



# FCC RADIO TEST REPORT

FCC ID : 2AP7S-6784  
Equipment : Tablet  
Model name : M8S26G  
Applicant : First Stride LLC  
6385 Old Shady Oak Rd., Ste 250  
Eden Prairie  
Minnesota  
55344  
Standard : FCC Part 15 Subpart E §15.407

The test was completed on Oct. 23, 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: Joseph Lin

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

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



## Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
<b>1 General Description .....</b>	<b>5</b>
1.1 Product Feature of Equipment Under Test.....	5
1.2 Product Specification of Equipment Under Test.....	5
1.3 Modification of EUT .....	5
1.4 Testing Location .....	6
1.5 Applicable Standards.....	6
<b>2 Test Configuration of Equipment Under Test .....</b>	<b>7</b>
2.1 Carrier Frequency and Channel .....	7
2.2 Test Mode.....	7
2.3 Connection Diagram of Test System.....	8
2.4 Support Unit used in test configuration and system .....	9
2.5 EUT Operation Test Setup .....	9
2.6 Measurement Results Explanation Example.....	9
<b>3 Test Result .....</b>	<b>10</b>
3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement .....	10
3.2 Maximum Conducted Output Power Measurement .....	13
3.3 Power Spectral Density Measurement .....	14
3.4 Unwanted Emissions Measurement.....	16
3.5 AC Conducted Emission Measurement.....	21
3.6 Automatically Discontinue Transmission .....	23
3.7 Antenna Requirements.....	25
<b>4 List of Measuring Equipment.....</b>	<b>26</b>
<b>5 Uncertainty of Evaluation.....</b>	<b>27</b>
<b>Appendix A. Conducted Test Results</b>	
<b>Appendix B. AC Conducted Emission Test Result</b>	
<b>Appendix C. Radiated Spurious Emission</b>	
<b>Appendix D. Radiated Spurious Emission Plots</b>	
<b>Appendix E. Duty Cycle Plots</b>	





## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)
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
3.5	15.207	AC Conducted Emission	Pass
3.6	15.407 (c)	Automatically Discontinue Transmission	Pass
3.7	15.203 & 15.407 (a)	Antenna Requirement	Pass

**Reviewed by: Wii Chang**

**Report Producer: Maggie Chiang**



# 1 General Description

## 1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet
Model Name	M8S26G
FCC ID	2AP7S-6784
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth BR/EDR/LE

## 1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	802.11a : 14.45 dBm / 0.0279 W 802.11n HT20 : 14.48 dBm / 0.0281 W 802.11n HT40 : 14.48 dBm / 0.0281 W
99% Occupied Bandwidth	802.11a : 16.70 MHz 802.11n HT20 : 17.70 MHz 802.11n HT40 : 36.30 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
Antenna Type / Gain	Fixed Internal Antenna with gain 0.30 dBi

## 1.3 Modification of EUT

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



### 1.4 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.

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		
	TH05-HY	CO05-HY	DFS02-HY

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

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	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		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		
	03CH16-HY		

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

### 1.5 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 414788 D01 Radiated Test Site v01r01.
- ♦ 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 (Z 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
	-	-	165	5825

Note: The above Frequency and Channel in "\*" were 802.11n HT40.

### 2.2 Test Mode

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

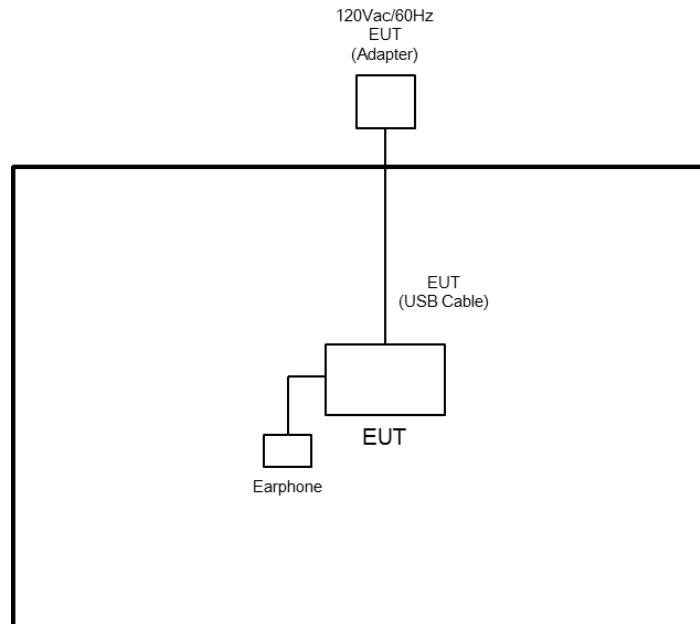
Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1: WLAN (5GHz) Link + Bluetooth Link + Camera (Front) + Earphone + MicroSD Card + USB Cable (Charging from Adapter)

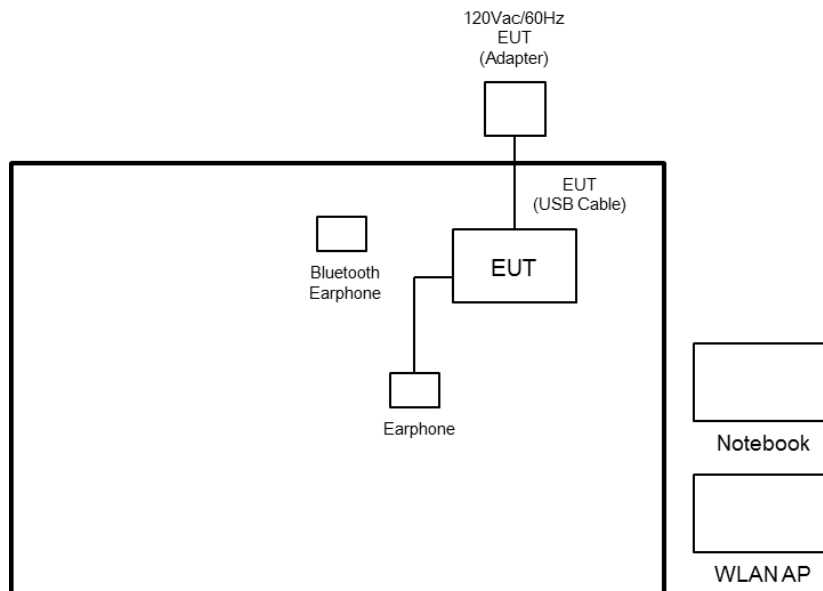
Ch. #		Band IV : 5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

## 2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>







## 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
4.	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
5.	Earphone	Sony	MH755	N/A	N/A	N/A
6.	Earphone	N/A	N/A	Verification	Unshielded, 1.15m	N/A

## 2.5 EUT Operation Test Setup

The RF test items, utility “CMD” 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.

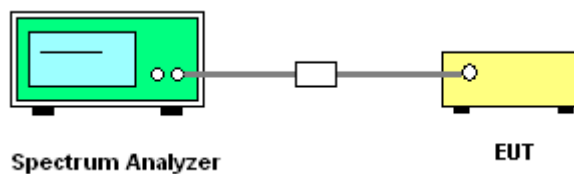
##### 3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

##### 3.1.3 Test Procedures

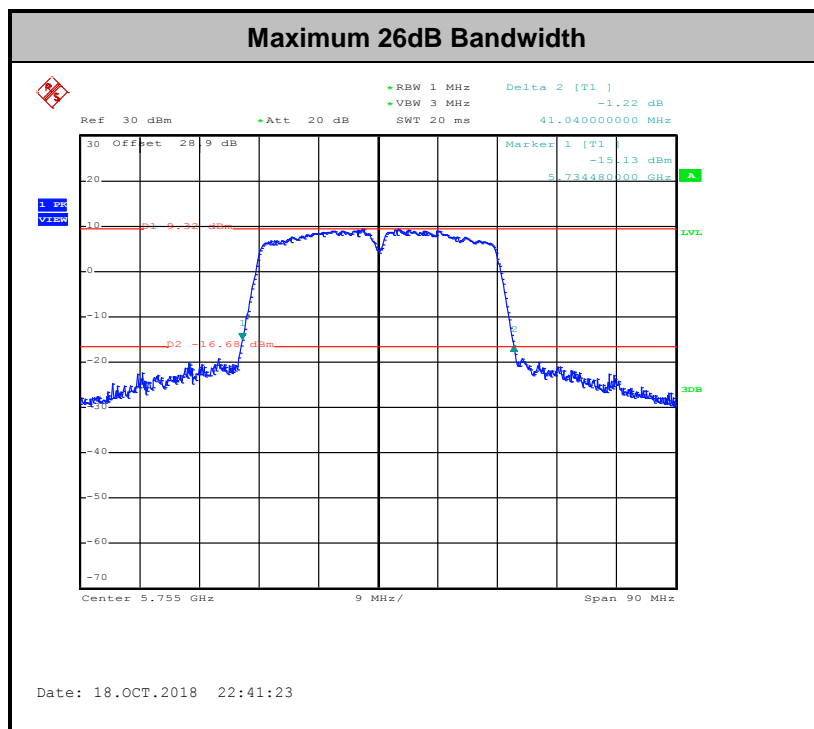
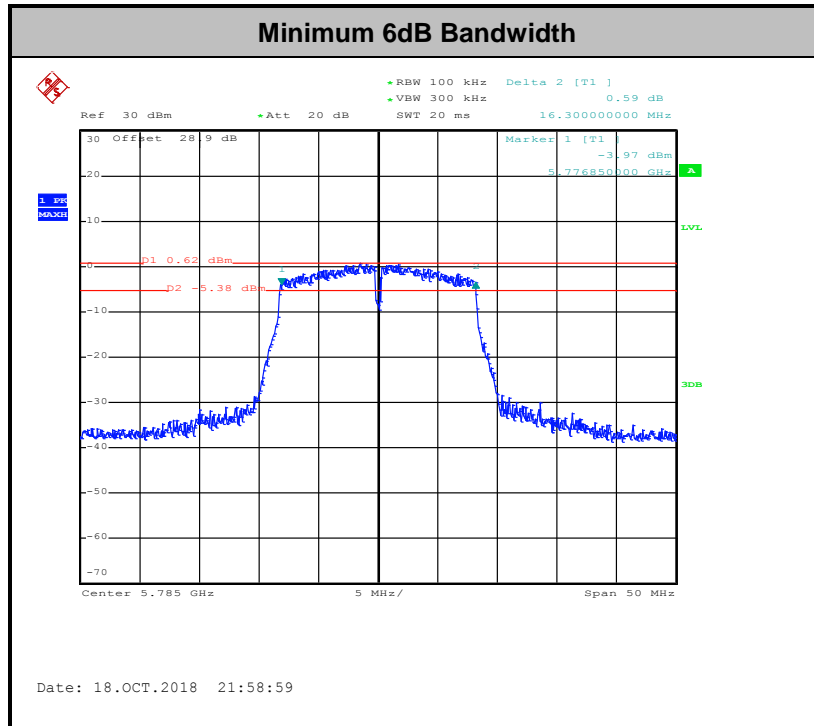
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is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

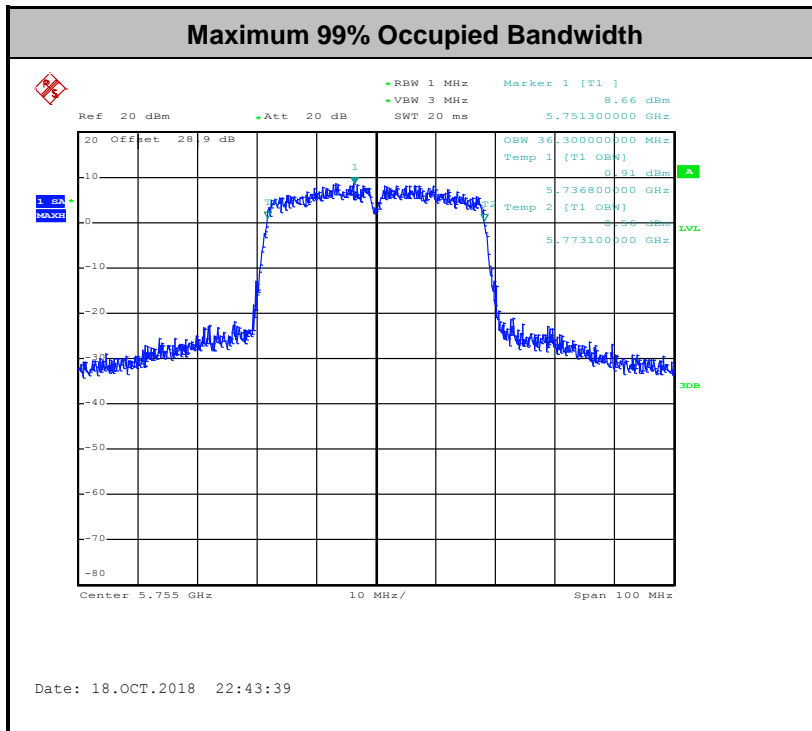
##### 3.1.4 Test Setup



##### 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.

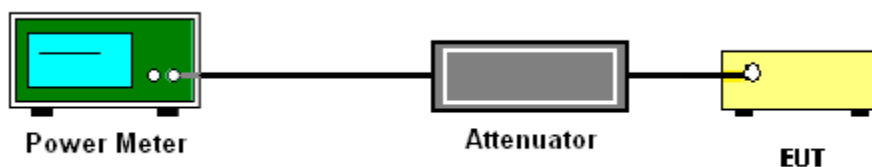
### 3.2.3 Test Procedures

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.

### 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.





### 3.4 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.

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

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 ≥ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

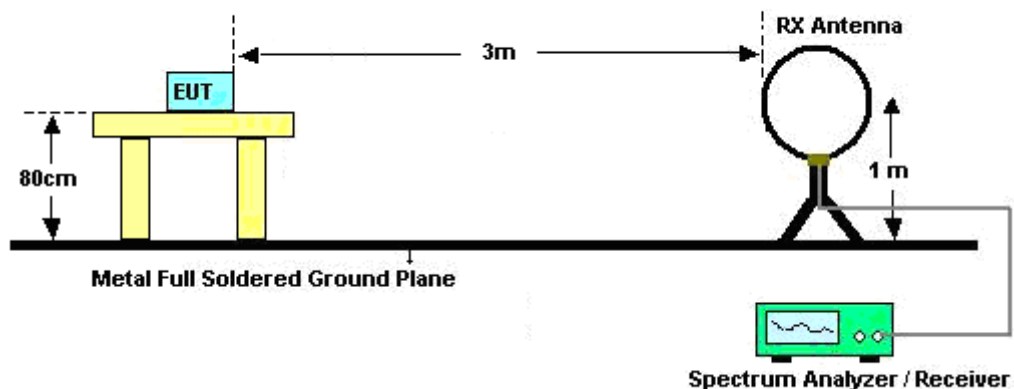
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

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

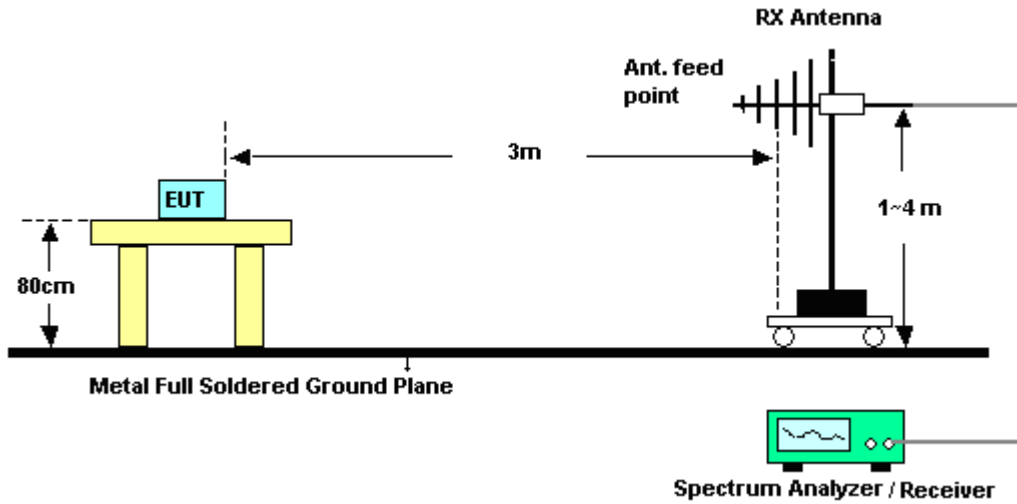
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

### 3.4.4 Test Setup

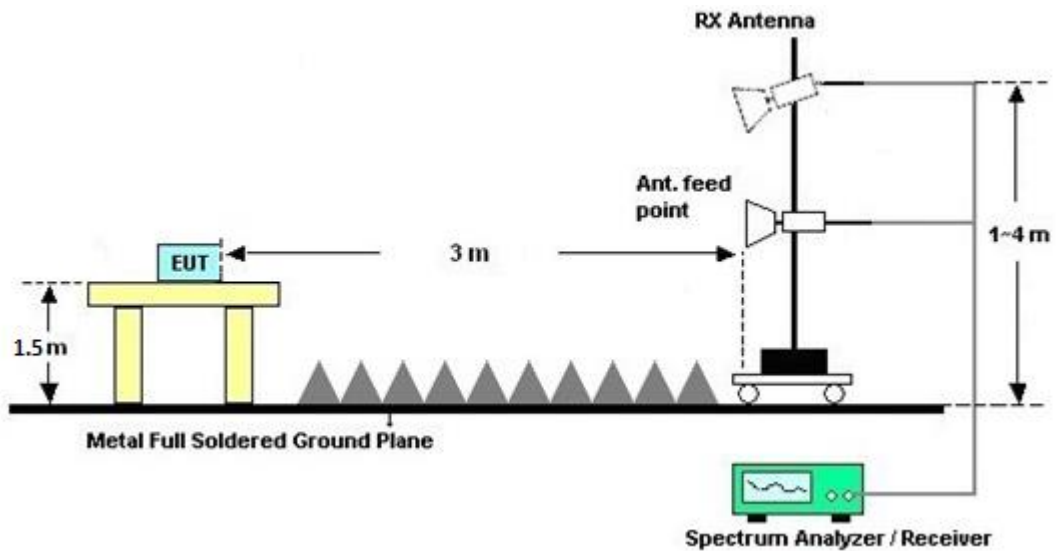
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, 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.

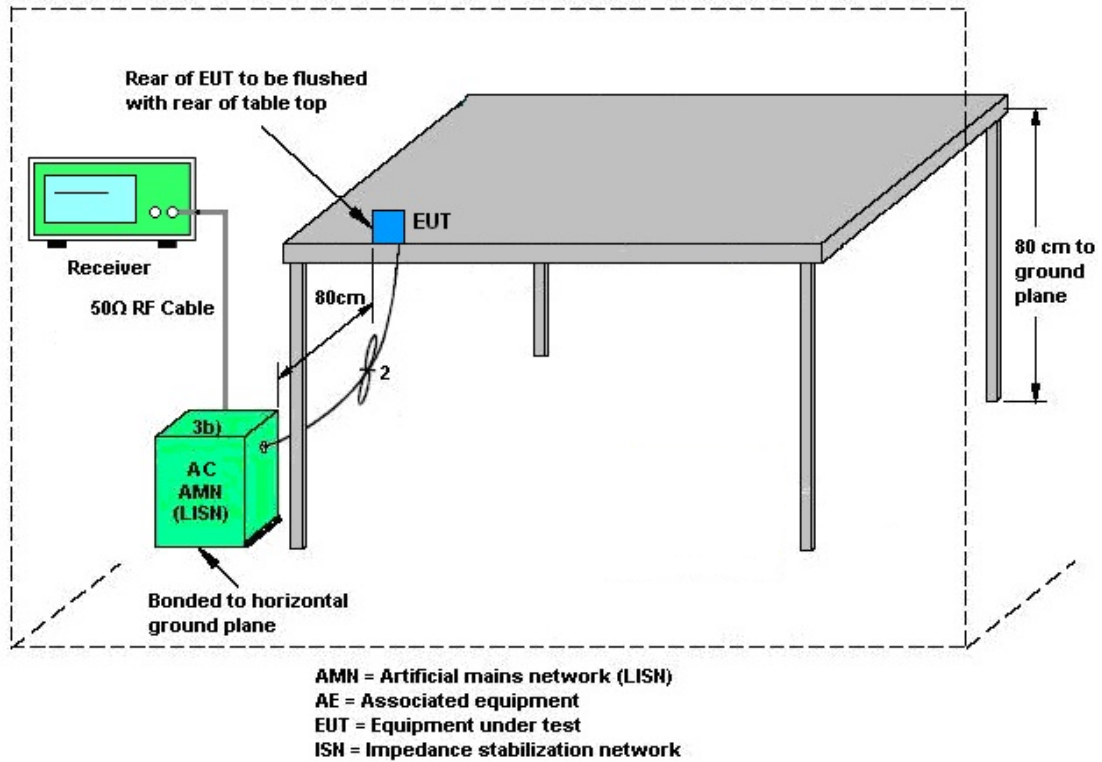
#### 3.5.2 Measuring Instruments

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**

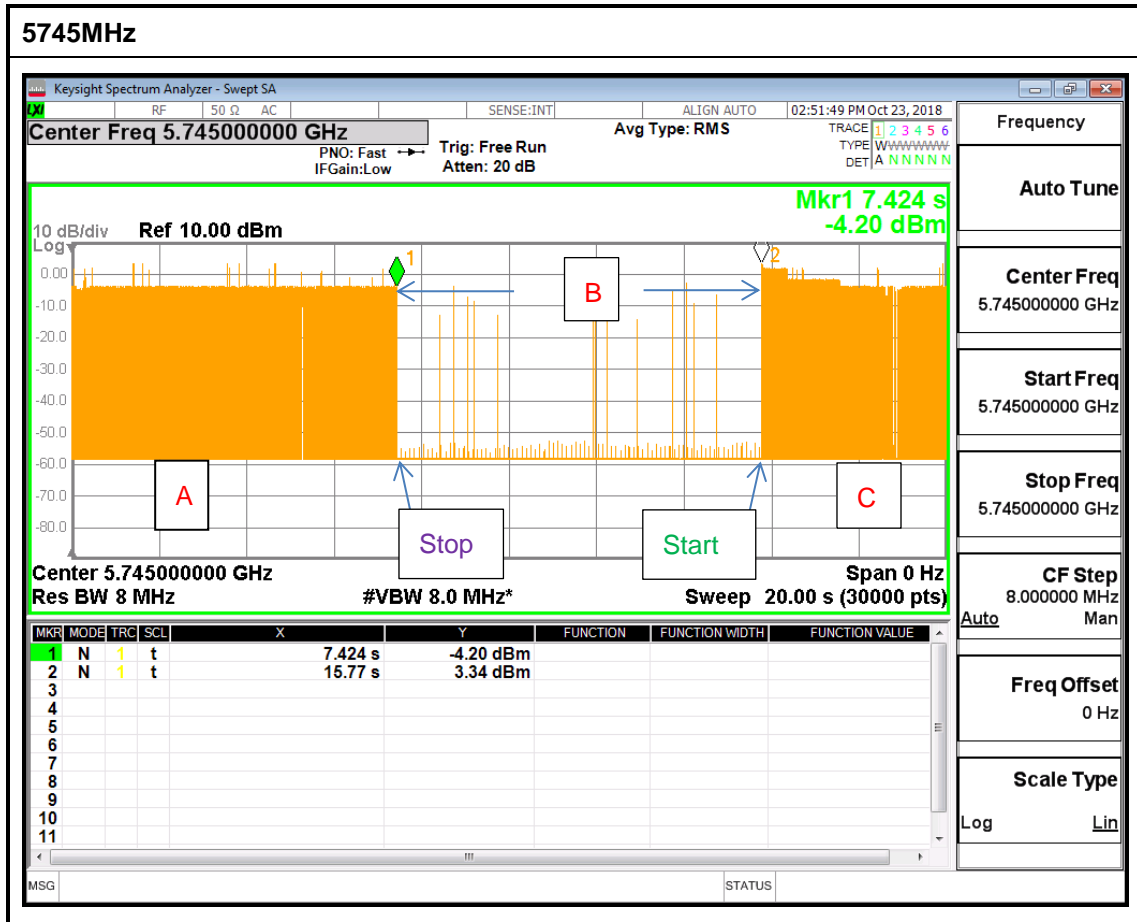
EUT is verified this characteristic during the function check of normal sample associated with an access point:

- A. Information start: make EUT supply information to the access point.
- B. Information stop: stop supplying information to the access point.

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving.

- C. Information start: make EUT supply information to the access point again.

The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.



**Note:** The control / signalling information during the period B is precluded.





## **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**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1132003	N/A	Aug. 16, 2018	Sep. 28, 2018~ Oct. 18, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1126017	300MHz~40GHz	Aug. 16, 2018	Sep. 28, 2018~ Oct. 18, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	Sep. 28, 2018~ Oct. 18, 2018	Nov. 12, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Sep. 28, 2018~ Oct. 18, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 21, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Dec. 08, 2017	Oct. 21, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Oct. 21, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 21, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Oct. 21, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Oct. 21, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Oct. 04, 2018~ Oct. 18, 2018	Nov. 22, 2018	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Jan. 16, 2018	Oct. 04, 2018~ Oct. 18, 2018	Jan. 15, 2019	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL6111D&008 02N1D01N-06	47020&06	30MHz to 1GHz	Nov. 20, 2017	Oct. 04, 2018~ Oct. 18, 2018	Nov. 19, 2018	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY57290111	3Hz~26.5GHz	Nov. 02, 2017	Oct. 04, 2018~ Oct. 18, 2018	Nov. 01, 2018	Radiation (03CH16-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Mar. 27, 2018	Oct. 04, 2018~ Oct. 18, 2018	Mar. 26, 2019	Radiation (03CH16-HY)
Preamplifier	Jet-Power	JPA0118-55-30 3	17100018000 54001	1GHz~18GHz	Apr. 16, 2018	Oct. 04, 2018~ Oct. 18, 2018	Apr. 15, 2019	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz ~ 26.5GHz	Dec. 05, 2017	Oct. 04, 2018~ Oct. 18, 2018	Dec. 04, 2018	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1522	1G~18GHz	May 10, 2018	Oct. 04, 2018~ Oct. 18, 2018	May 09, 2019	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz-30MHz	Mar. 14, 2018	Oct. 04, 2018~ Oct. 18, 2018	Mar. 13, 2019	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Nov. 27, 2017	Oct. 04, 2018~ Oct. 18, 2018	Nov. 26, 2018	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 05, 2017	Oct. 04, 2018~ Oct. 18, 2018	Dec. 04, 2018	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Oct. 04, 2018~ Oct. 18, 2018	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Oct. 04, 2018~ Oct. 18, 2018	N/A	Radiation (03CH16-HY)
Software	AUDIX	E3 6.2009-8-24	RK001136	N/A	N/A	Oct. 04, 2018~ Oct. 18, 2018	N/A	Radiation (03CH16-HY)
Filter	Woken	WHKX8-5872.5 -6750-18000-4 0ST	SN3	6.75GHz High Pass	Sep. 18, 2018	Oct. 04, 2018~ Oct. 18, 2018	Sep. 17, 2019	Radiation (03CH16-HY)
Filter	Wainwright	WHKX12-2700- 3000-18000-60 SS	SN2	3G High Pass	Sep. 18, 2018	Oct. 04, 2018~ Oct. 18, 2018	Sep. 17, 2019	Radiation (03CH16-HY)
Spectrum Analyzer	Keysight	N9010A	MY57120184	10Hz~7GHz	Nov. 08, 2017	Oct. 23, 2018	Nov. 07, 2018	DFS (DFS02-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.2
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.9
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.8
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.9
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**Appendix A. Test Result of Conducted Test Items**

Test Engineer:	Shiming Liu/AnAn Wu	Temperature:	21~25	°C
Test Date:	2018/9/28~2018/10/18	Relative Humidity:	51~54	%

**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		
11a	6Mbps	1	149	5745	16.65	-	21.00	-	16.31	-	0.5	Pass
11a	6Mbps	1	157	5785	16.70	-	21.40	-	16.30	-	0.5	Pass
11a	6Mbps	1	165	5825	16.60	-	21.00	-	16.30	-	0.5	Pass
HT20	MCS0	1	149	5745	17.65	-	21.40	-	17.55	-	0.5	Pass
HT20	MCS0	1	157	5785	17.70	-	21.40	-	17.60	-	0.5	Pass
HT20	MCS0	1	165	5825	17.70	-	21.40	-	17.55	-	0.5	Pass
HT40	MCS0	1	151	5755	36.30	-	41.04	-	36.18	-	0.5	Pass
HT40	MCS0	1	159	5795	36.20	-	40.86	-	36.27	-	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
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	0.00	-	14.45	-		30.00	-	0.30	-	Pass
11a	6Mbps	1	157	5785	0.00	-	14.40	-		30.00	-	0.30	-	Pass
11a	6Mbps	1	165	5825	0.00	-	14.36	-		30.00	-	0.30	-	Pass
HT20	MCS0	1	149	5745	0.00	-	14.48	-		30.00	-	0.30	-	Pass
HT20	MCS0	1	157	5785	0.00	-	14.35	-		30.00	-	0.30	-	Pass
HT20	MCS0	1	165	5825	0.00	-	14.38	-		30.00	-	0.30	-	Pass
HT40	MCS0	1	151	5755	0.00	-	14.48	-		30.00	-	0.30	-	Pass
HT40	MCS0	1	159	5795	0.00	-	14.45	-		30.00	-	0.30	-	Pass

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

Band IV																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	0.00	-	2.22	-	1.32	-		30.00	-	0.30	-	Pass
11a	6Mbps	1	157	5785	0.00	-	2.22	-	1.45	-		30.00	-	0.30	-	Pass
11a	6Mbps	1	165	5825	0.00	-	2.22	-	1.45	-		30.00	-	0.30	-	Pass
HT20	MCS0	1	149	5745	0.00	-	2.22	-	1.26	-		30.00	-	0.30	-	Pass
HT20	MCS0	1	157	5785	0.00	-	2.22	-	1.46	-		30.00	-	0.30	-	Pass
HT20	MCS0	1	165	5825	0.00	-	2.22	-	1.40	-		30.00	-	0.30	-	Pass
HT40	MCS0	1	151	5755	0.00	-	2.22	-	-2.13	-		30.00	-	0.30	-	Pass
HT40	MCS0	1	159	5795	0.00	-	2.22	-	-2.19	-		30.00	-	0.30	-	Pass

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



## Appendix B. AC Conducted Emission Test Results

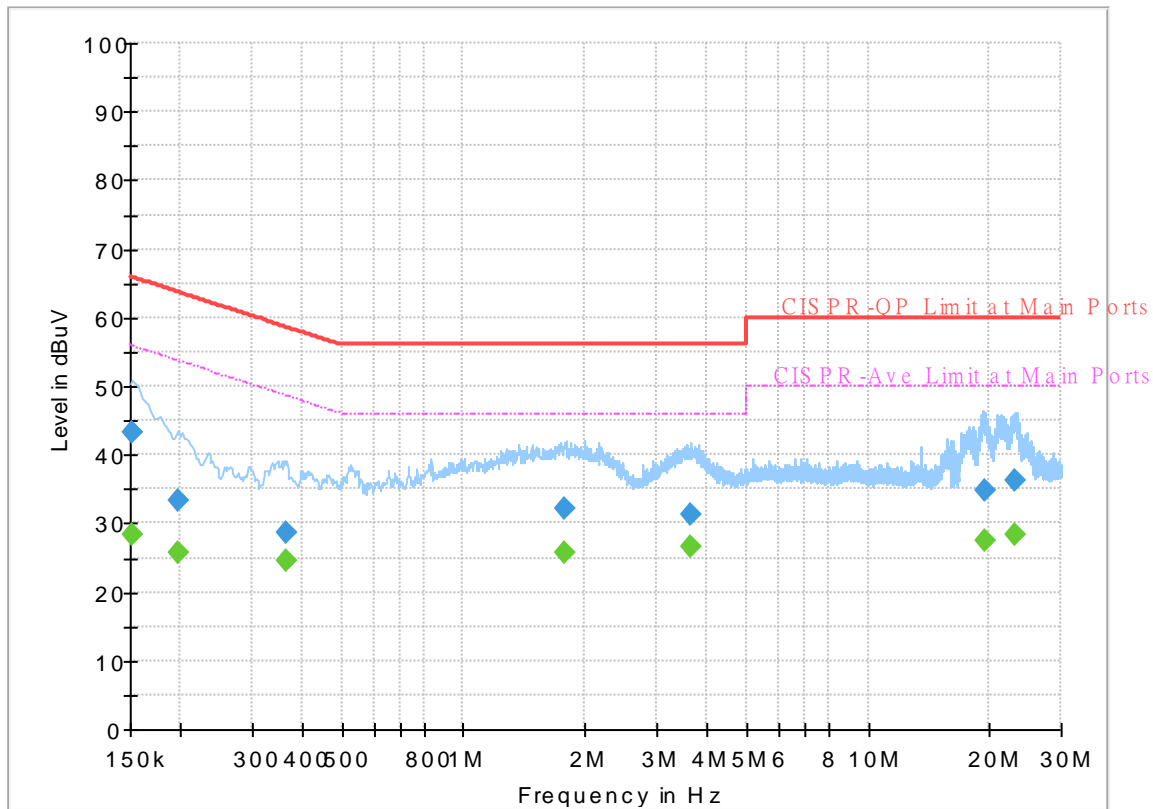
Test Engineer :	Rick Lin	Temperature :	21~24°C
		Relative Humidity :	51~53%



# EUT Information

Report NO : 872106-01  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Line

Full Spectrum



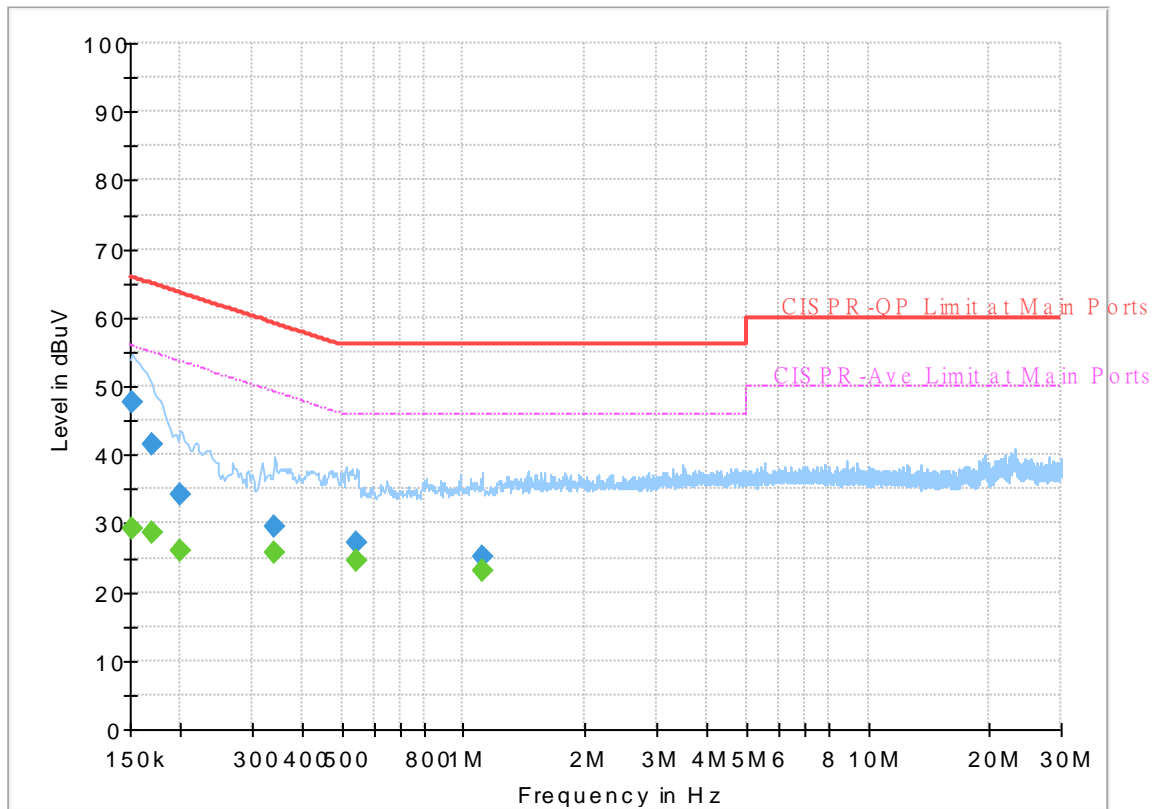
## Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	28.40	55.88	27.48	L1	OFF	19.5
0.152250	43.24	---	65.88	22.64	L1	OFF	19.5
0.197250	---	25.69	53.73	28.04	L1	OFF	19.5
0.197250	33.25	---	63.73	30.48	L1	OFF	19.5
0.366000	---	24.55	48.59	24.04	L1	OFF	19.5
0.366000	28.72	---	58.59	29.87	L1	OFF	19.5
1.772250	---	25.69	46.00	20.31	L1	OFF	19.6
1.772250	32.14	---	56.00	23.86	L1	OFF	19.6
3.637500	---	26.46	46.00	19.54	L1	OFF	19.7
3.637500	31.16	---	56.00	24.84	L1	OFF	19.7
19.554000	---	27.54	50.00	22.46	L1	OFF	20.2
19.554000	34.76	---	60.00	25.24	L1	OFF	20.2
23.082000	---	28.42	50.00	21.58	L1	OFF	20.3
23.082000	36.18	---	60.00	23.82	L1	OFF	20.3

## EUT Information

Report NO : 872106-01  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Neutral

Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	29.30	55.88	26.58	N	OFF	19.5
0.152250	47.58	---	65.88	18.30	N	OFF	19.5
0.170250	---	28.74	54.95	26.21	N	OFF	19.5
0.170250	41.42	---	64.95	23.53	N	OFF	19.5
0.199500	---	26.12	53.63	27.51	N	OFF	19.5
0.199500	34.10	---	63.63	29.53	N	OFF	19.5
0.341250	---	25.70	49.17	23.47	N	OFF	19.5
0.341250	29.61	---	59.17	29.56	N	OFF	19.5
0.546000	---	24.43	46.00	21.57	N	OFF	19.5
0.546000	27.23	---	56.00	28.77	N	OFF	19.5
1.115250	---	23.16	46.00	22.84	N	OFF	19.6
1.115250	25.05	---	56.00	30.95	N	OFF	19.6



### Appendix C. Radiated Spurious Emission

Test Engineer :	Yun Huang, J.C. Liang, CR Liao, and Andy Yang	Temperature :	22~25°C
		Relative Humidity :	50~54%

**Band 4 - 5725~5850MHz**

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11a CH 149 5745MHz		5606.8	55.07	-13.13	68.2	38.99	31.89	13.68	29.49	100	238	P	H
		5698	56.54	-47.19	103.73	40.09	32.06	13.92	29.53	100	238	P	H
		5717.6	58.63	-51.5	110.13	42.1	32.09	13.98	29.54	100	238	P	H
		5724.8	65.84	-55.9	121.74	49.28	32.1	14	29.54	100	238	P	H
	*	5745	107.25	-	-	90.62	32.14	14.05	29.56	100	238	P	H
	*	5745	100.12	-	-	83.49	32.14	14.05	29.56	100	238	A	H
		5637.4	55.34	-12.86	68.2	39.14	31.95	13.76	29.51	100	127	P	V
		5699.4	56.23	-48.53	104.76	39.77	32.06	13.93	29.53	100	127	P	V
		5718.6	58.28	-52.13	110.41	41.75	32.09	13.98	29.54	100	127	P	V
		5724.6	67.56	-53.73	121.29	51	32.1	14	29.54	100	127	P	V
	*	5745	109.35	-	-	92.72	32.14	14.05	29.56	100	127	P	V
	*	5745	101.99	-	-	85.36	32.14	14.05	29.56	100	127	A	V



WIFI	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 157 5785MHz		5623.4	55.19	-13.01	68.2	39.04	31.92	13.72	29.49	100	248	P	H
		5689.6	56.14	-41.39	97.53	39.73	32.04	13.9	29.53	100	248	P	H
		5718.6	56.33	-54.08	110.41	39.8	32.09	13.98	29.54	100	248	P	H
		5721.8	55.95	-58.95	114.9	39.4	32.1	13.99	29.54	100	248	P	H
	*	5785	108.46	-	-	91.67	32.21	14.16	29.58	100	248	P	H
	*	5785	101.43	-	-	84.64	32.21	14.16	29.58	100	248	A	H
		5852	56.74	-60.9	117.64	39.98	32.33	14.03	29.6	100	248	P	H
		5857	56.86	-53.38	110.24	40.11	32.34	14.01	29.6	100	248	P	H
		5891.6	55.17	-37.71	92.88	38.51	32.4	13.89	29.63	100	248	P	H
		5937	56.45	-11.75	68.2	39.88	32.49	13.74	29.66	100	248	P	H
		5645.2	55.59	-12.61	68.2	39.36	31.96	13.78	29.51	133	141	P	V
		5689.8	56.53	-41.15	97.68	40.12	32.04	13.9	29.53	133	141	P	V
		5718.2	58.37	-51.93	110.3	41.84	32.09	13.98	29.54	133	141	P	V
		5722	57.55	-57.81	115.36	41	32.1	13.99	29.54	133	141	P	V
	*	5785	111.11	-	-	94.32	32.21	14.16	29.58	133	141	P	V
	*	5785	104.05	-	-	87.26	32.21	14.16	29.58	133	141	A	V
		5850.8	57.13	-63.25	120.38	40.37	32.33	14.03	29.6	133	141	P	V
		5864.4	56.76	-51.41	108.17	40.04	32.36	13.98	29.62	133	141	P	V
	5876.2	55.74	-48.57	104.31	39.04	32.38	13.94	29.62	133	141	P	V	
	5940	54.8	-13.4	68.2	38.24	32.49	13.73	29.66	133	141	P	V	



WIFI	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 165 5825MHz	*	5825	108.75	-	-	91.94	32.28	14.12	29.59	100	249	P	H
	*	5825	101.39	-	-	84.58	32.28	14.12	29.59	100	249	A	H
		5852	61.06	-56.58	117.64	44.3	32.33	14.03	29.6	100	249	P	H
		5858.4	56.91	-52.94	109.85	40.18	32.35	14	29.62	100	249	P	H
		5883.6	56.09	-42.72	98.81	39.41	32.39	13.92	29.63	100	249	P	H
		5935.2	55.41	-12.79	68.2	38.84	32.48	13.75	29.66	100	249	P	H
	*	5825	110.97	-	-	94.16	32.28	14.12	29.59	133	142	P	V
	*	5825	103.64	-	-	86.83	32.28	14.12	29.59	133	142	A	V
		5850	62.71	-59.49	122.2	45.95	32.33	14.03	29.6	133	142	P	V
		5860	60.04	-49.36	109.4	43.31	32.35	14	29.62	133	142	P	V
		5884.4	58.38	-39.84	98.22	41.7	32.39	13.92	29.63	133	142	P	V
		5925.2	56.14	-12.06	68.2	39.53	32.47	13.78	29.64	133	142	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Band 4 5725~5850MHz**

**WIFI 802.11a (Harmonic @ 3m)**

WIFI	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	46.85	-27.15	74	49.97	39.91	18.37	61.4	100	0	P	H
		17235	47.31	-20.89	68.2	41.37	40.46	23.27	57.79	100	0	P	H
		11490	46.88	-27.12	74	50	39.91	18.37	61.4	100	0	P	V
		17235	47.26	-20.94	68.2	41.32	40.46	23.27	57.79	100	0	P	V
802.11a CH 157 5785MHz		11570	46.42	-27.58	74	49.75	39.76	18.44	61.53	100	0	P	H
		17355	46.71	-21.49	68.2	39.97	40.79	23.43	57.48	100	0	P	H
		11570	46.56	-27.44	74	49.89	39.76	18.44	61.53	100	0	P	V
		17355	46.89	-21.31	68.2	40.15	40.79	23.43	57.48	100	0	P	V
802.11a CH 165 5825MHz		11650	46.9	-27.1	74	50.47	39.6	18.5	61.67	100	0	P	H
		17475	47.61	-20.59	68.2	40.05	41.13	23.59	57.16	100	0	P	H
		11650	45.95	-28.05	74	49.52	39.6	18.5	61.67	100	0	P	V
		17475	47.37	-20.83	68.2	39.81	41.13	23.59	57.16	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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

Table with 14 columns: WIFI, 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). Rows include frequencies from 5640.6 to 5745 MHz with various measurement values.



WIFI	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 157 5785MHz		5604.6	54.81	-13.39	68.2	38.74	31.89	13.67	29.49	100	249	P	H
		5671.8	54.44	-29.93	84.37	38.1	32.01	13.85	29.52	100	249	P	H
		5708.4	55.84	-51.71	107.55	39.35	32.08	13.95	29.54	100	249	P	H
		5725	55.2	-67	122.2	38.64	32.1	14	29.54	100	249	P	H
	*	5785	108.51	-	-	91.72	32.21	14.16	29.58	100	249	P	H
	*	5785	101.22	-	-	84.43	32.21	14.16	29.58	100	249	A	H
		5854	55.79	-57.29	113.08	39.03	32.34	14.02	29.6	100	249	P	H
		5859	55.6	-54.08	109.68	38.87	32.35	14	29.62	100	249	P	H
		5885.6	55.43	-41.9	97.33	38.76	32.39	13.91	29.63	100	249	P	H
		5946	54.32	-13.88	68.2	37.77	32.5	13.71	29.66	100	249	P	H
		5634	54.98	-13.22	68.2	38.8	31.94	13.75	29.51	127	141	P	V
		5693.6	55.8	-44.68	100.48	39.37	32.05	13.91	29.53	127	141	P	V
		5719.8	57.65	-53.09	110.74	41.11	32.1	13.98	29.54	127	141	P	V
		5720.4	57.03	-54.68	111.71	40.48	32.1	13.99	29.54	127	141	P	V
	*	5785	110.46	-	-	93.67	32.21	14.16	29.58	127	141	P	V
	*	5785	103.34	-	-	86.55	32.21	14.16	29.58	127	141	A	V
		5853.6	55.74	-58.25	113.99	38.98	32.34	14.02	29.6	127	141	P	V
		5865	57.13	-50.87	108	40.41	32.36	13.98	29.62	127	141	P	V
	5876	55.43	-49.03	104.46	38.72	32.38	13.95	29.62	127	141	P	V	
	5926	54.5	-13.7	68.2	37.89	32.47	13.78	29.64	127	141	P	V	





WIFI	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	108.84	-	-	92.03	32.28	14.12	29.59	100	249	P	H
	*	5825	100.94	-	-	84.13	32.28	14.12	29.59	100	249	A	H
		5850	60.48	-61.72	122.2	43.72	32.33	14.03	29.6	100	249	P	H
		5855	59.24	-51.56	110.8	42.48	32.34	14.02	29.6	100	249	P	H
		5879.8	56.79	-44.84	101.63	40.1	32.38	13.93	29.62	100	249	P	H
		5927.8	55.21	-12.99	68.2	38.61	32.47	13.77	29.64	100	249	P	H
	*	5825	110.64	-	-	93.83	32.28	14.12	29.59	138	142	P	V
	*	5825	103.29	-	-	86.48	32.28	14.12	29.59	138	142	A	V
		5850.2	62.2	-59.54	121.74	45.44	32.33	14.03	29.6	138	142	P	V
		5855.2	58.94	-51.8	110.74	42.18	32.34	14.02	29.6	138	142	P	V
		5875.4	58.29	-46.61	104.9	41.58	32.38	13.95	29.62	138	142	P	V
		5930.8	55.09	-13.11	68.2	38.49	32.48	13.76	29.64	138	142	P	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 HT20 (Harmonic @ 3m)**

WIFI	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		11490	46.71	-27.29	74	49.83	39.91	18.37	61.4	100	0	P	H
HT20		17235	46.55	-21.65	68.2	40.61	40.46	23.27	57.79	100	0	P	H
CH 149		11490	47.07	-26.93	74	50.19	39.91	18.37	61.4	100	0	P	V
5745MHz		17235	45.28	-22.92	68.2	39.34	40.46	23.27	57.79	100	0	P	V
802.11n		11570	46.52	-27.48	74	49.85	39.76	18.44	61.53	100	0	P	H
HT20		17355	46.17	-22.03	68.2	39.43	40.79	23.43	57.48	100	0	P	H
CH 157		11570	47.04	-26.96	74	50.37	39.76	18.44	61.53	100	0	P	V
5785MHz		17355	44.47	-23.73	68.2	37.73	40.79	23.43	57.48	100	0	P	V
802.11n		11650	46.33	-27.67	74	49.9	39.6	18.5	61.67	100	0	P	H
HT20		17475	47	-21.2	68.2	39.44	41.13	23.59	57.16	100	0	P	H
CH 165		11650	45.35	-28.65	74	48.92	39.6	18.5	61.67	100	0	P	V
5825MHz		17475	47.19	-21.01	68.2	39.63	41.13	23.59	57.16	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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

WIFI	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		5607.8	55.35	-12.85	68.2	39.27	31.89	13.68	29.49	100	251	P	H
		5690.2	57.02	-40.95	97.97	40.61	32.04	13.9	29.53	100	251	P	H
		5719.4	68.36	-42.27	110.63	51.83	32.09	13.98	29.54	100	251	P	H
		5721.6	70.94	-43.51	114.45	54.39	32.1	13.99	29.54	100	251	P	H
	*	5755	105.33	-	-	88.65	32.16	14.08	29.56	100	251	P	H
	*	5755	97.54	-	-	80.86	32.16	14.08	29.56	100	251	A	H
		5854.2	54.9	-57.72	112.62	38.14	32.34	14.02	29.6	100	251	P	H
		5871.8	54.81	-51.28	106.09	38.1	32.37	13.96	29.62	100	251	P	H
		5880.8	56	-44.89	100.89	39.3	32.39	13.93	29.62	100	251	P	H
		5942.4	54.54	-13.66	68.2	37.98	32.5	13.72	29.66	100	251	P	H
		5646	56.41	-11.79	68.2	40.18	31.96	13.78	29.51	142	142	P	V
		5697.2	59.94	-43.2	103.14	43.5	32.05	13.92	29.53	142	142	P	V
		5718.2	70.7	-39.6	110.3	54.17	32.09	13.98	29.54	142	142	P	V
		5724.4	72.77	-48.06	120.83	56.21	32.1	14	29.54	142	142	P	V
	*	5755	106.94	-	-	90.26	32.16	14.08	29.56	142	142	P	V
	*	5755	99.3	-	-	82.62	32.16	14.08	29.56	142	142	A	V
		5850.4	55.37	-65.92	121.29	38.61	32.33	14.03	29.6	142	142	P	V
		5874.4	55.24	-50.13	105.37	38.54	32.37	13.95	29.62	142	142	P	V
		5877	55.89	-47.82	103.71	39.19	32.38	13.94	29.62	142	142	P	V
		5927	55.78	-12.42	68.2	39.18	32.47	13.77	29.64	142	142	P	V



WIFI	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 159 5795MHz		5634.8	55.07	-13.13	68.2	38.89	31.94	13.75	29.51	100	248	P	H
		5673	54.91	-30.35	85.26	38.56	32.01	13.86	29.52	100	248	P	H
		5719.2	56.28	-54.3	110.58	39.75	32.09	13.98	29.54	100	248	P	H
		5720.6	55.42	-56.75	112.17	38.87	32.1	13.99	29.54	100	248	P	H
	*	5795	105.35	-	-	88.51	32.23	14.19	29.58	100	248	P	H
	*	5795	97.74	-	-	80.9	32.23	14.19	29.58	100	248	A	H
		5851.6	59.1	-59.45	118.55	42.34	32.33	14.03	29.6	100	248	P	H
		5856.8	57.01	-53.29	110.3	40.26	32.34	14.01	29.6	100	248	P	H
		5911.2	54.77	-23.61	78.38	38.14	32.44	13.83	29.64	100	248	P	H
		5943.6	54.29	-13.91	68.2	37.73	32.5	13.72	29.66	100	248	P	H
		5649.6	56.46	-11.74	68.2	40.21	31.97	13.79	29.51	134	140	P	V
		5699.2	56.31	-48.3	104.61	39.85	32.06	13.93	29.53	134	140	P	V
		5718.4	57.36	-52.99	110.35	40.83	32.09	13.98	29.54	134	140	P	V
		5724.2	57.92	-62.46	120.38	41.36	32.1	14	29.54	134	140	P	V
	*	5795	107.36	-	-	90.52	32.23	14.19	29.58	134	140	P	V
	*	5795	99.74	-	-	82.9	32.23	14.19	29.58	134	140	A	V
		5853.2	59.28	-55.62	114.9	42.52	32.34	14.02	29.6	134	140	P	V
		5856.4	59.59	-50.82	110.41	42.84	32.34	14.01	29.6	134	140	P	V
	5888.2	55.57	-39.83	95.4	38.9	32.4	13.9	29.63	134	140	P	V	
	5932.6	55.16	-13.04	68.2	38.56	32.48	13.76	29.64	134	140	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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

Table with 14 columns: WIFI, 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). Rows include data for 802.11n HT40 CH 151 at 5755MHz and 802.11n HT40 CH 159 at 5795MHz.

- 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	Path	Preamp	Ant	Table	Peak	Pol.
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
5GHz 802.11n HT40 LF		32.16	22.08	-17.92	40	29.21	25.04	0.28	32.45	-	-	P	H
		97.23	23.09	-20.41	43.5	38.67	15.81	1.04	32.43	-	-	P	H
		150.42	25.03	-18.47	43.5	38.16	17.8	1.49	32.42	-	-	P	H
		741.7	28.99	-17.01	46	29.56	27.53	4.46	32.56	-	-	P	H
		839	30.74	-15.26	46	29.79	28.57	4.59	32.21	-	-	P	H
		954.5	32.19	-13.81	46	28.78	30.08	4.7	31.37	100	0	P	H
		38.91	24.3	-15.7	40	35.33	20.98	0.44	32.45	-	-	P	V
		43.5	24.12	-15.88	40	37.88	18.08	0.61	32.45	-	-	P	V
		51.33	22.23	-17.77	40	39	14.79	0.89	32.45	-	-	P	V
		659.1	27.81	-18.19	46	30.22	26.2	4.08	32.69	-	-	P	V
		832.7	30.71	-15.29	46	29.9	28.5	4.55	32.24	-	-	P	V
	950.3	32.24	-13.76	46	28.93	30.1	4.62	31.41	100	0	P	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>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



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		( 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 :	Yun Huang, J.C. Liang, CR Liao, and Andy Yang	Temperature :	22~25°C
		Relative Humidity :	50~54%

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

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11a CH149 5745MHz	
	Horizontal	Fundamental
<b>Peak</b>	<p>Site : 03CH16-HY            Condition : PEAK_BE(84)_16-24 3m HORN_1212 HORIZONTAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY            Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11a CH149 5745MHz	
	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
802.11a CH157 5785MHz		
	Horizontal	Fundamental
Peak		
Peak		Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
802.11a CH157 5785MHz		
	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11a CH165 5825MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11a CH165 5825MHz	
	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



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

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11n HT20 CH149 5745MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNIT) 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11n HT20 CH149 5745MHz	
	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>





WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
802.11n HT20 CH157 5785MHz		
Horizontal		Fundamental
Peak		
Peak		Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
802.11n HT20 CH157 5785MHz		
	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(LINII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11n HT20 CH165 5825MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



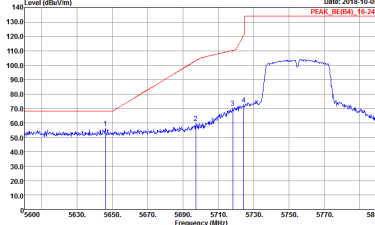
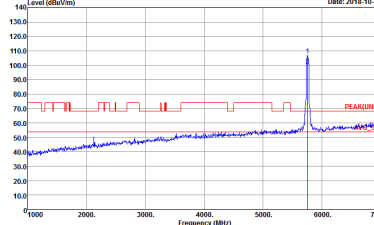
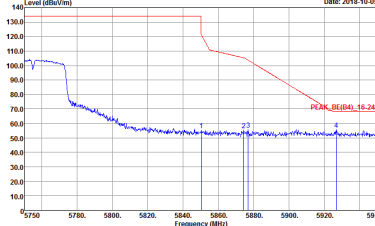
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
	802.11n HT20 CH165 5825MHz	
	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



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

Table with 2 columns (WIFI, Band 4 5725~5850MHz Band Edge @ 3m) and 2 rows (Peak, Peak). The table contains spectral plots for Horizontal and Fundamental signals, and a Left blank plot. Each plot shows Level (dBuV/m) vs Frequency (MHz) with specific peak annotations and site conditions.



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
802.11n HT40 CH151 5755MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	 <p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
802.11n HT40 CH159 5795MHz		
Horizontal		Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(LINII) 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
802.11n HT40 CH159 5795MHz		
	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH16-HY Condition : PEAK(UNII) 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m HORN_1212 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank





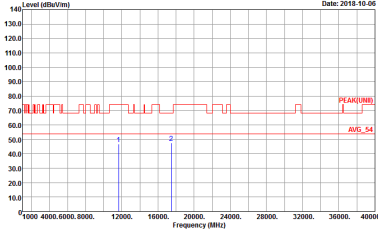
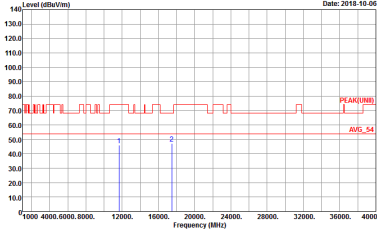
Band 4 - 5725~5850MHz  
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
	802.11a CH149 5745MHz	
	Horizontal	Vertical
Peak	<p>Site : 05CH16-HY Condition : PEAK(LINE1) 3m HORN_1212 HORIZONTAL Detector : Peak</p>	<p>Site : 05CH16-HY Condition : PEAK(LINE1) 3m HORN_1212 VERTICAL Detector : Peak</p>



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
	802.11a CH157 5785MHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 VERTICAL Detector : Peak</p>



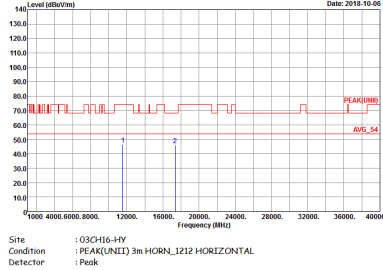
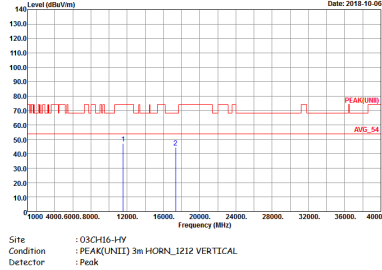
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
	802.11a CH165 5825MHz	
	Horizontal	Vertical
Peak	 <p data-bbox="432 667 683 703">Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 HORIZONTAL Detector : Peak</p>	 <p data-bbox="906 667 1141 703">Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 VERTICAL Detector : Peak</p>



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

Table with 2 columns: Horizontal and Vertical. Each column contains a spectral plot showing Level (dBu/Vm) vs Frequency (MHz) with a 'Peak' label on the left. The plots show a signal level around 70 dBu/Vm with a peak at approximately 12.5 MHz.



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
	802.11n HT20 CH157 5785MHz	
	Horizontal	Vertical
Peak	 <p>Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 VERTICAL Detector : Peak</p>



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
	802.11n HT20 CH165 5825MHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH16-HY Condition : PEAK(LINE1) 3m HORN_1212 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH16-HY Condition : PEAK(LINE1) 3m HORN_1212 VERTICAL Detector : Peak</p>



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

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
	802.11n HT40 CH151 5755MHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH16-HY Condition : PEAK(LINE1) 3m HORN_1212 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH16-HY Condition : PEAK(LINE1) 3m HORN_1212 VERTICAL Detector : Peak</p>

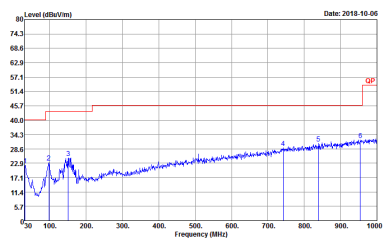
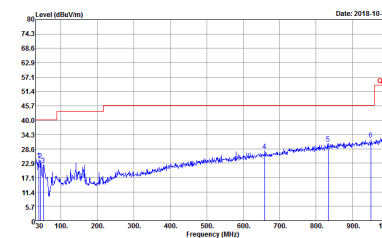


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
	802.11n HT40 CH159 5795MHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH16-HY Condition : PEAK(LINE) 3m HORN_1212 VERTICAL Detector : Peak</p>





Emission below 1GHz  
5GHz WIFI 802.11n HT40 (LF)

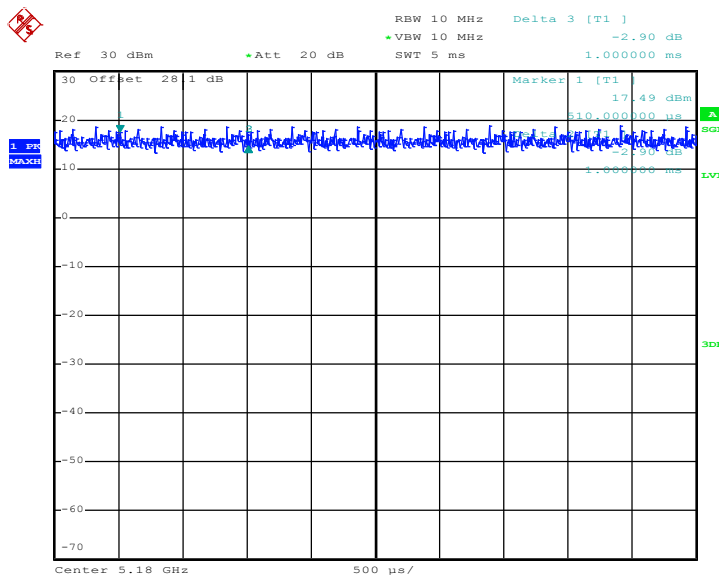
WIFI	5GHz 5725~5850MHz	
	802.11n HT40 LF	
	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH16-HY Condition : QP 3m BILDIG_47020406 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH16-HY Condition : QP 3m BILDIG_47020406 VERTICAL Detector : Peak</p>



## Appendix E. Duty Cycle Plots

Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor (dB)
802.11a	100.00	-	-	10Hz	0.00
5GHz 802.11n HT20	100.00	-	-	10Hz	0.00
5GHz 802.11n HT40	100.00	-	-	10Hz	0.00

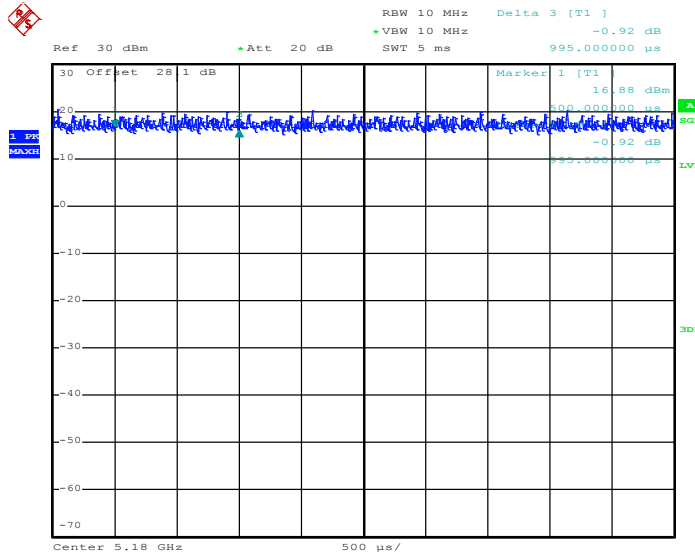
### 802.11a



Date: 28.SEP.2018 07:16:27

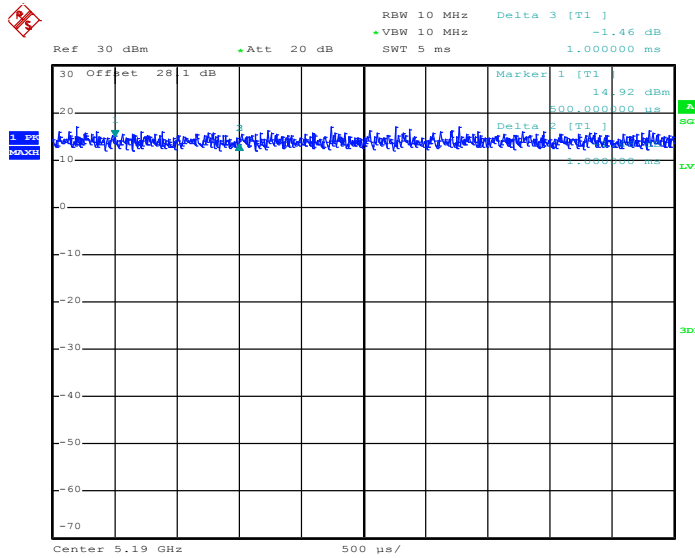


802.11n HT20



Date: 28.SEP.2018 07:24:13

802.11n HT40



Date: 28.SEP.2018 07:26:47

—THE END—