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	)	

To: The Commission:

COMMENTS OF PHILIPS HEALTHCARE

Philips Healthcare submits these comments to address issues in the *Notice of Proposed Rulemaking* in the above-referenced proceeding[1] that relate to the existing spectrum allocation at 608-614 MHz ("channel 37") for the Wireless Medical Telemetry Service ("WMTS") that is shared with the Radio Astronomy Service ("RAS") on a co-primary basis. Channel 37 is employed for wireless medical telemetry devices in healthcare institutions throughout the country and its continued availability is essential for patient monitoring and related transmissions to ensure the highest quality of care in hospitals. Philips Healthcare therefore urges the Commission to ensure both that this spectrum remains available for WMTS, and that its use for WMTS is not impaired by new co-channel or adjacent channel stations.

Background

WMTS devices used for wireless patient monitor transmissions are an essential ingredient in improving patient outcomes and lowering healthcare costs. Philips is one of the largest suppliers of medical equipment in the United States and a world leader in patient monitoring equipment. Headquartered in Andover, Massachusetts, Philips Healthcare delivers

[1] 27 FCC Rcd 12357 (2012) ("NPRM" or "Notice").

solutions that acquire, analyze, and present patient data in ways that are meaningful for clinicians in the most challenging clinical areas. Philips provides clinical informatics and patient care solutions that help improve and save lives, lower the overall cost of healthcare, and simplify clinician workflow.

The 608-614 MHz Spectrum Must be Maintained for WMTS

Philips Healthcare strongly supports the Commission's preferred bandplan that preserves continued WMTS use of the 608-614 MHz spectrum. The primary bandplan proposed by the FCC achieves the best outcome in an elegant spectrum-efficient manner that benefits multiple users by employing the channel 37 spectrum as part of the buffer between uplink and downlink blocks. This achieves the goal of more spectrum for wireless entities while avoiding disruption and unnecessary relocation costs for WMTS and RAS. Additional spectrum would be made available to wireless entities with a buffer while WMTS and RAS uses would be preserved.

Relocating current WMTS devices to nearby channels (such as channel 32) is not feasible because fixed filtering designed into WMTS channel 37 systems prevent their being easily re-tuned to other spectrum. Even a relatively short move to a nearby UHF channel would require redesign and replacement to an extent similar to that which would be necessary to relocate outside of the UHF band altogether. Relocation outside of 608-614 MHz therefore would require substantial redesign and replacement.

The WMTS bands at 1395-1400 MHz and 1427-1432 MHz alone have insufficient capacity to accommodate the needs of many larger hospitals and hospitals in dense urban areas. The Commission restricted the spectrum available to WMTS at 1.4 GHz band to only 7.5 MHz.[2] It is not feasible to fit some of the technologies used in WMTS channel 37 systems into the 1.4

[2] Philips long has advocated that the Commission permit more efficient use of the 1.427-1.432 MHz band to expand its capacity to accommodate WMTS devices. *See, e.g.*, Philips Healthcare Systems, Comments and Reply Comments in WP Docket No. 07-100 (filed May 14, 2010 and June 1, 2010, respectively).

GHz spectrum without expanding the 1.4 GHz allocation. Ultimately, vendors that have solutions only useable in channel 37 would be required to re-design their systems for the 1.4 GHz band, and the rush to 1.4 GHz would result in unacceptable congestion. In addition, some of the technologies employed at 608-614 MHz are incompatible with intense use of 1.4 GHz.

Philips recognizes that some broadcasters and wireless entities have expressed concern with the proposed bandplan for reasons unrelated to continued use of channel 37 for WMTS and RAS. The resolution of such concerns could affect preservation of the channel for WMTS and RAS. As submitted in detail by the WMTS Coalition in its filing,[3] attempting to move the hundreds of thousands of WMTS devices operating in the channel 37 spectrum would disrupt operations in hospitals and entail several billions of dollars in expenses.[4] We urge the Commission to preserve the channel 37 allocation to WMTS and RAS in any bandplan it may adopt. Doing so will avoid tremendous disruption and unnecessary cost to healthcare providers.

The 608-614 MHz spectrum has Irreplaceable Characteristics for WMTS

There are specific types of monitoring possible only in the sub-1 GHz range. It is critical that these capabilities continue to be available to patients at the lowest possible cost. Fetal/Obstetric monitoring, for example, must be done through water and is an important part of the birthing process. The physical medium attenuates radio signals above 1 GHz too much for a system operating at higher frequencies to be viable. Such monitoring must be accomplished below 1 GHz, and the 608-614 MHz spectrum is ideal for this purpose.

[3] *See* Initial Comments of the WMTS Coalition (filed Jan. 25, 2013). Philips Healthcare is a member of the WMTS Coalition and supports their filing. In this separate submission we focus on and amplify issues of paramount concern to Philips.
[4] *Id.*

Unlicensed Devices Are Incompatible with WMTS

The capability of a transmitting device to disrupt the communication of another device depends upon proximity between the two devices as much or more than actual output or radiated power. Thus it would be extremely inadvisable to authorize new unlicensed devices to operate co-channel to medical devices within the 608-614 MHz band. No matter what power unlicensed devices might utilize, there is no doubt that patients and hospital visitors bringing uncontrolled co-channel transmitting devices into close proximity to wireless monitors would disrupt wireless monitor transmissions. This would be a totally unnecessary and unacceptable risk. Given the total bandwidth of the channels outside the 608-614 MHz WMTS band that might be used, authorizing unlicensed devices co-channel to WMTS devices would border on the reckless.

Stations in Adjacent Channels Pose Risks to WMTS

New high-power operations in adjacent spectrum also would pose substantial risks to hospital WMTS systems unless out-of-band emissions are carefully regulated and separation distances observed.

Contrary to the Commission's suggestion that DTV stations do not interfere with WMTS operations,[5] Channel 37 in fact is highly compromised when next to one or more DTV broadcast stations. Hospitals located near a DTV station transmitting antenna typically find that more than 20 percent of the WMTS band is unusable. WMTS providers essentially use part of the Channel 37 spectrum as a guard band. This is the case even where filtering is applied in the WMTS distributed antenna networks. Hospitals are unlikely to have these protective filters if they are not next to a nearby TV station operating on either channel 36 or 38, so protection from new high-power adjacent channel operations must be considered.

[5] *See* Notice, *supra* note 1, at ¶ 191.

Hospital distributed antenna networks incorporate active antenna and line amplifiers to reduce the effect of RF cabling losses. Reciprocal mixing and spurious signals are created from near proximity to adjacent channel transmissions, the severity of which depends upon the power received by the WMTS device.

The wireless medical technology deployed in channel 37 typically is designed using Narrow Band Frequency Modulation (NBFM) with 25 kHz channel spacing and unidirectional transmission. These NBFM systems require continuous spectrum access and typically have weak protection against interference -- usually only forward error correction and no reverse channel to support data retransmission. Many systems employ wideband distributed active antenna systems that are susceptible to reciprocal mixing of signals. Increasing adjacent users will produce greater interference to these channel 37 systems.

Specifically, the noise floor in channel 37 will increase from reciprocal mixing signals from LTE or other types of transmissions on adjacent channels. The WMTS systems were designed in an era when there were only a limited number of active TV stations in the geographic area. Therefore carefully-considered OOBE protection for adjacent channel transmitters will be mandatory to ensure safe operation of WMTS channel 37 devices.

Protection of WMTS channel 37 from fixed high power downlink stations requires that sufficient separation distance be maintained from transmission sources. Keeping the powers received by the WMTS devices to <-43dBm in 10KHz or 100dBuV/120KHz at the input to WMTS antenna ports avoids the problem of interference through reciprocal mixing in the WMTS networks. For a typical LTE high power station, for example, a separation distance of 500 meters would be sufficient for protection if the downlink is outside WMTS channel 37.

Similarly, keeping the uplink above TV channel 41 should protect systems that do not have channel 37 filters.

Accordingly, as a starting point, Philips proposes that the spectral mask already defined in the Commission's Rules at 47 CFR § 15.709(c)(4) for TV white space devices be applied to transmitters operating on channels adjacent to WMTS channel 37. The adopted TV white space mask is defined below:

Frequency (MHz)	Field Strength dBμV/meter/120 kHz @ 1 meter
602 - 607	120 – 5[F(MHz) – 620]
607 - 608	95
608 - 614	30
614 - 615	95
615 - 620	10 – 5[620 – F(MHz)

Furthermore, the Commission's Rules at 47 CFR §§ 15.707(a) and 15.712(f)(2) should be adopted to protect WMTS channel 37 devices from the new transmitters proposed to be deployed in the TV spectrum.

This proposal can be illustrated by an example consisting of a 100mW LTE device inside a hospital, an LTE downlink located 500 meters from the healthcare facility, and the healthcare facility not having deployed additional WMTS channel 37 filters in its distributed antenna system. In such a case, adequate performance protection should be obtained with the 100mW LTE uplink located within 6 to 9 meters of the WMTS antenna, *provided* that the device is operating above 638 MHz. Under these circumstances this should provide adequate performance protection to WMTS.

For a hospital configured with a typical 608-614 MHz filter, to protect a channel 37 WMTS device from fixed high power downlink stations, sufficient distance separation would

have to be maintained. If the high power downlink station in this example is assumed to be emitting power at 43dBm EIRP, a 500 meter distance separation is estimated to be sufficient to keep the downlink level <100dBuV/m/ at 1 meter in 120 kHz into WMTS receiving antenna, where the downlink is outside WMTS channel 37. This takes into account that WMTS receivers are deployed indoors with some protection provided by the hospital building structure. A distance separation mechanism as adopted for TV white space devices similarly could be managed by coordination and access to an electronic database.

Conclusion

Continued access to channel 37 WMTS systems serves the public interest by expanding healthcare effectiveness and efficiency in an era when healthcare costs are of critical importance. Particularly with regard to fetal monitoring, channel 37 spectrum is optimal due to the physical constraints discussed above. We should not burden hospitals with uncertainty and additional costs. The new spectrum allocations being considered in this proceeding can and should be designed to avoid impacting this critical service.

Respectfully Submitted,

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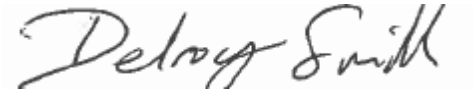

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