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Hughes LEO Fixed Phased-Array Full Duplex User Terminal Product Specification

HL1120W

1043810-0001
Revision C
August 21, 2024

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Purpose

The purpose of this document is to define the Product Specifications for the Hughes-OneWeb HL1120W User Terminal (UT) which is a Phased Array based Full Duplex User Terminal. HL1120W UT is a high-performance product for enterprise, government, and high-end residential fixed installations worldwide.

HL1120W overview

The UT consists of the following components:

- An Indoor Unit (IDU) with Power Supply Unit (PSU)
- An Outdoor Unit (ODU)
- Intra-facility links (IFL) interconnecting the ODU and IDU

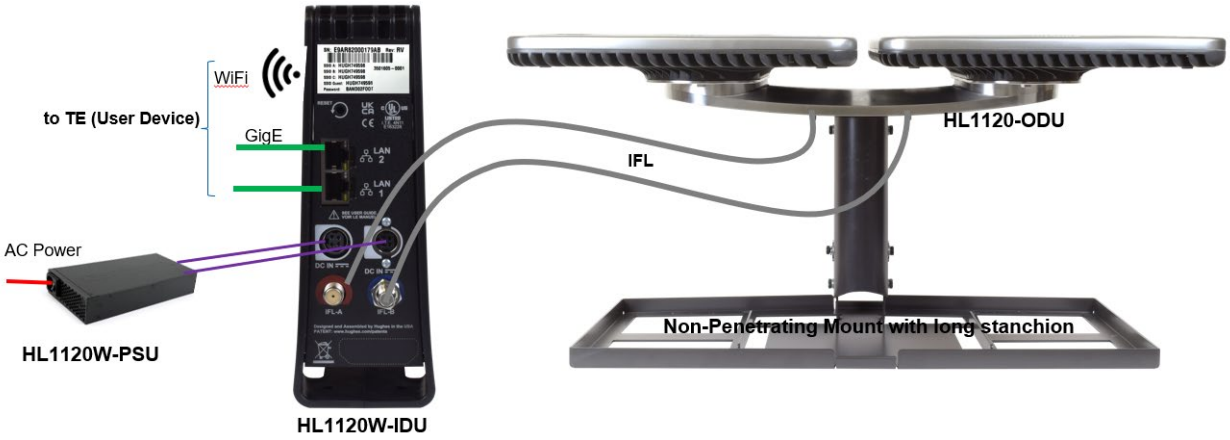

Figure 1: Example configuration of the product

Product application

The UT has been specifically designed to operate in almost any fixed location in the world with a clear view of the sky. As data consumption increases, data communication is being actively performed even in places with poor infrastructure, and data communication in places without infrastructure is expected to be more widely used through satellite communication with state-of-the-art UT's like this.

- Electronically steered antenna with rapid reconfiguration based on a unique passive technology for low cost and low power consumption.
- Fast, simple setup: Autonomous startup procedure finds satellites and connects within seconds.
- High reliability: No moving parts
- Self-contained outdoor packaging suitable for worldwide operations

Key Features

Key features are described in the subsections below.

Operating radio frequency (RF)

- TX Frequency 14.0 GHz to 14.5 GHz
- RX Frequency 10.7 GHz to 12.7 GHz

Functional

- Peak Downlink Data Rate: 195 Mbps
- Peak Uplink Data Rate: 32 Mbps
- Auto set-up with self-acquisition and connection to the customer network
- LEO beam and constellation tracking based on Program and Signal tracking
- Wi-Fi and LAN access Wi-Fi router
- Mobile App for commissioning and status check
- Local management interface available to the end user for onsite remote-monitoring, diagnostics, and troubleshooting
- Automatic provisioning for default services with Web-based user interface to configure advanced services
- Fault detection and recovery

Outdoor Unit (ODU)

The HL1120-ODU antenna assembly consists of two electronically steered antenna panels – IFL-A panel for receive (Rx) path and IFL-B panel for transmit (Tx) path. Each antenna panel has a Common Control Module (CCM), an RF Conversion Module (RCM) and a Beam Former Array (BFA). The CCM-A has a host processor that runs the UT software for control, management, and network services. The CCM-A also houses a satellite modem that communicates with OneWeb ground network through the OneWeb LEO satellites using the Rx & Tx tracking antennas.

Figure 2: HL1120-ODU

Indoor Unit (IDU)

The HL1120W-IDU hosts a Wi-Fi Router which provides two GigE ethernet ports and Wi-Fi access to the user data network. The Wi-Fi Router also provides access to the local management interface of the UT.

Figure 3: HL1120W-IDU

Power Supply Unit (PSU)

The HL1120W-PSU is an AC-DC power supply assembly that provides DC power to both IDU and ODU.

Figure 4: HL1120W-PSU

Field of view specifications

Table 1: Field of View (FoV) specifications, ODU

Item	Specification
Elevation	Minimum FoV of 54 degrees elevation from zenith
Azimuth	Full 360 degrees FoV
Pointing error	Max 0.75 degrees

RF specification

Table 2: RF Specification, ODU

Item	Specification
Rx Frequency	Rx: 10.7 – 12.7 GHz
G/T (@ 11.7 GHz, boresight, Rx)	Up to 11 dB/K
Tx Frequency	Tx: 14.0 – 14.5 GHz
EIRP Maximum (@14.25 GHz, boresight, Tx)	36.6 dBW over 40 MHz
Polarization	Circular (Rx: RHCP, Tx: LHCP)

Electrical specification

Table 3: Electrical Specification

Item	Specification
DC Power Consumption (ODU + IDU)	Max. 300W
Power Supply Unit (PSU)	Max. 476W
PSU Power Input	90 – 264 VAC, 50 – 60 Hz
DC Power Input to ODU	40-59 V, 54.7 V across 2 IFL cables

Interface specification

Table 4: Interface Specification

Item	Specification
IDU Interface	Two (2) GigE RJ-45 Ethernet Wi-Fi 6
ODU Interface	Dual IFL link – IFL-A with MoCA + DC power and IFL-B with power
MoCA adapter for ethernet over Coax	MoCA 2.0 E-band (400-700MHz)

Mechanical specifications

Table 5: Device dimensions

Device	Dimensions
HL1120-ODU	23.5 in. × 32.6 in. × 5.37 in.
HL1120W-IDU	7.25” x 5.75” x 2.5”
HL1120W-PSU	9.6”x5.1”x1.8”

Table 6: Device weight

Device	Weight
HL1120-ODU	53.2 lbs. (24.13kg)
HL1120W-IDU	1.1 lbs. (0.48kg)
HL1120W-PSU	4.12 lbs. (1.87kg)

Table 7: HL1120-ODU carton specifications

Item	Specification
Description	Outdoor Unit - Electronically Steered Antenna
Carton Dimensions (in) (L x W x H)	37.8 x 28.0 x 10.0
Carton Weight (lbs.)	65.4
Cartons / Pallet	10 cartons

Table 8: HL1120W-IDU carton specifications

Item	Specification
Description	Indoor Unit – MoCA adapter kit with power supply
Carton Dimensions (in) (L x W x H)	15.6 x 9.4 x 6.6
Carton Weight (lbs.)	6.0
Cartons / Pallet	72 cartons

Table 9: Maximum load for shipping ODU/IDU sets:

Item	Specification
40-ft HC Container Load (max)	140 sets (ODU: 14 pallets, IDU: 2 pallets)
53-ft Dry Van Trailer Load (max)	360 sets (ODU: 36 pallets double stack, IDU: 5 pallets)

Environmental specification

Table 10: HL1120-ODU Environmental specifications

Item	Specification
Operational Temperature	-40°C to + 55°C
Survival Temperature	-50°C to +85°C
Storage Temperature	-50°C to +85°C
Operational Humidity	5% - 95% RH, tested at 40C for 96hrs, per IEC 60068-2-78
Survival Humidity	5% - 95% RH tested at 40C for 240hrs, per IEC 60068-2-78
Operational Solar Radiation	1120W/m^2 for 72hrs, per Method Sa Procedure A of IEC 60068-2-5
Survival Solar Radiation	500hrs per ASTM G 154
Operational Vibration	0.57 G-rms; 5-200Hz, 0 dB/Oct slope, 0.0015 PSD (g^2/Hz); 200-500Hz, -6 dB/Oct, 0.0015 – 0.00024 PSD (g^2/Hz), 10 min. per axis, 3 axes, per IEC 60068-2-64
Survival Vibration	1.13 G-rms; 5-200Hz, 0 dB/Oct slope, 0.006 PSD (g^2/Hz); 200-500Hz, -6 dB/Oct, 0.006 – 0.00097 PSD (g^2/Hz), 10 min. per axis, 3 axes, per IEC 60068-2-64
Operational Shock	6 G's, 11 ms half sine pulse in +/- X, Y & Z, 3 shocks per axis per IEC 60068-2-27
Survival Shock	28 G's, 11 ms half sine pulse in +/- X, Y & Z, 3 shocks per axis per IEC 60068-2-27
Weather Tightness	IP67 per IEC 60529
Ice/Freezing Rain Survival	13mm icing per Method 521.3 of MIL-STD-810G
Lightning Protection	IEC/EN 61000-4-5 Class 4
Hail Impact	ASTM E822
Operational Wind Resistance	160 km/hr. (100 mph)
Survival Wind Resistance	240 km/hr. (150 mph)

Table 11: HL1120W-IDU Environmental specifications

Item	Specification
Operational Temperature	0°C to +40°C
Survival Temperature	-50°C to +85°C
Storage Temperature	-50°C to +85°C
Operational Humidity	5% - 90% RH, tested at 60%RH at 50C for 48hrs then 90%RH 42C for 48hrs (capped at 50g/m^3 absolute humidity), per IEC 60068-2-78
Survival Humidity	5% - 95% RH tested at 77%RH 45C (capped at 50g/m^3 absolute humidity with 5C from dew point), for 240hrs, per IEC 60068-2-78
Operational Vibration	1.02 G-rms; 5-100Hz, 0 dB/Oct slope, 0.0037 PSD (g^2/Hz); 100-137Hz, -6 dB/Oct; 137-350Hz, 0dB/Oct Slope, 0.00185 PSD (g^2/Hz); 350Hz-500Hz, -6dB/Oct Slope, 0.0009 PSD (g^2/Hz) 10 min. per axis, 3 axes, per IEC 60068-2-64
Survival Vibration	2.09 G-rms; 5-100Hz, 0 dB/Oct slope, 0.015 PSD (g^2/Hz); 100-137Hz, -6 dB/Oct; 137-350Hz, 0dB/Oct Slope, 0.008 PSD (g^2/Hz); 350Hz-500Hz, -6dB/Oct Slope, 0.0039 PSD (g^2/Hz) 10 min. per axis, 3 axes, per IEC 60068-2-64
Ingress Protection	IP20 as per IEC 60529

Regulatory compliance

Table 12: Regulatory compliance information for the ODU

Item	Specification
Safety	UL 62368-1, UL60950-1, and UL 60950-22 for the United States CSA/CAN No. 62368-1, CSA/CAN No. 60950-1, and CSA/CAN No. 60950-22 for Canada EN 62368-1, EN 60950-1, and EN 60950-22 for the European Union and the United Kingdom IEC 62368-1, IEC 60950-1, and IEC 60950-22 for the CB Scheme
EMI/EMC	FCC Part 15 for the United States ICES-003 Issue 7 for Canada EN 301 489-1 V2.2.3, EN 301 489-12 V3.2.1, and EN 301 489-17 V3.2.3 for the European Union and the United Kingdom
RF Spectrum	FCC Part 25 for the United States SRSP-101 Issue 3 for Canada EN 303 980 V1.3.1 for the European Union and the United Kingdom
RF Health Exposure	FCC OET Bulletin 65 for the United States SAFETY CODE 6 for Canada EN 62311 for the European Union and the United Kingdom
RoHS	EN/IEC 63000 for the European Union and the United Kingdom

Table 13: Regulatory compliance information for the IDU

Item	Specification
Safety	UL 62368-1 and UL60950-1 for the United States CSA/CAN No. 62368-1 and CSA/CAN No. 60950-1 for Canada EN 62368-1 and EN 60950-1 for the European Union and the United Kingdom IEC 62368-1 and IEC 60950-1 for the CB Scheme
EMI/EMC	FCC Part 15 for the United States ICES-003 Issue 7 for Canada EN55032, EN55035, EN 301 489-1 V2.2.3, EN 301 489-12 V3.2.1, and EN 301 489-17 V3.2.3 for the European Union and the United Kingdom
RF Spectrum	EN 303 980 V1.3.1, EN 301 893 V2.1.1, EN300 328 V2.2.2 for the European Union and the United Kingdom FCC Part 15.407 and FCC Part 15.247 for the United States
RF Health Exposure	FCC Part 2.1091 for the United States SAFETY CODE 6 for Canada EN 62311 for the European Union and the United Kingdom
RoHS	EN/IEC 63000 for the European Union and the United Kingdom

Homologation compliance

Homologation compliance information is shown below.

- Mexico
- Brazil (2024)
- Argentina (2024)
- South Africa (2024)
- Australia (2024)
- Japan (2024)
- India (2024)