RF TEST REPORT

Report No.: 18020308-FCC-R1
Supersede Report No.: N/A

Applicant	Shenzhen Shuaixian Electronic Equipment Co., Ltd.
Product Name	Bluetooth Earphones
Model No.	SX-888
Serial No.	SX-888A,SX-888B,SX-888C
Test Standard	FCC Part 15.247: 2017, ANSI C63.10: 2013
Test Date	March 26 to March 29, 2018
Issue Date	April 02, 2018
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
18020308-FCC-R1	NONE	Original	April 02, 2018

2. Customer information

Applicant Name	Shenzhen Shuaixian Electronic Equipment Co., Ltd.
Applicant Add	No.10 Lane 3, Longxing Rd., Dakang Long Village, Henggang Town,Longgang Dist., Shenzhen, China
Manufacturer	Shenzhen Shuaixian Electronic Equipment Co., Ltd.
Manufacturer Add	No.10 Lane 3, Longxing Rd., Dakang Long Village, Henggang Town,Longgang Dist., Shenzhen, China

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:	Bluetooth Earphones
Main Model:	SX-888
Serial Model:	SX-888A,SX-888B,SX-888C
Date EUT received:	March 19, 2018
Test Date(s):	March 26 to March 29, 2018
Antenna Gain:	Bluetooth: -0.5 dBi
Type of Modulation:	Bluetooth: GFSK, π/4DQPSK, 8DPSK
RF Operating Frequency (ies):	Bluetooth: 2402-2480 MHz
Max. Output Power:	0.827 dBm
Number of Channels:	Bluetooth: 79CH
Port:	USB Port
Input Power:	DC:3.3-4.2V Battery: 16mAh 0.592Wh 3.7V
Trade Name :	N/A
FCC ID:	UHB-SX-888

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 -0.5 dBi for Bluetooth.

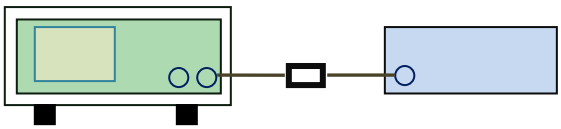
Antenna must be permanently attached to the unit ,it meets up with the ANTENNA REQUIREMENT.

Result: Compliant.

6.2 Channel Separation

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 26, 2018
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

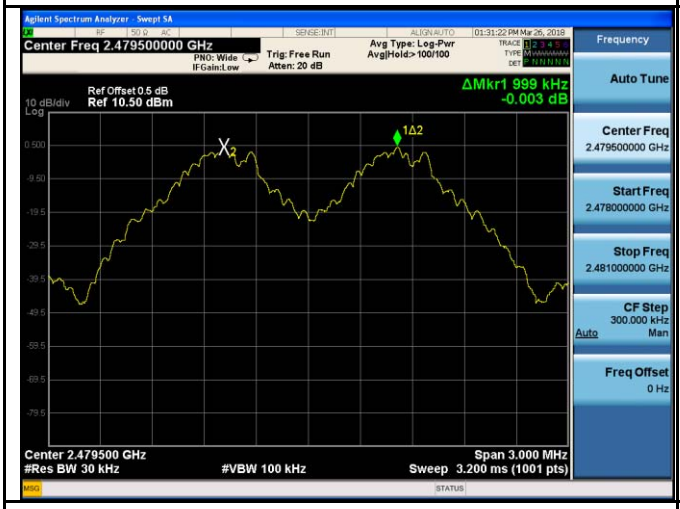
Type Modulation	CH	CH Freq (MHz)	CH Separation (MHz)	Limit (MHz)	Result
CH Separation GFSK	Low Channel	2402	0.999	0.9480	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	0.999	0.9408	Pass
	Adjacency Channel	2441			
	High Channel	2480	0.999	0.9338	Pass
	Adjacency Channel	2479			
CH Separation π/4 DQPSK	Low Channel	2402	0.999	0.8407	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.8207	Pass
	Adjacency Channel	2441			
	High Channel	2480	0.999	0.8220	Pass
	Adjacency Channel	2479			
CH Separation 8DPSK	Low Channel	2402	0.999	0.8533	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.8420	Pass
	Adjacency Channel	2441			
	High Channel	2480	0.999	0.8433	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

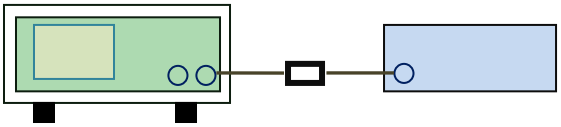
8DPSK - Middle Channel

8DPSK - High Channel

6.3 20dB Bandwidth

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 26, 2018
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

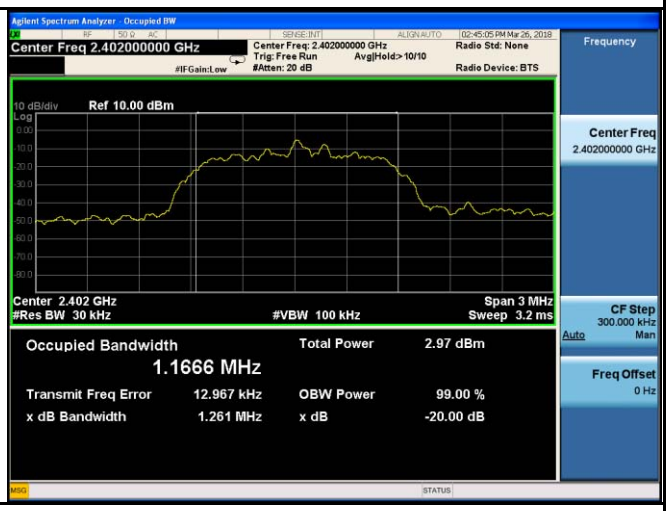
Modulation	CH	CH Freq (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
GFSK	Low	2402	0.9480	0.86051
	Mid	2441	0.9408	0.85186
	High	2480	0.9338	0.85264
π/4 DQPSK	Low	2402	1.261	1.1666
	Mid	2441	1.231	1.1693
	High	2480	1.233	1.1802
8-DPSK	Low	2402	1.280	1.1605
	Mid	2441	1.263	1.1610
	High	2480	1.265	1.1751

Test Plots
20dB Bandwidth measurement result

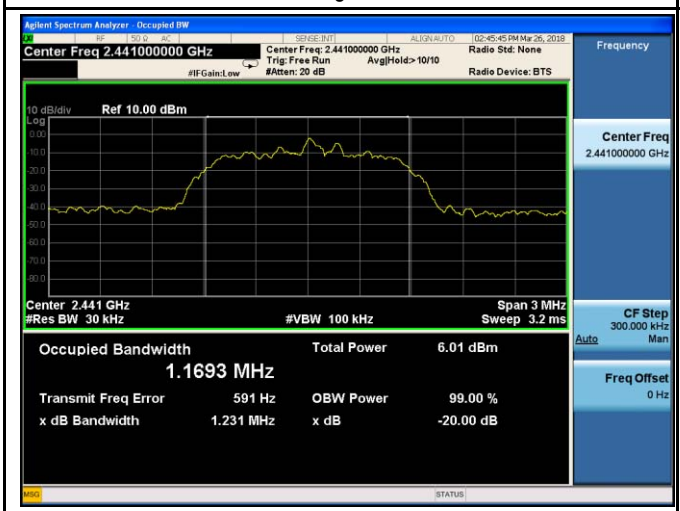
GFSK - Low Channel

GFSK - Middle Channel

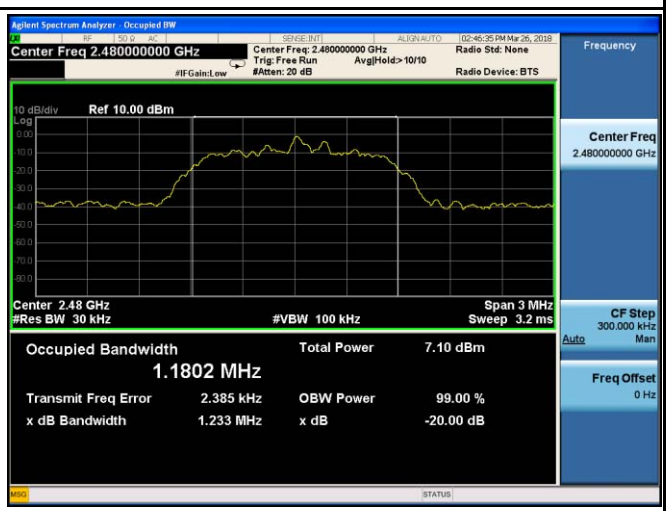
GFSK - High Channel



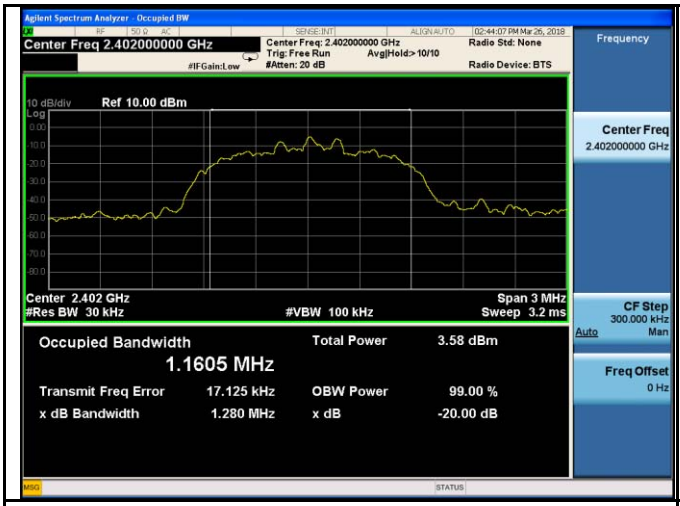
π/4 DQPSK - Low Channel



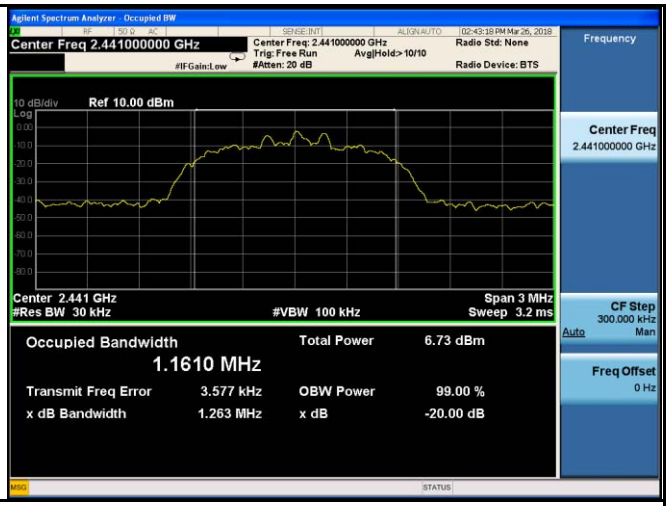
π/4 DQPSK - Middle Channel



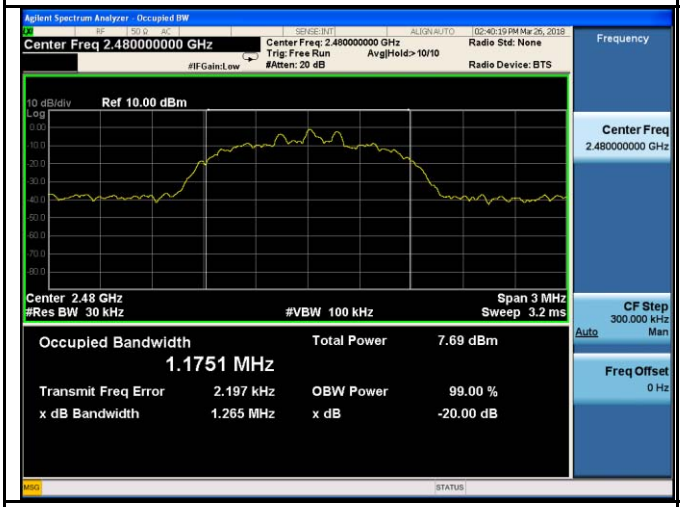
π/4 DQPSK - High Channel



8DPSK - Low Channel



8DPSK - Middle Channel

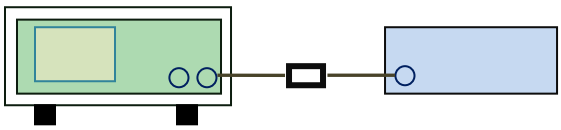


8DPSK - High Channel

6.4 Peak Output Power

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 26, 2018
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

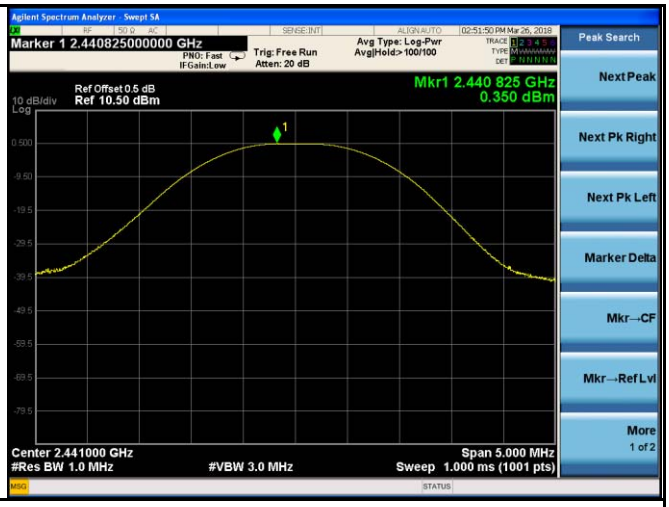
Peak Output Power measurement result

Type	Modulation	CH	Freq (MHz)	Conducted Power (dBm)	Limit (mW)	Result
Output Power	GFSK	Low	2402	-1.169	30	Pass
		Mid	2441	0.350	30	Pass
		High	2480	0.827	30	Pass
	π/4 DQPSK	Low	2402	-3.148	125	Pass
		Mid	2441	-0.507	125	Pass
		High	2480	0.168	125	Pass
	8-DPSK	Low	2402	-2.934	125	Pass
		Mid	2441	-0.310	125	Pass
		High	2480	0.388	125	Pass

Test Plots

Output Power measurement result

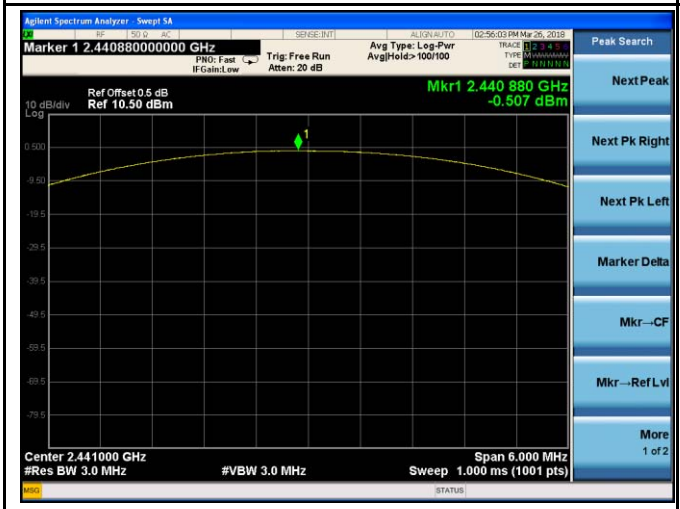
GFSK Output power - Low CH 2402



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

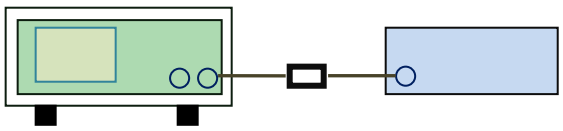
8DPSK Output power - Mid CH 2441

8DPSK Output power - High CH 2480

6.5 Number of Hopping Channel

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 26, 2018
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		

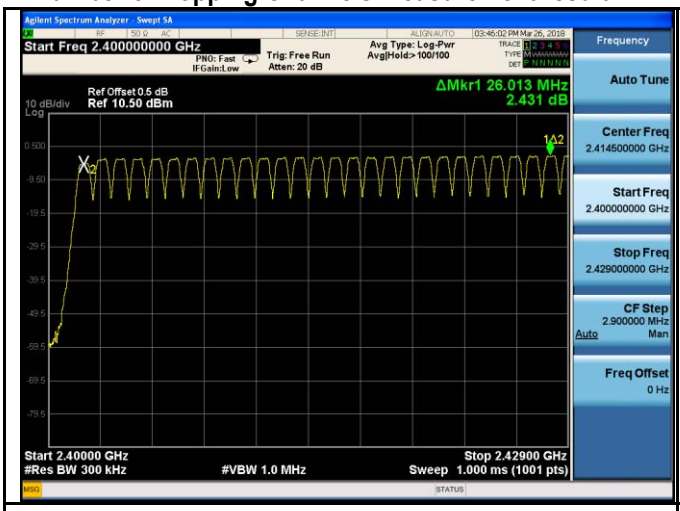
Test Data ☒Yes ☐N/A
Test Plot ☒Yes (See below) ☐N/A

Number of Hopping Channel measurement result

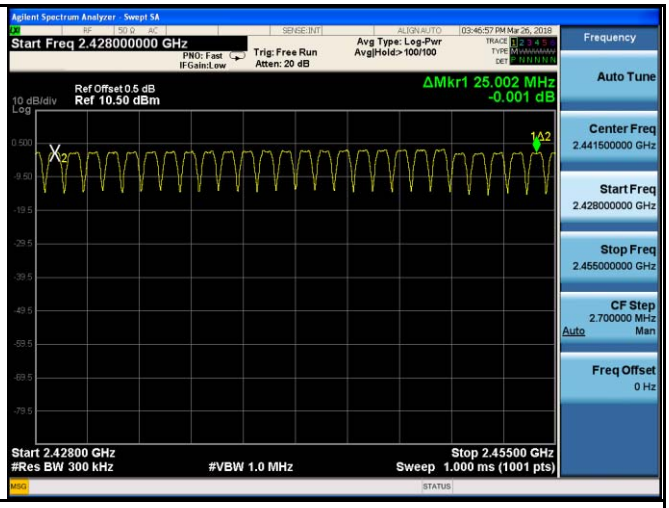
Type	Modulation	Frequency Range	Number of Hopping Channel	Limit
Number of Hopping Channel	GFSK	2400-2483.5	79	15
	π/4 DQPSK	2400-2483.5	79	15
	8-DPSK	2400-2483.5	79	15

Test Plots

Number of Hopping Channels measurement result

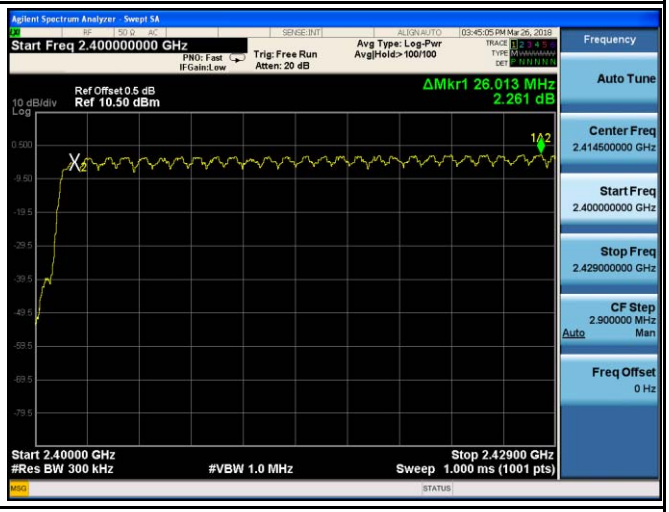


GFSK Number of Hopping Channels - 1

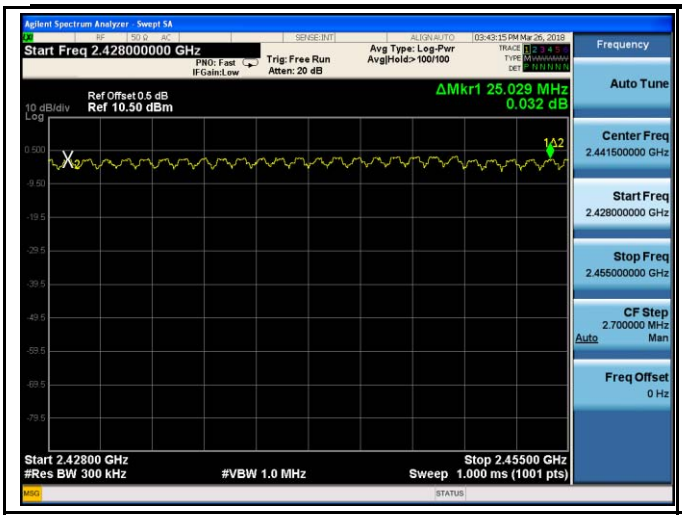


GFSK Number of Hopping Channels -2

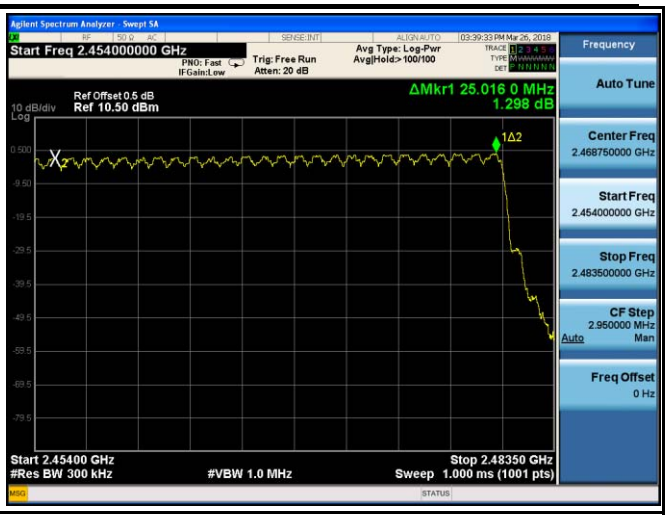
GFSK Number of Hopping Channels – 3



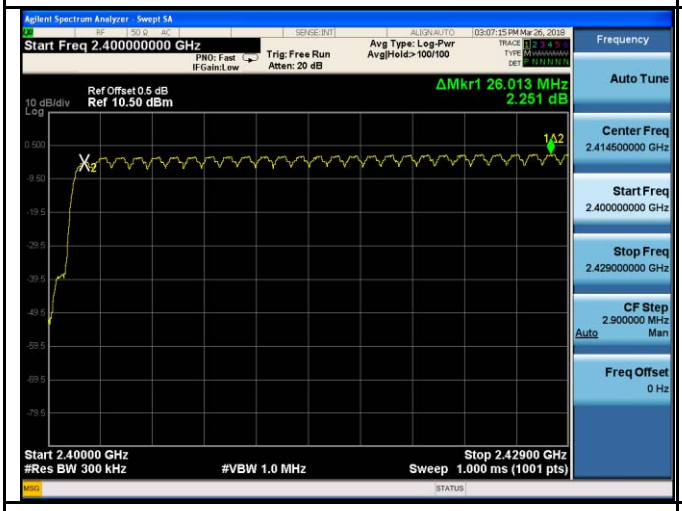
π/4 DQPSK Number of Hopping Channels - 1



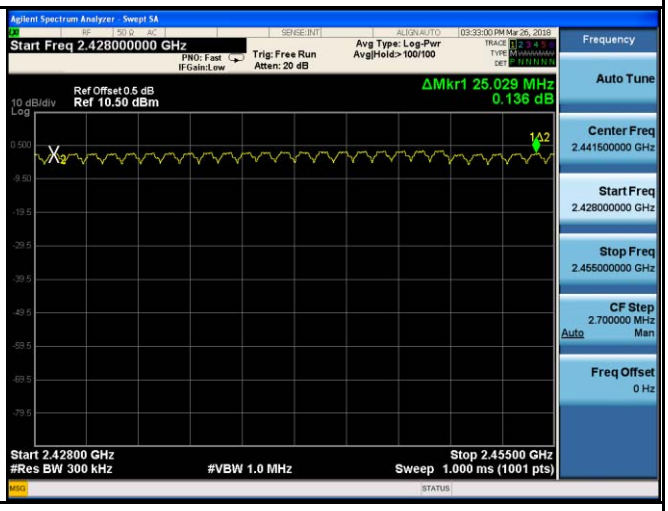
π/4 DQPSK Number of Hopping Channels - 2



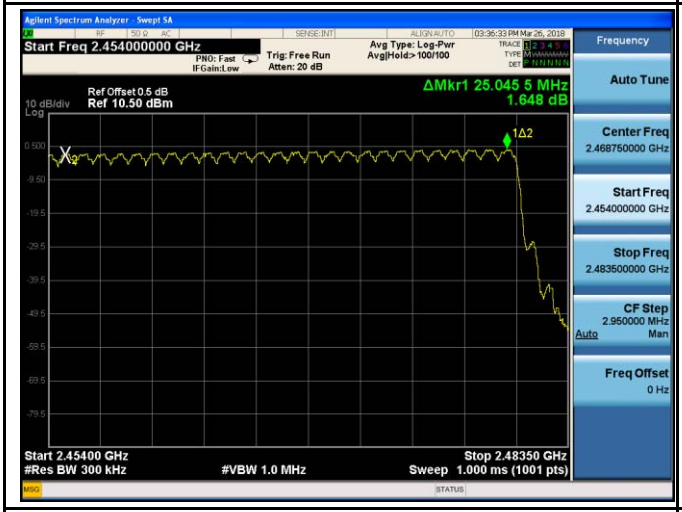
π/4 DQPSK Number of Hopping Channels - 3



8DPSK Number of Hopping Channels - 1



8DPSK Number of Hopping Channels - 2

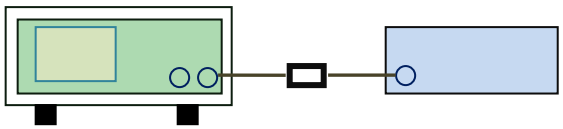


8DPSK Number of Hopping Channels - 3

6.6 Time of Occupancy (Dwell Time)

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 26, 2018
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

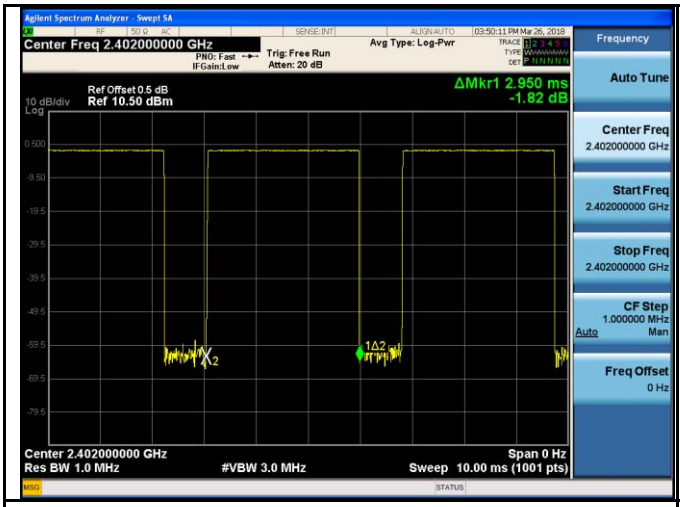
Test Plot ☒Yes (See below) ☐ N/A

Dwell Time measurement result

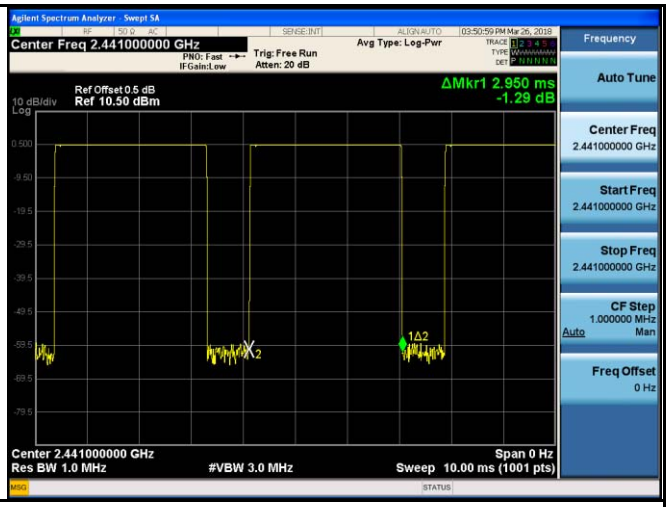
Type	Modulation	CH	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
Dwell Time	GFSK	Low	2.950	314.7	400	Pass
		Mid	2.950	314.7	400	Pass
		High	2.960	315.7	400	Pass
	π/4 DQPSK	Low	2.960	315.7	400	Pass
		Mid	2.960	315.7	400	Pass
		High	2.960	315.7	400	Pass
	8-DPSK	Low	2.970	316.8	400	Pass
		Mid	2.960	315.7	400	Pass
		High	2.970	316.8	400	Pass
Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6						

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

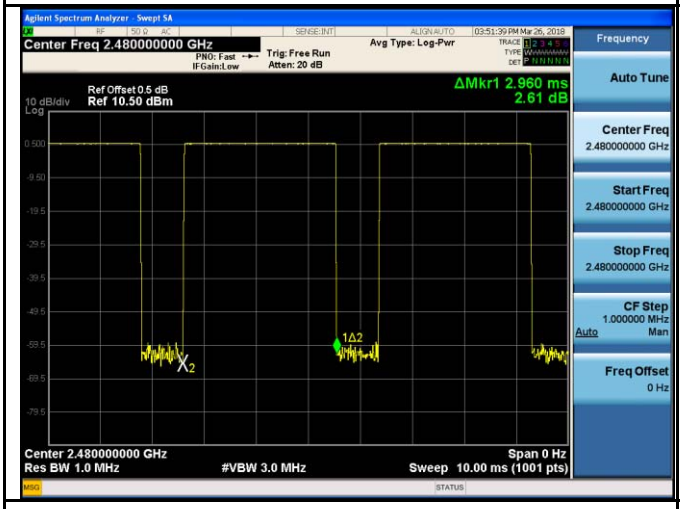
Test Plots
Dwell Time measurement result



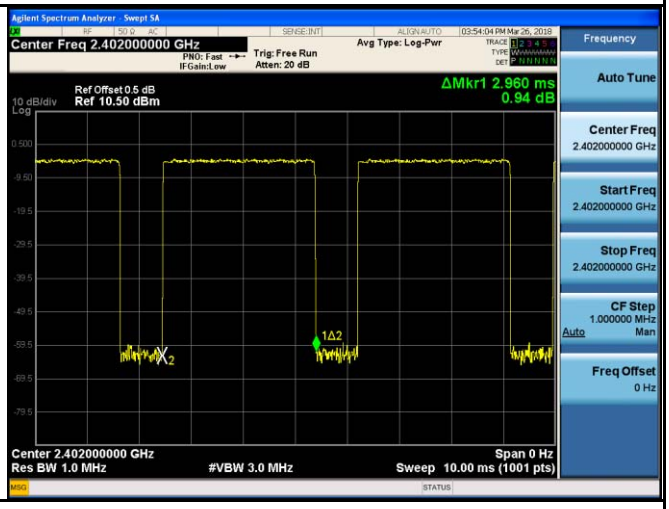
GFSK - Low CH 2402



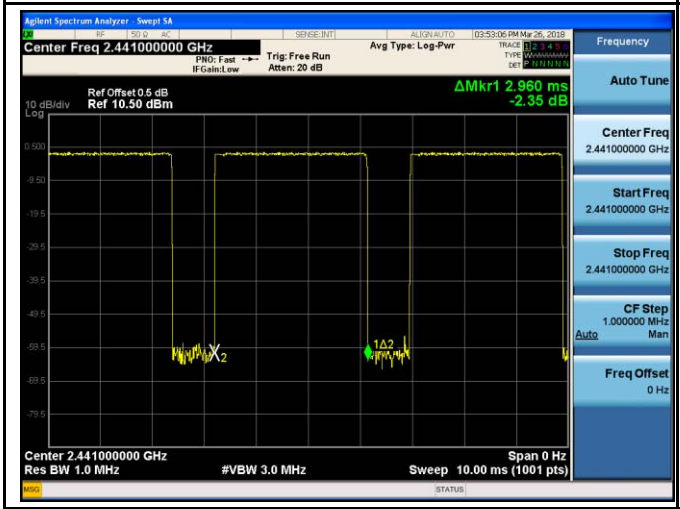
GFSK - Mid CH 2441



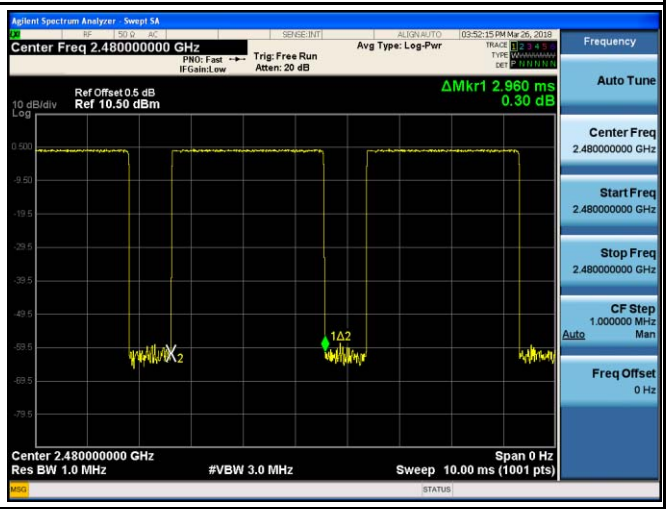
GFSK - High CH 2480



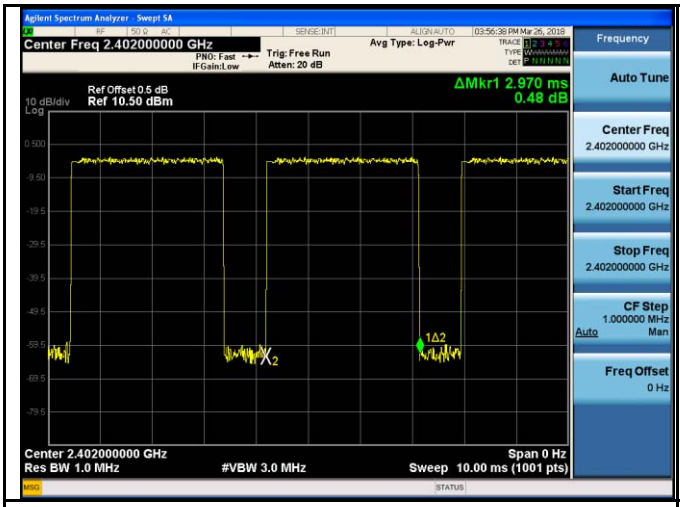
π/4 DQPSK - Low CH 2402



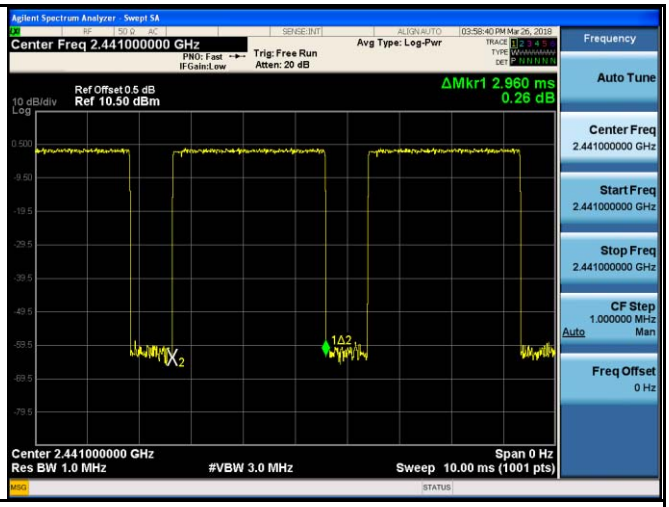
π/4 DQPSK - Mid CH 2441



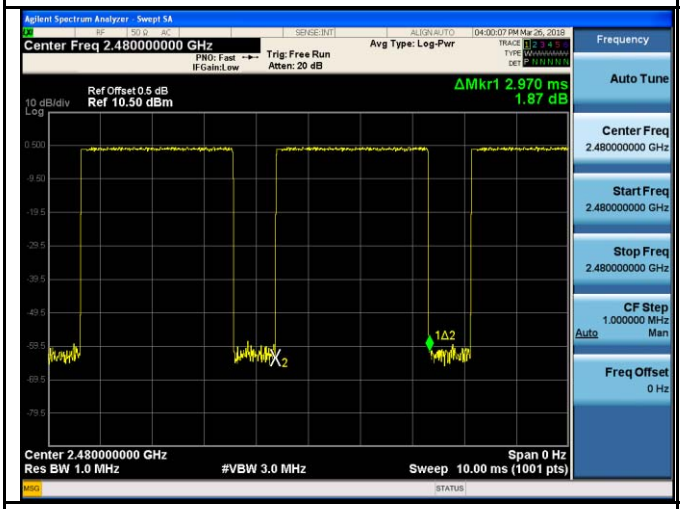
π/4 DQPSK - High CH 2480



8DPSK - Low CH 2402



8DPSK - Mid CH 2441



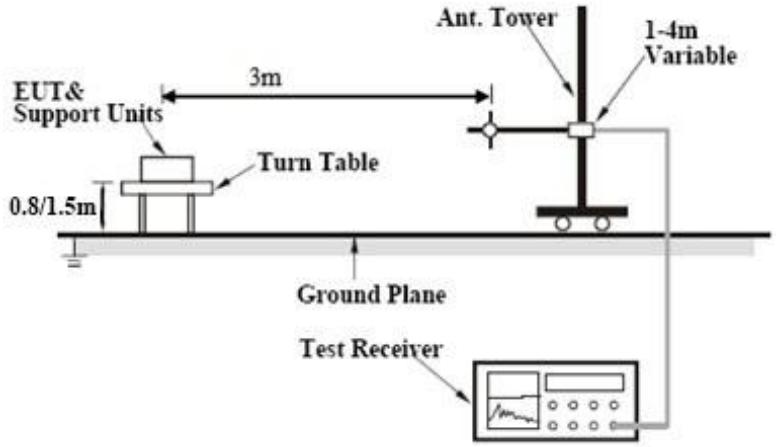
8DPSK - High CH 2480

6.7 Band Edge

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 29, 2018
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.	☒

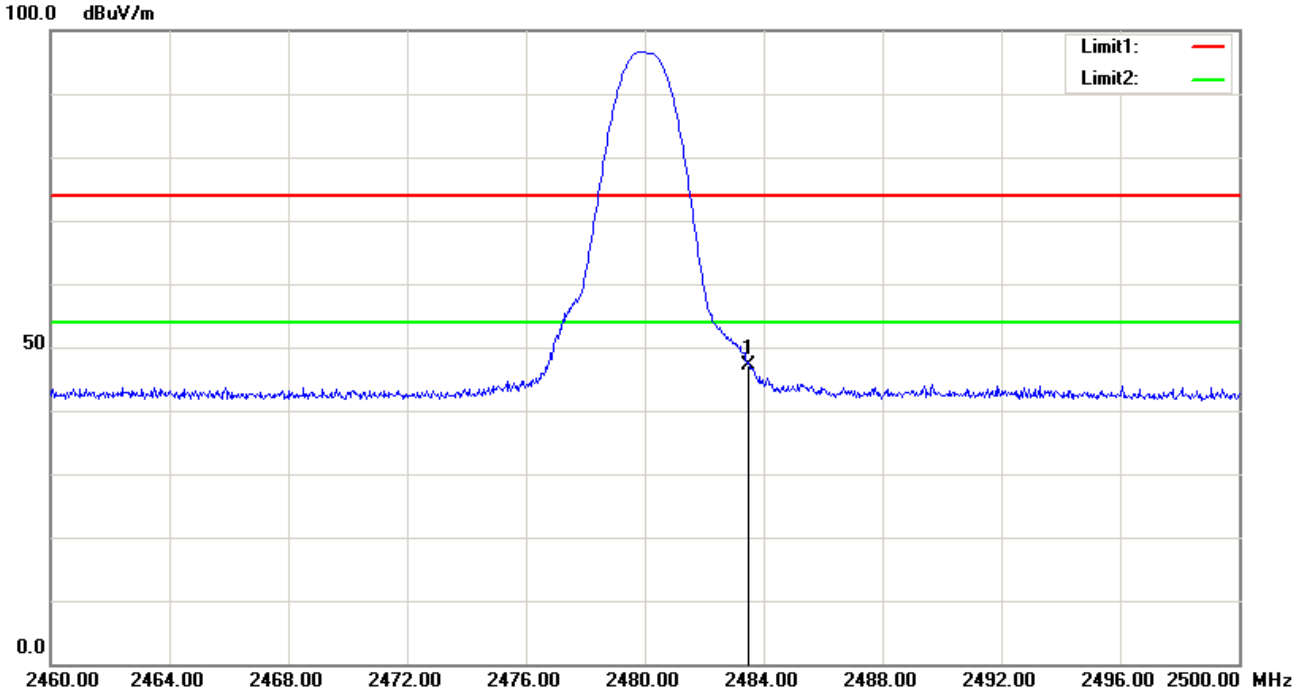
Test Setup	
Test Procedure	The test follows FCC Public Notice DA 00-705 Measurement Guidelines. Radiated Method Only - 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - 2. Position the EUT without connection to measurement 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

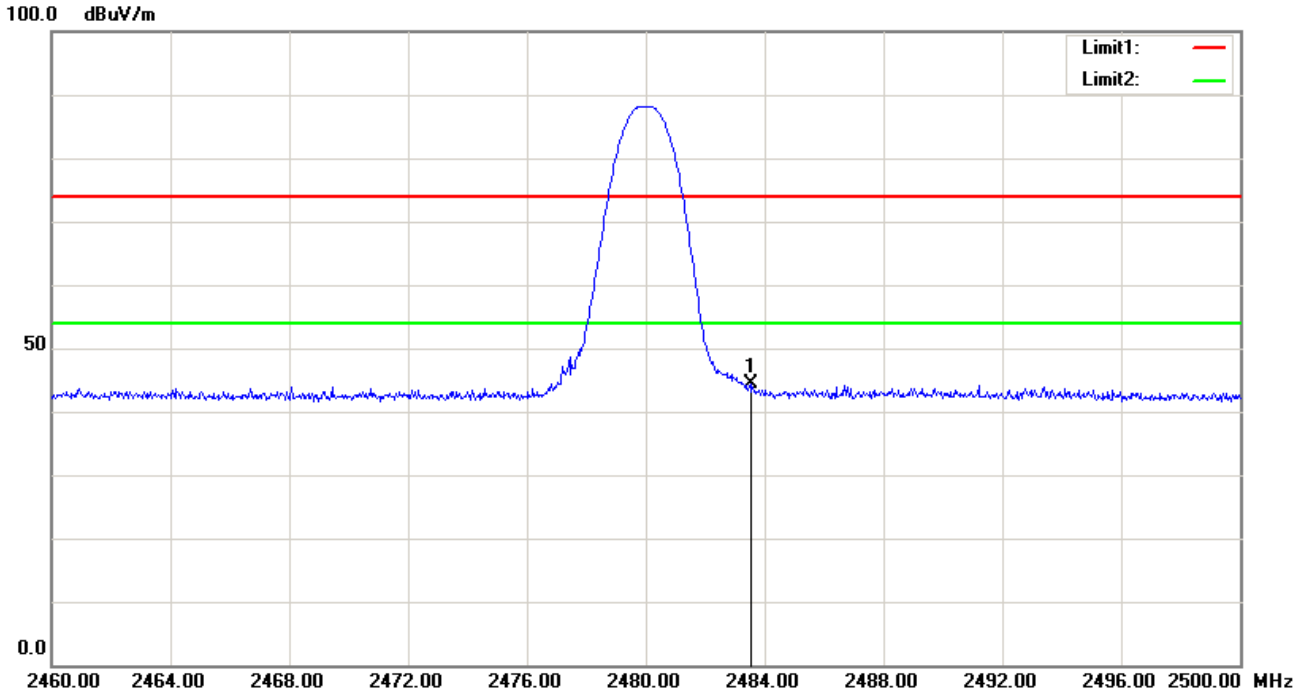
Test Plot ☒Yes (See below) ☐N/A

Test Plots
GFSK Mode



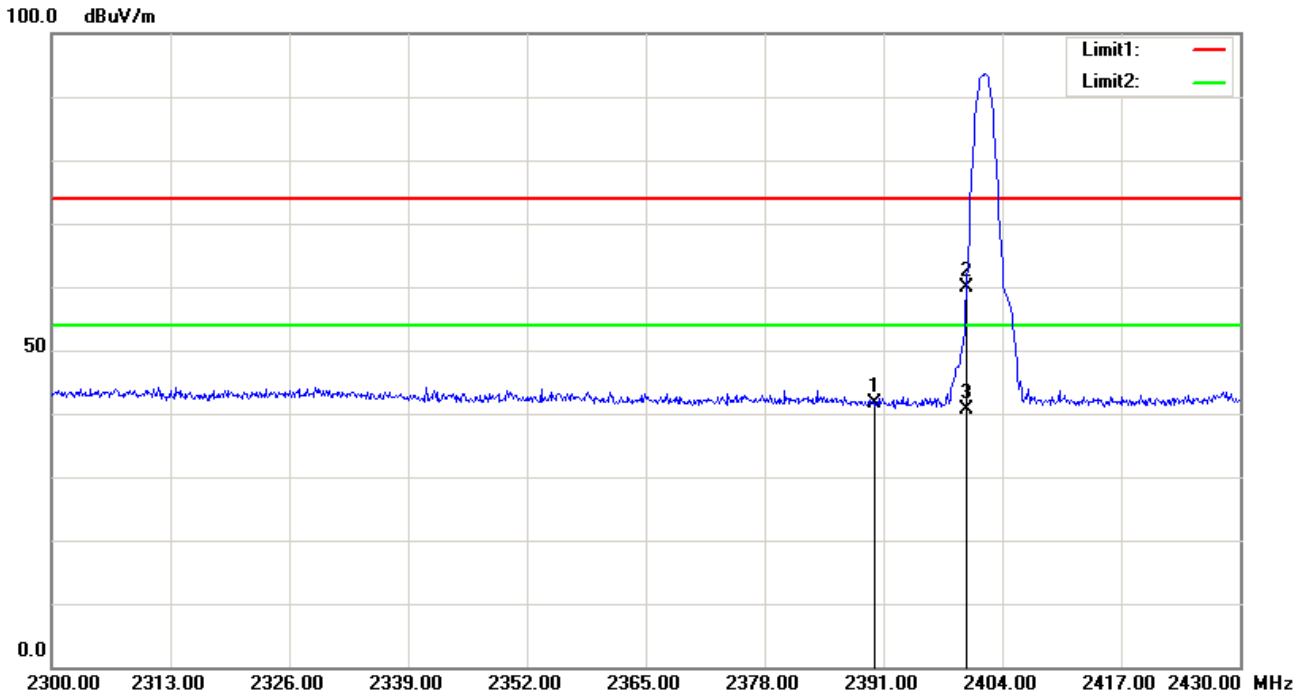
GFSK – Horizontal – Right

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	64.02	peak	31.59	52.63	4.06	47.04	74.00	-26.96	100	0



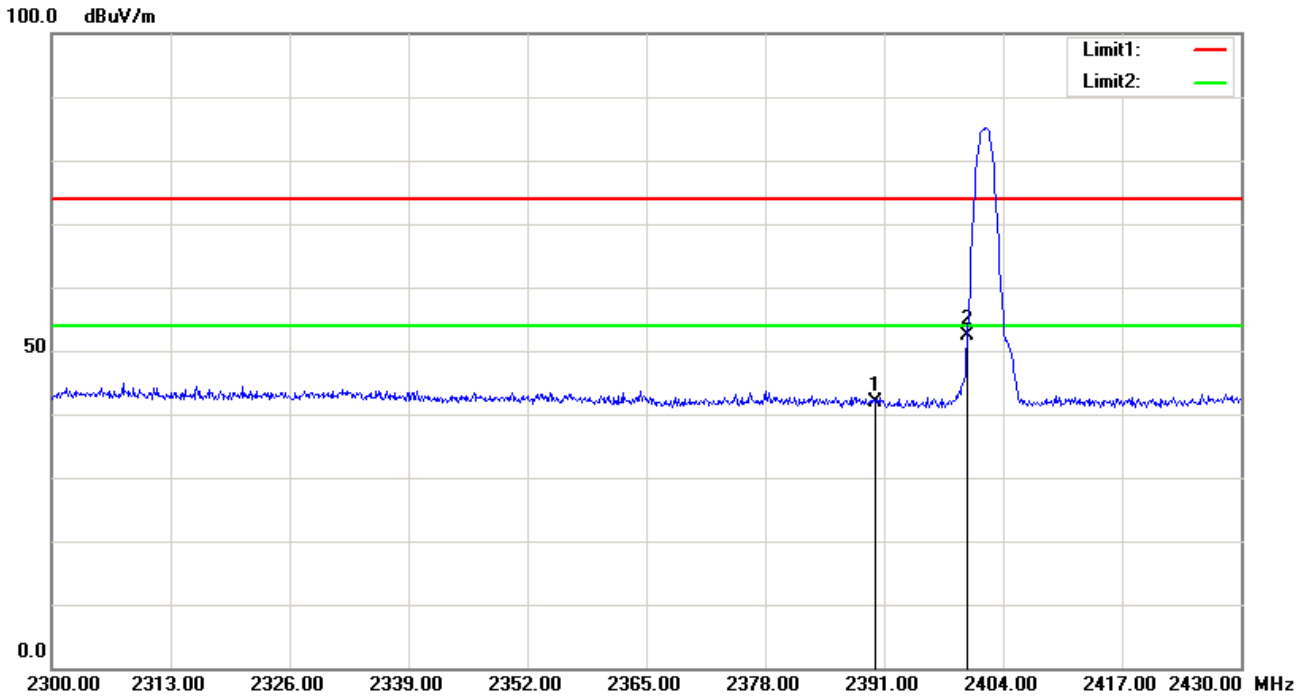
GFSK – Vertical – Right

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	61.26	peak	31.59	52.63	4.06	44.28	74.00	-29.72	200	296



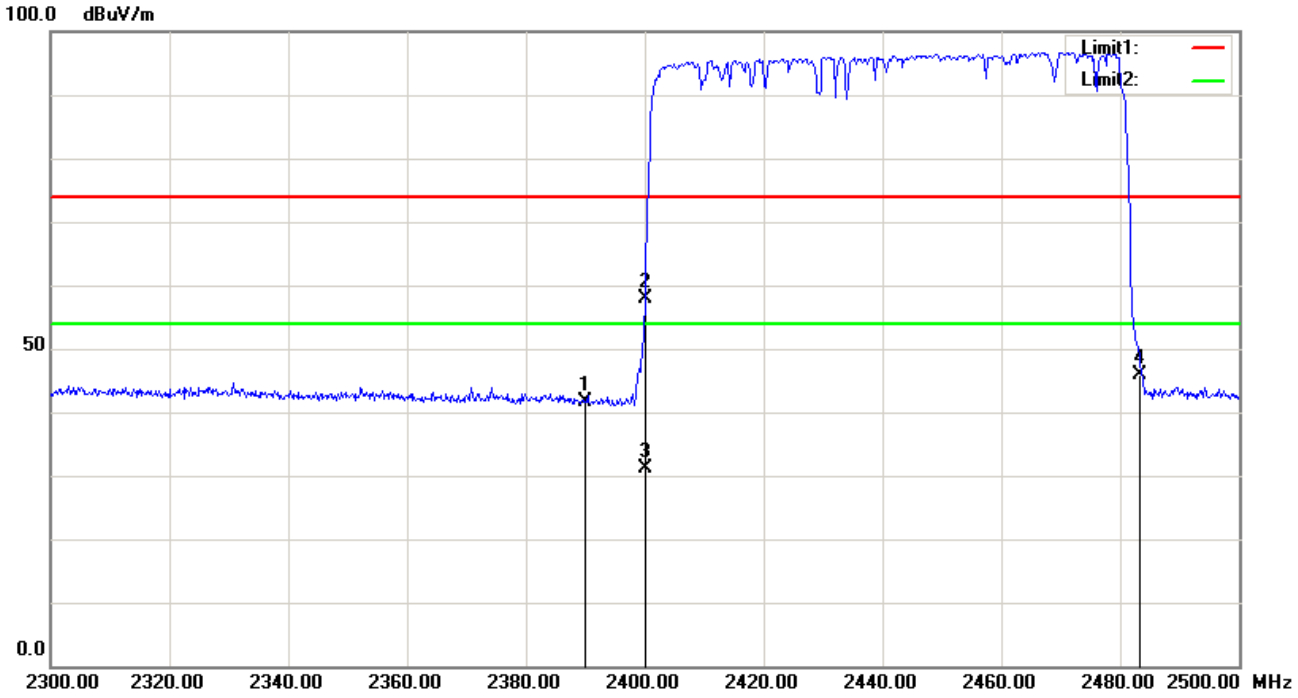
GFSK – Horizontal – Left

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	58.67	peak	31.53	52.55	4.02	41.67	74.00	-32.33	200	198
2	2400.000	76.96	peak	31.54	52.56	4.01	59.95	74.00	-14.05	100	351
3	2400.000	57.67	AVG	31.54	52.56	4.01	40.66	54.00	-13.34	100	351



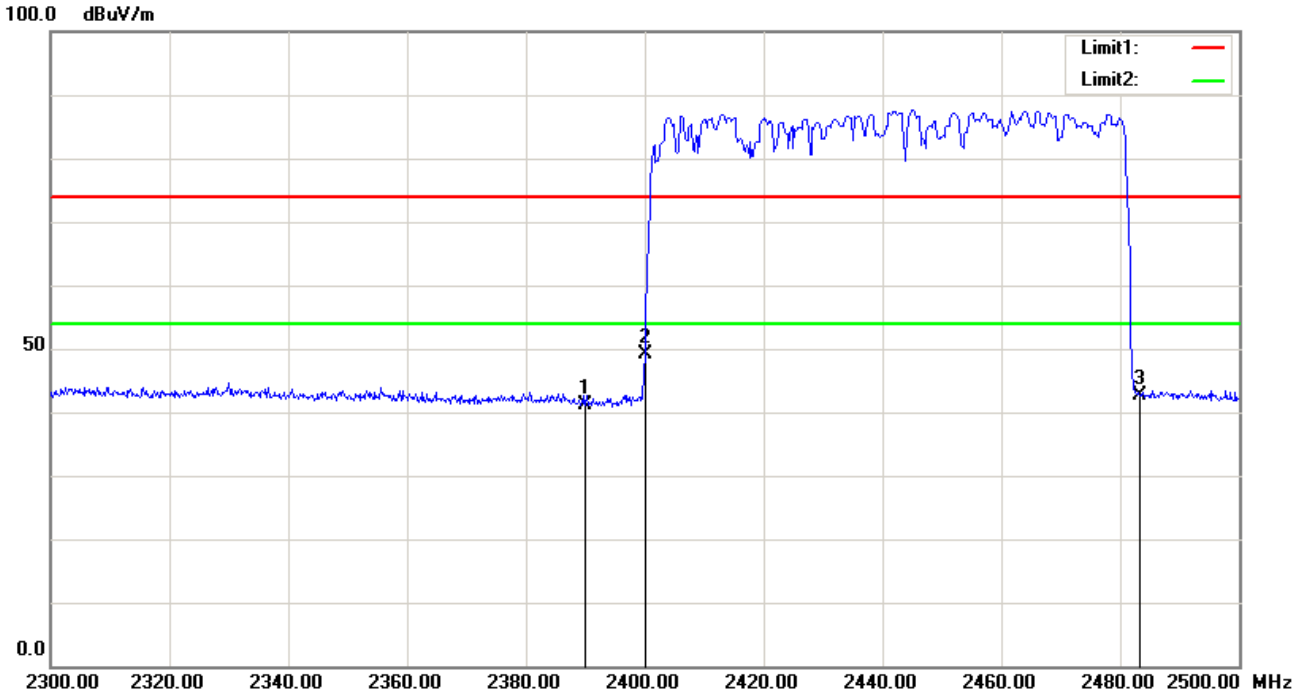
GFSK – Vertical – Left

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	58.83	peak	31.53	52.55	4.02	41.83	74.00	-32.17	100	76
2	2400.000	69.37	peak	31.54	52.56	4.01	52.36	74.00	-21.64	200	246



GFSK- Horizontal – Hopping

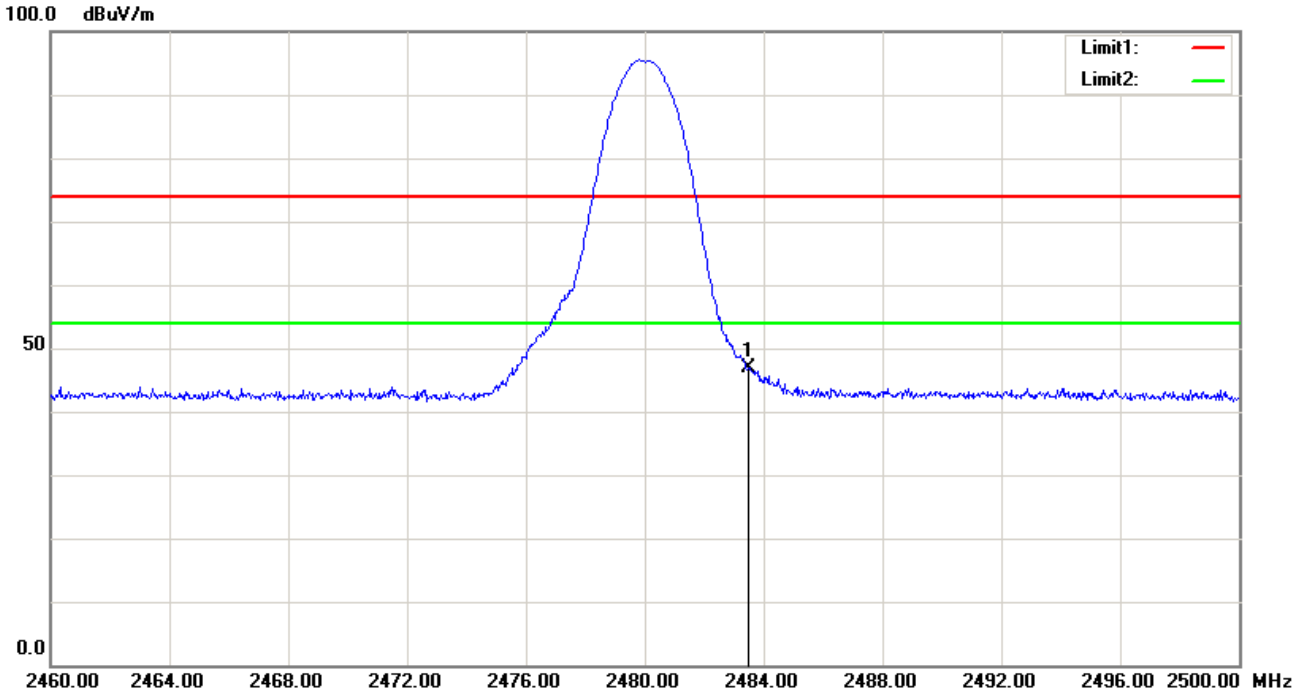
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	58.67	peak	31.53	52.55	4.02	41.67	74.00	-32.33	100	154
2	2400.000	74.99	peak	31.54	52.56	4.01	57.98	74.00	-16.02	100	347
3	2400.000	48.05	AVG	31.54	52.56	4.01	31.04	54.00	-22.96	100	347
4	2483.500	62.98	peak	31.59	52.63	4.06	46.00	74.00	-28.00	100	1



GFSK- Vertical – Hopping

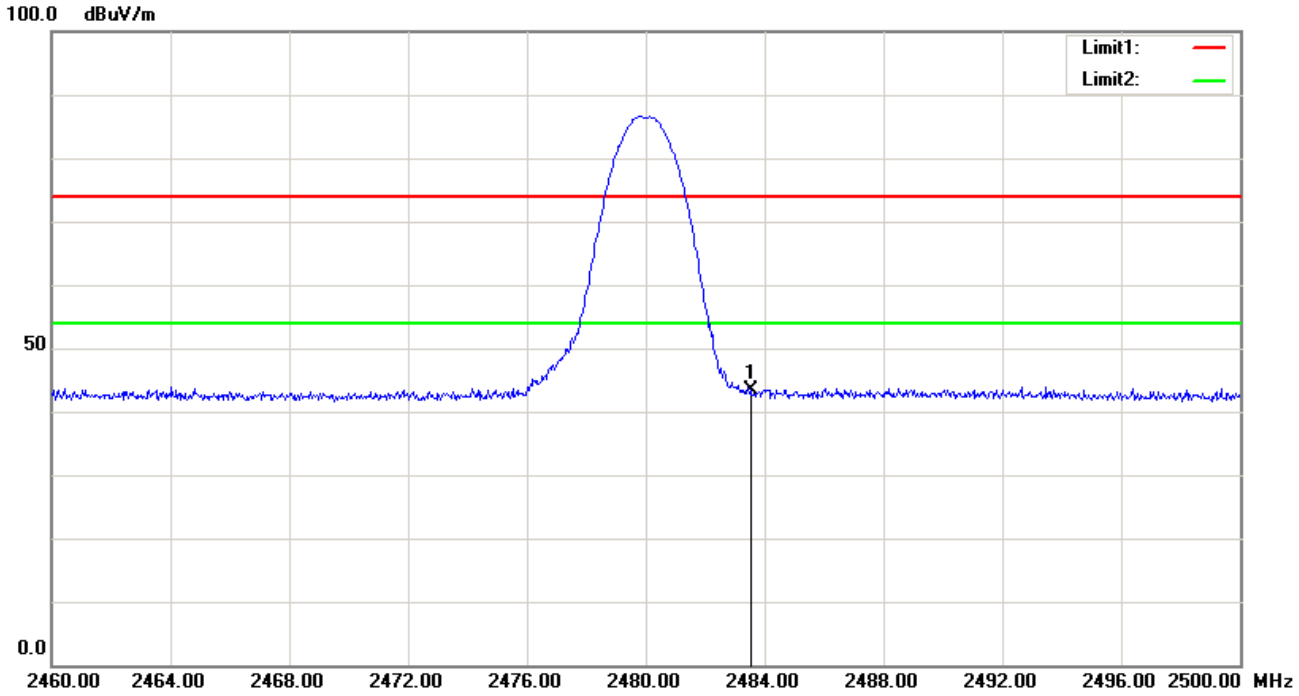
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( )
1	2390.000	58.15	peak	31.53	52.55	4.02	41.15	74.00	-32.85	200	359
2	2400.000	66.25	peak	31.54	52.56	4.01	49.24	74.00	-24.76	200	25
3	2483.500	59.49	peak	31.59	52.63	4.06	42.51	74.00	-31.49	100	191

π/4 DQPSK Mode



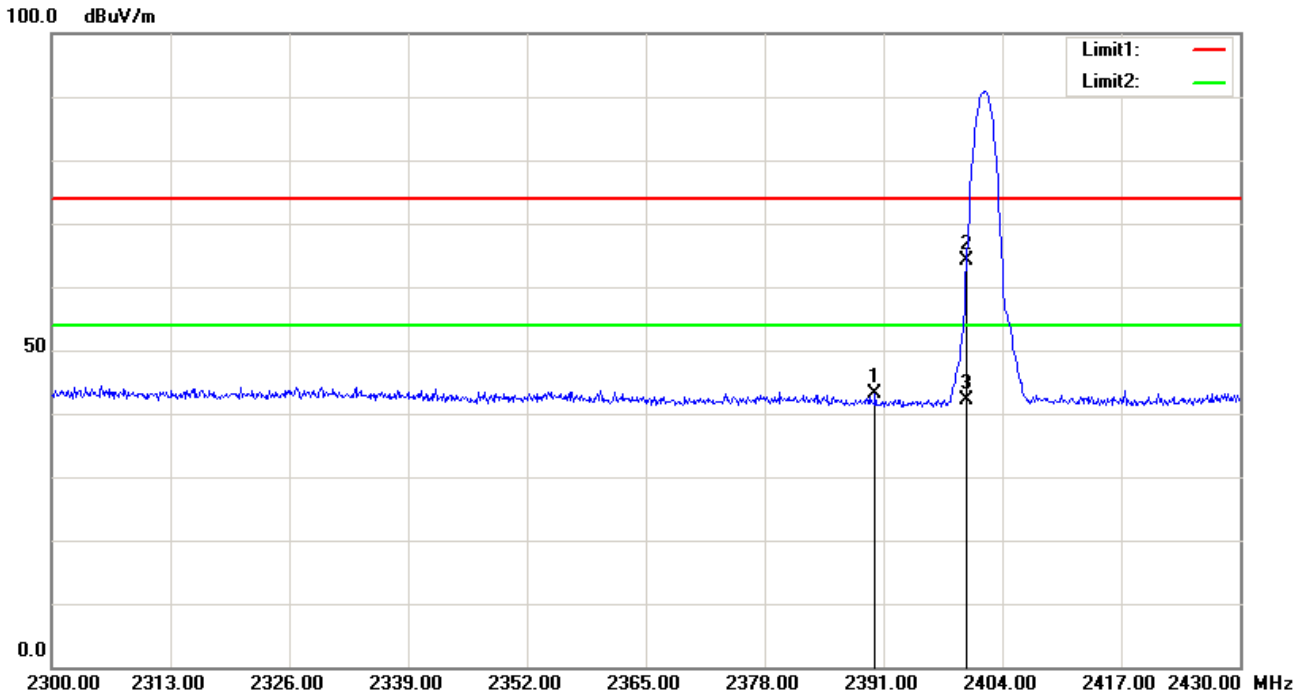
π/4 DQPSK – Horizontal – Right

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	63.77	peak	31.59	52.63	4.06	46.79	74.00	-27.21	200	360



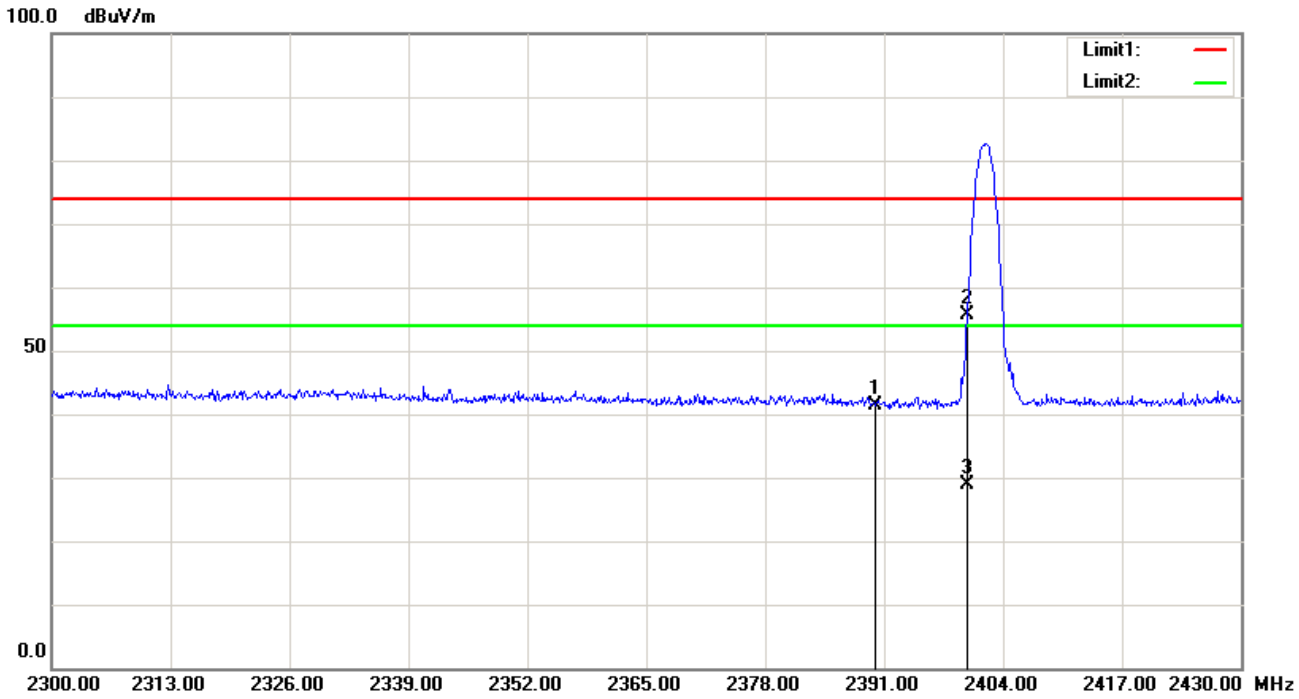
π/4 DQPSK – Vertical – Right

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	60.31	peak	31.59	52.63	4.06	43.33	74.00	-30.67	200	243



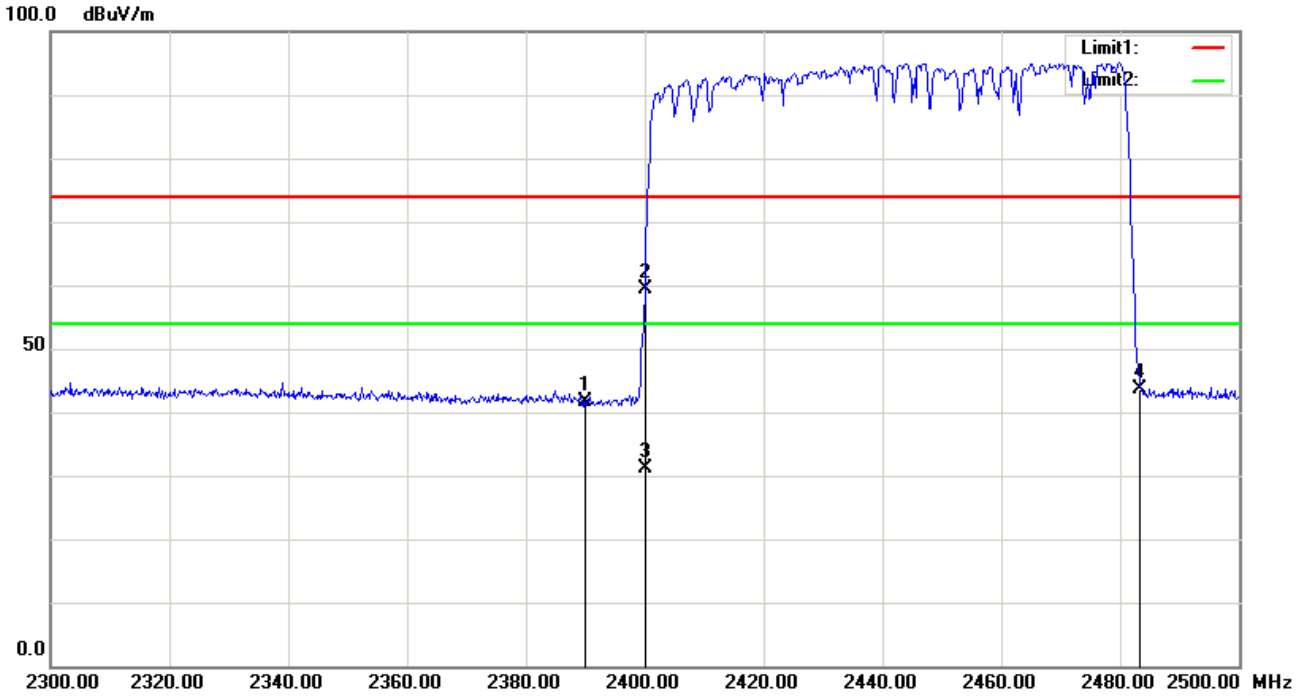
π/4 DQPSK – Horizontal – Left

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	60.14	peak	31.53	52.55	4.02	43.14	74.00	-30.86	200	359
2	2400.000	81.14	peak	31.54	52.56	4.01	64.13	74.00	-9.87	100	347
3	2400.000	59.15	AVG	31.54	52.56	4.01	42.14	54.00	-11.86	100	347



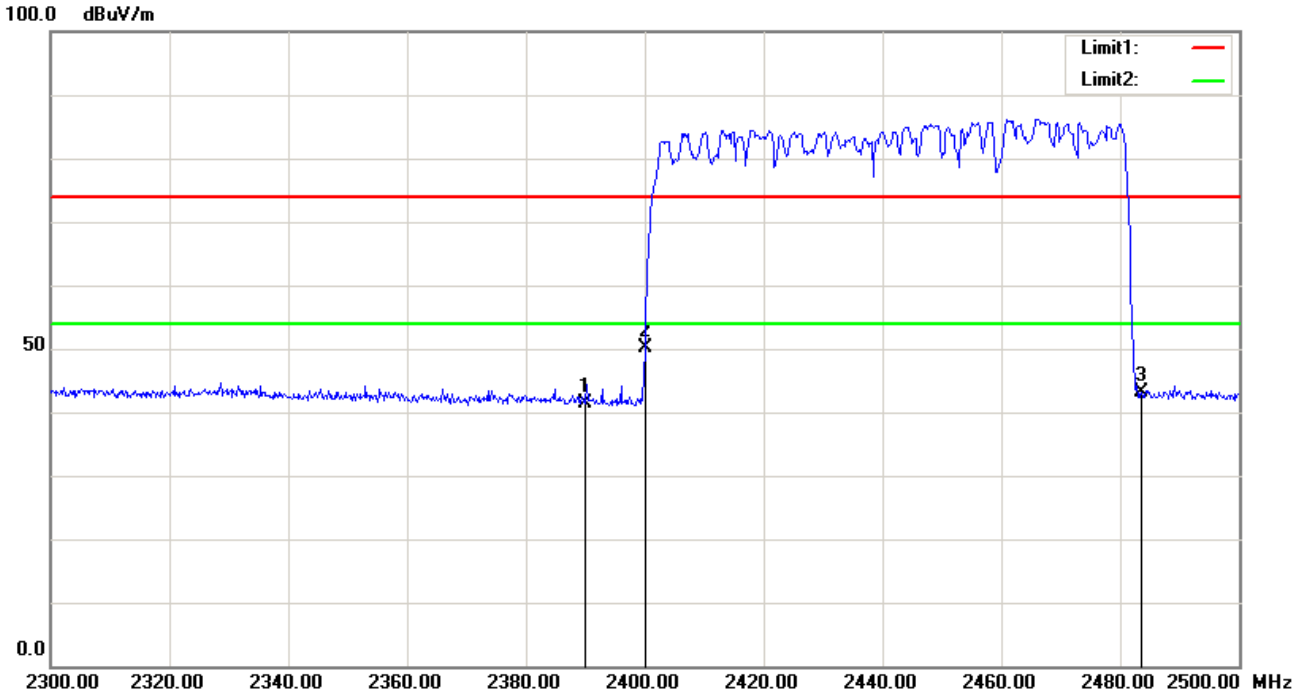
π/4 DQPSK – Vertical – Left

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	58.26	peak	31.53	52.55	4.02	41.26	74.00	-32.74	100	0
2	2400.000	72.70	peak	31.54	52.56	4.01	55.69	74.00	-18.31	200	251
3	2400.000	45.81	AVG	31.54	52.56	4.01	28.80	54.00	-25.20	200	251



π/4 DQPSK - Horizontal – Hopping

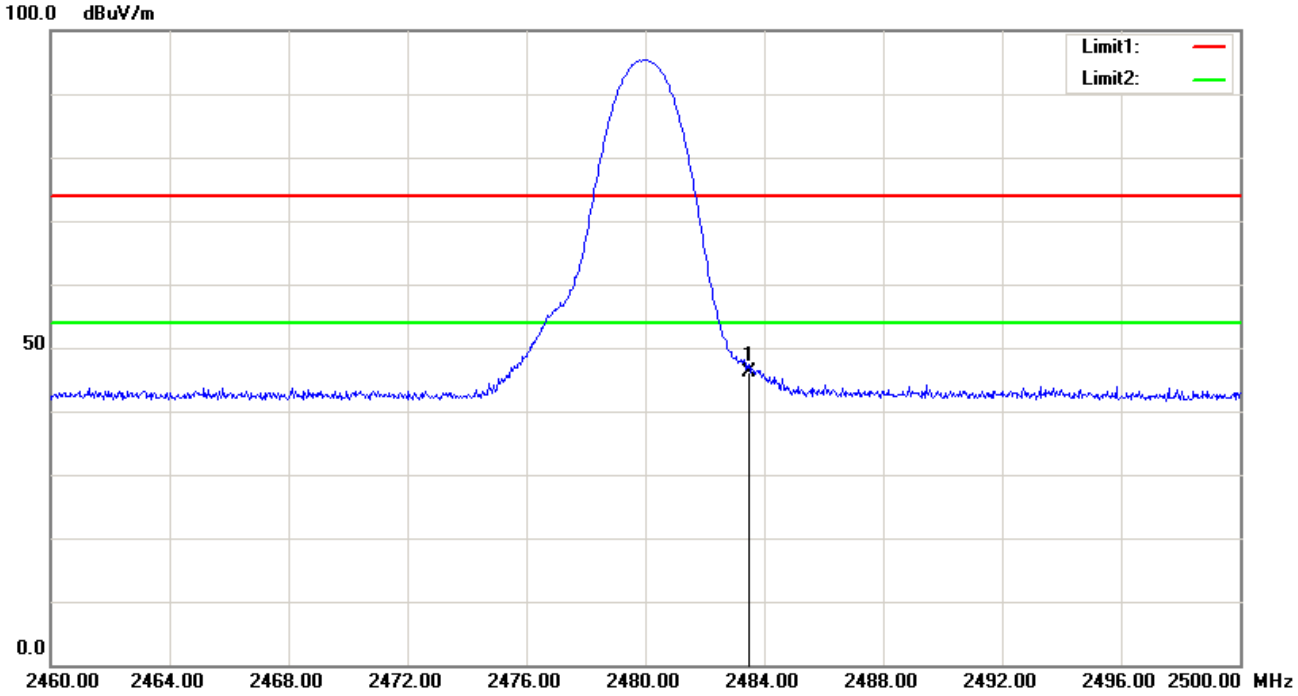
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	58.63	peak	31.53	52.55	4.02	41.63	74.00	-32.37	100	89
2	2400.000	76.38	peak	31.54	52.56	4.01	59.37	74.00	-14.63	200	358
3	2400.000	48.15	AVG	31.54	52.56	4.01	31.14	54.00	-22.86	200	358
4	2483.500	60.68	peak	31.59	52.63	4.06	43.70	74.00	-30.30	200	346
1	2390.000	58.63	peak	31.53	52.55	4.02	41.63	74.00	-32.37	99	89



π/4 DQPSK - Vertical – Hopping

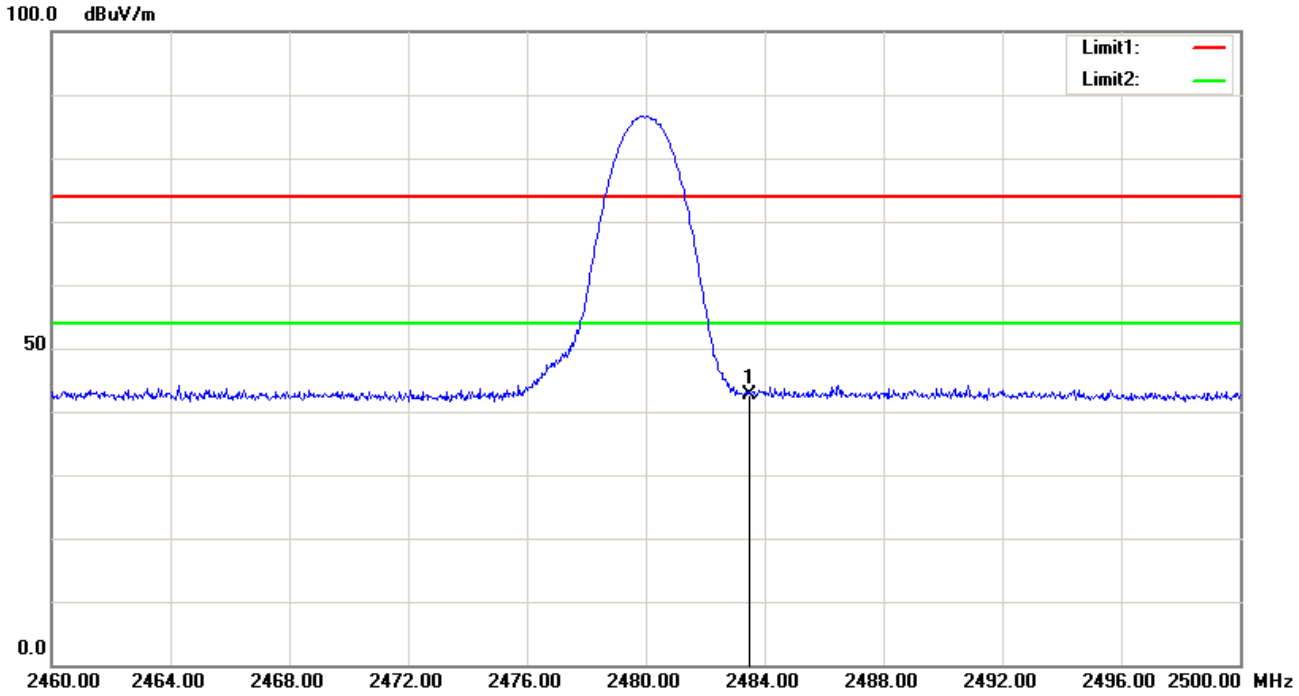
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree ( )
1	2390.000	58.29	peak	31.53	52.55	4.02	41.29	74.00	-32.71	100	25
2	2400.000	67.15	peak	31.54	52.56	4.01	50.14	74.00	-23.86	200	225
3	2483.500	60.21	peak	31.59	52.63	4.06	43.23	74.00	-30.77	200	188

8-DPSK Mode



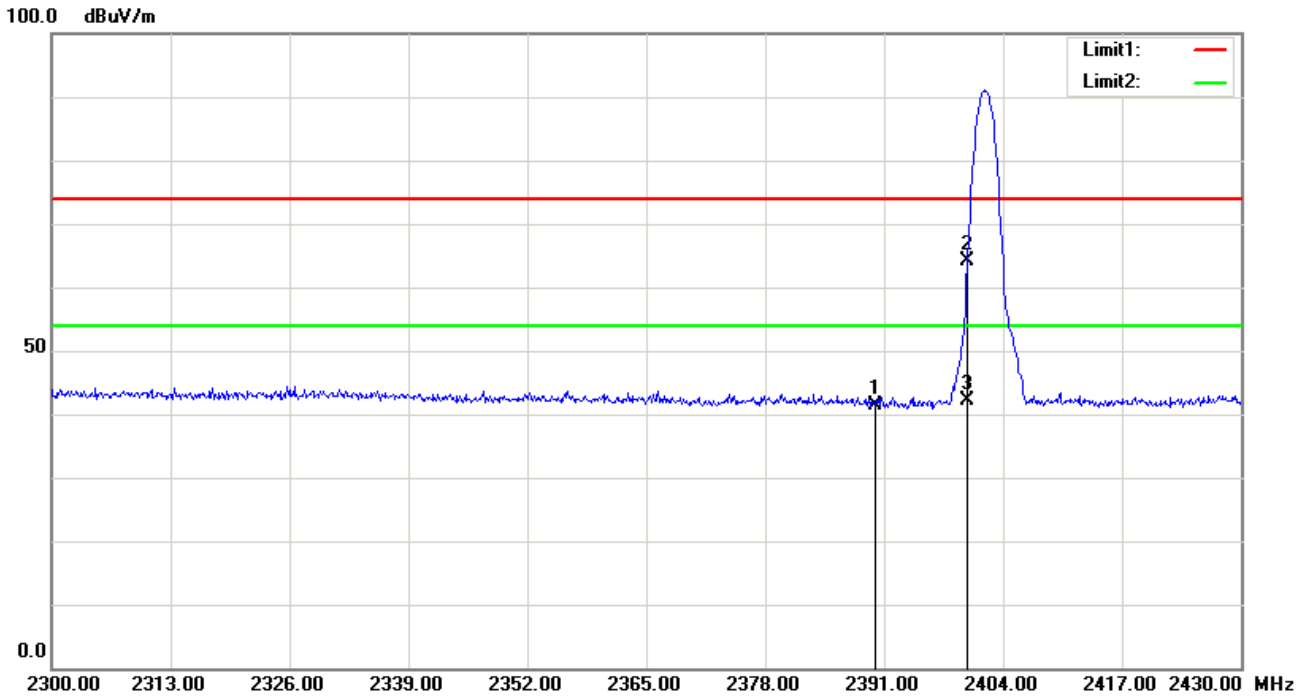
8-DPSK – Horizontal – Right

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	63.11	peak	31.59	52.63	4.06	46.13	74.00	-27.87	144	360



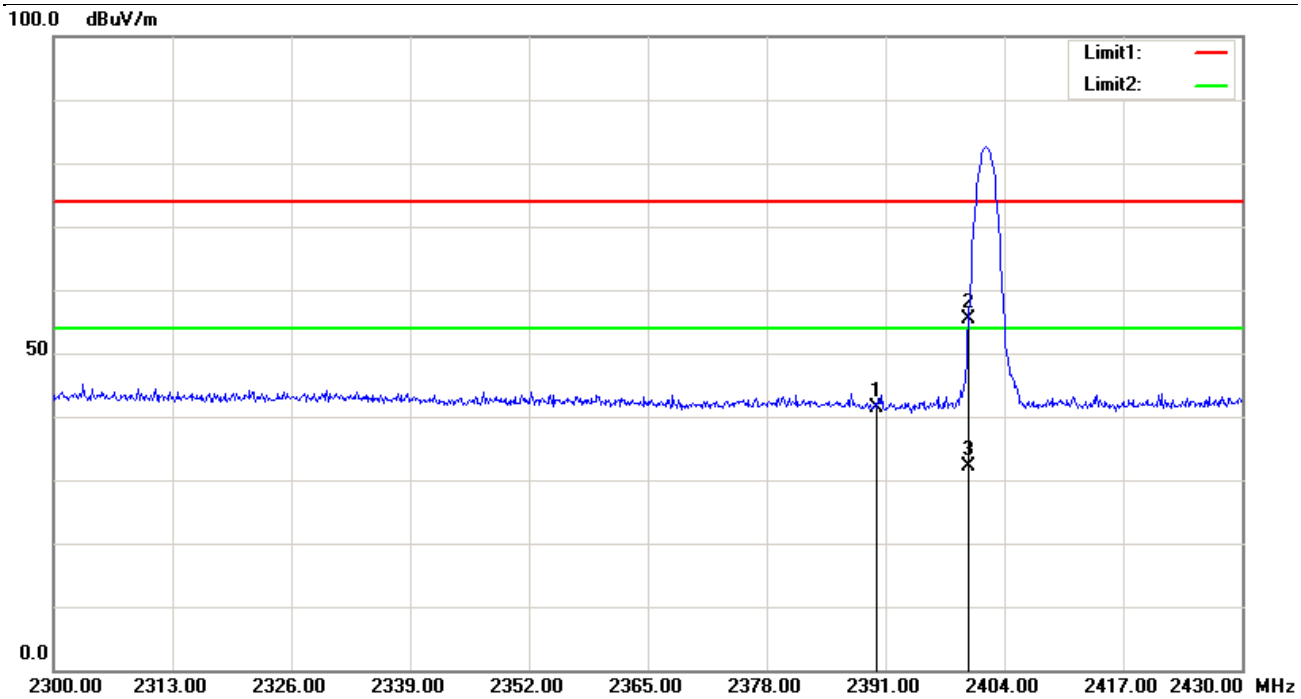
8-DPSK – Vertical – Right

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	59.71	peak	31.59	52.63	4.06	42.73	74.00	-31.27	100	262



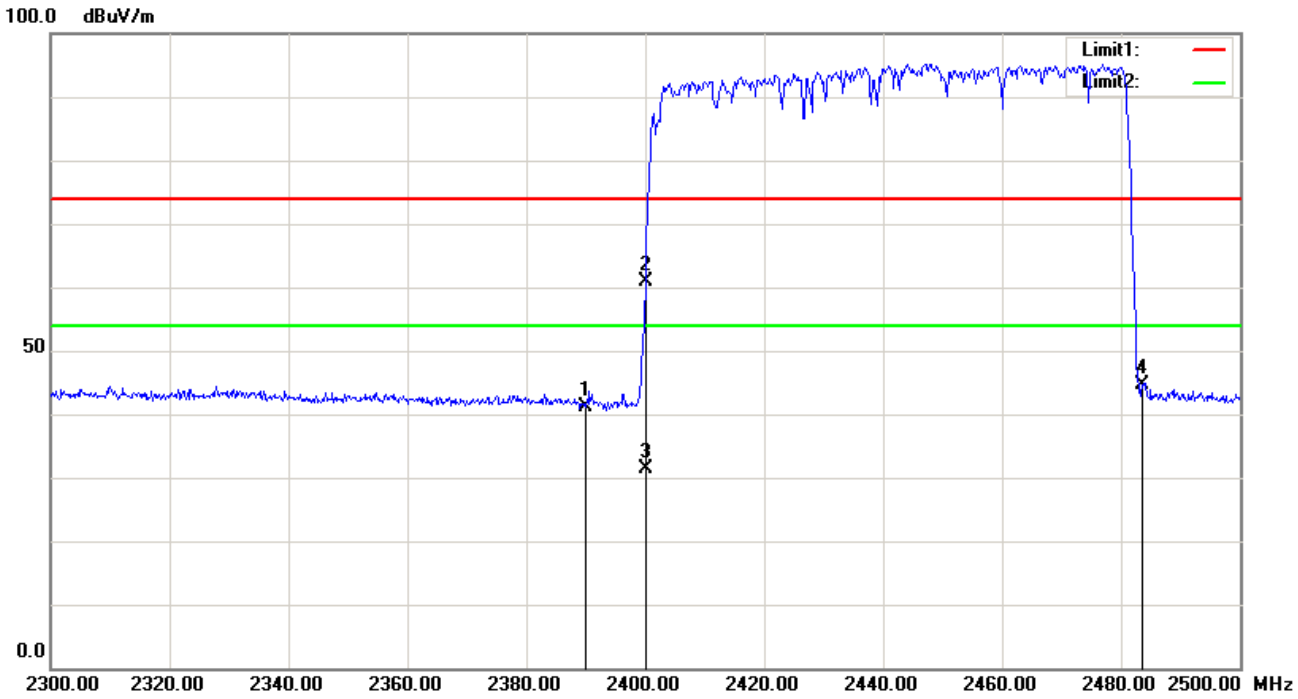
8-DPSK – Horizontal – Left

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	216
2	2400.000	81.10	peak	31.54	52.56	4.01	64.09	74.00	-9.91	200	352
3	2400.000	59.14	AVG	31.54	52.56	4.01	42.13	54.00	-11.87	200	352



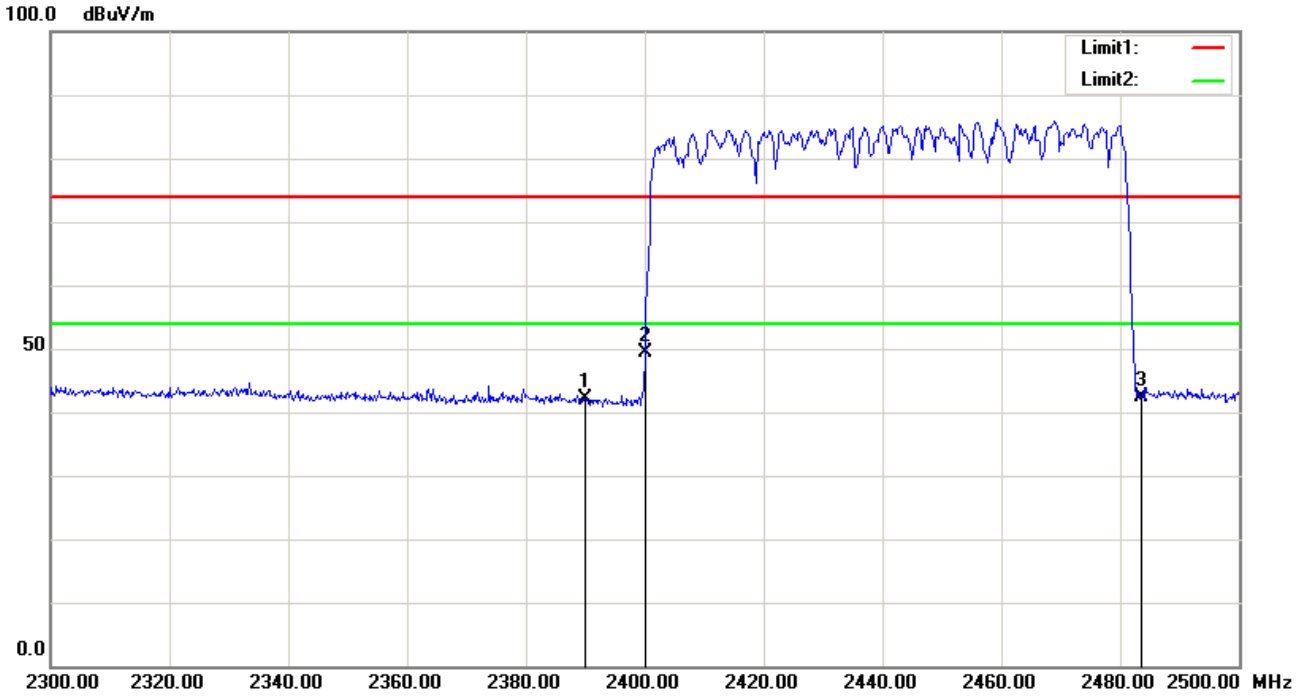
8-DPSK– Vertical – Left

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	2390.000	58.31	peak	31.53	52.55	4.02	41.31	74.00	-32.69	200	342
2	2400.000	72.36	peak	31.54	52.56	4.01	55.35	74.00	-18.65	200	247
3	2400.000	49.08	AVG	31.54	52.56	4.01	32.07	54.00	-21.93	200	247



8-DPSK - Horizontal – Hopping

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	58.20	peak	31.53	52.55	4.02	41.20	74.00	-32.80	100	214
2	2400.000	77.79	peak	31.54	52.56	4.01	60.78	74.00	-13.22	100	356
3	2400.000	48.41	AVG	31.54	52.56	4.01	31.40	54.00	-22.60	100	356
4	2483.500	61.62	peak	31.59	52.63	4.06	44.64	74.00	-29.36	100	360



8-DPSK - Vertical – Hopping

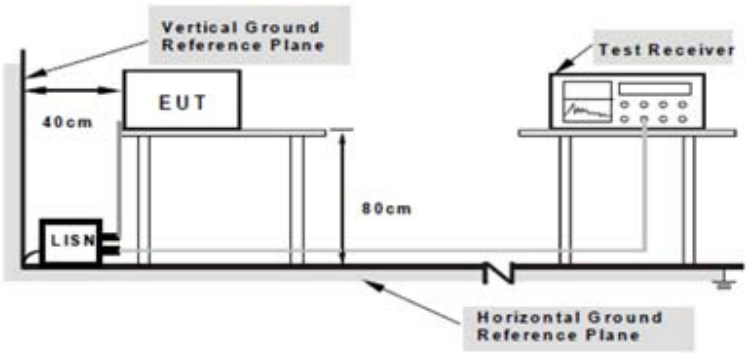
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	2390.000	59.14	peak	31.53	52.55	4.02	42.14	74.00	-31.86	100	351
2	2400.000	66.38	peak	31.54	52.56	4.01	49.37	74.00	-24.63	200	260
3	2483.500	59.47	peak	31.59	52.63	4.06	42.49	74.00	-31.51	189	360

6.8 Conducted Emissions

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 29, 2018
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</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>
<tr><td>Result</td><td colspan="3">☒Pass ☐Fail</td></tr>
</table>

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

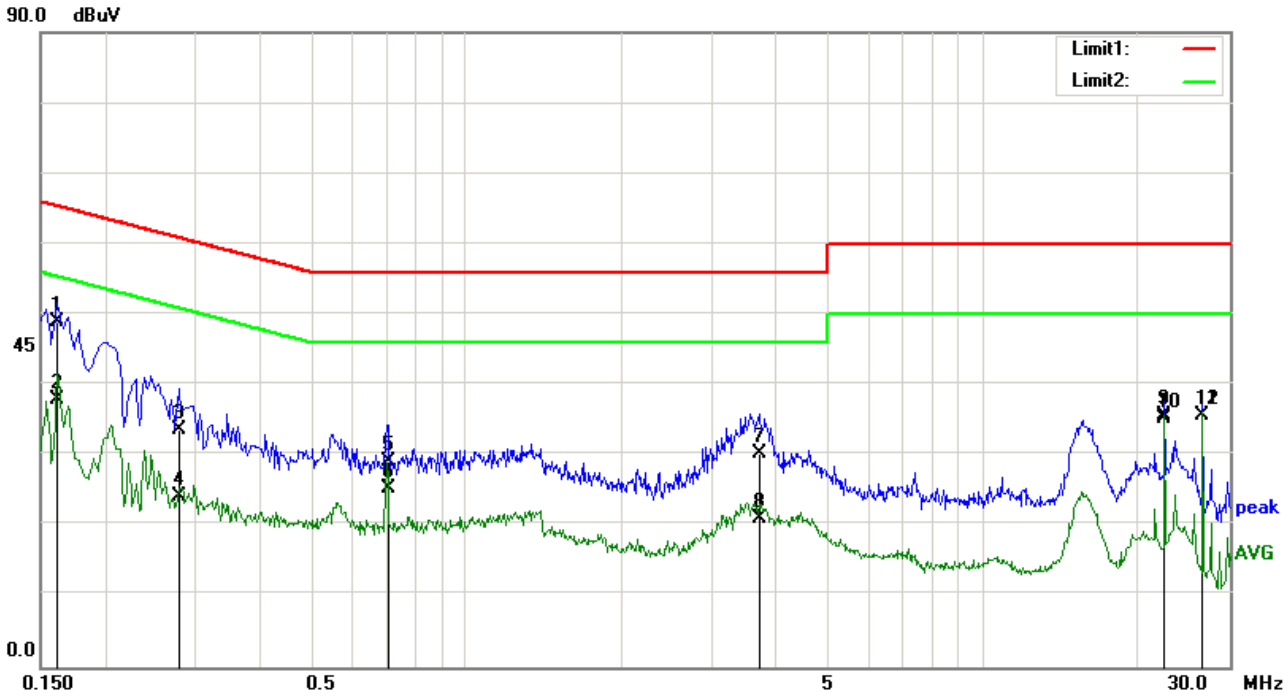
Result (dBμV) = Reading Value + Corrected Value

Limit (dBμV) = Limit stated in standard

Calculation Formula:

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

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

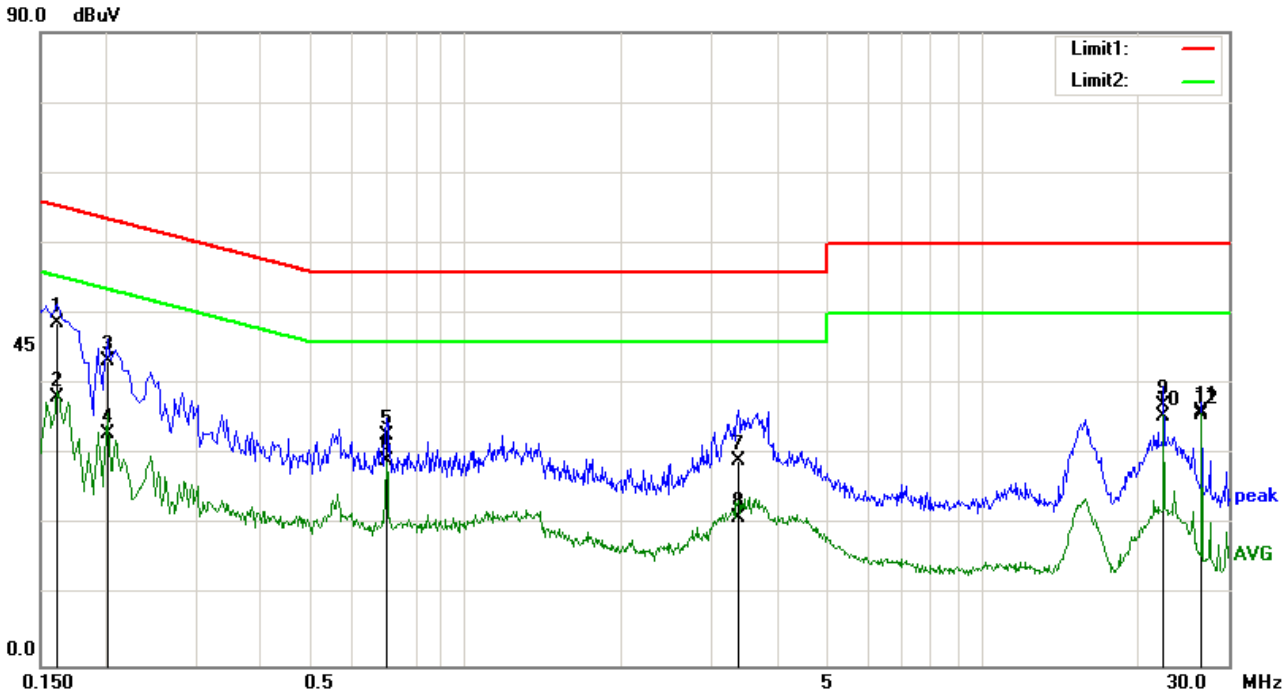


Test Data

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	0.1620	38.42	QP	0.10	-10.00	0.34	48.86	65.36	-16.50
2	0.1620	27.45	AVG	0.10	-10.00	0.34	37.89	55.36	-17.47
3	0.2780	23.41	QP	0.11	-10.00	0.20	33.72	60.88	-27.16
4	0.2780	13.85	AVG	0.11	-10.00	0.20	24.16	50.88	-26.72
5	0.7060	18.88	QP	0.13	-10.00	0.20	29.21	56.00	-26.79
6	0.7060	14.91	AVG	0.13	-10.00	0.20	25.24	46.00	-20.76
7	3.6900	19.69	QP	0.22	-10.00	0.25	30.16	56.00	-25.84
8	3.6900	10.68	AVG	0.22	-10.00	0.25	21.15	46.00	-24.85
9	22.5300	23.90	QP	1.19	-10.00	0.66	35.75	60.00	-24.25
10	22.5300	23.45	AVG	1.19	-10.00	0.66	35.30	50.00	-14.70
11	26.6260	23.78	QP	1.27	-10.00	0.70	35.75	60.00	-24.25
12	26.6260	23.71	AVG	1.27	-10.00	0.70	35.68	50.00	-14.32

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

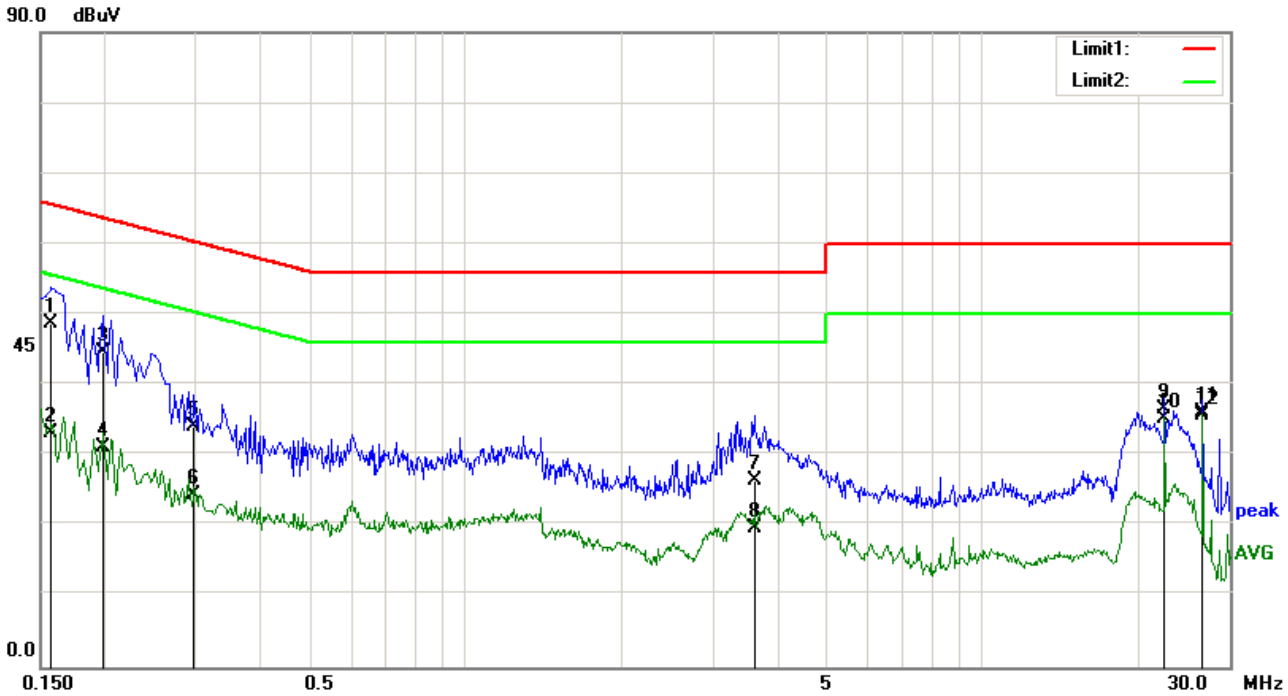


Test Data

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	0.1620	38.35	QP	0.11	-10.00	0.34	48.80	65.36	-16.56
2	0.1620	27.75	AVG	0.11	-10.00	0.34	38.20	55.36	-17.16
3	0.2020	32.97	QP	0.10	-10.00	0.28	43.35	63.53	-20.18
4	0.2020	22.67	AVG	0.10	-10.00	0.28	33.05	53.53	-20.48
5	0.7020	22.44	QP	0.12	-10.00	0.20	32.76	56.00	-23.24
6	0.7020	18.90	AVG	0.12	-10.00	0.20	29.22	46.00	-16.78
7	3.3700	18.74	QP	0.22	-10.00	0.24	29.20	56.00	-26.80
8	3.3700	10.48	AVG	0.22	-10.00	0.24	20.94	46.00	-25.06
9	22.5300	24.97	QP	1.31	-10.00	0.66	36.94	60.00	-23.06
10	22.5300	23.52	AVG	1.31	-10.00	0.66	35.49	50.00	-14.51
11	26.6260	23.92	QP	1.41	-10.00	0.70	36.03	60.00	-23.97
12	26.6260	23.61	AVG	1.41	-10.00	0.70	35.72	50.00	-14.28

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

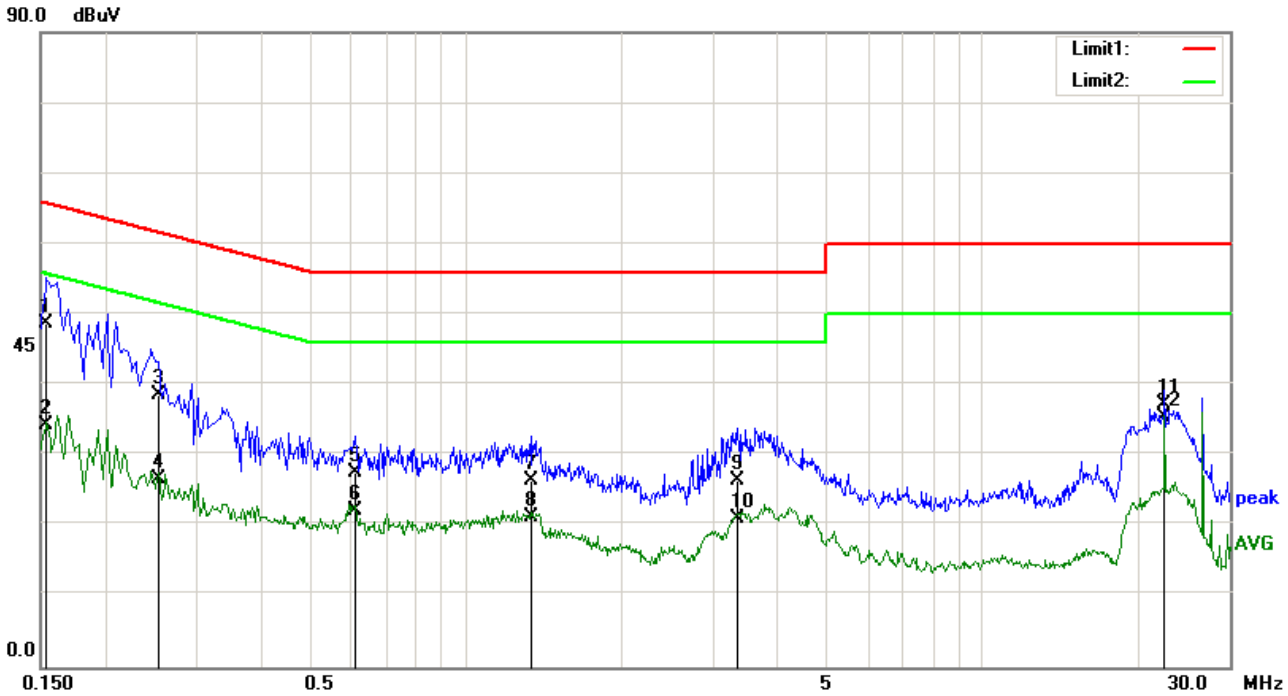


Test Data

Phase Line Plot at 230Vac, 50Hz

No.	Frequency (MHz)	Reading (dBuV)	Detector	Lisn/Isn (dB}	Ps_Lmt (dB)	Cab_L (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.1580	38.18	QP	0.10	-10.00	0.35	48.63	65.57	-16.94
2	0.1580	22.78	AVG	0.10	-10.00	0.35	33.23	55.57	-22.34
3	0.1980	34.22	QP	0.10	-10.00	0.28	44.60	63.69	-19.09
4	0.1980	20.84	AVG	0.10	-10.00	0.28	31.22	53.69	-22.47
5	0.2980	23.71	QP	0.11	-10.00	0.20	34.02	60.30	-26.28
6	0.2980	14.07	AVG	0.11	-10.00	0.20	24.38	50.30	-25.92
7	3.6060	15.99	QP	0.22	-10.00	0.25	26.46	56.00	-29.54
8	3.6060	9.26	AVG	0.22	-10.00	0.25	19.73	46.00	-26.27
9	22.5300	24.78	QP	1.19	-10.00	0.66	36.63	60.00	-23.37
10	22.5300	23.47	AVG	1.19	-10.00	0.66	35.32	50.00	-14.68
11	26.6260	24.20	QP	1.27	-10.00	0.70	36.17	60.00	-23.83
12	26.6260	23.72	AVG	1.27	-10.00	0.70	35.69	50.00	-14.31

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



Test Data

Phase Neutral Plot at 230Vac, 50Hz

No.	Frequency (MHz)	Reading (dBuV)	Detector	Lisn/Isn (dB)	Ps_Lmt (dB)	Cab_L (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.1540	38.17	QP	0.11	-10.00	0.35	48.63	65.78	-17.15
2	0.1540	23.86	AVG	0.11	-10.00	0.35	34.32	55.78	-21.46
3	0.2540	28.26	QP	0.10	-10.00	0.20	38.56	61.63	-23.07
4	0.2540	16.37	AVG	0.10	-10.00	0.20	26.67	51.63	-24.96
5	0.6100	17.26	QP	0.12	-10.00	0.21	27.59	56.00	-28.41
6	0.6100	11.91	AVG	0.12	-10.00	0.21	22.24	46.00	-23.76
7	1.3380	16.05	QP	0.14	-10.00	0.21	26.40	56.00	-29.60
8	1.3380	10.92	AVG	0.14	-10.00	0.21	21.27	46.00	-24.73
9	3.3500	16.02	QP	0.22	-10.00	0.24	26.48	56.00	-29.52
10	3.3500	10.58	AVG	0.22	-10.00	0.24	21.04	46.00	-24.96
11	22.5300	25.22	QP	1.31	-10.00	0.66	37.19	60.00	-22.81
12	22.5300	23.40	AVG	1.31	-10.00	0.66	35.37	50.00	-14.63

Note:We test 3 modulations, only show GFSK test data in the report.

6.9 Radiated Emissions

Temperature	23°C
Relative Humidity	51%
Atmospheric Pressure	1018mbar
Test date :	March 29, 2018
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	☑

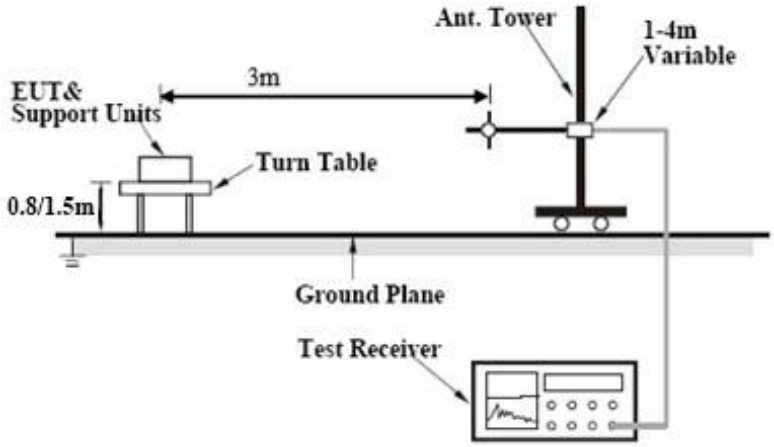
Class A Limit

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

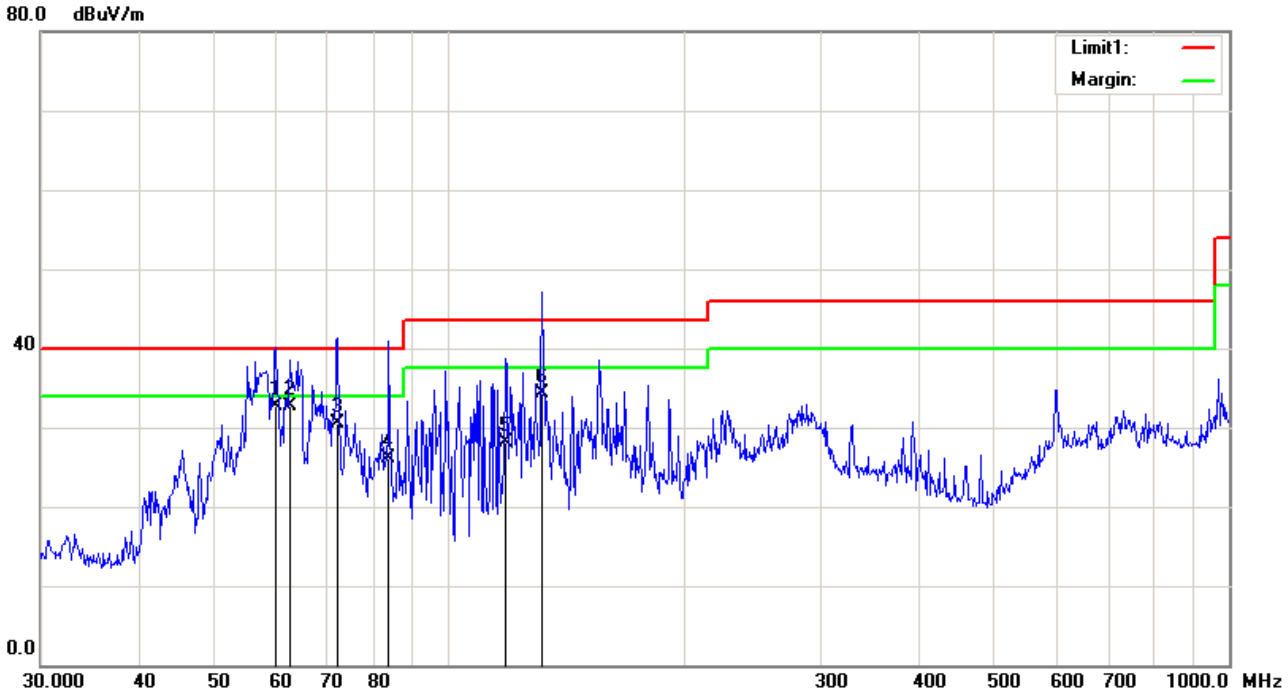
Degree = Turn table degree

Calculation Formula:

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

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

Below 1GHz



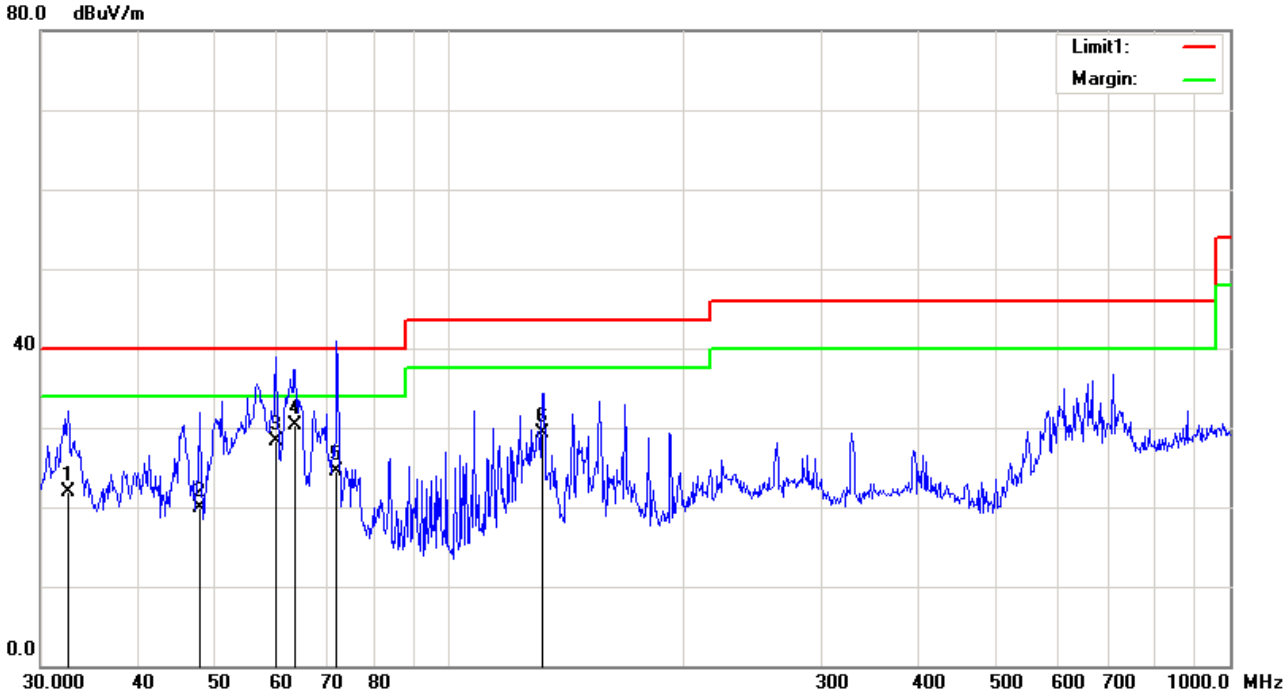
Test Data

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	60.0691	69.19	QP	9.49	47.28	1.30	32.70	40.00	-7.30	300	176
2	62.6507	69.12	QP	9.81	47.47	1.34	32.80	40.00	-7.20	200	180
3	72.0843	66.50	QP	10.47	47.91	1.44	30.50	40.00	-9.50	300	360
4	83.8156	62.73	QP	9.59	47.58	1.46	26.20	40.00	-13.80	300	177
5	118.1862	56.98	QP	15.86	46.50	1.76	28.10	43.50	-15.40	300	18
6	131.7577	65.23	QP	14.71	47.42	1.88	34.40	43.50	-9.10	300	194

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

Below 1GHz



Vertical Polarity Plot @3m

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	32.5198	46.51	QP	20.13	45.66	0.92	21.90	40.00	-18.10	100	0
2	47.9940	54.56	QP	10.40	46.27	1.21	19.90	40.00	-20.10	100	298
3	60.0691	66.52	QP	7.86	47.28	1.30	28.40	40.00	-11.60	100	96
4	63.5356	67.72	QP	8.76	47.53	1.35	30.30	40.00	-9.70	100	359
5	71.8320	61.19	QP	9.88	47.91	1.44	24.60	40.00	-15.40	200	217
6	131.7577	59.26	QP	15.68	47.42	1.88	29.40	43.50	-14.10	100	167

Note:We test 3 modulations, only show GFSK test data in the report.

Test Mode:	Transmitting BT Mode (GFSK)

Mode: GFSK (Worst Case)

Above 1GHz

Low Channel (2402 MHz)

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	1867.000	66.98	peak	30.53	51.61	3.99	49.89	74.00	-24.11	100	217
2	2139.000	62.92	peak	31.38	52.35	4.13	46.08	74.00	-27.92	200	0
3	2564.000	61.34	peak	31.59	52.66	4.11	44.38	74.00	-29.62	200	231
4	4804.000	57.06	peak	33.18	53.35	6.10	42.99	74.00	-31.01	200	350
5	5981.000	54.96	peak	33.40	51.36	5.87	42.87	74.00	-31.13	100	214
6	8106.000	55.98	peak	36.07	54.53	7.96	45.48	74.00	-28.52	200	298

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	1595.000	62.95	peak	28.95	50.31	3.91	45.50	74.00	-28.50	100	291
2	1867.000	67.61	peak	30.53	51.61	3.99	50.52	74.00	-23.48	200	21
3	2139.000	61.86	peak	31.38	52.35	4.13	45.02	74.00	-28.98	100	298
4	4332.000	57.29	peak	32.13	52.32	5.91	43.01	74.00	-30.99	194	0
5	4804.000	56.55	peak	33.03	53.05	6.13	42.66	74.00	-31.34	100	115
6	6321.000	55.71	peak	33.91	52.28	5.84	43.18	74.00	-30.82	100	84

Middle Channel (2441 MHz)

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	1867.000	66.80	peak	30.53	51.61	3.99	49.71	74.00	-24.29	200	11
2	2139.000	63.37	peak	31.38	52.35	4.13	46.53	74.00	-27.47	200	235
3	4502.000	56.85	peak	32.50	51.99	5.85	43.21	74.00	-30.79	200	29
4	4882.000	57.44	peak	33.33	53.66	6.00	43.11	74.00	-30.89	100	75
5	5845.000	55.67	peak	33.43	51.97	6.02	43.15	74.00	-30.85	100	90
6	7324.000	58.35	peak	34.82	55.04	7.15	45.28	74.00	-28.72	200	200

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	1850.000	67.67	peak	30.43	51.53	4.00	50.57	74.00	-23.43	200	165
2	2139.000	61.77	peak	31.38	52.35	4.13	44.93	74.00	-29.07	200	25
3	4553.000	56.04	peak	32.62	52.22	6.01	42.45	74.00	-31.55	99	58
4	4882.000	56.31	peak	33.29	53.58	6.03	42.05	74.00	-31.95	99	44
5	5692.000	56.26	peak	33.46	52.65	6.13	43.20	74.00	-30.80	200	234
6	7324.000	61.04	peak	34.82	55.04	7.15	47.97	74.00	-26.03	99	305

High Channel (2480 MHz)

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	1867.000	67.72	peak	30.53	51.61	3.99	50.63	74.00	-23.37	99	307
2	2139.000	62.23	peak	31.38	52.35	4.13	45.39	74.00	-28.61	200	111
3	4349.000	57.55	peak	32.17	52.28	5.88	43.32	74.00	-30.68	200	47
4	4960.000	57.66	peak	33.51	54.04	5.88	43.01	74.00	-30.99	99	79
5	6015.000	55.02	peak	33.42	51.33	5.85	42.96	74.00	-31.04	162	360
6	7443.000	59.54	peak	35.01	54.87	7.33	47.01	74.00	-26.99	200	198

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	1850.000	66.28	peak	30.43	51.53	4.00	49.18	74.00	-24.82	200	38
2	2139.000	63.44	peak	31.38	52.35	4.13	46.60	74.00	-27.40	200	52
3	4349.000	57.26	peak	32.17	52.28	5.88	43.03	74.00	-30.97	200	125
4	4960.000	56.29	peak	32.84	52.67	6.15	42.61	74.00	-31.39	100	177
5	6151.000	55.41	peak	33.64	51.75	5.85	43.15	74.00	-30.85	100	342
6	7443.000	61.48	peak	35.01	54.87	7.33	48.95	74.00	-25.05	100	310

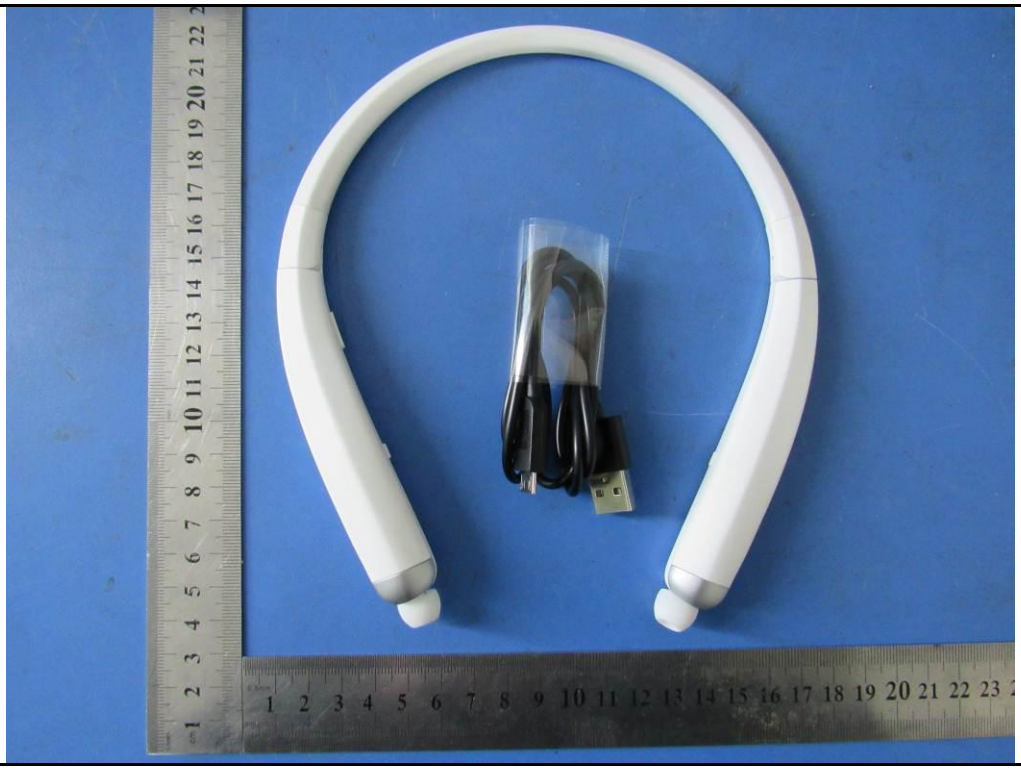
Note:We test 3 modulations, only show GFSK test data in the report.

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
Conducted Emissions					
R&S EMI Test Receiver	ESPI3	101216	05/03/2017	05/02/2018	☒
V-LISN	ESH3-Z5	838979/005	05/15/2017	05/14/2018	☒
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/08/2017	10/07/2018	☒
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#	02/02/2018	02/01/2019	☒
Spectrum Analyzer	N9010A	MY47191130	05/03/2017	05/02/2018	☒
Temperature/Humidity Chamber	1007H	N/A	01/07/2018	01/06/2019	☒
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	11/15/2017	11/14/2018	☒
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/09/2017	10/08/2018	☒
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	10/31/2017	10/30/2018	☒
Agilent Pre-Amplifier	8449B	N/A	10/31/2017	10/30/2018	☒
SIEMIC EZ_EMC Conducted Emissions	Ver.ICP-03A1	N/A	N/A	N/A	☒

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo



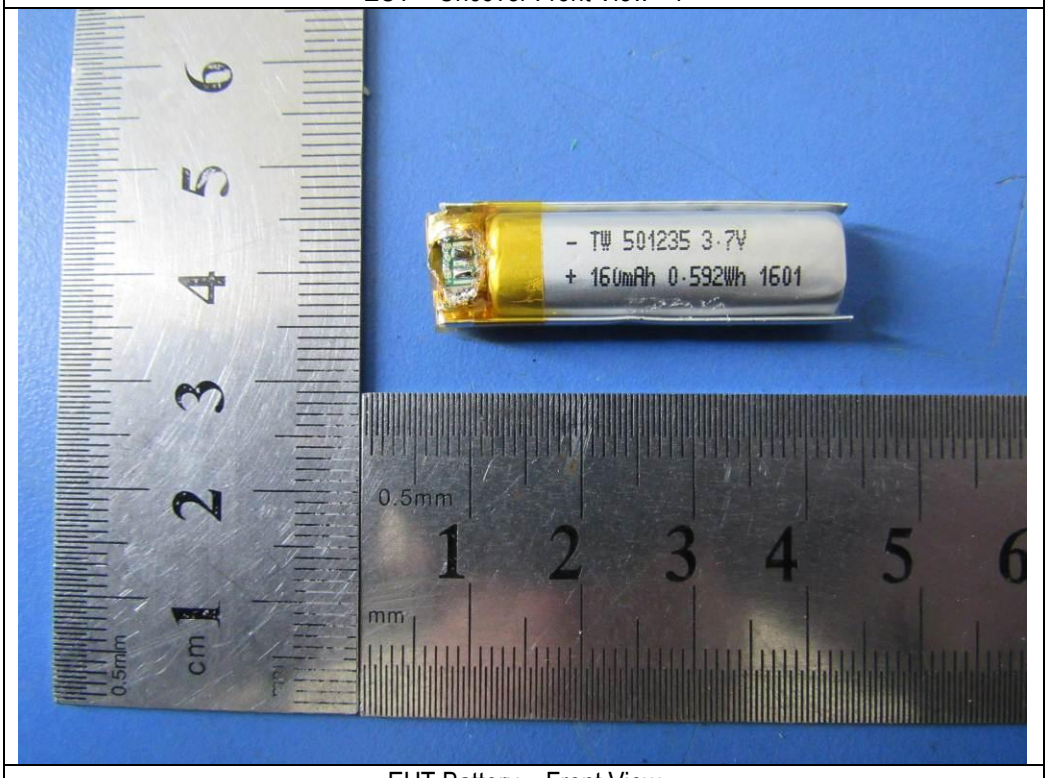
The Whole of EUT - Front View

EUT - Top View

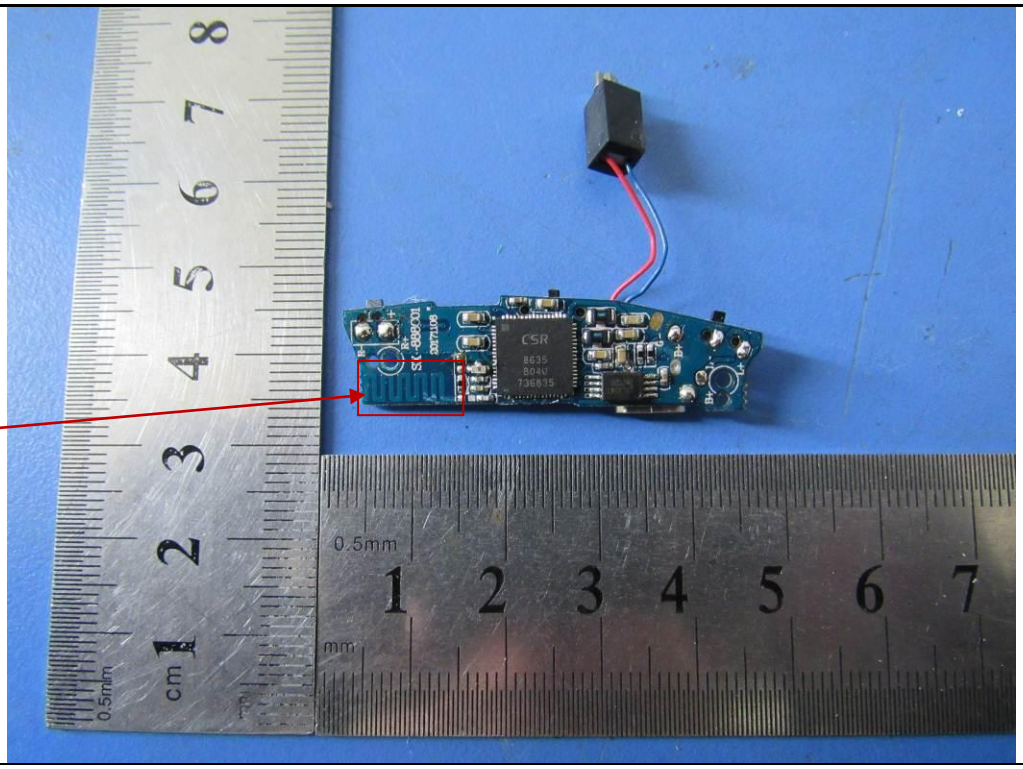
EUT - Bottom View

Annex B.ii. Photograph: EUT Internal Photo

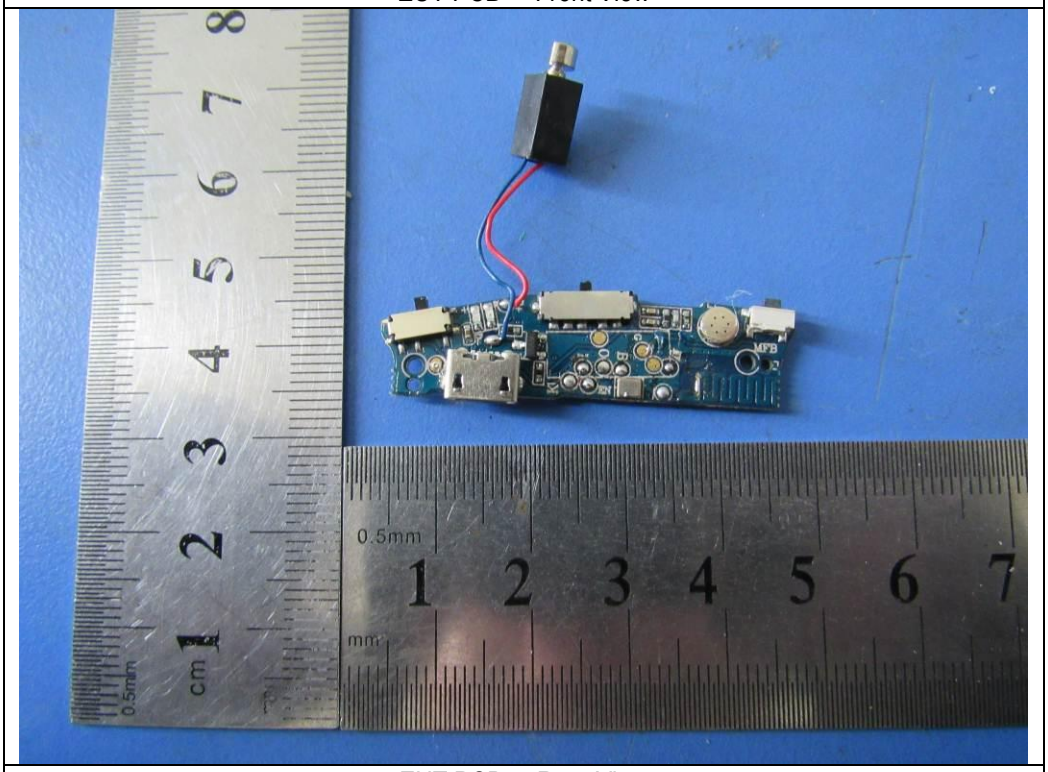
EUT – Uncover Front View - 1



EUT Battery – Front View



EUT PCB – Front View

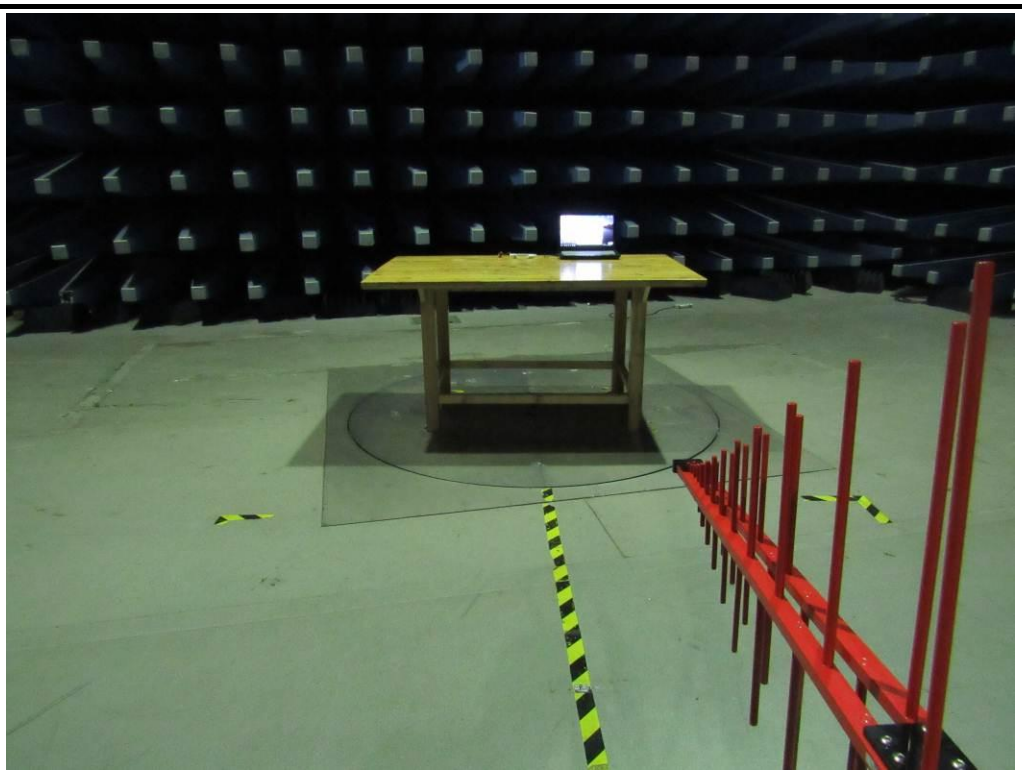


EUT PCB – Rear View

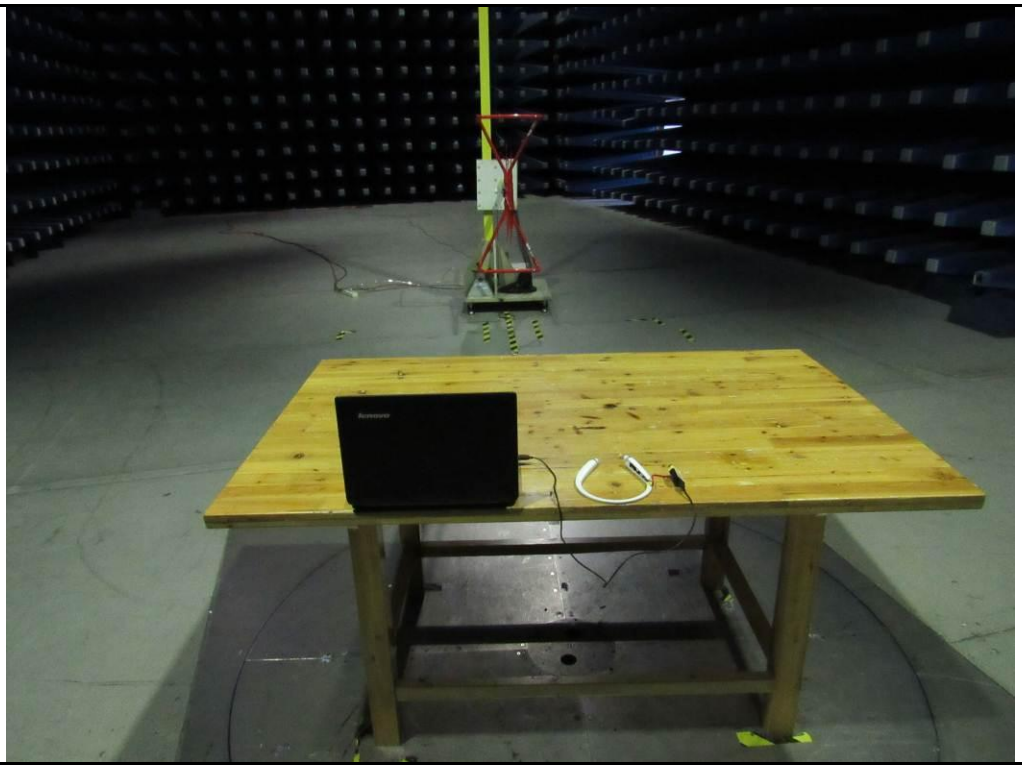
Annex B.iii. Photograph: Test Setup Photo

Conducted Emissions Test Setup Front View

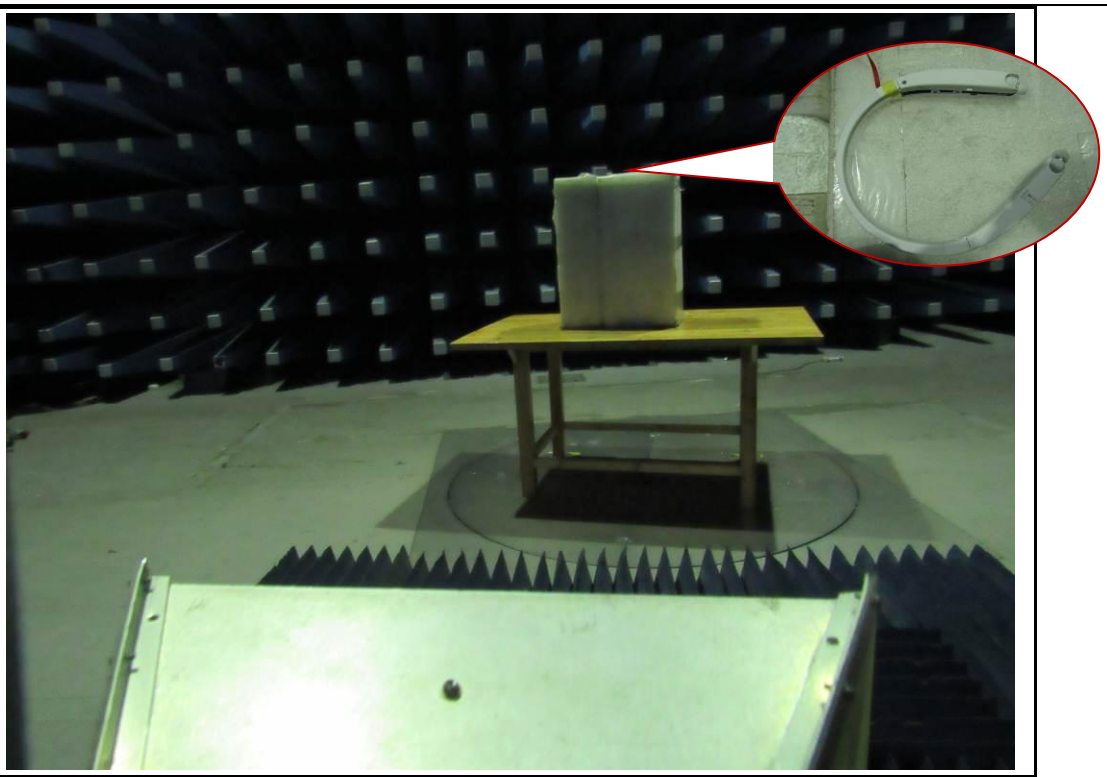
Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 1GHz



Radiated Spurious Emissions Test Setup Above 1GHz

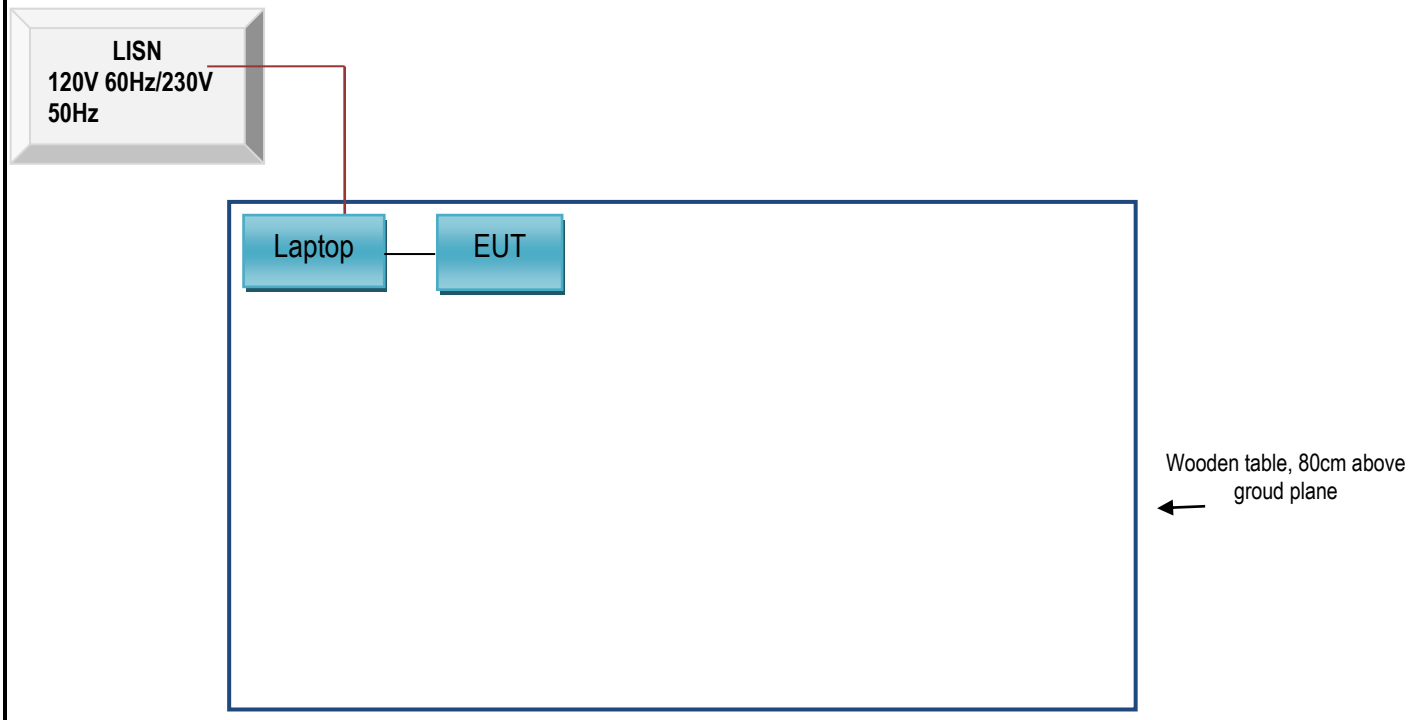


Radiated Spurious Emissions Test Setup Above 1GHz

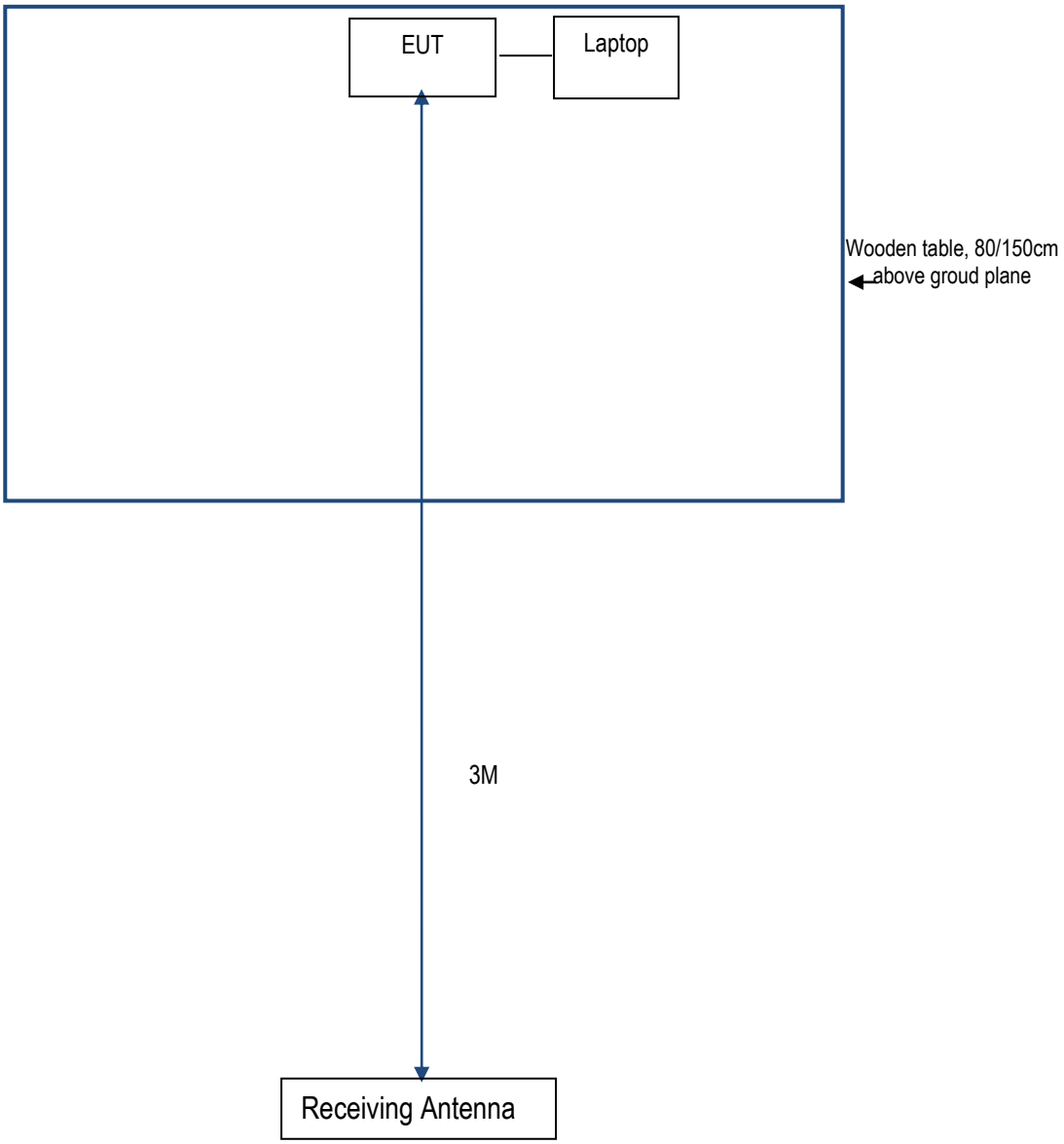
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for AC Line 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	Calibration Date	Calibration Due Date
Lenovo	Laptop	Y471A	N/A	N/A

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

Please see attachment

Annex E. DECLARATION OF SIMILARITY

To: SIEMIC INC.

Declaration letter

Dear Sir,

For our business issue and marketing requirement, we would like to list different models numbers on the FCC certificates and reports, as following:

Model No.: Model name SX-888
Model name SX-888A SX-888B SX-888C

The difference between the two models Model name SX-888 and Model name SX-888A SX-888B SX-888C are as follows:

The Serial Model Name Model name SX-888A SX-888B SX-888C Different model name and shape only, like all the other.

Thank you!

FCC ID: UHB-SX-888

Signature: Ye jie bin

Printed name/title: Ye Jie Bin/General Manager

Contact information /Address: Shenzhen Shuaixian Electronic Equipment Co., Ltd.
No.10 Lane 3, Longxing Rd., Dakang Long Village,Henggang Town, Longgang Dist., Shenzhen,518116 China