FCC RF Test Report

APPLICANT	:	**Lenovo (Shanghai) Electronics Technology Co., Ltd.**
EQUIPMENT	:	**Portable Tablet Computer**
BRAND NAME	:	**lenovo**
MODEL NAME	:	**YOGA Tablet 2–851F**
FCC ID	:	**O57YT2851F**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on Nov. 24, 2014 and testing was completed on Dec. 22, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
2627

SPORTON INTERNATIONAL (KUNSHAN) INC.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4N2403D	Rev. 01	Initial issue of report	Jan. 07, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	RSS-210 A9.2	99% Bandwidth	-	Pass	-
3.2	15.407(a)	RSS-210 A9.2	Maximum Conducted Output Power	≤24 dBm	Pass	-
3.3	15.407(a)	RSS-210 A9.2	Power Spectral Density	≤11 dBm	Pass	-
3.4	15.407(b)	RSS-210 A9.3	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 5.12 dB at 4962.00 MHz
3.5	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 17.66 dB at 0.720 MHz
3.6	15.407(g)	-	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	RSS-210 A9.4	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	RSS-210 A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Lenovo (Shanghai) Electronics Technology Co., Ltd.
No. 68 Building, 199 Fenju Road, Wai Gao Qiao FTZ, Shanghai, China

1.2 Manufacturer

Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3 Factory

LENOVO MOBILE COMMUNICATION TECHNOLOGY CO LTD.
NO.999 QISHAN NORTH 2ND ROAD, INFORMATION & OPTOELECTRONICS PARK, TORCH HIGH TECH, XIAMEN FUJIAN 361009, CHINA

LENOVO MOBILE COMMUNICATION (WUHAN) CO LTD.
19 GAOXIN 4TH RD EAST LAKE HIGH-TECH, ZONE WUHAN HUBEI 430205, CHINA

1.4 Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	lenovo
Model Name	YOGA Tablet 2–851F
FCC ID	O57YT2851F
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n HT20/HT40 WLAN5G 802.11a/n HT20/HT40 Bluetooth v3.0+EDR Bluetooth v4.0 LE
HW Version	Lenovopad YOGA Tablet 2-851F
SW Version	Lenovo TAB2-W10-S100-001-140624-ES
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power	802.11a : 8.10 dBm / 0.0065 W 802.11n HT20 : 6.49 dBm / 0.0045 W 802.11n HT40 : 7.90 dBm / 0.0062 W
99% Occupied Bandwidth	802.11a : 17.10 MHz 802.11n HT20 : 18.05 MHz 802.11n HT40 : 36.90 MHz
Antenna Type	Chain Port 0 : IFA Antenna with gain 0.50 dBi Chain Port 1 : IFA Antenna with gain 0.00 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Function Description	

	Chain Port 0	Chain Port 1
802.11 a	V	V
802.11 n SISO	V	V
802.11 n MIMO	V	V

1.6 Modification of EUT

No modifications are made to the EUT during all test items.

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	**Sporton Site No.**			**FCC/IC Registration No.**
	TH01-KS	03CH01-KS	CO01-KS	149928/4086E-1

Note: The test site complies with ANSI C63.4 2009 + C63.10 2009 requirement.

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.4 2009 + C63.10 2009
- IC RSS-210 Issued 8
- IC RSS-Gen Issue 4
- NOTICE 2012-DRS0126

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. Per the section 2.2.3 of Notice of 2012-DRS0126, " Receivers Excluded from Industry Canada Requirements", only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Laptop/Z plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38	**5190**	**46**	**5230**
	40	5200	48	5240

Note: The above Frequency and Channel in boldface were 802.11n HT40.

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

5GHz 802.11a Average Power (dBm)										
Data Rate (MHz)	CH	6Mbps	CH	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Chain Port 0	36	**8.10**	36	7.95	7.96	7.92	8.03	8.01	8.06	8.03
	44	7.85								
	48	7.75								
Chain Port 1	36	7.22	48	7.37	7.35	7.32	7.26	7.38	7.41	7.28
	44	7.19								
	48	**7.43**								

5GHz 802.11n HT20 Average Power (dBm)										
Data Rate (MHz)	CH	MCS0	CH	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Chain Port 0	36	**6.49**	36	6.21	6.32	6.28	6.26	6.43	6.44	6.45
	44	6.02								
	48	6.17								
Chain Port 1	36	**5.72**	36	5.34	5.29	5.42	5.57	5.69	5.70	5.67
	44	5.22								
	48	5.36								
Chain Port 0+1(0)	36	2.45	44	2.89	2.82	2.83	2.78	2.80	2.73	2.73
	44	**2.93**								
	48	2.39								
Chain Port 0+1(1)	36	**1.65**	36	1.63	1.36	1.65	1.59	1.45	1.56	1.30
	44	1.32								
	48	0.60								
Chain Port 0+1	36	5.08	44	5.32	5.21	5.25	5.22	5.20	5.10	4.98
	44	**5.21**								
	48	4.60								

5GHz 802.11n HT40 Average Power (dBm)										
Data Rate (MHz)	CH	MCS0	CH	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Chain Port 0	38	**5.73**	38	5.56	5.34	5.25	5.30	5.14	5.19	5.13
	46	5.57								
Chain Port 1	38	4.40	46	4.40	4.23	4.32	4.31	4.29	4.25	4.17
	46	**4.50**								
Chain Port 0+1(0)	38	**5.33**	38	5.13	5.16	5.11	4.89	5.01	5.02	5.13
	46	4.93								
Chain Port 0+1(1)	38	**4.39**	38	4.37	3.97	4.17	4.21	3.98	3.98	4.04
	46	4.30								
Chain Port 0+1	38	**7.90**	38	7.78	7.62	7.68	7.57	7.54	7.54	7.63
	46	7.64								

Note: Chain Port 0+1 is a calculated result from sum of the power Chain Port 0+1(0) and Chain Port 0+1(1).

2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	Mode	Data rate	Test Channel
Conducted TCs	99% BW Power Spectral Density	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0	L/M/H
		802.11n HT40	MCS0	L/H
	20dB Occupied Bandwidth	802.11a	6 Mbps	H
		802.11n HT20	MCS0	H
		802.11n HT40	MCS0	H
	Output Power	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0	L/M/H
		802.11n HT40	MCS0	L/H
	Frequency Stability	802.11a	6 Mbps	L
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	L/H
		802.11n HT20	MCS0	L/H
		802.11n HT40	MCS0	L/H
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0	L/M/H
		802.11n HT40	MCS0	L/H
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (5G) Link + USB Cable (Charging from Adapter) + Earphone + Battery			

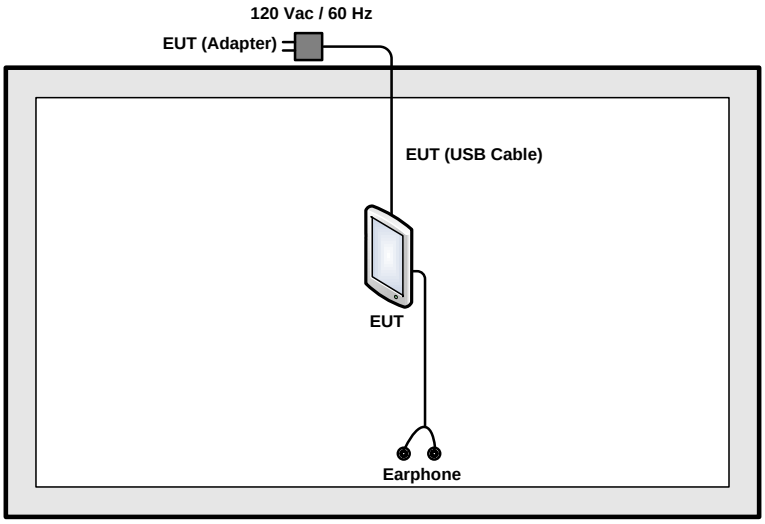
Remark:

1. For Radiated Test Cases, all the test modes were performed with Adapter, Battery, Earphone and USB Cable.

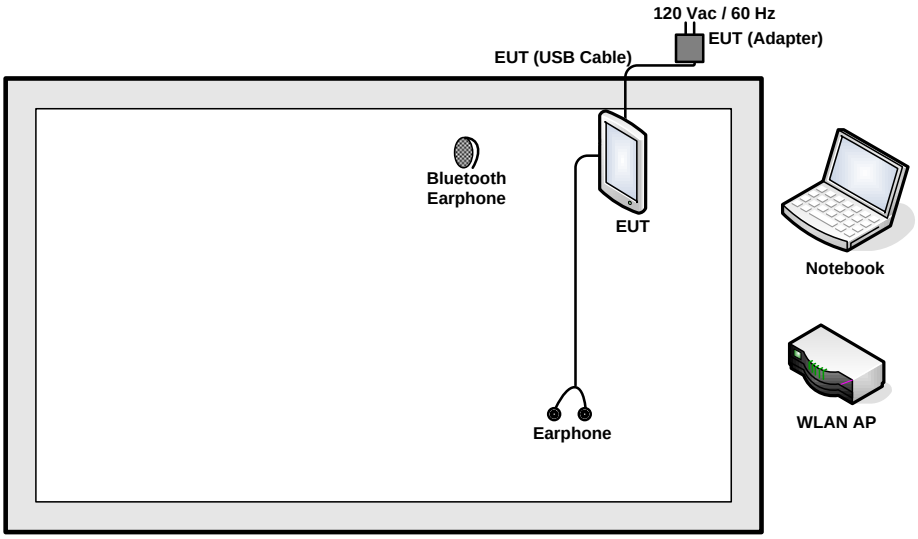
Ch. #		Band I：5150-5250 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	36	36	38
M	Middle	44	44	-
H	High	48	48	46

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH505	N/A	N/A	N/A
5.	Earphone	Lenovo	SH100	N/A	Unshielded, 1.2 m	N/A

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 7.3 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 7.3 + 10 = 17.3 (dB)

3 Test Result

3.1 99% Occupied Bandwidth Measurement

3.1.1 Description of 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

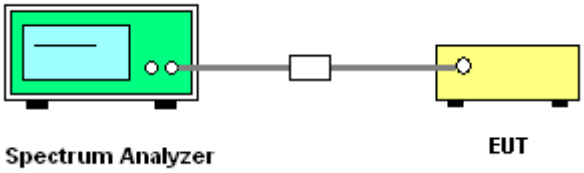
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
7. Measure and record the results in the test report.

3.1.4 Test Setup

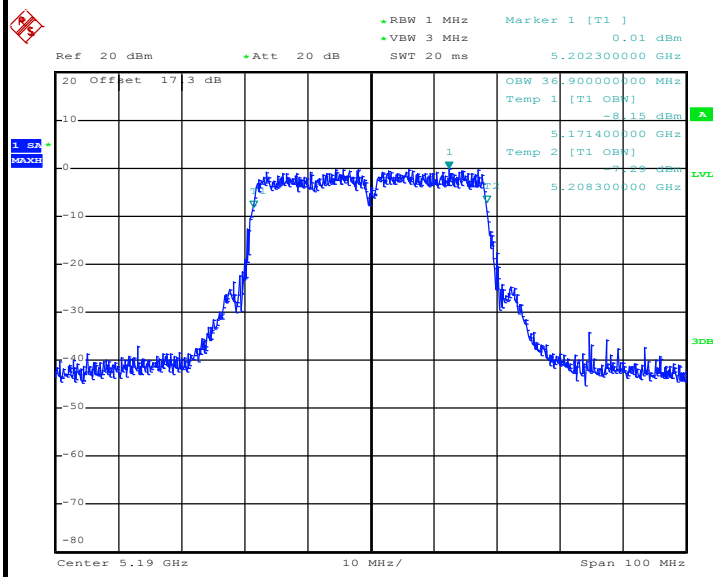


3.1.5 Test Result of 99% Occupied Bandwidth

Test Band :	5GHz band 1	Temperature :	24~25℃
Test Engineer :	Issac Song	Relative Humidity :	49~51%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	99% Bandwidth (MHz)		IC 99% Bandwidth EIRP Limit (dBm)	
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1
11a	6Mbps	1	36	5180	17.00	-	22.30	-
11a	6Mbps	1	44	5220	17.05	-	22.32	-
11a	6Mbps	1	48	5240	17.10	-	22.33	-
HT20	MCS0	1	36	5180	18.05	-	22.56	-
HT20	MCS0	1	44	5220	17.95	-	22.54	-
HT20	MCS0	1	48	5240	17.90	-	22.53	-
HT40	MCS0	1	38	5190	36.70	-	23.01	-
HT40	MCS0	1	46	5230	36.70	-	23.01	-
HT20	MCS8	2	36	5180	17.95	17.95	22.54	
HT20	MCS8	2	44	5220	18.00	18.00	22.55	
HT20	MCS8	2	48	5240	17.90	17.85	22.52	
HT40	MCS8	2	38	5190	36.90	36.70	23.01	
HT40	MCS8	2	46	5230	36.70	36.60	23.01	

Maximum 99% Occupied Bandwidth



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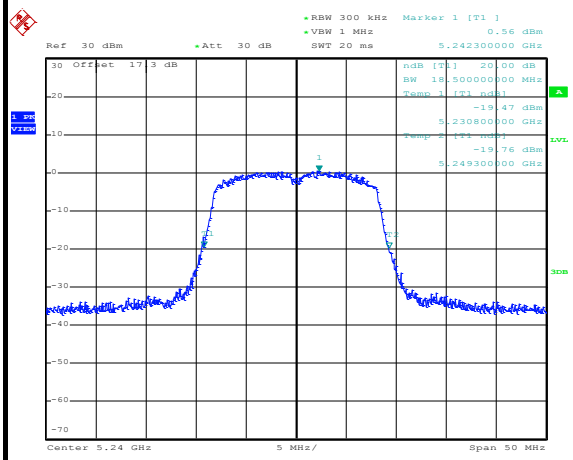
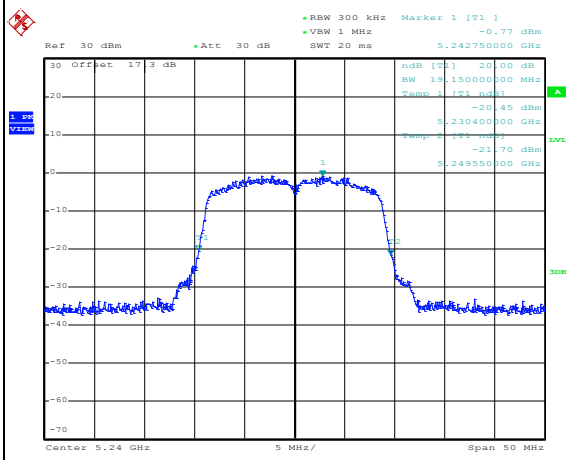
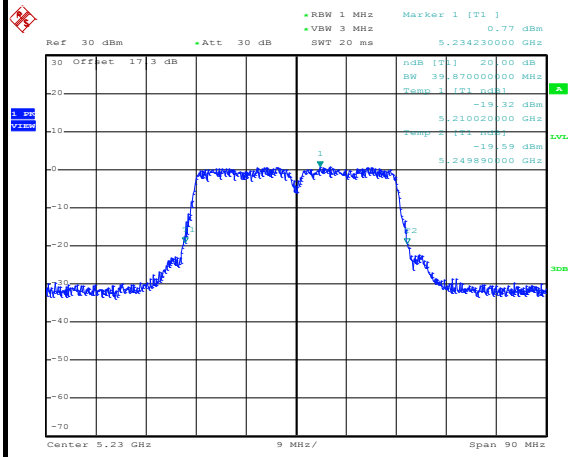
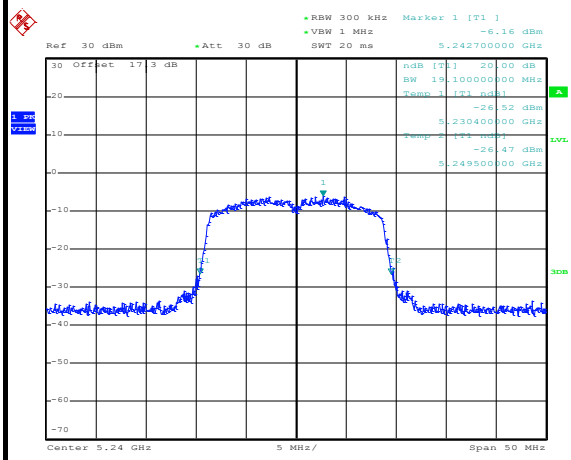
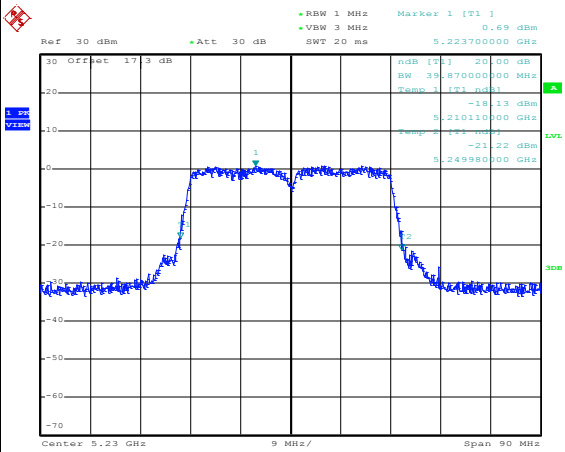
3.1.6 Test Result of 20dB Occupied Bandwidth

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	20dB Bandwidth (MHz)		20dB Bandwidth Upper Frequency (FH) (MHz)		Upper Limit Line (MHz)	Pass/Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1		
11a	6Mbps	1	48	5240	18.50	-	5249.30	-	5250	Pass
HT20	MCS0	1	48	5240	19.15	-	5249.55	-		Pass
HT40	MCS0	1	46	5230	39.87	-	5249.89	-		Pass
HT20	MCS8	2	48	5240	19.10	-	5249.50	-		Pass
HT40	MCS8	2	46	5230	39.87	-	5249.98	-		Pass

Number of TX = 1

20dB Occupied Bandwidth	
802.11a CH48 5240MHz for Chain 0	**802.11n HT20 CH48 5240MHz for Chain 0**
 Date: 28.NOV.2014 10:27:02	 Date: 28.NOV.2014 10:45:40
802.11n HT40 CH46 5230MHz for Chain 0	
 Date: 28.NOV.2014 11:53:45	

Number of TX = 2

20dB Occupied Bandwidth	
802.11n HT20 CH48 5240MHz for Chain 0	**802.11n HT40 CH46 5230MHz for Chain 0**
	
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3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

<IC RSS-210 Annex 9>

For the 5.15–5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

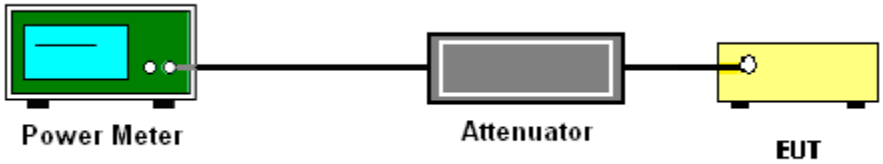
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Test Band :	5GHz band 1	Temperature :	24~25℃
Test Engineer :	Issac Song	Relative Humidity :	49~51%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Power Limit (dBm)		DG (dBi)		Pass /Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Sum Power	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	36	5180	0.18	0.20	8.10	7.22	-	24.00	24.00	0.50	0.00	Pass
11a	6Mbps	1	44	5220	0.18	0.20	7.85	7.19		24.00	24.00	0.50	0.00	Pass
11a	6Mbps	1	48	5240	0.18	0.20	7.75	7.43		24.00	24.00	0.50	0.00	Pass
HT20	MCS0	1	36	5180	0.22	0.20	6.49	5.72		24.00	24.00	0.50	0.00	Pass
HT20	MCS0	1	44	5220	0.22	0.20	6.02	5.22		24.00	24.00	0.50	0.00	Pass
HT20	MCS0	1	48	5240	0.22	0.20	6.17	5.36		24.00	24.00	0.50	0.00	Pass
HT40	MCS0	1	38	5190	0.22	0.24	5.73	4.40		24.00	24.00	0.50	0.00	Pass
HT40	MCS0	1	46	5230	0.22	0.24	5.57	4.50		24.00	24.00	0.50	0.00	Pass
HT20	MCS8	2	36	5180	0.41	0.41	2.45	1.65	5.08	24.00		3.26		Pass
HT20	MCS8	2	44	5220	0.41	0.41	2.93	1.32	5.21	24.00		3.26		Pass
HT20	MCS8	2	48	5240	0.41	0.41	2.39	0.60	4.60	24.00		3.26		Pass
HT40	MCS8	2	38	5190	0.45	0.41	5.33	4.39	7.90	24.00		3.26		Pass
HT40	MCS8	2	46	5230	0.45	0.41	5.16	4.30	7.76	24.00		3.26		Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. Sum Power is a calculated result from sum of the Chain Port 0 and Chain Port 1.

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			IC Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)		Pass /Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Sum Power	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	36	5180	0.18	0.20	8.10	7.22	-	22.30	-	0.50	0.00	22.30	-	Pass
11a	6Mbps	1	44	5220	0.18	0.20	7.85	7.19		22.32	-	0.50	0.00	22.32	-	Pass
11a	6Mbps	1	48	5240	0.18	0.20	7.75	7.43		22.33	-	0.50	0.00	22.33	-	Pass
HT20	MCS0	1	36	5180	0.22	0.20	6.49	5.72		22.56	-	0.50	0.00	22.56	-	Pass
HT20	MCS0	1	44	5220	0.22	0.20	6.02	5.22		22.54	-	0.50	0.00	22.54	-	Pass
HT20	MCS0	1	48	5240	0.22	0.20	6.17	5.36		22.53	-	0.50	0.00	22.53	-	Pass
HT40	MCS0	1	38	5190	0.22	0.24	5.73	4.40		23.01	-	0.50	0.00	23.01	-	Pass
HT40	MCS0	1	46	5230	0.22	0.24	5.57	4.50		23.01	-	0.50	0.00	23.01	-	Pass
HT20	MCS8	2	36	5180	0.41	0.41	2.45	1.65	5.08	19.28		3.26		22.54		Pass
HT20	MCS8	2	44	5220	0.41	0.41	2.93	1.32	5.21	19.29		3.26		22.55		Pass
HT20	MCS8	2	48	5240	0.41	0.41	2.39	0.60	4.60	19.25		3.26		22.52		Pass
HT40	MCS8	2	38	5190	0.45	0.41	5.33	4.39	7.90	19.75		3.26		23.01		Pass
HT40	MCS8	2	46	5230	0.45	0.41	5.16	4.30	7.76	19.75		3.26		23.01		Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. Sum Power is a calculated result from sum of the power Chain Port 0 and Chain Port 1.
3. For the band 5150-5250 MHz, the maximum average EIRP output power shall not exceed lesser of 200 mW (23dBm) or 10 dBm + 10log (B), where B is 99%OBW for IC.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

<IC RSS-210 Annex 9>

For the 5.15–5.25 GHz band, the e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
Section F) Maximum power spectral density.

 # Method SA-2 #

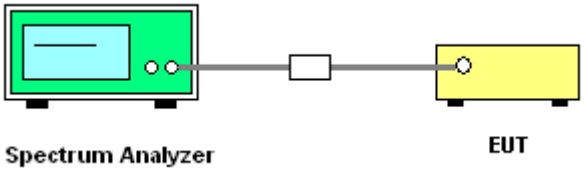
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - Sweep time = auto.
   - Detector = RMS
   - Trace average at least 100 traces in power averaging mode.
   - Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (1): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

3.3.4 Test Setup



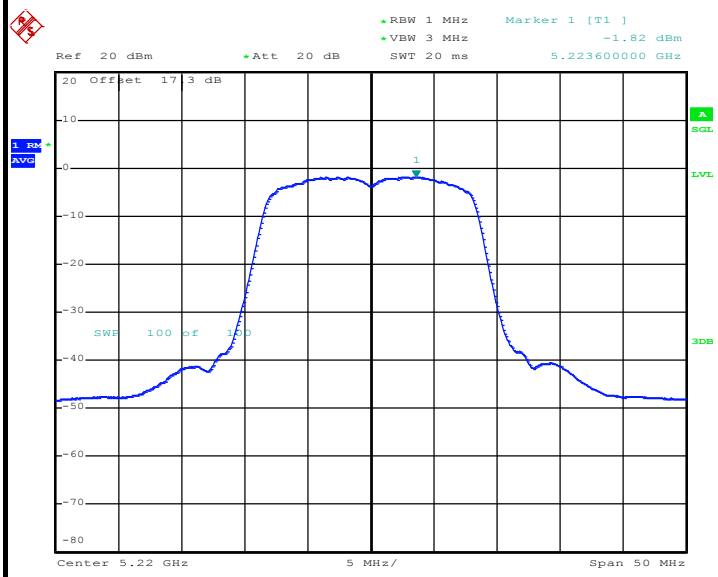
3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band 1	Temperature :	24~25℃
Test Engineer :	Issac Song	Relative Humidity :	49~51%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm)		DG (dBi)		Pass /Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Sum Power	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	36	5180	0.18	0.20	-1.92	-	-	11.00	11.00	0.50	0.00	Pass
11a	6Mbps	1	44	5220	0.18	0.20	-1.64	-		11.00	11.00	0.50	0.00	Pass
11a	6Mbps	1	48	5240	0.18	0.20	-1.65	-		11.00	11.00	0.50	0.00	Pass
HT20	MCS0	1	36	5180	0.22	0.20	-3.16	-		11.00	11.00	0.50	0.00	Pass
HT20	MCS0	1	44	5220	0.22	0.20	-3.17	-		11.00	11.00	0.50	0.00	Pass
HT20	MCS0	1	48	5240	0.22	0.20	-3.21	-		11.00	11.00	0.50	0.00	Pass
HT40	MCS0	1	38	5190	0.22	0.24	-7.37	-		11.00	11.00	0.50	0.00	Pass
HT40	MCS0	1	46	5230	0.22	0.24	-7.56	-		11.00	11.00	0.50	0.00	Pass
HT20	MCS8	2	36	5180	0.41	0.41	-		-7.91	11.00		3.26		Pass
HT20	MCS8	2	44	5220	0.41	0.41			-7.43	11.00		3.26		Pass
HT20	MCS8	2	48	5240	0.41	0.41			-7.43	11.00		3.26		Pass
HT40	MCS8	2	38	5190	0.45	0.41			-6.80	11.00		3.26		Pass
HT40	MCS8	2	46	5230	0.45	0.41			-6.54	11.00		3.26		Pass

Note: Sum PSD is a bin-by-bin combined result of Chain Port 0 and Chain Port 1.

Worst Case Power Density (dBm/MHz)



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3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

(2) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

Frequency (MHz)	Field Strength (microvolts/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

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

(3) KDB789033 v01 G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
0	802.11a	95.833	2.070	0.483	1kHz
1	802.11a	95.833	2.070	0.483	1kHz
0+1	802.11n HT20	90.976	0.988	1.012	3kHz
0+1	802.11n HT40	90.128	0.986	1.014	3kHz

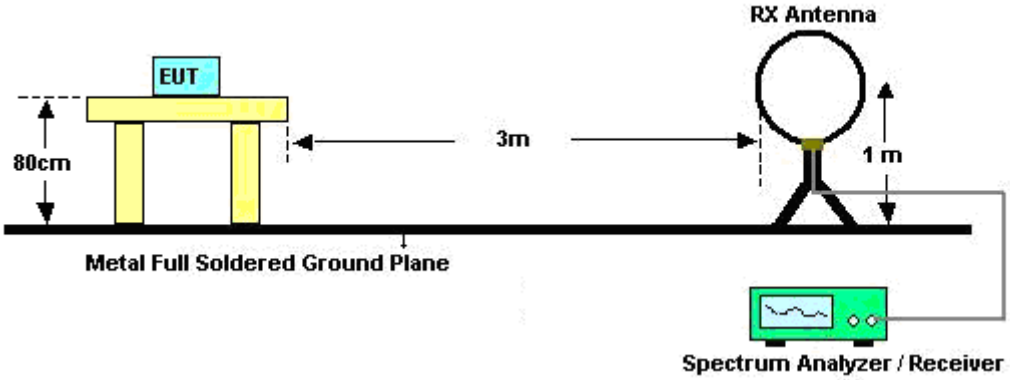
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the

limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.

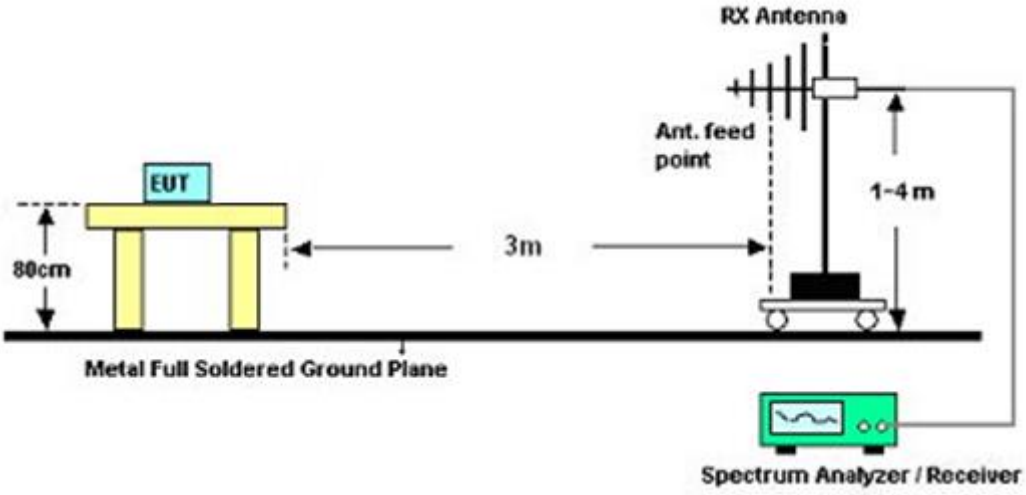
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

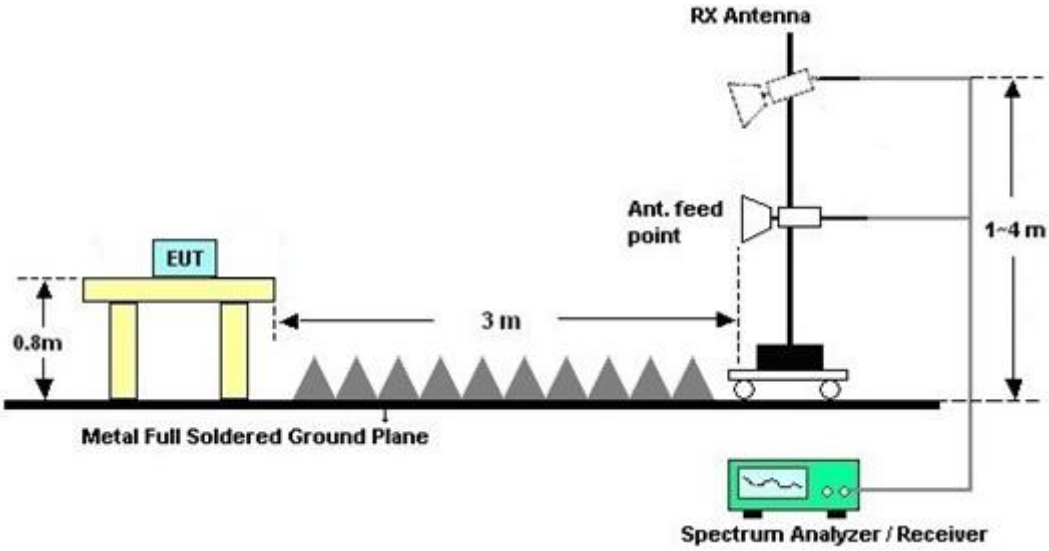
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.4.6 Test Result of Radiated Band Edges

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5149.9	55.51	-18.49	74	49.32	35.04	9.01	37.86	137	120	Peak
5149.05	43.14	-10.86	54	36.95	35.04	9.01	37.86	137	120	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5149.4	56.75	-17.25	74	50.56	35.04	9.01	37.86	100	319	Peak
5149.15	43.65	-10.35	54	37.46	35.04	9.01	37.86	100	319	Average

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5351.6	54.66	-19.34	74	49.4	35.11	9.23	39.08	100	139	Peak
5354.8	41.68	-12.32	54	36.42	35.11	9.23	39.08	100	139	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5363.45	54.34	-19.66	74	49.16	35.11	9.27	39.2	148	256	Peak
5355.95	42.2	-11.8	54	36.94	35.11	9.23	39.08	148	256	Average

Test Mode :	802.11a – Chain Port 1	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5101.25	56.31	-17.69	74	49.98	35.03	8.97	37.67	131	291	Peak
5143.75	43.65	-10.35	54	37.46	35.04	9.01	37.86	131	291	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5103.8	56.21	-17.79	74	49.88	35.03	8.97	37.67	127	87	Peak
5148.75	43.63	-10.37	54	37.44	35.04	9.01	37.86	127	86	Average

Test Mode :	802.11a – Chain Port 1	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5391.05	53.93	-20.07	74	48.85	35.12	9.27	39.31	149	117	Peak
5356.75	41.69	-12.31	54	36.43	35.11	9.23	39.08	149	117	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5380.35	53.93	-20.07	74	48.85	35.12	9.27	39.31	100	341	Peak
5367.45	41.94	-12.06	54	36.76	35.11	9.27	39.2	100	341	Average

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5107.4	54.65	-19.35	74	48.38	35.03	8.97	37.73	142	212	Peak
5148	43	-11	54	36.81	35.04	9.01	37.86	124	212	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5103.85	56.74	-17.26	74	50.41	35.03	8.97	37.67	100	354	Peak
5103.5	44.44	-9.56	54	38.11	35.03	8.97	37.67	100	354	Average

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5367.95	54.99	-19.01	74	49.81	35.11	9.27	39.2	100	128	Peak
5358.4	42.36	-11.64	54	37.1	35.11	9.23	39.08	100	128	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5366.65	55.72	-18.28	74	50.54	35.11	9.27	39.2	134	23	Peak
5363.85	42.84	-11.16	54	37.66	35.11	9.27	39.2	134	23	Average

Test Mode :	802.11n HT40 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	38	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5147.5	55.92	-18.08	74	49.73	35.04	9.01	37.86	100	141	Peak
5149.95	43.65	-10.35	54	37.46	35.04	9.01	37.86	100	141	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5148.8	60.67	-13.33	74	54.48	35.04	9.01	37.86	100	0	Peak
5149.95	44.52	-9.48	54	38.33	35.04	9.01	37.86	100	0	Average

Test Mode :	802.11n HT40 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	46	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5364.75	54.17	-19.83	74	48.99	35.11	9.27	39.2	105	113	Peak
5356.8	42.23	-11.77	54	36.97	35.11	9.23	39.08	105	113	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5357.8	55.66	-18.34	74	50.4	35.11	9.23	39.08	100	331	Peak
5367.45	42.59	-11.41	54	37.41	35.11	9.27	39.2	100	331	Average

3.4.7 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5180	100.96	-	-	94.85	35.05	9.06	38	137	120	Peak
5180	89.16	-	-	83.05	35.05	9.06	38	137	120	Average
10359	31.83	-42.17	74	53.99	1.46	13.15	36.77	105	246	Peak

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5180	102.73	-	-	96.62	35.05	9.06	38	100	319	Peak
5180	90.61	-	-	84.5	35.05	9.06	38	100	319	Average
10359	32.9	-41.1	74	55.06	1.46	13.15	36.77	104	234	Peak

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	44	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5220	100.24	-	-	94.26	35.06	9.1	38.18	169	345	Peak
5220	87.52	-	-	81.54	35.06	9.1	38.18	169	345	Average
10440	32.35	-41.65	74	54.46	1.53	13.18	36.82	112	156	Peak

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	44	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5220	103.49	-	-	97.51	35.06	9.1	38.18	100	298	Peak
5220	91.23	-	-	85.25	35.06	9.1	38.18	100	298	Average
10440	33.92	-40.08	74	56.03	1.53	13.18	36.82	156	235	Peak

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5240	97.71	-	-	91.83	35.07	9.1	38.29	100	139	Peak
5240	85.12	-	-	79.24	35.07	9.1	38.29	100	139	Average
10479	32.45	-41.55	74	54.6	1.56	13.2	36.91	105	215	Peak

Test Mode :	802.11a – Chain Port 0	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5240	104	-	-	98.12	35.07	9.1	38.29	148	256	Peak
5240	91.65	-	-	85.77	35.07	9.1	38.29	148	256	Average
10479	31.9	-42.1	74	54.05	1.56	13.2	36.91	146	289	Peak

Test Mode :	802.11a – Chain Port 1	**Temperature :**	22~23°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Star Wei	**Polarization :**	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5180	101.99	-	-	95.88	35.05	9.06	38	131	291	Peak
5180	89.08	-	-	82.97	35.05	9.06	38	131	291	Average
10360	31.95	-42.05	74	54.11	1.46	13.15	36.77	108	145	Peak

Test Mode :	802.11a – Chain Port 1	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5180	101.19	-	-	95.08	35.05	9.06	38	127	87	Peak
5180	89.95	-	-	83.84	35.05	9.06	38	127	87	Average
10359	30.66	-43.34	74	52.82	1.46	13.15	36.77	107	245	Peak

Test Mode :	802.11a – Chain Port 1	**Temperature :**	20~21°C
Test Channel :	44	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5220	97.61	-	-	91.63	35.06	9.1	38.18	100	143	Peak
5220	85.5	-	-	79.52	35.06	9.1	38.18	100	143	Average
10440	32.4	-41.6	74	54.51	1.53	13.18	36.82	105	256	Peak

Test Mode :	802.11a – Chain Port 1	**Temperature :**	20~21°C
Test Channel :	44	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5220	103.53	-	-	97.55	35.06	9.1	38.18	146	294	Peak
5220	90.79	-	-	84.81	35.06	9.1	38.18	146	294	Average
10440	31.87	-42.13	74	53.98	1.53	13.18	36.82	104	235	Peak

Test Mode :	802.11a – Chain Port 1	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5240	96.7	-	-	90.82	35.07	9.1	38.29	149	117	Peak
5240	84.91	-	-	79.03	35.07	9.1	38.29	149	117	Average
10479	31.21	-42.79	74	53.36	1.56	13.2	36.91	106	63	Peak

Test Mode :	802.11a – Chain Port 1	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5240	102.17	-	-	96.29	35.07	9.1	38.29	100	341	Peak
5240	90.14	-	-	84.26	35.07	9.1	38.29	100	341	Average
10479	31.91	-42.09	74	54.06	1.56	13.2	36.91	103	45	Peak

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 5614/10360 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5180	97.71	-	-	91.6	35.05	9.06	38	142	121	Peak
5180	85.57	-	-	79.46	35.05	9.06	38	142	121	Average
5614	60.07	-13.93	74	53.71	35.19	9.51	38.34	109	299	Peak
5614	48.07	-5.93	54	41.71	35.19	9.51	38.34	109	299	Average
10360	31	-43	74	53.16	1.46	13.15	36.77	103	54	Peak

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 5614/10359 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
4754	61.02	-12.98	74	53.81	34.85	8.68	36.32	128	170	Peak
4754	48.38	-5.62	54	41.17	34.85	8.68	36.32	128	170	Average
4962	63.29	-10.71	74	56.66	34.97	8.81	37.15	100	160	Peak
4962	48.88	-5.12	54	42.25	34.97	8.81	37.15	100	160	Average
5180	104.56	-	-	98.45	35.05	9.06	38	100	354	Peak
5180	92.29	-	-	86.18	35.05	9.06	38	100	354	Average
5398	61.63	-12.37	74	56.66	35.12	9.27	39.42	116	342	Peak
5398	46.84	-7.16	54	41.87	35.12	9.27	39.42	116	342	Average
5614	65.38	-8.62	74	59.02	35.19	9.51	38.34	100	36	Peak
10359	31.25	-42.75	74	53.41	1.46	13.15	36.77	108	64	Peak

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	44	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 5658/10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	26.78	-13.22	40	39.45	19.2	0.79	32.66	-	-	Peak
52.31	30.24	-9.76	40	53.88	8.18	0.79	32.61	105	265	Peak
72.68	28.96	-11.04	40	52.12	8.45	1.04	32.65	-	-	Peak
93.05	28.83	-14.67	43.5	49.86	10.53	1.04	32.6	-	-	Peak
194.9	29.25	-14.25	43.5	50.12	9.99	1.61	32.47	-	-	Peak
287.05	29.45	-16.55	46	47.21	12.77	1.9	32.43	-	-	Peak
5220	101.49	-	-	95.51	35.06	9.1	38.18	100	116	Peak
5220	87.72	-	-	81.74	35.06	9.1	38.18	100	116	Average
5440	54.05	-19.95	74	48.79	35.14	9.36	39.24	124	301	Peak
5440	48.45	-5.55	54	43.19	35.14	9.36	39.24	124	301	Average
5658	56.7	-17.3	74	50.4	35.22	9.55	38.47	118	218	Peak
10440	32.67	-41.33	74	54.78	1.53	13.18	36.82	100	219	Peak

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	44	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 5658/10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	34.83	-5.17	40	47.5	19.2	0.79	32.66	100	319	QP
56.19	33.68	-6.32	40	58.35	7.14	0.79	32.6	-	-	Peak
93.05	34.19	-9.31	43.5	55.22	10.53	1.04	32.6	-	-	Peak
125.06	33.48	-10.02	43.5	53.37	11.5	1.23	32.62	-	-	Peak
139.61	31.16	-12.34	43.5	50.87	11.62	1.23	32.56	-	-	Peak
481.05	32.28	-13.72	46	44.76	17.18	2.51	32.17	-	-	Peak
4784	60.59	-13.41	74	53.51	34.87	8.71	36.5	132	169	Peak
4784	48.19	-5.81	54	41.11	34.87	8.71	36.5	132	169	Average
5004	65.73	-8.27	74	59.23	35	8.84	37.34	118	19	Peak
5004	51.76	-2.24	54	45.26	35	8.84	37.34	118	19	Average
5220	104.32	-	-	98.34	35.06	9.1	38.18	143	208	Peak
5220	91.7	-	-	85.72	35.06	9.1	38.18	143	208	Average
5658	63.8	-10.2	74	57.5	35.22	9.55	38.47	100	91	Peak
10440	32.05	-41.95	74	54.16	1.53	13.18	36.82	147	59	Peak

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 5680/10479 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5240	98.99	-	-	93.11	35.07	9.1	38.29	100	128	Peak
5240	86.67	-	-	80.79	35.07	9.1	38.29	100	128	Average
5456	62.62	-11.38	74	57.27	35.14	9.36	39.15	100	293	Peak
5456	48.02	-5.98	54	42.67	35.14	9.36	39.15	100	293	Average
5680	61.51	-12.49	74	55.2	35.23	9.59	38.51	100	248	Peak
10479	30.98	-43.02	74	53.13	1.56	13.2	36.91	185	231	Peak

Test Mode :	802.11n HT20 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	48	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 5680 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
4808	61.12	-12.88	74	54.12	34.88	8.71	36.59	152	157	Peak
4808	48.6	-5.4	54	41.6	34.88	8.71	36.59	152	157	Average
5020	68.14	-5.86	74	61.6	35	8.88	37.34	134	23	Peak
5240	104.58	-	-	98.7	35.07	9.1	38.29	127	323	Peak
5240	91.42	-	-	85.54	35.07	9.1	38.29	127	323	Average
5680	66.92	-7.08	74	60.61	35.23	9.59	38.51	125	247	Peak

Test Mode :	802.11n HT40 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	38	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5190	93.62	-	-	87.51	35.05	9.06	38	100	141	Peak
5190	81.93	-	-	75.82	35.05	9.06	38	100	141	Average
10380	32.39	-41.61	74	54.51	1.48	13.17	36.77	116	58	Peak

Test Mode :	802.11n HT40 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	38	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 5620/10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5190	100.55	-	-	94.44	35.05	9.06	38	100	0	Peak
5190	87.39	-	-	81.28	35.05	9.06	38	100	0	Average
5620	59.83	-14.17	74	53.51	35.19	9.51	38.38	114	82	Peak
10380	31.46	-42.54	74	53.58	1.48	13.17	36.77	145	267	Peak

Test Mode :	802.11n HT40 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	46	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Horizontal
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5230	94.34	-	-	88.46	35.07	9.1	38.29	105	113	Peak
5230	82.56	-	-	76.68	35.07	9.1	38.29	105	113	Average
10461	33.71	-40.29	74	55.84	1.55	13.2	36.88	100	59	Peak

Test Mode :	802.11n HT40 – Chain Port 0+1	**Temperature :**	20~21°C
Test Channel :	46	**Relative Humidity :**	42~43%
Test Engineer :	Niok Su	**Polarization :**	Vertical
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 5682/10461 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5230	99.65	-	-	93.77	35.07	9.1	38.29	100	331	Peak
5230	87.25	-	-	81.37	35.07	9.1	38.29	100	331	Average
5444	59.9	-14.1	74	54.64	35.14	9.36	39.24	100	33	Peak
5444	45.46	-8.54	54	40.2	35.14	9.36	39.24	100	33	Average
5682	58.69	-15.31	74	52.38	35.23	9.59	38.51	125	248	Peak
10461	33.02	-40.98	74	55.15	1.55	13.2	36.88	114	72	Peak

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

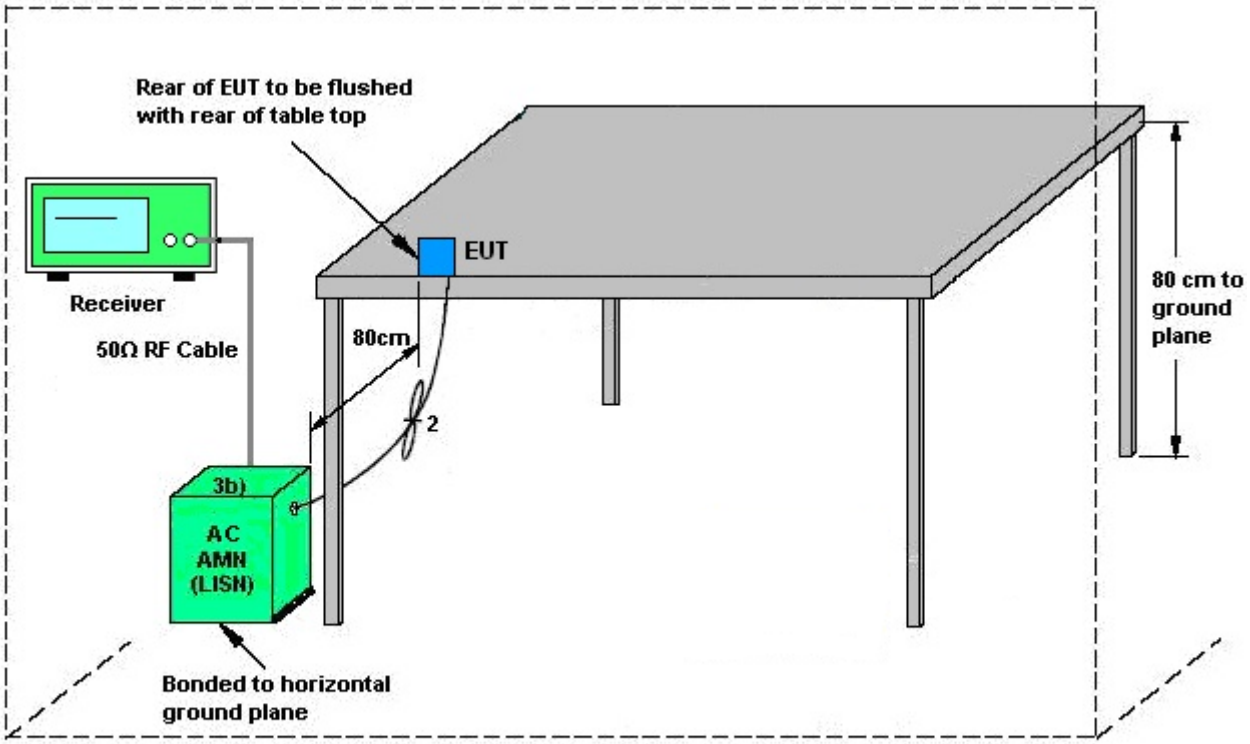
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

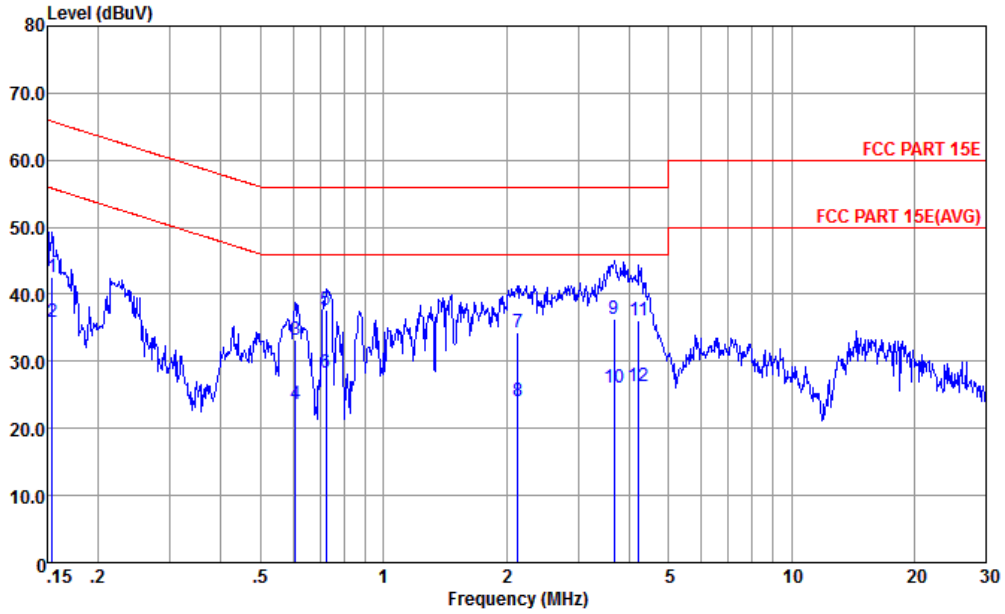
3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	**Temperature :**	22~24℃
Test Engineer :	Eligah Wang	**Relative Humidity :**	37~39%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5G) Link + USB Cable (Charging from Adapter) + Earphone + Battery		

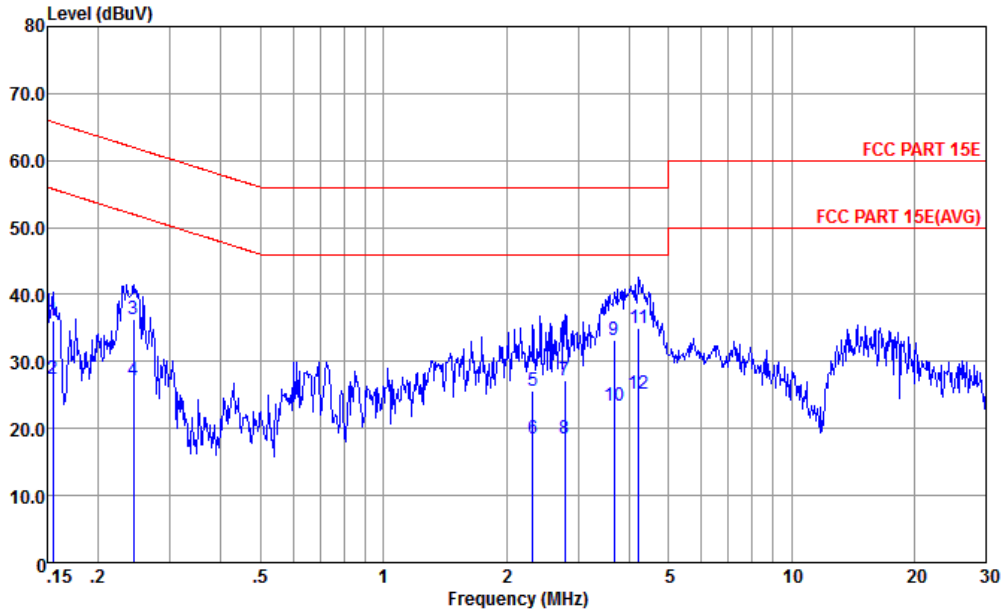


Site : CO01-KS
Condition : FCC PART 15E LISN-L20140306 LINE

mode : Mode 1

	Freq MHz	Level dBuV	Over Limit dB	Limit Line dBuV	Read Level dBuV	LISN Factor dB	Cable Loss dB	Remark
1	0.15	42.67	-23.11	65.78	30.40	1.89	10.38	QP
2	0.15	35.87	-19.91	55.78	23.60	1.89	10.38	Average
3	0.61	33.13	-22.87	56.00	22.30	0.20	10.63	QP
4	0.61	23.63	-22.37	46.00	12.80	0.20	10.63	Average
5	0.72	37.74	-18.26	56.00	26.91	0.19	10.64	QP
6 *	0.72	28.34	-17.66	46.00	17.51	0.19	10.64	Average
7	2.13	34.21	-21.79	56.00	23.40	0.10	10.71	QP
8	2.13	24.01	-21.99	46.00	13.20	0.10	10.71	Average
9	3.68	36.30	-19.70	56.00	25.30	0.18	10.82	QP
10	3.68	26.10	-19.90	46.00	15.10	0.18	10.82	Average
11	4.22	36.12	-19.88	56.00	25.10	0.19	10.83	QP
12	4.22	26.32	-19.68	46.00	15.30	0.19	10.83	Average

Test Mode :	Mode 2	**Temperature :**	22~24℃
Test Engineer :	Eligah Wang	**Relative Humidity :**	37~39%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	Bluetooth Link + WLAN (5G) Link + USB Cable (Charging from Adapter) + Earphone + Battery		



Site : CO01-KS
Condition : FCC PART 15E LISN-N20140306 NEUTRAL

mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	36.01	-29.73	65.74	23.80	1.83	10.38	QP
2	0.15	27.51	-28.23	55.74	15.30	1.83	10.38	Average
3	0.24	36.23	-25.72	61.95	24.80	0.91	10.52	QP
4	0.24	27.23	-24.72	51.95	15.80	0.91	10.52	Average
5	2.32	25.63	-30.37	56.00	14.80	0.11	10.72	QP
6	2.32	18.43	-27.57	46.00	7.60	0.11	10.72	Average
7	2.78	27.18	-28.82	56.00	16.29	0.13	10.76	QP
8	2.78	18.48	-27.52	46.00	7.59	0.13	10.76	Average
9	3.68	33.20	-22.80	56.00	22.20	0.18	10.82	QP
10	3.68	23.50	-22.50	46.00	12.50	0.18	10.82	Average
11	4.22	34.92	-21.08	56.00	23.90	0.19	10.83	QP
12 *	4.22	25.22	-20.78	46.00	14.20	0.19	10.83	Average

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

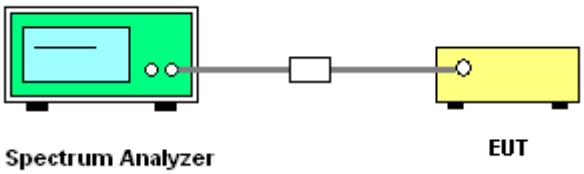
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Test Band :	5GHz band 1	Test Engineer :	Issac Song

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (˚C)	Voltage (V)
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	3.6
11a	6Mbps	1	36	5180	5179.950	-0.050	-9.65	20	4.35
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	3.75
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	-30	3.75
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	50	3.75

Note:

1. Center Frequency = (Low Frequency + High Frequency) / 2.

3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.8 Antenna Requirements

3.8.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit 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.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The EUT supports CDD mode.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

	Chain Port 0 (dBi)	Chain Port 1 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	0.50	0.00	3.26	3.26	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Oct. 28, 2014	Nov. 28, 2014~ Dec. 22, 2014	Oct. 27, 2015	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	30MHz~40GHz	Feb. 27, 2014	Nov. 28, 2014~ Dec. 22, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Feb. 27, 2014	Nov. 28, 2014~ Dec. 22, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	Nov. 28, 2014~ Dec. 22, 2014	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Oct. 25, 2014	Dec. 11, 2014	Oct. 24, 2015	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 28, 2013	Dec. 11, 2014	Dec. 27, 2014	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Dec. 11, 2014	Nov. 12, 2015	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Dec. 11, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Dec. 11, 2014	Nov. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Dec. 11, 2014	Nov. 07, 2015	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Dec. 11, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Dec. 11, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Oct. 28, 2014	Dec. 11, 2014	Oct. 27, 2015	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 11, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Dec. 11, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Dec. 11, 2014	NCR	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 04, 2014	Nov. 27, 2014	May 03, 2015	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Nov. 27, 2014	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Nov. 27, 2014	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Nov. 27, 2014	Oct. 24, 2015	Conduction (CO01-KS)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.3**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.5**