

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

In the Matter of)
)
Emission Mask Requirements for Digital) PS Docket No. 13-209
Technologies on 800 MHz NPSPAC Channels;) RM-11663
Analog FM Capability on Mutual Aid and)
Interoperability Channels)

NOTICE OF PROPOSED RULEMAKING

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By the Commission:

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I. INTRODUCTION

1. In this *Notice of Proposed Rulemaking (NPRM)*, initiated in response to a Petition for Rulemaking filed by Harris Corporation (Harris),¹ we propose to require digital technologies, including but not limited to Terrestrial Trunked Radio (TETRA) based technologies, to comply with Emission Mask H when operated in the 800 MHz National Public Safety Planning Advisory Committee (NPSPAC)

¹ Petition for Rulemaking of Harris Corporation, filed April 30, 2012 (Harris Petition).

band (806-809/851-854 MHz).² We also propose to require equipment to have analog FM capability when operating on 800 MHz, VHF, and UHF public safety mutual aid and interoperability channels. We believe that these proposals could help safeguard public safety licensees in the NPSPAC band from adjacent-channel interference and to preserve interoperability.

II. BACKGROUND

2. In September 2012, the Commission adopted the *TETRA Report and Order* in WT Docket No. 11-69, which modified Part 90 of the Commission's rules to permit the certification and use of TETRA equipment in certain Private Land Mobile Radio (PLMR) bands.³ TETRA is a digital trunked radio technology that operates with Time Division Multiple Access (TDMA) in four time slots within a 25 kilohertz channel.⁴ TETRA has been widely implemented in countries outside the United States, including for public safety communications, and is widely recognized as a spectrally efficient technology.⁵ However, prior to the *TETRA Report and Order*, TETRA was not authorized for use in the United States because: (1) TETRA emissions exceeded certain emission masks specified in Section 90.210 of the Commission's rules,⁶ and (2) TETRA uses a 22 kilohertz standard channel bandwidth that exceeded the 20 kilohertz maximum bandwidth for UHF and 800 MHz equipment specified in Section 90.209 of the Commission's rules.⁷

3. In the *TETRA Report and Order*, the Commission modified these rules to allow TETRA operations in the UHF band and the non-NPSPAC portion of the 800 MHz band, concluding that TETRA poses minimal risk of causing harmful interference in these bands.⁸ However, the Commission declined to allow TETRA operation in the 800 MHz NPSPAC band or the narrowband portion of the 700 MHz

² The NPSPAC band is allocated for exclusive public safety use on a regional basis. It is referred to as the NPSPAC band because the Commission's order allocating the band to public safety incorporated many recommendations of the National Public Safety Planning Advisory Committee. See Development and Implementation of a Public Safety National Plan and Amendment of Part 90 to Establish Service Rules and Technical Standards for Use of the 821–824/866–869 MHz Bands by the Public Safety Services, Gen. Docket 87-112, *Report and Order*, 3 FCC Rcd 905 (1987) (*NPSPAC Report and Order*).

³ See Amendment of Part 90 of the Commission's Rules to Permit Terrestrial Trunked Radio (TETRA) Technology, WT Docket No. 11-69, ET Docket No. 09-234, *Report and Order*, 27 FCC Rcd 11569 (2012) (*TETRA Report and Order*). On July 2, 2013, the Commission clarified that the *TETRA Report and Order* permits TETRA on all channels between 809-824/854-869 MHz, including non-NPSPAC public safety category channels. See Amendment of Part 90 of the Commission's Rules to Permit Terrestrial Trunked Radio (TETRA) Technology, WT Docket No. 11-69, *Order on Reconsideration*, FCC 13-91 (rel. Jul. 2, 2013).

⁴ Amendment of Part 90 of the Commission's Rules to Permit Terrestrial Trunked Radio (TETRA) Technology, WT Docket No. 11-69, ET Docket No. 09-234, *Order on Clarification*, 26 FCC Rcd 13360, 13361 ¶ 2 (*Clarification Order*).

⁵ See <http://www.tetrahealth.info/worldCountries.htm> (last accessed April 23, 2013).

⁶ 47 C.F.R. § 90.210. An emission mask is the technical specification that limits the distribution of power of a radio transmitter as a function of frequency. See Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, *First Report and Order and Third Notice of Proposed Rulemaking*, WT Docket No. 96-86, 14 FCC Rcd 152, 213 n.337 (1998). Emission masks provide an important technical parameter that affects the efficient use of a frequency band by limiting emissions from one channel into adjacent channels. 1998 Biennial Regulatory Review - 47 C.F.R. Part 90 - Private Land Mobile Radio Services, WT Docket No. 98-182, *Report and Order and Further Notice of Proposed Rule Making*, 15 FCC Rcd 16673, 16689 ¶ 33 (2000).

⁷ 47 C.F.R. § 90.209.

⁸ *TETRA Report and Order*, 27 FCC Rcd at 11572 ¶ 5.

public safety band.⁹ The Commission noted that TETRA equipment is not interoperable with equipment commonly used in the NPSPAC band and does not conform to the interoperability standard for the 700 MHz narrowband public safety band interoperability channels.¹⁰ The Commission also noted that because the NPSPAC band has 25 kilohertz bandwidth channels that are spaced 12.5 kilohertz apart, NPSPAC systems are more susceptible to adjacent channel interference than other bands that use 25 kilohertz spacing between 25 kHz channels.¹¹

4. During the course of the TETRA rulemaking proceeding, several parties submitted filings disputing whether the Commission's existing rules allowed operation of so-called "low-power" TETRA equipment in the NPSPAC band.¹² "Low-power" TETRA (also sometimes called "reduced power" TETRA) refers to technology that uses the TETRA waveform but operates at less than the 22 kilohertz bandwidth associated with the TETRA standard.¹³ One wireless equipment manufacturer, PowerTrunk, Inc. (PowerTrunk) developed a low-power TETRA technology that it contended should be permitted to operate in the NPSPAC band under existing rules. PowerTrunk noted that its technology uses the TETRA waveform but operates with a 20 kilohertz bandwidth, which complies with the maximum bandwidth allowed under Section 90.209 of the Commission's rules.¹⁴ PowerTrunk also asserted that its technology complied with one of two emission mask limitations applicable to the NPSPAC band. Specifically, PowerTrunk contended that, while its technology did not comply with Emission Mask H, the stricter of the two emission masks, it complied with Emission Mask B, a more relaxed emission mask applicable to NPSPAC band transmitters equipped with audio low-pass filters.¹⁵ PowerTrunk asserted that its equipment did incorporate low-pass audio filters, and, therefore, that compliance with Emission Mask B was sufficient to allow operation in the NPSPAC band.¹⁶

5. In its Petition and related *ex parte* filings, Harris disputed PowerTrunk's assertion that its low-power TETRA technology should be allowed to operate in the NPSPAC band. Harris asserted that PowerTrunk's technology would cause interference if used in the NPSPAC band unless it conformed to the more stringent Emission Mask H, and that PowerTrunk's claim of compliance with Emission Mask B was an attempt to take advantage of a "loophole" in the Commission's rules.¹⁷ Harris also asserted that PowerTrunk's technology would not support interoperable communications because it lacks analog FM

⁹ *Id.* at 11572 ¶¶ 5-6.

¹⁰ *Id.* at 11569 ¶4.

¹¹ *Id.* at 11573-74 ¶ 9.

¹² See, e.g., Letter from Patrick Sullivan, Harris Corp. to Marlene H. Dortch, Secretary, FCC, WT Docket 11-69, ET Docket No. 09-234 (March 16, 2012); Letter from Jose Martin, Executive Vice President, PowerTrunk, Inc., to Marlene H. Dortch, Secretary, FCC, WT Docket 11-69, ET Docket No. 09-234, (March 23, 2012) (PowerTrunk March 23 *Ex Parte*).

¹³ The terms "low-power" and "reduced-power" TETRA are not strictly accurate descriptions of the TETRA-based technology developed by PowerTrunk and others, which uses narrower bandwidth but operates with transmitter power output comparable to standard TETRA systems. Letter from Kevin Krufky, Alcatel-Lucent Corp. to Marlene Dortch, Secretary, FCC (March 23, 2012); *PowerTrunk March 23 Ex Parte*. Nevertheless, because the term "low-power TETRA" is in common usage, we use it herein to refer to modified TETRA technology such as PowerTrunk's that operates at 20 kilohertz bandwidth, which PowerTrunk more recently has identified as "TI D-LMR." Power Trunk Reply to Petition for Reconsideration, FCC ID WT7PTRNKTBSR75800, Mar 21, 2013.

¹⁴ PowerTrunk March 23 *Ex Parte* at 6.

¹⁵ *Id.* at 5-6. Transmitters equipped with an audio low-pass filter are permitted to comply with Emission Mask B when operating on NPSPAC channels. See 47 C.F.R. 90.210.

¹⁶ PowerTrunk March 23 *Ex Parte* at 6.

¹⁷ Harris Petition at 1.

capability, which is widely used to support interoperability in the VHF, UHF and 800 MHz public safety bands.¹⁸ Harris therefore requested that the Commission initiate a rulemaking (1) to require all digital equipment operating in the NPSPAC band to conform to Emission Mask H rather than Emission Mask B and (2) to require all digital equipment operating in the VHF, UHF, and 800 MHz bands to include an analog FM mode.¹⁹ Harris also requested that the Commission impose an immediate freeze on applications to use equipment that did not meet these proposed requirements.²⁰

6. In May 2012, the Commission issued a *Public Notice* seeking comment on the Harris Petition.²¹ In comments filed in response to the *Public Notice*, Alcatel-Lucent and PowerTrunk asked the Commission to dismiss the Harris Petition, claiming that it was filed in retaliation for Alcatel-Lucent's successful bid against Harris to build a new public safety communications system for New Jersey Transit.²² Other commenters, however, supported the Harris Petition. MSI stated that Harris had raised "legitimate concerns,"²³ and, along with the National Public Safety Telecommunications Council (NPSTC), recommended that the Commission "expeditiously clarify the need for the tighter 'H-mask' in the NPSPAC spectrum and continue to apply the existing mutual aid channel requirements for mobiles/portables that operate in the NPSPAC band."²⁴

7. Because the low-power TETRA issue raised by the Harris Petition had not previously been raised in the *TETRA NPRM*, the Commission concluded that it fell outside the scope of that proceeding.²⁵ Accordingly, the Commission took no action in the *TETRA Report and Order* with respect to low-power TETRA and stated it would treat that issue separately, as we do herein.²⁶

III. NOTICE OF PROPOSED RULEMAKING

8. As an initial matter, we agree with Harris that the question of whether low-power TETRA technology should be permitted in the NPSPAC band should be resolved in a rulemaking proceeding.²⁷ We also decline to dismiss the Harris Petition, as advocated by PowerTrunk, because we believe it raises legitimate issues about maintaining a viable interference environment in the NPSPAC band and ensuring interoperability on the mutual aid and interoperability channels.

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ *Id.* at 10-11.

²¹ See *Public Notice*, Report No. 2952, RM-11663 (May 31, 2012). Comments were received from Alcatel-Lucent, Harris, PowerTrunk, Motorola Solutions, Inc. (MSI), Nielson Communications, Inc. (Nielson), and New Jersey Transit. Reply Comments were filed by Harris and the National Public Safety Telecommunications Council.

²² Alcatel Lucent Comments at 1; PowerTrunk Comments at 1.

²³ MSI Comments at 1.

²⁴ *Id.*; NPSTC Comments at 1.

²⁵ *TETRA Report and Order*, 27 FCC Rcd at 11575 ¶ 13. TETRA + Critical Communications Association formerly known as the "TETRA Association," noted that the Harris rulemaking petition "does not concern the original TETRA standard." Letter from Henry Goldberg, Esq. Counsel for the TETRA + Critical Communications Association to Marlene H. Dortch, Secretary, FCC (Aug. 1, 2012).

²⁶ *TETRA Report and Order*, 27 FCC Rcd at 11575 ¶ 13.

²⁷ The Commission possesses broad discretion to determine whether it will proceed by rulemaking or adjudication. See, e.g., *SEC v. Chenery Corp.*, 332 U.S. 194, 203 (1947) ("[T]he choice made between proceeding by general rule or by individual, ad hoc litigation is one that lies primarily in the informed discretion of the administrative agency."); see also *Committee for Effective Cellular Rules v. FCC*, 53 F.3d 1309, 1319-20 (D.C. Cir. 1995).

A. Emission Mask

9. As noted above, Harris and other parties supporting its petition contend that digital low-power TETRA technology should not be allowed to operate in the NPSPAC band unless it conforms to Emission Mask H.²⁸ These parties also contend that authorizing digital technologies under any emission mask less stringent than the H Mask creates a risk of interference and could adversely impact spectrum efficiency.²⁹ NPSTC, for example, believes that low-power TETRA equipment, if deployed in the NPSPAC channels under the adjacent channel separations contained in current regional plans, would “have a high potential to increase adjacent-channel interference and further limit existing licensees’ abilities to change or add locations going forward.”³⁰

10. In light of these concerns, we propose to require all digital technology operating in the NPSPAC band to conform to Emission Mask H.³¹ Section 90.210 of the Commission’s rules – which established Emission Mask B – was adopted in the analog FM era because the width of the emission waveform of an FM transmitter is a direct function of the modulating frequency, *i.e.*, the higher the modulating frequency, the wider the spectral waveform, and the greater the potential for adjacent channel interference.³² The audio low-pass filter in a land mobile FM transmitter limits the modulating frequency, typically to 3 kilohertz, thus ensuring that the output waveform conforms to the relevant emission mask.³³ The same relationship between the modulating frequency and the width of the emission waveform does not exist in digital systems such as TETRA, *i.e.*, the width of the emission waveform remains constant and independent of the voice baseband modulating frequency. Accordingly, the presence – or absence – of an audio low-pass filter in such digital equipment appears to be meaningless in terms of the width of the output waveform.

11. We seek comment on whether manufacturers of digital equipment should continue to be able to take advantage of an emission mask rule intended to apply to analog FM systems. We believe that requiring digital systems to comply with Emission Mask H will reduce the potential of those systems to cause adjacent-channel interference in the NPSPAC band. Moreover, compliance with Emission Mask H appears to be achievable, as demonstrated by Harris and other manufacturers.³⁴

12. Our proposal to apply the H Mask to digital technology is limited to equipment that operates in the sensitive interference environment of the NPSPAC band where 25 kilohertz channels are spaced only 12.5 kilohertz apart.³⁵ The ability of public safety licensees to operate in this sensitive

²⁸ Harris Petition at 1.

²⁹ *Id.* at 3.

³⁰ *Id.*

³¹ Under this proposal emission Mask B would continue to apply to analog FM equipment employing audio low-pass filters.

³² J.R. Carson, *Notes on the Theory of Modulation*, Proc. IRE, vol. 10, no. 1 (Feb. 1922), pp. 57-64.

³³ PowerTrunk claims “that no matter how loud the user of a PowerTrunk radio speaks, neither the emission mask boundaries, nor the occupied bandwidth limits would be exceeded at any time. Thus, the PowerTrunk equipment qualifies as equipped with an audio low-pass filter.” See PowerTrunk March 23 *Ex Parte* at 6. PowerTrunk appears to misunderstand the effect of an audio low-pass filter which limits the frequency, not the amplitude (loudness), of the input audio signal.

³⁴ Harris states that “it is unaware of any manufacturer, other than PowerTrunk, offering B-mask only certified digital equipment for utilization in Public Safety spectrum.” Harris Comments at 4. We have been presented with no evidence that PowerTrunk is incapable of adapting its technology to comply with Emission Mask H.

³⁵ We observed that the NPSPAC channels are more susceptible to adjacent channel interference due to the 12.5 kHz channel spacing relative to the rest of the 800 MHz band, which are spaced 25 kHz apart. *TETRA Report and Order*, 27 FCC Red at 11573-74 ¶ 9.

interference environment is due, in large part, to the efforts of the Regional Planning Committees (RPC) that take both co-channel and adjacent-channel interference into account in recommending frequencies that can be licensed in the band. PowerTrunk suggests that its technology can be accommodated in the NPSPAC band if RPCs take the characteristics of PowerTrunk's technology into account when making channel assignments.³⁶ However, we believe that implementation of PowerTrunk's proposal would impose an additional burden on RPCs and would necessarily restrict the ability of the RPCs to make efficient use of the NPSPAC spectrum. We seek comment on this view.

13. Because NPSPAC channels are 25 kilohertz bandwidth channels spaced 12.5 kilohertz apart³⁷ they are more susceptible to adjacent-channel interference than other channels in the 800 MHz band which are spaced 25 kilohertz apart. PowerTrunk has not shown how the root raised cosine digital filter in its equipment provides protection against adjacent channel interference equivalent to that provided by an audio low pass filter in an analog system. We therefore seek comment on whether the root raised cosine filter – conventionally used to limit intersymbol interference in digital systems³⁸ – has any effect on adjacent channel interference and, if so, to what degree. Moreover, we do not find the prior certification of equipment that complies with Emission Mask B to be a bar to our adopting a rule applying the H Mask to all digital equipment in the NPSPAC band. It is not unusual for a rule change to render certified equipment no longer permissible in certain bands.³⁹ We seek comment on this proposal.

14. In an *ex parte* meeting on September 11, 2012 PowerTrunk asserted that its equipment, which conforms to Emission Mask B, is more spectrum efficient because it is capable of a higher data rate than other equipment on the market, including that produced by Harris.⁴⁰ This enhanced spectrum efficiency, PowerTrunk argues, facilitates coordination because fewer stations are needed to support a given data rate requirement.⁴¹ We seek comment on whether the spectrum efficiency benefits asserted by PowerTrunk for low power TETRA technology are sufficient to overcome any potential interference and interoperability costs. As an alternative to requiring conformance with Emission Mask H, should we consider development of a new mask or a different standard altogether, such as an adjacent channel power standard, in order to accommodate such digital technologies in the NPSPAC band?⁴²

³⁶ PowerTrunk Comments at 4.

³⁷ The five 800 MHz mutual aid channels are an exception to the 12.5 kilohertz spacing regime in the NPSPAC band and are separated by 25 kilohertz. See 47 C.F.R. §§90.16, 90.617(a)(1); Development and Implementation of a Public Safety National Plan and Amendment of Part 90 to Establish Service Rules and Technical Standards for Use of the 821–824/866–869 MHz Bands by the Public Safety Services, *Report and Order*, 3 FCC Rcd 905, 908 (1987).

³⁸ Ha, Tri T., *Theory and Design of Digital Communications Systems*, Cambridge Univ. Press, 2011, 473. See also, Newton's *Telecom Dictionary*, 20th Ed. CMP Books, 439 (“Intersymbol interference is a source of noise in baseband signaling that occurs when the signal pulses or symbols spread into adjacent pulses or symbols. This spreading effect occurs when the signal varies with frequency or when portions of the signal are delayed due to multipath fading.”)

³⁹ For example, under the Commission's “narrowbanding” mandate for bands below 470 MHz, 25 kilohertz bandwidth equipment was no longer permitted after January 1, 2013, notwithstanding that such equipment previously was certified. 47 C.F.R. § 90.209(b); see also Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended; Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies, *Third Memorandum Opinion and Order and Third Further Notice of Proposed Rule Making and Order*, WT Docket No. 99-87, RM-9332, 19 FCC Rcd 25045 (2004).

⁴⁰ Letter from Jose Martin, Executive Vice President, PowerTrunk, Inc., to Marlene H. Dortch, Secretary, FCC (Sept. 11, 2012) (PowerTrunk Sept. 11 *Ex Parte*) at 2.

⁴¹ *Id.*

⁴² *Id.* at 3. See also Letter from William K. Keane, Esq. to Marlene H. Dortch, Secretary, FCC (Sept. 21, 2012).

15. We also seek comment on the costs and benefits associated with requiring digital systems in the NPSPAC band to comply with Emission Mask H. What impact will such an approach have on financial investment in digital technology, the market for digital equipment or the availability of spectrum for digitally modulated equipment? Moreover, would such an approach accommodate emerging technologies and advanced capabilities for equipment operating in the public safety bands?

B. Analog FM Capability

16. As part of its long-standing commitment to public safety and homeland security, the Commission has dedicated a number of channels in the public safety bands to interoperable communications, including five mutual aid channels in the 800 MHz NPSPAC band⁴³ and nine interoperability channels in the VHF and UHF bands.⁴⁴ The Commission's rules further require equipment certified and marketed for public safety use in the 800 MHz, VHF, and UHF bands to be capable of operating on the applicable mutual aid or interoperability channels.⁴⁵

17. In its Petition, Harris contends that the current rules requiring equipment to be “capable of operating” on interoperability channels are problematic because they allow development of different equipment lines that can all operate on the interoperable channels but that are not interoperable with one another because they use different modulation waveforms.⁴⁶ Harris notes that while most equipment manufacturers and public safety licensees have historically used a common modulation – analog FM – for operation on 800 MHz, VHF, and UHF interoperability channels, PowerTrunk has obtained certification for low-power TETRA equipment that uses a different and incompatible digital modulation.⁴⁷ Harris argues that this undermines the Commission's policy of promoting interoperability and that the rules should therefore be amended to specify analog FM as a uniform modulation standard for certification of all 800 MHz, VHF, and UHF public safety equipment.⁴⁸ Harris notes that the Commission has previously adopted a similar modulation requirement for 700 MHz public safety narrowband equipment.⁴⁹

18. PowerTrunk argues that the Commission should not require 800 MHz, VHF, and UHF radios to have analog FM capability.⁵⁰ It states that its radios use IQ modulation⁵¹ which “is capable of

⁴³ 47 C.F.R. § 90.617(a)(1). *See NPSPAC Report and Order*, 3 FCC Rcd at 908 ¶¶ 27-30 (1987).

⁴⁴ 47 C.F.R. § 90.20(c)(3). In 2000, the Commission dedicated five channels in the 150-174 MHz band and four channel pairs in the 450-512 MHz band for interoperability purposes. *See Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, Establishment of Rules and Requirements For Priority Access Service*, WT Docket No. 96-86, *Third Memorandum Opinion and Order and Third Report and Order*, 15 FCC Rcd 19844, 19848-19849 ¶ 9 (2000). The Commission also designated two channel pairs in the VHF 156-162 MHz band for interoperability communication in thirty-three Economic Areas (EAs), where these channels are allocated for public safety entities. *Id.*

⁴⁵ *See* 47 C.F.R. § 90.203(i) (equipment certified after February 16, 1988 and marketed for public safety operation in the 800 MHz NPSPAC bands “must have the capability to be programmed for operation on the mutual aid channels as designated in § 90.617(a)(1) of the rules”); 47 C.F.R. § 90.203(j)(1) (mobile/portable equipment certified after January 1, 2005 for use on 150–174 MHz or 450–470 MHz public safety frequencies must be “capable of operating” on the nationwide public safety interoperability channel in the applicable band).

⁴⁶ Harris Petition at 8-9.

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ PowerTrunk Comments at 5.

⁵¹ *Id.*

generating analog FM signals” and discusses an available integrated circuit that allows “generating various digital and analog waveforms.”⁵² However, PowerTrunk stops short of claiming that its current radios actually have analog FM capability.⁵³ Instead, it asserts a “future capability of PowerTrunk to generate analog FM signals with its TI D-LMR equipment.”⁵⁴

19. Given this divergence of viewpoint, we seek comment on whether we should require all public safety radios operating on the 800 MHz, VHF, and UHF bands to use a common modulation for mutual aid and interoperability channels, as suggested by Harris, NPSTC, and MSI. When the current rules were adopted, analog FM was the predominant modulation used on public safety frequencies, and as a consequence, most if not all public safety radios intended for use on mutual aid and interoperability frequencies are capable of analog FM operation.⁵⁵ However, the rules do not expressly require use of a common modulation, creating the potential for vendors to develop non-interoperable equipment. Because analog FM has long been the *de facto* standard for communication on interoperability and mutual aid channels, we seek comment whether we should specify analog FM as the standard modulation for these channels. We seek comment on the potential public safety benefits of such a requirement, the cost burden, if any, that manufacturers would face in complying with the requirement, and whether the requirement would increase public safety licensees’ costs.

C. Limitation on 800 MHz NPSPAC Applications and Equipment Authorizations During the Pendency of the Proceeding

20. Currently, to our knowledge, there are no digital systems operating in the 800 MHz NPSPAC band that exceed Emission Mask H or lack analog FM capability.⁵⁶ We believe it is important to maintain this *status quo* during the pendency of this rule making proceeding, in light of the risk that allowing new non-conforming systems could cause adjacent-channel interference to and impair interoperability with incumbent NPSPAC systems. Accordingly, in a companion *Public Notice*, and on our own motion, we are announcing that during the pendency of this proceeding, we will not accept applications for license or equipment authorizations in the 800 MHz NPSPAC band unless such applications satisfy both of the following conditions: (a) the proposed equipment must conform to Emission Mask H; and (b) the proposed equipment must have analog FM capability for operation on the NPSPAC mutual aid channels.

⁵² *Id.*

⁵³ Harris claims that although PowerTrunk’s certification grants (for both 800MHz and UHF frequencies) for base stations show an analog emission designator (11K0F3E and 16K0F3E), none of Power Trunk’s subscriber units includes that analog emission designator. Further, Harris claims that PowerTrunk’s equipment does not currently generate analog FM signals and that standard TETRA radios do not have the TIA-603 analog FM mode included in them. Harris Reply Comments at 2.

⁵⁴ Power Trunk Sept 11 *Ex Parte* at 2.

⁵⁵ See, e.g., http://www.motorola.com/Business/US-EN/Business+Product+and+Services/Two-Way+Radios+-+Public+Safety/P25+Portable+Radios/XTS2500_US-EN (Motorola Model XTS2500 “operates on P-25 analog and digital systems.”); www.pspc.harris.com/.../7717C%20OpenSky2%20700-800%20MHz%20Overview_tcm27-13457.pdf (“Additionally, the VIDA architecture of the OpenSky2 system offers the capability of seamless interoperability with other analog or P25 systems.”); http://www.kenwoodusa.com/Communications/Land_Mobile_Radio/Public_Safety/TK-5910 (“Included Modes: Analog Conventional (25 & 12.5 kHz), P25 Conventional, & P25 Trunked”); <http://www.taitradio.com/products-and-services/technologies-products/p25/products/portables/TP9100> (“Fully interoperable, the TP9100 gives you the flexibility of working in digital, analog and auto-sensing dual mode”).

⁵⁶ New Jersey Transit previously proposed to operate in the NPSPAC band using low-power TETRA equipment manufactured by PowerTrunk. However, New Jersey Transit is now installing its system on non-NPSPAC channels, to which this proceeding does not apply.

21. We recognize that MSI and NPSTC oppose applying these processing limitations to all public safety frequencies.⁵⁷ However, we are only applying these limitations to applications and equipment authorizations in the 800 MHz NPSPAC band, not to applications and equipment authorizations in other public safety bands.

IV. PROCEDURAL MATTERS

A. *Ex Parte* Rules – Permit-But-Disclose

22. The proceeding this *NPRM* initiates shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.⁵⁸ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with Section 1.1206(b).⁵⁹ In proceedings governed by Section 1.49(f)⁶⁰ or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

B. Comment Period and Procedures

23. Pursuant to Sections 1.415 and 1.419 of the Commission’s rules,⁶¹ interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. All comments and reply comments should refer to PS Docket No. 13-209. Parties may file comments using: (1) the Commission’s Electronic Comment Filing System (ECFS), (2) the Federal Government’s eRulemaking Portal, or (3) by filing paper copies.⁶²

- Electronic Filers: File comments electronically using the Internet by accessing the ECFS: <http://www.fcc.gov/cgb/ecfs/> or the Federal eRulemaking Portal: <http://www.regulations.gov>. Filers should follow the instructions provided on the website for submitting comments.

⁵⁷ MSI Comments at 4; NPSTC Reply Comments at 7.

⁵⁸ 47 C.F.R. §§ 1.1200 *et seq.*

⁵⁹ 47 C.F.R. § 1.1206(b).

⁶⁰ 47 C.F.R. § 1.49(f).

⁶¹ 47 C.F.R. §§ 1.415 and 1.419.

⁶² See Electronic Filing of Documents in Rulemaking Proceedings, GC Docket No. 97-113, *Report and Order*, 13 FCC Rcd 11322 (1998).

- Paper Filers: Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.
- Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
 - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. .
 - Send commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) to 9300 East Hampton Drive, Capitol Heights, MD 20743.

24. Send U.S. Postal Service first-class, Express, and Priority mail to 445 12th Street, SW, Washington, DC.

25. People with Disabilities: To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (tty).

26. Address all filings to the Commission's Secretary, Marlene H. Dortch, Office of the Secretary, Federal Communications Commission, 445 12th Street, SW, Room TW-A325, Washington, DC 20554. Parties shall also serve one copy with the Commission's copy contractor, Best Copy and Printing, Inc. (BCPI), Portals II, 445 12th Street, SW, Room CY-B402, Washington, DC 20554, (202) 488-5300, or via e-mail to fcc@bcpiweb.com.

27. Documents in PS Docket No. 13-209 are available for public inspection and copying during business hours at the FCC Reference Information Center, Portals II, 445 12th St. SW, Room CY-A257, Washington, D.C. 20554. The documents are available for purchase from BCPI, telephone (202) 488-5300, facsimile (202) 488-5563, TTY (202) 488-5562, e-mail fcc@bcpiweb.com. These documents are also available for viewing on the Commission's website at <http://www.fcc.gov/cgb/ecfs>.

28. Because of the policy implications and potential impact of this proceeding on persons not party to these applications, it is in the public interest to treat this proceeding as a permit-but-disclose proceeding under the *ex parte* rules. See Sections 1.1200(a) and 1.1206 of the Commission's rules, 47 C.F.R. §§ 1.1200(a) and 1.1206. Therefore, subsequent to the release of this *Notice of Proposed Rulemaking*, we will allow *ex parte* presentations that address issues involved in this proceeding, provided they are disclosed in accordance with the requirements of Section 1.1206(b) of the Commission's rules, 47 C.F.R. § 1.1206(b).

C. Initial Regulatory Flexibility Analysis

29. As required by the Regulatory Flexibility Act of 1980 (RFA),⁶³ the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the policies and rules proposed in the *NPRM*. The analysis is found in Appendix B. We request written public comment on the analysis. Comments must be filed by the same dates as listed on the first page of this document and must have a separate and distinct heading designating them as responses to the IRFA. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this *NPRM*, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.

⁶³ 5 U.S.C. § 603.

D. Paperwork Reduction Analysis

30. This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4).

E. Further Information

31. For further information, contact John A. Evanoff, Esq., of the Public Safety and Homeland Security Bureau, Policy and Licensing Division, at (202) 418-0848, or by email to john.evanoff@fcc.gov.

V. ORDERING CLAUSES

32. Accordingly, IT IS ORDERED, pursuant to Sections 1, 2, 4(i), 4(j), 301, 302, 303, 308, 309(j), and 332 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 154(j), 301, 302, 303, 308, 309(j), and 332, that this *Notice of Proposed Rulemaking* is hereby ADOPTED.

33. IT IS FURTHER ORDERED that NOTICE IS HEREBY GIVEN of the proposed regulatory changes described in this *Notice of Proposed Rulemaking* and that comment is sought on these proposals.

34. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Notice of Proposed Rulemaking*, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

**APPENDIX A
Proposed Rules**

Chapter 1 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

Part 90 – Private Land Mobile Radio Services

1. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7).

2. Section 90.203 is revised by amending paragraphs (i) and (j)(1) as follows:

(i) Equipment certificated after DATE and marketed for public safety operation in the 806–809/851–854 MHz bands must have the capability to be programmed for analog FM operation on the mutual aid channels as designated in §90.617(a)(1) of the rules.

(j) ***

(1) Applications for certification received on or after DATE, for mobile and portable transmitters designed to transmit voice on public safety frequencies in the 150–174 MHz band will be granted only if the mobile/portable equipment is capable of operating in the analog FM mode on the nationwide public safety interoperability calling channel in the 150–174 MHz band. (See §90.20(c),(d) of this part.) Applications for certification received on or after DATE, for mobile and portable transmitters designed to transmit voice on public safety frequencies in the 450–470 MHz band will be granted only if the mobile/portable equipment is capable of operating in the analog FM mode on the nationwide public safety interoperability calling channel in the 450–470 MHz band. (See §90.20(c),(d) of this part.)

3. Section 90.210 is revised by amending the Table to add footnote 6 to read as follows:

§ 90.210 Emission Masks.

Applicable Emission Masks

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
***	***	***
806-809/851-854 ⁶	B	H
***	***	***

⁶Transmitters utilizing analog emissions that are equipped with an audio low-pass filter must meet Emission Mask B. All transmitters utilizing digital emissions and those transmitters using analog emissions without an audio low-pass filter must meet emission mask H.

APPENDIX B

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),⁶⁴ the Commission prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this *Notice of Proposed Rulemaking (NPRM)*. Written public comments are requested on this IRFA. Comments must be filed by the same dates as listed on the first page of the *NPRM* and must have a separate and distinct heading designating them as responses to this IRFA. The Commission will send a copy of the *NPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).⁶⁵ In addition, the *NPRM* and IRFA (or summaries thereof) will be published in the *Federal Register*.⁶⁶

A. Need for, and Objectives of, the Proposed Rules

2. The *NPRM* is intended to determine whether it is in the public interest, convenience and necessity to amend the Part 90 rules for emission masks and interoperability in order to prevent interference and promote interoperable public safety communications.

B. Legal Basis

3. The proposed action is taken under Sections 1, 2, 4(i), 301, 303, 307, 309, 319, 324, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 301, 303, 307, 309, 319, 324, and 332.

C. Estimate of the Number of Small Entities To Which the Proposed Rules Will Apply

4. The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.⁶⁷ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁶⁸ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁶⁹ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.⁷⁰ Below, we describe and estimate the number of small entities that may be affected by the rules changes proposed in this *NPRM*.

5. *Private Land Mobile Radio Licensees*. PLMR systems serve an essential role in a range of industrial, business, land transportation, and public safety activities. These radios are used by companies

⁶⁴ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. §§ 601–612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

⁶⁵ See 5 U.S.C. § 603(a).

⁶⁶ *Id.*

⁶⁷ 5 U.S.C. § 603(b)(3).

⁶⁸ 5 U.S.C. § 601(6).

⁶⁹ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.” *Id.*

⁷⁰ Small Business Act, 15 U.S.C. § 632 (1996).

of all sizes operating in all U.S. business categories, and are often used in support of the licensee's primary (non-telecommunications) business operations. For the purpose of determining whether a licensee of a PLMR system is a small business as defined by the SBA, we use the broad census category, Wireless Telecommunications Carriers (except Satellite). This definition provides that a small entity is any such entity employing no more than 1,500 persons.⁷¹ The Commission does not require PLMR licensees to disclose information about number of employees, so the Commission does not have information that could be used to determine how many PLMR licensees constitute small entities under this definition. We note that PLMR licensees generally use the licensed facilities in support of other business activities, and therefore, it would also be helpful to assess PLMR licensees under the standards applied to the particular industry subsector to which the licensee belongs.⁷²

6. As of November 1, 2012, there were 1,185 PLMR licensees operating in the PLMR band between 806-809/851-854 MHz (NPSPAC band) and 686 PLMR licensees operating on the VHF and UHF public safety interoperability channels. We note that any entity engaged in a commercial activity is eligible to hold a PLMR license, and that any revised rules in this context could therefore potentially impact small entities covering a great variety of industries.

7. *RF Equipment Manufacturers*. The Census Bureau defines this category as follows: "This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment."⁷³ The SBA small business size standard for Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing is all such firms having 750 or fewer employees.⁷⁴ According to Census Bureau data for 2007, there were a total of 939 establishments in this category that operated for the entire year.⁷⁵ Of this total, 912 had employment of under 500, and an additional 10 had employment of 500 to 999.⁷⁶ Thus, under this size standard, the majority of firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

8. The *NPRM* proposes two rule changes that will affect reporting, recordkeeping and other compliance requirements. The *NPRM* proposes requiring digital technologies, including, but not limited to TETRA-based technologies, to (a) comply with Emission Mask H when operated on 800 MHz

⁷¹ See 13 C.F.R. § 121.201, NAICS code 517210.

⁷² See generally 13 C.F.R. § 121.201.

⁷³ U.S. Census Bureau, 2007 NAICS Definitions, "334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing"; <http://www.census.gov/econ/industry/def/d334220.htm>.

⁷⁴ See 13 C.F.R. §121.201, NAICS code 334220.

⁷⁵ U.S. Census Bureau, 2007 Economic Census, 2007 Economic Census of Island Areas, and 2007 Nonemployer Statistics; http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?_afpt=table. The number of "establishments" is a less helpful indicator of small business prevalence in this context than would be the number of "firms" or "companies," because the latter take into account the concept of common ownership or control. Any single physical location for an entity is an establishment, even though that location may be owned by a different establishment. Thus, the numbers given may reflect inflated numbers of businesses in this category, including the numbers of small businesses. In this category, the Census breaks-out data for firms or companies only to give the total number of such entities for 2007, which was 844. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?_afpt=table

⁷⁶ http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_31SG3&prodType=table. An additional 17 establishments had employment of 1,000 or more.

NPSPEC channels and (b) have analog FM capability on public safety mutual aid and interoperability frequencies. These digital technologies are spectrum-efficient, but have characteristics that differ from those in use when the Emission Mask rules were adopted and, hence, have a greater likelihood of causing adjacent-channel interference than the earlier technologies. Industry practice recognizes that (1) digitally-modulated signals must be certified under the H-Mask for use in public safety spectrum and (2) radios intended for use on mutual aid and interoperability channels must be capable of analog FM operation. We expect that large and small manufacturers already comply with these proposed regulations. However, to the extent some manufacturers do not already comply with these proposed regulations and industry standards, we expect that such manufacturers would refrain from marketing their equipment to public safety entities as being in compliance with the Commission's rules and ensure that their equipment performs consistent with these proposed regulations designed to prevent interference and preserve interoperability.

E. Steps Taken To Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

9. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof for small entities.⁷⁷ We have evaluated our proposals in this *NPRM* in the context of small business entities and find no alternatives, to the benefit of small entities, that would achieve our goals of interference avoidance and interoperability. Additionally, this *NPRM* proposes rules that are consistent with industry practice. Accordingly, we expect most manufacturers already comply with our proposed regulations, therefore minimizing any significant economic impact on small entities.

10. We hereby invite interested parties to address any or all of these regulatory alternatives and to suggest additional alternatives to minimize any significant economic impact on small entities. Any significant alternative presented in the comments will be considered.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules

11. None.

⁷⁷ 5 U.S.C. § 603(c)(1)-(4).

APPENDIX C
List of Commenters

I. Comments

Alcatel-Lucent
Harris Corp.
Motorola Solutions, Inc.
New Jersey Transit Corp.
Nielsen Communications, Inc.
PowerTrunk, Inc.

II. Reply Comments

Harris Corp.
National Public Safety Telecommunications Council (NPSTC)

III. *Ex Parte* Filings

Harris Corp. (Aug. 30, 2012)
TETRA + Critical Communications Association (“TCCA,” formerly known as the TETRA Association) (Aug. 1, 2012 and Aug. 3, 2012)
PowerTrunk, Inc. (Sept. 11, 2012)
PowerTrunk, Inc. (Sept. 21, 2012)
PowerTrunk, Inc. (Sept. 28, 2012)
PowerTrunk, Inc. (Oct. 1, 2012)
PowerTrunk, Inc. (Oct. 12, 2012)
PowerTrunk, Inc. (Apr. 23, 2013)