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May 8, 2002

The Honorable Michael Powell
Chairman
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Dear Mr. Chairman:

The American Hospital Association (AHA) takes great pride in our cooperative effort with the FCC that has resulted in the development of the Wireless Medical Telemetry Service (the "WMTS"). For more than four years, all during your tenure on the Commission, we have worked with the Commission's staff, other governmental agencies, our member hospitals, manufacturers of wireless telemetry equipment, trade associations representing other land mobile and broadcast interests, and even other potential claimants to the radio spectrum, to ensure that critical patient needs are met with reliable, spectrally efficient wireless telemetry systems that are generally free from harmful interference. The Commission is about to vote on another significant element of that effort in WT Docket No. 02-08, the service rules that govern the use of bands adjacent to the WMTS allocated spectrum. I am therefore writing to urge your careful review of that item to ensure that the benefits achieved by your support for a viable WMTS will not be undermined by the adoption of service rules for non-WMTS licensees that fail to adequately protect the WMTS spectrum from interference from adjacent channel users.

The allocation for WMTS has been considered in three separate proceedings, and has required a substantial commitment of both private and public sector resources. The creation of the WMTS has required compromises from all sectors. But we have never compromised our commitment to patient health and safety. The AHA Task Force has received consistent assurances from the Commission in each separate rulemaking that the spectrum allocated for wireless medical telemetry would generally be protected from the types of co-channel and adjacent channel interference that were suffered in the past, and that led to the effort to set aside *dedicated* spectrum and create a licensed service for these systems. Even in the Notice of Proposed Rulemaking in Docket No. 02-08 (at paragraph 56), the Commission reiterated that "parties should comment on AHA's proposals as they relate to protecting WMTS from harmful interference . . . taking into consideration the importance of reliable medical telemetry operations to the public and the need for particularly conservative interference analyses."

In Docket No. 02-08 the Commission will finalize service rules that will govern the non-WMTS use of the 1.4 GHz band. This band includes the 1427-1432 MHz band in which the AHA has reached a carefully balanced compromise (resulting in a reduction in WMTS dedicated spectrum

in this band) with representatives of the utility telemetry sector, for a cooperative sharing of the band throughout the country. A key element of that compromise was the development of technical rules – and a reasonable expectation that adjacent channel use of the band would be sufficiently restricted by such technical regulations – that should protect WMTS licensees from interference. I want to assure you that the AHA Task Force is satisfied that these regulations can be imposed on non-WMTS licensees without significantly compromising the Commission's "flexible use" spectrum allocation policies. Moreover, we believe that any impact such restrictions may have on the use of the non-WMTS allocation is fully justified by the resulting protection of patients from any threat of interference while they are being monitored in health care facilities.

WT Docket No. 02-08 covers many subjects, and I anticipate that the final order in this proceeding will be complex. Nevertheless, knowing your personal interest and participation in the development of the WMTS, I ask that you carefully review the recommendations of the Commission's staff on this issue and urge such changes as may be required to meet the public interest. I am hopeful that you share our view that the benefits of a vigorous and viable WMTS should not be undone by the adoption of technical regulations governing the use of adjacent bands which fail to adequately protect the WMTS spectrum from interference from adjacent channel users.

I am attaching a letter from the AHA Task Force counsel, which provides more technical discussion of these issues. We appreciate the Commission's consideration of patient needs during this important effort to achieve an effective Wireless Medical Telemetry Service.

Sincerely,

Rick Pollack
Executive Vice President

cc: Commission Kathleen Q. Abernathy
Commissioner Michael J. Copps
Commissioner Kevin J. Martin
Thomas Sugrue, Chief, Wireless Telecommunications Bureau
D'Wana Terry, Division Chief, Public Safety and Private Wireless Division
Edmond J. Thomas, Chief, Office of Engineering and Technology
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May 8, 2002

**VIA HAND DELIVERY**

Mr. Thomas J. Sugrue
Chief, Wireless Telecommunications Bureau
Federal Communications Commission
445 - 12th Street, S.W.
Washington, D.C. 20554

Re: *Ex Parte Presentation*
*American Hospital Association Task Force*
*On Medical Telemetry*
*WT Docket No. 02-08*

Dear Mr. Sugrue:

On behalf of the American Hospital Association Task Force on Medical Telemetry (the "AHA Task Force"), this letter is submitted to clarify and confirm the AHA Task Force's position in the above-referenced rulemaking proceeding. We focus here specifically on the technical requirements that should be imposed on Telemetry Service licensees operating in the 1427-1432 MHz band in order to assure interference-free operation of systems in the Wireless Medical Telemetry Service ("WMTS").

The record in this proceeding overwhelmingly supports the adoption of technical service rules in this band that are consistent with the AHA Task Force proposals– including a strong preference to limit non-WMTS telemetry to fixed operations (with only limited, ancillary mobile uses allowed). Simply stated, when the Commission asked (at paragraph 56 of the NPRM) for "comment on AHA's proposals as they relate to protecting WMTS from harmful interference . . . taking into consideration the importance of reliable medical telemetry operations to the public and the need for *particularly conservative* interference analyses," (emphasis supplied) not a single commenter suggested that less stringent limits were appropriate for the non-WMTS portion of this spectrum in meeting this objective (and some manufacturers suggested that the limits should be even tighter). As more fully discussed below, any less conservative approach is

almost certain to adversely impact the full utilization of the WMTS allocation and the significant public benefits for which it was intended.

As a threshold matter, it must be emphasized that as part of the AHA-Itron band re-allocation proposal for the 1427-1432 MHz band (submitted as part of the AHA Task Force's comments in ET Docket No. 00-221), the AHA Task Force agreed to support a 0.5 MHz reduction of the WMTS allocation in order to maximize the efficient use of the band between WMTS and Utility Telemetry. **The fundamental underpinning of its support for the reduction in available bandwidth was the expectation that the use of the adjacent spectrum would be appropriately restricted to fixed uses operating at controlled power so that no "guard band" of spectrum would be needed in designing WMTS receivers in order to protect WMTS systems from interference.** The restrictions on utility telemetry envisioned in the AHA-Itron agreement were all intended to protect any well-designed WMTS system from interference caused by a utility telemetry system, while not unreasonably restricting the utility telemetry system's capabilities.

Two different problems were addressed in this regard: (a) the potential for interference from high power "out of band" (i.e., out of the WMTS operating band) signals causing WMTS receiver blocking; and (b) the potential for low power "in band" signals jamming specific WMTS channels (either by non-WMTS transmitters near geographic "band-flip" borders or by secondary non-WMTS transmitters):

A. Preventing out of band interference from blocking sensitive WMTS receivers.

The most significant concern to the AHA Task Force in this proceeding is the development of technical regulations for the non-WMTS adjacent channels that will protect the WMTS spectrum from interference. To achieve this goal, the total out-of-band interference power into the WMTS receiver's LNA (low noise amplifier) must be kept below –45dBm; otherwise the receiver may block, and *all* WMTS channels on that receiver will be lost.

This is not a problem that can be easily or efficiently fixed through WMTS design. The nature of WMTS use requires that the power of the WMTS transmitters must be very low, often less than one milliwatt. As the AHA Task Force has noted in many of its earlier submissions to the Commission, one of the broadest uses of wireless monitors is to allow patients to ambulate as soon as possible in their recovery, even if they require continuous monitoring. Such early ambulation is recognized as improving patient outcome. The WMTS transceivers must therefore be capable of continually transmitting real-time critical patient parameters and waveforms without frequent battery changes,

thus requiring relatively little battery drain from any transmission. In addition, WMTS transceivers must be sufficiently light in weight to allow seriously ill patients to easily wear or carry them. And because WMTS transceivers often are worn in direct contact with the patient's body for extended periods of time, RF energy exposure and power levels must be minimized.

Because the signals from the WMTS transmitter are so low in power, WMTS systems rely significantly on high receiver sensitivity to reliably receive data from the low power transmitters. This sensitivity necessarily leaves WMTS receivers susceptible to degradation from higher powered transmitters, particularly those operating in immediately adjacent bands. Such interfering signals simply cannot be filtered out without affecting the receiver's ability to receive the desired in-band WMTS signal. The onus must therefore be placed on licensees of the adjacent spectrum to operate under sufficiently restrictive technical limitations that can assure that WMTS licensees will not be subject to interference from out of band emissions. In this instance, that means restrictions on mobile operations.

The practically realizable limits on surface acoustic wave ("SAW") filters in the 1.4 GHz range result in about 10 MHz on either side of the WMTS primary band being attenuated by less than 10dB. Building insertion loss, i.e. attenuation from a plane wave impinging on a hospital to the lowest loss antenna feed, is often no more than 3dB for vertically polarized signals in the 1.4 GHz range. Thus, the impinging field strength in the adjacent bands at the hospital perimeter must be limited to about 80 mV/m (equivalent to -45 dBm into the receiver).

The following table indicates the worst case range (assuming 1/r^2 path loss) for a given transmitter power to reach 80mV/m.

| Transmitter power (EIRP) | Range |
|---|---|
| 25 mW | 36 feet |
| 1W | 226 feet |
| 10W | 714 feet |
| 100W | 2257 ft |

In developing technical limits for the adjacent services, it is appropriate to assume that a hospital will be responsible for reasonably controlling access for non-WMTS transmitters to within 36 feet of a WMTS receiver antenna. Therefore, a limit of 25mW

EIRP for mobile transmitters operating in an adjacent band can be reasonably presumed to be non-interfering with a WMTS system.

The AHA Task Force did, however, agree with Itron that Utility Telemetry users could operate mobiles on a limited basis with somewhat higher powers in spectrum that was not immediately adjacent to the WMTS bands. It was anticipated that the "out of band" emissions suggested by Itron and accepted by the AHA Task Force would be measured over any 1 MHz with an averaging detector *at the interference site,* i.e., anywhere along the perimeter of the healthcare facility. No less significantly, Itron further agreed with the AHA Task Force that any mobile transmitter operating above 25 mW EIRP would have to include some form of geographically-based power control which would automatically limit the power of the mobile transmitter back to a non-interfering level if the mobile transmitter was approaching a WMTS facility with which it might interfere at its authorized level.

It must be emphasized that this limited support for mobile operations in the adjacent band assumed that such use would be restricted to Utility Telemetry applications. The AHA Task Force believed that close coordination with the few Utility Telemetry licensees that might operate in any given area (and whose charter has a similar commitment to public safety and the avoidance of interference) would be possible, and certainly not unduly burdensome. It is simply not realistic to presume that the Commission will be able to enforce on the much larger pool of general Telemetry Service licensees a requirement to insert the appropriate power-limiting controls into all mobiles in use in this band or otherwise limit mobile use within an appropriate distance from hospitals in a fashion that will assure interference-free operation of life saving WMTS systems. For this reason, the AHA Task Force generally opposes any mobile operations in the non-WMTS spectrum adjacent to the WMTS allocation. However, if mobile operations are to be permitted in this band, then the power levels for non-WMTS telemetry mobile operations must be limited to no more than 25 mW in the entire 1427-1432 MHz band.

B. Preventing in-band interference from systems operating on a primary basis in adjacent geographic areas jamming specific WMTS channels also operating on a primary basis in the neighboring areas.

Assuming that the Commission adopts the "band flip" proposed by the AHA Task Force and Itron to protect incumbent licensees currently operating in the 1427-1429 MHz

band[1], there will be some non-WMTS transmitters operating on a primary basis in the 1427-1429 MHz band and in relatively close geographic proximity to WMTS systems operating on a primary basis in essentially the same spectrum. In these instances, a tolerable interference power at the perimeter of the hospital is on the order of 150uV/m (or -97dBm into a 0dBi antenna, less building penetration losses which, to accommodate the ambulatory nature of the use of wireless telemetry in health care facilities, cannot be counted on to be consistently greater than 3dB). It should be noted that under some circumstances a 150uV/m signal at the hospital can still cause interference on individual WMTS channels, though it should not produce the catastrophic effects of receiver blocking as described in A) above.

Any non-WMTS telemetry transmitter operating in a WMTS primary band – whether it is operating on a primary basis in an adjacent geographic area covered by the "band flip" or on a secondary basis in the WMTS primary areas -- must therefore meet this field strength limit. Unless line of sight propagation can be conclusively ruled out, non-WMTS telemetry transmitters will need to be kept at quite a distance from any WMTS sites in order to avoid this "in-band" interference. For example, a 1W EIRP transmitter still has a field strength exceeding 150 uV/m at a distance of more than 20 miles if a line of sight exists[2]; similarly, a 25 mW EIRP transmitter, e.g. a mobile telemeter, still reaches 150 uV/m at a distance of 3.6 miles. In other words, a telemetry transmitter could very easily exceed 150uV/m in the WMTS primary spectrum if the non-WMTS telemetry transmitter is across the boundary of one of the "band flip zones" from the hospital. This clearly mandates very close design coordination of the non-WMTS licensees operating in or around the geographic boundaries of the band-flipped areas with the WMTS data base coordinator to avoid such potential interference scenarios.

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[1] The AHA Task Force has supported the "band flip" only if the flipped frequencies conform to the AHA/Itron proposal. Since the band flip is designed only to allow the existing incumbents to continue operating in the 1427-1429 MHz band, there is no reason to adopt a band flip that goes beyond this accommodation. Indeed, if the AHA/Itron band flip proposal – which would allocate the 1429-1431.5 MHz band to WMTS in the designated "band flip" areas – is not adopted, then the WMTS will be highly prejudiced in its ability to use the spectrum in the band flipped areas, with virtually no benefit for the incumbent licensees who are not currently utilizing the 1429-1429.5 MHz band in any event.

[2] The actual number is 22.8 miles – if the height above ground of the telemetry transmitter plus the height above ground of the WMTS receiver, i.e. the highest floor of the hospital, sum to more than 400 feet, then the line of sight will clear the Earth's curvature.

All of the restrictions described above are designed to protect against interference to WMTS from other authorized users of the 1.4 GHz spectrum. The prevention of sporadic interference to medical telemetry operations was a principal reason why the Commission created the WMTS less than two years ago and allocated spectrum in the 1.4 GHz band for its future expansion. Because it will be virtually impossible to assure the controlled use of mobile operations in the band by a large universe of potential eligibles, the AHA Task Force is particularly concerned about the potential for such sporadic interference to exist on a regular basis. With a broad class of eligible licensees, it will likely be impossible to trace interference to a particular licensee's mobile transmitter, making interference resolution a difficult task.

Given the nature of the uses for which WMTS equipment is designed – including the monitoring of critically ill patients – hospitals will not tolerate even the possibility of ongoing instances of objectionable interference, even sporadic interference. If the interference is caused by a mobile in an adjacent band (for example, a delivery truck driving onto a hospital campus), typically the mobile is gone before the source of interference can be identified. Just one or two instances of this type will cause the hospital to lose confidence in the WMTS equipment in a particular band, even if a patient is not adversely affected in that particular instance. Equally significant, even hospitals that have not experienced interference from mobiles may decline to use equipment in a particular band if it is generally perceived within the clinical community that interference from mobile telemetry transmitters is a real possibility.

It is critical to the success of the WMTS, therefore, that appropriate technical limitations are imposed on the use of the adjacent non-WMTS spectrum. Whether the Telemetry Service allocation remains open to more general eligibility or is limited to Utility Telemetry, the technical service rules proposed in the AHA Task Force Comments in this proceeding and in ET Docket No. 00-221, supplemented by the Comments of General Electric Medical Systems Information Technologies and Philips Medical Systems, remain the most appropriate proposal for achieving these objectives. As noted therein, if eligibility for the Telemetry Service is not limited to utilities, it would be best if mobile operations were entirely prohibited; at the very least, mobile operations must be effectively restricted near any health care facilities to power levels no greater than 25 mW in the non-WMTS portion of the 1427-1432 MHz band.

Please contact the undersigned if you have any questions.

Very truly yours,

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cc: Ms. D'Wana R. Terry, Chief
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