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May 19, 2000

BY HAND DELIVERY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: Notice of Ex Parte Presentation:
IB Docket No. 98-172, RM-9005, RM-9118

Dear Ms. Salas:

Pursuant to Section 1.1206(b) of the Commission's rules, Hughes Network Systems ("Hughes") hereby submits this Notice of Ex Parte presentation. Yesterday, Joslyn Read of Hughes spoke with Adam Krinsky of the Commission staff by telephone and discussed matters that are reflected in Hughes's comments in the above-referenced proceeding. Ms. Read also provided the attached document to Mr. Krinsky by facsimile. I am filing an original and one copy of this Ex Parte Notice.

Respectfully submitted,

Arthur S. Landerholm
of LATHAM & WATKINS

cc: Adam Krinsky

TECHNICAL APPENDIX A: GSO FSS / NGSO MSS FEEDER LINK SHARING PRINCIPLES IN THE 29.25-29.5 GHZ BAND

Spectrum sharing between a GSO FSS system with ubiquitous small terminals and NGSO MSS feeder links in the 29.25-29.5 GHz band can successfully occur if two simple rules are followed. These rules are consistent with ones already adopted by the FCC in Part 25.258 of the Commission's rules[1]. The first rule is that GSO FSS uplink beams in the same and adjacent cells as the MSS feeder link must be of different type than the MSS feeder link's beams, where a beam type is associated with a specified frequency band and polarization.

Figures 1 and 2 illustrate how sharing can be accomplished between the SPACEWAY GSO FSS and NGSO MSS feeder links. Figure 1 shows an illustrative 1° satellite beam pattern that covers the contiguous U.S. Figure 2 shows this same beam pattern enlarged and shows how, with appropriate frequency and polarization management, two MSS feeder link sites can safely share spectrum with ubiquitous GSO FSS uplinks. The actual GSO FSS satellite beam pattern may vary from this figure, but will employ the sharing principles illustrated.

Using this frequency and polarization reuse pattern, it is possible to design an MSS system to use the 29.25-29.5 GHz band for feeder links without experiencing harmful interference from ubiquitous terminals of GSO FSS networks. This is shown in the attached link budget in Table 1, "UPLINK Interference to MEO space station." The MSS feeder link C/I ratio with inclusion of SPACEWAY ubiquitous terminal uplink interference is over 50 dB, assuming cross-polarization isolation of 30 dB.

Another rule, requiring the NGSO satellites to have repeating ground tracks, will be helpful in two ways. The first is that, even when an NGSO MSS feeder link earth station is collocated and operates in the same frequency band and polarization as a GSO FSS earth station, harmful interference between the MSS feeder link and the GSO

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[1] It is significant that the efficacy of these sharing principles is unaffected by the number of GSO FSS earth stations deployed at 29.25-29.5 GHz, and that these principles apply to GSO FSS earth station antennas 66 cm and larger. The sharing example of the attached link budget assumes an unlimited number of GSO FSS earth stations with 66 cm antennas.

From Hughes Electronics Comments in IB 98-172, November 18, 1998. (RM-9005, 9118)

network can be avoided by carefully choosing the Right Ascensions of the Ascending Node (RAANs)[2] of the NGSO satellites. The RAANs must be chosen such that the NGSO satellites maintain enough angular separation from the GSO satellite in question so as to prevent harmful interference between the NGSO and GSO systems. The RAAN can only be chosen for a repeating ground track because with a non-repeating ground track the RAAN changes significantly over time. An NGSO with a non-repeating ground track will maintain its initially chosen RAAN only for a short time. Figures 3 through 8 show how interference is mitigated with proper selection of the RAANs for a 3 plane, repeating ground track NGSO satellite system with circular orbits of altitude 10355 km and inclination 50°. Figures 3 through 5 show the azimuth and elevation angles from an East Coast site to the NGSO satellites and to a GSO satellite located at 101° W. The orbit plane of Figure 3 has a RAAN of 95°, that of Figure 4 has a RAAN of 215°, and that of Figure 5 has a RAAN of 335°. These figures show that the difference in angles pointing to the NGSO satellite and the GSO satellite is always at least about 8°. This angular separation provides at least 30 dB of interfering signal attenuation by an interfering earth station antenna.

Figures 6 through 8 show the same mitigation technique with the same RAANs for a West Coast site. These figures show that the difference in angles pointing to the NGSO satellite and the GSO satellite is always at least about 15°. Again, at least 30 dB of interfering signal attenuation will be provided by an interfering earth station antenna because of this large angular separation.

The second benefit from repeating ground tracks is that, interference from an NGSO system with a repeating ground track is easily tracked back to the specific NGSO feeder link interferor, and then the specific link can be dealt with. If the NGSO satellite does not have a repeating ground track, it will be difficult to ascribe interference to a specific link, as the NGSO satellite orbital history will be complex.

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[2] The RAAN specifies where the orbit crosses the Earth's equatorial plane as it flies Earth-Northward. For a satellite with a circular orbit of given altitude and inclination, the RAAN determines the look angles to the satellite from an earth station.

The current FCC rules support two major sharing techniques between NGSO MSS feeder links and GSO FSS systems with small ubiquitous terminals. Either technique, frequency and polarization management or careful choice of RAANs for repeating ground track NGSO MSS systems is adequate to allow sharing of spectrum between the NGSO system and a GSO system. These techniques can also be combined to allow sharing without harmful interference in the case where the full mitigation of one of the techniques is not achieved because its rules are not strictly followed.

ILLUSTRATIVE SPACEWAY & MSS MEO FEEDER LINK SHARING PLAN FOR CONTIGUOUS U.S., 29.250 - 29.500 GHz

Beam Type 1 = RHC Polarization, 29.250-29.375 GHz
Beam Type 2 = RHC Polarization, 29.375-29.500 GHz
Beam Type 3 = LHC Polarization, 29.250-29.375 GHz
Beam Type 4 = LHC Polarization, 29.375-29.500 GHz
Beam Type X = No SPACEWAY beam in the 29.250-29.500 GHz band (beam(s) using other band(s) will be utilized.)

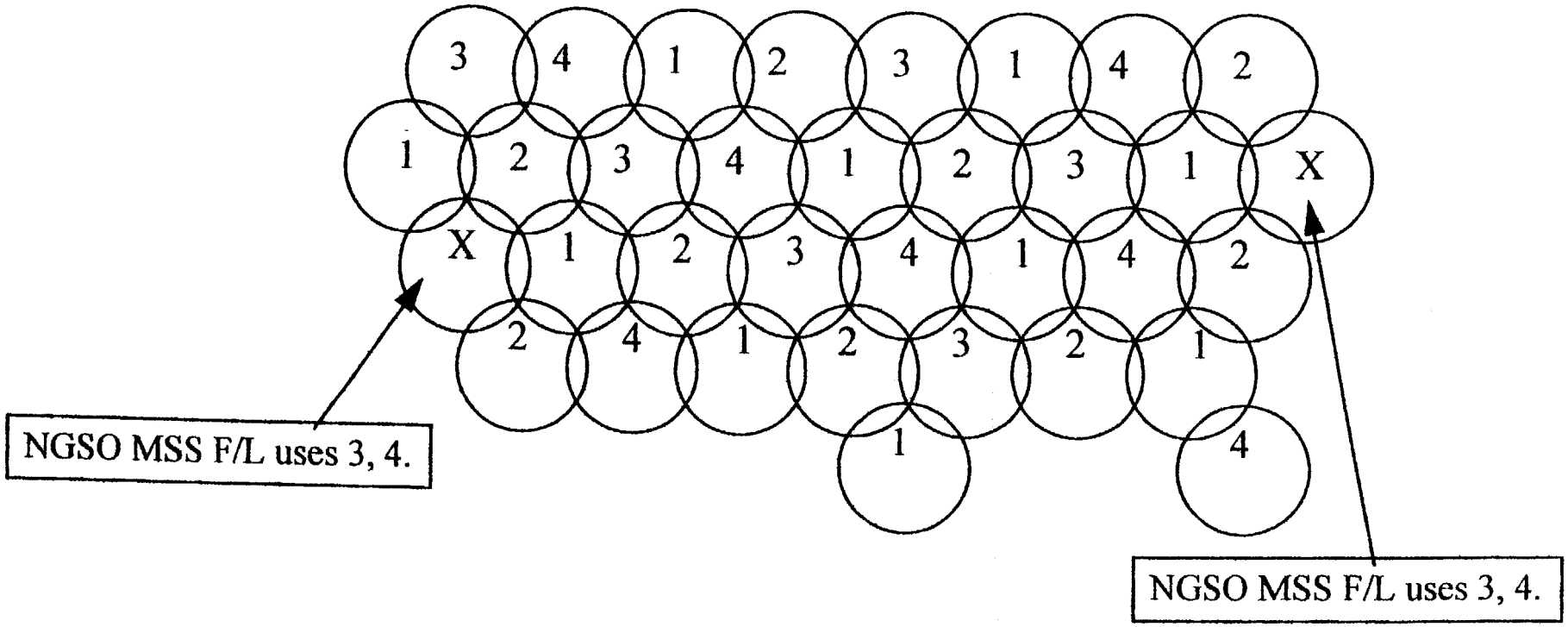

FIGURE 2

terrestrial stations with earth stations, and in § 25.203 in the case of coordination of earth stations with terrestrial stations.

(b) The technical aspects of coordination are based on appendix 28 of the International Telecommunications Union Radio Regulations and certain recommendations of the ITU Radiocommunication Sector ("ITU–R") (available at the International Bureau Reference Center, Room 102, 2000 M Street, NW., Washington, DC 20554.).

[62 FR 5931, Feb. 10, 1997]

§§ 25.252–25.256 [Reserved]

§ 25.257 Special requirements for operations in the band 29.1–29.25 GHz between NGSO MSS and LMDS.

(a) Non-geostationary mobile satellite service (NGSO MSS) operators shall be licensed to use the 29.1–29.25 GHz band for Earth-to-space transmissions from feeder link earth station complexes. A "feeder link earth station complex" may include up to three (3) earth station groups, with each earth station group having up to four (4) antennas, located within a radius of 75 km of a given set of geographic coordinates provided by a NGSO MSS licensees or applicants pursuant to § 101.147.

(b) A maximum of seven (7) feeder link earth station complexes in the contiguous United States, Alaska and Hawaii may be placed into operation, in the largest 100 MSAs, in the band 29.1–29.25 GHz in accordance with § 25.203 and § 101.147 of this chapter.

(c) One of the NGSO MSS operators licensed to use the 29.1–29.25 GHz band may specify geographic coordinates for a maximum of eight feeder link earth station complexes that transmit in the 29.1–29.25 GHz band. The other NGSO MSS operator licensed to use the 29.1–29.25 GHz band may specify geographic coordinates for a maximum of two feeder link earth station complexes that transmit in the 29.1–29.25 GHz band.

(d) Additional NGSO MSS operators may be licensed in this band if the additional NGSO MSS operator shows that its system can share with the existing NGSO MSS systems.

(e) All NGSO MSS operators shall cooperate fully and make reasonable efforts to identify mutually acceptable locations for feeder link earth station complexes. In this connection, any single NGSO MSS operator shall only identify one feeder link earth station complex protection zone in each category identified in § 101.147(c)(2) of this chapter until the other NGSO MSS operator has been given an opportunity to select a location from the same category.

[61 FR 44181, Aug. 28, 1996]

§ 25.258 Sharing between NGSO MSS Feeder links Stations and GSO FSS services in the 29.25–29.5 GHz Bands.

(a) Operators of NGSO MSS feeder link earth stations and GSO FSS earth stations in the band 29.25 to 29.5 GHz where both services have a co-primary allocation shall cooperate fully in order to coordinate their systems. During the coordination process both service operators shall exchange the necessary technical parameters required for coordination.

(b) Licensed GSO FSS systems shall, to the maximum extent possible, operate with frequency/polarization selections, in the vicinity of operational or planned NGSO MSS feeder link earth station complexes, that will minimize instances of unacceptable interference to the GSO FSS space stations.

(c) NGSO MSS satellites operating in this frequency band shall compensate for nodal regression due to the oblate shape of the Earth, and thus maintain constant successive sub-satellite ground tracks on the surface of the Earth.

(d) NGSO MSS systems applying to use the 29.25–29.5 GHz band, for feeder link earth station uplink, will have to demonstrate that their system can share with the authorized U.S. GSO/FSS systems operating in this band.

[61 FR 44181, Aug. 28, 1996]

§ 25.259 Time sharing between NOAA meteorological satellite systems and non-voice, non-geostationary satellite systems in the 137–138 MHz band.

(a) A non-voice, non-geostationary mobile-satellite service system licensee ("NVNG licensee") time-sharing spectrum in the 137–138 MHz frequency

band shall not transmit signals into the "protection areas" of National Oceanic and Atmospheric Administration ("NOAA") satellite systems. When calculating the protection areas for a NOAA satellite in the 137.333–137.367 MHz, 137.485–137.515 MHz, 137.605–137.635 MHz and 137.753–137.787 MHz bands, a NVNG licensee shall use an earth station elevation angle of five degrees towards the NOAA satellite and will cease its transmissions prior to the NVNG licensee's service area, based on an elevation angle of zero degrees towards the NVNG licensee's satellite, overlapping the NOAA protection area. When calculating the protection areas for a NOAA satellite in the 137.025–137.175 MHz and 137.825–138 MHz bands, a NVNG licensee shall use an earth station elevation angle of zero degrees, or less if reasonably necessary, towards the NOAA satellite and will cease its transmissions prior to the NVNG licensee's service area, based on an elevation angle of zero degrees towards the NVNG licensee's satellite, overlapping the NOAA protection area. A NVNG licensee is responsible for obtaining the necessary ephemeris data. This information shall be updated system-wide on at least a weekly basis. A NVNG licensee shall use an orbital propagator algorithm with an accuracy equal to or greater than the NORAD propagator used by NOAA.

(b) A NVNG licensee time sharing spectrum in the 137–138 MHz band shall establish a 24-hour per day contact person and telephone number so that claims of harmful interference into NOAA earth station users and other operational issues can be reported and resolved expeditiously. This contact information shall be made available to NOAA or its designee. If the National Telecommunications and Information Administration ("NTIA") notifies the Commission that NOAA is receiving unacceptable interference from a NVNG licensee, the Commission will require such NVNG licensee to terminate its interfering operations immediately unless it demonstrates to the Commission's reasonable satisfaction, and that of NTIA, that it is not responsible for causing harmful interference into the worldwide NOAA system. A NVNG licensee assumes the risk of any liability or damage that it and its d rectors, officers, employees, affiliate agents and subcontractors may incu or suffer in connection with an inte ruption of its non-voice, non-ge stationary mobile-satellite service, whole or in part, arising from or rela ing to its compliance or noncompliand with the requirements of this par graph (b). The Commission will n hesitate to impose sanctions on NVNG licensee time-sharing spectru in the 137–138 MHz band with NOAA, i cluding monetary forfeitures and cense revocations, when appropriate.

(c) Each satellite in a NVNG licen ee's system time-sharing spectru with NOAA in the 137–138 MHz ba shall automatically turn off and cea satellite transmissions if, after 72 co secutive hours, no reset signal is r ceived from the NVNG licensee's gat way earth station and verified by t satellite. All satellites in such NVN licensee's system shall be capable of i stantaneous shutdown on any sub-ba upon command from such NVNG censee's gateway earth station.

[62 FR 59296, Nov. 3, 1997]

§ 25.260 Time sharing between D meteorological satellite systems a non-voice, non-geostationary s ellite systems in the 400.15–401 M band.

(a) A non-voice, non-geostationa mobile-satellite service system censee ("NVNG licensee") time-shari spectrum in the 400.15–401.0 MHz ba shall not transmit signals into t "protection areas" of Department Defense ("DoD"). When calculating t protection areas for a DoD satellite the 400.15–401 MHz band, a NVNG censee shall use an earth station e vation angle of five degrees towa the DoD satellite and will shut off transmissions prior to the NVNG censee's service area, based on an e vation angle of zero degrees towa the NVNG licensee's satellite, overl ping the DoD protection area. A NV licensee is responsible for obtain the necessary ephemeris data. This formation shall be updated syste wide at least once per week. A NV licensee shall use an orbital propaga algorithm with an accuracy equal to