



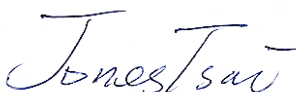
# FCC RADIO TEST REPORT

FCC ID : UDX-60053020  
Equipment : LTE & Wi-Fi Router  
Brand Name : CISCO  
Model name : Z3C-HW-NA  
Applicant : Cisco Systems, Inc.  
170 West Tasman Drive, San Jose, CA 95134  
Standard : FCC Part 15 Subpart E §15.407

The product was received on Jan. 17, 2018 and testing was started from May 08, 2018 and completed on May 25, 2018. We, SPORTON INTERNATIONAL 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Jones Tsai

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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## History of this test report

Report No.	Version	Description	Issued Date
FR811724E	01	Initial issue of report	Jul. 27, 2018

## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403 (i)	6dB & 26dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407 (a)	Maximum Conducted Output Power	Pass	-
3.3	15.407 (a)	Power Spectral Density	Pass	-
3.4	15.407(b)	Unwanted Emissions	Pass	Under limit 2.31 dB at 5929.800 MHz
3.5	15.207	AC Conducted Emission	Pass	Under limit 15.33 dB at 4.085 MHz
3.6	15.407 (c)	Automatically Discontinue Transmission	Pass	-
3.7	15.203 & 15.407 (a)	Antenna Requirement	Pass	-

**Reviewed by: Joseph Lin**

**Report Producer: Yuping Lin**

# 1 General Description

## 1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, and Wi-Fi 5GHz 802.11a/n/ac.

Product Specification subjective to this standard	
Antenna Type	WWAN: PIFA Antenna WLAN <Ant. 1>: PIFA Antenna <Ant. 2>: Dipole Antenna Bluetooth: PIFA Antenna

## 1.2 Modification of EUT

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

## 1.3 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	TH05-HY	CO05-HY

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

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855	
Test Site No.	Sporton Site No.	
	03CH15-HY	

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



## 1.4 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:**

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

- 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 (X plane) 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)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155 <sup>#</sup>	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 "<sup>#</sup>" 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 VHT20 (Covered by HT20)	MCS0
802.11ac VHT40 (Covered by HT40)	MCS0
802.11ac VHT80	MCS0

### TXBF Mode (Power Only)

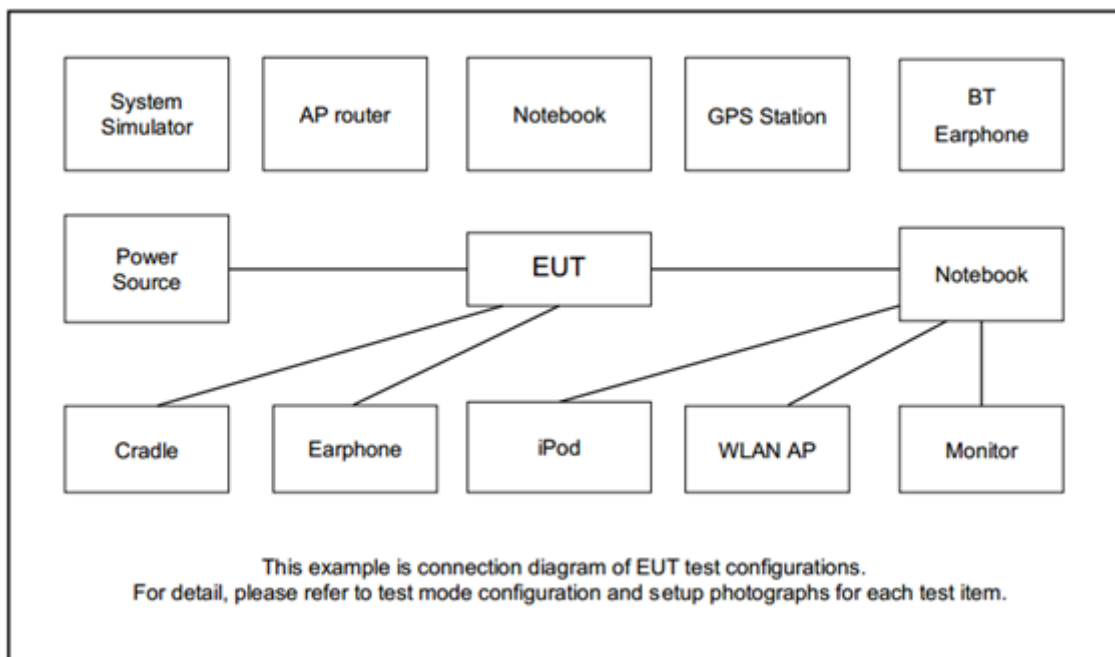
Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Test Cases	
<b>AC Conducted Emission</b>	Mode 1: WLAN (5GHz) Link + RJ-45 Link (LAN) + Bluetooth Link + USB Link + Adapter + Connects to the MR33 via RJ-45

Ch. #		Band IV : 5725-5850 MHz			
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-



## 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	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	DELL	Latitude E3340	FCC DoC/ Contains FCC ID: PD97260NGU	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Mobile Phone	Apple	Apple 6S Plus	N/A	N/A	N/A
4.	USB Flash Drive	Kingston	OTEG9	N/A	N/A	N/A
5.	Cloud-Managed	CISCO	MR33	N/A	N/A	N/A

## 2.5 EUT Operation Test Setup

The RF test items and TXBF mode, utility “QRCT” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.



## **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 4.2 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)}\end{aligned}$$

### 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.

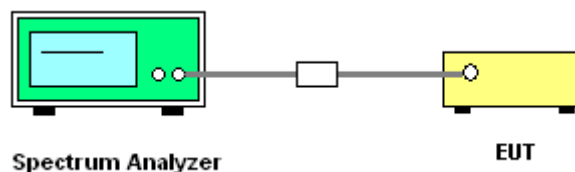
##### 3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

##### 3.1.3 Test Procedures

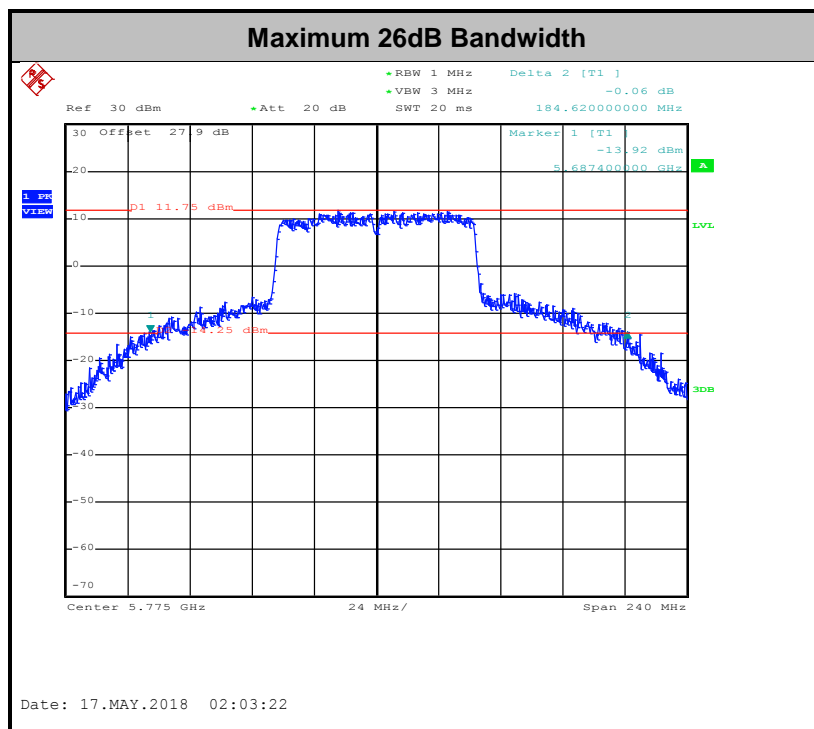
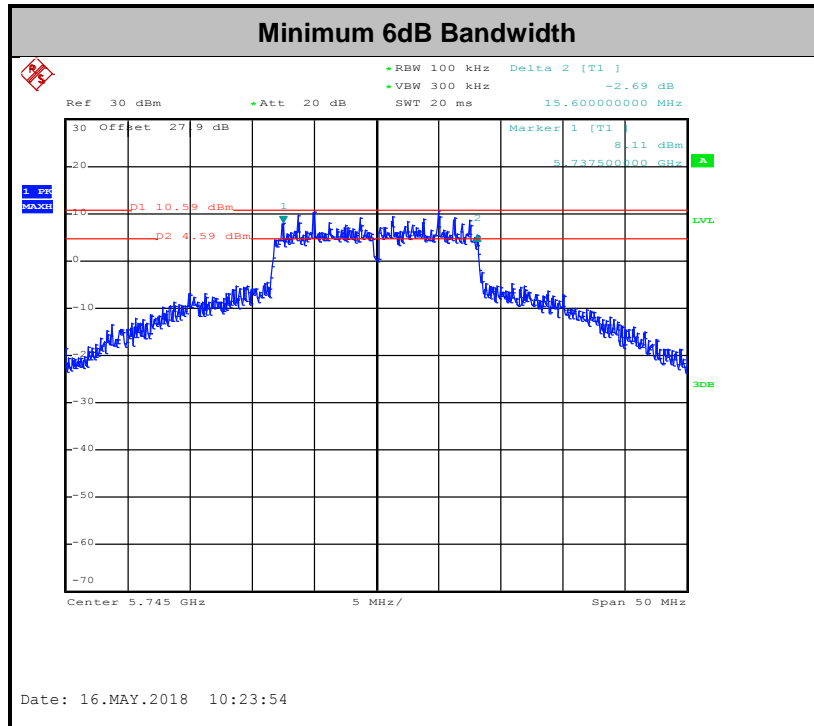
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.  
Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

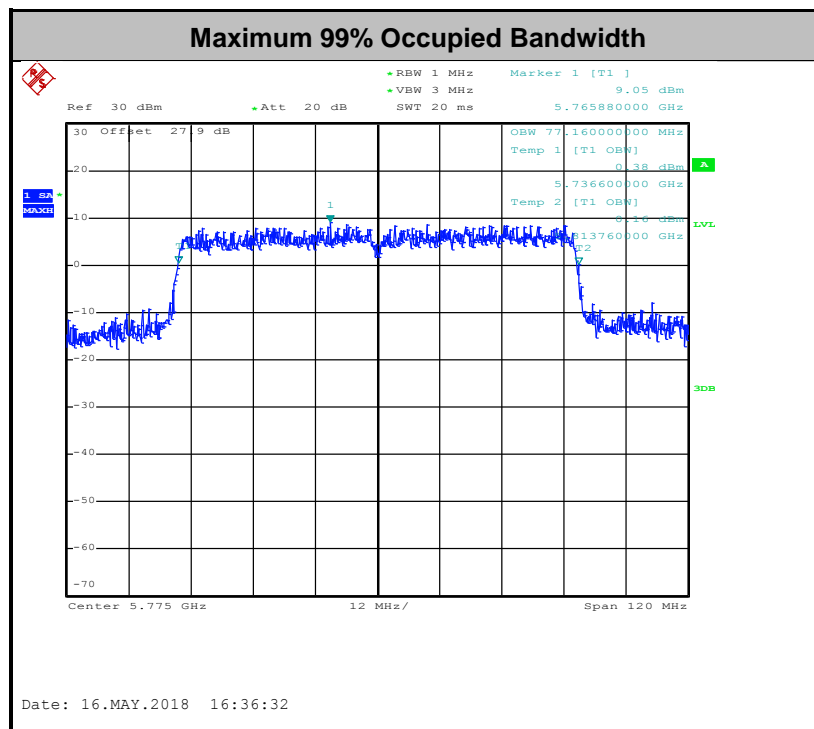
##### 3.1.4 Test Setup



##### 3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.





**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

See list of measuring equipment 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 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 Modes>

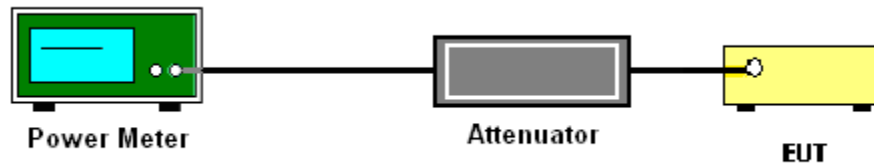
The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 for TXBF modes.

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.

Additional TXBF gain  $10 \log(N = 2)$  has offset to the CDD mode in order to show compliance for TXBF mode.

### 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**

See list of measuring equipment 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.

##### **# 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  $\geq$  1 MHz.
  - Number of points in sweep  $\geq$  2 Span / RBW.
  - Sweep time = auto.
  - Detector = RMS
  - Trace average at least 100 traces in power averaging mode.
  - Add  $10 \log(500\text{kHz}/\text{RBW})$  to the test result.
  - Add  $10 \log(1/x)$ , where  $x$  is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add  $10 \log(1/0.25) = 6$  dB if the duty cycle is 25 percent.
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
  2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

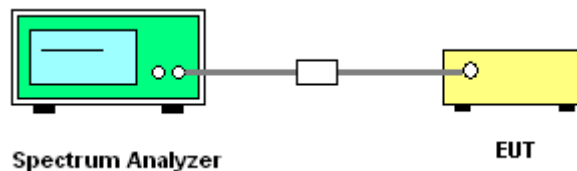


3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

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

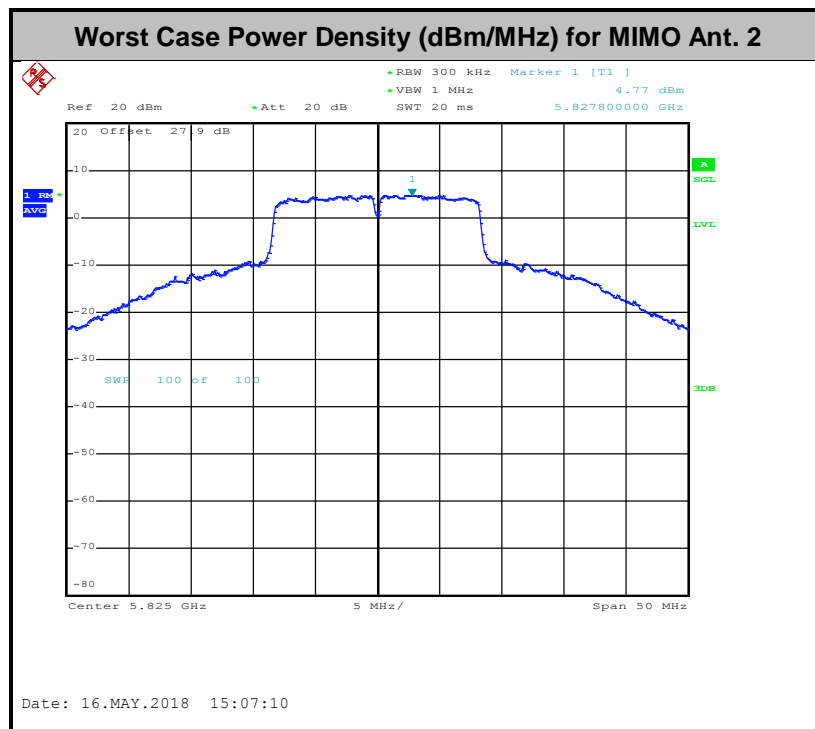
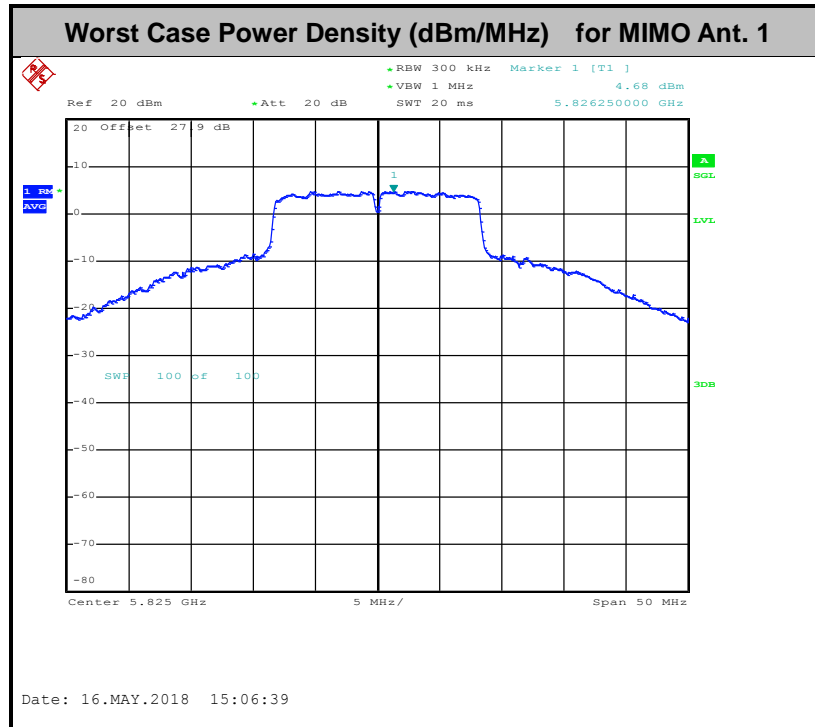
With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity  $10 \log(N_{\text{ANT}})$  dB is added to each spectrum value before comparing to the emission limit. The addition of  $10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

### 3.3.4 Test Setup



### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



### 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 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.

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

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

(3) KDB789033 D02 v02r01 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.<sup>3</sup>
- (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.<sup>4</sup>

**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

See list of measuring equipment 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  $\geq$  3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

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

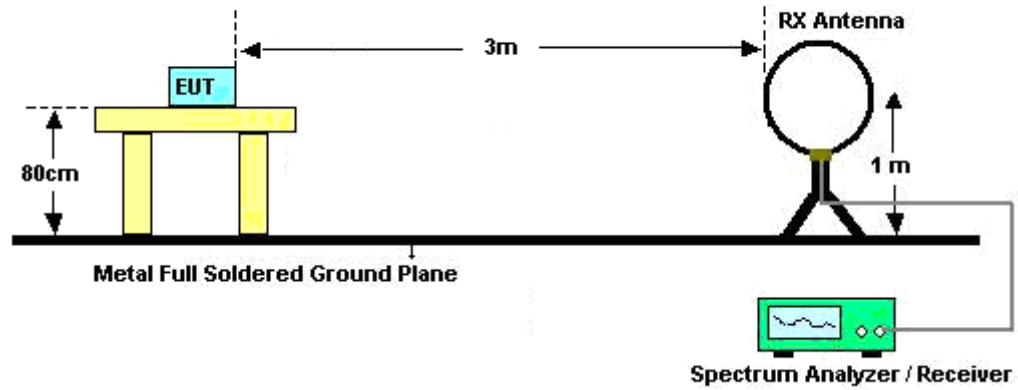
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW  $\geq$  1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



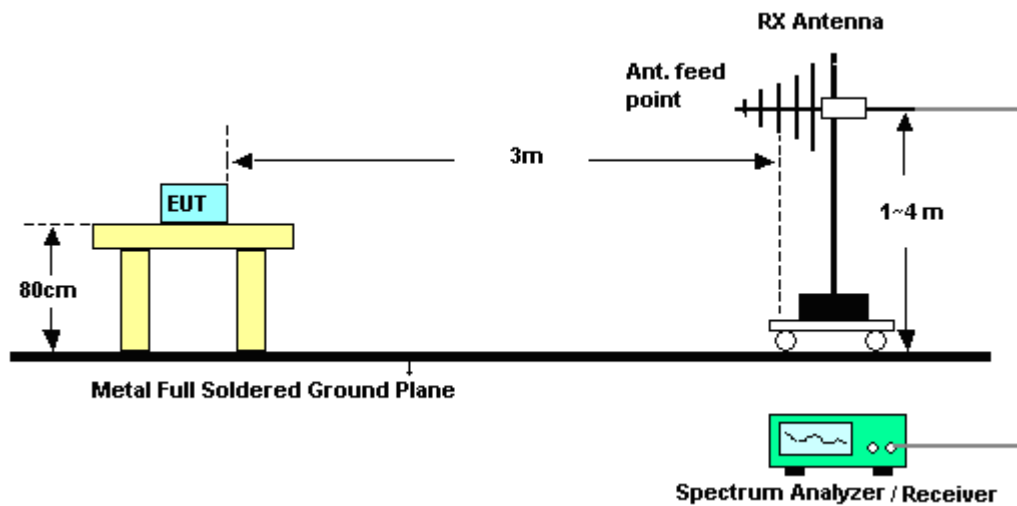
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

### 3.4.4 Test Setup

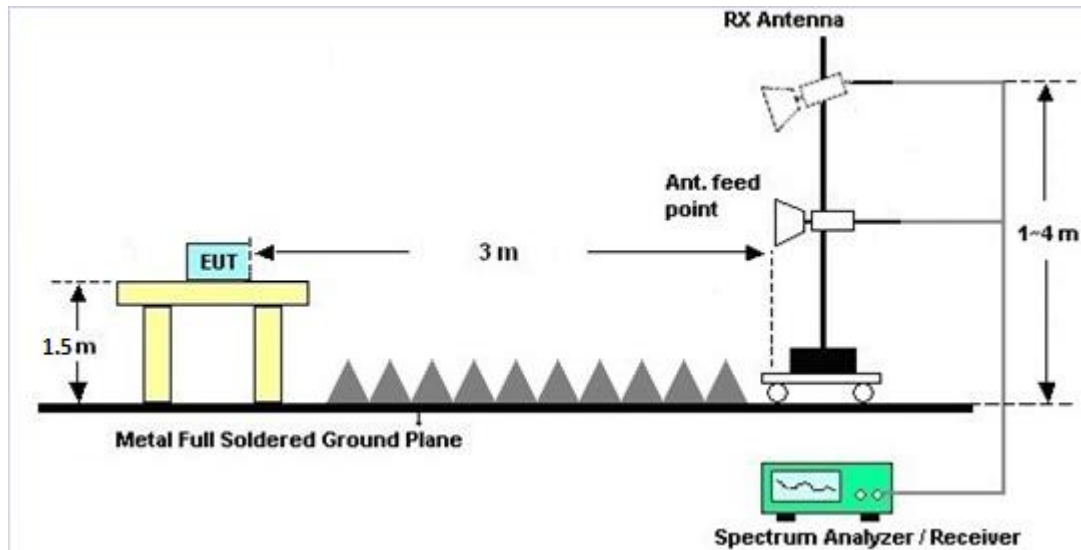
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line 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 Band Edges

Please refer to Appendix C and D.

### 3.4.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

### 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 (dB $\mu$ V)	
	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

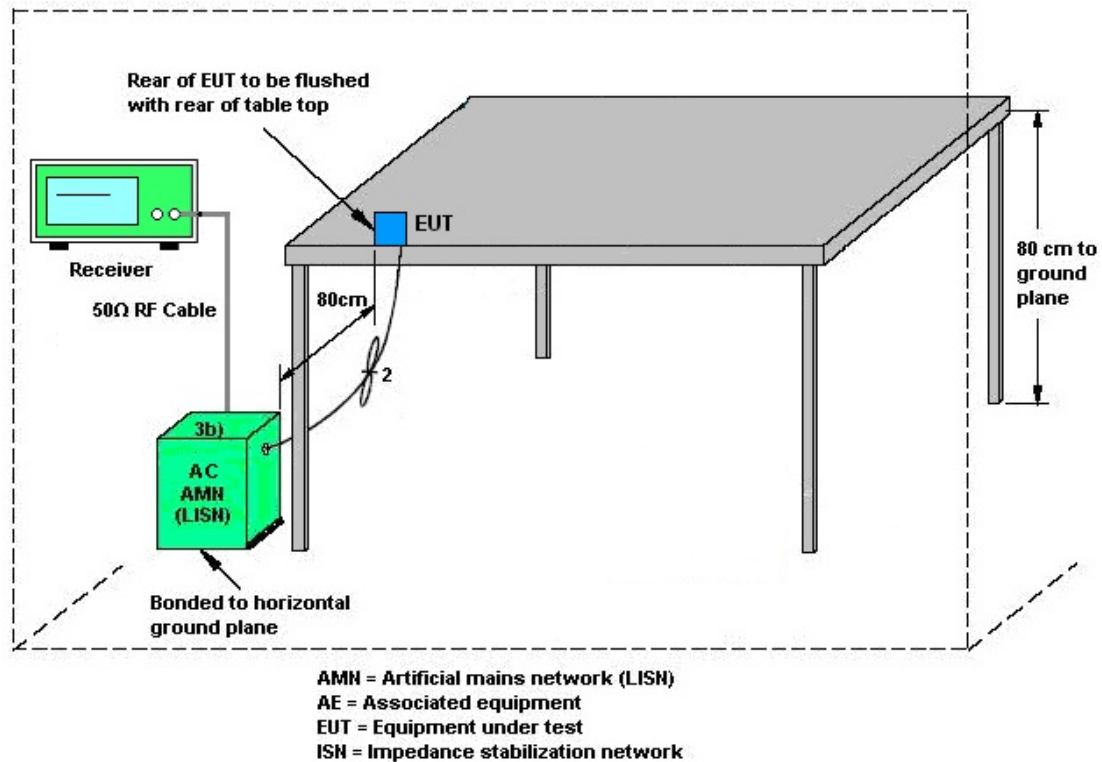
See list of measuring equipment of this test report.

#### 3.5.3 Test Procedures

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



### 3.5.4 Test Setup



### 3.5.5 Test Result of AC Conducted Emission

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**

See list of measuring equipment 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 = G<sub>ANT</sub> + Array Gain, where Array Gain is as follows.

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

Array Gain = 10 log(N<sub>ANT</sub>/N<sub>SS</sub>=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for N<sub>ANT</sub> ≤ 4.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G<sub>ANT</sub> set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G<sub>ANT</sub> 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.

			DG	DG	Power	PSD
	Ant. 1	Ant. 2	for	for	Limit	Limit
	(dBi)	(dBi)	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band IV	4.00	3.50	4.00	6.76	0.00	0.76

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

*PSD Limit Reduction = DG(PSD) – 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  $k$ th antenna is being fed by spatial stream  $j$ , or zero if it is not;  
 $G_k$  is the gain in dBi of the  $k$ th 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.

			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant 1	Ant 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
<b>Band IV</b>	4.00	3.50	6.76	6.76	0.76	0.76

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 26, 2017	May 11, 2018~ May 18, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz z	Sep. 26, 2017	May 11, 2018~ May 18, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	May 11, 2018~ May 18, 2018	Nov. 12, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC130048 4	N/A	Mar. 01, 2018	May 11, 2018~ May 18, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 25, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	May 25, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	May 25, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	May 25, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	May 25, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	May 25, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	May 08, 2018~ May 10, 2018	Nov. 22, 2018	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&0 0800N1D01N- 06	41912&05	30MHz to 1GHz	Jan. 10, 2018	May 08, 2018~ May 10, 2018	Jan. 09, 2019	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-162 0	1G~18GHz	Oct. 03, 2017	May 08, 2018~ May 10, 2018	Oct. 02, 2018	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Nov. 27, 2017	May 08, 2018~ May 10, 2018	Nov. 26, 2018	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 26, 2017	May 08, 2018~ May 10, 2018	Dec. 25, 2018	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY532701 95	1GHz~26.5GHz	Aug. 21, 2017	May 08, 2018~ May 10, 2018	Aug. 20, 2018	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-3 03	171000180 0054001	1GHz~18GHz	Apr. 16, 2018	May 08, 2018~ May 10, 2018	Apr. 15, 2019	Radiation (03CH15-HY)
Amplifier	MITEQ	TTA1840-35- HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	May 08, 2018~ May 10, 2018	Jul. 17, 2018	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	N9030A	MY523502 76	3Hz~44GHz	Mar. 27, 2018	May 08, 2018~ May 10, 2018	Mar. 26, 2019	Radiation (03CH15-HY)
Filter	Woken	WHKX8-5272. 5-6750-18000 -40ST	SN2	6.75G Highpass	Mar. 21, 2018	May 08, 2018~ May 10, 2018	Mar. 20, 2019	Radiation (03CH15-HY)
Filter	Wainwright	WLJ4-1000-1 530-6000-40S T	SN3	1.53 GHz Lowpass	Mar. 23, 2018	May 08, 2018~ May 10, 2018	Mar. 22, 2019	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24	RK-00104 2	N/A	N/A	May 08, 2018~ May 10, 2018	N/A	Radiation (03CH15-HY)



## FCC RADIO TEST REPORT

Report No. : FR811724E

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	May 08, 2018~ May 10, 2018	N/A	Radiation (03CH15-HY)

## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.7
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.2
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.5
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.2
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**Appendix A. Test Result of Conducted Test Items**

Test Engineer:	Eason Huang/Shiming Liu	Temperature:	21~25	°C
Test Date:	2018/5/11~2018/5/18	Relative Humidity:	51~54	%



&lt;CDD Mode&gt;

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

Band IV													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		6 dB Bandwidth (MHz)		6 dB Bandwidth Min. Limit (MHz)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	32.45	33.20	52.80	57.60	15.60	16.30	0.5		Pass
11a	6Mbps	2	157	5785	33.75	34.65	57.60	57.61	16.30	16.30	0.5		Pass
11a	6Mbps	2	165	5825	34.55	34.25	57.92	57.76	16.30	15.70	0.5		Pass
HT20	MCS0	2	149	5745	34.55	35.75	55.70	64.00	17.55	17.55	0.5		Pass
HT20	MCS0	2	157	5785	35.90	36.00	69.92	65.28	17.55	17.55	0.5		Pass
HT20	MCS0	2	165	5825	35.65	35.60	69.76	64.70	17.55	17.60	0.5		Pass
HT40	MCS0	2	151	5755	68.40	65.90	103.14	99.18	34.97	34.74	0.5		Pass
HT40	MCS0	2	159	5795	69.20	66.70	103.68	98.58	31.34	33.79	0.5		Pass
VHT80	MCS0	2	155	5775	76.80	77.16	184.62	75.20	75.40	75.20	0.5		Pass

**TEST RESULTS DATA**  
**Average Power Table**

Band IV																
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail	Power Setting	
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
11a	6Mbps	2	149	5745	0.16	0.18	21.18	21.37	24.29	30.00		4.00		Pass	22	
11a	6Mbps	2	157	5785	0.16	0.18	21.16	21.50	24.35	30.00		4.00		Pass	22	
11a	6Mbps	2	165	5825	0.16	0.18	21.51	21.54	24.54	30.00		4.00		Pass	22	
HT20	MCS0	2	149	5745	0.10	0.10	21.26	21.52	24.41	30.00		4.00		Pass	22	
HT20	MCS0	2	157	5785	0.10	0.10	21.22	21.51	24.38	30.00		4.00		Pass	22	
HT20	MCS0	2	165	5825	0.10	0.10	21.53	21.56	24.56	30.00		4.00		Pass	22	
HT40	MCS0	2	151	5755	0.18	0.18	21.47	21.53	24.51	30.00		4.00		Pass	22	
HT40	MCS0	2	159	5795	0.18	0.18	21.51	21.58	24.55	30.00		4.00		Pass	22	
VHT20	MCS0	2	149	5745	0.10	0.10	21.23	21.51	24.39	30.00		4.00		Pass	22	
VHT20	MCS0	2	157	5785	0.10	0.10	21.21	21.50	24.37	30.00		4.00		Pass	22	
VHT20	MCS0	2	165	5825	0.10	0.10	21.52	21.54	24.54	30.00		4.00		Pass	22	
VHT40	MCS0	2	151	5755	0.18	0.14	21.45	21.45	24.46	30.00		4.00		Pass	22	
VHT40	MCS0	2	159	5795	0.18	0.14	21.49	21.56	24.53	30.00		4.00		Pass	22	
VHT80	MCS0	2	155	5775	0.33	0.31	18.73	19.04	21.90	30.00		4.00		Pass	19	

**TEST RESULTS DATA**  
**Power Spectral Density**

Band IV																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	0.16	0.18	2.22	6.90	4.77	10.00	29.24		6.76		Pass	
11a	6Mbps	2	157	5785	0.16	0.18	2.22	6.83	4.78	10.01	29.24		6.76		Pass	
11a	6Mbps	2	165	5825	0.16	0.18	2.22	7.06	4.95	10.18	29.24		6.76		Pass	
HT20	MCS0	2	149	5745	0.10	0.10	2.22	6.50	4.51	9.74	29.24		6.76		Pass	
HT20	MCS0	2	157	5785	0.10	0.10	2.22	6.55	4.35	9.58	29.24		6.76		Pass	
HT20	MCS0	2	165	5825	0.10	0.10	2.22	6.77	4.65	9.88	29.24		6.76		Pass	
HT40	MCS0	2	151	5755	0.18	0.18	2.22	3.72	1.65	6.88	29.24		6.76		Pass	
HT40	MCS0	2	159	5795	0.18	0.18	2.22	4.18	2.06	7.29	29.24		6.76		Pass	
VHT80	MCS0	2	155	5775	0.33	0.31	2.22	-1.58	-4.05	1.43	29.24		6.76		Pass	

Note: PSD Sum = Max PSD(Ant. 1, Ant. 2) + 10 log (n)

&lt;TXBF Mode&gt;

**TEST RESULTS DATA**  
**Average Power Table**

Band IV																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail	Power Setting	
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
HT20	MCS0	2	149	5745	0.10	0.10	18.25	18.51	21.40	29.24		6.76		Pass	19	
HT20	MCS0	2	157	5785	0.10	0.10	18.21	18.50	21.37	29.24		6.76		Pass	19	
HT20	MCS0	2	165	5825	0.10	0.10	18.52	18.55	21.55	29.24		6.76		Pass	19	
HT40	MCS0	2	151	5755	0.18	0.18	18.46	18.52	21.50	29.24		6.76		Pass	19	
HT40	MCS0	2	159	5795	0.18	0.18	18.50	18.57	21.54	29.24		6.76		Pass	19	
VHT20	MCS0	2	149	5745	0.10	0.10	18.22	18.50	21.38	29.24		6.76		Pass	19	
VHT20	MCS0	2	157	5785	0.10	0.10	18.20	18.49	21.36	29.24		6.76		Pass	19	
VHT20	MCS0	2	165	5825	0.10	0.10	18.51	18.53	21.53	29.24		6.76		Pass	19	
VHT40	MCS0	2	151	5755	0.18	0.14	18.44	18.44	21.45	29.24		6.76		Pass	19	
VHT40	MCS0	2	159	5795	0.18	0.14	18.48	18.55	21.52	29.24		6.76		Pass	19	
VHT80	MCS0	2	155	5775	0.33	0.31	15.72	16.03	18.89	29.24		6.76		Pass	16	



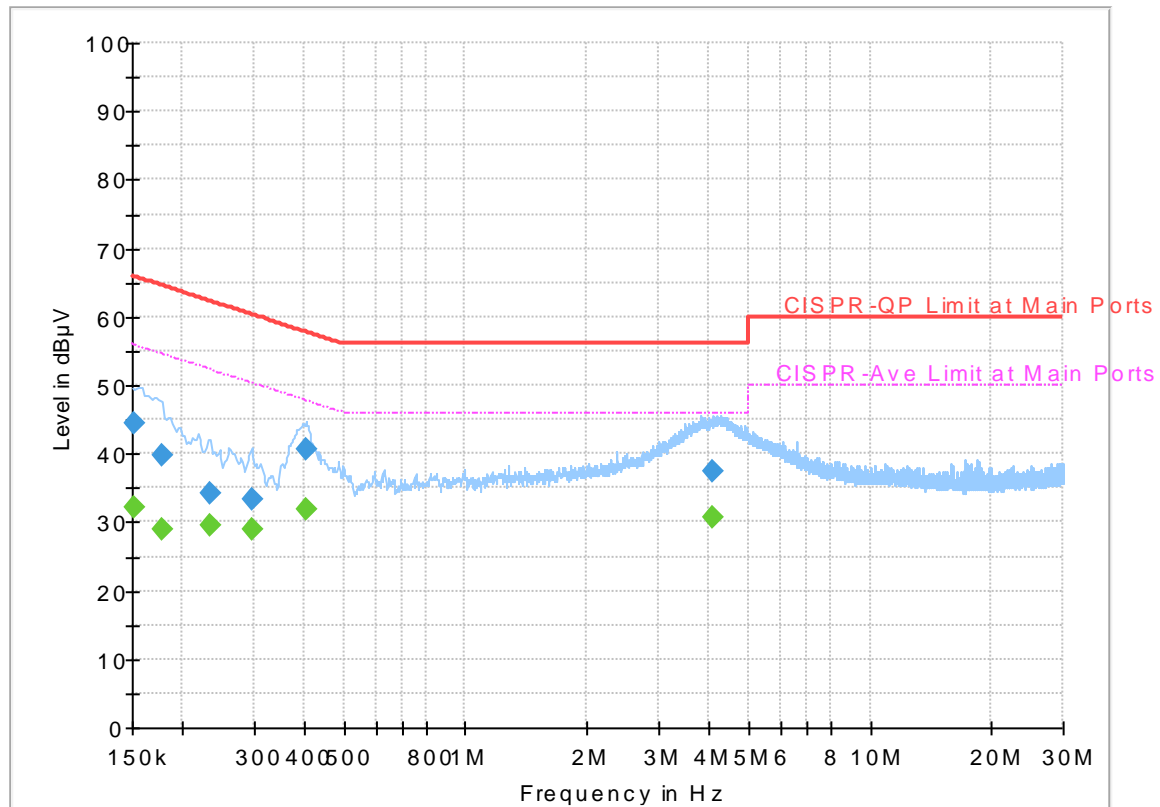
## **Appendix B. AC Conducted Emission Test Results**

<b>Test Engineer :</b>	Arthur Hsieh	<b>Temperature :</b>	25~26°C
		<b>Relative Humidity :</b>	64~66%

## EUT Information

Report NO : 811724  
Test Mode : Mode 1  
Test Voltage : 120Vac/60Hz  
Phase : Line

Full Spectrum



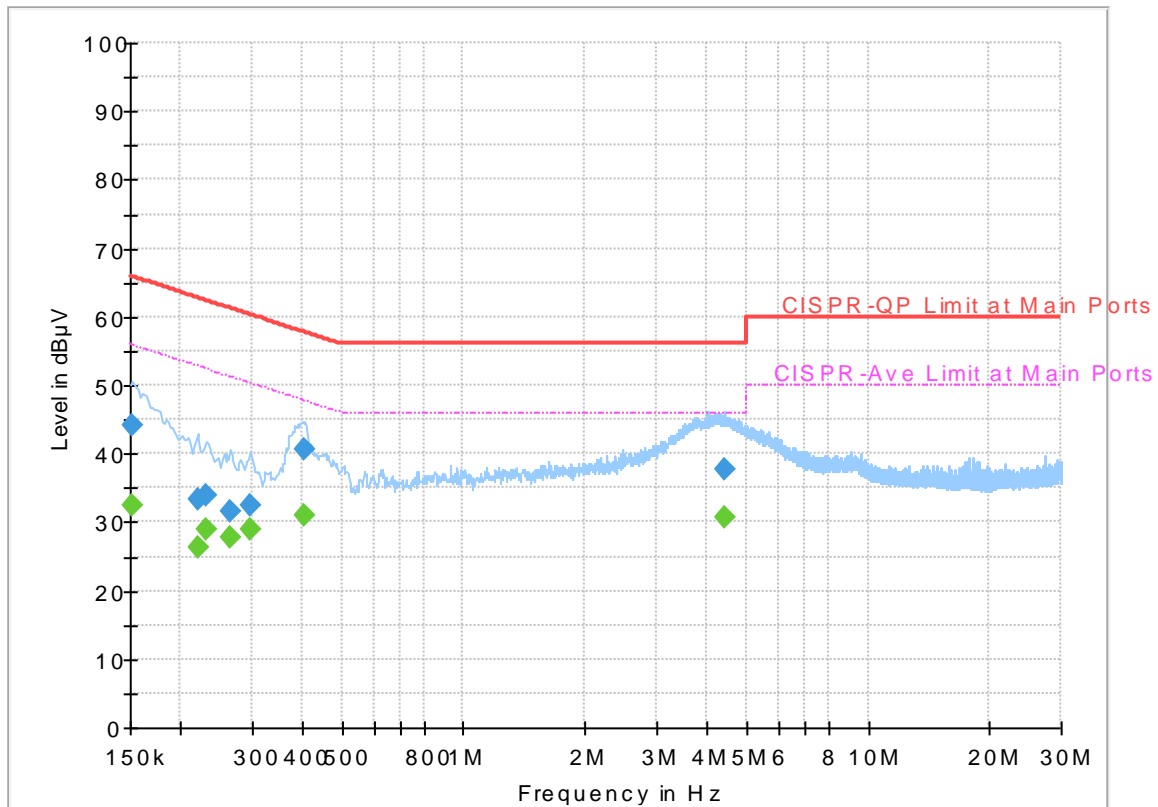
## Final\_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	32.25	55.88	23.63	L1	OFF	19.5
0.152250	44.41	---	65.88	21.47	L1	OFF	19.5
0.177000	---	29.02	54.63	25.61	L1	OFF	19.5
0.177000	39.85	---	64.63	24.78	L1	OFF	19.5
0.233250	---	29.50	52.33	22.83	L1	OFF	19.5
0.233250	34.22	---	62.33	28.11	L1	OFF	19.5
0.296250	---	29.06	50.35	21.29	L1	OFF	19.5
0.296250	33.19	---	60.35	27.16	L1	OFF	19.5
0.404250	---	31.80	47.77	15.97	L1	OFF	19.5
0.404250	40.57	---	57.77	17.20	L1	OFF	19.5
4.085250	---	30.67	46.00	15.33	L1	OFF	19.6
4.085250	37.50	---	56.00	18.50	L1	OFF	19.6

## EUT Information

Report NO : 811724  
Test Mode : Mode 1  
Test Voltage : 120Vac/60Hz  
Phase : Neutral

Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	32.34	55.88	23.54	N	OFF	19.5
0.152250	44.25	---	65.88	21.63	N	OFF	19.5
0.219750	---	26.24	52.83	26.59	N	OFF	19.5
0.219750	33.43	---	62.83	29.40	N	OFF	19.5
0.231000	---	28.85	52.41	23.56	N	OFF	19.5
0.231000	33.93	---	62.41	28.48	N	OFF	19.5
0.264750	---	27.73	51.28	23.55	N	OFF	19.5
0.264750	31.68	---	61.28	29.60	N	OFF	19.5
0.298500	---	29.06	50.28	21.22	N	OFF	19.5
0.298500	32.39	---	60.28	27.89	N	OFF	19.5
0.406500	---	30.97	47.72	16.75	N	OFF	19.5
0.406500	40.66	---	57.72	17.06	N	OFF	19.5
4.409250	---	30.61	46.00	15.39	N	OFF	19.6
4.409250	37.82	---	56.00	18.18	N	OFF	19.6



## Appendix C. Radiated Spurious Emission

Test Engineer :	Jacky Hung	Temperature :	22~25°C
		Relative Humidity :	52~57%

## Band 4 - 5725~5850MHz

## WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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 149 5745MHz		5646.6	51.37	-16.83	68.2	40.18	32.17	9.24	30.22	370	102	P	H
		5697.4	71.05	-32.23	103.28	59.74	32.23	9.33	30.25	370	102	P	H
		5717	90.32	-19.64	109.96	78.96	32.25	9.37	30.26	370	102	P	H
		5723.4	89.88	-28.67	118.55	78.49	32.27	9.38	30.26	370	102	P	H
	*	5745	119	-	-	107.56	32.29	9.42	30.27	370	102	P	H
	*	5745	110.86	-	-	99.42	32.29	9.42	30.27	370	102	A	H
													H
													H
		5645.6	52.05	-16.15	68.2	40.87	32.17	9.23	30.22	105	221	P	V
		5699	70.74	-33.72	104.46	59.43	32.23	9.33	30.25	105	221	P	V
		5718.8	90.34	-20.12	110.46	78.96	32.27	9.37	30.26	105	221	P	V
		5724.6	95.75	-25.54	121.29	84.36	32.27	9.38	30.26	105	221	P	V
	*	5745	119.7	-	-	108.26	32.29	9.42	30.27	105	221	P	V
	*	5745	112.29	-	-	100.85	32.29	9.42	30.27	105	221	A	V
													V
													V





WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
<b>802.11a CH 157 5785MHz</b>		5600.4	51.59	-16.61	68.2	40.51	32.12	9.15	30.19	367	102	P	H
		5693	53.35	-46.69	100.04	42.05	32.23	9.32	30.25	367	102	P	H
		5718.4	59.9	-50.45	110.35	48.52	32.27	9.37	30.26	367	102	P	H
		5722.6	61.43	-55.3	116.73	50.04	32.27	9.38	30.26	367	102	P	H
	*	5785	118.85	-	-	107.33	32.33	9.49	30.3	367	102	P	H
	*	5785	110.94	-	-	99.42	32.33	9.49	30.3	367	102	A	H
		5851.6	58.22	-60.33	118.55	46.56	32.41	9.58	30.33	367	102	P	H
		5857	58.46	-51.78	110.24	46.77	32.43	9.59	30.33	367	102	P	H
		5881.2	52.41	-48.18	100.59	40.68	32.46	9.61	30.34	367	102	P	H
		5946.8	51.14	-17.06	68.2	39.29	32.54	9.69	30.38	367	102	P	H
													H
													H
		5648	51.26	-16.94	68.2	40.07	32.17	9.24	30.22	100	225	P	V
		5699.4	52.88	-51.88	104.76	41.57	32.23	9.33	30.25	100	225	P	V
		5719.6	56.93	-53.76	110.69	45.55	32.27	9.37	30.26	100	225	P	V
		5723	60.75	-56.89	117.64	49.36	32.27	9.38	30.26	100	225	P	V
	*	5785	120.06	-	-	108.54	32.33	9.49	30.3	100	225	P	V
	*	5785	112.26	-	-	100.74	32.33	9.49	30.3	100	225	A	V
		5853	57.61	-57.75	115.36	45.95	32.41	9.58	30.33	100	225	P	V
		5862.8	58.41	-50.2	108.61	46.73	32.43	9.59	30.34	100	225	P	V
		5879.4	52.78	-49.15	101.93	41.05	32.46	9.61	30.34	100	225	P	V
		5933.2	50.79	-17.41	68.2	38.97	32.52	9.67	30.37	100	225	P	V
													V
													V



WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
<b>802.11a CH 165 5825MHz</b>	*	5825	118.36	-	-	106.74	32.39	9.55	30.32	378	101	P	H
	*	5825	110.26	-	-	98.64	32.39	9.55	30.32	378	101	A	H
		5852	86.84	-30.8	117.64	75.18	32.41	9.58	30.33	378	101	P	H
		5857.8	81.28	-28.73	110.01	69.6	32.43	9.59	30.34	378	101	P	H
		5883	67.4	-31.86	99.26	55.66	32.46	9.62	30.34	378	101	P	H
		5929.8	50.5	-17.7	68.2	38.68	32.52	9.67	30.37	378	101	P	H
													H
													H
	*	5825	119.24	-	-	107.62	32.39	9.55	30.32	103	226	P	V
	*	5825	111.75	-	-	100.13	32.39	9.55	30.32	103	226	A	V
		5852.4	86.05	-30.68	116.73	74.39	32.41	9.58	30.33	103	226	P	V
		5855.4	82.49	-28.2	110.69	70.81	32.43	9.58	30.33	103	226	P	V
		5879.4	64.99	-36.94	101.93	53.26	32.46	9.61	30.34	103	226	P	V
		5946.2	52.4	-15.8	68.2	40.55	32.54	9.69	30.38	103	226	P	V
													V
													V
													V
<b>Remark</b> <ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>													



## Band 4 5725~5850MHz

## 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 )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11a CH 149 5745MHz		11490	45.46	-28.54	74	52.53	40.41	13.92	61.4	100	0	P	H
		17235	51.55	-16.65	68.2	49.46	41.71	17.88	57.5	100	0	P	H
													H
													H
		11490	46.78	-27.22	74	53.85	40.41	13.92	61.4	100	0	P	V
		17235	54.56	-13.64	68.2	52.47	41.71	17.88	57.5	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11570	46.2	-27.8	74	53.53	40.22	13.95	61.5	100	0	P	H
		17355	52.99	-15.21	68.2	49.7	42.32	18.06	57.09	100	0	P	H
													H
													H
		11570	46.48	-27.52	74	53.81	40.22	13.95	61.5	100	0	P	V
		17355	55.29	-12.91	68.2	52	42.32	18.06	57.09	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11650	45.14	-28.86	74	52.73	40.04	13.98	61.61	100	0	P	H
		17475	51.25	-16.95	68.2	46.81	42.93	18.19	56.68	100	0	P	H
													H
													H
		11650	45.1	-28.9	74	52.69	40.04	13.98	61.61	100	0	P	V
		17475	53	-15.2	68.2	48.56	42.93	18.19	56.68	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
<b>802.11n HT20 CH 149 5745MHz</b>		5640.6	51.38	-16.82	68.2	40.2	32.17	9.23	30.22	370	95	P	H
		5698.6	74.23	-29.94	104.17	62.92	32.23	9.33	30.25	370	95	P	H
		5718	86.3	-23.94	110.24	74.92	32.27	9.37	30.26	370	95	P	H
		5722.6	94.58	-22.15	116.73	83.19	32.27	9.38	30.26	370	95	P	H
	*	5745	117.89	-	-	106.45	32.29	9.42	30.27	370	95	P	H
	*	5745	109.52	-	-	98.08	32.29	9.42	30.27	370	95	A	H
													H
													H
		5648.2	51.44	-16.76	68.2	40.25	32.17	9.24	30.22	103	224	P	V
		5699	74.92	-29.54	104.46	63.61	32.23	9.33	30.25	103	224	P	V
		5719.8	90.51	-20.23	110.74	79.13	32.27	9.37	30.26	103	224	P	V
		5722.8	97.71	-19.47	117.18	86.32	32.27	9.38	30.26	103	224	P	V
	*	5745	120.4	-	-	108.96	32.29	9.42	30.27	103	224	P	V
	*	5745	112.19	-	-	100.75	32.29	9.42	30.27	103	224	A	V
													V
													V



WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
<b>802.11n HT20 CH 157 5785MHz</b>		5638	49.56	-18.64	68.2	38.39	32.17	9.22	30.22	329	96	P	H
		5699.8	52.35	-52.7	105.05	41.04	32.23	9.33	30.25	329	96	P	H
		5715.6	58.16	-51.41	109.57	46.81	32.25	9.36	30.26	329	96	P	H
		5720.8	63.58	-49.04	112.62	52.2	32.27	9.37	30.26	329	96	P	H
	*	5785	118.42	-	-	106.9	32.33	9.49	30.3	329	96	P	H
	*	5785	110.23	-	-	98.71	32.33	9.49	30.3	329	96	A	H
		5851	57.7	-62.22	119.92	46.04	32.41	9.58	30.33	329	96	P	H
		5857.6	58.75	-51.32	110.07	47.06	32.43	9.59	30.33	329	96	P	H
		5884.8	53.51	-44.41	97.92	41.79	32.46	9.62	30.36	329	96	P	H
		5939.6	49.94	-18.26	68.2	38.1	32.54	9.68	30.38	329	96	P	H
													H
													H
		5609.2	49.69	-18.51	68.2	38.61	32.12	9.17	30.21	103	224	P	V
		5698	51.16	-52.57	103.73	39.85	32.23	9.33	30.25	103	224	P	V
		5718	57.39	-52.85	110.24	46.01	32.27	9.37	30.26	103	224	P	V
		5723.8	62.4	-57.06	119.46	51.01	32.27	9.38	30.26	103	224	P	V
	*	5785	120.02	-	-	108.5	32.33	9.49	30.3	103	224	P	V
	*	5785	112.23	-	-	100.71	32.33	9.49	30.3	103	224	A	V
		5853	55.8	-59.56	115.36	44.14	32.41	9.58	30.33	103	224	P	V
		5861.8	59.56	-49.33	108.89	47.88	32.43	9.59	30.34	103	224	P	V
		5879	53.98	-48.25	102.23	42.25	32.46	9.61	30.34	103	224	P	V
		5943	52.62	-15.58	68.2	40.78	32.54	9.68	30.38	103	224	P	V
													V
													V



WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 165 5825MHz	*	5825	118.44	-	-	106.82	32.39	9.55	30.32	354	97	P	H
	*	5825	109.84	-	-	98.22	32.39	9.55	30.32	354	97	A	H
		5853.8	85.7	-27.84	113.54	74.02	32.43	9.58	30.33	354	97	P	H
		5857.8	84.59	-25.42	110.01	72.91	32.43	9.59	30.34	354	97	P	H
		5875.2	70.57	-34.48	105.05	58.84	32.46	9.61	30.34	354	97	P	H
		5944.2	51.35	-16.85	68.2	39.5	32.54	9.69	30.38	354	97	P	H
													H
													H
	*	5825	120.16	-	-	108.54	32.39	9.55	30.32	100	224	P	V
	*	5825	111.72	-	-	100.1	32.39	9.55	30.32	100	224	A	V
		5854.8	82.38	-28.88	111.26	70.7	32.43	9.58	30.33	100	224	P	V
		5857	86.71	-23.53	110.24	75.02	32.43	9.59	30.33	100	224	P	V
		5876.8	66.82	-37.04	103.86	55.09	32.46	9.61	30.34	100	224	P	V
		5928.2	51.57	-16.63	68.2	39.75	32.52	9.67	30.37	100	224	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 4 5725~5850MHz**  
**WIFI 802.11n HT20 (Harmonic @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 149 5745MHz		11490	46.14	-27.86	74	53.21	40.41	13.92	61.4	100	0	P	H
		17235	52.08	-16.12	68.2	49.99	41.71	17.88	57.5	100	0	P	H
													H
													H
		11490	47.64	-26.36	74	54.71	40.41	13.92	61.4	100	0	P	V
		17235	54.34	-13.86	68.2	52.25	41.71	17.88	57.5	100	0	P	V
													V
													V
802.11n HT20 CH 157 5785MHz		11570	45.76	-28.24	74	53.09	40.22	13.95	61.5	100	0	P	H
		17355	51.53	-16.67	68.2	48.24	42.32	18.06	57.09	100	0	P	H
													H
													H
		11570	46.1	-27.9	74	53.43	40.22	13.95	61.5	100	0	P	V
		17355	53.47	-14.73	68.2	50.18	42.32	18.06	57.09	100	0	P	V
													V
													V
802.11n HT20 CH 165 5825MHz		11650	44.46	-29.54	74	52.05	40.04	13.98	61.61	100	0	P	H
		17475	51.97	-16.23	68.2	47.53	42.93	18.19	56.68	100	0	P	H
													H
													H
		11650	46.9	-27.1	74	54.49	40.04	13.98	61.61	100	0	P	V
		17475	51.91	-16.29	68.2	47.47	42.93	18.19	56.68	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 4 5725~5850MHz

## WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT40 CH 151 5755MHz		5643	60.81	-7.39	68.2	49.63	32.17	9.23	30.22	355	103	P	H
		5699.8	79.59	-25.46	105.05	68.28	32.23	9.33	30.25	355	103	P	H
		5718.2	90.08	-20.22	110.3	78.7	32.27	9.37	30.26	355	103	P	H
		5724	95.08	-24.84	119.92	83.69	32.27	9.38	30.26	355	103	P	H
	*	5755	116.51	-	-	105.03	32.31	9.44	30.27	355	103	P	H
	*	5755	107.46	-	-	95.98	32.31	9.44	30.27	355	103	A	H
		5852.2	60.64	-56.54	117.18	48.98	32.41	9.58	30.33	355	103	P	H
		5859.8	63.16	-46.29	109.45	51.48	32.43	9.59	30.34	355	103	P	H
		5877.4	57.54	-45.88	103.42	45.81	32.46	9.61	30.34	355	103	P	H
		5938.2	51.02	-17.18	68.2	39.2	32.52	9.68	30.38	355	103	P	H
													H
													H
		5649.8	59.02	-9.18	68.2	47.81	32.19	9.24	30.22	101	223	P	V
		5696.8	80.91	-21.93	102.84	69.6	32.23	9.33	30.25	101	223	P	V
		5713.6	92.04	-16.97	109.01	80.69	32.25	9.36	30.26	101	223	P	V
		5724.6	87.16	-34.13	121.29	75.77	32.27	9.38	30.26	101	223	P	V
	*	5755	117.49	-	-	106.01	32.31	9.44	30.27	101	223	P	V
	*	5755	109.41	-	-	97.93	32.31	9.44	30.27	101	223	A	V
		5850.8	68.86	-51.52	120.38	57.2	32.41	9.58	30.33	101	223	P	V
		5867.8	67.01	-40.2	107.21	55.32	32.43	9.6	30.34	101	223	P	V
		5883.4	56.6	-42.36	98.96	44.88	32.46	9.62	30.36	101	223	P	V
		5938.8	53.77	-14.43	68.2	41.93	32.54	9.68	30.38	101	223	P	V
													V
													V





WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
<b>802.11n HT40 CH 159 5795MHz</b>		5647.4	53.05	-15.15	68.2	41.86	32.17	9.24	30.22	352	100	P	H
		5693.8	60.86	-39.77	100.63	49.56	32.23	9.32	30.25	352	100	P	H
		5707.8	69.4	-37.99	107.39	58.06	32.25	9.35	30.26	352	100	P	H
		5724.8	75.04	-46.7	121.74	63.65	32.27	9.38	30.26	352	100	P	H
	*	5795	115.81	-	-	104.25	32.35	9.51	30.3	352	100	P	H
	*	5795	107.47	-	-	95.91	32.35	9.51	30.3	352	100	A	H
		5851.4	79.3	-39.71	119.01	67.64	32.41	9.58	30.33	352	100	P	H
		5864.6	76.36	-31.75	108.11	64.68	32.43	9.59	30.34	352	100	P	H
		5885.8	70.02	-27.16	97.18	58.3	32.46	9.62	30.36	352	100	P	H
		5927.6	54.61	-13.59	68.2	42.79	32.52	9.67	30.37	352	100	P	H
													H
													H
		5618.6	50.36	-17.84	68.2	39.25	32.14	9.18	30.21	102	225	P	V
		5695.4	63.1	-38.71	101.81	51.79	32.23	9.33	30.25	102	225	P	V
		5713.2	72.04	-36.86	108.9	60.69	32.25	9.36	30.26	102	225	P	V
		5724.8	67.79	-53.95	121.74	56.4	32.27	9.38	30.26	102	225	P	V
	*	5795	117.18	-	-	105.62	32.35	9.51	30.3	102	225	P	V
	*	5795	109.29	-	-	97.73	32.35	9.51	30.3	102	225	A	V
		5852	83.41	-34.23	117.64	71.75	32.41	9.58	30.33	102	225	P	V
		5855.4	78.39	-32.3	110.69	66.71	32.43	9.58	30.33	102	225	P	V
		5875.8	70.06	-34.55	104.61	58.33	32.46	9.61	30.34	102	225	P	V
		5925.4	54.84	-13.36	68.2	43.03	32.52	9.66	30.37	102	225	P	V
													V
													V
<b>Remark</b>	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												



**Band 4 5725~5850MHz**  
**WIFI 802.11n HT40 (Harmonic @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT40 CH 151 5755MHz		11510	45.71	-28.29	74	52.79	40.4	13.93	61.41	100	0	P	H
		17265	49.1	-19.1	68.2	46.68	41.89	17.93	57.4	100	0	P	H
													H
													H
		11510	45.67	-28.33	74	52.75	40.4	13.93	61.41	100	0	P	V
		17265	51.36	-16.84	68.2	48.94	41.89	17.93	57.4	100	0	P	V
													V
													V
802.11n HT40 CH 159 5795MHz		11590	45.55	-28.45	74	52.94	40.18	13.96	61.53	100	0	P	H
		17385	50.49	-17.71	68.2	46.91	42.49	18.08	56.99	100	0	P	H
													H
													H
		11590	45.31	-28.69	74	52.7	40.18	13.96	61.53	100	0	P	V
		17385	51.07	-17.13	68.2	47.49	42.49	18.08	56.99	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Band 4 5725~5850MHz

## WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11ac VHT80 CH 155 5775MHz		5646.2	65.14	-3.06	68.2	53.95	32.17	9.24	30.22	355	101	P	H
		5691.4	81.55	-17.31	98.86	70.25	32.23	9.32	30.25	355	101	P	H
		5711.6	85.36	-23.09	108.45	74.01	32.25	9.36	30.26	355	101	P	H
		5724.2	85.73	-34.65	120.38	74.34	32.27	9.38	30.26	355	101	P	H
	*	5775	110.3	-	-	98.79	32.33	9.47	30.29	355	101	P	H
	*	5775	102.59	-	-	91.08	32.33	9.47	30.29	355	101	A	H
		5851	85.92	-34	119.92	74.26	32.41	9.58	30.33	355	101	P	H
		5871.4	81.06	-25.15	106.21	69.34	32.46	9.6	30.34	355	101	P	H
		5876	73.74	-30.72	104.46	62.01	32.46	9.61	30.34	355	101	P	H
		5925	64.48	-3.72	68.2	52.67	32.52	9.66	30.37	355	101	P	H
													H
													H
		5649.6	64.17	-4.03	68.2	52.96	32.19	9.24	30.22	101	227	P	V
		5691.4	82.47	-16.39	98.86	71.17	32.23	9.32	30.25	101	227	P	V
		5714.6	89.39	-19.9	109.29	78.04	32.25	9.36	30.26	101	227	P	V
		5723.8	82.48	-36.98	119.46	71.09	32.27	9.38	30.26	101	227	P	V
	*	5775	111.62	-	-	100.11	32.33	9.47	30.29	101	227	P	V
	*	5775	103.95	-	-	92.44	32.33	9.47	30.29	101	227	A	V
		5852.6	87.83	-28.44	116.27	76.17	32.41	9.58	30.33	101	227	P	V
		5869.6	82.75	-23.96	106.71	71.06	32.43	9.6	30.34	101	227	P	V
		5884.6	74.19	-23.88	98.07	62.47	32.46	9.62	30.36	101	227	P	V
		5929.8	65.89	-2.31	68.2	54.07	32.52	9.67	30.37	101	227	P	V
													V
													V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11ac VHT80 (Harmonic @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
<b>802.11ac VHT80 CH 155 5775MHz</b>		11550	46.9	-27.1	74	54.15	40.27	13.95	61.47	100	0	P	H
		17325	50.33	-17.87	68.2	47.35	42.15	18.02	57.19	100	0	P	H
													H
													H
		11550	45.9	-28.1	74	53.15	40.27	13.95	61.47	100	0	P	V
		17325	51.34	-16.86	68.2	48.36	42.15	18.02	57.19	100	0	P	V
													V
													V
<b>Remark</b>	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	Path	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)
5GHz 802.11ac  VHT80 LF		82.11	30.68	-9.32	40	48.25	13.83	1.19	32.59	-	-	P	H
		167.43	31.89	-11.61	43.5	46.75	15.95	1.74	32.55	-	-	P	H
		207.12	30.31	-13.19	43.5	45.5	15.47	1.88	32.54	-	-	P	H
		325.9	30.52	-15.48	46	40.79	20.04	2.22	32.53	-	-	P	H
		674.5	36.94	-9.06	46	39.76	26.51	3.18	32.51	100	0	P	H
		952.4	33.4	-12.6	46	29.73	31.04	3.89	31.26	-	-	P	H
													H
													H
													H
													H
													H
													H
		41.61	36.75	-3.25	40	49.97	18.59	0.82	32.63	100	0	P	V
		49.44	36.4	-3.6	40	53.5	14.65	0.87	32.62	-	-	P	V
		83.73	36.64	-3.36	40	54.01	14.01	1.21	32.59	-	-	P	V
		685	31.91	-14.09	46	34.62	26.58	3.21	32.5	-	-	P	V
		885.2	33.09	-12.91	46	32	29.16	3.71	31.78	-	-	P	V
		954.5	33.38	-12.62	46	29.64	31.08	3.9	31.24	-	-	P	V
													V
													V
												V	
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



**Note symbol**

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)  
 = Antenna Factor(dB/m) + Path 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) + Path 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”.**

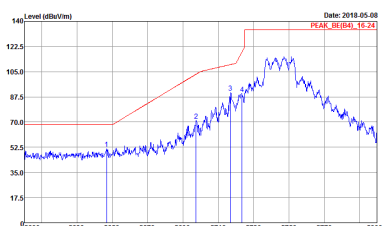
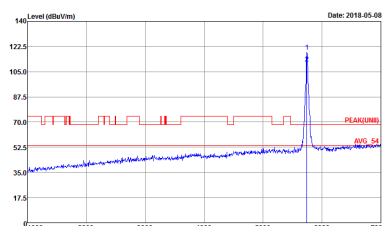


## Appendix D. Radiated Spurious Emission Plots

Test Engineer :	Jacky Hung	Temperature :	22~25°C
		Relative Humidity :	52~57%

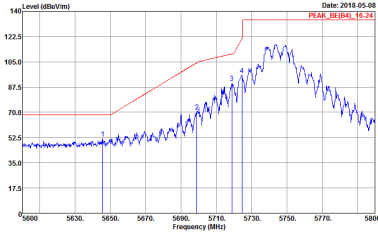
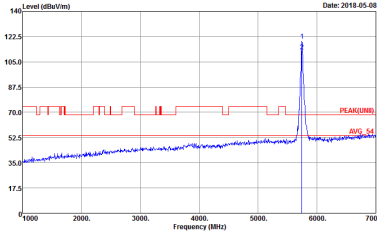
## Band 4 - 5725~5850MHz

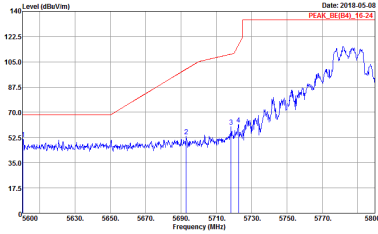
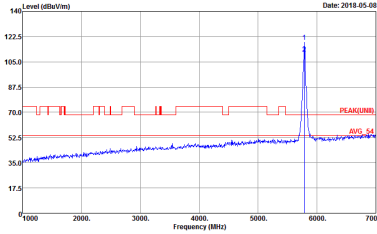
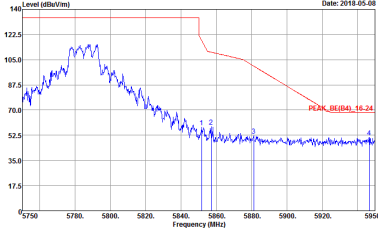
## WIFI 802.11a (Band Edge @ 3m)

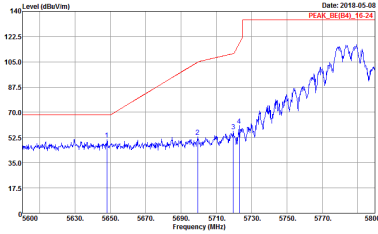
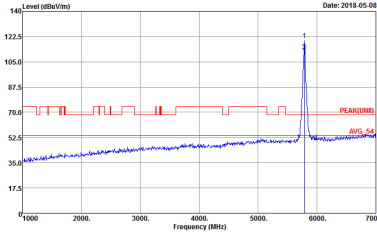
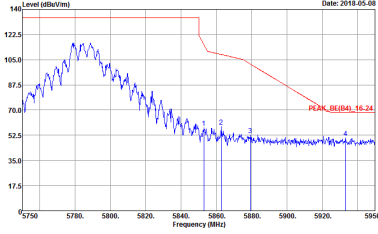
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(B4)_16-24 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : ZZ</p>	 <p>Site : 03CH15-HY Condition : PEAK(UNIT) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : ZZ</p>



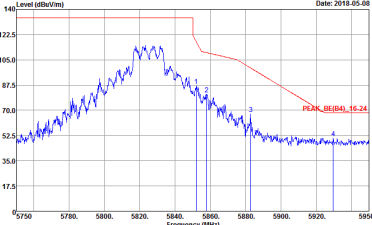
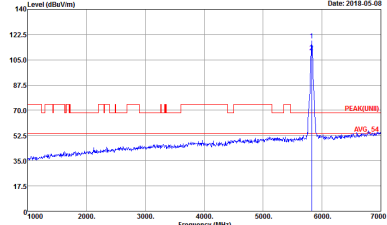


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Vertical	Fundamental
Peak	<div><p>Site : 03CH15-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CH15-HY Condition : PEAK(FUNDI) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>	 <p>Site : 03CH15-HY Condition : PEAK(FUNDI) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>
	 <p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Vertical	Fundamental
Peak	 <p>           Site : 03CH15-HY            Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 811724            Setting : 22         </p>	 <p>           Site : 03CH15-HY            Condition : PEAK(04)_15-24 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 811724            Setting : 22         </p>
	 <p>           Site : 03CH15-HY            Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 811724            Setting : 22         </p>	Left blank

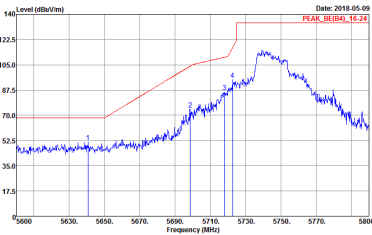
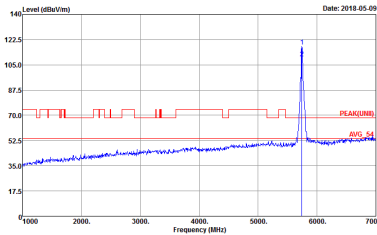


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Fundamental
Peak	<div><p>Site : 03CH15-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>

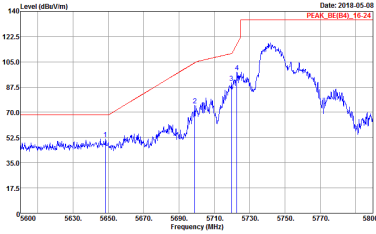
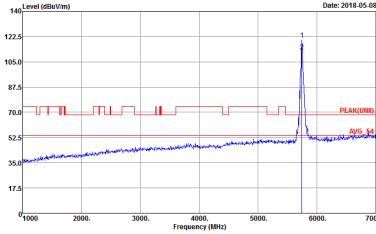


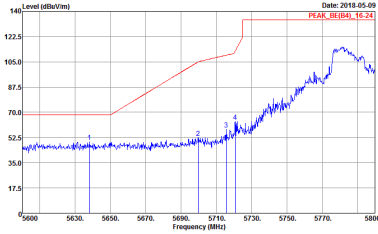
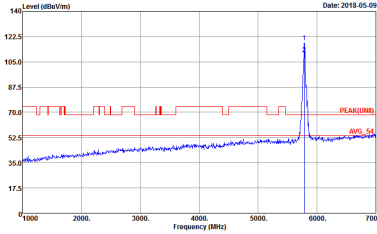
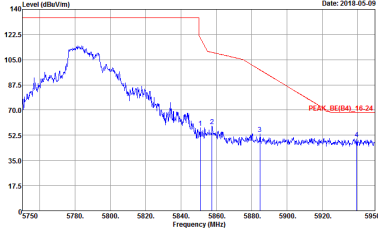
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Vertical	Fundamental
Peak	<div><p>Site : 03CHI5-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CHI5-HY Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>

**Band 4 5725~5850MHz**  
**WIFI 802.11n HT20 (Band Edge @ 3m)**

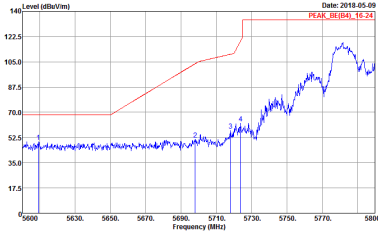
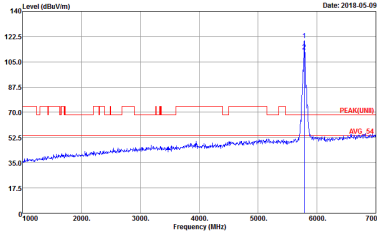
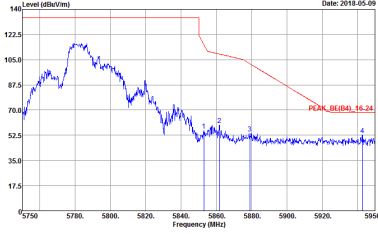
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1+2	Horizontal	Fundamental
<b>Peak</b>	 <p>Site : 03CH15-HY  Condition : PEAK_8E(84)_16-24 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : Z2</p>	 <p>Site : 03CH15-HY  Condition : PEAK(UNIT) 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : Z2</p>



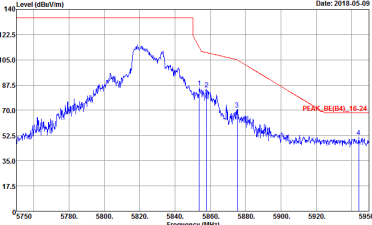
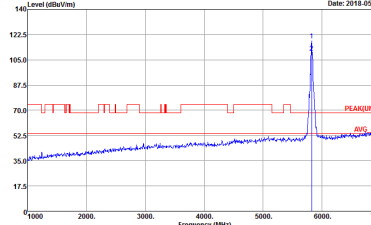
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1+2	Vertical	Fundamental
Peak	<div><p>Site : 03CHI5-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CHI5-HY Condition : PEAK(FUNDI) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>	 <p>Site : 03CH15-HY Condition : PEAK_UB(04)_15-24 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>	Left blank


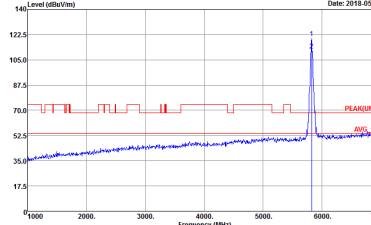


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1+2	Vertical	Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p>	 <p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p>
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p>	Left blank

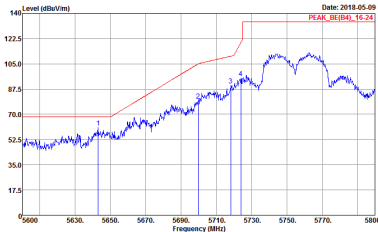
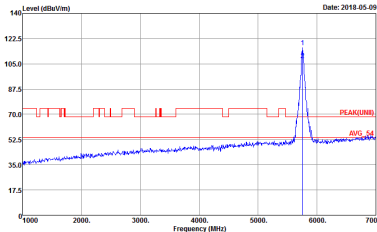
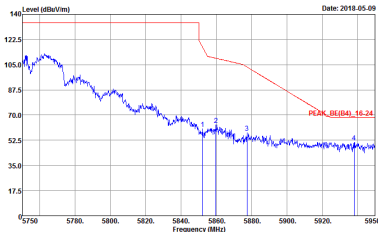


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1+2	Horizontal	Fundamental
Peak	<div><p>Site : 03CH15-HV Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CH15-HV Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>

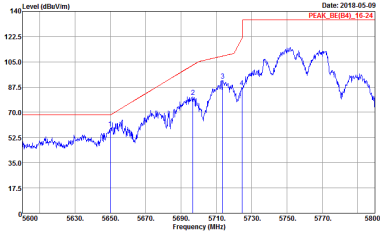
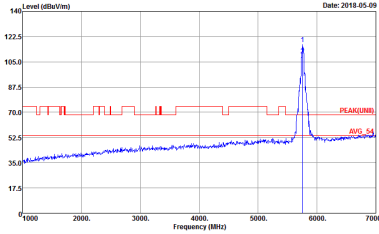
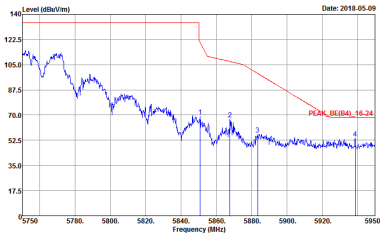


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1+2	Vertical	Fundamental
Peak	<div><p>Site : 03CHI5-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CHI5-HY Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>

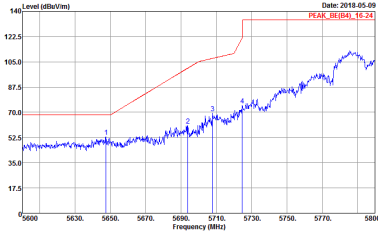
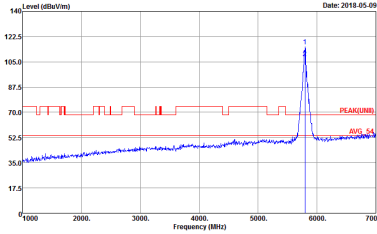
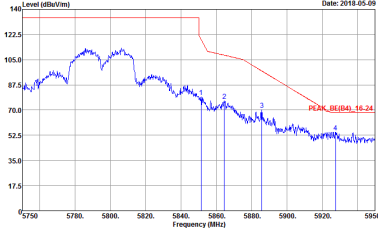
**Band 4 5725~5850MHz**  
**WIFI 802.11n HT40 (Band Edge @ 3m)**

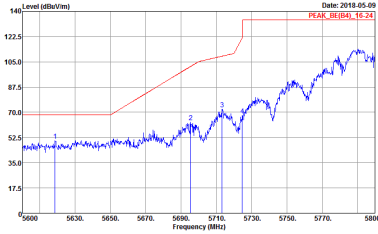
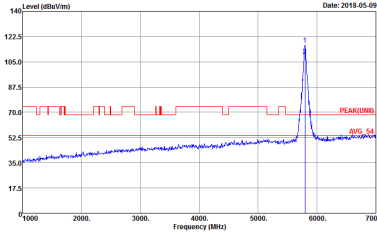
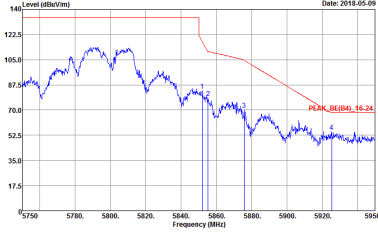
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH15-HY  Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : Z2</p>	 <p>Site : 03CH15-HY  Condition : PEAK(UNIT) 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : Z2</p>
	 <p>Site : 03CH15-HY  Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : Z2</p>	Left blank



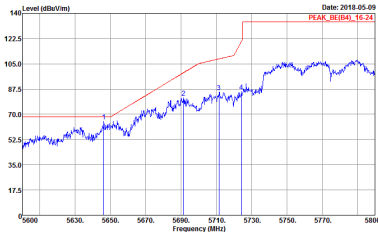
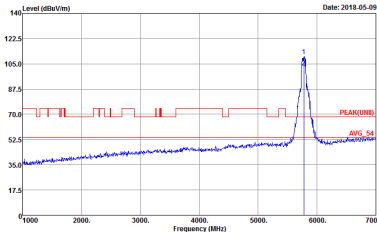

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1+2	Vertical	Fundamental
Peak	<div><p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CH15-HY Condition : PEAK(UBI) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>
Peak	<div><p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	Left blank



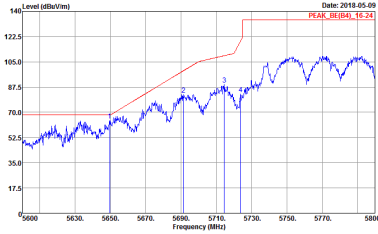
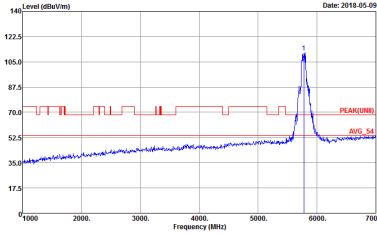
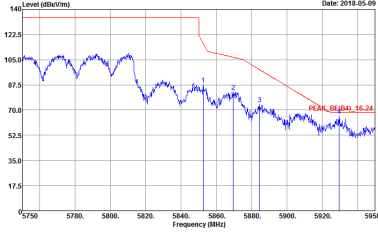
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1+2	Horizontal	Fundamental
Peak	<div><p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CH15-HY Condition : PEAK(04)_15-24 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>
Peak	<div><p>Site : 03CH15-HY Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 22</p></div>	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1+2	Vertical	Fundamental
Peak	 <p>           Site : 03CH15-HY            Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 811724            Setting : 22         </p>	 <p>           Site : 03CH15-HY            Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 811724            Setting : 22         </p>
Peak	 <p>           Site : 03CH15-HY            Condition : PEAK_BE(04)_15-24 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 811724            Setting : 22         </p>	Left blank

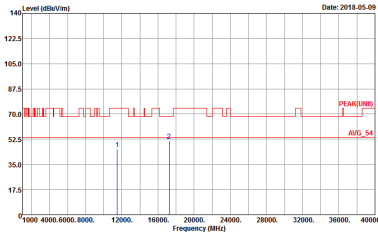
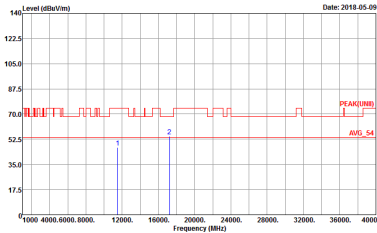
**Band 4 5725~5850MHz**  
**WIFI 802.11ac VHT80 (Band Edge @ 3m)**

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH15-HY  Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : 19</p>	 <p>Site : 03CH15-HY  Condition : PEAK(UNIT) 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : 19</p>
	 <p>Site : 03CH15-HY  Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : 19</p>	Left blank

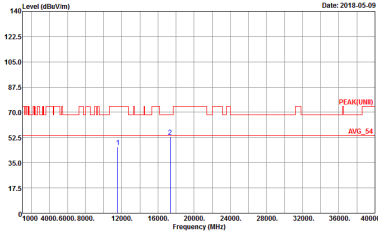
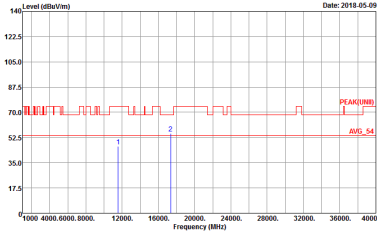


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1+2	Vertical	Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 19</p>	 <p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 19</p>
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 811724 Setting : 19</p>	Left blank

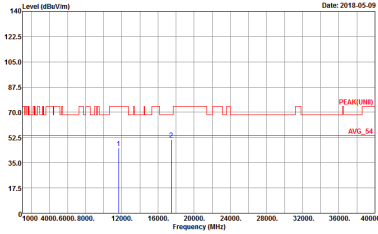
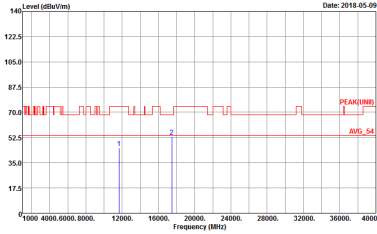
**Band 4 - 5725~5850MHz**  
**WIFI 802.11a (Harmonic @ 3m)**

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Horizontal	Vertical
<b>Peak</b>  <b>Avg.</b>	 <p>           Site : 03CH15-HY            Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 811724            Setting : 22         </p>	 <p>           Site : 03CH15-HY            Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 811724            Setting : 22         </p>

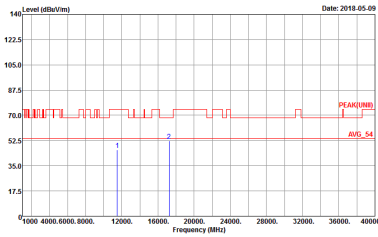
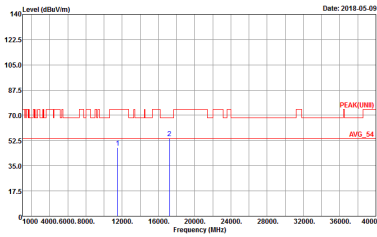


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	<div><p>Site : 03CHI5-HV Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CHI5-HV Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p></div>

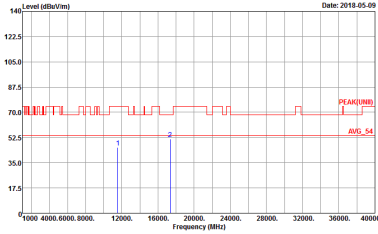
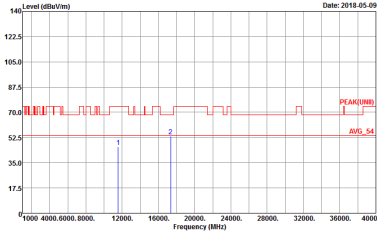


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Vertical
Peak Avg.	<div><p>Site : 03CH15-HV Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CH15-HV Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p></div>

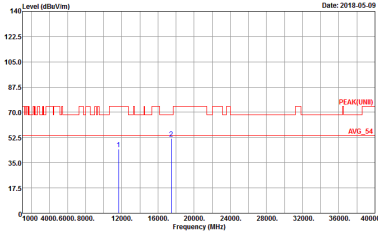
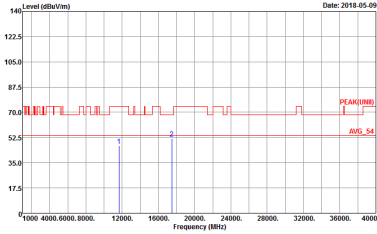
**Band 4 5725~5850MHz**  
**WIFI 802.11n HT20 (Harmonic @ 3m)**

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1+2	Horizontal	Vertical
<b>Peak</b>  <b>Avg.</b>	 <p>           Site : 03CH15-HY            Condition : PEAK(UWB) 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 811724            Setting : 22         </p>	 <p>           Site : 03CH15-HY            Condition : PEAK(UWB) 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 811724            Setting : 22         </p>

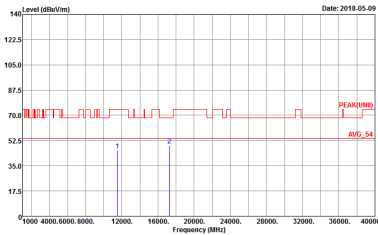
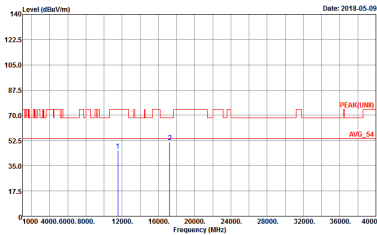


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CHI5-HV Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>	 <p>Site : 03CHI5-HV Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p>



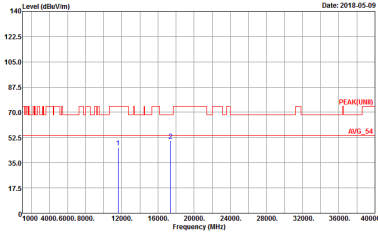
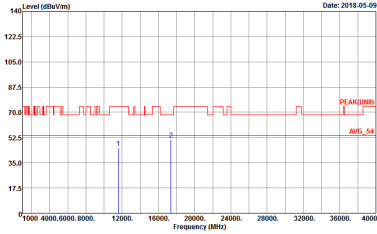
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1+2	Horizontal	Vertical
Peak Avg.	<div><p>Site : 03CHI5-HV Condition : PEAK(UNB) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p></div>	<div><p>Site : 03CHI5-HV Condition : PEAK(UNB) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p></div>

**Band 4 5725~5850MHz**  
**WIFI 802.11n HT40 (Harmonic @ 3m)**

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1+2	Horizontal	Vertical
<b>Peak</b>  <b>Avg.</b>	 <p> Site : 03CH15-HY  Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL  Detector : Peak  Project : 811724  Setting : 22 </p>	 <p> Site : 03CH15-HY  Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL  Detector : Peak  Project : 811724  Setting : 22 </p>

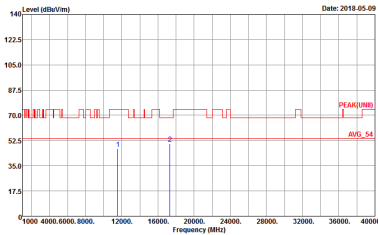
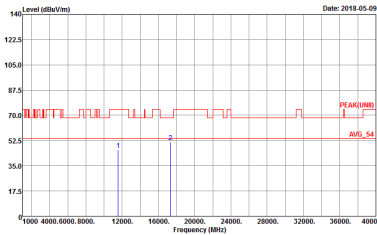




WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1+2	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CHI5-HV Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 22</p>	 <p>Site : 03CHI5-HV Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 22</p>

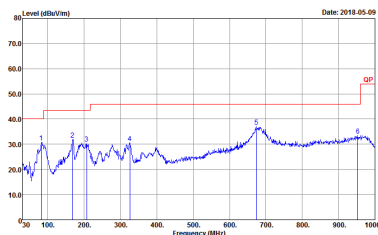
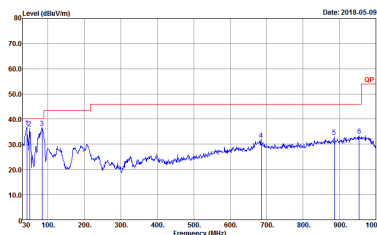


Band 4 5725~5850MHz  
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1+2	Horizontal	Vertical
Peak Avg.	<div><p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 811724 Setting : 19</p></div>	<div><p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 811724 Setting : 19</p></div>



Emission below 1GHz  
5GHz WIFI 802.11ac VHT80 (LF)

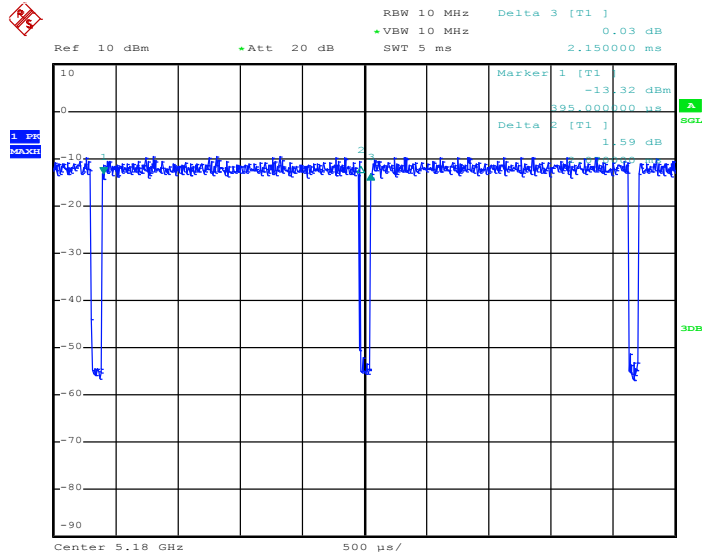
WIFI	5GHz 5725~5850MHz	
ANT	802.11ac VHT80 LF	
1+2	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH15-HY Condition : QP 3m BTL06_15_41912 HORIZONTAL Detector : Peak Project : 811724</p>	 <p>Site : 03CH15-HY Condition : QP 3m BTL06_15_41912 VERTICAL Detector : Peak Project : 811724</p>

## Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor (dB)
1+2	802.11a for Antenna 1	96.28	2070.00	0.48	1kHz	0.16
1+2	802.11a for Antenna 2	95.83	2070.00	0.48	1kHz	0.18
1+2	5GHz 802.11n HT20 for Antenna 1	97.65	4995.00	0.20	300Hz	0.10
1+2	5GHz 802.11n HT20 for Antenna 2	97.63	4950.00	0.20	300Hz	0.10
1+2	5GHz 802.11n HT40 for Antenna 1	96.03	2420.00	0.41	1kHz	0.18
1+2	5GHz 802.11n HT40 for Antenna 2	96.03	2420.00	0.41	1kHz	0.18
1+2	5GHz 802.11ac VHT20 for Antenna 1	97.65	4980.00	0.20	300Hz	0.10
1+2	5GHz 802.11ac VHT20 for Antenna 2	97.66	5010.00	0.20	300Hz	0.10
1+2	5GHz 802.11ac VHT40 for Antenna 1	96.00	2400.00	0.42	1kHz	0.18
1+2	5GHz 802.11ac VHT40 for Antenna 2	96.83	2440.00	0.41	1kHz	0.14
1+2	5GHz 802.11ac VHT80 for Antenna 1	92.74	1150.00	0.87	1kHz	0.33
1+2	5GHz 802.11ac VHT80 for Antenna 2	93.12	1150.00	0.87	1kHz	0.31

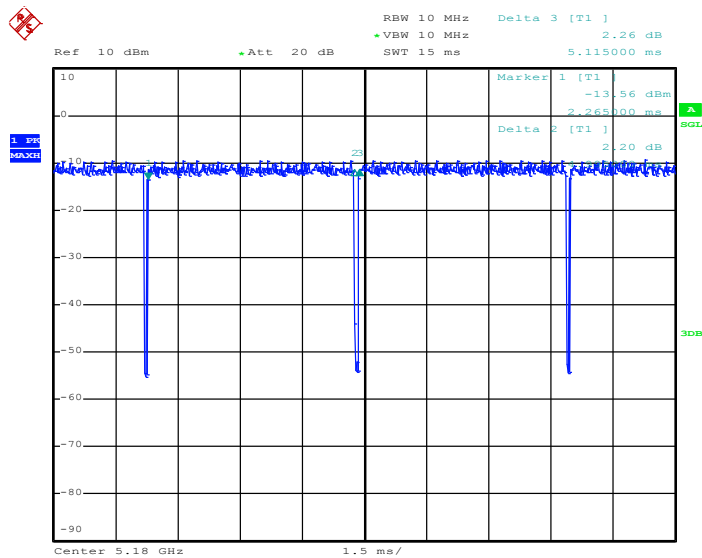
## MIMO<Ant. 1>

### 802.11a



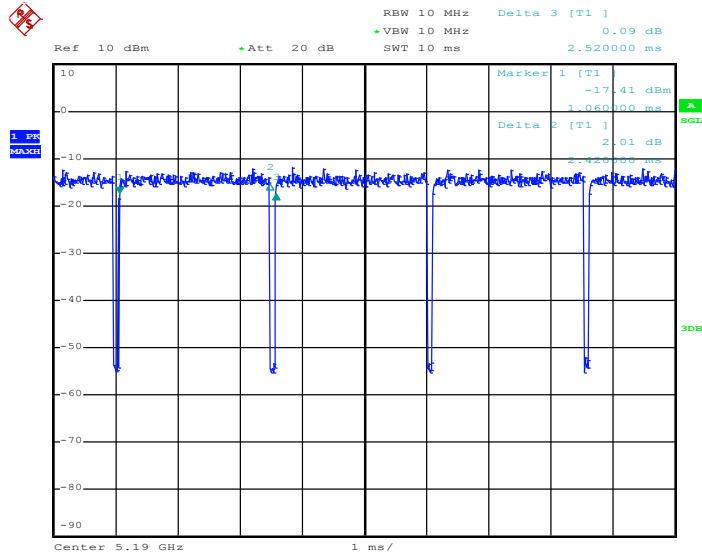
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### 802.11n HT20



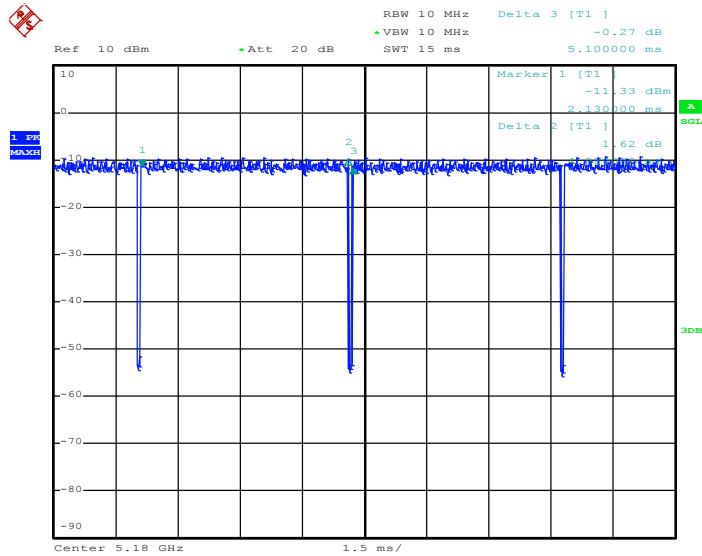
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## 802.11n HT40



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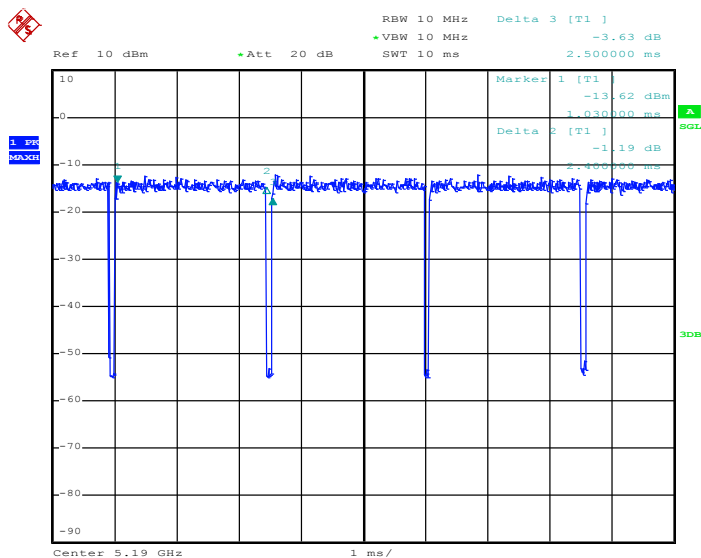
## 802.11ac VHT20



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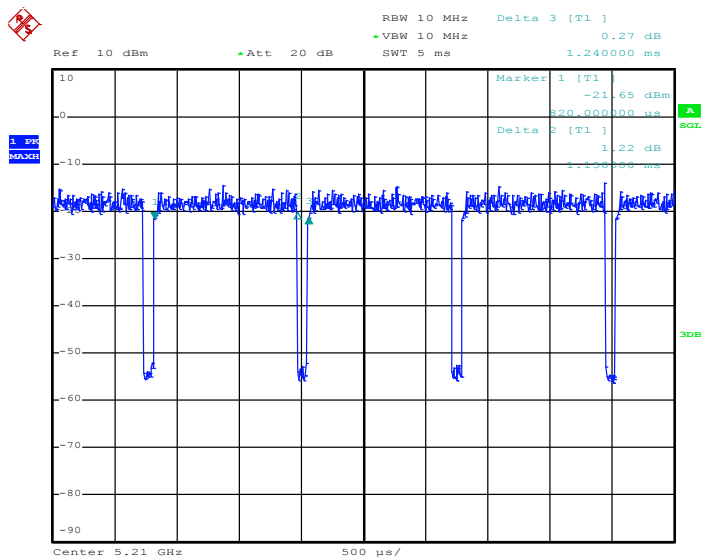


802.11ac VHT40



Date: 11.MAY.2018 10:59:51

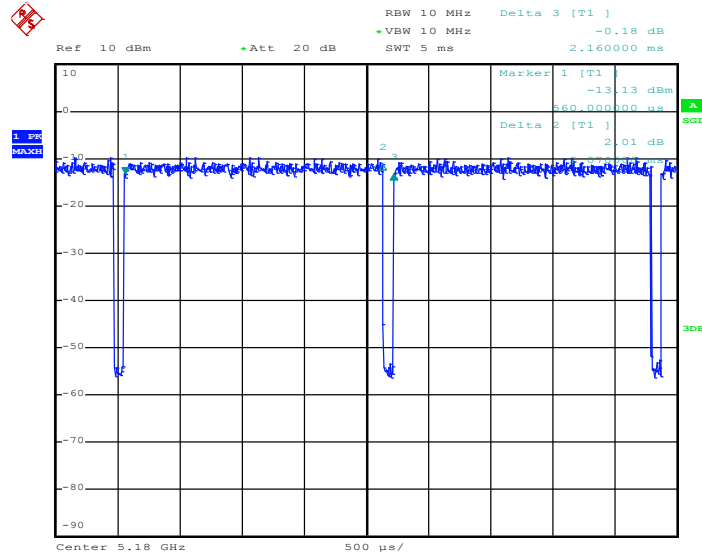
802.11ac VHT80



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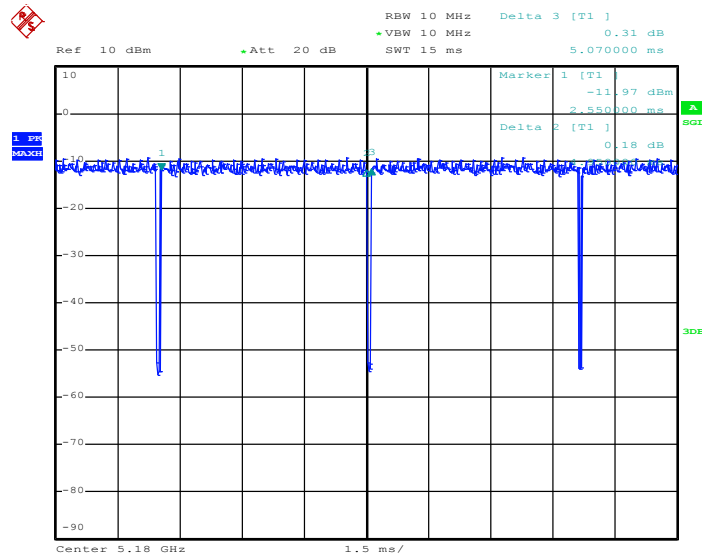
## MIMO<Ant. 2>

### 802.11a



Date: 11.MAY.2018 10:52:21

### 802.11n HT20

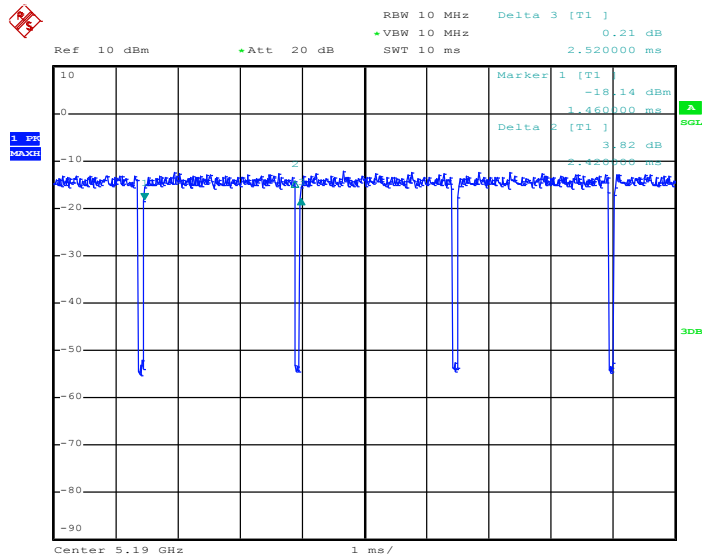


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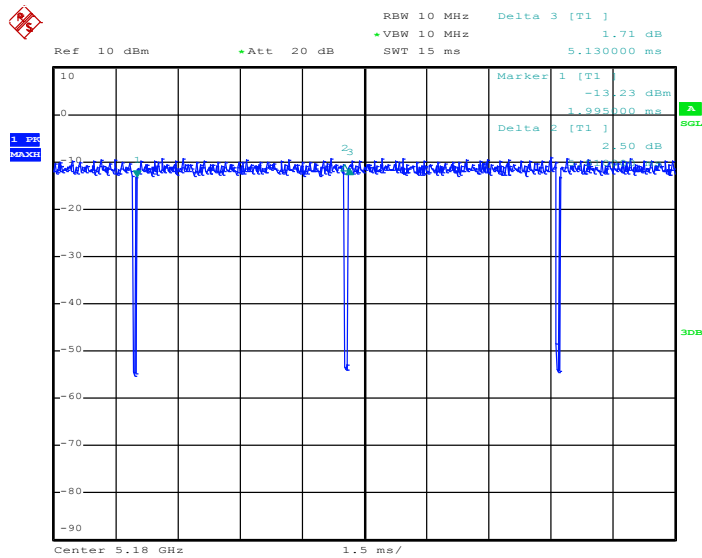


802.11n HT40



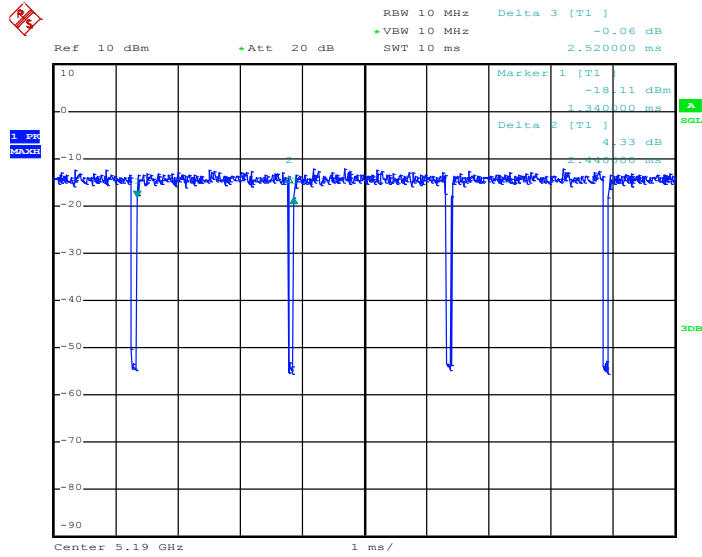
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802.11ac VHT20



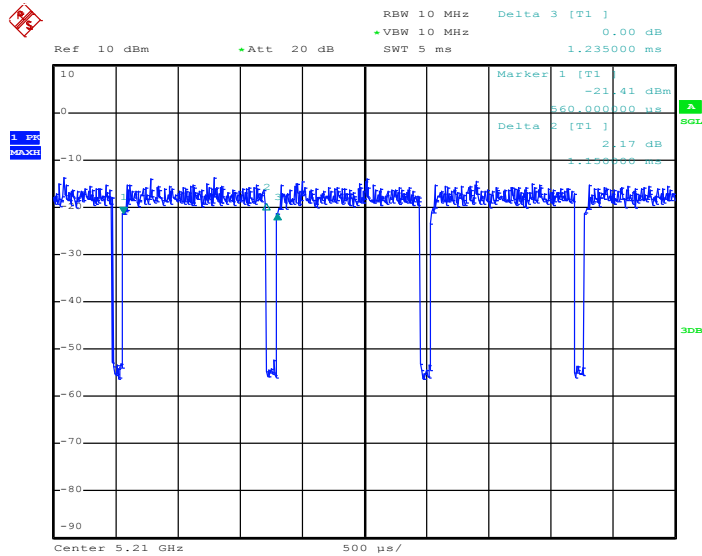
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## 802.11ac VHT40



Date: 11.MAY.2018 11:00:30

## 802.11ac VHT80



Date: 11.MAY.2018 11:02:11