



# TEST REPORT

## Test Report No. : UL-RPT-RP1428592-516A

**Customer** : Luminary ROLI Ltd

**Model No. / HVIN** : LKB01

**PMN** : LUMI Keys

**FCC ID** : 2AFT3-LKB01

**ISED Certification No.** : IC: 20629-LKB01

**Technology** : *Bluetooth – Low Energy*

**Test Standard(s)** : FCC Parts 15.209(a) & 15.247  
Innovation, Science and Economic Development Canada  
RSS-247 Issue 2 March 2017  
RSS-Gen Issue 5 February 2021

**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 1.0.

**Date of Issue:** 21 September 2022

**Checked by:**   
Ben Mercer  
Lead Project Engineer, Radio Laboratory

**Company Signatory:**   
Sarah Williams  
RF Operations Leader, Radio Laboratory



5772

The *Bluetooth*® word mark and logos are owned by the *Bluetooth* SIG, Inc. and any use of such marks by UL International (UK) Ltd is under licence. Other trademarks and trade names are those of their respective owners.

---

### UL International (UK) LTD

Unit 1-3 Horizon, Kingsland Business Park, Wade Road, Basingstoke, Hampshire, RG24 8AH, UK  
Telephone: +44 (0)1256 312000  
Facsimile: +44 (0)1256 312001

## Customer Information

<b>Company Name:</b>	Luminary ROLI Ltd.
<b>Address:</b>	326 Stein Street, London, E8 4ED, United Kingdom

## Report Revision History

<b>Version Number</b>	<b>Issue Date</b>	<b>Revision Details</b>	<b>Revised By</b>
1.0	21/09/2022	Initial Version	Ben Mercer

## **Table of Contents**

<b>Customer Information.....</b>	<b>2</b>
<b>Report Revision History .....</b>	<b>2</b>
<b>Table of Contents.....</b>	<b>3</b>
<b>1 Attestation of Test Results.....</b>	<b>4</b>
1.1 Description of EUT	4
1.2 General Information	4
1.3 Summary of Test Results	5
1.4 Deviations from the Test Specification	5
<b>2 Summary of Testing.....</b>	<b>6</b>
2.1 Facilities and Accreditation	6
2.2 Methods and Procedures	6
2.3 Calibration and Uncertainty	7
2.4 Test and Measurement Equipment	8
<b>3 Equipment Under Test (EUT) .....</b>	<b>9</b>
3.1 Identification of Equipment Under Test (EUT)	9
3.2 Modifications Incorporated in the EUT	9
3.3 Additional Information Related to Testing	10
3.4 Description of Available Antennas	10
3.5 Description of Test Setup	11
<b>4 Radiated Test Results.....</b>	<b>15</b>
4.1 Transmitter Radiated Emissions <1 GHz	15
4.2 Transmitter Radiated Emissions >1 GHz	17
4.3 Transmitter Band Edge Radiated Emissions	20

## **1 Attestation of Test Results**

### **1.1 Description of EUT**

The Equipment Under Test was a light-up MIDI keyboard with *Bluetooth* Low Energy and ShockBurst transceivers.

### **1.2 General Information**

<b>Specification Reference:</b>	47CFR15.247
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Section 15.247
<b>Specification Reference:</b>	47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Sections 15.207 and 15.209
<b>Specification Reference:</b>	RSS-Gen Issue 5 February 2021
<b>Specification Title:</b>	General Requirements for Compliance of Radio Apparatus
<b>Specification Reference:</b>	RSS-247 Issue 2 March 2017
<b>Specification Title:</b>	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
<b>Site Registration:</b>	FCC: 685609, ISED: 20903
<b>FCC Lab. Designation No.:</b>	UK2011
<b>ISEDC CABID:</b>	UK0001
<b>Location of Testing:</b>	Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, G24 8AH, United Kingdom
<b>Test Dates:</b>	27 July 2022 to 28 July 2022

### **1.3 Summary of Test Results**

FCC Reference (47CFR)	ISED Canada Reference	Measurement	Result
Part 15.247(d) & 15.209(a)	RSS-Gen 6.13 / RSS-247 5.5	Transmitter Radiated Emissions	
Part 15.247(d) & 15.209(a)	RSS-Gen 6.13 / RSS-247 5.5	Transmitter Band Edge Radiated Emissions	

#### **Key to Results**

 = Complied  = Did not comply

### **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**

<b>Reference:</b>	ANSI C63.10-2013
<b>Title:</b>	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
<b>Reference:</b>	KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019
<b>Title:</b>	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
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 Radiated Emissions Tests**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2040	Thermohygrometer	Testo	608-H1	45124934	09 Dec 2022	12
K0001	3m RSE Chamber	Rainford	N/A	N/A	06 Sep 2022	12
M2044	Test Receiver	Rohde & Schwarz	ESU26	100122	29 Apr 2023	12
A3165	Magnetic Loop Antenna	ETS-Lindgren	6502	00224383	05 May 2023	12
M2003	Thermohygrometer	Testo	608-H1	45046641	09 Dec 2022	12
K0017	3m RSE Chamber	Rainford	3m Semi-Anechoic chamber	Site17-3	26 Oct 2022	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	12 Oct 2022	12
A3167	Pre-Amplifier	Com-Power	PAM-103	18020010	20 Oct 2022	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	21 Oct 2022	12
A3142	Pre-Amplifier	Schwarzbeck	BBV 9718B	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

### **Test Equipment Used for Transmitter Band Edge 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	3m Semi-Anechoic chamber	Site17-3	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
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#2	26 Jan 2023	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	00653	26 Oct 2022	12

### **3 Equipment Under Test (EUT)**

#### **3.1 Identification of Equipment Under Test (EUT)**

<b>Brand Name:</b>	ROLI
<b>Model No. / HVIN:</b>	LKB01
<b>PMN:</b>	LUMI Keys
<b>Test Sample Serial Number:</b>	LKBHTK0POWSQXWVD ( <i>Radiated sample</i> )
<b>Hardware Version:</b>	V15
<b>Firmware Version:</b>	Special Radio Test
<b>FCC ID:</b>	2AFT3-LKB01
<b>ISED Canada Certification Number:</b>	IC: 20629-LKB01

#### **3.2 Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

### **3.3 Additional Information Related to Testing**

<b>Technology Tested:</b>	Bluetooth Low Energy (Digital Transmission System)		
<b>Type of Unit:</b>	Transceiver		
<b>Channel Spacing:</b>	2 MHz		
<b>Modulation:</b>	GFSK		
<b>Data Rate: LE</b>	1 Mbps		
<b>Data Rate: LE2M</b>	2 Mbps		
<b>Power Supply Requirement(s):</b>	Nominal	3.7 VDC	
<b>Transmit Frequency Range:</b>	2402 MHz to 2480 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	37	2402
	Middle	38	2440
	Top	39	2480

<b>Technology Tested:</b>	ShockBurst (Digital Transmission System)		
<b>Type of Unit:</b>	Transceiver		
<b>Channel Spacing:</b>	2 MHz		
<b>Modulation:</b>	GFSK		
<b>Data Rate:</b>	2 Mbps		
<b>Power Supply Requirement(s):</b>	Nominal	3.7 VDC	
<b>Transmit Frequency Range:</b>	2402 MHz to 2480 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	37	2402
	Middle	38	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)
2402-2480	2.5

### **3.5 Description of Test Setup**

#### **Support Equipment**

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

<b>Description:</b>	Laptop PC
<b>Brand Name:</b>	Lenovo
<b>Model Name or Number:</b>	Thinkpad L480
<b>Serial Number:</b>	PF1EJ3BY

<b>Description:</b>	USB Hub
<b>Brand Name:</b>	Belkin
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

<b>Description:</b>	USB Cable. Length 1 metres
<b>Brand Name:</b>	Not marked or stated
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

## **Operating Modes**

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

- Transmitting at maximum power in the following modes with modulation and maximum possible data length available:
  - *Bluetooth LE*
  - *Bluetooth LE2M*
  - ShockBurst

## **Configuration and Peripherals**

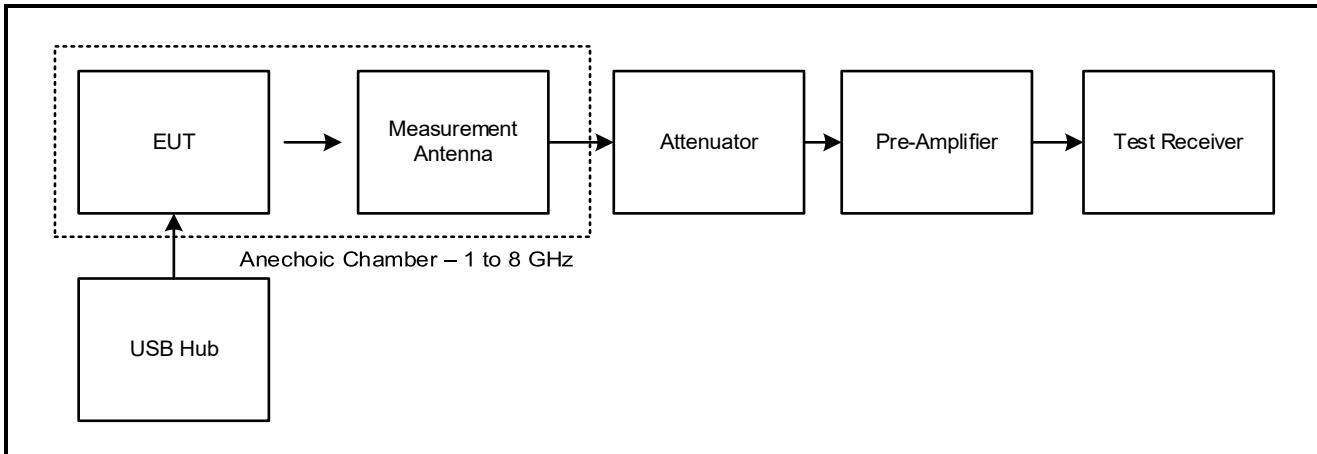
The EUT was tested in the following configuration(s):

- Controlled in test mode using test firmware on the EUT. The EUT was connected to a laptop PC running Teraterm. Test commands were used to enable a continuous transmission or receive mode and to select the test channels as required. The customer supplied a document containing the setup instructions 'LKB01 Setup Instructions - Google Docs.pdf' dated 02 September 2019.
- The transmitter was set to the default power level of 0 dBm.
- The EUT was powered from the internal battery during radiated tests.
- Transmitter radiated spurious emissions tests were performed with the EUT transmitting in LE mode as this was found to transmit the highest power.
- All active ports were terminated using the appropriate terminations during radiated emissions testing.

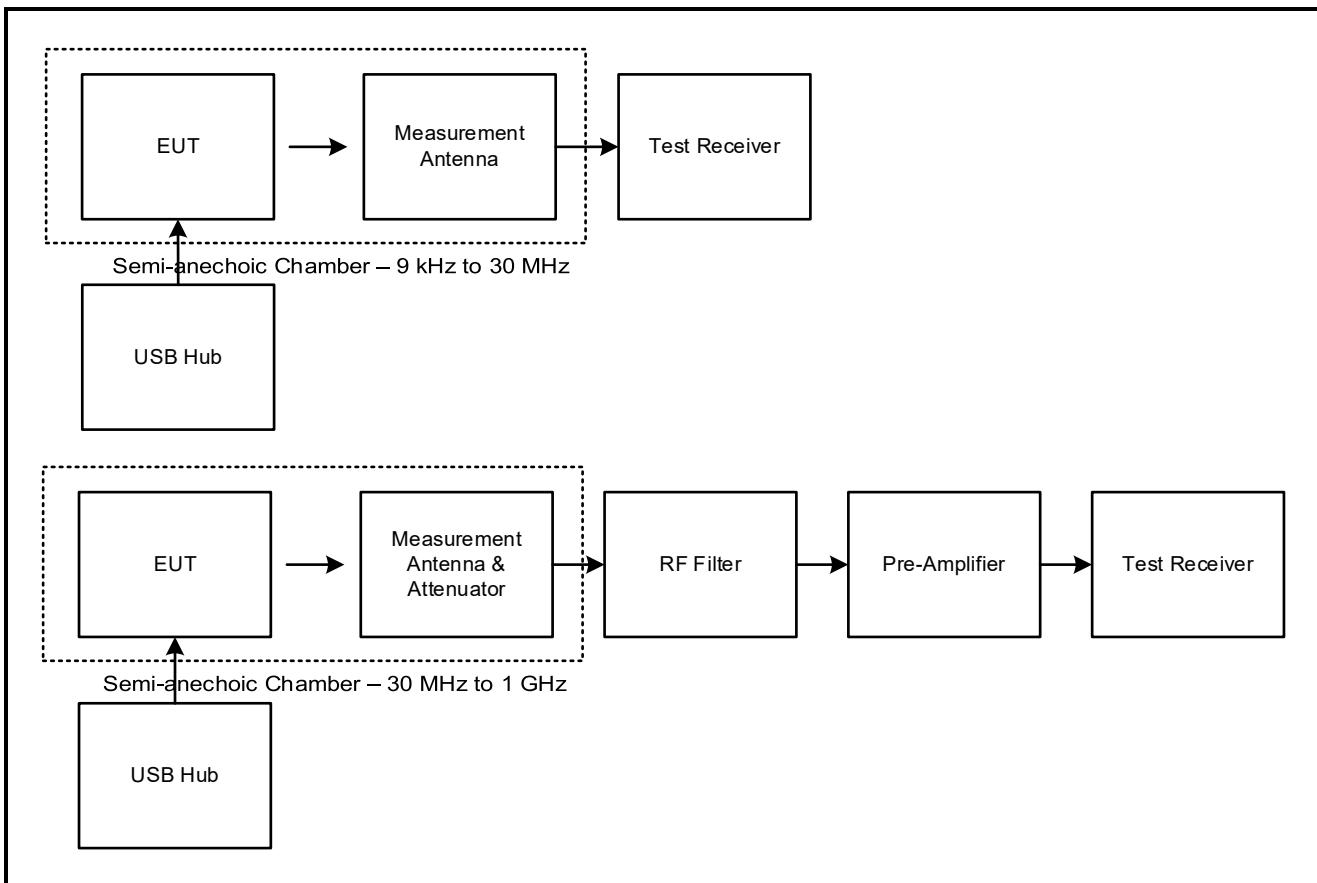
## Test Setup Diagrams

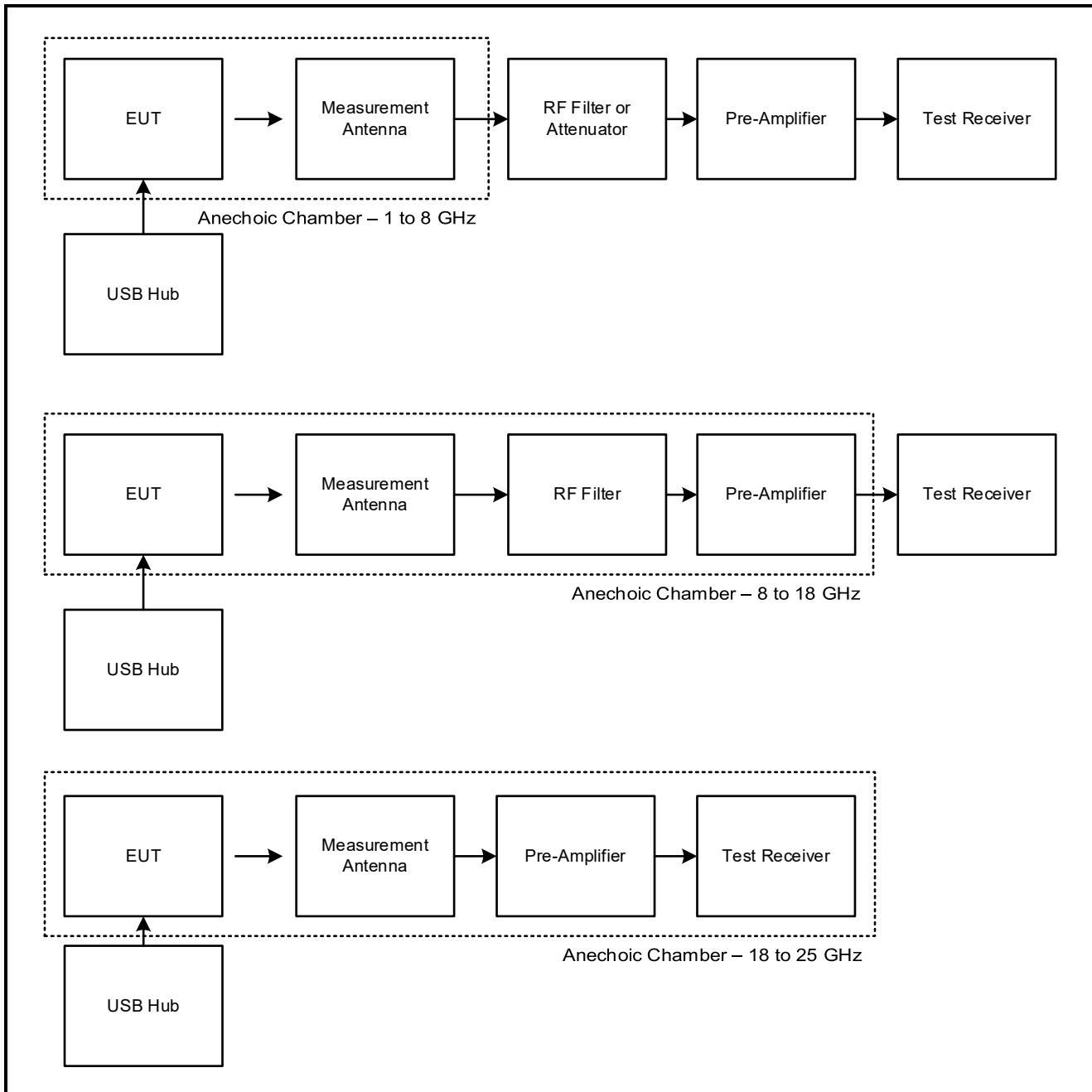
### Radiated Tests:

#### Test Setup for Transmitter Radiated band Edge



#### Test Setup for Transmitter Radiated Emissions



**Test Setup Diagrams (continued)****Test Setup for Transmitter Radiated Emissions (continued)**

## **4 Radiated Test Results**

### **4.1 Transmitter Radiated Emissions <1 GHz**

#### **Test Summary:**

<b>Test Engineers:</b>	John Ferdinand & Andrew Edwards	<b>Test Dates:</b>	27 July 2022 & 28 July 2022
<b>Test Sample Serial Number:</b>	LKBHTK0POWSQXWVD		

<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>ISED Canada Reference:</b>	RSS-Gen 6.13 & 8.9 / RSS-247 5.5
<b>Test Method Used:</b>	ANSI C63.10 Sections 6.3, 6.4 and 6.5
<b>Frequency Range</b>	9 kHz to 1000 MHz

#### **Environmental Conditions:**

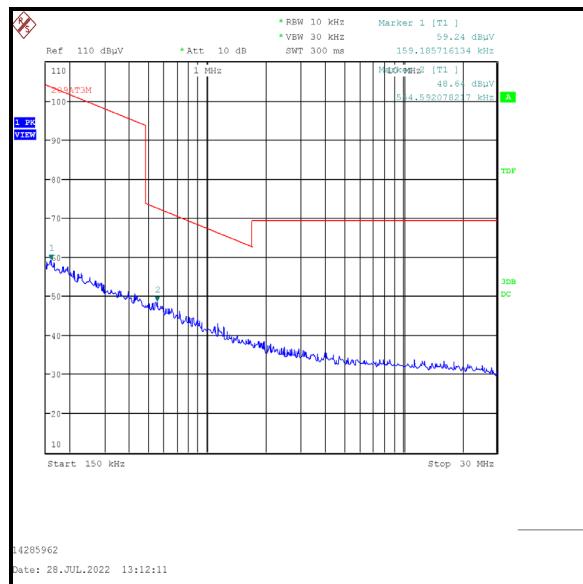
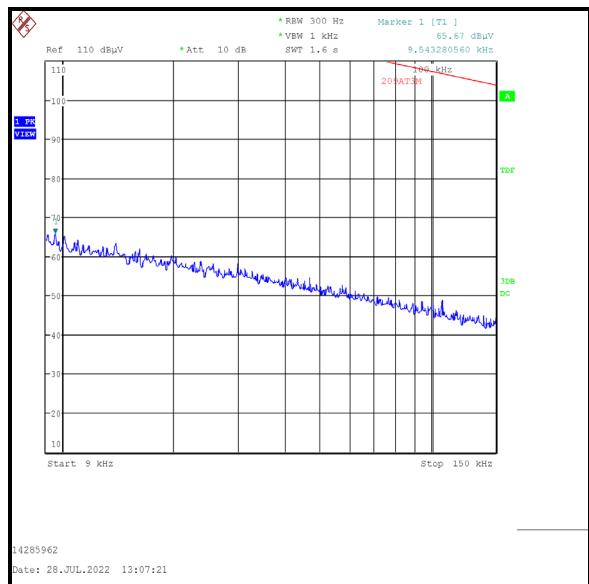
<b>Temperature (°C):</b>	22 to 23
<b>Relative Humidity (%):</b>	42 to 49

#### **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 ANSI C63.10 clause 6.4.3; measurements may be performed at a closer distance and the measured level extrapolated to the specified measurement distance using the method described in clause 6.4.4.2.
4. Measurements between 30 MHz to 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.
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: Peak / Middle Channel / LE**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
983.282	Vertical	31.3	54.0	22.7	Complied



## **4.2 Transmitter Radiated Emissions >1 GHz**

### **Test Summary:**

<b>Test Engineers:</b>	John Ferdinand & Andrew Harding	<b>Test Date:</b>	27 July 2022
<b>Test Sample Serial Number:</b>	LKBHTK0POWSQXWVD		

<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>ISED Canada Reference:</b>	RSS-Gen 6.13 & 8.9 / RSS-247 5.5
<b>Test Method Used:</b>	FCC KDB 558074 Sections 8.1 c)3), 8.5, 8.6 & 11 Q3 A3b referencing ANSI C63.10 Sections 6.3, 6.6, 11.11 & 11.12
<b>Frequency Range</b>	1 GHz to 25 GHz

### **Environmental Conditions:**

<b>Temperature (°C):</b>	22 to 24
<b>Relative Humidity (%):</b>	42 to 43

### **Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scans were investigated and found to be ambient, > 20 dB below the appropriate limit or below the noise floor of the measurement system.
3. The emission shown on the 1 GHz to 3 GHz plot is the EUT fundamental.
4. \*In accordance with ANSI C63.10 Section 6.6.4.3, Note 1, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
5. 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.
6. 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.
7. 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.
8. \*\*-20 dBc limit applies in non-restricted band as the conducted output power measurements were performed using a peak detector.

**Transmitter Radiated Emissions (continued)****Results: Bottom Channel / Peak / LE**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
4803.625	Horizontal	51.2*	54.0	2.8	Complied
7206.956	Vertical	42.6	75.9**	3.3	Complied

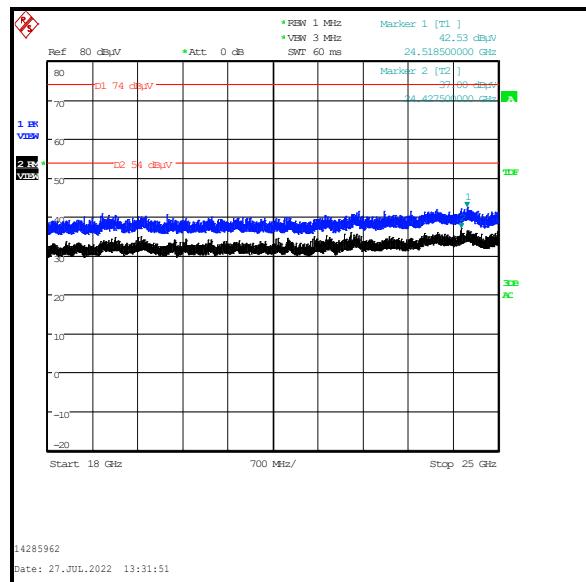
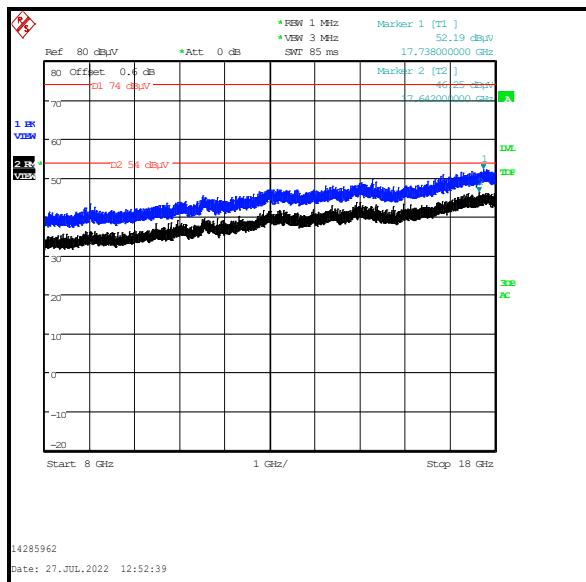
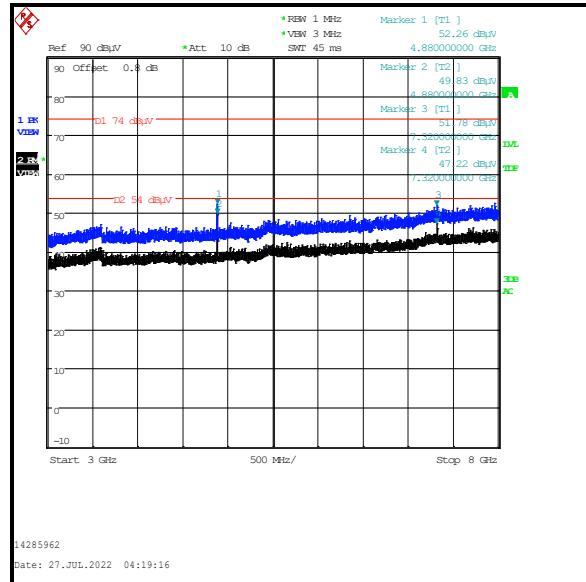
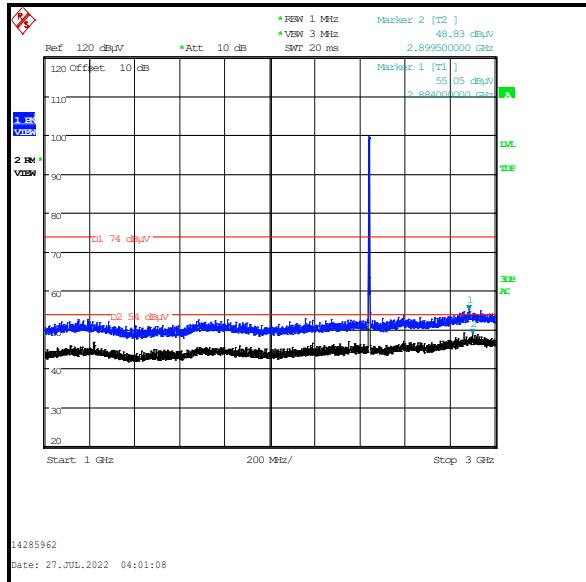
**Results: Middle Channel / Peak / LE**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
4879.409	Horizontal	50.2*	54.0	3.8	Complied
7320.571	Vertical	51.6*	54.0	2.4	Complied

**Results: Top Channel / Peak / LE**

Frequency (MHz)	Antenna Polarity	Peak Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
4960.170	Horizontal	51.6*	54.0	2.4	Complied
7440.223	Vertical	51.5*	54.0	2.5	Complied

## Transmitter Radiated Emissions (continued)



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

### **4.3 Transmitter Band Edge Radiated Emissions**

#### **Test Summary:**

<b>Test Engineer:</b>	John Ferdinand	<b>Test Date:</b>	27 July 2022
<b>Test Sample Serial Number:</b>	LKBHTK0POWSQXWVD		

<b>FCC Reference:</b>	Parts 15.247(d) & 15.209(a)
<b>ISED Canada Reference:</b>	RSS-Gen 6.13 / RSS-247 5.5
<b>Test Method Used:</b>	KDB 558074 Section 8.7, 11 Q3 A3b referencing ANSI C63.10 Sections 11.11, 11.12 & 11.13

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	22
<b>Relative Humidity (%):</b>	42

#### **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.
5. \* -20 dBc limit.

**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak / LE**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2399.599	Horizontal	48.2	75.9*	27.7	Complied
2400.000	Horizontal	44.8	75.9*	31.1	Complied
2483.500	Horizontal	60.0	74.0	14.0	Complied

**Results: Average / LE**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.500	Horizontal	53.1	54.0	0.9	Complied

**Results: 2310 MHz to 2390 MHz Restricted Band / Peak / LE**

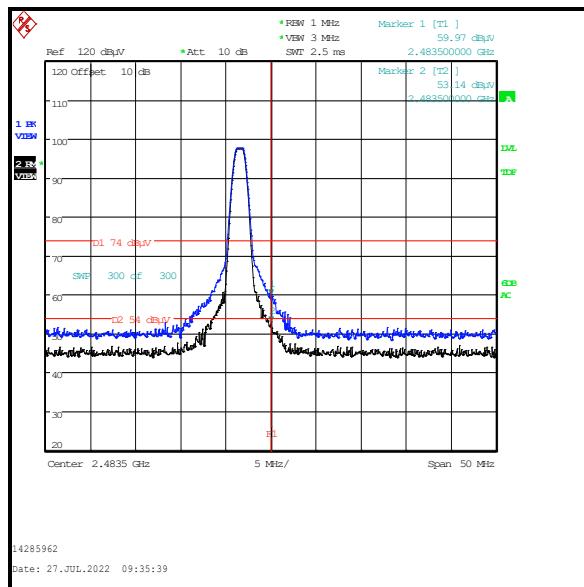
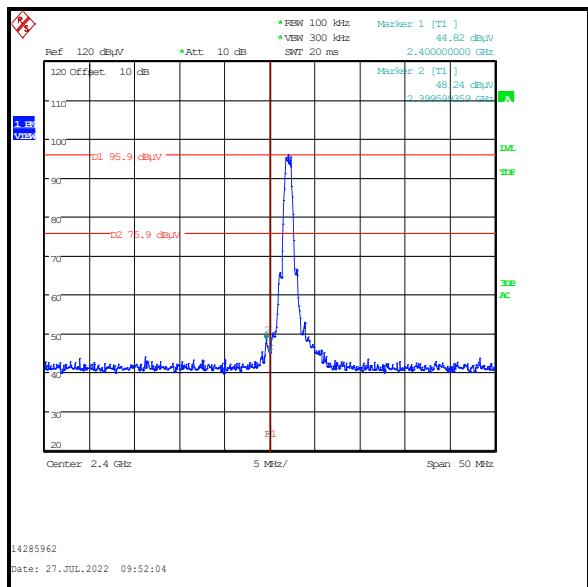
Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2356.667	Horizontal	52.5	74.0	21.5	Complied

**Results: 2310 MHz to 2390 MHz Restricted Band / Average / LE**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2340.513	Horizontal	48.1	54.0	5.9	Complied

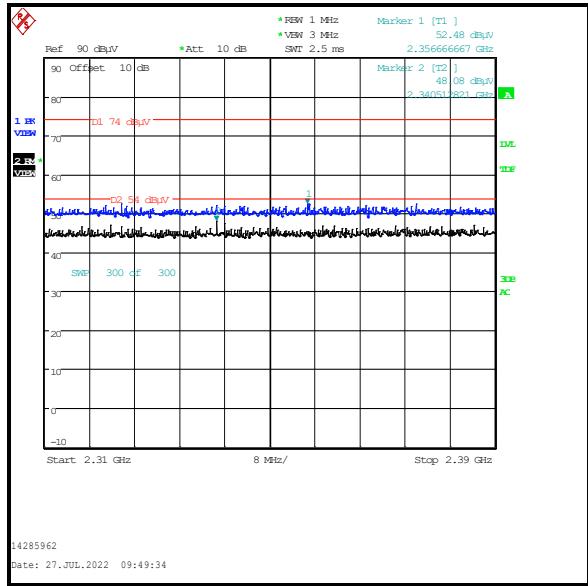
## **Transmitter Band Edge Radiated Emissions (continued)**

## **Results: LE**



## Lower Band Edge

## Upper Band Edge



## **2310 MHz to 2390 MHz Restricted Band**

**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak / LE2M**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2400.000	Horizontal	60.9	75.9*	15.0	Complied
2483.500	Horizontal	60.7	74.0	13.3	Complied

**Results: Average / LE2M**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.500	Horizontal	51.8	54.0	2.2	Complied
2483.821	Horizontal	52.2	54.0	1.8	Complied

**Results: 2310 MHz to 2390 MHz Restricted Band / Peak / LE2M**

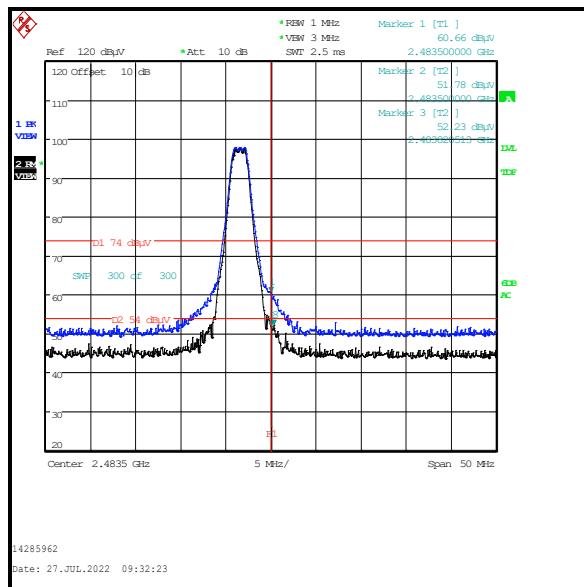
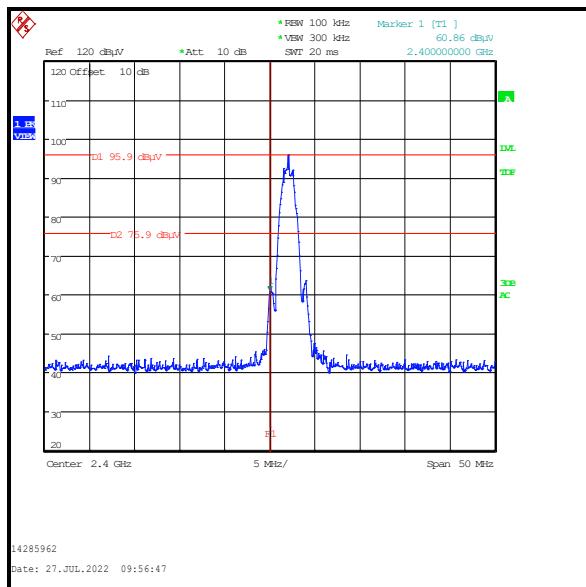
Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2377.949	Horizontal	52.8	74.0	21.2	Complied

**Results: 2310 MHz to 2390 MHz Restricted Band / Average / LE2M**

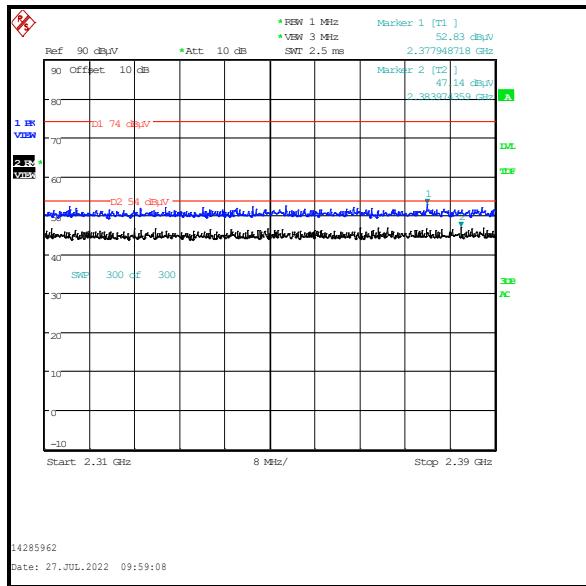
Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2383.974	Horizontal	47.1	54.0	6.9	Complied

## Transmitter Band Edge Radiated Emissions (continued)

## **Results: LE2M**



## Lower Band Edge



## Upper Band Edge

## 2310 MHz to 2390 MHz Restricted Band

**Transmitter Band Edge Radiated Emissions (continued)****Results: Peak / ShockBurst**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2397.035	Horizontal	43.8	76.0*	32.2	Complied
2400.000	Horizontal	42.2	76.0*	33.8	Complied
2483.500	Horizontal	53.8	74.0	20.2	Complied
2483.660	Horizontal	54.8	74.0	19.2	Complied

**Results: Average / ShockBurst**

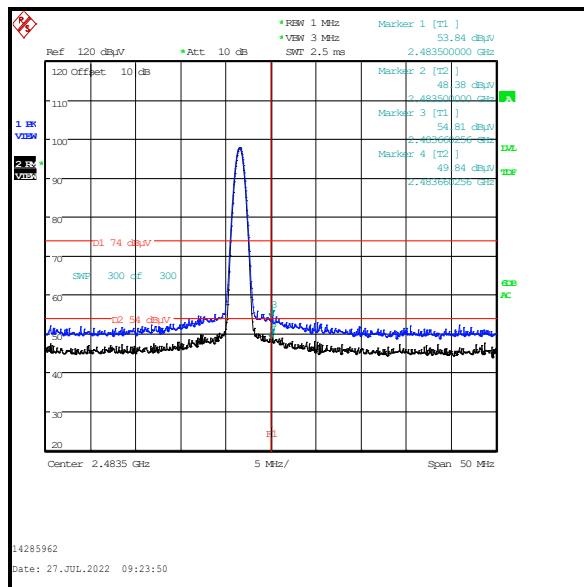
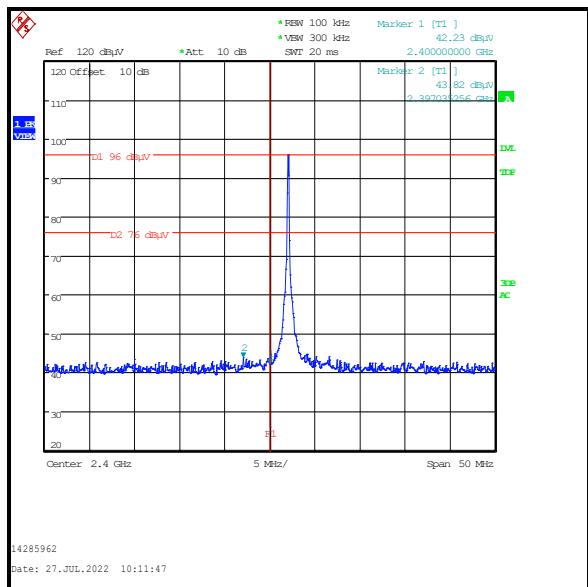
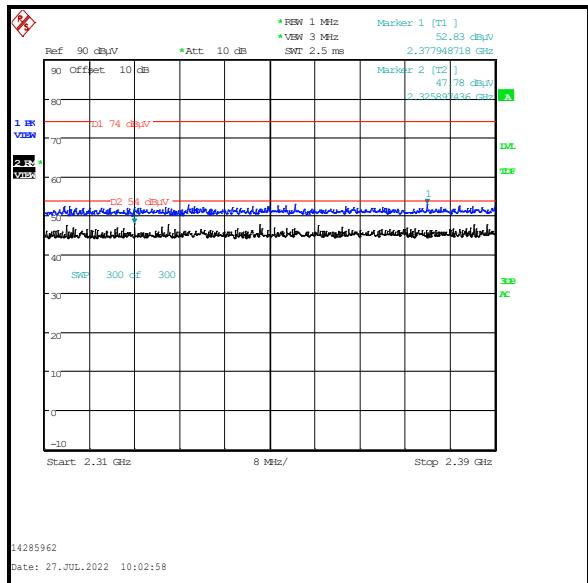
Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.500	Horizontal	48.4	54.0	5.6	Complied
2483.660	Horizontal	49.8	54.0	4.2	Complied

**Results: 2310 MHz to 2390 MHz Restricted Band / Peak / ShockBurst**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2377.949	Horizontal	52.8	74.0	21.2	Complied

**Results: 2310 MHz to 2390 MHz Restricted Band / Average / ShockBurst**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2325.897	Horizontal	47.8	54.0	6.2	Complied

**Transmitter Band Edge Radiated Emissions (continued)****Results: ShockBurst****Lower Band Edge****Upper Band Edge****2310 MHz to 2390 MHz Restricted Band****--- END OF REPORT ---**