RF TEST REPORT

Report No.: Q191108S002-FCC-R2

Supersede Report No.: N/A

Applicant	Cedar Kingdom Corporation Limited
Product Name	Mobile Phone
Model No.	V205
Serial No.	N/A
Test Standard	FCC Part 15.247, ANSI C63.10: 2013
Test Date	Nov. 15 to Dec. 03, 2019
Issue Date	Dec. 10, 2019
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:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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Laboratories Introduction

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In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

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
Q191108S002-FCC-R2	NONE	Original	Dec. 10, 2019

2. Customer information

Applicant Name	Cedar Kingdom Corporation Limited
Applicant Add	Flat/Rm 05, 14/F, Lucky Centre, 165-171 Wanchai Road, Wanchai, Hong Kong
Manufacturer	Cedar Kingdom Corporation Limited
Manufacturer Add	Flat/Rm 05, 14/F, Lucky Centre, 165-171 Wanchai Road, Wanchai, Hong Kong

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
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:	Mobile Phone
Main Model:	V205
Serial Model:	N/A
Date EUT received:	Nov. 13, 2019
Test Date(s):	Nov. 15 to Dec. 03, 2019
Equipment Category :	DSS
Antenna Gain:	GSM850: -1.12dBi PCS1900: -1.45dBi Bluetooth: -2.06dBi
Antenna Type:	Fixed Internal Antenna
Type of Modulation:	GSM / GPRS: GMSK Bluetooth: GFSK, π /4DQPSK, 8DPSK

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 Bluetooth: 2402-2480 MHz
Max. Output Power:	10.36 dBm
Number of Channels:	GSM 850: 124CH PCS1900: 299CH Bluetooth: 79CH
Port:	Please refer to the user's manual
Input Power:	Adapter : Model: V205 Input: AC100-240V~50/60Hz,.0.15A Output: DC 5.0V, 500mA Battery : Model: BL-25BI Spec: 3.7V, 3000mAh/11.1Wh Limited charge voltage: 4.2V
Trade Name :	VIRZO
FCC ID:	2AKQUVZCKV205

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 Fixed Internal Antenna Bluetooth, the gain is -2.06dBi for Bluetooth.
A permanently attached Fixed Internal Antenna for GSM/PCS, the gain is -1.12dBi for GSM850, -1.45dBi for PCS1900.

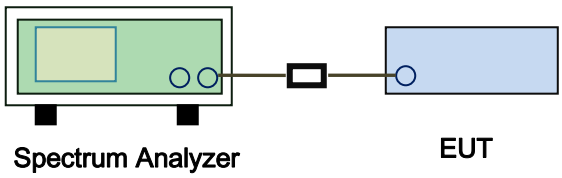
The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2 Channel Separation

Temperature	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 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

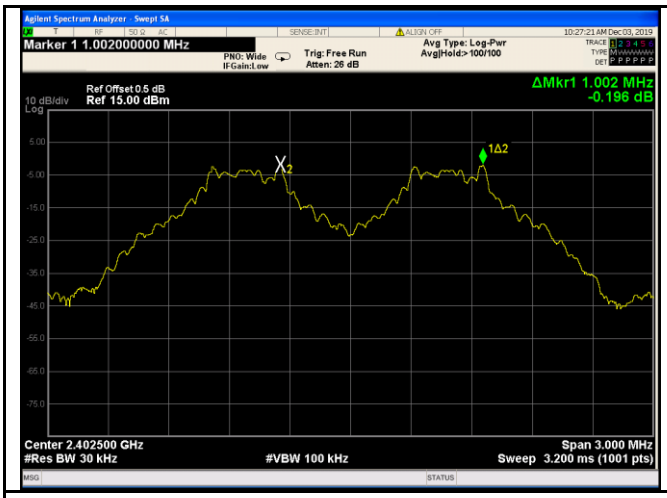
Channel Separation measurement result

Type/ Modulation	CH	CH Frequency (MHz)	CH Separation (MHz)	Limit (MHz)	Result
CH Separation GFSK	Low Channel	2402	1.002	0.93	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.951	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.948	Pass
	Adjacency Channel	2479			
CH Separation π /4 DQPSK	Low Channel	2402	1.002	0.824	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.832	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.828	Pass
	Adjacency Channel	2479			
CH Separation 8DPSK	Low Channel	2402	1.002	0.834	Pass
	Adjacency Channel	2403			
	Mid Channel	2440	1.002	0.828	Pass
	Adjacency Channel	2441			
	High Channel	2480	1.002	0.836	Pass
	Adjacency Channel	2479			

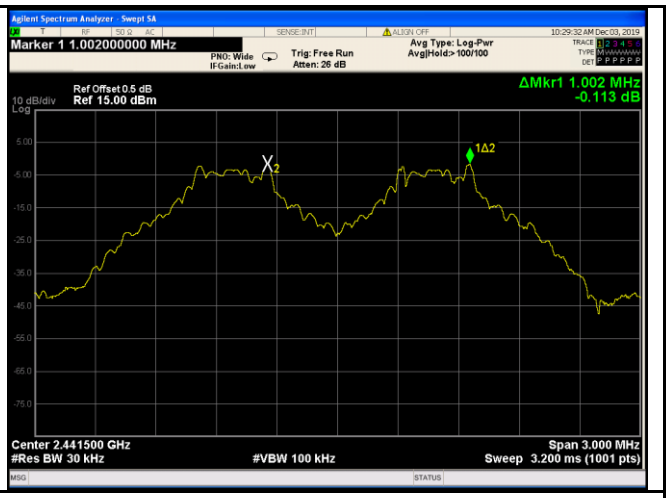
NOTE: The minimum limit is two-third 20dB bandwidth.

Test Plots

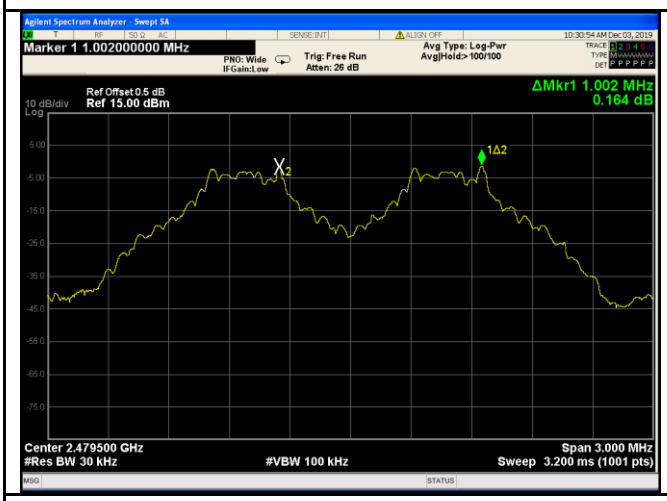
Channel Separation measurement result



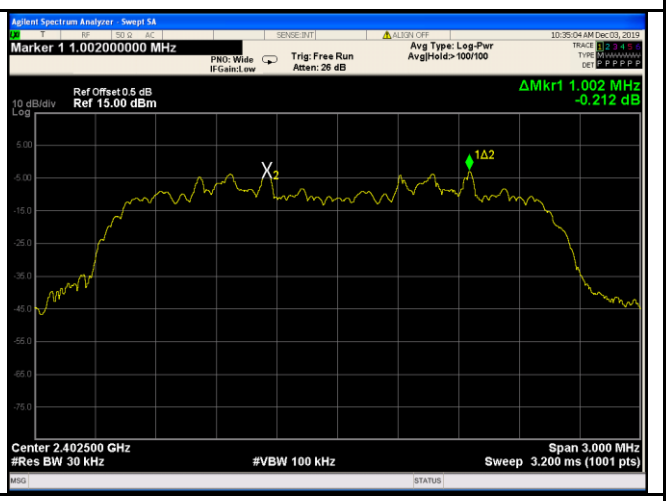
GFSK - Low Channel



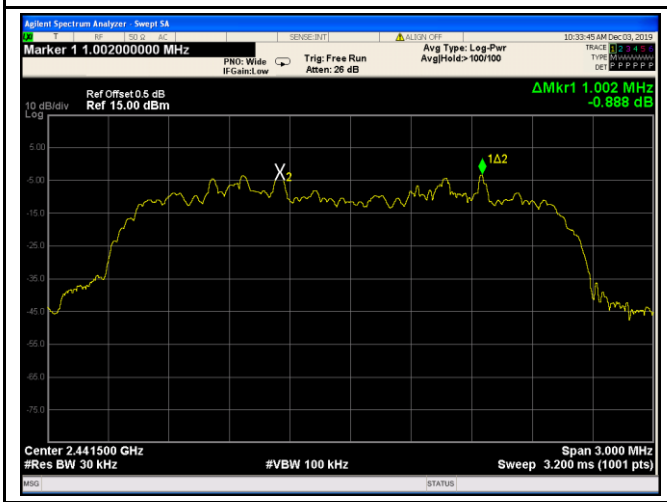
GFSK - Middle Channel



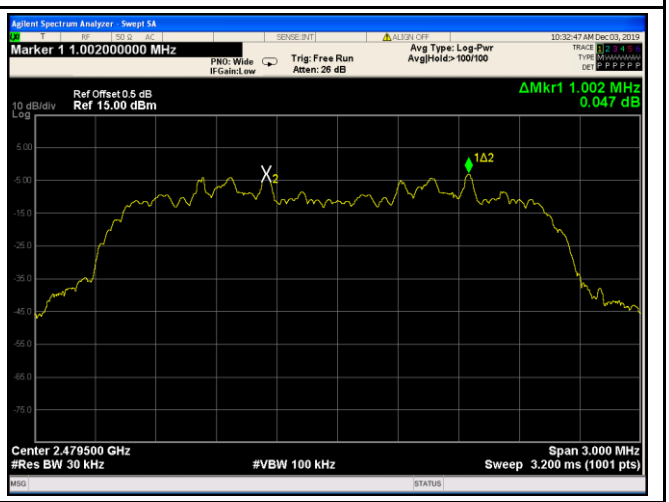
GFSK - High Channel



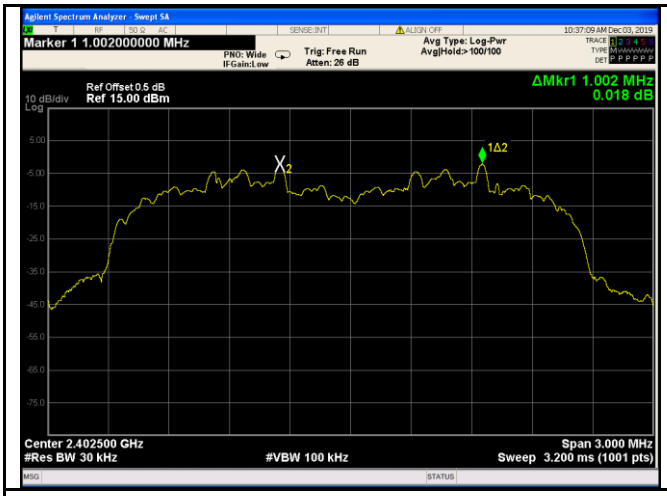
π /4 DPSK - Low Channel



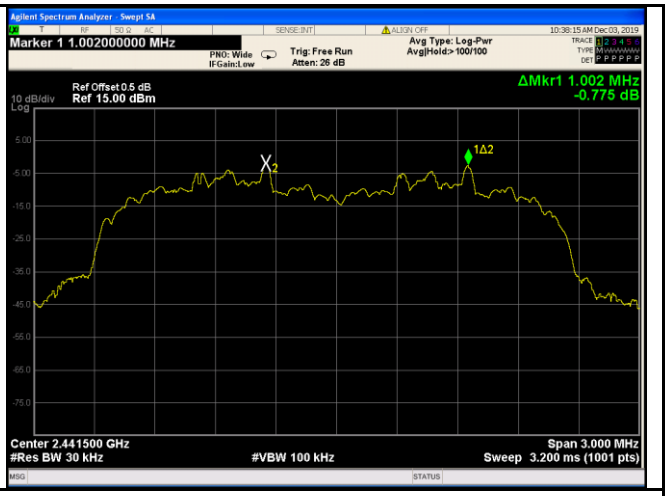
π /4 DQPSK - Middle Channel



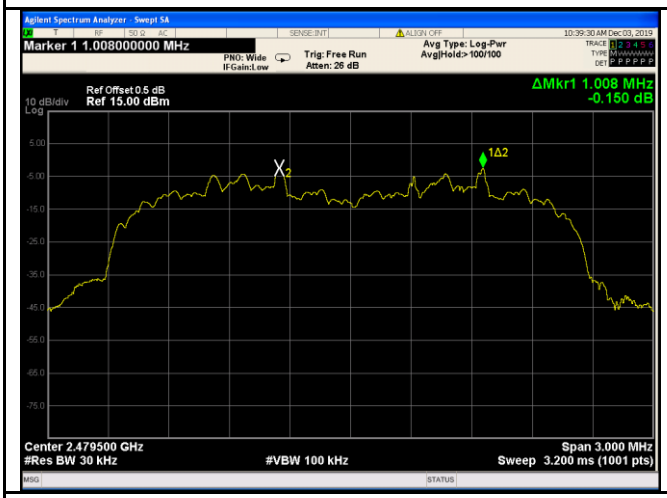
π /4 DQPSK - High Channel



8DPSK - Low Channel



8DPSK - Middle Channel

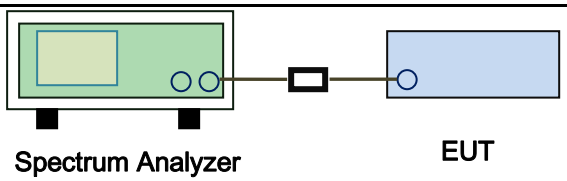


8DPSK - High Channel

6.3 20dB Bandwidth

Temperature	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 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	0.930
	Mid	2441	0.951
	High	2480	0.948
π /4 DQPSK	Low	2402	1.236
	Mid	2441	1.248
	High	2480	1.242
8-DPSK	Low	2402	1.251
	Mid	2441	1.242
	High	2480	1.254

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

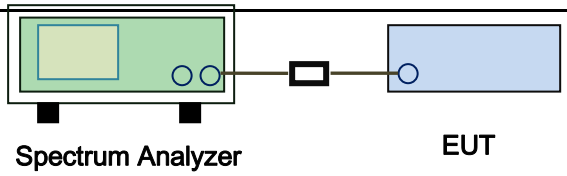
8DPSK - Middle Channel

8DPSK - High Channel

6.4 Peak Output Power

Temperature	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 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			
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

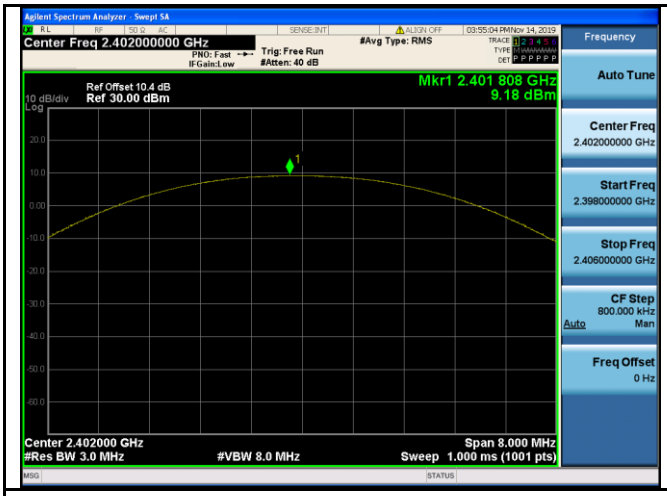
Test Plot ☑ Yes (See below) ☐ N/A

Peak Output Power measurement result

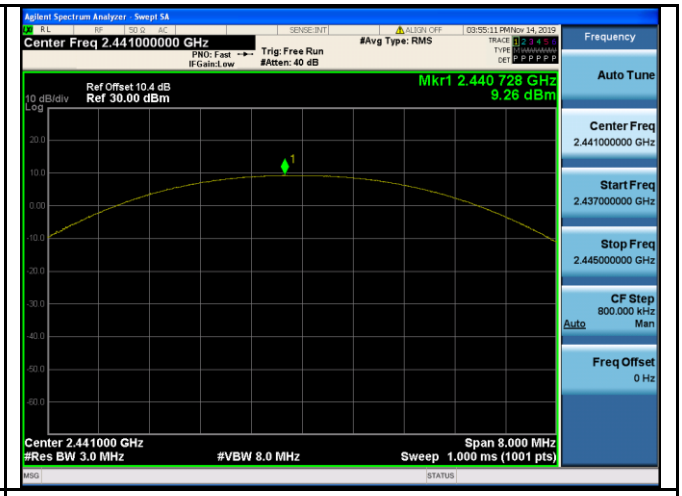
Type	Modulation	CH	Conducted Power (dBm)	Conducted Power (mW)	Limit (mW)	Result
Output power	GFSK	Low	9.18	8.279	1000	Pass
		Mid	9.26	8.433	1000	Pass
		High	9.49	8.892	1000	Pass
	π /4 DQPSK	Low	10.24	10.57	125	Pass
		Mid	**10.36**	10.86	125	Pass
		High	10.25	10.59	125	Pass
	8-DPSK	Low	10.14	10.33	125	Pass
		Mid	10.31	10.74	125	Pass
		High	10.24	10.57	125	Pass

Test Plots

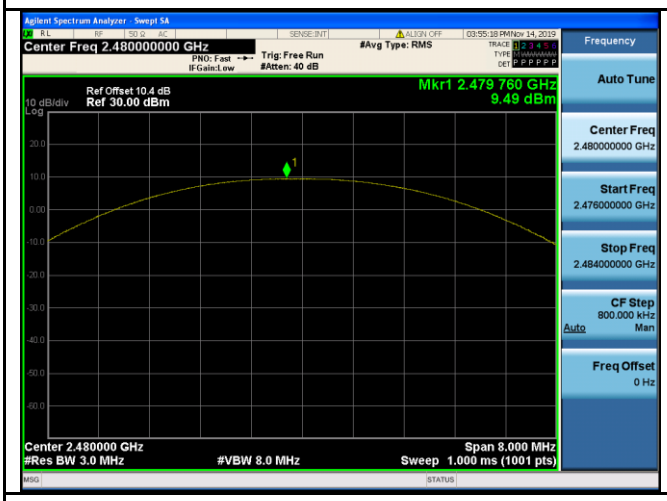
Output Power measurement result



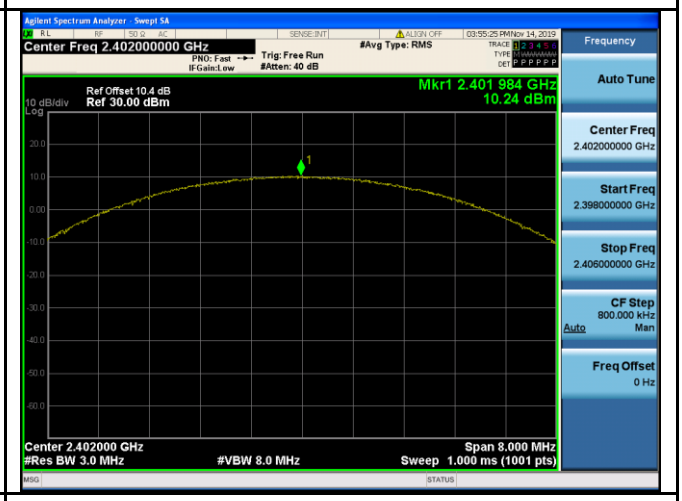
GFSK Output power - Low CH 2402



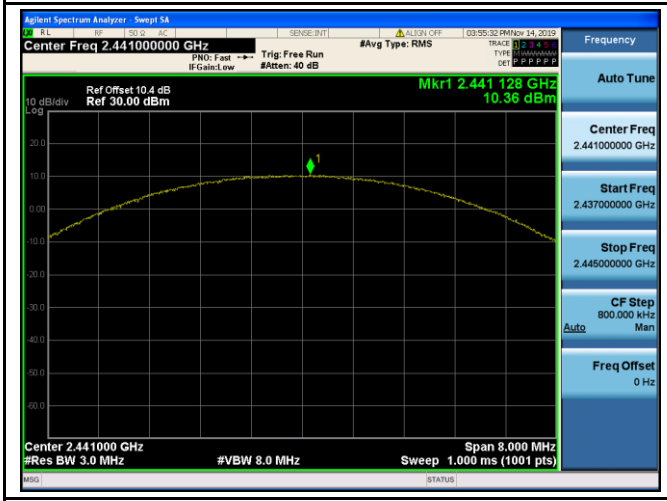
GFSK Output power - Mid CH 2441



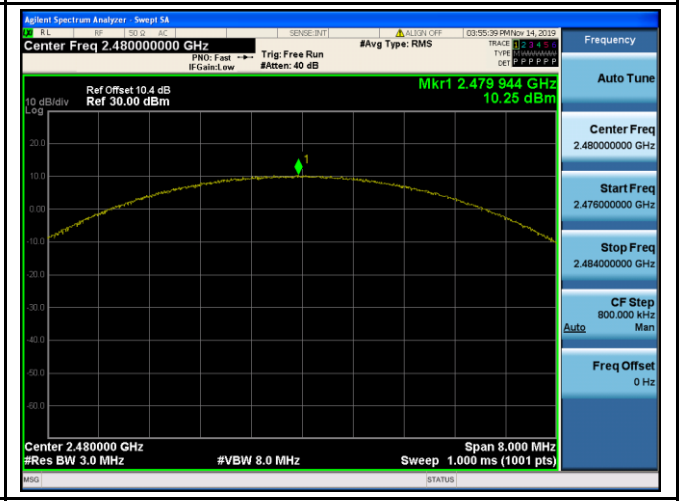
GFSK Output power - High CH 2480



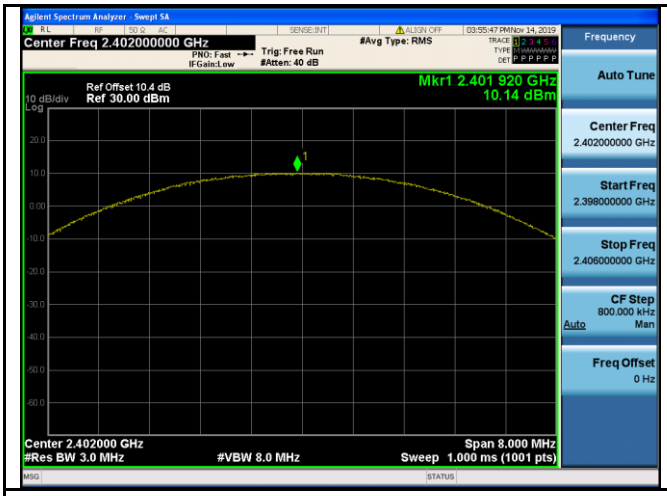
π /4 DQPSK Output power - Low CH 2402



π /4 DQPSK Output power - Mid CH 2441

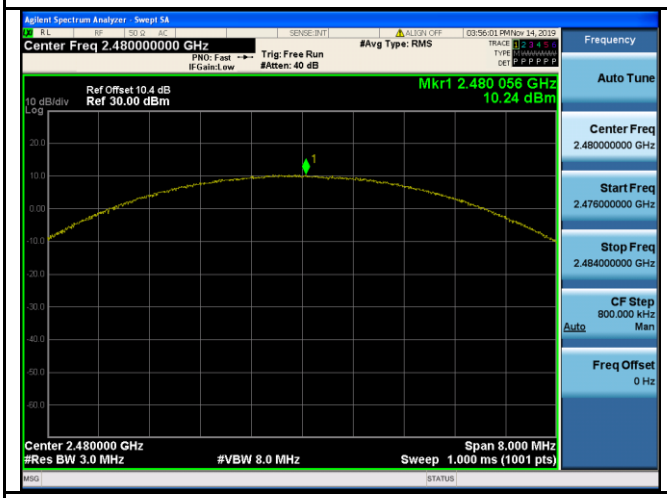


π /4 DQPSK Output power - High CH 2480



8DPSK Output power - Low CH 2402

8DPSK Output power - Mid CH 2441



8DPSK Output power - High CH 2480

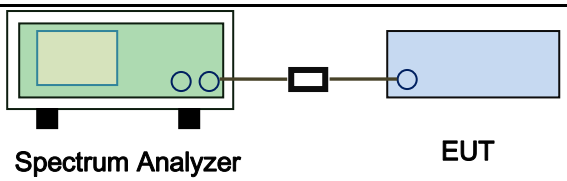
Average OUTPUT POWER(FOR REFERENCE)

Modulation	CH	Frequency (MHz)	Reading (dBm)	Duty cycle factor (dB)	Average Power (dBm)	Average Power (mW)
GFSK	Low	2402	5.61	3.35	8.96	7.870
	Mid	2441	5.42	3.35	8.77	7.534
	High	2480	5.53	3.35	8.88	7.727
π /4 DQPSK	Low	2402	2.63	5.16	7.79	6.012
	Mid	2441	2.66	5.16	7.82	6.053
	High	2480	2.83	5.16	7.99	6.295
8-DPSK	Low	2402	2.68	5.16	7.84	6.081
	Mid	2441	2.82	5.16	7.98	6.281
	High	2480	2.35	5.16	7.51	5.636

6.5 Number of Hopping Channel

Temperature	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 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			
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

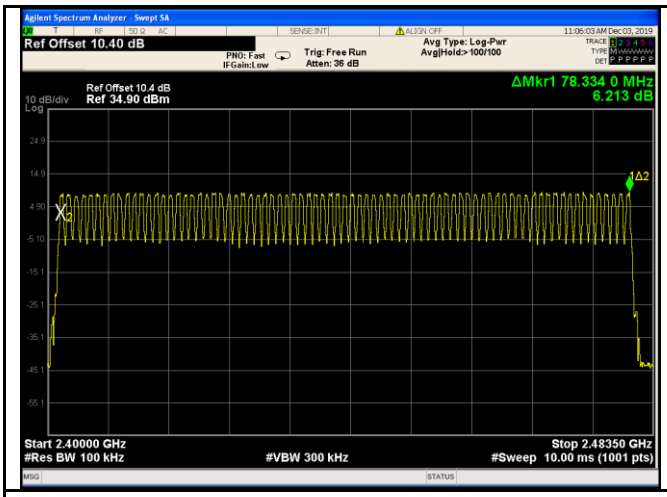
Test Plot ☑ Yes (See below) ☐ N/A

Number of Hopping Channel measurement result

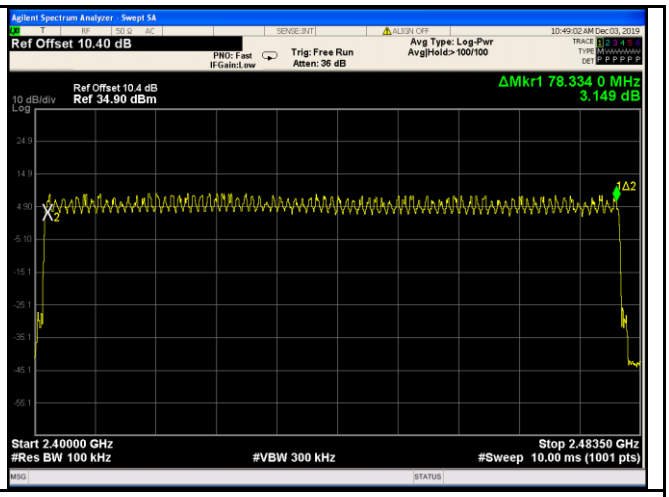
Type	Modulation	Frequency Range	Number of Hopping Channel	Limit
Number of Hopping Channel	GFSK	2400-2483.5	79	15
	π /4 DQPSK	2400-2483.5	79	15
	8-DPSK	2400-2483.5	79	15

Test Plots

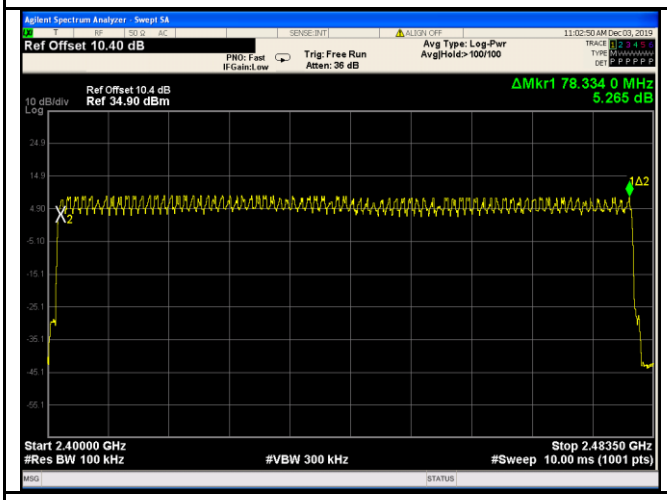
Number of Hopping Channels measurement result



GFSK



π /4DQPSK

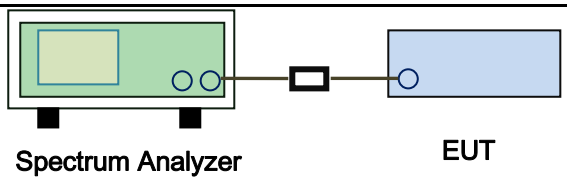


8DPSK

6.6 Time of Occupancy (Dwell Time)

Temperature	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 2019
Tested By :	Aaron Liang

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

GFSK

Mode	Number of Hopping Channel	Number of transmission in a period(channel number*0.4 sec)				Length of transmission on 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	26	260	0.3904	101.504	400	PASS
DH3	79	31.6	3.16	13	130	1.646	213.98	400	PASS
DH5	79	31.6	3.16	7	70	2.893	202.51	400	PASS

π /4 DQPSK

Mode	Number of Hopping Channel	Number of transmission in a period(channel number*0.4 sec)				Length of transmission on time (msec)	Result (msec)	Limit (msec)	PASS / FAIL
		period (sec)	sweep time (sec)	times in a sweep	times in a period				
2DH1	79	31.6	3.16	30	300	0.3808	114.24	400	PASS
2DH3	79	31.6	3.16	13	130	1.634	212.42	400	PASS
2DH5	79	31.6	3.16	5	50	2.881	144.05	400	PASS

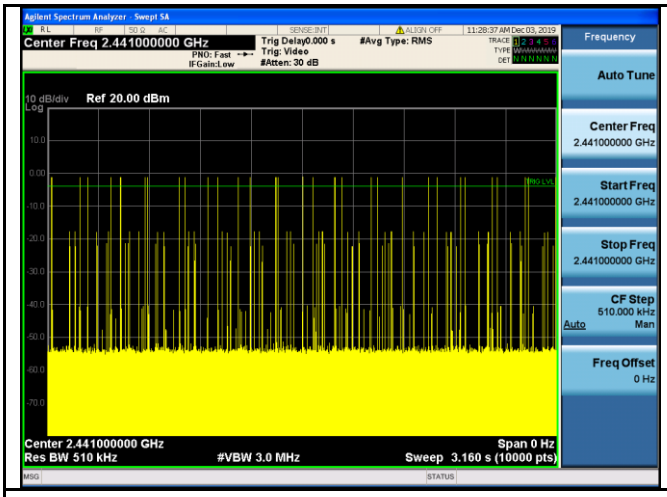
8-DPSK

Mode	Number of Hopping Channel	Number of transmission in a period(channel number*0.4 sec)				Length of transmission on 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	31	310	0.3797	117.707	400	PASS
3DH3	79	31.6	3.16	12	120	1.629	195.48	400	PASS
3DH5	79	31.6	3.16	4	40	2.88	115.2	400	PASS

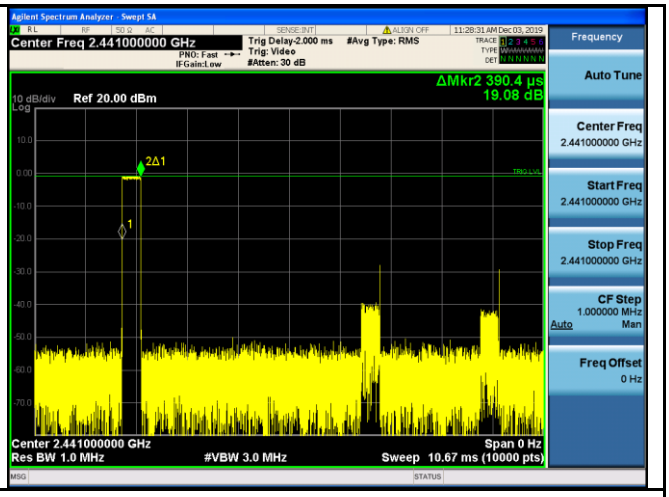
Test Plots

Dwell Time measurement result

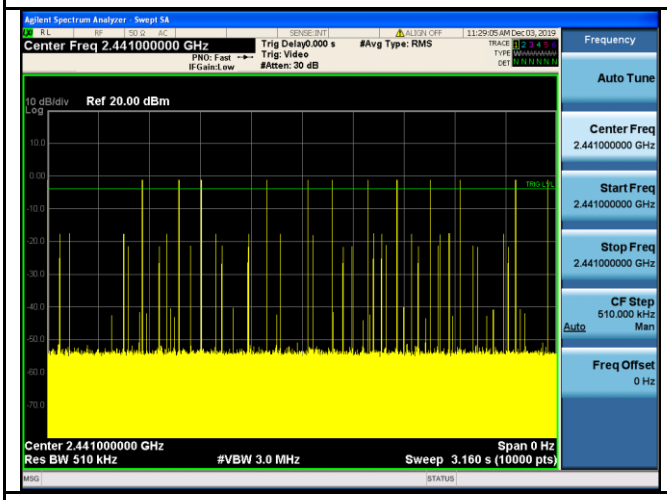
GFSK:



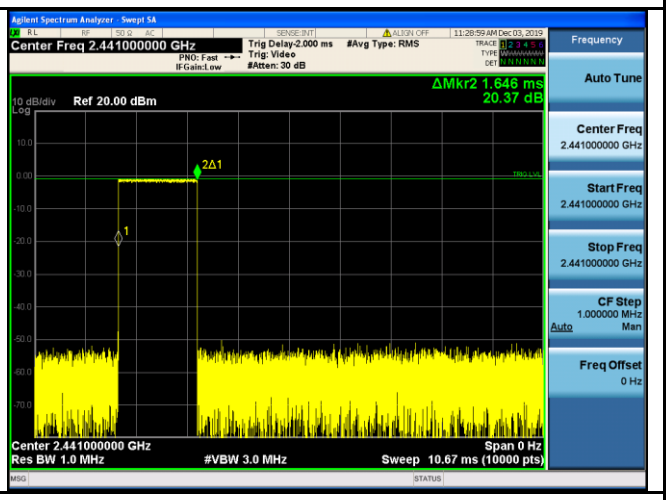
DH1-1



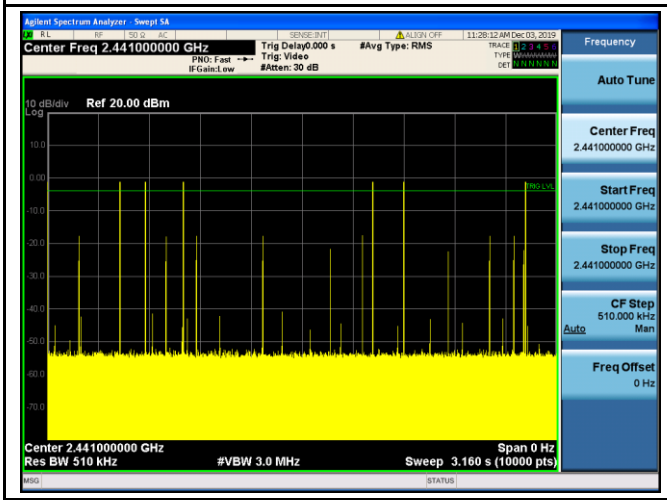
DH1-2



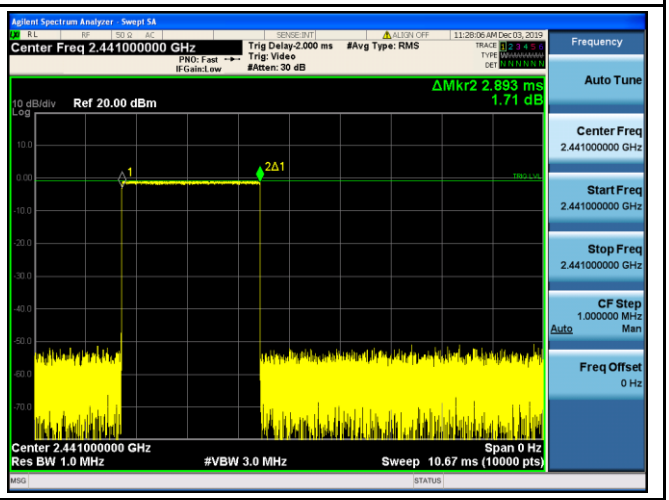
DH3-1



DH3-2

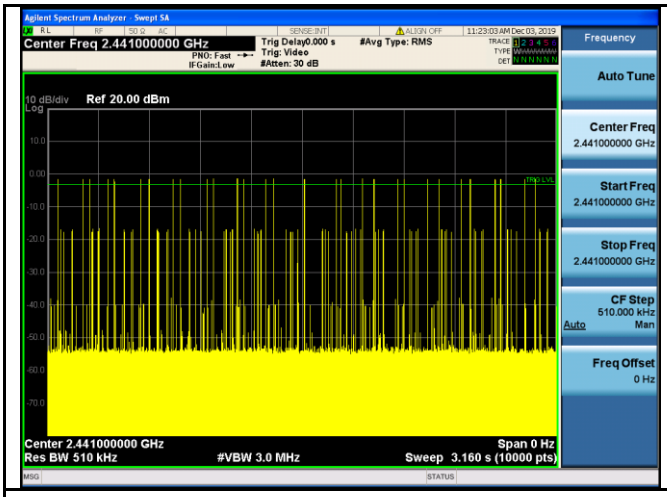


DH5-1

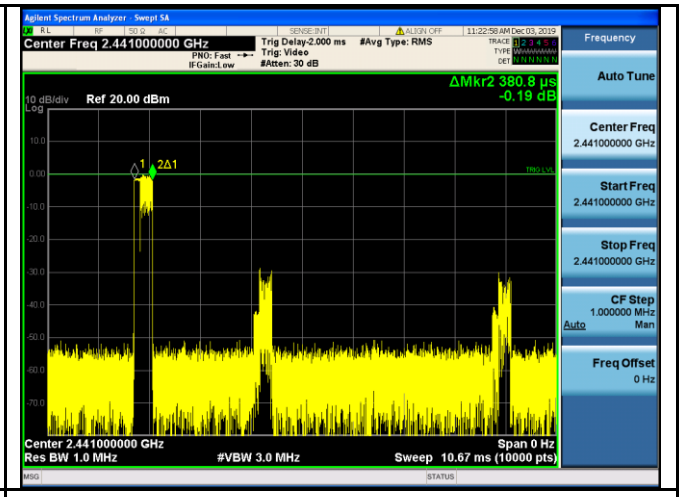


DH5-2

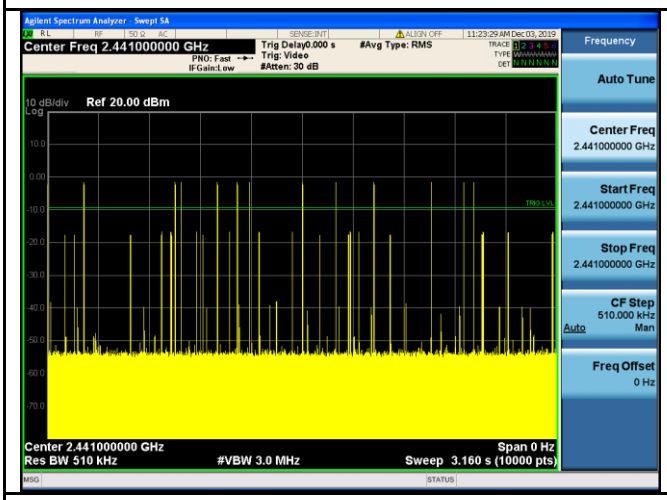
π /4 DQPSK



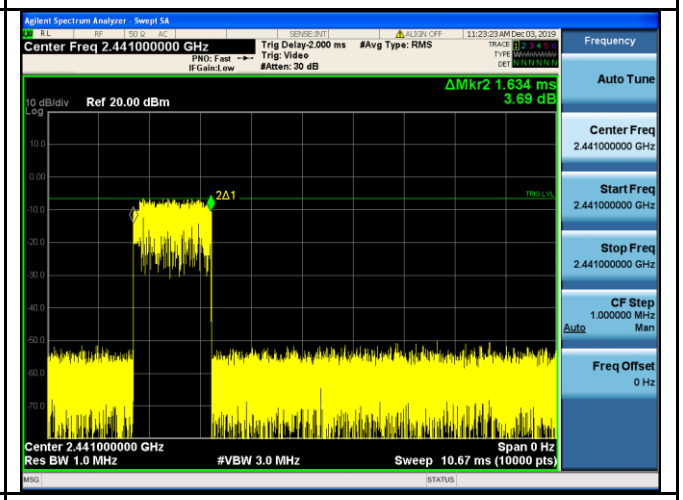
2DH1-1



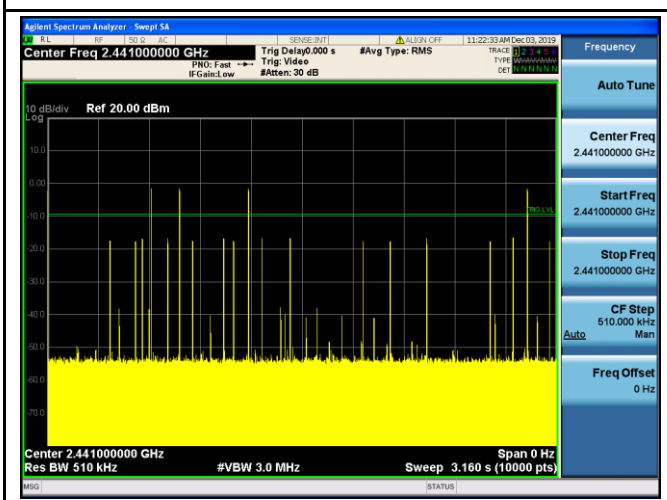
2DH1-2



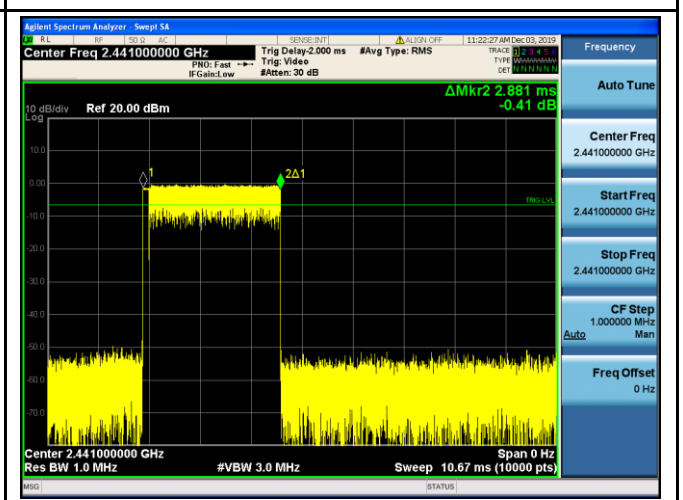
2DH3-1



2DH3-2

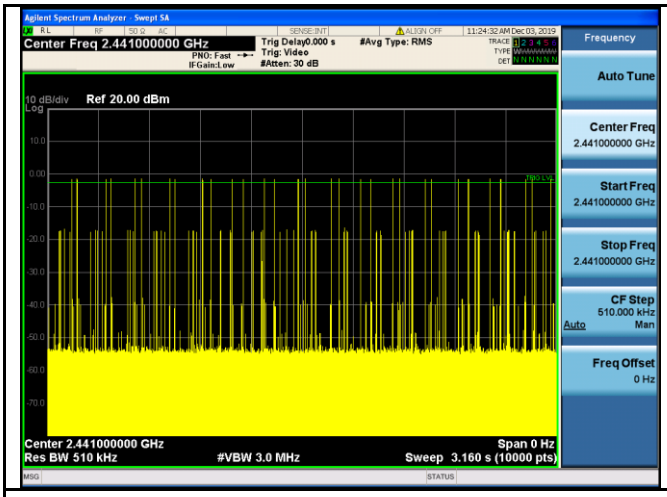


2DH5-1

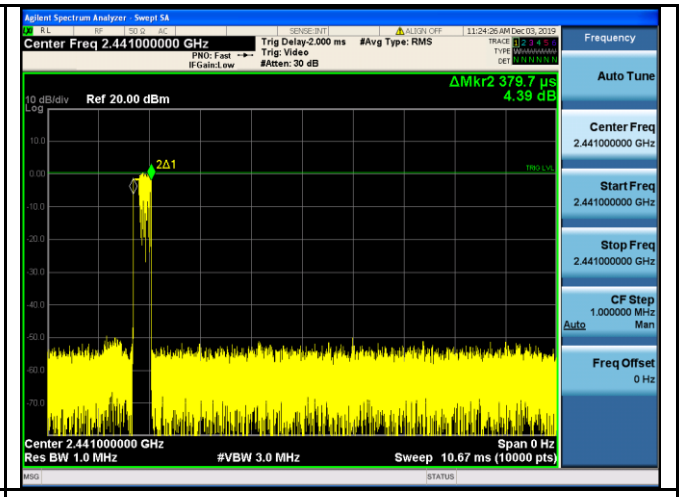


2DH5-2

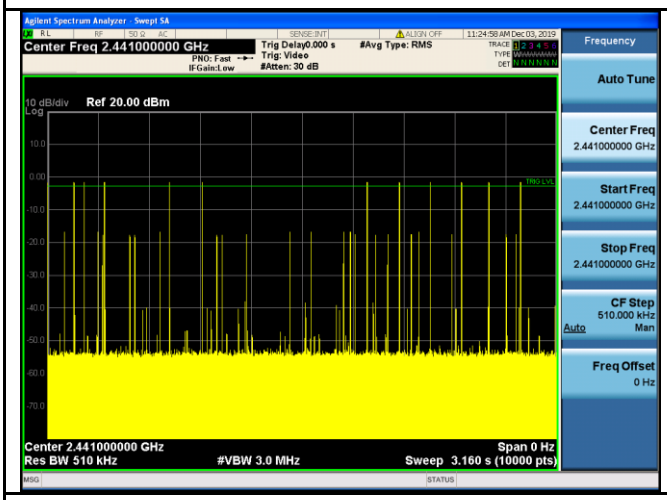
8-DPSK



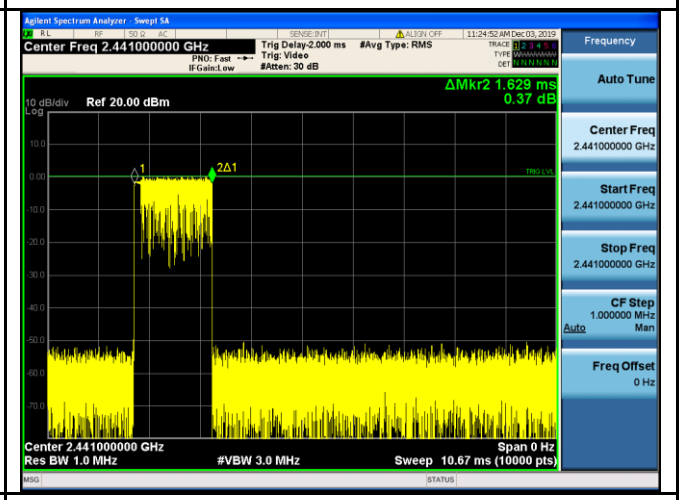
3DH1-1



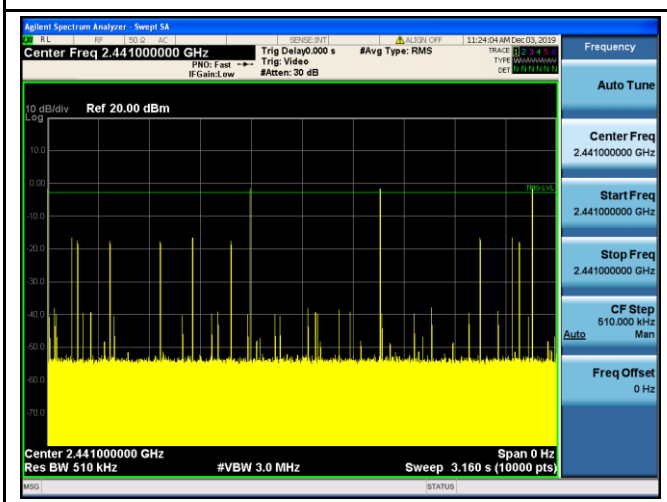
3DH1-2



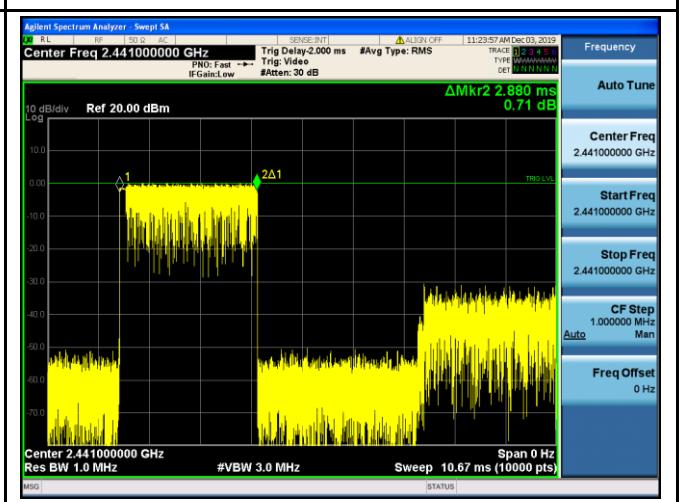
3DH3-1



3DH3-2



3DH5-1

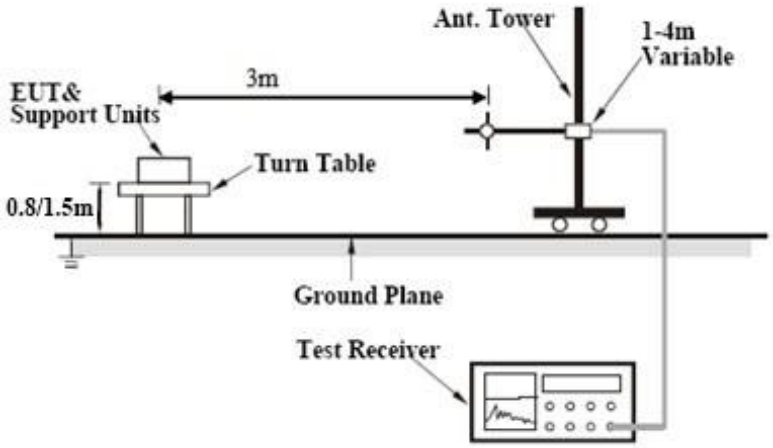


3DH5-2

6.7 Band Edge & Restricted Band

Temperature	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 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

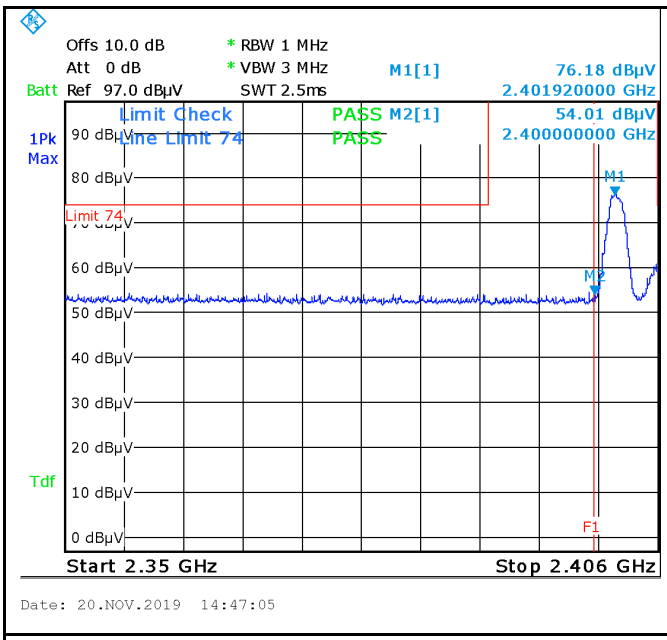
Test Data ☐ Yes ☑ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Worst Case Data:

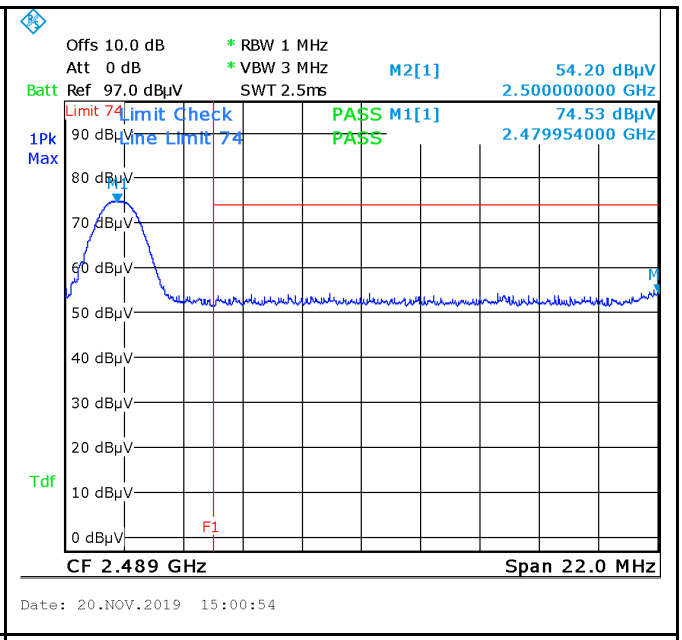
GFSK Mode & Antenna polarization: Horizontal

Test Plots



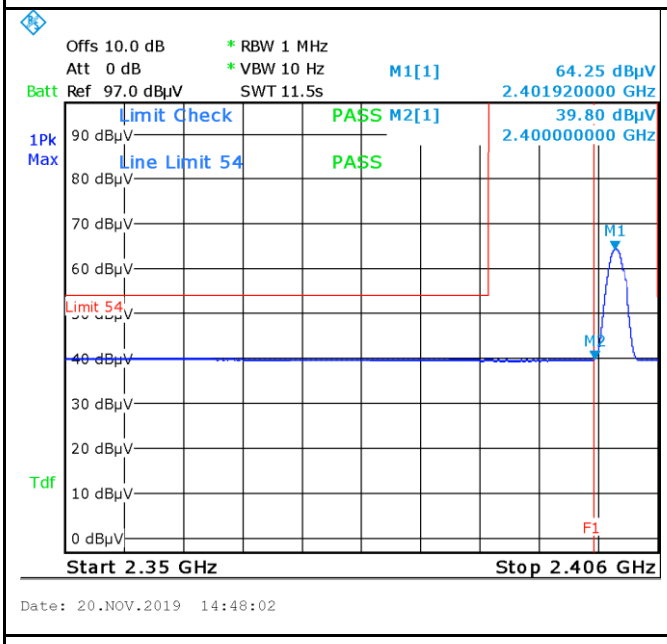
GFSK-Left Side-PK

Note: F1 is frequency 2400MHz

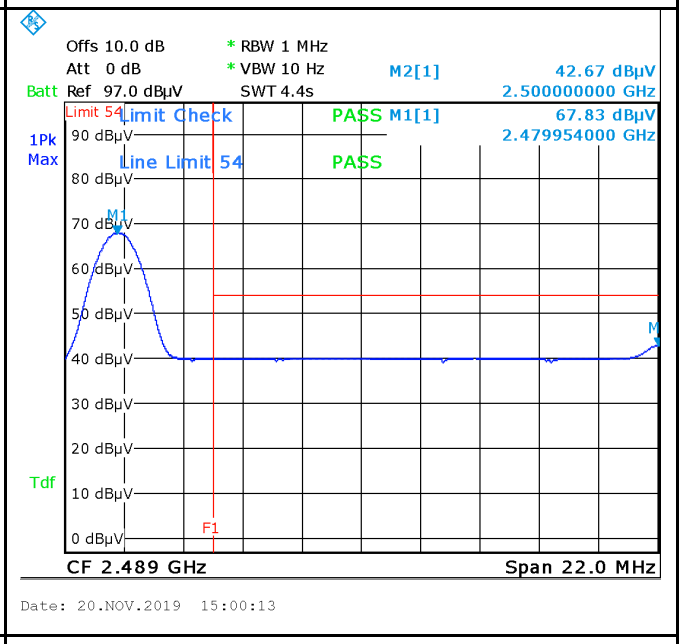


GFSK-Right Side-PK

Note: F1 is frequency 2483.5MHz



GFSK-Left Side-AV



GFSK-Right Side-AV

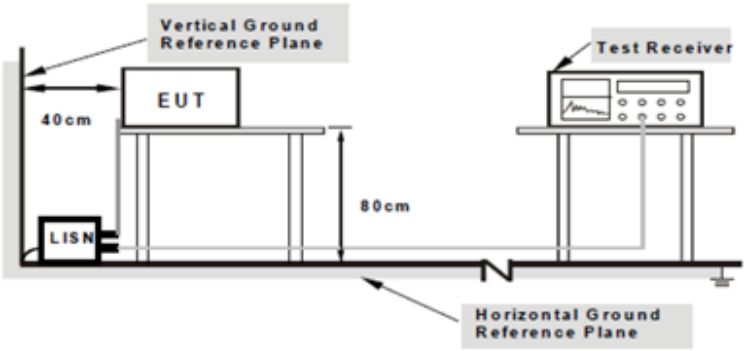
Note: 1, Both Horizontal and vertical polarities were investigated. The results above show only the worst case.

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	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 2019
Tested By :	Aaron Liang

Requirement(s):

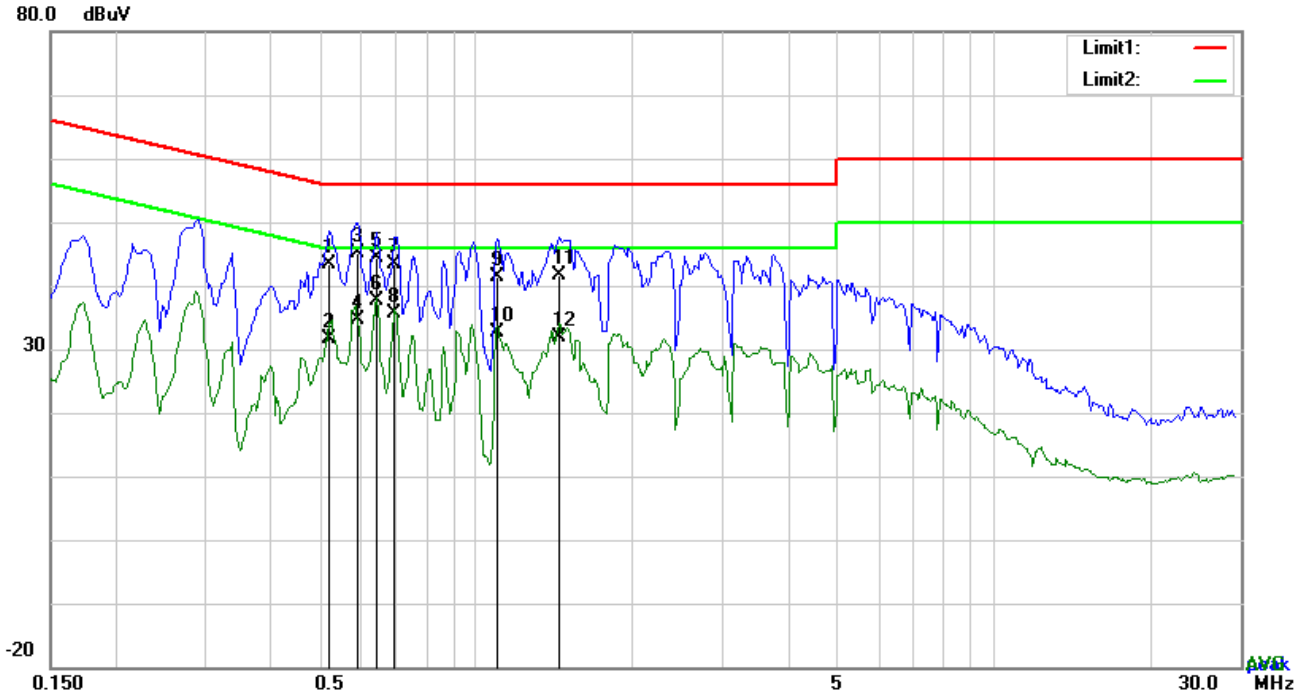
<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.207, RSS210 (A8.1)</td><td>a)</td><td>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto 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

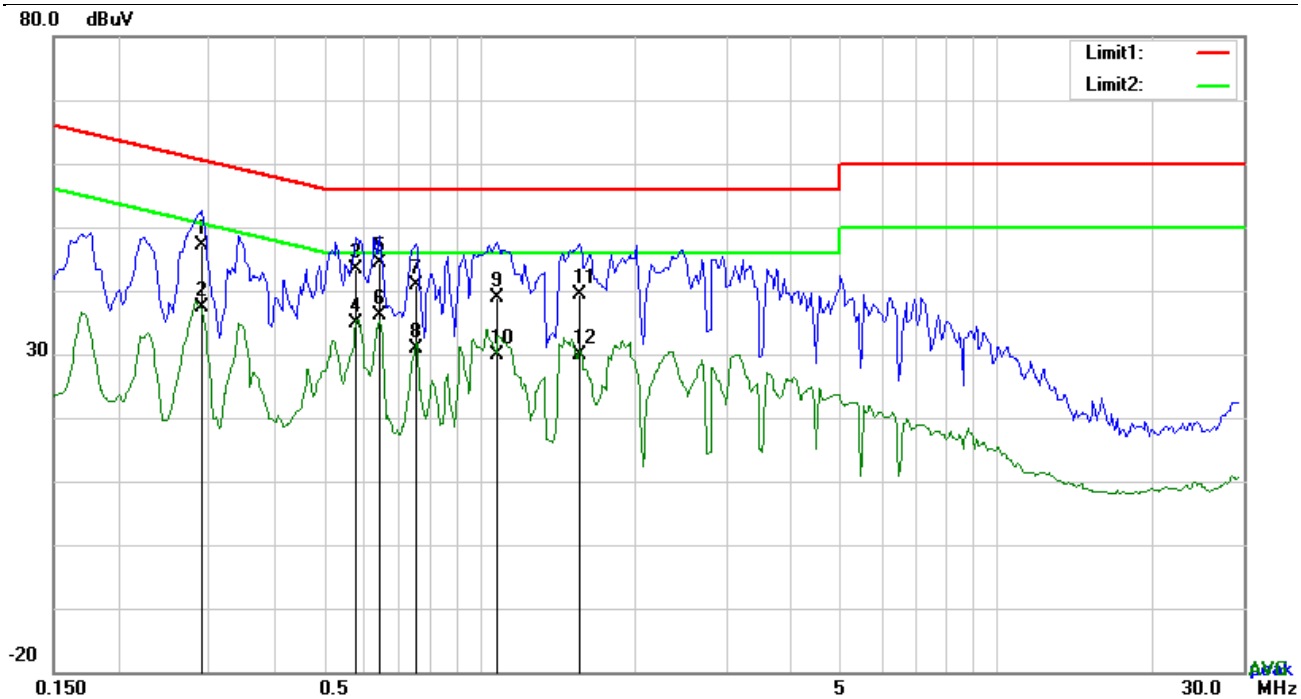
Test Plot ☑ Yes (See below) ☐ N/A



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	0.5205	33.38	QP	10.10	43.48	56.00	-12.52
2	L1	0.5205	21.55	AVG	10.10	31.65	46.00	-14.35
3	L1	0.5907	35.04	QP	10.10	45.14	56.00	-10.86
4	L1	0.5907	24.44	AVG	10.10	34.54	46.00	-11.46
5	L1	0.6414	34.27	QP	10.11	44.38	56.00	-11.62
6	L1	0.6414	27.57	AVG	10.11	37.68	46.00	-8.32
7	L1	0.6936	33.23	QP	10.11	43.34	56.00	-12.66
8	L1	0.6936	25.41	AVG	10.11	35.52	46.00	-10.48
9	L1	1.0977	31.19	QP	10.13	41.32	56.00	-14.68
10	L1	1.0977	22.38	AVG	10.13	32.51	46.00	-13.49
11	L1	1.4448	31.60	QP	10.14	41.74	56.00	-14.26
12	L1	1.4448	21.74	AVG	10.14	31.88	46.00	-14.12



Test Data

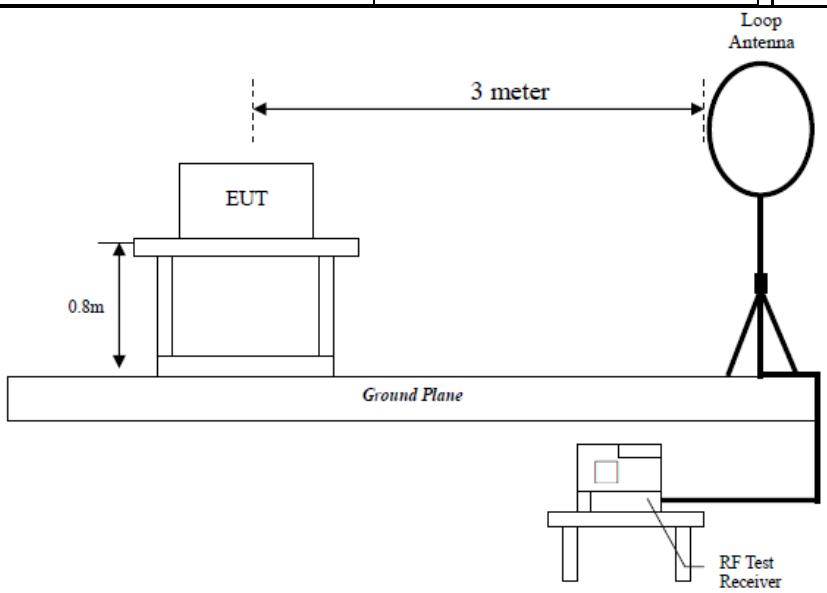
Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.2904	37.02	QP	10.13	47.15	60.51	-13.36
2	N	0.2904	27.36	AVG	10.13	37.49	50.51	-13.02
3	N	0.5790	33.27	QP	10.12	43.39	56.00	-12.61
4	N	0.5790	24.73	AVG	10.12	34.85	46.00	-11.15
5	N	0.6414	34.21	QP	10.13	44.34	56.00	-11.66
6	N	0.6414	25.98	AVG	10.13	36.11	46.00	-9.89
7	N	0.7584	30.65	QP	10.13	40.78	56.00	-15.22
8	N	0.7584	20.80	AVG	10.13	30.93	46.00	-15.07
9	N	1.0782	28.67	QP	10.15	38.82	56.00	-17.18
10	N	1.0782	19.66	AVG	10.15	29.81	46.00	-16.19
11	N	1.5657	29.31	QP	10.16	39.47	56.00	-16.53
12	N	1.5657	19.83	AVG	10.16	29.99	46.00	-16.01

6.9 Radiated Emissions & Restricted Band

Temperature	25℃
Relative Humidity	29%
Atmospheric Pressure	1018mbar
Test date :	Dec. 03 , 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"> 
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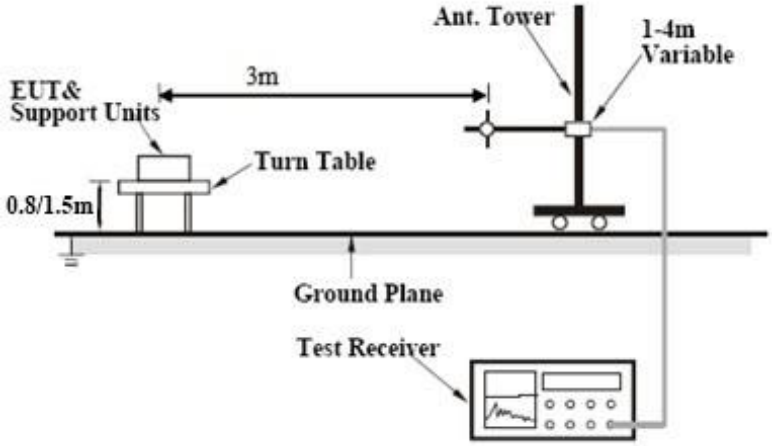


Procedure

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:

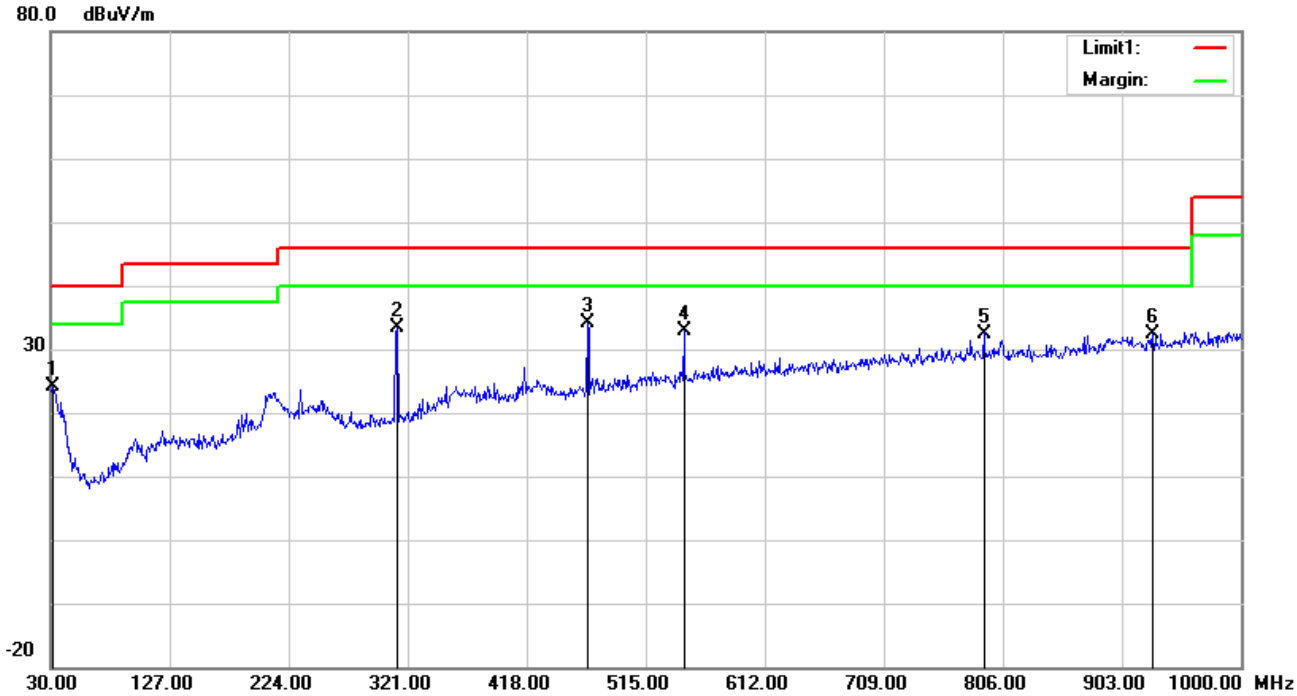
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

Test Mode:	Bluetooth Mode

30MHz -1GHz

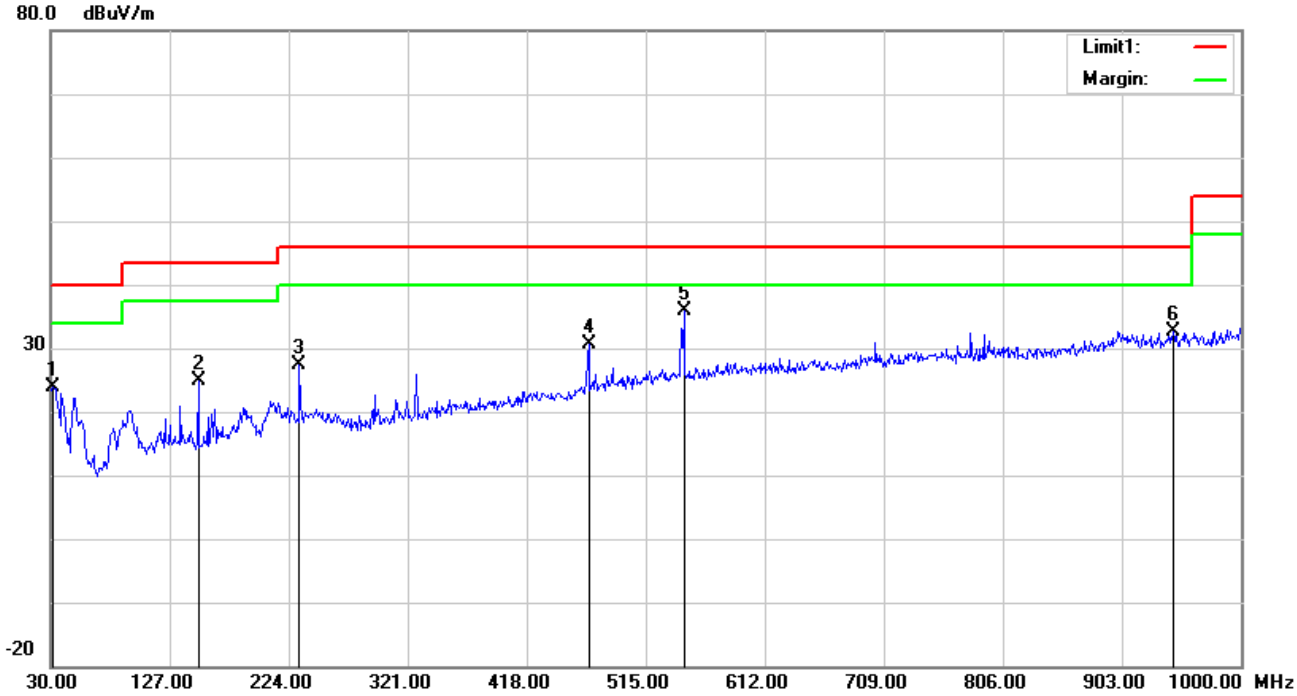


Test Data

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	31.9400	27.39	18.86	22.27	0.14	24.12	40.00	-15.88	100	238
2	H	312.2700	39.87	13.95	22.26	1.75	33.31	46.00	-12.69	100	124
3	H	467.4700	35.96	18.01	21.88	2.05	34.14	46.00	-11.86	100	179
4	H	546.0400	33.13	19.28	21.70	2.26	32.97	46.00	-13.03	100	21
5	H	790.4800	29.02	22.11	21.17	2.54	32.50	46.00	-13.50	100	295
6	H	928.2200	27.04	23.44	20.83	2.68	32.33	46.00	-13.67	100	249

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	31.9400	27.08	18.86	22.27	0.14	23.81	40.00	-16.19	200	204
2	V	150.2800	35.04	10.90	22.34	1.27	24.87	43.50	-18.63	100	193
3	V	232.7300	36.47	11.55	22.32	1.59	27.29	46.00	-18.71	100	66
4	V	468.4400	32.43	18.06	21.87	2.05	30.67	46.00	-15.33	100	10
5	V	546.0400	36.06	19.28	21.70	2.26	35.90	46.00	-10.10	100	256
6	V	944.7100	27.14	23.64	20.80	2.69	32.67	46.00	-13.33	100	273

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	2400	52.11 PK	74	-21.89	266	335	65.81	-13.7
2	2400	39.4 AV	54	-14.6	164	335	65.81	-13.7
3	2402	74.22 PK			121	83	87.92	-13.7
4	2402	62.7 AV			340	83	87.92	-13.7
5	4804	49.95 PK	74	-24.05	374	255	56.33	-6.38
6	4804	39.11 AV	54	-14.89	266	255	56.33	-6.38
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	2400	54.01 PK	74	-19.99	322	57	67.71	-13.7
2	2400	39.8 AV	54	-14.2	134	57	67.71	-13.7
3	2402	76.18 PK			285	181	89.88	-13.7
4	2402	64.25 AV			122	181	89.88	-13.7
5	4804	50.44 PK	74	-23.56	173	167	56.82	-6.38
6	4804	39.25 AV	54	-14.75	197	167	56.82	-6.38

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	2441	74.81 PK			188	212	88.51	-13.7
2	2441	62.11 AV			205	212	88.51	-13.7
3	4882	50.34 PK	74	-23.66	200	278	56.28	-5.94
4	4882	41.08 AV	54	-12.92	273	278	56.28	-5.94
5	3325.9	50.48 PK	74	-23.52	166	273	62.06	-11.58
6	3325.9	38.99 AV	54	-15.01	371	273	62.06	-11.58
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	2441	76.95 PK			160	223	90.65	-13.7
2	2441	64.59 AV			302	223	90.65	-13.7
3	4882	51.34 PK	74	-22.66	263	286	57.28	-5.94
4	4882	42.16 AV	54	-11.84	246	286	57.28	-5.94
5	4504.5	53.26 PK	74	-20.74	292	33	61.55	-8.29
6	4504.5	41.59 AV	54	-12.41	142	33	61.55	-8.29

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	2483.5	51.95 PK	74	-22.05	293	51	65.65	-13.7
2	2483.5	40.33 AV	54	-13.67	353	51	65.65	-13.7
3	2480	73.01 PK			173	152	86.71	-13.7
4	2480	65.29 AV			212	152	86.71	-13.7
5	4960	51.41 PK	74	-22.59	354	83	56.85	-5.44
6	4960	42.03 AV	54	-11.97	239	83	56.85	-5.44
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	2500	54.2 PK	74	-19.8	301	238	67.9	-13.7
2	2500	42.67 AV	54	-11.33	186	238	67.9	-13.7
3	2480	74.53 PK			268	294	88.23	-13.7
4	2480	67.83 AV			126	294	88.23	-13.7
5	4960	51.58 PK	74	-22.42	289	246	57.02	-5.44
6	4960	42.22 AV	54	-11.78	379	246	57.02	-5.44

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
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

RE& RSE

Frequency Range Above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum	Agilent	E4446A	MY46180622	May. 08,19	Mar. 07, 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 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
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

Antenna Port Conducted RF measurement

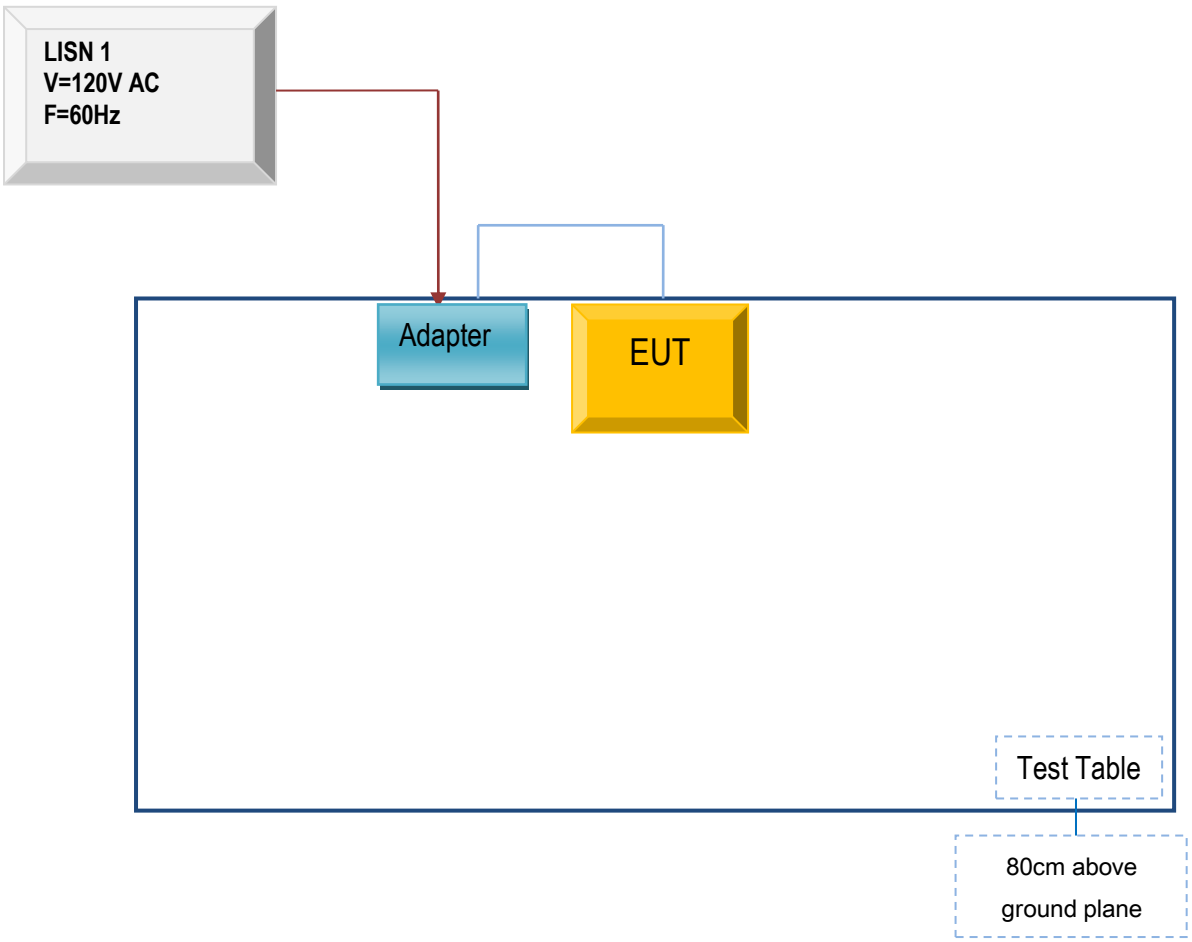
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Wireless Connectivity	R&S	CMW270	1201.0002K75	Nov. 29, 18	Nov. 28, 19
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 28,19	Mar. 27,20
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 28,19	Mar. 27,20
RF Control Unit	Tonscend	JS0806-2	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 & Humidity	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	1201.0002K50 0-155842-Gd	Aug. 06, 19	Aug. 05, 20

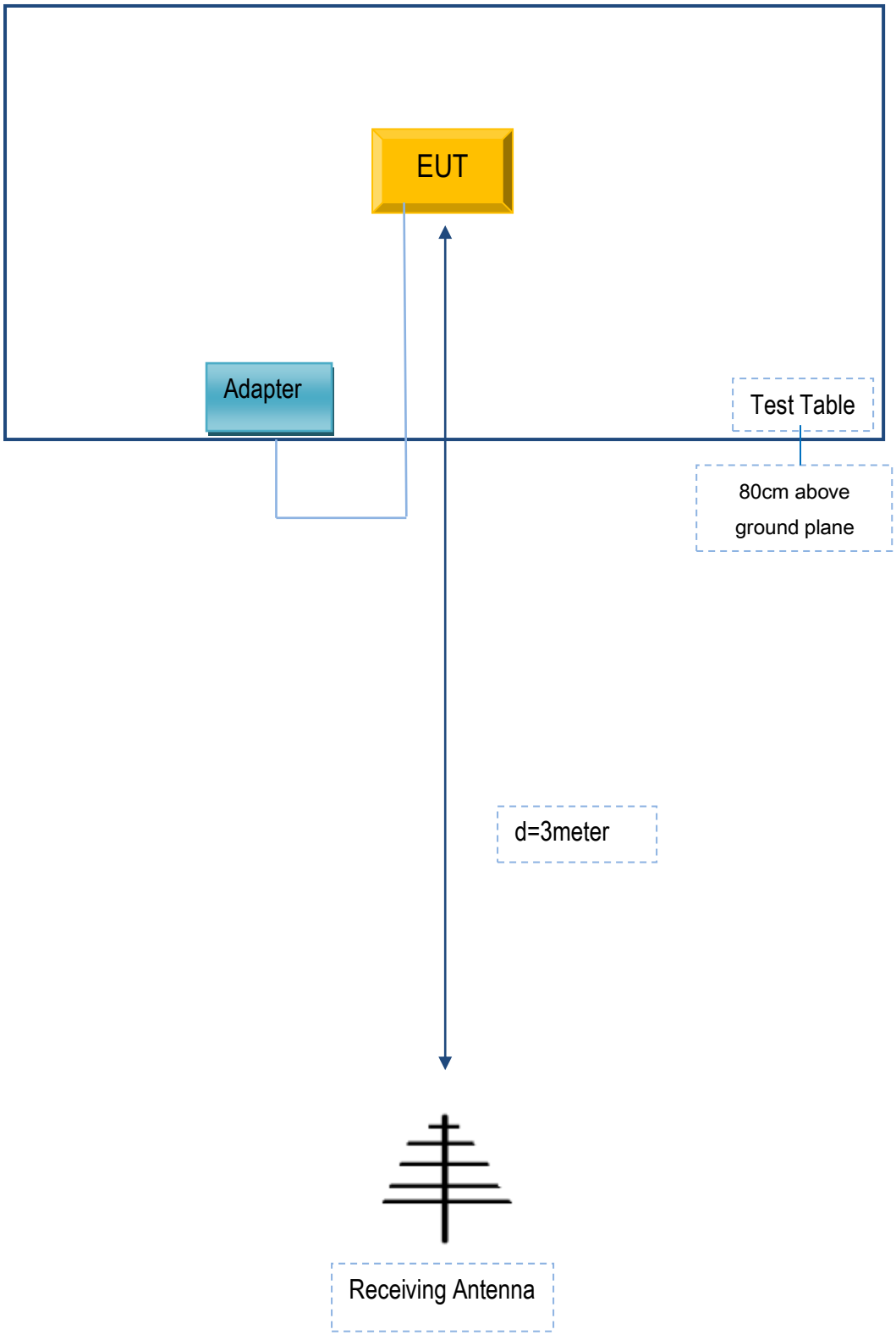
Annex B. TEST SETUP AND SUPPORTING EQUIPMENT

Annex B.i. TEST SET UP BLOCK

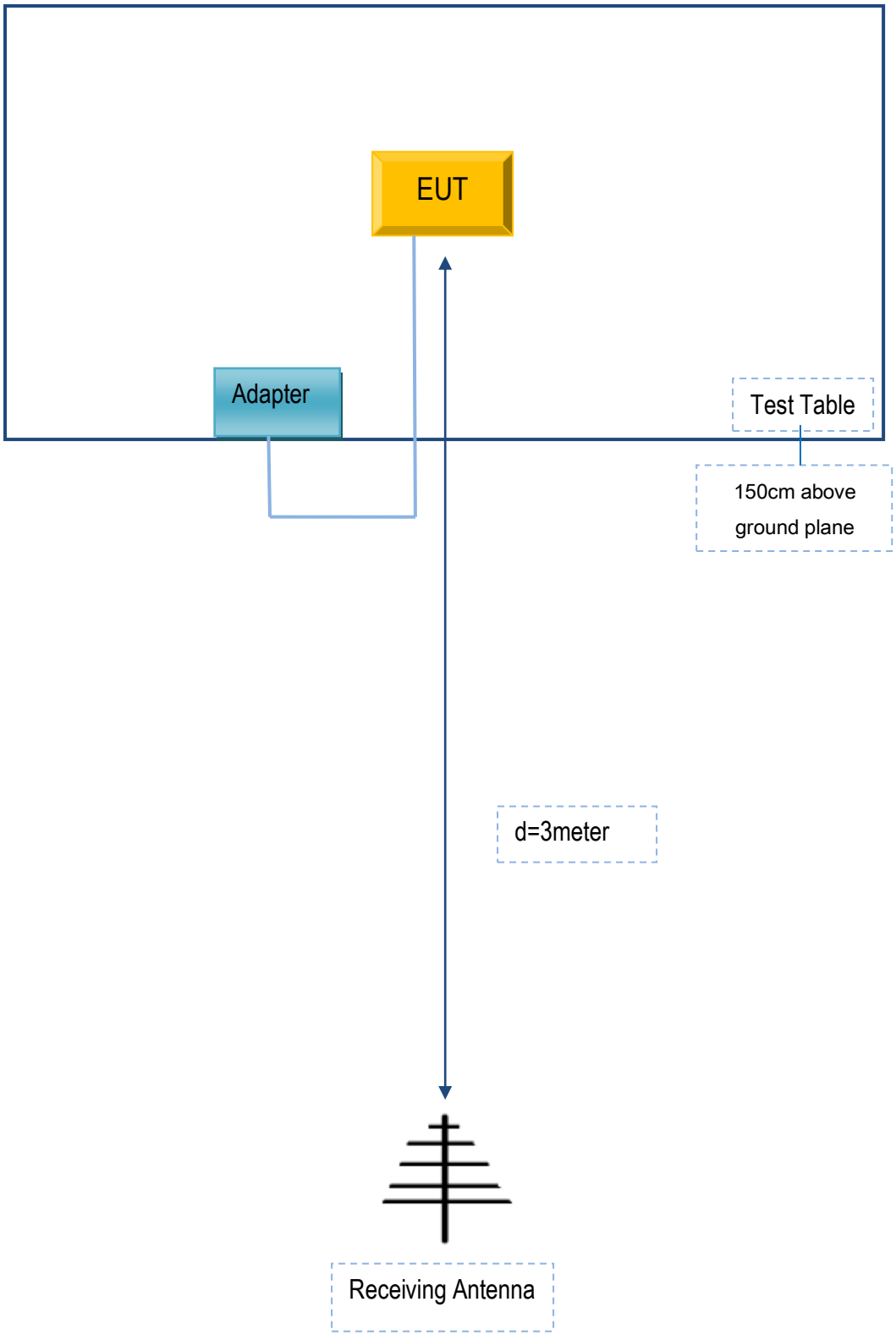
Block Configuration Diagram for AC Line Conducted Emissions



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