed a channelling arrangement based on 3-kHz separation between channels and has also provided an allotment arrangement based on administrations' requirements;
- c) that Resolution PL-B/2 resolves that administrations should change to the new frequencies on 0001 hours UTC 31 December 1992 and that this date was subject to confirmation by this Conference;
- d) that the frequency spectrum should be used in the most efficient way possible;
- e) that the new channelling and allotment arrangements provide for more efficient use of the frequency spectrum;
- f) that a considerable number of aircraft and aeronautical station frequency assignments will be transferred from existing frequency assignments to the new frequencies designated in the channelling and allotment arrangements;
- g) that the transfer of frequency assignments should be made with the least disruption of service and in a manner to avoid harmful interference during the implementation period;
- h) that administrations will have a considerable task to change to the new frequencies and notify their new assignments;

noting

that Recommendation No. 406 (MOB-87) further addresses certain problems regarding the inclusion of all members of the Union communications requirements in the aeronautical mobile off-route (OR) service frequency bands contained in Appendix 26 to the Radio Regulations and that these problems will be addressed at a future conference;

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

is of the opinion

that the requirements of all members of the Union have been considered and included in the allotment arrangement provided by the IFRB;

further noting

that although some of the technical and operational criteria contained in Appendix 27 Aer2 to the Radio Regulations are not applicable in all aspects of operations relating to the aeronautical OR service, there are certain provisions that may be applied to the aeronautical OR service on an interim basis;

resolves

1. that the channelling arrangement and allotment arrangement prepared by the IFRB will become effective as of 1 March 1994;
2. that on 1 March 1994 the frequencies and allotment plan appearing in Appendix 26 to the Radio Regulations shall be replaced by the channelling and allotment arrangements prepared by the IFRB;
3. that administrations take all the necessary measures to convert to single-sideband operation as soon as possible; discontinue double-sideband emissions as early as possible, and, in any event, not later than 1 March 1996;
4. that the classes of emissions A1A, F1B, F7B, H2B, J2B, J2D, J3E, J7B, and J9X only shall be authorized as of 1 March 1996, and that use of these emissions should, on an interim basis, be governed by Nos. 27/10 and 27/11 of Appendix 27 Aer2 to the Radio Regulations;

resolves to recommend

that appropriate technical and operational provisions replacing those contained in Appendix 26 to the Radio Regulations should be developed for consideration by a competent world administrative radio conference addressing Recommendation 406;

invites the CCIR

to develop appropriate technical criteria applicable to aeronautical OR service operations.

Reason:

To implement the new channelling arrangement being developed by the IFRB.

RECOMMENDED U.S. PROPOSALS -- FIRST DRAFT

ADD

RECOMMENDATION NO. ZZZ

Relating to Interim Implementation of Wind Profiler Radars at Frequencies Near 400 MHz

The World Administrative Radio Conference, Spain, 1992

considering

- a) that many administrations plan to deploy wind profiler radars at sites dispersed over large geographical areas in order to improve meteorological predications, support studies of the climate and enhance the safety of navigation;
- b) that the CCIR is conducting studies under Questions [AB/2] and 65/8 to determine the characteristics and requirements of wind profiler radars in order to make Recommendations as to suitable frequency bands and associated standards and frequency sharing criteria necessary for compatibility with the services that may be affected;
- c) that frequencies in the 400 MHz region are preferred for measurements of winds at altitudes that are of the greatest general interest, but that implementation of wind profiler radars in the 402-406 MHz band poses an unacceptable risk of interference to the COSPAS-SARSAT system for distress alerting;
- d) that in relation to the need to protect satellite receivers, operation of wind profiler radars in accordance with No. 342 requires special attention to the cumulative effects of all such operations in the large areas that are within view of the satellites;
- e) Resolution AAA:

noting

that some administrations have found that wind profiler operations near [4XX MHz] will be compatible with existing systems;

recommends

that administrations consider frequencies near [XXX MHz] in making assignments to wind profiler radars until such time as the CCIR develops applicable Recommendations.

Reason:

To provide for the interim implementation of wind profiler radar systems and the continuance of current CCIR studies regarding wind profiler radars, while providing protection for the COSPAS-SARSAT system.

ADMINISTRATIVE COUNCIL

45th SESSION — GENEVA — JUNE 1990

Document 7048-E

(CA45-142)

21 June 1990

Original : English

French

Spanish

IAC-23/79

PLENARY MEETING

Note by the Secretary-General

CONSULTATION REGARDING WARC-92

I have the honour to transmit for consideration by the Administrative Council copy of Circular Telegram No. A87, addressed to the Members of the Union on 21 June 1990.

Pekka TARJANNE
Secretary-General

Annex:1

ANNEX

COPY OF CIRCULAR TELEGRAM No. A87

ADDRESSED TO MEMBERS OF THE ITU ON 21 JUNE 1990

CTITU A87

AAA THE ADMINISTRATIVE COUNCIL NOW IN SESSION HAS ESTABLISHED AN AGENDA FOR THE WORLD ADMINISTRATIVE RADIO CONFERENCE FOR DEALING WITH FREQUENCY ALLOCATIONS IN CERTAIN PARTS OF THE SPECTRUM (WARC-92) AND PROPOSES THE FOLLOWING TEXT:

CONSIDERING, INTER ALIA,

- A) THAT RESOLUTION NO. PL-B/1 OF THE PLENIPOTENTIARY CONFERENCE, NICE, 1989, SCHEDULED A WORLD ADMINISTRATIVE RADIO CONFERENCE FOR DEALING WITH FREQUENCY ALLOCATIONS IN CERTAIN PARTS OF THE SPECTRUM (WARC-92) TO BE CONVENED IN SPAIN IN THE FIRST QUARTER OF 1992 FOR A PERIOD OF FOUR WEEKS AND TWO DAYS;
- B) THAT IN ACCORDANCE WITH RESOLUTION NO. PL-B/1 OF THE PLENIPOTENTIARY CONFERENCE, NICE, 1989, THE AGENDA OF THE WARC-92 SHALL TAKE INTO ACCOUNT THE RESOLUTIONS AND RECOMMENDATIONS OF WARC HFBC-87, WARC MOB-87 AND WARC ORB-88 RELATING TO FREQUENCY ALLOCATIONS;
- C) THAT, PURSUANT TO RESOLUTION NO. PL-B/1, THE WARC-92 MAY IN ADDITION CONSIDER DEFINING CERTAIN NEW SPACE SERVICES AND CONSIDER ALLOCATIONS TO THESE SERVICES IN FREQUENCY BANDS ABOVE 20 GHZ;
- D) THAT THE PLENIPOTENTIARY CONFERENCE, NICE, 1989, HAVING RECOGNIZED THAT THE PLAN FOR THE AERONAUTICAL MOBILE (OR) SERVICE CONTAINED IN APPENDIX 26 OF THE RADIO REGULATIONS REQUIRES APPROPRIATE ADJUSTMENTS, ADOPTED RESOLUTION NO. PL-B/2;
- E) THAT IN ACCORDANCE WITH RESOLUTION NO. PLEN/8 OF THE PLENIPOTENTIARY CONFERENCE, NICE, 1989, THE WARC-92 SHOULD CONSIDER THE PROVISIONS OF ARTICLES 55(REV.) AND 56(REV.) OF THE RADIO REGULATIONS, AS AMENDED BY WARC MOB-87,

CONSIDERING FURTHER THAT THE RADIO SPECTRUM TO BE CONSIDERED BY THIS CONFERENCE IS ALREADY ALLOCATED TO CERTAIN

WELCOMING THE INVITATION OF THE ADMINISTRATION OF SPAIN TO THE ITU TO HOLD WARC-92 IN THAT COUNTRY;

RESOLVES

1. THAT THE WORLD ADMINISTRATIVE RADIO CONFERENCE FOR DEALING WITH FREQUENCY ALLOCATIONS IN CERTAIN PARTS OF THE SPECTRUM (WARC-92) BE CONVENED IN SPAIN FROM 3 FEBRUARY 1992 FOR A PERIOD OF FOUR WEEKS AND TWO DAYS;

2. THE AGENDA FOR WARC-92 SHALL BE AS FOLLOWS:

ON THE BASIS OF PROPOSALS BY ADMINISTRATIONS AND TAKING ACCOUNT OF REPORTS FROM THE IFRB AND THE CCIR:

2.1 TO CONSIDER DEFINITIONS FOR CERTAIN NEW SPACE APPLICATIONS AND TO REVIEW THE RELEVANT PROVISIONS OF ARTICLE 1;

2.2 TO REVIEW THE PROVISIONS OF ARTICLE 8, TAKING ACCOUNT OF CONSIDERING FURTHER ABOVE, WITH A VIEW TO:

2.2.1 THE CONSIDERATION OF POSSIBLE ALLOCATIONS OF FREQUENCY BANDS ABOVE 20 GHZ TO THE NEW SPACE SERVICE APPLICATIONS¹;

2.2.2 THE POSSIBLE EXTENSION OF THE FREQUENCY SPECTRUM ALLOCATED EXCLUSIVELY TO HF BROADCASTING, AS INDICATED IN RECOMMENDATION NO. 511(HFBC-87);

2.2.3 THE CONSIDERATION OF THE ALLOCATION OF FREQUENCY BANDS TO THE BROADCASTING-SATELLITE SERVICE AND THE ASSOCIATED FEEDER LINKS:

¹ COMMUNICATIONS WITH MANNED SPACE VEHICLES MAY BE DEFINED AS A NEW SPACE APPLICATION WHICH MAY REQUIRE THE INDICATION OF THE SPACE SERVICE AND THE FREQUENCY BANDS THAT THIS SERVICE MAY USE FOR THIS PURPOSE.

- A) FOR THE BROADCASTING-SATELLITE SERVICE (SOUND) IN THE RANGE 500 - 3 000 MHZ, AS INDICATED IN RESOLUTION 520(ORB-88), INCLUDING THE ACCOMMODATION OF COMPLEMENTARY TERRESTRIAL SOUND BROADCASTING USES WITHIN THIS ALLOCATION;
- B) FOR WIDE RF-BAND HIGH DEFINITION TELEVISION ON A WORLD-WIDE BASIS, AS INDICATED IN RESOLUTION 521(ORB-88) GIVING CONSIDERATION TO THE RESULTS OF CCIR STUDIES CARRIED OUT IN ACCORDANCE WITH THIS RESOLUTION;

2.2.4 THE CONSIDERATION OF AN ALLOCATION OF FREQUENCY BANDS TO THE MOBILE AND MOBILE-SATELLITE SERVICES AND ASSOCIATED FEEDER-LINKS:

- A) IN THE APPROXIMATE RANGE 1 - 3 GHZ, AS INDICATED IN RESOLUTION NO. 208(MOB-87);
- B) FOR THE DEVELOPMENT IN THE APPROXIMATE RANGE 1 - 3 GHZ OF A WORLD-WIDE SYSTEM OF PUBLIC CORRESPONDENCE WITH AIRCRAFT, AS INDICATED IN RECOMMENDATION NO. 408(MOB-87), OR DESIGNATE FOR THIS USE A BAND ALREADY ALLOCATED TO THE MOBILE SERVICE IN THE SAME RANGE;
- C) FOR THE DEVELOPMENT OF THE INTERNATIONAL USE OF THE MOBILE SERVICE FOR FUTURE PUBLIC LAND MOBILE TELECOMMUNICATION SYSTEMS, AS INDICATED IN RECOMMENDATION NO. 205(MOB-87), OR DESIGNATE FOR THIS USE A BAND ALREADY ALLOCATED TO THE MOBILE SERVICE;
- D) CONSIDER POSSIBLE ALLOCATIONS OF UP TO 5 MHZ OF A FREQUENCY BAND BELOW 1 GHZ TO LOW-ORBIT SATELLITES ON THE BASIS OF APPROPRIATE SHARING CRITERIA;

2.2.5 THE CONSIDERATION OF THE ALLOCATION OF THE FREQUENCY BAND 14.5 - 14.8 GHZ TO THE FIXED-SATELLITE SERVICE (EARTH-TO-SPACE) WITH DUE PROTECTION OF ASSIGNMENTS APPEARING IN APPENDIX 30A OF THE RADIO REGULATIONS, AND TO TAKE ACCOUNT OF SERVICES TO WHICH THESE FREQUENCY BANDS ARE CURRENTLY ALLOCATED;

- 2.2.6 THE EXAMINATION OF THE FREQUENCY BANDS 2 025 - 2 110 MHZ AND 2 200 - 2 290 MHZ FOR THE SPACE OPERATIONS AND SPACE RESEARCH SERVICES, AS INDICATED IN RECOMMENDATION 716(ORB-88);
- 2.2.7 THE CONSIDERATION OF FOOTNOTES RELATING TO THE RADIODETERMINATION-SATELLITE SERVICE IN THE FREQUENCY RANGE 1.6 - 2.5 GHZ WITH THE VIEW TO HARMONIZING THEM AND ALLOWING ADMINISTRATIONS TO REVISE THE STATUS OF THEIR RESPECTIVE ALLOCATIONS TO THIS SERVICE AND TO REVIEW THE SHARING CRITERIA AS INDICATED IN RESOLUTION NO. 708(MOB-87);
- 2.2.8 THE EXAMINATION OF THE FOOTNOTES RR 635 AND RR 797B;
- 2.3 TO CONSIDER THE PROVISIONS OF ARTICLES 55(REV.) AND 56(REV.) OF THE RADIO REGULATIONS WHICH CONCERN THE MANDATORY CARRIAGE ON BOARD SHIPS OF PERSONNEL CERTIFICATED FOR THE ON-BOARD MAINTENANCE OF SHIPBORNE RADIO AND ELECTRONIC EQUIPMENT, AS INDICATED IN RESOLUTION NO. PLEN/8¹;
- 2.4 TO CONSIDER MINIMUM MODIFICATIONS TO ARTICLE 12 OF THE RADIO REGULATIONS AS A RESULT OF ACTIONS TAKEN WITH REGARD TO APPENDIX 26, AS INDICATED IN RESOLUTION NO. PL-B/2¹;
- 2.5 TO CONSIDER APPROPRIATE ACTION, IN LIGHT OF THE DECISION OF THE CONFERENCE RELATING TO DEFINITIONS IN ACCORDANCE WITH RESOLUTION NO. PL/10¹;
- 2.6 TO MAKE SUCH CONSEQUENTIAL CHANGES AND AMENDMENTS IN THE RADIO REGULATIONS AS MAY BE NECESSITATED BY THE DECISIONS OF THE CONFERENCE;
- 2.7 TO DEVELOP NEW RECOMMENDATIONS AND RESOLUTIONS IN RELATION TO THE AGENDA OF THE CONFERENCE INCLUDING METEOROLOGICAL AIDS SERVICE IN FREQUENCY BANDS BELOW 1000 MHZ AND PRESENT ALLOCATIONS TO SPACE SERVICES ABOVE 20 GHZ WHICH WERE NOT PLACED ON THIS AGENDA;

¹ PLENIPOTENTIARY CONFERENCE, NICE, 1989

2.8 TO CONSIDER PROBLEMS ASSOCIATED WITH THE USE OF THE FREQUENCY BANDS IN THE RANGE 401 - 403 MHZ BY THE METEOROLOGICAL SATELLITE AND EARTH EXPLORATION SATELLITE SERVICES WITH THE VIEW TO RECOMMEND THEIR CONSIDERATION BY THE NEXT COMPETENT ADMINISTRATIVE RADIO CONFERENCE;

2.9 TO CONSIDER, REVISE AS NECESSARY, AND TAKE OTHER APPROPRIATE ACTION UPON THE RELEVANT RECOMMENDATIONS AND RESOLUTIONS;

2.9.1 TO SAFEGUARD THE INTERESTS OF SERVICES THAT MAY BE AFFECTED BY CHANGES TO THE TABLE OF FREQUENCY ALLOCATIONS BY ADOPTING APPROPRIATE SHARING CRITERIA WHEN REQUIRED AND TO ADOPT APPROPRIATE SCHEDULE FOR THE ENTERING INTO FORCE OF THE DECISIONS ADOPTED BY THE CONFERENCE;

2.9.2 TO REVIEW RESOLUTION NO. 703 IN THE LIGHT OF THE PROCEDURE ADOPTED BY THE XVIIITH CCIR PLENARY ASSEMBLY (RESOLUTION PLEN/75) FOR THE APPROVAL OF RECOMMENDATIONS IN THE INTERVAL BETWEEN PLENARY ASSEMBLIES;

2.10 TO IDENTIFY THE FINANCIAL IMPLICATIONS OF THE DECISIONS OF THE CONFERENCE, TAKING INTO ACCOUNT THE UNION'S BUDGETARY PROVISIONS, AND AS NECESSARY TO SUBMIT A STATEMENT THEREON TO THE ADMINISTRATIVE COUNCIL IN ACCORDANCE WITH ARTICLE 80 OF THE INTERNATIONAL TELECOMMUNICATION CONVENTION AND RESOLUTION NO. 48 OF THE PLENIPOTENTIARY CONFERENCE, NAIROBI, 1982,

INVITES

1. THE CCIR TO PREPARE THE TECHNICAL AND OPERATIONAL BASES FOR THE CONFERENCE AND TO SUBMIT TO ADMINISTRATIONS A REPORT SETTING OUT THE RESULTS OF ITS WORK AT LEAST EIGHT MONTHS PRIOR TO THE OPENING OF THE CONFERENCE;

2. THE IFRB TO PROVIDE TECHNICAL ASSISTANCE FOR THE PREPARATION AND ORGANIZATION OF THE CONFERENCE AND TO SUBMIT TO ALL ADMINISTRATIONS A REPORT ON RESULTS WITH RESPECT TO THE APPROPRIATE ABOVE AGENDA ITEMS AT LEAST TEN MONTHS PRIOR TO THE OPENING OF THE CONFERENCE,

INSTRUCTS THE SECRETARY-GENERAL

1. TO MAKE ALL THE ARRANGEMENTS NECESSARY FOR HOLDING THE CONFERENCE;

2. TO COMMUNICATE THIS RESOLUTION TO ICAO, IMO, WMO AND TO OTHER CONCERNED INTERNATIONAL ORGANIZATIONS.

BBB IN ACCORDANCE WITH THE RELEVANT PROVISIONS OF ARTICLE 54 OF THE CONVENTION, ALL MEMBERS OF THE UNION ARE INVITED TO INDICATE THEIR CONCURRENCE WITH THE AGENDA, DATES AND PLACE OF THE CONFERENCE.

CCC ALL MEMBERS ARE REQUESTED TO REPLY BY FAX OR TELEX TO THE CHAIRMAN OF THE COUNCIL IN GENEVA BEFORE FRIDAY 20 JULY 1990 AT 2359 UTC.

A. PH. DJIWATAMPU, CHAIRMAN
BURINTERNA
NNNN

Appendix C--FCC Proposals Versus Informal Working Group 1's (HF) Proposals

<u>FCC Proposal*</u> (1)	<u>Working Group Proposal**</u> (2)	<u>Difference</u> (3)=(2)-(1)
No Proposal	4750-4850/4850-4995 kHz*** (245 kilohertz) and delete footnote 503 from this band	245 kilohertz
5900-5950 kHz amateur realignment (50 kilohertz)	5800-5950 kHz amateur realignment (150 kilohertz)	100 kilohertz
6900-7200 kHz (300 kilohertz)	6950-7250 kHz (300 kilohertz)	0
7200-7400 kHz (200 kilohertz)	7250-7450 kHz (200 kilohertz)	0
7400-7525 kHz (125 kilohertz)	7450-7750 kHz (300 kilohertz)	175 kilohertz
9350-9500 kHz (150 kilohertz)	9250-9500 kHz (250 kilohertz)	100 kilohertz
No Proposal	9900-9940 kHz (40 kilohertz)	40 kilohertz
No Proposal	10200-10400 kHz (200 kilohertz)	200 kilohertz
11550-11650 kHz (100 kilohertz)	11500-11650 kHz (150 kilohertz)	50 kilohertz
No Proposal	12050-12150 kHz (100 kilohertz)	100 kilohertz
No Proposal	13480-13600 kHz (120 kilohertz)	120 kilohertz

There are no differences in proposals in the bands above 13600 kHz.

* The Commission proposes to require RSSB emissions in all bands except 7200-7400 kHz.

** Stations operating with RSSB emissions in accordance with Appendix 45 shall be given a priority status.

*** Stations in the defined tropical zone utilizing transmitters with power levels not in excess of 47 dBW (50 kW) in the band 4750-4995 kHz will be assigned a priority in the frequency planning procedure (World Plan) to be developed at WARC-HFBC-93.

Appendix D--Parties Filing Comments or Reply Comments to the Notice of Inquiry

Advanced Mobilecomm, Inc.
Advanced Television Systems Committee
Adventist Broadcasting Service, Inc.
Aeronautical Radio, Inc. and Air Transport Association of America
Aerospace & Flight Test Radio Coordinating Council
AFRISPACE, Inc.
Aircraft Owners and Pilots Association
American Institute of Merchant Shipping
American Mobile Satellite Corporation
American Petroleum Institute
American Radio Relay League
American Technical Systems Committee
American Telephone and Telegraph Company
Antech World Corporation
ARNAV Systems, Inc.
Associated Public-Safety Communications Officers, Inc.
Association for Broadcast Engineering Standards, Inc.
Association of American Railroads
Association of Maximum Service Telecasters, Inc.
Association of North American Radio Clubs
Dennis Atkeson
State of California, Department of General Services, Telecommunications
Division
California Public-Safety Radio Association, Inc.
Anna L. Case
Brian Cassidy
CBS, Inc.
Christian Science Monitor Syndicate, Inc.
Communications Satellite Corporation
Digital Microwave Corporation
Energetics Satellite Corporation
Ericsson Corporation
F Corporation
Family Stations
Gary Gaulin
GEC Plessey Telecommunications, Ltd. and Stromberg-Carlson Corporation
George Mason University Foundation, Inc.
Geostar Corporation
Global-Wulfsberg Systems
GTE Service Corporation
Harris Corporation--Farinon Division
High Adventure Ministries
IDB Communications Group, Inc.
International Monitoring Association for Students & Teachers
George Jacobs & Associates, Inc.
Michael R. Kelley
Benjamin Krepp
David Kurlander

KUSW Worldwide Radio
Litel Telecommunications Corporation
Chick Longman
Los Angeles County Sheriff's Department
McCaw Cellular Communications, Inc.
Mobile Marine Radio, Inc.
Motorola, Inc.
National Academy of Sciences--National Research Council's Committee on
Radio Frequencies
National Aeronautics and Space Administration
National Association of Broadcasters
National Association of Shortwave Broadcasters
National Association of State Telecommunications Directors
National ITFS Association
National Public Radio
Northern Telecom, Inc.
NYNEX Corporation
Ohio Educational Broadcasting Network Commission
Ohio University Avionics Engineering Center
Orbital Communications Corporation
Qualcomm, Inc.
Radio-Electronics Officers Union and American Radio Association
Radio Technical Commission for Maritime Services
Rockwell International Corporation
Daniel L. Ross
Satellite CD Radio, Inc.
Sea-Land Service, Inc.
Shannondale Wireless
South Carolina Division of Information Resource Management
Super Talkers of Pennsylvania
Leslie Taylor Associates
Telecommunications Industry Association, Mobile Communications Division
Telecommunications Systems
United Parcel Service, Inc.
University of Maryland
State of Utah, Department of Public Safety, Telecommunications Division
Utilities Telecommunications Council
Voice of America
Voice of Hope World Network
Volunteers in Technical Assistance, Incorporated
Wild Goose Association
Wireless Cable Association
World Christian Broadcasting Corporation
World Radio TV Handbook
Dr. Philip R. Yant

