

**NATIONAL RADIO ASTRONOMY OBSERVATORY**

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16 October 2019

**Before the**

**Federal Communications Commission**

**Washington, D.C. 20554**

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| In the Matter of  Sensible Medical Innovations Ltd.  Request for Waiver of Part 15 Ultra-Wideband  Rules for a Medical Imaging System | **)**  **)**  **)**  **)**  **)**  **)** | ET Docket No. 18-39 |

**Petition for Reconsideration of the Order**

**I. Introduction**

1. Here, the National Radio Astronomy Observatory (NRAO) petitions for reconsideration of the FCC’s Order DA 19-937 (the “Order”), in the above-captioned proceeding granting waivers of Part 15 rules for ultra-wideband devices to Sensible Medical Innovations, LTD (SMI) for a medical imaging system.

1. The National Radio Astronomy Observatory and its sister observatory the Green Bank Observatory (<http://greenbankobservatory.org/>) are operated by Associated Universities, Inc. (<http://www.aui.edu>) under cooperative agreement with the National Science Foundation. Their facilities include the Jansky Very Large Array (VLA) in New Mexico, the 100m Robert C. Byrd Green Bank Telescope (GBT) in West Virginia and the 10-element Very Long Baseline Array (VLBA) that is distributed from St. Croix to Hawaii. These facilities, along with the [Arecibo Observatory in Puerto Rico](http://www.naic.edu/) and other radio astronomy sites mentioned in footnote US385 to the table of frequency allocations, observe in spectrum bands allocated to radio astronomy at 1400 – 1427 MHz and 1610.6 – 1613.8 MHz that stand to be contaminated by emissions from SMI’s devices.

**II. Sharing and compatibility with radio astronomy service operations**

1. In Table 4 of its reply comments, SMI presented a calculation at 1611 MHz showing a safety margin of 25 dB for SMI operation at a distance of 1 km. SMI assumed a 30 K radio astronomy system temperature and compared the power in their emissions to the instantaneous thermal noise in a radio astronomy receiver, as if a radio telescope were a radiocommunication device. Ad hoc and very much to its own benefit, SMI assumed uniform 30 dB signal attenuation somehow arising from the high forward gain of large antennas that are used to bring weak cosmic signals to detectable levels under the best conditions.
2. For the record, Table 1 here contains a conventional compatibility calculation using standard radio astronomy service protection criteria from Table 2 of ITU-R Rec. RA.769 that applies to NRAO’s VLA and GBT instruments and to the other non-VLBA radio telescopes observing in the relevant frequency ranges and listed in footnote US385. The required line of sight separation distance ranges from 35 to 195 km for building entry losses ranging from 15 to 0 dB. The coordination distances for SMI devices that emit out of windows with little building entry loss exceed 100 km.

**Table 1: Compatibility calculation using RAS protection criteria from Table 2 of**

**ITU-R Rec. RA.769 for spectral line observations at 1612 MHz**

|  |  |
| --- | --- |
| SMI: EIRP | -47.2 dBm |
| RAS: Noise Temperature | 20 K |
| RAS: Gain | 0 dBi |
| RAS: Threshold power flux | -194 (dBW/m2) |
| Building entry loss (dB) | |  |  |  |  | | --- | --- | --- | --- | | 0 | 5 | 10 | 15 | |
| Line of sight separation (km) | |  |  |  |  | | --- | --- | --- | --- | | 195.2 | 109.7 | 61.7 | 34.7 | |

1. For the same EIRP, the separation distances at 1400 – 1427 MHz differ only very slightly. The SMI devices have considerably stronger potential for interference than SMI claimed.

**III. Protection requested for sites not subject to coordination in the Order**

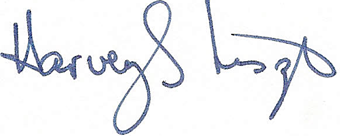
1. In light of the disparity noted in Section II between our calculation and that of SMI, NRAO requests that the Allen Telescope Array, the NASA Goldstone Deep Space Communications Complex and the Owens Valley Radio Observatory noted in US385 be protected by coordination zones in the same manner as NRAO’s VLA and GBT instruments. Arrangements could be effected in consultation with NTIA and the Electromagnetic Spectrum Management Unit at NSF and it is possible that such discussion might find a need for protection of the VLBA antennas, based on details of the installation of SMI’s devices.

**IV. RR. 5.340, US246 and Part 15**

1. SMI has shown no recognition that their devices operate in derogation of the Radio Regulations by transmitting in the frequency band at 1400 – 1427 MHz that is protected by footnote RR 5.340 to the international table of frequency allocations. NRAO asks that SMI’s license be conditioned on recognition of the responsibilities under the ITU-R Rules of Procedure for RR No. 4.4, as noted in NRAO’s recent comment dated 27 August 2019 in Docket 18-21.
2. In its comment, NRAO noted that Part 15 devices are not normally allowed to transmit in frequency bands protected by footnote US246. In footnote 29 to the Order, it is noted that “Certain categories of UWB devices may operate on any frequency below 10.6 GHz, including in the 1400-1427 MHz band and UWB devices are specifically exempted from the restricted band limits that prohibit most Part 15 devices from operating in the 1400-1427 MHz band. 47 CFR §§ 15.509(a) and 15.205(d)(6). As such, NRAO’s assertion that Footnote US246 of the Table of Frequency Allocations serves as a bar to Sensible’s use of 1417.0625 MHz is misplaced.” However, the SMI devices were only classified as UWB devices when the Commission waived its rules, and NRAO’s comment was not “misplaced”.

Respectfully submitted,

National Radio Astronomy Observatory



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