MOTOROLA SOLUTIONS

MS ISO/IEC 17025
TESTING
SAMM No. 0825

MOTOROLA PENANG ADV. COMM. LABORATORY
Motorola Solutions Malaysia Sdn. Bhd.
Innoplex Plot 2A Medan Bayan Lepas,
Mukim 12, S.W.D. 11900 Bayan Lepas,
Penang, Malaysia.

FCC / IC TEST REPORT
Report Revision : Rev.B

Date/s Tested	:	14-September-2018 – 24-September-2018
Report Issue Date	:	25-September-2018
Manufacturer/Location	:	Motorola Solutions – Penang
Requestor	:	TAN, CHIN FONG
Product Type	:	Portable
Model Number	:	AZH63UCH6TZ8AN
Frequency Band	:	2.402 – 2.480 GHz
Rated / Max RF Output Power	:	2.00 mWatts / 2.51 mWatts
Applicant Name	:	Motorola Solutions Inc.
Applicant Address	:	Innoplex Plot 2A, Medan Bayan lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia
IC Registrations	:	109AK
FCC Test Firm Registrations	:	461337

The equipment was tested accordance to the requirement listed below:

(2.4GHz BT LE)	**PASS**
Part 15C	
IC RSS 247	

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Prepared By:

Sharmila Jegatheesan
Test Personnel

Approved By:

Vincent Foong
Responsible Engineer

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	25-September-2018	Sharmila Jegatheesan
Rev. B	Addressed TCB issues dated Nov 13 2018	23-November-2018	Vincent Foong

1.0 General Information

EUT Description:

Technologies	2.4GHz BT LE
TX Frequency range	2402MHz – 2480MHz
Modulation Type	GFSK
Input/Output	RF Port
Connector type	PROGRAMMING, TEST & ALIGNMENT CABLE
Antenna type	BLUETOOTH ANTENNA KIT

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 IMPRES2 LIION IP68 3400T	MOTOROLA	PMNN4522A
RS232 DATA CABLE	MOTOROLA	PMKN4122A

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 General Rules Part (47CFR)	IC General Rules Part	Test Item	Result	Remark
15.205, 15.209, 15.247 (d)	RSS247 5.5	Radiated Emission within Restricted Bands	Pass	Worst case emission: 54.25 dBμV/m
15.207	RSS-Gen 8.8	AC Power Line Conducted Spurious Emission	NA	NA
15.247 (b)(3)	RSS 247 5.4 (4)	Conducted RF Output Power (Peak)	Pass	Highest output power: 3.30 dBm
15.247 (a)(2)	RSS 247 5.2 (1)	6dB Channel Bandwidth	Pass	Highest 99% OCB: 1.10 MHz (1M10F1D)
15.247 (d)	RSS-247 5.5	Band-Edge Conducted Spurious Emission	Pass	Worst case emission: -56.37 dBm
15.247 (b)	RSS-247 5.5	Conducted Spurious Emission	Pass	Worst case emission: -40.01 dBm
15.247(e)	RSS 247 5.2 (2)	Maximum Peak Power Spectral Density	Pass	Highest PSD: 3.47 dBm
15.203	-	Antenna Requirement	NA	Internal antenna is not accessible to the end-user

3.0. Measurement Uncertainty

Measurement	Frequency	Expended 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
BLUETOOTH ATE # 1				
POWER SUPPLY	6652A	MY40001437	17-Aug-17	17-Aug-19
SPECTRUM ANALYZER	FSEK30	838495/014	11-July-18	11-July-19
SPECTRUM ANALYZER	E4445A	MY46181597	21-Dec-16	21-Dec-18
10dB ATTENUATOR	33.10.34	NA	Not Required	Not Required
RF CABLE	SUCOFLEX 104	MY27726/4	Not Required	Not Required

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

DESCRIPTION	MODEL	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
EMC CHAMBER # 1				
DRG HORN FREQ.	SAS-571	719	18-July-17	18-July-19
DRG HORN FREQ.	SAS-571	720	02-Mar-17	02-Mar-19
POWER SUPPLY	6032A	2615A-01178	13-Jun-18	13-Jun-19
MICROWAVE SIGNAL GENERATOR	SMP04	100131	12-July-18	11-July-19
EMI TEST RECEIVER	ESIB40	100307	08-July-18	08-July-19
EMI TEST RECEIVER	ESW44	101750	25-Jun-18	25-Jun-19
5m SEMI-ANECHOIC CHAMBER	S800-HX	J2308	Not Required	Not Required
BILOG ANTENNA	CBL6112D	30991	23-Apr-18	23-Apr-19
BILOG ANTENNA	CBL6112B	2964	16-Feb-18	16-Feb-20
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	07-Nov-17	07-Nov-18
DATA LOGGER	SDL500	A.016776	18-Mar-17	18-Mar-19
LOOP ANTENNA	6502	203479	08-Aug-17	08-Nov-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	Miteq Hi Gain Sucoflex	2	Not Required	Not Required
PREAMPLIFIER	PAM-0118P	361	Not Required	Not Required
AUDIO ANALYZER	8903B	3729A17397	03-Apr-18	03-Apr-19
HIGH PASS FILTER	TRILITHIC INC	200551043	Not Required	Not Required
RF CABLE #8	SUCOFLEX 106P	500083/6P	Not Required	Not Required
RF CABLE #3	SUCOFLEX 106P	500175/6P	Not Required	Not Required
TEST SOFTWARE	EMC_FCC_IC_Bluetooth_RE_Test			
VERSION	EMC_FCC_RE_v1.5.1			

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).

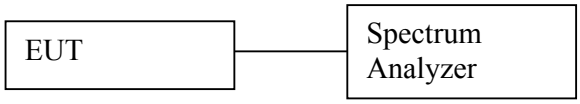
☒Following channel(s) was (were) selected for the final test as listed below.

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



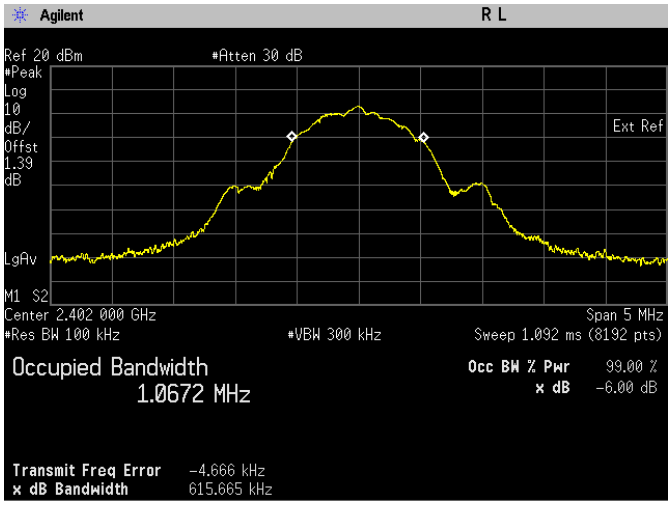
1) Check and ensure the spectrum analyzer well calibrate.
2) Turn on the DUT and set DUT to transmit maximum power.
3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
4) Setting of Spectrum analyzer :
    a. RBW = 100 kHz
    b. VBW = 300 kHz
    c. Detector mode = Peak
  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

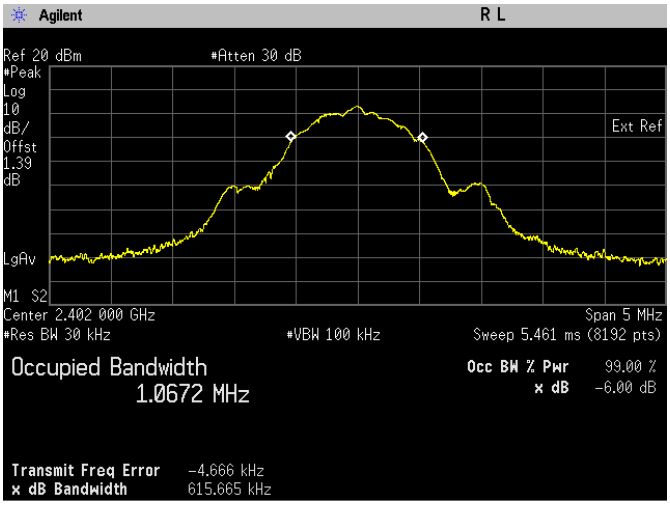
Normal Condition (25 º C)
≥500 kHz

6.1.3 Test Data:

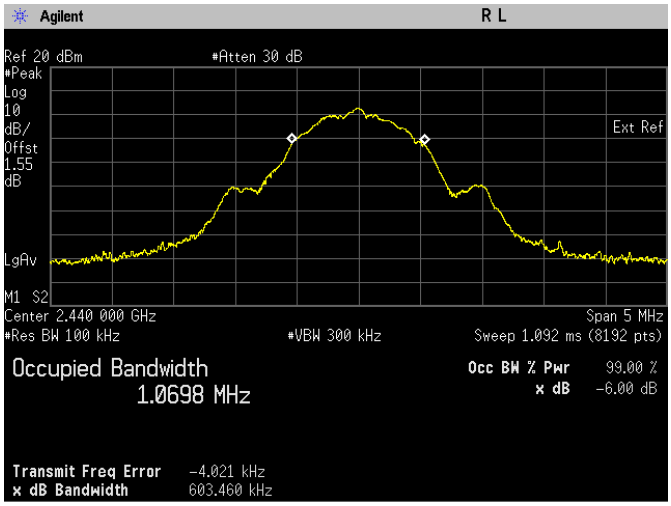
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
Bluetooth L.E	GFSK	2402	0.616	1.067	Pass
Bluetooth L.E	GFSK	2440	0.603	1.070	Pass
Bluetooth L.E	GFSK	2480	0.609	1.067	Pass



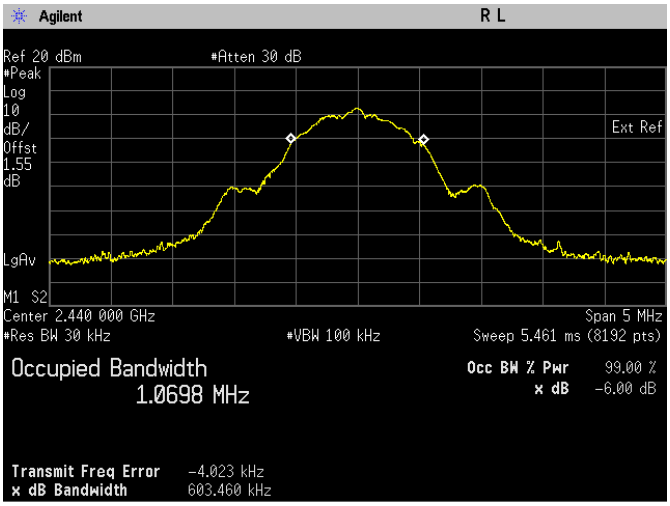
6dB Bandwidth. Bluetooth LE
Frequency 2402 MHz



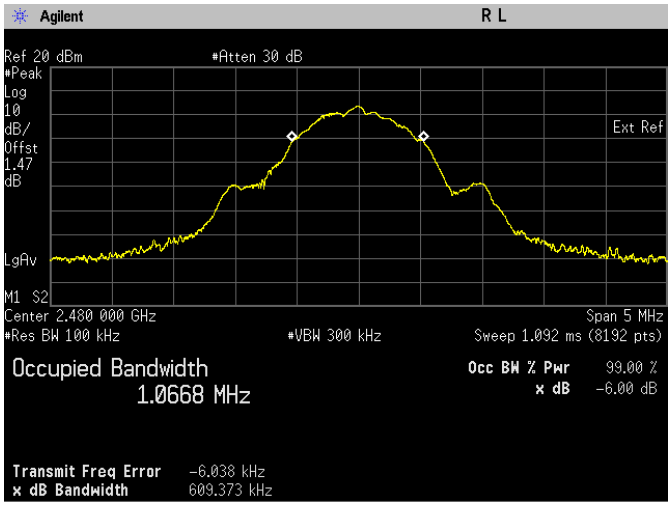
99% Bandwidth. Bluetooth LE
Frequency 2402 MHz



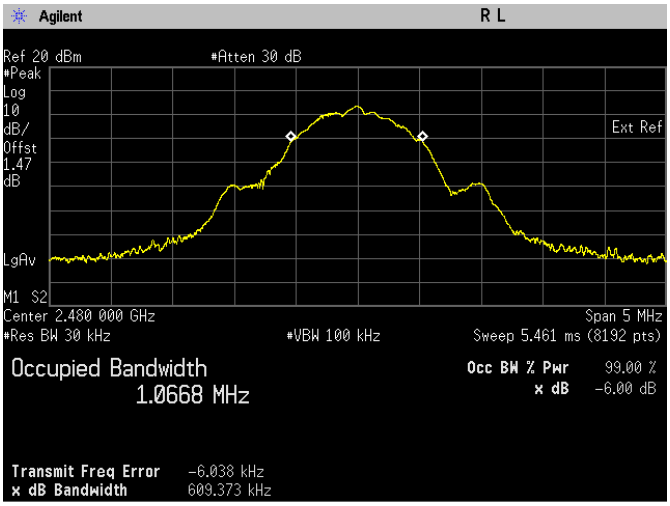
6dB Bandwidth. Bluetooth LE
Frequency 2440 MHz



99% Bandwidth. Bluetooth LE
Frequency 2440 MHz



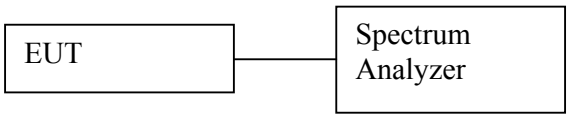
6dB Bandwidth. Bluetooth LE
Frequency 2480 MHz



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 = 1%-5% of the OBW
    b. Set the VBW ≥ [3 × RBW].
    c. Set the span ≥ [1.5 × OBW bandwidth].
    d. Detector = average.
    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)

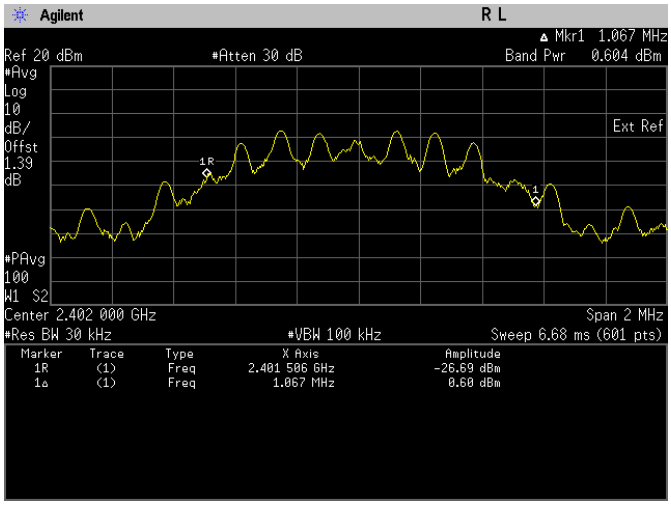
6.2.2 Test Limits:

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

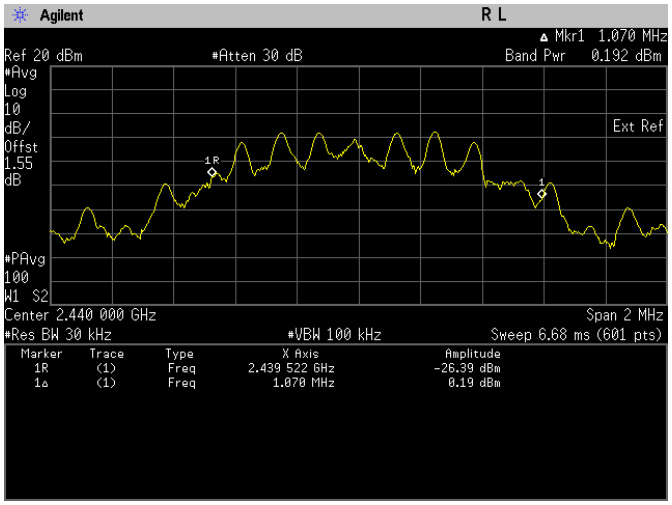
6.2.3 Test Data:

Test Conditions			Test Frequency	Results
Standard	Modulation Type	Tx (MHz)	Output Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2.475	Pass
Bluetooth L.E	GFSK	2440	2.063	Pass
Bluetooth L.E	GFSK	2480	3.342	Pass

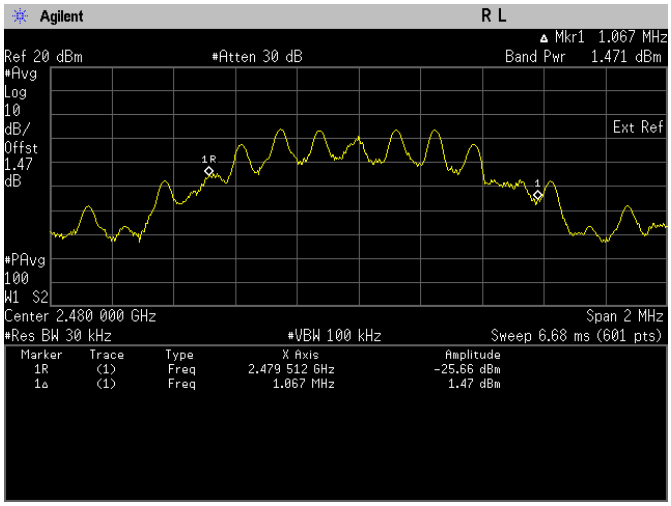
***Power =Band Pwr +[10log(1/Duty cycle)]**
Duty Cycle =0.6499
Power= Band Pwr +1.871dBm



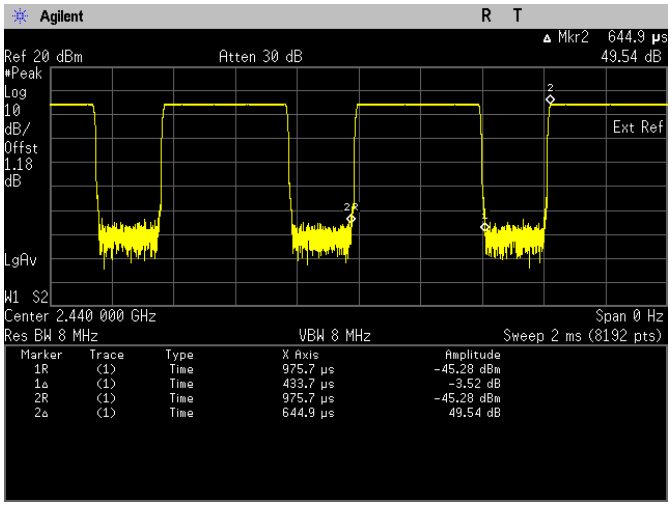
Maximum Conducted average Output Power.
Bluetooth LE Frequency 2402 MHz



Maximum Conducted average Output Power.
Bluetooth LE Frequency 2440 MHz



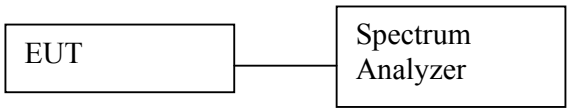
Maximum Conducted average Output Power.
Bluetooth LE Frequency 2480 MHz



Duty Cycle

6.3 Maximum Peak Power Spectral Density

6.3.1 Test Setup



Maximum Peak

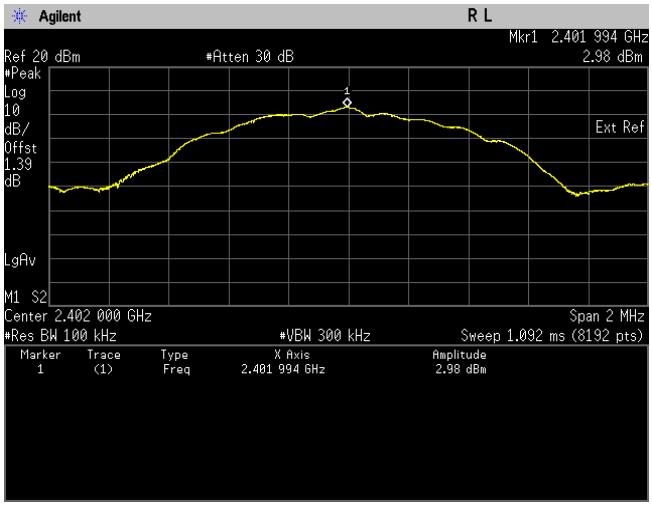
1) Check and ensure the spectrum analyzer well calibrate.
2) Turn on the DUT and set DUT to transmit maximum power.
3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
4) Setting of Spectrum analyzer :
    a. Set analyzer center frequency to DTS channel center frequency.
    b. Set the span to 1.5 times the DTS bandwidth.
    c. Set the RBW to 100 kHz.
    d. Set the VBW ≥ [3 × 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.
5) Convert final result from (dBm/100kHz) → (dBm/3kHz).

6.3.2 Test Limits:

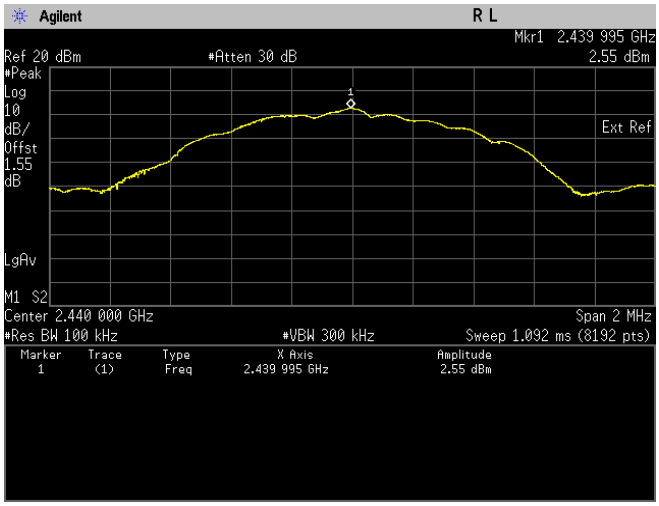
Normal Condition (25 º C)
≤ 8 dBm/3kHz

6.3.3 Test Result

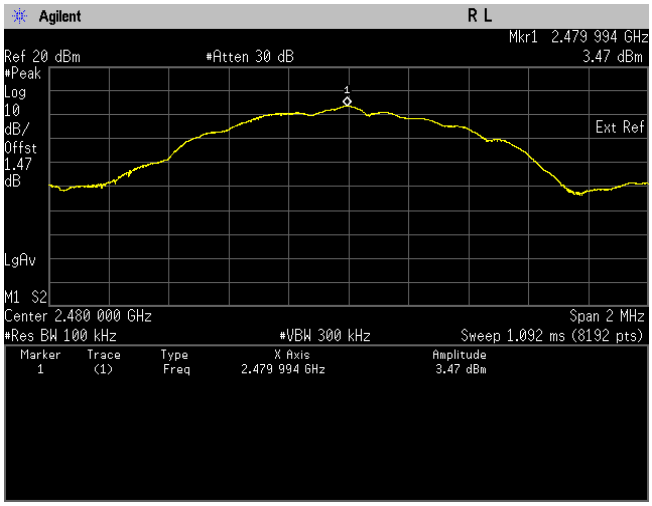
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	Power (dBm/100kHz)	Power (dBm/3kHz)	Status
Bluetooth L.E.	GFSK	2402	2.98	-12.25	Pass
Bluetooth L.E.	GFSK	2440	2.55	-12.68	Pass
Bluetooth L.E.	GFSK	2480	3.47	-11.76	Pass



Maximum Power Spectral Density.
Bluetooth LE Frequency 2402 MHz



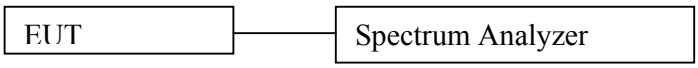
Maximum Power Spectral Density.
Bluetooth LE Frequency 2440 MHz



Maximum Power Spectral Density.
Bluetooth LE Frequency 2480 MHz

6.4 Conducted Spurious Emission

6.4.1 Test Setup



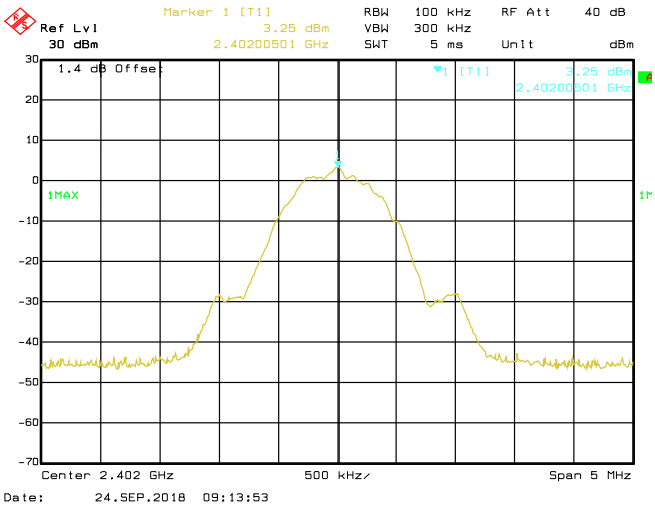
1) Check and ensure the spectrum analyzer well calibrate.
2) Turn on the DUT and set DUT to transmit maximum power.
3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
4) Setting of Spectrum analyzer :
   a. RBW = 100 kHz
   b. VBW = 300 kHz
   c. Detector mode = Peak
   d.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

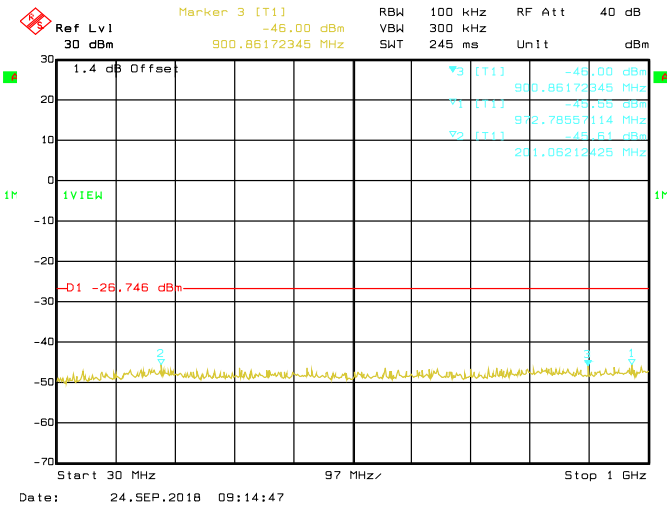
Normal Condition (25 º C)
Shall be at least 30 dB below peak (max) power.

6.4.3 Test Result

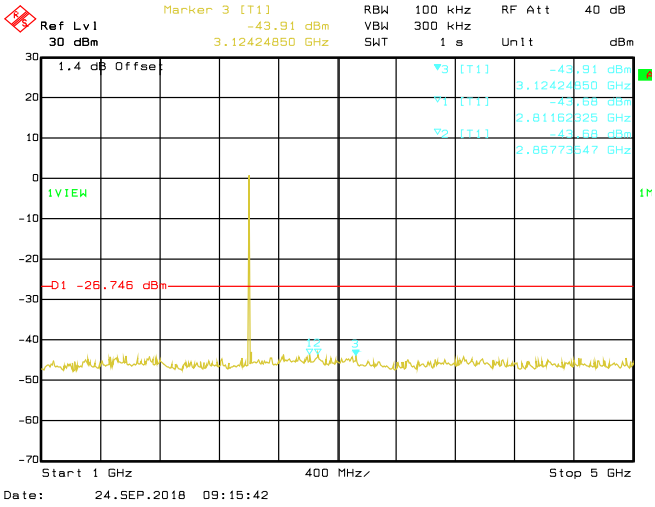
Test Conditions			Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
Bluetooth L.E.	GFSK	2402	22625.25	-40.01	Pass
			14188.38	-40.27	Pass
			6993.99	-41.11	Pass
Bluetooth L.E.	GFSK	2440	14188.38	-40.25	Pass
			6973.95	-40.78	Pass
			22625.25	-40.96	Pass
Bluetooth L.E.	GFSK	2480	14188.38	-40.18	Pass
			15671.34	-40.75	Pass
			22605.21	-41.35	Pass



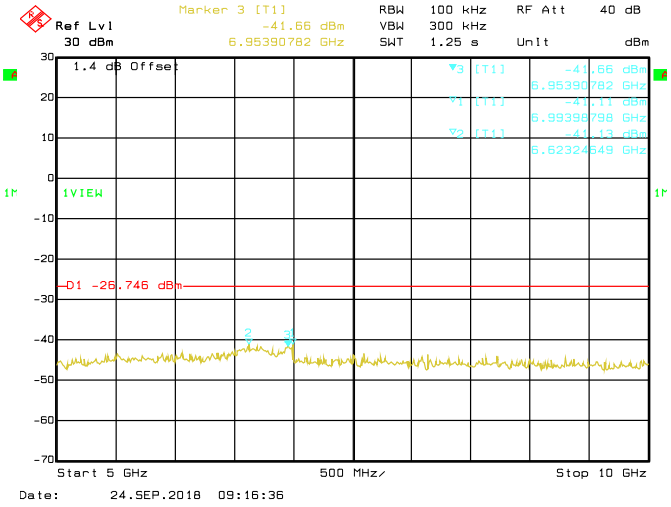
Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Reference Level



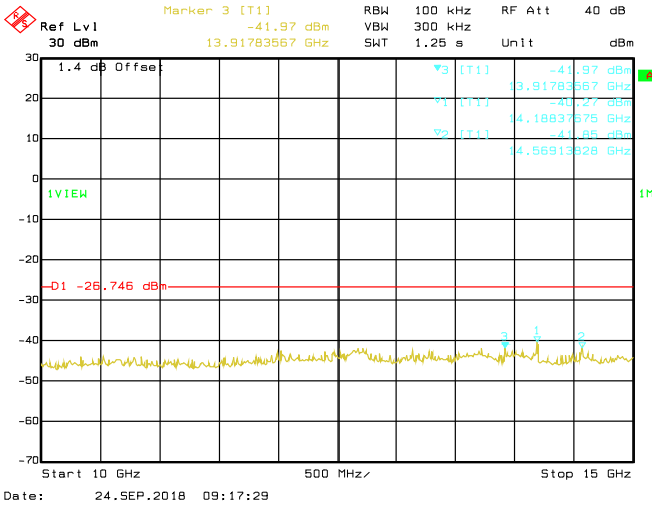
Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 30 MHz -> 1 GHz



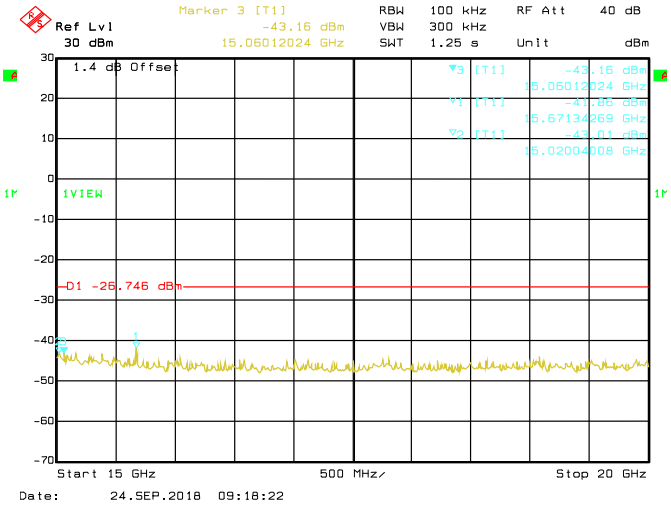
Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 1 GHz -> 5 GHz



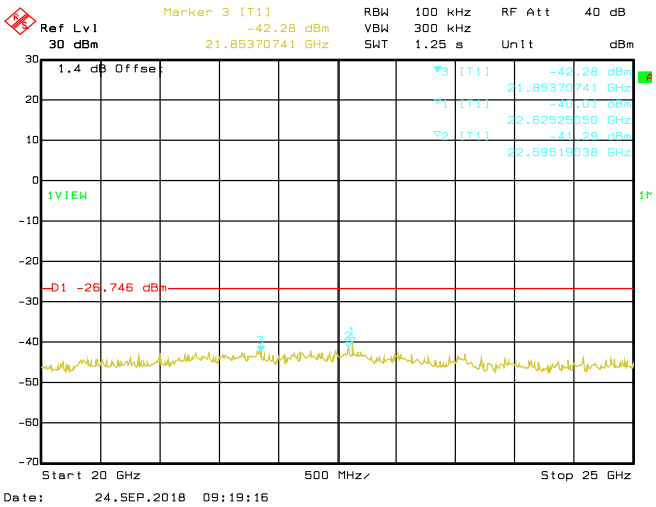
Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 5 GHz -> 10 GHz



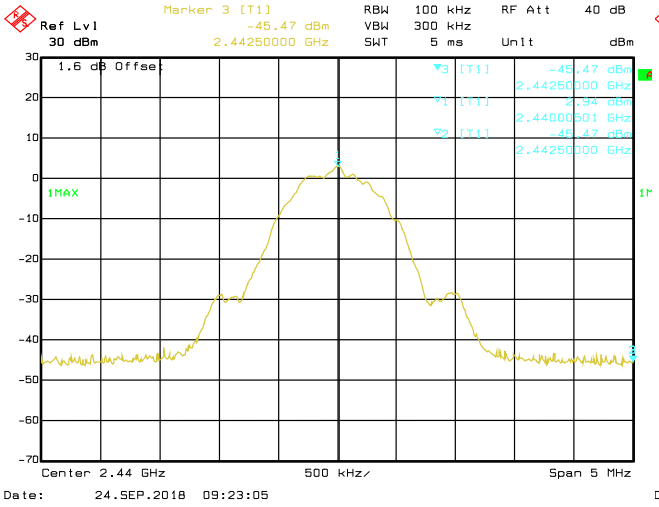
Conducted Emissions. Bluetooth LE, Frequency 2402 Emission Level, 10 GHz -> 15 GHz



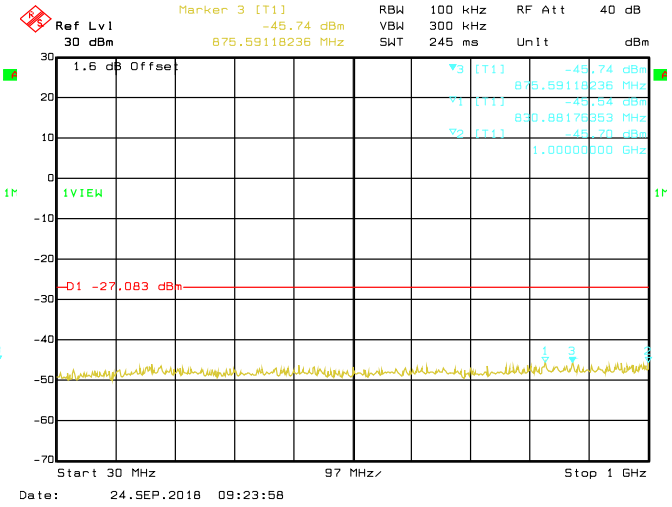
Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 15 GHz -> 20 GHz



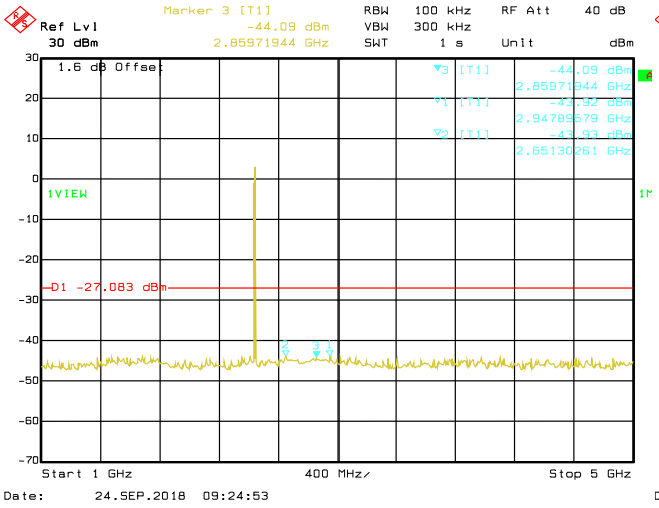
Conducted Emissions. Bluetooth LE, Frequency 2402 MHz Emission Level, 20 GHz -> 25 GHz



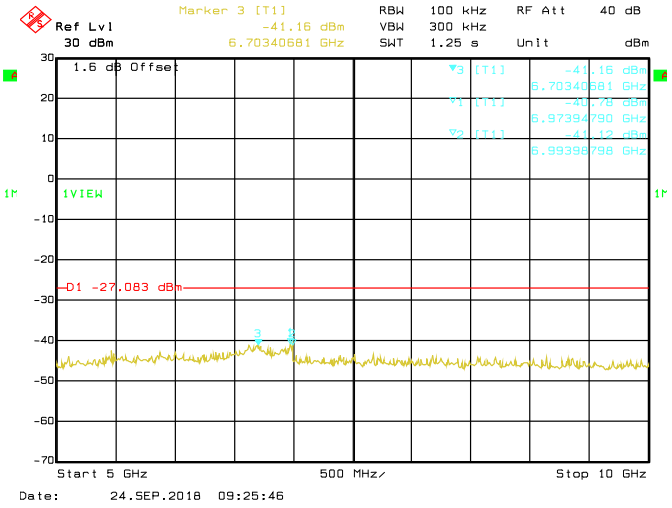
Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Reference Level



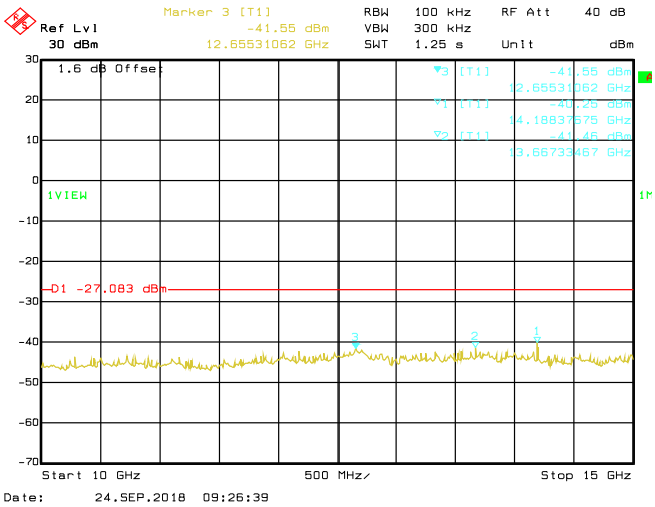
Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Emission Level, 30 MHz -> 1 GHz



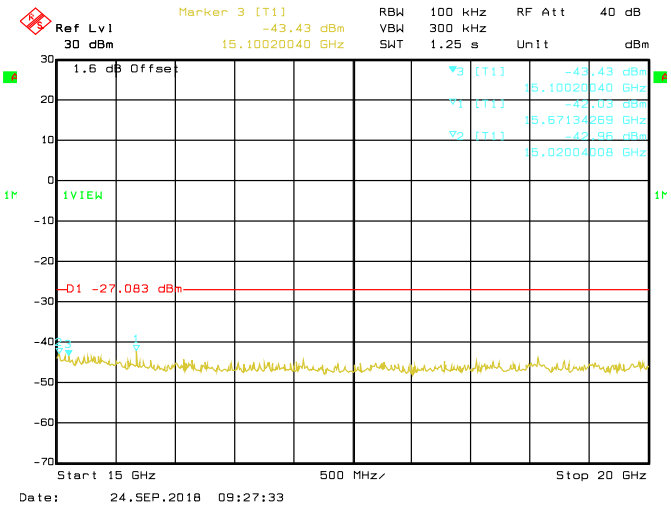
Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Emission Level, 1 GHz -> 5 GHz



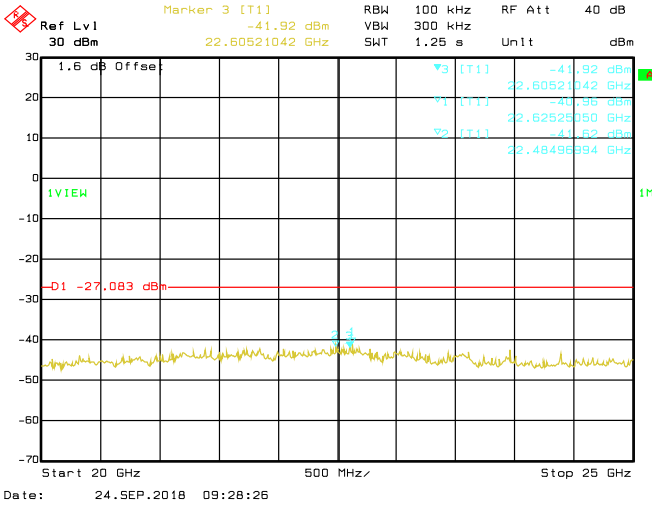
Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Emission Level, 5 GHz -> 10 GHz



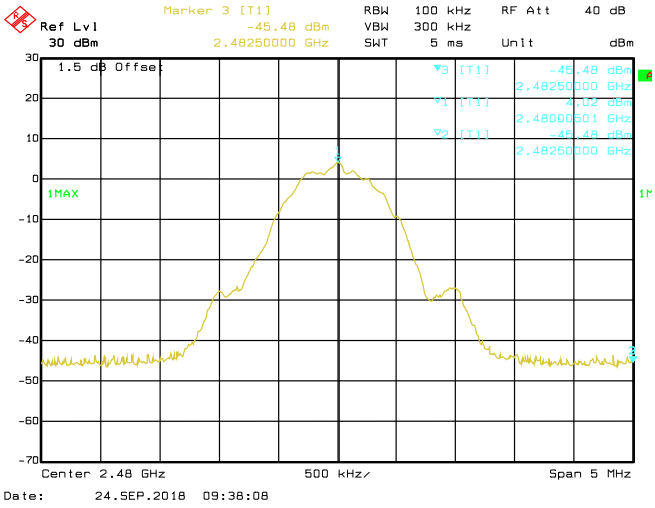
Conducted Emissions. Bluetooth LE, Frequency 2440 Emission Level, 10 GHz -> 15 GHz



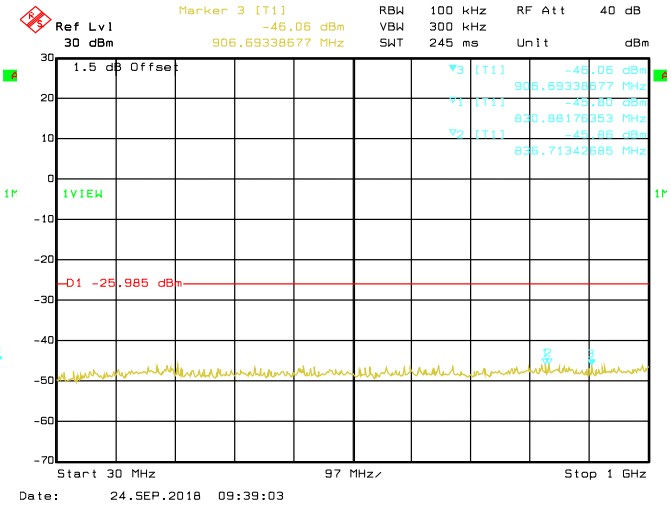
Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Emission Level, 15 GHz -> 20 GHz



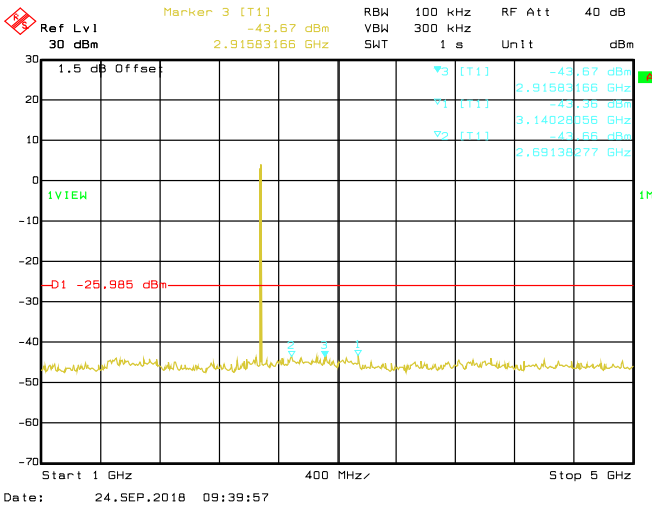
Conducted Emissions. Bluetooth LE, Frequency 2440 MHz Emission Level, 20 GHz -> 25 GHz



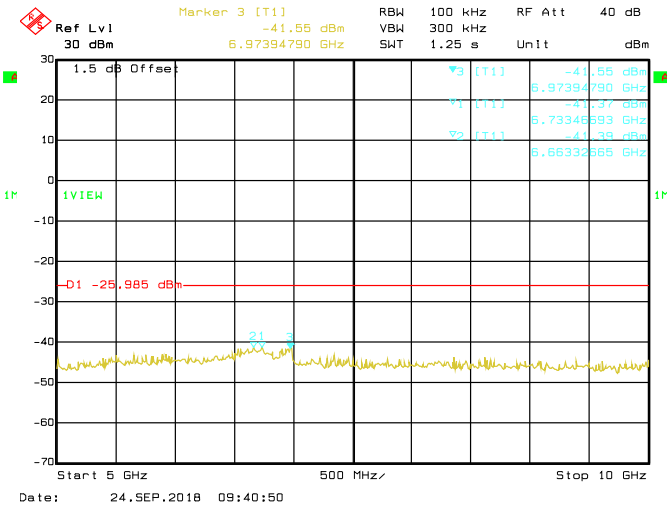
Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Reference Level



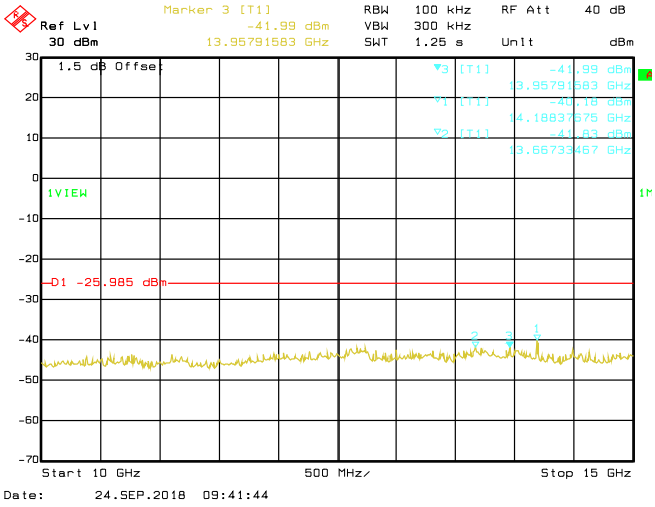
Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 30 MHz -> 1 GHz



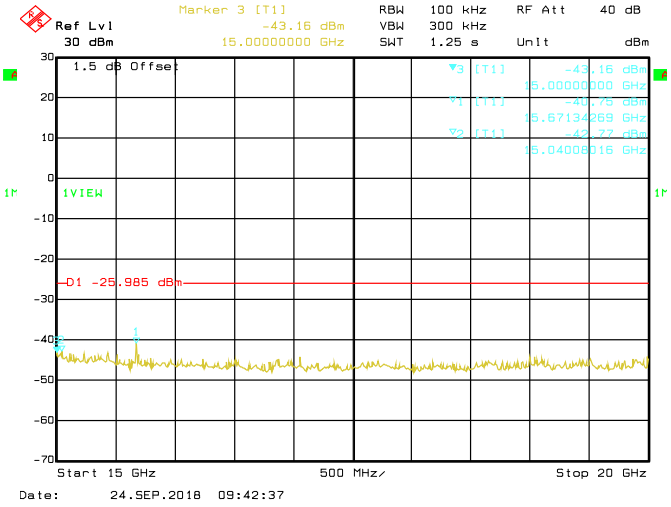
Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 1 GHz -> 5 GHz



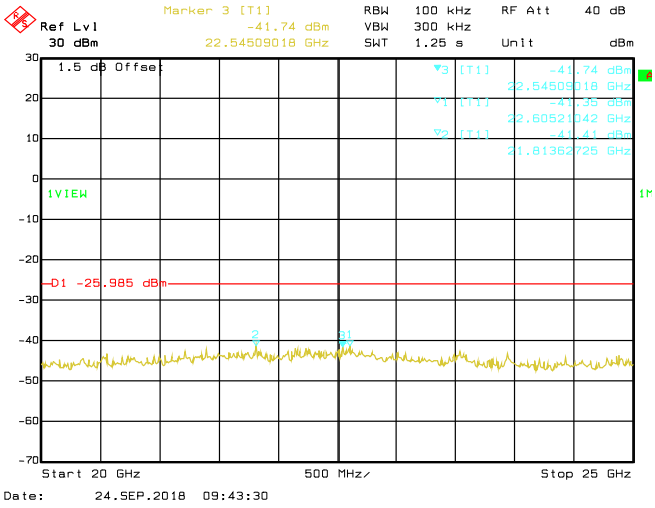
Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions. Bluetooth LE, Frequency 2480 Emission Level, 10 GHz -> 15 GHz



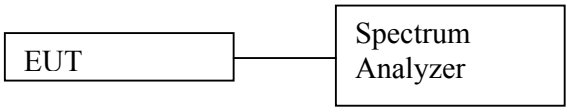
Conducted Emissions. Bluetooth LE, Frequency 2480 MHz Emission Level, 15 GHz -> 20 GHz



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



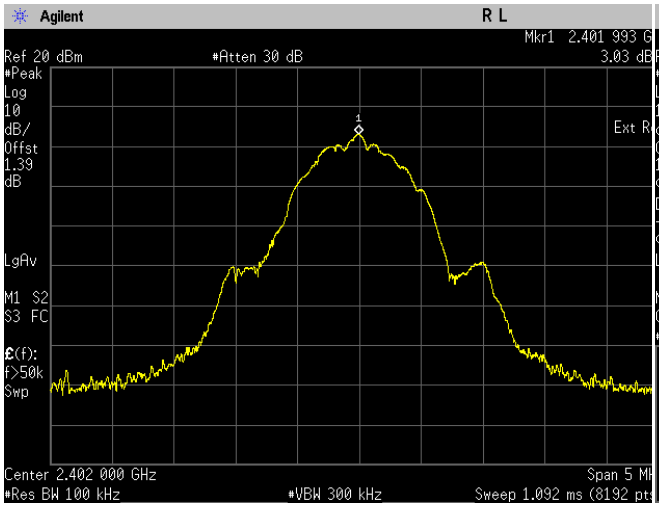
a) Check and ensure the spectrum analyzer well calibrate.
b) Turn on the DUT and set DUT to transmit maximum power.
c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
d) Setting of Spectrum analyzer :
    a. RBW = 100 kHz
    b. VBW = 300 kHz
    c. Detector mode = Peak
  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

6.5.2 Test Limits:

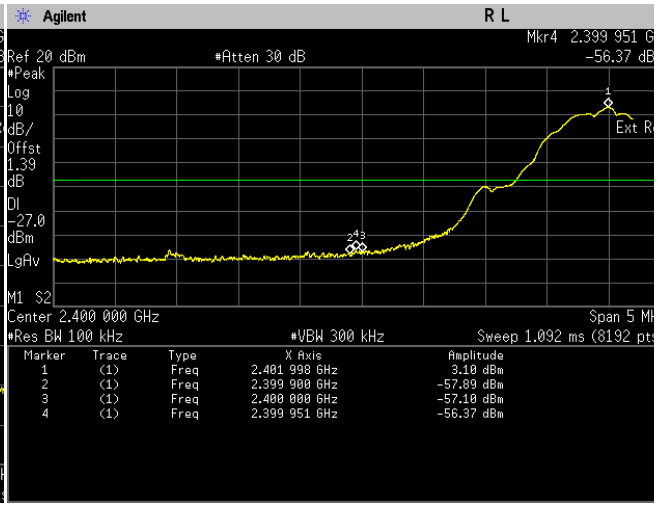
Normal Condition (25 º C)
Shall be at least 30 dB below peak (max) power.

6.5.3 Test Result

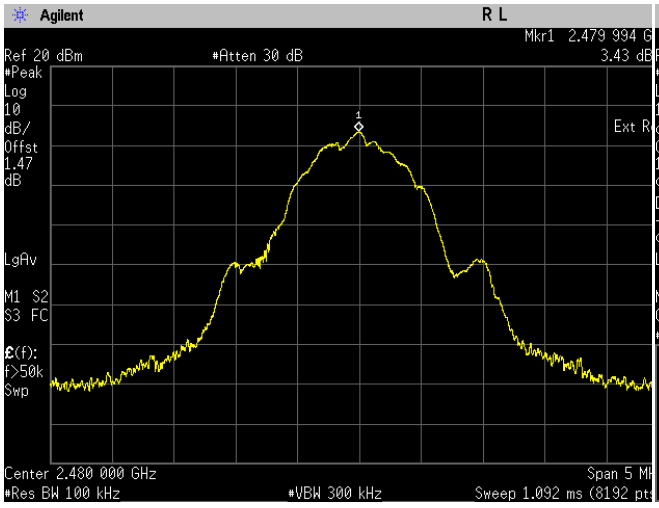
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2399.95	-56.37	Pass
Bluetooth L.E	GFSK	2480	2483.56	-57.05	Pass



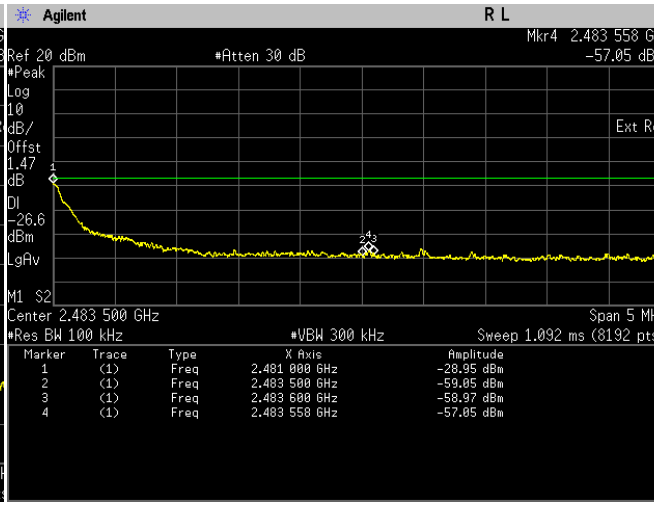
Band Edge. Bluetooth LE
Frequency 2402 MHz Reference Level



Band Edge. Bluetooth LE
Frequency 2402 MHz Band Edge



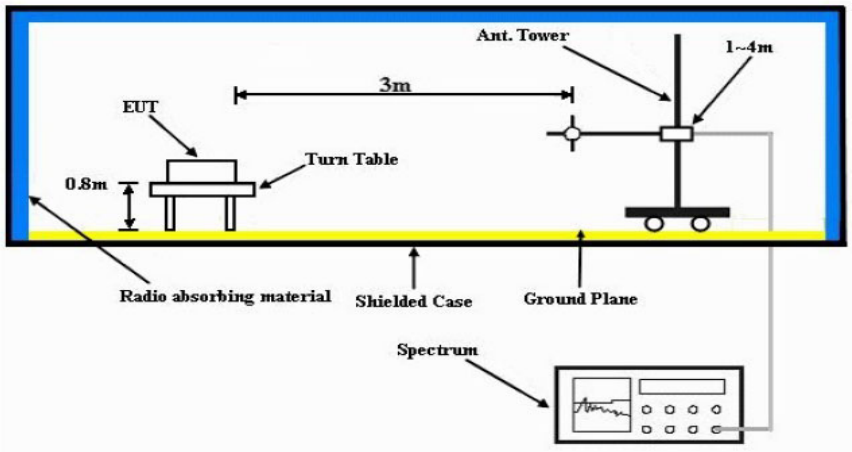
Band Edge. Bluetooth LE
Frequency 2480 MHz Reference Level



Band Edge. Bluetooth LE
Frequency 2480 MHz Band Edge

6.6 Radiated Emission within Restricted Bands

6.6.1 Test Setup



a. 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.
b. The EUT is set 3m away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
c. 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.
d. 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.
e. The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. 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:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
2. 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 : AZH63UCH6TZ8AN **S/N : 893TUB6029** **EMC SR ID # : 02567-EMC-00040**
Battery : PMNN4522A **Accessory : 85012070001**
Test Frequency : 2402.0000 MHz **Test Channel : Low** **Test Standard : ANSI C63.10-2013**
Worst Case Plane : Y-Plane (BT LE)

Restricted Band Edge (Low Channel) tabular data

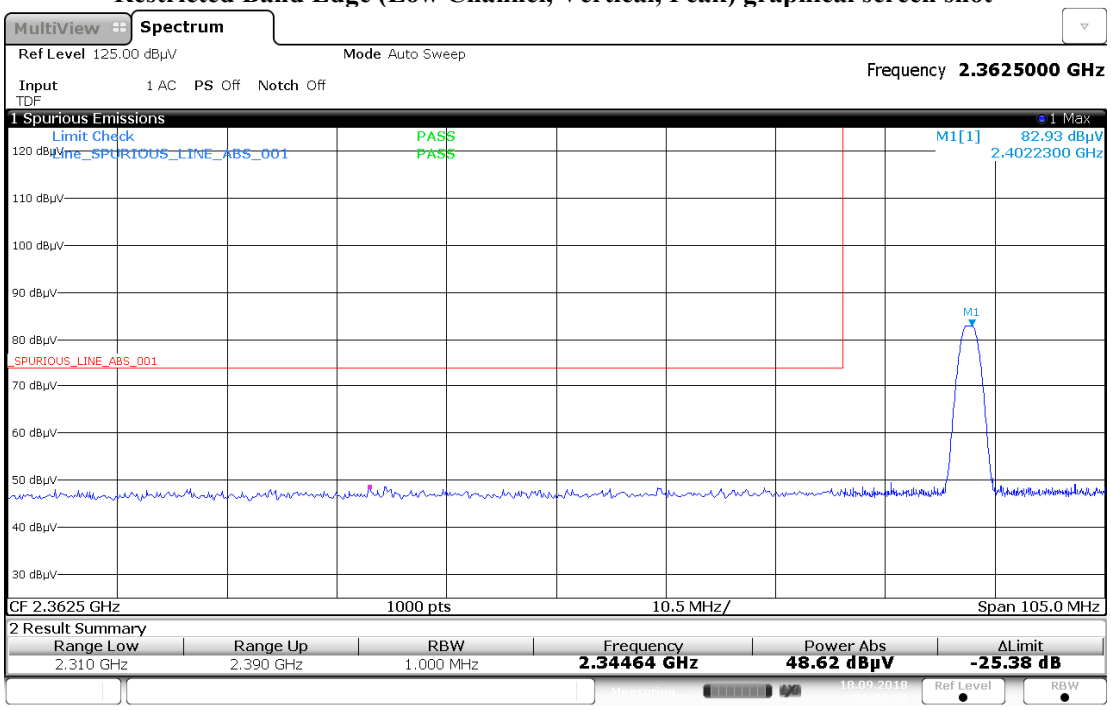
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
Horizontal Radiated Emission Result										

Remarks: Pass Result	Marginal Result	Fail Result

Temperature (degC): 23.3 **Humidity (%): 70.4**
Test Performed by: Nazrin & Qawiman **Test Date: Wed, Sep 19, 2018**
System MU: 5.01dB

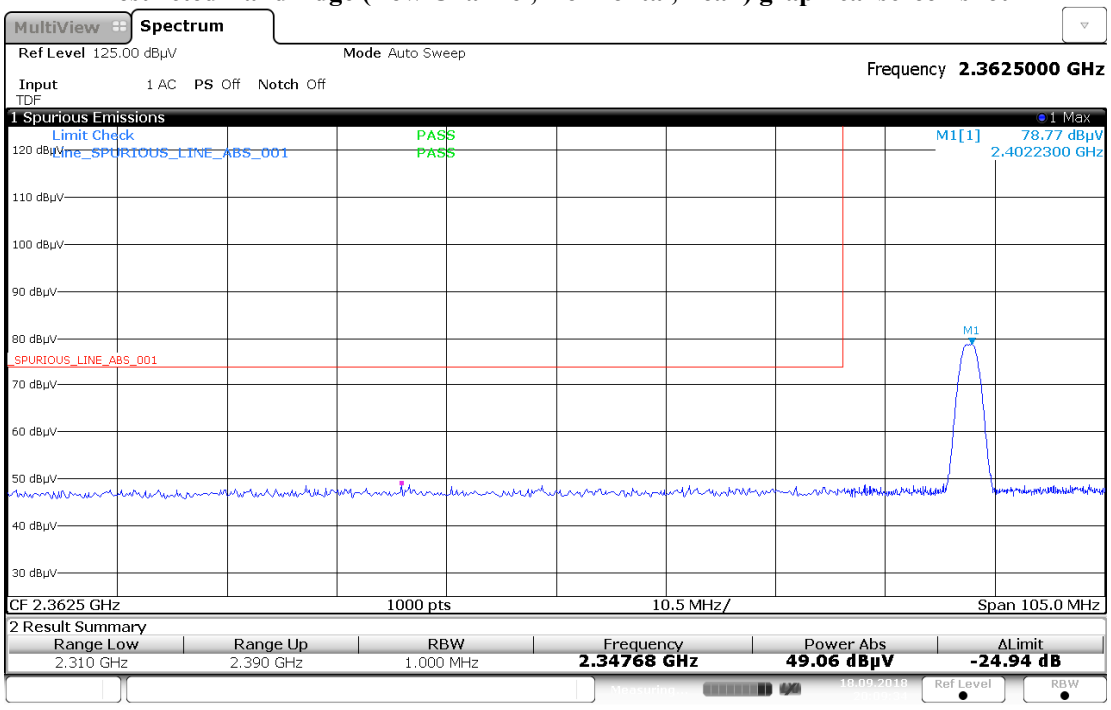
Note: No spurs were found in this test.

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



20:05:54 18.09.2018

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



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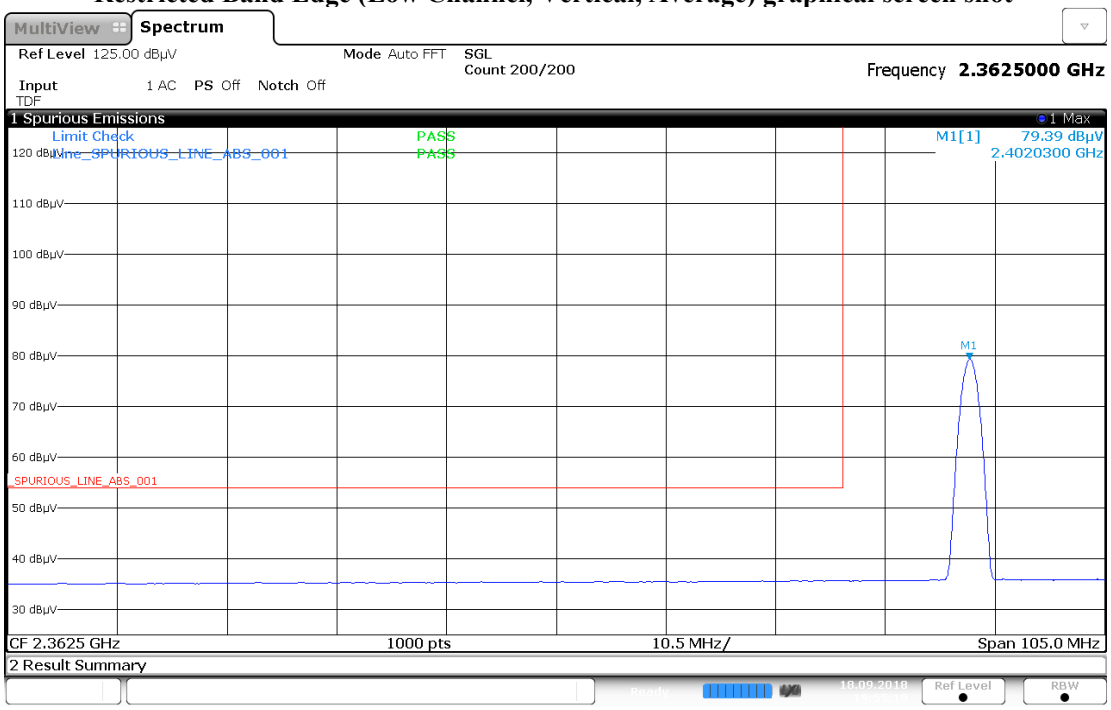
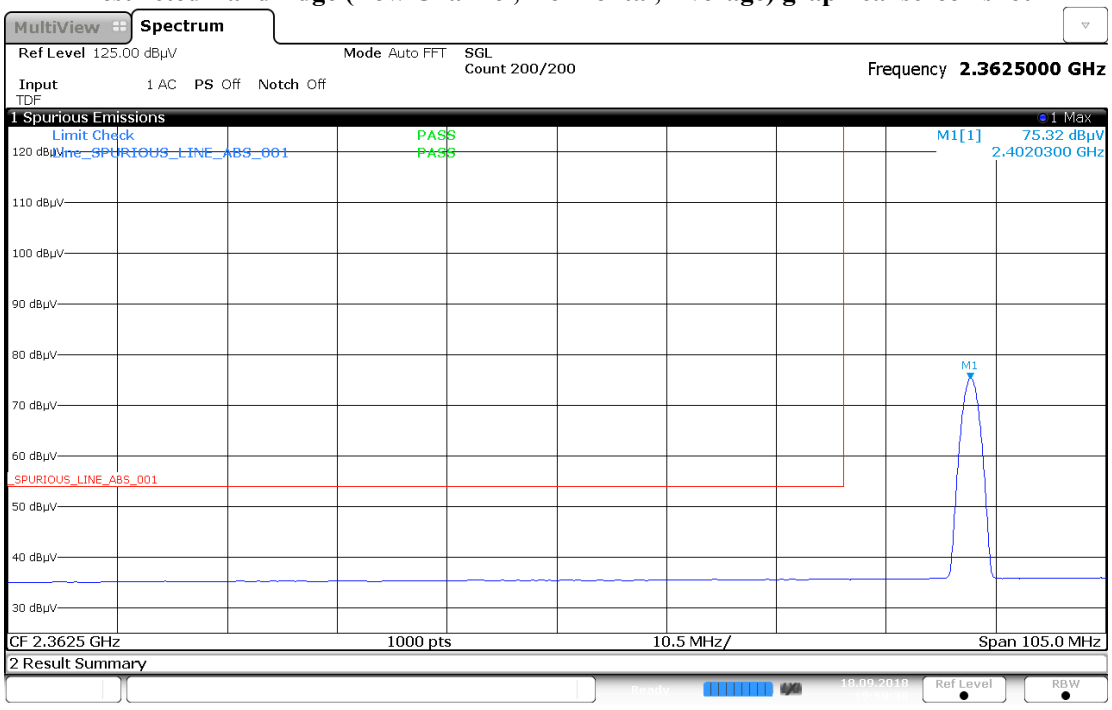
Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



19:55:19 18.09.2018

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



19:59:39 18.09.2018

Test: Bluetooth SAC Restricted Band Edge

Model Number : AZH63UCH6TZ8AN **S/N : 893TUB6029** **EMC SR ID # : 02567-EMC-00040**
Battery : PMNN4522A **Accessory : 85012070001**
Test Frequency : 2480.0000 MHz **Test Channel : High** **Test Standard : ANSI C63.10-2013**
Worst Case Plane : Y-Plane (BT LE)

Restricted Band Edge (High Channel) tabular data

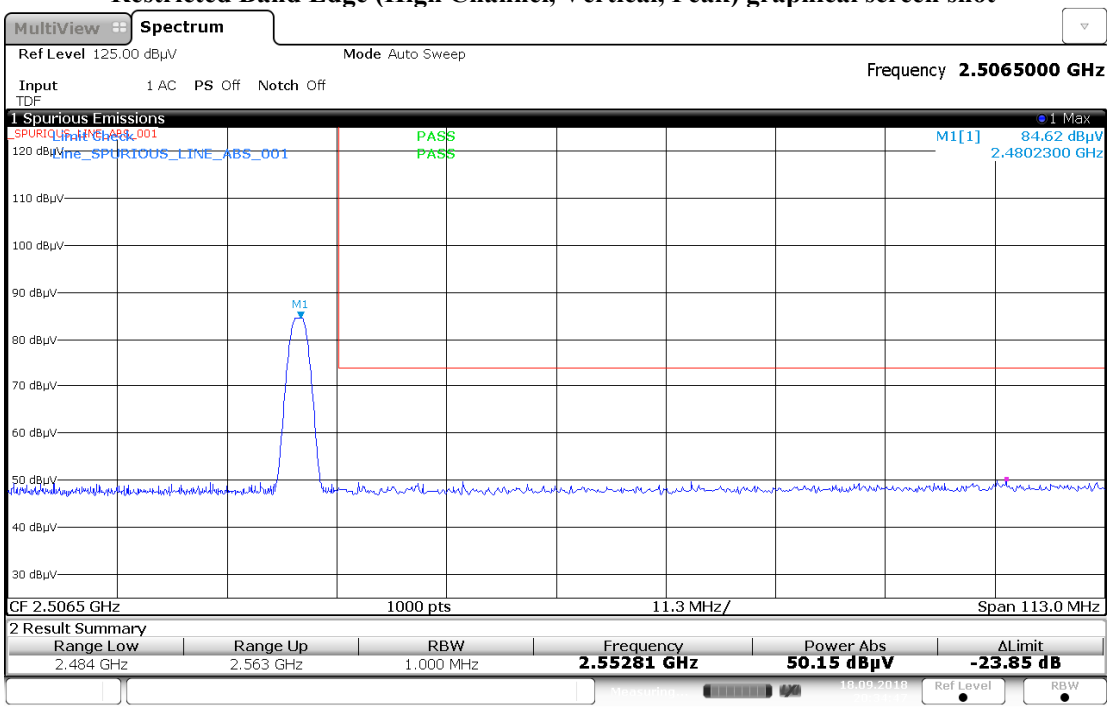
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
Horizontal Radiated Emission Result										

Remarks: Pass Result	Marginal Result	Fail Result

Temperature (degC): 23.3 **Humidity (%): 70.4**
Test Performed by: Nazrin & Qawiman **Test Date: Wed, Sep 19, 2018**
System MU: 5.01dB

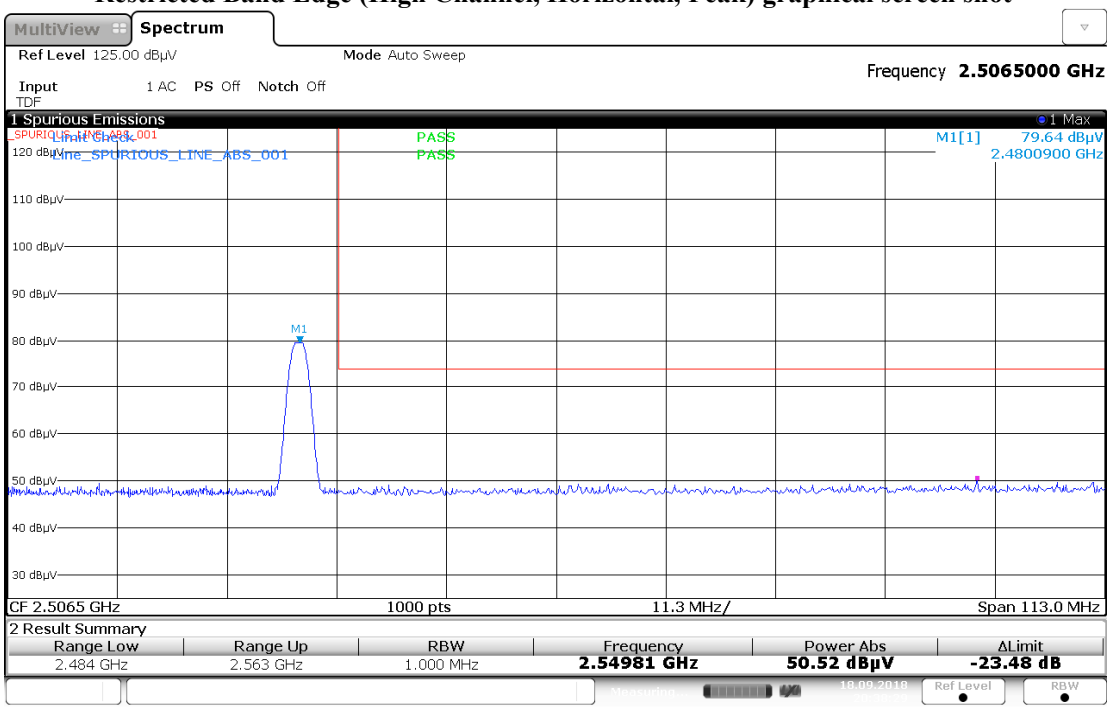
Note: No spurs were found in this test.

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



20:34:47 18.09.2018

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



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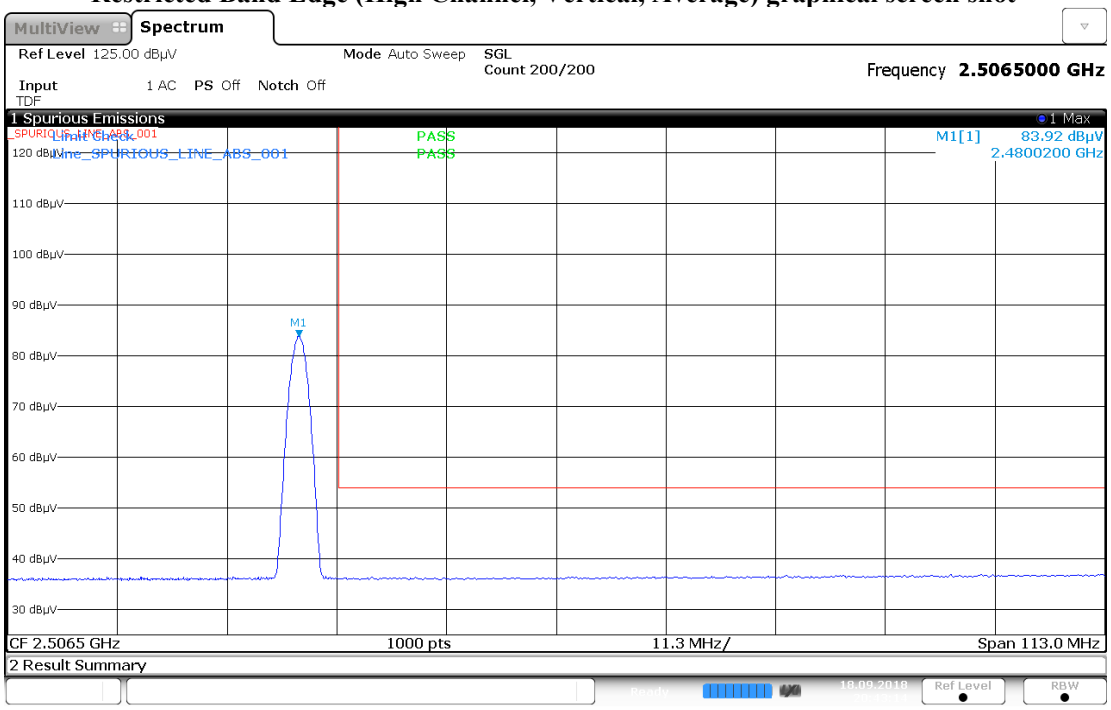
Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



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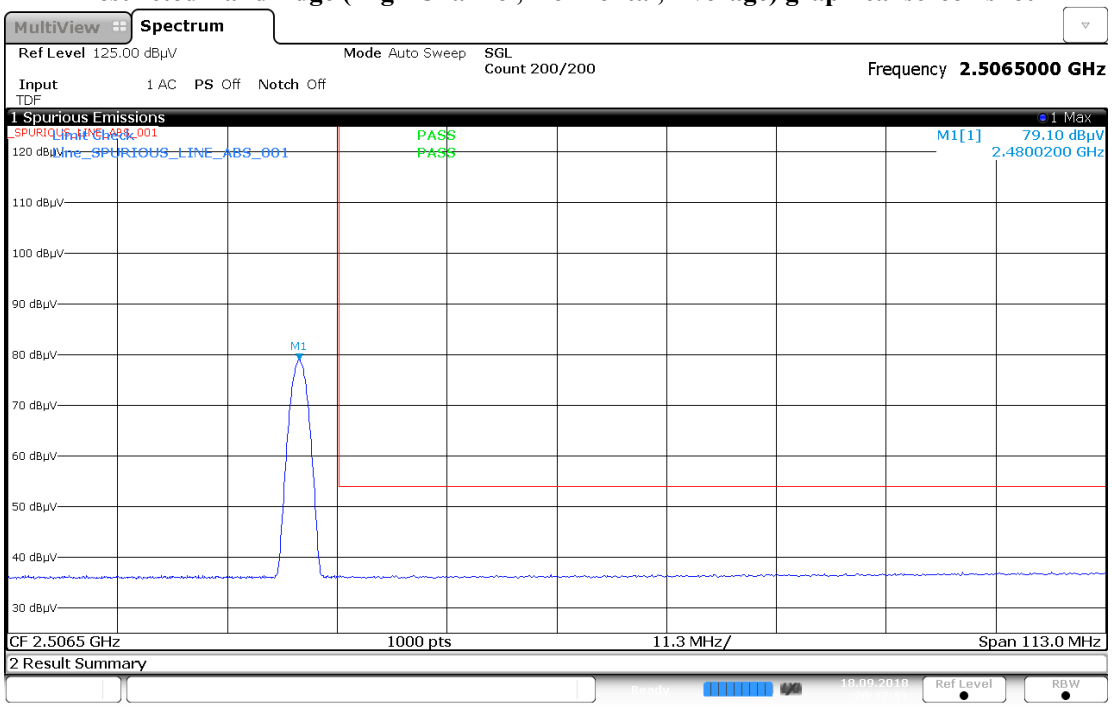
Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



20:47:52 18.09.2018

Test: Bluetooth SAC Transmitter Radiated Emission

Model Number : AZH63UCH6TZ8AN **S/N : 893TUB6029** **EMC SR ID # : 02567-EMC-00040**
Battery : PMNN4522A **Accessory : 85012070001**
Test Frequency : 2402.0000 MHz **Test Channel : Low** **Test Standard : ANSI C63.10-2013**
Worst Case Plane : Y-Plane (BT LE)

Radiated Emission (Low Channel) tabular data

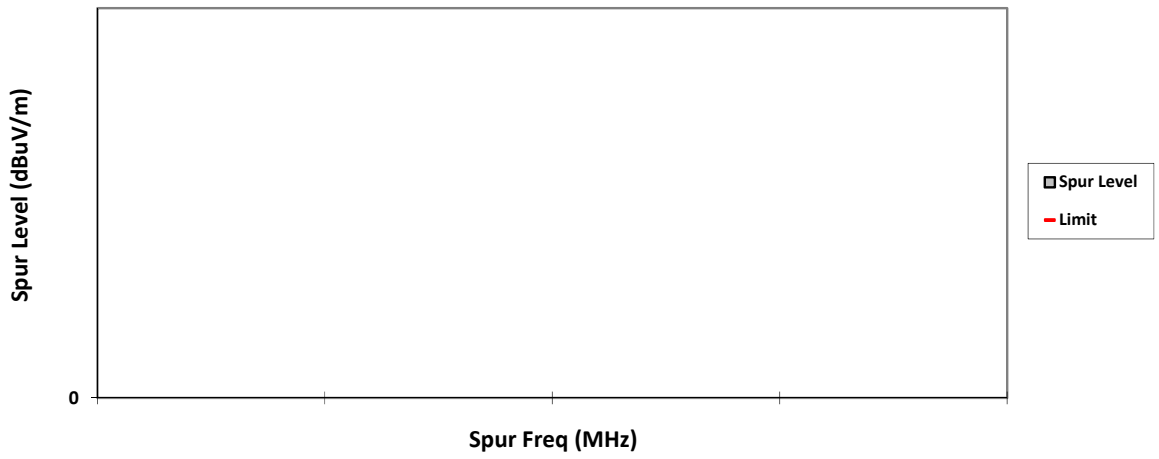
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
4804	-	38.6011**	**	-	74	54	-	35.40**	-	-
7206	-	43.4750**	**	-	74	54	-	30.52**	-	-
9608	-	46.2159**	**	-	74	54	-	27.78**	-	-
12010	-	50.2317**	**	-	74	54	-	23.77**	-	-
14412	-	53.1215**	**	-	74	54	-	20.88**	-	-
16814	-	53.8844**	**	-	74	54	-	20.12**	-	-
19216	-	35.5631**	**	-	74	54	-	38.44**	-	-
21618	-	35.6443**	**	-	74	54	-	38.36**	-	-
24020	-	36.7412**	**	-	74	54	-	37.26**	-	-
Horizontal Radiated Emission Result										
4804	-	38.7854**	**	-	74	54	-	35.21**	-	-
7206	-	43.5572**	**	-	74	54	-	30.44**	-	-
9608	-	46.0085**	**	-	74	54	-	27.99**	-	-
12010	-	50.9412**	**	-	74	54	-	23.06**	-	-
14412	-	52.8273**	**	-	74	54	-	21.17**	-	-
16814	-	54.2501**	**	-	74	54	-	19.75**	-	-
19216	-	35.2109**	**	-	74	54	-	38.79**	-	-
21618	-	34.9153**	**	-	74	54	-	39.08**	-	-
24020	-	35.8962**	**	-	74	54	-	38.10**	-	-

Remarks: Pass Result	Marginal Result	Fail Result

Temperature (degC): 23.3 **Humidity (%): 70.4**
Test Performed by: Nazrin & Azil **Test Date: Sun, Sep 16, 2018**
System MU: 5.01dB

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



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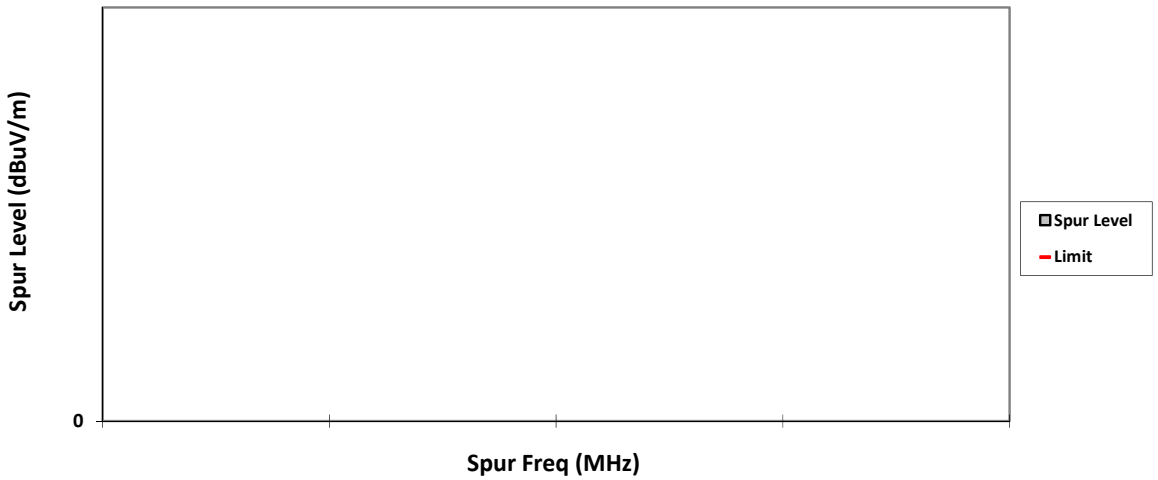
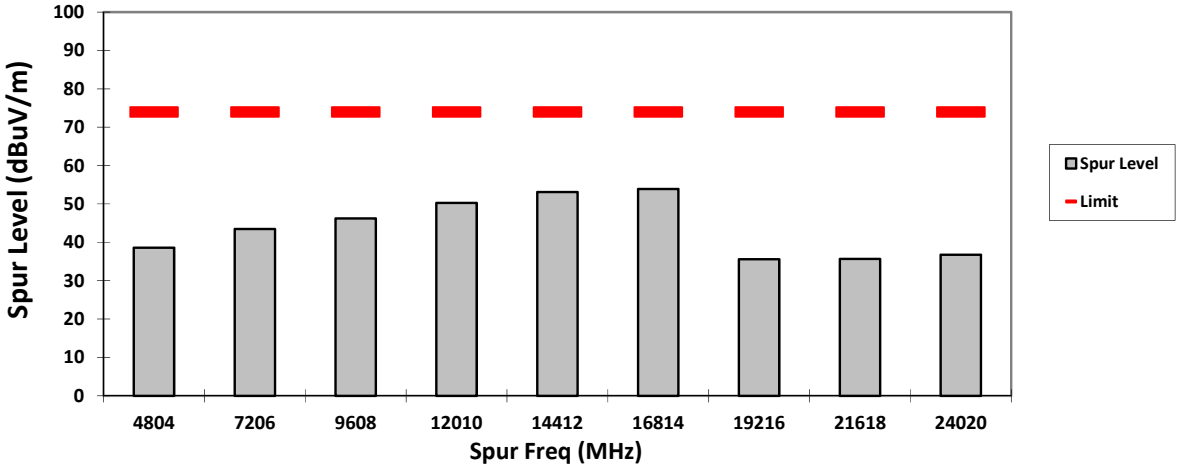
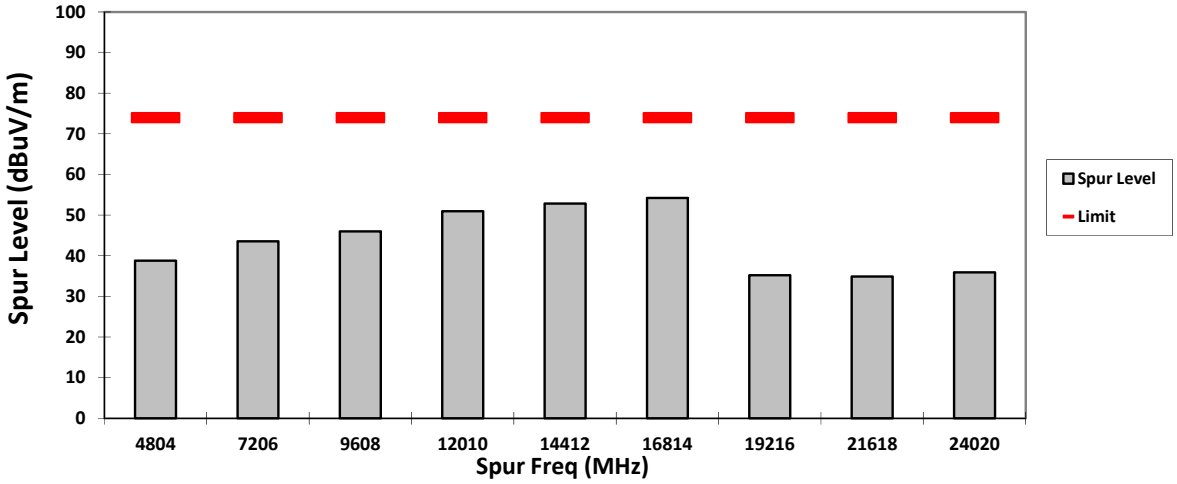


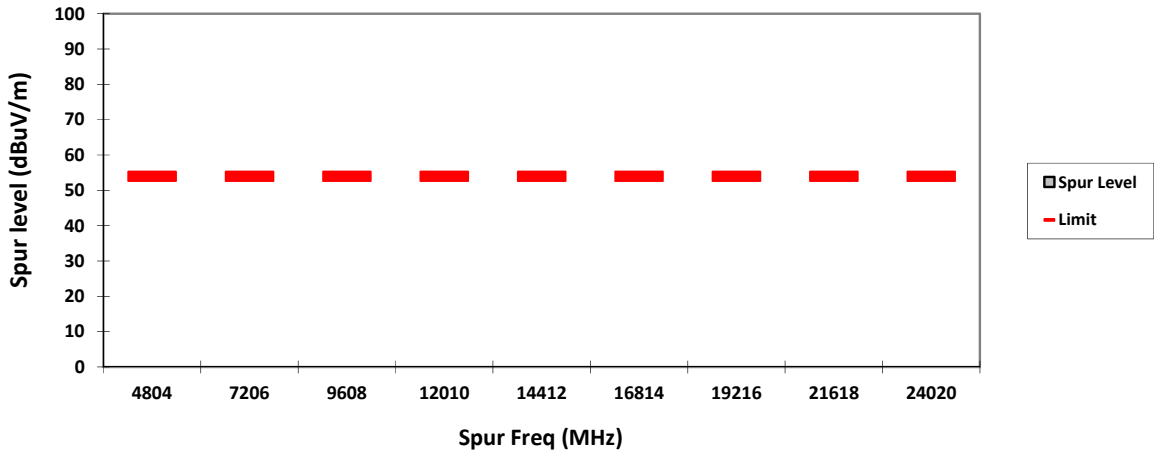
VERTICAL, PK



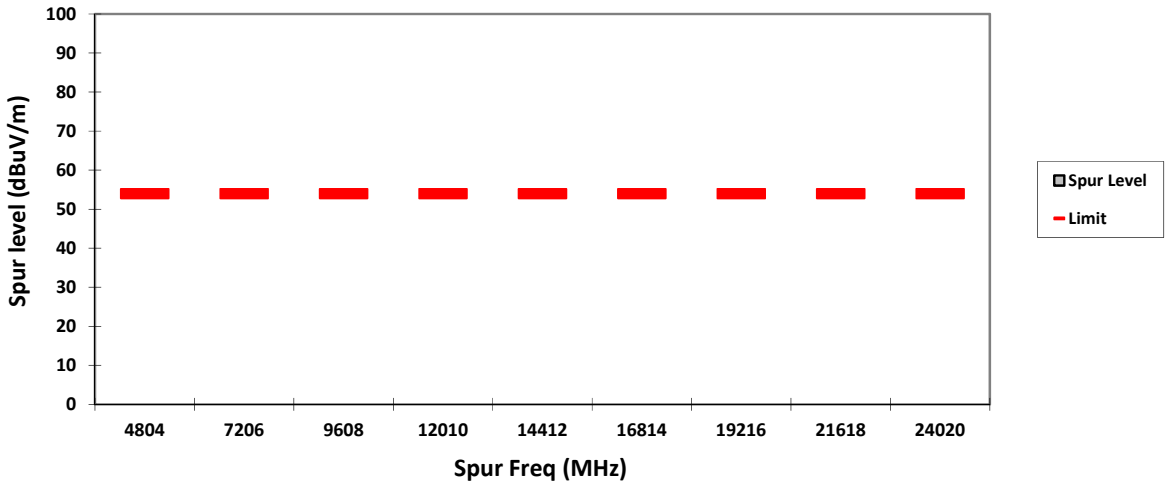
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission

Model Number : AZH63UCH6TZ8AN **S/N : 893TUB6029** **EMC SR ID # : 02567-EMC-00040**
Battery : PMNN4522A **Accessory : 85012070001**
Test Frequency : 2440.0000 MHz **Test Channel : Mid** **Test Standard : ANSI C63.10-2013**
Worst Case Plane : Y-Plane (BT LE)

Radiated Emission (Mid Channel) tabular data

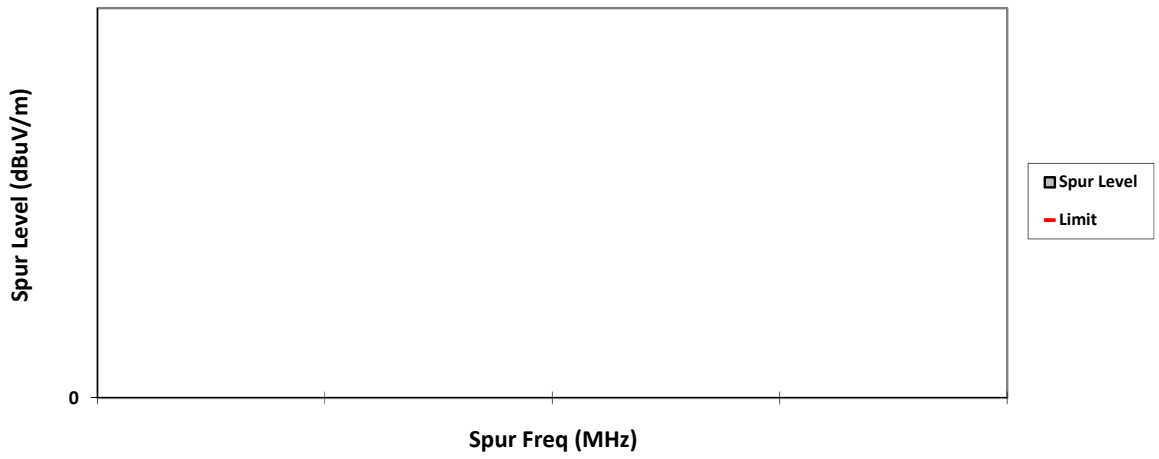
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
4880	-	38.5890**	**	-	74	54	-	35.41**	-	-
7320	-	43.3270**	**	-	74	54	-	30.67**	-	-
9760	-	46.7093**	**	-	74	54	-	27.29**	-	-
12200	-	50.3777**	**	-	74	54	-	23.62**	-	-
14640	-	53.1017**	**	-	74	54	-	20.90**	-	-
17080	-	53.4010**	**	-	74	54	-	20.60**	-	-
19520	-	35.7020**	**	-	74	54	-	38.30**	-	-
21960	-	35.8927**	**	-	74	54	-	38.11**	-	-
24400	-	36.1106**	**	-	74	54	-	37.89**	-	-
Horizontal Radiated Emission Result										
4880	-	38.9611**	**	-	74	54	-	35.04**	-	-
7320	-	44.0911**	**	-	74	54	-	29.91**	-	-
9760	-	46.3397**	**	-	74	54	-	27.66**	-	-
12200	-	50.5268**	**	-	74	54	-	23.47**	-	-
14640	-	52.7127**	**	-	74	54	-	21.29**	-	-
17080	-	53.6522**	**	-	74	54	-	20.35**	-	-
19520	-	36.0041**	**	-	74	54	-	38.00**	-	-
21960	-	35.5103**	**	-	74	54	-	38.49**	-	-
24400	-	36.0769**	**	-	74	54	-	37.92**	-	-

Remarks: Pass Result	Marginal Result	Fail Result

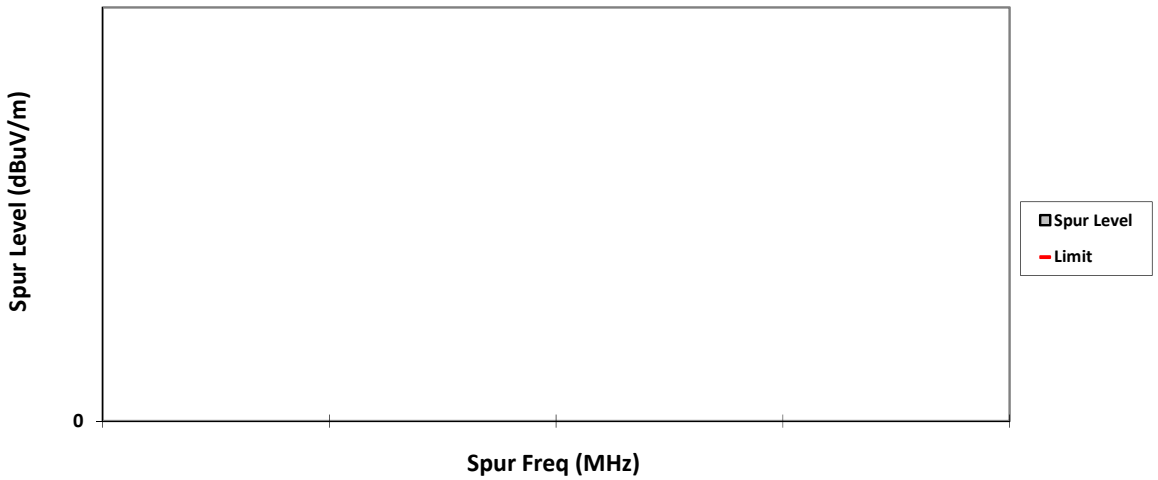
Temperature (degC): 23.3 **Humidity (%): 70.4**
Test Performed by: Nazrin & Azil **Test Date: Sun, Sep 16, 2018**
System MU: 5.01dB

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.**

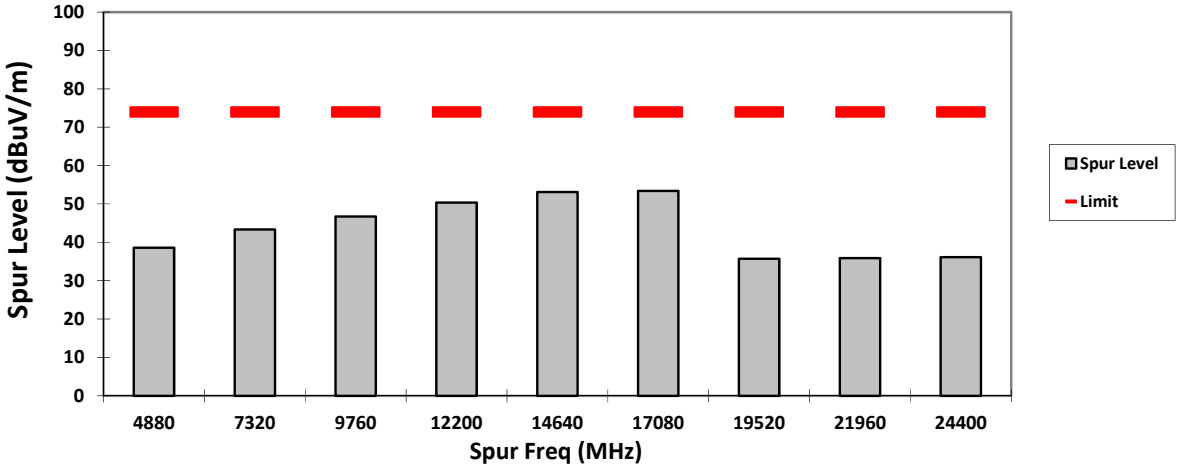
VERTICAL, QPK



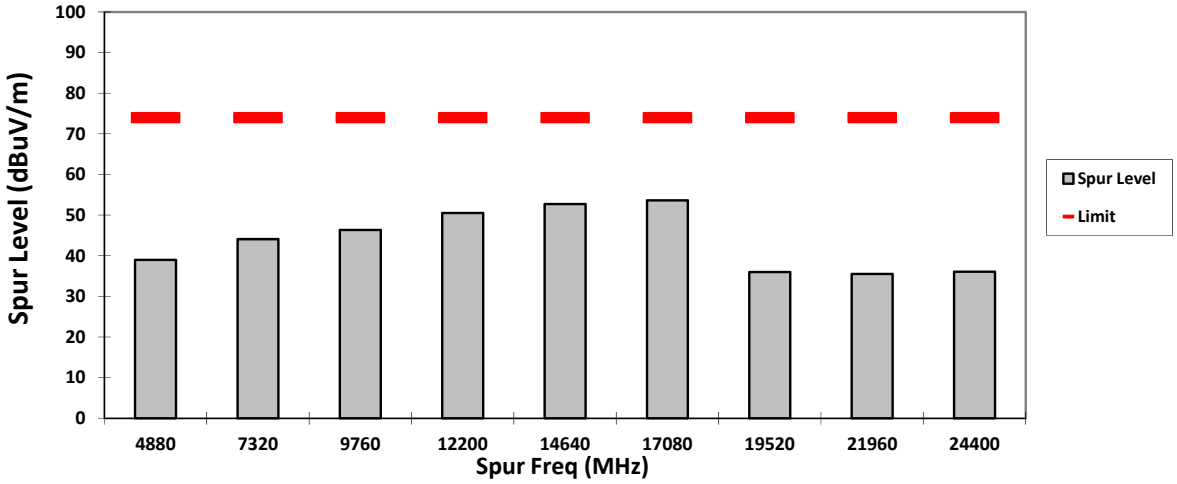
HORIZONTAL, QPK



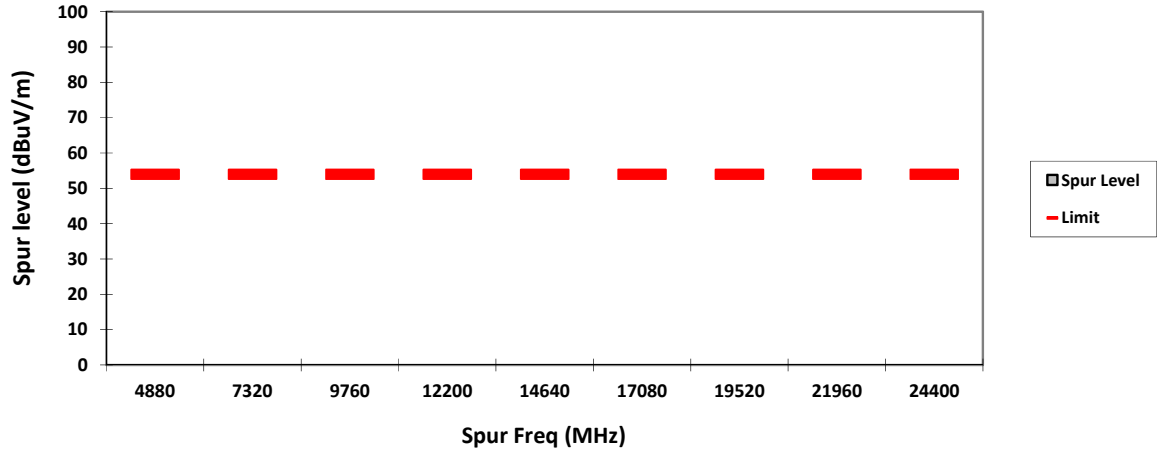
VERTICAL, PK



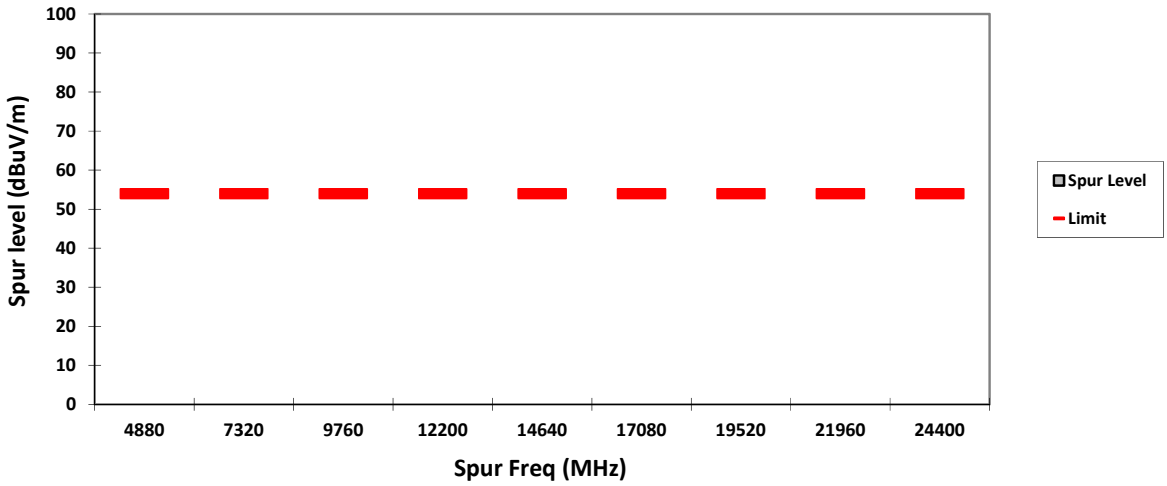
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: Bluetooth SAC Transmitter Radiated Emission

Model Number : AZH63UCH6TZ8AN **S/N : 893TUB6029** **EMC SR ID # : 02567-EMC-00040**
Battery : PMNN4522A **Accessory : 85012070001**
Test Frequency : 2480.0000 MHz **Test Channel : High** **Test Standard : ANSI C63.10-2013**
Worst Case Plane : Y-Plane (BT LE)

Radiated Emission (High Channel) tabular data

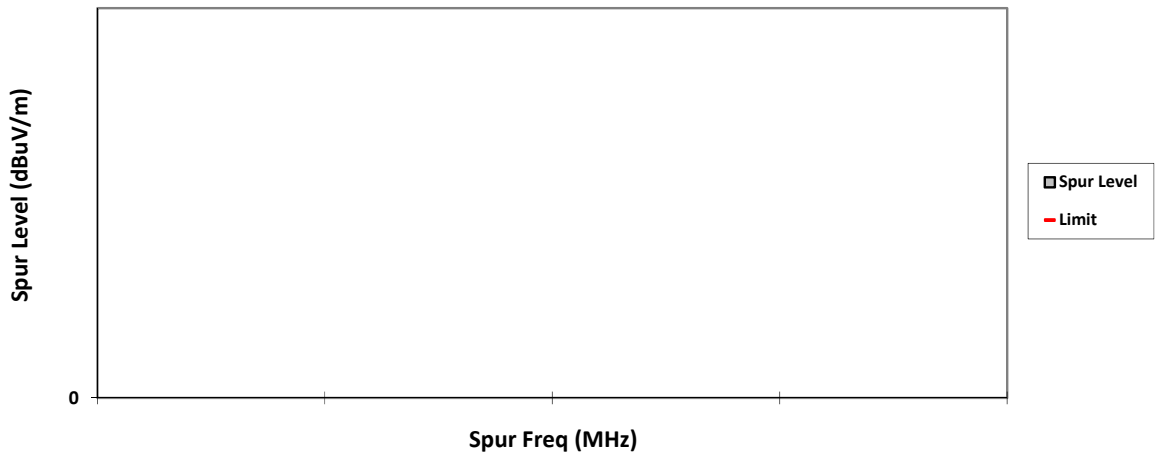
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBµV/m)	Spur level PK (dBµV/m)	Spur level AV (dBµV/m)	Limit QPK (dBµV/m)	Limit PK (dBµV/m)	Limit AV (dBµV/m)	Margin QPK (dBµV/m)	Margin PK (dBµV/m)	Margin AV (dBµV/m)	Carrier PK Power (dBµV/m)
4960	-	38.9307**	**	-	74	54	-	35.07**	-	-
7440	-	44.7648**	**	-	74	54	-	29.24**	-	-
9920	-	46.8574**	**	-	74	54	-	27.14**	-	-
12400	-	50.5094**	**	-	74	54	-	23.49**	-	-
14880	-	52.0653**	**	-	74	54	-	21.93**	-	-
17360	-	53.9829**	**	-	74	54	-	20.02**	-	-
19840	-	36.0286**	**	-	74	54	-	37.97**	-	-
22320	-	34.5904**	**	-	74	54	-	39.41**	-	-
24800	-	37.7026**	**	-	74	54	-	36.30**	-	-
Horizontal Radiated Emission Result										
4960	-	39.4065**	**	-	74	54	-	34.59**	-	-
7440	-	44.7924**	**	-	74	54	-	29.21**	-	-
9920	-	46.6666**	**	-	74	54	-	27.33**	-	-
12400	-	50.3204**	**	-	74	54	-	23.68**	-	-
14880	-	52.0266**	**	-	74	54	-	21.97**	-	-
17360	-	53.4589**	**	-	74	54	-	20.54**	-	-
19840	-	36.4768**	**	-	74	54	-	37.52**	-	-
22320	-	34.7196**	**	-	74	54	-	39.28**	-	-
24800	-	36.9605**	**	-	74	54	-	37.04**	-	-

Remarks: Pass Result	Marginal Result	Fail Result

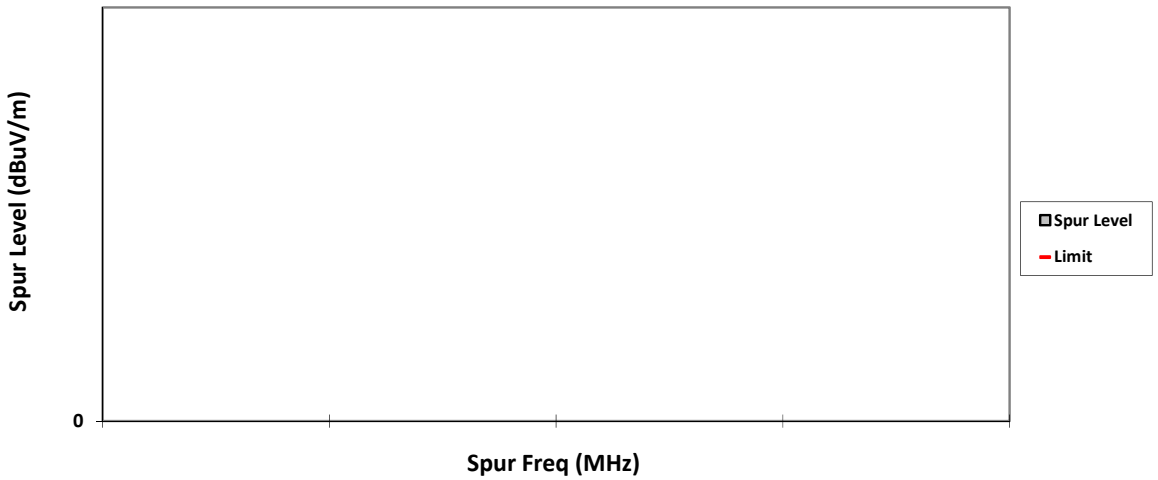
Temperature (degC): 23.3 **Humidity (%): 70.4**
Test Performed by: Nazrin & Azil **Test Date: Sun, Sep 16, 2018**
System MU: 5.01dB

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.**

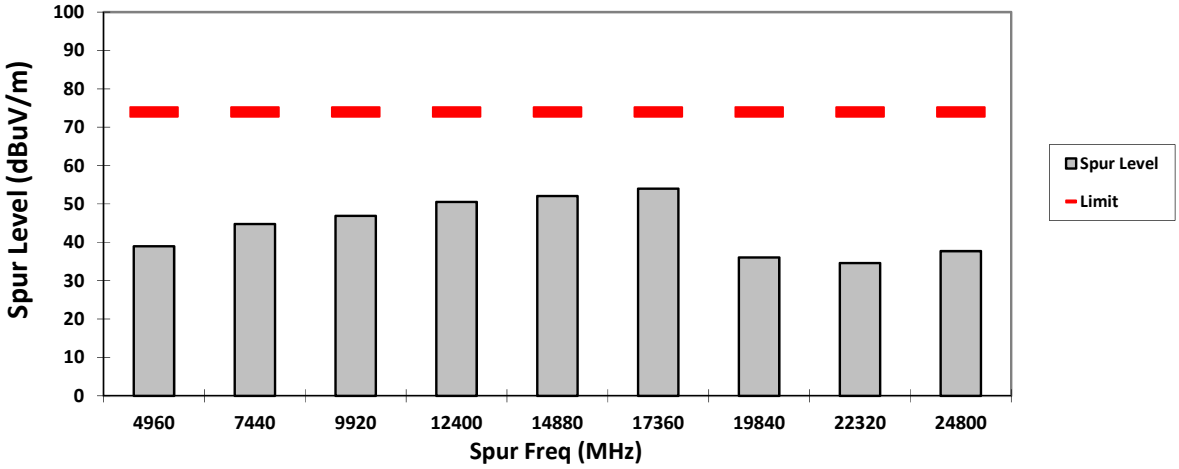
VERTICAL, QPK



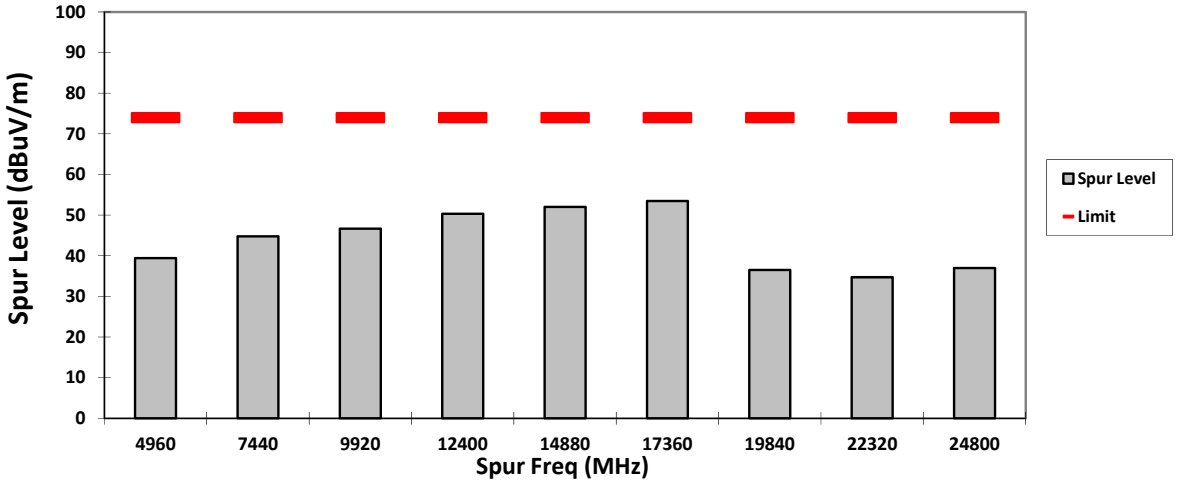
HORIZONTAL, QPK



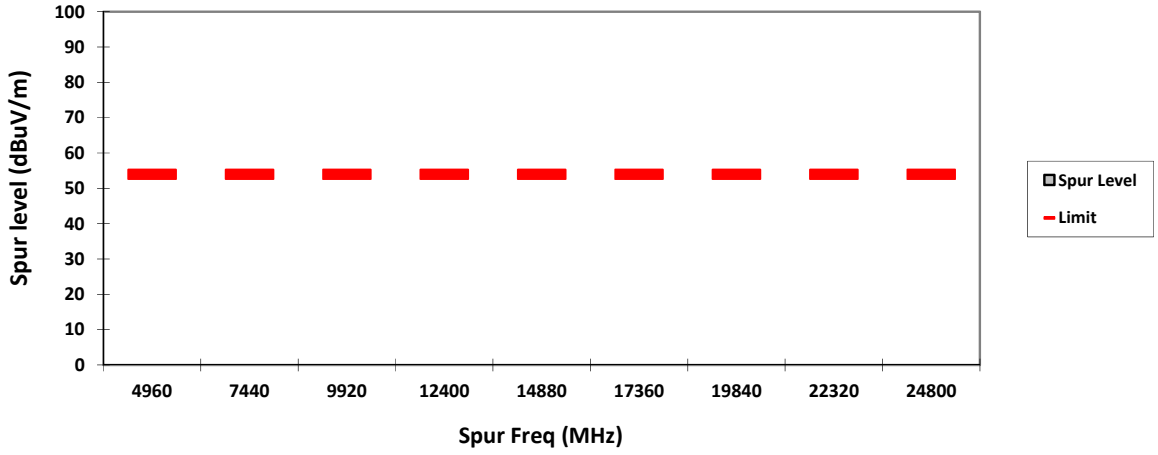
VERTICAL, PK



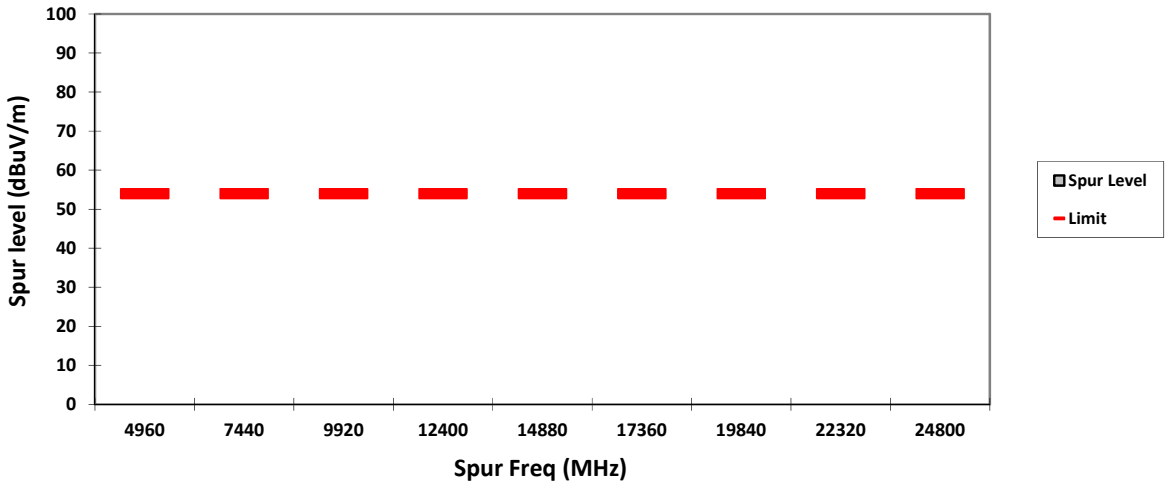
HORIZONTAL, PK



VERTICAL, AV

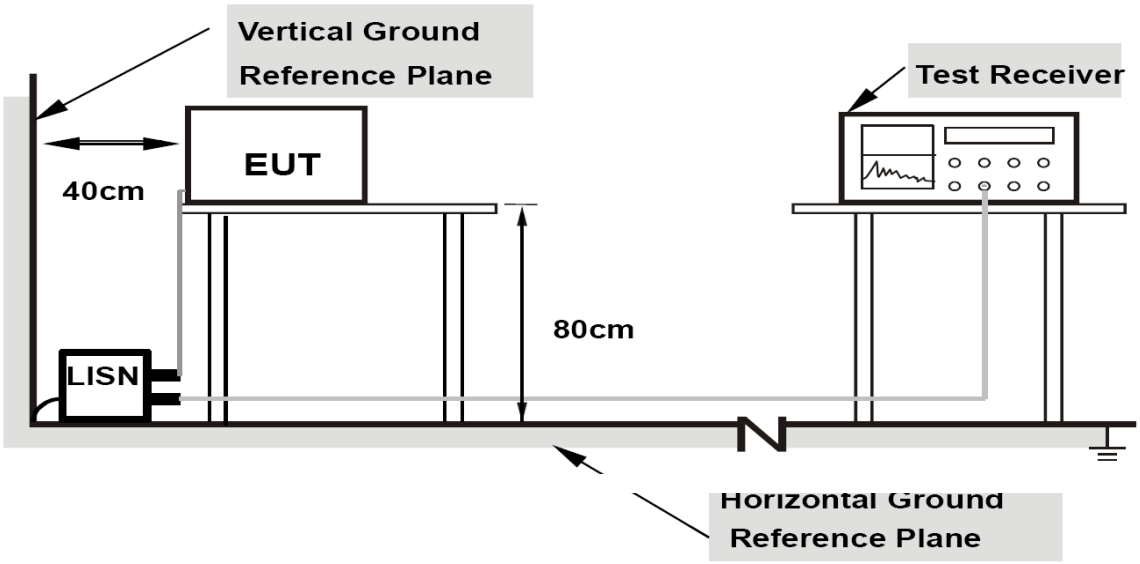


HORIZONTAL, AV



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(µV)	
	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(µV)	
	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.