

## Attachment A: Compliance with 47 C.F.R. § 25.136(a)(4)

Section 25.136 of the Commission’s rules defines conditions that, if met, permit an earth station licensee to operate in accordance with the terms of its authorization without providing interference protection to Upper Microwave Flexible Use Service (“UMFUS”) stations in the 27.5-28.35 GHz band.<sup>1</sup> The International Bureau has provided guidance to applicants on how to show compliance with the rule’s specifications.<sup>2</sup> The following analysis demonstrates that the Hawaii mPOWER Gateway meets all the requirements of Section 25.136(a)(4).

### Background

The Hawaii mPOWER Gateway will be collocated at a site occupied by two existing O3b earth stations in Honolulu County, Call Signs E100088 and E140107. Both of the existing earth stations were licensed prior to July 14, 2016 and are therefore entitled to grandfathered status under Section 25.136(a)(2).<sup>3</sup>

Consistent with the Commission’s Rules and the Siting Guidance Notice, O3b has calculated the area within which the aggregate power flux density (“PFD”) for O3b’s existing and proposed antennas at the site of the Hawaii mPOWER Gateway is equal to or exceeds  $-77.6 \text{ dBm/m}^2/\text{MHz}$  and has determined that this contour is entirely contained within the contour of the grandfathered O3b earth stations.

The earth station parameters used to calculate the aggregate PFD contour are shown in the following table.

Parameter	New Antennas	E100088	E140107
Latitude	21° 40’ 11.5” N.L.	21° 40’ 17.8” N.L.	21° 40’ 17.8” N.L.
Longitude	158° 1’ 58.1” W.L.	158° 1’ 54.9” W.L.	158° 1’ 54.9” W.L.
Antenna Size	5.5 meters	7.3 meters	2.4 meters
EIRP Density	36.85 dBW/4 kHz	39.97 dBW/4 kHz	24.60 dBW/4 kHz
Antenna Pattern	Measured gain pattern	Measured gain pattern	Measured gain pattern
Min. Elev. Angle	5 degrees	5 degrees	5 degrees

In this analysis, O3b has assumed the ITU-R P.452 propagation model and used 1/3 arc second resolution USGS National Elevation Dataset (NED) data. Because of the absence of artificial obstacles surrounding the site, O3b did not conduct a clutter analysis. The analysis takes into account the full range of antenna pointing angles necessary to communicate with the O3b satellites. O3b used the worst-case input power density and the measured gain antenna patterns.

<sup>1</sup> See 47 C.F.R. § 25.136(a)(4).

<sup>2</sup> International Bureau Issues Guidance on Siting Methodologies for Earth Stations Seeking to Operate in the 24.75-25.25 GHz, 27.5-28.35 GHz, 37.5-40 GHz, 47.2-48.2 GHz, and 50.4-51.4 GHz Frequency Bands to Demonstrate Compliance with Section 25.136, IB Docket No. 17-172, Report No. SPB-281, DA 20-631 (rel. June 16, 2020) (the “Siting Guidance Notice”).

<sup>3</sup> 47 C.F.R. § 25.136(a)(2).

O3b developed the aggregate PFD contour for this site using the earth station parameters identified above and the propagation loss formulas contained in ITU-R P.452. The resulting contour is shown in blue on the map on the following page. In addition, O3b is attaching to this application a copy of the contour in KML file format, as suggested by the Siting Guidance Notice.

Figure 1: Aggregate PFD Contour for Sunset Beach



The aggregate PFD contour shown in Figure 1 for the O3b mPOWER Gateway earth station, taking into account the different power levels and antenna diameters of the existing and proposed operations, is identical to the PFD contour of the two grandfathered O3b earth stations at this site.<sup>4</sup> Adding the proposed new antennas does not change the aggregate contour because terrain factors dominate the propagation at this site.

**§ 25.136(a)(4)(i) and (ii)**

The Hawaii mPOWER Gateway complies with the numerical limits on the number of earth stations in a county that can be exempt from the requirement to provide interference protection to UMFUS licensees in Section 25.136(a)(4)(i) and with the population limits in Section 25.136(a)(4)(ii). Specifically, as discussed above, the aggregate contour taking into account the new proposed antennas of the O3b mPOWER Gateway is entirely contained within the contour of the existing grandfathered O3b earth stations at this location. Under these circumstances, the Siting Guidance Notice makes clear that “the new earth station will not be counted against the limit on the total number of earth stations for that license area or considered in the calculation of the aggregate population limit.”<sup>5</sup> The Hawaii mPOWER Gateway therefore will comply with Section 25.136(a)(4)(i) and (ii).

**§ 25.136(a)(4)(iii)**

The Hawaii mPOWER Gateway also conforms to the limitations in Section 25.136(a)(4)(iii). Because adding the proposed antennas will not increase the aggregate PFD contour beyond that of the grandfathered O3b antennas at this location, the application will not affect whether there are major transportation facilities or event venues within the scope of the PFD contour. In any event, O3b has performed an updated search on both the FHWA HEPGIS portal<sup>6</sup> as well as the Hawaii Department of Transportation website<sup>7</sup> to confirm that roads that intersect the Hawaii mPOWER Gateway’s PFD contour are not designated as Other Freeways and Expressways, or Other Principal Arterials. Additionally, there are no major event venues, passenger railroads and cruise ship ports within the contour. As a result, the Hawaii mPOWER Gateway satisfies the requirements of Section 25.136(a)(4)(iii).

**§ 25.136(a)(4)(iv)**

Finally, O3b has complied with Section 25.136(a)(4)(iv) for the Hawaii mPOWER Gateway. That rule specifies that the earth station applicant must successfully complete coordination within its relevant PFD contour with respect to any “existing facilities constructed

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<sup>4</sup> See Supplemental Filing of O3b Limited, Call Sign E100088, File No. SES-MOD-20190207-00084, June 20, 2019, Attachment at 4.

<sup>5</sup> Siting Guidance Notice at 4-5.

<sup>6</sup> See U.S. Department of Transportation, Federal Highway Administration, National Highway System map. Available at: <https://hepgis.fhwa.dot.gov/fhwagis/>.

<sup>7</sup> See State of Hawaii Department of Transportation maps, available at: <https://hidot.hawaii.gov/island-maps/>.

and in operation by the UMFUS licensee.”<sup>8</sup> O3b has completed coordination, and the local UMFUS licensees have not raised any objections to siting an earth station at this location with respect to any existing facilities constructed and in operation by the UMFUS licensee.

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<sup>8</sup> 47 C.F.R. § 25.136(a)(4)(iv).