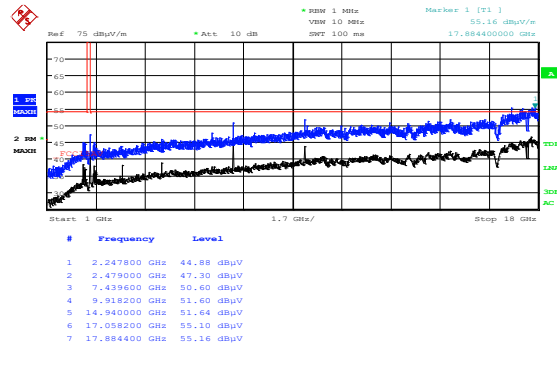


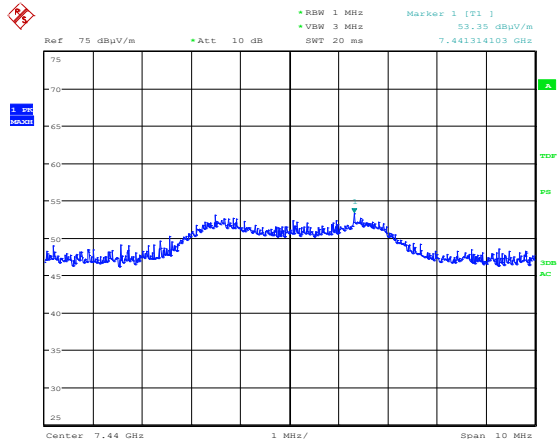
Date: 8.FEB.2024 14:04:24

Radiated Emissions 1 - 18 GHz, EUT Flat, BLE 2M, 2480 MHz, HP



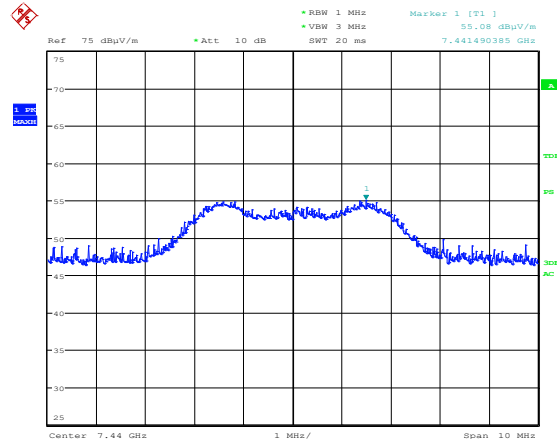
Date: 8.FEB.2024 14:02:27

Radiated Emissions 1 - 18 GHz, EUT Flat, BLE 2M, 2480 MHz, VP



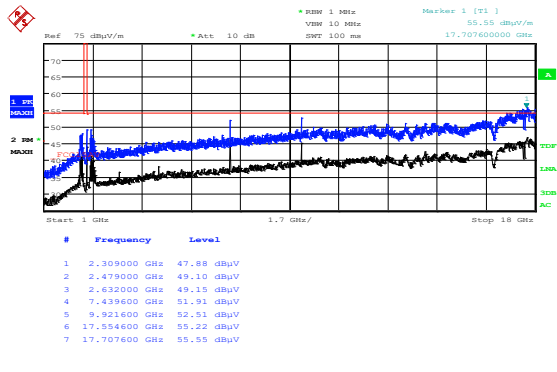
Date: 8.FEB.2024 14:18:19

Radiated Emissions 7440 MHz, EUT Flat, BLE 2M, 2480 MHz, HP



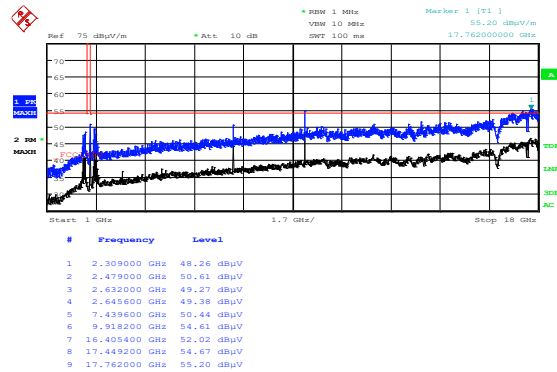
Date: 8.FEB.2024 14:16:27

Radiated Emissions 7440 MHz, EUT Flat, BLE 2M, 2480 MHz, VP



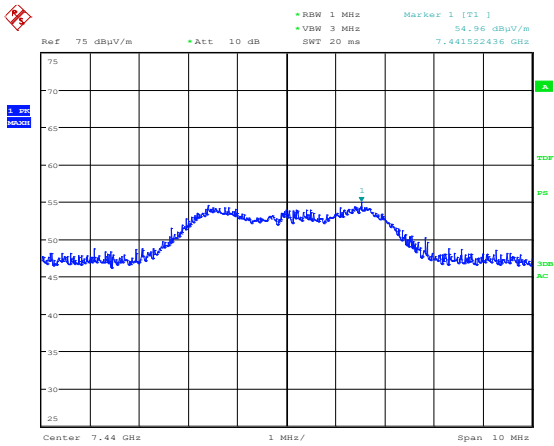
Date: 8.FEB.2024 13:45:18

Radiated Emissions 1 - 18 GHz, EUT Vert, BLE 2M, 2480 MHz, HP



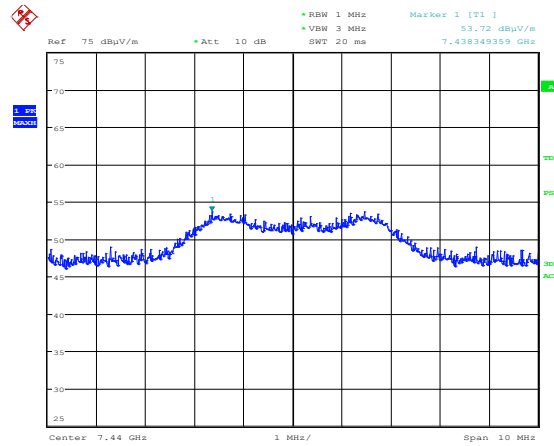
Date: 8.FEB.2024 13:43:21

Radiated Emissions 1 - 18 GHz, EUT Vert, BLE 2M, 2480 MHz, VP



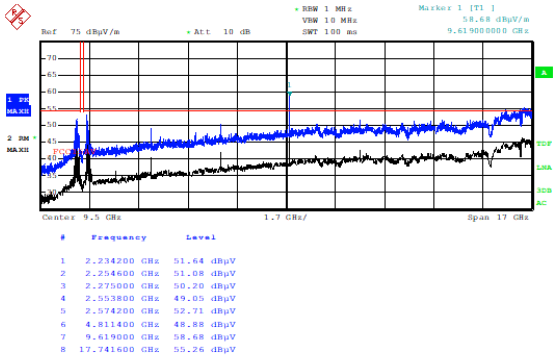
Date: 8.FEB.2024 13:57:16

Radiated Emissions 7440 MHz, EUT Vert, BLE 2M, 2480 MHz, HP



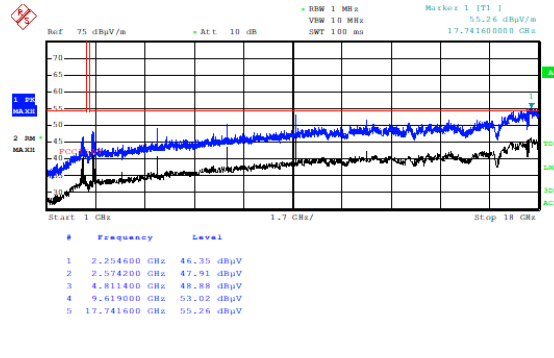
Date: 8.FEB.2024 13:58:40

Radiated Emissions 7440 MHz, EUT Vert, BLE 2M, 2480 MHz, VP



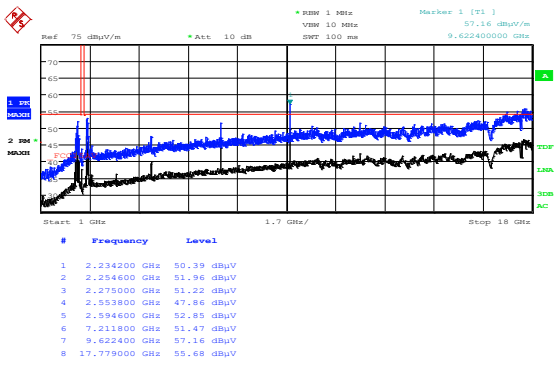
Date: 8.FEB.2024 09:46:22

Radiated Emissions 1 - 18 GHz, EUT Flat, Snobee, 2405 MHz, HP



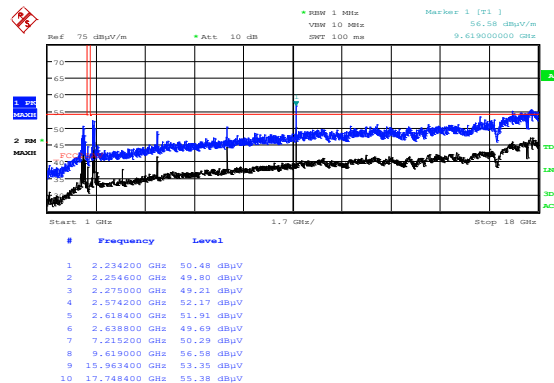
Date: 8.FEB.2024 09:44:37

Radiated Emissions 1 - 18 GHz, EUT Flat, Snobee, 2405 MHz, VP



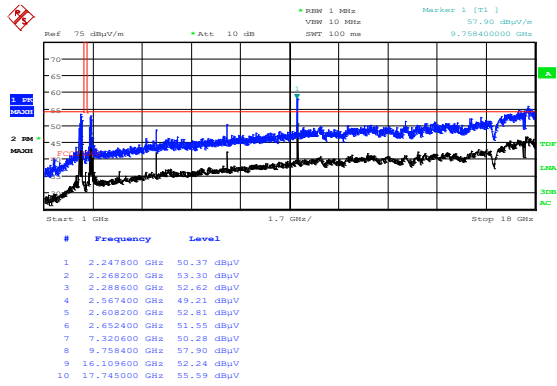
Date: 8.FEB.2024 10:55:20

Radiated Emissions 1 - 18 GHz, EUT Vert, Snobee, 2405 MHz, HP



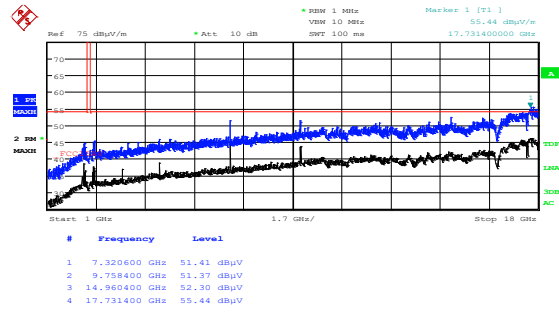
Date: 8.FEB.2024 10:53:23

Radiated Emissions 1 - 18 GHz, EUT Vert, Snobee, 2405 MHz, VP



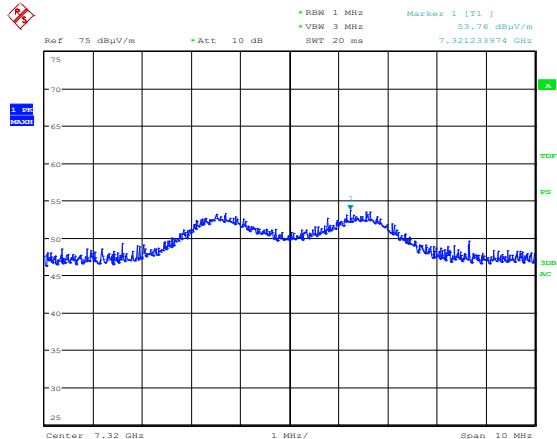
Date: 9.FEB.2024 12:51:41

Radiated Emissions 1 - 18 GHz, EUT Flat, Snobee, 2440 MHz, HP



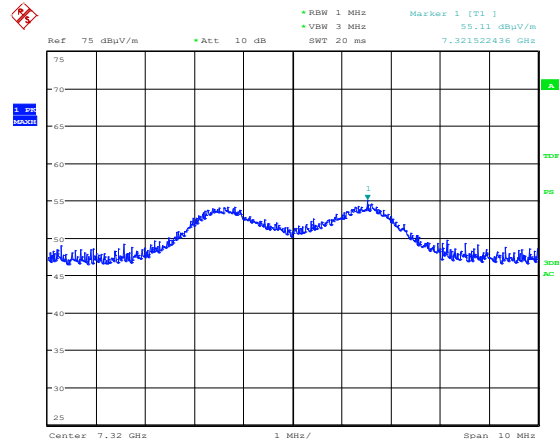
Date: 9.FEB.2024 12:49:45

Radiated Emissions 1 - 18 GHz, EUT Flat, Snobee, 2440 MHz, VP



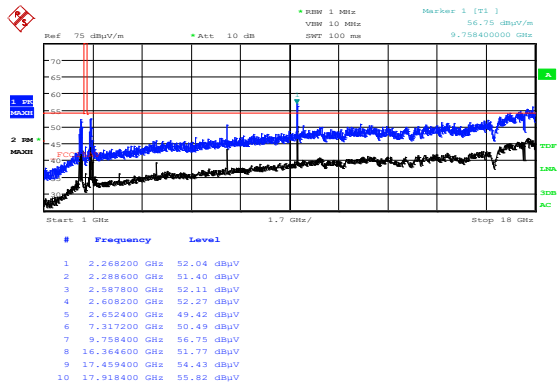
Date: 9.FEB.2024 13:12:04

Radiated Emissions 7320 MHz, EUT Flat, Snobee, 2440 MHz, HP



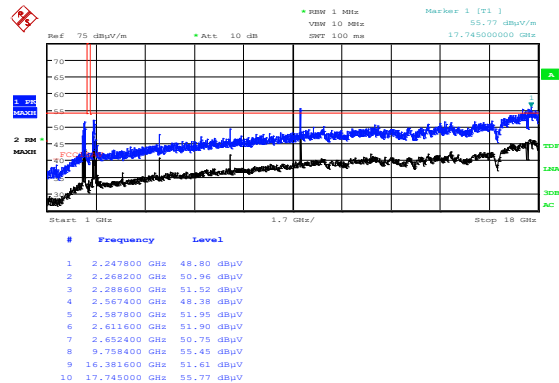
Date: 9.FEB.2024 13:10:55

Radiated Emissions 7320 MHz, EUT Flat, Snobee, 2440 MHz, VP



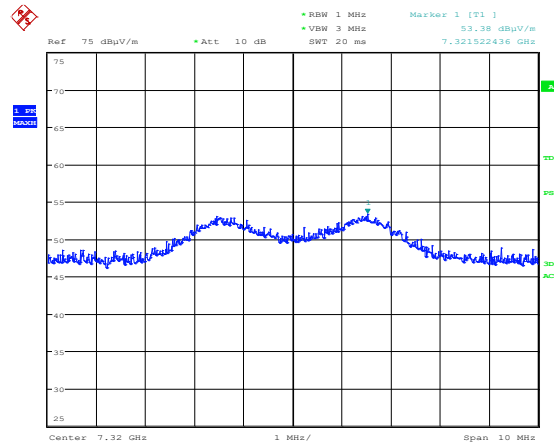
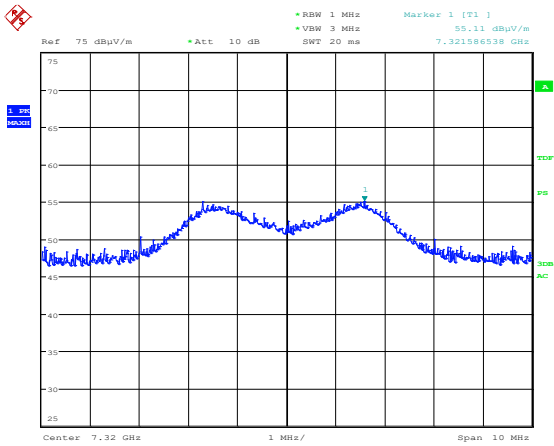
Date: 9.FEB.2024 13:19:06

Radiated Emissions 1 - 18 GHz, EUT Vert, Snobee, 2440 MHz, HP



Date: 9.FEB.2024 13:17:09

Radiated Emissions 1 - 18 GHz, EUT Vert, Snobee, 2440 MHz, VP

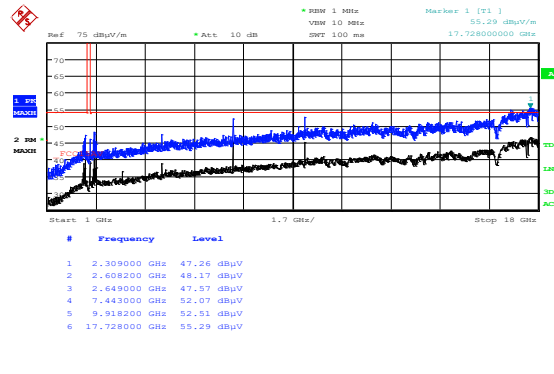
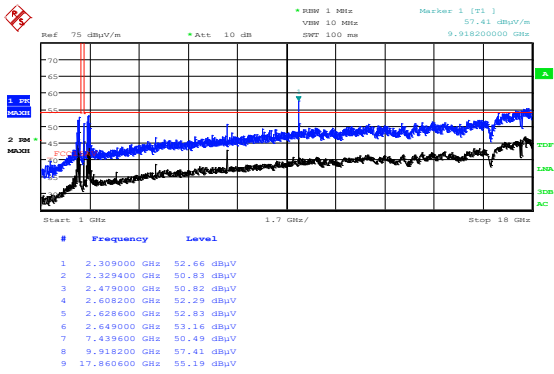


Date: 9.FEB.2024 13:31:20

Date: 9.FEB.2024 13:32:44

Radiated Emissions 7320 MHz, EUT Vert, Snobee, 2440 MHz, HP

Radiated Emissions 7320 MHz, EUT Vert, Snobee, 2440 MHz, VP

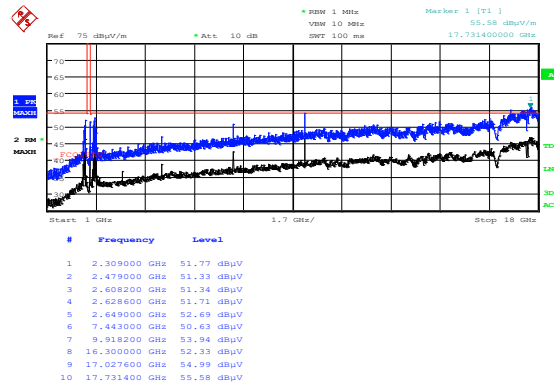
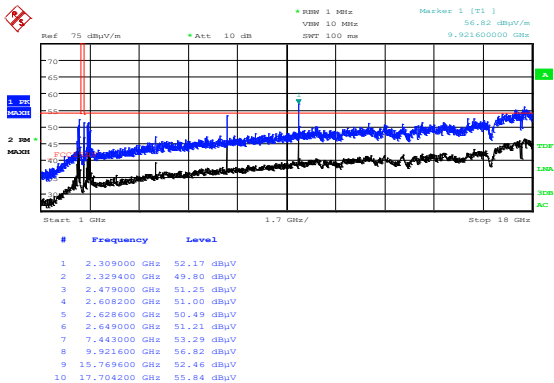


Date: 8.FEB.2024 11:18:40

Date: 8.FEB.2024 11:16:44

Radiated Emissions 1 - 18 GHz, EUT Flat, Snobee, 2480 MHz, HP

Radiated Emissions 1 - 18 GHz, EUT Flat, Snobee, 2480 MHz, VP

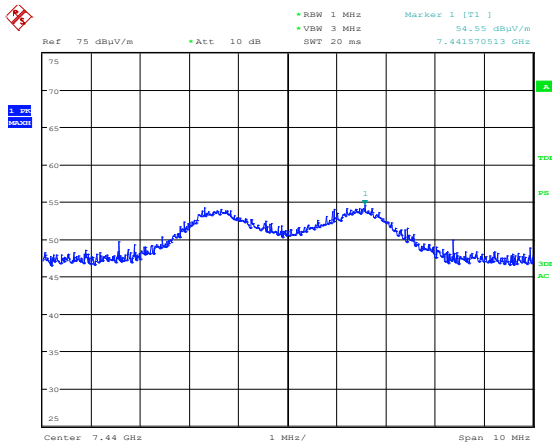


Date: 8.FEB.2024 12:11:42

Date: 8.FEB.2024 12:09:46

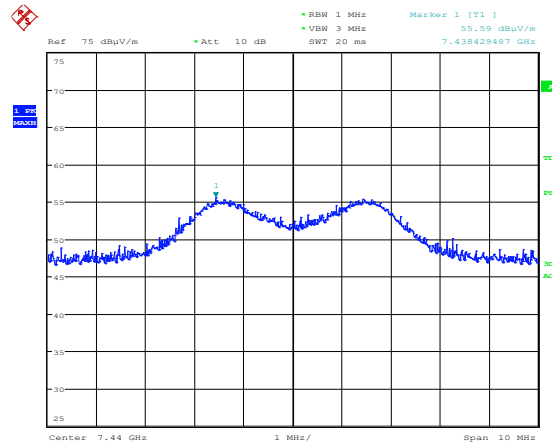
Radiated Emissions 1 - 18 GHz, EUT Vert, Snobee, 2480 MHz, HP

Radiated Emissions 1 - 18 GHz, EUT Vert, Snobee, 2480 MHz, VP



Date: 8.FEB.2024 11:30:24

Radiated Emissions 7440 MHz, EUT Vert, Snobee, 2480 MHz, HP



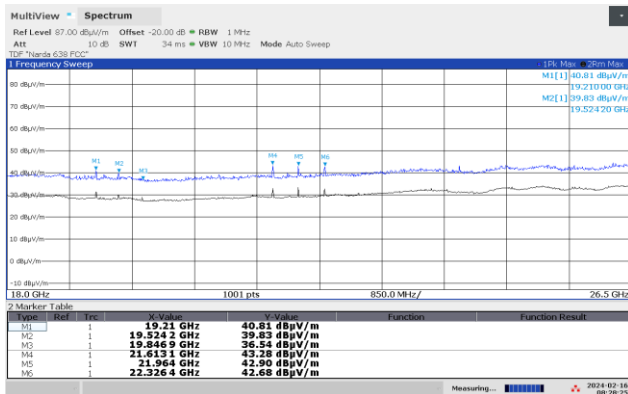
Date: 8.FEB.2024 11:32:14

Radiated Emissions 7440 MHz, EUT Vert, Snobee, 2480 MHz, HP

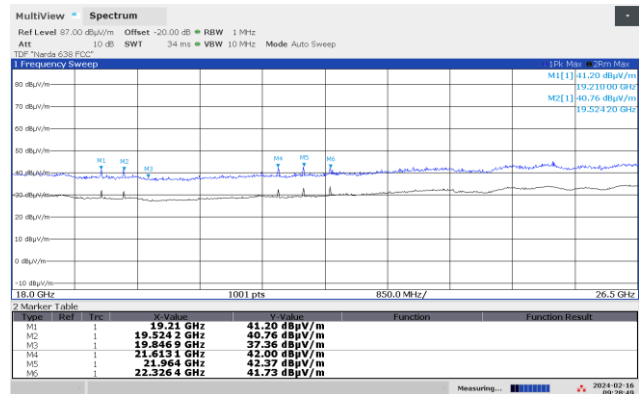
Below: Prescan 18-26 GHz at 5-10 cm distance.

The Offset of the analyzer is set to -20 dB - corresponding to a measurement distance of 30 cm.

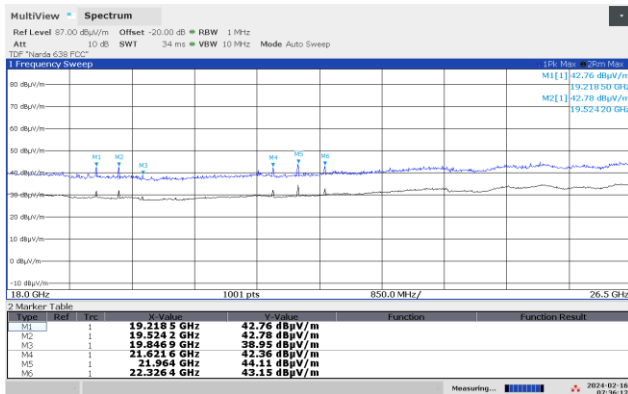
In order to see the spurious signals on the plots the actual measurement distance was decreased to 5-10 cms which corresponds to an additional offset of 9.5 dB.



Radiated Emissions 18 - 26 GHz, BLE 1Mb, 2402, 2440, 2480 MHz



Radiated Emissions 18 - 26 GHz, BLE 2Mb, 2402, 2440, 2480 MHz



Radiated Emissions 18 - 26 GHz, Snobee, 2405, 2440, 2480 MHz.

3.11 Power Spectral Density (PSD)

FCC part 15.247(d)

ISED Canada RSS-247 Issue 3, Clause 5.2 (2)

Measurement procedure: ANSI C63.10-2013 Clause 11.10

Test Results: Complies

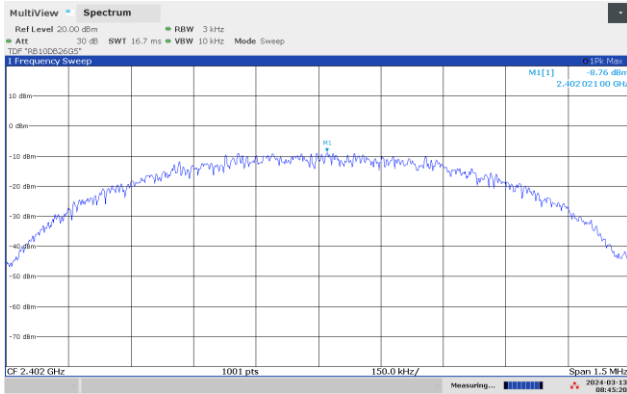
Measurement Data:

The measurement procedure PKPSD described in ANSI C63.10-2013 was used.

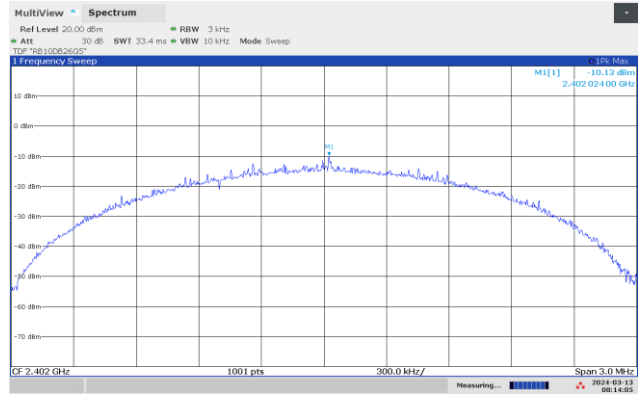
Modulation Type and Bitrate	Measured Power Spectral Density (dBm/3kHz)		
	Low	Mid	High
BLE 1Mb	-8.8	-8.9	-9.0
BLE 2Mb	-10.1	-10.1	-10.2
Snobee	-5.8	-5.6	-6.4

The measured values are with 3kHz RBW.

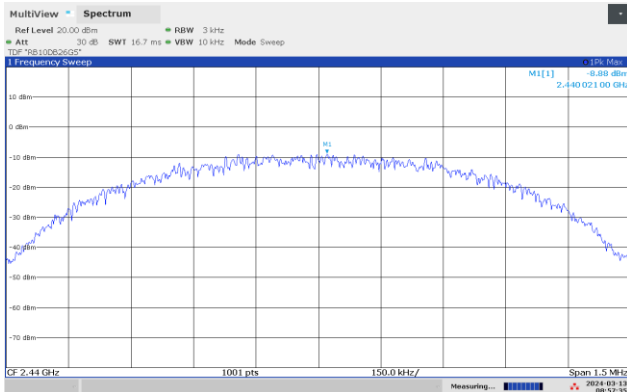
Requirement for systems using Digital Modulation
The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
No requirements for Frequency Hopping Systems.



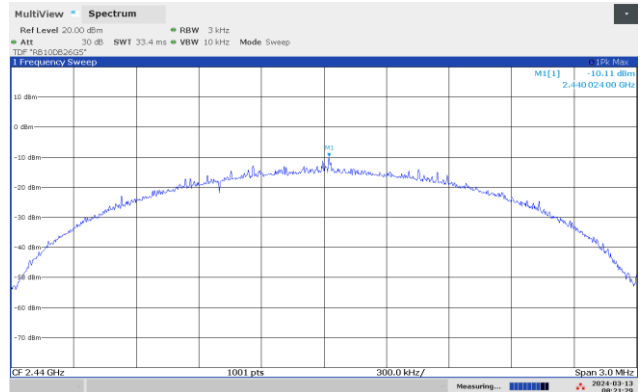
PSD, 2402 MHz, BLE 1Mb



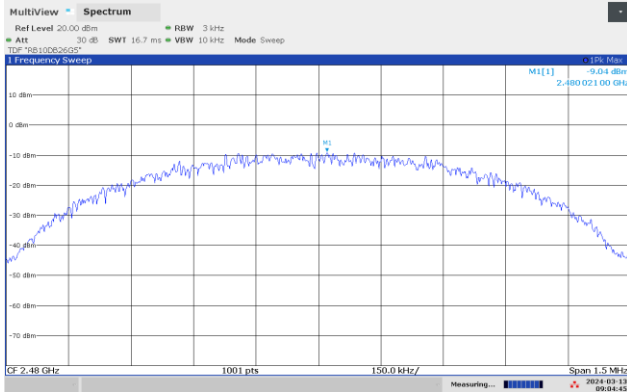
PSD, 2402 MHz, BLE 2Mb



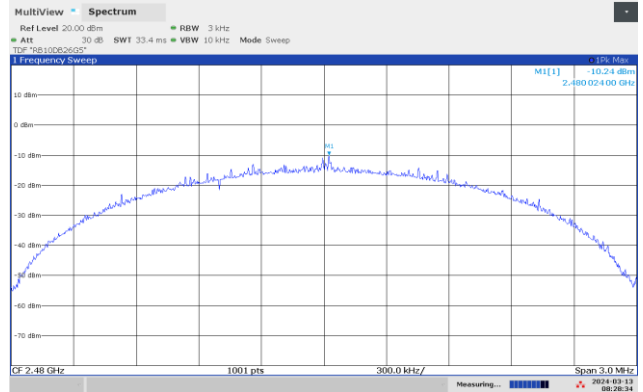
PSD, 2440 MHz, BLE 1Mb



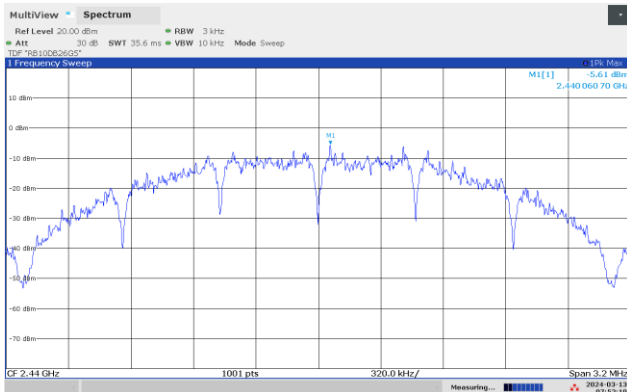
PSD, 2440 MHz, BLE 2Mb



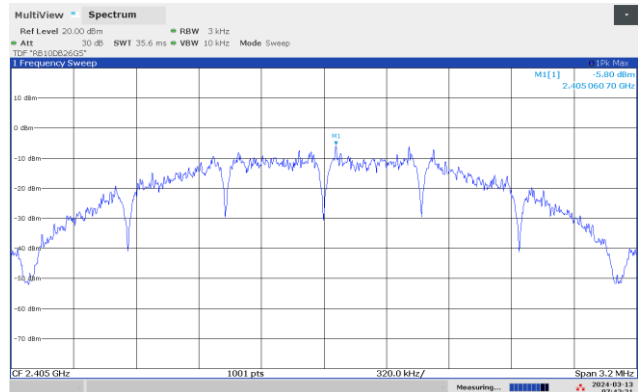
PSD, 2480 MHz, BLE 1Mb



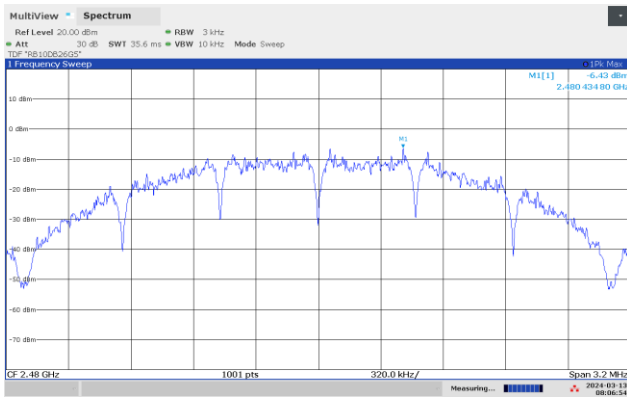
PSD, 2480 MHz, BLE 2Mb



PSD, 2405 MHz, Snobee



PSD, 2440 MHz, Snobee



PSD, 2480 MHz, Snobee

4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the testhouse.

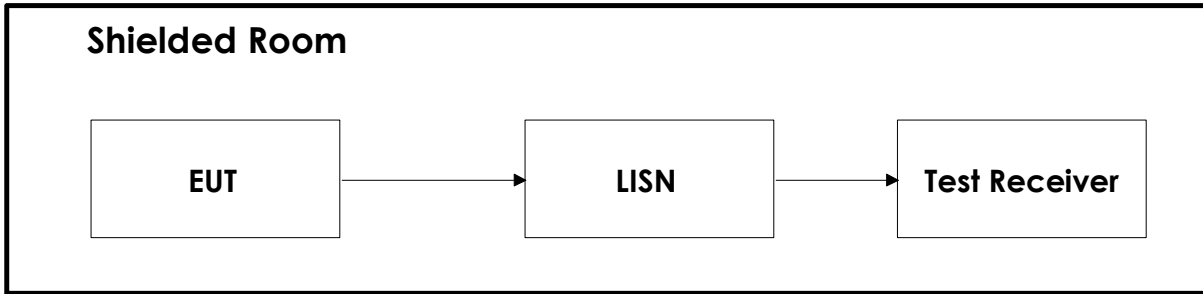
No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	FSW43	Spectrum Analyzer	Rohde & Schwarz	LR 1690	2024-01	2026-01
2	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2024-02	2025-02
3	6810.17B	Attenuator	Suhner	LR 1669	2023-03	2025-03
4	NO324415	Band Reject Filter	Microwave Circuits	LR 1760	COU	
5	JB3	Bilog Antenna	SunAR	N 4525	2023-04	2026-04
6	317	Preamplifier	Sonoma Inst.	LR 1687	2023-09	2024-09
7	3117-PA	Horn Antenna +PreAmp	EMCO	LR 1717	2023-08	2024-08
8	8449A	Pre-amplifier	Hewlett Packard	LR 1322	2023-09	2024-09
9	638	Antenna Horn	Narda	LR 1480	N/A	
10	Model 87V	Multimeter	Fluke	LR 1599	2023-04	2025-04
11	ST18/SMA/N/36	RF Cable	Suhner	LR 1627	COU	
The following equipment was used for powering during conducted emissions test						
12	TL-SF1008P	PoE Switch	TP-LINK	S/N 11494600231		
13	NU60-F480125-11	AC/DC converter 48V	LEI	N 14939		
14						

The software listed below has been used for one or more tests.

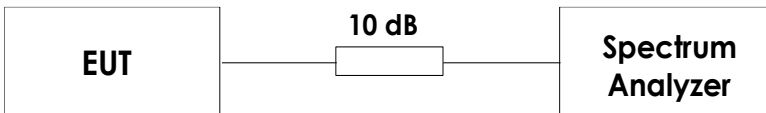
No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.60	EMC test software
2	Nemko AS	RSPlot	1.0.8	Screenshots from R&S Spectrum Analyzers

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission

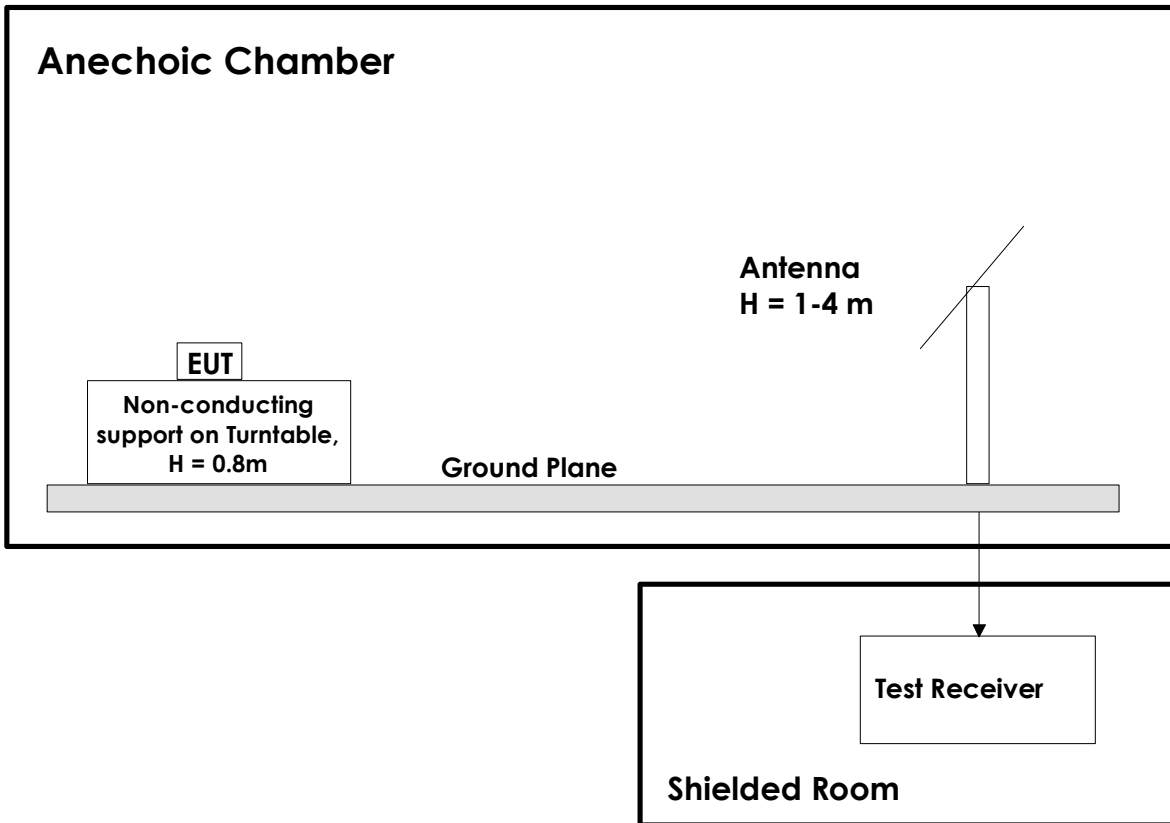


6.2 Conducted Tests



This test set-up is used for all Conducted tests.
For Frequency Stability test the EUT was placed in a climatic chamber.

6.3 Test Site Radiated Emission



This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10m, for all other frequencies it is 3m or 1m. Emissions above 1 GHz are measured with a Spectrum Analyzer and Horn Antenna. For measurements above 18 GHz the test receiver is moved inside the anechoic chamber and located next to the antenna to minimize the cable loss. All measurements at 1GHz and above were performed with turntable height 1.5m and with the ground plane covered by absorbers. A pre-amplifier is used for all measurements above 30 MHz, and High-Pass or Band-Pass filter is used for all harmonics.