RF TEST REPORT

Report No.: 17021127-FCC-R1
Supersede Report No.: N/A

Applicant	Ningbo Lumiaudio Electronic Technology LTD
Product Name	Tube Amplifier With Bluetooth Stereo
Model No.	AMP-T100
Serial No.	N/A
Test Standard	FCC Part 15.247: 2016, ANSI C63.10: 2013
Test Date	September 15 to November 7, 2017
Issue Date	November 8, 2017
Test Result	☑ **Pass** ☐ **Fail**
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Amos. Xia	Deon Dai	
Amos Xia **Test Engineer**	**Deon Dai** **Engineer Reviewer**	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
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Laboratories Introduction

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Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
17021127-FCC-R1	NONE	Original	November 8, 2017

2. Customer information

Applicant Name	Ningbo Lumiaudio Electronic Technology LTD
Applicant Add	22/F.,Building 1,Lisi Plaza,Huifeng East Road ,Ningbo,China 315100
Manufacturer	Ningbo Lumiaudio Electronic Technology LTD
Manufacturer Add	22/F.,Building 1,Lisi Plaza,Huifeng East Road ,Ningbo,China 315100

3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	694825
IC Test Site No.	4842B-1
Test Software	EZ_EMC

4. Equipment under Test (EUT) Information

Description of EUT:	Tube Amplifier With Bluetooth Stereo
Main Model:	AMP-T100
Serial Model:	N/A
Date EUT received:	September 11, 2017
Test Date(s):	September 15 to November 7, 2017
Antenna Gain:	Bluetooth: 0 dBi
Type of Modulation:	Bluetooth: GFSK, π/4DQPSK, 8DPSK
RF Operating Frequency (ies):	Bluetooth: 2402-2480 MHz
Max. Output Power:	3.091 dBm
Number of Channels:	Bluetooth: 79CH
Port:	USB Port、HEADPHONES Port、CD Port*2、DVD Port*2、Power Port
Input Power:	110V 60Hz
Trade Name :	N/A
FCC ID:	2AKKHAMP

Operating Channel list

Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	17	2419	34	2436	51	2453	68	2470
01	2403	18	2420	35	2437	52	2454	69	2471
02	2404	19	2421	36	2438	53	2455	70	2472
03	2405	20	2422	37	2439	54	2456	71	2473
04	2406	21	2423	38	2440	55	2457	72	2474
05	2407	22	2424	39	2441	56	2458	73	2475
06	2408	23	2425	40	2442	57	2459	74	2476
07	2409	24	2426	41	2443	58	2460	75	2477
08	2410	25	2427	42	2444	59	2461	76	2478
09	2411	26	2428	43	2445	60	2462	77	2479
10	2412	27	2429	44	2446	61	2463	78	2480
11	2413	28	2430	45	2447	62	2464		
12	2414	29	2431	46	2448	63	2465		
13	2415	30	2432	47	2449	64	2466		
14	2416	31	2433	48	2450	65	2467		
15	2417	32	2434	49	2451	66	2468		
16	2418	33	2435	50	2452	67	2469		

5. Test Summary

The product was tested in accordance with the following specifications.
All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.247(a)(1)	Channel Separation	Compliance
§15.247(a)(1)	20 dB Bandwidth	Compliance
§15.247(b)(1)	Peak Output Power	Compliance
§15.247(a)(1)(iii)	Number of Hopping Channel	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(d)	Band Edge	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance

Measurement Uncertainty

Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 Antenna Requirement

Applicable Standard

According to § 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit. And according to FCC 47 CFR section 15.247 (b), if the 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 6 dBi.

Antenna Connector Construction

The EUT has 1 antennas:
A permanently attached PCB antenna for Bluetooth, the gain is 0 dBi for Bluetooth.

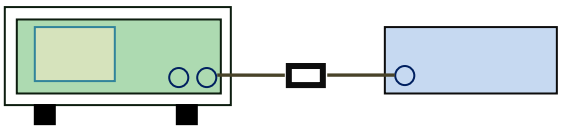
Antenna must be permanently attached to the unit ,it meets up with the ANTENNA REQUIREMENT.

Result: Compliant.

6.2 Channel Separation

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	November 6, 2017
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(a)(1)	a)	Channel Separation < 20dB BW and 20dB BW < 25KHz ; Channel Separation Limit=25KHz Chanel Separation < 20dB BW and 20dB BW > 25kHz ; Channel Separation Limit=2/3 20dB BW	☒
Test Setup			
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings: - The EUT must have its hopping function enabled - Span = wide enough to capture the peaks of two adjacent channels - Resolution (or IF) Bandwidth (RBW) ≥1% of the span - Video (or Average) Bandwidth (VBW) ≥RBW - Sweep = auto - Detector function = peak - Trace = max hold - Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.		
Remark			
Result	☒Pass ☐Fail		

Test Data ☒Yes ☐N/A
Test Plot ☒Yes (See below) ☐N/A

Channel Separation measurement result

Type/ Modulation	CH	CH Freq (MHz)	CH Separation (MHz)	Limit (MHz)	Result
CH Separation GFSK	Low Channel	2402	1.002	0.697	Pass
	Adjacency Channel	2403			
	Mid Channel	2441	0.999	0.698	Pass
	Adjacency Channel	2440			
	High Channel	2480	0.999	0.698	Pass
	Adjacency Channel	2479			
CH Separation π/4 DQPSK	Low Channel	2402	0.999	0.819	Pass
	Adjacency Channel	2403			
	Mid Channel	2441	0.999	0.820	Pass
	Adjacency Channel	2440			
	High Channel	2480	0.999	0.820	Pass
	Adjacency Channel	2479			
CH Separation 8DPSK	Low Channel	2402	1.002	0.781	Pass
	Adjacency Channel	2403			
	Mid Channel	2441	1.002	0.780	Pass
	Adjacency Channel	2440			
	High Channel	2480	1.002	0.780	Pass
	Adjacency Channel	2479			

Test Plots

Channel Separation measurement result

GFSK - Low Channel

GFSK - Middle Channel

GFSK - High Channel

π/4 DQPSK - Low Channel

π/4 DQPSK - Middle Channel

π/4 DQPSK - High Channel

8DPSK - Low Channel

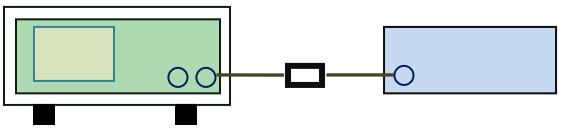
8DPSK - Middle Channel

8DPSK - High Channel

6.3 20dB Bandwidth

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	November 6 , 2017
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a) (1)	a)	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.	☒
Test Setup			
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings: - Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel - RBW ≥1% of the 20 dB bandwidth - VBW ≥RBW - Sweep = auto - Detector function = peak - Trace = max hold. - The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).		
Remark			
Result	☒Pass ☐ Fail		

Test Data ☒Yes ☐ N/A

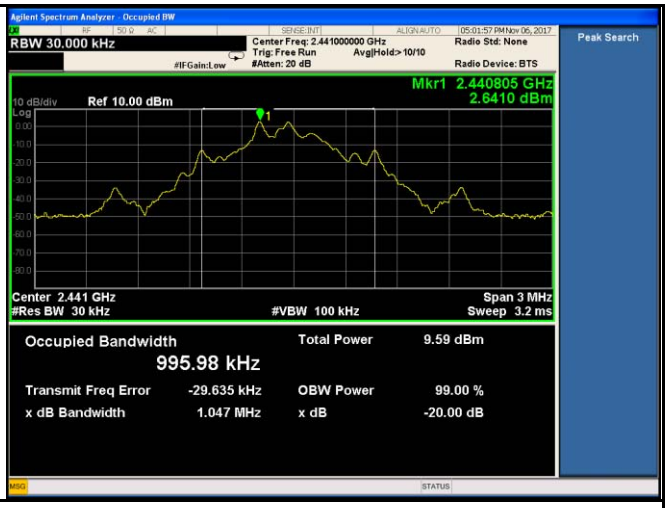
Test Plot ☒Yes (See below) ☐ N/A

Measurement result

Modulation	CH	CH Freq (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
GFSK	Low	2402	1.046	0.99527
	Mid	2441	1.047	0.99598
	High	2480	1.047	0.99651
π/4 DQPSK	Low	2402	1.229	1.1634
	Mid	2441	1.230	1.1641
	High	2480	1.230	1.1642
8-DPSK	Low	2402	1.171	1.1166
	Mid	2441	1.170	1.1162
	High	2480	1.170	1.1165

Test Plots
20dB Bandwidth measurement result

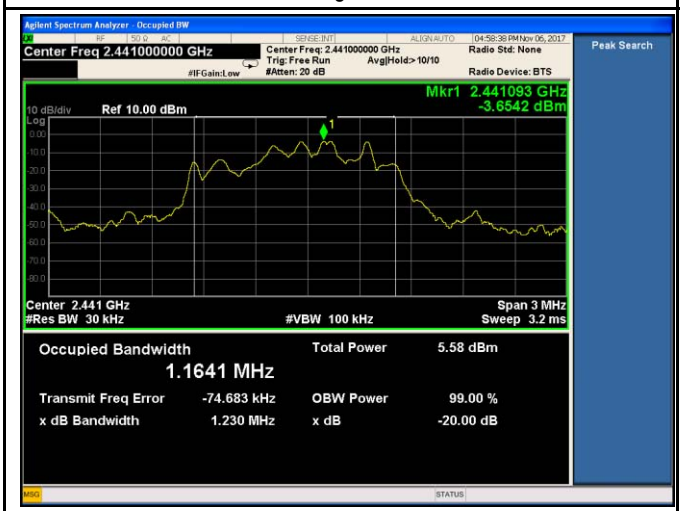
GFSK - Low Channel



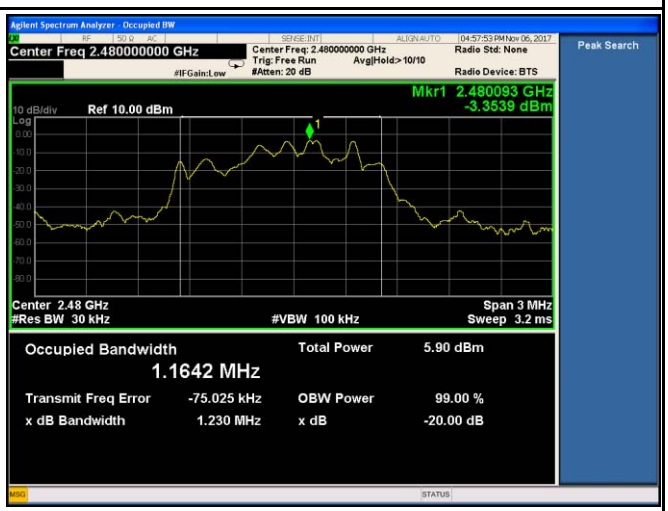
GFSK - Middle Channel

GFSK - High Channel

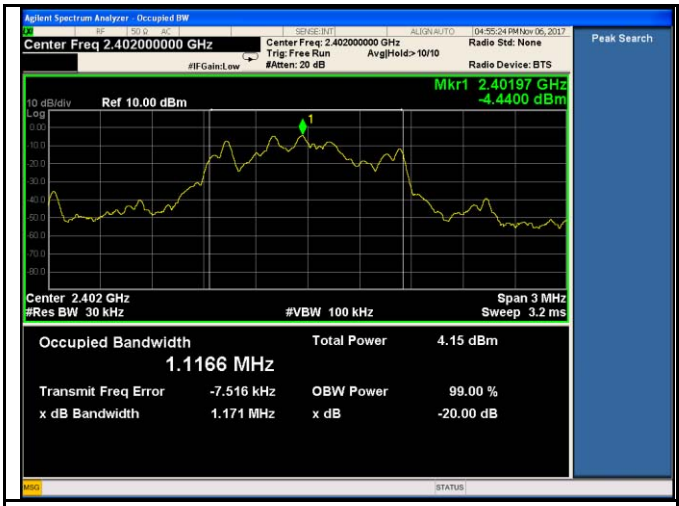
π/4 DQPSK - Low Channel



π/4 DQPSK - Middle Channel



π/4 DQPSK - High Channel



8DPSK - Low Channel

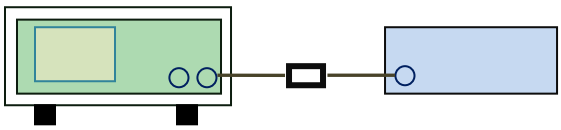
8DPSK - Middle Channel

8DPSK - High Channel

6.4 Peak Output Power

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	November 6 , 2017
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (2)	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤1 Watt	☒
	b)	FHSS in 5725-5850MHz: ≤1 Watt	☐
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤0.125 Watt.	☒
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤1 Watt	☐
	e)	FHSS in 902-928MHz with ≥ 25 & <50 channels: ≤0.25 Watt	☐
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤1 Watt	☐
Test Setup			
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings: - Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel - RBW > the 20 dB bandwidth of the emission being measured - VBW ≥RBW - Sweep = auto - Detector function = peak - Trace = max hold - Allow the trace to stabilize. - Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (see the note above regarding external attenuation and cable loss). The limit is specified in one of the subparagraphs of this Section. Submit this plot. A peak responding power meter may be used instead of a spectrum analyzer.		
Remark			
Result	☒Pass ☐ Fail		

Test Data ☒Yes ☐N/A

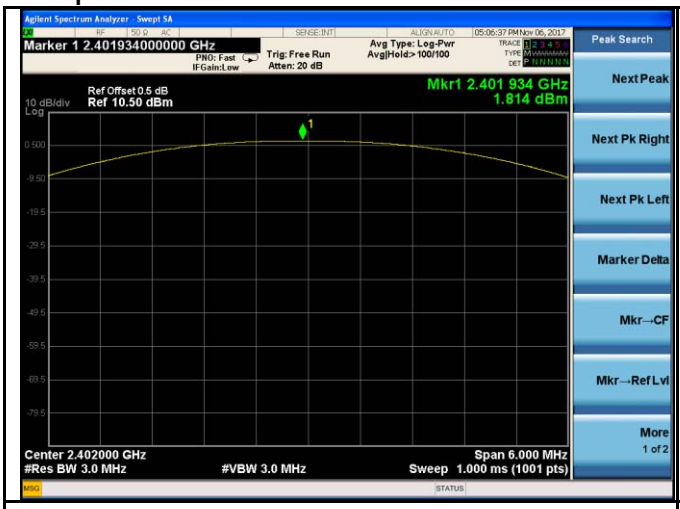
Test Plot ☒Yes (See below) ☐N/A

Peak Output Power measurement result

Type	Modulation	CH	Freq (MHz)	Conducted Power (dBm)	Limit (mW)	Result
Output power	GFSK	Low	2402	1.814	125	Pass
		Mid	2441	2.693	125	Pass
		High	2480	3.091	125	Pass
	π/4 DQPSK	Low	2402	-1.578	125	Pass
		Mid	2441	-0.739	125	Pass
		High	2480	-0.405	125	Pass
	8-DPSK	Low	2402	-1.676	125	Pass
		Mid	2441	-0.863	125	Pass
		High	2480	-0.519	125	Pass

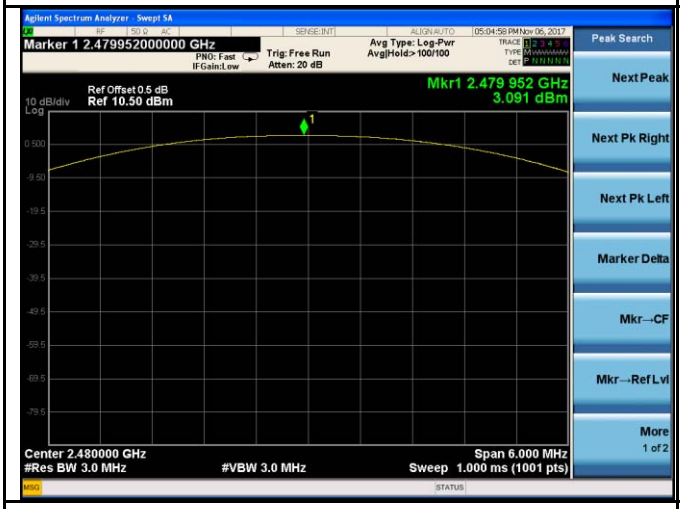
Test Plots

Output Power measurement result



GFSK Output power - Low CH 2402

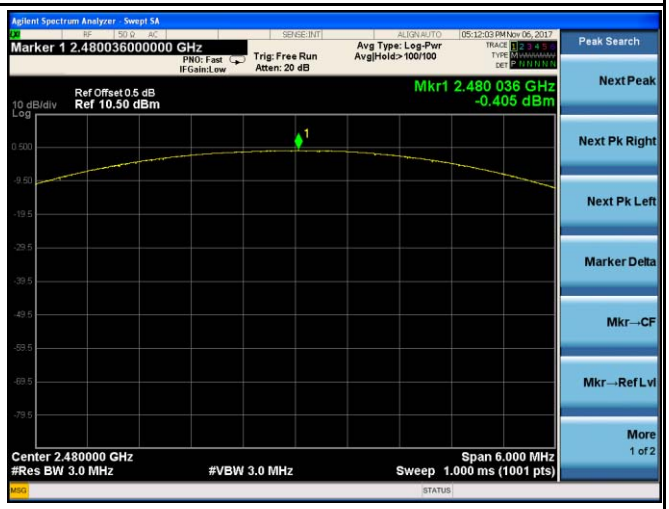
GFSK Output power - Mid CH 2441



GFSK Output power - High CH 2480

π/4 DQPSK Output power - Low CH 2402

π/4 DQPSK Output power - Mid CH 2441



π/4 DQPSK Output power - High CH 2480

8DPSK Output power - Low CH 2402

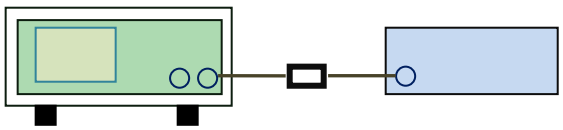
8DPSK Output power - Mid CH 2441

8DPSK Output power - High CH 2480

6.5 Number of Hopping Channel

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	November 6, 2017
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a)(1)(iii)	a)	FHSS in 2400-2483.5MHz ≥ 15 channels	☒
Test Setup			
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer settings: The EUT must have its hopping function enabled. - Span = the frequency band of operation - RBW ≥1% of the span - VBW ≥RBW - Sweep = auto - Detector function = peak - Trace = max hold - Allow trace to fully stabilize. - It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).		
Remark			
Result	☒Pass ☐Fail		

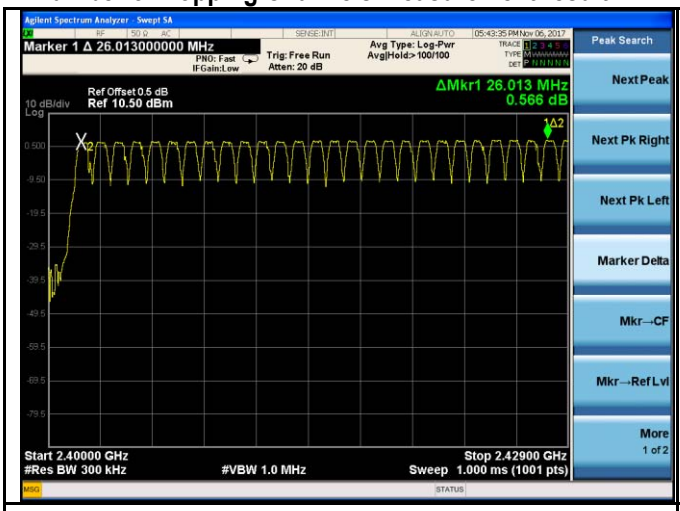
Test Data ☒Yes ☐N/A
Test Plot ☒Yes (See below) ☐N/A

Number of Hopping Channel measurement result

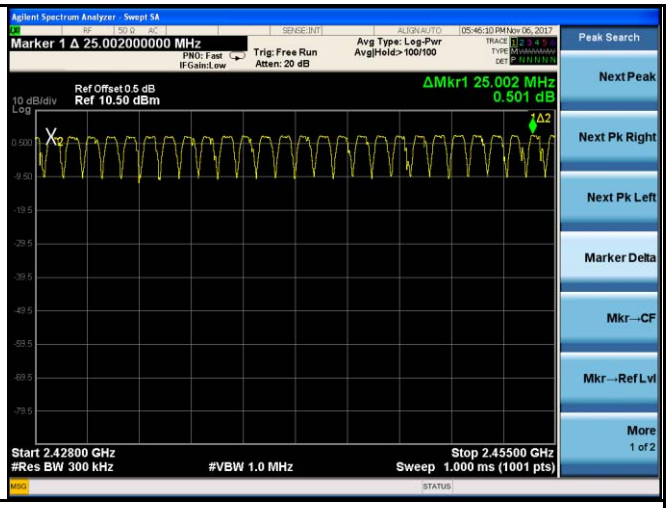
Type	Modulation	Frequency Range	Number of Hopping Channel	Limit
Number of Hopping Channel	GFSK	2400-2483.5	79	15
	π/4 DQPSK	2400-2483.5	79	15
	8-DPSK	2400-2483.5	79	15

Test Plots

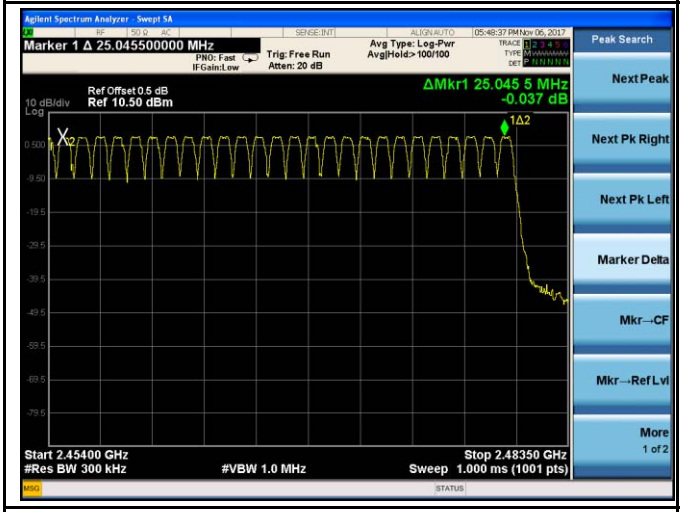
Number of Hopping Channels measurement result



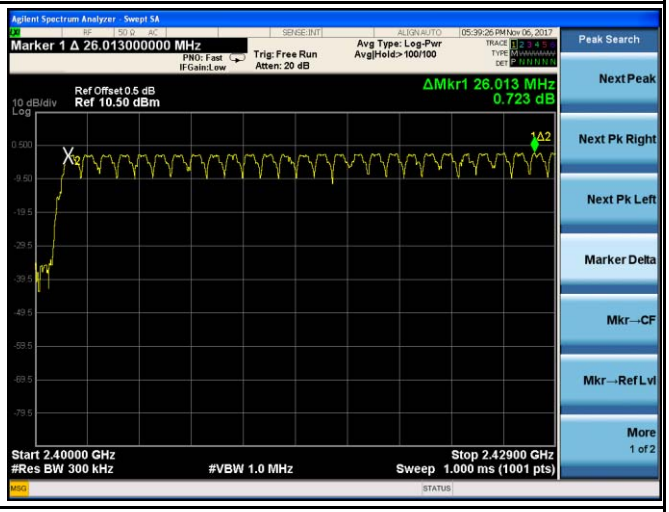
GFSK Number of Hopping Channels - 1



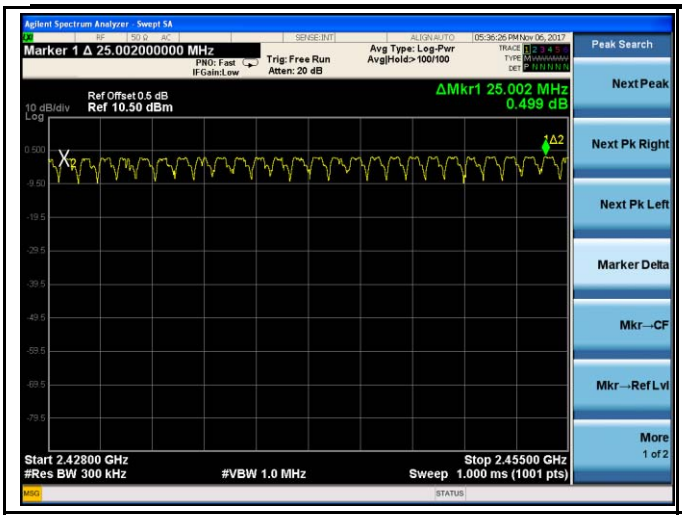
GFSK Number of Hopping Channels -2



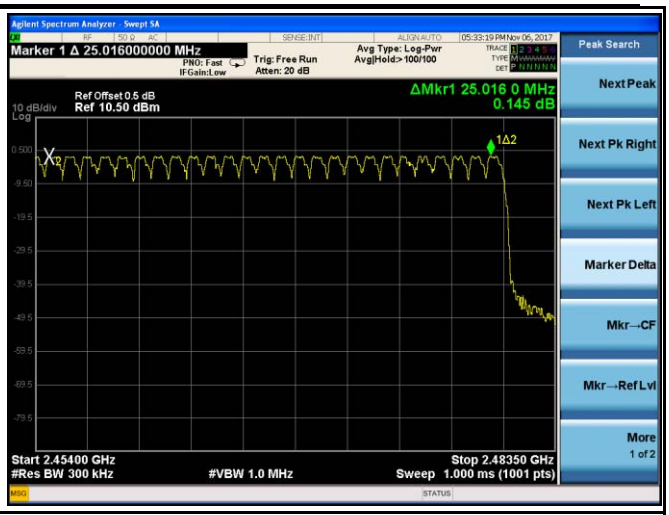
GFSK Number of Hopping Channels – 3



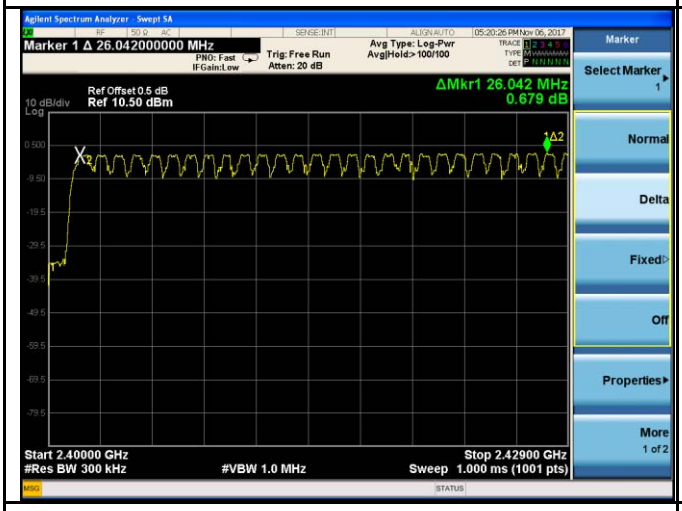
π/4 DQPSK Number of Hopping Channels - 1



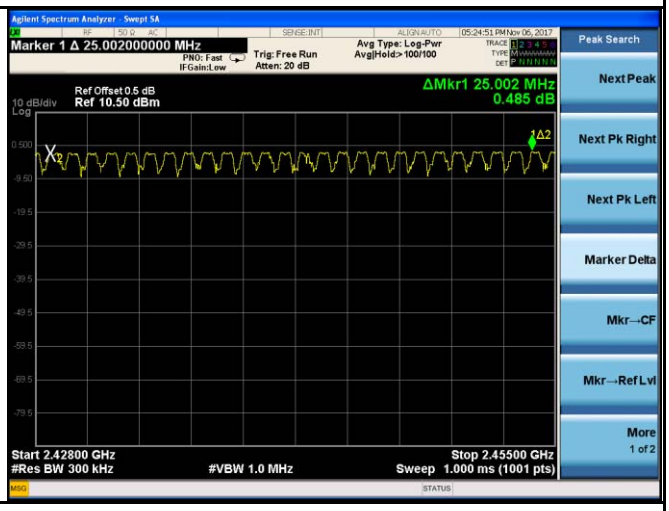
π/4 DQPSK Number of Hopping Channels - 2



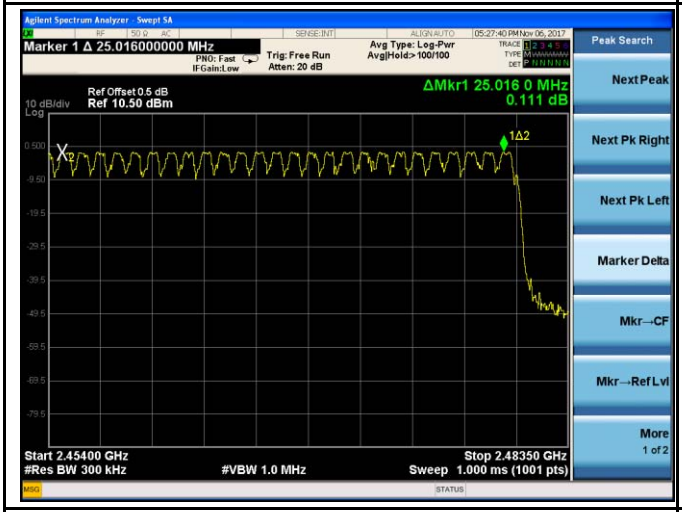
π/4 DQPSK Number of Hopping Channels - 3



8DPSK Number of Hopping Channels - 1



8DPSK Number of Hopping Channels - 2

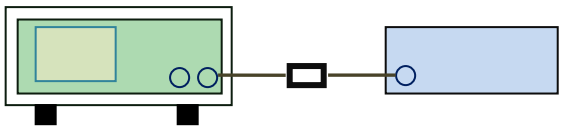


8DPSK Number of Hopping Channels - 3

6.6 Time of Occupancy (Dwell Time)

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	November 6, 2017
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a)(1)(iii)	a)	Dwell Time < 0.4s	☒
Test Setup			
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Use the following spectrum analyzer - Span = zero span, centered on a hopping channel - RBW = 1 MHz - VBW ≥RBW - Sweep = as necessary to capture the entire dwell time per hopping channel - Detector function = peak - Trace = max hold - use the marker-delta function to determine the dwell time		
Remark			
Result	☒Pass ☐ Fail		

Test Data ☒Yes ☐ N/A

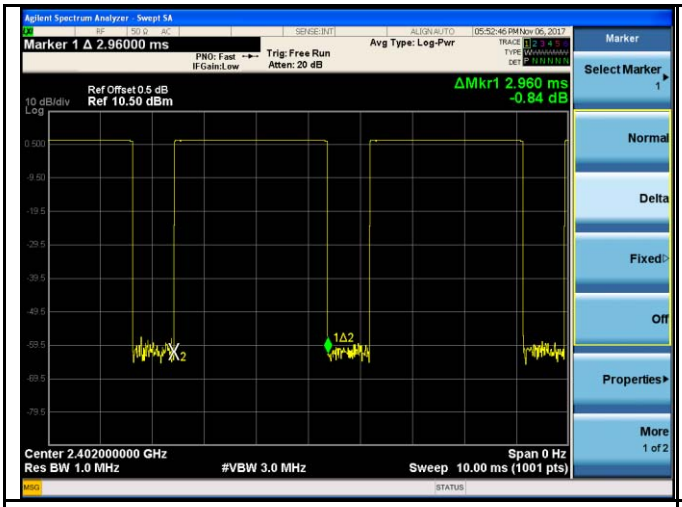
Test Plot ☒Yes (See below) ☐ N/A

Dwell Time measurement result

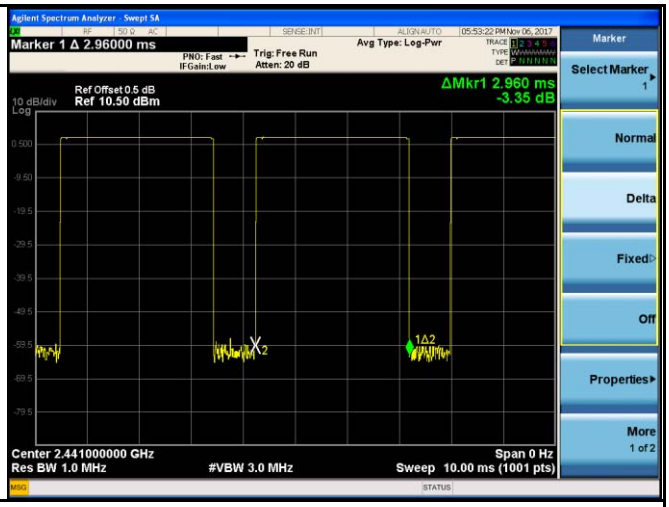
Type	Modulation	CH	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
Dwell Time	GFSK	Low	2.960	315.73	400	Pass
		Mid	2.960	315.73	400	Pass
		High	2.960	315.73	400	Pass
	π/4 DQPSK	Low	2.960	315.73	400	Pass
		Mid	2.960	315.73	400	Pass
		High	2.960	315.73	400	Pass
	8-DPSK	Low	2.950	314.67	400	Pass
		Mid	2.960	315.73	400	Pass
		High	2.950	314.67	400	Pass
Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6						

Note：All packet have been tested（DH1、DH2、DH3）,but only worst（DH5）case is the reported.

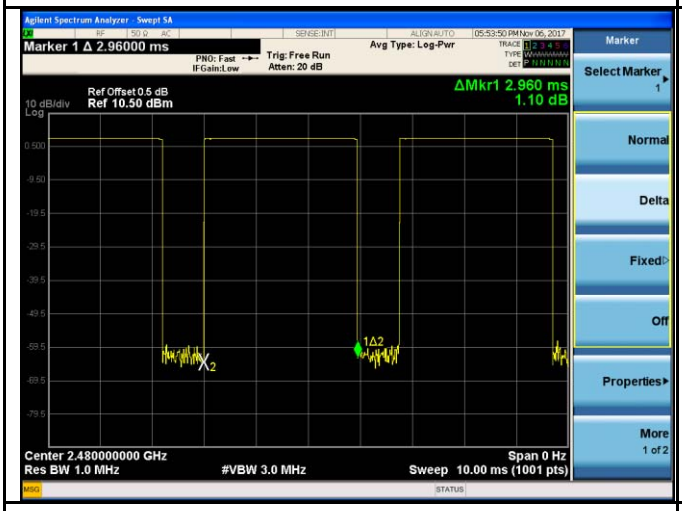
Test Plots
Dwell Time measurement result



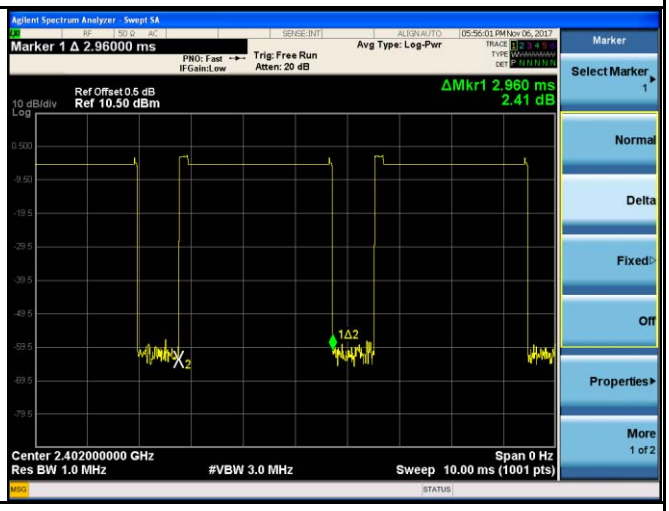
GFSK - Low CH 2402



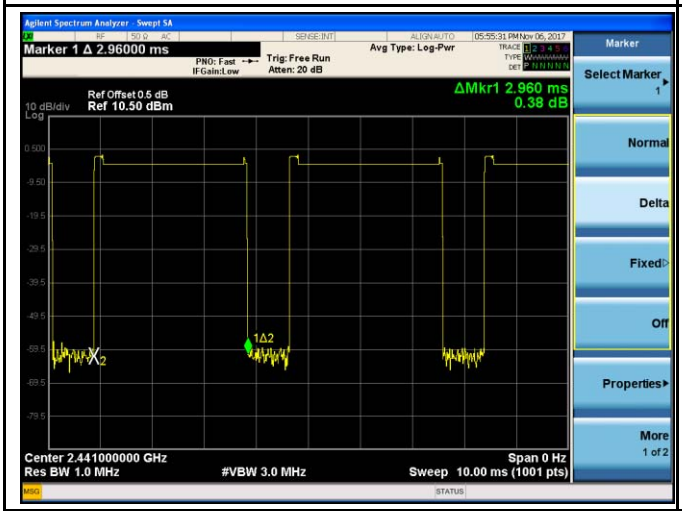
GFSK - Mid CH 2441



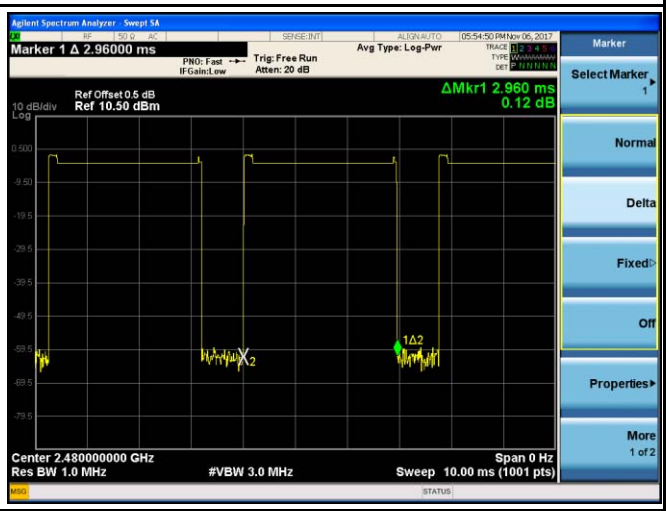
GFSK - High CH 2480



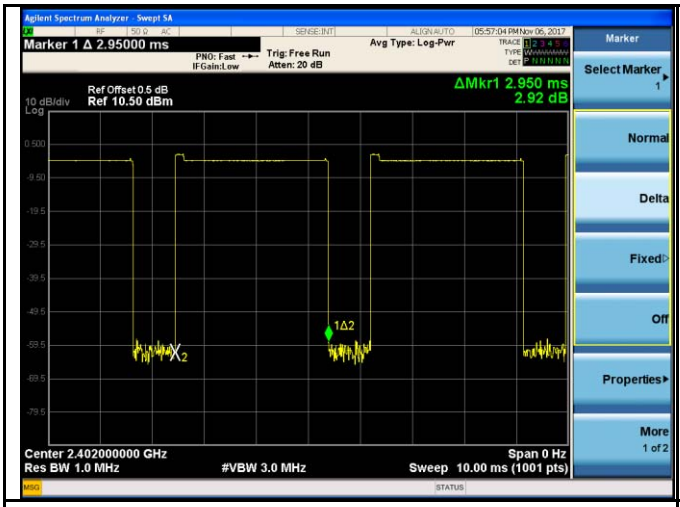
π/4 DQPSK - Low CH 2402



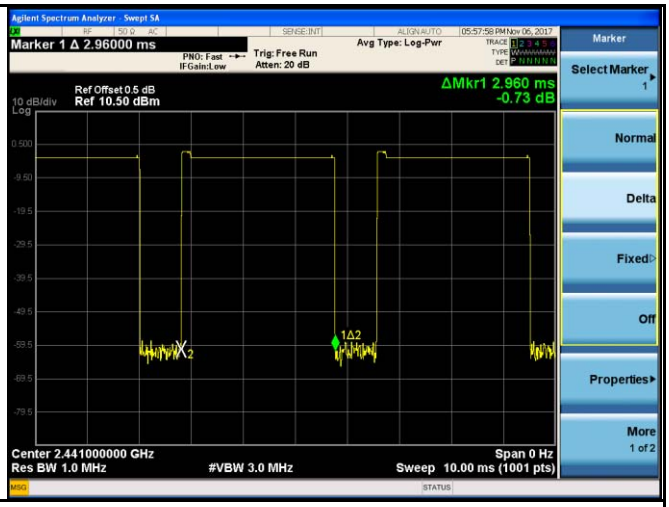
π/4 DQPSK - Mid CH 2441



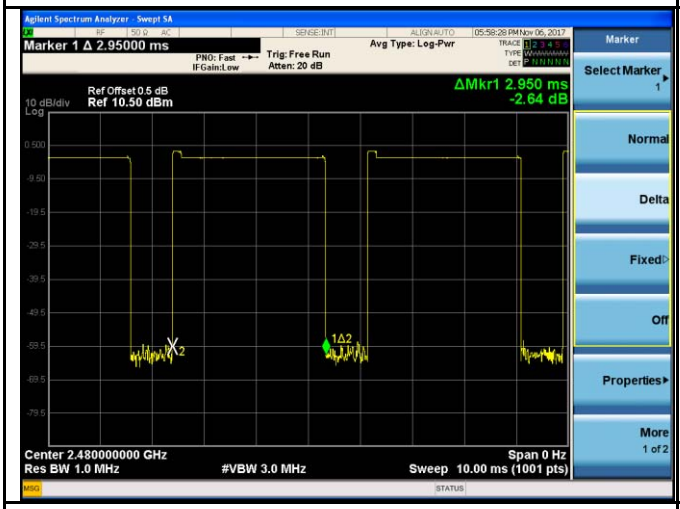
π/4 DQPSK - High CH 2480



8DPSK - Low CH 2402



8DPSK - Mid CH 2441



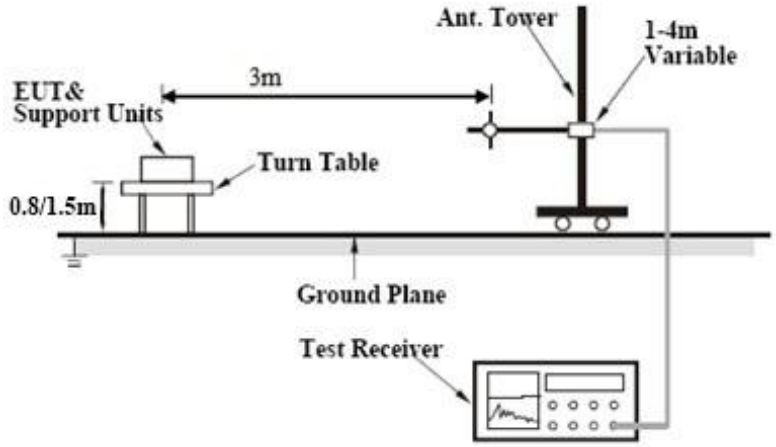
8DPSK - High CH 2480

6.7 Band Edge

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	November 7, 2017
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a)(1)(iii)	a)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.	☒

Test Setup	
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Radiated Method Only - 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - 2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range. - 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz. - 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. - 5. Repeat above procedures until all measured frequencies were complete.
Remark	

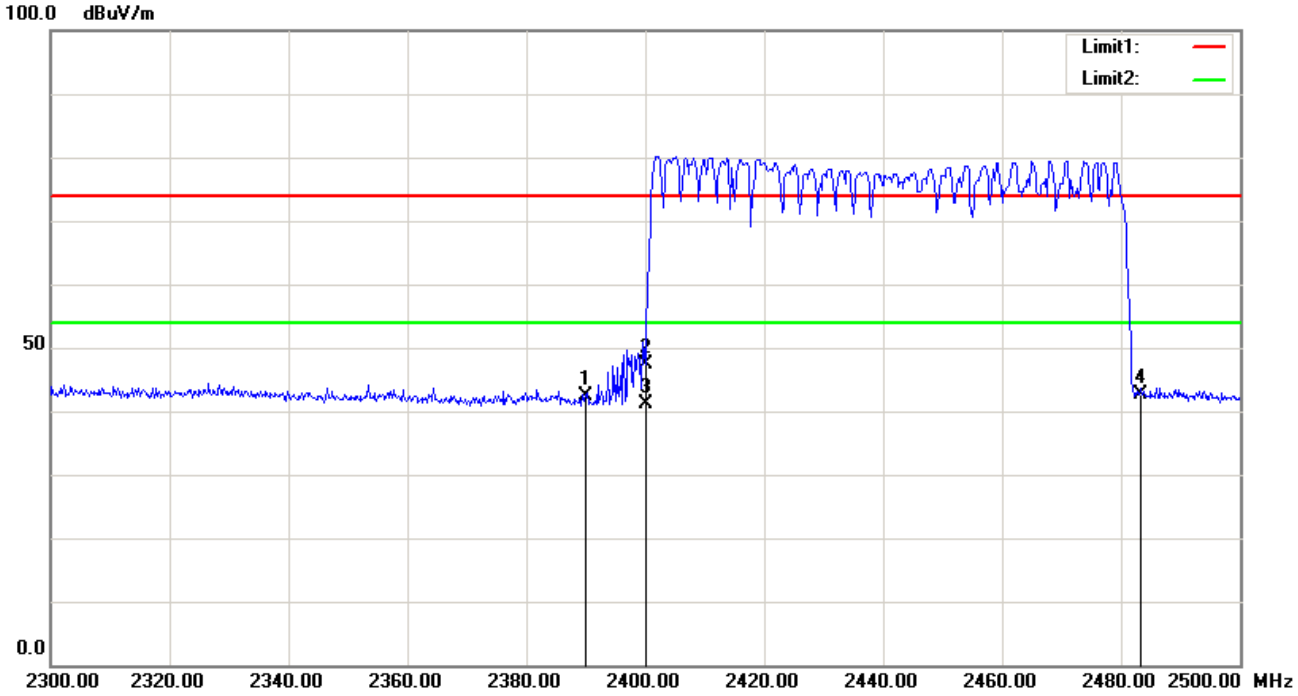
Result	☒Pass ☐Fail

Test Data ☐Yes ☒N/A

Test Plot ☒Yes (See below) ☐N/A

Test Plots
GFSK

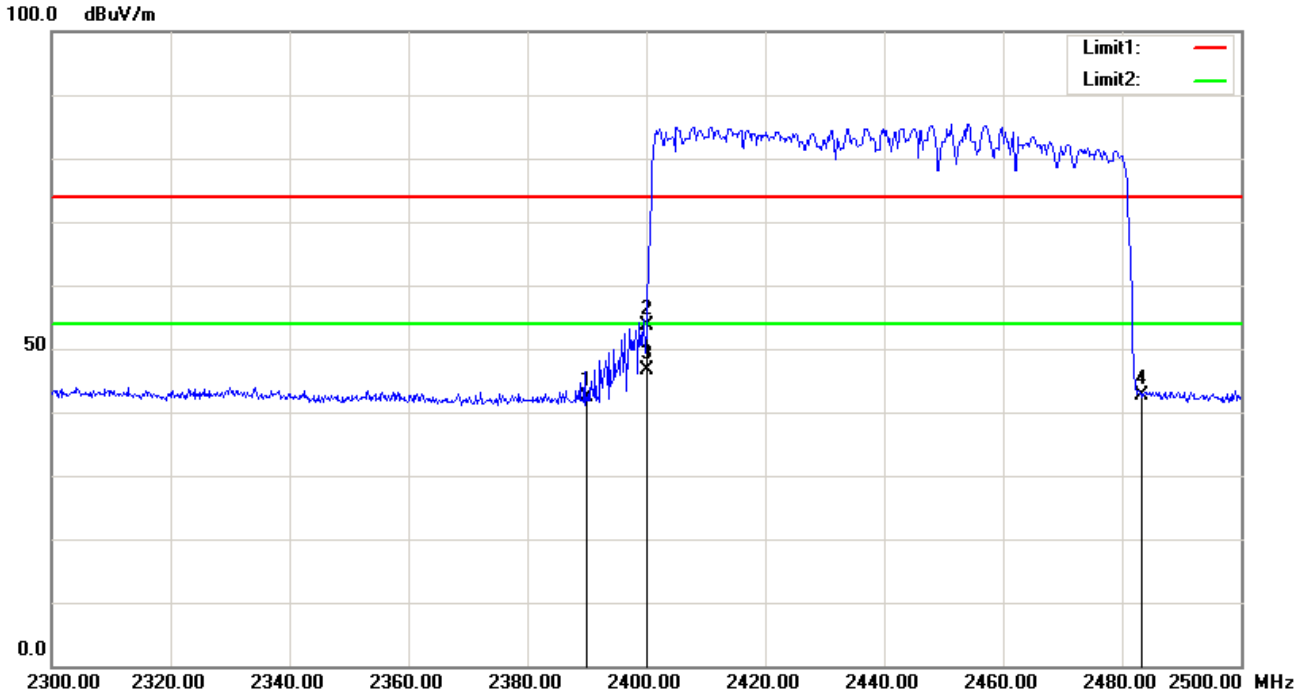
Test Mode:	Hopping Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	59.43	peak	31.53	52.55	4.02	42.43	74.00	-31.57	100	78
2	2400.000	64.51	peak	31.54	52.56	4.01	47.50	74.00	-26.50	100	344
3	2400.000	58.24	AVG	31.54	52.56	4.01	41.23	54.00	-12.77	100	344
4	2483.500	59.63	peak	31.59	52.63	4.06	42.65	74.00	-31.35	100	238

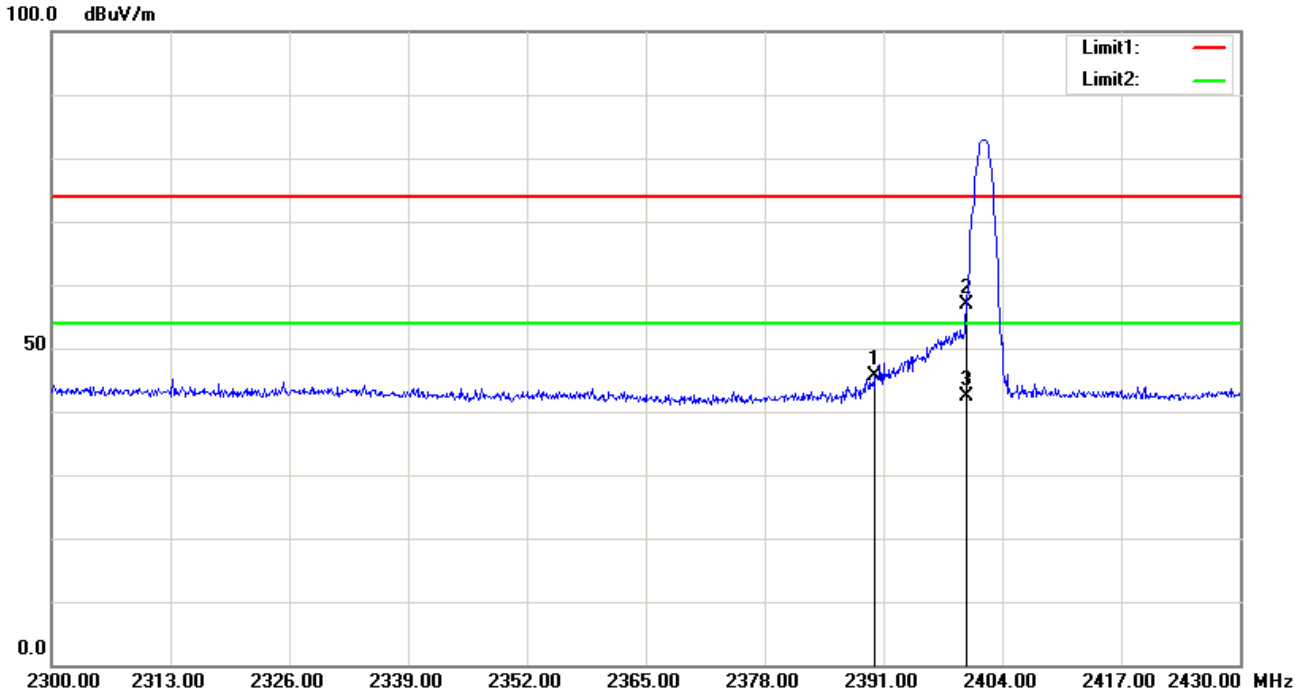
Test Mode:	Hopping Mode



Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	59.41	peak	31.53	52.55	4.02	42.41	74.00	-31.59	100	233
2	2400.000	70.69	peak	31.54	52.56	4.01	53.68	74.00	-20.32	100	13
3	2400.000	63.54	AVG	31.54	52.56	4.01	46.53	54.00	-7.47	100	13
4	2483.500	59.65	peak	31.59	52.63	4.06	42.67	74.00	-31.33	100	119

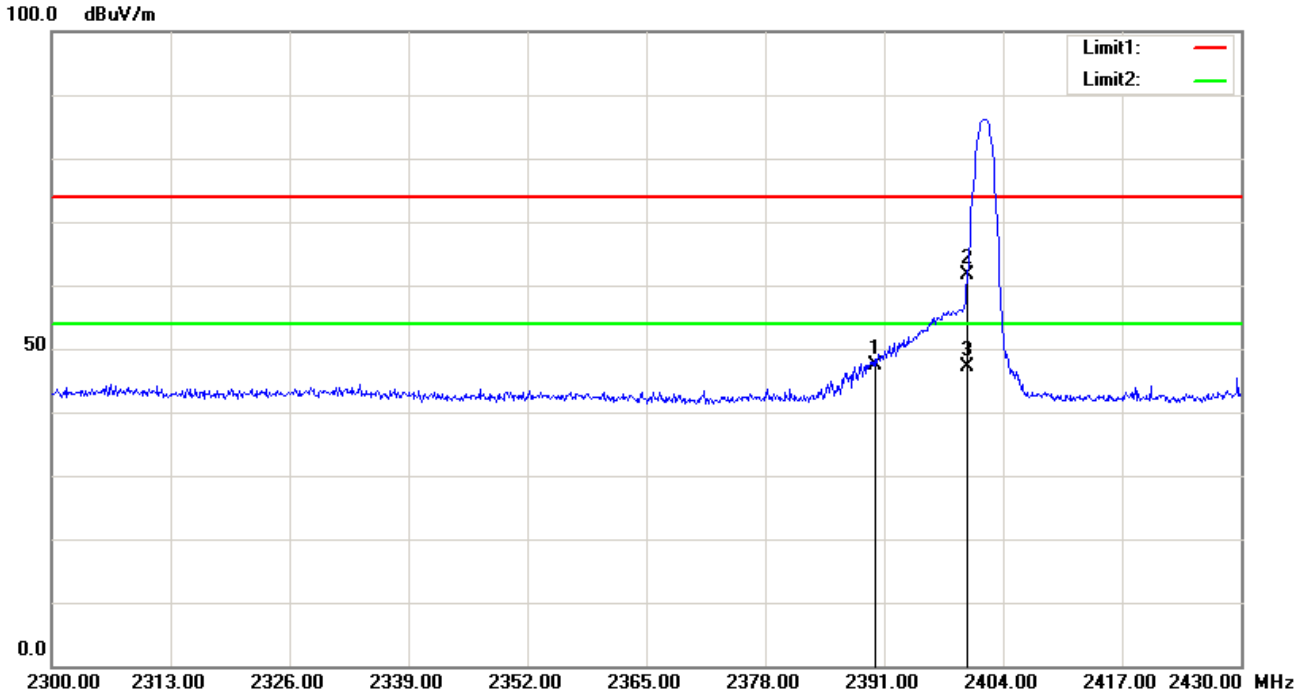
Test Mode:	Low channel TX Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	62.55	peak	31.53	52.55	4.02	45.55	74.00	-28.45	100	157
2	2400.000	73.80	peak	31.54	52.56	4.01	56.79	74.00	-17.21	100	127
3	2400.000	59.41	AVG	31.54	52.56	4.01	42.40	54.00	-11.60	100	127

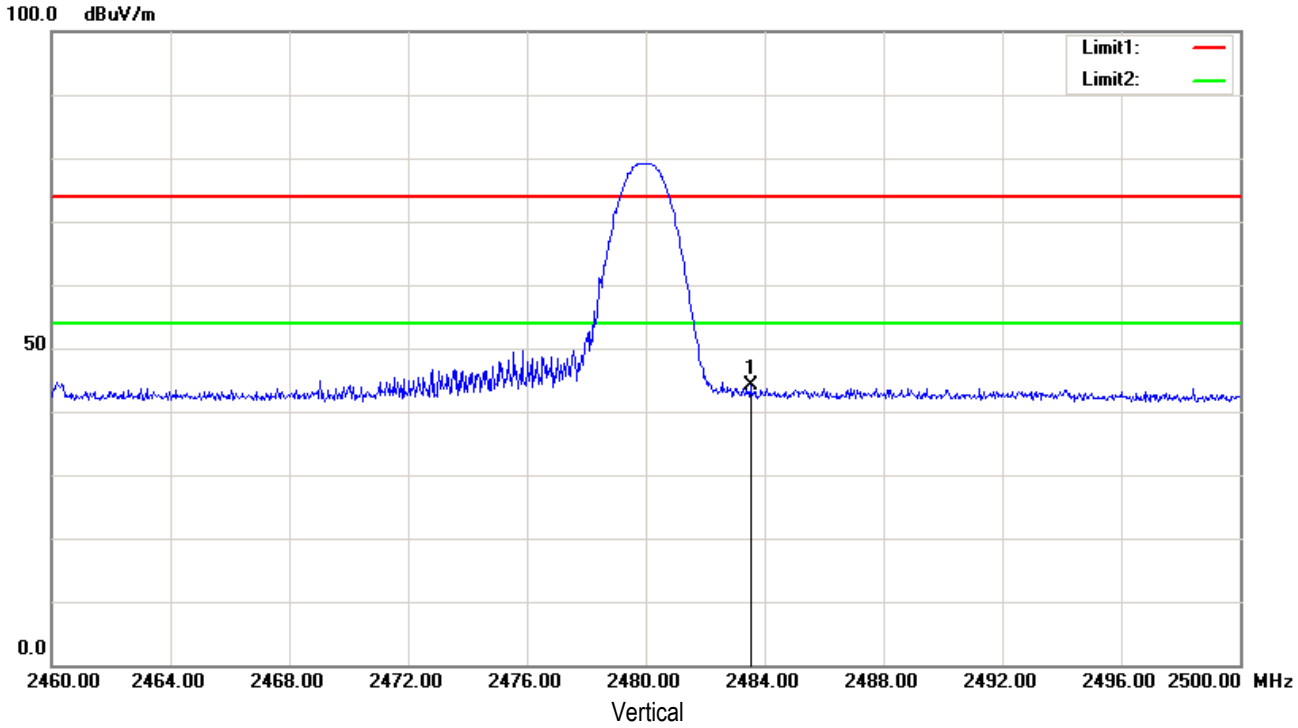
Test Mode:	Low channel TX Mode



Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	64.44	peak	31.53	52.55	4.02	47.44	74.00	-26.56	100	27
2	2400.000	78.59	peak	31.54	52.56	4.01	61.58	74.00	-12.42	100	312
3	2400.000	64.25	AVG	31.54	52.56	4.01	47.24	54.00	-6.76	100	312

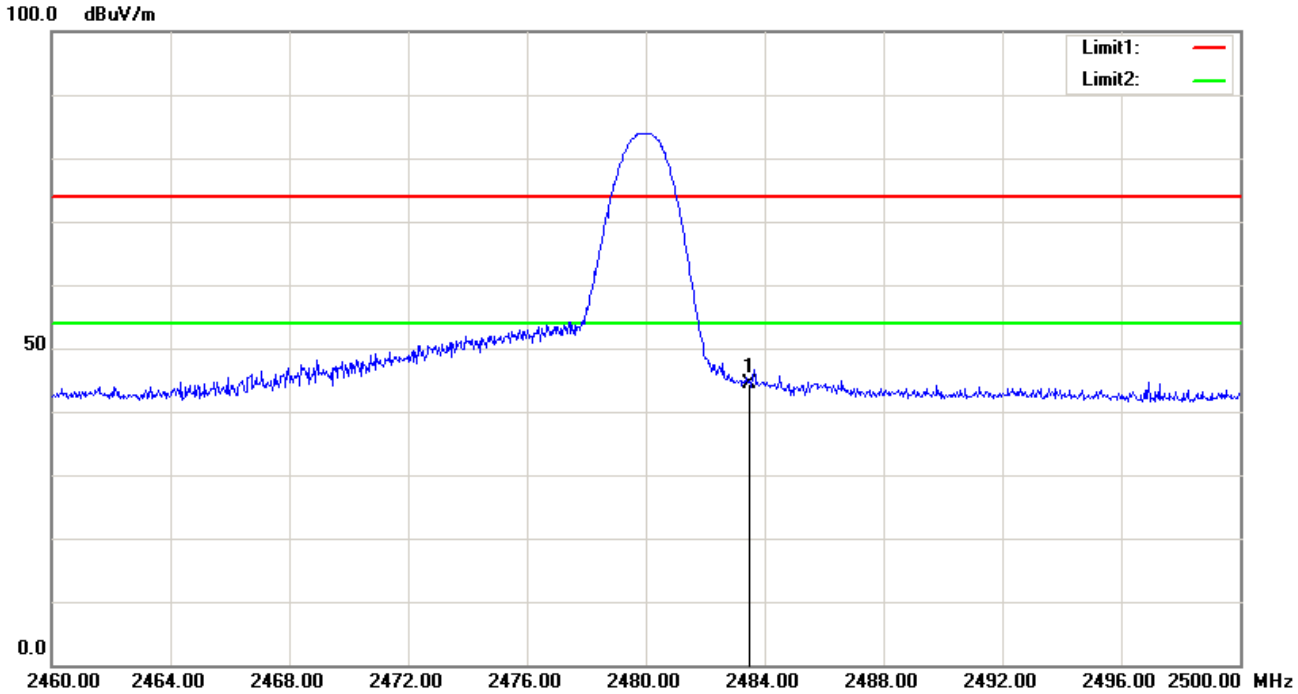
Test Mode:	High channel TX Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2483.500	60.99	peak	31.59	52.63	4.06	44.01	74.00	-29.99	100	159

Test Mode:	High channel TX Mode

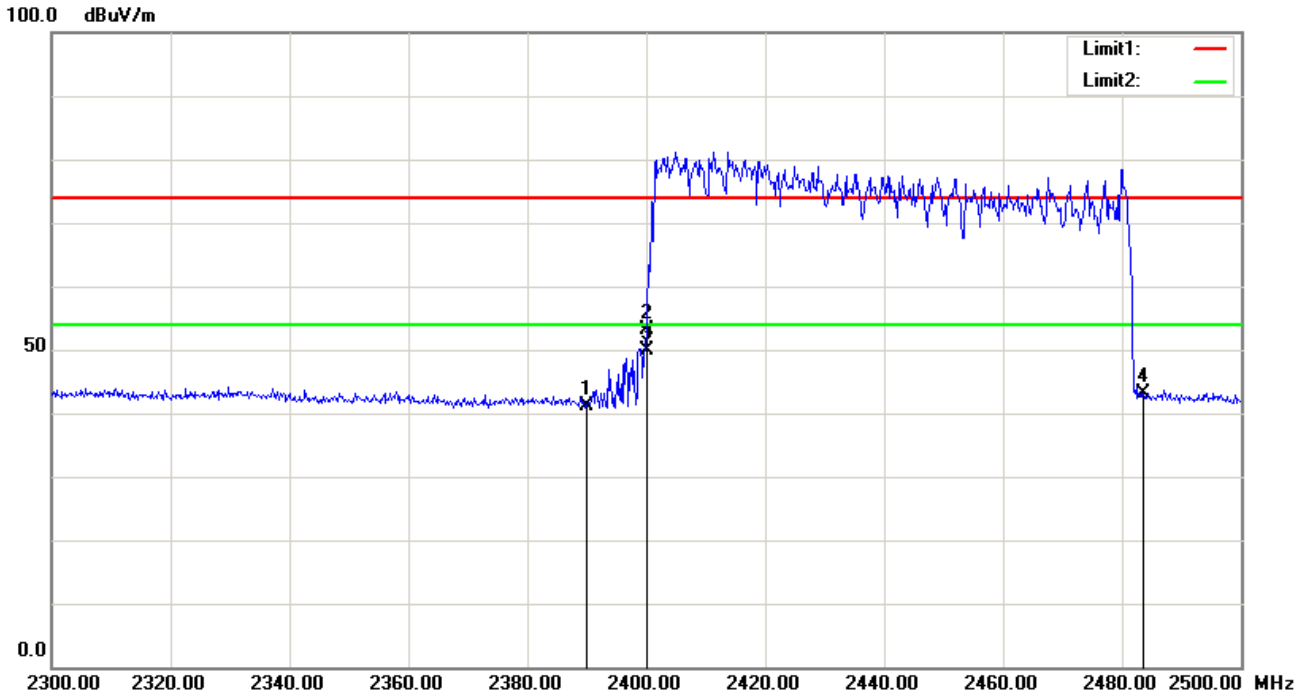


Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2483.500	61.35	peak	31.59	52.63	4.06	44.37	74.00	-29.63	100	305

π/4 DQPSK :

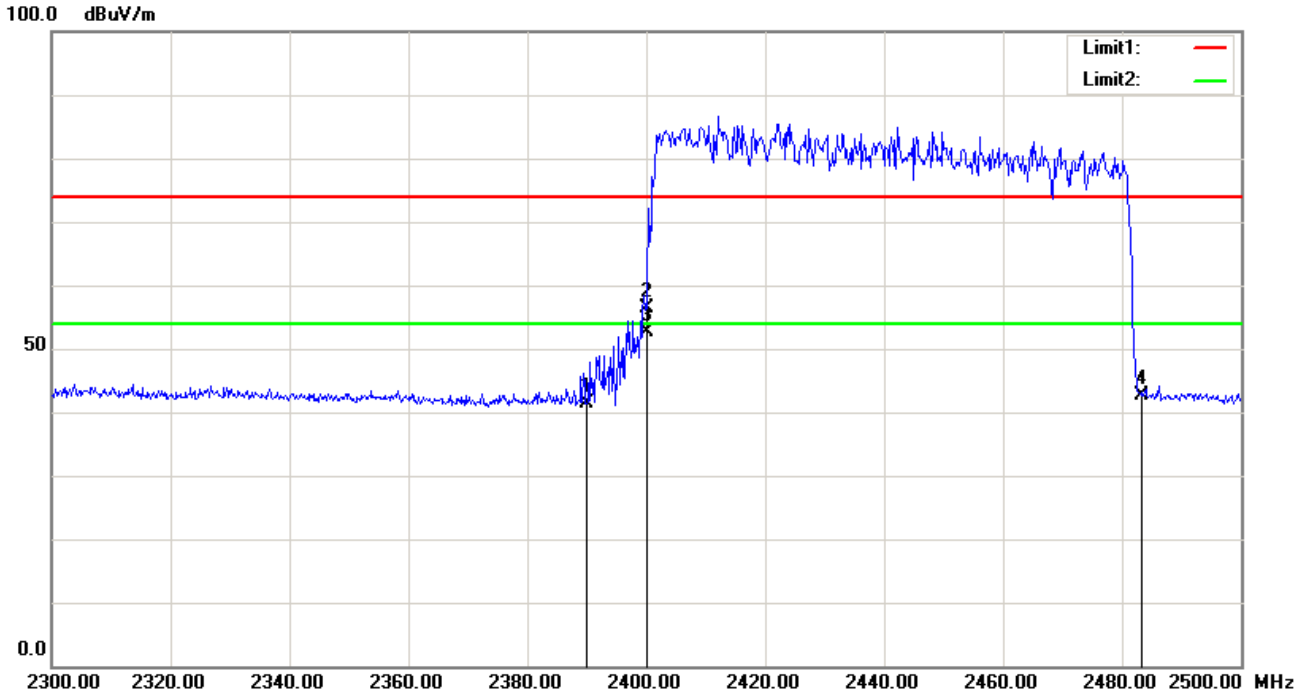
Test Mode:	Hopping Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	58.11	peak	31.53	52.55	4.02	41.11	74.00	-32.89	100	163
2	2400.000	70.23	peak	31.54	52.56	4.01	53.22	74.00	-20.78	100	322
3	2400.000	66.86	AVG	31.54	52.56	4.01	49.85	54.00	-4.15	100	322
4	2483.500	60.08	peak	31.59	52.63	4.06	43.10	74.00	-30.90	100	179

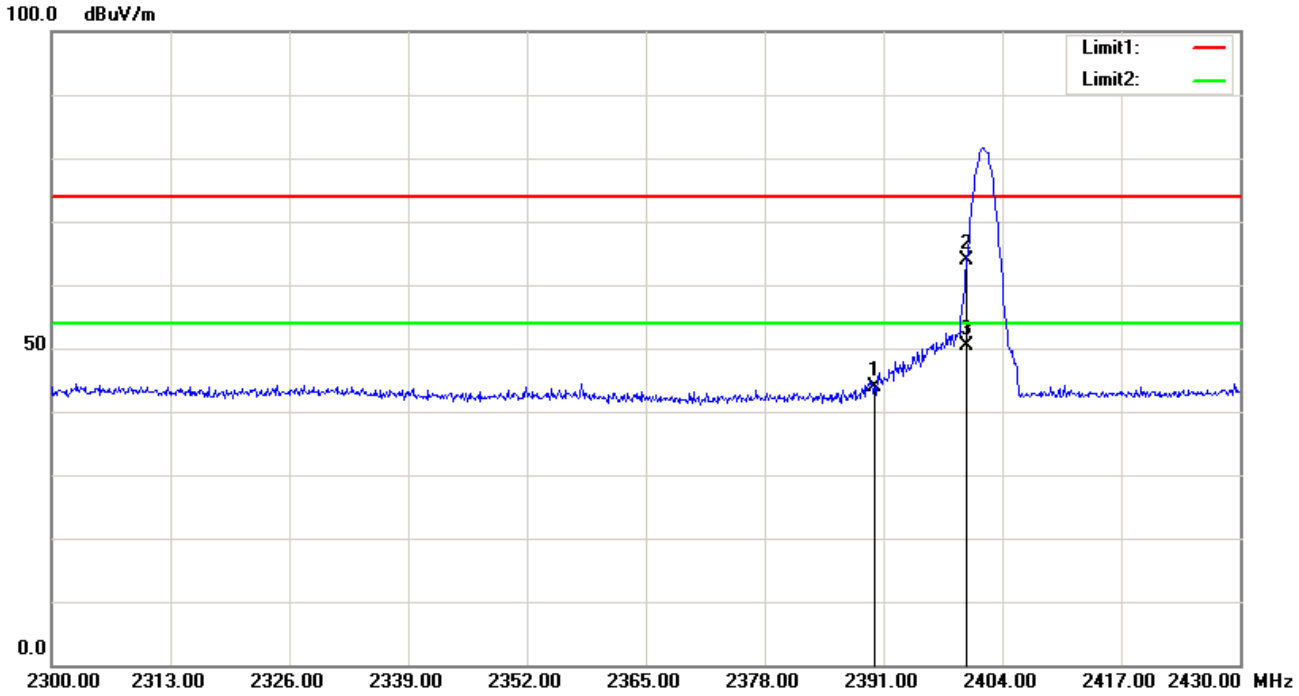
Test Mode:	Hopping Mode



Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	58.38	peak	31.53	52.55	4.02	41.38	74.00	-32.62	100	128
2	2400.000	73.39	peak	31.54	52.56	4.01	56.38	74.00	-17.62	100	71
3	2400.000	69.54	AVG	31.54	52.56	4.01	52.53	54.00	-1.47	100	71
4	2483.500	59.58	peak	31.59	52.63	4.06	42.60	74.00	-31.40	100	14

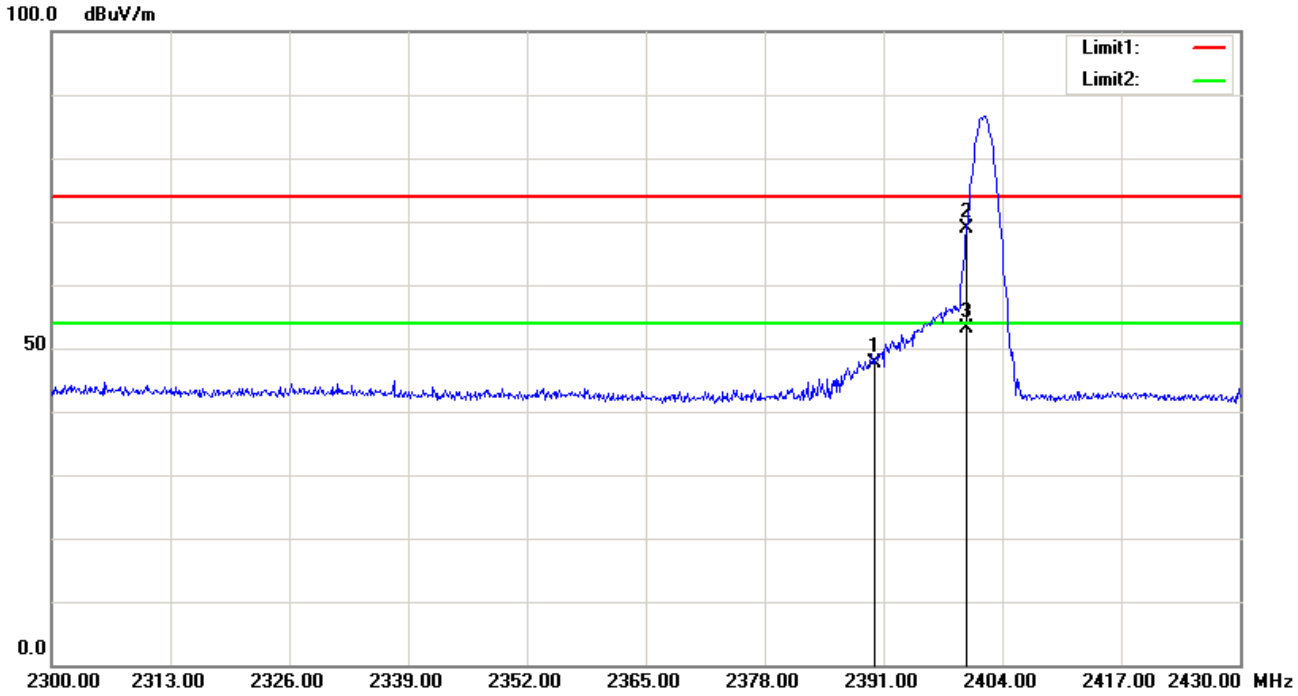
Test Mode:	Low channel TX Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	60.81	peak	31.53	52.55	4.02	43.81	74.00	-30.19	100	170
2	2400.000	80.98	peak	31.54	52.56	4.01	63.97	74.00	-10.03	100	333
3	2400.000	67.42	AVG	31.54	52.56	4.01	50.41	54.00	-3.59	100	159

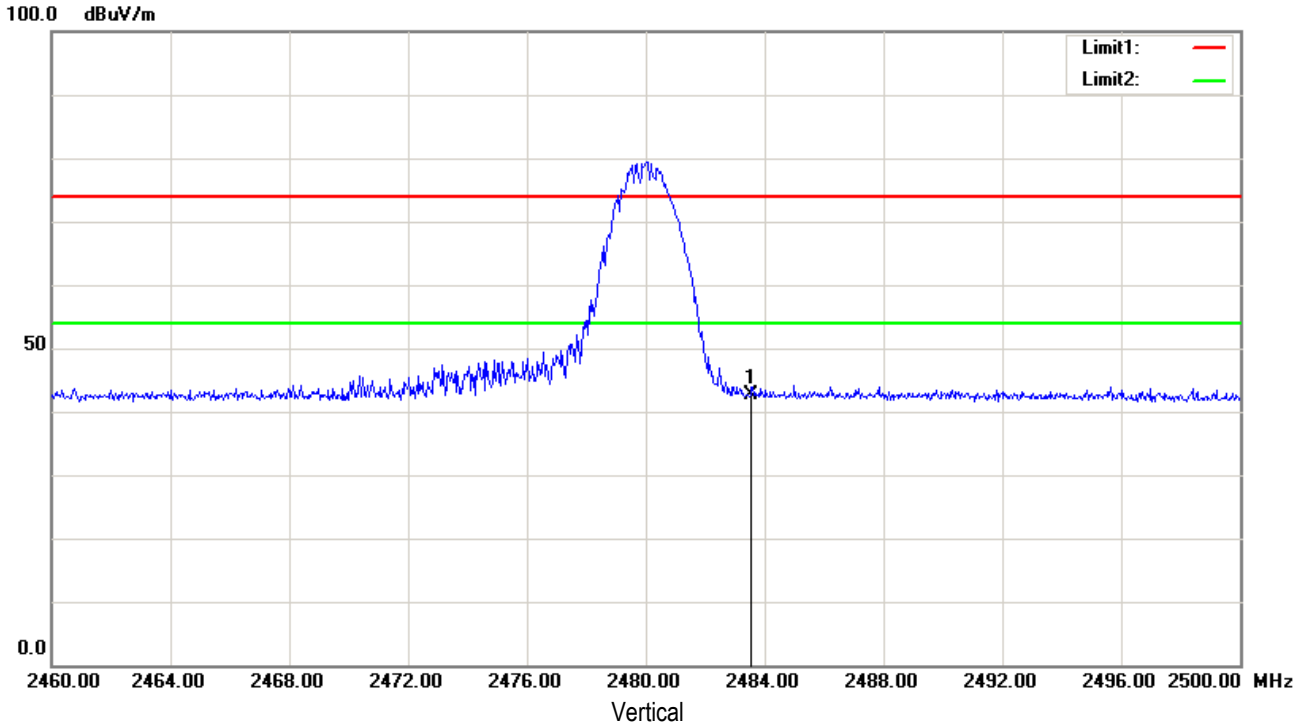
Test Mode:	Low channel TX Mode



Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	64.62	peak	31.53	52.55	4.02	47.62	74.00	-26.38	100	8
2	2400.000	85.82	peak	31.54	52.56	4.01	68.81	74.00	-5.19	100	16
3	2400.000	70.05	AVG	31.54	52.56	4.01	53.04	54.00	-0.96	100	16

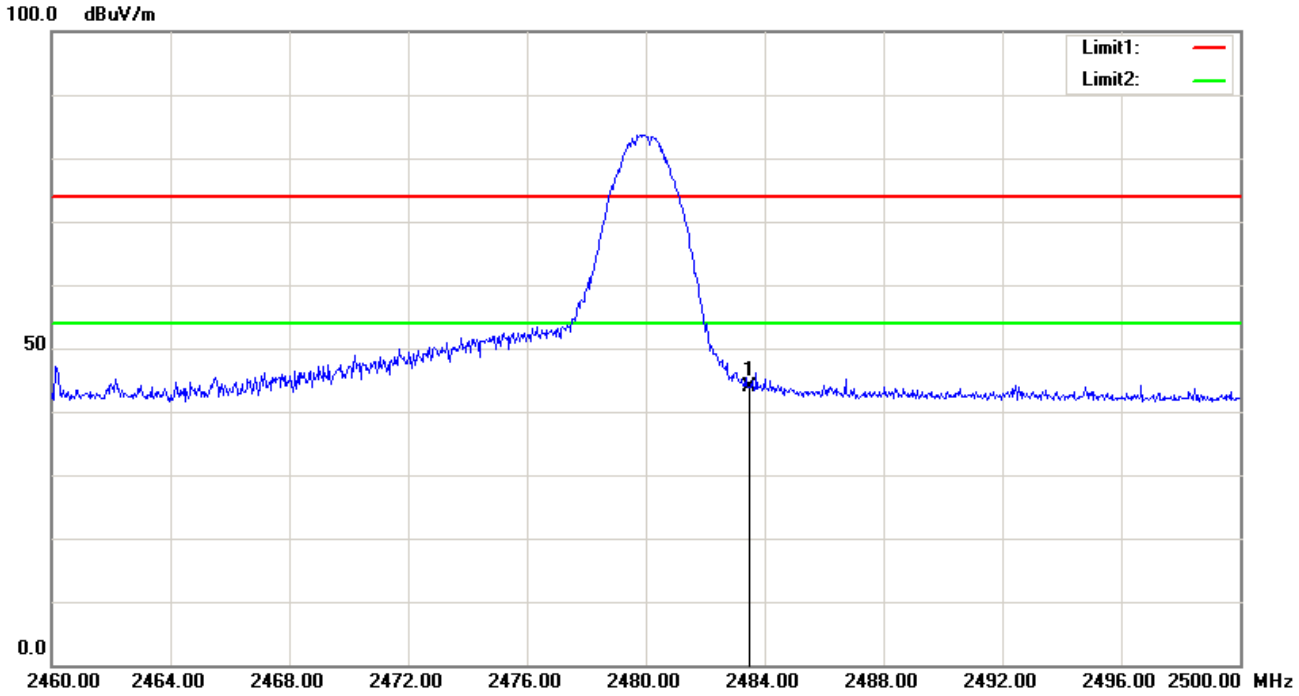
Test Mode:	High channel TX Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2483.500	59.51	peak	31.59	52.63	4.06	42.53	74.00	-31.47	100	9

Test Mode:	High channel TX Mode

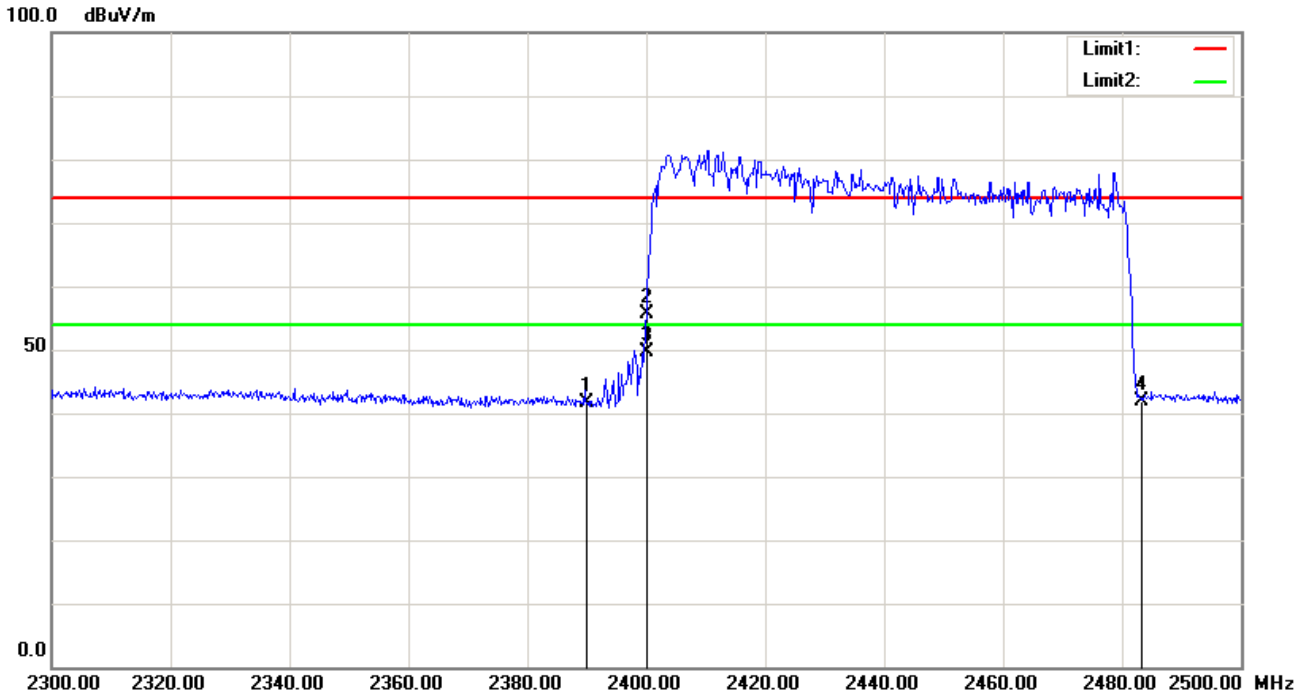


Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2483.500	60.79	peak	31.59	52.63	4.06	43.81	74.00	-30.19	100	21

8-DPSK Mode:

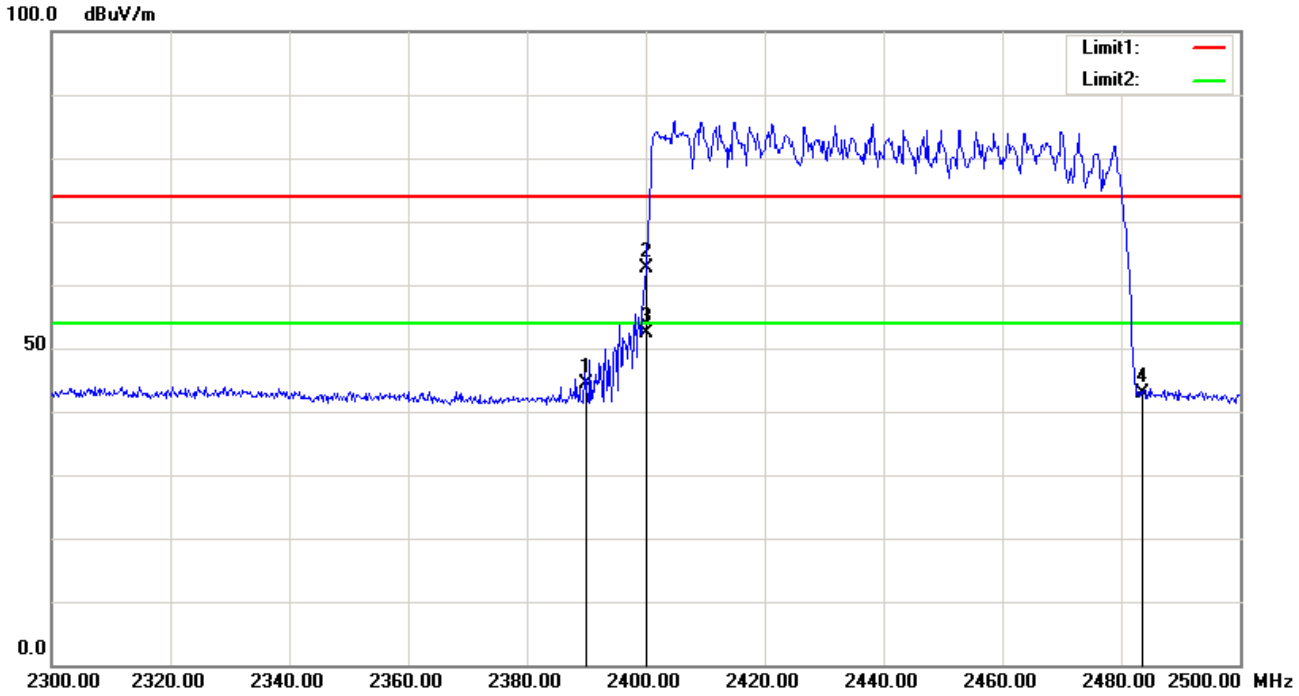
Test Mode:	Hopping Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	58.58	peak	31.53	52.55	4.02	41.58	74.00	-32.42	100	281
2	2400.000	72.59	peak	31.54	52.56	4.01	55.58	74.00	-18.42	100	302
3	2400.000	66.54	AVG	31.54	52.56	4.01	49.53	54.00	-4.47	100	302
4	2483.500	58.98	peak	31.59	52.63	4.06	42.00	74.00	-32.00	100	281

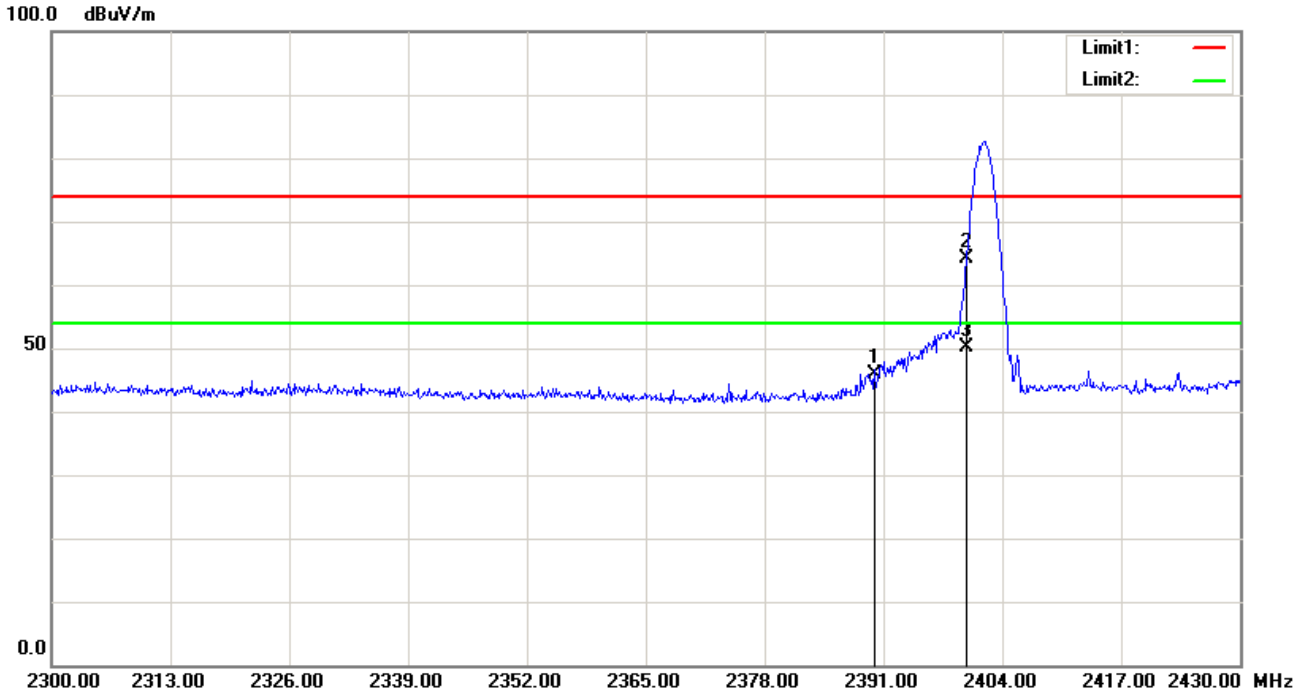
Test Mode:	Hopping Mode



Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	61.46	peak	31.53	52.55	4.02	44.46	74.00	-29.54	100	29
2	2400.000	79.75	peak	31.54	52.56	4.01	62.74	74.00	-11.26	100	314
3	2400.000	69.31	AVG	31.54	52.56	4.01	52.30	54.00	-1.70	100	314
4	2483.500	59.89	peak	31.59	52.63	4.06	42.91	74.00	-31.09	100	67

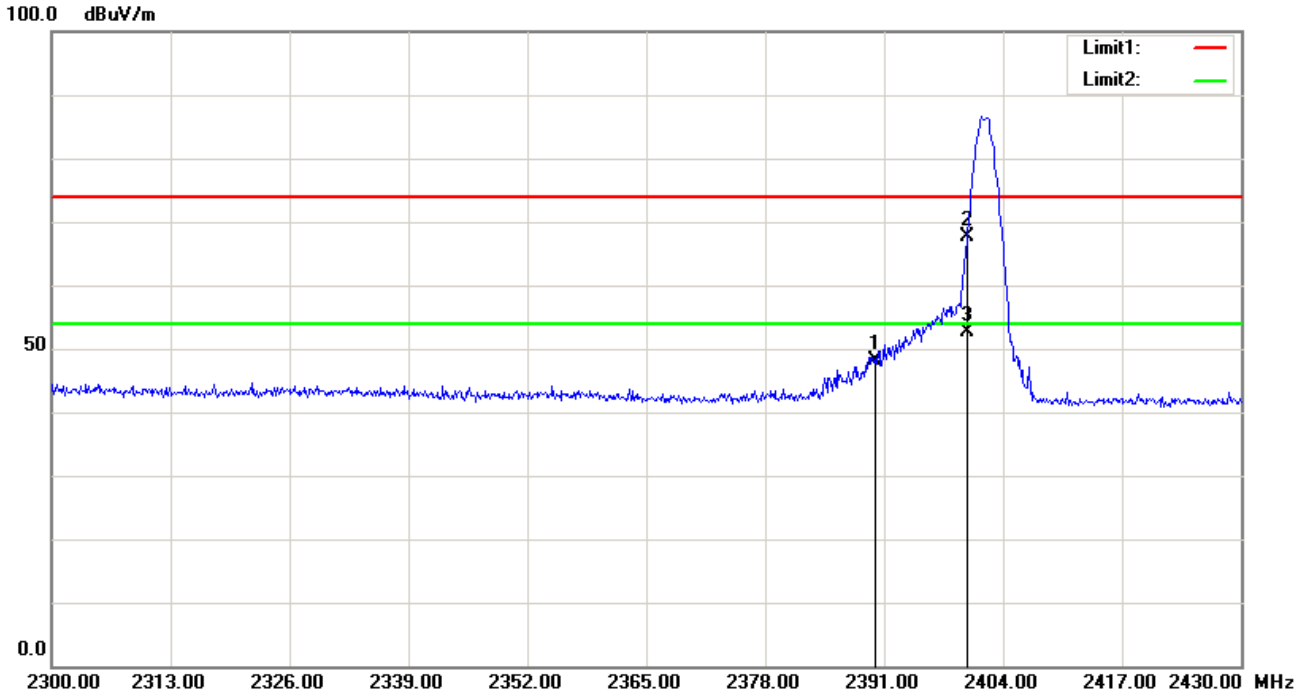
Test Mode:	Low channel TX Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	62.77	peak	31.53	52.55	4.02	45.77	74.00	-28.23	100	330
2	2400.000	81.02	peak	31.54	52.56	4.01	64.01	74.00	-9.99	100	173
3	2400.000	67.16	AVG	31.54	52.56	4.01	50.15	54.00	-3.85	100	114

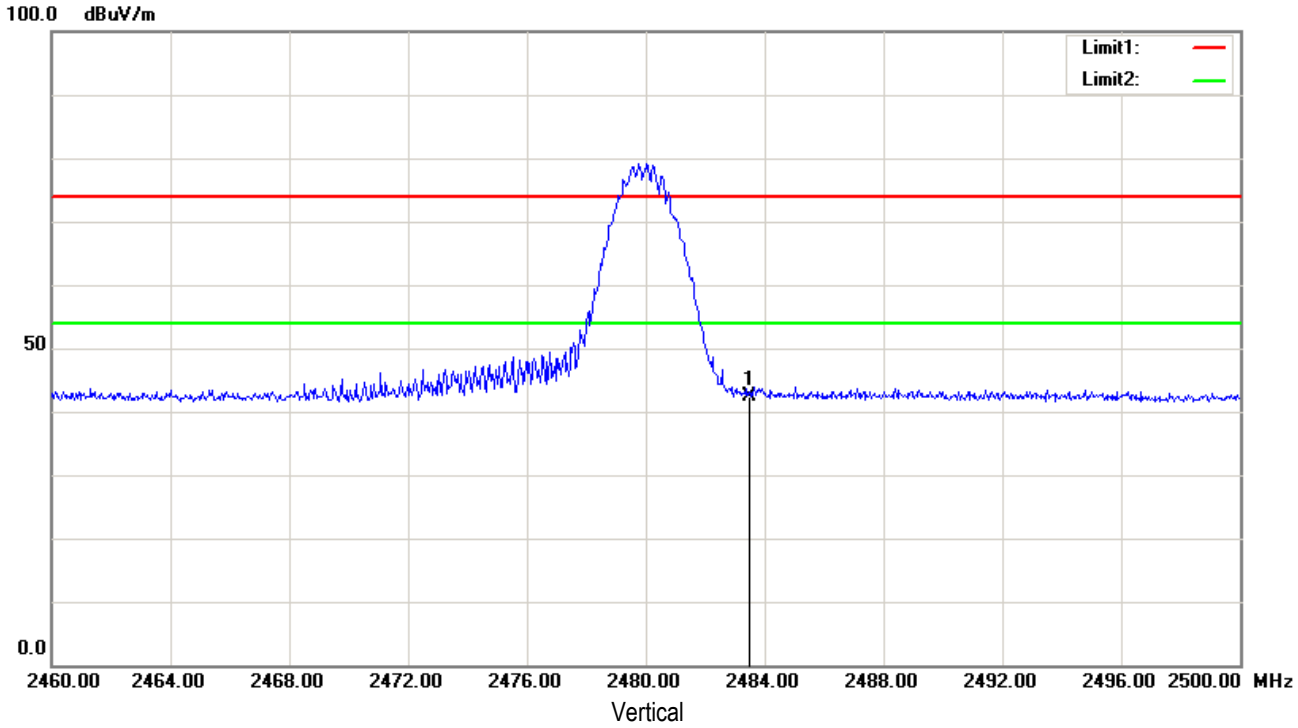
Test Mode:	Low channel TX Mode



Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	65.15	peak	31.53	52.55	4.02	48.15	74.00	-25.85	100	314
2	2400.000	84.66	peak	31.54	52.56	4.01	67.65	74.00	-6.35	100	21
3	2400.000	69.57	AVG	31.54	52.56	4.01	52.56	54.00	-1.44	100	21

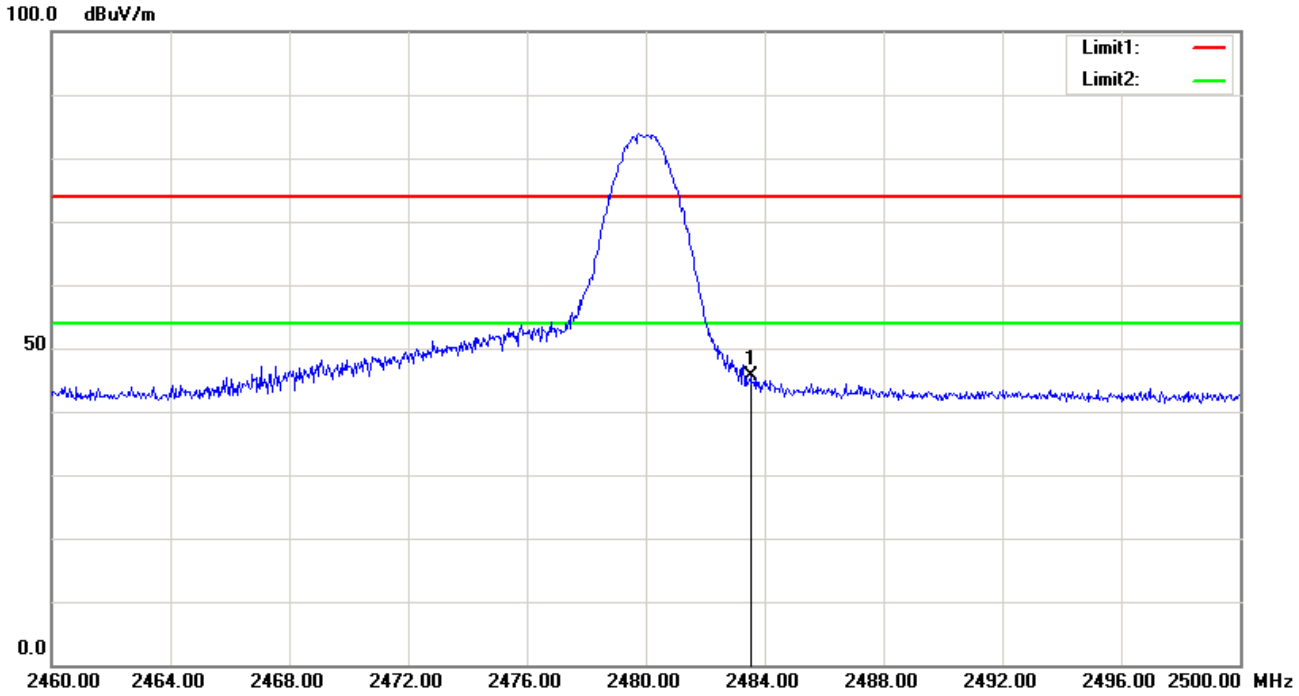
Test Mode:	High channel TX Mode



Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2483.500	59.42	peak	31.59	52.63	4.06	42.44	74.00	-31.56	100	38

Test Mode:	High channel TX Mode



Horizontal

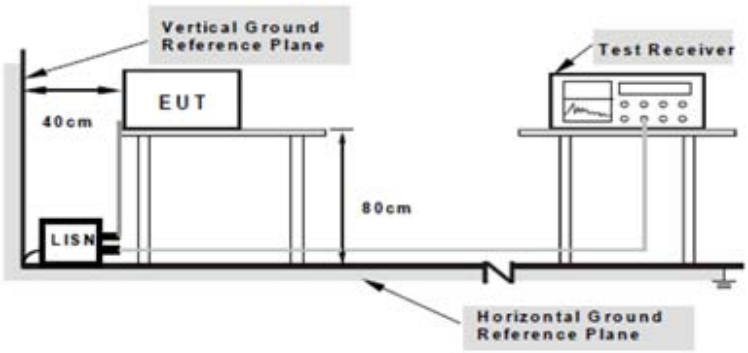
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2483.500	62.62	peak	31.59	52.63	4.06	45.64	74.00	-28.36	100	243

6.8 AC Power Line Conducted Emissions

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	September 15,2017
Tested By :	Amos Xia

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.207, RSS210 (A8.1)</td><td>a)</td><td>For Low-power radio-frequency devices 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, as measured using a 50 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.

Class A Limit
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<tr><td>0.15 ~ 0.5</td><td>79</td><td>66</td></tr>
<tr><td>0.5 ~ 30</td><td>73</td><td>60</td></tr>
</table>
Class B Limit
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 46</td></tr>
<tr><td>0.5 ~ 5</td><td>56</td><td>46</td></tr>
<tr><td>5 ~ 30</td><td>60</td><td>50</td></tr>
</table></td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 

Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50 [mu]H/50 EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another main supply.
5. The EUT was switched on and allowed to warm up to its normal operating condition.
6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz.
8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</td></tr>
<tr><td>Remark</td><td colspan="3">We test 3 modulations, only show GFSK test data in the report.</td></tr>
</table>

Result	☒Pass ☐Fail

Test Data ☒Yes ☐N/A

Test Plot ☒Yes (See below) ☐N/A

Data sample

No.	Frequency	Reading	Detector	Lisn/Isn	Ps_Lmt	Cab_L	Result	Limit	Margin
	(MHz)	(dBμV)		(dB}	(dB)	(dB)	(dBμV)	(dBμV)	(dB)

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV) = Receiver Reading Value

Detector=Quasi Peak Detector or Average Detector

Lisn/ISN= Insertion loss of LISN

Ps_Lmt= Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

Cab_L= cable loss

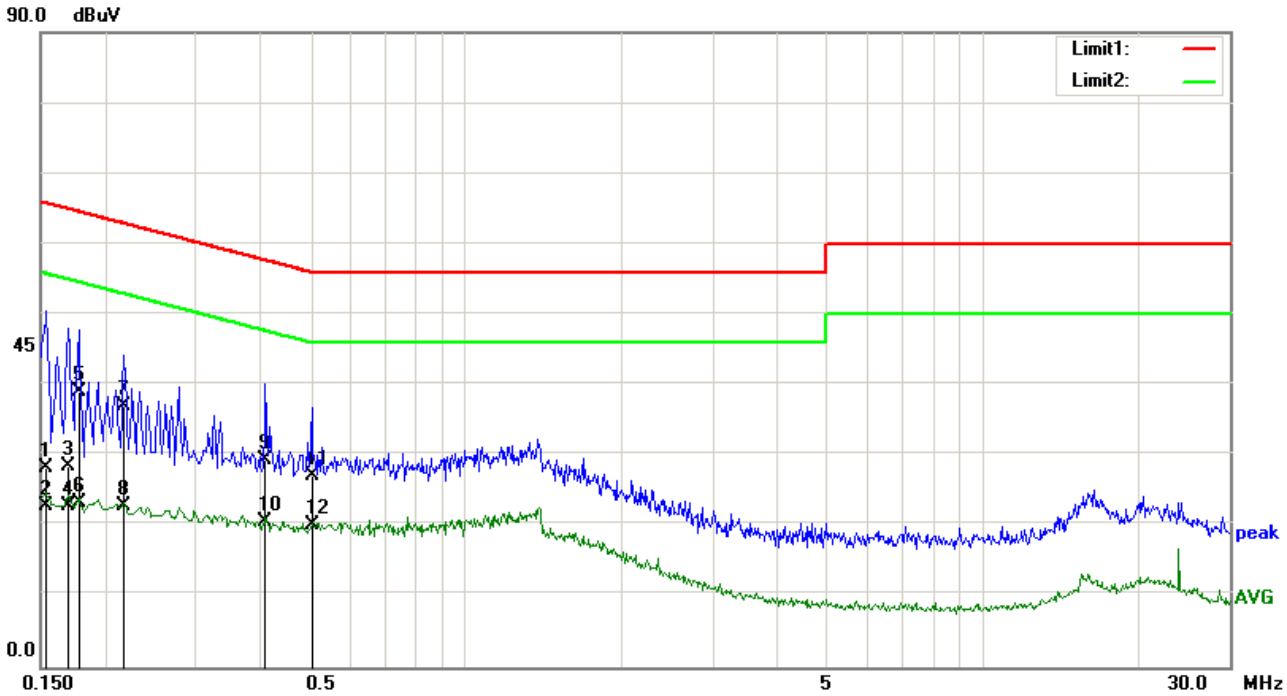
Result (dBμV) = Reading Value + Corrected Value

Limit (dBμV) = Limit stated in standard

Calculation Formula:

Margin (dB) = Result (dBμV) – limit (dBμV)

Test Mode:	Transmitting BT Mode (GFSK-Low Channel)



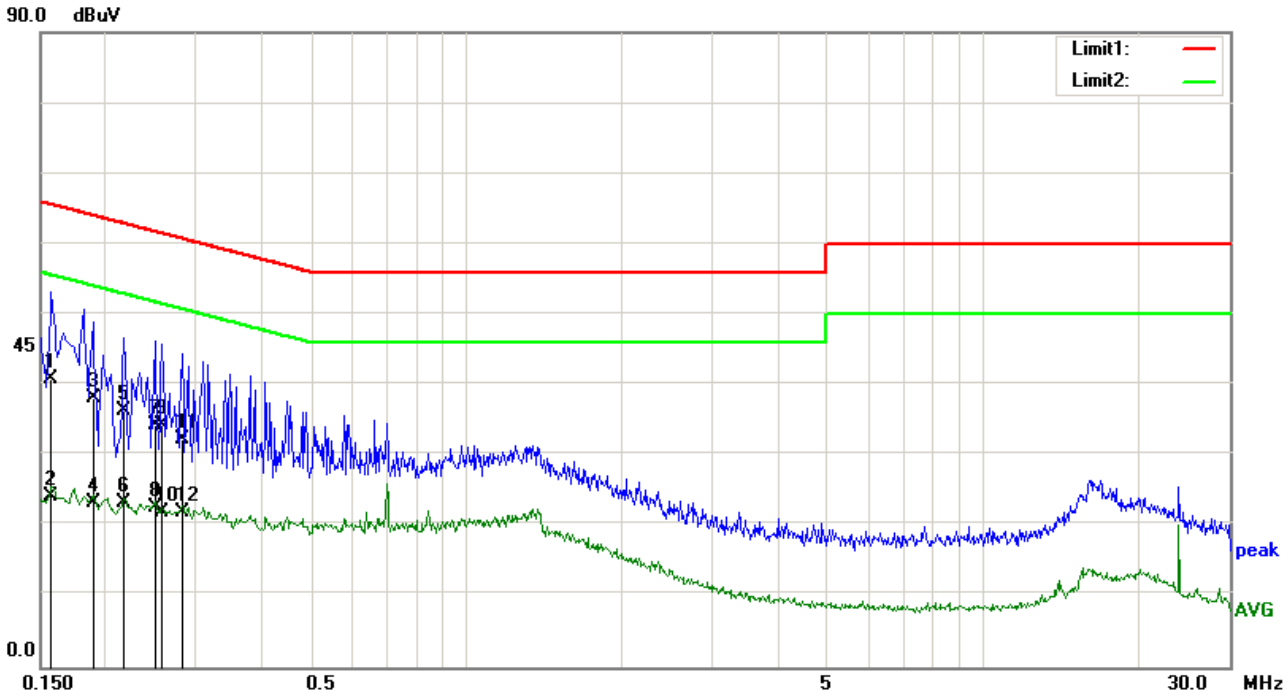
Test Data

Phase Line Plot at 120Vac, 60Hz

No.	Frequency (MHz)	Reading (dBuV)	Detector	Lisn/Isn (dB}	Ps_Lmt (dB)	Cab_L (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.1540	17.68	QP	0.10	-10.00	0.35	28.13	65.78	-37.65
2	0.1540	12.45	AVG	0.10	-10.00	0.35	22.90	55.78	-32.88
3	0.1700	18.07	QP	0.10	-10.00	0.33	28.50	64.96	-36.46
4	0.1700	12.34	AVG	0.10	-10.00	0.33	22.77	54.96	-32.19
5	0.1780	28.70	QP	0.10	-10.00	0.32	39.12	64.58	-25.46
6	0.1780	12.88	AVG	0.10	-10.00	0.32	23.30	54.58	-31.28
7	0.2180	26.69	QP	0.10	-10.00	0.25	37.04	62.89	-25.85
8	0.2180	12.52	AVG	0.10	-10.00	0.25	22.87	52.89	-30.02
9	0.4100	19.09	QP	0.11	-10.00	0.21	29.41	57.65	-28.24
10	0.4100	10.31	AVG	0.11	-10.00	0.21	20.63	47.65	-27.02
11	0.5020	16.76	QP	0.12	-10.00	0.21	27.09	56.00	-28.91
12	0.5020	9.79	AVG	0.12	-10.00	0.21	20.12	46.00	-25.88

Note:We had tested different mode Low/Mid/High channel,and only show worse case (GFSK Low channel) in the r eport.

Test Mode:	Transmitting BT Mode (GFSK-Low Channel)



Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	Frequency (MHz)	Reading (dBuV)	Detector	Lisn/Isn (dB}	Ps_Lmt (dB)	Cab_L (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.1580	30.28	QP	0.11	-10.00	0.35	40.74	65.57	-24.83
2	0.1580	13.81	AVG	0.11	-10.00	0.35	24.27	55.57	-31.30
3	0.1900	27.72	QP	0.10	-10.00	0.30	38.12	64.04	-25.92
4	0.1900	12.97	AVG	0.10	-10.00	0.30	23.37	54.04	-30.67
5	0.2180	26.09	QP	0.10	-10.00	0.25	36.44	62.89	-26.45
6	0.2180	12.96	AVG	0.10	-10.00	0.25	23.31	52.89	-29.58
7	0.2500	23.95	QP	0.10	-10.00	0.20	34.25	61.76	-27.51
8	0.2500	12.33	AVG	0.10	-10.00	0.20	22.63	51.76	-29.13
9	0.2580	23.91	QP	0.10	-10.00	0.20	34.21	61.50	-27.29
10	0.2580	11.64	AVG	0.10	-10.00	0.20	21.94	51.50	-29.56
11	0.2820	22.03	QP	0.10	-10.00	0.20	32.33	60.76	-28.43
12	0.2820	11.72	AVG	0.10	-10.00	0.20	22.02	50.76	-28.74

Note:We had tested different mode Low/Mid/High channel,and only show worse case (GFSK Low channel) in the r eport.

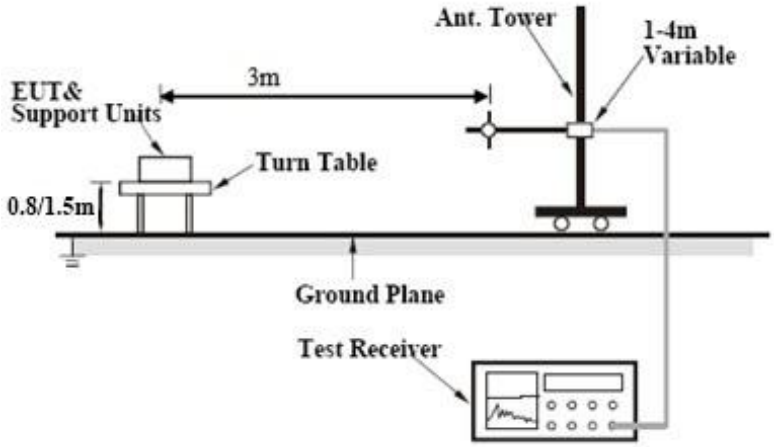
6.9 Radiated Emissions

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	November 6, 2017
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.205, §15.209, §15.247(d)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges **Class A Limit** Frequency range (MHz) / Field Strength (μV/m) 30 – 88 / 90 88 – 216 / 150 216 – 960 / 210 Above 960 / 300 **Class B Limit** Frequency range (MHz) / Field Strength (μV/m) 30 – 88 / 100 88 – 216 / 150 216 – 960 / 200 Above 960 / 500	☑

Test Setup



Procedure

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz.
   The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz

	with Peak detection for Average Measurement as below at frequency above 1GHz. 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	We test 3 modulations, only show GFSK test data in the report.
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Data sample

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBμV/m)		(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(cm)	(°)

Frequency (MHz) = Emission frequency in MHz

Reading (dBμV/m) = Receiver Reading Value

Detector= Peak Detector or Quasi Peak Detector

Ant_F=Antenna Factor

PA_G=Pre-Amplifier Gain

Cab_L=Cable Loss

Result (dBμV/m) = Read ing Value + Corrected Value

Limit (dBμV/m) = Limit stated in standard

Height (cm) = Height of Receiver antenna

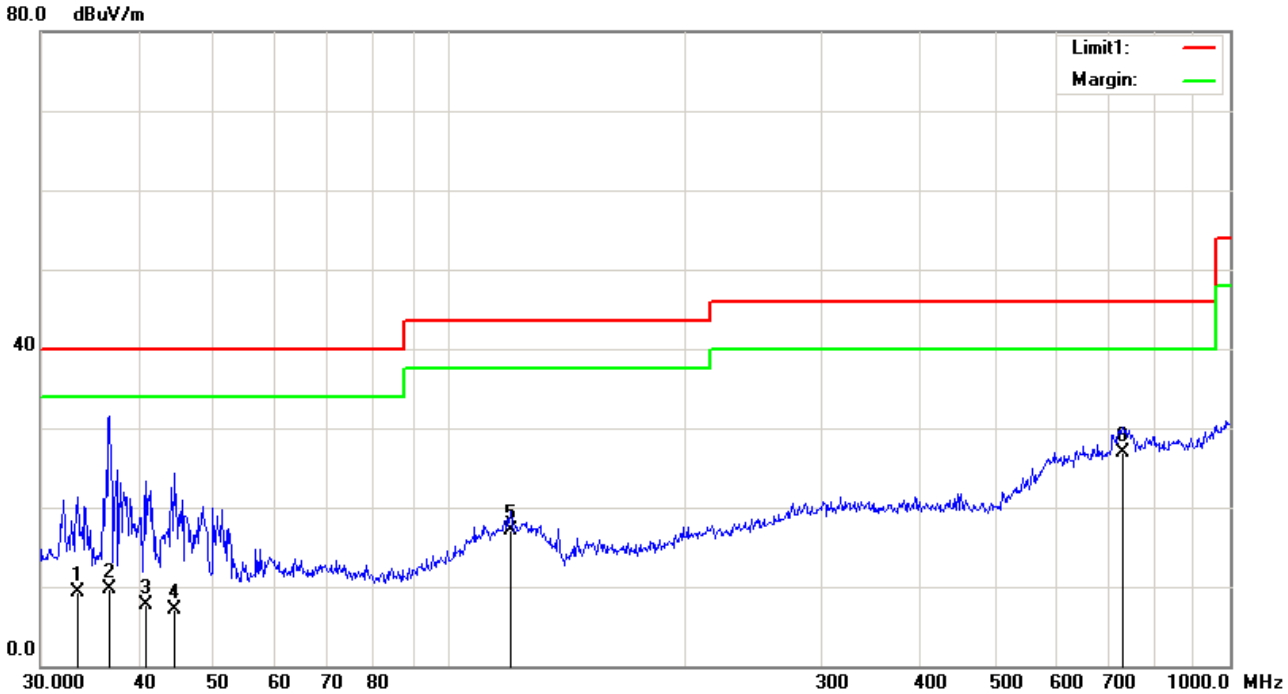
Degree = Turn table degree

Calculation Formula:

Margin (dB) = Result (dBμV/m) – limit (dBμV/m)

Test Mode:	Transmitting BT Mode (GFSK-Low Channel)

Below 1GHz



Test Data

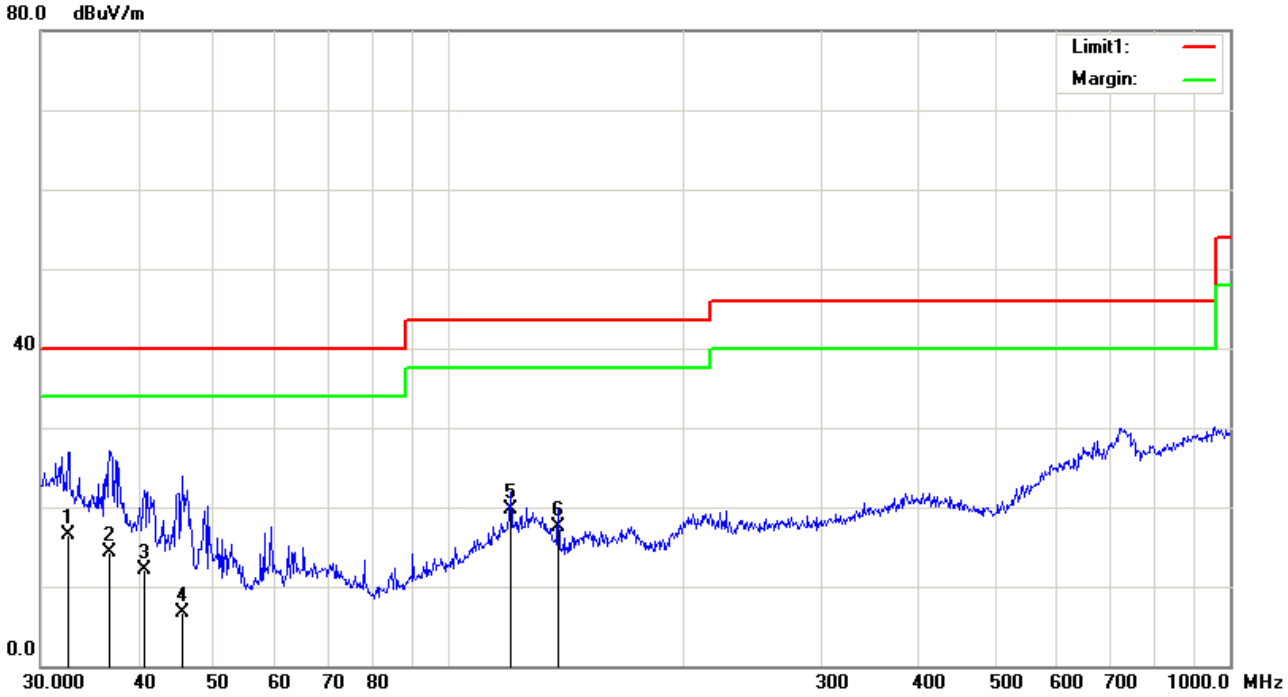
Horizontal Polarity Plot @3m

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	33.4449	42.00	QP	12.12	45.65	0.93	9.40	40.00	-30.60	300	1
2	36.7662	42.83	QP	11.53	45.65	0.99	9.70	40.00	-30.30	300	64
3	40.8446	41.52	QP	10.86	45.75	1.07	7.70	40.00	-32.30	300	59
4	44.4308	41.55	QP	10.48	45.97	1.14	7.20	40.00	-32.80	200	241
5	119.8556	45.85	QP	16.03	46.56	1.78	17.10	43.50	-26.40	200	19
6	729.3583	45.44	QP	22.58	45.46	4.34	26.90	46.00	-19.10	300	292

Note:We had tested different mode Low/Mid/High channel,and only show worse case (GFSK Low channel) in the r eport.

Test Mode:	Transmitting BT Mode (GFSK-Low Channel)

Below 1GHz



Vertical Polarity Plot @3m

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	32.5198	41.21	QP	20.13	45.66	0.92	16.60	40.00	-23.40	100	309
2	36.7662	41.30	QP	17.66	45.65	0.99	14.30	40.00	-25.70	100	82
3	40.7016	41.47	QP	15.31	45.74	1.06	12.10	40.00	-27.90	100	160
4	45.5348	39.64	QP	12.06	46.06	1.16	6.80	40.00	-33.20	100	32
5	119.8556	48.67	QP	15.81	46.56	1.78	19.70	43.50	-23.80	100	232
6	137.9029	50.20	QP	13.26	47.82	1.96	17.60	43.50	-25.90	100	150

Note:We had tested different mode Low/Mid/High channel,and only show worse case (GFSK Low channel) in the r eport.

Test Mode:	Transmitting BT Mode (GFSK - Low Channel)

Above 1GHz
Low Channel
Horizontal

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	1865.000	66.81	peak	30.52	51.60	3.99	49.72	74.00	-24.28	200	151
2	2135.000	62.74	peak	31.38	52.35	4.12	45.89	74.00	-28.11	100	344
3	2590.000	61.81	peak	31.59	52.67	4.12	44.85	74.00	-29.15	100	290
4	3895.000	57.27	peak	31.44	52.96	5.50	41.25	74.00	-32.75	100	355
5	4565.000	56.25	peak	32.64	52.27	6.05	42.67	74.00	-31.33	100	214
6	4804.000	63.61	peak	33.39	53.79	5.96	49.17	74.00	-24.83	100	201

Vertical

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	1905.000	67.20	peak	30.75	51.79	3.98	50.14	74.00	-23.86	200	343
2	2130.000	63.31	peak	31.38	52.34	4.12	46.47	74.00	-27.53	100	290
3	2595.000	62.29	peak	31.59	52.67	4.13	45.34	74.00	-28.66	200	48
4	4045.000	58.14	peak	31.50	52.89	5.99	42.74	74.00	-31.26	200	358
5	4510.000	56.61	peak	32.52	52.02	5.87	42.98	74.00	-31.02	100	173
6	4804.000	60.79	peak	33.28	53.56	6.03	46.54	74.00	-27.46	100	145

Note:We had tested different mode Low/Mid/High channel,and only show worse case (GFSK Low channel) in the r eport.

Test Mode:	Transmitting BT Mode (GFSK - Mid Channel)

Mid Channel

Horizontal

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	1510.000	61.63	peak	28.46	49.91	3.43	43.61	74.00	-30.39	200	193
2	1865.000	64.39	peak	30.52	51.60	3.99	47.30	74.00	-26.70	200	13
3	2135.000	61.44	peak	31.38	52.35	4.12	44.59	74.00	-29.41	100	304
4	2590.000	60.57	peak	31.59	52.67	4.12	43.61	74.00	-30.39	100	66
5	4325.000	56.71	peak	32.12	52.33	5.92	42.42	74.00	-31.58	100	131
6	4882.000	62.61	peak	33.30	53.61	6.02	48.32	74.00	-25.68	100	166

Vertical

No.	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	1860.000	66.45	peak	30.49	51.57	4.00	49.37	74.00	-24.63	200	160
2	2130.000	61.52	peak	31.38	52.34	4.12	44.68	74.00	-29.32	200	255
3	2305.000	61.24	peak	31.48	52.48	4.10	44.34	74.00	-29.66	200	184
4	3000.000	58.96	peak	31.55	52.81	4.44	42.14	74.00	-31.86	200	318
5	4305.000	57.85	peak	32.07	52.37	5.95	43.50	74.00	-30.50	200	288
6	4882.000	60.89	peak	33.23	53.45	6.07	46.74	74.00	-27.26	200	154

Note:We had tested different mode Low/Mid/High channel,and only show worse case (GFSK Mid channel) in the re port.

Test Mode:	Transmitting BT Mode (GFSK -High Channel)

High Channel

Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1865.000	64.69	peak	30.52	51.60	3.99	47.60	74.00	-26.40	100	17
2	2130.000	61.95	peak	31.38	52.34	4.12	45.11	74.00	-28.89	100	312
3	2590.000	60.94	peak	31.59	52.67	4.12	43.98	74.00	-30.02	200	57
4	2960.000	59.18	peak	31.55	52.80	4.40	42.33	74.00	-31.67	100	359
5	4065.000	57.59	peak	31.54	52.85	6.00	42.28	74.00	-31.72	200	109
6	4960.000	62.58	peak	33.23	53.45	6.07	48.43	74.00	-25.57	100	169

Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1865.000	65.00	peak	30.52	51.60	3.99	47.91	74.00	-26.09	200	137
2	2130.000	61.87	peak	31.38	52.34	4.12	45.03	74.00	-28.97	100	130
3	2590.000	62.01	peak	31.59	52.67	4.12	45.05	74.00	-28.95	200	156
4	3155.000	58.73	peak	31.57	52.83	4.69	42.16	74.00	-31.84	200	254
5	4690.000	58.07	peak	32.92	52.83	6.14	44.30	74.00	-29.70	200	83
6	4960.000	59.78	peak	33.36	53.72	5.98	45.40	74.00	-28.60	200	156

Note:We had tested different mode Low/Mid/High channel,and only show worse case (GFSK High channel) in the r eport.

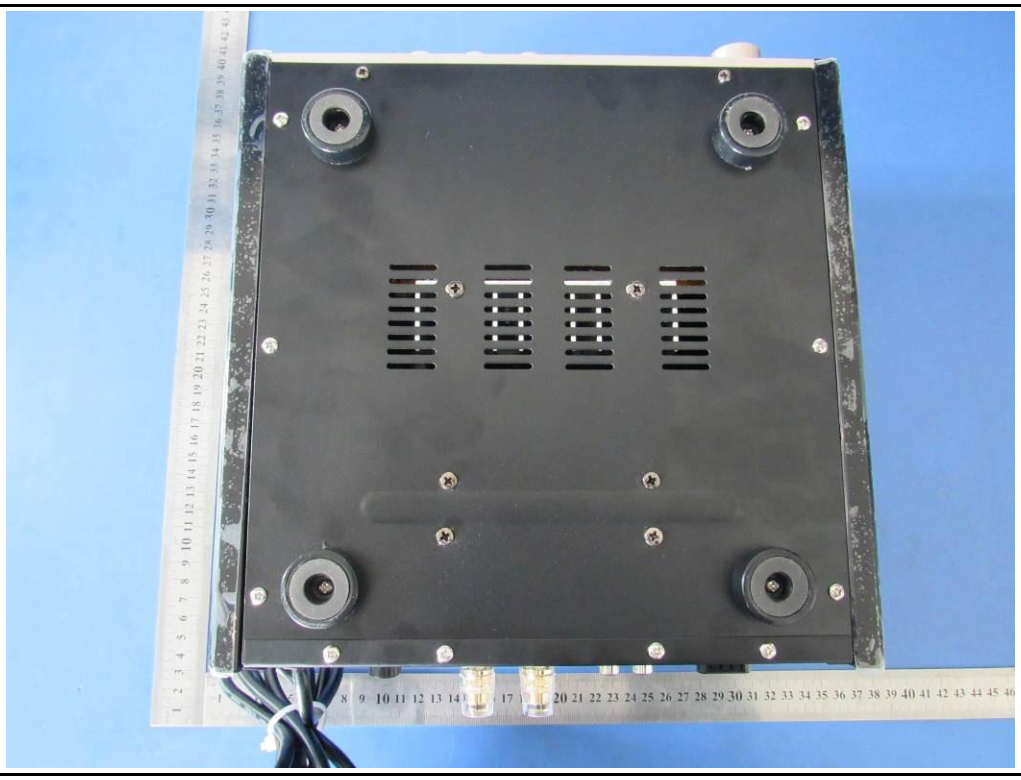
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
R&S EMI Test Receiver	ESPI3	101216	05/03/2017	05/02/2018	☒
V-LISN	ESH3-Z5	838979/005	03/30/2017	03/29/2018	☒
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/08/2016	10/07/2017	☒
SIEMIC EZ_EMC Conducted Emissions	Ver.ICP-03A1	N/A	N/A	N/A	☒
RF conducted test					
R&S EMI Receiver	ESPI3	101216	05/03/2017	05/02/2018	☒
Power Splitter	1#	1#	02/02/2017	02/01/2018	☒
Spectrum Analyzer	N9010A	MY47191130	03/30/2017	03/29/2018	☒
Temperature/Humidity Chamber	1007H	N/A	01/07/2017	01/06/2018	☒
Radiated Emissions					
Spectrum Analyzer	N9010A	MY47191130	05/03/2017	05/02/2018	☒
R&S EMI Receiver	ESPI3	101216	05/03/2017	05/02/2018	☒
Antenna (30MHz~6GHz)	JB6	A121411	10/31/2017	10/30/2018	☒
EMCO Horn Antenna (1 ~18GHz)	3115	N/A	11/15/2016	11/14/2017	☒
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/08/2016	10/07/2017	☒
			10/07/2017	10/06/2018	
Horn Antenna (18~40GHz)	AH-840	101013	04/30/2017	04/29/2018	N/A
Microwave Pre-Amp (18~40GHz)	PA-840	181250	05/28/2017	05/27/2018	N/A
Hp Pre-Amplifier	8447F	1937A01160	10/30/2017	10/29/2018	☒
Agilent Pre-Amplifier	8447B	N/A	10/30/2017	10/29/2018	☒
MITEQ Pre-Amplifier (0.1 ~ 18GHz)	AMF-7D-00101800-	1451709	10/26/2017	10/25/2018	☒
SIEMIC Labview Radiated Emissions software	V1.0	N/A	N/A	N/A	☒

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

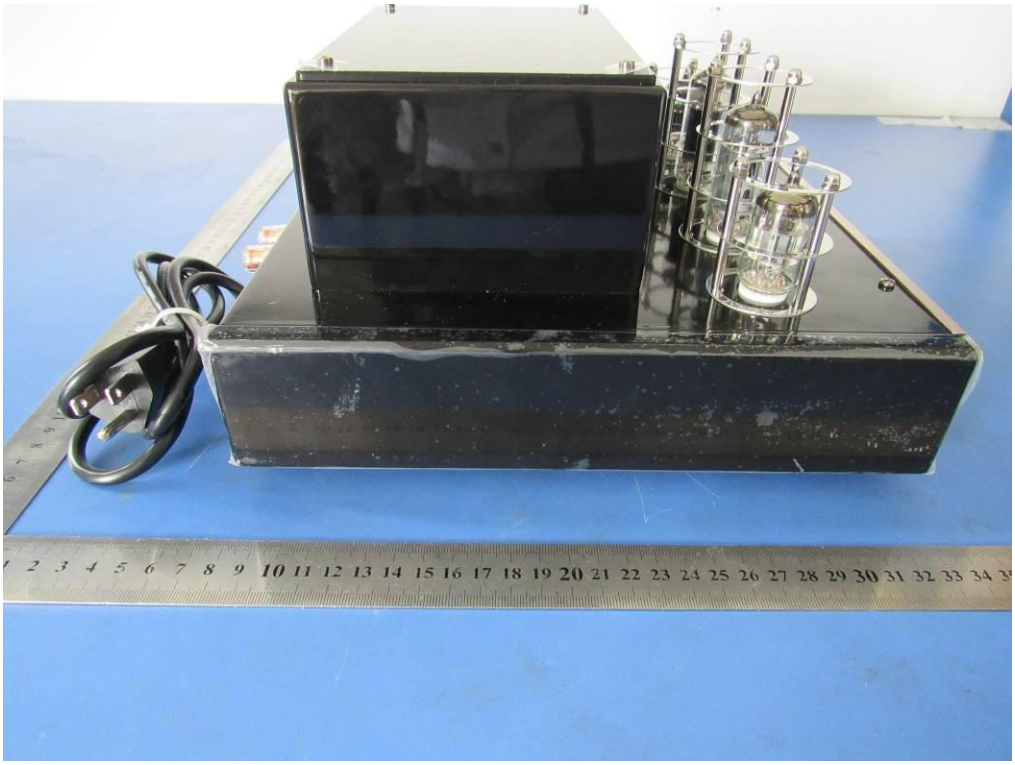
EUT - Top View



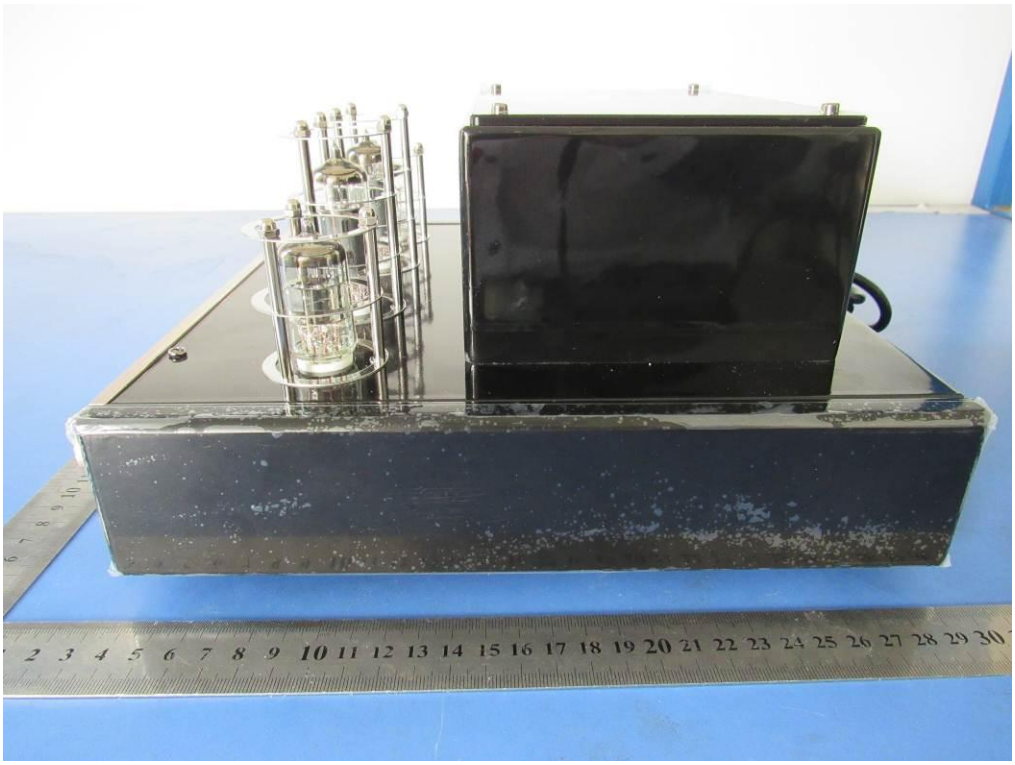
EUT - Bottom View

EUT - Front View

EUT - Rear View

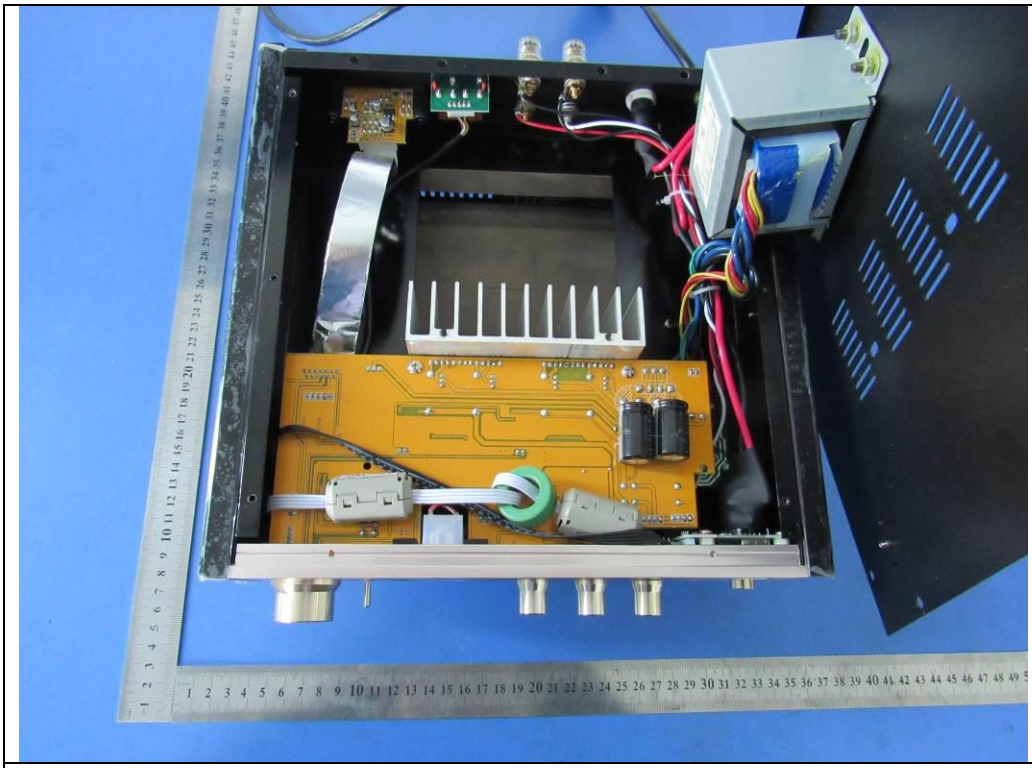


EUT - Left View

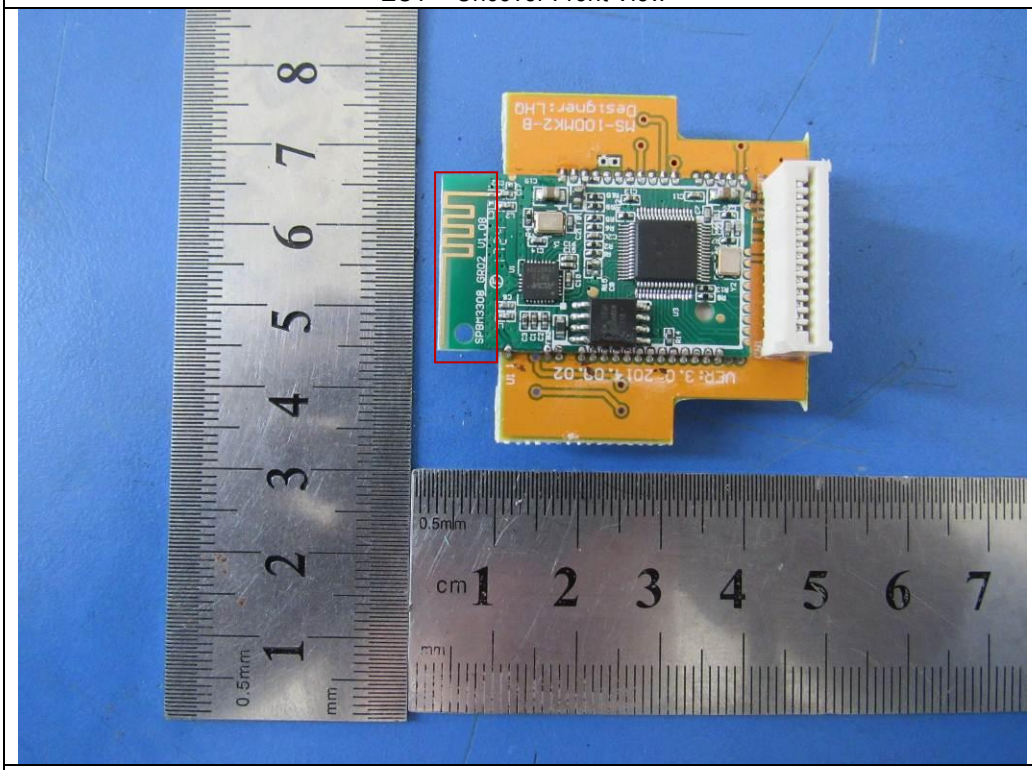


EUT - Right View

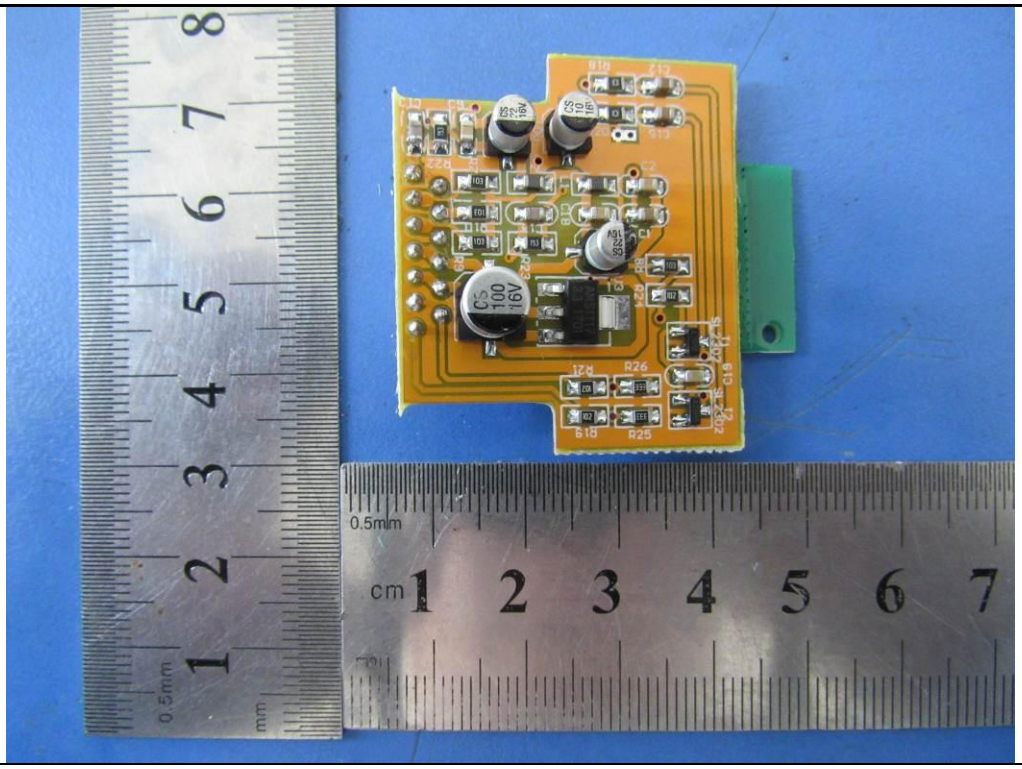
Annex B.ii. Photograph: EUT Internal Photo



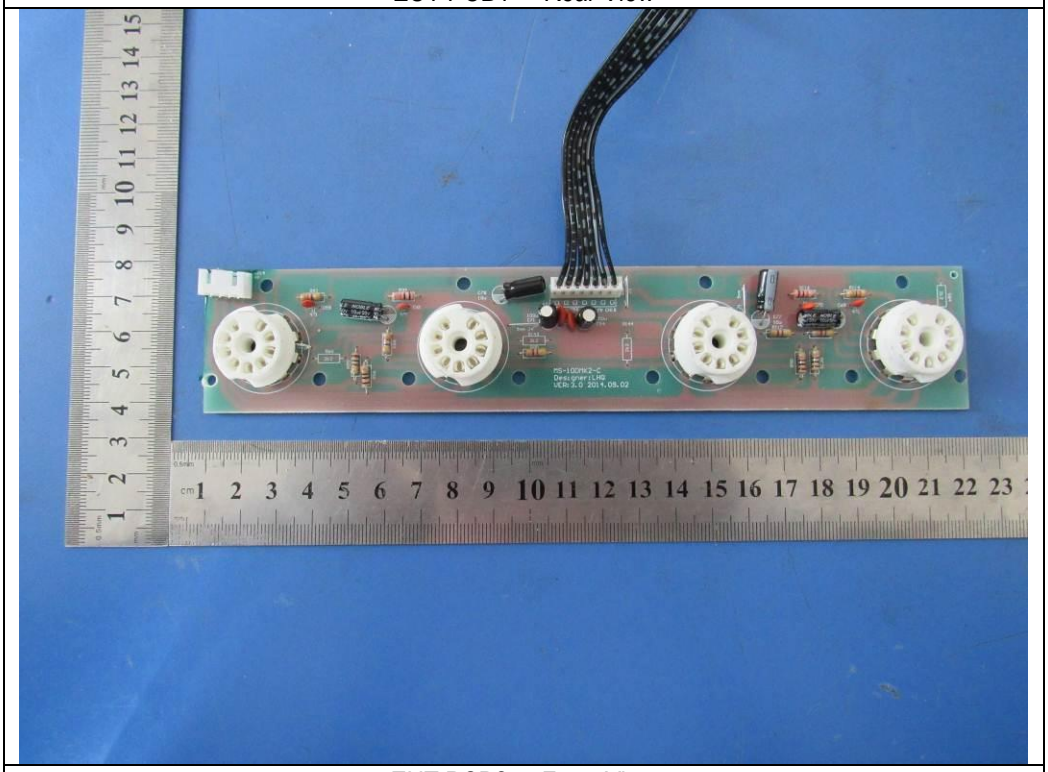
EUT – Uncover Front View



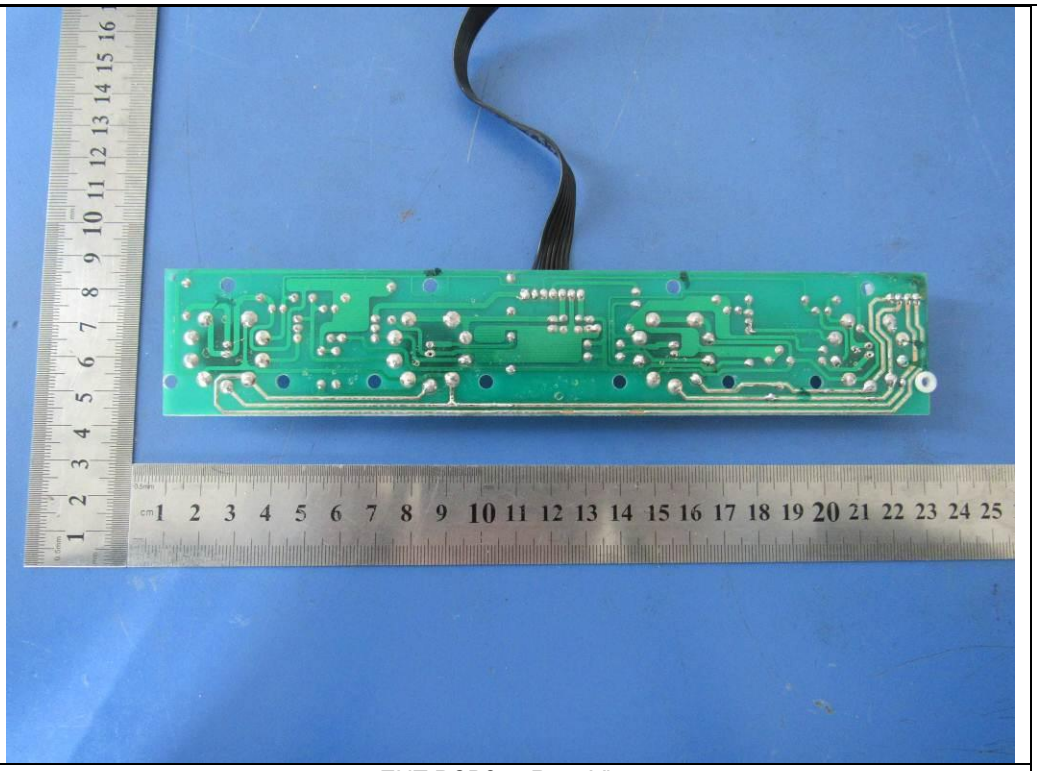
EUT PCB1 – Front View



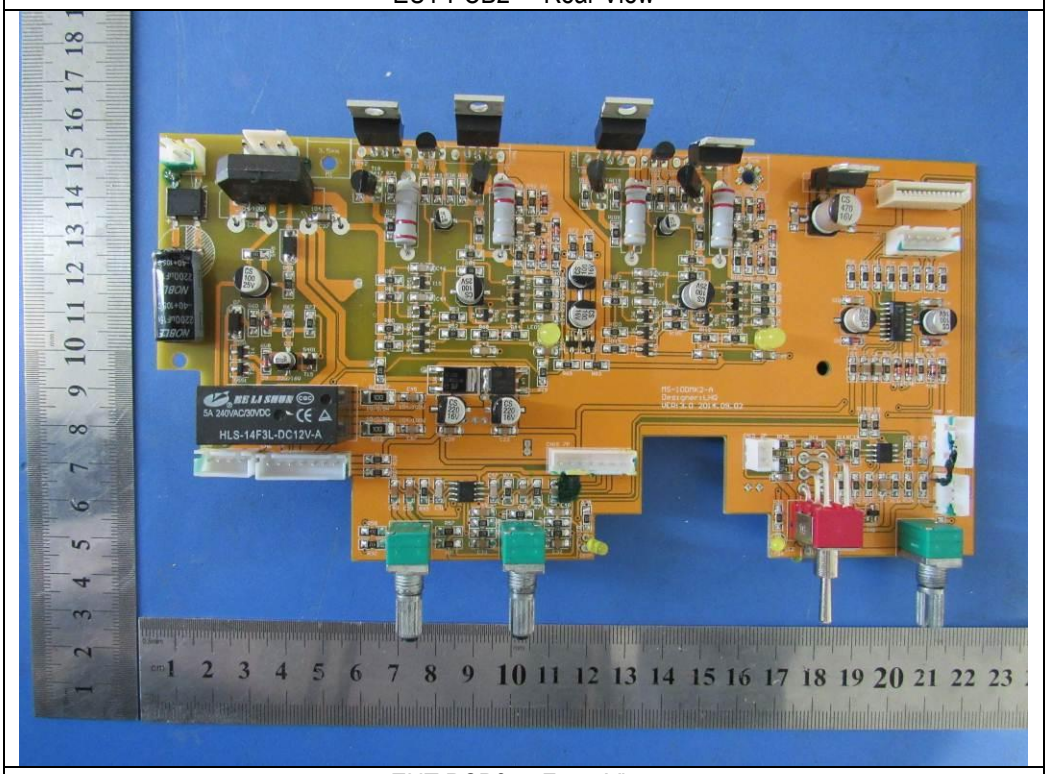
EUT PCB1 – Rear View



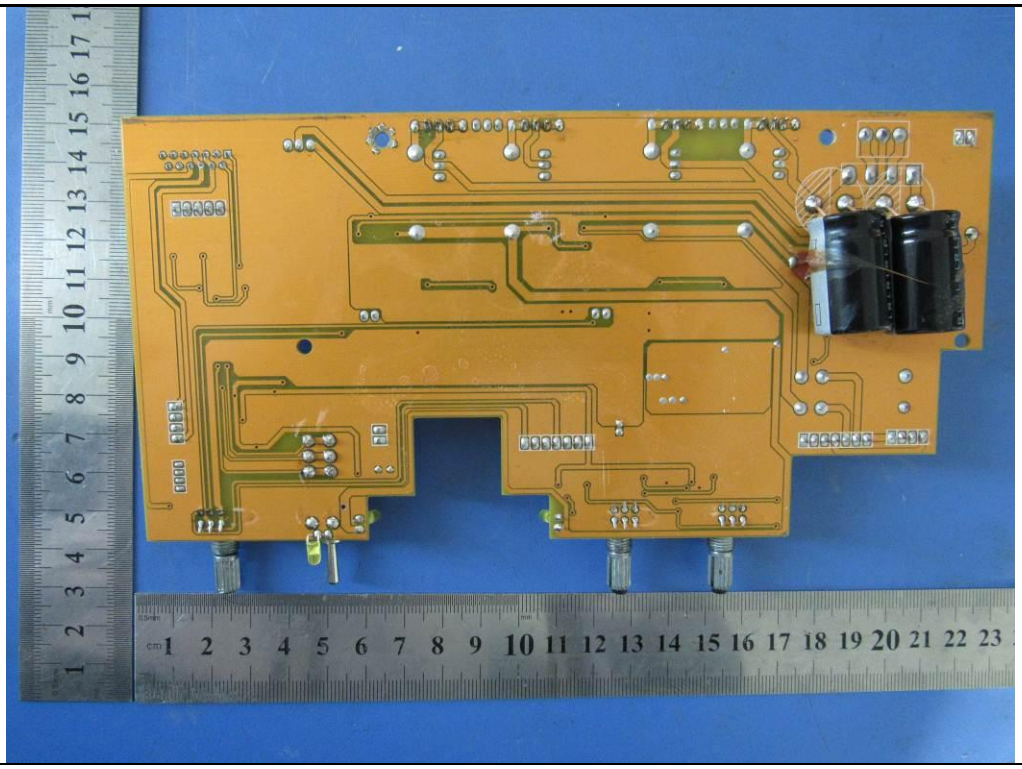
EUT PCB2 – Front View



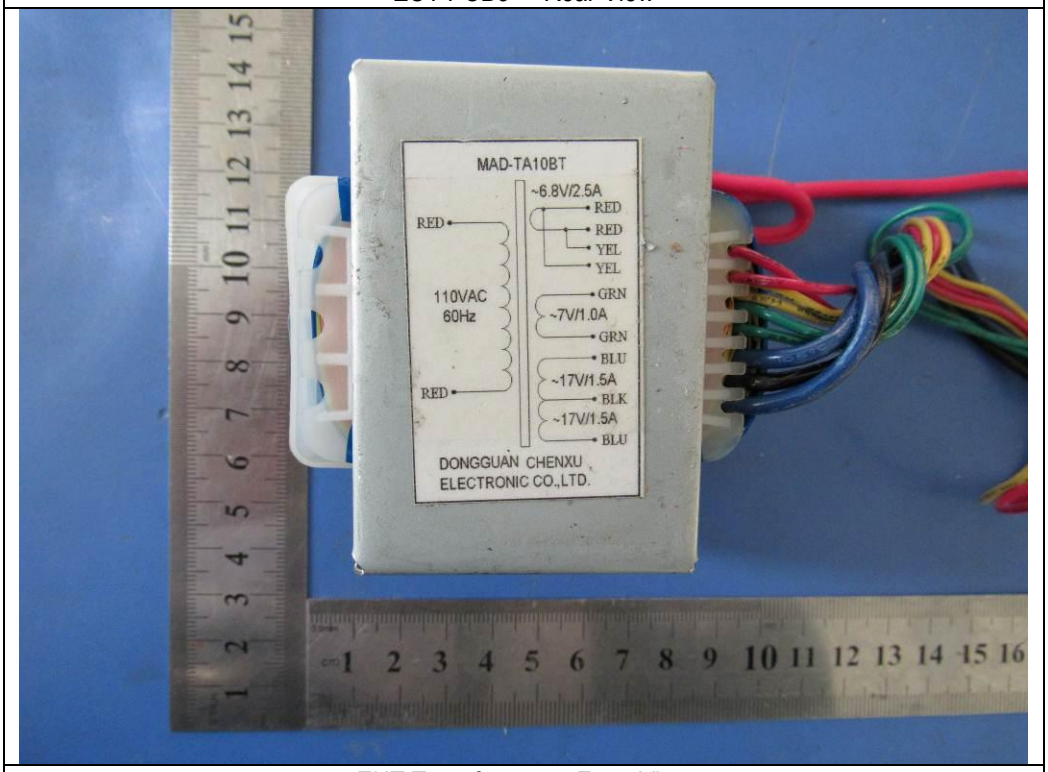
EUT PCB2 – Rear View



EUT PCB3 – Front View



EUT PCB3 – Rear View

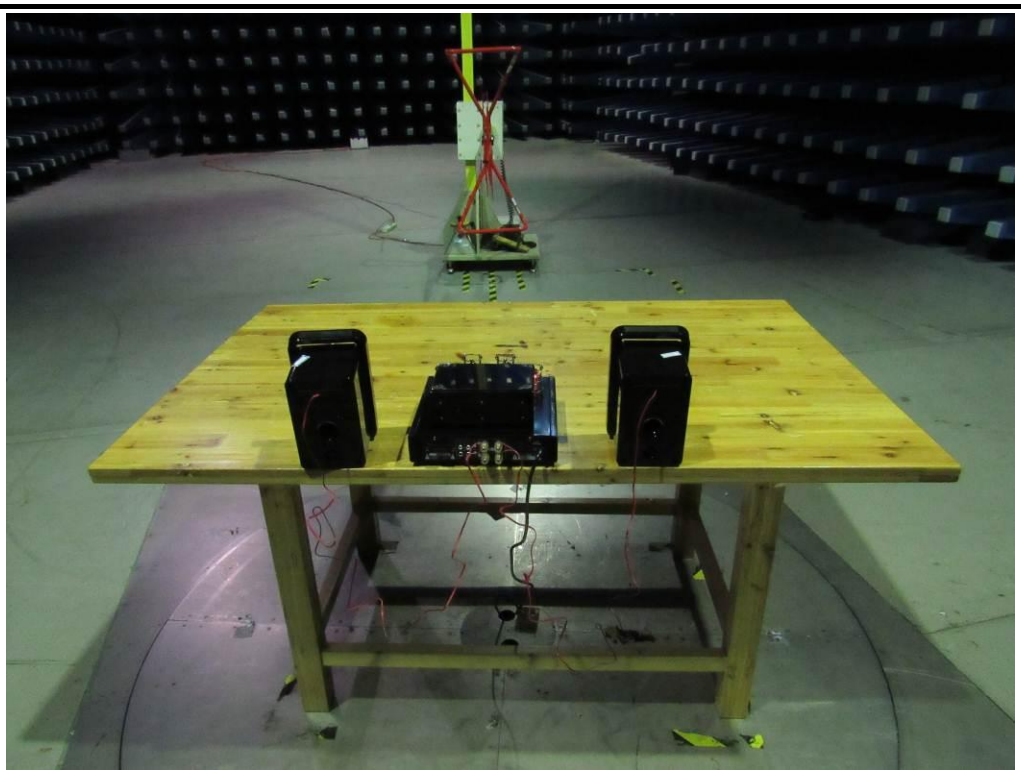


EUT Transformer – Front View

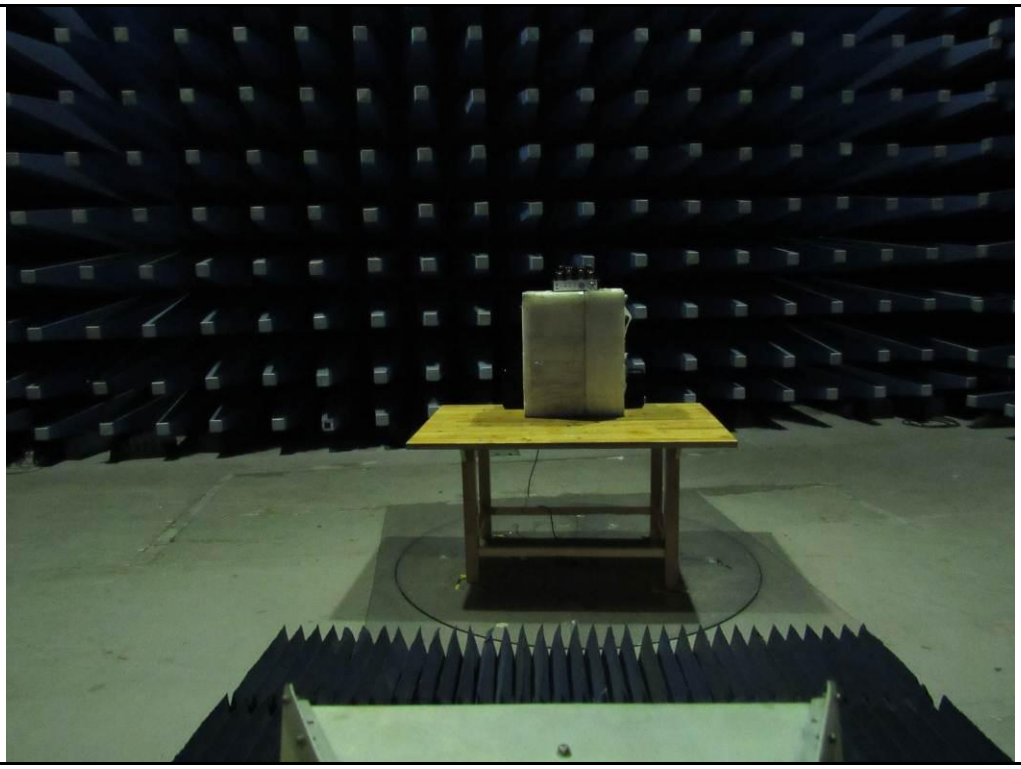
Annex B.iii. Photograph: Test Setup Photo

Conducted Emissions Test Setup Front View

Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 1GHz

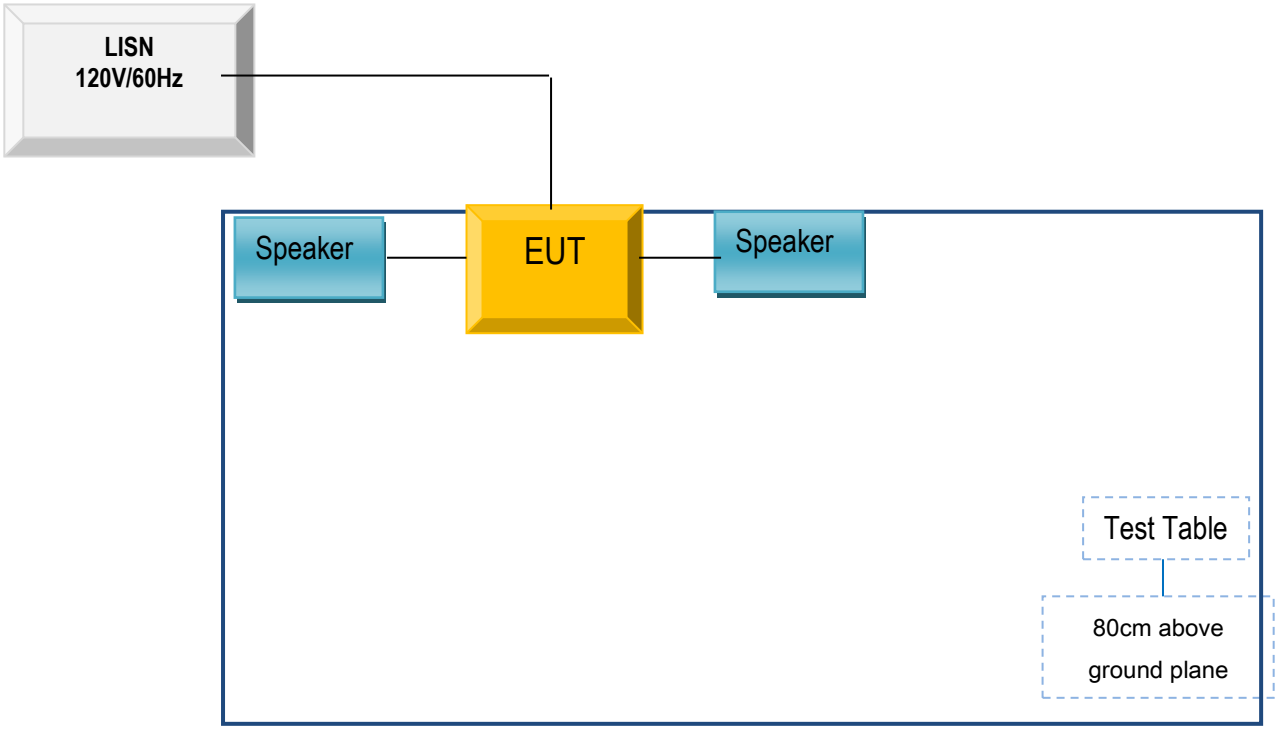


Radiated Spurious Emissions Test Setup Above 1GHz

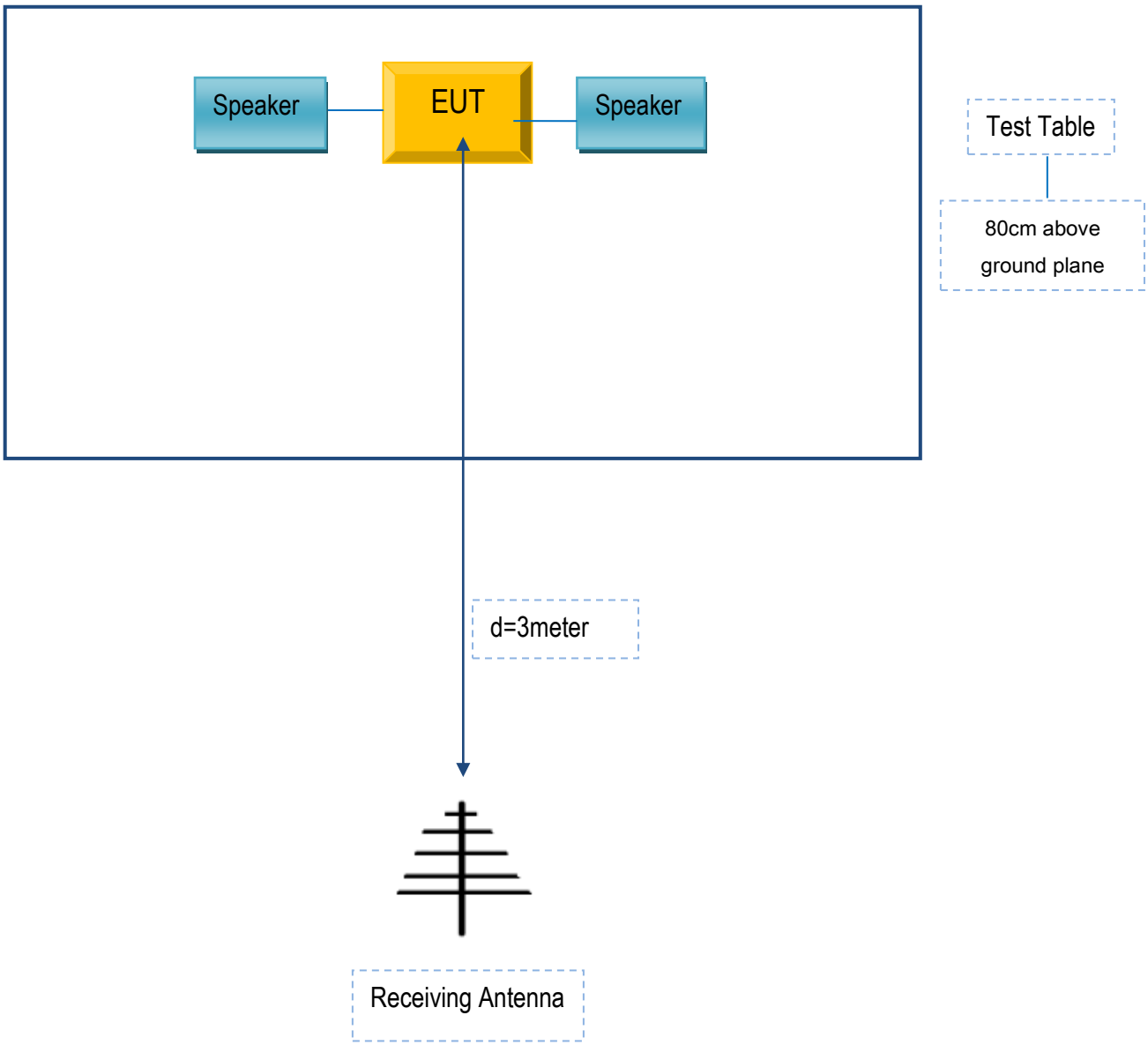
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Serial No
ILIVE	Speaker	N/A	N/A

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

Annex E. DECLARATION OF SIMILARITY

N/A