ATTACHMENT 1

TECHNICAL ATTACHMENT
EUTELSAT NEXT NON-GEOSTATIONARY SATELLITE SYSTEM

A.1 SCOPE AND PURPOSE

This attachment contains the information required by Sections 25.114(d), 25.146 and other sections of the Federal Communications Commission's ("Commission's") Part 25 rules that cannot be captured by the Schedule S software.

A.2 OVERALL DESCRIPTION OF SYSTEM FACILITIES, OPERATIONS AND SERVICES AND EXPLANATION OF HOW UPLINK FREQUENCY BANDS ARE CONNECTED TO DOWNLINK FREQUENCY BANDS (§25.114(d)(1))

The Eutelsat Next non-geostationary orbit ("NGSO") satellite system ("Eutelsat Next") consists of a constellation of 528 satellites in circular, inclined orbits at 60° in Low Earth Orbit ("LEO"), plus in-orbit spares, with an altitude of 1,220 km, as well as associated ground control facilities, gateway earth stations, and end user earth stations ("user terminals"). Eutelsat Next is designed to expand the company's ability to provide secure, resilient, high-speed, high-capacity communications services around the world.

Eutelsat Next uses Ku-band for the radiofrequency ("RF") links between the satellites and user terminals and Ka-band for the RF links between the satellites and gateway earth stations, with the latter providing the interconnection to the global Internet. Eutelsat Next Ku-band user terminals consist of small and inexpensive antennas (typically in the 30 cm to 75 cm range). The Ka-band gateway earth stations will typically utilize 2.4 m or larger antennas, depending on their location and the associated propagation characteristics and service requirements. Optical inter-satellite links between Eutelsat Next satellites may also be available.

The frequency ranges used by Eutelsat Next are summarized in Table A.2-1 below. The detailed channelized frequency plan is given in the associated Schedule S.

Table A.2-1: Frequency Bands Used by Eutelsat Next

Type of Link and Transmission Direction	Frequency Ranges
Gateway-to-Satellite	27.5 – 29.1 GHz 29.5 – 30.0 GHz
Satellite-to-Gateway	17.8 – 18.6 GHz 18.8 – 19.3 GHz 19.7 – 20.2 GHz
User Terminal-to-Satellite	13.75 – 14.5 GHz
Satellite-to-User Terminal	10.7 – 12.7 GHz

Each Eutelsat Next satellite will be capable of producing up to 140 Ku user beams, each capable of transmitting or receiving on one or multiple RF channels on one or both circular polarizations. The satellites will have on-board processing and may make use of optical inter-satellite links such that user traffic packets can be routed through various satellites for most effective routing. User uplink signals are demodulated by the onboard processor and routed either to one of the gateway beams if the traffic terminates within the satellite footprint, or may be routed via optical intersatellite links to other satellites for a more direct path to the intended destination. Such user packets can also be routed to a user beam for direct links between customers where permitted. Return traffic either from another user in the direct connection scenario, or from the gateway site for Internet access, follows a similar path.

There are two identical steerable gateway beam antennas, operating in Ka-band, on each Eutelsat Next satellite, and each of these antennas creates an independently steerable circular spot beam.

For Telemetry, Tracking, and Command ("TT&C") purposes, including the control of the Eutelsat Next satellite payloads, there are dedicated channels in portions of Ka-band.

The total aggregate footprint of the Ku-band beams of Eutelsat Next can cover all of the Earth's surface between 60 degrees North and South latitude, with the ability to relocate the beams to areas with the highest demand. The movement of the satellites in their orbits means that a user will be progressively handed over from one Eutelsat Next satellite to the next satellite in either the same or an adjacent orbital plane. Handover of the Eutelsat Next satellite gateway links between different sets of gateway earth stations will also occur as the satellites move in their orbits. In the forward direction, Eutelsat Next uses the 27.5 – 29.1 GHz and 29.5 – 30 GHz uplink bands and the 10.7 – 12.7 GHz downlink band in the United States. In the return direction, it uses the 13.75 – 14.5 GHz uplink band and the 17.8 – 18.6 GHz, 18.8 – 19.3 GHz, 19.7-20.2 GHz downlink bands in the United States. Payload control transmissions to and from the U.S. gateway earth stations will take place in the band edges just below 19.3 GHz (downlink) and just above 27.5 GHz (uplink).

The overall system architecture, including air interface and waveform design, is aligned with the 3GPP 5G Non-Terrestrial Network ("NTN") standard for improved flexibility and enhanced service continuity across Eutelsat Next.

User terminal and feeder link carrier sizes are between 50 to 800 MHz wide.

The ground segment for Eutelsat Next would consist of (i) gateway earth stations, (ii) user terminal earth stations, (iii) and earth stations used exclusively for tracking, telemetry, and control ("TT&C-only" earth stations). Gateway earth stations would be used to provide TT&C to Eutelsat Next and serve as points of interconnection between user terminals and the global Internet. Eutelsat Next would use approximately 50 gateway earth stations worldwide, including six earth stations currently operated in the United States with OneWeb. User terminals served by Eutelsat Next would consist of a range of terminal types, including both fixed terminals and earth stations in motion ("ESIMs"). As of this filing no TT&C-only earth

stations are planned for operations in the United States. Eutelsat will seek the necessary licenses to communicate with earth stations using Eutelsat Next in the United States prior to commencing operations. The user terminals will employ electronically steerable phased array antennas or other beam steering technology. User terminals will be capable of providing continuous service allowing for handover between active satellites as the electronically steerable beam instantaneously switches between active satellites using a single fixed antenna aperture.

Eutelsat Next will operate under Eutelsat ITU networks. Further details of this are provided in Section A.11 below.

A.3 PREDICTED SPACE STATION ANTENNA GAIN CONTOURS

For the links between Eutelsat Next satellites and the user terminals, each satellite has 140 independently steerable and re-configurable Ku-band receive and transmit spot beams that can be moved anywhere in the visible portion of the Earth's surface where the elevation angle, at beam center, exceeds 20 degrees. The transmit power into each of these beams is independently adjusted using automatic downlink power control to nominally maintain a constant Power Flux Density ("PFD") at the Earth's surface as the beam is moved from nadir direction towards edge-of-coverage, and then a slight reduction in PFD near the 20° elevation contour, as necessary, depending on the size of the transmitting beam and its sidelobe roll-off. This feature is used to control the power levels generated in certain directions by Eutelsat Next so as to be compliant with the PFD and equivalent power flux density ("EPFD") limits in the Commission's rules and ITU Radio Regulations, as explained in Sections A.7 and A.8 below. These beams can also be adjusted in terms of their size, and hence gain, over a wide range of values. To account for this adjustability in gain, the Schedule S includes both maximum and minimum gain values for these Ku-band beams.

For the links between Eutelsat Next satellites and the gateway earth stations, each satellite has two identical circular Ka-band spot beams which are independently steerable over the full field of view of the Earth. Downlink power control is used to maintain the PFD at the Earth's surface at a nominal value over the range of angles of arrival between 15° and 90°. Exceptionally, the beams could steer down to 5° elevation angles, for instance when satellites fly over oceans and need to reach far-away land areas, but in this case the downlink power density will not increase beyond the value used at 15° elevation point resulting in a further reduction in PFD at the Earth's surface for elevation angles below 15°.

Data for the Ku-band and Ka-band beam contours are embedded in the associated Schedule S submission. This data is provided in the form of the required contours plotted on a flat-Earth projection and with the beam peak pointed to nadir, as required by Section 25.114(c)(4)(vi)(B).

A.4 GEOGRAPHIC COVERAGE

Eutelsat Next satellites pass over all parts of the Earth's surface between the sixtieth degrees of latitude. Every point between these latitudes will see, at all times, a Eutelsat Next satellite at an elevation no less than 20º.

Ku-Band Geographic Coverage

For the Ku-band service links, the combination of the geographic coverage achievable from each satellite, based on 140 individually steerable user beams, plus the number and proximity of the satellites in their orbits, ensures that blanket Ku-band coverage within the service arc is provided by Eutelsat Next. In order to comply with the EPFD limits and thereby protect GSO satellite networks from interference, the pointing directions of the Ku-band beams avoid the direction vectors between the GSO arc and all points on the Earth's surface where there could be an in-line event with Eutelsat Next satellites. This technique also protects Eutelsat Next from interference caused by GSO networks.

Ka-Band Geographic Coverage

The gateway links of Eutelsat Next provide the necessary communications links back from Eutelsat Next satellites to the global Internet. The on-board processor, potentially augmented by optical intersatellite links, will allow traffic to be routed from any user to any other user, or to the terrestrial infrastructure. Therefore, the Eutelsat Next Ka-band gateway links will be sufficient to serve Eutelsat Next satellites. In order to comply with the EPFD limits and thereby protect GSO satellite networks from interference, the pointing directions of the Ka-band beams avoid the direction vectors between the GSO arc and all points on the Earth's surface where there could be an in-line event with Eutelsat Next satellites. This technique also protects Eutelsat Next from interference caused by GSO networks.

A.5 TT&C AND PAYLOAD CONTROL CHARACTERISTICS

Gateway earth stations capable of receiving and transmitting payload control transmissions will be located in the United States. This Petition therefore requests authorization from the Commission for the payload control transmissions to and from the gateway earth stations only. The basic parameters of the overall TT&C and payload control system are described in this section and complement what is provided in the associated Schedule S submission.

Eutelsat Next's TT&C system provides for communications during pre-launch, transfer orbit and on-station operations, as well as during spacecraft emergencies. The TT&C system operates at the edges of the Ka-band frequency allocations (around 29.5 GHz or 27.5 GHz and around 17.7 GHz and 19.7 GHz) in the communications uplink and downlink frequency ranges during all phases of the mission. The TT&C and payload control system controls and monitors all aspects of the spacecraft necessary for onboard equipment configuration, safe operations and health monitoring. Some control data is required in real-time (e.g., certain payload control functions), but other data is not as time-sensitive because the spacecraft are sufficiently autonomous for periods of time without receiving continuous telecommand signals. The time-sensitive payload control information is transmitted to and from Eutelsat Next satellites using the gateway earth stations. All payload control transmissions to and from these gateway earth stations are at EIRP density levels no higher than the gateway communications carriers because they access the high gain satellite antennas onboard Eutelsat Next satellites. Because these transmissions may take place from U.S. gateway earth stations, their technical parameters are taken into account in the associated Schedule S. A

summary of the TT&C and payload control subsystem characteristics is given in Table A.5-1.[1] The frequency ranges specified for the TT&C transmissions may be reduced further as the final operational TT&C frequencies are selected, and Eutelsat will inform the Commission of such reduction at that time.

Table A.5-1: TT&C and Payload Control Characteristics

Uplink Control Signal Modulation	BPSK or BPSK/DSSS
Uplink Control Frequencies[2]	27.5 – 29.1 GHz 29.5 – 30.0 GHz
Downlink Control Signal Modulation	QPSK or QPSK/DSSS
Downlink Control Frequencies[3]	17.8 – 18.6 GHz
	Or 18.8 – 19.3 GHz Or 19.7 – 20.2 GHz
Polarization of Satellite Rx/Tx Antennas	RHCP or LHCP

A.6 CESSATION OF EMISSIONS

Each active satellite transmission chain (channel amplifiers and associated solid state power amplifier) can be individually turned on and off by ground telecommand, thereby causing cessation of emissions from the satellite, as required by Section 25.207 of the Commission's rules.

A.7 COMPLIANCE WITH PFD LIMITS (§ 25.146(a)(1))

Eutelsat Next complies with all applicable Commission and ITU PFD limits, which are designed to protect the terrestrial Fixed Service ("FS") from downlink interference due to the satellite transmissions.

Downlink PFD Limits in Ku-band

The Commission's Ku-band downlink PFD limits which apply to each satellite of Eutelsat Next, and which apply across the 10.7-11.7 GHz band, are set forth in Section 25.208(b)(1) and are as follows:

- -150 dB(W/m2) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- -150+(δ-5)/2 dB(W/m2) in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- -140 dB(W/m2) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

[1] Eutelsat Next will also be capable of operating in the 29.1-29.5 GHz and 19.3-19.7 GHz bands, including for TT&C purposes. Eutelsat does not have plans to operate in that spectrum in the United States and is not seeking U.S. market access for these bands.

[2] While the exact control frequencies have not been determined yet, Eutelsat will conduct TT&C operations in compliance with the Commission's rules. *See* 47 CFR § 25.202(g).

[3] *Id.*

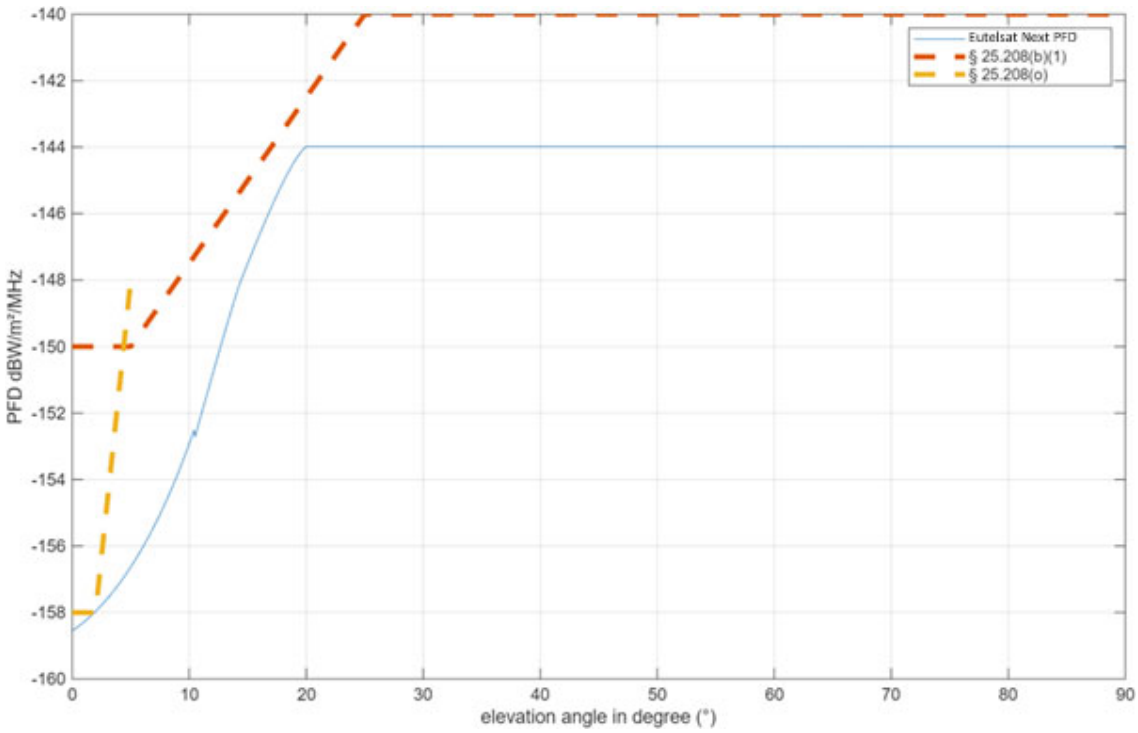
In addition, there are ITU PFD limits applicable to NGSO systems which also apply to Eutelsat Next consistent with Section 25.146(a)(1). These ITU PFD limits are the same as those contained in Section 25.208(b)(1) across the 10.7-11.7 GHz band but are 2 dB higher across the 11.7-12.7 GHz band.

The Commission also has specific low elevation PFD limits in Section 25.208(o) which apply in the 12.2-12.7 GHz band in order to protect the Multichannel Video Distribution and Data Service ("MVDDS") service. These limits, which relate to the PFD into an actual operational MVDDS receiver, are defined as follows:

- -158 dB(W/m2) in any 4 kHz band for angles of arrival between 0 and 2 degrees above the horizontal plane;
- -158+3.33(δ-2) dB(W/m2) in any 4 kHz band for angles of arrival δ (in degrees) between 2 and 5 degrees above the horizontal plane.

Downlink power control is used on Eutelsat Next satellite transmissions to maintain constant PFD throughout the range of pointing directions, while ensuring compliance with all of the abovementioned PFD limits. For non-nadir directions the path length to the Earth increases thereby permitting a higher EIRP density to be used while still complying with the PFD limits.

Figure A.7-1: Eutelsat Next PFD



From Figure A.7-1 above it is clear that compliance with all PFD limits is achieved for this Ku beam using a maximum downlink PFD of -120 dBW/m²/MHz.

Downlink PFD Limits in Ka-band

The Commission's Ka-band downlink PFD limits in Section 25.146(a)(1) which refers to provision in Section 25.108 apply the ITU PFD limits of Article 21 to NGSO systems in different parts of the Ka-band downlink frequency bands used by Eutelsat Next. A single set of PFD limits in Article 21 of the ITU Radio Regulations applies to NGSO systems across the entire band 17.7-19.3 GHz which encompasses most of the Ka-band downlink band used by Eutelsat Next.

In the 19.7-20.2 GHz band there are no PFD limits in the Commission rules nor in the ITU Radio Regulations. The PFD limits in Article 21 of the ITU Radio Regulations are expressed as a function of the number of satellites in the NGSO system. The NGSO PFD limits of Article 21 of the Radio Regulations are as follows:

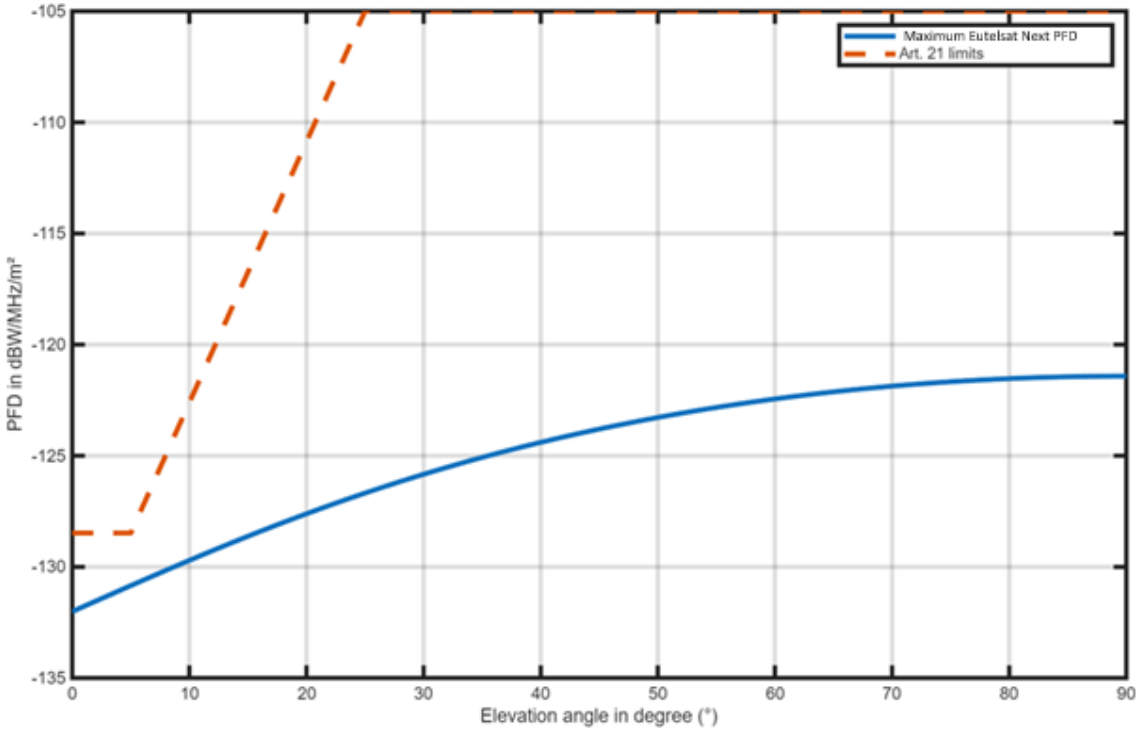
- -115-X dB(W/m2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- -115-X+((10+X)/20)(δ-5) dB(W/m2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- -105 dB(W/m2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

Where X is defined as a function of the number of satellites in the non-GSO FSS constellation, n, as follows in the Eutelsat Next case:

- $X = (1/69)\ (n + 402)$ dB for $288 < n \leq 999$

Eutelsat Next uses downlink power control, the PFD is constant within the angular range from 15º to 90º in elevation on the Earth's surface. The maximum EIRP density of Eutelsat Next is 11.3 dBW/MHz.

Figure A.7-2: Eutelsat Next PFD at maximum level of the EIRP density.



Therefore, compliance with the PFD limit in Section 25.146(a)(1) for all angles is achieved.

A.8 INTERFERENCE ANALYSES

Referring to Table A.2-1 showing the frequency ranges proposed to be used in Ku-band and Ka-band, respectively, and further considering the designations that exist in these bands in the U.S. table of frequency allocations allows a better understanding of the more detailed explanations of each sharing / interference scenario described in the sub-sections below.

A.8.1 Interference Protection for GSO Satellite Networks (§ 25.146)

Eutelsat Next has been designed to provide the necessary interference protection to GSO satellite networks in both Ku-band and Ka-band as required under Article 22 of the ITU Radio Regulations and Section 25.146(a)(2) of the Commission's rules. Eutelsat Next fully complies with these limits, which are evaluated by the ITU as part of its satellite registration procedures.[4]

A.8.1.1 EPFD Compliance in Ku-Band

Eutelsat Next will be designed to provide the necessary interference protection to GSO satellite networks in Ku-band as required under Article 22 of the ITU Radio Regulations.

[4] Eutelsat reserves the right to supplement its showing with an analysis consistent with the recently adopted revisions to the NGSO-GSO sharing framework.

Relevant satellite network F-SAT-NG-15_B already received favorable finding from ITU, as published in IFIC 3060.

Plots extracted from the published validation results are provided in Annex 1 attached hereto.

A.8.1.2 EPFD Compliance in Ka-Band

Eutelsat Next will be designed to provide the necessary interference protection to GSO satellite networks in Ka-band as required under Article 22 of the ITU Radio Regulations. Relevant satellite network F-SAT-NG-15_B already received favorable finding from ITU, as published in IFIC 3060.

Plots extracted from the published validation results are provided in Annex 2 attached hereto.

A.8.1.3 Ka-Band Frequency Ranges Where No EPFD Limits Exist

Eutelsat Next's frequency plan includes some portions of Ka-band spectrum where no EPFD limits exist in the ITU Radio Regulations. These are the 28.6-29.1 GHz uplink and 18.8-19.3 GHz downlink frequency bands, which are allocated to NGSO satellites on a primary basis according to the Commission's Ka-band frequency plan, with GSO satellite networks operating on a secondary basis in the 28.6-29.1 GHz range and on a non-conforming basis in the 18.8-19.3 GHz range. According to ITU procedures applicable to these frequency ranges (RR 9.11A), coordination between NGSO and GSO networks is on a first-come, first-served basis, depending on the ITU date priority of the relevant ITU filings. For GSO networks operating outside the United States, Eutelsat has completed coordination with many GSO satellite networks in these frequency ranges for OneWeb and is confident that compatibility with all GSO satellite networks in this band can be achieved for Eutelsat Next using a similar GSO arc avoidance methodology as is adopted in the parts of Ka-band where EPFD limits apply.

A.8.2 Interference with Respect to NGSO Satellite Systems Within the Same Processing Round

Under Section 25.261 of the Commission's rules, sharing between NGSO satellite systems should be achievable using good faith efforts during inter-operator coordination to avoid in-line interference events or by resorting to band segmentation in the absence of any such coordination agreement.

Eutelsat is confident that it can achieve coordination with other NGSO satellite systems, as necessary. Eutelsat has already started the coordination process with some other NGSO operators with regard to Eutelsat Next.

A.8.3 Interference with Respect to Earlier -Round NGSO Satellite Systems

Eutelsat is confident that it can ensure the protection of NGSO systems authorized in earlier processing rounds and will adhere to the NGSO/NGSO criteria established by the Commission. Specifically, Eutelsat will either complete coordination or file a compatibility showing as required by Section 25.261(d) of the Commission's rules.

A.8.4 Interference with Respect to Terrestrial Networks in the 10.7-11.7 GHz Band

In this band, which is shared on a co-primary basis between the FSS and FS, the Commission originally restricted the earth stations in an NGSO system to gateway earth stations only. The rationale for this was to limit the number of earth stations that would need interference protection from the FS, thereby avoiding constraints on future deployment of the FS in this band. Since then, the Commission allowed blanket licensing of user terminals. Eutelsat Next would operate with user terminal earth stations in this band on a non-interference, non-protected basis with respect to the FS. This will be achieved as follows:

- The satellite downlink transmissions in the 10.7-11.7 GHz band to these earth stations will comply with the existing Commission PFD limits as demonstrated in Section A.7 above. These PFD limits are intended to protect the FS from interference from the satellite downlinks, and the Commission has determined that such limits are sufficient for this purpose.
- The receiving earth stations will not seek any interference protection from the FS and so their operation will not constrain the further development of the FS in this band.

A.8.4 Interference with Respect to Terrestrial Networks in the 12.2-12.7 GHz Band

There are currently some grandfathered FS links in the 12.2-12.7 GHz band that have legacy licenses under old Commission allocations. No new FS links will be authorized by the Commission in this band. Eutelsat will accept any interference from these approximately 40 legacy FS links. Eutelsat Next's downlink transmissions in the 12.2-12.7 GHz band will comply with the ITU PFD limits as demonstrated in Section A.7 above. These PFD limits are intended to protect the FS from interference from the satellite downlinks and so will ensure there is no downlink interference into these 46 legacy FS links.

The Commission has authorized the MVDDS in the 12.2-12.7 GHz band and established technical and service rules for MVDDS which specifically state that the MVDDS providers will share the 12 GHz band with NGSO FSS operators on a co-primary basis.

To account for the particular interference mechanisms between MVDDS and NGSO systems the Commission adopted the following operating requirements for both systems.

<u>MVDDS Operating Requirements:</u>

(i) PFD at a distance: To promote MVDDS and NGSO FSS band sharing, the PFD of an MVDDS transmitting system shall not exceed -135 dBW/m2 /4 kHz measured and/or calculated at the surface of the earth at distances greater than 3 km from the MVDDS transmitting site.

(ii) The maximum MVDDS EIRP shall not exceed 14 dBm per 24 MHz, but there is no restriction on the polarization of the MVDDS transmission.

(iii) The MVDDS transmitting antenna may not be installed within 10 km of any pre-existing NGSO FSS receiver unless the affected licensees agree to a closer separation.

<u>NGSO FSS Operating Requirements</u>:

Later-in-time NGSO FSS receivers must accept any interference resulting from preexisting MVDDS transmitting antennas.

(iv) Later-in-time NGSO FSS receivers must accept any interference resulting from preexisting MVDDS transmitting antennas.

(v) Low angle PFD limits on NGSO FSS downlinks in 12.2-12.7 GHz band: For elevation angles from 0º to 2º above the horizontal plane, NGSO FSS downlinks must meet a reduced PFD level of -158 dBW/m2 /4kHz, and for elevation angles from 2º to 5º degrees above the horizontal plane, a reduced PFD level of -158 + 3.33 (δ-2) dBW/m2 /4kHz, where δ is the elevation angle in degrees.

To allow the sharing mechanisms of (i), (iii) and (iv) above to be implemented the MVDDS and NGSO FSS operators must maintain and share databases of their respective transmitters and receivers, as required by the Second Report and Order. Eutelsat acknowledges this sharing arrangement and will comply with the Commission's required sharing arrangements.

Eutelsat will also comply with the requirements of (v) above concerning the low elevation angle PFD limits in the 12.2-12.7 GHz band, as demonstrated in Section A.7 above.

A.8.5 Interference with Respect to Terrestrial Networks in the 17.8-18.3 GHz Band

In the 17.8-18.3 GHz band, which Eutelsat Next uses in the space-to-Earth direction and only for links to a relatively small number of gateway earth stations in the U.S., the only potential interference path from the FS is from the transmitting FS station into the sidelobes of the Eutelsat Next receiving gateway earth station antenna.

In the unlikely event that potential interference would be caused to the Eutelsat Next gateway earth station by FS activity in the area, Eutelsat Next will accept any such interference and take the necessary measures to prevent it from impacting the earth station operations. Such necessary technical measures may include adjusting the minimum operational elevation angles, frequency avoidance, power level adjustment, earth station shielding or some combination thereof.

A.8.6 Interference with Respect to Terrestrial Networks in the 27.5-28.35 GHz Band

Eutelsat Next uses the 27.5-28.35 GHz band for its gateway earth stations in the United States. Eutelsat acknowledges that FSS is secondary to the Upper Microwave Flexible Use Service ("UMFUS") in this band. Eutelsat Next's operations in this band will adequately protect UMFUS operations and otherwise will be consistent with Section 25.136(a) of the Commission's rules, as will be described in further detail in its license applications for gateway earth stations in the United States.[5]

[5] Eutelsat notes that the Commission has an ongoing proceeding concerning revisions to its rules for UMFUS and Eutelsat intends to comply with any revised spectrum sharing framework adopted in that proceeding. *Facilitating More Intensive Use of Upper Microwave Spectrum*, Notice of Proposed Rulemaking, 40 FCC Rcd 8401 (2025).

A.8.7 Interference with Respect to TDRSS Receiving Ground Stations in the 14.0-14.2 GHz Band

Eutelsat Next has already started and will continue to coordinate with NASA concerning the protection of the designated TDRSS receiving ground stations in the United States from transmissions of Eutelsat Next user terminals operating in the 14.0-14.2 GHz band. There is no reason to believe that the coordination would be more difficult with the proposed Eutelsat Next than the OneWeb NGSO system ("OneWeb") given that the minimum operational elevation angles for the user terminals are no less than for OneWeb.

A.8.8 Interference with Respect to the Radio Astronomy Service

Eutelsat has been involved in coordination discussions with the National Science Foundation ("NSF") and the heads of various Radio Astronomy Service ("RAS") sites concerning the protection of the RAS sites in the U.S. and worldwide. These protection requirements have been factored into the design of Eutelsat Next satellites. For OneWeb, agreement has been reached in principle with regards to satellite unwanted emissions in the 10.6-10.7 GHz band and significant progress has been made to address the potential interference from transmit earth stations (gateways and user terminals) to ensure protection of RAS sites for currently-authorized OneWeb and similar measures will be used in operating Eutelsat Next. The coordination discussions are also addressing the possibility of perturbations to optical astronomy and work continues to avoid reflections from Eutelsat Next satellites into optical telescopes.

A.9 COORDINATION WITH VERY LARGE ANTENNAS ("VLA") IN THE 10.7-12.5 GHZ BAND (§ 25.146(d))

Eutelsat is in the process of coordinating with the representative of the operators of VLAs in the Ku-band in various countries around the world based on the characteristics in this Petition. Eutelsat is optimistic that coordination can also be concluded taking into account the characteristics of Eutelsat Next as detailed in this Petition. Eutelsat will inform the Commission when this coordination has been completed.

A.10 COORDINATION WITH U.S. GOVERNMENT SATELLITE NETWORKS (Footnote US334 in the U.S. Table of Frequency Allocations)

US334 requires coordination of Eutelsat Next with U.S. government satellite networks, both GSO and NGSO, in portions of the Ka-band. Eutelsat has held detailed coordination discussions with US government representatives for the currently-authorized OneWeb and has made substantial progress having completed coordination with the GSO networks. Much progress has also been made in coordination with NGSO networks, which remains ongoing. Eutelsat is optimistic that coordination can be concluded in a mutually acceptable manner that can then be extended to cover Eutelsat Next deployment. Eutelsat will inform the Commission when this has been completed.

A.11 ITU FILINGS FOR EUTELSAT NEXT

Eutelsat Next is registered with the ITU by the French administration under the satellite network name F-SAT-NG-15_B. A summary of the related ITU publications is given in Table A.11-1 below. These encompass all the frequencies to be used by Eutelsat Next that are the subject of this Petition.

Table A.11-1: Eutelsat Next ITU Filing

Publication reference	Date of receipt	IFIC number	IFIC publication date
CR/C/ 6342	09/07/2024	3060	25/11/2025

A.12 ORBITAL DEBRIS (§ 25.114(d)(14))

FCC Orbital Debris Mitigation Rule Compliance Assessment for Eutelsat Next	
Rule and Citation	Eutelsat Statement
A statement that the space station operator has assessed and limited the amount of debris released in a planned manner during normal operations. Where applicable, this statement must include an orbital debris mitigation disclosure for any separate deployment devices, distinct from the space station launch vehicle, that may become a source of orbital debris; § 25.114(d)(14)(i)	Eutelsat has assessed and will limit the amount of debris released in a planned manner during normal operations. The design of the Eutelsat Next space stations includes no releasable components, and there is no planned release of debris from the satellites.
A statement indicating whether the space station operator has assessed and limited the probability that the space station(s) will become a source of debris by collision with small debris or meteoroids that would cause loss of control and prevent disposal. The statement must indicate whether this probability for an individual space station is 0.01 (1 in 100) or less, as calculated using the NASA Debris Assessment Software or a higher fidelity assessment tool; § 25.114(d)(14)(ii)	Eutelsat has assessed and limited the probability that the space stations will become a source of debris by collision with small debris or meteoroids that would cause loss of control and prevent disposal. The probability for an individual space station is less than 1 in 100, as calculated using the NASA Debris Assessment Software, and Eutelsat's design requirements specify a value lower than 1 in 100.
A statement that the space station operator has assessed and limited the probability, during and after completion of mission operations, of accidental explosions or of release of liquids that will persist in droplet	Eutelsat has assessed and limited the probability, during and after completion of mission operations, of accidental explosions or of release of liquids that will persist in droplet form. Chemical, pressure, and

form. This statement must include a demonstration that debris generation will not result from the conversion of energy sources on board the spacecraft into energy that fragments the spacecraft. Energy sources include chemical, pressure, and kinetic energy. This demonstration should address whether stored energy will be removed at the spacecraft's end of life, by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy, or through other equivalent procedures specifically disclosed in the application; § 25.114(d)(14)(iii)	kinetic energy sources will be depleted over the life of the spacecraft and robustly contained to avoid fragmenting during expenditure and passivation. Stored energy will be removed at the spacecraft's end of life at passivation and deorbiting. By design, Eutelsat will deplete residual fuel, open all fuel line valves, vent any pressurized system, leave all batteries in a permanent discharge state, and remove any remaining source of stored energy at passivation and deorbiting.
A statement that the space station operator has assessed and limited the probability of the space station(s) becoming a source of debris by collisions with large debris or other operational space stations. § 25.114(d)(14)(iv)	Eutelsat has assessed and limited the probability of the space station(s) becoming a source of debris by collisions with large debris or other operational space stations. The Eutelsat Next platform will be maneuverable and able to perform coordinated Collision Avoidance Maneuvers during the entirety of its lifetime up to platform passivation. Hence no collisions with large debris or other operational space stations are expected.
A demonstration that the space station operator has assessed and limited the probability of collision between any space station of the system and other large objects (10 cm or larger in diameter) during the total orbital lifetime of the space station, including any de-orbit phases, to less than 0.001 (1 in 1,000). The probability shall be calculated using the NASA Debris Assessment Software or a higher fidelity assessment tool. The collision risk may be assumed zero for a space station during any period in which the space station will be maneuvered	Eutelsat has assessed and limited the probability of collision between any space station of the system and other large objects (10 cm or larger in diameter) during the total orbital lifetime of the space station, including any post-passivation de-orbit phases, to less than 0.001 (1 in 1,000). Eutelsat has calculated this probability using the NASA Debris Assessment Software and finds a probability of 0.000104. The space station will be maneuverable in a circular orbit at all altitudes until 375 km upon deorbiting and will be maneuvered effectively to avoid

effectively to avoid colliding with large objects. § 25.114(d)(14)(iv)(A)(1)	colliding with large objects at least until passivation.
The statement must identify characteristics of the space station(s)' orbits that may present a collision risk, including any planned and/or operational space stations in those orbits, and indicate what steps, if any, have been taken to coordinate with the other spacecraft or system, or what other measures the operator plans to use to avoid collision. § 25.114(d)(14)(iv)(A)(2)	As with OneWeb, Eutelsat has chosen a circular orbit at 1,220 km (with a tolerance of ±70 km) to minimize collision risk with other operators' space stations. The only other major constellation using this altitude range is OneWeb, and Eutelsat will effect collision avoidance among OneWeb and Eutelsat Next. Eutelsat assesses collision risks through cooperation with other operators, including mutual assessment of ephemeris data provided and routinely updated by Eutelsat and other operators.
If at any time during the space station(s)' mission or de-orbit phase the space station(s) will transit through the orbits used by any inhabitable spacecraft, including the International Space Station, the statement must describe the design and operational strategies, if any, that will be used to minimize the risk of collision and avoid posing any operational constraints to the inhabitable spacecraft. § 25.114(d)(14)(iv)(A)(3)	Eutelsat Next space stations will transit through the orbit used by the International Space Station at launch and upon disposal. At both phases of spacecraft operation, Eutelsat will be aware of the International Space Station's location through published ephemeris data and will maneuver the space station away from its location through the 400-420 km altitude range.
The statement must disclose the accuracy, if any, with which orbital parameters will be maintained, including apogee, perigee, inclination, and the right ascension of the ascending node(s). In the event that a system is not able to maintain orbital tolerances, *e.g.,* its propulsion system will not be used for orbital maintenance, that fact must be included in the debris mitigation disclosure. Such systems must also indicate the anticipated evolution over time of the orbit of the proposed satellite or satellites. All systems must describe the	Eutelsat will, at a minimum, maintain orbital parameters within orbital tolerance of ±70 km, 2 degree accuracy for inclination, and 0.2 degree accuracy for the right ascension of the ascending nodes, as specified by Eutelsat in the Schedule S. Eutelsat will endeavor to maintain operations as close to the nominal values as possible. Eutelsat Next satellite design includes a propulsion system and will maintain maneuverability throughout operations at least until the altitude reaches 375 km upon disposal.

extent of satellite maneuverability, whether or not the space station design includes a propulsion system. §25.114(d)(14)(iv)(A)(4)	
The space station operator must certify that upon receipt of a space situational awareness conjunction warning, the operator will review and take all possible steps to assess the collision risk, and will mitigate the collision risk if necessary. As appropriate, steps to assess and mitigate the collision risk should include, but are not limited to: Contacting the operator of any active spacecraft involved in such a warning; sharing ephemeris data and other appropriate operational information with any such operator; and modifying space station attitude and/or operations. §25.114(d)(14)(iv)(A)(5)	Eutelsat certifies that upon receipt of a space situational awareness conjunction warning, it will review and take all possible steps to assess the collision risk and will mitigate the collision risk if necessary. Eutelsat will assess and mitigate the collision risk by, without limitation, contacting the operator of any active spacecraft involved in such a warning, sharing ephemeris data and other appropriate operational information with any such operator, and modifying space station attitude and/or operations. After receiving a warning for a conjunction with a collision probability above the threshold during normal operations, Eutelsat will perform a collision avoidance action, including, at minimum: 1) Maneuvers, if the warning is received up to 12 hours before the conjunction and the spacecraft is maneuverable, 2) Assessment in less than 4 hours after the warning, and 3) Active communication of a spacecraft's status and ephemerides.
A statement addressing the trackability of the space station(s). Space station(s) operating in low-Earth orbit will be presumed trackable if each individual space station is 10 cm or larger in its smallest dimension, excluding deployable components. § 25.114(d)(14)(v)	Each Eutelsat Next space station will be 10 cm or larger in its smallest dimension, excluding deployable components. Thus, the space stations are presumed trackable.

Where the application is for an NGSO space station or system, the statement shall also disclose the following: (A) How the operator plans to identify the space station(s) following deployment and whether space station tracking will be active or passive; (B) Whether, prior to deployment, the space station(s) will be registered with the 18th Space Control Squadron or successor entity; and (C) The extent to which the space station operator plans to share information regarding initial deployment, ephemeris, and/or planned maneuvers with the 18th Space Control Squadron or successor entity, other entities that engage in space situational awareness or space traffic management functions, and/or other operators. § 25.114(d)(14)(v)(A)-(C)	(A) Eutelsat will transmit identifying information from each space station from deployment through deorbiting. Eutelsat will actively track each space station. (B) Eutelsat will register Eutelsat Next space stations with the 18th Space Control Squadron or successor entity prior to deployment. (C) Eutelsat will share its most up to date ephemeris with the 18th Space Control Squadron or successor entity on a sub-daily cadence. Eutelsat's disclosures will include its most recent maneuver plans. Eutelsat will engage in bidirectional coordination with other entities that engage in space situational awareness or space traffic management functions, as well as other operators.
A statement disclosing planned proximity operations, if any, and addressing debris generation that will or may result from the proposed operations, including any planned release of debris, the risk of accidental explosions, the risk of accidental collision, and measures taken to mitigate those risks. § 25.114(d)(14)(vi)	Eutelsat expects that any proximity operations with Eutelsat Next space stations would occur in conjunction with Active Debris Removal, if necessary. Each Eutelsat Next space station will be equipped with a docking station, forming a dedicated interface for such operations. The docking station will be located on the surface of the spacecraft in an area which would prevent direct contact of the servicing spacecraft with parts of the satellite that could form debris.
A statement detailing the disposal plans for the space station, including the quantity of fuel—if any—that will be reserved for disposal maneuvers. In addition, the following specific provisions apply: (B) For space stations terminating operations in an orbit in or passing through	(B) Eutelsat will dispose of Eutelsat Next spacecraft through atmospheric re-entry. Direct retrieval of the spacecraft would not ordinarily be used, but may be used if necessary. The expected time in orbit for the space station following the completion of the

the low-Earth orbit region below 2,000 km altitude, the statement must disclose whether the spacecraft will be disposed of through atmospheric re-entry, specifying if direct retrieval of the spacecraft will be used. The statement must also disclose the expected time in orbit for the space station following the completion of the mission. (D) For all space stations under paragraph (d)(14)(vii) (B) or (C) of this section, the following additional specific provisions apply: (1) The statement must include a demonstration that the probability of success of the chosen disposal method will be 0.9 or greater for any individual space station. For space station systems consisting of multiple space stations, the demonstration should include additional information regarding efforts to achieve a higher probability of success, with a goal, for large systems, of a probability of success for any individual space station of 0.99 or better. For space stations under paragraph (d)(14)(vii)(B) of this section ending their mission in or passing through the low-Earth orbit region below 2000 km altitude, successful disposal is defined, for the purposes of this paragraph (d)(14)(vii)(D)(1), as atmospheric re-entry of the spacecraft as soon as practicable, but no later than five years following completion of the mission. For all other space stations under paragraphs (d)(14)(vii)(B) and (C) of this section, successful disposal will be assessed on a case-by-case basis. (2) If planned disposal is by atmospheric re-entry, the statement must also include: (i) A disclosure indicating whether the atmospheric re-entry will be an	mission is as soon as practicable afterwards, and in no case less than five years. (D)(1) Eutelsat Next space stations will implement very highly reliable units, functional redundancy, or both for all critical functions for disposal operations. As a constellation of less than 1,000 satellites, the probability of success for any individual space station will be at least 0.95, in accordance with French Space Law. Eutelsat commits to utilize Active Debris Removal services as necessary to supplement routine disposal operations. In all cases, disposal will be by atmospheric re-entry as soon as practicable upon end of mission, but no later than five years following completion of the mission. (D)(2)(i) Eutelsat will dispose of Eutelsat Next space stations by uncontrolled re-entry. (D)(2)(ii) Eutelsat Next space stations will be designed such that all portions will not survive re-entry and impact the surface of the Earth with a kinetic energy in excess of 15 joules. The objective casualty risk 0.000001 (1 in 1,000,000).

uncontrolled re-entry or a controlled targeted reentry. (ii) An assessment as to whether portions of any individual spacecraft will survive atmospheric re-entry and impact the surface of the Earth with a kinetic energy in excess of 15 joules, and demonstration that the calculated casualty risk for an individual spacecraft using the NASA Debris Assessment Software or a higher fidelity assessment tool is less than 0.0001 (1 in 10,000). § 25.114(d)(14)(vii)(B)-(D)	
For non-U.S.-licensed space stations, the requirement to describe the design and operational strategies to minimize orbital debris risk can be satisfied by demonstrating that debris mitigation plans for the space station(s) for which U.S. market access is requested are subject to direct and effective regulatory oversight by the national licensing authority. § 25.114(d)(14)(viii)	The Eutelsat Next space stations will be licensed by France, which has an extensive Space Law. The licensing authority provides direct and effective regulatory oversight of its licensee's debris mitigation plans.

A.13 ADDITIONAL INFORMATION CONCERNING DATA IN THE ASSOCIATED SCHEDULE S (§ 25.114(c))

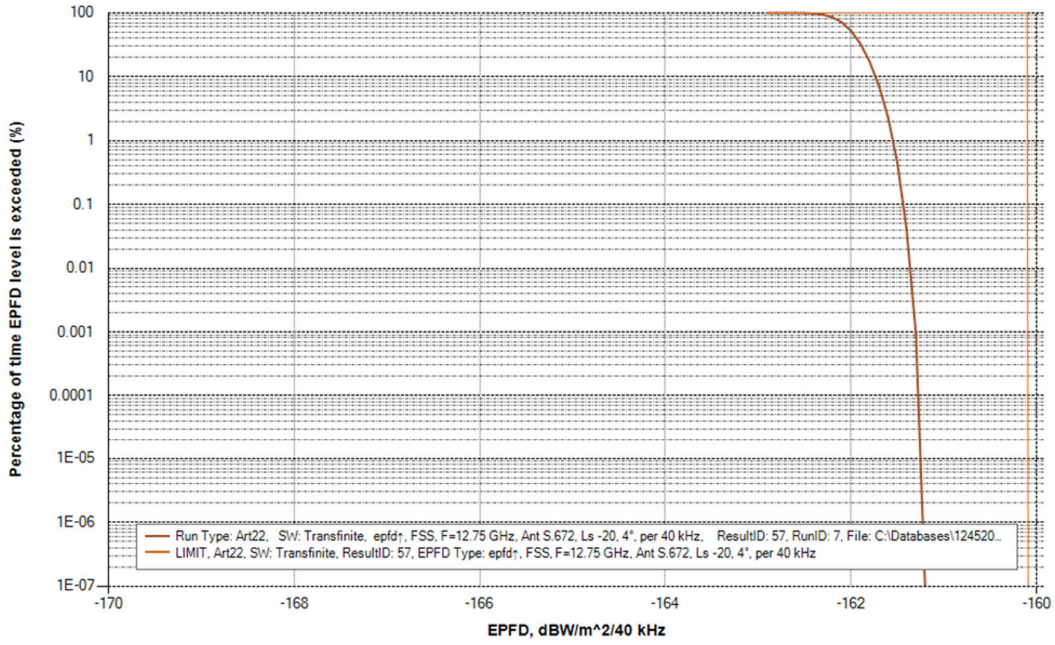
Eutelsat notes that the phase angles in the 24 planes of the constellation are listed in the Schedule S as "irregularly spaced." The satellites are actually evenly spaced within the plane. When regular spacing is chosen as an option in the ICFS software, the phase angle for each satellite truncates to a whole number, which is unsuitable for numbers of satellites within a plane that do not evenly divide 360. Because 360 divided by 22 is not a whole number, Eutelsat chose to use the "irregularly spaced" setting for functional purposes, not descriptive purposes.

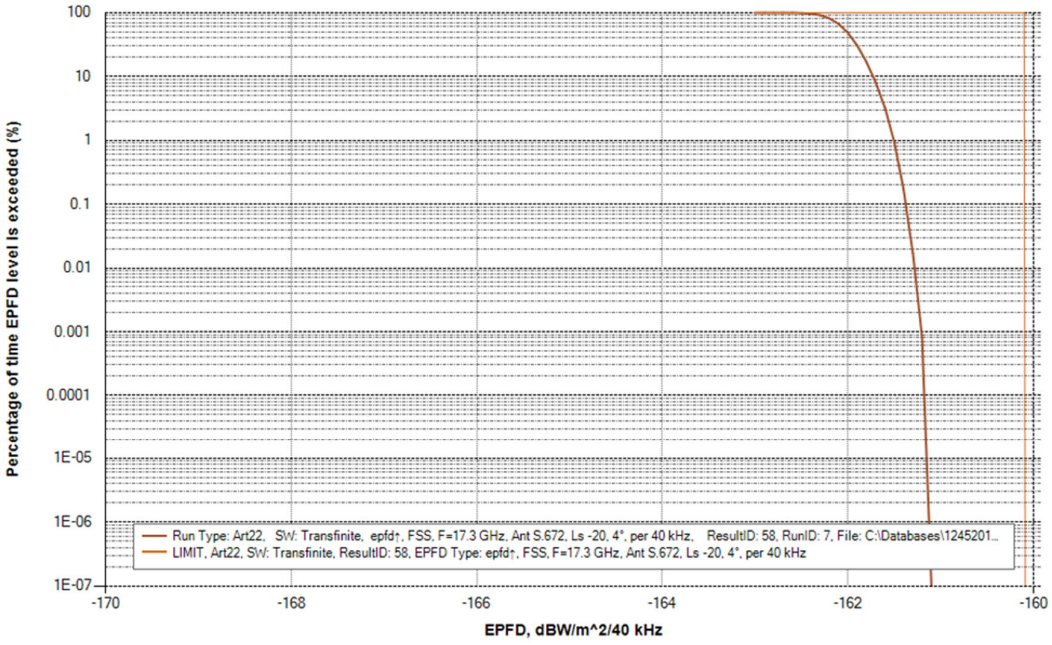
ANNEX 1

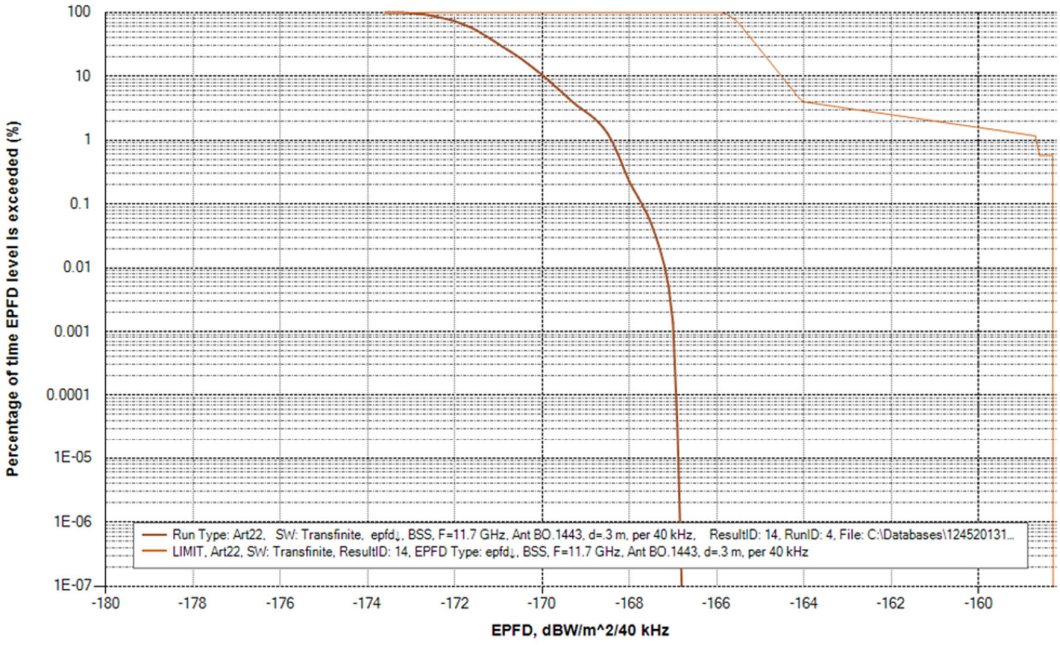
Demonstration of EPFD Compliance in Ku-Band

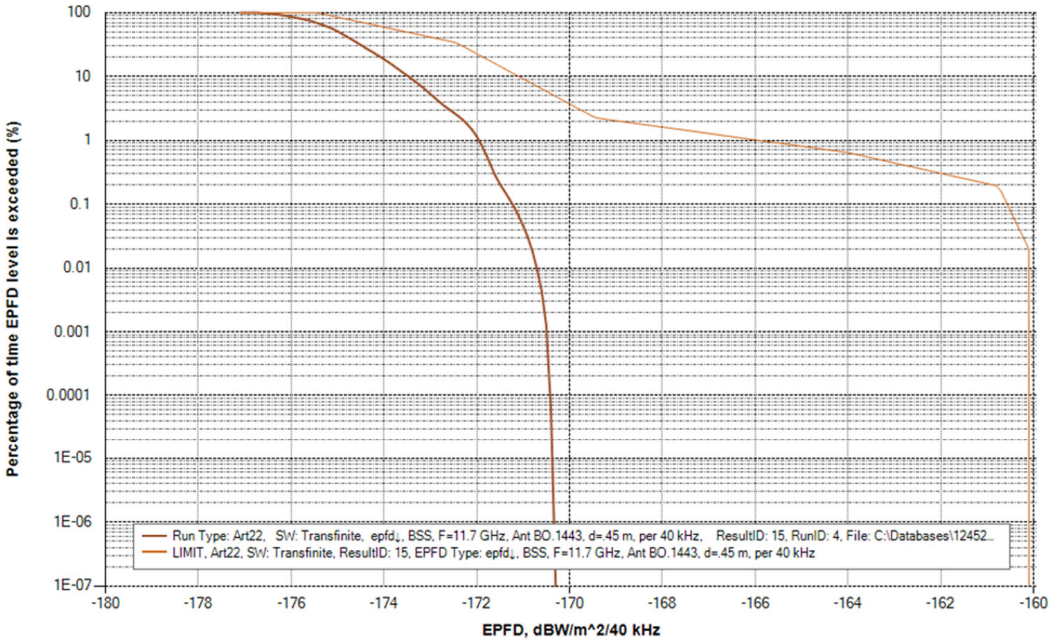
The Ku-band results from the EPFD validation computer program are shown below. Each plot corresponds to one of the EPFD limits and GSO reference earth station antenna sizes (for the downlink direction) from the EPFD limits. The labeling of each diagram indicates the frequency (in GHz), the reference bandwidth, the size of the GSO reference earth station antenna (in meters), whether this is a BSS or FSS EPFD limit, and whether it is uplink, downlink or intersatellite limit.

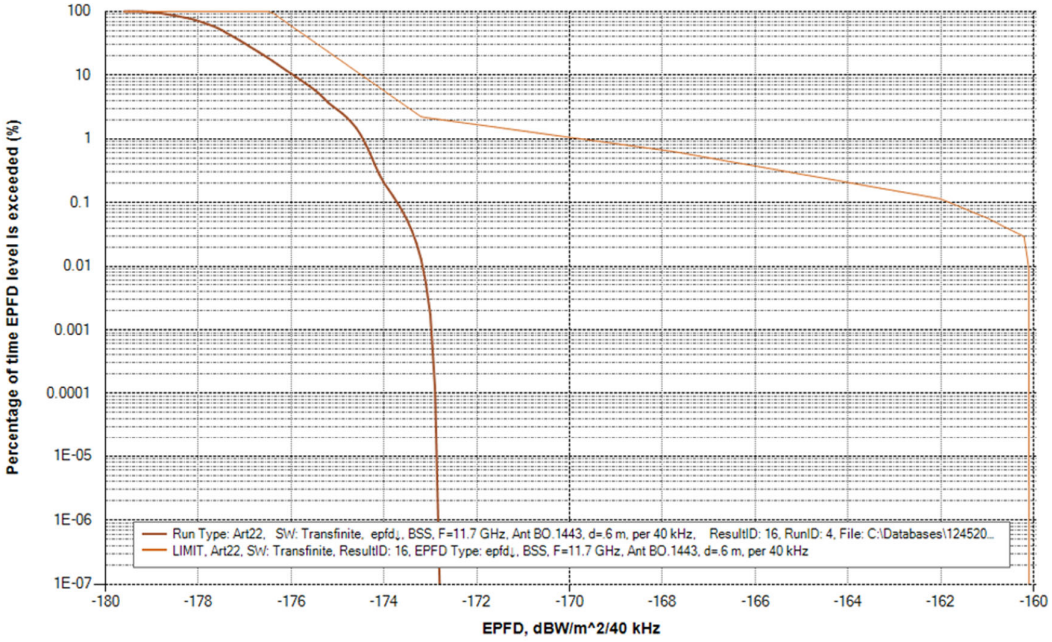
On each diagram the resulting EPFD level is shown by the red curve and the EPFD mask that applies is shown by the orange lines.

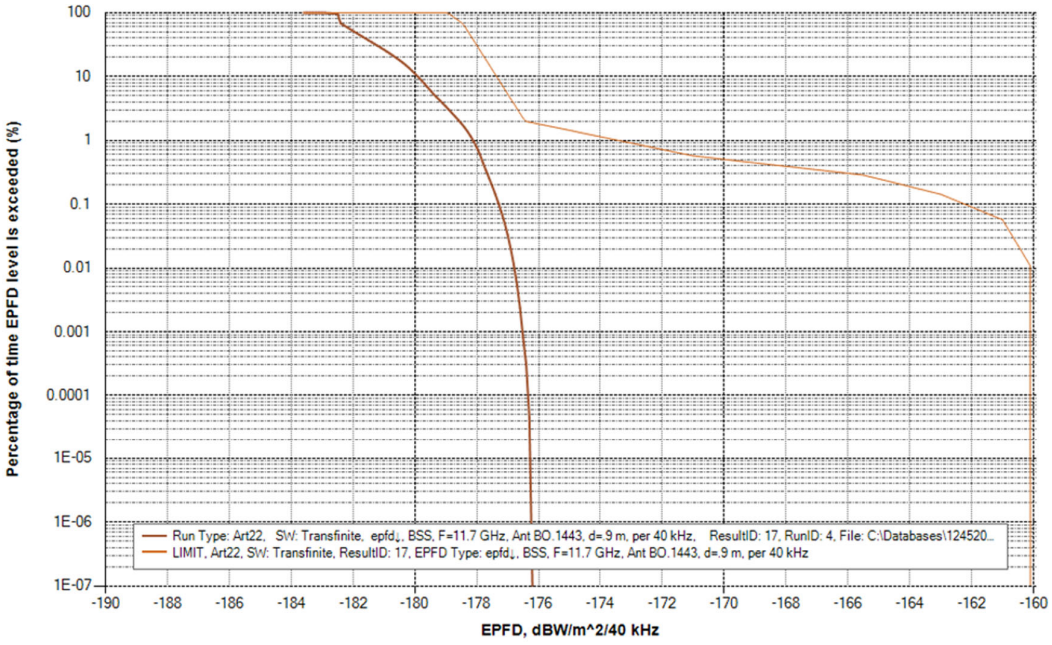


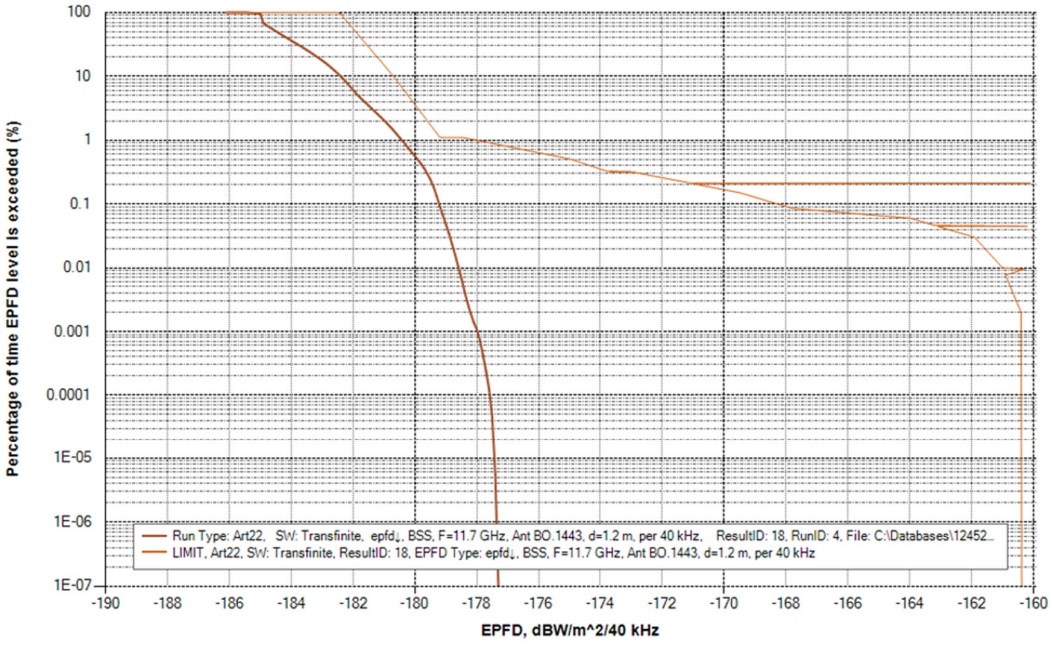

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-170
-168
-166
-164
-162
-160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↑, FSS, F=17.3 GHz, Ant S.672, Ls -20, 4°, per 40 kHz, ResultID: 58, RunID: 7, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 58, EPFD Type: epfd↑, FSS, F=17.3 GHz, Ant S.672, Ls -20, 4°, per 40 kHz

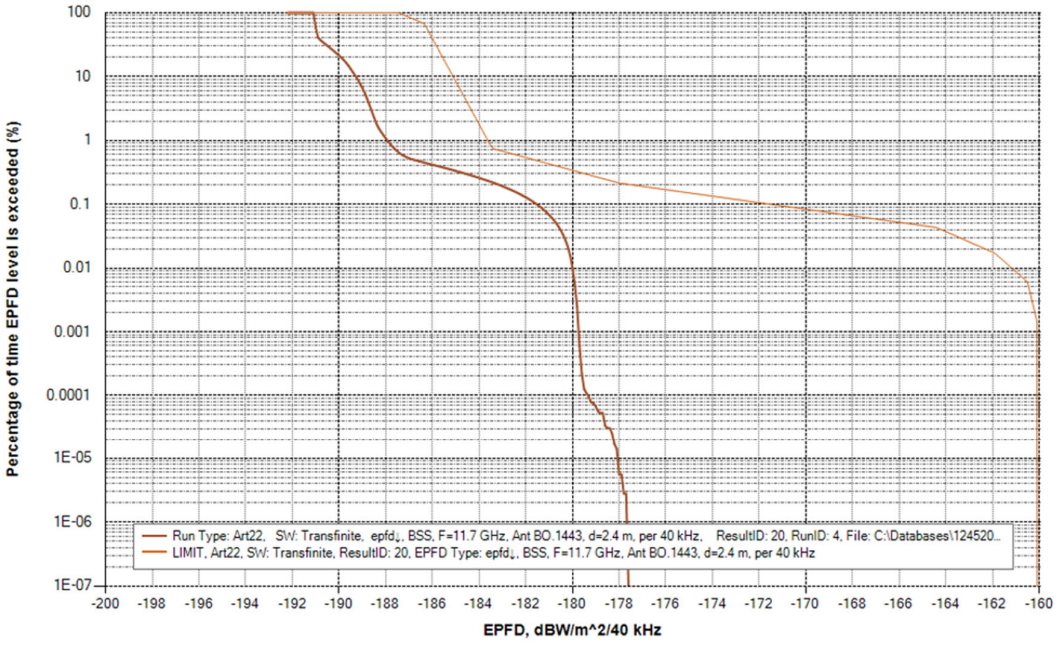

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
-162
-160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.3 m, per 40 kHz, ResultID: 14, RunID: 4, File: C:\Databases\124520131...
LIMIT, Art22, SW: Transfinite, ResultID: 14, EPFD Type: epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.3 m, per 40 kHz

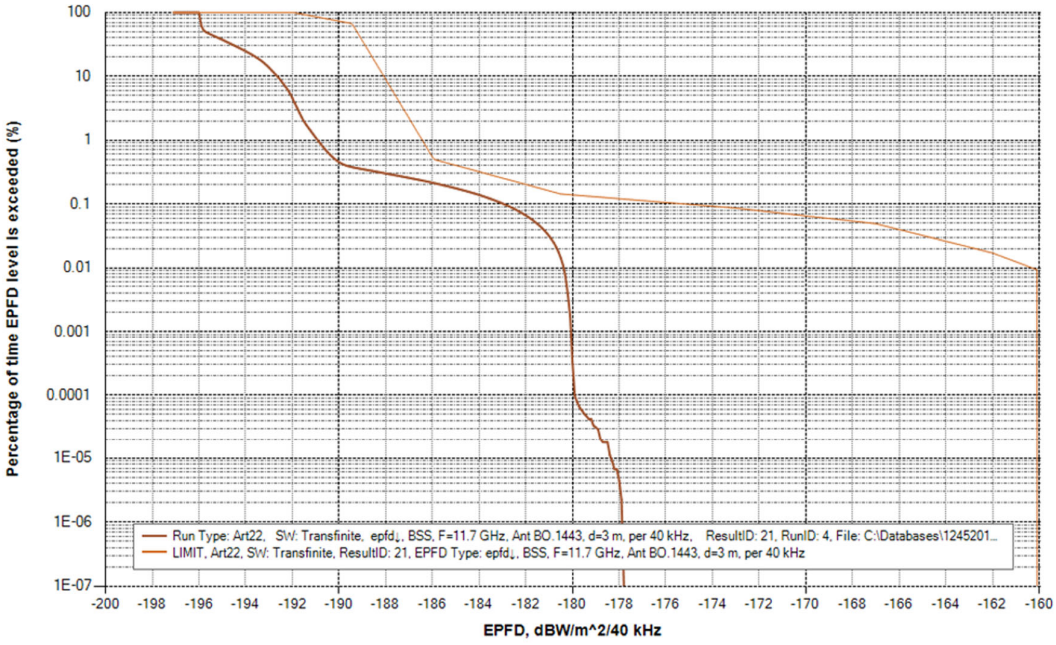

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
-162
-160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.45 m, per 40 kHz, ResultID: 15, RunID: 4, File: C:\Databases\12452...
LIMIT, Art22, SW: Transfinite, ResultID: 15, EPFD Type: epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.45 m, per 40 kHz

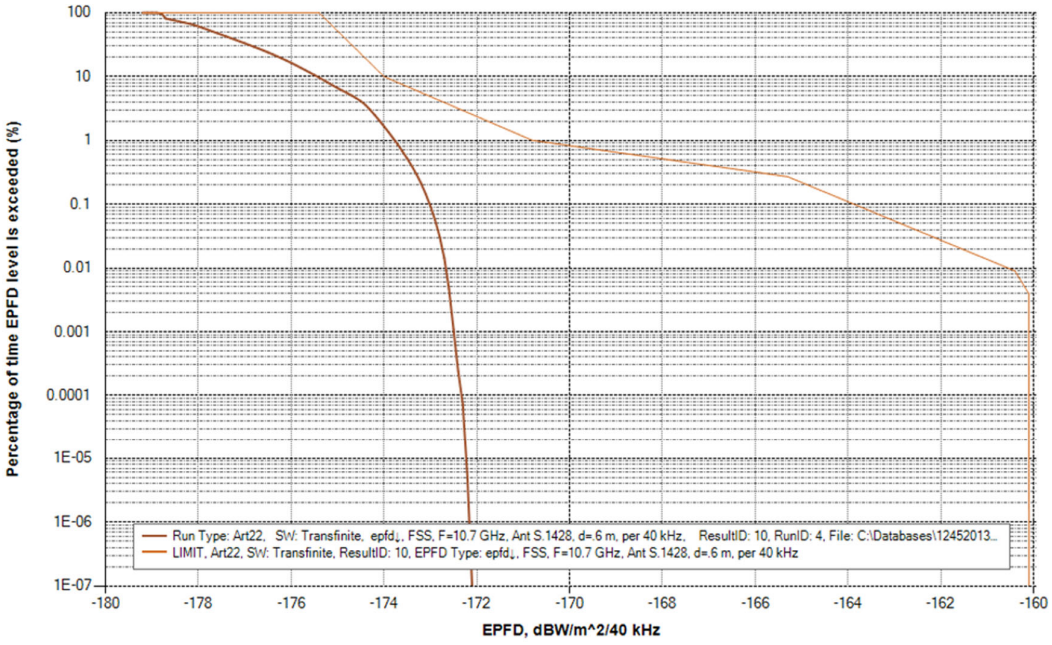

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
-162
-160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.6 m, per 40 kHz, ResultID: 16, RunID: 4, File: C:\Databases\124520...
LIMIT, Art22, SW: Transfinite, ResultID: 16, EPFD Type: epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.6 m, per 40 kHz

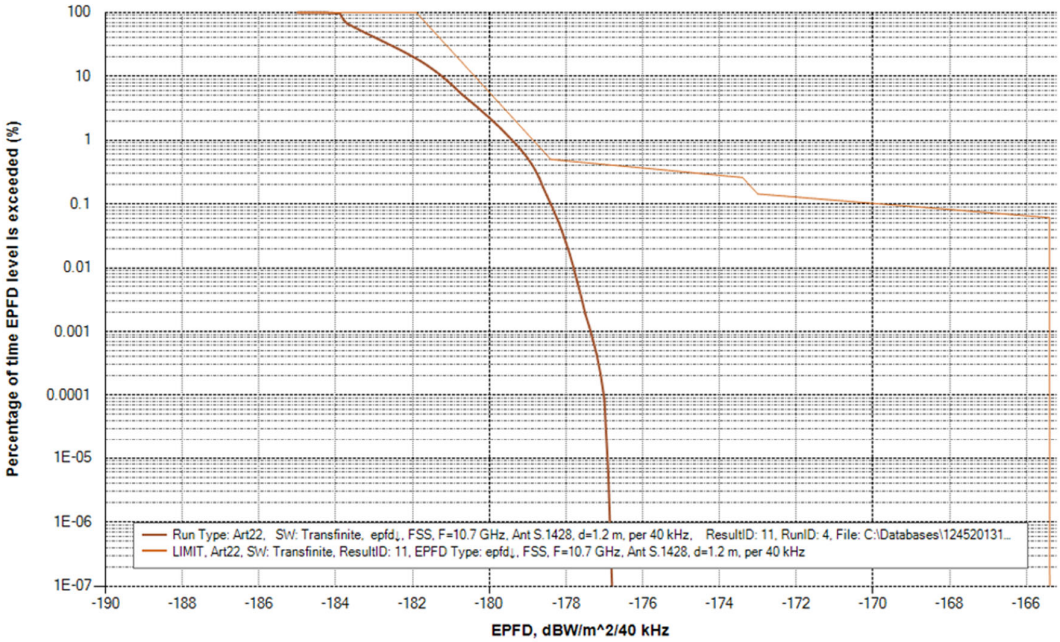

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.9 m, per 40 kHz, ResultID: 17, RunID: 4, File: C:\Databases\124520...
LIMIT, Art22, SW: Transfinite, ResultID: 17, EPFD Type: epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=.9 m, per 40 kHz

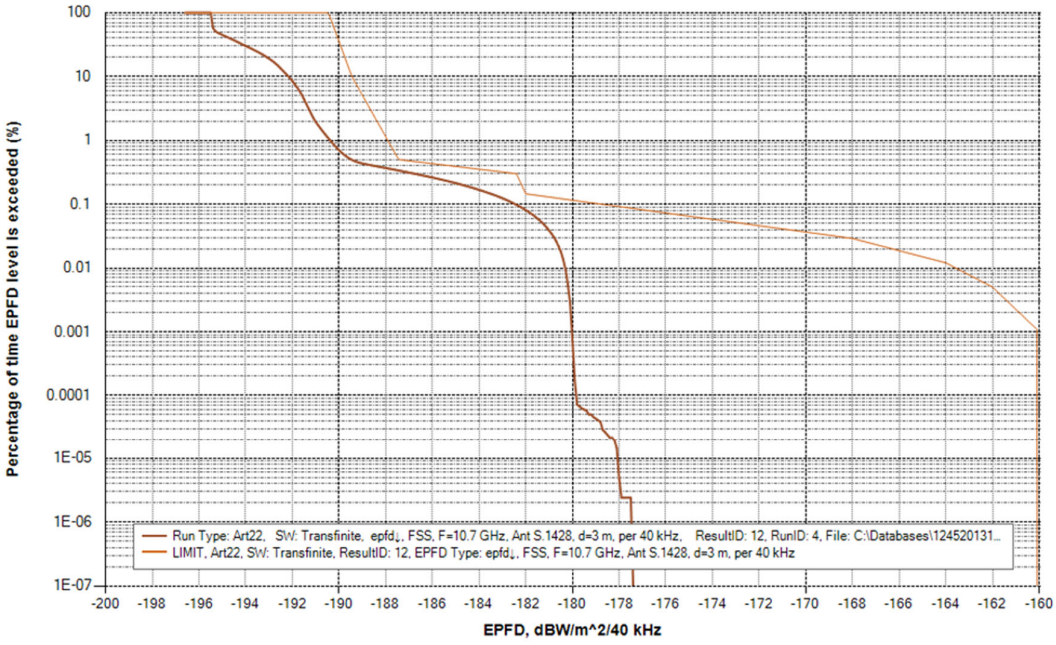

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=1.2 m, per 40 kHz, ResultID: 18, RunID: 4, File: C:\Databases\12452...
LIMIT, Art22, SW: Transfinite, ResultID: 18, EPFD Type: epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=1.2 m, per 40 kHz

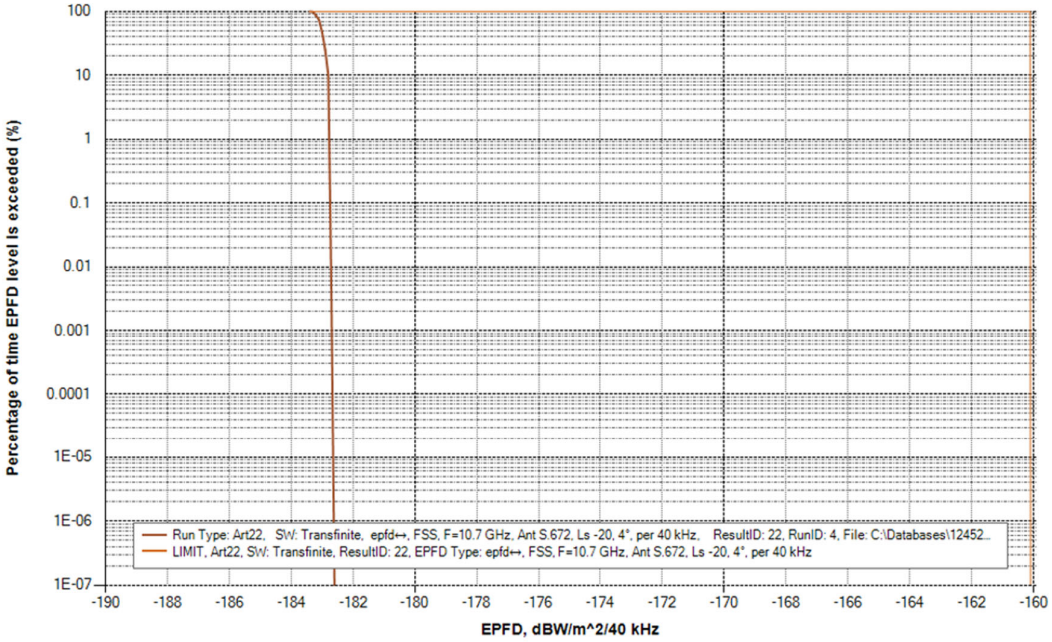

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200 -198 -196 -194 -192 -190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=2.4 m, per 40 kHz, ResultID: 20, RunID: 4, File: C:\Databases\124520...
LIMIT, Art22, SW: Transfinite, ResultID: 20, EPFD Type: epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=2.4 m, per 40 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200 -198 -196 -194 -192 -190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=3 m, per 40 kHz, ResultID: 21, RunID: 4, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 21, EPFD Type: epfd↓, BSS, F=11.7 GHz, Ant BO.1443, d=3 m, per 40 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
-162
-160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=10.7 GHz, Ant S.1428, d=.6 m, per 40 kHz, ResultID: 10, RunID: 4, File: C:\Databases\12452013...
LIMIT, Art22, SW: Transfinite, ResultID: 10, EPFD Type: epfd↓, FSS, F=10.7 GHz, Ant S.1428, d=.6 m, per 40 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190
-188
-186
-184
-182
-180
-178
-176
-174
-172
-170
-168
-166
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=10.7 GHz, Ant S.1428, d=1.2 m, per 40 kHz, ResultID: 11, RunID: 4, File: C:\Databases\124520131...
LIMIT, Art22, SW: Transfinite, ResultID: 11, EPFD Type: epfd↓, FSS, F=10.7 GHz, Ant S.1428, d=1.2 m, per 40 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200 -198 -196 -194 -192 -190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=10.7 GHz, Ant S.1428, d=3 m, per 40 kHz, ResultID: 12, RunID: 4, File: C:\Databases\124520131...
LIMIT, Art22, SW: Transfinite, ResultID: 12, EPFD Type: epfd↓, FSS, F=10.7 GHz, Ant S.1428, d=3 m, per 40 kHz

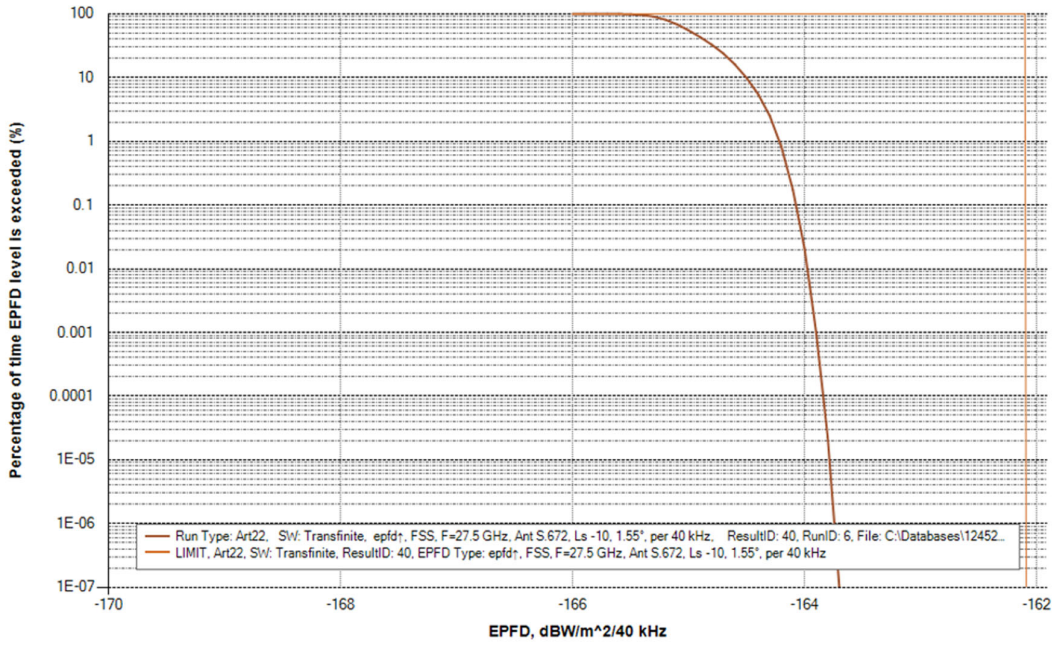

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↔, FSS, F=10.7 GHz, Ant S.672, Ls -20, 4°, per 40 kHz, ResultID: 22, RunID: 4, File: C:\Databases\12452...
LIMIT, Art22, SW: Transfinite, ResultID: 22, EPFD Type: epfd↔, FSS, F=10.7 GHz, Ant S.672, Ls -20, 4°, per 40 kHz

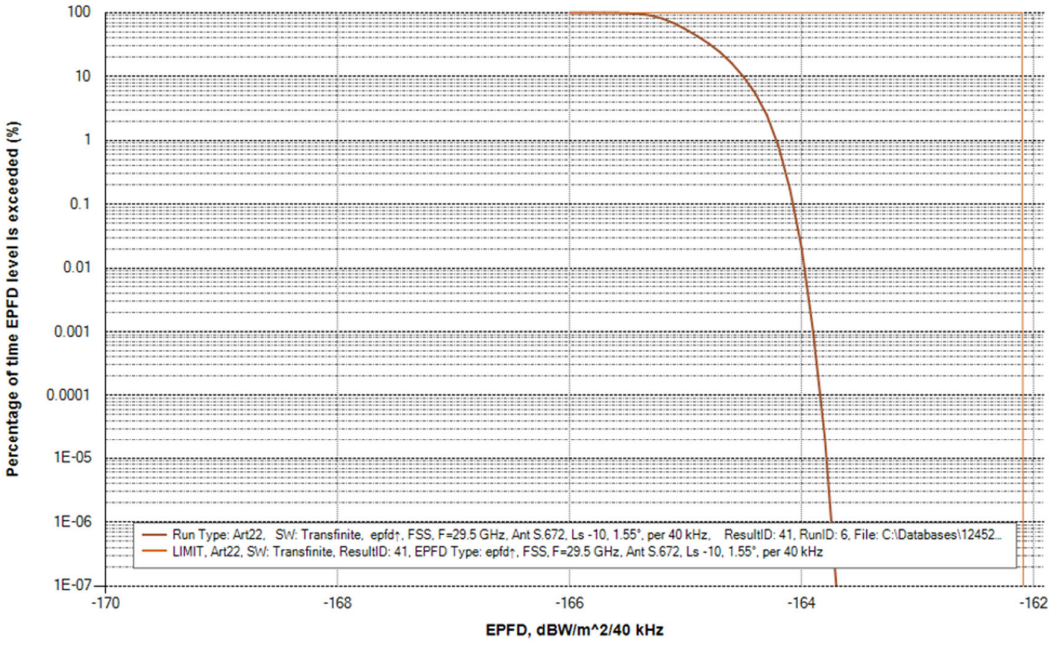
ANNEX 2

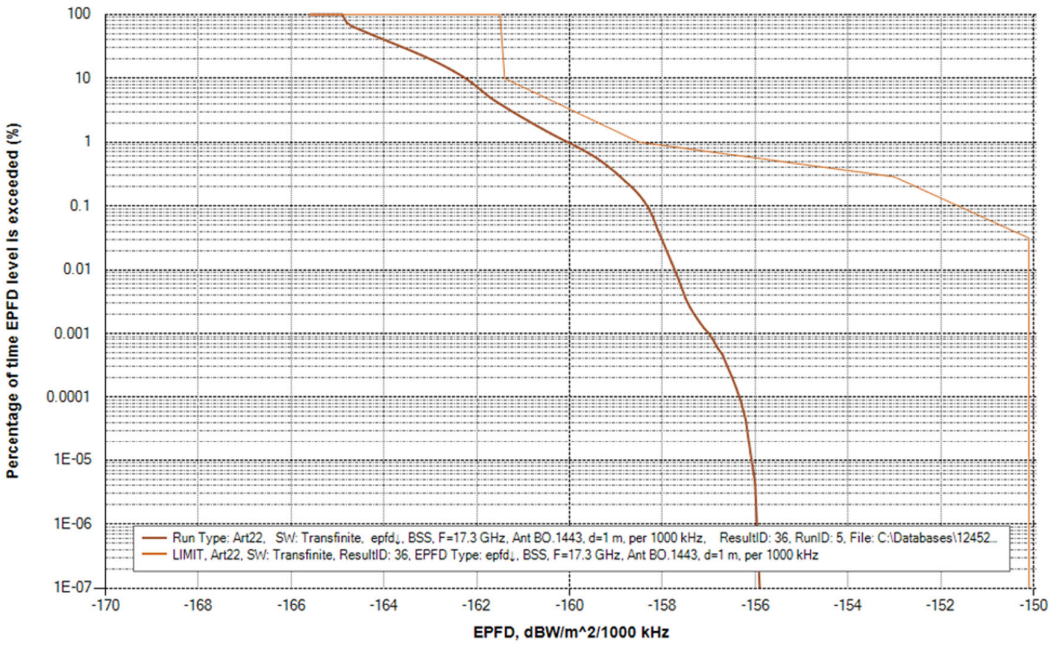
Demonstration of EPFD Compliance in Ka-Band

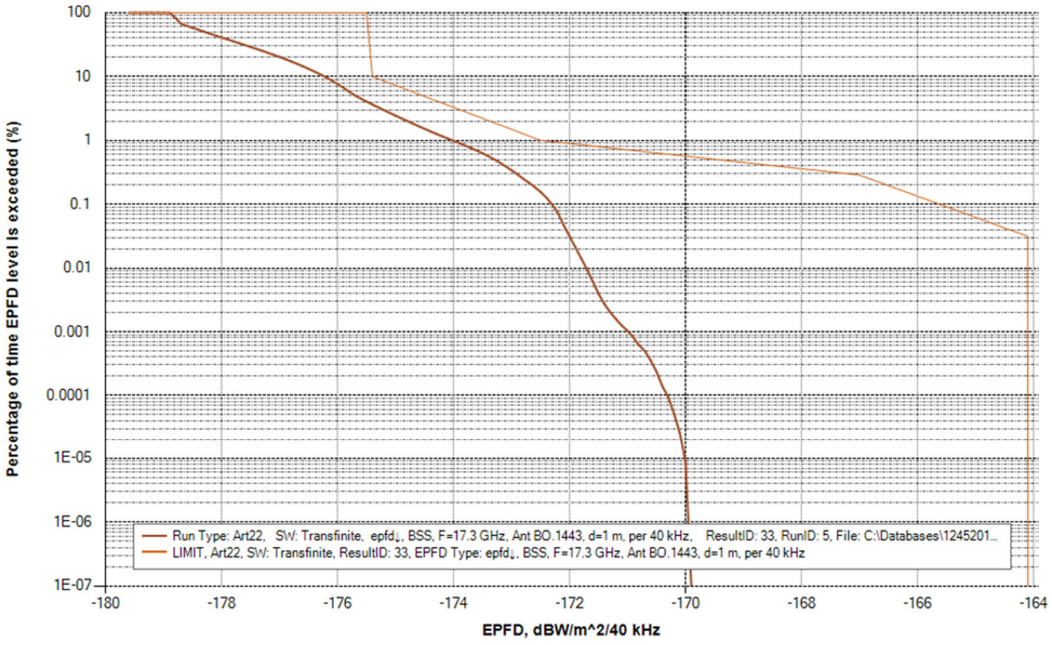
The Ka-band results from the EPFD validation computer program are shown below. Each plot corresponds to one of the EPFD limits and GSO reference earth station antenna sizes (for the downlink direction) from the EPFD limits. The labeling of each diagram indicates the frequency (in GHz), the reference bandwidth, the size of the GSO reference earth station antenna (in meters), whether this is a BSS or FSS EPFD limit, and whether it is uplink, downlink or intersatellite limit.

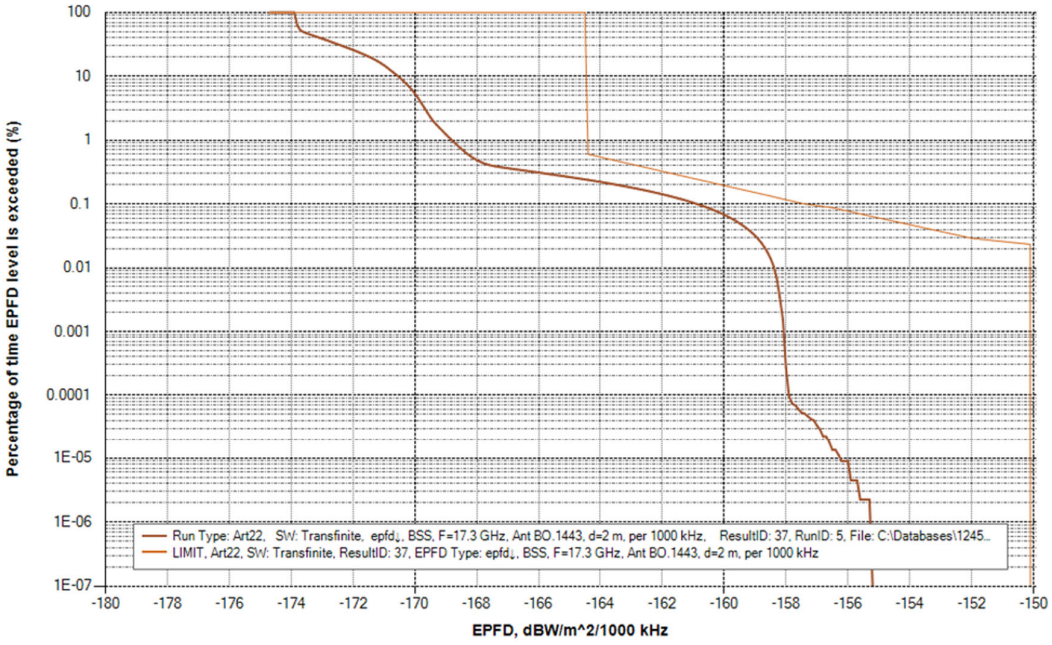
On each diagram the resulting EPFD level is shown by the red curve and the EPFD mask that applies is shown by the orange lines.

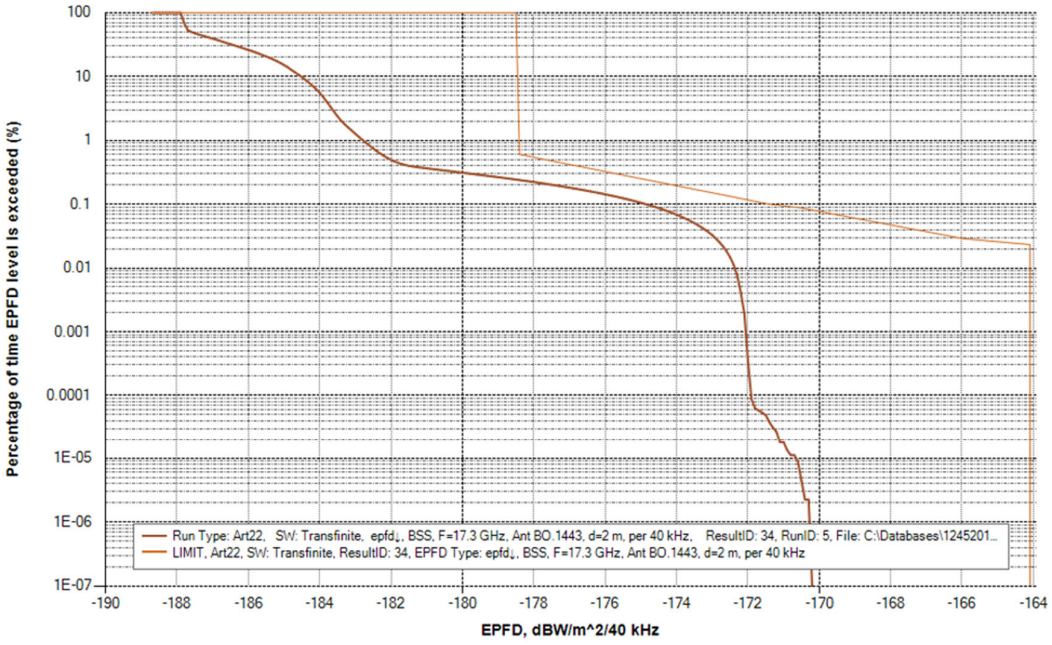


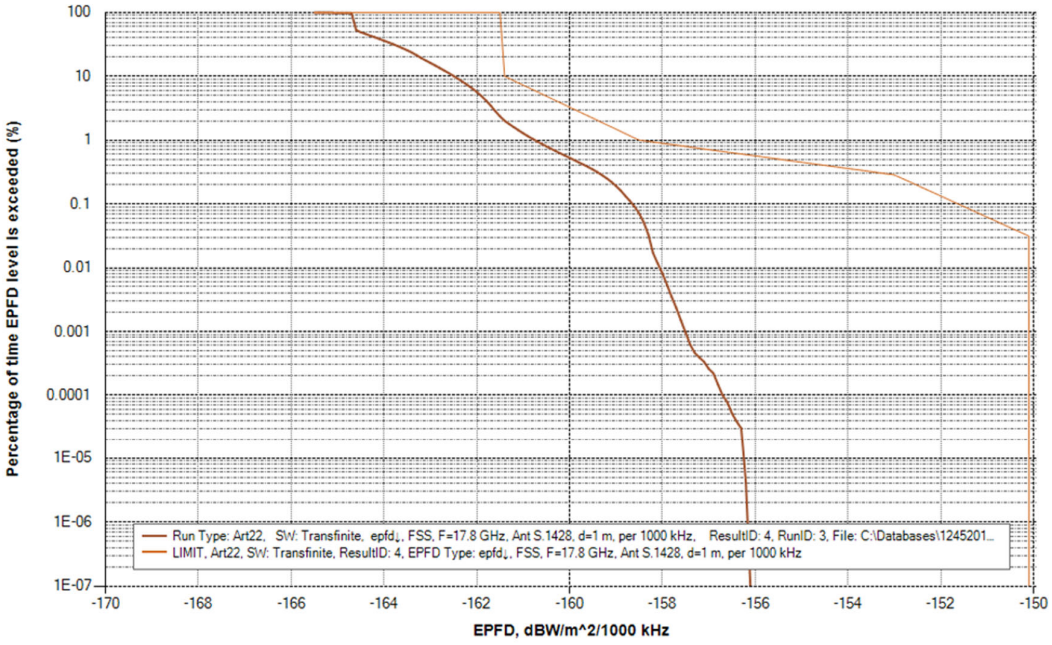

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-170
-168
-166
-164
-162
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↑, FSS, F=29.5 GHz, Ant S.672, Ls -10, 1.55°, per 40 kHz, ResultID: 41, RunID: 6, File: C:\Databases\12452...
LIMIT, Art22, SW: Transfinite, ResultID: 41, EPFD Type: epfd↑, FSS, F=29.5 GHz, Ant S.672, Ls -10, 1.55°, per 40 kHz

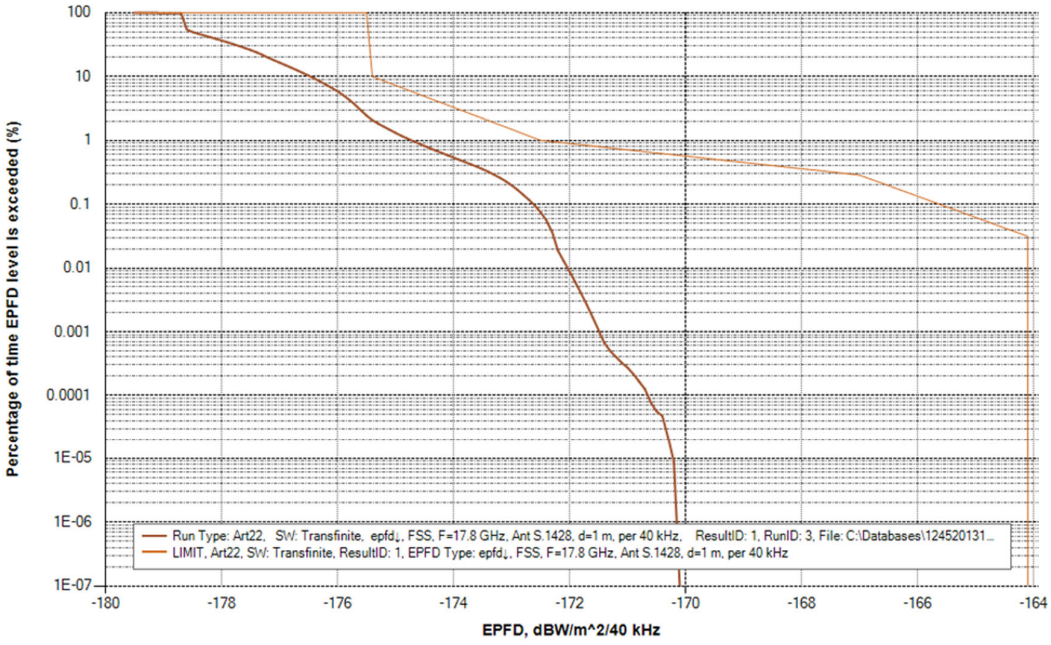

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-170
-168
-166
-164
-162
-160
-158
-156
-154
-152
-150
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=1 m, per 1000 kHz, ResultID: 36, RunID: 5, File: C:\Databases\12452...
LIMIT, Art22, SW: Transfinite, ResultID: 36, EPFD Type: epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=1 m, per 1000 kHz

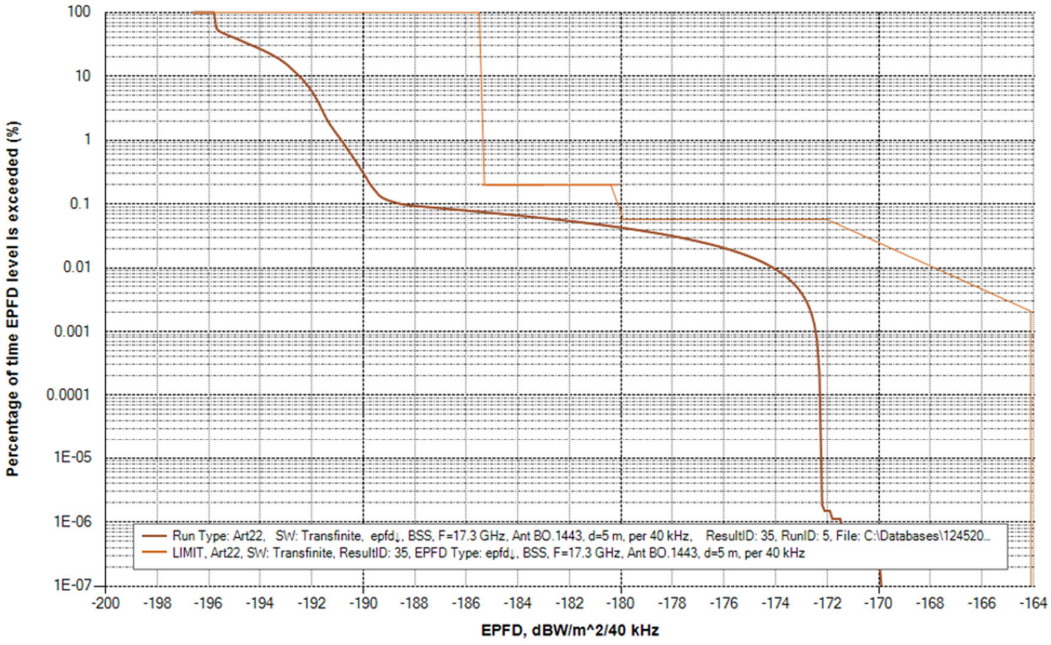

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=1 m, per 40 kHz, ResultID: 33, RunID: 5, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 33, EPFD Type: epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=1 m, per 40 kHz

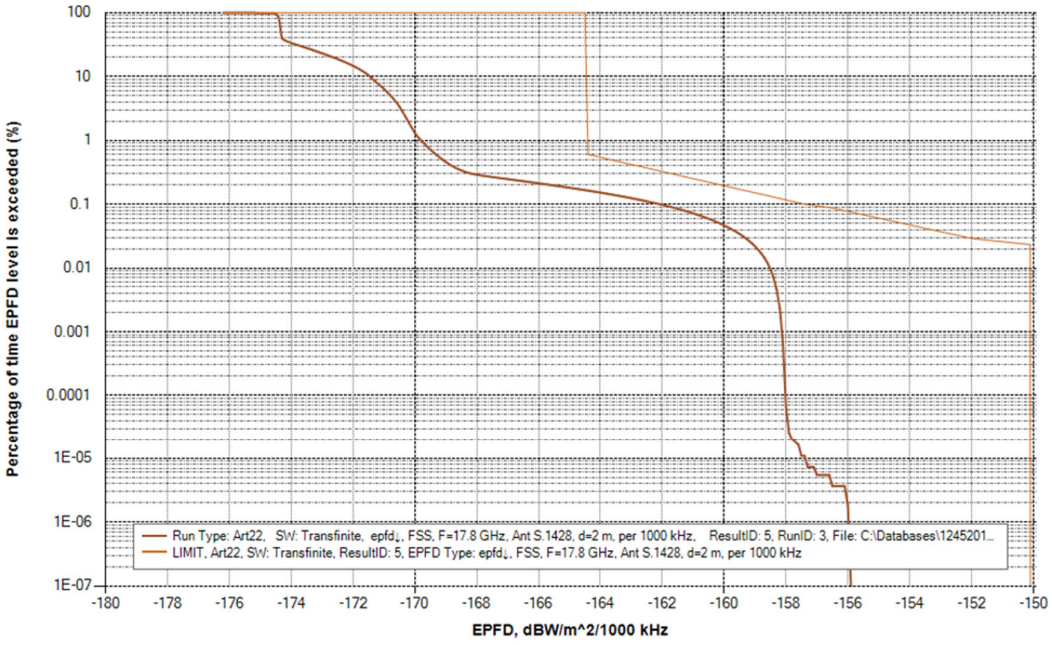

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
-162
-160
-158
-156
-154
-152
-150
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=2 m, per 1000 kHz, ResultID: 37, RunID: 5, File: C:\Databases\1245...
LIMIT, Art22, SW: Transfinite, ResultID: 37, EPFD Type: epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=2 m, per 1000 kHz

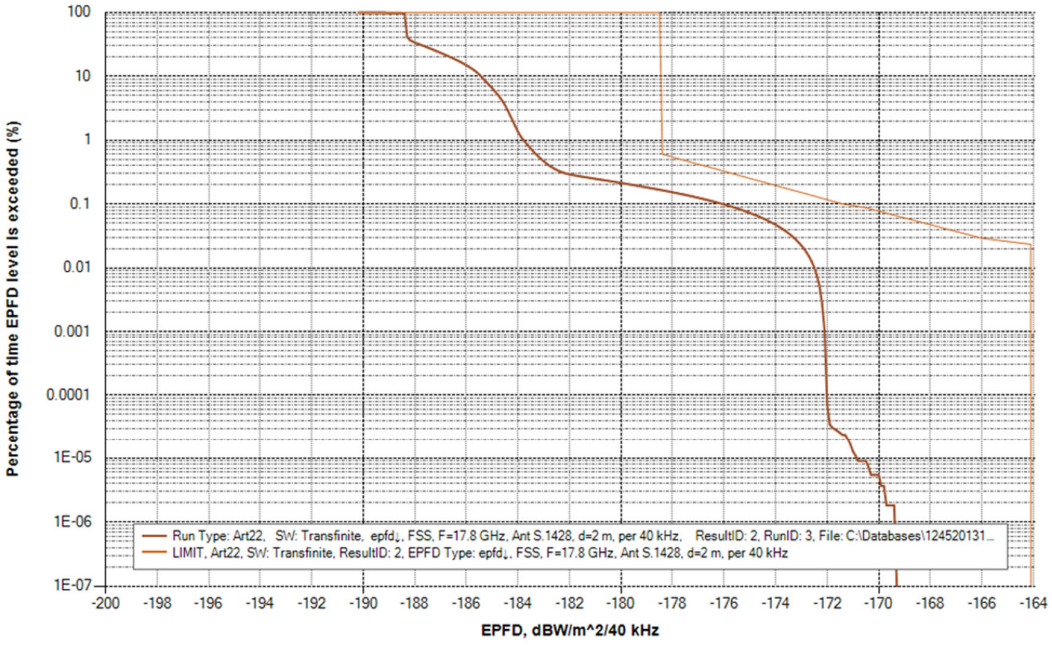

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190
-188
-186
-184
-182
-180
-178
-176
-174
-172
-170
-168
-166
-164
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=2 m, per 40 kHz, ResultID: 34, RunID: 5, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 34, EPFD Type: epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=2 m, per 40 kHz

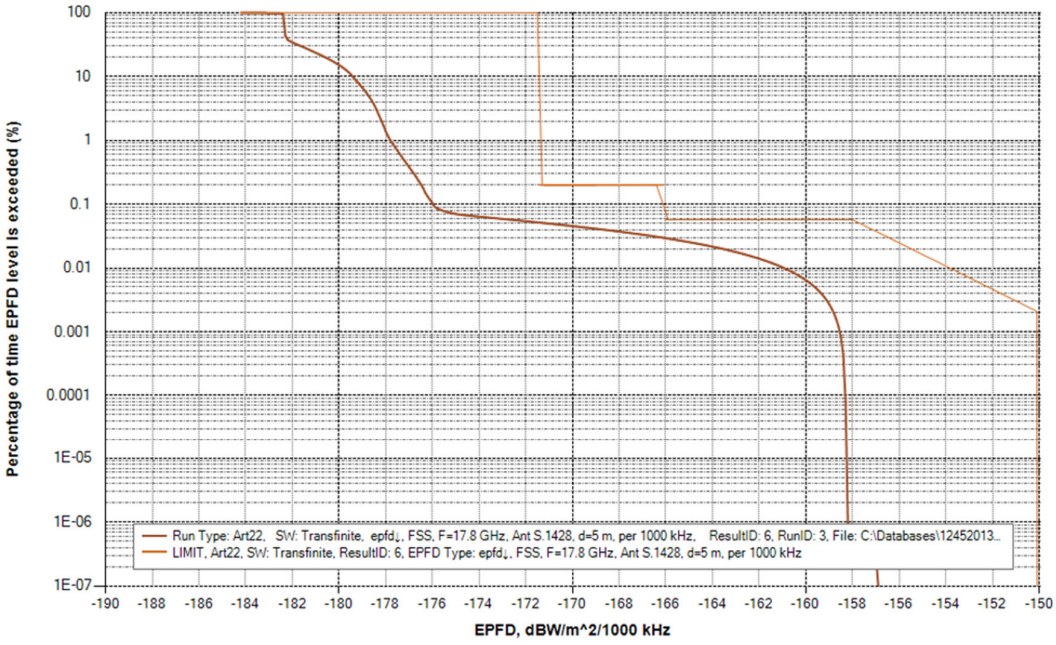

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-170
-168
-166
-164
-162
-160
-158
-156
-154
-152
-150
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=1 m, per 1000 kHz, ResultID: 4, RunID: 3, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 4, EPFD Type: epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=1 m, per 1000 kHz

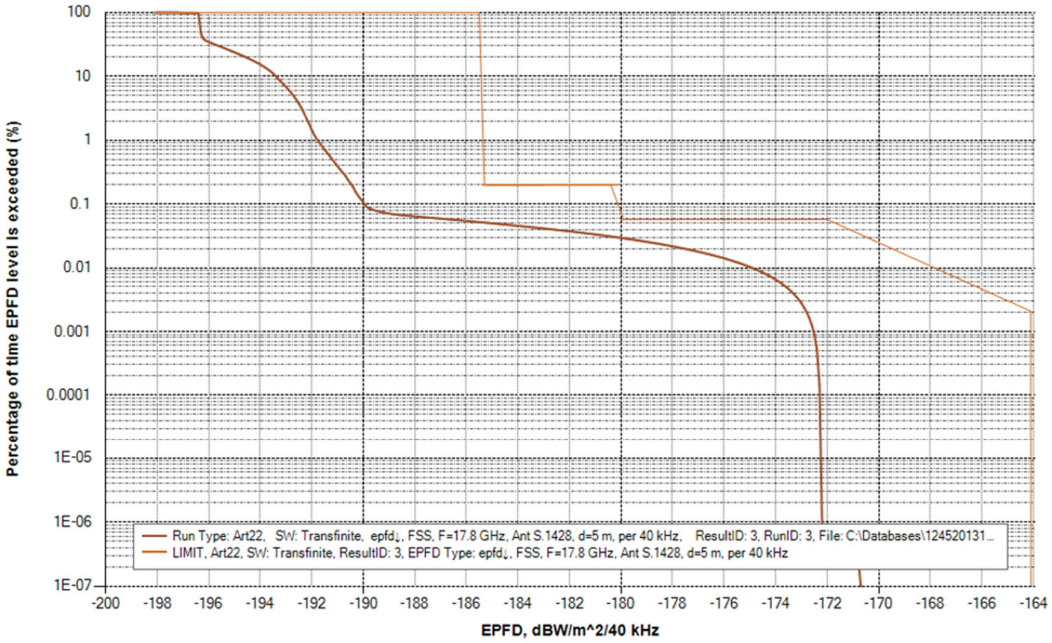

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=1 m, per 40 kHz, ResultID: 1, RunID: 3, File: C:\Databases\124520131...
LIMIT, Art22, SW: Transfinite, ResultID: 1, EPFD Type: epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=1 m, per 40 kHz

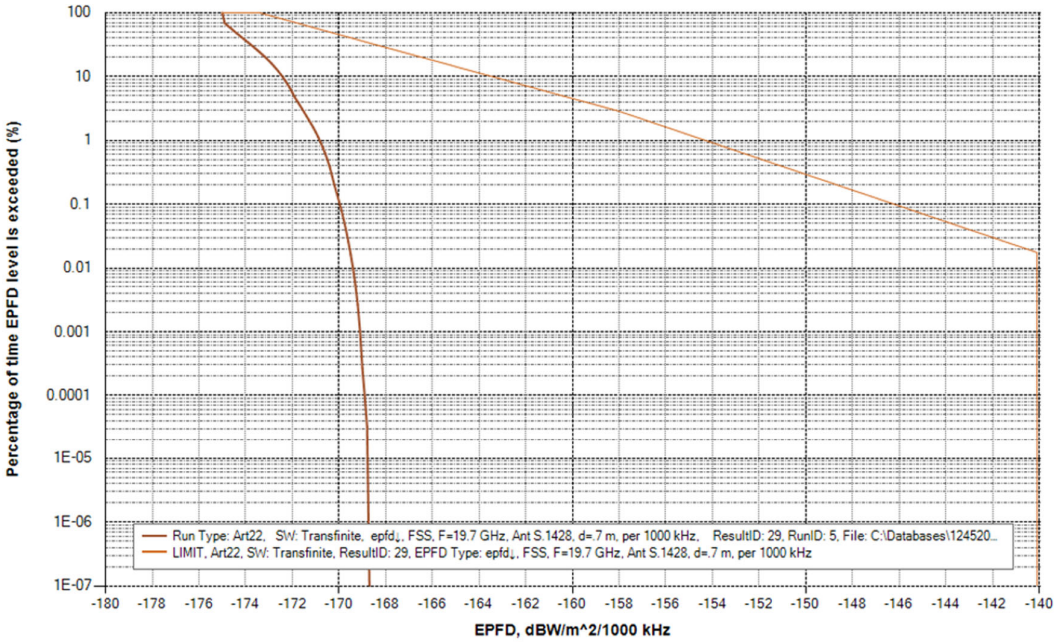

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200
-198
-196
-194
-192
-190
-188
-186
-184
-182
-180
-178
-176
-174
-172
-170
-168
-166
-164
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=5 m, per 40 kHz, ResultID: 35, RunID: 5, File: C:\Databases\124520...
LIMIT, Art22, SW: Transfinite, ResultID: 35, EPFD Type: epfd↓, BSS, F=17.3 GHz, Ant BO.1443, d=5 m, per 40 kHz

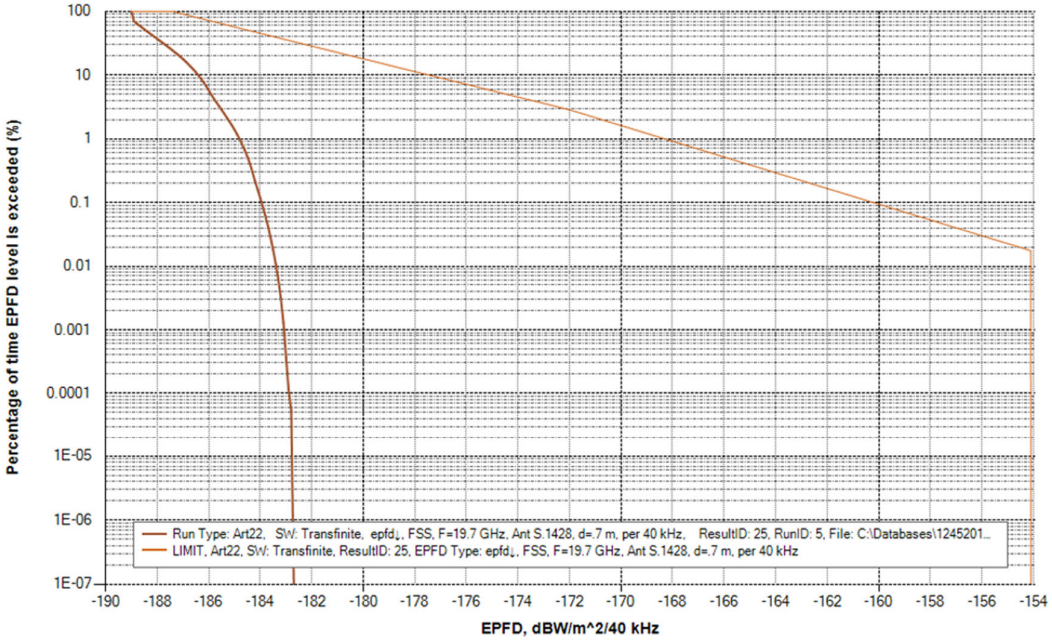

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154 -152 -150
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=2 m, per 1000 kHz, ResultID: 5, RunID: 3, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 5, EPFD Type: epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=2 m, per 1000 kHz

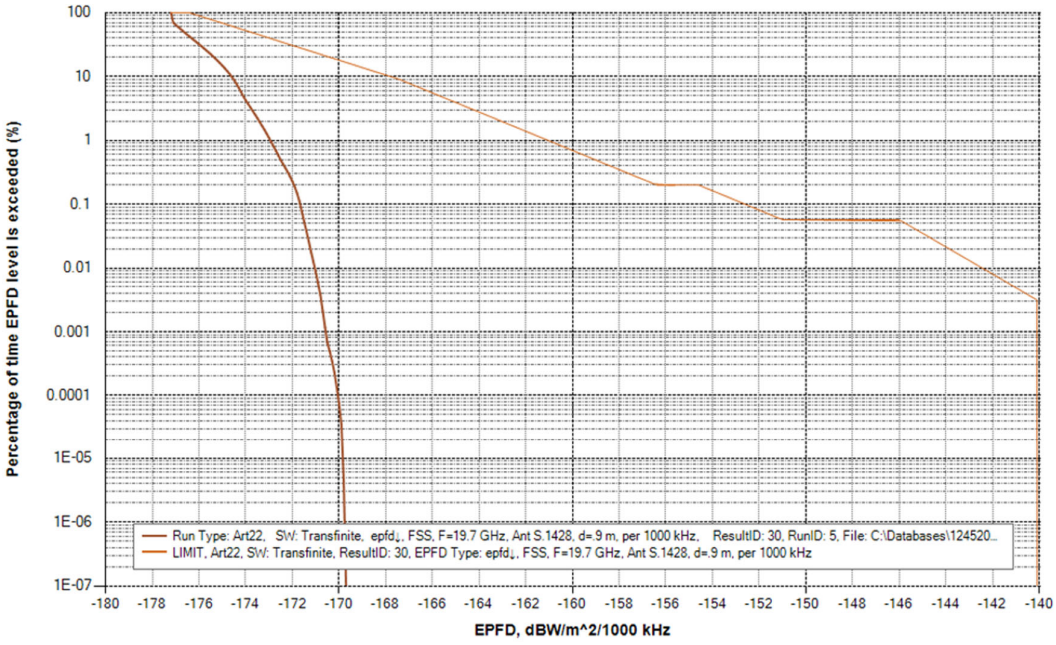

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200 -198 -196 -194 -192 -190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=2 m, per 40 kHz, ResultID: 2, RunID: 3, File: C:\Databases\124520131...
LIMIT, Art22, SW: Transfinite, ResultID: 2, EPFD Type: epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=2 m, per 40 kHz

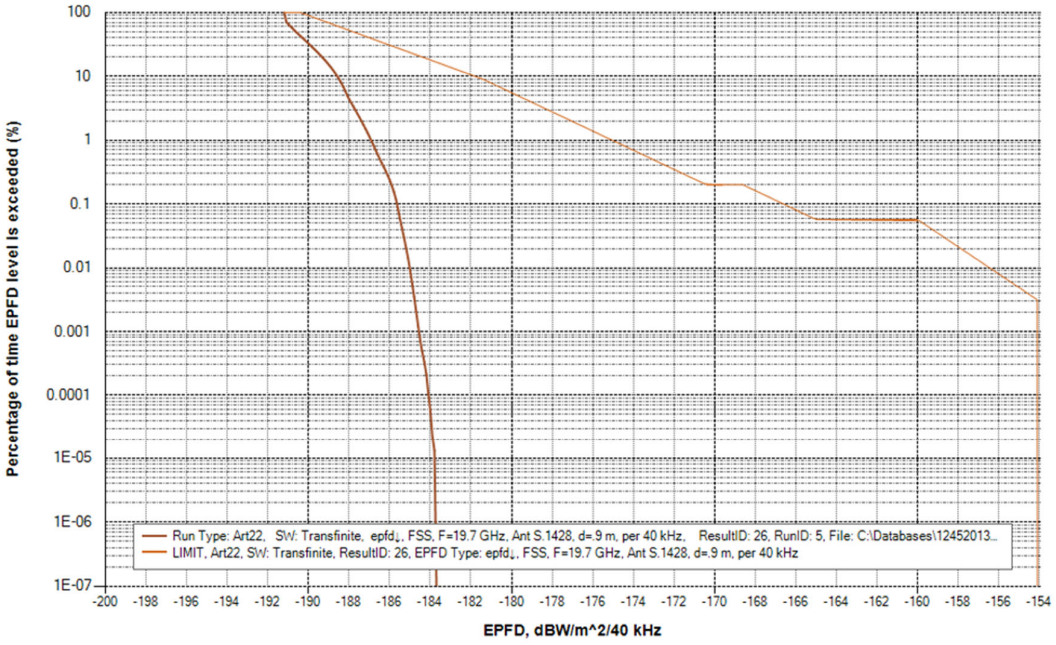

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154 -152 -150
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=5 m, per 1000 kHz, ResultID: 6, RunID: 3, File: C:\Databases\12452013...
LIMIT, Art22, SW: Transfinite, ResultID: 6, EPFD Type: epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=5 m, per 1000 kHz

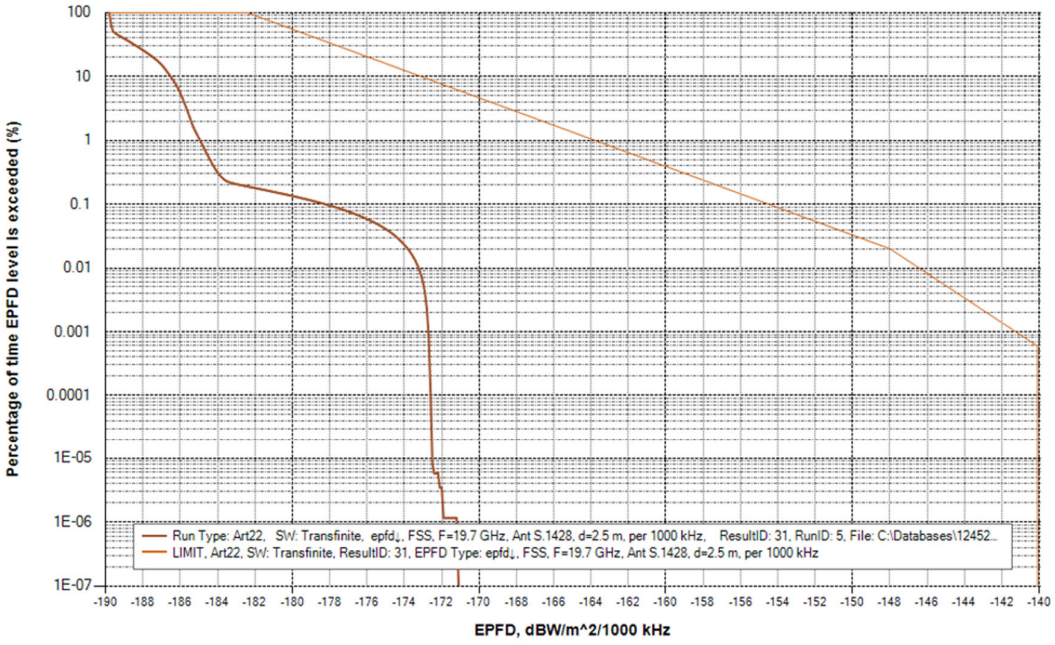

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200 -198 -196 -194 -192 -190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=5 m, per 40 kHz, ResultID: 3, RunID: 3, File: C:\Databases\124520131...
LIMIT, Art22, SW: Transfinite, ResultID: 3, EPFD Type: epfd↓, FSS, F=17.8 GHz, Ant S.1428, d=5 m, per 40 kHz

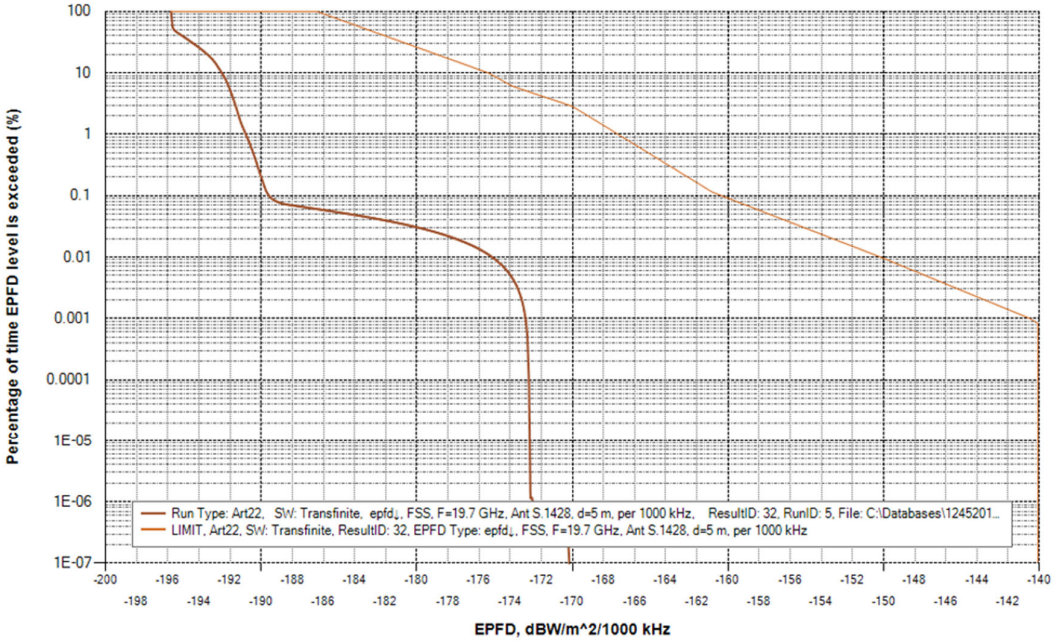

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154 -152 -150 -148 -146 -144 -142 -140
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.7 m, per 1000 kHz, ResultID: 29, RunID: 5, File: C:\Databases\124520...
LIMIT, Art22, SW: Transfinite, ResultID: 29, EPFD Type: epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.7 m, per 1000 kHz

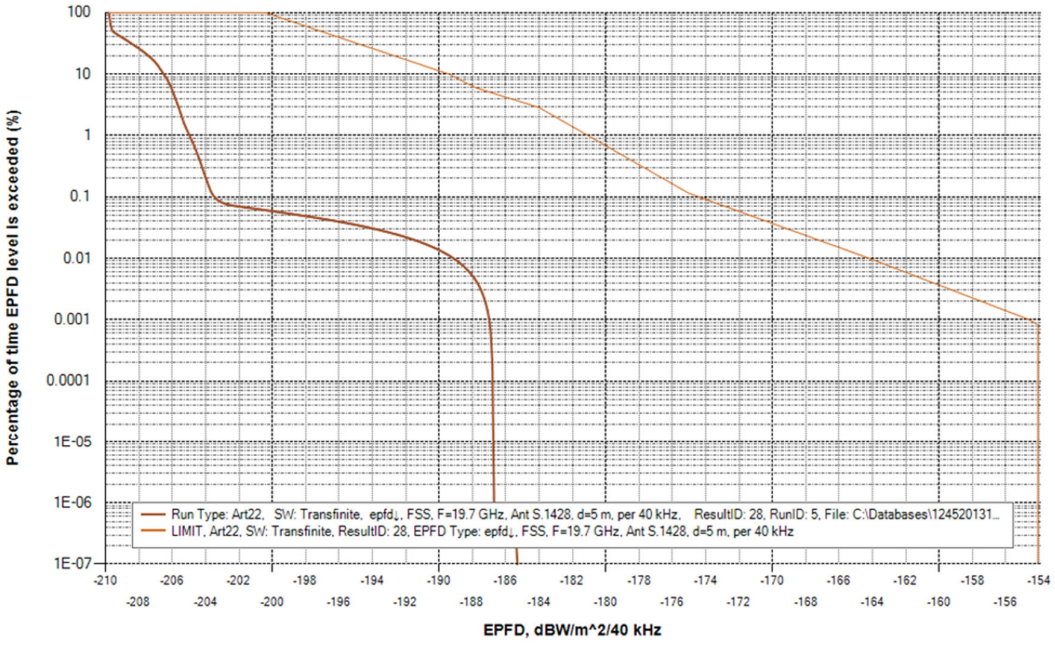

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.7 m, per 40 kHz, ResultID: 25, RunID: 5, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 25, EPFD Type: epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.7 m, per 40 kHz

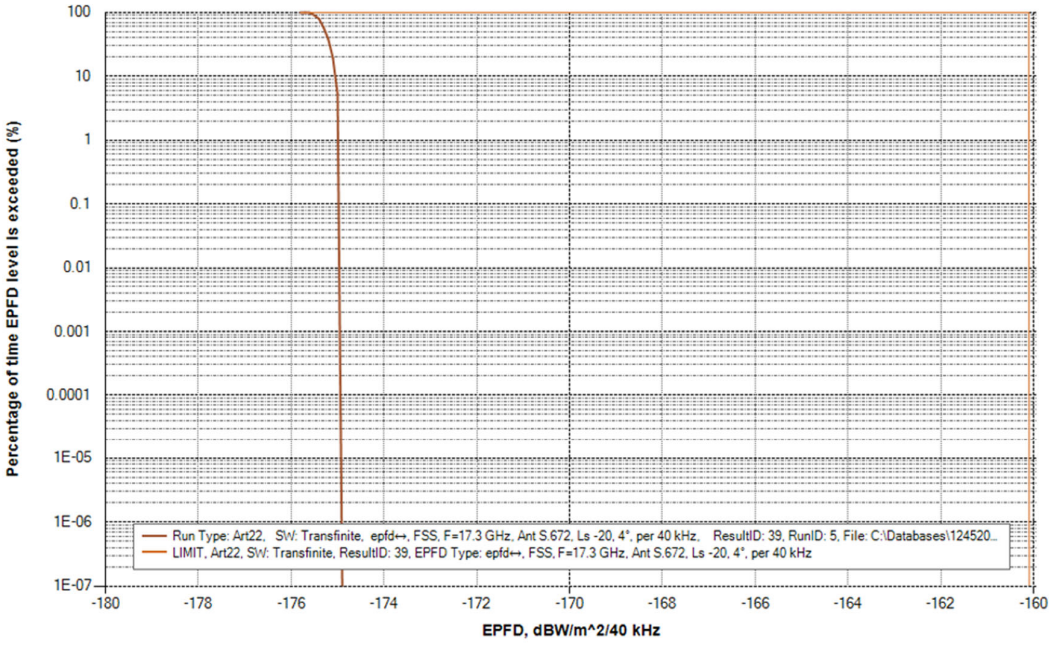

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154 -152 -150 -148 -146 -144 -142 -140
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.9 m, per 1000 kHz, ResultID: 30, RunID: 5, File: C:\Databases\124520..
LIMIT, Art22, SW: Transfinite, ResultID: 30, EPFD Type: epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.9 m, per 1000 kHz

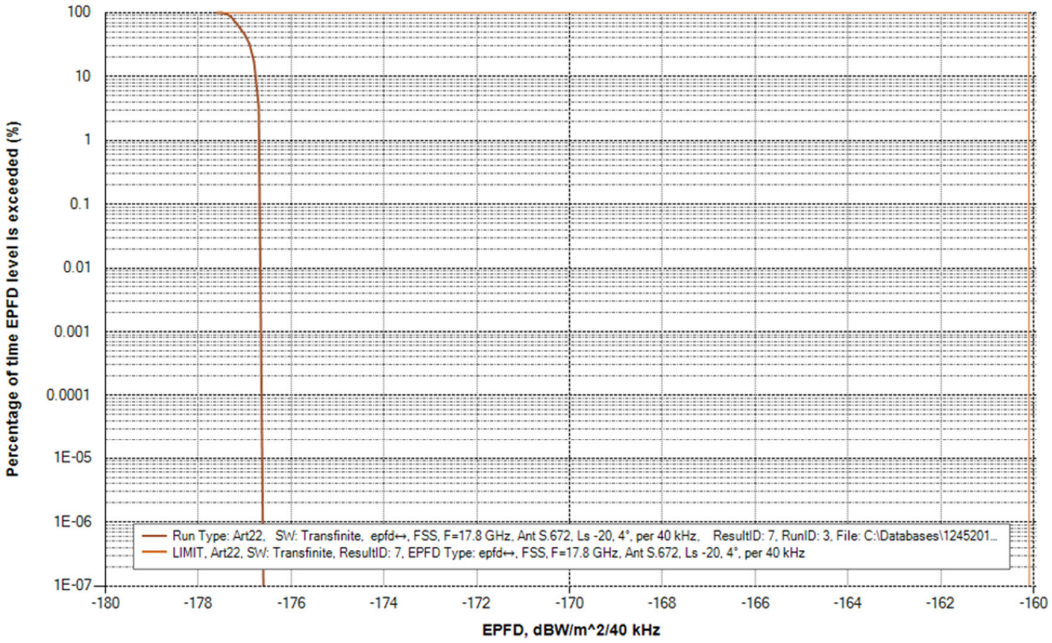

Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200 -198 -196 -194 -192 -190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.9 m, per 40 kHz, ResultID: 26, RunID: 5, File: C:\Databases\12452013..
LIMIT, Art22, SW: Transfinite, ResultID: 26, EPFD Type: epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=.9 m, per 40 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154 -152 -150 -148 -146 -144 -142 -140
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=2.5 m, per 1000 kHz, ResultID: 31, RunID: 5, File: C:\Databases\12452...
LIMIT, Art22, SW: Transfinite, ResultID: 31, EPFD Type: epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=2.5 m, per 1000 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-200 -196 -192 -188 -184 -180 -176 -172 -168 -164 -160 -156 -152 -148 -144 -140
-198 -194 -190 -186 -182 -178 -174 -170 -166 -162 -158 -154 -150 -146 -142
EPFD, dBW/m^2/1000 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=5 m, per 1000 kHz, ResultID: 32, RunID: 5, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 32, EPFD Type: epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=5 m, per 1000 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-210 -208 -206 -204 -202 -200 -198 -196 -194 -192 -190 -188 -186 -184 -182 -180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160 -158 -156 -154
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=5 m, per 40 kHz, ResultID: 28, RunID: 5, File: C:\Databases\124520131...
LIMIT, Art22, SW: Transfinite, ResultID: 28, EPFD Type: epfd↓, FSS, F=19.7 GHz, Ant S.1428, d=5 m, per 40 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180 -178 -176 -174 -172 -170 -168 -166 -164 -162 -160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↔, FSS, F=17.3 GHz, Ant S.672, Ls -20, 4°, per 40 kHz, ResultID: 39, RunID: 5, File: C:\Databases\124520...
LIMIT, Art22, SW: Transfinite, ResultID: 39, EPFD Type: epfd↔, FSS, F=17.3 GHz, Ant S.672, Ls -20, 4°, per 40 kHz


Percentage of time EPFD level is exceeded (%)
100
10
1
0.1
0.01
0.001
0.0001
1E-05
1E-06
1E-07
-180
-178
-176
-174
-172
-170
-168
-166
-164
-162
-160
EPFD, dBW/m^2/40 kHz
Run Type: Art22, SW: Transfinite, epfd↔, FSS, F=17.8 GHz, Ant S.672, Ls -20, 4°, per 40 kHz, ResultID: 7, RunID: 3, File: C:\Databases\1245201...
LIMIT, Art22, SW: Transfinite, ResultID: 7, EPFD Type: epfd↔, FSS, F=17.8 GHz, Ant S.672, Ls -20, 4°, per 40 kHz

CERTIFICATION OF PERSON RESPONSIBLE
FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this Petition, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this Petition and that it is complete and accurate to the best of my knowledge and belief.

/s/ *Alexandre Guerin*
Alexandre Guerin
Vice President, Regulatory Affairs &
Spectrum Management
WorldVu Satellites Limited