RF TEST REPORT

Report No.: Q200102S012-FCC-R2

Supersede Report No.: N/A

Applicant	ZTE Corporation
Product Name	3G Smart Feature Phone
Model No.	Z2317
Serial No.	N/A
Test Standard	FCC Part 15.247, ANSI C63.10: 2013
Test Date	Sep 02 to 09, 2019
Issue Date	Jan. 21, 2020
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Aaron Liang	David Huang
Aaron Liang Test Engineer	David Huang Checked By

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

Issued by:

BUREAU VERITAS (SHENZHEN) CONSUMER PRODUCTS SERVICES CO., LTD

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CONTENTS

1. Report Revision History

Report No.	Report Version	Description	Issue Date
Q200102S012-FCC-R2	NONE	Original	Jan. 21, 2020

2. Customer information

Applicant Name	ZTE Corporation
Applicant Add	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China
Manufacturer	ZTE Corporation
Manufacturer Add	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China

3. Test site information

Lab performing tests	BUREAU VERITAS (SHENZHEN) CONSUMER PRODUCTS SERVICES CO., LTD
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	3G Smart Feature Phone
Main Model:	Z2317
Serial Model:	N/A
Date EUT received:	Aug 28, 2019
Test Date(s):	Sep 02 to 09, 2019
Equipment Category：	DSS
Antenna Gain:	GSM850: -1dBi PCS1900: -1.5dBi UMTS-FDD Band V: -1dBi UMTS-FDD Band II: -1.5dBi WIFI: 0dBi Bluetooth/BLE: 0dBi
Antenna Type:	PIFA antenna
Type of Modulation:	GSM / GPRS: GMSK EGPRS: GMSK UMTS-FDD: QPSK 802.11b/g/n: DSSS, OFDM Bluetooth: GFSK, π /4DQPSK, 8DPSK BLE: GFSK GPS:BPSK

RF Operating Frequency (ies):	GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz UMTS-FDD Band II TX:1852.4 ~ 1907.6 MHz; RX: 1932.4 ~ 1987.6 MHz WIFI: 802.11b/g/n(20M): 2412-2462 MHz WIFI: 802.11n(40M): 2422-2452 MHz Bluetooth& BLE: 2402-2480 MHz GPS: 1575.42 MHz
Max. Output Power:	7.88 dBm
Number of Channels:	GSM 850: 124CH PCS1900: 299CH UMTS-FDD Band V: 102CH UMTS-FDD Band II: 277CH WIFI :802.11b/g/n(20M): 11CH WIFI :802.11n(40M): 7CH Bluetooth: 79CH BLE: 40CH GPS:1CH
Port:	Please refer to the user's manual
Input Power:	Adapter 1: Model: TPA-97050050U01 Input: AC100-240V~50/60Hz,0.15A Output: DC 5.0V, 500mA Adapter 2: Model: 50.069MX03 Input: AC100-240V~50/60Hz,0.2A Output: DC 5.0V, 500mA Battery : Model: 5C1001 Spec: 3.7V, 1000mAh/3.7Wh Limited charge voltage: 4.2

Trade Name : ZTE

FCC ID: SRQ-ZTEZ2317

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& Restricted Band	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions& Restricted Band	Compliance

Measurement Uncertainty

Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge& Restricted Band and Radiated Emissions& Restricted Band	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 2 antennas:
A permanently attached PIFA antenna for Bluetooth/BLE/WIF/GPS, the gain is 0dBi for Bluetooth/BLE, the gain is 0dBi for WIFI.
A permanently attached PIFA antenna for GSM/PCS/UMTS, the gain is -1dBi for GSM850, -1.5dBi for PCS1900, -1dBi for UMTS-FDD Band V, -1.5dBi for UMTS-FDD Band II.

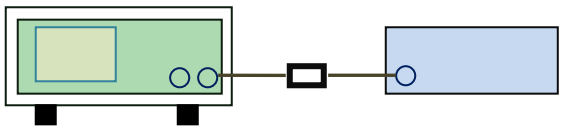
The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 Channel Separation

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
Test date :	Sep 09，2019
Tested By :	Aaron Liang

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

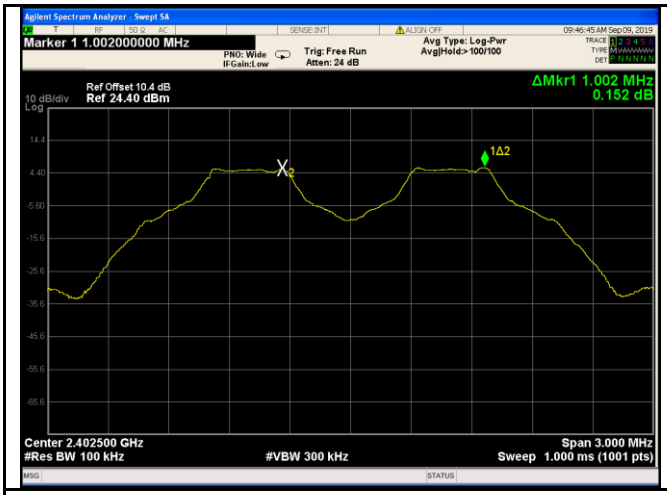
Test Plot ☑ Yes (See below) ☐ N/A

Channel Separation measurement result

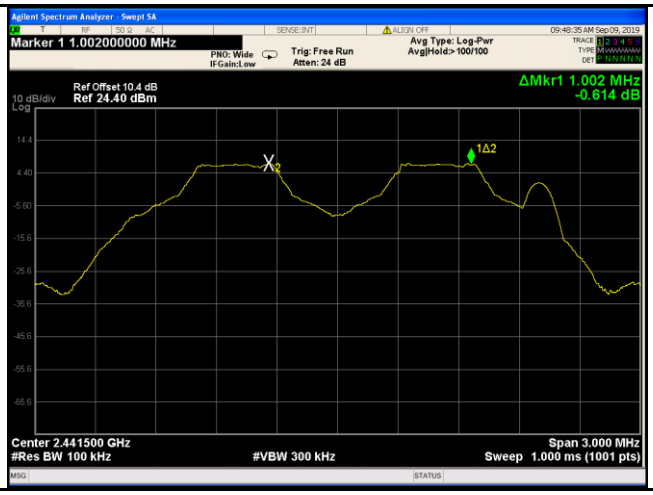
Type/ Modulation	CH	CH Frequency (MHz)	CH Separation (MHz)	Limit (MHz)	Result
CH Separation GFSK	Low Channel	2402	1.002	0.762	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.734	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.740	Pass
	Adjacency Channel	2479			
CH Separation π /4 DQPSK	Low Channel	2402	1.002	0.918	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.910	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.880	Pass
	Adjacency Channel	2479			
CH Separation 8DPSK	Low Channel	2402	1.002	0.856	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.866	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.846	Pass
	Adjacency Channel	2479			

Test Plots

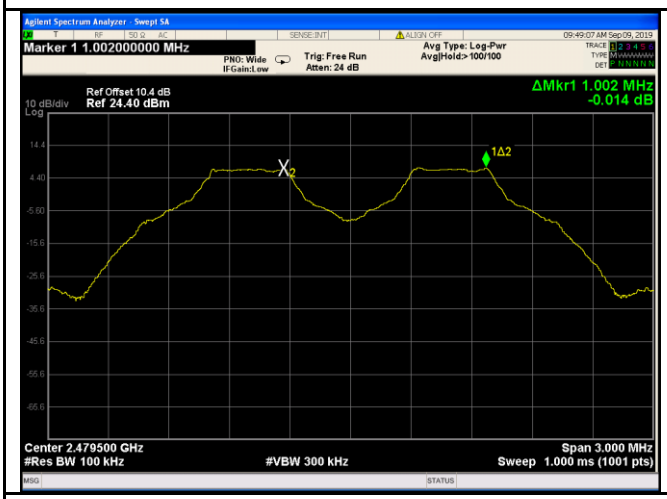
Channel Separation measurement result



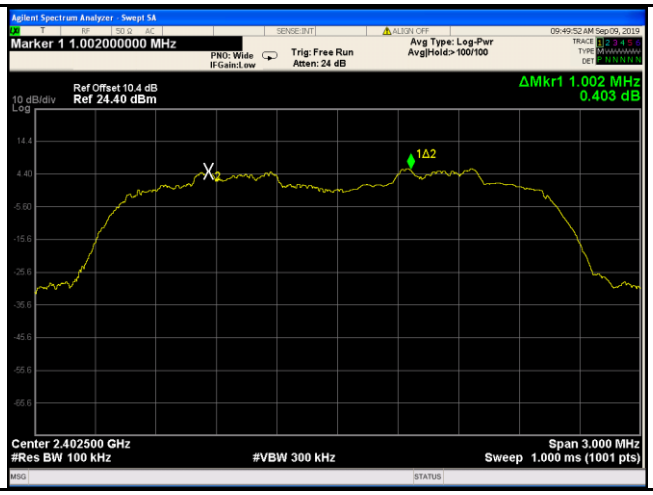
GFSK - Low Channel



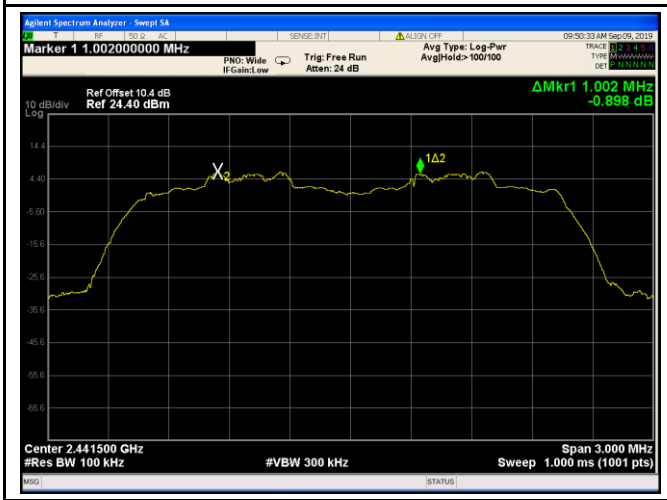
GFSK - Middle Channel



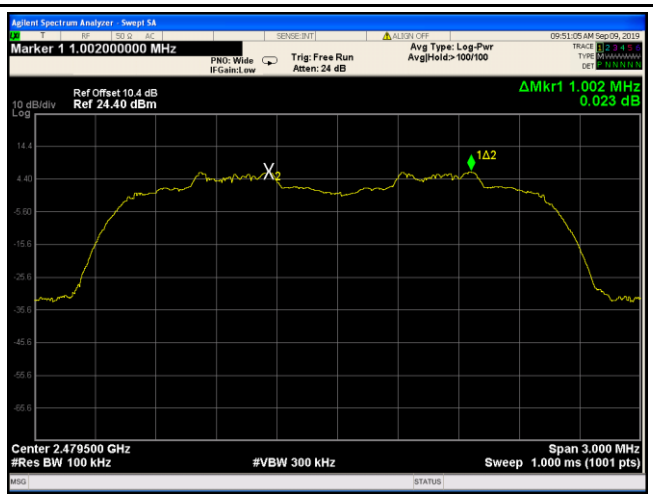
GFSK - High Channel



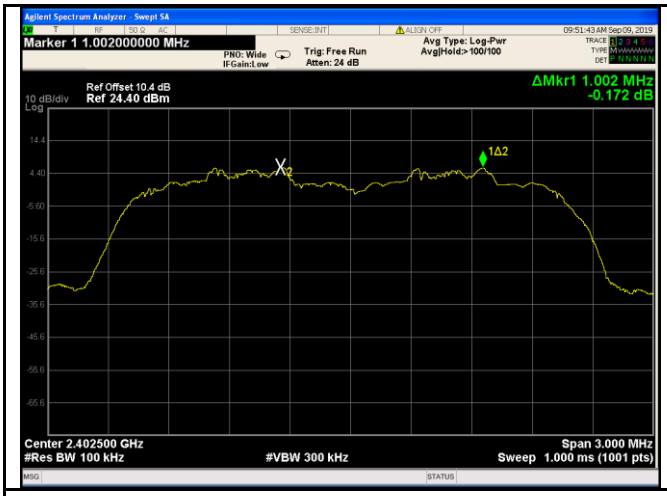
π /4 DPSK - Low Channel



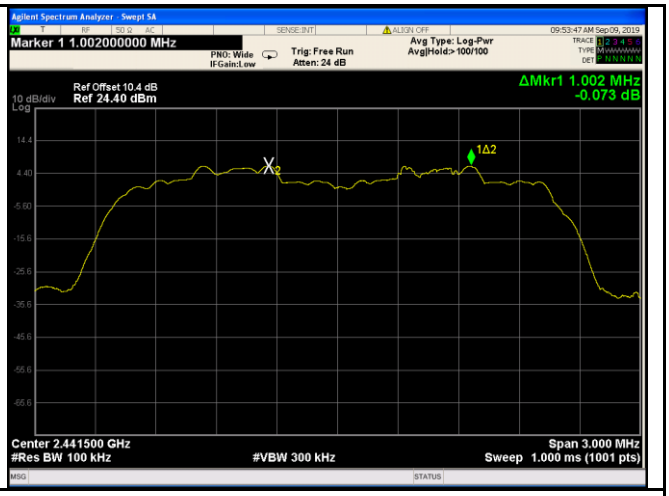
π /4 DQPSK - Middle Channel



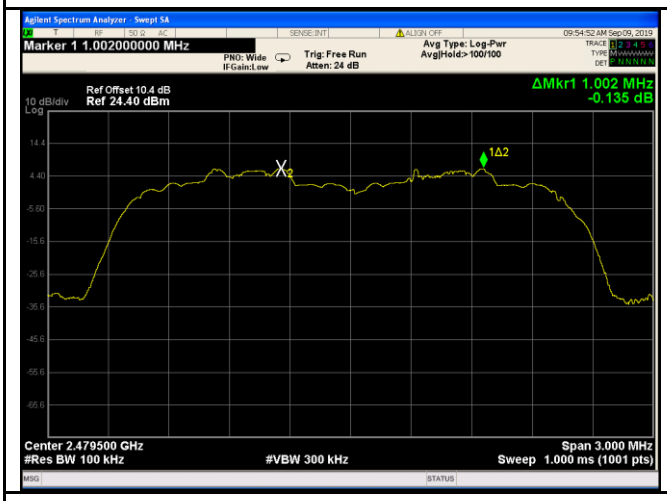
π /4 DQPSK - High Channel



8DPSK - Low Channel



8DPSK - Middle Channel

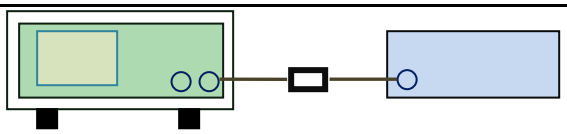


8DPSK - High Channel

6.3 20dB Bandwidth

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
Test date :	Sep 02 , 2019
Tested By :	Aaron Liang

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 Frequency (MHz)	20dB Bandwidth (MHz)
GFSK	Low	2402	1.143
	Mid	2441	1.101
	High	2480	1.11
π /4 DQPSK	Low	2402	1.377
	Mid	2441	1.365
	High	2480	1.32
8-DPSK	Low	2402	1.284
	Mid	2441	1.299
	High	2480	1.269

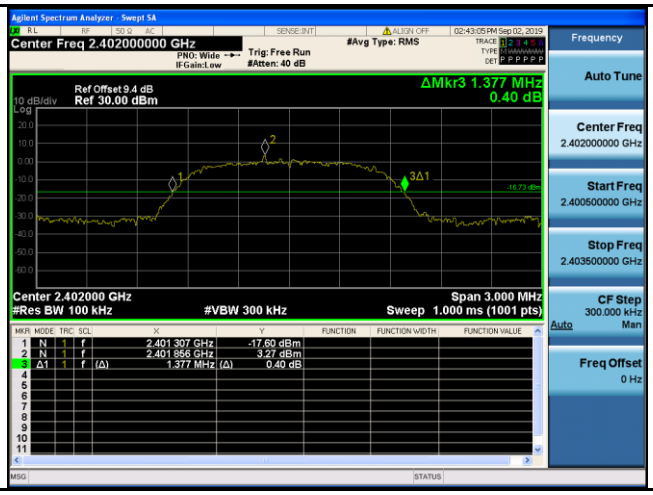
Test Plots

20dB Bandwidth measurement result

GFSK - Low Channel

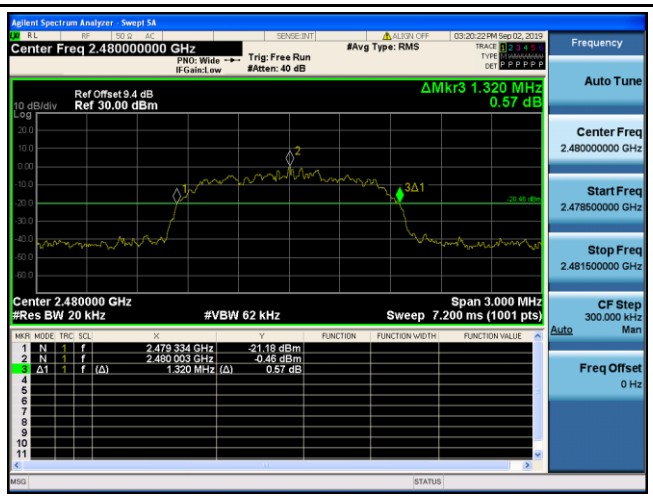
GFSK - Middle Channel

GFSK - High Channel

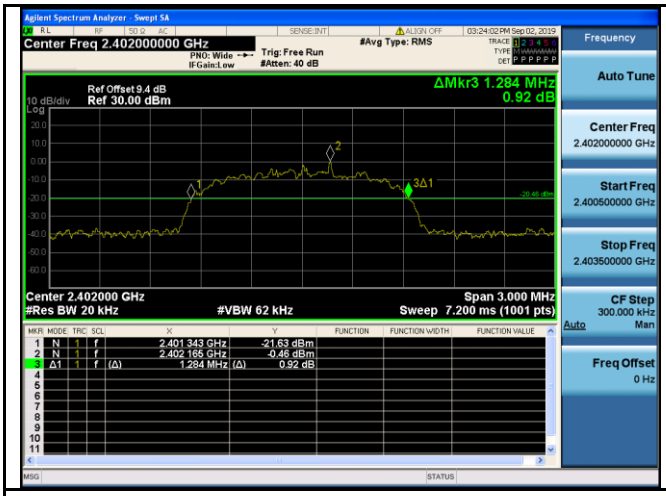


π /4 DPSK - Low Channel

π /4 DQPSK - Middle Channel



π /4 DQPSK - High Channel



8DPSK - Low Channel

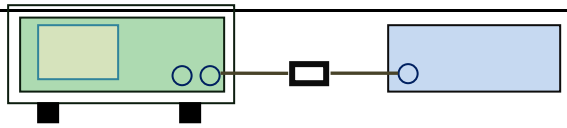
8DPSK - Middle Channel

8DPSK - High Channel

6.4 Peak Output Power

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
Test date :	Sep 07 , 2019
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (3)	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)	DTS in 902-928MHz, 2400-2483.5MHz: ≤ 1 Watt	☐
Test Setup	 Spectrum Analyzer EUT		
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

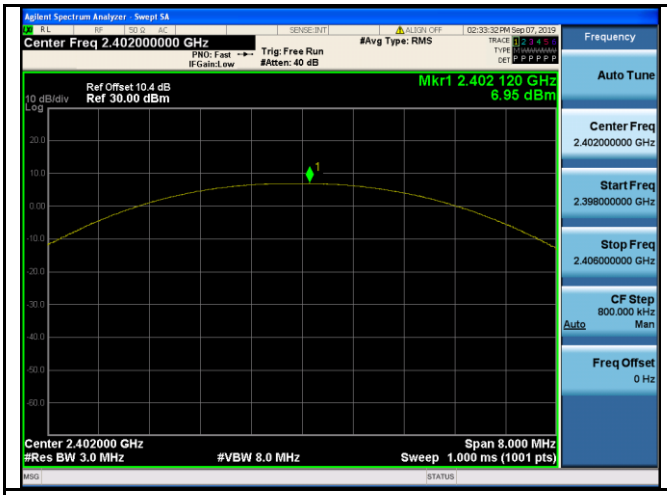
Test Plot ☑ Yes (See below) ☐ N/A

Peak Output Power measurement result

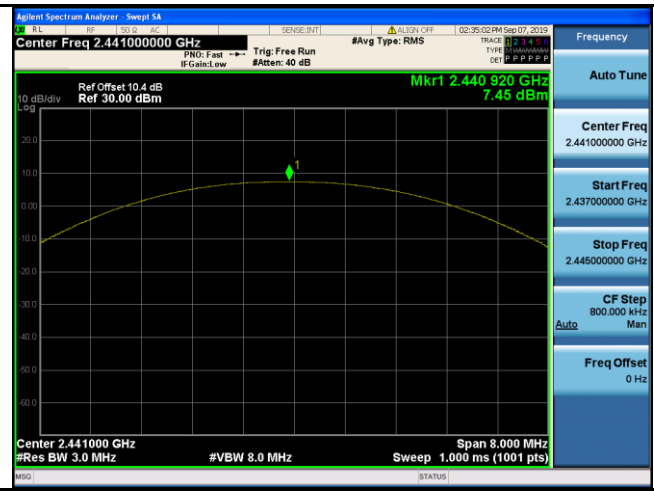
Type	Modulation	CH	Frequency (MHz)	Conducted Power (dBm)	Limit (mW)	Result
Output power	GFSK	Low	2402	6.95	125	Pass
		Mid	2441	7.45	125	Pass
		High	2480	**7.88**	125	Pass
	π /4 DQPSK	Low	2402	6.78	125	Pass
		Mid	2441	7.48	125	Pass
		High	2480	7.55	125	Pass
	8-DPSK	Low	2402	6.79	125	Pass
		Mid	2441	7.35	125	Pass
		High	2480	7.69	125	Pass

Test Plots

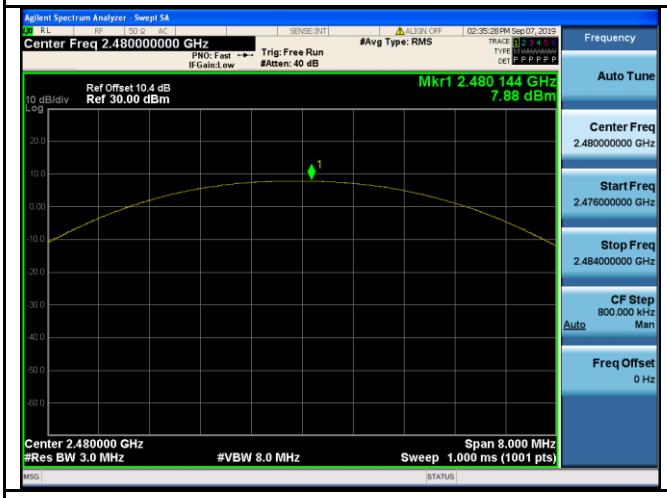
Output Power measurement result



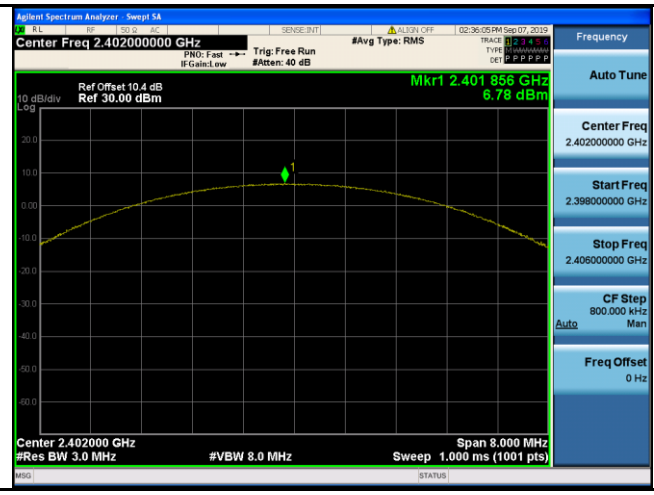
GFSK Output power - Low CH 2402



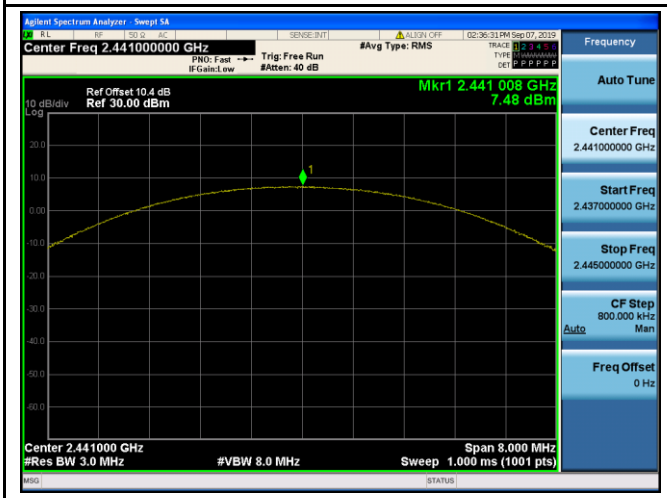
GFSK Output power - Mid CH 2441



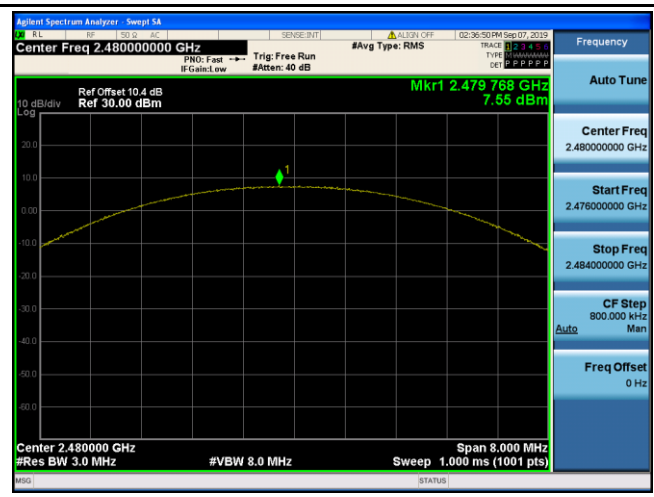
GFSK Output power - High CH 2480



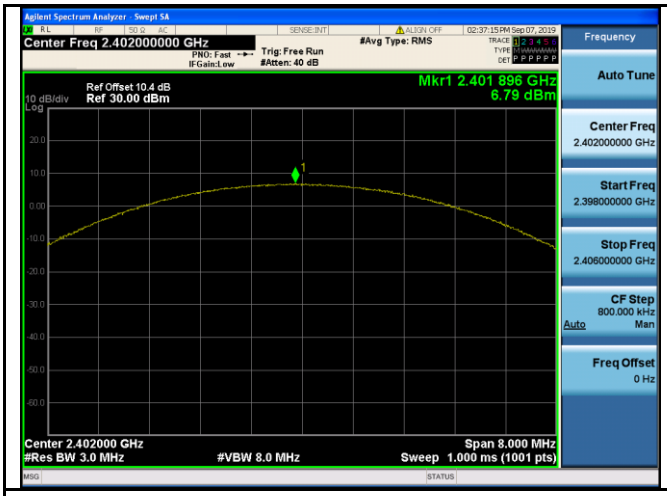
π /4 DQPSK Output power - Low CH 2402



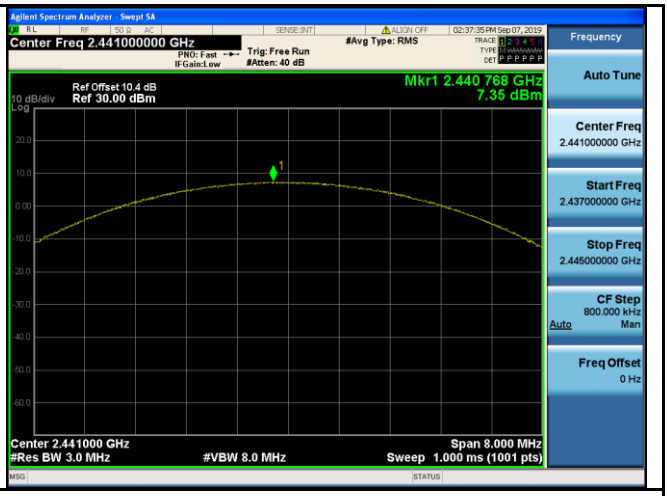
π /4 DQPSK Output power - Mid CH 2441



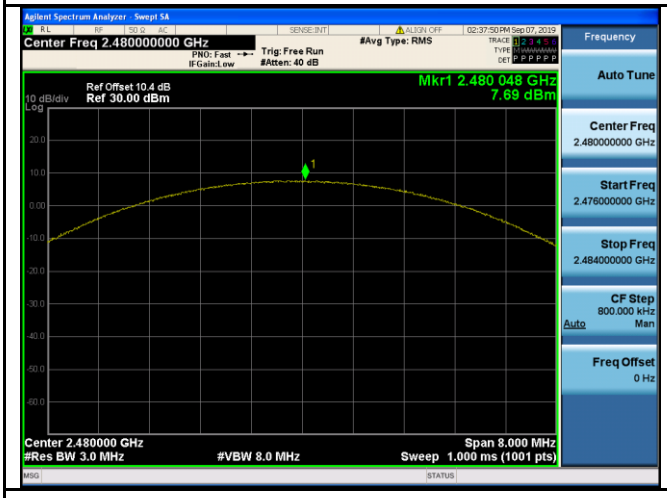
π /4 DQPSK Output power - High CH 2480



8DPSK Output power - Low CH 2402



8DPSK Output power - Mid CH 2441

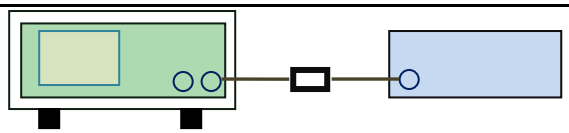


8DPSK Output power - High CH 2480

6.5 Number of Hopping Channel

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
Test date :	Sep 02 , 2019
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a)(1)(iii)	a)	FHSS in 2400-2483.5MHz ≥ 15 channels	☑
Test Setup	 Spectrum Analyzer EUT		
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

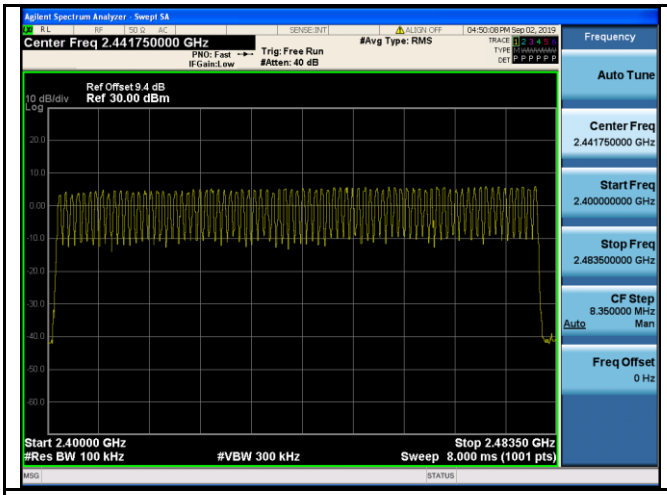
Test Plot ☑ Yes (See below) ☐ N/A

Number of Hopping Channel measurement result

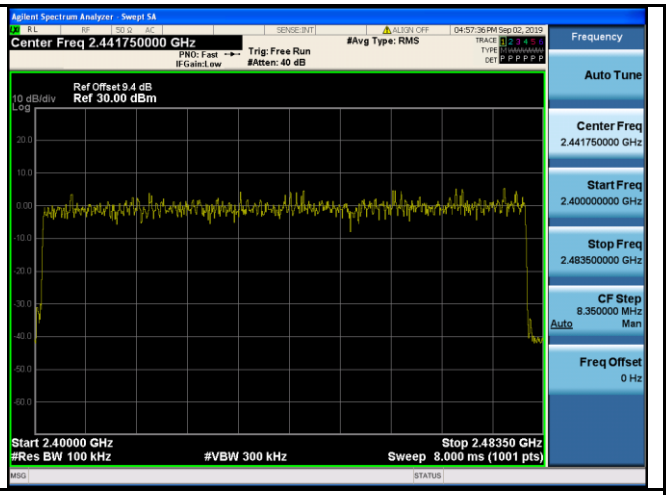
Type	Modulation	Frequency Range	Number of Hopping Channel	Limit
Number of Hopping Channel	GFSK	2400-2483.5	79	15
	π /4 DQPSK	2400-2483.5	79	15
	8-DPSK	2400-2483.5	79	15

Test Plots

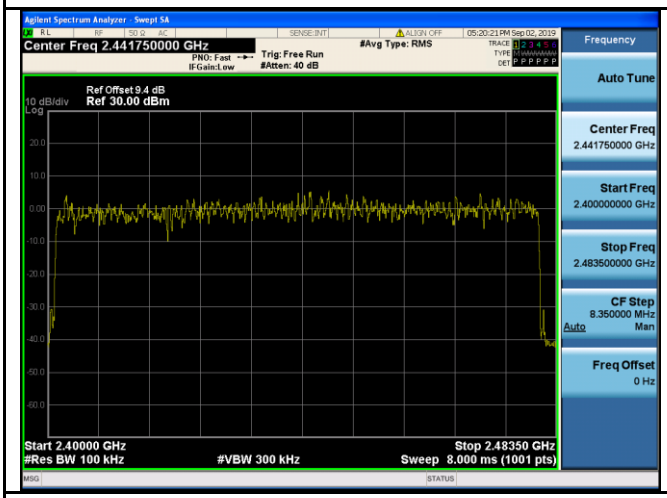
Number of Hopping Channels measurement result



GFSK



π /4DQPSK

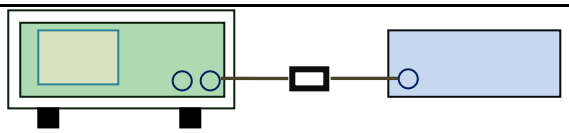


8DPSK

6.6 Time of Occupancy (Dwell Time)

Temperature	25°C
Relative Humidity	57%
Atmospheric Pressure	1024mbar
Test date :	Sep 09 , 2019
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(a)(1)(iii)	a)	Dwell Time < 0.4s	☑
Test Setup	 Spectrum Analyzer EUT		
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

GFSK

Mode	Number of Hopping Channel	Number of transmission in a period(channel number*0.4 sec)				Length of transmission time (msec)	Result (msec)	Limit (msec)	PASS / FAIL
		period (sec)	sweep time (sec)	times in a sweep	times in a period				
DH1	79	31.6	3.16	10	100	0.401	40.1	400.0	PASS
DH3	79	31.6	3.16	9	90	1.652	148.68	400	PASS
DH5	79	31.6	3.16	13	130	2.873	373.49	400	PASS

π /4 DQPSK

Mode	Number of Hopping Channel	Number of transmission in a period(channel number*0.4 sec)				Length of transmission time (msec)	Result (msec)	Limit (msec)	PASS / FAIL
		period (sec)	sweep time (sec)	times in a sweep	times in a period				
3DH1	79	31.6	3.16	13	130	1.651	214.63	400	PASS
3DH3	79	31.6	3.16	9	90	1.72	154.8	400	PASS
3DH5	79	31.6	3.16	6	60	2.877	172.62	400	PASS

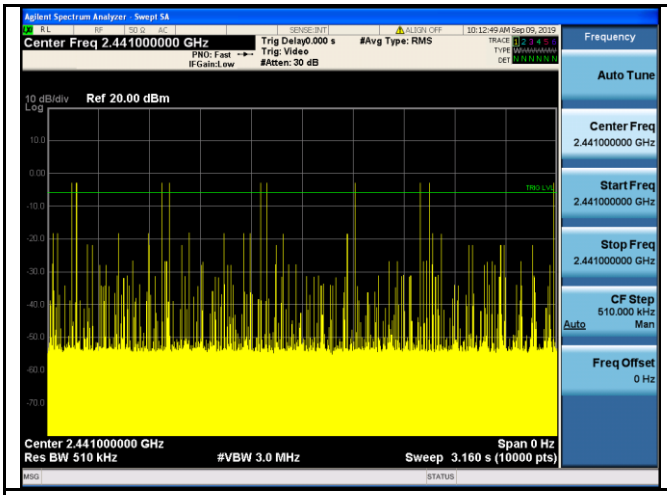
8-DPSK

Mode	Number of Hopping Channel	Number of transmission in a period(channel number*0.4 sec)				Length of transmission time (msec)	Result (msec)	Limit (msec)	PASS / FAIL
		period (sec)	sweep time (sec)	times in a sweep	times in a period				
3DH1	79	31.6	3.16	9	90	0.400	36	400	PASS
3DH3	79	31.6	3.16	6	60	1.650	99	400	PASS
3DH5	79	31.6	3.16	11	110	2.878	316.58	400	PASS

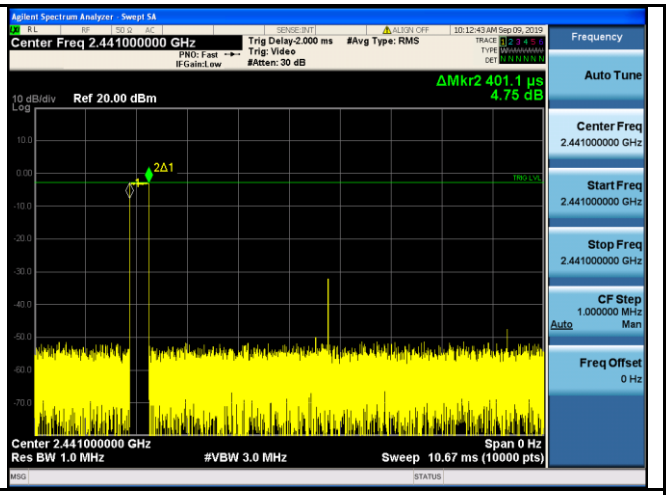
Test Plots

Dwell Time measurement result

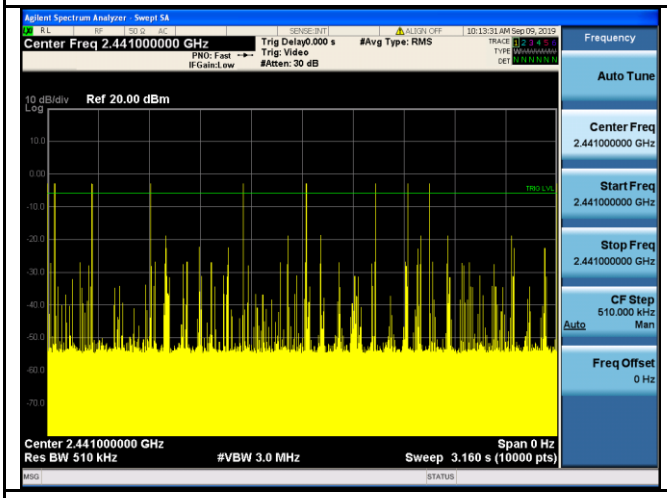
GFSK:



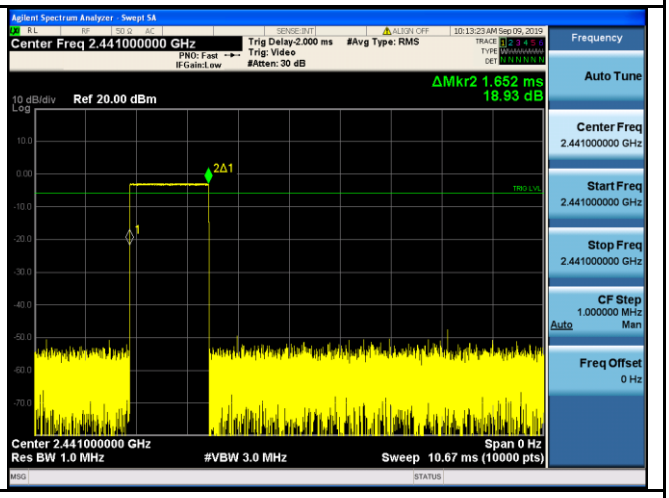
DH1-1



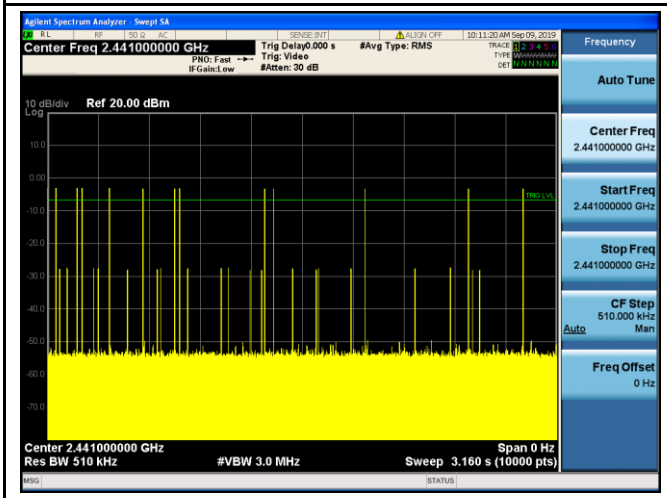
DH1-2



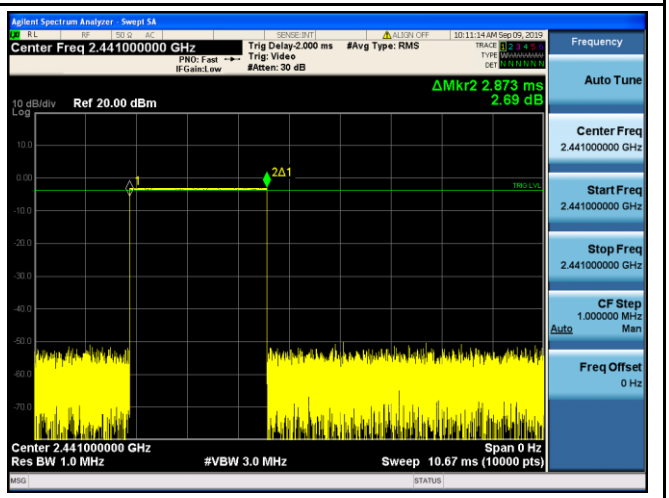
DH3-1



DH3-2

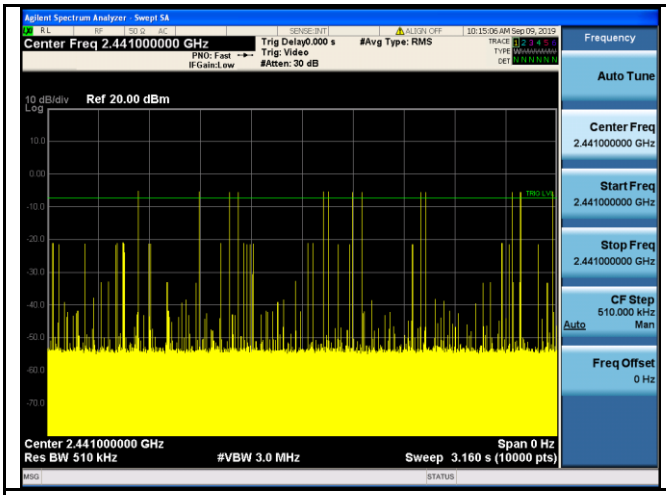


DH5-1

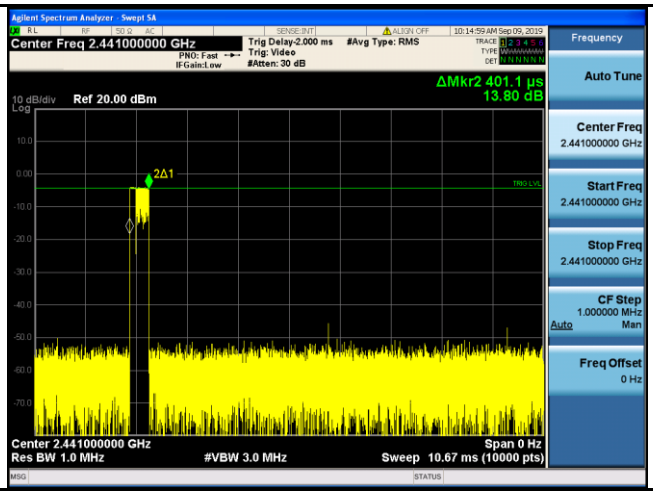


DH5-2

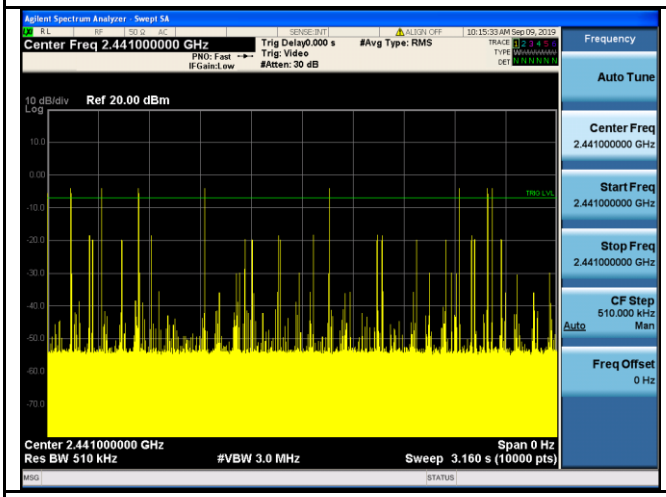
π /4 DQPSK



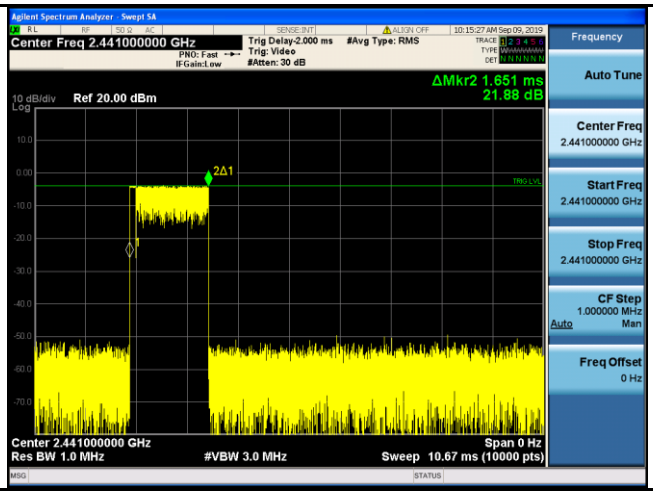
2DH1-1



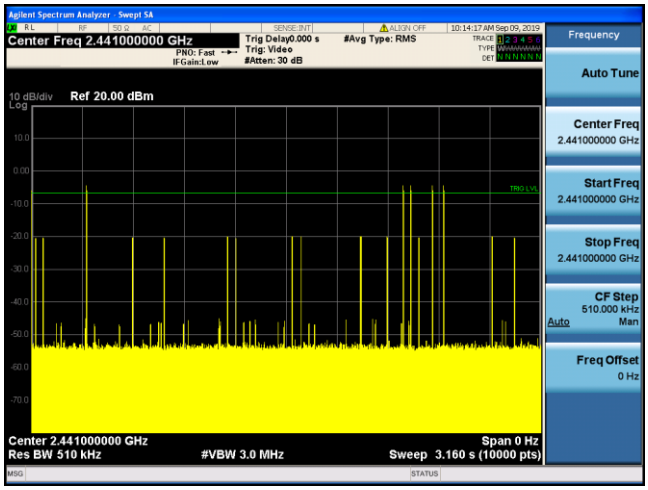
2DH1-2



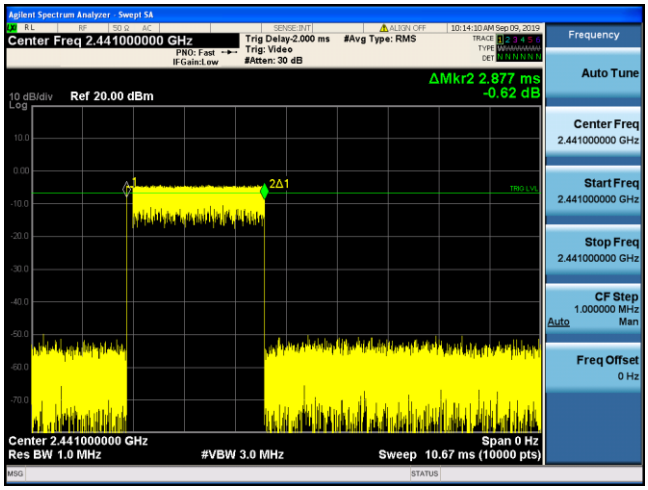
2DH3-1



2DH3-2

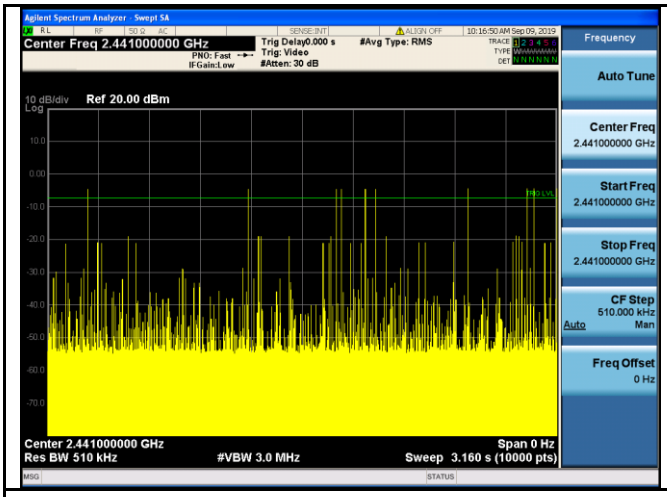


2DH5-1

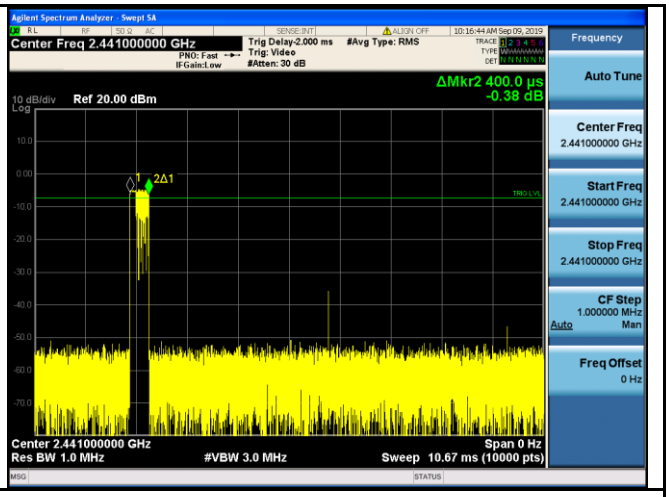


2DH5-2

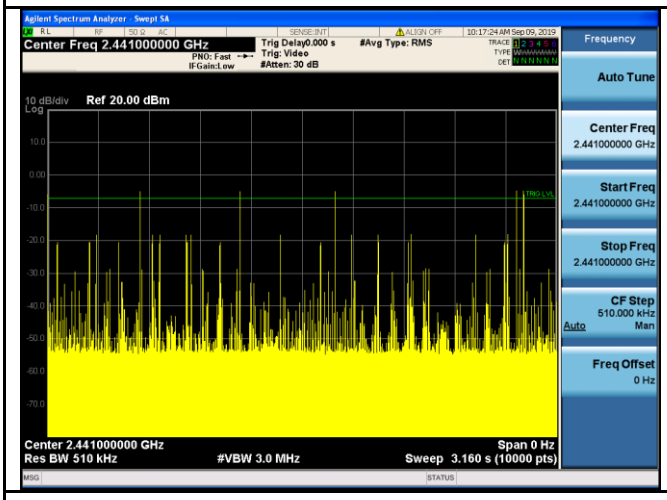
8-DPSK



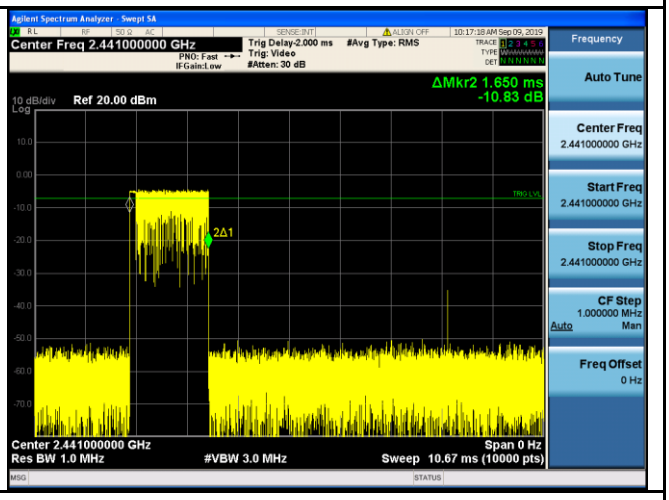
3DH1-1



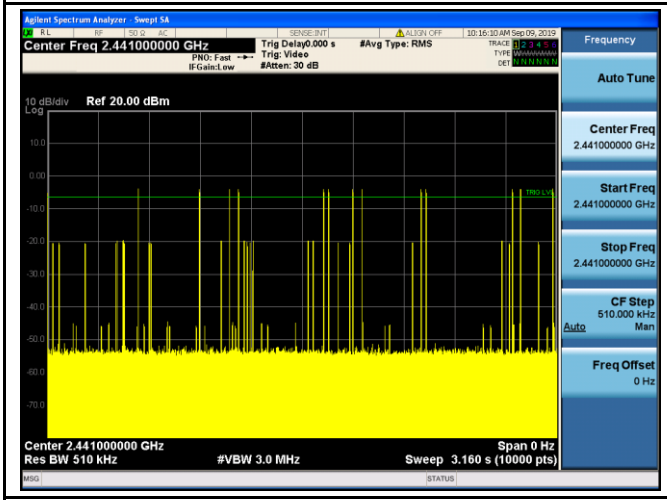
3DH1-2



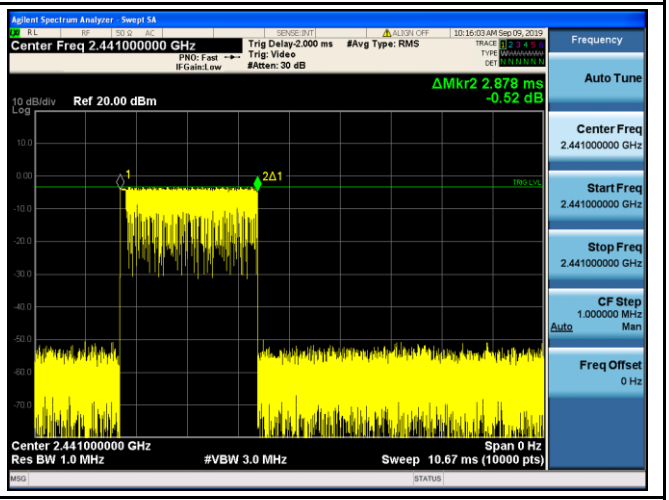
3DH3-1



3DH3-2



3DH5-1

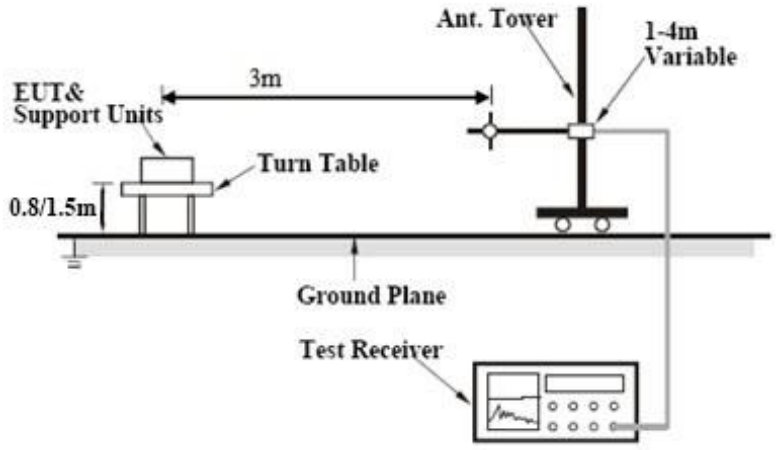


3DH5-2

6.7 Band Edge & Restricted Band

Temperature	26°C
Relative Humidity	55%
Atmospheric Pressure	1010mbar
Test date :	Sep 05，2019
Tested By :	Aaron Liang

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

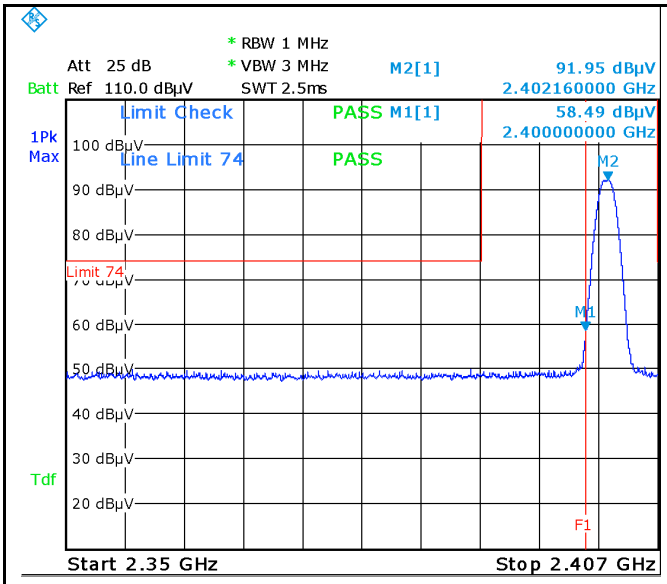
Test Data ☐ Yes ☑ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Worst Case Data:

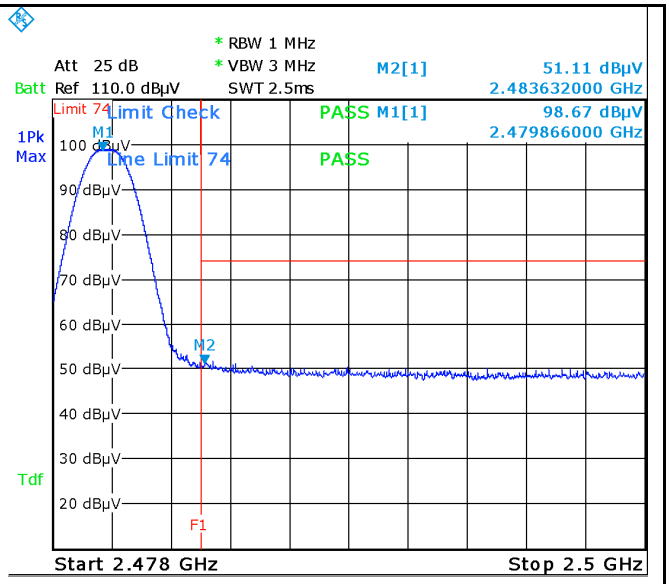
GFSK Mode & Antenna polarization: Horizontal

Test Plots



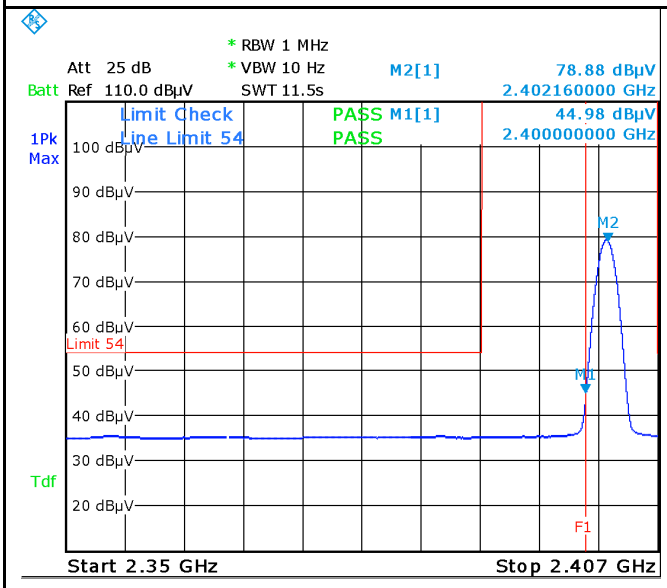
GFSK-Left Side-PK

Note: F1 is frequency 2400MHz

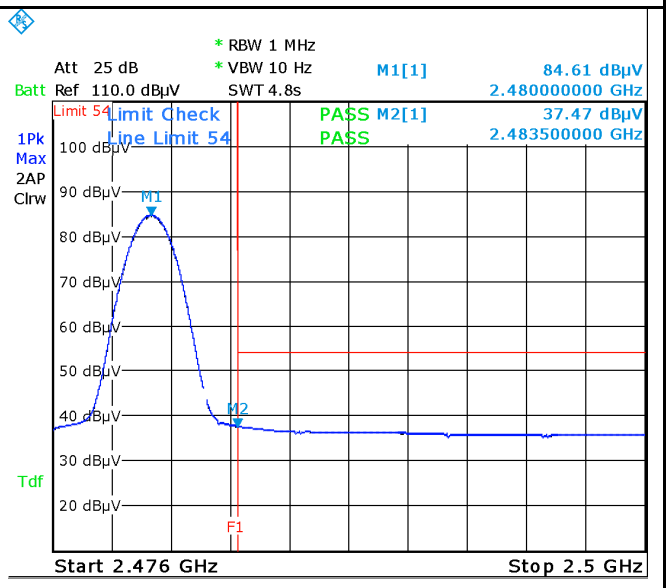


GFSK-Right Side-PK

Note: F1 is frequency 2483.5MHz

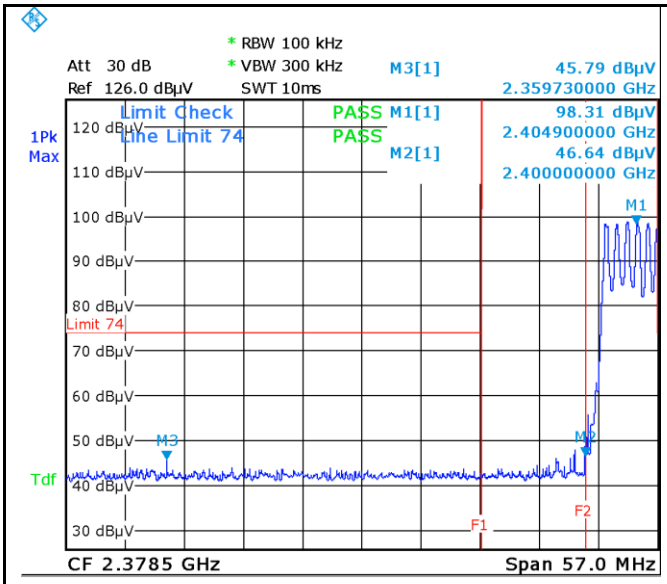


GFSK-Left Side-AV



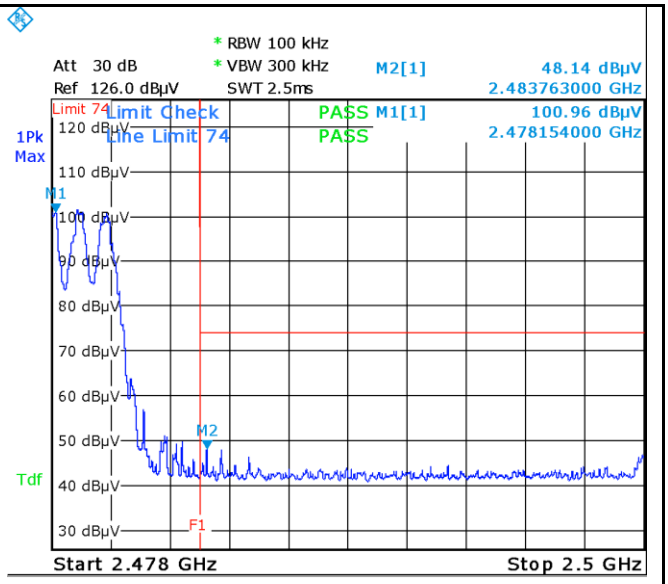
GFSK-Right Side-AV

HOPPING MODE



GFSK-Left Side-PK

Note: F1 is frequency 2400MHz



GFSK-Right Side-PK

Note: F1 is frequency 2483.5MHz

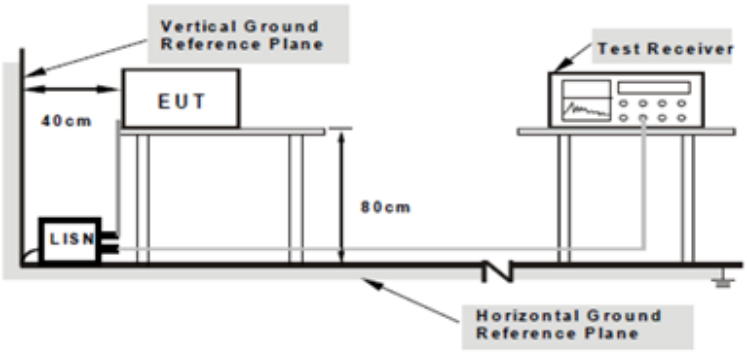
Note: 1, Both Horizontal and vertical polarities were investigated. The results above show only the worst case.

2. GFSK, π /4 DQPSK, 8-DPSK modes were investigated. The results above show only the worst case.

6.8 AC Power Line Conducted Emissions

Temperature	26°C
Relative Humidity	55%
Atmospheric Pressure	1010mbar
Test date :	Sep 05 , 2019
Tested By :	Aaron Liang

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.
<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 50W/50mH 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</td></tr>
</table>

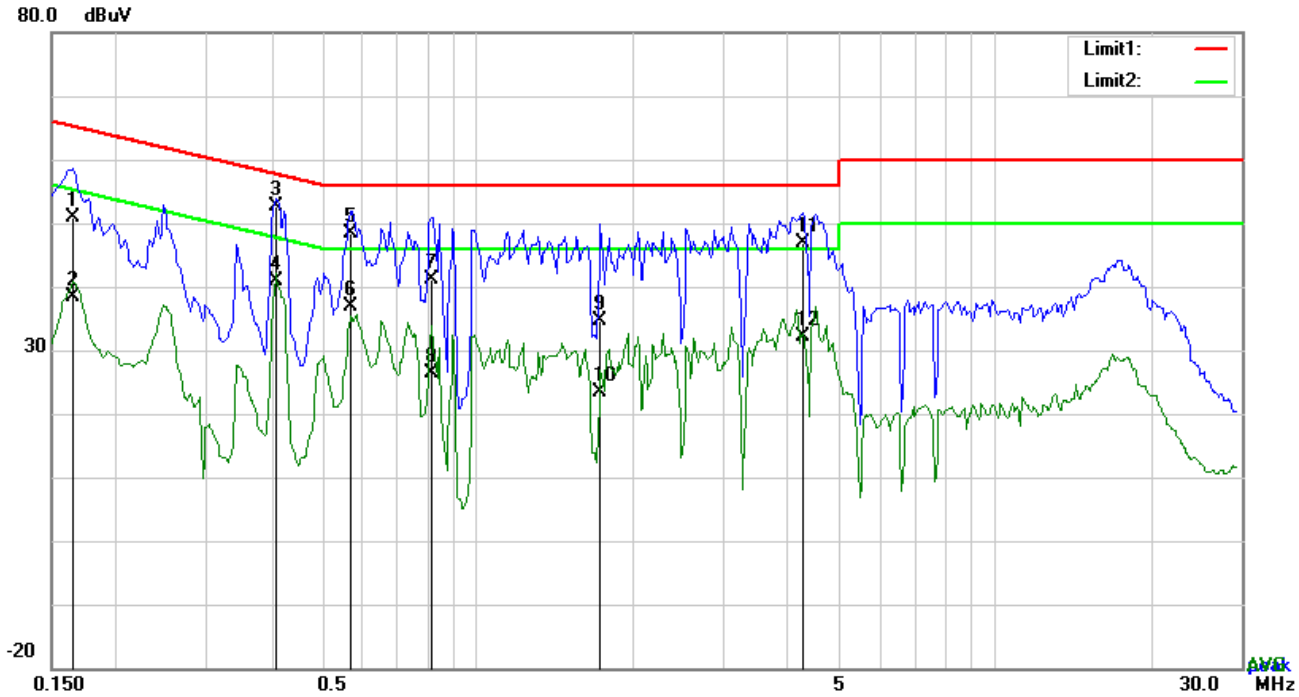
	coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range 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).
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Note: 1, The Phase Line Plot at 120Vac, 60Hz and 240Vac, 60Hz were investigated. The results below show only the worst case.

Test Mode:	Bluetooth Mode

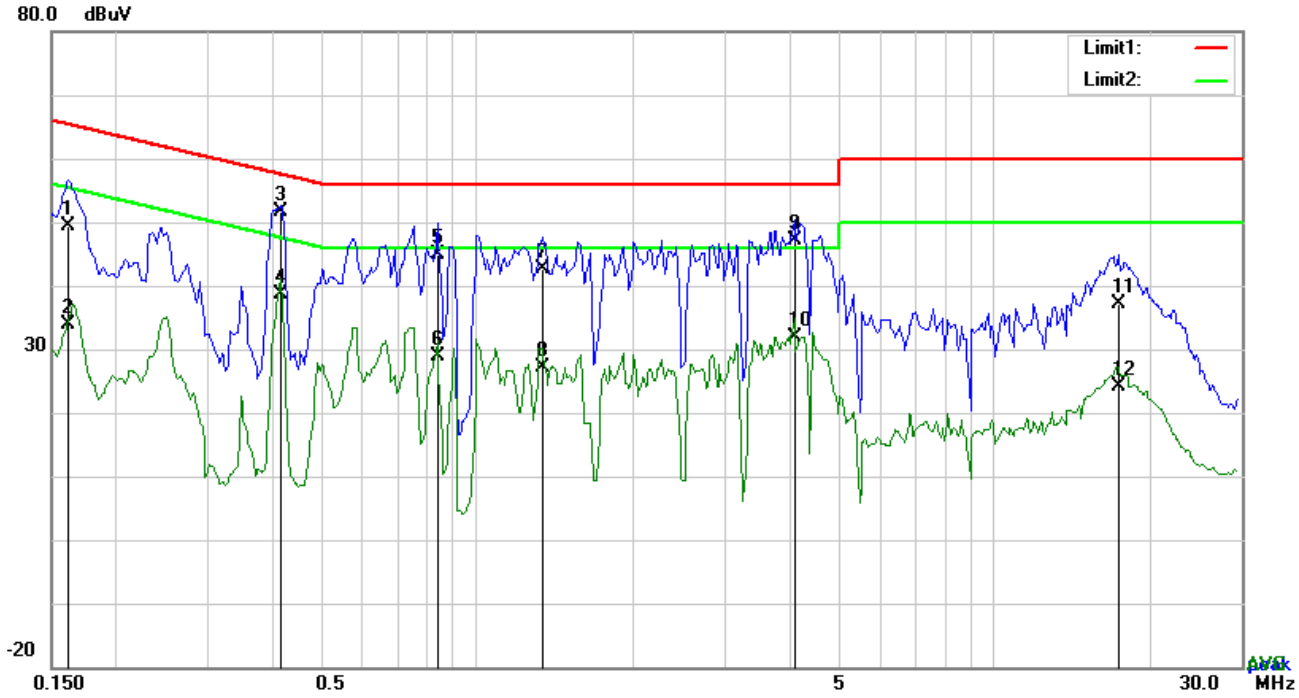


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1656	40.79	QP	10.12	50.91	65.18	-14.27
2	L1	0.1656	28.28	AVG	10.12	38.40	55.18	-16.78
3	L1	0.4074	42.65	QP	10.10	52.75	57.70	-4.95
4	L1	0.4074	30.66	AVG	10.10	40.76	47.70	-6.94
5	L1	0.5673	38.40	QP	10.10	48.50	56.00	-7.50
6	L1	0.5673	26.69	AVG	10.10	36.79	46.00	-9.21
7	L1	0.8169	30.98	QP	10.12	41.10	56.00	-14.90
8	L1	0.8169	16.29	AVG	10.12	26.41	46.00	-19.59
9	L1	1.7256	24.52	QP	10.14	34.66	56.00	-21.34
10	L1	1.7256	13.15	AVG	10.14	23.29	46.00	-22.71
11	L1	4.2480	36.81	QP	10.19	47.00	56.00	-9.00
12	L1	4.2480	21.84	AVG	10.19	32.03	46.00	-13.97

Test Mode:	Bluetooth Mode



Test Data

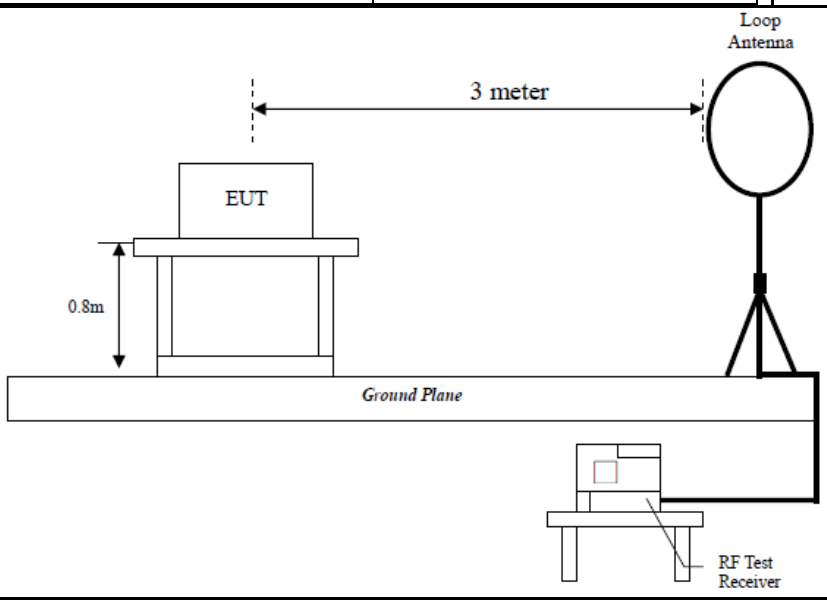
Phase Neutral Plot at 120Vac, 60Hz

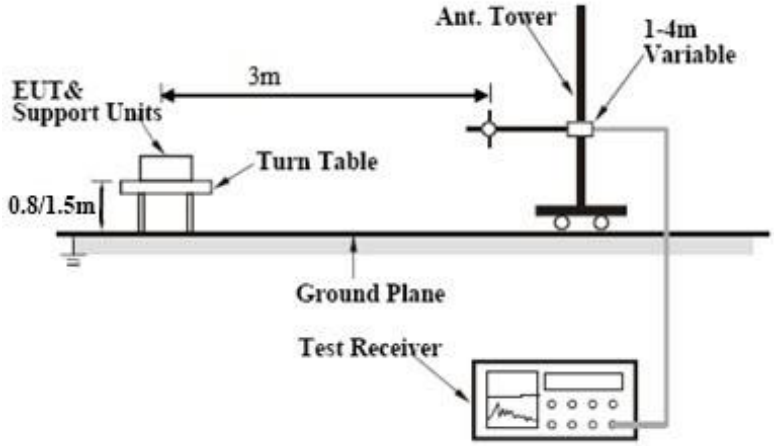
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1617	39.15	QP	10.14	49.29	65.38	-16.09
2	N	0.1617	23.70	AVG	10.14	33.84	55.38	-21.54
3	N	0.4191	41.41	QP	10.12	51.53	57.47	-5.94
4	N	0.4191	28.49	AVG	10.12	38.61	47.47	-8.86
5	N	0.8364	34.84	QP	10.14	44.98	56.00	-11.02
6	N	0.8364	18.85	AVG	10.14	28.99	46.00	-17.01
7	N	1.3317	32.45	QP	10.15	42.60	56.00	-13.40
8	N	1.3317	17.02	AVG	10.15	27.17	46.00	-18.83
9	N	4.0998	36.83	QP	10.20	47.03	56.00	-8.97
10	N	4.0998	21.73	AVG	10.20	31.93	46.00	-14.07
11	N	17.3247	26.70	QP	10.34	37.04	60.00	-22.96
12	N	17.3247	13.90	AVG	10.34	24.24	50.00	-25.76

6.9 Radiated Emissions & Restricted Band

Temperature	26°C
Relative Humidity	55%
Atmospheric Pressure	1010mbar
Test date :	Sep 05，2019
Tested By :	Aaron Liang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.205,
§15.209,
§15.247(d)</td><td>a)</td><td>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
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>0.009~0.490</td><td>2400/F(KHz)</td></tr>
<tr><td>0.490~1.705</td><td>24000/F(KHz)</td></tr>
<tr><td>1.705~30.0</td><td>30</td></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
</table>



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

Result ☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Result:

Test Mode:	Transmitting Mode

Frequency range: 9KHz - 30MHz

Freq. (MHz)	Detection value	Factor (dB/m)	Reading (dBuV/m)	Result (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)
--	--	--	--	--	--	>20
--	--	--	--	--	--	>20

Note:

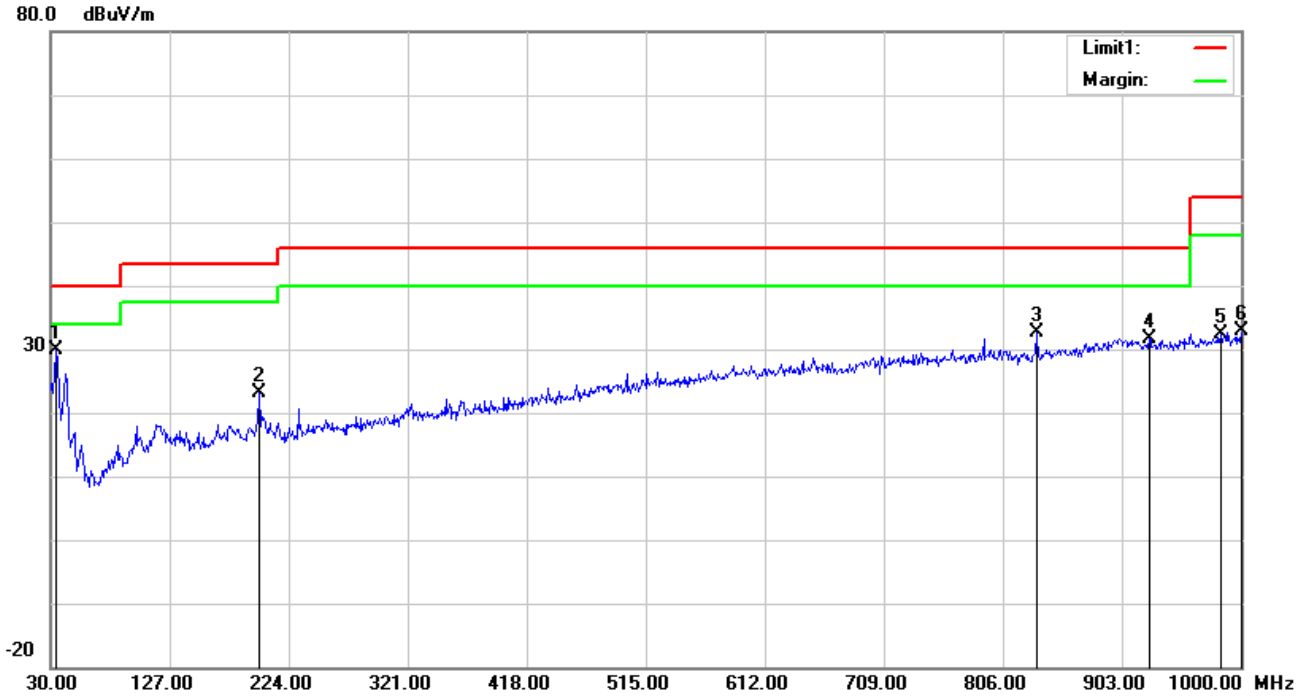
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

Test Mode:	Bluetooth Mode

30MHz -1GHz

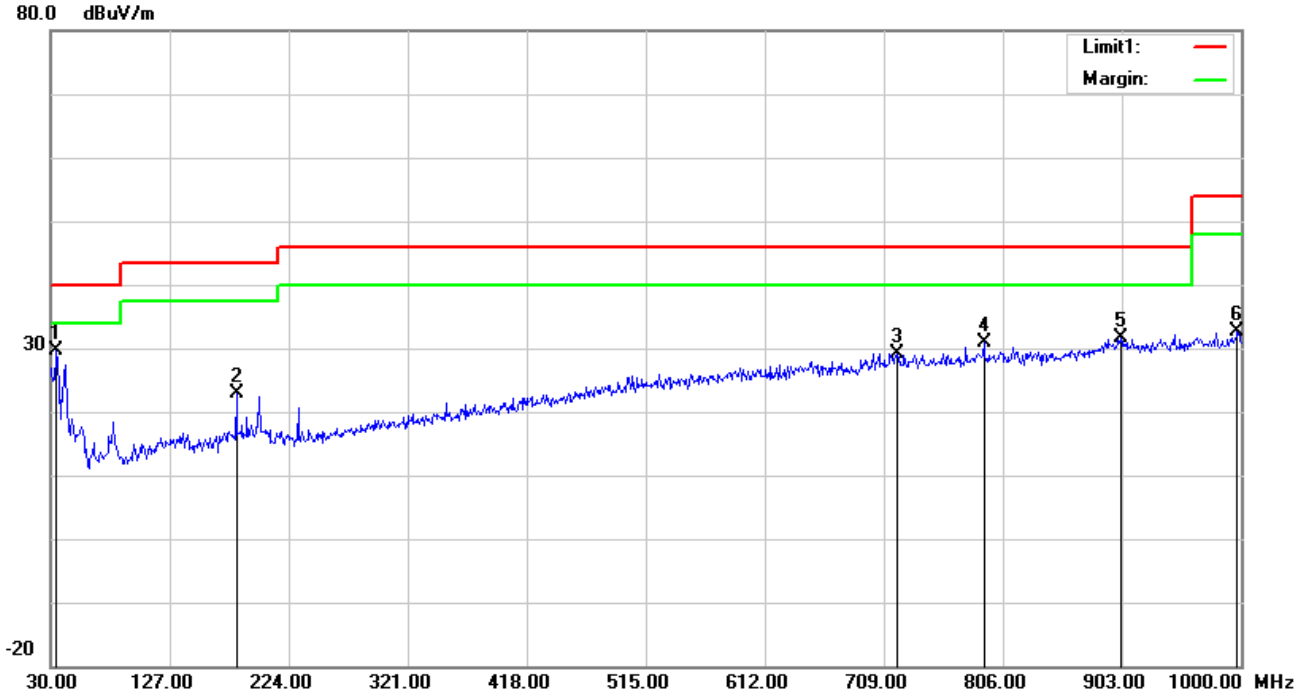


Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	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	H	34.8500	34.87	17.00	22.25	0.15	29.77	40.00	-10.23	100	321
2	H	199.7500	32.58	11.50	22.38	1.55	23.25	43.50	-20.25	100	45
3	H	833.1600	28.92	22.17	21.06	2.59	32.62	46.00	-13.38	100	82
4	H	925.3100	26.48	23.40	20.83	2.68	31.73	46.00	-14.27	100	116
5	H	983.5100	26.51	23.94	20.72	2.74	32.47	54.00	-21.53	100	305
6	H	1000.0000	26.29	24.40	20.69	2.76	32.76	54.00	-21.24	200	146

30MHz -1GHz



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	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	V	34.8500	34.82	17.00	22.25	0.15	29.72	40.00	-10.28	100	86
2	V	181.3200	32.37	11.28	22.26	1.47	22.86	43.50	-20.64	100	161
3	V	719.6700	26.44	21.58	21.32	2.44	29.14	46.00	-16.86	100	123
4	V	790.4800	27.42	22.11	21.17	2.54	30.90	46.00	-15.10	100	105
5	V	902.0300	26.07	23.86	20.88	2.65	31.70	46.00	-14.30	100	71
6	V	997.0900	26.31	24.32	20.70	2.76	32.69	54.00	-21.31	100	249

Above 1GHz

Test Mode:	Transmitting Mode

Low Channel: GFSK Mode (Worst Case) (2402 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4804	50.49PK	74	-23.51	266	114	64.24	-13.75
2	4804	33.51AV	54	-20.49	178	270	47.26	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4804	50.14PK	74	-23.86	234	199	63.89	-13.75
2	4804	33.27AV	54	-20.73	376	196	47.02	-13.75

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Preamplifier Gain.

3. Only emissions significantly above equipment noise floor are reported.

4. Margin value = Emission level – Limit value.

5. The testing has been conformed to 10*2402MHz=24,020MHz

6. X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Middle Channel: π /4DQPSK Mode (Worst Case) (2440 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4882	50.98 PK	74	-23.02	343	261	64.73	-13.75
2	4882	33.87 AV	54	-20.13	252	308	47.62	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4882	50.14 PK	74	-23.86	311	128	63.89	-13.75
2	4882	33.27 AV	54	-20.73	143	90	47.02	-13.75

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Preamplifier Gain.

3. Only emissions significantly above equipment noise floor are reported.

4. Margin value = Emission level – Limit value.

5. The testing has been conformed to 10*2440MHz=24,400MHz

6. X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

High Channel: 8DPSK Mode (Worst Case) (2480 MHz)

ANTENNA POLARITY & test distance: HORIZONTAL at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4960	51.24 PK	74	-22.76	343	275	64.99	-13.75
2	4960	34.51 AV	54	-19.49	133	105	48.26	-13.75
ANTENNA POLARITY & test distance: Vertical at 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4960	50.49 PK	74	-23.51	276	290	64.24	-13.75
2	4960	33.85 AV	54	-20.15	203	139	47.6	-13.75

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Preamplifier Gain.

3. Only emissions significantly above equipment noise floor are reported.

4. Margin value = Emission level – Limit value.

5. The testing has been conformed to 10*2462MHz=24,620MHz

6, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Annex A. TEST INSTRUMENT

RE& RSE

Frequency Range Below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESL6	1300.5001K06-100262-eQ	Apr. 04, 19	Apr. 03, 20
Bilog Antenna	Sunol Sciences	JB6	A110712	Apr. 08, 19	Apr. 07, 20
Active Antenna	CMO-POWER	AL-130	121031	Mar. 27, 19	Mar. 26, 20
Signal Amplifier	HP	8447E	443008	Mar. 28, 19	Mar. 27, 20
3m Semi-anechoic Chamber	SAEMC	9m*6m*6m	N/A	Oct. 18,18	Oct. 17,21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A

RE& RSE

Frequency Range Above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum	Agilent	E4446A	MY46180622	8-May-19	7-May-20
MXA signal analyzer	Agilent	N9020A	MY49100060	Mar. 28, 19	Mar. 27, 20
Horn Antenna	COM-POWER	HAH-118	71259	Mar. 22, 19	Mar. 21, 20
Horn Antenna	COM-POWER	HAH-118	71283	Mar. 20, 19	Mar. 19, 20

SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170147	Jun. 30, 19	Jun. 29, 20
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170242	Jun. 30, 19	Jun. 29, 20
AMPLIFIER	EM Electornic Corporation	EM01G26G	60613	Mar. 28, 19	Mar. 27, 20
AMPLIFIER	Emc Instruments Corporation	Emc012645	980077	Jan. 04, 19	Jan. 03,20
3m Semi-anechoic	SAEMC	9m*6m*6m	N/A	Oct. 18,18	Oct. 17,21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A

Antenna Port Conducted RF measurement

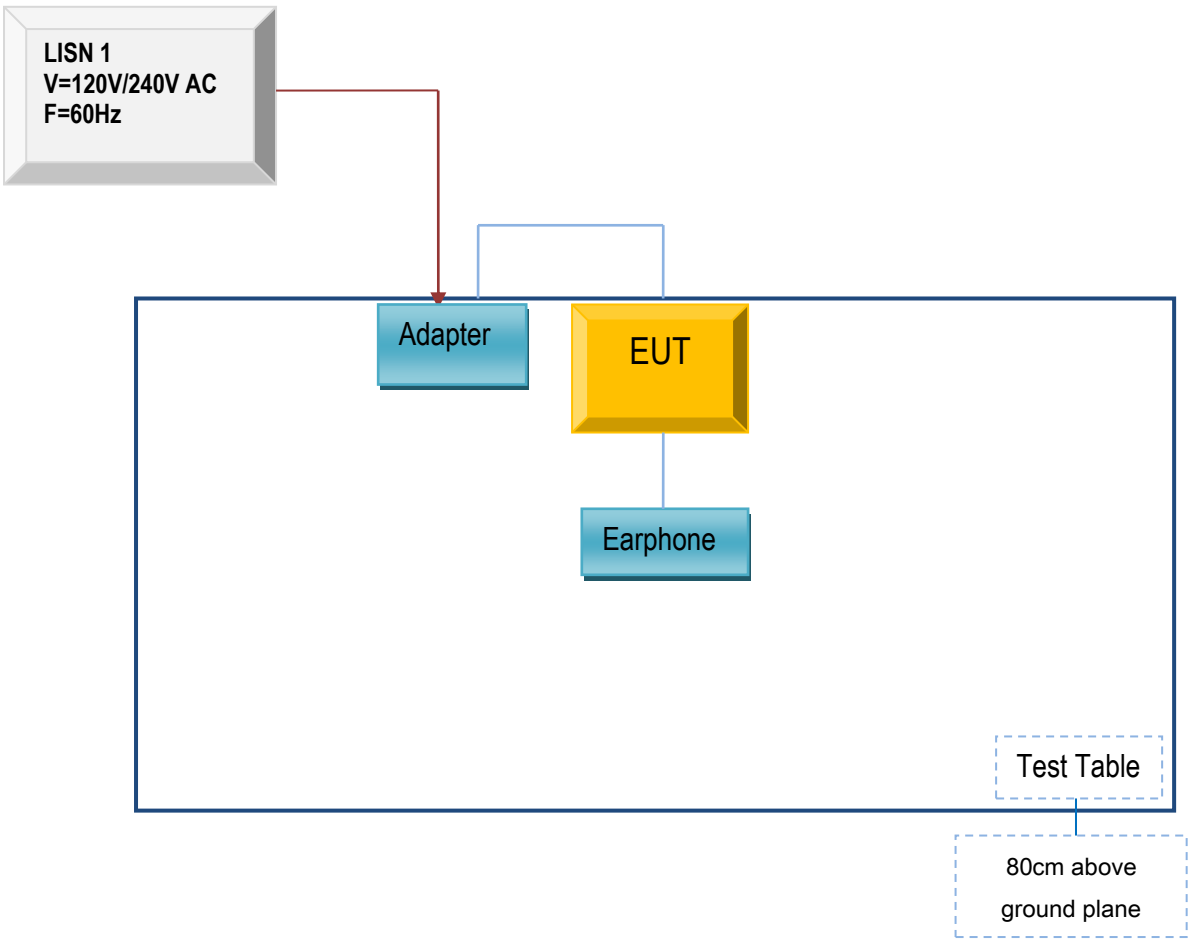
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Wireless Connectivity	R&S	CMW270	1201.0002K75	Nov. 29, 18	Nov. 28, 19
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 28,19	Mar. 27,20
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 28,19	Mar. 27,20
RF Control Unit	Tonscend	JS0806-2	188060112	Mar. 28,19	Mar. 27,20
Signal Generation	Agilent	E4421B	US40051152	Nov. 29, 18	Nov. 28, 19
DC Power Supply	Agilent	E3640A	MY40004013	Mar. 28,19	Mar. 27,20
Programmable Temperature &	Hongjin	HYC-TH-225DH	DG-180746	Mar. 28,19	Mar. 27,20

Test System	Tonscend	JS 1120-3	N/A	N/A	N/A
Power Splitter	Weinschel	1580-1	TL177	Mar. 20,19	Mar. 19,20
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	112012	Mar. 28,19	Mar. 27,20
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	121393	Mar. 28,19	Mar. 27,20
Wireless Communication Test Set	ROHDE&SCHWARZ	CMW500	1201.0002K500-155842-Gd	Aug. 06, 19	Aug. 05, 20

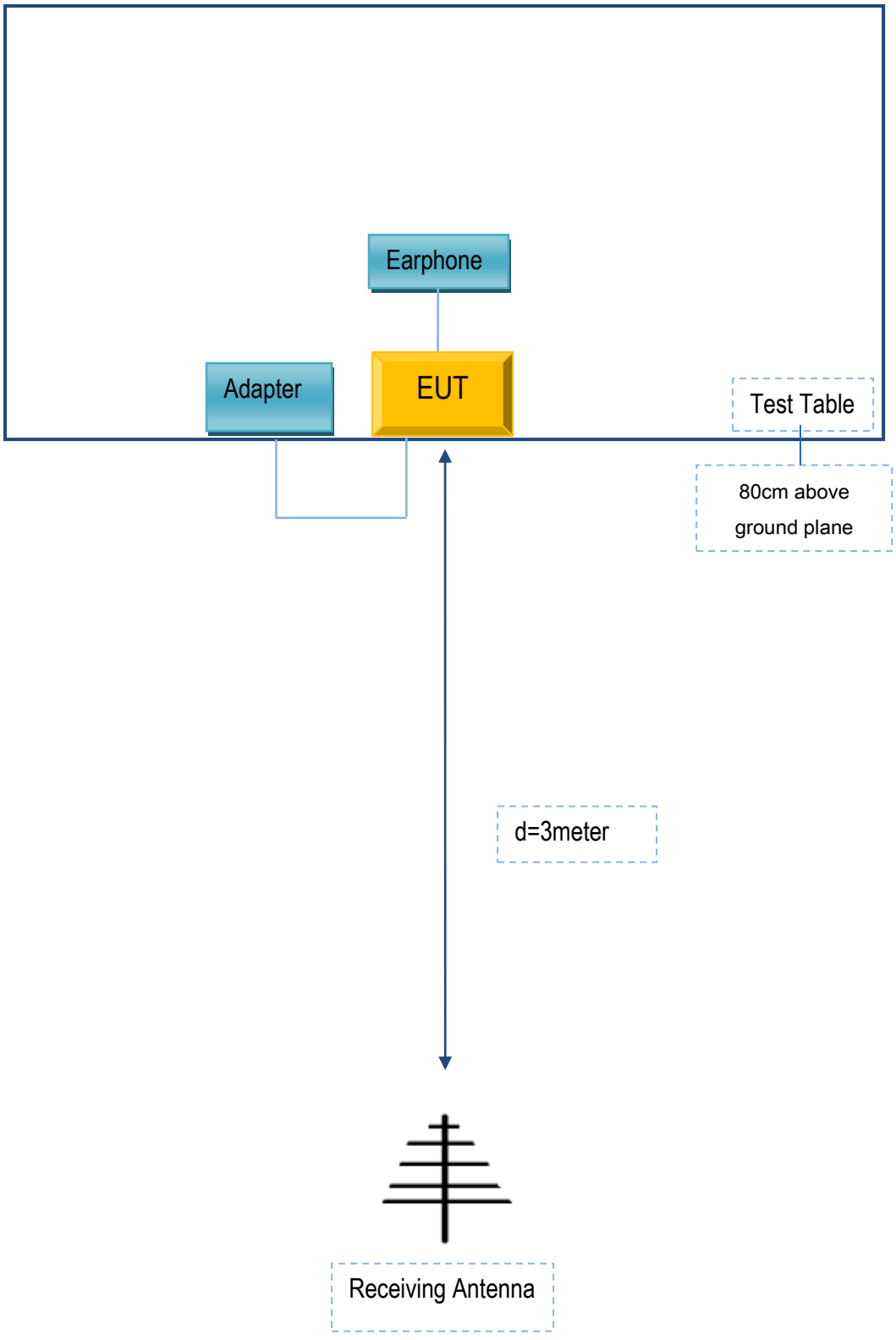
Annex B. TEST SETUP AND SUPPORTING EQUIPMENT

Annex B.i. TEST SET UP BLOCK

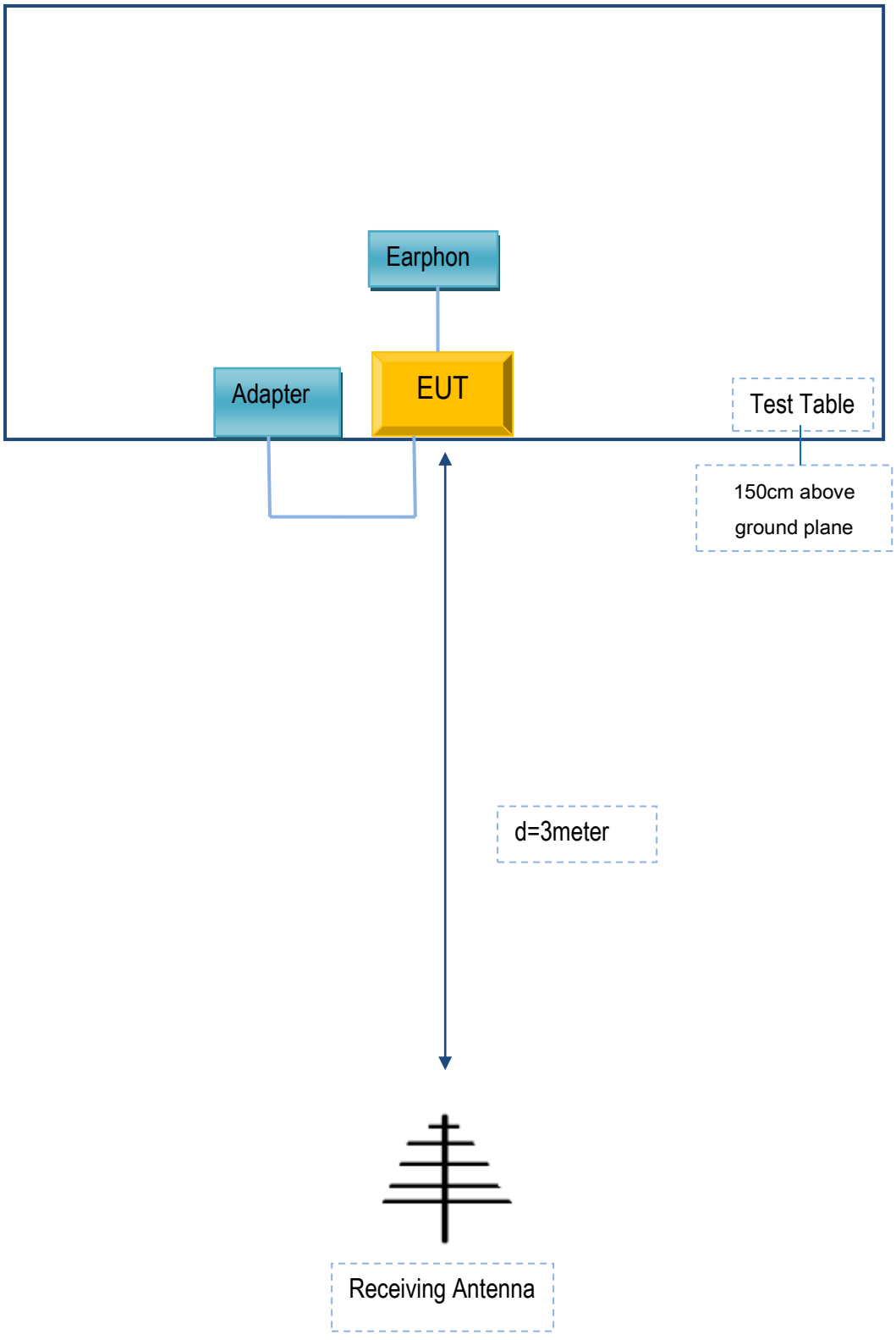
Block Configuration Diagram for AC Line Conducted Emissions



Block Configuration Diagram for Radiated Emissions （Below 1GHz）.



Block Configuration Diagram for Radiated Emissions （Above 1GHz）.



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

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

Supporting Equipment:

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

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
N/A	N/A	N/A	N/A	N/A

Annex C. User Manual / Block Diagram / Schematics / Partlist/ DECLARATION OF SIMILARITY

Please see the attachment