FCC RF Test Report

APPLICANT	:	**Plume Design Inc**
EQUIPMENT	:	**Plume Pod**
BRAND NAME	:	**Plume Design Inc**
MODEL NAME	:	**A2A**
MARKETING NAME	:	**PLUME ADAPTIVE WIFI**
FCC ID	:	**2AG7G-A2A**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on Jun. 28, 2018 and testing was completed on Oct. 25, 2018. 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.

This report contains data that were produced under subcontract by Laboratory SPORTON INTERNATIONAL INC.

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.

James Huang

NVLAP® TESTING NVLAP LAB CODE 600155-0

Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone,
Jiangsu Province 215335, China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR860502C	Rev. 01	Initial issue of report	Oct. 30, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 17 dBm	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 1.00 dB at 5149.280 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.19 dB at 0.375 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Plume Design Inc
290 California Ave, Suite 200, Palo Alto, CA 94306, USA

1.2 Manufacturer

Plume Design Inc
290 California Ave, Suite 200, Palo Alto, CA 94306, USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Plume Pod
Brand Name	Plume Design Inc
Model Name	A2A
Marketing Name	Plume Adaptive WiFi
FCC ID	2AG7G-A2A
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 LE
HW Version	N/A
SW Version	N/A
EUT Stage	Production Unit

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 Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power to Antenna <CDD Modes>	**<Ant 1>** **<5180 MHz ~ 5240 MHz>** 802.11a : 17.57 dBm / 0.0571 W 802.11n HT20 : 19.68 dBm / 0.0929 W 802.11n HT40 : 21.29 dBm / 0.1346 W 802.11ac VHT20 : 19.65 dBm / 0.0923 W 802.11ac VHT40 : 21.26 dBm / 0.1337 W 802.11ac VHT80 : 14.80 dBm / 0.0302 W **MIMO <Ant 1+2>** **<5180 MHz ~ 5240 MHz>** 802.11a : 19.73 dBm / 0.0940 W 802.11n HT20 : 19.91 dBm / 0.0979 W 802.11n HT40 : 22.73 dBm / 0.1875 W 802.11ac VHT20 : 19.87 dBm / 0.0971 W 802.11ac VHT40 : 22.69 dBm / 0.1858 W 802.11ac VHT80 : 16.66 dBm / 0.0463 W
Maximum Output Power to Antenna <Beamforming Modes>	**MIMO <Ant 1+2>** **<5180 MHz ~ 5240 MHz>** 802.11a : 13.96 dBm / 0.0249 W 802.11n HT20 : 15.09 dBm / 0.0323 W 802.11n HT40 : 15.48 dBm / 0.0353 W 802.11ac VHT80 : 15.33 dBm / 0.0341 W
99% Occupied Bandwidth <CDD Modes>	**<Ant 1>** **<5180 MHz ~ 5240 MHz>** 802.11a : 17.08 MHz 802.11n HT20 : 18.48 MHz 802.11n HT40 : 39.06 MHz 802.11ac VHT80 : 75.76 MHz **MIMO <Ant 1+2>** **<5180 MHz ~ 5240 MHz>** 802.11a : 17.13 MHz 802.11n HT20 : 18.23 MHz 802.11n HT40 : 36.26 MHz 802.11ac VHT80 : 75.64 MHz
99% Occupied Bandwidth <Beamforming Modes>	**MIMO <Ant 1+2>** **<5180 MHz ~ 5240 MHz>** 802.11a : 17.18 MHz 802.11n HT20 : 18.23 MHz 802.11n HT40 : 36.36 MHz 802.11ac VHT80 : 76.12 MHz
Antenna Gain / Gain	**<5180 MHz ~ 5240 MHz>** <Ant. 1> : Loop Antenna with gain 2.44 dBi <Ant. 2> : Loop Antenna with gain 1.97 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Antenna Function Description	

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

Note:

1. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
2. For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing is assessed only 802.11n HT20/ HT40 by referring to their higher conducted power.

1.5 Modification of EUT

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

1.6 Testing Location

SPORTON INTERNATIONAL INC. is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and under the FCC-recognized accredited testing laboratories by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	CO05-HY

Note: Test data subcontracted: Conducted Emission in section 3.5 of this report.

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0).

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	TH01-KS 03CH04-KS/03CH02-KS	CN5013	630927

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 v02r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

a. 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: conduction emission (150 kHz to 30 MHz), radiation 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.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210		

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 modes are considering the modulation and worse data rates as below table.

MIMO Mode

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

TXBF Mode

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

Test Cases	
AC Conducted Emission	Mode 1 : WLAN Link(5G) + Bluetooth Link + Lan Link(Ping) Mode 2 : WLAN Link(5G) + Bluetooth Link + Lan Link(TX)
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.	

Ch. #		Band I：5180-5240 MHz
		802.11a
L	Low	36
M	Middle	44
H	High	48

Ch. #		Band I：5180-5240 MHz
		802.11n HT20
L	Low	36
M	Middle	44
H	High	48

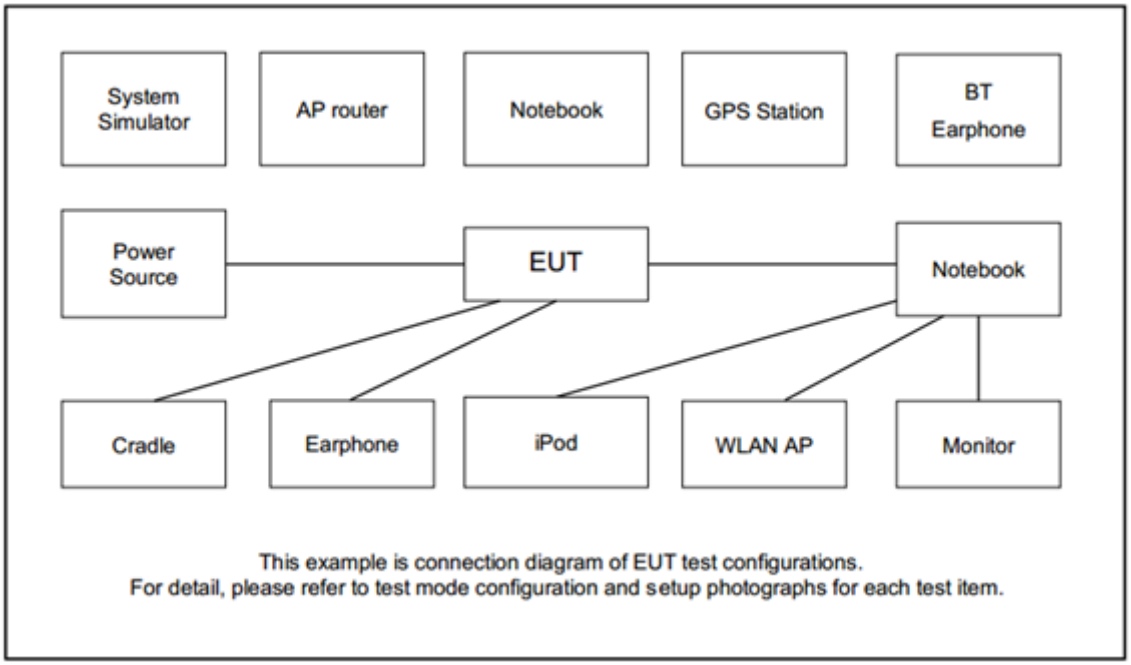
Ch. #		Band I：5180-5240 MHz
		802.11n HT40
L	Low	38
M	Middle	-
H	High	46

Ch. #		Band I：5180-5240 MHz
		802.11ac VHT20
L	Low	36
M	Middle	44
H	High	48

Ch. #		Band I：5180-5240 MHz
		802.11ac VHT40
L	Low	38
M	Middle	-
H	High	46

Ch. #		Band I：5180-5240 MHz
		802.11ac VHT80
L	Low	-
M	Middle	42
H	High	-

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Dell	E5570	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	Dell	E3340	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD MONITOR	Asus	PB27UQ	FCC DoC	Shielded, 1.6m	Unshielded 1.8m
4.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0m	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 derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.1 dB.

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

= 6.1 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

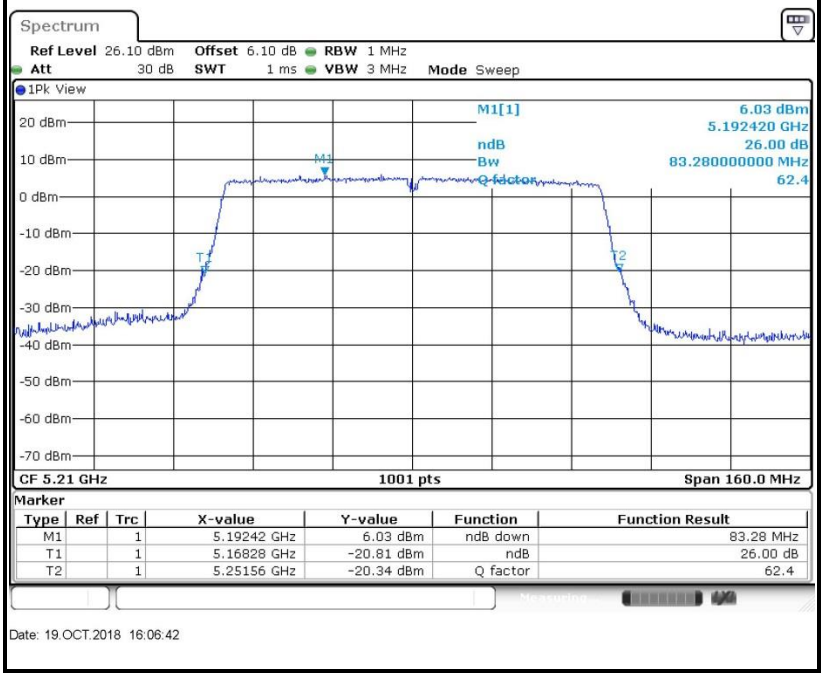
3.1.4 Test Setup

3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

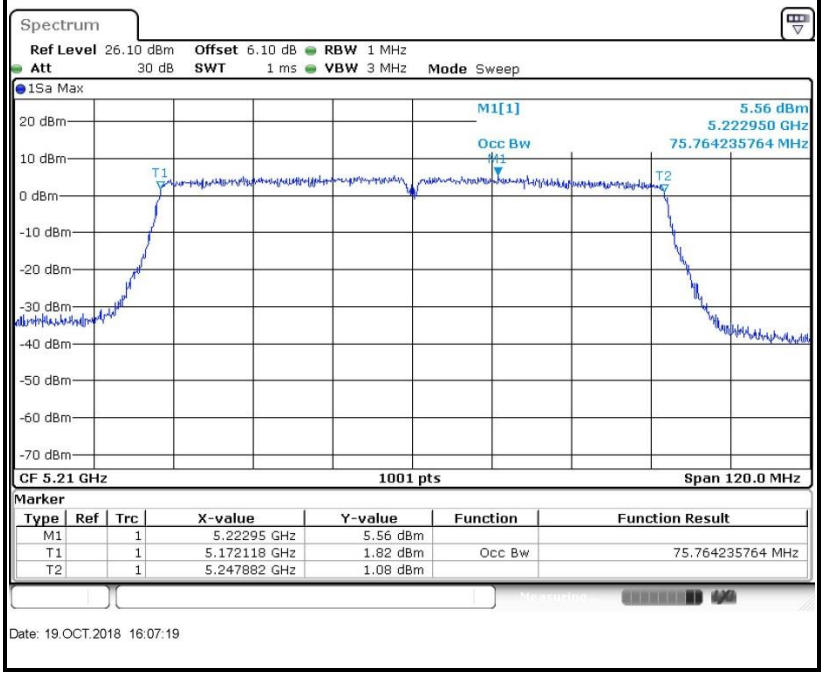
Please refer to Appendix A.

<CDD Mode>

Maximum 26dB Bandwidth



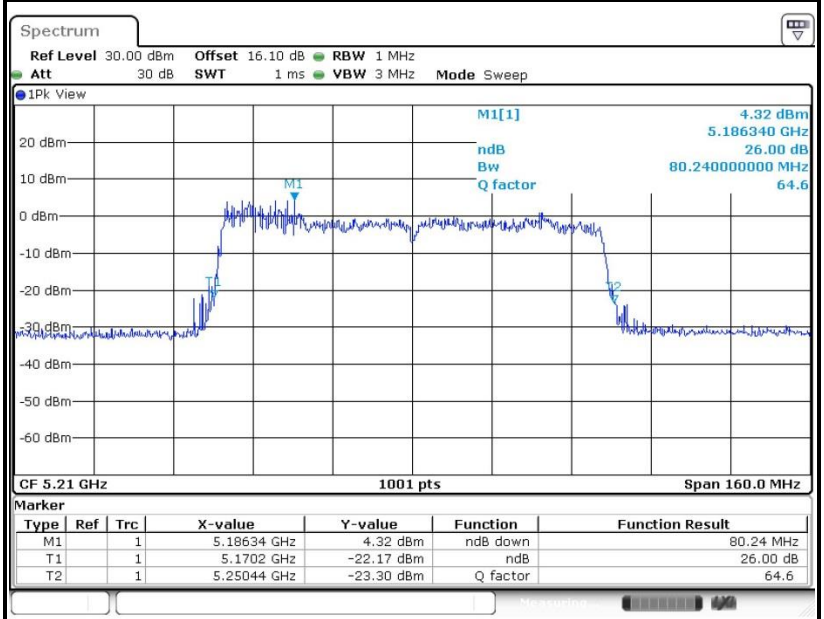
Maximum 99% Occupied Bandwidth



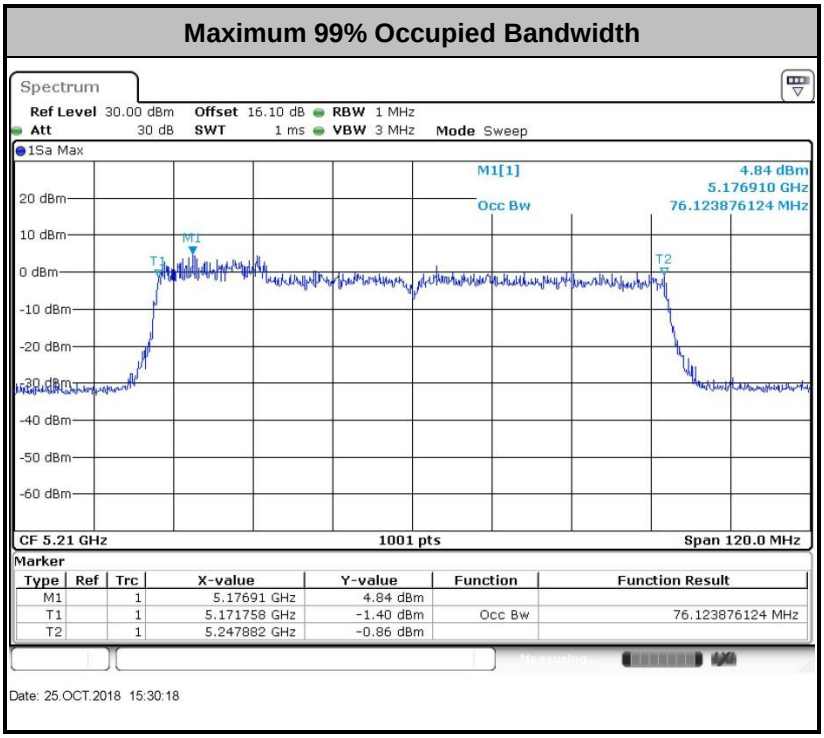
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<TXBF Mode>

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

<FCC 14-30 CFR 15.407>

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 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 Mode>

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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 Mode>

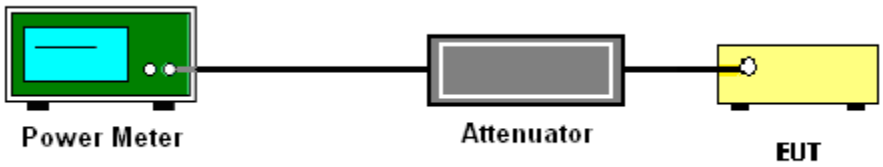
The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 for TXBF modes.

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

For normal channel:



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

<FCC 14-30 CFR 15.407>

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section F) Maximum power spectral density.

<CDD/ TXBF Mode>

 # Method SA-2 #

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

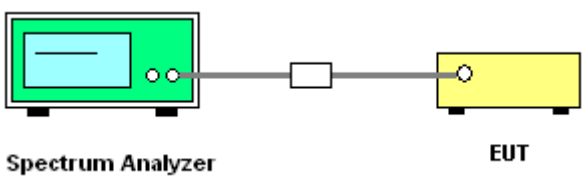
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

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 (a): Measure and sum the spectra across the outputs.

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

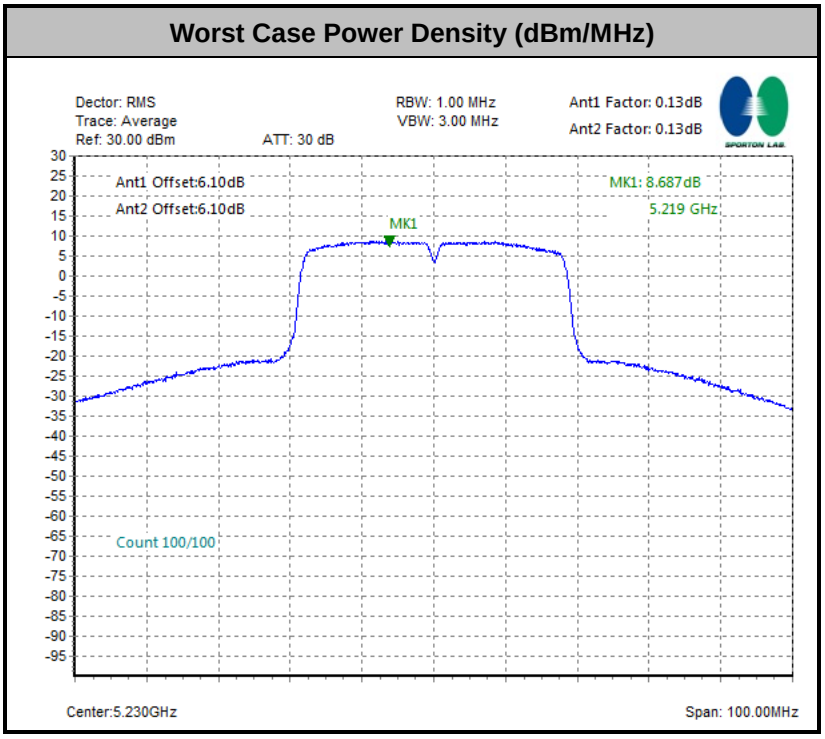
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

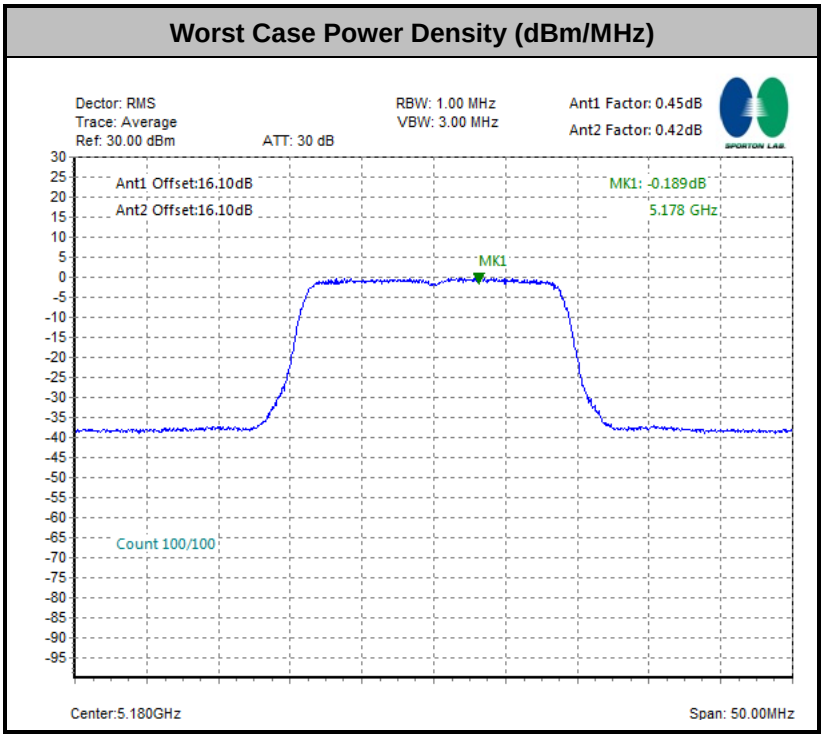
Please refer to Appendix A.

<CDD Mode>



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

<TXBF Mode>



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

3.4 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.4.1 Limit of Unwanted Emissions

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

(2) Unwanted spurious emissions fallen in restricted bands 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

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

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

$$EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m

d_{Meas} is the measurement distance, in m

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 v02r01. Section G) Unwanted emissions measurement.

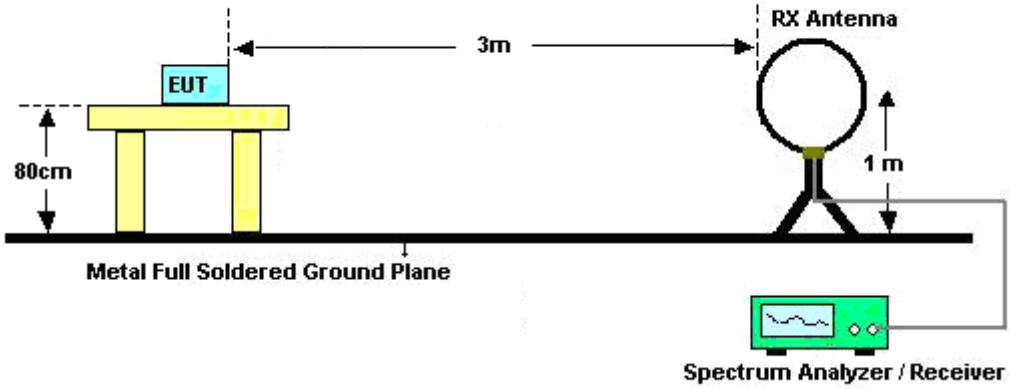
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (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.

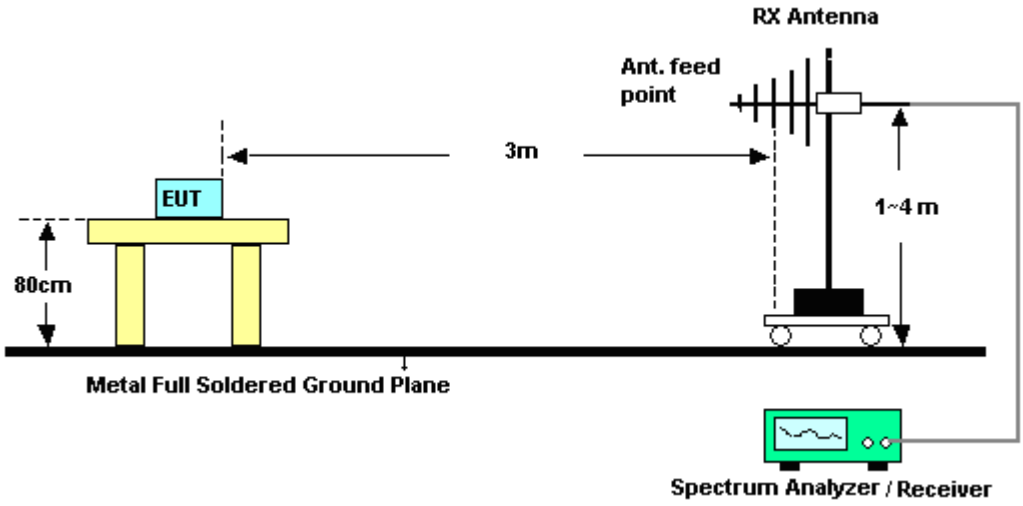
3.4.4 Test Setup

For radiated emissions below 30MHz

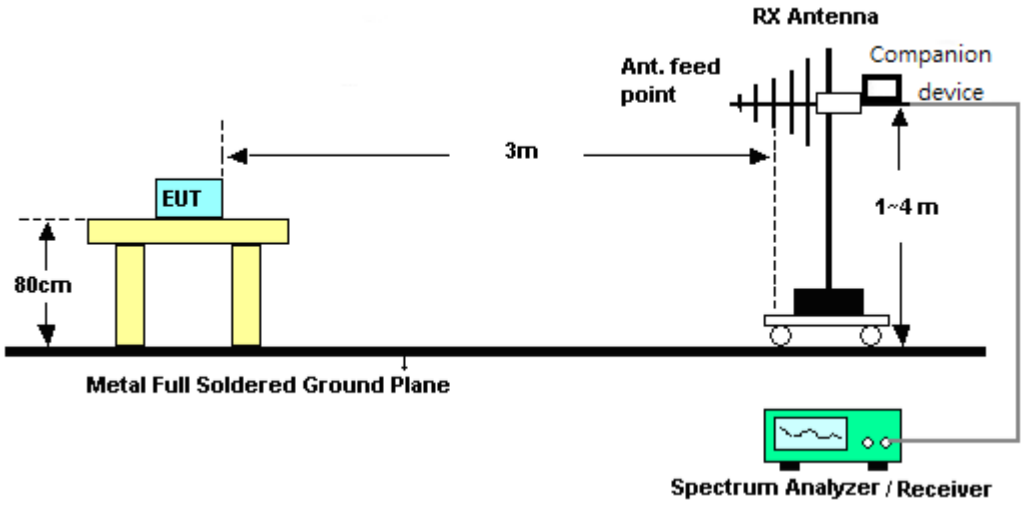


For radiated emissions from 30MHz to 1GHz

<CDD Mode>

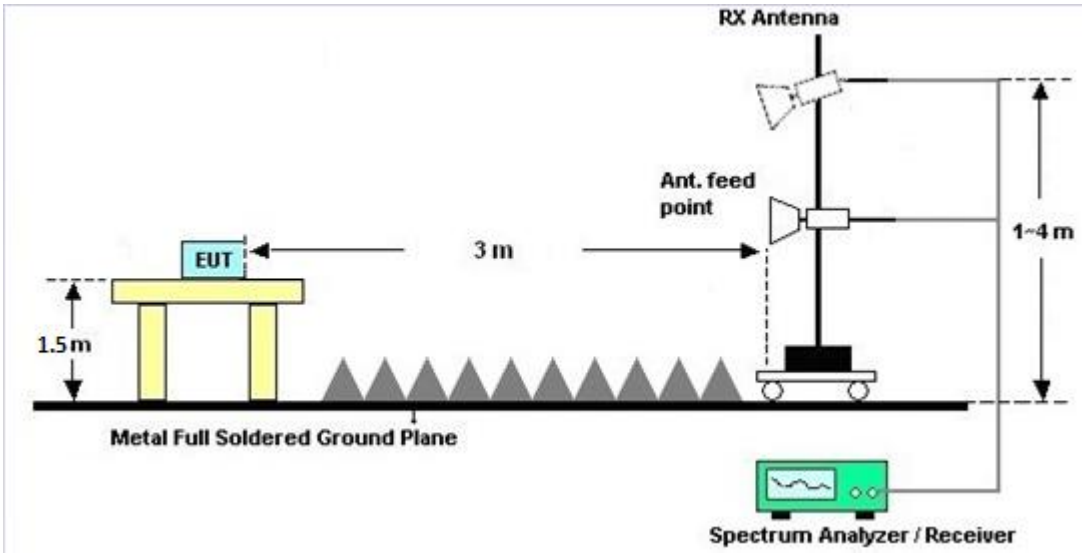


<TXBF Mode>

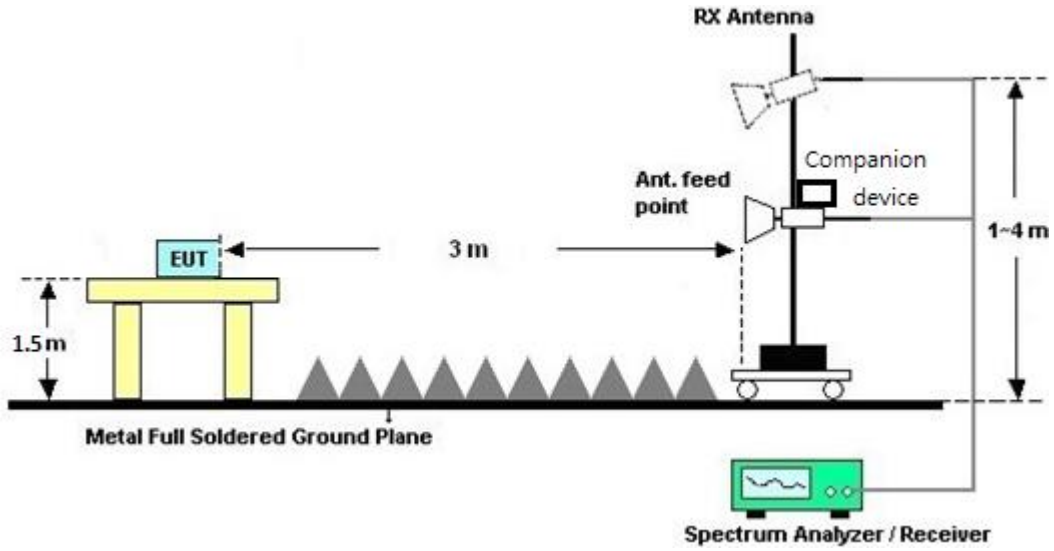


For radiated emissions above 1GHz

<CDD Mode>



<TXBF Modes>



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.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

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.

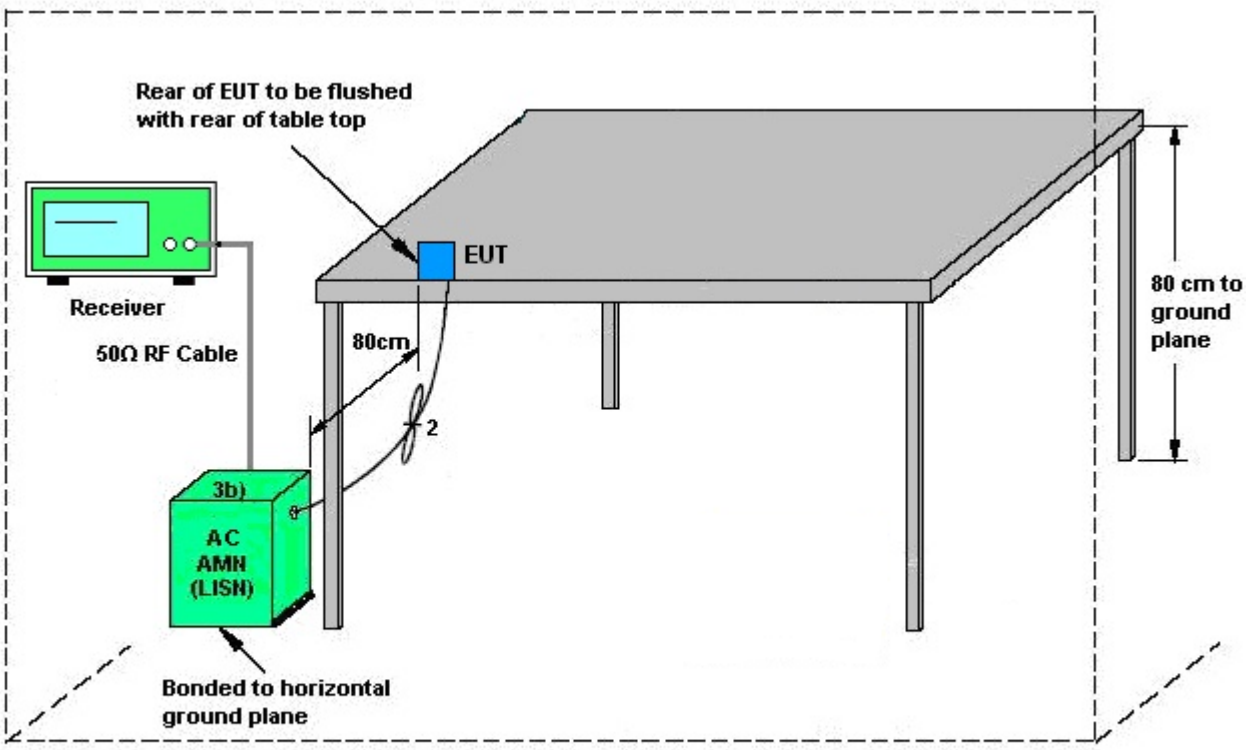
3.5.2 Measuring Instruments

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

Please refer to Appendix B.

3.6 Automatically Discontinue Transmission

3.6.1 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.

3.6.2 Measuring Instruments

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

3.6.3 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.

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

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

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 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 GANT 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.

<CDD Modes>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	2.44	1.97	2.44	5.22	0.00	0.00

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

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

where

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

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

N_{ANT} = the total number of antennas

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

G_k is the gain in dBi of the kth antenna.

The EUT supports beamforming 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.

	Ant 1 (dBi)	Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	2.44	1.97	5.22	5.22	0.00	0.00

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

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2018	Oct. 19, 2018~ Oct. 25, 2018	Aug. 06, 2019	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	Oct. 19, 2018~ Oct. 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	Oct. 19, 2018~ Oct. 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
USB RFPower Sensor	Dare	RPR3006W	15I00041SNO93	50MHz~6GHz，-50dBm~ +10dBm	Jan. 18, 2018	Oct. 19, 2018~ Oct. 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
USB RFPower Sensor	Dare	RPR3006W	15I00041SNO94	50MHz~6GHz，-50dBm~ +10dBm	Jan. 18, 2018	Oct. 19, 2018~ Oct. 25, 2018	Jan. 17, 2019	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Aug. 07, 2018	Oct. 10, 2018~ Oct. 11, 2018	Aug. 06, 2019	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Oct. 10, 2018~ Oct. 11, 2018	Oct. 21, 2018	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-2GHz	Jan. 29, 2018	Oct. 10, 2018~ Oct. 11, 2018	Jan. 28, 2019	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2018	Oct. 10, 2018~ Oct. 11, 2018	Aug. 05, 2019	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	61601000247 3	N/A	NCR	Oct. 10, 2018~ Oct. 11, 2018	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Oct. 10, 2018~ Oct. 11, 2018	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Oct. 10, 2018~ Oct. 11, 2018	NCR	Radiation (03CH02-KS)
EMI Test Receiver	Keysight	N9038A	MY56400023	3Hz~8.5GHz;Max 30dBm	Oct. 19, 2017	Oct. 10, 2018~ Oct. 11, 2018	Oct. 18, 2018	Radiation (03CH04-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44GHz	Oct. 14, 2017	Oct. 10, 2018~ Oct. 11, 2018	Oct. 13, 2018	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1648	1GHz~18GHz	Dec. 16, 2017	Oct. 10, 2018~ Oct. 11, 2018	Dec. 15, 2018	Radiation (03CH04-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Oct. 10, 2018~ Oct. 11, 2018	Feb. 06, 2019	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Dec. 16, 2017	Oct. 10, 2018~ Oct. 11, 2018	Dec. 15, 2018	Radiation (03CH04-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz	Feb. 08, 2018	Oct. 10, 2018~ Oct. 11, 2018	Feb. 07, 2019	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Oct. 10, 2018~ Oct. 11, 2018	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Oct. 10, 2018~ Oct. 11, 2018	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Oct. 10, 2018~ Oct. 11, 2018	NCR	Radiation (03CH04-KS)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	NCR	Jul. 11, 2018	NCR	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Jul. 11, 2018	Dec. 07, 2018	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 06, 2018	Jul. 11, 2018	Mar. 05, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jul. 11, 2018	Nov. 29, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 08, 2017	Jul. 11, 2018	Dec. 07, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	NCR	Jul. 11, 2018	NCR	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Jul. 11, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Jul. 11, 2018	Jan. 02, 2019	Conduction (CO05-HY)

NCR: No Calibration Required

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz) for CO05-HY

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.7dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH02-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.8dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz) for 03CH04-KS

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

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz) for 03CH04-KS

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

Appendix A. Conducted Test Results

Report Number : FR860502C

Test Engineer:	Smile Wang	Temperature:	21~25	°C
Test Date:	2018/10/19~2018/10/25	Relative Humidity:	51~54	%

Report Number : FR860502C

TEST RESULTS DATA
26dB and 99% OBW
CDD Modes

Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)			Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	17.08		20.68		-		22.33			
11a	6Mbps	1	44	5220	17.08		20.48		-		22.33			
11a	6Mbps	1	48	5240	17.08		20.88		-		22.33			
HT20	MCS0	1	36	5180	18.23		21.58		-		22.61			
HT20	MCS0	1	44	5220	18.48		22.68		-		22.67			
HT20	MCS0	1	48	5240	18.13		21.83		-		22.58			
HT40	MCS0	1	38	5190	36.06		40.55		-		23.01			
HT40	MCS0	1	46	5230	39.06		73.64		-		23.01			
VHT80	MCS0	1	42	5210	75.76		83.28		-		23.01			
11a	6Mbps	2	36	5180	17.13	17.13	20.63	20.48	-		22.34			
11a	6Mbps	2	44	5220	17.13	17.08	20.78	20.43	-		22.33			
11a	6Mbps	2	48	5240	17.13	17.08	20.63	20.43	-		22.33			
HT20	MCS0	2	36	5180	18.13	18.23	21.58	21.63	-		22.58			
HT20	MCS0	2	44	5220	18.18	18.18	21.53	21.53	-		22.60			
HT20	MCS0	2	48	5240	18.23	18.23	21.78	21.48	-		22.61			
HT40	MCS0	2	38	5190	36.16	36.16	40.55	40.64	-		23.01			
HT40	MCS0	2	46	5230	36.26	36.26	41.00	41.09	-		23.01			
VHT80	MCS0	2	42	5210	75.64	75.64	83.28	82.32	-		23.01			

Report Number : FR860502C

TEST RESULTS DATA
Average Power Table
CDD Modes

FCC Band I															
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	36	5180	0.12		17.17			30.00	30.00	2.44	1.97		Pass
11a	6Mbps	1	44	5220	0.12		16.74			30.00	30.00	2.44	1.97		Pass
11a	6Mbps	1	48	5240	0.12		17.57			30.00	30.00	2.44	1.97		Pass
HT20	MCS0	1	36	5180	0.05		16.80			30.00	30.00	2.44	1.97		Pass
HT20	MCS0	1	44	5220	0.05		19.68			30.00	30.00	2.44	1.97		Pass
HT20	MCS0	1	48	5240	0.05		18.24			30.00	30.00	2.44	1.97		Pass
HT40	MCS0	1	38	5190	0.10		15.79			30.00	30.00	2.44	1.97		Pass
HT40	MCS0	1	46	5230	0.10		21.29			30.00	30.00	2.44	1.97		Pass
VHT20	MCS0	1	36	5180	0.04		16.77			30.00	30.00	2.44	1.97		Pass
VHT20	MCS0	1	44	5220	0.04		19.65			30.00	30.00	2.44	1.97		Pass
VHT20	MCS0	1	48	5240	0.04		18.22			30.00	30.00	2.44	1.97		Pass
VHT40	MCS0	1	38	5190	0.13		15.78			30.00	30.00	2.44	1.97		Pass
VHT40	MCS0	1	46	5230	0.13		21.26			30.00	30.00	2.44	1.97		Pass
VHT80	MCS0	1	42	5210	0.24		14.80			30.00	30.00	2.44	1.97		Pass
11a	6Mbps	2	36	5180	0.12	0.12	16.25	16.55	19.42	30.00		2.44			Pass
11a	6Mbps	2	44	5220	0.12	0.12	16.27	16.37	19.33	30.00		2.44			Pass
11a	6Mbps	2	48	5240	0.12	0.12	16.63	16.80	19.73	30.00		2.44			Pass
HT20	MCS0	2	36	5180	0.05	0.05	15.88	16.40	19.16	30.00		2.44			Pass
HT20	MCS0	2	44	5220	0.05	0.05	16.33	16.76	19.56	30.00		2.44			Pass
HT20	MCS0	2	48	5240	0.05	0.05	16.73	17.06	19.91	30.00		2.44			Pass
HT40	MCS0	2	38	5190	0.13	0.13	14.81	15.18	18.01	30.00		2.44			Pass
HT40	MCS0	2	46	5230	0.13	0.13	19.57	19.86	22.73	30.00		2.44			Pass
VHT20	MCS0	2	36	5180	0.03	0.04	15.78	16.35	19.08	30.00		2.44			Pass
VHT20	MCS0	2	44	5220	0.03	0.04	16.26	16.66	19.47	30.00		2.44			Pass
VHT20	MCS0	2	48	5240	0.03	0.04	16.71	17.00	19.87	30.00		2.44			Pass
VHT40	MCS0	2	38	5190	0.13	0.13	14.78	15.14	17.97	30.00		2.44			Pass
VHT40	MCS0	2	46	5230	0.13	0.13	19.54	19.82	22.69	30.00		2.44			Pass
VHT80	MCS0	2	42	5210	0.22	0.24	13.67	13.62	16.66	30.00		2.44			Pass

TEST RESULTS DATA
Power Spectral Density
CDD Modes

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	36	5180	0.12		5.88			17.00	17.00	2.44	1.97		Pass
11a	6Mbps	1	44	5220	0.12		5.61			17.00	17.00	2.44	1.97		Pass
11a	6Mbps	1	48	5240	0.12		6.42			17.00	17.00	2.44	1.97		Pass
HT20	MCS0	1	36	5180	0.05		5.56			17.00	17.00	2.44	1.97		Pass
HT20	MCS0	1	44	5220	0.05		8.31			17.00	17.00	2.44	1.97		Pass
HT20	MCS0	1	48	5240	0.05		6.93			17.00	17.00	2.44	1.97		Pass
HT40	MCS0	1	38	5190	0.10		1.85			17.00	17.00	2.44	1.97		Pass
HT40	MCS0	1	46	5230	0.10		7.23			17.00	17.00	2.44	1.97		Pass
VHT80	MCS0	1	42	5210	0.24		-2.44			17.00	17.00	2.44	1.97		Pass
11a	6Mbps	2	36	5180	0.12	0.12			8.02	17.00		5.22			Pass
11a	6Mbps	2	44	5220	0.12	0.12			8.21	17.00		5.22			Pass
11a	6Mbps	2	48	5240	0.12	0.12			8.42	17.00		5.22			Pass
HT20	MCS0	2	36	5180	0.05	0.05			7.50	17.00		5.22			Pass
HT20	MCS0	2	44	5220	0.05	0.05			8.04	17.00		5.22			Pass
HT20	MCS0	2	48	5240	0.05	0.05			8.21	17.00		5.22			Pass
HT40	MCS0	2	38	5190	0.13	0.13			3.94	17.00		5.22			Pass
HT40	MCS0	2	46	5230	0.13	0.13			8.69	17.00		5.22			Pass
VHT80	MCS0	2	42	5210	0.22	0.24			-1.01	17.00		5.22			Pass

TEST RESULTS DATA
26dB and 99% OBW
Beamforming Modes

Band I													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)			Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	17.08	17.08	20.63	20.38	-		22.33			
11a	6Mbps	2	44	5220	17.18	17.03	20.68	20.53	-		22.31			
11a	6Mbps	2	48	5240	17.13	17.08	20.68	20.48	-		22.33			
HT20	MCS0	2	36	5180	18.13	18.18	21.08	21.48	-		22.58			
HT20	MCS0	2	44	5220	18.18	18.23	21.58	21.53	-		22.60			
HT20	MCS0	2	48	5240	18.18	18.18	21.73	21.58	-		22.60			
HT40	MCS0	2	38	5190	36.06	36.36	39.29	39.56	-		23.01			
HT40	MCS0	2	46	5230	36.26	36.16	39.65	39.74	-		23.01			
VHT80	MCS0	2	42	5210	76.12	76.12	80.24	79.60	-		23.01			

TEST RESULTS DATA
Average Power Table
Beamforming Modes

FCC Band I													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	10.86	10.66	13.77	30.00		5.22			Pass
11a	6Mbps	2	44	5220	11.05	10.68	13.88	30.00		5.22			Pass
11a	6Mbps	2	48	5240	11.15	10.75	13.96	30.00		5.22			Pass
HT20	MCS0	2	36	5180	12.21	11.59	14.92	30.00		5.22			Pass
HT20	MCS0	2	44	5220	12.40	11.74	15.09	30.00		5.22			Pass
HT20	MCS0	2	48	5240	12.46	11.64	15.08	30.00		5.22			Pass
HT40	MCS0	2	38	5190	12.62	12.24	15.44	30.00		5.22			Pass
HT40	MCS0	2	46	5230	12.55	12.39	15.48	30.00		5.22			Pass
VHT80	MCS0	2	42	5210	12.66	11.95	15.33	30.00		5.22			Pass

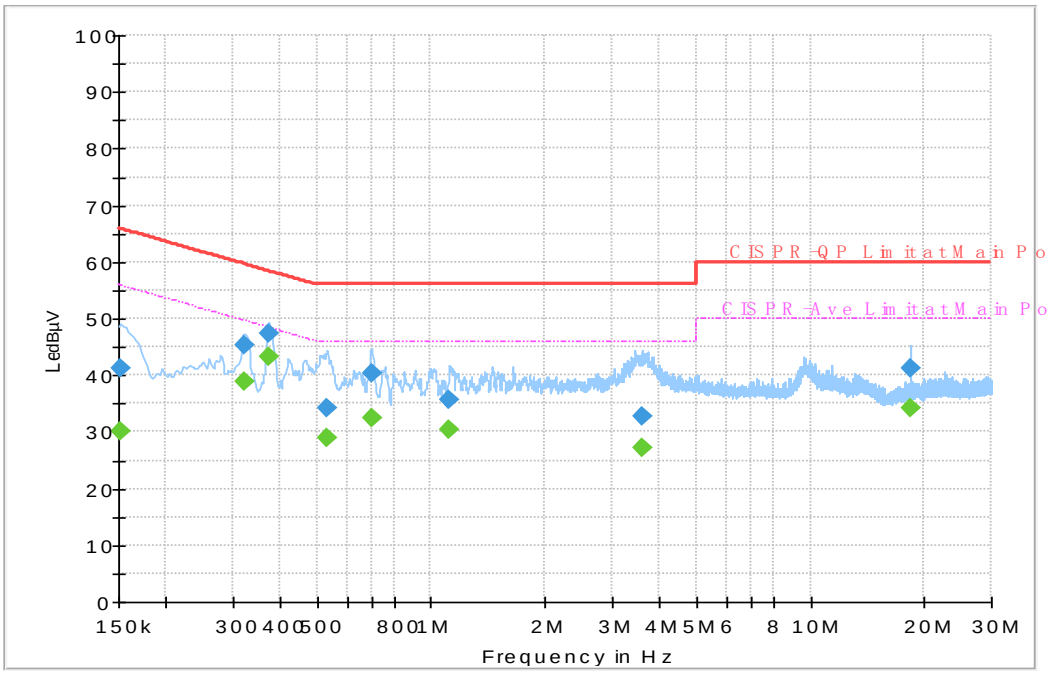
TEST RESULTS DATA
Power Spectral Density
Beamforming Modes

FCC Band I													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180			-0.72	17.00		5.22			Pass
11a	6Mbps	2	44	5220			-0.70	17.00		5.22			Pass
11a	6Mbps	2	48	5240			-0.48	17.00		5.22			Pass
HT20	MCS0	2	36	5180			-0.19	17.00		5.22			Pass
HT20	MCS0	2	44	5220			-0.35	17.00		5.22			Pass
HT20	MCS0	2	48	5240			-0.54	17.00		5.22			Pass
HT40	MCS0	2	38	5190			-5.78	17.00		5.22			Pass
HT40	MCS0	2	46	5230			-5.63	17.00		5.22			Pass
VHT80	MCS0	2	42	5210			-12.29	17.00		5.22			Pass

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Kai-Chun Chu	**Temperature :**	25~26℃
		Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line

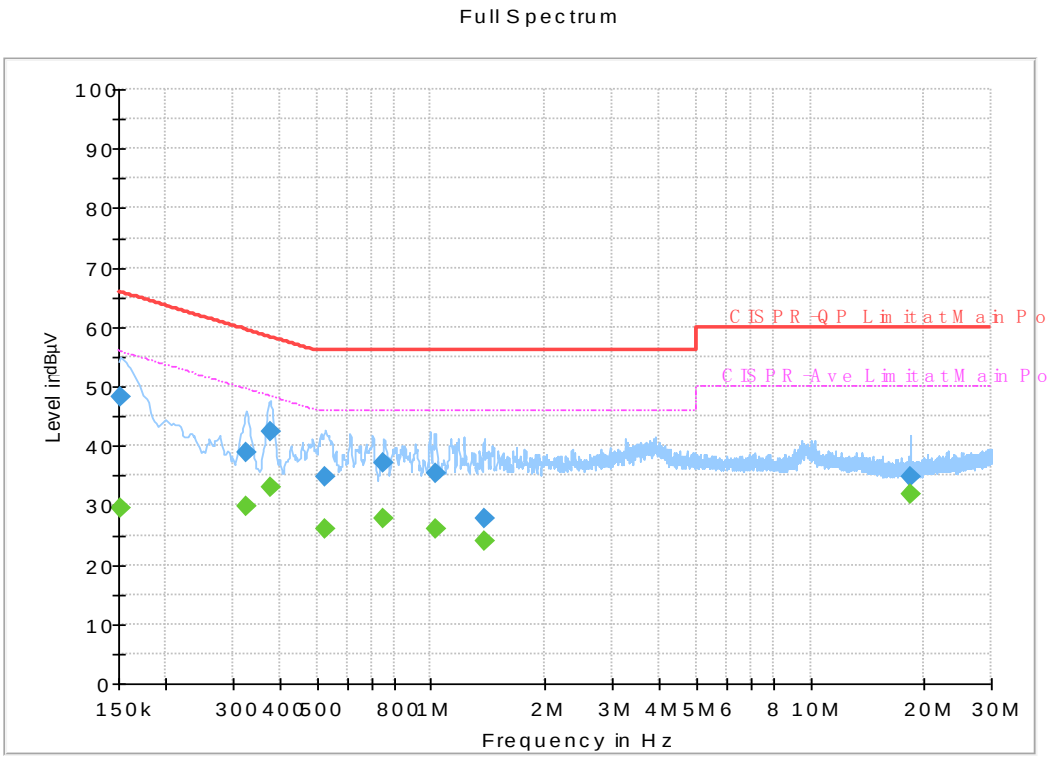
Full Spectrum



Final Result

Frequency (MHz)	Quasi-Peak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	30.24	55.88	25.64	L1	OFF	19.5
0.152250	41.09	---	65.88	24.79	L1	OFF	19.5
0.323250	---	38.88	49.62	10.74	L1	OFF	19.5
0.323250	45.36	---	59.62	14.26	L1	OFF	19.5
0.375000	---	43.20	48.39	5.19	L1	OFF	19.5
0.375000	47.37	---	58.39	11.02	L1	OFF	19.5
0.532500	---	29.04	46.00	16.96	L1	OFF	19.5
0.532500	34.11	---	56.00	21.89	L1	OFF	19.5
0.696750	---	32.50	46.00	13.50	L1	OFF	19.6
0.696750	40.26	---	56.00	15.74	L1	OFF	19.6
1.119750	---	30.35	46.00	15.65	L1	OFF	19.6
1.119750	35.56	---	56.00	20.44	L1	OFF	19.6
3.599250	---	27.16	46.00	18.84	L1	OFF	19.7
3.599250	32.82	---	56.00	23.18	L1	OFF	19.7
18.431250	---	34.28	50.00	15.72	L1	OFF	20.2
18.431250	41.36	---	60.00	18.64	L1	OFF	20.2

Test Engineer :	Kai-Chun Chu	Temperature :	25~26℃
		Relative Humidity :	52~54%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Final Result

Frequency (MHz)	Quasi-Peak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	29.59	55.88	26.29	N	OFF	19.5
0.152250	48.12	---	65.88	17.76	N	OFF	19.5
0.325500	---	29.85	49.57	19.72	N	OFF	19.5
0.325500	39.02	---	59.57	20.55	N	OFF	19.5
0.377250	---	32.90	48.34	15.44	N	OFF	19.5
0.377250	42.54	---	58.34	15.80	N	OFF	19.5
0.528000	---	26.17	46.00	19.83	N	OFF	19.5
0.528000	34.94	---	56.00	21.06	N	OFF	19.5
0.750750	---	27.83	46.00	18.17	N	OFF	19.6
0.750750	37.03	---	56.00	18.97	N	OFF	19.6
1.025250	---	26.14	46.00	19.86	N	OFF	19.6
1.025250	35.24	---	56.00	20.76	N	OFF	19.6
1.378500	---	23.91	46.00	22.09	N	OFF	19.6
1.378500	27.64	---	56.00	28.36	N	OFF	19.6
18.431250	---	31.94	50.00	18.06	N	OFF	20.3
18.431250	34.73	---	60.00	25.27	N	OFF	20.3

Appendix C. Radiated Spurious Emission

For CDD Modes

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5149.76	60.3	-13.7	74	50.17	35.39	7.99	33.25	239	29	P	H
		5150	49.69	-4.31	54	39.56	35.39	7.99	33.25	239	29	A	H
	*	5178	108.65	-	-	98.55	35.36	7.99	33.25	239	29	P	H
		5178	100.19	-	-	90.09	35.36	7.99	33.25	239	29	A	H
		5149.28	62.53	-11.47	74	52.4	35.39	7.99	33.25	111	179	P	V
		5150	52.4	-1.6	54	42.27	35.39	7.99	33.25	111	179	A	V
	*	5182	111.75	-	-	101.65	35.36	7.99	33.25	111	179	P	V
		5182	102.83	-	-	92.73	35.36	7.99	33.25	111	179	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	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		10360	58.83	-9.47	68.3	74.57	38.47	11.94	66.15	100	360	P	H
CH 36 5180MHz		10360	63.38	-4.92	68.3	79.12	38.47	11.94	66.15	100	360	P	V
802.11a		10440	66.86	-1.44	68.3	82.35	38.52	12.09	66.1	297	1	P	H
CH 44 5220MHz		10440	66.23	-2.07	68.3	81.72	38.52	12.09	66.1	258	325	P	V
802.11a		10480	67	-1.3	68.3	82.3	38.56	12.21	66.07	285	0	P	H
CH 48 5240MHz		10480	66.54	-1.76	68.3	81.84	38.56	12.21	66.07	260	317	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		5149.6	61.88	-12.12	74	51.75	35.39	7.99	33.25	290	85	P	H
		5149.99	50.67	-3.33	54	40.54	35.39	7.99	33.25	290	85	A	H
	*	5184	109.79	-	-	99.69	35.36	7.99	33.25	290	85	P	H
		5184	101.36	-	-	91.26	35.36	7.99	33.25	290	85	A	H
		5149.6	62.9	-11.1	74	52.77	35.39	7.99	33.25	110	175	P	V
		5149.92	51.41	-2.59	54	41.28	35.39	7.99	33.25	110	175	A	V
	*	5182	111.57	-	-	101.47	35.36	7.99	33.25	110	175	P	V
		5182	102.45	-	-	92.35	35.36	7.99	33.25	110	175	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		10360	65.83	-2.47	68.3	81.57	38.47	11.94	66.15	298	249	P	H
		10360	65.18	-3.12	68.3	80.92	38.47	11.94	66.15	340	128	P	V
802.11n HT20 CH 44 5220MHz		10440	67.03	-1.27	68.3	82.52	38.52	12.09	66.1	300	0	P	H
		15660	46.87	-27.13	74	57.49	40.78	14.15	65.55	100	0	P	H
		10440	66.03	-2.27	68.3	81.52	38.52	12.09	66.10	265	317	P	V
		15654	52.03	-21.97	74	62.65	40.78	14.15	65.55	100	0	P	V
		15654	46.63	-7.37	54	57.25	40.78	14.15	65.55	265	317	A	V
802.11n HT20 CH 48 5240MHz		10480	66.9	-1.4	68.3	82.20	38.56	12.21	66.07	281	0	P	H
		10480	65.45	-2.85	68.3	80.75	38.56	12.21	66.07	265	320	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5146.88	62.66	-11.34	74	52.53	35.39	7.99	33.25	360	88	P	H
		5149.6	51.25	-2.75	54	41.12	35.39	7.99	33.25	360	88	A	H
	*	5198	105.92	-	-	95.83	35.35	7.99	33.25	360	88	P	H
		5198	98.28	-	-	88.19	35.35	7.99	33.25	360	88	A	H
		5378.4	51.72	-22.28	74	41.45	35.2	8.28	33.21	360	88	P	H
		5353.74	42.25	-11.75	54	32.02	35.23	8.22	33.22	360	88	A	H
		5143.36	63.13	-10.87	74	53	35.39	7.99	33.25	117	194	P	V
		5148.8	52.53	-1.47	54	42.4	35.39	7.99	33.25	117	194	A	V
	*	5200	106.06	-	-	95.97	35.35	7.99	33.25	117	194	P	V
		5200	99.36	-	-	89.27	35.35	7.99	33.25	117	194	A	V
		5398.2	52.51	-21.49	74	42.23	35.19	8.3	33.21	117	194	P	V
		5350	42.89	-11.11	54	32.66	35.23	8.22	33.22	117	194	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	54.18	-14.12	68.3	69.86	38.48	11.98	66.14	100	360	P	H
		10380	55.29	-13.01	68.3	70.97	38.48	11.98	66.14	100	360	P	V
802.11n HT40 CH 46 5230MHz		10460	65.99	-2.31	68.3	81.42	38.53	12.13	66.09	285	3	P	H
		10460	66.36	-1.94	68.3	81.79	38.53	12.13	66.09	257	316	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5144.16	61.03	-12.97	74	50.9	35.39	7.99	33.25	361	85	P	H
		5142.56	50.23	-3.77	54	40.1	35.39	7.99	33.25	361	85	A	H
	*	5208	100.7	-	-	90.59	35.34	8.01	33.24	361	85	P	H
		5208	93.65	-	-	83.54	35.34	8.01	33.24	361	85	A	H
		5360.04	52.95	-21.05	74	42.72	35.23	8.22	33.22	361	85	P	H
		5351.22	43.9	-10.1	54	33.67	35.23	8.22	33.22	361	85	A	H
		5145.76	64.04	-9.96	74	53.91	35.39	7.99	33.25	287	58	P	V
		5148.16	51.62	-2.38	54	41.49	35.39	7.99	33.25	287	58	A	V
	*	5194	102.14	-	-	92.05	35.35	7.99	33.25	287	58	P	V
		5194	94.89	-	-	84.8	35.35	7.99	33.25	287	58	A	V
		5351.4	54.95	-19.05	74	44.72	35.23	8.22	33.22	287	58	P	V
		5350.14	45.84	-8.16	54	35.61	35.23	8.22	33.22	287	58	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		10420	49.9	-18.4	68.3	65.45	38.51	12.06	66.12	100	360	P	H
VHT80 CH 42 5210MHz		10420	51.77	-16.53	68.3	67.32	38.51	12.06	66.12	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 LF		30	21.99	-18.01	40	28.79	24.5	0.61	31.91	-	-	P	H
		162.89	20.25	-23.25	43.5	34.81	15.71	1.3	31.57	-	-	P	H
		262.8	30.56	-15.44	46	40.74	19.21	1.76	31.15	-	-	P	H
		672.14	30.53	-15.47	46	32.22	24.52	2.6	28.81	-	-	P	H
		710.94	34.02	-11.98	46	35.17	24.73	2.67	28.55	-	-	P	H
		773.02	34.36	-11.64	46	34.25	25.47	2.8	28.16	100	54	P	H
		30	22.5	-17.5	40	29.3	24.5	0.61	31.91	-	-	P	V
		121.18	17.53	-25.97	43.5	30.05	18.06	1.12	31.7	-	-	P	V
		261.83	28.58	-17.42	46	38.74	19.24	1.76	31.16	-	-	P	V
		547.01	27.62	-18.38	46	31.04	23.71	2.47	29.6	-	-	P	V
		710.94	29.18	-16.82	46	30.33	24.73	2.67	28.55	-	-	P	V
		773.02	31.38	-14.62	46	31.27	25.47	2.8	28.16	100	65	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Band 1 - 5150~5250MHz

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5145.28	60.24	-13.76	74	50.11	35.39	7.99	33.25	358	230	P	H
		5149.92	51.21	-2.79	54	41.08	35.39	7.99	33.25	358	230	A	H
	*	5184	112.9	-	-	102.8	35.36	7.99	33.25	358	230	P	H
		5184	105.67	-	-	95.57	35.36	7.99	33.25	358	230	A	H
		5149.99	59.47	-14.53	74	49.34	35.39	7.99	33.25	106	124	P	V
		5150	50.46	-3.54	54	40.33	35.39	7.99	33.25	106	124	A	V
	*	5186	109.88	-	-	99.78	35.36	7.99	33.25	106	124	P	V
		5186	103.36	-	-	93.26	35.36	7.99	33.25	106	124	A	V

Band 1 5150~5250MHz

WIFI 802.11a (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)
802.11a CH 36 5180MHz		10360	59.78	-8.52	68.3	75.52	38.47	11.94	66.15	100	360	P	H
		10360	61.32	-6.98	68.3	77.06	38.47	11.94	66.15	100	360	P	V
802.11a CH 44 5220MHz		10440	67.05	-1.25	68.3	82.54	38.52	12.09	66.1	298	239	P	H
		15660	44.09	-29.91	74	54.71	40.78	14.15	65.55	100	0	P	H
		10440	66.51	-1.79	68.3	82	38.52	12.09	66.1	324	216	P	V
		15660	44.54	-29.46	74	55.16	40.78	14.15	65.55	100	0	P	V
802.11a CH 48 5240MHz		10485	67.08	-1.22	68.3	82.38	38.56	12.21	66.07	299	238	P	H
		15720	47.64	-26.36	74	58.47	40.72	14.2	65.75	100	0	P	H
		10480	66.2	-2.1	68.3	81.5	38.56	12.21	66.07	321	220	P	V
		15720	45.43	-28.57	74	56.26	40.72	14.2	65.75	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	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)
		5146.4	61.37	-12.63	74	51.24	35.39	7.99	33.25	113	61	P	H
		5148	50.62	-3.38	54	40.49	35.39	7.99	33.25	113	61	A	H
802.11n	*	5186	111.48	-	-	101.38	35.36	7.99	33.25	113	61	P	H
HT20		5186	104.76	-	-	94.66	35.36	7.99	33.25	113	61	A	H
CH 36		5146.56	56.24	-17.76	74	46.11	35.39	7.99	33.25	114	111	P	V
5180MHz		5139.04	47.08	-6.92	54	36.94	35.41	7.99	33.26	114	111	A	V
	*	5178	110.54	-	-	100.44	35.36	7.99	33.25	114	111	P	V
		5178	103.76	-	-	93.66	35.36	7.99	33.25	114	111	A	V

Band 1 5150~5250MHz

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		10360	66.8	-1.5	68.3	82.54	38.47	11.94	66.15	300	260	P	H
HT20 CH 36 5180MHz		10365	65.51	-2.79	68.3	81.25	38.47	11.94	66.15	100	189	P	V
802.11n		10440	66.97	-1.33	68.3	82.46	38.52	12.09	66.1	294	240	P	H
HT20		15660	45.85	-28.15	74	56.47	40.78	14.15	65.55	100	0	P	H
CH 44		10440	65.78	-2.52	68.3	81.27	38.52	12.09	66.1	342	219	P	V
5220MHz		15654	45.83	-28.17	74	56.45	40.78	14.15	65.55	100	0	P	V
802.11n		10475	67.05	-1.25	68.3	82.41	38.55	12.17	66.08	286	238	P	H
HT20		15720	49.71	-24.29	74	60.54	40.72	14.2	65.75	100	0	P	H
CH 48		10480	65.22	-3.08	68.3	80.52	38.56	12.21	66.07	330	221	P	V
5240MHz		15720	47.84	-26.16	74	58.67	40.72	14.2	65.75	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5149.6	63.88	-10.12	74	53.75	35.39	7.99	33.25	339	227	P	H
		5149.92	52.94	-1.06	54	42.81	35.39	7.99	33.25	339	227	A	H
	*	5188	108.68	-	-	98.58	35.36	7.99	33.25	339	227	P	H
		5188	101.71	-	-	91.61	35.36	7.99	33.25	339	227	A	H
		5367.06	52.11	-21.89	74	41.86	35.22	8.25	33.22	339	227	P	H
		5352.12	42.36	-11.64	54	32.13	35.23	8.22	33.22	339	227	A	H
		5148.8	61.79	-12.21	74	51.66	35.39	7.99	33.25	100	112	P	V
		5149.99	52.86	-1.14	54	42.73	35.39	7.99	33.25	100	112	A	V
	*	5198	106.47	-	-	96.38	35.35	7.99	33.25	100	112	P	V
		5198	99.13	-	-	89.04	35.35	7.99	33.25	100	112	A	V
		5350.68	52.55	-21.45	74	42.32	35.23	8.22	33.22	100	112	P	V
		5350.1	42.07	-11.93	54	31.84	35.23	8.22	33.22	100	112	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		10380	61.38	-6.92	68.3	77.06	38.48	11.98	66.14	296	264	P	H
HT40 CH 38 5190MHz		10385	61.08	-7.22	68.3	76.76	38.48	11.98	66.14	390	213	P	V
802.11n		10465	65.64	-2.66	68.3	81	38.55	12.17	66.08	278	233	P	H
HT40		15696	49.89	-24.11	74	60.62	40.75	14.17	65.65	100	0	P	H
CH 46		10460	64.44	-3.86	68.3	79.87	38.53	12.13	66.09	100	195	P	V
5230MHz		15690	48.09	-25.91	74	58.82	40.75	14.17	65.65	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5139.36	63.32	-10.68	74	53.18	35.41	7.99	33.26	294	220	P	H
		5140.8	52.32	-1.68	54	42.19	35.39	7.99	33.25	294	220	A	H
	*	5222	104.05	-	-	93.94	35.34	8.01	33.24	294	220	P	H
		5222	96.71	-	-	86.6	35.34	8.01	33.24	294	220	A	H
		5351.04	54.13	-19.87	74	43.9	35.23	8.22	33.22	294	220	P	H
		5351.4	44.5	-9.5	54	34.27	35.23	8.22	33.22	294	220	A	H
		5142.08	63.47	-10.53	74	53.34	35.39	7.99	33.25	100	122	P	V
		5149.28	53	-1	54	42.87	35.39	7.99	33.25	100	122	A	V
	*	5200	101.74	-	-	91.65	35.35	7.99	33.25	100	122	P	V
		5200	94.93	-	-	84.84	35.35	7.99	33.25	100	122	A	V
		5388.12	52.4	-21.6	74	42.13	35.2	8.28	33.21	100	122	P	V
		5355.54	43.08	-10.92	54	32.85	35.23	8.22	33.22	100	122	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		10420	51.8	-16.5	68.3	67.35	38.51	12.06	66.12	100	360	P	H
VHT80 CH 42 5210MHz		10420	51.2	-17.1	68.3	66.75	38.51	12.06	66.12	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		30	22.3	-17.7	40	29.1	24.5	0.61	31.91	-	-	P	H
		143.49	22.59	-20.91	43.5	36.09	16.93	1.22	31.65	-	-	P	H
		215.27	23.46	-20.04	43.5	38.13	15.15	1.53	31.35	-	-	P	H
		263.77	31.56	-14.44	46	41.76	19.19	1.76	31.15	-	-	P	H
		710.94	34.31	-11.69	46	35.46	24.73	2.67	28.55	100	64	P	H
		773.02	34.14	-11.86	46	34.03	25.47	2.8	28.16	-	-	P	H
		30	22.69	-17.31	40	29.49	24.5	0.61	31.91	-	-	P	V
		256.01	27.84	-18.16	46	38.35	18.92	1.75	31.18	-	-	P	V
		430.61	25.69	-20.31	46	31.79	22.09	2.09	30.28	-	-	P	V
		539.25	29.22	-16.78	46	32.78	23.63	2.45	29.64	-	-	P	V
		710.94	32.8	-13.2	46	33.95	24.73	2.67	28.55	100	69	P	V
		773.02	31.53	-14.47	46	31.42	25.47	2.8	28.16	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

For Beamforming Modes

Band 1 - 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5142.88	56.79	-17.21	74	46.66	35.39	7.99	33.25	301	65	P	H
		5137.92	47.75	-6.25	54	37.61	35.41	7.99	33.26	301	65	A	H
802.11n	*	5184	111.27	-	-	101.17	35.36	7.99	33.25	301	65	P	H
HT20		5184	103.54	-	-	93.44	35.36	7.99	33.25	301	65	A	H
CH 36		5137.6	58.01	-15.99	74	47.87	35.41	7.99	33.26	101	168	P	V
5180MHz		5144	48.08	-5.92	54	37.95	35.39	7.99	33.25	101	168	A	V
	*	5182	112.05	-	-	101.95	35.36	7.99	33.25	101	168	P	V
		5182	103.45	-	-	93.35	35.36	7.99	33.25	101	168	A	V

Band 1 5150~5250MHz

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		10360	57.72	-10.58	68.3	73.46	38.47	11.94	66.15	100	360	P	H
HT20 CH 36 5180MHz		10360	65.35	-2.95	68.3	81.09	38.47	11.94	66.15	100	360	P	V
802.11n		10440	57.33	-10.97	68.3	72.82	38.52	12.09	66.1	100	360	P	H
HT20 CH 44 5220MHz		10440	62.72	-5.58	68.3	78.21	38.52	12.09	66.1	300	55	P	V
802.11n		10480	54.62	-13.68	68.3	69.92	38.56	12.21	66.07	100	360	P	H
HT20 CH 48 5240MHz		10480	64.59	-3.71	68.3	79.89	38.56	12.21	66.07	300	26	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5148.64	62.41	-11.59	74	52.28	35.39	7.99	33.25	311	59	P	H
		5149.76	52.51	-1.49	54	42.38	35.39	7.99	33.25	311	59	A	H
	*	5186	105.12	-	-	95.02	35.36	7.99	33.25	311	59	P	H
		5186	97.59	-	-	87.49	35.36	7.99	33.25	311	59	A	H
		5370.84	51.71	-22.29	74	41.46	35.22	8.25	33.22	311	59	P	H
		5391.54	42.42	-11.58	54	32.15	35.2	8.28	33.21	311	59	A	H
		5146.08	63.87	-10.13	74	53.74	35.39	7.99	33.25	100	229	P	V
		5149.92	52.91	-1.09	54	42.78	35.39	7.99	33.25	100	229	A	V
	*	5200	107.94	-	-	97.85	35.35	7.99	33.25	100	229	P	V
		5200	100.47	-	-	90.38	35.35	7.99	33.25	100	229	A	V
		5396.94	51.44	-22.56	74	41.16	35.19	8.3	33.21	100	229	P	V
		5392.98	42.66	-11.34	54	32.39	35.2	8.28	33.21	100	229	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	53.31	-14.99	68.3	68.99	38.48	11.98	66.14	100	360	P	H
		10380	55.07	-13.23	68.3	70.75	38.48	11.98	66.14	100	360	P	V
802.11n HT40 CH 46 5230MHz		10460	50.88	-17.42	68.3	66.31	38.53	12.13	66.09	100	360	P	H
		10460	61.53	-6.77	68.3	76.96	38.53	12.13	66.09	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5114.4	55.64	-18.36	74	45.49	35.42	7.99	33.26	277	255	P	H
		5142.56	50.68	-3.32	54	40.55	35.39	7.99	33.25	277	255	A	H
	*	5230	94.28	-	-	84.16	35.32	8.04	33.24	277	255	P	H
		5230	92.71	-	-	82.59	35.32	8.04	33.24	277	255	A	H
		5392.08	51.97	-22.03	74	41.7	35.2	8.28	33.21	277	255	P	H
		5350.14	42.64	-11.36	54	32.41	35.23	8.22	33.22	277	255	A	H
		5149.92	56.95	-17.05	74	46.82	35.39	7.99	33.25	219	310	P	V
		5142.88	52.54	-1.46	54	42.41	35.39	7.99	33.25	219	310	A	V
	*	5224	103.49	-	-	93.38	35.34	8.01	33.24	100	217	P	V
		5224	97.32	-	-	87.21	35.34	8.01	33.24	100	217	A	V
		5351.76	52.22	-21.78	74	41.99	35.23	8.22	33.22	219	310	P	V
		5351.76	44.12	-9.88	54	33.89	35.23	8.22	33.22	219	310	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		10420	52.34	-15.96	68.3	67.89	38.51	12.06	66.12	100	360	P	H
VHT80 CH 42 5210MHz		10420	55.09	-13.21	68.3	70.64	38.51	12.06	66.12	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11n HT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		30	22.82	-17.18	40	29.62	24.5	0.61	31.91	-	-	P	H
		171.62	23.65	-19.85	43.5	38.4	15.46	1.33	31.54	-	-	P	H
		263.77	27.69	-18.31	46	37.89	19.19	1.76	31.15	-	-	P	H
		578.05	28.37	-17.63	46	31.21	24.05	2.54	29.43	-	-	P	H
		773.02	32.99	-13.01	46	32.88	25.47	2.8	28.16	100	298	P	H
		805.03	30.39	-15.61	46	29.63	25.83	2.88	27.95	-	-	P	H
		30	22.08	-17.92	40	28.88	24.5	0.61	31.91	-	-	P	V
		162.89	21.85	-21.65	43.5	36.41	15.71	1.3	31.57	-	-	P	V
		261.83	27.52	-18.48	46	37.68	19.24	1.76	31.16	-	-	P	V
		664.38	29.89	-16.11	46	31.67	24.49	2.59	28.86	-	-	P	V
		710.94	33.73	-12.27	46	34.88	24.73	2.67	28.55	100	264	P	V
		773.02	32.43	-13.57	46	32.32	25.47	2.8	28.16	-	-	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.	
1+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)

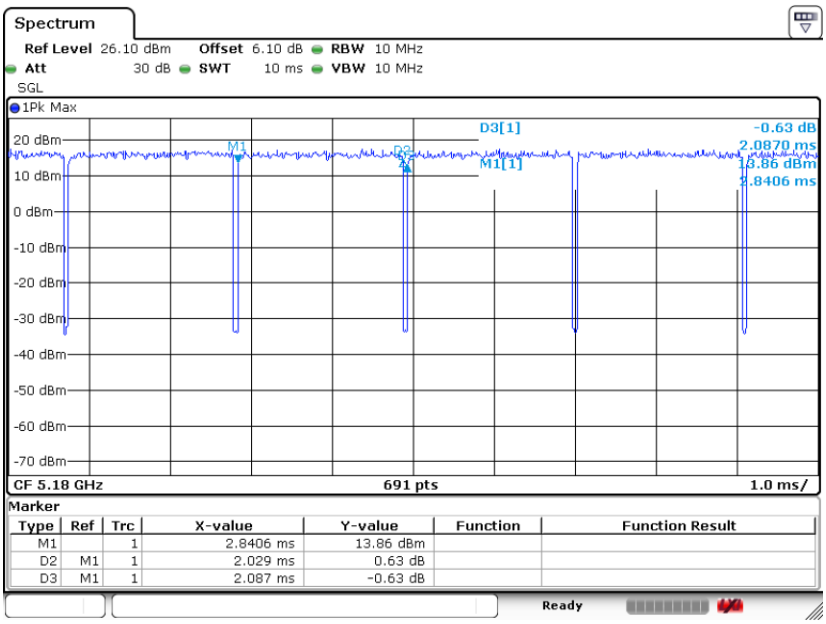
Both peak and average measured complies with the limit line, so test result is "PASS".

Appendix D. Duty Cycle Plots

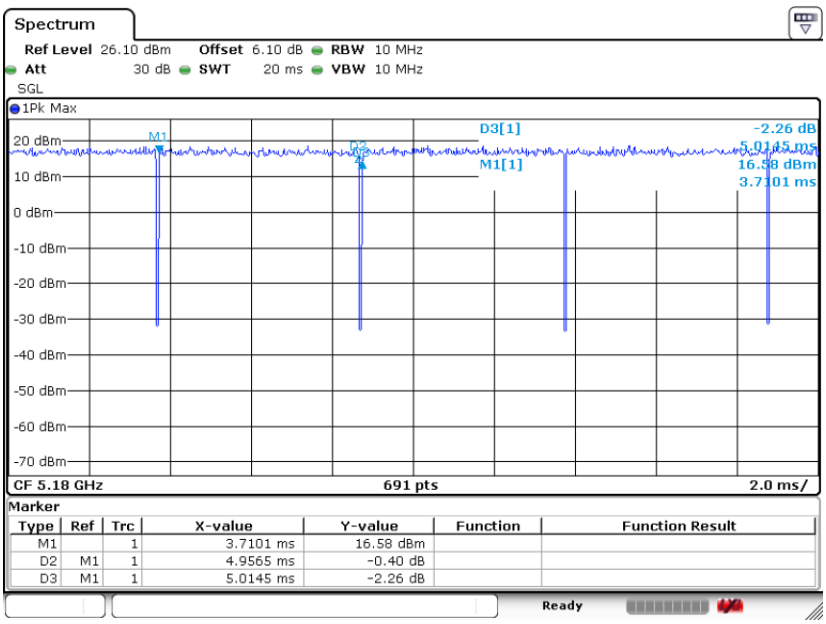
For CDD Modes

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11a	97.22	2.029	0.493	0.51KHz
1	802.11n HT20	98.84	-	-	10Hz
1	802.11n HT40	97.66	2.420	0.413	0.43KHz
1	802.11ac VHT80	94.58	1.138	0.879	0.91KHz
1+2	802.11a	97.22	2.029	0.493	0.51KHz
1+2	802.11n HT20	98.85	-	-	10Hz
1+2	802.11n HT40	97.07	2.406	0.416	0.43KHz
1+2	802.11ac VHT80	94.55	1.130	0.885	0.91KHz

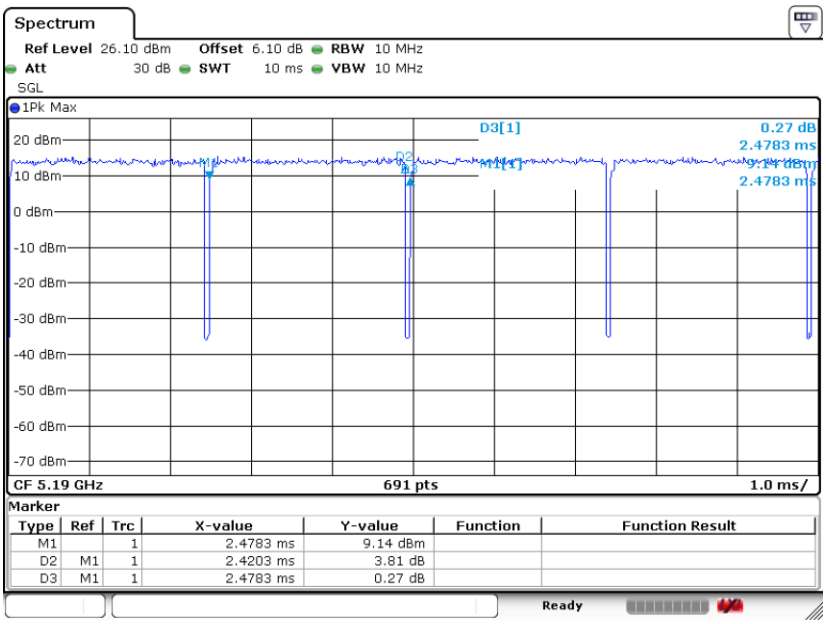
802.11a Antenna 1



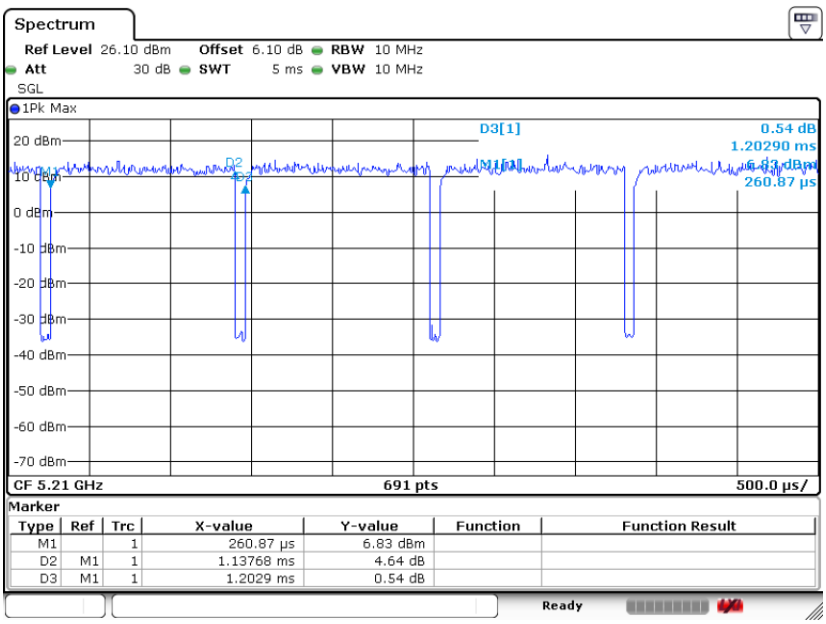
802.11n HT20 Antenna 1



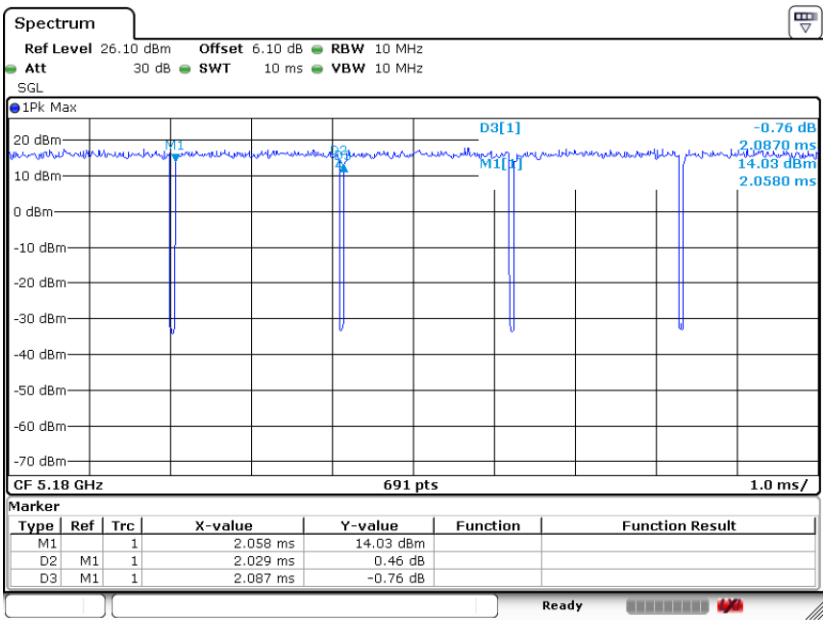
802.11n HT40 Antenna 1



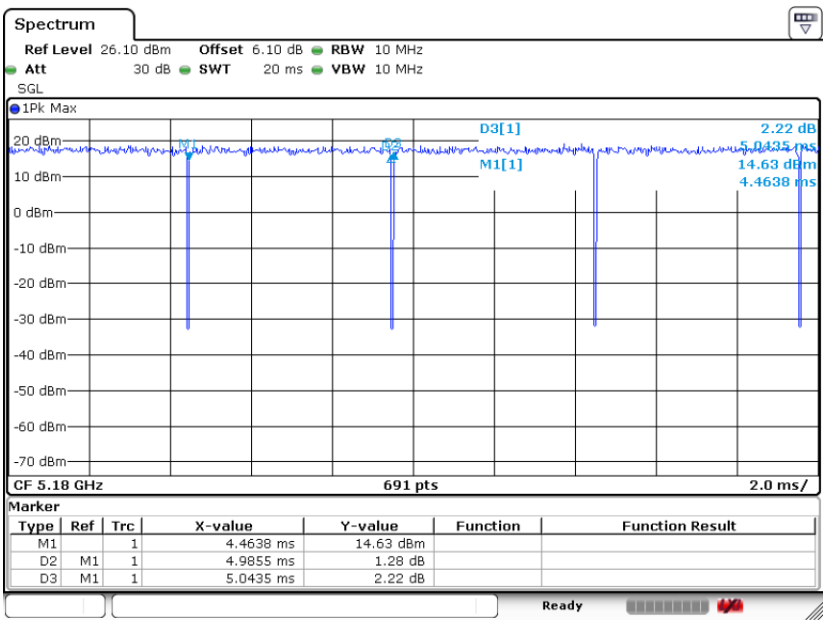
802.11ac VHT80 Antenna 1



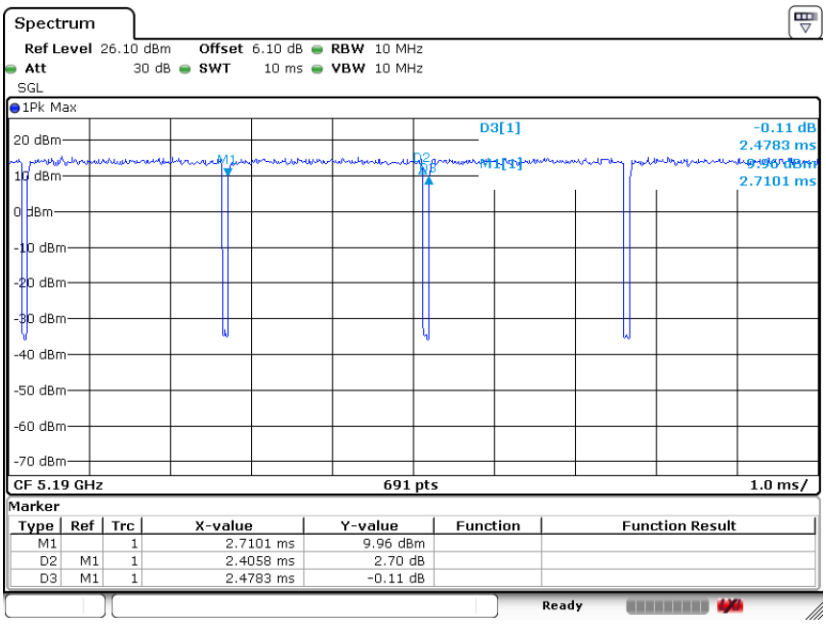
802.11a Antenna 1+2



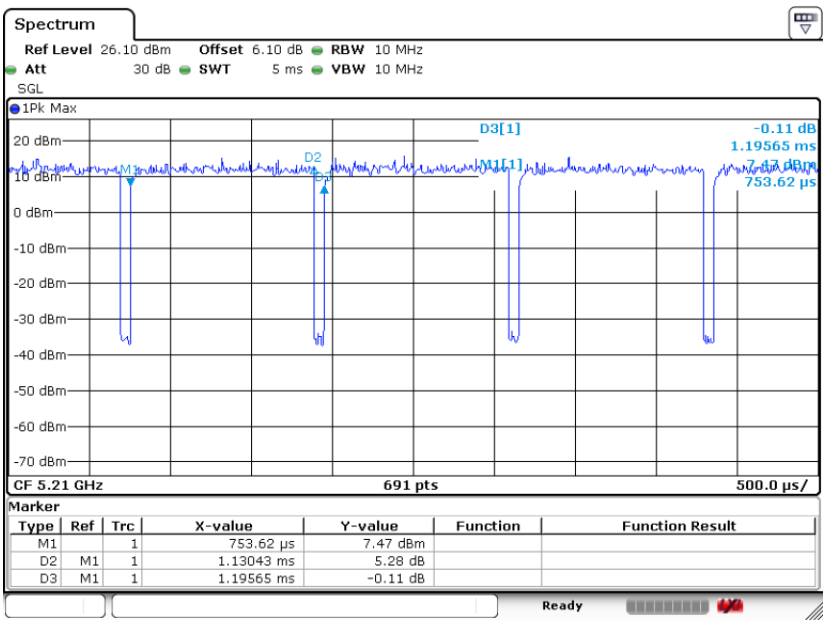
802.11n HT20 Antenna 1+2



802.11n HT40 Antenna 1+2



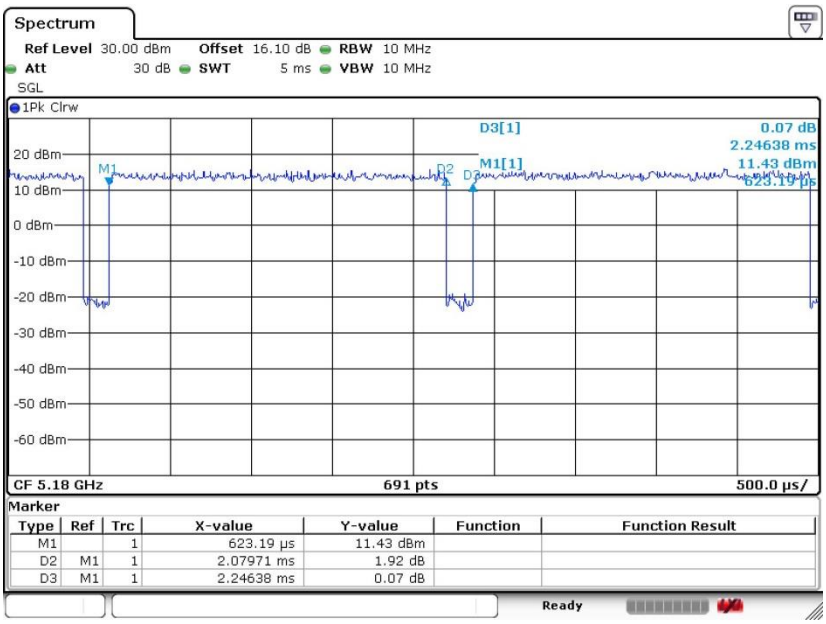
802.11ac VHT80 Antenna 1+2



For Beamforming Modes

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11a	92.581	2.077	0.481	0.51KHz
1+2	802.11n HT20	90.848	1.942	0.515	0.51KHz
1+2	802.11n HT40	90.910	1.884	0.531	0.56KHz
1+2	802.11ac VHT80	92.124	1.949	0.513	0.56KHz

802.11a Antenna 1+2



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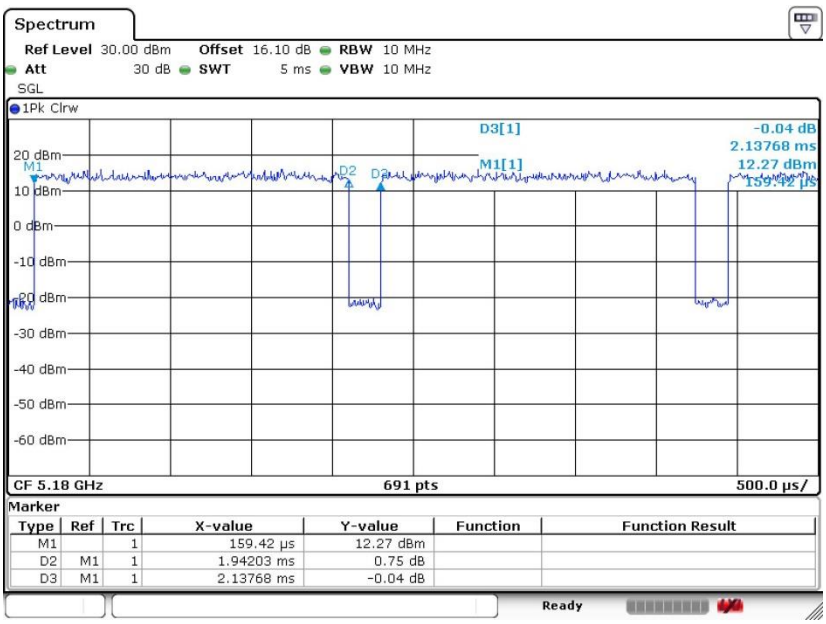

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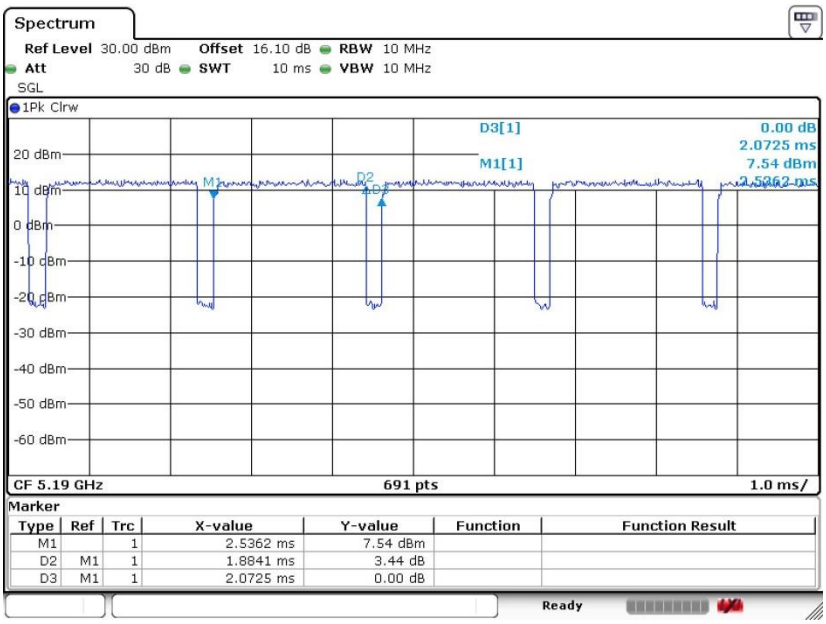

802.11ac VHT80 Antenna 1+2