TEST REPORT

Test Report No. : UL-RPT-RP14277658-416A

Customer	:	Nemaura Pharma Limited
Model No.	:	sugarBEAT
FCC ID	:	2A8VFAA
Technology	:	*Bluetooth* – Low Energy
Test Standard(s)	:	FCC Parts 15.209(a) & 15.247
Test Laboratory	:	UL International (UK) Ltd, Basingstoke, Hampshire, RG24 8AH, United Kingdom

1. This test report shall not be reproduced except in full, without the written approval of UL International (UK) Ltd.
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 December 2022

Checked by:

Ben Mercer
Lead Project Engineer, Radio Laboratory

Company Signatory:

Sarah Williams
RF Operations Leader, Radio Laboratory

5772

Customer Information

Company Name:	Nemaura Pharma Limited
Address:	Advanced Technology Centre Oakwood Drive Loughborough Leicestershire LE11 3QF United Kingdom

Report Revision History

Version Number	Issue Date	Revision Details	Revised By
1.0	17/10/2022	Initial Version	Ben Mercer
2.0	12/12/2022	<30 MHz correlation statement added	Ben Mercer

Table of Contents

1 Attestation of Test Results

1.1 Description of EUT

The equipment under test was a non-invasive glucose monitor containing a *Bluetooth* LE transceiver.

1.2 General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Section 15.247
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Section 15.209
Site Registration:	685609
Lab. Designation No.:	UK2011
Location of Testing:	Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, G24 8AH, United Kingdom
Test Dates:	30 August 2022 to 06 September 2022

1.3 Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.35(c)	Transmitter Duty Cycle	Note 1
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	✓
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	✓
Part 15.247(e)	Transmitter Power Spectral Density	Note 2
Part 15.247(d) & 15.209(a)	Transmitter Radiated Emissions	✓
Part 15.247(d) & 15.209(a)	Transmitter Band Edge Radiated Emissions	✓
Key to Results ✓ = Complied ✗ = Did not comply		

Note(s):

1. The measurement was performed to assist in the calculation of the level of the emissions. The EUT cannot transmit continuously and sweep triggering/signal gating cannot be implemented.
2. In accordance with ANSI C63.10 Section 11.10.1, PSD measurements are not required if the maximum conducted output power is less than the PSD limit of 8 dBm / 3 kHz. The PSD level is therefore deemed to be equal to the measured output power.

1.4 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.

2 Summary of Testing

2.1 Facilities and Accreditation

The test site and measurement facilities used to collect data are located at Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom. The following table identifies which facilities were utilised for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

Site 1	X
Site 2	
Site 17	X

UL International (UK) Ltd is accredited by the United Kingdom Accreditation Service (UKAS). UKAS is one of the signatories to the International Laboratory Accreditation Co-operation (ILAC) Arrangement for the mutual recognition of test reports. The tests reported herein have been performed in accordance with its terms of accreditation.

2.2 Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019
Title:	Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules

2.3 Calibration and Uncertainty

Measuring Instrument Calibration

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.

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
Duty Cycle	2.4 GHz to 2.4835 GHz	95%	±1.14 %
Minimum 6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±4.59 %
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±5.32 dB
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±3.30 dB
Radiated Spurious Emissions	1 GHz to 25 GHz	95%	±3.16 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.

2.4 Test and Measurement Equipment

Test Equipment Used for Transmitter Minimum 6 dB Bandwidth & Maximum Peak Output Power Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2072	Thermohygrometer	Testo	608-H1	45257961	08 Dec 2022	12
A2424	10 dB Attenuator	AtlanTecRF	AN18W5-10	832827#2	Calibrated before use	-
221040	Signal Analyser	Rohde & Schwarz	FSV3030	101864	08 Jun 2023	12
G0614	Signal Generator	Rohde & Schwarz	SMB100A	177687	19 May 2023	36

Test Equipment Used for Transmitter Radiated Emissions Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	09 Dec 2022	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	26 Oct 2022	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	12 Oct 2022	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	21 Oct 2022	12
A3167	Pre-Amplifier	Com Power	PAM-103	18020010	20 Oct 2022	12
A3142	Pre-Amplifier	Schwarzbeck	BBV 9718 B	00020	20 Oct 2022	12
A3265	Pre-Amplifier	Schwarzbeck	BBV 9721	9721-069	03 Nov 2022	12
A490	Antenna	Chase	CBL6111A	1590	14 Sep 2022	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	00653	26 Oct 2022	12
A2890	Antenna	Schwarzbeck	HWRD 750	014	29 Oct 2022	12
A2892	Antenna	Schwarzbeck	BBHA 9170	9170-727	02 Nov 2022	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#2	26 Jan 2023	12
A3036	Low Pass Filter	AtlanTecRF	AFL-02000	15062902848	25 Jan 2023	12
A2914	High Pass Filter	AtlanTecRF	AFH-03000	2155	25 Jan 2023	12
A2947	High Pass Filter	AtlanTecRF	AFH-07000	1601900001	25 Jan 2023	12
M2040	Thermohygrometer	Testo	608-H1	45124934	09 Dec 2022	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A		12
M2044	Test Receiver	Rohde & Schwarz	ESU26	100122	29 Apr 2023	12
A3165	Mag-Loop Antenna	ETS-Lindgren	6502	00224383	05 May 2023	12

Test and Measurement Equipment (continued)

Test Equipment Used for Transmitter Band Edge Radiated Emissions & Duty Cycle Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	09 Dec 2022	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	26 Oct 2022	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	12 Oct 2022	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	21 Oct 2022	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	00653	26 Oct 2022	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#2	26 Jan 2023	12

3 Equipment Under Test (EUT)

3.1 Identification of Equipment Under Test (EUT)

Brand Name:	sugarBEAT
Model Name or Number:	sugarBEAT
Test Sample Serial Number:	260722-01 *(Conducted sample #1)*
Hardware Version:	04
Software Version:	T.0.17.0.5 (92) DM mmol/1
Firmware Version:	SB_6_0_Test_E_5.bin (5.6.0)
FCC ID:	2A8VFAA

Brand Name:	sugarBEAT
Model Name or Number:	sugarBEAT
Test Sample Serial Number:	120722-04 *(Radiated sample #1)*
Hardware Version:	04
Software Version:	T.0.17.0.5 (92) DM mmol/1
Firmware Version:	SB_6_0_Test_E_5.bin (5.6.0)
FCC ID:	2A8VFAA

3.2 Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.3 Additional Information Related to Testing

Technology Tested:	*Bluetooth* Low Energy (Digital Transmission System)		
Type of Unit:	Transceiver		
Channel Spacing:	2 MHz		
Modulation:	GFSK		
Data Rate: LE	1 Mbps		
Power Supply Requirement(s):	Nominal	3.8 VDC	
Maximum Conducted Output Power:	-3.1 dBm		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	37	2402
	Middle	17	2440
	Top	39	2480

3.4 Description of Available Antennas

The radio utilizes an integrated antenna, with the following maximum gain:

Frequency Range (MHz)	Antenna Gain (dBi)
2400-2480	0.5

3.5 Description of Test Setup

Support Equipment

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

Description:	Android Phone
Brand Name:	Samsung
Model Name or Number:	Galaxy A10
Serial Number:	RZ8N12C4HJB

Description:	Docking Station
Brand Name:	sugarBEAT
Model Name or Number:	2020-10
Serial Number:	Not Stated

Description:	AC to DC Adapter
Brand Name:	Huahui Electronic Technology
Model Name or Number:	PSHH0168-USB
Serial Number:	Not Stated

Operating Modes

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

- Transmitting at maximum power in *Bluetooth* LE mode with modulation, maximum possible data length available and Pseudorandom Bit Sequence 9.

Configuration and Peripherals

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

- Controlled in test mode using commands entered into a software application on the support Android phone supplied by the customer. The commands were used to enable a continuous transmission and to select the test channels as required. The customer supplied a document containing the setup instructions 'FCC SugarBEAT Test Instructions - Radio Radiated and Radio Conducted.pdf'.
- The EUT was powered by an internal 3.8 V rechargeable battery.
- There were no active ports to terminate during radiated tests.

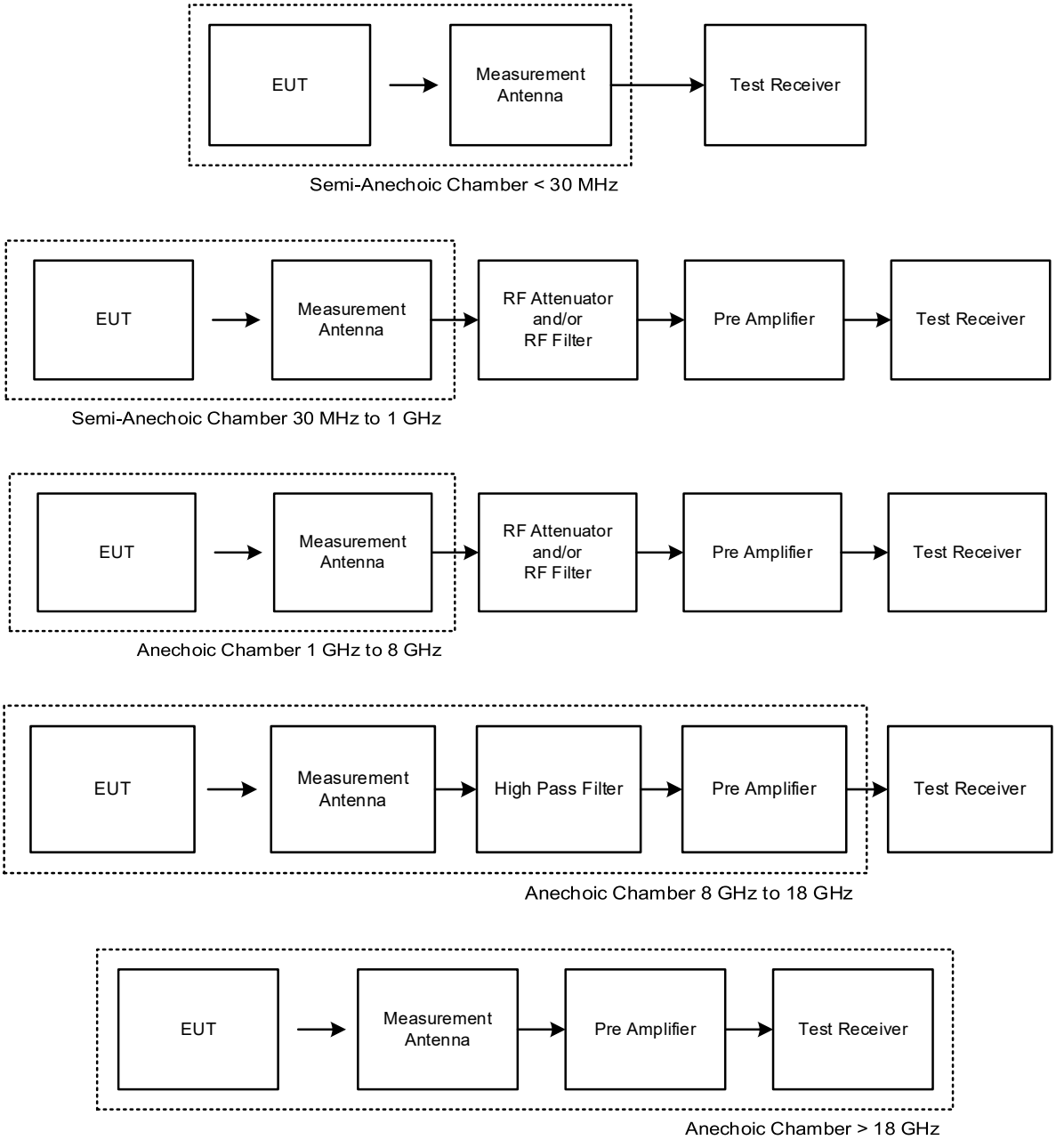
Test Setup Diagrams

Conducted Tests:

Test Setup for Transmitter Minimum 6 dB Bandwidth & Maximum Peak Output Power

Radiated Tests:

Test Setup for Transmitter Radiated Emissions



4 Antenna Port Test Results

4.1 Transmitter Minimum 6 dB Bandwidth

Test Summary:

Test Engineer:	Nick Raptopoulos	**Test Date:**	02 September 2022
Test Sample Serial Number:	260722-01		

FCC Reference:	Part 15.247(a)(2)
Test Method Used:	FCC KDB 558074 Section 8.2 referencing ANSI C63.10 Section 11.8.1

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	59

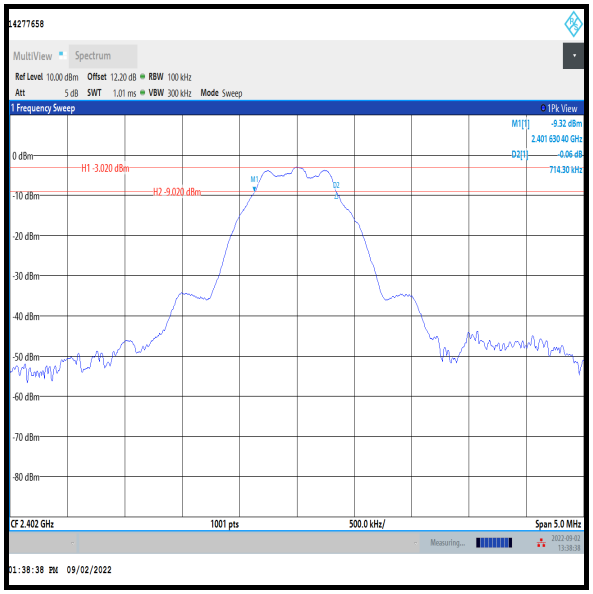
Note(s):

1. 6 dB DTS bandwidth tests were performed using a signal analyser in accordance with ANSI C63.10 Section 11.8.1 Option 1 measurement procedure. The signal analyser resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The DTS bandwidth was measured at 6 dB down from the peak of the signal.
2. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

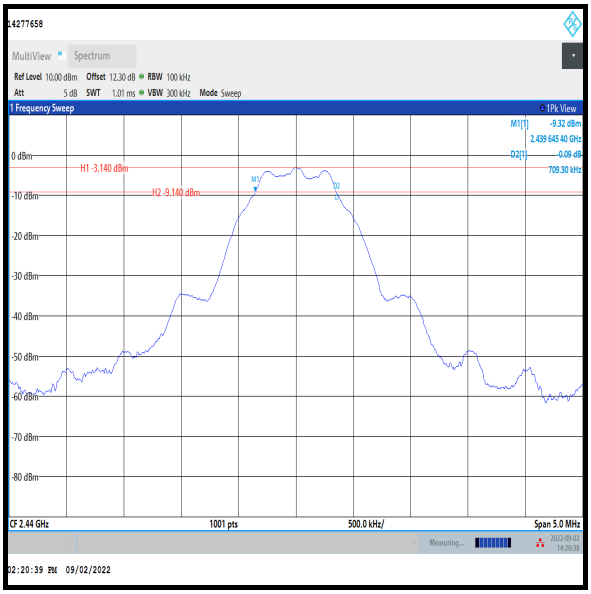
Transmitter Minimum 6 dB Bandwidth (continued)

Results:

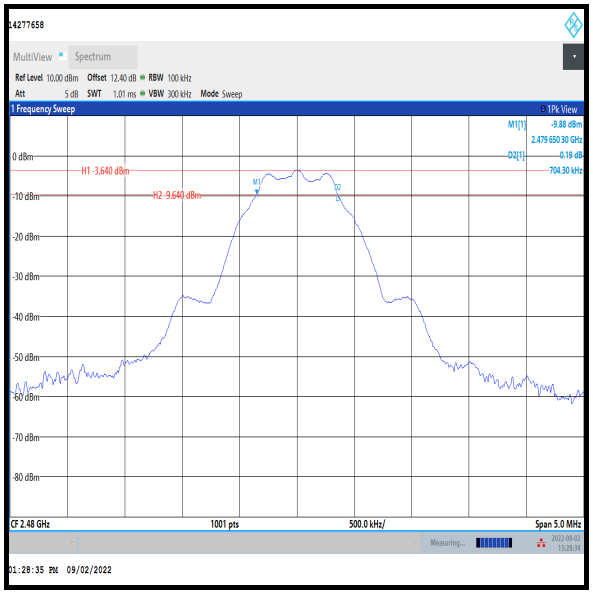
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	714.300	≥500	214.300	Complied
Middle	709.300	≥500	209.300	Complied
Top	704.300	≥500	204.300	Complied



Bottom Channel



Middle Channel



Top Channel

4.2 Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Nick Raptopoulos	**Test Date:**	02 September 2022
Test Sample Serial Number:	260722-01		

FCC Reference:	Part 15.247(b)(3)
Test Method Used:	FCC KDB 558074 Section 8.3.1.1 referencing ANSI C63.10 Section 11.9.1.1 and Notes below

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	59

Note(s):

1. Conducted power tests were performed using a signal analyser in accordance with ANSI C63.10 Section 11.9.1.1 with the RBW ≥ DTS bandwidth procedure.
2. The signal analyser resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 3 MHz. A marker was placed at the peak of the signal and the results recorded in the tables below.
3. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
4. The conducted power was added to the declared antenna gain to obtain the EIRP.

Transmitter Maximum Peak Output Power (continued)

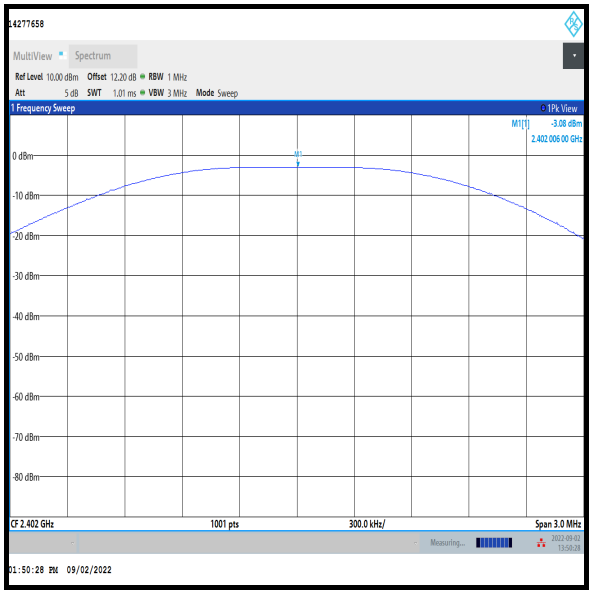
Results:

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	-3.1	30.0	33.1	Complied
Middle	-3.2	30.0	33.2	Complied
Top	-3.7	30.0	33.7	Complied

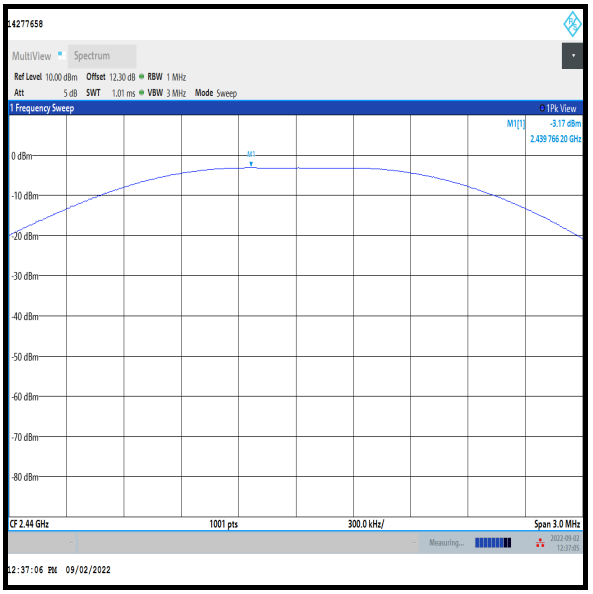
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	-3.1	0.5	-2.6	36.0	38.6	Complied
Middle	-3.2	0.5	-2.7	36.0	38.7	Complied
Top	-3.7	0.5	-3.2	36.0	39.2	Complied

Transmitter Maximum Peak Output Power (continued)

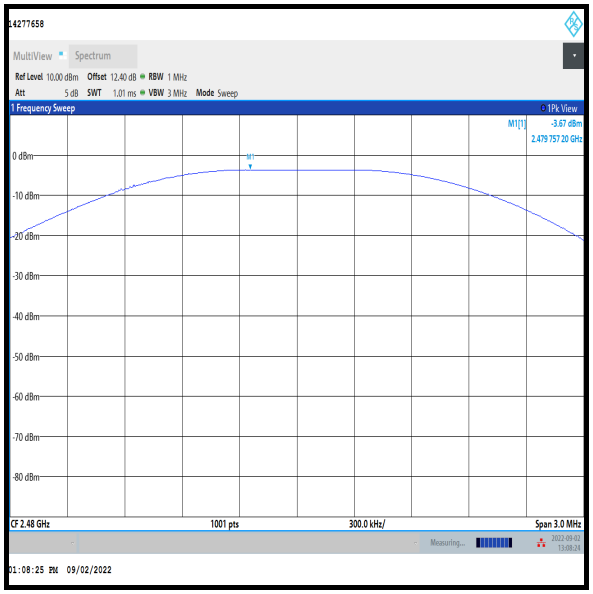
Results:



Bottom Channel



Middle Channel



Top Channel

5 Radiated Test Results

5.1 Transmitter Duty Cycle

Test Summary:

Test Engineer:	Andrew Harding	**Test Date:**	30 August 2022
Test Sample Serial Number:	120722-04		

FCC Reference:	Part 15.35(c)
Test Method Used:	FCC KDB 558074 Section 6 referencing ANSI C63.10 Section 7.5 & 11.6

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	50

Note(s):

1. In order to assist with the determination of the average level of spurious emissions field strength, the customer declared a worst-case operational Duty Cycle of 4.2% (see Annex A). A Duty Cycle correction factor was calculated as follows in accordance with ANSI C63.10 clause 7.5:

   Duty Cycle: 20 log (0.042) = 27.5 dB (limited to 20 dB)

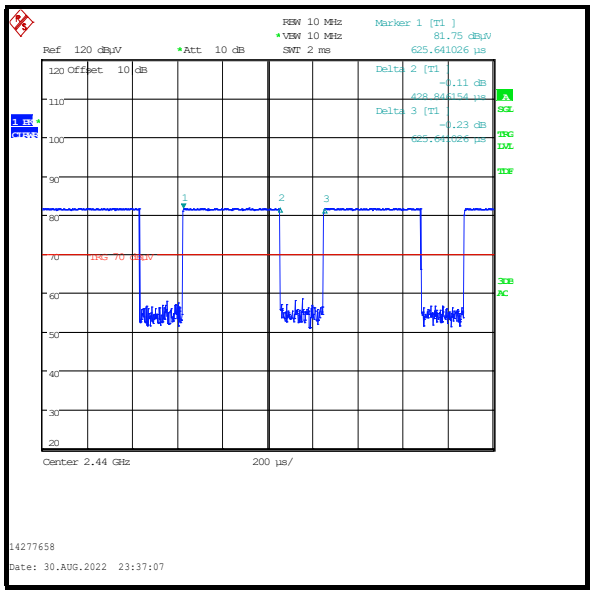
2. The test mode transmitter duty cycle was measured using a spectrum/signal analyser in the time domain and is reported below for information:

   Duty Cycle: 10 log (1 / (428.846 µs / 625.641 µs)) = 1.6 dB

Transmitter Duty Cycle (continued)

Results:

Pulse Duration (µs)	Period (µs)	Duty Cycle (dB)
428.846	625.641	1.6



5.2 Transmitter Radiated Emissions <1 GHz

Test Summary:

Test Engineer:	Andrew Harding	**Test Dates:**	31 August 2022 to 06 September 2022
Test Sample Serial Number:	120722-04		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Sections 6.3, 6.4 and 6.5
Frequency Range	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	23 to 24
Relative Humidity (%):	47 to 50

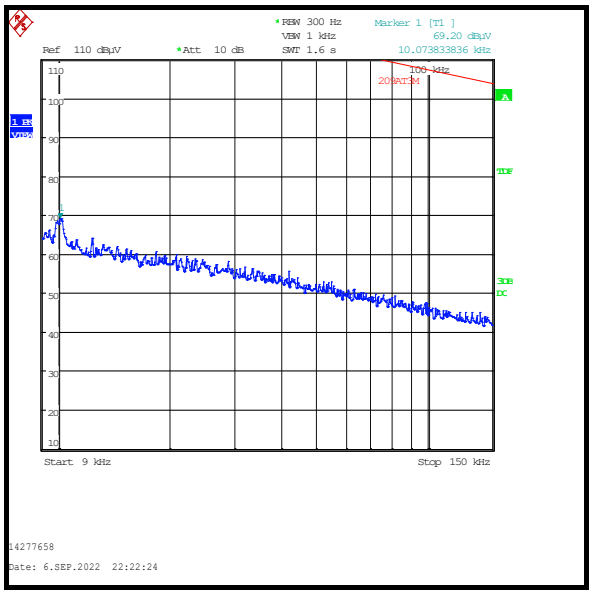
Note(s):

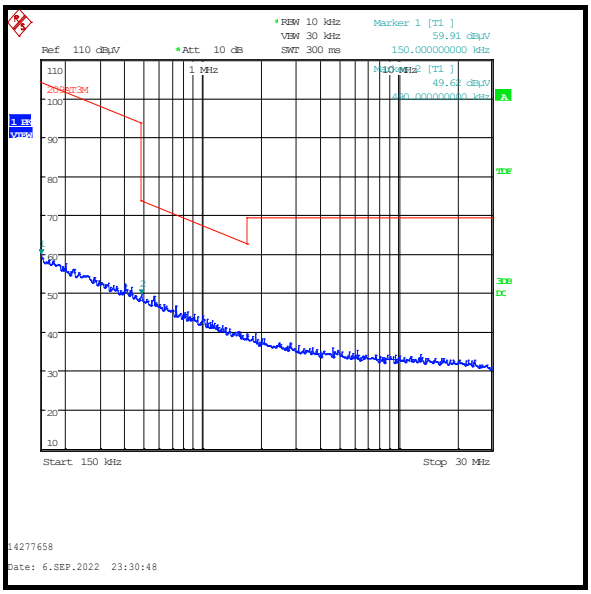
1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table below.
3. Measurements below 30 MHz were performed in a semi-anechoic chamber (Asset Number K0001) at 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 clause 6.4.3 using the method described in clause 6.4.4.2. ANSI C63.10 clause 5.2 states an alternative test site that can demonstrate equivalence to an open area test site may be used for measurements below 30 MHz. Therefore, measurements were performed in a semi-anechoic chamber. The correlation data between semi-anechoic chamber and an open field test site is available upon request.
4. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0017/K0001) 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.
5. Pre-scans were performed and markers placed on the highest measured levels. The test receiver was configured as follows: For 9 kHz to 150 kHz, the resolution bandwidth was set to 300 Hz and video bandwidth 1 kHz. A peak detector was used and trace mode was Max Hold. For 150 kHz to 30 MHz, the resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz, trace mode was Max Hold. For 30 MHz to 1 GHz, the resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.

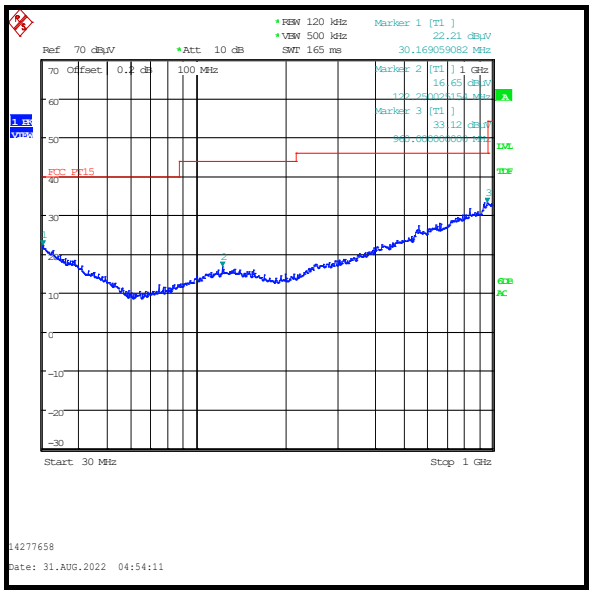
Transmitter Radiated Emissions (continued)

Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
0.010	Vertical	69.2	106.7	37.5	Complied







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

5.3 Transmitter Radiated Emissions >1 GHz

Test Summary:

Test Engineer:	Andrew Harding	**Test Dates:**	31 August 2022
Test Sample Serial Number:	120722-04		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	FCC KDB 558074 Sections 8.1 c)3), 8.5 & 8.6 referencing ANSI C63.10 Sections 6.3, 6.6, 11.11 & 11.12
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	50

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 emission shown on the 1 GHz to 3 GHz plot is the EUT fundamental.
3. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT.
4. Final measurements above 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 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.
5. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. Peak and average measurements were performed with their own appropriate detectors during the pre-scan measurements.
6. *The average value was calculated by subtracting the duty cycle correction factor from the measured peak value.

Transmitter Radiated Emissions (continued)

Results: Bottom Channel / Peak

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4803.560	Horizontal	56.8	74.0	17.2	Complied

Results: Bottom Channel / Average

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4804.010	Horizontal	36.8*	54.0	17.2	Complied

Results: Middle Channel / Peak

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4879.950	Horizontal	57.1	74.0	16.9	Complied

Results: Middle Channel / Average

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4880.040	Horizontal	37.1*	54.0	16.9	Complied

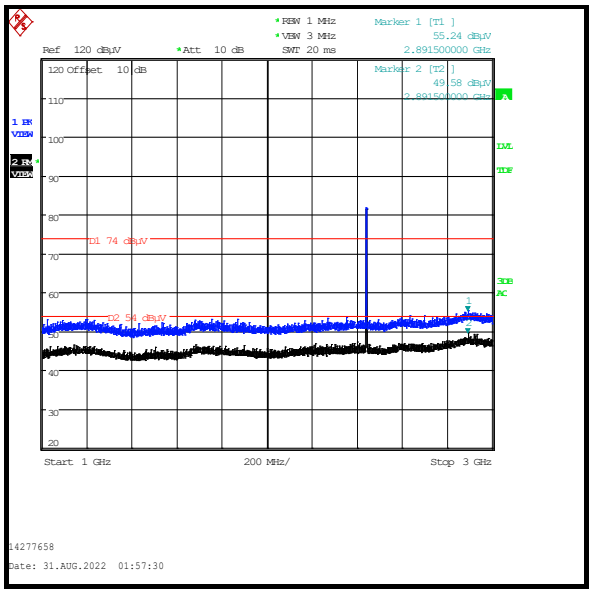
Results: Top Channel / Peak

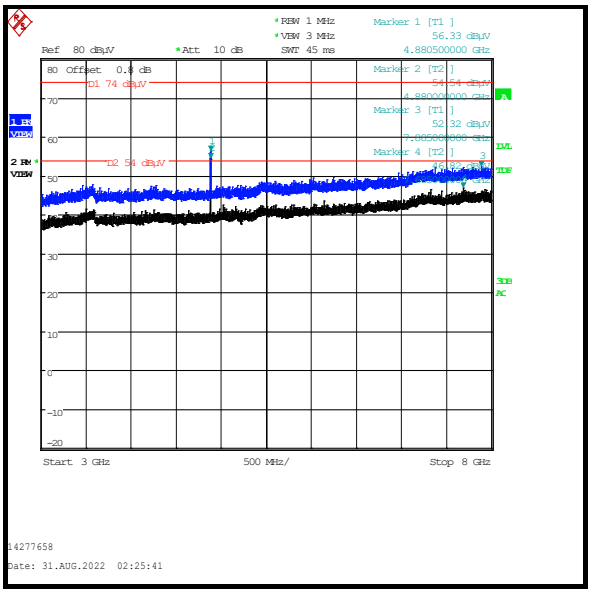
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4959.490	Horizontal	54.2	74.0	19.8	Complied

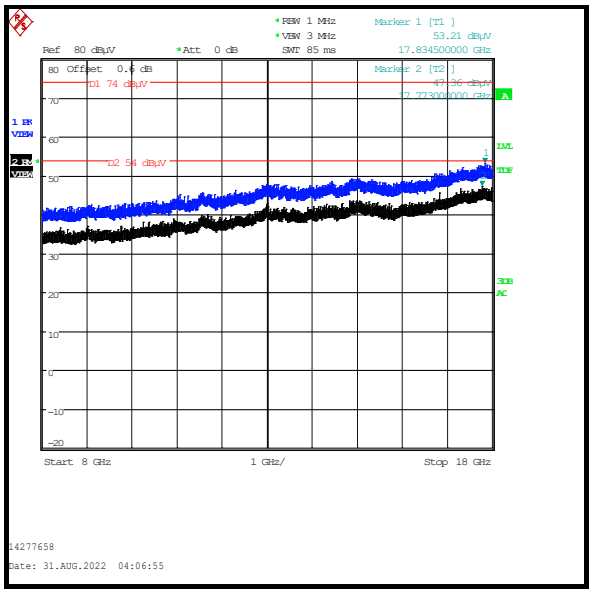
Results: Top Channel / Average

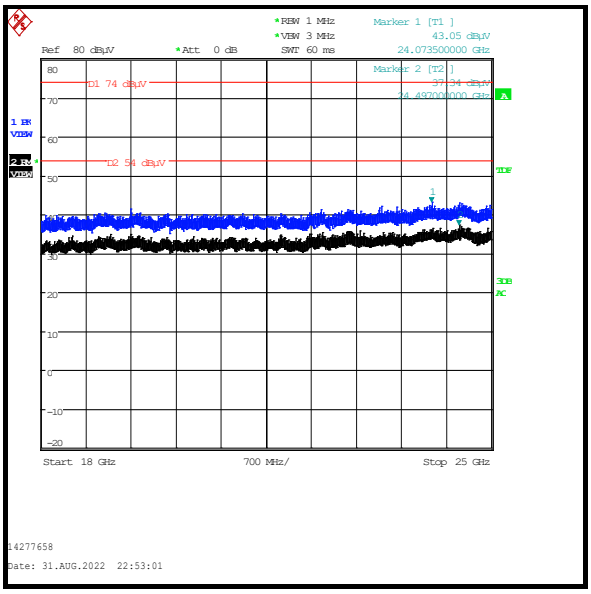
Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
4960.100	Horizontal	34.2*	54.0	19.8	Complied

Transmitter Radiated Emissions (continued)









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

5.4 Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Andrew Harding	**Test Date:**	31 August 2022
Test Sample Serial Number:	120722-04		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	KDB 558074 Section 8.7 referencing ANSI C63.10 Sections 11.11, 11.12 & 11.13

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	50

Transmitter Band Edge Radiated Emissions (continued)

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. As the lower band edge is adjacent to a non-restricted band, only peak measurements are required. In accordance with ANSI C63.10 Section 11.11.1, the test method in Section 11.11.3 was followed: the test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker and corresponding reference level line were placed on the peak of the carrier. As the maximum peak conducted output power was measured using an peak detector in accordance with ANSI C63.10 Section 11.9.1.1 an out-of-band limit line was placed 20 dB (ANSI C63.10 Section 11.11.1(a)) below the peak level. A marker was placed on the band edge spot frequencies. Marker frequency and levels were recorded.
3. As the upper band edge is adjacent to a restricted band, both peak and average measurements were recorded by placing a marker at the edge of the band. For peak measurements the test receiver resolution bandwidth was set to 1 MHz and the video bandwidth 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. For average measurements the test receiver resolution bandwidth was set to 1 MHz and the video bandwidth 3 MHz. An RMS detector was used, sweep time was set to auto and trace mode was Max Hold. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
4. There is a restricted band 10 MHz below the lower band edge. The test receiver was set up as follows: the RBW set to 1 MHz, the VBW set to 3 MHz, with the sweep time set to auto couple. Peak and average measurements were performed with peak and RMS detectors respectively. Markers were placed on the highest point on each trace.

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2382.250	Vertical	44.1	62.1	18.0	Complied
2400.000	Vertical	42.8	62.1	19.3	Complied
2483.500	Vertical	49.2	74.0	24.8	Complied
2483.950	Vertical	51.8	74.0	22.2	Complied

Results: Average

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.500	Vertical	43.9	54.0	10.1	Complied
2496.650	Vertical	46.3	54.0	7.7	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Peak

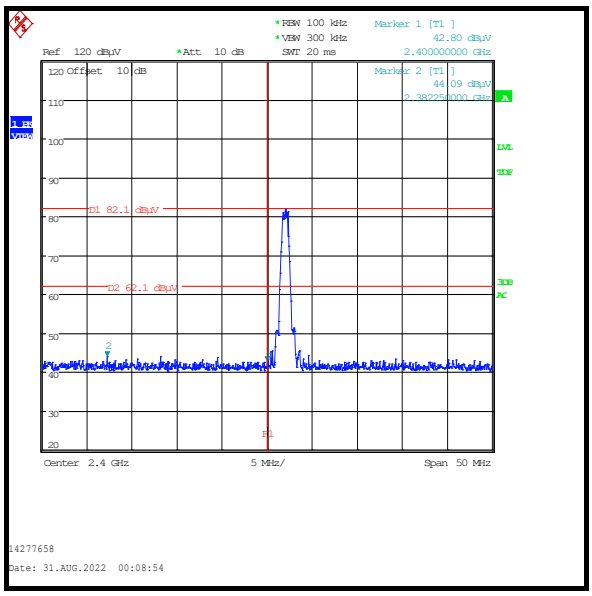
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2324.080	Vertical	53.8	74.0	20.2	Complied

Results: 2310 MHz to 2390 MHz Restricted Band / Average

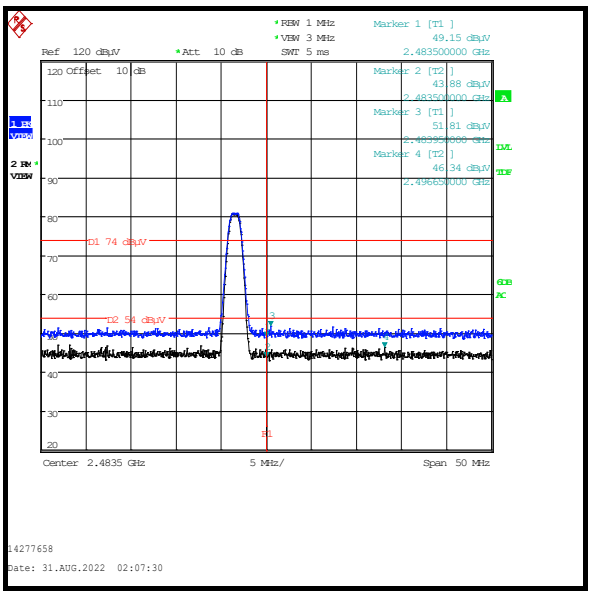
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2351.840	Vertical	46.9	54.0	7.1	Complied

Transmitter Band Edge Radiated Emissions (continued)

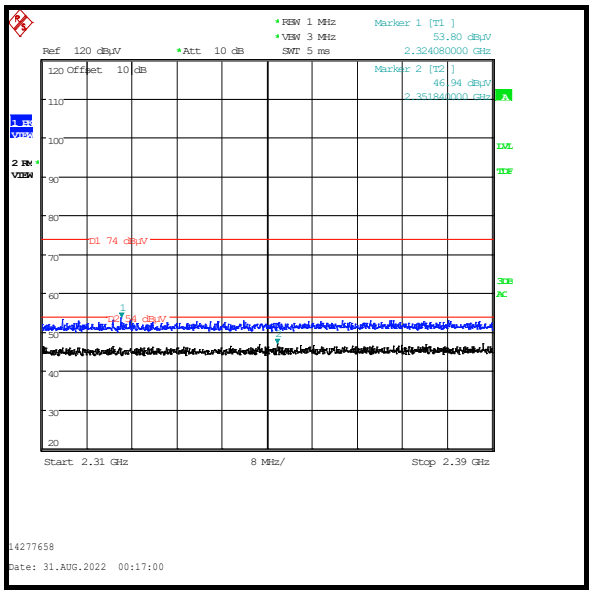
Results:



Lower Band Edge



Upper Band Edge



2310 MHz to 2390 MHz Restricted Band

Annex A: Real World Duty Cycle

The device will transmit a maximum of 1 packet per connection interval. That is a Link-Layer packet of up to 27 bytes in an overall packet size of 41 bytes. Therefore, the protocol overhead is 41/27 = 1.5.

The minimum connection interval is 7.5ms, so this is used as the most pessimistic figure (i.e. giving the highest duty cycle).

In 100ms there will be up to 100/7.5 = 13 packets of 27 bytes plus framing overhead of ~50%. Therefore, total bits transmitted over the air interface during 100ms = 13 x 1.5 x 27 x 8 = 4212 bits.

Each bit takes 1us to transmit giving 4212us = 4.2 ms (in 100ms)

Max duty cycle over 100ms = 4.2 / 100 = 0.042 (4.2%)

--- END OF REPORT ---