

FCC and ISED Test Report

Manufacturer: 3D Technologies Ltd

Model: Moasure 2

In accordance with FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN

Technology: (2.4 GHz Bluetooth Low Energy)

Prepared for: 3D Technologies Ltd
Innovation Centre,
Warwick Technology Park
Warwick CV34 6UW

FCC ID: 2BO3RMoasure2-2PRO. IC: 33900 - M2M2PRO



COMMERCIAL-IN-CONFIDENCE

Document 75964306-02 Issue 01

SIGNATURE			
A handwritten signature in black ink, appearing to read "S. Marshall".			
NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	20 May 2025

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Connor Lee	20 May 2025	A handwritten signature in black ink, appearing to read "Connor Lee".
Testing	George Williams	20 May 2025	A handwritten signature in black ink, appearing to read "George Williams".
Testing	Pier-Angelo Lorusso	20 May 2025	A handwritten signature in black ink, appearing to read "Pier-Angelo Lorusso".

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A/UK0003 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C, 2023, ISED RSS-247, Issue 3 (2023-08) and ISED RSS-GEN, Issue 5 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.

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Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Application Form	4
1.5	Product Information	7
1.6	Deviations from the Standard.....	7
1.7	EUT Modification Record	7
1.8	Test Location.....	7
2	Test Details	8
2.1	AC Power Line Conducted Emissions	8
2.2	Emission Bandwidth	13
2.3	Maximum Conducted Output Power	23
2.4	Spurious Radiated Emissions	27
2.5	Power Spectral Density	49
2.6	Restricted Band Edges.....	52
2.7	Authorised Band Edges	56
3	Photographs	59
3.1	Test Setup Photographs	59
4	Measurement Uncertainty	65



1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	20 May 2025

Table 1

1.2 Introduction

Applicant	3D Technologies Ltd
Manufacturer	3D Technologies Ltd
Model Number(s)	Moasure 2
Serial Number(s)	94413 & 103852
Hardware Version(s)	(BOM) Moasure_TWO_Issue_10"
Software Version(s)	See table 3
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15C, 2023 ISED RSS-247, Issue 3 (2023-08) ISED RSS-GEN, Issue 5 (2018-04) + A2 (2021-02)
Order Number	1108
Date	08-April-2025
Date of Receipt of EUT	09-April-2025
Start of Test	07-April-2025
Finish of Test	24-April-2025
Name of Engineer(s)	Connor Lee, George Williams and Pier-Angelo Lorusso
Related Document(s)	ANSI C63.10 (2020)



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-247	RSS-GEN			
Configuration and Mode: M2 - Bluetooth Low Energy						
	15.203			Antenna Requirement	N/T	The device complies with the provisions of this section, as it uses permanently attached integral antennas.
2.1	15.207	3.1	8.8	AC Power Line Conducted Emissions	Pass	
2.2	15.247 (a)(2)	5.2	6.7	Emission Bandwidth	Pass	
2.3	15.247 (b)	5.4	6.12	Maximum Conducted Output Power	Pass	
2.4	15.247 (d) and 15.209	3.3 and 5.5	6.13 and 8.9	Spurious Radiated Emissions	Pass	
2.5	15.247 (e)	5.2	6.12	Power Spectral Density	Pass	
2.6	15.205	3.3	8.10	Restricted Band Edges	Pass	
2.7	15.247 (d)	5.5	N/A	Authorised Band Edges	Pass	

Table 2



1.4 Application Form

Equipment Description

Technical Description: <i>(Please provide a brief description of the intended use of the equipment including the technologies the product supports)</i>	Battery powered, motion based measuring device that pairs with a mobile phone running companion application via BLE. Where applicable it can calculate perimeter, area, and volume, as well as creating a digital representation of the measured item or location.		
Manufacturer:	3D Technologies Ltd.		
Model:	Moasure 2		
Part Number:	Moasure 2		
Hardware Version:	"(BOM) Moasure_TWO_Issue_10"		
Software Version:	<p>NRF image: (Project: NordicSDK, Branch: feature/DTM_test, Commit: 7c1d7c9553cb46f77b24cf60095dcfc1417e8d47)</p> <p>Loaded onto NRF via S70 using DTM_FW_LOADER.img (Project: FW_M2_S70, Branch: feature/NRF_DTM_FW_UPLOADER, Commit: d8d7a9823a96c98e55d69fd88706340a4dff9fd9)</p> <p>S70 image (replaces DTM_FW_LOADER.img after NRF image flashed): DTM_S70_BRIDGE_v2.img (Project: FW_M2_S70, Branch: feature/NRF_DTM, Commit: a57f42d19a937dc8eae70c72816dc6fee571e87f)</p>		
FCC ID of the product under test – see guidance here	2BO3RMoasure2-2PRO		
IC ID of the product under test – see guidance here	33900 - M2M2PRO		
Device Category	Mobile <input type="checkbox"/>	Portable <input checked="" type="checkbox"/>	Fixed <input type="checkbox"/>
Equipment is fitted with an Audio Low Pass Filter	Yes <input type="checkbox"/>		No <input checked="" type="checkbox"/>

Table 3

Intentional Radiators

Technology	Nordic NRF52832 SoC – running BLE 5.0. (1MLE,2MLE)
Frequency Range (MHz to MHz)	2402-2480
Conducted Declared Output Power (dBm)	<1 dBm (when set to 0dBm in SW)
Antenna Gain (dBi)	1dBi (Peak)
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	1MHz, 2MHz
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	GFSK
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	1M00G1D / 2M00G1D
Bottom Frequency (MHz)	2402
Middle Frequency (MHz)	2440
Top Frequency (MHz)	2480

Table 4



Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	PCB Max:32MHz, Internal to MCU:300MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	0Hz (DC)
Class A Digital Device (Use in commercial, industrial or business environment) <input checked="" type="checkbox"/>	
Class B Digital Device (Use in residential environment only) <input type="checkbox"/>	

Table 5

AC Power Source

AC supply frequency:	N/A	Hz
Voltage	N/A	V
Max current:	N/A	A
Single Phase <input type="checkbox"/> Three Phase <input type="checkbox"/>		

Table 6

DC Power Source

Nominal voltage:	5	V
Extreme upper voltage:	5.1	V
Extreme lower voltage:	4.35	V
Max current:	0.5	A

Table 7

Battery Power Source

Voltage:	3.7 (Nominal)	V
End-point voltage:	3 (UVLO), 4.28(OVLO)	V (Point at which the battery will terminate)
Alkaline <input type="checkbox"/> Leclanche <input type="checkbox"/> Lithium <input checked="" type="checkbox"/> Nickel Cadmium <input type="checkbox"/> Lead Acid* <input type="checkbox"/> * (Vehicle regulated)		
Other <input type="checkbox"/>	Please detail:	

Table 8

Charging

Can the EUT transmit whilst being charged	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
---	---	-----------------------------

Table 9

Temperature

Minimum temperature:	-10	°C
Maximum temperature:	50	°C

Table 10



Cable Loss

Adapter Cable Loss (Conducted sample)	0.8	dB
--	-----	----

Table 11

Antenna Characteristics

Antenna connector <input type="checkbox"/>			State impedance		Ohm
Temporary antenna connector <input type="checkbox"/>			State impedance		Ohm
Integral antenna <input checked="" type="checkbox"/>	Type:	Ceramic	Gain	1	dBi
External antenna <input type="checkbox"/>	Type:		Gain		dBi
For external antenna only: Standard Antenna Jack <input type="checkbox"/> If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed <input type="checkbox"/> Non-standard Antenna Jack <input type="checkbox"/>					
All part 15 applications will need to show how the antenna gain was derived either from a manufacturer data sheet or a measurement. Where the gain of the antenna is inherently accounted for as a result of the measurement, such as field strength measurements on a part 15.249 or 15.231 device, so the gain does not necessarily need to be verified. However, enough information regarding the construction of the antenna shall be provided. Such information maybe photographs, length of wire antenna etc.					

Table 12

Ancillaries (if applicable)

Manufacturer:	3D Technologies Ltd	Part Number:	
Model:	Moasure 2	Country of Origin:	<i>United Kingdom or Mainland China based on geographic location of market"</i>

Table 13

I hereby declare that the information supplied is correct and complete.

Name: Frederick Ford
Position held: Snr Embedded Engineer
Date: 07 April 2025



1.5 Product Information

1.5.1 Technical Description

Battery powered, motion based measuring device that pairs with a mobile phone running companion application via BLE. Where applicable it can calculate perimeter, area, and volume, as well as creating a digital representation of the measured item or location.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model:M2 , Serial Number: 94413			
0	As supplied by the customer	Not Applicable	Not Applicable
Model:M2 , Serial Number: 103852			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: M2 - Bluetooth Low Energy		
AC Power Line Conducted Emissions	Connor Lee	UKAS
Emission Bandwidth	George Williams	UKAS
Maximum Conducted Output Power	George Williams	UKAS
Spurious Radiated Emissions	Pier-Angelo Lorusso	UKAS
Power Spectral Density	George Williams	UKAS
Restricted Band Edges	Pier-Angelo Lorusso	UKAS
Authorised Band Edges	Pier-Angelo Lorusso	UKAS

Table 15

Office Address:

TÜV SÜD, Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 AC Power Line Conducted Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.207
ISED RSS-247, Clause 3.1
ISED RSS-GEN, Clause 8.8

2.1.2 Equipment Under Test and Modification State

Moasure 2, S/N: 103852 - Modification State 0

2.1.3 Date of Test

24-April-2025

2.1.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.2.

The EUT was placed on a non-conductive table 0.8m above a reference ground plane and 0.4m away from a vertical coupling plane

All power was connected to the EUT through an Artificial Mains Network (AMN).

Conducted disturbance voltage measurements on mains lines were made at the output of the AMN.

2.1.5 Environmental Conditions

Ambient Temperature	23.4 °C
Relative Humidity	39.8 %



2.1.6 Test Results

Applied supply Voltage: 120 Vac
Applied supply frequency: 60 Hz

Frequency (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.154	32.67	65.80	-33.13	Q-Peak
0.154	18.29	55.80	-37.51	CISPR Avg
0.506	32.04	56.00	-23.96	Q-Peak
0.506	25.52	46.00	-20.48	CISPR Avg
0.612	39.15	56.00	-16.85	Q-Peak
0.612	33.12	46.00	-12.88	CISPR Avg
0.789	27.24	56.00	-28.76	Q-Peak
0.789	20.18	46.00	-25.82	CISPR Avg
0.997	30.38	56.00	-25.62	Q-Peak
0.997	24.26	46.00	-21.74	CISPR Avg
1.132	23.93	46.00	-22.07	CISPR Avg
1.132	30.41	56.00	-25.59	Q-Peak

Table 16 - Live Line

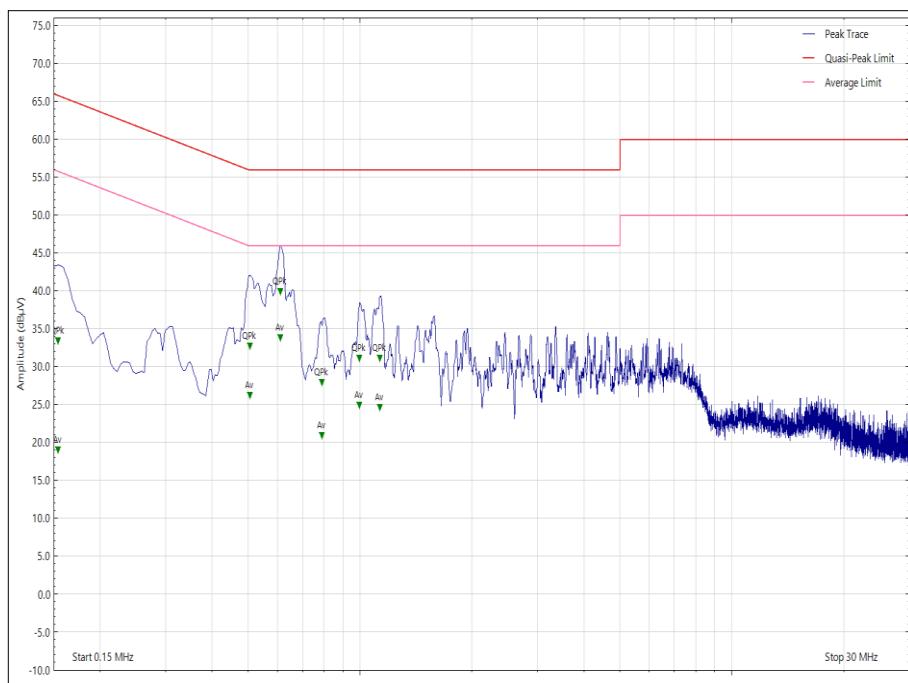


Figure 1 - Live Line - 150 kHz to 30 MHz



Frequency (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.159	31.39	65.50	-34.11	Q-Peak
0.159	18.25	55.50	-37.25	CISPR Avg
0.494	29.11	56.10	-26.99	Q-Peak
0.494	25.88	46.10	-20.22	CISPR Avg
0.624	34.10	46.00	-11.90	CISPR Avg
0.624	36.77	56.00	-19.23	Q-Peak
1.140	27.27	56.00	-28.73	Q-Peak
1.140	23.64	46.00	-22.36	CISPR Avg
1.252	24.53	56.00	-31.47	Q-Peak
1.252	14.26	46.00	-31.74	CISPR Avg
1.587	24.67	56.00	-31.33	Q-Peak
1.587	20.20	46.00	-25.80	CISPR Avg

Table 17 - Neutral Line

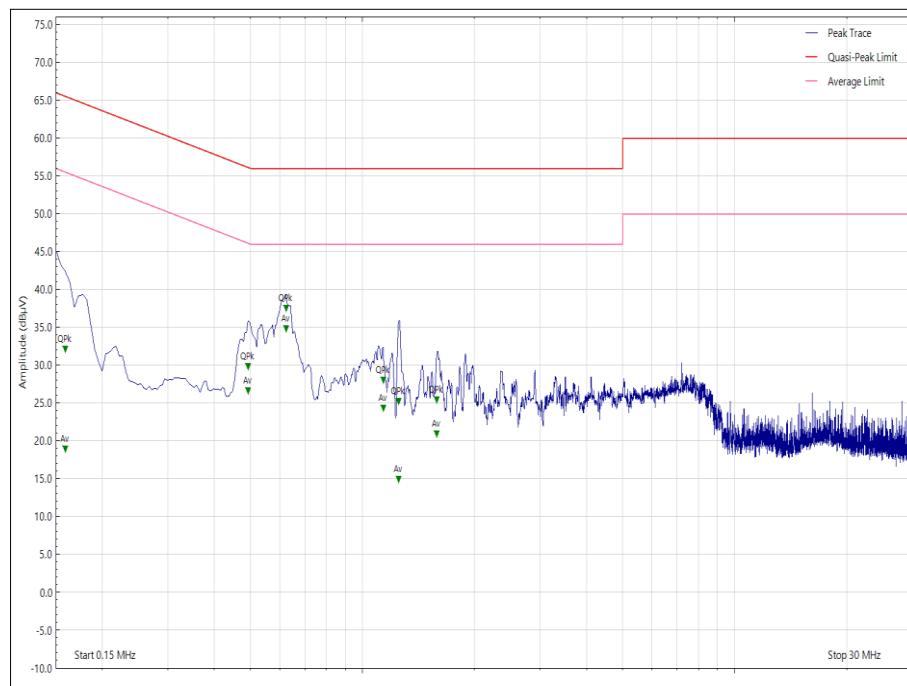


Figure 2 - Neutral Line - 150 kHz to 30 MHz

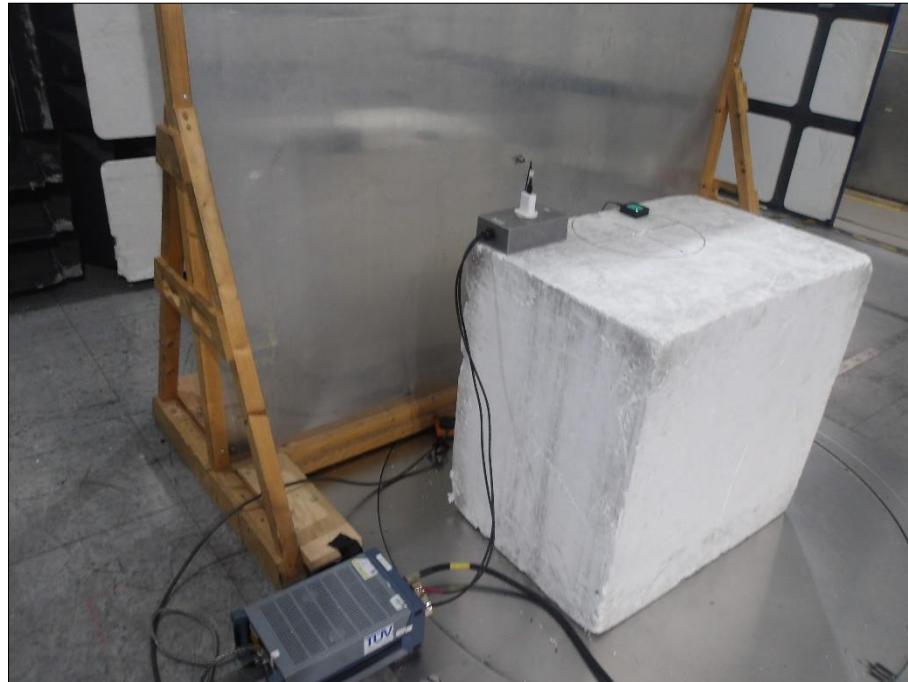


Figure 3 - 103852 Test Setup

2.1.7 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.207

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 18

*Decreases with the logarithm of the frequency.



2.1.8 Test Location and Test Equipment Used

This test was carried out in Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
LISN (CISPR 16, Single Phase)	Rohde & Schwarz	ESH3-Z5	1390	12	4-Feb-2026
Hygrometer	Rotronic	HandPalm 0	3028	12	12-Aug-2025
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Transient Limiter	Hewlett Packard	11947A	2377	12	25-Mar-2026
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Emissions Software	TUV SUD	EmX V3.5.1 V.	5125	-	N/A - Software
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5517	12	23-May-2025
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	26-Jul-2025
8m Cable	Scott Cables	SCB800-A-NMNM-08.00M	6718	6	6-Jun-2025

Table 19

TU – Traceability Unscheduled



2.2 Emission Bandwidth

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(2)
ISED RSS-247, Clause 5.2
ISED RSS-GEN, Clause 6.7

2.2.2 Equipment Under Test and Modification State

M2, S/N: 103852 - Modification State 0
M2, S/N: 94413 - Modification State 0

2.2.3 Date of Test

09-April-2025

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.8.1 for 6 dB BW and 6.9.3 for 99% occupied bandwidth measurements.

The EUT was powered by its internal battery and connected to a support laptop via USB-C for the duration of the test.

2.2.5 Environmental Conditions

Ambient Temperature	19.2 °C
Relative Humidity	31.9 %



2.2.6 Test Results

M2 - Bluetooth Low Energy

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 1M)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (B)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2402	-	0.724	-	-	≥500.0
2440	-	0.732	-	-	≥500.0
2480	-	0.728	-	-	≥500.0

Table 20 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2402	-	1.056	-	-	-
2440	-	1.060	-	-	-
2480	-	1.060	-	-	-

Table 21 - 99% Bandwidth Results



Figure 4 - B (B) 2402 MHz (CH37) 99% Bandwidth

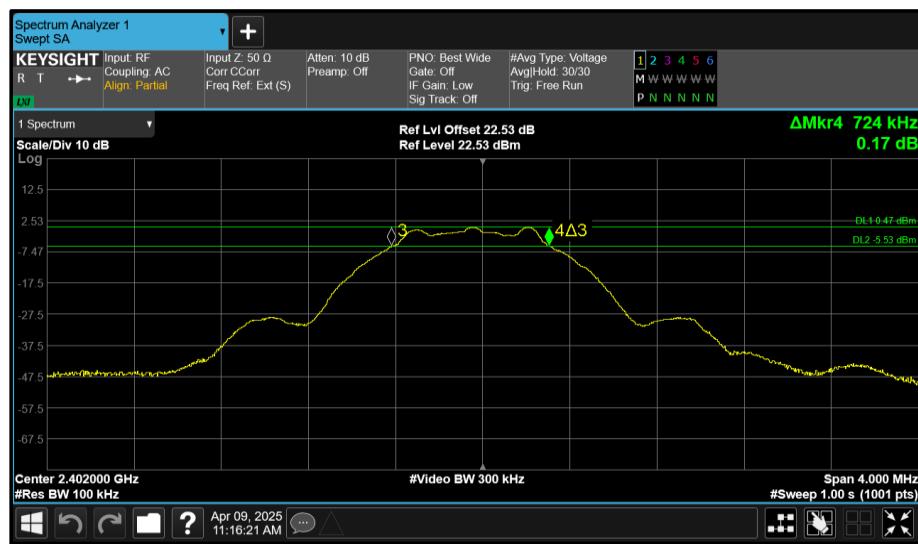


Figure 5 - B (B) 2402 MHz (CH37) 6 dB Bandwidth



Figure 6 - B (B) 2440 MHz (CH17) 99% Bandwidth

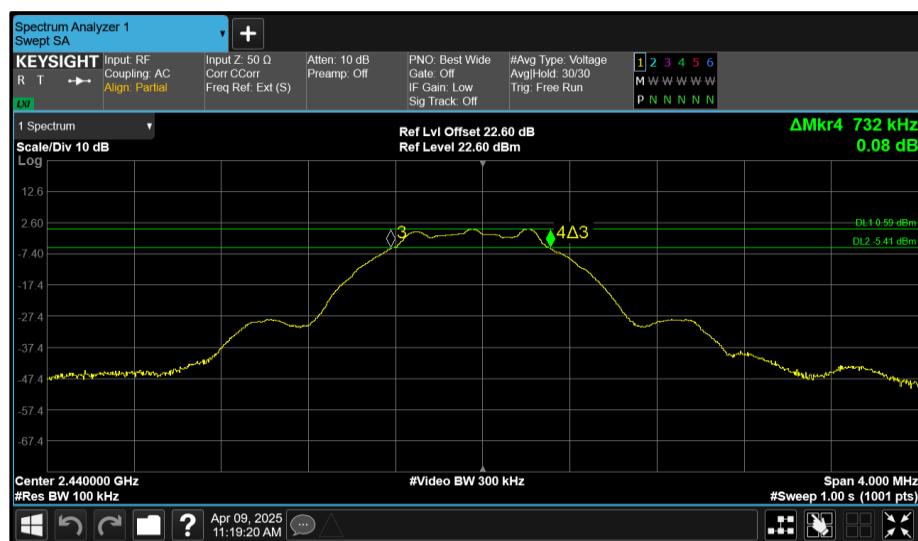


Figure 7 - B (B) 2440 MHz (CH17) 6 dB Bandwidth



Figure 8 - B (B) 2480 MHz (CH39) 99% Bandwidth

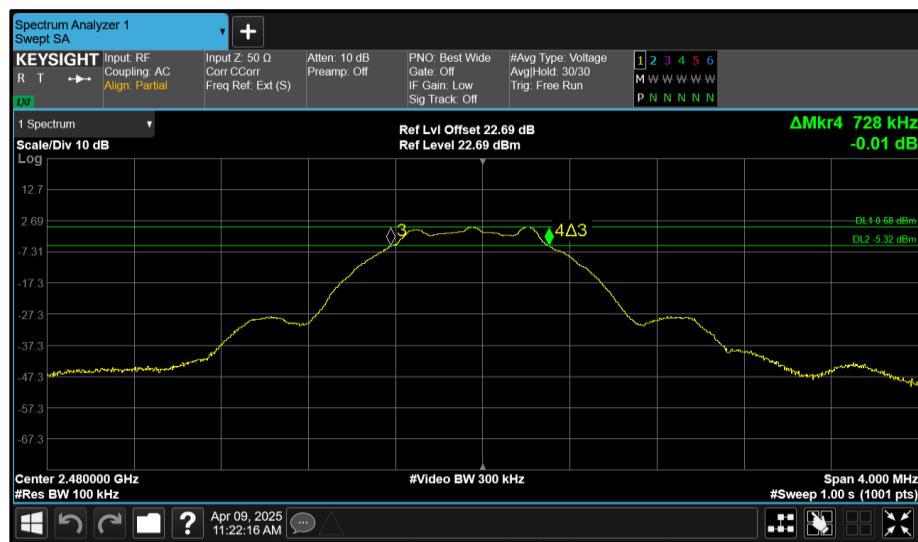


Figure 9 - B (B) 2480 MHz (CH39) 6 dB Bandwidth



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 2M)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (B)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2402	-	1.176	-	-	≥500.0
2440	-	1.160	-	-	≥500.0
2480	-	1.168	-	-	≥500.0

Table 22 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2402	-	2.056	-	-	-
2440	-	2.056	-	-	-
2480	-	2.064	-	-	-

Table 23 - 99% Bandwidth Results



Figure 10 - B (B) 2402 MHz (CH37) 99% Bandwidth



Figure 11 - B (B) 2402 MHz (CH37) 6 dB Bandwidth





Figure 14 - B (B) 2480 MHz (CH39) 99% Bandwidth



Figure 15 - B (B) 2480 MHz (CH39) 6 dB Bandwidth



2.2.7 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.247(a)(2) and ISED RSS-247, Clause 5.2(a)

The minimum 6 dB Bandwidth shall be at least 500 kHz.

2.2.8 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	2891	12	02-Dec-2025
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	18-Sep-2025
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	18-Sep-2025
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU001	6350	12	02-Aug-2025
SCU Cable Assembly	TUV SUD	SPECTRUM_SCU-CA	6639	12	02-Aug-2025

Table 24



2.3 Maximum Conducted Output Power

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b),
ISED RSS-247, Clause 5.4
ISED RSS-GEN, Clause 6.12

2.3.2 Equipment Under Test and Modification State

Moasure 2, S/N: 103852 - Modification State 0

2.3.3 Date of Test

09-April-2025

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10 clause 11.9.1.2 Method PKPM1.

The EUT was powered by its internal battery and connected to a support laptop via USB-C for the duration of the test.

2.3.5 Environmental Conditions

Ambient Temperature	19.2 °C
Relative Humidity	31.9 %



2.3.6 Test Results

M2 - Bluetooth Low Energy

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 1M)	Duty Cycle (%):	85.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (B)	Peak Antenna Gain (dBi):	1.00

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	-	1.06	-	-	-	30.00	-28.94
2440	-	0.98	-	-	-	30.00	-29.02
2480	-	1.08	-	-	-	30.00	-28.92

Table 25 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	-	1.06	-	-	-	30.00	-28.94	2.06	36.00	-33.94
2440	-	0.98	-	-	-	30.00	-29.02	1.98	36.00	-34.02
2480	-	1.08	-	-	-	30.00	-28.92	2.08	36.00	-33.92

Table 26 - ISED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 2M)	Duty Cycle (%):	57.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (B)	Peak Antenna Gain (dBi):	1.00

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	-	0.89	-	-	-	30.00	-29.11
2440	-	0.93	-	-	-	30.00	-29.07
2480	-	0.96	-	-	-	30.00	-29.04

Table 27 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	-	0.89	-	-	-	30.00	-29.11	1.89	36.00	-34.11
2440	-	0.93	-	-	-	30.00	-29.07	1.93	36.00	-34.07
2480	-	0.96	-	-	-	30.00	-29.04	1.96	36.00	-34.04

Table 28 - ISED Maximum Conducted (peak) Output Power Results



2.3.7 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

ISED RSS-247, Limit Clause 5.4 (d)

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e) of the specification.

2.3.8 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	2891	12	02-Dec-2025
USB Power Sensor	Boonton	RTP5008	5833	12	26-Jul-2025
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU001	6350	12	02-Aug-2025
SCU Cable Assembly	TUV SUD	SPECTRUM_SCU-CA	6639	12	02-Aug-2025

Table 29



2.4 Spurious Radiated Emissions

2.4.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d) and 15.209,
ISED RSS-247, Clause 3.3 and 5.5
ISED RSS-GEN, Clause 6.13 and 8.9

2.4.2 Equipment Under Test and Modification State

Moasure 2, S/N: 103852 - Modification State 0

2.4.3 Date of Test

07-April-2025 to 09-April-2025

2.4.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

The EUT was powered by a USB Connection from a Laptop for Frequency range above 1GHz and by an Internal Battery for below 1GHZ.

The EUT worst-case configuration was determined from Radiated Mid-channel 17 Fundamental measurements (X-Plane Horizontal) and configured as BLE 2MHz.

For frequencies > 1 GHz, plots for average measurements were taken in accordance with ANSI C63.10, clause 11.12.2.5.2.

The EUT was placed on the non-conducting platform in a manner typical of a normal installation.

As the EUT was considered mobile/portable and therefore reasonable to be used in multiple planes, pre-scans were performed with the EUT orientated in X, Y and Z planes with reference to the ground plane.

The plots shown are the characterisation of the EUT. The limits on the plots represent the most stringent case for restricted bands, (74/54 dB μ V/m) when compared to 20 dBc outside restricted bands. The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

The following conversion can be applied to convert from dB μ V/m to μ V/m:
 $10^{(Field\ Strength\ in\ dB\mu\ V/m/20)}$.

Above 18 GHz, the measurement distance was reduced to 1 m. The limit line was increased by $20 * LOG(3/1) = 9.54$ dB.

Where formal measurements have been necessary, the results have been presented in the emissions table.

2.4.5 Example Test Setup Diagram

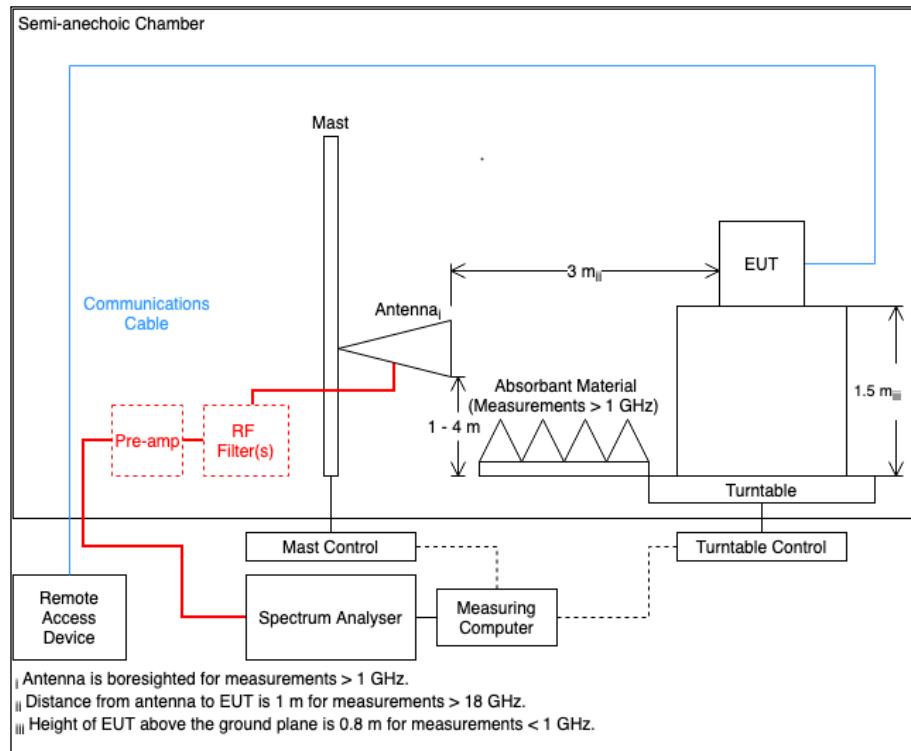


Figure 16

2.4.6 Environmental Conditions

Ambient Temperature 22.2 - 23.4 °C
Relative Humidity 27.4 - 30.2 %

2.4.7 Test Results

M2 - Bluetooth Low Energy

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 30 - CH37_LE2M_X Plane, 2402 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

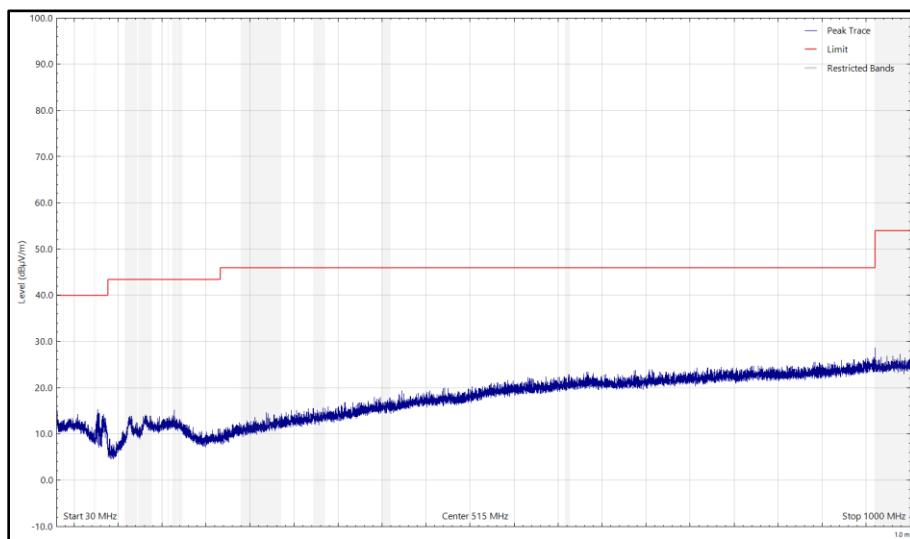


Figure 17 - CH37_LE2M_X Plane, 2402 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

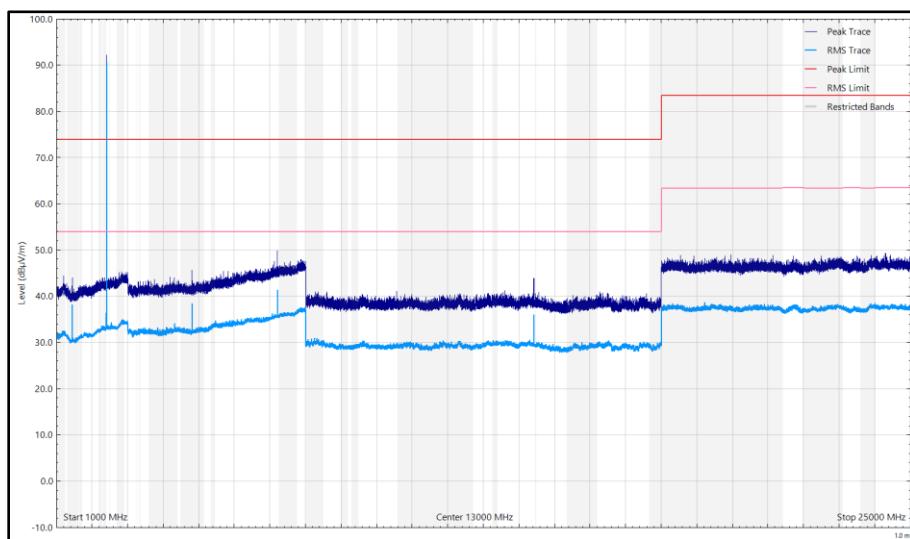


Figure 18 - CH37_LE2M_X Plane, 2402 MHz, 1 GHz to 25 GHz, Horizontal

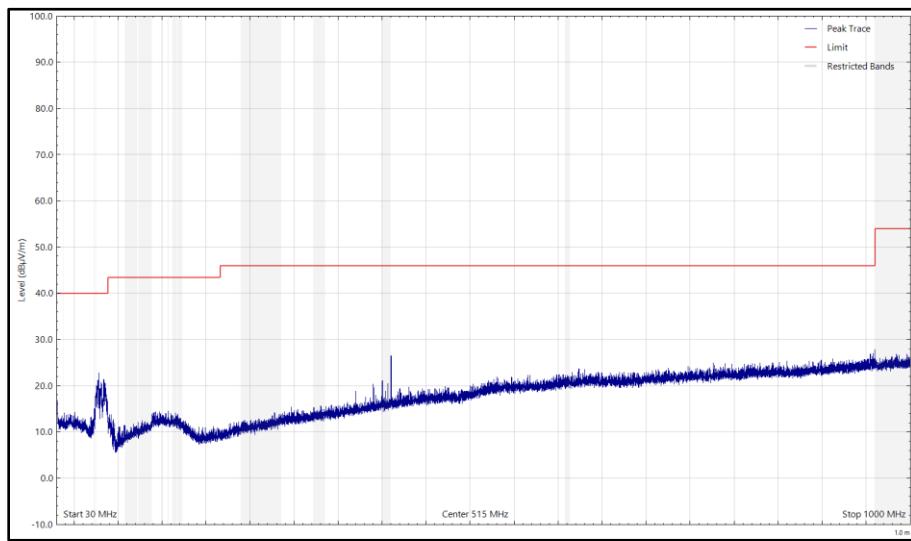


Figure 19 - CH37 LE2M_X Plane, 2402 MHz, 30 MHz to 1 GHz, Vertical (Peak)

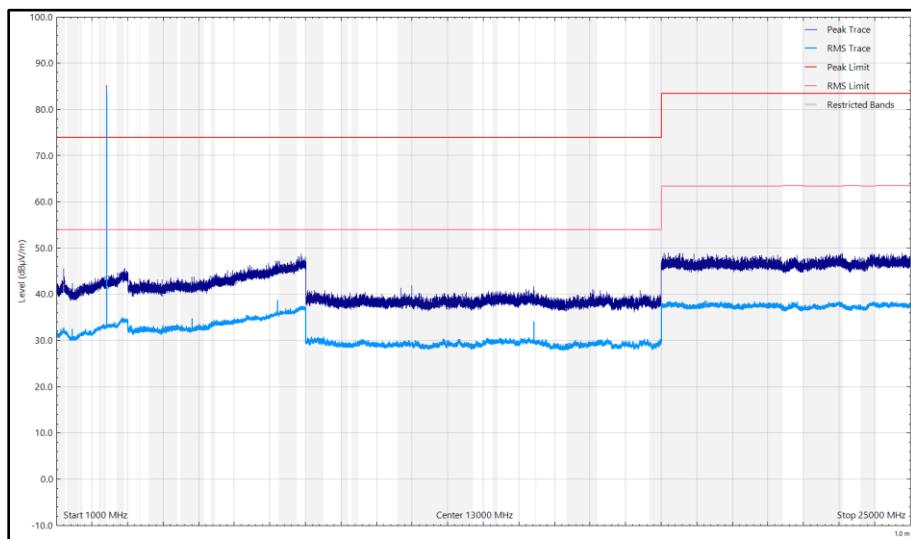


Figure 20 - CH37 LE2M_X Plane, 2402 MHz, 1 GHz to 25 GHz, Vertical



Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 31 - CH37_LE2M_Y Plane, 2402 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

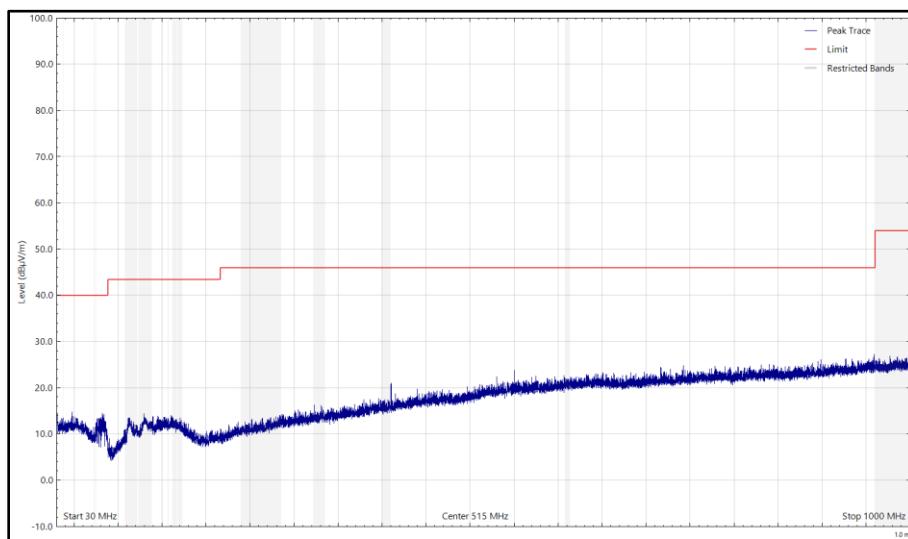


Figure 21 - CH37_LE2M_Y Plane, 2402 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

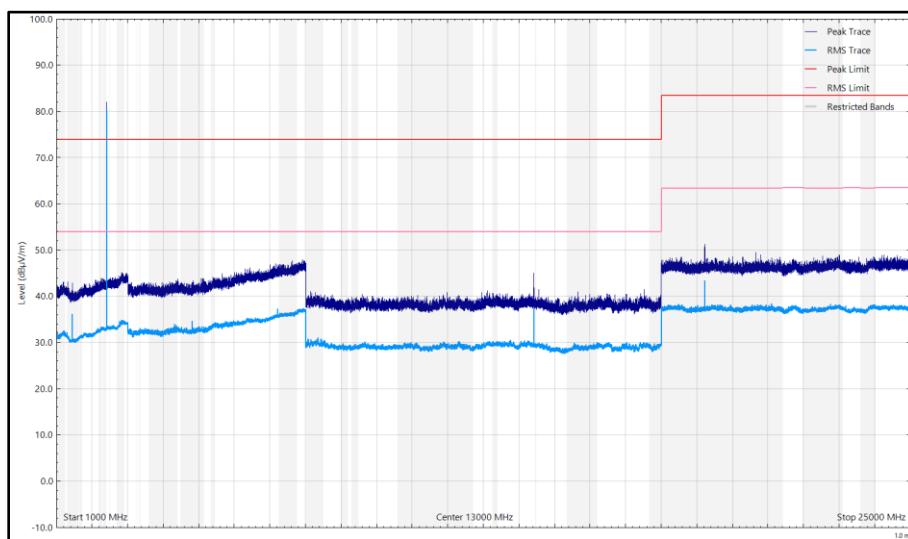


Figure 22 - CH37_LE2M_Y Plane, 2402 MHz, 1 GHz to 25 GHz, Horizontal

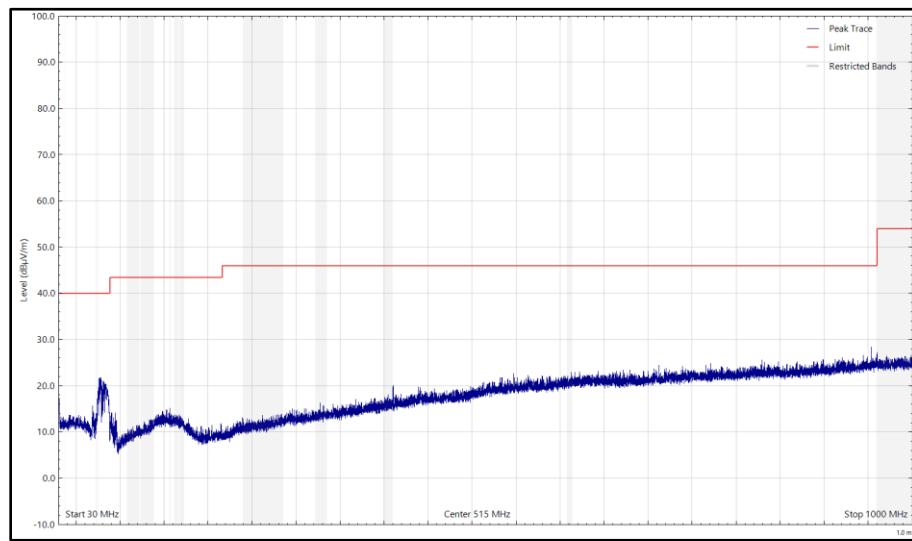


Figure 23 - CH37_LE2M_Y Plane, 2402 MHz, 30 MHz to 1 GHz, Vertical (Peak)

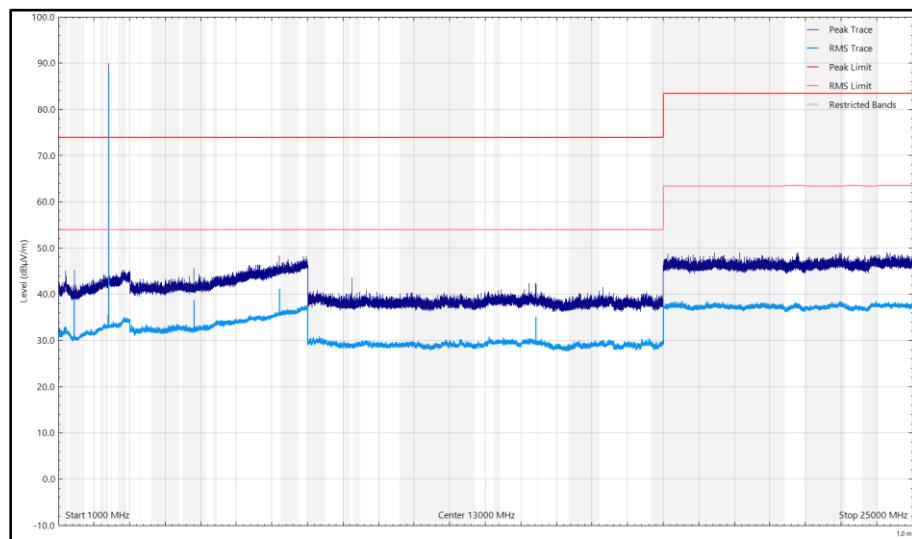


Figure 24 - CH37_LE2M_Y Plane, 2402 MHz, 1 GHz to 25 GHz, Vertical



Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 32 - CH37_LE2M_Z Plane, 2402 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

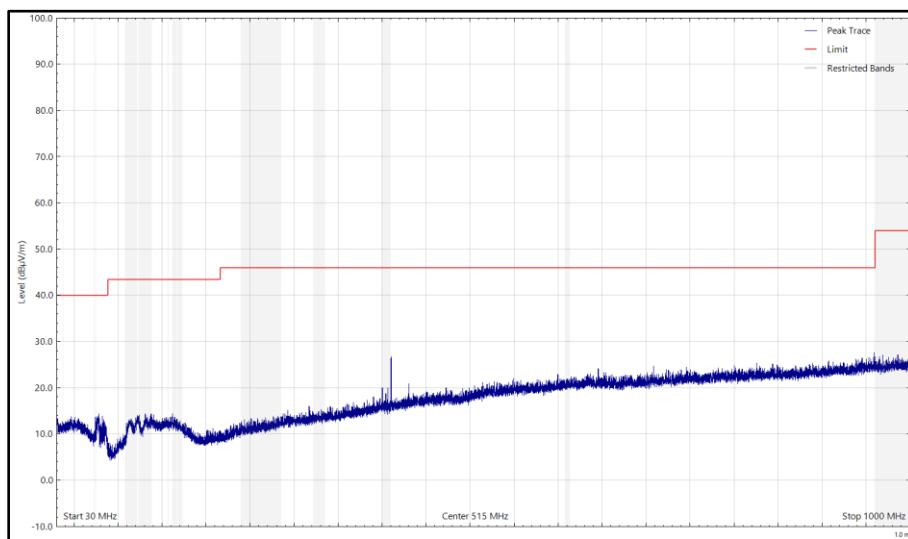


Figure 25 - CH37_LE2M_Z Plane, 2402 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

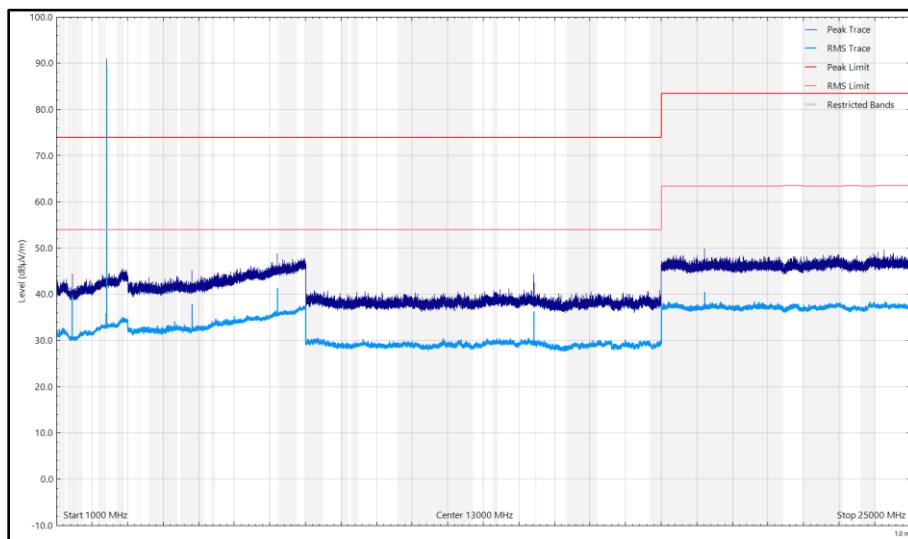


Figure 26 - CH37_LE2M_Z Plane, 2402 MHz, 1 GHz to 25 GHz, Horizontal

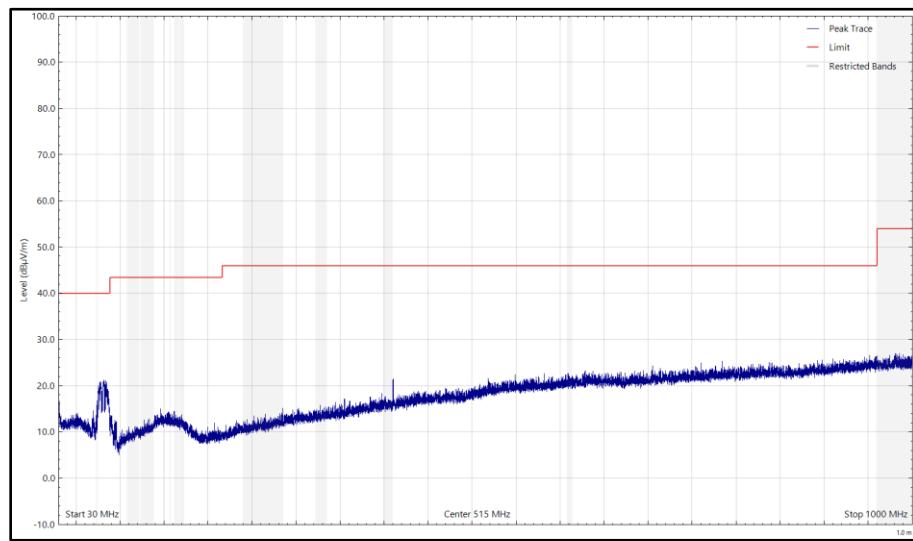


Figure 27 - CH37 LE2M_Z Plane, 2402 MHz, 30 MHz to 1 GHz, Vertical (Peak)

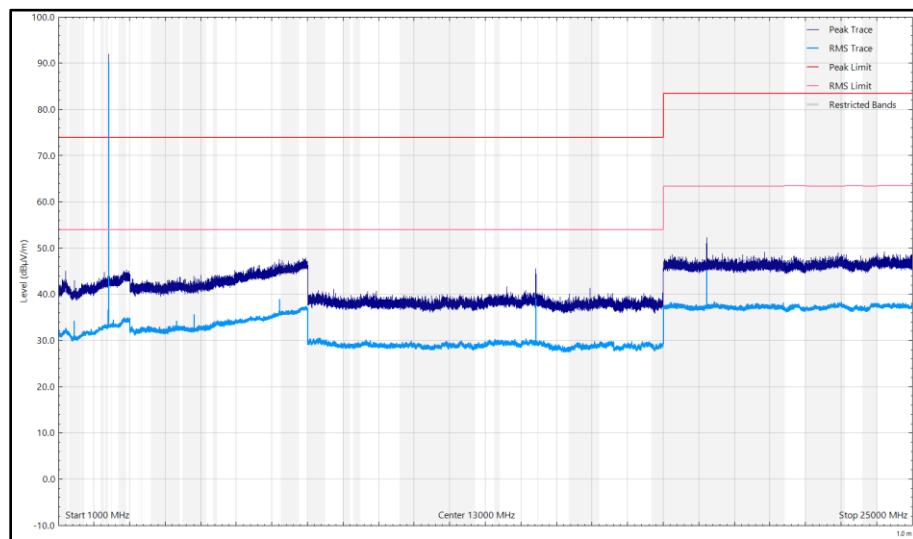


Figure 28 - CH37 LE2M_Z Plane, 2402 MHz, 1 GHz to 25 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 33 - CH17_LE2M_X Plane, 2440 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

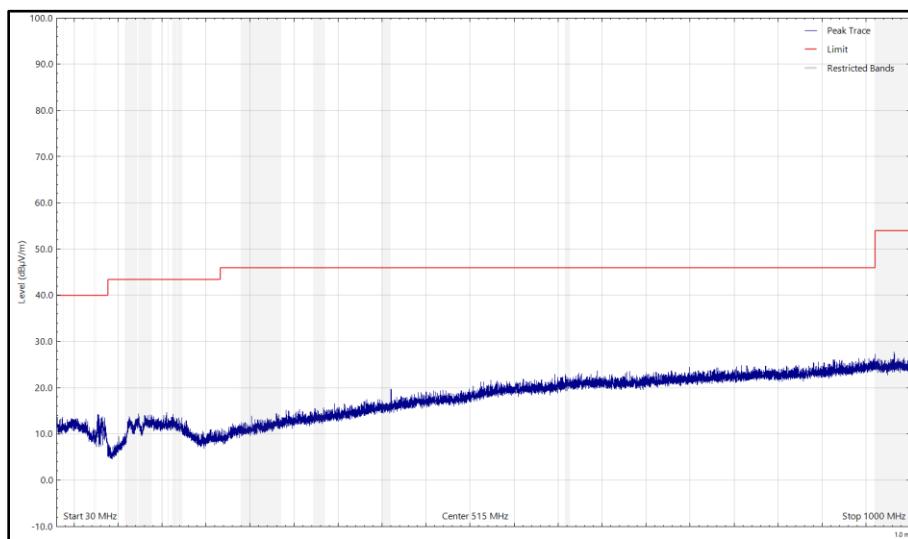


Figure 29 - CH17_LE2M_X Plane, 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

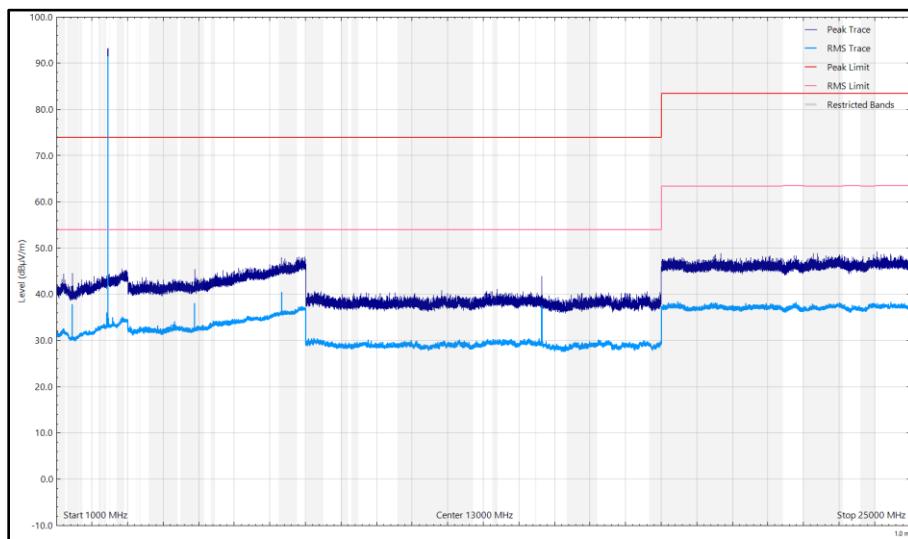


Figure 30 - CH17_LE2M_X Plane, 2440 MHz, 1 GHz to 25 GHz, Horizontal

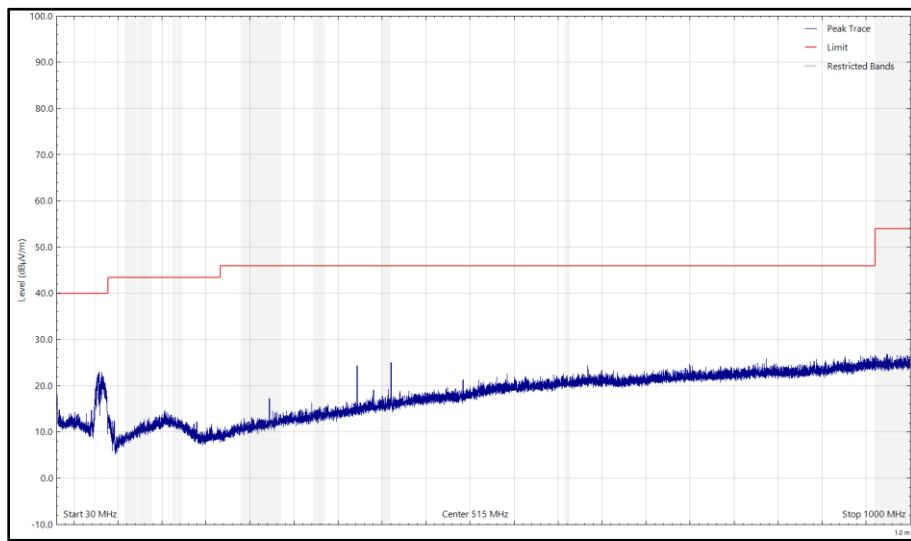


Figure 31 - CH17_X Plane, 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak)

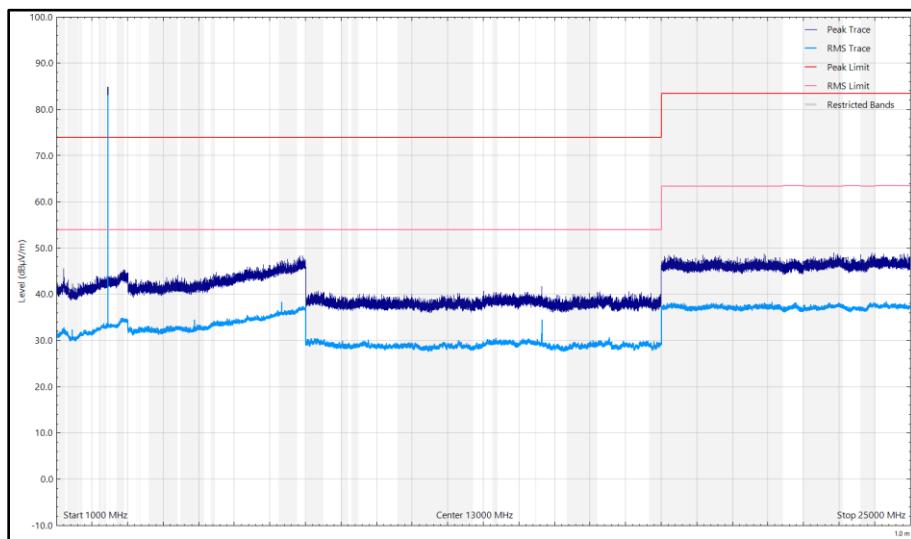


Figure 32 - CH17_X Plane, 2440 MHz, 1 GHz to 25 GHz, Vertical



Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 34 - CH17_LE2M_Y Plane, 2440 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

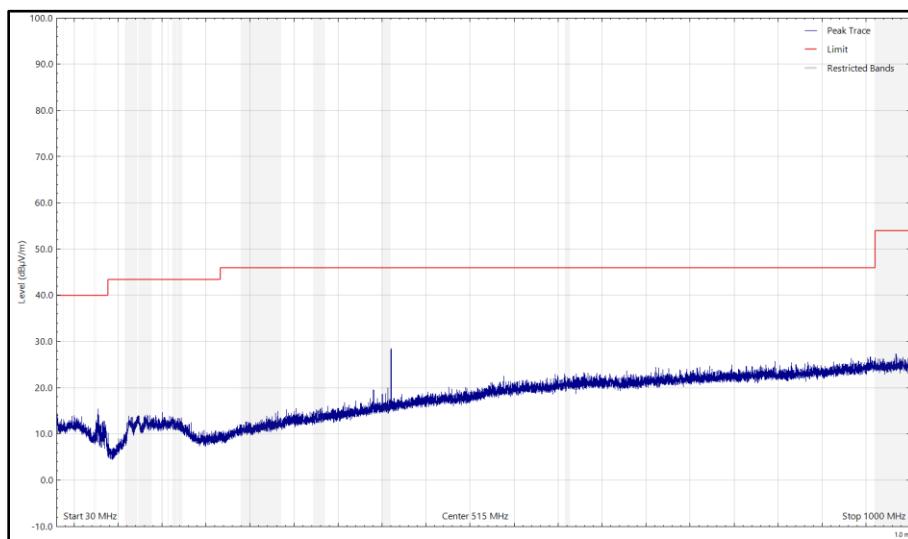


Figure 33 - CH17_LE2M_Y Plane, 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

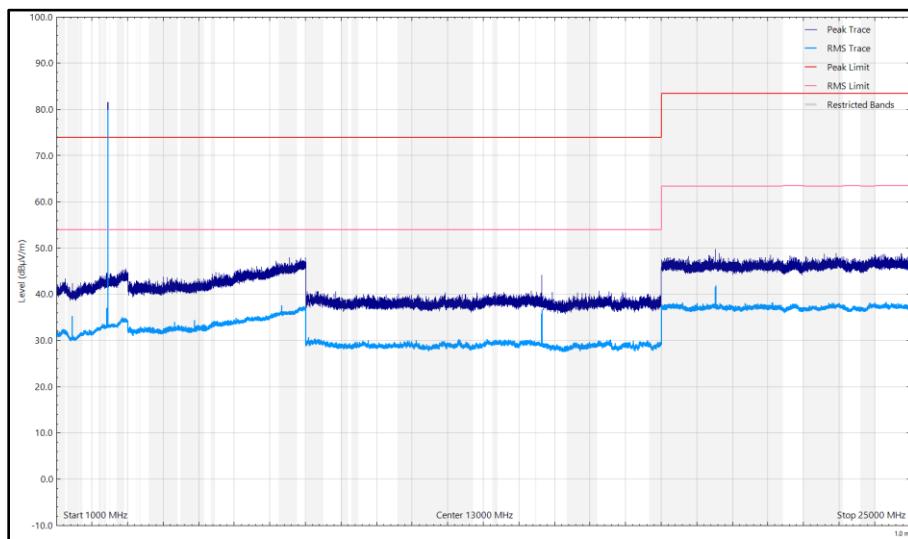


Figure 34 - CH17_LE2M_Y Plane, 2440 MHz, 1 GHz to 25 GHz, Horizontal

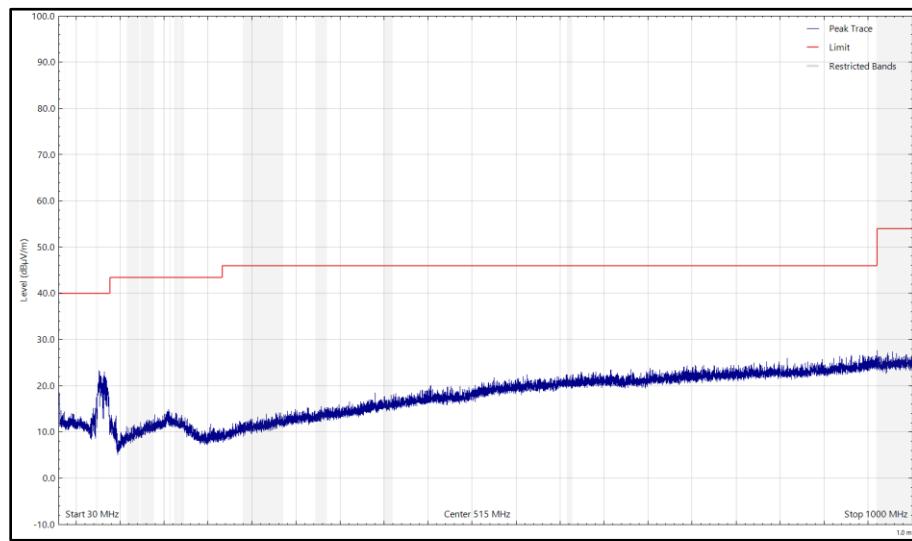


Figure 35 - CH17_LE2M_Y Plane, 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak)

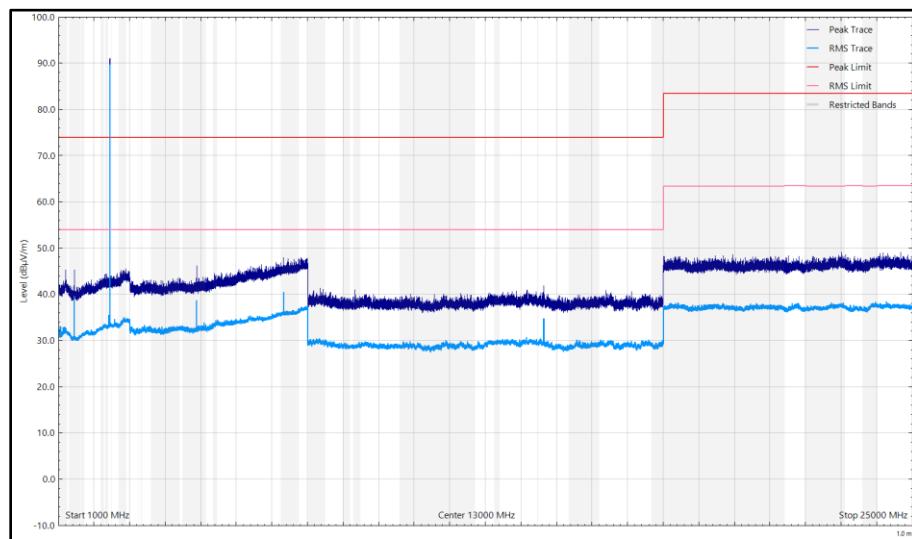


Figure 36 - CH17_LE2M_Y Plane, 2440 MHz, 1 GHz to 25 GHz, Vertical



Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 35 - CH17_LE2M_Z Plane, 2440 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

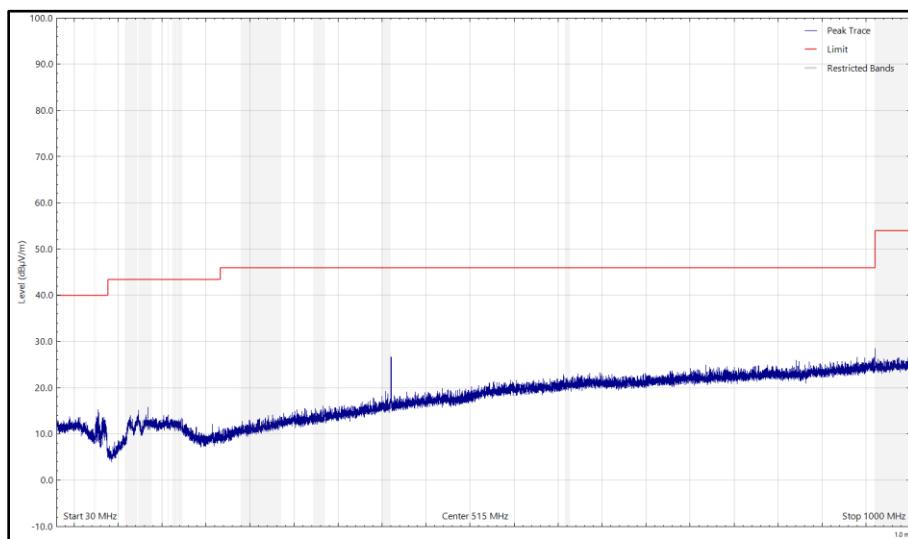


Figure 37 - CH17_LE2M_Z Plane, 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

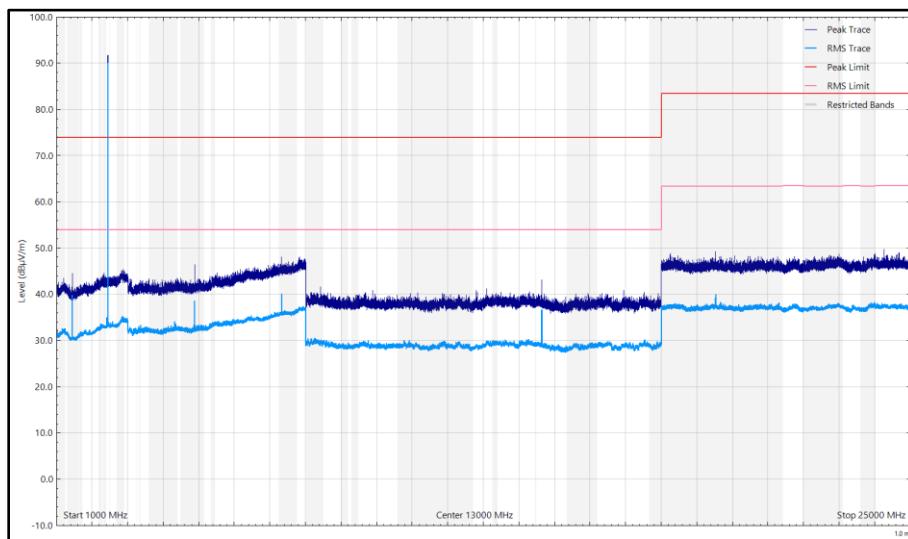


Figure 38 - CH17_LE2M_Z Plane, 2440 MHz, 1 GHz to 25 GHz, Horizontal

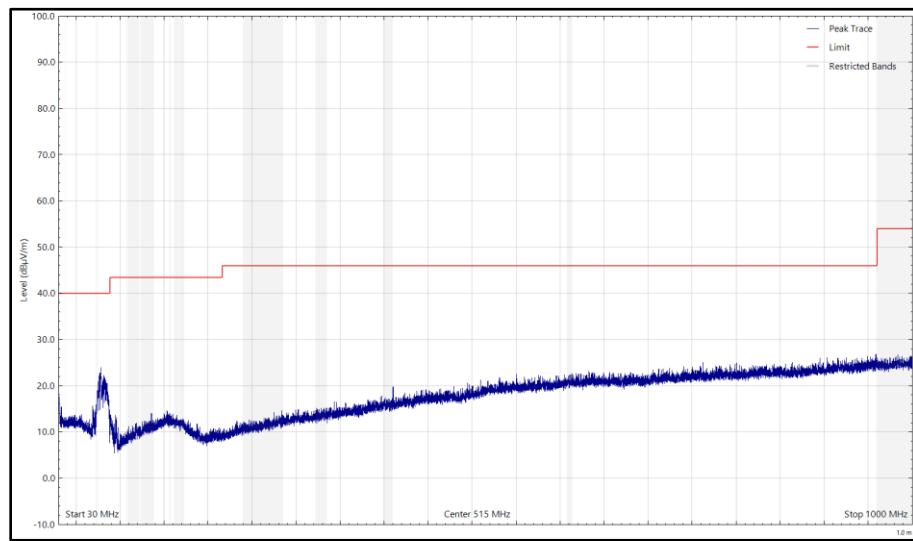


Figure 39 - CH17 LE2M_Z Plane, 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak)

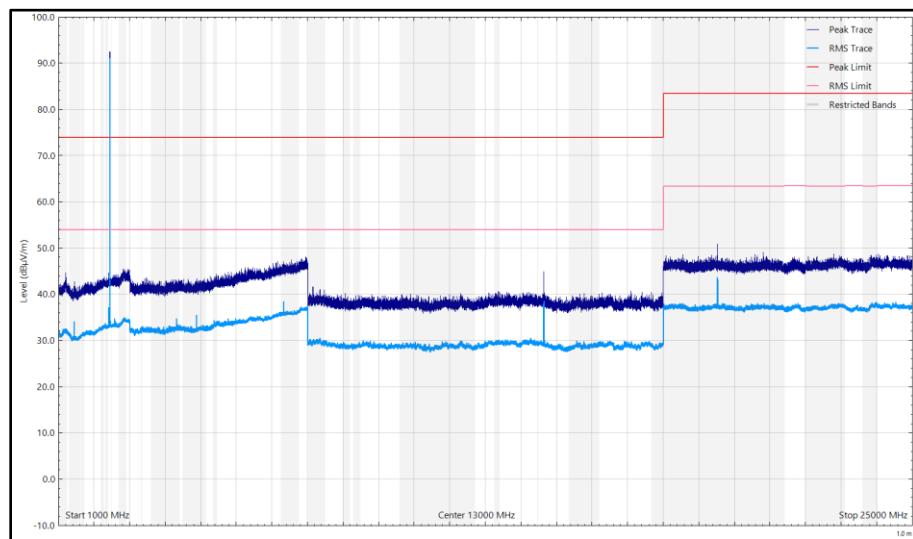


Figure 40 - CH17 LE2M_Z Plane, 2440 MHz, 1 GHz to 25 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 36 - CH39_LE2M_X Plane, 2480 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

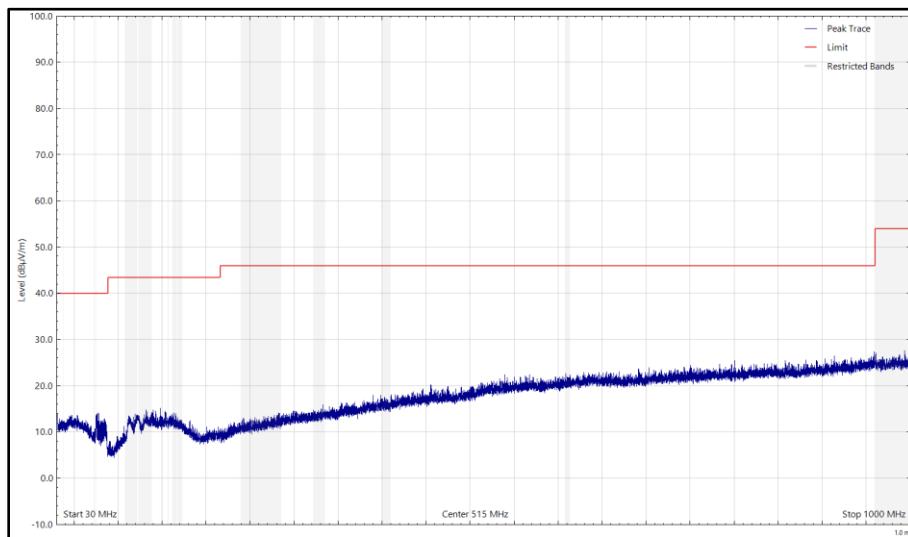


Figure 41 - CH39_LE2M_X Plane, 2480 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

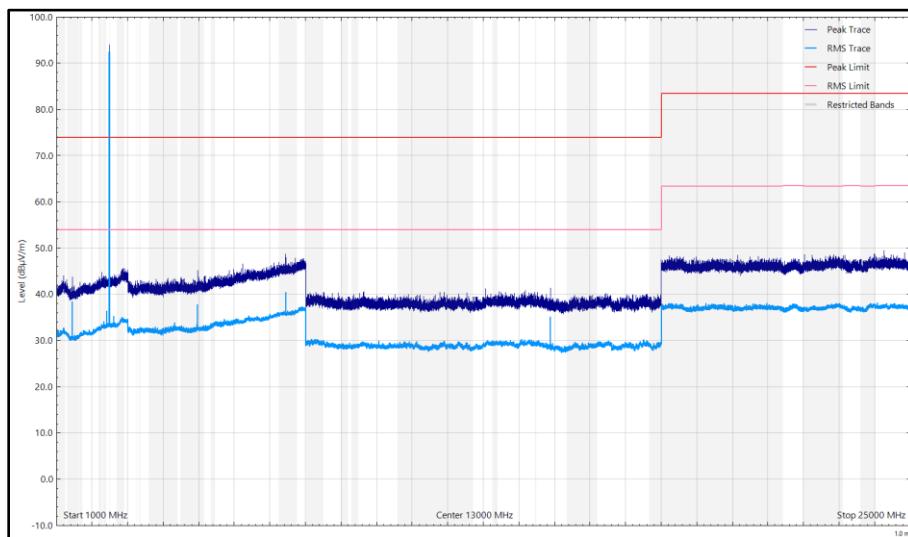


Figure 42 - CH39_LE2M_X Plane, 2480 MHz, 1 GHz to 25 GHz, Horizontal

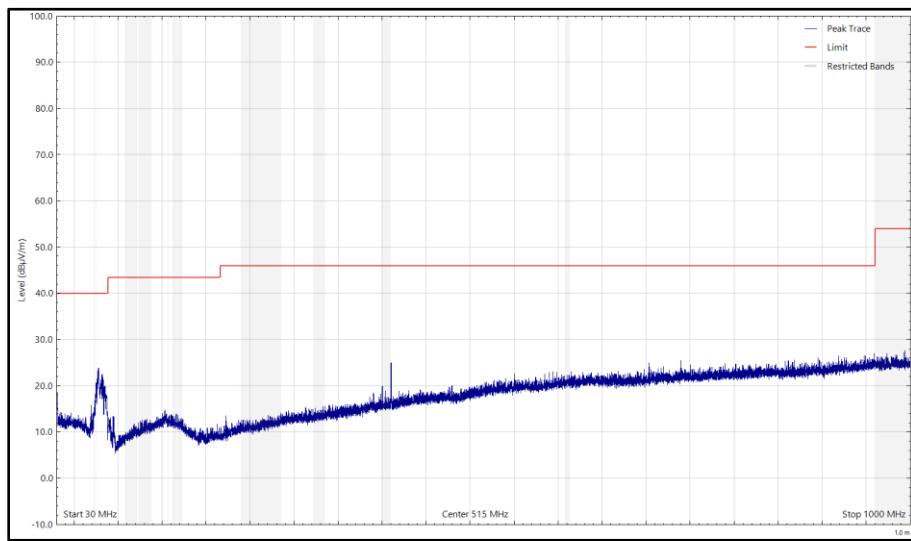


Figure 43 - CH39 LE2M_X Plane, 2480 MHz, 30 MHz to 1 GHz, Vertical (Peak)

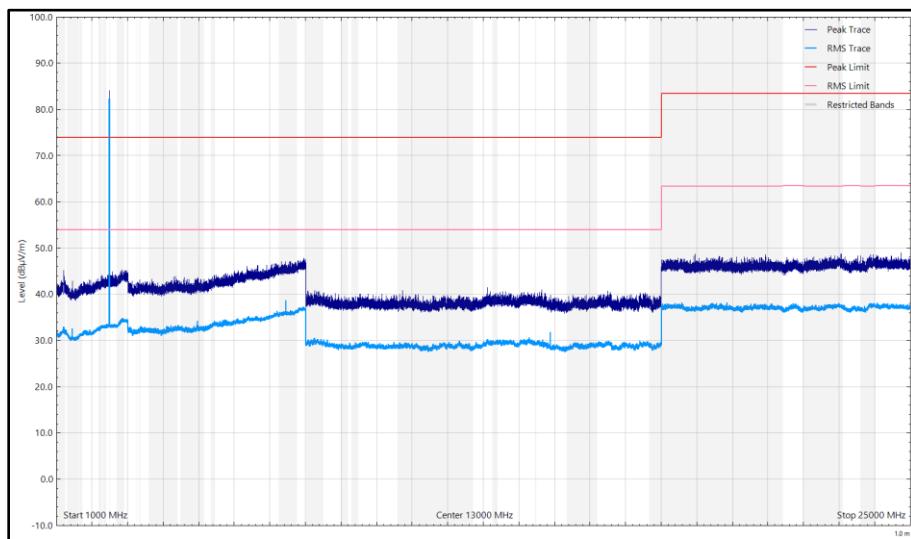


Figure 44 - CH39 LE2M_X Plane, 2480 MHz, 1 GHz to 25 GHz, Vertical



Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 37 - CH39_LE2M_Y Plane, 2480 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

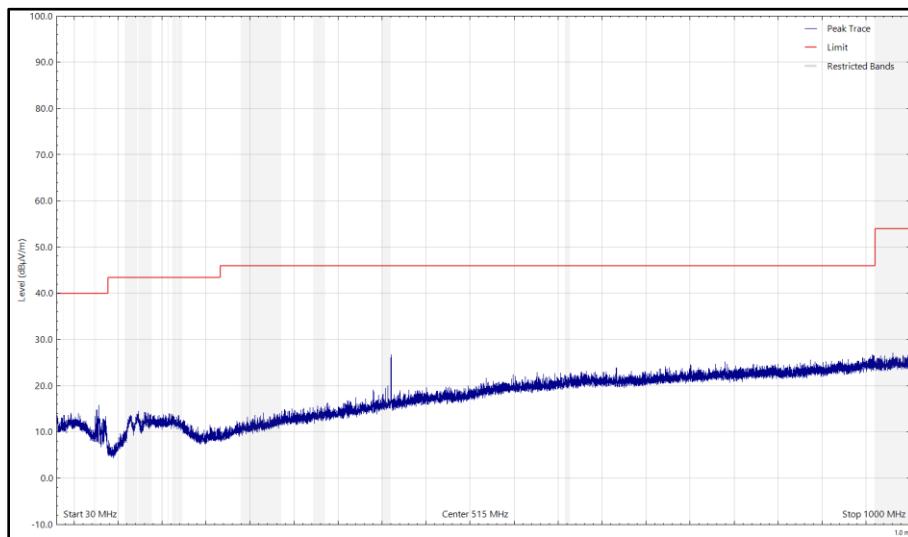


Figure 45 - CH39_LE2M_Y Plane, 2480 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

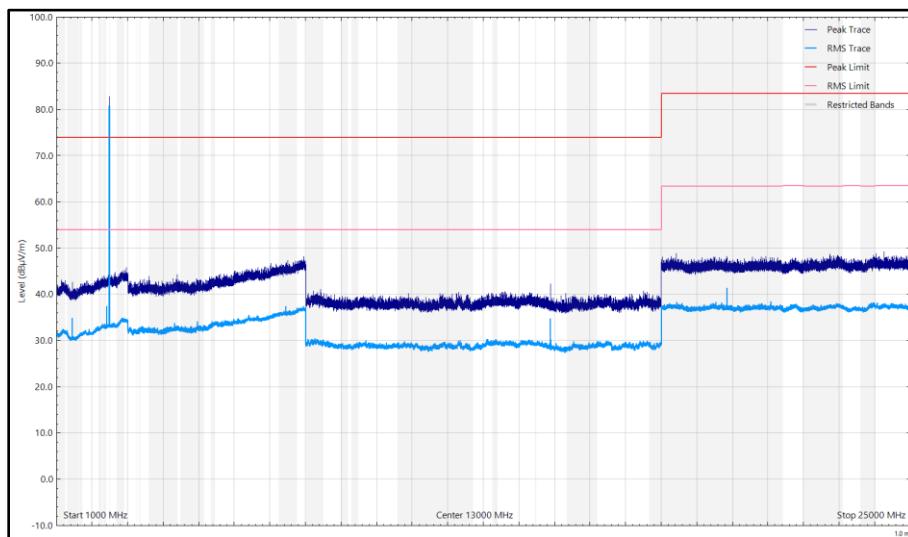


Figure 46 - CH39_LE2M_Y Plane, 2480 MHz, 1 GHz to 25 GHz, Horizontal

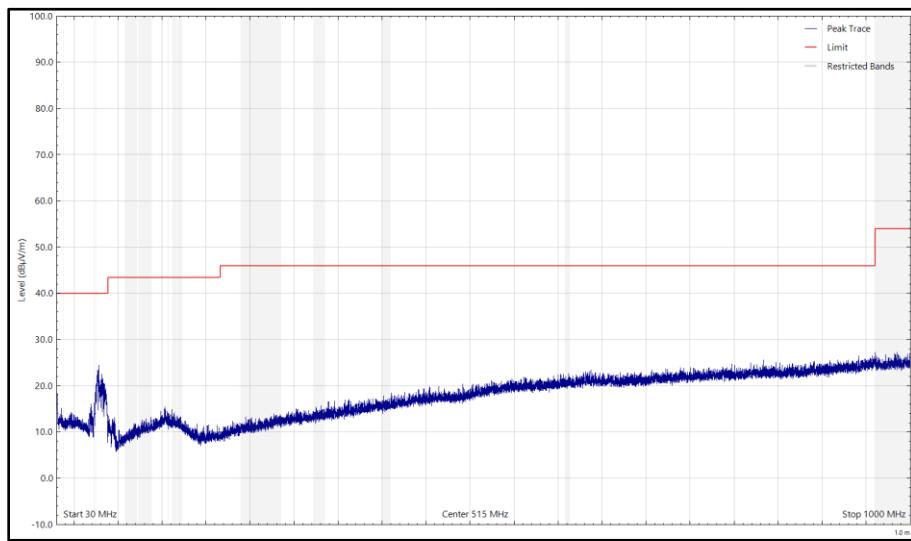


Figure 47 - CH39_LE2M_Y Plane, 2480 MHz, 30 MHz to 1 GHz, Vertical (Peak)

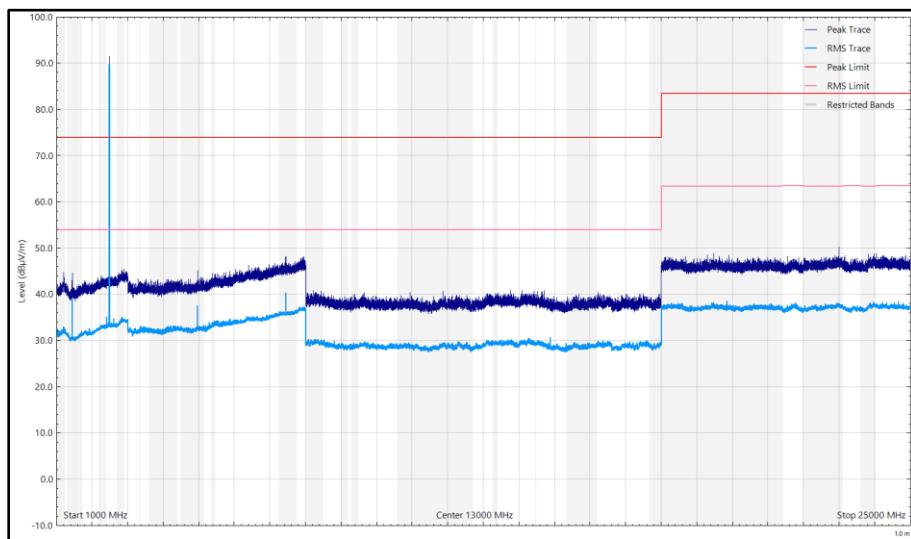


Figure 48 - CH39_LE2M_Y Plane, 2480 MHz, 1 GHz to 25 GHz, Vertical

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 38 - CH39_LE2M_Z Plane, 2480 MHz, 30 MHz to 25 GHz

*No emissions found within 10 dB of the limit.

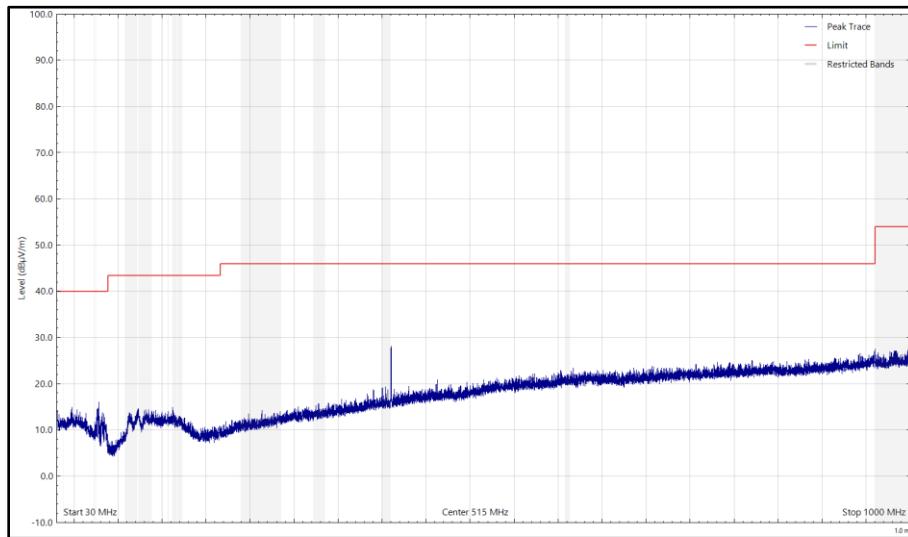


Figure 49 - CH39_LE2M_Z Plane, 2480 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

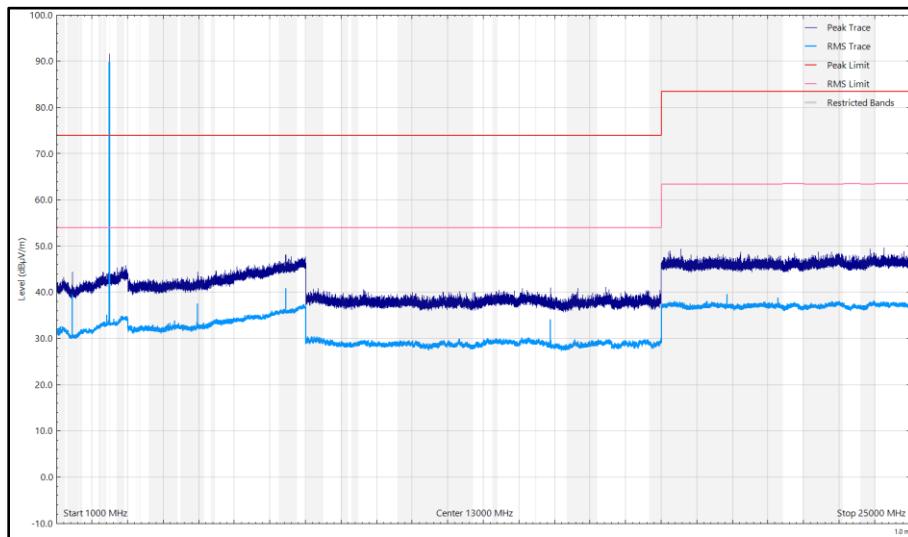


Figure 50 - CH39_LE2M_Z Plane, 2480 MHz, 1 GHz to 25 GHz, Horizontal

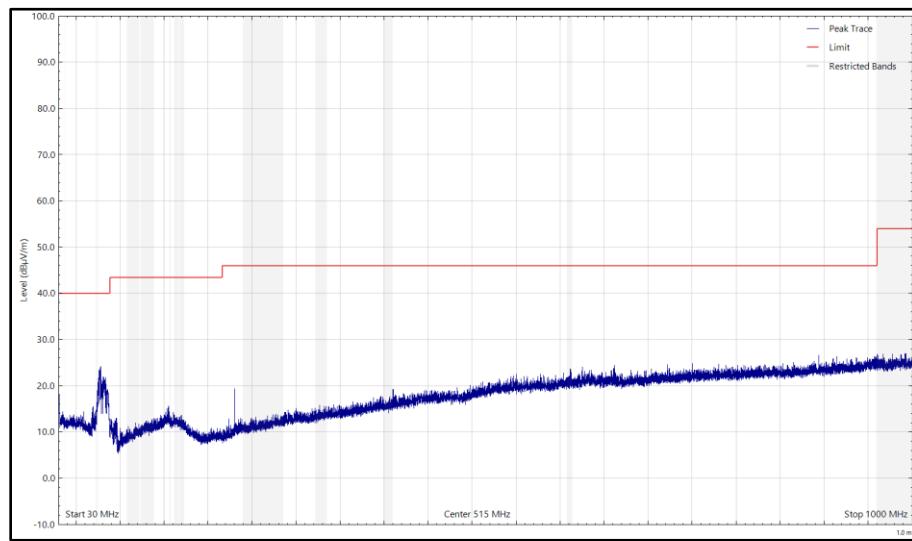


Figure 51 - CH39_LE2M_Z Plane, 2480 MHz, 30 MHz to 1 GHz, Vertical (Peak)

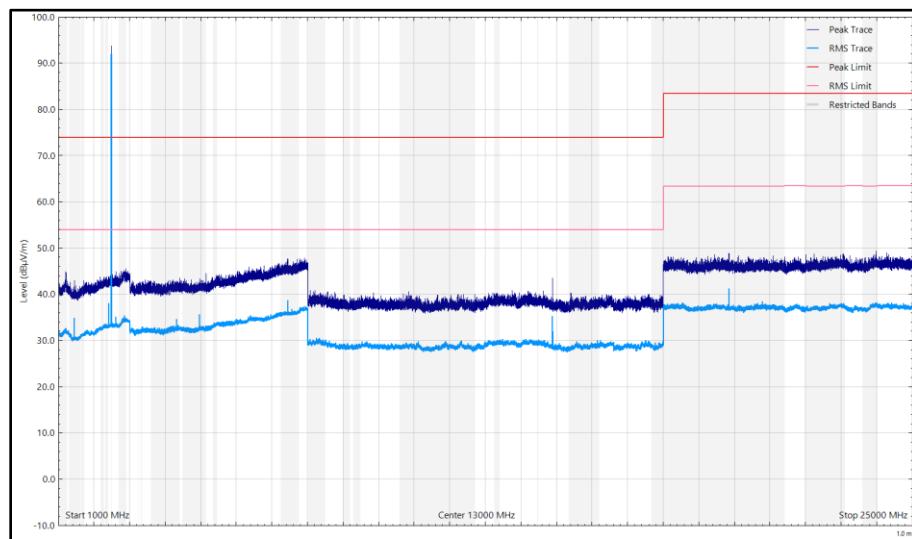


Figure 52 - CH39_LE2M_Z Plane, 2480 MHz, 1 GHz to 25 GHz, Vertical



2.4.8 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

ISED RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in RSS-GEN, clause 8.10, must also comply with the radiated emission limits specified in RSS-GEN clause 8.9.



2.4.9 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Antenna (DRG, 18 GHz to 40 GHz)	Link Microtek Ltd	AM180HA-K-TU2	230	24	08-Oct-2026
True RMS Multimeter	Fluke	79 Series III	411	12	09-Jan-2026
Pre-Amplifier (18 GHz to 40 GHz)	Phase One	PSO4-0087	1534	12	16-Aug-2025
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	02-Dec-2025
Emissions Software	TUV SUD	EmX V3.5.1	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	14-Nov-2027
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	14-Jul-2025
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5216	12	14-Jul-2025
Test Receiver	Rohde & Schwarz	ESW44	5382	12	09-Sep-2025
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	23-May-2025
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5512	12	23-May-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5547	12	29-May-2025
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5550	12	30-May-2025
Pre-Amplifier (8 GHz to 18 GHz)	Wright Technologies	APS06-0061	5595	12	28-Oct-2025
Cable (K-Type to K-Type, 2 m)	Junkosha	MWX241-02000KMSKMS/B	5934	12	20-Jun-2025
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	6635	24	13-Jun-2025
8m Cable	Scott Cables	SCB800-A-NMNM-08.00M	6714	6	06-Jun-2025

Table 39

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment



2.5 Power Spectral Density

2.5.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (e),
ISED RSS-247 Clause 5.2
ISED RSS-GEN, Clause 6.12

2.5.2 Equipment Under Test and Modification State

Moasure 2, S/N: 103852 - Modification State 0

2.5.3 Date of Test

09-April-2025

2.5.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.2.

The EUT was powered by its internal battery and connected to a support laptop via USB-C for the duration of the test.

2.5.5 Environmental Conditions

Ambient Temperature	19.2 °C
Relative Humidity	39.1 %



2.5.6 Test Results

M2 - Bluetooth Low Energy

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 1M)	Duty Cycle (%):	85.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (B)	Peak Antenna Gain (dBi):	1.00

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-	-15.07	-	-	-	8.00	-23.07
2440	3.0	-	-15.02	-	-	-	8.00	-23.02
2480	3.0	-	-15.55	-	-	-	8.00	-23.55

Table 40 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 2M)	Duty Cycle (%):	57.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (B)	Peak Antenna Gain (dBi):	1.00

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-	-17.74	-	-	-	8.00	-25.74
2440	3.0	-	-17.47	-	-	-	8.00	-25.47
2480	3.0	-	-17.51	-	-	-	8.00	-25.51

Table 41 - Maximum Power Spectral Density Results



2.5.7 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

ISED RSS-247, Limit Clause 5.2(b)

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

2.5.8 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	2891	12	02-Dec-2025
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	18-Sep-2025
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	18-Sep-2025
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU0_01	6350	12	02-Aug-2025
SCU Cable Assembly	TUV SUD	SPECTRUM_SCU-CA	6639	12	02-Aug-2025

Table 42



2.6 Restricted Band Edges

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
ISED RSS-247 Clause 3.3
ISED RSS-GEN, Clause 8.10

2.6.2 Equipment Under Test and Modification State

Moasure 2, S/N: 103852 - Modification State 0

2.6.3 Date of Test

07-April-2025

2.6.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.10.5 and 11.12.1.

The EUT was powered by a USB connection from a Laptop.

The Worst-case mode for the Band-edge measured were in accordance with ANSI 63.10 Clause 5.6.2.2.

Testing was carried out on LE2M only as this represented the worst case for Band Edge measurements. The output power of both LE1M and LE2M modes was different by <0.2 dB, (see section 2.3.6), however, the signal bandwidth is double, (see section 2.2.6), with the modulation and packet type identical in both LE1M and LE2M operation modes.

Plots for average measurements were taken in accordance with ANSI C63.10, clause 11.12.2.5.2.

The following conversion can be applied to convert from dB μ V/m to μ V/m:
 $10^{(Field\ Strength\ in\ dB\mu V/m)/20}$.

2.6.5 Environmental Conditions

Ambient Temperature	21.8 °C
Relative Humidity	29.6 %



2.6.6 Test Results

M2 - Bluetooth Low Energy

Mode	Modulation	Packet Type	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
LE2M	GFSK	37 Bytes PRBS	2402	2390.0	47.01	37.17
LE2M	GFSK	37 Bytes PRBS	2480	2483.5	55.52	39.77

Table 43

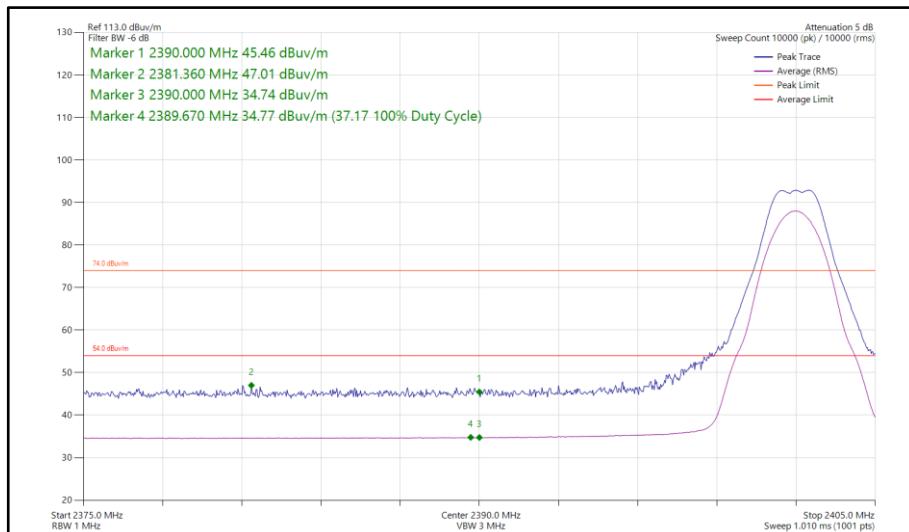


Figure 53 - CH37_LRB_LE2M, 2402 MHz, Band Edge Frequency 2390 MHz

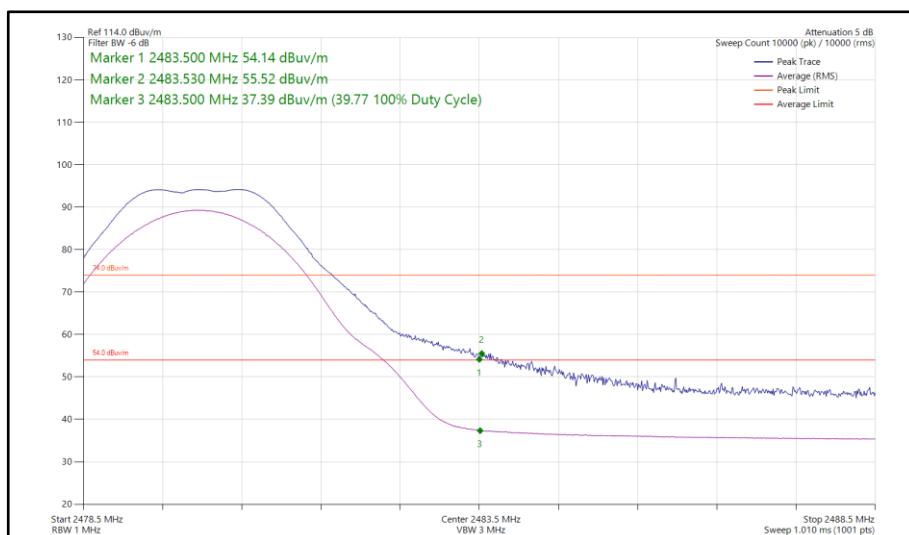


Figure 54 - CH39_URB_LE2M, 2480 MHz, Band Edge Frequency 2483.5 MHz



2.6.7 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (μ V/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 44

ISED RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (μ V/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960*	500

Table 45

*Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.



2.6.8 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	3220	12	02-Dec-2025
Emissions Software	TÜV SUD	EmX V3.5.1	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	14-Nov-2027
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	14-Jul-2025
Test Receiver	Rohde & Schwarz	ESW44	5382	12	09-Sep-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
8m Cable	Scott Cables	SCB800-A-NMNM-08.00M	6714	6	06-Jun-2025

Table 46

TU - Traceability Unscheduled



2.7 Authorised Band Edges

2.7.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d),
ISED RSS-247 Clause 5.5
ISED RSS-GEN, Clause N/A

2.7.2 Equipment Under Test and Modification State

Moasure 2, S/N: 103852 - Modification State 0

2.7.3 Date of Test

07-April-2025

2.7.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.10.4.

The EUT was powered by a USB connection from a Laptop.

The Worst-case mode for the Band-edge measured were in accordance with ANSI 63.10 Clause 5.6.2.2.

Testing was carried out on LE2M only as this represented the worst case for Band Edge measurements. The output power of both LE1M and LE2M modes was different by <0.2 dB, (see section 2.3.6), however, the signal bandwidth is double, (see section 2.2.6), with the modulation and packet type identical in both LE1M and LE2M operation modes.

2.7.5 Environmental Conditions

Ambient Temperature	21.8 °C
Relative Humidity	29.6 %



2.7.6 Test Results

M2 - Bluetooth Low Energy

Mode	Modulation	Packet Type	Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
LE2M	GFSK	37 Bytes PRBS	2402	2400.0	33.24
LE2M	GFSK	37 Bytes PRBS	2480	2483.5	54.38

Table 47

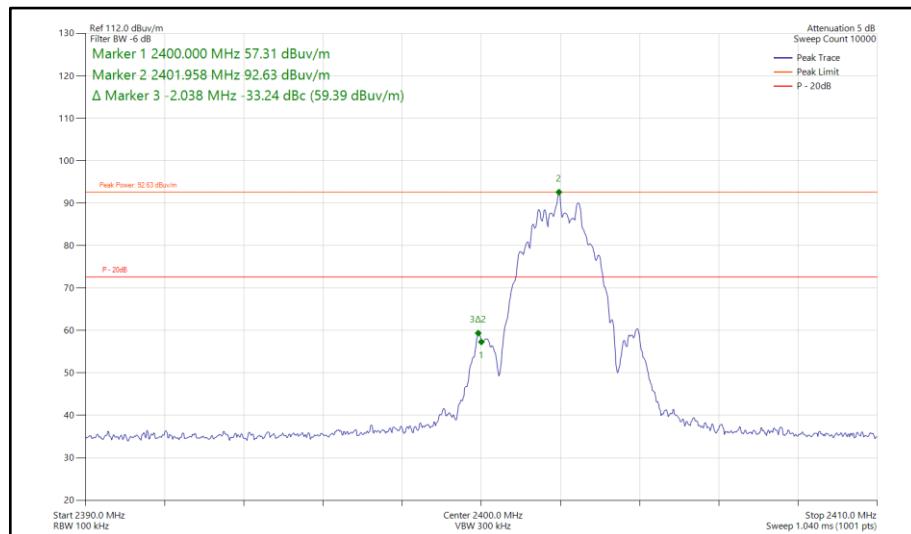


Figure 55 - CH37_LBE_LE2M, 2402 MHz, Band Edge Frequency 2400 MHz

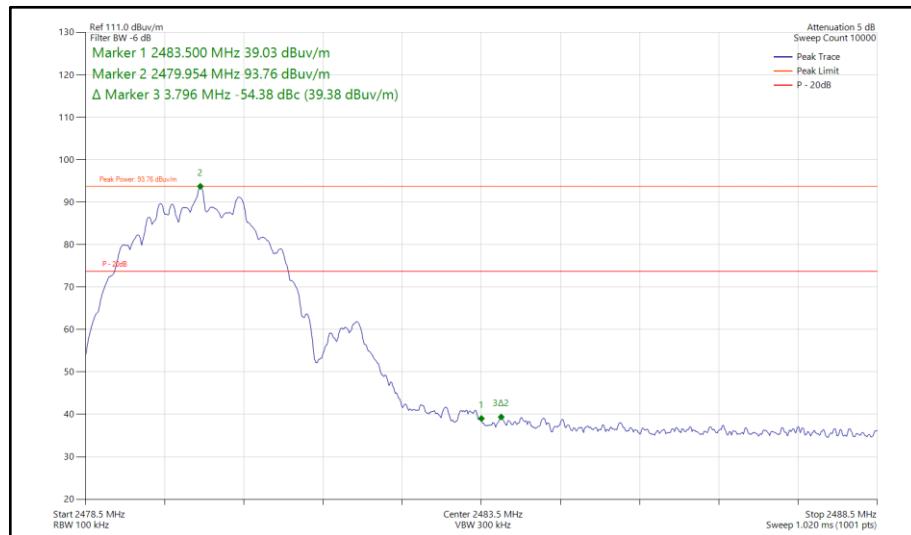


Figure 56 - CH39_UBE_LE2M, 2480 MHz, Band Edge Frequency 2483.5 MHz



2.7.7 Specification Limits

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

ISED RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

2.7.8 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Hygrometer	Rotronic	I-1000	3220	12	02-Dec-2025
Emissions Software	TUV SUD	EmX V3.5.1	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	14-Nov-2027
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	14-Jul-2025
Test Receiver	Rohde & Schwarz	ESW44	5382	12	09-Sep-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
8m Cable	Scott Cables	SCB800-A-NMNM-08.00M	6714	6	06-Jun-2025

Table 48

TU - Traceability Unscheduled

3 Photographs

3.1 Test Setup Photographs

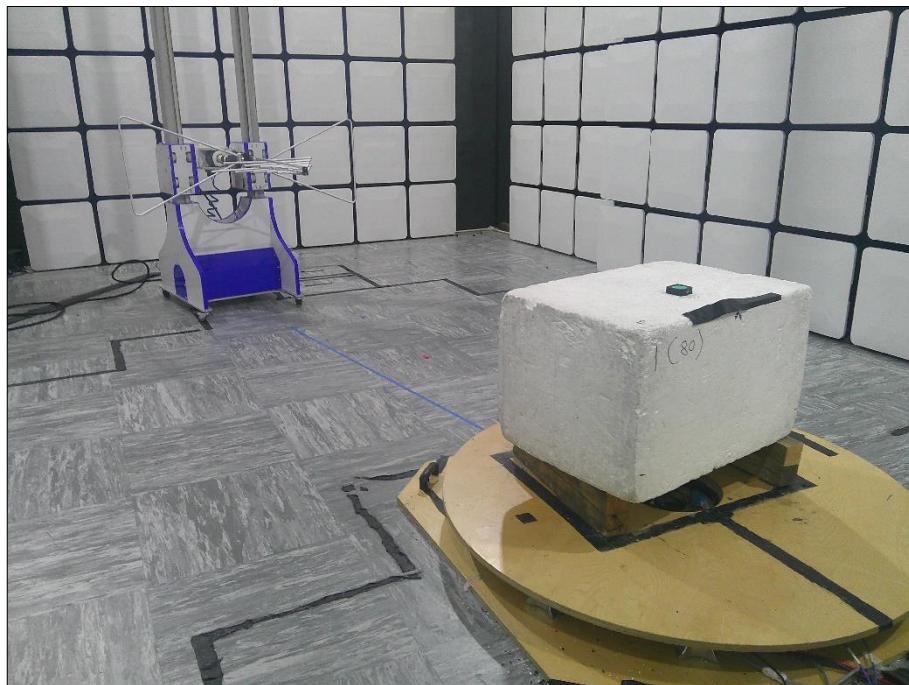


Figure 57 - Test Setup - 30 MHz to 1 GHz X Plane



Figure 58 - Test Setup - 30 MHz to 1 GHz Y Plane

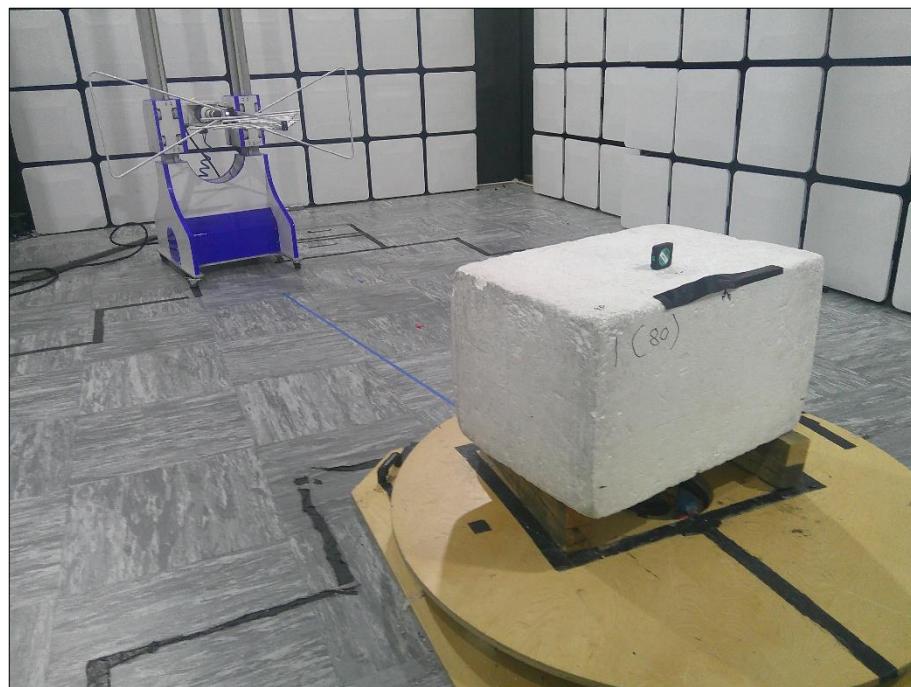


Figure 59 - Test Setup - 30 MHz to 1 GHz Z Plane

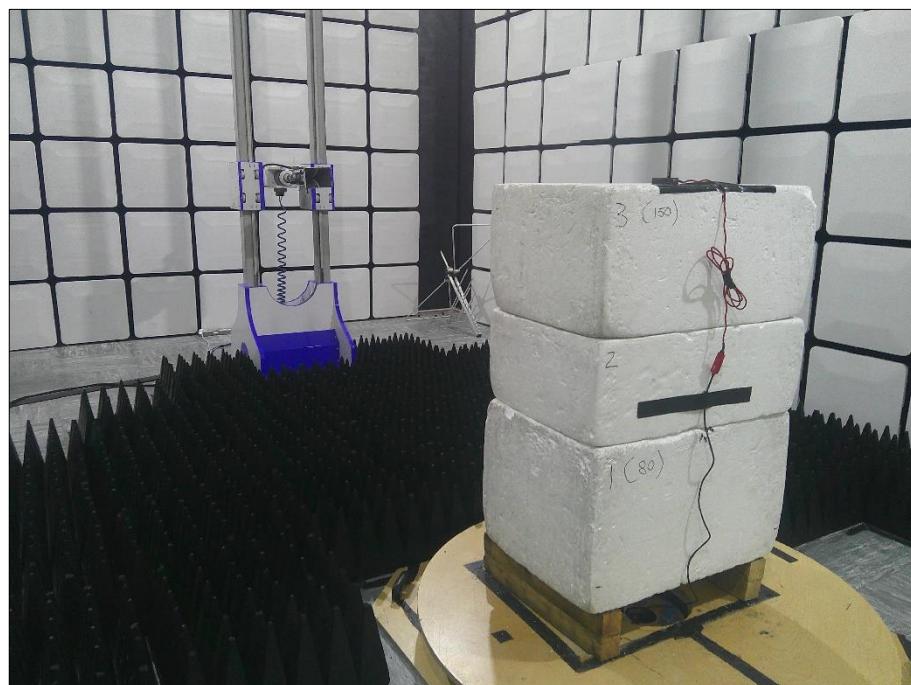


Figure 60 - Test Setup - 1 GHz to 8 GHz X Plane



Figure 61 - Test Setup - 1 GHz to 8 GHz Y Plane

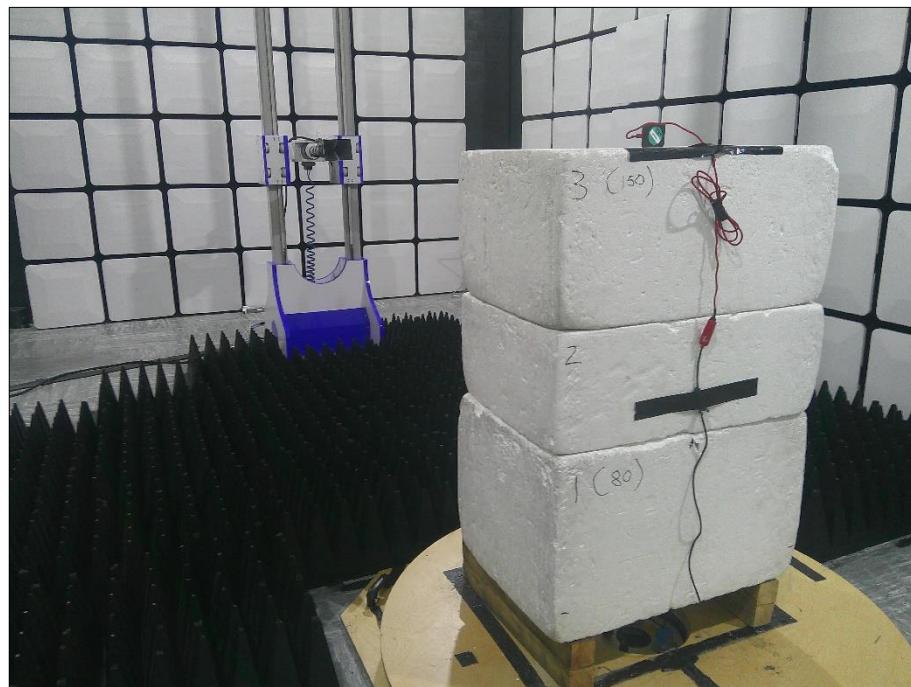


Figure 62 - Test Setup - 1 GHz to 8 GHz Z Plane

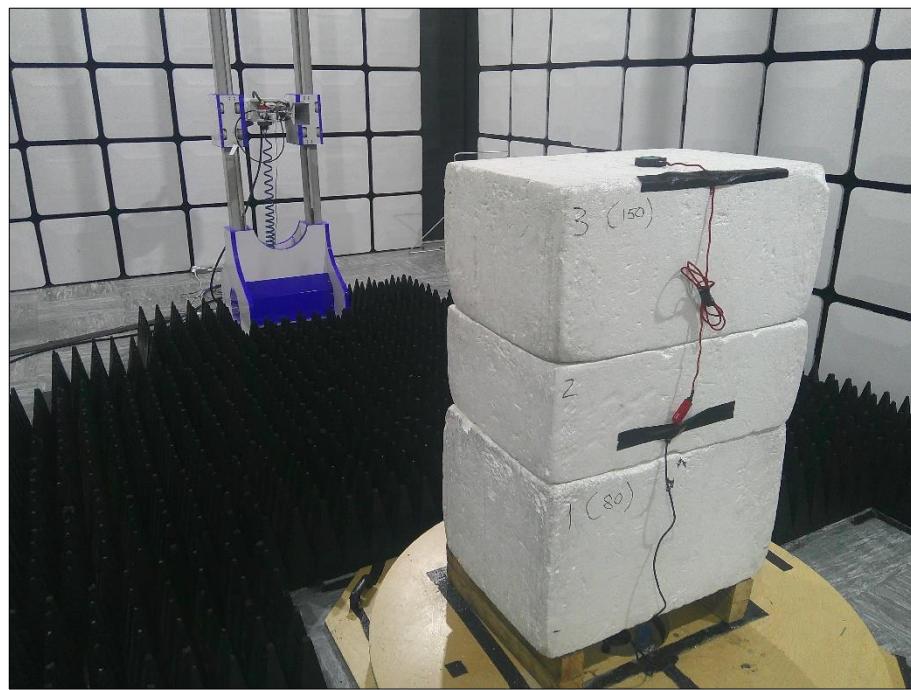


Figure 63 - Test Setup - 8 GHz to 18 GHz X Plane

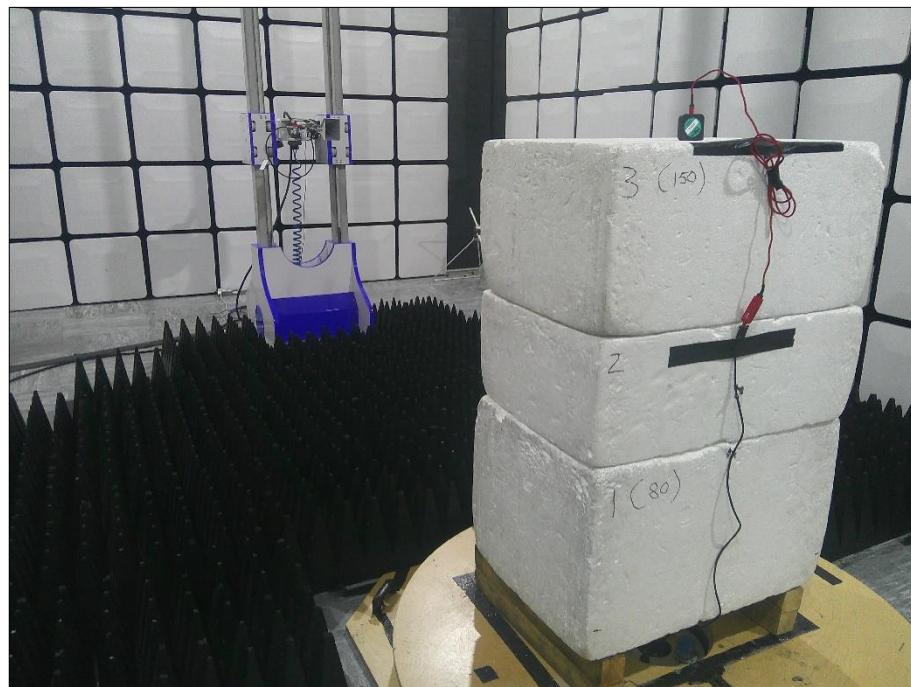


Figure 64 - Test Setup - 8 GHz to 18 GHz Y Plane

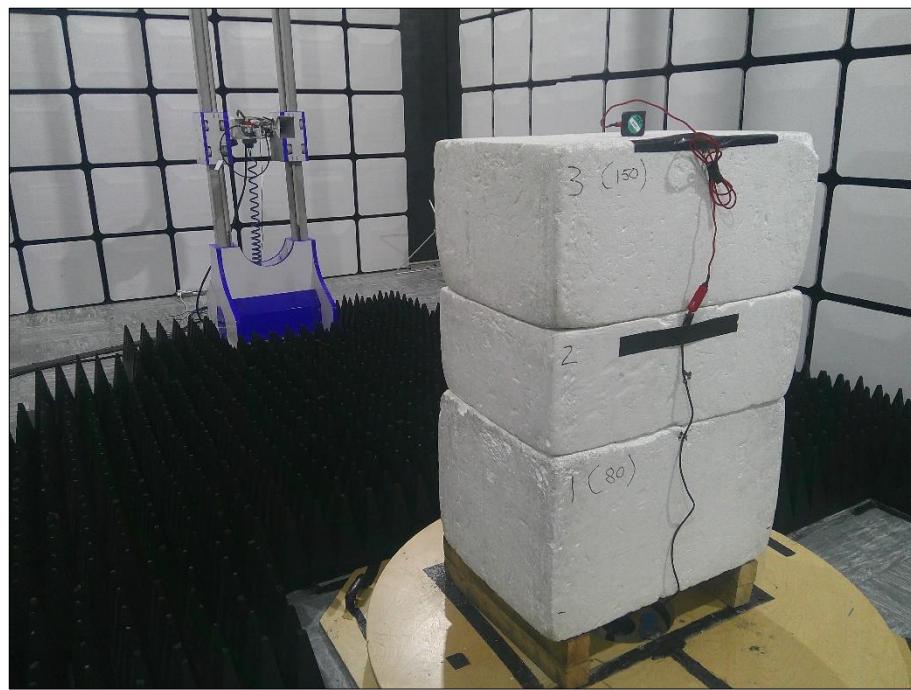


Figure 65 - Test Setup - 8 GHz to 18 GHz Z Plane

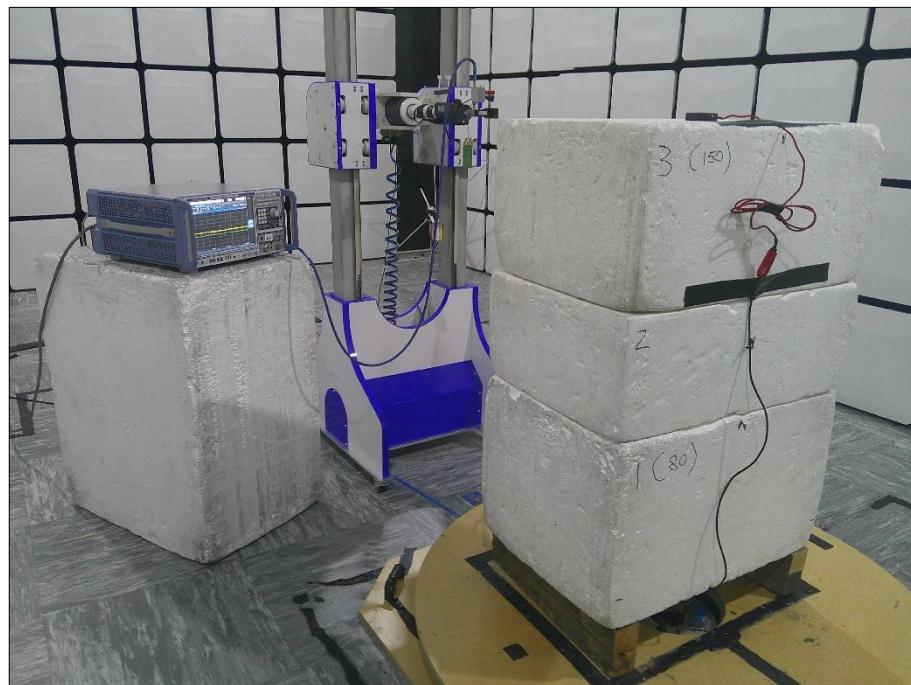


Figure 66 - Test Setup - 18 GHz to 25 GHz X Plane

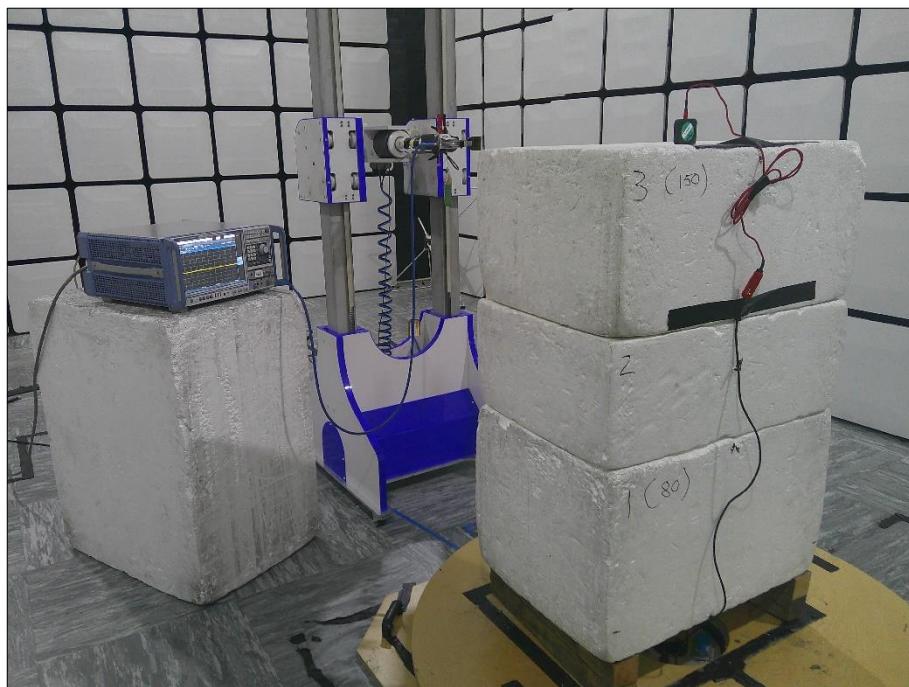


Figure 67 - Test Setup - 18 GHz to 25 GHz Y Plane



Figure 68 - Test Setup - 18 GHz to 25 GHz Z Plane



4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Emission Bandwidth	± 30.43 kHz
Maximum Conducted Output Power	± 0.65 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Power Spectral Density	± 1.00 dB
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Authorised Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 49

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.