

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

In the Matter of)
)
Amendment of Parts 2 and 95 of the) ET Docket No. 09-36
Commission's Rules to Provide Additional)
Spectrum for Medical Device)
Radiocommunication Service in the)
413–457 MHz Band)

To: The Commission

Rebuttal *Ex Parte* Comments of EIBASS

Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS) hereby respectfully submits its *ex parte* comments in the above-captioned notice of proposed rulemaking relating to medical micro-power network (MMN) devices at 413–457 MHz. These comments are in response to the August 12, 2010, Alfred Mann Foundation (AMF) *ex parte* comments.

I. EIBASS Did Not Misread the WMTS Reconsideration Order

1. In its August 12 *ex parte* filing, AMF claims that EIBASS made a "fundamental misreading" of the May 7, 2010, *Order on Reconsideration* to WP Docket 07-100, which AMF refers to as the *WMTS Reconsideration Order*. Based on its August 12 filing, it is AMF who misread the *WMTS Reconsideration Order*.

2. The EIBASS May 14, 2010, *ex parte* filing to the ET Docket 09-36 never claimed that the *WMTS Reconsideration Order* meant *per se* that the medical micropower network service (MMNS) requested by AMF was automatically contrary to the public interest; EIBASS agrees with AMF that no such broad conclusion can come from the *WMTS Reconsideration Order*. Rather, the EIBASS filing pointed out that the same technical issues that caused the Commission to preclude medical telemetry devices on a secondary basis at 1,427–1,432 MHz also apply to AMF's proposed operation at 451–457 MHz (one of four 6-MHz wide band spectrum allocations requested by AMF between 413–457 MHz). Thus, it is the technical issues upon which the Commission based its *WMTS Reconsideration Order* on that EIBASS believes also apply to the AMF 451–457 MHz proposal, and not that the *WMTS Reconsideration Order* meant that the AMF proposal was *per se* defective.

**EIBASS Rebuttal *Ex Parte* Comments: ET Docket 09-36
MMN Devices at 413–457 MHz**

**II. NTIA Has Also "Speculated" About Harmful Interference to
AMF's MMNS Proposal**

3. AMF charges that EIBASS "merely speculates" that MMNS at 451–457 MHz would be at risk of debilitating interference from 455–456 MHz Remote Pickup (RPU) operations. If so, then so has the National Telecommunications and Information Administration (NTIA) of the Department of Commerce. NTIA raised similar concerns in its February 27, 2009, letter stating its position regarding MMNS operations if allowed at 413–419 MHz; 426–432 MHz; or 438–444 MHz; that is, in bands now allocated for federal government and military use.

4. Just as SBE and EIBASS did, the NTIA letter identified the interference threat of incumbent federal government radars and other federal stations in the 413–450 MHz government band as interference threats to MMNS operations. EIBASS totally agrees with the following observations taken from the NTIA letter:

Given the diverse nature of the incumbent systems operating in the 413–450 MHz band it may be difficult to implement interference mitigation techniques that are optimized for the different types of signals.

An error detection and correction coding technique that works well for a low duty cycles pulsed radar signal may prove to be ineffective for analog or digital LRM [land mobile radio] signals.

The merits of employing detection and avoidance techniques for wideband systems (e.g., 5 MHz) in a congested LMR signal environment will also need to be addressed as part of this rulemaking proceeding.

There are no analytical techniques that can be employed to assess the effectiveness of an interference mitigation technique. Measurements are necessary to verify that the interference mitigation techniques will actually protect MMN Service systems and the individuals that rely on them. To accomplish this, coordinated measurement efforts with the incumbent spectrum users are necessary. The MMN Service devices should be thoroughly evaluated prior to initiating a measurement program with the incumbent spectrum users. The authorization of MMN Service will be subject to the successful completion of measurements that verify the interference mitigation techniques employed protect MMN Service devices from incumbent systems. [bolding added by EIBASS]

To the best of EIBASS' knowledge, no tests involving 455–456 MHz RPU band radios have been made by AMF.

5. Indeed, EIBASS believes that NTIA has underestimated the interference threat of co-channel, or even adjacent-channel, LMR interference into MMNS. A 4-watt handi-talkie (H-T) typically carried by a first-responder emergency medical technician (EMT) would be likely to

**EIBASS Rebuttal *Ex Parte* Comments: ET Docket 09-36
MMN Devices at 413–457 MHz**

cause interference to a patient with an implanted radio-controlled medical device. An H-T, if used within inches of the patient, such as would likely occur in the confined space of an ambulance, would raise the threat of brute force overload (BFO) to an MMNS receiver. Further, while LMR transmissions typically have a 5% duty cycle, a portable RPU station has a 100% duty cycle for the duration of the remote broadcast, which, as EIBASS has previously pointed out, could be originating from a medical venue (*e.g.*, a remote broadcast at a hospital, in support of a "Walkathon for Health" event, or even for coverage related to a newsworthy patient).

6. Of course, EIBASS realizes that if MMNS proves successful, persons with implanted radio-controlled medical devices will no longer be confined to medical venues, and will become a member of general public, albeit one equipped with a portable master control unit (MCU) to control the implants. This makes it all the more important that the frequencies for MMNS be primary and protected.

7. Thus, EIBASS submits that it is AMF that has been seriously lacking in their "technical analysis." Contrary to AMF's allegation, EIBASS has not "failed to consider the various MMN interference avoidance and management mechanisms." Also contrary to AMF's allegation, it has *not* discussed at length the technical details of its claimed interference mitigating protocols. AMF has made sweeping claims about dynamic channel switching, spectral exclusion/notching, and "signal coding," but has offered no technical details to back up its claims. Indeed, AMF initially requested that the six-month status reports for its WD2XLW experimental license be kept secret, and the Commission unfortunately granted that request.¹

8. Accordingly, it is impossible for EIBASS, NTIA, or any other interested party to assess the veracity of the AMF claims that much higher power, co-channel, licensed operations would not cause interference to MMNS devices. While EIBASS agrees that the interference mitigating techniques listed by AMF could all help, especially when the venue is conventionally sized radio hardware with access to reasonable power sources for digital signal processing, even these techniques have their limits when co-channel operation is involved. AMF offers no proof at all

¹ EIBASS notes that two the most recent WD2XLW progress report do not have the "not available" flag. However, clicking on the links to those reports return two 2-page reports dated July 6, 2009, and May 17, 2010, which are almost word-for-word identical and are frustratingly vague. That is, the reports contains no detailed technical data or other results that would allow an interested party such as EIBASS to independently evaluate the effectiveness of any interference-avoiding schemes. Instead, only generalized statements such as "version two MCU radio hardware succeeded in substantially improving receiver linearity to facilitate interoperability signal processing in shared spectrum;" and "the spectral excision algorithm is operating as expected;" and "the detection and excision mechanisms are being tested against these captured signals in order to study the effects of parametric changes on a repeated signal pattern" are provided.

**EIBASS Rebuttal *Ex Parte* Comments: ET Docket 09-36
MMN Devices at 413–457 MHz**

that electronic devices small enough to be implanted in a human being could incorporate the plethora of sophisticated anti-interference capabilities it claims. As the late Dr. Carl Sagan said, "Extraordinary claims require extraordinary evidence."²

9. Absent AMF conclusively and openly proving through empirical testing of a potential worst case electromagnetic interference (EMI) scenario, EIBASS will not accept a mere assurance of interference-free operation, especially from a 100% duty cycle RPU signal. A test that would satisfy EIBASS should be conducted using a tripod-mounted, seven-element Yagi antenna at a height of five feet, driven by a 30 watt RPU transmitter (*e.g.*, a Marti Electronics Model SRPT 30 transmitter) through 15 feet of RG-8U coaxial cable with a loss of approximately 0.7 dB at 455 MHz. The resulting effective radiation power (ERP) would be approximately 230 watts.³ The MMNS device should be placed in line with the main beam of the transmitting antenna, and demonstrate interference-free operation at a distance of 25 feet for at least a 1-minute time interval. If an MMNS device operating with a center frequency of 453.695 MHz and with a signal bandwidth of 4.972 MHz, as detailed in the May 17, 2010, AMF WD2XLW report is shown to be interference-free, then EIBASS would withdraw its objection to MMNS devices using 451–457 MHz. EIBASS will leave it to others, such as the Association of Public Safety Communications Officials (APCO) or the Land Mobile Communications Council⁴, to suggest tests that it might find as suitable for demonstrating that the immediate proximity use of H-T radios would similarly not cause the AMF MMNS devices to fail.

10. Although AMF has said that secondary, unprotected status for MMNS operations would be acceptable, EIBASS doubts this would be the case should actual harmful interference be caused by RPU operations to MMNS operations. Further, EIBASS questions whether AMF is in a position to be making such a statement on behalf of the patients who would be put at risk by such a policy, not to mention their doctors who have legal and ethical responsibilities regarding standards of patient care. EIBASS repeats that it is not in the public interest to allow MMNS on

² "Encyclopaedia Galactica". Carl Sagan (writer/host). *Cosmos*. PBS. 1980-12-14. No. 12. 01:24 minutes in.

³ The calculated distance to the 1.52 mW/cm² occupational limit applying at 455 MHz for this ERP is 7.5 feet. Thus, no main beam exposure should be allowed closer than that distance, unless measurements with an RF exposure meter are made showing that shorter distances are possible without exceeding the occupational limit. If the time-average factor that would be possible for a 1-minute transmission in a 6-minute window is applied, then the effective time-averaged ERP becomes 38 watts, giving a predicted distance in the main beam to the occupational limit of 3.1 feet.

⁴ EIBASS notes that on August 11, 2009, both APCO and LMCC filed comments to ET 09-36, expressing their concerns about public safety operations causing interference to MMNS devices, especially from H-T radios in close proximity to an individual with implanted neuromuscular devices.

**EIBASS Rebuttal *Ex Parte* Comments: ET Docket 09-36
MMN Devices at 413–457 MHz**

an unprotected, Part 15 basis: If the application is for an important medical purpose, then the use of RF spectrum for that purpose needs to be on a primary, protected, basis.

III. The June 25, 2010, EIBASS *Ex Parte* Filing Was Not "Frivolous"

11. Finally, AMF claims that the June 25, 2010, EIBASS filing, pointing out the for-profit nature of AMF (based on material from its own web site), was "frivolous." It was nothing of the sort. This for-profit aspect of AMF's operation is pertinent because in its filings with the Commission, AMF has implied that by creating an allocation that would allow the implantation of radio-controlled muscle stimulator devices, the potential benefits to persons suffering nerve damage justifies a higher, or special, public interest consideration for awarding AMF use of spectrum between 413–457 MHz. After all, it was AMF that claimed, in its June 3, 2010, *ex parte* filing that it was a "non-profit [entity] engaged *solely* in medical research."⁵ The EIBASS filing showing a for-profit aspect of AMF's effort was intended to have the record reflect that AMF is little different from other parties asking the Commission for changed frequency allotments that would be to its benefit. Further, EIBASS reiterates that it has never disputed the intended medical benefits these devices can deliver to nerve-damaged patients if RF spectrum allocations utilized are done on a primary, protected basis.

IV. Summary

12. EIBASS did not misread the *WMTF Reconsideration Order*; rather, we applied the technical considerations the Commission used in reaching its decision regarding secondary medical telemetry devices at 1.4 GHz to the proposed AMF use at 455 MHz, and showed that the same technical arguments resulted, and not that the AMF proposal, as a medical telemetry use *per se*, was defective. While EIBASS' concerns about interference to MMNS operations that would be co-channel with 455–456 MHz RPU operations is speculative, it is informed speculation, just as NTIA's concerns that MMNS operations in the other proposed bands would similarly be subject to interference from incumbent federal government users. It is AMF that has failed to disclose any technical details regarding its claims that much higher power, primary, co-channel operations by existing users would not result in harmful interference to patients with radio-controlled MMNS devices implanted in their bodies; indeed, AMF has gone out of its way to suppress such information. The public interest calculus that the Commission must employ in all rulemakings makes the for-profit aspect shown on the AMF web site (*i.e.*, the obtaining of a patent) pertinent to this rulemaking. Finally, weighing the promised medical benefits against the

⁵ Italics added by EIBASS; see the second AMF Power Point slide, second bullet point.

**EIBASS Rebuttal *Ex Parte* Comments: ET Docket 09-36
MMN Devices at 413–457 MHz**

risks that have been pointed out, EIBASS hopes that primary, protected spectrum segments can be identified that minimize risks, and maximize chances for a successful new treatment to help patients with nerve damage.

Respectfully submitted,

/s/ Dane E. Ericksen, P.E., CSRTE, 8-VSB, CBNT
EIBASS Co-Chair
Hammett & Edison, Inc., Consulting Engineers
San Francisco, CA

/s/ Richard A. Rudman, CPBE
EIBASS Co-Chair
Remote Possibilities
Los Angeles, CA

August 26, 2010

EIBASS
18755 Park Tree Lane
Sonoma, CA 95476
707/996-5200 dericksen@h-e.com