FCC DEVELOPMENTS
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Paul Feldman
feldman@fhhlaw.com

I. Order on 14 GHz Satellite Earth Stations on Vessels (IB Docket 02-10)

In November 2003, the FCC released a Notice of Proposed Rulemaking on rules and footnotes to the U.S. Table of Allocations for satellite earth stations on board ships and vessels ("ESV's") at 3700-4200/5925-6425 MHz and 11.7-12.2/14.0-14.5 GHz.

Problem: while it is reasonably easy to coordinate between fixed FSS earth stations and other facilities, things become more complicated when the FSS earth station is on a moving boat.

The FCC recognized the existing footnote US203 protection of RAS at 14.47-14.50 GHz, but this provided only "practicable effort" protection. FCC proposed coordination of 14 GHz ESV's with RAS through NTIA, and also proposed a footnote requiring protection of RAS observatories listed in US203.

CORF filed comments supporting this proposal, and suggested adding Mauna Kes, St. Croix and Arecibo to list for protection from 14 GHz ESVs.

I. Order on 14 GHz Satellite Earth Stations on Vessels (IB Docket 02-10) (cont.)

In its Jan. 2005 Order, the FCC:

-authorized ESV uplinks at 14.0-14.5 GHz on a primary basis.

-did not create exclusion zones around any observatory, but in response to RAS comments did require ESV operators to coordinate with NTIA prior to operations within 125 km of Mauna Kea, 45 km to St. Croix, and 90 km to Arecibo. Other sites in footnote US203 were not included, but I am informed that either those sites do not make observations at 14 GHZ, or that they are far enough away from major bodies of water so that there should not be a problem.

The coordination process is not crystal clear, but it appears that upon contemplation of operations near the three observatories, operator must contact NTIA.

The observatory must provide a schedule to the ESV operator of proposed observation times at 14.47 GHz.

Upon completion of coordination, the ESV operator must alert the FCC, which will issue a public notice stating that ESV operations may commence in those areas 30 days from the date of the public notice.

II. UWB Frequency Hopping Order (ET Docket 98-153)

Siemens had filed a petition seeking an amendment to the UWB rules to permit the operation of frequency hopping vehicular radar systems in the 22-29 GHZ band. Under the Siemens proposal, such systems would be permitted to comply with the RMS average emission limits based on averaging over a 10 millisecond period, rather than at any single point in time. Siemens claimed that this would nave not negative effect "when the integration time of space borne [EESS] passive sensors is taken into account."

-CORF opposed the Siemens proposal, but suggested use of a 0.1 ms averaging time period.

-In its December 2004 Order, although the FCC noted the concern of NTIA and CORF about the impact on EESS, in the end, it created a compromise:

-While it allowed some use of frequency hopping generally within frequency band of 23.12-29.0 GHz, the FCC prohibited fundamental transmissions at 23.6-24.0 GHz, in order to protect EESS.

-In regards to measuring peak transmissions, such devices must be measured with the frequency hopping function disabled, and with an averaging period of 1 ms.

III. Broadband Over Powerline Order (ET Docket 03-104)

BPL systems are new types of carrier current systems that operate on an unlicensed basis under Part 15 of the FCC's rules. They use existing electrical power lines as a transmission medium to provide high-speed communications capabilities by coupling RF energy onto the power line.

-The primary frequencies of interest to most BPL proponents at this time are between 20 and 100 MHz.

-This is a high-profile item with a lot of political support in the FCC.

-In October of 2004, the FCC adopted a Report and Order enacting new rules for BPL systems. Generally, the FCC adopted:

1) new operational requirements designed to promote avoidance and resolution of harmful interference;

2) new administrative requirements designed to aid in identifying BPL installations in the case of interference; and

3) specific measurement guidelines and certification requirements designed to ensure accurate and repeatable evaluations of emissions for BPL systems.

Interference Prevention Measures

1. Emission Limits

   Pre-existing emission limits in Part 15 of its rules for unintentional radiators (Rule Section 15.109) continue to apply to BPL.

2. Exclusion Bands

   BPL systems are prohibited from placing carrier frequencies in a number of bands, including 74.8-75.2 MHz. The 37-38 MHz frequency band was not specifically listed as an “exclusion band:” but its use by BPL near certain RAS facilities does trigger prior “consultation” with those facilities.

3. Exclusion Zones

   BPL systems using overhead medium voltage lines within 29 km of the VLBA facilities, or BPL systems using overhead low voltage power lines or underground lines with 11 km of the VLBA, may not use the carrier frequencies 73.0-74.6 MHz.

Interference Prevention Measures (cont.)

4. Consultation Areas and Procedures

BPL operations on 1-38.25 MHz within 4 km of any RAS facility listed in footnote US311 (not just the VLBA), must give notification to the RAS facility 30 days prior to initiation of operation. The notification must give at least the following information:

(1) The name of BPL provider and contact info;
(2) The frequencies used in the BPL operation;
(3) The postal zip codes served by the BPL operation;
(4) Information to identify the manufacturer and type of BPL equipment;
(5) The proposed/or actual date of BPL operation.

No specific points of contact are listed for RAS facilities in the rules, and I will look into how to remedy that oversight.

Interference Mitigation Measures

It is important to remember that as a Part 15 unlicensed service, BPL is a secondary service and it may not cause harmful interference to services with a primary allocation in a particular band. Towards this end, the FCC required BPL systems to incorporate capabilities to modify their systems' operations and performance to mitigate or avoid potential harmful interference to radio services and to deactivate specific units found to actually cause harmful interference that cannot be remedied through modification of their operations.

1. Database Requirements

The FCC required that the BPL industry create a publicly accessible database. The BPL operator must provide to the database the following information 30 days prior to initiation of any operation or service: 1) the name of the BPL provider; 2) the frequencies of the BPL operation; 3) the postal zip codes served by the specific BPL operation; 4) the manufacture and type of Access BPL equipment being deployed (i.e., FCC ID); 5) point of contact information (both telephone and e-mail address) for interference inquiries and resolution; and 6) the proposed/or actual date of BPL operation. Additional or more detailed relevant information needed by an interference victim could be requested via the BPL contact person indicated in the database, as appropriate.

Interference Mitigation Measures

2. Frequency Notching

The FCC required BPL systems to incorporate the capability of avoiding the use of specific frequency bands ("notching"). At frequencies below 30 MHz, the BPL operator must be able to provide at least a 20 dB reduction in emissions. At frequencies about 30 MHz, the reduction must be at least 10 dB. While the systems must have the capability of notching out any frequency they use in response to a complaint, the BPL systems are not required to notch out any specific frequencies in advance (as was suggested by CORF and other parties).

3. Shut-Down Requirement

BPL equipment and systems must have the capability to deactivate individual system components on a remote-controlled basis for the BPL central system operations facility or other appropriate location. The FCC does not intend that service shut-down be the first step in a system operator's response to an interference complaint, but rather a last resort.

4. Complaints to the FCC

The FCC makes it clear that if a party believes that it is receiving harmful interference from BPL operations, it is to go to the BPL operator first, and that the parties are to try to resolve the matter amongst themselves. If that does not succeed, then the interference victim can file a complaint with the FCC.

IV. Cognitive Radio Order (ET Docket No. 03-108)

Cognitive radios change transmission parameters based on interaction with environment.

Primary intended use – allow unlicensed device to "listen" for users on a particular band, and if it doesn't "hear" anything, it could change frequencies to use that band, or if already programmed for that frequency, increase power or other transmit parameters.

For political reasons, FCC is excited about such use in "rural" areas.

CORF's primary concern in comments that it filed was that the FCC might broadly authorize use of cognitive radio technology to allow use of devices that would transmit on frequencies allocated to passive users, especially in rural areas. CORF noted that proposed functions designed to prevent interference to authorized users would not work in the case of passive users.

In its March 2005 Order, FCC did not make radical change in the rules, and did not authorize use of such radios on passive bands.

IV. Cognitive Radio Order (ET Docket No. 03-108) (cont.)

However, they did make a minor change in the rules which might increase the possibility of unauthorized use of such radios on passive bands.

Because other counties allow transmissions on certain bands that are prohibited in the U.S., the FCC allowed manufacturers to create devices with hardware that can transmit on bands prohibited in the U.S., while using software and network controls to prevent such transmissions here.

-FCC enacts a "master/client device" paradigm, where master device sends enabling signals to client devices on network.

-FCC requires master devices marketed in U.S. to operate only on permitted Part 15 bands. Master devices that have hardware capability to operate on other bands must have security features to limit the operation frequency range for devices marketed in the United States. Rules do not specify the details of those security features.

This does not address the problem of a device "marketed" to another country but operated in the U.S., but that is true of all telecommunications equipment.

V. Big LEO/Iridium Spectrum Order (IB Docket 02-364)

In its July 2004 Report and Order the FCC addressed allocation of spectrum to Big LEO MSS systems at 1610-1626 MHz.

In 1994 the FCC allocated 1610-1621.35 MHz for uplinks for Big LEO operators using CDMA technology, and 1621.35-1626.5 MHz for bi-directional transmissions of Big LEO operators using TDMA technology.

Only CDMA operator is Globalstar. The only TDMA operator is Iridium.

In April of 2003, Iridium sought and received special temporary authority ("STA") to operate downlinks on an additional 2.5 MHz of spectrum, from 1618.85 MHz – 1621.35 MHz. Starting in June of 2003, and pursuant to the suggestion of Cornell and Globalstar, the additional STA spectrum was reduced to 1.25 MHz, at 1620.1 – 1621.35 MHz.

In this proceeding, the Iridium had requested permanent allocation of 5.85 MHz of spectrum, at 1615.5 – 1621.35 MHz. Globalstar and Cornell opposed.

V. Big LEO/Iridium Spectrum Order (IB Docket No. 02-364) (cont.)

In the Order the FCC "splits the baby" by giving Iridium 3.1 MHz of spectrum on a permanent basis. Specifically, 1618.25-1621.35 MHz is allocated for shared CDMA/TDMA use on a co-primary basis in the uplink direction, and on a secondary basis for TDMA (Iridium) in the downlink direction. It is unclear at this time what the "secondary" nature of that downlink means. It may be referring to the need to protect RAS or CDMA. It may also be referring to the fact that the international allocations for downlinks in this band are secondary ones.

The Order expressly recognizes the need to protect RAS and reminds Iridium that its use of the additional spectrum is subject to Section 25.213 and its coordination agreements. In additions, the Order reminds Iridium that it will have to terminate operations if it causes "unacceptable interference" to RAS facilities "outside of the limits specified in the existing agreements. The Order also recognizes that entities other than NRAO and NAIC observe in this band, and it encourages those facilities to request coordination with Iridium.

VI. Mobile Satellite Ventures L-Band Order

In January of 2005, the FCC authorized Mobile Satellite Ventures to launch and operate an L—band Mobile Satellite Service (MSS) satellite, at 63.5" W.L. to provide service within South America and between South America and the United States.

MSV is authorized to use 1525-1559 MHz (space-to-Earth) and 1626.5-1660.5 MHz (Earth-to-space) for service links, and also to operate feeder links, TT&C, and gateway-to-gateway communication links in the 10.7-10.95 GHz and 11.2-11.45 GHz bands (space-to-Earth) and the 12.75-13.25 GHz band (Earth-to-space).

Hard to evaluate what the impact might be on U.S. observatories. However, the Order sets forth conditions intended to protect U.S. RAS at 10.7-11.4 GHz (from feeder links and TT&C which will be transmitted to the U.S., apparently to Northern Virginia).

-- Citing Footnote US211, the FCC requires MSV to take "all practicable steps" to protect RAS from harmful interference, and MSV suggests that it has agreed to equip its "replacement satellites" with a transmitter output filter to limit the emissions in the 10.6-10.7 GHz band at or below the -160 dbW/m2 level suggested by the NSF.

VI. Mobile Satellite Ventures L-Band Order (cont.)

-MSV states that its "existing in-orbit satellites in this band employ such a filter as part of past agreements between the MSS and radioastronomy communities."

-Pursuant to Footnote US251, MSV pledges to take "all practicable steps " to protect STS at 13 GHz at Goldstone.

By the way, in para. 17, the Order requires MSV to coordinate with RAS in South America in regards to use of 1525-1559 MHz, pursuant to ITU Footnote 5.354.

VII. NRPM on Unlicensed Operations on Channel 37 (ET Docket 04-186)

In a May 2004 NPRM, the FCC proposed to allow limited use of unlicensed devices where TV channels that are not being "used".

-Device would test for use by GPS location or sensing signals.

The NPRM specifically proposes to prohibit operations on Channel 37, in order to protect RAS and WMTS. Kudos to those in the community who recognized that inviting WMTS into the band would help protect RAS from other allocations of other services into the band!

-CORF filed comments supporting prohibition of unlicensed use of MHz

-CORF also suggested prohibition of use on Channels 14, 36, and 38 within 75 km or radio astronomy observatories listed in footnote US311 (8km for VLBA), and prohibition on use in Quiet Zones.

There is huge opposition in this proceeding from broadcasters.

VIII. NPRM on AMSS (IB Docket 05-20)

In a Feb. 2005 NPRM, the FCC makes proposals and seeks comments on a regulatory framework for licensing the operation of Aeronautical Mobile Satellite Service (AMSS) systems to communicate with fixed-satellite service (FSS) birds in the Ku-Band frequencies. Aircraft Earth stations (AES) in the AMSS can be used to provide broadband telecommunications services on aircraft.

Currently, Boeing has interim authority to operate AMSS (its "Connexion" service) using 11.7-12.2 GHz downlinks and 14.0-14.5 GHz uplinks.

-Currently only used on foreign-based commercial planes (Lufthansa) over U.S. territory, and on government and executive planes. Boeing is negotiating commercial use with U.S. carriers.

-ARINC has a pending application to offer AMSS services, and has experimental authority form the FCC to test the service on 15 airplanes.

-Both Boeing and ARINC have signed MOUs with the NSF, to coordinate operations and avoid harmful interference to existing and future U.S. observatories.

VIII. NPRM on AMSS (IB Docket 05-20) (cont.)

There is already a secondary allocation to AMSS at 14.0-14.5 in the international table of allocations, and the FCC has already adopted a similar secondary allocation. The U.S. Table also has a primary allocation to FSS uplinks at 14.0-14.5, which is used for VSATs and ship-broad transmitters ("ESVs"). In the NPRM, the FCC proposes to allow AMSS uplinks on a secondary basis to those other FSS operations.

NPRM recognizes that RAS has a secondary allocation at 14.47-14.50 in the International Table, and that Footnote US203 provides "practicable effort" protection to certain listed observatories. MPRM seeks comments on a number of proposals to protect RAS in this band:

1. Should AMSS operators have to coordinate with NTIA to resolve any potential concerns regarding radio astronomy facilities? One option would be that AMSS not operate within line of site of a protected observatory. Should AMSS coordination should cover the entire band, as opposed to just the narrower 14.47-14.50 portions?

2. Should the US Table should be modified to give RAS co-secondary status with AMSS? This would give RAS footnote level protection from harmful interference from AMSS (but not from other services).

VIII. NPRM on AMSS (IB Docket 05-20) (cont.)

3. Should AMSS coordinate with future new RAS sites? If AMSS operators are required only to coordinate with sites listed in US203, then protection of new sited will require an FCC rulemaking proceeding to modify US203. Alternatively-coordinate on an ad hoc basis.

4. Boeing suggests that observatories should provide advanced notice to AMSS on observations in the 14 GHz band. Such an approach is consistent with most RAS MOUs.

5. Observatories currently listed in US203: Green Bank, Socorro, Hat Creek, Haystack, Tyngsboro, OVRO, and Five Colleges. Should any of these sites be deleted, and any others added, especially in light of previous CORF filings noting that 14.5 GHz observations are no longer made at Hat Creek, Tyngsboro, and Five Colleges; and that the NSF MOU states that such observations are made at the VLBA station?

VIII. NPRM on AMSS (IB Docket 05-20) (cont.)

6. Should AMSS operators be required to keep aircraft tracking data for one year, and make it available on request to the FCC and NTIA, in connection with investigating interference event?

7. Should the FCC regulate AMSS use on foreign carriers using U.S. AMSS systems, and on foreign aircraft using foreign systems in U.S. airspace?

Comments are due July 15th!

IX. NPRM on Airborne Use of Cell Phones (WT Docket 04-435)

In a recent NPRM, the FCC proposes to replace or relax its ban on airborne usage of 800 MHz cellular handsets.

-FCC rules currently prohibit the airborne use of 800 MHz cellular telephones, including the use of such phones on commercial and private aircraft.

-There is a similar, though less restrictive rule in Part 90 which places some limitations on airborne use of Nextel phones.

-While 1.8 GHz PCS handsets are not subject to an airborne use prohibition under Part 24 of the FCC's rules, FAA regulations prohibit the use of all types of mobile telephones on aircraft, unless the aircraft operator has determined that the use will not interfere with the aircraft's aviation navigations and communications systems.

-Any steps the FCC ultimately takes will still leave the use of phones aboard aircraft subject to the separate rules and policies of the FAA and aircraft operators. However, a government/industry committee is currently studying the impact of phones on aircraft navigation and safety, and will submit a report to the FAA.

IX. NPRM on Airborne Use of Cell Phones (WT Docket 04-435) (cont.)

As a bit of background;

-cellular phones use the bands 824-849 MHz and 869-894 MHz.

-Nextel phones currently operate at 806-821 and 851-866 MHz, though and FCC Order will move their frequencies to 817-824 and 862-869 MHz in the next few years.

-PCS uses frequencies in the 1850-1990 MHz band.

There are some authorized airborne uses of these bands:

-Verizon (GTE)/Airfone air to ground service at 849-851 (uplink) and 894-896 (downlink) MHz. Wired handsets inside the plane, with a single antenna on the plane transmitting to and receiving from the ground.

IX. NPRM on Airborne Use of Cell Phones (WT Docket 04-435) (cont.)

-The FCC has authorized AirCell to operate an airborne cellular system using traditional cellular frequencies, with some limitations designed to minimize interference to terrestrial cellular service. I believe that the company now or will shortly offer a service in which subscribers can use their own wireless handset in the plane, which transmits to and is under the control of a "pico cell" system in the plane, which then transmits the signal to and from the ground. AirCell is primarily used on general aviation aircraft, though they are targeting commercial planes. AirCell also has systems that connect with Iridium.

While not authorized, it is generally suspected that passengers and pilots on general aviation aircraft are using their cell phones on a regular basis.

IX. NPRM on Airborne Use of Cell Phones (WT Docket 04-435) (cont.)

In the current NPRM, the FCC proposes to lift ban on airborne use, but is concerned about interference to terrestrial cellular systems.

-limit to use on planes with pico cells and separate air-to-ground transmission? A pico cell is a low power cellular base station installed in the aircraft for the purpose of communication with (and controlling the operations of) cellular handsets or other cellular devices brought on the aircraft. This would minimize handset power levels.

-Apply pico cell proposal to PCS and Nextel?

-Should FCC adjust the permissible out-of-band and spurious emission limits on cellular handsets to limit impact on airplane systems?

NPRM makes no mention of interference to passive users. No surprise, given that (to the best of my knowledge) the passive user community has to this point not been actively involved in proceedings on airborne use of 800 MHz systems.

Reply comments are due May 9th

Questions?

Thanks!

Paul Feldman
feldman@fhhlaw.com