FCC RF Test Report

APPLICANT	:	Starry, Inc.
EQUIPMENT	:	Starry Wing
BRAND NAME	:	Starry
MODEL NAME	:	S00211
FCC ID	:	2AGZ3S00211
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was completed on Jan. 12, 2017. 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.

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2627

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR690802E	Rev. 01	Initial issue of report	Jan. 25, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) &15.209(a)	Pass	Under limit 3.05 dB at 69.770 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.30 dB at 0.391 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

Starry, Inc.
PO Box 52226 Boston, MA 02205

1.2 Manufacturer

Flextronics Manufacturing (Zhuhai) Co.Ltd
Xin Qing Science & Technology Industrial Park, Doumen County, Zhuhai

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Starry Wing
Brand Name	Starry
Model Name	S00211
FCC ID	2AGZ3S00211
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/Bluetooth v4.2 LE
HW Version	Wing Ver1.2
SW Version	uboot version:1.0.9 Kernel version:W00002
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	5745 MHz ~ 5825 MHz
Maximum Output Power	**<5745 MHz ~ 5825 MHz>** **<Ant. 1>** 802.11a : 11.67 dBm / 0.0147 W 802.11n HT20 : 11.61 dBm / 0.0145 W 802.11n HT40 : 9.26 dBm / 0.0084 W 802.11ac VHT20: 10.41 dBm / 0.0110 W 802.11ac VHT40: 9.43 dBm / 0.0088 W 802.11ac VHT80: 9.28 dBm / 0.0085 W **<Ant. 2>** 802.11a : 11.44 dBm / 0.0139 W 802.11n HT20 : 11.53 dBm / 0.0142 W 802.11n HT40 : 10.26 dBm / 0.0106 W 802.11ac VHT20: 10.67 dBm / 0.0117 W 802.11ac VHT40: 9.33 dBm / 0.0086 W 802.11ac VHT80: 9.42 dBm / 0.0087 W **MIMO <Ant. 1 + 2>** 802.11n HT20 : 13.47 dBm / 0.0222 W 802.11n HT40 : 10.55 dBm / 0.0114 W 802.11ac VHT20: 12.53 dBm / 0.0179 W 802.11ac VHT40: 9.91 dBm / 0.0098 W 802.11ac VHT80: 11.97 dBm / 0.0157 W
99% Occupied Bandwidth	802.11a : 17.68 MHz 802.11n HT20 : 18.53 MHz 802.11n HT40 : 36.56 MHz 802.11ac VHT20 : 18.28 MHz 802.11ac VHT40 : 36.36 MHz 802.11ac VHT80 : 76.48 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Type / Gain	**Ant. 1 :** FPC Antenna with gain 2.16 dBi **Ant. 2 :** FPC Antenna with gain 2.12 dBi
Antenna Function Description	

	Ant. 1	Ant. 2
802.11 a/n/ac SISO	V	V
802.11 n/ac MIMO	V	V

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

1.5 Modification of EUT

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

1.6 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 Registration No.**
	TH01-KS	CO01-KS	03CH03-KS	306251

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 v01r03
- 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). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5745-5825 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80.

2.2 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Single Antenna

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

MIMO Antenna

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

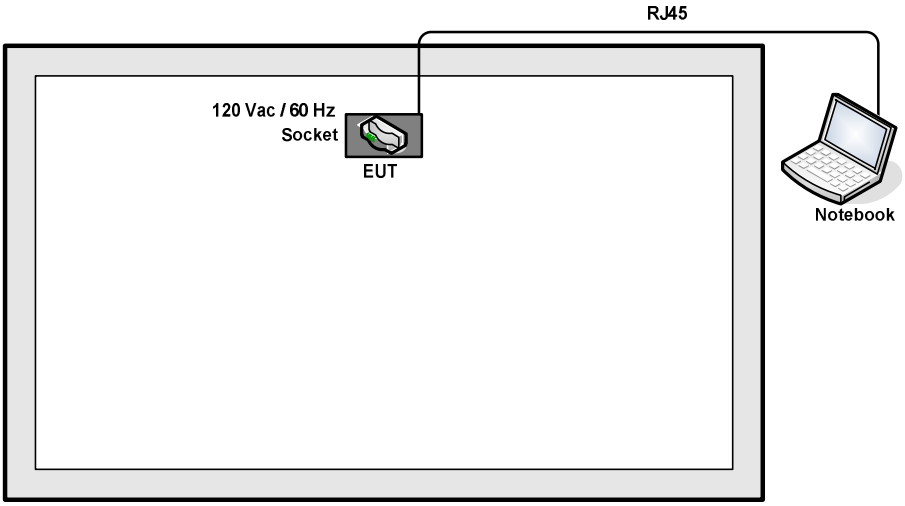
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (5G) Link + LAN Link

Ch. #		Band IV：5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

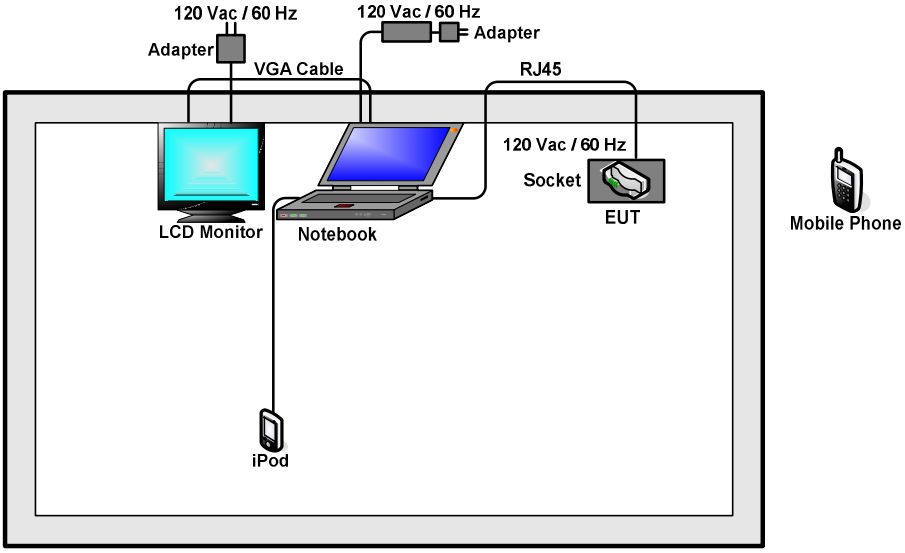
Ch. #		Band IV：5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

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.	Notebook	Lenovo	E49	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
2.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	DELL	BO-130	N/A	N/A	Unshielded, 1.8 m
4.	iPod	Apple	A1199	FCC DoC	Shielded, 1.2 m	N/A
5.	Mobile Phone	ZTE	A1	N/A	N/A	N/A
6.	VGA Cable	Moto	SKN6378A	N/A	N/A	N/A
7.	Socket	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 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 from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 7.0dB.

Offset(dB) = RF cable loss(dB).

= 7.0 (dB)

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

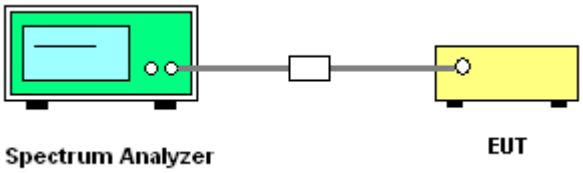
3.1.2 Measuring Instruments

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 v01r03. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

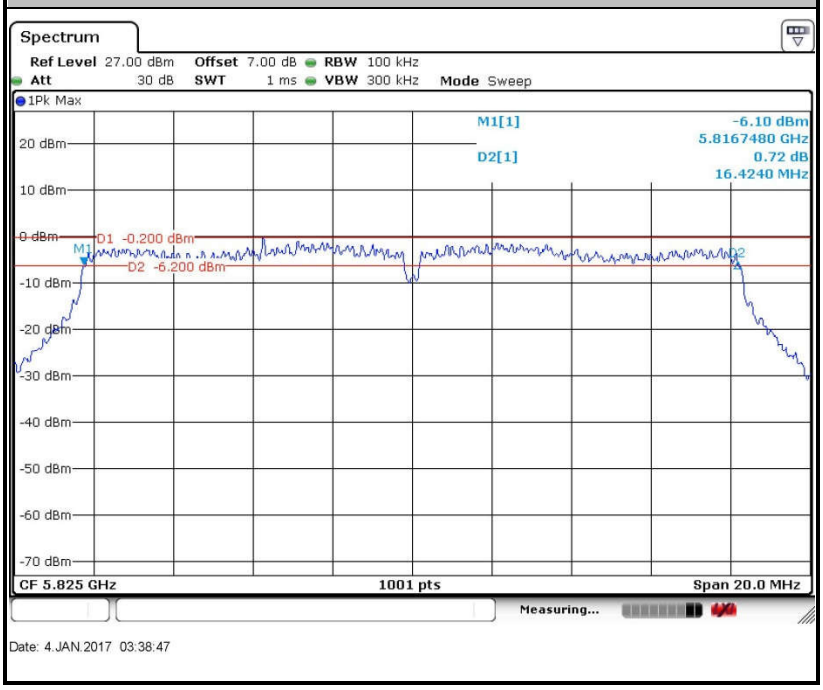
3.1.4 Test Setup



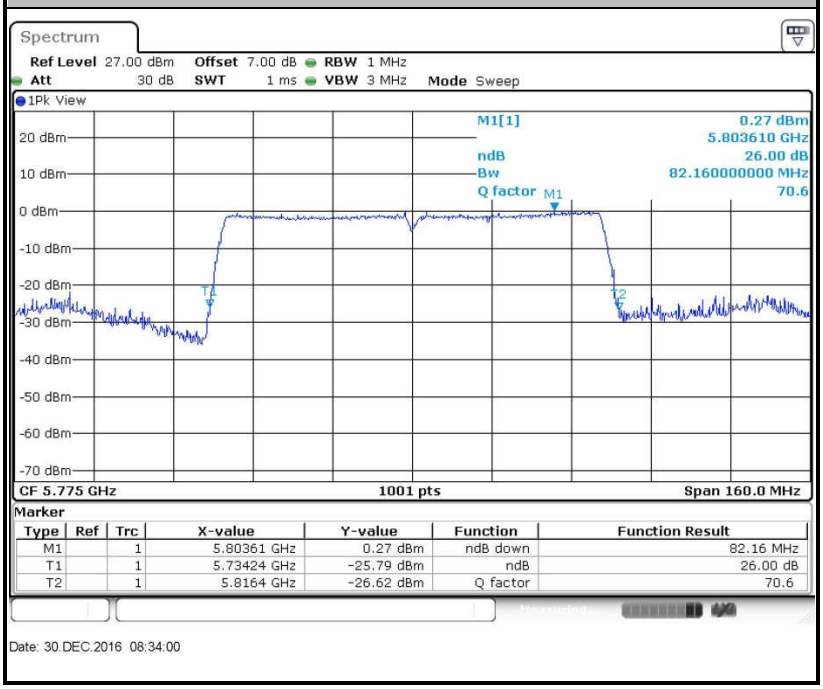
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

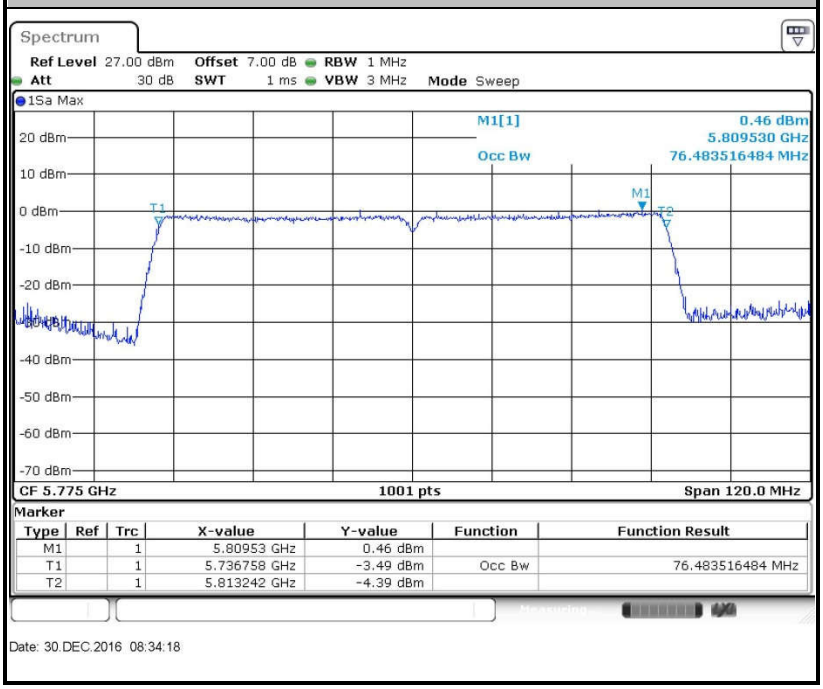
Minimum 6dB Bandwidth



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 the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

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.

3.2.2 Measuring Instruments

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

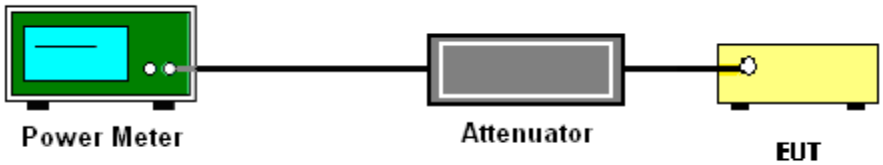
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.

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 the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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 v01r03. 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).

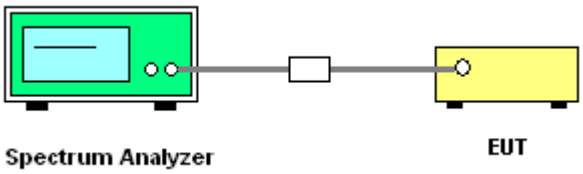
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz.
- Set VBW ≥ 1 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(500kHz/RBW) to the test result.
- 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.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (c): Measure and add 10 log(N_{ANT}) dB.

   With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity 10 log(N_{ANT}) dB is added to each spectrum value before comparing to the emission limit. The addition of 10 log(N_{ANT}) dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{ANT}$ th of the PSD limit.

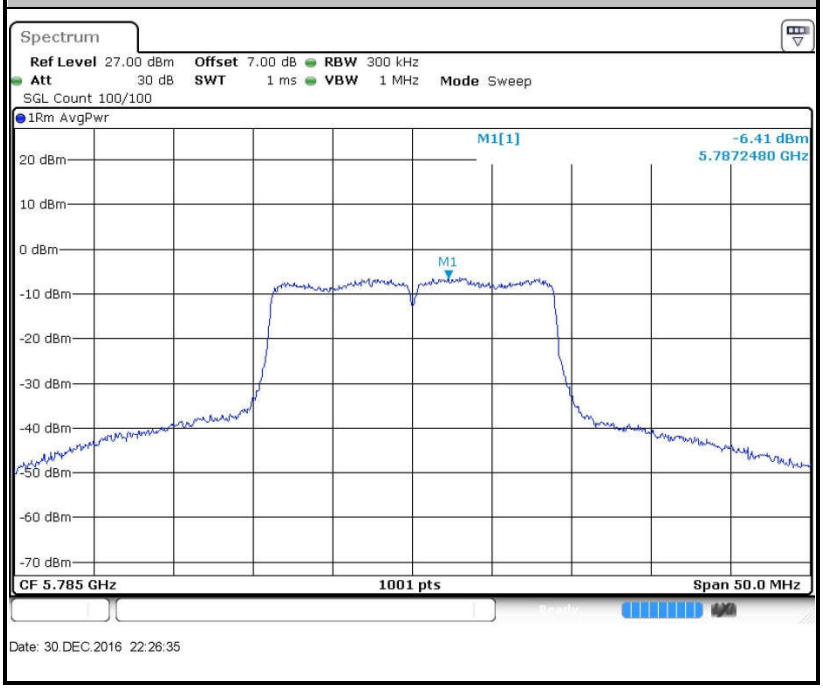
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300kHz)



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 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(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) KDB 789033 D02 General UNII Test Procedures New Rules v01r03 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 v01r03. 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

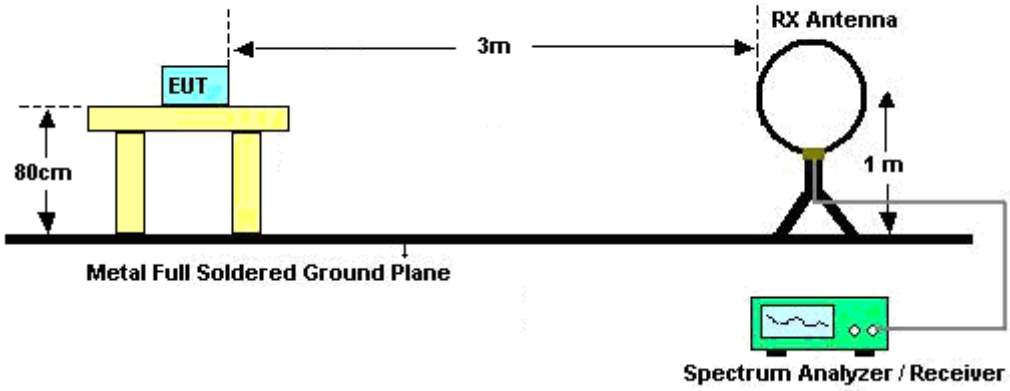
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

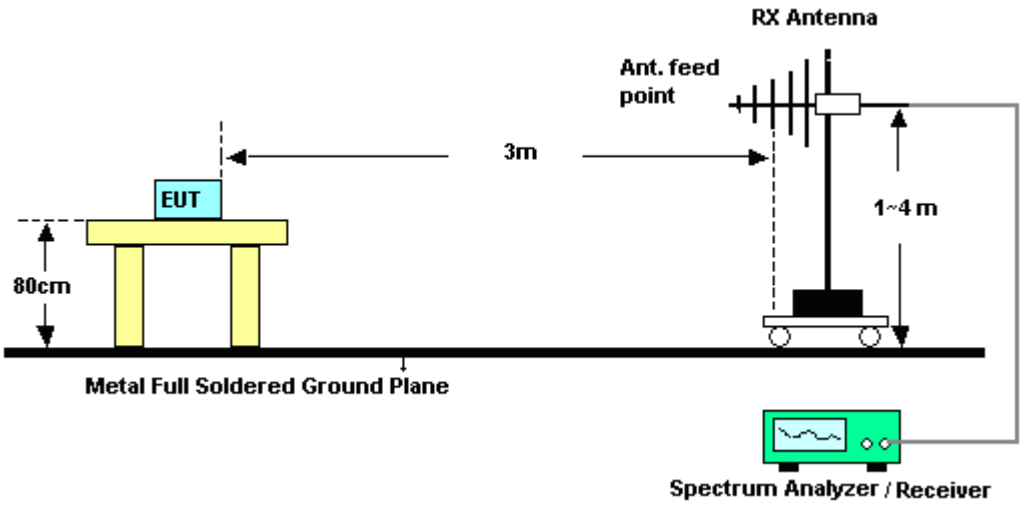
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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

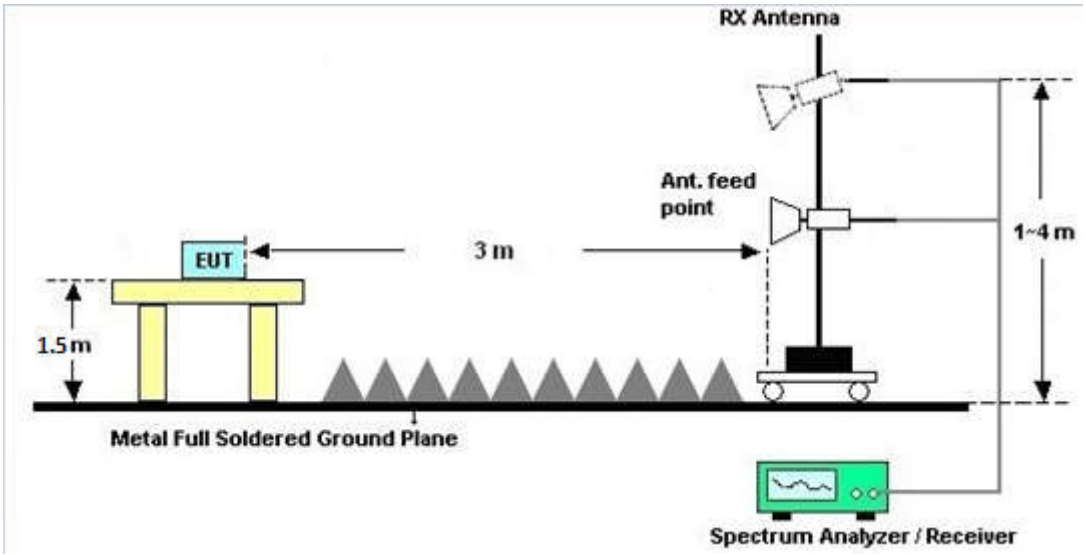
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Spurious 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 Spurious at Band Edges

Please refer to Appendix B.

3.4.7 Duty Cycle

Please refer to Appendix C.

3.4.8 Test Result of Radiated Spurious Emissions (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.

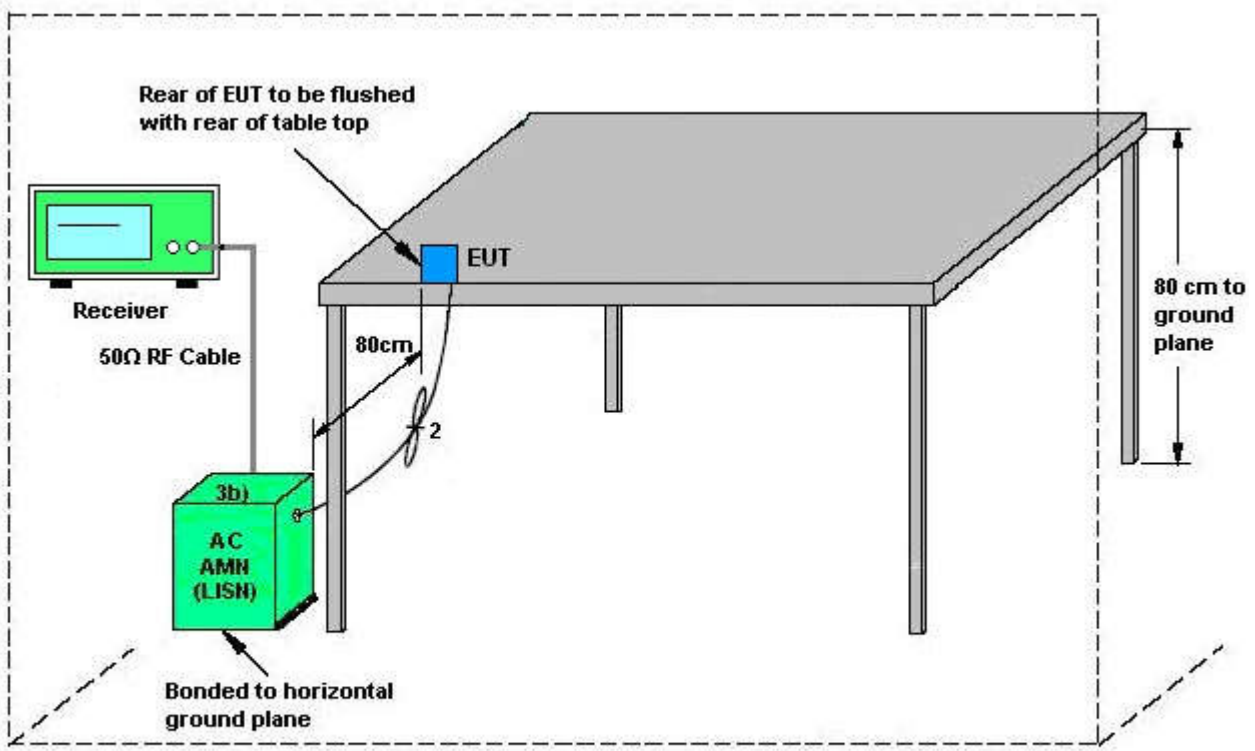
3.5.2 Measuring Instruments

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.

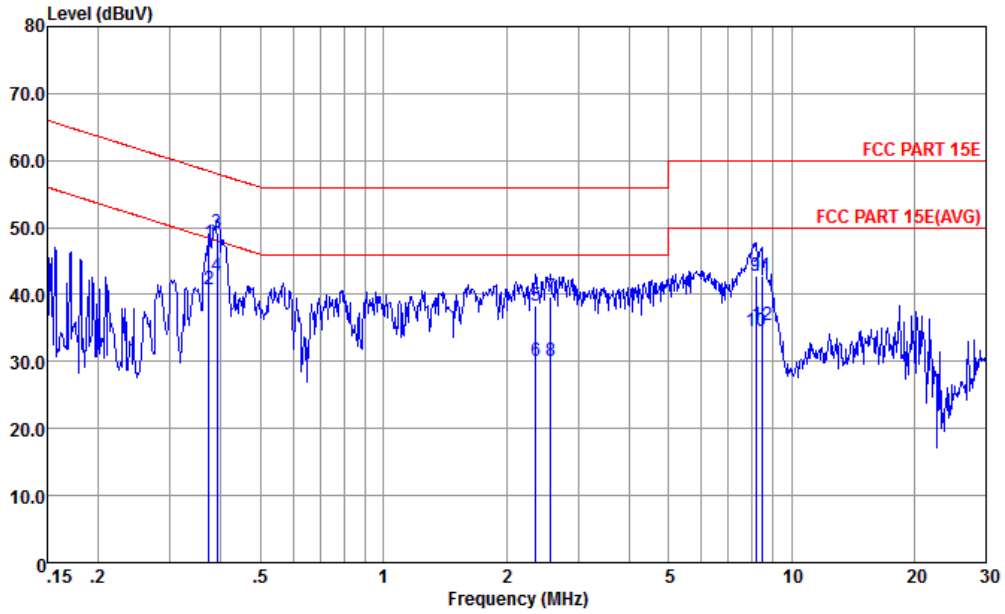
3.5.4 Test Setup



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 1	**Temperature :**	20~22℃
Test Engineer :	Peter Wei	**Relative Humidity :**	40~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (5G) Link + LAN Link		

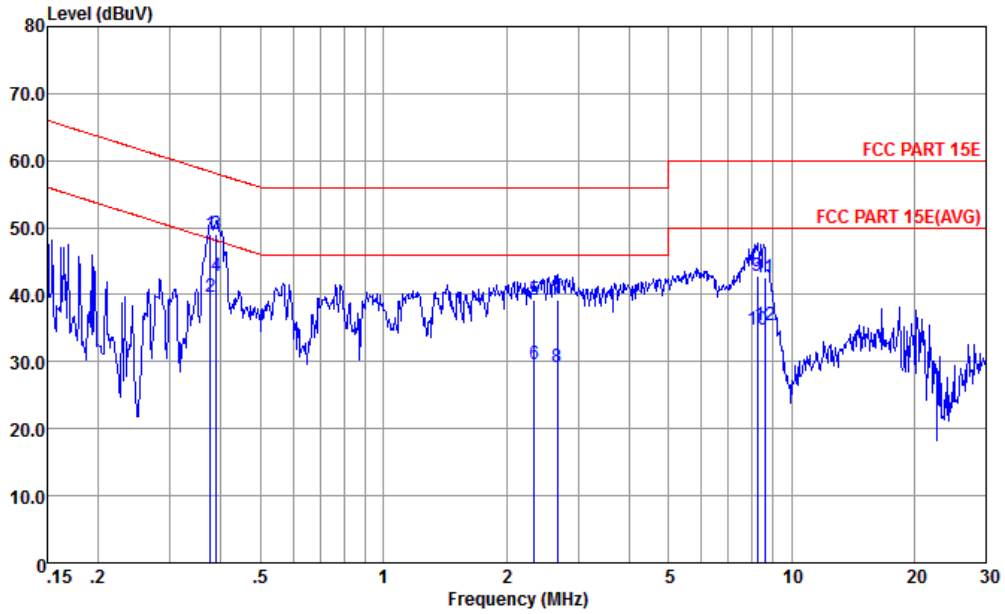


Site : CO01-KS
Condition : FCC PART 15E LISN-L-20151024 LINE

mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.373	47.74	-10.69	58.43	37.30	0.23	10.21	QP
2	0.373	40.74	-7.69	48.43	30.30	0.23	10.21	Average
3	0.391	49.33	-8.70	58.03	38.90	0.23	10.20	QP
4 *	0.391	42.73	-5.30	48.03	32.30	0.23	10.20	Average
5	2.358	38.28	-17.72	56.00	27.90	0.18	10.20	QP
6	2.358	29.98	-16.02	46.00	19.60	0.18	10.20	Average
7	2.567	39.59	-16.41	56.00	29.20	0.18	10.21	QP
8	2.567	29.99	-16.01	46.00	19.60	0.18	10.21	Average
9	8.192	42.85	-17.15	60.00	32.30	0.24	10.31	QP
10	8.192	34.45	-15.55	50.00	23.90	0.24	10.31	Average
11	8.456	42.76	-17.24	60.00	32.21	0.24	10.31	QP
12	8.456	35.46	-14.54	50.00	24.91	0.24	10.31	Average

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Peter Wei	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN (5G) Link + LAN Link		



Site : CO01-KS
Condition : FCC PART 15E LISN-N-20151024 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		0.377	49.03	-9.31	58.34	38.50	0.32	10.21	QP
2		0.377	39.63	-8.71	48.34	29.10	0.32	10.21	Average
3		0.389	49.12	-8.96	58.08	38.60	0.32	10.20	QP
4	*	0.389	42.72	-5.36	48.08	32.20	0.32	10.20	Average
5		2.346	39.18	-16.82	56.00	28.60	0.38	10.20	QP
6		2.346	29.68	-16.32	46.00	19.10	0.38	10.20	Average
7		2.664	39.18	-16.82	56.00	28.60	0.37	10.21	QP
8		2.664	29.08	-16.92	46.00	18.50	0.37	10.21	Average
9		8.235	42.80	-17.20	60.00	32.20	0.29	10.31	QP
10		8.235	34.70	-15.30	50.00	24.10	0.29	10.31	Average
11		8.592	42.50	-17.50	60.00	31.90	0.28	10.32	QP
12		8.592	35.40	-14.60	50.00	24.80	0.28	10.32	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.

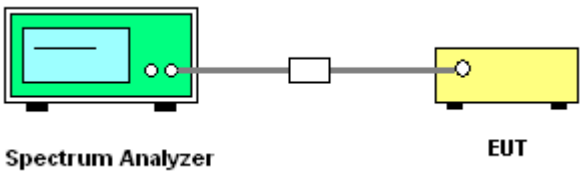
3.6.2 Measuring Instruments

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

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

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.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

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.

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band IV	2.16	2.12	2.16	5.15	0.00	0.00

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

PSD limit reduction = Composite gain + PSD Array gain – 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	101040	10Hz~40GHz	Aug. 09, 2016	Dec. 30, 2016~ Jan. 04, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Dec. 30, 2016~ Jan. 04, 2017	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Dec. 30, 2016~ Jan. 04, 2017	Jan. 19, 2017	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 13, 2016	Dec. 30, 2016~ Jan. 04, 2017	Oct. 12, 2017	Conducted (TH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Apr. 29, 2016	Jan. 12, 2017	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Jan. 12, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Jan. 12, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Jan. 12, 2017	Oct. 12, 2017	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Jan. 12, 2017	Aug. 08, 2017	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Jan. 12, 2017	Apr. 21, 2017	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Jan. 12, 2017	Nov. 22, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Jan. 12, 2017	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Jan. 12, 2017	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Jan. 12, 2017	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Jan. 12, 2017	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Jan. 20, 2016	Jan. 12, 2017	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Jan. 12, 2017	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 12, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 12, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 12, 2017	NCR	Radiation (03CH03-KS)

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))	2.5 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5 dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.6 dB

Appendix A. Conducted Test Results

Report Number : FR690802E

Test Engineer:	Ivan Zhang	Temperature:	24~25	°C
Test Date:	2017/12/30~2017/1/4	Relative Humidity:	54~55	%

Report Number : FR690802E

TEST RESULTS DATA
6dB and 26dB EBW and 99% OBW

Band IV													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		6 dB Bandwidth (MHz)		6 dB Bandwidth Min. Limit (MHz)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	17.53		21.03		16.50		0.5	0.5	Pass
11a	6Mbps	1	157	5785	17.68		20.98		16.54		0.5	0.5	Pass
11a	6Mbps	1	165	5825	17.63		20.98		16.42		0.5	0.5	Pass
HT20	MCS0	1	149	5745	18.28		21.28		17.58		0.5	0.5	Pass
HT20	MCS0	1	157	5785	18.33		21.33		17.68		0.5	0.5	Pass
HT20	MCS0	1	165	5825	18.18		21.28		17.58		0.5	0.5	Pass
HT40	MCS0	1	151	5755		36.46		41.90		36.28	0.5	0.5	Pass
HT40	MCS0	1	159	5795		36.56		41.81		35.92	0.5	0.5	Pass
VHT20	MCS0	1	149	5745		18.13		21.38		17.66	0.5	0.5	Pass
VHT20	MCS0	1	157	5785		18.13		21.28		17.66	0.5	0.5	Pass
VHT20	MCS0	1	165	5825		18.08		21.23		17.58	0.5	0.5	Pass
VHT40	MCS0	1	151	5755	36.36		41.90		36.32		0.5	0.5	Pass
VHT40	MCS0	1	159	5795	36.36		41.54		36.44		0.5	0.5	Pass
VHT80	MCS0	1	155	5775		76.48		82.16		76.32	0.5	0.5	Pass
HT20	MCS0	2	149	5745	18.53	18.33	21.53	21.28	17.70	17.58	0.5		Pass
HT20	MCS0	2	157	5785	18.38	18.33	21.63	21.18	17.60	17.64	0.5		Pass
HT20	MCS0	2	165	5825	18.28	18.23	21.58	21.18	17.64	17.58	0.5		Pass
HT40	MCS0	2	151	5755	36.46	36.36	41.72	41.18	36.36	36.32	0.5		Pass
HT40	MCS0	2	159	5795	36.46	36.36	41.54	41.00	35.92	36.36	0.5		Pass
VHT20	MCS0	2	149	5745	18.18	18.23	21.33	21.23	17.60	17.64	0.5		Pass
VHT20	MCS0	2	157	5785	18.23	18.28	21.43	21.28	17.68	17.58	0.5		Pass
VHT20	MCS0	2	165	5825	18.13	18.23	21.43	21.03	17.60	17.58	0.5		Pass
VHT40	MCS0	2	151	5755	36.36	36.26	41.72	41.00	36.28	36.28	0.5		Pass
VHT40	MCS0	2	159	5795	36.36	36.26	41.72	40.73	35.88	36.32	0.5		Pass
VHT80	MCS0	2	155	5775	76.36	76.24	81.68	81.52	76.08	76.48	0.5		Pass

Report Number : FR690802E

TEST RESULTS DATA
Average Power Table

Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	149	5745	0.00	0.00	10.66	10.68		30.00	30.00	2.16	2.12		Pass
11a	6Mbps	1	157	5785	0.00	0.00	11.17	10.93		30.00	30.00	2.16	2.12		Pass
11a	6Mbps	1	165	5825	0.00	0.00	11.67	11.44		30.00	30.00	2.16	2.12		Pass
HT20	MCS0	1	149	5745	0.00	0.00	10.67	11.53		30.00	30.00	2.16	2.12		Pass
HT20	MCS0	1	157	5785	0.00	0.00	11.13	10.99		30.00	30.00	2.16	2.12		Pass
HT20	MCS0	1	165	5825	0.00	0.00	11.61	11.43		30.00	30.00	2.16	2.12		Pass
HT40	MCS0	1	151	5755	0.00	0.00	8.42	9.86		30.00	30.00	2.16	2.12		Pass
HT40	MCS0	1	159	5795	0.00	0.00	9.26	10.26		30.00	30.00	2.16	2.12		Pass
VHT20	MCS0	1	149	5745	0.00	0.00	10.41	10.34		30.00	30.00	2.16	2.12		Pass
VHT20	MCS0	1	157	5785	0.00	0.00	9.54	10.67		30.00	30.00	2.16	2.12		Pass
VHT20	MCS0	1	165	5825	0.00	0.00	9.77	10.17		30.00	30.00	2.16	2.12		Pass
VHT40	MCS0	1	151	5755	0.00	0.00	9.43	9.30		30.00	30.00	2.16	2.12		Pass
VHT40	MCS0	1	159	5795	0.00	0.00	9.04	9.33		30.00	30.00	2.16	2.12		Pass
VHT80	MCS0	1	155	5775	0.00	0.00	9.28	9.42		30.00	30.00	2.16	2.12		Pass
HT20	MCS0	2	149	5745	0.00	0.00	10.74	10.15	13.47	30.00		2.16			Pass
HT20	MCS0	2	157	5785	0.00	0.00	10.03	8.32	12.27	30.00		2.16			Pass
HT20	MCS0	2	165	5825	0.00	0.00	9.25	7.94	11.65	30.00		2.16			Pass
HT40	MCS0	2	151	5755	0.00	0.00	7.61	7.46	10.55	30.00		2.16			Pass
HT40	MCS0	2	159	5795	0.00	0.00	7.56	7.24	10.41	30.00		2.16			Pass
VHT20	MCS0	2	149	5745	0.00	0.00	9.40	9.15	12.29	30.00		2.16			Pass
VHT20	MCS0	2	157	5785	0.00	0.00	10.28	8.59	12.53	30.00		2.16			Pass
VHT20	MCS0	2	165	5825	0.00	0.00	7.86	7.47	10.68	30.00		2.16			Pass
VHT40	MCS0	2	151	5755	0.00	0.00	6.42	6.45	9.45	30.00		2.16			Pass
VHT40	MCS0	2	159	5795	0.00	0.00	7.22	6.55	9.91	30.00		2.16			Pass
VHT80	MCS0	2	155	5775	0.00	0.00	8.62	9.28	11.97	30.00		2.16			Pass

Report Number : FR690802E

TEST RESULTS DATA
Power Spectral Density

Band IV																	
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	0.00	0.00	2.22	2.22	-3.59			30.00	30.00	2.16	2.12	Pass
11a	6Mbps	1	157	5785	0.00	0.00	2.22	2.22	-2.80			30.00	30.00	2.16	2.12	Pass
11a	6Mbps	1	165	5825	0.00	0.00	2.22	2.22	-2.84			30.00	30.00	2.16	2.12	Pass
HT20	MCS0	1	149	5745	0.00	0.00	2.22	2.22	-4.14			30.00	30.00	2.16	2.12	Pass
HT20	MCS0	1	157	5785	0.00	0.00	2.22	2.22	-3.25			30.00	30.00	2.16	2.12	Pass
HT20	MCS0	1	165	5825	0.00	0.00	2.22	2.22	-2.94			30.00	30.00	2.16	2.12	Pass
HT40	MCS0	1	151	5755	0.00	0.00	2.22	2.22		-7.94		30.00	30.00	2.16	2.12	Pass
HT40	MCS0	1	159	5795	0.00	0.00	2.22	2.22		-6.32		30.00	30.00	2.16	2.12	Pass
VHT20	MCS0	1	149	5745	0.00	0.00	2.22	2.22		-3.78		30.00	30.00	2.16	2.12	Pass
VHT20	MCS0	1	157	5785	0.00	0.00	2.22	2.22		-3.43		30.00	30.00	2.16	2.12	Pass
VHT20	MCS0	1	165	5825	0.00	0.00	2.22	2.22		-4.40		30.00	30.00	2.16	2.12	Pass
VHT40	MCS0	1	151	5755	0.00	0.00	2.22	2.22	-7.48			30.00	30.00	2.16	2.12	Pass
VHT40	MCS0	1	159	5795	0.00	0.00	2.22	2.22	-7.72			30.00	30.00	2.16	2.12	Pass
VHT80	MCS0	1	155	5775	0.00	0.00	2.22	2.22		-11.70		30.00	30.00	2.16	2.12	Pass
HT20	MCS0	2	149	5745	0.00	0.00	2.22				-1.21	30.00		5.15		Pass
HT20	MCS0	2	157	5785	0.00	0.00	2.22				-1.35	30.00		5.15		Pass
HT20	MCS0	2	165	5825	0.00	0.00	2.22				-2.20	30.00		5.15		Pass
HT40	MCS0	2	151	5755	0.00	0.00	2.22				-7.22	30.00		5.15		Pass
HT40	MCS0	2	159	5795	0.00	0.00	2.22				-5.70	30.00		5.15		Pass
VHT20	MCS0	2	149	5745	0.00	0.00	2.22				-1.85	30.00		5.15		Pass
VHT20	MCS0	2	157	5785	0.00	0.00	2.22				-1.18	30.00		5.15		Pass
VHT20	MCS0	2	165	5825	0.00	0.00	2.22				-3.59	30.00		5.15		Pass
VHT40	MCS0	2	151	5755	0.00	0.00	2.22				-8.71	30.00		5.15		Pass
VHT40	MCS0	2	159	5795	0.00	0.00	2.22				-7.51	30.00		5.15		Pass
VHT80	MCS0	2	155	5775	0.00	0.00	2.22				-8.77	30.00		5.15		Pass

Report Number : FR690802E

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	149	5745	5745.025	0.025	4.35	50	110	
11a	6Mbps	1	149	5745	5745.050	0.050	8.70	-30	110	
11a	6Mbps	1	149	5745	5744.975	-0.025	-4.35	20	240	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	100	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	110	

Appendix B. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	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 149 5745MHz		5698.8	53.75	-50.67	104.42	49.73	32.02	8.25	36.25	100	303	P	H
		5719.1	65.21	-45.44	110.65	61.14	32.04	8.31	36.28	100	303	P	H
		5724	68.78	-51.24	120.02	64.71	32.04	8.31	36.28	100	303	P	H
		5748	103.25	-	-	99.15	32.05	8.34	36.29	100	303	P	H
		5748	96.31	-	-	92.21	32.05	8.34	36.29	100	303	A	H
		5698.5	58.49	-45.7	104.19	54.47	32.02	8.25	36.25	100	270	P	V
		5719.2	70.56	-40.12	110.68	66.49	32.04	8.31	36.28	100	270	P	V
		5723.8	75.69	-43.87	119.56	71.62	32.04	8.31	36.28	100	270	P	V
		5742	108.61	-	-	104.51	32.05	8.34	36.29	100	270	P	V
		5742	101.24	-	-	97.14	32.05	8.34	36.29	100	270	A	V
802.11a CH 157 5785MHz		5693.3	45.95	-54.41	100.36	41.93	32.02	8.25	36.25	100	272	P	H
		5714.1	47.33	-61.92	109.25	43.29	32.03	8.28	36.27	100	272	P	H
		5724.5	46.33	-74.83	121.16	42.26	32.04	8.31	36.28	100	272	P	H
		5782	99.04	-	-	94.89	32.06	8.4	36.31	100	272	P	H
		5782	91.74	-	-	87.59	32.06	8.4	36.31	100	272	A	H
		5851.24	45.71	-73.76	119.47	41.49	32.09	8.49	36.36	100	272	P	H
		5867.96	46.9	-60.37	107.27	42.66	32.1	8.51	36.37	100	272	P	H
		5886.77	46.42	-50.14	96.56	42.17	32.1	8.53	36.38	100	272	P	H
		5697.5	46.86	-56.6	103.46	42.84	32.02	8.25	36.25	267	295	P	V
		5712.7	48.9	-59.96	108.86	44.86	32.03	8.28	36.27	267	295	P	V
		5724.7	51.34	-70.28	121.62	47.27	32.04	8.31	36.28	267	295	P	V
		5788	105.5	-	-	101.32	32.07	8.43	36.32	267	295	P	V
		5788	97.88	-	-	93.7	32.07	8.43	36.32	267	295	A	V
		5851.43	47.57	-71.47	119.04	43.35	32.09	8.49	36.36	267	295	P	V
		5864.92	50.1	-58.02	108.12	45.86	32.1	8.51	36.37	267	295	P	V
		5882.59	47.32	-52.34	99.66	43.07	32.1	8.53	36.38	267	295	P	V

WIFI Ant. 1	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 165 5825MHz		5822	103.86	-	-	99.66	32.08	8.47	36.35	100	302	P	H
		5822	95.6	-	-	91.4	32.08	8.47	36.35	100	302	A	H
		5852.57	65.43	-51.01	116.44	61.21	32.09	8.49	36.36	100	302	P	H
		5856.94	60.3	-50.06	110.36	56.06	32.1	8.51	36.37	100	302	P	H
		5876.13	54.09	-50.37	104.46	49.84	32.1	8.53	36.38	100	302	P	H
		5828	108.24	-	-	104.04	32.08	8.47	36.35	100	312	P	V
		5828	100.39	-	-	96.19	32.08	8.47	36.35	100	312	A	V
		5851.05	72.28	-47.63	119.91	68.06	32.09	8.49	36.36	100	312	P	V
		5857.51	68.44	-41.76	110.2	64.2	32.1	8.51	36.37	100	312	P	V
		5875.18	59.04	-46.13	105.17	54.79	32.1	8.53	36.38	100	312	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	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 149 5745MHz		11490	42.77	-31.23	74	48.59	38.59	12.57	56.98	160	360	P	H
		11490	39.68	-34.32	74	45.5	38.59	12.57	56.98	160	360	P	V
802.11a CH 157 5785MHz		11570	39.4	-34.6	74	45.17	38.75	12.63	57.15	160	360	P	H
		11570	38.5	-35.5	74	44.27	38.75	12.63	57.15	160	360	P	V
802.11a CH 165 5825MHz		11650	40.96	-33.04	74	46.68	38.9	12.67	57.29	160	360	P	H
		11650	40	-34	74	45.72	38.9	12.67	57.29	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant. 2	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 149 5745MHz		5694.7	47.04	-54.35	101.39	43.02	32.02	8.25	36.25	334	252	P	H
		5719.4	53.09	-57.64	110.73	49.02	32.04	8.31	36.28	334	252	P	H
		5724.6	58.39	-63	121.39	54.32	32.04	8.31	36.28	334	252	P	H
		5742	95.1	-	-	91	32.05	8.34	36.29	334	252	P	H
		5742	87.6	-	-	83.5	32.05	8.34	36.29	334	252	A	H
		5698.8	52.79	-51.63	104.42	48.77	32.02	8.25	36.25	216	64	P	V
		5719.6	64.48	-46.31	110.79	60.41	32.04	8.31	36.28	216	64	P	V
		5724.1	69.55	-50.7	120.25	65.48	32.04	8.31	36.28	216	64	P	V
		5746	107.25	-	-	103.15	32.05	8.34	36.29	216	64	P	V
		5746	100	-	-	95.9	32.05	8.34	36.29	216	64	A	V
802.11a CH 157 5785MHz		5698.1	45.65	-58.25	103.9	41.63	32.02	8.25	36.25	376	22	P	H
		5705.6	45.95	-60.92	106.87	41.91	32.03	8.28	36.27	376	22	P	H
		5723.3	45.21	-73.21	118.42	41.14	32.04	8.31	36.28	376	22	P	H
		5782	97.66	-	-	93.51	32.06	8.4	36.31	376	22	P	H
		5782	89.71	-	-	85.56	32.06	8.4	36.31	376	22	A	H
		5854.98	45.44	-65.51	110.95	41.2	32.1	8.51	36.37	376	22	P	H
		5871.95	46.58	-59.57	106.15	42.33	32.1	8.53	36.38	376	22	P	H
		5887.72	46.94	-48.92	95.86	42.68	32.11	8.55	36.4	376	22	P	H
		5699.4	48.08	-56.78	104.86	44.06	32.02	8.25	36.25	211	65	P	V
		5712.1	51.28	-57.41	108.69	47.24	32.03	8.28	36.27	211	65	P	V
		5720.5	49.4	-62.64	112.04	45.33	32.04	8.31	36.28	211	65	P	V
		5782	108.32	-	-	104.17	32.06	8.4	36.31	211	65	P	V
		5782	101.47	-	-	97.32	32.06	8.4	36.31	211	65	A	V
		5853.14	50.71	-64.43	115.14	46.49	32.09	8.49	36.36	211	65	P	V
		5857.7	51.82	-58.32	110.14	47.58	32.1	8.51	36.37	211	65	P	V
		5888.1	49.6	-45.98	95.58	45.34	32.11	8.55	36.4	211	65	P	V

WIFI Ant. 2	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 165 5825MHz		5828	97.99	-	-	93.79	32.08	8.47	36.35	157	155	P	H
		5828	90.28	-	-	86.08	32.08	8.47	36.35	157	155	A	H
		5851.43	57.5	-61.54	119.04	53.28	32.09	8.49	36.36	157	155	P	H
		5855.04	55.5	-55.39	110.89	51.26	32.1	8.51	36.37	157	155	P	H
		5876.13	46.91	-57.55	104.46	42.66	32.1	8.53	36.38	157	155	P	H
		5828	108.97	-	-	104.77	32.08	8.47	36.35	226	63	P	V
		5828	101.67	-	-	97.47	32.08	8.47	36.35	226	63	A	V
		5851.81	70.71	-47.46	118.17	66.49	32.09	8.49	36.36	226	63	P	V
		5856.56	64.85	-45.61	110.46	60.61	32.1	8.51	36.37	226	63	P	V
		5877.84	53.43	-49.76	103.19	49.18	32.1	8.53	36.38	226	63	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 2	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 149 5745MHz		11490	41.85	-32.15	74	47.67	38.59	12.57	56.98	160	360	P	H
		11490	39.55	-34.45	74	45.37	38.59	12.57	56.98	160	360	P	V
802.11a CH 157 5785MHz		11570	40.92	-33.08	74	46.69	38.75	12.63	57.15	160	360	P	H
		11570	40.47	-33.53	74	46.24	38.75	12.63	57.15	160	360	P	V
802.11a CH 165 5825MHz		11650	40.8	-33.2	74	46.52	38.9	12.67	57.29	160	360	P	H
		11650	41.77	-32.23	74	47.49	38.9	12.67	57.29	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 - 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	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 149 5745MHz		5697.4	64.83	-38.55	103.38	60.81	32.02	8.25	36.25	100	190	P	H
		5719.9	73.27	-37.6	110.87	69.2	32.04	8.31	36.28	100	190	P	H
		5724.7	81.19	-40.43	121.62	77.12	32.04	8.31	36.28	100	190	P	H
		5742	109.62	-	-	105.52	32.05	8.34	36.29	100	190	P	H
		5742	102.25	-	-	98.15	32.05	8.34	36.29	100	190	A	H
		5696.9	54.17	-48.85	103.02	50.15	32.02	8.25	36.25	100	315	P	V
		5716.2	64.53	-45.31	109.84	60.49	32.03	8.28	36.27	100	315	P	V
		5722.1	69.12	-46.57	115.69	65.05	32.04	8.31	36.28	100	315	P	V
		5748	103.22	-	-	99.12	32.05	8.34	36.29	100	315	P	V
		5748	96.01	-	-	91.91	32.05	8.34	36.29	100	315	A	V
802.11n HT20 CH 157 5785MHz		5685.2	53.21	-41.17	94.38	49.19	32.02	8.25	36.25	100	191	P	H
		5710.3	54.51	-53.68	108.19	50.47	32.03	8.28	36.27	100	191	P	H
		5724.9	54.88	-67.19	122.07	50.81	32.04	8.31	36.28	100	191	P	H
		5788	106.81	-	-	102.63	32.07	8.43	36.32	100	191	P	H
		5788	99.62	-	-	95.44	32.07	8.43	36.32	100	191	A	H
		5854.85	53.43	-57.81	111.24	49.19	32.1	8.51	36.37	100	191	P	H
		5859.98	53.73	-55.77	109.5	49.49	32.1	8.51	36.37	100	191	P	H
		5886.58	53.06	-43.64	96.7	48.81	32.1	8.53	36.38	100	191	P	H
		5693.9	52.28	-48.52	100.8	48.26	32.02	8.25	36.25	100	321	P	V
		5716.3	52.68	-57.19	109.87	48.64	32.03	8.28	36.27	100	321	P	V
		5723.8	53.03	-66.53	119.56	48.96	32.04	8.31	36.28	100	321	P	V
		5788	100.36	-	-	96.18	32.07	8.43	36.32	100	321	P	V
		5788	93.02	-	-	88.84	32.07	8.43	36.32	100	321	A	V
		5854.09	52.94	-60.03	112.97	48.7	32.1	8.51	36.37	100	321	P	V
		5870.05	53.32	-53.36	106.68	49.08	32.1	8.51	36.37	100	321	P	V
		5880.31	53.97	-47.39	101.36	49.72	32.1	8.53	36.38	100	321	P	V

WIFI Ant. 1+2	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 165 5825MHz		5822	106.2	-	-	102	32.08	8.47	35.35	296	173	P	H
		5822	99.23	-	-	95.03	32.08	8.47	36.35	296	173	A	H
		5852.19	63.44	-53.87	117.31	59.22	32.09	8.49	36.36	296	173	P	H
		5855.04	59.06	-51.83	110.89	54.82	32.1	8.51	36.37	296	173	P	H
		5878.22	54.19	-48.72	102.91	49.94	32.1	8.53	36.38	296	173	P	H
		5824	101.05	-	-	96.85	32.08	8.47	36.35	298	79	P	V
		5824	94.14	-	-	89.94	32.08	8.47	36.35	298	79	A	V
		5850.1	55.93	-66.14	122.07	51.71	32.09	8.49	36.36	298	79	P	V
		5856.94	54.48	-55.88	110.36	50.24	32.1	8.51	36.37	298	79	P	V
		5886.01	53.38	-43.75	97.13	49.13	32.1	8.53	36.38	298	79	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	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 149 5745MHz		11490	39.92	-34.08	74	45.74	38.59	12.57	56.98	160	360	P	H
		11490	40.04	-33.96	74	45.86	38.59	12.57	56.98	160	360	P	V
802.11n HT20 CH 157 5785MHz		11570	40.55	-33.45	74	46.32	38.75	12.63	57.15	160	360	P	H
		11570	41.3	-32.7	74	47.07	38.75	12.63	57.15	160	360	P	V
802.11n HT20 CH 165 5825MHz		11650	44.28	-29.72	74	50	38.9	12.67	57.29	160	360	P	H
		11650	43.35	-30.65	74	49.07	38.9	12.67	57.29	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	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 151 5755MHz		5699.1	60.29	-44.35	104.64	56.27	32.02	8.25	36.25	370	189	P	H
		5715.7	73.63	-36.07	109.7	69.59	32.03	8.28	36.27	370	189	P	H
		5722.1	74.91	-40.78	115.69	70.84	32.04	8.31	36.28	370	189	P	H
		5760	103.78	-	-	99.66	32.05	8.37	36.3	370	189	P	H
		5760	96.4	-	-	92.28	32.05	8.37	36.3	370	189	A	H
		5854.99	52.59	-58.33	110.92	48.35	32.1	8.51	36.37	370	189	P	H
		5871.57	53.91	-52.35	106.26	49.66	32.1	8.53	36.38	370	189	P	H
		5884.11	53.41	-45.13	98.54	49.16	32.1	8.53	36.38	370	189	P	H
		5699.1	55.51	-49.13	104.64	51.49	32.02	8.25	36.25	298	53	P	V
		5719.7	67.73	-43.09	110.82	63.66	32.04	8.31	36.28	298	53	P	V
		5724.6	69.14	-52.25	121.39	65.07	32.04	8.31	36.28	298	53	P	V
		5750	97.43	-	-	93.33	32.05	8.34	36.29	298	53	P	V
		5750	90.25	-	-	86.15	32.05	8.34	36.29	298	53	A	V
		5853.14	51.6	-63.54	115.14	47.38	32.09	8.49	36.36	298	53	P	V
		5870.05	54.37	-52.31	106.68	50.13	32.1	8.51	36.37	298	53	P	V
		5877.08	52.33	-51.42	103.75	48.08	32.1	8.53	36.38	298	53	P	V

WIFI Ant. 1+2	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 159 5795MHz		5688.1	52.82	-43.7	96.52	48.8	32.02	8.25	36.25	365	187	P	H
		5706.2	54.18	-52.86	107.04	50.14	32.03	8.28	36.27	365	187	P	H
		5724.99	56.4	-65.88	122.28	52.33	32.04	8.31	36.28	365	187	P	H
		5802	102.25	-	-	98.07	32.07	8.43	36.32	365	187	P	H
		5802	95.56	-	-	91.38	32.07	8.43	36.32	365	187	A	H
		5852	56.92	-60.82	117.74	52.7	32.09	8.49	36.36	365	187	P	H
		5855.99	56.91	-53.71	110.62	52.67	32.1	8.51	36.37	365	187	P	H
		5878.03	54.65	-48.4	103.05	50.4	32.1	8.53	36.38	365	187	P	H
		5850.01	54.37	-67.91	122.28	50.15	32.09	8.49	36.36	302	82	P	V
		5861.69	55.02	-54	109.02	50.78	32.1	8.51	36.37	302	82	P	V
		5878.03	53.23	-49.82	103.05	48.98	32.1	8.53	36.38	302	82	P	V
		5800	97.1	-	-	92.92	32.07	8.43	36.32	302	82	P	V
		5800	90.25	-	-	86.07	32.07	8.43	36.32	302	82	A	V
		5699.3	52.58	-52.2	104.78	48.56	32.02	8.25	36.25	302	82	P	V
		5707.8	52.94	-54.55	107.49	48.9	32.03	8.28	36.27	302	82	P	V
		5723.3	51.76	-66.66	118.42	47.69	32.04	8.31	36.28	302	82	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	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 151 5755MHz		11510	42.82	-31.18	74	48.66	38.6	12.58	57.02	160	360	P	H
		11510	42.13	-31.87	74	47.97	38.6	12.58	57.02	160	360	P	V
802.11n HT40 CH 159 5795MHz		11590	42.1	-31.9	74	47.86	38.79	12.64	57.19	160	360	P	H
		11590	42.51	-31.49	74	48.27	38.79	12.64	57.19	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI Ant. 1+2	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 VHT20 CH 149 5745MHz		5690.3	56.72	-41.43	98.15	52.7	32.02	8.25	36.25	100	189	P	H
		5718.8	72.68	-37.88	110.56	68.61	32.04	8.31	36.28	100	189	P	H
		5724.2	78.38	-42.1	120.48	74.31	32.04	8.31	36.28	100	189	P	H
		5738	108.68	-	-	104.58	32.05	8.34	36.29	100	189	P	H
		5738	101.93	-	-	97.83	32.05	8.34	36.29	100	189	A	H
		5687.5	53.11	-42.97	96.08	49.09	32.02	8.25	36.25	150	203	P	V
		5718.6	61.5	-49.01	110.51	57.43	32.04	8.31	36.28	150	203	P	V
		5723.6	67.79	-51.32	119.11	63.72	32.04	8.31	36.28	150	203	P	V
		5748	101.27	-	-	97.17	32.05	8.34	36.29	150	203	P	V
		5748	93.93	-	-	89.83	32.05	8.34	36.29	150	203	A	V
802.11ac VHT20 CH 157 5785MHz		5698.3	52.82	-51.23	104.05	48.8	32.02	8.25	36.25	100	185	P	H
		5709.7	53.32	-54.7	108.02	49.28	32.03	8.28	36.27	100	185	P	H
		5720.2	52.3	-59.06	111.36	48.23	32.04	8.31	36.28	100	185	P	H
		5786	107.38	-	-	103.2	32.07	8.43	36.32	100	185	P	H
		5786	100.31	-	-	96.13	32.07	8.43	36.32	100	185	A	H
		5854.99	53.22	-57.7	110.92	48.98	32.1	8.51	36.37	100	185	P	H
		5873.09	53.44	-52.39	105.83	49.19	32.1	8.53	36.38	100	185	P	H
		5877.08	54.29	-49.46	103.75	50.04	32.1	8.53	36.38	100	185	P	H
		5697.3	52.66	-50.65	103.31	48.64	32.02	8.25	36.25	175	207	P	V
		5703.3	52.22	-54.01	106.23	48.18	32.03	8.28	36.27	175	207	P	V
		5723.8	51.82	-67.74	119.56	47.75	32.04	8.31	36.28	175	207	P	V
		5784	101.31	-	-	97.16	32.06	8.4	36.31	175	207	P	V
		5784	94.16	-	-	90.01	32.06	8.4	36.31	175	207	A	V
		5851.43	52.43	-66.61	119.04	48.21	32.09	8.49	36.36	175	207	P	V
		5873.28	52.94	-52.84	105.78	48.69	32.1	8.53	36.38	175	207	P	V
		5882.02	54.16	-45.93	100.09	49.91	32.1	8.53	36.38	175	207	P	V

WIFI Ant. 1+2	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 VHT20 CH 165 5825MHz		5822	108.96	-	-	104.76	32.08	8.47	36.35	364	2	P	H
		5822	101.51	-	-	97.31	32.08	8.47	36.35	364	2	A	H
		5851.24	66	-53.47	119.47	61.78	32.09	8.49	36.36	364	2	P	H
		5856.94	61.53	-48.83	110.36	57.29	32.1	8.51	36.37	364	2	P	H
		5875.18	53.86	-51.31	105.17	49.61	32.1	8.53	36.38	364	2	P	H
		5822	102.11	-	-	97.91	32.08	8.47	36.35	303	80	P	V
		5822	94.55	-	-	90.35	32.08	8.47	36.35	303	80	A	V
		5850.86	60.6	-59.74	120.34	56.38	32.09	8.49	36.36	303	80	P	V
		5855.99	56.17	-54.45	110.62	51.93	32.1	8.51	36.37	303	80	P	V
		5884.87	52.33	-45.64	97.97	48.08	32.1	8.53	36.38	303	80	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1+2	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 VHT20 CH 149 5745MHz		11490	42.76	-31.24	74	48.58	38.59	12.57	56.98	160	360	P	H
		11490	42.64	-31.36	74	48.46	38.59	12.57	56.98	160	360	P	V
802.11ac VHT20 CH 157 5785MHz		11570	43.44	-30.56	74	49.21	38.75	12.63	57.15	160	360	P	H
		11570	43.79	-30.21	74	49.56	38.75	12.63	57.15	160	360	P	V
802.11ac VHT20 CH 165 5825MHz		11650	43.57	-30.43	74	49.29	38.9	12.67	57.29	160	360	P	H
		11650	43.54	-30.46	74	49.26	38.9	12.67	57.29	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI Ant. 1+2	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 VHT40 CH 151 5755MHz		5697.2	53.39	-49.85	103.24	49.37	32.02	8.25	36.25	300	71	P	H
		5716	62.03	-47.75	109.78	57.99	32.03	8.28	36.27	300	71	P	H
		5721.9	65.07	-50.16	115.23	61	32.04	8.31	36.28	300	71	P	H
		5752	95.28	-	-	91.16	32.05	8.37	36.3	300	71	P	H
		5752	87.78	-	-	83.66	32.05	8.37	36.3	300	71	A	H
		5852.38	52.04	-64.83	116.87	47.82	32.09	8.49	36.36	300	71	P	H
		5867.01	52.09	-55.44	107.53	47.85	32.1	8.51	36.37	300	71	P	H
		5876.32	51.64	-52.68	104.32	47.39	32.1	8.53	36.38	300	71	P	H
		5696.3	56.47	-46.1	102.57	52.45	32.02	8.25	36.25	103	198	P	V
		5719.99	70.15	-40.75	110.9	66.08	32.04	8.31	36.28	103	198	P	V
		5720.8	71.71	-41.01	112.72	67.64	32.04	8.31	36.28	103	198	P	V
		5750	102.27	-	-	98.17	32.05	8.34	36.29	103	198	P	V
		5750	93.9	-	-	89.8	32.05	8.34	36.29	103	198	A	V
		5854.99	53.14	-57.78	110.92	48.9	32.1	8.51	36.37	103	198	P	V
		5873.66	53.31	-52.36	105.67	49.06	32.1	8.53	36.38	103	198	P	V
		5878.98	52.16	-50.18	102.34	47.91	32.1	8.53	36.38	103	198	P	V

WIFI Ant. 1+2	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 VHT40 CH 159 5795MHz		5687.6	51.57	-44.58	96.15	47.55	32.02	8.25	36.25	291	70	P	H
		5701.9	53.18	-52.65	105.83	49.14	32.03	8.28	36.27	291	70	P	H
		5721.6	52.56	-61.99	114.55	48.49	32.04	8.31	36.28	291	70	P	H
		5796	94.34	-	-	90.16	32.07	8.43	36.32	291	70	P	H
		5796	87.48	-	-	83.3	32.07	8.43	36.32	291	70	A	H
		5850.86	52.83	-67.51	120.34	48.61	32.09	8.49	36.36	291	70	P	H
		5859.03	52.48	-57.29	109.77	48.24	32.1	8.51	36.37	291	70	P	H
		5889.24	52.67	-42.06	94.73	48.41	32.11	8.55	36.4	291	70	P	H
		5698.9	52.69	-51.8	104.49	48.67	32.02	8.25	36.25	100	199	P	V
		5719.1	52.77	-57.88	110.65	48.7	32.04	8.31	36.28	100	199	P	V
		5720.9	53.99	-58.96	112.95	49.92	32.04	8.31	36.28	100	199	P	V
		5790	100.94	-	-	96.76	32.07	8.43	36.32	100	199	P	V
		5790	93.63	-	-	89.45	32.07	8.43	36.32	100	199	A	V
		5851.1	54.53	-65.26	119.79	50.31	32.09	8.49	36.36	100	199	P	V
		5861.88	53.92	-55.05	108.97	49.68	32.1	8.51	36.37	100	199	P	V
		5888.67	52.59	-42.56	95.15	48.33	32.11	8.55	36.4	100	199	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI Ant. 1+2	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		11510	42.62	-31.38	74	48.46	38.6	12.58	57.02	160	360	P	H
VHT40 CH 151 5755MHz		11510	41.31	-32.69	74	47.15	38.6	12.58	57.02	160	360	P	V
802.11ac		11590	43.87	-30.13	74	49.63	38.79	12.64	57.19	160	360	P	H
VHT40 CH 159 5795MHz		11590	42.01	-31.99	74	47.77	38.79	12.64	57.19	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	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 155 5775MHz		5697.3	70.88	-32.43	103.31	66.86	32.02	8.25	36.25	301	88	P	H
		5701.9	70.11	-35.72	105.83	66.07	32.03	8.28	36.27	301	88	P	H
		5721.8	66.85	-48.15	115	62.78	32.04	8.31	36.28	301	88	P	H
		5786	94.1	-	-	89.92	32.07	8.43	36.32	301	88	P	H
		5786	83.03	-	-	78.85	32.07	8.43	36.32	301	88	A	H
		5852.19	67.79	-49.52	117.31	63.57	32.09	8.49	36.36	301	88	P	H
		5857.13	68.57	-41.73	110.3	64.33	32.1	8.51	36.37	301	88	P	H
		5877.46	61.69	-41.78	103.47	57.44	32.1	8.53	36.38	301	88	P	H
		5695.1	77.8	-23.89	101.69	73.78	32.02	8.25	36.25	230	254	P	V
		5700.6	78.09	-27.38	105.47	74.05	32.03	8.28	36.27	230	254	P	V
		5720.6	76.15	-36.12	112.27	72.08	32.04	8.31	36.28	230	254	P	V
		5780	99.24	-	-	95.09	32.06	8.4	36.31	230	254	P	V
		5780	88.17	-	-	84.02	32.06	8.4	36.31	230	254	A	V
		5854.99	77.26	-33.66	110.92	73.02	32.1	8.51	36.37	230	254	P	V
		5855.23	78.59	-32.25	110.84	74.35	32.1	8.51	36.37	230	254	P	V
		5875.94	68.59	-36.01	104.6	64.34	32.1	8.53	36.38	230	254	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2	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		11550	42.33	-31.67	74	48.12	38.71	12.62	57.12	160	360	P	H
VHT80 CH 155 5775MHz		11550	41.75	-32.25	74	47.54	38.71	12.62	57.12	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

Emission below 1GHz

WIFI 802.11ac VHT80 (LF @ 3m)

WIFI Ant. 1+2	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 LF		47.46	36.39	-3.61	40	50.41	17.7	0.84	32.56	-	-	P	H
		95.96	37.94	-5.56	43.5	50.5	18.58	1.18	32.32	-	-	P	H
		141.55	39.98	-3.52	43.5	52.91	18.06	1.44	32.43	100	45	P	H
		183.26	39.44	-4.06	43.5	53.82	16.5	1.65	32.53	-	-	P	H
		193.93	39.41	-4.09	43.5	54.19	16.05	1.7	32.53	-	-	P	H
		209.45	37.04	-6.46	43.5	51.61	16.05	1.73	32.35	-	-	P	H
		41.64	35.93	-4.07	40	46.63	21.1	0.78	32.58	-	-	P	V
		69.77	36.95	-3.05	40	54.77	13.7	1	32.52	300	250	P	V
		146.4	36.69	-6.81	43.5	49.71	17.96	1.46	32.44	-	-	P	V
		375.32	42.14	-3.86	46	49.74	22.25	2.39	32.24	-	-	P	V
		450.01	40.17	-5.83	46	44.22	25.5	2.64	32.19	-	-	P	V
		500.45	41.69	-4.31	46	47.77	23.33	2.8	32.21	-	-	P	V
Remark	1. No other spurious found. 2. 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.	
2		(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)

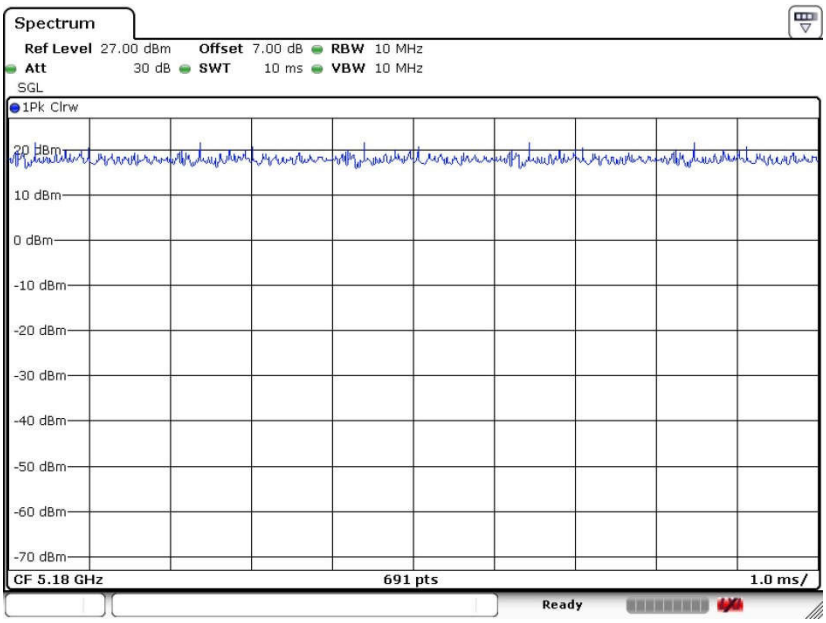
Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11a	100.00	-	-	10Hz
2	802.11a	100.00	-	-	10Hz
1+2	802.11n HT20	100.00	-	-	10Hz
1+2	802.11n HT40	100.00	-	-	10Hz
1+2	802.11ac VHT20	100.00	-	-	10Hz
1+2	802.11ac VHT40	100.00	-	-	10Hz
1+2	802.11ac VHT80	100.00	-	-	10Hz

<Ant.1>

802.11a



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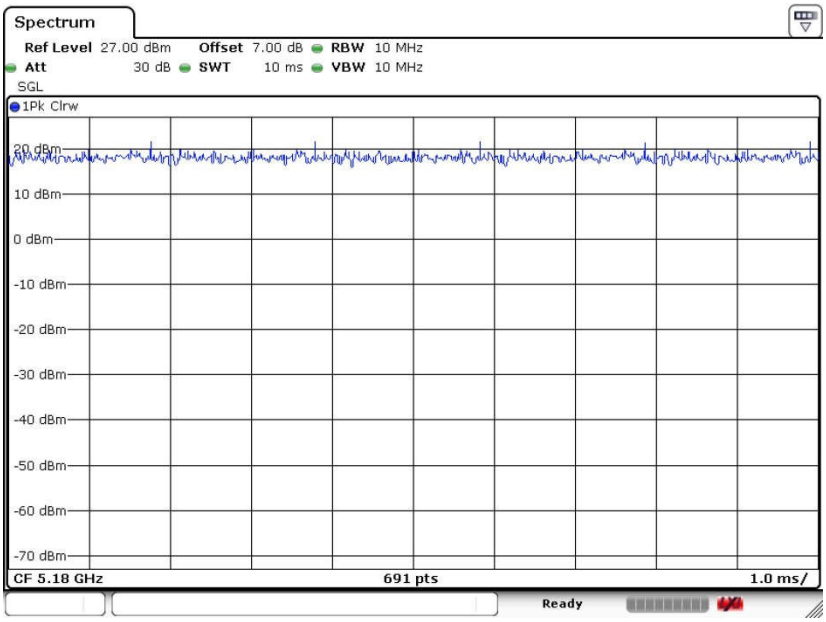
802.11a



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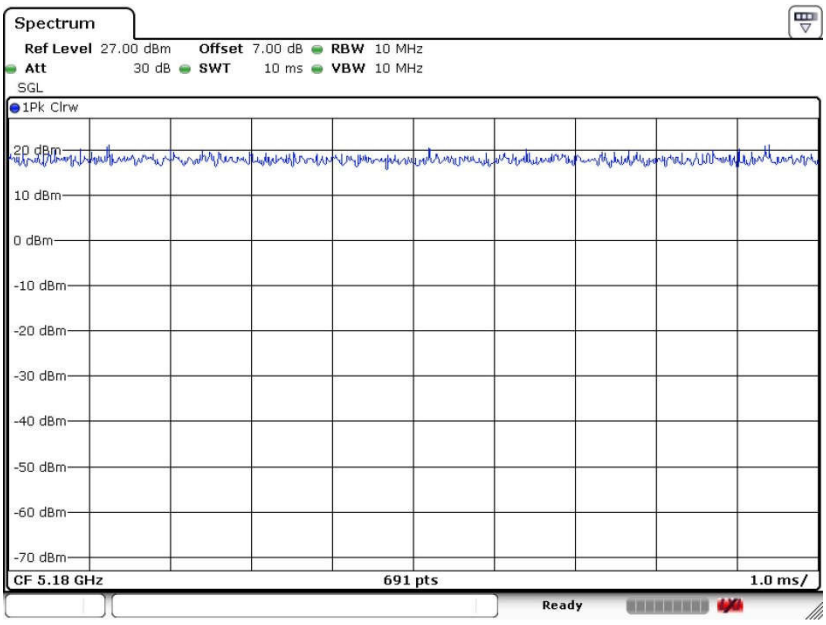

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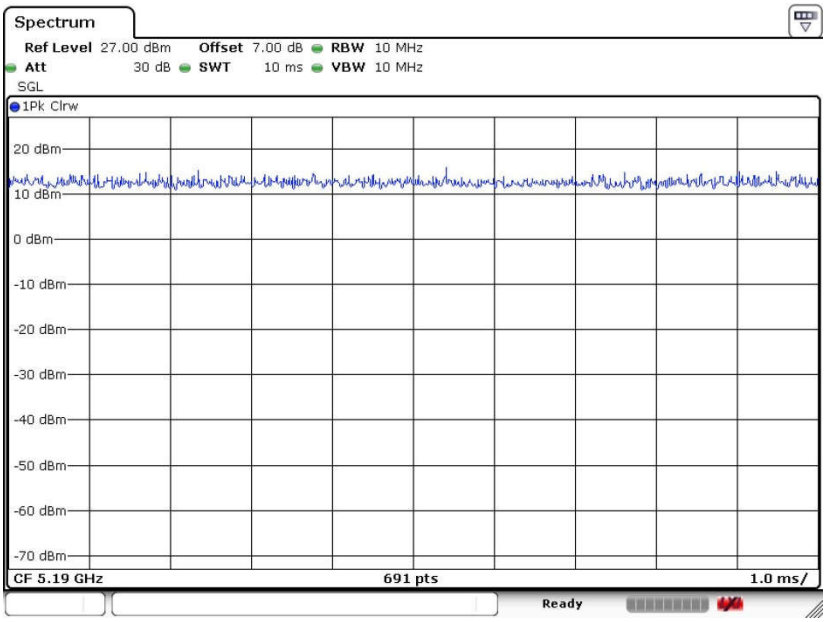

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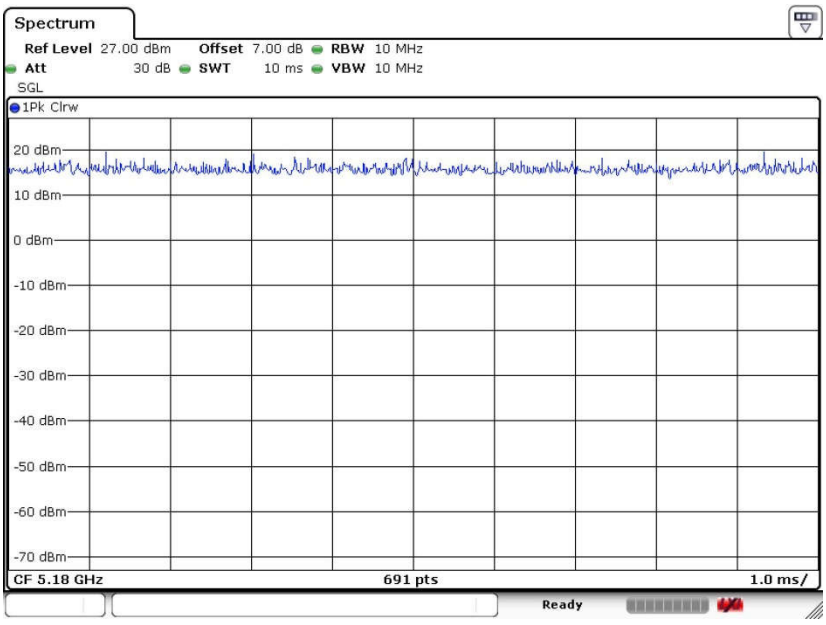

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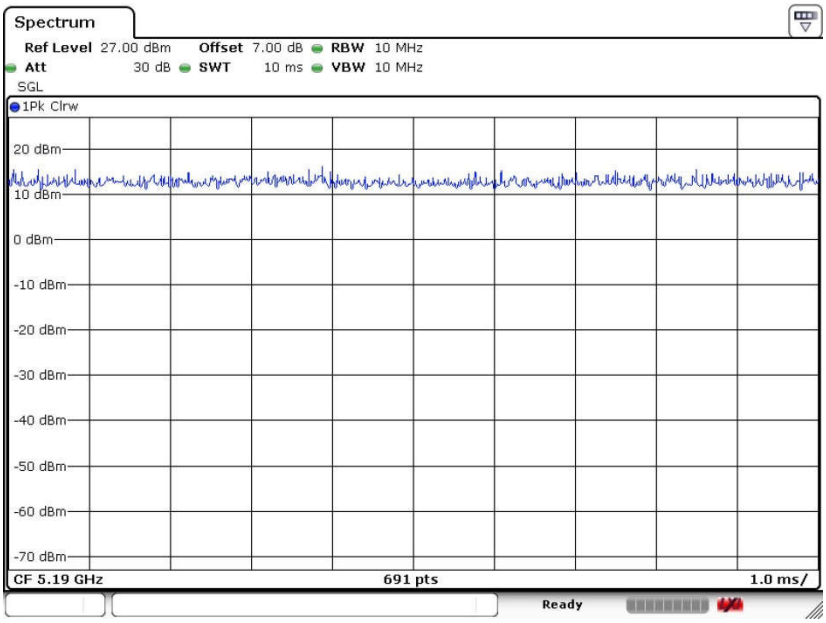

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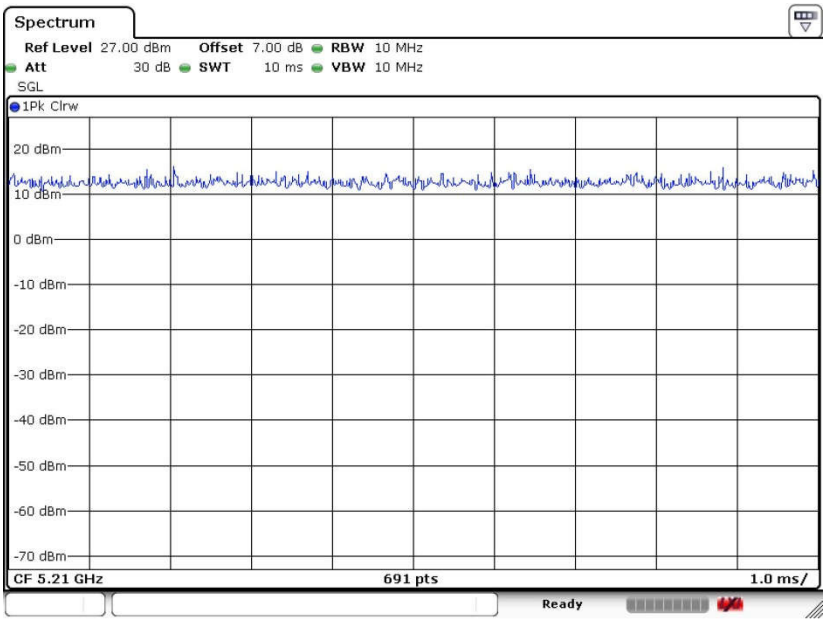
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