SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	**Delta Mobile Systems**
Applicant Address	645 Tollgate Road, Suite 300 Elgin, Illinois 60123
FCC ID	YSI-AR2X
Manufacturer's company	**Alpha Networks Inc**
Manufacturer Address	No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu City 30078, Taiwan, ROC

Product Name	AR20 Smart Sensor System
Brand Name	DELTA MOBILE SYSTEMS
Model Name	AR2X
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.249
Frequency Range	24000 ~ 24250 MHz
Received Date	Sep. 30, 2015
Final Test Date	Nov. 19, 2015
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

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5O2919	Rev. 01	Initial issue of report	Dec. 15, 2015

1 VERIFICATION OF COMPLIANCE

Product Name	:	AR20 Smart Sensor System
Brand Name	:	DELTA MOBILE SYSTEMS
Model Name	:	AR2X
Applicant	:	Delta Mobile Systems
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 Sep. 30, 2015 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**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	29.43 dB
4.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	15.78 dB
4.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
4.4	15.249(a)/(d)	Radiated Emissions	Complies	5.66 dB
4.5	15.249(d)	Band Edge Emissions	Complies	4.50 dB
4.6	15.203	Antenna Requirements	Complies	-

3 GENERAL INFORMATION

3.1 Product Details

Items	Description
Power Type	DC power supply
Modulation	FMCW
Frequency Range	24000 ~ 24250 MHz
Operation Frequency Range	24004 ~ 24246 MHz
Channel Number	3
Channel Band Width (99%)	0.323 MHz
Max. Field Strength	101.76 dBuV/m at 1m (Average)
Carrier Frequencies	Please refer to section 3.3
Antenna	Please refer to section 3.4

3.2 Accessories

N/A

3.3 Table for Filed Antenna

Ant.	Brand	Part Number	Antenna Type	Connector	Gain (dBi)
1	-	AR24 PCB	8 patch On-board Antenna	N/A	14.2

3.4 Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency
24000 ~ 24250 MHz	1	24004 MHz
	2	24125 MHz
	3	24246 MHz

3.5 Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. 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	1/2/3
Radiated Emissions 30MHz~1GHz	Normal Link	-
Radiated Emissions 1GHz~40GHz	CTX	1/2/3
Radiated Emissions 40GHz~100GHz	CTX	1/2/3
Band Edge Emissions	CTX	1/2/3

Note: 1. CTX=continuously transmitting

2. The adapter is for measurement only, would not be marketed and its information for the following table:

Support Unit	Brand	Model	FCC ID
Adapter	N/A	CHD-12-0305	N/A

3.6 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 Reg. No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	187376	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7 Table for Supporting Units

For Test Site No: CO01-CB and 03CH01-CB (below 1GHz)

Support Unit	Brand	Model	FCC ID
Power Supply	Advanced	LPS-305	N/A
AR20 Smart Sensor System (Controller)	DELTA MOBILE SYSTEMS	AR2C	N/A

For Test Site No: 03CH01-CB (above 1GHz) and TH01-CB

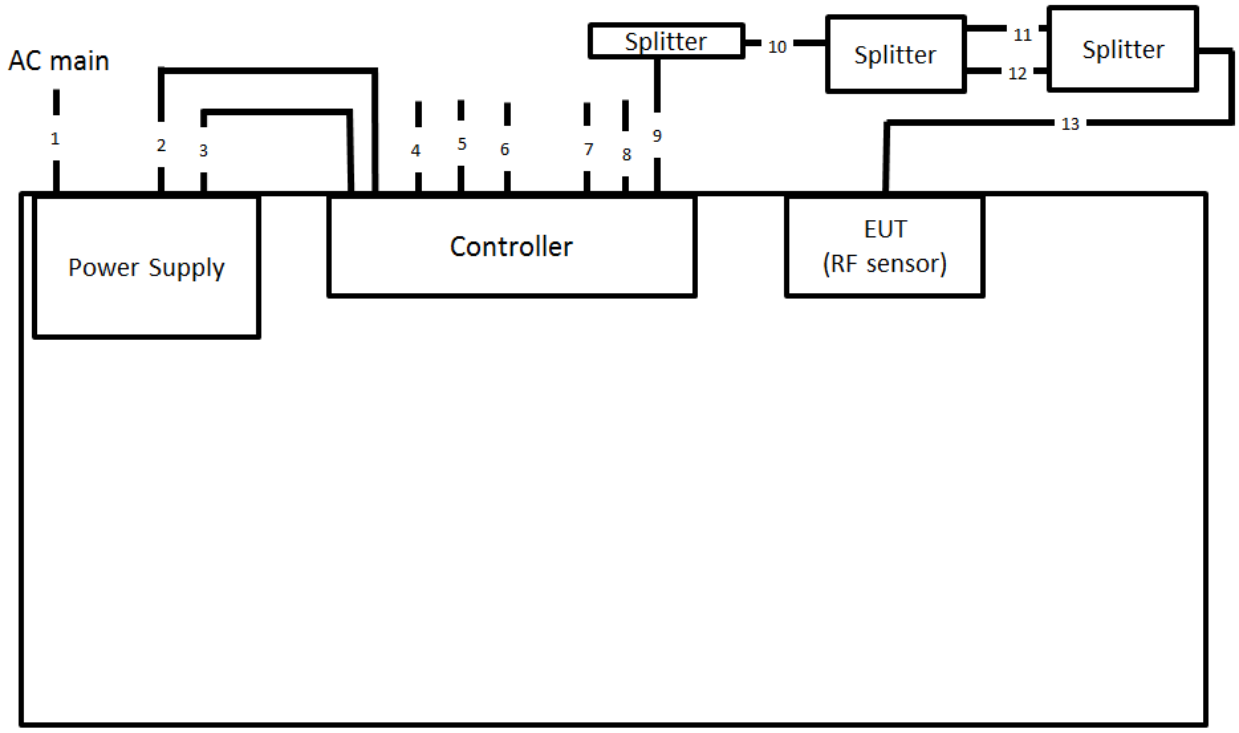
Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Fixture	alphanetworks	AD2411 VR1.00	N/A
Adapter	N/A	CHD-12-0305	N/A

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

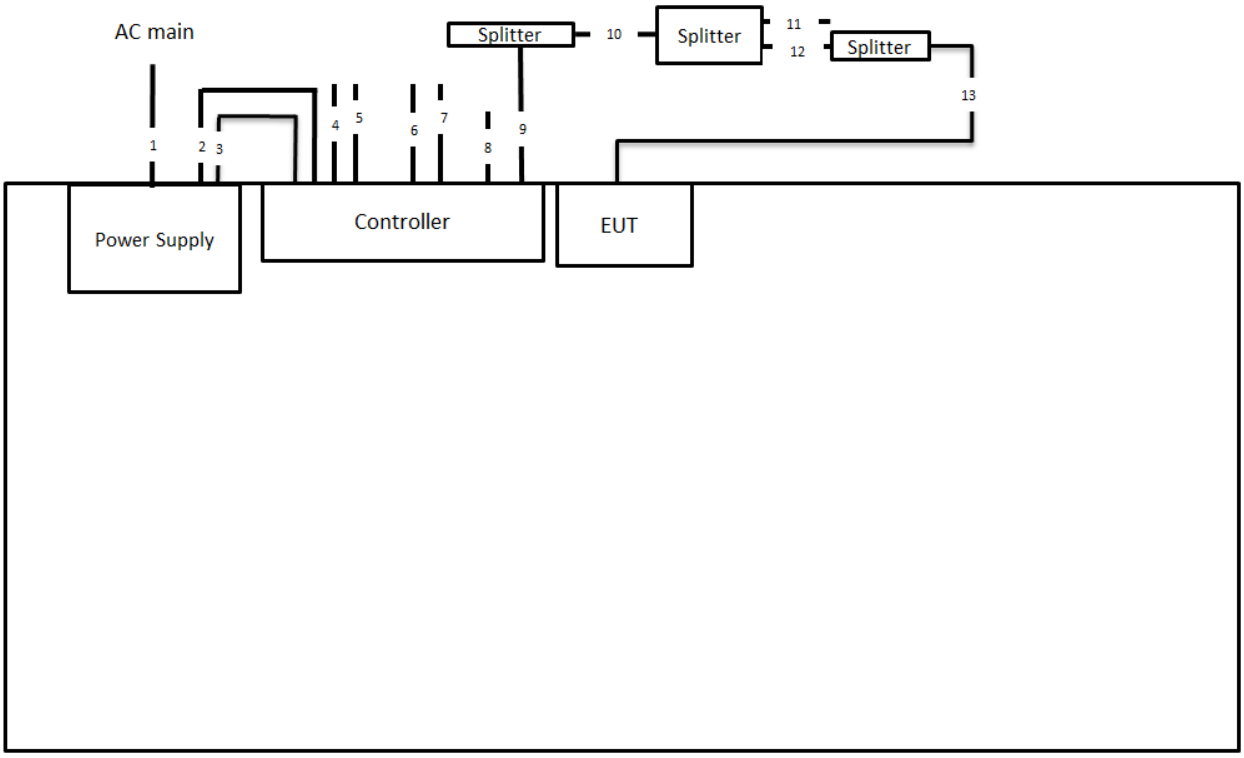
3.9.1 AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	Power cable	No	1.3m
3	Power cable	No	1.3m
4	Power cable	No	0.3m
5	Power cable	No	0.3m
6	Power cable	No	0.3m
7	Power cable	No	0.3m
8	Console cable	No	0.2m
9	Console cable	No	0.2m
10	Console cable	No	9.5m
11	Console cable	No	0.3m
12	Console cable	No	0.3m
13	Console cable	No	0.7m

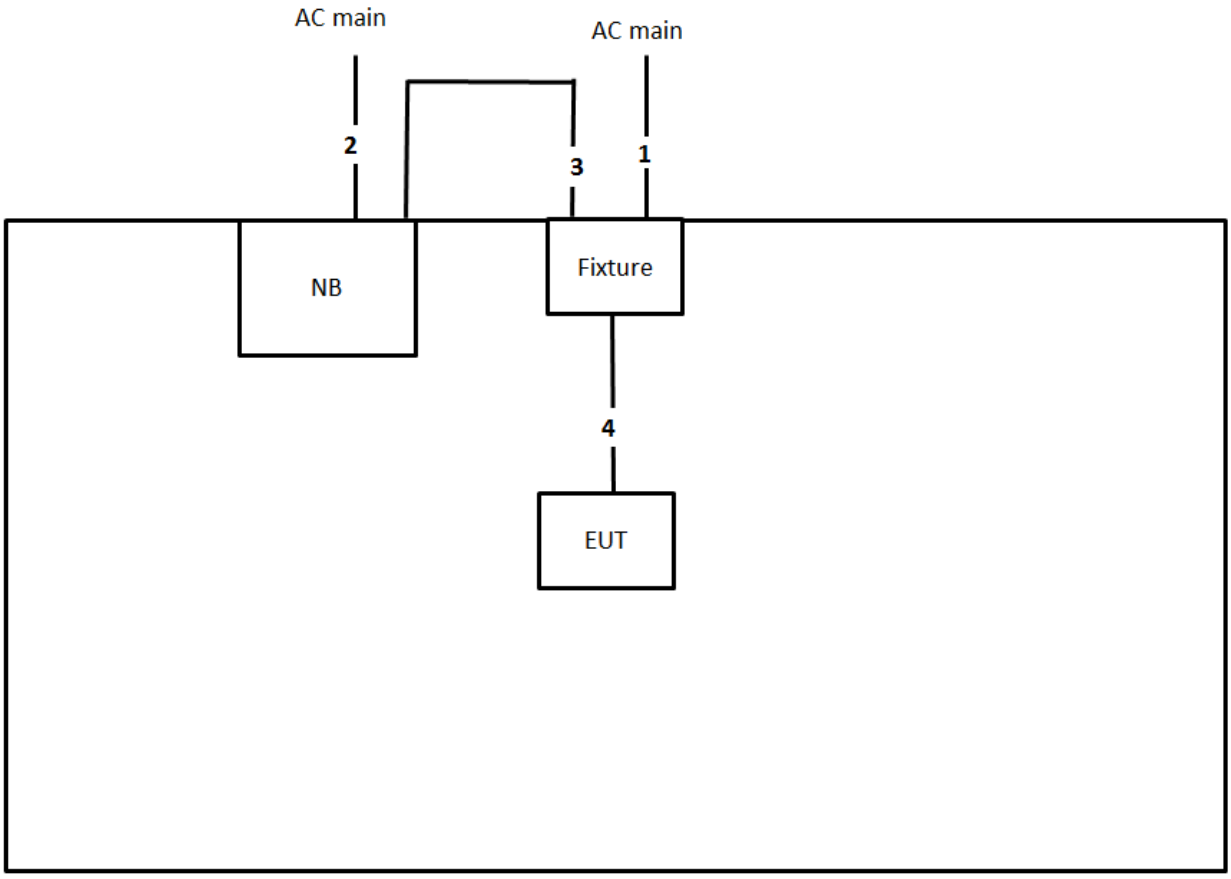
3.9.2 Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	Power cable	No	1.3m
3	Power cable	No	1.3m
4	Power cable	No	0.3m
5	Power cable	No	0.3m
6	Power cable	No	0.3m
7	Power cable	No	0.3m
8	Console cable	No	0.2m
9	Console cable	No	0.2m
10	Console cable	No	9.5m
11	Console cable	No	0.3m
12	Console cable	No	0.3m
13	Console cable	No	0.7m

Test Configuration: Above 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1m
2	Power cable	No	2.6m
3	USB cable	Yes	1m
4	RS-232 cable	No	1.6

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

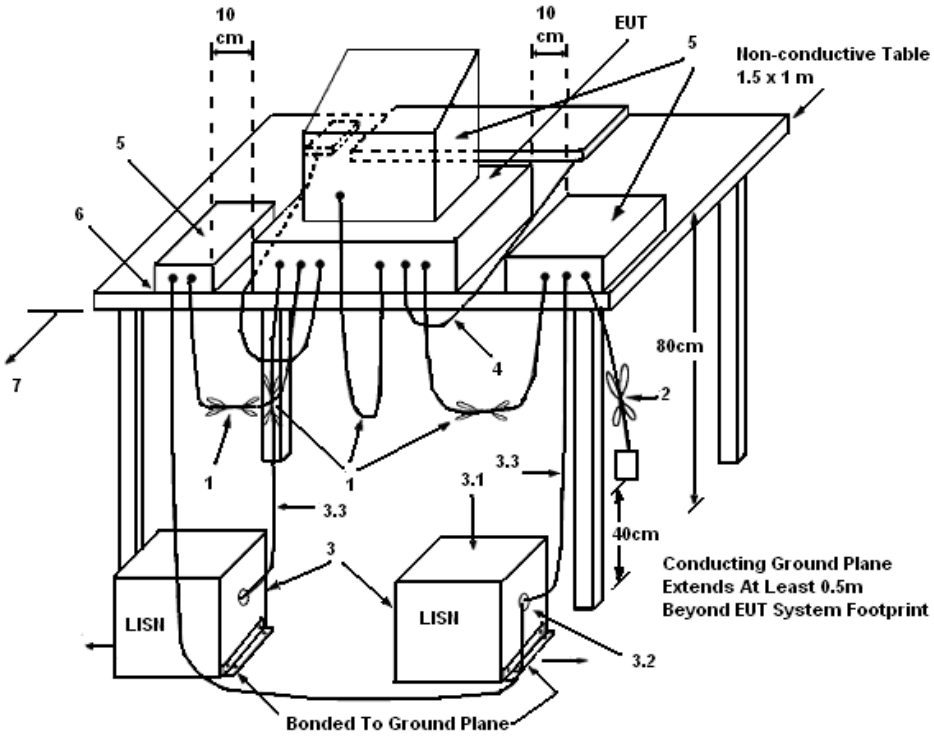
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

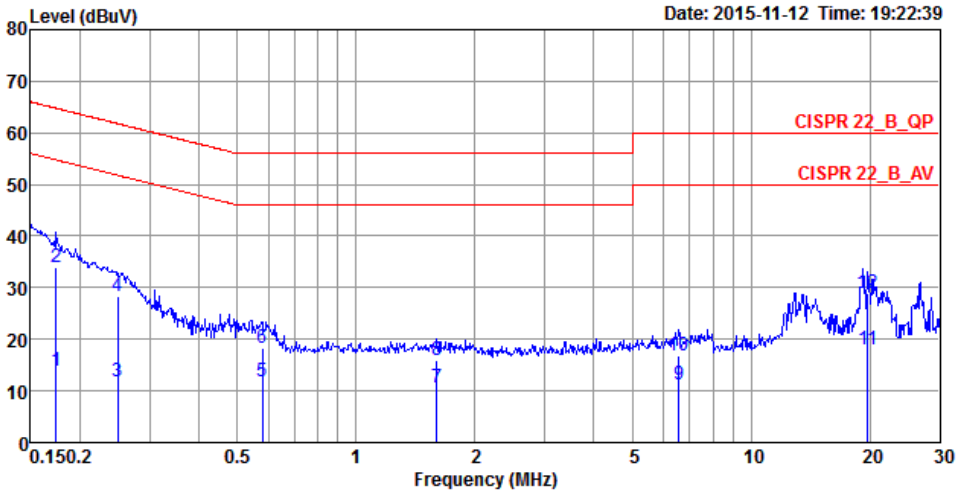
There is no deviation with the original standard.

4.1.6 EUT Operation during Test

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

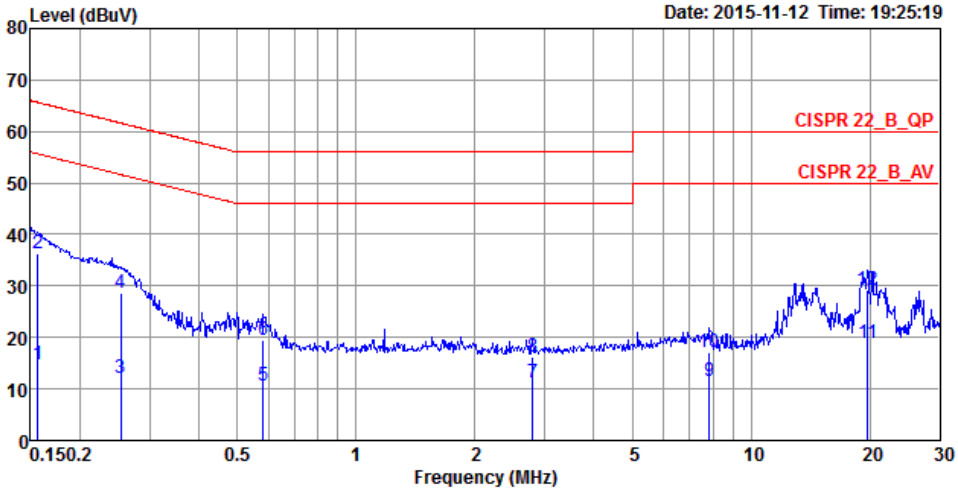
4.1.7 Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	58%
Test Engineer	Parody Lin	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1740	13.88	-40.89	54.77	3.93	9.93	0.02	LINE	Average
2	0.1740	33.93	-30.84	64.77	23.98	9.93	0.02	LINE	QP
3	0.2495	11.87	-39.91	51.78	1.91	9.93	0.03	LINE	Average
4	0.2495	28.27	-33.51	61.78	18.31	9.93	0.03	LINE	QP
5	0.5792	11.73	-34.27	46.00	1.75	9.94	0.04	LINE	Average
6	0.5792	18.41	-37.59	56.00	8.43	9.94	0.04	LINE	QP
7	1.6020	10.49	-35.51	46.00	0.45	9.98	0.06	LINE	Average
8	1.6020	15.93	-40.07	56.00	5.89	9.98	0.06	LINE	QP
9	6.5573	11.13	-38.87	50.00	0.90	10.11	0.12	LINE	Average
10	6.5573	16.72	-43.28	60.00	6.49	10.11	0.12	LINE	QP
11	19.7397	18.12	-31.88	50.00	7.43	10.43	0.26	LINE	Average
12	19.7397	28.85	-31.15	60.00	18.16	10.43	0.26	LINE	QP

Temperature	25°C	Humidity	58%
Test Engineer	Parody Lin	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1565	14.71	-40.94	55.65	4.91	9.78	0.02	NEUTRAL	Average
2	0.1565	36.22	-29.43	65.65	26.42	9.78	0.02	NEUTRAL	QP
3	0.2535	12.11	-39.53	51.64	2.29	9.79	0.03	NEUTRAL	Average
4	0.2535	28.65	-32.99	61.64	18.83	9.79	0.03	NEUTRAL	QP
5	0.5823	10.51	-35.49	46.00	0.67	9.80	0.04	NEUTRAL	Average
6	0.5823	19.47	-36.53	56.00	9.63	9.80	0.04	NEUTRAL	QP
7	2.7942	11.28	-34.72	46.00	1.38	9.85	0.05	NEUTRAL	Average
8	2.7942	16.31	-39.69	56.00	6.41	9.85	0.05	NEUTRAL	QP
9	7.8516	11.39	-38.61	50.00	1.26	9.97	0.16	NEUTRAL	Average
10	7.8516	17.16	-42.84	60.00	7.03	9.97	0.16	NEUTRAL	QP
11	19.7397	19.04	-30.96	50.00	8.60	10.18	0.26	NEUTRAL	Average
12	19.7397	29.17	-30.83	60.00	18.73	10.18	0.26	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 (MHz)	Fundamental Emissions Limit Average/Peak (dBuV/m) at 3m
24000-24250	108/128

4.2.2 Measuring Instruments and Setting

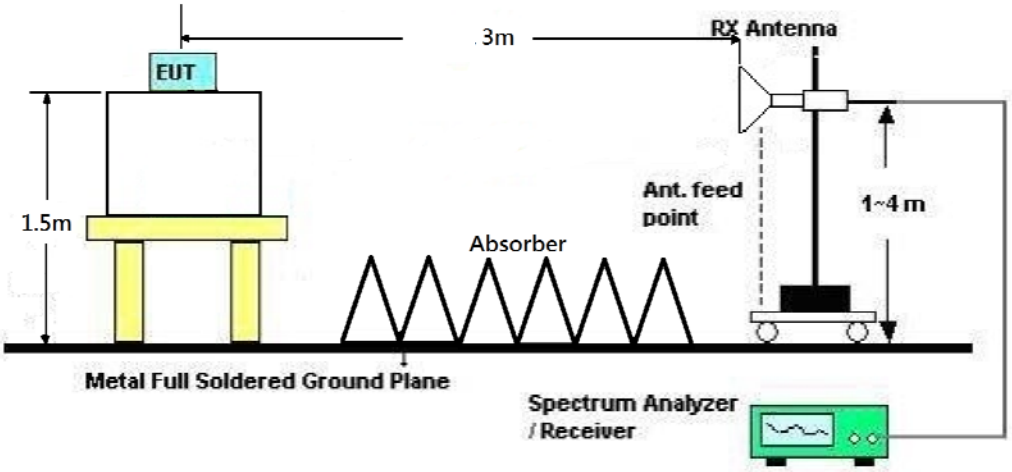
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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



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].

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	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 1
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	24004.03	77.33	117.54	-40.21	73.64	15.81	38.90	51.02	153	263	HORIZONTAL	Average
2	24004.03	97.26	137.54	-40.28	93.57	15.81	38.90	51.02	153	263	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	24003.97	101.54	117.54	-16.00	97.85	15.81	38.90	51.02	155	2	VERTICAL	Average
2	24003.97	121.49	137.54	-16.05	117.80	15.81	38.90	51.02	155	2	VERTICAL	Peak

Temperature	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 2
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	24125.03	81.05	117.54	-36.49	77.24	15.85	38.93	50.97	153	20	HORIZONTAL	Average
2	24125.03	100.99	137.54	-36.55	97.18	15.85	38.93	50.97	153	20	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	24124.94	101.76	117.54	-15.78	97.95	15.85	38.93	50.97	155	3	VERTICAL	Average
2	24124.94	121.70	137.54	-15.84	117.89	15.85	38.93	50.97	155	3	VERTICAL	Peak

Temperature	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 3
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	24246.03	81.93	117.54	-35.61	78.01	15.89	38.95	50.92	154	20	HORIZONTAL	Average
2	24246.03	101.87	137.54	-35.67	97.95	15.89	38.95	50.92	154	20	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	24246.00	100.74	117.54	-16.80	96.82	15.89	38.95	50.92	156	11	VERTICAL	Average
2	24246.00	120.68	137.54	-16.86	116.76	15.89	38.95	50.92	156	11	VERTICAL	Peak

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

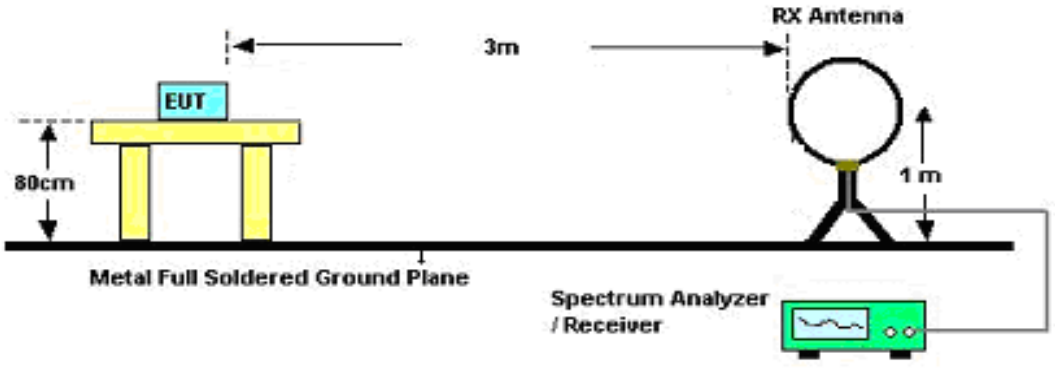
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

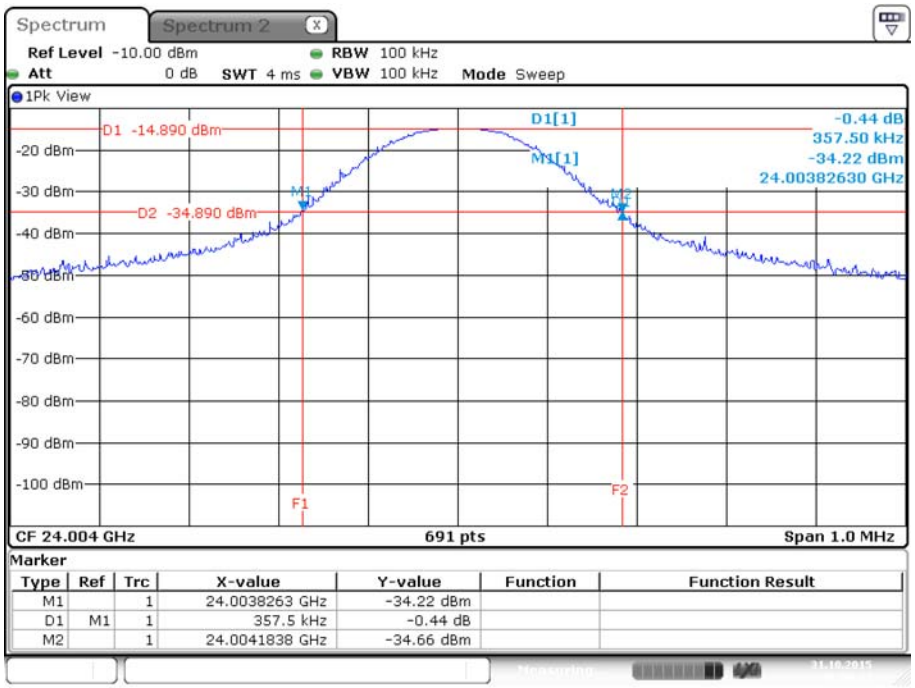
The EUT was programmed to be in continuously transmitting mode.

4.3.7 Test Result of 20dB Spectrum Bandwidth

Temperature	25°C	Humidity	51%
Test Engineer	Kenneth Huang	Configurations	Channel 1/2/3

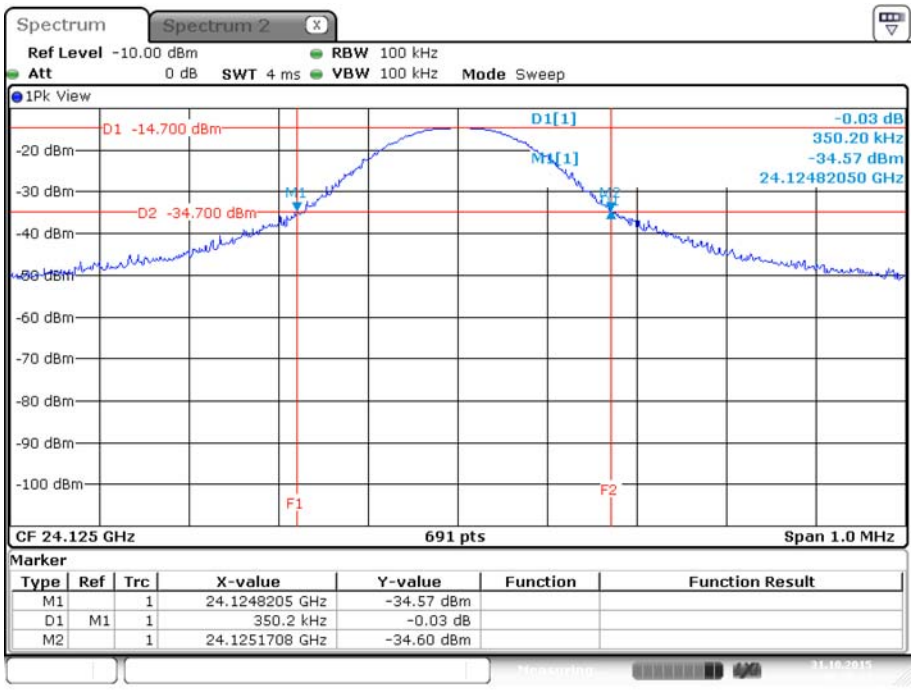
Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) f_L > 24000MHz	Frequency range (MHz) f_H < 24250MHz	Test Result
24004 MHz	0.358	0.323	24003.826	-	Complies
24125 MHz	0.350	0.323	-	-	Complies
24246 MHz	0.344	0.301	-	24246.172	Complies

20 dB Bandwidth Plot on 24004 MHz



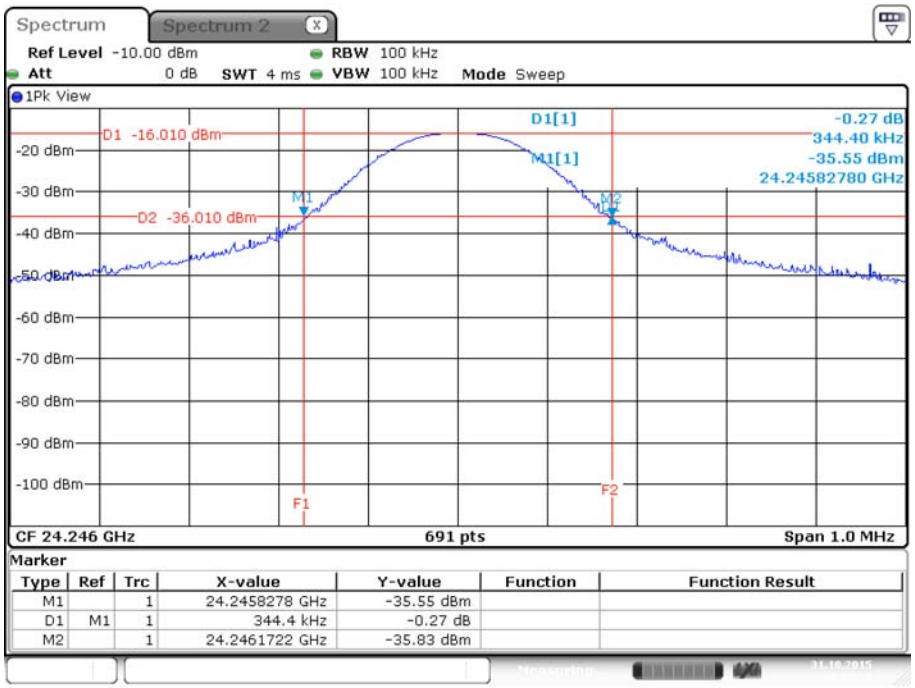
Date: 31.OCT.2015 00:06:47

20 dB Bandwidth Plot on 24125 MHz



Date: 31.OCT.2015 00:10:41

20 dB Bandwidth Plot on 24246 MHz



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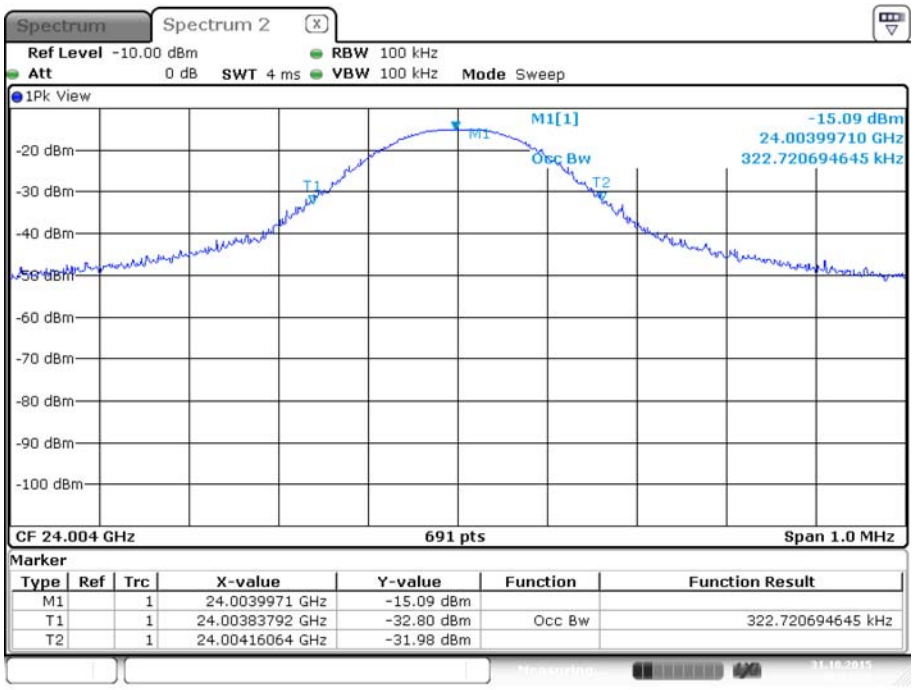
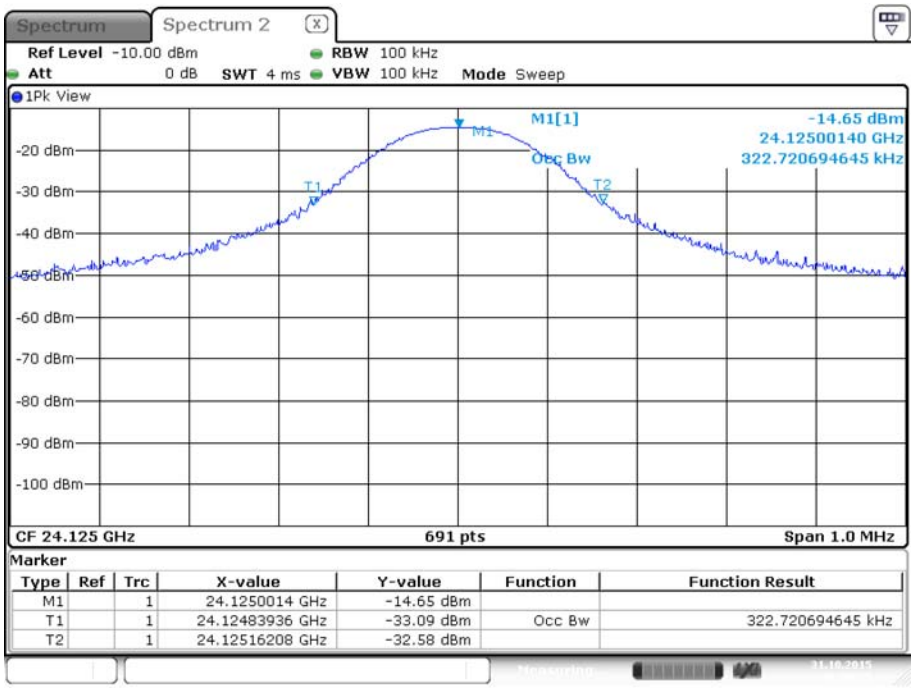
99% Bandwidth Plot on 24004 MHz



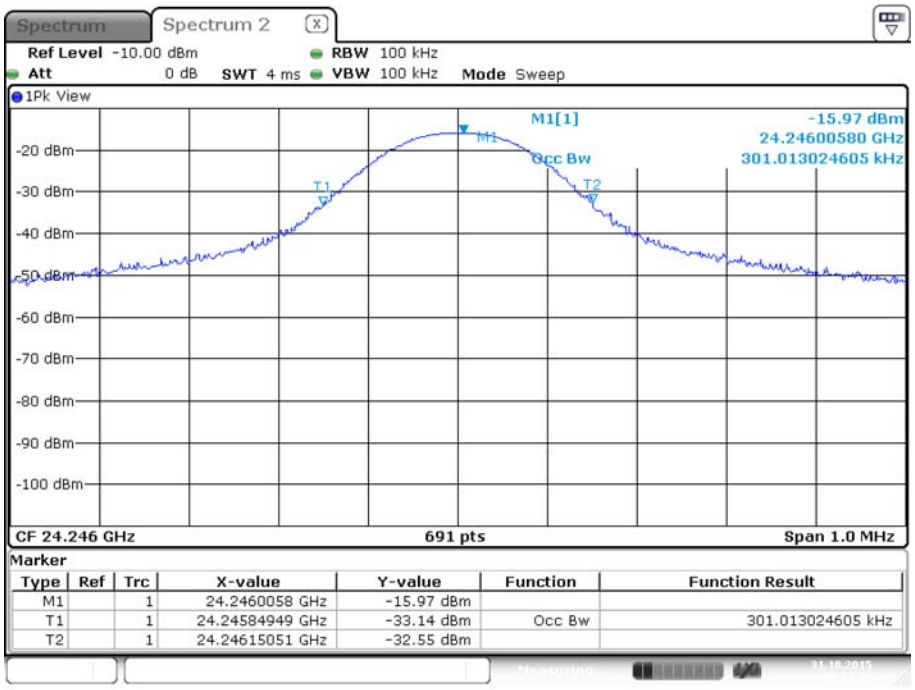
Date: 31.OCT.2015 00:02:10

99% Bandwidth Plot on 24125 MHz



Date: 31.OCT.2015 00:08:16

99% Bandwidth Plot on 24246 MHz



Date: 31.OCT.2015 00:13:38

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 (MHz)	Harmonics Strength (micorvolts/meter)	Harmonics Strength (dBuV/m) at 3m
24.0~24.25 GHz	2500 at 3m	68 (Average)
24.0~24.25 GHz	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

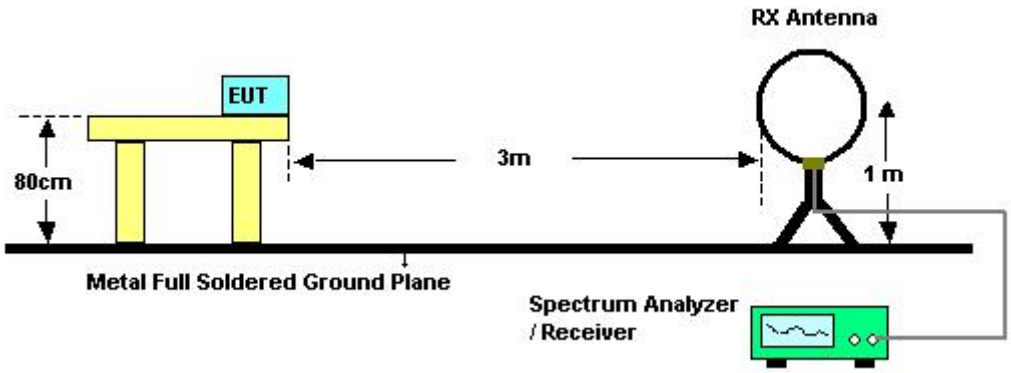
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.4.3 Test Procedures

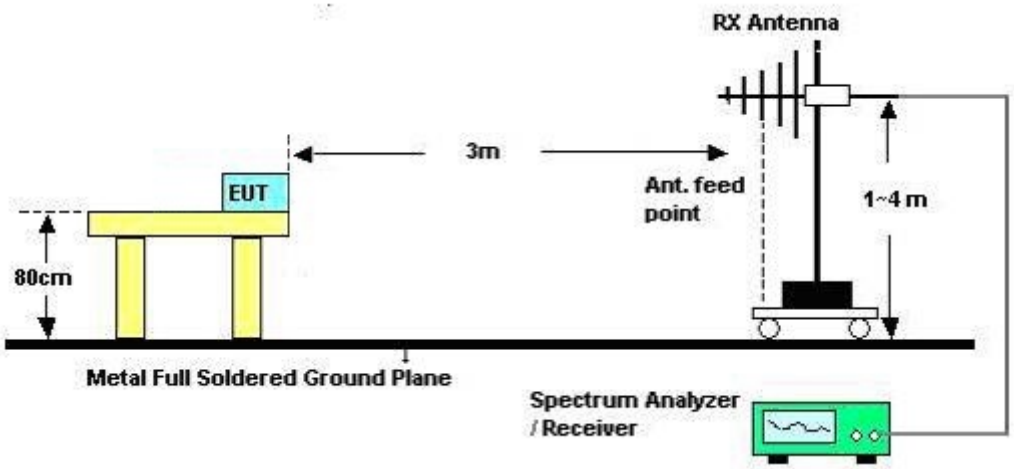
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

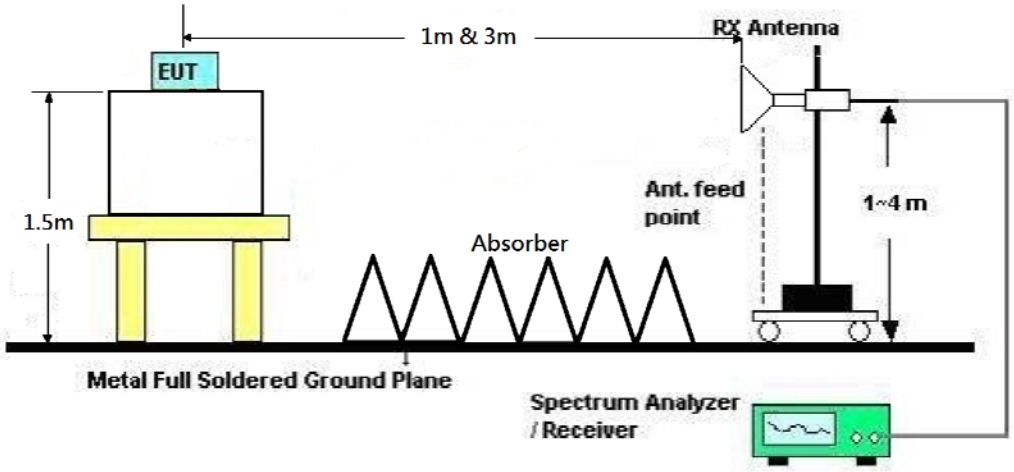
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For radiated emissions: 1GHz~40GHz

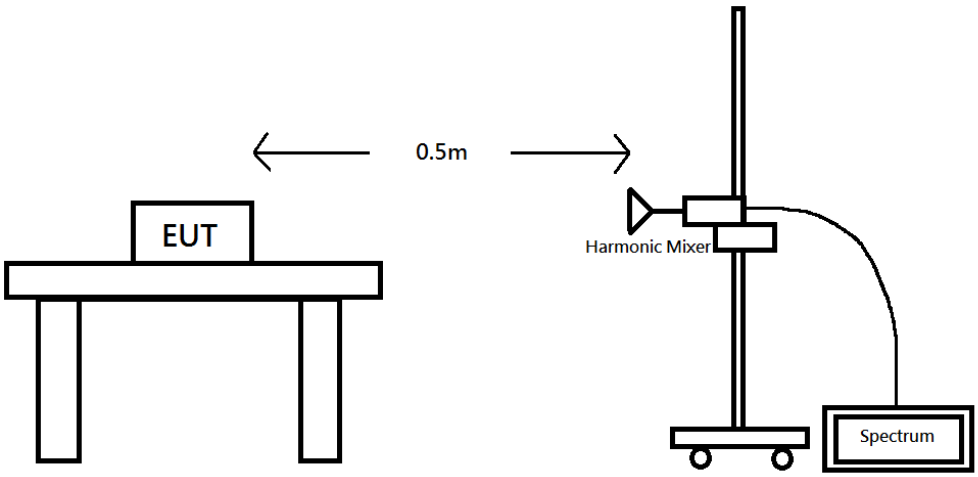


Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

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	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Normal Link
Test Date	Nov. 19, 2015		

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.

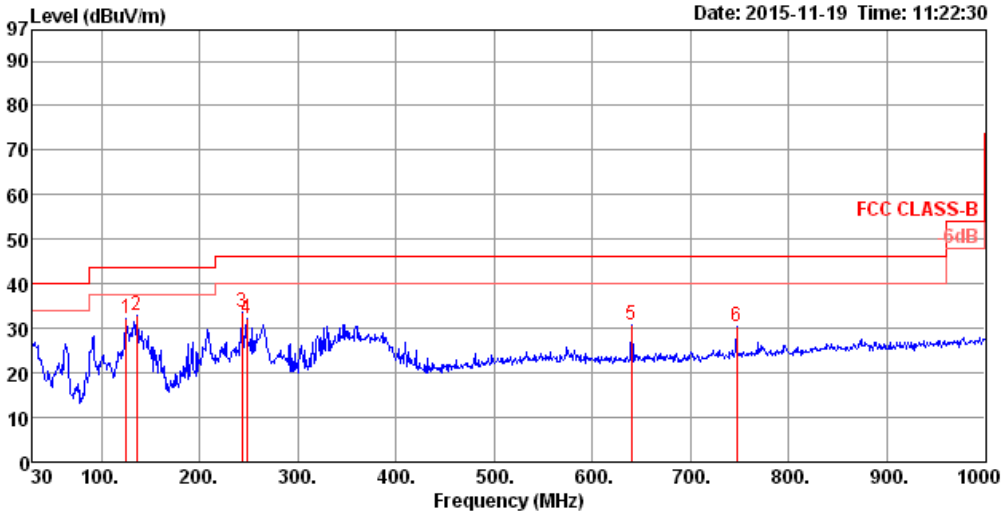
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

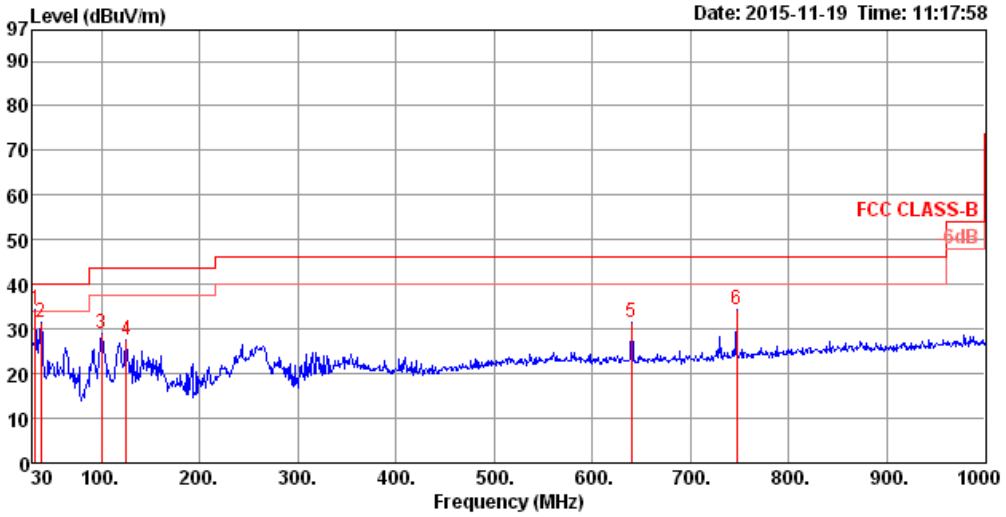
Temperature	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Normal Link

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	125.06	32.15	43.50	-11.35	46.10	0.89	12.65	27.49	100	0	HORIZONTAL	Peak
2	135.73	33.10	43.50	-10.40	47.95	0.92	12.26	28.03	100	0	HORIZONTAL	Peak
3	243.40	33.65	46.00	-12.35	50.08	1.24	12.37	30.04	100	0	HORIZONTAL	Peak
4	248.25	32.28	46.00	-13.72	48.26	1.25	12.77	30.00	100	0	HORIZONTAL	Peak
5	640.13	30.87	46.00	-15.13	37.39	2.00	19.41	27.93	100	0	HORIZONTAL	Peak
6	746.83	30.40	46.00	-15.60	35.70	2.18	20.17	27.65	100	0	HORIZONTAL	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	32.91	34.34	40.00	-5.66	40.47	0.53	18.13	24.79	300	360	VERTICAL	Peak
2	38.73	31.46	40.00	-8.54	40.97	0.53	14.61	24.65	300	360	VERTICAL	Peak
3	99.84	28.99	43.50	-14.51	42.98	0.87	11.20	26.06	300	360	VERTICAL	Peak
4	125.06	27.73	43.50	-15.77	41.68	0.89	12.65	27.49	300	360	VERTICAL	Peak
5	640.13	31.48	46.00	-14.52	38.00	2.00	19.41	27.93	300	360	VERTICAL	Peak
6	746.83	34.35	46.00	-11.65	39.65	2.18	20.17	27.65	300	360	VERTICAL	Peak

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	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 1 / 1~18G
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4523.41	27.88	54.00	-26.12	25.11	5.26	31.95	34.44	100	202	HORIZONTAL	Average
2	4523.41	47.82	74.00	-26.18	45.05	5.26	31.95	34.44	100	202	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4523.29	31.47	54.00	-22.53	28.70	5.26	31.95	34.44	150	11	VERTICAL	Average
2	4523.29	51.41	74.00	-22.59	48.64	5.26	31.95	34.44	150	11	VERTICAL	Peak

Temperature	23℃	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 1 / 18~40G
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	25642.41	40.54	63.54	-23.00	35.16	16.45	38.96	50.03	160	360	HORIZONTAL	Average
2	25642.41	60.48	83.54	-23.06	55.10	16.45	38.96	50.03	160	360	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	25642.40	38.95	63.54	-24.59	33.57	16.45	38.96	50.03	160	360	VERTICAL	Average
2	25642.40	58.89	83.54	-24.65	53.51	16.45	38.96	50.03	160	360	VERTICAL	Peak

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	23℃	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 2 / 1～18G
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4523.65	27.58	54.00	-26.42	24.81	5.26	31.95	34.44	112	62	HORIZONTAL	Average
2	4523.65	47.52	74.00	-26.48	44.75	5.26	31.95	34.44	112	62	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4523.44	27.99	54.00	-26.01	25.22	5.26	31.95	34.44	102	184	VERTICAL	Average
2	4523.44	47.93	74.00	-26.07	45.16	5.26	31.95	34.44	102	184	VERTICAL	Peak

Temperature	23℃	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 2 / 18~40G
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	22626.70	57.58	83.54	-25.96	55.64	15.36	38.10	51.52	150	261	HORIZONTAL	Peak
2	22626.70	37.64	63.54	-25.90	35.70	15.36	38.10	51.52	150	261	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	22617.32	58.11	83.54	-25.43	56.21	15.32	38.10	51.52	152	360	VERTICAL	Peak
2	22617.32	38.17	63.54	-25.37	36.27	15.32	38.10	51.52	152	360	VERTICAL	Average

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	23℃	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 3 / 1～18G
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4545.96	30.03	54.00	-23.97	27.20	5.26	32.01	34.44	111	202	HORIZONTAL	Average
2	4545.96	49.97	74.00	-24.03	47.14	5.26	32.01	34.44	111	202	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4546.11	30.75	54.00	-23.25	27.92	5.26	32.01	34.44	102	25	VERTICAL	Average
2	4546.11	50.69	74.00	-23.31	47.86	5.26	32.01	34.44	102	25	VERTICAL	Peak

Temperature	23℃	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 3 / 18~40G
Test Date	Sep. 30, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	34128.80	36.74	63.54	-26.80	28.73	19.15	40.80	51.94	150	0	HORIZONTAL	Average
2	34128.80	56.68	83.54	-26.86	48.67	19.15	40.80	51.94	150	0	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	34128.30	44.80	63.54	-18.74	36.79	19.15	40.80	51.94	150	360	VERTICAL	Average
2	34128.30	64.74	83.54	-18.80	56.73	19.15	40.80	51.94	150	360	VERTICAL	Peak

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	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 1
Test Date	Nov. 02, 2015		

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
71.64	0.5	87.704	103.56	-15.856
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
71.64	0.5	80.544	83.56	-3.016

Temperature	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 2
Test Date	Nov. 02, 2015		

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
72	0.5	88.828	103.56	-14.732
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
72	0.5	82.278	83.56	-1.282

Temperature	23℃	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 3
Test Date	Nov. 02, 2015		

Frequency (GHz)	Measurement Distance (m)	Measurement Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
72.37	0.5	88.082	103.56	-15.478
Frequency (GHz)	**Measurement Distance (m)**	**Measurement Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
72.37	0.5	81.802	83.56	-1.758

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	23°C	Humidity	60%
Test Engineer	Owen Hsu	Configurations	Channel 1, 2, 3
Test Date	Sep. 30, 2015 / Nov. 02, 2015		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	23999.98	78.98	83.54	-4.56	75.29	15.81	38.90	51.02	155	2	VERTICAL	Peak
2	23999.98	59.04	63.54	-4.50	55.35	15.81	38.90	51.02	155	2	VERTICAL	Average
3	24004.00	101.54			97.85	15.81	38.90	51.02	155	2	VERTICAL	Average
4	24004.00	121.48			117.79	15.81	38.90	51.02	155	2	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 24004 MHz.

Channel 2

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	23981.30	49.68	63.54	-13.86	46.03	15.79	38.89	51.03	153	20	HORIZONTAL	Average
2	23981.30	69.62	83.54	-13.92	65.97	15.79	38.89	51.03	153	20	HORIZONTAL	Peak
3	24125.00	81.05			77.24	15.85	38.93	50.97	153	20	HORIZONTAL	Average
4	24125.00	100.99			97.18	15.85	38.93	50.97	153	20	HORIZONTAL	Peak
5	24250.00	48.82	63.54	-14.72	44.90	15.89	38.95	50.92	153	20	HORIZONTAL	Average
6	24250.00	68.76	83.54	-14.78	64.84	15.89	38.95	50.92	153	20	HORIZONTAL	Peak

Item 3, 4 are the fundamental frequency at 24125 MHz.

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	24245.97	100.74			96.82	15.89	38.95	50.92	156	11	VERTICAL	Average
2	24245.97	120.68			116.76	15.89	38.95	50.92	156	11	VERTICAL	Peak
3	24250.02	57.97	63.54	-5.57	54.05	15.89	38.95	50.92	156	11	VERTICAL	Average
4	24250.02	77.91	83.54	-5.63	73.99	15.89	38.95	50.92	156	11	VERTICAL	Peak

Item 1, 2 are the fundamental frequency at 24246 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 Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 03, 2014	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 2015	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Feb.10, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	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)
Mixer	OML	M05HW/A	G91113-1	140 ~ 220 GHz	Sep. 24, 2015	Radiation (03CH01-CB)
*Pico Scope	Pico	Pico Scope 6402C	CX372/002	N/A	Jul. 06, 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)
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)
Standard Horn Antenna	Custom Microwave	HO05R	G91113-A	140 ~ 220 GHz	Sep. 24, 2015	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-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%