RF TEST REPORT

Report No.:	SET2020-06046
Product Name:	LTE OBD dongle
FCC ID:	PJ7-N2110-AM
Model No. :	N2110-AM
Applicant:	Shenzhen Neoway Technology Co., Ltd.
Address:	4F-2#, Lianjian Science&Industry Park, Huarong Road, Dalang, Longhua District, Shenzhen City, Guangdong Province, P.R.China.
Dates of Testing:	05/20/2020 —06/09/2020
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China.
	Tel: 86 755 26627338 **Fax:** 86 755 26627238

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Test Report

Product Name ..... :	LTE OBD dongle
Brand Name ..... :	neoway
Trade Name ..... :	neoway
Applicant ..... :	Shenzhen Neoway Technology Co., Ltd.
Applicant Address ..... :	4F-2#, Lianjian Science&Industry Park, Huarong Road, Dalang, Longhua District, Shenzhen City, Guangdong Province, P.R.China.
Manufacturer ..... :	Shenzhen Neoway Technology Co., Ltd.
Manufacturer Address ..... :	4F-2#, Lianjian Science&Industry Park, Huarong Road, Dalang, Longhua District, Shenzhen City, Guangdong Province, P.R.China.
Test Standards ..... :	47 CFR Part 15 Subpart C KDB558074 D01 DTS Meas Guidance v05r02
Test Result ..... :	PASS

Tested by ..... : Vincent 2020.06.09

Vincent, Test Engineer

Reviewed by ..... : Chris You 2020.06.09

Chris You, Senior Engineer

Approved by ..... : Shuangwen Zhang 2020.06.09

Shuangwen Zhang, Manager

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Change History		
Issue	Date	Reason for change
1.0	2020.06.09	First edition

1. General Information

1.1. EUT Description

EUT Type	LTE OBD dongle	
Frequency Range	Bluetooth LE	2402MHz~2480MHz
Channel Number	Bluetooth LE	40
Bit Rate of Transmitter	Bluetooth LE	1Mbps
Modulation Type	Bluetooth LE	GFSK
Antenna Type	Internal	

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 2: 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)	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 15.205 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 v05r02.

40 channels are provided for Bluetooth LE

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	Peak Conducted Output Power Power Spectral Density 6dB 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

CNAS-Lab Code: L1659

CCIC-SET is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

FCC-Registration No.: CN5031

CCIC Southern Testing 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, 2020.

ISED Registration: 11185A-1

CCIC Southern Testing 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 Dec. 31, 2020.

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	Ant. Gain
1	LTE OBD dongle	Internal	2dBi

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

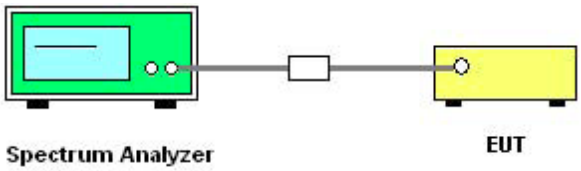
2.2.1. Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is30dBm. 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 v05r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

   Thepath 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 Bandwidth

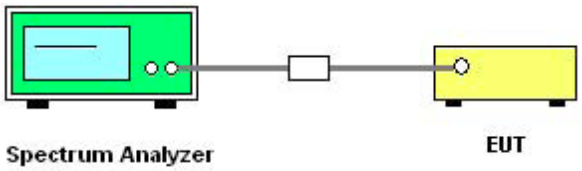
2.3.1. Limit of 6dB Bandwidth

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 v05r02.

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) = 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.

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

2.3.5. Test Results of 6dBBandwidth

Please refer to Appendix A for detail

2.4. Conducted Band Edges and Spurious Emissions

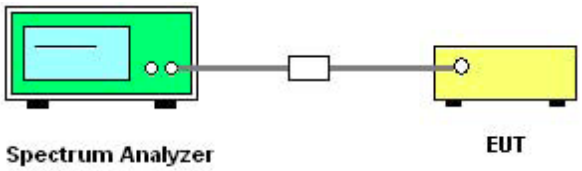
2.4.1. Limit of Conducted Band Edges and Spurious Emissions

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 v05r02.
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)

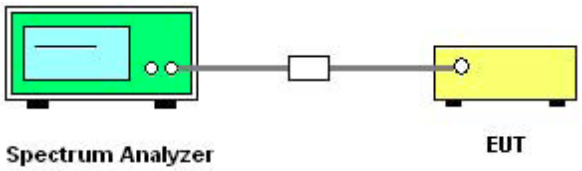
2.5.1. Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time intervalof 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 v05r02.

2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. Thepath 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 1.5times DTS Channel Bandwidth. (6dB BW)

5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fullystabilize. 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 limitline 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/spuriousmust be at least 20 dB below the highest emission level within the authorized band. If the outputpower of this device was measured by spectrum analyzer, the attenuation under this paragraph shallbe 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must alsocomply with the FCC section 15.209 limits as below.

Note: Wireless charger configuration was evaluated.

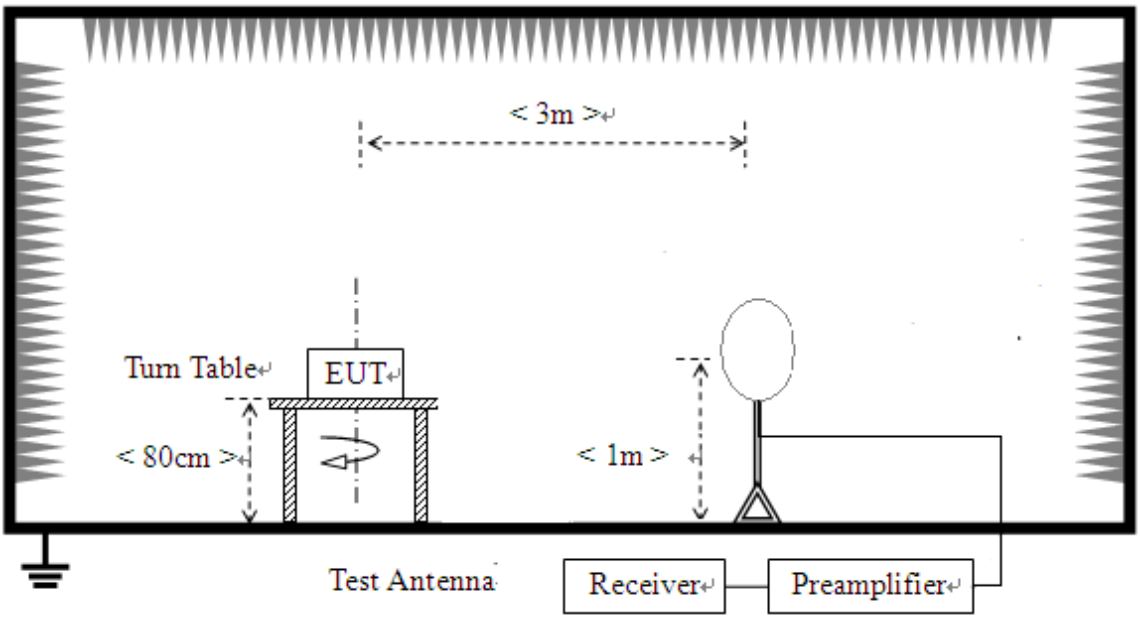
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

2.6.2. Measuring Instruments

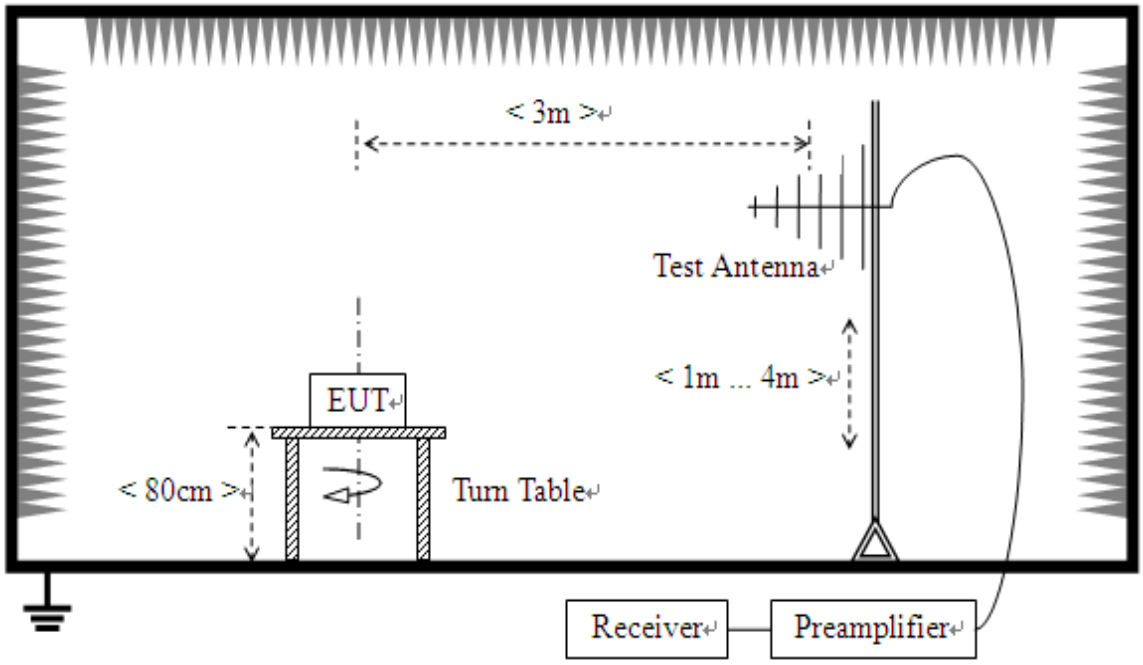
The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup

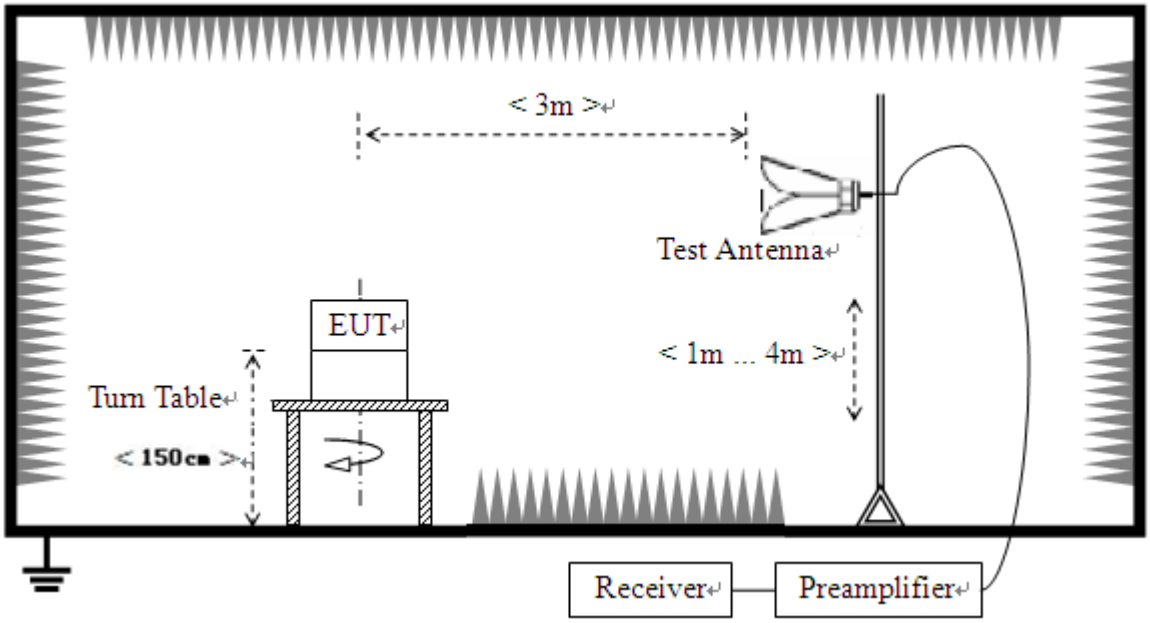
For radiated emissions from 9 KHz to 30 MHz



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 ata 3 meters semi-anechoic chamber. The table was rotated 360 degrees todetermine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
3. Height of receiving antenna is varied from one meter to four meters above theground to determine the maximum value of the field strength. Both horizontal andvertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatable tablewas 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 oraveragemethod as specified and then reported in a data sheet.

NOTE:

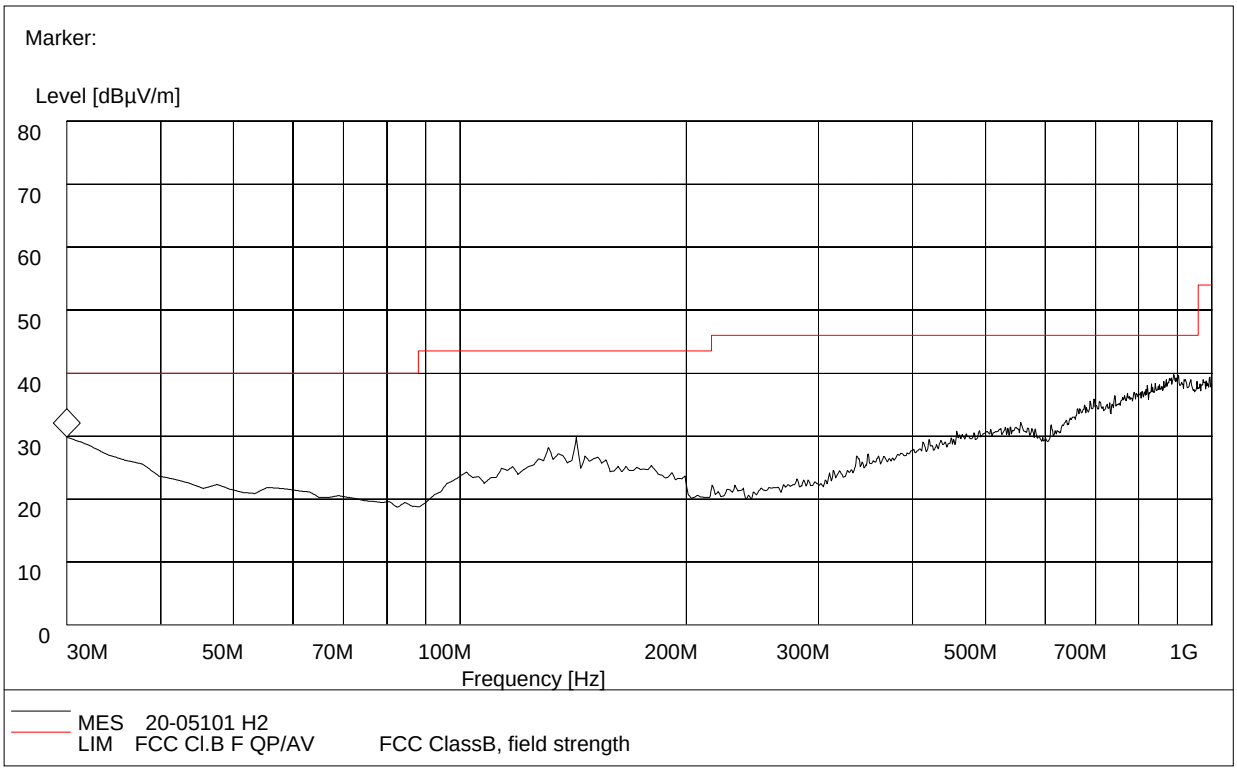
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution 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) atfrequency 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

For9KHz to 30MHz

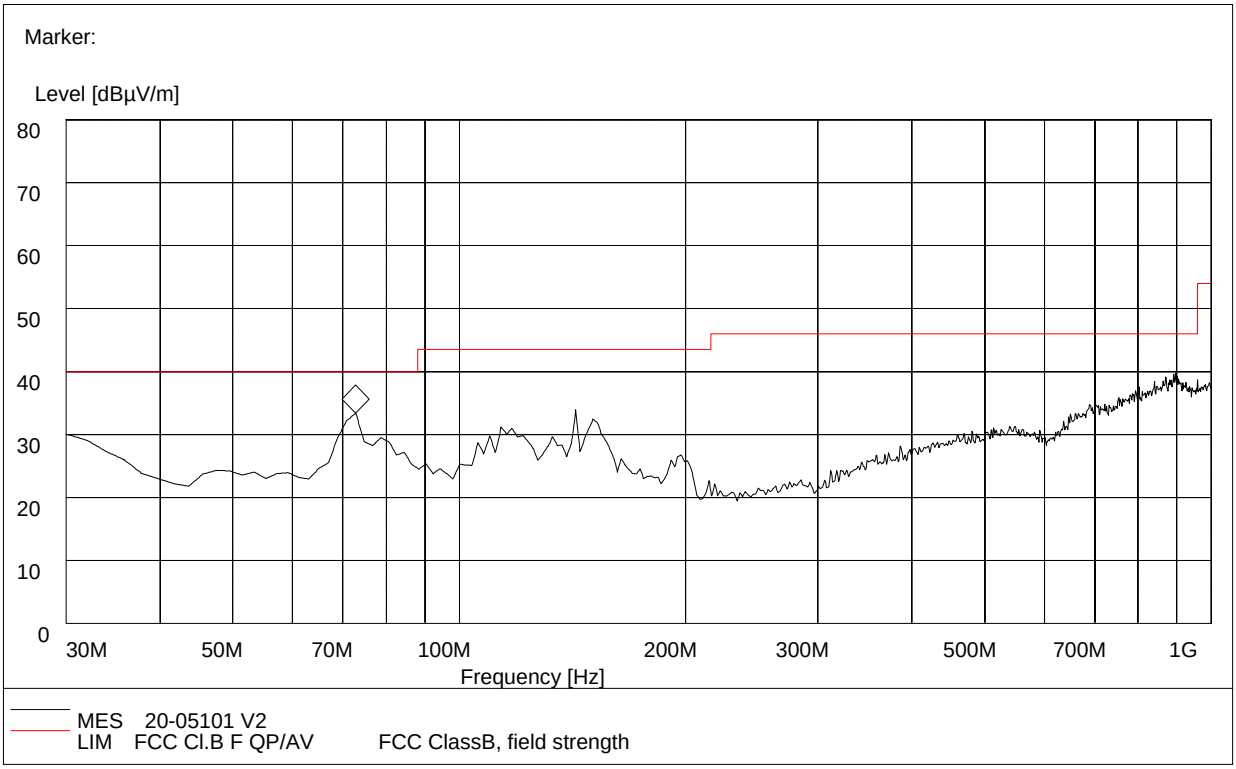
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1000 MHz



Plot A: 30MHz to 1GHz, Antenna Horizontal

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Corr. Factor (dB/m)	Antenna height (cm)	Limit (dBµV/m)	Margin	Antenna	Verdict
30.000000	28.25	120.000	17.90	100.0	40.0	11.75	Horizontal	Pass
32.050000	26.48	120.000	17.90	100.0	40.0	13.52	Horizontal	Pass
133.140000	23.20	120.000	10.20	100.0	43.5	20.3	Horizontal	Pass
142.830000	28.15	120.000	12.90	100.0	43.5	15.35	Horizontal	Pass
881.350000	38.21	120.000	24.80	100.0	46.0	7.79	Horizontal	Pass
900.000000	38.74	120.000	24.80	100.0	46.0	7.26	Horizontal	Pass



Plot B: 30MHz to 1GHz, Antenna Vertical

Frequency (MHz)	QuasiPeak (dB µ V/m)	Bandwidth (kHz)	Corr. Factor (dBµV/m)	Antenna height (cm)	Limit (dB µ V/m)	Margin	Antenna	Verdict
30.000000	28.01	120.000	17.90	100.0	40.0	11.99	Vertical	Pass
32.050000	26.50	120.000	17.90	100.0	40.0	13.5	Vertical	Pass
73.150000	32.74	120.000	10.20	100.0	40.0	7.26	Vertical	Pass
142.630000	30.22	120.000	12.90	100.0	43.5	13.28	Vertical	Pass
152.050000	28.45	120.000	24.80	100.0	43.5	15.05	Vertical	Pass
900.000000	39.15	120.000	24.80	100.0	46.0	6.85	Vertical	Pass

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)
3. Margin value = Limit value – Emission Level
4. The other emission levels were very low against the limit.

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	48.65	PK	74.00	-25.35	1.5	160	47.35	5.2	28.60	32.5	1.3
2	2390	37.70	AV	54.00	-16.3	1.5	160	36.4	5.2	28.60	32.5	1.3
3	4804	51.36	PK	74.00	-22.64	1.5	160	44.96	7.4	30.40	31.4	6.4
4	4804	40.42	AV	54.00	-13.58	1.5	160	34.02	7.4	30.40	31.4	6.4
5	7206	51.84	PK	74.00	-22.16	1.5	160	42.54	9.9	31.50	32.1	9.3
6	7206	41.17	AV	54.00	-12.83	1.5	160	31.87	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	48.57	PK	74.00	-25.43	1.8	300	47.27	5.2	28.60	32.5	1.3
2	2390	38.22	AV	54.00	-15.78	1.8	300	36.92	5.2	28.60	32.5	1.3
3	4804	50.77	PK	74.00	-23.23	1.8	300	44.37	7.4	30.40	31.4	6.4
4	4804	40.69	AV	54.00	-13.31	1.8	300	34.29	7.4	30.40	31.4	6.4
5	7206	52.68	PK	74.00	-21.32	1.8	300	43.38	9.9	31.50	32.1	9.3
6	7206	42.36	AV	54.00	-11.64	1.8	300	33.06	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	50.31	PK	74	-23.69	1.5	160	42.55	6.7	31.2	31.5	6.4
2	4880	39.82	AV	54	-14.18	1.5	160	32.18	6.7	31.2	31.5	6.4
3	7320	51.09	PK	74	-22.91	1.5	160	45.94	6.7	31.2	31.5	6.4
4	7320	40.98	AV	54	-13.02	1.5	160	35.75	6.7	31.2	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	50.48	PK	74	-23.52	1.8	300	44.77	6.7	31.2	31.5	6.4
2	4880	40.26	AV	54	-13.74	1.8	300	34.53	6.7	31.2	31.5	6.4
3	7320	51.28	PK	74	-22.72	1.8	300	45.97	6.7	31.2	31.5	6.4
4	7320	41.19	AV	54	-12.81	1.8	300	35.68	6.7	31.2	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	49.65	PK	74	-24.35	1.5	160	46.45	5.7	29.5	31.8	3.4
2	2483.5	38.35	AV	54	-15.65	1.5	160	36.23	5.7	29.5	31.8	3.4
3	4960	51.34	PK	74	-22.66	1.5	160	45.92	7	30.05	31.5	5.55
4	4960	41.1	AV	54	-12.9	1.5	160	35.74	7	30.05	31.5	5.55
5	7440	52.16	PK	74	-21.84	1.5	160	37.44	16	31.2	32	15.2
6	7440	41.81	AV	54	-12.19	1.5	160	27.19	16	31.2	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	48.66	PK	74	-25.34	1.8	300	45.25	5.7	29.5	31.8	3.4
2	2483.5	36.6	AV	54	-17.4	1.8	300	35.1	5.7	29.5	31.8	3.4
3	4960	50.97	PK	74	-23.03	1.8	300	45.89	7	30.05	31.5	5.55
4	4960	40.73	AV	54	-13.27	1.8	300	35.07	7	30.05	31.5	5.55
5	7440	52.03	PK	74	-21.97	1.8	300	38.42	16	31.2	32	15.2
6	7440	41.66	AV	54	-12.34	1.8	300	28.07	16	31.2	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

2.7. Conducted Emission

2.7.1. Limit of Conducted Emission

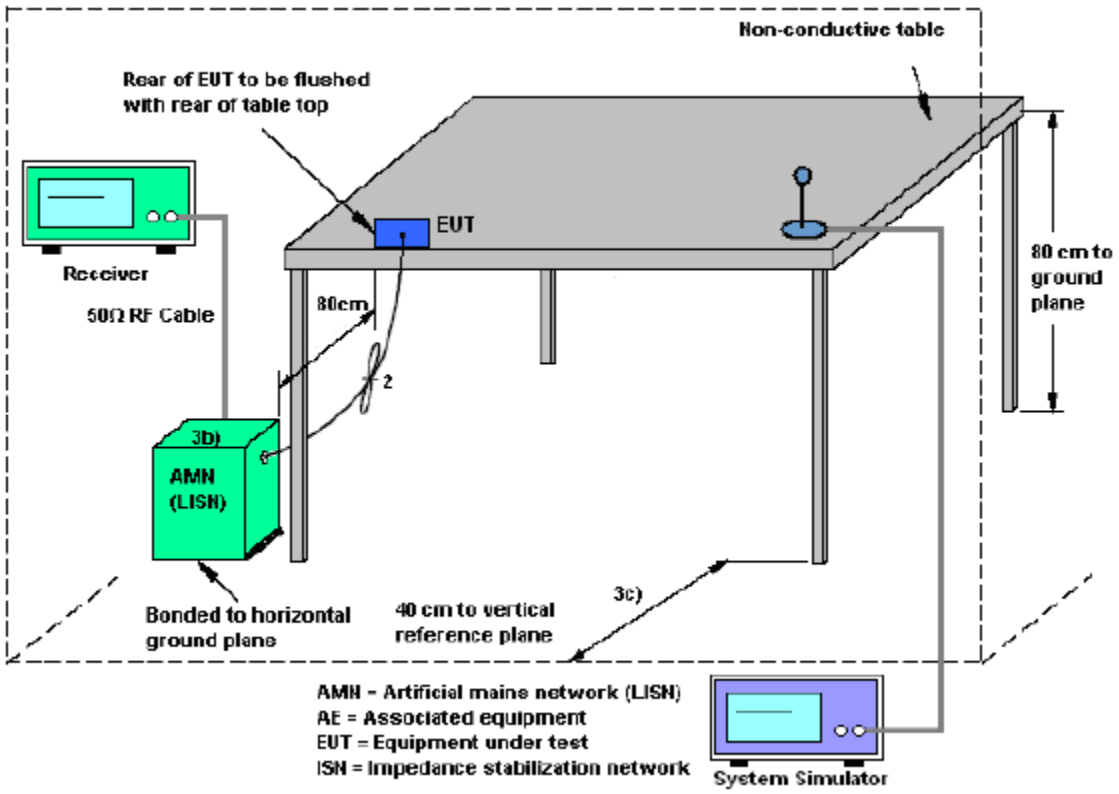
For equipment that is designed to be connected to the public utility (AC) power line, the radiofrequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

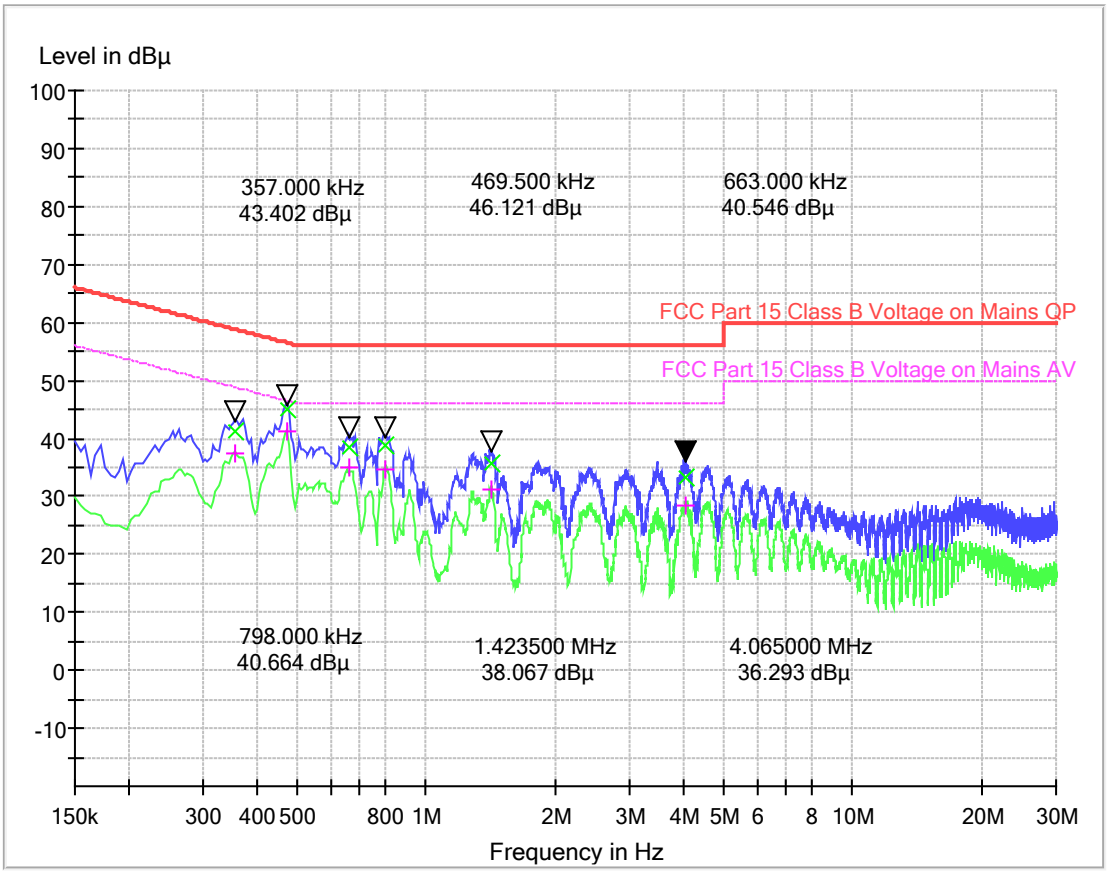


2.7.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least80 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.

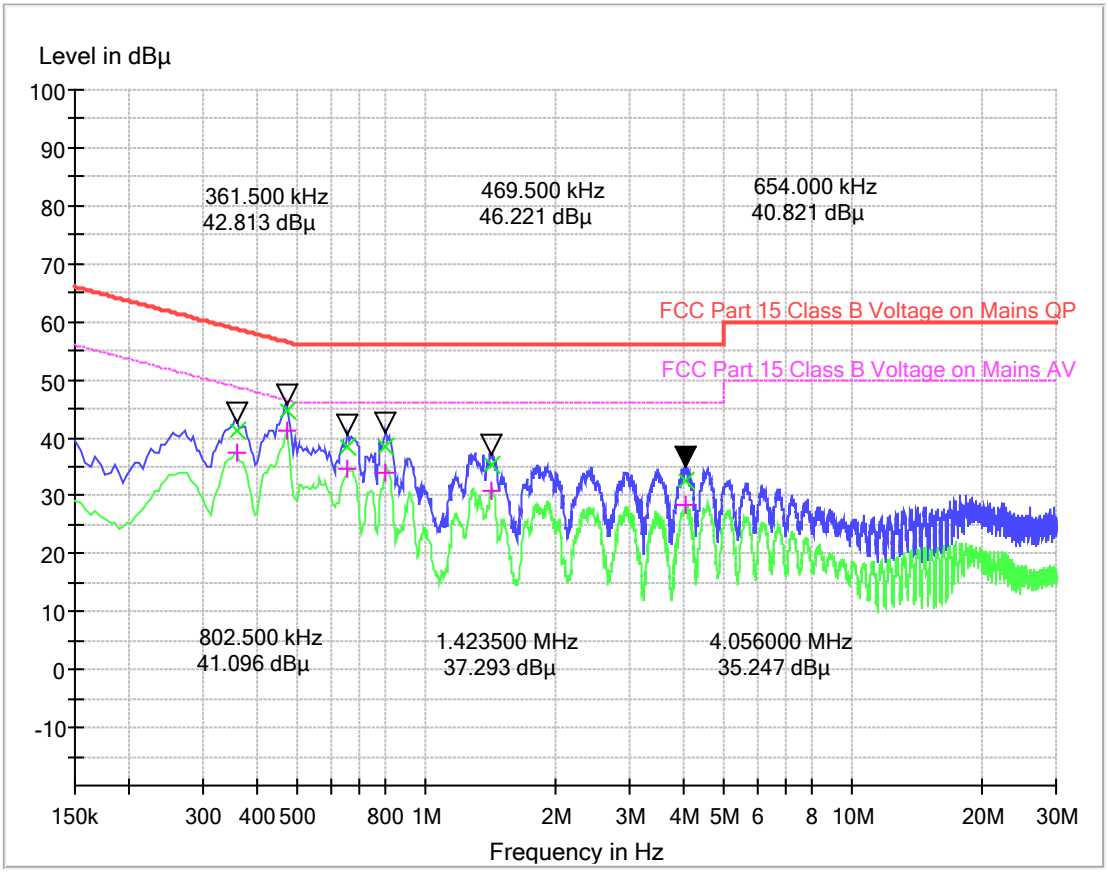
2.7.5. Test Result

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



(Plot A: L Phase)

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB µ V)
0.357000	41.25	37.44	0.1	10.1	17.55	58.8	11.36	48.8
0.469500	44.86	41.27	0.1	10.1	11.66	56.5	5.25	46.5
0.663000	38.61	35.00	0.1	10.1	17.39	56.0	11.00	46.0
0.798000	38.93	34.58	0.1	10.1	17.07	56.0	11.42	46.0
1.423500	35.72	31.30	0.2	10.2	20.28	56.0	14.70	46.0
4.065000	33.10	28.53	0.2	10.2	22.90	56.0	17.47	46.0



(Plot B: N Phase)

Frequency (MHz)	QuasiPeak (dB µ V)	CAverage (dB µ V)	Cabel Loss (dB)	Corr. (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dB µ V)
0.361500	41.08	37.35	0.1	10.1	17.61	58.7	11.34	48.7
0.469500	44.82	41.29	0.1	10.1	11.70	56.5	5.23	46.5
0.654000	38.33	34.78	0.1	10.1	17.67	56.0	11.22	46.0
0.802500	38.48	34.06	0.1	10.1	17.52	56.0	11.94	46.0
1.423500	35.43	30.95	0.2	10.2	20.57	56.0	15.05	46.0
4.056000	32.53	28.43	0.2	10.2	23.47	56.0	17.57	46.0

Test Result: PASS

Note: Correction factor=Cabel loss+ attenuation factor

attenuation factor=10dB

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI TEST RECEIVER	R&S	ESIB7	A0501375	2019.07.30	2020.07.29
2	Power Meter	R&S	NRP-Z31	102872	2020.05.18	2021.05.17
3	TURNTABLE	ETS	2088	2149	N/A	N/A
4	ANTENNA MAST	ETS	2075	2346	N/A	N/A
5	EMI TEST Software	R&S	ESK1	N/A	N/A	N/A
6	Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.11.10	2020.11.09
7	Amplifer	MILMEGA	80RF1000-250	A140901925	2017.10.09	2020.10.08
8	JS amplifer	AR	25S1G4AM1	A0304248	2017.10.09	2020.10.08
9	High pass filter	Compliance Direction systems	BSU-6	34202	2019.11.10	2020.11.09
13	Horn Antenna	AR	AT4002A	305753	2017.07.12	2020.07.11
14	Horn Antenna	AR	AT4510	325306	2018.07.14	2020.07.13
15	ULTRA-BROADBAND ANTENNA	R&S	HL562	A0304224	2017.07.14	2020.07.13
16	Passive Loop Antenna	R&S	HFH2-Z2	100047	2019.04.26	2022.04.25
17	Temperature chamber	welissom Inc.	SU-642	A150802409	2019.07.18	2020.07.17
18	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2020.05.18	2021.05.17
19	Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02
20	EMI TEST RECEIVER	KEYSIGHT	ESCI	A0902601	2019.07.02	2020.07.01
21	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2019.11.21	2020.11.20

4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence . The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150KHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	5.0dB

Uncertainty of Radiated Emission Measurement (1GHz~18GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	5.1dB

Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

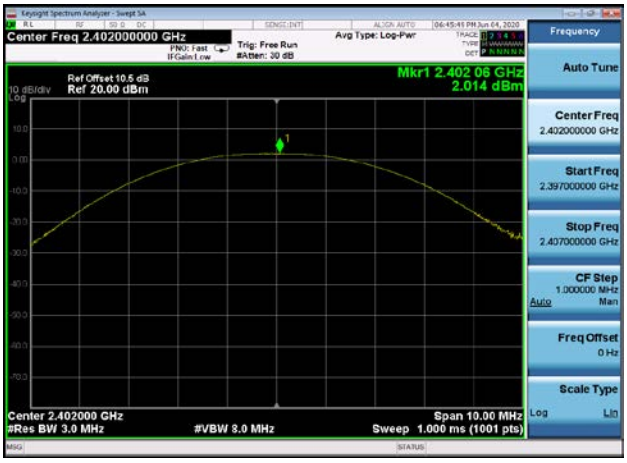
Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	5.1dB

Appendix A

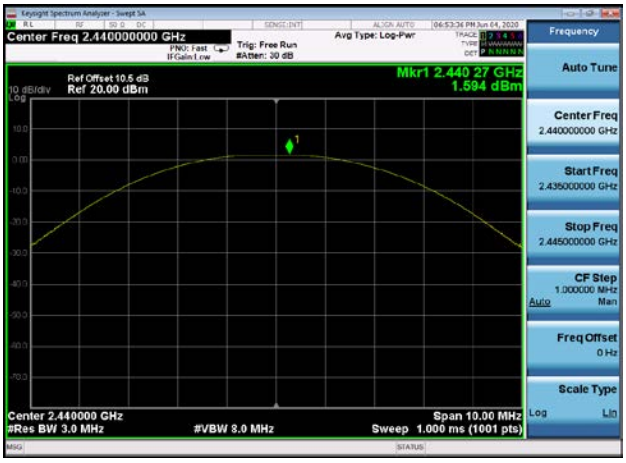
Peak Output Power
Test Result and Data

Test Frequency	Power(dBm)	Limit(dBm)	Result
2402	2.014	30	Pass
2440	1.594		Pass
2480	0.948		Pass

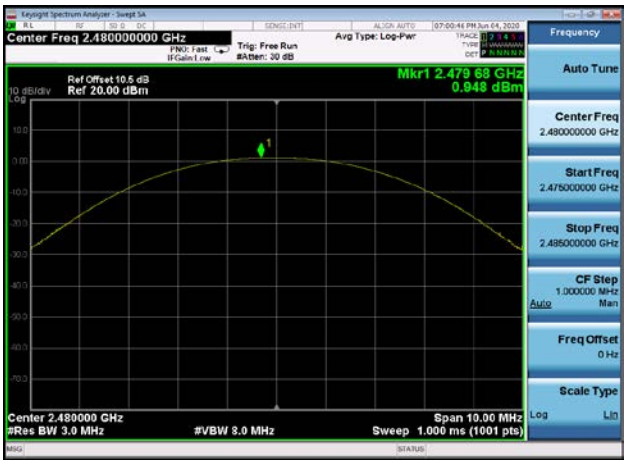
Output Power：2402MHz



Output Power：2440MHz



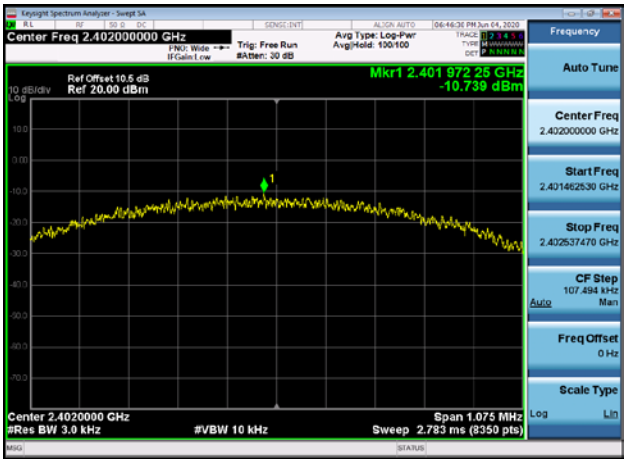
Output Power：2480MHz



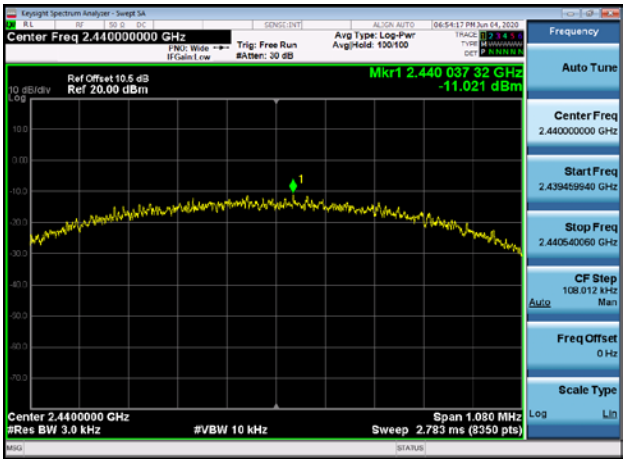
Power Spectral Density
Test Result and Data

Test Frequency	PSD(dBm/3KHz)	Limit(dBm/3KHz)	Result
2402	-10.739	8	Pass
2440	-11.021		Pass
2480	-12.249		Pass

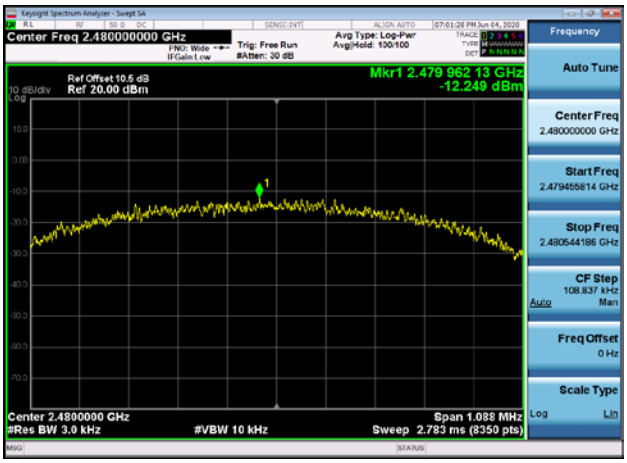
Power spectral density：2402MHz



Power spectral density：2440MHz



Power spectral density：2480MHz



6dB BandWidth

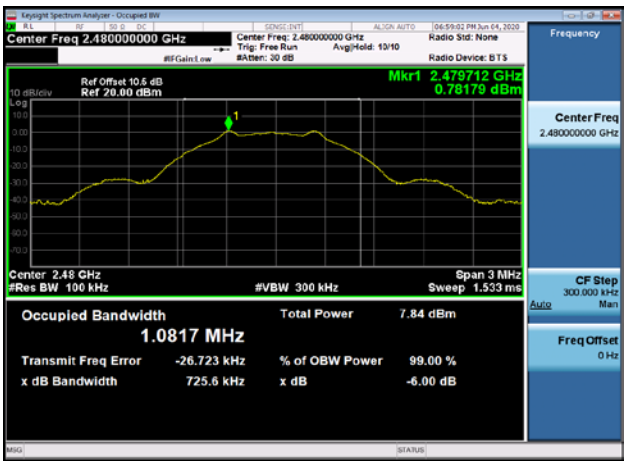
Test Result and Data

Test Frequency	6dBOccupy Bandwidth(Khz)	Min Limit(kHz)	Result
2402	716.626	500	Pass
2440	720.08		Pass
2480	725.581		Pass

6dB Bandwidth：2402MHz

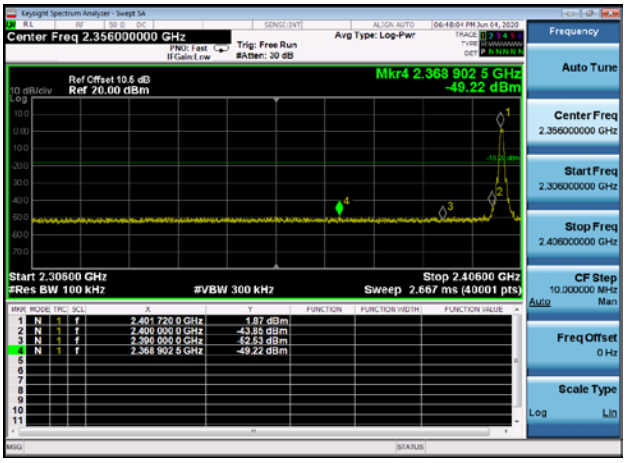
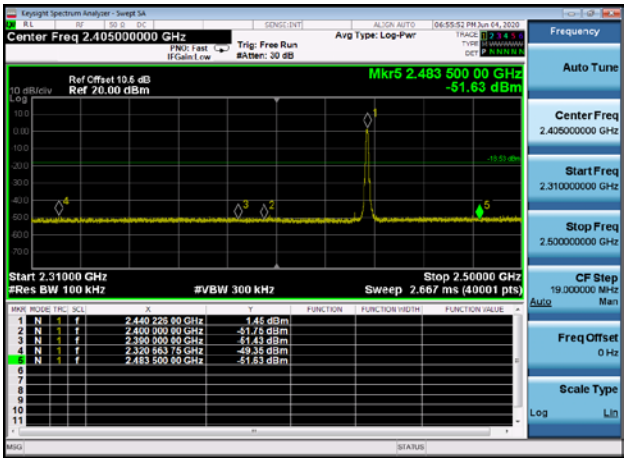
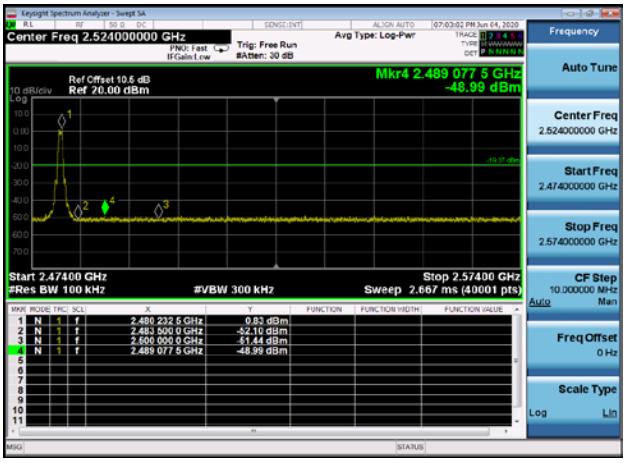
6dB Bandwidth：2440MHz

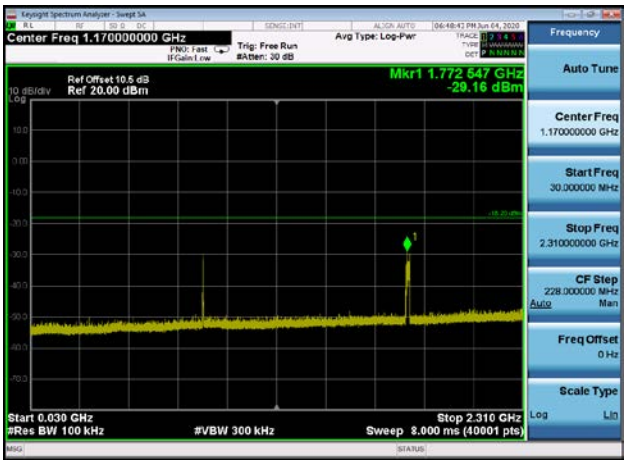
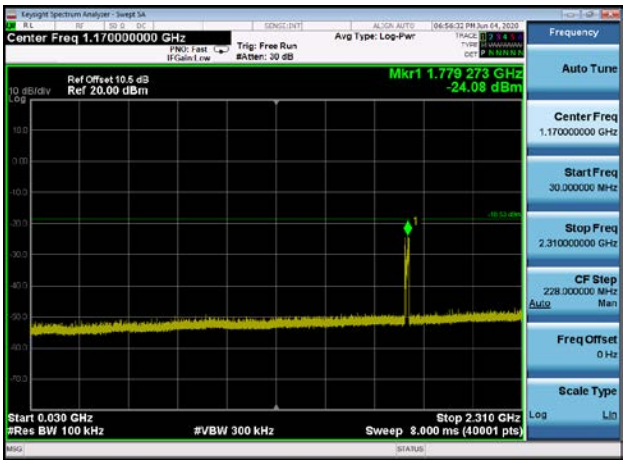
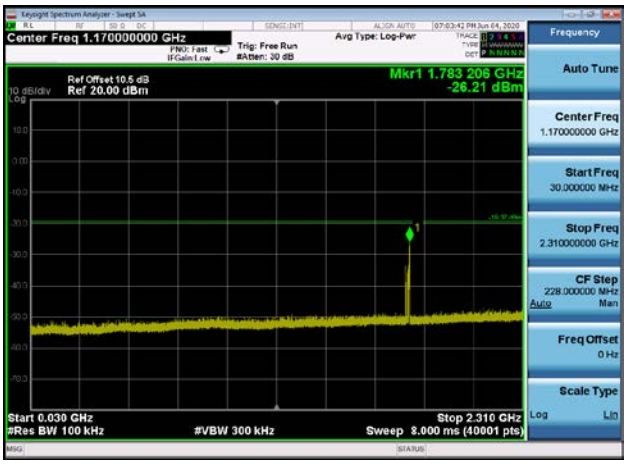
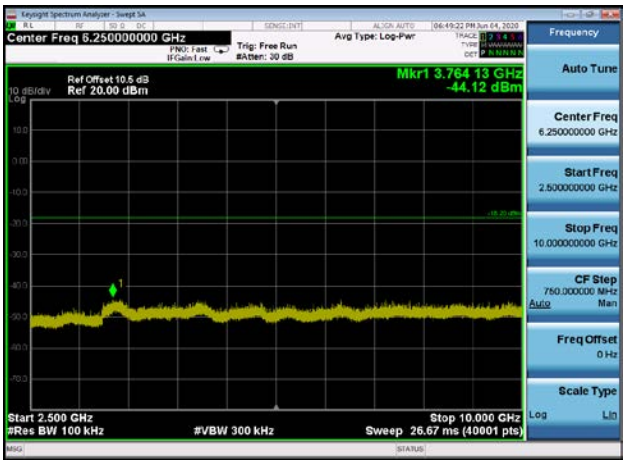
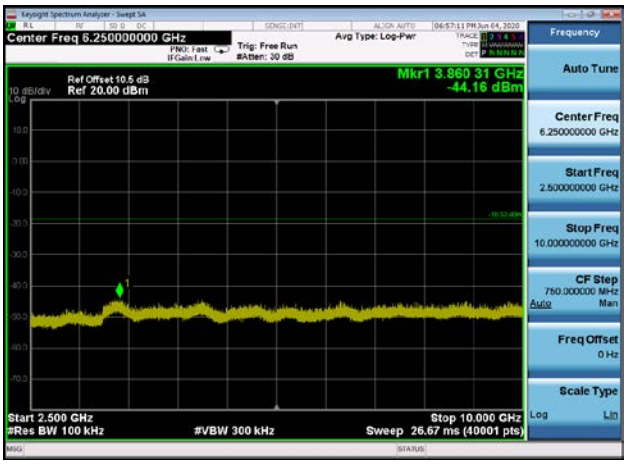
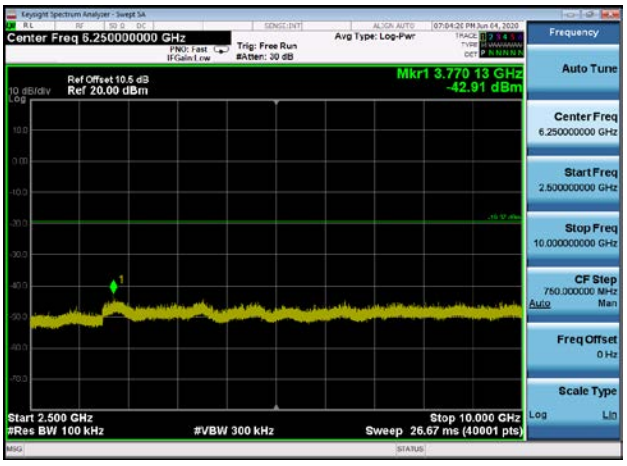
6dB Bandwidth：2480MHz

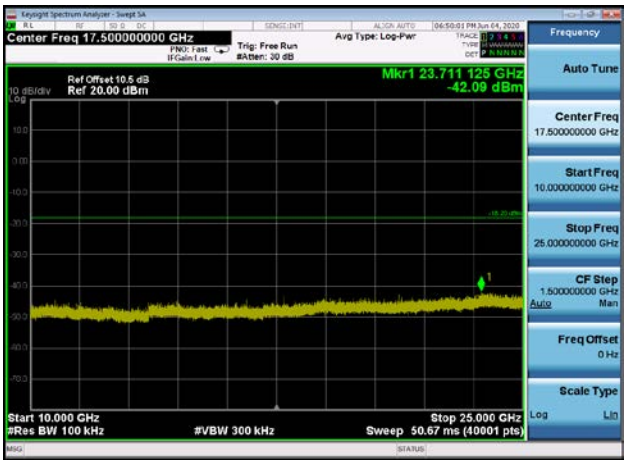
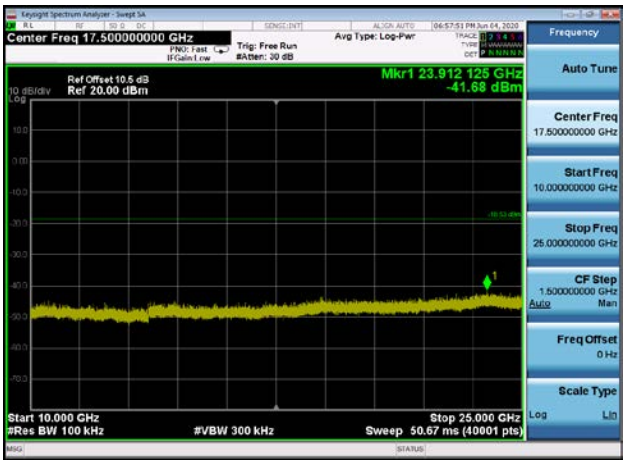
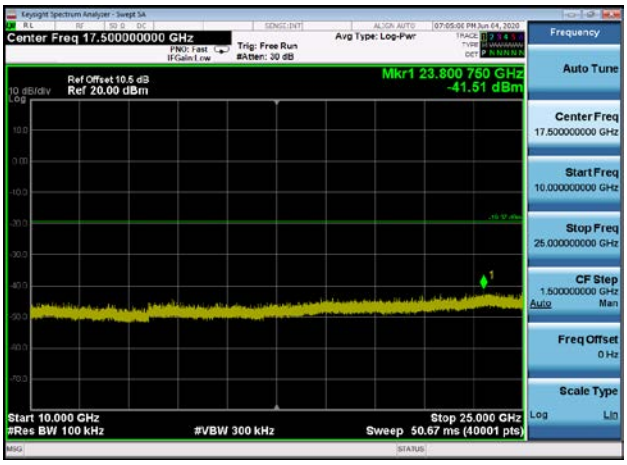


Conducted Band Edges and Spurious Emissions

Test Result and Data

,Plot ,1Transmitter Spurious Emission ： 2402,Reference Level	,Plot ,1Transmitter Spurious Emission ： 2440,Reference Level
	
,Plot ,1Transmitter Spurious Emission ： 2480,Reference 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
	
,Plot ,4Transmitter Spurious Emission ： 2440,2500MHz~10000MHz	,Plot ,4Transmitter Spurious Emission ： 2480,2500MHz~10000MHz
	

,Plot ,5Transmitter Spurious Emission ： 2402,10000MHz~25000MHz	,Plot ,5Transmitter Spurious Emission ： 2440,10000MHz~25000MHz
	
,Plot ,5Transmitter Spurious Emission ： 2480,10000MHz~25000MHz	
	

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