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FCC RADIO TEST REPORT

Applicant's company	Linksys LLC
Applicant Address	121 Theory, Irvine CA 92617, United States
FCC ID	Q87-EA8300

Product Name	Linksys Tri-Band Wireless-AC Router
Brand Name	Linksys
Model Name	EA8300, EA8250
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.249
Test Freq. Range	2402 ~ 2480MHz
Received Date	Dec. 07, 2016
Final Test Date	Feb. 21, 2017
Submission Type	Original Equipment

Statement

Test result included is only for the Bluetooth BR/EDR of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013** and **47 CFR FCC Part 15 Subpart C**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



Testing Laboratory
1190

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History of This Test Report



1. VERIFICATION OF COMPLIANCE

Product Name : Linksys Tri-Band Wireless-AC Router
Brand Name : Linksys
Model Name : EA8300, EA8250
Applicant : Linksys LLC
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.249

Sportun International as requested by the applicant to evaluate the EMC performance of the product sample received on Dec. 07, 2016 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

A handwritten signature in blue ink that appears to read "Cliff Chang".

Reviewed By:

Cliff Chang

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C			
Part	Rule Section	Description of Test	Result
4.1	15.207	AC Power Line Conducted Emissions	Complies
4.2	15.249(a)	Field Strength of Fundamental Emissions	Complies
4.3	15.215(c)	20dB Spectrum Bandwidth	Complies
4.4	15.249(a)/(d)	Radiated Emissions	Complies
4.5	15.249(d)	Band Edge Emissions	Complies
4.6	15.203	Antenna Requirements	Complies

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Power Type	From power adapter
Modulation	FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK)
Data Rate (Mbps)	GFSK: 1 ; $\pi/4$ -DQPSK: 2 ; 8DPSK: 3
Frequency Range	2402 ~ 2480MHz
Channel Number	79
Channel Bandwidth (99%)	BR (GFSK) 1 Mbps: 0.94 MHz EDR (8DPSK) 3 Mbps: 1.22 MHz
Max. Field Strength	BR (GFSK) 1 Mbps: 83.60 dBuV/m at 3m EDR (8DPSK) 3 Mbps: 81.63 dBuV/m at 3m
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

3.2. Accessories

Power	Brand	Model	Rating
Adapter 1 (Fixed plug)	LEI	MU24-Y120200-A1	Input: 100-240Vac, 50/60Hz, 0.7A Output: 12Vdc, 2.0A
Adapter 2 (Fixed plug)	DVE	DSA-24PFM-12 FUS 120200	Input: 100-240Vac, 50/60Hz, 0.8A Output: 12Vdc, 2A
Adapter 3 (Interchangeable plug)	DVE	DSA-24PFM-12 FCA 120200	Input: 100-240Vac, 50/60Hz, 0.8A Output: 12Vdc, 2A
Others			
Plug*1 (for adapter 3 use only)			
RJ-45 cable: Non-shielded, 0.9m			

Note: Adapter does not affect the radio tests, there is only adapter 1 tested and recorded in this report.

3.3. Table for Filed Antenna

Ant.	Brand	P/N	Type	Connector	Gain (dBi)	
					2.4GHz	5GHz Band 4
1	ARISTOTLE	RFA-52-F90S-240-165	Dipole	I-PEX	2.70	3.14
2	ARISTOTLE	RFA-52-F90-195-105	Dipole	I-PEX	2.06	3.47
Ant.	Brand	P/N	Type	Connector	5GHz Band 1	
3	ARISTOTLE	RFA-05-F90-120	Dipole	I-PEX	3.59	
4	ARISTOTLE	RFA-05-F90S-165	Dipole	I-PEX	3.49	
Ant.	Brand	P/N	Type	Connector	Bluetooth	
5	PSA	RFMTA271200NNAB003	PIFA	N/A	2.54	

Note: The EUT has five antennas.

For WLAN 2.4GHz (2TX/2RX):

Ant. 1 and Ant. 2 could transmit/receive simultaneously.

For WLAN 5GHz (2TX/2RX):

For 5GHz Band 4: Ant. 1 and Ant. 2 could transmit/receive simultaneously.

For 5GHz Band 1: Ant. 3 and Ant. 4 could transmit/receive simultaneously.

For Bluetooth (1TX/1RX):

Only Ant. 5 can be used as transmitting/receiving antenna.

3.4. Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	0	2402 MHz	39	2441 MHz
	1	2403 MHz	40	2442 MHz
	:	:	:	:
	37	2439 MHz	77	2479 MHz
	38	2440 MHz	78	2480 MHz

3.5. Table for Test Modes

The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	CTX	-	-	-
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	BR (GFSK)	1 Mbps	0/38/78	5
	EDR (8DPSK)	3 Mbps	0/38/78	5
Radiated Emissions 30MHz ~ 1GHz	CTX	-	-	-
Radiated Emissions 1GHz~10 th Harmonic	BR (GFSK)	1 Mbps	0/38/78	5
	EDR (8DPSK)	3 Mbps	0/38/78	5
Band Edge Emissions	BR (GFSK)	1 Mbps	0/38/78	5
	EDR (8DPSK)	3 Mbps	0/38/78	5

The following test modes were performed for all tests:

AC Power Line Conducted Emissions	
Test Mode	Description
1	WLAN 2.4GHz + Adapter 2
2	WLAN 5GHz + Adapter 2
3	Bluetooth + Adapter 2
Mode 2 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4~5 will follow this same test mode.	
4	WLAN 5GHz + Adapter 1
5	WLAN 5GHz + Adapter 3
Mode 2 generated the worst test result, so it was recorded in this report.	

Radiated Emissions 30MHz ~ 1GHz	
Test Mode	Description
1	EUT Z axis + WLAN 2.4GHz + Adapter 1
2	EUT Y axis + WLAN 2.4GHz + Adapter 1
Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3~4 will follow this same test mode.	
3	EUT Z axis + WLAN 5GHz + Adapter 1
4	EUT Z axis + Bluetooth + Adapter 1
Mode 1 has been evaluated to be the worst case among Mode 1~4, thus measurement for Mode 5~6 will follow this same test mode.	
5	EUT Z axis + WLAN 2.4GHz + Adapter 2
6	EUT Z axis + WLAN 2.4GHz + Adapter 3

Mode 1 generated the worst test result, so it was recorded in this report.

Radiated Emissions 1GHz~10th Harmonic	
Test Mode	Description
1	EUT Z axis
2	EUT Y axis
Mode 2 has been evaluated to be the worst case after evaluating. Consequently, measurement will follow this same test mode.	

Simultaneous Transmission Analysis	
Test Mode	Description
1	WLAN 2.4GHz + WLAN 5GHz
2	WLAN 5GHz + Bluetooth
Refer to Sporton Test Report No.: FA710901 for Co-location RF Exposure Evaluation.	

3.6. Table for Testing Locations

Test Site Location					
Test Site No.	Site Category	Location	FCC Designation No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

3.7. Table for Multiple Listing

The EUT has two model names which are identical to each other in all aspects except for the following table:

Model No.	Description
EA8300	All models are identical except for the EA8300 supports 256QAM and
EA8250	the EA8250 disable 256QAM.

From the above models, model: EA8300 was selected as representative model for the test and its data was recorded in this report.

3.8. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
Flash disk3.0	Transcend	JetFlash-700	DoC

For Test Site No: 03CH01-CB and TH01-CB

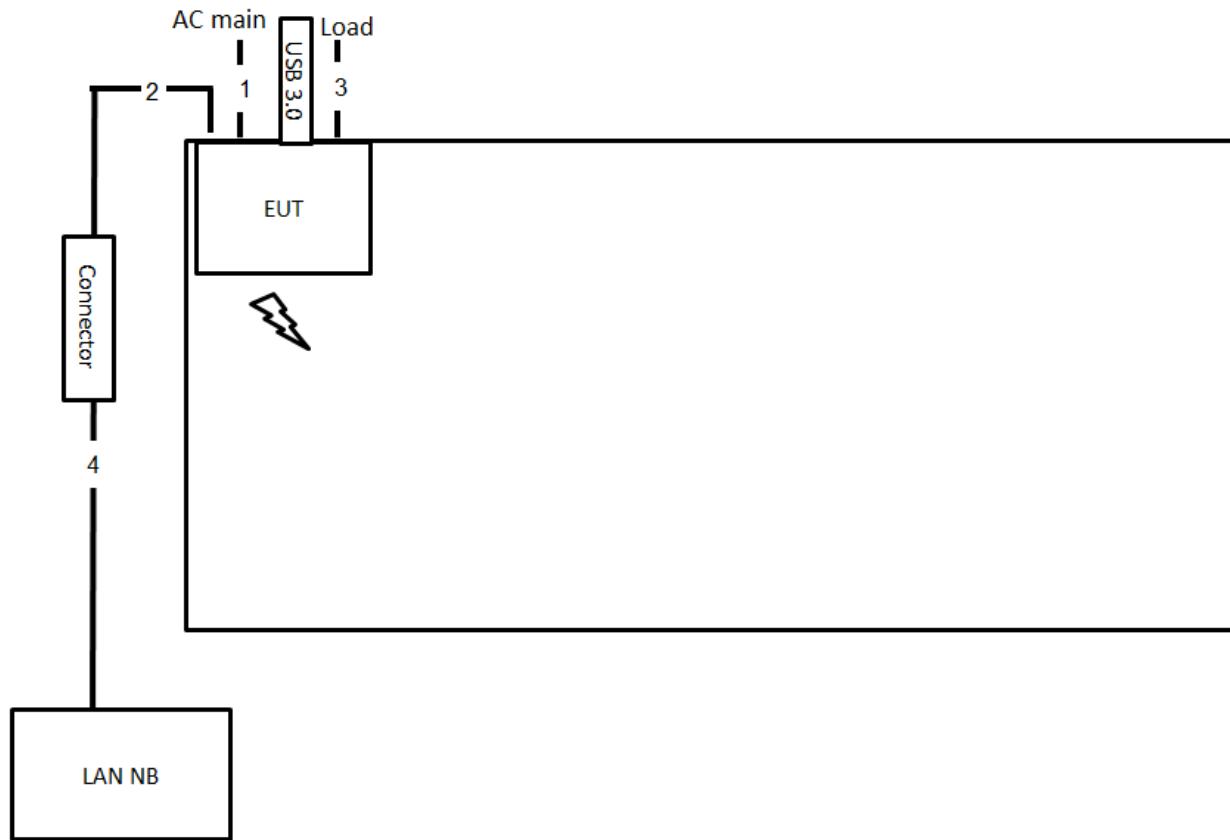
Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.9. Duty Cycle

On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
0.393	0.645	60.87	2.16	2.55

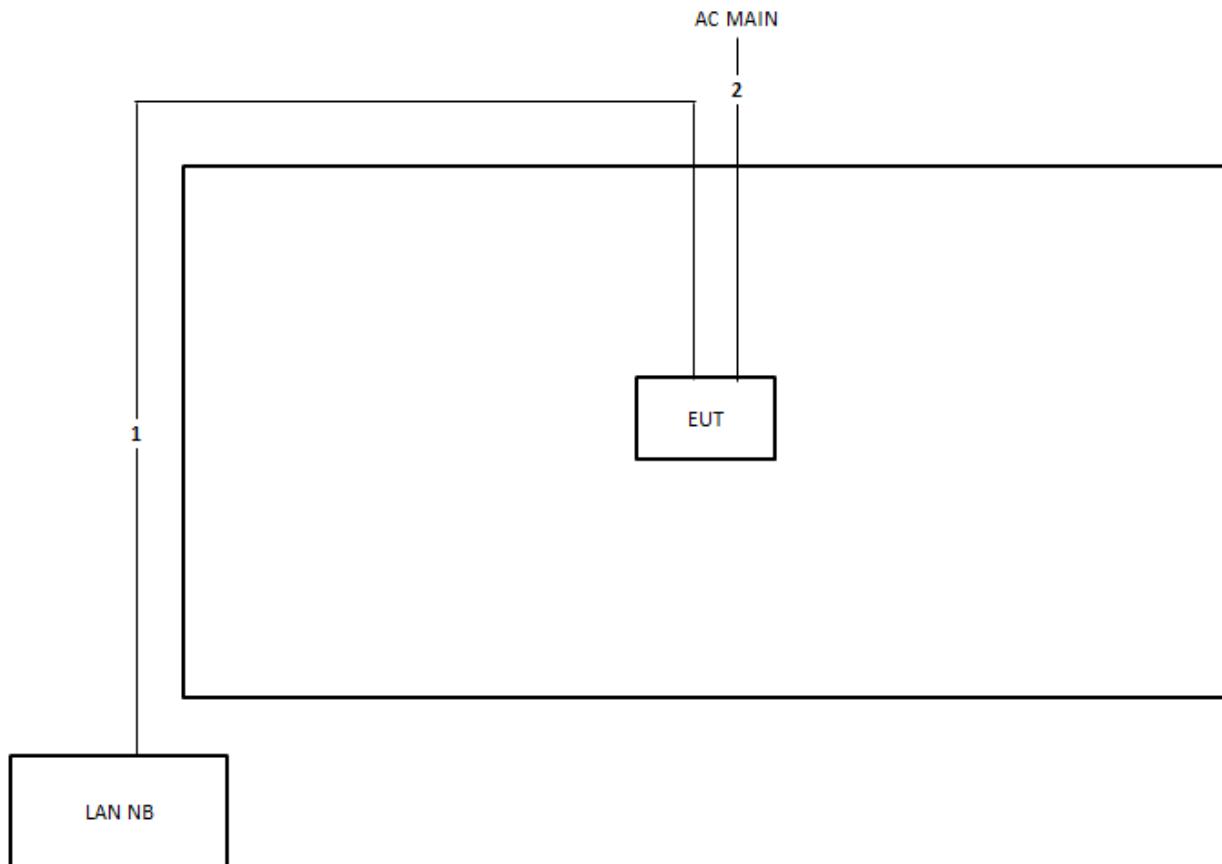
3.10. Test Configurations

3.10.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	0.9m
3	RJ-45 cable*4	No	1.5m
4	RJ-45 cable	No	10m

3.10.2. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	1.5m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product which is designed to be connected to the 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 below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

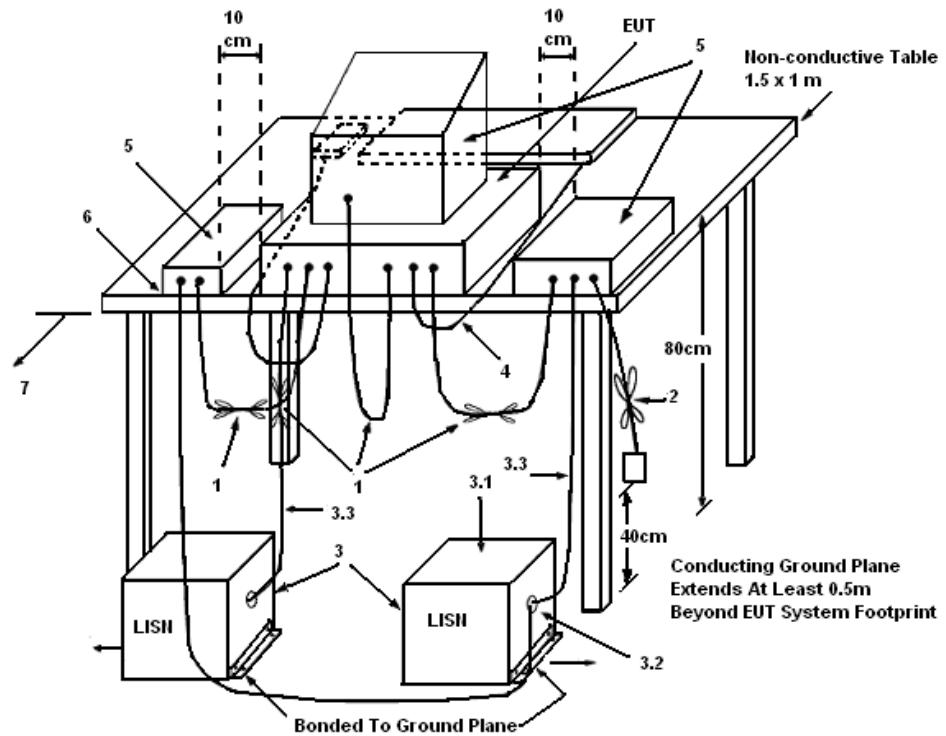
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
 - (3.1) All other equipment powered from additional LISN(s).
 - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
 - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

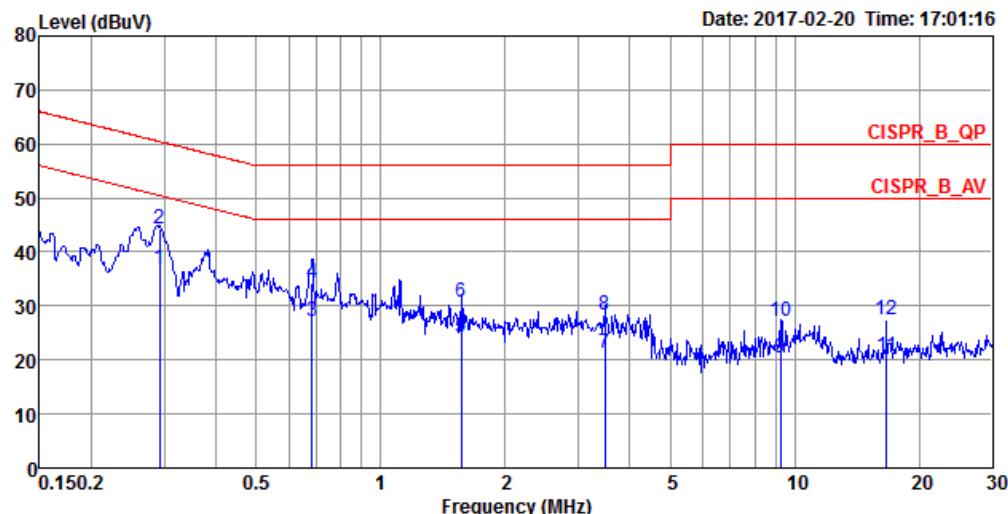
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

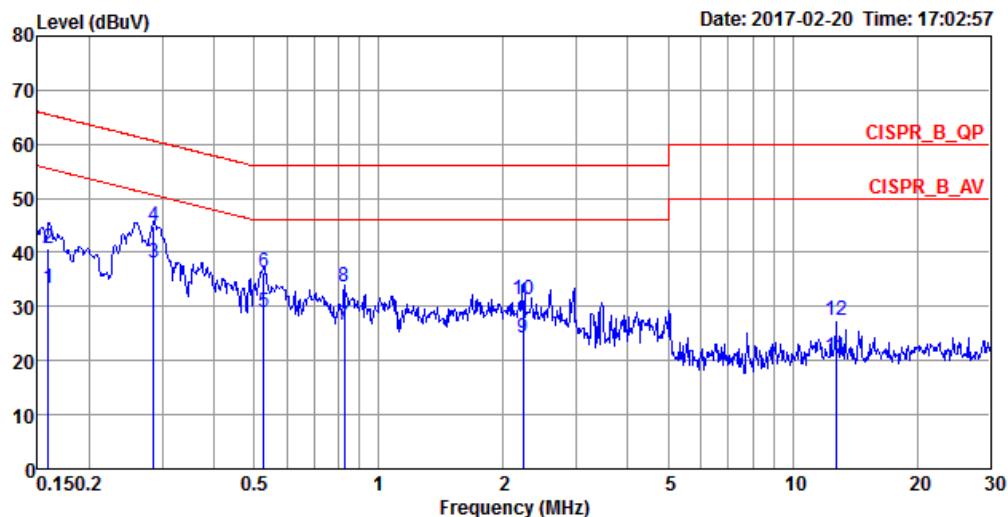
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	59%
Test Engineer	Da Deng	Phase	Line
Configuration	CTX	Test Mode	Mode 2



Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
		Limit	Line	Level	Factor	Loss		
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.2924	36.88	-13.58	50.46	26.92	9.91	0.05 Average	LINE
2	0.2924	44.29	-16.17	60.46	34.33	9.91	0.05 QP	LINE
3	0.6826	27.21	-18.79	46.00	17.22	9.94	0.05 Average	LINE
4	0.6826	34.38	-21.62	56.00	24.39	9.94	0.05 QP	LINE
5	1.5684	24.07	-21.93	46.00	14.00	10.00	0.07 Average	LINE
6	1.5684	30.81	-25.19	56.00	20.74	10.00	0.07 QP	LINE
7	3.4722	21.37	-24.63	46.00	11.29	9.96	0.12 Average	LINE
8	3.4722	28.24	-27.76	56.00	18.16	9.96	0.12 QP	LINE
9	9.2532	20.31	-29.69	50.00	10.08	10.05	0.18 Average	LINE
10	9.2532	27.21	-32.79	60.00	16.98	10.05	0.18 QP	LINE
11	16.6612	20.57	-29.43	50.00	10.16	10.18	0.23 Average	LINE
12	16.6612	27.32	-32.68	60.00	16.91	10.18	0.23 QP	LINE

Temperature	22°C	Humidity	59%
Test Engineer	Da Deng	Phase	Neutral
Configuration	CTX	Test Mode	Mode 2



Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
		Line	dBuV	Level	Factor	Loss		
	MHz	dBuV	dB	dBuV	dB	dB		
1	0.1590	33.36	-22.16	55.52	23.37	9.95	0.04 Average	NEUTRAL
2	0.1590	40.74	-24.78	65.52	30.75	9.95	0.04 QP	NEUTRAL
3	0.2863	38.00	-12.63	50.63	27.98	9.97	0.05 Average	NEUTRAL
4	0.2863	44.97	-15.66	60.63	34.95	9.97	0.05 QP	NEUTRAL
5	0.5265	28.95	-17.05	46.00	18.94	9.97	0.04 Average	NEUTRAL
6	0.5265	36.22	-19.78	56.00	26.21	9.97	0.04 QP	NEUTRAL
7	0.8261	26.67	-19.33	46.00	16.64	9.98	0.05 Average	NEUTRAL
8	0.8261	33.78	-22.22	56.00	23.75	9.98	0.05 QP	NEUTRAL
9	2.2367	24.18	-21.82	46.00	14.11	9.98	0.09 Average	NEUTRAL
10	2.2367	31.38	-24.62	56.00	21.31	9.98	0.09 QP	NEUTRAL
11	12.7161	20.63	-29.37	50.00	10.22	10.20	0.21 Average	NEUTRAL
12	12.7161	27.59	-32.41	60.00	17.18	10.20	0.21 QP	NEUTRAL

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Field Strength of Fundamental Emissions Measurement

4.2.1. Limit

The field strength of fundamental emissions within these bands specified at a distance of 3 meters (measurement instrumentation employing an average detector) shall comply with the following table.

Frequency Band (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
2402 ~ 2480MHz	94 (Average)
	114 (Peak)

4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

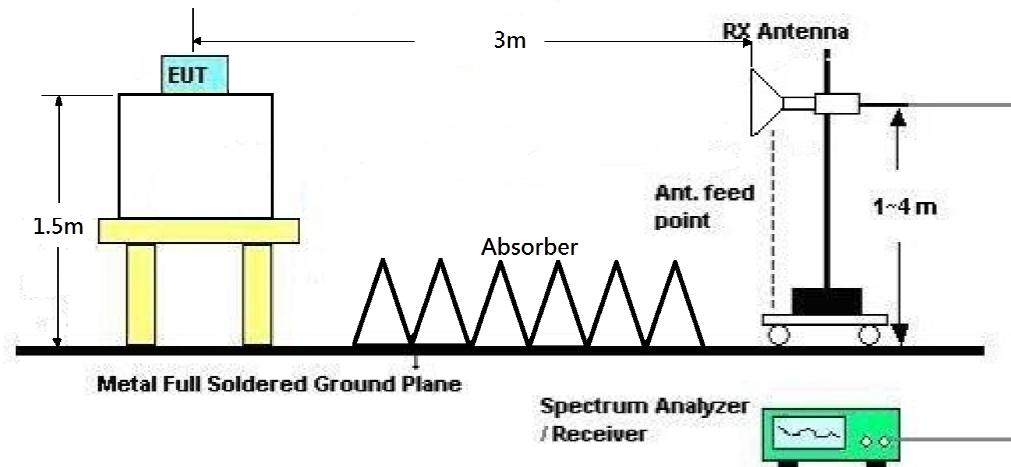
Power Meter Parameter	Setting
RBW	1 MHz Peak / 3MHz Peak
VBW	1 MHz Peak / 1/T Average
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For Fundamental emissions, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a

0.1 second interval during which the field strength is at its maximum value.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Field Strength of Fundamental Emissions

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	BR (GFSK) / Channel 0, 38, 78
Test Date	Jan. 05, 2017, Jan. 20, 2017		

Channel 0

Freq	Level	Limit		Over Limit	Read Level	Cable		Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Line	dBuV/m			dB	dBuV			dB	dB/m	dB	cm
1	2402.30	80.64	94.00	-13.36	48.74	3.59	28.31	0.00	301	307	Average	HORIZONTAL	
2	2402.30	101.90	114.00	-12.10	70.00	3.59	28.31	0.00	301	307	Peak	HORIZONTAL	

Channel 38

Freq	Level	Limit		Over Limit	Read Level	Cable		Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Line	dBuV/m			dB	dBuV			dB	dB/m	dB	cm
1	2440.00	83.60	94.00	-10.40	50.88	4.31	28.41	0.00	294	319	Average	HORIZONTAL	
2	2440.00	104.86	114.00	-9.14	72.14	4.31	28.41	0.00	294	319	Peak	HORIZONTAL	

Channel 78

Freq	Level	Limit		Over Limit	Read Level	Cable		Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Line	dBuV/m			dB	dBuV			dB	dB/m	dB	cm
1	2479.80	82.53	94.00	-11.47	50.41	3.65	28.47	0.00	317	305	Average	HORIZONTAL	
2	2479.80	103.79	114.00	-10.21	71.67	3.65	28.47	0.00	317	305	Peak	HORIZONTAL	

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	EDR (8DPSK) / Channel 0, 38, 78
Test Date	Jan. 20, 2017		

Channel 0

	Freq	Limit		Over Limit	Read Level	Cable		Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Level	Line			Loss	dB/m						
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg			
1	2402.00	78.35	94.00	-15.65	46.45	3.59	28.31	0.00	302	307	Average	HORIZONTAL	
2	2402.00	99.61	114.00	-14.39	67.71	3.59	28.31	0.00	302	307	Peak	HORIZONTAL	

Channel 38

	Freq	Limit		Over Limit	Read Level	Cable		Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Level	Line			Loss	dB/m						
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg			
1	2440.40	78.65	94.00	-15.35	46.62	3.62	28.41	0.00	267	309	Average	HORIZONTAL	
2	2440.40	100.91	114.00	-13.09	68.88	3.62	28.41	0.00	267	309	Peak	HORIZONTAL	

Channel 78

	Freq	Limit		Over Limit	Read Level	Cable		Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Level	Line			Loss	dB/m						
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg			
1	2480.00	81.63	94.00	-12.37	49.51	3.65	28.47	0.00	282	302	Average	HORIZONTAL	
2	2480.00	102.89	114.00	-11.11	70.77	3.65	28.47	0.00	282	302	Peak	HORIZONTAL	

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

4.3. 20dB Spectrum Bandwidth Measurement

4.3.1. Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (2402 ~ 2480MHz).

4.3.2. Measuring Instruments and Setting

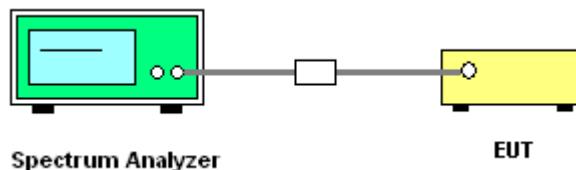
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RBW	100 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 20dB Spectrum Bandwidth

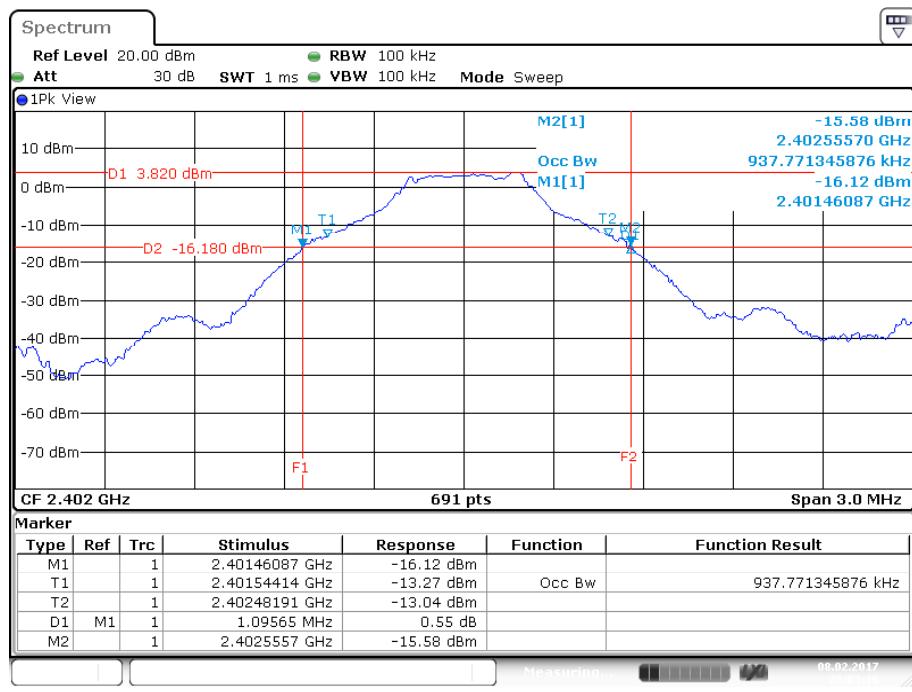
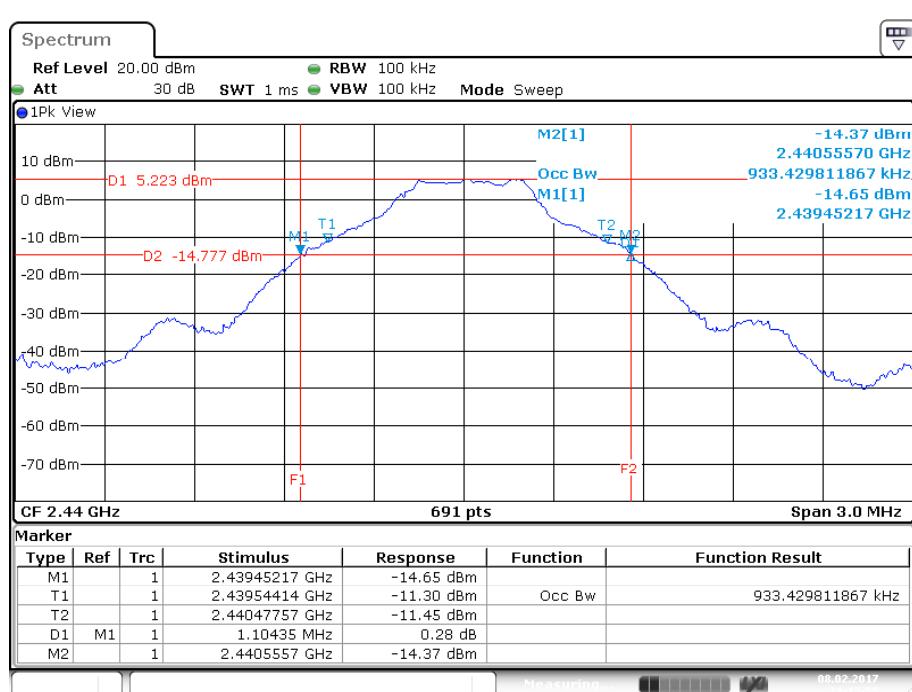
Temperature	20°C	Humidity	58%
Test Engineer	Andy Tsai, Peter Lin	Configurations	BR (GFSK), EDR (8DPSK) / Channel 0/38/78

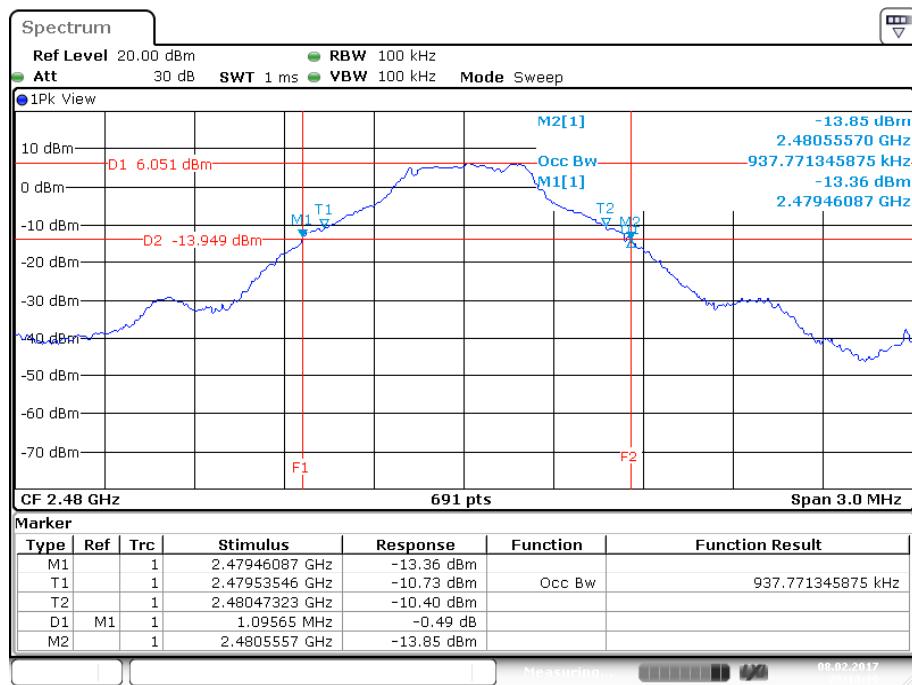
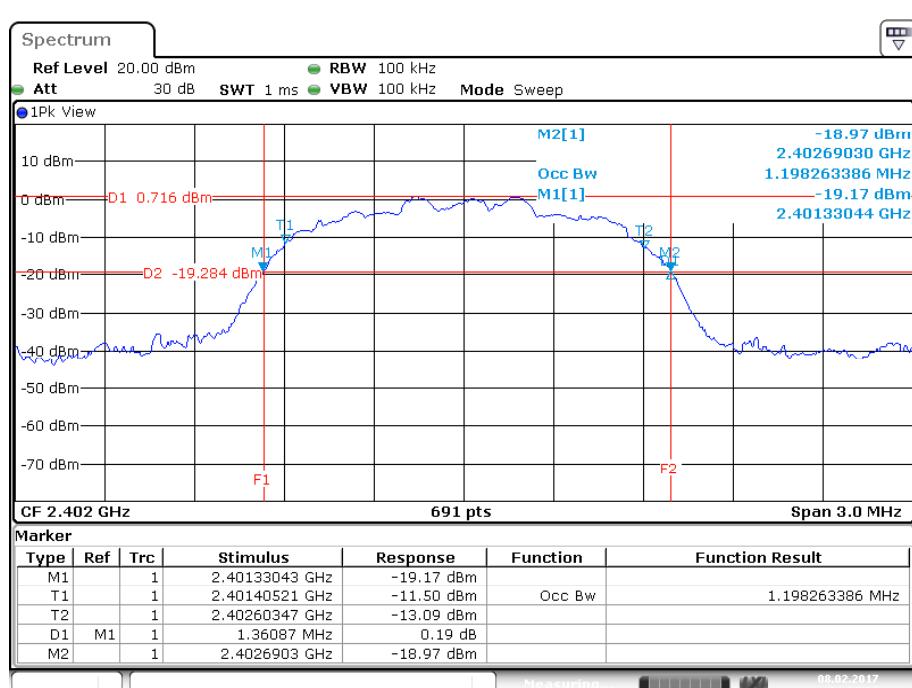
For BR (GFSK) 1 Mbps:

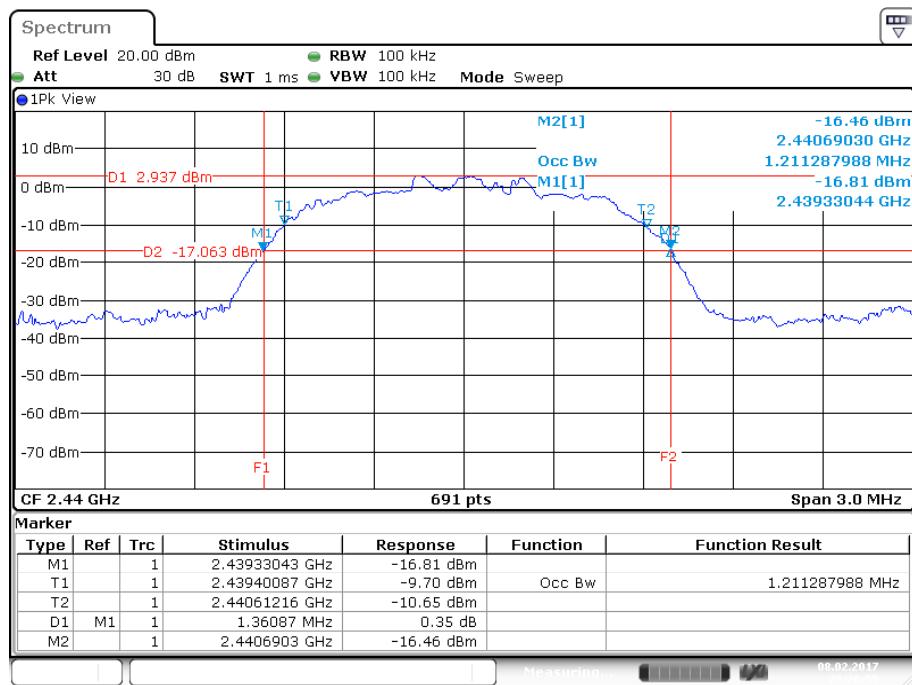
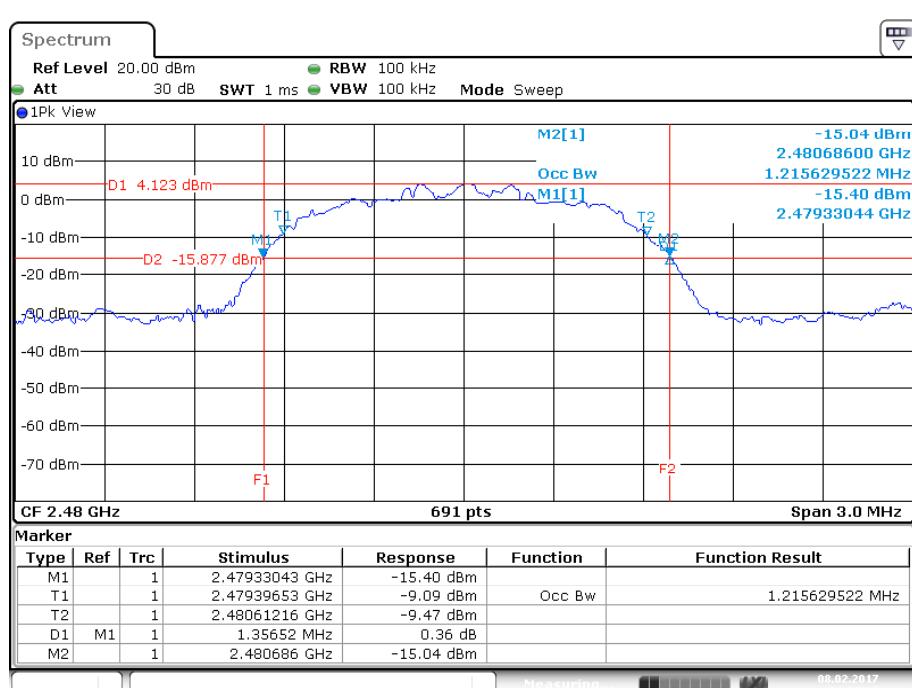
Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) $f_L > 2400\text{MHz}$	Frequency range (MHz) $f_H < 2483.5\text{MHz}$	Test Result
2402 MHz	1.10	0.94	2401.4609	-	Complies
2440 MHz	1.10	0.93	-	-	Complies
2480 MHz	1.10	0.94	-	2480.5557	Complies

For EDR (8DPSK) 3 Mbps:

Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) $f_L > 2400\text{MHz}$	Frequency range (MHz) $f_H < 2483.5\text{MHz}$	Test Result
2402 MHz	1.36	1.20	2401.3304	-	Complies
2440 MHz	1.36	1.21	-	-	Complies
2480 MHz	1.36	1.22	-	2480.6860	Complies

20 dB / 99% Bandwidth Plot on BR (GFSK) 1 Mbps / Channel 0 / 2402 MHz

20 dB / 99% Bandwidth Plot on BR (GFSK) 1 Mbps / Channel 38 / 2440 MHz


20 dB / 99% Bandwidth Plot on BR (GFSK) 1 Mbps / Channel 78 / 2480 MHz

20 dB / 99% Bandwidth Plot on EDR (8DPSK) 3 Mbps / Channel 0 / 2402 MHz


20 dB / 99% Bandwidth Plot on EDR (8DPSK) 3 Mbps / Channel 38 / 2440 MHz

20 dB / 99% Bandwidth Plot on EDR (8DPSK) 3 Mbps / Channel 78 / 2480 MHz


4.4. Radiated Emissions Measurement

4.4.1. Limit

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.4.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	100kHz/300kHz for Peak

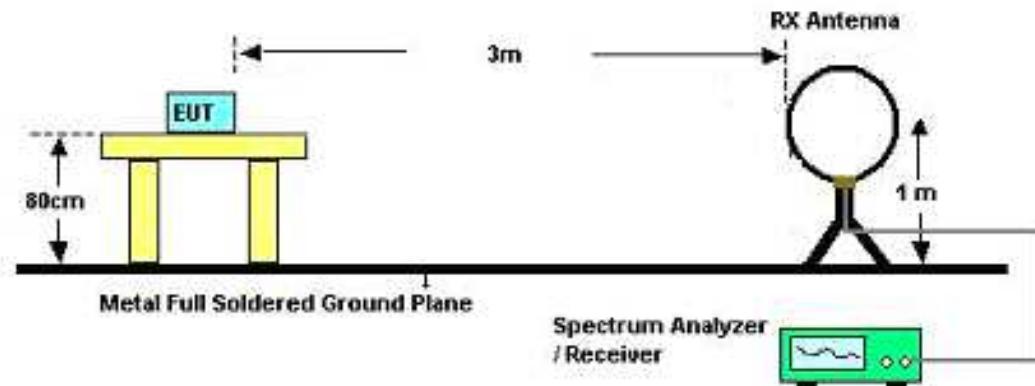
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.4.3. Test Procedures

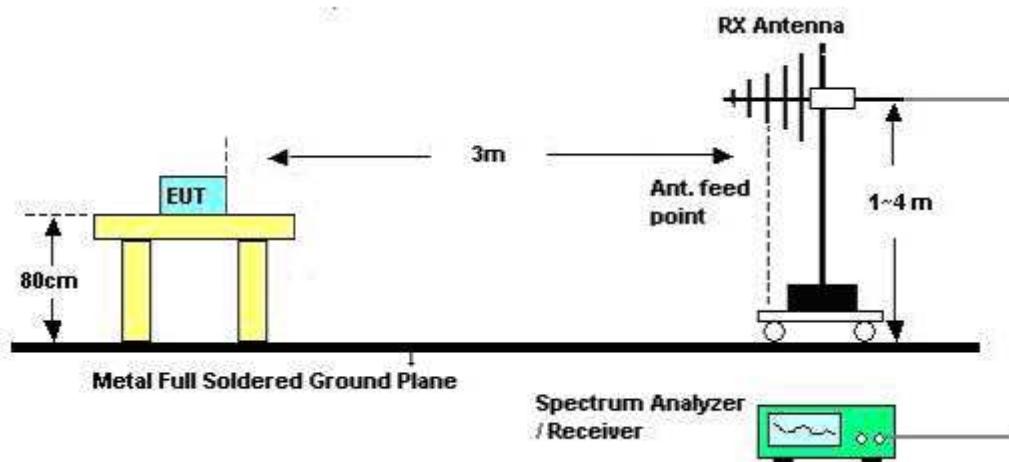
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.4.4. Test Setup Layout

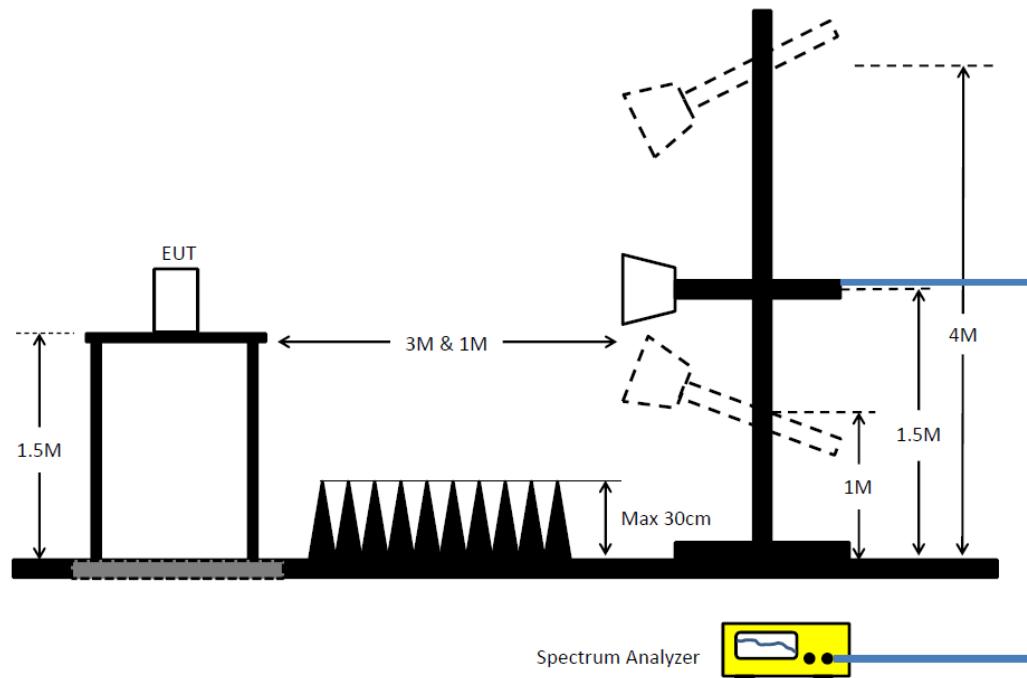
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	CTX
Test Date	Feb. 17, 2017	Test Mode	Mode 1

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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

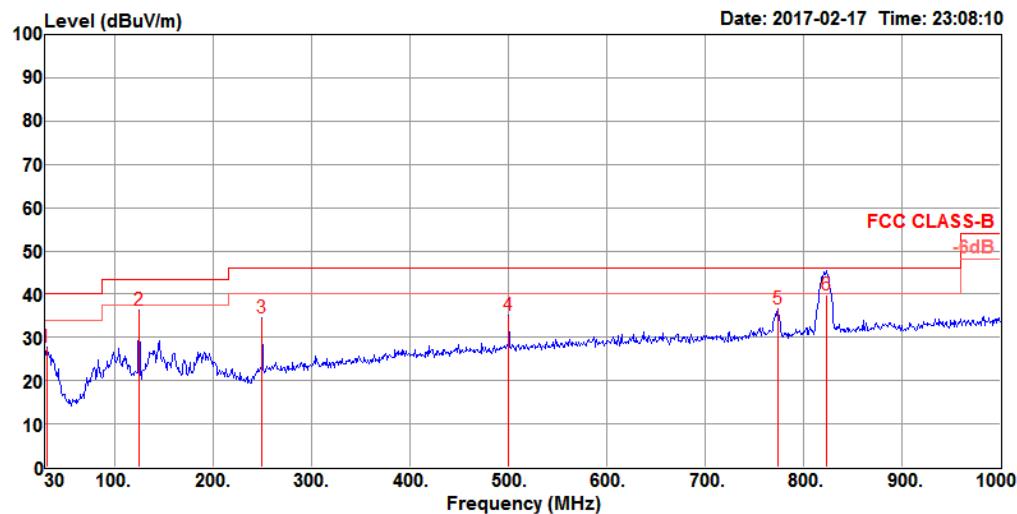
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

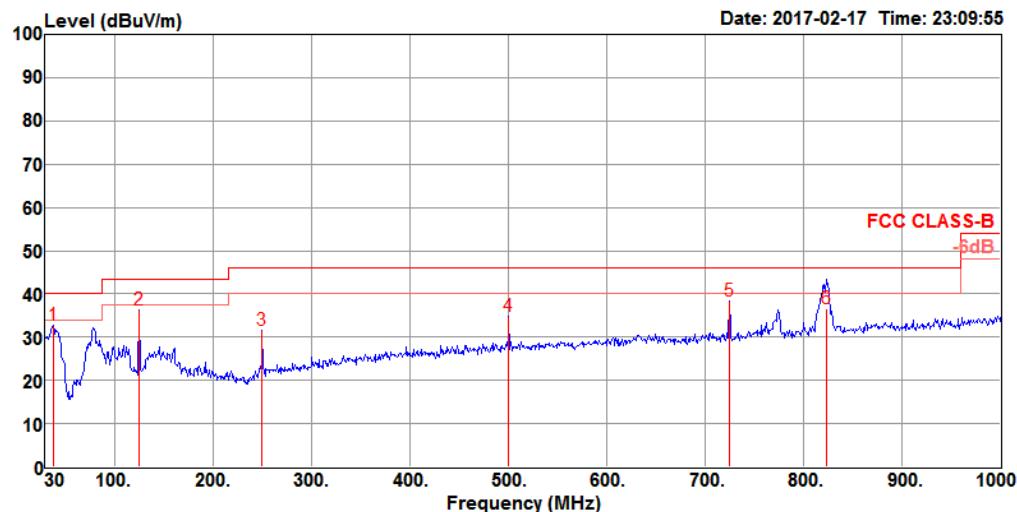
4.4.8. Results of Radiated Emissions (30MHz~1GHz)

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	CTX
Test Mode	Mode 1		

Horizontal



Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	cm	deg		
MHz	dBuV/m	dBuV/m		dB	dBuV	dB	dB/m	dB	cm	deg	
1	30.97	27.62	40.00	-12.38	34.97	0.51	25.13	32.99	100	353	Peak HORIZONTAL
2	125.06	36.41	43.50	-7.09	48.81	1.07	18.94	32.41	200	78	Peak HORIZONTAL
3	250.19	34.47	46.00	-11.53	46.20	1.50	19.10	32.33	125	233	Peak HORIZONTAL
4	500.45	35.11	46.00	-10.89	41.20	2.18	24.03	32.30	150	127	Peak HORIZONTAL
5	773.99	36.51	46.00	-9.49	39.28	2.87	26.60	32.24	150	55	Peak HORIZONTAL
6	822.49	39.94	46.00	-6.06	41.97	2.96	27.07	32.06	100	181	QP HORIZONTAL

Vertical


Freq	Level	Limit		Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Line	dB									
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	37.76	32.80	40.00	-7.20	43.44	0.58	21.51	32.73	100	7	Peak	VERTICAL
2	125.06	36.25	43.50	-7.25	48.65	1.07	18.94	32.41	100	354	Peak	VERTICAL
3	250.19	31.67	46.00	-14.33	43.40	1.50	19.10	32.33	100	0	Peak	VERTICAL
4	500.45	34.85	46.00	-11.15	40.94	2.18	24.03	32.30	125	114	Peak	VERTICAL
5	724.52	38.46	46.00	-7.54	42.00	2.64	26.15	32.33	100	300	Peak	VERTICAL
6	822.49	36.63	46.00	-9.37	38.66	2.96	27.07	32.06	125	1	QP	VERTICAL

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.4.9. Results for Radiated Emissions (1GHz~10th Harmonic)

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	BR (GFSK) / Channel 0
Test Date	Jan. 20, 2017		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4804.11	31.30	54.00	-22.70	26.25	5.18	32.92	33.05	257	272	Average	HORIZONTAL
2	4804.11	52.56	74.00	-21.44	47.51	5.18	32.92	33.05	257	272	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4804.22	29.66	54.00	-24.34	24.61	5.18	32.92	33.05	263	37	Average	VERTICAL
2	4804.22	50.92	74.00	-23.08	45.87	5.18	32.92	33.05	263	37	Peak	VERTICAL

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	BR (GFSK) / Channel 38
Test Date	Jan. 05, 2017		

Horizontal

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	cm	deg		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4880.27	31.22	54.00	-22.78	24.96	6.22	33.06	33.02	207	236 Average	HORIZONTAL
2	4880.27	52.48	74.00	-21.52	46.22	6.22	33.06	33.02	207	236 Peak	HORIZONTAL

Vertical

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	cm	deg		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4880.33	30.86	54.00	-23.14	24.60	6.22	33.06	33.02	153	135 Average	VERTICAL
2	4880.33	52.12	74.00	-21.88	45.86	6.22	33.06	33.02	153	135 Peak	VERTICAL

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	BR (GFSK) / Channel 78
Test Date	Jan. 20, 2017		

Horizontal

	Freq	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	Freq	Level	Line	Limit	Level	Loss	Factor	Factor			
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4960.32	30.13	54.00	-23.87	24.61	5.27	33.23	32.98	280	218	Average HORIZONTAL
2	4960.32	51.39	74.00	-22.61	45.87	5.27	33.23	32.98	280	218	Peak HORIZONTAL

Vertical

	Freq	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	Freq	Level	Line	Limit	Level	Loss	Factor	Factor			
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4959.75	29.24	54.00	-24.76	23.72	5.27	33.23	32.98	316	95	Average VERTICAL
2	4959.75	50.50	74.00	-23.50	44.98	5.27	33.23	32.98	316	95	Peak VERTICAL

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.



Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	EDR (8DPSK) / Channel 0
Test Date	Jan. 20, 2017		

Horizontal

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor				
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.58	29.58	54.00	-24.42	24.53	5.18	32.92	33.05	258	268 Average	HORIZONTAL
2	4803.58	50.84	74.00	-23.16	45.79	5.18	32.92	33.05	258	268 Peak	HORIZONTAL

Vertical

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor				
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4803.62	28.57	54.00	-25.43	23.52	5.18	32.92	33.05	266	35 Average	VERTICAL
2	4803.62	49.83	74.00	-24.17	44.78	5.18	32.92	33.05	266	35 Peak	VERTICAL

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	EDR (8DPSK) / Channel 38
Test Date	Jan. 20, 2017		

Horizontal

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	cm	deg		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4880.23	29.06	54.00	-24.94	23.80	5.22	33.06	33.02	252	272	Average
2	4880.23	50.32	74.00	-23.68	45.06	5.22	33.06	33.02	252	272	Peak
											HORIZONTAL

Vertical

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	cm	deg		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4879.94	27.76	54.00	-26.24	22.50	5.22	33.06	33.02	270	353	Average
2	4879.94	49.02	74.00	-24.98	43.76	5.22	33.06	33.02	270	353	Peak
											VERTICAL

Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	EDR (8DPSK) / Channel 78
Test Date	Jan. 20, 2017		

Horizontal

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	dB	cm		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4959.68	30.03	54.00	-23.97	24.51	5.27	33.23	32.98	268	222 Average	HORIZONTAL
2	4959.68	51.29	74.00	-22.71	45.77	5.27	33.23	32.98	268	222 Peak	HORIZONTAL

Vertical

Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	dB	cm		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4960.29	28.01	54.00	-25.99	22.49	5.27	33.23	32.98	317	96 Average	VERTICAL
2	4960.29	49.27	74.00	-24.73	43.75	5.27	33.23	32.98	317	96 Peak	VERTICAL

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.5. Band Edge Emissions Measurement

4.5.1. Limit

Band edge emissions radiated outside of the specified frequency bands shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	100kHz/300kHz for Peak

4.5.3. Test Procedures

The test procedure is the same as section 4.4.3.

4.5.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.4.4.

4.5.5. Test Deviation

There is no deviation with the original standard.

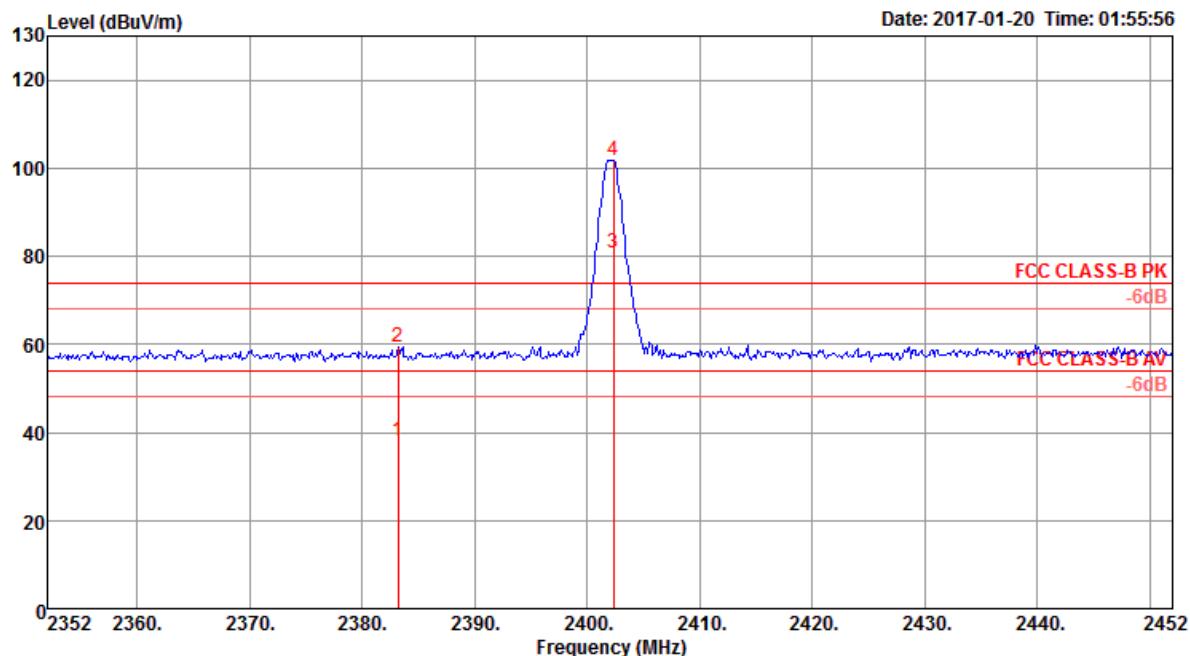
4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Band Edge and Fundamental Emissions

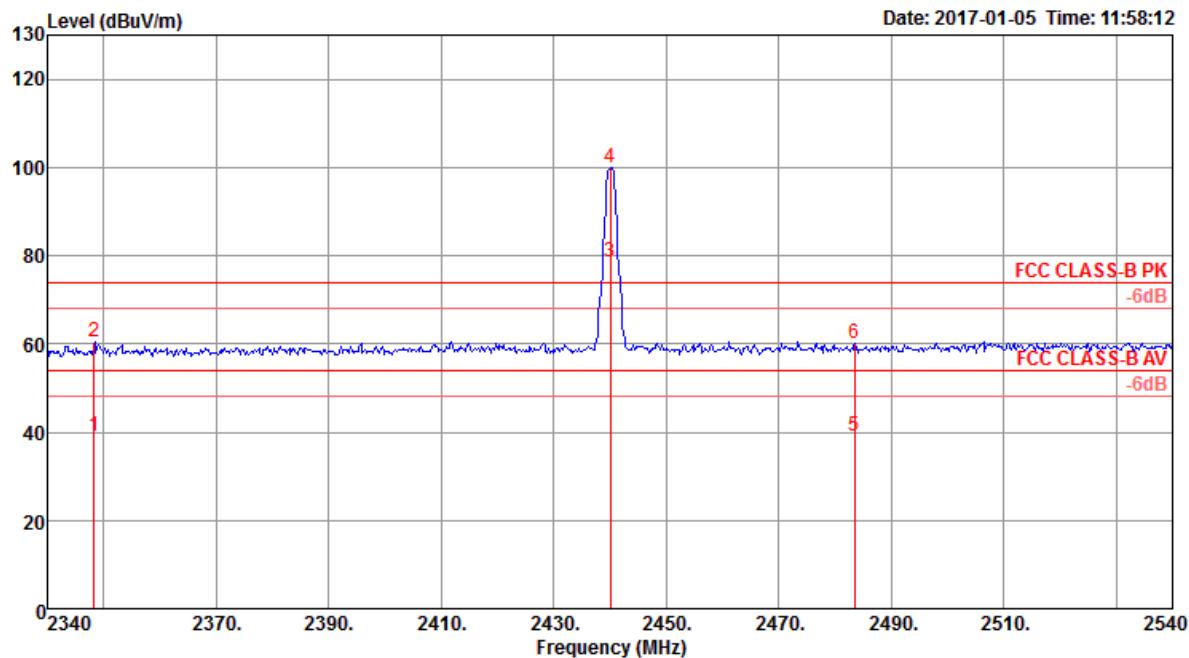
Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	BR (GFSK) / Channel 0, 38, 78

Channel 0



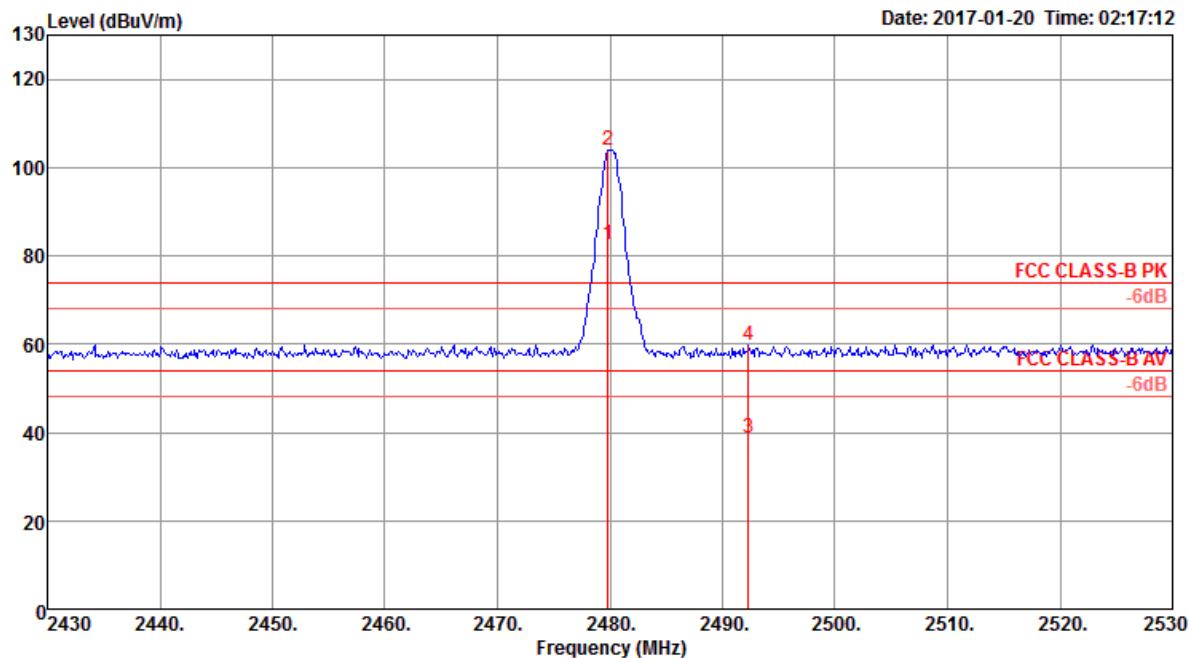
Freq	Level	Limit		Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Line	dB									
MHz	dBuV/m	dBuV/m	dB		dBuV	dB	dB/m	dB	cm	deg		
1 2383.20	38.19	54.00	-15.81		6.34	3.57	28.28	0.00	301	307	Average	HORIZONTAL
2 2383.20	59.45	74.00	-14.55		27.60	3.57	28.28	0.00	301	307	Peak	HORIZONTAL
3 @ 2402.30	80.64				48.74	3.59	28.31	0.00	301	307	Average	HORIZONTAL
4 @ 2402.30	101.90				70.00	3.59	28.31	0.00	301	307	Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2402 MHz.

Channel 38


Freq	Level	Limit	Over	Read	Cable			Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
					Line	Limit	Level						
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg				
1	2348.33	39.11	54.00	-14.89	6.66	4.23	28.22	0.00	150	264	Average	VERTICAL	
2	2348.33	60.37	74.00	-13.63	27.92	4.23	28.22	0.00	150	264	Peak	VERTICAL	
3 @	2440.00	78.72			46.00	4.31	28.41	0.00	150	264	Average	VERTICAL	
4 @	2440.00	99.98			67.26	4.31	28.41	0.00	150	264	Peak	VERTICAL	
5	2483.50	38.97	54.00	-15.03	6.15	4.35	28.47	0.00	150	264	Average	VERTICAL	
6	2483.50	60.23	74.00	-13.77	27.41	4.35	28.47	0.00	150	264	Peak	VERTICAL	

Item 3, 4 are the fundamental frequency at 2440 MHz.

Channel 78


Freq	Level	Limit	Over	Read	Cable			Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
					Line	Limit	Level						
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg				
1 @ 2479.80	82.53				50.41	3.65	28.47	0.00	317	305	Average	HORIZONTAL	
2 @ 2479.80	103.79				71.67	3.65	28.47	0.00	317	305	Peak	HORIZONTAL	
3 2492.30	38.63	54.00	-15.37	6.47	3.66	28.50	0.00	317	305	Average	HORIZONTAL		
4 2492.30	59.89	74.00	-14.11	27.73	3.66	28.50	0.00	317	305	Peak	HORIZONTAL		

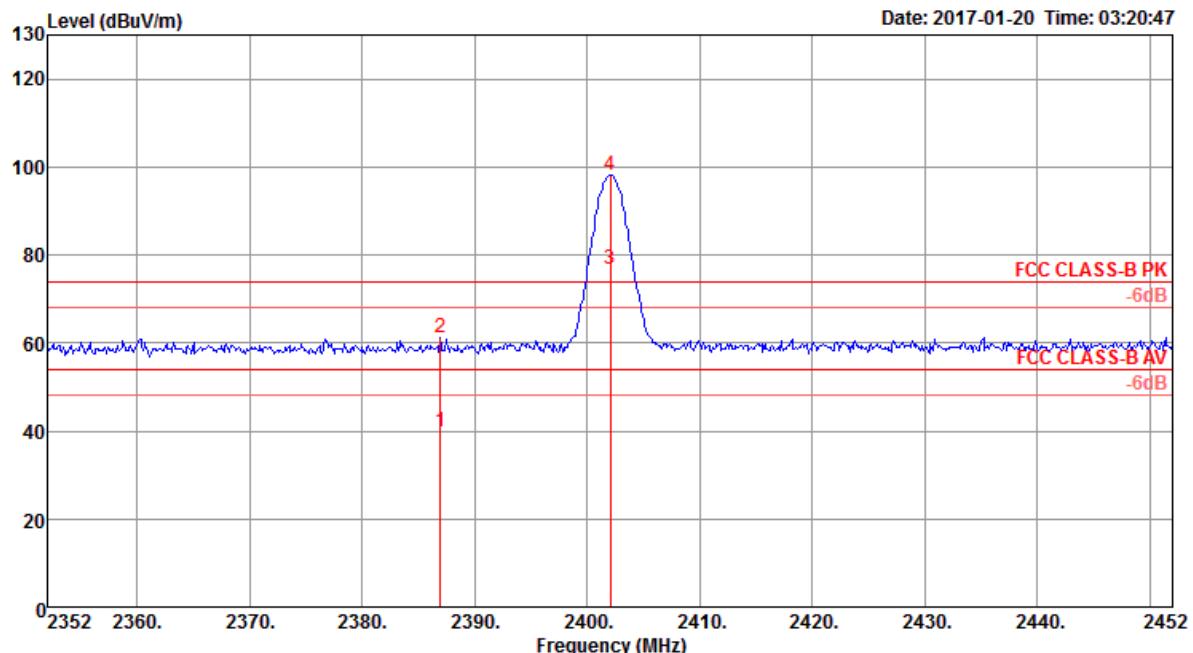
Item 1, 2 are the fundamental frequency at 2480 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

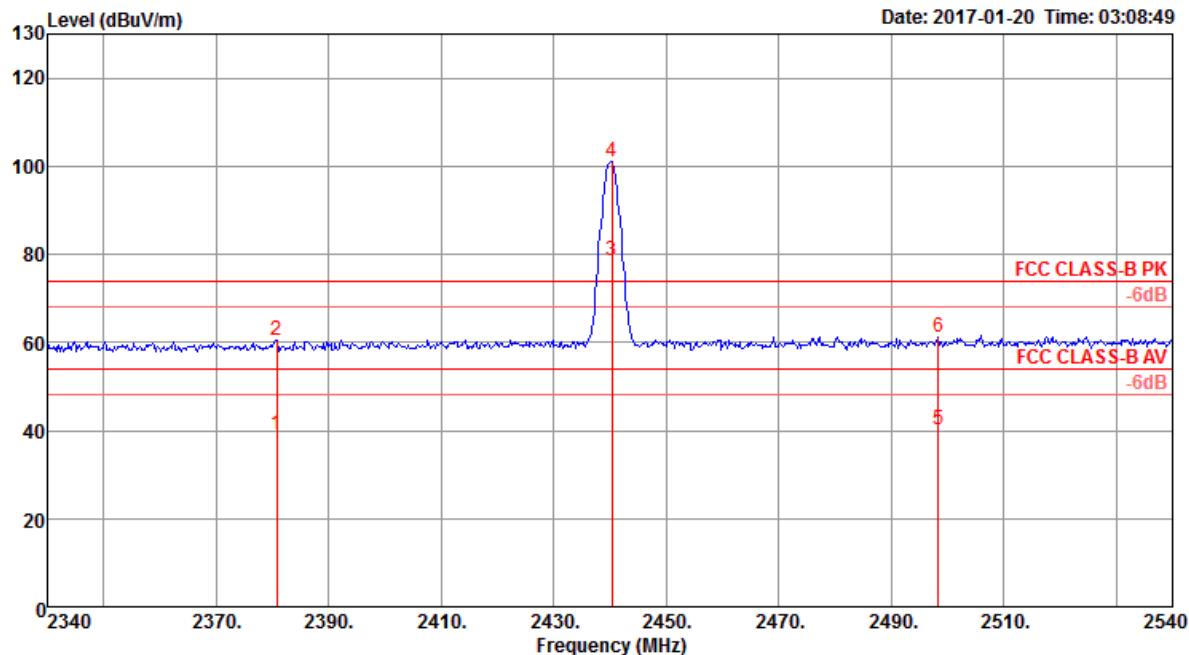
Temperature	25°C	Humidity	58%
Test Engineer	Jay Luo, Jeff Wu, Steven Liang	Configurations	EDR (8DPSK) / Channel 0, 38, 78

Channel 0


Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	dB	cm		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 2386.90	39.83	54.00	-14.17	7.94	3.58	28.31	0.00	170	191	Average	VERTICAL
2 2386.90	61.09	74.00	-12.91	29.20	3.58	28.31	0.00	170	191	Peak	VERTICAL
3 @ 2402.00	76.88			44.98	3.59	28.31	0.00	170	191	Average	VERTICAL
4 @ 2402.00	98.14			66.24	3.59	28.31	0.00	170	191	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2402 MHz.

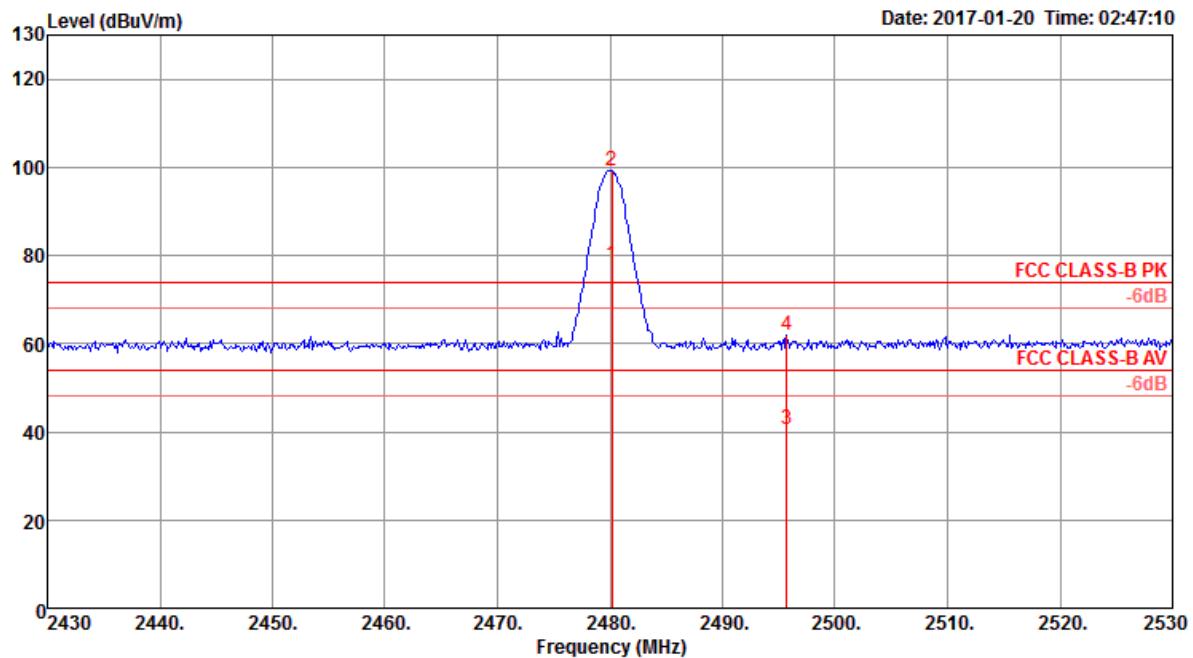
Channel 38



Freq	Level	Limit	Over	Read	Cable			Preamp	A/Pos	T/Pos	Remark	Pol/Phase
					Line	Limit	dB					
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg			
1	2380.80	39.16	54.00	-14.84	7.31	3.57	28.28	0.00	267	309	Average	HORIZONTAL
2	2380.80	60.42	74.00	-13.58	28.57	3.57	28.28	0.00	267	309	Peak	HORIZONTAL
3 @	2440.40	78.65			46.62	3.62	28.41	0.00	267	309	Average	HORIZONTAL
4 @	2440.40	100.91			68.88	3.62	28.41	0.00	267	309	Peak	HORIZONTAL
5	2498.40	40.09	54.00	-13.91	7.92	3.67	28.50	0.00	267	309	Average	HORIZONTAL
6	2498.40	61.35	74.00	-12.65	29.18	3.67	28.50	0.00	267	309	Peak	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2440 MHz.

Channel 78



Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	cm	deg		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 @ 2480.20	78.01				45.89	3.65	28.47	0.00	110	0 Average	VERTICAL
2 @ 2480.20	99.27				67.15	3.65	28.47	0.00	110	0 Peak	VERTICAL
3 @ 2495.70	40.62	54.00	-13.38	8.46	3.66	28.50	0.00	110	0 Average	VERTICAL	
4 @ 2495.70	61.88	74.00	-12.12	29.72	3.66	28.50	0.00	110	0 Peak	VERTICAL	

Item 1, 2 are the fundamental frequency at 2480 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.6. Antenna Requirements

4.6.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.6.2. Antenna Connector Construction

Please refer to section 3.1 in this test report, antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 23, 2017	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 14, 2016	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 21, 2016	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 24, 2016	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMC	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2016	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 10, 2016	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 25, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Mar. 15, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 16, 2017	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jun. 28, 2016	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 21, 2016	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 16, 2016	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-I0-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 26, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 22, 2016	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

** Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%