Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)
	)
Part 95, Medical Body Area Network	)
(MBAN) Measurement Procedure	)
	)

COMMENTS OF GE HEALTHCARE

GE Healthcare ("GEHC")[1] hereby submits these comments in response to the October 15, 2015 Draft Publications Report ("Draft Report") released by the Federal Communications Commission's ("FCC") Office of Engineering and Technology ("OET") Laboratory Division.[2] The Draft Report proposes guidance on the electromagnetic compatibility ("EMC") and frequency coordination requirements in the FCC's rules for Medical Body Area Network ("MBAN") devices.[3]

The Draft Report promises to be an excellent resource that will aid equipment manufacturers as they develop and certify MBAN-enabled devices. However, as explained below, modifying the Draft Report's unwanted radiation measurement guidance in three ways will help enable the most efficient use of the 2360-2400 MHz band while ensuring that primary users and adjacent band technologies are adequately protected. First, changing the resolution bandwidth ("RBW") setting to 100 kHz will help detect spurious energy and free additional

[1] GEHC is a unit of General Electric Company and provides a broad range of products and services that enable healthcare providers to better diagnose and treat diseases and medical conditions, including products and services that incorporate wireless technology.

[2] *See Medical Body Area Network (MBAN) Measurement Procedures*, Draft Laboratory Division Publications Report, 670572 D01 MBAN v01 (OET, rel. Oct. 15, 2015) ("Draft Report"), *available at* https://apps.fcc.gov/eas/comments/GetPublishedDocument.html?id=395&tn=433449.

[3] *See id.*

spectrum for MBAN use. Second, including appropriate RBW filter roll-off specifications for test equipment will help ensure consistent measurements. Third, using center frequencies that take into account the width of the RBW will help avoid measuring in-band MBAN signals. In addition, GEHC notes that we are coordinating with other stakeholders and anticipate addressing in a subsequent filing what the phrase "automatically cease" should mean in the context of Section 95.628 of the FCC's rules.

Section 95.635(d) – RBW Setting. The Draft Report specifies that the maximum power measured within 2.5 MHz of the 2360-2400 MHz band's edges (*i.e.*, 2357.5-2360 MHz and 2400-2402.5 MHz) must be at least 20 dB below the maximum power in-band using an RBW equal to 1 MHz.[4] The RBW setting of 1 MHz is likely inappropriate for narrowband MBAN transmissions, such as those with Guassian frequency-shift keying ("GFSK") or IEEE 802.15.6 compliant Pi/4-DQPSK modulation, when MBAN sensors operate within 2 MHz of the lower and upper portions of the 2360-2400 MHz band as compared to the out-of-band emissions requirement in Section 15.247(d) of the FCC's rules, which uses an RBW equal to 100 kHz.[5] The wider RBW captures more energy and results in a 20 dBc limit violation for narrowband MBAN signals at up to 3 MHz away from the 2360-2400 MHz band's edges (see **Figure 1**). If a 100 kHz RBW were used instead, the measurement sensitivity for detecting spurious energy would be improved, and narrowband MBAN systems would be able to reclaim an additional 2

[4] *See* Draft Report at 8; *see also* 47 C.F.R. 95.635(d).

[5] *See Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under § 15.247*, 558074 D01 DTS Meas Guidance v03r03, at 15 (OET, rel. June 9, 2015), *available at* https://apps.fcc.gov/kdb/GetAttachment.html?id=3XsS0%2BYw%2Bws2IrS%2FleXRtw%3D%3D&desc=558074%20D01%20DTS%20Meas%20Guidance%20v03r03&tracking_number=21124 ("The DTS rules specify that in **any 100 kHz bandwidth outside** of the authorized frequency band, the power shall be attenuated according to the following conditions . . . then the peak output power measured **in any 100 kHz bandwidth outside of the authorized frequency band** shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.") (emphasis added).

MHz of spectrum for use by operating 1 MHz closer to both edges of the 2360-2400 MHz band (see **Figure 2**).

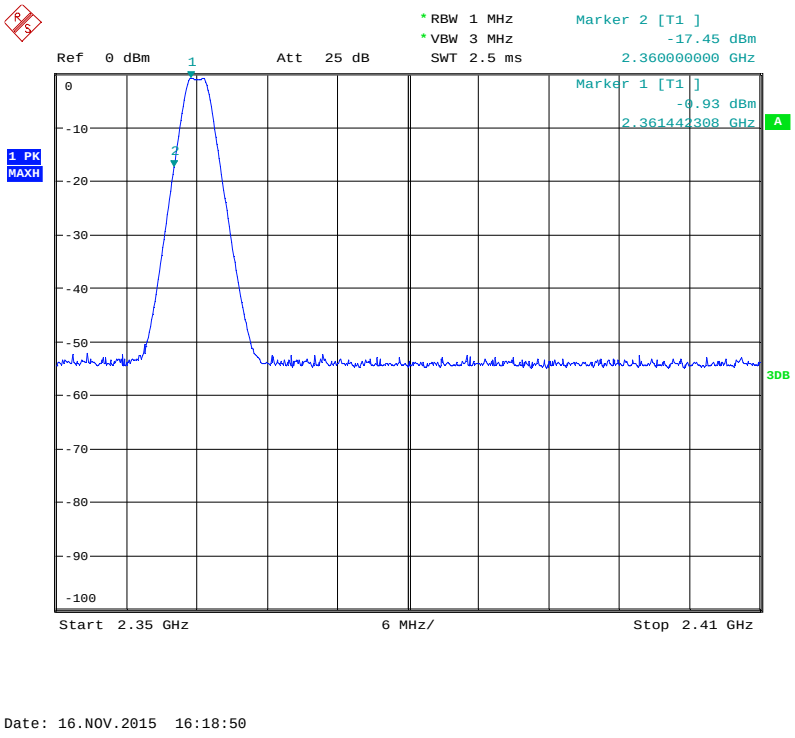

Figure 1: RBW = 1 MHz

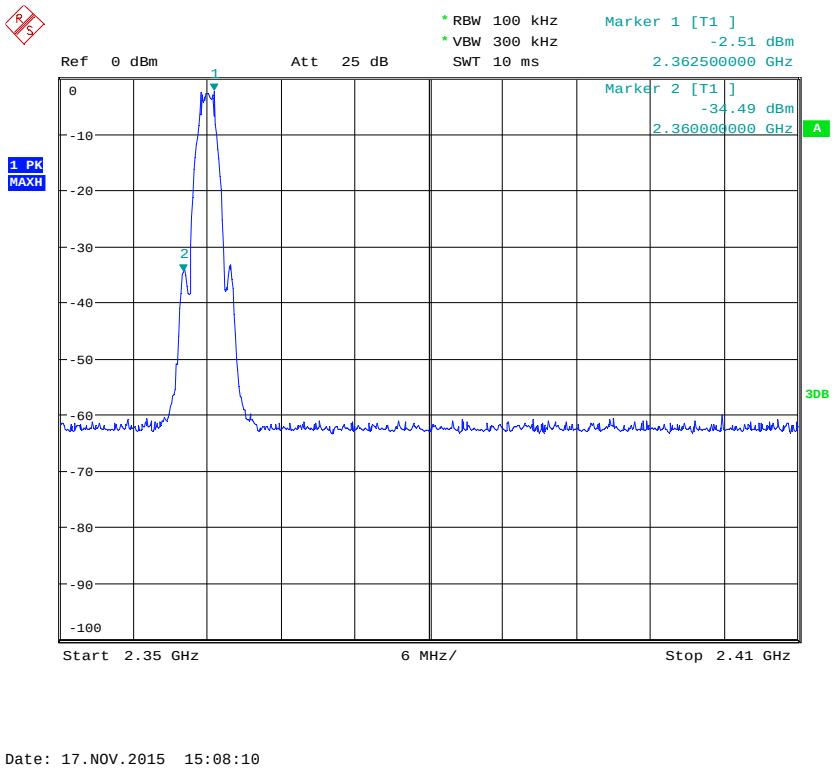

Figure 2: RBW = 100 kHz

Section 95.635(d) – Test Equipment Specifications. The Draft Report's unwanted radiation measurement guidance should include RBW filter roll-off specifications for the test equipment that perform these measurements. The roll-off for a 1 MHz RBW filter (*i.e.*, shape factor) can vary by several dB across equipment makes and models, which could further affect an MBAN system's ability to comply with the FCC's rules. **Figure 3** and **Figure 4** demonstrate a difference of 4.78 dB in two models' measurements of the same generated MBAN signal.

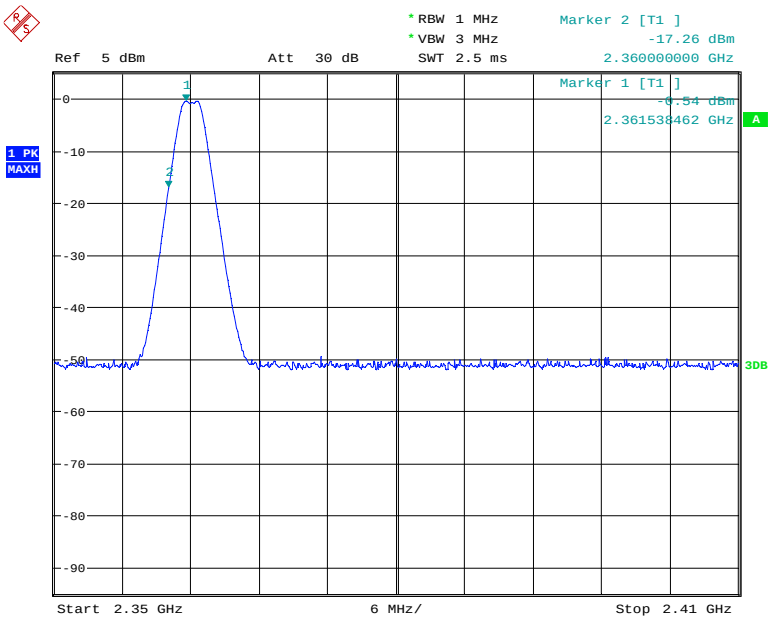

Figure 3: FSUP Measurement

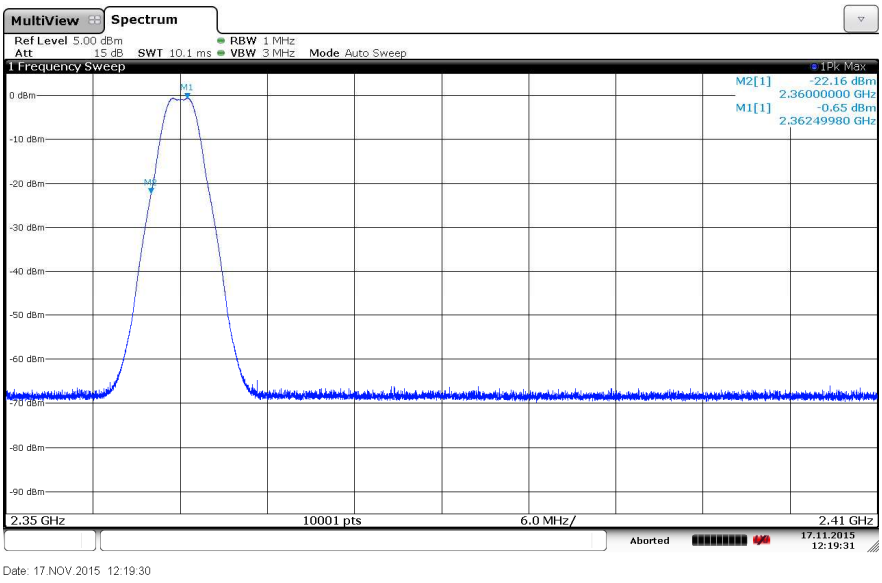

Figure 4: FSW Measurement

Section 95.635(d) – Center Frequency. The Draft Report's unwanted radiation measurement guidance should use center frequencies that take into account the width of the RBW to avoid measuring in-band MBAN signals. Centering the 1 MHz RBW on 2360 MHz (as

indicated in Step "m") or 2400 MHz (as indicated in Step "u") would measure 500 kHz of the in-band MBAN signal, which would distort the "out-of-band" measurement by including in-band energy.[6] Instead, the Draft Report should use 2359.5 MHz (2360 MHz – 0.5 MHz of RBW) and 2400.5 MHz (2400 MHz + 0.5 MHz of RBW) as the center frequencies.

Section 95.628 – Frequency Coordination. The Draft Report states that Section 95.628 of the FCC's rules requires an MBAN transmitter to "automatically cease" operation in the 2360-2390 MHz band if it does not receive a control message permitting such operation.[7] We are currently engaged in a discussion regarding what "automatically cease" should mean in this context with the Aerospace and Flight Test Radio Coordinating Council ("AFTRCC") and other relevant stakeholders. We anticipate addressing this issue in a subsequent filing.

Conclusion. For the reasons discussed above, GEHC proposes the following changes to the Draft Report's guidance on unwanted radiation measurement: (1) change the RBW setting to 100 kHz; (2) account for RBW filter roll-off in the test equipment specifications; and (3) use 2359.5 MHz and 2400.5 MHz as the center frequencies.

[6] *See* Draft Report at 8.

[7] *See* Draft Report at 5; *see also* 47 C.F.R. § 95.628.

Respectfully submitted,

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