FCC RF Test Report

APPLICANT	:	TP-LINK TECHNOLOGIES CO., LTD.
EQUIPMENT	:	AC1200 Wireless Dual Band DOCSIS 3.0 Cable Modem Router
BRAND NAME	:	TP-LINK
MODEL NAME	:	Archer CR500
MARKETING NAME	:	AC1200 Wireless Dual Band DOCSIS 3.0 Cable Modem Router
FCC ID	:	TE7CR500V1
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product testing was completed on Jun. 08, 2016. We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR631009-01B	Rev. 01	This project is FCC change ID application; The difference between previous and current is changing the FCC ID: TE7CR700V2 to TE7CR500V1, equipment name and model name. Based on the similarity between two products, the test result is not affected; all test cases were leveraged from original report (Sporton Report Number FR631009B).	Sep. 27, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	FCC ≤ 30 dBm (depend on band)	Pass	-
3.3	15.407(a)	Power Spectral Density	FCC ≤ 17 dBm (depend on band)	Pass	-
3.4	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 0.1 dB at 51.340 MHz for Quasi-Peak
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 0.68 dB at 0.640 MHz
3.6	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

TP-LINK TECHNOLOGIES CO., LTD.
Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Shennan Rd., Nanshan, Shenzhen, China

1.2 Manufacturer

TP-LINK TECHNOLOGIES CO., LTD.
Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Shennan Rd., Nanshan, Shenzhen, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	AC1200 Wireless Dual Band DOCSIS 3.0 Cable Modem Router
Brand Name	TP-LINK
Model Name	Archer CR500
Marketing Name	AC1200 Wireless Dual Band DOCSIS 3.0 Cable Modem Router
FCC ID	TE7CR500V1
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n HT20/HT40/ WLAN5GHz 802.11a/n HT20/HT40/ WLAN5GHz 802.11ac VHT20/VHT40/VHT80
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power For CDD Mode	**<5180 MHz ~ 5240 MHz>** 802.11a : 26.78 dBm / 0.4764 W 802.11n HT20 : 26.92 dBm / 0.4920 W 802.11n HT40 : 27.03 dBm / 0.5047 W 802.11ac VHT20 : 26.83 dBm / 0.4819 W 802.11ac VHT40 : 26.79 dBm / 0.4775 W 802.11ac VHT80 : 17.01 dBm / 0.0502 W
Maximum Output Power For Beamforming Mode	**<5180 MHz ~ 5240 MHz>** 802.11a : 26.74 dBm / 0.4721 W 802.11n HT20 : 26.88 dBm / 0.4875 W 802.11n HT40 : 27.01 dBm / 0.5023 W 802.11ac VHT20: 26.79 dBm / 0.4775 W 802.11ac VHT40: 26.75 dBm / 0.4732 W 802.11ac VHT80: 16.96 dBm / 0.0497 W
99% Occupied Bandwidth	802.11a : 18.15 MHz 802.11n HT20 : 18.90 MHz 802.11n HT40 : 36.80 MHz 802.11ac VHT20: 18.90 MHz 802.11ac VHT40 : 36.80 MHz 802.11ac VHT80 : 75.72 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type	Chain Port 1 : Omni directional Antenna Chain Port 2 : Omni directional Antenna Chain Port 3 : Omni directional Antenna
Antenna Gain	Chain Port 1 : 2.6 dBi Chain Port 2 : 2.5 dBi Chain Port 3 : 2.5 dBi
Antenna Function Description	<table><tr><td></td><td>Chain Port 1</td><td>Chain Port 2</td><td>Chain Port 3</td></tr><tr><td>802.11a/n/ac MIMO</td><td>V</td><td>V</td><td>V</td></tr></table>

1.5 Modification of EUT

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

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	**Sporton Site No.**	
	TH01-SZ	CO01-SZ

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Registration No.**
	03CH03-SZ	565805

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 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 v01r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- ANSI C63.10-2013

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.

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).

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
	42	5210		

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

2.2 Test Mode

Below worst test mode of conducted test items and radiated spurious emissions are considering all the possible combinations, modulation, data rates.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5G) Link + Cable Link with Coaxial line port + LAN Link with Notebook + LAN Load + USB Link with U-dish + Adapter
Remark: For Radiated TCs, the tests were performed with adapter, U- dish and Notebook.	

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

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

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

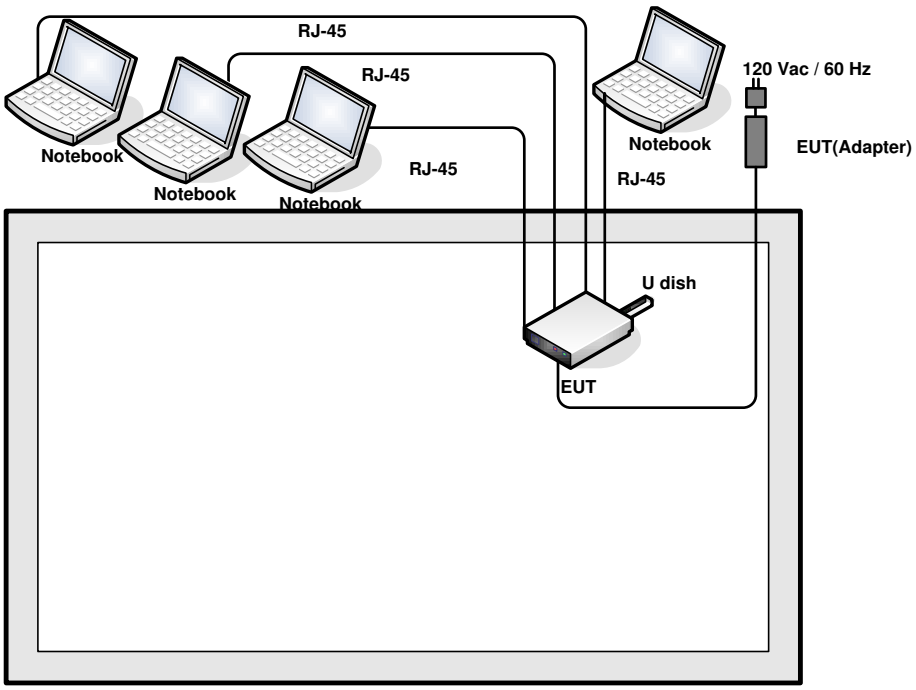
Ch. #		Band I : 5150-5250 MHz
		802.11ac VHT20
L	Low	36
M	Middle	44
H	High	48

Ch. #		Band I : 5150-5250 MHz
		802.11ac VHT40
L	Low	38
M	Middle	-
H	High	46

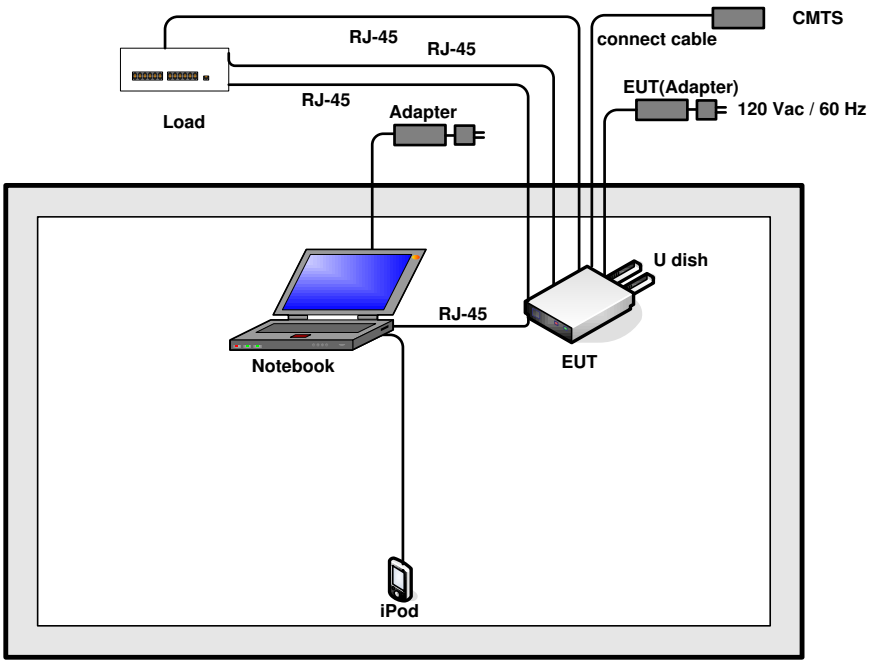
Ch. #		Band I : 5150-5250 MHz
		802.11ac VHT80
L	Low	-
M	Middle	42
H	High	-

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	CMTS	TOPVISION	CC8800	N/A	N/A	N/A
2.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 0.8 m DC O/P: Shielded, 1.8 m
4.	Notebook	DELL	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m
5.	Notebook	DELL	Vostro1440	FCC DoC	N/A	AC I/P: Unshielded, 1.2m DC O/P: Shielded, 1.8 m
6.	U dish	Kingston	DT101G2	FCC DoC	N/A	N/A
7.	U dish	Kingston	N/A	N/A	N/A	N/A
8.	Load	N/A	N/A	N/A	N/A	N/A
9.	SD Card	SanDisk	4G Class 4	FCC DoC	N/A	N/A
10.	iPod nano 8GB	Apple	MC690ZP/A	FCC DoC	Shielded, 1.2 m	N/A
11.	connect cable	N/A	N/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

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

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

2.6 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 6.5 dB and 10dB attenuator.

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

= 6.5 + 10 = 16.5 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

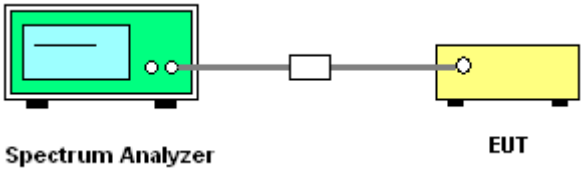
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

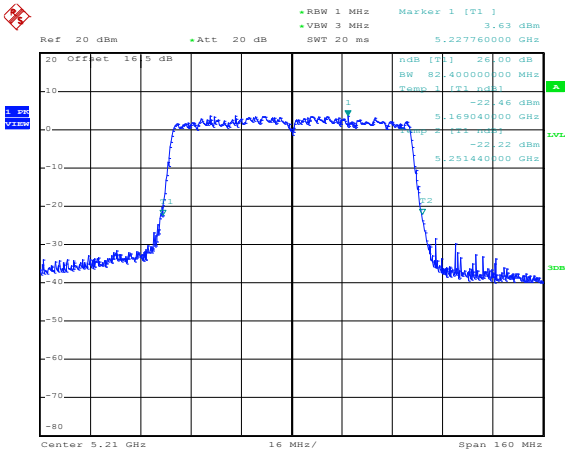
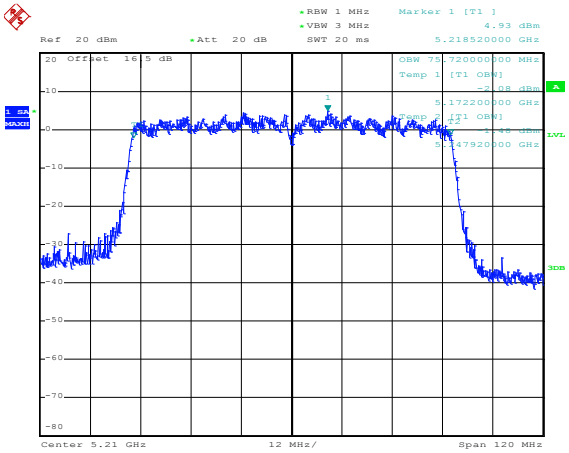
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

Maximum 26dB Bandwidth	Maximum 99% Occupied Bandwidth
	

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

For an indoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W.

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.

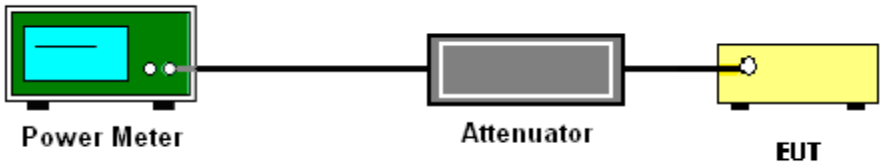
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.

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

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For an indoor access point operating in the band 5.15–5.25GHz, The maximum power spectral density shall not exceed 17 dBm in any 1 megahertz 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 v01r02.
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).

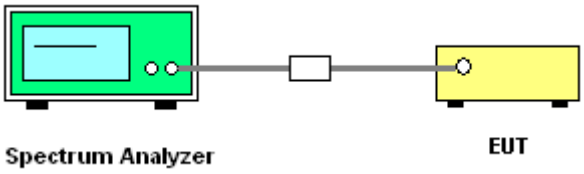
1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - 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.

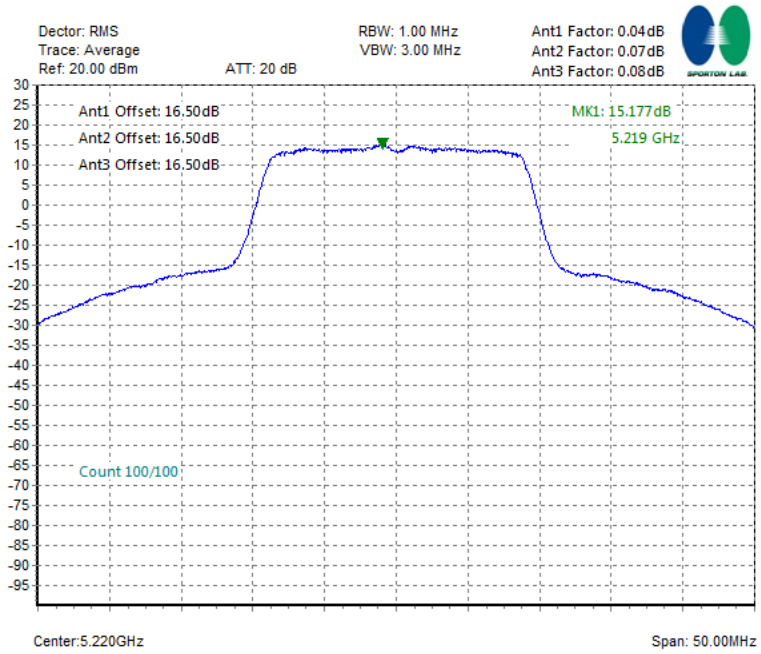
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



Note: Average Power Density (dB) = Measured value+ Duty Factor

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 D02 v01r02 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 v01r02. 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

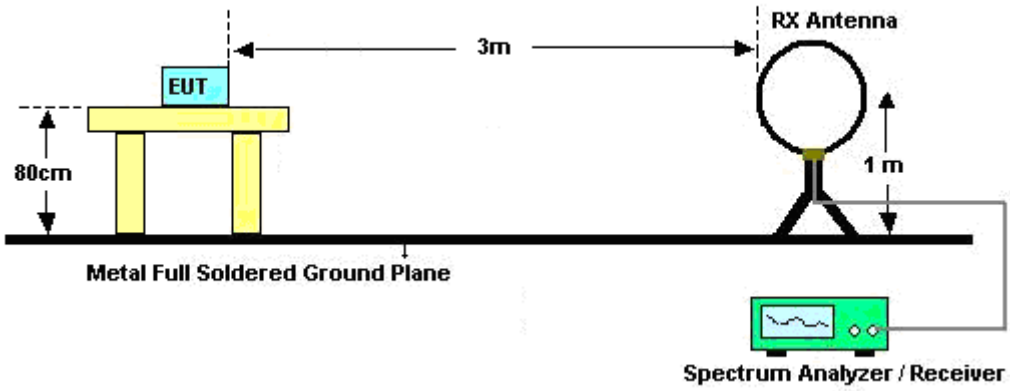
   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (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.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively 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

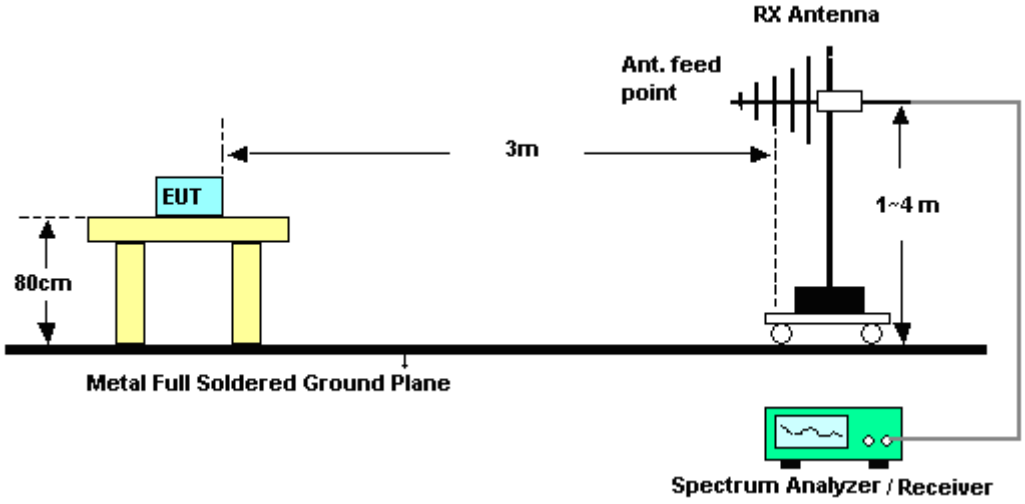
measured in average mode again and reported.

3.4.4 Test Setup

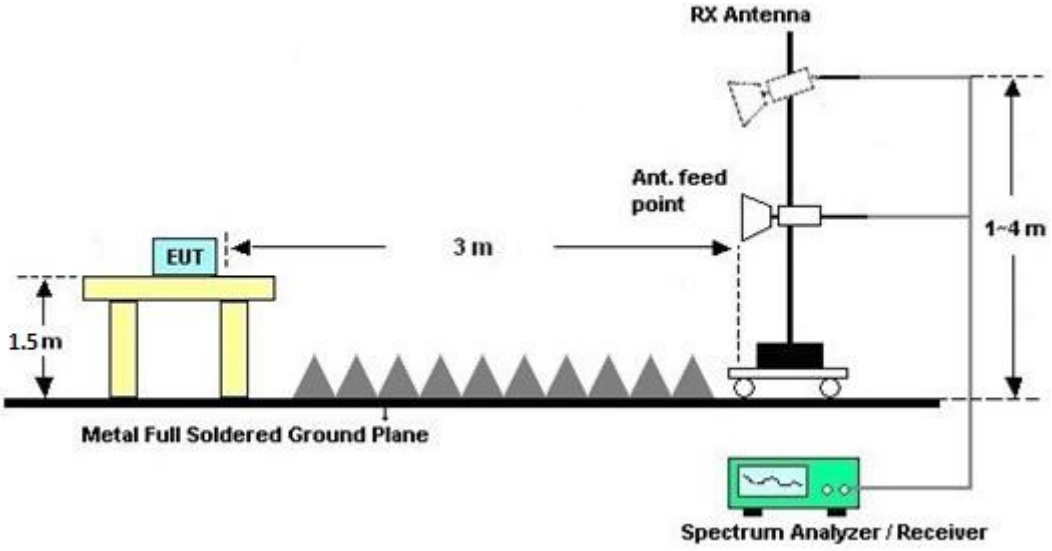
For radiated emissions below 30MHz



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

Please refer to Appendix B.

3.4.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix B.

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.

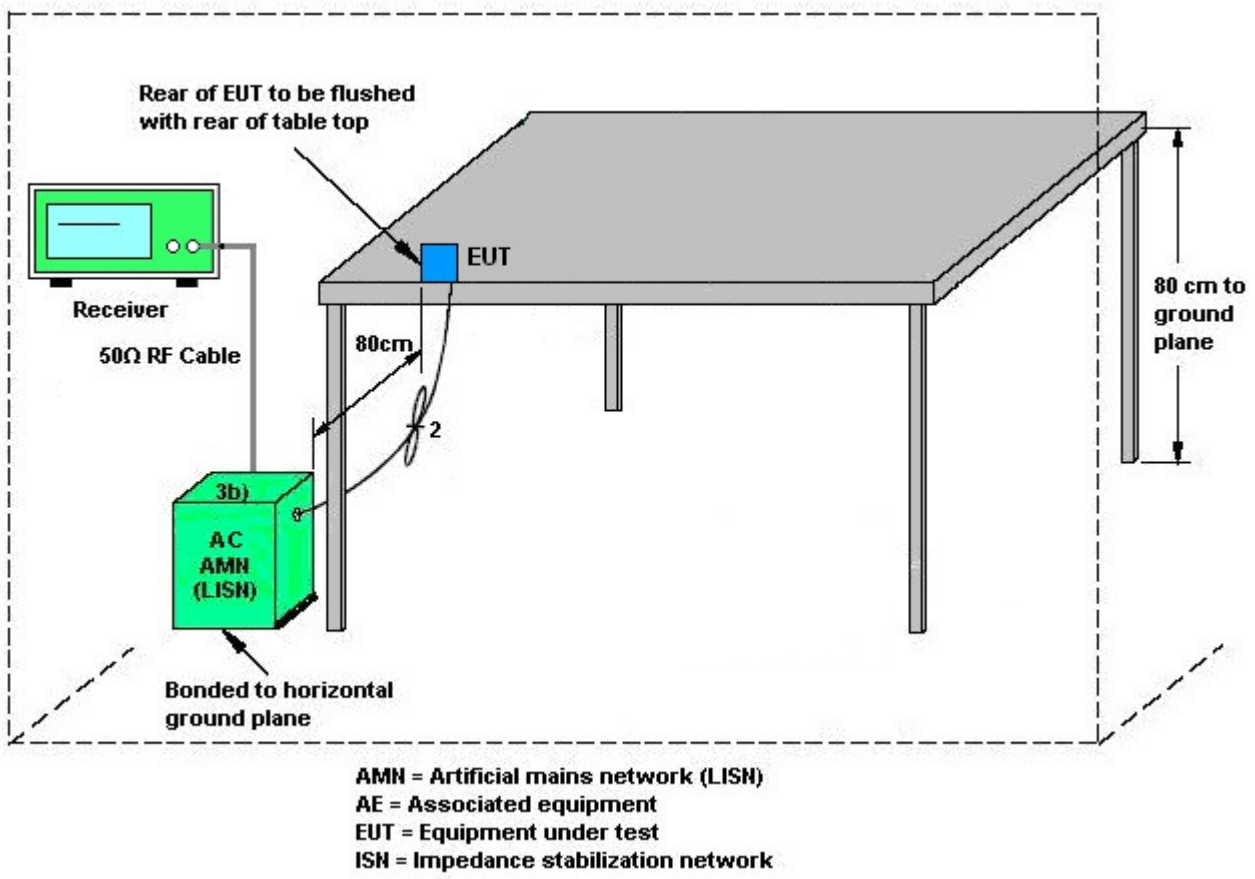
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

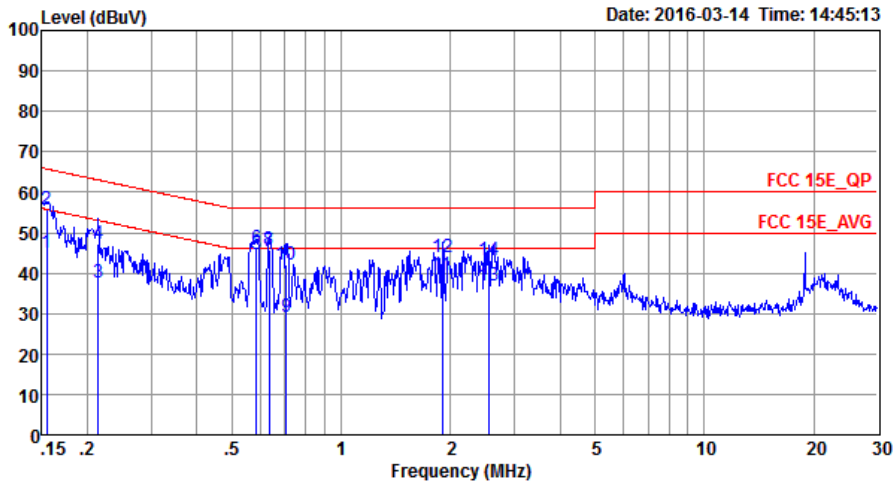
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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



3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Jacky Yang	**Relative Humidity :**	41~43%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN (5G) Link + Cable Link with Coaxial line port + LAN Link with Notebook + LAN Load + USB Link with U-dish + Adapter		

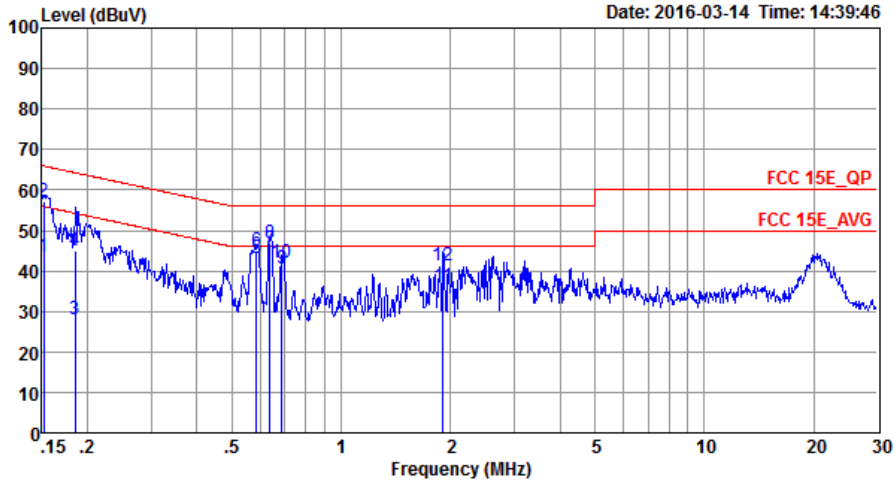


Site : CO01-SZ
Condition: FCC 15E QP LISN_L_20160112 LINE

Mode : Mode 1
IMEI : N/A

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	45.09	-10.65	55.74	34.30	0.44	10.35	Average
2	0.15	55.79	-9.95	65.74	45.00	0.44	10.35	QP
3	0.21	37.61	-15.44	53.05	26.80	0.53	10.28	Average
4	0.21	47.11	-15.94	63.05	36.30	0.53	10.28	QP
5	0.59	44.76	-1.24	46.00	34.00	0.61	10.15	Average
6	0.59	46.06	-9.94	56.00	35.30	0.61	10.15	QP
7 *	0.63	45.23	-0.77	46.00	34.50	0.58	10.15	Average
8	0.63	45.83	-10.17	56.00	35.10	0.58	10.15	QP
9	0.70	29.29	-16.71	46.00	18.60	0.54	10.15	Average
10	0.70	42.19	-13.81	56.00	31.50	0.54	10.15	QP
11	1.90	39.45	-6.55	46.00	28.80	0.46	10.19	Average
12	1.90	43.95	-12.05	56.00	33.30	0.46	10.19	QP
13	2.54	36.91	-9.09	46.00	26.20	0.51	10.20	Average
14	2.54	43.21	-12.79	56.00	32.50	0.51	10.20	QP

Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Jacky Yang	**Relative Humidity :**	41~43%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WLAN (5G) Link + Cable Link with Coaxial line port + LAN Link with Notebook + LAN Load + USB Link with U-dish + Adapter		



Site : CO01-SZ
Condition: FCC 15E_QP LISN_N_20160112 NEUTRAL

Mode : Mode 1
IMEI : N/A

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.15	43.71	-12.20	55.91	32.90	0.45	10.36	Average
2		0.15	57.11	-8.80	65.91	46.30	0.45	10.36	QP
3		0.19	27.91	-26.33	54.24	17.11	0.49	10.31	Average
4		0.19	45.01	-19.23	64.24	34.21	0.49	10.31	QP
5		0.59	43.23	-2.77	46.00	32.50	0.58	10.15	Average
6		0.59	45.13	-10.87	56.00	34.40	0.58	10.15	QP
7	*	0.64	45.32	-0.68	46.00	34.60	0.57	10.15	Average
8		0.64	46.82	-9.18	56.00	36.10	0.57	10.15	QP
9		0.69	40.70	-5.30	46.00	30.00	0.55	10.15	Average
10		0.69	42.20	-13.80	56.00	31.50	0.55	10.15	QP
11		1.91	36.26	-9.74	46.00	25.50	0.57	10.19	Average
12		1.91	41.46	-14.54	56.00	30.70	0.57	10.19	QP

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.

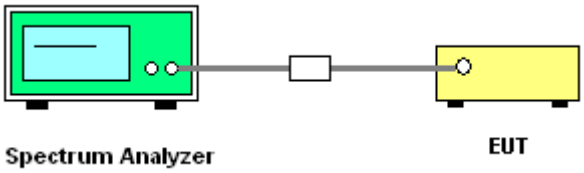
3.6.2 Measuring Instruments

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

Please refer to Appendix A.

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

For CDD Mode

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

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.

5.2G Band Antenna	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
1	2.60	2.60	0.00	0.00
2	2.50	2.50	0.00	0.00
3	2.50	2.50	0.00	0.00
1+2	2.60	5.56	0.00	0.00
1+3	2.60	5.56	0.00	0.00
2+3	2.50	5.51	0.00	0.00
1+2+3	2.60	7.30	0.00	1.30

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

For Beamforming Mode

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 beamforming.

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.

5.2G Band Antenna	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
1	2.60	2.60	0.00	0.00
2	2.50	2.50	0.00	0.00
3	2.50	2.50	0.00	0.00
1+2	5.56	5.56	0.00	0.00
1+3	5.56	5.56	0.00	0.00
2+3	5.51	5.51	0.00	0.00
1+2+3	7.30	7.30	1.30	1.30

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	FSV40	101078	9kHz~40GHz	May 07, 2016	Jun. 07, 2016	May 06, 2017	Conducted (TH01-SZ)
Spectrum Analyzer	R&S	FSP30	101400	9kHz~40GHz	Jan. 12, 2016	Jun. 07, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 12, 2016	Jun. 07, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 12, 2016	Jun. 07, 2016	Jan. 11, 2017	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Aug. 07, 2015	Jun. 07, 2016	Aug. 06, 2016	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	May 07, 2016	Jun. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	May 07, 2016	Jun. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 07, 2016	Jun. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	May 21, 2016	Jun. 08, 2016	May 20, 2017	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120 D	9120D-1355	1GHz~18GHz	May 07, 2016	Jun. 08, 2016	May 06, 2017	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Aug. 19, 2015	Jun. 08, 2016	Aug. 18, 2016	Radiation (03CH03-SZ)
Amplifier	PREAMP LIFIER	BPA-530	102210	0.01Hz ~3000MHz	Oct. 20, 2015	Jun. 08, 2016	Oct. 19, 2016	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5G Hz	Jan. 12, 2016	Jun. 08, 2016	Jan. 11, 2017	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-3 5-HG	1871923	18GHz~40GHz	Jul. 18, 2015	Jun. 08, 2016	Jul. 17, 2016	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jun. 08, 2016	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jun. 08, 2016	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jun. 08, 2016	NCR	Radiation (03CH03-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz; Max 30dBm	Oct. 20, 2015	Mar. 14, 2016	Oct. 19, 2016	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Jan.12, 2016	Mar. 14, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103912	9kHz~30MHz	Jan. 12, 2016	Mar. 14, 2016	Jan. 11, 2017	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Aug. 07, 2015	Mar. 14, 2016	Aug. 06, 2016	Conduction (CO01-SZ)

NCR: No Calibration Required

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 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0 dB**

Appendix A. Conducted Test Results

Test Engineer:	Tiny You	Temperature:	24~26	°C
Test Date:	2016/6/7	Relative Humidity:	50~53	%

TEST RESULTS DATA
26dB and 99% OBW

Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26 dB Bandwidth (MHz)				99% Bandwidth (MHz)				IC 99% Bandwidth EIRP Limit (dBm)			
					Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4
11a	6Mbps	3	36	5180	22	21.65	21.80		17.90	17.80	17.70		22.53	22.50	22.48	
11a	6Mbps	3	44	5220	22.45	22.20	21.80		18.00	17.80	17.80		22.55	22.50	22.50	
11a	6Mbps	3	48	5240	21.85	21.95	21.30		18.15	17.85	17.75		22.59	22.52	22.49	
HT20	MCS0	3	36	5180	22.25	22.00	22.05		18.80	18.70	18.65		22.74	22.72	22.71	
HT20	MCS0	3	44	5220	22.75	22.65	22.25		18.80	18.65	18.55		22.74	22.71	22.68	
HT20	MCS0	3	48	5240	22.75	22.40	21.95		18.90	18.65	18.55		22.76	22.71	22.68	
HT40	MCS0	3	38	5190	41.22	40.86	40.68		36.50	36.50	36.60		23.01	23.01	23.01	
HT40	MCS0	3	46	5230	42.93	41.49	41.13		36.80	36.80	36.50		23.01	23.01	23.01	
VHT20	MCS0	3	36	5180	22.35	22.05	22.00		18.75	18.60	18.55		22.73	22.70	22.68	
VHT20	MCS0	3	44	5220	23.2	22.05	21.85		18.90	18.75	18.60		22.76	22.73	22.70	
VHT20	MCS0	3	48	5240	22.4	22.25	21.90		18.90	18.70	18.70		22.76	22.72	22.72	
VHT40	MCS0	3	38	5190	41.49	40.95	40.86		36.60	36.50	36.40		23.01	23.01	23.01	
VHT40	MCS0	3	46	5230	42.12	41.67	41.04		36.70	36.80	36.50		23.01	23.01	23.01	
VHT80	MCS0	3	42	5210	82.4	82.24	81.76		75.72	75.72	75.60		23.01	23.01	23.01	

TEST RESULTS DATA
Average Power Table
For CDD Mode

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail
						Ant 1	Ant 2	Ant 3	Ant 4	SUM					
11a	6Mbps	3	36	5180	1+2+3	19.34	19.14	19.41		24.07	30.00	2.60	26.67	-	Pass
11a	6Mbps	3	44	5220	1+2+3	23.15	21.85	20.52		26.74	30.00	2.60	29.34	-	Pass
11a	6Mbps	3	48	5240	1+2+3	23.18	21.88	20.56		26.78	30.00	2.60	29.38	-	Pass
HT20	MCS0	3	36	5180	1+2+3	19.19	19.12	19.33		23.98	30.00	2.60	26.58	-	Pass
HT20	MCS0	3	44	5220	1+2+3	23.26	21.99	20.44		26.82	30.00	2.60	29.42	-	Pass
HT20	MCS0	3	48	5240	1+2+3	23.28	22.08	20.70		26.92	30.00	2.60	29.52	-	Pass
HT40	MCS0	3	38	5190	1+2+3	13.08	13.12	13.31		17.95	30.00	2.60	20.55	-	Pass
HT40	MCS0	3	46	5230	1+2+3	23.32	22.19	20.93		27.03	30.00	2.60	29.63	-	Pass
VHT20	MCS0	3	36	5180	1+2+3	18.69	18.83	18.90		23.58	30.00	2.60	26.18	-	Pass
VHT20	MCS0	3	44	5220	1+2+3	23.18	21.93	20.53		26.79	30.00	2.60	29.39	-	Pass
VHT20	MCS0	3	48	5240	1+2+3	23.20	21.96	20.64		26.83	30.00	2.60	29.43	-	Pass
VHT40	MCS0	3	38	5190	1+2+3	13.09	13.25	13.29		17.98	30.00	2.60	20.58	-	Pass
VHT40	MCS0	3	46	5230	1+2+3	23.09	22.00	20.61		26.79	30.00	2.60	29.39	-	Pass
VHT80	MCS0	3	42	5210	1+2+3	12.00	12.42	12.27		17.01	30.00	2.60	19.61	-	Pass

TEST RESULTS DATA
Average Power Table
For Beamforming
Mode

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail
						Ant 1	Ant 2	Ant 3	Ant 4	SUM					
11a	6Mbps	3	36	5180	1+2+3	19.32	19.10	19.38		24.04	28.70	7.30	31.35	-	Pass
11a	6Mbps	3	44	5220	1+2+3	23.10	21.82	20.48		26.70	28.70	7.30	34.01	-	Pass
11a	6Mbps	3	48	5240	1+2+3	23.15	21.84	20.53		26.74	28.70	7.30	34.05	-	Pass
HT20	MCS0	3	36	5180	1+2+3	16.23	16.17	16.36		21.02	28.70	7.30	28.33	-	Pass
HT20	MCS0	3	44	5220	1+2+3	23.22	21.93	20.38		26.76	28.70	7.30	34.07	-	Pass
HT20	MCS0	3	48	5240	1+2+3	23.24	22.05	20.65		26.88	28.70	7.30	34.18	-	Pass
HT40	MCS0	3	38	5190	1+2+3	13.04	13.08	13.26		17.90	28.70	7.30	25.21	-	Pass
HT40	MCS0	3	46	5230	1+2+3	23.30	22.18	20.90		27.01	28.70	7.30	34.32	-	Pass
VHT20	MCS0	3	36	5180	1+2+3	16.20	16.12	16.31		20.98	28.70	7.30	28.29	-	Pass
VHT20	MCS0	3	44	5220	1+2+3	23.15	21.90	20.49		26.75	28.70	7.30	34.06	-	Pass
VHT20	MCS0	3	48	5240	1+2+3	23.16	21.94	20.59		26.79	28.70	7.30	34.10	-	Pass
VHT40	MCS0	3	38	5190	1+2+3	12.92	13.15	13.21		17.87	28.70	7.30	25.17	-	Pass
VHT40	MCS0	3	46	5230	1+2+3	23.07	21.95	20.56		26.75	28.70	7.30	34.06	-	Pass
VHT80	MCS0	3	42	5210	1+2+3	11.96	12.37	12.23		16.96	28.70	7.30	24.27	-	Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Duty Factor (dB)				Average PSD with Duty Factor (dBm/MHz)	PSD Limit (dBm/ MHz)	DG (dBi)		Pass /Fail
						Ant 1	Ant 2	Ant 3	Ant 4					
11a	6Mbps	3	36	5180	1+2+3	0.22	0.20	0.24		11.452	15.70	7.30		Pass
11a	6Mbps	3	44	5220	1+2+3	0.22	0.20	0.24		13.767	15.70	7.30		Pass
11a	6Mbps	3	48	5240	1+2+3	0.22	0.20	0.24		14.407	15.70	7.30		Pass
HT20	MCS0	3	36	5180	1+2+3	0.21	0.21	0.23		11.041	15.70	7.30		Pass
HT20	MCS0	3	44	5220	1+2+3	0.21	0.21	0.23		14.617	15.70	7.30		Pass
HT20	MCS0	3	48	5240	1+2+3	0.21	0.21	0.23		13.946	15.70	7.30		Pass
HT40	MCS0	3	38	5190	1+2+3	0.43	0.43	0.48		1.493	15.70	7.30		Pass
HT40	MCS0	3	46	5230	1+2+3	0.43	0.43	0.48		11.884	15.70	7.30		Pass
VHT20	MCS0	3	36	5180	1+2+3	0.04	0.07	0.08		12.055	15.70	7.30		Pass
VHT20	MCS0	3	44	5220	1+2+3	0.04	0.07	0.08		15.177	15.70	7.30		Pass
VHT20	MCS0	3	48	5240	1+2+3	0.04	0.07	0.08		15.162	15.70	7.30		Pass
VHT40	MCS0	3	38	5190	1+2+3	0.13	0.13	0.15		3.482	15.70	7.30		Pass
VHT40	MCS0	3	46	5230	1+2+3	0.13	0.13	0.15		12.197	15.70	7.30		Pass
VHT80	MCS0	3	42	5210	1+2+3	0.28	0.28	0.31		-0.849	15.70	7.30		Pass

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (˚C)	Voltage (V)	Note
11a	6Mbps	3	36	5180	5180.000	0.000	0.00	20	90	
11a	6Mbps	3	36	5180	5180.000	0.000	0.00	20	264	
11a	6Mbps	3	36	5180	5180.025	0.025	4.83	20	120	
11a	6Mbps	3	36	5180	5180.000	0.000	0.00	-30	120	
11a	6Mbps	3	36	5180	5180.050	0.050	9.65	50	120	

Appendix B. Radiated Spurious Emission

For CDD Mode:

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5145.65	62.19	-11.81	74	57.29	31.5	7.07	33.67	150	285	P	H
		5148.5	50.75	-3.25	54	45.85	31.5	7.07	33.67	150	285	A	H
	*	5180	113.88	-	-	108.9	31.55	7.08	33.65	150	285	P	H
	*	5180	106.88	-	-	101.9	31.55	7.08	33.65	150	285	A	H
		5145.95	63.6	-10.4	74	58.7	31.5	7.07	33.67	150	263	P	V
		5150	53.72	-0.28	54	48.82	31.5	7.07	33.67	150	263	A	V
	*	5180	112.95	-	-	107.97	31.55	7.08	33.65	150	263	P	V
	*	5180	106.28	-	-	101.3	31.55	7.08	33.65	150	263	A	V
802.11a CH 44 5220MHz		5142.05	51.22	-22.78	74	46.34	31.5	7.07	33.69	245	335	P	H
		5144.3	40.68	-13.32	54	35.78	31.5	7.07	33.67	245	335	A	H
	*	5220	111.74	-	-	106.69	31.6	7.09	33.64	245	335	P	H
	*	5220	105.05	-	-	100	31.6	7.09	33.64	245	335	A	H
		5354.73	52.02	-21.98	74	46.64	31.79	7.12	33.53	245	335	P	H
		5437.67	42.53	-11.47	54	36.95	31.91	7.15	33.48	245	335	A	H
		5147.3	51.73	-22.27	74	46.83	31.5	7.07	33.67	150	8	P	V
		5000.15	43.32	-10.68	54	38.76	31.29	7.04	33.77	150	8	A	V
	*	5220	115.03	-	-	109.98	31.6	7.09	33.64	150	8	P	V
	*	5220	107.58	-	-	102.53	31.6	7.09	33.64	150	8	A	V
		5434.81	54.24	-19.76	74	48.66	31.91	7.15	33.48	150	8	P	V
		5437.56	46.85	-7.15	54	41.27	31.91	7.15	33.48	150	8	A	V

802.11a CH 48 5240MHz		5137.1	50.82	-23.18	74	45.96	31.48	7.07	33.69	250	279	P	H
		5000	45.4	-8.6	54	40.84	31.29	7.04	33.77	250	279	A	H
	*	5240	114.53	-	-	109.44	31.62	7.09	33.62	250	279	P	H
	*	5240	109.02	-	-	103.93	31.62	7.09	33.62	250	279	A	H
		5396.09	54.27	-19.73	74	48.8	31.86	7.13	33.52	250	279	P	H
		5395.43	44.82	-9.18	54	39.35	31.86	7.13	33.52	250	279	A	H
		5142.95	51.14	-22.86	74	46.26	31.5	7.07	33.69	150	8	P	V
		5000.15	43.42	-10.58	54	38.86	31.29	7.04	33.77	150	8	A	V
	*	5240	115.16	-	-	110.07	31.62	7.09	33.62	150	8	P	V
	*	5240	107.96	-	-	102.87	31.62	7.09	33.62	150	8	A	V
		5405.77	53.49	-20.51	74	48	31.86	7.13	33.5	150	8	P	V
		5397.96	44.72	-9.28	54	39.25	31.86	7.13	33.52	150	8	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	49.73	-24.27	74	60.04	38.62	10.07	59	250	0	P	H
		15540	48.23	-25.77	74	56.61	38.54	12.77	59.69	150	0	P	H
		10360	53.86	-20.14	74	64.17	38.62	10.07	59	250	0	P	V
		10360	44.79	-9.21	54	55.1	38.62	10.07	59	150	252	A	V
		15540	48.36	-25.64	74	56.74	38.54	12.77	59.69	150	0	P	V
802.11a CH 44 5220MHz		10440	51.9	-22.1	74	62.07	38.72	10.13	59.02	150	358	P	H
		10440	43.38	-10.62	54	53.55	38.72	10.13	59.02	150	358	A	H
		15660	48.86	-25.14	74	57.51	38.17	12.93	59.75	150	0	P	H
		10440	60.93	-13.07	74	71.1	38.72	10.13	59.02	150	257	P	V
		10440	47.25	-6.75	54	57.42	38.72	10.13	59.02	150	257	A	V
		15660	49.89	-24.11	74	58.54	38.17	12.93	59.75	150	0	P	V
802.11a CH 48 5240MHz		10480	54.13	-19.87	74	64.22	38.79	10.15	59.03	150	240	P	H
		10480	43.06	-10.94	54	53.15	38.79	10.15	59.03	150	240	A	H
		15720	49.61	-24.39	74	58.41	37.96	13.03	59.79	150	0	P	H
		10480	54.79	-19.21	74	64.88	38.79	10.15	59.03	150	258	P	V
		10480	46.13	-7.87	54	56.22	38.79	10.15	59.03	150	258	A	V
		15720	49.99	-24.01	74	58.79	37.96	13.03	59.79	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		5148.95	65.3	-8.7	74	60.4	31.5	7.07	33.67	150	289	P	H
		5148.35	52.72	-1.28	54	47.82	31.5	7.07	33.67	150	289	A	H
	*	5180	114.17	-	-	109.19	31.55	7.08	33.65	150	289	P	H
	*	5180	106.38	-	-	101.4	31.55	7.08	33.65	150	289	A	H
		5146.7	63.26	-10.74	74	58.36	31.5	7.07	33.67	150	265	P	V
		5149.85	53.36	-0.64	54	48.46	31.5	7.07	33.67	150	265	A	V
	*	5180	113.67	-	-	108.69	31.55	7.08	33.65	150	265	P	V
	*	5180	107.13	-	-	102.15	31.55	7.08	33.65	150	265	A	V
802.11n HT20 CH 44 5220MHz		5108	51.2	-22.8	74	46.39	31.45	7.06	33.7	150	293	P	H
		5147.9	42.48	-11.52	54	37.58	31.5	7.07	33.67	150	293	A	H
	*	5220	114.54	-	-	109.49	31.6	7.09	33.64	150	293	P	H
	*	5220	108.27	-	-	103.22	31.6	7.09	33.64	150	293	A	H
		5430.41	53.64	-20.36	74	48.06	31.91	7.15	33.48	150	293	P	H
		5437.56	45.6	-8.4	54	40.02	31.91	7.15	33.48	150	293	A	H
		5145.65	52.52	-21.48	74	47.62	31.5	7.07	33.67	150	263	P	V
		5145.95	43.29	-10.71	54	38.39	31.5	7.07	33.67	150	263	A	V
	*	5220	115.29	-	-	110.24	31.6	7.09	33.64	150	263	P	V
	*	5220	108.74	-	-	103.69	31.6	7.09	33.64	150	263	A	V
		5386.63	52.46	-21.54	74	47.02	31.83	7.13	33.52	150	263	P	V
		5381.46	42.43	-11.57	54	36.99	31.83	7.13	33.52	150	263	A	V

802.11n HT20 CH 48 5240MHz		5148.05	51.01	-22.99	74	46.11	31.5	7.07	33.67	154	294	P	H
		5148.95	41.14	-12.86	54	36.24	31.5	7.07	33.67	154	294	A	H
	*	5240	114.87	-	-	109.78	31.62	7.09	33.62	154	294	P	H
	*	5240	112.6	-	-	107.51	31.62	7.09	33.62	154	294	A	H
		5458.46	55.02	-18.98	74	49.39	31.93	7.17	33.47	154	294	P	H
		5458.35	45.54	-8.46	54	39.91	31.93	7.17	33.47	154	294	A	H
		5143.85	51.21	-22.79	74	46.31	31.5	7.07	33.67	236	266	P	V
		5000	46.06	-7.94	54	41.5	31.29	7.04	33.77	236	266	A	V
	*	5240	115.85	-	-	110.76	31.62	7.09	33.62	236	266	P	V
	*	5240	109.59	-	-	104.5	31.62	7.09	33.62	236	266	A	V
		5459.01	55.06	-18.94	74	49.43	31.93	7.17	33.47	236	266	P	V
		5458.46	46.58	-7.42	54	40.95	31.93	7.17	33.47	236	266	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		10360	49.96	-24.04	74	60.27	38.62	10.07	59	250	0	P	H
		15540	50.16	-23.84	74	58.54	38.54	12.77	59.69	150	0	P	H
		10360	53.34	-20.66	74	63.65	38.62	10.07	59	150	256	P	V
		10360	42.24	-11.76	54	52.55	38.62	10.07	59	150	256	A	V
		15540	50.17	-23.83	74	58.55	38.54	12.77	59.69	150	0	P	V
802.11n HT20 CH 44 5220MHz		10440	55.2	-18.8	74	65.37	38.72	10.13	59.02	150	260	P	H
		10440	44.42	-9.58	54	54.59	38.72	10.13	59.02	150	260	A	H
		15660	49.92	-24.08	74	58.57	38.17	12.93	59.75	150	0	P	H
		10440	57.23	-16.77	74	67.4	38.72	10.13	59.02	150	258	P	V
		10440	46.17	-7.83	54	56.34	38.72	10.13	59.02	150	258	A	V
		15660	50.84	-23.16	74	59.49	38.17	12.93	59.75	150	0	P	V
802.11n HT20 CH 48 5240MHz		10480	56.79	-17.21	74	66.88	38.79	10.15	59.03	150	260	P	H
		10480	44.01	-9.99	54	54.1	38.79	10.15	59.03	150	260	A	H
		15720	49.92	-24.08	74	58.72	37.96	13.03	59.79	150	0	P	H
		10480	57.85	-16.15	74	67.94	38.79	10.15	59.03	150	258	P	V
		10480	46.01	-7.99	54	56.1	38.79	10.15	59.03	150	258	A	V
		15720	50.64	-23.36	74	59.44	37.96	13.03	59.79	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5148.05	60.89	-13.11	74	55.99	31.5	7.07	33.67	150	283	P	H
		5147.9	52.7	-1.3	54	47.8	31.5	7.07	33.67	150	283	A	H
	*	5190	105.64	-	-	100.66	31.55	7.08	33.65	150	283	P	H
	*	5190	97.96	-	-	92.98	31.55	7.08	33.65	150	283	A	H
		5363.75	48.96	-25.04	74	43.56	31.81	7.12	33.53	150	283	P	H
		5360.67	38.85	-15.15	54	33.45	31.81	7.12	33.53	150	283	A	H
		5146.4	62.78	-11.22	74	57.88	31.5	7.07	33.67	150	257	P	V
		5150	53.78	-0.22	54	48.88	31.5	7.07	33.67	150	257	A	V
	*	5190	107.18	-	-	102.2	31.55	7.08	33.65	150	257	P	V
	*	5190	99.41	-	-	94.43	31.55	7.08	33.65	150	257	A	V
		5436.9	48.45	-25.55	74	42.87	31.91	7.15	33.48	150	257	P	V
		5399.94	40.32	-13.68	54	34.83	31.86	7.13	33.5	150	257	A	V
802.11n HT40 CH 46 5230MHz		5147	57.96	-16.04	74	53.06	31.5	7.07	33.67	150	294	P	H
		5147.3	46.73	-7.27	54	41.83	31.5	7.07	33.67	150	294	A	H
	*	5230	112.41	-	-	107.32	31.62	7.09	33.62	150	294	P	H
	*	5230	105.17	-	-	100.08	31.62	7.09	33.62	150	294	A	H
		5359.13	52.53	-21.47	74	47.15	31.79	7.12	33.53	150	294	P	H
		5383.11	43.43	-10.57	54	37.99	31.83	7.13	33.52	150	294	A	H
		5143.55	55.99	-18.01	74	51.11	31.5	7.07	33.69	250	265	P	V
		5150	48.64	-5.36	54	43.74	31.5	7.07	33.67	250	265	A	V
	*	5230	113.52	-	-	108.43	31.62	7.09	33.62	250	265	P	V
	*	5230	106.89	-	-	101.8	31.62	7.09	33.62	250	265	A	V
		5398.07	53.51	-20.49	74	48.04	31.86	7.13	33.52	250	265	P	V
		5385.75	44.21	-9.79	54	38.77	31.83	7.13	33.52	250	265	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		10380	49.19	-24.81	74	59.45	38.65	10.1	59.01	250	0	P	H
HT40		15570	49.23	-24.77	74	57.68	38.44	12.82	59.71	150	0	P	H
CH 38		10380	49.2	-24.8	74	59.46	38.65	10.1	59.01	250	0	P	V
5190MHz		15570	50.33	-23.67	74	58.78	38.44	12.82	59.71	150	0	P	V
802.11n		10460	50.25	-23.75	74	60.39	38.74	10.15	59.03	250	0	P	H
HT40		15690	49.96	-24.04	74	58.69	38.06	12.98	59.77	150	0	P	H
CH 46		10460	50.46	-23.54	74	60.6	38.74	10.15	59.03	250	0	P	V
5230MHz		15690	50.23	-23.77	74	58.96	38.06	12.98	59.77	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5148.5	62.07	-11.93	74	57.17	31.5	7.07	33.67	150	278	P	H
		5148.8	53.77	-0.23	54	48.87	31.5	7.07	33.67	150	278	A	H
	*	5210	101.17	-	-	96.12	31.6	7.09	33.64	150	278	P	H
	*	5210	95.17	-	-	90.12	31.6	7.09	33.64	150	278	A	H
		5377.72	49.1	-24.9	74	43.66	31.83	7.13	33.52	150	278	P	H
		5350.77	39.23	-14.77	54	33.85	31.79	7.12	33.53	150	278	A	H
		5145.65	61.58	-12.42	74	56.68	31.5	7.07	33.67	238	254	P	V
		5146.25	53.35	-0.65	54	48.45	31.5	7.07	33.67	238	254	A	V
	*	5210	102.52	-	-	97.47	31.6	7.09	33.64	238	254	P	V
	*	5210	95.15	-	-	90.1	31.6	7.09	33.64	238	254	A	V
		5383.11	49.45	-24.55	74	44.01	31.83	7.13	33.52	238	254	P	V
		5400.16	39.77	-14.23	54	34.28	31.86	7.13	33.5	238	254	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		10420	48.99	-25.01	74	59.18	38.69	10.13	59.01	250	0	P	H
VHT80		15630	48.67	-25.33	74	57.31	38.22	12.88	59.74	150	0	P	H
CH 42		10420	48.34	-25.66	74	58.53	38.69	10.13	59.01	250	0	P	V
5210MHz		15630	47.89	-26.11	74	56.53	38.22	12.88	59.74	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11n HT40 (LF @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		31.94	22.3	-17.7	40	35.94	17.14	1	31.78	-	-	P	H
		268.62	28.83	-17.17	46	45.66	12.65	1.83	31.31	-	-	P	H
		334.58	28.93	-17.07	46	43.45	14.74	2.04	31.3	-	-	P	H
		399.57	29.5	-16.5	46	42.12	16.5	2.12	31.24	-	-	P	H
		801.15	30.49	-15.51	46	38.61	20.21	2.91	31.24	-	-	P	H
		864.2	34.73	-11.27	46	42.19	20.78	3.03	31.27	180	241	P	H
		45.52	27.13	-12.87	40	47.15	10.72	1	31.74	-	-	P	V
		58.13	28.73	-11.27	40	52.48	6.82	1.14	31.71	152	305	P	V
		72.68	24.91	-15.09	40	47.49	7.97	1.14	31.69	-	-	P	V
		445.16	28.05	-17.95	46	39.9	17.13	2.22	31.2	-	-	P	V
		790.48	30.79	-15.21	46	38.99	20.13	2.91	31.24	-	-	P	V
		864.2	34.64	-11.36	46	42.1	20.78	3.03	31.27	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

For Beamforming Mode

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5148.2	61.78	-12.22	74	56.69	31.5	7.26	33.67	150	103	P	H
		5148.65	51.96	-2.04	54	46.87	31.5	7.26	33.67	150	103	A	H
	*	5180	118.15	-	-	112.88	31.55	7.37	33.65	150	103	P	H
	*	5180	107.42	-	-	102.15	31.55	7.37	33.65	150	103	A	H
		5150	64.08	-9.92	74	58.99	31.5	7.26	33.67	150	135	P	V
		5150	52.02	-1.98	54	46.93	31.5	7.26	33.67	150	135	A	V
	*	5180	115.27	-	-	110	31.55	7.37	33.65	150	135	P	V
	*	5180	105.44	-	-	100.17	31.55	7.37	33.65	150	135	A	V
802.11a CH 44 5220MHz		5131.4	52.16	-21.84	74	47.11	31.48	7.26	33.69	150	98	P	H
		5143.7	42.52	-11.48	54	37.45	31.5	7.26	33.69	150	98	A	H
	*	5220	116.31	-	-	110.98	31.6	7.37	33.64	150	98	P	H
	*	5220	108.13	-	-	102.8	31.6	7.37	33.64	150	98	A	H
		5444.38	53.71	-20.29	74	47.85	31.91	7.43	33.48	150	98	P	H
		5437.67	46.09	-7.91	54	40.23	31.91	7.43	33.48	150	98	A	H
		5142.05	51.05	-22.95	74	45.98	31.5	7.26	33.69	150	132	P	V
		5141.6	43.76	-10.24	54	38.69	31.5	7.26	33.69	150	132	A	V
	*	5220	113.33	-	-	108	31.6	7.37	33.64	150	132	P	V
	*	5220	106.61	-	-	101.28	31.6	7.37	33.64	150	132	A	V
		5372.77	52.95	-21.05	74	47.28	31.81	7.39	33.53	150	132	P	V
		5382.78	43.1	-10.9	54	37.4	31.83	7.39	33.52	150	132	A	V

802.11a CH 48 5240MHz		5000.15	51.84	-22.16	74	47.18	31.29	7.14	33.77	250	267	P	H
		5000	48.16	-5.84	54	43.5	31.29	7.14	33.77	250	267	A	H
	*	5240	112.67	-	-	107.3	31.62	7.37	33.62	250	267	P	H
	*	5240	105.08	-	-	99.71	31.62	7.37	33.62	250	267	A	H
		5427.55	48.89	-25.11	74	43.06	31.88	7.43	33.48	250	267	P	H
		5458.24	39.34	-14.66	54	33.41	31.93	7.47	33.47	250	267	A	H
		5093.45	49.55	-24.45	74	44.66	31.43	7.16	33.7	250	135	P	V
		5000.15	43.72	-10.28	54	39.06	31.29	7.14	33.77	250	135	A	V
	*	5240	115.64	-	-	110.27	31.62	7.37	33.62	250	135	P	V
	*	5240	108.18	-	-	102.81	31.62	7.37	33.62	250	135	A	V
		5436.9	53.91	-20.09	74	48.05	31.91	7.43	33.48	250	135	P	V
		5402.91	43.59	-10.41	54	37.84	31.86	7.39	33.5	250	135	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	49.95	-24.05	74	59.75	38.62	10.58	59	250	0	P	H
		15540	50.24	-23.76	74	58.35	38.54	13.04	59.69	150	0	P	H
		10360	56.62	-17.38	74	66.42	38.62	10.58	59	150	107	P	V
		10360	44.18	-9.82	54	53.98	38.62	10.58	59	150	107	A	V
		15540	49.82	-24.18	74	57.93	38.54	13.04	59.69	150	0	P	V
802.11a CH 44 5220MHz		10440	50.33	-23.67	74	60.05	38.72	10.58	59.02	250	0	P	H
		15660	49.95	-24.05	74	58.38	38.17	13.15	59.75	150	0	P	H
		10440	55.28	-18.72	74	65	38.72	10.58	59.02	150	123	P	V
		10440	45.97	-8.03	54	55.69	38.72	10.58	59.02	150	123	A	V
		15660	50.04	-23.96	74	58.47	38.17	13.15	59.75	150	0	P	V
802.11a CH 48 5240MHz		10480	52.91	-21.09	74	62.56	38.79	10.59	59.03	250	0	P	H
		10480	44.54	-9.46	54	54.19	38.79	10.59	59.03	154	210	A	H
		15720	50.1	-23.9	74	58.7	37.96	13.23	59.79	150	0	P	H
		10480	54.61	-19.39	74	64.26	38.79	10.59	59.03	250	0	P	V
		10480	47.64	-6.36	54	57.29	38.79	10.59	59.03	150	82	A	V
		15720	50.84	-23.16	74	59.44	37.96	13.23	59.79	150	0	P	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		5149.1	62.17	-11.83	74	57.08	31.5	7.26	33.67	150	73	P	H
		5148.95	53.22	-0.78	54	48.13	31.5	7.26	33.67	150	73	A	H
	*	5180	113.36	-	-	108.09	31.55	7.37	33.65	150	73	P	H
	*	5180	106.82	-	-	101.55	31.55	7.37	33.65	150	73	A	H
		5150	60	-14	74	54.91	31.5	7.26	33.67	250	82	P	V
		5150	50.31	-3.69	54	45.22	31.5	7.26	33.67	250	82	A	V
	*	5180	112.98	-	-	107.71	31.55	7.37	33.65	250	82	P	V
	*	5180	105.47	-	-	100.2	31.55	7.37	33.65	250	82	A	V
802.11n HT20 CH 44 5220MHz		5144	53.14	-20.86	74	48.05	31.5	7.26	33.67	153	73	P	H
		5000	42.32	-11.68	54	37.66	31.29	7.14	33.77	153	73	A	H
	*	5220	114.2	-	-	108.87	31.6	7.37	33.64	150	73	P	H
	*	5220	109.83	-	-	104.5	31.6	7.37	33.64	150	73	A	H
		5371.67	51.6	-22.4	74	45.93	31.81	7.39	33.53	153	73	P	H
		5379.59	42.12	-11.88	54	36.42	31.83	7.39	33.52	153	73	A	H
		5143.55	52.12	-21.88	74	47.05	31.5	7.26	33.69	250	81	P	V
		5000	46.57	-7.43	54	41.91	31.29	7.14	33.77	250	81	A	V
	*	5220	114.56	-	-	109.23	31.6	7.37	33.64	250	81	P	V
	*	5220	108.83	-	-	103.5	31.6	7.37	33.64	250	81	A	V
		5440.42	54.4	-19.6	74	48.54	31.91	7.43	33.48	250	81	P	V
		5444.93	43.37	-10.63	54	37.51	31.91	7.43	33.48	250	81	A	V

802.11n HT20 CH 48 5240MHz		5000	48.72	-25.28	74	44.06	31.29	7.14	33.77	200	261	P	H
		5000	43.87	-10.13	54	39.21	31.29	7.14	33.77	200	261	A	H
	*	5240	112.26	-	-	106.89	31.62	7.37	33.62	200	261	P	H
	*	5240	103.28	-	-	97.91	31.62	7.37	33.62	200	261	A	H
		5384.87	48.88	-25.12	74	43.18	31.83	7.39	33.52	200	261	P	H
		5400.82	39.55	-14.45	54	33.8	31.86	7.39	33.5	200	261	A	H
		5132.15	50.57	-23.43	74	45.52	31.48	7.26	33.69	225	82	P	V
		5000.15	45.38	-8.62	54	40.72	31.29	7.14	33.77	225	82	A	V
	*	5240	115.27	-	-	109.9	31.62	7.37	33.62	225	82	P	V
	*	5240	108.88	-	-	103.51	31.62	7.37	33.62	225	82	A	V
		5458.46	54.34	-19.66	74	48.41	31.93	7.47	33.47	225	82	P	V
		5458.46	44.3	-9.7	54	38.37	31.93	7.47	33.47	225	82	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		10360	50.85	-23.15	74	60.65	38.62	10.58	59	250	0	P	H
		15540	49.16	-24.84	74	57.27	38.54	13.04	59.69	150	0	P	H
		10360	53.67	-20.33	74	63.47	38.62	10.58	59	250	0	P	V
		10360	45	-9	54	54.8	38.62	10.58	59	150	108	A	V
		15540	49.48	-24.52	74	57.59	38.54	13.04	59.69	150	0	P	V
802.11n HT20 CH 44 5220MHz		10440	52.14	-21.86	74	61.86	38.72	10.58	59.02	250	0	P	H
		10440	44.68	-9.32	54	54.4	38.72	10.58	59.02	154	223	A	H
		15660	50.69	-23.31	74	59.12	38.17	13.15	59.75	150	0	P	H
		10440	55.12	-18.88	74	64.84	38.72	10.58	59.02	250	0	P	V
		10440	47.78	-6.22	54	57.5	38.72	10.58	59.02	150	77	A	V
		15660	50.13	-23.87	74	58.56	38.17	13.15	59.75	150	0	P	V
802.11n HT20 CH 48 5240MHz		10480	50.68	-23.32	74	60.33	38.79	10.59	59.03	250	0	P	H
		15720	50.09	-23.91	74	58.69	37.96	13.23	59.79	150	0	P	H
		10480	54.03	-19.97	74	63.68	38.79	10.59	59.03	250	0	P	V
		10480	47.14	-6.86	54	56.79	38.79	10.59	59.03	250	0	A	V
		15720	50.17	-23.83	74	58.77	37.96	13.23	59.79	150	0	P	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5148.95	61.76	-12.24	74	56.67	31.5	7.26	33.67	198	113	P	H
		5148.65	53.24	-0.76	54	48.15	31.5	7.26	33.67	198	113	A	H
	*	5190	108.53	-	-	103.26	31.55	7.37	33.65	198	113	P	H
	*	5190	98.77	-	-	93.5	31.55	7.37	33.65	198	113	A	H
		5406.65	49.18	-24.82	74	43.39	31.86	7.43	33.5	198	113	P	H
		5410.17	39.25	-14.75	54	33.46	31.86	7.43	33.5	198	113	A	H
		5149.4	61.15	-12.85	74	56.06	31.5	7.26	33.67	167	134	P	V
		5149.25	50.46	-3.54	54	45.37	31.5	7.26	33.67	167	134	A	V
	*	5190	106.77	-	-	101.5	31.55	7.37	33.65	167	134	P	V
	*	5190	95.87	-	-	90.6	31.55	7.37	33.65	167	134	A	V
		5439.65	49.02	-24.98	74	43.16	31.91	7.43	33.48	167	134	P	V
		5399.94	38.92	-15.08	54	33.17	31.86	7.39	33.5	167	134	A	V
802.11n HT40 CH 46 5230MHz		5147.45	59.41	-14.59	74	54.32	31.5	7.26	33.67	210	123	P	H
		5148.35	49.81	-4.19	54	44.72	31.5	7.26	33.67	210	123	A	H
	*	5230	113.22	-	-	107.85	31.62	7.37	33.62	210	123	P	H
	*	5230	105.08	-	-	99.71	31.62	7.37	33.62	210	123	A	H
		5410.94	52.98	-21.02	74	47.19	31.86	7.43	33.5	210	123	P	H
		5407.53	43.58	-10.42	54	37.79	31.86	7.43	33.5	210	123	A	H
		5144.45	57.04	-16.96	74	51.95	31.5	7.26	33.67	150	89	P	V
		5149.85	48.35	-5.65	54	43.26	31.5	7.26	33.67	150	89	A	V
	*	5230	112.94	-	-	107.57	31.62	7.37	33.62	150	89	P	V
	*	5230	107.48	-	-	102.11	31.62	7.37	33.62	150	89	A	V
		5435.25	53.35	-20.65	74	47.49	31.91	7.43	33.48	150	89	P	V
		5386.19	42.92	-11.08	54	37.22	31.83	7.39	33.52	150	89	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	49.15	-24.85	74	58.93	38.65	10.58	59.01	250	0	P	H
		15570	49.78	-24.22	74	57.97	38.44	13.08	59.71	150	0	P	H
		10380	50.15	-23.85	74	59.93	38.65	10.58	59.01	250	0	P	V
		15570	50.58	-23.42	74	58.77	38.44	13.08	59.71	150	0	P	V
802.11n HT40 CH 46 5230MHz		10460	50.82	-23.18	74	60.52	38.74	10.59	59.03	250	0	P	H
		15690	49.86	-24.14	74	58.38	38.06	13.19	59.77	150	0	P	H
		10460	51.96	-22.04	74	61.66	38.74	10.59	59.03	150	323	P	V
		10460	42.54	-11.46	54	52.24	38.74	10.59	59.03	150	323	A	V
		15690	50.97	-23.03	74	59.49	38.06	13.19	59.77	150	0	P	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5148.05	61.46	-12.54	74	56.37	31.5	7.26	33.67	185	75	P	H
		5149.25	52.26	-1.74	54	47.17	31.5	7.26	33.67	185	75	A	H
	*	5210	102.48	-	-	97.15	31.6	7.37	33.64	185	75	P	H
	*	5210	100.73	-	-	95.4	31.6	7.37	33.64	185	75	A	H
		5369.69	48.22	-25.78	74	42.55	31.81	7.39	33.53	185	75	P	H
		5360.78	40.25	-13.75	54	34.58	31.81	7.39	33.53	185	75	A	H
		5145.8	61.41	-12.59	74	56.32	31.5	7.26	33.67	238	81	P	V
		5145.95	52.4	-1.6	54	47.31	31.5	7.26	33.67	238	81	A	V
	*	5210	102.06	-	-	96.73	31.6	7.37	33.64	238	81	P	V
	*	5210	95.45	-	-	90.12	31.6	7.37	33.64	238	81	A	V
		5380.14	54.2	-19.8	74	48.5	31.83	7.39	33.52	238	81	P	V
		5453.07	44.48	-9.52	54	38.55	31.93	7.47	33.47	238	81	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		10420	49.47	-24.53	74	59.21	38.69	10.58	59.01	250	0	P	H
VHT80		15630	50.25	-23.75	74	58.65	38.22	13.12	59.74	150	0	P	H
CH 42		10420	49.93	-24.07	74	59.67	38.69	10.58	59.01	250	0	P	V
5210MHz		15630	49.78	-24.22	74	58.18	38.22	13.12	59.74	150	0	P	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11n HT40 (LF @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		51.34	32.48	-7.52	40	50.37	14.64	0.83	33.36	-	-	P	H
		70.74	34.1	-5.9	40	53.05	13.59	0.83	33.37	-	-	P	H
		96.93	33.84	-9.66	43.5	48.4	17.82	0.99	33.37	-	-	P	H
		129.91	35.89	-7.61	43.5	50.54	17.64	0.99	33.28	-	-	P	H
		174.53	34.38	-9.12	43.5	49.64	16.66	1.28	33.2	-	-	P	H
		874.87	41.59	-4.41	46	43.35	26.87	2.71	31.34	100	200	P	H
		30.97	33.09	-6.91	40	42.16	23.67	0.62	33.36	100	20	QP	V
		51.34	39.9	-0.1	40	57.79	14.64	0.83	33.36	100	22	QP	V
		64.92	39.52	-0.48	40	59.19	12.85	0.83	33.35	100	300	QP	V
		86.26	39.76	-0.24	40	56.1	16.22	0.83	33.39	100	305	QP	V
		100.81	40.53	-2.97	43.5	54.62	18.28	0.99	33.36	100	0	QP	V
		142.52	39.19	-4.31	43.5	53.94	17.36	1.15	33.26			P	V
Remark	3. No other spurious found. 4. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

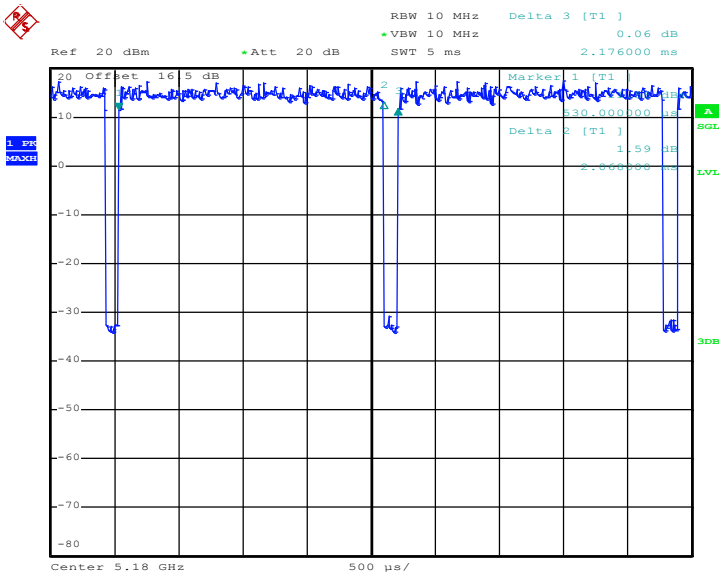
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

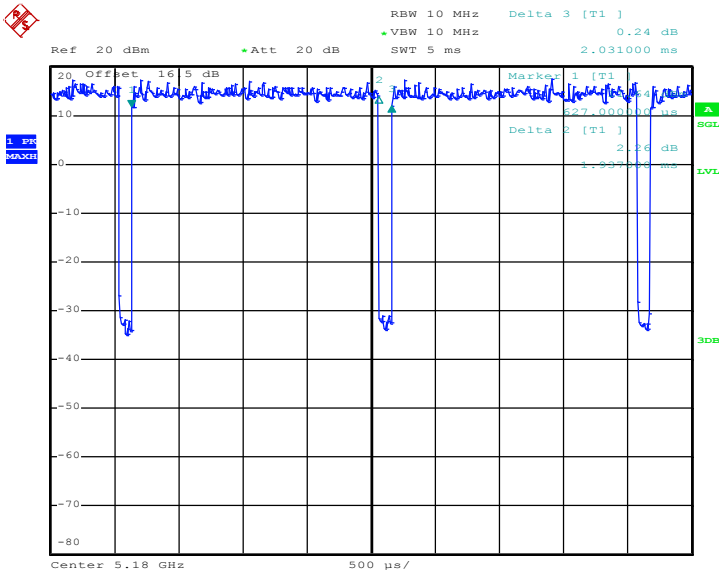
Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2+3	802.11a	95.037	2.068	0.484	1kHz
1+2+3	802.11n HT20	95.372	1.937	0.516	1kHz
1+2+3	802.11n HT40	90.476	0.950	1.053	3kHz
1+2+3	802.11ac VHT20	98.980	-	-	10Hz
1+2+3	802.11ac VHT40	96.976	0.962	1.040	3kHz
1+2+3	802.11ac VHT80	93.737	0.464	2.155	3kHz

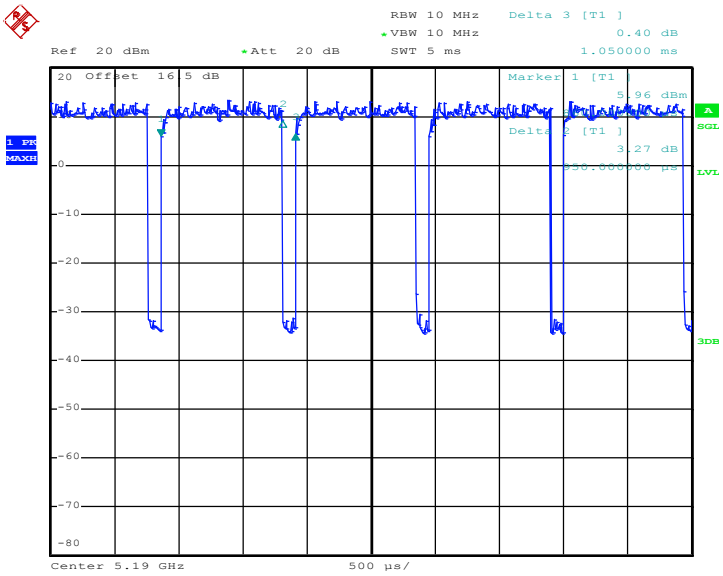
802.11a



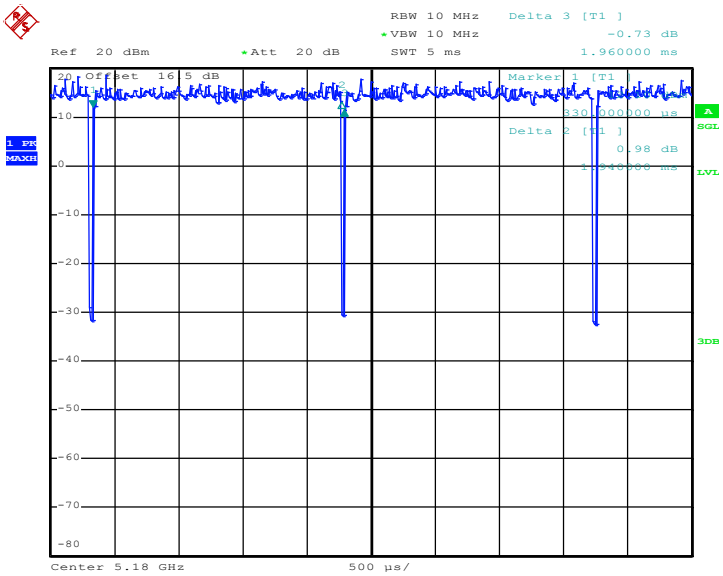
802.11n HT20



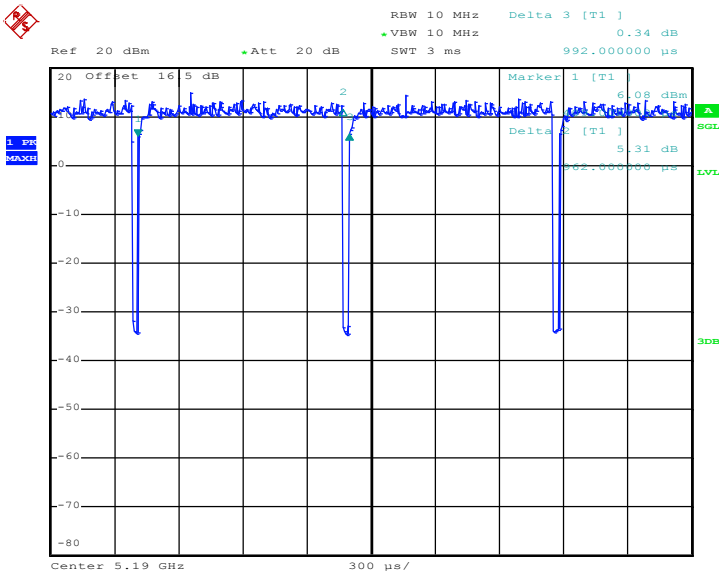
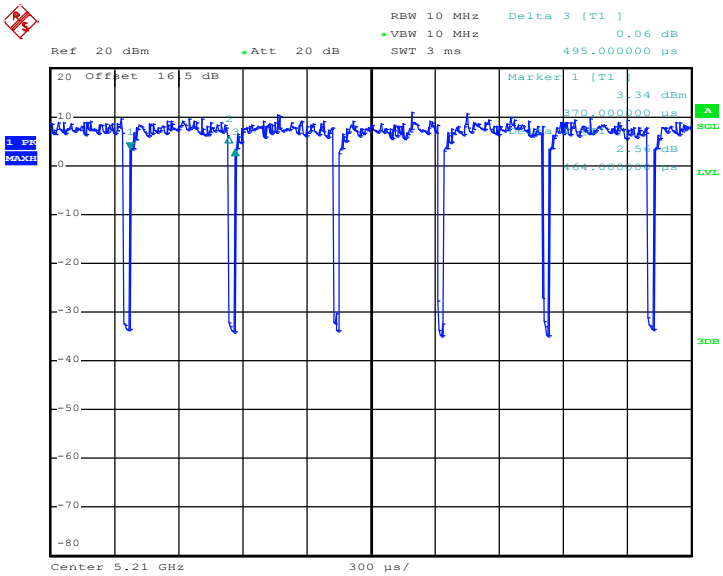
802.11n HT40



802.11ac VHT20



802.11ac VHT40



802.11ac VHT80