SPORTON International Inc.
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FCC RADIO TEST REPORT

Applicant's company	**ZTE Corporation**
Applicant Address	ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong, 518057 China
FCC ID	**Q78-ZXWLW822E**
Manufacturer's company	**ZTE Corporation**
Manufacturer Address	ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong, 518057 China

Product Name	Indoor Wireless AP
Brand Name	ZTE
Model No.	ZXWL W822Ei
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250MHz
Received Date	Aug. 07, 2013
Final Test Date	Feb. 24, 2014
Submission Type	Class II Change

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a (5150 ~ 5250MHz) of the product.

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009**, **47 CFR FCC Part 15 Subpart E, KDB 789033 D01 v01r03, KDB 662911 D01 v02r01.**

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
FR380712-01AB	Rev. 01	Initial issue of report	Feb. 27, 2014

Certificate No.: CB10302133

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Indoor Wireless AP
Brand Name	:	ZTE
Model No.	:	ZXWL W822Ei
Applicant	:	ZTE Corporation
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Aug. 07, 2013 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.

Sam Chen
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.407(a)	Maximum Conducted Output Power	Complies	0.16 dB
4.2	15.407(b)	Radiated Emissions	Complies	0.34 dB
4.3	15.407(b)	Band Edge Emissions	Complies	6.80 dB
4.4	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or PoE
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
Frequency Range	5150 ~ 5250MHz
Channel Number	4 for 20MHz bandwidth ; 2 for 40MHz bandwidth
Maximum Conducted Output Power	MCS0 (HT20): 15.86 dBm ; MCS0 (HT40): 16.84 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

IEEE 802.11a

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or PoE
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5150 ~ 5250MHz
Channel Number	4
Maximum Conducted Output Power	15.45 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Beamforming Function	☐ With beamforming	☒ Without beamforming

Antenna and Band width

Antenna	Three (TX)	
Band width Mode	20 MHz	40 MHz
IEEE 802.11a	V	X
IEEE 802.11n	V	V

IEEE 11n Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n		

3.2. Accessories

Power	Brand	Model No.	Rating
Adapter	MOSO	MSP-C2000IC12.0-24W-US	Input: 100-240Vac, 50/60Hz, 0.8A max. Output: 12.0Vdc, 2A
Other			
Wall-mounted pedestal*1			

3.3. Table for Filed Antenna

Ant.	Brand	Model No.	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	Airgain	M2450DL6	PIFA Antenna	I-PEX	4.9	5.0

Note: The EUT has six internal antennas.

<For 2.4GHz Band:>

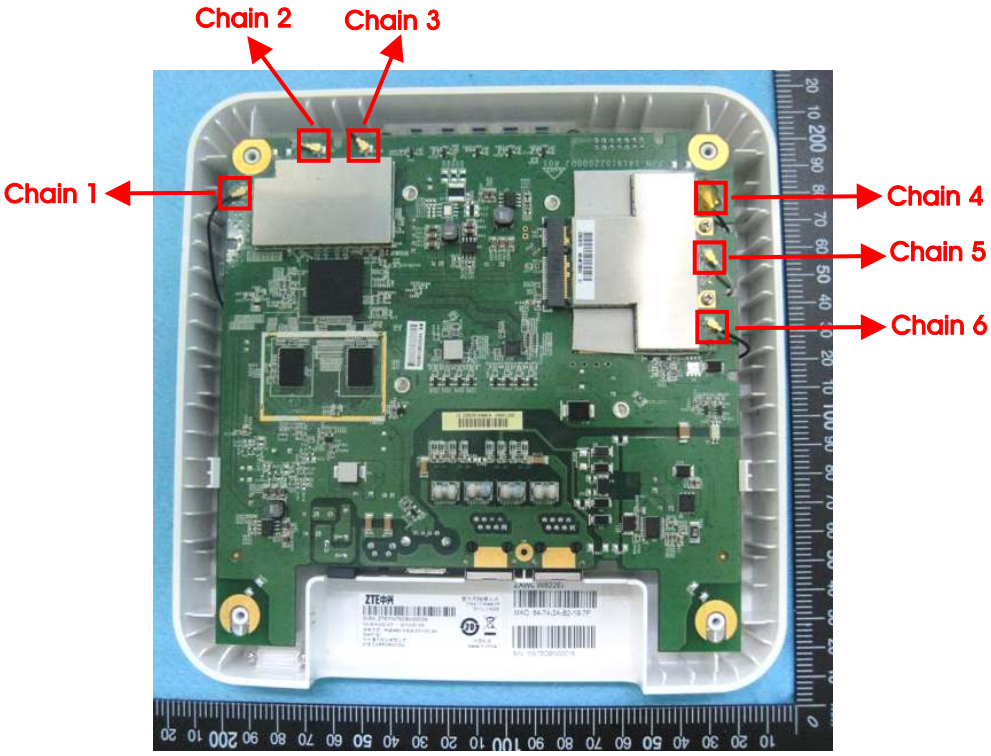
For IEEE 802.11b/g/n mode (3TX/3RX):

Chain 1, Chain 2 and Chain 3 could transmit/receive simultaneously.

<For 5GHz Band:>

For IEEE 802.11a/n mode (3TX/3RX):

Chain 4, Chain 5 and Chain 6 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

The EUT has two bandwidth system.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48.

For 40MHz bandwidth systems, use Channel 38, 46.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. 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		Data Rate	Channel	Chain
Max. Conducted Output Power	11n HT20	Band 1	MCS0	36/40/48	4+5+6
	11n HT40	Band 1	MCS0	38/46	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4+5+6
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11n HT20	Band 1	MCS0	36/40/48	4+5+6
	11n HT40	Band 1	MCS0	38/46	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4+5+6
Band Edge Emission	11n HT20	Band 1	MCS0	36/40/48	4+5+6
	11n HT40	Band 1	MCS0	38/46	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4+5+6

The following test modes were performed for all tests:

For Radiated Emission below 1GHz test:

Mode 1. Stand of EUT + Adapter

Mode 2. Laying of EUT + Adapter

Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.

Mode 3. Stand of EUT + PoE

Mode 1 and Mode 3 are worst test result among Mode 1~Mode 3, and the test result of those two modes are selected to record in the test report.

For Radiated Emission above 1GHz test:

The EUT for Radiated Emission above 1GHz test was performed at X axis, Y axis and Z axis and the worst-case was found at Y axis. So the measurement will follow this same test configuration.

For Co-location MPE and Radiated Emission Co-location tests:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to Appendix C) and Radiated Emission Co-location (please refer to Appendix D) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

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	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR380712AB.

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. It adds six internal antennas for this device. 2. Change the model number to "ZXWL W822Ei" from "ZXWL W822E".	1. Maximum Conducted Output Power. 2. Radiated Emissions. 3. Band Edges Emissions. 4. Co-location Maximum Permissible Exposure. 5. Radiated Emission Co-location.

3.8. Table for Supporting Units

For Radiated Emissions below 1GHz test:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	E2K4965AGNM
Notebook	DELL	M1340	E2K4965AGNM
Notebook	DELL	E6430	DoC
Notebook	DELL	D420	E2KWM3945ABG
PoE	PowerDsine	PD-6561G300	NA

For Others test:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC

3.9. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters of IEEE 802.11n MCS0 HT20 / Chain 4 + Chain 5 + Chain 6

Test Software Version	ART2-GUI		
Frequency	5180 MHz	5200 MHz	5240 MHz
MCS0 HT20	10	10	9.5

Power Parameters of IEEE 802.11n MCS0 HT40 / Chain 4 + Chain 5 + Chain 6

Test Software Version	ART2-GUI	
Frequency	5190 MHz	5230 MHz
MCS0 HT40	11.5	11.5

Power Parameters of IEEE 802.11a / Chain 4 + Chain 5 + Chain 6

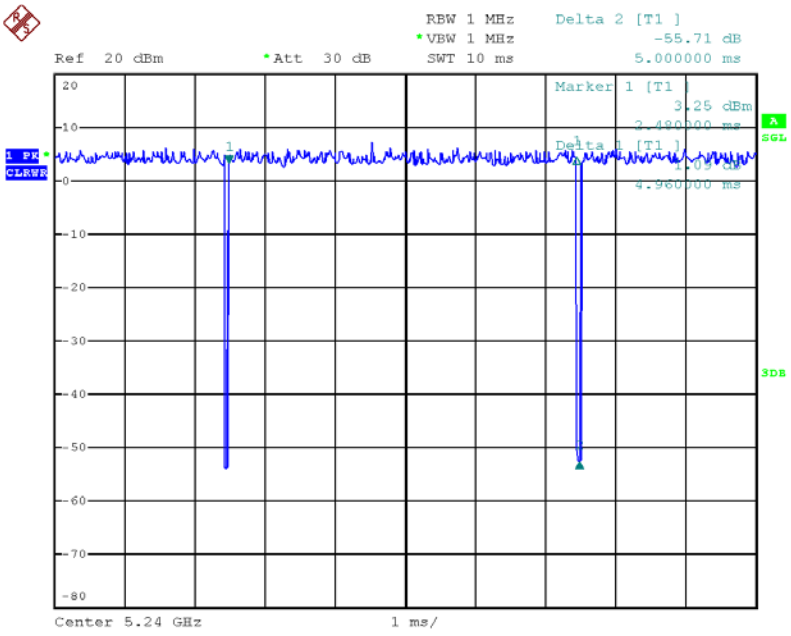
Test Software Version	ART2-GUI		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	9.5	9.5	9

3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

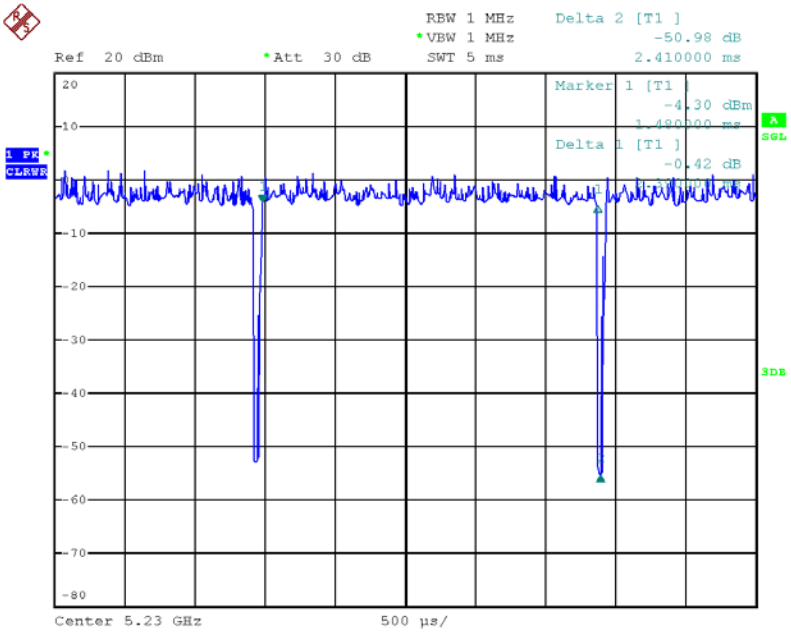
3.11. Duty Cycle

IEEE 802.11n MCS0 HT20



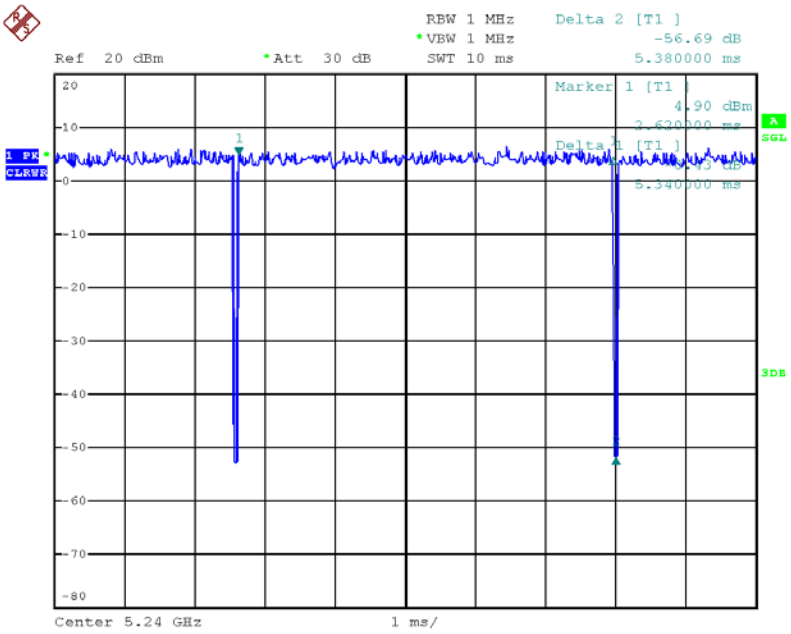
Date: 5.SEP.2013 18:11:00

IEEE 802.11n MCS0 HT40



Date: 5.SEP.2013 18:07:36

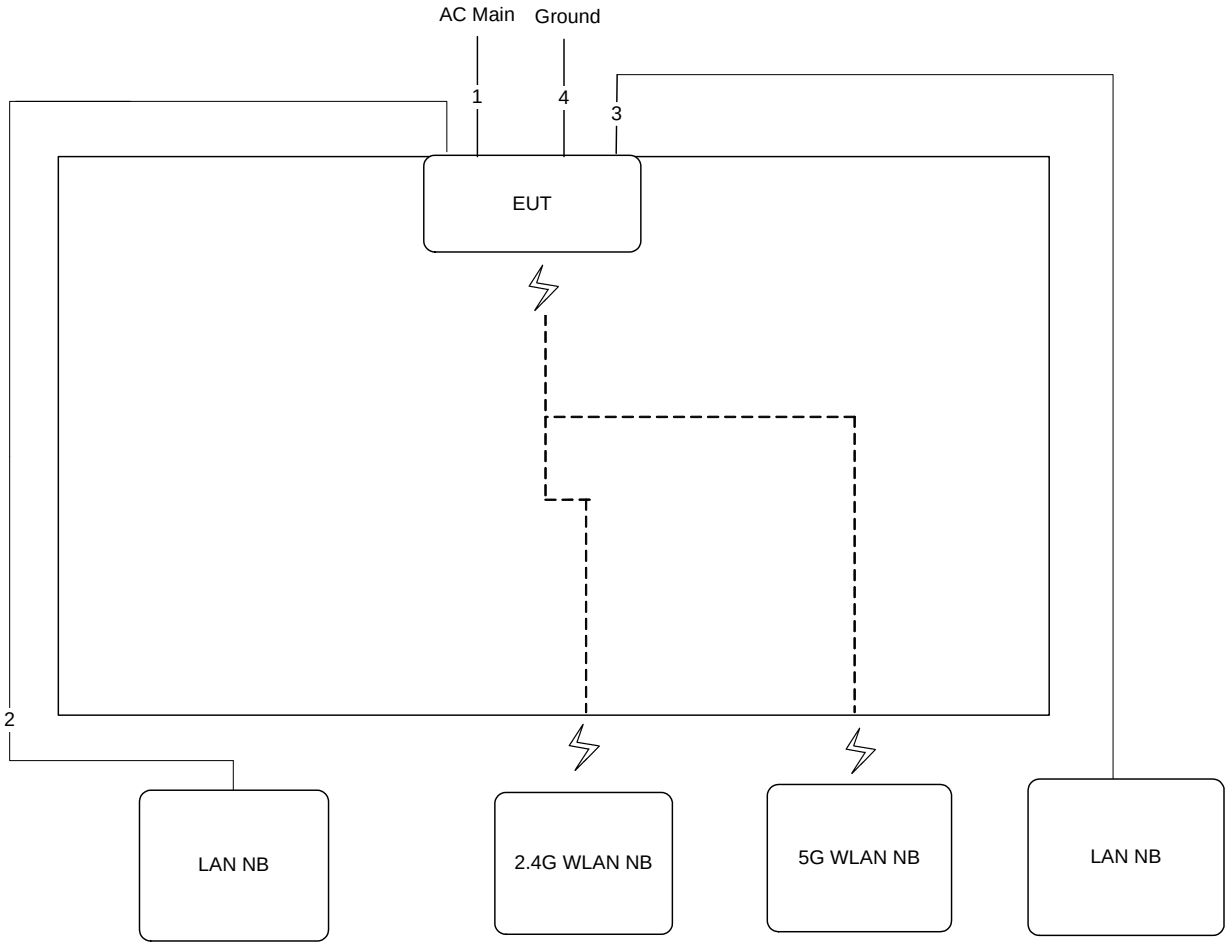
IEEE 802.11a


RBW 1 MHz
VBW 1 MHz
SWT 10 ms
Delta 2 [T1]
-56.69 dB
5.380000 ms
Ref 20 dBm
Att 30 dB
Marker 1 [T1
4.90 dBm
Delta 1 [T1]
5.340000 ms
1 PK
CLRWR
SGL
3DB
Center 5.24 GHz
1 ms/
Date: 5.SEP.2013 18:12:03

3.12. Test Configurations

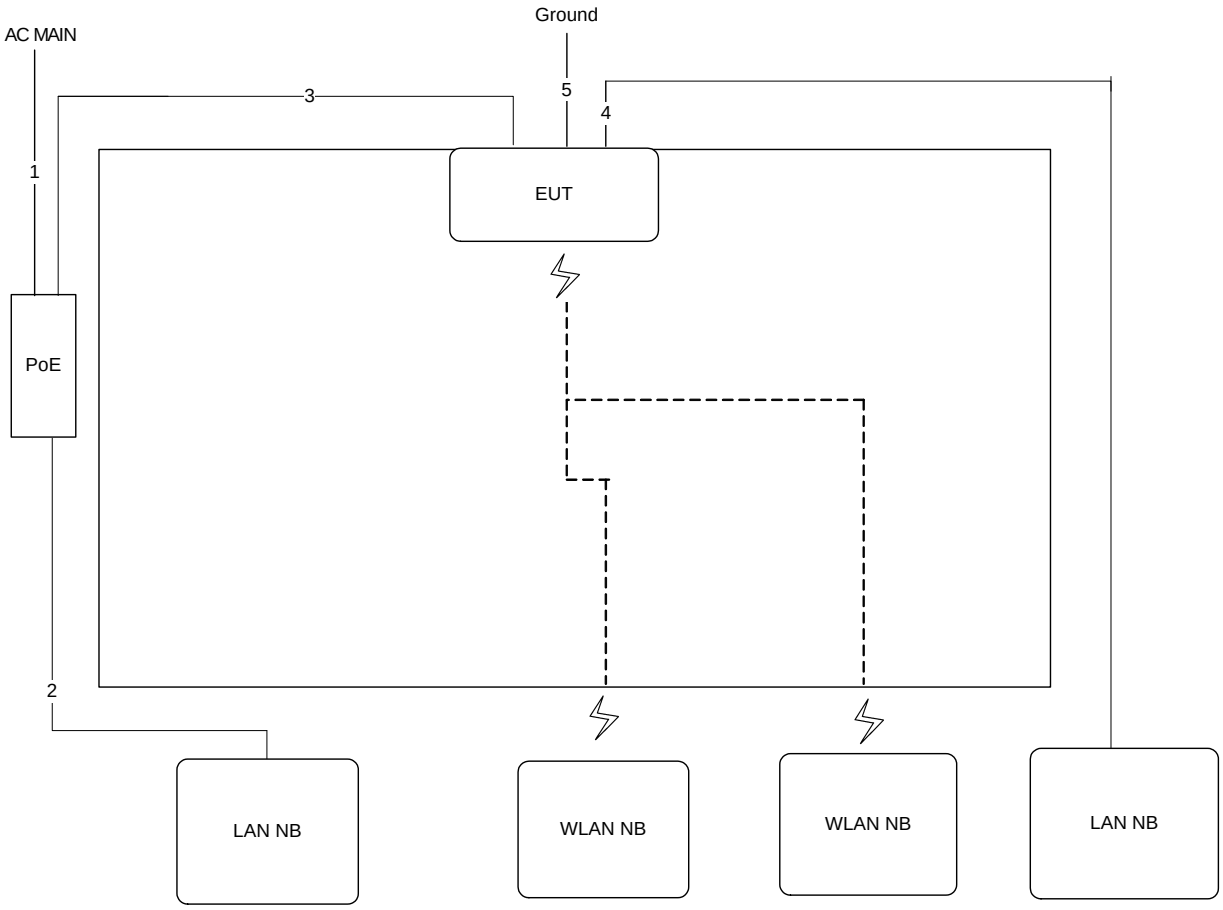
3.12.1. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz / Test Mode: Mode 1



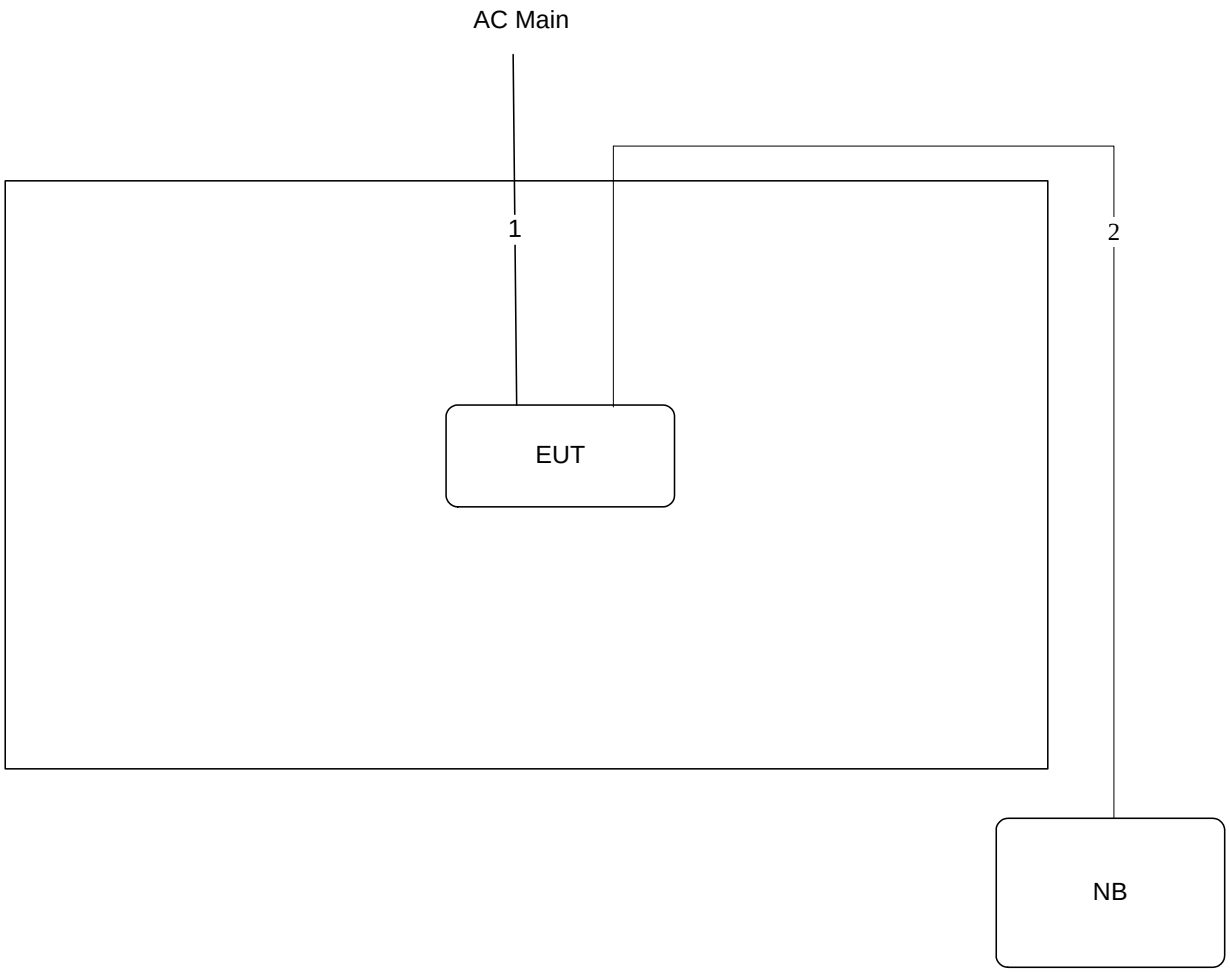
Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	Ground cable	No	1.5m

Test Mode: Mode 3



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1m
4	RJ-45 cable	No	10m
5	Ground cable	No	1.5m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m

4. TEST RESULT

4.1. Maximum Conducted Output Power Measurement

4.1.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.1.2. Measuring Instruments and Setting

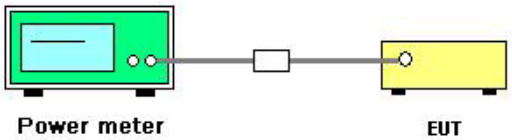
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	AVERAGE

4.1.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB 789033 D01 v01r03 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E,section (E) Maximum conducted output power =>(3) Method PM (Measurement using an RF average power meter) Multiple antenna systems was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. When measuring maximum conducted output power with multiple antenna systems,add every result of the values by mathematic formula.

4.1.4. Test Setup Layout



4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.1.7. Test Result of Maximum Conducted Output Power

Temperature	22°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11n
Test Date	Feb. 15, 2014		

Configuration IEEE 802.11n MCS0 HT20

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6	Total		
36	5180 MHz	11.57	10.83	10.83	15.86	17.00	Complies
40	5200 MHz	11.02	10.73	11.21	15.76	17.00	Complies
48	5240 MHz	10.42	10.32	10.65	15.24	17.00	Complies

Configuration IEEE 802.11n MCS0 HT40

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6	Total		
38	5190 MHz	12.41	11.51	12.12	16.80	17.00	Complies
46	5230 MHz	12.49	11.49	12.16	16.84	17.00	Complies

Temperature	22°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a
Test Date	Feb. 15, 2014		

Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6	Total		
36	5180 MHz	11.17	10.27	10.56	15.45	17.00	Complies
40	5200 MHz	10.69	10.17	10.78	15.33	17.00	Complies
48	5240 MHz	10.01	9.72	10.19	14.75	17.00	Complies

4.2. Radiated Emissions Measurement

4.2.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 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

4.2.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

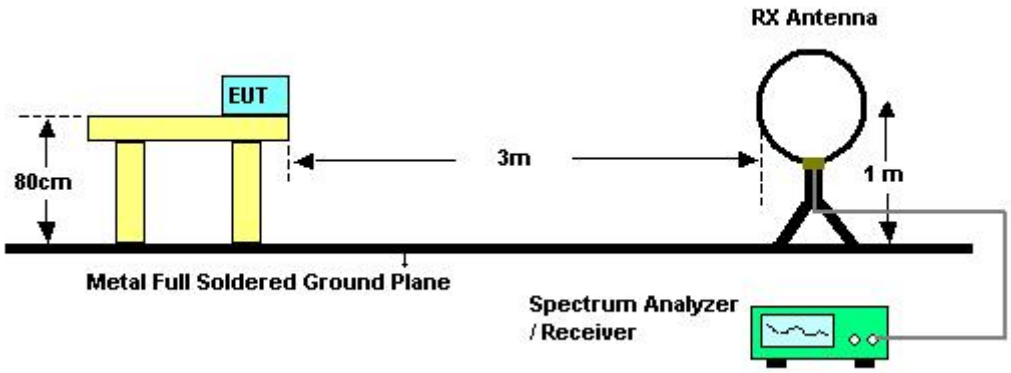
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.2.3. Test Procedures

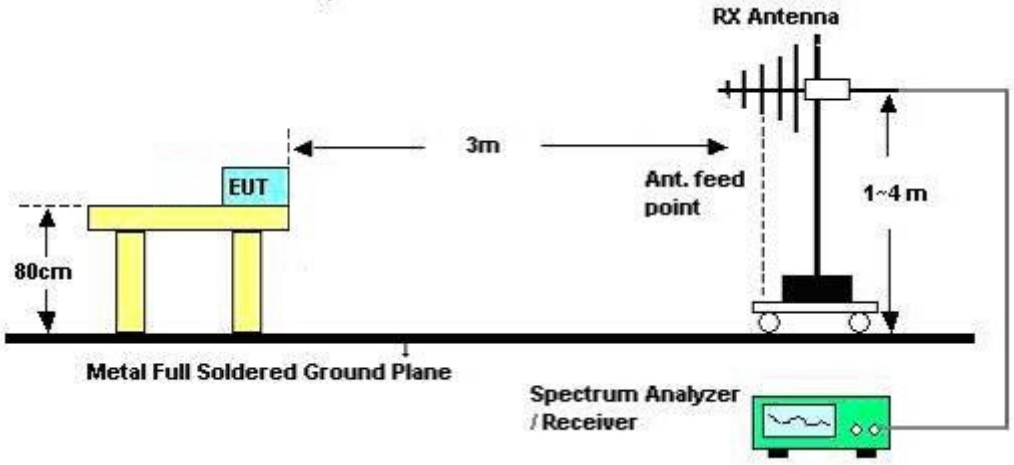
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. 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 10Hz 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.

4.2.4. Test Setup Layout

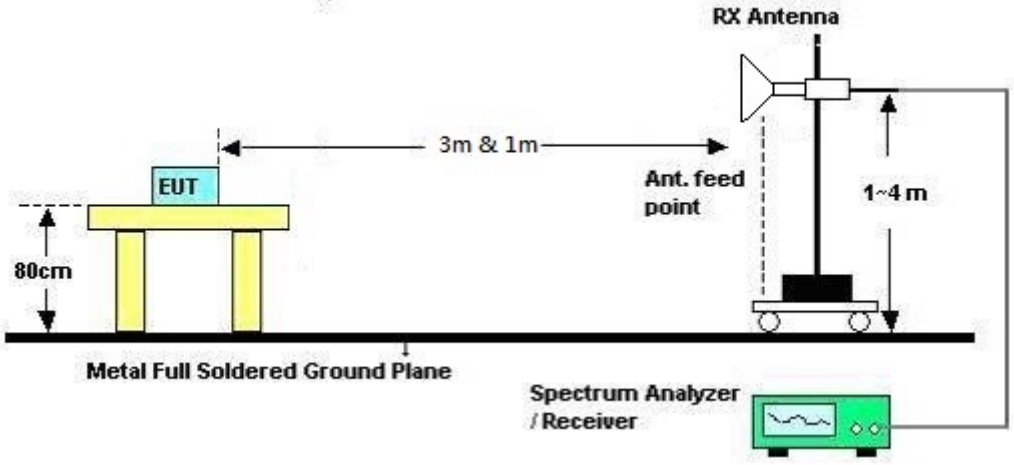
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



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

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	Normal Link
Test Date	Feb. 14, 2014	Test Mode	Mode 1

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

Note:

The amplitude of spurious emissions that 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.

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	Normal Link
Test Date	Feb. 24, 2014	Test Mode	Mode 3

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

Note:

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

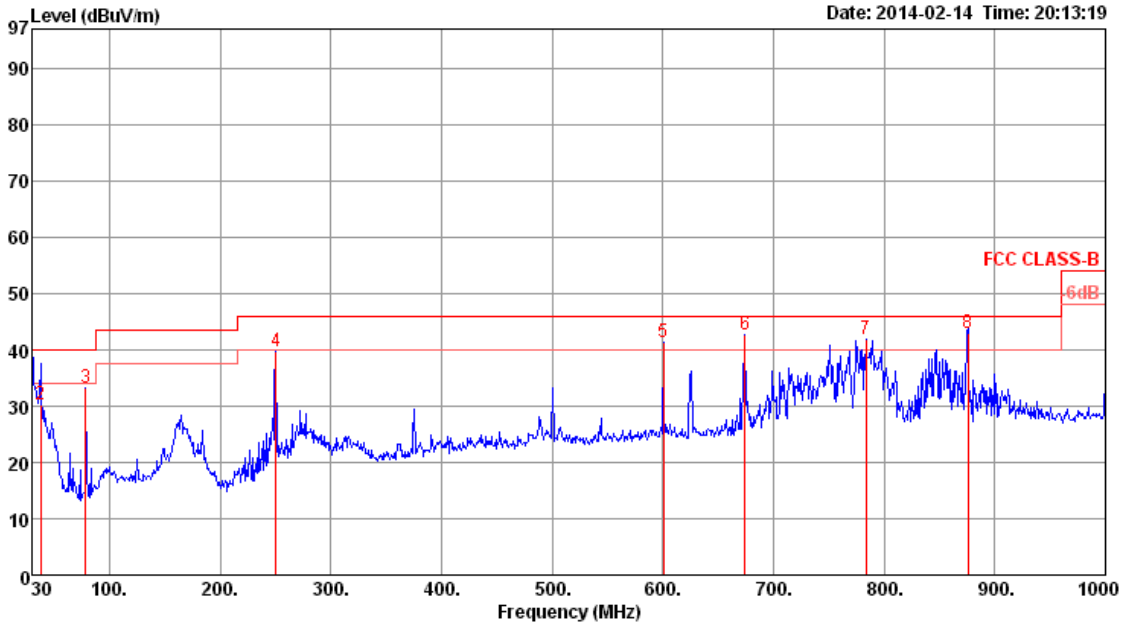
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

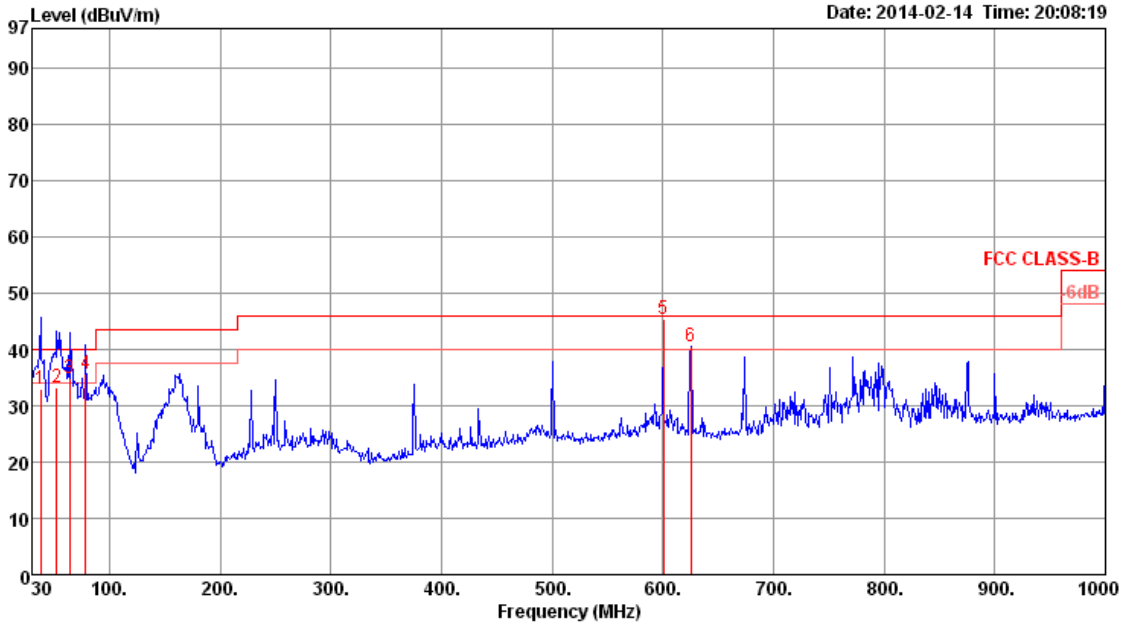
Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	Normal Link
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	30.00	32.80	40.00	-7.20	41.23	0.61	18.76	27.80	QP	100	312	HORIZONTAL
2	37.76	30.29	40.00	-9.71	43.11	0.68	14.30	27.80	QP	133	0	HORIZONTAL
3	78.50	33.13	40.00	-6.87	52.79	0.96	7.07	27.69	Peak	100	0	HORIZONTAL
4	250.19	39.60	46.00	-6.40	52.05	1.78	12.77	27.00	Peak	100	0	HORIZONTAL
5	600.36	41.26	46.00	-4.74	47.78	2.81	18.77	28.10	Peak	100	0	HORIZONTAL
6	674.08	42.58	46.00	-3.42	48.56	3.04	19.01	28.03	Peak	100	0	HORIZONTAL
7	783.69	41.81	46.00	-4.19	46.61	3.21	19.66	27.67	Peak	100	0	HORIZONTAL
8	875.84	42.97	46.00	-3.03	46.61	3.46	20.35	27.45	QP	100	154	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	37.76	32.87	40.00	-7.13	45.69	0.68	14.30	27.80	QP	100	173	VERTICAL
2	52.31	33.33	40.00	-6.67	52.08	0.86	8.18	27.79	QP	100	136	VERTICAL
3	63.95	34.89	40.00	-5.11	54.98	0.93	6.72	27.74	QP	100	196	VERTICAL
4	78.50	35.74	40.00	-4.26	55.40	0.96	7.07	27.69	QP	100	179	VERTICAL
5	600.36	45.40	46.00	-0.60	51.92	2.81	18.77	28.10	QP	100	170	VERTICAL
6	625.58	40.44	46.00	-5.56	46.76	2.90	18.85	28.07	Peak	400	0	VERTICAL

Note:

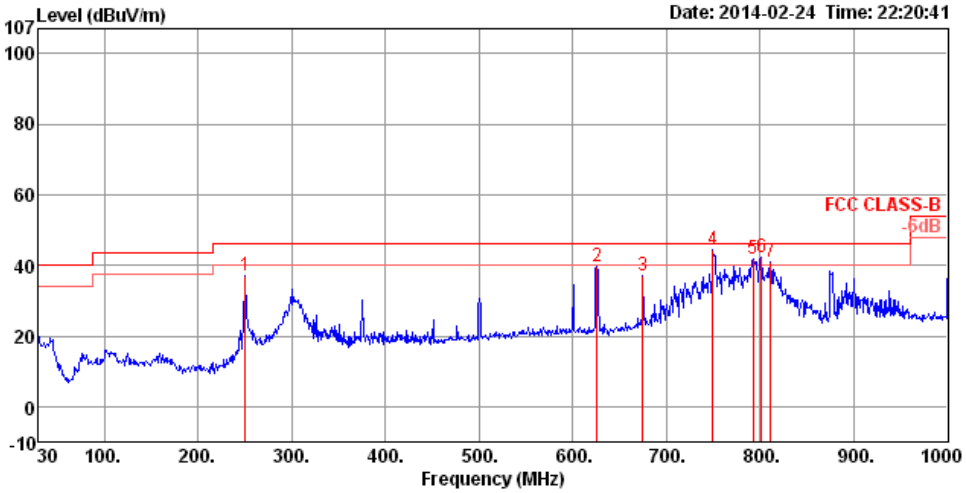
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

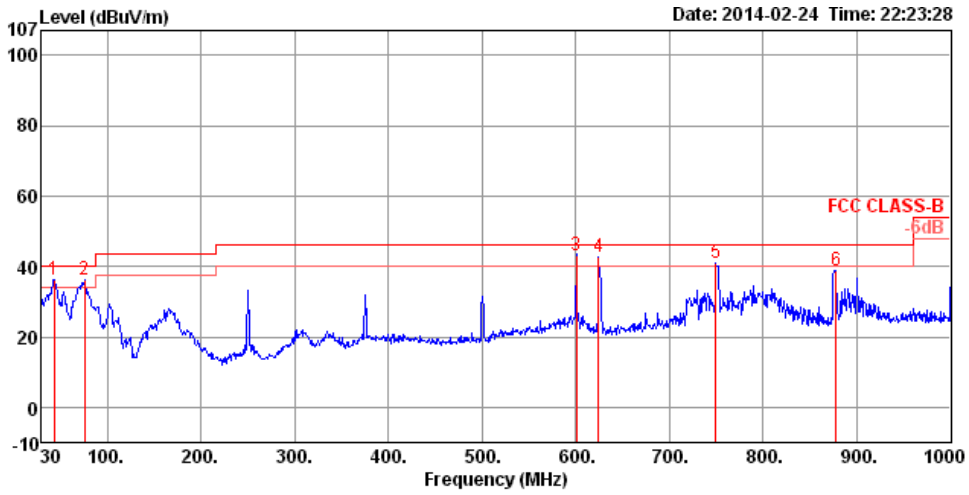
Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	Normal Link
Test Mode	Mode 3		

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	250.19	36.91	46.00	-9.09	54.59	1.90	11.91	31.49	125	248	HORIZONTAL	Peak
2	625.58	39.57	46.00	-6.43	49.17	3.19	18.62	31.41	150	266	HORIZONTAL	Peak
3	675.05	36.92	46.00	-9.08	46.17	3.33	18.78	31.36	125	209	HORIZONTAL	Peak
4	749.74	44.54	46.00	-1.46	52.69	3.53	19.69	31.37	132	359	HORIZONTAL	QP
5	792.42	41.64	46.00	-4.36	49.55	3.65	19.74	31.30	125	360	HORIZONTAL	Peak
6	801.15	42.06	46.00	-3.94	49.86	3.67	19.80	31.27	150	357	HORIZONTAL	Peak
7	810.85	41.07	46.00	-4.93	48.44	3.69	20.17	31.23	125	6	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	43.58	36.28	40.00	-3.72	57.09	0.78	10.25	31.84	100	239	VERTICAL	Peak
2	75.59	36.34	40.00	-3.66	60.89	1.02	6.11	31.68	125	246	VERTICAL	Peak
3	600.36	42.93	46.00	-3.07	52.60	3.12	18.45	31.24	100	352	VERTICAL	QP
4	624.61	42.51	46.00	-3.49	52.12	3.18	18.61	31.40	100	84	VERTICAL	Peak
5	749.74	40.98	46.00	-5.02	49.13	3.53	19.69	31.37	100	288	VERTICAL	Peak
6	877.78	38.84	46.00	-7.16	45.81	3.91	20.26	31.14	150	32	VERTICAL	Peak

Note:

The amplitude of spurious emissions that 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.

4.2.9. Results for Radiated Emissions (1GHz~40GHz)

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n MCS0 HT20 CH 36 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4960.02	57.50	74.00	-16.50	55.08	4.23	34.64	2.42	Peak	231	100	HORIZONTAL
2	4960.03	51.76	54.00	-2.24	49.34	4.23	34.64	2.42	Average	231	100	HORIZONTAL
3	5439.62	62.38	74.00	-11.62	58.88	4.53	34.62	3.50	Peak	211	163	HORIZONTAL
4	5439.95	53.55	54.00	-0.45	50.05	4.53	34.62	3.50	Average	231	163	HORIZONTAL
5	15540.88	41.94	54.00	-12.06	30.39	7.85	34.79	11.55	Average	231	100	HORIZONTAL
6	15540.92	55.09	74.00	-18.91	43.54	7.85	34.79	11.55	Peak	231	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.95	52.35	74.00	-21.65	49.93	4.23	34.64	2.42	Peak	216	100	VERTICAL
2	4960.00	45.68	54.00	-8.32	43.26	4.23	34.64	2.42	Average	216	100	VERTICAL
3	5440.07	57.76	74.00	-16.24	54.26	4.53	34.62	3.50	Peak	213	100	VERTICAL
4	5440.08	49.02	54.00	-4.98	45.52	4.53	34.62	3.50	Average	213	100	VERTICAL
5	15540.64	55.41	74.00	-18.59	43.86	7.85	34.79	11.55	Peak	94	100	VERTICAL
6	15540.86	41.93	54.00	-12.07	30.38	7.85	34.79	11.55	Average	94	100	VERTICAL

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n MCS0 HT20 CH 40 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4960.02	50.70	54.00	-3.30	48.28	4.23	34.64	2.42	Average	231	103	HORIZONTAL
2	4960.08	56.59	74.00	-17.41	54.17	4.23	34.64	2.42	Peak	231	103	HORIZONTAL
3	5439.97	60.18	74.00	-13.82	56.68	4.53	34.62	3.50	Peak	214	114	HORIZONTAL
4	5440.00	53.31	54.00	-0.69	49.81	4.53	34.62	3.50	Average	214	114	HORIZONTAL
5	15599.08	42.22	54.00	-11.78	30.72	7.88	34.86	11.50	Average	98	100	HORIZONTAL
6	15599.47	55.33	74.00	-18.67	43.83	7.88	34.86	11.50	Peak	98	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.98	50.95	74.00	-23.05	48.53	4.23	34.64	2.42	Peak	216	100	VERTICAL
2	4959.98	43.81	54.00	-10.19	41.39	4.23	34.64	2.42	Average	216	100	VERTICAL
3	5440.03	48.59	54.00	-5.41	45.09	4.53	34.62	3.50	Average	213	100	VERTICAL
4	5440.05	57.42	74.00	-16.58	53.92	4.53	34.62	3.50	Peak	213	100	VERTICAL
5	15599.02	41.98	54.00	-12.02	30.48	7.88	34.86	11.50	Average	110	100	VERTICAL
6	15599.46	54.94	74.00	-19.06	43.44	7.88	34.86	11.50	Peak	110	100	VERTICAL

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n MCS0 HT20 CH 48 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.98	51.13	54.00	-2.87	48.71	4.23	34.64	2.42	Average	232	102	HORIZONTAL
2	4959.99	55.95	74.00	-18.05	53.53	4.23	34.64	2.42	Peak	232	102	HORIZONTAL
3	5440.02	61.49	74.00	-12.51	57.99	4.53	34.62	3.50	Peak	214	162	HORIZONTAL
4	5440.02	52.87	54.00	-1.13	49.37	4.53	34.62	3.50	Average	214	162	HORIZONTAL
5	15719.51	41.79	54.00	-12.21	30.35	7.92	34.94	11.44	Average	89	100	HORIZONTAL
6	15719.74	55.07	74.00	-18.93	43.63	7.92	34.94	11.44	Peak	89	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4960.00	43.39	54.00	-10.61	40.97	4.23	34.64	2.42	Average	217	100	VERTICAL
2	4960.03	50.47	74.00	-23.53	48.05	4.23	34.64	2.42	Peak	217	100	VERTICAL
3	5439.93	57.53	74.00	-16.47	54.03	4.53	34.62	3.50	Peak	214	100	VERTICAL
4	5440.07	48.66	54.00	-5.34	45.16	4.53	34.62	3.50	Average	214	100	VERTICAL
5	15719.86	41.58	54.00	-12.42	30.14	7.92	34.94	11.44	Average	113	100	VERTICAL
6	15720.76	55.28	74.00	-18.72	43.84	7.92	34.94	11.44	Peak	113	100	VERTICAL

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n MCS0 HT40 CH 38 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.91	57.24	74.00	-16.76	54.82	4.23	34.64	2.42	Peak	232	103	HORIZONTAL
2	4960.01	52.36	54.00	-1.64	49.94	4.23	34.64	2.42	Average	232	103	HORIZONTAL
3	5439.98	53.49	54.00	-0.51	49.99	4.53	34.62	3.50	Average	225	113	HORIZONTAL
4	5440.00	62.45	74.00	-11.55	58.95	4.53	34.62	3.50	Peak	225	113	HORIZONTAL
5	15570.21	42.23	54.00	-11.77	30.69	7.86	34.81	11.54	Average	137	100	HORIZONTAL
6	15570.66	54.65	74.00	-19.35	43.11	7.86	34.81	11.54	Peak	137	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.91	52.97	74.00	-21.03	50.55	4.23	34.64	2.42	Peak	215	100	VERTICAL
2	4960.02	46.64	54.00	-7.36	44.22	4.23	34.64	2.42	Average	215	100	VERTICAL
3	5440.02	57.95	74.00	-16.05	54.45	4.53	34.62	3.50	Peak	217	100	VERTICAL
4	5440.05	50.33	54.00	-3.67	46.83	4.53	34.62	3.50	Average	217	100	VERTICAL
5	15570.33	54.62	74.00	-19.38	43.08	7.86	34.81	11.54	Peak	101	100	VERTICAL
6	15570.96	42.10	54.00	-11.90	30.56	7.86	34.81	11.54	Average	101	100	VERTICAL

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n MCS0 HT40 CH 46 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.99	51.61	54.00	-2.39	49.19	4.23	34.64	2.42	Average	231	103	HORIZONTAL
2	4960.00	58.21	74.00	-15.79	55.79	4.23	34.64	2.42	Peak	231	103	HORIZONTAL
3	5440.01	61.18	74.00	-12.82	57.68	4.53	34.62	3.50	Peak	219	168	HORIZONTAL
4	5440.06	52.03	54.00	-1.97	48.53	4.53	34.62	3.50	Average	219	168	HORIZONTAL
5	15689.96	54.94	74.00	-19.06	43.50	7.90	34.92	11.44	Peak	124	100	HORIZONTAL
6	15690.39	41.86	54.00	-12.14	30.42	7.90	34.92	11.44	Average	124	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.81	52.70	74.00	-21.30	50.28	4.23	34.64	2.42	Peak	215	100	VERTICAL
2	4959.98	45.91	54.00	-8.09	43.49	4.23	34.64	2.42	Average	215	100	VERTICAL
3	5439.98	47.66	54.00	-6.34	44.16	4.53	34.62	3.50	Average	213	100	VERTICAL
4	5440.06	57.54	74.00	-16.46	54.04	4.53	34.62	3.50	Peak	213	100	VERTICAL
5	15690.02	42.35	54.00	-11.65	30.91	7.90	34.92	11.44	Average	138	100	VERTICAL
6	15690.54	54.94	74.00	-19.06	43.50	7.90	34.92	11.44	Peak	138	100	VERTICAL

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11a CH 36 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.95	57.79	74.00	-16.21	55.37	4.23	34.64	2.42	Peak	232	100	HORIZONTAL
2	4960.00	52.16	54.00	-1.84	49.74	4.23	34.64	2.42	Average	232	100	HORIZONTAL
3	5439.99	53.46	54.00	-0.54	49.96	4.53	34.62	3.50	Average	218	169	HORIZONTAL
4	5440.01	61.40	74.00	-12.60	57.90	4.53	34.62	3.50	Peak	218	169	HORIZONTAL
5	15536.00	57.75	74.00	-16.25	46.20	7.85	34.79	11.55	Peak	173	100	HORIZONTAL
6	15543.64	43.44	54.00	-10.56	31.88	7.86	34.79	11.56	Average	173	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.81	51.93	74.00	-22.07	49.51	4.23	34.64	2.42	Peak	215	100	VERTICAL
2	4959.98	45.50	54.00	-8.50	43.08	4.23	34.64	2.42	Average	215	100	VERTICAL
3	5439.97	47.29	54.00	-6.71	43.79	4.53	34.62	3.50	Average	217	100	VERTICAL
4	5440.05	57.16	74.00	-16.84	53.66	4.53	34.62	3.50	Peak	217	100	VERTICAL
5	15537.88	53.89	74.00	-20.11	42.34	7.85	34.79	11.55	Peak	170	100	VERTICAL
6	15543.48	42.08	54.00	-11.92	30.53	7.85	34.79	11.55	Average	170	100	VERTICAL

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11a CH 40 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4960.01	51.70	54.00	-2.30	49.28	4.23	34.64	2.42	Average	232	102	HORIZONTAL
2	4960.13	59.66	74.00	-14.34	57.24	4.23	34.64	2.42	Peak	232	103	HORIZONTAL
3	5439.96	61.70	74.00	-12.30	58.20	4.53	34.62	3.50	Peak	226	112	HORIZONTAL
4	5440.02	53.66	54.00	-0.34	50.16	4.53	34.62	3.50	Average	226	112	HORIZONTAL
5	15540.10	41.94	54.00	-12.06	30.39	7.85	34.79	11.55	Average	137	100	HORIZONTAL
6	15540.38	54.87	74.00	-19.13	43.32	7.85	34.79	11.55	Peak	137	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4960.02	44.87	54.00	-9.13	42.45	4.23	34.64	2.42	Average	215	100	VERTICAL
2	4960.05	51.58	74.00	-22.42	49.16	4.23	34.64	2.42	Peak	215	100	VERTICAL
3	5440.01	56.06	74.00	-17.94	52.56	4.53	34.62	3.50	Peak	216	100	VERTICAL
4	5440.02	46.94	54.00	-7.06	43.44	4.53	34.62	3.50	Average	216	100	VERTICAL
5	15539.93	54.35	74.00	-19.65	42.80	7.85	34.79	11.55	Peak	114	100	VERTICAL
6	15540.76	41.57	54.00	-12.43	30.02	7.85	34.79	11.55	Average	114	100	VERTICAL

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11a CH 48 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.95	57.35	74.00	-16.65	54.93	4.23	34.64	2.42	Peak	231	104	HORIZONTAL
2	4960.01	51.55	54.00	-2.45	49.13	4.23	34.64	2.42	Average	231	104	HORIZONTAL
3	5439.88	62.27	74.00	-11.73	58.77	4.53	34.62	3.50	Peak	216	160	HORIZONTAL
4	5440.00	52.90	54.00	-1.10	49.40	4.53	34.62	3.50	Average	216	160	HORIZONTAL
5	15720.19	38.12	54.00	-15.88	26.68	7.92	34.94	11.44	Average	271	103	HORIZONTAL
6	15720.25	51.21	74.00	-22.79	39.77	7.92	34.94	11.44	Peak	271	103	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4959.97	52.11	74.00	-21.89	49.69	4.23	34.64	2.42	Peak	216	100	VERTICAL
2	4960.00	44.99	54.00	-9.01	42.57	4.23	34.64	2.42	Average	216	100	VERTICAL
3	5440.00	57.43	74.00	-16.57	53.93	4.53	34.62	3.50	Peak	213	100	VERTICAL
4	5440.03	48.63	54.00	-5.37	45.13	4.53	34.62	3.50	Average	213	100	VERTICAL
5	15719.83	41.69	54.00	-12.31	30.25	7.92	34.94	11.44	Average	298	100	VERTICAL
6	15720.28	54.79	74.00	-19.21	43.35	7.92	34.94	11.44	Peak	298	100	VERTICAL

Note:

The amplitude of spurious emissions that 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.

4.3. Band Edge Emissions Measurement

4.3.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 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

4.3.2. 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 Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for Peak

4.3.3. Test Procedures

The test procedure is the same as section 4.2.3, only the frequency range investigated is limited to 100MHz around bandedges.

4.3.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.2.4.

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 Band Edge and Fundamental Emissions

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n MCS0 HT20 CH 36, 40, 48 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5149.40	57.03	74.00	-16.97	19.55	4.34	0.00	37.48	Peak	219	100	HORIZONTAL
2	5150.00	43.92	54.00	-10.08	6.44	4.34	0.00	37.48	Average	219	100	HORIZONTAL
3	5178.40	112.08			74.53	4.36	0.00	37.55	Peak	219	100	HORIZONTAL
4	5179.00	100.63			63.08	4.36	0.00	37.55	Average	219	100	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5148.00	56.08	74.00	-17.92	18.60	4.34	0.00	37.48	Peak	110	100	HORIZONTAL
2	5148.80	43.61	54.00	-10.39	6.13	4.34	0.00	37.48	Average	110	100	HORIZONTAL
3	5194.40	100.91			63.32	4.37	0.00	37.59	Average	110	100	HORIZONTAL
4	5195.20	112.39			74.80	4.37	0.00	37.59	Peak	110	100	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5147.60	55.96	74.00	-18.04	18.48	4.34	0.00	37.48	Peak	113	100	HORIZONTAL
2	5150.00	43.56	54.00	-10.44	6.08	4.34	0.00	37.48	Average	113	100	HORIZONTAL
3	5234.60	112.13			74.47	4.39	0.00	37.66	Peak	113	100	HORIZONTAL
4	5234.60	100.87			63.21	4.39	0.00	37.66	Average	113	100	HORIZONTAL
5	5354.20	57.51	74.00	-16.49	19.58	4.47	0.00	37.93	Peak	113	100	HORIZONTAL
6	5360.80	46.83	54.00	-7.17	8.86	4.48	0.00	37.97	Average	113	100	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n MCS0 HT40 CH 38, 46 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5120.00	55.82	74.00	-18.18	18.41	4.32	0.00	37.41	Peak	242	174	HORIZONTAL
2	5120.00	47.20	54.00	-6.80	9.79	4.32	0.00	37.41	Average	242	174	HORIZONTAL
3	5143.20	59.04	74.00	-14.96	21.56	4.34	0.00	37.48	Peak	242	174	HORIZONTAL
4	5143.60	44.17	54.00	-9.83	6.69	4.34	0.00	37.48	Average	242	174	HORIZONTAL
5	5200.00	98.47			60.88	4.37	0.00	37.59	Average	242	174	HORIZONTAL
6	5200.80	108.15			70.56	4.37	0.00	37.59	Peak	242	174	HORIZONTAL

Item 5, 6 are the fundamental frequency at 5190 MHz.

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5146.40	56.13	74.00	-17.87	18.65	4.34	0.00	37.48	Peak	218	100	HORIZONTAL
2	5149.60	43.86	54.00	-10.14	6.38	4.34	0.00	37.48	Average	218	100	HORIZONTAL
3	5218.80	97.72			60.09	4.38	0.00	37.63	Average	218	100	HORIZONTAL
4	5224.40	109.78			72.15	4.38	0.00	37.63	Peak	218	100	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5230 MHz.

Temperature	24°C	Humidity	53%
Test Engineer	Nick Peng	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 4 + Chain 5 + Chain 6
Test Date	Feb. 10, 2014		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5148.00	55.99	74.00	-18.01	18.51	4.34	0.00	37.48	Peak	218	100	HORIZONTAL
2	5150.00	43.87	54.00	-10.13	6.39	4.34	0.00	37.48	Average	218	100	HORIZONTAL
3	5182.60	102.79			65.24	4.36	0.00	37.55	Average	218	100	HORIZONTAL
4	5182.80	114.95			77.40	4.36	0.00	37.55	Peak	218	100	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5119.60	46.46	54.00	-7.54	9.05	4.32	0.00	37.41	Average	218	100	HORIZONTAL
2	5120.00	55.95	74.00	-18.05	18.54	4.32	0.00	37.41	Peak	218	100	HORIZONTAL
3	5148.80	56.53	74.00	-17.47	19.05	4.34	0.00	37.48	Peak	218	100	HORIZONTAL
4	5150.00	43.55	54.00	-10.45	6.07	4.34	0.00	37.48	Average	218	100	HORIZONTAL
5	5202.00	101.23			63.64	4.37	0.00	37.59	Average	218	100	HORIZONTAL
6	5202.80	112.27			74.68	4.37	0.00	37.59	Peak	218	100	HORIZONTAL

Item 5, 6 are the fundamental frequency at 5200 MHz.

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5148.20	56.89	74.00	-17.11	19.41	4.34	0.00	37.48	Peak	142	100	HORIZONTAL
2	5150.00	43.71	54.00	-10.29	6.23	4.34	0.00	37.48	Average	142	100	HORIZONTAL
3	5232.80	112.15			74.49	4.39	0.00	37.66	Peak	142	100	HORIZONTAL
4	5242.40	101.01			63.31	4.40	0.00	37.70	Average	142	100	HORIZONTAL
5	5353.00	58.27	74.00	-15.73	20.34	4.47	0.00	37.93	Peak	142	100	HORIZONTAL
6	5360.20	46.44	54.00	-7.56	8.51	4.47	0.00	37.93	Average	142	100	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Note:

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

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

4.4. Antenna Requirements

4.4.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.4.2. Antenna Connector Construction

Please refer to section 3.3 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
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Dec. 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Oct. 08, 2012	Conducted (TH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 28, 2012	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 27, 2012	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

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

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

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

6. MEASUREMENT UNCERTAINTY

Uncertainty of Radiated Emission Measurement (30MHz ~ 1,000MHz)

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.173	dB	K=1	0.086
Cable loss	±0.174	dB	K=2	0.087
Antenna gain	±0.169	dB	K=2	0.084
Site imperfection	±0.433	dB	Triangular	0.214
Pre-amplifier gain	±0.366	dB	K=2	0.183
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.778
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.555

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.191	dB	K=1	0.095
Cable loss	±0.169	dB	K=2	0.084
Antenna gain	±0.191	dB	K=2	0.096
Site imperfection	±0.582	dB	Triangular	0.291
Pre-amplifier gain	±0.304	dB	K=2	0.152
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.839
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.678

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.186	dB	K=1	0.093
Cable loss	±0.167	dB	K=2	0.083
Antenna gain	±0.190	dB	K=2	0.095
Site imperfection	±0.488	dB	Triangular	0.244
Pre-amplifier gain	±0.269	dB	K=2	0.134
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.771
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.541

Uncertainty of Conducted Emission Measurement

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Cable loss	±0.038	dB	K=2	0.019
Attenuator	±0.047	dB	K=2	0.024
Power Meter specification	±0.300	dB	Triangular	0.150
Power Sensor specification	±0.300	dB	Rectangular	0.150
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				0.863
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				1.726