TEST REPORT

Test Report No. : UL-RPT-RP13678390-116A V2.0

Manufacturer	:	Cambium Networks Ltd
Model No.	:	60 GHz cnWave V3000
FCC ID	:	QWP-60V3000
Test Standard(s)	:	FCC Parts 15.209, 15.215 & 15.255(c), (d) & (e)

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 12 April 2021

Checked by:

Sarah Williams
RF Operations Leader, Radio Laboratory

Company Signatory:

Ben Mercer
Lead Project Engineer, Radio Laboratory

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The tests reported herein have been performed in accordance with its terms of accreditation.

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Table of Contents

1. Customer Information

Company Name:	Cambium Networks Ltd
Address:	Unit B2 Linhay Business Park Eastern Road Ashburton Devon TQ13 7UP United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.255
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Radio Frequency Devices) – Section 15.255
Specification Reference:	47CFR15.209 and 47CFR15.215
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Sections 15.209 & 15.215
Site Registration:	621311
FCC Lab. Designation No.:	UK2011
Location of Testing:	Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	07 February 2021 to 22 March 2021

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.255(c)(1)(ii)	Transmitter EIRP	✓
Part 15.255(e)	Transmitter Peak Output Power	✓
Part 15.255(d) / 15.209	Transmitter Spurious Emissions	✓

Key to Results

✓ = Complied ✗ = Did not comply

2.3. Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Cambium Networks
Model Name or Number:	60 GHz cnWave V3000
Test Sample Serial Number:	V5WM01QL295N *(Radiated sample #1)*
Hardware Version:	P7.0
Software Version:	DM Tools 3.9.0.3
Firmware Version:	10.11.1.83
FCC ID:	QWP-60V3000

Brand Name:	Cambium Networks
Model Name or Number:	60 GHz cnWave V3000
Test Sample Serial Number:	V5WM01QFN8PR *(Radiated sample #2)*
Hardware Version:	P7.0
Software Version:	DM Tools 3.9.0.3
Firmware Version:	10.11.1.83
FCC ID:	QWP-60V3000

3.2. Description of EUT

The equipment under test was a point-to-point / point-to-multipoint high gain client node operating in the 57-71 GHz band.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Category of Equipment:	Transceiver	
Power Supply Requirement:	Nominal	56 VDC via 120 VAC PoE
Channel Spacing:	2.16 GHz	
Modulation Type:	BPSK, QPSK & 16QAM	
Antenna Type:	Integrated Patch & Parabolic Reflector	
Antenna Gain:	20.1 dBi (patch) 20.4 dB (reflector) Combined: 40.5 dBi	
Transmit Frequency Range:	57 GHz to 66 GHz	
Transmit Channels Tested:	**Channel ID**	**Channel Frequency (GHz)**
	Bottom	58.320
	Middle	62.640
	Top	64.800

3.5. EUT Settings

Channel	Sector	Tx Lineup	RF Lineup	DAC	LO GC	E-Base	Notch
1	32	N/A	N/A	110/110	1	N/A	N/A
3	32	N/A	N/A	119/119	1	N/A	N/A
4	32	N/A	N/A	192/192	1	N/A	N/A

3.6. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	PoE
Brand Name:	Cambium Networks
Model Name or Number:	N000000L142A
Serial Number:	2020000773

Description:	Test Laptop
Brand Name:	HP EliteBook
Model Name or Number:	NH121UC#ABU
Serial Number:	2CE00223BK

Description:	Ethernet Cables. Quantity 3. Length 1 m / 3 m / 10 m
Brand Name:	RS Pro
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Transmitting with BPSK MCS5 modulation, which was found to be the worst case mode after preliminary investigation.
- Operating on bottom, middle and top channels with a 2.16 GHz channel bandwidth.
- Transmitting at maximum output power with beamforming locked to sector 27 (straight ahead), which was found to be the direction of highest EIRP during preliminary investigation.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- A laptop PC with Qualcomm DMTools and QRCT software was used to configure the EUT during the testing. Telnet commands were used to set the channel and modulation. The laptop was connected to the EUT via Ethernet.
- The EUT was powered by a PoE supply connected to 120 VAC mains.
- Due to the large dimensions of the 22 dB reflector, the far field measurement distance is in excess of 100 m. For in-band tests, the reflector was removed to expose the smaller 20.1 dBi patch, allowing measurements to be made in the far field at 3 m. The 20.4 dB reflector gain was added to the measured results. An inquiry was made to the FCC OET and this method was deemed acceptable.
- Transmitter radiated spurious emissions tests were performed with the 20.4 dB reflector fitted. All measurements were performed in the far field of the measurement antenna.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6: Measurement Uncertainties* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter EIRP

Test Summary:

Test Engineer:	Ben Mercer	**Test Date:**	07 February 2021
Test Sample Serial Number:	V5WM01QL295N		

FCC Reference:	Part 15.255(c)(1)(ii)
Test Method Used:	ANSI C63.10 Section 9.11

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	33

Note(s):

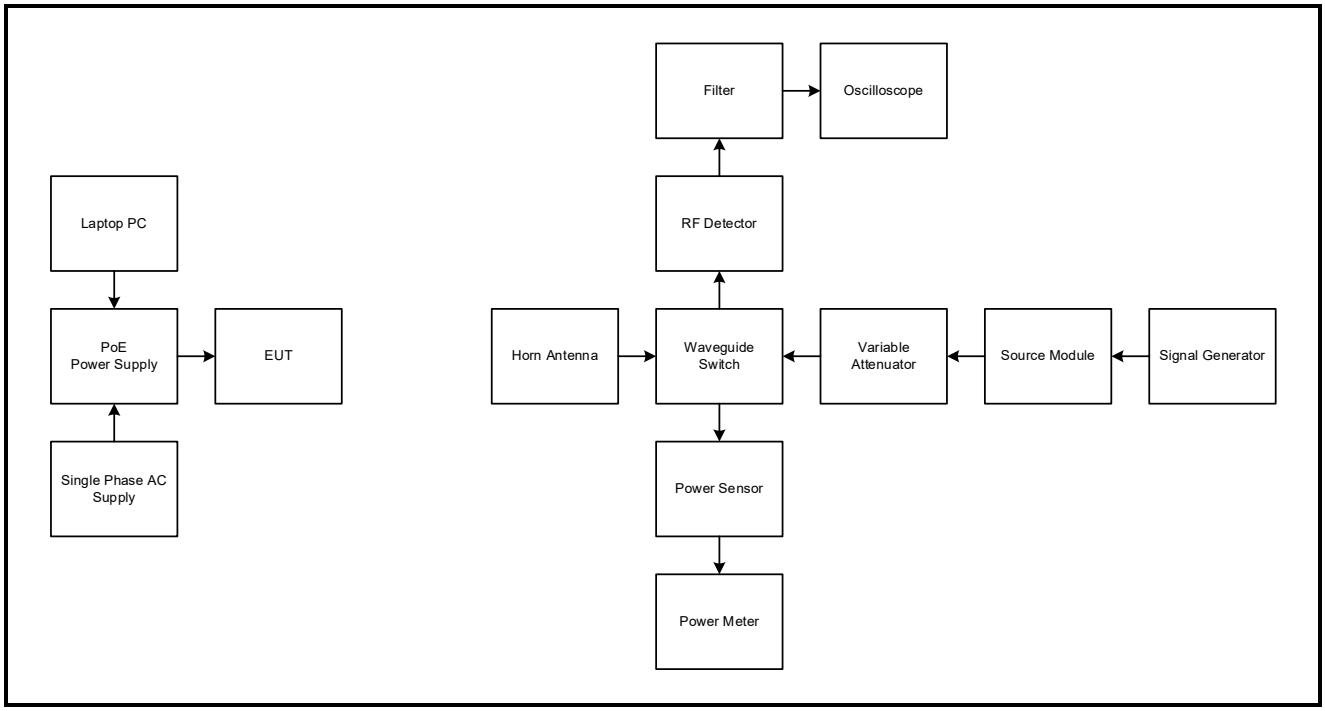
1. The measurement antenna was connected to an RF detector via a 4 way waveguide switch. A CW signal generator and wideband thermocouple power sensor were connected to the remaining two ports.
2. The RF detector was connected to the 50 Ω input of a digital storage oscilloscope via a 10 MHz low pass filter.
3. The EUT peak and average voltages were measured on the oscilloscope. The waveguide switch was then rotated to connect the signal generator to the RF detector, and the signal generator output was adjusted to match the previously measured voltages. The waveguide switch was then rotated to connect the signal generator output to the thermocouple power sensor, and the signal generator output power was measured.
4. The substituted levels recorded below include the calibrated path loss of the waveguide switch.
5. In accordance with Part 15.255(c)(1)(ii), the peak and average EIRP limits shall be reduced by 2 dB for every dB that the antenna gain is less than 51 dBi. The combined gain of the patch antenna and reflector is 40.5 dBi. The limit reduction was calculated as follows:

$$2 \times (51 \text{ dBi} - 40.5 \text{ dBi}) = 21.0 \text{ dB}$$

Peak EIRP Limit: 85 dBm – 21.0 dB = 64.0 dBm
Average EIRP Limit: 82 dBm – 21.0 dB = 61.0 dBm

Transmitter EIRP (continued)

Test setup:



Transmitter EIRP (continued)

Results: Bottom Channel / Peak

Frequency (GHz)	Level (V)	Substituted EIRP Level (dBm)	Reflector Gain (dB)	Corrected EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Result
58.320	3.3	33.6	20.4	54.0	64.0	10.0	Complied

Results: Bottom Channel / Average

Frequency (GHz)	Level (V)	Substituted EIRP Level (dBm)	Reflector Gain (dB)	Corrected EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Result
58.320	2.4	32.9	20.4	53.3	61.0	7.7	Complied

Results: Middle Channel / Peak

Frequency (GHz)	Level (V)	Substituted EIRP Level (dBm)	Reflector Gain (dB)	Corrected EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Result
62.640	3.3	34.0	20.4	54.4	64.0	9.6	Complied

Results: Middle Channel / Average

Frequency (GHz)	Level (V)	Substituted EIRP Level (dBm)	Reflector Gain (dB)	Corrected EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Result
62.640	2.7	33.6	20.4	54.0	61.0	7.0	Complied

Results: Top Channel / Peak

Frequency (GHz)	Level (V)	Substituted EIRP Level (dBm)	Reflector Gain (dB)	Corrected EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Result
64.800	1.9	32.3	20.4	52.7	64.0	11.3	Complied

Results: Top Channel / Average

Frequency (GHz)	Level (V)	Substituted EIRP Level (dBm)	Reflector Gain (dB)	Corrected EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Result
64.800	1.5	31.9	20.4	52.3	61.0	8.7	Complied

Transmitter EIRP (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2016	Thermohygrometer	Testo	608-H1	45046428	10 Dec 2021	12
M2070	Oscilloscope	Keysight	DSOX2024A	MY59125508	28 Aug 2021	24
A3233	Waveguide RF Detector	Sage Millimeter	SFD-503753-15SF-P1	18199-01	Calibrated before use	-
A3235	Waveguide Switch	Flann	25333-2	215753	Calibrated before use	-
M1145	Power Meter	Hewlett Packard	437B	3737U26557	18 Nov 2021	12
M291	Waveguide Power Sensor	Hewlett Packard	V8486A	US39010039	30 Nov 2022	24
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	25 Jan 2022	24
G094	Source Module	Hewlett Packard	83557A	2948A00475	Calibrated before use	-
A3211	Horn Antenna	Sage Millimeter	SAZ-2410-15-S1	18199-01	31 Dec 2021	12
A3251	Video Amplifier	Femto	HVA-200M-40B	05-01-354	Calibrated before use	-
A3252	Low Pass Filter	Mini-Circuits	BLP-10.7+	YUU54901833	Calibrated before use	-

5.2.2. Transmitter Peak Conducted Output Power

Test Summary:

Test Engineer:	Ben Mercer	**Test Date:**	07 February 2021
Test Sample Serial Number:	V5WM01QL295N		

FCC Reference:	Part 15.255(e)
Test Method Used:	ANSI C63.10 Section 9.11

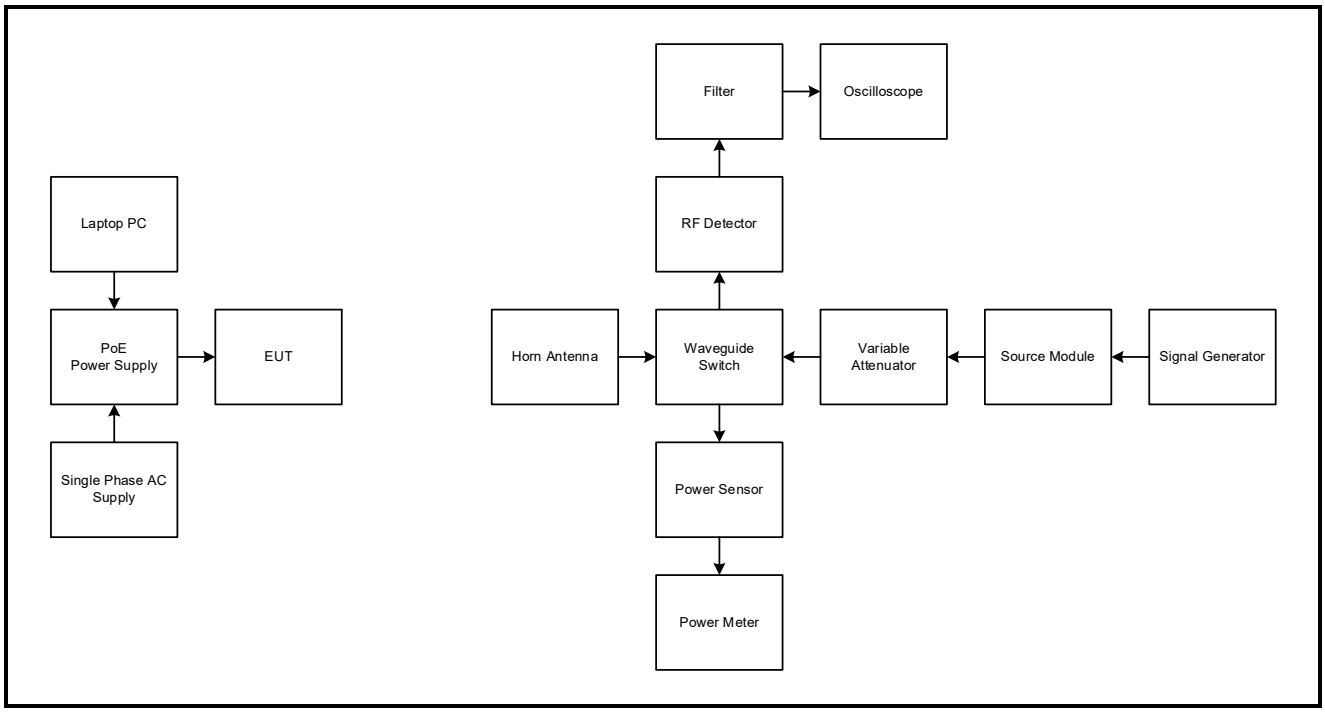
Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	33

Note(s):

1. The measurement antenna was connected to an RF detector via a 4 way waveguide switch. A CW signal generator and wideband thermocouple power sensor were connected to the remaining two ports.
2. The RF detector was connected to the 50 Ω input of a digital storage oscilloscope via a 10 MHz low pass filter.
3. The EUT peak and average voltages were measured on the oscilloscope. The waveguide switch was then rotated to connect the signal generator to the RF detector, and the signal generator output was adjusted to match the previously measured voltages. The waveguide switch was then rotated to connect the signal generator output to the thermocouple power sensor, and the signal generator output power was measured.
4. The stated antenna gain was subtracted from the measured EIRP to obtain the conducted power.
5. The substituted levels recorded below include the calibrated path loss of the waveguide switch.

Test setup:



Transmitter Peak Conducted Output Power (continued)

Results: Bottom Channel

EIRP Level (dBm)	Antenna Gain (dBi)	Conducted Level (dBm)	Conducted Level (mW)	Limit (mW)	Margin (mW)	Result
54.0	40.5	13.5	22.4	500	477.6	Complied

Results: Middle Channel

EIRP Level (dBm)	Antenna Gain (dBi)	Conducted Level (dBm)	Conducted Level (mW)	Limit (mW)	Margin (mW)	Result
54.4	40.5	13.9	24.5	500	475.5	Complied

Results: Top Channel

EIRP Level (dBm)	Antenna Gain (dBi)	Conducted Level (dBm)	Conducted Level (mW)	Limit (mW)	Margin (mW)	Result
52.7	40.5	12.2	16.6	500	483.4	Complied

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2016	Thermohygrometer	Testo	608-H1	45046428	10 Dec 2021	12
M2070	Oscilloscope	Keysight	DSOX2024A	MY59125508	28 Aug 2021	24
A3233	Waveguide RF Detector	Sage Millimeter	SFD-503753-15SF-P1	18199-01	Calibrated before use	-
A3235	Waveguide Switch	Flann	25333-2	215753	Calibrated before use	-
M1145	Power Meter	Hewlett Packard	437B	3737U26557	18 Nov 2021	12
M291	Waveguide Power Sensor	Hewlett Packard	V8486A	US39010039	30 Nov 2022	24
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	25 Jan 2022	24
G094	Source Module	Hewlett Packard	83557A	2948A00475	Calibrated before use	-
A3211	Horn Antenna	Sage Millimeter	SAZ-2410-15-S1	18199-01	31 Dec 2021	12
A3251	Video Amplifier	Femto	HVA-200M-40B	05-01-354	Calibrated before use	-
A3252	Low Pass Filter	Mini-Circuits	BLP-10.7+	YUU54901833	Calibrated before use	-

5.2.3. Transmitter Radiated Spurious Emissions

Test Summary:

Test Engineer:	Mohamed Toubella	**Test Dates:**	19 March 2021 & 20 March 2021
Test Sample Serial Number:	V5WM01QFN8PR		

FCC Reference:	Part 15.255(d) / 15.209
Test Method Used:	ANSI C63.10 Sections 6.3, 6.4, 6.5 & 9.13
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

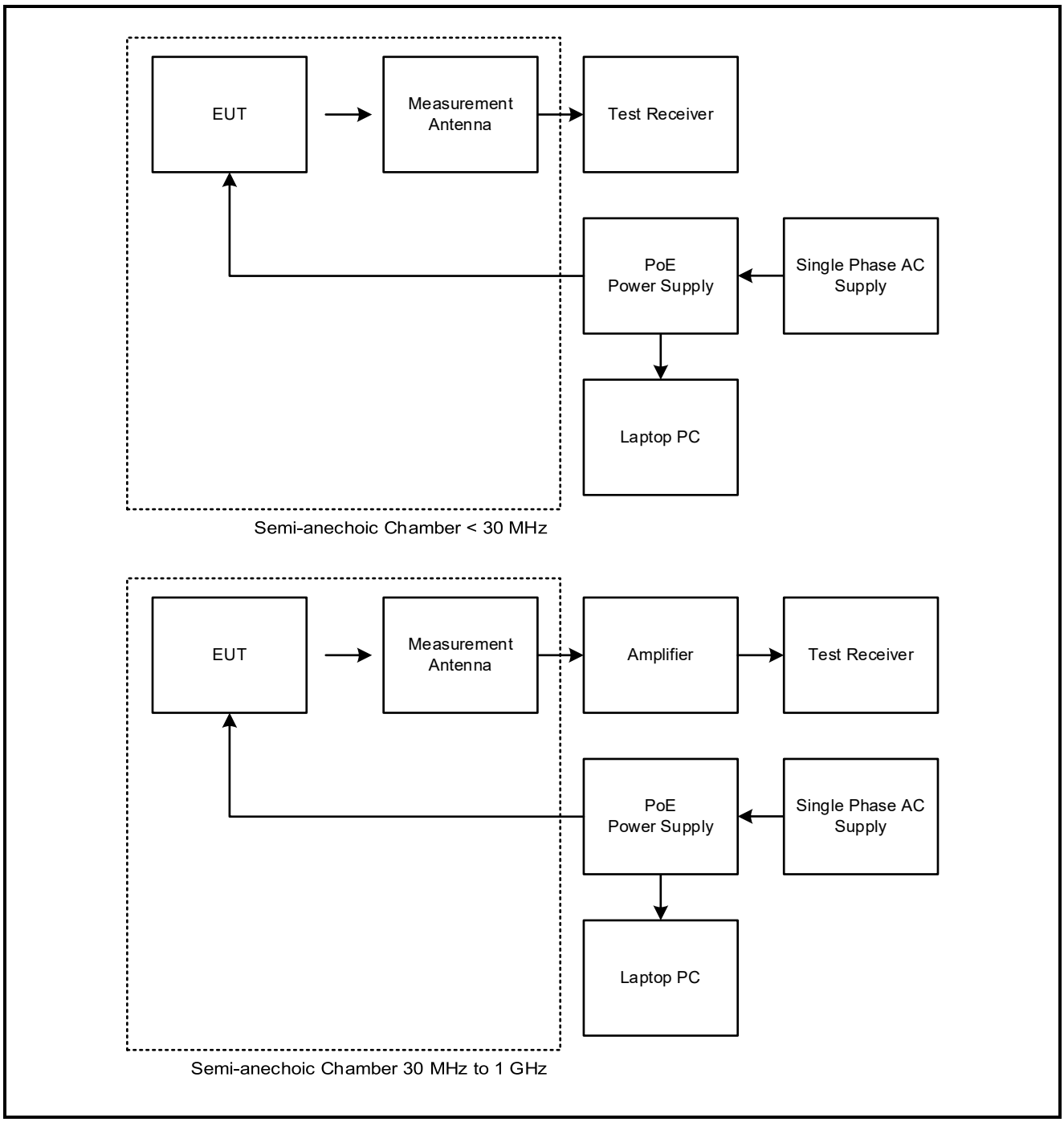
Temperature (°C):	22 to 23
Relative Humidity (%):	35

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements below 1 GHz were performed with the EUT set to the middle channel only.
3. All other emissions were at least 20 dB below the appropriate limit or below the noise floor of the measurement system.
4. There are ambient emissions seen between 2 to 30 MHz on the pre-scan plot for 150 kHz to 30 MHz. A background scan is stored on the company server and is available for inspection upon request.
5. Measurements below 30 MHz were performed in a semi-anechoic chamber (asset number K0001) as a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. The limit was extrapolated to 3 metres in accordance with ANSI C63.10 Section 6.4.4.2. Correlation data between the semi-anechoic chamber and an open-field test site is available upon request.
6. Measurements between 30 MHz and 1 GHz were performed in a semi-anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
7. Final measurements were performed and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and a span wide enough to include the entire emission.

Transmitter Radiated Spurious Emissions (continued)

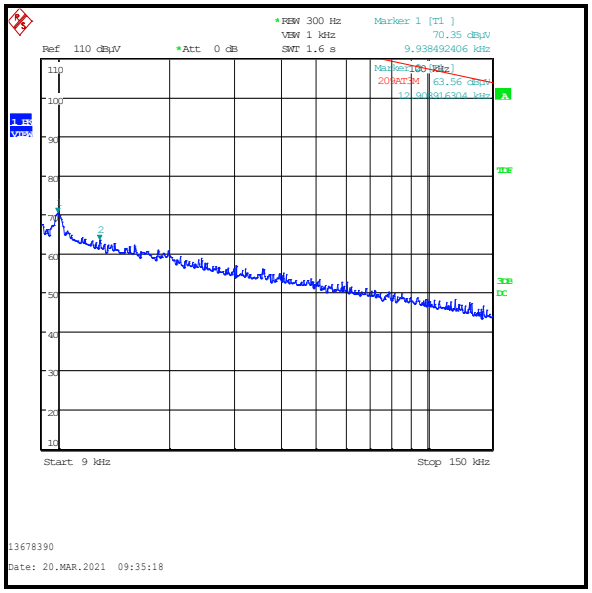
Test setup:

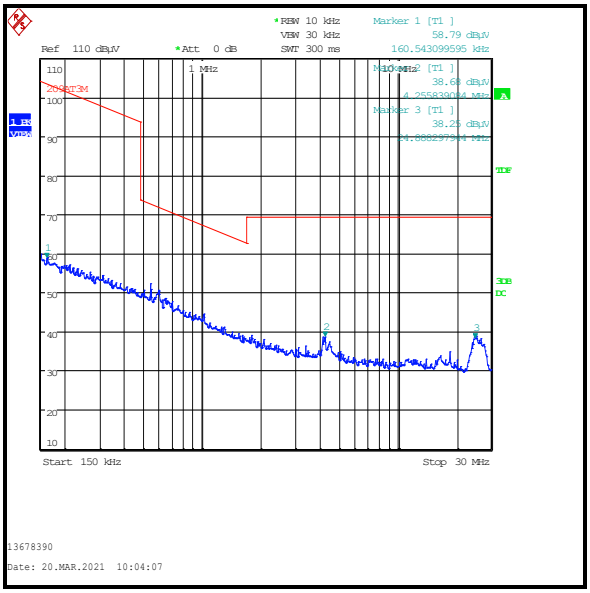


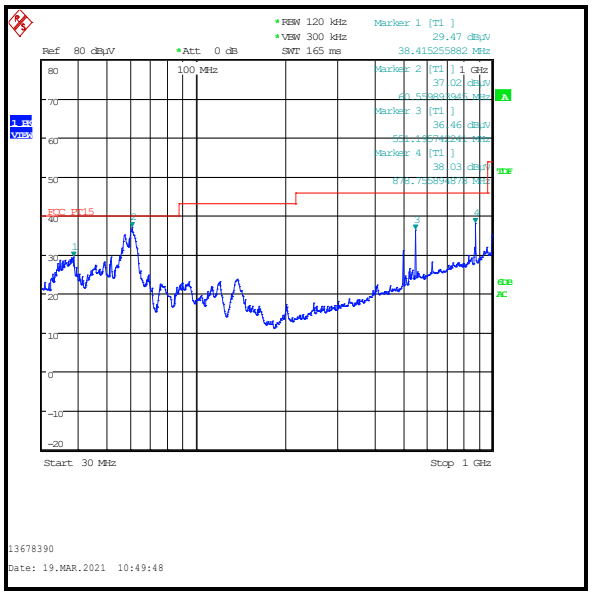
Transmitter Radiated Spurious Emissions (continued)

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
57.573	Horizontal	30.3	40.0	9.7	Complied
60.560	Horizontal	31.7	40.0	8.3	Complied







Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Spurious Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2041	Thermohygrometer	Testo	608-H1	45119912	10 Dec 2021	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Oct 2021	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	15 May 2021	12
A3167	Amplifier	Com-Power	PAM-103	18020010	21 Oct 2021	12
A259	Antenna	Chase	CBL6111A	1513	13 Jul 2021	12
M2040	Thermohygrometer	Testo	608-H1	451224934	10 Dec 2021	12
M2044	Test Receiver	Rohde & Schwarz	ESU26	100122	03 Sep 2021	12
A3198	Loop Antenna	ETS Lindgren	6502	00221887	01 Apr 2021	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Oct 2021	12

Transmitter Radiated Spurious Emissions (continued)

Test Summary:

Test Engineers:	Mohamed Toubella & Ben Mercer	**Test Dates:**	24 February 2021 to 22 March 2021
Test Sample Serial Numbers:	V5WM01QL295N & V5WM01QFN8PR		

FCC Reference:	Part 15.255(d) / 15.209
Test Method Used:	ANSI C63.10 Sections 6.3, 6.6, 9.8, 9.9, 9.12 & 9.13
Frequency Range:	1 GHz to 200 GHz

Environmental Conditions:

Temperature (°C):	20 to 23
Relative Humidity (%):	38 to 42

Note(s):

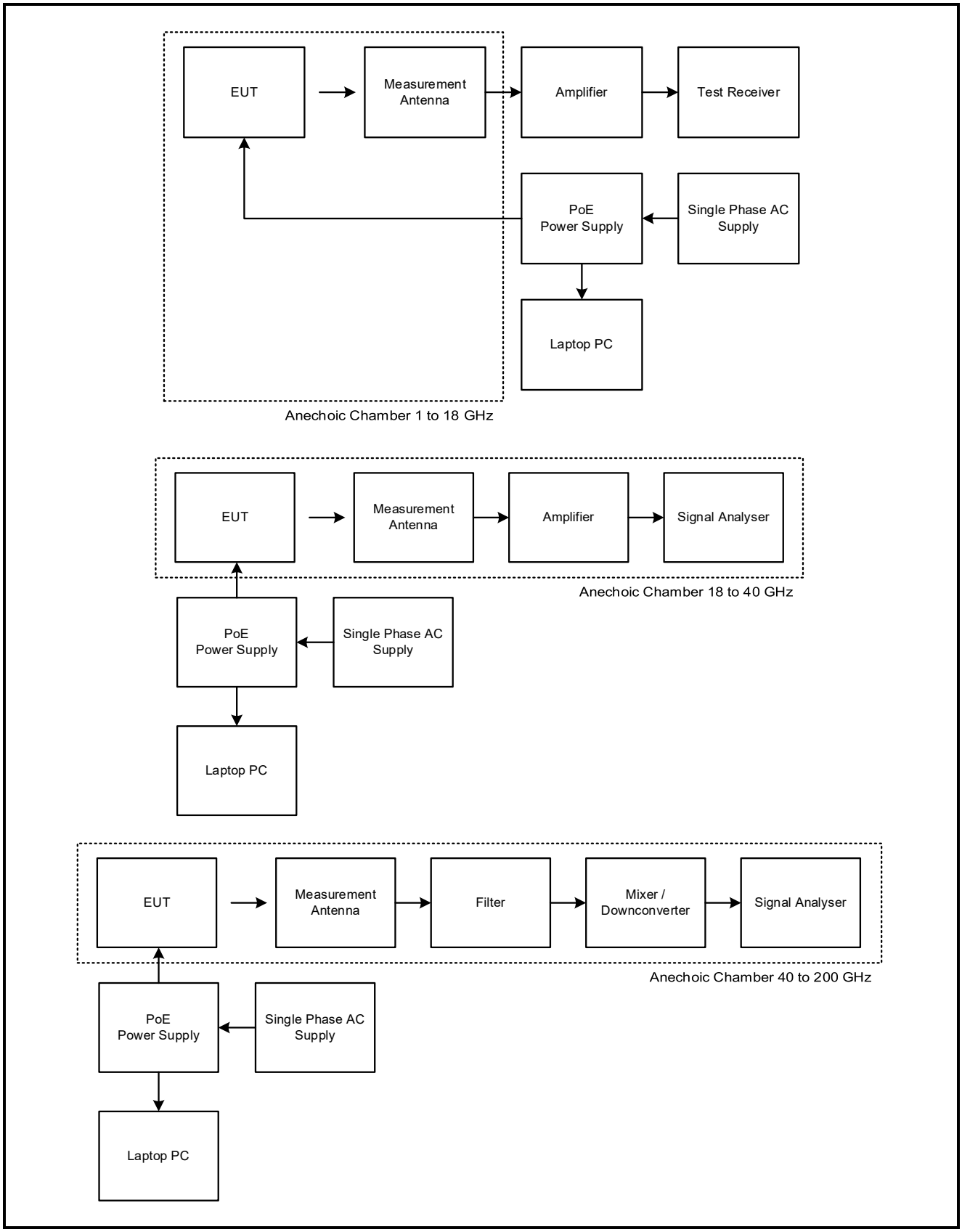
1. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
2. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
3. The emission identified by a marker on the 57 – 71 GHz plot is the fundamental.
4. Part 15.255(d)(3) defines a power density limit of 90 pW/cm^2 at 3 metres for spurious emissions between 40 GHz and 200 GHz. This was converted to a field strength limit of 85.31 dBuV/m using the equations provided in section 9.6 of ANSI C63.10.
5. Measurements distances above 40 GHz were determined using the procedure defined in section 9.8 of ANSI C63.10. Measurements were made at the following distances:

   40 GHz to 50 GHz – 1 metre
   50 GHz to 75 GHz – 3 metres
   75 GHz to 110 GHz – 1 metre
   110 GHz to 170 GHz – 1 metre
   170 GHz to 200 GHz – 1 metre

6. Where measurements were performed at a distance other than that specified by the limit, a correction factor was calculated using the equation provided in section 9.4 of ANSI C63.10. This correction factor was included in the transducer factor entered on the signal analyser.
7. All other emissions were at least 20 dB below the appropriate limit or below the noise floor of the measurement system.

Transmitter Radiated Spurious Emissions (continued)

Test setup:



Transmitter Radiated Spurious Emissions (continued)

Results: Bottom Channel / Peak

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)	Result
7290.016	Horizontal	55.0	74.0	19.0	Complied

Results: Bottom Channel / Average

Frequency (MHz)	Antenna Polarity	Average Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
7289.952	Horizontal	50.7	54.0	3.3	Complied

Results: Middle Channel / Peak

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)	Result
7829.936	Horizontal	56.0	74.0	18.0	Complied
15536.250	Horizontal	58.3	74.0	15.7	Complied

Results: Middle Channel / Average

Frequency (MHz)	Antenna Polarity	Average Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
7829.888	Horizontal	52.0	54.0	2.0	Complied
15429.4	Horizontal	50.8	54.0	3.2	Complied

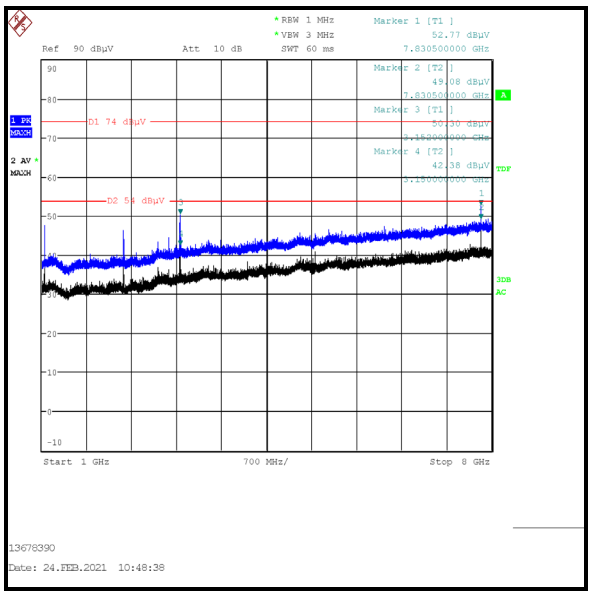
Results: Top Channel / Peak

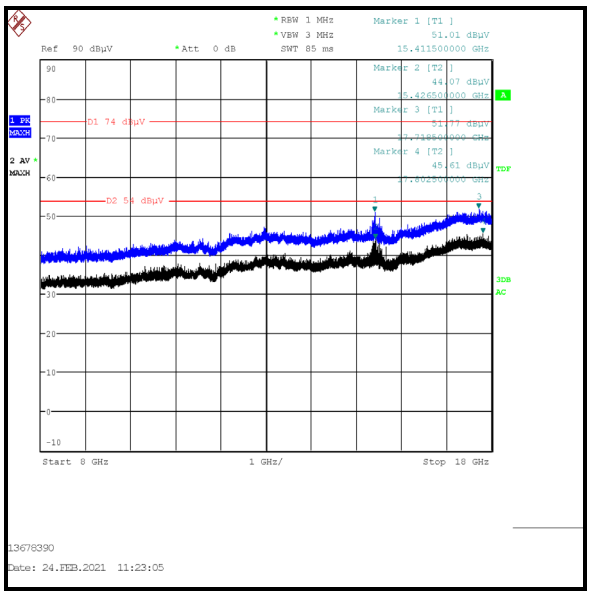
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)	Result
8099.904	Horizontal	54.8	74.0	19.2	Complied

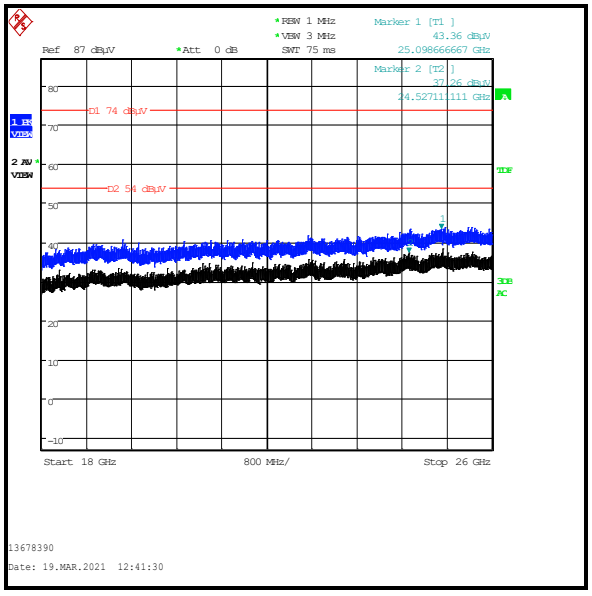
Results: Top Channel / Average

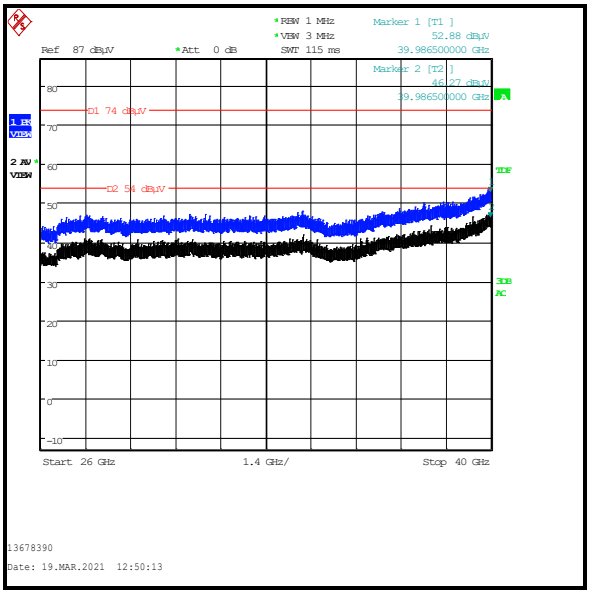
Frequency (MHz)	Antenna Polarity	Average Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
8099.904	Horizontal	53.9	54.0	0.1	Complied

Transmitter Radiated Spurious Emissions (continued)



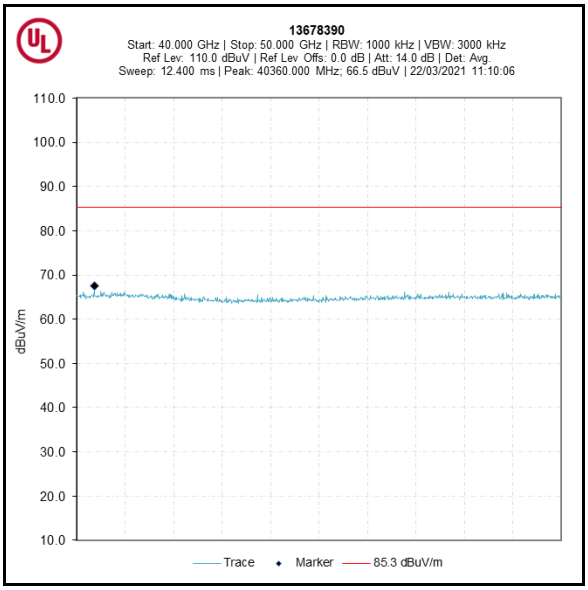


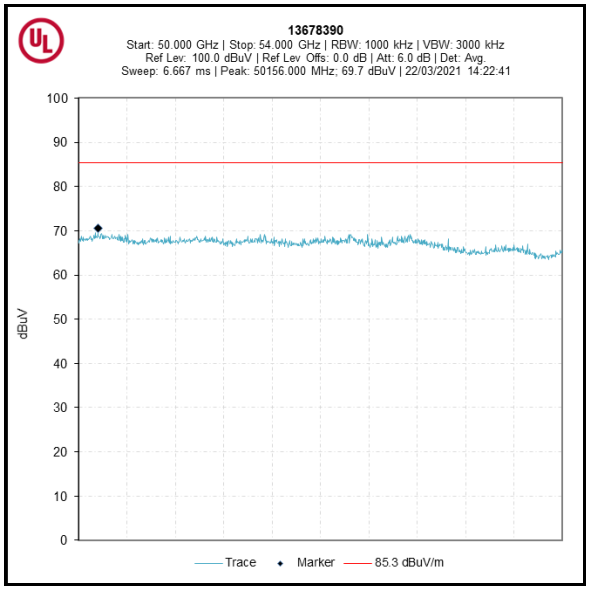


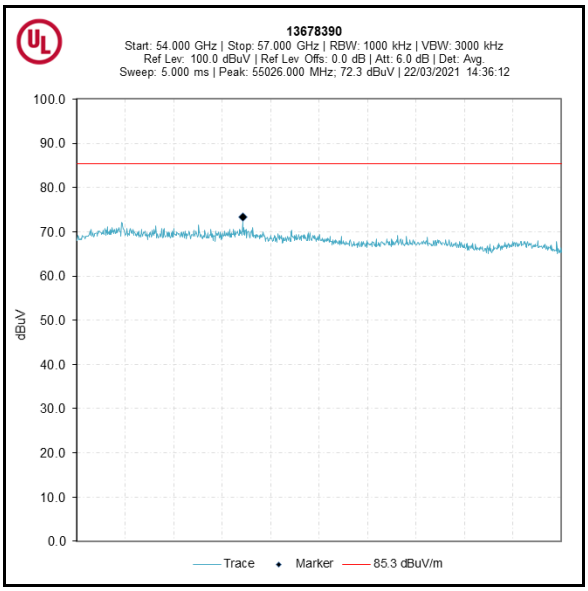


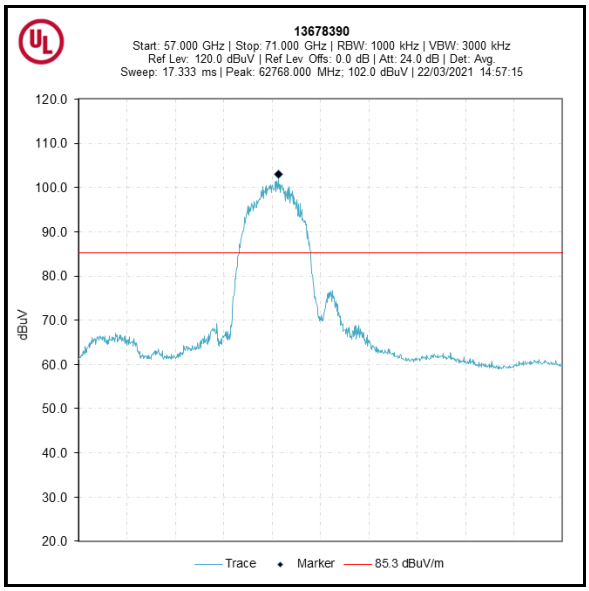
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Spurious Emissions (continued)



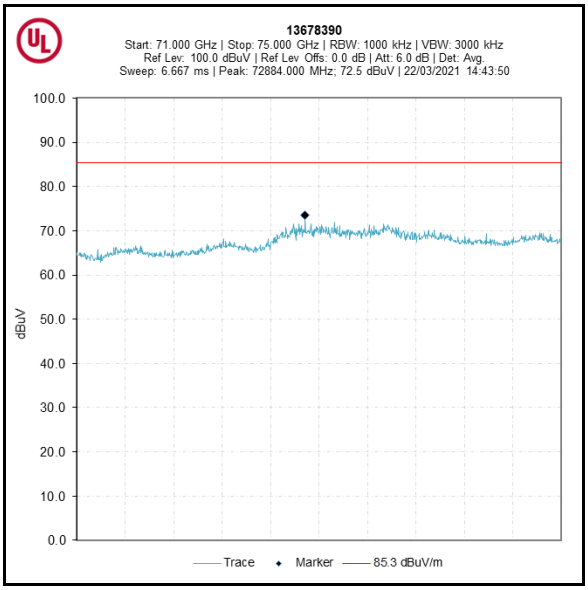


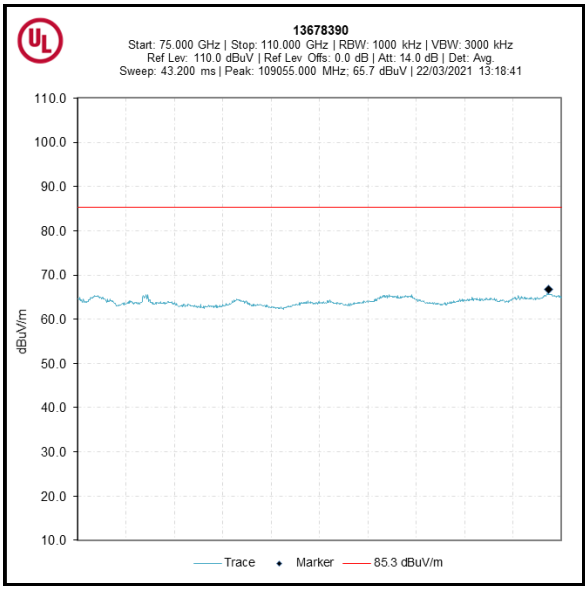


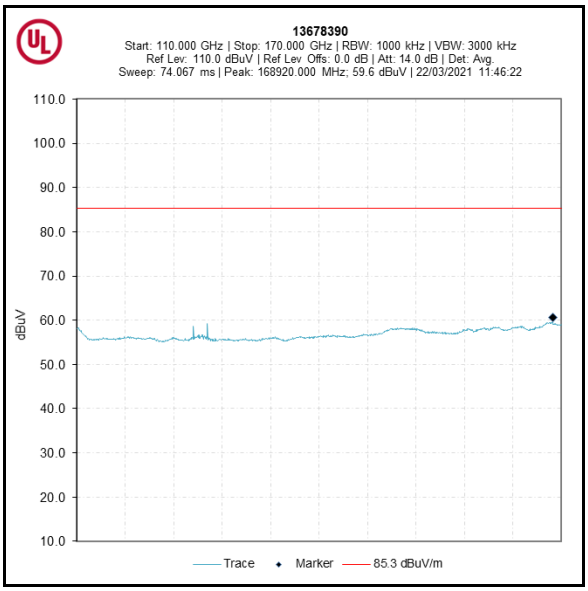


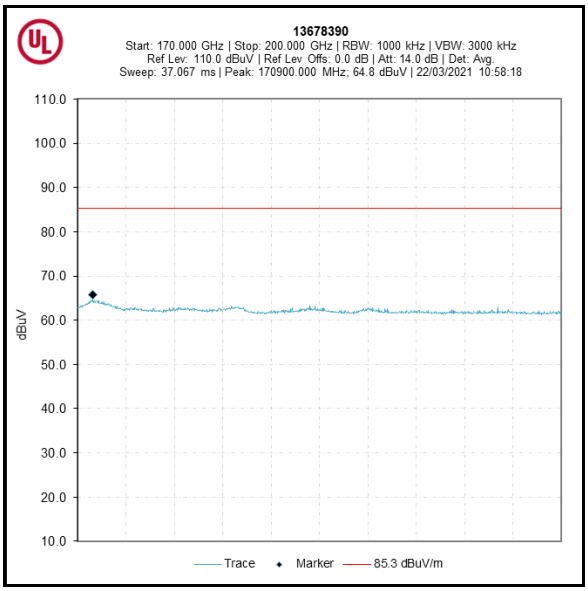
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Spurious Emissions (continued)









Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Spurious Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	10 Dec 2021	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Oct 2021	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	07 Dec 2021	12
A2948	Pre Amplifier	Com-Power	PAM-118A	551087	21 Oct 2021	12
A2863	Pre Amplifier	Keysight	8449B	3008A02100	21 Oct 2021	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	00653	23 Oct 2021	12
A2890	Antenna	Schwarzbeck	HWRD 750	014	26 Oct 2021	12
M2040	Thermohygrometer	Testo	608-H1	45124934	10 Dec 2021	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Oct 2021	12
M2044	Test Receiver	Rohde & Schwarz	ESU26	100122	03 Sep 2021	12
A3154	Pre-Amplifier	Com-Power	PAM-103	18020012	29 Sep 2021	12
A2896	Pre Amplifier	Schwarzbeck	BBV 9721	9721-023	16 Feb 2022	12
A553	Antenna	Chase	CBL6111A	1593	21 Sep 2021	12
A2895	Antenna	Schwarzbeck	BBHA 9170	9170-728	16 Feb 2022	12
M1832	Signal Analyser	Agilent	N9010A	MY53470303	06 Mar 2022	24
M1621	Harmonic Mixer	Hewlett Packard	11970U	3003A01631	30 Apr 2021	36
M2065	Downconverter	Virginia Diodes	WR10SAX	SAX 393	11 Jul 2021	24
M2066	Downconverter	Virginia Diodes	WR6.5SAX	SAX 392	24 Jul 2021	24
M2067	Downconverter	Virginia Diodes	WR4.3SAX	SAX 391	18 Jun 2021	24
M2069	Downconverter	Virginia Diodes	WR15SAX	SAX 394	09 Jul 2021	24
A2963	Horn Antenna	Link Microtek	AM19HA-ULV1	14929	31 Dec 2021	12
A2964	Horn Antenna	Link Microtek	AM15HA-ULV1	14930	31 Dec 2021	12
A2967	Horn Antenna	Link Microtek	AM10HA-ULV1	14933	31 Dec 2021	12
A2968	Horn Antenna	Link Microtek	AM7HA-ULV1	14934	31 Dec 2021	12
A3212	Low Pass Filter	Sage Millimeter	SWF-50354340-22-L1	B10754-01	Calibrated before use	-
A3213	High Pass Filter	Sage Millimeter	SWF-75370340-10-H1	18199-01	Calibrated before use	-
M1252	Signal Generator	Hewlett Packard	83640A	3119A00489	25 Jan 2022	24
G0554	Source Module	Hewlett Packard	83556A	2616A00428	Calibrated before use	-
G0555	Source Module	Hewlett Packard	83558A	2948A00189	Calibrated before use	-

6. Measurement Uncertainty & Decision Rule

Overview

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

Decision Rule

The decision rule applied is based upon the accuracy method criteria. The measurement uncertainty is met and the result is considered in conformance with the requirement criteria if the observed value is within the prescribed limit.

Measurement Uncertainty

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Transmitter EIRP	57 to 71 GHz	95%	± 5.36 dB
Transmitter Peak Output Power	57 to 71 GHz	95%	± 5.36 dB
Transmitter Radiated Emissions	9 kHz to 30 MHz	95%	±5.32 dB
Transmitter Radiated Emissions	30 MHz to 1 GHz	95%	±3.30 dB
Transmitter Radiated Emissions	1 GHz to 40 GHz	95%	±2.94 dB
Transmitter Radiated Emissions	40 GHz to 200 GHz	95%	±5.10 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	**Clause**	**Details**
1.0	-	-	Initial Version
2.0	6	3.1	Address TCB requests

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