
<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.C</p>
<p>Date/s Tested : 02-May-2023 - 23-May-2023 Report Issue Date : 12-July-2023 Manufacturer/Location : Motorola Solutions Malaysia Sdn Bhd Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia Requestor : TANG, GARY Product Type : Hand-held Product Version (PMN) : APXN50 Model Number (HVIN) : H25KDF9PW6AN Frequency Band : 2.402 - 2.480 GHz Max RF Output Power : 7.08 mWatts Applicant Name : Motorola Solutions Inc Applicant Address : 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322 FCC Registrations : 461337 ISED Registrations : MY0001 Firmware Version (FVIN) : D30.80.88</p> <p>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>	
<p>This report shall not be reproduced without written approval from an officially designated representative of the Motorola Penang Adv. Comm. Laboratory. The results and statements contained in this report pertain only to the device(s) evaluated.</p>	
<p>Prepared By:</p> <p><i>hidayati</i></p> <hr/> <p>SITI NURHIDAYATI BINTI ABDUL HALIM Test Personnel</p>	<p>Approved Signatory:</p> <p><i>Maheshvaran</i></p> <hr/> <p>MAHESHVARAN A/L RAJAGOPAL Responsible Engineer</p>

Table of Contents

1.0 General Information3

2.0 Summary of Test Results.....4

3.0. Measurement Uncertainty4

4.0 Equipment List5

5.0 Test Mode Applicability and Test Channel Detail6

6.0 Transmitter Test Parameters7

 6.1 6dB Channel Bandwidth.....7

 6.1.1 Test Setup.....7

 6.1.2 Test Limits:7

 6.1.3 Test Data:7

 6.2 Maximum Peak Conducted RF Output Power9

 6.2.1 Test Setup.....9

 6.2.2 Test Limits:9

 6.2.3 Test Data:10

 6.3 Maximum Peak Power Spectral Density11

 6.3.1 Test Setup.....11

 6.3.2 Test Limits:11

 6.3.3 Test Result11

 6.4 Conducted Spurious Emission.....12

 6.4.1 Test Setup.....12

 6.4.2 Test Limits:12

 6.4.3 Test Result12

 6.5 Band edge Conducted Spurious Emission.....13

 6.5.1 Test Setup.....13

 6.5.2 Test Limits:13

 6.5.3 Test Result13

 6.6 Radiated Emission within Restricted Bands.....14

 6.6.1 Test Setup.....14

 6.6.2 Test Limits:15

 6.6.3 Test Results:16

 6.7 AC Powerline Conducted Emission33

 6.7.1 Test Setup.....33

 6.7.2 Test Limits:33

 6.7.3 Test Result35

REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	20-June-2023	Siti Nurhidayati
Rev. B	Update Summary of Test Results Table	12-July-2023	Siti Nurhidayati
Rev. C	Update summary table	31-July-2023	Mahesh

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	IFA BLUETOOTH/WIFI ANTENNA

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
Cable, Port Prog, Test And Align Cable PSA	MOTOROLA	PMKN4231A
Antenna, Whip, Antenna, Whip, VHF, 18CM 136 - 174 MHz	MOTOROLA	AN000421A01
Batt Liion Impres 2 IP68 2850T	MOTOROLA	PMNN4813A
Chgr desktop single unit impres 2 base only	MOTOROLA	PMPN4819A
Chgr desktop multi unit impres 2 1 displays base only	MOTOROLA	PMPN4593A

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 - 1.049 MHz (1M05F1D)	287TZH0057	Hidayati
15.247 (b)(3)	RSS 247 5.4 (d)	Conducted RF Output Power (Peak)	Pass	Highest output power: 8.001 dBm (6.311 mW)	287TZH0057	Hidayati
15.247(e)	RSS 247 5.2 (b)	Maximum Peak Power Spectral Density	Pass	References data from AZ489FT7161 / ISED 109U-89FT7161	NA	NA
15.247 (d)	RSS-247 5.5	Band-Edge Conducted Spurious Emission	Pass	References data from AZ489FT7161 / ISED 109U-89FT7161	NA	NA
15.247 (b)	RSS-247 5.5	Conducted Spurious Emission	Pass	References data from AZ489FT7161 / ISED 109U-89FT7161	NA	NA
15.205, 15.209, 15.247 (d)	RSS247 5.5	Radiated Emission within Restricted Bands	Pass	Worst case emission: RBE: 44.1167 dBuV/m. (Margin = 9.8833 dB) RSE: 51.4093 dBuV/m (Margin = 2.5907 dB), noise floor	287TZH0154	Nazrin&Qawiman
15.207	RSS-Gen 8.8	AC Power Line Conducted Spurious Emission	NA	Meet the limit requirement	287TZH0154	Shidee
15.203	-	Antenna Requirement	NA	Internal antenna is not accessible to the end-user	NA	

***NOTE: The BT chipset is identical to FCC ID AZ489FT7161 / ISED 109U-89FT7161. The rest of conducted measurements are by similarity. Configurations of radiated emissions based on FCC ID AZ489FT7162 / ISED 109U-89FT7162 are tested. As per KDB 484596 D01v01, the applicant takes full responsibility that data referenced represents compliance to the relevant rules for this current FCC ID.**

3.0. Measurement Uncertainty

Measurement	Frequency	Expanded 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
	1GHz ~ 18GHz	5.84
Radiated Emissions above 1 GHz	18GHz ~ 40GHz	6.02
	9kHz ~ 12.75GHz	2.82

4.0 Equipment List

Bluetooth ATE # 1 (SW Version: Ate Main_3.1.11)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
CHAMBER	SH-641	92003820	8-Jul-22	8-Jul-23
ANALYZER SPECTRUM	E4440A	US45303111	22-Jul-22	22-Jul-23
POWER SUPPLY	6652A	3640A02967	19-Oct-22	19-Oct-23

Radiated Spurious Emission (SW Version: EMC_FCC_RE_v1.6.5)

Description	Model #	Serial Number	Calibration Date	Calibration Due Date
DRG HORN FREQ.	SAS-571	1143	8-Mar-23	8-Mar-25
DRG HORN FREQ.	SAS-571	1027	3-Jun-22	3-Jun-23
DC POWER SUPPLY	N7976A	MY53410110	30-Jun-22	30-Jun-23
SIGNAL GENERATOR	SMB 100A	182511	4-Jun-21	4-Jun-24
EMI TEST RECEIVER	ESW44	101731	5-Oct-22	5-Oct-23
5m SEMI-ANECHOIC CHAMBER	S800-HX	J2308	No Cal. Req'd	No Cal. Req'd
BILOG ANTENNA	CBL6112B	2863	22-Jun-22	22-Jun-23
BILOG ANTENNA	CBL6112D	55546	23-Jun-22	23-Jun-23
DATA LOGGER THERMOHYGROMETER	SDL500	A.016785	23-Jun-22	23-Jun-23
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	18-Aug-22	18-Aug-23
PREAMPLIFIER 18-40GHz	Miteq Hi Gain Sucoflex	2	No Cal. Req'd	No Cal. Req'd
PREAMPLIFIER	PAM-0118P	361	11-Sep-20	11-Sep-23
LOOP ANTENNA	6502	208416	12-Oct-22	12-Oct-23

AC Power Line Conducted Spurious Emission (SW Version: Ver. 10.60.10)

Description	Model #	Serial Number	Calibration Date	Calibration Due Date
DATA LOGGER	DSB	16344143	13-Jun-22	13-Jun-23
V-NETWORK 2-LINE	ENV216	101268	15-Aug-22	15-Aug-23
EMI TEST RECEIVER	ESCI	100225	9-Aug-22	9-Aug-23
PROGRAMMABLE AC SOURCE	61604	ABR000000926	30-Jun-22	30-Jun-23

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).

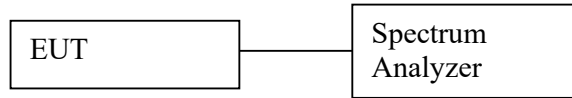
Following channel(s) was (were) selected for the final test as listed below.

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



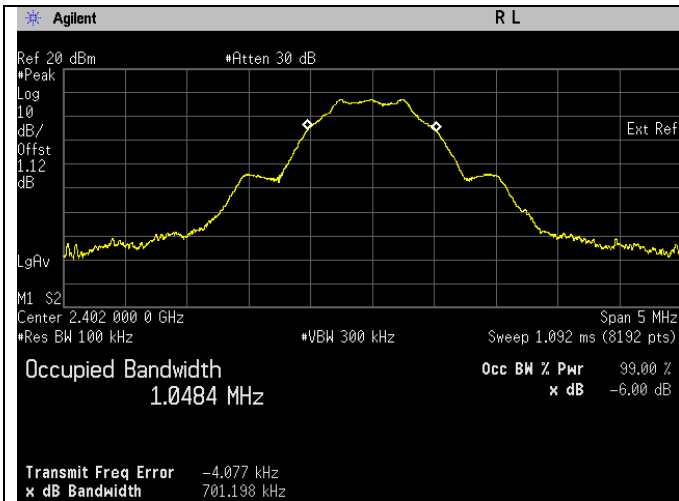
- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - 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:

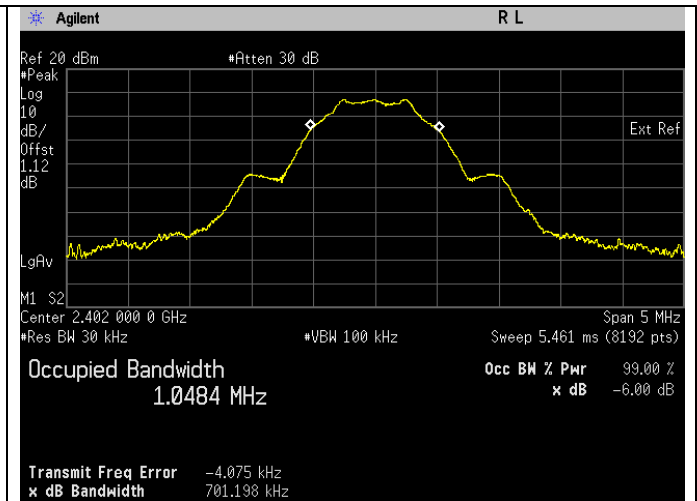
Normal Condition (25 ° C)
≥500 kHz

6.1.3 Test Data:

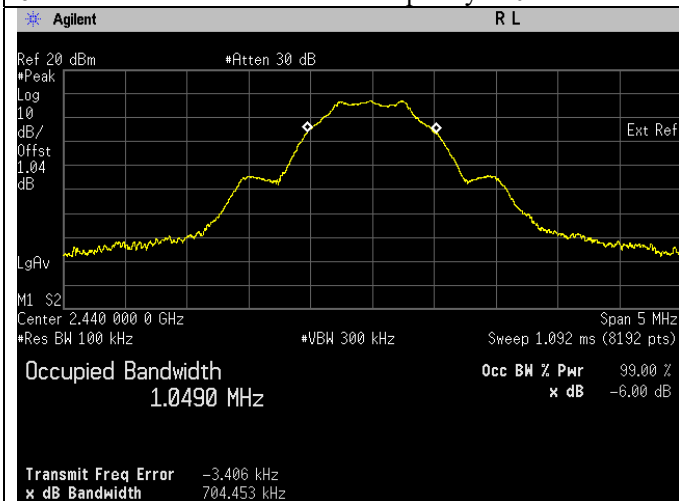
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
Bluetooth L.E	GFSK	2402	0.701	1.048	Pass
Bluetooth L.E	GFSK	2440	0.704	1.049	Pass
Bluetooth L.E	GFSK	2480	0.710	1.047	Pass



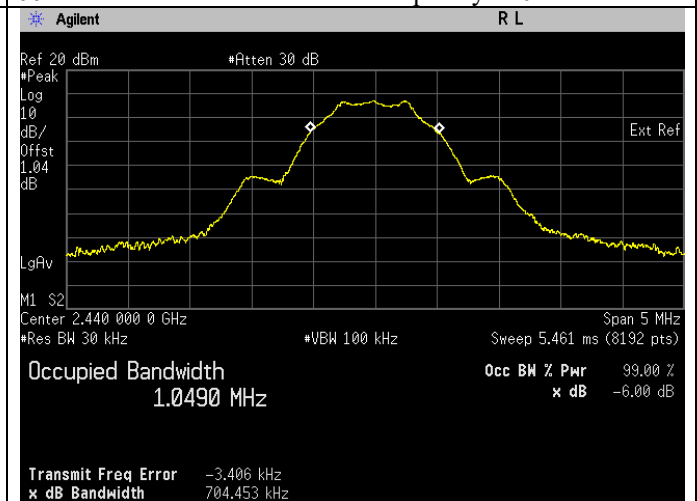
6dB Bandwidth. Bluetooth LE Frequency 2402 MHz



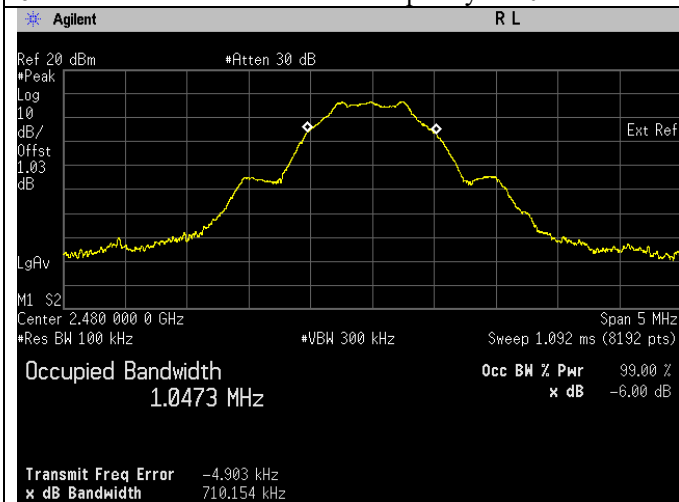
99% Bandwidth. Bluetooth LE Frequency 2402 MHz



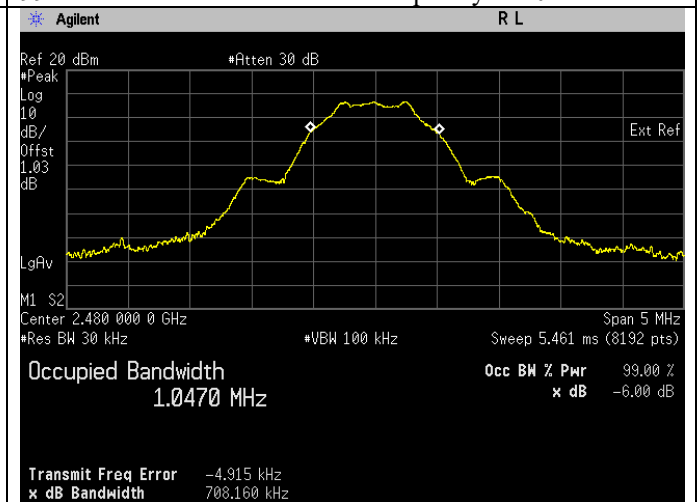
6dB Bandwidth. Bluetooth LE Frequency 2440 MHz



99% Bandwidth. Bluetooth LE Frequency 2440 MHz



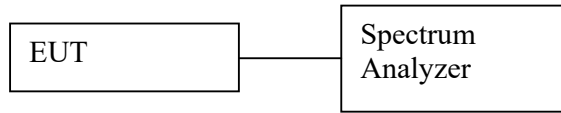
6dB Bandwidth. Bluetooth LE Frequency 2480 MHz



99% Bandwidth. Bluetooth LE Frequency 2480 MHz

6.2 Conducted RF Output Power

6.2.1 Test Setup



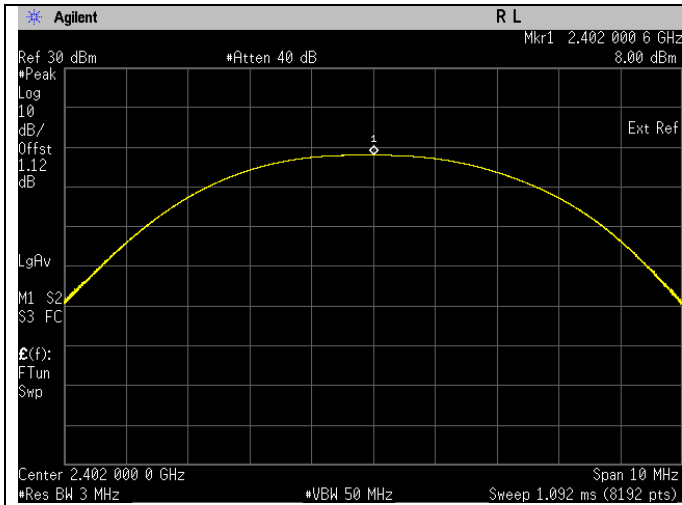
- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Measure the duty cycle of transmitter output signal.
- 4) Setting of Spectrum analyzer :
 - a. Set the RBW = 30 kHz.
 - b. Set the VBW $\geq [3 \times \text{RBW}]$.
 - c. Set the span $\geq [1.5 \times \text{OBW bandwidth}]$.
 - d. Detector = Peak.
 - e. Sweep time = auto couple.
 - f. Trace mode = free run.
 - g. Allow trace to fully stabilize.
- 5) Add in duty cycle correction into final test result.
- 6) Duty cycle correction is calculated as below:
$$10 \log (1/x)$$

6.2.2 Test Limits:

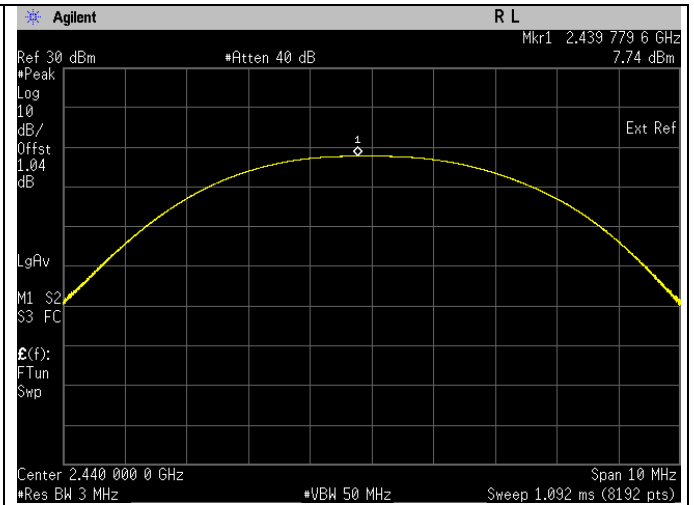
Normal Condition (25 ° C)
≤ 1 Watt(30 dBm)

6.2.3 Test Data:

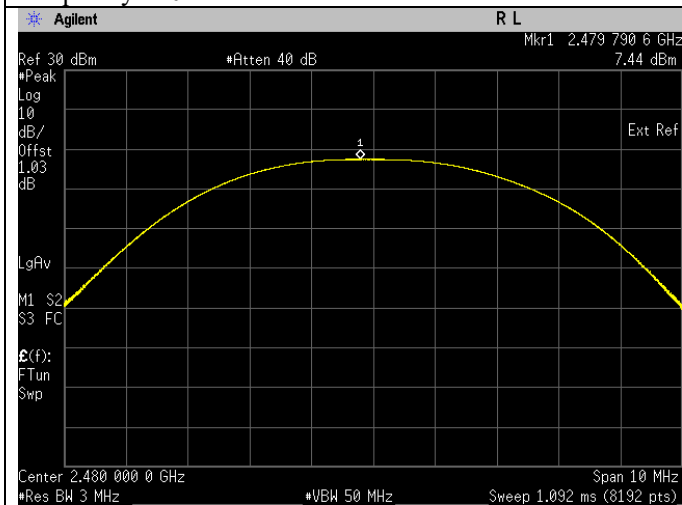
Test Conditions			Test Frequency	Results
Standard	Modulation Type	Tx (MHz)	Output Power (dBm)	Status
Bluetooth L.E	GFSK	2402	8.001	Pass
Bluetooth L.E	GFSK	2440	7.743	Pass
Bluetooth L.E	GFSK	2480	7.444	Pass



Frequency 2402 MHz



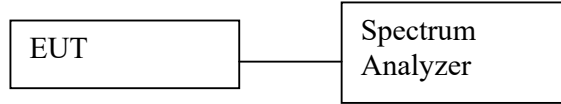
Frequency 2440 MHz



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:

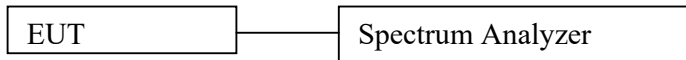
Normal Condition (25 ° C)
$\leq 8 \text{ dBm/3kHz}$

6.3.3 Test Result

Not Applicable

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:

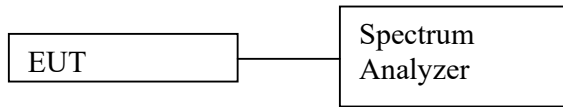
Normal Condition (25 ° C)
Shall be at least 30 dB below peak (max) power.

6.4.3 Test Result

Not Applicable

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)

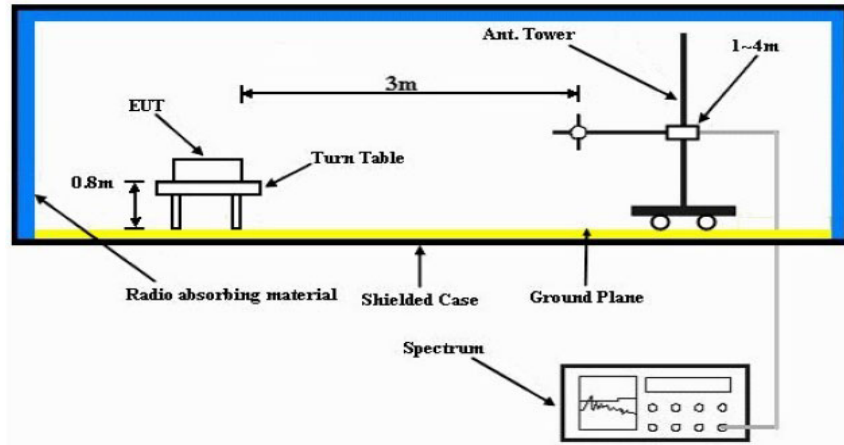
Shall be at least 30 dB below peak (max) power.
--

6.5.3 Test Result

Not Applicable

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.
- 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: H25KDF9PW6AN S/N: 287TZH0154 EMC SR ID#: 29844-EMC-00026
Battery: PMNN4813A Accessory: NA
Test Channel: Low Test Frequency: 2402.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE)

Restricted Band Edge (Low Channel) tabular data

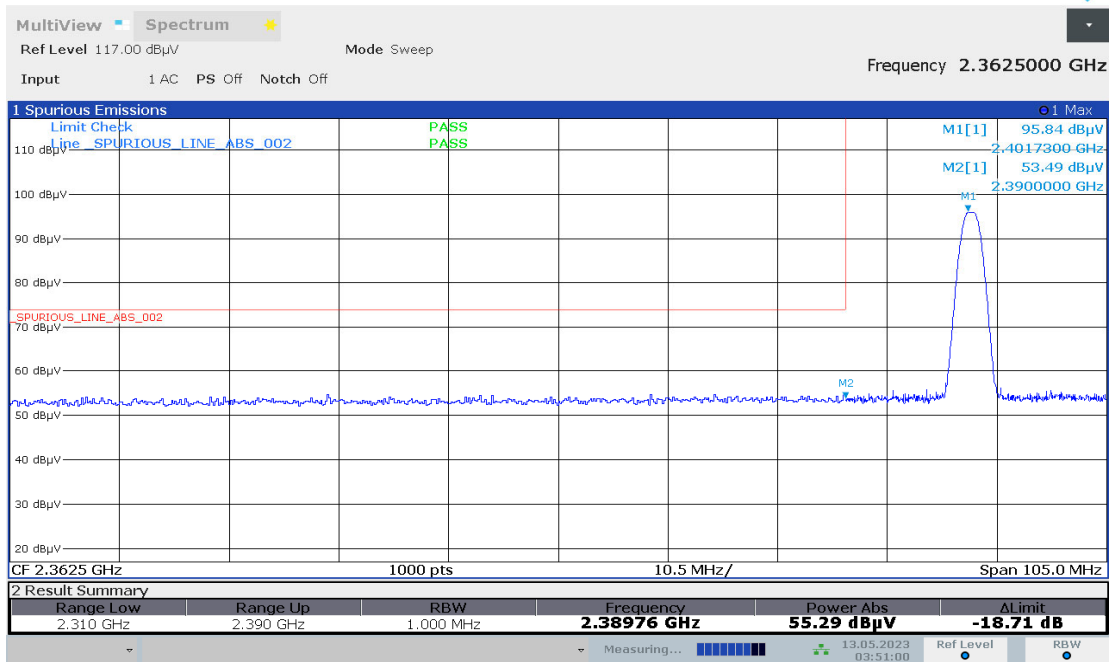
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dB μ V/m)	Spur level PK (dB μ V/m)	Spur level AV (dB μ V/m)	Limit QPK (dB μ V/m)	Limit PK (dB μ V/m)	Limit AV (dB μ V/m)	Margin QPK (dB μ V/m)	Margin PK (dB μ V/m)	Margin AV (dB μ V/m)	Carrier PK Power (dB μ V/m)
2390.0000	-	53.4918	43.0680	-	74.0000	54.0000	-	20.5082	10.9320	-
Horizontal Radiated Emission Result										
2390.0000	-	52.9772	42.9552	-	74.0000	54.0000	-	21.0228	11.0448	-

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	------------------------	--------------------

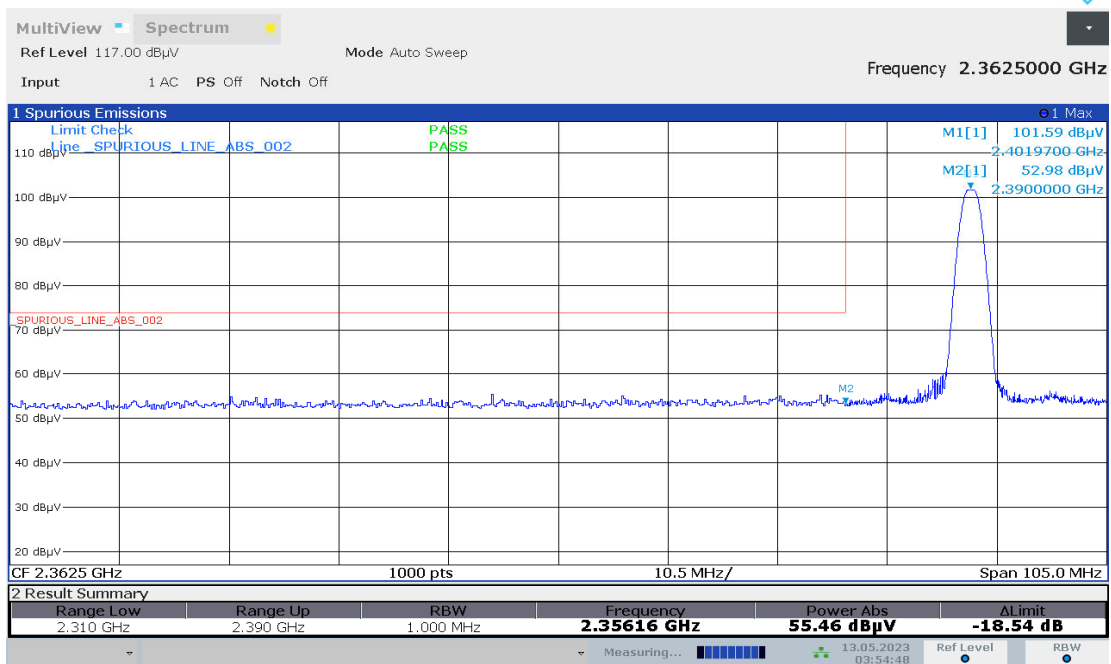
Temperature (degC): 23.4
Test Performed by: Nazrin&Qawiman
System MU: 5.84dB

Humidity (%): 69.9
Test Date: Sat, 13 May, 2023

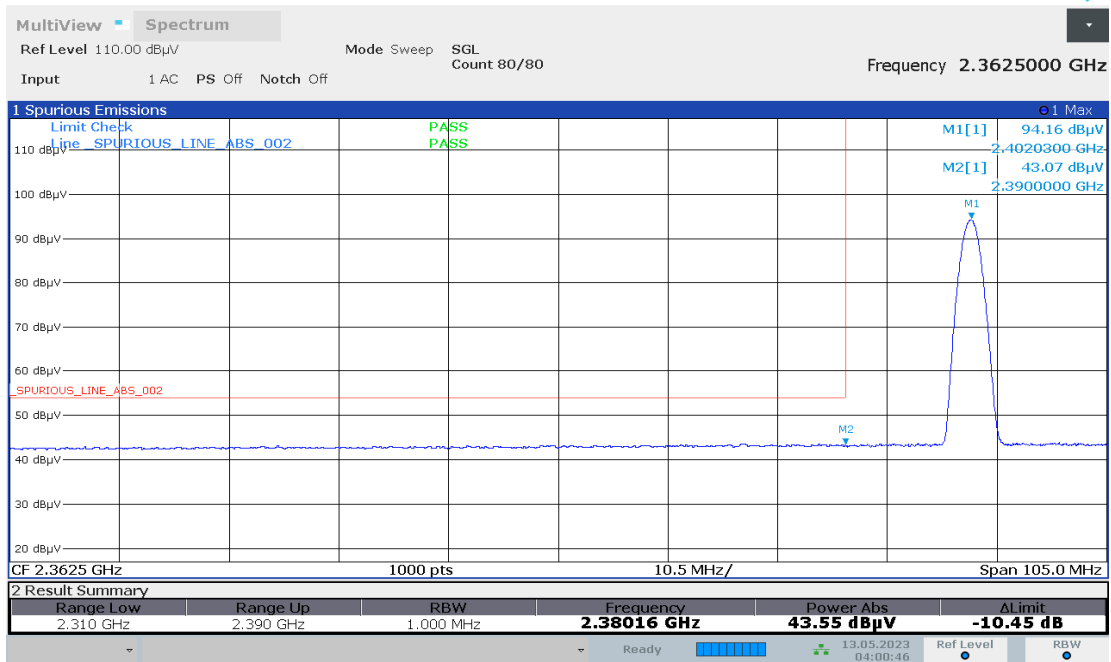
Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



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

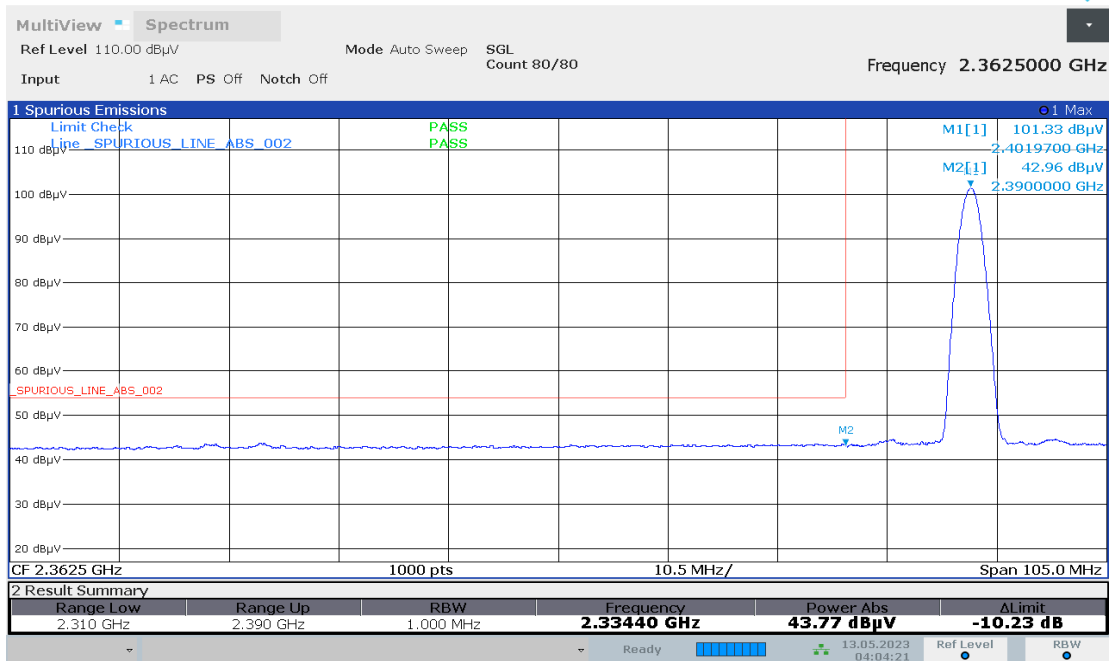


Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



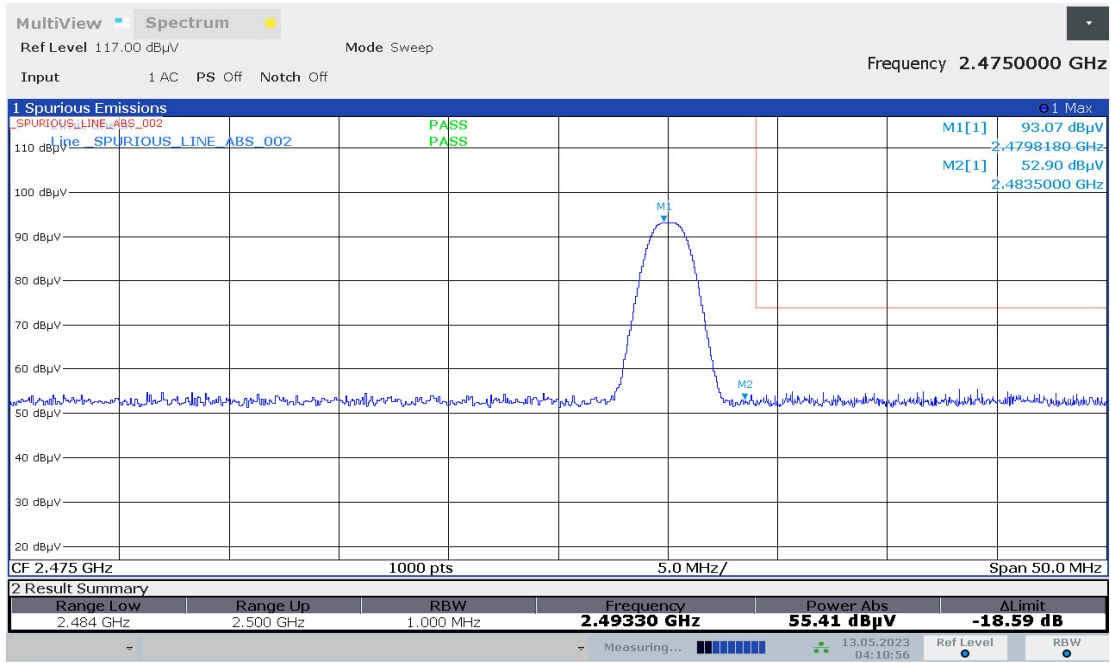
04:00:46 13.05.2023

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

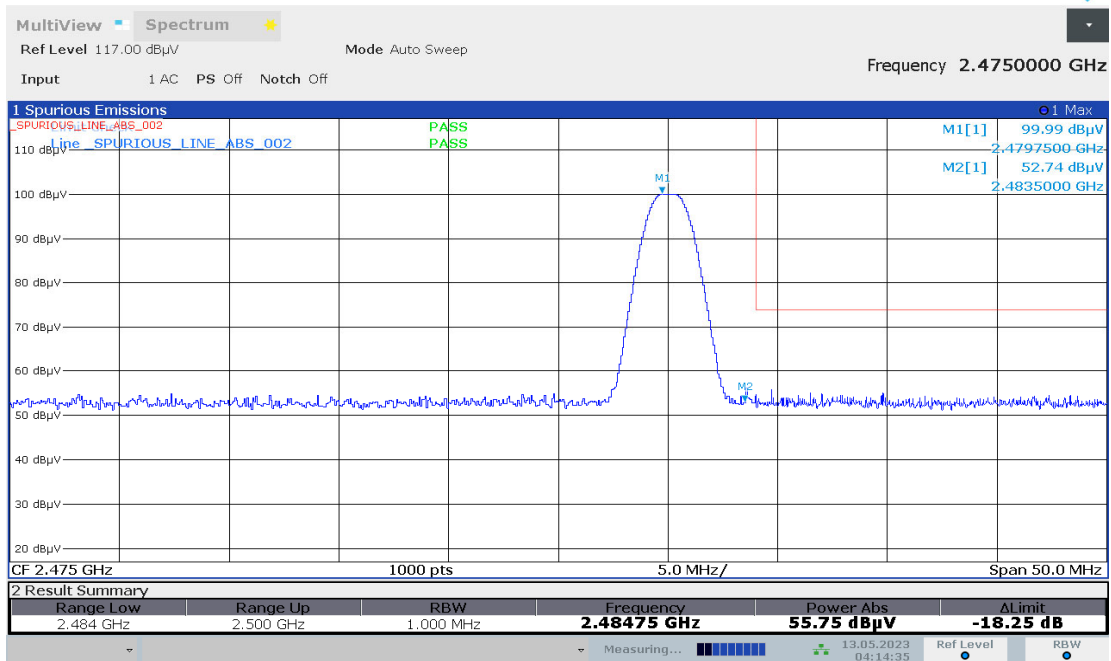


04:04:21 13.05.2023

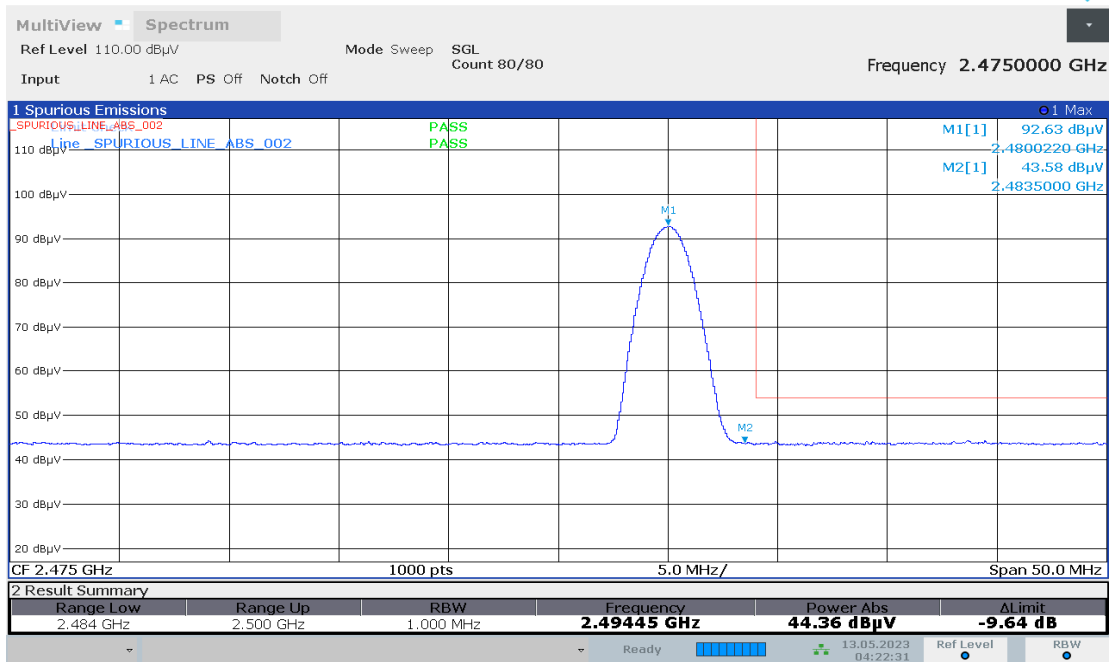
Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



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

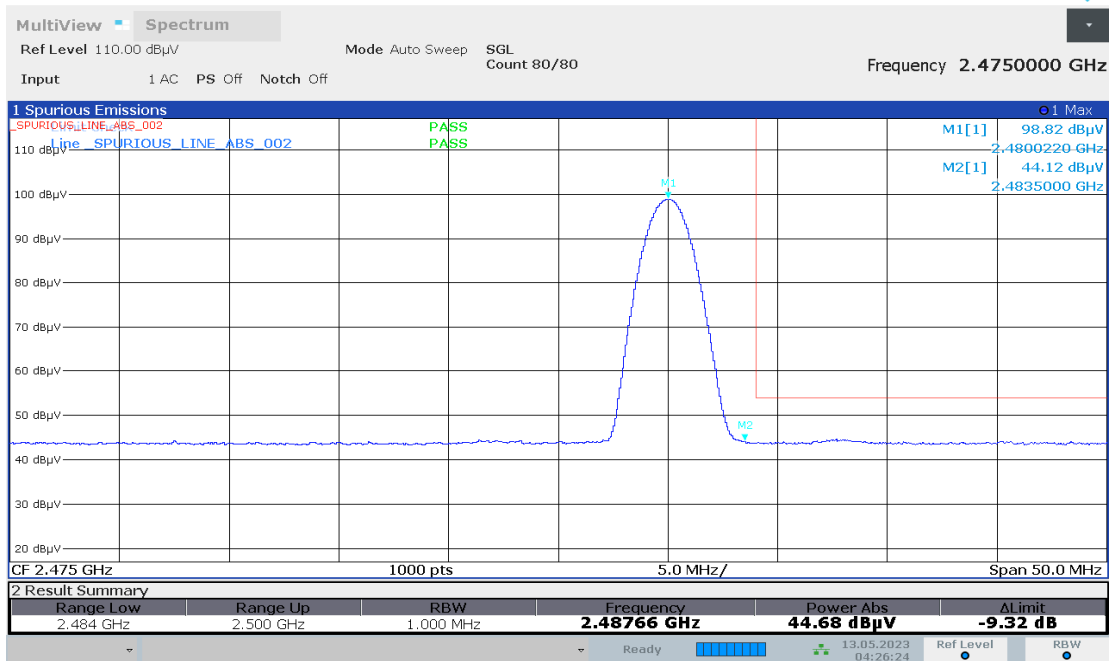


Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



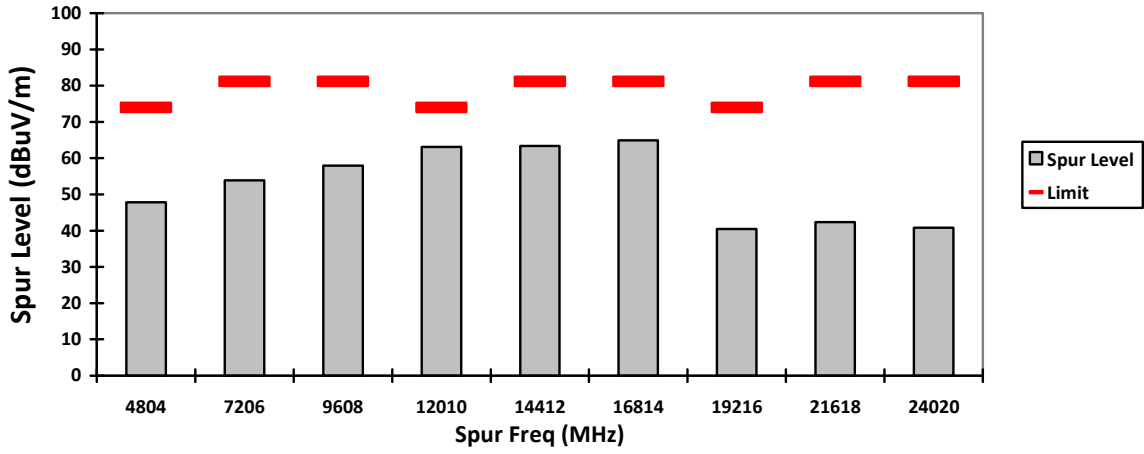
04:22:31 13.05.2023

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

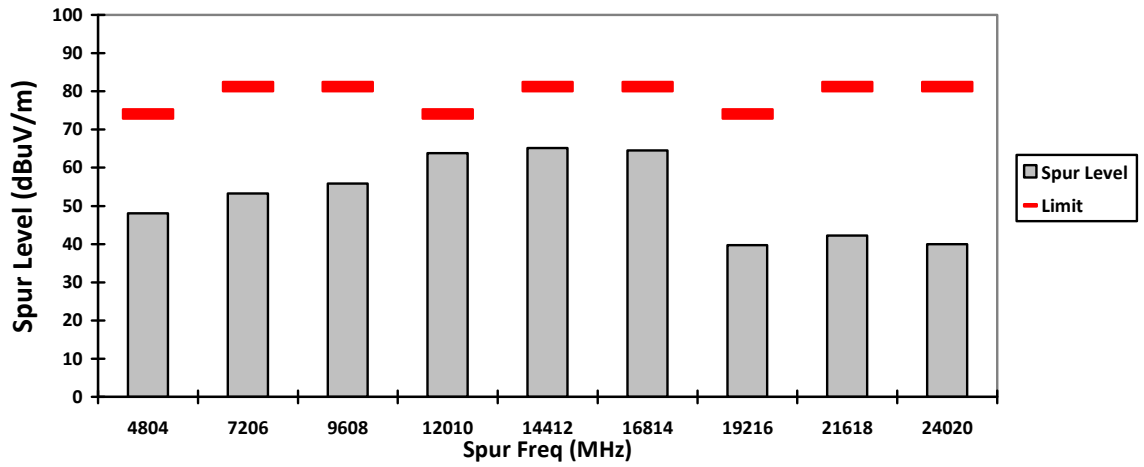


04:26:24 13.05.2023

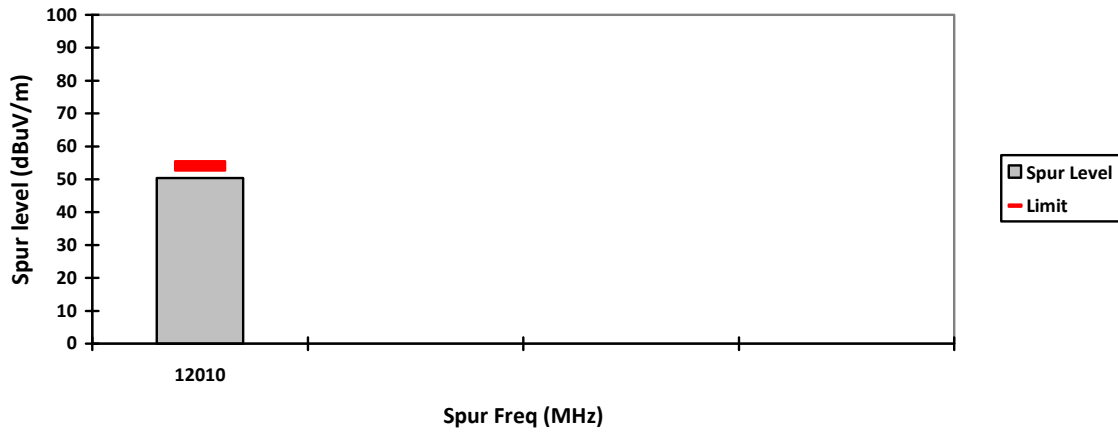
VERTICAL, PK



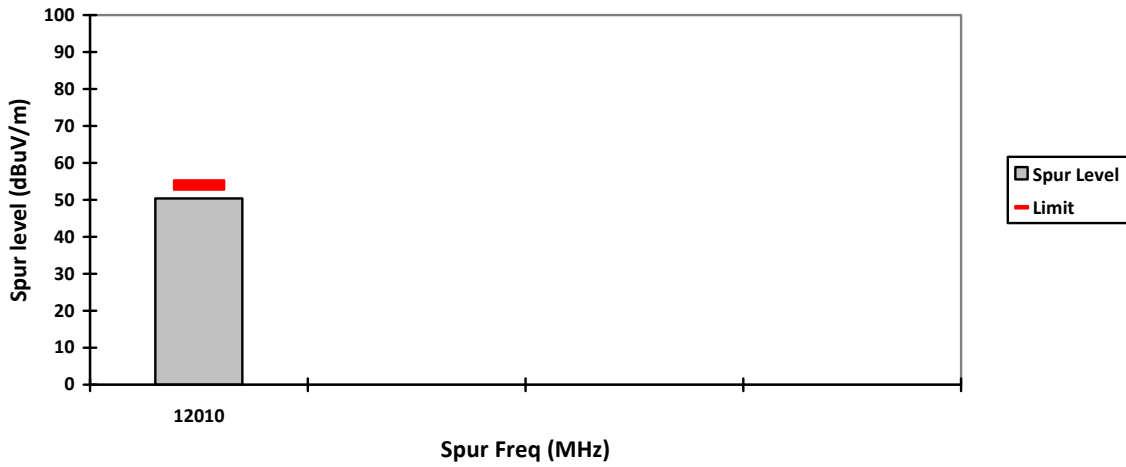
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission
Model#: H25KDF9PW6AN S/N: 287TZH0154 EMC SR ID#: 29844-EMC-00026
Battery: PMNN4813A Accessory: NA
Test Channel: Mid Test Frequency: 2440.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: Z-Plane (BTLE)

Radiated Emission (Mid Channel) tabular data

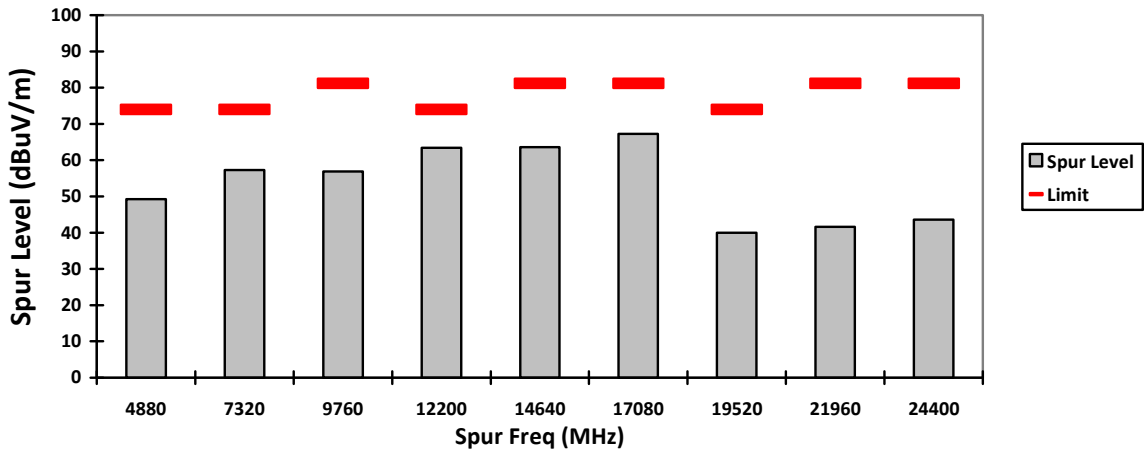
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
4880	-	49.2574**	-	-	74.0000	-	-	24.7426	-	-
7320	-	57.3122**	44.4116**	-	74.0000	54.0000	-	16.6878	9.5884	-
9760	-	56.8502**	-	-	81.1900	-	-	24.3398	-	101.1900
12200	-	63.4073**	51.0190**	-	74.0000	54.0000	-	10.5927	2.9810	-
14640	-	63.5702**	-	-	81.1900	-	-	17.6198	-	101.1900
17080	-	67.2548**	-	-	81.1900	-	-	13.9352	-	101.1900
19520	-	39.9980**	-	-	74.0000	-	-	34.0020	-	-
21960	-	41.5851**	-	-	81.1900	-	-	39.6049	-	101.1900
24400	-	43.6140**	-	-	81.1900	-	-	37.5760	-	101.1900
Horizontal Radiated Emission Result										
4880	-	48.4235**	-	-	74.0000	-	-	25.5765	-	-
7320	-	57.4296**	44.5270**	-	74.0000	54.0000	-	16.5704	9.4730	-
9760	-	57.5180**	-	-	81.1900	-	-	23.6720	-	101.1900
12200	-	63.8861**	51.1969**	-	74.0000	54.0000	-	10.1139	2.8031	-
14640	-	62.4618**	-	-	81.1900	-	-	18.7282	-	101.1900
17080	-	66.6801**	-	-	81.1900	-	-	14.5099	-	101.1900
19520	-	39.6706**	-	-	74.0000	-	-	34.3294	-	-
21960	-	41.3969**	-	-	81.1900	-	-	39.7931	-	101.1900
24400	-	40.2663**	-	-	81.1900	-	-	40.9237	-	101.1900

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

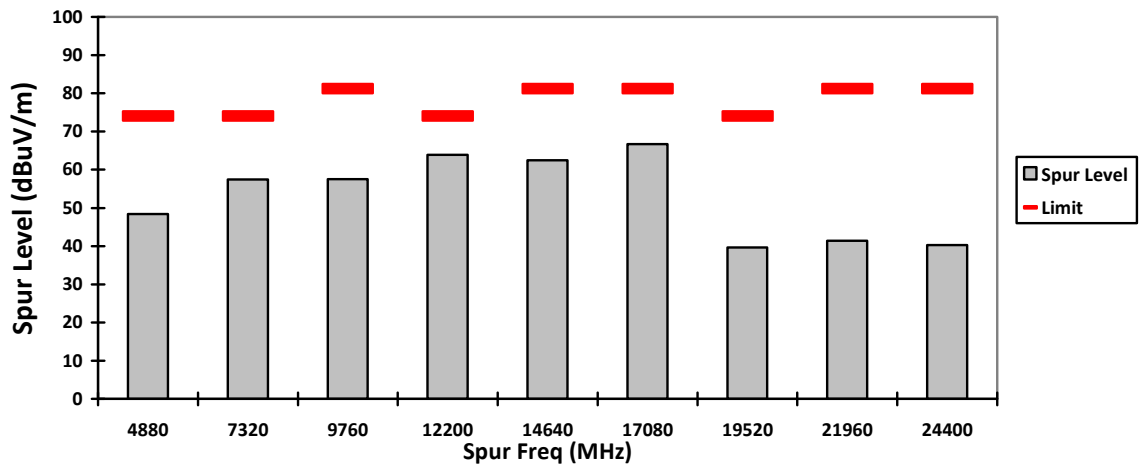
Temperature (degC): 23.4 Humidity (%): 69.9
 Test Performed by: Nazrin&Qawiman Test Date: Mon, 15 May, 2023
 System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

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.

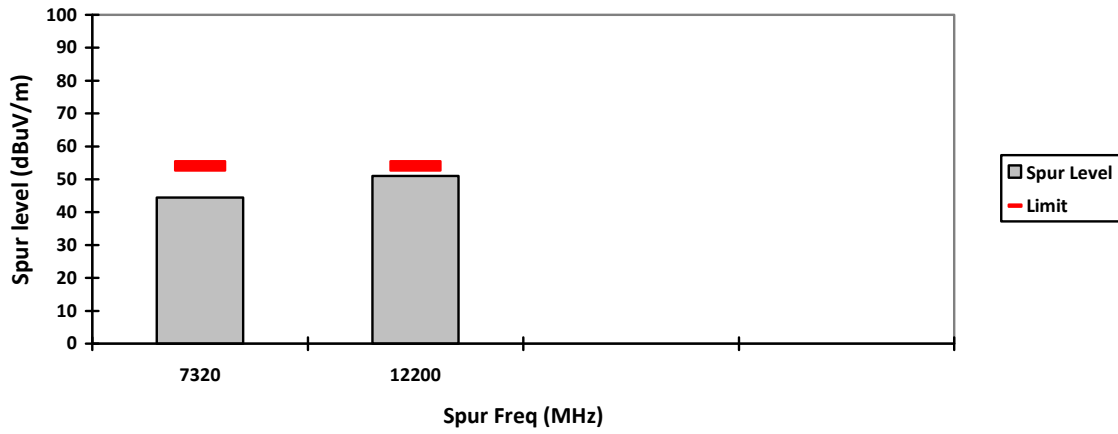
VERTICAL, PK



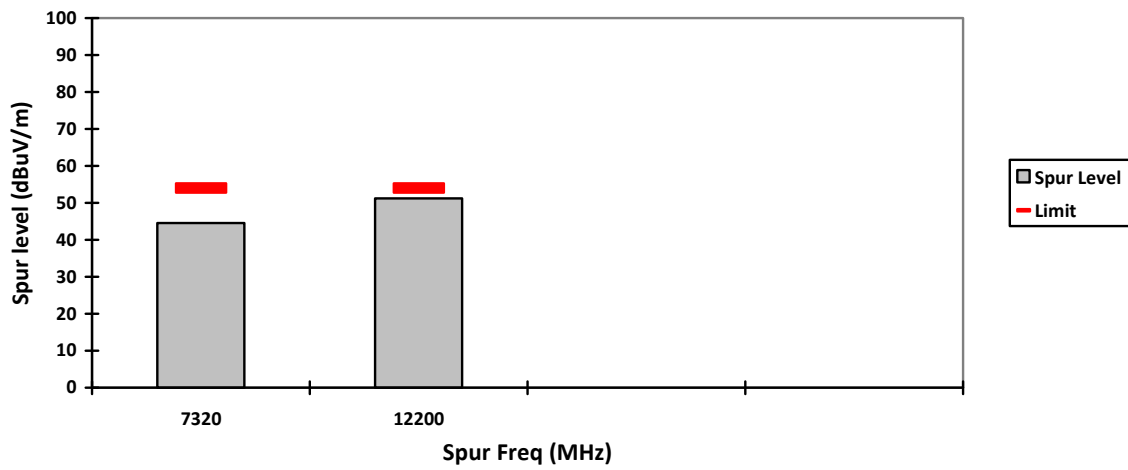
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission
Model#: H25KDF9PW6AN **S/N: 287TZH0154** **EMC SR ID#: 29844-EMC-00026**
Battery: PMNN4813A **Accessory: NA**
Test Channel: High **Test Frequency: 2480.0000 MHz** **Test Standard: ANSI C63.10-2013**
Worst Case Plane: Z-Plane (BTLE)

Radiated Emission (High Channel) tabular data

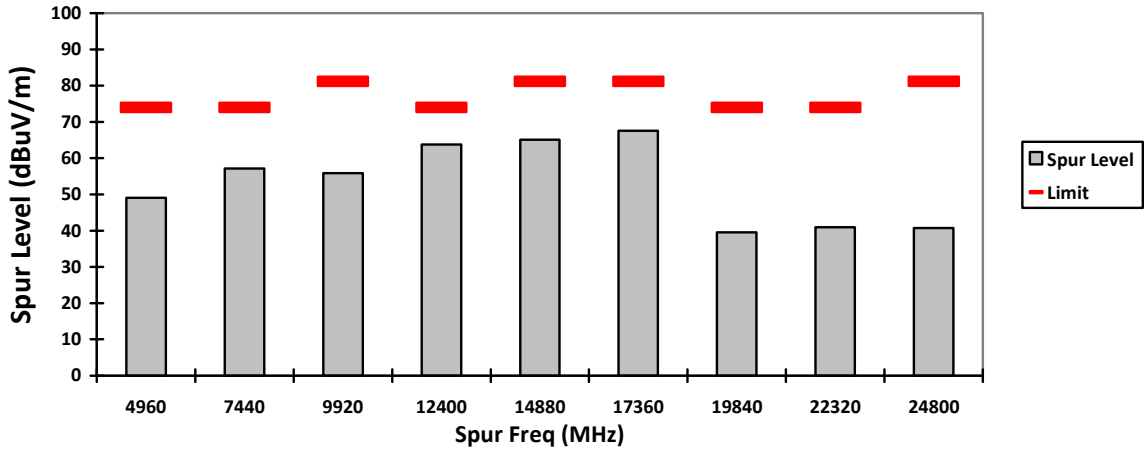
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
4960	-	49.0576**	-	-	74.0000	-	-	24.9424	-	-
7440	-	57.1480**	44.8002**	-	74.0000	54.0000	-	16.8520	9.1998	-
9920	-	55.9284**	-	-	81.1900	-	-	25.2616	-	101.1900
12400	-	63.7482**	51.4093**	-	74.0000	54.0000	-	10.2518	2.5907	-
14880	-	65.1100**	-	-	81.1900	-	-	16.0800	-	101.1900
17360	-	67.5973**	-	-	81.1900	-	-	13.5927	-	101.1900
19840	-	39.5215**	-	-	74.0000	-	-	34.4785	-	-
22320	-	40.9536**	-	-	74.0000	-	-	33.0464	-	-
24800	-	40.7519**	-	-	81.1900	-	-	40.4381	-	101.1900
Horizontal Radiated Emission Result										
4960	-	48.7421**	-	-	74.0000	-	-	25.2579	-	-
7440	-	57.0841**	44.4130**	-	74.0000	54.0000	-	16.9159	9.5870	-
9920	-	55.3996**	-	-	81.1900	-	-	25.7904	-	101.1900
12400	-	64.1406**	51.4085**	-	74.0000	54.0000	-	9.8594	2.5915	-
14880	-	62.2598**	-	-	81.1900	-	-	18.9302	-	101.1900
17360	-	67.4084**	-	-	81.1900	-	-	13.7816	-	101.1900
19840	-	40.2585**	-	-	74.0000	-	-	33.7415	-	-
22320	-	41.4975**	-	-	74.0000	-	-	32.5025	-	-
24800	-	41.9115**	-	-	81.1900	-	-	39.2785	-	101.1900

Remarks:	Marginal Result	Fail Result
Pass Result		

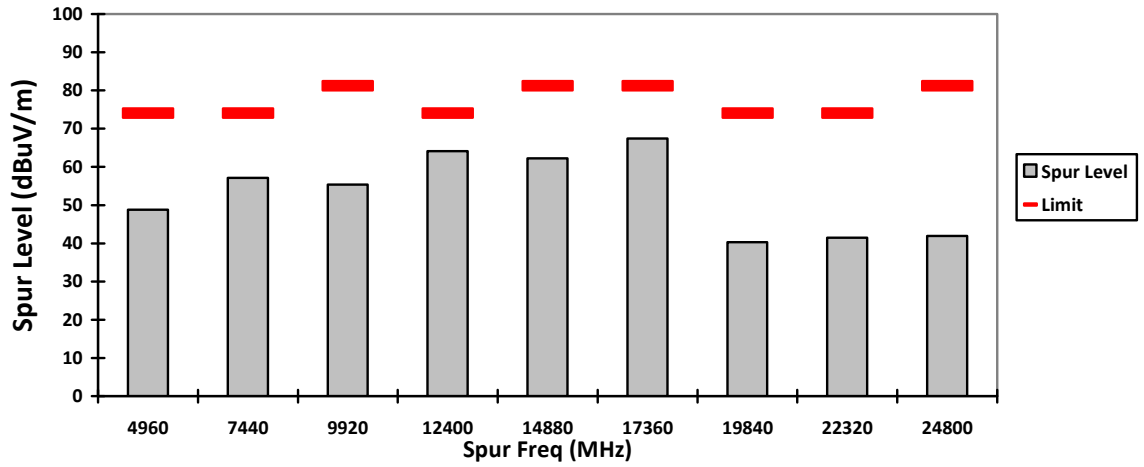
Temperature (degC): 23.4 **Humidity (%): 69.9**
Test Performed by: Nazrin&Qawiman **Test Date: Mon, 15 May, 2023**
System MU: 5.88 dB (30-1000MHz), 5.84 dB (1000-18000MHz), 6.02 dB (18000MHz-40000MHz)

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.**

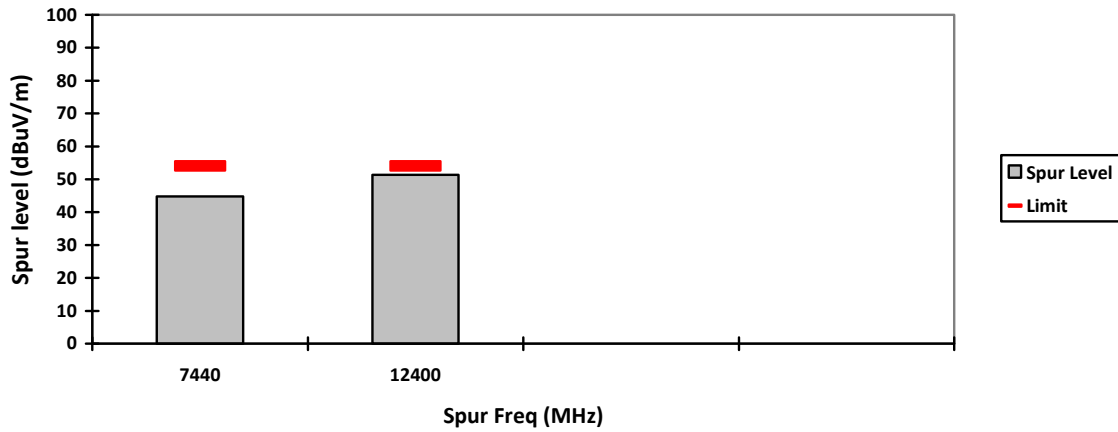
VERTICAL, PK



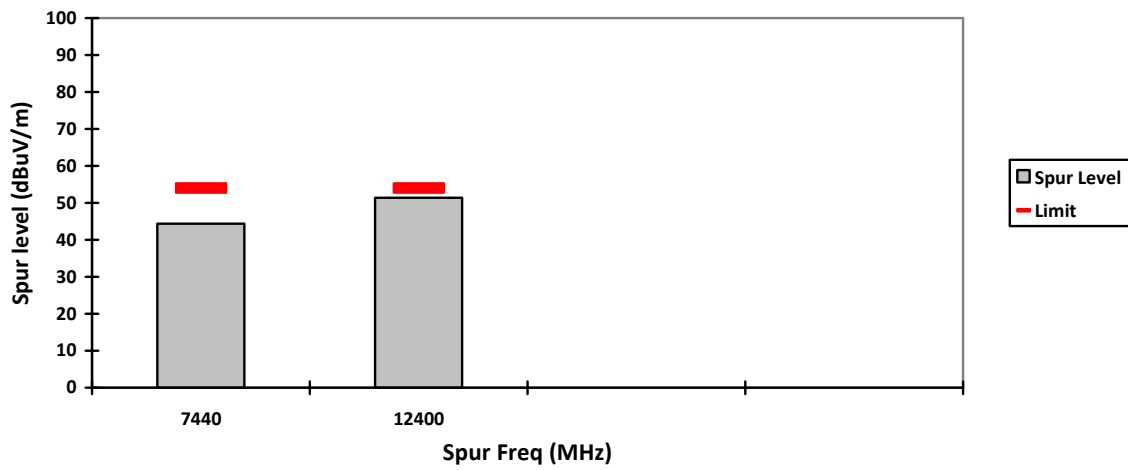
HORIZONTAL, PK



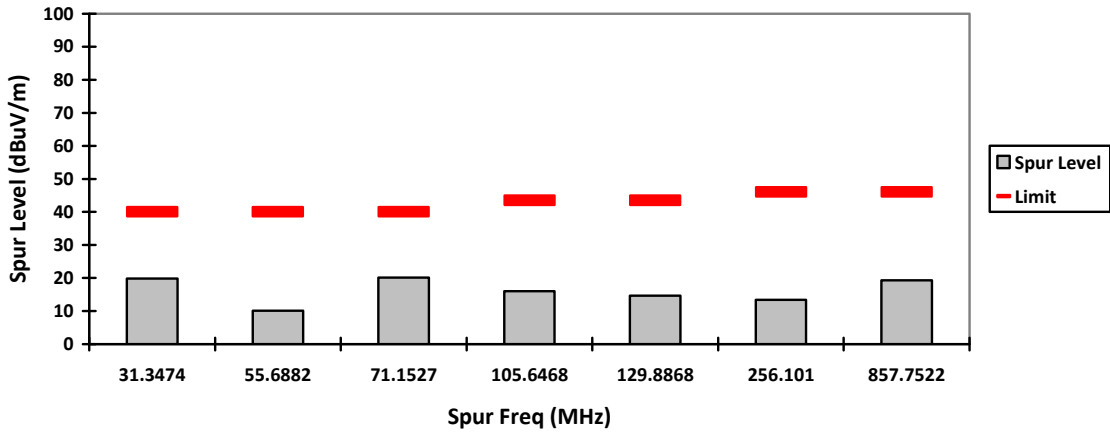
VERTICAL, AV



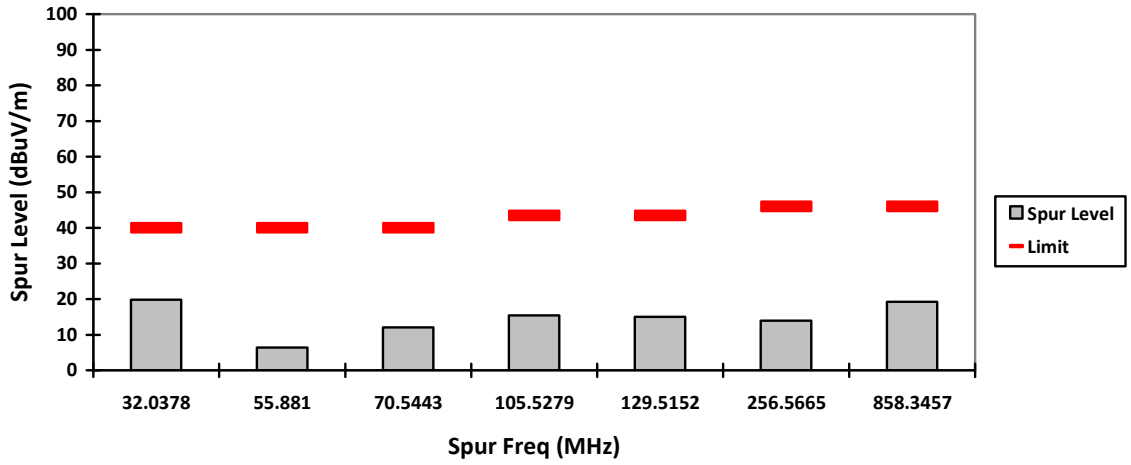
HORIZONTAL, AV



VERTICAL, QPK

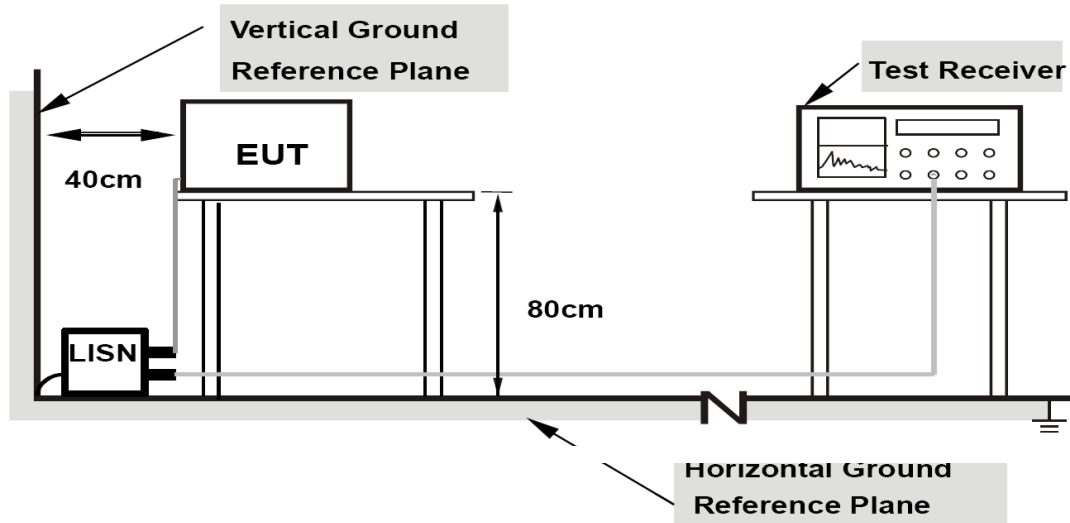


HORIZONTAL, QPK



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

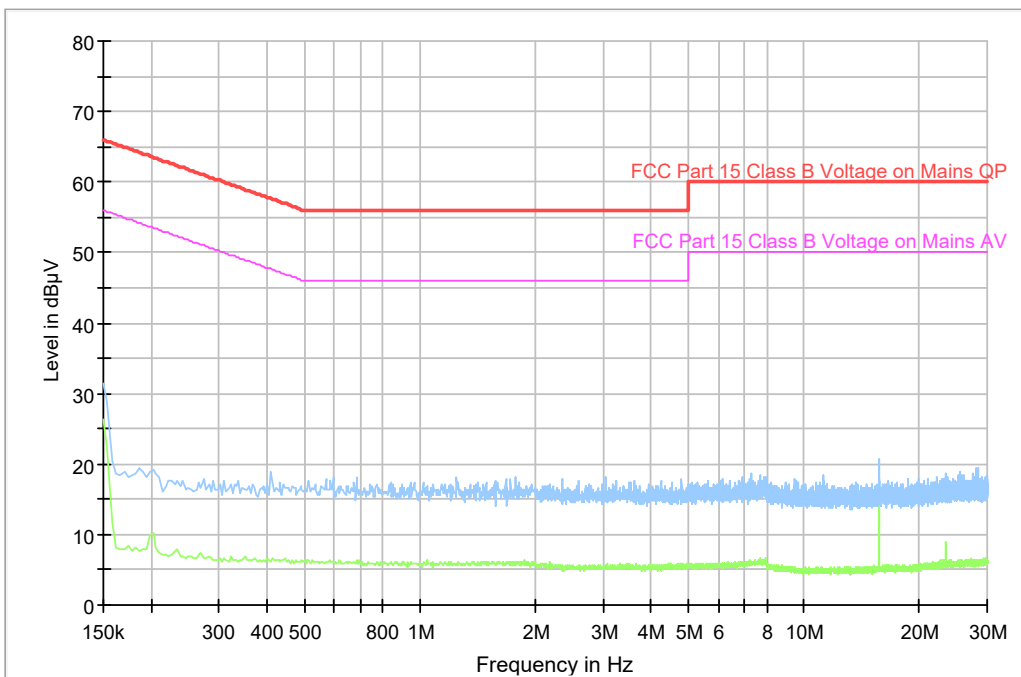
6.7.3 Test Result

Report ID.:	: 29844-EMC-00026
Ambient Temperature:	: 19.7 °C
Humidity:	: 57.6 %RH
Tester:	: Shidee
Date of test:	: 16 May 2023

120Vac SUC

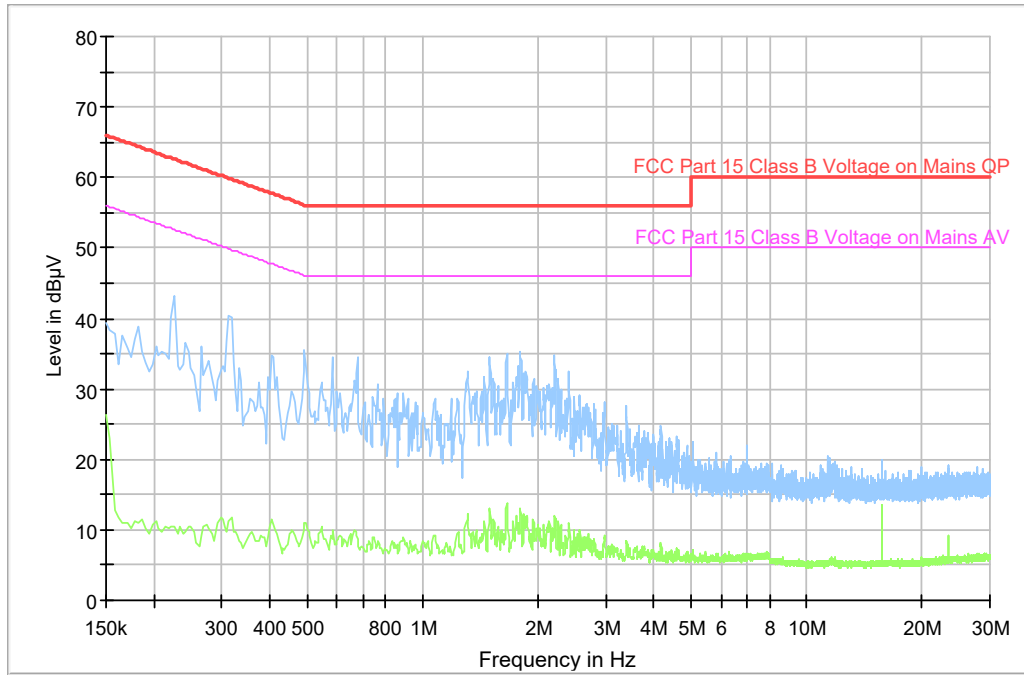
1) Ambient

Full Spectrum



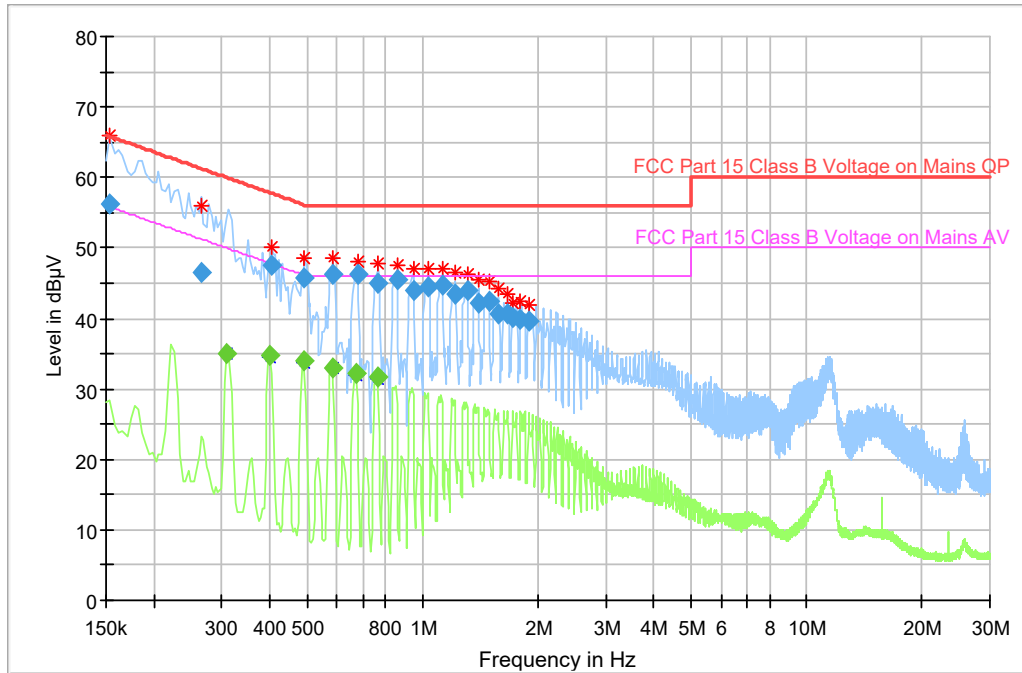
2) Charger Alone

Full Spectrum



3) Charger + Radio Off

Full Spectrum



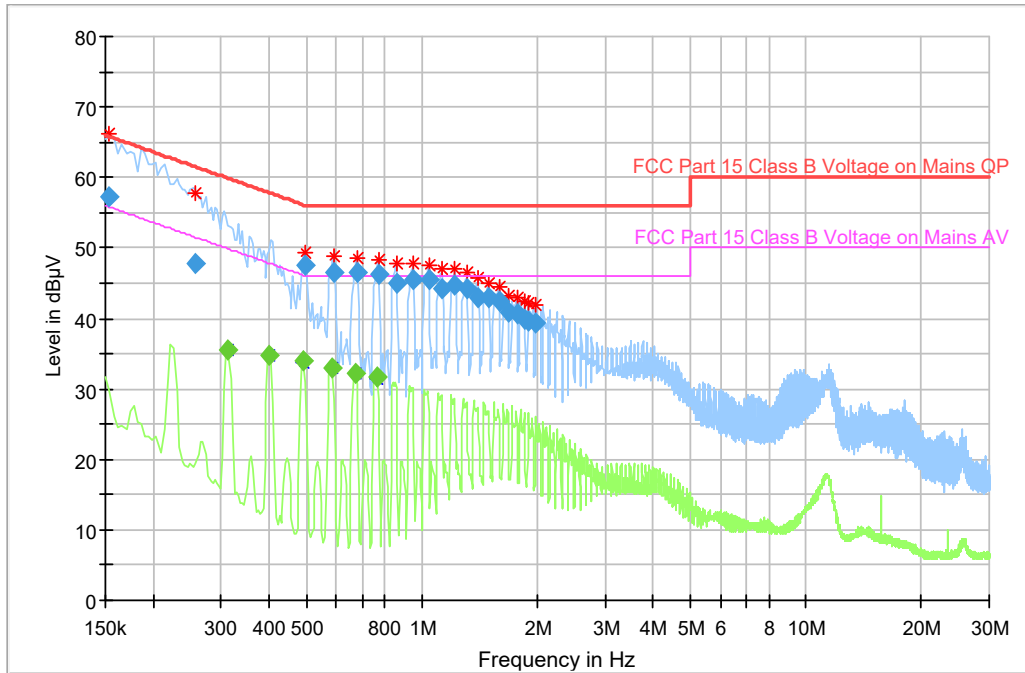
Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.154000	56.31	---	65.78	9.47	1000.0	9.000	L1	ON	10.4	Pass
0.266000	46.59	---	61.24	14.65	1000.0	9.000	N	ON	10.2	Pass
0.310000	---	35.03	49.97	14.94	1000.0	9.000	L1	ON	10.3	Pass
0.402000	---	34.77	47.81	13.04	1000.0	9.000	L1	ON	10.3	Pass
0.406000	47.55	---	57.73	10.18	1000.0	9.000	N	ON	10.3	Pass
0.490000	---	33.90	46.17	12.27	1000.0	9.000	L1	ON	10.3	Pass
0.494000	45.83	---	56.10	10.27	1000.0	9.000	N	ON	10.3	Pass
0.582000	---	33.02	46.00	12.98	1000.0	9.000	L1	ON	10.3	Pass
0.586000	46.31	---	56.00	9.69	1000.0	9.000	N	ON	10.3	Pass
0.670000	---	32.11	46.00	13.89	1000.0	9.000	L1	ON	10.3	Pass
0.678000	46.22	---	56.00	9.78	1000.0	9.000	N	ON	10.3	Pass
0.762000	---	31.60	46.00	14.40	1000.0	9.000	L1	ON	10.3	Pass
0.766000	44.98	---	56.00	11.02	1000.0	9.000	N	ON	10.3	Pass
0.858000	45.48	---	56.00	10.52	1000.0	9.000	N	ON	10.3	Pass
0.946000	44.07	---	56.00	11.93	1000.0	9.000	N	ON	10.3	Pass
1.038000	44.54	---	56.00	11.46	1000.0	9.000	N	ON	10.2	Pass
1.130000	44.82	---	56.00	11.18	1000.0	9.000	N	ON	10.2	Pass
1.218000	43.53	---	56.00	12.47	1000.0	9.000	N	ON	10.2	Pass
1.310000	43.94	---	56.00	12.06	1000.0	9.000	N	ON	10.2	Pass
1.398000	42.29	---	56.00	13.71	1000.0	9.000	N	ON	10.2	Pass
1.490000	42.39	---	56.00	13.61	1000.0	9.000	N	ON	10.2	Pass
1.578000	40.74	---	56.00	15.26	1000.0	9.000	N	ON	10.2	Pass
1.670000	40.56	---	56.00	15.44	1000.0	9.000	N	ON	10.2	Pass
1.714000	40.07	---	56.00	15.93	1000.0	9.000	L1	ON	10.2	Pass
1.802000	39.93	---	56.00	16.07	1000.0	9.000	L1	ON	10.2	Pass
1.890000	39.70	---	56.00	16.30	1000.0	9.000	L1	ON	10.2	Pass

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

4) Charger + Radio Standby

Full Spectrum

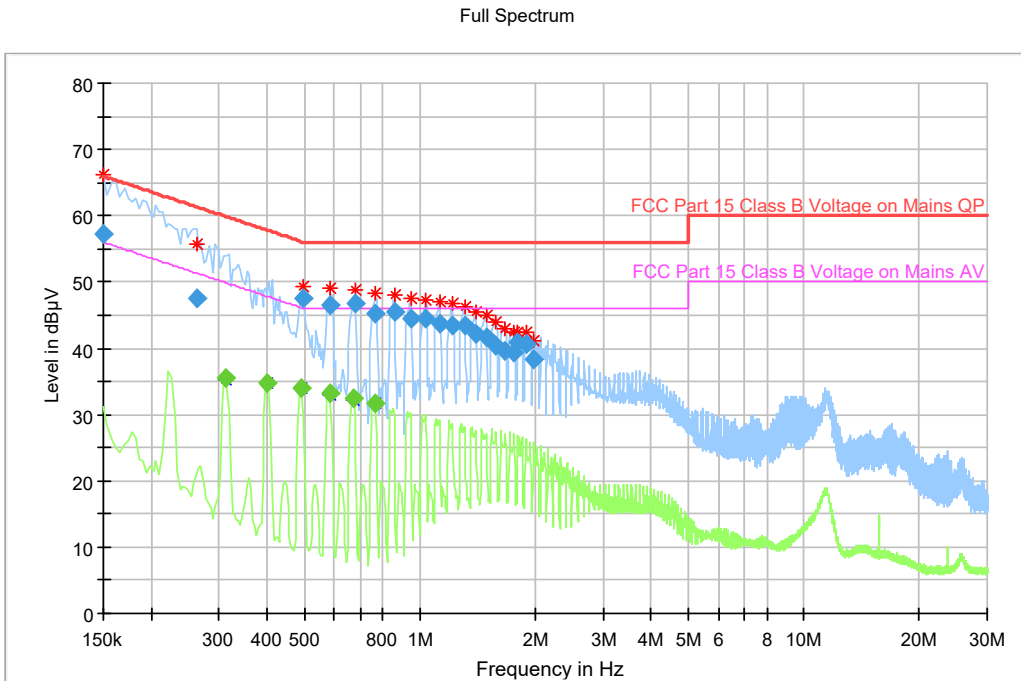


Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.154000	57.16	---	65.78	8.62	1000.0	9.000	N	ON	10.4	Pass
0.258000	47.68	---	61.50	13.82	1000.0	9.000	N	ON	10.2	Pass
0.314000	---	35.50	49.86	14.37	1000.0	9.000	L1	ON	10.3	Pass
0.402000	---	34.87	47.81	12.94	1000.0	9.000	L1	ON	10.3	Pass
0.490000	---	33.97	46.17	12.20	1000.0	9.000	L1	ON	10.3	Pass
0.498000	47.48	---	56.03	8.55	1000.0	9.000	N	ON	10.3	Pass
0.582000	---	33.08	46.00	12.92	1000.0	9.000	L1	ON	10.3	Pass
0.590000	46.57	---	56.00	9.43	1000.0	9.000	N	ON	10.3	Pass
0.674000	---	32.29	46.00	13.71	1000.0	9.000	L1	ON	10.3	Pass
0.678000	46.40	---	56.00	9.60	1000.0	9.000	N	ON	10.3	Pass
0.762000	---	31.59	46.00	14.41	1000.0	9.000	L1	ON	10.3	Pass
0.770000	46.30	---	56.00	9.71	1000.0	9.000	N	ON	10.3	Pass
0.858000	44.99	---	56.00	11.01	1000.0	9.000	N	ON	10.3	Pass
0.950000	45.46	---	56.00	10.54	1000.0	9.000	N	ON	10.3	Pass
1.042000	45.41	---	56.00	10.59	1000.0	9.000	N	ON	10.2	Pass
1.130000	44.29	---	56.00	11.71	1000.0	9.000	N	ON	10.2	Pass
1.222000	44.61	---	56.00	11.39	1000.0	9.000	N	ON	10.2	Pass
1.314000	44.32	---	56.00	11.68	1000.0	9.000	N	ON	10.2	Pass
1.402000	42.98	---	56.00	13.02	1000.0	9.000	N	ON	10.2	Pass
1.494000	42.91	---	56.00	13.09	1000.0	9.000	N	ON	10.2	Pass
1.586000	42.35	---	56.00	13.65	1000.0	9.000	N	ON	10.2	Pass
1.674000	40.83	---	56.00	15.17	1000.0	9.000	N	ON	10.2	Pass
1.766000	40.60	---	56.00	15.40	1000.0	9.000	N	ON	10.2	Pass
1.858000	39.98	---	56.00	16.02	1000.0	9.000	N	ON	10.2	Pass
1.890000	39.58	---	56.00	16.42	1000.0	9.000	L1	ON	10.2	Pass
1.978000	39.32	---	56.00	16.68	1000.0	9.000	L1	ON	10.2	Pass

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

5) Charger + Radio Tx with BT LE



Quasipeak and Average Measurement

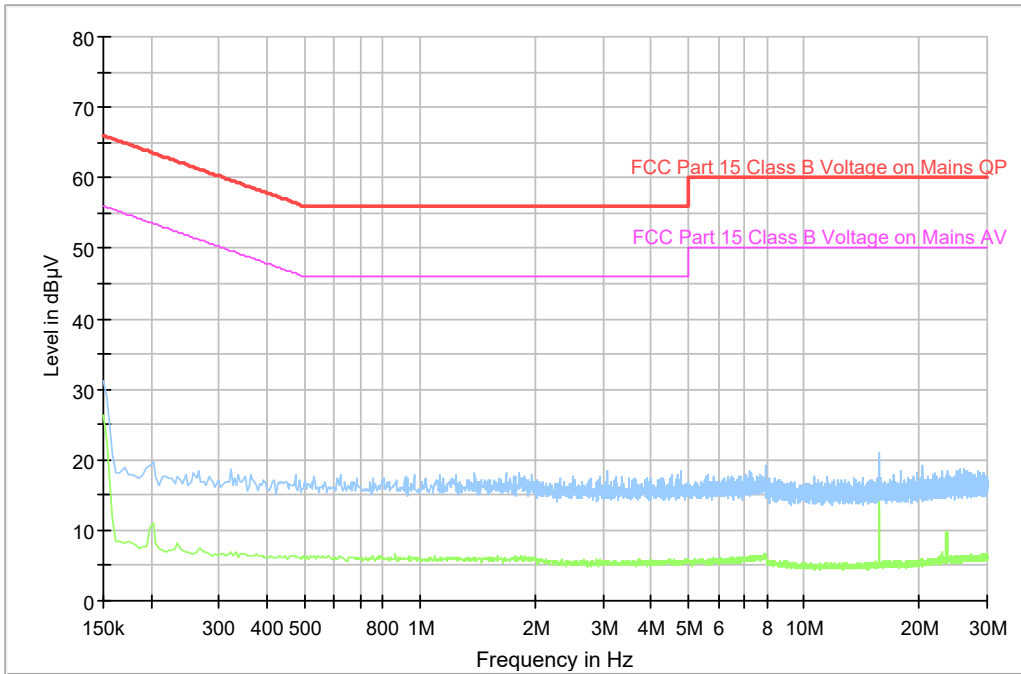
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.150000	57.16	---	66.00	8.84	1000.0	9.000	L1	ON	10.3	Pass
0.262000	47.44	---	61.37	13.93	1000.0	9.000	N	ON	10.2	Pass
0.314000	---	35.47	49.86	14.40	1000.0	9.000	L1	ON	10.3	Pass
0.402000	---	34.87	47.81	12.94	1000.0	9.000	L1	ON	10.3	Pass
0.490000	---	33.97	46.17	12.20	1000.0	9.000	L1	ON	10.3	Pass
0.498000	47.58	---	56.03	8.45	1000.0	9.000	N	ON	10.3	Pass
0.582000	---	33.13	46.00	12.87	1000.0	9.000	L1	ON	10.3	Pass
0.586000	46.45	---	56.00	9.55	1000.0	9.000	N	ON	10.3	Pass
0.674000	---	32.35	46.00	13.65	1000.0	9.000	L1	ON	10.3	Pass
0.678000	46.76	---	56.00	9.24	1000.0	9.000	N	ON	10.3	Pass
0.762000	---	31.68	46.00	14.32	1000.0	9.000	L1	ON	10.3	Pass
0.766000	45.22	---	56.00	10.78	1000.0	9.000	N	ON	10.3	Pass
0.858000	45.54	---	56.00	10.46	1000.0	9.000	N	ON	10.3	Pass
0.946000	44.39	---	56.00	11.61	1000.0	9.000	N	ON	10.3	Pass
1.038000	44.35	---	56.00	11.65	1000.0	9.000	N	ON	10.2	Pass
1.126000	43.64	---	56.00	12.36	1000.0	9.000	N	ON	10.2	Pass
1.218000	43.40	---	56.00	12.60	1000.0	9.000	N	ON	10.2	Pass
1.310000	43.46	---	56.00	12.54	1000.0	9.000	N	ON	10.2	Pass
1.398000	42.14	---	56.00	13.86	1000.0	9.000	N	ON	10.2	Pass
1.490000	41.64	---	56.00	14.36	1000.0	9.000	N	ON	10.2	Pass
1.578000	40.41	---	56.00	15.59	1000.0	9.000	N	ON	10.2	Pass
1.670000	39.60	---	56.00	16.40	1000.0	9.000	N	ON	10.2	Pass
1.762000	39.32	---	56.00	16.68	1000.0	9.000	N	ON	10.2	Pass
1.802000	40.86	---	56.00	15.14	1000.0	9.000	L1	ON	10.2	Pass
1.890000	40.60	---	56.00	15.40	1000.0	9.000	L1	ON	10.2	Pass
1.974000	38.26	---	56.00	17.74	1000.0	9.000	L1	ON	10.2	Pass

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

120Vac MUC

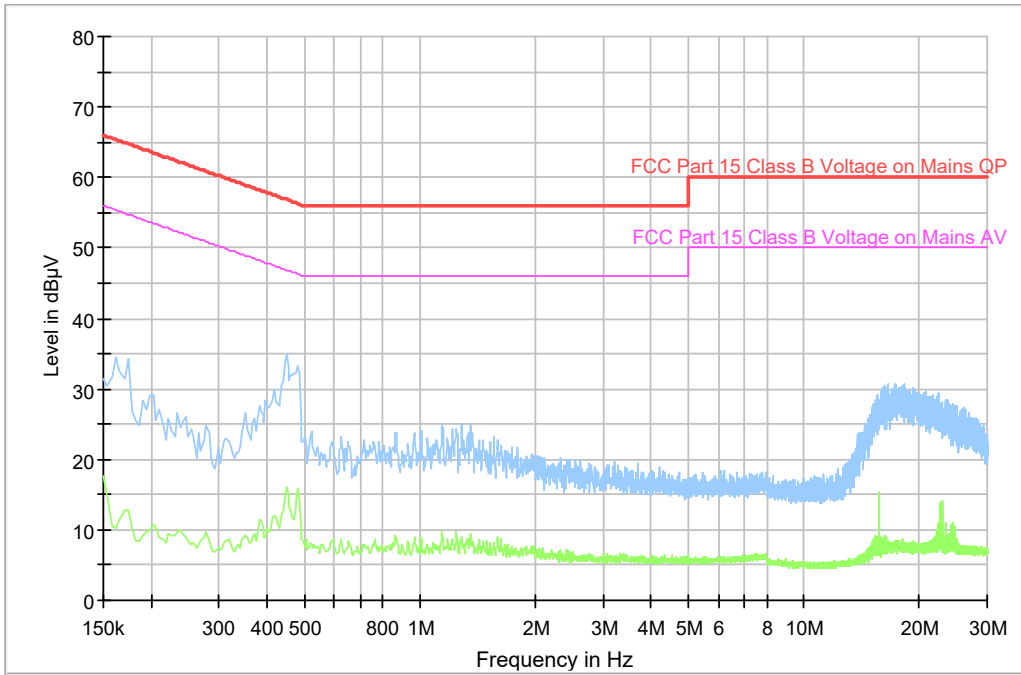
6) Ambient

Full Spectrum



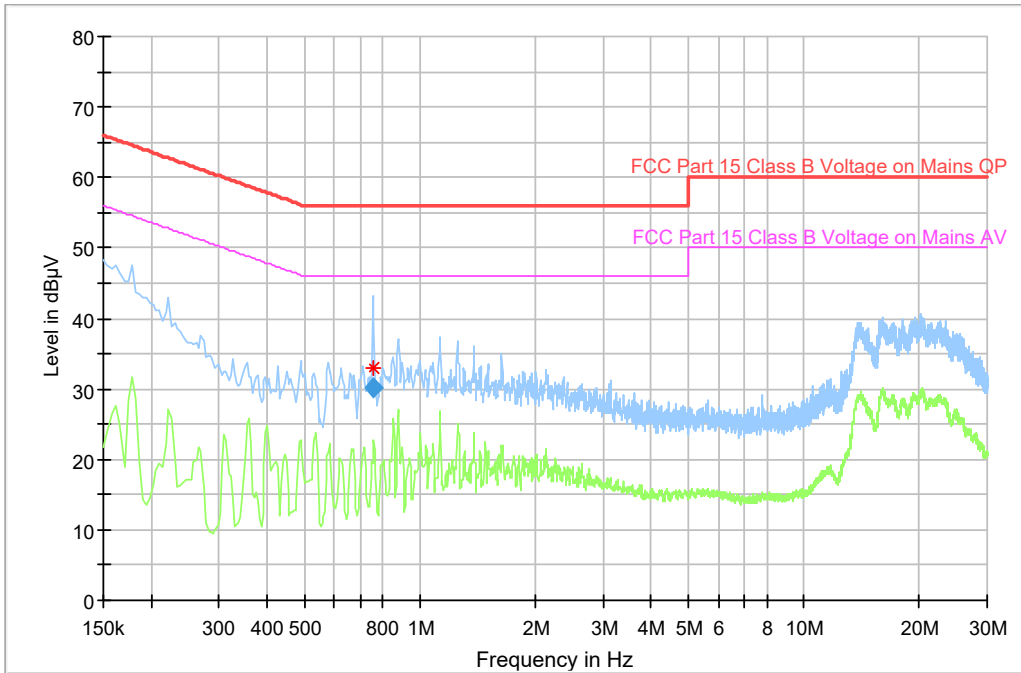
7) Charger Alone

Full Spectrum



8) Charger + Radio Off

Full Spectrum



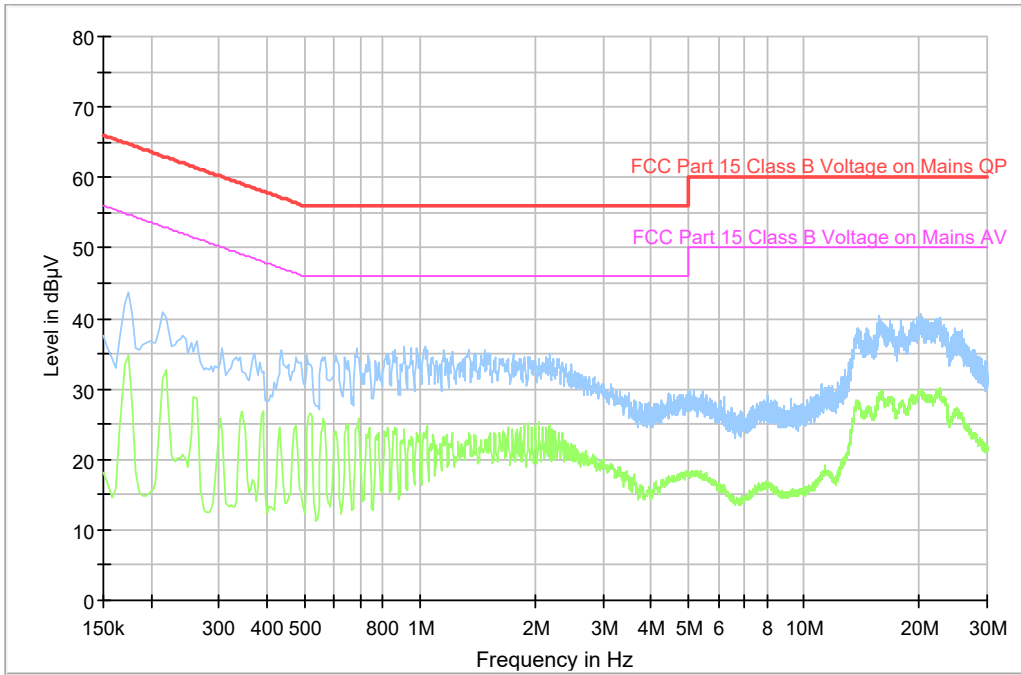
Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.754000	30.11	---	56.00	25.89	1000.0	9.000	L1	ON	10.3	Pass

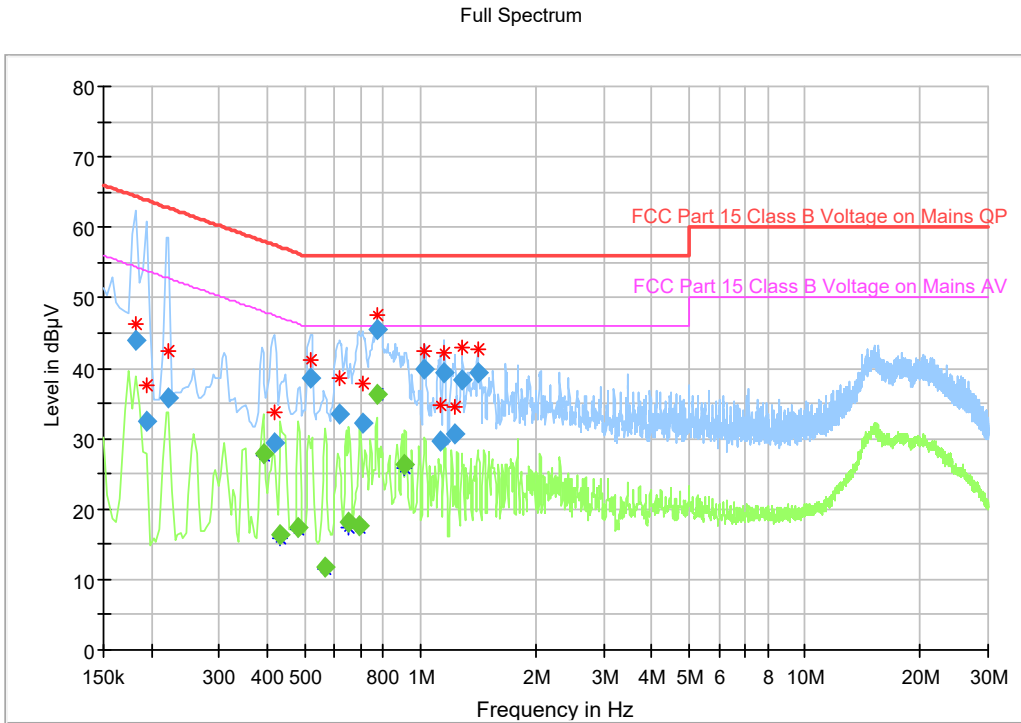
* Expanded Uncertainty (U) = +/- 3.48dB

9) Charger + Radio Standby

Full Spectrum



10) Charger + Radio Tx with BT LE



Quasipeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Comment
0.182000	43.87	---	64.39	20.52	1000.0	9.000	N	ON	10.5	Pass
0.194000	32.56	---	63.86	31.30	1000.0	9.000	N	ON	10.4	Pass
0.222000	35.87	---	62.74	26.88	1000.0	9.000	N	ON	10.3	Pass
0.390000	---	27.93	48.06	20.14	1000.0	9.000	N	ON	10.3	Pass
0.418000	29.49	---	57.49	27.99	1000.0	9.000	N	ON	10.3	Pass
0.434000	---	16.24	47.18	30.94	1000.0	9.000	N	ON	10.3	Pass
0.482000	---	17.35	46.31	28.95	1000.0	9.000	N	ON	10.3	Pass
0.518000	38.65	---	56.00	17.35	1000.0	9.000	N	ON	10.3	Pass
0.566000	---	11.75	46.00	34.25	1000.0	9.000	L1	ON	10.3	Pass
0.618000	33.40	---	56.00	22.60	1000.0	9.000	N	ON	10.3	Pass
0.654000	---	18.05	46.00	27.95	1000.0	9.000	N	ON	10.3	Pass
0.698000	---	17.65	46.00	28.35	1000.0	9.000	L1	ON	10.3	Pass
0.706000	32.11	---	56.00	23.89	1000.0	9.000	L1	ON	10.3	Pass
0.770000	---	36.23	46.00	9.77	1000.0	9.000	L1	ON	10.3	Pass
0.770000	45.53	---	56.00	10.47	1000.0	9.000	L1	ON	10.3	Pass
0.914000	---	26.24	46.00	19.76	1000.0	9.000	L1	ON	10.3	Pass
1.026000	39.99	---	56.00	16.01	1000.0	9.000	L1	ON	10.2	Pass
1.130000	29.58	---	56.00	26.42	1000.0	9.000	L1	ON	10.2	Pass
1.154000	39.26	---	56.00	16.74	1000.0	9.000	L1	ON	10.2	Pass
1.230000	30.57	---	56.00	25.43	1000.0	9.000	L1	ON	10.2	Pass
1.282000	38.25	---	56.00	17.75	1000.0	9.000	L1	ON	10.2	Pass
1.414000	39.28	---	56.00	16.72	1000.0	9.000	L1	ON	10.2	Pass

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

END OF TEST REPORT