

Ms. Mindel De La Torre  
Federal Communications Commission  
International Bureau  
445 12th Street SW  
Washington, D.C. 20554

Date: 11 July 2014

Subject: Iridium NEXT interference to radio astronomy in the band 1610.6 – 1613.8 MHz

Dear Ms De La Torre,

The radio astronomy service (RAS) operating under a primary allocation in the band 1610.6 – 1613.8 MHz has been suffering from unacceptable interference due to out-of-band emissions from the space segment of the Iridium satellite system, which is operating under a secondary allocation to the Mobile Satellite Service in the adjacent band 1613.8-1626.5 MHz, since the launch of the first generation of Iridium satellites more than 15 years ago. This has been documented in e.g. ECC report 171, in which the interference has been traced back to Iridium.

It was expected that the NEXT generation of Iridium satellites would be constructed in such a way that they do not cause harmful interference to the RAS. Iridium has indicated this will only be the case under certain conditions to be imposed on RAS operations, which are unacceptable to the RAS.

Since the autumn of 2013, CRAF, the Expert Committee on Radio Astronomy Frequencies of the European Science Foundation (ESF), representing the European and South-African radio astronomy community in radio spectrum matters and Sector Member of ITU-R, has been engaged in discussions with the US-based company Iridium regarding the measures to be taken by Iridium to protect the RAS from the newly designed Iridium NEXT satellites.

Iridium has informed CRAF about their plans for reducing the out-of-band interference from the NEXT satellites into the 1610.6 – 1613.8 MHz RAS band down to the level required by the RAS. The satellites can be switched from the default mode to a newly implemented so-called RAS protection (RASP) mode upon request.

Simulations performed by Iridium show that the RAS data loss at the upper edge of the RAS band will be 71.5%, 1.6% and 0.46%, for RASP mode bandwidths of 8.5, 6.5 and 4.5 MHz, respectively. Iridium indicated that the 8.5 MHz RASP mode has a similar performance as the default operation mode, which has a bandwidth of 8.5 MHz.

According to Footnote 5.372 of the ITU-R Radio Regulations, harmful interference shall not be caused by stations of the mobile-satellite service to RAS stations using the band 1610.6 – 1613.8 MHz, whereas Recommendation ITU-R RA.1513 defines interference to the RAS to be harmful when it causes more than 2% of observational data loss.

We therefore conclude that Iridium NEXT operations using a bandwidth of 8.5 MHz or more are not in compliance with Footnote 5.372. This means that both the default mode of operation of Iridium NEXT satellites and its 8.5 MHz bandwidth RASP mode are in violation of the ITU-R Radio Regulations.

Iridium has proposed to CRAF to set up a coordination procedure in which the RAS, operating as a *primary* service, has to notify Iridium, operating as a *secondary* service, at least 24 hours in advance about planned observations for each RAS station. Iridium will then switch to one of the narrower bandwidth RASP modes for the indicated observing times per RAS station. However, the following limitation applies: Iridium will operate in these RASP modes for up to 18 hours per day only; during peak traffic hours (at least between noon and 6 pm), RASP modes cannot be applied.

CRAF cannot agree with the proposal from Iridium for the following reasons:

1. It is against the Radio Regulations that a primary service has to coordinate with a secondary service regarding the interference-free use of its band;
2. As RAS stations apply dynamic scheduling or rescheduling of their operations with lead times between 1 minute and 1 day, they cannot give a 24-hour advance notification to satellite operators;
3. During at least 6 hours every day RAS observations will be subject to harmful interference from Iridium. It is not possible for the RAS to avoid observations during a fixed daily time interval, due to operational constraints imposed by the scientific objectives of its research programs;
4. The scientific objectives of the RAS operations require Iridium to operate continuously in RASP mode for sufficiently long periods, up to several weeks;
5. A similar coordination process has not worked effectively for the current generation of Iridium satellites, as based on the Framework Agreement between Iridium and the ESF on behalf of CRAF (for the period from 1<sup>st</sup> May 1999 to 1<sup>st</sup> January 2006.);

As the radio astronomy community is closely connected worldwide, with many radio astronomers from the USA using observing facilities abroad, the interference from Iridium to European and South-African RAS stations also affects American radio astronomers.

CRAF therefore requests the US administration to take appropriate steps to reduce the interference from the Iridium NEXT system into the RAS band 1610.6 – 1613.8 MHz to the levels given in Recommendation ITU-R RA.769, e.g. by enforcing modification of the satellites that will be launched from 2015 onwards, or by limiting the license for the Iridium NEXT space segment to RASP modes with a maximum bandwidth of 6.5 MHz. CRAF asks the US administration to be informed about the steps taken.

Thank you very much in advance.

Yours sincerely,



Dr. Hans van der Marel  
CRAF chair