FCC RF Test Report

APPLICANT	:	TP-Link Technologies Co., Ltd.
EQUIPMENT	:	AC1750 Wireless Dual Band Gigabit Router
BRAND NAME	:	TP-Link
MODEL NAME	:	Archer C8
FCC ID	:	TE7C8V4
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Feb. 18, 2017 and testing was completed on May 17, 2017. 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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Approved by: Jones Tsai / Manager

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR721809C	Rev. 01	Initial issue of report	Jun. 12, 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) 15.209(a)	Pass	Under limit 3.05 dB at 32.910 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.36 dB at 0.150 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	AC1750 Wireless Dual Band Gigabit Router
Brand Name	TP-Link
Model Name	Archer C8
FCC ID	TE7C8V4
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	5745 MHz ~ 5825 MHz
Maximum Output Power <CDD Modes>	**MIMO <Ant. 1+2+3>** 802.11a : 25.86 dBm / 0.3855 W 802.11n HT20 : 25.53 dBm / 0.3573 W 802.11n HT40 : 25.25 dBm / 0.3350 W 802.11ac VHT20 : 25.48 dBm / 0.3532 W 802.11ac VHT40 : 23.44 dBm / 0.2208 W 802.11ac VHT80 : 25.30 dBm / 0.3388 W
Maximum Output Power <Beamforming Modes>	**MIMO <Ant. 1+2+3>** 802.11ac VHT20 : 25.11 dBm / 0.3243 W 802.11ac VHT40 : 23.27 dBm / 0.2123 W 802.11ac VHT80 : 24.52 dBm / 0.2831 W
99% Occupied Bandwidth <CDD Modes>	**<MIMO Ant. 1+2+3>** 802.11a : 22.23 MHz 802.11n HT20 : 24.48 MHz 802.11n HT40 : 43.86 MHz 802.11ac VHT80 : 76.60 MHz
99% Occupied Bandwidth <Beamforming Modes>	**<MIMO Ant. 1+2+3>** 802.11ac VHT20 : 24.23 MHz 802.11ac VHT40 : 40.16 MHz 802.11ac VHT80 : 76.12 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	**Ant. 1 :** Omni Antenna with gain 4.56 dBi **Ant. 2 :** Omni Antenna with gain 4.56 dBi **Ant. 2 :** Omni Antenna with gain 4.56 dBi **Beamforming Gain:** 9.33 dBi
Antenna Function Description	<table><tr><td></td><td>Ant. 1</td><td>Ant. 2</td><td>Ant. 3</td></tr><tr><td>802.11 a/n/ac MIMO</td><td>V</td><td>V</td><td>V</td></tr></table>

Note:

1. MIMO Ant. 1+2+3 is a calculated result from sum of the power MIMO Ant. 1, MIMO Ant. 2 and MIMO Ant. 3.
2. Only 11ac support TX beamforming.

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	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan District, Shenzhen City, Guangdong Province, 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 v01r04
- 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 (Y plane) 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.

MIMO Antenna 1+2+3 for CDD

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

MIMO Antenna 1+2+3 for Beamforming

Modulation	Data Rate
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Remark: According to the power and RSE verified data, MIMO Antenna 1+2+3 is the worst case of Radiated spurious emission.

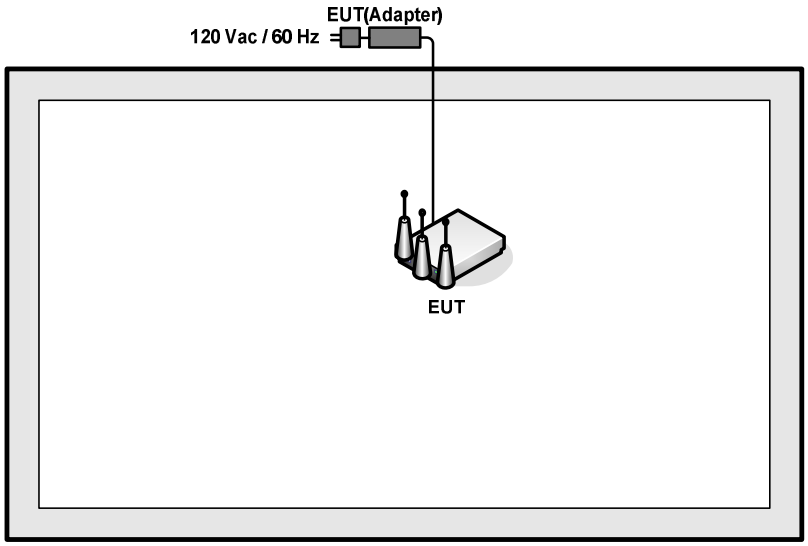
AC Conducted Emission	Mode 1 ： LAN Link + WAN Link + WLAN Link (5G) + USB Link

Ch. #		Band IV：5745-5825 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

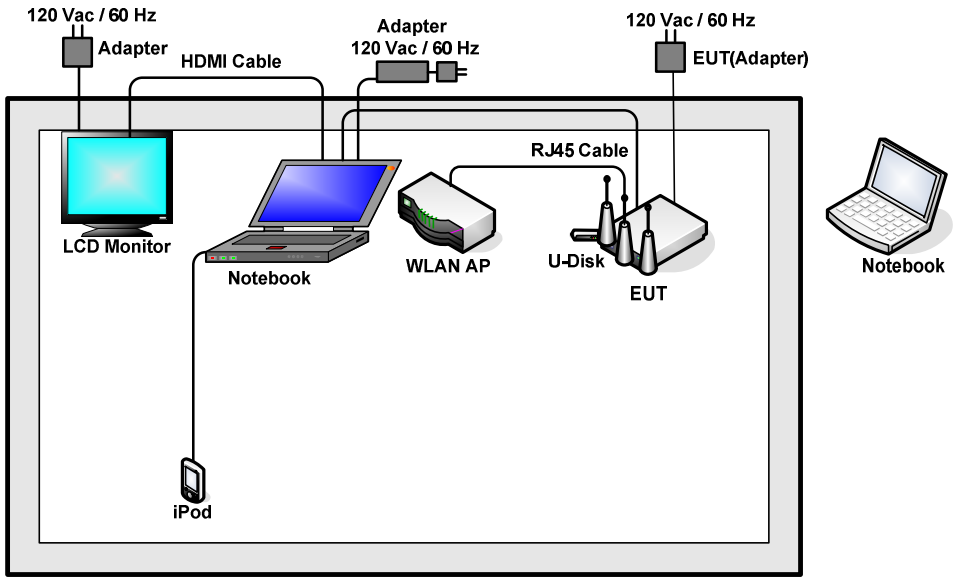
Ch. #		Band IV：5745-5825 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

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.	WLAN AP	D-link	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
2.	Notebook	Lenovo	E450	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Monitor	Dell	P2715Qt	FCC DoC	N/A	Unshielded,1.8m
5.	U-Disk	Kingston	DT101 G2	FCC DoC	N/A	N/A
6.	iPod nano 8GB	Apple	MC690ZP/A	FCC DoC	Shielded, 1.2m	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 6.30 dB and 10dB attenuator.

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

= 6.30 + 10 = 16.30 (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.

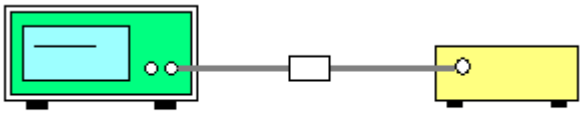
3.1.2 Measuring Instruments

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 v01r04. 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

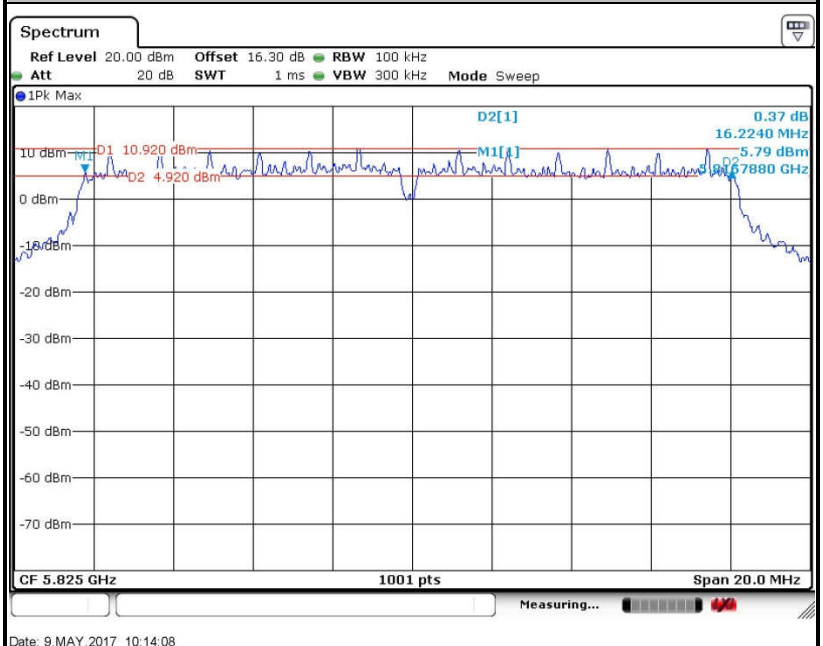


3.1.5 Test Result of 6dB Bandwidth

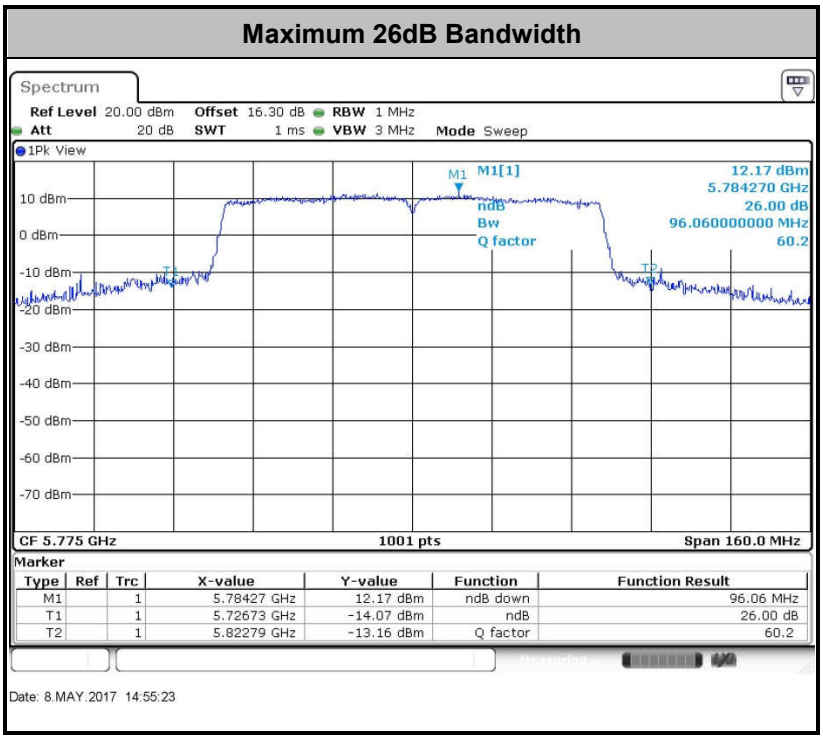
Please refer to Appendix A.

<CDD Mode>

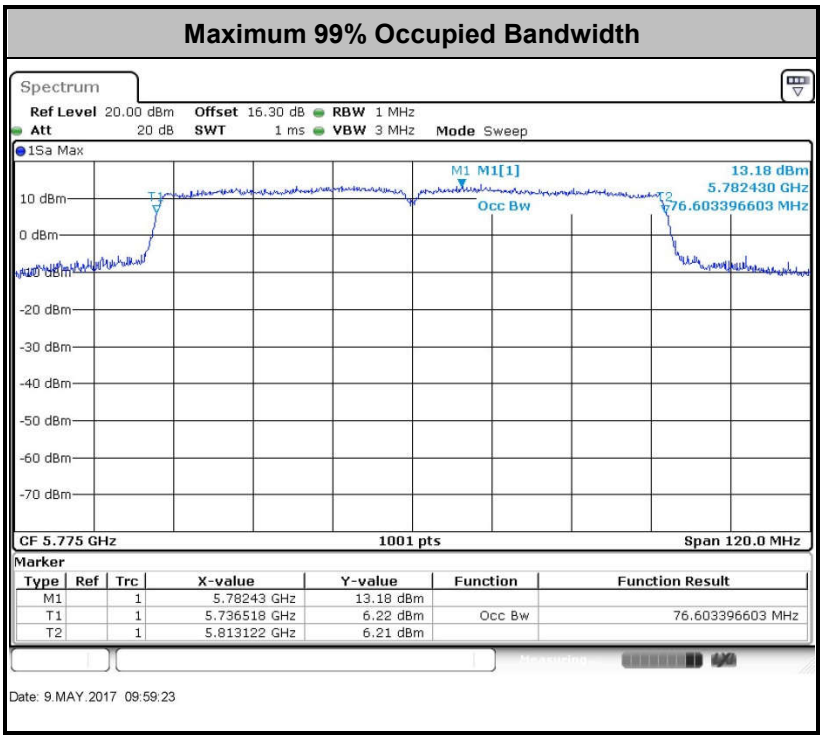
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



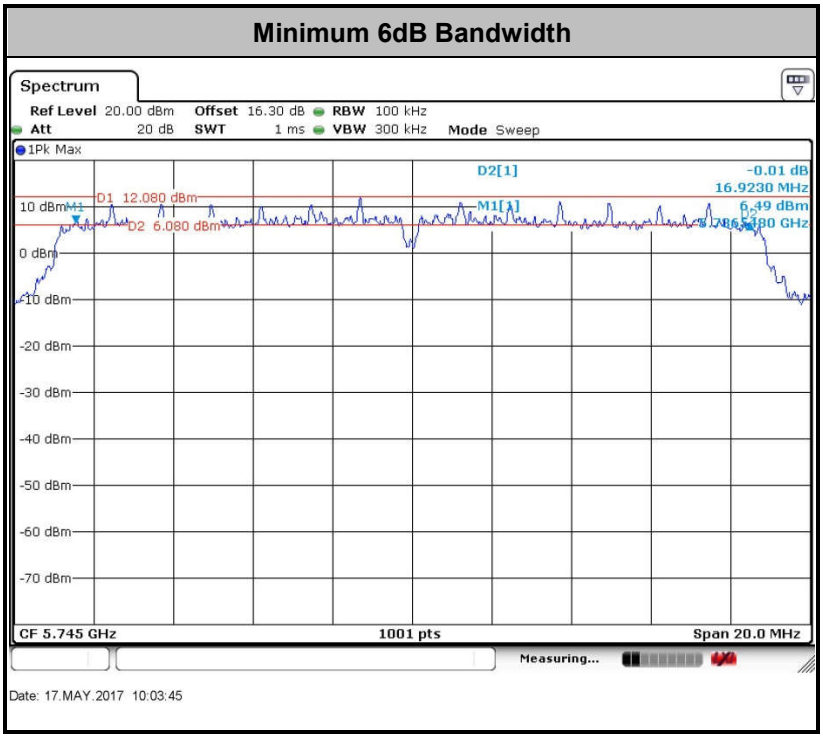
Maximum 99% Occupied Bandwidth



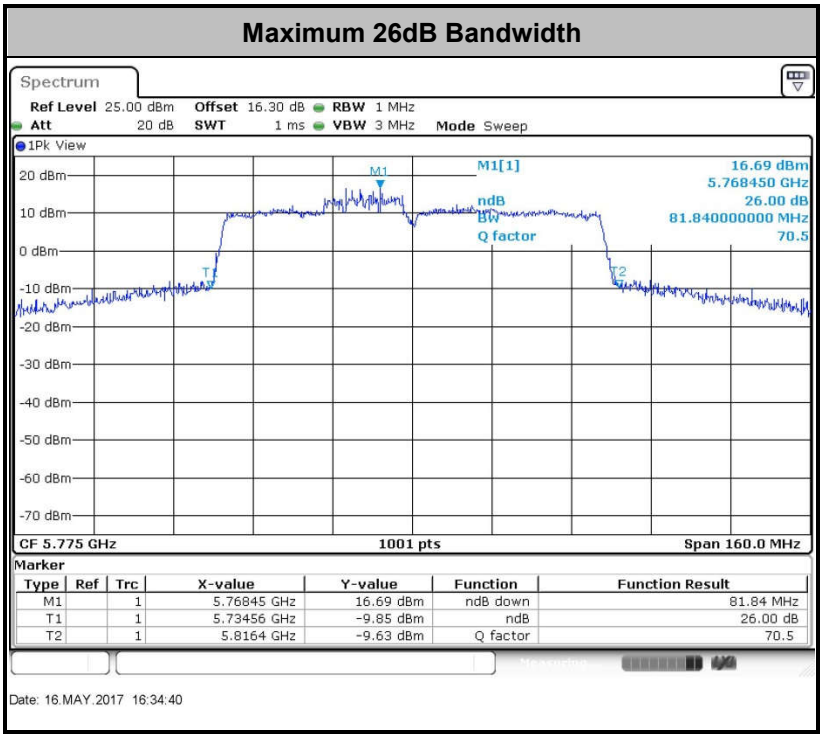
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<TXBF Mode>

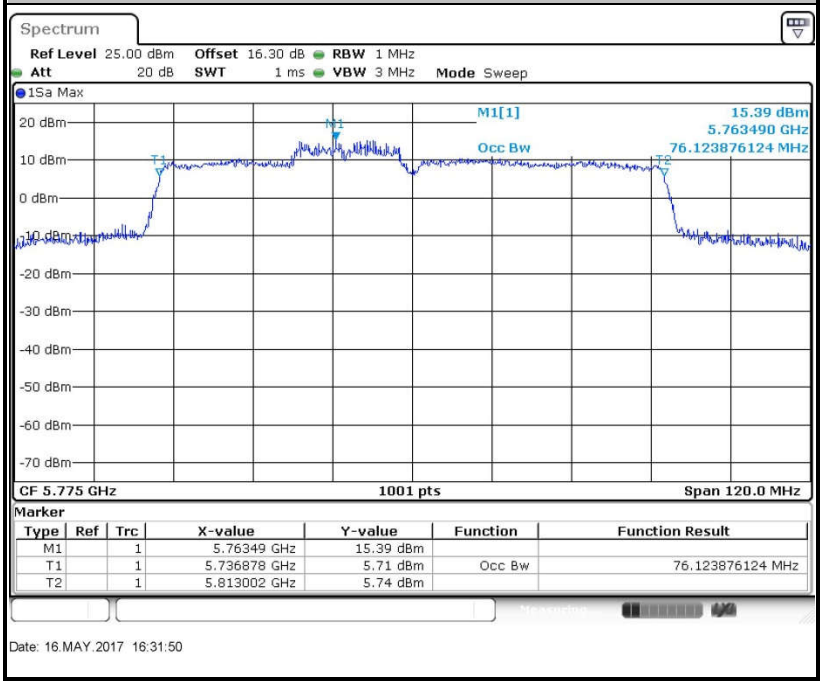
Minimum 6dB Bandwidth



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

CDD modes

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

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.

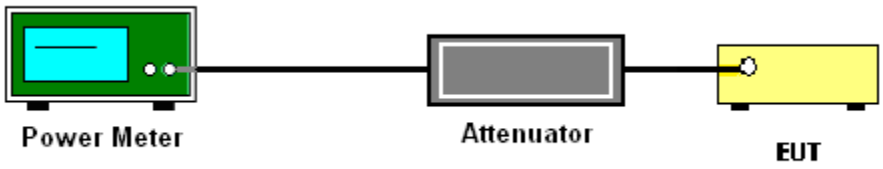
TXBF modes

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 for TXBF modes.

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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 v01r04. Section F) Maximum power spectral density.

CDD modes

 # 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.

TXBF modes

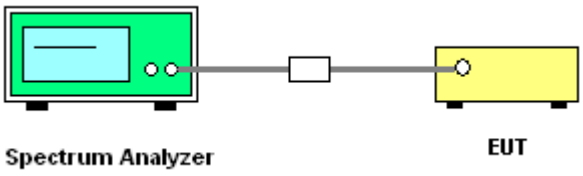
 # Method SA-3 #

(power averaging (rms) detection with max hold):

- 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 ≤ (number of points in sweep) × 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.
- Detector = power averaging (rms).
- Trace mode = max hold.
- Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

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

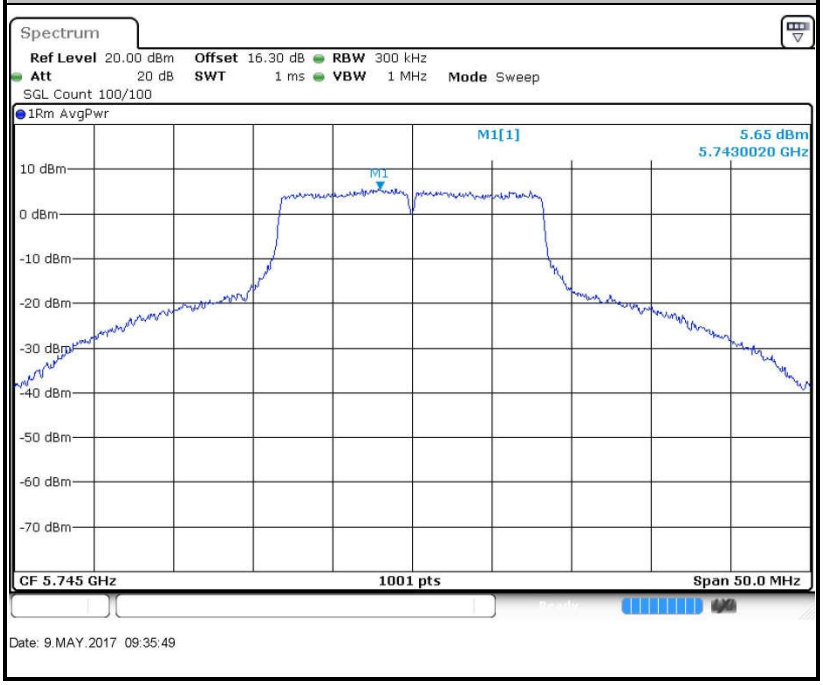


3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

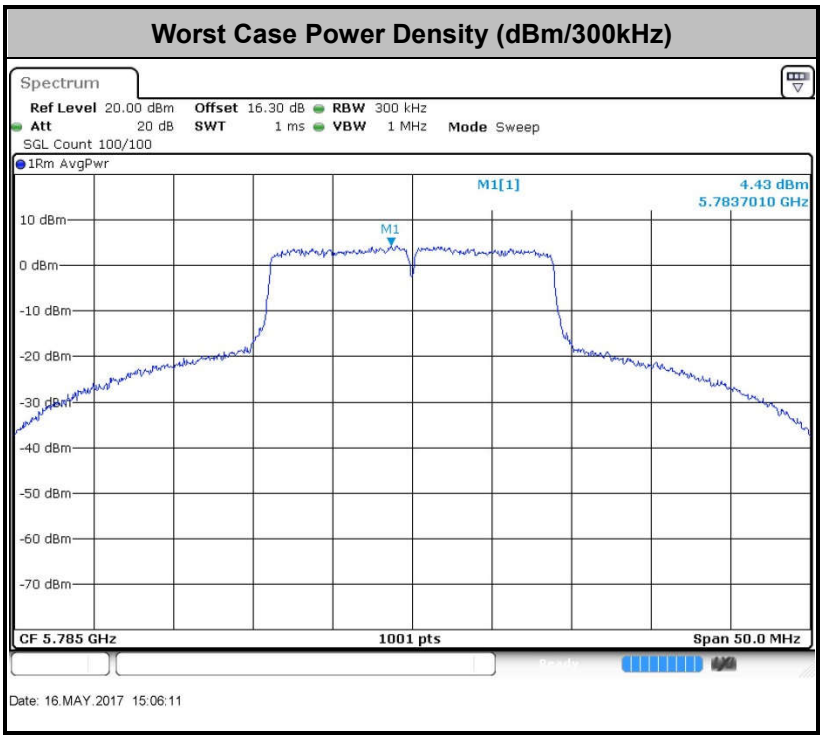
<CDD Mode>

Worst Case Power Density (dBm/300kHz)



<TXBF Mode>

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 shall comply with the general field strength limits 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 D01 v01r04 G)2)c)

(i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.[3]

(ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.[4]

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

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 v01r04. 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

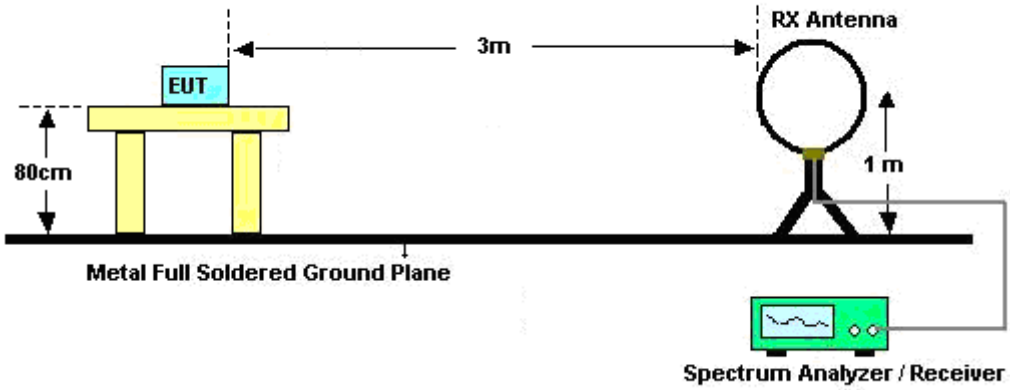
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

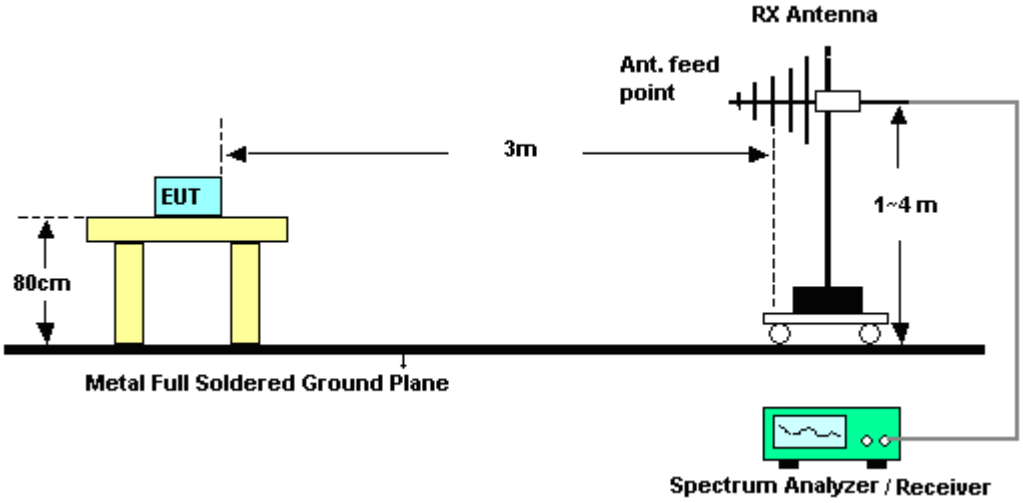
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

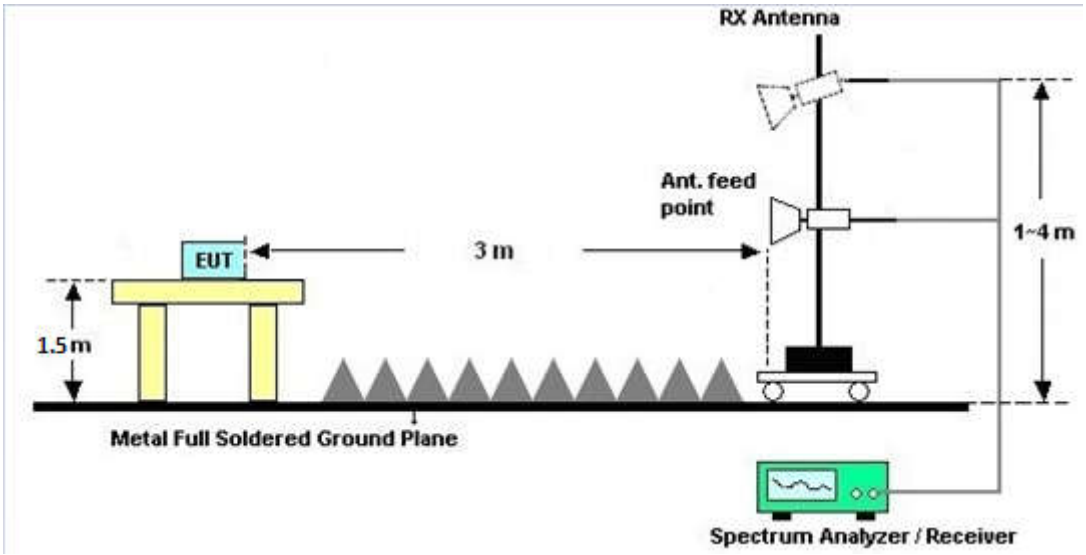
For radiated emissions below 30MHz



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 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.

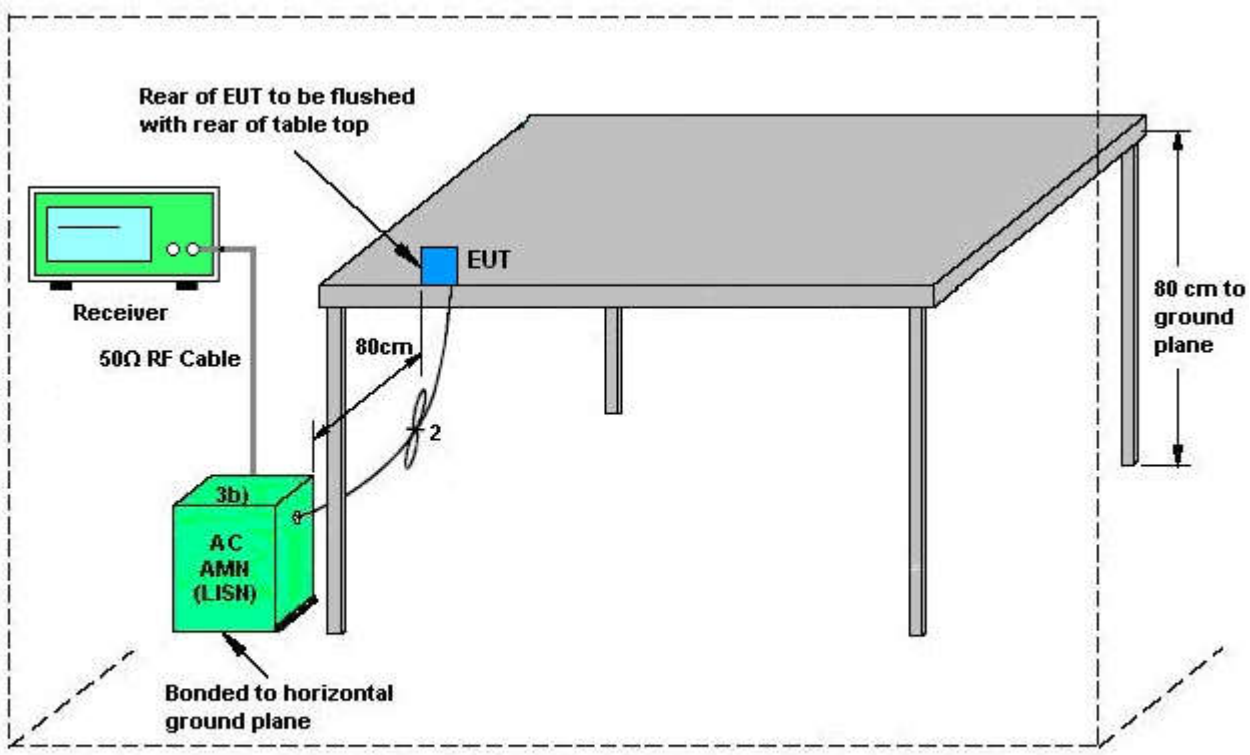
3.5.2 Measuring Instruments

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.

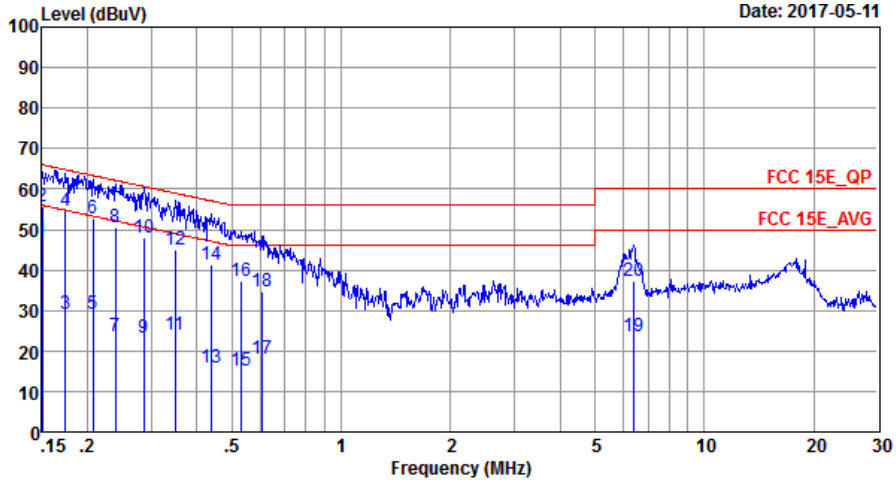
3.5.4 Test Setup



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 :	21~23℃
Test Engineer :	Tao Cheng	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LAN Link + WAN Link + WLAN Link (5G) + USB Link		

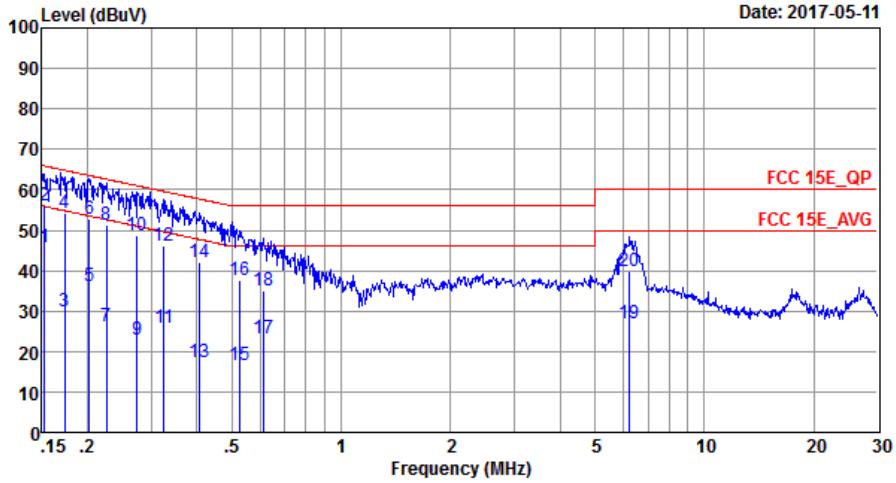


Site : CO01-SZ
Condition: FCC 15E_QP LISN_20170301_L LINE

Mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.15	47.64	-8.36	56.00	37.20	0.03	10.41	Average
2		0.15	55.84	-10.16	66.00	45.40	0.03	10.41	QP
3		0.17	29.04	-25.73	54.77	18.70	0.03	10.31	Average
4		0.17	54.44	-10.33	64.77	44.10	0.03	10.31	QP
5		0.21	29.15	-24.17	53.32	18.90	0.03	10.22	Average
6		0.21	52.75	-10.57	63.32	42.50	0.03	10.22	QP
7		0.24	23.65	-28.48	52.13	13.40	0.03	10.22	Average
8		0.24	50.65	-11.48	62.13	40.40	0.03	10.22	QP
9		0.29	23.25	-27.38	50.63	13.00	0.03	10.22	Average
10		0.29	47.95	-12.68	60.63	37.70	0.03	10.22	QP
11		0.35	24.03	-24.97	49.00	13.80	0.03	10.20	Average
12		0.35	45.13	-13.87	59.00	34.90	0.03	10.20	QP
13		0.44	15.91	-31.16	47.07	5.69	0.03	10.19	Average
14		0.44	41.21	-15.86	57.07	30.99	0.03	10.19	QP
15		0.53	15.20	-30.80	46.00	5.00	0.02	10.18	Average
16		0.53	37.30	-18.70	56.00	27.10	0.02	10.18	QP
17		0.61	18.19	-27.81	46.00	8.00	0.02	10.17	Average
18		0.61	34.79	-21.21	56.00	24.60	0.02	10.17	QP
19		6.39	23.53	-26.47	50.00	13.00	0.22	10.31	Average
20		6.39	37.33	-22.67	60.00	26.80	0.22	10.31	QP

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Tao Cheng	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LAN Link + WAN Link + WLAN Link (5G) + USB Link		



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20170301_N NEUTRAL

Mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.15	45.83	-10.04	55.87	35.40	0.03	10.40	Average
2	*	0.15	55.93	-9.94	65.87	45.50	0.03	10.40	QP
3		0.17	29.75	-25.06	54.81	19.40	0.03	10.32	Average
4		0.17	54.24	-10.57	64.81	43.89	0.03	10.32	QP
5		0.20	36.15	-17.34	53.49	25.90	0.03	10.22	Average
6		0.20	52.95	-10.54	63.49	42.70	0.03	10.22	QP
7		0.23	26.05	-26.56	52.61	15.80	0.03	10.22	Average
8		0.23	51.35	-11.26	62.61	41.10	0.03	10.22	QP
9		0.27	23.05	-27.93	50.98	12.80	0.03	10.22	Average
10		0.27	48.75	-12.23	60.98	38.50	0.03	10.22	QP
11		0.33	25.94	-23.63	49.57	15.70	0.03	10.21	Average
12		0.33	46.04	-13.53	59.57	35.80	0.03	10.21	QP
13		0.41	17.31	-30.37	47.68	7.10	0.02	10.19	Average
14		0.41	42.21	-15.47	57.68	32.00	0.02	10.19	QP
15		0.53	16.50	-29.50	46.00	6.30	0.02	10.18	Average
16		0.53	37.70	-18.30	56.00	27.50	0.02	10.18	QP
17		0.61	23.39	-22.61	46.00	13.20	0.02	10.17	Average
18		0.61	34.89	-21.11	56.00	24.70	0.02	10.17	QP
19		6.22	26.88	-23.12	50.00	16.50	0.07	10.31	Average
20		6.22	39.98	-20.02	60.00	29.60	0.07	10.31	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

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

CDD modes

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 GANT 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.

5.8G Band Antenna	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
1+2+3	4.56	9.33	0.00	3.33

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

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

TXBF modes

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

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 for 802.11ac modes.

The directional gain calculation is following F)2)e)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.

5.8G Band Antenna	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
1+2+3	9.33	9.33	3.33	3.33

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	Apr. 20, 2017	May 08, 2017~ May 17, 2017	Apr. 19, 2018	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Jan. 06, 2017	May 08, 2017~ May 17, 2017	Jan. 05, 2018	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Jan. 06, 2017	May 08, 2017~ May 17, 2017	Jan. 05, 2018	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 16, 2016	May 08, 2017~ May 17, 2017	Jul. 15, 2017	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 20, 2017	Apr. 26, 2017	Apr. 19, 2018	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 20, 2017	Apr. 26, 2017	Apr. 19, 2018	Radiation (03CH03-SZ
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 07, 2016	Apr. 26, 2017	May 06, 2017	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	May 21, 2016	Apr. 26, 2017	May 20, 2017	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	May 07, 2016	Apr. 26, 2017	May 06, 2017	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul.16, 2016	Apr. 26, 2017	Jul.15, 2017	Radiation (03CH03-SZ
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Aug.10, 2016	Apr. 26, 2017	Aug. 09, 2017	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 11, 2016	Apr. 26, 2017	Oct. 10, 2017	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 11, 2016	Apr. 26, 2017	Oct. 10, 2017	Radiation (03CH03-SZ
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 06, 2017	Apr. 26, 2017	Jan. 05, 2018	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Apr. 26, 2017	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Apr. 26, 2017	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Apr. 26, 2017	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jan. 06, 2017	May 11, 2017	Jan. 05, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Jan. 05, 2017	May 11, 2017	Jan. 04, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103912	9kHz~30MHz	Jan. 05, 2017	May 11, 2017	Jan. 04, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	6160200008 91	100Vac~250Vac	Jul. 16, 2016	May 11, 2017	Jul. 15, 2017	Conduction (CO01-SZ)
Pulse Limiter	COM-POWER	LIT-153 Transient Limiter	53139	150kHz~30MHz	Oct. 11, 2016	May 11, 2017	Oct. 10, 2017	Conduction (CO01-SZ)
RF Cable	Woken	B0720#0001	CO01SZ0007	150kHz~30MHz	Oct. 08, 2016	May 11, 2017	Oct. 07, 2017	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))	2.5dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1dB

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

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

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

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

Appendix A. Conducted Test Results

Report Number : FR721809C

Test Engineer:	Sam Zheng	Temperature:	24~26	°C
Test Date:	2017/5/08~2017/5/17	Relative Humidity:	50~53	%

Report Number : FR721809C

TEST RESULTS DATA
6dB and 99% OBW CDD Modes

Band IV																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)			26 dB Bandwidth (MHz)			6 dB Bandwidth (MHz)			6 dB BW Min. Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3		
11a	6Mbps	3	149	5745	19.98	22.23	19.98	33.17	35.07	31.47	16.30	16.28	16.32	0.5	Pass
11a	6Mbps	3	157	5785	20.58	21.78	19.53	33.92	34.27	33.57	16.30	16.30	16.26	0.5	Pass
11a	6Mbps	3	165	5825	20.88	22.03	19.08	33.62	33.22	29.32	16.30	16.22	16.32	0.5	Pass
HT20	MCS0	3	149	5745	22.18	23.48	21.68	35.17	38.11	33.97	17.50	17.54	17.54	0.5	Pass
HT20	MCS0	3	157	5785	22.98	24.48	21.28	36.21	38.16	30.87	17.54	17.52	17.54	0.5	Pass
HT20	MCS0	3	165	5825	23.53	21.38	20.18	34.37	35.27	29.57	17.52	17.58	17.58	0.5	Pass
HT40	MCS0	3	151	5755	38.16	43.86	37.96	63.66	73.19	58.35	36.28	36.28	36.28	0.5	Pass
HT40	MCS0	3	159	5795	38.56	40.46	37.76	60.60	68.87	58.17	36.28	36.28	36.28	0.5	Pass
VHT80	MCS0	3	155	5775	76.24	76.60	76.24	96.06	94.95	94.63	75.76	75.21	75.13	0.5	Pass

Report Number : FR721809C

TEST RESULTS DATA
Average Power Table CDD Modes

Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)				FCC Conducted Power Limit (dBm)			DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 3	SUM	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	
11a	6Mbps	3	149	5745	21.10	21.25	20.91	25.86	30.00			4.56			Pass
11a	6Mbps	3	157	5785	20.92	20.94	20.68	25.62	30.00			4.56			Pass
11a	6Mbps	3	165	5825	20.49	20.64	20.55	25.33	30.00			4.56			Pass
HT20	MCS0	3	149	5745	20.54	21.03	20.69	25.53	30.00			4.56			Pass
HT20	MCS0	3	157	5785	20.34	20.69	20.59	25.32	30.00			4.56			Pass
HT20	MCS0	3	165	5825	20.10	20.58	20.5	25.17	30.00			4.56			Pass
HT40	MCS0	3	151	5755	20.27	20.62	20.52	25.25	30.00			4.56			Pass
HT40	MCS0	3	159	5795	20.05	20.48	20.38	25.08	30.00			4.56			Pass
VHT20	MCS0	3	149	5745	20.51	20.95	20.64	25.48	30.00			4.56			Pass
VHT20	MCS0	3	157	5785	20.29	20.67	20.56	25.28	30.00			4.56			Pass
VHT20	MCS0	3	165	5825	20.09	20.43	20.48	25.11	30.00			4.56			Pass
VHT40	MCS0	3	151	5755	20.25	20.60	20.49	23.44	30.00			4.56			Pass
VHT40	MCS0	3	159	5795	20.03	20.45	20.36	23.26	30.00			4.56			Pass
VHT80	MCS0	3	155	5775	20.64	20.47	20.47	25.30	30.00			4.56			Pass

Report Number : FR721809C

TEST RESULTS DATA
Power Spectral Density CDD Modes

FCC Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density with RBW and duty factor (dBm/500kHz)				Average PSD Limit (dBm/500kHz)			DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 3	SUM	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	
11a	6Mbps	3	149	5745	6.69	8.09	6.93	12.86	26.67			9.33			Pass
11a	6Mbps	3	157	5785	6.41	7.74	7.07	12.51	26.67			9.33			Pass
11a	6Mbps	3	165	5825	6.40	7.68	6.46	12.45	26.67			9.33			Pass
HT20	MCS0	3	149	5745	6.57	7.60	6.42	12.37	26.67			9.33			Pass
HT20	MCS0	3	157	5785	6.16	7.70	6.40	12.47	26.67			9.33			Pass
HT20	MCS0	3	165	5825	6.17	7.45	6.01	12.22	26.67			9.33			Pass
HT40	MCS0	3	151	5755	3.25	5.02	3.54	9.79	26.67			9.33			Pass
HT40	MCS0	3	159	5795	3.19	4.61	3.56	9.38	26.67			9.33			Pass
VHT80	MCS0	3	155	5775	0.88	1.34	0.61	6.11	26.67			9.33			Pass

Report Number : FR721809C

TEST RESULTS DATA
Frequency Stability CDD Modes

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	5744.900	-0.100	-17.41	25	100	
11a	6Mbps	1	149	5745	5744.900	-0.100	-17.41	25	240	
11a	6Mbps	1	149	5745	5744.900	-0.100	-17.41	25	120	
11a	6Mbps	1	149	5745	5744.925	-0.075	-13.05	-30	120	
11a	6Mbps	1	149	5745	5744.900	-0.100	-17.41	50	120	

Report Number : FR721809C

TEST RESULTS DATA
6dB and 99% OBW Beamforming Modes

Band IV																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)			26 dB Bandwidth (MHz)			6 dB Bandwidth (MHz)			6 dB BW Min. Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3		
VHT20	MCS0	3	149	5745	22.08	19.93	24.23	37.46	34.52	37.76	17.52	16.92	17.24	0.5	Pass
VHT20	MCS0	3	157	5785	21.88	21.03	20.13	37.21	34.42	33.92	17.04	17.50	17.02	0.5	Pass
VHT20	MCS0	3	165	5825	21.48	22.48	20.08	33.22	37.71	34.77	17.54	17.50	16.98	0.5	Pass
VHT40	MCS0	3	151	5755	40.16	38.06	38.26	62.85	57.09	57.9	35.41	35.64	35.64	0.5	Pass
VHT40	MCS0	3	159	5795	39.86	37.96	39.76	65.28	55.30	64.29	36.00	35.68	35.68	0.5	Pass
VHT80	MCS0	3	155	5775	76.00	75.88	76.12	81.84	81.04	81.2	53.71	41.26	52.51	0.5	Pass

TEST RESULTS DATA
Average Power Table Beamforming Modes

Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)				FCC Conducted Power Limit (dBm)			DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 3	SUM	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	
VHT20	MCS0	3	149	5745	20.46	20.38	20.16	25.11	26.67			9.33			Pass
VHT20	MCS0	3	157	5785	20.32	20.18	19.87	24.90	26.67			9.33			Pass
VHT20	MCS0	3	165	5825	19.97	20.17	19.81	24.76	26.67			9.33			Pass
VHT40	MCS0	3	151	5755	20.30	20.22	19.84	23.27	26.67			9.33			Pass
VHT40	MCS0	3	159	5795	20.17	20.20	19.77	23.20	26.67			9.33			Pass
VHT80	MCS0	3	155	5775	19.98	19.67	19.58	24.52	26.67			9.33			Pass

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TEST RESULTS DATA
Power Spectral Density Beamforming Modes

FCC Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density with RBW and duty factor (dBm/500kHz)				Average PSD Limit (dBm/500kHz)			DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 3	SUM	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	
VHT20	MCS0	3	149	5745	6.55	6.15	6.29	11.32	26.67			9.33			Pass
VHT20	MCS0	3	157	5785	6.77	6.08	5.85	11.54	26.67			9.33			Pass
VHT20	MCS0	3	165	5825	6.63	6.32	5.69	11.40	26.67			9.33			Pass
VHT40	MCS0	3	151	5755	2.96	3.54	1.65	8.31	26.67			9.33			Pass
VHT40	MCS0	3	159	5795	3.66	3.02	2.45	8.43	26.67			9.33			Pass
VHT80	MCS0	3	155	5775	-1.16	-0.85	-1.73	3.92	26.67			9.33			Pass

TEST RESULTS DATA
Frequency Stability Beamforming Modes

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
VHT20	MCS0	1	149	5745	5744.950	-0.050	-8.70	25	100	
VHT20	MCS0	1	149	5745	5744.950	-0.050	-8.70	25	240	
VHT20	MCS0	1	149	5745	5744.950	-0.050	-8.70	25	120	
VHT20	MCS0	1	149	5745	5744.950	-0.050	-8.70	-30	120	
VHT20	MCS0	1	149	5745	5744.950	-0.050	-8.70	50	120	

Appendix B. Radiated Spurious Emission

MIMO Antenna 1+2+3 for CDD

15E Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5685	51.5	-42.73	94.23	38.38	35.08	12.37	34.33	150	130	P	H
		5699.7	61.93	-43.15	105.08	48.67	35.08	12.51	34.33	150	130	P	H
		5718.7	71.95	-38.59	110.54	58.58	35.21	12.51	34.35	150	130	P	H
		5723.1	77.62	-40.35	117.97	64.25	35.21	12.51	34.35	150	130	P	H
		5745	112.2	-	-	98.65	35.27	12.65	34.37	150	130	P	H
		5745	103.63	-	-	90.08	35.27	12.65	34.37	150	130	A	H
		5685	54.47	-39.76	94.23	41.35	35.08	12.37	34.33	150	186	P	V
		5699.7	69.34	-35.74	105.08	56.08	35.08	12.51	34.33	150	186	P	V
		5718.9	81.02	-29.57	110.59	67.65	35.21	12.51	34.35	150	186	P	V
		5724	93.31	-26.71	120.02	79.94	35.21	12.51	34.35	150	186	P	V
		5745	120.36	-	-	106.81	35.27	12.65	34.37	150	186	P	V
		5745	113.8	-	-	100.25	35.27	12.65	34.37	150	186	A	V

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 157 5785MHz		5685	48.65	-45.58	94.23	35.53	35.08	12.37	34.33	150	117	P	H
		5694.89	51.09	-50.44	101.53	37.97	35.08	12.37	34.33	150	117	P	H
		5713.06	51.63	-57.33	108.96	38.32	35.14	12.51	34.34	150	117	P	H
		5722.72	50.52	-66.58	117.1	37.15	35.21	12.51	34.35	150	117	P	H
		5785	100.27	-	-	86.49	35.39	12.79	34.4	150	117	P	H
		5785	94.31	-	-	80.53	35.39	12.79	34.4	150	117	A	H
		5853.33	49.37	-65.34	114.71	35.3	35.64	12.88	34.45	150	117	P	H
		5860.36	53.37	-56.03	109.4	39.16	35.7	12.97	34.46	150	117	P	H
		5885.82	50.63	-46.64	97.27	36.37	35.77	12.97	34.48	150	117	P	H
		5890	50.23	-43.94	94.17	35.92	35.83	12.97	34.49	150	117	P	H
		5685	52.97	-41.26	94.23	39.85	35.08	12.37	34.33	150	184	P	V
		5698.34	60.35	-43.73	104.08	47.23	35.08	12.37	34.33	150	184	P	V
		5703.63	63.32	-43	106.32	50.01	35.14	12.51	34.34	150	184	P	V
		5724.79	56.72	-65.1	121.82	43.35	35.21	12.51	34.35	150	184	P	V
		5785	119.35	-	-	105.57	35.39	12.79	34.4	150	184	P	V
		5785	113.63	-	-	99.85	35.39	12.79	34.4	150	184	A	V
		5852.19	56.82	-60.49	117.31	42.75	35.64	12.88	34.45	150	184	P	V
		5863.97	65.93	-42.46	108.39	51.72	35.7	12.97	34.46	150	184	P	V
		5889.05	55.83	-39.04	94.87	41.52	35.83	12.97	34.49	150	184	P	V
		5890	54.19	-39.98	94.17	39.88	35.83	12.97	34.49	150	184	P	V

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 165 5825MHz		5825	101.08	-	-	87.06	35.58	12.88	34.44	150	119	P	H
		5825	95.6	-	-	81.58	35.58	12.88	34.44	150	119	A	H
		5849.91	62.17	-60.13	122.3	48.1	35.64	12.88	34.45	150	119	P	H
		5856.75	59.49	-50.92	110.41	45.28	35.7	12.97	34.46	150	119	P	H
		5884.3	50.85	-47.54	98.39	36.59	35.77	12.97	34.48	150	119	P	H
		5890	47.86	-46.31	94.17	33.55	35.83	12.97	34.49	150	119	P	H
		5825	113.19	-	-	99.17	35.58	12.88	34.44	150	178	P	V
		5825	106.92	-	-	92.9	35.58	12.88	34.44	150	178	A	V
		5850.86	74.28	-46.06	120.34	60.21	35.64	12.88	34.45	150	178	P	V
		5858.84	69.46	-40.36	109.82	55.25	35.7	12.97	34.46	150	178	P	V
		5875.18	64.56	-40.61	105.17	50.3	35.77	12.97	34.48	150	178	P	V
		5890	53.07	-41.1	94.17	38.76	35.83	12.97	34.49	150	178	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

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+2+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		11490	53.58	-20.42	74	56.14	38.58	14.88	56.02	145	265	P	H
		17235	50.1	-18.2	68.3	46.88	40.63	18.04	55.45	174	321	P	H
		11490	53.78	-20.22	74	56.34	38.58	14.88	56.02	145	265	P	V
		17235	50.92	-17.38	68.3	47.7	40.63	18.04	55.45	174	321	P	V
802.11a CH 157 5785MHz		11570	53.05	-20.95	74	55.63	38.63	14.9	56.11	105	198	P	H
		17355	50.25	-18.05	68.3	46.98	41.1	18.18	56.01	189	185	P	H
		11570	53.34	-20.66	74	55.92	38.63	14.9	56.11	105	198	P	V
		17355	50.73	-17.57	68.3	47.46	41.1	18.18	56.01	189	185	P	V
802.11a CH 165 5825MHz		11650	52.48	-21.52	74	55.09	38.66	14.92	56.19	156	347	P	H
		17475	53.71	-14.59	68.3	50.4	41.57	18.31	56.57	170	360	P	H
		11650	54.17	-19.83	74	56.78	38.66	14.92	56.19	156	347	P	V
		11650	44.26	-9.74	54	46.87	38.66	14.92	56.19	156	347	A	V
		17475	57.01	-11.29	68.3	53.7	41.57	18.31	56.57	160	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5685	49.14	-45.09	94.23	36.02	35.08	12.37	34.33	150	113	P	H
		5700	60.37	-44.93	105.3	47.11	35.08	12.51	34.33	150	113	P	H
		5715.5	70.41	-39.23	109.64	57.1	35.14	12.51	34.34	150	113	P	H
		5725	79.02	-43.28	122.3	65.65	35.21	12.51	34.35	150	113	P	H
802.11n		5745	108.31	-	-	94.76	35.27	12.65	34.37	150	113	P	H
HT20		5745	100.07	-	-	86.52	35.27	12.65	34.37	150	113	A	H
CH 149		5685	60.71	-33.52	94.23	47.59	35.08	12.37	34.33	150	182	P	V
5745MHz		5695.4	70.66	-31.25	101.91	57.54	35.08	12.37	34.33	150	182	P	V
		5719.6	84.49	-26.3	110.79	71.12	35.21	12.51	34.35	150	182	P	V
		5724.7	95.13	-26.49	121.62	81.76	35.21	12.51	34.35	150	182	P	V
		5745	119.3	-	-	105.75	35.27	12.65	34.37	150	182	P	V
		5745	111.13	-	-	97.58	35.27	12.65	34.37	150	182	A	V

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5685	48.08	-46.15	94.23	34.96	35.08	12.37	34.33	150	114	P	H
		5696.5	52.59	-50.13	102.72	39.47	35.08	12.37	34.33	150	114	P	H
		5706.16	53.55	-53.48	107.03	40.24	35.14	12.51	34.34	150	114	P	H
		5724.905	50.47	-71.61	122.08	37.1	35.21	12.51	34.35	150	114	P	H
		5785	108.54	-	-	94.76	35.39	12.79	34.4	150	114	P	H
		5785	100.33	-	-	86.55	35.39	12.79	34.4	150	114	A	H
		5853.33	50.77	-63.94	114.71	36.7	35.64	12.88	34.45	150	114	P	H
		5866.25	55.98	-51.77	107.75	41.77	35.7	12.97	34.46	150	114	P	H
802.11n		5887.53	51.36	-44.64	96	37.05	35.83	12.97	34.49	150	114	P	H
HT20		5890	50.16	-44.01	94.17	35.85	35.83	12.97	34.49	150	114	P	H
CH 157		5685	53.82	-40.41	94.23	40.7	35.08	12.37	34.33	150	182	P	V
5785MHz		5699.26	62.2	-42.55	104.75	49.08	35.08	12.37	34.33	150	182	P	V
		5704.32	62.52	-43.99	106.51	49.21	35.14	12.51	34.34	150	182	P	V
		5723.64	63.71	-55.49	119.2	50.34	35.21	12.51	34.35	150	182	P	V
		5785	119.97	-	-	106.19	35.39	12.79	34.4	150	182	P	V
		5785	110.04	-	-	96.26	35.39	12.79	34.4	150	182	A	V
		5850.29	60.3	-61.34	121.64	46.23	35.64	12.88	34.45	150	182	P	V
		5859.22	65.74	-43.98	109.72	51.53	35.7	12.97	34.46	150	182	P	V
		5877.08	56.1	-47.65	103.75	41.84	35.77	12.97	34.48	150	182	P	V
		5890	54.1	-40.07	94.17	39.79	35.83	12.97	34.49	150	182	P	V

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 165 5825MHz		5825	109.56	-	-	95.54	35.58	12.88	34.44	150	115	P	H
		5825	102.42	-	-	88.4	35.58	12.88	34.44	150	115	A	H
		5850.48	69.76	-51.45	121.21	55.69	35.64	12.88	34.45	150	115	P	H
		5855.61	65.3	-45.43	110.73	51.09	35.7	12.97	34.46	150	115	P	H
		5875.37	56.35	-48.67	105.02	42.09	35.77	12.97	34.48	150	115	P	H
		5890	49.04	-45.13	94.17	34.73	35.83	12.97	34.49	150	115	P	H
		5825	119.13	-	-	105.11	35.58	12.88	34.44	150	182	P	V
		5825	113.83	-	-	99.81	35.58	12.88	34.44	150	182	A	V
		5850.29	82.11	-39.53	121.64	68.04	35.64	12.88	34.45	150	182	P	V
		5855.04	76.97	-33.92	110.89	62.85	35.7	12.88	34.46	150	182	P	V
		5875.37	66.33	-38.69	105.02	52.07	35.77	12.97	34.48	150	182	P	V
		5890	56.07	-38.1	94.17	41.76	35.83	12.97	34.49	150	182	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 149 5745MHz		11490	53.71	-20.29	74	56.27	38.58	14.88	56.02	145	265	P	H
		17235	58.3	-10	68.3	55.08	40.63	18.04	55.45	174	321	P	H
		11490	54.28	-19.72	74	56.84	38.58	14.88	56.02	155	265	P	V
		11490	44.69	-9.31	54	47.25	38.58	14.88	56.02	155	265	A	V
		17235	58.53	-9.77	68.3	55.31	40.63	18.04	55.45	174	321	P	V
802.11n HT20 CH 157 5785MHz		11570	53.89	-20.11	74	56.47	38.63	14.9	56.11	155	198	P	H
		17355	57.76	-10.54	68.3	54.49	41.1	18.18	56.01	189	185	P	H
		11570	55.01	-18.99	74	57.59	38.63	14.9	56.11	175	198	P	V
		11570	45.11	-8.89	54	47.69	38.63	14.9	56.11	175	198	A	V
		17355	57.06	-11.24	68.3	53.79	41.1	18.18	56.01	189	185	P	V
802.11n HT20 CH 165 5825MHz		11650	54.2	-19.8	74	56.81	38.66	14.92	56.19	156	347	P	H
		11650	44.72	-9.28	54	47.33	38.66	14.92	56.19	156	347	A	H
		17475	57.87	-10.43	68.3	54.56	41.57	18.31	56.57	165	360	P	H
		11650	55.17	-18.83	74	57.78	38.66	14.92	56.19	156	347	P	V
		11650	45.23	-8.77	54	47.84	38.66	14.92	56.19	156	347	A	V
		17475	59.21	-9.09	68.3	55.9	41.57	18.31	56.57	150	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5685	58.27	-35.96	94.23	45.15	35.08	12.37	34.33	150	127	P	H
		5697.535	67.12	-36.36	103.48	54	35.08	12.37	34.33	150	127	P	H
		5717.89	82.38	-27.93	110.31	69.01	35.21	12.51	34.35	150	127	P	H
		5723.525	82.01	-36.93	118.94	68.64	35.21	12.51	34.35	150	127	P	H
		5755	106.24	-	-	92.64	35.33	12.65	34.38	150	127	P	H
		5755	100.28	-	-	86.68	35.33	12.65	34.38	150	127	A	H
		5853.52	57.6	-56.67	114.27	43.48	35.7	12.88	34.46	150	127	P	H
		5861.88	54.73	-54.24	108.97	40.52	35.7	12.97	34.46	150	127	P	H
802.11n		5883.54	51.73	-47.23	98.96	37.47	35.77	12.97	34.48	150	127	P	H
HT40		5890	49.93	-44.24	94.17	35.62	35.83	12.97	34.49	150	127	P	H
CH 151		5685	70.58	-23.65	94.23	57.46	35.08	12.37	34.33	150	182	P	V
5755MHz		5694.66	76.94	-24.42	101.36	63.82	35.08	12.37	34.33	150	182	P	V
		5719.385	93.08	-17.65	110.73	79.71	35.21	12.51	34.35	150	182	P	V
		5724.215	96.68	-23.83	120.51	83.31	35.21	12.51	34.35	150	182	P	V
		5755	117.41	-	-	103.81	35.33	12.65	34.38	150	182	P	V
		5755	112.5	-	-	98.9	35.33	12.65	34.38	150	182	A	V
		5853.9	66.42	-46.99	113.41	52.3	35.7	12.88	34.46	150	182	P	V
		5857.7	67.41	-42.73	110.14	53.2	35.7	12.97	34.46	150	182	P	V
		5883.54	59.04	-39.92	98.96	44.78	35.77	12.97	34.48	150	182	P	V
		5890	54.57	-39.6	94.17	40.26	35.83	12.97	34.49	150	182	P	V

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+2+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 159 5795MHz		5685	49.72	-44.51	94.23	36.6	35.08	12.37	34.33	150	135	P	H
		5687.875	53.92	-42.44	96.36	40.8	35.08	12.37	34.33	150	135	P	H
		5718.12	60.48	-49.89	110.37	47.11	35.21	12.51	34.35	150	135	P	H
		5723.065	61.25	-56.64	117.89	47.88	35.21	12.51	34.35	150	135	P	H
		5795	105.76	-	-	91.92	35.46	12.79	34.41	150	135	P	H
		5795	97.52	-	-	83.68	35.46	12.79	34.41	150	135	A	H
		5852.38	64.76	-52.11	116.87	50.69	35.64	12.88	34.45	150	135	P	H
		5858.27	62.57	-47.41	109.98	48.36	35.7	12.97	34.46	150	135	P	H
		5877.84	58.44	-44.75	103.19	44.18	35.77	12.97	34.48	150	135	P	H
		5890	52.03	-42.14	94.17	37.72	35.83	12.97	34.49	150	135	P	H
		5685	58.75	-35.48	94.23	45.63	35.08	12.37	34.33	150	182	P	V
		5698.8	65.4	-39.02	104.42	52.28	35.08	12.37	34.33	150	182	P	V
		5719.385	71.2	-39.53	110.73	57.83	35.21	12.51	34.35	150	182	P	V
		5724.1	71.74	-48.51	120.25	58.37	35.21	12.51	34.35	150	182	P	V
		5795	116.59	-	-	102.75	35.46	12.79	34.41	150	182	P	V
		5795	111.72	-	-	97.88	35.46	12.79	34.41	150	182	A	V
		5852.57	75.03	-41.41	116.44	60.96	35.64	12.88	34.45	150	182	P	V
		5859.22	75.36	-34.36	109.72	61.15	35.7	12.97	34.46	150	182	P	V
		5875.18	68.54	-36.63	105.17	54.28	35.77	12.97	34.48	150	182	P	V
		5890	63.15	-31.02	94.17	48.84	35.83	12.97	34.49	150	182	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 151 5755MHz		11510	52.8	-21.2	74	55.35	38.6	14.88	56.03	100	360	P	H
		17265	57.58	-10.72	68.3	54.33	40.77	18.09	55.61	100	360	P	H
		11510	53.57	-20.43	74	56.12	38.6	14.88	56.03	160	360	P	V
		17265	58.29	-10.01	68.3	55.04	40.77	18.09	55.61	170	360	P	V
802.11n HT40 CH 159 5795MHz		11590	52.04	-21.96	74	54.63	38.63	14.91	56.13	150	300	P	H
		17385	56.33	-11.97	68.3	53.05	41.23	18.22	56.17	150	200	P	H
		11590	55.07	-18.93	74	57.66	38.63	14.91	56.13	170	300	P	V
		11590	44.93	-9.07	54	47.52	38.63	14.91	56.13	170	300	A	V
		17385	56.96	-11.34	68.3	53.68	41.23	18.22	56.17	170	200	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Emission below 1GHz

5GHz WIFI 802.11n HT20 (LF @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT20 LF		34.85	27.92	-12.08	40	34.6	24.6	0.32	31.6	-	-	P	H
		173.56	32.76	-10.74	43.5	45.86	16.76	1.45	31.31	100	200	P	H
		265.71	29.45	-16.55	46	40.34	18.35	1.92	31.16	-	-	P	H
		333.61	29.85	-16.15	46	39.01	19.98	2.16	31.3	-	-	P	H
		725.49	32.13	-13.87	46	32.76	27.5	3.37	31.5	-	-	P	H
		945.68	34.26	-11.74	46	32.5	29.33	3.93	31.5	-	-	P	H
		34.85	36.17	-3.83	40	42.85	24.6	0.32	31.6	100	0	P	V
		40.67	31.18	-8.82	40	40.3	21.94	0.39	31.45	-	-	P	V
		174.53	27.96	-15.54	43.5	41.08	16.72	1.45	31.29	-	-	P	V
		407.33	29.65	-16.35	46	32.7	25.83	2.42	31.3	-	-	P	V
		638.19	32.48	-13.52	46	35.61	25.25	3.12	31.5	-	-	P	V
		985.45	34.73	-19.27	54	31.99	30.11	4.13	31.5	-	-	P	V

Remark	1. No other spurious found. 2. All results are PASS against limit line.

MIMO Antenna 1+2+3 for Beamforming

15E Band 4 5725~5850MHz

WIFI 802.11ac HT20 (Band Edge @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5685	48.05	-46.18	94.23	34.93	35.08	12.37	34.33	150	109	P	H
		5700	59.39	-45.91	105.3	46.13	35.08	12.51	34.33	150	109	P	H
		5720	74.34	-36.56	110.9	60.97	35.21	12.51	34.35	150	109	P	H
		5724.8	82.42	-39.42	121.84	69.05	35.21	12.51	34.35	150	109	P	H
802.11ac		5745	108.61	-	-	95.06	35.27	12.65	34.37	150	109	P	H
HT20		5745	102.6	-	-	89.05	35.27	12.65	34.37	150	109	A	H
CH 149		5685	63.21	-31.02	94.23	50.09	35.08	12.37	34.33	250	0	P	V
5745MHz		5700	69.75	-35.55	105.3	56.49	35.08	12.51	34.33	250	0	P	V
		5719.9	87.85	-23.02	110.87	74.48	35.21	12.51	34.35	250	0	P	V
		5723.2	98.04	-20.16	118.2	84.67	35.21	12.51	34.35	250	0	P	V
		5745	120.61	-	-	107.06	35.27	12.65	34.37	250	0	P	V
		5745	112.9	-	-	99.35	35.27	12.65	34.37	250	0	A	V

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5685	47.28	-46.95	94.23	34.16	35.08	12.37	34.33	200	260	P	H
		5697.65	53.98	-49.59	103.57	40.86	35.08	12.37	34.33	200	260	P	H
		5701.675	53.56	-52.21	105.77	40.25	35.14	12.51	34.34	200	260	P	H
		5721.455	52.04	-62.18	114.22	38.67	35.21	12.51	34.35	200	260	P	H
		5785	105.98	-	-	92.2	35.39	12.79	34.4	200	260	P	H
		5785	97.24	-	-	83.46	35.39	12.79	34.4	200	260	A	H
		5852.76	50.99	-65.02	116.01	36.92	35.64	12.88	34.45	200	260	P	H
		5861.5	54.57	-54.51	109.08	40.36	35.7	12.97	34.46	200	260	P	H
802.11ac		5888.67	52.44	-42.71	95.15	38.13	35.83	12.97	34.49	200	260	P	H
HT20		5890	48.14	-46.03	94.17	33.83	35.83	12.97	34.49	200	260	P	H
CH 157		5685	52.14	-42.09	94.23	39.02	35.08	12.37	34.33	250	0	P	V
5785MHz		5697.995	63.33	-40.49	103.82	50.21	35.08	12.37	34.33	250	0	P	V
		5708.23	64.51	-43.1	107.61	51.2	35.14	12.51	34.34	250	0	P	V
		5723.18	62.79	-55.36	118.15	49.42	35.21	12.51	34.35	250	0	P	V
		5785	121.56	-	-	107.78	35.39	12.79	34.4	250	0	P	V
		5785	113.67	-	-	99.89	35.39	12.79	34.4	250	0	A	V
		5851.43	58.38	-60.66	119.04	44.31	35.64	12.88	34.45	250	0	P	V
		5867.39	67	-40.43	107.43	52.79	35.7	12.97	34.46	250	0	P	V
		5876.7	56.71	-47.33	104.04	42.45	35.77	12.97	34.48	250	0	P	V
		5890	54.61	-39.56	94.17	40.3	35.83	12.97	34.49	250	0	P	V

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac HT20 CH 165 5825MHz		5825	108.86	-	-	94.84	35.58	12.88	34.44	150	130	P	H
		5825	102.67	-	-	88.65	35.58	12.88	34.44	150	130	A	H
		5849.91	67.21	-55.09	122.3	53.14	35.64	12.88	34.45	150	130	P	H
		5855.04	61.72	-49.17	110.89	47.6	35.7	12.88	34.46	150	130	P	H
		5875.56	55.41	-49.47	104.88	41.15	35.77	12.97	34.48	150	130	P	H
		5890	48.56	-45.61	94.17	34.25	35.83	12.97	34.49	150	130	P	H
		5825	121.15	-	-	107.13	35.58	12.88	34.44	250	0	P	V
		5825	113.34	-	-	99.32	35.58	12.88	34.44	250	0	A	V
		5850.29	84.56	-37.08	121.64	70.49	35.64	12.88	34.45	250	0	P	V
		5855.42	80.18	-30.6	110.78	66.06	35.7	12.88	34.46	250	0	P	V
		5875.94	67.43	-37.17	104.6	53.17	35.77	12.97	34.48	250	0	P	V
		5890	58.75	-35.42	94.17	44.44	35.83	12.97	34.49	250	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11ac HT20 (Harmonic @ 3m)

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+2+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac HT20 CH 149 5745MHz		11490	50.42	-23.58	74	52.98	38.58	14.88	56.02	155	265	P	H
		17235	57.28	-11.02	68.3	54.06	40.63	18.04	55.45	174	321	P	H
		11490	50.24	-23.76	74	52.8	38.58	14.88	56.02	155	265	P	V
		17235	56.82	-11.48	68.3	53.6	40.63	18.04	55.45	174	321	P	V
802.11ac HT20 CH 157 5785MHz		11570	50.09	-23.91	74	52.67	38.63	14.9	56.11	175	198	P	H
		17355	57.33	-10.97	68.3	54.06	41.1	18.18	56.01	189	185	P	H
		11570	50.96	-23.04	74	53.54	38.63	14.9	56.11	175	198	P	V
		17355	57.24	-11.06	68.3	53.97	41.1	18.18	56.01	189	185	P	V
802.11ac HT20 CH 165 5825MHz		11650	50.6	-23.4	74	53.21	38.66	14.92	56.19	156	347	P	H
		17475	57.34	-10.96	68.3	54.03	41.57	18.31	56.57	150	360	P	H
		11650	50.08	-23.92	74	52.69	38.66	14.92	56.19	156	347	P	V
		17475	57.22	-11.08	68.3	53.91	41.57	18.31	56.57	150	360	P	V
		11490	50.42	-23.58	74	52.98	38.58	14.88	56.02	155	265	P	V
		17235	57.28	-11.02	68.3	54.06	40.63	18.04	55.45	174	321	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11ac HT40 (Band Edge @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5685	56.15	-38.08	94.23	43.03	35.08	12.37	34.33	200	260	P	H
		5698.915	69.53	-34.97	104.5	56.41	35.08	12.37	34.33	200	260	P	H
		5719.615	82.83	-27.96	110.79	69.46	35.21	12.51	34.35	200	260	P	H
		5724.1	86.2	-34.05	120.25	72.83	35.21	12.51	34.35	200	260	P	H
		5755	104.41	-	-	90.81	35.33	12.65	34.38	200	260	P	H
		5755	96.58	-	-	82.98	35.33	12.65	34.38	200	260	A	H
		5852.76	54.06	-61.95	116.01	39.99	35.64	12.88	34.45	200	260	P	H
		5855.61	52.93	-57.8	110.73	38.72	35.7	12.97	34.46	200	260	P	H
802.11ac		5883.16	49.86	-49.38	99.24	35.6	35.77	12.97	34.48	200	260	P	H
HT40		5890	47.73	-46.44	94.17	33.42	35.83	12.97	34.49	200	260	P	H
CH 151		5685	71.32	-22.91	94.23	58.2	35.08	12.37	34.33	250	0	P	V
5755MHz		5699.145	81.55	-23.12	104.67	68.43	35.08	12.37	34.33	250	0	P	V
		5716.395	95.58	-14.31	109.89	82.27	35.14	12.51	34.34	250	0	P	V
		5724.33	98.86	-21.91	120.77	85.49	35.21	12.51	34.35	250	0	P	V
		5755	120.3	-	-	106.7	35.33	12.65	34.38	250	0	P	V
		5755	111.95	-	-	98.35	35.33	12.65	34.38	250	0	A	V
		5850.29	67.67	-53.97	121.64	53.6	35.64	12.88	34.45	250	0	P	V
		5856.94	66.08	-44.28	110.36	51.87	35.7	12.97	34.46	250	0	P	V
		5877.84	63.54	-39.65	103.19	49.28	35.77	12.97	34.48	250	0	P	V
		5890	56.73	-37.44	94.17	42.42	35.83	12.97	34.49	250	0	P	V

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+2+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac HT40 CH 159 5795MHz		5685	48.28	-45.95	94.23	35.16	35.08	12.37	34.33	200	260	P	H
		5697.65	54.79	-48.78	103.57	41.67	35.08	12.37	34.33	200	260	P	H
		5717.2	60.97	-49.15	110.12	47.66	35.14	12.51	34.34	200	260	P	H
		5725.02	61.61	-60.69	122.3	48.24	35.21	12.51	34.35	200	260	P	H
		5795	104.57	-	-	90.73	35.46	12.79	34.41	200	260	P	H
		5795	96.72	-	-	82.88	35.46	12.79	34.41	200	260	A	H
		5853.33	65.09	-49.62	114.71	51.02	35.64	12.88	34.45	200	260	P	H
		5856.18	64.87	-45.7	110.57	50.66	35.7	12.97	34.46	200	260	P	H
		5879.55	57.71	-44.21	101.92	43.45	35.77	12.97	34.48	200	260	P	H
		5890	53.61	-40.56	94.17	39.3	35.83	12.97	34.49	200	260	P	H
		5685	61.81	-32.42	94.23	48.69	35.08	12.37	34.33	250	0	P	V
		5694.085	66.39	-34.55	100.94	53.27	35.08	12.37	34.33	250	0	P	V
		5718.58	74.33	-36.17	110.5	60.96	35.21	12.51	34.35	250	0	P	V
		5720.305	74.4	-37.2	111.6	61.03	35.21	12.51	34.35	250	0	P	V
		5795	119.55	-	-	105.71	35.46	12.79	34.41	250	0	P	V
		5795	112.07	-	-	98.23	35.46	12.79	34.41	250	0	A	V
		5853.52	78.31	-35.96	114.27	64.19	35.7	12.88	34.46	250	0	P	V
		5863.21	78.03	-30.57	108.6	63.82	35.7	12.97	34.46	250	0	P	V
		5875.94	70.77	-33.83	104.6	56.51	35.77	12.97	34.48	250	0	P	V
		5890	65.87	-28.3	94.17	51.56	35.83	12.97	34.49	250	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11ac HT40 (Harmonic @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac		11510	50.46	-23.54	74	53.01	38.6	14.88	56.03	160	360	P	H
HT40		17265	56.95	-11.35	68.3	53.7	40.77	18.09	55.61	170	360	P	H
CH 151		11510	50.07	-23.93	74	52.62	38.6	14.88	56.03	160	360	P	V
5755MHz		17265	57.71	-10.59	68.3	54.46	40.77	18.09	55.61	170	360	P	V
802.11ac		11590	50.2	-23.8	74	52.79	38.63	14.91	56.13	170	300	P	H
HT40		17385	56.18	-12.12	68.3	52.9	41.23	18.22	56.17	150	200	P	H
CH 159		11590	50.23	-23.77	74	52.82	38.63	14.91	56.13	170	300	P	V
5795MHz		17385	55.9	-12.4	68.3	52.62	41.23	18.22	56.17	150	200	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT80 CH 155 5775MHz		5685	67.72	-26.51	94.23	54.6	35.08	12.37	34.33	200	260	P	H
		5693.28	76.46	-23.89	100.35	63.34	35.08	12.37	34.33	200	260	P	H
		5717.545	80.23	-29.98	110.21	66.86	35.21	12.51	34.35	200	260	P	H
		5722.145	80.76	-35.03	115.79	67.39	35.21	12.51	34.35	200	260	P	H
		5775	100.87	-	-	87.23	35.39	12.65	34.4	200	260	P	H
		5775	93.99	-	-	80.35	35.39	12.65	34.4	200	260	A	H
		5851.62	76.36	-42.25	118.61	62.29	35.64	12.88	34.45	200	260	P	H
		5867.58	74.59	-32.79	107.38	60.38	35.7	12.97	34.46	200	260	P	H
		5875.18	66.6	-38.57	105.17	52.34	35.77	12.97	34.48	200	260	P	H
		5890	57.19	-36.98	94.17	42.88	35.83	12.97	34.49	200	260	P	H
		5685	83.13	-11.1	94.23	70.01	35.08	12.37	34.33	250	0	P	V
		5690.06	90.17	-7.8	97.97	77.05	35.08	12.37	34.33	250	0	P	V
		5716.05	97.81	-11.99	109.8	84.5	35.14	12.51	34.34	250	0	P	V
		5720.995	95.09	-18.08	113.17	81.72	35.21	12.51	34.35	250	0	P	V
		5775	116.38	-	-	102.74	35.39	12.65	34.4	250	0	P	V
		5775	108.97	-	-	95.33	35.39	12.65	34.4	250	0	A	V
		5851.24	91.61	-27.86	119.47	77.54	35.64	12.88	34.45	250	0	P	V
		5871.57	90.11	-16.15	106.26	75.85	35.77	12.97	34.48	250	0	P	V
		5875.94	84.91	-19.69	104.6	70.65	35.77	12.97	34.48	250	0	P	V
		5890	70.78	-23.39	94.17	56.47	35.83	12.97	34.49	250	0	P	V

Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.

15E Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac		11550	50.78	-23.22	74	53.35	38.62	14.9	56.09	175	198	P	H
VHT80		17325	57.8	-10.5	68.3	54.5	40.97	18.18	55.85	189	185	P	H
CH 155		11550	50.89	-23.11	74	53.46	38.62	14.9	56.09	175	198	P	V
5775MHz		17325	56.94	-11.36	68.3	53.64	40.97	18.18	55.85	189	185	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15E Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (LF @ 3m)

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+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11ac VHT80 LF		34.85	28.92	-11.08	40	35.6	24.6	0.32	31.6			P	H
		170.65	32.95	-10.55	43.5	45.95	16.89	1.43	31.32	100	150	P	H
		224.97	29.36	-16.64	46	41.97	16.8	1.74	31.15			P	H
		426.73	32.92	-13.08	46	36.32	25.41	2.49	31.3			P	H
		685.72	31.01	-14.99	46	32.26	27.01	3.24	31.5			P	H
		945.68	33.26	-12.74	46	31.5	29.33	3.93	31.5			P	H
		32.91	36.95	-3.05	40	42.88	25.44	0.28	31.65	100	158	P	V
		174.53	27.96	-15.54	43.5	41.08	16.72	1.45	31.29			P	V
		330.7	26.73	-19.27	46	35.98	19.9	2.15	31.3			P	V
		407.33	29.65	-16.35	46	32.7	25.83	2.42	31.3			P	V
		638.19	32.48	-13.52	46	35.61	25.25	3.12	31.5			P	V
		937.92	33.21	-12.79	46	31.61	29.19	3.91	31.5			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 per 15.209(c).
!	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+2+3		(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)

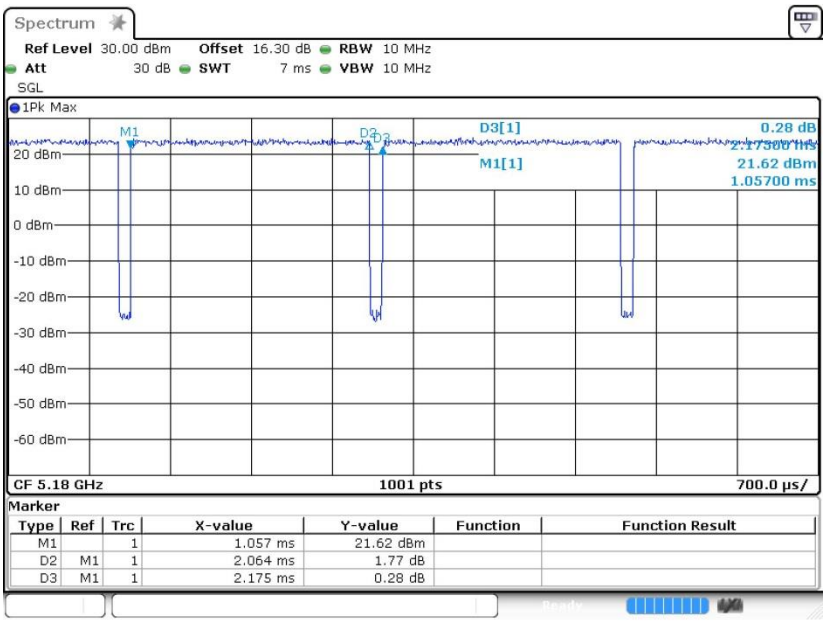
= -10.46(dB)

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

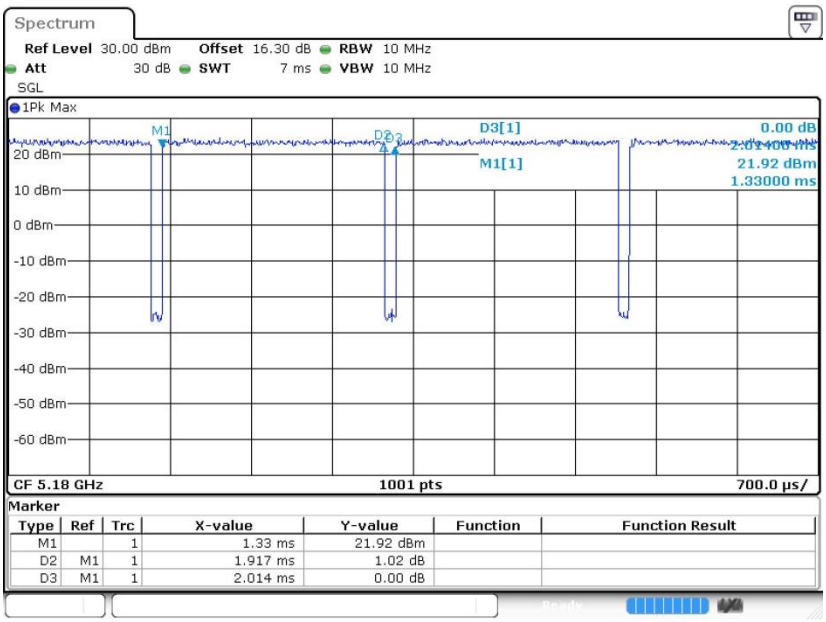
Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2+3	802.11a	94.90	2.064	0.484	1kHz
1+2+3	802.11n HT20	95.18	1.917	0.521	1kHz
1+2+3	802.11n HT40	90.46	0.948	1.055	3kHz
1+2+3	802.11ac VHT80	94.08	0.461	2.170	3kHz

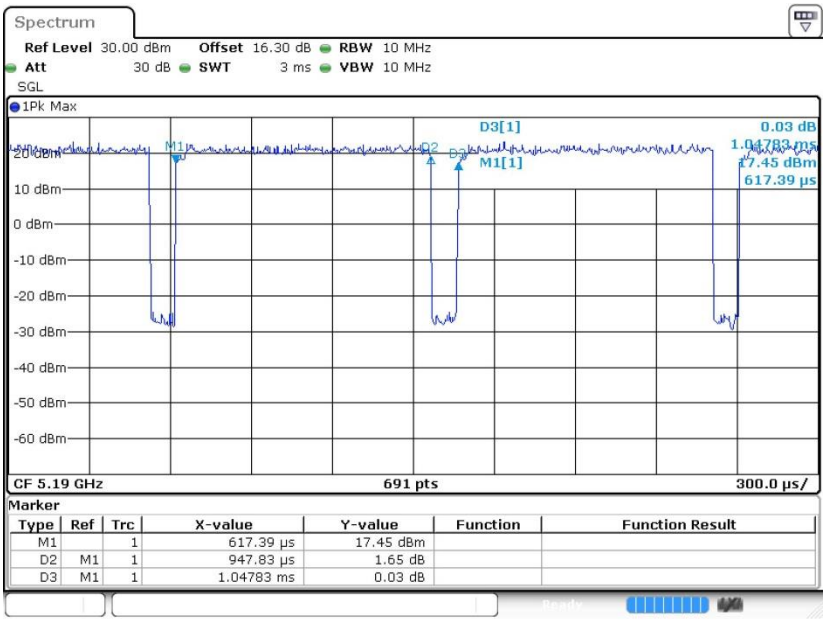
802.11a Antenna 1+2+3



802.11n HT20 Antenna 1+2+3



802.11n HT40 Antenna 1+2+3



802.11ac VHT80 Antenna 1+2+3