

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

In the Matter of)
)
WTB & OET Seek Comment on Ericsson Waiver) WT Docket No. 22-298
of Sections 27.53 and 2.947)
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ORDER

Adopted: February 22, 2023

Released: February 22, 2023

By the Mobility Division, Wireless Telecommunications Bureau:

I. INTRODUCTION

1. By this Order, the Wireless Telecommunications Bureau, Mobility Division, conditionally grants Ericsson’s request (Ericsson or Petitioner) for a waiver¹ of section 27.53(n) of the Commission’s rules governing out-of-band emissions (OOBE) in the 3.45 GHz Service.² Ericsson requests the waiver to allow it to manufacture, market, and sell a multiband base station radio—for use by wireless providers that hold licenses in the 3.45 and 3.7 GHz Services—that would exceed the 3.45 GHz Service OOBE limits in the 3.7-4.0 GHz frequency range.³ For the reasons discussed below, we grant Petitioner’s waiver request, subject to conditions outlined herein.

II. BACKGROUND

2. The 3.45 GHz Service, in the 3.45-3.55 GHz band (3.45 GHz band), together with the Citizens Broadband Radio Service, in the 3.55-3.7 GHz band (3.5 GHz band), and the 3.7 GHz Service, in the 3.7-4.2 GHz band (3.7 GHz band), offer wireless operators 530 megahertz of mid-band spectrum for next generation wireless services, including 5G.⁴ To ensure effective coexistence across these bands, the Commission adopted base station out-of-band emission (OOBE) limits for each of the three wireless services. These OOBE limits reflect the unique operational environment in and adjacent to each of the

¹ See Petition of Ericsson for Waiver, WT Docket No. 22-298 (filed Mar. 4, 2022) https://www.fcc.gov/ecfs/document/10808146788120/1 (Ericsson Petition).

² 47 CFR § 27.53(n). Ericsson also requested a conforming waiver of section 2.947(f) of the Commission’s rules for purposes of obtaining equipment certification. Ericsson Petition at 3; 47 CFR § 2.947(f). As discussed below, we find that a waiver of section 2.947(f) is unnecessary in this case.

³ See Ericsson Petition at 1. While Ericsson’s waiver request specified the 3.7-4.0 GHz frequency range, the 3.7 GHz Service—and its associated OOBE limits—are limited to the 3.7-3.98 GHz frequency range under the Commission’s rules. See 47 CFR §§ 27.4, 27.5(m), 27.53(l). Accordingly, this conditional waiver grant is limited to operations in the 3.7-3.98 GHz frequency range.

⁴ See Facilitating Shared Use in the 3100-3550 MHz Band, WT Docket No. 19-348, Second Report and Order, Order on Reconsideration, and Order of Proposed Modification, 36 FCC Rcd 5987, 5994 at para. 12 (2021) (3.45 GHz Second R&O); Expanding Flexible Use of the 3.7 to 4.2 GHz Band, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343 (2020) (establishing the 3.7 GHz Service in the 3.7-4.2 GHz band) (3.7 GHz R&O); Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015) (establishing the Citizens Broadband Radio Service in the 3.55-3.7 GHz band) (3.5 GHz R&O).

three bands.⁵ For all three services, the Commission required base stations to limit their conducted power to no greater than -13 dBm/MHz outside of their authorized channel(s).⁶ Base stations in the 3.45 GHz band are further required to limit their OOB to a conducted power level of no greater than -25 dBm/MHz below 3440 MHz and above 3560 MHz, and to a conducted power level of no greater than -40 dBm/MHz below 3430 MHz and above 3570 MHz.⁷ In the 3.5 GHz band, base stations are required to limit their OOB to -25 dBm/MHz beyond 10 megahertz from the edge of their authorized channel(s) and to -40 dBm/MHz below 3530 MHz and above 3720 MHz.⁸

3. Petitioner seeks a waiver of the 3.45 GHz band -40 dBm/MHz OOB limit in the 3.7-4.0 GHz range, as well as a conforming waiver of section 2.947(f) to permit equipment authorization in accordance with a higher emission limit than allowed by the rule.⁹ Petitioner seeks this relief so that it can manufacture, market, and sell a multiband radio to be used by wireless carriers holding licenses in the 3.45 and 3.7 GHz Services.¹⁰ Ericsson states its proposed multiband radio would be “capable of transmitting (i) in standalone 3.7 GHz spectrum or (ii) with carrier aggregation, in both the 3.7 and 3.45 GHz band simultaneously.”¹¹ According to Ericsson, when operated in carrier aggregation mode, the 3.45 GHz-3.55 GHz waveform generated by its base station will exceed the 3.45 GHz OOB limit in the 3.7-4.0 GHz range.¹² However, Petitioner represents that emissions from these operations will not exceed the -13 dBm/MHz emission limit required for base stations operated by licensees in the 3.7 GHz Service and, as such, will not increase the likelihood of harmful interference in the 3.7 GHz band.¹³ Finally, Petitioner represents that operation of its proposed radio, in both carrier aggregation mode and standalone 3.7 GHz Service mode, complies with the 3.45 GHz service OOB limits across the 3.5 GHz band, as well as below the 3.45 GHz band edge.¹⁴

4. On August 8, 2022, the Commission’s Wireless Telecommunications Bureau and Office of Engineering and Technology sought comment on the Petition.¹⁵ Mavenir Systems, Inc., AT&T Services, Inc., T-Mobile USA, Inc., United States Cellular Corporation, Samsung Electronics America, Qualcomm Incorporated, and Nokia filed comments in support of the Petition.¹⁶ The National Telecommunications and Information Administration (NTIA) also filed comments on behalf of the Federal Aviation Administration (FAA) expressing concerns that Petitioner’s proposal would increase

⁵ *3.45 GHz Second R&O* at 6016-19, paras. 79-87.

⁶ *Id.* at 6016-17, paras. 79-83; 47 CFR § 27.53(n)(1); *3.5 GHz R&O* at 4017, para. 184; 47 CFR § 96.41(e)(1); *3.7 GHz R&O* at 2470, para 343; 47 CFR § 27.53(l)(1).

⁷ *3.45 GHz Second R&O* at 6016-17, paras. 79-83; 47 CFR § 27.53(n)(1).

⁸ *3.5 GHz R&O* at 4017, para. 184; 47 CFR § 96.41(e)(1)-(2).

⁹ *Ericsson Petition* at 1, 3. See 47 CFR §§ 2.497(f), 27.53(n). The Commission’s “composite system” rule states that radio frequency devices that operate in multiple bands must meet the rules for each band. See 47 CFR § 2.947(f).

¹⁰ *Ericsson Petition* at 2.

¹¹ *Id.* at 2.

¹² *Id.* at 7.

¹³ *Id.* at 5-7.

¹⁴ *Id.* at 5-6.

¹⁵ *Wireless Telecommunications Bureau and Office of Engineering and Technology Seek Comment on Ericsson’s Waiver Request to Enable Multiband Devices for the 3.45 GHz and 3.7 GHz Services*, Public Notice, DA 22-834 (WTB/OET Aug. 8, 2022), 2022 WL 3339410.

¹⁶ See generally Nokia Comments; AT&T Services, Inc. Comments (*AT&T Comments*); T-Mobile USA, Inc. Comments (*T-Mobile Comments*); Samsung Electronics America Comments (*Samsung Comments*); United States Cellular Corporation Comments (*U.S. Cellular Comments*); Qualcomm Incorporated Comments; Mavenir Systems, Inc. Comments (*Mavenir Comments*).

OOBE levels in the 3.7 GHz band.¹⁷ NTIA later submitted a letter indicating that, after the original comments were filed, Ericsson provided sufficient information to confirm that its proposed radio will meet the spurious emission performance that Petitioner had demonstrated for 3.7 GHz Service devices into the 4.2-4.4 GHz band.¹⁸

III. DISCUSSION

5. Section 1.925(b)(3) of the Commission's rules states that the Commission may grant a waiver when either (i) "[t]he underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and that a grant of the requested waiver would be in the public interest," or (ii) "[i]n view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly burdensome or contrary to the public interest, or the applicant has no reasonable alternative."¹⁹ After consideration of the *Ericsson Petition* and the record in this proceeding, we find that Petitioner has satisfied the requirements of section 1.925(b)(3) and, accordingly, we grant Petitioner's request to waive section 27.53(n) of the Commission's rules subject to the conditions set forth below.

6. First, we find that, given the facts presented by Ericsson, the purpose of section 27.53(n) would not be served by its strict application in this case.²⁰ The purpose of section 27.53(n) is to ensure that 3.45 GHz devices effectively coexist with services operating in adjacent bands.²¹ As noted above, the rules governing the 3.7 GHz Service permit base station OOB of no greater than -13 dBm/MHz outside the 3.7-3.98 GHz frequency range.²² Petitioner asserts that its proposed radio will not exceed -13 dBm/MHz within the 3.7-4.0 GHz frequency range.²³ Petitioner has also provided diagrams and figures demonstrating that its proposed radio complies with the 3.45 GHz band OOB limits across the 3.5 GHz band, as well as below 3.45 GHz.²⁴ Commenters agree with Ericsson's assertions on both of these points,²⁵ and no commenters express concerns related to harmful interference with operations in the 3.45 GHz, 3.5 GHz, or 3.7 GHz bands. For those reasons, we find that conditionally granting Ericsson's petition is consistent with the purpose of section 27.53(n) of the Commission's rules.

7. We also find that granting Ericsson a conditional waiver would serve the public interest by helping to facilitate the deployment of multiband wireless services while ensuring that adjacent band operations are protected from harmful interference. In the *3.45 GHz Second R&O*, the Commission found that enabling carriers to pair spectrum in the 3.45 GHz band with other spectrum bands would serve the public interest by supporting investment, minimizing harmful interference, and aligning with international

¹⁷ National Telecommunications and Information Administration Comments.

¹⁸ Letter from Sandra Wright, IRAC Alternate Representative, Federal Aviation Administration, to Alan Frable, Chairman, Interdepartment Radio Advisory Committee National Telecommunications and Information Administration (Dec. 2, 2022) (filed by NTIA in WT Docket No. 22-298 on Dec. 12, 2022).

¹⁹ 47 CFR § 1.925(b)(3). While Petitioner requests relief under section 1.3, we note the waiver standard under section 1.3 is "virtually identical" to the waiver standard under section 1.925. See *Delta Radio Inc.*, Memorandum Opinion and Order, 18 FCC Rcd 16889, 16891, para. 7 (2003) (affirming Bureau-level waiver denial) (citing *BellSouth Corp. v. FCC*, 162 F.3d 1215, 1225 n.10 (D.C. Cir. 1999)).

²⁰ See 47 CFR § 1.925(b)(3)(i) (permitting waiver if the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and if waiver is in the public interest).

²¹ *3.45 GHz Second R&O* at 6016-17, paras. 80-81.

²² See 47 CFR § 27.53(l)(1).

²³ *Ericsson Petition* at 8.

²⁴ *Id.* at 5-7.

²⁵ *AT&T Comments* at 2-3; *T-Mobile Comments* at 4; *U.S. Cellular Comments* at 3; *Samsung Comments* at 2.

agreements.²⁶ Commenters assert that granting the *Ericsson Petition* will promote these public interest goals by making spectrum pairing more feasible.²⁷ Specifically, commenters claim that Petitioner's proposed radio will reduce tower loading by allowing carriers to pair both bands with a single radio.²⁸ Commenters also assert that lighter structural loading on towers increases the likelihood that carriers will be able to pair spectrum in the 3.45 GHz and 3.7 GHz Services from a single site, which increases the likelihood that carriers will pair spectrum in those bands at all.²⁹ Commenters also claim that spectrum pairing will broaden coverage and improve network performance.³⁰ We therefore find that conditionally granting the *Ericsson Petition* will advance the Commission's public interest goals without, as previously discussed, increasing the risk of harmful interference to services operating in adjacent bands.

8. We also conclude that the *Ericsson Petition* satisfies the second prong of section 1.925(b)(3). In this case, Ericsson presents unique factual circumstances and argues that applying section 27.53(n) to it would result in slower, more costly, and less logical deployment of 5G services in mid-band spectrum.³¹ Commenters agree and contend that applying section 27.53(n) in this case would require licensees in the 3.45 GHz and 3.7 GHz Services to lease more space on towers, as they would need to deploy separate radios for each band.³² These commenters assert that, since some towers may not have capacity for a second radio, carriers would otherwise need to lease separate tower sites to accommodate multiple base station radios in some circumstances.³³ Commenters also claim that these additional sites will lead to increased installation costs, historical and environmental reviews, and maintenance.³⁴ In addition, according to Ericsson and commenters, applying section 27.53(n) to these unique facts would raise the environmental impact from mobile networks by increasing raw material and energy consumption by carriers unable to combine equipment for the two bands.³⁵ No commenters opposed Ericsson's arguments or expressed concerns about harmful interference to other services in the 3 GHz bands. After consideration of the record, we find that, given the unique factual circumstances described by Ericsson, strict application of section 27.53(n) of the Commission's rules in this case would be contrary to the public interest.

9. In sum, we find that conditionally granting the *Ericsson Petition* will not undermine the policy of section 27.53(n) of the Commission's rules, and that conditional waiver is in the public interest. Specifically, Ericsson's waiver request is granted subject to the following conditions: (1) Petitioner's radio when operated in carrier aggregation mode across the 3.5 GHz and 3.7 GHz Services must comply with section 27.53(n)(1) of the Commission's rules in its entirety, except for the -25 dBm/MHz conducted power limit specified for emissions above 3560 MHz and the -40 dBm/MHz conducted power limit above

²⁶ 3.45 GHz Second R&O at 5995, para. 16

²⁷ See *AT&T Comments* at 1-2; *Mavenir Comments* at 1-2; *T-Mobile Comments* at 1-2.

²⁸ More radios result in increased tower loads, necessarily leading to less capacity. See *AT&T Comments* at 1-2. See also *Ericsson Petition* at 10 (noting that multiple radios will result in increasing the weight of equipment and associated space needed at a cell site); *Mavenir Comments* at 1-2 (noting that two radios increase size, weight, and cost).

²⁹ *AT&T Comments* at 2; *T-Mobile Comments* at 1-2.

³⁰ *Samsung Comments* at 3; *T-Mobile Comments* at 3-4.

³¹ *Ericsson Petition* at 10-12.

³² See *U.S. Cellular Comments* at 1-2; *T-Mobile Comments* at 3-4; *AT&T Comments* at 2.

³³ *Id.*

³⁴ *Mavenir Comments* at 1-2; *AT&T Comments* at 2.

³⁵ *Ericsson Petition* at 12; *T-Mobile Comments* at 1, 4.

3570 MHz,³⁶ as those limits apply throughout the 3.7 GHz band; (2) Petitioner's radio must comply with all Commission rules not specifically waived herein;³⁷ and (3) when operating as a standalone device in any particular band, the device must meet the technical rules, including OOB, for that band.³⁸ Prior to marketing the multiband base station described in its waiver request, Petitioner must submit its base station for testing and certification—and the base station must demonstrate compliance with the conditions of this waiver order during the testing and certification process—in accordance with part 2 of the Commission's rules.³⁹

10. For these reasons, we find it is in the public interest to conditionally grant Petitioner's request for a waiver of section 27.53(n) subject to the conditions described herein. Although Petitioner also requested a conforming waiver of section 2.947(f) of the Commission's rules, we find that a waiver of section 2.947(f) is unnecessary for Petitioner to obtain equipment certification pursuant to the conditionally waived OOB limits in section 27.53(n).⁴⁰

IV. ORDERING CLAUSES

11. Accordingly, IT IS ORDERED, pursuant to Section 4(i) of the Communications Act of 1934, as amended, 47 U.S.C. § 154(i), and section 1.925 of the Commission's rules, 47 CFR § 1.925, that the request filed by Ericsson for waiver of section 27.53(n) of the Commission's rules, 47 CFR § 27.53(n), is GRANTED to the extent described, and with the conditions specified herein, and that the request filed by Ericsson for waiver of section 2.947(f) of the Commission's rules, 47 CFR § 2.947(f) is DENIED.

12. This action is taken under delegated authority pursuant to sections 0.131 and 0.331 of the Commission's rules, 47 CFR §§ 0.131 and 0.331.

FEDERAL COMMUNICATIONS COMMISSION

Roger Noel
Chief, Mobility Division
Wireless Telecommunications Bureau

³⁶ 47 CFR § 27.53(n)(1) ("Notwithstanding the channel edge requirement of -13 dBm per megahertz, for base station operations in the 3450-3550 MHz band, the conducted power of any emission below 3440 MHz or above 3560 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3430 MHz or above 3570 MHz shall not exceed -40 dBm/MHz.").

³⁷ These rules include the other OOB limits referenced in this order. See 47 CFR § 27.53(l)(1), (n)(1)

³⁸ Although Petitioner represents that its proposed radio would not be capable of standalone 3.45 GHz operation (See *Ericsson Petition* at 5), this Waiver Order does not preclude such operation.

³⁹ See generally 47 CFR pt. 2.

⁴⁰ *Ericsson Petition* at 3; 47 CFR § 2.947(f).