


																																
<p><b>MOTOROLA PENANG ADV. COMM. LABORATORY</b>  <b>Motorola Solutions Malaysia Sdn. Bhd.</b>  <b>Innoplex Plot 2A Medan Bayan Lepas,</b>  <b>Mukim 12, S.W.D. 11900 Bayan Lepas,</b>  <b>Penang, Malaysia.</b></p>	<p><b>FCC / IC TEST REPORT</b>  <b>Report Revision : Rev.A</b></p>																															
<table border="0"> <tr> <td><b>Date/s Tested</b></td> <td>: 21-May-2017 - 4-June-2017</td> <td rowspan="12" style="text-align: center; vertical-align: middle;">  </td> </tr> <tr> <td><b>Report Issue Date</b></td> <td>: 5-June-2017</td> </tr> <tr> <td><b>Manufacturer/Location</b></td> <td>: Motorola Solutions - Penang</td> </tr> <tr> <td><b>Requestor</b></td> <td>: MOHAMED AFENDY MOHAMED RAFI</td> </tr> <tr> <td><b>Product Type</b></td> <td>: Portable</td> </tr> <tr> <td><b>Model Number</b></td> <td>: AAH88YCD9SA2AN</td> </tr> <tr> <td><b>Frequency Band</b></td> <td>: 2.402 - 2.480 GHz</td> </tr> <tr> <td><b>Rated / Max RF Output Power</b></td> <td>: 6.3 mWatts / 9.2 mWatts</td> </tr> <tr> <td><b>Applicant Name</b></td> <td>: Motorola Solution Malaysia Sdn Bhd</td> </tr> <tr> <td><b>Applicant Address</b></td> <td>: Innoplex Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia</td> </tr> <tr> <td><b>FCC Registrations</b></td> <td>: 772092</td> </tr> <tr> <td><b>IC Registrations</b></td> <td>: 109AK</td> </tr> </table> <p><b>The equipment was tested accordance to the requirement listed below:</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 60%;"><b>(2.4GHz BT LE )</b></td> <td style="text-align: right;"><b>PASS</b></td> </tr> <tr> <td><b>Part 15C</b></td> <td></td> </tr> <tr> <td><b>IC RSS 247</b></td> <td></td> </tr> </table>		<b>Date/s Tested</b>	: 21-May-2017 - 4-June-2017		<b>Report Issue Date</b>	: 5-June-2017	<b>Manufacturer/Location</b>	: Motorola Solutions - Penang	<b>Requestor</b>	: MOHAMED AFENDY MOHAMED RAFI	<b>Product Type</b>	: Portable	<b>Model Number</b>	: AAH88YCD9SA2AN	<b>Frequency Band</b>	: 2.402 - 2.480 GHz	<b>Rated / Max RF Output Power</b>	: 6.3 mWatts / 9.2 mWatts	<b>Applicant Name</b>	: Motorola Solution Malaysia Sdn Bhd	<b>Applicant Address</b>	: Innoplex Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia	<b>FCC Registrations</b>	: 772092	<b>IC Registrations</b>	: 109AK	<b>(2.4GHz BT LE )</b>	<b>PASS</b>	<b>Part 15C</b>		<b>IC RSS 247</b>	
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<p>Prepared By:</p> <p>_____</p> <p><b>Jino Lim</b>  <b>Test Personnel</b></p>	<p>Approved By:</p> <p>_____</p> <p><b>Goh Aik Hong</b>  <b>Responsible Engineer</b></p>																															

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	5-June-2017	Jino Lim

## 1.0 General Information

### EUT Description:

<b>Technologies</b>	2.4GHz BT LE
<b>TX Frequency range</b>	2402MHz – 2480MHz
<b>Modulation Type</b>	GFSK
<b>Input/Output</b>	RF Port
<b>Connector type</b>	PROGRAMMING, TEST & ALIGNMENT CABLE
<b>Antenna type</b>	BT/WIFI MODULE PATCH ANTENNA

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

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
BATT LIION 2300T (BT100x)	MOTOROLA	PMNN4468A
PROGRAMMING, TEST & ALIGNMENT CABLE	MOTOROLA	-

### 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:

**ANSI C63.10-2013**

## 2.0 Summary of Test Results

FCC Clause	IC Clause	Test Item	Result	Remark
15.247 (b)(1)	RSS-247 5.1(2)	6dB Channel Bandwidth	Pass	NA
15.247 (a)(1)	RSS-247 5.1(1) RSS-247 5.1(2)	Conducted RF Output Power (Peak)	Pass	NA
15.247(a)(1)(iii)	RSS-247 5.1(4)	Maximum Power Spectral Density	Pass	NA
15.247(a)(1)(iii)	RSS-247 5.1(4)	Conducted Spurious Emissions	Pass	NA
15.247 (d)	RSS-247 5.5	Band edge Conducted Spurious Emission	Pass	NA
15.205, 15.209, 15.247 (d)	RSS-247 5.5	Radiated Emission within Restricted Bands	Pass	NA
15.207	RSS-247 5.5	AC Powerline Conducted Emission	NA	Testing is not required, radio shall turn off during charging mode
15.203	RSS-Gen 8.8	Antenna requirement	NA	Internal antenna is not accessible to the end-user

## 3.0. Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=1.96) (±)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.01
	200MHz ~ 1000MHz	5.01
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.01
	18GHz ~ 25GHz	5.01

#### 4.0 Equipment List

##### Bluetooth ATE # 1 (SW Version: Ate Main\_3.1.9\_R1)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SPECTRUM ANALYZER	E4445A	MY46181597	21-Dec-16	21-Dec-18
POWER SUPPLY	6652A	3541A02403	7-Sep-15	7-Sep-17
SPECTRUM ANALYZER	FSEK30	838495/014	29-Jun-16	29-Jun-18

##### Radiated Emission Station (SW Version: EMC FCC RE v1.5.1)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DRG HORN FREQ.	SAS-571	566	4-Sep-16	4-Sep-17
DRG HORN FREQ.	SAS-571	720	2-Mar-17	2-Mar-19
POWER SUPPLY	6674A	3126A00133	12-Nov-15	12-Nov-17
MICROWAVE SIGNAL GENERATOR	SMP04	100127	3-Jul-16	3-Jul-17
EMI TEST RECEIVER	ESIB26	100336	19-Oct-16	19-Oct-17
SIGNAL ANALYZER	FSV40	101103	25-Jun-16	25-Jun-17
5m Semi-anechoic Chamber	S800-HX	J2308	29-Jul-16	29-Jul-17
BILOG ANTENNA	CBL6112B	2950	23-Feb-16	23-Feb-18
BILOG ANTENNA	CBL6112B	2964	3-Feb-17	3-Feb-18
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	14-Oct-16	14-Oct-17
DATA LOGGER	SDL500	A.016776	18-Mar-17	18-Mar-18
SYSTEM CONTROLLER	SC104V	050806-1	Not Required	Not Required
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	Not Required	Not Required
ANTENNA POSITIONING TOWER	TLT2	NA	Not Required	Not Required
18 - 40GHz PREAMPLIFIER	BBV9721	9721-007	Not Required	Not Required
LOOP ANTENNA	6502	208416	24-Jun-16	24-Jun-17
PREAMPLIFIER	PAM-0118P	361	Not Required	Not Required

### 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
Test Mode	0 to 39	0,19,39	GFSK

#### **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
Test Mode	0 to 39	0,19,39	GFSK

#### **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
Application Mode	0 to 39	AUTO	AUTO

#### **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).

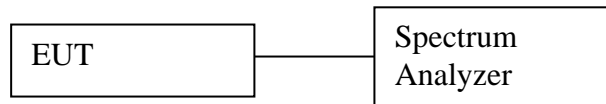
Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
Test Mode	0 to 39	0,19,39	GFSK

## 6.0 Transmitter Test Parameters

### 6.1 6dB Channel Bandwidth

#### 6.1.1 Test Setup



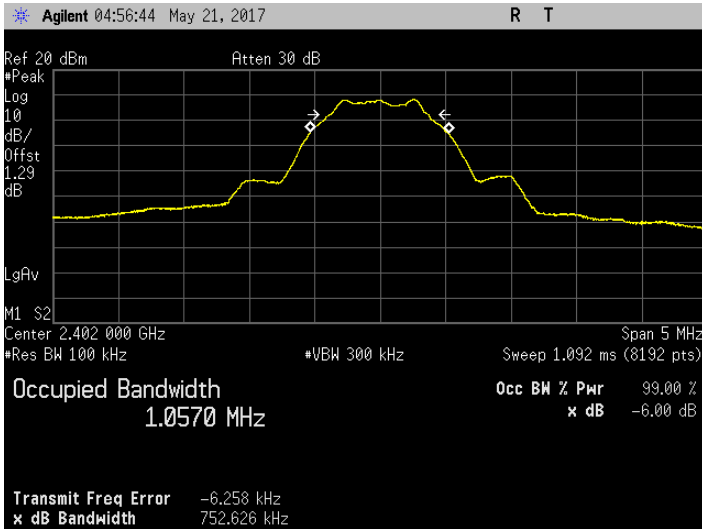
- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode =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

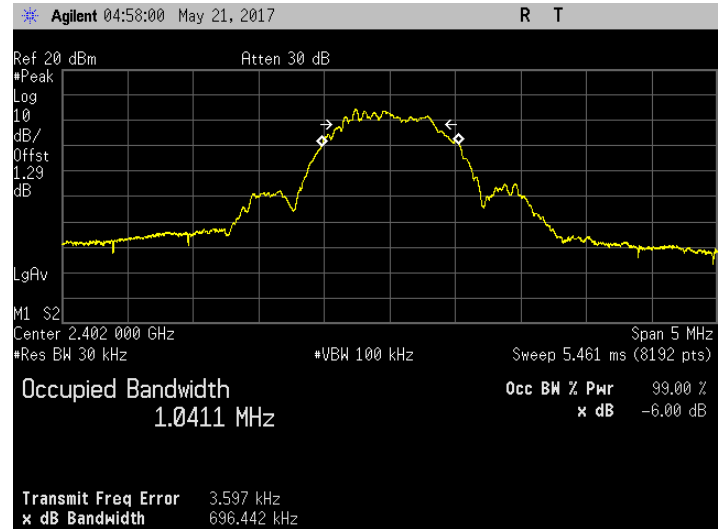
<b>Normal Condition (25 ° C)</b>
<b>≥500 kHz</b>

#### 6.1.1 Test Data:

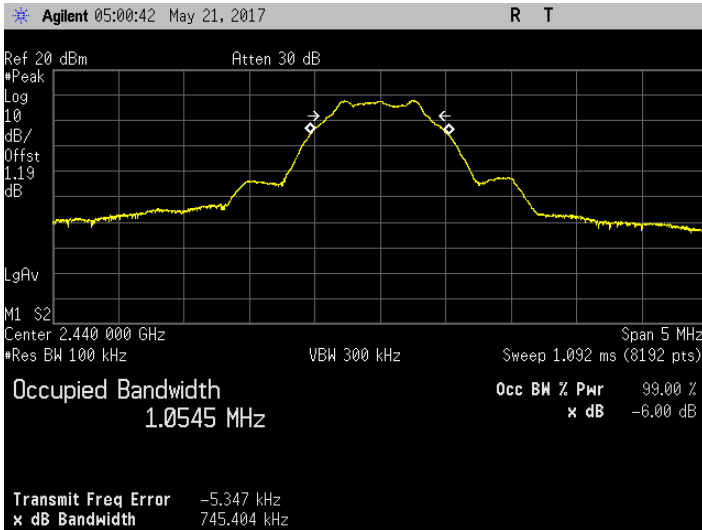
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
Bluetooth L.E	GFSK	2402	0.7526	1.0411	Pass
Bluetooth L.E	GFSK	2440	0.7454	1.0404	Pass
Bluetooth L.E	GFSK	2480	0.7501	1.0413	Pass



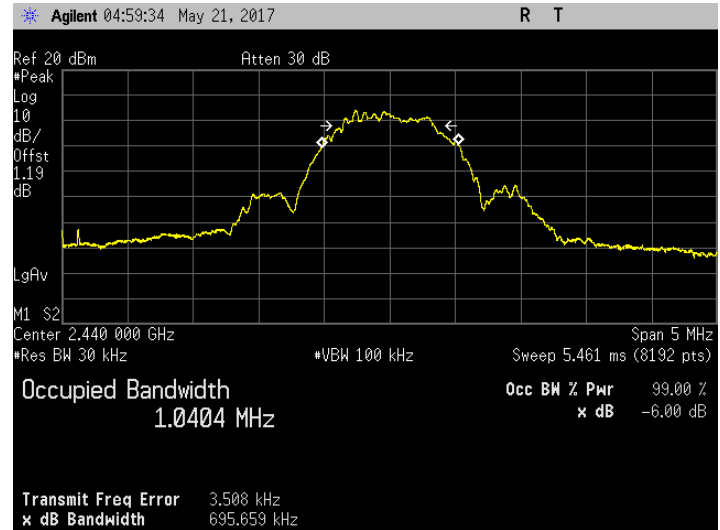
**6dB Bandwidth. Bluetooth LE Frequency 2402 MHz**



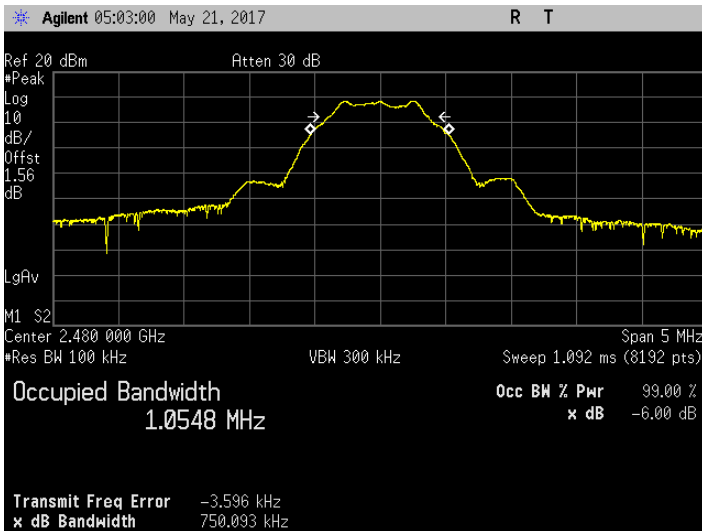
**99% Bandwidth. Bluetooth LE Frequency 2402 MHz**



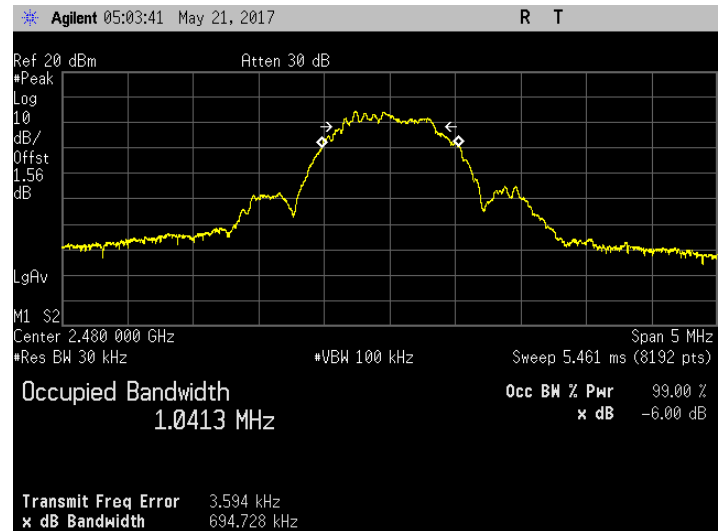
**6dB Bandwidth. Bluetooth LE Frequency 2440 MHz**



**99% Bandwidth. Bluetooth LE Frequency 2440 MHz**



**6dB Bandwidth. Bluetooth LE Frequency 2480 MHz**

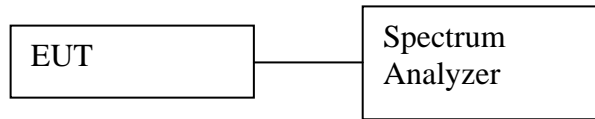


**99% Bandwidth. Bluetooth LE Frequency 2480 MHz**



## 6.2 Maximum Peak 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) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. Set the RBW  $\geq$  DTS bandwidth.
  - b. Set the VBW  $\geq$   $[3 \times \text{RBW}]$ .
  - c. Set the span  $\geq$   $[3 \times \text{RBW}]$ .
  - d. Detector = peak.
  - e. Sweep time = auto couple.
  - f. Trace mode = max hold.
  - g. Allow trace to fully stabilize.
  - h. Use peak marker function to determine the peak amplitude level.

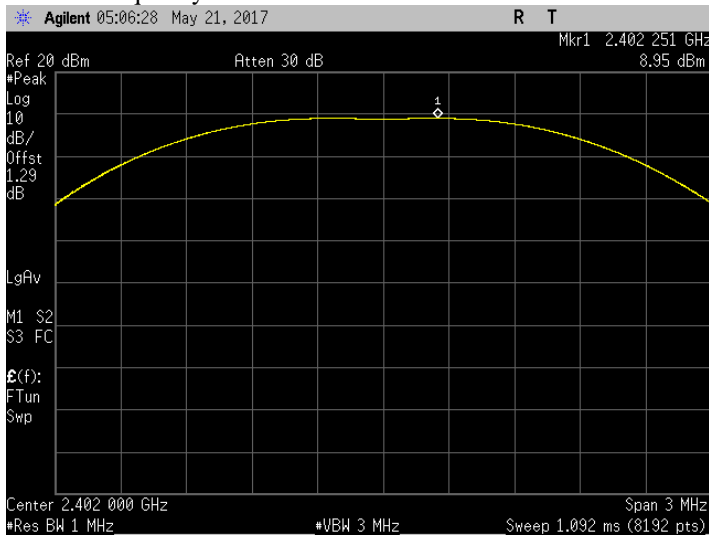
### 6.2.2 Test Limits:

<b>Normal Condition (25 ° C)</b>
<b><math>\leq 1</math> Watt(30 dBm)</b>

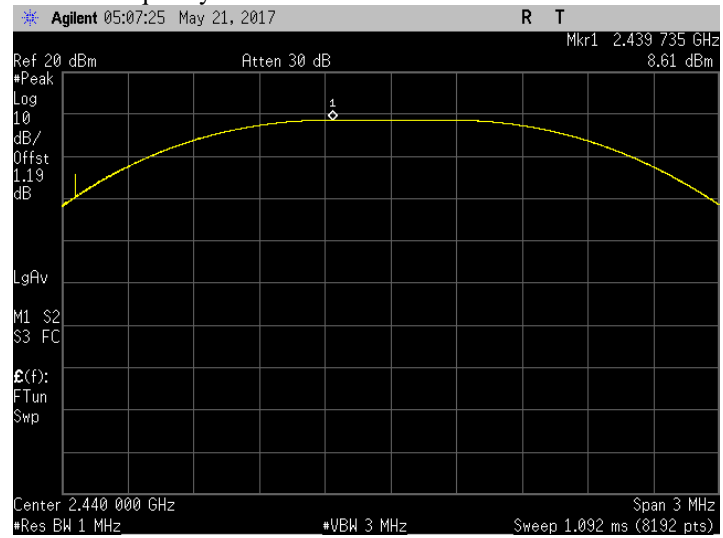
### 6.2.3 Test Data:

Test Conditions			Test Frequency	Results
Standard	Modulation Type	Tx (MHz)	Output Power (dBm)	Status
Bluetooth L.E	GFSK	2402	8.95	Pass
Bluetooth L.E	GFSK	2440	8.61	Pass
Bluetooth L.E	GFSK	2480	9.24	Pass

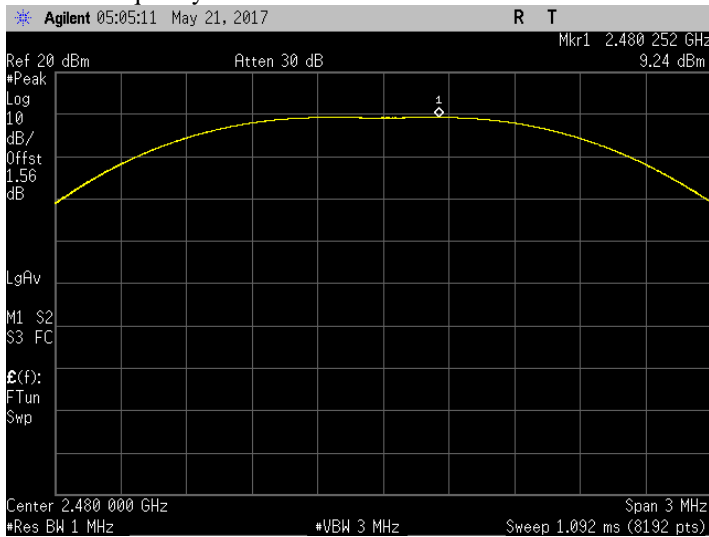
i. The Conducted RF Output Power test with result at low frequency.



ii. The Conducted RF Output Power test with result at mid frequency.

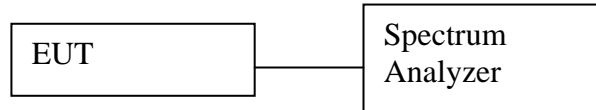


iii. The Conducted RF Output Power test with result at high frequency.



## 6.3 Maximum Peak Power Spectral Density

### 6.3.1 Test Setup



#### Maximum Peak

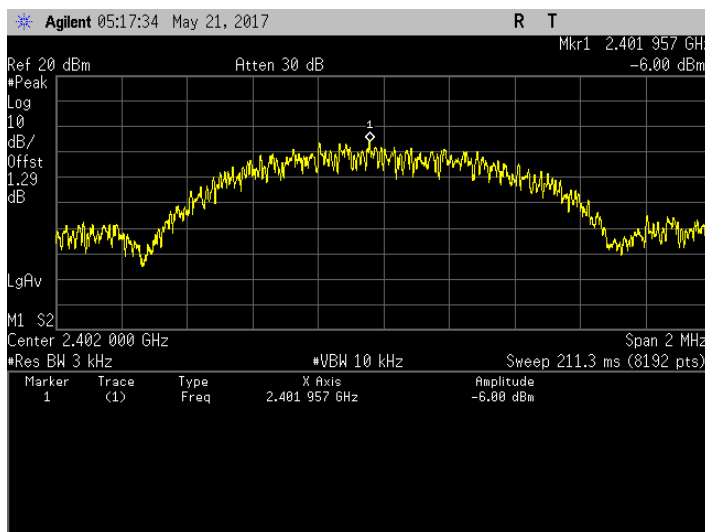
- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. Set analyzer center frequency to DTS channel center frequency.
  - b. Set the span to 1.5 times the DTS bandwidth.
  - c. Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
  - 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:

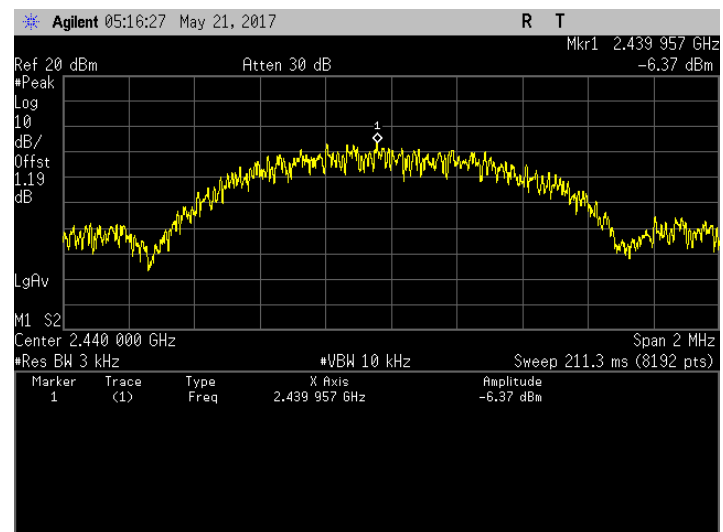
<b>Normal Condition (25 ° C)</b>
<b><math>\leq 8 \text{ dBm/3kHz}</math></b>

### 6.3.3 Test Result

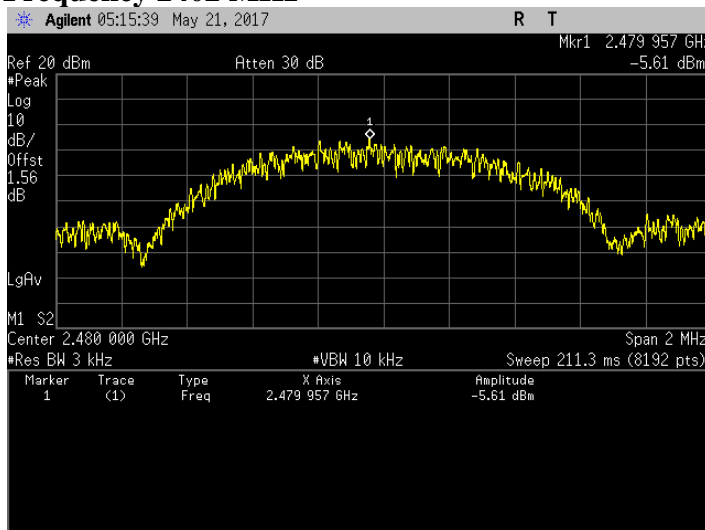
Test Conditions		Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Power (dBm/3kHz)	Status
Bluetooth L.E.	GFSK	2402	-6.00	Pass
Bluetooth L.E.	GFSK	2440	-6.37	Pass
Bluetooth L.E.	GFSK	2480	-5.61	Pass



**Maximum Power Spectral Density. Bluetooth LE Frequency 2402 MHz**



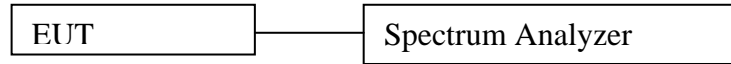
**Maximum Power Spectral Density. Bluetooth LE Frequency 2440 MHz**



**Maximum Power Spectral Density. Bluetooth LE Frequency 2480 MHz**

## 6.4 Conducted Spurious Emission

### 6.4.1 Test Setup



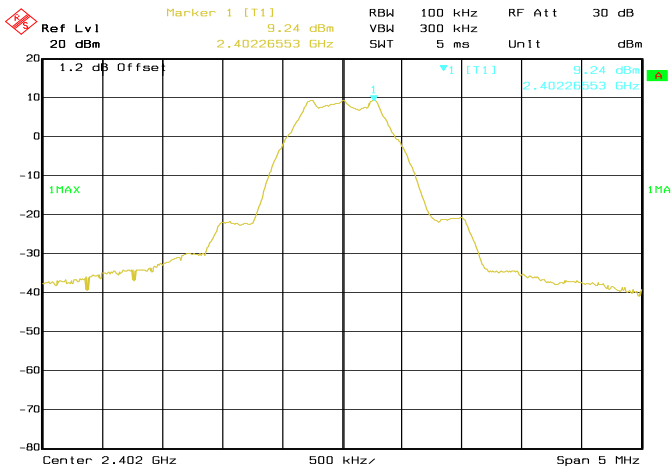
- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode =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

### 6.4.2 Test Limits:

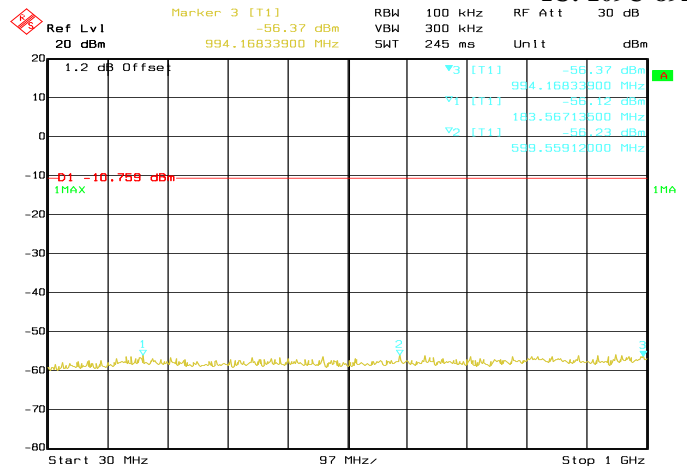
<b>Normal Condition (25 ° C)</b>
<b>Shall be at least 20 dB below peak (max) power.</b>

### 6.4.3 Test Result

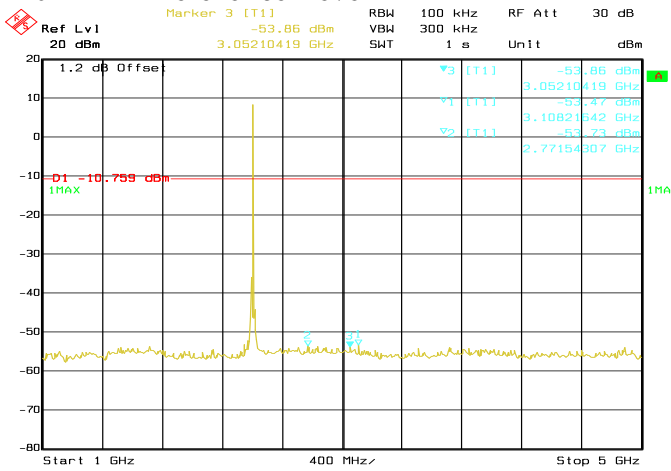
Test Conditions			Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
Bluetooth L.E.	GFSK	2402	6983.97	-50.69	Pass
			14418.84	-49.31	Pass
			15671.34	-51.79	Pass
Bluetooth L.E.	GFSK	2440	6973.95	-50.87	Pass
			14649.30	-48.91	Pass
			15671.34	-51.91	Pass
Bluetooth L.E.	GFSK	2480	6993.99	-49.91	Pass
			14198.40	-50.59	Pass
			15671.34	-51.87	Pass



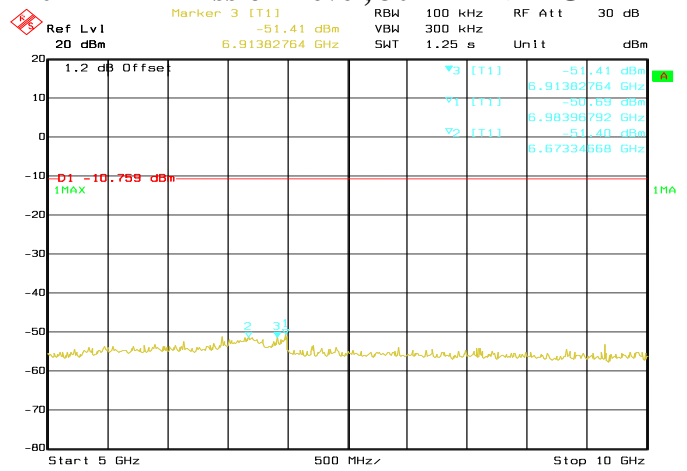
Date: 04.JUN.2017 11:08:39  
**Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Reference Level**



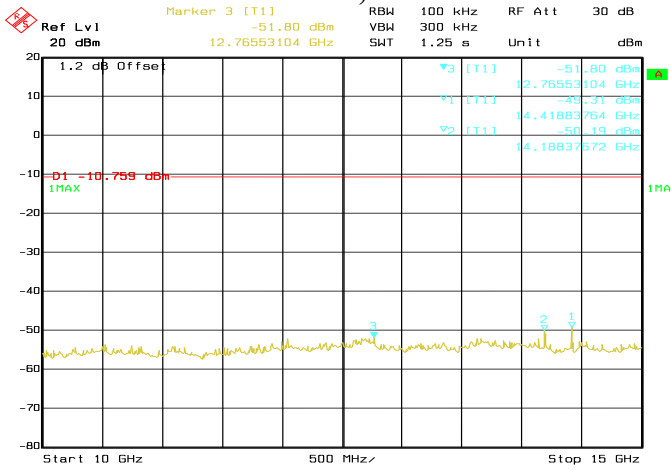
Date: 04.JUN.2017 11:09:12  
**Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 30 MHz -> 1 GHz**



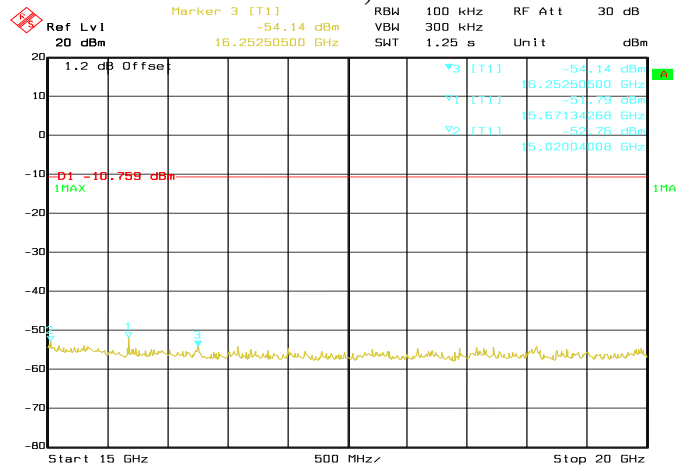
Date: 04.JUN.2017 11:09:44  
**Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 1 GHz -> 5 GHz**



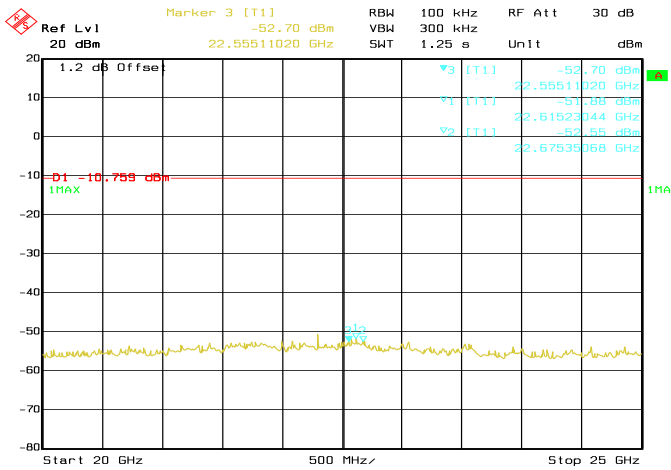
Date: 04.JUN.2017 11:10:17  
**Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 5 GHz -> 10 GHz**



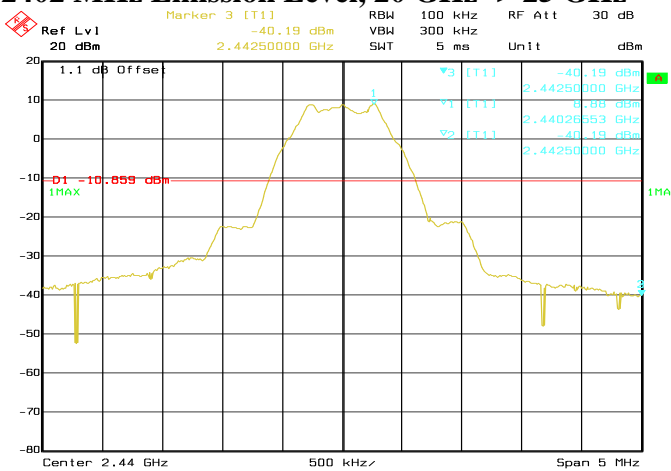
Date: 04.JUN.2017 11:10:50  
**Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 10 GHz -> 15 GHz**



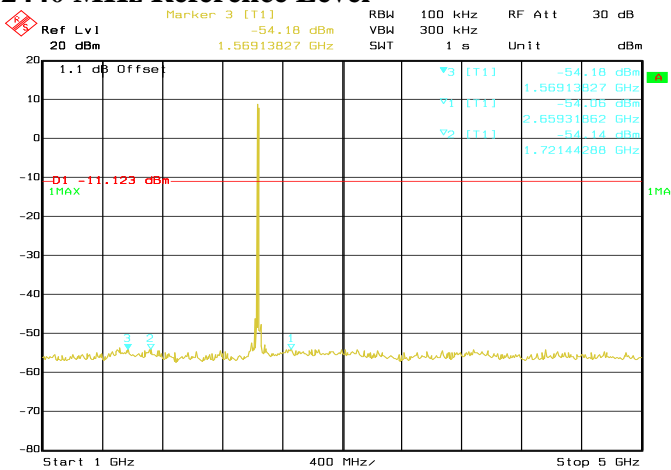
Date: 04.JUN.2017 11:11:23  
**Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 15 GHz -> 20 GHz**



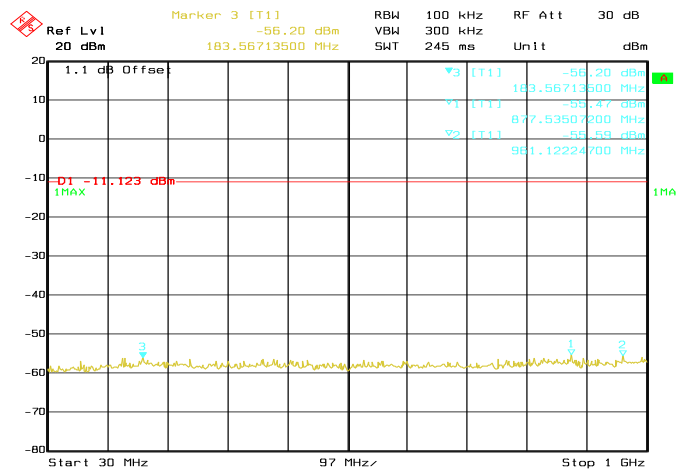
**Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 20 GHz -> 25 GHz**



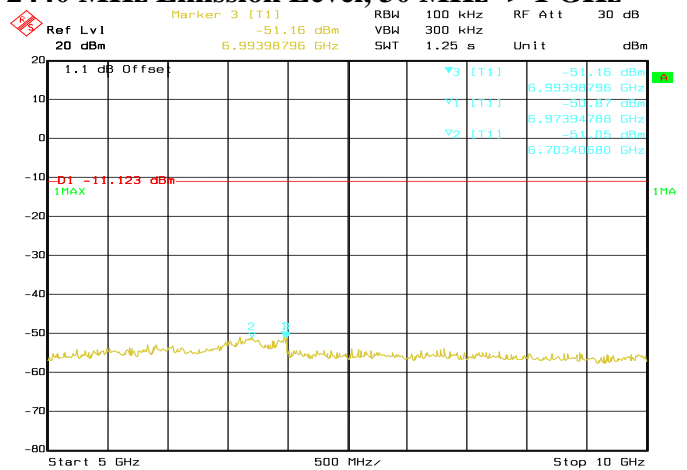
**Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Reference Level**



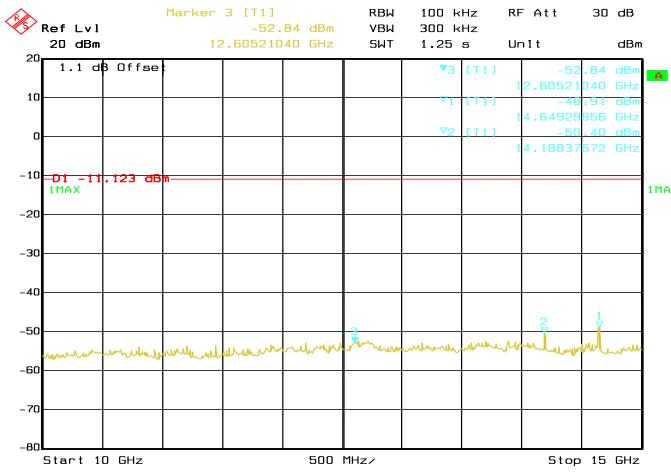
**Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Emission Level, 1 GHz -> 5 GHz**



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

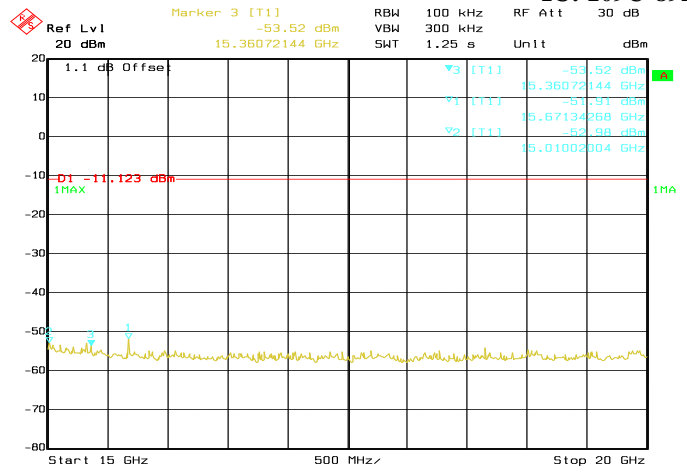


**Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Emission Level, 5 GHz -> 10 GHz**



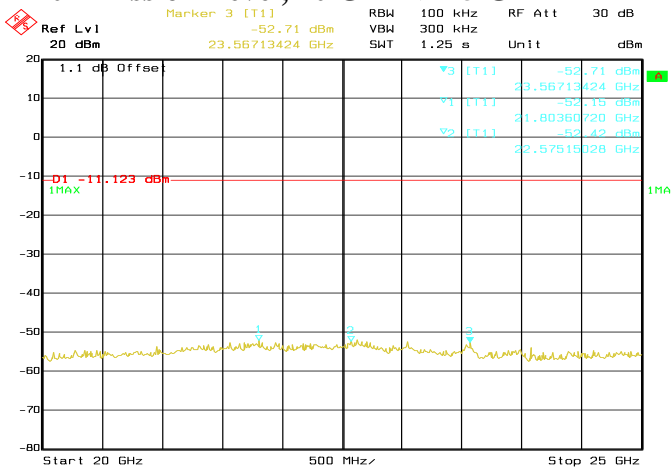
Date: 04.JUN.2017 11:15:31

**Conducted Emissions. Bluetooth LE, Frequency 2440 Emission Level, 10 GHz -> 15 GHz**



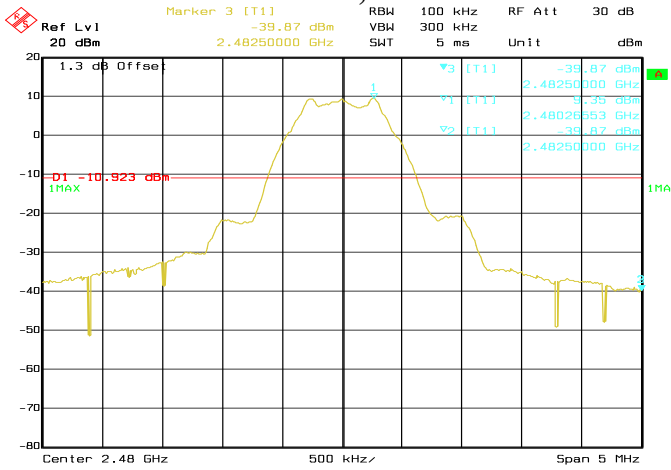
Date: 04.JUN.2017 11:16:04

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



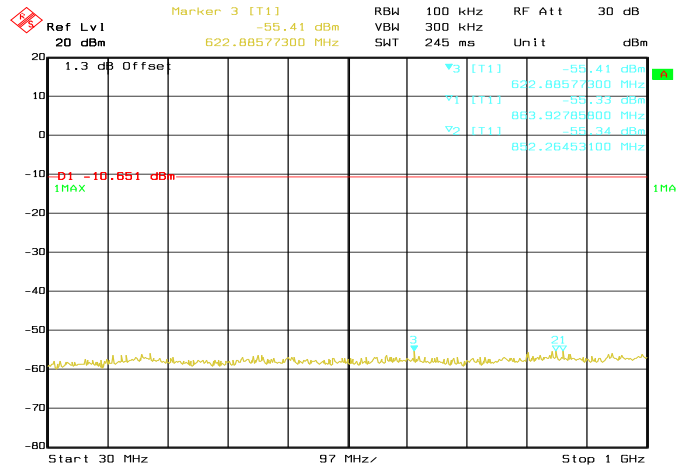
Date: 04.JUN.2017 11:16:36

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



Date: 04.JUN.2017 11:17:45

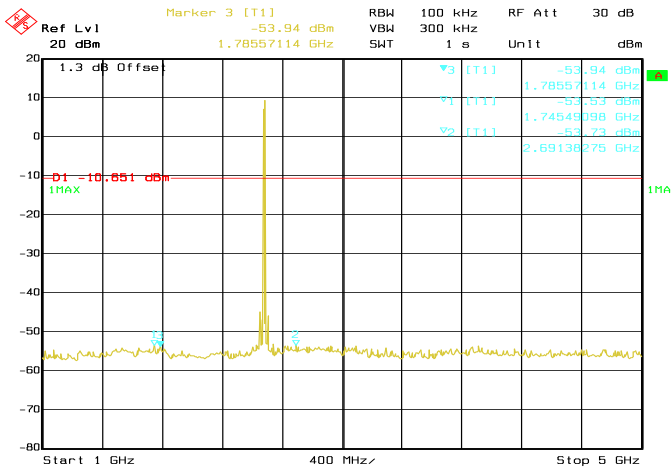
**Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Reference Level**



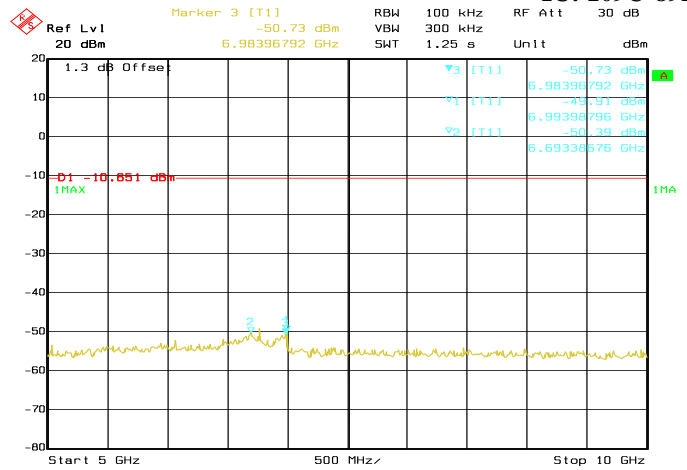
Date: 04.JUN.2017 11:18:17

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

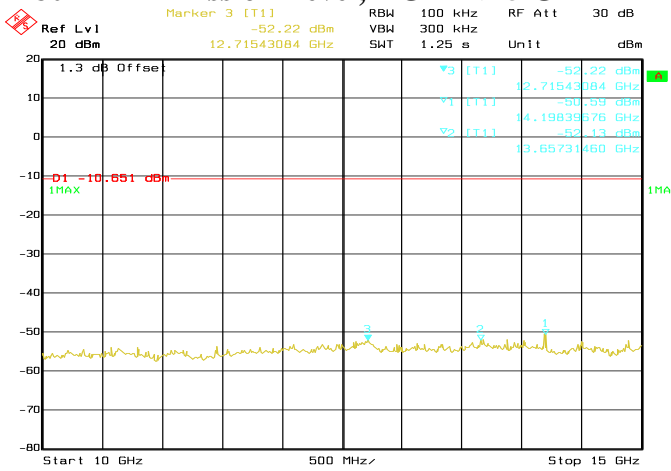




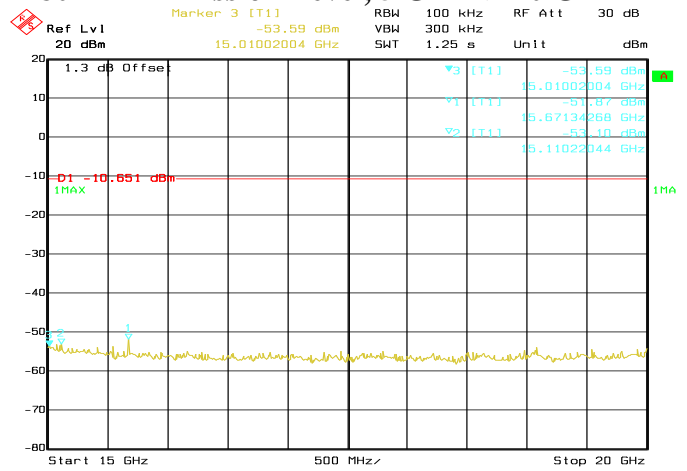
Date: 04 JUN 2017 11:18:50  
**Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 1 GHz -> 5 GHz**



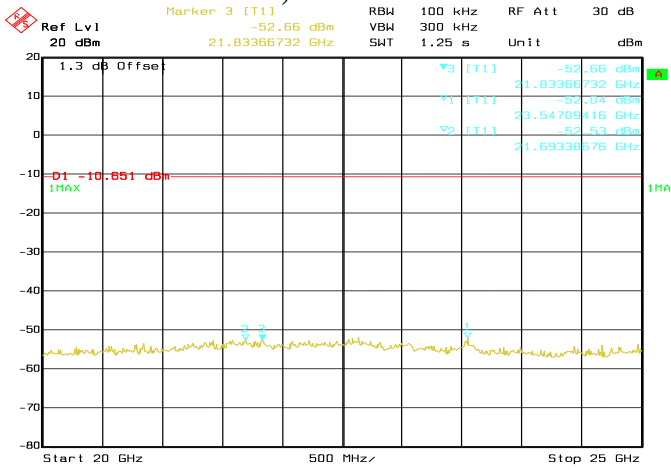
Date: 04 JUN 2017 11:19:22  
**Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 5 GHz -> 10 GHz**



Date: 04 JUN 2017 11:19:55  
**Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 10 GHz -> 15 GHz**



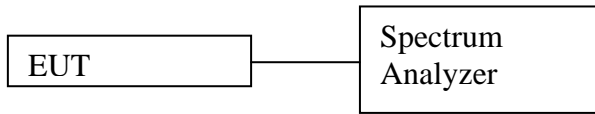
Date: 04 JUN 2017 11:20:28  
**Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 15 GHz -> 20 GHz**



Date: 04 JUN 2017 11:21:00  
**Conducted Emissions. 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.

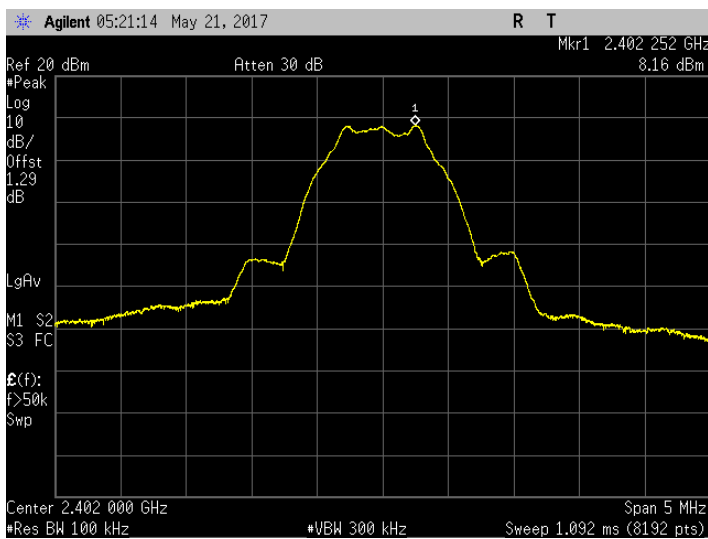
### 6.5.2 Test Limits:

**Normal Condition (25 ° C)**

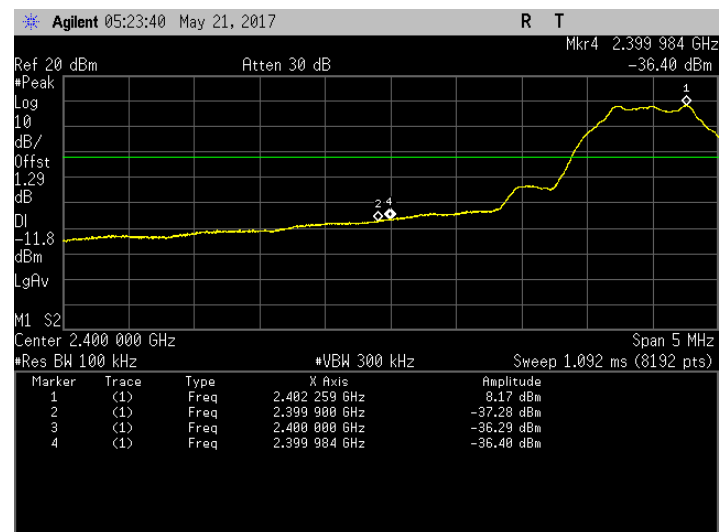
**Shall be at least 20 dB below peak (max) power.**

### 6.5.3 Test Result

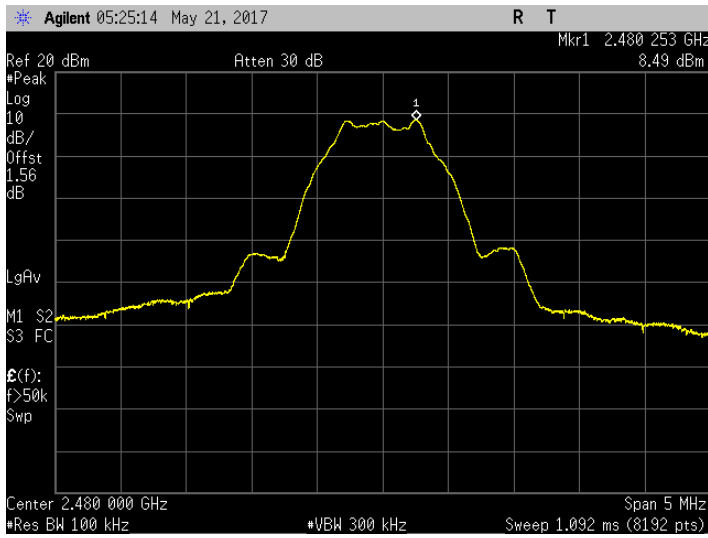
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2400.00	-36.40	Pass
Bluetooth L.E	GFSK	2480	2483.52	-45.13	Pass



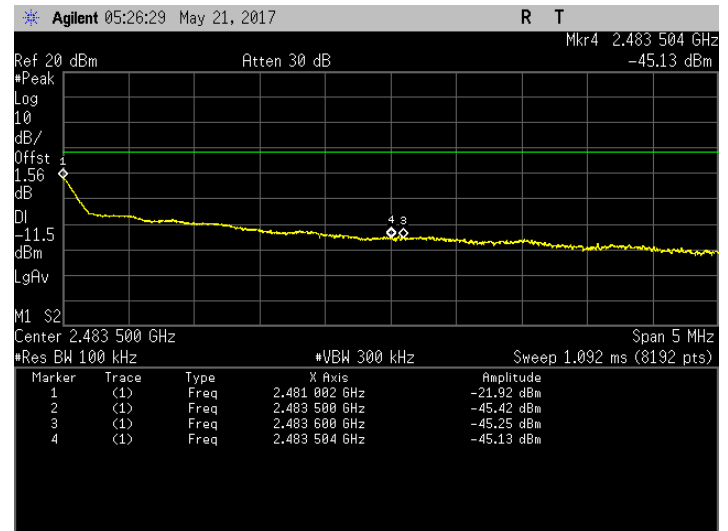
Band Edge. Bluetooth LE Frequency 2402 MHz  
 Reference Level



Band Edge. Bluetooth LE Frequency 2402 MHz Band  
 Edge



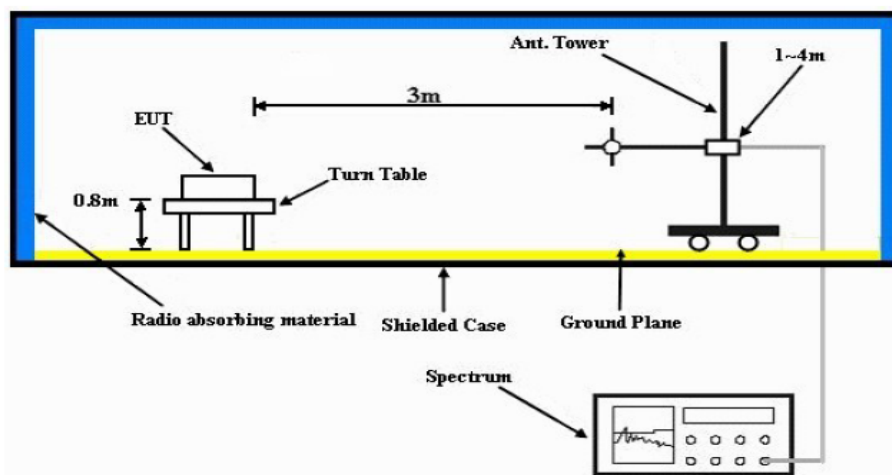
Band Edge. Bluetooth LE Frequency 2480 MHz Reference Level



Band Edge. 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 above the ground (<1GHz) and 1.5m above the ground (>1GHz) 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.

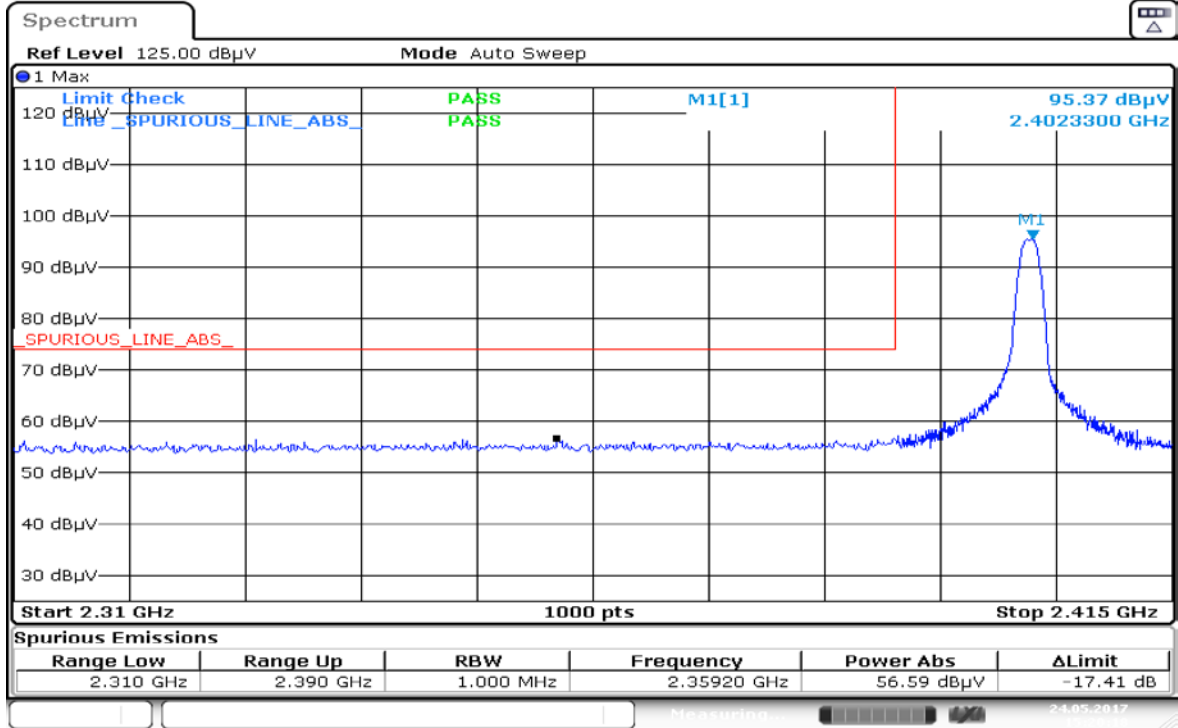
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**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.

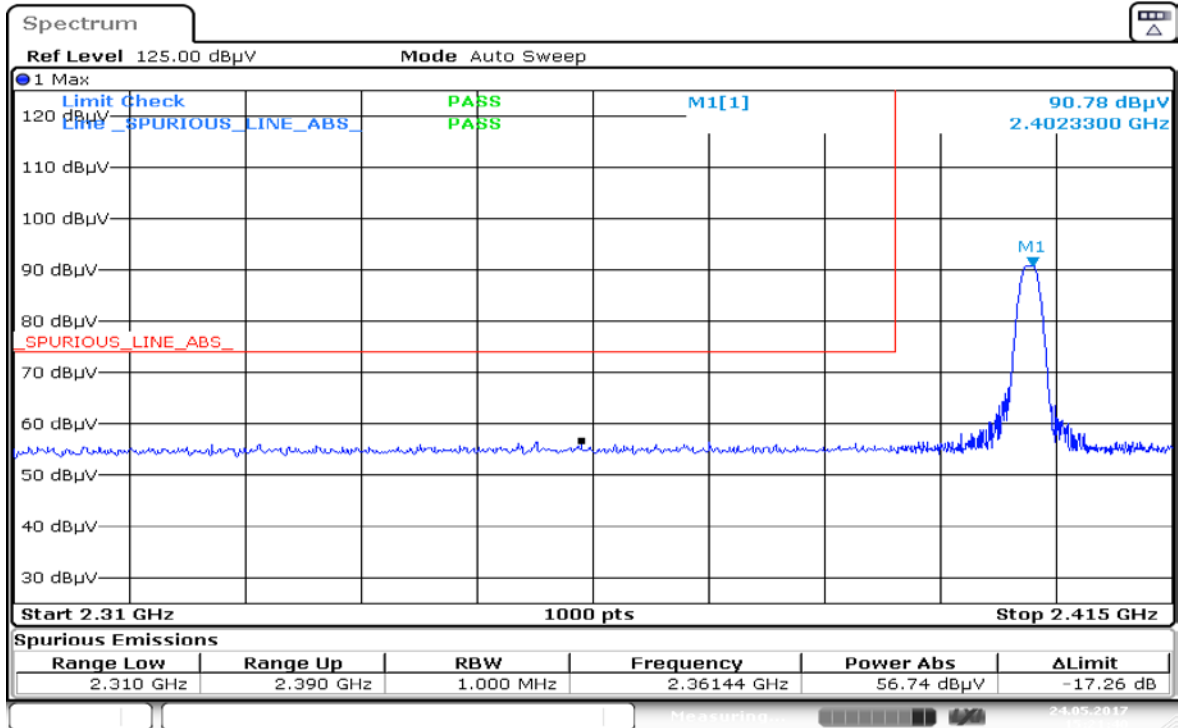


**Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot**



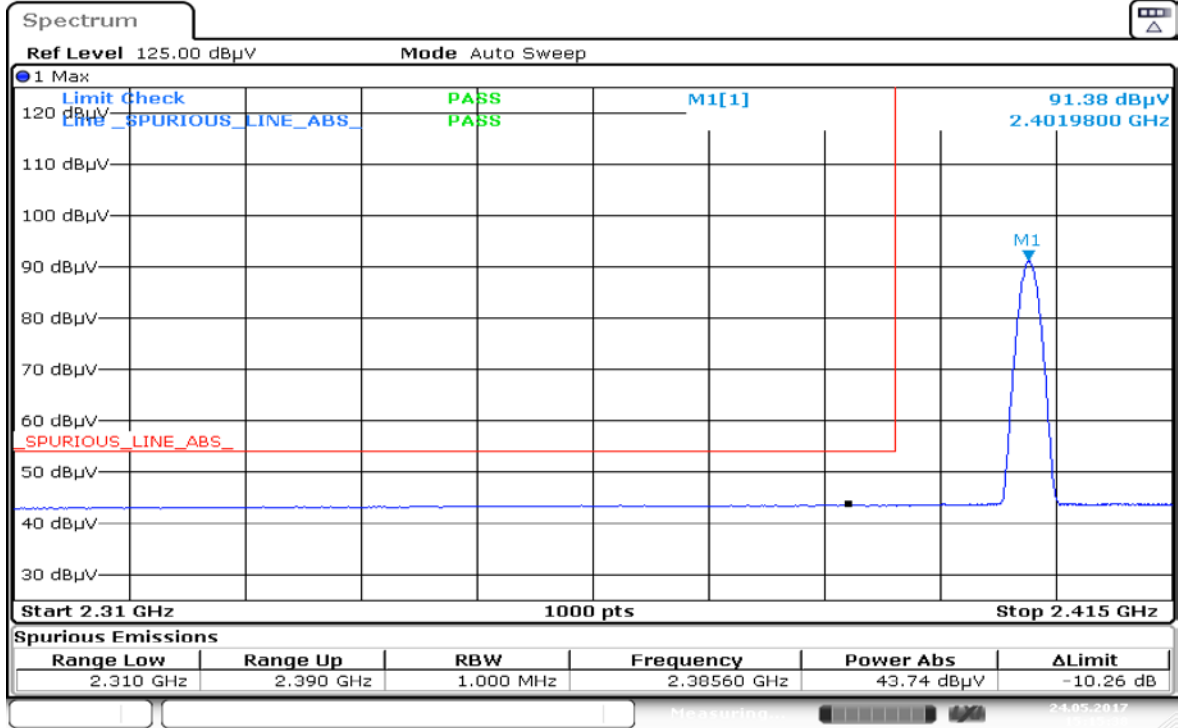
Date: 24.MAY.2017 15:20:18

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



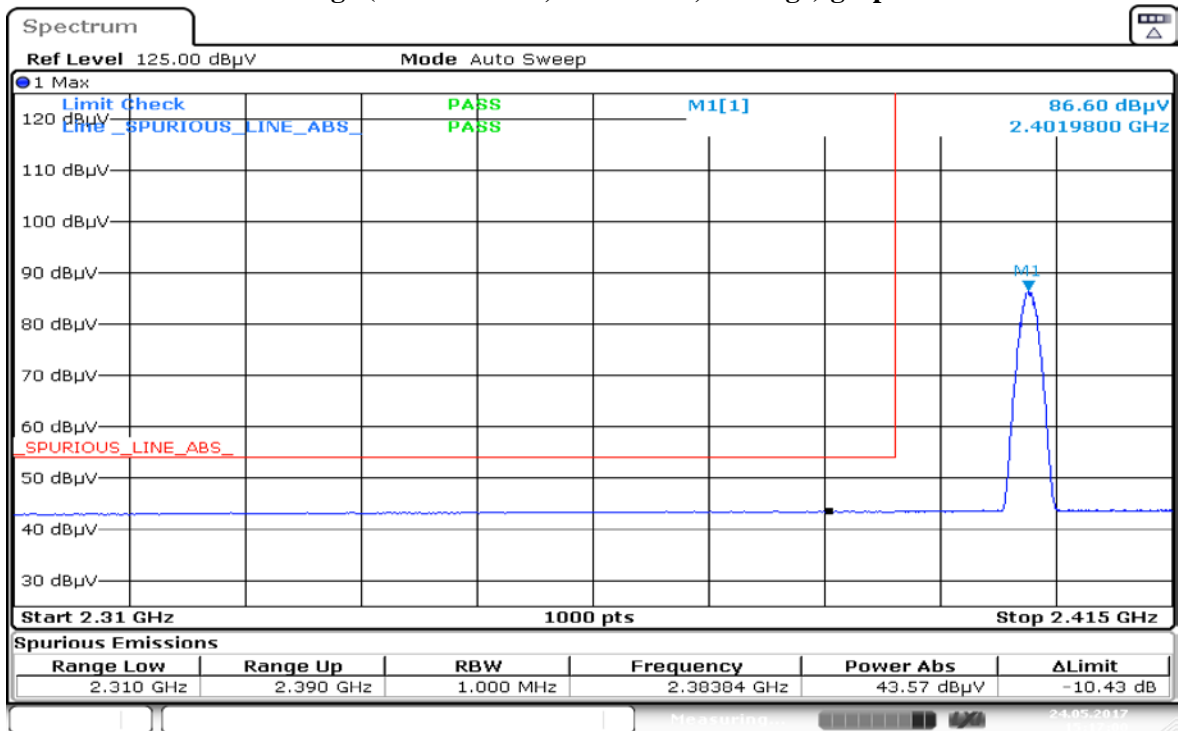
Date: 24.MAY.2017 15:21:41

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



Date: 24.MAY.2017 15:15:38

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



Date: 24.MAY.2017 15:17:01



**Test: Bluetooth SAC Restricted Band Edge**

**Model Number:** AAH88YCD9SA2AN **S/N:** 130TTK0170 **EMC SR ID#:** 06404-EMC-00002  
**Battery:** PMNN4468A **Accessory:** NA  
**Test Channel:** High **Test Frequency:** 2480.0000 MHz **Test Standard:** ANSI C63.10-2013  
**Worst Case Plane:** X-Plane (BT LE)

**Restricted Band Edge (High Channel) tabular data**

Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dB $\mu$ V/m)	Spur level PK (dB $\mu$ V/m)	Spur level AV (dB $\mu$ V/m)	Limit QPK (dB $\mu$ V/m)	Limit PK (dB $\mu$ V/m)	Limit AV (dB $\mu$ V/m)	Margin QPK (dB $\mu$ V/m)	Margin PK (dB $\mu$ V/m)	Margin AV (dB $\mu$ V/m)	Carrier PK Power (dB $\mu$ V/m)

Horizontal Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dB $\mu$ V/m)	Spur level PK (dB $\mu$ V/m)	Spur level AV (dB $\mu$ V/m)	Limit QPK (dB $\mu$ V/m)	Limit PK (dB $\mu$ V/m)	Limit AV (dB $\mu$ V/m)	Margin QPK (dB $\mu$ V/m)	Margin PK (dB $\mu$ V/m)	Margin AV (dB $\mu$ V/m)	Carrier PK Power (dB $\mu$ V/m)

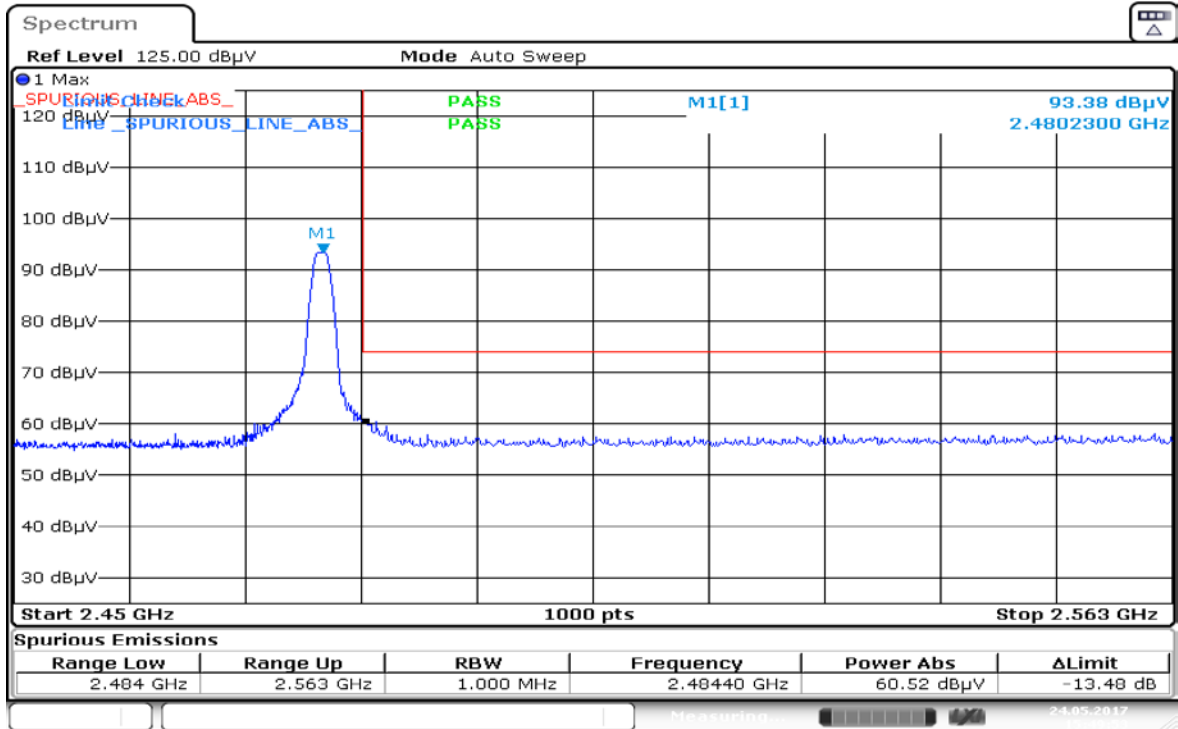
Remarks: Pass Result	Marginal Result	Fail Result
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**Temperature (degC):** 22.3  
**Test Performed by:** Nazrin&Qawiman  
**System MU:** 5.01dB

**Humidity (%):** 71.5  
**Test Date:** Wed, May 24, 2017  
**Duty Cycle (%):** < 77

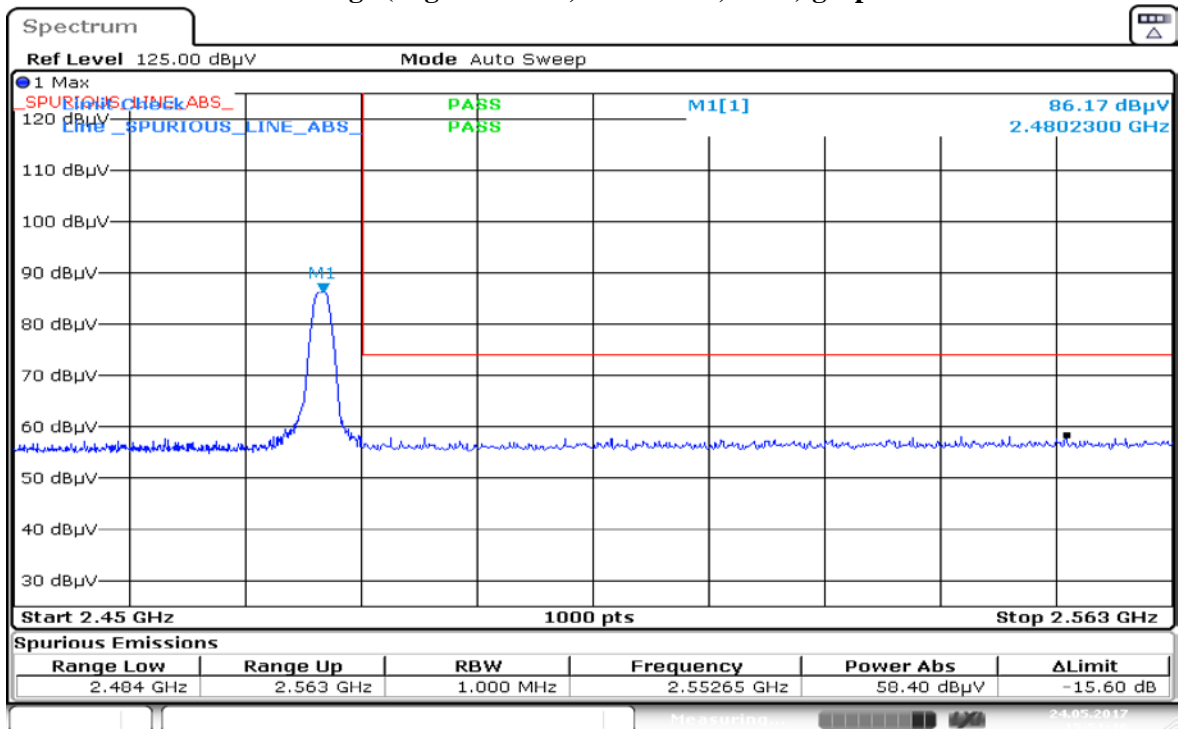
**Note:** No spurs were found in this test.

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



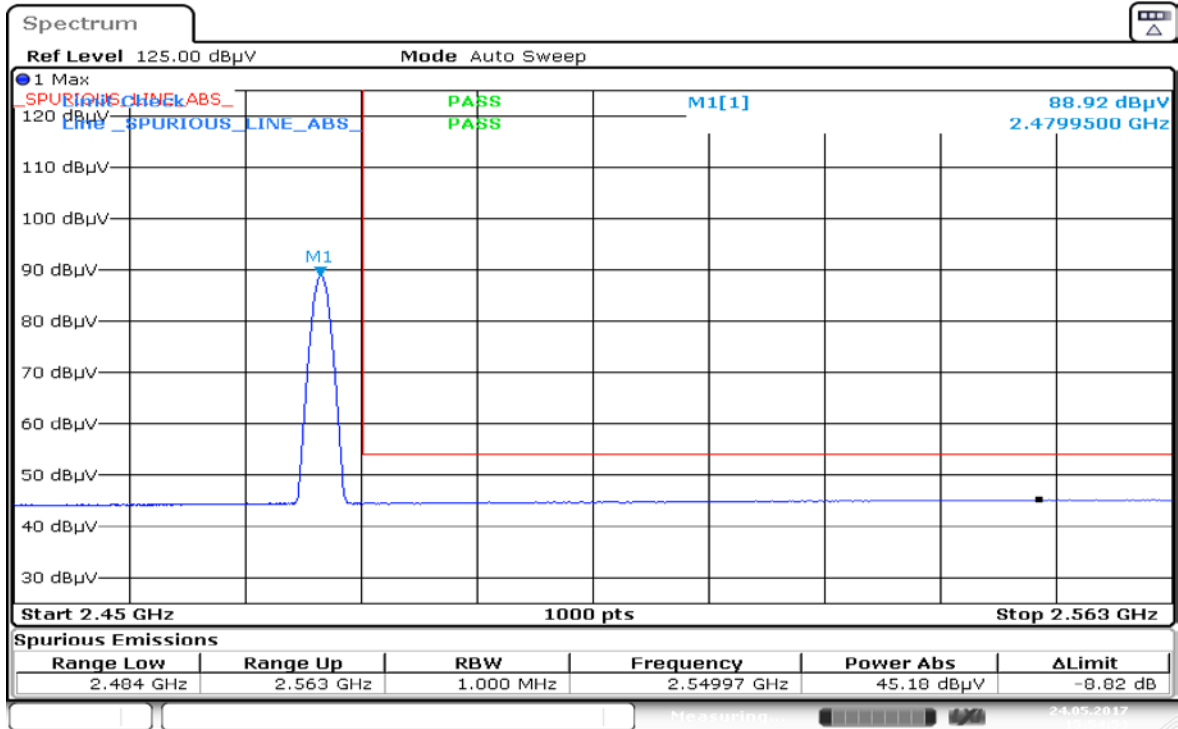
Date: 24.MAY.2017 15:49:53

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



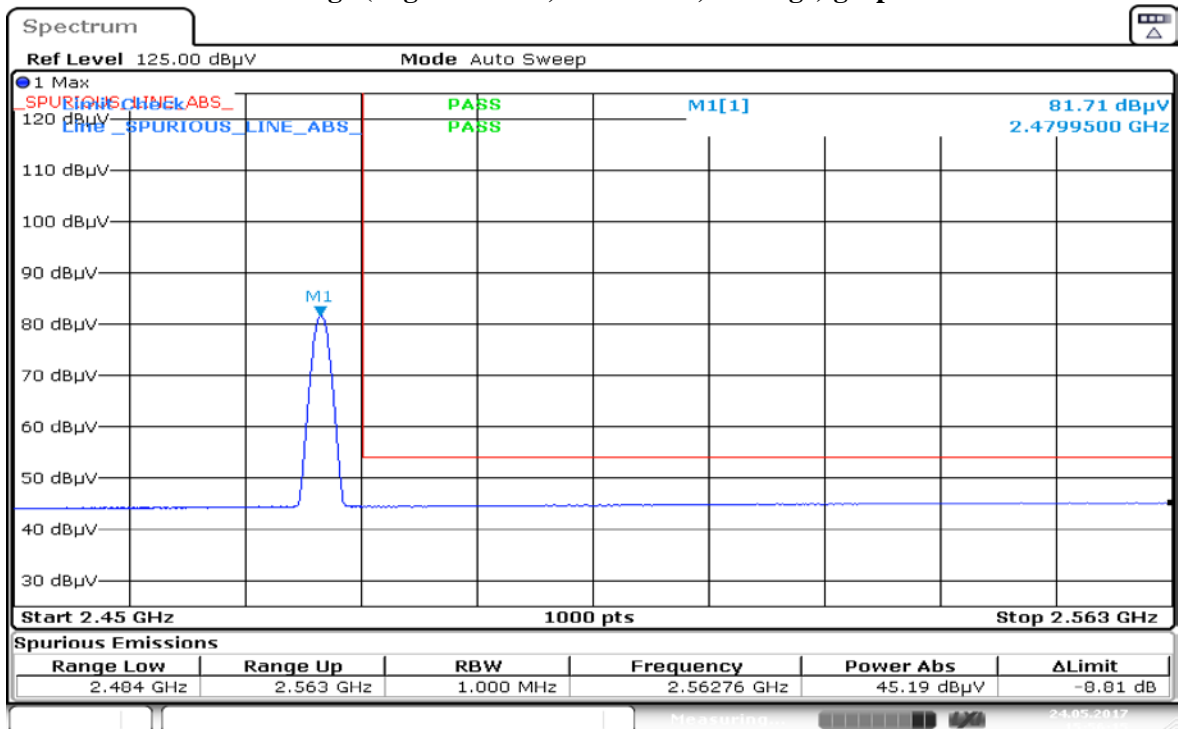
Date: 24.MAY.2017 15:51:16

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



Date: 24.MAY.2017 15:54:53

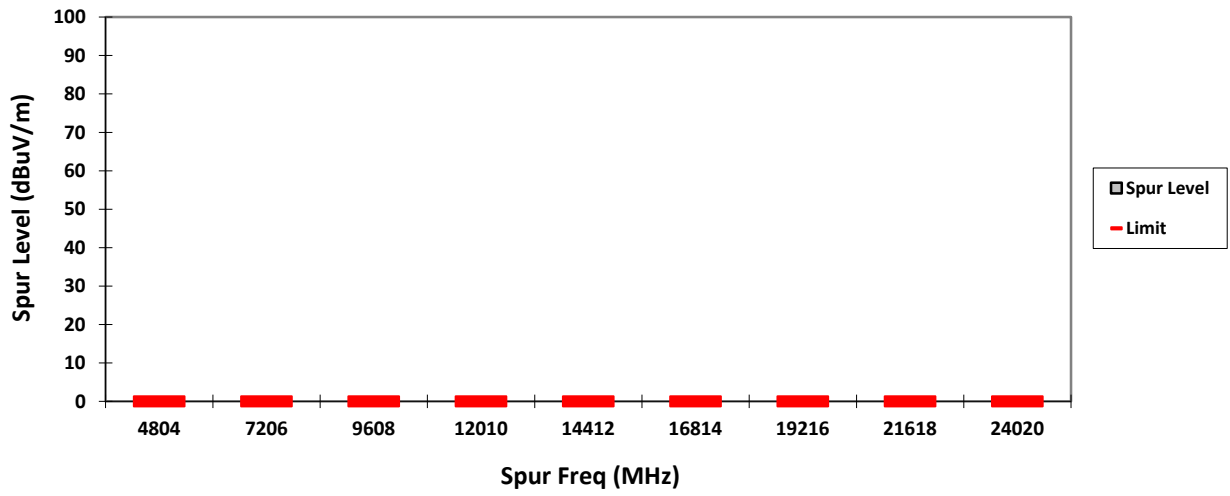
**Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot**



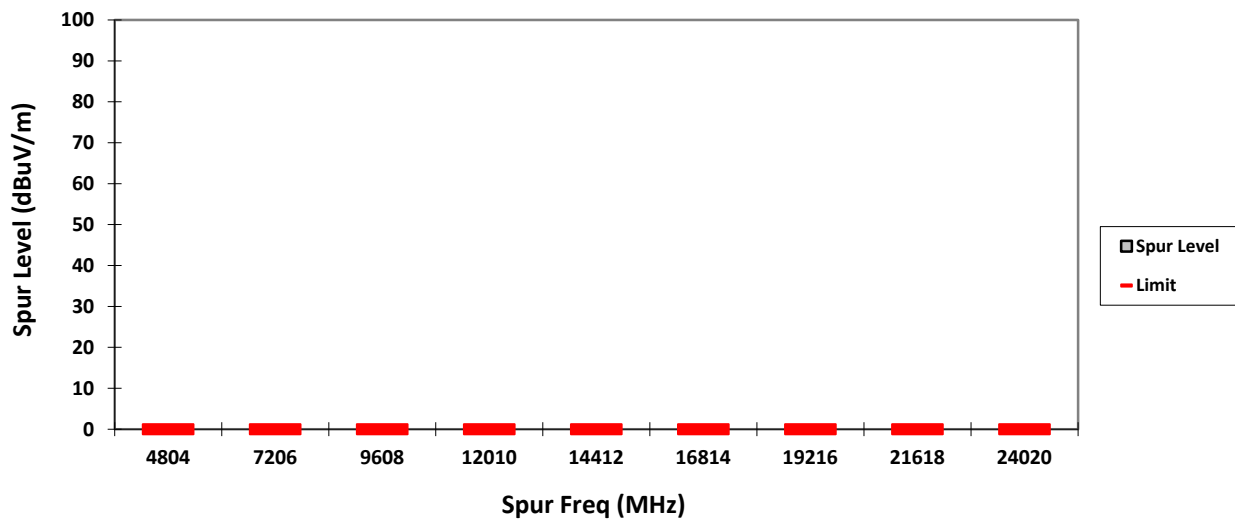
Date: 24.MAY.2017 15:56:16



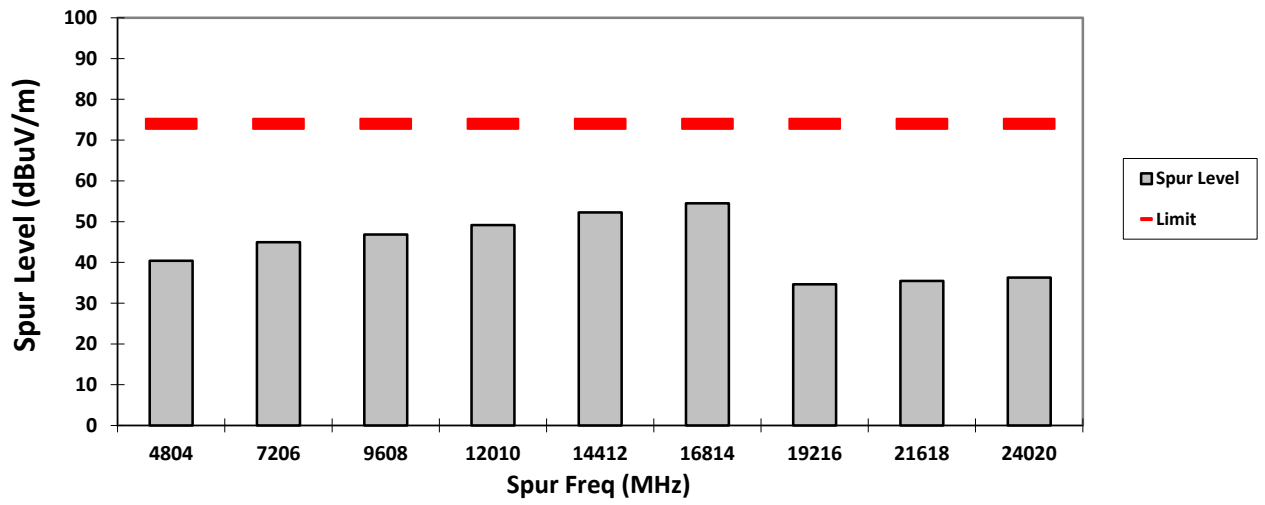
### VERTICAL, QPK



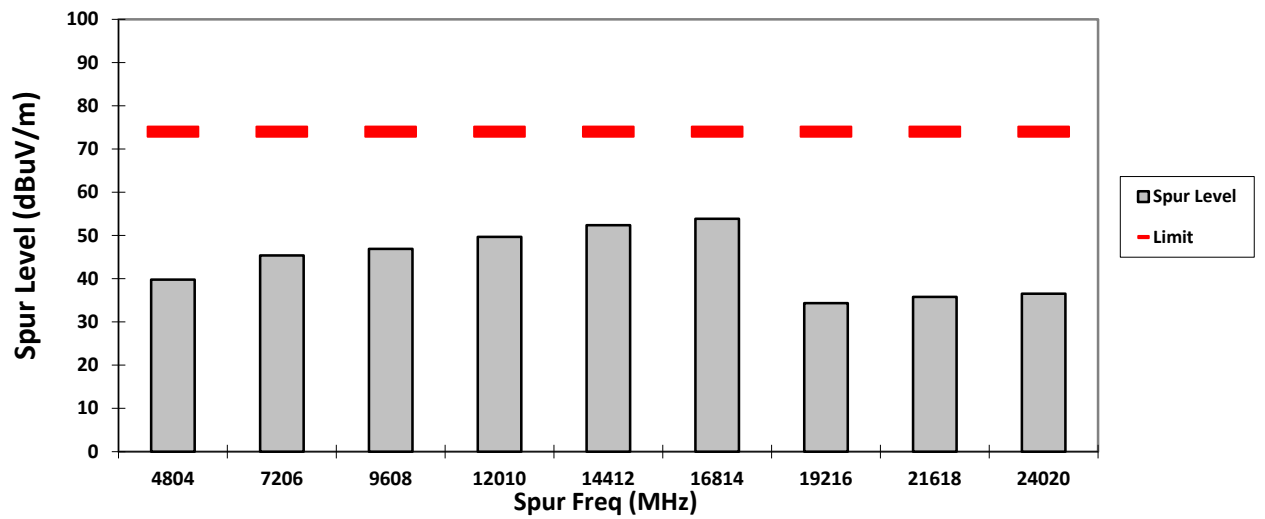
### HORIZONTAL, QPK



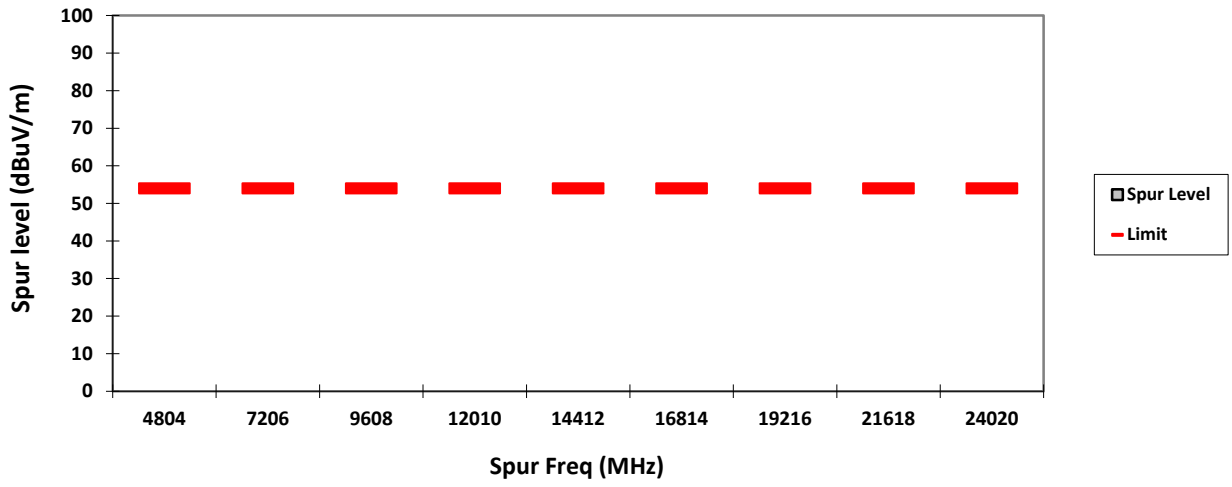
### VERTICAL, PK



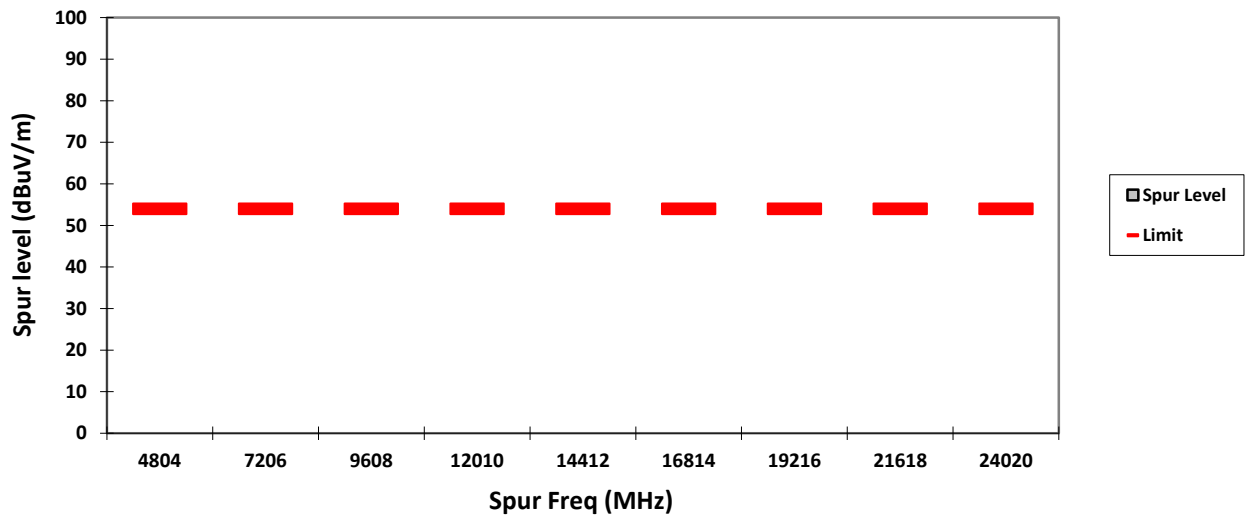
### HORIZONTAL, PK



### VERTICAL, AV



### HORIZONTAL, AV



**Test: Bluetooth SAC Transmitter Radiated Emission**  
**Model#: AAH88YCD9SA2AN**      **S/N: 130TTK0170**      **EMC SR ID#: 06404-EMC-00002**  
**Battery: PMNN4468A**      **Accessory: NA**  
**Test Channel: Mid**      **Test Frequency: 2440.0000 MHz**      **Test Standard: ANSI C63.10-2013**  
**Worst Case Plane: X-Plane (BT LE)**

**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	-	40.7570**	**	-	74	54	-	33.24**	-	-
7320	-	44.9376**	**	-	74	54	-	29.06**	-	-
9760	-	44.3084**	**	-	74	54	-	29.69**	-	-
12200	-	50.5492**	**	-	74	54	-	23.45**	-	-
14640	-	51.7549**	**	-	74	54	-	22.25**	-	-
17080	-	54.8665**	**	-	74	54	-	19.13**	-	-
19520	-	35.9033**	**	-	74	54	-	38.10**	-	-
21960	-	36.9786**	**	-	74	54	-	37.02**	-	-
24400	-	35.3427**	**	-	74	54	-	38.66**	-	-
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	-	40.9712**	**	-	74	54	-	33.03**	-	-
7320	-	45.5955**	**	-	74	54	-	28.40**	-	-
9760	-	44.5934**	**	-	74	54	-	29.41**	-	-
12200	-	51.2165**	**	-	74	54	-	22.78**	-	-
14640	-	52.3018**	**	-	74	54	-	21.70**	-	-
17080	-	54.6085**	**	-	74	54	-	19.39**	-	-
19520	-	34.2971**	**	-	74	54	-	39.70**	-	-
21960	-	36.4339**	**	-	74	54	-	37.57**	-	-
24400	-	35.3104**	**	-	74	54	-	38.69**	-	-

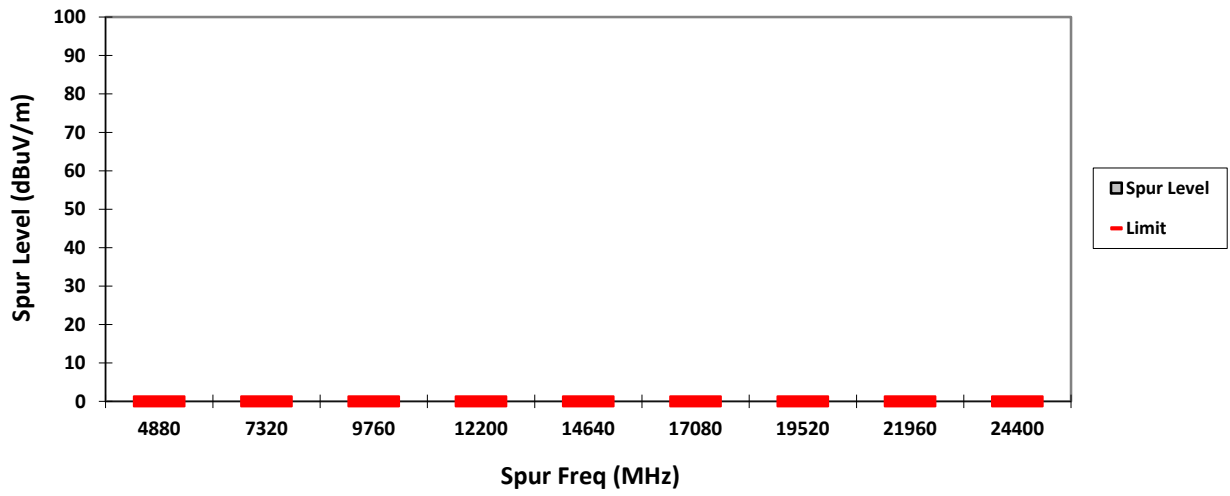
Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

**Temperature (degC): 22.3**      **Humidity (%): 71.5**  
**Test Performed by: Nazrin&Qawiman**      **Test Date: Fri, May 26, 2017**  
**System MU: 5.01dB**      **Duty Cycle (%): < 77**

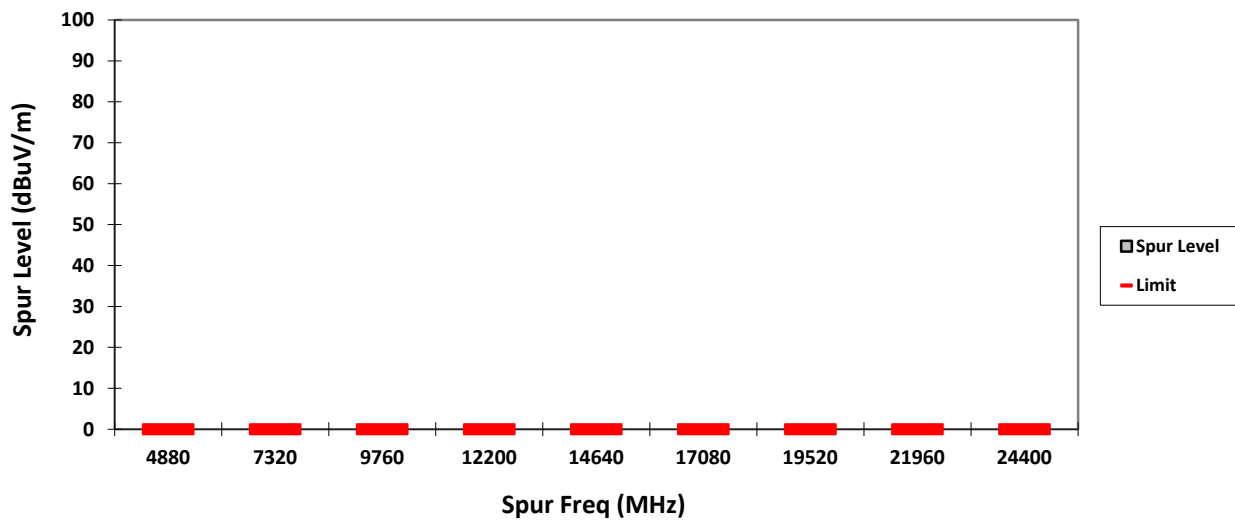
**Remarks: \*\* Indicates the spurious emission could not be detected due to noise limitations or ambient.**  
**\*Pursuant to CFR 47 Part 2.1057 ( c ), emissions attenuated more than 20 dB below the permissible limit are not reported.**



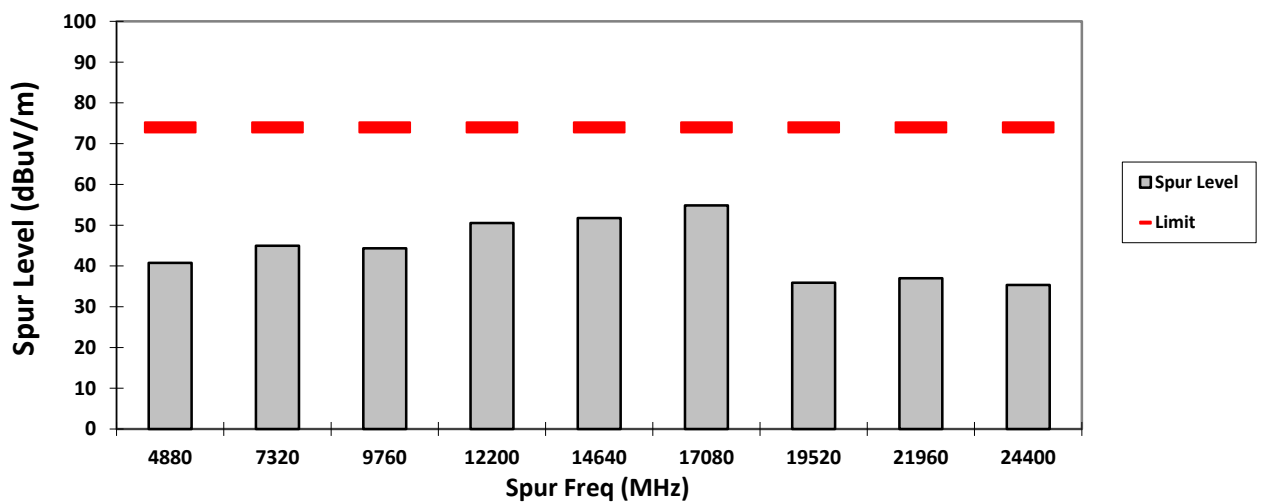
### VERTICAL, QPK



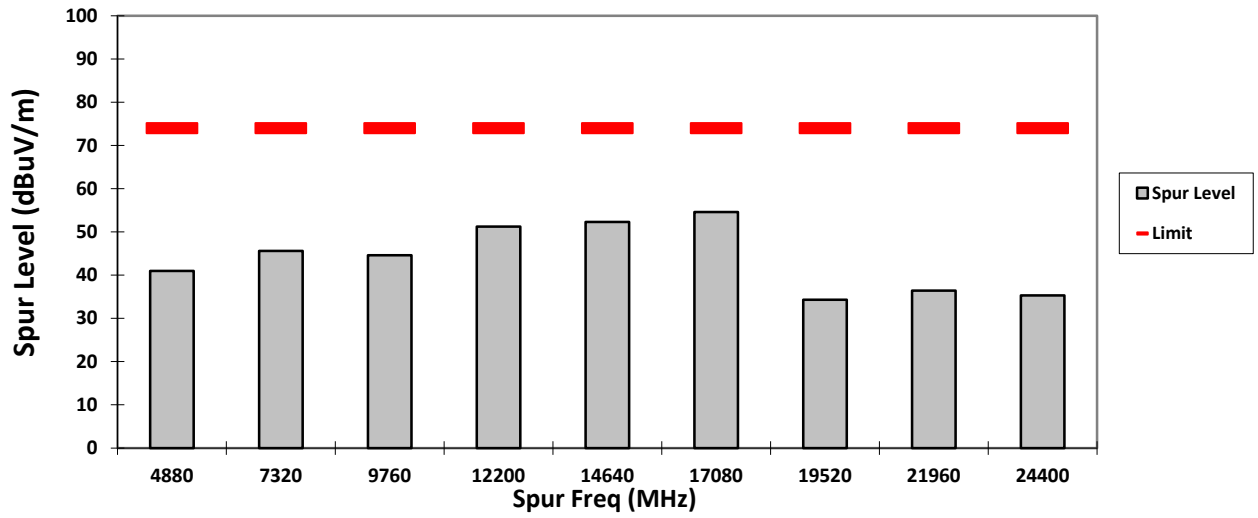
### HORIZONTAL, QPK



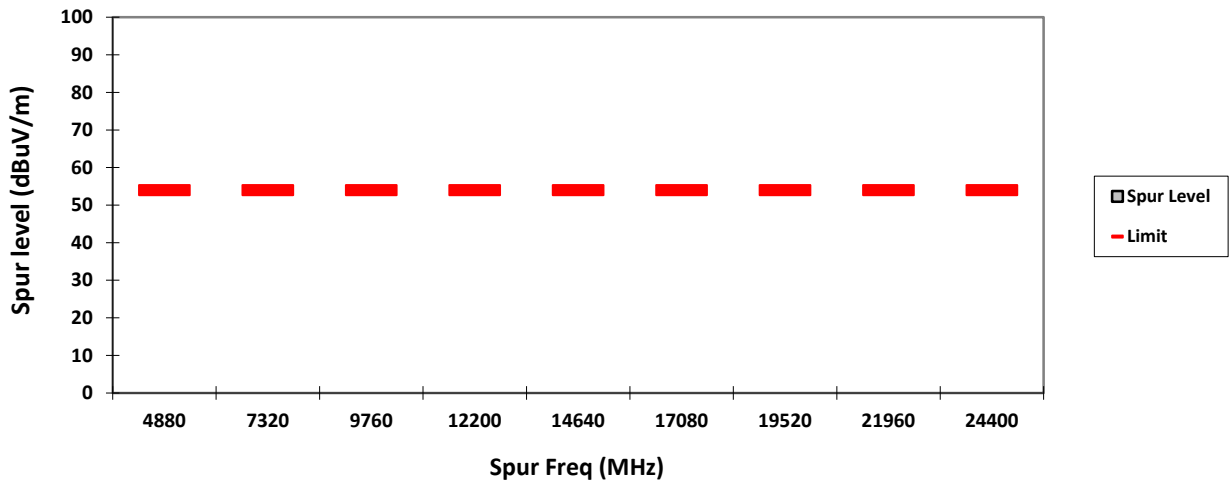
### VERTICAL, PK



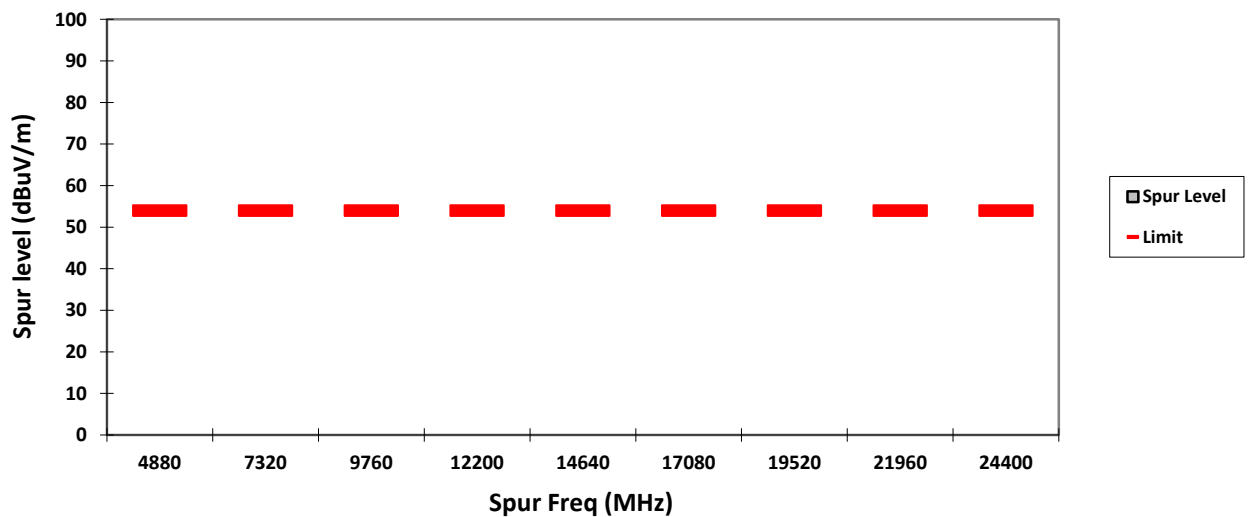
### HORIZONTAL, PK



### VERTICAL, AV

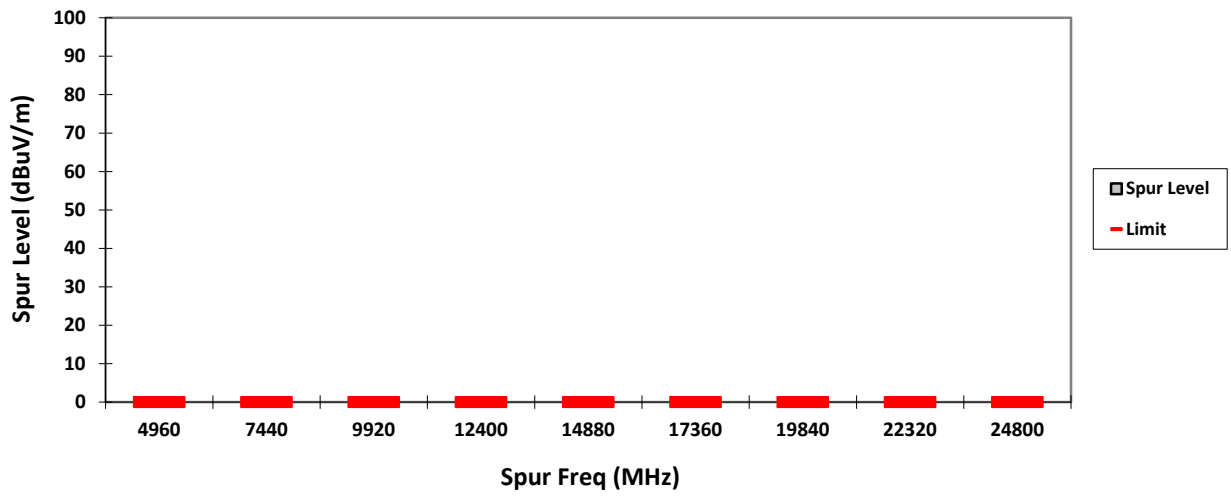


### HORIZONTAL, AV

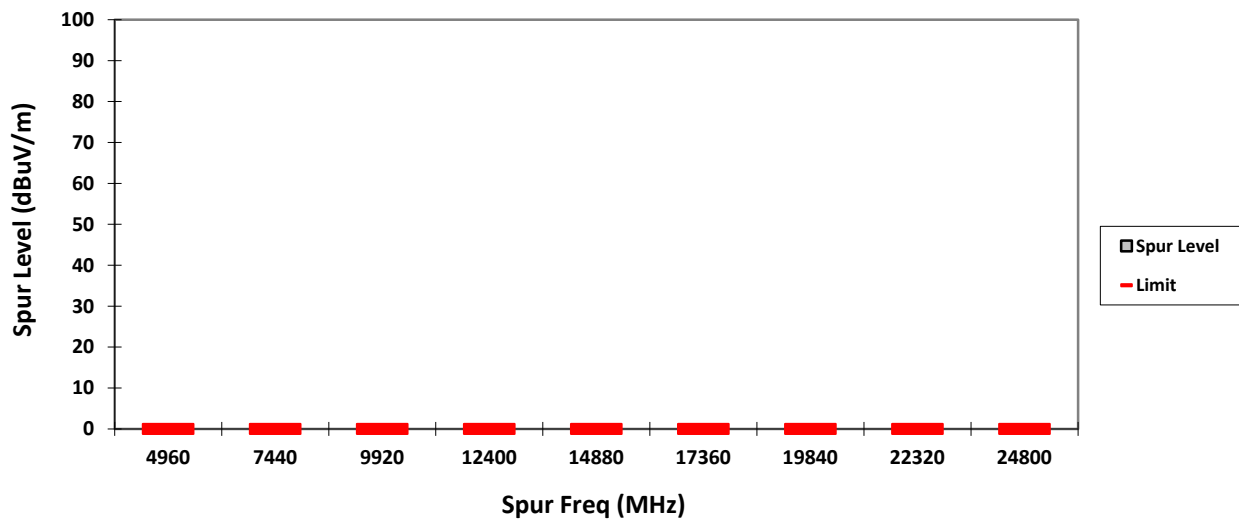




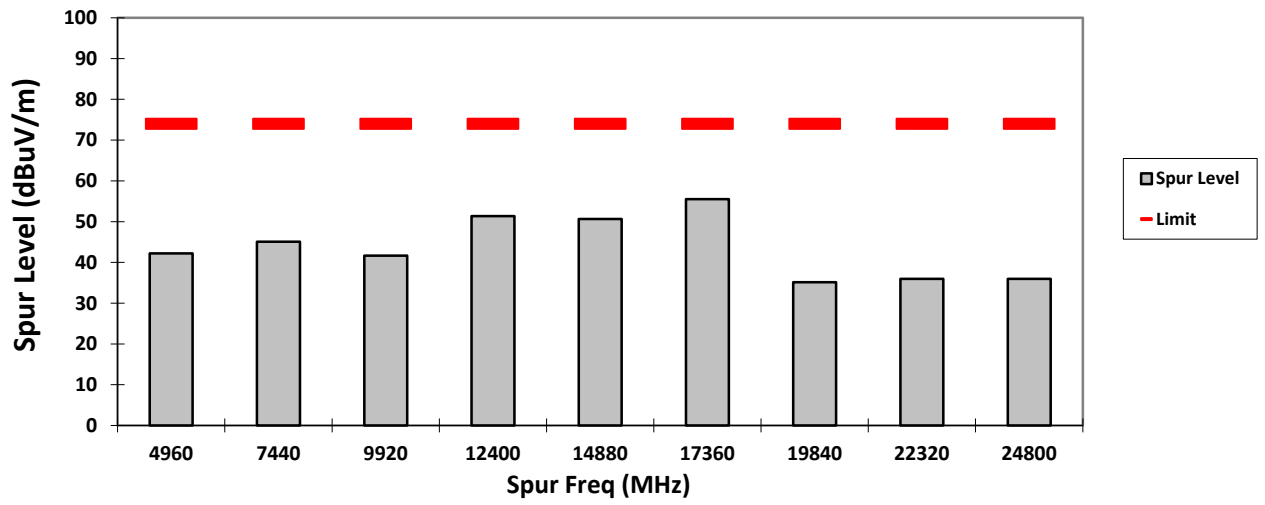
### VERTICAL, QPK



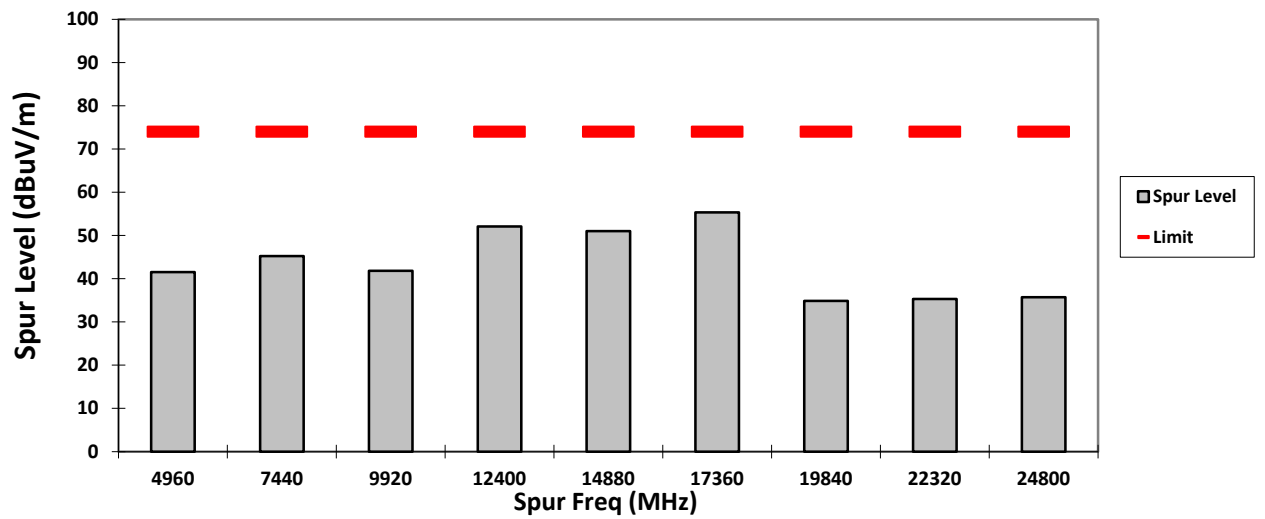
### HORIZONTAL, QPK



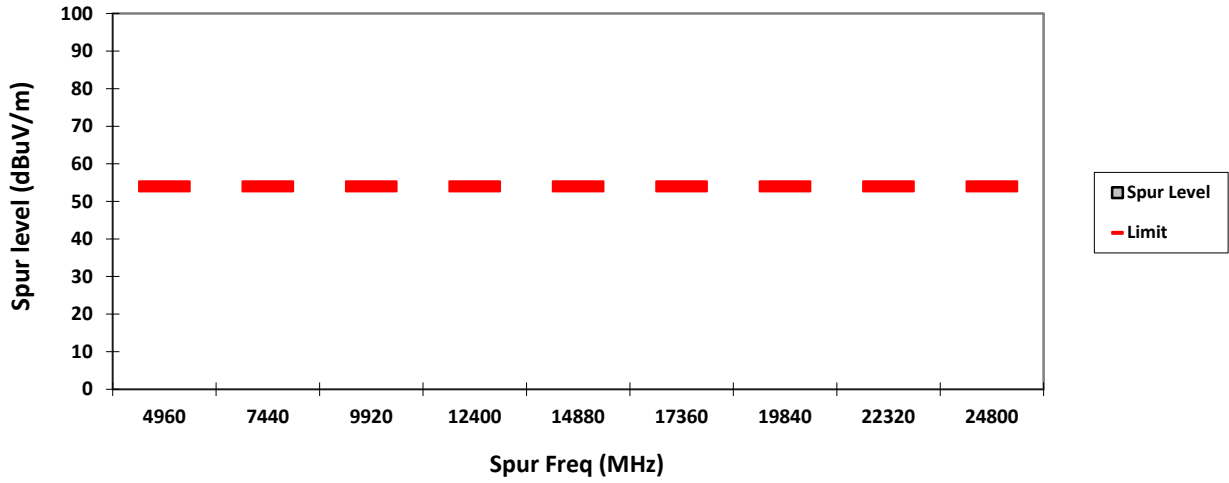
**VERTICAL, PK**



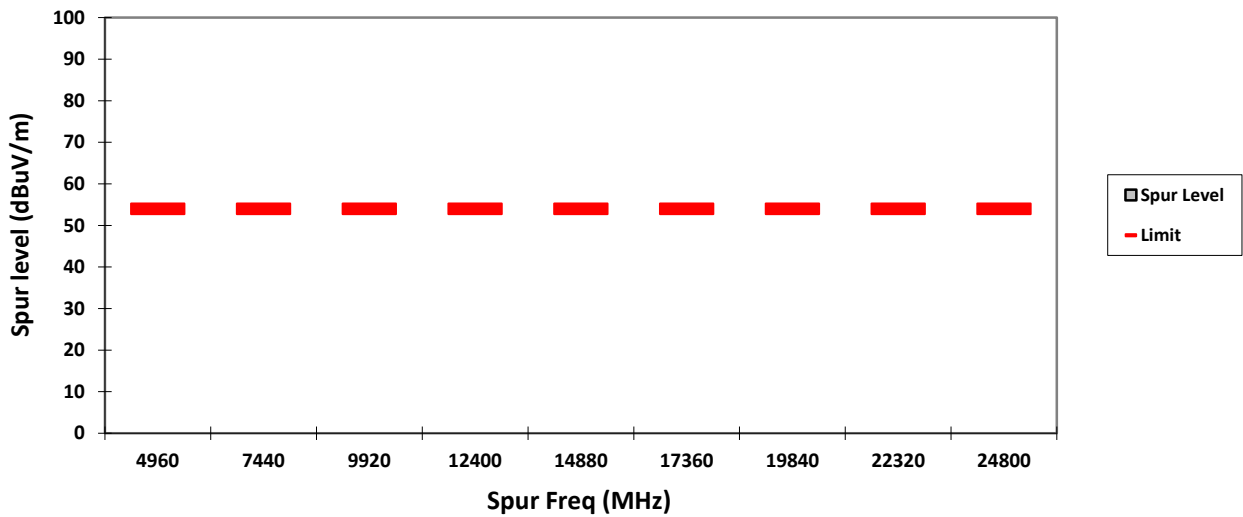
**HORIZONTAL, PK**



**VERTICAL, AV**



**HORIZONTAL, AV**



**NOTE:**

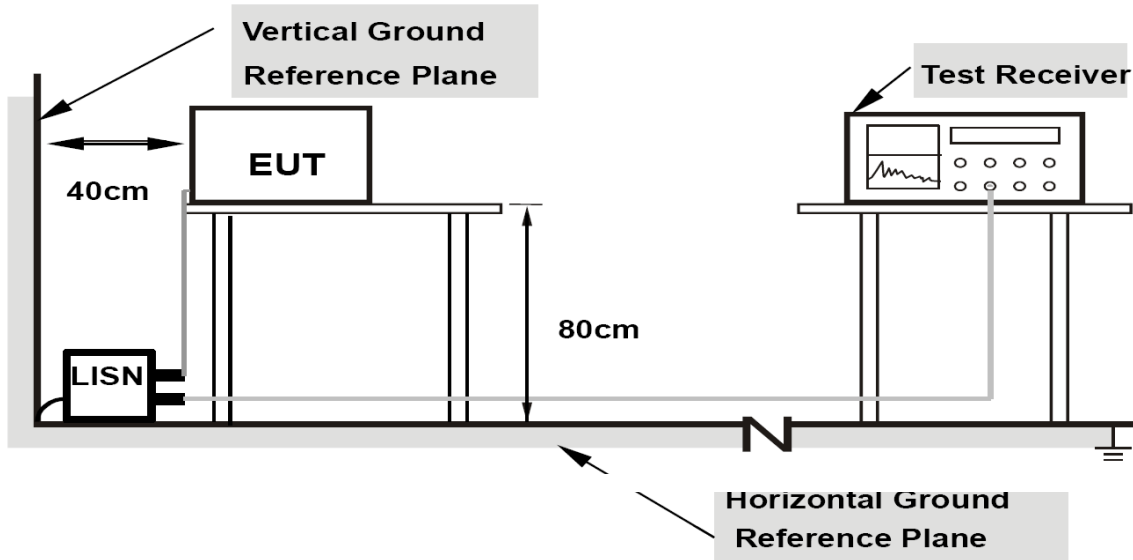
Transmitter Duty Cycle Calculation, FCC Rule 15.35 (b,c)

Based on the Bluetooth Specification Version 2.1+EDR, and worst case AFH mode, transmitter ON time is independent of packet type (DH1, DH3 and DH5) and packet length, the AFH mode Duty cycle connection factor as below:

- Channel hop rate = 800 hops/second (AFH Mode)
- Adjusted channel hop rate for DH5 mode = 133.33 hops/second
- Time per channel hop = 1 / 133.33 hops/second = 7.5 ms
- Time to cycle through all channels = 7.5 x 20 channels = 150 ms
- Number of times transmitter hits on one channel = 100 ms / 150 ms = 1 time(s)
- Worst case dwell time = 7.5 ms
- Duty cycle connection factor =  $20\log_{10}(7.5\text{ms} / 100\text{ms}) = -22.5 \text{ dB}$

## 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( $\mu$ 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( $\mu$ 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

**Not Applicable. Testing is not required, radio shall turn off during charging mode.**