

Waiver Requests

Pursuant to Section 1.3 of the Commission's rules, the Commission may waive its rules for good cause shown.¹ "Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation would better serve the public interest than would strict adherence to the general rule," including "more effective implementation of overall policy."² In determining whether to waive its rules, the Commission should "take into account considerations of hardship, equity, or more effective implementation of overall policy."³ As shown below, there is good cause for the Commission to grant a waiver of Sections 2.106, 25.202(g)(1), 25.217(b), and, to the extent necessary, various limitations in the Commission's Schedule S.

I. Waiver of U.S. Table of Frequency Allocations

Capella satellites will communicate with Inmarsat satellites using a spaceborne Inmarsat BGAN terminal operating in L-Band spectrum licensed to Inmarsat for its normal operations. Specifically, the BGAN terminal installed on Capella spacecraft will receive in the 1525.0-1559.0 MHz band and transmit in the 1626.5-1660.0 MHz band. These are bands that the Commission has authorized for regular communications between U.S.-licensed earth stations and Inmarsat's MSS satellites.⁴ These communications will allow Capella to relay customer

¹ 47 C.F.R. § 1.3. See also *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969), *cert. denied*, 409 U.S. 1027 (1972); *Northeast Cellular Telephone Co., LP v. FCC*, 897 F.2d 1164 (D.C. Cir. 1990).

² *GE American Communications, Inc.*, 16 FCC Rcd. 11038, ¶ 9 (Int'l Bur. 2001).

³ *WAIT Radio*, 418 F.2d at 1159.

⁴ See, e.g., *Inmarsat Inc.*, 23 FCC Rcd. 15268 (2008) (establishing ISAT list to streamline earth station licensing). Capella recognizes that the 1544-1545 MHz and 1645.5-1646.5 MHz bands are reserved for distress and safety communications only. See 47 C.F.R. § 2.106, nn. 5.356, 5.375.

observation requests immediately so that they can be acted upon without the need to wait until the appropriate satellite is within view of a Capella earth station, as would be required for other TT&C operations. This will serve the public interest by allowing Capella to provide a more responsive and capable SAR system to users in the U.S. and internationally without increasing the risk of interference to other operators or services.

The Commission's rules and the ITU Radio Regulations define "intersatellite service" as a radiocommunication service providing links between satellites.⁵ Section 25.279(a) of the Commission's rules states that space stations may use frequencies in the inter-satellite service as indicated in Section 2.106, and other frequencies where inter-satellite links are part of the service definition.⁶ The definition of MSS, in turn, includes radiocommunication service "between space stations used by this service,"⁷ thereby permitting frequencies allocated to MSS to be used for inter-satellite links. However, the Table of Frequency Allocations specifies a directional limitation on MSS operations in the L-band – *i.e.*, either space-to-Earth (1525-1559 MHz) or Earth-to-space (1626.5-1660.0 MHz). The best interpretation of the Commission's rules is that Section 25.279(a) controls and authorizes the proposed intersatellite communications. However, it could be argued that, because transmissions would neither originate nor terminate on Earth, the directional limitations in the Table of Allocations would render inter-satellite service a non-conforming use of these bands.

Accordingly, in an abundance of caution, Capella requests a waiver of Section 2.106 to allow communications between its spacecraft and Inmarsat satellites. These transmissions will occur only on frequencies that Inmarsat assigns to the spaceborne Inmarsat BGAN terminal

⁵ See 47 C.F.R. § 25.103; ITU Rad. Regs. 1.22.

⁶ See 47 C.F.R. § 25.279(a).

⁷ See 47 C.F.R. § 25.103.

onboard the Capella satellite. As with its other operations, Inmarsat will assign channels to Capella satellites consistent with its coordination agreements with other operators in the band, ensuring that there is no harmful interference between these systems. Furthermore, in the 1525 - 1559 MHz band, Capella’s operations will be receive-only. The received signals will be transmitted by Inmarsat satellites with the same technical parameters as Inmarsat would use to communicate with its authorized MSS terminals on the earth’s surface. As a result, these intersatellite transmissions will not result in any additional interference. In considering requests for such non-conforming spectrum uses, the Commission has indicated that it would generally grant waivers “when there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the non-conforming operator accepts any interference from authorized services.”⁸

II. Waiver of Section 25.202(g)(1) for TT&C Operations in the 2025-2110 MHz band

Section 25.202(g)(1) anticipates that satellite systems will conduct telemetry, tracking and command (“TT&C”) operations using spectrum at the edge of or within their assigned bands.⁹ Capella proposes to conduct its TT&C uplink transmissions at 2035-2037 MHz – spectrum in which non-federal Earth-to-space transmissions may be authorized for EESS operations subject to conditions on a case-by-case basis and on a non-harmful interference basis.¹⁰ Capella intends

⁸ See, e.g., *Fugro-Chance, Inc.*, 10 FCC Rcd. 2860, ¶ 2 (Int’l Bur. 1995) (authorizing non-conforming MSS in the C-band); *Motorola Satellite Communications, Inc.*, 11 FCC Rcd. 13952, ¶ 11 (Int’l Bur. 1996) (authorizing service to fixed terminals in bands allocated to MSS).

⁹ See 47 C.F.R. § 25.202(g)(1).

¹⁰ See *id.* § 2.106, n. US347.

to operate on such a basis, but will use the spectrum solely for TT&C. In this case, waiver is appropriate due to the unusual spectrum usage of the Capella system.

Specifically, Capella uses spectrum to take radar images of the Earth. Although its satellites must process a return echo from these transmissions, they do not need an uplink channel to carry commercial communications typical of most satellites. Thus, there is no assigned uplink band for customer traffic, and therefore no band edge at which to conduct TT&C operations in accordance with Section 25.202(g)(1). Indeed, the only uplink spectrum used by the Capella system is for TT&C itself.

III. Waiver of Section 25.217(b) default service rules

Capella requests a waiver of the default service rules under Section 25.217(b) of the Commission's rules. The Commission has not adopted band-specific rules for EESS NGSO operations in the 8025-8400 MHz and 9300-9900 MHz bands. However, the Commission has granted to NGSO EESS system licensees on multiple occasions waivers of the default service rules contained in Section 25.217(b), based on the fact that EESS operators are required to comply with technical requirements in Part 2 of the Commission's rules and applicable ITU rules.¹¹ In these cases, the Commission concluded that because the cited requirements had been sufficient to prevent harmful interference, there was no need to impose additional technical requirements.¹² For these same reasons, the Commission should grant Capella a waiver of the default service rules contained in Section 25.217(b)

¹¹ See, e.g., Space Imaging, ¶ 25; Digital Globe, ¶ 15.

¹² *Id.*

IV. Waiver of Limitations in Schedule S

As required by the Commission's rules,¹³ Capella has submitted with this application a completed Schedule S, which contains certain technical information in a prescribed form. Capella has found that it cannot accurately describe its system in certain respects due to limitations in Schedule S itself. Below we discuss several aspects of the system that fall into this category as well as how Schedule S was completed in light of these limitations. To the extent necessary, Capella requests that the Commission waive these aspects of the requirement to complete Schedule S.

First, section 25.114(c)(4)(v) requires both the minimum and maximum saturation flux density ("SFD") values for each space station receive antenna that is connected to transponders. The concept of SFD only applies to "bent pipe" satellite systems, and thus is not relevant to the Capella system. However, the Schedule S system does not allow an entry of "not applicable." Instead, it requires a numerical entry for SFD, which must include different maximum and minimum values. In order to accommodate this requirement, Capella has entered values of "0" and "-0.1" in Schedule S with respect to these parameters.

Second, Schedule S requires completion of the field "Polarization Alignment Relative to the Equatorial Plane" for antennas with linear polarizations such as Capella's SAR emitter. However, due to Capella's orbital and operational characteristics — in particular, the fact that the Capella system is an NGSO, not a GSO system — Capella's satellites will not operate with a consistent alignment relative to the equatorial plane. Thus, Capella has entered a value of 0 for this parameter.

¹³ See 47 C.F.R. § 25.114(a)(1).

Third, Schedule S Capella's payload downlink beam at 8043.75 – 8381.25 MHz has a switchable polarization between LHCP and RHCP. However, Schedule S does not permit this information to be correctly entered. Thus, Capella has completed that form to indicate only LHCP polarization.

Fourth, Schedule S requires submission of a channel plan for each transmit and receive beam. However, as explained in Capella's Technical Attachment, Capella's space-to-space links will operate on channels, and with bandwidths, specified by Inmarsat. Accordingly, it is not possible for Capella to provide a specific channel plan beyond the information provided in the Technical Attachment. Therefore, for each space-to-space beam, Capella has entered information for only a single channel on Schedule S, which will not be representative of Capella's anticipated operations. Likewise, because PFD and EIRP density of Capella's space-to-space transmissions will vary depending on bandwidth, Capella has provided the worst-case EIRP density and PFD values on Schedule S.

Finally, Schedule S does not appear to permit a two-digit value for the field "Active Service Arc End Angle," making it impossible to properly represent full-arc coverage (i.e. 0-360 degrees). Capella has entered 0 for both begin and end values in light of this limitation to reflect full-arc coverage.