

FCC and ISED Test Report Silicon Laboratories Finland Oy

Main Model: SiW917Y1GA
Series Model: SiW917Y1GN

In accordance with FCC 47 CFR Part 15C, ISED
RSS-247 and ISED RSS-GEN
(2.4 GHz Bluetooth Low Energy)



Prepared for: Silicon Laboratories Finland Oy
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FCC ID: QOQ-917AC IC: 5123A-917AC

COMMERCIAL-IN-CONFIDENCE

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SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	05 September 2024

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	Ahmad Javid	05 September 2024	
	Pier-Angelo Lorusso	05 September 2024	
	Thomas Biddlecombe	05 September 2024	

FCC Accreditation

492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation

12669A 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: 2022, ISED RSS-247: Issue 3 (08-2023) and ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3.



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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	02-Sept-2024
2	Duty Cycle figure amendment	05-Sept-2024

Table 1

1.2 Introduction

Applicant	Silicon Laboratories Finland Oy
Manufacturer	Silicon Laboratories Finland Oy
Model Number(s)	Main Model: SiW917Y1GA Series Model: SiW917Y1GN
Serial Number(s)	BLE MAC address: D4:48:67:DD:D7:30 BLE MAC address: D4:48:67:DD:D6:87
Hardware Version(s)	1.0
Software Version(s)	Stack's "Connectivity Firmware" version 2.12.1.0.0.1
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2022 ISED RSS-247: Issue 3 (08-2023) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	PTP ~ 6000530772
Date	08-March-2024
Date of Receipt of EUT	20-May-2024
Start of Test	22-May-2024
Finish of Test	05-June-2024
Name of Engineer(s)	Ahmad Javid, Pier-Angelo Lorusso and Thomas Biddlecombe
Related Document(s)	ANSI C63.10 (2020) ANSI C63.10 (2013)



1.3 Brief Summary of Results

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

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-247	RSS-GEN			
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - PCB Trace Antenna (SiW917Y1GA)						
2.1	15.209 & 15.247 (d)	3.3 & 5.5	6.13 & 8.9	Spurious Radiated Emissions	Pass	
2.5	15.205	3.3	8.10	Restricted Band Edges	Pass	
2.6	15.247 (d)	5.5	-	Authorised Band Edges	Pass	
	15.203	-	-	Antenna Requirement	N/T	The device complies with the provisions of this section as it uses permanently attached integral antennas.
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna (SiW917Y1GN)						
2.1	15.209 & 15.247 (d)	3.3 & 5.5	6.13 & 8.9	Spurious Radiated Emissions	Pass	
2.5	15.205	3.3	8.10	Restricted Band Edges	Pass	
2.6	15.247 (d)	5.5	-	Authorised Band Edges	Pass	
	15.203	-	-	Antenna Requirement	N/T	The device complies with the provisions of this section as it comes with an unique connector in the form of an RF pad
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - Conducted Tests (SiW917Y1GN)						
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 (e)	5.2	6.12	Power Spectral Density	Pass	

Table 2

Note: For conducted testing, antenna gain was taken as 2.80 dBi as per the ANT-2.4-CW-CT-SMA/RPS Antenna as this is the highest gain antenna.



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>		Bluetooth Low Energy (LE), and Wi-Fi 802.11b/g/n/ax wireless radio module	
Legal Manufacturer (Technology Owner):		Silicon Laboratories Finland Oy	
Model name(s):		Main Model: SiW917Y1GA (with integral antenna) Series Model: SiW917Y1GN (with no integral antenna but RF pin)	
Brand Name:		SILICON LABS	
Hardware Version:		1.0	
Software Version:		Connectivity Firmware (runs the wireless stacks): 2.12.1.0.0.1	
FCC ID of the product under test – see guidance here		QOQ-917AC	
IC ID of the product under test – see guidance here		5123A-917AC	
Device Category	Mobile ☒	Portable ☒	Fixed ☐
Equipment is fitted with an Audio Low Pass Filter		Yes ☐	No ☒

Table 3



Intentional Radiators

Technology	Bluetooth Low Energy	Wi-Fi 802.11b	Wi-Fi 802.11g	Wi-Fi 802.11n	Wi-Fi 802.11ax
Frequency Range (MHz to MHz)	2402-2480 MHz	2412-2462 MHz			
Conducted Declared Output Power (dBm)	Max: 16	Max: 20			Max: 18
Antenna Gain (dBi)	Integral Antenna: 2.26 External Reference Dipole Antenna (1/2 Wave Whip 2.4GHz RPS): 2.80				
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	1MBaud PHYs: 1 2MBaud PHY: 2	20			
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	GFSK	DSSS / CCK	OFDM (Orthogonal Frequency Division Multiplexing) / Subcarriers: BPSK, QPSK, 16-QAM or 64-QAM / Up to MCS7		OFDMA (Orthogonal frequency-division multiple access) / Subcarriers: BPSK, QPSK, 16-QAM or 64-QAM / Up to MCS7
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)					
Bottom Frequency (MHz)	Adv mode: 2402 Data mode: 2404	2412			
Middle Frequency (MHz)	Data mode: 2440	2437			
Top Frequency (MHz)	Adv mode: 2480 Data mode: 2478	2462			

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	180 MHz (embedded MCU clock, for ARM® Cortex® M4 core) 40 MHz (module's on-board crystal, for radio portion)
Lowest frequency generated or used in the device or on which the device operates or tunes	
Class A Digital Device (Use in commercial, industrial or business environment) ☒	
Class B Digital Device (Use in residential environment only) ☒	

Table 5

AC Power Source

AC supply frequency:		Hz
Voltage		V
Max current:		A
Single Phase ☐ Three Phase ☐		

Table 6



DC Power Source

Nominal voltage:	3.3	V
Extreme upper voltage:	3.63	V
Extreme lower voltage:	3.0	V
Max current:	400	mA

Table 7

Battery Power Source

Voltage:		V
End-point voltage:		V (Point at which the battery will terminate)
Alkaline ☐ Leclanche ☐ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ *(Vehicle regulated)		
Other ☐	Please detail:	

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☐
---	--

Table 9

Temperature

Minimum temperature:	-40	°C
Maximum temperature:	+85	°C

Table 10

Cable Loss

Adapter Cable Loss (Conducted sample)	0.5 (u.FL and SMA connectors, plus coax cable, for external reference dipole antenna)	dB
--	--	----

Table 11



Antenna Characteristics

Antenna connector ☐			State impedance		Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒	Type:	PCB Trace	Gain	2.26	dBi
External antenna ☒	Type:	Dipole, 1/2 Wave Whip, 2.4GHz, RPS (reference only, not sold with module)	Gain	2.80	dBi
For external antenna only: Standard Antenna Jack ☐ If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed ☐ Non-standard Antenna Jack / RF Pin ☒ 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)

Legal Manufacturer (Technology Owner):	Silicon Laboratories Finland Oy	Brand Name:	SILICON LABS
Model(s):	Main Model: SiW917Y1GA (with integral antenna) Series Model: SiW917Y1GN (with no integral antenna but RF pin)	Country of Origin:	China

Table 13

Data in the tables above is provided by the Manufacturer



1.5 Product Information

1.5.1 Technical Description

Bluetooth Low Energy (LE), and Wi-Fi 802.11b/g/n/ax wireless radio module.

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: SiW917Y1GA, Serial Number: BLE MAC address: D4:48:67:DD:D6:87			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: SiW917Y1GN, Serial Number: BLE MAC address: D4:48:67:DD:D7:30			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

Note: The serial numbers used throughout this report are the MAC address of the equipment under test.



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: 2.4 GHz Bluetooth Low Energy - PCB Trace Antenna		
Spurious Radiated Emissions	Ahmad Javid	UKAS
Restricted Band Edges	Ahmad Javid	UKAS
Authorised Band Edges	Ahmad Javid	UKAS
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA//RPS Antenna		
Spurious Radiated Emissions	Pier-Angelo Lorusso	UKAS
Restricted Band Edges	Pier-Angelo Lorusso	UKAS
Authorised Band Edges	Pier-Angelo Lorusso	UKAS
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - Conducted Tests		
Emission Bandwidth	Thomas Biddlecombe	UKAS
Maximum Conducted Output Power	Thomas Biddlecombe	UKAS
Power Spectral Density	Thomas Biddlecombe	UKAS

Table 15

Office Address:

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



2 Test Details

2.1 Spurious Radiated Emissions

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0
SiW917Y1GA, S/N: BLE MAC address: D4:48:67:DD:D6:87 - Modification State 0

2.1.3 Date of Test

24-May-2024 to 05-June-2024

2.1.4 Test Method

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

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 dBuV/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 dBμV/m to μV/m:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$

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

At a measurement distance of 1 meter the limit line was increased by $20 \cdot \text{LOG}(3/1) = 9.54$ dB.

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

The EUT was supplied with 3.3 VDC by means of a regulator residing in the host certification board, which was in turn being powered over the host certification board's USB connector.

2.1.5 Example Test Setup Diagram

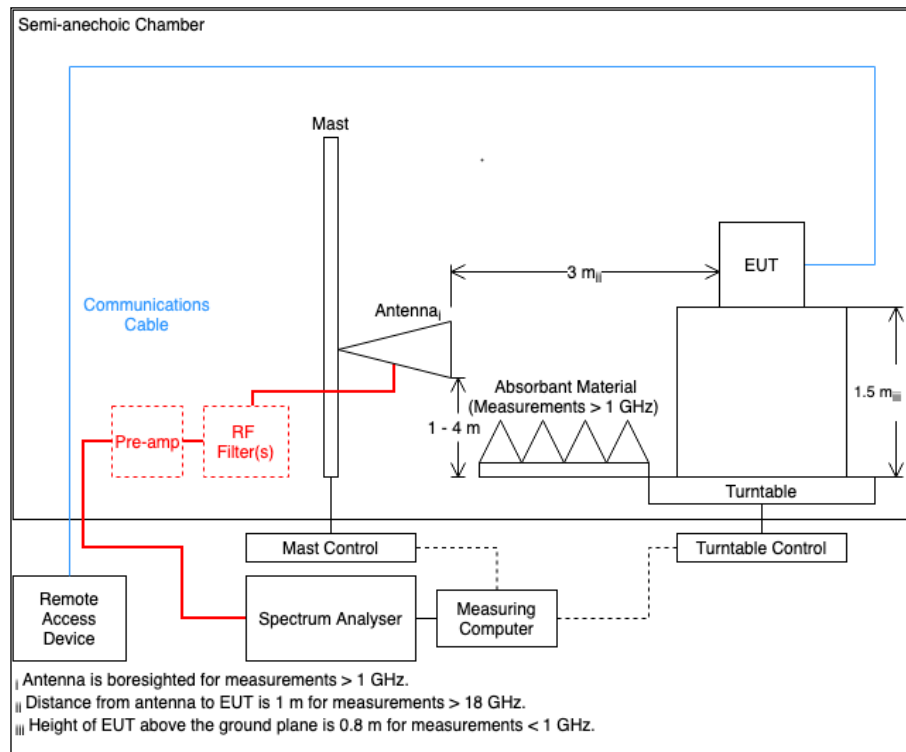


Figure 1

2.1.6 Environmental Conditions

Ambient Temperature	19.3 - 23.0 °C
Relative Humidity	45.8 - 54.2 %

2.1.7 Test Results

2.4 GHz Bluetooth Low Energy - PCB Trace Antenna

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 16 – Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 25 GHz X Orientation

*No emissions found within 10 dB of the limit.

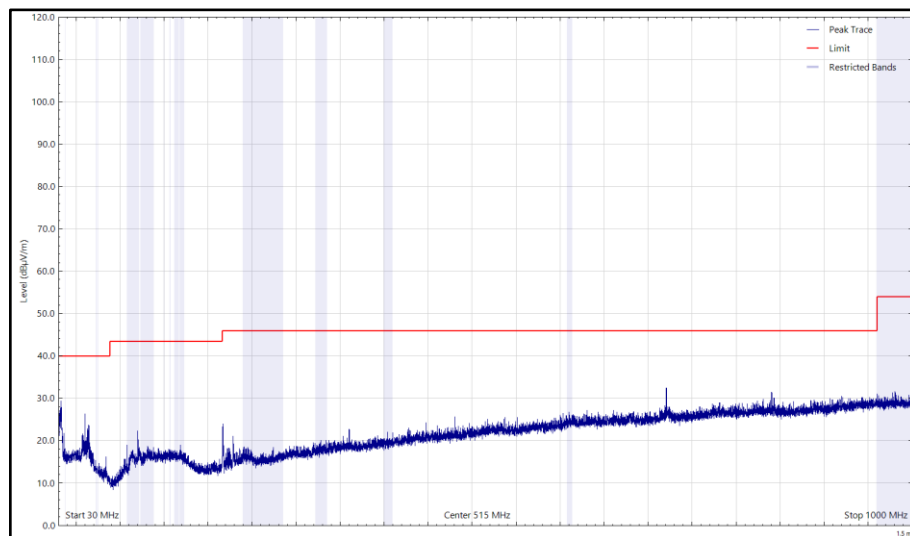


Figure 2 – Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Horizontal (Peak) X Orientation

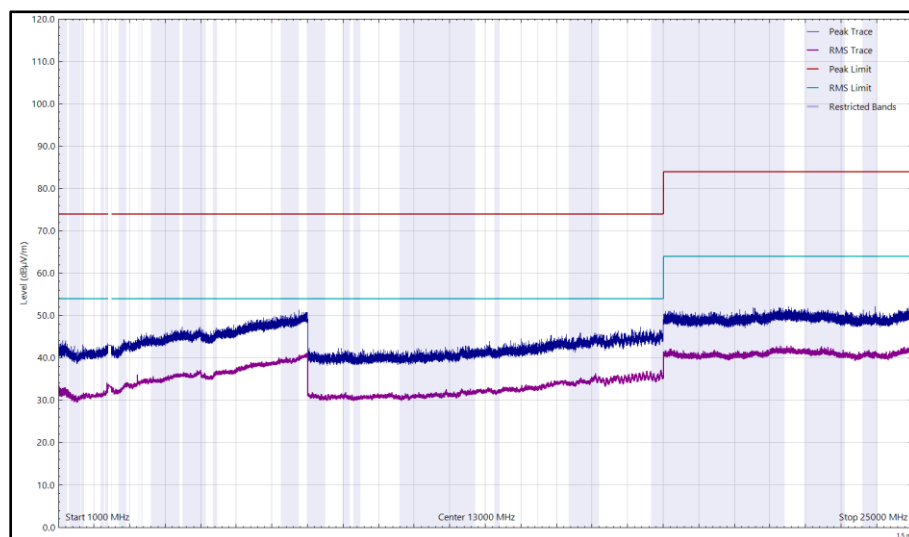


Figure 3 – Bottom_BLE_LE1M - 2402 MHz, 1 GHz to 25 GHz, Horizontal X Orientation

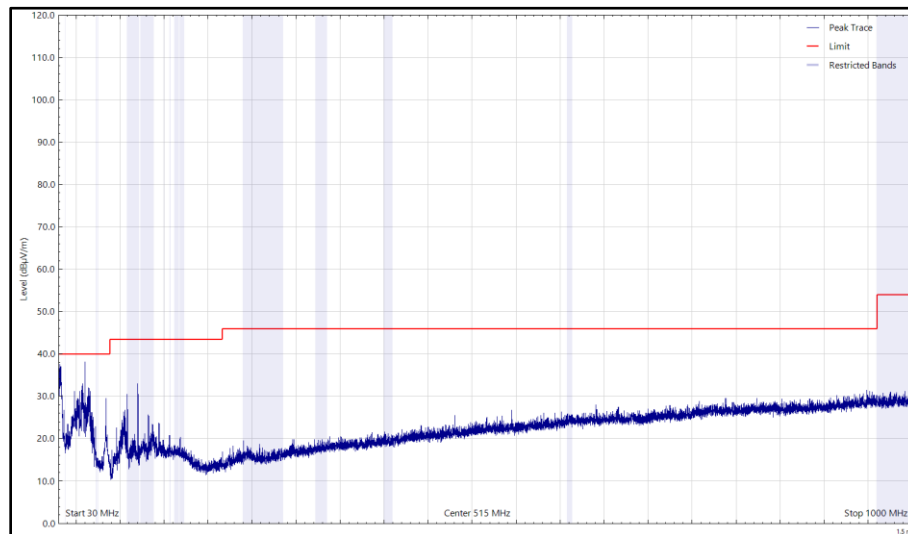


Figure 4 – Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Vertical (Peak) X Orientation

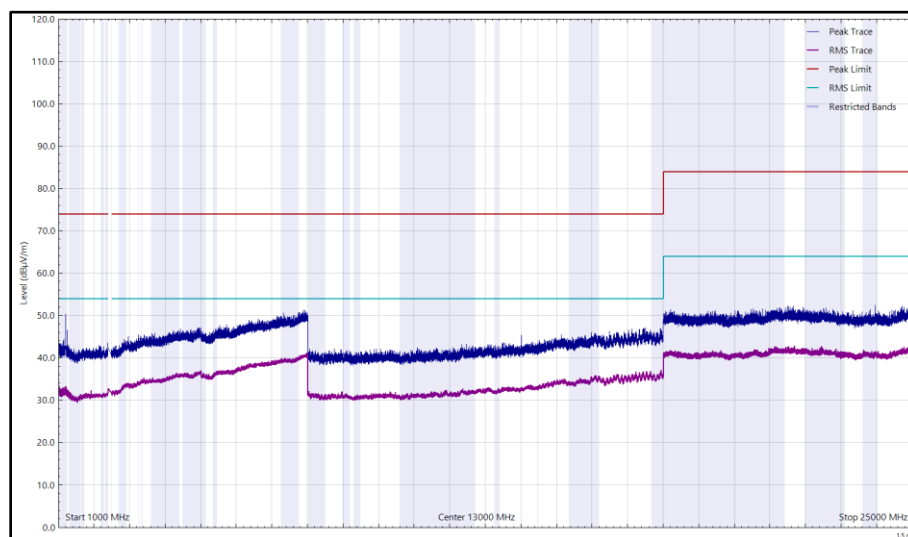


Figure 5 – Bottom_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Vertical X Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 17 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 25 GHz X Orientation

*No emissions found within 10 dB of the limit.

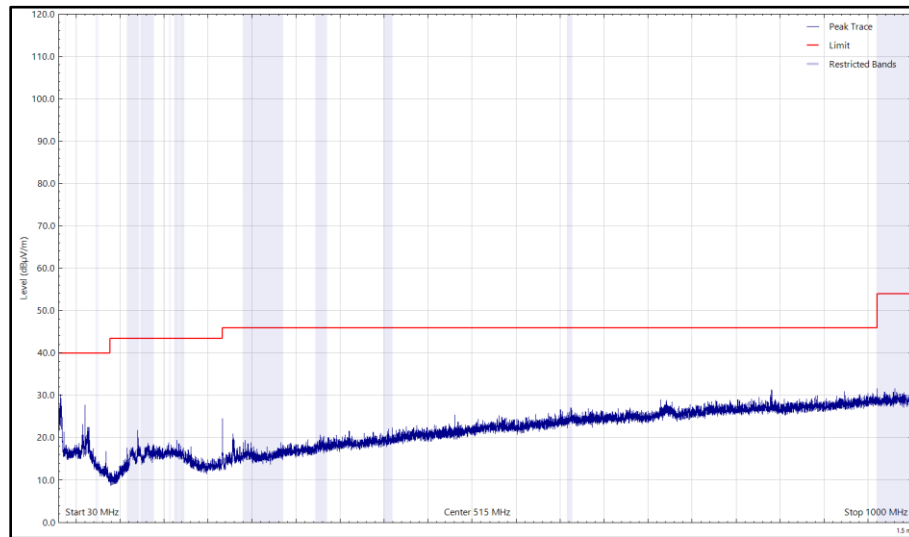


Figure 6 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak) X Orientation

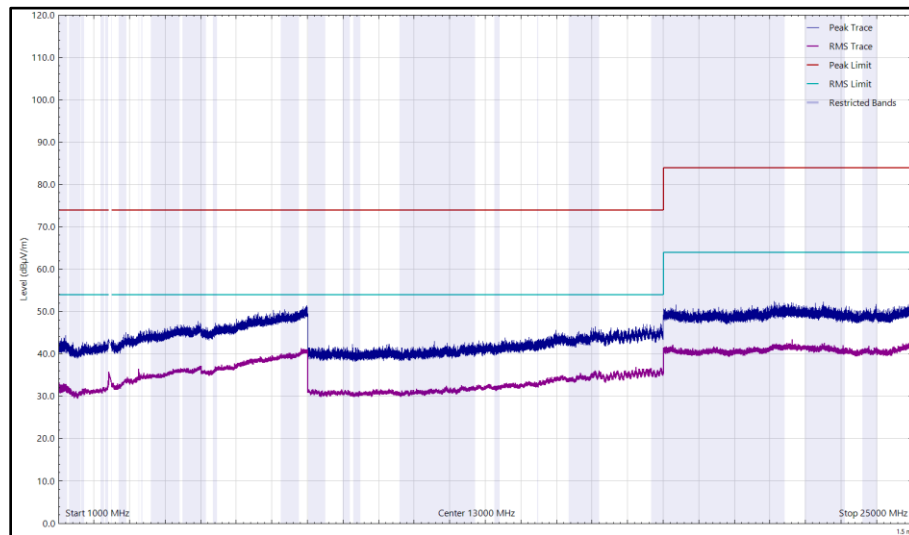


Figure 7 - Middle_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Horizontal X Orientation

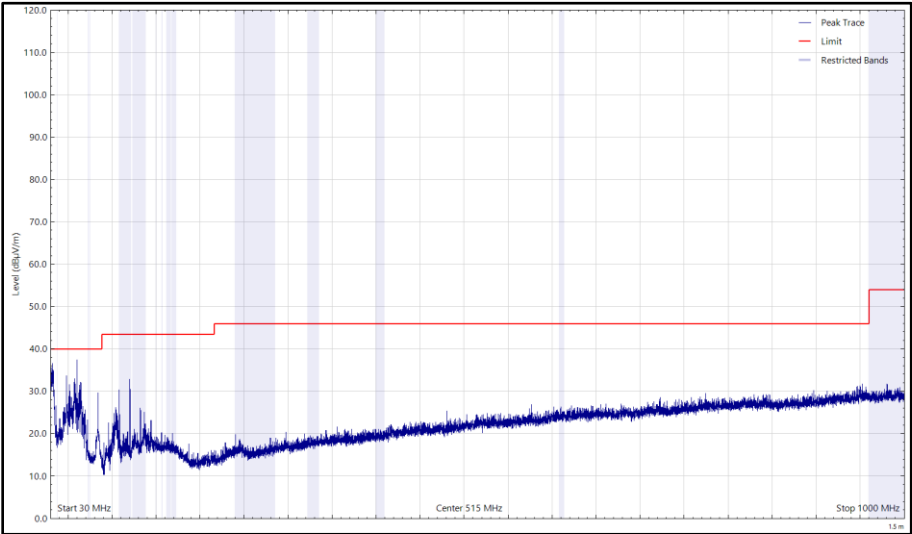


Figure 8 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak) X Orientation

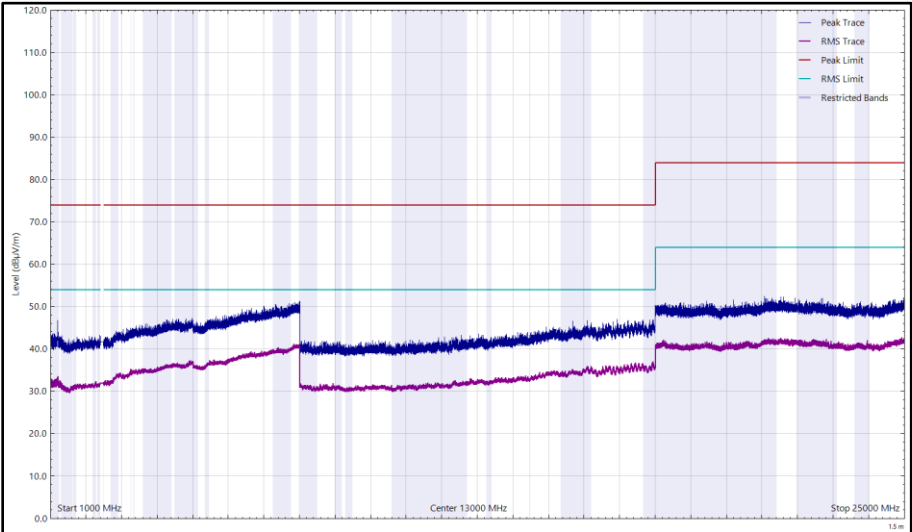


Figure 9 - Middle_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Vertical X Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 18 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 25 GHz X Orientation

*No emissions found within 10 dB of the limit.

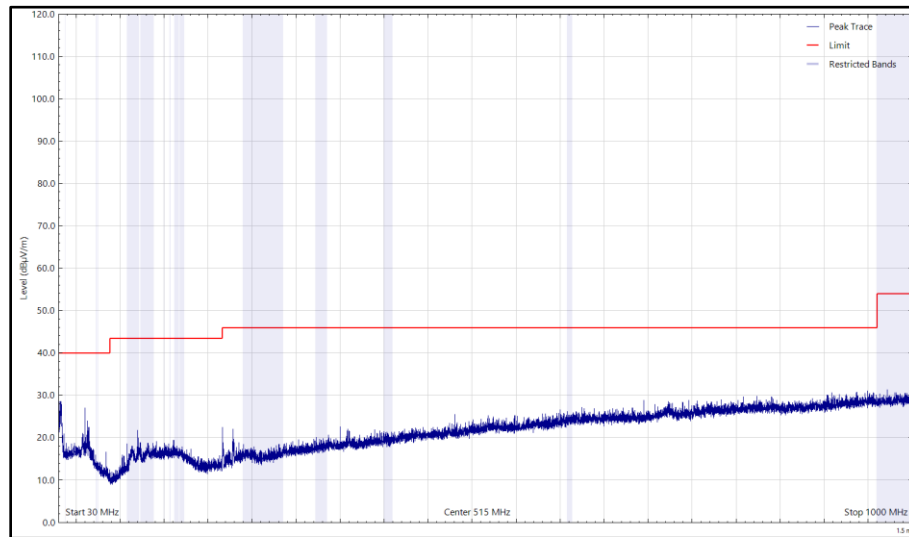


Figure 10 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Horizontal (Peak) X Orientation

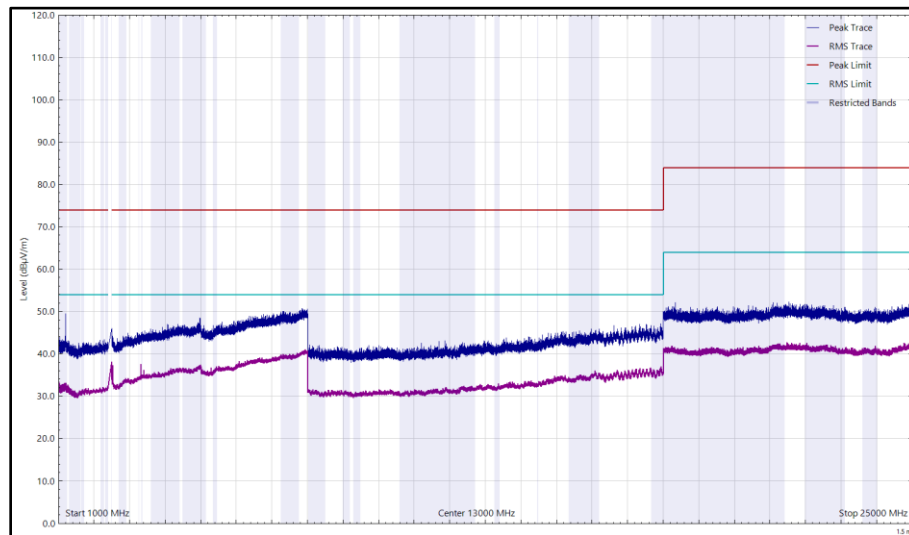


Figure 11 - Top_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Horizontal X Orientation

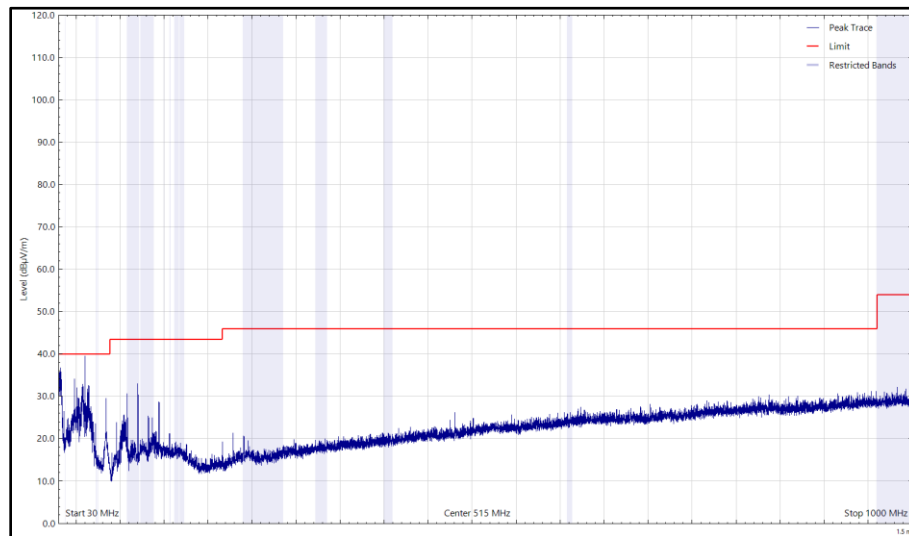


Figure 12 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Vertical (Peak) X Orientation

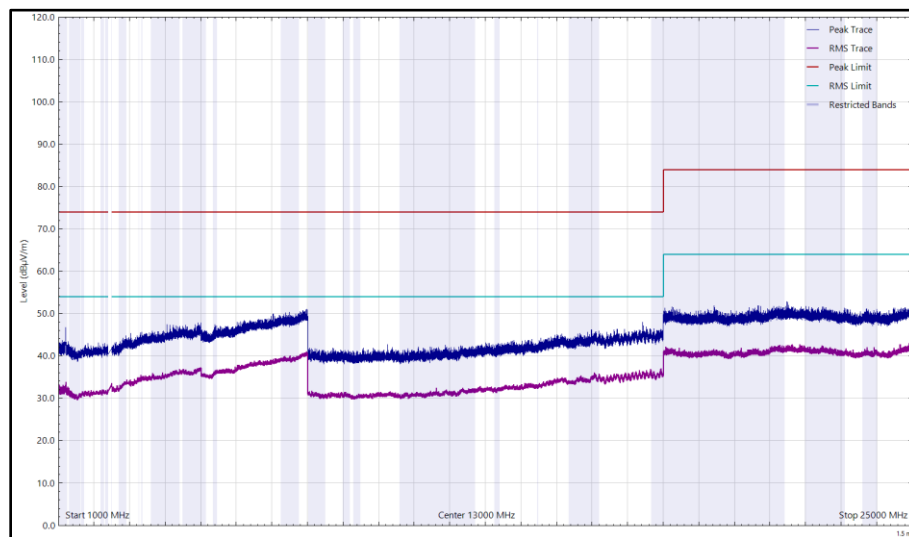


Figure 13 - Top_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Vertical X Orientation



Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 19 - Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 25 GHz Y Orientation

*No emissions found within 10 dB of the limit.

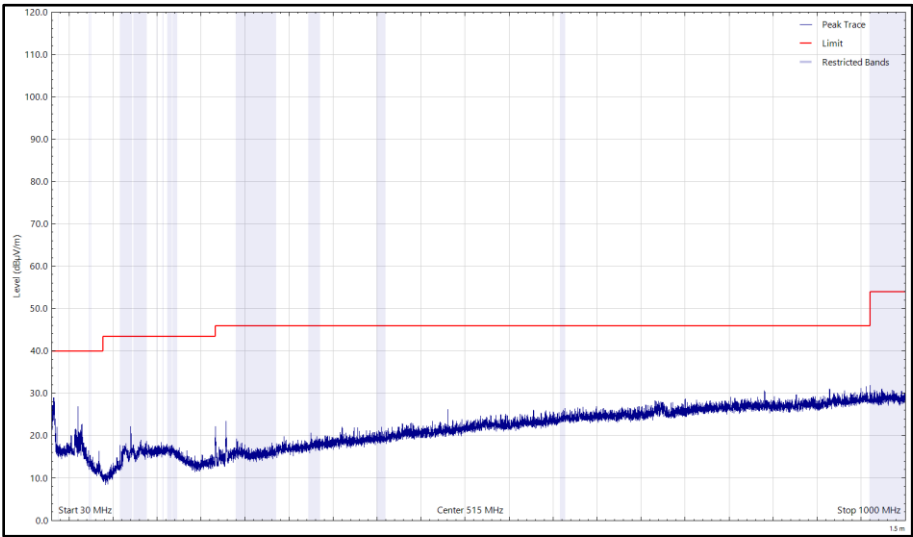


Figure 14 - Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Y Orientation

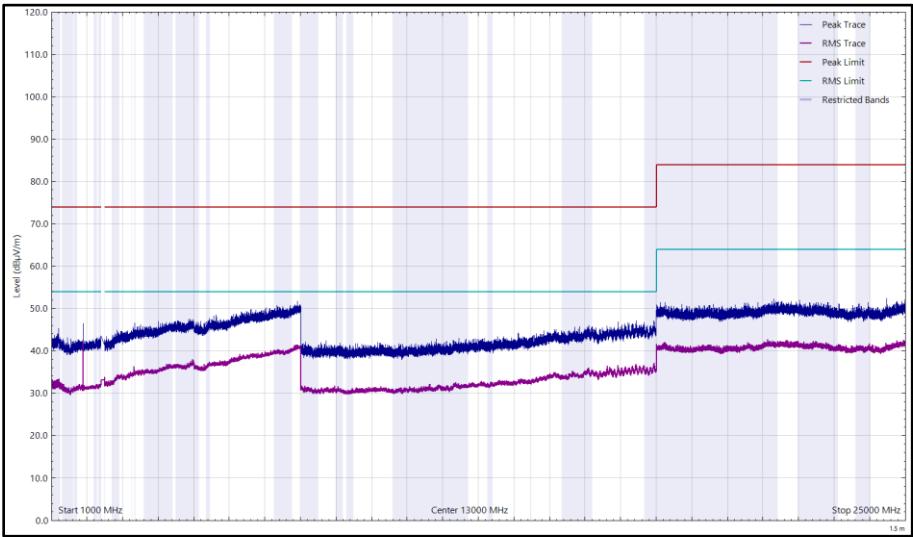


Figure 15 - Bottom_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Horizontal Y Orientation

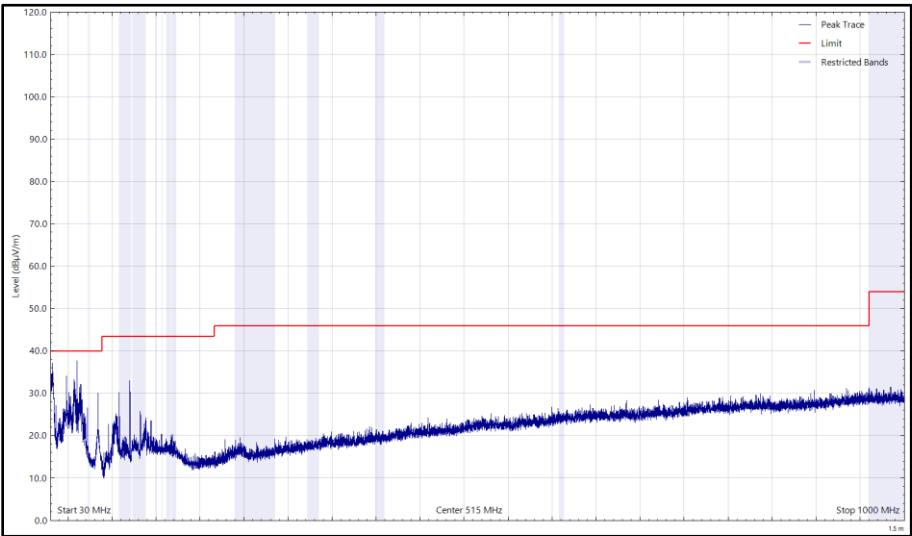


Figure 16 - Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Vertical (Peak) Y Orientation

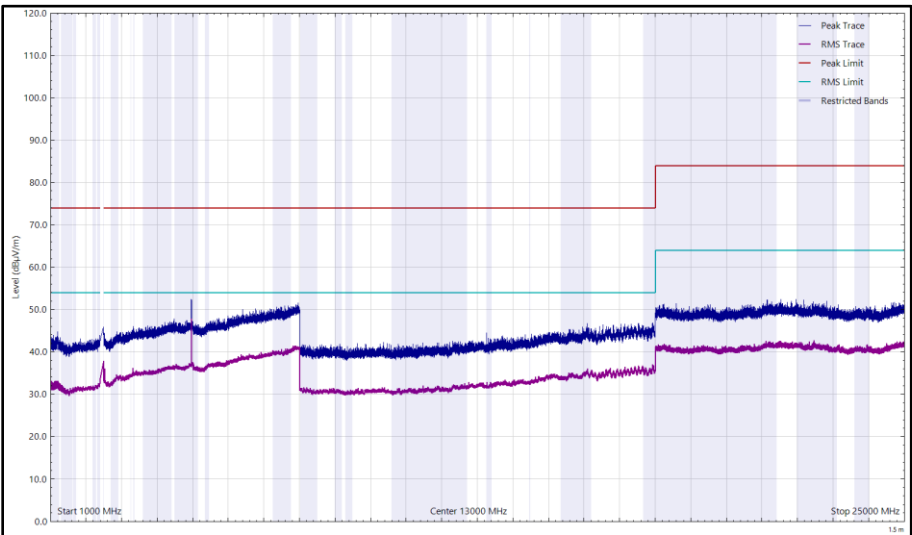


Figure 17 - Bottom_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Vertical Y Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 20 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 25 GHz Y Orientation

*No emissions found within 10 dB of the limit.

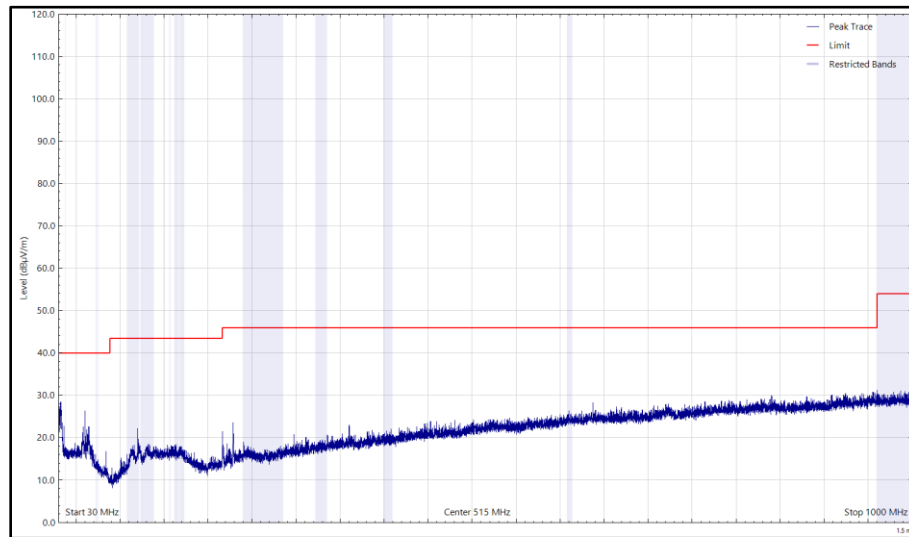


Figure 18 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Y Orientation

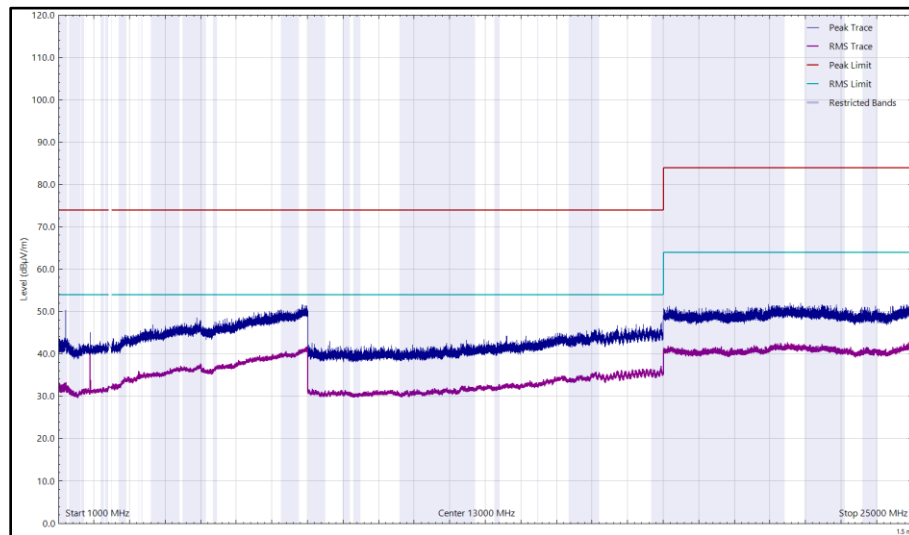


Figure 19 - Middle_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Horizontal Y Orientation

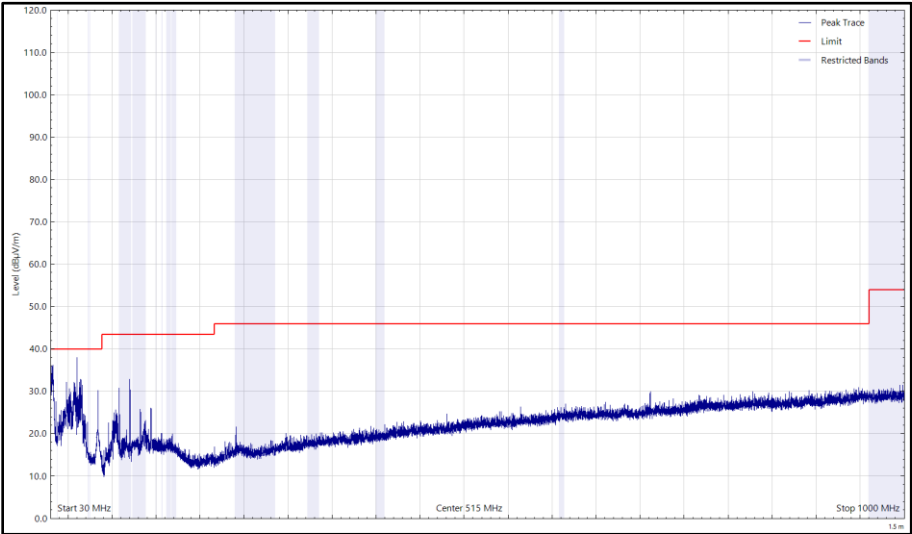


Figure 20 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak) Y Orientation

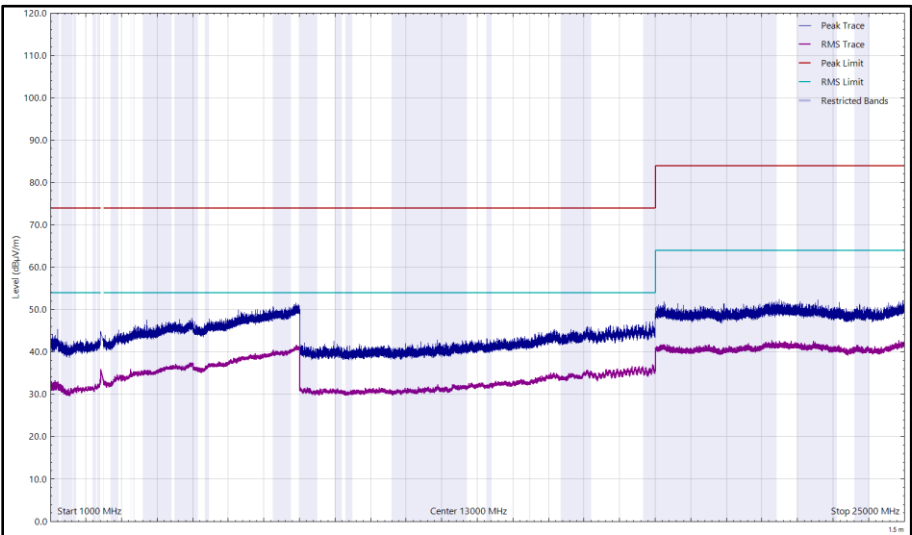


Figure 21 - Middle_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Vertical Y Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 21 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 25 GHz Y Orientation

*No emissions found within 10 dB of the limit.

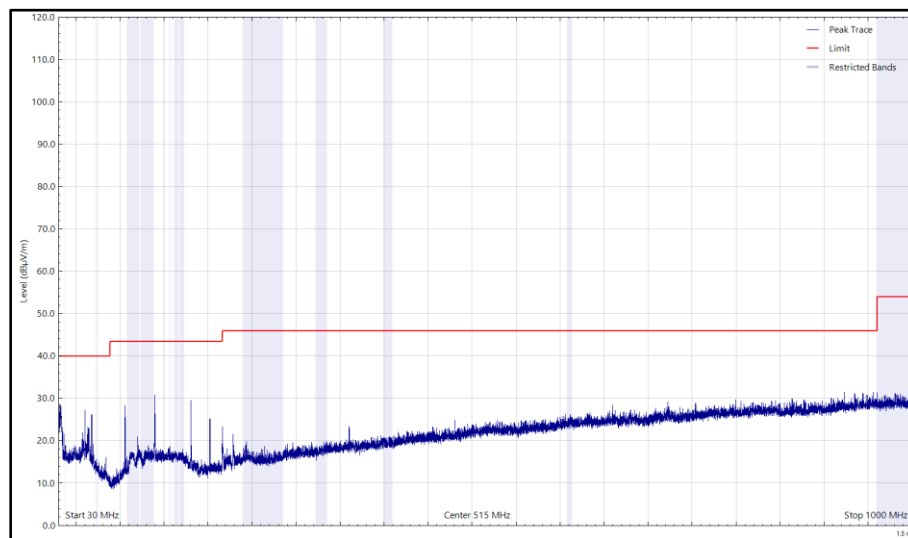


Figure 22 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Y Orientation

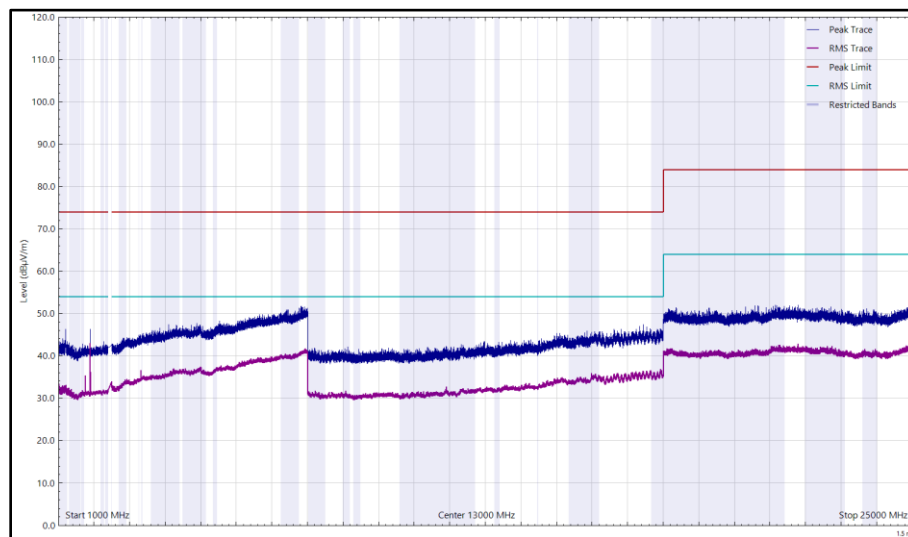


Figure 23 - Top_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Horizontal Y Orientation

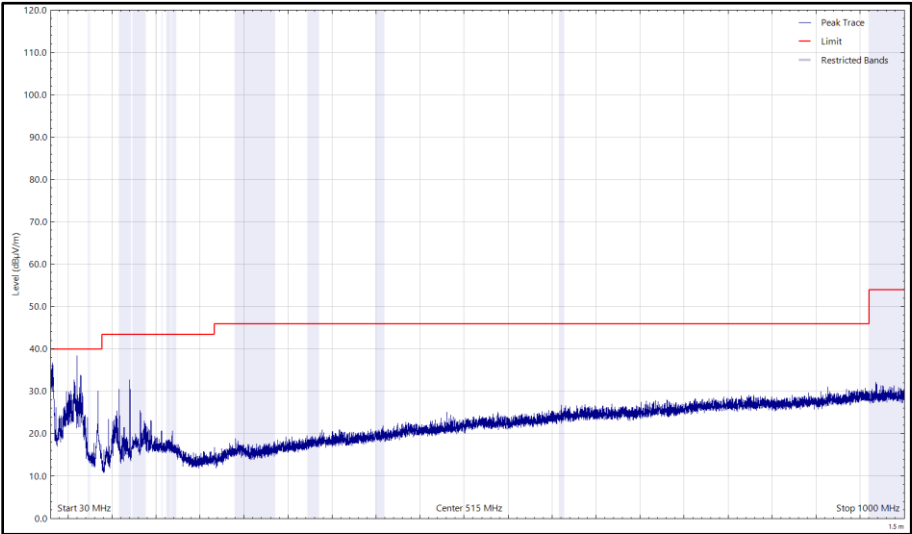


Figure 24 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Vertical (Peak) Y Orientation

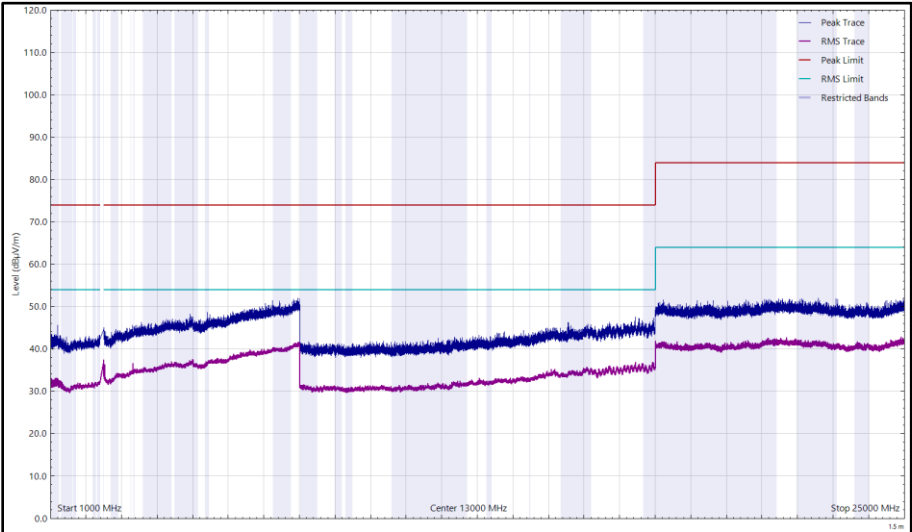


Figure 25 - Top_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Vertical Y Orientation



Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 22 - Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 25 GHz Z Orientation

*No emissions found within 10 dB of the limit.

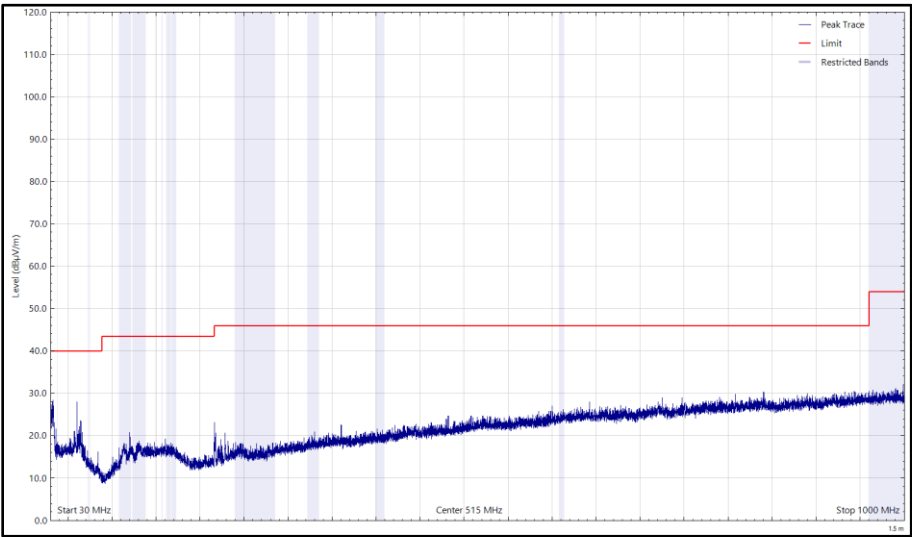


Figure 26 - Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Z Orientation

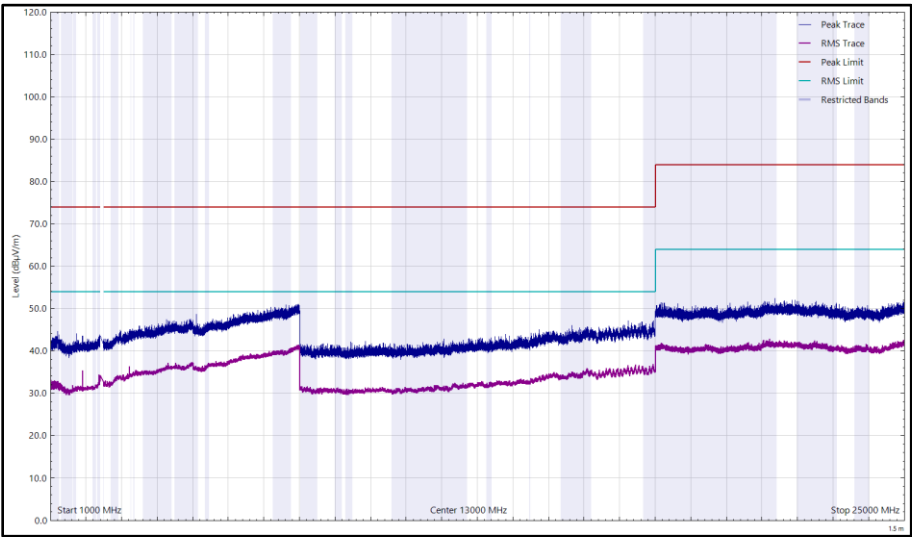


Figure 27 - Bottom_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Horizontal Z Orientation

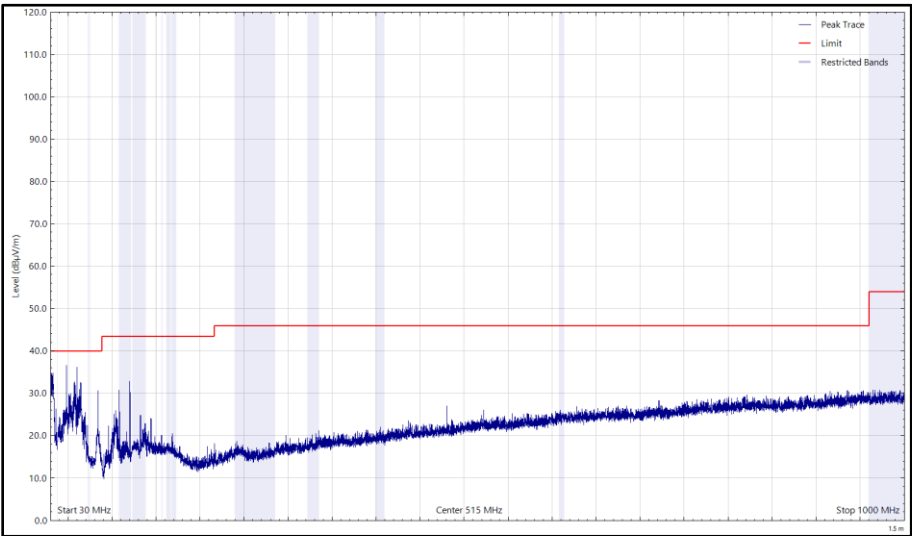


Figure 28 - Bottom_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Vertical (Peak) Z Orientation

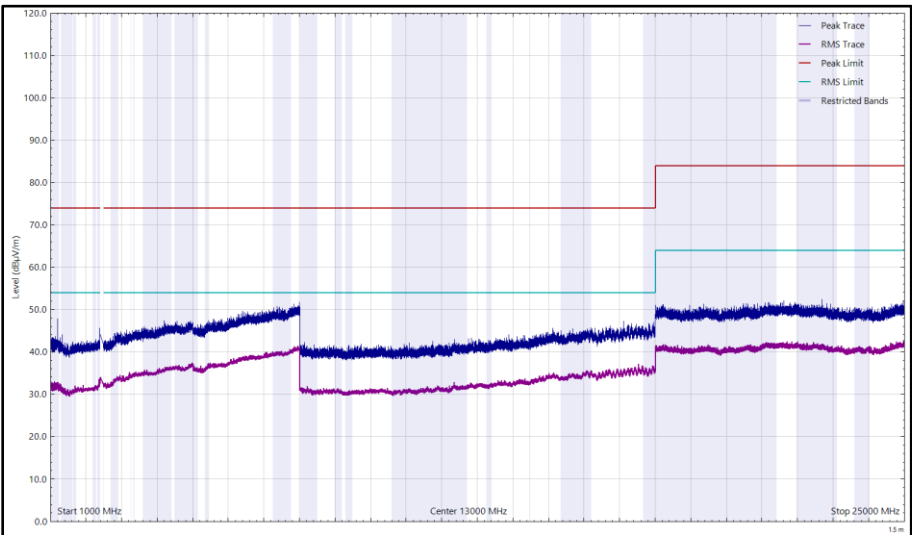


Figure 29 - Bottom_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Vertical Z Orientation



Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 23 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 25 GHz Z Orientation

*No emissions found within 10 dB of the limit.

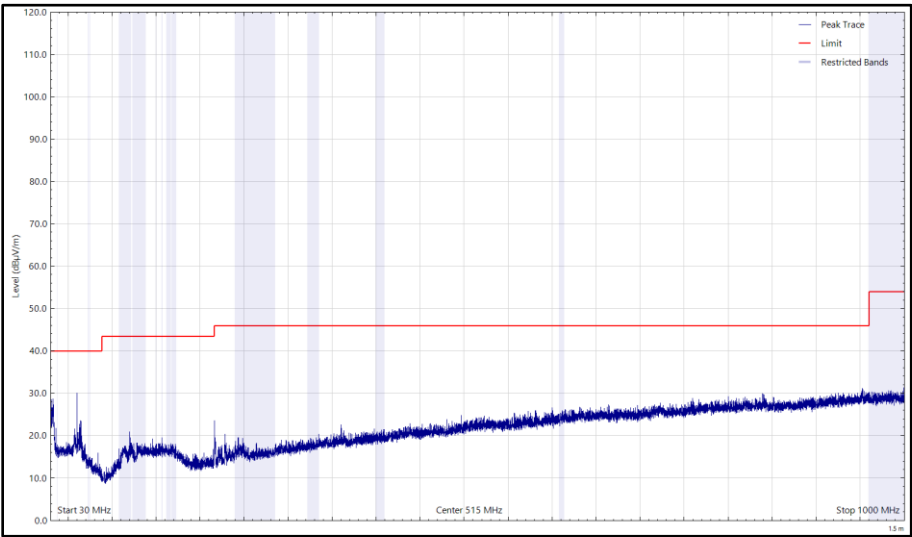


Figure 30 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Z Orientation

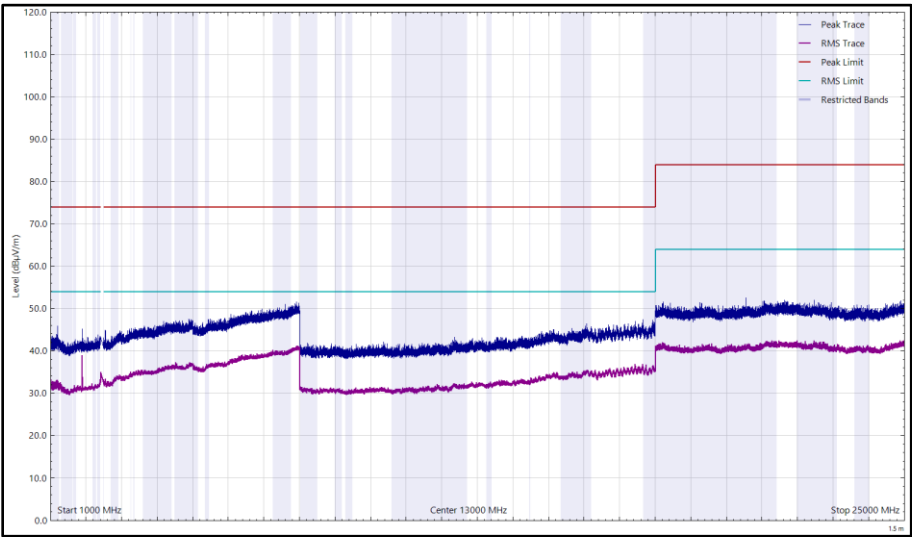


Figure 31 - Middle_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Horizontal Z Orientation

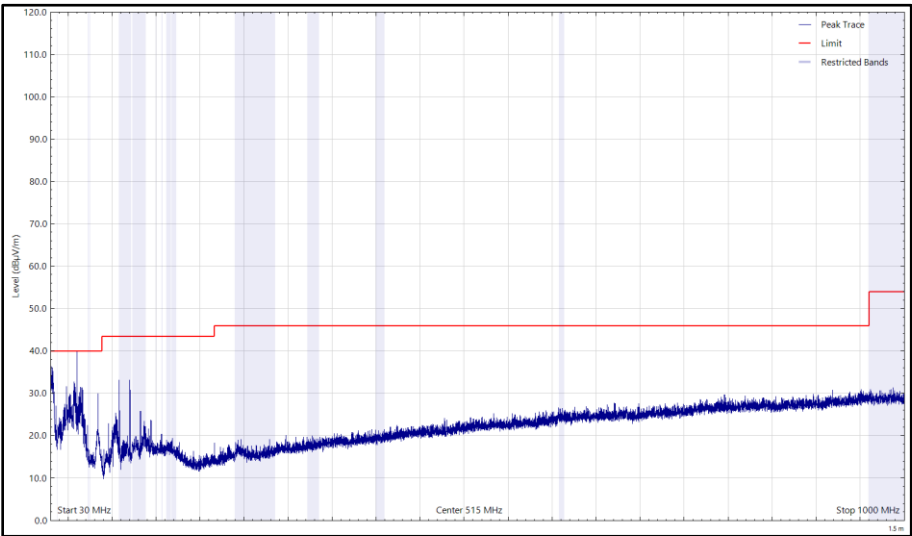


Figure 32 - Middle_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak) Z Orientation

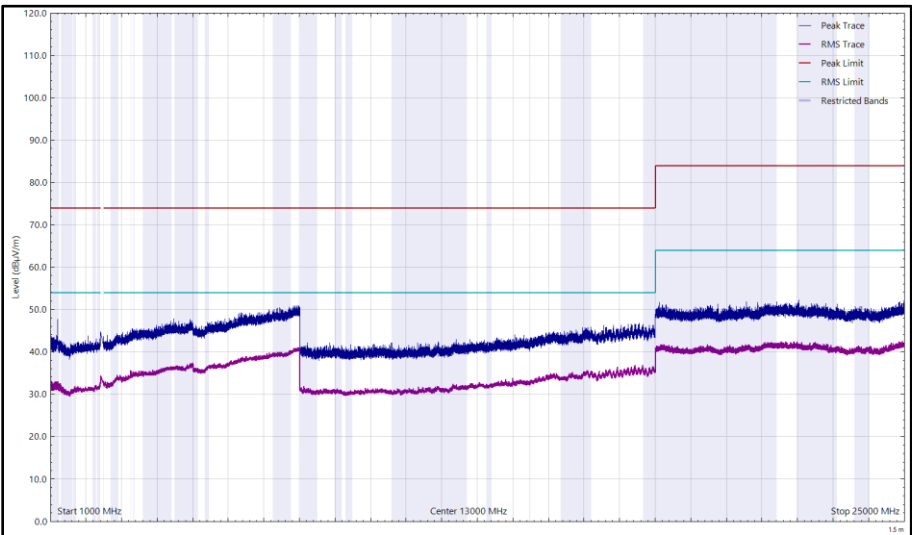


Figure 33 - Middle_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Vertical Z Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation	Orientation
*									

Table 24 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 25 GHz Z Orientation

*No emissions found within 10 dB of the limit.

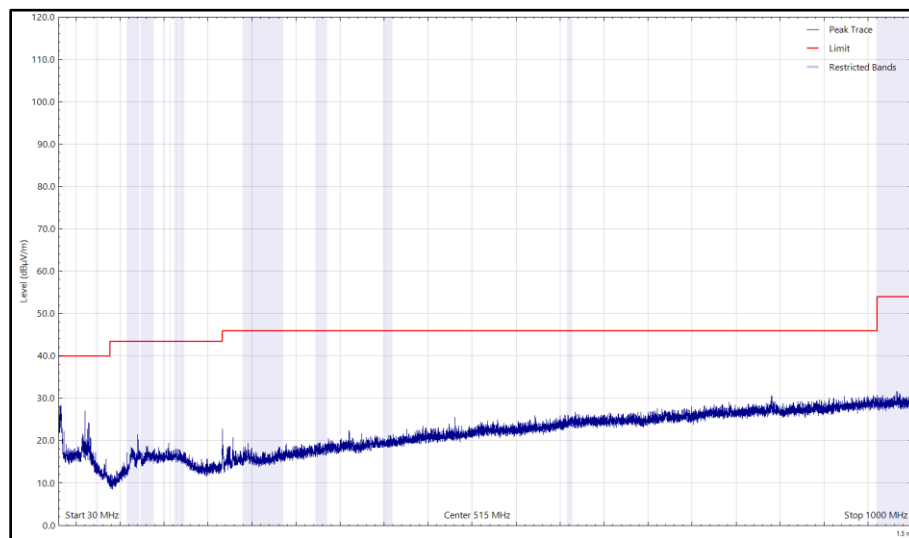


Figure 34 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Z Orientation

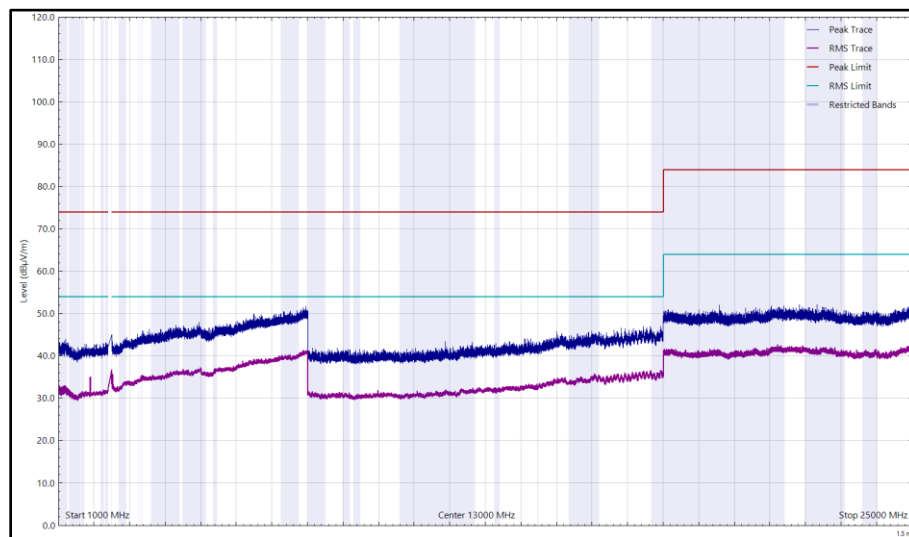


Figure 35 - Top_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Horizontal Z Orientation

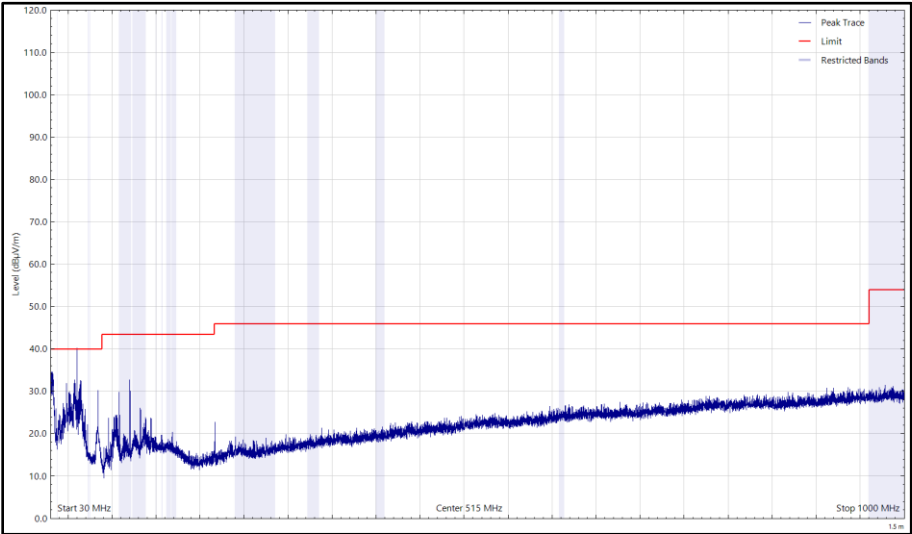


Figure 36 - Top_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Vertical (Peak) Z Orientation

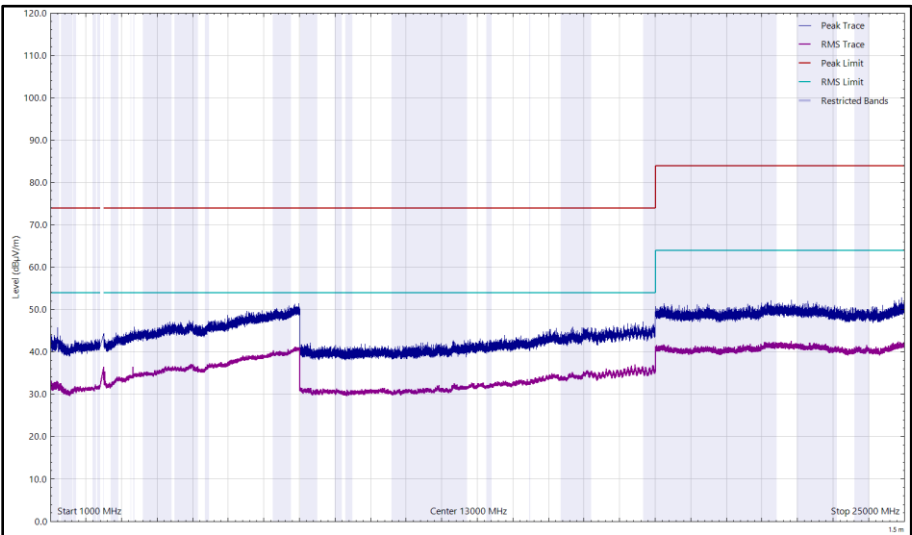


Figure 37 - Top_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Vertical Z Orientation

2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
35.980	30.86	40.00	-9.14	Q-Peak	dBuV/m	108	380	Horizontal
59.991	38.00	40.00	-2.00	Q-Peak	dBuV/m	119	106	Vertical

Table 25 - Ch1_BLE_LE1M – 2404 MHz, 30 MHz to 25 GHz X Orientation

No other emissions found within 10 dB of the limit.

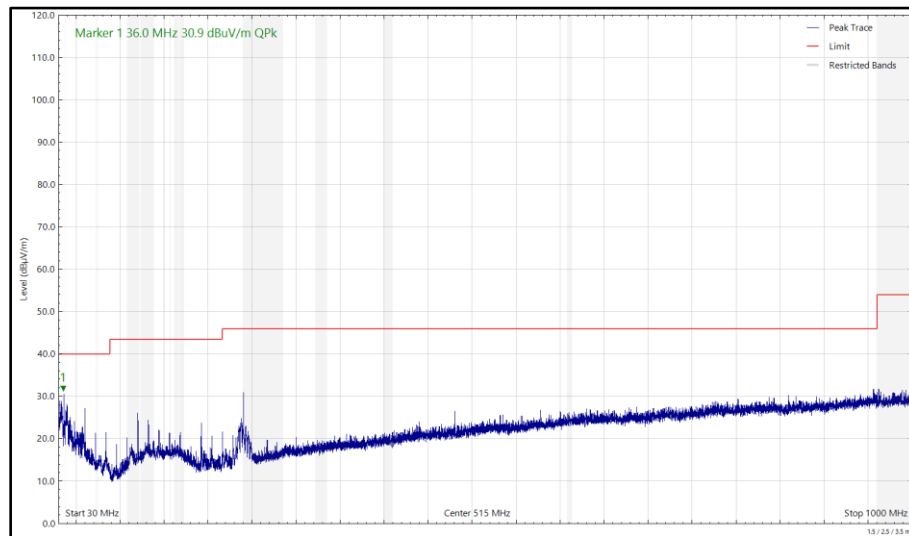


Figure 38 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Horizontal (Peak) X Orientation

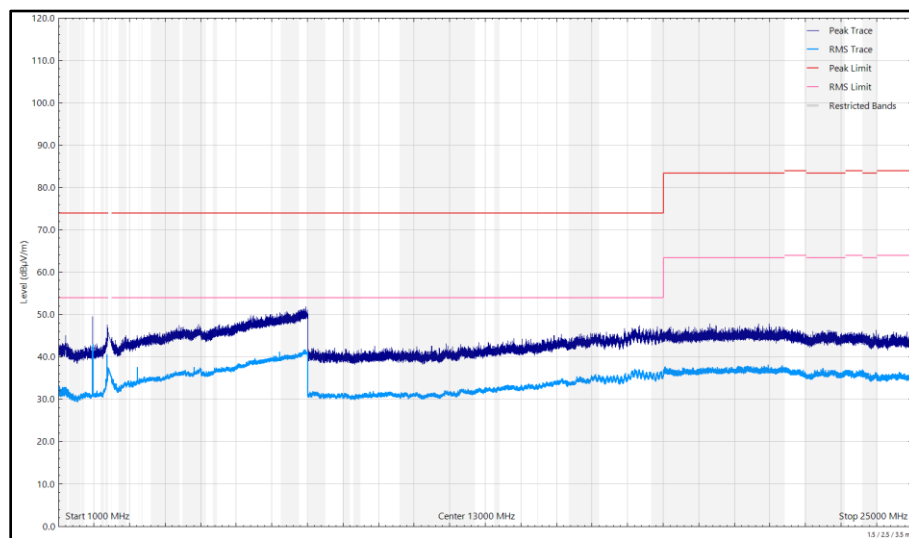


Figure 39 - Ch1_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Horizontal X Orientation

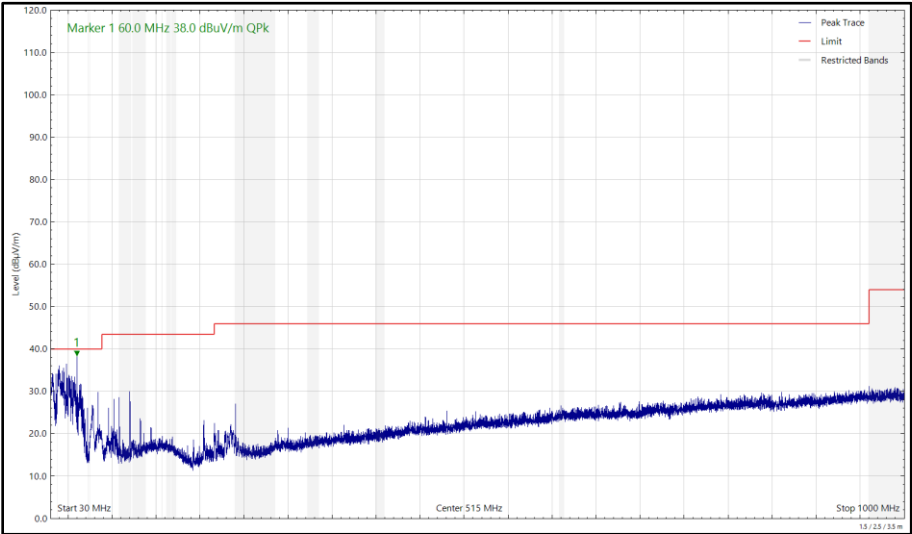


Figure 40 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Vertical (Peak) X Orientation

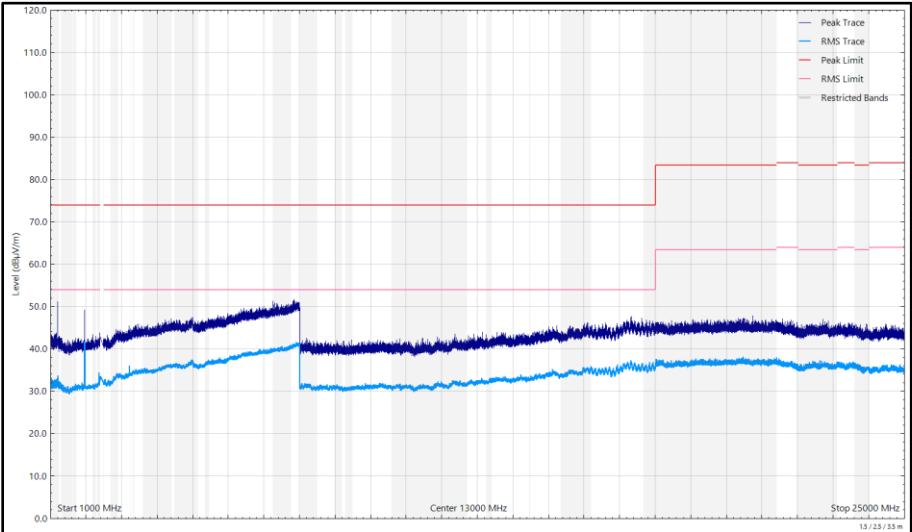


Figure 41 - Ch1_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Vertical X Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
59.977	34.73	40.00	-5.27	Q-Peak	dBuV/m	48	101	Vertical
854.575	18.47	46.00	-27.53	Q-Peak	dBuV/m	0	100	Vertical

Table 26 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 25 GHz X Orientation

No other emissions found within 10 dB of the limit.

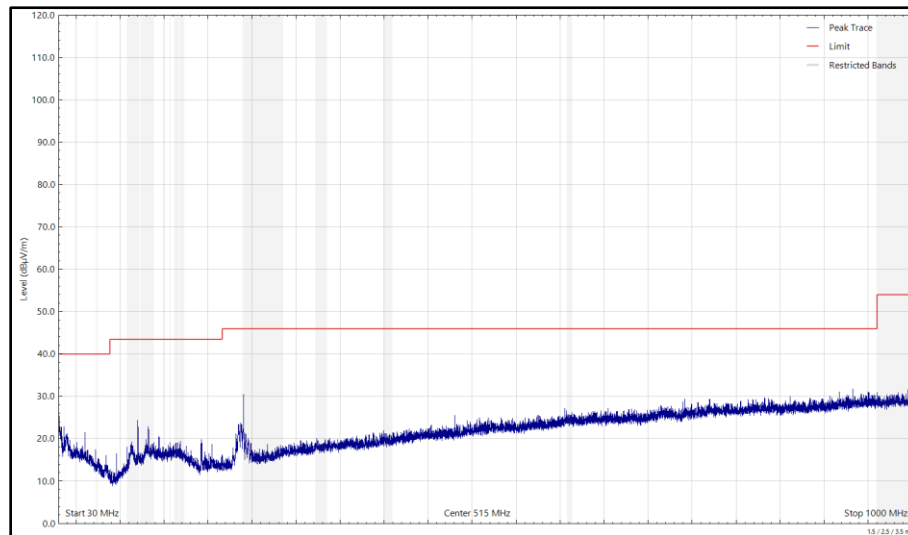


Figure 42 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak) X Orientation

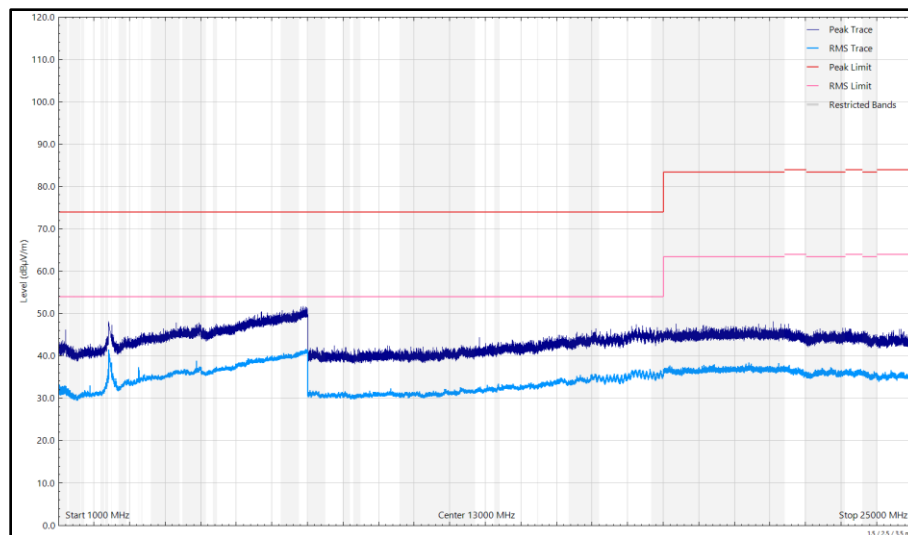


Figure 43 - Ch19_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Horizontal X Orientation

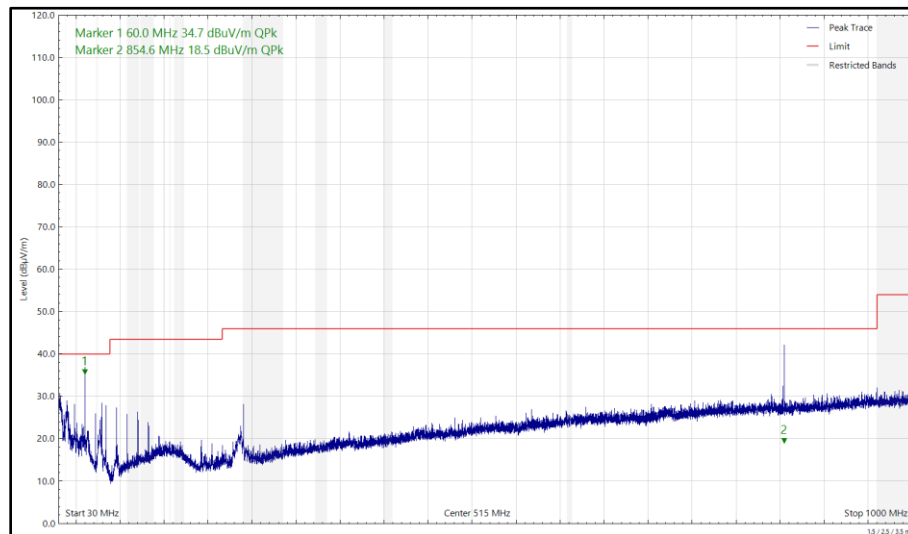


Figure 44 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak) X Orientation

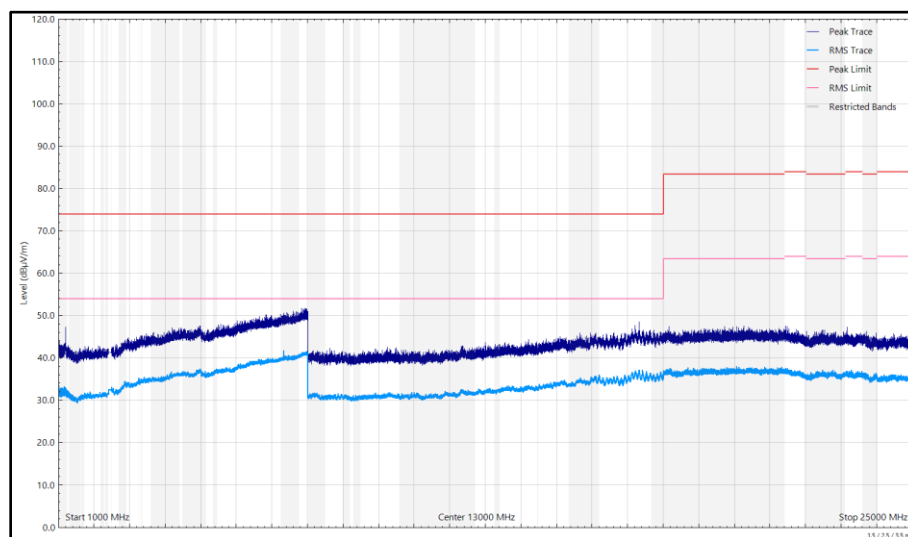


Figure 45 - Ch19_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Vertical X Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
60.028	32.28	40.00	-7.72	Q-Peak	dBuV/m	67	137	Vertical

Table 27 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 25 GHz X Orientation

No other emissions found within 10 dB of the limit.

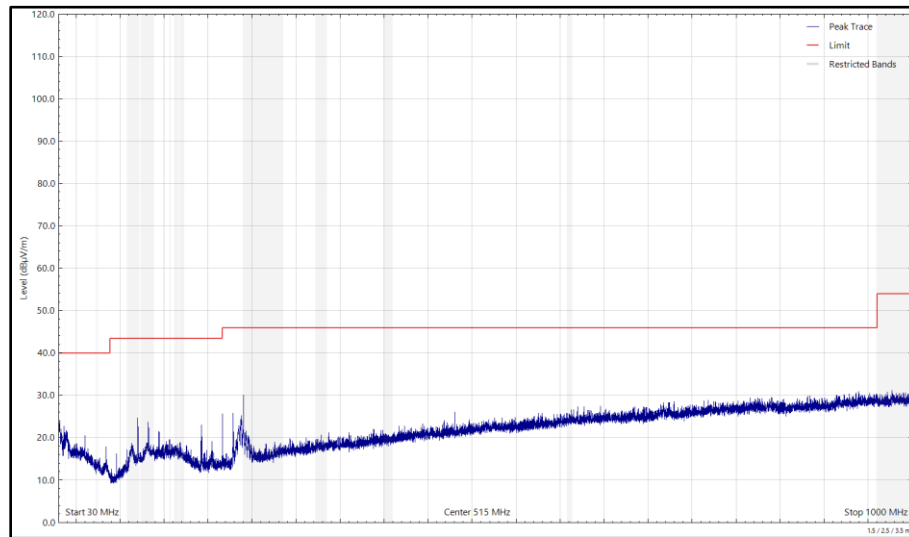


Figure 46 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Horizontal (Peak) X Orientation

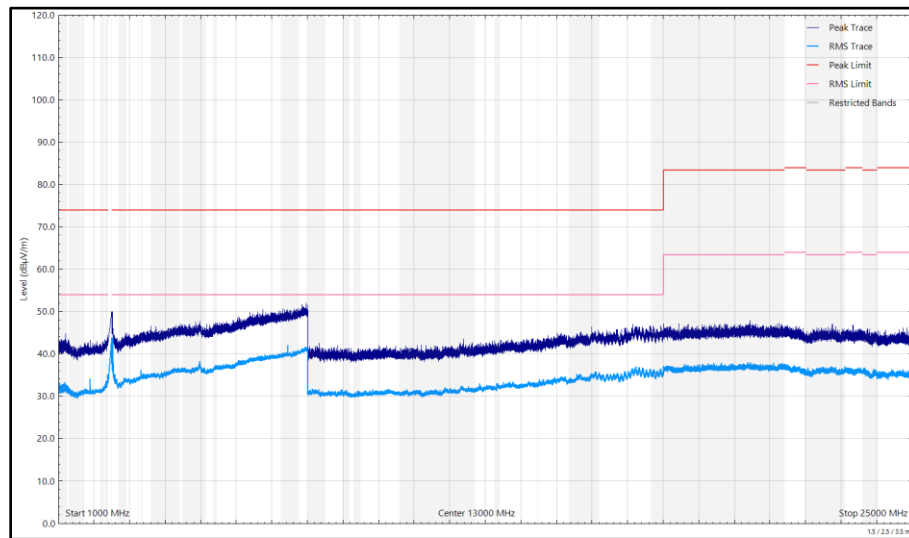


Figure 47 - Ch38_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Horizontal X Orientation

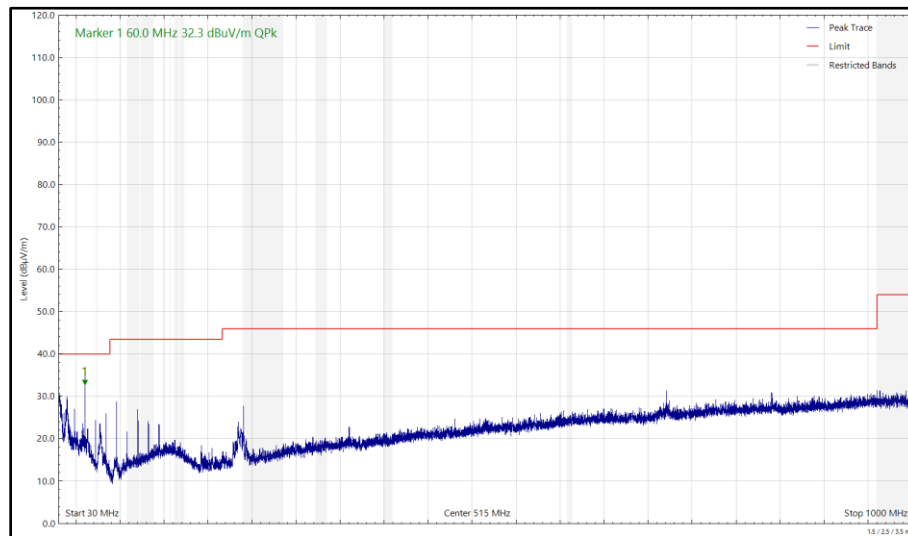


Figure 48 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Vertical (Peak) X Orientation

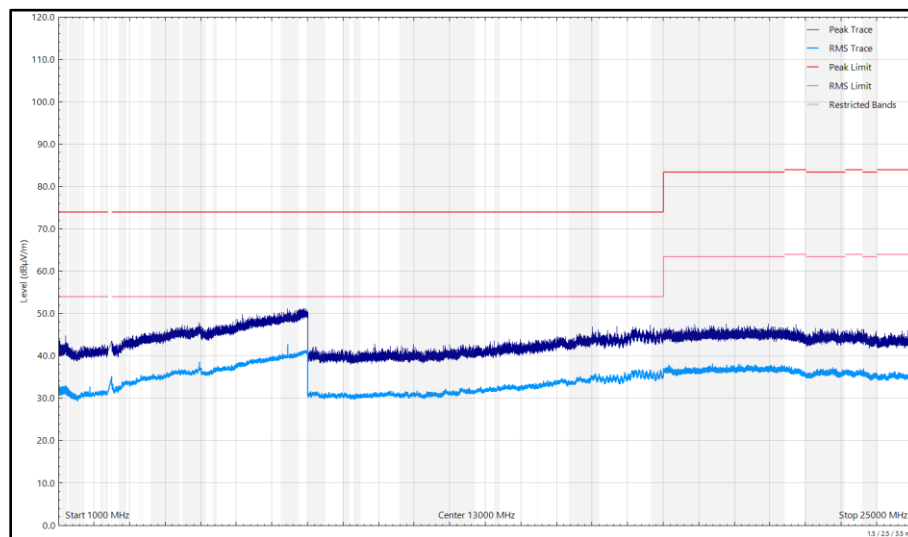


Figure 49 - Ch38_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Vertical X Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
84.003	28.45	40.00	-11.55	Q-Peak	dBuV/m	107	140	Vertical
1950.686	30.49	54.00	-23.51	RMS	dBuV/m	143	288	Horizontal

Table 28 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 25 GHz Y Orientation

No other emissions found within 10 dB of the limit.

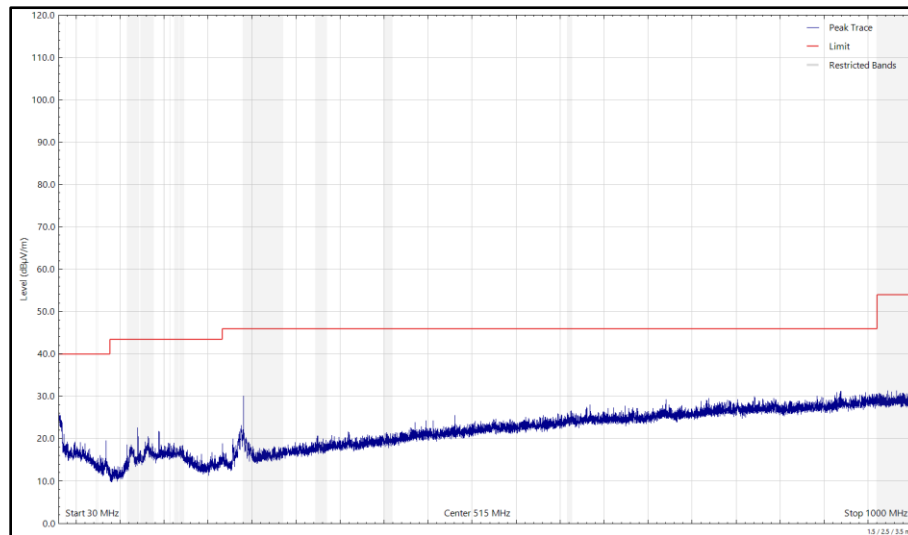


Figure 50 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Y Orientation

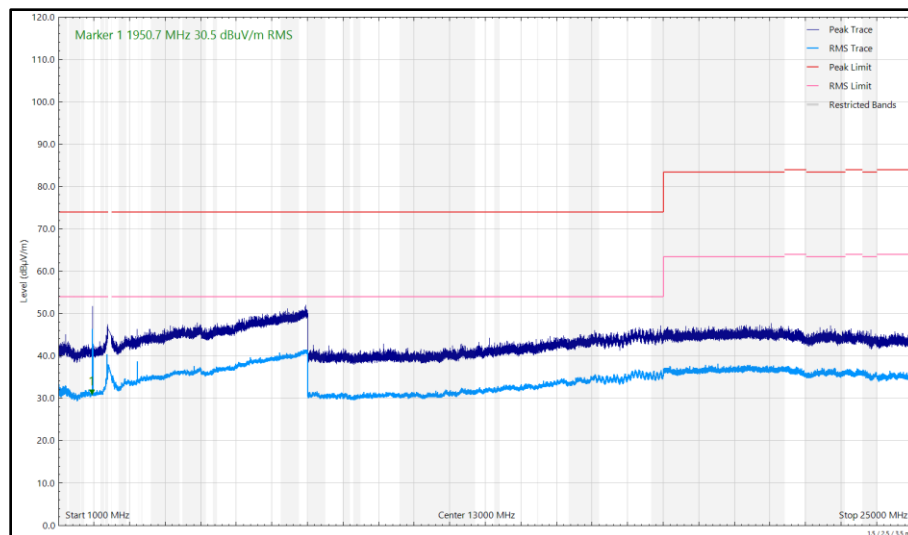


Figure 51 - Ch1_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Horizontal Y Orientation

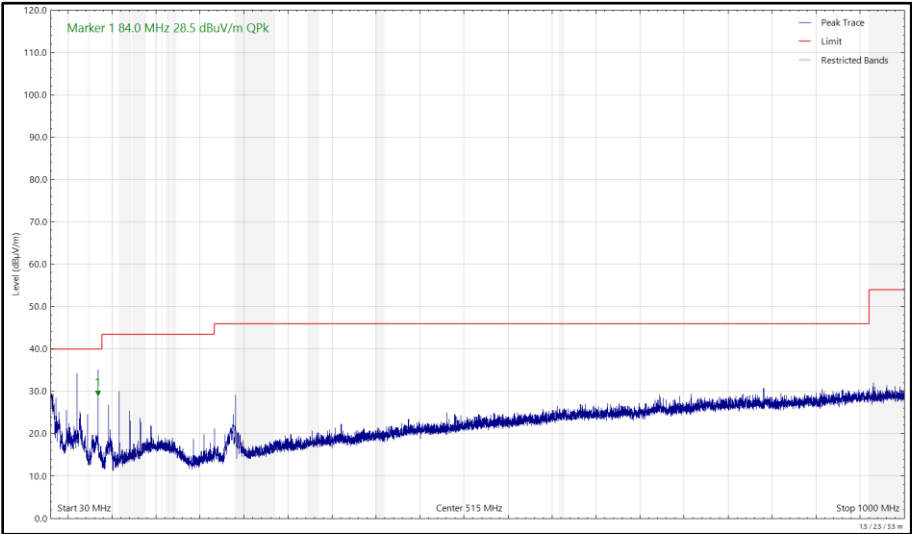


Figure 52 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Vertical (Peak) Y Orientation

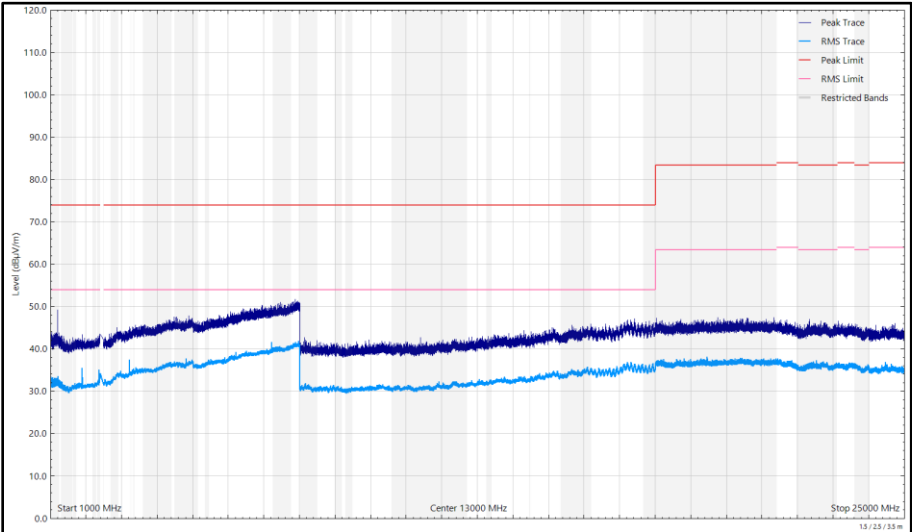


Figure 53 - Ch1_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Vertical Y Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
30.782	28.45	40.00	-11.55	Q-Peak	dBuV/m	290	149	Vertical

Table 29 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 25 GHz Y Orientation

No other emissions found within 10 dB of the limit.

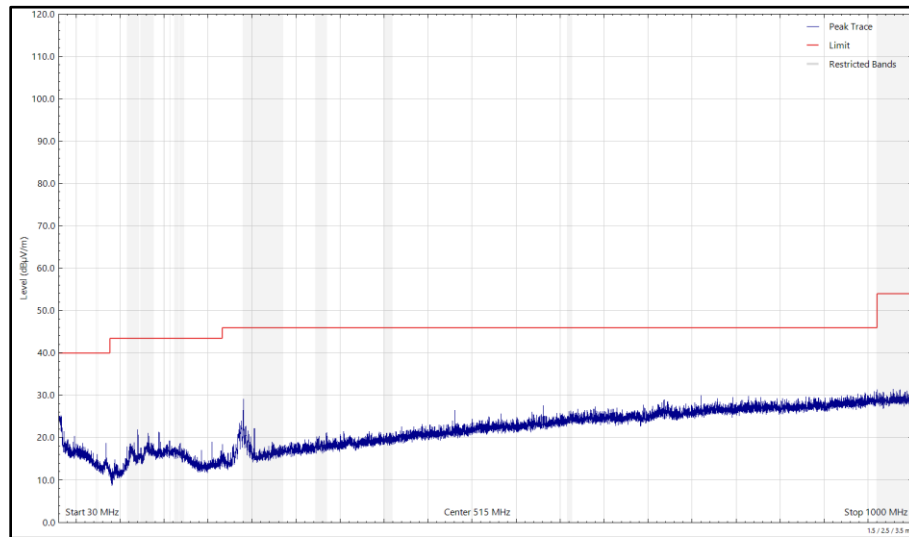


Figure 54 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Y Orientation

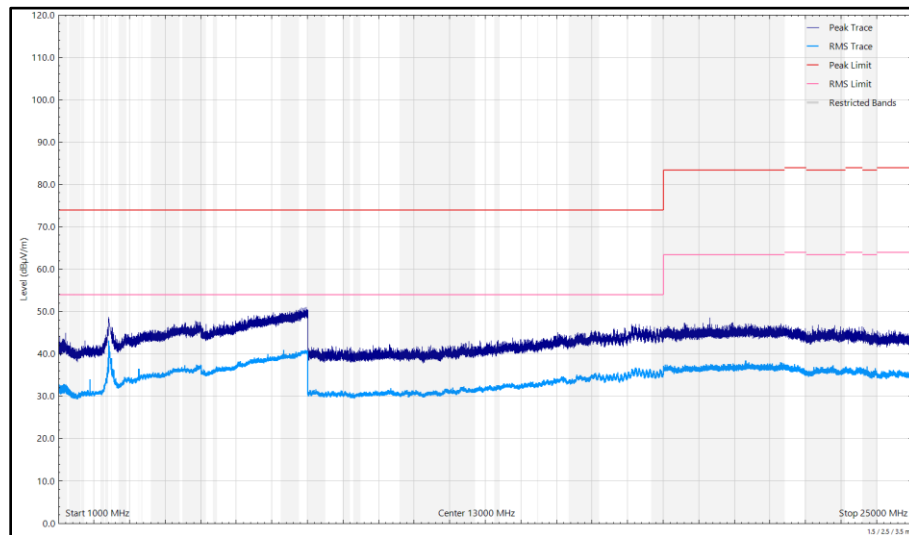


Figure 55 - Ch19_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Horizontal Y Orientation

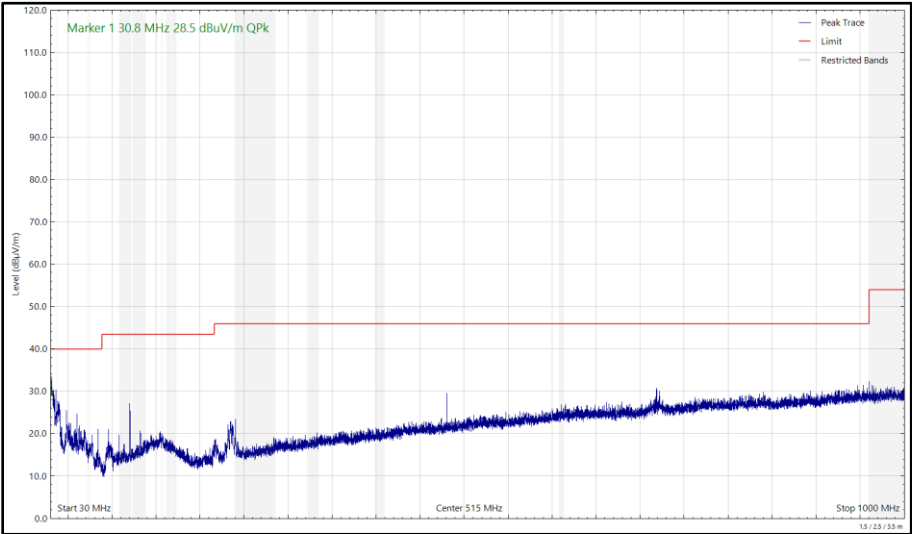


Figure 56 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak) Y Orientation

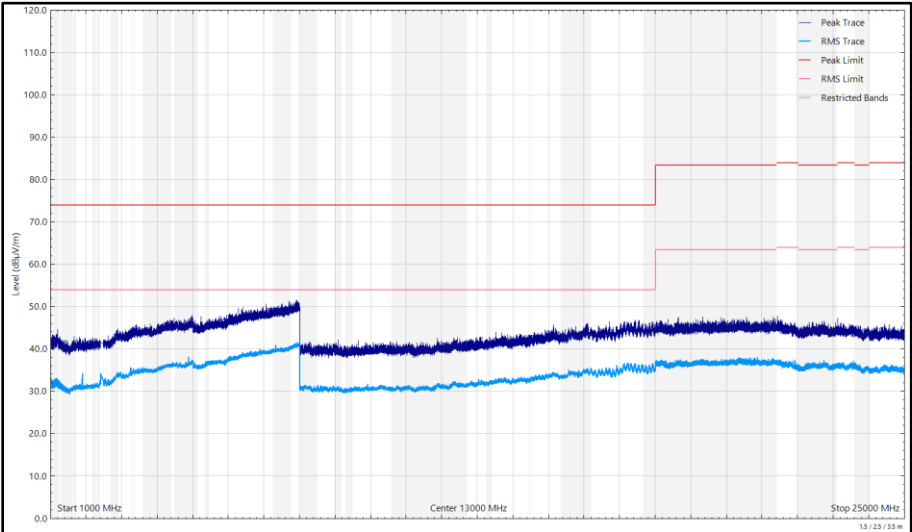


Figure 57 - Ch19_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Vertical Y Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
34.570	22.12	40.00	-17.88	Q-Peak	dBuV/m	275	107	Vertical
2493.946	44.37	54.00	-9.63	RMS	dBuV/m	15	100	Horizontal

Table 30 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 25 GHz Y Orientation

No other emissions found within 10 dB of the limit.

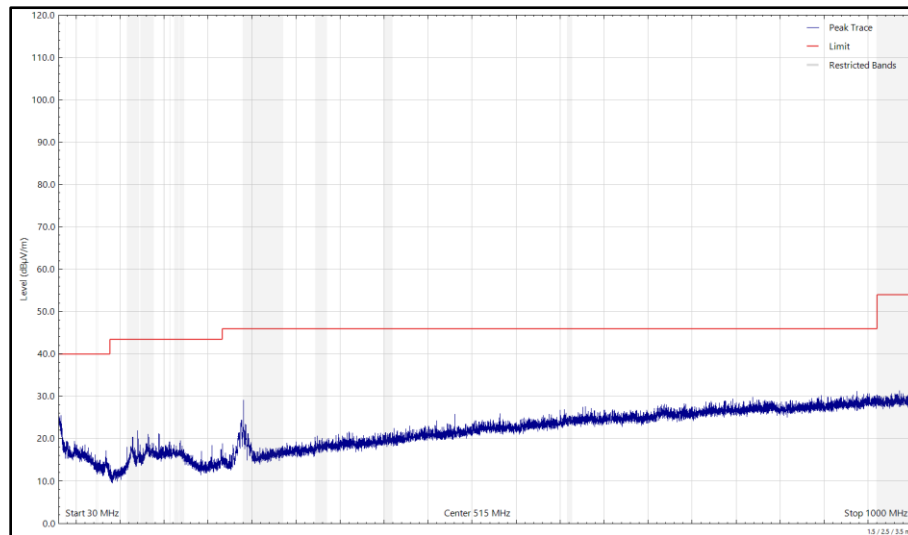


Figure 58 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Y Orientation

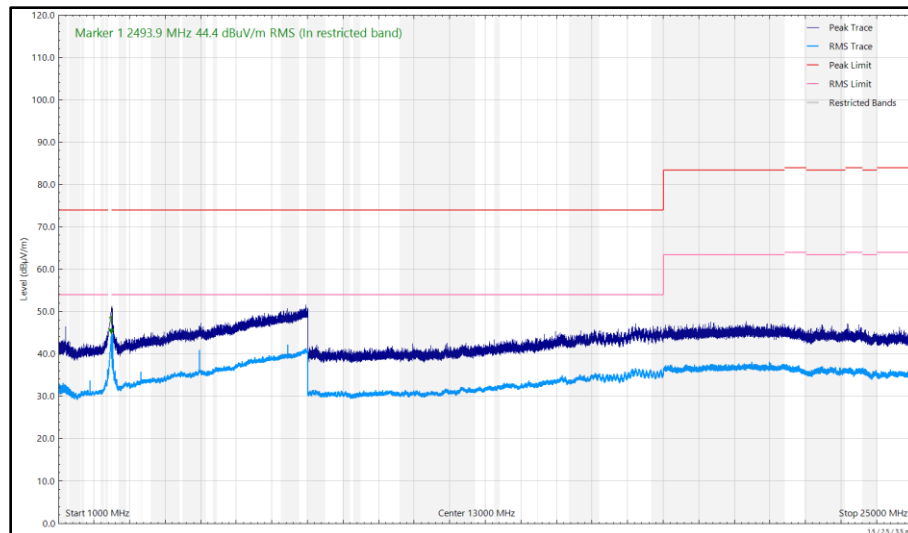


Figure 59 - Ch38_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Horizontal Y Orientation

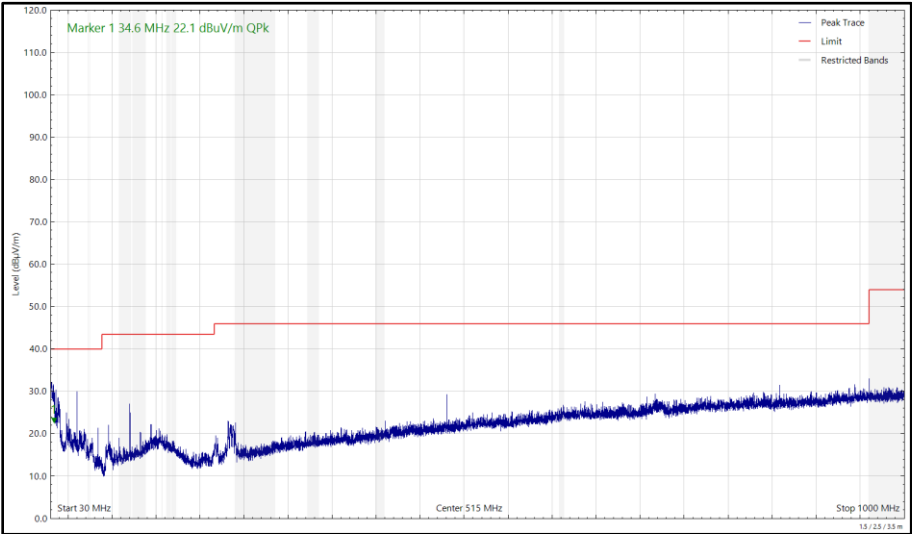


Figure 60 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Vertical (Peak) Y Orientation

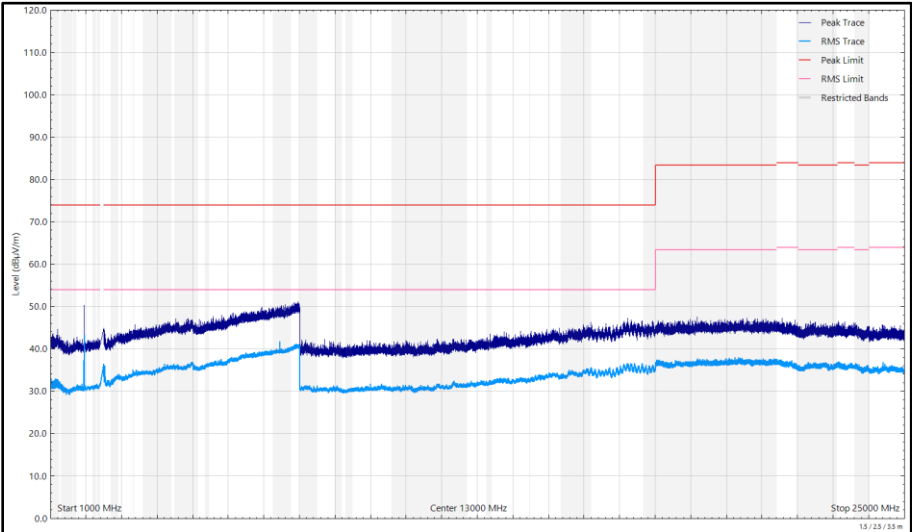


Figure 61 - Ch38_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Vertical Y Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
36.004	28.99	40.00	-11.01	Q-Peak	dBuV/m	0	108	Vertical

Table 31 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 25 GHz Z Orientation

No other emissions found within 10 dB of the limit.

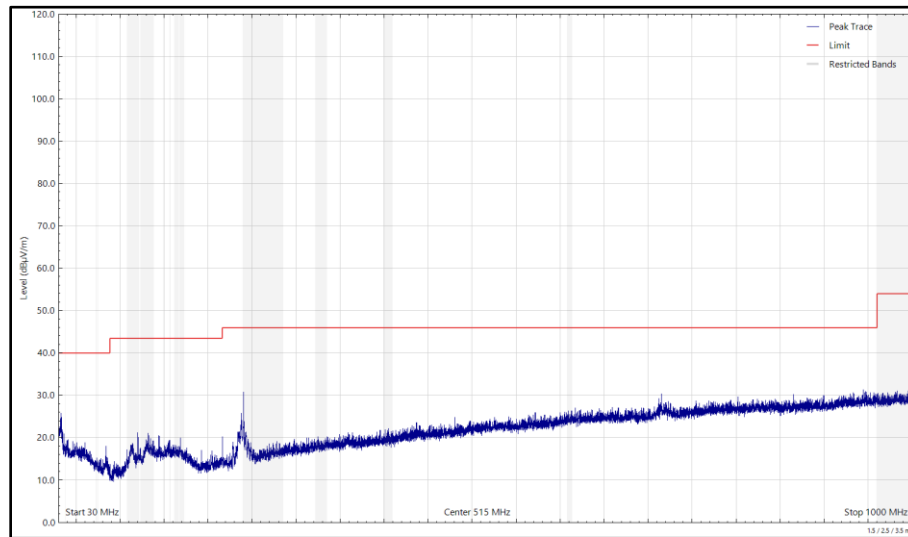


Figure 62 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Z Orientation

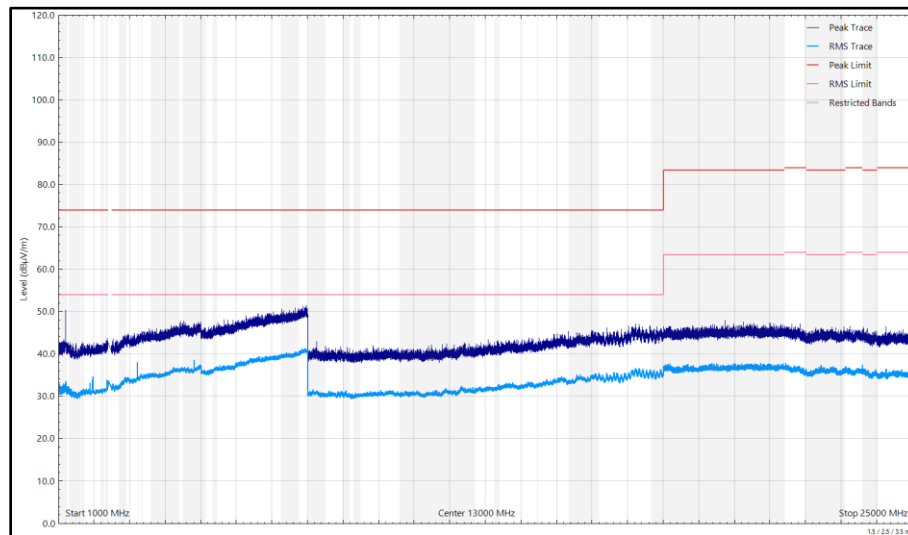


Figure 63 - Ch1_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Horizontal Z Orientation

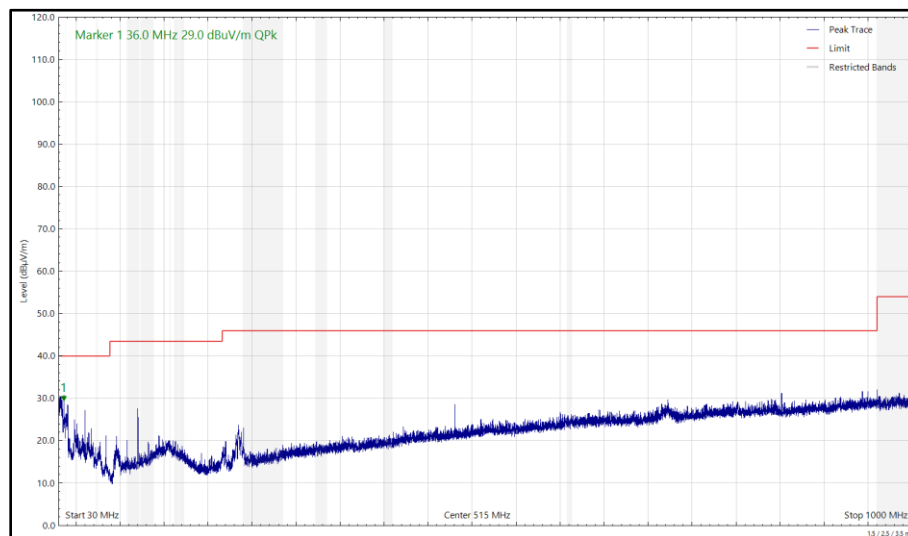


Figure 64 - Ch1_BLE_LE1M - 2404 MHz, 30 MHz to 1 GHz, Vertical (Peak) Z Orientation

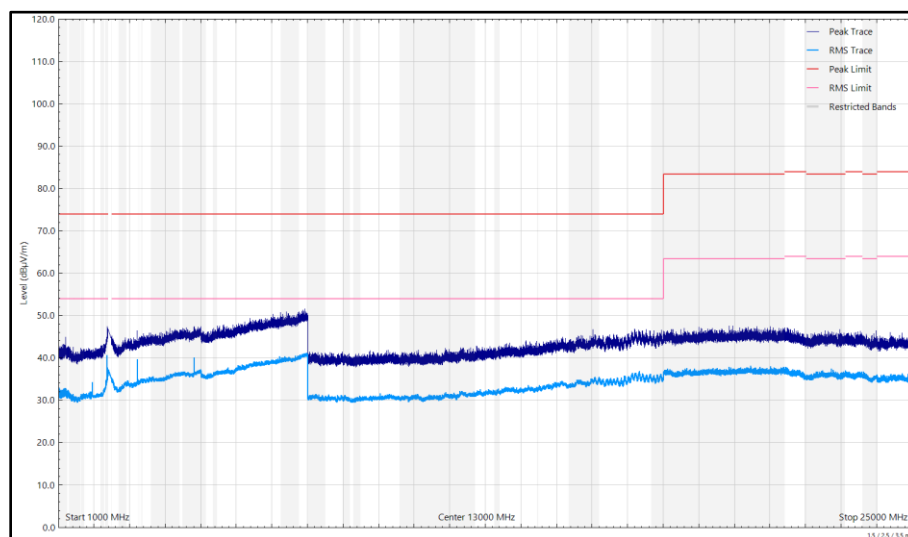


Figure 65 - Ch1_BLE_LE1M - 2404 MHz, 1 GHz to 25 GHz, Vertical Z Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
36.003	28.72	40.00	-11.28	Q-Peak	dBuV/m	5	103	Vertical

Table 32 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 25 GHz Z Orientation

No other emissions found within 10 dB of the limit.

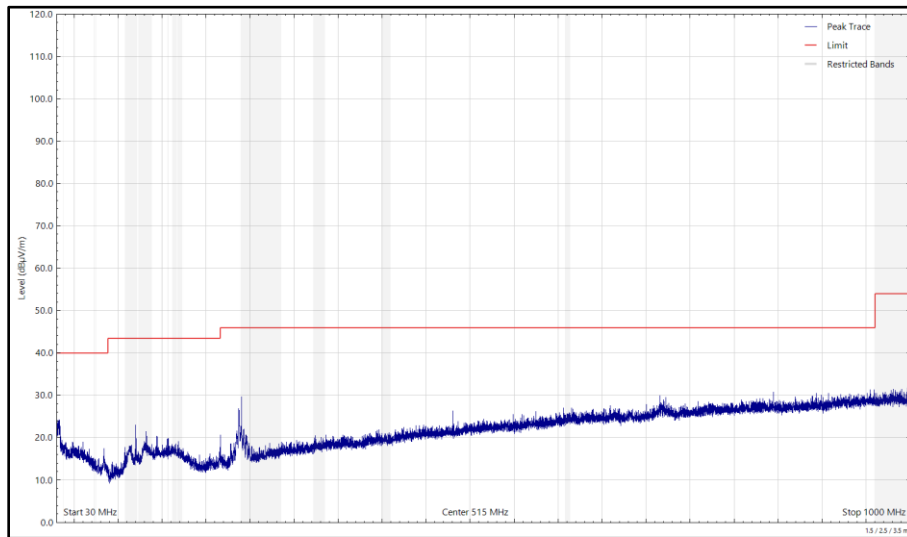


Figure 66 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Z Orientation

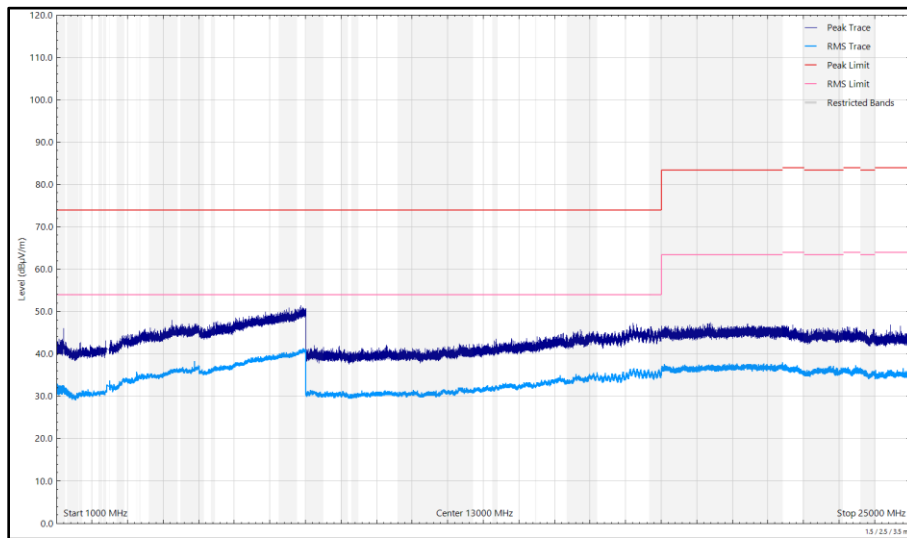


Figure 67 - Ch19_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Horizontal Z Orientation

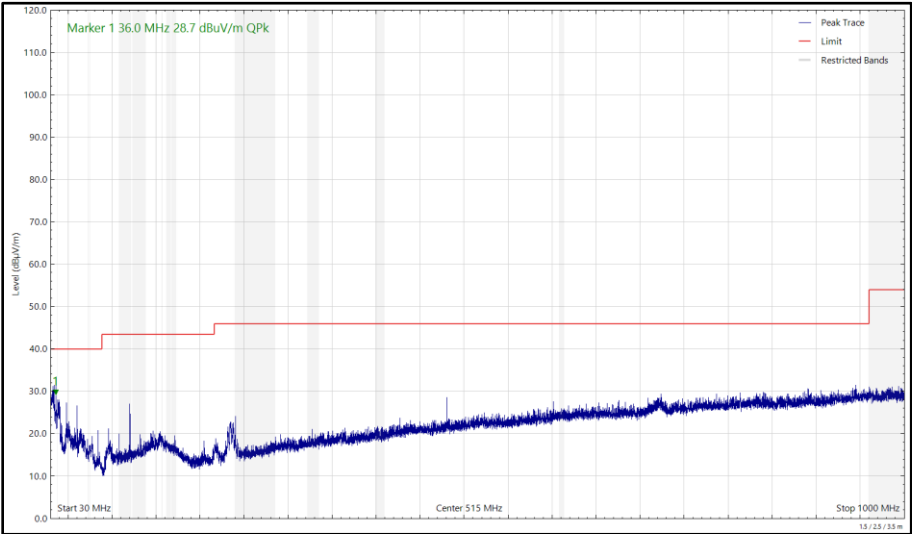


Figure 68 - Ch19_BLE_LE1M - 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak) Z Orientation

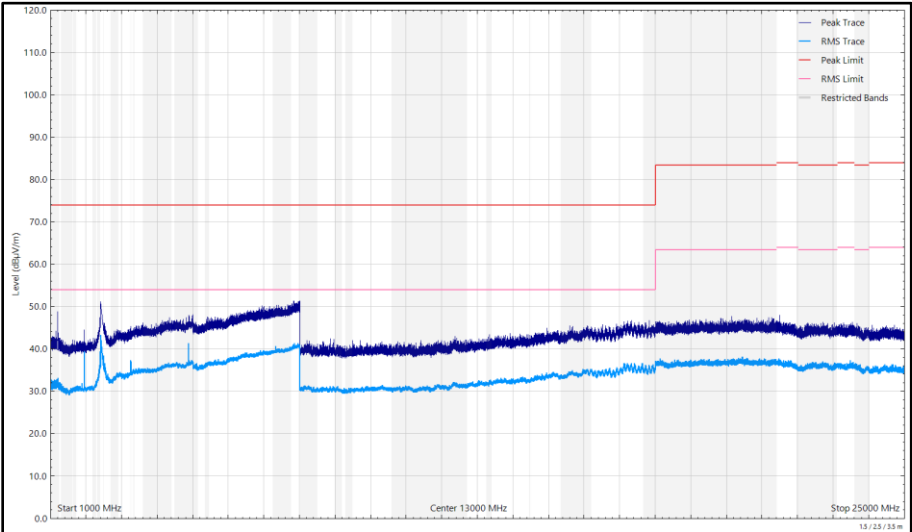


Figure 69 - Ch19_BLE_LE1M - 2440 MHz, 1 GHz to 25 GHz, Vertical Z Orientation

Frequency (MHz)	Level	Limit	Margin (dB)	Detector	Unit	Angle (°)	Height (cm)	Polarisation
36.021	29.55	40.00	-10.45	Q-Peak	dBuV/m	217	100	Vertical
2493.984	44.11	54.00	-9.89	RMS	dBuV/m	358	100	Vertical

Table 33 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 25 GHz Z Orientation

No other emissions found within 10 dB of the limit.

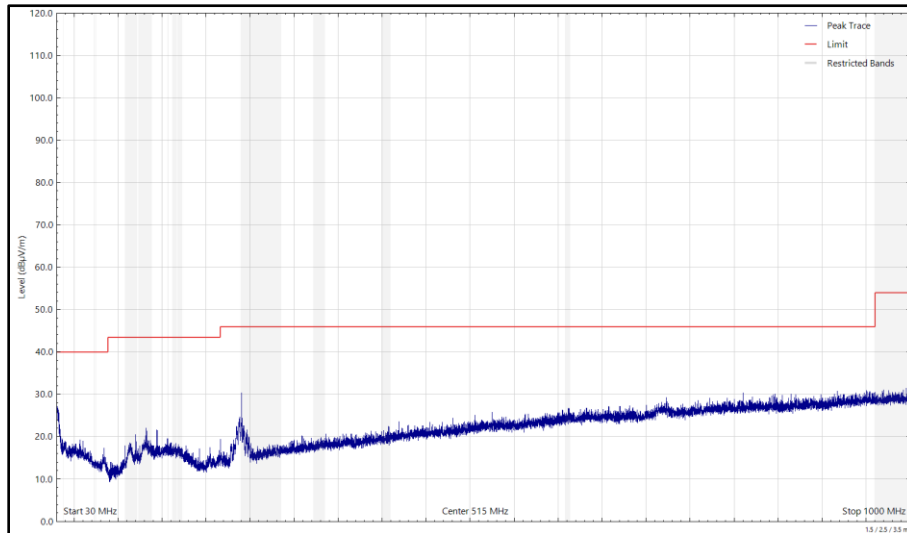


Figure 70 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Horizontal (Peak) Z Orientation

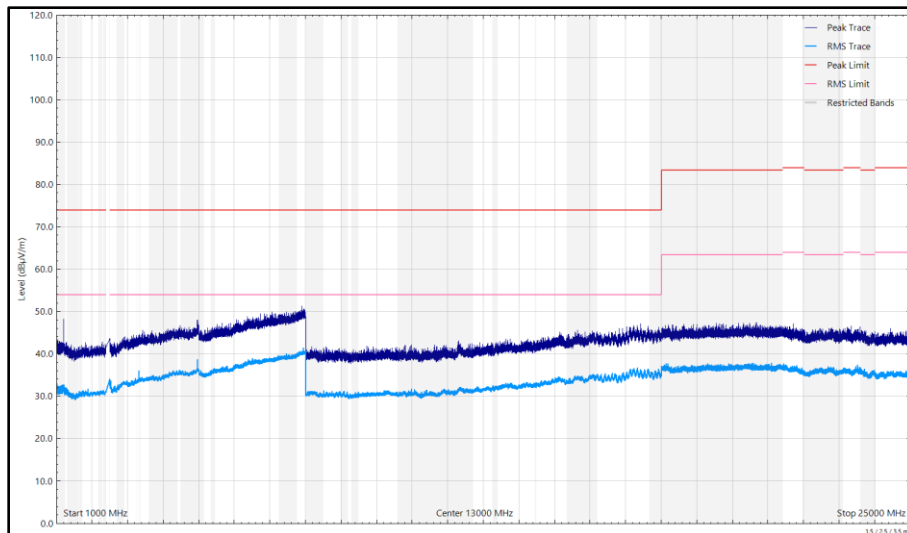


Figure 71 - Ch38_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Horizontal Z Orientation

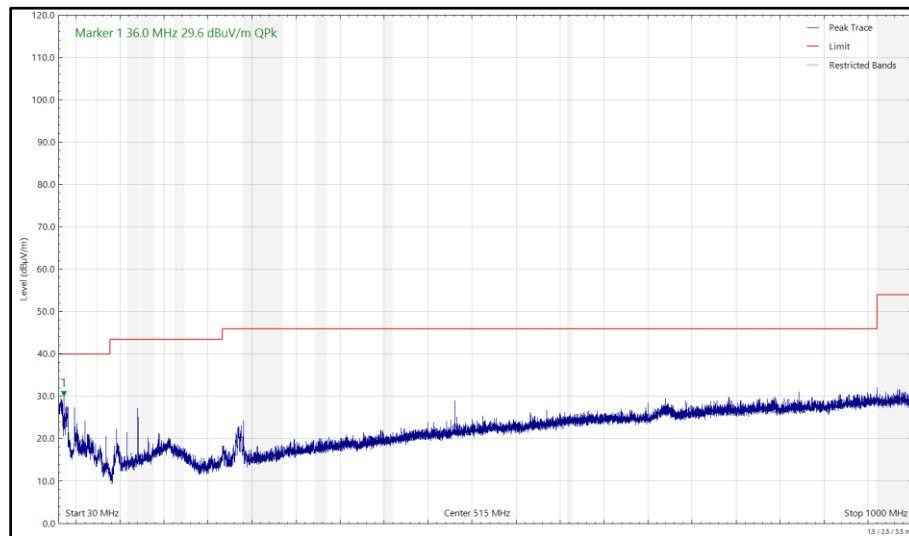


Figure 72 - Ch38_BLE_LE1M - 2478 MHz, 30 MHz to 1 GHz, Vertical (Peak) Z Orientation

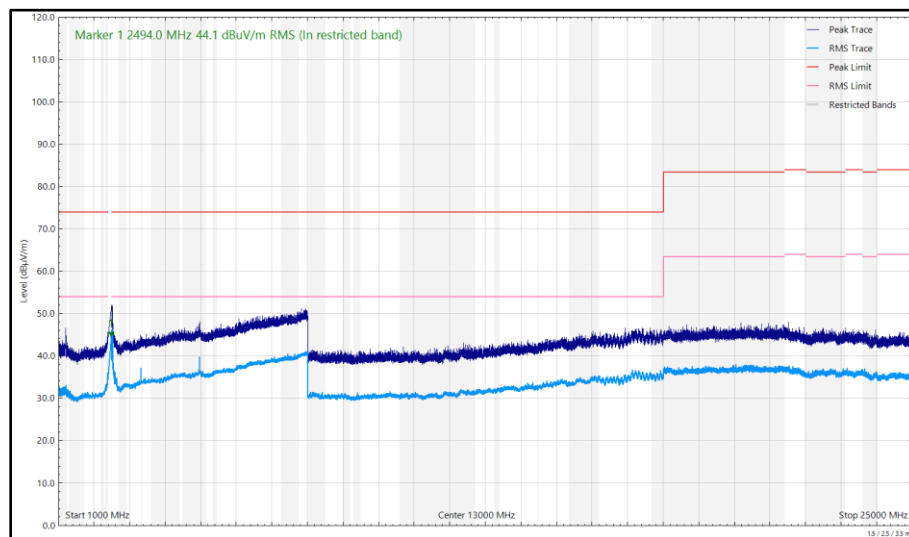


Figure 73 - Ch38_BLE_LE1M - 2478 MHz, 1 GHz to 25 GHz, Vertical Z Orientation



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.



2.1.8 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
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Jun-2024
4dB Attenuator	Pasternack	PE7047-4	4935	12	20-Jul-2024
Band Reject Filter - 2.425 GHz	Wainwright	WRCGV14-2390-2400-2450-2460-50SS	5066	12	22-Feb-2025
Band Reject Filter - 2.4585 GHz	Wainwright	WRCGV14-2423.5-2433.5-2483.5-2493.5-50SS	5068	12	06-Nov-2024
Test Receiver	Rohde & Schwarz	ESW44	5084	12	04-Nov-2024
Emissions Software	TUV SUD	EmX V3.2.0	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	24-Nov-2024
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	09-Jul-2024
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5220	12	03-Apr-2025
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5549	12	16-Aug-2024
Pre-Amplifier (8 GHz to 18 GHz)	Wright Technologies	APS06-0061	5595	12	26-Oct-2024
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5610	12	15-Oct-2024
Cable (K-Type to K-Type, 2 m)	Junkosha	MWX241-02000KMSKMS/B	5934	12	18-Jun-2024
Double Ridge Active Horn Antenna (18-40 GHz)	Com-Power	AHA-840	6189	24	02-Jun-2024
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	12	17-Feb-2025
1m Coaxial Cable Assy	Junkosha	MWX221-01000AMSAMS/A	6376	12	14-May-2025
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	6635	24	13-Jun-2025
Preamplifier	Hewlett Packard	HP8449B	6763	12	28-Feb-2025

Table 34

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



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

SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

2.2.3 Date of Test

22-May-2024

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 supplied with 3.3 VDC directly with a DC PSU.

2.2.5 Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	52.5 %



2.2.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

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):	-	Peak Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	6 dB Bandwidth (MHz)	Limit (kHz)
2402	16.00	0.710	≥500.0
2404	16.00	0.716	≥500.0
2440	16.00	0.720	≥500.0
2478	16.00	0.720	≥500.0
2480	16.00	0.720	≥500.0

Table 35 - 6 dB Bandwidth Results

Test Frequency (MHz)	Power Index	99% Bandwidth (MHz)	Limit (kHz)
2402	16.00	1.200	-
2404	16.00	1.204	-
2440	16.00	1.200	-
2478	16.00	1.200	-
2480	16.00	1.195	-

Table 36 - 99% Bandwidth Results

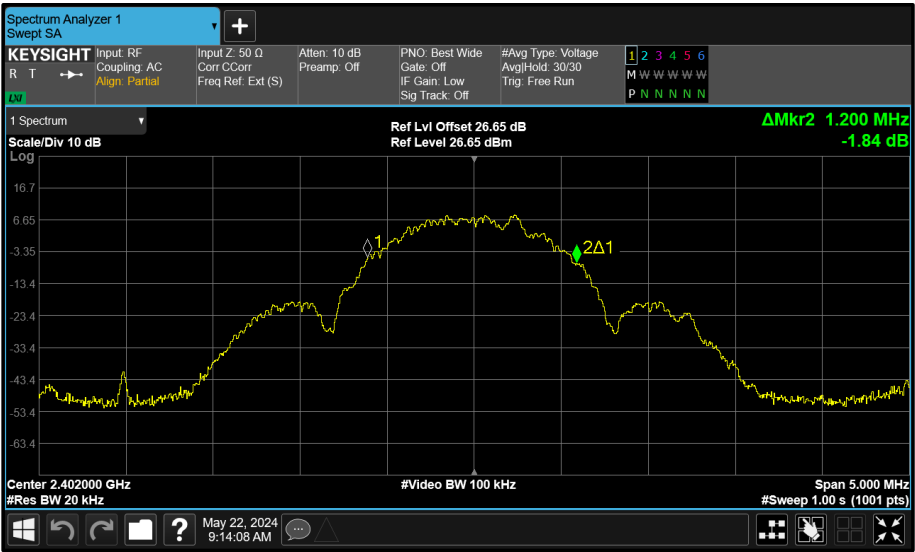


Figure 74 - 2402 MHz (CH37) 99% Bandwidth

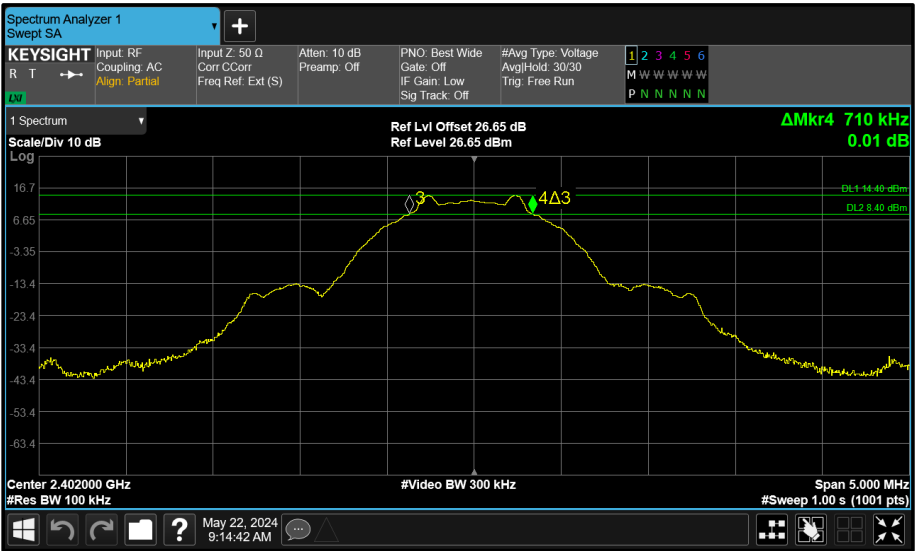


Figure 75 - 2402 MHz (CH37) 6 dB Bandwidth

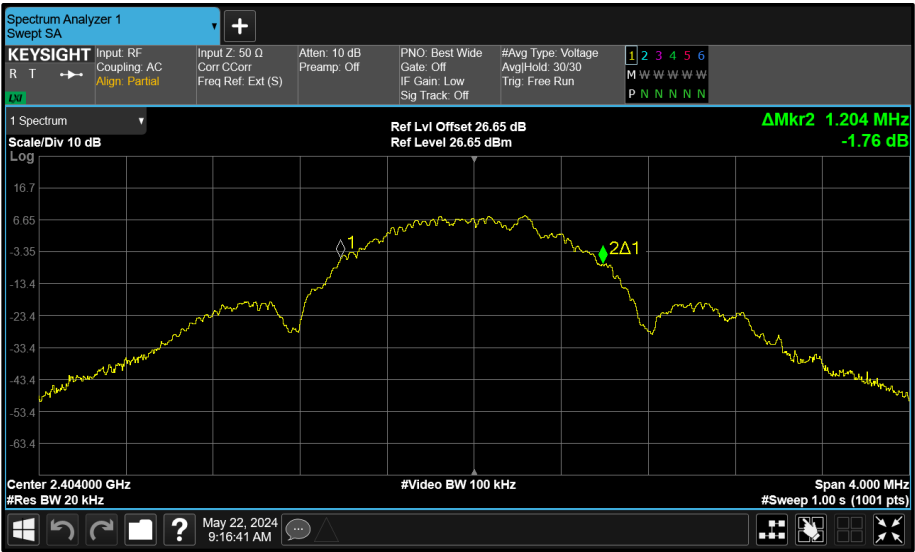


Figure 76 - 2404 MHz (CH0) 99% Bandwidth

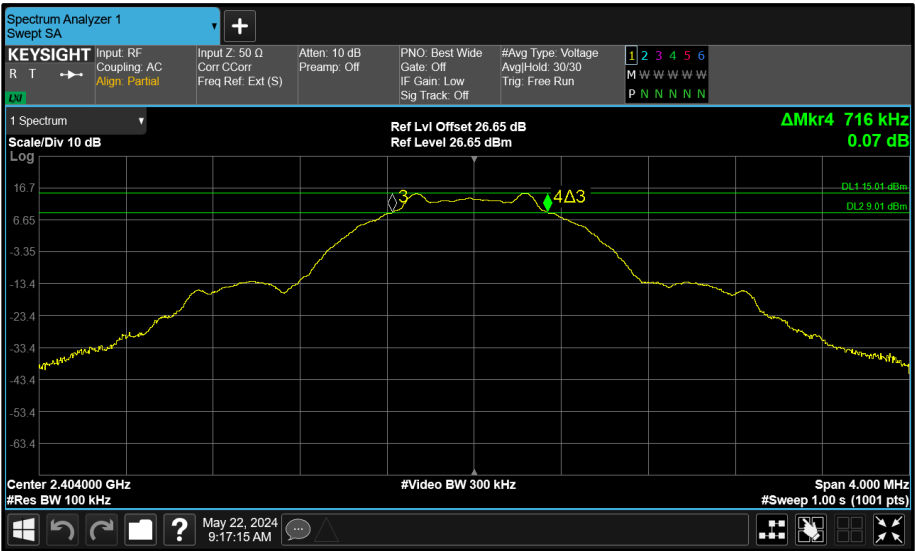


Figure 77 - 2404 MHz (CH0) 6 dB Bandwidth

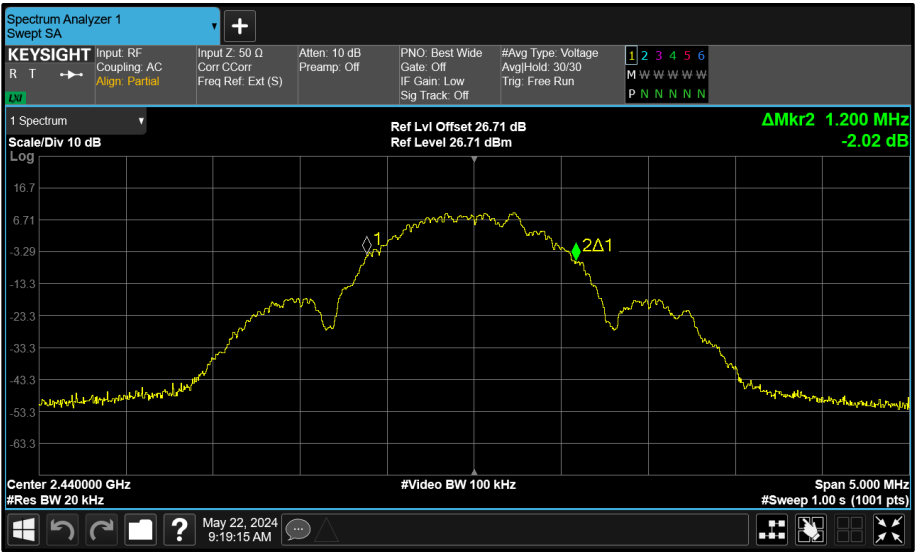


Figure 78 - 2440 MHz (CH17) 99% Bandwidth

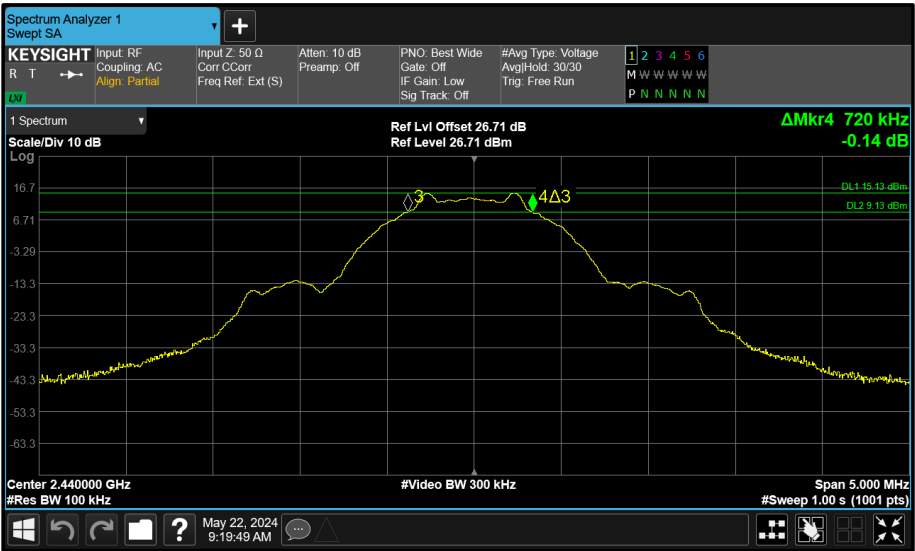


Figure 79 - 2440 MHz (CH17) 6 dB Bandwidth

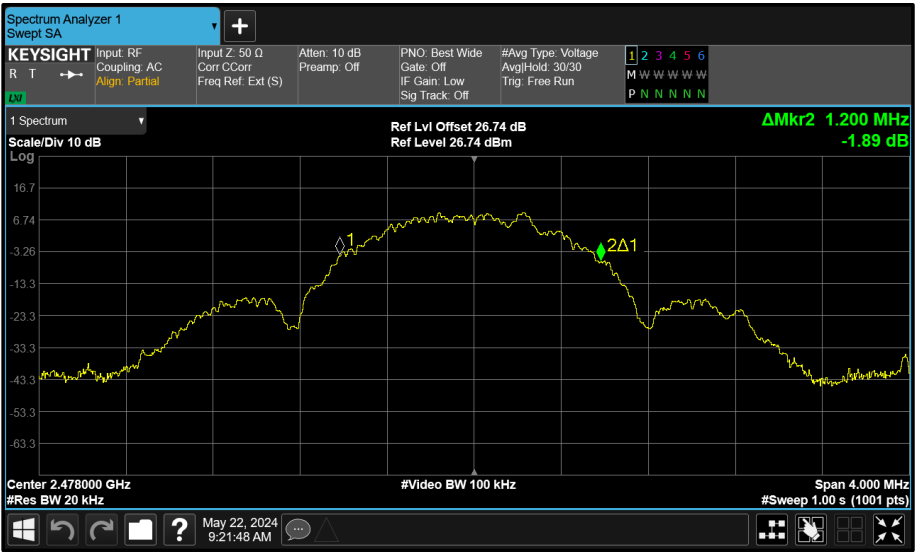


Figure 80 - 2478 MHz (CH36) 99% Bandwidth

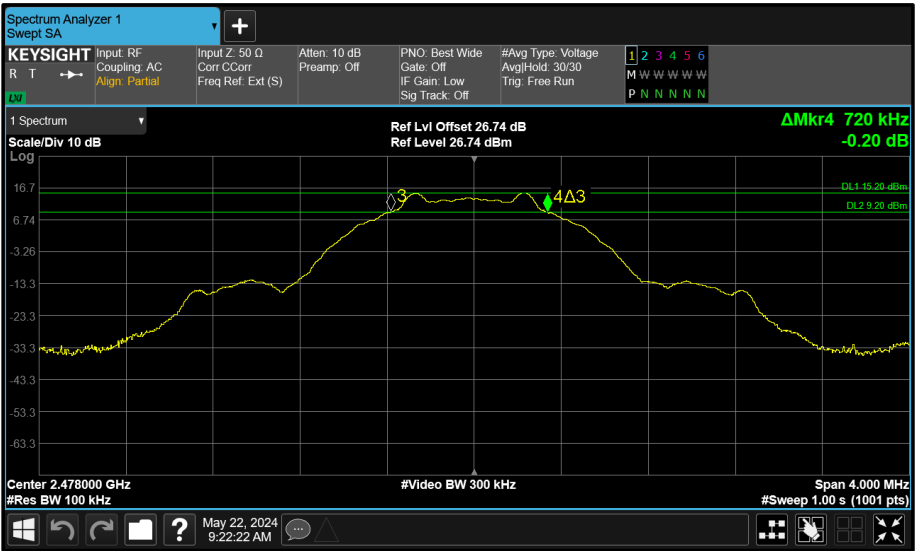


Figure 81 - 2478 MHz (CH36) 6 dB Bandwidth

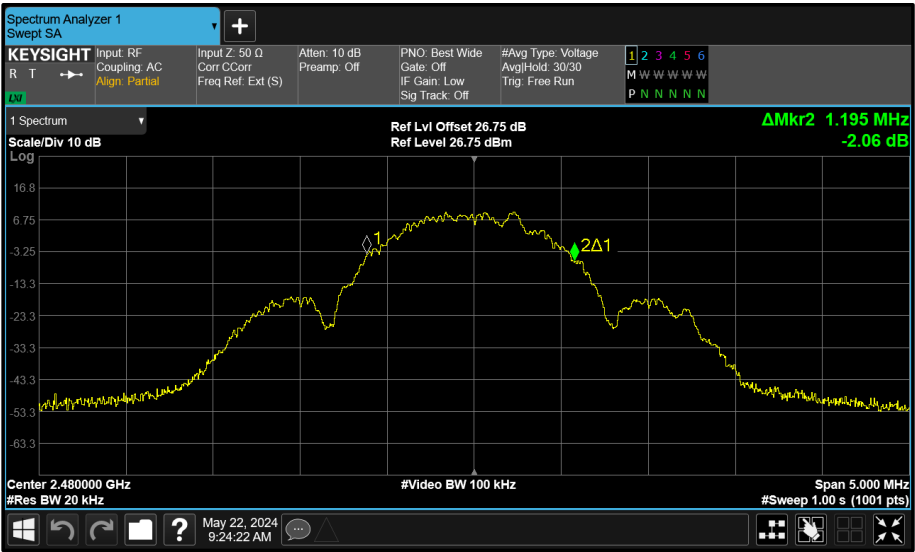


Figure 82 - 2480 MHz (CH39) 99% Bandwidth

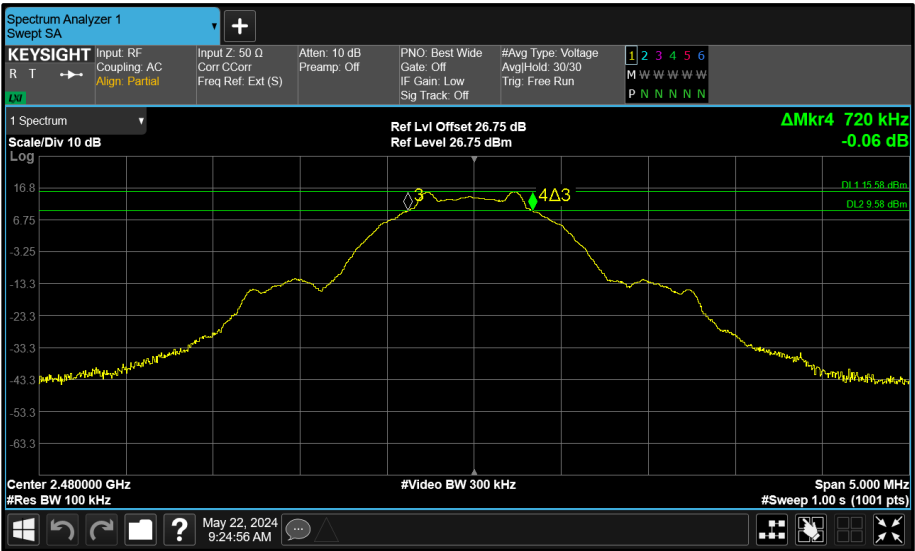


Figure 83 - 2480 MHz (CH39) 6 dB Bandwidth



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):	-	Peak Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	6 dB Bandwidth (MHz)	Limit (kHz)
2404	16.00	1.336	≥500.0
2440	16.00	1.336	≥500.0
2478	16.00	1.336	≥500.0

Table 37 - 6 dB Bandwidth Results

Test Frequency (MHz)	Power Index	99% Bandwidth (MHz)	Limit (kHz)
2404	16.00	2.408	-
2440	16.00	2.408	-
2478	16.00	2.424	-

Table 38 - 99% Bandwidth Results

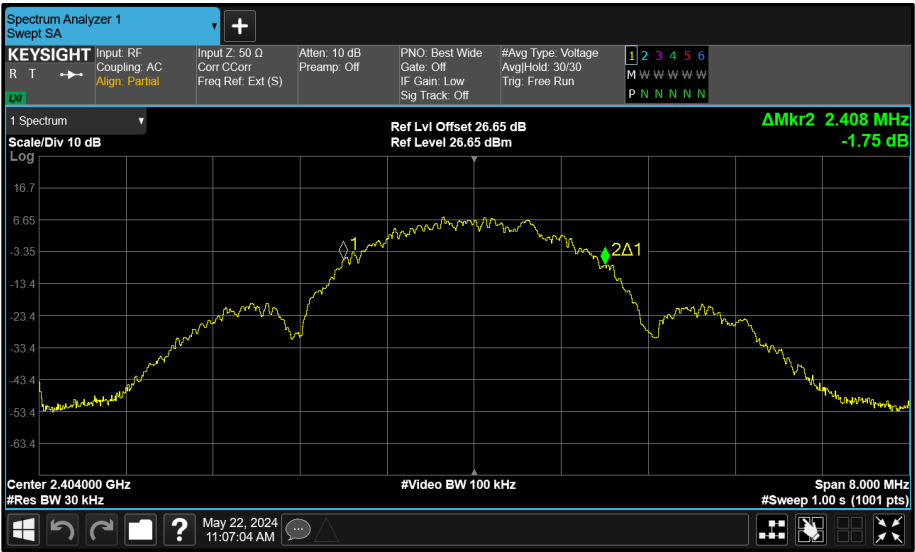


Figure 84 - 2404 MHz (CH0) 99% Bandwidth

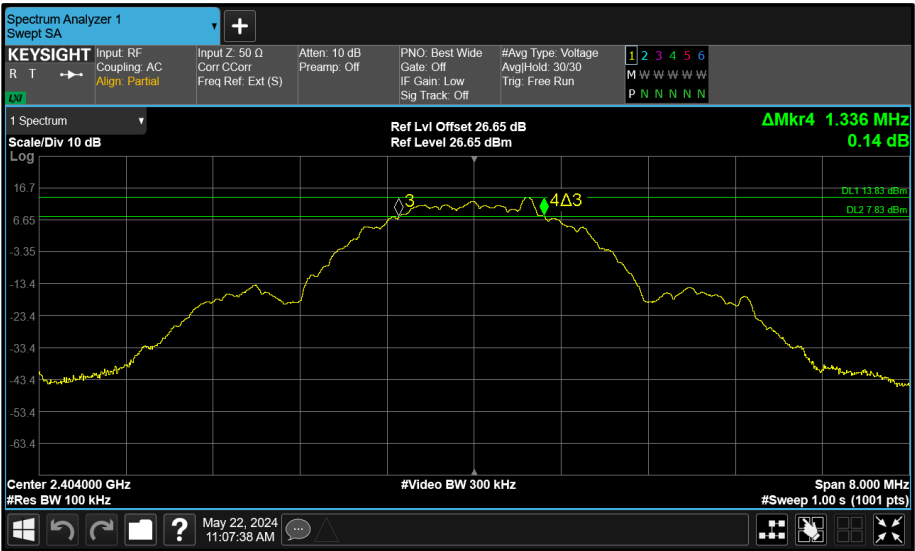


Figure 85 - 2404 MHz (CH0) 6 dB Bandwidth

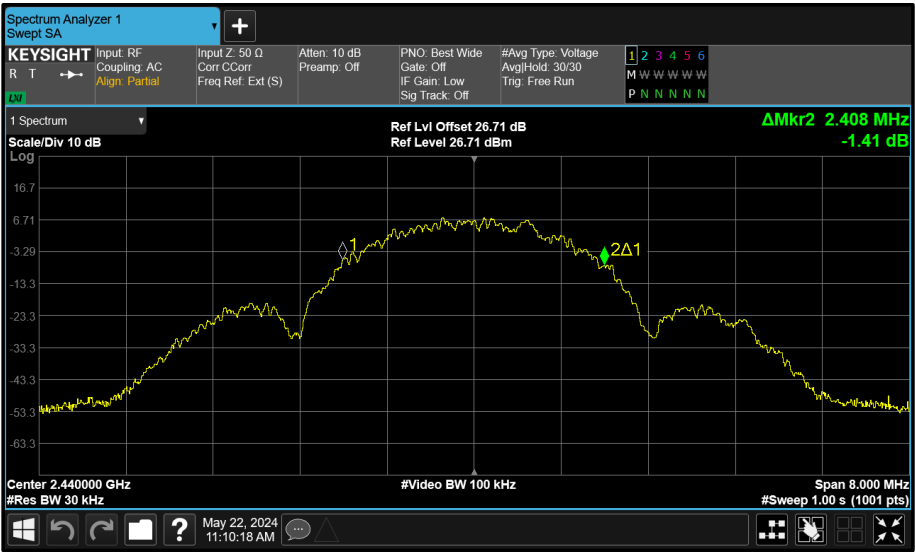


Figure 86 - 2440 MHz (CH17) 99% Bandwidth

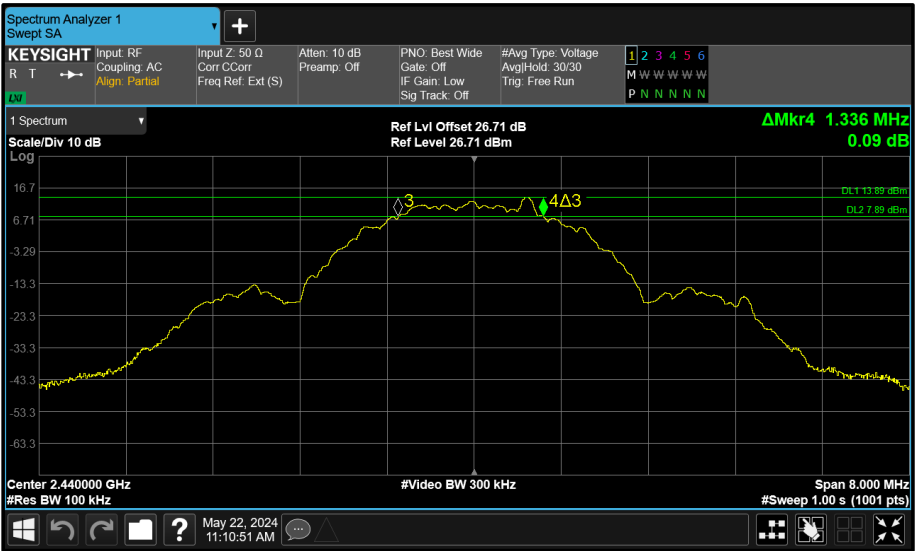


Figure 87 - 2440 MHz (CH17) 6 dB Bandwidth

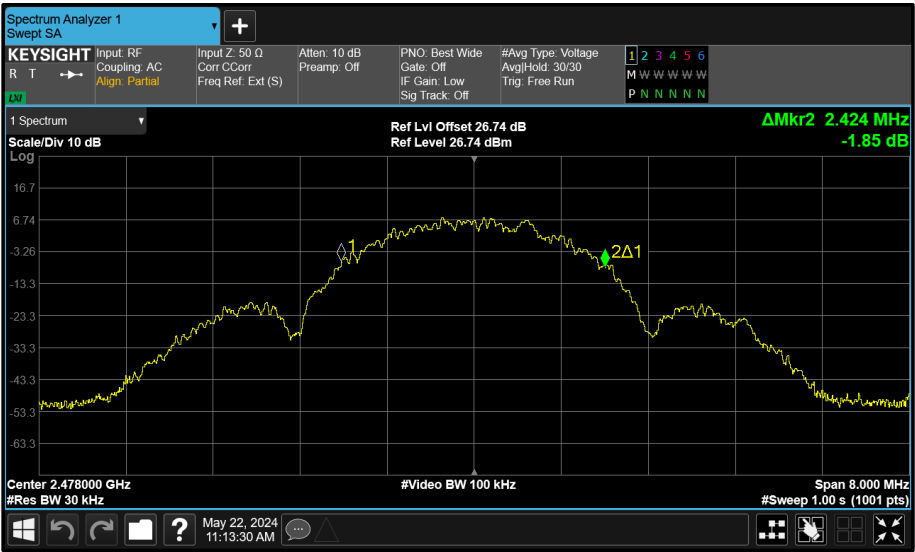


Figure 88 - 2478 MHz (CH36) 99% Bandwidth

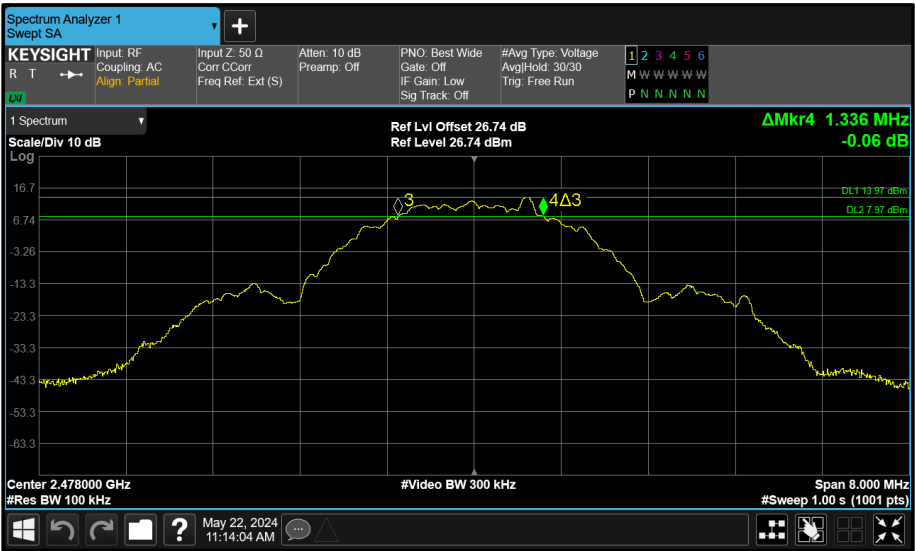


Figure 89 - 2478 MHz (CH36) 6 dB Bandwidth



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 125K)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	6 dB Bandwidth (MHz)	Limit (kHz)
2402	11.00	0.736	≥500.0
2404	11.00	0.736	≥500.0
2440	11.00	0.740	≥500.0
2478	11.00	0.732	≥500.0
2480	11.00	0.736	≥500.0

Table 39 - 6 dB Bandwidth Results

Test Frequency (MHz)	Power Index	99% Bandwidth (MHz)	Limit (kHz)
2402	11.00	1.196	-
2404	11.00	1.196	-
2440	11.00	1.192	-
2478	11.00	1.196	-
2480	11.00	1.196	-

Table 40 - 99% Bandwidth Results

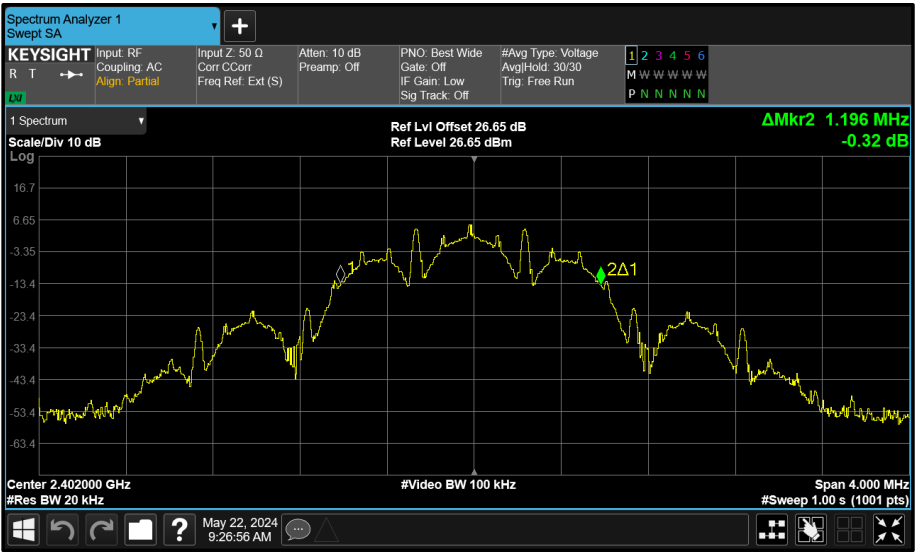


Figure 90 - 2402 MHz (CH37) 99% Bandwidth

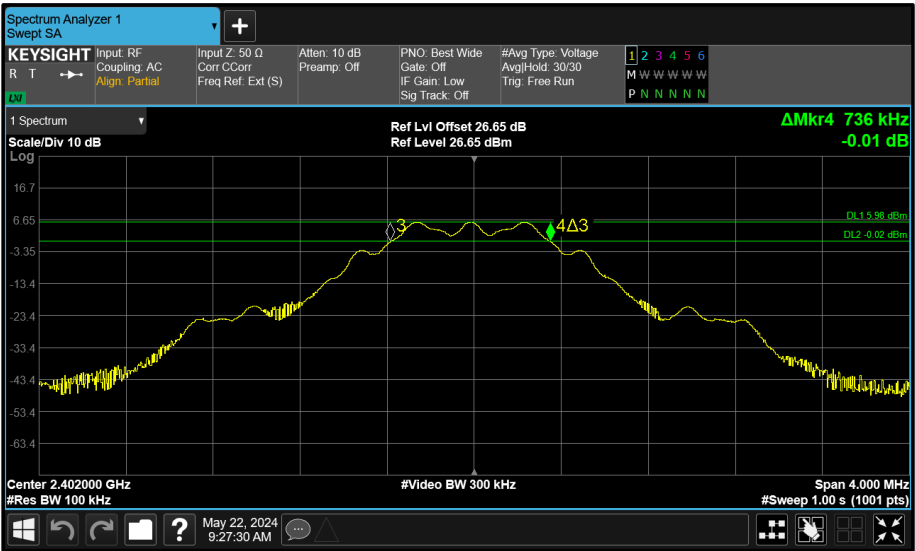


Figure 91 - 2402 MHz (CH37) 6 dB Bandwidth

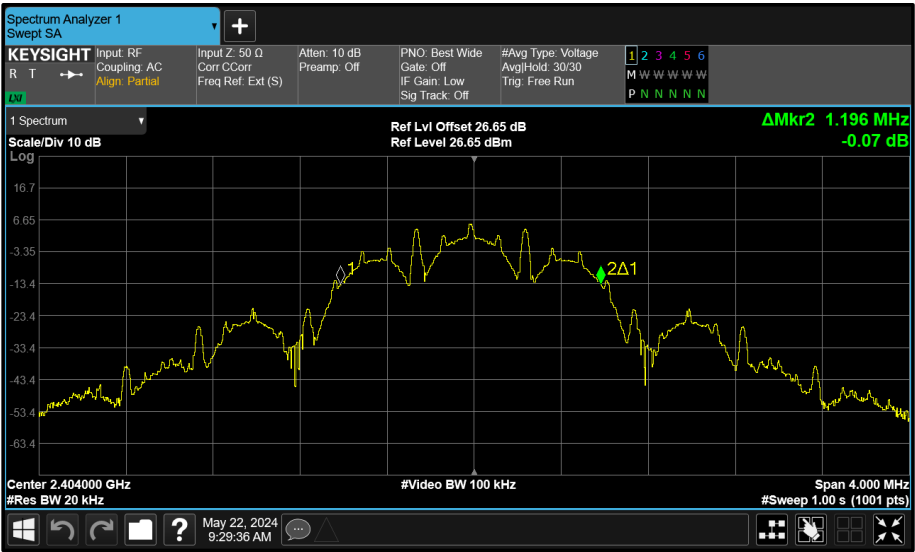


Figure 92 - 2404 MHz (CH0) 99% Bandwidth

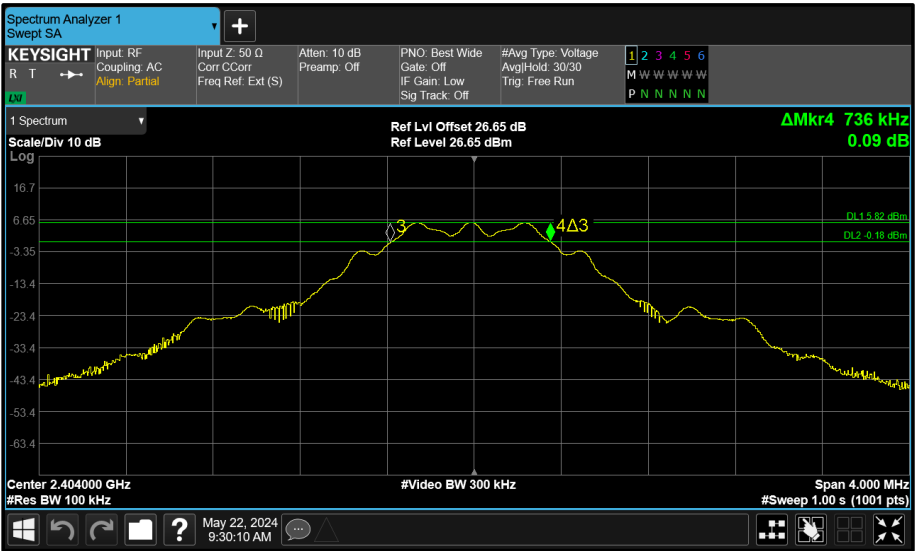


Figure 93 - 2404 MHz (CH0) 6 dB Bandwidth

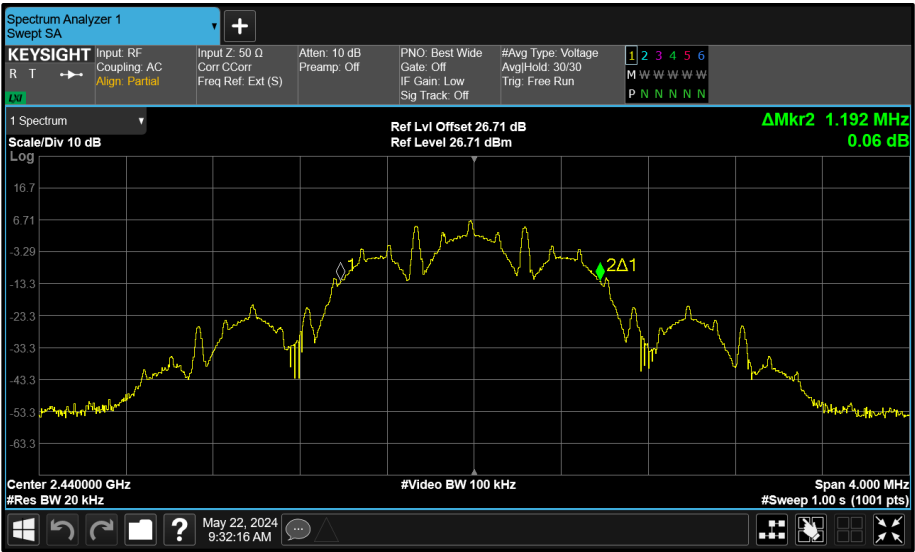


Figure 94 - 2440 MHz (CH17) 99% Bandwidth

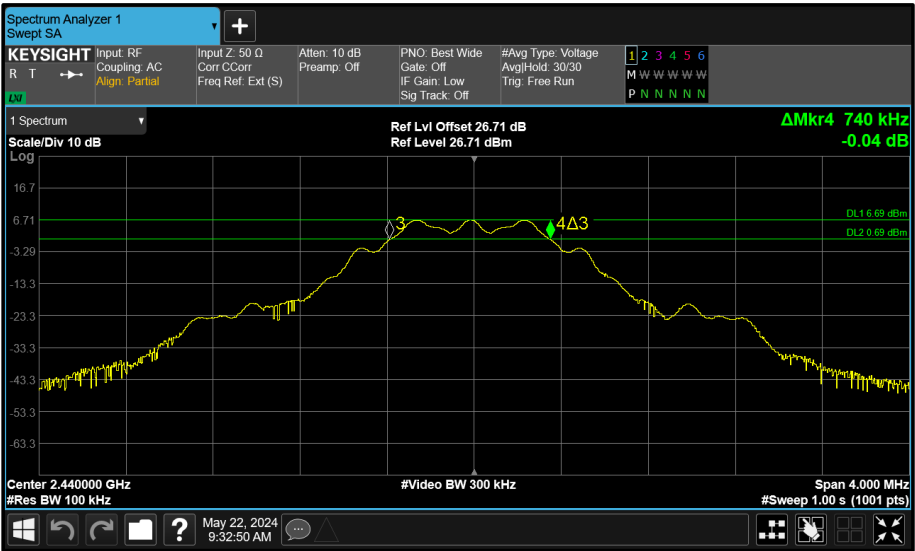


Figure 95 - 2440 MHz (CH17) 6 dB Bandwidth

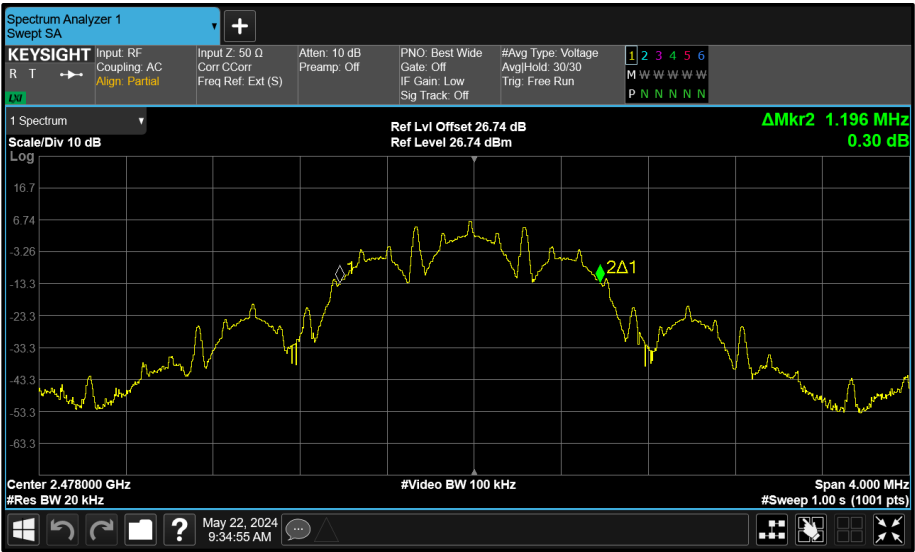


Figure 96 - 2478 MHz (CH36) 99% Bandwidth

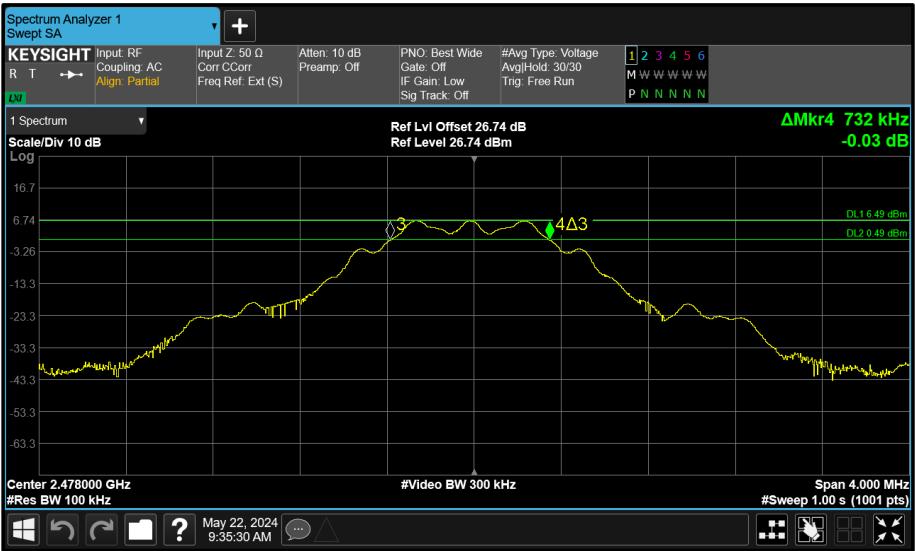


Figure 97 - 2478 MHz (CH36) 6 dB Bandwidth

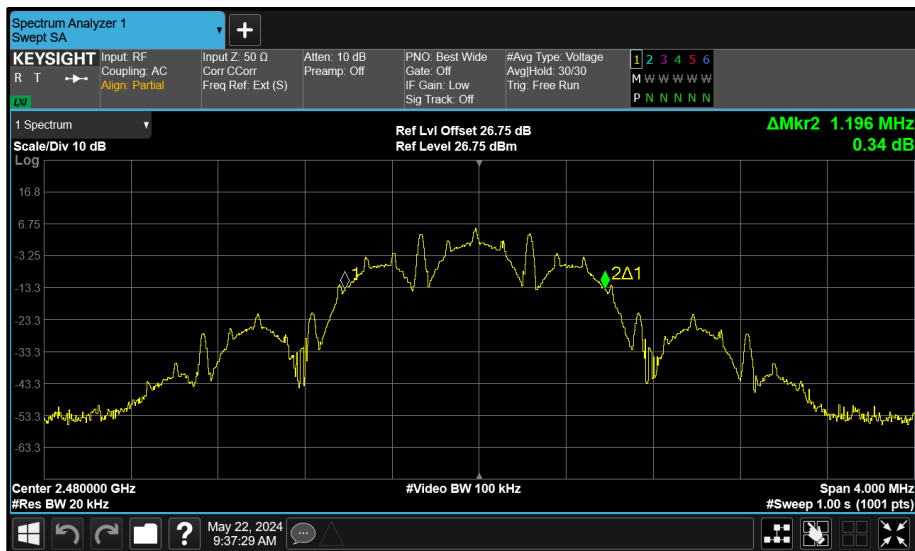


Figure 98 - 2480 MHz (CH39) 99% Bandwidth

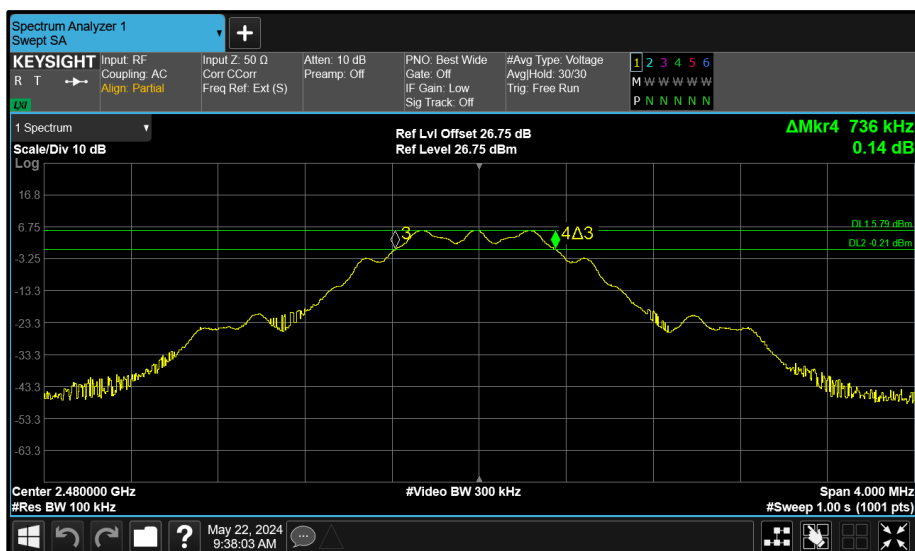


Figure 99 - 2480 MHz (CH39) 6 dB Bandwidth

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.



2.2.7 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
True RMS Multimeter	Fluke	79 Series III	411	12	12-Jan-2025
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	14-Sep-2024
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	18-Sep-2025
Modular Power System Mainframe	Keysight Technologies	N6701C	5835	-	TU
DC Power Module 60V 20A 300W	Keysight Technologies	N6754A	5836	-	O/P Mon
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU001	6350	-	26-Jul-2024
SCU Cable Assembly SCU	TUV SUD	SPECTRUM_SCU_CA	6638	12	26-Jul-2024

Table 41

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



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

SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

2.3.3 Date of Test

22-May-2024

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 supplied with 3.3 VDC directly with a DC PSU.

2.3.5 Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	52.5 %



2.3.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

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 (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	16.00	15.22	30.00	-14.78
2404	16.00	15.14	30.00	-14.86
2440	16.00	15.97	30.00	-14.03
2478	16.00	16.06	30.00	-13.94
2480	16.00	16.18	30.00	-13.82

Table 42 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	16.00	15.22	30.00	-14.78	18.02	36.00	-17.98
2404	16.00	15.14	30.00	-14.86	17.94	36.00	-18.06
2440	16.00	15.97	30.00	-14.03	18.77	36.00	-17.23
2478	16.00	16.06	30.00	-13.94	18.86	36.00	-17.14
2480	16.00	16.18	30.00	-13.82	18.98	36.00	-17.02

Table 43 - ISSED 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 (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2404	16.00	14.97	30.00	-15.03
2440	16.00	15.71	30.00	-14.29
2478	16.00	15.86	30.00	-14.14

Table 44 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2404	16.00	14.97	30.00	-15.03	17.77	36.00	-18.23
2440	16.00	15.71	30.00	-14.29	18.51	36.00	-17.49
2478	16.00	15.86	30.00	-14.14	18.66	36.00	-17.34

Table 45 - 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 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	11.00	10.51	30.00	-19.49
2404	11.00	10.60	30.00	-19.40
2440	11.00	11.28	30.00	-18.72
2478	11.00	11.09	30.00	-18.91
2480	11.00	10.27	30.00	-19.73

Table 46 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	11.00	10.51	30.00	-19.49	13.31	36.00	-22.69
2404	11.00	10.60	30.00	-19.40	13.40	36.00	-22.60
2440	11.00	11.28	30.00	-18.72	14.08	36.00	-21.92
2478	11.00	11.09	30.00	-18.91	13.89	36.00	-22.11
2480	11.00	10.27	30.00	-19.73	13.07	36.00	-22.93

Table 47 - ISSED Maximum Conducted (peak) Output Power Results



FCC 47 CFR Part 15, Limit Clause 15.247 (b)(1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

ISED RSS-247, Limit Clause 5.4 (b)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channel; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channel. The e.i.r.p. shall not exceed 4 W except as provided in section 5.4(e) of the specification.

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(2)

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels.

ISED RSS-247, Limit Clause 5.4 (a)

For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

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.



2.3.7 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
True RMS Multimeter	Fluke	79 Series III	411	12	12-Jan-2025
Multimeter	Fluke	75 Mk3	455	12	15-Dec-2024
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
USB Power Sensor	Boonton	RTP5008	5833	12	12-Jul-2024
Modular Power System Mainframe	Keysight Technologies	N6701C	5835	-	TU
DC Power Module 60V 20A 300W	Keysight Technologies	N6754A	5836	-	O/P Mon
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU001	6350	-	26-Jul-2024
SCU Cable Assembly SCU	TUV SUD	SPECTRUM_SCU_CA	6638	12	26-Jul-2024

Table 48

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.4 Power Spectral Density

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test and Modification State

SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

2.4.3 Date of Test

22-May-2024

2.4.4 Test Method

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

The EUT was supplied with 3.3 VDC directly with a DC PSU.

2.4.5 Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	52.5 %



2.4.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

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 (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	RBW (kHz)	PSD (dBm/RBW)	Limit (dBm/3 kHz)	Margin (dB)
2402	16.00	3.0	1.86	8.00	-6.15
2404	16.00	3.0	2.55	8.00	-5.45
2440	16.00	3.0	2.71	8.00	-5.29
2478	16.00	3.0	2.86	8.00	-5.14
2480	16.00	3.0	3.32	8.00	-4.69

Table 49 - 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 (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	RBW (kHz)	PSD (dBm/RBW)	Limit (dBm/3 kHz)	Margin (dB)
2404	16.00	3.0	-1.53	8.00	-9.53
2440	16.00	3.0	-1.70	8.00	-9.70
2478	16.00	3.0	-1.24	8.00	-9.24

Table 50 - 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 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	RBW (kHz)	PSD (dBm/RBW)	Limit (dBm/3 kHz)	Margin (dB)
2402	11.00	3.0	3.58	8.00	-4.42
2404	11.00	3.0	4.37	8.00	-3.63
2440	11.00	3.0	4.33	8.00	-3.67
2478	11.00	3.0	4.17	8.00	-3.83
2480	11.00	3.0	2.36	8.00	-5.64

Table 51 - Maximum Power Spectral Density Results



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

2.4.7 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
True RMS Multimeter	Fluke	79 Series III	411	12	12-Jan-2025
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	14-Sep-2024
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	18-Sep-2025
Modular Power System Mainframe	Keysight Technologies	N6701C	5835	-	TU
DC Power Module 60V 20A 300W	Keysight Technologies	N6754A	5836	-	O/P Mon
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU001	6350	-	26-Jul-2024
SCU Cable Assembly SCU	TUV SUD	SPECTRUM_SCU_CA	6638	12	26-Jul-2024

Table 52

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.5 Restricted Band Edges

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test and Modification State

SiW917Y1GA, S/N: BLE MAC address: D4:48:67:DD:D6:87 - Modification State 0
SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

2.5.3 Date of Test

28-May-2024 to 05-June-2024

2.5.4 Test Method

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

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:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$.

The EUT was supplied with 3.3 VDC by means of a regulator residing in the host certification board, which was in turn being powered over the host certification board's USB connector.

2.5.5 Environmental Conditions

Ambient Temperature	19.3 - 23.3 °C
Relative Humidity	49.1 - 51.8 %

2.5.6 Test Results

2.4 GHz Bluetooth Low Energy - PCB Trace Antenna

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
BLE	125k	2402	2390	46.61	33.83
BLE	125k	2480	2483.5	51.96	37.77
BLE	1M	2402	2390	46.91	33.80
BLE	1M	2480	2483.5	52.77	37.80
BLE	125k	2404	2390	46.67	34.25
BLE	125k	2478	2483.5	48.07	36.93
BLE	1M	2404	2390	45.99	34.12
BLE	1M	2478	2483.5	48.71	36.72
BLE	2M	2404	2390	46.35	33.83
BLE	2M	2478	2483.5	50.80	33.83

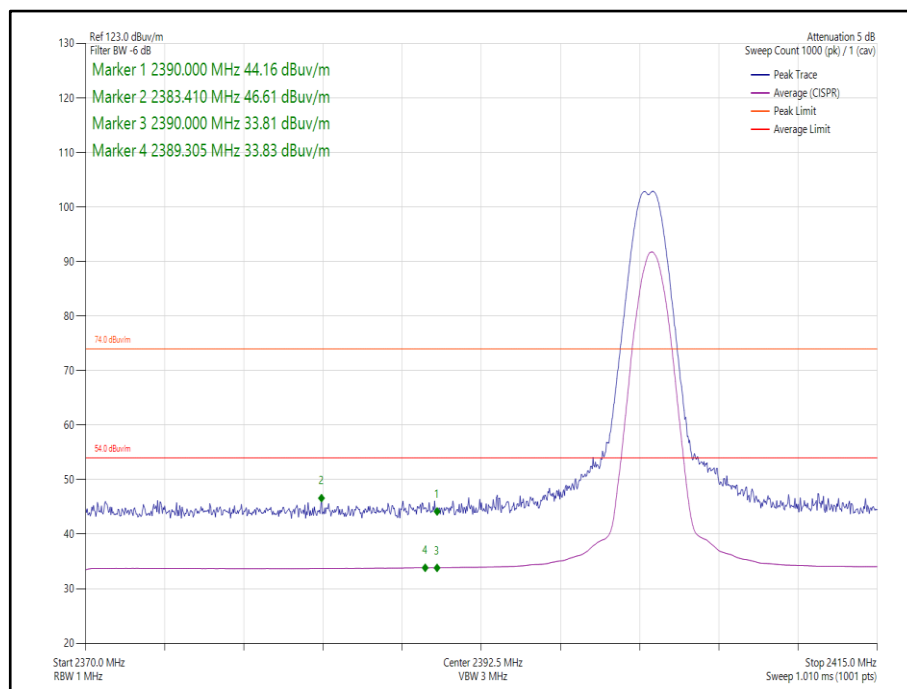


Figure 100 - CH0_125 kHz_TX, 2402 MHz, Band Edge Frequency 2390 MHz

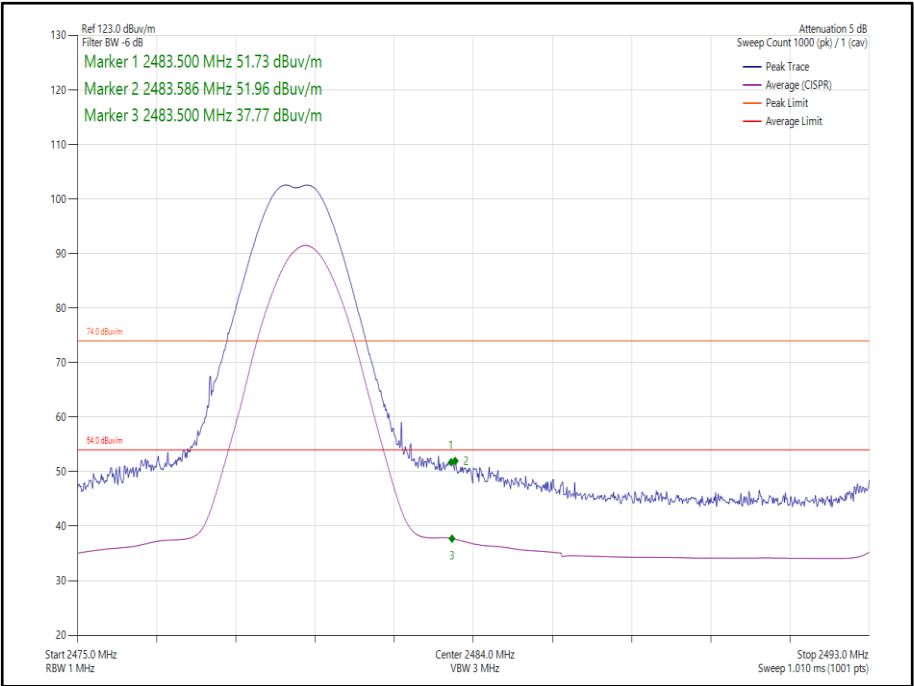


Figure 101 - CH39_125 kHz _TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

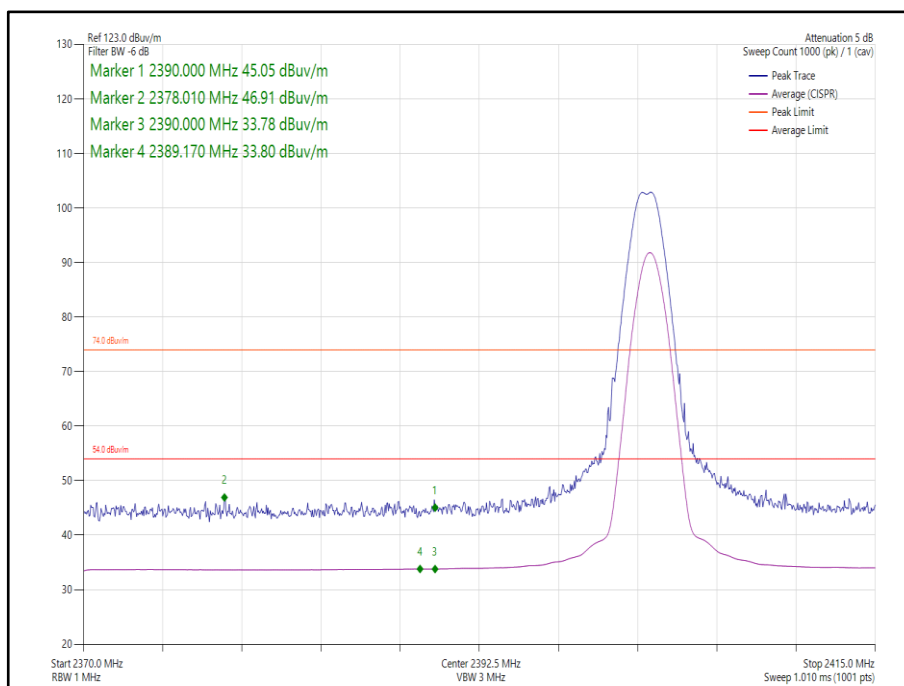


Figure 102 - CH0_1 MHz_TX, 2402 MHz, Band Edge Frequency 2390 MHz

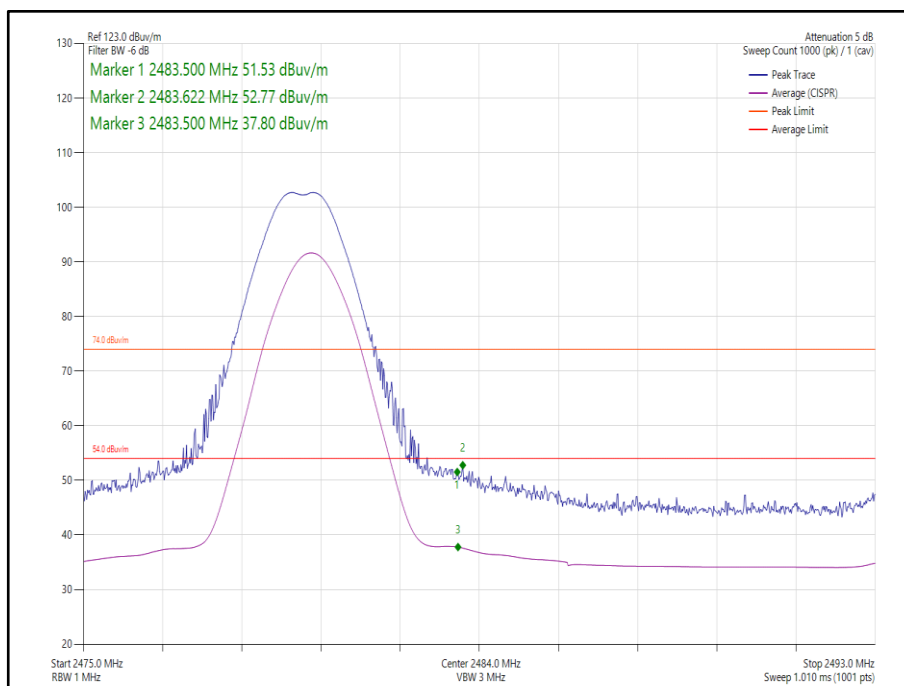


Figure 103 - CH39_1 MHz_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

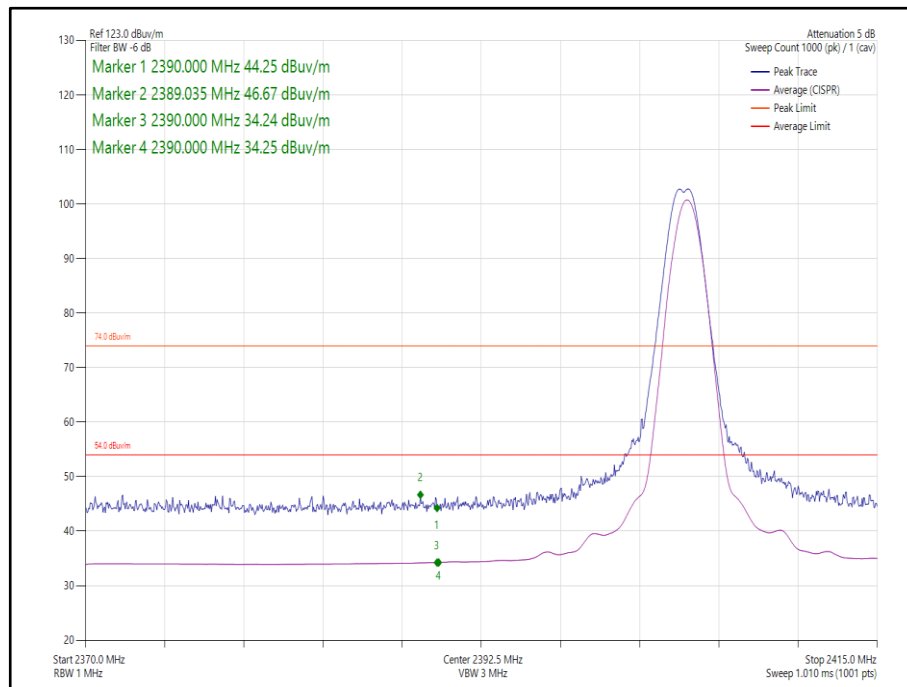


Figure 104 - CH1_125 kHz_TX, 2404 MHz, Band Edge Frequency 2390 MHz

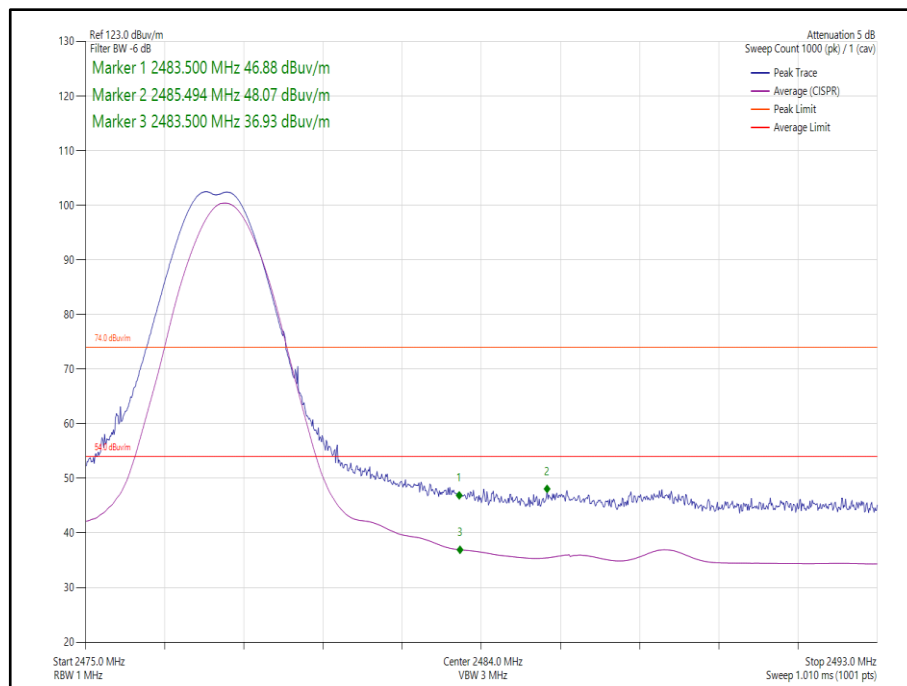


Figure 105 - CH38_125 kHz_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

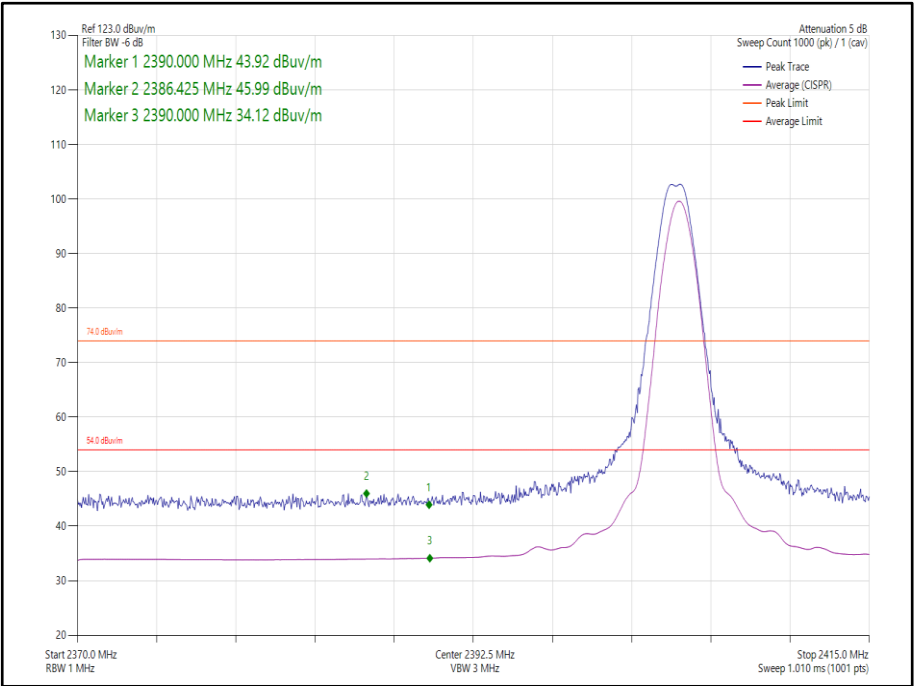


Figure 106 - CH1_1 MHz_TX, 2404 MHz, Band Edge Frequency 2390 MHz

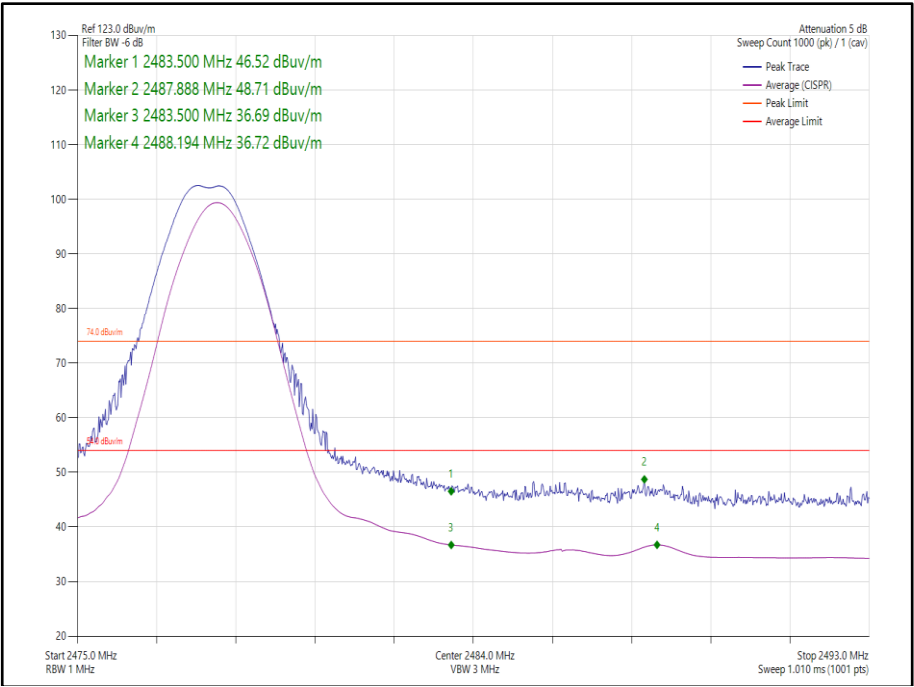


Figure 107 - CH38_1 MHz_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

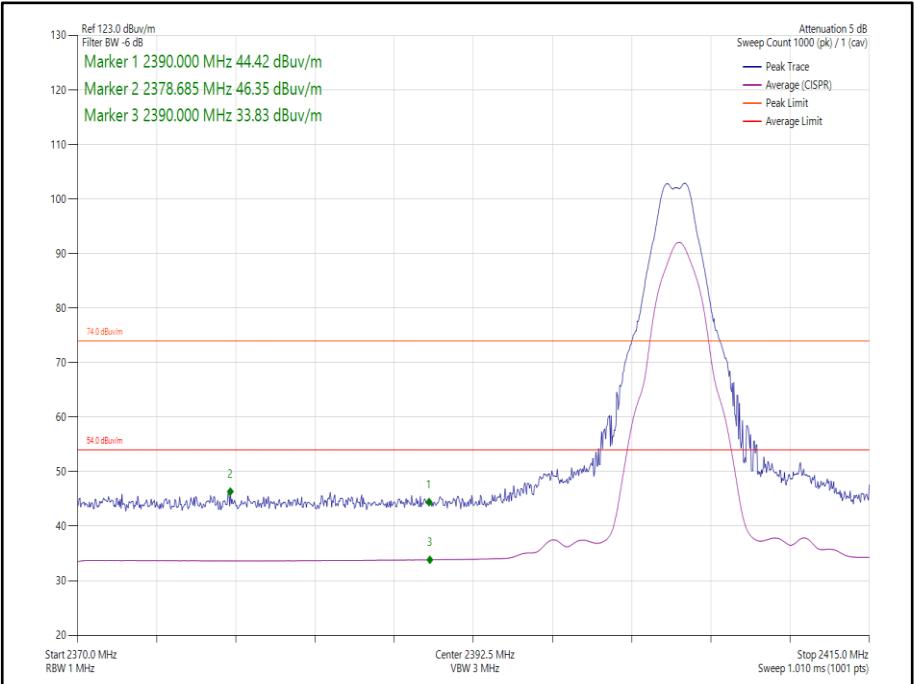


Figure 108 - CH1_2 MHz_TX, 2404 MHz, Band Edge Frequency 2390 MHz

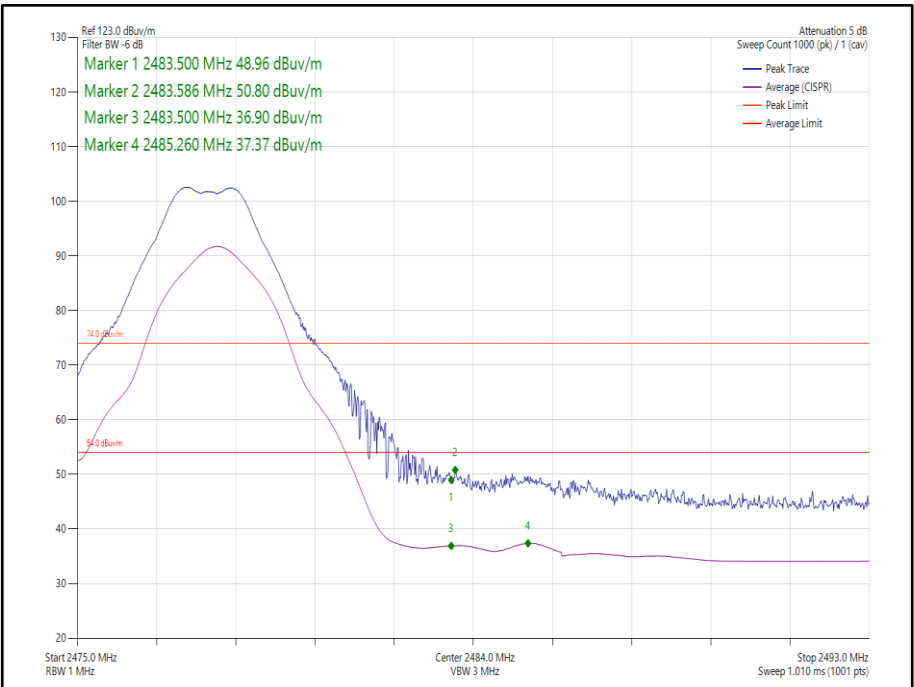


Figure 109 - CH38_2 MHz_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna

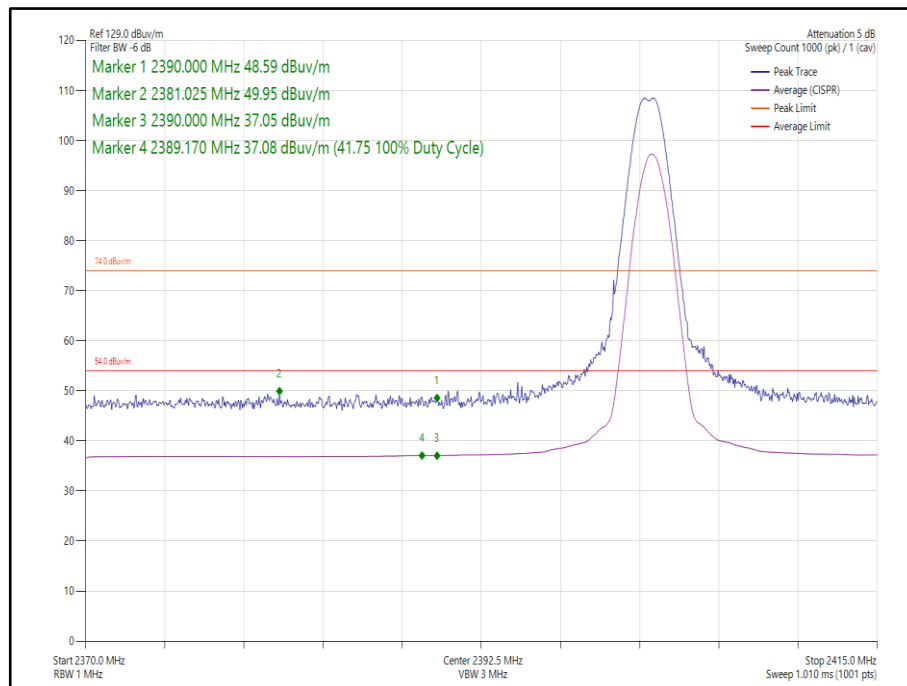


Figure 110 - CH0_125 kHz_TX, 2402 MHz, Band Edge Frequency 2390 MHz

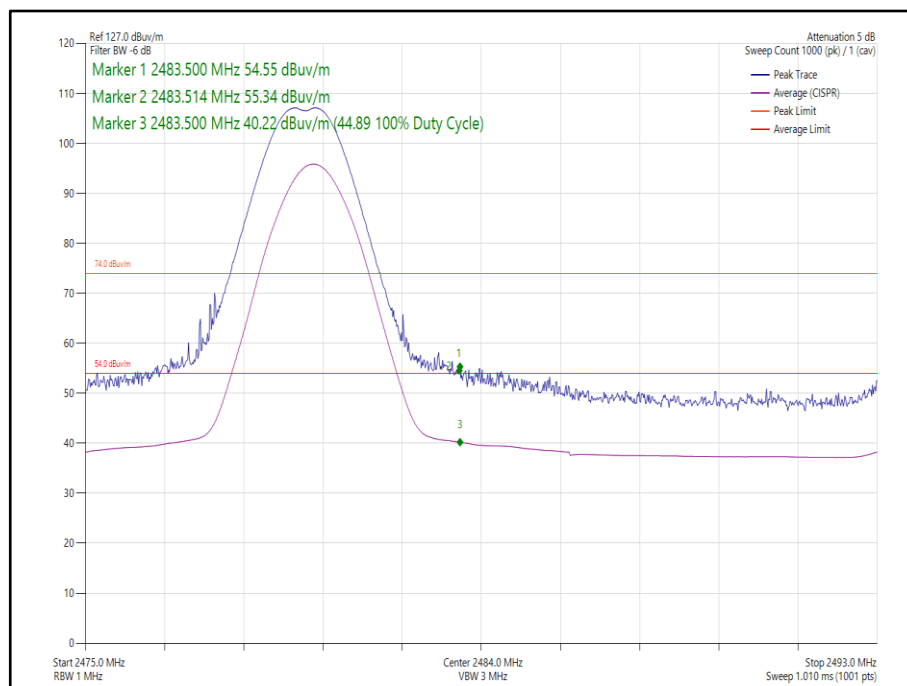


Figure 111 - CH39_125 kHz_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

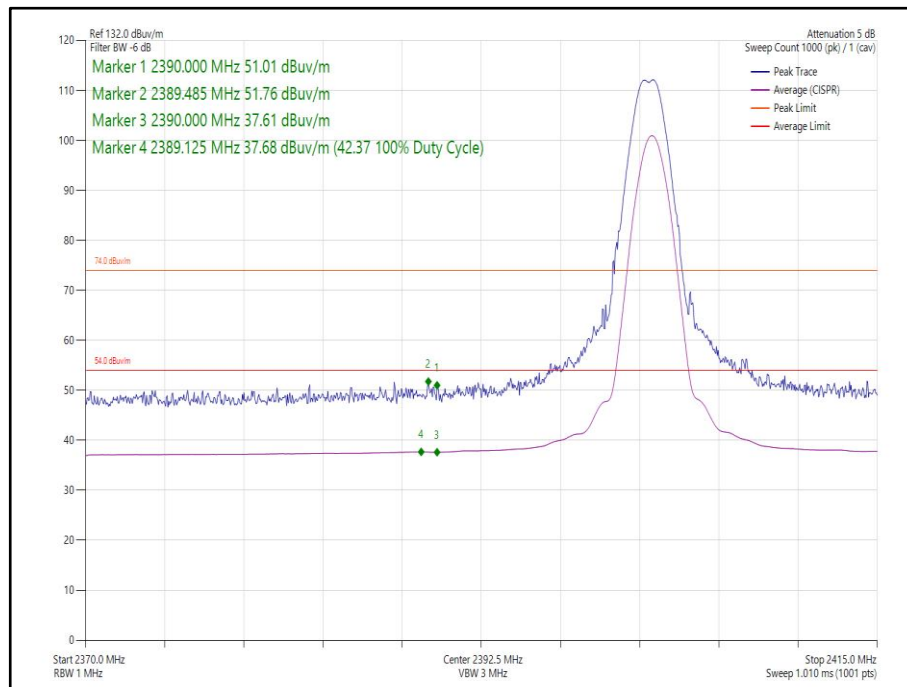


Figure 112 - CH0_1 MHz_TX, 2402 MHz, Band Edge Frequency 2390 MHz

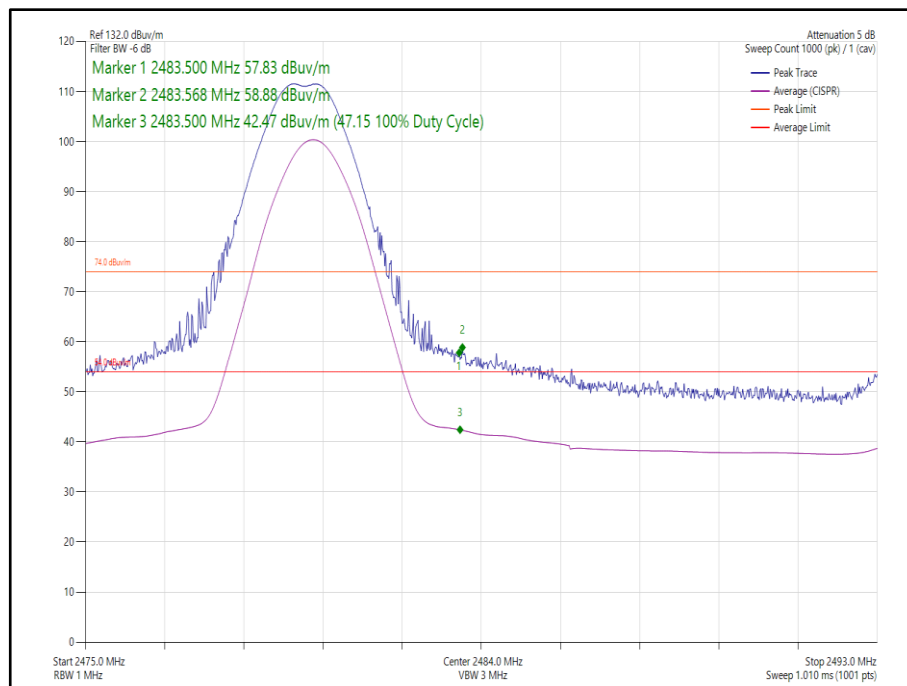


Figure 113 - CH39_1 MHz_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

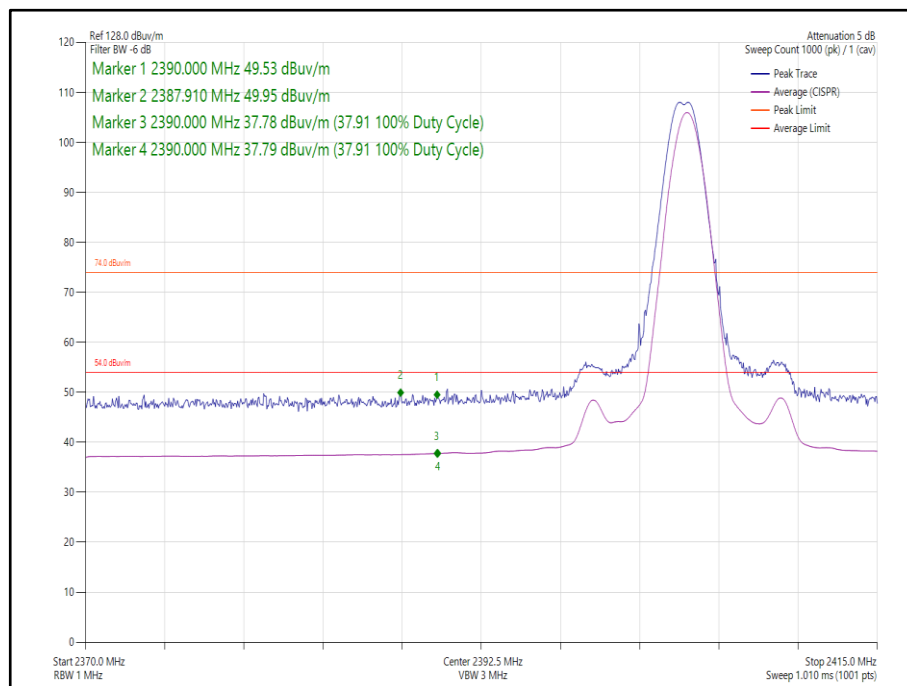


Figure 114 - CH1_125 kHz_TX, 2404 MHz, Band Edge Frequency 2390 MHz

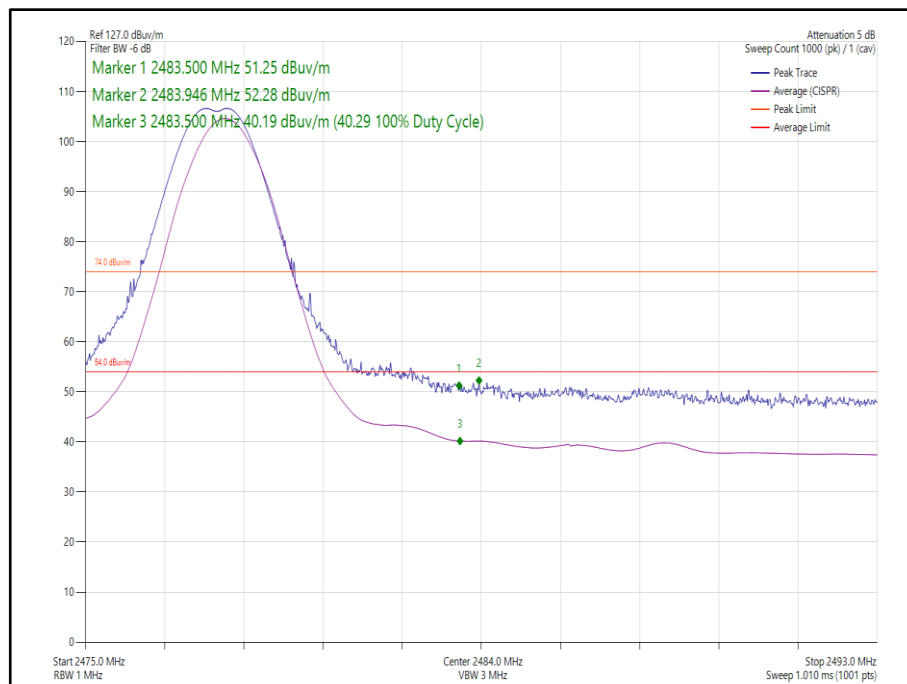


Figure 115 - CH38_125 kHz_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

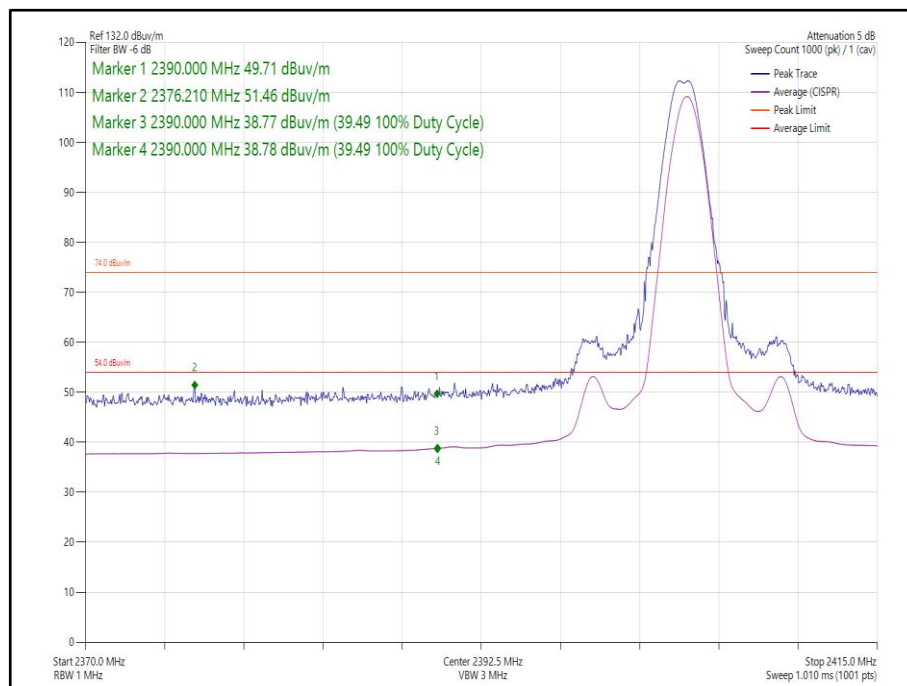


Figure 116 - CH1_1 MHz_TX, 2404 MHz, Band Edge Frequency 2390 MHz

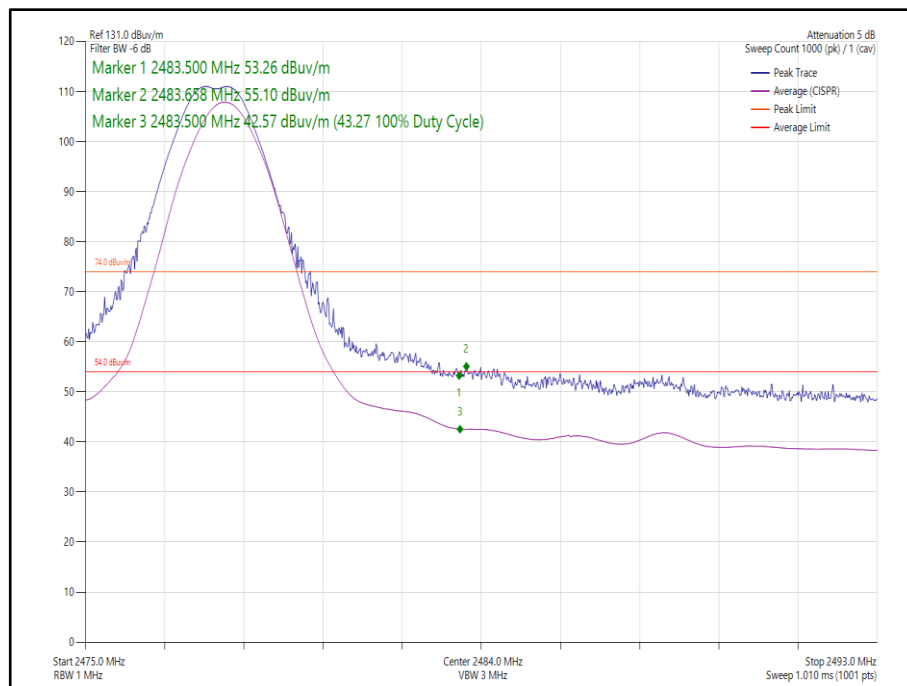


Figure 117 - CH38_1 MHz_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

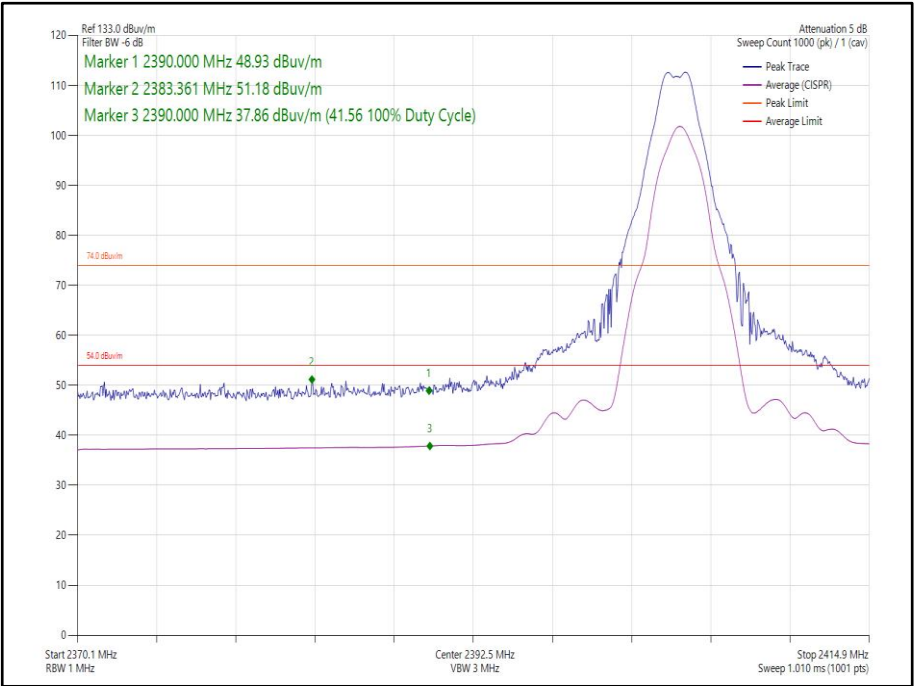


Figure 118 - CH1_2 MHz_TX, 2404 MHz, Band Edge Frequency 2390 MHz



Figure 119 - CH38_2 MHz_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.209

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

Table 53

ISED RSS-GEN, Limit Clause 8.9

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

Table 54

*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.



2.5.7 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
Test Receiver	Rohde & Schwarz	ESW44	5084	12	04-Nov-2024
Emissions Software	TUV SUD	EmX V3.2.0	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	09-Jul-2024
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	25-May-2024
Thermo-Hygro-Barometer	PCE Instruments	OCE-THB-40	5470	12	20-Apr-2024
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5512	12	21-May-2024
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	14-Apr-2024
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	5522	12	14-Apr-2024

Table 55

TU - Traceability Unscheduled



2.6 Authorised Band Edges

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test and Modification State

SiW917Y1GA, S/N: BLE MAC address: D4:48:67:DD:D6:87 - Modification State 0
SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

2.6.3 Date of Test

28-May-2024 to 05-June-2024

2.6.4 Test Method

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

The EUT was supplied with 3.3 VDC by means of a regulator residing in the host certification board, which was in turn being powered over the host certification board's USB connector.

2.6.5 Environmental Conditions

Ambient Temperature	19.3 - 23.3 °C
Relative Humidity	49.1 - 51.8 %

2.6.6 Test Results

2.4 GHz Bluetooth Low Energy - PCB Trace Antenna

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
BLE	125k	2402	2400	-50.94
BLE	125k	2480	2483.5	-54.83
BLE	1M	2402	2400	-55.91
BLE	1M	2480	2483.5	-56.98
BLE	125k	2404	2400	-58.30
BLE	125k	2478	2483.5	-59.40
BLE	1M	2404	2400	-59.95
BLE	1M	2478	2483.5	-62.91
BLE	2M	2404	2400	-56.60
BLE	2M	2478	2483.5	-57.79

Table 29

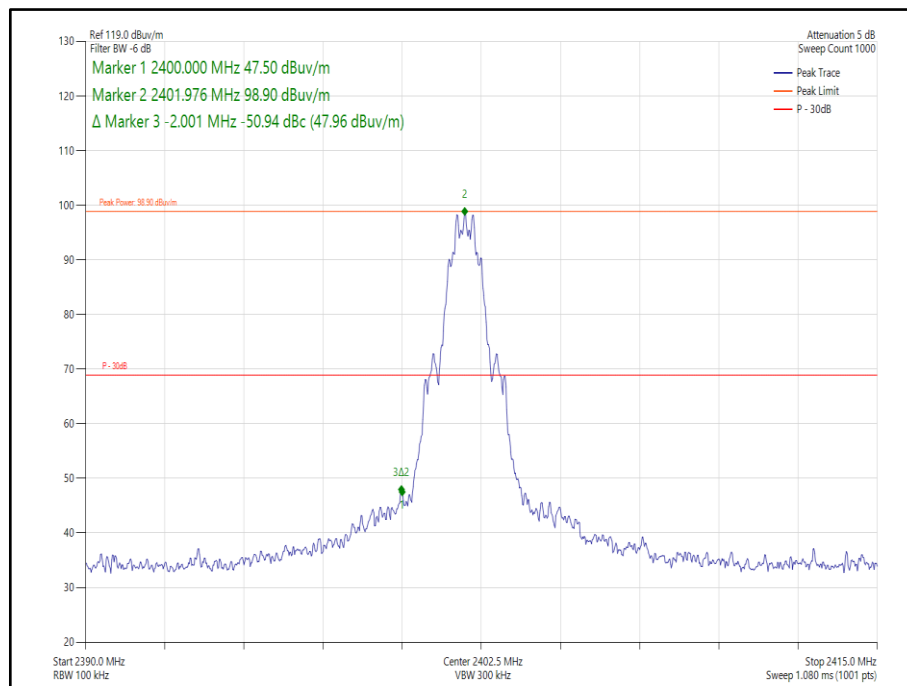


Figure 120 - CH0_125k_TX, 2402 MHz, Band Edge Frequency 2400 MHz

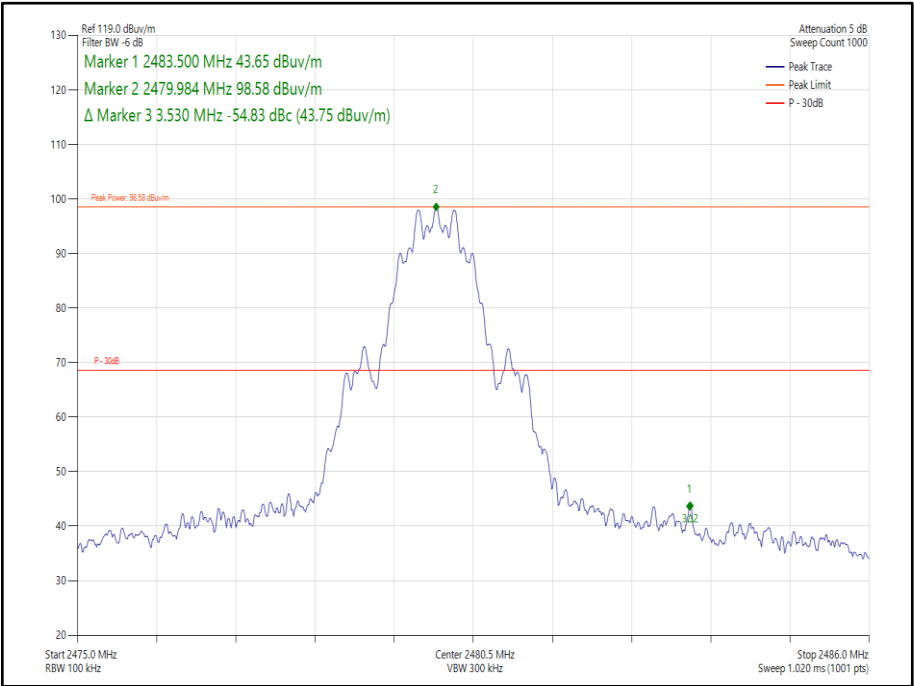


Figure 121 - CH39_125k_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

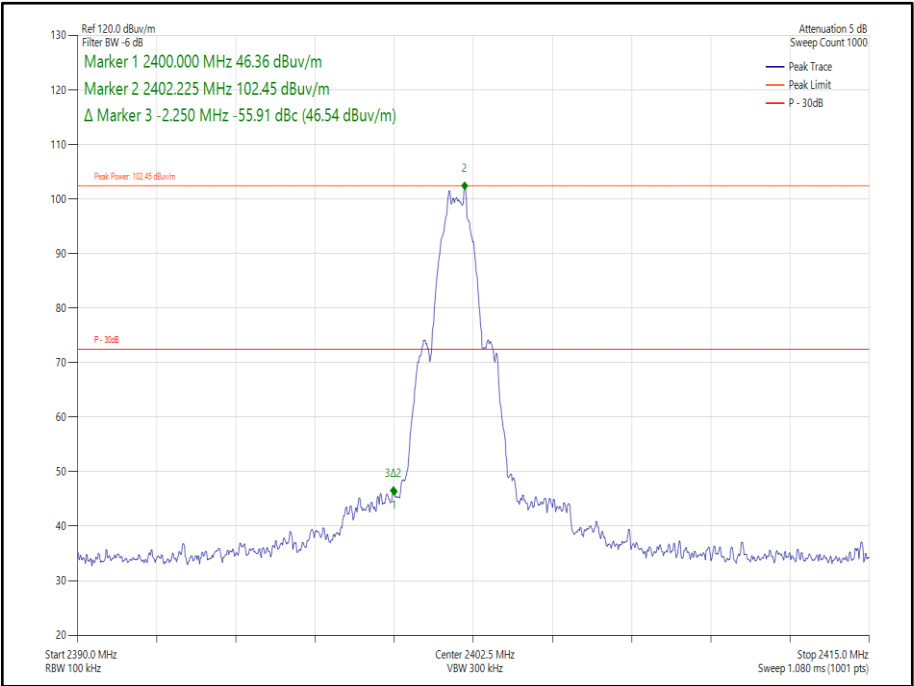


Figure 122 - CH0_1M_TX, 2402 MHz, Band Edge Frequency 2400 MHz

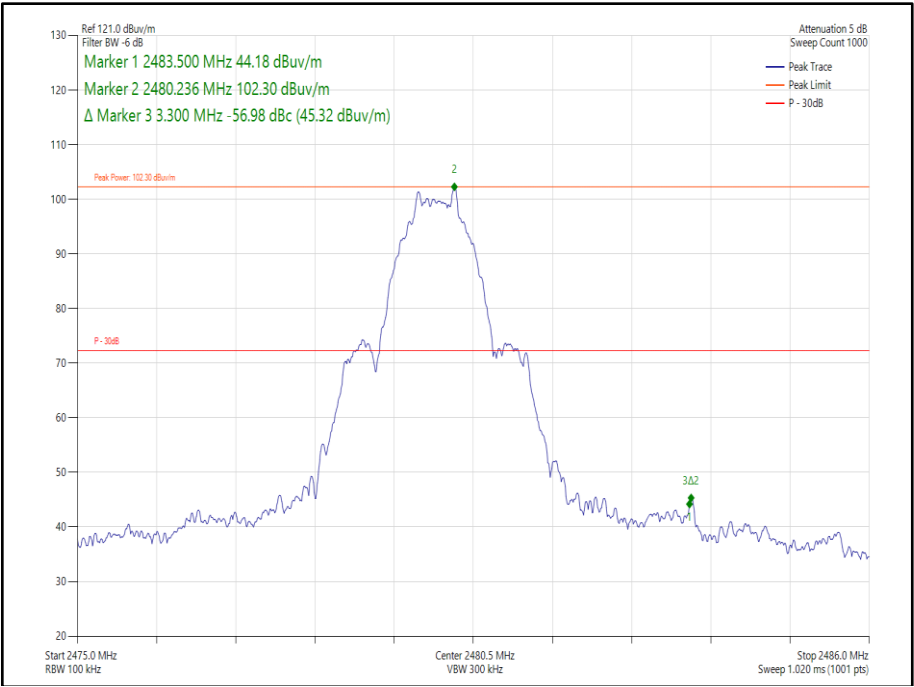
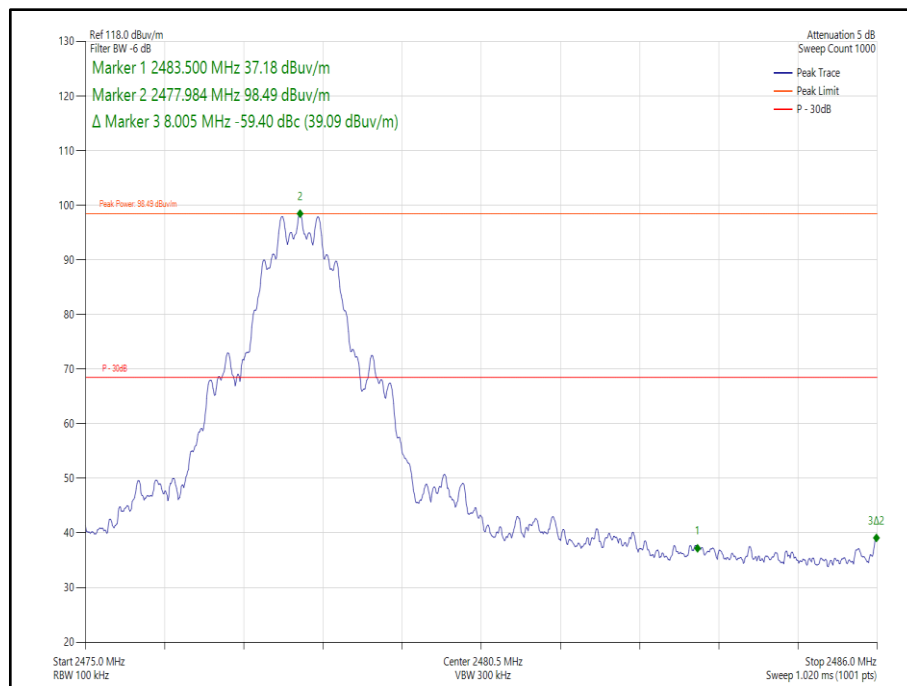
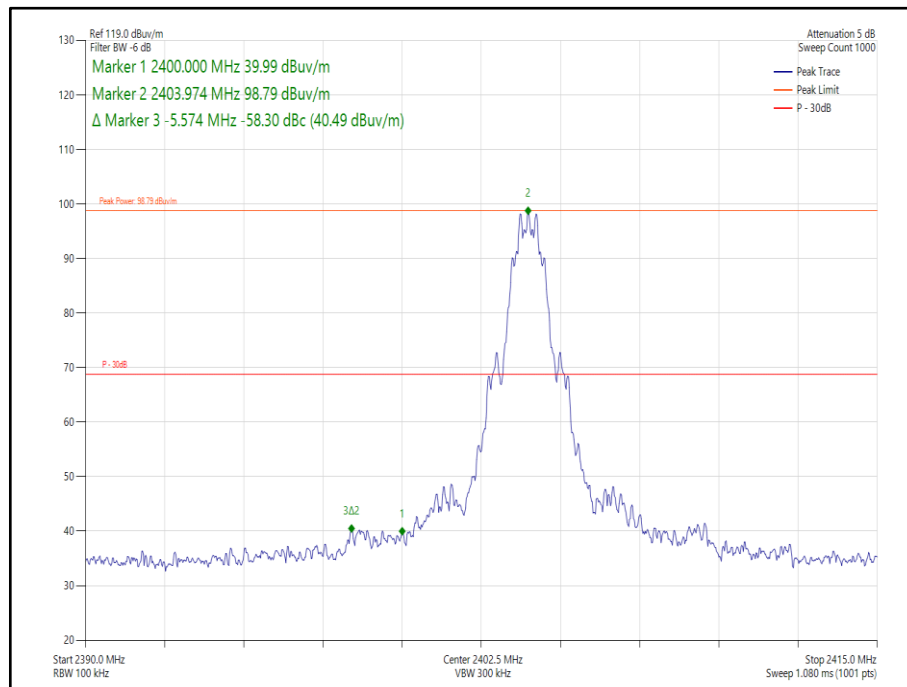


Figure 123 - CH39_1M_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz



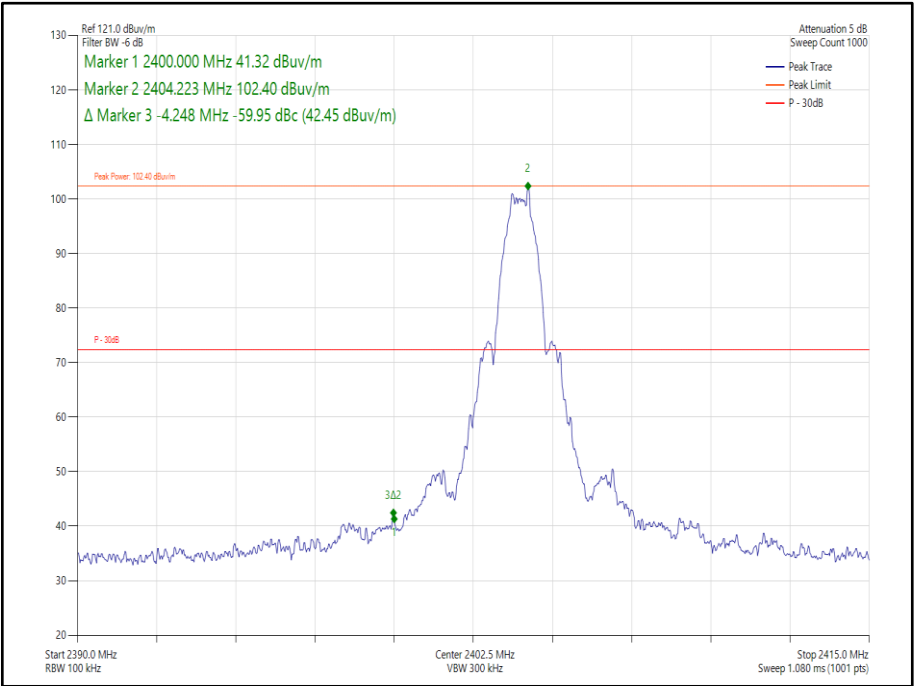


Figure 126 - CH1_1M_TX, 2404 MHz, Band Edge Frequency 2400 MHz

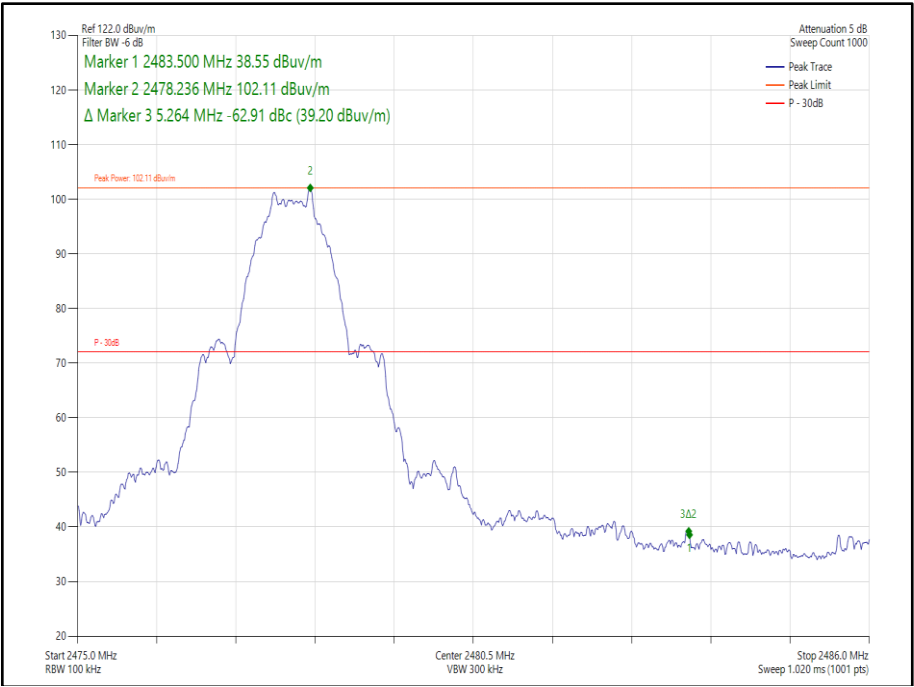


Figure 127 - CH38_1M_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

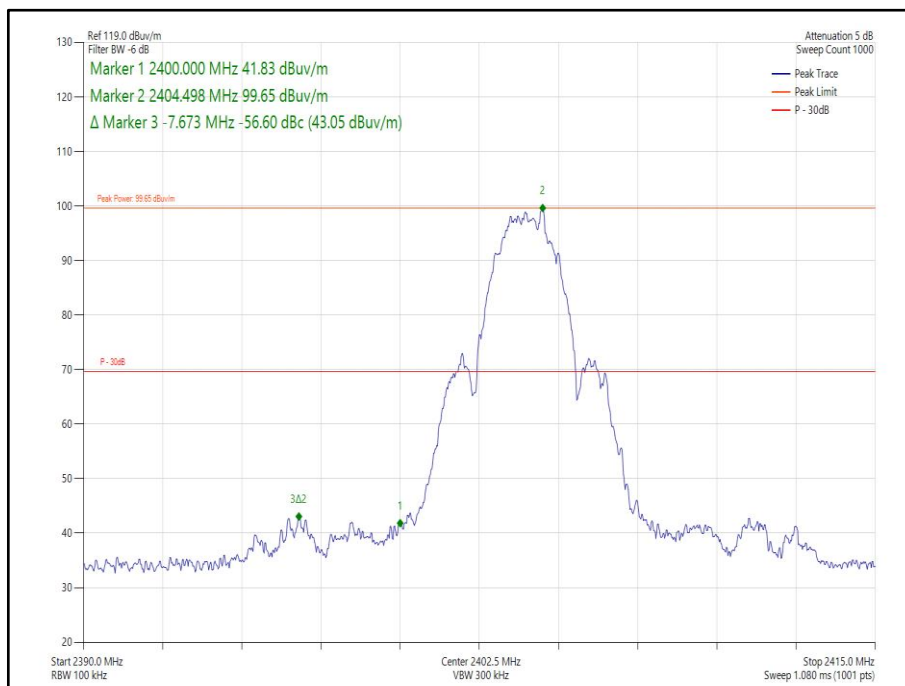


Figure 128 - CH1_2M_TX, 2404 MHz, Band Edge Frequency 2400 MHz

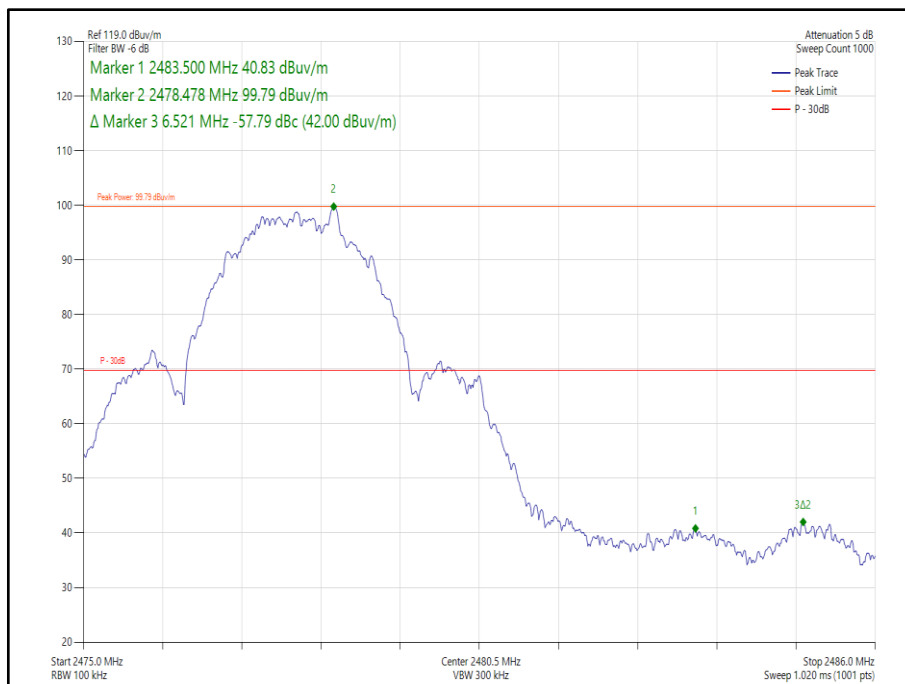


Figure 129 - CH38_2M_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna

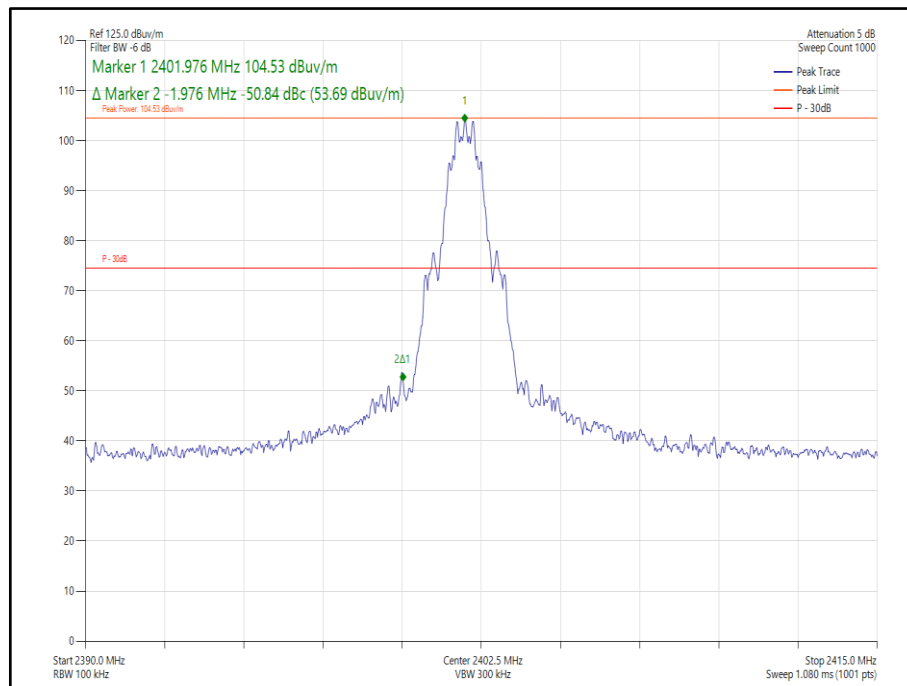


Figure 130 - CH0_125k_TX, 2402 MHz, Band Edge Frequency 2390 MHz

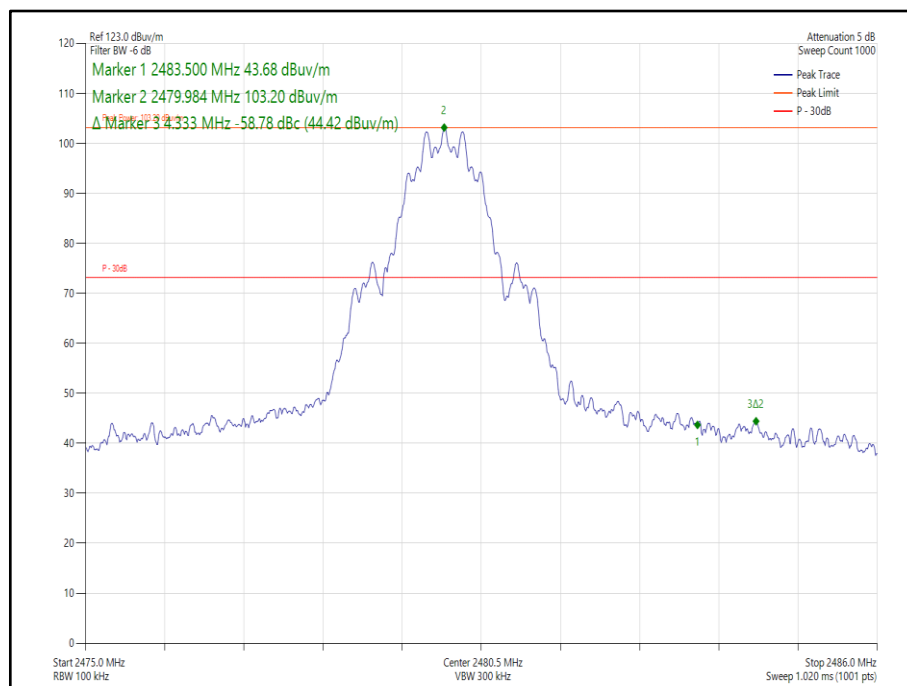


Figure 131 - CH39_125k_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

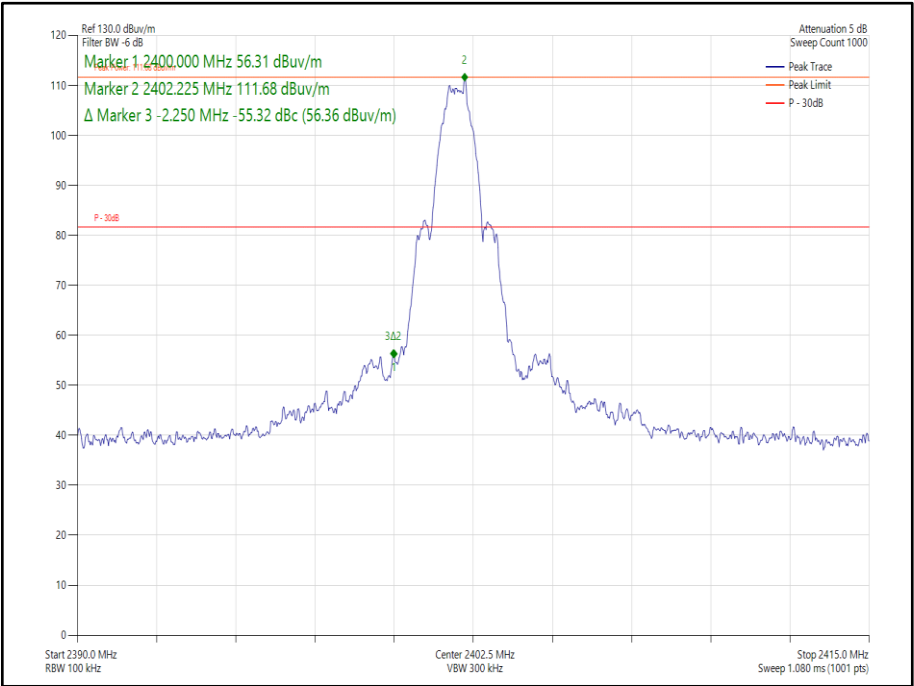


Figure 132 - CH0_1M_TX, 2402 MHz, Band Edge Frequency 2390 MHz

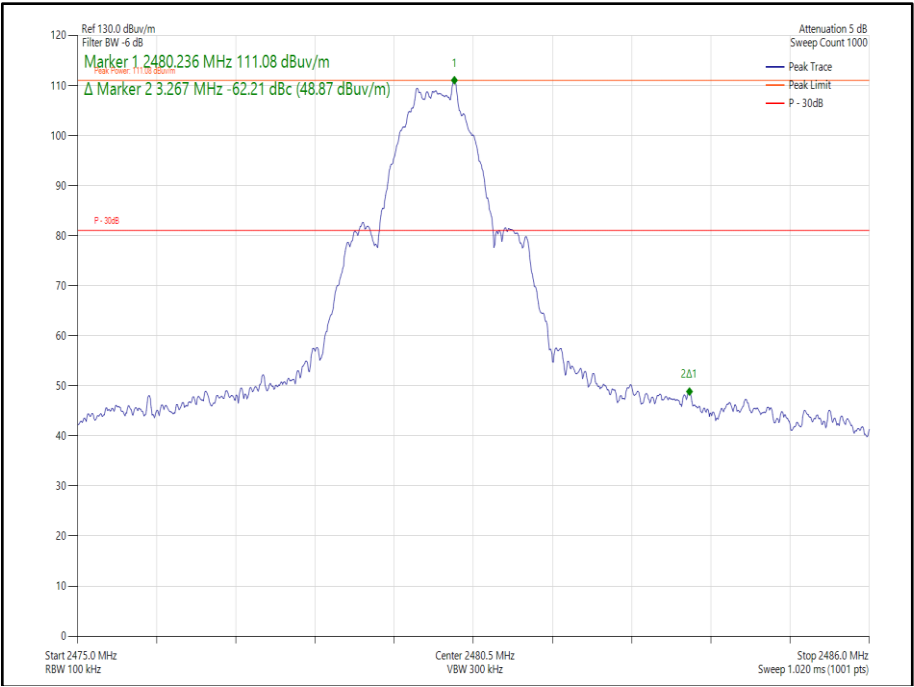


Figure 133 - CH39_1M_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

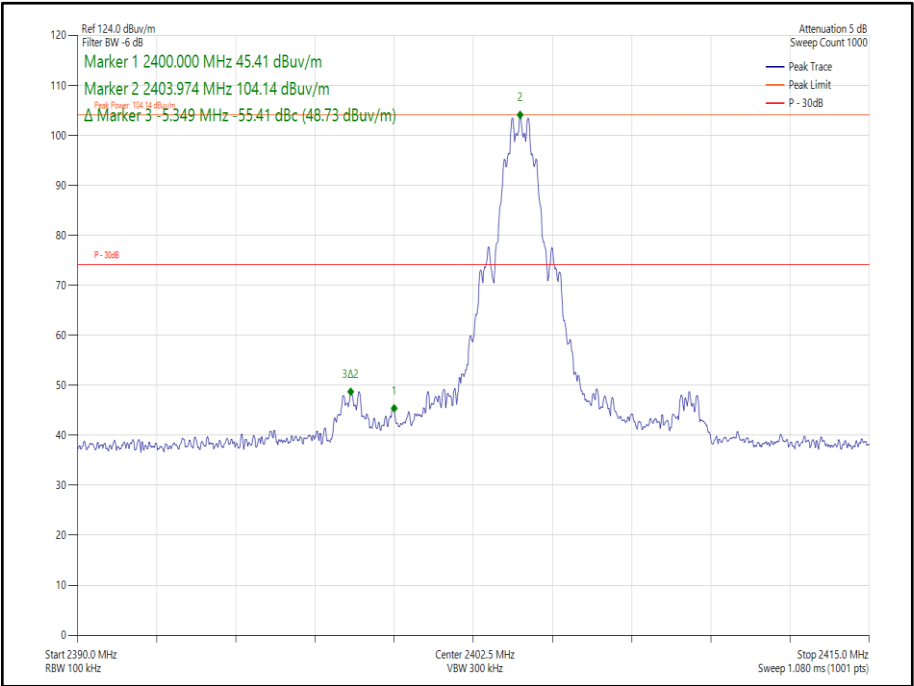


Figure 134 - CH1_125k_TX, 2404 MHz, Band Edge Frequency 2390 MHz

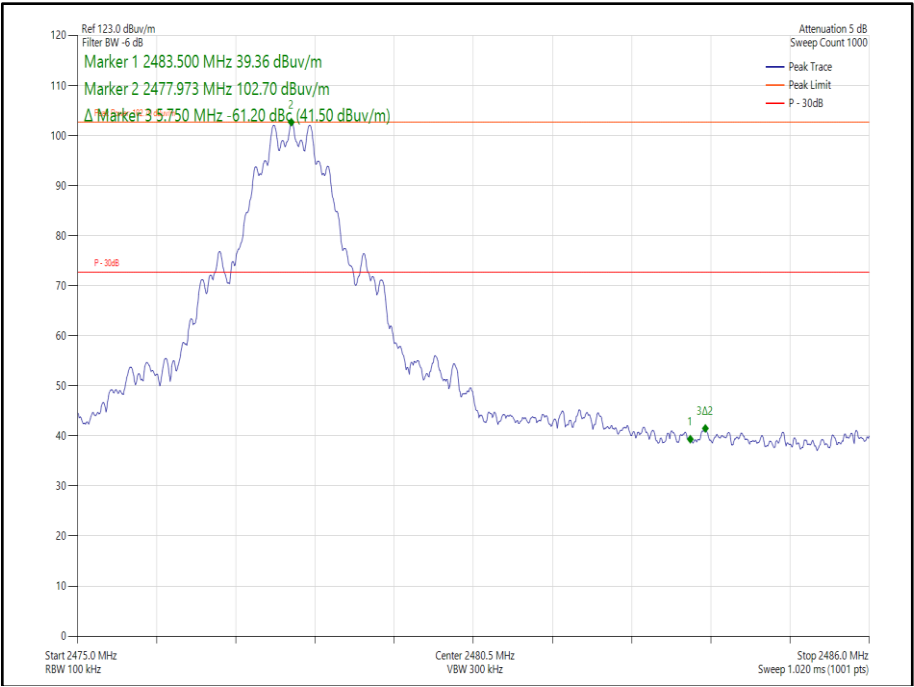


Figure 135 - CH38_125k_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

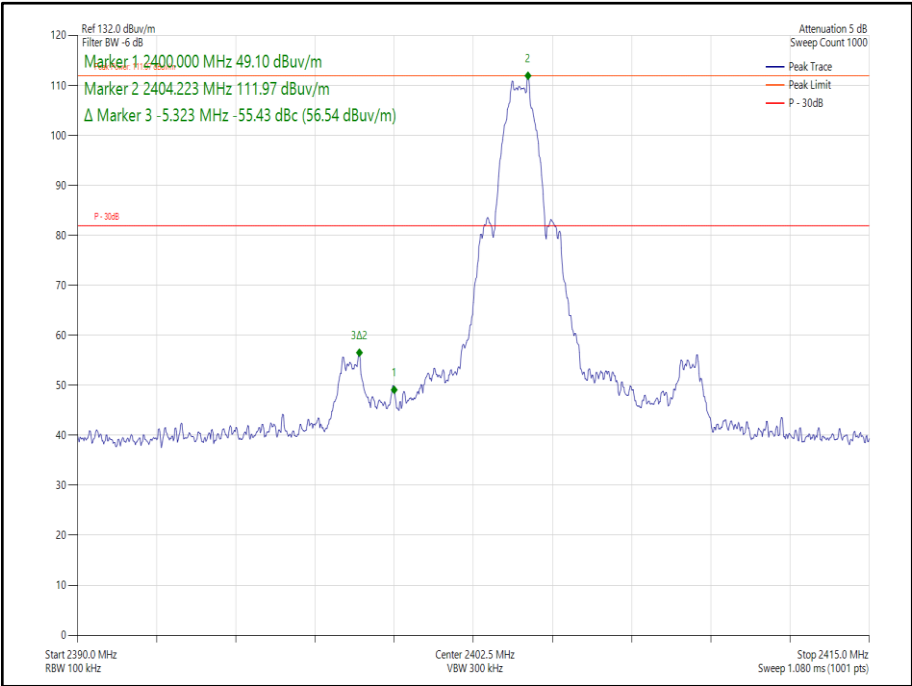


Figure 136 - CH1_1M_TX, 2404 MHz, Band Edge Frequency 2390 MHz



Figure 137 - CH38_1M_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

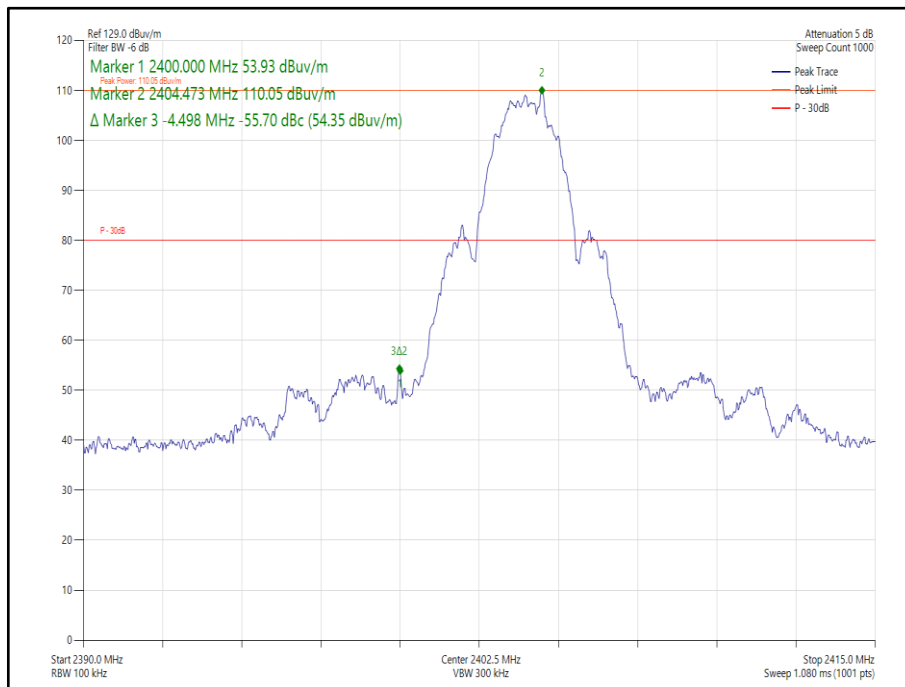


Figure 138 - CH1_2M_TX, 2404 MHz, Band Edge Frequency 2390 MHz

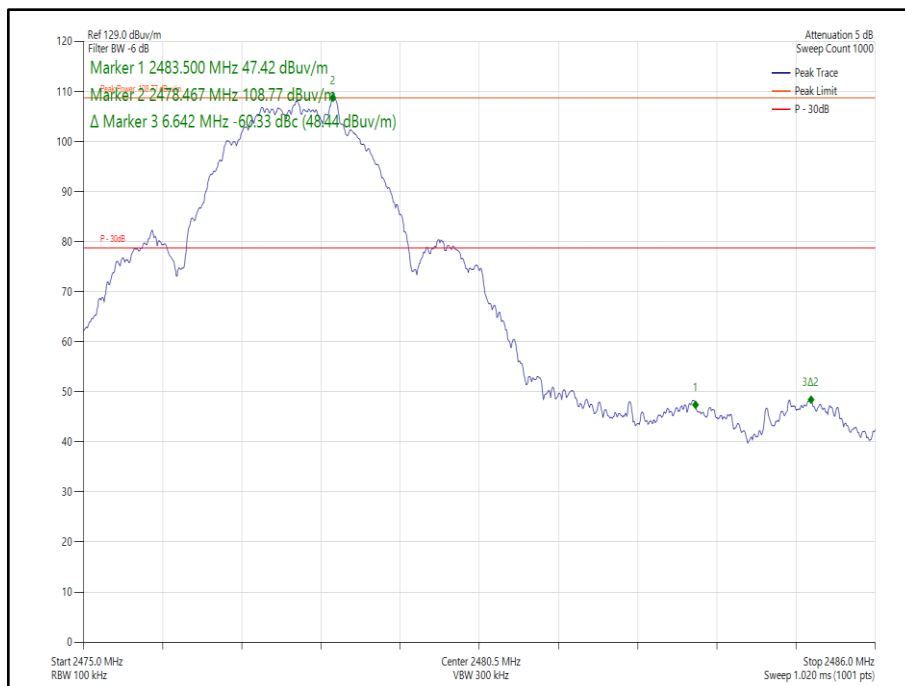


Figure 139 - CH38_2M_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz



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.

2.6.7 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
Test Receiver	Rohde & Schwarz	ESW44	5084	12	04-Nov-2024
Emissions Software	TUV SUD	EmX V3.2.0	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	09-Jul-2024
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	25-May-2024
Thermo-Hygro-Barometer	PCE Instruments	OCE-THB-40	5470	12	20-Apr-2024
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5512	12	21-May-2024
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	14-Apr-2024
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	5522	12	14-Apr-2024

Table 56

TU - Traceability Unscheduled

3 Photographs

3.1 Test Setup Photographs

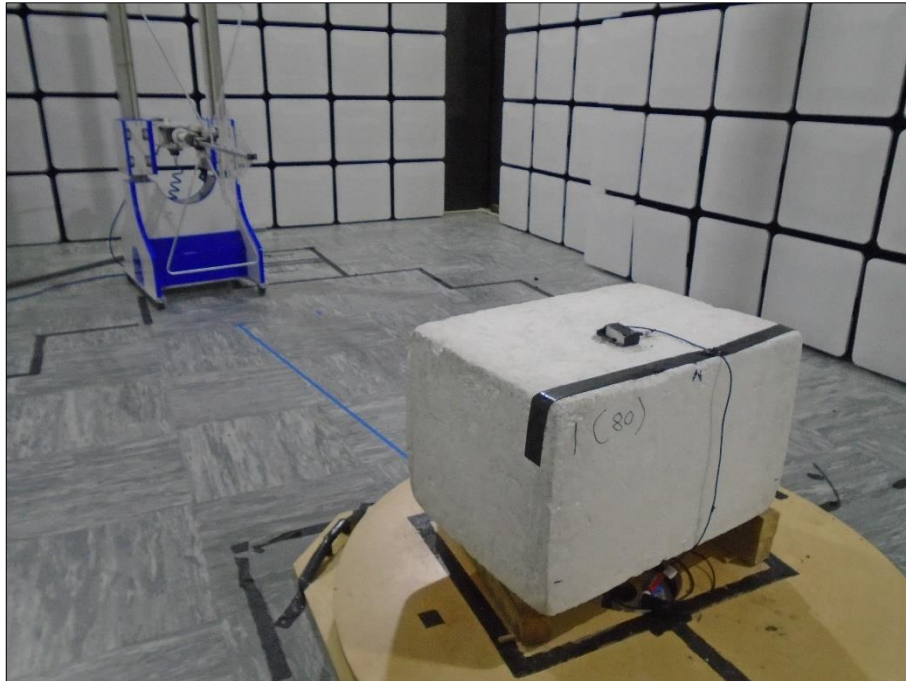


Figure 140 - Test Setup - 30 MHz to 1 GHz X Plane



Figure 141 - Test Setup - 30 MHz to 1 GHz Y Plane

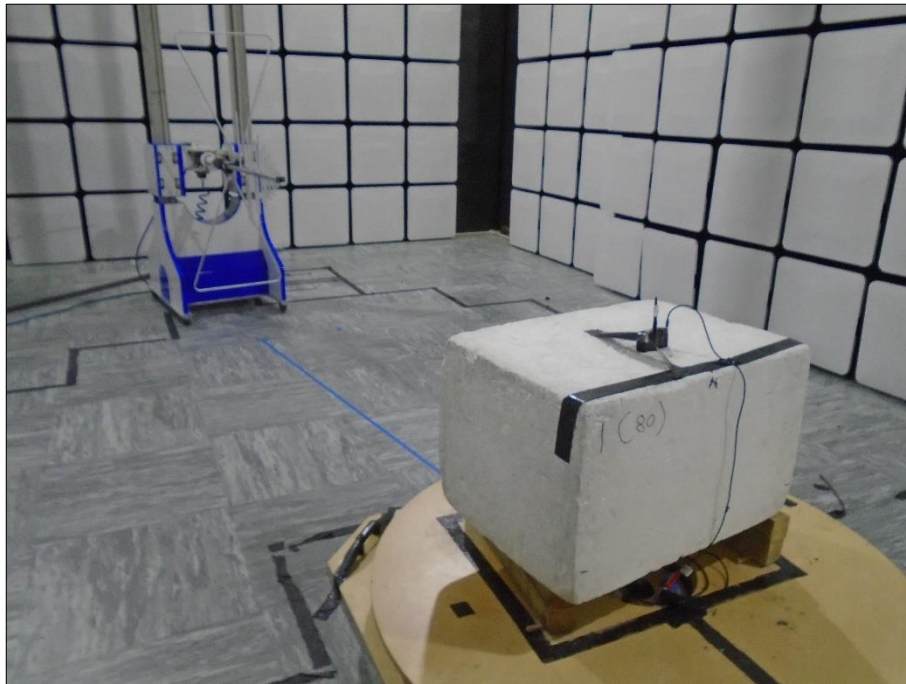


Figure 142 - Test Setup - 30 MHz to 1 GHz Z Plane

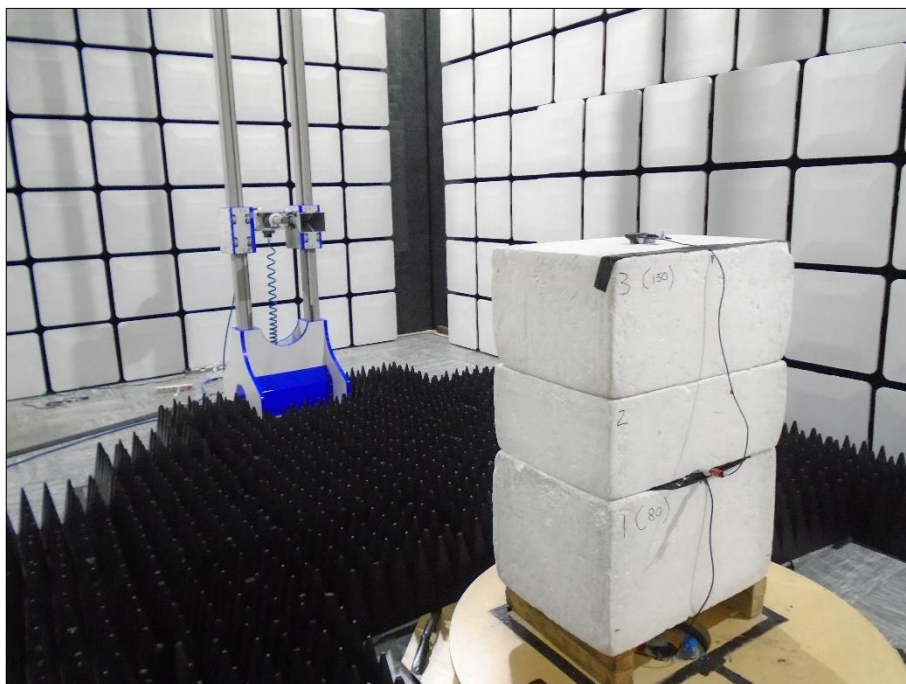


Figure 143 - Test Setup - 1 GHz to 18 GHz X Plane

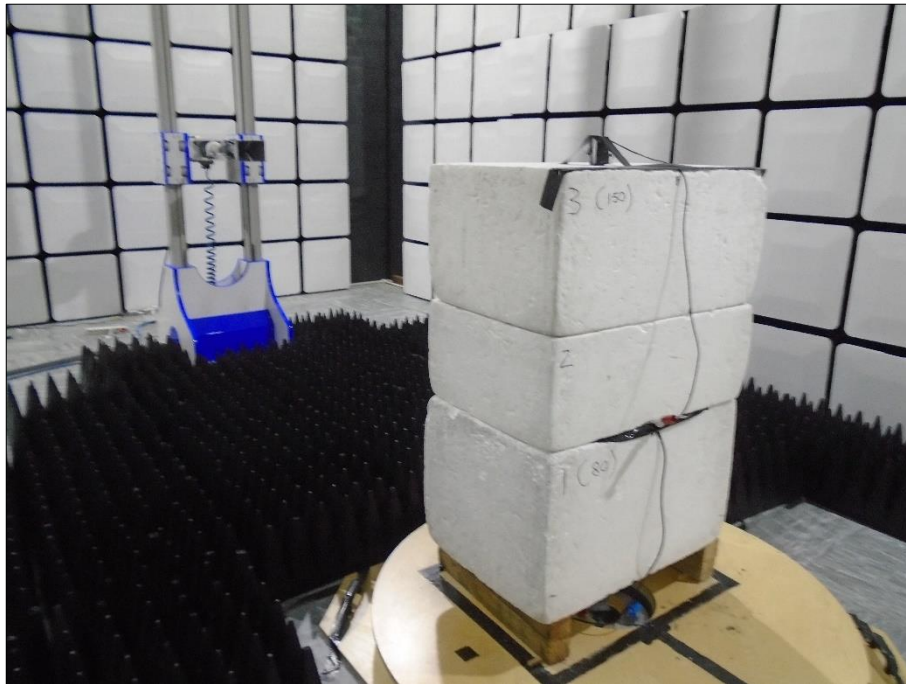


Figure 144 - Test Setup - 1 GHz to 18 GHz Y Plane

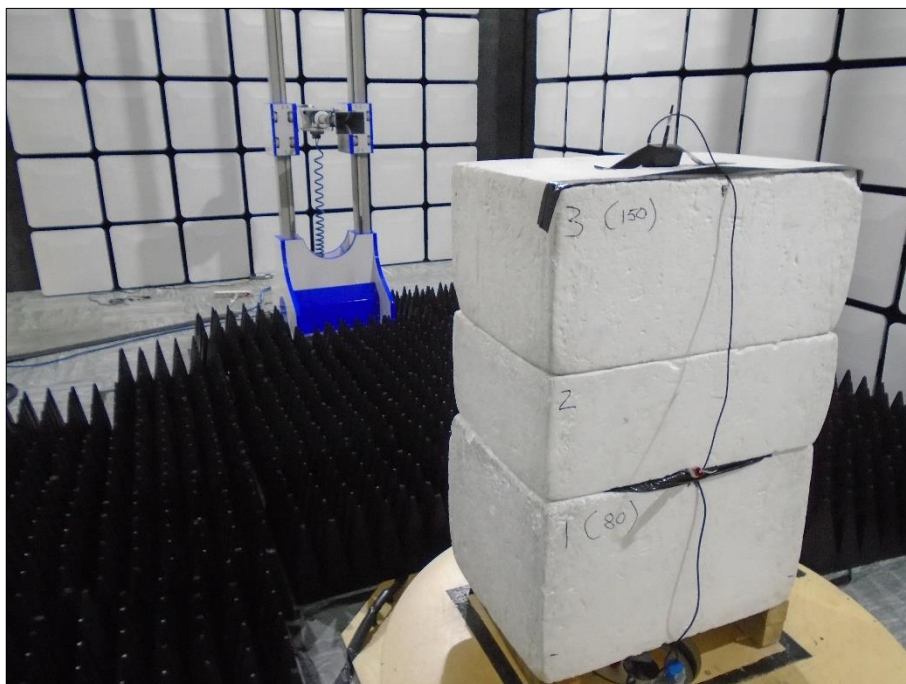


Figure 145 - Test Setup - 1 GHz to 18 GHz Z Plane

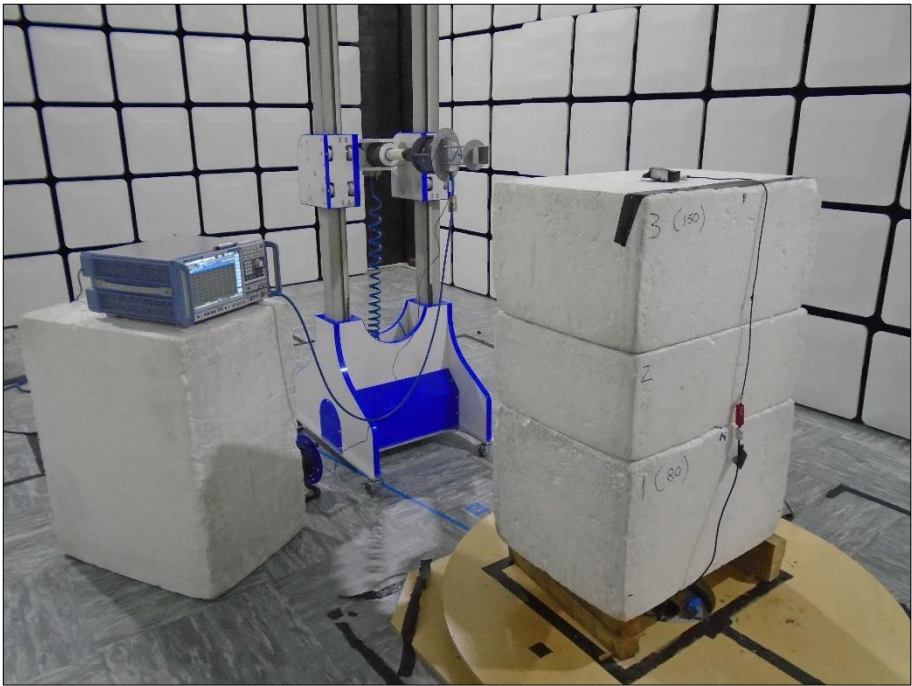


Figure 146 - Test Setup - 18 GHz to 25 GHz X Plane



Figure 147 - Test Setup - 18 GHz to 25 GHz Y Plane

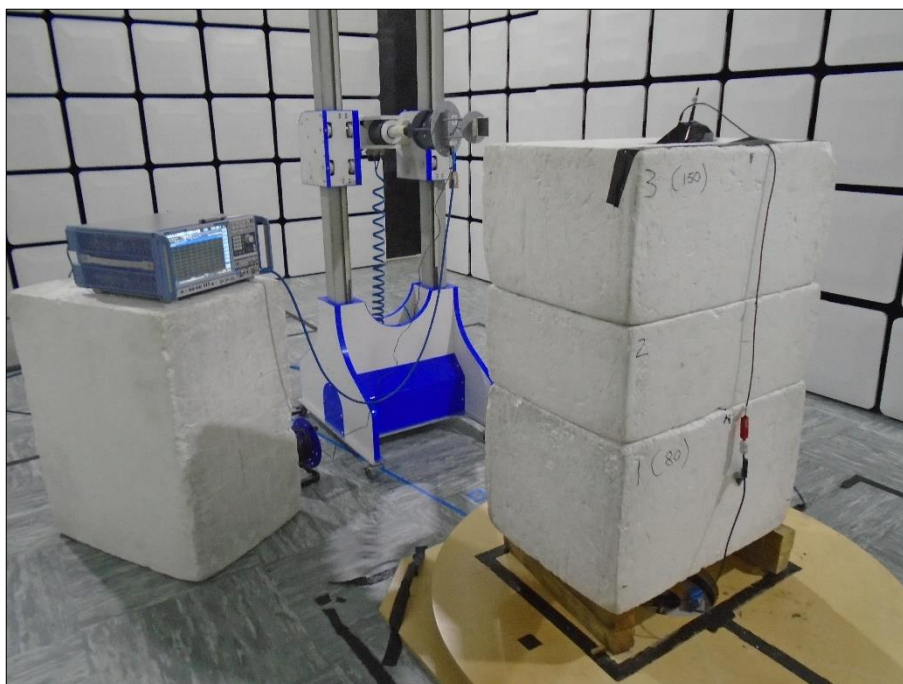


Figure 148 - Test Setup - 18 GHz to 25 GHz Z Plane

4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 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
Emission Bandwidth	± 447.29 kHz
Maximum Conducted Output Power	± 1.38 dB
Power Spectral Density	± 1.49 dB

Table 57

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.



ANNEX A

Maximum Conducted Output Power at Extreme Voltages

Measurements in this section were performed at the request of the manufacturer to show that the RF Output power remained compliant when subjected to the extreme voltage conditions stated by the manufacturer to provide evidence that the implementation is satisfactory to comply to the requirements of FCC 47 CFR 15.212.



Maximum Conducted Output Power

Specification Reference

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

Equipment Under Test and Modification State

SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

Date of Test

22-May-2024

Test Method

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

The EUT was supplied directly with a DC PSU.

Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	52.5 %



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 (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.00V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	16.00	15.52	30.00	-14.48
2404	16.00	15.39	30.00	-14.61
2440	16.00	15.71	30.00	-14.29
2478	16.00	15.90	30.00	-14.10
2480	16.00	15.98	30.00	-14.02

Table 58 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	16.00	15.52	30.00	-14.48	18.32	36.00	-17.68
2404	16.00	15.39	30.00	-14.61	18.19	36.00	-17.81
2440	16.00	15.71	30.00	-14.29	18.51	36.00	-17.49
2478	16.00	15.90	30.00	-14.10	18.70	36.00	-17.30
2480	16.00	15.98	30.00	-14.02	18.78	36.00	-17.22

Table 59 - ISSED 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 1M)	Duty Cycle (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.63V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	16.00	15.88	30.00	-14.12
2404	16.00	15.69	30.00	-14.31
2440	16.00	15.98	30.00	-14.02
2478	16.00	16.21	30.00	-13.79
2480	16.00	16.35	30.00	-13.65

Table 60 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	16.00	15.88	30.00	-14.12	18.68	36.00	-17.32
2404	16.00	15.69	30.00	-14.31	18.49	36.00	-17.51
2440	16.00	15.98	30.00	-14.02	18.78	36.00	-17.22
2478	16.00	16.21	30.00	-13.79	19.01	36.00	-16.99
2480	16.00	16.35	30.00	-13.65	19.15	36.00	-16.85

Table 61 - ISSED 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 (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.00V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2404	16.00	14.74	30.00	-15.26
2440	16.00	15.05	30.00	-14.95
2478	16.00	15.23	30.00	-14.77

Table 62 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2404	16.00	14.74	30.00	-15.26	17.54	36.00	-18.46
2440	16.00	15.05	30.00	-14.95	17.85	36.00	-18.15
2478	16.00	15.23	30.00	-14.77	18.03	36.00	-17.97

Table 63 - ISSED 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 (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.63V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2404	16.00	15.91	30.00	-14.09
2440	16.00	16.19	30.00	-13.81
2478	16.00	16.40	30.00	-13.60

Table 64 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2404	16.00	15.91	30.00	-14.09	18.71	36.00	-17.29
2440	16.00	16.19	30.00	-13.81	18.99	36.00	-17.01
2478	16.00	16.40	30.00	-13.60	19.20	36.00	-16.80

Table 65 - 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 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.00V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	11.00	10.94	30.00	-19.06
2404	11.00	10.87	30.00	-19.13
2440	11.00	10.69	30.00	-19.31
2478	11.00	10.61	30.00	-19.39
2480	11.00	9.67	30.00	-20.33

Table 66 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	11.00	10.94	30.00	-19.06	13.74	36.00	-22.26
2404	11.00	10.87	30.00	-19.13	13.67	36.00	-22.33
2440	11.00	10.69	30.00	-19.31	13.49	36.00	-22.51
2478	11.00	10.61	30.00	-19.39	13.41	36.00	-22.59
2480	11.00	9.67	30.00	-20.33	12.47	36.00	-23.53

Table 67 - ISSED 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 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.63V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	11.00	11.37	30.00	-18.63
2404	11.00	11.15	30.00	-18.85
2440	11.00	10.99	30.00	-19.01
2478	11.00	10.88	30.00	-19.12
2480	11.00	9.99	30.00	-20.01

Table 68 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	11.00	11.37	30.00	-18.63	14.17	36.00	-21.83
2404	11.00	11.15	30.00	-18.85	13.95	36.00	-22.05
2440	11.00	10.99	30.00	-19.01	13.79	36.00	-22.21
2478	11.00	10.88	30.00	-19.12	13.68	36.00	-22.32
2480	11.00	9.99	30.00	-20.01	12.79	36.00	-23.21

Table 69 - ISSED Maximum Conducted (peak) Output Power Results



FCC 47 CFR Part 15, Limit Clause 15.247 (b)(1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

ISED RSS-247, Limit Clause 5.4 (b)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channel; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channel. The e.i.r.p. shall not exceed 4 W except as provided in section 5.4(e) of the specification.

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(2)

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels.

ISED RSS-247, Limit Clause 5.4 (a)

For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

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.



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
True RMS Multimeter	Fluke	79 Series III	411	12	12-Jan-2025
Multimeter	Fluke	75 Mk3	455	12	15-Dec-2024
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
USB Power Sensor	Boonton	RTP5008	5833	12	12-Jul-2024
Modular Power System Mainframe	Keysight Technologies	N6701C	5835	-	TU
DC Power Module 60V 20A 300W	Keysight Technologies	N6754A	5836	-	O/P Mon
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU001	6350	-	26-Jul-2024
SCU Cable Assembly SCU	TUV SUD	SPECTRUM_SCU_CA	6638	12	26-Jul-2024

Table 70

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment