



# RF TEST REPORT

**Report No.:** SET2018-14844

**Product Name:** Wireless data transceiver

**FCC ID:** 2ACRAHX-DU8616D

**Main Model No. :** HX-DU8616D

**Series Model:** HX-DU86XXD(XX=17~27)

**Applicant:** HARXON CORPORATION

**Address:** 6/F, Block B, D3 Building, TCL International E City, No. 1001  
Zhongshanyuan Road, Nanshan District, Shenzhen, 518055, PRC

**Dates of Testing:** 11/22/2018 — 11/26/2018

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

**Lab Location:** Building 28/29, East of Shigu Xili Industrial Zone, Nanshan District  
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## Test Report

**Product Name** ..... : Wireless data transceiver

**Brand Name** ..... : HARXON

**Trade Name** ..... : HARXON

**Applicant** ..... : HARXON CORPORATION

**Applicant Address** ..... : 6/F, Block B, D3 Building, TCL International E City, No.  
1001 Zhongshanyuan Road, Nanshan District, Shenzhen,  
518055, PRC

**Manufacturer** ..... : HARXON CORPORATION

**Manufacturer Address** ..... : 6/F, Block B, D3 Building, TCL International E City, No.  
1001 Zhongshanyuan Road, Nanshan District, Shenzhen,  
518055, PRC

**Test Standards** ..... : 47 CFR Part 15 Subpart C: Radio Frequency Devices  
ANSI C63.10-2013: American National Standard for  
Testing Unlicensed Wireless Devices

**Test Result** ..... : PASS

**Tested by** ..... : Shallwe Yang 2018.11.26  
Shallwe Yang, Test Engineer

**Reviewed by** ..... : Chris You 2018.11.26  
Chris You, Senior EGINEER

**Approved by** ..... : Zhu Qi 2018.11.26  
Zhu Qi, Manager

## TABLE OF CONTENTS

**RF TEST REPORT ..... 1**

**1. GENERAL INFORMATION ..... 4**

1.1. EUT Description ..... 4

1.2. Test Standards and Results ..... 5

1.3. Table for Supporting Units ..... 6

1.4. Facilities and Accreditations ..... 7

**2. 47 CFR PART 15C REQUIREMENTS ..... 8**

2.1. Antenna requirement ..... 8

2.2. Peak Output Power ..... 9

2.3. 6dB and 99% Occupy Bandwidth ..... 10

2.4. Conducted Band Edges and Spurious Emissions ..... 11

2.5. Power spectral density (PSD) ..... 13

2.6. Radiated Band Edge and Spurious Emission ..... 15

2.7. Conducted Emission ..... 23

**3. LIST OF MEASURING EQUIPMENT ..... 27**

**APPENDIX A ..... 28**

Change History		
Issue	Date	Reason for change
1.0	2018.11.26	First edition

## 1. General Information

### 1.1. EUT Description

EUT Type	Wireless data transceiver	
Hardware Version	V1R1	
Software Version	E025.00.00	
Frequency Range	Bluetooth LE 4.1	2402MHz~2480MHz
Channel Number	Bluetooth LE 4.1	40
Bit Rate of Transmitter	Bluetooth LE 4.1	1Mbps
Modulation Type	Bluetooth LE 4.1	GFSK
Antenna Type	Internal	
Antenna Gain	0.5dBi	

Note 1: The EUT is a Wireless data transceiver, it contain Bluetooth 4.1 LE Module operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth 4.1 LE is  $F(\text{MHz})=2402+2*n$  ( $0 \leq n \leq 39$ ). 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%.

Note 4: the main model and the series model only model name is different.



## 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 4.1

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 and 99 % 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	Wireless data transceiver	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

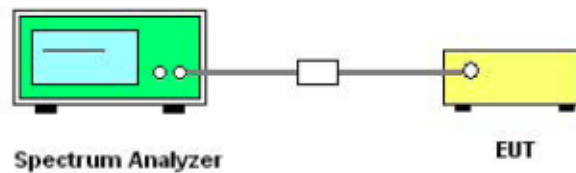
### 2.2.1. Limit of Peak Output Power

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 = the frequency band of operation;  
RBW  $\geq$  100KHz; VBW  $\geq$  RBW; 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

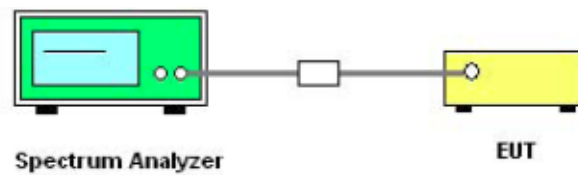
### 2.3.1. Limit of 6dB Bandwidth

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

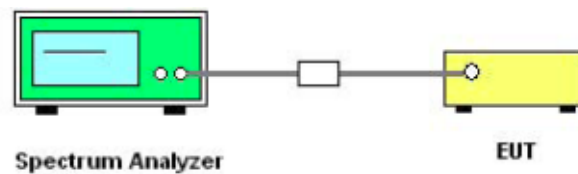
### 2.4.1. Limit of Conducted Band Edges and Spurious Emissions

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)

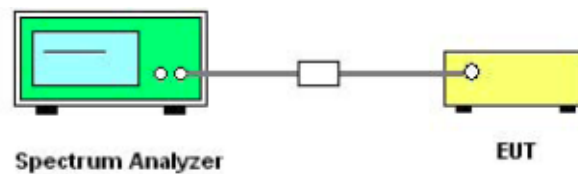
### 2.5.1. Limit of Power Spectral Density

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.

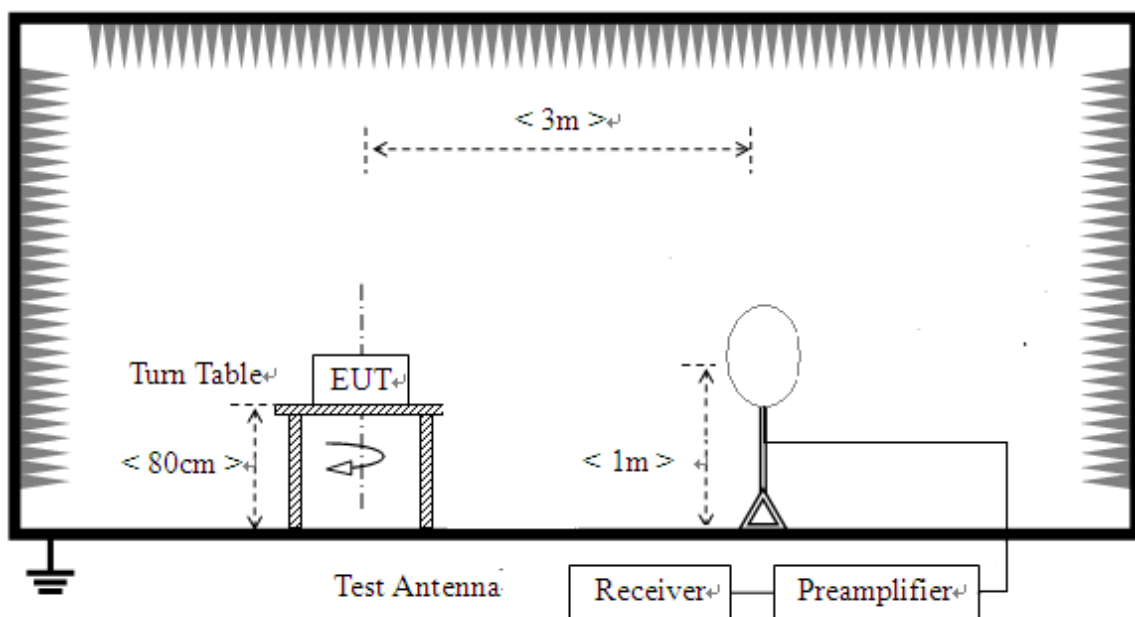
Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

### 2.6.2. Measuring Instruments

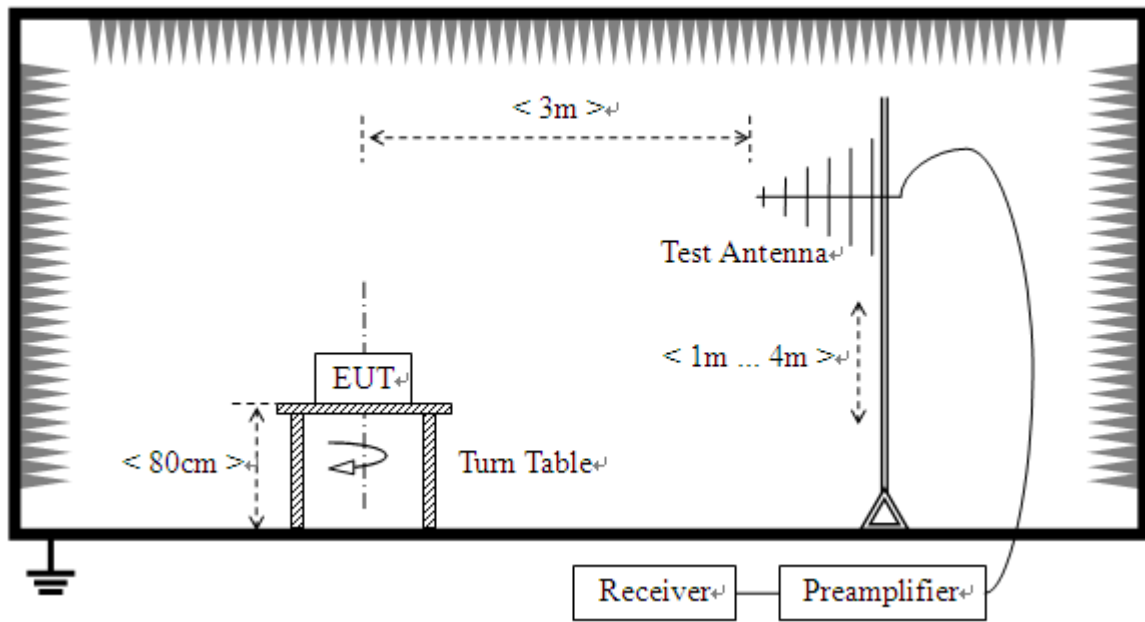
The measuring equipment is listed in the section 3 of this test report.

### 2.6.3. Test Setup

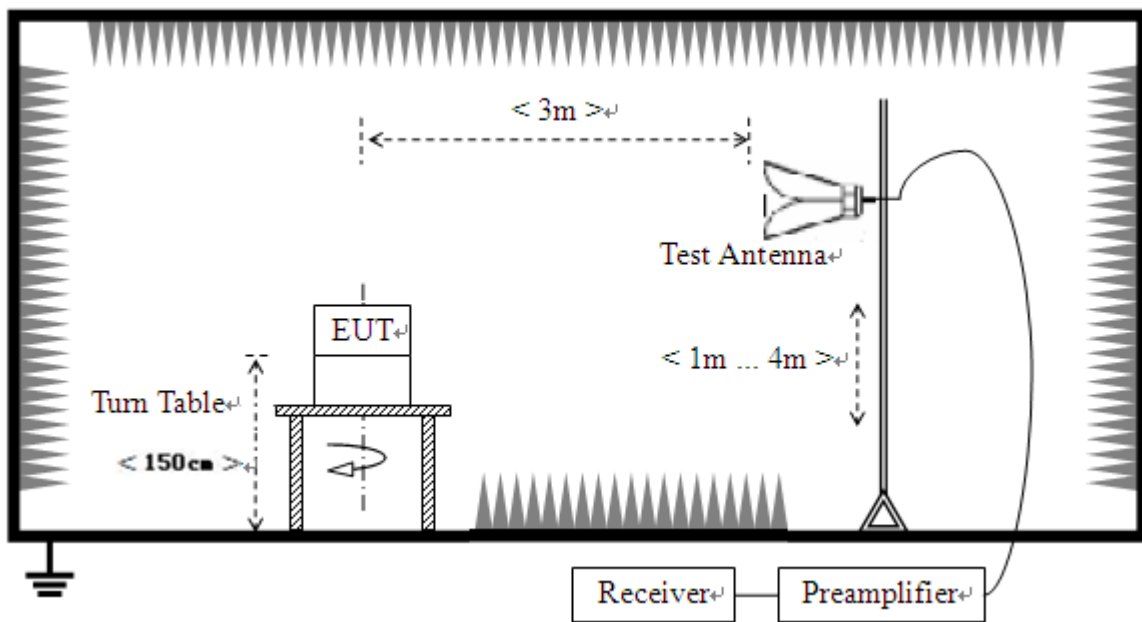
For radiated emissions from 9 KHz to 30 MHz



**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  $\geq 1/T$  (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.

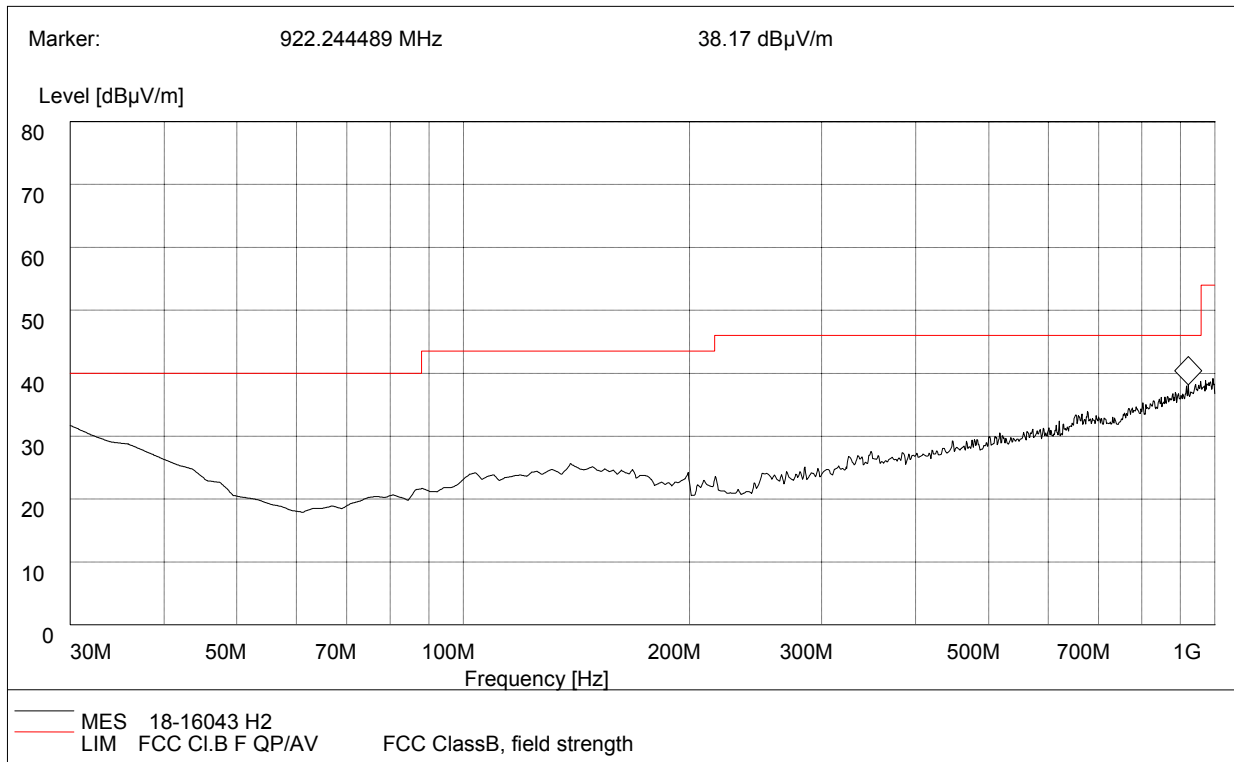


### 2.6.5. Test Results of Radiated Band Edge and Spurious Emission

#### For 9KHz to 30MHz

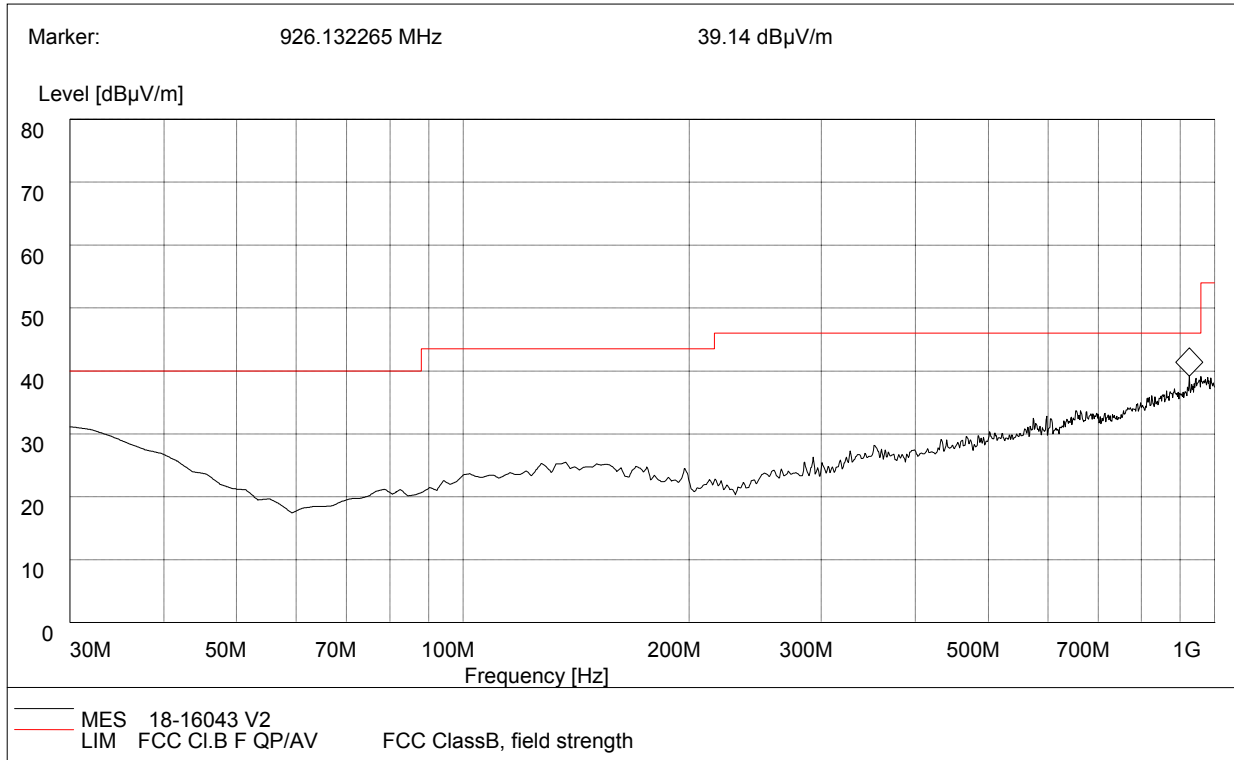
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

#### 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	31.69	120.000	28.87	150.0	40.0	Horizontal	Pass
138.86	25.59	120.000	28.89	150.0	43.5	Horizontal	Pass
168.02	24.65	120.000	29.00	150.0	43.5	Horizontal	Pass
517.92	30.51	120.000	29.20	150.0	46.0	Horizontal	Pass
677.31	33.90	120.000	29.8	150.0	46.0	Horizontal	Pass
922.24	38.17	120.000	30.2	150.0	46.0	Horizontal	Pass



**Plot B: 30MHz to 1GHz, Antenna Vertical**

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Bandwidth (kHz)	Cor. Factor	Antenna height (cm)	Limit (dB $\mu$ V/m)	Antenna	Verdict
30.00	30.14	120.000	28.87	150.0	40.0	Vertical	Pass
136.91	24.46	120.000	28.89	150.0	43.5	Vertical	Pass
169.96	24.78	120.000	29.00	150.0	43.5	Vertical	Pass
574.29	32.46	120.000	29.20	150.0	46.0	Vertical	Pass
655.93	33.51	120.000	29.8	150.0	46.0	Vertical	Pass
926.13	39.14	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)	Emission 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	48.52	PK	74.00	-25.48	1.5	120	47.22	5.2	28.60	32.5	1.3
2	2390	38.54	AV	54.00	-15.46	1.5	120	37.24	5.2	28.60	32.5	1.3
3	4804	55.48	PK	74.00	-18.52	2	180	49.08	7.4	30.40	31.4	6.4
4	4804	48.98	AV	54.00	-5.02	2	180	42.58	7.4	30.40	31.4	6.4
5	7206	45.17	PK	74.00	-28.83	1	360	35.87	9.9	31.50	32.1	9.3
6	7206	36.28	AV	54.00	-17.72	1	360	26.98	9.9	31.50	32.1	9.3

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (0CH\_2402MHz)**

No.	Frequency (MHz)	Emission 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	49.36	PK	74.00	-24.64	1.5	120	48.06	5.2	28.60	32.5	1.3
2	2390	40.71	AV	54.00	-13.29	1.5	120	39.41	5.2	28.60	32.5	1.3
3	4804	54.12	PK	74.00	-19.88	2	360	47.72	7.4	30.40	31.4	6.4
4	4804	46.62	AV	54.00	-7.38	2	360	40.22	7.4	30.40	31.4	6.4
5	7206	47.25	PK	74.00	-26.75	1	180	37.95	9.9	31.50	32.1	9.3
6	7206	39.11	AV	54.00	-14.89	1	180	29.81	9.9	31.50	32.1	9.3



**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (19CH\_2440MHz)**

No.	Fre. (MHz)	Emission 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	56.89	PK	74.00	-17.11	1.5	360	50.49	6.7	31.20	31.5	6.4
2	4880	51.69	AV	54.00	-2.31	1.5	360	45.29	6.7	31.20	31.5	6.4
3	7320	55.15	PK	74.00	-18.85	2	180	48.75	6.7	31.20	31.5	6.4
4	7320	48.57	AV	54.00	-5.43	2	180	42.17	6.7	31.20	31.5	6.4

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (19CH\_2440MHz)**

No.	Frequency (MHz)	Emission 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	55.26	PK	74.00	-18.74	1.5	120	48.86	6.7	31.20	31.5	6.4
2	4880	48.28	AV	54.00	-5.72	1.5	120	41.88	6.7	31.20	31.5	6.4
3	7320	53.24	PK	74.00	-20.76	1.5	320	46.84	6.7	31.20	31.5	6.4
4	7320	45.68	AV	54.00	-8.32	1.5	320	39.28	6.7	31.20	31.5	6.4



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (39CH_2480MHz)												
No.	Frequency (MHz)	Emission 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	48.33	PK	74.00	-25.67	1	120	44.93	5.7	29.50	31.8	3.4
2	2483.5	40.84	AV	54.00	-13.16	1	120	37.44	5.7	29.50	31.8	3.4
3	4960	51.26	PK	74.00	-22.74	1.5	360	45.71	7	30.05	31.5	5.55
4	4960	43.01	AV	54.00	-10.99	1.5	360	37.46	7	30.05	31.5	5.55
5	7440	54.78	PK	74.00	-19.22	1.5	270	39.58	16	31.20	32	15.2
6	7440	46.80	AV	54.00	-7.2	1.5	270	31.6	16	31.20	32	15.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (39CH_2480MHz)												
No.	Frequency (MHz)	Emission 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	45.88	PK	74.00	-28.12	1	120	42.48	5.7	29.50	31.8	3.4
2	2483.5	37.63	AV	54.00	-16.37	1	120	34.23	5.7	29.50	31.8	3.4
3	4960	53.12	PK	74.00	-20.88	1.5	150	47.57	7	30.05	31.5	5.55
4	4960	45.64	AV	54.00	-8.36	1.5	150	40.09	7	30.05	31.5	5.55
5	7440	52.14	PK	74.00	-21.86	1.5	120	36.94	16	31.20	32	15.2
6	7440	44.16	AV	54.00	-9.84	1.5	120	28.96	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

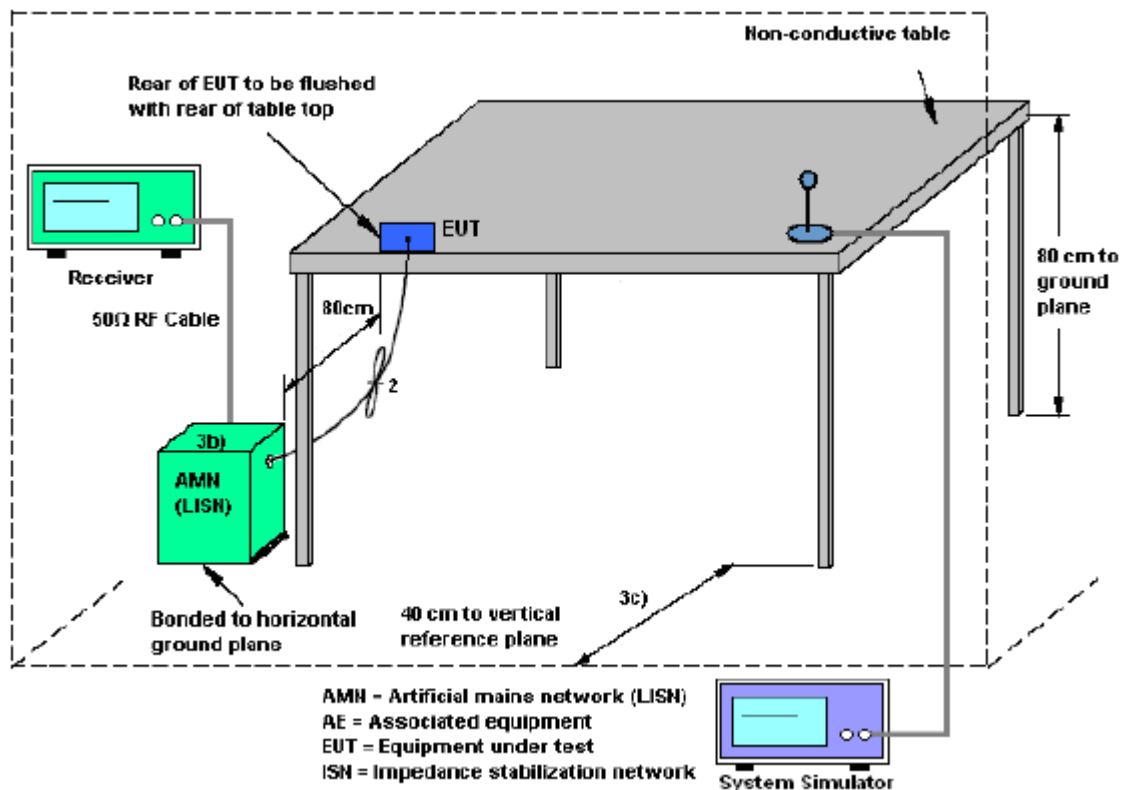
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	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



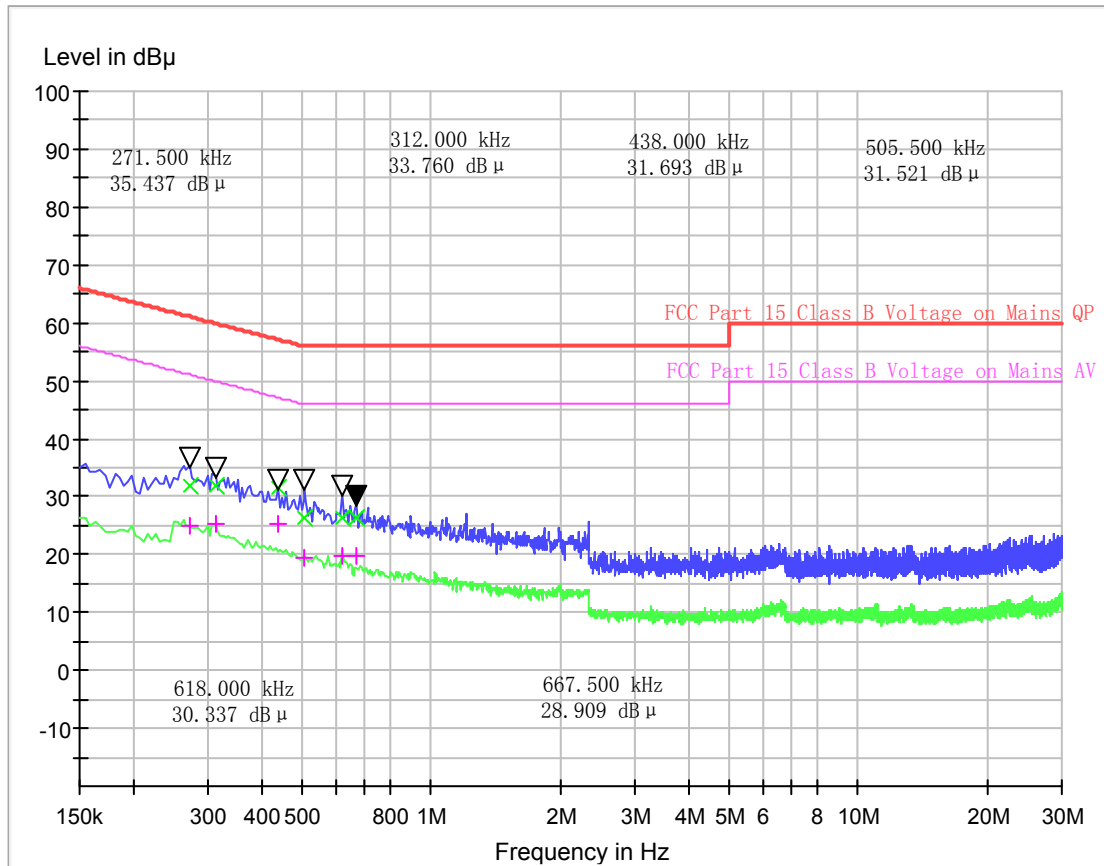
#### **2.7.4. Test Procedures**

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 + DC Power



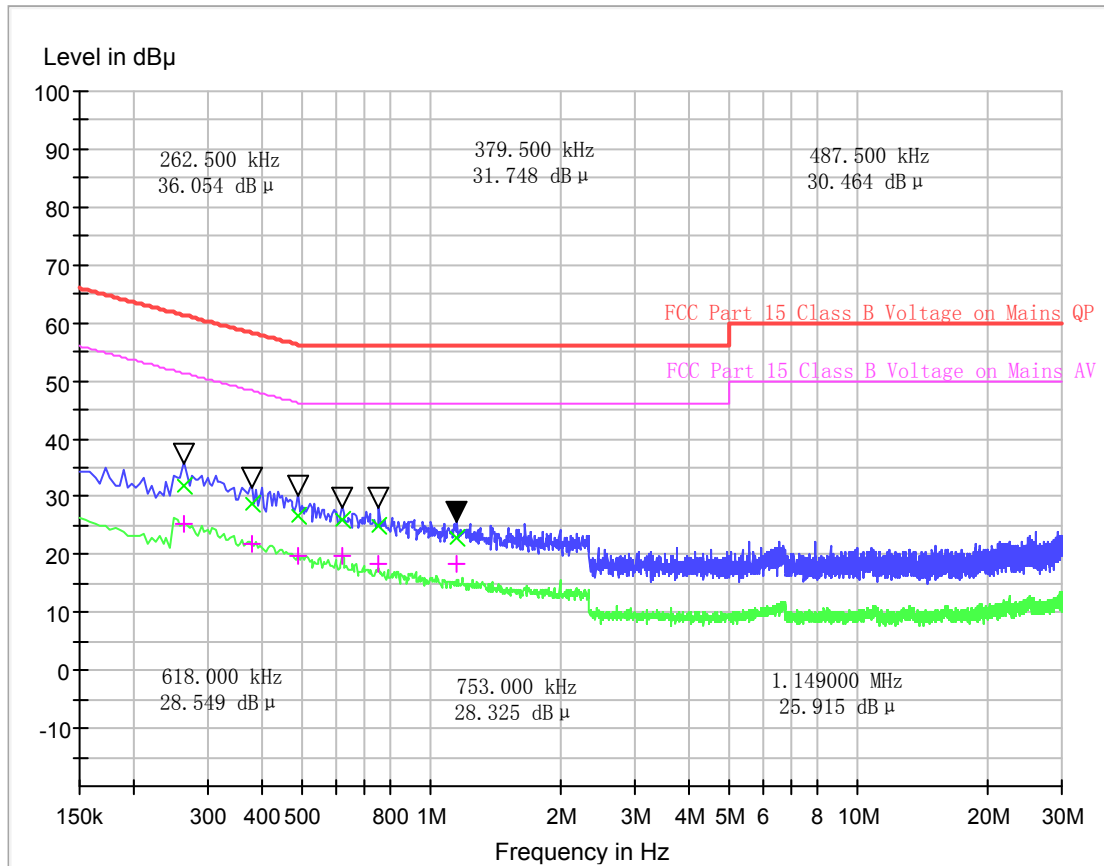


(Plot A: L Phase)

**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)
0.271500	61.1	31.85	0.2	21.0	0.271500	51.1	24.87
0.312000	59.9	31.94	0.2	21.0	0.312000	49.9	25.36
0.438000	57.1	31.69	0.3	21.0	0.438000	47.1	25.31
0.505500	56.0	26.32	0.3	20.8	0.505500	46.0	19.55
0.618000	56.0	26.36	0.3	20.8	0.618000	46.0	19.70
0.667500	56.0	26.22	0.3	20.6	0.667500	46.0	19.76



(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)
0.262500	61.4	31.89	0.2	20.9	0.262500	51.4	25.20
0.379500	58.3	28.84	0.2	20.8	0.379500	48.3	21.89
0.487500	56.2	26.58	0.3	20.7	0.487500	46.2	19.71
0.618000	56.0	26.12	0.3	20.5	0.618000	46.0	19.72
0.753000	56.0	24.91	0.3	20.4	0.753000	46.0	18.22
1.149000	56.0	22.73	0.5	20.1	1.149000	46.0	18.25

**Test Result: PASS**



### 3. List of measuring equipment

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

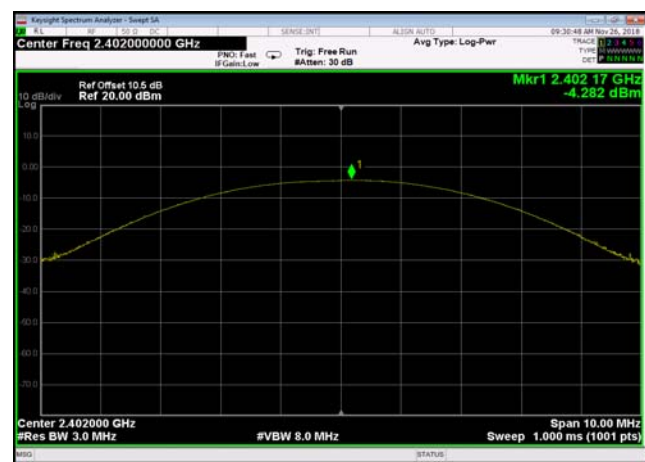


## Appendix A

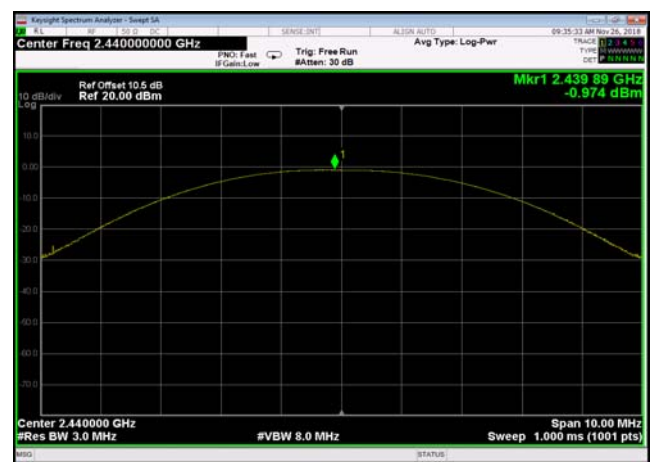
### Peak Output Power Test Result and Data

Test Frequency	Power(dBm)	Limit(dBm)	Result
2402	-4.399	30	Pass
2440	-0.974		Pass
2480	1.569		Pass

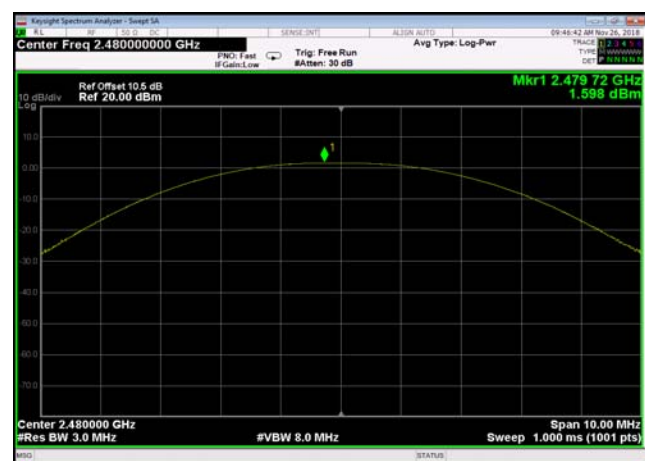
Output Power: 2402MHz



Output Power: 2440MHz



Output Power: 2480MHz

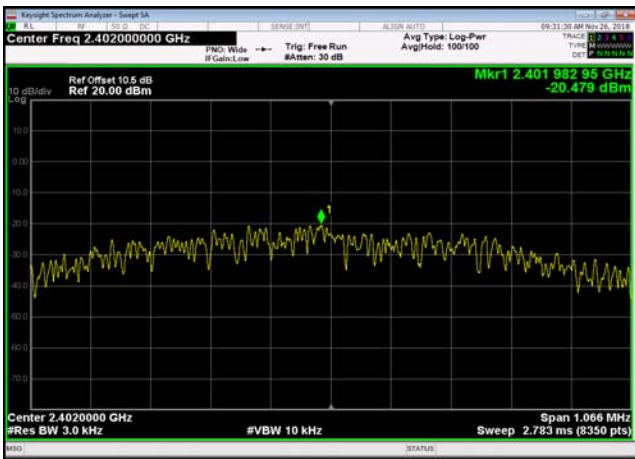




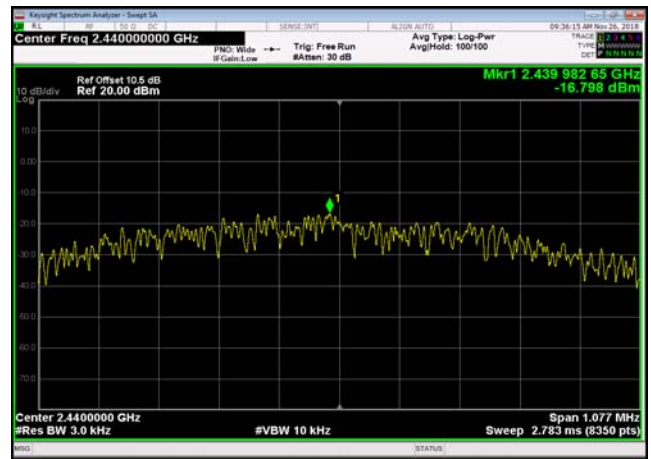
### Power Spectral Density Test Result and Data

Test Frequency	PSD(dBm/3KHz)	Limit(dBm/3KHz)	Result
2402	-20.479	8	Pass
2440	-16.798		Pass
2480	-13.859		Pass

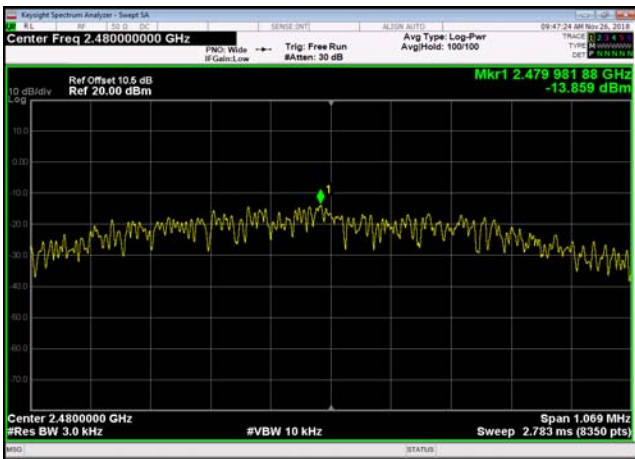
Power spectral density: 2402MHz



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	710.814	500	Pass
2440	717.827		Pass
2480	712.835		Pass

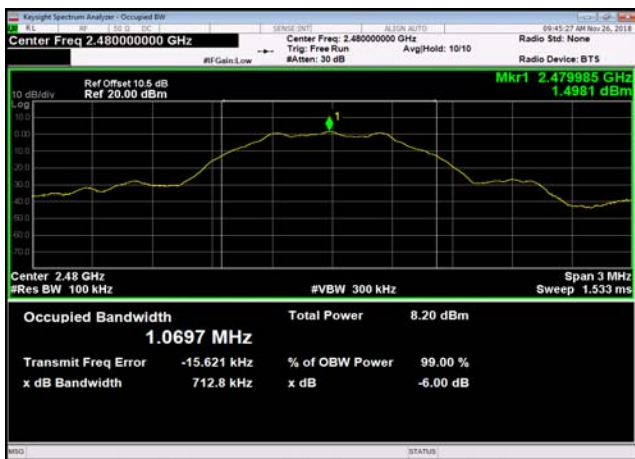
6dB Bandwidth: 2402MHz



6dB Bandwidth: 2440MHz



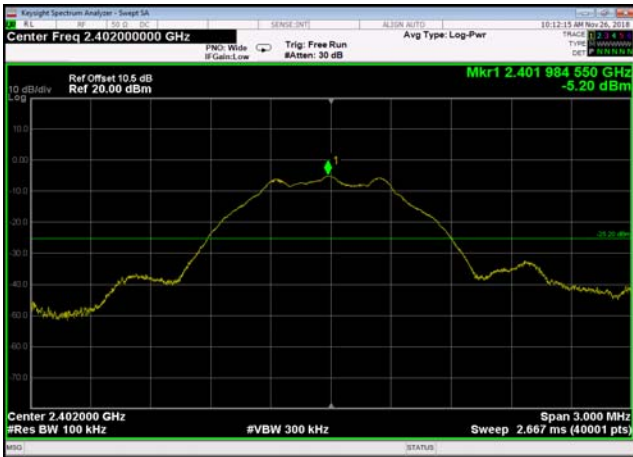
6dB Bandwidth: 2480MHz



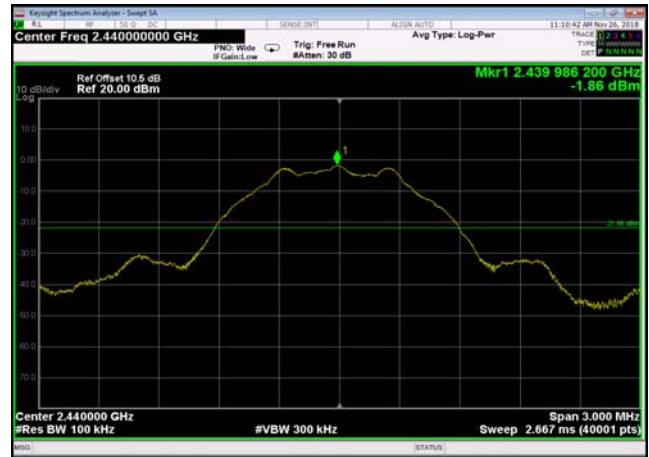


### Conducted Band Edges and Spurious Emissions Test Result and Data

Transmitter Spurious Emission  
: 2402,Reference Level



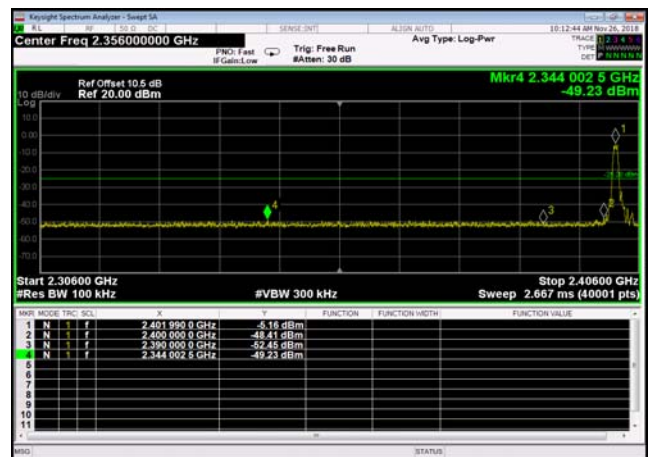
Transmitter Spurious Emission  
: 2440,Reference Level



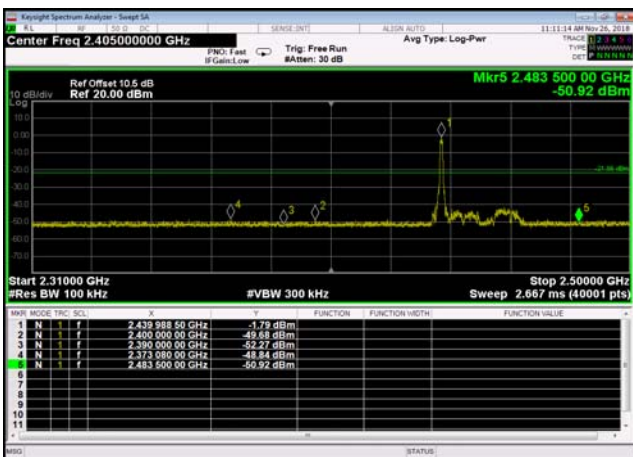
Transmitter Spurious Emission  
: 2480,Reference Level



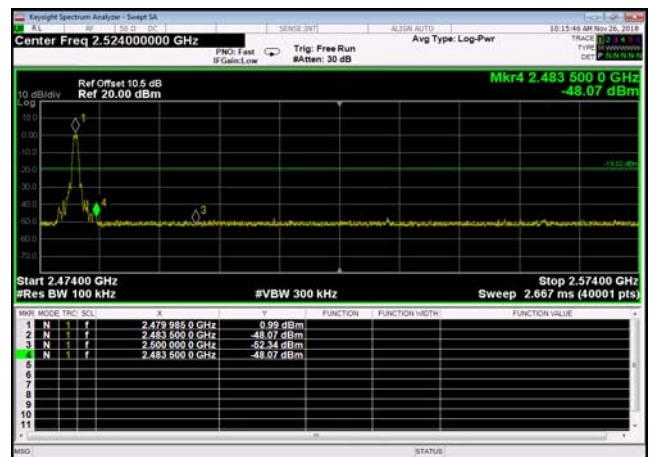
Conducted Emission: 2402  
,Band Edge



Conducted Emission: 2440  
,Band Edge

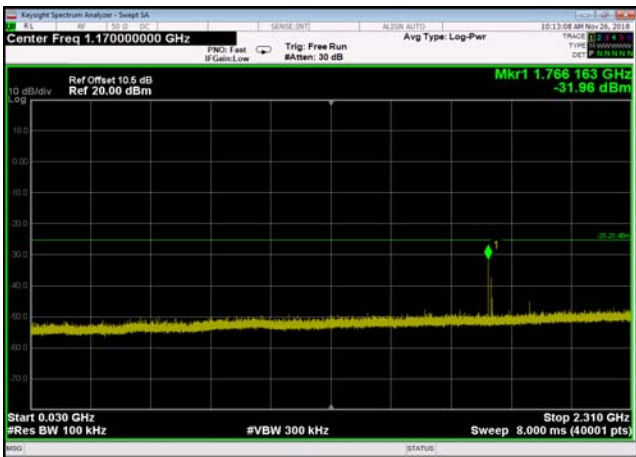


Conducted Emission: 2480  
,Band Edge

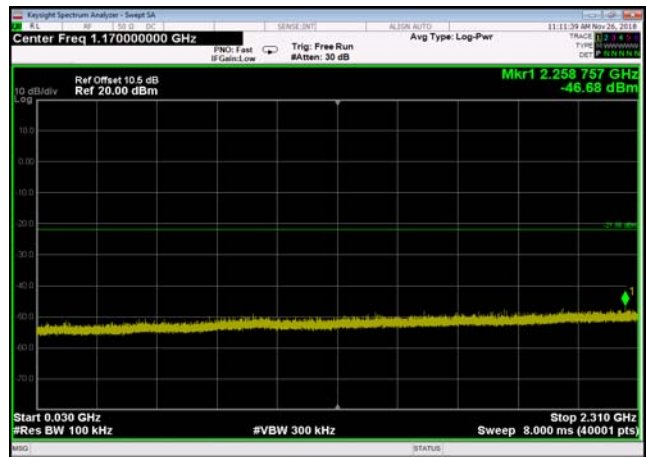




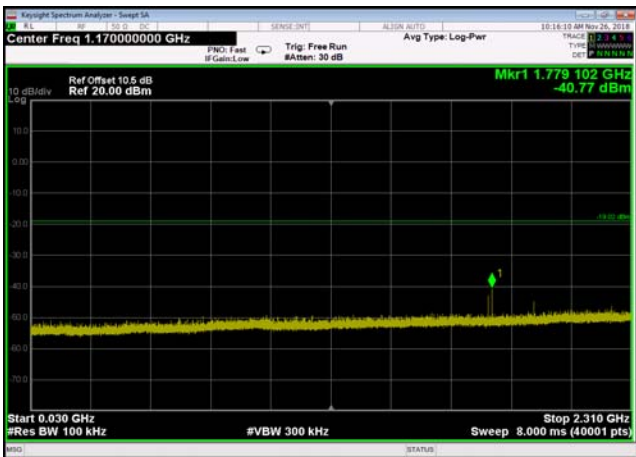
Transmitter Spurious Emission : 2402,30MHz~2310MHz



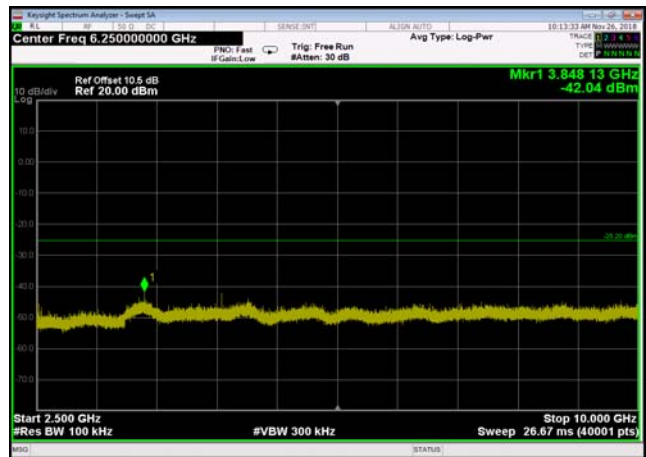
Transmitter Spurious Emission : 2440,30MHz~2310MHz



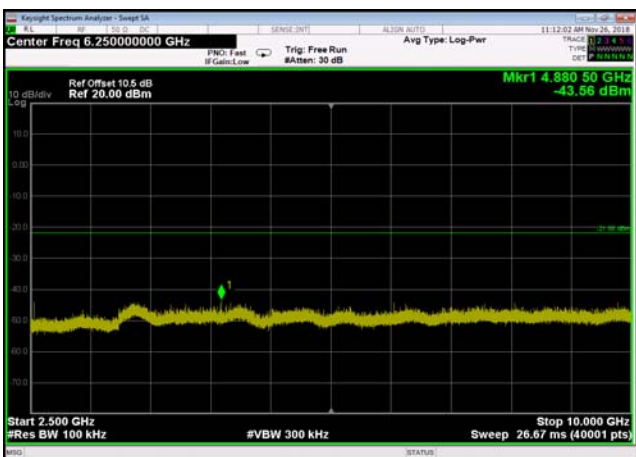
Transmitter Spurious Emission : 2480,30MHz~2310MHz



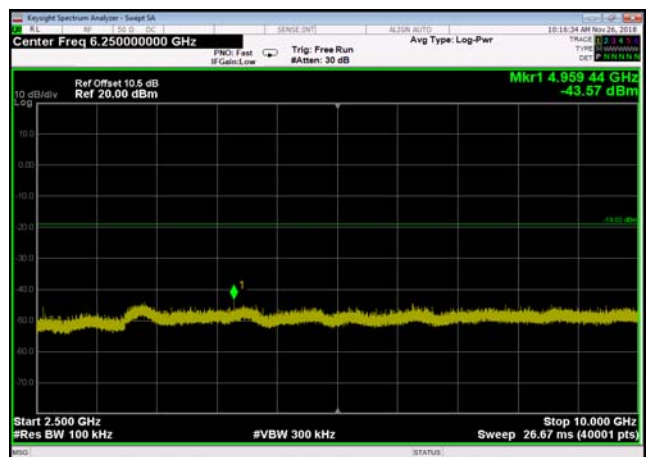
Transmitter Spurious Emission : 2402,2500MHz~10000MHz



Transmitter Spurious Emission : 2440,2500MHz~10000MHz



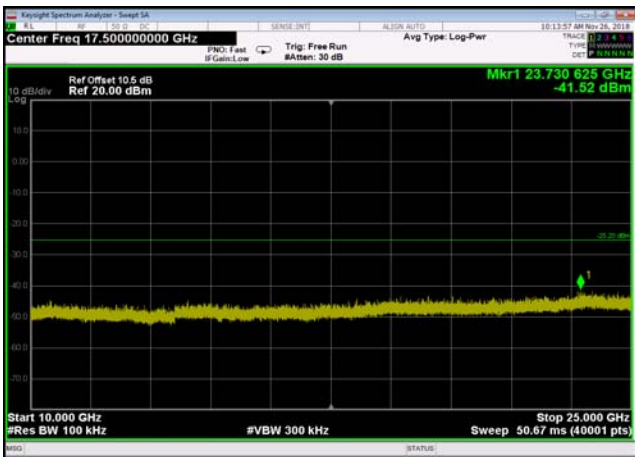
Transmitter Spurious Emission : 2480,2500MHz~10000MHz



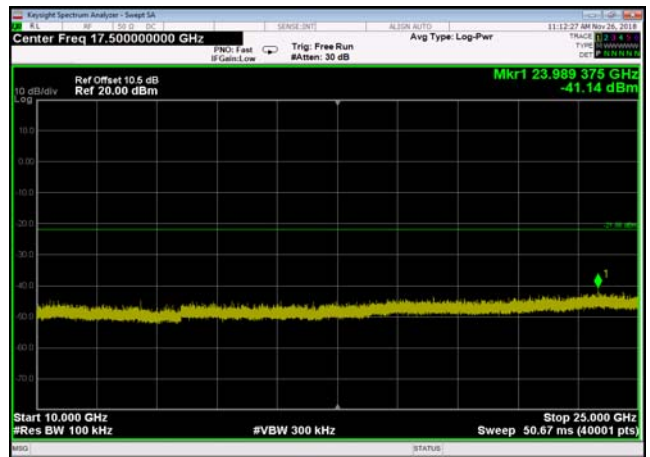




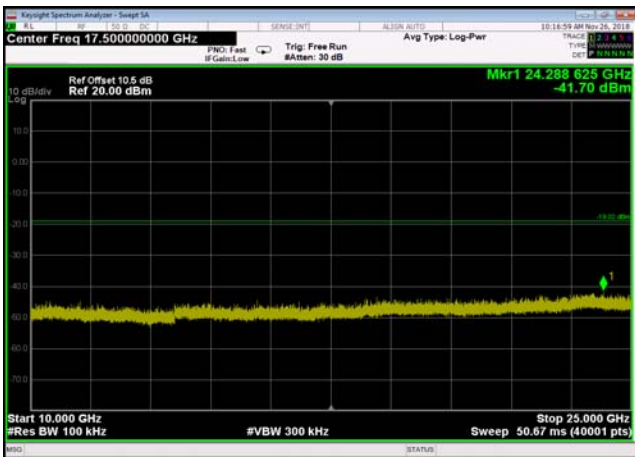
Transmitter Spurious Emission  
: 2402,10000MHz~25000MHz



Transmitter Spurious Emission  
: 2440,10000MHz~25000MHz



Transmitter Spurious Emission  
: 2480,10000MHz~25000MHz



\*\* END OF REPORT \*\*