

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the matter of)
2010 Biennial Review of Regulations) WT Docket No. 10–271
)

To: Chief, Wireless Telecommunications Bureau

REPLY COMMENTS

Ericsson Inc hereby submits Reply Comments in response to the Commission’s December 30 Public Notice¹ concerning the 2010 Biennial Review of Regulations in accordance with Section 11 of the Communications Act, 47 U.S.C. § 161.

I. INTRODUCTION

While the Commission’s Public Notice focused principally on data collection requirements, its biennial review must, under the statute, consider whether “meaningful competition among providers” makes “*any*” of its rules unnecessary, not only data collection rules.² As Verizon noted in its comments, the Commission’s biennial review should “relieve legacy providers of dominant carrier regulations where appropriate so that these providers can compete with other carriers on a level playing field, which benefits consumers.”³ In accordance with this obligation, the Commission has previously used its regulatory review process to “streamlin[e] and harmoniz[e]” its technical rules to “clarify spectrum rights and obligations . . . ,

¹ *Commission Seeks Public Comment in 2010 Biennial Review of Telecommunications Regulations; Announces Particular Focus on Data Collection Requirements*, CG Docket 10–266, EB Docket 10–267, IB Docket 10–268, ET Docket 10–269, PS Docket 10–270, WT Docket 10–271, WC Docket 10–272, *Public Notice*, FCC 10–204 (Dec. 30, 2010).

² 47 U.S.C. § 161(a)(2) (emphasis added).

³ Comments of Verizon and Verizon Wireless at 16 (filed Jan. 31, 2011).

optimize flexibility . . . , [and] encourage the development of new technologies and services that will benefit the public.”⁴

II. THE COMMISSION SHOULD HARMONIZE ITS OUT-OF-BAND EMISSION LIMITS FOR BROADBAND AND NARROWBAND TRANSMISSIONS

Ericsson urges the Commission to harmonize the out-of-band emission (“OOBE”) limits placed on broader vs. narrower broadband transmissions in the wireless services.⁵ Currently, the Commission’s OOBE limits for broadband services are based on a resolution bandwidth that depends on the technology used or carrier size, the result of which is to require wider-band broadband spectrum users to attenuate OOBE much more sharply than is the case for somewhat narrower-band spectrum users. The rule applies different OOBE limits to radio transmissions that have the same power spectral density, based solely on the carrier bandwidth of the technology. Ericsson recommends the use of a constant fixed OOBE attenuation for all licensed frequency blocks greater than 5 MHz.

As discussed below, this approach has significant public interest benefits: First, it will promote spectrum neutrality, rather than favoring particular competing technologies over others. Second, this approach will promote innovation and competition. Moreover, it will not result in increased interference for existing or adjacent licenses. It will also eliminate ambiguity with

⁴ *Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27 and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket 03–264, *Third Report and Order*, 23 F.C.C.R. 5319, 5321 (2008).

⁵ Ericsson has previously advocated similar measures in connection with the National Broadband Plan. *See, e.g.*, Comments of Ericsson Inc, GN Dockets 09–47, 09–51, 09–137, at 2-8 (filed Oct. 23, 2009); Comments of Ericsson Inc, GN Docket 09–51, at 17-18 (filed June 8, 2009); *see also* Comments of Ericsson Inc, WT Docket 10–123, at 6 n.18 (filed June 28, 2010).

respect to OOB limits on technology with the capability to simultaneously transmit multiple carriers in the same frequency block.

A. REVISING THE OOB RULES ENSURES THE COMMISSION'S RULES ARE APPLIED IN A TECHNOLOGY-NEUTRAL MANNER

Technology is evolving toward wider bandwidth utilization because these technologies, like Long Term Evolution (“LTE”), offer distinct performance and efficiency advantages that benefit consumers. For example, with LTE, licensees are able to support more bandwidth-intensive services and to provide more bandwidth to more users. However, the Commission’s current OOB rules inadvertently discriminate against broadband systems that use wider bandwidths because the emission limits are based on designated bandwidth. Although wider band technologies, such as LTE using frequency blocks of 10 MHz or greater, can still meet the Commission’s OOB rules, eliminating the designated bandwidth criteria promotes the technology neutral application of the Commission’s OOB rules.⁶

A prime example of the disparate effect of the Commission’s OOB rules on wider band technologies can be found in 47 C.F.R. § 27.43(h)(1), where the attenuation requirement is based on the designated bandwidth of the carrier.⁷ In practice, this rule requires wider band technologies to satisfy more stringent OOB requirements than narrower band technologies.

⁶ LTE can be deployed in a range of bandwidths from 1.4, 3, 5, 10, 15 to 20 MHz. LTE-Advanced can be deployed in bandwidths up to 100 MHz.

⁷ 47 C.F.R. § 27.53 (h)(1) provides:

- (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee’s frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.
- (1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission

(continued)

Existing OOB rules require the attenuation of emissions in the 1 MHz immediately outside and adjacent to the licensee's frequency block by $43 + 10 \log_{10}(P)$ dB, based on a resolution bandwidth equal to one percent of the emission bandwidth of the carrier. This results in an OOB limit of 43 dB below one watt, or -13 dBm, within that resolution bandwidth. Under the rule, a 5 MHz-sized block has a resolution bandwidth of 50 kHz (one percent of 5 MHz), a 10 MHz block has a resolution bandwidth of 100 kHz, and a 20 MHz-sized block has a resolution bandwidth of 200 kHz.

Because the OOB must be attenuated below a fixed level of -13 dBm within a resolution bandwidth that varies by emission bandwidth of the carrier, the amount of attenuation will be greater per unit of bandwidth — greater attenuation required for greater emission bandwidths. For example, a 5 MHz carrier requires attenuation of OOB in each 50 kHz to -13 dBm; thus, the total allowable OOB in any two 50 kHz segments (*i.e.*, 100 kHz) is 3 dB greater, or -10 dBm, and in four 50 kHz segments (*i.e.*, 200 kHz), -7 dBm. By contrast, a 10 MHz carrier, which requires a 100 kHz resolution bandwidth, is allowed only -13 dBm of OOB — *i.e.*, 3 dB more attenuation within that 100 kHz window than is required for 5 MHz bandwidth technology. Likewise, a 20 MHz carrier has a -13 dBm OOB limit in its 200 kHz resolution bandwidth, which represents 6 dB more attenuation than the 5 MHz technology is required to achieve within that same amount of spectrum. The following chart shows the permissible level of OOB within a given 50 kHz portion of the resolution bandwidth under the bandwidth-dependent OOB attenuation rule:

(footnote continued)

of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Carrier Bandwidth	1% Resolution Bandwidth	Attenuated OOB Limit in First Adjacent MHz
5 MHz	50 kHz	-13 dBm/50 kHz
10 MHz	100 kHz	-13 dBm/100 kHz = -16 dBm/50 kHz
20 MHz	200 kHz	-13 dBm/200 kHz = -19 dBm/50 kHz

For example, a single 20 MHz LTE carrier occupies the same amount of spectrum as four adjacent 5 MHz LTE carriers, with the same power spectral density, but it requires 6dB greater OOB attenuation within the adjacent one MHz of spectrum, even though the two deployment scenarios have the same RF occupancy characteristics.

In other words, the bandwidth-dependent OOB limit handicaps wider-band technologies and services and, in effect, favors the narrower-band technologies and services with which they compete. One approach to remedy the disparate impact of the current OOB rules on wider-band technologies is to remove the bandwidth-dependent resolution bandwidth in the OOB calculations and replace it with a constant resolution bandwidth. Ericsson recommends that the Commission establish a fixed OOB mask, based on the current 50 kHz resolution bandwidth for 5 MHz carriers, for technologies greater than 5 MHz, *i.e.*, -13 dBm/50 kHz in the one MHz immediately outside and adjacent to the licensed frequency block. In Ericsson’s view, changing the OOB rules in this way is the best way to respond to competition from wider-bandwidth services that has rendered the current rule obsolete.

The Commission should not impose additional emissions limits on the current and existing implementation of technologies using licensed frequency blocks smaller than 5 MHz. Any increase for narrowband technologies would have substantial negative impacts on the existing base of equipment and would unnecessarily compromise the integrity of existing systems like GSM and cdma2000. Instead, the OOB limits for these narrowband technologies should be grandfathered. The Commission, however, should remove the bandwidth dependency

of its OOB rules for all technologies greater than 5 MHz bandwidths in order to address the aspect of the rule that unfairly discriminates against higher bandwidth technologies.

B. REVISING THE OOB RULES SUPPORTS COMPETITION

Wider bandwidth technologies, such as LTE, enable network operators to accommodate more bits per Hertz (or, for that matter, Megabits per MegaHertz) — in fact, LTE can be deployed in a range of bandwidths from 1.4, 3, 5, 10, 15 to 20 MHz. As a result, they can more efficiently deliver the bandwidth-intensive mobile products and services that consumers increasingly demand. In this dynamic ecosystem, it is important that the Commission's rules not unduly delay or complicate the deployment of new technologies. Rather, the rules should be flexible enough to permit innovation and streamlined adoption of enhanced technologies. Changes such as the proposed modification to the OOB limits will further this goal and support the innovation that helps deliver more content-rich applications and services to U.S. consumers and makes it possible for newer, more advanced technologies to compete with current technologies without artificial and unnecessary constraints.

C. ELIMINATING THE BANDWIDTH DEPENDENCY IN THE OOB RULES DOES NOT CHANGE THE INTERFERENCE LANDSCAPE

The Commission can adopt Ericsson's proposed rule modification without adversely affecting existing or adjacent spectrum users. The current emissions limit for 5 MHz-carriers — *i.e.*, -13 dBm/50 kHz in the 1 MHz immediately outside and adjacent to the licensed frequency block — is already in place to protect adjacent users from harmful interference. There is no inherent reason for requiring licensees employing broader channel-width to have a significantly greater attenuation of OOB in the same adjacent 1 MHz of spectrum. The potential for interference in that adjacent space does not change because of the channel size utilized.

Therefore, there is no technical reason to impose a stricter attenuation requirement on wider-band technologies than the requirement imposed on narrower-band technologies.

D. REVISING THE OOB RULES SUPPORTS INNOVATION

The current OOB rules could divert investment in innovative technologies that promote more efficient and flexible use of spectrum, such as Multi-Standard Radio (“MSR”). MSRs permit several air interface technologies (e.g. LTE and GSM) to be simultaneously deployed in the same licensed frequency block of spectrum using the same equipment. The Commission’s current OOB rules based on “designated bandwidth” are not adaptable to MSR deployments since MSRs can simultaneously transmit multiple carriers with different bandwidths in the same licensed frequency block. An emissions limit based on “designated bandwidth” would be ambiguous with respect to MSR deployments because the existing rule assumes only a single carrier per licensed frequency block. Resolving how the existing rules would apply to MSRs, or other new technologies, can be a costly and time-consuming barrier to innovation. For this reason, Ericsson urges the Commission to revise its OOB rules based on fixed attenuation to ensure that the rules are flexible enough to keep pace with and support technology advancements.

CONCLUSION

Based on the foregoing, Ericsson respectfully recommends that the Commission restructure its technical rules concerning emissions limits requirements to remove the bandwidth dependency for technologies with bandwidths greater than 5 MHz and instead implement a fixed attenuation requirement based on -13 dBm/50 kHz in the one MHz immediately outside and adjacent to the licensed frequency block. This rule modification will respond to present and future competitive concerns by ensuring that the Commission’s rules are applied in a technology

neutral manner, especially with respect to wider band technologies. In addition, the rule modification will support innovation by enabling the flexibility to implement technologies such as MSR, which can transmit simultaneous carriers in a licensed frequency block, and will facilitate developments in carrier aggregation technology that will allow carriers to span multiple licensed frequency blocks. These innovations support the demand by U.S. consumers for feature-rich products and services. Moreover, the proposed rule change will not negatively impact existing narrowband systems because it will not impose additional emissions limits on the current and existing implementation of technologies using frequency blocks smaller than 5 MHz. In addition, adjacent licensees also will not be impacted by the Ericsson proposal, which will instead ensure that OOB rules are appropriately applied to technology advances that permit fuller and more efficient utilization of spectrum resources. For these reasons, the proposed change is in the public interest and we encourage the Commission to implement it as soon as practicable.

Respectfully submitted,

ERICSSON INC

/s/ Mark Racek
Mark Racek
Director, Spectrum Policy
Ericsson Inc
1634 I Street, N.W., Suite 600
Washington D.C. 20006-4083

Telephone: (202) 824-0110
Facsimile: (202) 783-2206

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