

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)
)
Expanding the Economic and Innovation) GN Docket No. 12-268
Opportunities of Spectrum Through Incentive)
Auctions)

PETITION FOR RECONSIDERATION OF GE HEALTHCARE

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I. INTRODUCTION AND SUMMARY

The Commission should re-evaluate and strengthen the rules reviewed in the *Second Order on Reconsideration* in this proceeding to protect Channel 37 Wireless Medical Telemetry Service (“WMTS”) operations from interference from adjacent band 600 MHz mobile base station operations. Due to the severe and wide-ranging negative consequences of interference to Channel 37 WMTS, the Commission’s expressed intent to use a worst-case (i.e. minimum coupling loss) analysis in evaluating separation between Channel 37 WMTS and 600 MHz band mobile base stations is appropriate, but its adopted separation rules are not, in fact, based on a worst-case analysis, as the Commission appears to believe.

Accordingly, the Commission’s separation analysis should be revised to use a significantly lower value for 600 MHz building penetration loss, as GE Healthcare’s (“GEHC”) field tests have demonstrated that the realistic worst-case building penetration loss value approaches 0 dB. The discrepancy between the GEHC field tests and the Commission’s assumption for building penetration loss significantly impacts computation of the separation distances required to prevent harmful interference from adjacent band mobile base stations to WMTS operations on Channel 37, such that these distances cannot reasonably be assumed to exist without requiring coordination.

II. ANY POTENTIAL INTERFERENCE TO SAFETY-OF-LIFE WMTS SHOULD BE WEIGHED HEAVILY IN DETERMINING FINAL SEPARATION RULES

In the event that the incentive auction recovers 84 MHz or more of total spectrum, 600 MHz mobile base station operations will be placed in the spectrum bands adjacent to Channel 37 WMTS with a guard band between the 600 MHz mobile base station operations and WMTS of

only 3 MHz.¹ This major change in the usage of the spectrum band immediately adjacent to WMTS requires a careful evaluation of the real-world interference risks created to these safety-of-life systems. Even the repacking of TV broadcasters into Channels 36 and 38 could have serious adverse effects on WMTS under these rules, especially given the lack of a coordination requirement.²

GEHC reminds the Commission that there is much more at stake in an accurate calibration of separation rules than simply the appeasement of a particular industry. WMTS is a life-saving technology that thousands of hospitals and patients rely on every day.³ Just one incident of interference could have dramatic, negative consequences for patient monitoring (including all fetal and most heart monitoring) throughout the country. Every effort should be made to mitigate these risks, including the establishment of robust interference protection rules.

III. THE DATA THE COMMISSION USED TO INFORM ITS SEPARATION RULES DID NOT REFLECT A WORST-CASE ANALYSIS

The Commission should re-evaluate its rules to protect Channel 37 WMTS from 600 MHz mobile base station operations in light of the fact that the data used for its separation analysis were not based on a worst-case, minimum coupling loss, scenario and did not reflect real-world testing of building penetration loss at hospitals. In its *Second Order on Reconsideration*, the Commission explained that its decisions on the rules needed to protect Channel 37 WMTS were supported by its own technical analysis, “based on protection criteria

¹ *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Second Order on Reconsideration, 30 FCC Rcd. 6746, 6796, ¶ 110 (rel. Jun. 19, 2015) (“*Second Order on Reconsideration*”).

² *Id.* at 6797, ¶ 110.

³ Comments of GE Healthcare, GN Docket No. 12-268, at 6 (Jan. 25, 2013) (“*GEHC NPRM Comments*”).

GEHC provided in its comments.”⁴ Although the Commission rightly revised its technical analyses to account for earlier errors in its application of GEHC’s technical data,⁵ significant material errors remain.

In particular—and most alarmingly—the Commission indicated in the *Second Order on Reconsideration* that its separation distance rules were based on a “worst case analysis,”⁶ but misapplied values that GEHC had stated were “intended only to illustrate examples of typical scenarios under which that interference could occur and *not* as an absolute worst-case analysis.”⁷ One assumption in the Commission’s analysis that significantly underestimated the potential for interference was the value assumed for hospital building penetration loss. The interference analysis presented in the *GEHC NPRM Comments* included a value of 20 dB for building penetration loss.⁸ However, GEHC deliberately chose that value not as a worst-case value, but in order to demonstrate that interference could occur even where substantial building penetration loss was present. In its *Petition for Reconsideration* GEHC explicitly highlighted the fact that there would be situations where building penetration loss would be far less than 20 dB: “Other factors could also vary from those used in the GEHC analysis—in particular building penetration loss could be less than 20 dB”⁹ At least one relevant path loss model suggests a value of 7 dB even for the *mean* building penetration loss, considerably lower than the *minimum* value used in the Commission’s interference analysis.¹⁰ Furthermore, as detailed below, recent

⁴ *Second Order on Reconsideration*, 30 FCC Rcd. at 6797, ¶ 111.

⁵ *Id.* at 6797, ¶ 113.

⁶ *Id.* at 6800, ¶ 119.

⁷ *Petition for Reconsideration of GE Healthcare*, GN Docket No. 12-268, at 14, note 44 (Sep. 15, 2014) (emphasis in original) (“*GEHC Petition for Reconsideration*”); *see also id.* at 2 (“The assumptions contained in GEHC’s Technical Analysis reflected ‘real world’ conditions, rather than the ‘worst case’ scenarios used to determine the separation distances needed to prevent harmful interference.”).

⁸ *GEHC NPRM Comments*, at Technical Appendix, 42.

⁹ *GEHC Petition for Reconsideration*, at 14, note 44.

¹⁰ *See* Juha Meinilä et al., *D5.3:Winner+ Final Channel Models* 61 (2010), available at

measurements conducted by GEHC and the WMTS Coalition at actual hospitals demonstrate building penetration losses approaching 0 dB.

Clearly, 20 dB of building loss is not a worst-case value and should not have been used by the Commission as part of its minimum coupling loss analysis. Furthermore, the Commission's claim that the "*vast majority* of WMTS stations will not suffer any detrimental effects from the installation of new 600 MHz base stations"¹¹ reveals a lack of understanding of the catastrophic consequences that could result from *any* interference to WMTS. It is not enough for the Commission to "encourage new 600 MHz licensees to be cognizant of the presence of WMTS facilities when designing their networks."¹² Self-regulation can often work, but the risks inherent in any interference to safety-of-life WMTS require that there be no room for new 600 MHz mobile base station licensees to make a mistake. Finally, though it is true that technical solutions to interference problems can often be developed, and in theory "manufacturers could design their equipment to provide sufficient protection from adjacent channel interference,"¹³ thousands of hospitals and patients are relying at present on *existing* WMTS equipment to function without harmful interference. It would be economically prohibitive and impractical for WMTS equipment manufacturers and hospitals to harden such a large installed base to the specifications required and any such hardening would likely reduce significantly the spectrum capacity available for WMTS.

http://projects.celtic-initiative.org/WINNER+/WINNER+%20Deliverables/D5.3_v1.0.pdf; citing R.F. Rudd, *Building penetration loss for slant-paths at L-, S-and C-band*, ICAP 2003, 590 (2003), available at <http://www.aegis-systems.co.uk/download/article/ieeicap1.pdf>. See also Letter from Neal Seidl & Matthew Pekarske, GE Healthcare, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-268, at 3, note 12 (filed Mar. 7, 2014).

¹¹ *Second Order on Reconsideration*, 30 FCC Rcd. at 6800, ¶ 119 (emphasis added).

¹² *Id.*

¹³ *Id.* at 6801, ¶ 121.

IV. FIELD TESTING SHOWS THAT MUCH STRICTER SEPARATION REQUIREMENTS WILL BE NEEDED TO PROTECT CHANNEL 37 WMTS FROM HARMFUL INTERFERENCE

Field testing conducted by GEHC and the WMTS Coalition shows that 600 MHz signals operating at the technical specifications adopted in the *Second Order on Reconsideration* can have widely variable building penetration loss values that are often much lower than the Commission's estimate.¹⁴ Such high variability in building penetration loss underscores the need for the Commission to revise its separation and coordination requirements for 600 MHz mobile base stations. Most building loss values measured in the field tests were below 20 dB, and the worst case value, as measured, was 0.23 dB.¹⁵ As the Commission has stated, the 600 MHz band is well-suited for building penetration.¹⁶ Thus, the Commission's analysis should be modified to reflect realistic worst-case values for this variable.¹⁷

Moreover, although the GEHC and WMTS Coalition field tests measured building penetration from a single source antenna, there will undoubtedly be multiple LTE base stations in the vicinity of a single hospital, magnifying the risk of harmful interference. Even after field testing, it is difficult to establish an accurate range of path loss values for hospitals due to the enormous variation in hospital building architecture and construction and placement of WMTS

¹⁴ Comsearch, *Radio Frequency Measurement Report: 608-614 MHz WMTS Frequency Band*, WMTS Coalition (Apr. 2015) ("*Comsearch Field Test Report*"); Matthew R. Pekarske, *Wireless Medical Telemetry Service ("WMTS") / Television White Space ("TVWS") Test Results: Summary for Froedtert Community Memorial Hospital*, GE Healthcare (July 1, 2015) ("*GEHC Field Test Report*").

¹⁵ *Comsearch Field Test Report*, at 102. See Letter from Lawrence J. Movshin & Timothy J. Cooney, Counsel to the WMTS Coalition, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-268, at 2 (filed July 20, 2015).

¹⁶ *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd. 6567, 6685, ¶ 271 (rel. June 2, 2014) ("Finally, spectrum in the 600 MHz frequency range has excellent propagation characteristics that allow signals to reach farther and penetrate walls and other structures")

¹⁷ The Commission's consideration of facts from these field tests is appropriate under 47 C.F.R. § 1.429(b)(2) because the facts were unknown to GEHC until after its last opportunity to present them and GEHC could not have learned of these facts until careful field tests were completed; and under § 1.429(b)(3), it is in the public interest to consider these facts due to the risk of serious harm from interference in safety-of-life WMTS.

equipment within hospital environments. However, these field tests together provide a case study that better approximates a realistic worst-case scenario for—and prove the invalidity of—the Commission’s interference analysis of Channel 37 WMTS interference.

Coordination rules could provide an alternative to the significant increase in separation distance that is necessary to avoid interference in the observed worst-case scenario. As a model for such light touch coordination, the Commission could turn to its existing requirements for coordination of Wireless Communications Services (“WCS”) licensees with Aeronautical Mobile Telemetry (“AMT”) receive operators in the 2.3 GHz band.¹⁸

V. CONCLUSION

Due to the significant risks of hospital building penetration by 600 MHz signals, as reflected by GEHC’s and the WMTS Coalition’s real-world testing, the Commission should modify its 600 MHz mobile base station separation and coordination rules, as discussed above, to protect Channel 37 WMTS operations from interference.

¹⁸ 47 C.F.R. § 27.73; *see Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band*, Report and Order and Second Report and Order, 25 FCC Rcd. 11710, 11786-87, ¶ 185 (rel. May 20, 2010).