RF TEST REPORT

Report No.: SET2018-14997

Product Name: Bluetooth UHF Reader

FCC ID: 2ABREIVF-BU01

Model No. : IVF-BU01

Applicant: Xiamen Innov Information Technology Co.,LTD

Address: INNOV Industrial Park, Tong Long two Road 943, Xiang An district, Xiamen city , Fujian Province, China

Dates of Testing: 11/22/2018 — 12/05/2018

Issued by: CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

Lab Location: Building 28/29, East of Shigu Xili Industrial Zone, Nanshan District Shenzhen, Guangdong 518055, China.

Tel: 86 755 26627338 **Fax:** 86 755 26627238

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Test Report

Product Name ..... : Bluetooth UHF Reader

Brand Name ..... : XMiNNOV

Trade Name ..... : XMiNNOV

Applicant ..... : Xiamen Innov Information Technology Co.,LTD

Applicant Address ..... : INNOV Industrial Park, Tong Long two Road 943, Xiang An district, Xiamen city , Fujian Province, China

Manufacturer ..... : Xiamen Innov Information Technology Co.,LTD

Manufacturer Address ..... : INNOV Industrial Park, Tong Long two Road 943, Xiang An district, Xiamen city , Fujian Province, China

Test Standards ..... : 47 CFR Part 15 Subpart C：Radio Frequency Devices
ANSI C63.10-2013：American National Standard for Testing Unlicensed Wireless Devices
KDB558074 D01 DTS Meas Guidance v05

Test Result ..... : PASS

Tested by ..... : Shallwe Yang 2018.12.12

Shallwe Yang, Test Engineer

Reviewed by ..... : Chris You 2018.12.12

Chris You, Senior Egineer

Approved by ..... : Zhu Qi 2018.12.12

Zhu Qi, Manager

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Change History		
Issue	Date	Reason for change
1.0	2018.12.12	First edition

1. General Information

1.1. EUT Description

EUT Type	Bluetooth UHF Reader	
Hardware Version	IVF-BU01-V1.4	
Software Version	IVF-BU01-V1.1	
Frequency Range	Bluetooth LE 4.0	2402MHz~2480MHz
Channel Number	Bluetooth LE 4.0	40
Bit Rate of Transmitter	Bluetooth LE 4.0	1Mbps
Modulation Type	Bluetooth LE 4.0	GFSK
Antenna Type	Internal	
Antenna Gain	0.5dBi	

Note 1: The EUT is a Bluetooth UHF Reader, it contain Bluetooth 4.0 LE Module operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth 4.0 LE is F(MHz)=2402+2*n (0<=n<=39). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 0 (2402MHz), 19(2440MHz) and 39 (2480MHz).

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 3: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2017	Radio Frequency Devices
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	15.203	Antenna Requirement	PASS
2	15.247(b)	Peak Output Power	PASS
3	15.247(a)	6dB Occupy Bandwidth	PASS
4	15.247(d)	Conducted Band Edges and Spurious Emission	PASS
5	15.247(e)	Power spectral density (PSD)	PASS
6	15.207	Conducted Emission	PASS
7	15.209 15.247(d)	Radiated Band Edges and Spurious Emission	PASS

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10-2013.

These RF tests were performed according to the method of measurements prescribed in KDB 558074D01 v05.

40 channels are provided for Bluetooth LE 4.0

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464

12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

	Test Items	Modulation	Channel
Bluetooth LE 4.0	Peak Conducted Output Power Power Spectral Density 6dB and99 % Bandwidth Conducted and Spurious Emission Radiated and Spurious Emission	GFSK	0/20/39
	Band Edge	GFSK	0/39

1.3. Table for Supporting Units

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	Note
1	Notebook	DELL	PP11L	DELL	H5914A03	FCC DOC

1.4. Facilities and Accreditations

1.4.1. Facilities

FCC-Registration No.: CN5031

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN5031, valid time is until December 31, 2018.

ISED Registration: 11185A-1

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Aug. 03, 2019.

NVLAP Lab Code: 201008-0

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

1.4.2. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15°C - 35°C
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2.1.2. Antenna Information

Antenna Category: Internal antenna

An Internal antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

Antenna General Information:

No.	EUT	Ant. Type	Gain(dBi)
1	Bluetooth UHF Reader	Internal	0.5

2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Peak Output Power

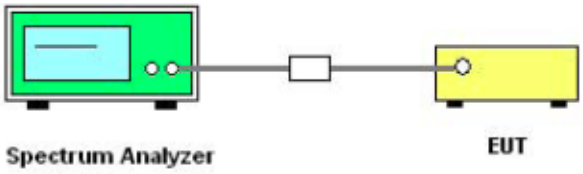
2.2.1. Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB 558074D01 v05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

   The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings: Span≥3RBW;

   RBW≥DTS bandwidth; VBW≥3RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Measure the conducted output power and record the results in the test report.

2.2.5. Test Result

Please refer to Appendix A for detail

2.3. 6dB Occupy Bandwidth

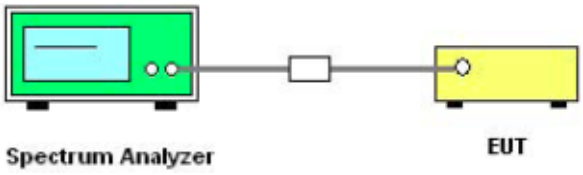
2.3.1. Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows FCC KDB 558074D01 v05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. For 6dB bandwidth measurement，Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz.

In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.

2.3.5. Test Results of 6dB Bandwidth Occupy Bandwidth

Please refer to Appendix A for detail

2.4. Conducted Band Edges and Spurious Emissions

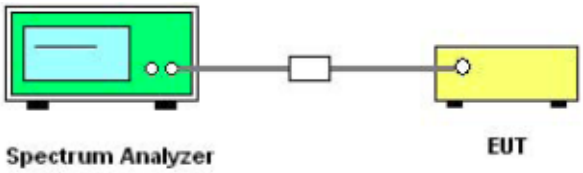
2.4.1. Limit of Conducted Band Edges and Spurious Emissions

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedure

1. The testing follows FCC KDB 558074D01 v05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

2.4.5. Test Results of Conducted Band Edges

Please refer to Appendix A for detail

2.5. Power spectral density (PSD)

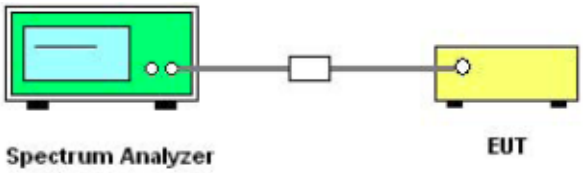
2.5.1. Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup



2.5.4. Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB 558074D01 v05.

2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.

4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)

5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.

6. Measure and record the results in the test report.

7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

2.5.5. Test Results of Power spectral density

Please refer to Appendix A for detail

2.6. Radiated Band Edge and Spurious Emission

2.6.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Note: Wireless charger configuration was evaluated.

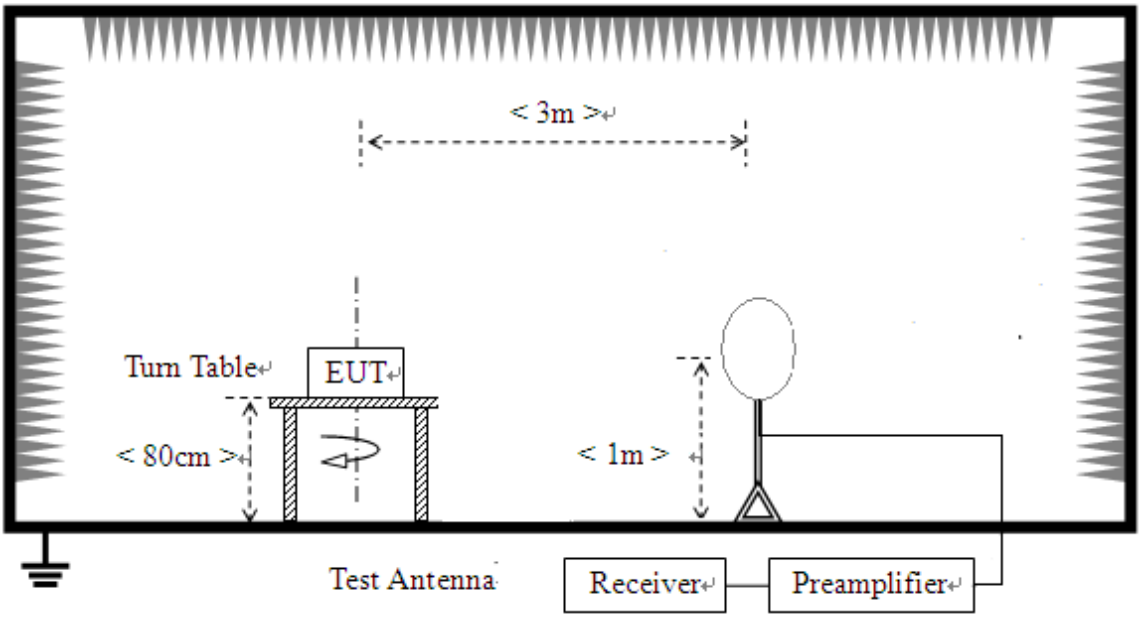
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

2.6.2. Measuring Instruments

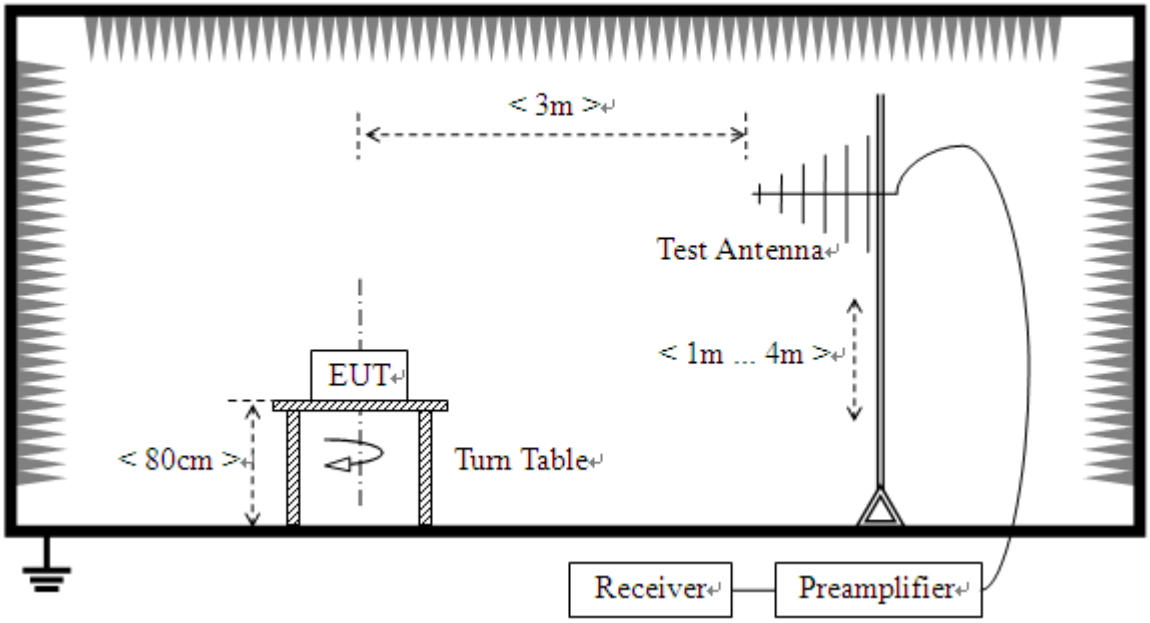
The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup

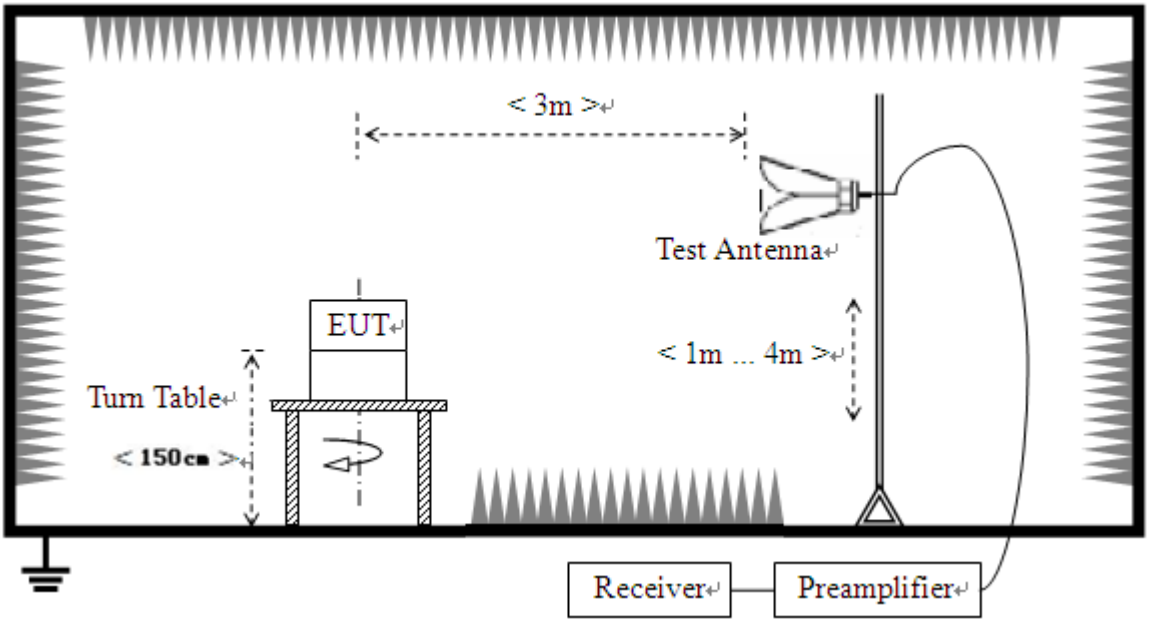
For radiated emissions from 9 KHz to 30 MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.6.4. Test Procedures

1. The EUT was placed on a turntable 0.8m below 1GHz and 1.5m above 1GHz above ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. Height of receiving antenna 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.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported.
   Otherwise 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.

NOTE:

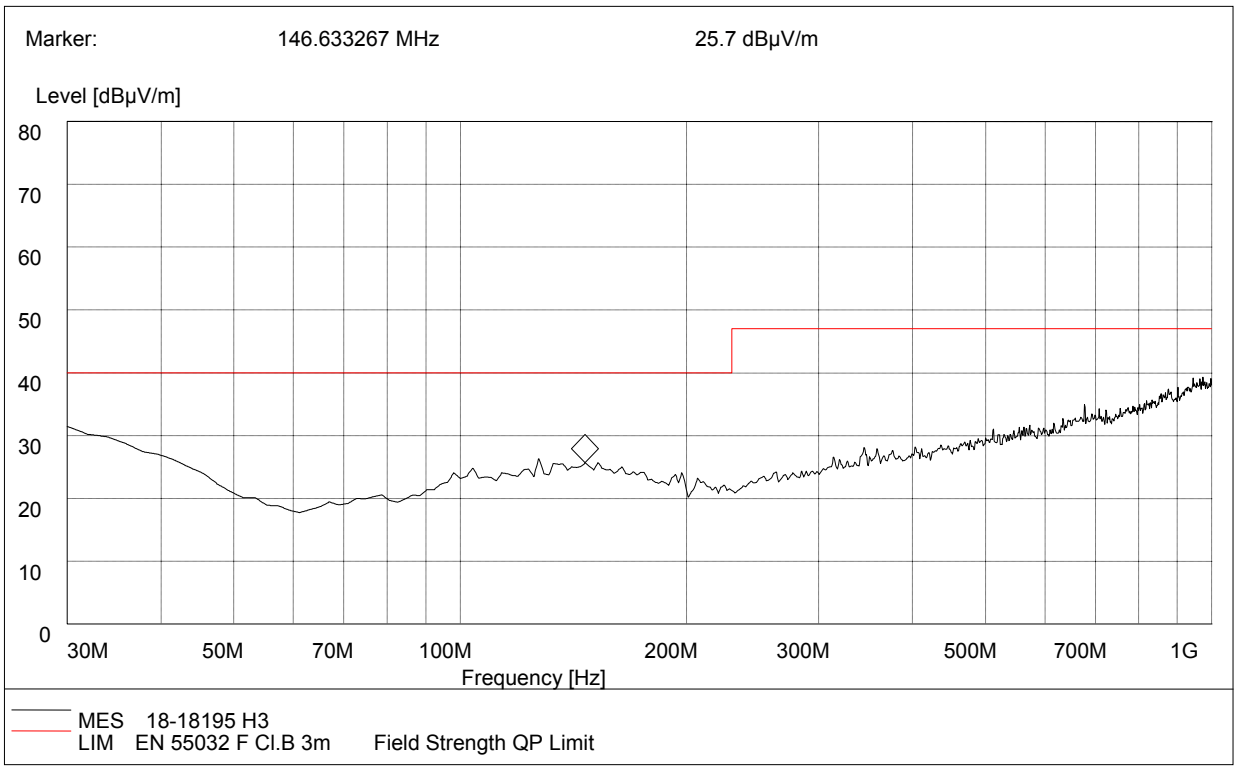
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is≥ 1/T (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

2.6.5. Test Results of Radiated Band Edge and Spurious Emission

For 9KHz to 30MHz

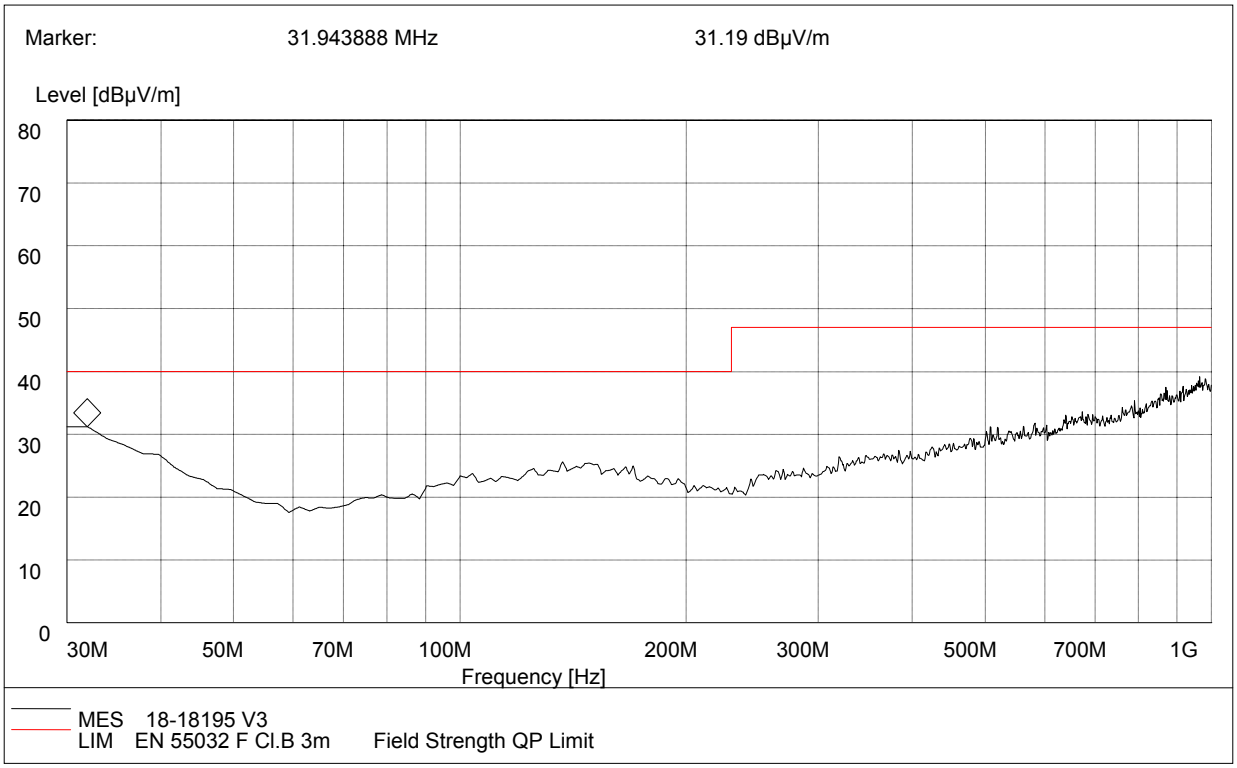
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1000 MHz



Plot A: 30MHz to 1GHz, Antenna Horizontal

Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Cor. Factor	Antenna height (cm)	Limit (dB µ V/m)	Antenna	Verdict
30.00	31.62	120.000	28.87	150.0	40.0	Horizontal	Pass
51.58	20.35	120.000	28.89	150.0	40.0	Horizontal	Pass
96.48	21.65	120.000	29.00	150.0	43.5	Horizontal	Pass
146.63	25.70	120.000	29.20	150.0	43.5	Horizontal	Pass
568.55	3115	120.000	29.8	150.0	46.0	Horizontal	Pass
950.00	37.36	120.000	30.2	150.0	46.0	Horizontal	Pass



Plot B: 30MHz to 1GHz, Antenna Vertical

Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Cor. Factor	Antenna height (cm)	Limit (dB µ V/m)	Antenna	Verdict
31.94	31.19	120.000	28.87	150.0	40.0	Vertical	Pass
49.78	2139	120.000	28.89	150.0	40.0	Vertical	Pass
77.52	20.33	120.000	29.00	150.0	40.0	Vertical	Pass
156.77	25.39	120.000	29.20	150.0	43.5	Vertical	Pass
502.68	29.75	120.000	29.8	150.0	46.0	Vertical	Pass
948.75	36.33	120.000	30.2	150.0	46.0	Vertical	Pass

For 1GHz to 25GHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（0CH_2402MHz）												
No.	Fre. (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390	45.34	PK	74.00	-28.66	1.5	120	44.04	5.2	28.60	32.5	1.3
2	2390	35.36	AV	54.00	-18.64	1.5	120	34.06	5.2	28.60	32.5	1.3
3	4804	50.44	PK	74.00	-23.56	2	180	44.04	7.4	30.40	31.4	6.4
4	4804	43.94	AV	54.00	-10.06	2	180	37.54	7.4	30.40	31.4	6.4
5	7206	53.25	PK	74.00	-20.75	1	360	43.95	9.9	31.50	32.1	9.3
6	7206	44.36	AV	54.00	-9.64	1	360	35.06	9.9	31.50	32.1	9.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（0CH_2402MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390	45.63	PK	74.00	-28.37	1.5	120	44.33	5.2	28.60	32.5	1.3
2	2390	36.98	AV	54.00	-17.02	1.5	120	35.68	5.2	28.60	32.5	1.3
3	4804	50.01	PK	74.00	-23.99	2	360	43.61	7.4	30.40	31.4	6.4
4	4804	42.51	AV	54.00	-11.49	2	360	36.11	7.4	30.40	31.4	6.4
5	7206	52.69	PK	74.00	-21.31	1	180	43.39	9.9	31.50	32.1	9.3
6	7206	44.55	AV	54.00	-9.45	1	180	35.25	9.9	31.50	32.1	9.3

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（19CH_2440MHz）												
No.	Fre. (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4880	52.14	PK	74.00	-21.86	1.5	360	45.74	6.7	31.20	31.5	6.4
2	4880	46.94	AV	54.00	-7.06	1.5	360	40.54	6.7	31.20	31.5	6.4
3	7320	53.34	PK	74.00	-20.66	2	180	46.94	6.7	31.20	31.5	6.4
4	7320	46.76	AV	54.00	-7.24	2	180	40.36	6.7	31.20	31.5	6.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（19CH_2440MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	4880	51.69	PK	74.00	-22.31	1.5	120	45.29	6.7	31.20	31.5	6.4
2	4880	44.71	AV	54.00	-9.29	1.5	120	38.31	6.7	31.20	31.5	6.4
3	7320	50.14	PK	74.00	-23.86	1.5	320	43.74	6.7	31.20	31.5	6.4
4	7320	42.58	AV	54.00	-11.42	1.5	320	36.18	6.7	31.20	31.5	6.4

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（39CH_2480MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.5	47.50	PK	74.00	-26.5	1	120	44.1	5.7	29.50	31.8	3.4
2	2483.5	35.66	AV	54.00	-18.34	1	120	32.26	5.7	29.50	31.8	3.4
3	4960	51.25	PK	74.00	-22.75	1.5	360	45.7	7	30.05	31.5	5.55
4	4960	43.00	AV	54.00	-11	1.5	360	37.45	7	30.05	31.5	5.55
5	7440	52.95	PK	74.00	-21.05	1.5	270	37.75	16	31.20	32	15.2
6	7440	44.97	AV	54.00	-9.03	1.5	270	29.77	16	31.20	32	15.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（39CH_2480MHz）												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2483.5	46.90	PK	74.00	-27.1	1	120	43.5	5.7	29.50	31.8	3.4
2	2483.5	38.65	AV	54.00	-15.35	1	120	35.25	5.7	29.50	31.8	3.4
3	4960	51.11	PK	74.00	-22.89	1.5	150	45.56	7	30.05	31.5	5.55
4	4960	43.63	AV	54.00	-10.37	1.5	150	38.08	7	30.05	31.5	5.55
5	7440	53.09	PK	74.00	-20.91	1.5	120	37.89	16	31.20	32	15.2
6	7440	45.11	AV	54.00	-8.89	1.5	120	29.91	16	31.20	32	15.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
   − Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level − Limit value
5. " * ": Fundamental frequency.

2.7. Conducted Emission

2.7.1. Limit of Conducted Emission

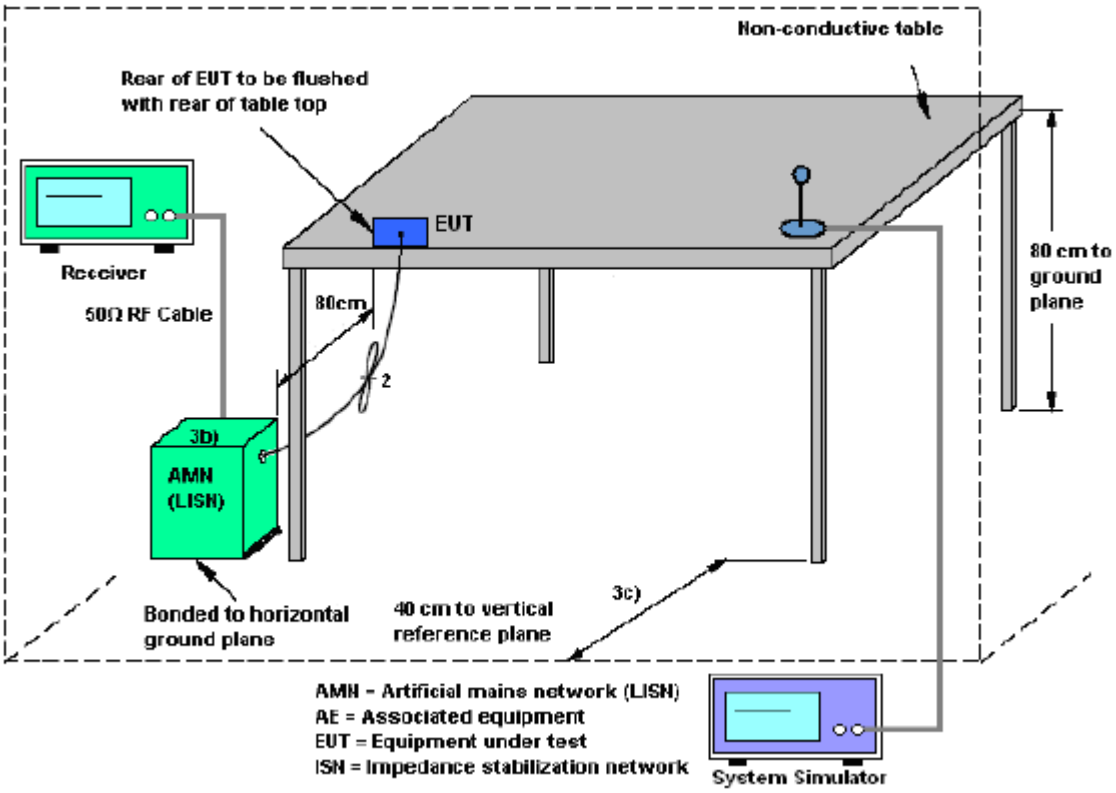
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3. Test Setup

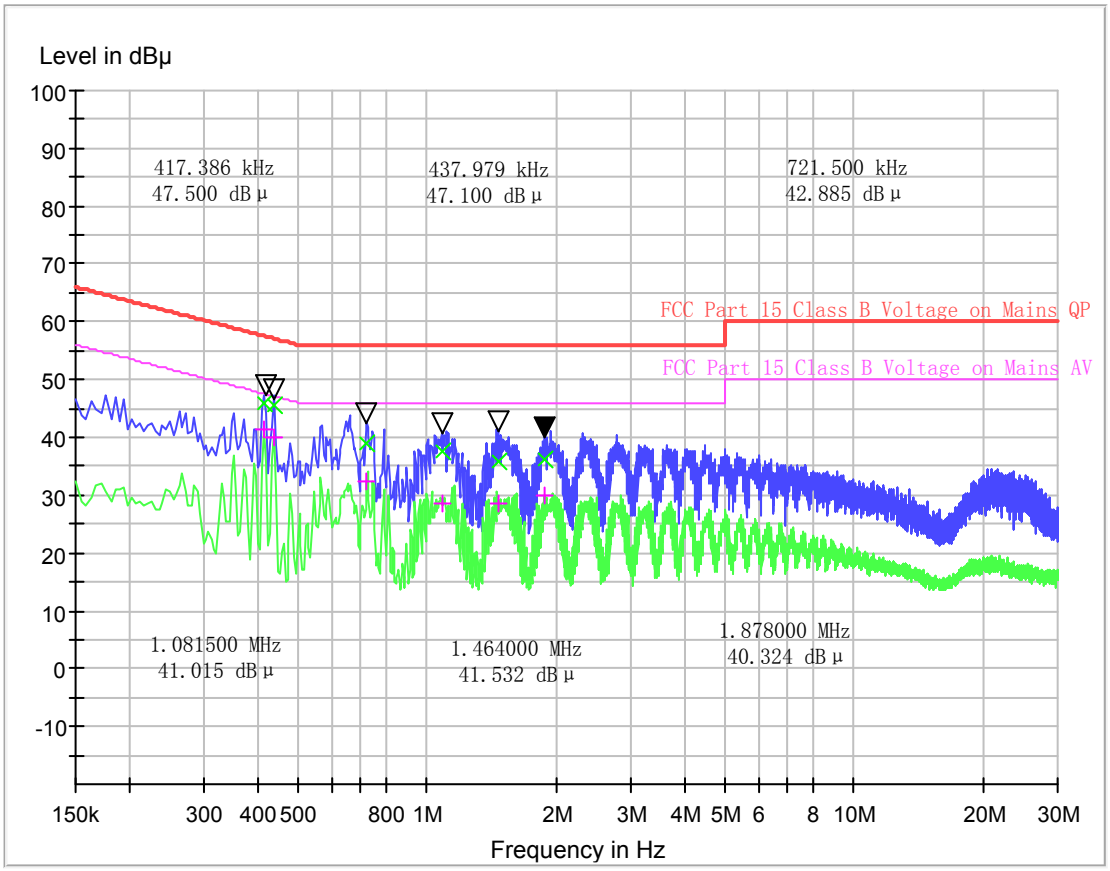


2.7.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

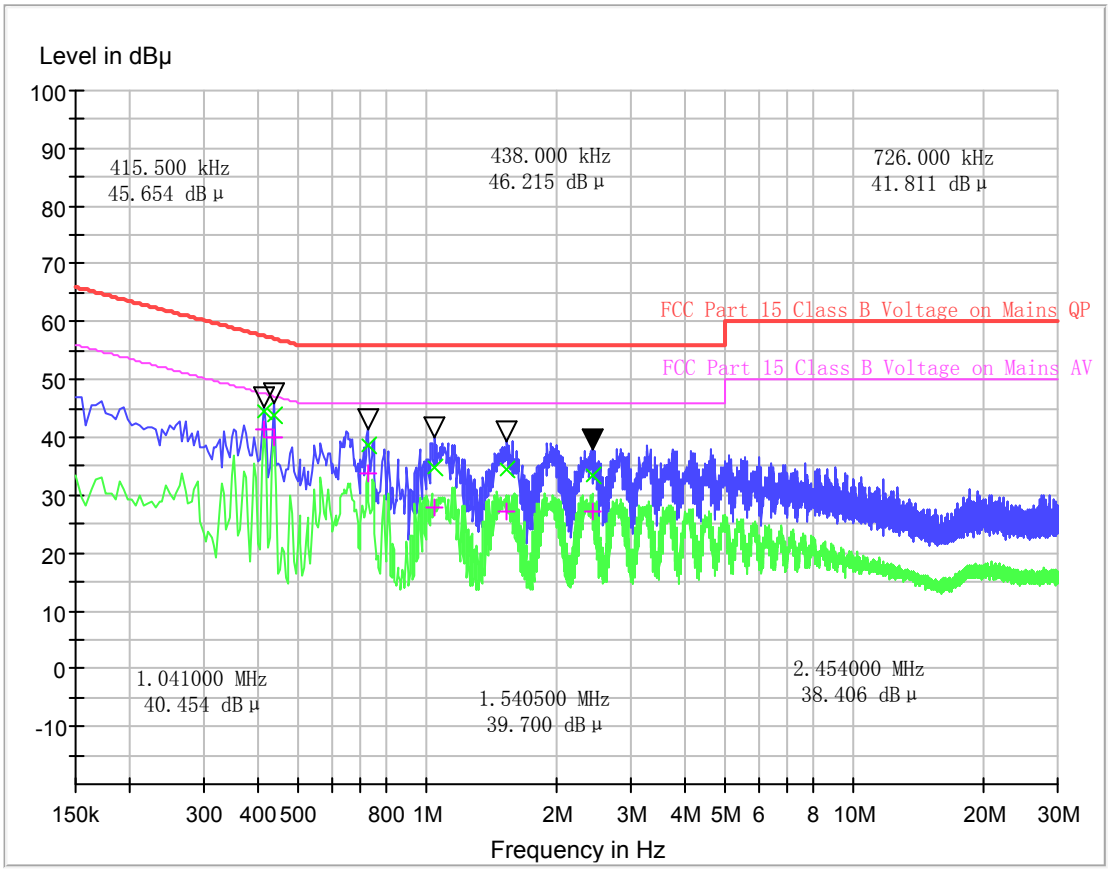
2.7.5. Test Result

The EUT configuration of the emission tests is Bluetooth Link + USB Cable (Charging from adapter)



(Plot A: L Phase)

Conducted Disturbance at Mains Terminals							
L Test Data							
QP					AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Cable Loss (dB)	Cor. Factor (dB)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.415500	57.5	45.88	0.2	20.8	0.415500	47.5	41.23
0.438000	57.1	45.46	0.2	20.8	0.438000	47.1	40.15
0.721500	56.0	39.06	0.3	20.5	0.721500	46.0	32.31
1.081500	56.0	37.49	0.8	20.3	1.081500	46.0	28.64
1.464000	56.0	36.01	1.2	20.2	1.464000	46.0	28.64
1.878000	56.0	36.19	1.5	20.2	1.878000	46.0	29.81



(Plot B: N Phase)

Conducted Disturbance at Mains Terminals							
L Test Data							
QP					AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Cable Loss (dB)	Cor. Factor (dB)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.415500	57.5	44.40	0.5	20.7	0.415500	47.5	41.32
0.438000	57.1	43.69	0.5	20.7	0.438000	47.1	40.11
0.726000	56.0	38.63	0.5	20.4	0.726000	46.0	33.93
1.041000	56.0	34.94	0.8	20.1	1.041000	46.0	27.97
1.540500	56.0	34.58	1.2	20.0	1.540500	46.0	27.26
2.454000	56.0	33.47	1.5	19.9	2.454000	46.0	27.11

Test Result: PASS

3. List of measuring equipment

Radiated Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	11/11/2018	11/10/2019
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	11/11/2018	11/10/2019
3	EMI TEST Software	Audix	E3	N/A	N/A	N/A
4	TURNTABLE	ETS	2088	2149	N/A	N/A
5	ANTENNA MAST	ETS	2075	2346	N/A	N/A
6	EMI TEST Software	Rohde&Schwarz	ESK1	N/A	N/A	N/A
7	HORNANTENNA	ShwarzBeck	9120D	1011	11/11/2018	11/10/2019
8	Amplifer	Sonoma	310N	E009-13	11/11/2018	11/10/2019
9	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	11/11/2018	11/10/2019
10	High pass filter	Compliance Direction systems	BSU-6	34202	11/11/2018	11/10/2019
11	HORNANTENNA	ShwarzBeck	9120D	1012	11/11/2018	11/10/2019
12	Amplifer	Compliance Direction systems	PAP1-4060	120	11/11/2018	11/10/2019
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	11/11/2018	11/10/2019
14	TURNTABLE	MATURO	TT2.0	----	N/A	N/A
15	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A	N/A
16	Horn Antenna	SCHWARZBECK	BBHA9170	25841	11/11/2018	11/10/2019
17	ULTRA-BROAD BAND ANTENNA	Rohde&Schwarz	HL562	100015	11/11/2018	11/10/2019
18	Spectrum Analyzer	Keysight	N9030A	ATO-67098	10/08/2018	10/07/2019

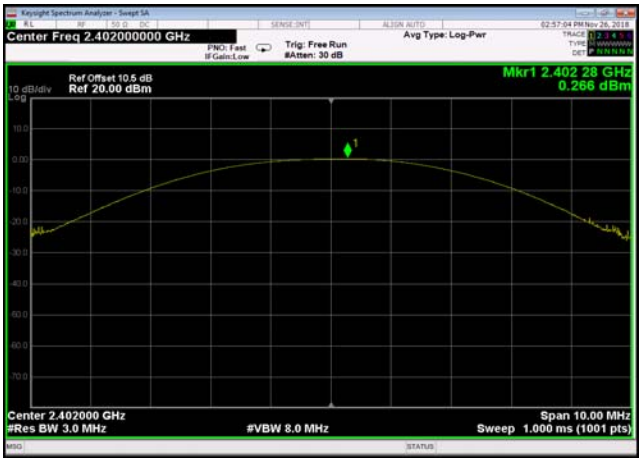
Note: Calibration interval of test equipments is one year.

Appendix A

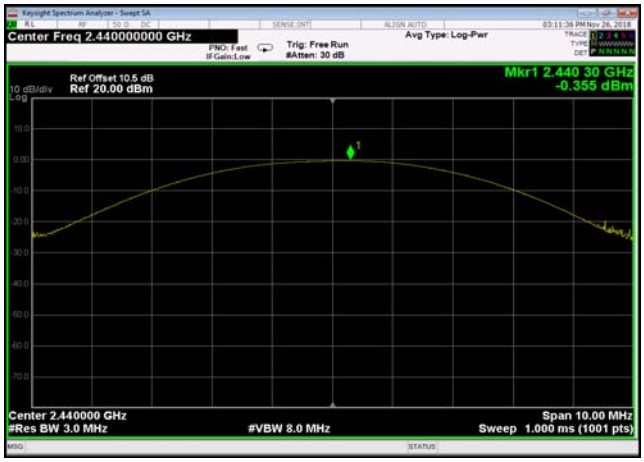
Peak Output Power
Test Result and Data

Test Frequency	Power(dBm)	Limit(dBm)	Result
2402	0.260	30	Pass
2440	-0.384		Pass
2480	-1.016		Pass

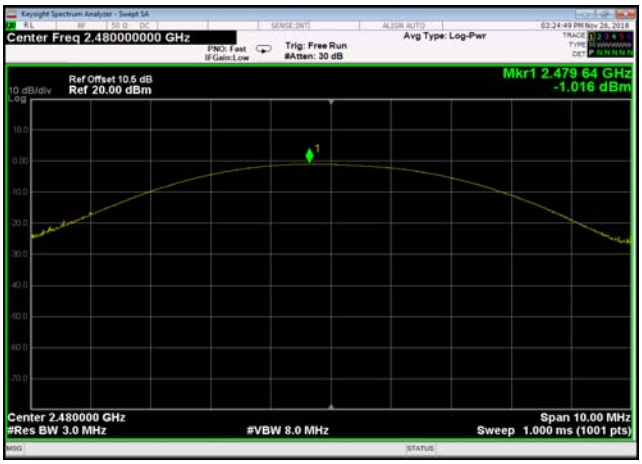
Output Power：2402MHz



Output Power：2440MHz



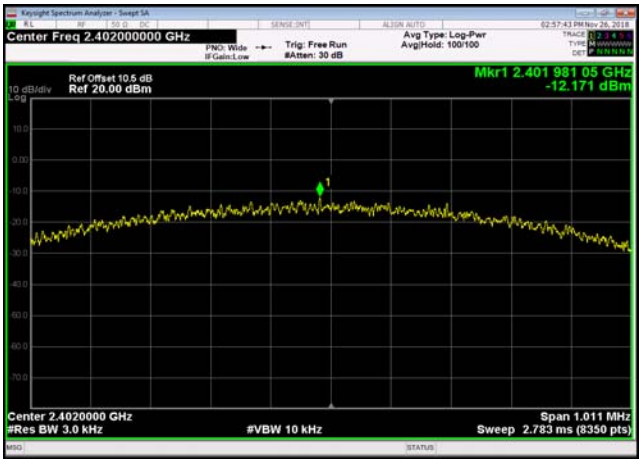
Output Power：2480MHz



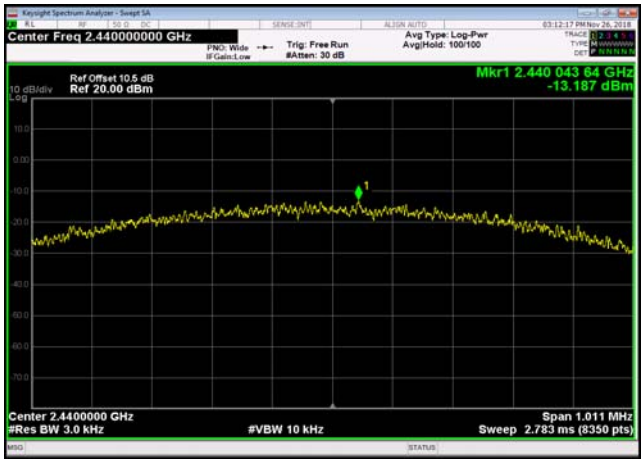
Power Spectral Density
Test Result and Data

Test Frequency	PSD(dBm/3KHz)	Limit(dBm/3KHz)	Result
2402	-12.171	8	Pass
2440	-13.187		Pass
2480	-13.301		Pass

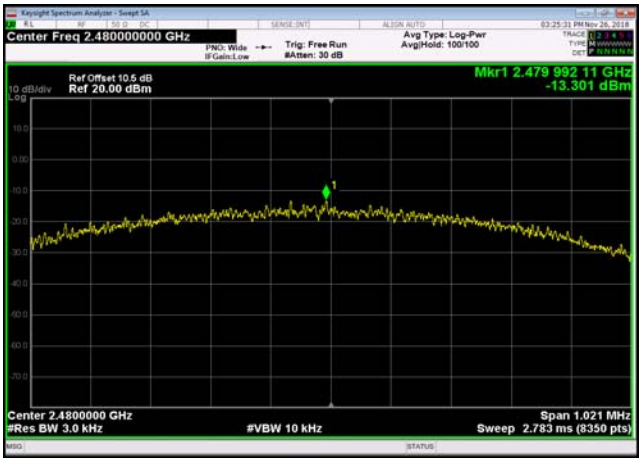
Power spectral density：2402MHz



Power spectral density：2440MHz



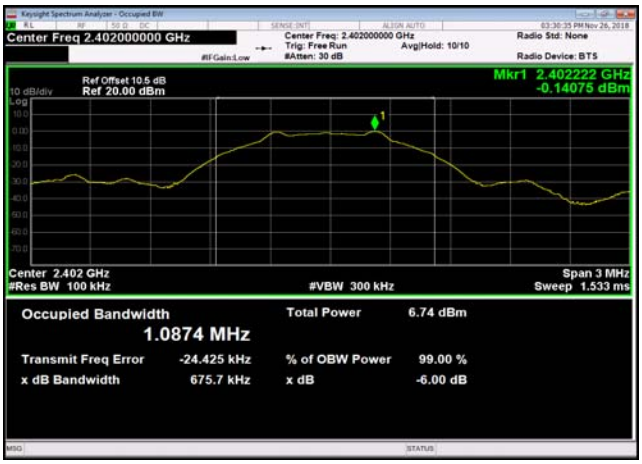
Power spectral density：2480MHz



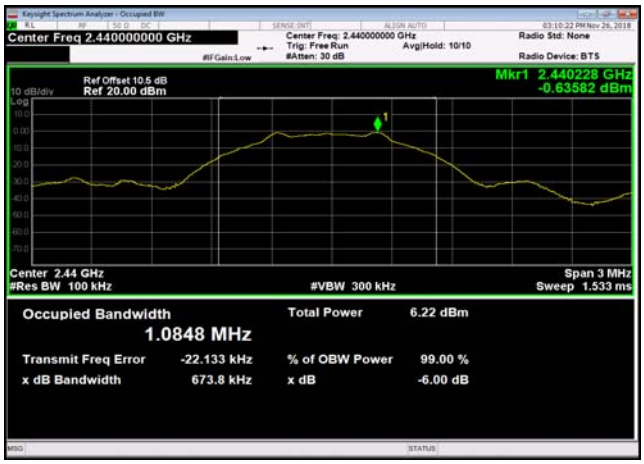
6dB Band Width
Test Result and Data

Test Frequency	6dB Occupy Bandwidth(Khz)	Min Limit(kHz)	Result
2402	675.680	500	Pass
2440	673.777		Pass
2480	680.834		Pass

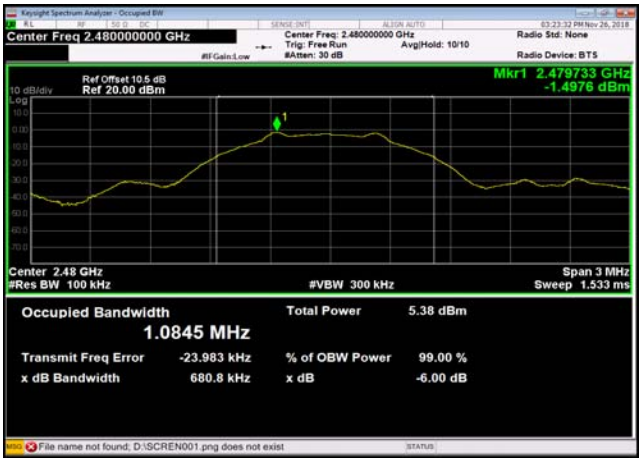
6dB Bandwidth：2402MHz



6dB Bandwidth：2440MHz

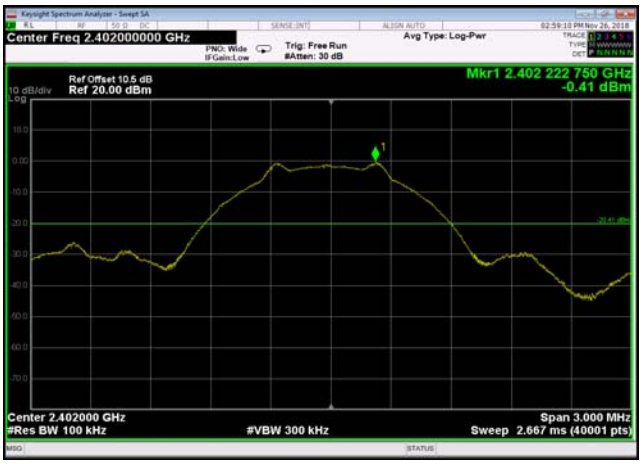
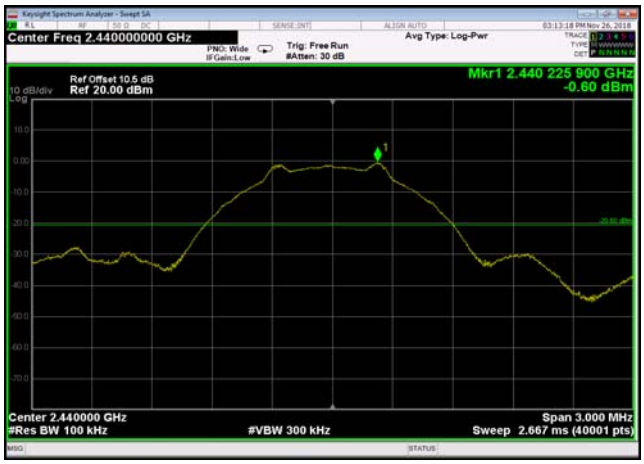
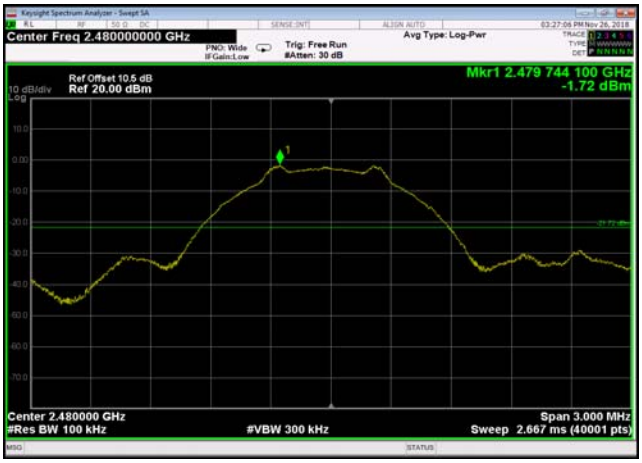
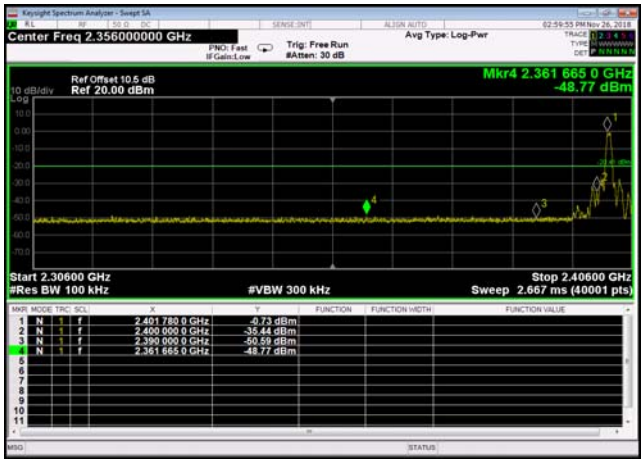
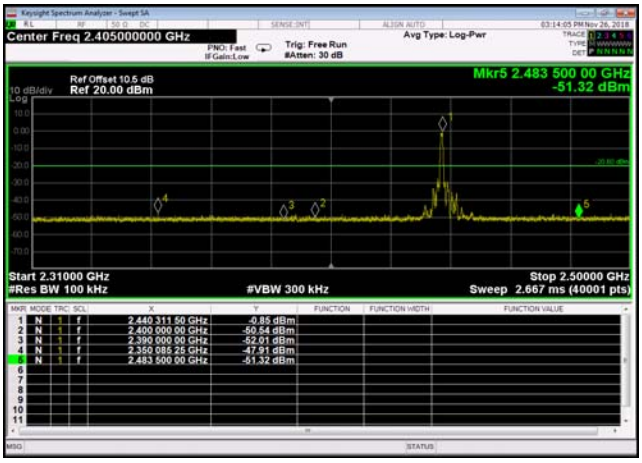
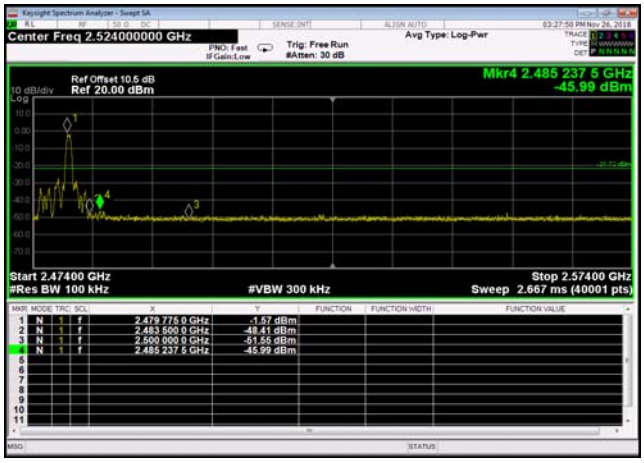


6dB Bandwidth：2480MHz

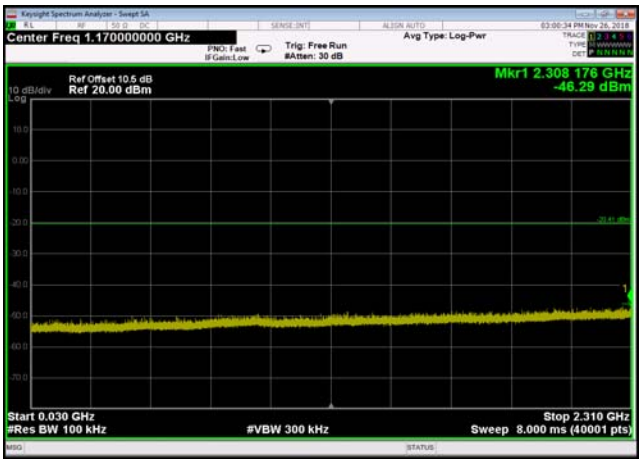


Conducted Band Edges and Spurious Emissions

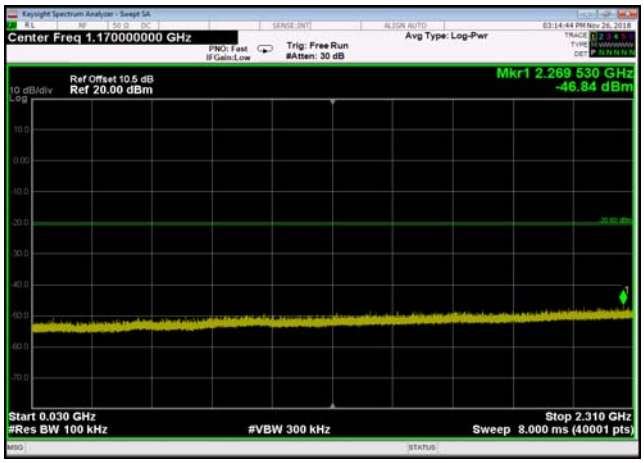
Test Result and Data

,Plot ,1Transmitter Spurious Emission ：2402,Referecy Level	,Plot ,1Transmitter Spurious Emission ：2440,Referecy Level
	
,Plot ,1Transmitter Spurious Emission ：2480,Referecy Level	,Plot ,2Conducted Emission：2402 ,Band Edge
	
,Plot ,2Conducted Emission：2440 ,Band Edge	,Plot ,2Conducted Emission：2480 ,Band Edge
	

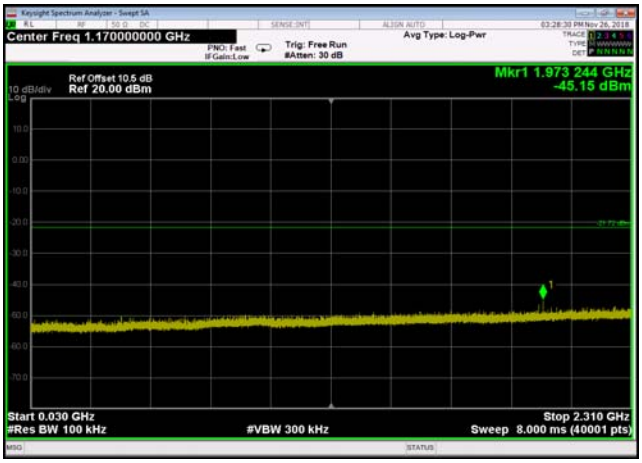
,Plot ,3Transmitter Spurious Emission ：2402,30MHz~2310MHz



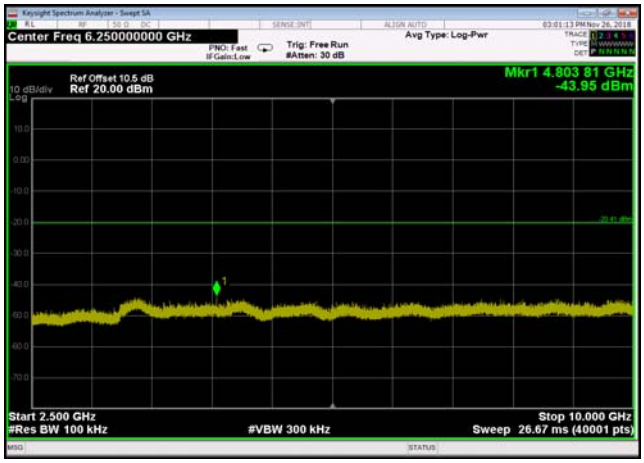
,Plot ,3Transmitter Spurious Emission ：2440,30MHz~2310MHz



,Plot ,3Transmitter Spurious Emission ：2480,30MHz~2310MHz



,Plot ,4Transmitter Spurious Emission ：2402,2500MHz~10000MHz



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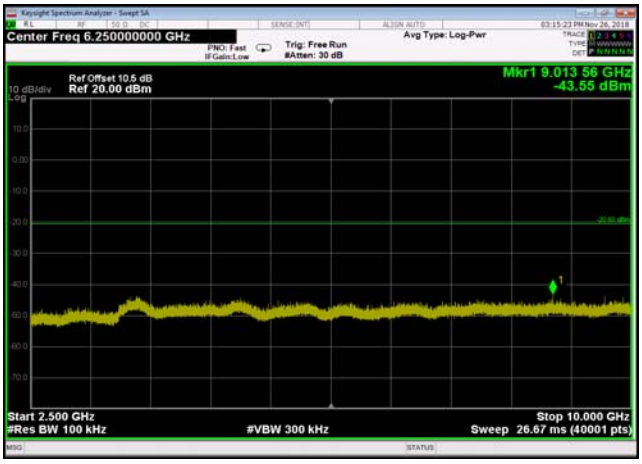
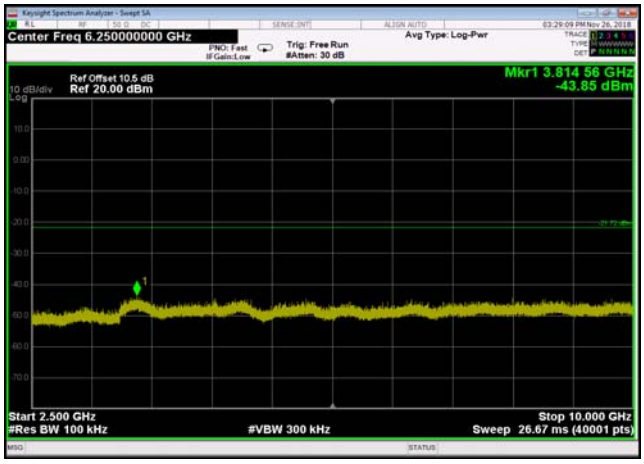
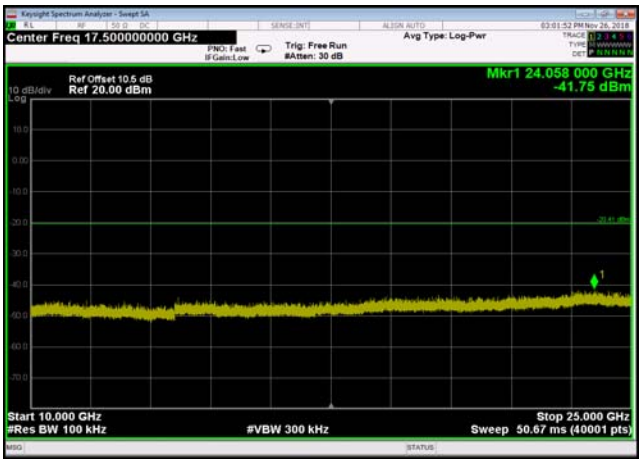
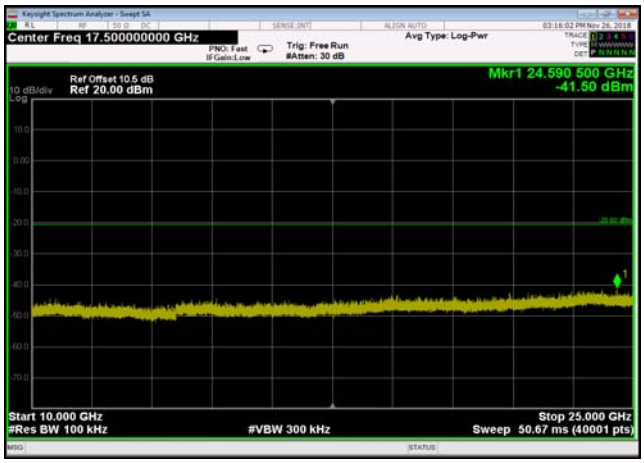


,Plot ,4Transmitter Spurious Emission ：2480,2500MHz~10000MHz



,Plot ,5Transmitter Spurious Emission ：2402,10000MHz~25000MHz	,Plot ,5Transmitter Spurious Emission ：2440,10000MHz~25000MHz
	
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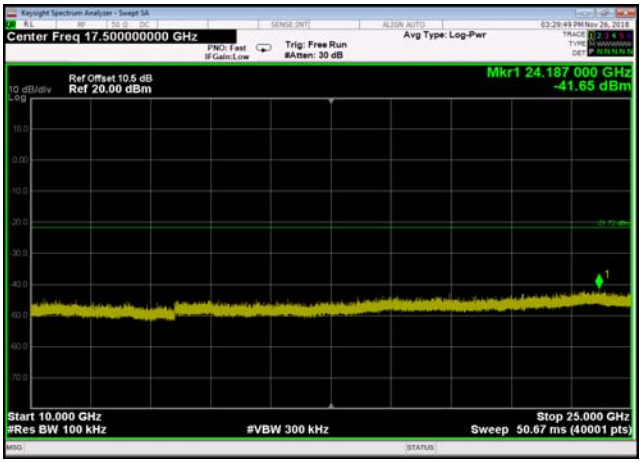	

** END OF REPORT **