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FCC RADIO TEST REPORT

Applicant's company	**Wistron NeWeb Corporation**
Applicant Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan
FCC ID	NKR-RT05
Manufacturer's company	**Wistron NeWeb Corporation**
Manufacturer Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan

Product Name	24GHz Rader BSD+RCTA sensor system
Brand Name	WNC
Model Name	RT05
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.249
Frequency Range	24000 ~ 24250 MHz
Received Date	Oct. 12, 2016
Final Test Date	Nov. 10, 2016
Submission Type	Original Equipment

Statement

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

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR6O1240	Rev. 01	Initial issue of report	Nov. 15, 2016

1 VERIFICATION OF COMPLIANCE

Product Name	:	24GHz Rader BSD+RCTA sensor system
Brand Name	:	WNC
Model Name	:	RT05
Applicant	:	Wistron NeWeb Corporation
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.249

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 12, 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.

Reviewed By:
Sam Chen

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 DC 12V
Modulation	FMCW
Frequency Range	24000 ~ 24250 MHz
Operation Frequency Range	EUT 1: 24075 ~ 24225 MHz EUT 2: 24065 ~ 24215 MHz
Channel Space	0.146484375 MHz
Channel Number	EUT 1: 1025 EUT 2: 1025
Channel Bandwidth (99%)	EUT 1: 0.32 MHz EUT 2: 0.32 MHz
Max. Field Strength	EUT 1: 110.53 dBuV/m at 1m (Average) EUT 2: 110.03 dBuV/m at 1m (Average)
Carrier Frequencies	Please refer to section 3.3
Antenna	EUT 1: Antenna Type: PATCH array Antenna (Without any antenna connector), Antenna Gain: 12.00 dBi EUT 2: Antenna Type: PATCH array Antenna (Without any antenna connector), Antenna Gain: 17.30 dBi

3.2 Accessories

Description
Power cable 1: Non-shielded, 9.5m (for EUT 1 use)
Power cable 2: Non-shielded, 5.5m (for EUT 2 use)

3.3 Table for Carrier Frequencies

For EUT 1:

Frequency Band	Channel No.	Frequency
24000 ~ 24250 MHz	0	24075 MHz
	1	24075.146484375 MHz
	:	:
	511	24149.853515625 MHz
	512	24150 MHz
	513	24150.146484375 MHz
	:	:
	1023	24224.853515625 MHz
	1024	24225 MHz

For EUT 2:

Frequency Band	Channel No.	Frequency
24000 ~ 24250 MHz	0	24065 MHz
	1	24065.146484375 MHz
	:	:
	511	24139.853515625 MHz
	512	24140 MHz
	513	24140.146484375 MHz
	:	:
	1023	24214.853515625 MHz
	1024	24215 MHz

3.4 Table for Test Modes

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

Test Items	Mode	Channel
AC Power Line Conducted Emissions	Normal Link	-
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	CTX	0/512/1024
Radiated Emissions 30MHz~1GHz	Normal Link	-
Radiated Emissions 1GHz~40GHz	CTX	0/512/1024
Radiated Emissions 40GHz~100GHz	CTX	0/512/1024
Band Edge Emissions	CTX	0/512/1024

Note: 1. CTX=continuously transmitting.

2. The EUT can only be used at Y axis position.

The following test modes were performed for all tests:

For AC Power Line Conducted Emissions test:

Mode 1. EUT 1

Mode 2. EUT 2

Mode 2 is the worst case, so it was selected to record in this test report.

For Radiated Emissions 30MHz~1GHz test:

Mode 1. EUT 1

Mode 2. EUT 2

Mode 2 is the worst case, so it was selected to record in this test report.

For Other tests:

Mode 1. EUT 1

Mode 2. EUT 2

3.5 Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
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).

3.6 Table for Multiple Listing

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

Type	Description	Operation Frequency Range	Remark
1	Mater EUT	24075 ~ 24225 MHz	EUT 1
2	Slave EUT	24065 ~ 24215 MHz	EUT 2

3.7 Table for Supporting Units

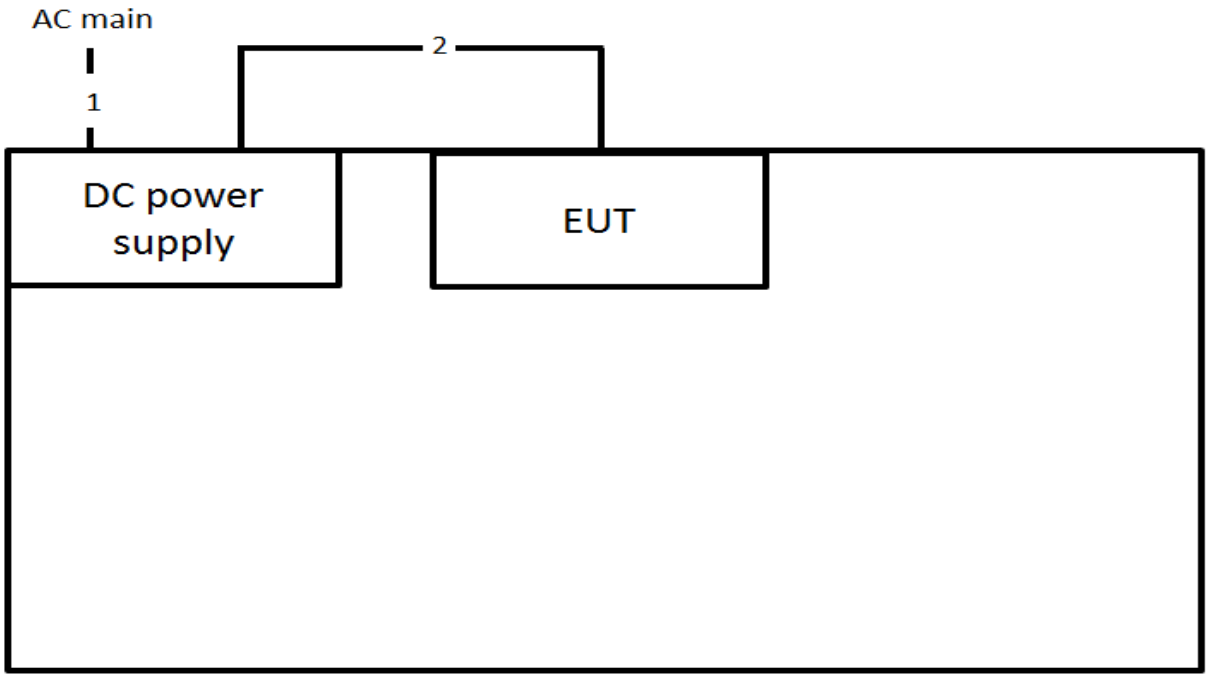
Support Unit	Brand	Model	FCC ID
DC power supply	Advanced	LPS-305	N/A

3.8 Duty Cycle

On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
1.000	1.000	100.00	0.00	0.01

3.9 Test Configurations

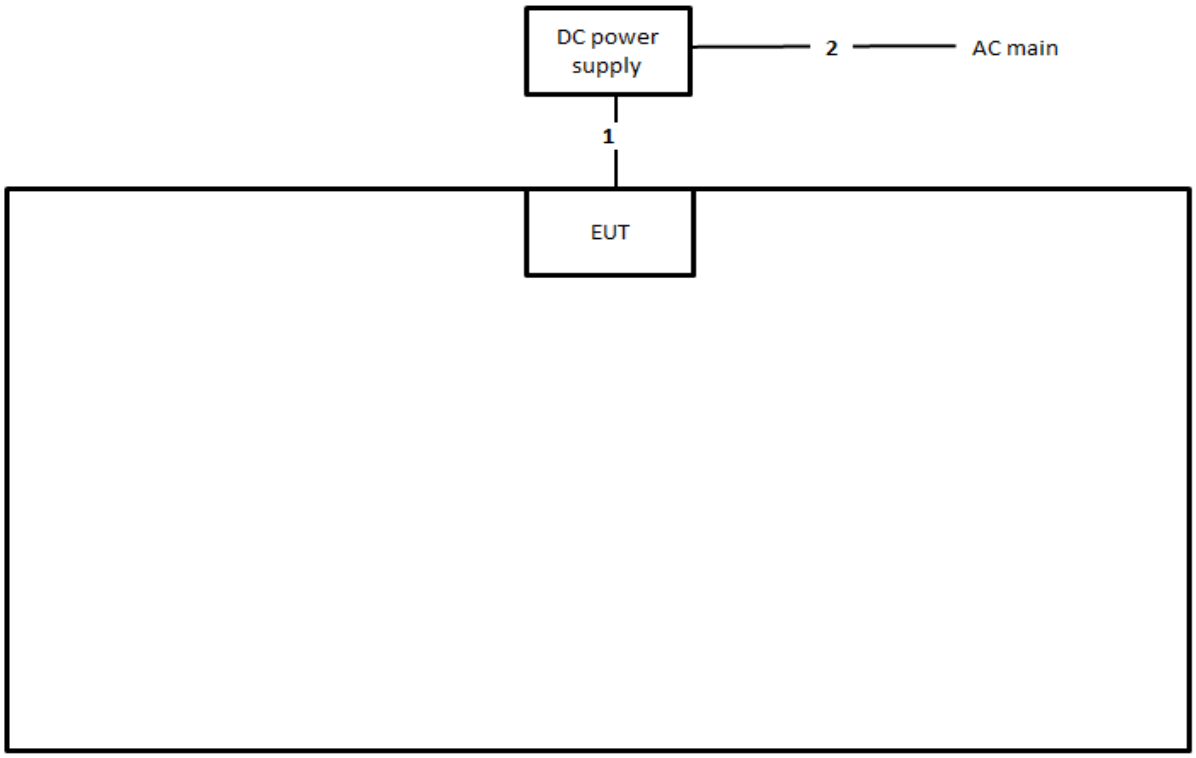
3.9.1 AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	Power cable	No	5.5m

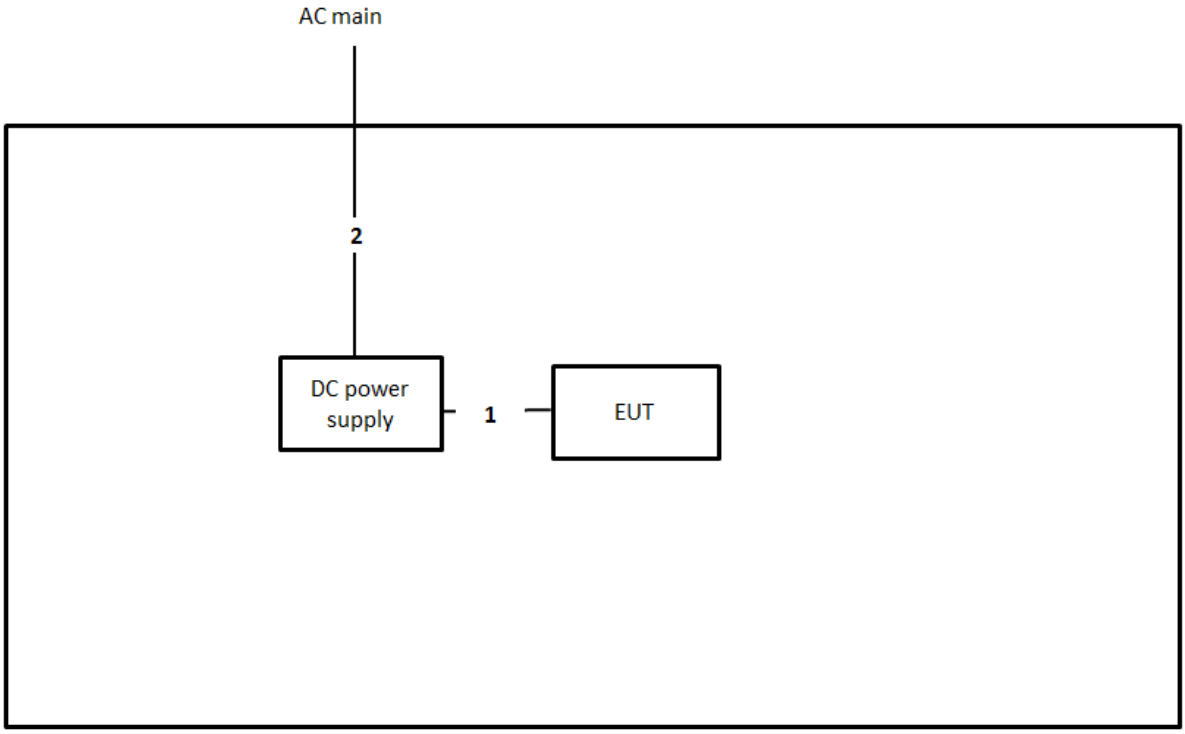
3.9.2 Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



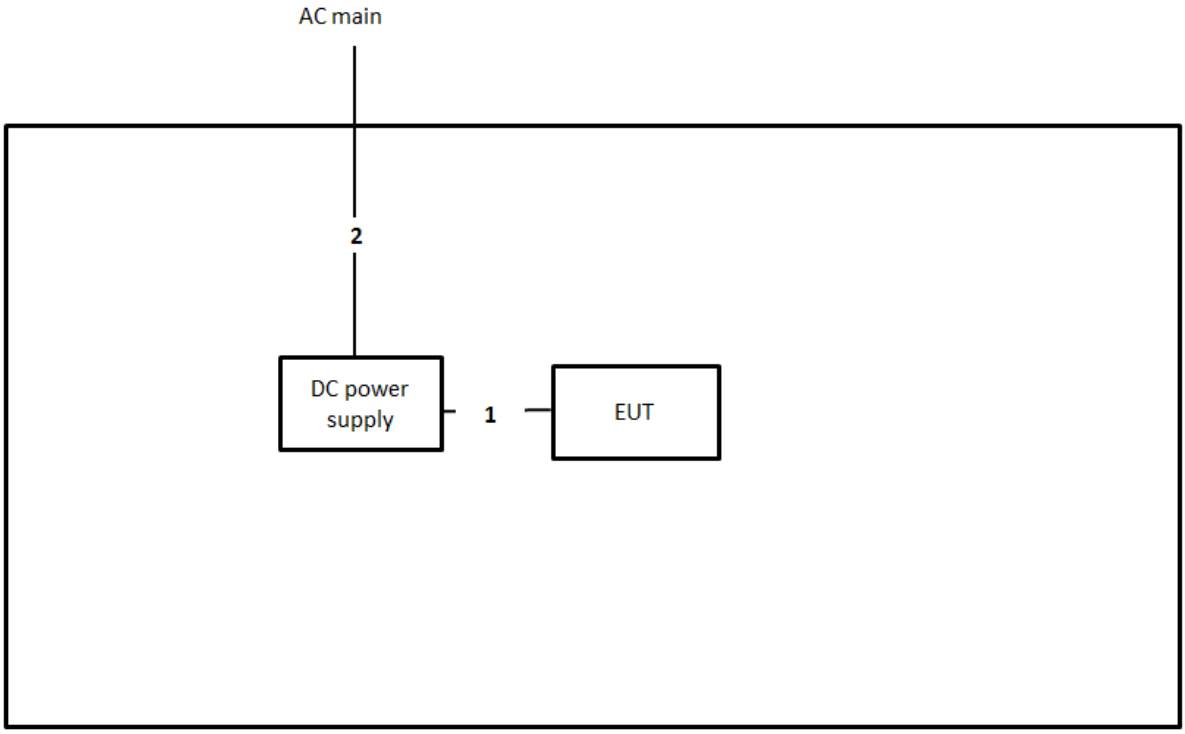
Item	Connection	Shielded	Length
1	Power cable	No	5.5m
2	Power cable	No	1.5m

Test Configuration: Above 1GHz / Test Mode: Mode 1



Item	Connection	Shielded	Length
1	Power cable	No	9.5m
2	Power cable	No	1.5m

Test Mode: Mode 2



Item	Connection	Shielded	Length
1	Power cable	No	5.5m
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

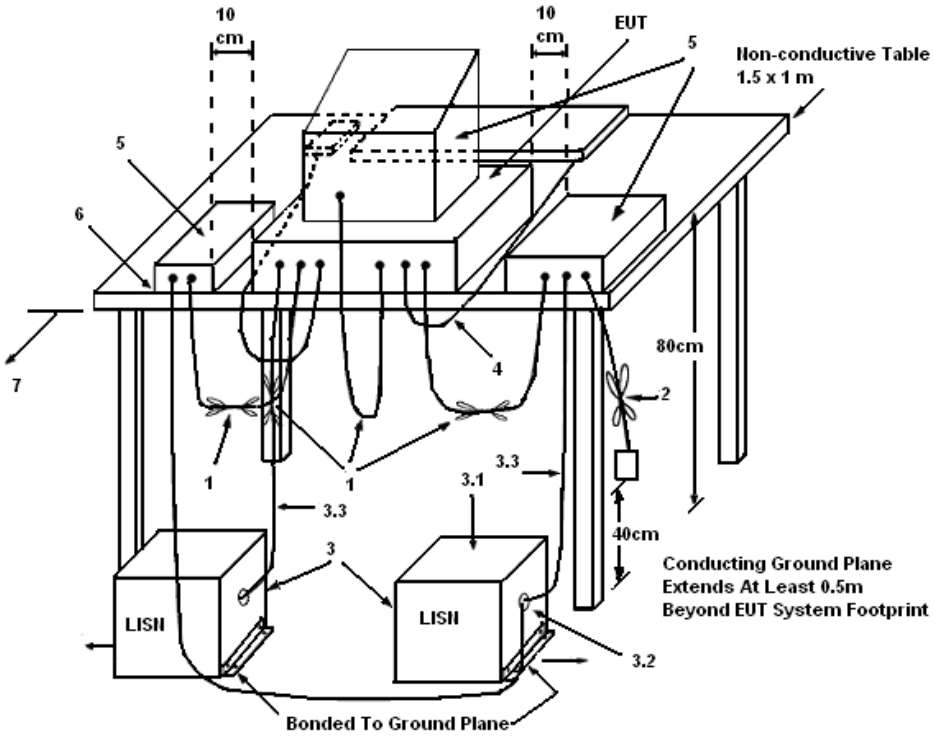
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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 50 Ω. 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

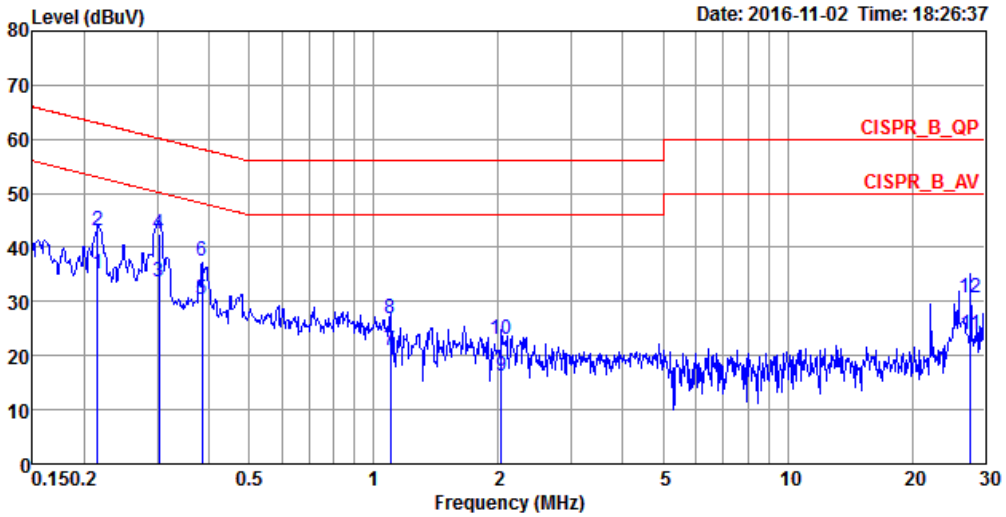
There is no deviation with the original standard.

4.1.6 EUT Operation during Test

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

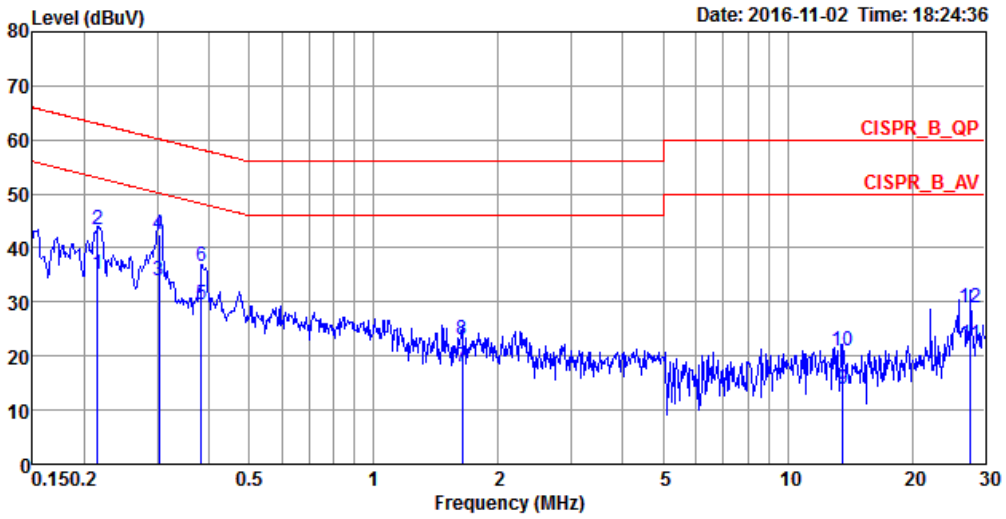
4.1.7 Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	53%
Test Engineer	Hank Yang	Phase	Line
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2151	35.23	-17.78	53.01	25.14	9.92	0.17	LINE	Average
2	0.2151	43.17	-19.84	63.01	33.08	9.92	0.17	LINE	QP
3	0.3035	33.80	-16.35	50.15	23.80	9.92	0.08	LINE	Average
4	0.3035	42.46	-17.69	60.15	32.46	9.92	0.08	LINE	QP
5	0.3852	30.42	-17.75	48.17	20.48	9.92	0.02	LINE	Average
6	0.3852	37.49	-20.68	58.17	27.55	9.92	0.02	LINE	QP
7	1.0997	20.93	-25.07	46.00	10.34	9.94	0.65	LINE	Average
8	1.0997	26.76	-29.24	56.00	16.17	9.94	0.65	LINE	QP
9	2.0333	16.36	-29.64	46.00	6.34	9.96	0.06	LINE	Average
10	2.0333	23.17	-32.83	56.00	13.15	9.96	0.06	LINE	QP
11	27.7080	23.95	-26.05	50.00	13.14	10.51	0.30	LINE	Average
12	27.7080	30.64	-29.36	60.00	19.83	10.51	0.30	LINE	QP

Temperature	24°C	Humidity	53%
Test Engineer	Hank Yang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2151	35.25	-17.76	53.01	25.16	9.92	0.17	NEUTRAL	Average
2	0.2151	43.52	-19.49	63.01	33.43	9.92	0.17	NEUTRAL	QP
3	0.3035	34.04	-16.11	50.15	24.04	9.92	0.08	NEUTRAL	Average
4	0.3035	42.60	-17.55	60.15	32.60	9.92	0.08	NEUTRAL	QP
5	0.3832	29.41	-18.80	48.21	19.47	9.92	0.02	NEUTRAL	Average
6	0.3832	36.49	-21.72	58.21	26.55	9.92	0.02	NEUTRAL	QP
7	1.6363	18.05	-27.95	46.00	7.84	9.95	0.26	NEUTRAL	Average
8	1.6363	22.89	-33.11	56.00	12.68	9.95	0.26	NEUTRAL	QP
9	13.6228	13.94	-36.06	50.00	3.53	10.21	0.20	NEUTRAL	Average
10	13.6228	20.82	-39.18	60.00	10.41	10.21	0.20	NEUTRAL	QP
11	27.7080	22.00	-28.00	50.00	11.19	10.51	0.30	NEUTRAL	Average
12	27.7080	28.88	-31.12	60.00	18.07	10.51	0.30	NEUTRAL	QP

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	Fundamental Emissions Limit Average/Peak (dBuV/m) at 3m
24000 ~ 24250 MHz	108/128

Note 1: 107.96 dBuV/m rounding to 108dBuV/m and 127.96 dBuV/m rounding to 128dBuV/m

Note 2: Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

Average limit = 108dBuV/m + distance extrapolation factor (9.54 dB) =117.54dBuV/m.

Peak limit = 128dBuV/m + distance extrapolation factor (9.54 dB) =137.54dBuV/m.

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.

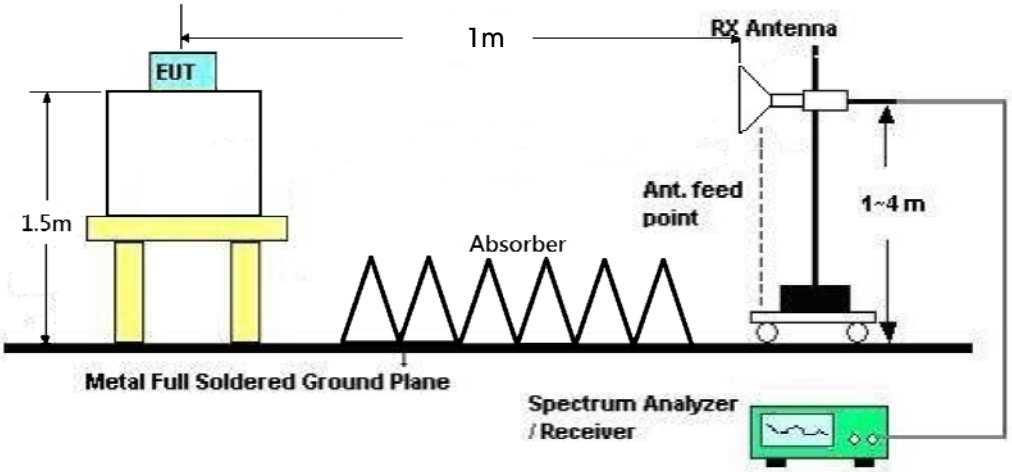
Power Meter Parameter	Setting
RBW	1 MHz Peak / 3MHz Average
VBW	1 MHz Peak / 1/T Average
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 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. 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	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0
Test Date	Nov. 10, 2016	Test Mode	Mode 1

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	24072.00	92.40	137.54	-45.14	95.56	9.30	38.80	51.26	150	327	Peak	HORIZONTAL
2	24072.50	92.74	117.54	-24.80	95.90	9.30	38.80	51.26	150	327	Average	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	24071.00	110.66	137.54	-26.88	113.82	9.30	38.80	51.26	152	14	Peak	VERTICAL
2	24071.50	110.53	117.54	-7.01	113.69	9.30	38.80	51.26	152	14	Average	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 512
Test Date	Oct. 27, 2016	Test Mode	Mode 1

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	24150.00	88.55	137.54	-48.99	91.67	9.32	38.80	51.24	150	190	Peak	HORIZONTAL
2	24151.00	87.93	117.54	-29.61	91.05	9.32	38.80	51.24	150	190	Average	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	24151.00	108.88	137.54	-28.66	112.00	9.32	38.80	51.24	154	194	Peak	VERTICAL
2	24151.00	108.23	117.54	-9.31	111.35	9.32	38.80	51.24	154	194	Average	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 1024
Test Date	Oct. 27, 2016	Test Mode	Mode 1

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	24227.00	87.43	137.54	-50.11	90.51	9.34	38.80	51.22	150	190	Peak	HORIZONTAL
2	24227.00	86.78	117.54	-30.76	89.86	9.34	38.80	51.22	150	190	Average	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	24226.00	108.71	137.54	-28.83	111.79	9.34	38.80	51.22	153	194	Peak	VERTICAL
2	24227.00	107.99	117.54	-9.55	111.07	9.34	38.80	51.22	153	194	Average	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0
Test Date	Oct. 27, 2016	Test Mode	Mode 2

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	24063.00	89.74	137.54	-47.80	92.90	9.30	38.80	51.26	152	187	Peak	HORIZONTAL
2	24063.00	89.22	117.54	-28.32	92.38	9.30	38.80	51.26	152	187	Average	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	24061.00	106.72	117.54	-10.82	109.88	9.30	38.80	51.26	156	199	Average	VERTICAL
2	24062.00	107.13	137.54	-30.41	110.29	9.30	38.80	51.26	156	199	Peak	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 512
Test Date	Nov. 10, 2016	Test Mode	Mode 2

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	24140.50	86.75	137.54	-50.79	89.87	9.32	38.80	51.24	153	344	Peak	HORIZONTAL
2	24140.50	85.78	117.54	-31.76	88.90	9.32	38.80	51.24	153	344	Average	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	24140.50	109.95	137.54	-27.59	113.07	9.32	38.80	51.24	151	14	Peak	VERTICAL
2	24141.00	109.36	117.54	-8.18	112.48	9.32	38.80	51.24	151	14	Average	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 1024
Test Date	Nov. 10, 2016	Test Mode	Mode 2

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	24213.50	90.19	137.54	-47.35	93.27	9.34	38.80	51.22	154	322	Peak	HORIZONTAL
2	24214.50	89.36	117.54	-28.18	92.44	9.34	38.80	51.22	154	322	Average	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	24214.00	110.03	117.54	-7.51	113.11	9.34	38.80	51.22	150	18	Average	VERTICAL
2	24216.00	110.74	137.54	-26.80	113.82	9.34	38.80	51.22	150	18	Peak	VERTICAL

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 (24000 ~ 24250 MHz).

4.3.2 Measuring Instruments and Setting

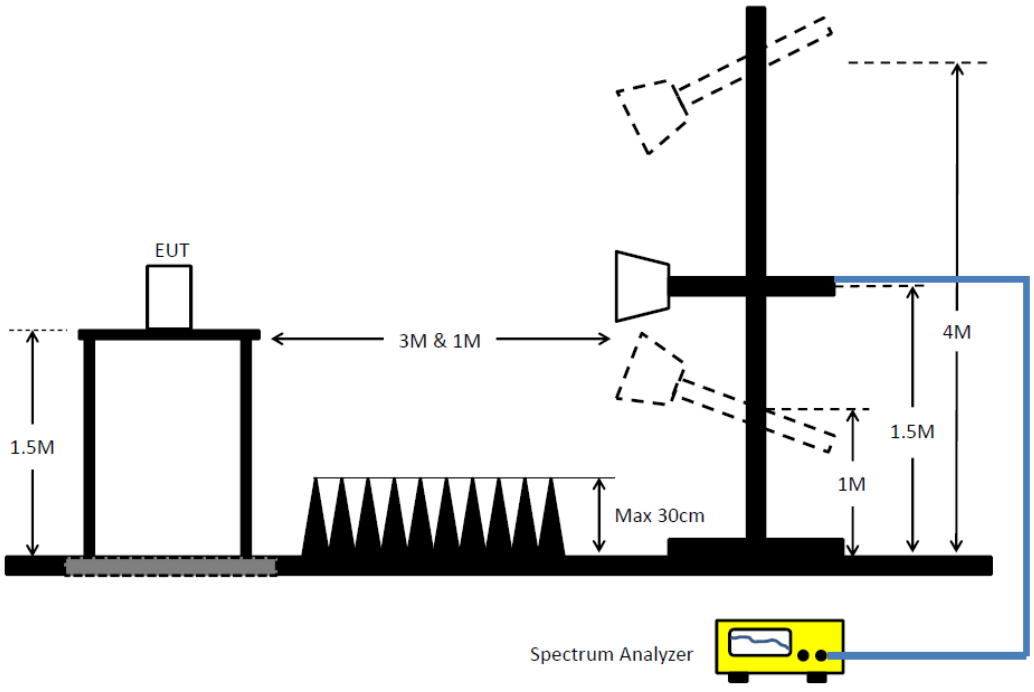
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 test procedure is the same as section 4.4.3.
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 20dB 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

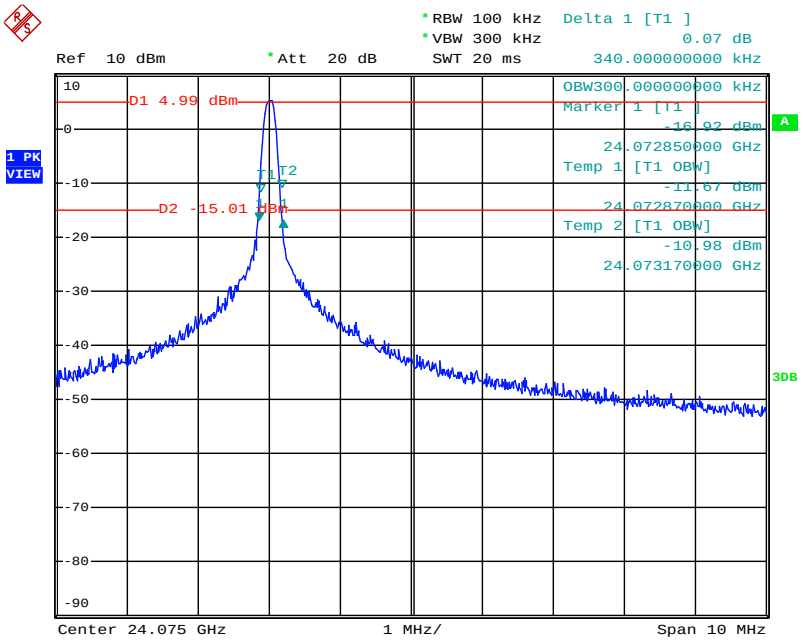
The EUT was programmed to be in continuously transmitting mode.

4.3.7 Test Result of 20dB Spectrum Bandwidth

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0/512/1024
Test Mode	Mode 1		

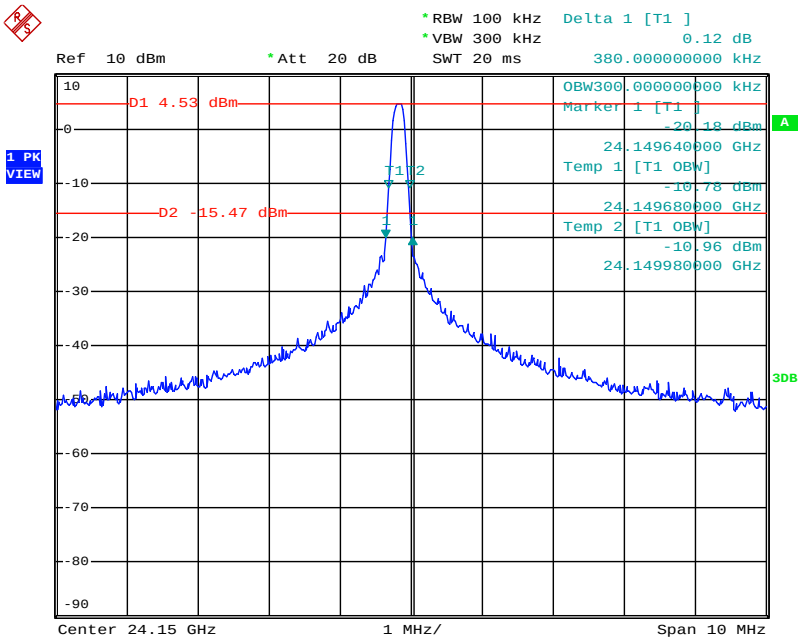
Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) f_L > 24000MHz	Frequency range (MHz) f_H < 24250MHz	Test Result
24075 MHz	0.34	0.30	24072.8700	-	Complies
24150 MHz	0.38	0.30	-	-	Complies
24225 MHz	0.40	0.32	-	24227.4000	Complies

20 dB Bandwidth and 99% Occupied Bandwidth Plot on 24075 MHz



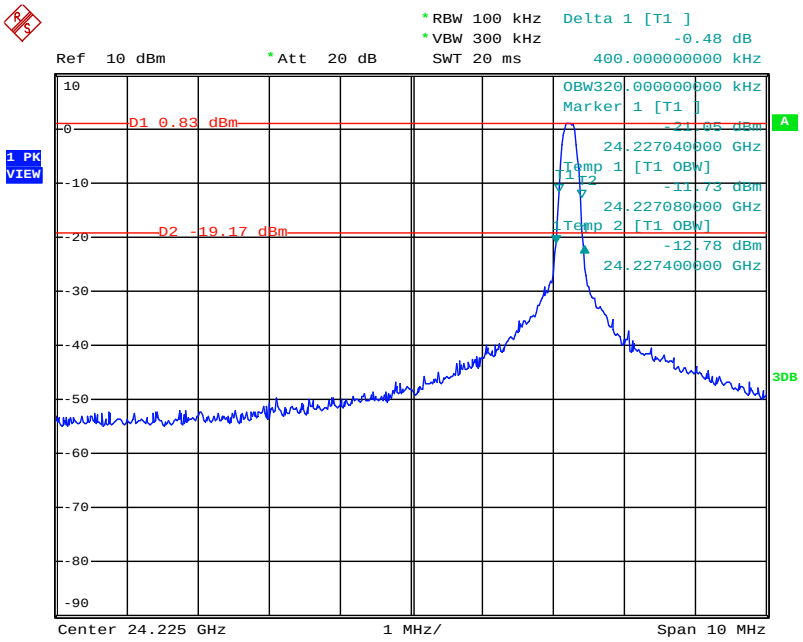
Date: 10.NOV.2016 15:31:51

20 dB Bandwidth and 99% Occupied Bandwidth Plot on 24150 MHz



Date: 27.OCT.2016 17:01:55

20 dB Bandwidth and 99% Occupied Bandwidth Plot on 24225 MHz

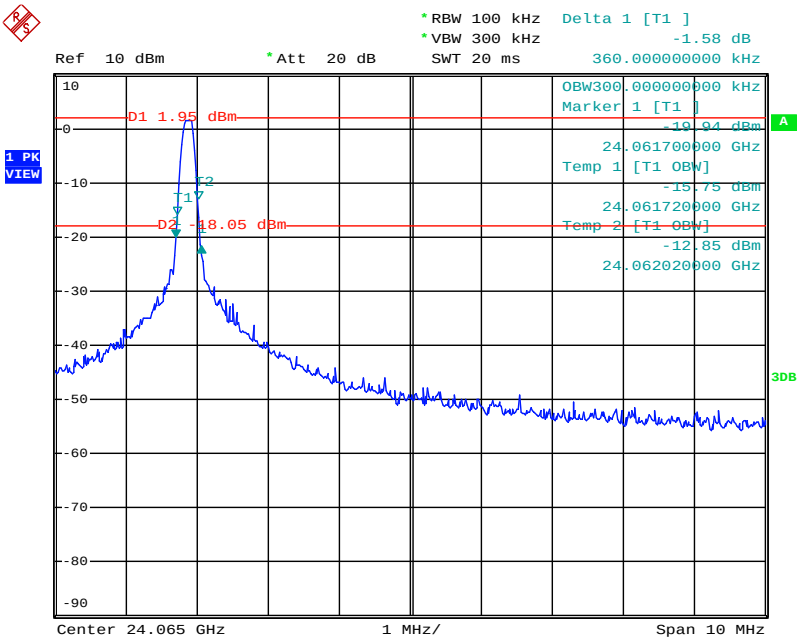


Date: 3.NOV.2016 13:29:05

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0/512/1024
Test Mode	Mode 2		

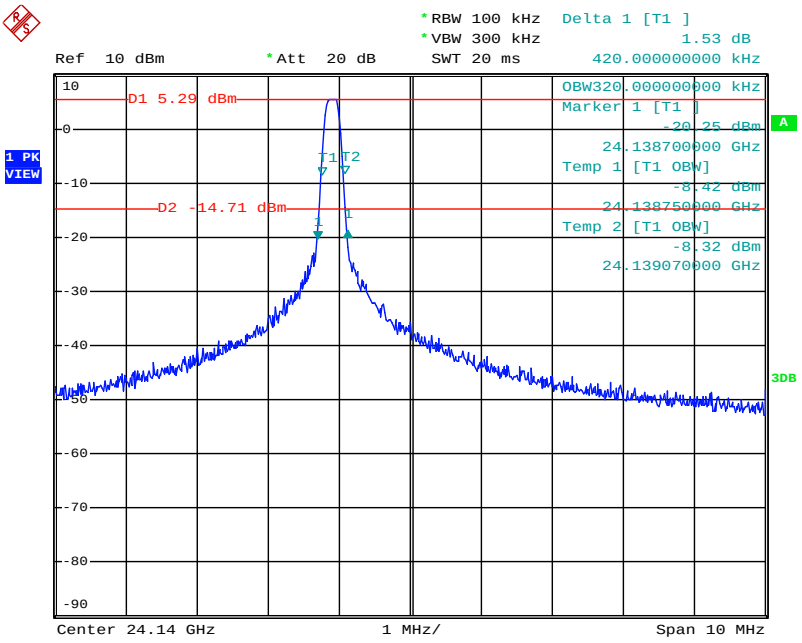
Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) f_L > 24000MHz	Frequency range (MHz) f_H < 24250MHz	Test Result
24065 MHz	0.36	0.30	24061.7000	-	Complies
24140 MHz	0.42	0.32	-	-	Complies
24215 MHz	0.38	0.32	-	24214.0400	Complies

20 dB Bandwidth and 99% Occupied Bandwidth Plot on 24065 MHz



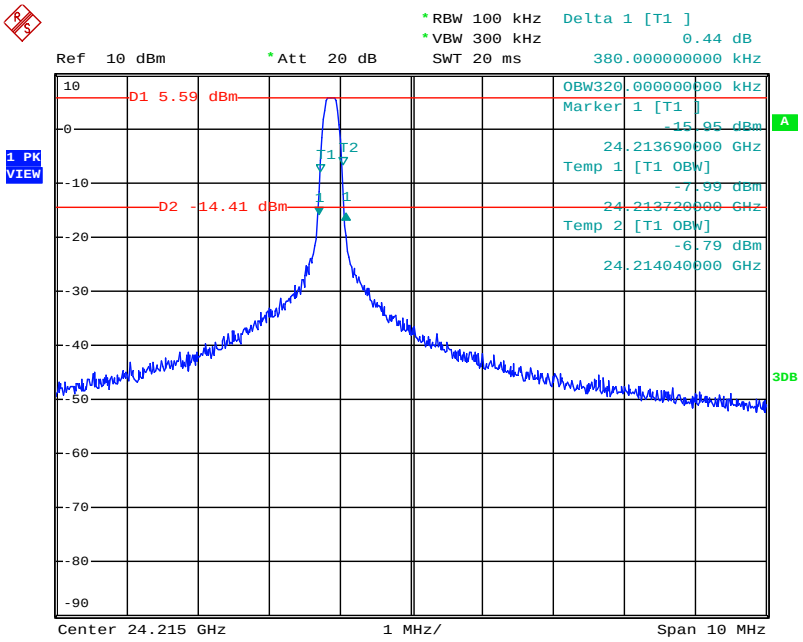
Date: 3.NOV.2016 13:10:30

20 dB Bandwidth and 99% Occupied Bandwidth Plot on 24140 MHz



Date: 10.NOV.2016 16:05:42

20 dB Bandwidth and 99% Occupied Bandwidth Plot on 24215 MHz



Date: 10.NOV.2016 15:51:58

4.4 Radiated Emissions Measurement

4.4.1 Limit

For 9kHz~40GHz

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

For 40GHz~100GHz

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 to the general radiated emission limits in 47 CFR Part 15.249, whichever is the lesser attenuation.

Operating Frequencies	Harmonics Strength (micorvolts/meter)	Harmonics Strength (dBuV/m) at 3m
24000 ~ 24250 MHz	2500 at 3m	68 (Average)
24000 ~ 24250 MHz	2500 at 3m	88 (Peak)

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	1MHz / 1MHz for Peak, 1 MHz / 1/T for Average

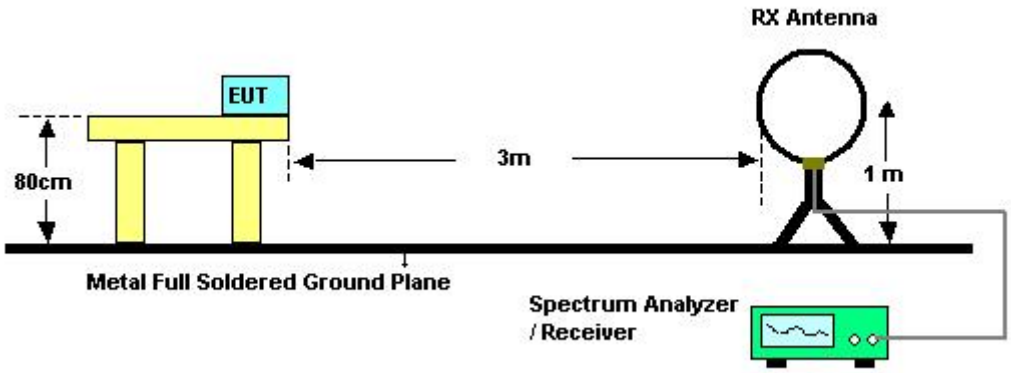
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.4.3 Test Procedures

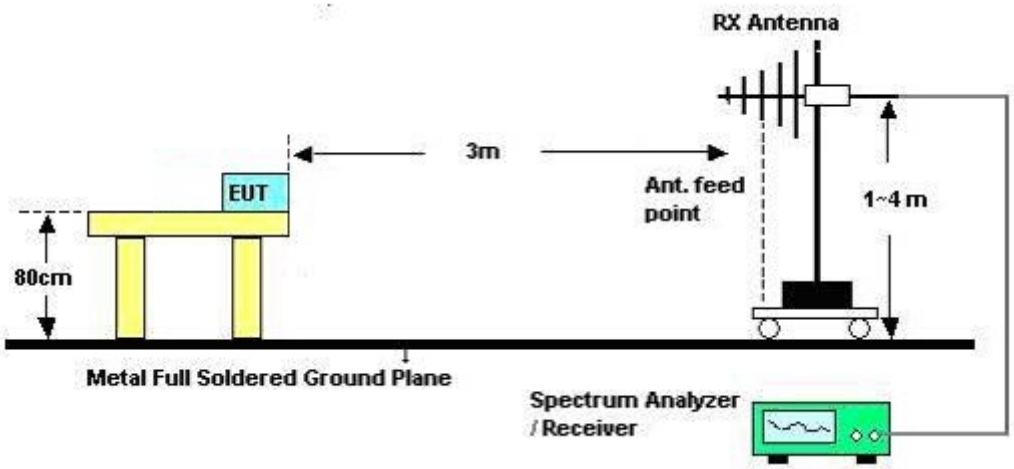
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 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

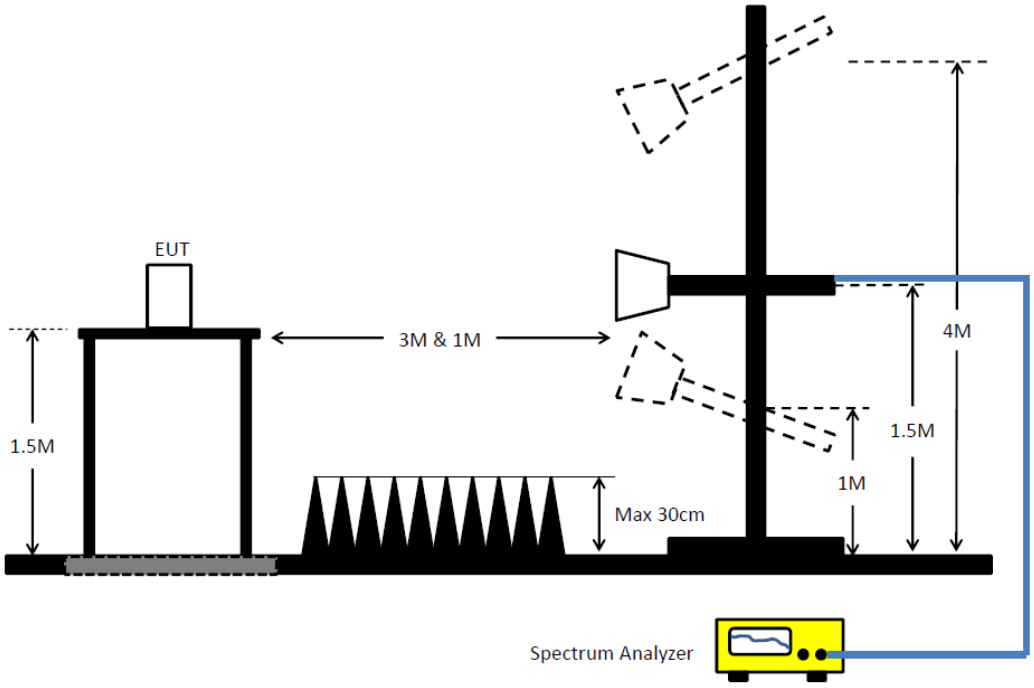
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For radiated emissions: 1GHz~40GHz

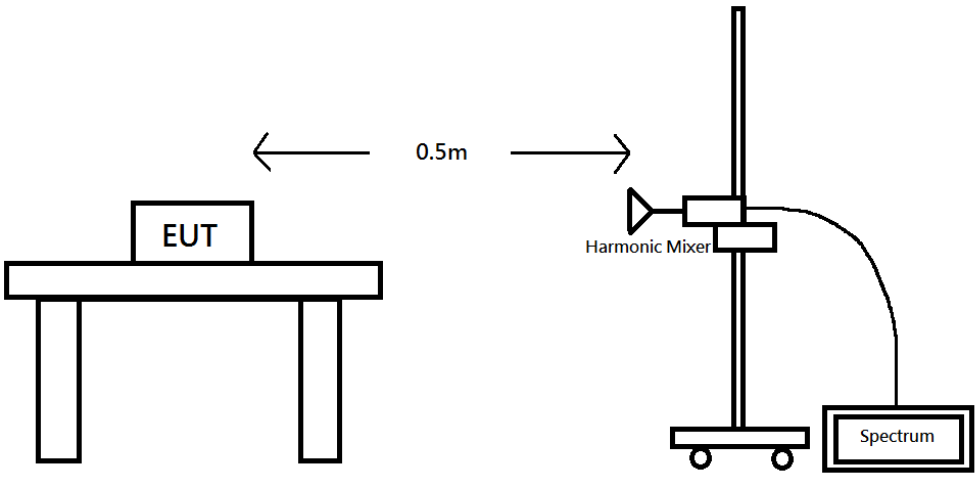


Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

For radiated emissions: 40GHz~100GHz



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	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Normal Link
Test Date	Oct. 27, 2016	Test Mode	Mode 2

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 20 dB below the permissible value has no need to be reported.

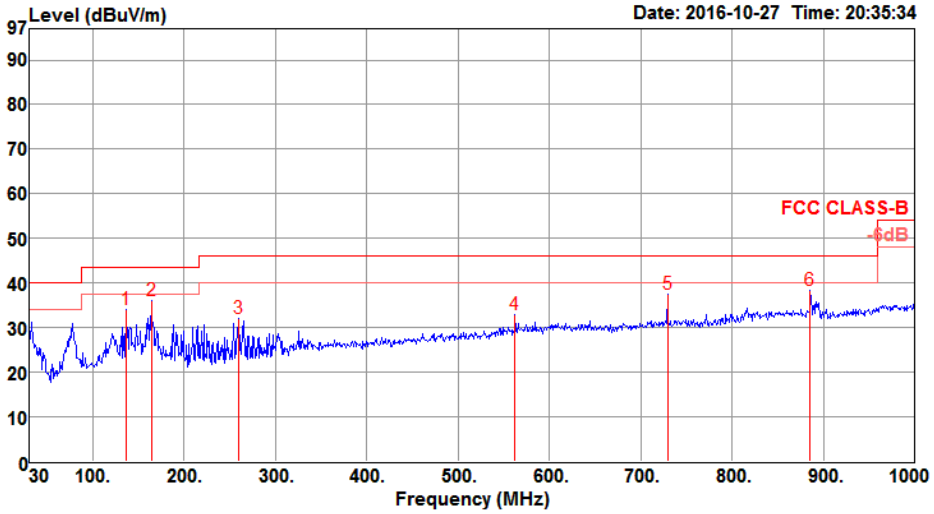
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

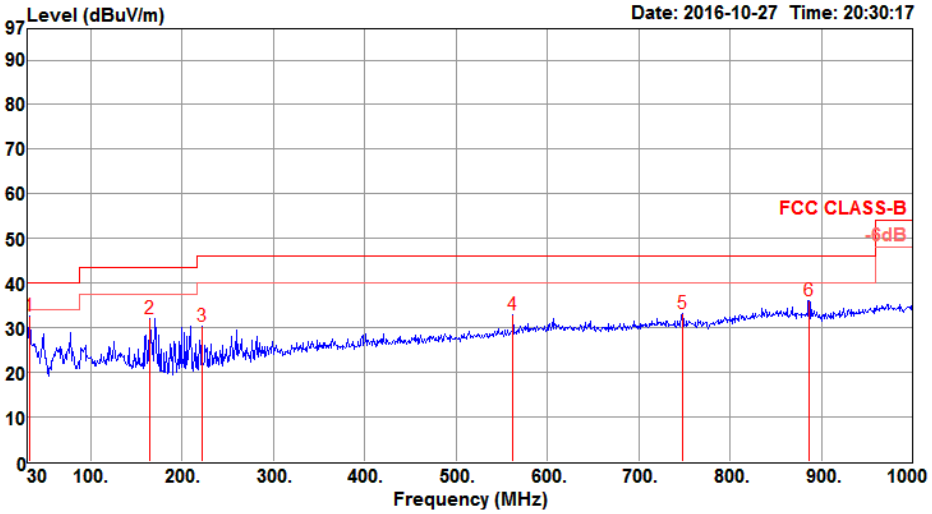
Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Normal Link
Test Mode	Mode 2		

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	135.73	33.93	43.50	-9.57	42.47	1.66	17.86	28.06	400	0	Peak	HORIZONTAL
2	163.86	36.10	43.50	-7.40	46.01	1.73	16.28	27.92	400	0	Peak	HORIZONTAL
3	259.89	32.02	46.00	-13.98	37.73	2.00	19.90	27.61	400	0	Peak	HORIZONTAL
4	562.53	33.04	46.00	-12.96	34.31	2.74	24.78	28.79	400	0	Peak	HORIZONTAL
5	729.37	37.39	46.00	-8.61	36.91	3.20	25.84	28.56	400	0	Peak	HORIZONTAL
6	885.54	38.26	46.00	-7.74	35.44	3.42	27.48	28.08	400	0	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	32.91	32.59	40.00	-7.41	35.99	1.23	23.85	28.48	400	0	Peak	VERTICAL
2	163.86	32.13	43.50	-11.37	42.04	1.73	16.28	27.92	400	0	Peak	VERTICAL
3	221.09	30.23	46.00	-15.77	39.71	1.91	16.32	27.71	400	0	Peak	VERTICAL
4	562.53	32.82	46.00	-13.18	34.09	2.74	24.78	28.79	400	0	Peak	VERTICAL
5	747.80	33.18	46.00	-12.82	32.49	3.22	25.98	28.51	400	0	Peak	VERTICAL
6	886.51	36.06	46.00	-9.94	33.18	3.43	27.50	28.05	400	0	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.

4.4.9 Results for Radiated Emissions (1GHz~40GHz)

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0 / 1~40G
Test Date	Oct. 27, 2016	Test Mode	Mode 1

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	1922.90	42.47	74.00	-31.53	44.98	4.00	28.09	34.60	222	189	Peak	HORIZONTAL
2	1923.12	33.48	54.00	-20.52	35.99	4.00	28.09	34.60	222	198	Average	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	1923.32	45.60	74.00	-28.40	48.11	4.00	28.09	34.60	335	142	Peak	VERTICAL
2	1923.54	35.64	54.00	-18.36	38.15	4.00	28.09	34.60	335	142	Average	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 512 / 1~40G
Test Date	Oct. 27, 2016	Test Mode	Mode 1

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	1847.40	31.02	54.00	-22.98	34.33	4.23	27.03	34.57	189	224	Average	HORIZONTAL
2	1847.52	40.26	74.00	-33.74	43.57	4.23	27.03	34.57	189	224	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	1847.40	31.10	54.00	-22.90	34.41	4.23	27.03	34.57	179	208	Average	VERTICAL
2	1847.74	39.88	74.00	-34.12	43.19	4.23	27.03	34.57	179	208	Peak	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 1024 / 1~40G
Test Date	Oct. 27, 2016	Test Mode	Mode 1

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	1847.35	40.07	74.00	-33.93	43.38	4.23	27.03	34.57	180	202	Peak	HORIZONTAL
2	1847.38	30.25	54.00	-23.75	33.56	4.23	27.03	34.57	180	202	Average	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	1847.32	40.35	74.00	-33.65	43.66	4.23	27.03	34.57	189	164	Peak	VERTICAL
2	1847.41	32.10	54.00	-21.90	35.41	4.23	27.03	34.57	189	164	Average	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0 / 1~40G
Test Date	Oct. 27, 2016	Test Mode	Mode 2

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	1847.48	31.21	54.00	-22.79	34.52	4.23	27.03	34.57	206	234	Average	HORIZONTAL
2	1847.56	40.69	74.00	-33.31	44.00	4.23	27.03	34.57	206	234	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	1847.48	33.31	54.00	-20.69	36.62	4.23	27.03	34.57	184	127	Average	VERTICAL
2	1847.48	39.81	74.00	-34.19	43.12	4.23	27.03	34.57	184	127	Peak	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 512 / 1~40G
Test Date	Oct. 27, 2016	Test Mode	Mode 2

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	1687.22	40.90	74.00	-33.10	45.17	3.68	26.79	34.74	189	174	Peak	HORIZONTAL
2	1687.31	29.06	54.00	-24.94	33.33	3.68	26.79	34.74	189	174	Average	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	1687.10	44.05	74.00	-29.95	48.32	3.68	26.79	34.74	221	56	Peak	VERTICAL
2	1688.93	30.97	54.00	-23.03	35.24	3.68	26.79	34.74	221	56	Average	VERTICAL

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 1024 / 1~40G
Test Date	Oct. 27, 2016	Test Mode	Mode 2

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	1535.90	39.63	74.00	-34.37	45.12	3.52	25.83	34.84	223	178	Peak	HORIZONTAL
2	1536.10	28.40	54.00	-25.60	33.85	3.53	25.86	34.84	223	178	Average	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	1535.30	30.95	54.00	-23.05	36.44	3.52	25.83	34.84	156	148	Average	VERTICAL
2	1535.56	41.84	74.00	-32.16	47.33	3.52	25.83	34.84	156	148	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.

4.4.10 Results for Radiated Emissions (40GHz~100GHz)

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0
Test Date	Oct. 27, 2016~Nov. 03, 2016	Test Mode	Mode 1

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.14	0.5	78.551	103.56	-25.012
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.14	0.5	77.601	83.56	-5.962

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 512
Test Date	Oct. 27, 2016~Nov. 03, 2016	Test Mode	Mode 1

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.30	0.5	81.740	103.56	-21.823
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.30	0.5	81.150	83.56	-2.413

Temperature	24℃	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 1024
Test Date	Oct. 27, 2016~Nov. 03, 2016	Test Mode	Mode 1

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.44	0.5	78.185	103.56	-25.378
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.44	0.5	76.625	83.56	-6.938

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [0.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [15.56 dB].

EIRP = PT * GT = (PR / GR) * (4 * Pi * D / λ)^2

EIRP = Meas. Level - RX Antenna Gain + 20*log(4*Pi(3.14159)*D/(300/(Frequency*1000)))

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0
Test Date	Oct. 27, 2016~Nov. 03, 2016	Test Mode	Mode 2

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.11	0.5	79.456	103.56	-24.107
Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.11	0.5	78.176	83.56	-5.387

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 512
Test Date	Oct. 27, 2016~Nov. 03, 2016	Test Mode	Mode 2

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.28	0.5	77.457	103.56	-26.107
Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.28	0.5	76.517	83.56	-7.047

Temperature	24℃	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 1024
Test Date	Oct. 27, 2016~Nov. 03, 2016	Test Mode	Mode 2

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.42	0.5	76.572	103.56	-26.991
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
48.42	0.5	75.412	83.56	-8.151

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [0.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [15.56 dB].

EIRP = PT * GT = (PR / GR) * (4 * Pi * D / λ)^2

EIRP = Meas. Level - RX Antenna Gain + 20*log(4*Pi(3.14159)*D/(300/(Frequency*1000))))

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 (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

4.5.2 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	1MHz / 1MHz for Peak, 1 MHz / 1/T for Average

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.

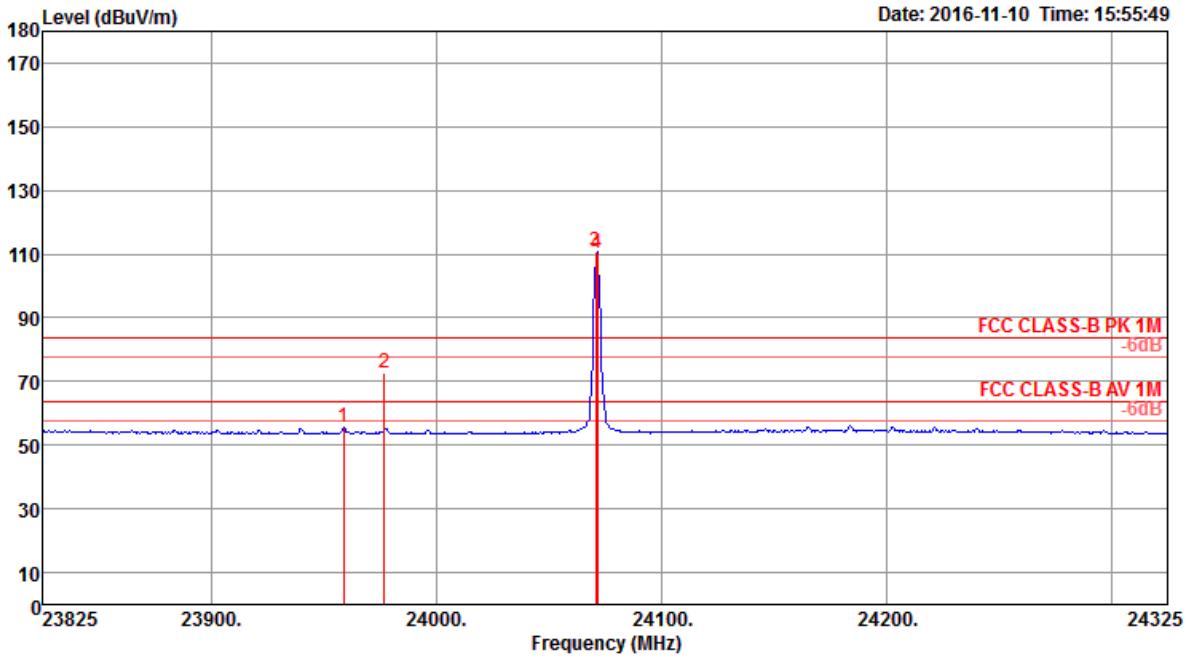
4.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7 Test Result of Band Edge and Fundamental Emissions

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0, 512, 1024
Test Mode	Mode 1		

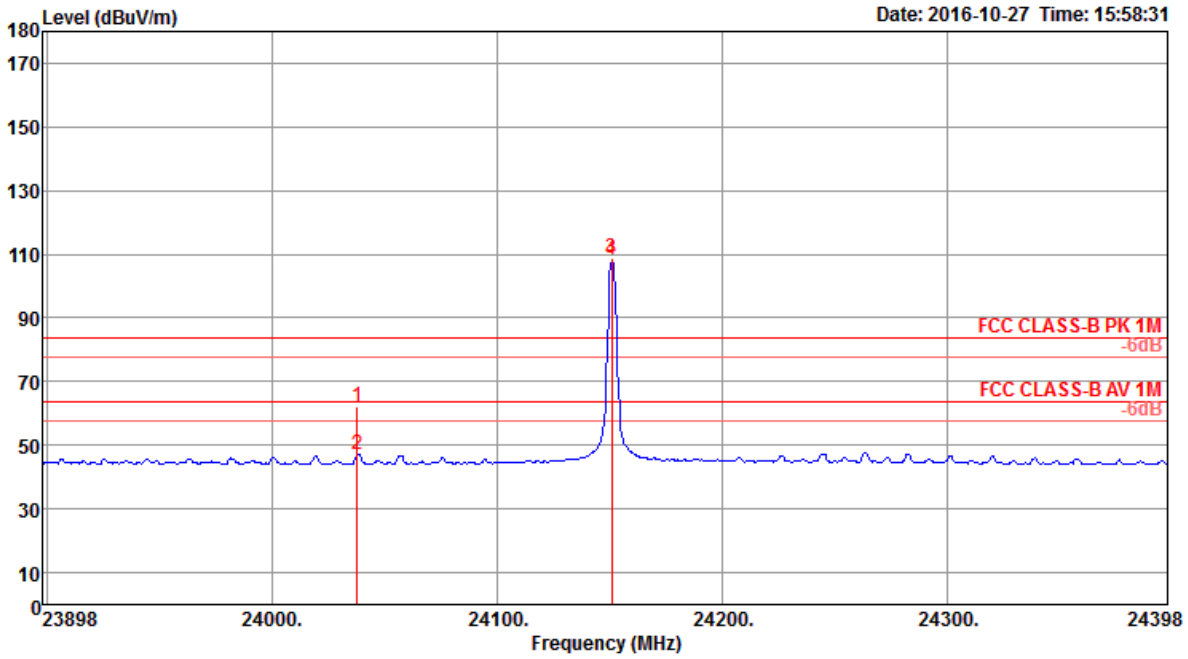
Channel 0



	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	23959.00	55.68	63.54	-7.86	58.93	9.27	38.77	51.29	152	14	Average	VERTICAL
2	23977.00	72.66	83.54	-10.88	75.88	9.28	38.78	51.28	152	14	Peak	VERTICAL
3 @	24071.00	110.66			113.82	9.30	38.80	51.26	152	14	Peak	VERTICAL
4 @	24071.50	110.53			113.69	9.30	38.80	51.26	152	14	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 24075 MHz.

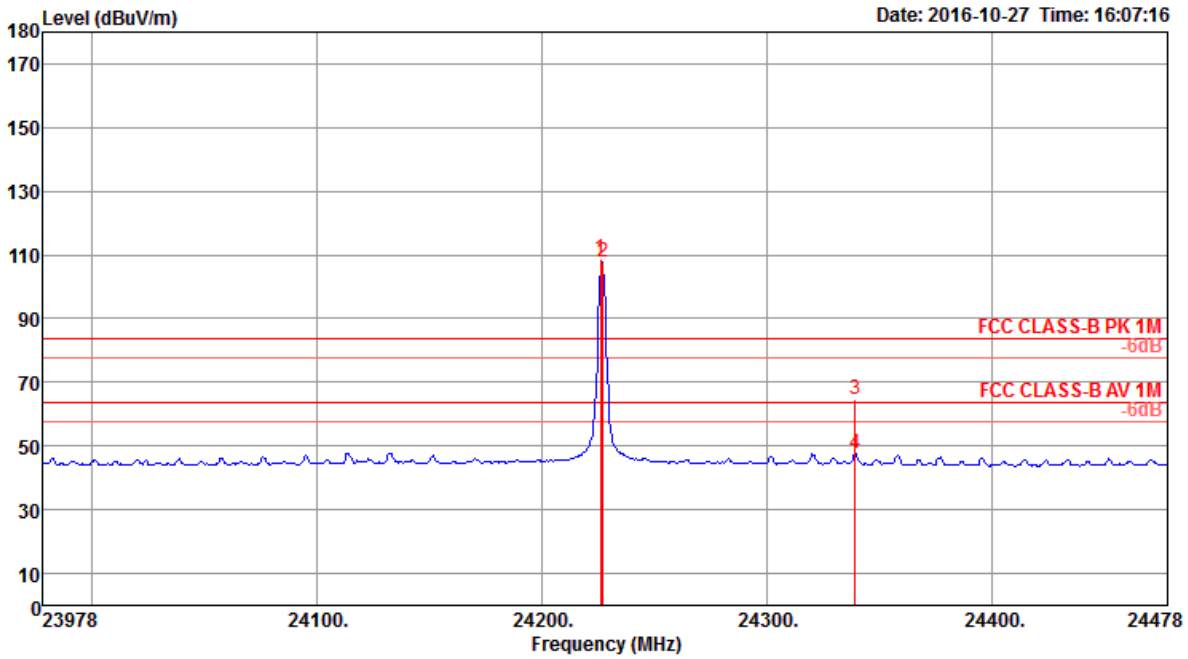
Channel 512



	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	24038.00	62.18	83.54	-21.36	65.36	9.29	38.80	51.27	154	194	Peak	VERTICAL
2	24038.00	47.18	63.54	-16.36	50.36	9.29	38.80	51.27	154	194	Average	VERTICAL
3 @	24151.00	108.88			112.00	9.32	38.80	51.24	154	194	Peak	VERTICAL
4 @	24151.00	108.23			111.35	9.32	38.80	51.24	154	194	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 24150 MHz.

Channel 1024

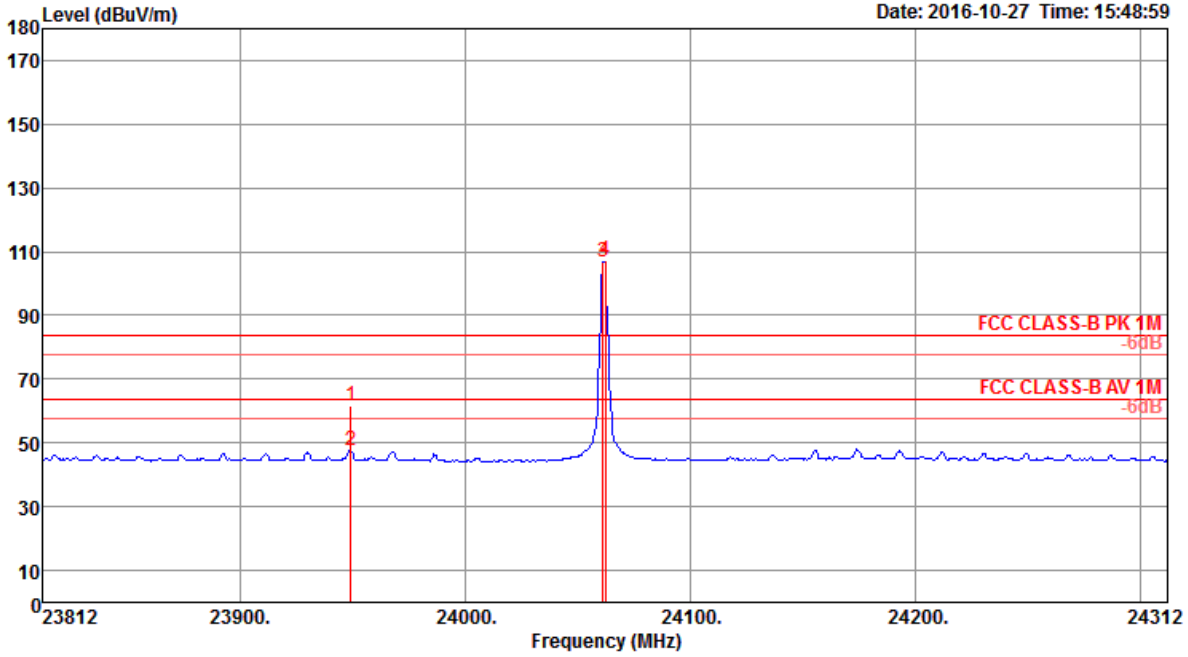


	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 @	24226.00	108.71			111.79	9.34	38.80	51.22	153	194	Peak	VERTICAL
2 @	24227.00	107.99			111.07	9.34	38.80	51.22	153	194	Average	VERTICAL
3	24339.00	64.50	83.54	-19.04	67.51	9.37	38.80	51.18	153	194	Peak	VERTICAL
4	24339.00	47.50	63.54	-16.04	50.51	9.37	38.80	51.18	153	194	Average	VERTICAL

Item 1, 2 are the fundamental frequency at 24225 MHz.

Temperature	24°C	Humidity	59%
Test Engineer	Jay Luo, DK Chang	Configurations	Channel 0, 512, 1024
Test Mode	Mode 2		

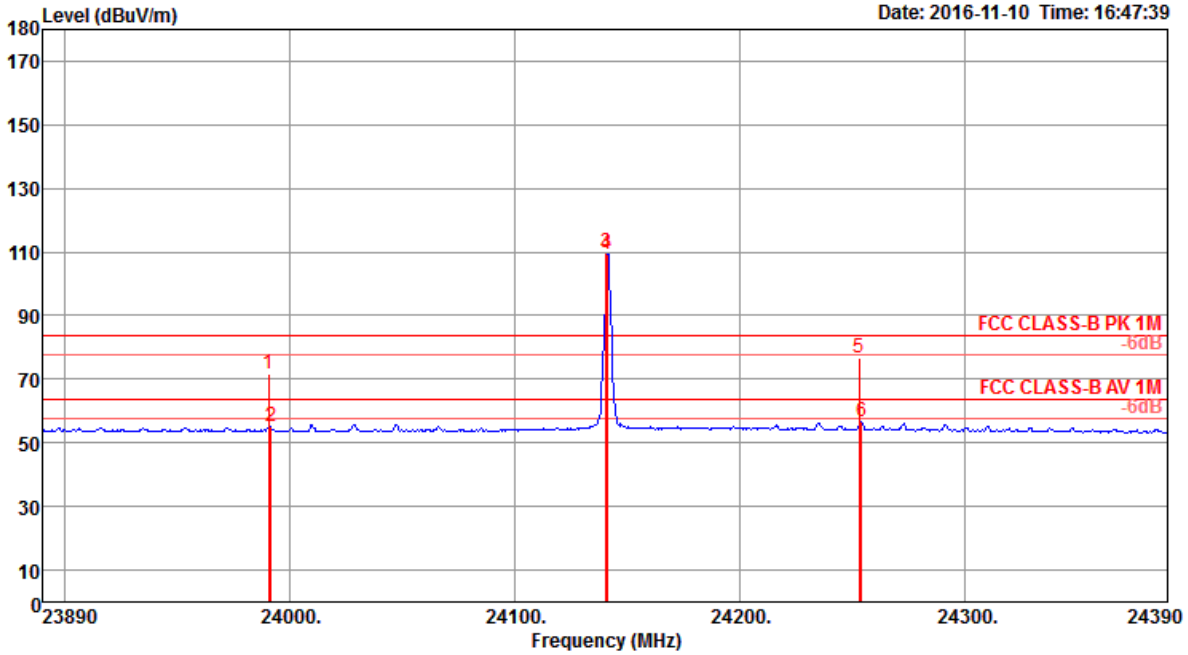
Channel 0



	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	23949.00	61.59	83.54	-21.95	64.84	9.27	38.77	51.29	156	199	Peak	VERTICAL
2	23949.00	47.59	63.54	-15.95	50.84	9.27	38.77	51.29	156	199	Average	VERTICAL
3 @	24061.00	106.72			109.88	9.30	38.80	51.26	156	199	Average	VERTICAL
4 @	24062.00	107.13			110.29	9.30	38.80	51.26	156	199	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 24065 MHz.

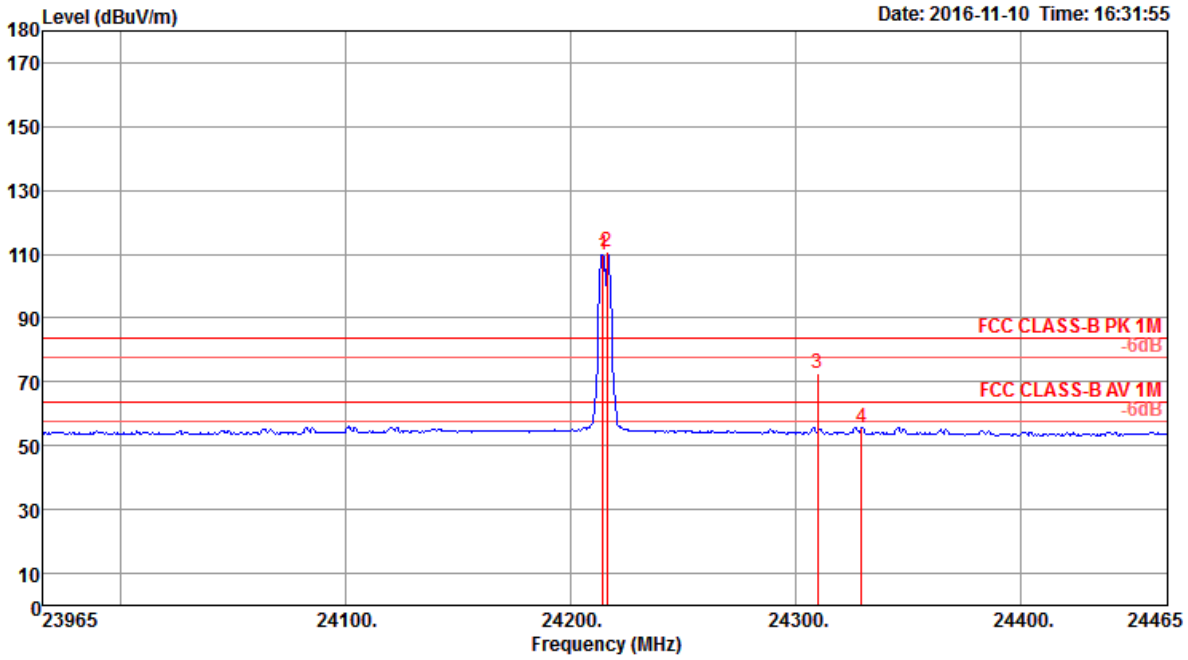
Channel 512



	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	23990.50	71.62	83.54	-11.92	74.82	9.28	38.80	51.28	151	14	Peak	VERTICAL
2	23991.50	55.29	63.54	-8.25	58.49	9.28	38.80	51.28	151	14	Average	VERTICAL
3 @	24140.50	109.95			113.07	9.32	38.80	51.24	151	14	Peak	VERTICAL
4 @	24141.00	109.36			112.48	9.32	38.80	51.24	151	14	Average	VERTICAL
5	24253.00	76.50	83.54	-7.04	79.56	9.35	38.80	51.21	151	14	Peak	VERTICAL
6	24254.00	56.54	63.54	-7.00	59.60	9.35	38.80	51.21	151	14	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 24140 MHz.

Channel 1024



	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 @	24214.00	110.03			113.11	9.34	38.80	51.22	150	18	Average	VERTICAL
2 @	24216.00	110.74			113.82	9.34	38.80	51.22	150	18	Peak	VERTICAL
3	24309.50	72.62	83.54	-10.92	75.65	9.36	38.80	51.19	150	18	Peak	VERTICAL
4	24329.00	55.72	63.54	-7.82	58.74	9.37	38.80	51.19	150	18	Average	VERTICAL

Item 1, 2 are the fundamental frequency at 24215 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.

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. 27, 2016	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 08, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 23, 2015	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	TESEQ	CBL6112D	37880	20MHz ~ 2GHz	Aug. 30, 2016	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1370	1GHz~18GHz	Jul. 07, 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	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 13, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP-40	100019	9kHz ~ 40GHz	Apr. 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-1	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-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-l0-7	N/A	N/A	Radiation (03CH01-CB)
Mixer	OML	M19HW/A	U91113-1	40 ~ 60 GHz	Sep. 09, 2015*	Radiation (03CH01-CB)
Mixer	OML	M15HW/A	V91113-1	50 ~ 75 GHz	Sep. 14, 2015*	Radiation (03CH01-CB)
Mixer	OML	M12HW/A	E91113-1	60 ~ 90 GHz	Sep. 17, 2015*	Radiation (03CH01-CB)
Mixer	OML	M08HW/A	F91113-1	90 ~ 140 GHz	Sep. 21, 2015*	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO19R	U91113-A	40 ~ 60 GHz	Sep. 09, 2015*	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO15R	V91113-A	50 ~ 75 GHz	Sep. 14, 2015*	Radiation (03CH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Standard Horn Antenna	Custom Microwave	HO12R	E91113-A	60 ~ 90 GHz	Sep. 17, 2015*	Radiation (03CH01-CB)
Standard Horn Antenna	Custom Microwave	HO08R	F91113-A	90 ~ 140 GHz	Sep. 21, 2015*	Radiation (03CH01-CB)

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

*Calibration Interval of instruments listed above is two year.

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%
Radiated Emission (40GHz ~ 220GHz)	4.7 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%