

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matters of)
)
 Request for Declaratory Ruling on)
 Partial-Band Licensing of Earth) RM No. 9649
 Stations in the Fixed Satellite Service)
 that Share Terrestrial Spectrum)
)
 Petition for Rule Making to Set)
 Loading Standards for Earth Stations)
 in the Fixed Satellite Service that)
 Share Terrestrial Spectrum)

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COMMENTS OF SKYBRIDGE L.L.C.

SkyBridge L.L.C. ("SkyBridge"), by its attorneys, hereby submits these comments on the above-captioned Request for Declaratory Ruling and Petition for Rulemaking of the Fixed Wireless Communications Coalition (the "FWCC"), filed May 5, 1999 (the "Petition").^{1/} SkyBridge is an applicant before the Commission for authority to launch and operate non-geostationary orbit ("NGSO") Fixed Satellite Service ("FSS") systems in the Ku-band (the "SkyBridge System") and the Ka-band (the "SkyBridge II System"). Both of these bands are subjects of the instant Petition.^{2/}

^{1/} See Public Notice, Report No. 2334, June 11, 1999.

^{2/} Most of the issues raised by the FWCC in its Petition were raised previously in the rulemaking proceeding concerning NGSO FSS systems in the Ku-band. See Reply Comments of SkyBridge L.L.C., In the Matter of Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-band and Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Direct Broadcast Satellite Licensees and Their Affiliates, ET Docket No. 98-206, RM-9147, RM-9245 (filed April 14, 1999) ("NPRM Reply Comments"). In the Ku-band NGSO FSS proceeding, SkyBridge proposed a comprehensive regulatory regime that will protect FS operations and expansion, without imposing unnecessary burdens on NGSO FSS systems. SkyBridge's proposals place significant constraints on NGSO

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As discussed below, SkyBridge agrees with the FWCC on the importance of maximizing efficient use of the radio spectrum for both FSS and point-to-point terrestrial Fixed Service ("FS") operations.^{3/} However, because the FWCC fails to take into account a number of critical aspects of FSS/FS coordination and the nature of FSS operation in general, its proposals are seriously flawed.

I. The FWCC's Proposed Rules Regarding Coordination of FSS Earth Stations and FS Terrestrial Facilities Ignore Critical Factors That Must Be Taken Into Account to Avoid Penalizing Either Service.

The FWCC requested that the Commission require earth station operators that waive interference cases when siting an earth station in an existing environment of terrestrial facilities to give similar treatment to later-coordinated terrestrial facilities. As the Petition explains, an earth station applicant may accept a given level of interference from an existing point-to-point terrestrial user, either because it does not plan to use the interfering frequencies, or because it knows that terrain or a specific local feature, such as a berm or building, will attenuate the signal to an acceptable level.^{4/} The FWCC complains that, when a subsequent terrestrial applicant seeks coordination, the earth station operator is free to

^{2/} (...continued)

FSS systems, yet SkyBridge believes that they represent a reasoned accommodation to the FS industry. However, as explained in the NPRM Reply Comments, SkyBridge does take issue with certain of the undue constraints on NGSO FSS systems proposed by some in the FS community, which achieve no identifiable countervailing benefit to the public.

^{3/} Petition at i. Indeed, Alcatel Network Systems Inc., one of the world's largest manufacturers of terrestrial microwave systems and a member of the FWCC, and SkyBridge are both controlled by Alcatel, which has a distinct and considerable financial interest in ensuring efficient use of spectrum by both satellite and terrestrial services.

^{4/} Petition at 6, 10. FWCC states that such facts, including the existence of a berm or building, are not available to the terrestrial user. *Id.* However, such situations that make a coordination successful are explained in the resulting earth station application to the Commission. See 47 C.F.R. § 203(b), (c)(4).

disregard those same facts, and deny a particular siting to the terrestrial user, even when the facilities would not cause actual interference to the earth station.

As it has stated previously, SkyBridge is sympathetic to this predicament,^{5/} which can work both ways (to the disadvantage of either the FSS earth station or the FS facility). However, before addressing FWCC's proposal to ameliorate this situation, SkyBridge would like to clarify a number of misleading statements contained in the FWCC Petition regarding coordination between satellite earth stations and fixed point-to-point facilities.

A. The FWCC Makes a Number of Erroneous and Misleading Assumptions Regarding Coordination Between FSS Earth Stations and FS Facilities.

The FWCC claims that a terrestrial applicant must usually undertake coordination if it seeks to locate anywhere within 100 to 150 miles of a licensed earth station.^{6/} This statement is misleading, because the *coordination distance* does not represent the actual *separation distance* required to prevent interference between the two parties. The coordination distance defines only the region in which a detailed interference analysis becomes necessary.^{7/} For example, it is computed assuming main-beam to main-beam interference. In the vast majority of cases, a detailed interference analysis, including the actual operational characteristics and pointing directions of the FSS and FS stations, as well as the terrain profile, will result in a required separation distance much less than this coordination distance.

^{5/} NPRM Reply Comments at 52.

^{6/} See, e.g., Petition at 6.

^{7/} The minimum coordination distance of 100 kilometers (not miles) specified in the FCC and ITU rules (see 47 C.F.R. § 25.251(b) and Appendix 28/Appendix S7 of the ITU Radio Regulations) is necessarily based on conservative assumptions to ensure that it captures all potential interference configurations.

The FWCC further claims that, "even if a point-to-point station successfully coordinates with an earth station on an unused frequency, the earth station remains free at any time to expand its operations and displace the terrestrial station."^{8/} This is absolutely not true. A successful coordination results in an agreement, communicated to the Commission. An earth station operator cannot later decide to operate contrary to the conditions of that agreement (except at its own risk, in the case of accepting interference to the earth station operator). And it definitely cannot displace the licensed terrestrial station.

Finally, the FWCC characterizes as "warehousing" the fact that earth stations are routinely licensed and coordinated for all azimuths at all elevations.^{9/} However, even with GSO earth stations with fixed pointing angles, this is an absolute necessity to avoid interference to or from the earth station side-lobes and back-lobes.^{10/} It does not lead to spectrum warehousing, because the actual required separation distance will depend on where the terrestrial station falls within the earth station antenna pattern, and will be no greater than that required for protection of the systems.

B. The FWCC's Proposal For New Coordination Rules Is Flawed In Important Respects.

The FWCC proposes that, if an FSS earth station accepts higher-than-desired interference when coordinating, then a FS facility that subsequently coordinates should have

^{8/} Petition at 6.

^{9/} Id. at 4.

^{10/} In the case of earth stations communicating with NGSO satellites, it can be expected that all azimuths will be used by the earth station. However, the minimum elevation angle used may vary greatly depending on azimuth. The Commission should employ the revision to Appendix 28/S7, which takes into account the time-varying nature of the horizon gain of the NGSO earth station antenna for a given azimuth. This leads to a smaller coordination area, facilitating coordination with FS links.

the benefit of the same higher level.^{11/} As noted above, SkyBridge agrees with this concept in principle, so long as it is applied to any coordination and to both services (i.e., terrestrial and satellite). As is often the case, however, the "devil is in the details," and SkyBridge sees numerous difficulties with the specific regime proposed by the FWCC.

First, the FWCC proposes that, if the only explanation for an earth station operator's waiver of its performance objectives is frequency off-set, future FS stations should not be required to protect the earth station in the subject frequencies.^{12/} This, however, ignores the potential impact of adjacent band interference. Rather than simply ignore the earth station in future coordinations involving the subject frequencies, the impact of adjacent band interference must be taken into account on a case-by-case basis.

Moreover, even in cases where adjacent band interference is not a significant factor, the earth station should not be ignored in future coordinations. An earth station operator may waive a small discrepancy between actual and desired interference if the risk that the operator will need to use the frequency (e.g., in the event of a transponder failure) is small. However, the earth station operator should not thereby be required to accept large discrepancies.^{13/} Requiring an earth station operator to accept large discrepancies, because of a small-discrepancy waiver, would, in fact, work to the disadvantage of the FS; any incentive that the operator would have to waive a small discrepancy would clearly vanish.

Second, the FWCC proposes that, if the only explanation for an earth station operator's waiver of its performance objectives is shielding by a local feature (such as a building or berm that would not show up on a topographical map), then the level of attenuation is deemed to be the amount of the missed objective, which will be applied over

^{11/} Petition at 10-12, Appendix C at i-ii (proposed new Section 25.203(e)).

^{12/} Id. at 11, Appendix C at ii.

^{13/} If, to prevent this, the operator designated its waiver as "unexplained" under the FWCC's proposed regime, rather than "frequency offset," the operator would be required to accept the discrepancy at all frequencies.

the entire azimuth subtended by the feature.^{14/} However, the level of attenuation caused by a feature is not constant over the azimuth subtended by the feature, particularly near the edge. Measurements or calculations of variations in azimuth caused by edge diffraction or other characteristics of the feature should be taken into account.

Similarly, the FWCC proposes that, if the explanation for a waiver is terrain blockage, the earth station applicant must evaluate the blockage using industry-accepted programs based on current topographical maps. If the evaluated blockage is less than the difference between the desired and accepted interference, the discrepancy would be recorded as "unexplained," and the performance objectives applied for new terrestrial facilities would be increased by this amount.^{15/} Again, however, this may penalize the earth station operator, by leaving open to interpretation the reasons behind a given coordination result between two parties. It must be fully within the control of the earth station operator to evaluate a given coordination situation, taking into account all factors, including terrain, and to reach an agreement with an FS operator on that basis. Denying an earth station operator, for all future coordinations, the difference between its waiver of its interference objectives and the theoretical output of a computer program for a specific case is an overly simplistic mechanism for addressing the FWCC's concerns, and will adversely affect the dynamic of the coordination process.

Finally, both of the explanations for attenuation (local feature and terrain) must be correlated with the frequencies coordinated. As noted above, some frequencies may be legitimately more important to an earth station operator than others. To impute any waiver at one frequency as applying to all frequencies would unfairly penalize the earth station operator, and reduce any incentive to cooperate with FS operators in siting new facilities.

^{14/} Petition at 10, Appendix C at ii.

^{15/} Id. at 11-12, Appendix C at ii.

II. The FWCC's Proposed Rules and Declaratory Ruling on Earth Station Bandwidth Use and Loading Ignore Key Distinctions Between Terrestrial and Satellite Systems.

The FWCC proposed a declaratory ruling and new rules aimed at increasing the efficiency of bandwidth use by satellite systems.^{16/} As discussed below, however, these proposals ignore key distinctions between terrestrial and satellite services, and, as proposed, would impose significant burdens on satellite systems.^{17/}

First, the FWCC has requested that the Commission require earth stations using shared spectrum to meet minimum loading standards. Specifically, the FWCC proposes that an FSS earth station licensed for greater than 40 MHz of shared spectrum be required to load to 50% of licensed bandwidth within 30 months after licensing, or else reduce its licensed bandwidth.^{18/}

As the FWCC acknowledges, this proposal is based on Commission rules applicable to terrestrial facilities.^{19/} However, there are key differences between terrestrial and satellite operations.^{20/} Terrestrial operations can be quickly designed, built, and brought

^{16/} It should be kept in mind that satellite systems must employ two frequency bands, one for uplink and the other for downlink, while terrestrial FS systems operate within a single band.

^{17/} Moreover, the benefit of such rules will be diminished if the details of the coordination rules discussed above can be satisfactorily worked out to correct the defects of the FWCC proposal.

^{18/} Petition at 10, Appendix C at i (proposed new Section 25.133 (e)).

^{19/} Id. at 10.

^{20/} The FWCC routinely ignores such differences. In the Ku-band NGSO FSS proceeding (see note 2, supra), for example, the FWCC proposed that SkyBridge be required to increase its spectrum efficiency by using 16-QAM modulation. However, SkyBridge's use of spread spectrum is very well-suited for the satellite environment, where transmission power is a scarce resource, and for frequency re-use with FS and GSO systems. The use of 16-QAM would force SkyBridge to increase the power transmitted by its satellites and

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on-line in response to demonstrated need. Satellite projects, on the other hand, must be designed years in advance of commencement of service, based on market projections. Moreover, especially with global systems, service may commence in phases. Finally, equipment in space is not flexible; capacity cannot be simply added as customers are added. The satellite operator must design, license, and build its system for the ultimate market, which may not be realized until several years after launch of the system. Requiring a global satellite system to meet arbitrary loading standards as a condition to maintaining the full capabilities of its extensive earth station facilities is simply unworkable.^{21/}

Nor is it clear how such a rule could be applied in practice. As just one example, it is not obvious how the rule could be applied to spread spectrum systems, which spread their emissions across an entire band. In addition, loading data is very commercially sensitive information, which operators should not be required to disclose.

In addition to loading standards, the FWCC has also requested that the Commission issue a declaratory ruling, and adopt rules, both stating that earth stations may be licensed and coordinated to use only twice the amount of spectrum for which the applicant

^{20/} (...continued)

earth stations (which would not benefit GSO, NGSO or FS systems) and would make the system more sensitive to interference. See NPRM Reply Comments at 53 .

^{21/} The FWCC also proposes that earth station operators be required to publish any failure to meet loading standards. Petition, Appendix C at i. However, assuming arguendo that loading standards are adopted, it is not clear why any notification could not be handled through the Commission's public notice procedures.

has demonstrated actual need.^{22/} The FWCC proposed to permit twice the spectrum to allow for changeover to alternate transponders or satellites, as required.

One problem with any such requirement is the demonstration of "need." The FWCC proposes that this may be accomplished by the earth station operator, for example, by certifying that it has appropriate contracts for transponder usage, or certifying as to minutes of usage per day, or by justifying the bandwidth applied for in terms of the services proposed.^{23/} However, there is simply no general criteria for bandwidth usage that could be applied across the board to all satellite systems. Transponder usage and minutes per day are not easily applicable to new satellite systems, such as NGSO FSS systems, and a requirement that bandwidth be justified "in terms of the services proposed" leaves the door open for endless controversies.

For example, as described above, satellite system build-out differs from deployment of terrestrial systems. An earth station operator for a satellite system may not use all of the bandwidth available from the start of service, but may augment its use as its business grows. However, the earth station must be coordinated and licensed from the start for all of the bandwidth ultimately needed by the projected traffic. Moreover, earth stations operating with satellite systems implementing frequency reuse may switch bands from time to time. All such bands used by the earth station are "needed."

^{22/} Petition at 8, Appendix B, Appendix C at i (proposed new Section 25.130(f)). As the FWCC notes (Petition at 5), GSO earth stations are often coordinated and licensed for the entire band licensed to the satellite. However, this is necessary because a satellite transponder failure may require a particular earth station to switch to another transponder operating at a different frequency. Unlike terrestrial facilities, repairs to a satellite are generally impossible, and therefore flexibility is required to maximize use of the satellite resources. Similarly, GSO earth stations are often coordinated for all pointing directions along the GSO arc, in case a satellite failure requires repointing earth stations to a different GSO satellite.

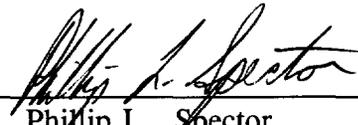
^{23/} Petition at 8.

III. Conclusion

SkyBridge is sympathetic to some of the problems identified in the FWCC Petition; these can affect FSS earth station licensees as well as FS station licensees. However, the FWCC fails to take into account a number of critical factors, with the result that its proposals are seriously flawed. For these reasons, the Commission should not issue the declaratory ruling proposed by the FWCC. Moreover, should the Commission decide to initiate a rulemaking on any of the identified issues, it should take into account in its Notice of Proposed Rulemaking the concerns identified above.

Respectfully submitted,

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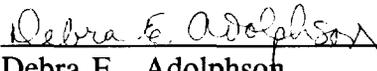
July 12, 1999

CERTIFICATE OF SERVICE

I hereby certify that the foregoing Comments of SkyBridge L.L.C. was served by first-class mail, postage prepaid, this 12th day of July, 1999, on the following person:

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