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March 31, 2015

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Room TWA325
Washington, DC 20554

Re: ET Docket No. 14-165, *Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37*

GN Docket No. 12-268, *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*

Dear Ms. Dortch:

On March 30, 2015, Orrin Marcella, Manager of Government Relations, GE Healthcare Americas; Tom Peters of Hogan Lovells US LLP; and the undersigned, Counsel to GE Healthcare, met with Louis Peraertz, Senior Legal Advisor to Commissioner Mignon Clyburn.

During the meeting, the parties discussed the attached slide presentation[1] and why the Commission should:

- Correct the calculations used to derive, and accordingly enlarge, the separation distances proposed in the *Part 15 NPRM* to protect Wireless Medical Telemetry Service ("WMTS") operations on Channel 37 from harmful interference;[2]

[1] *See* Appendix A.

[2] *See Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37 et al.*, Notice of Proposed Rulemaking, 29 FCC Rcd 12248, ¶¶ 109-15 (2014) ("*Part 15 NPRM*").

- Require geolocation databases to consider hospital and unlicensed device heights when calculating "location;"

- Initially allow only fixed unlicensed devices to operate in Channel 37 once technical standards are developed that are shown to fully protect WMTS;

- Require manufacturers of geolocation database software and unlicensed devices to follow rigorous quality assurance standards throughout the relevant product life cycles; and

- Establish and require unlicensed device manufacturers to comply with a comprehensive system of quality regulations that span device life cycles.

Consistent with Section 1.206(b)(2) of the Commission's rules, please associate this letter with the above-referenced dockets.

Respectfully submitted,

/s/ Ari Q. Fitzgerald
Ari Q. Fitzgerald
Counsel to GE Healthcare

Attachment

cc: Louis Peraertz

Appendix A

Impact of Unlicensed Operations on WMTS Use in TV Channel 37

Presentation to the FCC

March 30, 2015

ET Docket No. 14-165
GN Docket No. 12-268

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Agenda

1. FCC's Proposed Separation Distances
2. GEHC's Field Tests
3. Interference's Impact on WMTS
4. A More Nuanced Approach
5. Database Dependability
6. Personal-Portable Devices
7. Proposed Solutions

The Proposed Separation Distances Are Insufficient to Protect WMTS

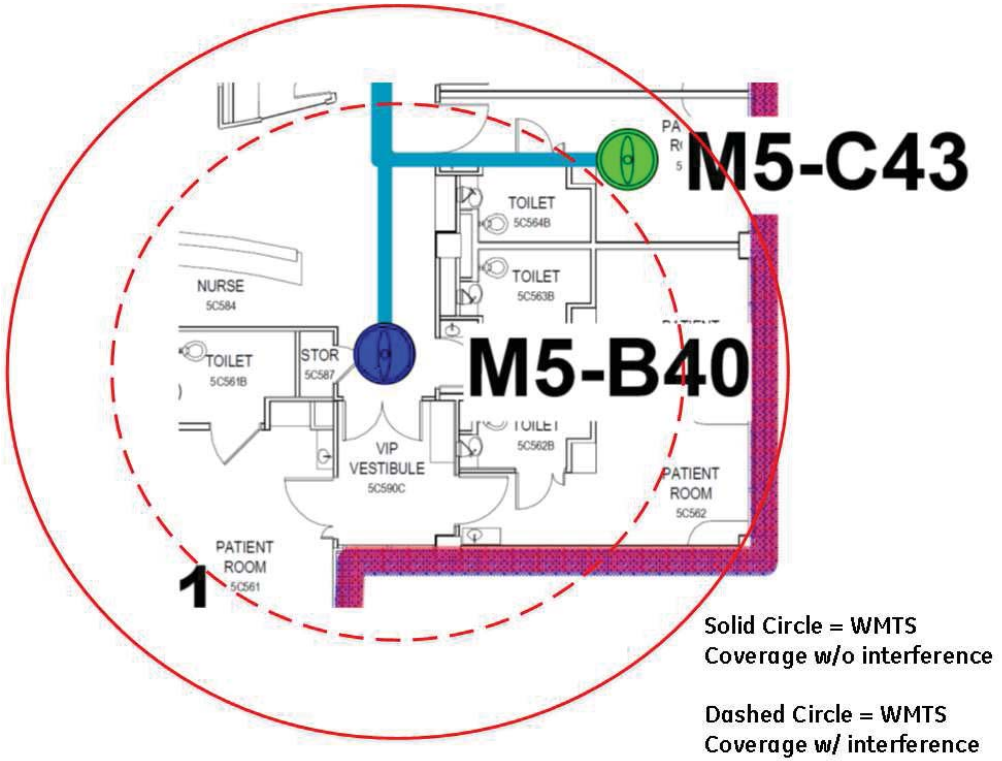
- A mathematical error has caused the FCC to assume that WMTS facilities can tolerate 17.8 dB more interference than they actually can.
  - The *Incentive Auction R&O* states: 20 mV/m/MHz = 20,000 µV/m/MHz = 2,000 µV/m/100kHz = 66 dBµV/m/100 kHz.
  - However, the proper way to scale to one tenth the bandwidth in the linear domain is to divide by the square root of 10, which yields a field strength of 6,324.6 µV/m/100 kHz and the correct value of 76 dBµV/m/100 kHz.
  - The FCC appears to have made the same error in the *Part 15 NPRM*.
- The TM 91-1 model and the F(50,50) curves used by the FCC are both inappropriate for calculating separation distances between Part 15 transmitters and WMTS facilities; free space (Longley-Rice model) propagation should be assumed instead.
- If corrections are made, standard separation distances between WMTS facilities and 4 watt Part 15 transmitters would be much greater.

GEHC Field Tests Confirm that WMTS Will Not Be Protected from Harmful Interference Under the NPRM Proposal

- Path loss between the test location and hospital approached free space loss and did not match the TM 91-1 model or the F(50,50) curves.
- In some cases, the interfering signal needed to be reduced by up to 9 dB to avoid electrocardiogram ("ECG") waveform dropout or completely missing arrhythmia events.
- Interference effects would have been even more severe if:
  - Multiple interferers were simulated;
  - WMTS transmitters were positioned at the outer limit of the WMTS coverage area;
  - The test equipment had supported the FCC's proposed allowable antenna height; or
  - Antenna diversity had been disabled.

How Interference Impacts WMTS Coverage

- WMTS sites are designed to operate without interference.
- When interference is present, it raises the noise floor.
- In turn, the raised noise floor reduces WMTS coverage.



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A More Nuanced Interference Mitigation Approach May Be Appropriate in Some Cases

- An interference mitigation approach that considers specific device-to-site propagation (such as terrain and building features) could help to better tailor separation distances in some instances.

- Default separation distances based on free-space calculations should otherwise apply.

- Any expenses incurred through a more nuanced approach by WMTS operators or a WMTS coordinator should be reimbursable.

Serious Concerns Remain About the Geo-location Databases' Dependability

- Separation distances, no matter how large, will not be effective unless dependably enforced.
- Beyond just the databases, overall system complexity and dependence on device software creates many vulnerabilities and failure opportunities.
- Software is inherently unreliable without rigorous assurance mechanisms throughout the lifecycle.
- The FCC's existing device certification regime is inadequate to assure reliable and secure operation of critical functionality in device software – devices can be expected to both be hacked and simply malfunction to inappropriately operate on Channel 37.

Unlicensed Personal-Portable Devices Should Not Be Allowed in Channel 37

- The FCC has limited experience using geolocation databases with unlicensed fixed devices and no experience whatsoever using them with personal-portable devices. Currently, only nine devices, all fixed, from only six manufacturers are certified to operate in the U.S.
- Given the amount of people who pass through hospitals each day, unlicensed personal-portable devices would inevitably be brought into hospitals and near WMTS systems with regularity.
- Neither technology solutions nor other means are currently available to mitigate the additional risk posed by personal-portable devices.

Ways to Mitigate the Risk of Harmful Interference

- Correct the separation distances:
  1. Fix the 17.8 dB mathematical error; and
  2. Use the free-space (Longley-Rice) path loss model to account for line-of-sight scenarios.
- Require geolocation databases to consider hospital and unlicensed device heights when calculating "location."
- Once technical standards are developed that are shown to fully protect WMTS, initially allow only fixed unlicensed devices to operate in Channel 37.

Ways to Mitigate the Risk of Harmful Interference (cont'd)

- Require manufacturers of geolocation database software and unlicensed devices to follow rigorous quality assurance standards (*e.g.*, IEC 62304) throughout product life cycles.
- Establish and require unlicensed device manufacturers to comply with a comprehensive system of quality regulations that span the device life cycle (similar to those used for medical devices), including:
    - Preproduction design controls;
    - Supplier controls;
    - Production and process controls;
    - Servicing and installation controls;
    - Corrective and preventative actions;
    - Post market surveillance;
    - Device traceability;
    - Recalls and field corrections; and
    - Compliance audits.