

<p>MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia Sdn. Bhd. Plot 2A Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia.</p>	<p>FCC / ISED TEST REPORT Report Revision : Rev.B</p>
<p>Date/s Tested : 22-March-2024 - 25-April-2024 Report Issue Date : 18-July-2024 Manufacturer/Location : Motorola Solutions Malaysia Sdn Bhd Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia Requestor : WONG CHEW LOOI Product Type : Portable Product Marketing Name (PMN) : R7 Hardware Version Identification Number (HVIN) : AAH06RDN9RA1AN (IC Model: PMUE5722ABB) Frequency Band : 2.402 - 2.480 GHz Max RF Output Power : 10 mWatts Applicant Name : Motorola Solutions Inc Applicant Address : Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia FCC Registrations : 461337 ISED Registrations : MY0001 Firmware Version Identification Number (FVIN) : D02.24.02.0078 The equipment was tested accordance to the requirement listed below:</p> <p>(2.4GHz BT LE) PASS 47 CFR Part 15C ISED RSS 247 Issue 2 February 2017</p>	
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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	31-May-2024	Alieya
Rev. B	Update antenna type, applicant name, max RF output power and cover page HVIN from “AAH06RDN9RA1AN” to “AAH06RDN9RA1AN (IC Model: PMUE5722ABB)”	18-July-2024	Alieya

1.0 General Information

EUT Description:

Technologies	2.4GHz BT LE
TX Frequency range	2402MHz – 2480MHz
Modulation Type	GFSK
Connector type	PROGRAMMING, TEST & ALIGNMENT CABLE
Antenna type	PCB

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
ANTENNA, STAMPED METAL,UHF SLIM WHIP ANTENNA (400-527MHZ) 400 - 527MHz	MOTOROLA	PMAE4079A
BATTERY PACK,BATT IMPRES LIION TIA4950 IP68 3200T	MOTOROLA	PMNN4810A
POWER SUPPLY ADAPTOR,IMPRES SUC LEVEL V SMPS NA CORD	MOTOROLA	WPLN4253B

Channel number and frequency information:

40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

FCC 47 CFR Part 15 Subpart C
KDB 558074 D01 15.247 Meas Guidance v05
ANSI C63.10-2013

Deviation from standard

Not applicable as no deviation from standard test method

Modifications to EUT

For RF conducted measurements a pigtail was soldered out of the board while for radiated measurements there were no modifications to the device

2.0 Summary of Test Results

FCC Clause	ISED Clause	Test Item	Result	Remark	Serial number tested	Tested by
15.247 (a)(2)	RSS 247 5.2 (a)	DTS & 99% Channel Bandwidth	Pass	Highest 99% OCB: BT 4.0 - 1.05MHz (1M05F1D) BT 5.0 -2.07MHz (2M07F1D)	865EAD9539	Hidayati
15.247 (b)(3)	RSS 247 5.4 (d)	Conducted RF Output Power (Peak)	Pass	Highest output power: BT 4.0 - 9.616 dBm (9.154 mW) BT 5.0 - 9.693 dBm (9.318 mW)	865EAD9539	Hidayati
15.247(e)	RSS 247 5.2 (b)	Maximum Peak Power Spectral Density	Pass	Meet the limit requirement.	865EAD9539	Hidayati
15.247 (d)	RSS-247 5.5	Band-Edge Conducted Spurious Emission	Pass	Worst case emission: -23.15 dBm	865EAD9539	Hidayati
15.247 (b)	RSS-247 5.5	Conducted Spurious Emission	Pass	Worst case emission: -41.97 dBm	865EAD9539	Hidayati
15.205, 15.209, 15.247 (d)	RSS247 5.5	Radiated Emission within Restricted Bands	Pass	Worst case emission: RBE: 47.2392 dBuV/m (margin: 6.7608 dBuV/m) RSE: 65.3759 dBuV/m (margin: 8.6241 dBuV/m), Noise floor	865EAD9538	Nazrin & Rezza
15.207	RSS-Gen 8.8	AC Power Line Conducted Spurious Emission	NA	Meet the limit requirement.	865EAD9538	Shidee
15.203	-	Antenna Requirement	NA	Internal antenna is not accessible to the end-user	NA	NA

3.0. Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±dB)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.48
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.88
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.84
	18GHz ~ 40GHz	6.02
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82

4.0 Equipment List

Bluetooth ATE # 1 (SW Version: Ate Main_3.1.12_R1)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
CHAMBER	SH-641	92003820	18-Jul-23	18-Jul-24
POWER SUPPLY	6652A	3541A02371	18-Jul-23	18-Jul-24
PULSE SENSOR	MA2411B	1726287	22-Aug-23	22-Aug-24
PULSE POWER METER	ML2495A	1845014	16-Aug-23	16-Aug-24
SPECTRUM ANALYZER	E4440A	MY48250517	8-Nov-23	8-Nov-24

Radiated Emission Station (SW Version: EMC FCC RE v1.6.5)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DRG HORN FREQ.	SAS-571	1143	08-Mar-23	08-Mar-25
DRG HORN FREQ.	SAS-571	720	18-Apr-23	18-Apr-25
DC Power Supply	NR973A	MY54180189	30-Aug-23	30-Aug-24
SIGNAL GENERATOR	SMB 100A	182511	4-Jun-21	4-Jun-24
EMI TEST RECEIVER	ESW44	101731	11-Aug-23	11-Aug-24
5m SEMI-ANECHOIC CHAMBER	S800-HX	J2308	No Cal. Req'd	No Cal. Req'd
BILOG ANTENNA	CBL6112B	2950	14-Dec-23	14-Dec-24
BILOG ANTENNA	CBL6112B	2964	25-Sep-23	25-Sep-24
DATA LOGGER THERMOHYGROMETER	SDL500	A.016800	21-Jun-23	21-Jun-24
SYSTEM CONTROLLER	SC104V	050806-1	No Cal. Req'd	No Cal. Req'd
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	No Cal. Req'd	No Cal. Req'd
ANTENNA POSITIONING TOWER	TLT2	NA	No Cal. Req'd	No Cal. Req'd
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170143	28-Aug-23	28-Aug-24
PREAMPLIFIER 18-40GHz	Miteq Hi Gain Sucoflex	002	No Cal. Req'd	No Cal. Req'd
PREAMPLIFIER	PAM-0118P	269	28-Jun-23	28-Jun-24
LOOP ANTENNA	6502	00208416	26-Oct-23	26-Oct-24

AC Powerline Station (SW Version: EMC32 Ver.10.60.10)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DATA LOGGER	DSB	16344143	21-Jun-23	21-Jun-24
V-NETWORK 2-LINE	ENV216V	101039	13-Dec-23	13-Dec-24
EMI TEST RECEIVER	ESIB40	100225	19-Sep-23	19-Sep-24
PROGRAMMABLE AC SOURCE	61604	ABR000000926	25-Jul-23	25-Jul-24

5.0 Test Mode Applicability and Test Channel Detail

Radiated Emission Test (Above 1GHz)

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Test Mode	0 to 39	0,19,39	GFSK	22.8°C, 70.1%RH

Radiated Emission Test (Below 1GHz)

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Test Mode	0 to 39	0,19,39	GFSK	22.8°C, 70.1%RH

Power Line Conducted Emission Test

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Application Mode	0 to 39	AUTO	AUTO	NA

Antenna Port Conducted Measurement:

This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

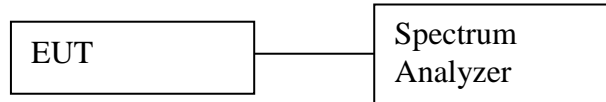
Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Test Mode	0 to 39	0,19,39	GFSK	25°C, 54.8%RH

6.0 Transmitter Test Parameters

6.1 6dB Channel Bandwidth

6.1.1 Test Setup



- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - d. Trace = Max hold
 - e. Sweep = auto
- 5) Measure the freq different of two frequencies that were attenuated 6dB from peak of the emission & record the frequency difference as the emission bandwidth.

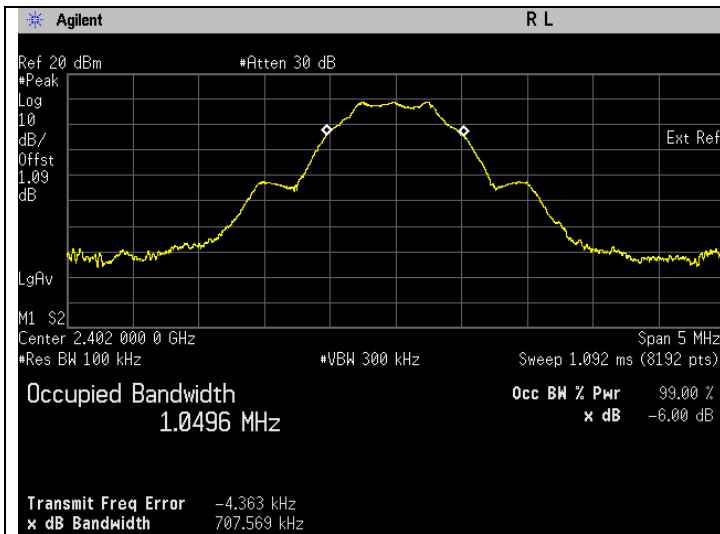
6.1.2 Test Limits:

Normal Condition (25 ° C)
≥ 500 kHz

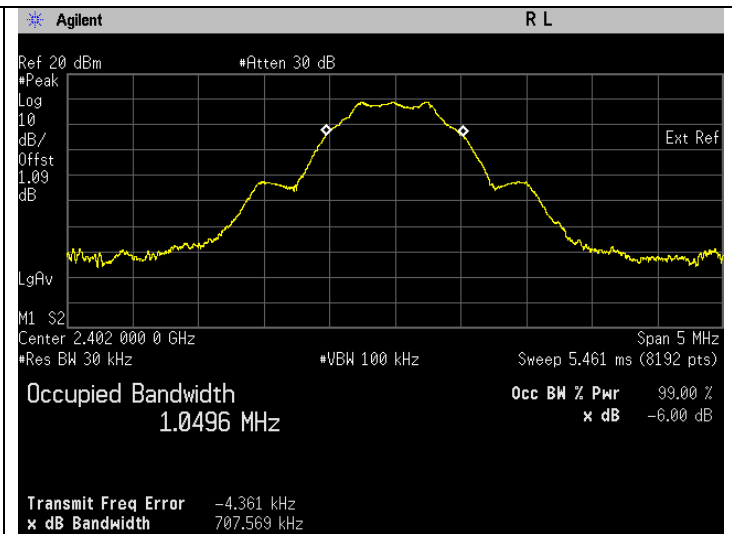
6.1.3 Test Data:

BTLE 1M

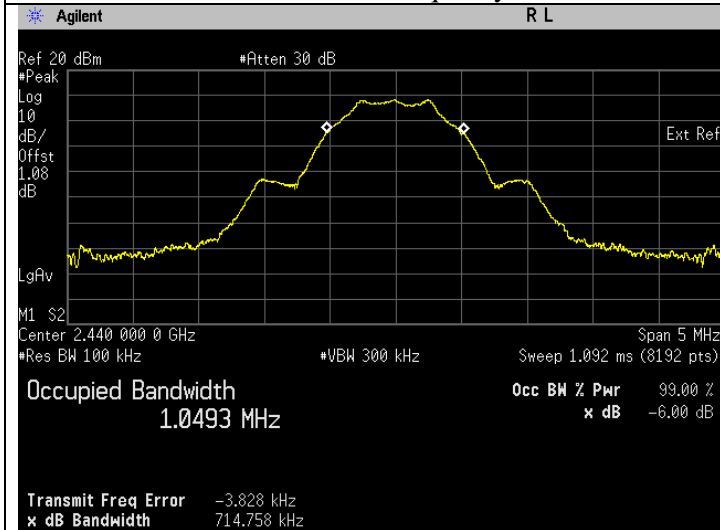
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
Bluetooth L.E	GFSK	2402	0.71	1.05	Pass
Bluetooth L.E	GFSK	2440	0.71	1.05	Pass
Bluetooth L.E	GFSK	2480	0.70	1.05	Pass



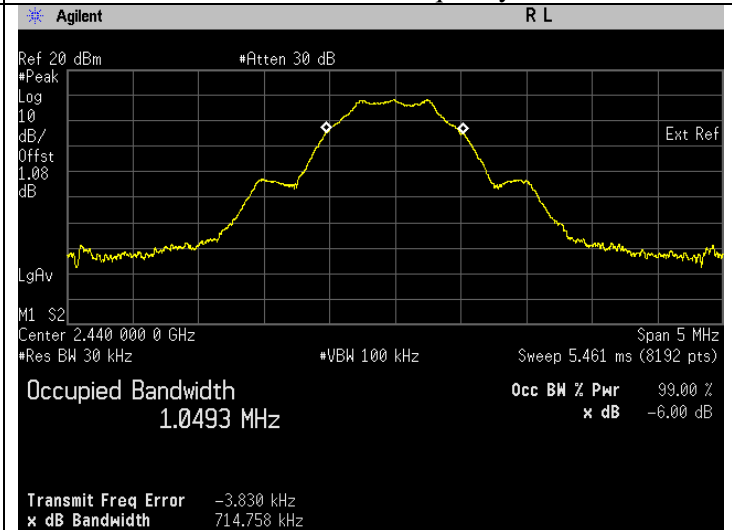
6dB Bandwidth. Bluetooth LE Frequency 2402 MHz



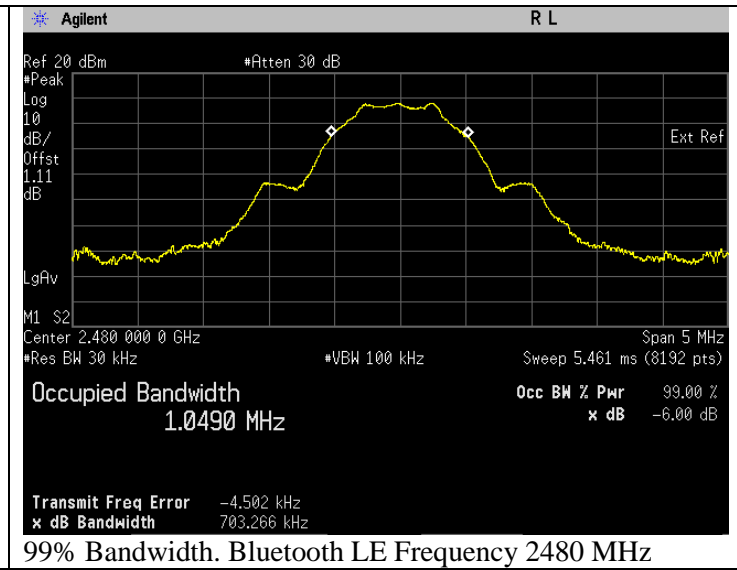
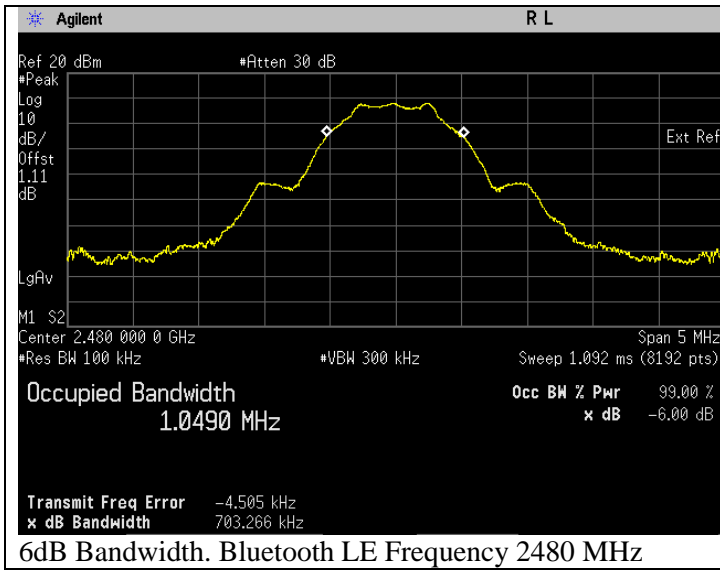
99% Bandwidth. Bluetooth LE Frequency 2402 MHz



6dB Bandwidth. Bluetooth LE Frequency 2440 MHz

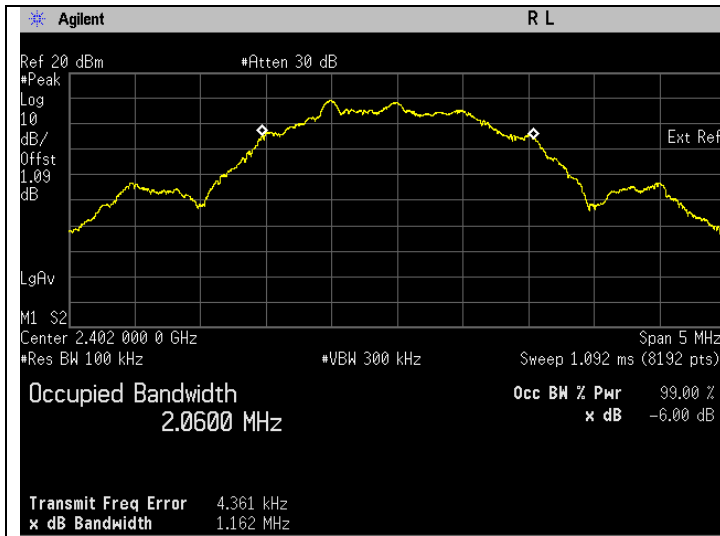


99% Bandwidth. Bluetooth LE Frequency 2440 MHz

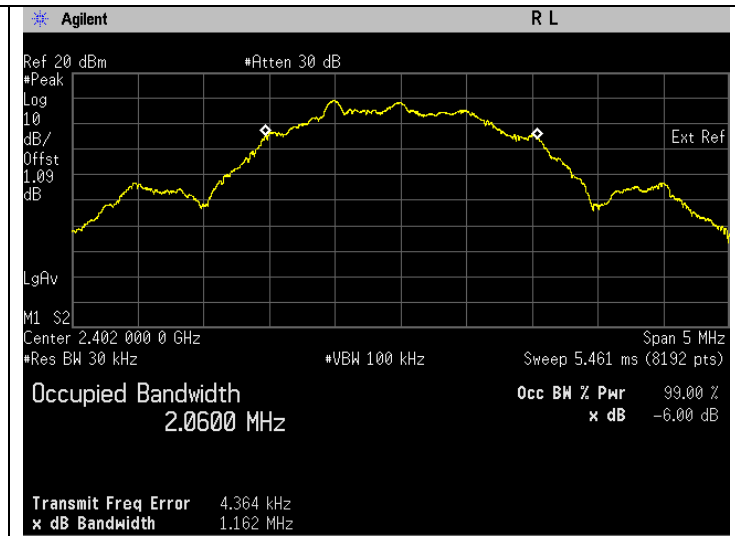


BTLE 2M

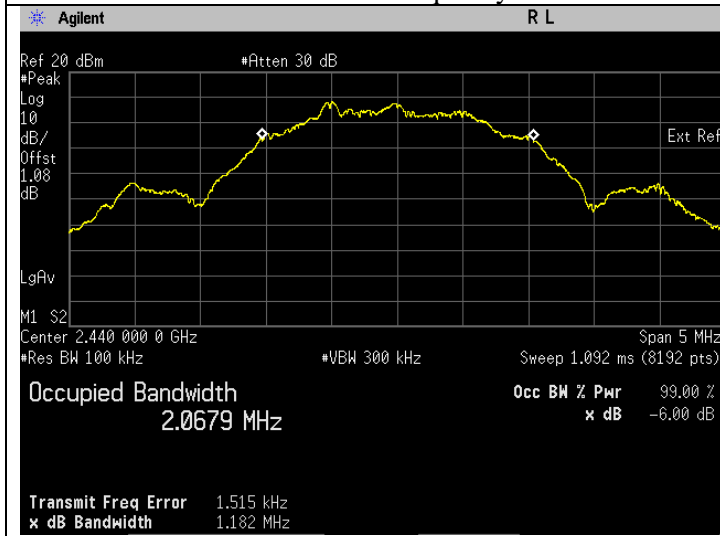
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
Bluetooth L.E	GFSK	2402	1.16	2.06	Pass
Bluetooth L.E	GFSK	2440	1.18	2.07	Pass
Bluetooth L.E	GFSK	2480	1.17	2.07	Pass



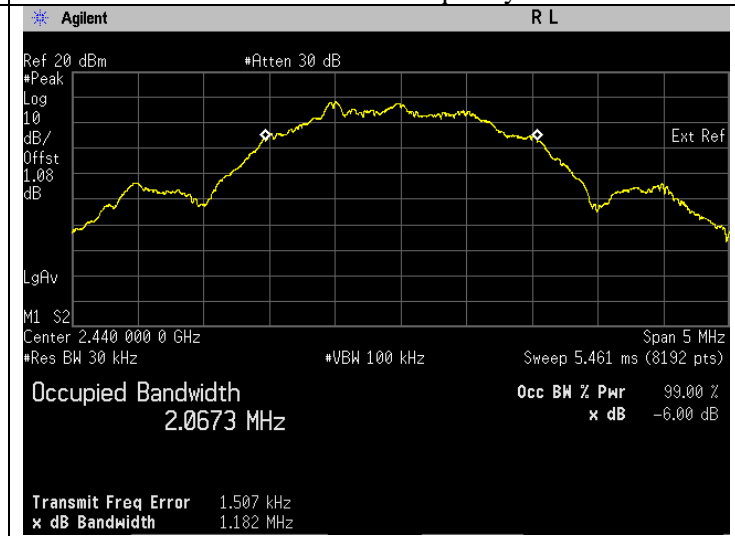
6dB Bandwidth. Bluetooth LE Frequency 2402 MHz



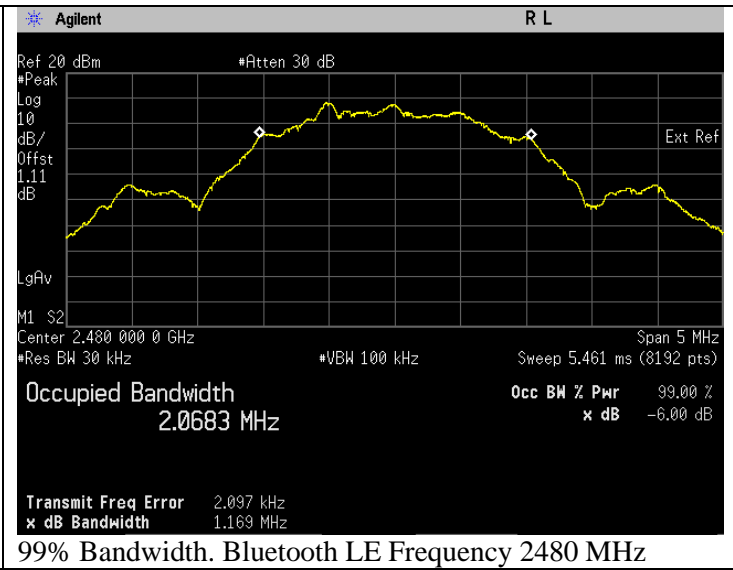
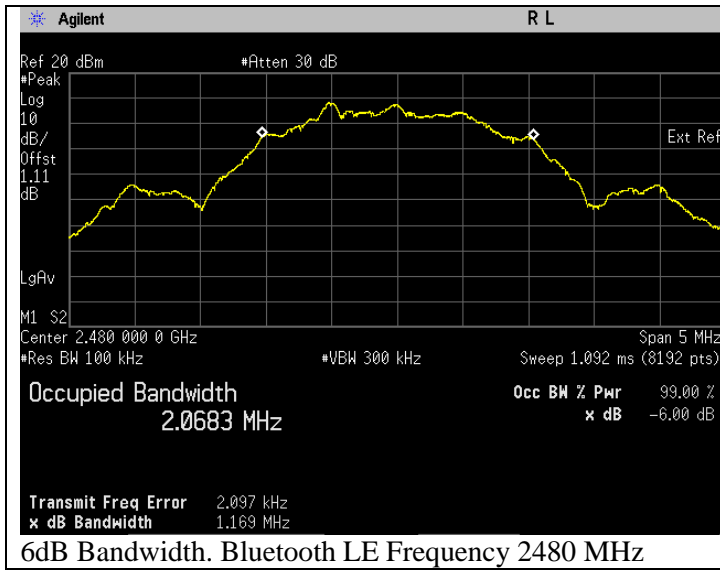
99% Bandwidth. Bluetooth LE Frequency 2402 MHz



6dB Bandwidth. Bluetooth LE Frequency 2440 MHz

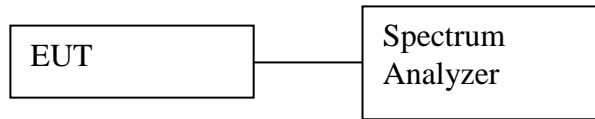


99% Bandwidth. Bluetooth LE Frequency 2440 MHz



6.2 Conducted RF Output Power

6.2.1 Test Setup



Peak

- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Measure the duty cycle of transmitter output signal.
- 4) Setting of Spectrum analyzer :
 - a. Set the RBW = 3 MHz.
 - b. Set the VBW = 50 MHz.
 - c. Set the span $\geq [1.5 \times \text{OBW bandwidth}]$.
 - d. Detector = Peak
 - e. Sweep time = auto couple.
 - f. Trace mode = max hold.
 - g. Allow trace to fully stabilize.

6.2.2 Test Limits:

Normal Condition (25 ° C)
≤ 1 Watt(30 dBm)

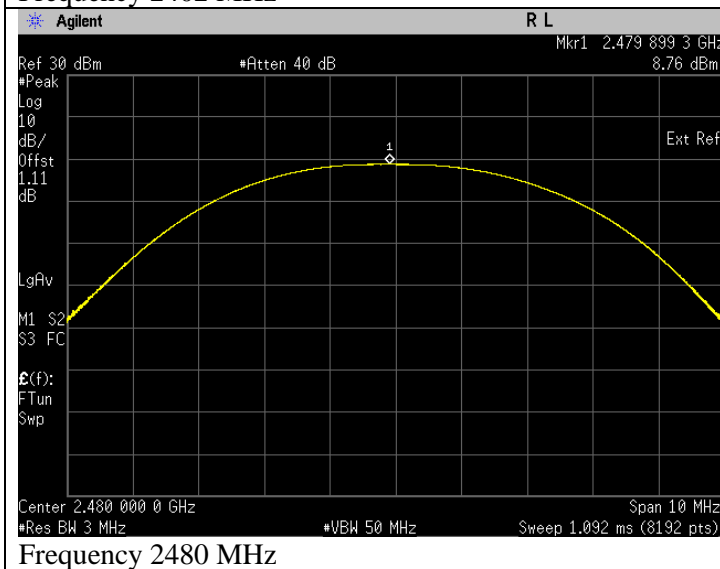
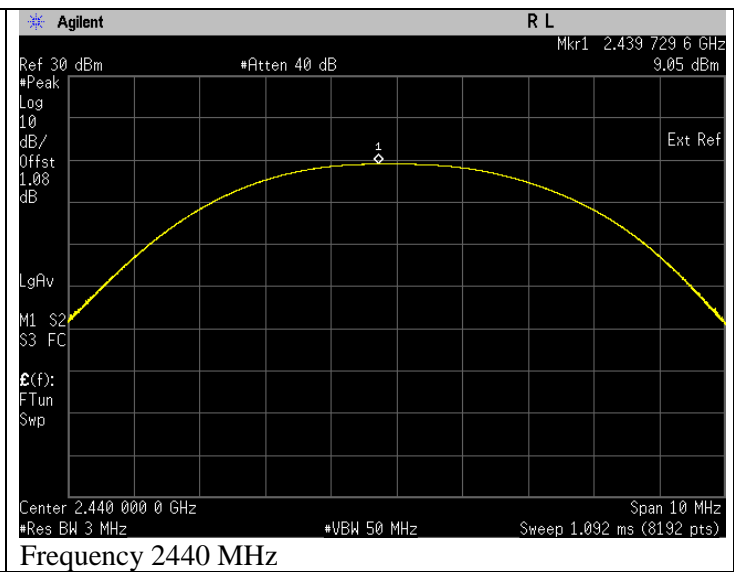
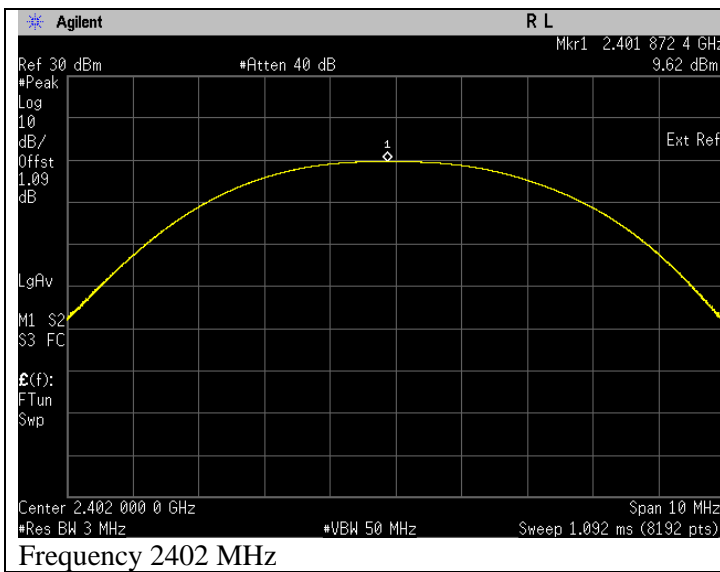
6.2.3

6.2.4 Test Data:

Test was conducted with peak power.

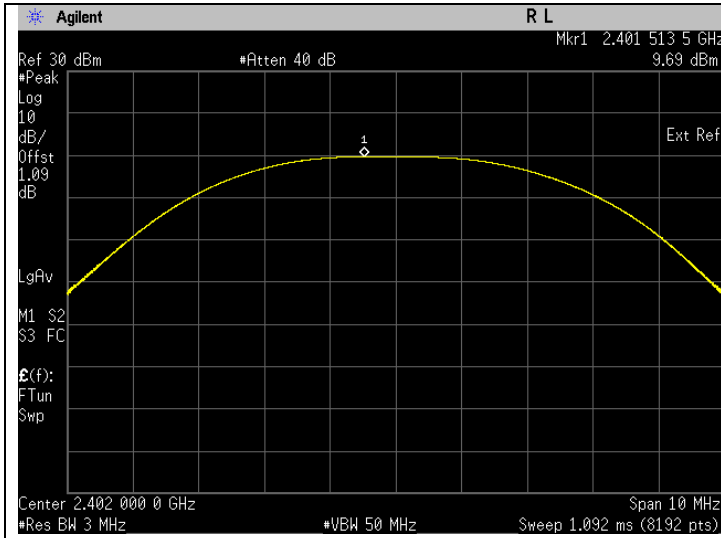
BTLE 1M

Test Conditions			Test Frequency	Results
Standard	Modulation Type	Tx (MHz)	Output Power (dBm)	Status
Bluetooth L.E	GFSK	2402	9.616	Pass
Bluetooth L.E	GFSK	2440	9.045	Pass
Bluetooth L.E	GFSK	2480	8.759	Pass

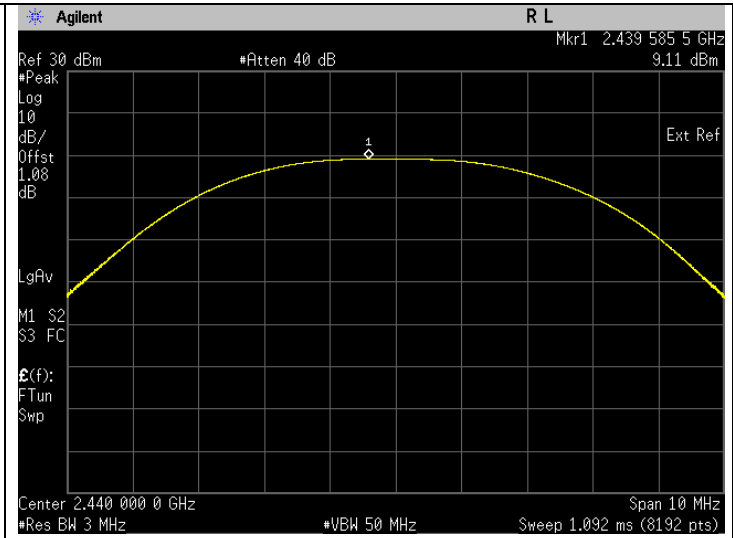


BTLE 2M

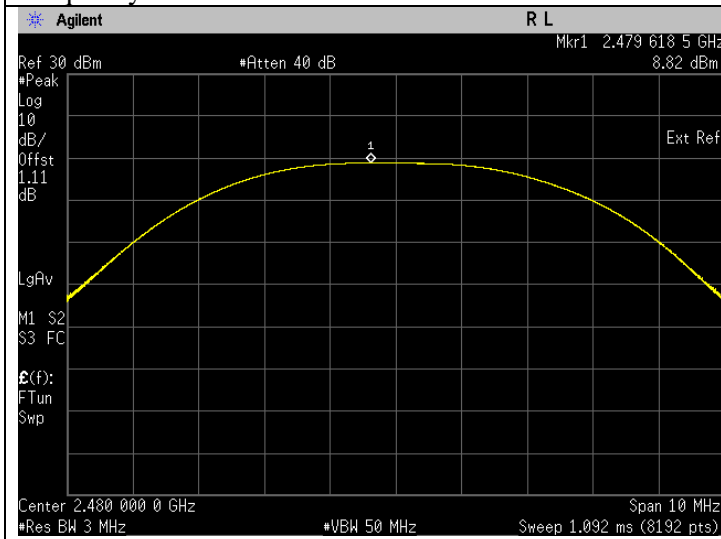
Test Conditions			Test Frequency	Results
Standard	Modulation Type	Tx (MHz)	Output Power (dBm)	Status
Bluetooth L.E	GFSK	2402	9.693	Pass
Bluetooth L.E	GFSK	2440	9.112	Pass
Bluetooth L.E	GFSK	2480	8.824	Pass



Frequency 2402 MHz



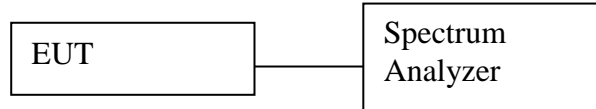
Frequency 2440 MHz



Frequency 2480 MHz

6.3 Maximum Peak Power Spectral Density

6.3.1 Test Setup



Maximum Peak

- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
 - a. Set analyzer center frequency to DTS channel center frequency.
 - b. Set the span to 1.5 times the DTS bandwidth.
 - c. Set the RBW to 3 kHz.
 - d. Set the VBW $\geq [3 \times \text{RBW}]$.
 - e. Detector = peak.
 - f. Sweep time = auto couple.
 - g. Trace mode = max hold.
 - h. Allow trace to fully stabilize.
 - i. Use the peak marker function to determine the maximum amplitude level within the RBW.
 - j. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

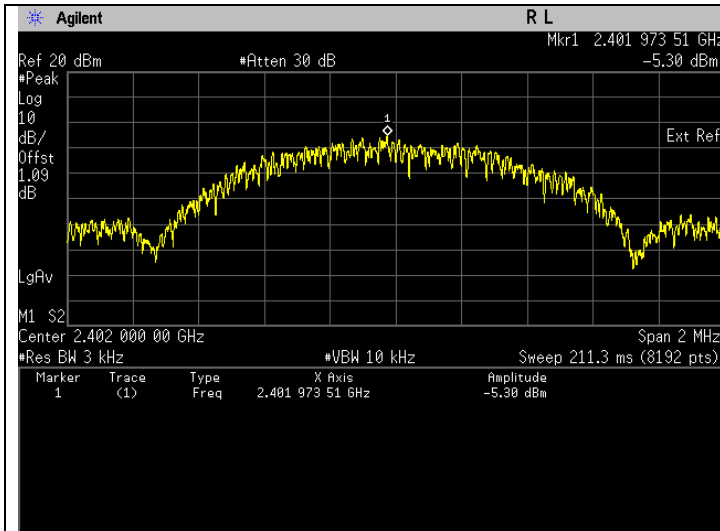
6.3.2 Test Limits:

Normal Condition (25 ° C)
$\leq 8 \text{ dBm/3kHz}$

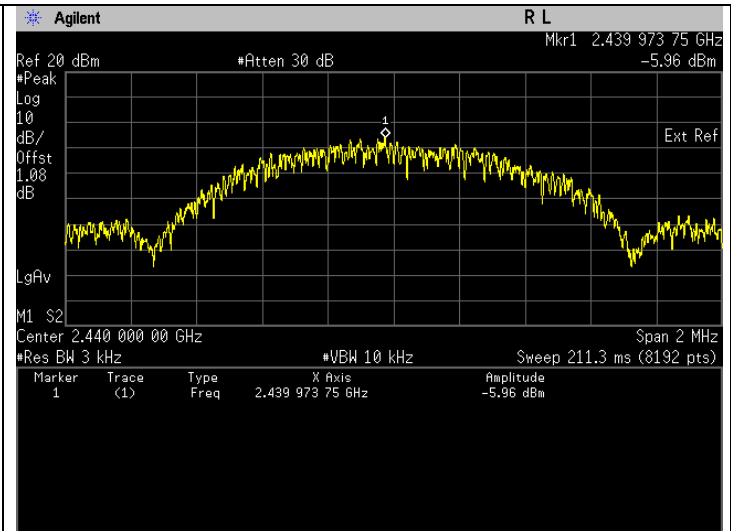
6.3.3 Test Result

BTLE 1M

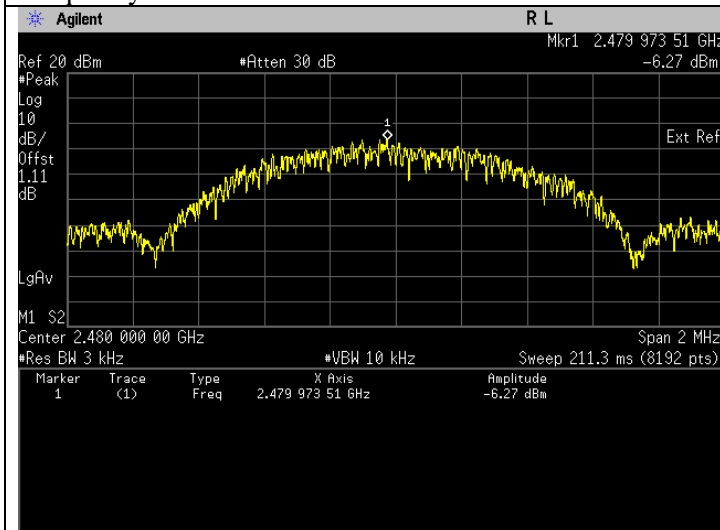
Test Conditions		Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Power (dBm/3kHz)	Status
Bluetooth L.E.	GFSK	2402	-5.30	Pass
Bluetooth L.E.	GFSK	2440	-5.96	Pass
Bluetooth L.E.	GFSK	2480	-6.27	Pass



Maximum Power Spectral Density. Bluetooth LE
 Frequency 2402 MHz



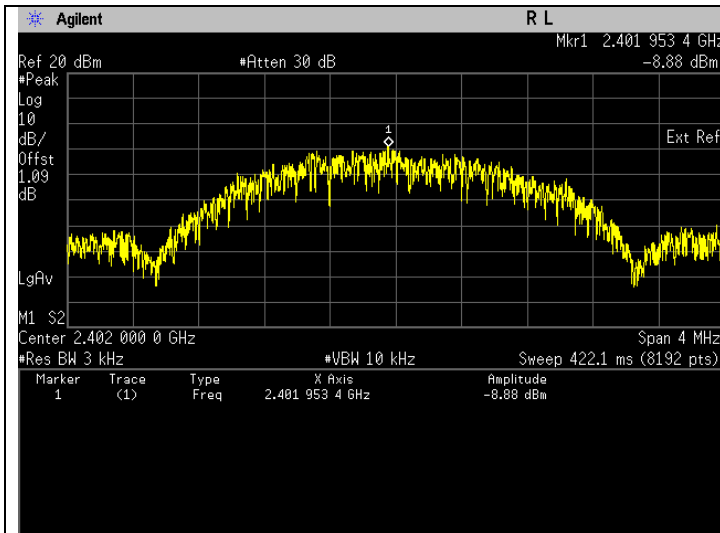
Maximum Power Spectral Density. Bluetooth LE
 Frequency 2440 MHz



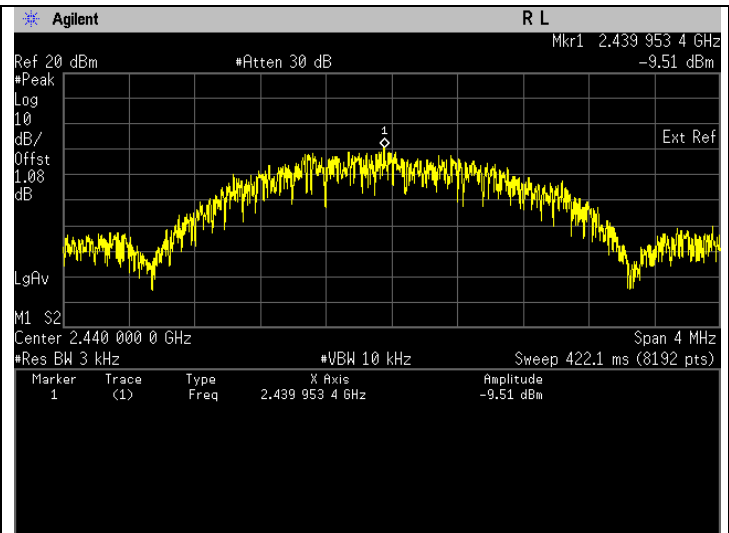
Maximum Power Spectral Density. Bluetooth LE
 Frequency 2480 MHz

BTLE 2M

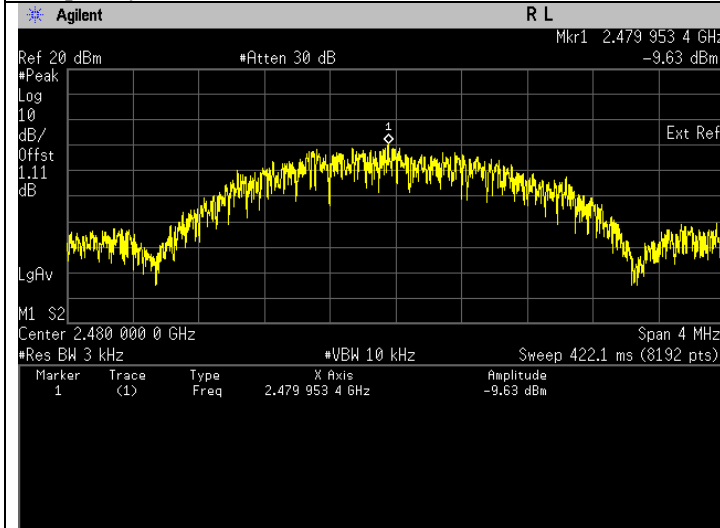
Test Conditions		Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Power (dBm/3kHz)	Status
Bluetooth L.E.	GFSK	2402	-8.88	Pass
Bluetooth L.E.	GFSK	2440	-9.51	Pass
Bluetooth L.E.	GFSK	2480	-9.63	Pass



Maximum Power Spectral Density. Bluetooth LE
 Frequency 2402 MHz



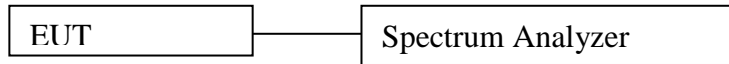
Maximum Power Spectral Density. Bluetooth LE
 Frequency 2440 MHz



Maximum Power Spectral Density. Bluetooth LE
 Frequency 2480 MHz

6.4 Conducted Spurious Emission

6.4.1 Test Setup



- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - d. Trace = Max Hold
 - e. Sweep = auto
- 5) Use the peak marker function to measure highest emission and scan up to 10th harmonic.

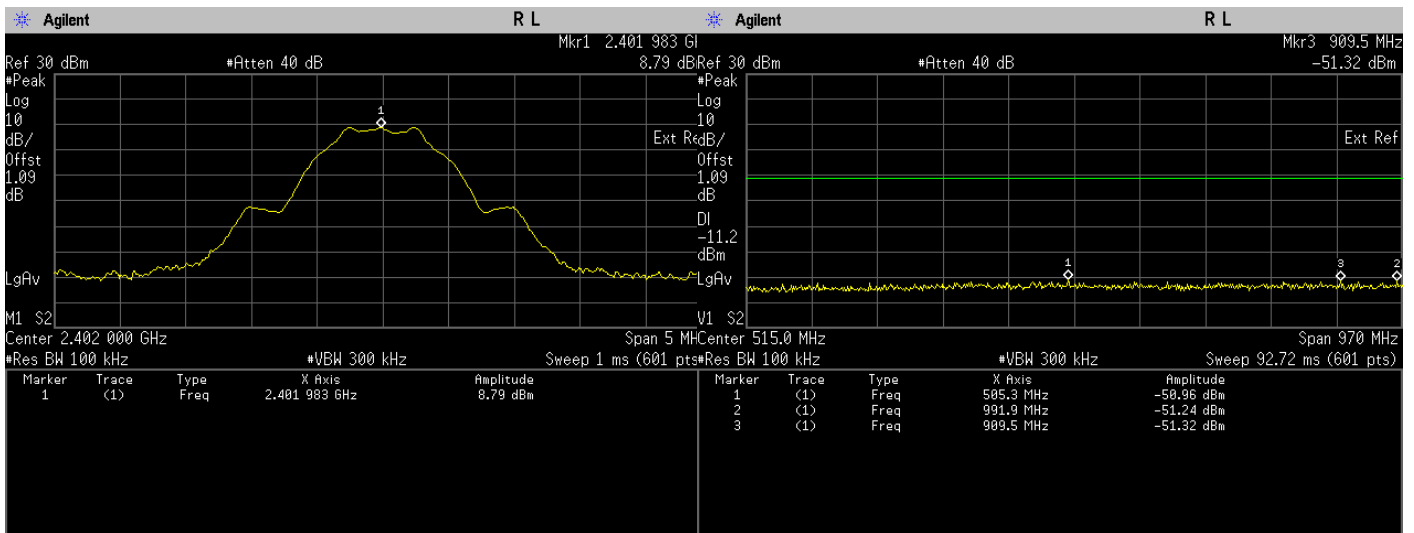
6.4.2 Test Limits:

Normal Condition (25 ° C)
Shall be at least 20 dB below max power. (Peak detector)

6.4.3 Test Result

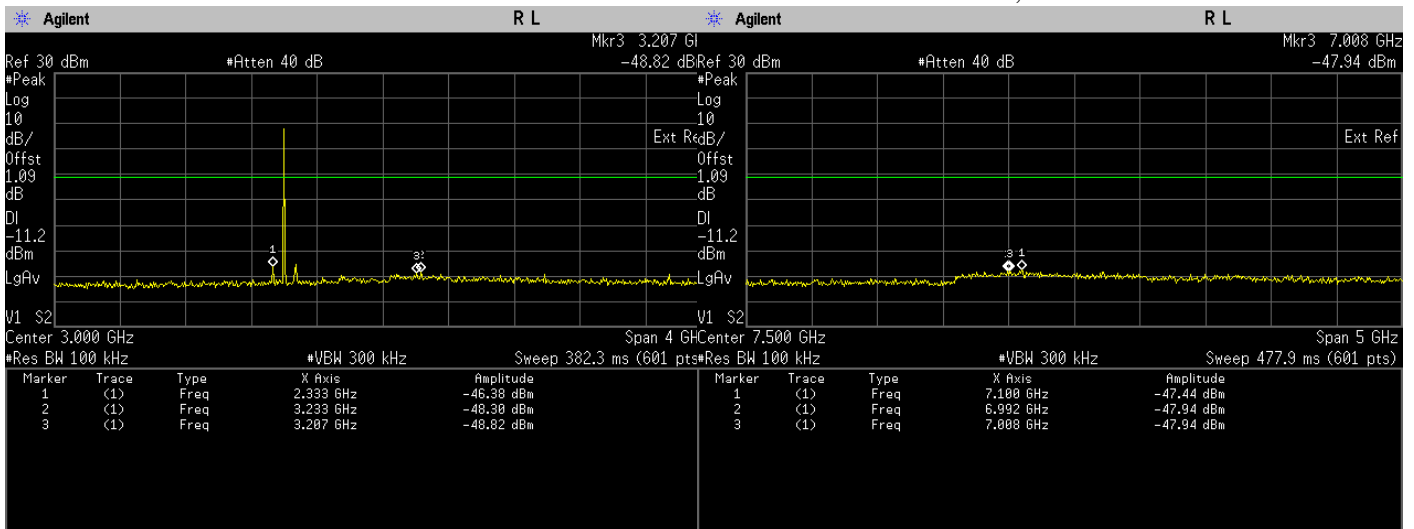
BTLE 1M

Test Conditions			Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
Bluetooth L.E.	GFSK	2402	24300.00	-43.21	Pass
			24958.00	-43.58	Pass
			24983.00	-43.64	Pass
Bluetooth L.E.	GFSK	2440	24708.00	-42.19	Pass
			23675.00	-43.25	Pass
			24808.00	-43.33	Pass
Bluetooth L.E.	GFSK	2480	24917.00	-42.79	Pass
			24850.00	-43.35	Pass
			24983.00	-43.46	Pass



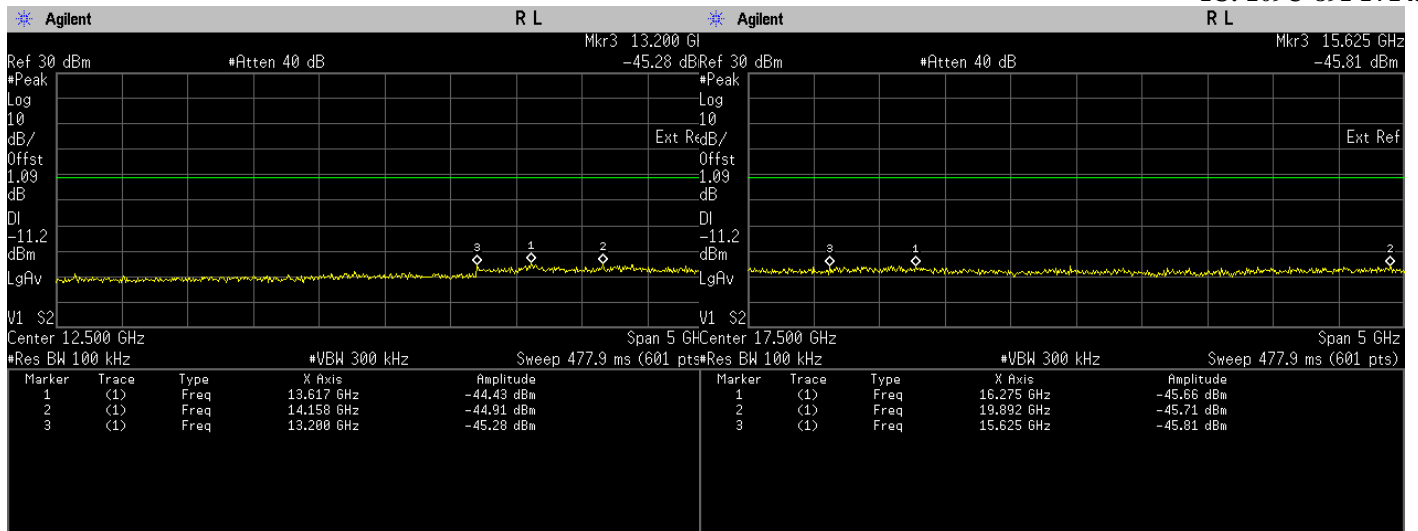
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Reference Level

Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 30 MHz -> 1 GHz



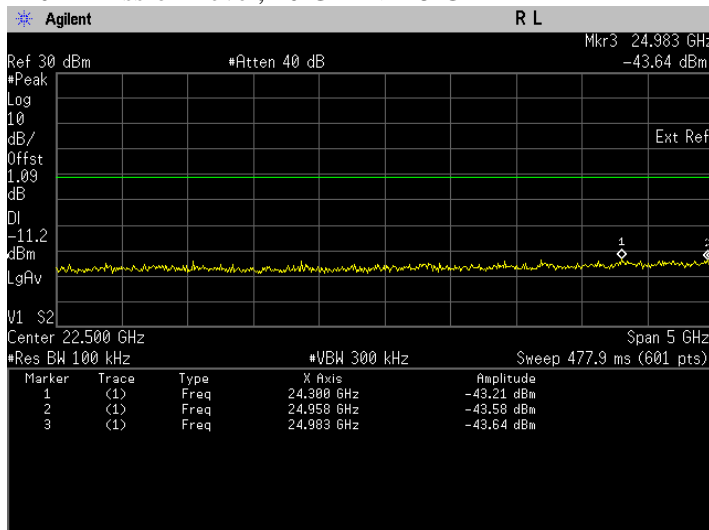
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 5 GHz -> 10 GHz

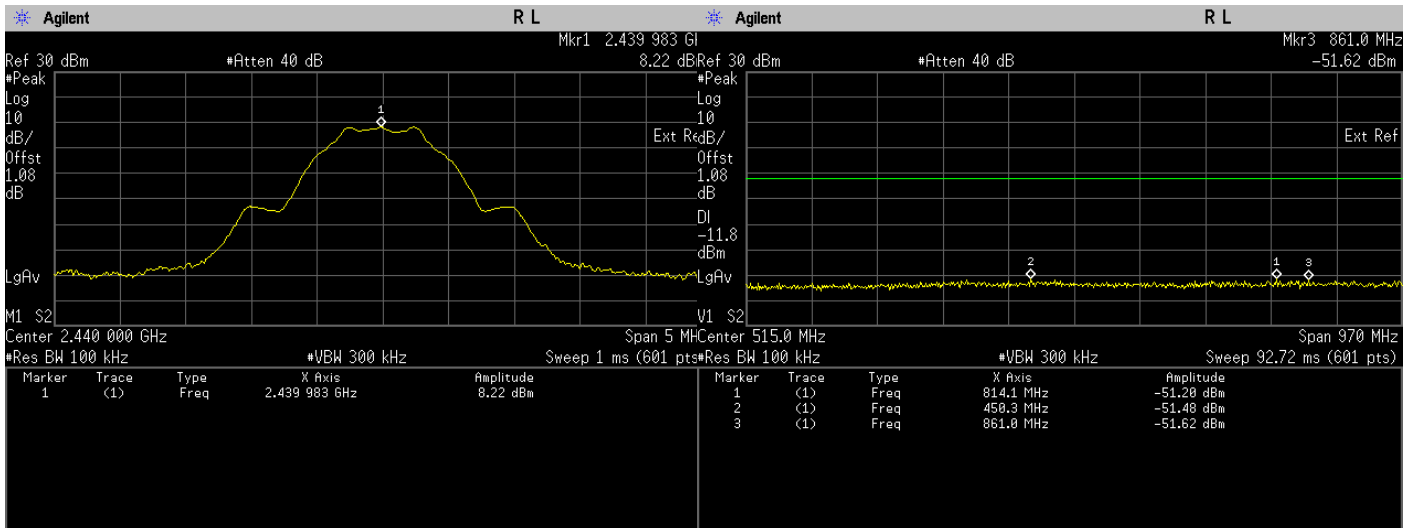


Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 15 GHz -> 20 GHz

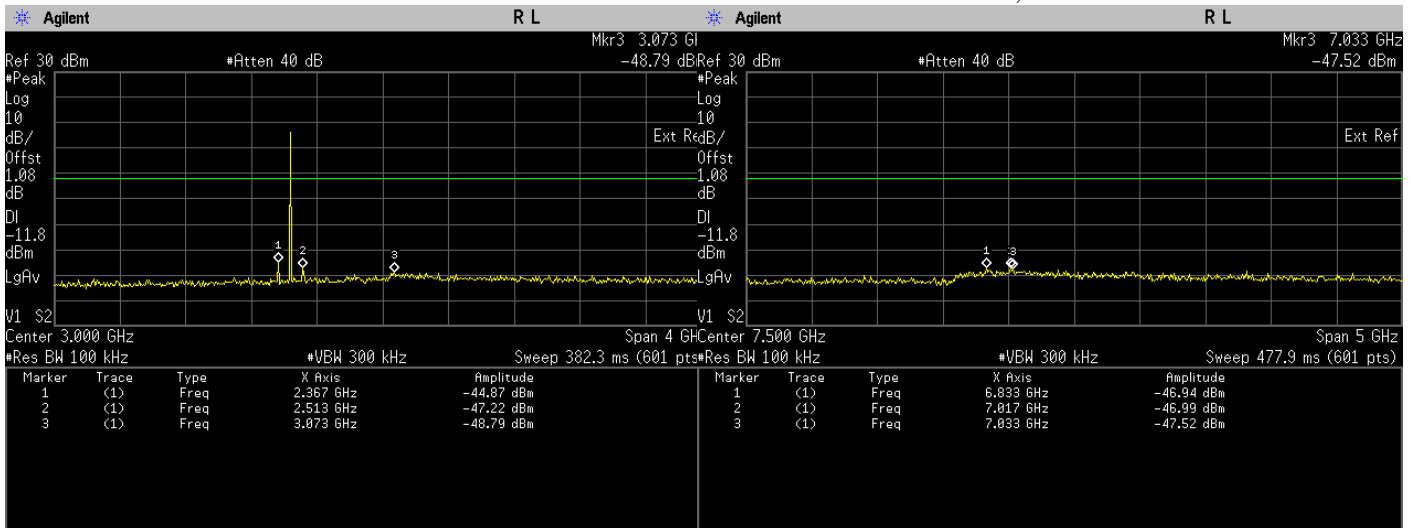


Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 20 GHz -> 25 GHz



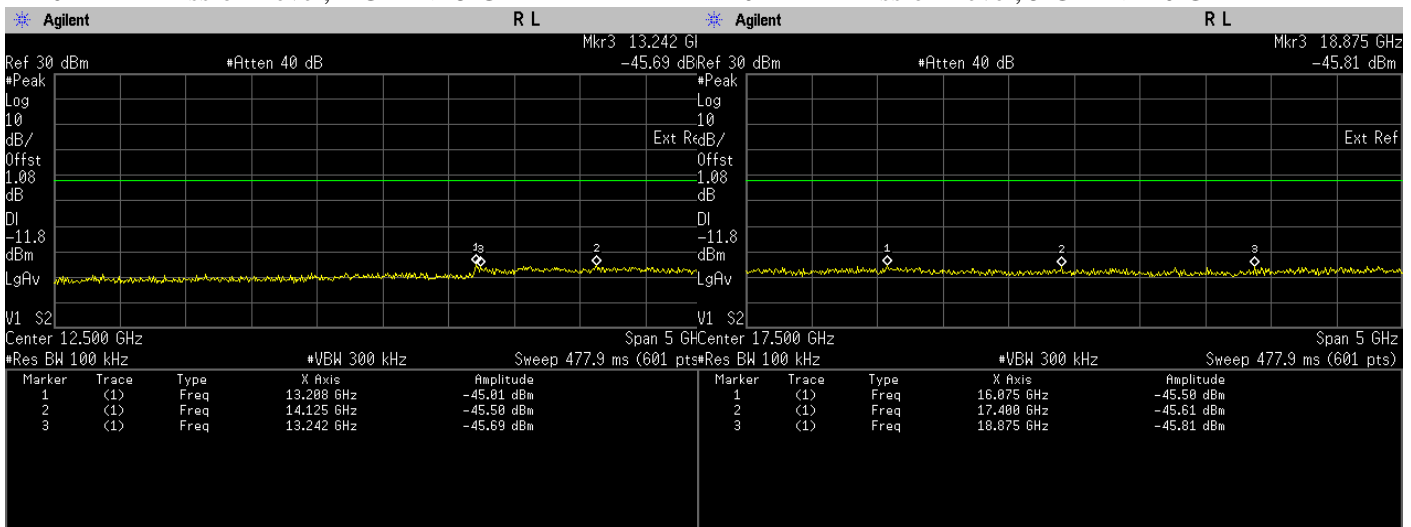
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Reference Level

Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 30 MHz -> 1 GHz



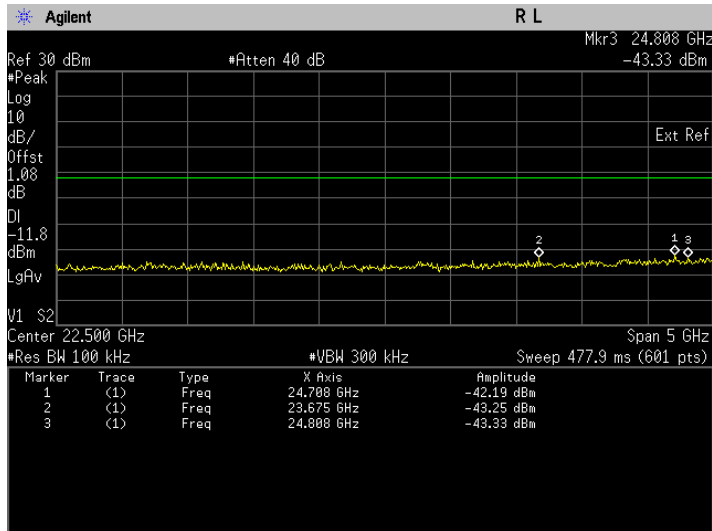
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 5 GHz -> 10 GHz

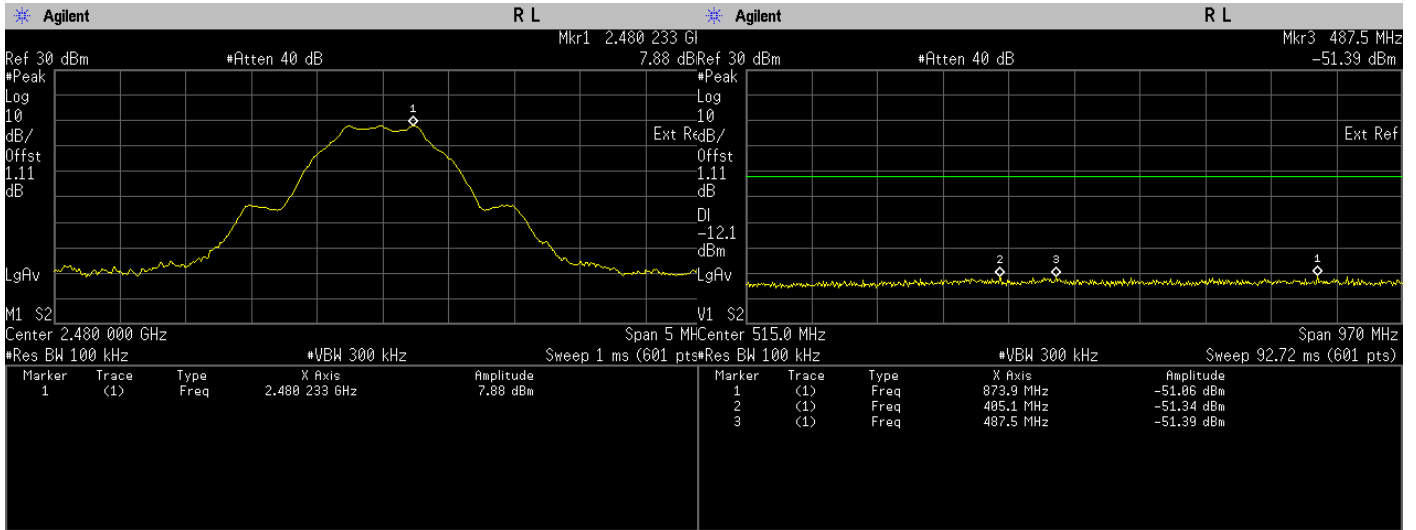


Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 15 GHz -> 20 GHz

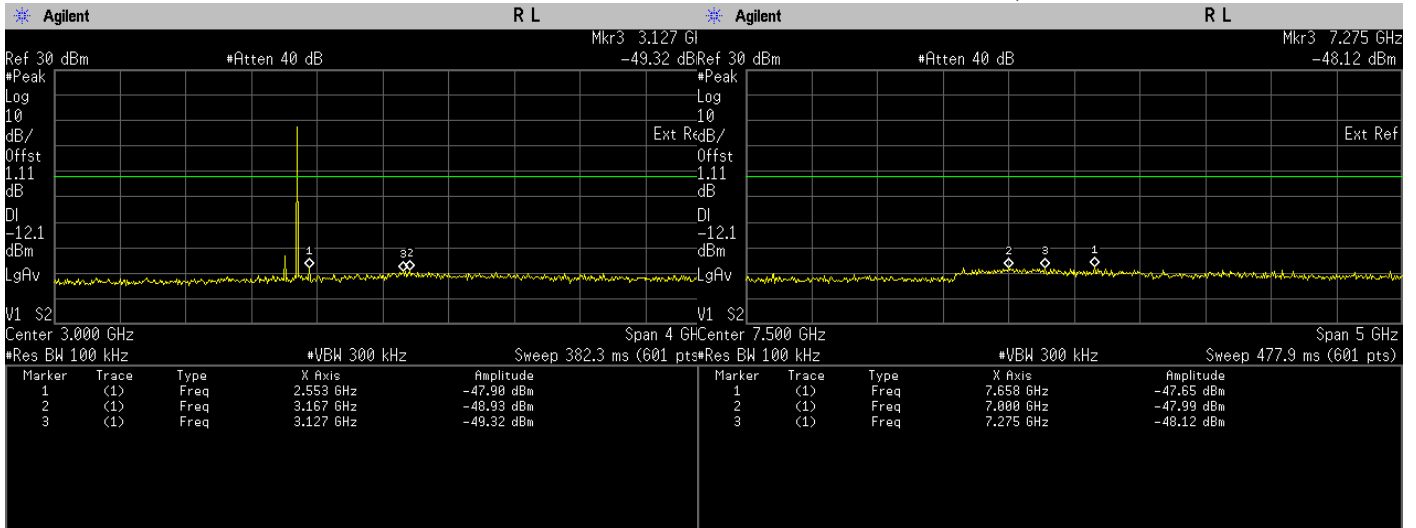


Conducted Emissions(Peak). Bluetooth LE, Frequency
 2440 MHz Emission Level, 20 GHz -> 25 GHz



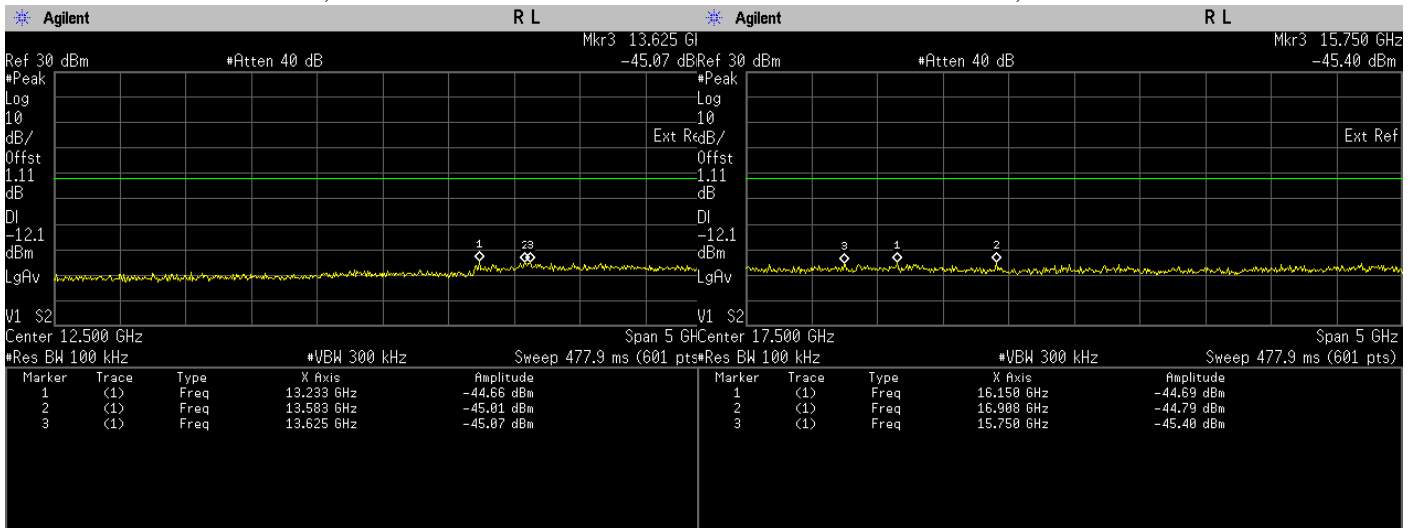
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Reference Level

Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 30 MHz -> 1 GHz



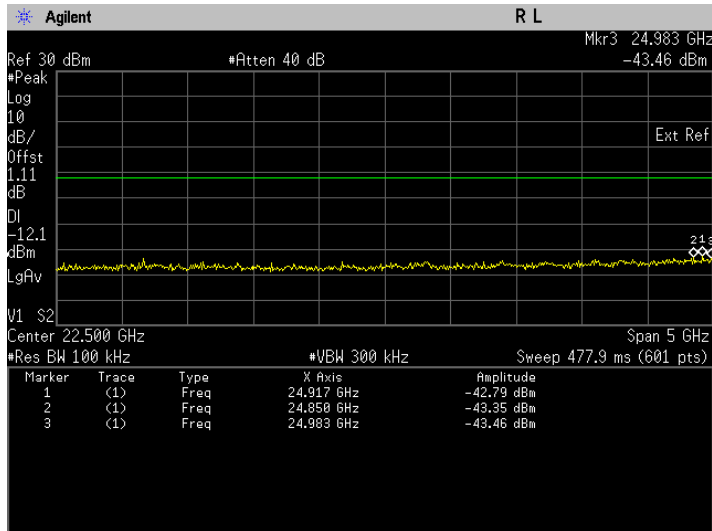
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 10 GHz -> 15 GHz

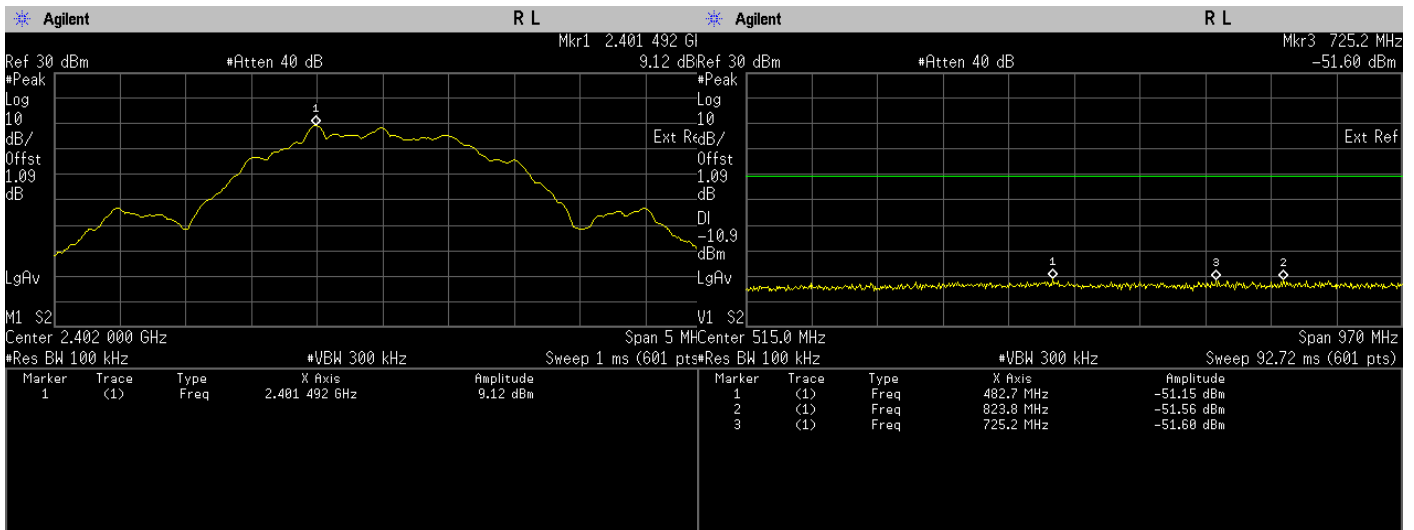
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 15 GHz -> 20 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency
 2480 MHz Emission Level, 20 GHz -> 25 GHz

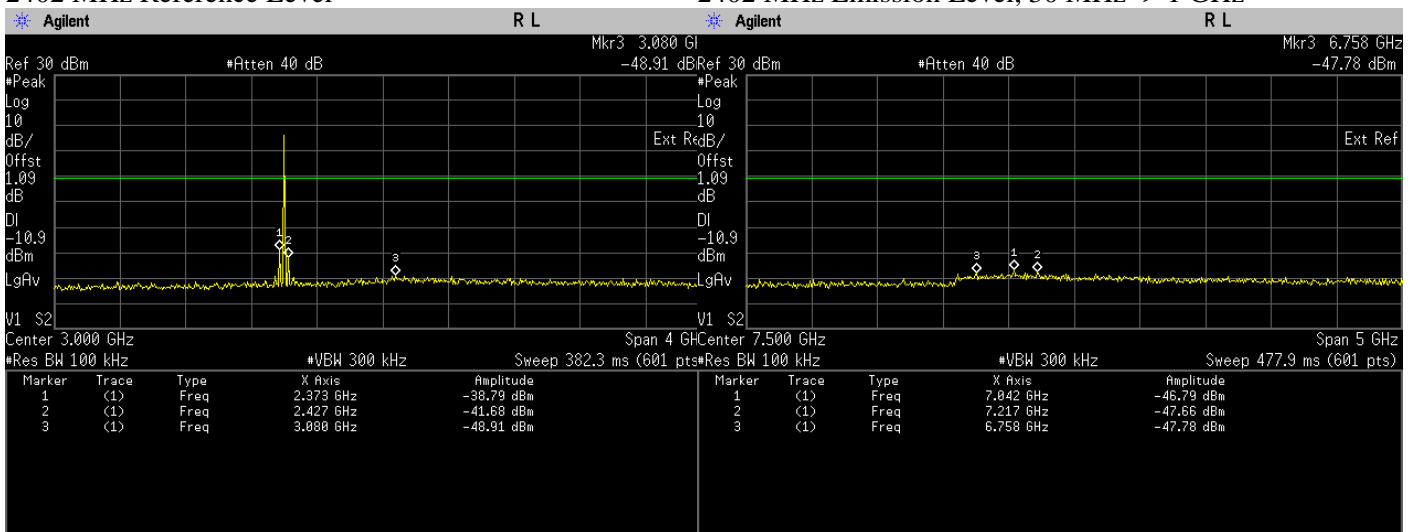
BTLE 2M

Test Conditions			Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
Bluetooth L.E.	GFSK	2402	24758.00	-42.35	Pass
			24825.00	-43.31	Pass
			24342.00	-43.52	Pass
Bluetooth L.E.	GFSK	2440	24867.00	-42.51	Pass
			23717.00	-43.33	Pass
			24283.00	-43.62	Pass
Bluetooth L.E.	GFSK	2480	24983.00	-41.97	Pass
			24692.00	-42.69	Pass
			24350.00	-43.31	Pass



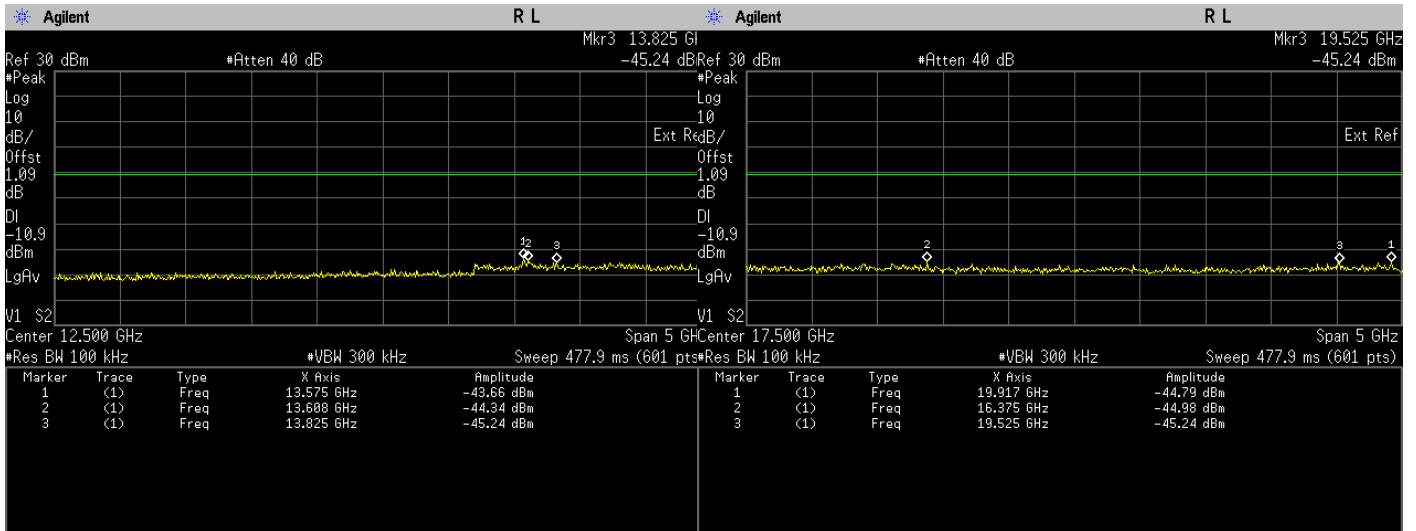
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Reference Level

Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 30 MHz -> 1 GHz



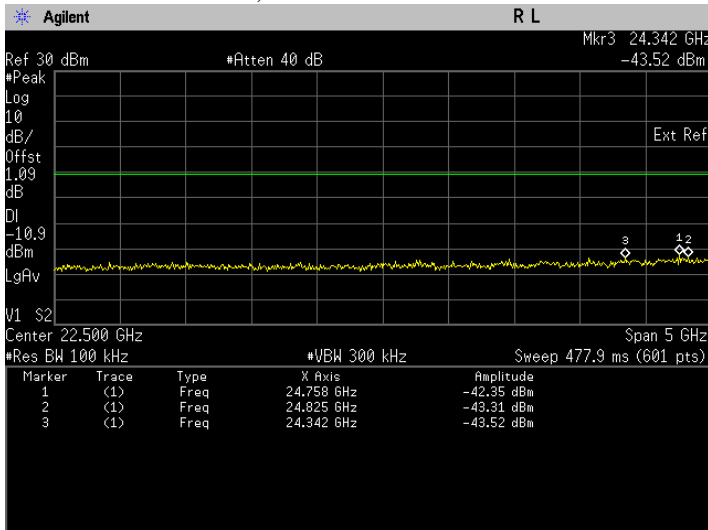
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 5 GHz -> 10 GHz

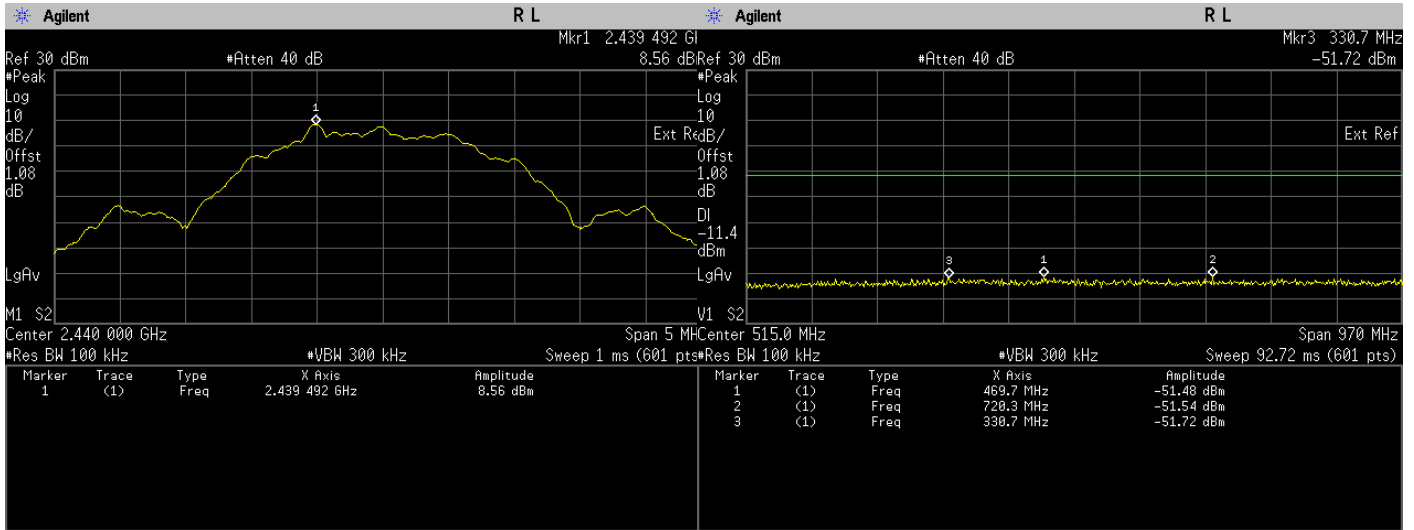


Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 15 GHz -> 20 GHz

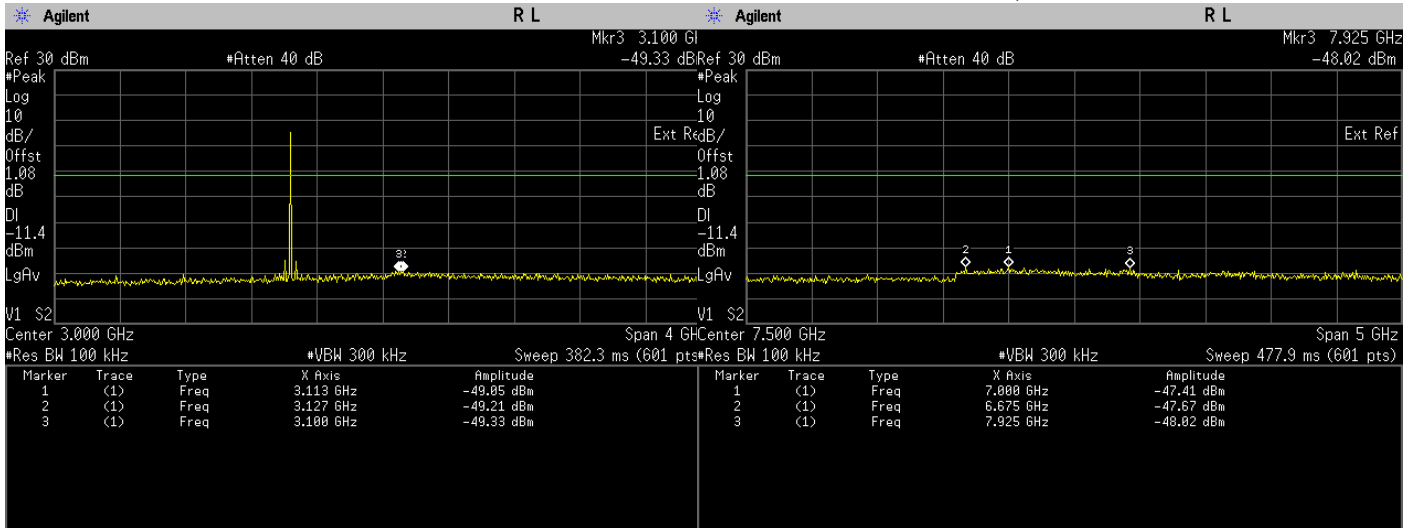


Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 20 GHz -> 25 GHz



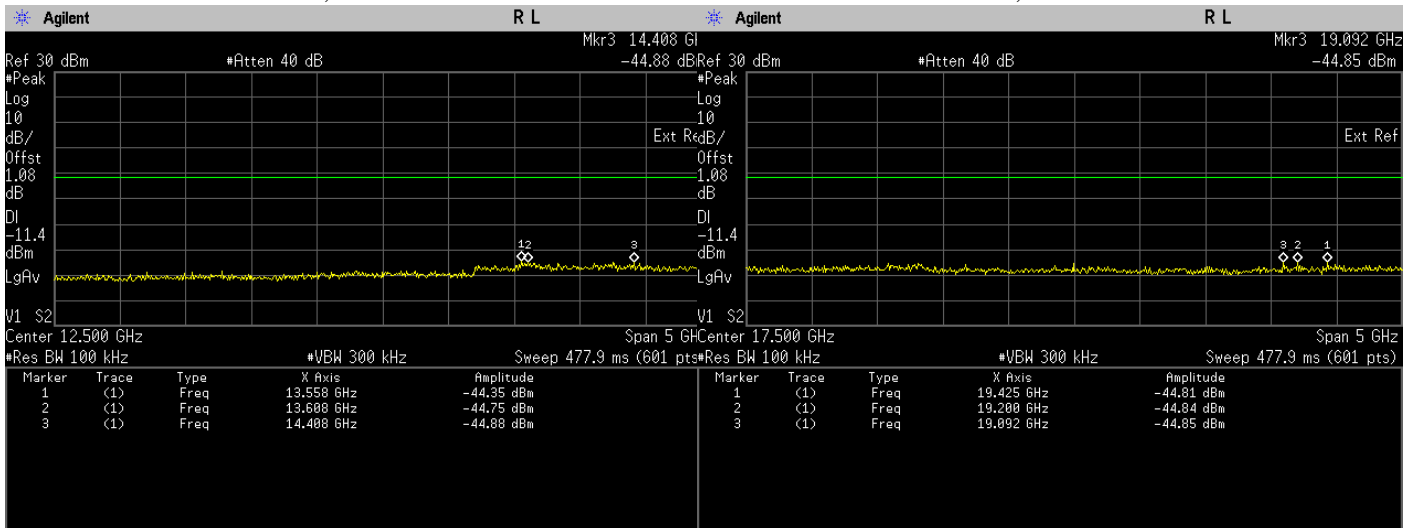
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Reference Level

Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 30 MHz -> 1 GHz



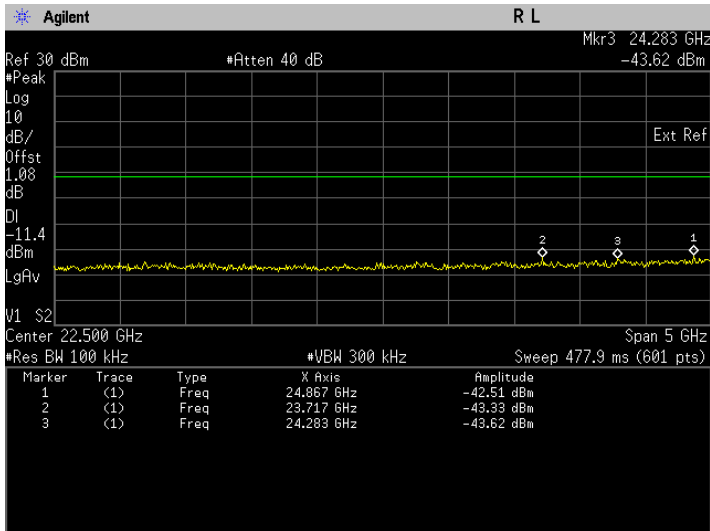
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 5 GHz -> 10 GHz

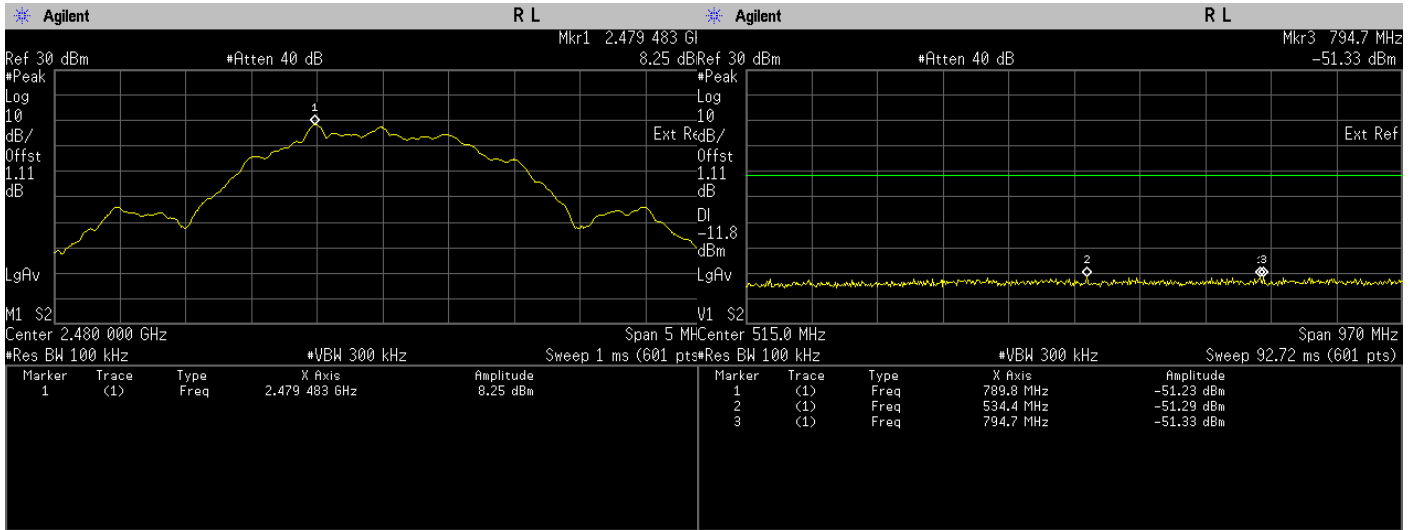


Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 10 GHz -> 15 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 15 GHz -> 20 GHz

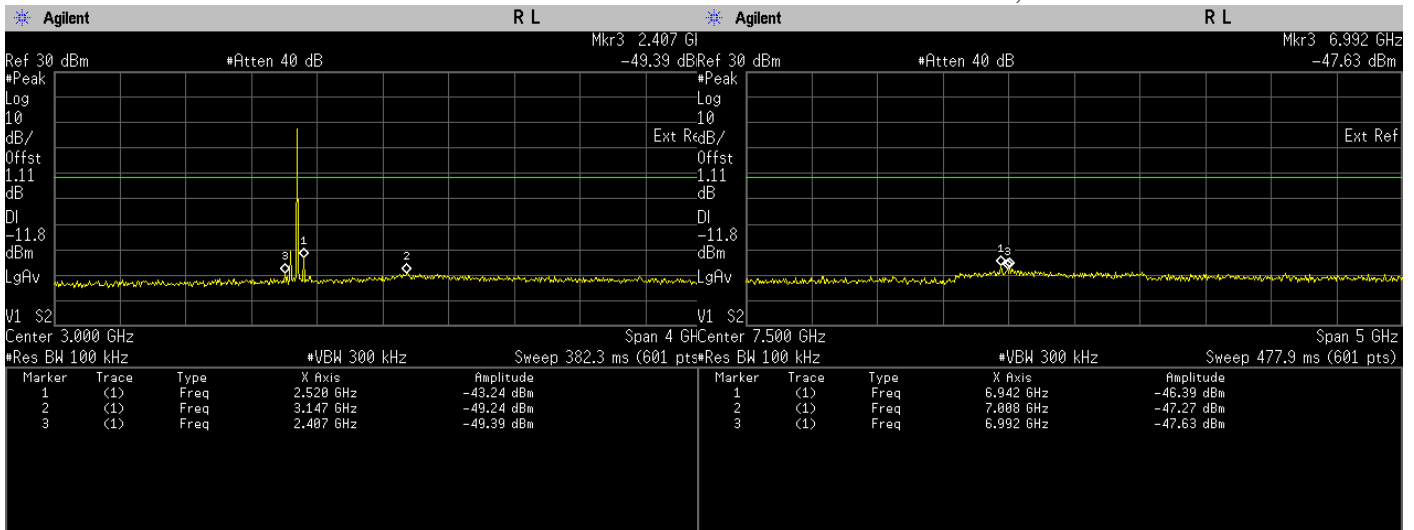


Conducted Emissions(Peak). Bluetooth LE, Frequency
 2440 MHz Emission Level, 20 GHz -> 25 GHz



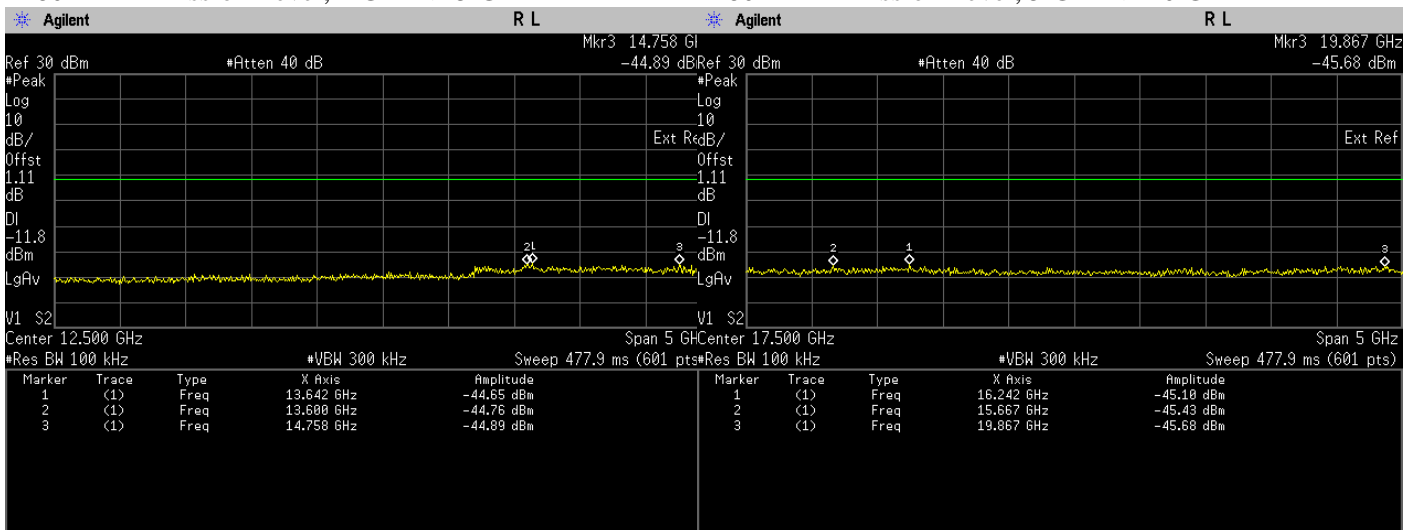
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Reference Level

Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 30 MHz -> 1 GHz



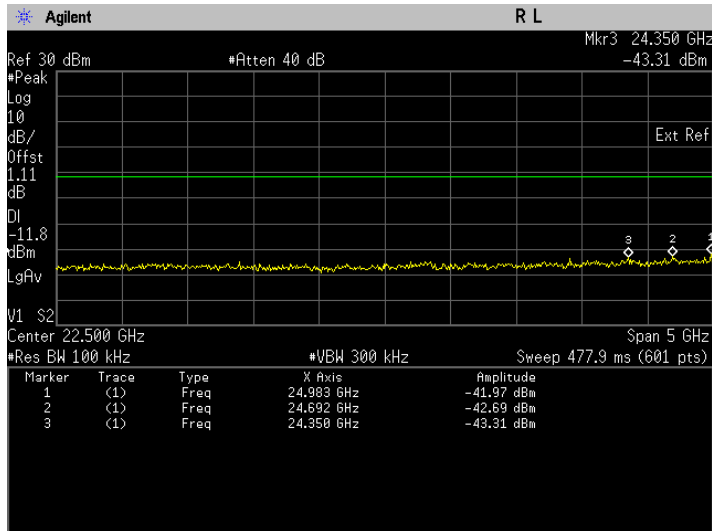
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 1 GHz -> 5 GHz

Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 10 GHz -> 15 GHz

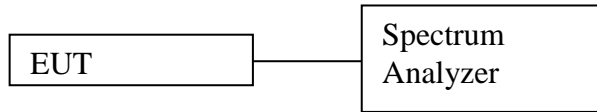
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 15 GHz -> 20 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency
 2480 MHz Emission Level, 20 GHz -> 25 GHz

6.5 Band edge Conducted Spurious Emission

6.5.1 Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - d. Trace = Max Hold
 - e. Sweep = auto
- e) Use the peak marker function to measure highest emission.

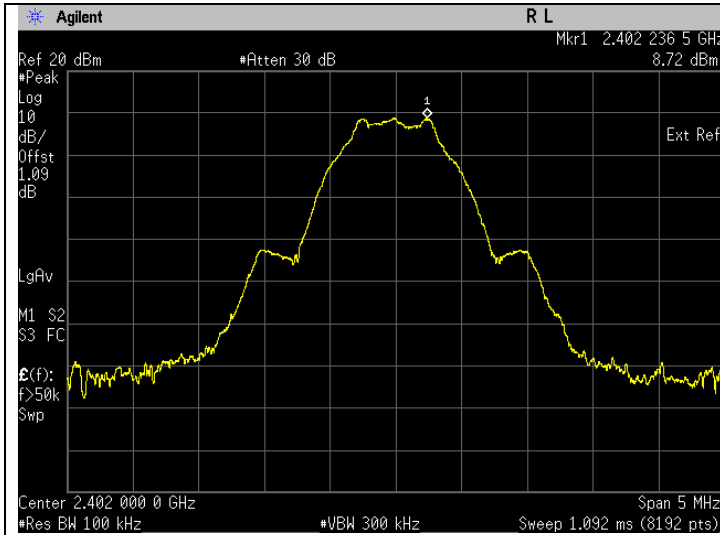
6.5.2 Test Limits:

Normal Condition (25 ° C)
Shall be at least 20 dB below max power. (Peak detector)

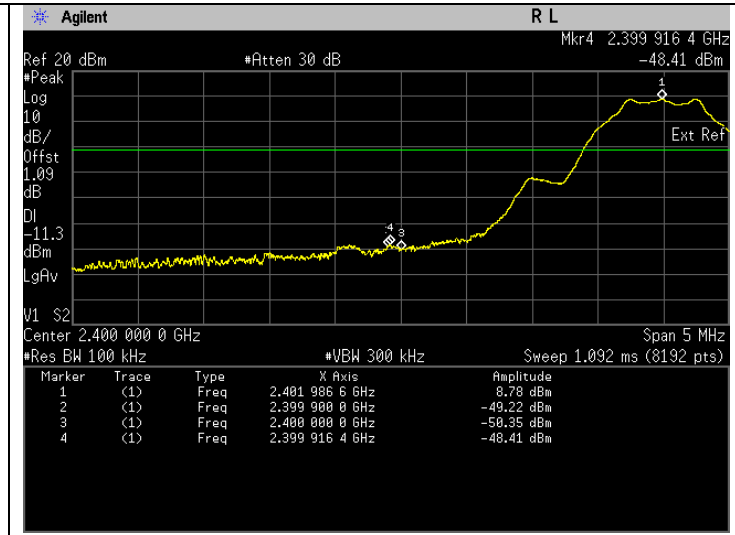
6.5.3 Test Result

BTLE 1M

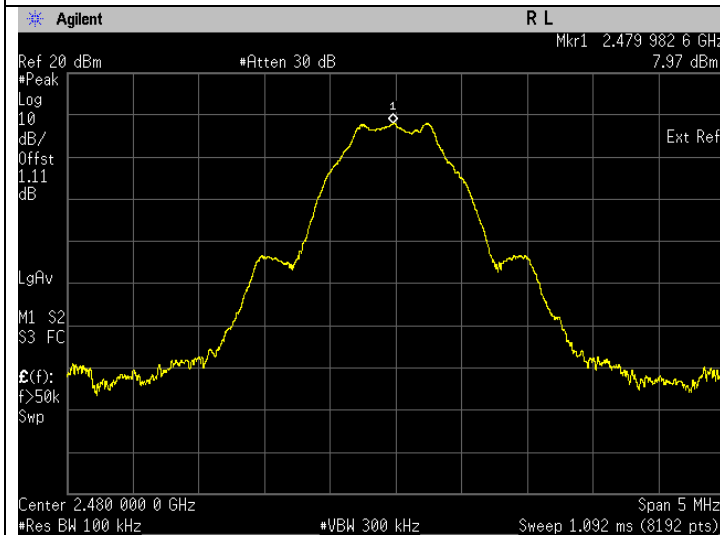
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2399.92	-48.41	Pass
Bluetooth L.E	GFSK	2480	2483.59	-55.90	Pass



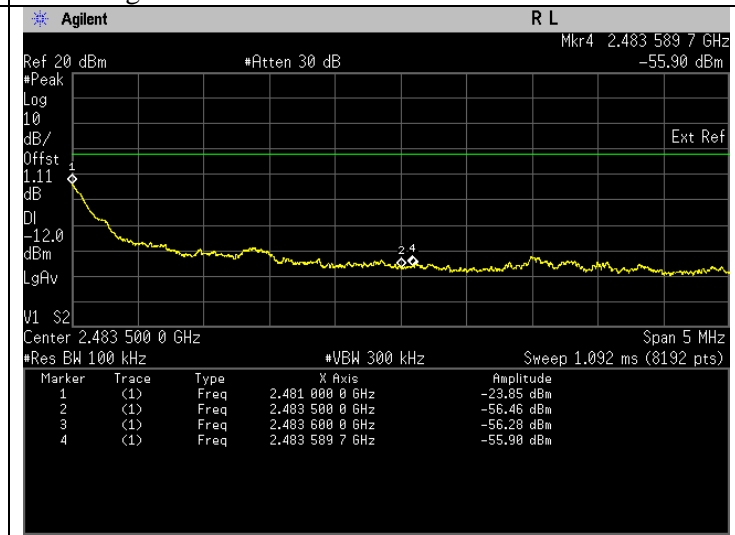
Band Edge(Peak). Bluetooth LE Frequency 2402 MHz
 Reference Level



Band Edge(Peak). Bluetooth LE Frequency 2402 MHz
 Band Edge



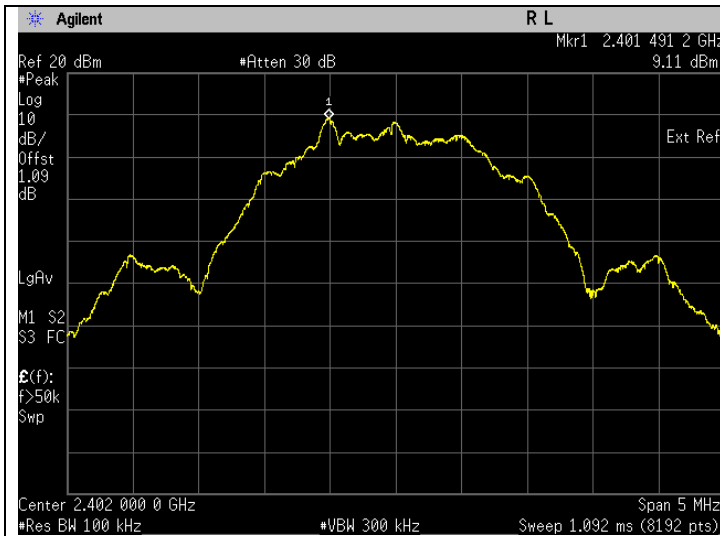
Band Edge(Peak). Bluetooth LE Frequency 2480 MHz
 Reference Level



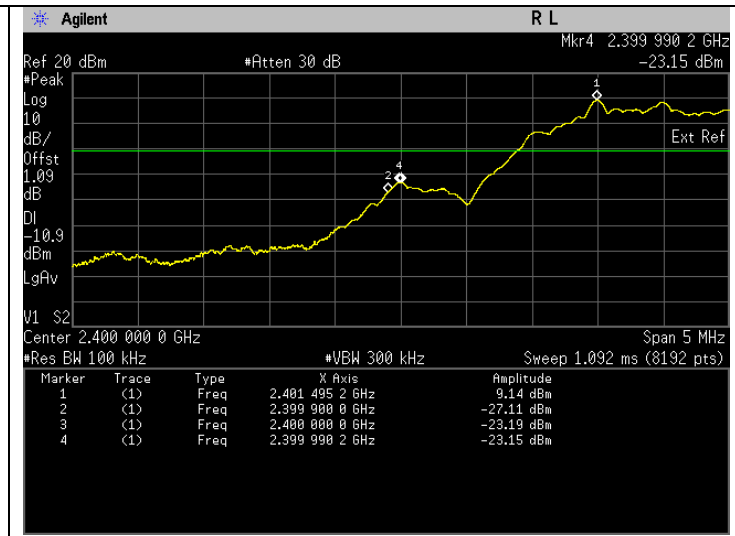
Band Edge(Peak). Bluetooth LE Frequency 2480 MHz
 Band Edge

BTLE 2M

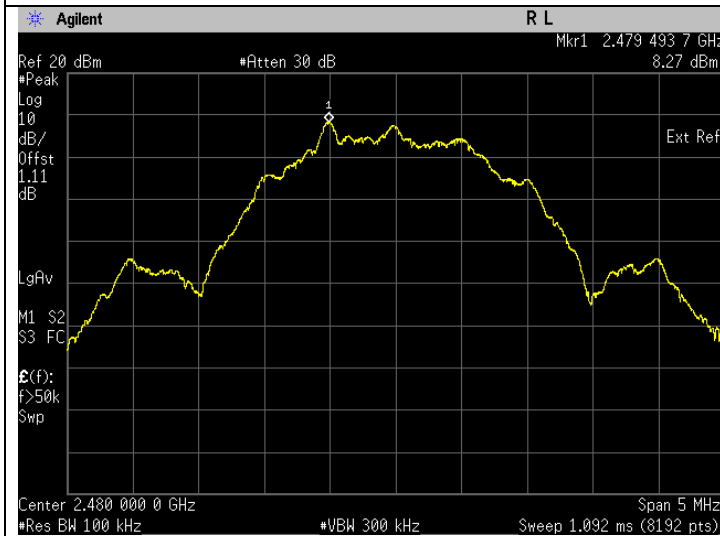
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2399.99	-23.15	Pass
Bluetooth L.E	GFSK	2480	2483.55	-53.23	Pass



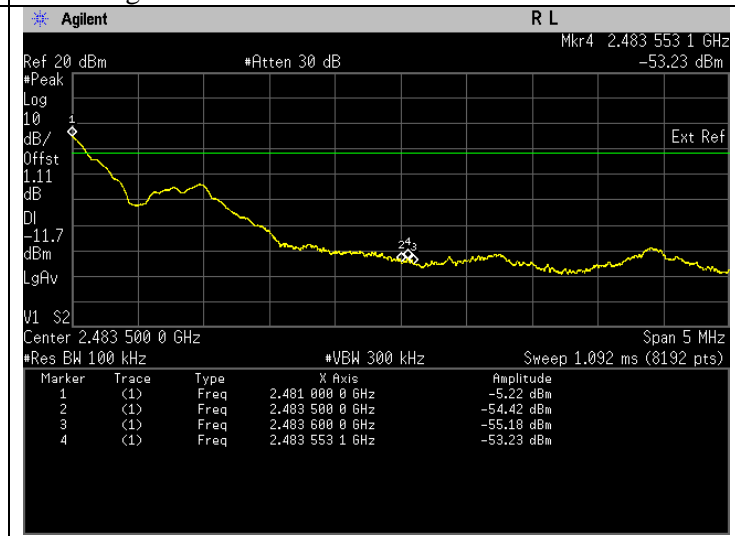
Band Edge(Peak). Bluetooth LE Frequency 2402 MHz
 Reference Level



Band Edge(Peak). Bluetooth LE Frequency 2402 MHz
 Band Edge



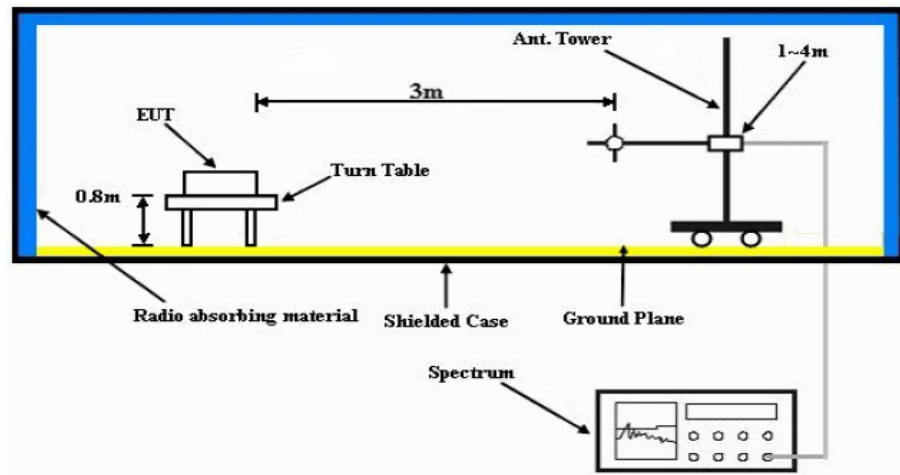
Band Edge(Peak). Bluetooth LE Frequency 2480 MHz
 Reference Level



Band Edge(Peak). Bluetooth LE Frequency 2480 MHz
 Band Edge

6.6 Radiated Emission within Restricted Bands

6.6.1 Test Setup



- The EUT is placed on the top of a rotating table 0.8m (<1GHz) or 1.5m (>1GHz) above the ground at a 3m semi-anechoic chamber. The table is rotated 360 degrees to determine the position of the highest radiation.
- The EUT is set 3m away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
- The antenna is Bilog/Horn antenna depend on which frequency range uses, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT is arranged to its worst case and then the antenna is tuned to heights from 1m to 4m and the rotatable table is turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode is fall within the range of 10dB from the limit specified, the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. Otherwise, the testing could be stopped and the peak values of the EUT would be reported.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.

3. All modes of operation were investigated and the worst-case emissions are reported.

6.6.2 Test Limits:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

NOTE:

- 1) The lower limit shall apply at the transition frequencies.
- 2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3) For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

6.6.3 Test Results:

Test: Bluetooth SAC Restricted Band Edge
Model Number: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: Low Test Frequency: 2402.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 1M)

Restricted Band Edge (Low Channel) tabular data

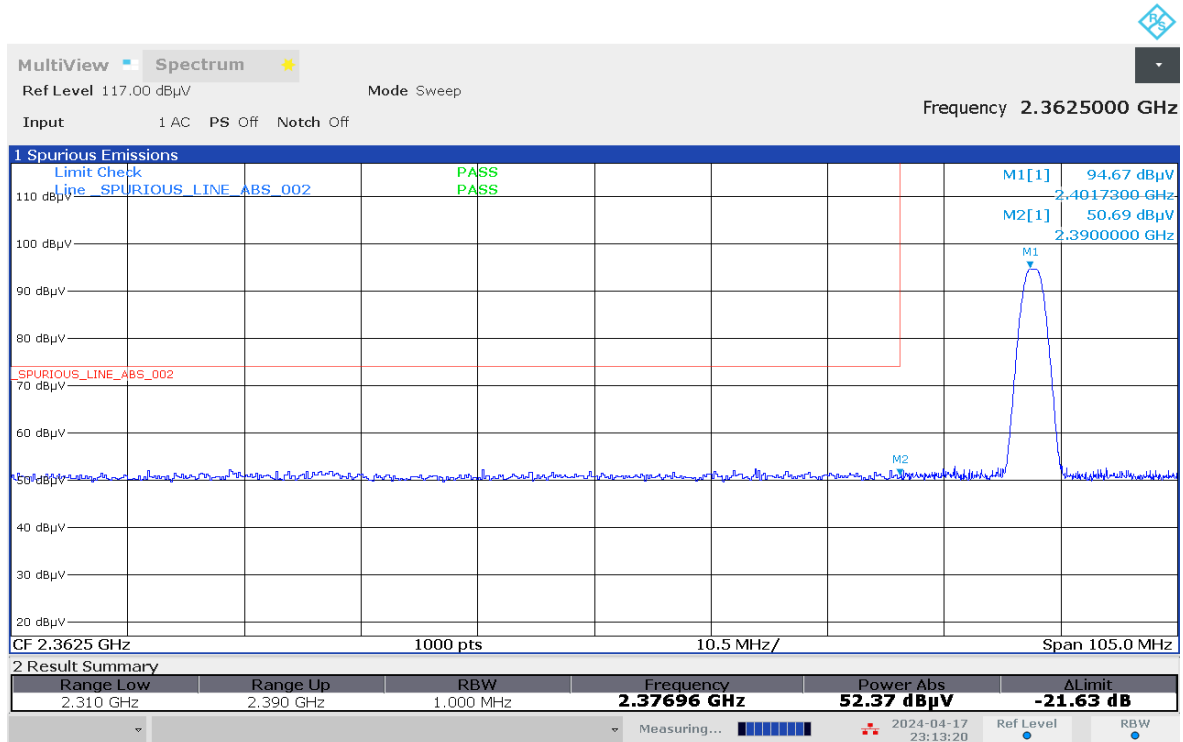
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
2390.0000	-	50.5610	40.4334	-	74.0000	54.0000	-	23.4390	13.5666	-
Horizontal Radiated Emission Result										
2390.0000	-	50.4132	40.7571	-	74.0000	54.0000	-	23.5868	13.2429	-

Remarks: Pass Result	Marginal Result	Fail Result
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Temperature (degC): 23.5
Test Performed by: Nazrin & Rezza
System MU: 5.84dB

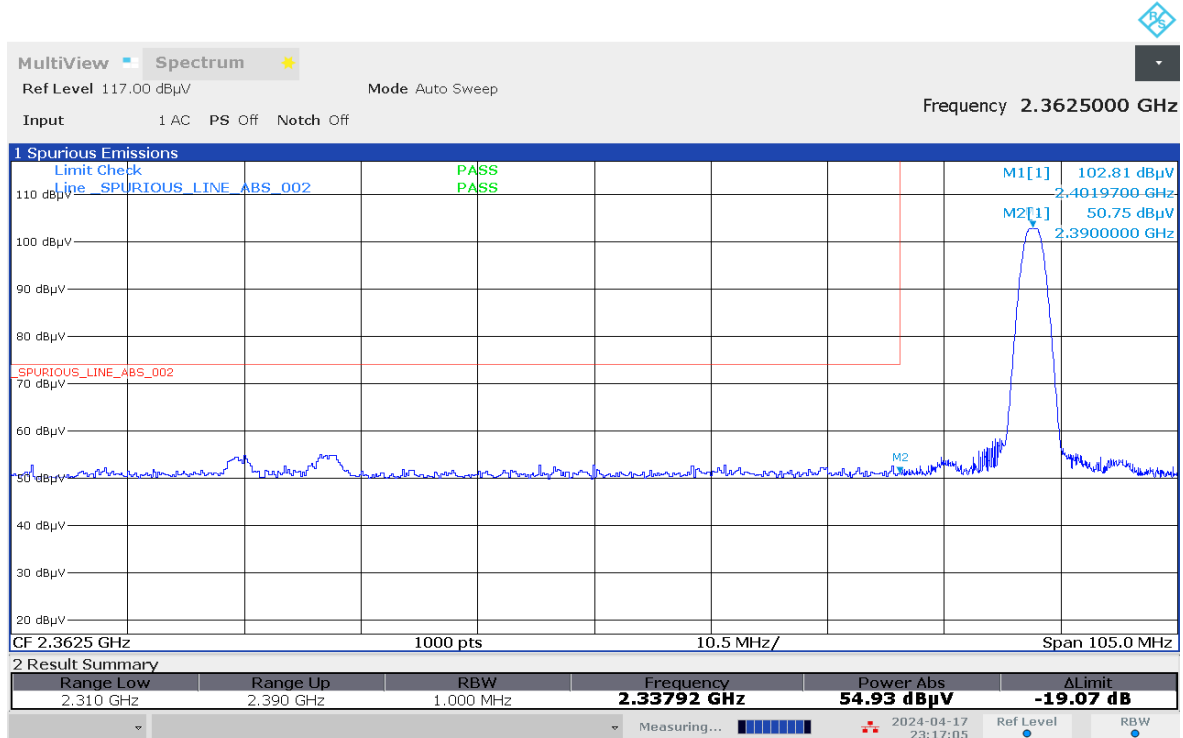
Humidity (%): 69.4
Test Date: Tue, 23 Apr, 2024

Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



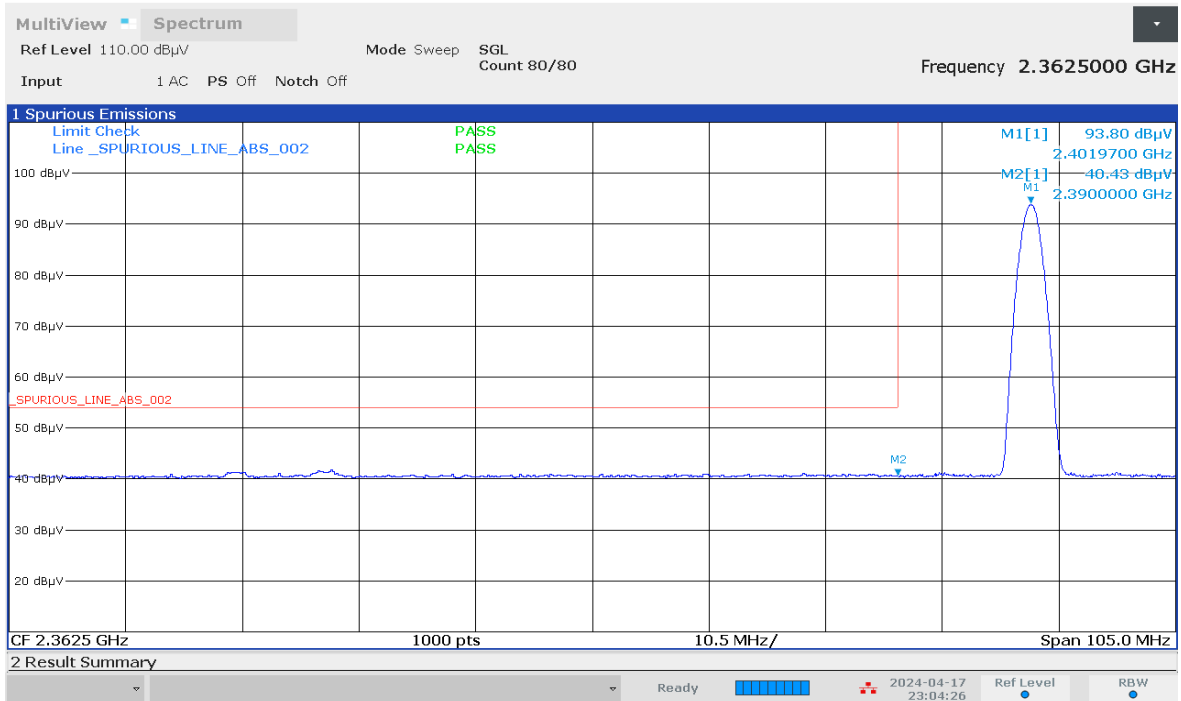
11:13:21 PM 04/17/2024

Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



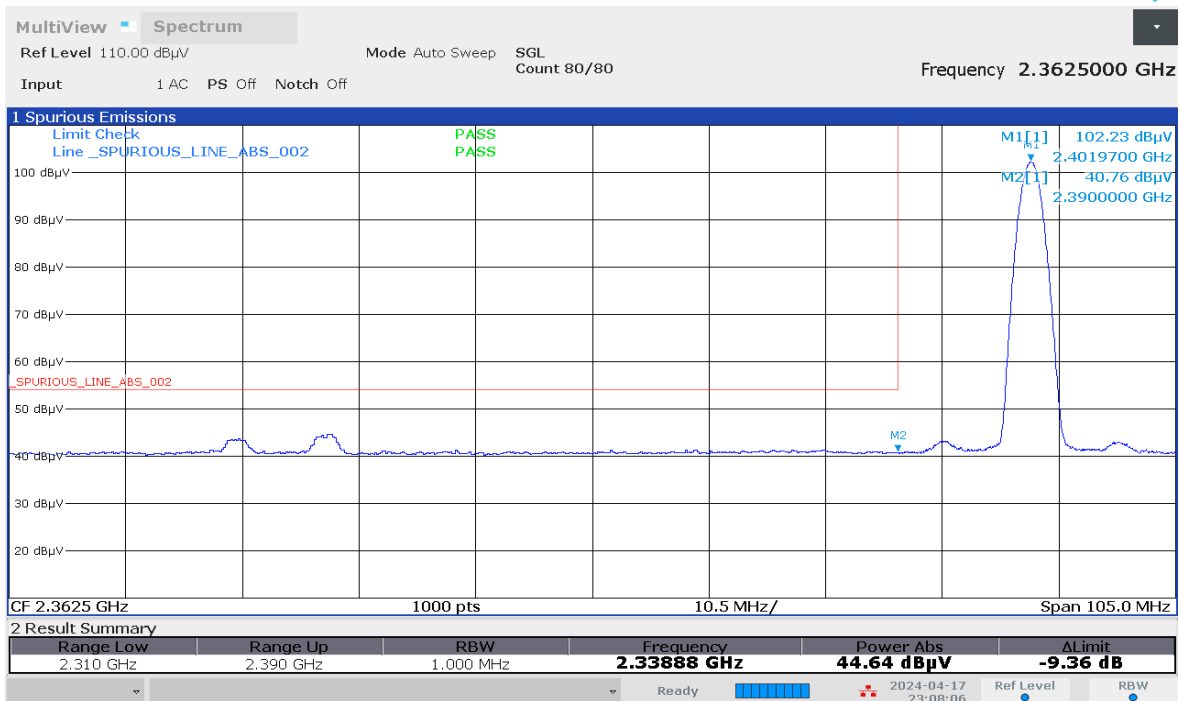
11:17:06 PM 04/17/2024

Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



11:04:26 PM 04/17/2024

Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



11:08:06 PM 04/17/2024

Test: Bluetooth SAC Restricted Band Edge
Model Number: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: High Test Frequency: 2480.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 1M)

Restricted Band Edge (High Channel) tabular data

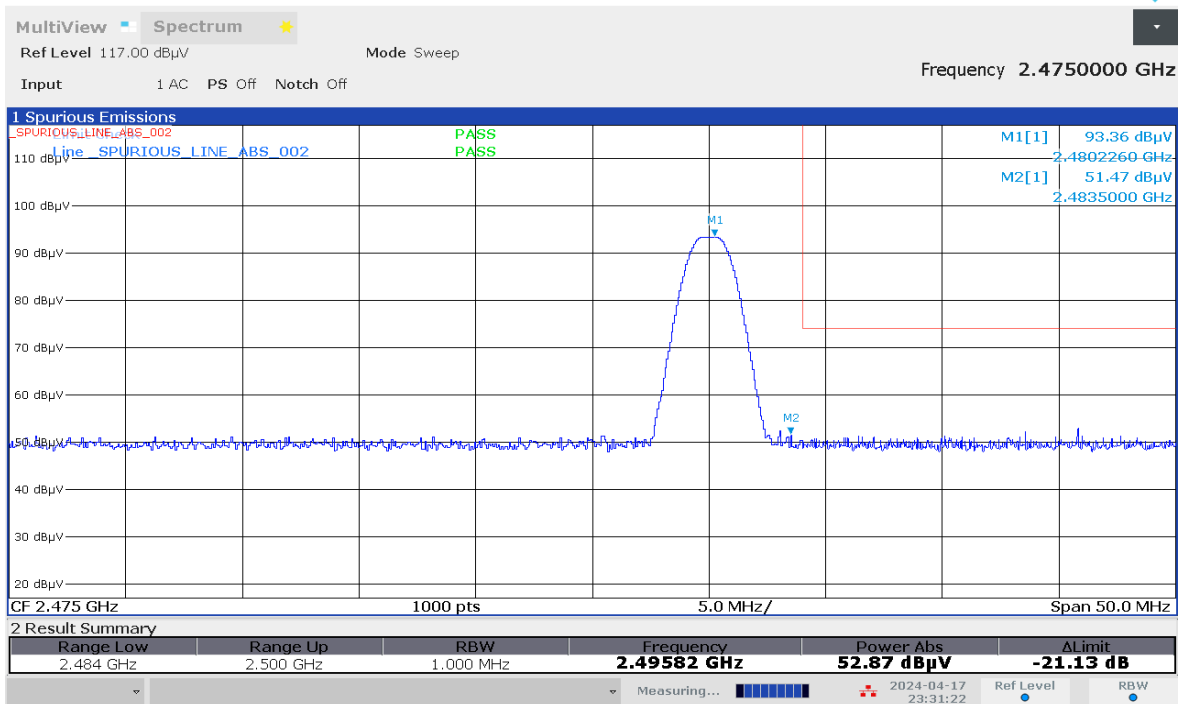
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dB μ V/m)	Spur level PK (dB μ V/m)	Spur level AV (dB μ V/m)	Limit QPK (dB μ V/m)	Limit PK (dB μ V/m)	Limit AV (dB μ V/m)	Margin QPK (dB μ V/m)	Margin PK (dB μ V/m)	Margin AV (dB μ V/m)	Carrier PK Power (dB μ V/m)
2483.5000	-	51.4702	40.6347	-	74.0000	54.0000	-	22.5298	13.3653	-
Horizontal Radiated Emission Result										
2483.5000	-	49.5546	41.2320	-	74.0000	54.0000	-	24.4454	12.7680	-

Remarks: Pass Result	Marginal Result	Fail Result
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Temperature (degC): 23.5
 Test Performed by: Nazrin & Rezza
 System MU: 5.84dB

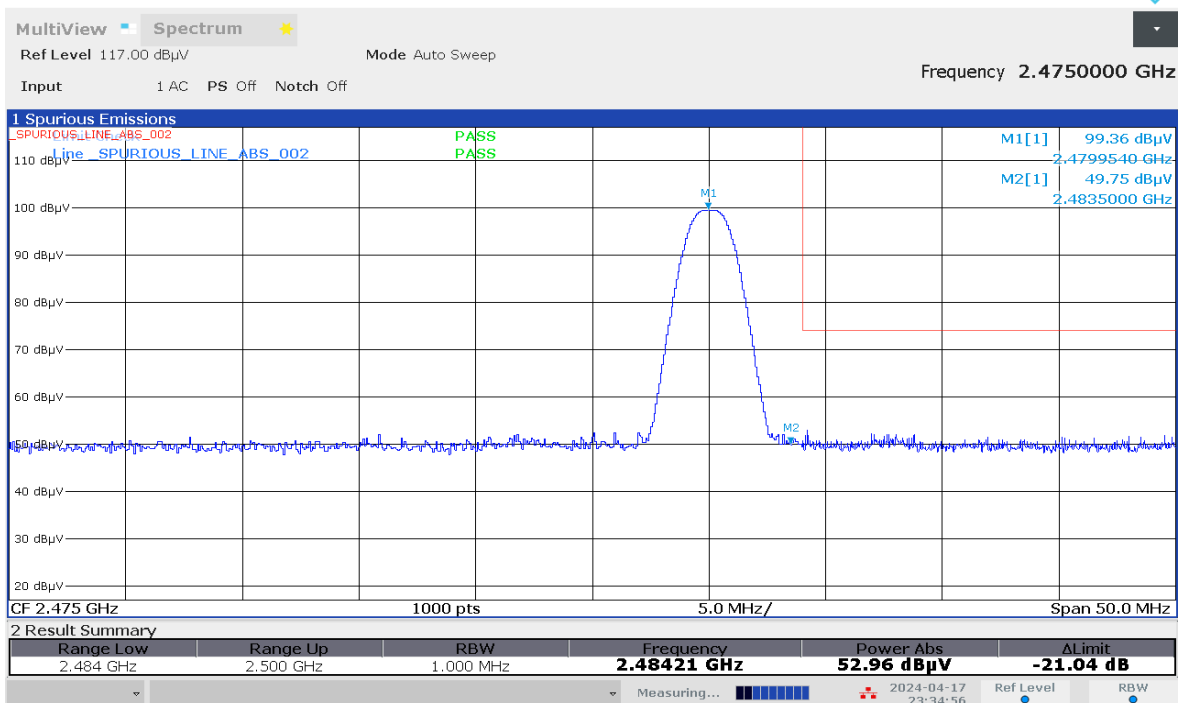
Humidity (%): 69.4
 Test Date: Tue, 23 Apr, 2024

Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



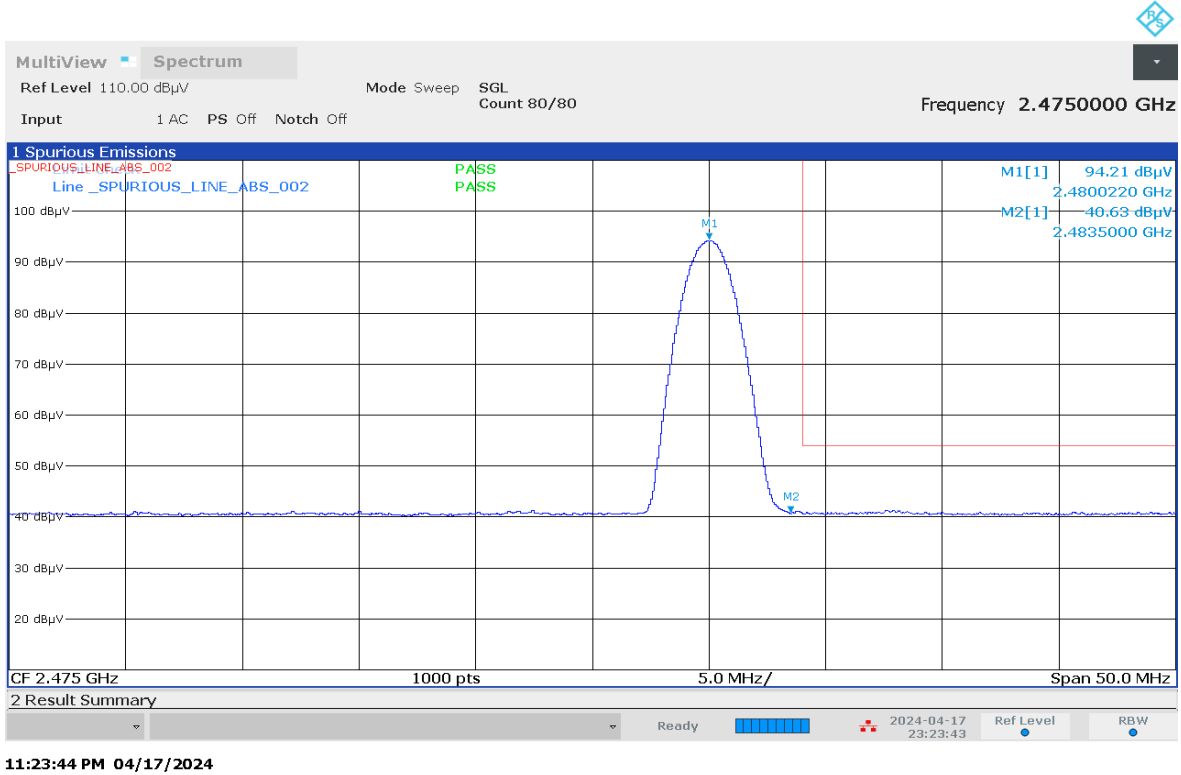
11:31:23 PM 04/17/2024

Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot

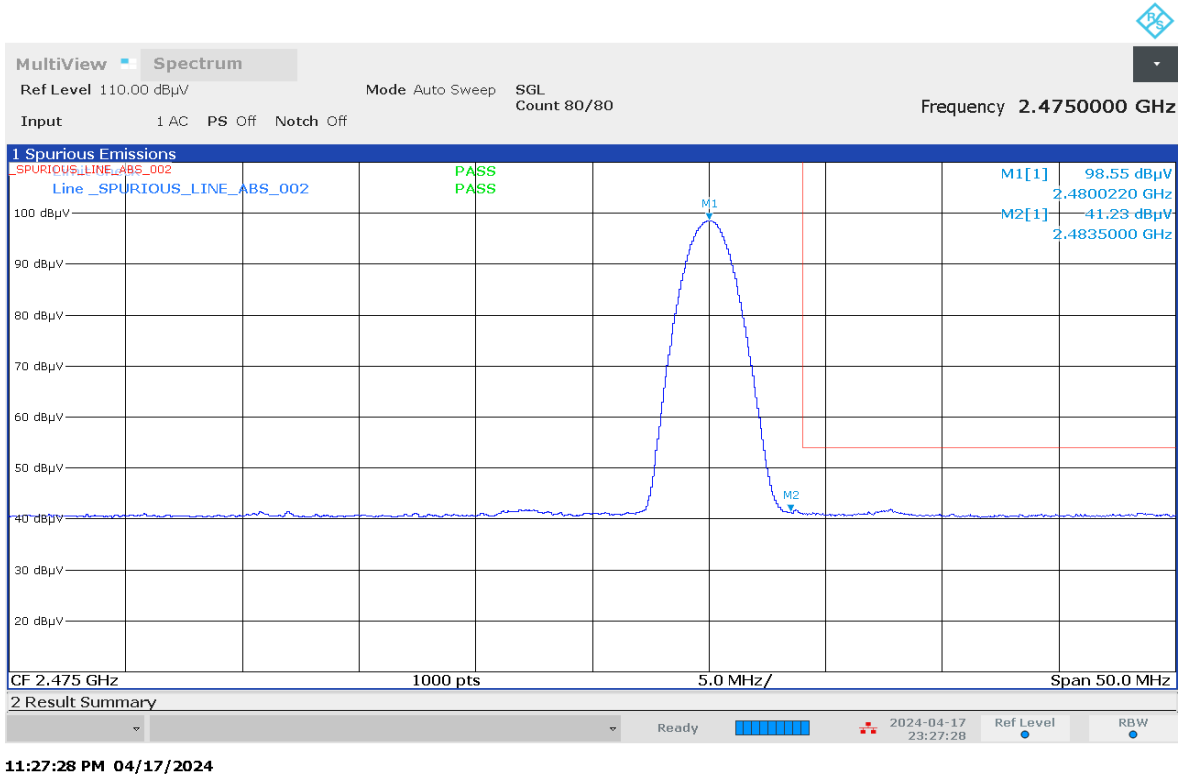


11:34:56 PM 04/17/2024

Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



Test: Bluetooth SAC Restricted Band Edge
Model Number: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: Low Test Frequency: 2402.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 2M)

Restricted Band Edge (Low Channel) tabular data

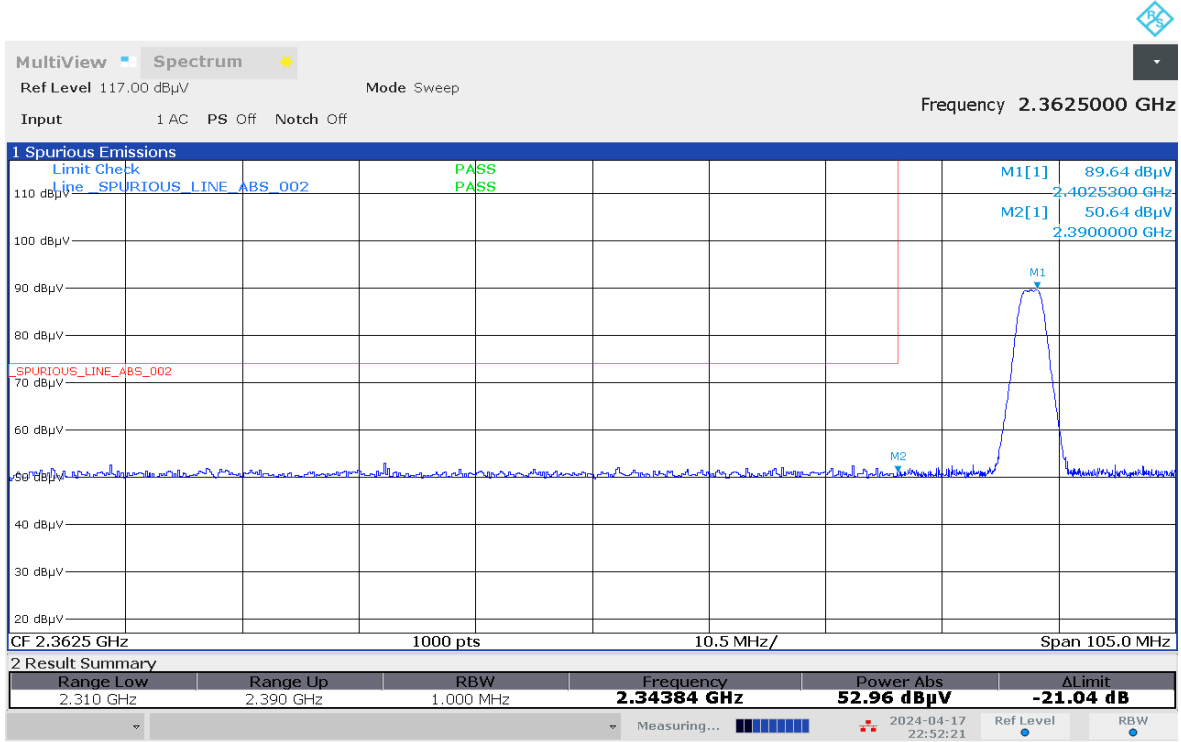
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
2377.1200	-	-	43.4265	-	-	54.0000	-	-	10.5735	-
2390.0000	-	50.6412	41.0008	-	74.0000	54.0000	-	23.3588	12.9992	-
Horizontal Radiated Emission Result										
2377.2800	-	-	47.2392	-	-	54.0000	-	-	6.7608	-
2390.0000	-	50.5688	40.5788	-	74.0000	54.0000	-	23.4312	13.4212	-

Remarks:	Marginal Result	Fail Result
Pass Result		

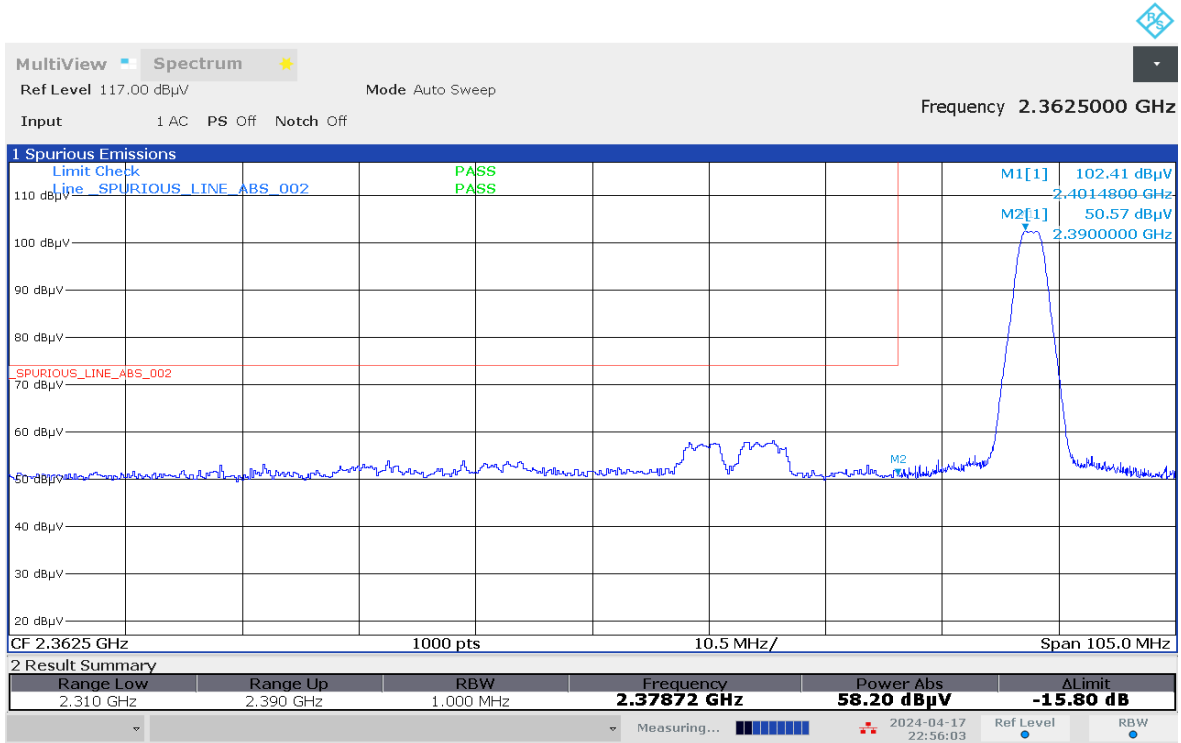
Temperature (degC): 23.7
Test Performed by: Nazrin & Rezza
System MU: 5.84dB

Humidity (%): 69.2
Test Date: Tue, 23 Apr, 2024

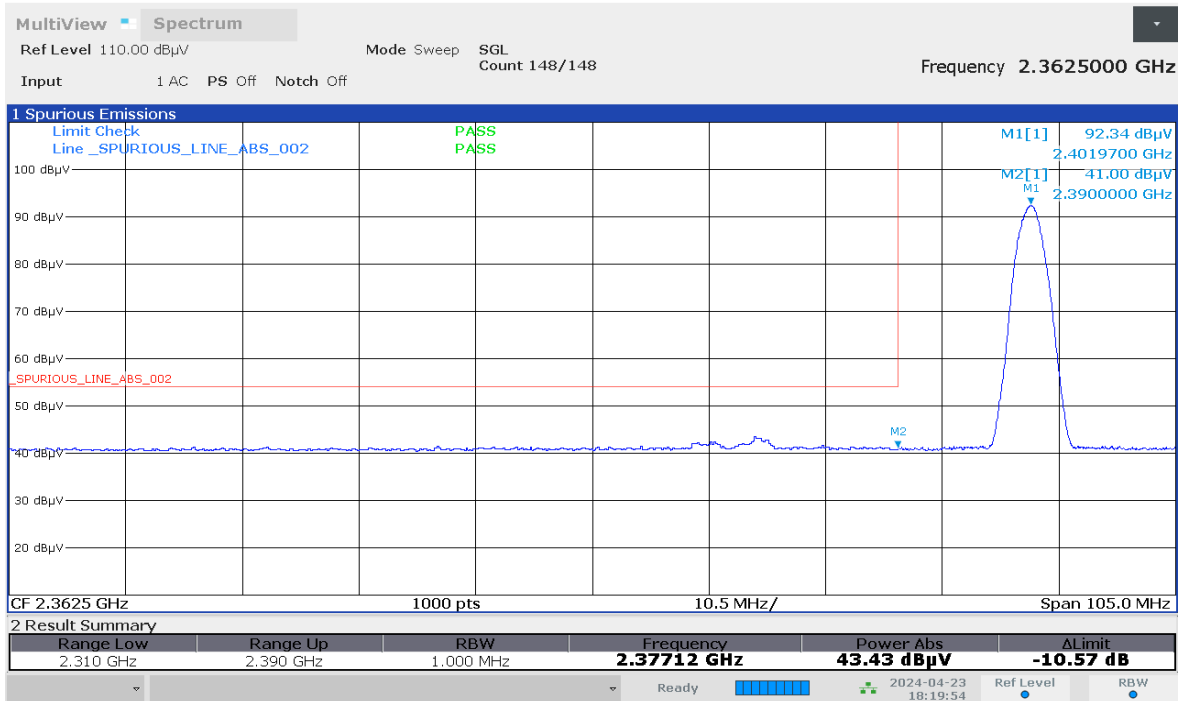
Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot

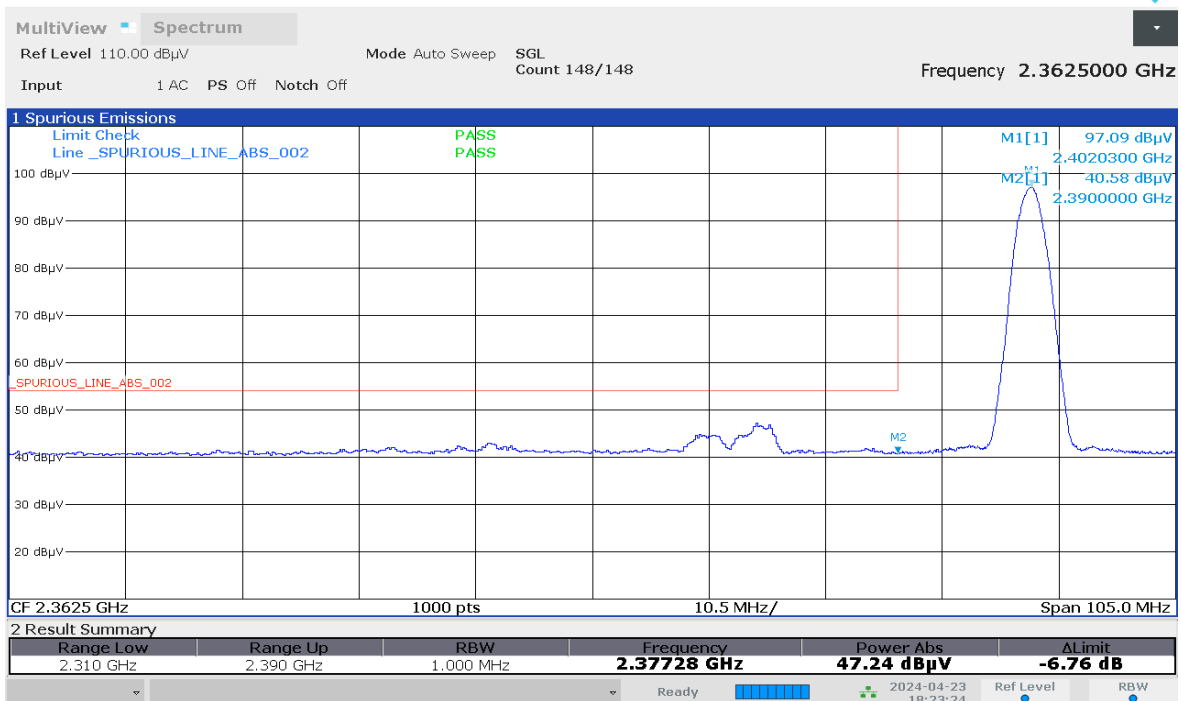


Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



06:19:54 PM 04/23/2024

Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



06:23:25 PM 04/23/2024

Test: Bluetooth SAC Restricted Band Edge
Model Number: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: High Test Frequency: 2480.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 2M)

Restricted Band Edge (High Channel) tabular data

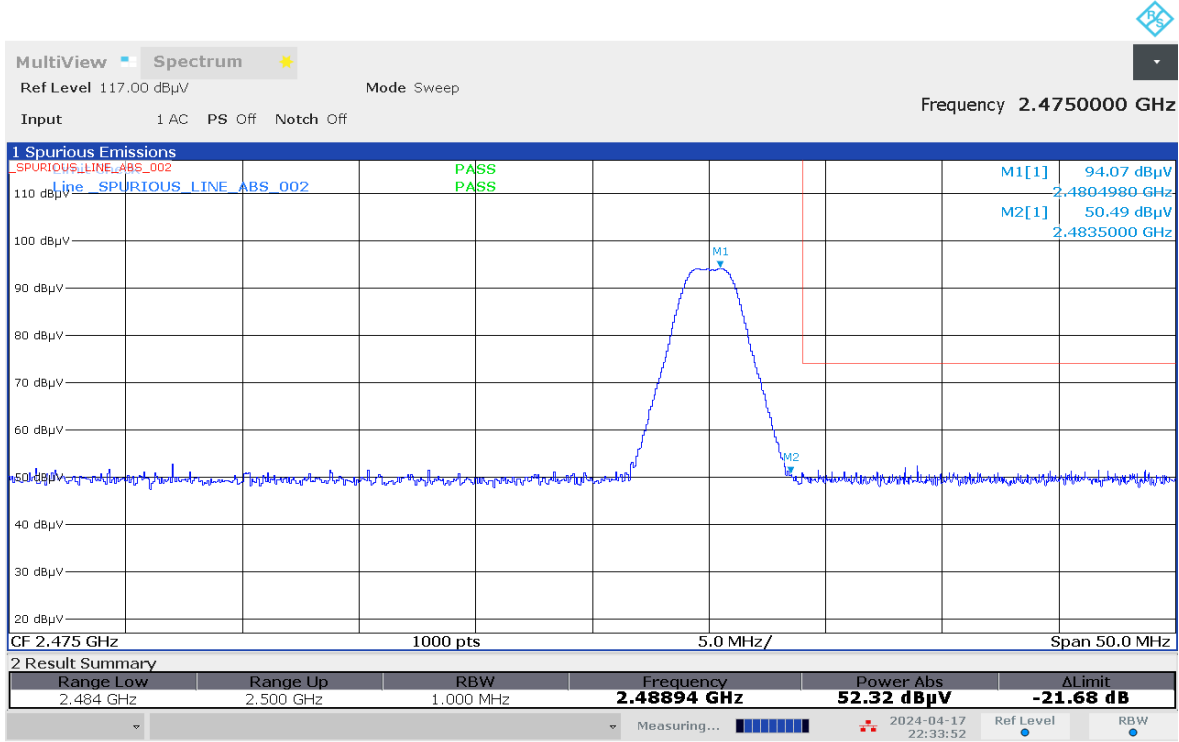
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμ V/ m)	Spur level PK (dBμ V/ m)	Spur level AV (dBμ V/ m)	Limit QPK (dBμ V/ m)	Limit PK (dBμ V/ m)	Limit AV (dBμ V/ m)	Margin QPK (dBμ V/ m)	Margin PK (dBμ V/ m)	Margin AV (dBμ V/ m)	Carrier PK Power (dBμ V/ m)
2483.5000	-	50.4941	43.5362	-	74.0000	54.0000	-	23.5059	10.4638	-
Horizontal Radiated Emission Result										
2483.5000	-	54.5917	45.2003	-	74.0000	54.0000	-	19.4083	8.7997	-

Remarks: Pass Result	Marginal Result	Fail Result
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Temperature (degC): 23.5
Test Performed by: Nazrin & Rezza
System MU: 5.84dB

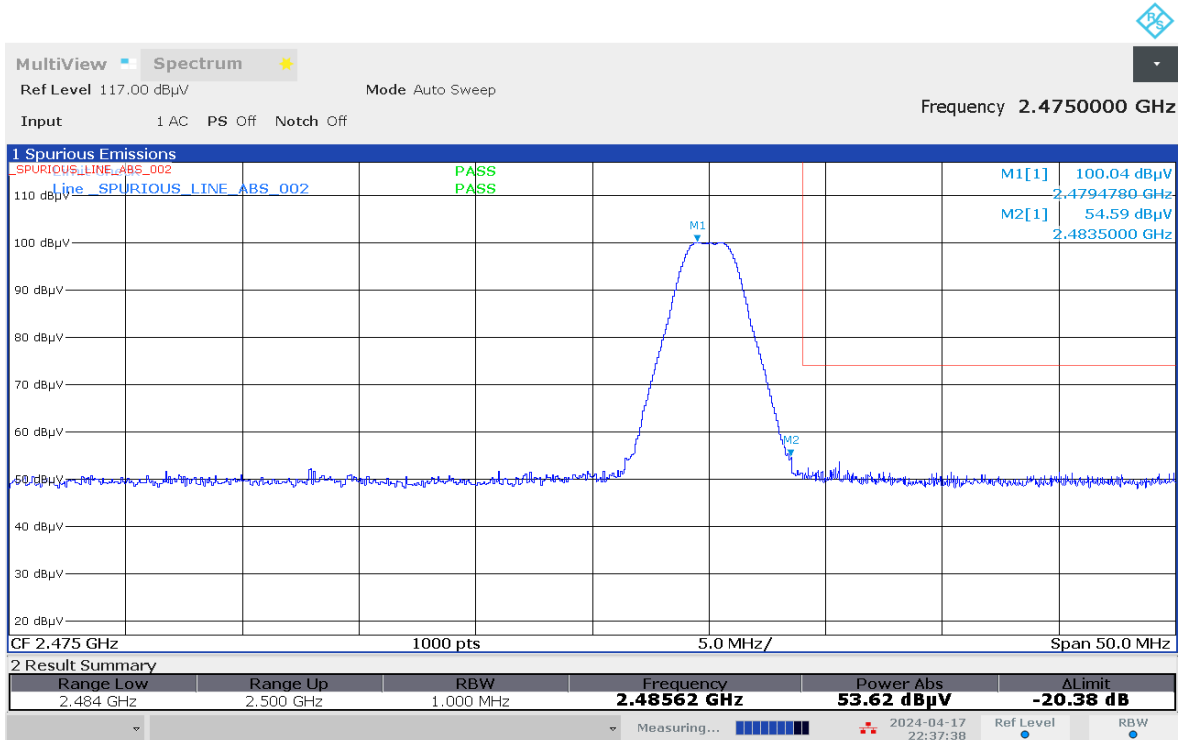
Humidity (%): 69.4
Test Date: Tue, 23 Apr, 2024

Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



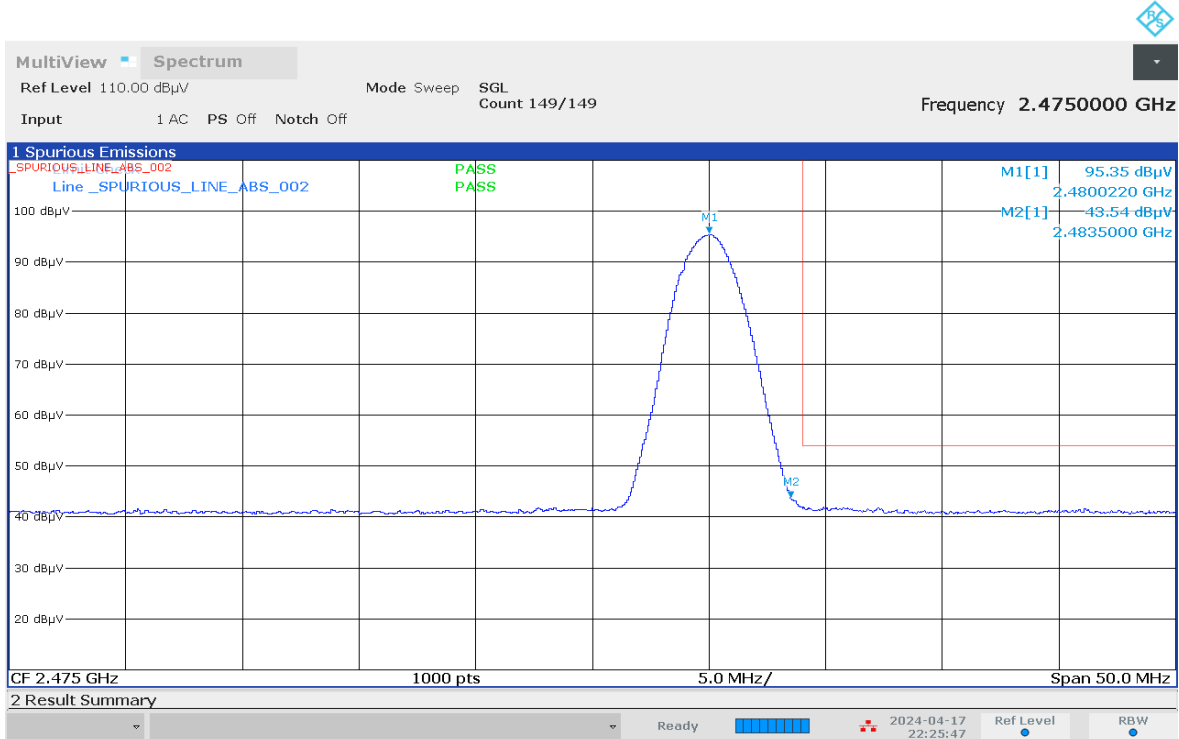
10:33:52 PM 04/17/2024

Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



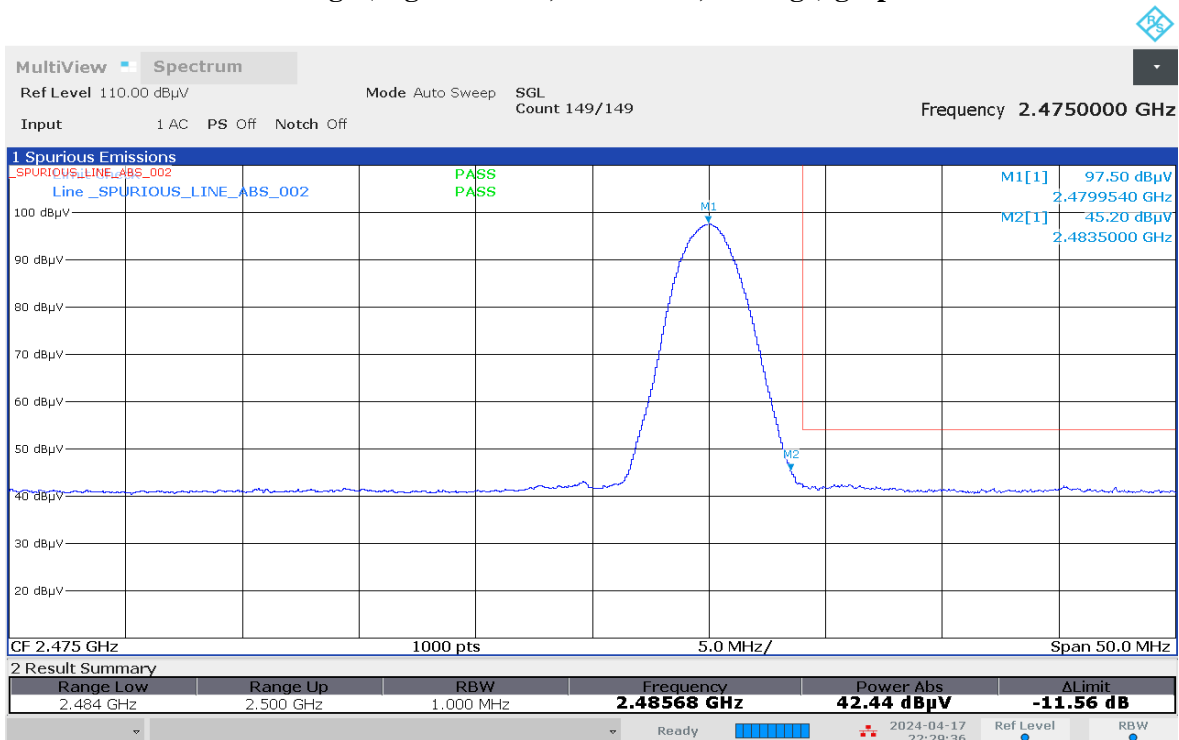
10:37:38 PM 04/17/2024

Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



10:25:47 PM 04/17/2024

Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



10:29:36 PM 04/17/2024

Test: Bluetooth SAC Transmitter Radiated Emission
Model#: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: Low Test Frequency: 2402.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 1M)

Radiated Emission (Low Channel) tabular data

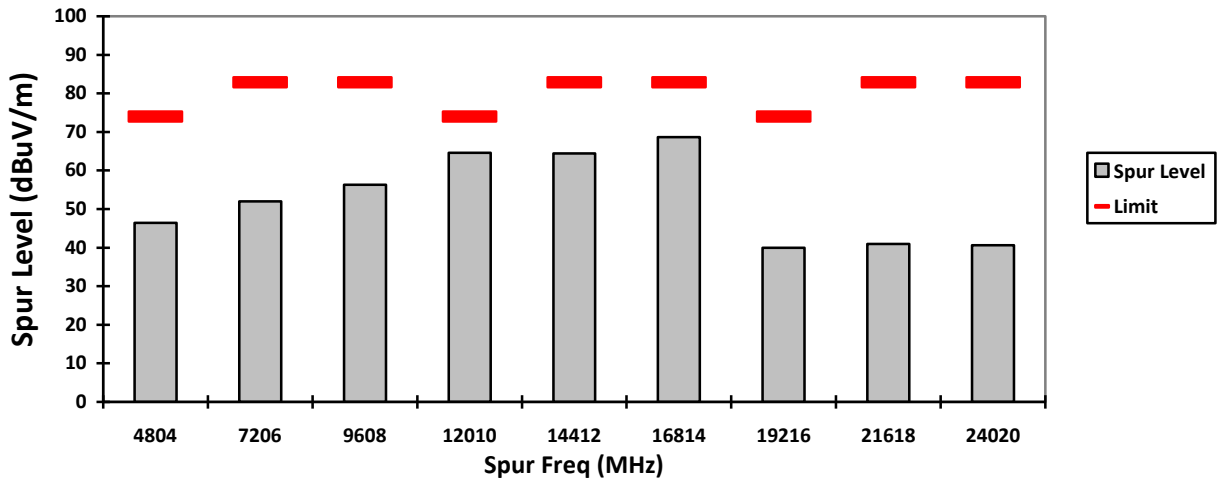
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
4804	-	46.4658**	-	-	74.0000	-	-	27.5342	-	-
7206	-	52.0264**	-	-	82.7978	-	-	30.7714	-	102.7978
9608	-	56.3276**	-	-	82.7978	-	-	26.4702	-	102.7978
12010	-	64.6283**	42.1283**	-	74.0000	54.0000	-	9.3717	11.8717	-
14412	-	64.4583**	-	-	82.7978	-	-	18.3395	-	102.7978
16814	-	68.6582**	-	-	82.7978	-	-	14.1396	-	102.7978
19216	-	40.0034**	-	-	74.0000	-	-	33.9966	-	-
21618	-	40.9359**	-	-	82.7978	-	-	41.8619	-	102.7978
24020	-	40.6384**	-	-	82.7978	-	-	42.1594	-	102.7978
Horizontal Radiated Emission Result										
4804	-	46.7641**	-	-	74.0000	-	-	27.2359	-	-
7206	-	53.7701**	-	-	82.7978	-	-	29.0277	-	102.7978
9608	-	55.6165**	-	-	82.7978	-	-	27.1813	-	102.7978
12010	-	64.8513**	42.3513**	-	74.0000	54.0000	-	9.1487	11.6487	-
14412	-	63.2292**	-	-	82.7978	-	-	19.5686	-	102.7978
16814	-	66.7183**	-	-	82.7978	-	-	16.0795	-	102.7978
19216	-	39.8741**	-	-	74.0000	-	-	34.1259	-	-
21618	-	39.1734**	-	-	82.7978	-	-	43.6244	-	102.7978
24020	-	40.9346**	-	-	82.7978	-	-	41.8632	-	102.7978

Remarks: Pass Result	Marginal Result	Fail Result
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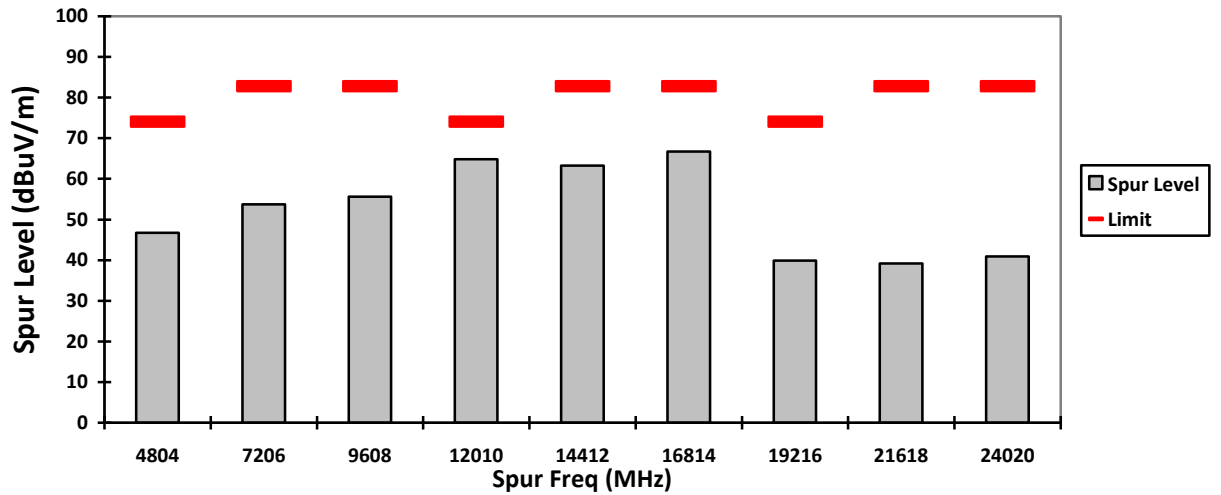
Temperature (degC): 23.5 Humidity (%): 69.4
Test Performed by: Nazrin & Rezza Test Date: Tue, 23 Apr, 2024
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

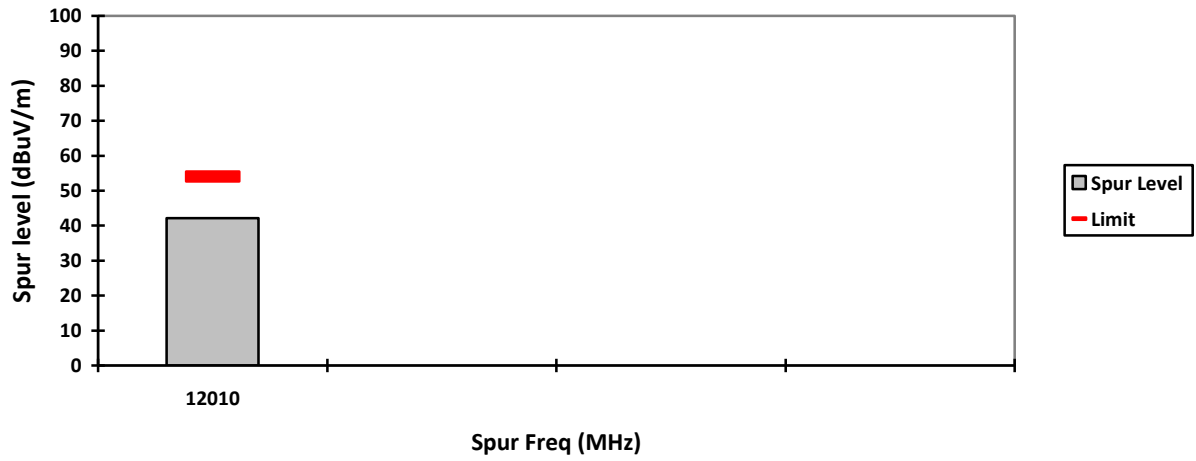
VERTICAL, PK



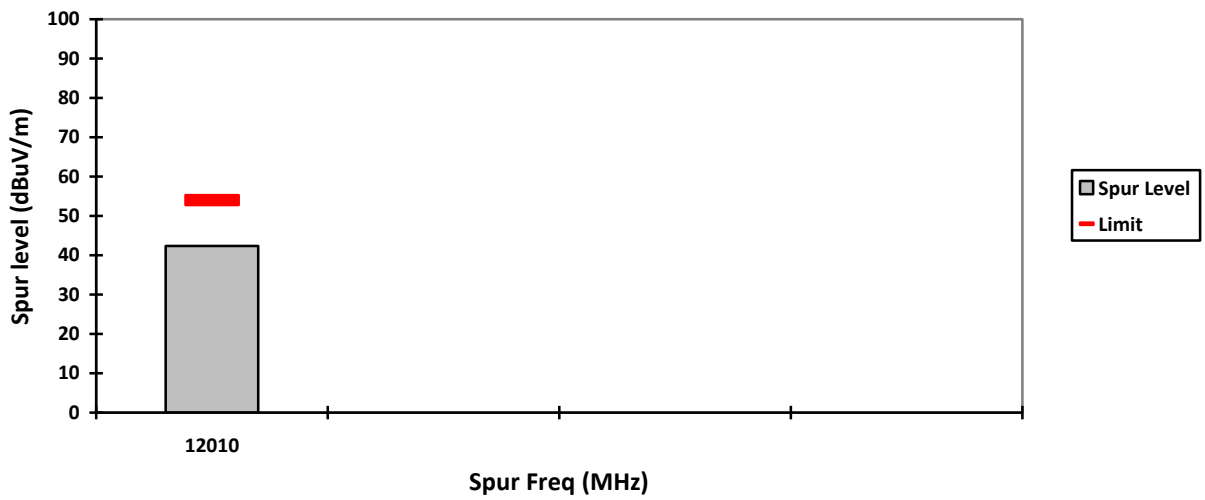
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission
Model#: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: Mid Test Frequency: 2440.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 1M)

Radiated Emission (Mid Channel) tabular data

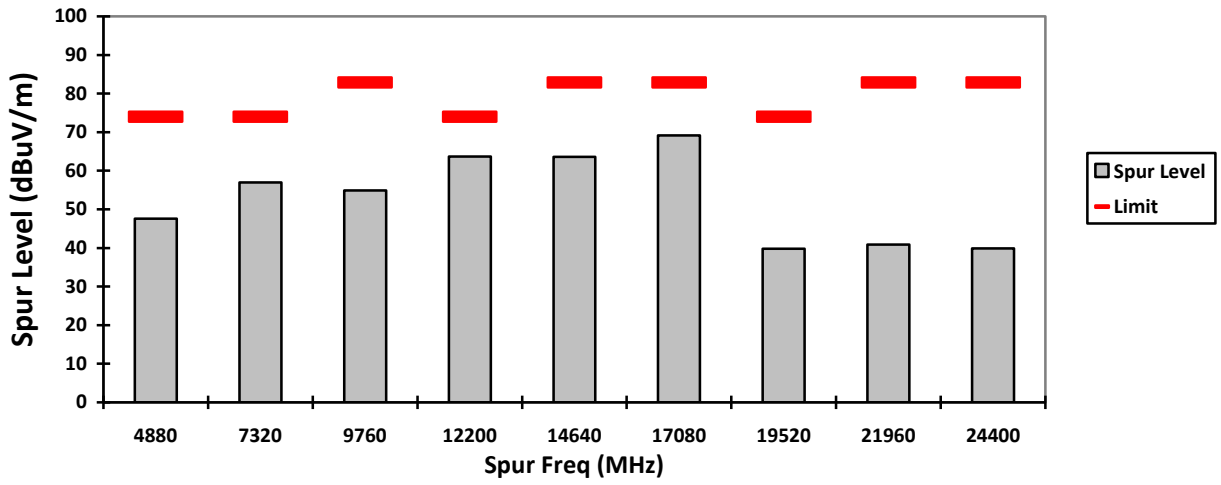
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
4880	-	47.5734**	-	-	74.0000	-	-	26.4266	-	-
7320	-	56.9547**	34.4547**	-	74.0000	54.0000	-	17.0453	19.5453	-
9760	-	54.9328**	-	-	82.7978	-	-	27.8650	-	102.7978
12200	-	63.7052**	41.2052**	-	74.0000	54.0000	-	10.2948	12.7948	-
14640	-	63.6109**	-	-	82.7978	-	-	19.1869	-	102.7978
17080	-	69.1285**	-	-	82.7978	-	-	13.6693	-	102.7978
19520	-	39.7707**	-	-	74.0000	-	-	34.2293	-	-
21960	-	40.8509**	-	-	82.7978	-	-	41.9469	-	102.7978
24400	-	39.9058**	-	-	82.7978	-	-	42.8920	-	102.7978
Horizontal Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
4880	-	47.6645**	-	-	74.0000	-	-	26.3355	-	-
7320	-	56.8371**	34.3371**	-	74.0000	54.0000	-	17.1629	19.6629	-
9760	-	55.8600**	-	-	82.7978	-	-	26.9378	-	102.7978
12200	-	63.7042**	41.2042**	-	74.0000	54.0000	-	10.2958	12.7958	-
14640	-	63.0417**	-	-	82.7978	-	-	19.7561	-	102.7978
17080	-	67.6972**	-	-	82.7978	-	-	15.1006	-	102.7978
19520	-	38.8435**	-	-	74.0000	-	-	35.1565	-	-
21960	-	41.3466**	-	-	82.7978	-	-	41.4512	-	102.7978
24400	-	39.4368**	-	-	82.7978	-	-	43.3610	-	102.7978

Remarks: Pass Result	Marginal Result	Fail Result
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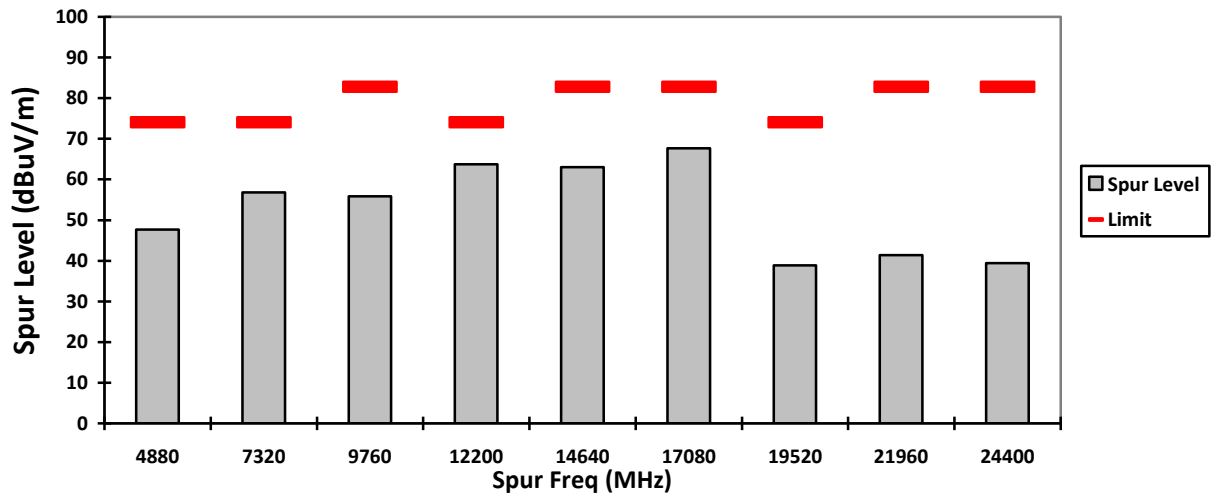
Temperature (degC): 23.5 Humidity (%): 69.4
Test Performed by: Nazrin & Rezza Test Date: Tue, 23 Apr, 2024
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

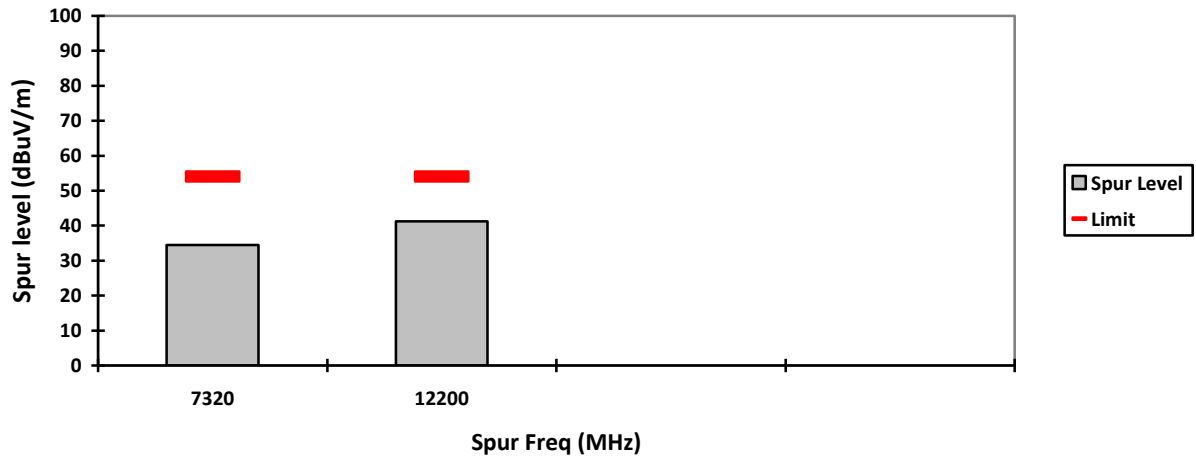
VERTICAL, PK



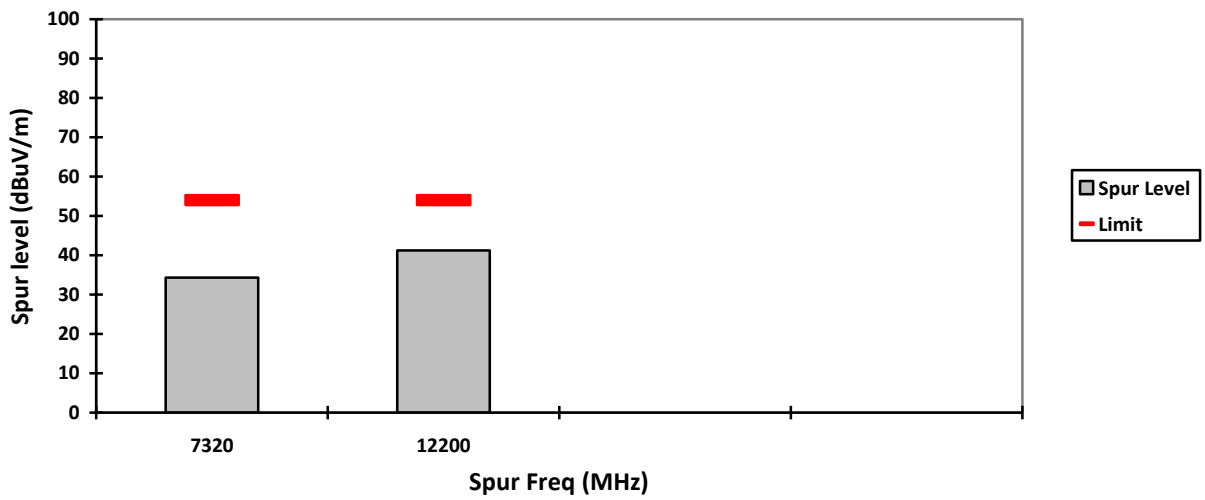
HORIZONTAL, PK



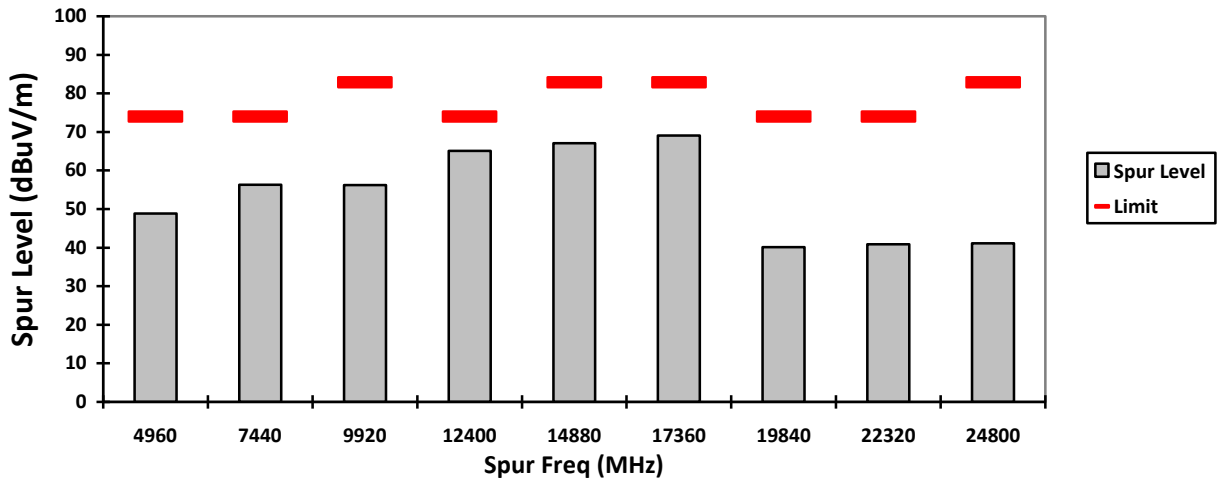
VERTICAL, AV



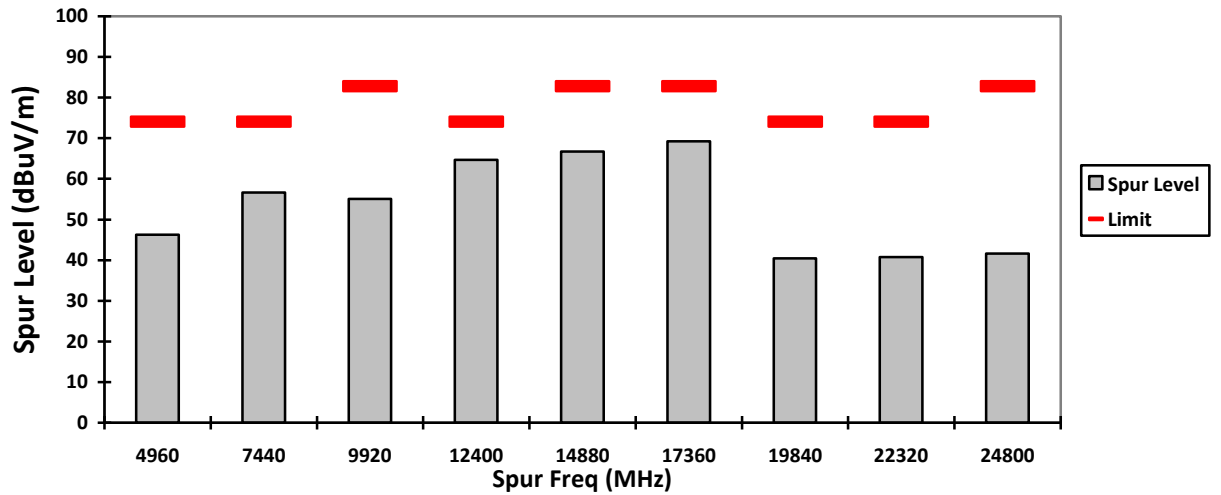
HORIZONTAL, AV



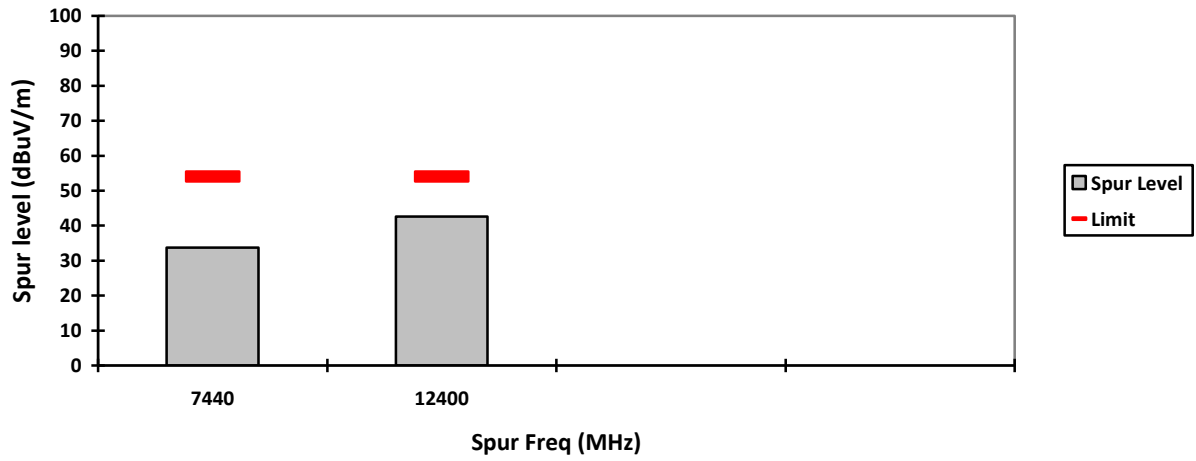
VERTICAL, PK



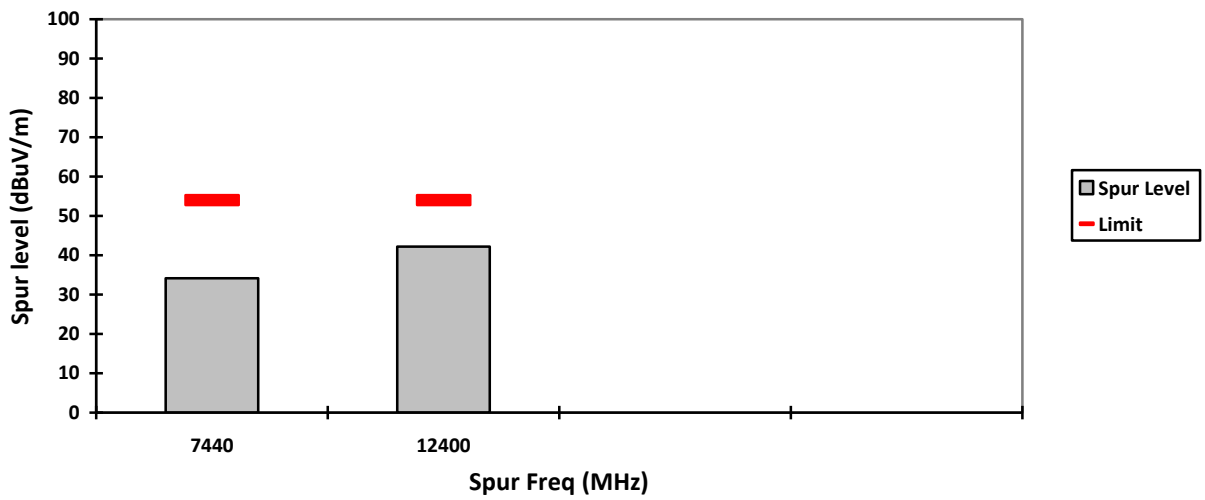
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission
Model#: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: Low Test Frequency: 2402.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 2M)

Radiated Emission (Low Channel) tabular data

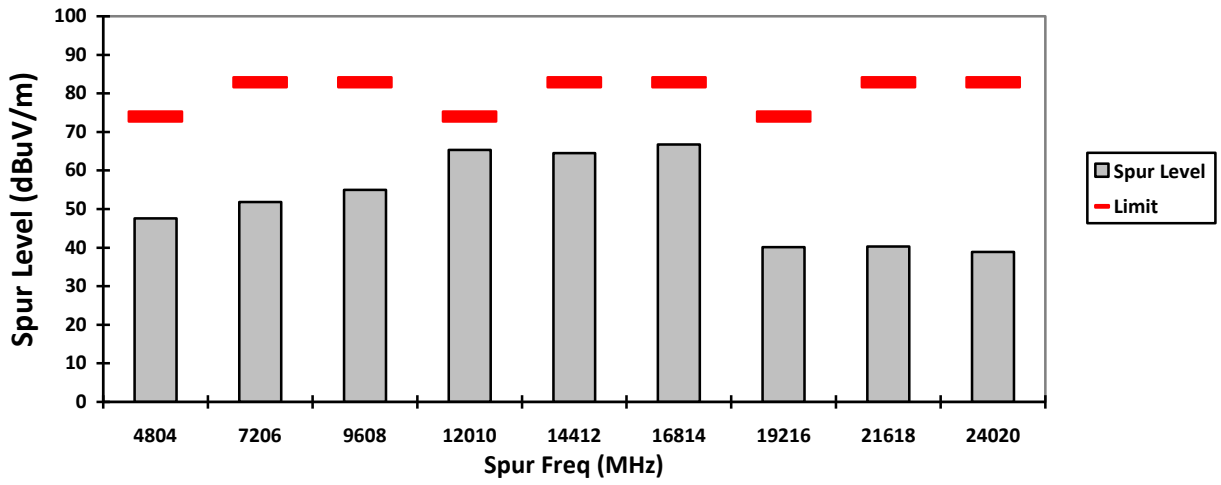
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
4804	-	47.5692**	-	-	74.0000	-	-	26.4308	-	-
7206	-	51.8431**	-	-	82.7978	-	-	30.9547	-	102.7978
9608	-	54.9465**	-	-	82.7978	-	-	27.8513	-	102.7978
12010	-	65.3759**	42.8759**	-	74.0000	54.0000	-	8.6241	11.1241	-
14412	-	64.5058**	-	-	82.7978	-	-	18.2920	-	102.7978
16814	-	66.7486**	-	-	82.7978	-	-	16.0492	-	102.7978
19216	-	40.1199**	-	-	74.0000	-	-	33.8801	-	-
21618	-	40.2807**	-	-	82.7978	-	-	42.5171	-	102.7978
24020	-	38.8564**	-	-	82.7978	-	-	43.9414	-	102.7978
Horizontal Radiated Emission Result										
4804	-	46.5558**	-	-	74.0000	-	-	27.4442	-	-
7206	-	53.3517**	-	-	82.7978	-	-	29.4461	-	102.7978
9608	-	55.4523**	-	-	82.7978	-	-	27.3455	-	102.7978
12010	-	64.7064**	42.2064**	-	74.0000	54.0000	-	9.2936	11.7936	-
14412	-	64.4752**	-	-	82.7978	-	-	18.3226	-	102.7978
16814	-	67.1988**	-	-	82.7978	-	-	15.5990	-	102.7978
19216	-	40.5501**	-	-	74.0000	-	-	33.4499	-	-
21618	-	40.4809**	-	-	82.7978	-	-	42.3169	-	102.7978
24020	-	40.2297**	-	-	82.7978	-	-	42.5681	-	102.7978

Remarks: Pass Result	Marginal Result	Fail Result
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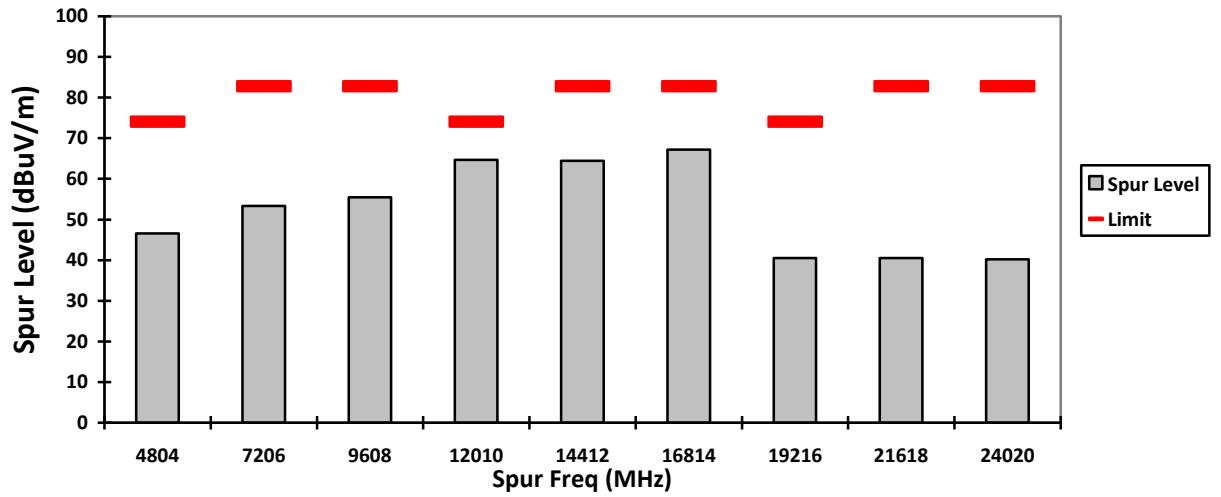
Temperature (degC): 23.5 Humidity (%): 69.4
Test Performed by: Nazrin & Rezza Test Date: Tue, 23 Apr, 2024
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

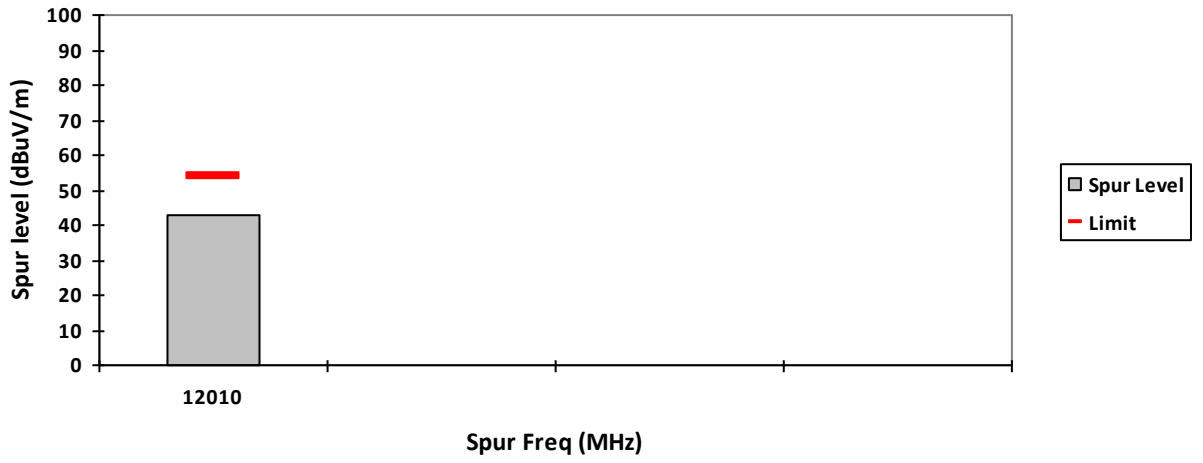
VERTICAL, PK



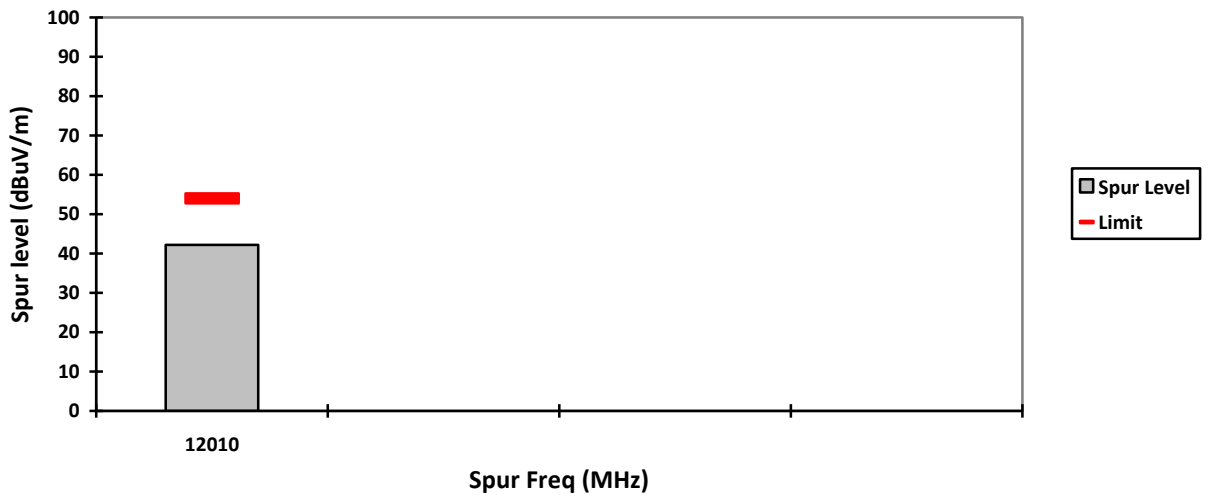
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission
Model#: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: Mid Test Frequency: 2440.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 2M)

Radiated Emission (Mid Channel) tabular data

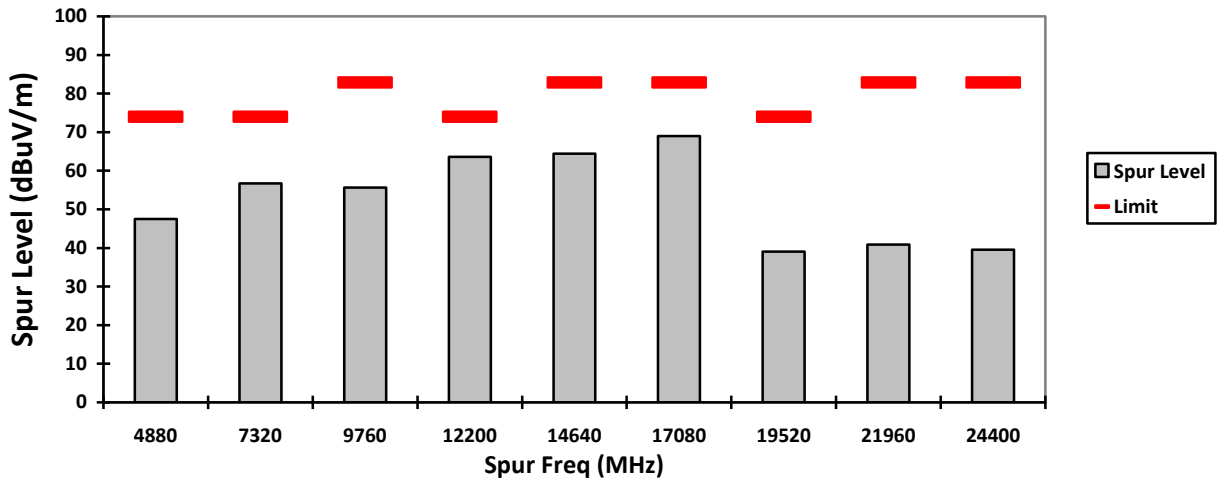
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
4880	-	47.5212**	-	-	74.0000	-	-	26.4788	-	-
7320	-	56.7038**	34.2038**	-	74.0000	54.0000	-	17.2962	19.7962	-
9760	-	55.6483**	-	-	82.7978	-	-	27.1495	-	102.7978
12200	-	63.5915**	41.0915**	-	74.0000	54.0000	-	10.4085	12.9085	-
14640	-	64.4559**	-	-	82.7978	-	-	18.3419	-	102.7978
17080	-	68.9530**	-	-	82.7978	-	-	13.8448	-	102.7978
19520	-	39.0956**	-	-	74.0000	-	-	34.9044	-	-
21960	-	40.8845**	-	-	82.7978	-	-	41.9133	-	102.7978
24400	-	39.5540**	-	-	82.7978	-	-	43.2438	-	102.7978
Horizontal Radiated Emission Result										
4880	-	46.7066**	-	-	74.0000	-	-	27.2934	-	-
7320	-	56.3852**	33.8852**	-	74.0000	54.0000	-	17.6148	20.1148	-
9760	-	56.0944**	-	-	82.7978	-	-	26.7034	-	102.7978
12200	-	63.7850**	41.2850**	-	74.0000	54.0000	-	10.2150	12.7150	-
14640	-	62.8005**	-	-	82.7978	-	-	19.9973	-	102.7978
17080	-	68.3735**	-	-	82.7978	-	-	14.4243	-	102.7978
19520	-	39.0653**	-	-	74.0000	-	-	34.9347	-	-
21960	-	40.5974**	-	-	82.7978	-	-	42.2004	-	102.7978
24400	-	40.3134**	-	-	82.7978	-	-	42.4844	-	102.7978

Remarks: Pass Result	Marginal Result	Fail Result
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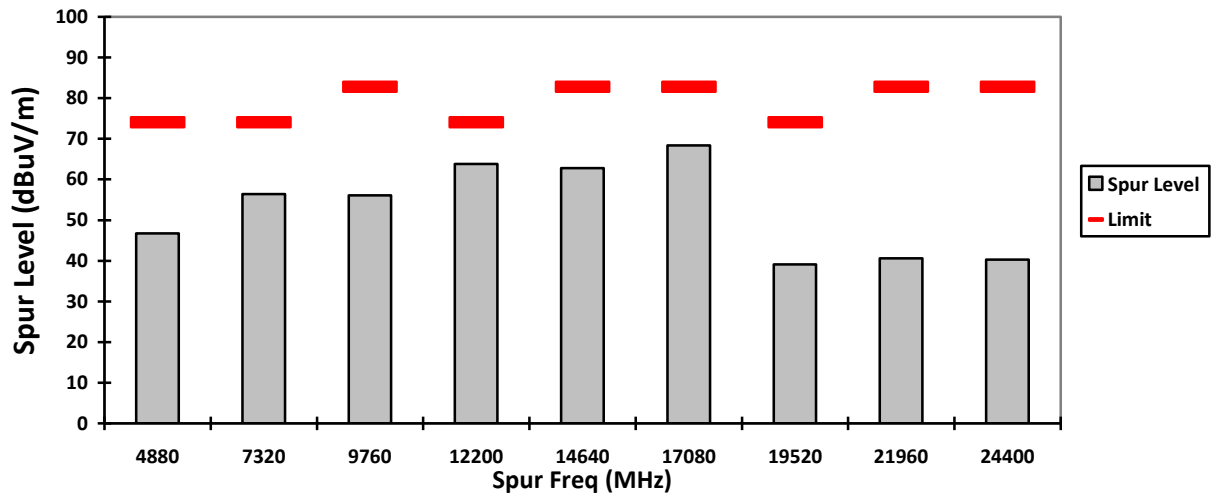
Temperature (degC): 23.5 Humidity (%): 69.4
Test Performed by: Nazrin & Rezza Test Date: Tue, 23 Apr, 2024
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

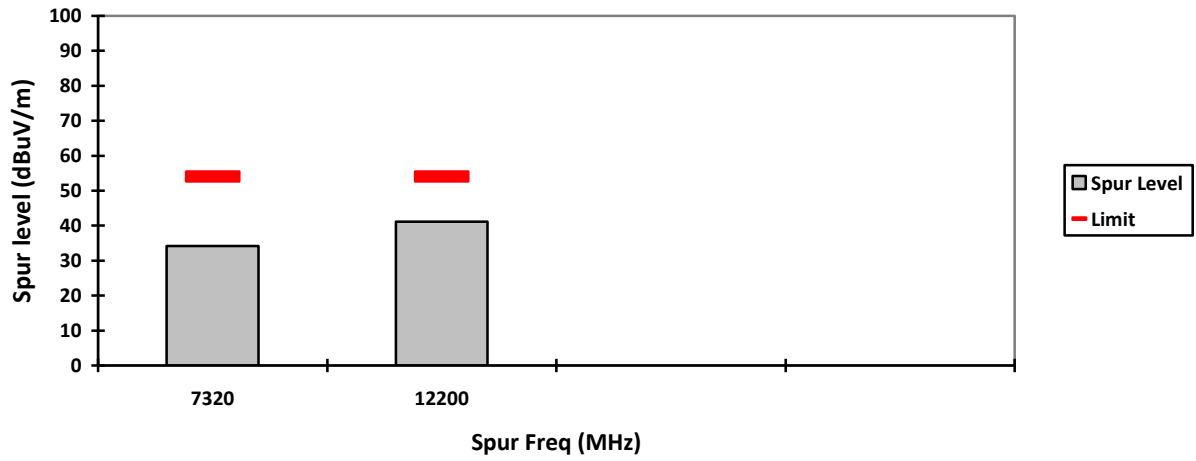
VERTICAL, PK



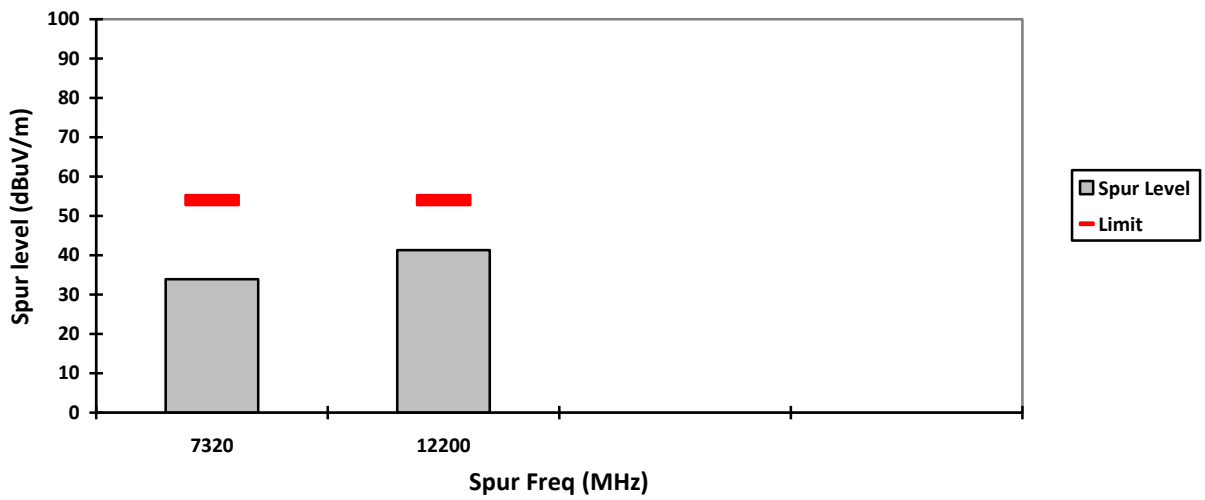
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission
Model#: AAH06RDN9RA1AN S/N: 865EAD9538 EMC SR ID#: 0512P01-EMC-00006
Battery: PMNN4810A Accessory: PMAE4079A
Test Channel: High Test Frequency: 2480.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE 2M)

Radiated Emission (High Channel) tabular data

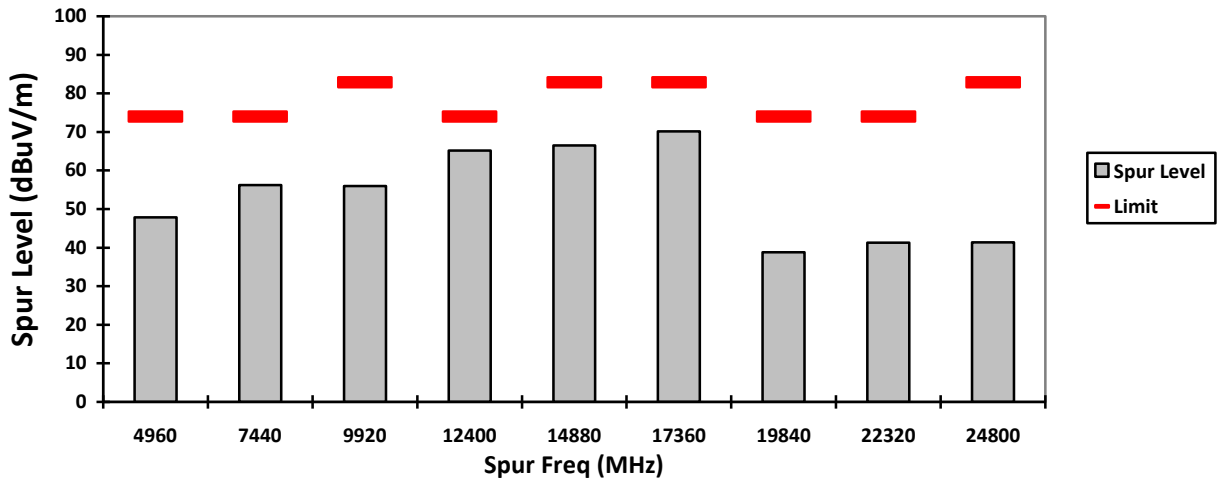
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
4960	-	47.8172**	-	-	74.0000	-	-	26.1828	-	-
7440	-	56.2539**	33.7539**	-	74.0000	54.0000	-	17.7461	20.2461	-
9920	-	55.9760**	-	-	82.7978	-	-	26.8218	-	102.7978
12400	-	65.1844**	42.6844**	-	74.0000	54.0000	-	8.8156	11.3156	-
14880	-	66.5172**	-	-	82.7978	-	-	16.2806	-	102.7978
17360	-	70.1219**	-	-	82.7978	-	-	12.6759	-	102.7978
19840	-	38.8140**	-	-	74.0000	-	-	35.1860	-	-
22320	-	41.3104**	-	-	74.0000	-	-	32.6896	-	-
24800	-	41.3391**	-	-	82.7978	-	-	41.4587	-	102.7978
Horizontal Radiated Emission Result										
4960	-	46.5471**	-	-	74.0000	-	-	27.4529	-	-
7440	-	56.0764**	33.5764**	-	74.0000	54.0000	-	17.9236	20.4236	-
9920	-	54.7947**	-	-	82.7978	-	-	28.0031	-	102.7978
12400	-	64.4329**	41.9329**	-	74.0000	54.0000	-	9.5671	12.0671	-
14880	-	65.6274**	-	-	82.7978	-	-	17.1704	-	102.7978
17360	-	68.8676**	-	-	82.7978	-	-	13.9302	-	102.7978
19840	-	38.7379**	-	-	74.0000	-	-	35.2621	-	-
22320	-	41.3166**	-	-	74.0000	-	-	32.6834	-	-
24800	-	42.3315**	-	-	82.7978	-	-	40.4663	-	102.7978

Remarks: Pass Result	Marginal Result	Fail Result
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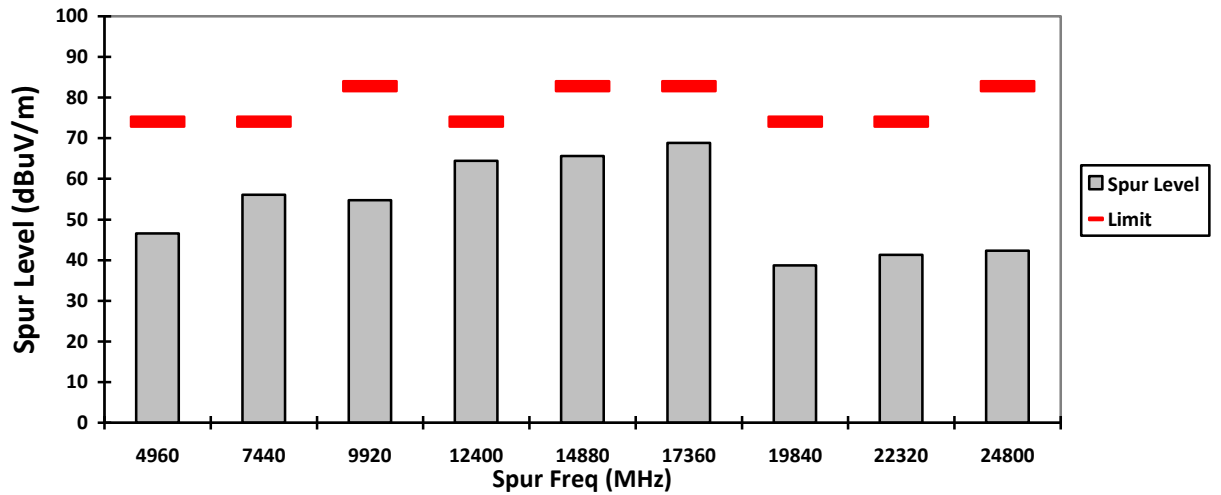
Temperature (degC): 23.5 Humidity (%): 69.4
Test Performed by: Nazrin & Rezza Test Date: Tue, 23 Apr, 2024
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

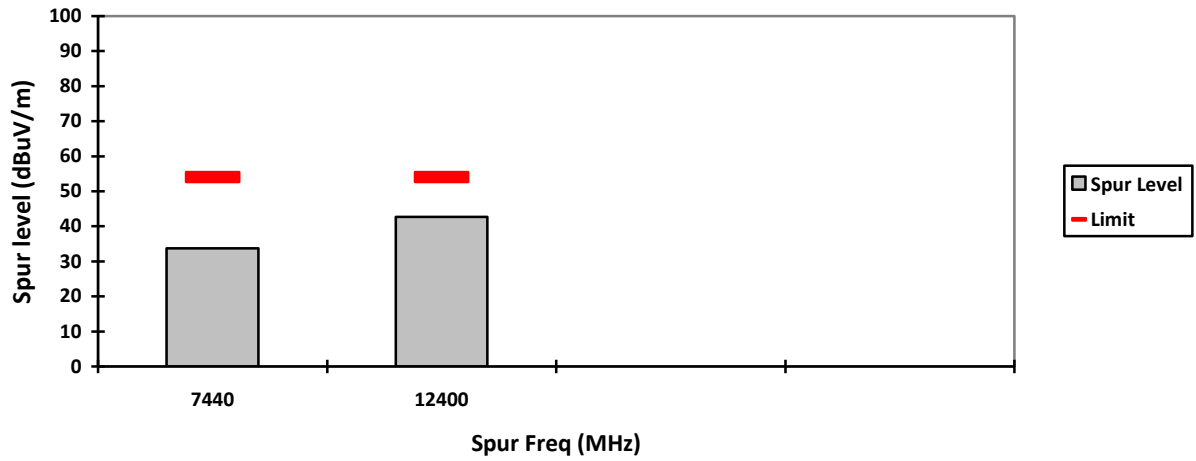
VERTICAL, PK



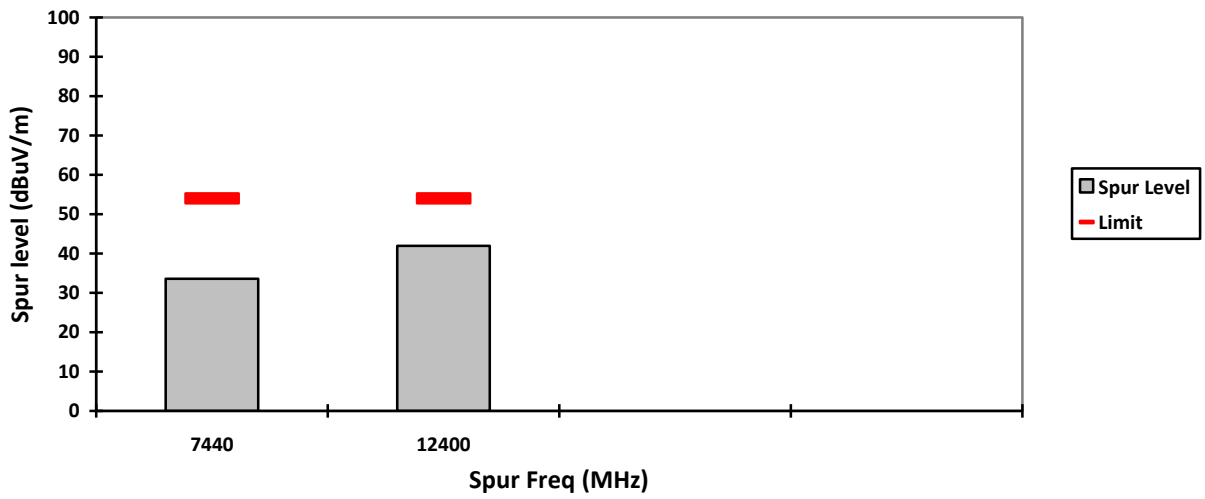
HORIZONTAL, PK



VERTICAL, AV

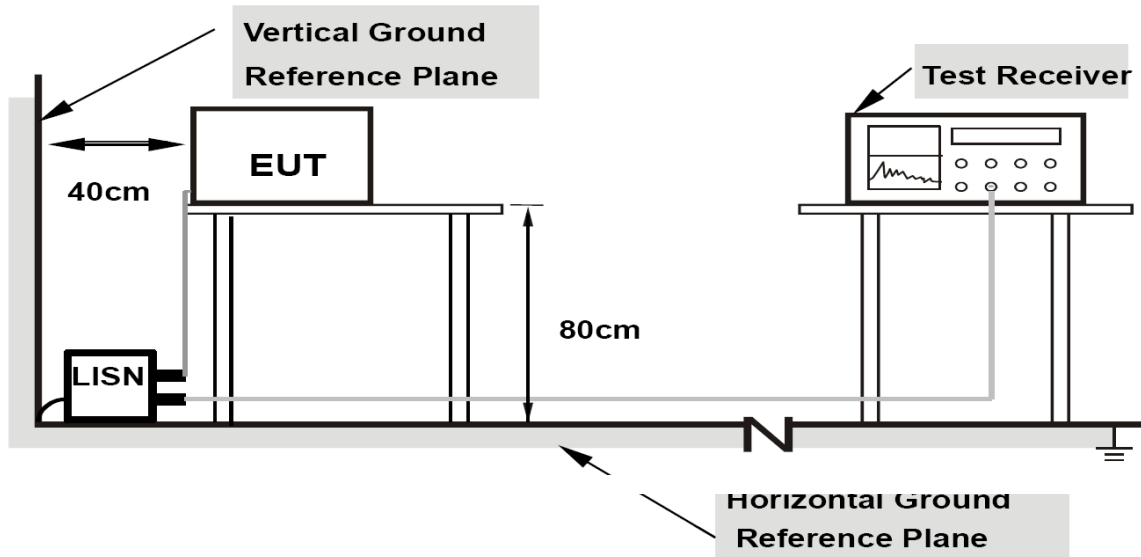


HORIZONTAL, AV



6.7 AC Powerline Conducted Emission

6.7.1 Test Setup



- 1) Tests were conducted for both Receive and Transmit Mode of the EUT.
- 2) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
- 3) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 4) The frequency range from 150 kHz to 30MHz was measured.

6.7.2 Test Limits:

For AC Power Line Conducted Test Limit can be Class A or B depends on product classification.

Limits for conducted disturbance at the mains ports of class A ITE

Frequency range MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60

NOTE The lower limit shall apply at the transition frequency.

Table 1: Limits for Conducted Disturbance at the Mains Ports of Class A ITE.

**Limits for conducted disturbance at the mains ports
of class B ITE**

Frequency range MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

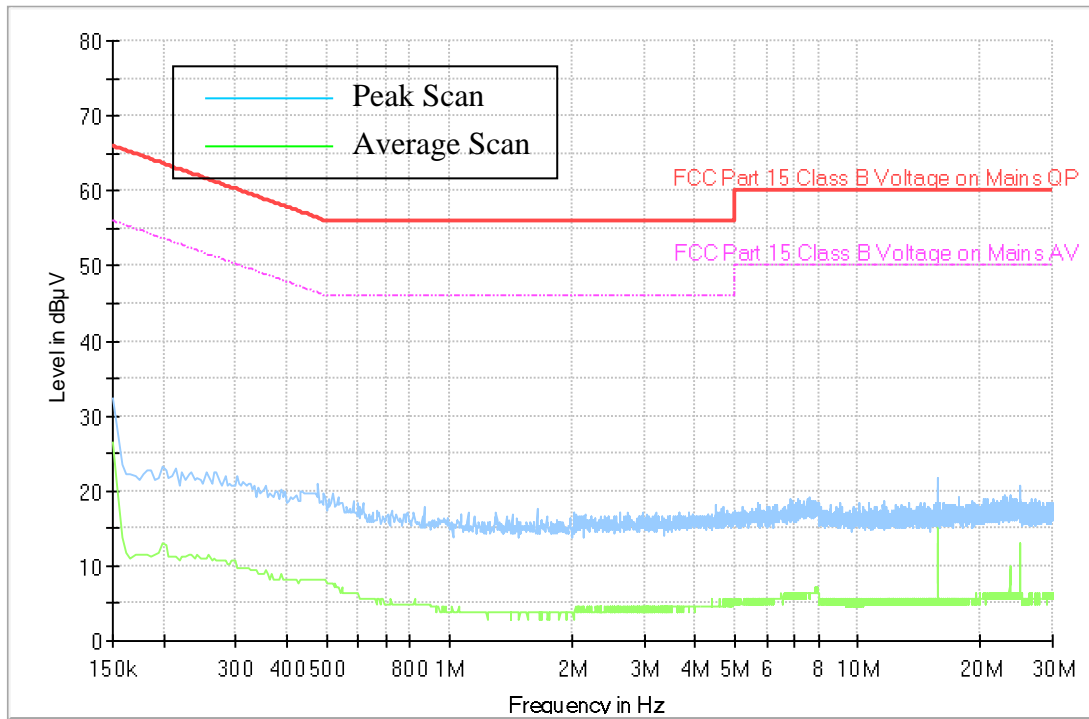
NOTE 1 The lower limit shall apply at the transition frequencies.
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

Table 2: Limits for Conducted Disturbance at the Mains Ports of Class B ITE

6.7.3 Test Result

1) Ambient

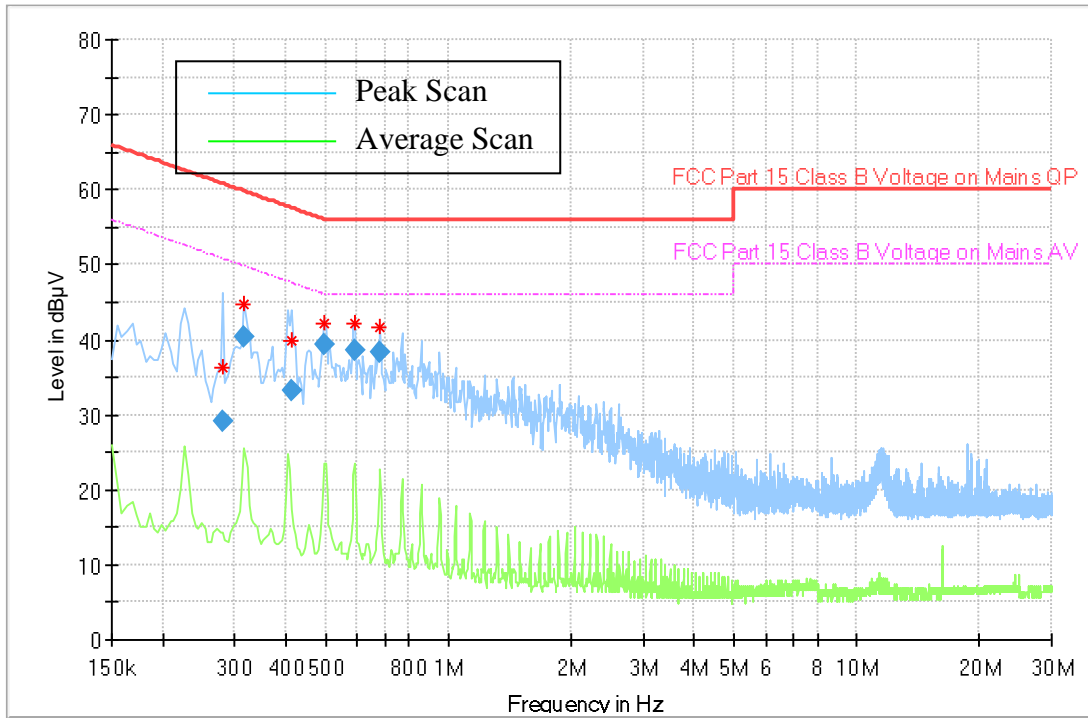
Full Spectrum



120 Vac, 60Hz

1) Charger Alone

Full Spectrum



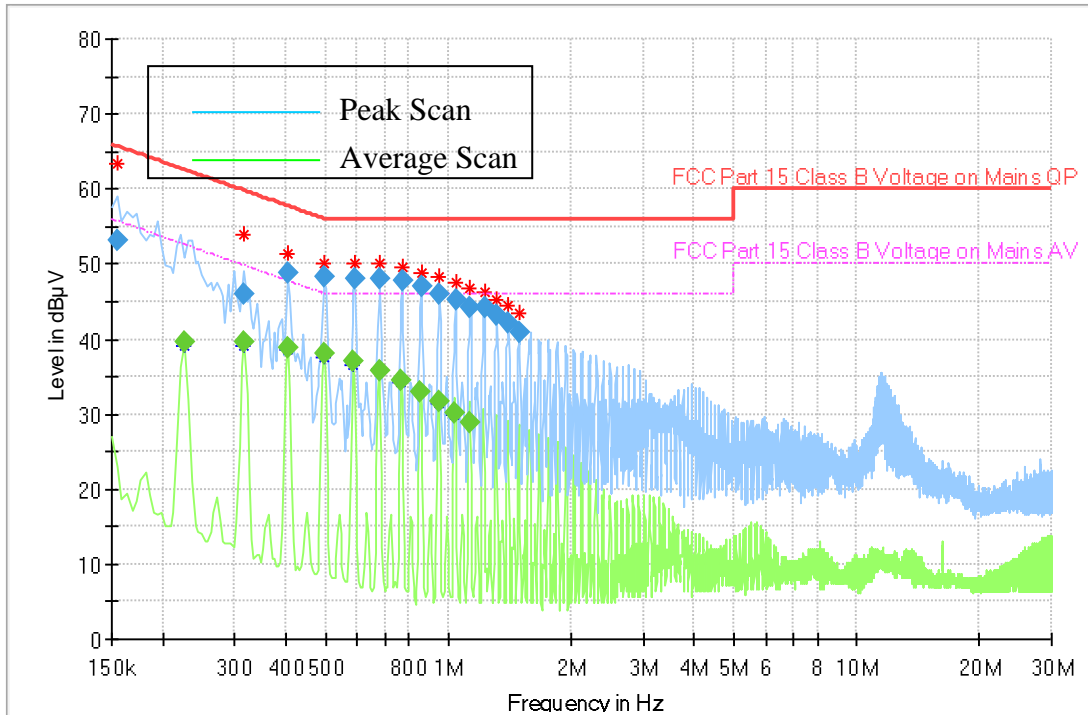
Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.280500	29.06	---	60.80	31.74	1000.0	9.000	L1	ON	10.3	Pass
0.316500	40.34	---	59.80	19.46	1000.0	9.000	N	ON	10.3	Pass
0.415500	33.24	---	57.54	24.30	1000.0	9.000	L1	ON	10.3	Pass
0.496500	39.47	---	56.06	16.59	1000.0	9.000	L1	ON	10.3	Pass
0.591000	38.72	---	56.00	17.28	1000.0	9.000	L1	ON	10.3	Pass
0.681000	38.38	---	56.00	17.62	1000.0	9.000	L1	ON	10.3	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

2) Charger + Radio Off

Full Spectrum



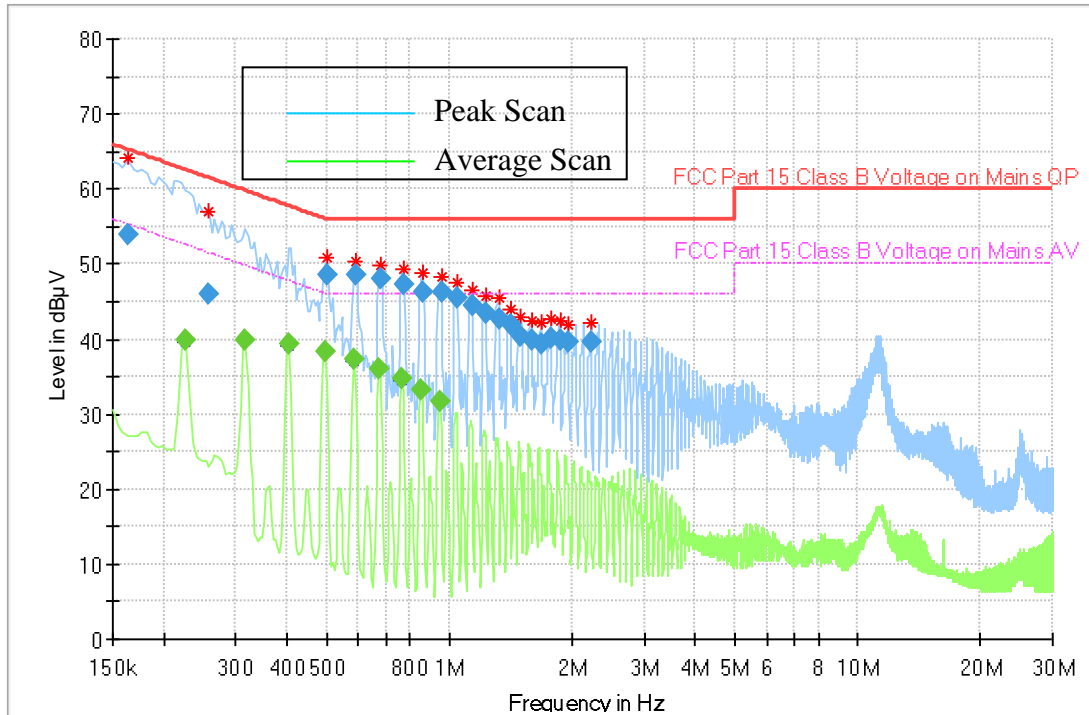
Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.154500	53.06	---	65.75	12.70	1000.0	9.000	L1	ON	10.3	Pass
0.226500	---	39.57	52.58	13.01	1000.0	9.000	L1	ON	10.3	Pass
0.316500	46.08	---	59.80	13.71	1000.0	9.000	N	ON	10.3	Pass
0.316500	---	39.58	49.80	10.22	1000.0	9.000	L1	ON	10.3	Pass
0.406500	48.77	---	57.72	8.95	1000.0	9.000	L1	ON	10.3	Pass
0.406500	---	38.91	47.72	8.81	1000.0	9.000	L1	ON	10.3	Pass
0.496500	---	38.04	46.06	8.02	1000.0	9.000	L1	ON	10.3	Pass
0.496500	48.25	---	56.06	7.81	1000.0	9.000	L1	ON	10.3	Pass
0.586500	---	36.95	46.00	9.05	1000.0	9.000	L1	ON	10.3	Pass
0.591000	48.01	---	56.00	7.99	1000.0	9.000	L1	ON	10.3	Pass
0.676500	---	35.75	46.00	10.25	1000.0	9.000	L1	ON	10.3	Pass
0.681000	48.06	---	56.00	7.94	1000.0	9.000	L1	ON	10.3	Pass
0.766500	---	34.44	46.00	11.56	1000.0	9.000	L1	ON	10.3	Pass
0.771000	47.71	---	56.00	8.29	1000.0	9.000	L1	ON	10.3	Pass
0.856500	---	33.09	46.00	12.91	1000.0	9.000	L1	ON	10.3	Pass
0.861000	46.95	---	56.00	9.05	1000.0	9.000	L1	ON	10.3	Pass
0.946500	---	31.66	46.00	14.34	1000.0	9.000	L1	ON	10.3	Pass
0.951000	46.03	---	56.00	9.97	1000.0	9.000	L1	ON	10.3	Pass
1.036500	---	30.26	46.00	15.74	1000.0	9.000	L1	ON	10.3	Pass
1.041000	45.13	---	56.00	10.87	1000.0	9.000	L1	ON	10.3	Pass
1.126500	---	28.82	46.00	17.18	1000.0	9.000	L1	ON	10.3	Pass
1.131000	44.20	---	56.00	11.80	1000.0	9.000	L1	ON	10.3	Pass
1.225500	44.19	---	56.00	11.81	1000.0	9.000	L1	ON	10.3	Pass
1.315500	43.25	---	56.00	12.75	1000.0	9.000	L1	ON	10.3	Pass
1.405500	42.09	---	56.00	13.91	1000.0	9.000	L1	ON	10.3	Pass
1.495500	40.86	---	56.00	15.14	1000.0	9.000	L1	ON	10.3	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

3) Charger + Radio Standby

Full Spectrum



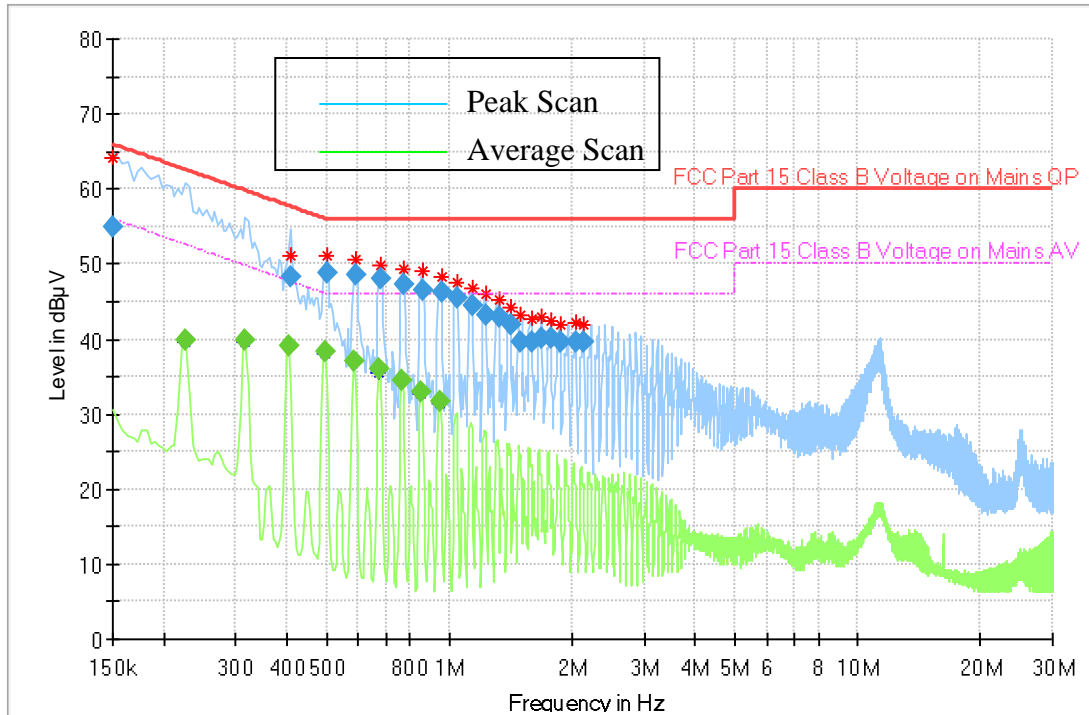
Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.163500	54.00	---	65.28	11.28	1000.0	9.000	N	ON	10.3	Pass
0.226500	---	39.91	52.58	12.67	1000.0	9.000	L1	ON	10.3	Pass
0.258000	46.02	---	61.50	15.48	1000.0	9.000	L1	ON	10.3	Pass
0.316500	---	39.95	49.80	9.85	1000.0	9.000	L1	ON	10.3	Pass
0.406500	---	39.28	47.72	8.44	1000.0	9.000	L1	ON	10.3	Pass
0.496500	---	38.35	46.06	7.70	1000.0	9.000	L1	ON	10.3	Pass
0.501000	48.56	---	56.00	7.44	1000.0	9.000	L1	ON	10.3	Pass
0.586500	---	37.23	46.00	8.77	1000.0	9.000	L1	ON	10.3	Pass
0.591000	48.57	---	56.00	7.43	1000.0	9.000	L1	ON	10.3	Pass
0.672000	---	36.04	46.00	9.96	1000.0	9.000	L1	ON	10.3	Pass
0.681000	48.06	---	56.00	7.94	1000.0	9.000	L1	ON	10.3	Pass
0.762000	---	34.66	46.00	11.34	1000.0	9.000	L1	ON	10.3	Pass
0.771000	47.21	---	56.00	8.79	1000.0	9.000	L1	ON	10.3	Pass
0.856500	---	33.16	46.00	12.84	1000.0	9.000	L1	ON	10.3	Pass
0.865500	46.29	---	56.00	9.71	1000.0	9.000	L1	ON	10.3	Pass
0.946500	---	31.70	46.00	14.30	1000.0	9.000	L1	ON	10.3	Pass
0.955500	46.21	---	56.00	9.79	1000.0	9.000	L1	ON	10.3	Pass
1.045500	45.55	---	56.00	10.45	1000.0	9.000	L1	ON	10.3	Pass
1.135500	44.53	---	56.00	11.47	1000.0	9.000	L1	ON	10.3	Pass
1.225500	43.41	---	56.00	12.59	1000.0	9.000	L1	ON	10.3	Pass
1.320000	42.76	---	56.00	13.24	1000.0	9.000	L1	ON	10.3	Pass
1.410000	41.96	---	56.00	14.04	1000.0	9.000	L1	ON	10.3	Pass
1.500000	40.42	---	56.00	15.58	1000.0	9.000	N	ON	10.3	Pass
1.590000	39.98	---	56.00	16.02	1000.0	9.000	N	ON	10.3	Pass
1.680000	39.46	---	56.00	16.54	1000.0	9.000	N	ON	10.3	Pass
1.774500	40.05	---	56.00	15.95	1000.0	9.000	N	ON	10.3	Pass
1.864500	39.87	---	56.00	16.13	1000.0	9.000	N	ON	10.3	Pass
1.954500	39.51	---	56.00	16.49	1000.0	9.000	N	ON	10.3	Pass
2.229000	39.65	---	56.00	16.35	1000.0	9.000	N	ON	10.3	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

4) Charger + Radio TX BTLE 4.0

Full Spectrum



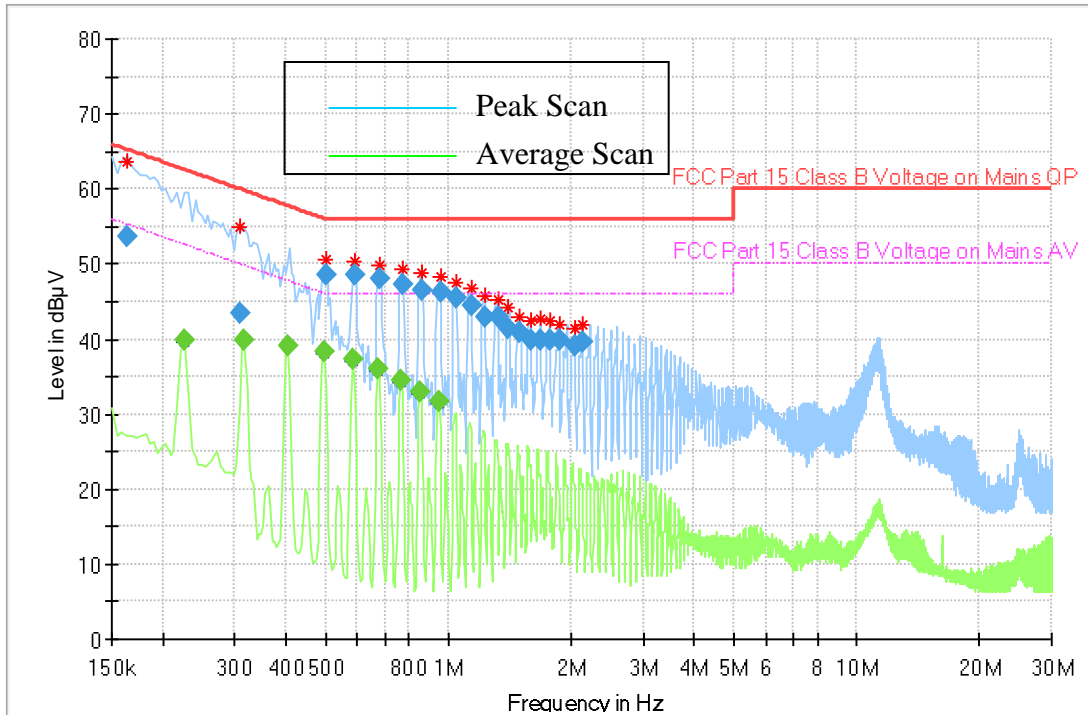
Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.150000	54.94	---	66.00	11.06	1000.0	9.000	L1	ON	10.3	Pass
0.226500	---	39.95	52.58	12.63	1000.0	9.000	L1	ON	10.3	Pass
0.316500	---	39.91	49.80	9.89	1000.0	9.000	L1	ON	10.3	Pass
0.406500	---	39.20	47.72	8.52	1000.0	9.000	L1	ON	10.3	Pass
0.411000	48.22	---	57.63	9.41	1000.0	9.000	L1	ON	10.3	Pass
0.496500	---	38.26	46.06	7.79	1000.0	9.000	L1	ON	10.3	Pass
0.501000	48.76	---	56.00	7.24	1000.0	9.000	L1	ON	10.3	Pass
0.586500	---	37.10	46.00	8.90	1000.0	9.000	L1	ON	10.3	Pass
0.591000	48.67	---	56.00	7.33	1000.0	9.000	L1	ON	10.3	Pass
0.672000	---	35.97	46.00	10.03	1000.0	9.000	L1	ON	10.3	Pass
0.681000	48.04	---	56.00	7.96	1000.0	9.000	L1	ON	10.3	Pass
0.762000	---	34.55	46.00	11.45	1000.0	9.000	L1	ON	10.3	Pass
0.771000	47.18	---	56.00	8.82	1000.0	9.000	L1	ON	10.3	Pass
0.856500	---	33.06	46.00	12.94	1000.0	9.000	L1	ON	10.3	Pass
0.865500	46.60	---	56.00	9.40	1000.0	9.000	L1	ON	10.3	Pass
0.946500	---	31.58	46.00	14.42	1000.0	9.000	L1	ON	10.3	Pass
0.955500	46.34	---	56.00	9.66	1000.0	9.000	L1	ON	10.3	Pass
1.045500	45.52	---	56.00	10.48	1000.0	9.000	L1	ON	10.3	Pass
1.135500	44.47	---	56.00	11.53	1000.0	9.000	L1	ON	10.3	Pass
1.230000	43.32	---	56.00	12.68	1000.0	9.000	L1	ON	10.3	Pass
1.320000	42.95	---	56.00	13.05	1000.0	9.000	L1	ON	10.3	Pass
1.410000	41.98	---	56.00	14.02	1000.0	9.000	L1	ON	10.3	Pass
1.491000	39.67	---	56.00	16.33	1000.0	9.000	L1	ON	10.3	Pass
1.594500	39.74	---	56.00	16.26	1000.0	9.000	N	ON	10.3	Pass
1.684500	40.13	---	56.00	15.87	1000.0	9.000	N	ON	10.3	Pass
1.774500	40.03	---	56.00	15.97	1000.0	9.000	N	ON	10.3	Pass
1.864500	39.72	---	56.00	16.29	1000.0	9.000	N	ON	10.3	Pass
2.049000	39.71	---	56.00	16.29	1000.0	9.000	N	ON	10.3	Pass
2.139000	39.73	---	56.00	16.27	1000.0	9.000	N	ON	10.3	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

5) Charger + Radio TX BTLE 5.0

Full Spectrum



Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.163500	53.76	---	65.28	11.53	1000.0	9.000	N	ON	10.3	Pass
0.226500	---	39.91	52.58	12.67	1000.0	9.000	L1	ON	10.3	Pass
0.307500	43.47	---	60.04	16.56	1000.0	9.000	N	ON	10.3	Pass
0.316500	---	39.89	49.80	9.91	1000.0	9.000	L1	ON	10.3	Pass
0.406500	---	39.21	47.72	8.51	1000.0	9.000	L1	ON	10.3	Pass
0.496500	---	38.28	46.06	7.78	1000.0	9.000	L1	ON	10.3	Pass
0.501000	48.64	---	56.00	7.36	1000.0	9.000	L1	ON	10.3	Pass
0.582000	---	37.23	46.00	8.77	1000.0	9.000	L1	ON	10.3	Pass
0.591000	48.64	---	56.00	7.36	1000.0	9.000	L1	ON	10.3	Pass
0.672000	---	35.97	46.00	10.03	1000.0	9.000	L1	ON	10.3	Pass
0.681000	48.11	---	56.00	7.89	1000.0	9.000	L1	ON	10.3	Pass
0.762000	---	34.58	46.00	11.42	1000.0	9.000	L1	ON	10.3	Pass
0.771000	47.27	---	56.00	8.73	1000.0	9.000	L1	ON	10.3	Pass
0.856500	---	33.06	46.00	12.94	1000.0	9.000	L1	ON	10.3	Pass
0.865500	46.42	---	56.00	9.58	1000.0	9.000	L1	ON	10.3	Pass
0.946500	---	31.58	46.00	14.42	1000.0	9.000	L1	ON	10.3	Pass
0.955500	46.30	---	56.00	9.70	1000.0	9.000	L1	ON	10.3	Pass
1.045500	45.62	---	56.00	10.38	1000.0	9.000	L1	ON	10.3	Pass
1.135500	44.59	---	56.00	11.41	1000.0	9.000	L1	ON	10.3	Pass
1.230000	43.06	---	56.00	12.94	1000.0	9.000	L1	ON	10.3	Pass
1.320000	42.88	---	56.00	13.12	1000.0	9.000	L1	ON	10.3	Pass
1.405500	41.35	---	56.00	14.65	1000.0	9.000	L1	ON	10.3	Pass
1.500000	40.83	---	56.00	15.17	1000.0	9.000	L1	ON	10.3	Pass
1.590000	39.81	---	56.00	16.19	1000.0	9.000	N	ON	10.3	Pass
1.684500	39.91	---	56.00	16.09	1000.0	9.000	N	ON	10.3	Pass
1.774500	39.94	---	56.00	16.06	1000.0	9.000	N	ON	10.3	Pass
1.864500	39.75	---	56.00	16.25	1000.0	9.000	N	ON	10.3	Pass
2.044500	39.03	---	56.00	16.97	1000.0	9.000	N	ON	10.3	Pass
2.139000	39.63	---	56.00	16.37	1000.0	9.000	N	ON	10.3	Pass

* Expanded Uncertainty (U) = +/- 3.48dB

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IC: 109U-89FT7143

END OF TEST REPORT