

The Arecibo telescope has for some time frequently detected RFI within the radio astronomy service ("RAS") band at 1610.6 to 1613.8 MHz. Two particular RFI emissions have occurred recently, one at approximately 1612.65 MHz, and the other at approximately 1613.30 MHz. Usually just one or the other of these is seen with much intensity, though on rare occasions both have occurred in the same data-sets. Changes to the receiver's various local oscillator frequencies do not change the observed frequencies of this RFI, which as a result is not caused by intermodulation products in the receiver. The RFI is thus being detected as a real signal.

This letter responds to your letter to me dated November 21, 2003. Therein, you requested updated information regarding Cornell University's investigation of whether Iridium's STA use of additional spectrum below 1621.35 MHz has created harmful interference to radio astronomy observations at the Arecibo Radio Astronomy Observatory. Cornell is grateful for the opportunity to provide further input in this proceeding. As discussed further below, Cornell has concluded that the specific radio frequency interference ("RFI") features seen in spectra at the Arecibo Observatory which were referred to in pleadings filed by Cornell in the above-captioned docket are not influenced by the Iridium's use of additional spectrum, and are very probably unrelated to Iridium operations.

Dear Mr. Ball

**Re: IB Docket 02-364 – Cornell University
Response to Request for Additional Information**

Federal Communications Commission
Bureau / Office

DEC 17 2003

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Washington, D.C. 20554

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Federal Communications Commission

International Bureau

Chief, Policy Division

Mr. James Ball

By Hand Delivery

Policy Division
International Bureau
December 17, 2003

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Mr James Ball
December 17, 2003
Page 2

In light of the proximity of these specific RFI features to the additional spectrum used by Iridium under the STA, and the timing of initial appearance, Cornell became concerned that these phenomena were in some way being generated by Iridium operations. Accordingly, Cornell recently implemented two tests (i) to see whether the RFI emission was more intense when an Iridium satellite passes through the Observatory's antenna beam, and (ii) to see if the RFI exhibited any sign of the 90 millisecond Iridium clock cycle.

Cornell has recently examined two instances in which an Iridium satellite passed through or very near the Arecibo antenna beam. The association of these events with Iridium space vehicles is established by the easy detection of the 333 kHz comb of frequencies which is emitted by these vehicles across the RAS band: this is a documented characteristic of the Iridium system. However neither of the RFI emission features referenced above was detected during either of these events. Likewise, Cornell adapted a system used by pulsar observers to obtain spectra every 2 milliseconds, and then folded these together at the 90 millisecond periodicity of the Iridium clock-cycle, to gain sensitivity. Some of the resulting data exhibit both of the RFI features, though these appear to be independent of the clock-cycle. Moreover, in one 300 second set of data, where the RFI features were more than usually intense (by a factor of ~4), the intensity of the Iridium transmission frequencies in their 1620-1626.5 MHz band were in fact less intense than usual (by a factor ~20). In addition, there is a 300 second set of data in which Iridium has its usual intensity, and the RFI features are not in evidence at all. Thus, there is no obvious correlation between the intensity of these specific RFI features and the Iridium satellite signal.

Finally, Cornell has now had the chance to carefully reexamine the extant data taken with the Arecibo telescope, with regard to the question of interference in the RAS band 1610.6 to 1613.8 MHz in the March-July 2003 time-frame. This examination shows that the RFI, which is episodic in intensity and occurrence, has been detected in a few observations during March 2003, at times prior to the STA increase in the spectrum used by Iridium. Furthermore, these RFI features were not obviously stronger or more frequent during April and May, when Iridium's commenced use of 2.5 MHz of spectrum more than it had been using before.¹

¹ Cornell bases its assumption regarding the date Iridium commenced use of its additional spectrum on data provided in Iridium's July 11, 2003 Reply Comments to the NPRM in this proceeding. Figure 2 (on page 20 of that document) presents a graph of the number of blocked calls plotted against dates, and shows that the number of blocked calls fell after April 11, when the FCC had granted an STA to allow use of additional spectrum.

Mr James Ball
December 17, 2003
Page 3

In sum, Cornell has now concluded that the specific 1612.65 & 1613.30 MHz RFI features recently seen in spectra at the Arecibo Observatory are not a consequence of Iridium's recent use of additional spectrum, and are very probably unrelated to Iridium operations

Thank you again for the opportunity to provide further data in this proceeding, and for your patience and understanding regarding the constraints on Cornell's ability to quickly investigate and report on this phenomena. If you need any further information, please do not hesitate to contact me

Sincerely,

Paul J. Feldman
Counsel for Cornell University

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