Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: FCC Notice of Proposed Rulemaking MBANS Spectrum Allocation

Date Submitted: July 13, 2009

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References: IEEE P802.15-08-0108-01 / 0254-02 / 0491-00 / 0537-01 / 0761-01-0006

Abstract: This presentation provides an overview of the FCC's NPRM seeking comment on allocating spectrum and establishing service and technical rules for operation of Medical Body Area Network (MBAN) systems using body sensor devices.

Purpose: To inform TG6 of the FCC's NPRM and call for expression of support.

FCC Notice of Proposed Rulemaking for Medical Body Area Networks (MBANS) Spectrum Allocation

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Agenda

- FCC Notice of Proposed Rulemaking (NPRM)
  - Importance to 802.15 TG6
  - Summary of NPRM questions
- Call for action
  - Engaging 802.18 TAG
- Discussion and Motion

FCC adopted a NPRM for MBAN spectrum allocation on June 29, 2009

"This Notice reflects our [FCC's] continuing desire to foster the availability and use of advanced medical devices using wireless technologies, which, in turn, should help to improve the health and well-being of the American public. "

"Given the significant health care benefits offered by MBAN systems, we tentatively conclude that providing spectrum for MBAN operations would serve the public interest. We believe that fostering the development of MBAN technologies would afford significant benefits in terms of the improved quality of health care for all Americans."

NEWS

Federal Communications Commission
445 12th Street, S.W.
Washington, D. C. 20554

News Media Information 202 / 418-0500
Internet: http://www.fcc.gov
TTY: 1-888-835-5322

This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action. See MCI v. FCC. 515 F 2d 385 (D.C. Circ 1974).

FOR IMMEDIATE RELEASE:
June 29, 2009

NEWS MEDIA CONTACT:
Bruce Romano: 202-418-2124

FCC SEEKS COMMENT ON PROVIDING SPECTRUM FOR MEDICAL BODY AREA NETWORKS
(ET Docket No. 08-59)

Washington, D.C. – The Federal Communications Commission (FCC) today adopted a Notice of Proposed Rulemaking that seeks comment on allocating spectrum and establishing service and technical rules for the operation of Medical Body Area Networks.

Medical Body Area Networks – or "MBANs" – could be used to create wireless body sensor networks around individual patients to monitor an array of physiological data – such as temperature, pulse, blood glucose level, blood pressure, respiratory function and a variety of other physiological metrics. MBAN systems would primarily be used in health care facilities, with the potential also of being used in other patient care/monitoring circumstances. Unlike traditional medical telemetry systems which rely on separate uncoordinated links for each physiological function being monitored, MBAN systems could serve to wirelessly monitor all of the desired data of a single patient, which could then be aggregated and wirelessly transmitted to a remote location for evaluation.

Using MBAN systems to eliminate much of the wired cables that typically connect patients to monitoring equipment and to facilitate the aggregation and transfer of physiological data will offer several clinical benefits – including improved patient mobility and comfort, reduced risks of infection, reduced clinical errors, and reduced patient monitoring costs.

Reference: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-291783A1.pdf

FCC's NPRM for MBANS spectrum allocation represents a tremendous opportunity for 802.15 TG6 to achieve its requirements for coexistence and noninterference for medical applications

The future of MBANS NPRM requires the support of health care providers, researchers, medical device manufacturers, industry groups, international standards organizations and the general public.

802.15.6 PAR defines need for reliable links for medical body area devices

5.2 Scope: This is a standard for short range, wireless communication in the vicinity of, or inside, a human body (but not limited to humans). It can use existing ISM bands as well as frequency bands approved by national medical and/or regulatory authorities. Support for Quality of Service (QoS), extremely low power, and data rates up to 10 Mbps is required **while simultaneously complying with strict non-interference guidelines where needed**. This standard considers effects on portable antennas due to the presence of a person (varying with male, female, skinny, heavy, etc.), radiation pattern shaping to minimize SAR* into the body, and changes in characteristics as a result of the user motions. *SAR (Specific Absorption Rate) measured in (W/kg) = (J/kg/s). SAR is regulated, with limits for local exposure (Head) of: in US: 1.6 W/kg in 1 gram and in EU: 2 W/kg in 10 gram. This limits the transmit (TX) power in US < 1.6 mW and in EU < 20 mW.

5.4 Purpose: The purpose is to provide an international standard for a short range (ie about human body range), low power and **highly reliable wireless communication** for use in close proximity to, or inside, a human body. Data rates, typically up to 10Mbps, can be offered to satisfy an evolutionary set of entertainment and **healthcare services**. Current Personal Area Networks (PANs) do not meet the medical (proximity to human tissue) and relevant communication regulations for some application environments. They also do not support the **combination of reliability (QoS), low power, data rate and noninterference** required to broadly address the breadth of body area network applications.

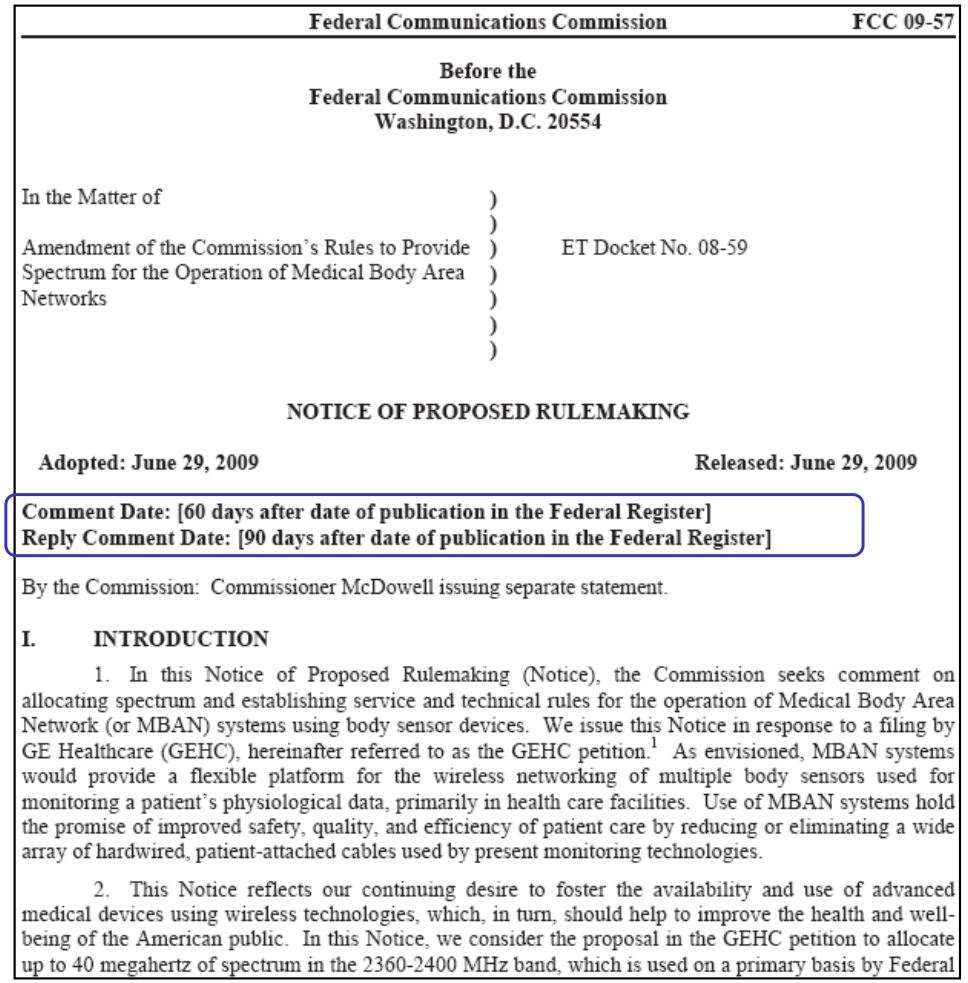
5.5 Need for the Project: There is a need for a standard optimized for ultra low power devices and **operation on, in or around the human body to serve a variety of applications including medical** and personal entertainment. Examples of the applications served by the proposed standard are: Electroencephalogram (EEG), Electrocardiogram (ECG), Electromyography (EMG), vital signals monitoring (temperature (wearable thermometer), respiratory, wearable heart rate monitor, wearable pulse oximeter, wearable blood pressure monitor, oxygen, pH value , wearable glucose sensor, implanted glucose sensor, cardiac arrhythmia), wireless capsule endoscope (gastrointestinal), wireless capsule for drug delivery, deep brain stimulator, cortical stimulator (visual neuro-stimulator, audio neuro stimulator, Parkinson's disease, etc…), remote control of medical devices such as pacemaker, actuators, insulin pump, hearing aid (wearable and implanted), retina implants, disability assistance, such as muscle tension sensing and stimulation, wearable weighing scale, fall detection, aiding sport training. This will include body-centric solutions for future wearable computers. In a similar vein, the same technology can provide effective solutions for personal entertainment as well. The existence of a body area network standard will provide opportunities to expand these product features, better healthcare and well being for the users. It will therefore result in economic opportunity for technology component suppliers and equipment manufacturers.

Reference = https://development.standards.ieee.org/P625900033/par

FCC adopted a NPRM for MBAN spectrum allocation on June 29, 2009

"In this Notice, we [FCC] consider the proposal in the *GEHC petition* to allocate up to 40 megahertz of spectrum in the 2360-2400 MHz band…

"In addition, *we seek comment* more generally on whether allocating spectrum and establishing rules to allow the operation of MBAN systems for the purposes described herein would serve the public interest."



Federal Communications Commission FCC 09-57

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)
)
Amendment of the Commission's Rules to Provide) ET Docket No. 08-59
Spectrum for the Operation of Medical Body Area)
Networks)
)
)

NOTICE OF PROPOSED RULEMAKING

Adopted: June 29, 2009 Released: June 29, 2009

Comment Date: [60 days after date of publication in the Federal Register]
Reply Comment Date: [90 days after date of publication in the Federal Register]

By the Commission: Commissioner McDowell issuing separate statement.

I. INTRODUCTION

1. In this Notice of Proposed Rulemaking (Notice), the Commission seeks comment on allocating spectrum and establishing service and technical rules for the operation of Medical Body Area Network (or MBAN) systems using body sensor devices. We issue this Notice in response to a filing by GE Healthcare (GEHC), hereinafter referred to as the GEHC petition.[1] As envisioned, MBAN systems would provide a flexible platform for the wireless networking of multiple body sensors used for monitoring a patient's physiological data, primarily in health care facilities. Use of MBAN systems hold the promise of improved safety, quality, and efficiency of patient care by reducing or eliminating a wide array of hardwired, patient-attached cables used by present monitoring technologies.

2. This Notice reflects our continuing desire to foster the availability and use of advanced medical devices using wireless technologies, which, in turn, should help to improve the health and well-being of the American public. In this Notice, we consider the proposal in the GEHC petition to allocate up to 40 megahertz of spectrum in the 2360-2400 MHz band, which is used on a primary basis by Federal

Reference: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-57A1.pdf

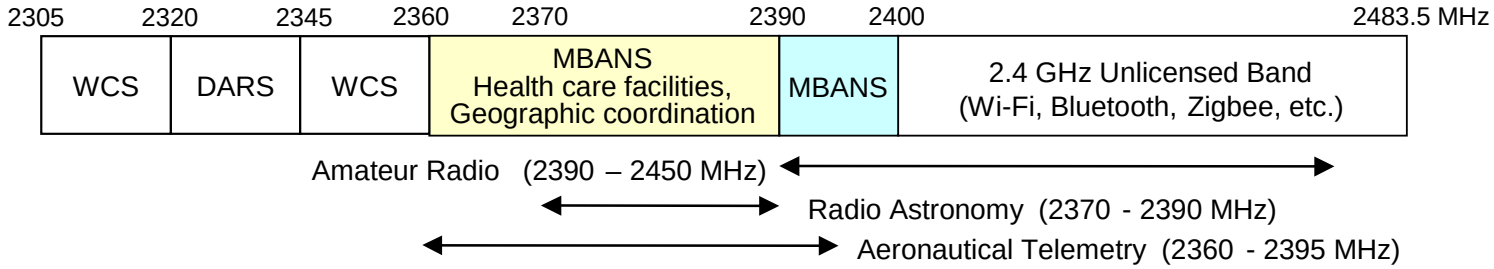
GE Healthcare's Petition for MBANS

Eligibility & Permissible Communications

- Licenses by rule operations by authorized health care professionals and by any other person, if such use is prescribed by a health care professional. Limited to transmission of data (no voice) used for monitoring, diagnosing or treating patients.

Frequencies & Authorized Locations

- **2360-2390 MHz** MBANS operations in the 2360-2390 MHz band limited to health care facilities only. Establish **geographic exclusion zones** around all 157 aeronautical mobile telemetry receive sites. MBANS operations in the 2360-2390 MHz band would not occur within such geographic exclusion zones.
- **2390-2400 MHz** operations permitted anywhere CB radios may operate.



Technical Parameters

- All stations must employ unrestricted contention-based protocol.
- Maximum emission bandwidth of 1 MHz.
- Maximum EIRP not to exceed the lesser of **1 mW** or 10 log $BW_{20dB\ MHz}$ dBm.
- Same out-of-band (more than 500 kHz outside of band) field strength limits as apply to MICS.

Reference = http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520184274, Nov 2008

FCC MBANS NPRM seeks comment on many topics including

Frequency Allocation

- 2300-2305 MHz and 2360-2400 MHz
- 2400-2483.5 MHz or Other bands (5150-5250 MHz)

Service Rules

- Licensing, Definitions,
- Permissible Communications and Operator Eligibility

Technical Rules

- Exclusion Zones, Frequency Coordination, Channelization
- Frequency Monitoring (Contention-based Access Protocols)
- Transmitter Power, Bandwidth, Duty Cycle, Channel Aggregation
- Unwanted Emissions, Frequency Stability, Antenna Locations, RF Safety

Frequency Allocation

NPRM states:

> 2. This Notice reflects our continuing desire to foster the availability and use of advanced medical devices using wireless technologies, which, in turn, should help to improve the health and well-being of the American public. In this Notice, we consider the proposal in the GEHC petition to allocate up to 40 megahertz of spectrum in the 2360-2400 MHz band, which is used on a primary basis by Federal and non-Federal Aeronautical Mobile Telemetry (AMT), Federal Radiolocation, and non-Federal Amateur services. In addition, we seek comment on an alternative proposal by the Aerospace and Flight Test Radio Coordinating Council (AFTRCC) to accommodate MBAN operations in the 2300-2305 MHz and 2395-2400 MHz bands. In addition, we seek comment on whether other bands such as the 2400-2483.5 MHz or 5150-5250 MHz bands could be used to support MBAN operations.

Frequency Allocation (2)

Why 2360 to 2400 MHz? *

- Leverage 2.4 GHz off-the-shelf component integration, capability and volume costs
- Suitable on-body propagation characteristics similar to 2.4 GHz
- Permits small, efficient antennas
- Sufficient amount of spectrum to enable frequency diversity as well as secondary, opportunistic access with respect to incumbent operations
- Incumbent Aeronautical Telemetry and Amateur operations are good candidates for coexistence

** Reference = Medical Body Area Network Application, 15-08-0108-01-0006-medical-body-area-network-application.pdf*

Frequency Allocation (3)

2300-2305 MHz challenges and limitations

- Coupled with 2390-2400 MHz, separated by 90 MHz which burdens low-power transceiver design
- Limited bandwidth permits few, 1 MHz wide channels depending upon necessary guard band for OOBE limits
- Next to WCS service which may be high power and located in populated near hospitals

Frequency Allocation (4)

Why not 2400 - 2483.5 MHz or 5150 - 5250 MHz?

- MBANS spectrum needed for high patient density environments where unlicensed systems are used for mission critical applications.
- Wireless LAN 802.11a/b/g/n operating in these bands are widely deployed and heavily used in hospital and health care environments.
- Wireless LAN clients and access points use much higher power than MBANS and in close proximity to MBANS devices.
- Wireless PAN 802.15, Bluetooth and Zigbee devices already share unlicensed 2.4 GHz with 802.11 systems and other radio devices.

Service Rules – Licensing

NPRM states:

35. *Licensing*. We seek comment on whether medical device operations should be authorized in Part 95 of our Rules, thus providing for license-by-rule operation[46] pursuant to Section 307(e) of the Communications Act (Act).[47] Under this approach, medical devices would operate in the band on a shared, non-exclusive basis with respect to each other and without the need for MBAN systems to be individually licensed. As the Commission determined when it adopted the MedRadio Service rules, this approach minimizes regulatory burdens and facilitates the expeditious deployment of new generations of beneficial wireless medical devices that can improve the quality of life for countless Americans, thus serving the public interest, convenience and necessity. We seek comment on whether the rules for MBANs should be included in Subpart I of Part 95, which authorizes the MedRadio Service, or whether the rules for MBANs should be included in a new Subpart under Part 95.

36. Alternatively, we seek comment on whether MBAN operations should be licensed on a non-exclusive basis under Part 90. We are concerned that the use of exclusion zones could frustrate the widespread use of MBAN devices, particularly if it is determined in the course of this proceeding that such exclusion zones would be sufficiently large to encompass major metropolitan areas where MBAN operations might be prohibited. As we discuss further below, frequency coordination also could facilitate sharing between the incumbent operations and MBAN devices. Frequency coordination is required for WMTS operations authorized under Part 95,[48] but does not involve as many sites as could be required for MBAN and AMT coordination. Another licensing approach that we would consider for MBAN operation that includes coordination is non-exclusive licensing under Part 90. Under that approach, MBAN operations would be licensed on a non-exclusive basis with respect to each other for ten year license terms. We seek comment on whether we should consider using the same approach here as we do with wireless broadband services in the 3650-3700 MHz band, *i.e.*, eligible entities would apply for non-exclusive nationwide licenses and subsequently register individual stations with the Commission.[49] If we were to adopt this approach, should we require that licensees register each individual MBAN system or, alternatively, require them to register the individual health care facility at which the licensee would be allowed to operate multiple MBAN systems? What type of licensing and registration information for MBAN operations would facilitate coordination with incumbent services? What would be the relative benefits and disadvantages of licensing under Part 90 compared with the license-by-rule approach under Part 95?

Service Rules – Definitions

NPRM states:

37. *Definitions*. We seek comment on the definitions to apply to MBAN systems and body sensor devices. Because MBAN systems may be comprised of sensors that perform not only monitoring functions but also diagnostic and therapeutic functions, definitions for MBAN and body sensor networks should be consistent with definitions already in the Com*miss*ion's Part 95 rules for wireless medical telemetry and body-worn devices.[50] We seek comment on the following proposed definitions:

- Medical body area device – a medical sensing device that is placed on or in close proximity to the human body for the purpose of measuring and recording physiological parameters and other patient information or performing diagnostic or therapeutic functions via radiated bi- or unidirectional electromagnetic signals. These devices may only communicate as part of a medical body area network.
- Medical body area network (MBAN) – a low-power independent network comprised of multiple medical body area devices that transmit or receive either non-voice me*dical data* of a patient or related device control commands. Transmissions to and from these multiple medical body area devices are routed through a hub, which is placed on or in close proximity to the patient's body, and which may communicate with a remote monitoring location.
- MBAN transmitter – A transmitter that operates as part of a Medical Body Area Network, and is located either on the human body or in close proximity to it.
- MBAN control transmitter – A MBAN transmitter, which is designed to placed on or in close proximity *t*o the patient's body, that serves as a hub to control and coordinate communications with body area devices, and which may also communicate with a remote monitoring location.

Service Rules – Permissible Communications and Operator Eligibility

NPRM states:

39. *Permissible Communications and Operator Eligibility.* We propose to establish requirements for permissible communications and operator eligibility that are generally the same as those in place for the MedRadio Service. The MedRadio rules provide that a MedRadio device may be used by persons for diagnostic and therapeutic purposes, but only to the extent that such devices have been provided to a human patient under the direction of a duly authorized health care professional.[52] Furthermore, transmissions are limited to non-voice data signals.[53] We expect, based on GEHC's representations, that wireless body sensor devices configured as a MBAN would be used primarily for monitoring patient data. We believe it would be prudent to provide flexibility so that MBAN systems can also be used for performing diagnostic or therapeutic functions. We seek comment on whether these requirements would be appropriate for MBAN operations.

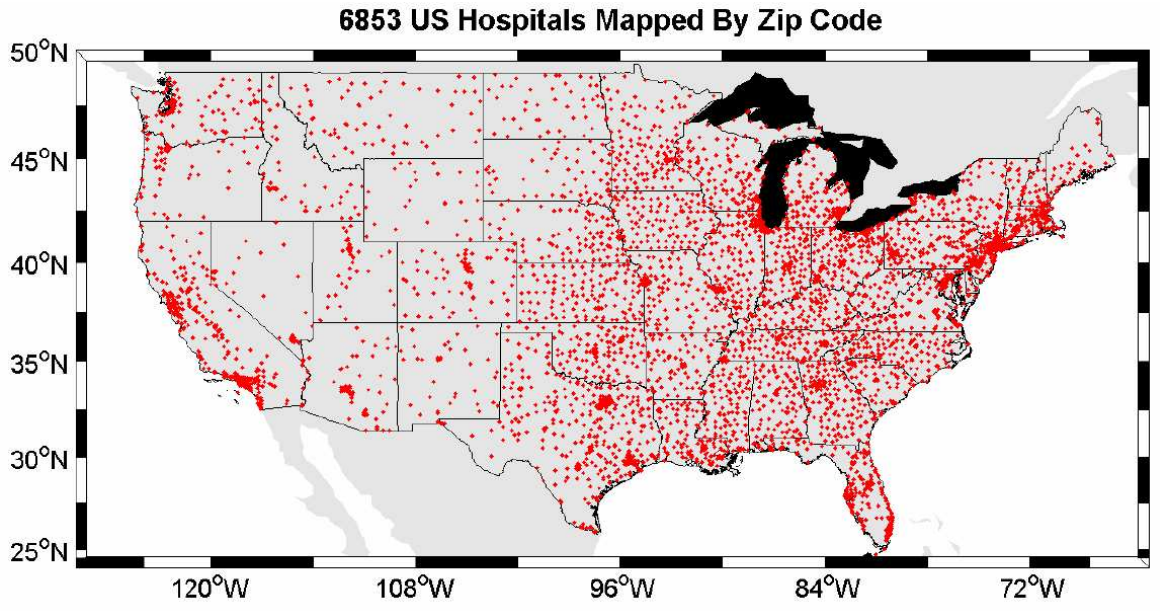
42. We seek comment on whether communications between MBAN body sensors, or other intra-MBAN network communications, should be allowed, and whether there should be a requirement that each external MBAN control transmitter be limited to controlling the body sensor transmitters for a single patient. Alternatively, we ask whether we should permit groups of MBAN body sensors for multiple patients to be coordinated by one central MBAN control transmitter and if so, whether any special protocols or other requirements should be applied to such communications.

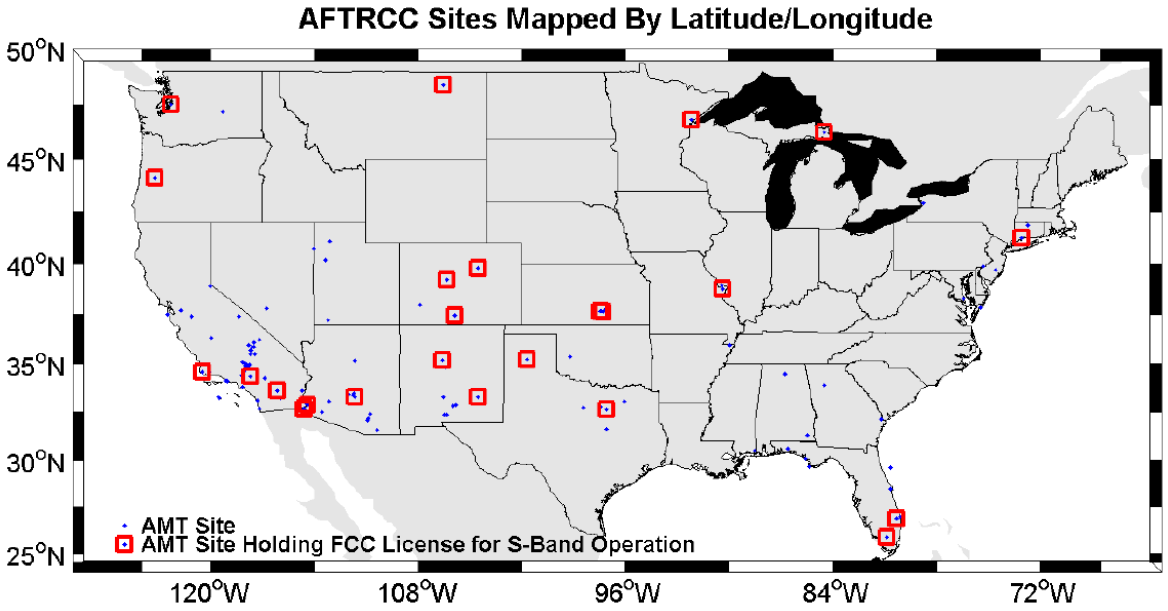
Technical Rules – Exclusion Zones

NPRM states:

22. Regarding the potential for interference from MBAN devices to incumbent operations, we believe that sharing between MBAN systems and incumbent AMT and radiolocation operations could be facilitated if we establish effective exclusion zones around AMT test flight sites in the 2360-2395 MHz band to protect those sites from harmful interference. We discuss this in more detail below. Further, sharing between MBAN systems and incumbent AMT and radiolocation operations could be facilitated if MBAN operations in the 2360-2390 MHz band, which is allocated for AMT operations, are limited to indoor use within health care facilities as defined in the WMTS.[39] We believe that this requirement would limit the incidence of MBAN operations and effectively reduce the likelihood that they would occur near AMT flight test sites. Because MBAN systems would be used indoors, building structures would attenuate MBAN signals and further reduce the likelihood of interference to AMT. We seek comment on whether to limit MBAN operations to indoor use within health care facilities. In addition to or in lieu of exclusion zones, MBAN operators and AMT licensees may be able to coordinate their operations. We discuss in more detail below the coordination approach. We seek comment on whether permitting MBAN systems to operate in 2360-2395 MHz band under the limitations proposed would provide interference protection to incumbent users.

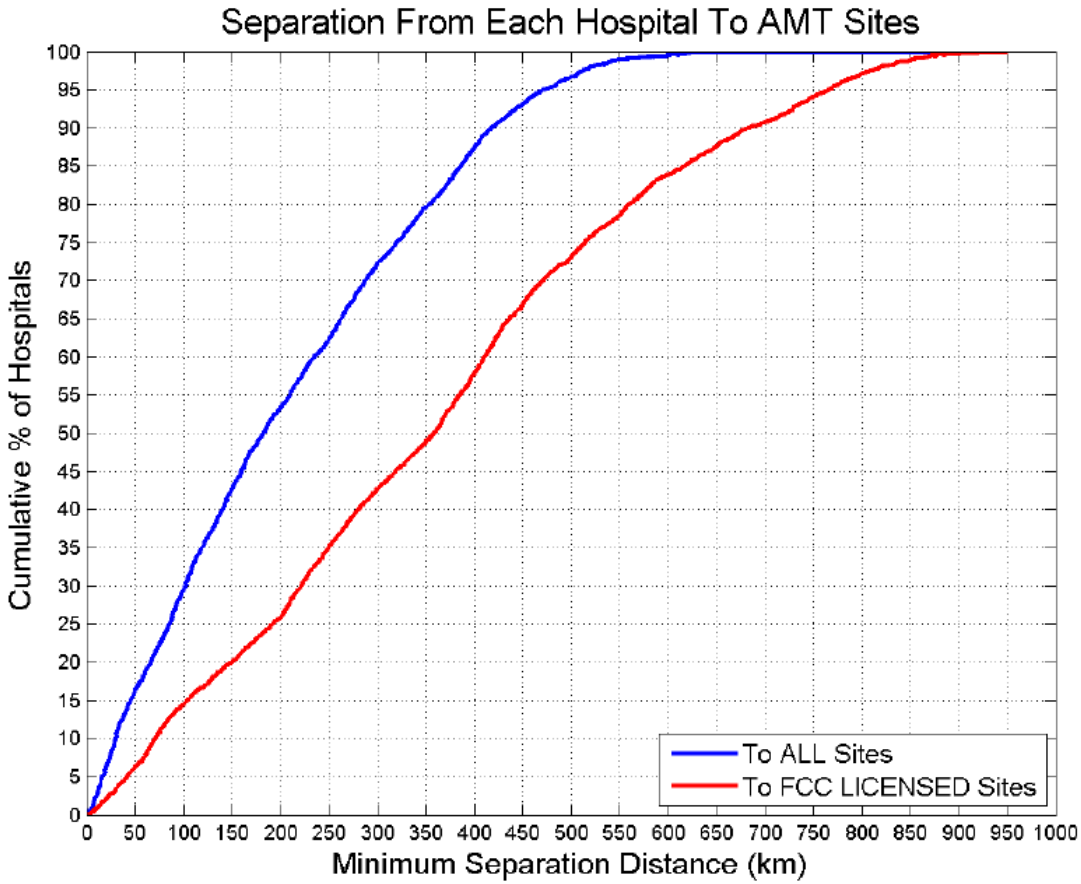
Spatial separation between US hospitals and aeronautical mobile telemetry (AMT) test sites





Reference = http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520028374

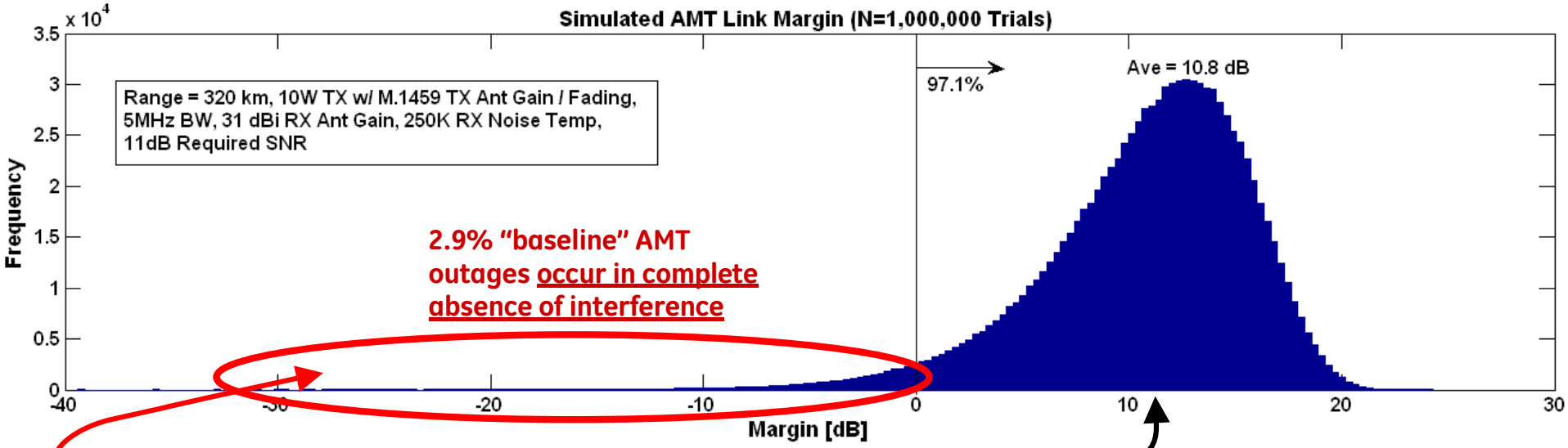
Spatial separation between US hospitals and aeronautical mobile telemetry (AMT) test sites



Only 6.1% of hospitals are located < 20 km from any AMT site

Reference = http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520028374

Actual Characteristics of Typical AMT Link That Are Not Accounted for in AFTRCC Analysis



- At most points in time, AMT link has copious excess margin.
- AMT outages are driven by long "tail" of fading distribution – outages will be relatively common, even with zero interference.
- Although imperfect, the AMT link is quite robust – outage rate is insensitive to moderate interference.
- For cases where a perfectly-reliable AMT link really is required, it would best be achieved through techniques like coding or diversity, which can exploit the significant excess margin, and not by preserving fractional dBs of SNR by seeking to limit interference to unrealistically low thresholds.

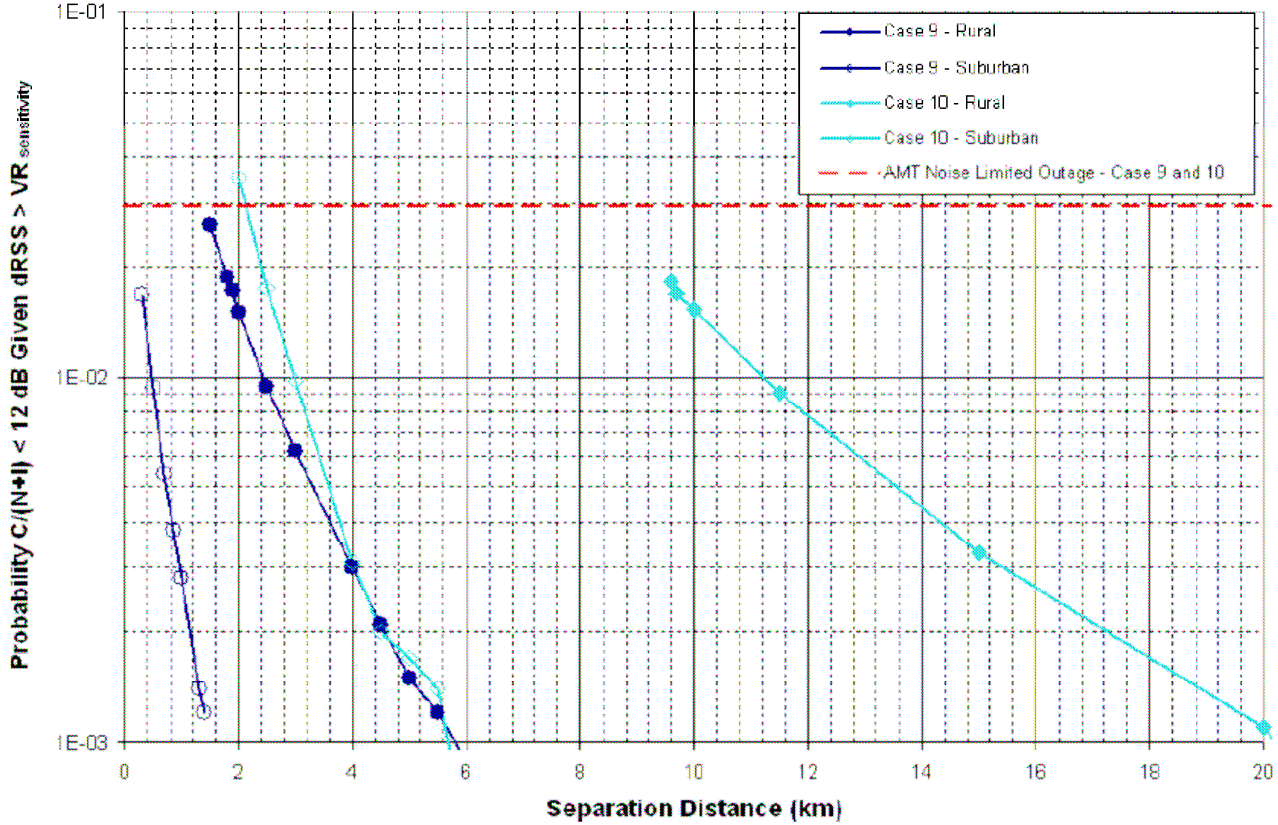
Either: Outage rates of several percent are, in fact, acceptable and are being tolerated already,

Or: The AMT link budget actually has more margin than AFTRCC has acknowledged (e.g. not operating out to full 320 km, using more TX power than claimed, actual fading is less severe than claimed 30 dB, incorporating coding, diversity, or other mitigation techniques, etc.).

Monte Carlo Analysis Confirms MBANS / AMT Coexistence With Modest Separation Distances

Simulated <u>conservative, worst-case scenario</u>:

- 50 interference-contributing MBANS systems in the main beam of an AMT receive antenna.
- Range of AMT transmitter to receiver was fixed at the worst-case of 320 km.
- AMT Propagation model with Rayleigh-like fading from ITU-R M.1459
- MBANS propagation did not include body loss or antenna mismatch



Resulting upper bounds on sufficient separation:

≤**3.3 km** for suburban propagation.

9.7 km for rural propagation with typical 31 dBi (8' diameter) AMT antenna.

Compare to AFTRCC's claim that 62 km required for a <u>single</u> 1 mW MBANS device.

Reference: http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520169190

Technical Rules – Frequency Monitoring (Contention-based Spectrum Access Protocols)

NPRM states:

61. *Frequency Monitoring (Contention-based Spectrum Access Protocols).* GEHC proposes that we apply contention protocols as a way for MBAN devices to successfully coexist within the band, and also as a way to protect MBAN devices from interference from the primary AMT systems.[73] We recognize that low power operation and spread spectrum or similar technology may enable MBAN devices to operate in very close proximity to one another without any mutual interference and mitigate the potential for one body sensor network to block another's access to the spectrum. We invite comment on this premise and whether any rules should be adopted to ensure such sharing. In particular, we seek comment on whether a contention-based protocol should be applied to MBAN transmitting devices, and if so, how such a protocol might be developed. If we were to adopt a requirement for a contention-based protocol, we invite comment as to whether we should rely upon the general definition of *contention-based protocol* recently adopted by the Commission for the operation of wireless devices under Part 90 of the rules in the 3650 MHz band, which reads as follows.[74]

> "*Contention-based protocol.* A protocol that allows multiple users to share the same spectrum by defining the events that must occur when two or more transmitters attempt to simultaneously access the same channel and establishing rules by which a transmitter provides reasonable opportunities for other transmitters to operate. Such a protocol may consist of procedures for initiating new transmissions, procedures for determining the state of the channel (available or unavailable), and procedures for managing retransmissions in the event of a busy channel."

62. Depending upon the transmit/receive reliability, or quality of service requirements of a particular use, contention-based protocols could take a variety of forms, such as listen-before-talk (LBT) frequency monitoring, time slot synchronization, or frequency hopping among others. GEHC does not specify the type of contention-based protocol that it envisions using for MBAN devices. One option would be to follow the existing approach of the MedRadio service whereby the medical transmitting device must incorporate a LBT frequency monitoring mechanism to monitor the channel or channels that the medical device transmitters intend to occupy.[75] One potential benefit of this latter approach would be that the LBT protocol of the MedRadio Service is already clearly defined in the rules and appears to be successful in allowing a number of uncoordinated devices to share the same spectrum.

Technical Rules – Frequency Monitoring (Contention-based Spectrum Access Protocols)

- Effort of TG6 will yield contention protocol for MBAN
  - Frequency hopping, TDMA beacon time shifting, CSMA/CA AND duty cycle limits (slots) are within scope of MedWiN and other proposals.

- MedRadio LBT function poorly suited for continuous or episodic monitoring of ambulatory patients
  - MedRadio LBT defined for programmer/controller to single implant exchange at a stationary location.
  - Lack of use of channel for 15 seconds requires LBT scan
  - Movement of patients leads to changing RF environment

Technical Rules – Transmitter Power, Emission Bandwidth and Duty Cycle

NPRM states:

65. *Transmitter Power, Emission Bandwidth, and Duty Cycle.* As recommended by GEHC, we would limit individual MBAN devices to a maximum transmit power of 1 mW equivalent isotropic radiated power (EIRP) measured in a 1 megahertz bandwidth, and a maximum emission bandwidth of 1 megahertz. In explaining this recommendation, GEHC indicates that, as presently conceived, a typical MBAN system would be comprised of a single network per patient/person with a gateway-hub device coordinating transmissions from multiple body worn sensors. It estimates that the suggested power and bandwidth limits would be sufficient to allow short burst messaging, which in turn would facilitate low power consumption from duty cycles less than 25 percent.

66. While GEHC emphasizes the use of MBAN systems for monitoring patient physiological data, we recognize that the definition that we propose for MBAN systems would also allow the operation of two or more networked medical devices to perform diagnostic and therapeutic functions. We seek comment on whether the power/bandwidth limits proposed above - which reflect GEHC's recommendations - are appropriate for such other purposes. We specifically ask whether another combination of power and duty cycle limits would provide a better balance between affording interference protection to incumbent users and achieving sufficiently reliable MBAN system performance. Commenters suggesting other bandwidths should fully discuss their relative benefits and potential disadvantages in light of the considerations discussed herein. With respect to transmitter duty cycles, we seek comment on whether GEHC's assumption of a 25 percent factor adequately characterizes operations that would be expected from real-world devices. For example, would the duty factor of MBAN transmitters used for diagnostic or therapeutic purposes, instead of patient monitoring, be more likely to require higher, lower, or the approximately the same duty cycles and, if so, should this be accounted for in the maximum duty cycle specification? What would be the relative advantages or disadvantages of specifying versus not specifying specific duty cycle limits for MBAN transmitters in the rules? Is a duty cycle limit needed to allow the functioning of a contention-based spectrum access protocol and, if so, what is the maximum duty cycle that should be allowed in order to support such a protocol? Should the duty cycle apply to individual MBAN transmitters, whether located in a medical body area device or the MBAN control transmitter, or to the aggregate duty cycle of all transmitters comprising an MBAN, as the terms are proposed to be defined above?

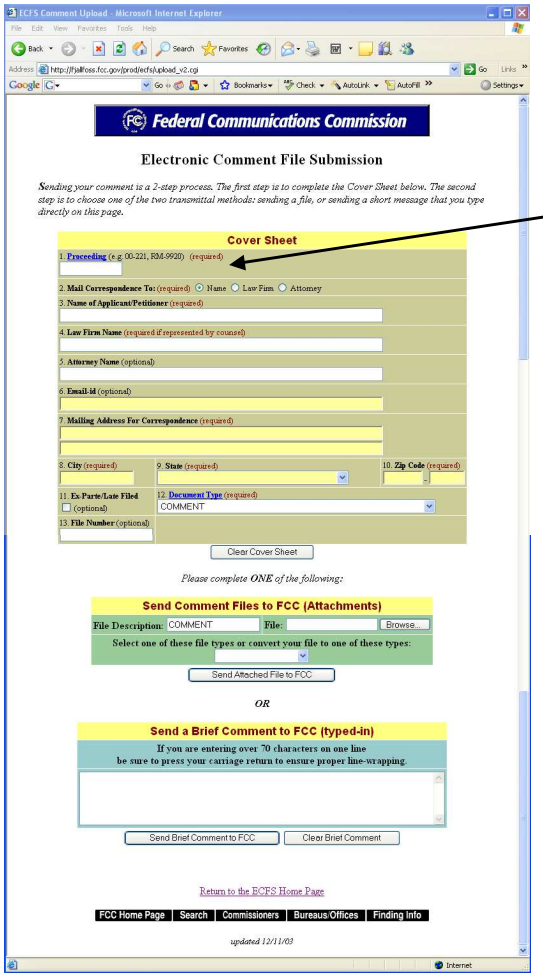
FCC NPRM presents opportunity for TG6 to achieve its PAR purpose

- Opportunity for spectrum affording reliable physical layer for medical devices
- Adjacent to 2.4 GHz ISM band for entertainment and non-medical devices

CALL TO ACTION: Future of MBANS Notice of Proposed Rulemaking requires comments supporting the allocation of spectrum as well as addressing the questions raised.

FCC makes filing comments simple

www.fcc.gov/cgb/ecfs/



08-59

Engage IEEE 802.18 to file comments on behalf of 802.15 TG6

- Need vote at 802.15 TG6 and 802.15 WG to engage 802.18 TAG

- IEEE 802.18 Radio Regulatory TAG to prepare and file comments including:
  - 802.15 TG6 scope, purpose, need (sections 5.2, 5.4, 5.5 of PAR)
  - Benefit of licensed spectrum for medical body area network coexistence and noninterference
  - Balance interests of other 802 groups, including 802.16

Conclusion

- FCC NPRM issued considering allocation of spectrum for Medical Body Area Networks
- MBANS proposal represents opportunity for 802.15 TG6 to achieve coexistence and noninterference for medical applications
- Support of MBANS proposal requested from all, including IEEE 802, via filing of comments with FCC
- TG6 should engage 802.18 TAG to convey its support of MBANS NPRM and input to various questions posed by FCC.

Move that 802.15 TG6 and 802.15 WG vote to engage 802.18 TAG to file comments to the FCC stating:

- Scope, purpose and need of 802.15 TG6 to develop an international standard for body area networks (sections 5.2, 5,4, 5.5 of PAR).
- Support the allocation of spectrum for medical body area networks as benefiting the delivery of health care and the general public.
- Support the allocation of 2360-2400 MHz as most viable alternative. Oppose the use of 2400-2483.5 and 5150-5250 MHz given numerous, higher power, unlicensed radio system deployments in health care environment (e.g. 802.11a/b/g/n, 802.15.1/.4)
- Express desire for flexibility in the technical rules to allow 802.15 TG6 to develop appropriate contention based protocol to share the spectrum among MBANS systems.
- Express utility of frequency hopping, TDMA beacon shifting, CSMA/CA and duty cycle limits for contention based access as opposed to existing MedRadio LBT mechanism which is ill-suited for ambulatory patient environments.
- Encourage the Commission to move expeditiously towards issuing final rules to make the next generation of wireless medical devices a reality