



# FCC RF Test Report

**APPLICANT** : Ubiquiti Networks, Inc.  
**EQUIPMENT** : Protect Cam  
**BRAND NAME** : ULABS  
**MODEL NAME** : AFi-VC  
**FCC ID** : SWX-AFVC  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

The product was received on Aug. 13, 2016 and testing was completed on Sep. 28, 2016. 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 test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



## **SPORTON INTERNATIONAL INC.**

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FCC ID : SWX-AFVC

Page Number : 1 of 32

Report Issued Date : May 16, 2017

Report Version : Rev. 02

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### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR681313-02B	Rev. 01	Initial issue of report	May 12, 2017
FR681313-02B	Rev. 02	Revising connection diagram of test system	May 16, 2017



### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.50 dB at 2390.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 4.10 dB at 0.486 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-



# 1 General Description

## 1.1 Applicant

Ubiquiti Networks, Inc.  
2580 Orchard Parkway San Jose, CA 95131

## 1.2 Manufacturer

Ubiquiti Networks, Inc.  
2580 Orchard Parkway San Jose, CA 95131

## 1.3 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n

Product Specification subjective to this standard	
Antenna Type	WLAN: Internal Antenna Bluetooth: Internal Antenna

## 1.4 Modification of EUT

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



### 1.5 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. 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, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	TH05-HY	CO05-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>	
	03CH11-HY	

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

### 1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ♦ 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)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

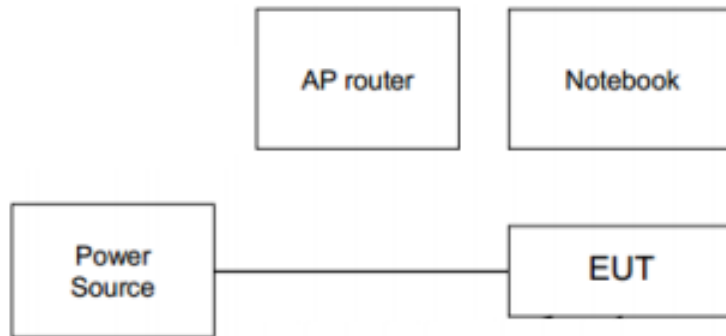
### 2.2 Test Mode

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

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WLAN Link + USB Cable (Charging from Adapter (Side)) + Recoding

## 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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 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

## 2.5 EUT Operation Test Setup

The RF test items, programmed RF utility, “Putty” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving 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 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB and 99% Bandwidth

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

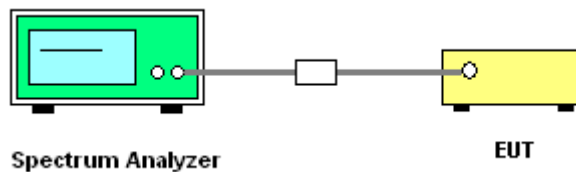
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

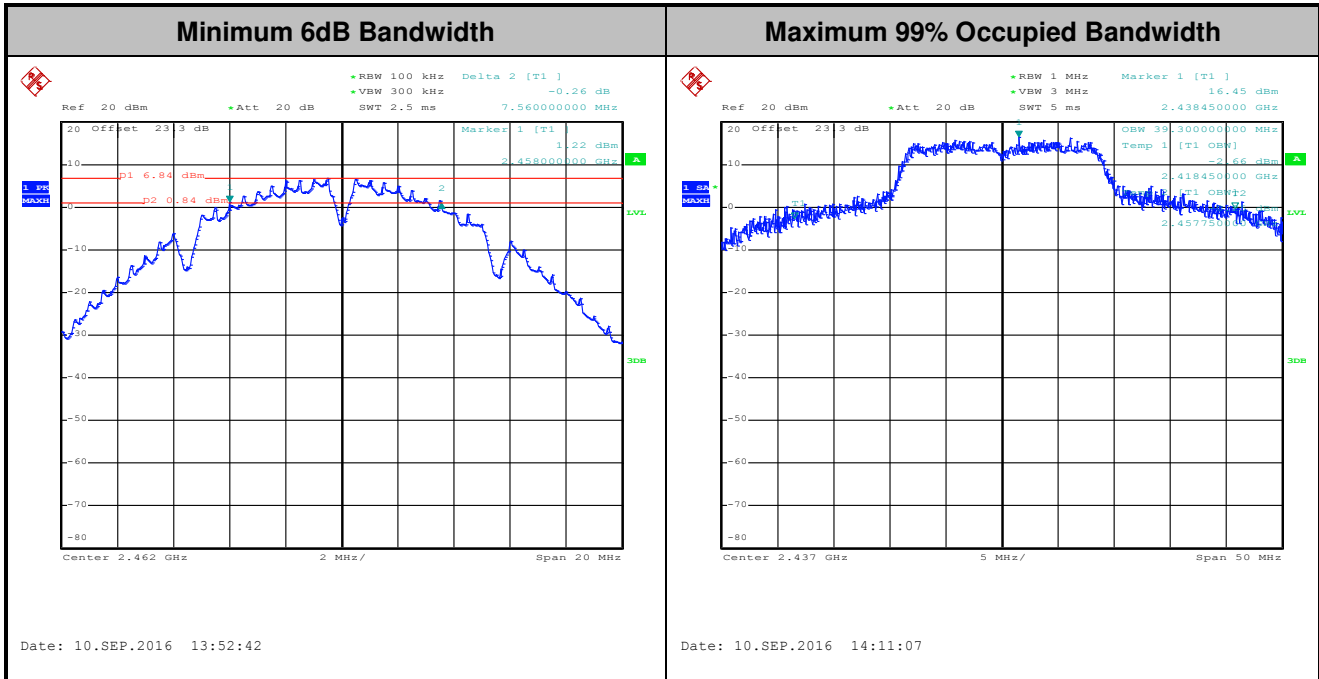
##### 3.1.4 Test Setup





### 3.1.5 Test Result of 6dB and 99% Occupied 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 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

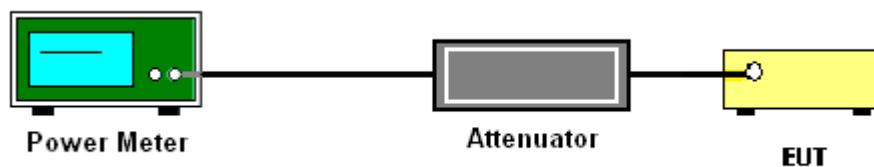
### 3.2.2 Measuring Instruments

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

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.2 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

### 3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

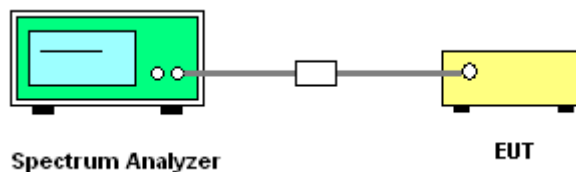
#### 3.3.2 Measuring Instruments

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

#### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

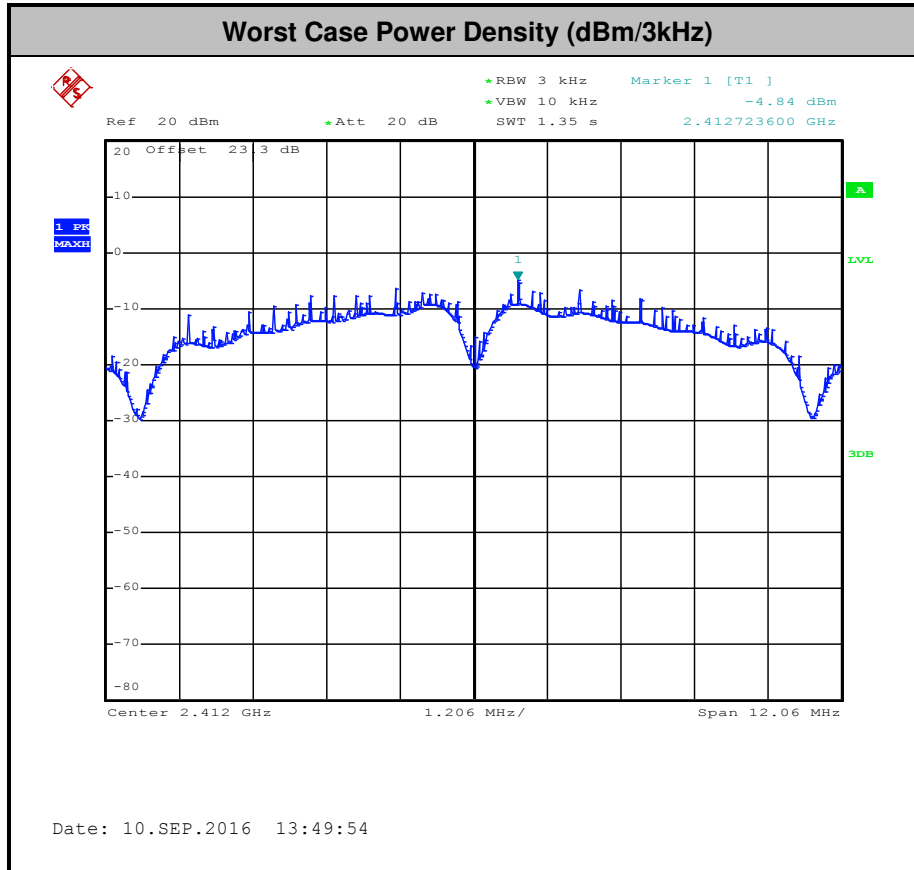
#### 3.3.4 Test Setup





### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

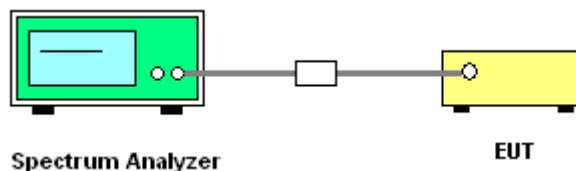
### 3.4.2 Measuring Instruments

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

### 3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 3.4.4 Test Setup



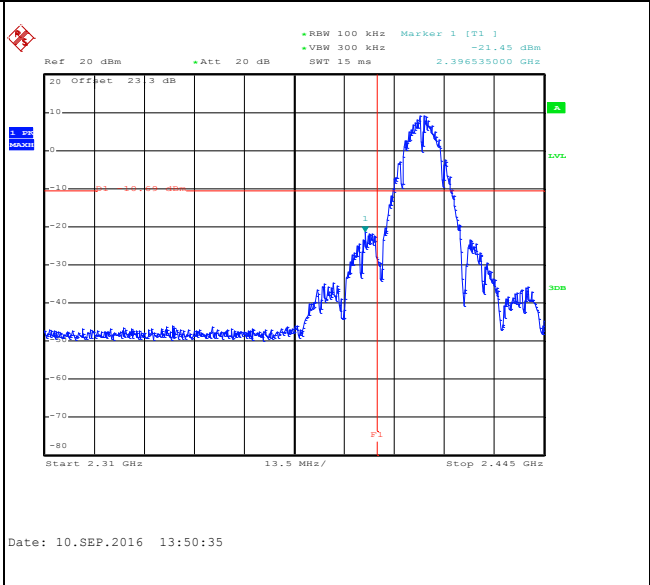
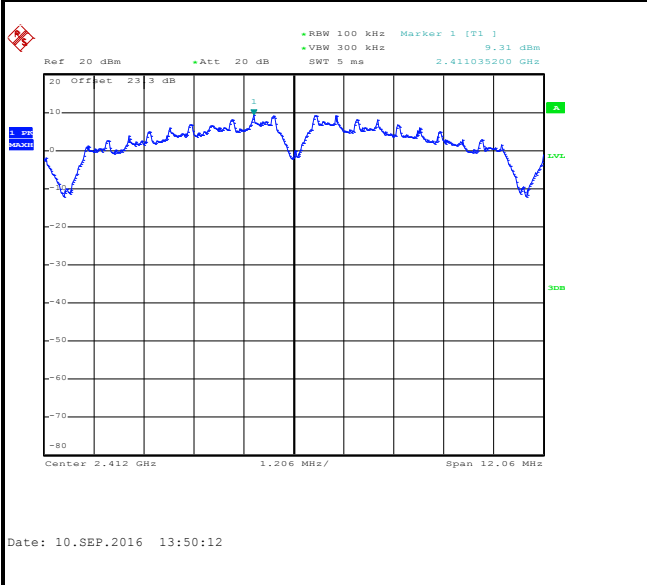


### 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

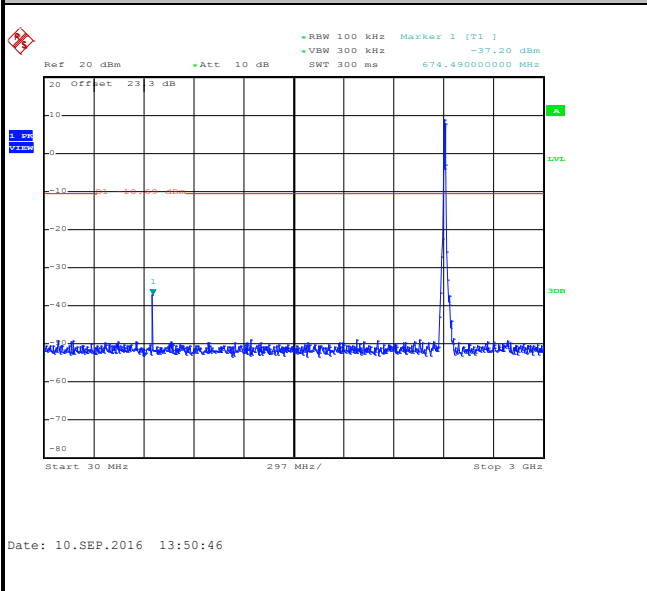
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Bill Kuo

#### WLAN 802.11b Channel 01

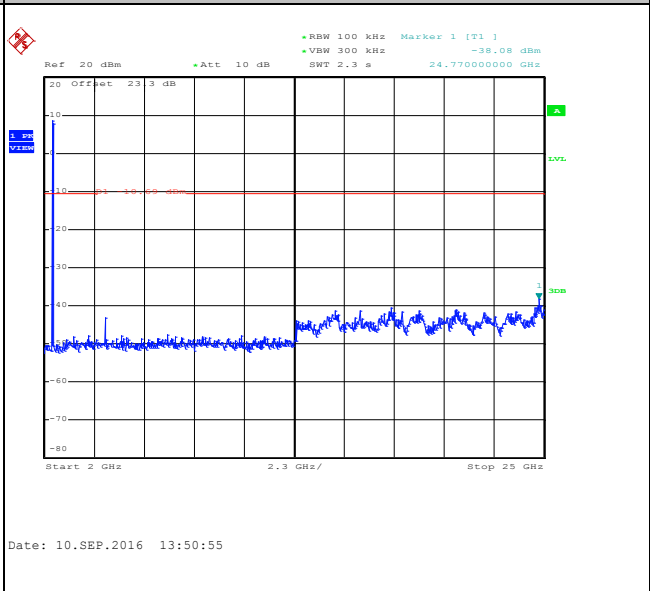
<b>100kHz PSD reference Level</b>	<b>Low Channel Plot</b>
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#### Spurious Emission 30MHz~3GHz



#### Spurious Emission 2GHz~25GHz

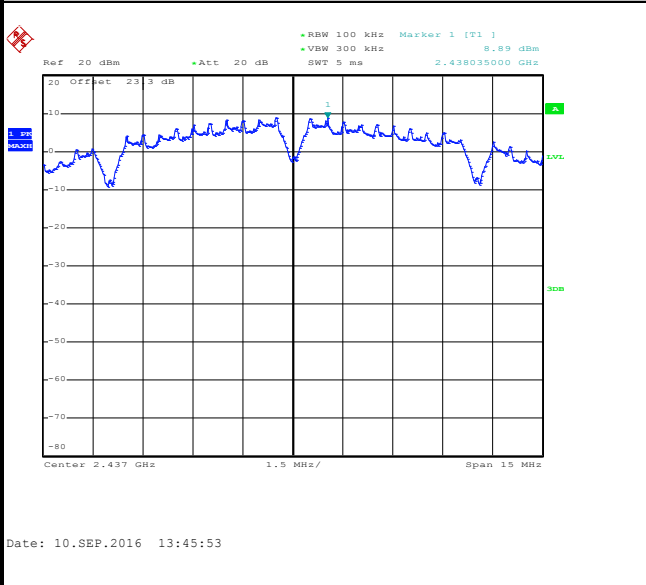




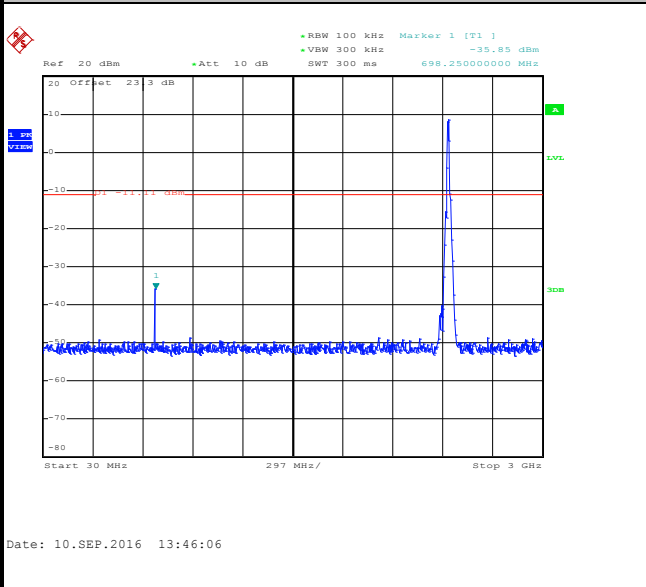
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Test Band :	2.4GHz Mid	Relative Humidity :	51~54
Test Channel :	06	Test Engineer :	Bill Kuo

WLAN 802.11b Channel 06

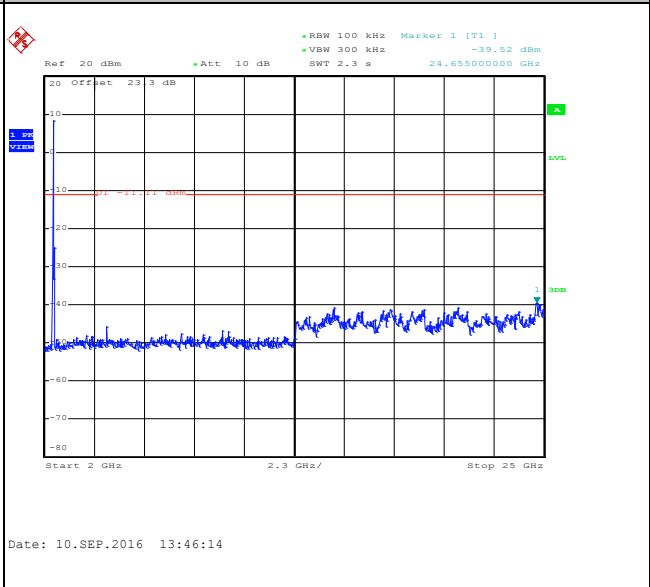
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz



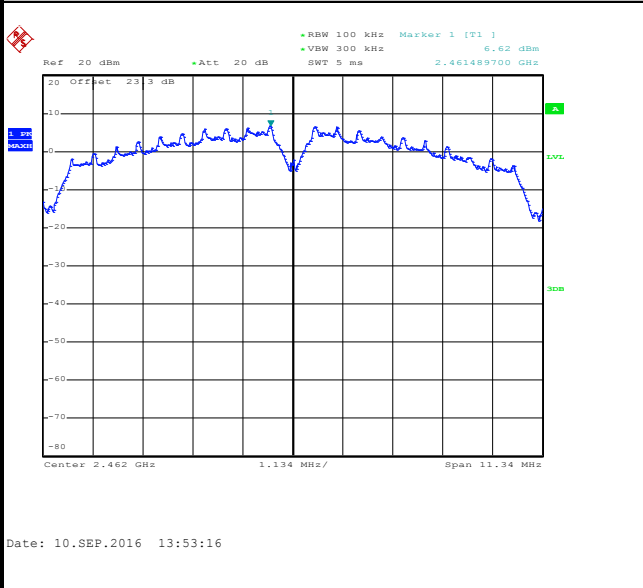




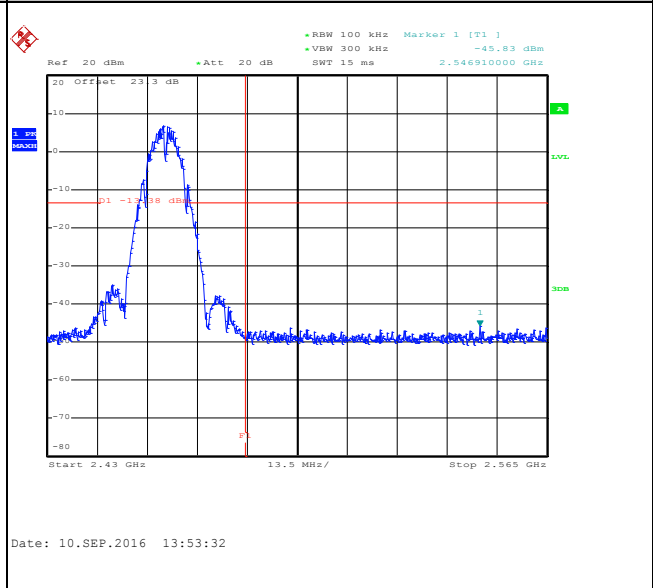
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Test Band :	2.4GHz High	Relative Humidity :	51~54
Test Channel :	11	Test Engineer :	Bill Kuo

WLAN 802.11b Channel 11

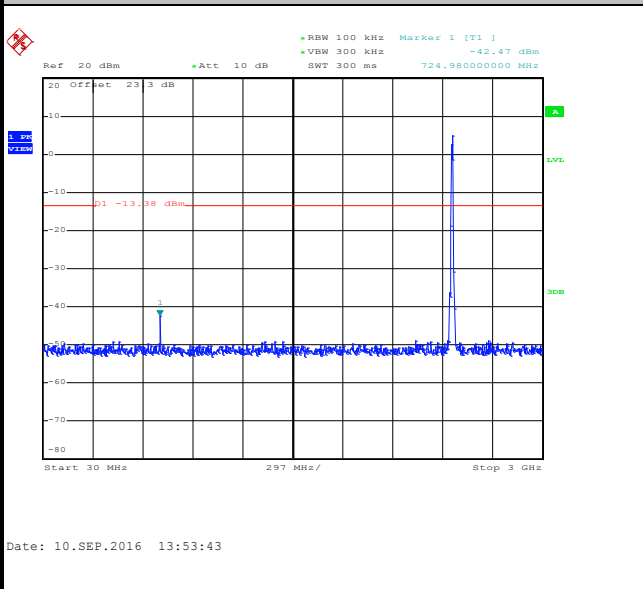
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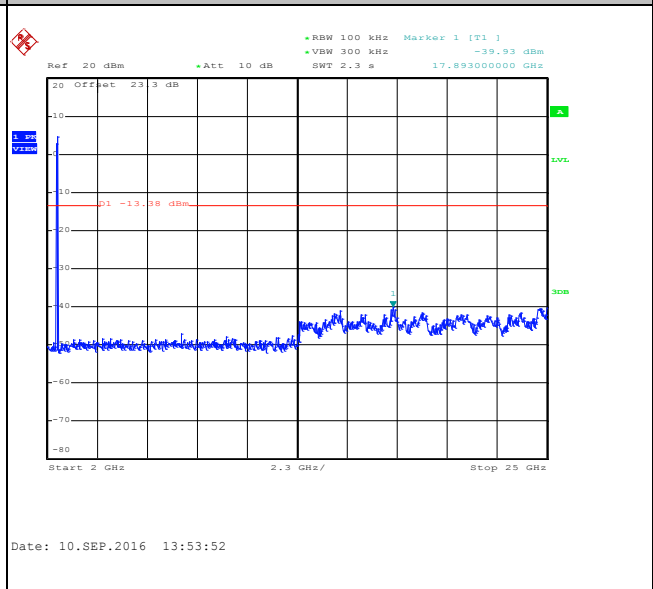
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

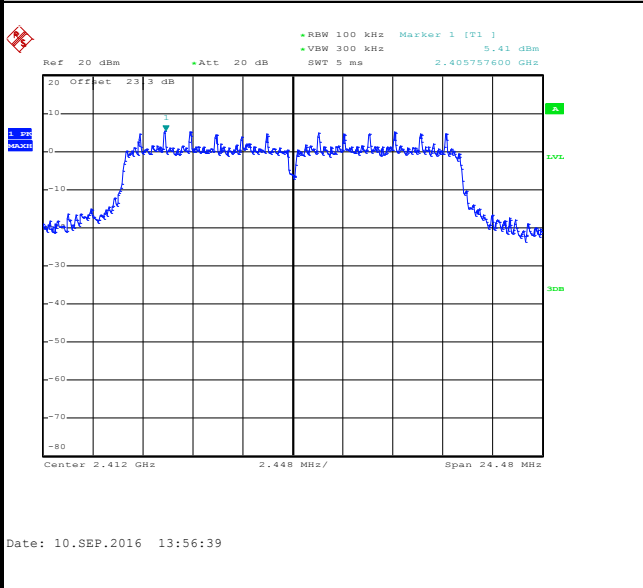




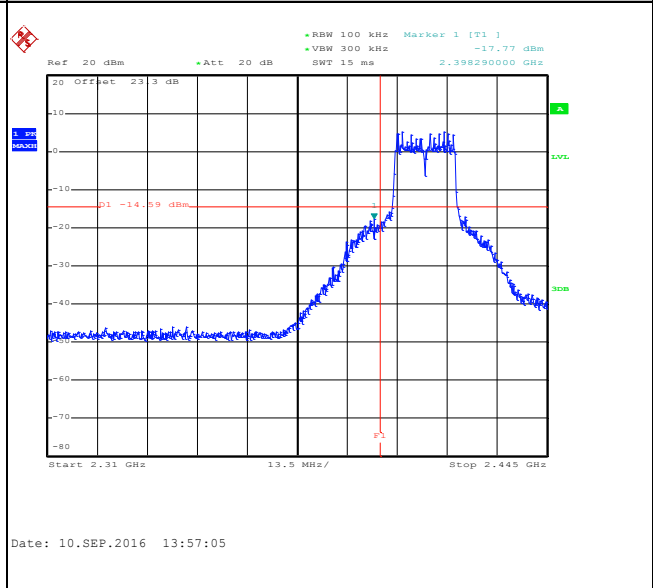
Test Mode :	802.11g	Temperature :	21~25
Test Band :	2.4GHz Low	Relative Humidity :	51~54
Test Channel :	01	Test Engineer :	Bill Kuo

WLAN 802.11g Channel 01

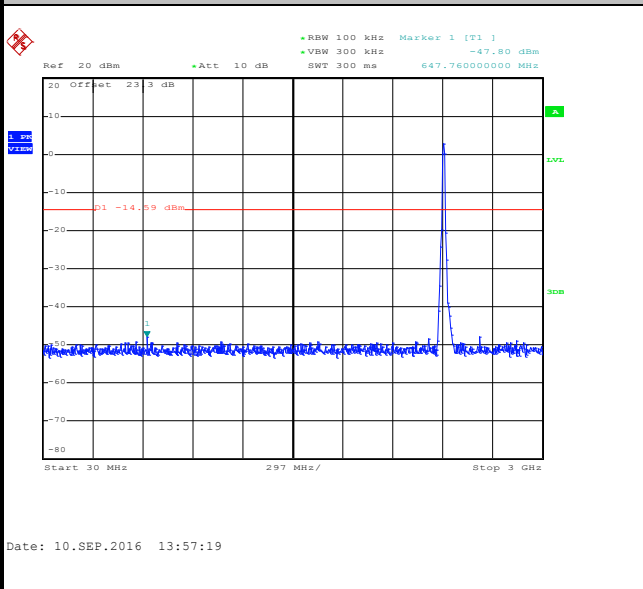
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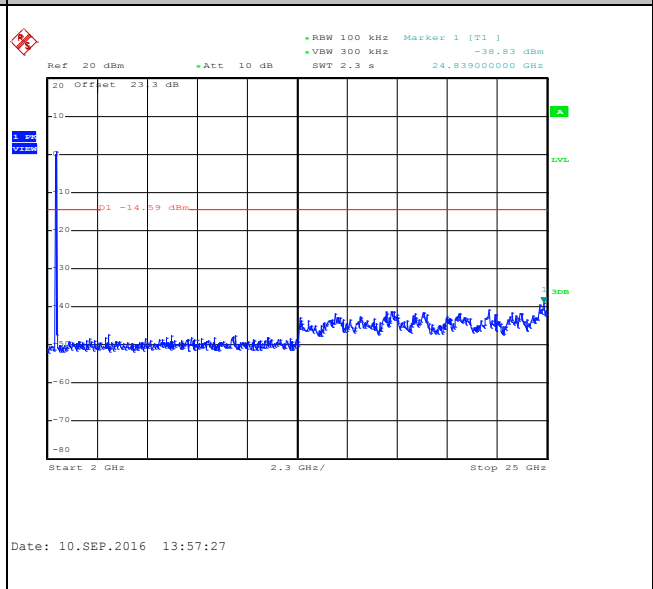
Low Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

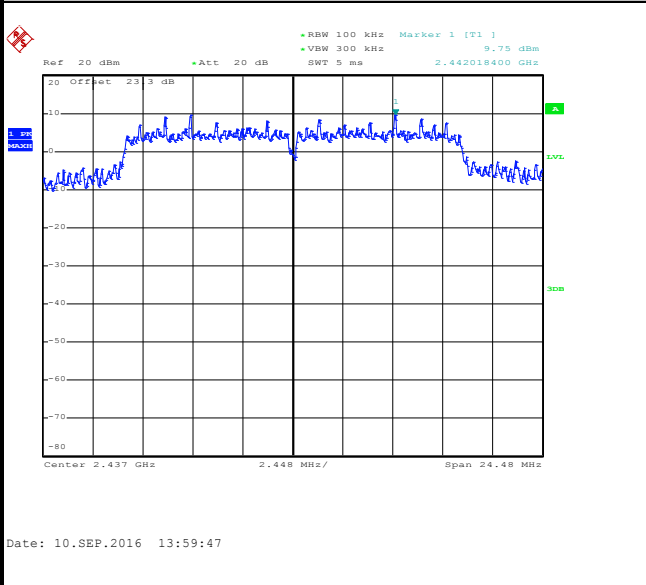




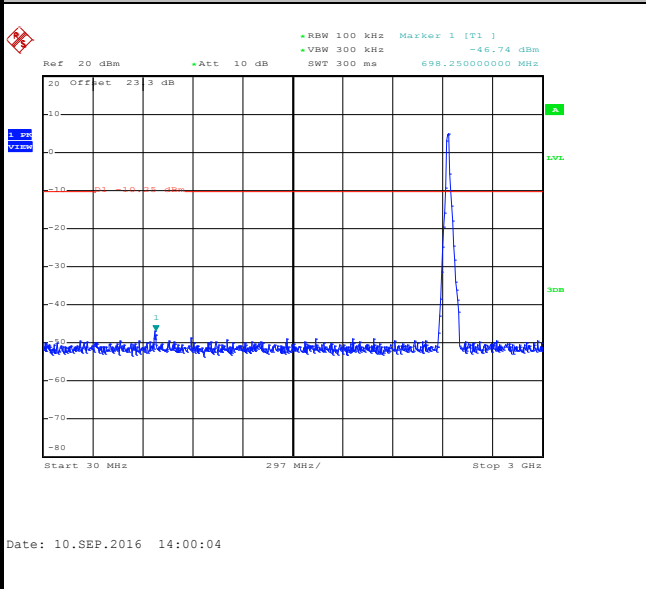
Test Mode :	802.11g	Temperature :	21~25
Test Band :	2.4GHz Mid	Relative Humidity :	51~54
Test Channel :	06	Test Engineer :	Bill Kuo

WLAN 802.11g Channel 06

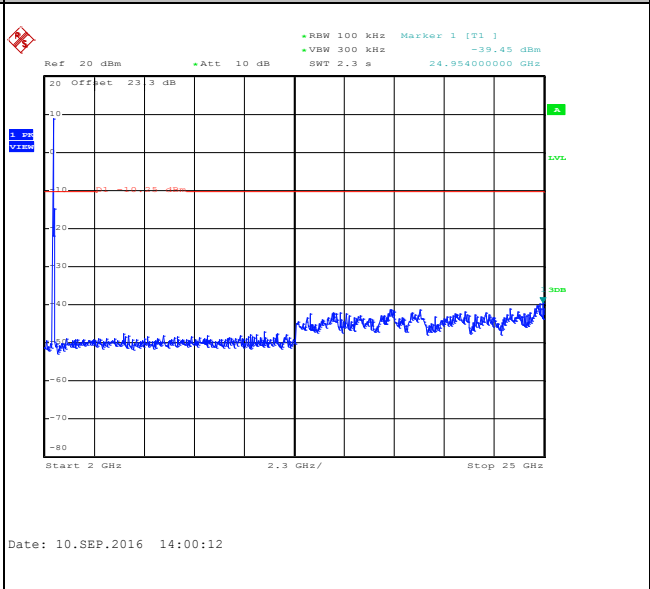
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

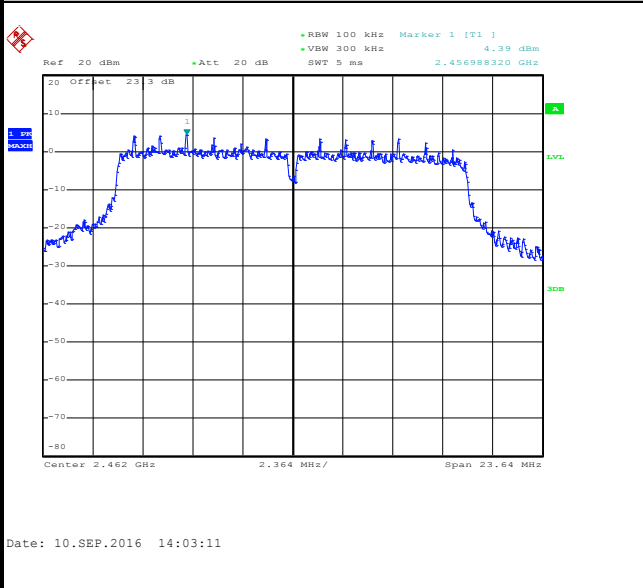




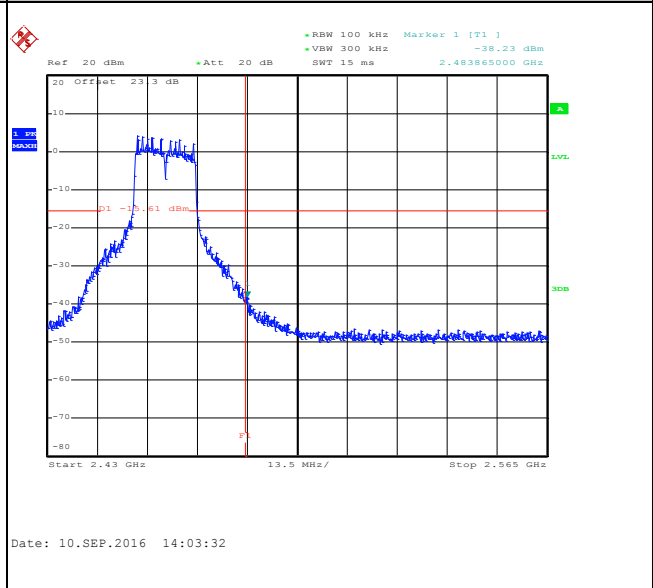
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Test Band :	2.4GHz High	Relative Humidity :	51~54
Test Channel :	11	Test Engineer :	Bill Kuo

WLAN 802.11g Channel 11

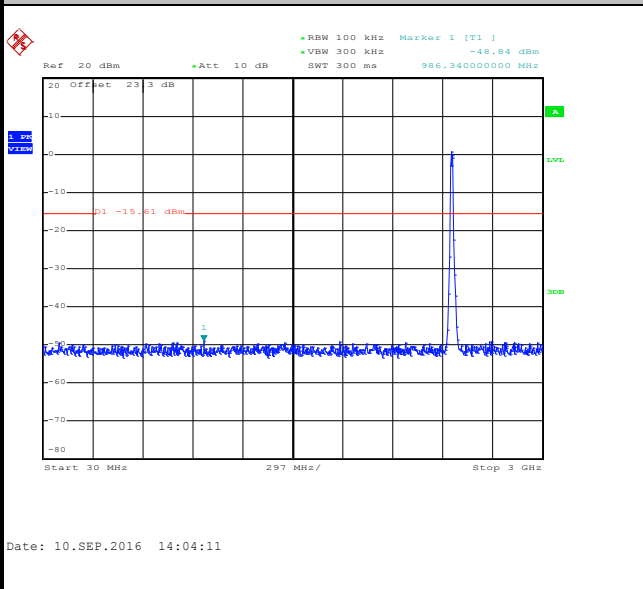
100kHz PSD reference Level



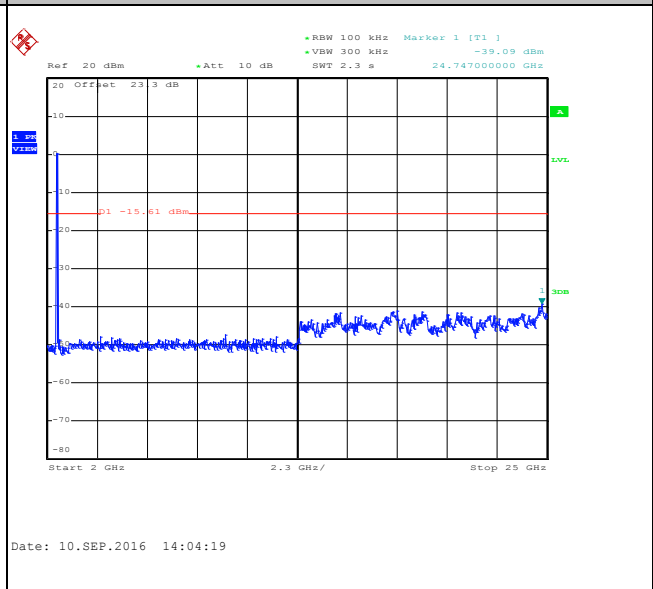
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

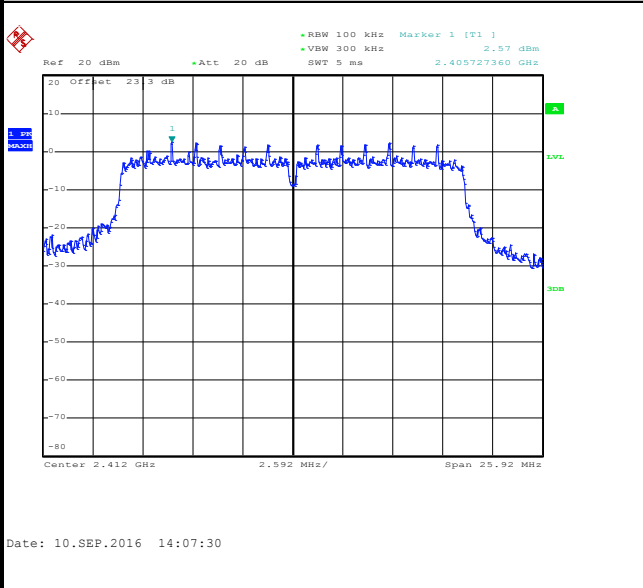




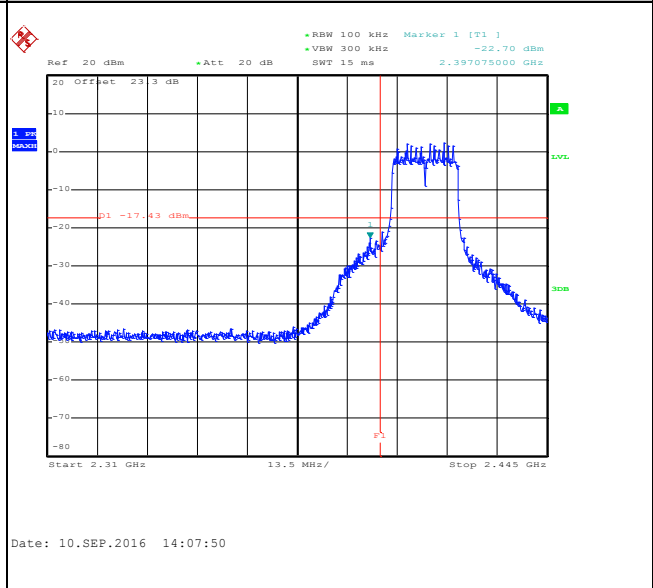
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Test Band :	2.4GHz Low	Relative Humidity :	51~54
Test Channel :	01	Test Engineer :	Bill Kuo

WLAN 802.11n HT20 Channel 01

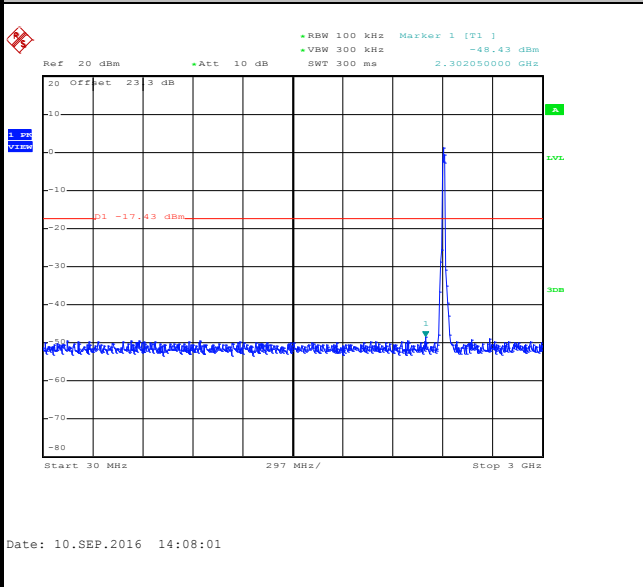
100kHz PSD reference Level



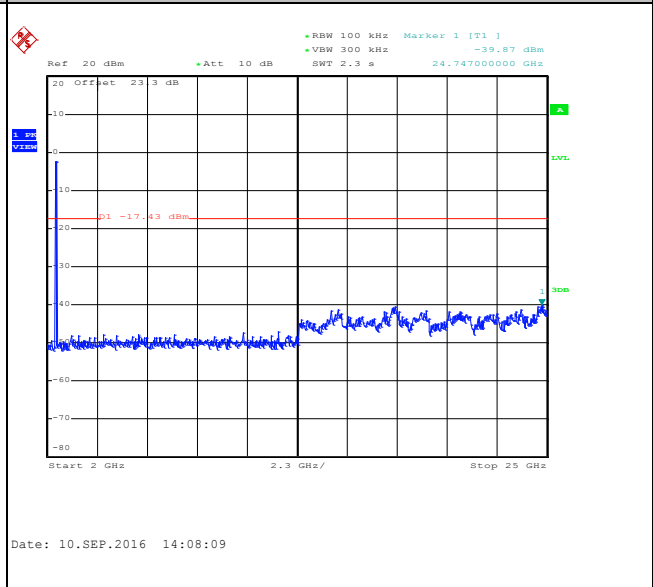
Low Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

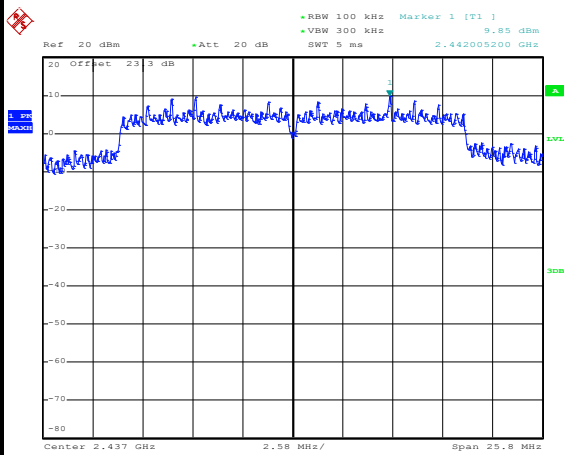




Test Mode :	802.11n HT20	Temperature :	21~25
Test Band :	2.4GHz Mid	Relative Humidity :	51~54
Test Channel :	06	Test Engineer :	Bill Kuo

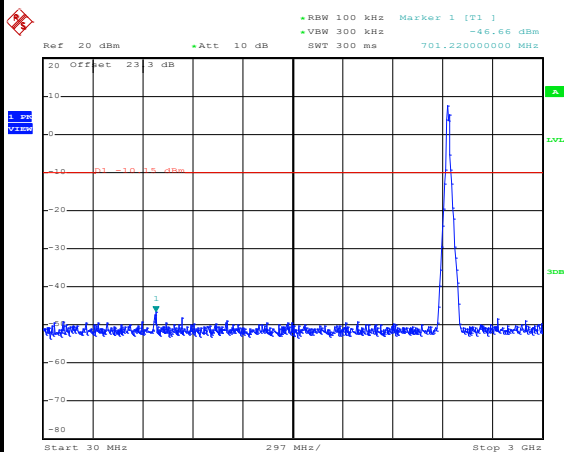
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



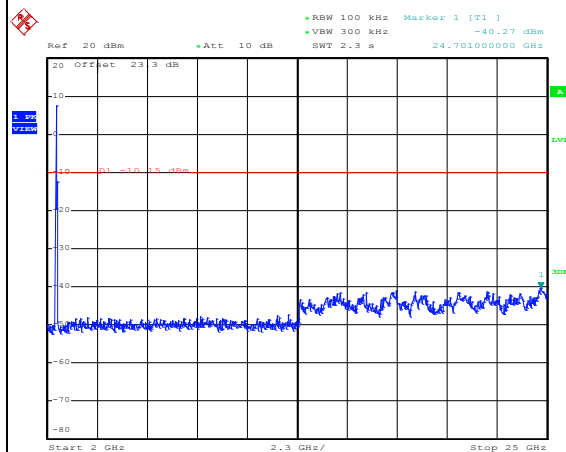
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Spurious Emission 30MHz~3GHz



Date: 10.SEP.2016 14:10:44

Spurious Emission 2GHz~25GHz



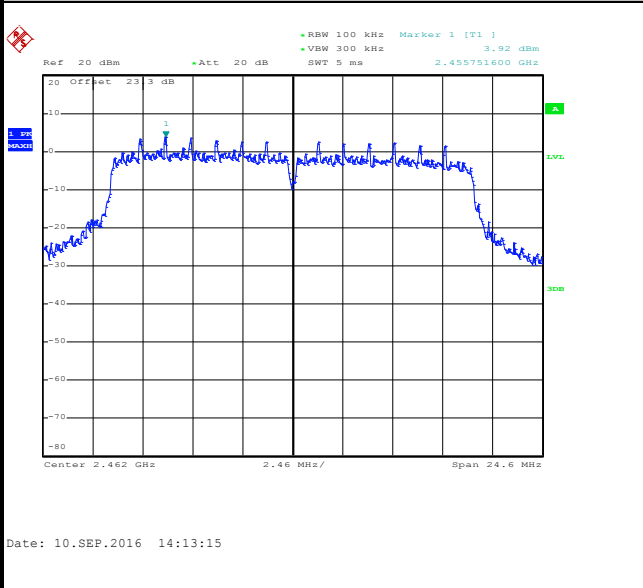
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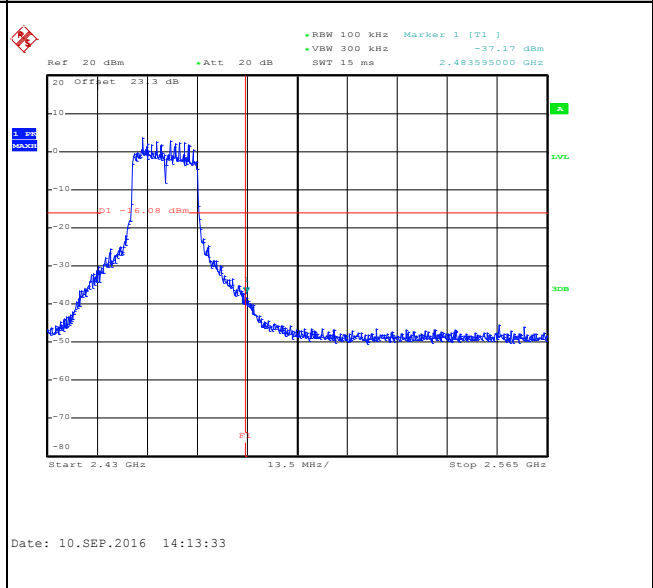
Test Mode :	802.11n HT20	Temperature :	21~25
Test Band :	2.4GHz High	Relative Humidity :	51~54
Test Channel :	11	Test Engineer :	Bill Kuo

WLAN 802.11n HT20 Channel 11

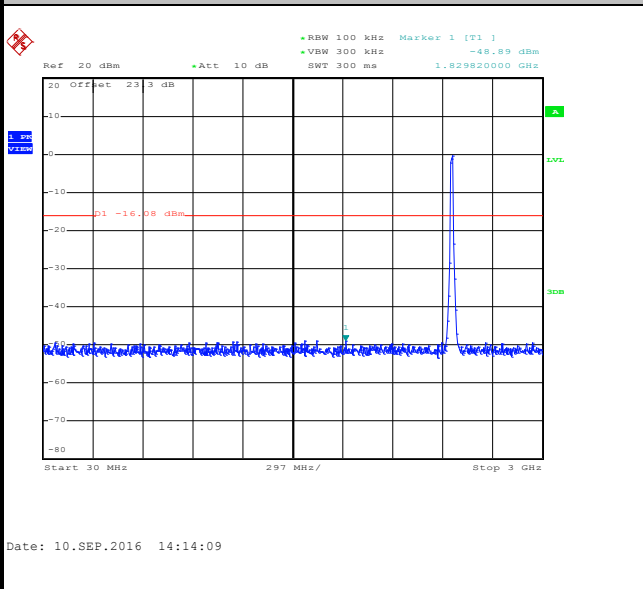
100kHz PSD reference Level



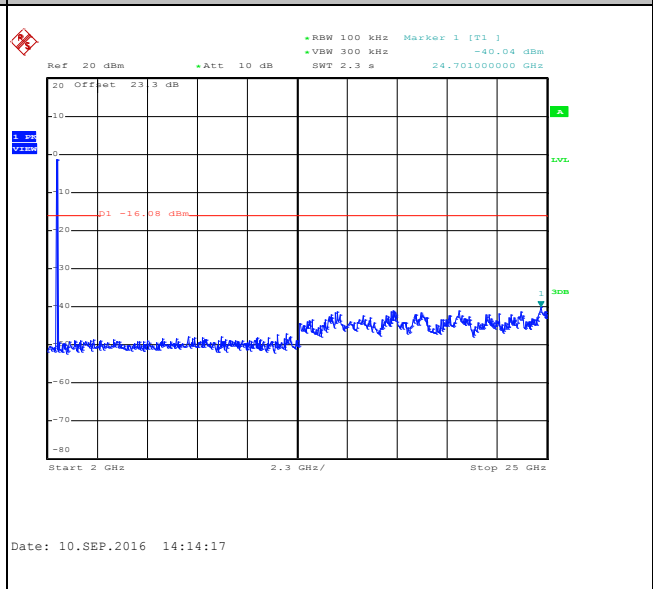
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz





### 3.5 Radiated Band Edges and Spurious Emission Measurement

#### 3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

#### 3.5.2 Measuring Instruments

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



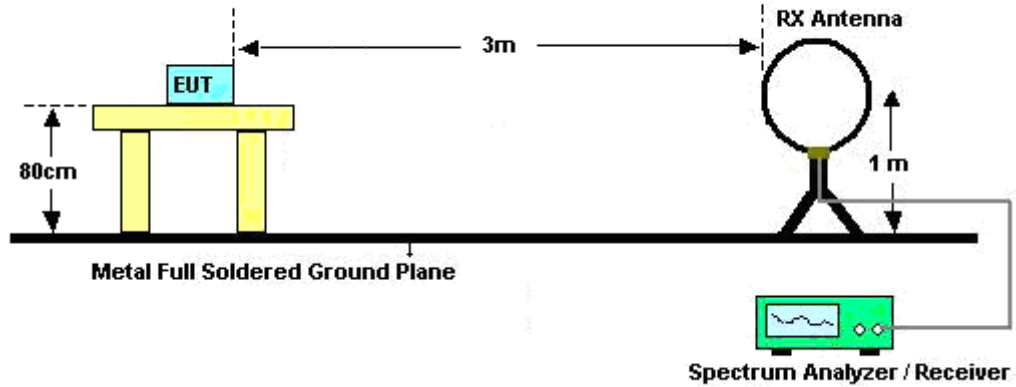


### 3.5.3 Test Procedures

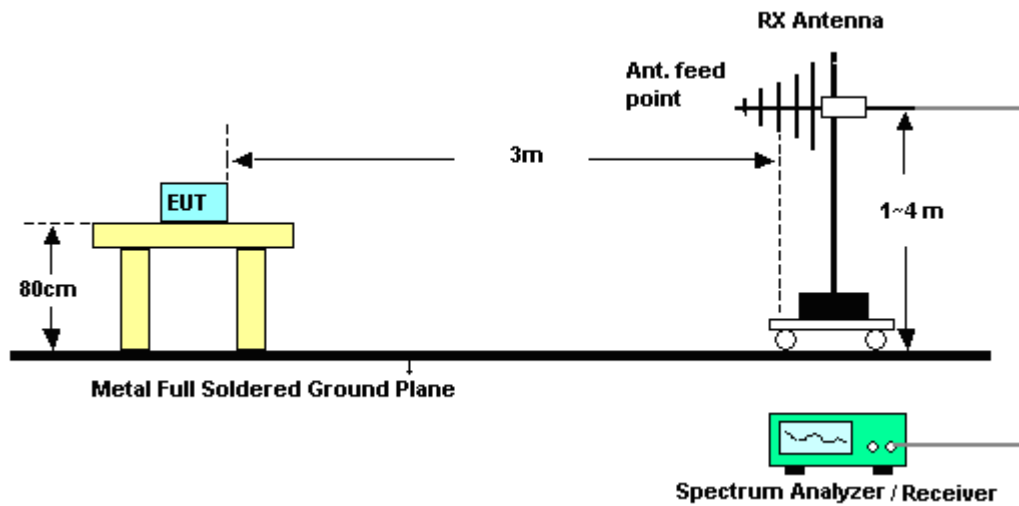
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. 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.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.  
For average measurement:
    - 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.

### 3.5.4 Test Setup

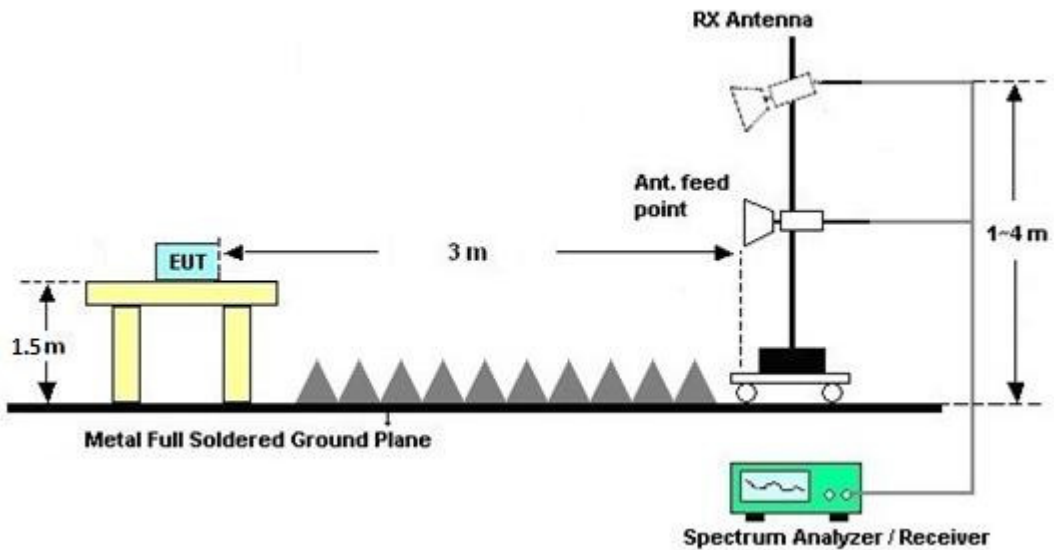
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

### 3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

### 3.5.7 Duty Cycle

Please refer to Appendix E.

### 3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)

Please refer to Appendix C and D.



### 3.6 AC Conducted Emission Measurement

#### 3.6.1 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.

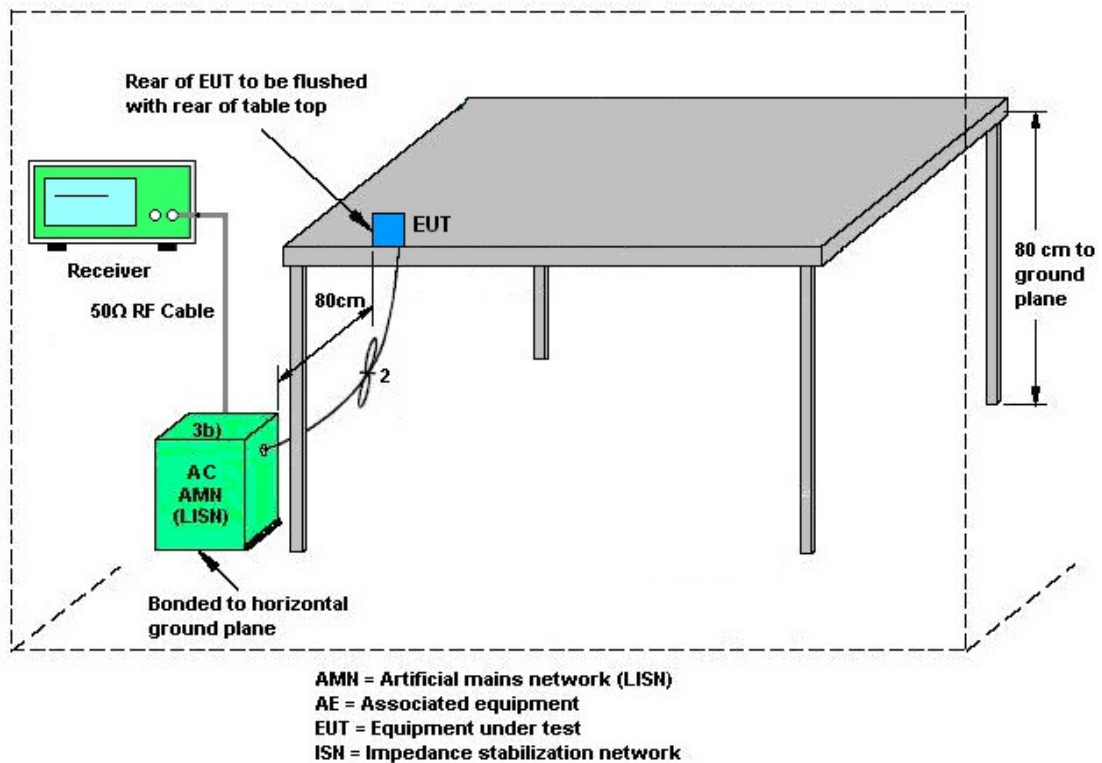
#### 3.6.2 Measuring Instruments

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

#### 3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it 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 (IF bandwidth = 9kHz) with Maximum Hold Mode.

### 3.6.4 Test Setup



### 3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



## **3.7 Antenna Requirements**

### **3.7.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

### **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	1218006	300MHz~40GHz	Oct. 07, 2015	Sep. 10, 2016	Oct. 06, 2016	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Oct. 05, 2015	Sep. 10, 2016	Oct. 04, 2016	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 23, 2015	Sep. 10, 2016	Nov. 22, 2016	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Sep. 15, 2016 ~ Sep. 28, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 30, 2016	Sep. 15, 2016 ~ Sep. 28, 2016	Aug. 29, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	Sep. 15, 2016 ~ Sep. 28, 2016	Dec. 01, 2016	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Sep. 09, 2016 ~ Sep. 10, 2016	Sep. 01, 2017	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 20, 2015	Sep. 09, 2016 ~ Sep. 10, 2016	Nov. 19, 2016	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D	35414	30MHz~1GHz	Nov. 17, 2015	Sep. 09, 2016 ~ Sep. 10, 2016	Nov. 16, 2016	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 08, 2015	Sep. 09, 2016 ~ Sep. 10, 2016	Oct. 07, 2016	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 19, 2015	Sep. 09, 2016 ~ Sep. 10, 2016	Nov. 18, 2016	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1902247	1GHz~18GHz	Jun. 22, 2016	Sep. 09, 2016 ~ Sep. 10, 2016	Jun. 21, 2017	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHz	Sep. 24, 2015	Sep. 09, 2016 ~ Sep. 10, 2016	Sep. 23, 2016	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Sep. 09, 2016 ~ Sep. 10, 2016	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Sep. 09, 2016 ~ Sep. 10, 2016	N/A	Radiation (03CH11-HY)
Preamplifier	MITEQ	JS44-180040 00-33-8P	1840917	18GHz ~ 40GHz	Jun. 14, 2016	Sep. 09, 2016 ~ Sep. 10, 2016	Jun. 13, 2017	Radiation (03CH11-HY)
EMI Test Receiver	Agilent	N9038A (MXE)	MY53290053	20Hz to 26.5GHz	Jan. 20, 2016	Sep. 09, 2016 ~ Sep. 10, 2016	Jan. 19, 2017	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	Sep. 09, 2016 ~ Sep. 10, 2016	Nov. 01, 2016	Radiation (03CH11-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. Conducted Test Results**

Test Engineer:	Bill Kuo	Temperature:	21~25	°C
Test Date:	2016/9/10	Relative Humidity:	51~54	%

**TEST RESULTS DATA**  
**6dB and 99% Occupied Bandwidth**

2.4GHz Band								
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	14.55	8.04	0.50	Pass
11b	1Mbps	1	6	2437	23.60	10.00	0.50	Pass
11b	1Mbps	1	11	2462	12.40	7.56	0.50	Pass
11g	6Mbps	1	1	2412	18.45	16.32	0.50	Pass
11g	6Mbps	1	6	2437	36.85	16.32	0.50	Pass
11g	6Mbps	1	11	2462	17.65	15.76	0.50	Pass
HT20	MCS0	1	1	2412	18.75	17.28	0.50	Pass
HT20	MCS0	1	6	2437	39.30	17.20	0.50	Pass
HT20	MCS0	1	11	2462	18.50	16.40	0.50	Pass

**TEST RESULTS DATA**  
**Peak Power Table**

2.4GHz Band										
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
11b	1Mbps	1	1	2412	22.02	30.00	1.00	23.02	36.00	Pass
11b	1Mbps	1	6	2437	21.25	30.00	1.00	22.25	36.00	Pass
11b	1Mbps	1	11	2462	20.04	30.00	1.00	21.04	36.00	Pass
11g	6Mbps	1	1	2412	20.86	30.00	1.00	21.86	36.00	Pass
11g	6Mbps	1	6	2437	21.79	30.00	1.00	22.79	36.00	Pass
11g	6Mbps	1	11	2462	21.16	30.00	1.00	22.16	36.00	Pass
HT20	MCS0	1	1	2412	19.09	30.00	1.00	20.09	36.00	Pass
HT20	MCS0	1	6	2437	21.79	30.00	1.00	22.79	36.00	Pass
HT20	MCS0	1	11	2462	20.79	30.00	1.00	21.79	36.00	Pass

**TEST RESULTS DATA**  
**Average Power Table**  
***(Reporting Only)***

2.4GHz Band						
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	19.85
11b	1Mbps	1	6	2437	0.00	20.09
11b	1Mbps	1	11	2462	0.00	17.39
11g	6Mbps	1	1	2412	0.12	16.13
11g	6Mbps	1	6	2437	0.12	20.44
11g	6Mbps	1	11	2462	0.12	16.28
HT20	MCS0	1	1	2412	0.13	13.38
HT20	MCS0	1	6	2437	0.13	20.25
HT20	MCS0	1	11	2462	0.13	15.42

**TEST RESULTS DATA**  
**Peak Power Density**

2.4GHz Band								
Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-4.84	1.00	8.00	Pass
11b	1Mbps	1	6	2437	-7.02	1.00	8.00	Pass
11b	1Mbps	1	11	2462	-7.41	1.00	8.00	Pass
11g	6Mbps	1	1	2412	-11.57	1.00	8.00	Pass
11g	6Mbps	1	6	2437	-7.59	1.00	8.00	Pass
11g	6Mbps	1	11	2462	-11.32	1.00	8.00	Pass
HT20	MCS0	1	1	2412	-14.11	1.00	8.00	Pass
HT20	MCS0	1	6	2437	-7.35	1.00	8.00	Pass
HT20	MCS0	1	11	2462	-13.03	1.00	8.00	Pass



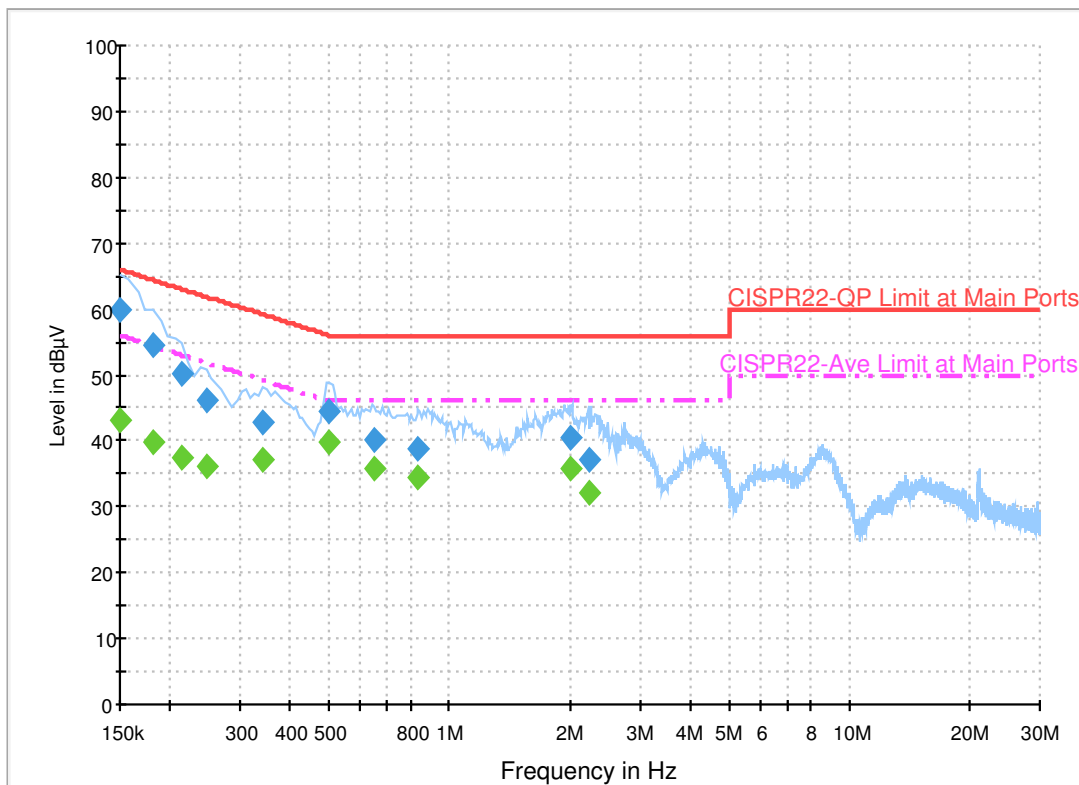
## Appendix B. AC Conducted Emission Test Results

<b>Test Engineer :</b> Kai-Chun Chu	<b>Temperature :</b>	24~25°C
	<b>Relative Humidity :</b>	49~50%

# EUT Information

Report NO : 681313  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Line

ENV216 Auto Test FCC Power Bar - L



## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	59.8	Off	L1	19.6	6.2	66.0
0.182000	54.6	Off	L1	19.6	9.8	64.4
0.214000	50.1	Off	L1	19.6	12.9	63.0
0.246000	46.0	Off	L1	19.6	15.9	61.9
0.342000	42.7	Off	L1	19.6	16.5	59.2
0.502000	44.6	Off	L1	19.6	11.4	56.0
0.646000	40.2	Off	L1	19.6	15.8	56.0
0.838000	38.9	Off	L1	19.6	17.1	56.0
2.014000	40.3	Off	L1	19.7	15.7	56.0
2.246000	37.1	Off	L1	18.4	18.9	56.0

## Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	43.3	Off	L1	19.6	12.7	56.0
0.182000	39.8	Off	L1	19.6	14.6	54.4
0.214000	37.6	Off	L1	19.6	15.4	53.0
0.246000	36.0	Off	L1	19.6	15.9	51.9
0.342000	37.2	Off	L1	19.6	12.0	49.2
0.502000	39.9	Off	L1	19.6	6.1	46.0
0.646000	35.9	Off	L1	19.6	10.1	46.0
0.838000	34.6	Off	L1	19.6	11.4	46.0



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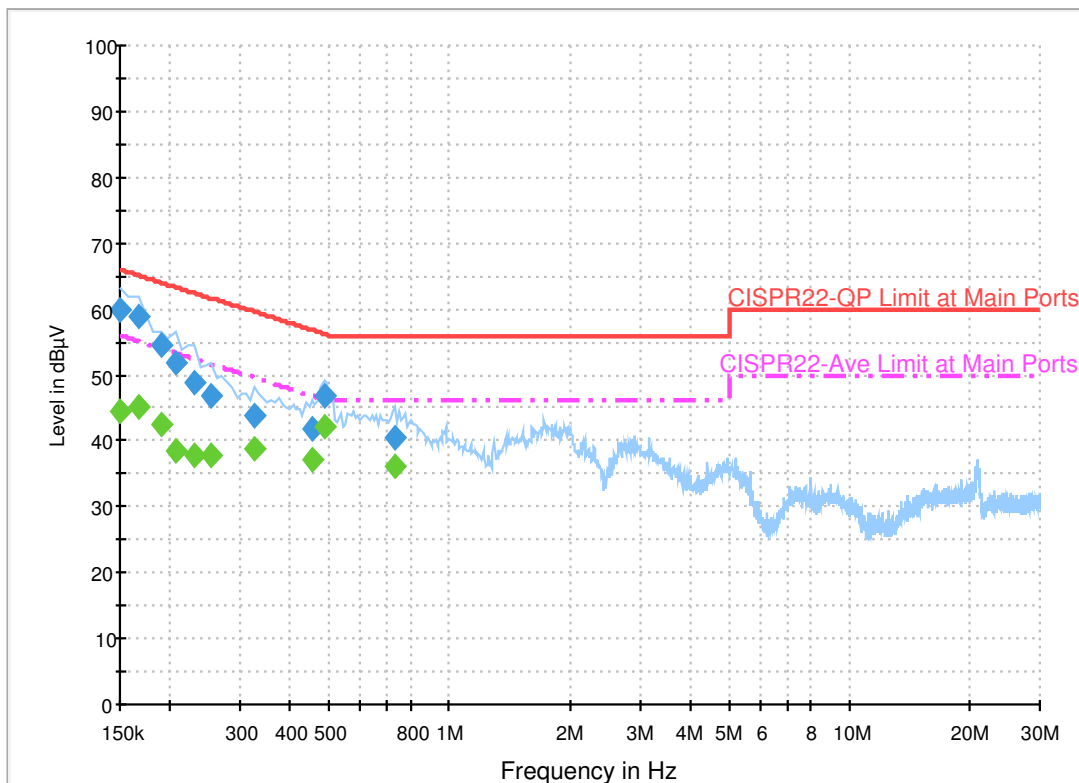
Frequency (MHz)	Average (dB $\mu$ V)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
2.014000	35.9	Off	L1	19.7	10.1	46.0
2.246000	32.1	Off	L1	18.4	13.9	46.0

---

# EUT Information

Report NO : 681313  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Neutral

ENV216 Auto Test FCC Power Bar - N



## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	60.0	Off	N	19.6	6.0	66.0
0.166000	59.0	Off	N	19.6	6.2	65.2
0.190000	54.4	Off	N	19.6	9.6	64.0
0.206000	51.8	Off	N	19.6	11.6	63.4
0.230000	48.7	Off	N	19.6	13.7	62.4
0.254000	46.7	Off	N	19.6	14.9	61.6
0.326000	43.9	Off	N	19.6	15.7	59.6
0.454000	41.8	Off	N	19.6	15.0	56.8
0.486000	46.7	Off	N	19.6	9.5	56.2
0.734000	40.5	Off	N	19.6	15.5	56.0

## Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	44.4	Off	N	19.6	11.6	56.0
0.166000	45.2	Off	N	19.6	10.0	55.2
0.190000	42.3	Off	N	19.6	11.7	54.0
0.206000	38.3	Off	N	19.6	15.1	53.4
0.230000	37.8	Off	N	19.6	14.6	52.4
0.254000	37.7	Off	N	19.6	13.9	51.6
0.326000	38.7	Off	N	19.6	11.0	49.6
0.454000	37.1	Off	N	19.6	9.7	46.8

---

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.486000	42.1	Off	N	19.6	4.1	46.2
0.734000	36.2	Off	N	19.6	9.8	46.0

---



## Appendix C. Radiated Spurious Emission

Test Engineer :	J.C. Liang and Jacky Hung	Temperature :	20~23°C
		Relative Humidity :	50~55%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
802.11b CH 01 2412MHz		2387.91	56.62	-17.38	74	56.89	27.01	6.71	33.99	308	44	P	H	
		2385.39	51.46	-2.54	54	51.78	26.96	6.71	33.99	308	44	A	H	
	*	2412	103.2	-	-	103.41	27.06	6.71	33.98	308	44	P	H	
	*	2412	99.73	-	-	99.94	27.06	6.71	33.98	308	44	A	H	
													H	
														H
			2387.07	55.22	-18.78	74	55.49	27.01	6.71	33.99	295	37	P	V
			2385.285	48.81	-5.19	54	49.13	26.96	6.71	33.99	295	37	A	V
	*		2412	100.6	-	-	100.81	27.06	6.71	33.98	295	37	P	V
	*		2412	97.15	-	-	97.36	27.06	6.71	33.98	295	37	A	V
														V
														V
802.11b CH 06 2437MHz		2386.3	52.96	-21.04	74	53.23	27.01	6.71	33.99	400	28	P	H	
		2386.72	44.5	-9.5	54	44.77	27.01	6.71	33.99	400	28	A	H	
	*	2437	101.33	-	-	101.4	27.16	6.74	33.97	400	28	P	H	
	*	2437	99	-	-	99.07	27.16	6.74	33.97	400	28	A	H	
			2490.55	51.63	-22.37	74	51.51	27.3	6.77	33.95	400	28	P	H
			2488.17	41.37	-12.63	54	41.25	27.3	6.77	33.95	400	28	A	H
			2388.12	51.72	-22.28	74	51.99	27.01	6.71	33.99	282	293	P	V
			2388.26	42.33	-11.67	54	42.6	27.01	6.71	33.99	282	293	A	V
	*		2437	98.79	-	-	98.86	27.16	6.74	33.97	282	293	P	V
	*		2437	95.41	-	-	95.48	27.16	6.74	33.97	282	293	A	V
			2488.59	51.41	-22.59	74	51.29	27.3	6.77	33.95	282	293	P	V
			2488.1	41.12	-12.88	54	41	27.3	6.77	33.95	282	293	A	V



<b>802.11b CH 11 2462MHz</b>	*	2462	99.48	-	-	99.47	27.2	6.77	33.96	390	28	P	H
	*	2462	96.12	-	-	96.11	27.2	6.77	33.96	390	28	A	H
		2486.04	58.39	-15.61	74	58.32	27.25	6.77	33.95	390	28	P	H
		2486.04	53.48	-0.52	54	53.41	27.25	6.77	33.95	390	28	A	H
													H
													H
	*	2462	97.55	-	-	97.54	27.2	6.77	33.96	319	296	P	V
	*	2462	94.28	-	-	94.27	27.2	6.77	33.96	319	296	A	V
		2486	56.87	-17.13	74	56.8	27.25	6.77	33.95	319	296	P	V
		2486.04	51.63	-2.37	54	51.56	27.25	6.77	33.95	319	296	A	V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11b CH 01 2412MHz		4824	39.23	-34.77	74	48.62	31.12	10.58	51.09	100	0	P	H	
													H	
													H	
													H	
			4824	46.32	-27.68	74	55.71	31.12	10.58	51.09	100	0	P	V
														V
														V
802.11b CH 06 2437MHz		4874	38.9	-35.1	74	48.27	31.21	10.48	51.06	100	0	P	H	
		7311	38.83	-35.17	74	40.98	36.08	12.28	50.51	100	0	P	H	
													H	
													H	
			4874	44.37	-29.63	74	53.74	31.21	10.48	51.06	100	0	P	V
			7311	39.39	-34.61	74	41.54	36.08	12.28	50.51	100	0	P	V
														V
802.11b CH 11 2462MHz		4924	35.12	-38.88	74	44.48	31.29	10.39	51.04	100	0	P	H	
		7386	39.26	-34.74	74	41.01	36.27	12.49	50.51	100	0	P	H	
													H	
													H	
			4924	38.66	-35.34	74	48.02	31.29	10.39	51.04	100	0	P	V
			7386	40.08	-33.92	74	41.83	36.27	12.49	50.51	100	0	P	V
														V
Remark	1. No other spurious found.													
	2. All results are PASS against Peak and Average limit line.													



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11g CH 01 2412MHz		2390	63.55	-10.45	74	63.81	27.01	6.71	33.98	389	32	P	H	
		2390	53.5	-0.5	54	53.76	27.01	6.71	33.98	389	32	A	H	
	*	2412	100.76	-	-	100.97	27.06	6.71	33.98	389	32	P	H	
	*	2412	92.61	-	-	92.82	27.06	6.71	33.98	389	32	A	H	
													H	
														H
			2390	57.26	-16.74	74	57.52	27.01	6.71	33.98	228	284	P	V
			2390	47.58	-6.42	54	47.84	27.01	6.71	33.98	228	284	A	V
	*		2412	96.44	-	-	96.65	27.06	6.71	33.98	228	284	P	V
	*		2412	87.72	-	-	87.93	27.06	6.71	33.98	228	284	A	V
														V
														V
802.11g CH 06 2437MHz		2386.16	63	-11	74	63.27	27.01	6.71	33.99	361	27	P	H	
		2389.94	52.65	-1.35	54	52.91	27.01	6.71	33.98	361	27	A	H	
	*	2437	103.95	-	-	104.02	27.16	6.74	33.97	361	27	P	H	
	*	2437	95.36	-	-	95.43	27.16	6.74	33.97	361	27	A	H	
			2483.69	62.06	-11.94	74	61.99	27.25	6.77	33.95	361	27	P	H
			2483.62	49.22	-4.78	54	49.15	27.25	6.77	33.95	361	27	A	H
			2388.4	57.23	-16.77	74	57.5	27.01	6.71	33.99	289	293	P	V
			2389.94	47.2	-6.8	54	47.46	27.01	6.71	33.98	289	293	A	V
	*		2437	100.5	-	-	100.57	27.16	6.74	33.97	289	293	P	V
	*		2437	91.86	-	-	91.93	27.16	6.74	33.97	289	293	A	V
			2483.52	58.68	-15.32	74	58.61	27.25	6.77	33.95	289	293	P	V
			2483.9	46.71	-7.29	54	46.64	27.25	6.77	33.95	289	293	A	V



<b>802.11g CH 11 2462MHz</b>	*	2462	98.01	-	-	98	27.2	6.77	33.96	353	28	P	H
	*	2462	89.4	-	-	89.39	27.2	6.77	33.96	353	28	A	H
		2483.56	63.64	-10.36	74	63.57	27.25	6.77	33.95	353	28	P	H
		2483.52	52.79	-1.21	54	52.72	27.25	6.77	33.95	353	28	A	H
													H
													H
	*	2462	95.15	-	-	95.14	27.2	6.77	33.96	276	293	P	V
	*	2462	86.41	-	-	86.4	27.2	6.77	33.96	276	293	A	V
		2483.56	63.29	-10.71	74	63.22	27.25	6.77	33.95	276	293	P	V
		2483.56	52.62	-1.38	54	52.55	27.25	6.77	33.95	276	293	A	V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												





2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11g CH 01 2412MHz		4824	34.49	-39.51	74	43.88	31.12	10.58	51.09	100	0	P	H	
													H	
													H	
													H	
			4824	39.85	-34.15	74	49.24	31.12	10.58	51.09	100	0	P	V
														V
														V
802.11g CH 06 2437MHz		4874	38.8	-35.2	74	48.17	31.21	10.48	51.06	100	0	P	H	
		7311	37.61	-36.39	74	39.76	36.08	12.28	50.51	100	0	P	H	
													H	
													H	
			4874	42.91	-31.09	74	52.28	31.21	10.48	51.06	100	0	P	V
			7311	37.65	-36.35	74	39.8	36.08	12.28	50.51	100	0	P	V
														V
802.11g CH 11 2462MHz		4924	31.39	-42.61	74	40.75	31.29	10.39	51.04	100	0	P	H	
		7386	36.01	-37.99	74	37.76	36.27	12.49	50.51	100	0	P	H	
													H	
													H	
			4924	35.13	-38.87	74	44.49	31.29	10.39	51.04	100	0	P	V
			7386	35.02	-38.98	74	36.77	36.27	12.49	50.51	100	0	P	V
														V
Remark	1. No other spurious found.													
	2. All results are PASS against Peak and Average limit line.													



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11n HT20 CH 01 2412MHz		2389.905	61.74	-12.26	74	62	27.01	6.71	33.98	357	35	P	H	
		2390	51.41	-2.59	54	51.67	27.01	6.71	33.98	357	35	A	H	
	*	2412	97.65	-	-	97.86	27.06	6.71	33.98	357	35	P	H	
	*	2412	89.18	-	-	89.39	27.06	6.71	33.98	357	35	A	H	
													H	
													H	
			2389.59	55.88	-18.12	74	56.15	27.01	6.71	33.99	228	285	P	V
			2390	46.44	-7.56	54	46.7	27.01	6.71	33.98	228	285	A	V
		*	2412	93.62	-	-	93.83	27.06	6.71	33.98	228	285	P	V
		*	2412	85.08	-	-	85.29	27.06	6.71	33.98	228	285	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2389.52	61.78	-12.22	74	62.05	27.01	6.71	33.99	400	26	P	H	
		2389.94	50.98	-3.02	54	51.24	27.01	6.71	33.98	400	26	A	H	
	*	2437	103.17	-	-	103.24	27.16	6.74	33.97	400	26	P	H	
	*	2437	94.11	-	-	94.18	27.16	6.74	33.97	400	26	A	H	
			2484.25	64.05	-9.95	74	63.98	27.25	6.77	33.95	400	26	P	H
			2483.5	52.24	-1.76	54	52.17	27.25	6.77	33.95	400	26	A	H
			2389.94	57.01	-16.99	74	57.27	27.01	6.71	33.98	222	286	P	V
			2389.94	46.29	-7.71	54	46.55	27.01	6.71	33.98	222	286	A	V
		*	2437	98.91	-	-	98.98	27.16	6.74	33.97	222	286	P	V
		*	2437	90.32	-	-	90.39	27.16	6.74	33.97	222	286	A	V
		2484.04	62.41	-11.59	74	62.34	27.25	6.77	33.95	222	286	P	V	
		2483.5	50.11	-3.89	54	50.04	27.25	6.77	33.95	222	286	A	V	



<b>802.11n</b> <b>HT20</b> <b>CH 11</b> <b>2462MHz</b>	*	2462	95.54	-	-	95.53	27.2	6.77	33.96	388	27	P	H
	*	2462	86.68	-	-	86.67	27.2	6.77	33.96	388	27	A	H
		2483.84	62.82	-11.18	74	62.75	27.25	6.77	33.95	388	27	P	H
		2483.68	52.32	-1.68	54	52.25	27.25	6.77	33.95	388	27	A	H
													H
													H
	*	2462	90.26	-	-	90.25	27.2	6.77	33.96	222	289	P	V
	*	2462	81.6	-	-	81.59	27.2	6.77	33.96	222	289	A	V
		2484.72	60.79	-13.21	74	60.72	27.25	6.77	33.95	222	289	P	V
		2483.52	50.38	-3.62	54	50.31	27.25	6.77	33.95	222	289	A	V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11n HT20 CH 01 2412MHz		4824	32.62	-41.38	74	42.01	31.12	10.58	51.09	100	0	P	H	
													H	
													H	
													H	
			4824	33.88	-40.12	74	43.27	31.12	10.58	51.09	100	0	P	V
														V
														V
802.11n HT20 CH 06 2437MHz		4874	35.32	-38.68	74	44.69	31.21	10.48	51.06	100	0	P	H	
													H	
			7311	37.51	-36.49	74	39.66	36.08	12.28	50.51	100	0	P	H
														H
			4874	40.66	-33.34	74	50.03	31.21	10.48	51.06	100	0	P	V
			7311	38.88	-35.12	74	41.03	36.08	12.28	50.51	100	0	P	V
														V
802.11n HT20 CH 11 2462MHz		4924	32.86	-41.14	74	42.22	31.29	10.39	51.04	100	0	P	H	
													H	
			7386	36.75	-37.25	74	38.5	36.27	12.49	50.51	100	0	P	H
														H
			4924	33.44	-40.56	74	42.8	31.29	10.39	51.04	100	0	P	V
			7386	35.07	-38.93	74	36.82	36.27	12.49	50.51	100	0	P	V
														V
Remark	1. No other spurious found.													
	2. All results are PASS against Peak and Average limit line.													



Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
2.4GHz 802.11g LF		70.5	39.48	-0.52	40	57.58	12.52	1.17	31.79	208	120	QP	H	
	*	70.5	43.43	3.43	40	61.53	12.52	1.17	31.79	208	120	P	H	
		139.89	39.68	-3.82	43.5	52.08	17.9	1.48	31.78	-	-	P	H	
		232.23	36.27	-9.73	46	49	17.06	1.98	31.77	-	-	P	H	
		407.1	40.73	-5.27	46	47.42	22.54	2.58	31.81	200	53	QP	H	
		407.1	45.18	-0.82	46	51.87	22.54	2.58	31.81	200	53	P	H	
		528.2	42.34	-3.66	46	46.82	24.5	2.95	31.93	-	-	P	H	
		694.8	33.2	-12.8	46	35.15	26.64	3.45	32.04	-	-	P	H	
														H
														H
														H
														H
			51.33	35.84	-4.16	40	52.11	14.6	0.93	31.8	-	-	P	V
			139.08	40.13	-3.37	43.5	52.52	17.91	1.48	31.78	152	255	P	V
			232.23	33.22	-12.78	46	45.95	17.06	1.98	31.77	-	-	P	V
			335.7	37.5	-8.5	46	46.34	20.7	2.23	31.77	-	-	P	V
			407.1	38.33	-7.67	46	45.02	22.54	2.58	31.81	-	-	P	V
			600.3	37.81	-8.19	46	40.99	25.7	3.16	32.04	-	-	P	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>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	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b		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. Level(dBμV/m) =  
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- 2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- 1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)  
= 55.45 (dBμV/m)
- 2. Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- 1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)  
= 43.54 (dBμV/m)
- 2. Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

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



## Appendix D. Radiated Spurious Emission Plots

Test Engineer :	J.C. Liang and Jacky Hung	Temperature :	20~23°C
		Relative Humidity :	50~55%

### Note symbol

-L	Low channel location
-R	High channel location



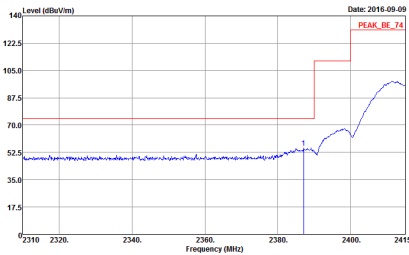
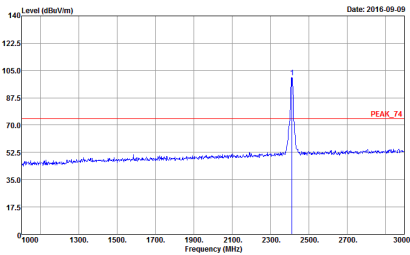
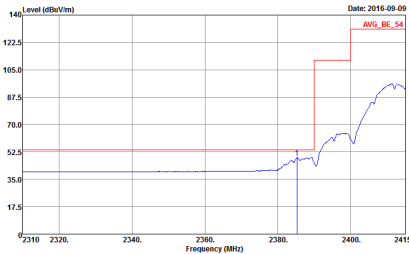
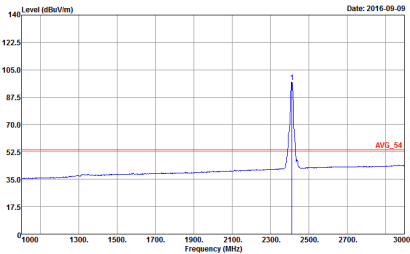


2.4GHz 2400~2483.5MHz

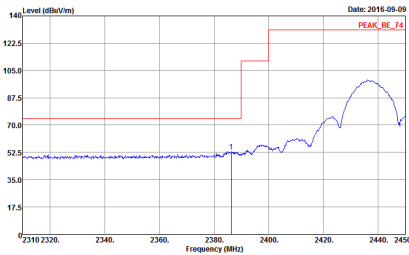
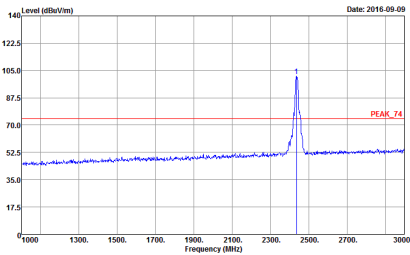
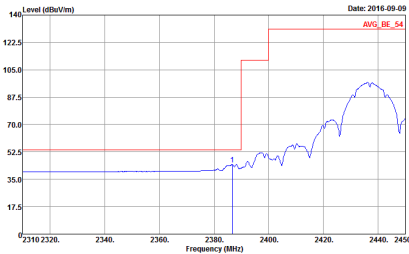
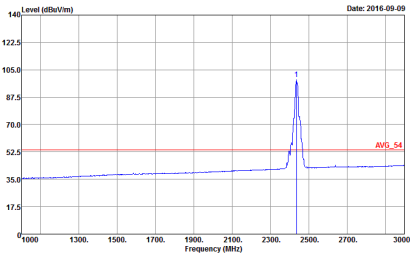
WIFI 802.11b (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak</p>
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak</p>	<p>Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:0.010KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:0.010KHz SWT:Auto            Detector : Peak</p>

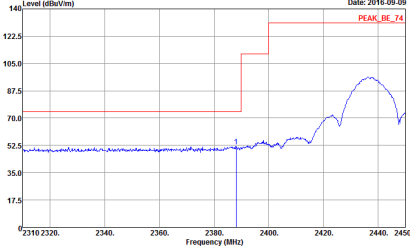
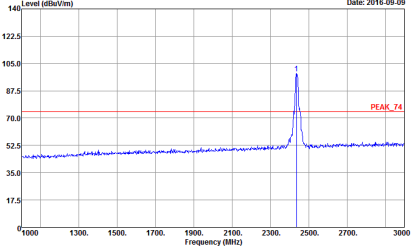
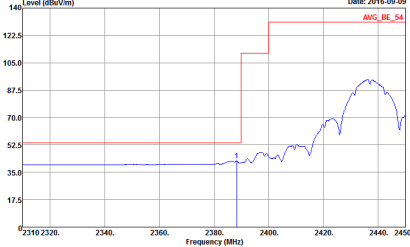
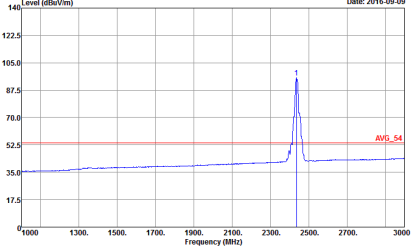


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 2310 to 2450 MHz. A red line indicates a peak level of approximately 130 dBuV/m at 2437 MHz, labeled 'PEAK_BE_74'. A blue line shows the spectrum with a peak at the same frequency.</p> <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 1000 to 3000 MHz. A red line indicates a peak level of approximately 70 dBuV/m at 2437 MHz, labeled 'PEAK_74'. A blue line shows a sharp peak at the same frequency.</p> <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>
Avg.	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 2310 to 2450 MHz. A red line indicates an average level of approximately 130 dBuV/m at 2437 MHz, labeled 'AVG_BE_54'. A blue line shows the spectrum with a peak at the same frequency.</p> <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 1000 to 3000 MHz. A red line indicates an average level of approximately 70 dBuV/m at 2437 MHz, labeled 'AVG_54'. A blue line shows a sharp peak at the same frequency.</p> <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>

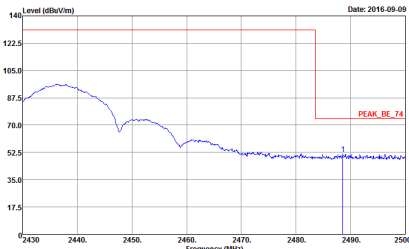



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL Detector : Peak</p>	Left blank

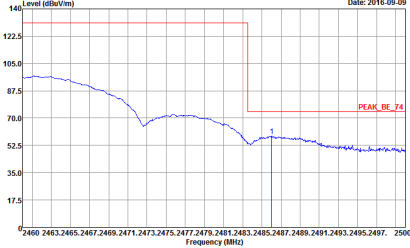
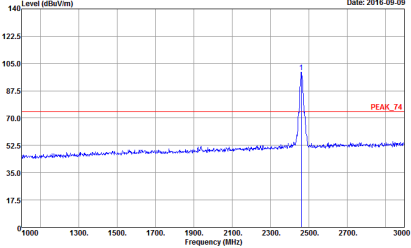
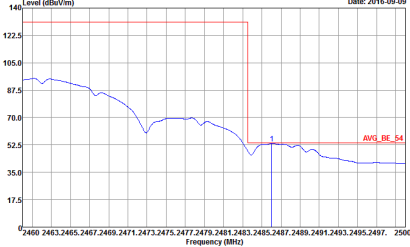
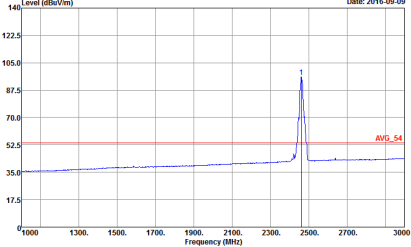


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical Peak. The plot shows a signal level around 70 dBuV/m with a peak at approximately 2437 MHz reaching about 105 dBuV/m. A red horizontal line labeled 'PEAK_BE_74' is drawn at approximately 130 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental Peak. The plot shows a sharp peak at approximately 2437 MHz reaching about 105 dBuV/m. A red horizontal line labeled 'PEAK_74' is drawn at approximately 70 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>
Avg.	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical Avg. The plot shows a signal level around 70 dBuV/m with a peak at approximately 2437 MHz reaching about 105 dBuV/m. A red horizontal line labeled 'AVG_BE_54' is drawn at approximately 130 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental Avg. The plot shows a sharp peak at approximately 2437 MHz reaching about 105 dBuV/m. A red horizontal line labeled 'AVG_54' is drawn at approximately 70 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>

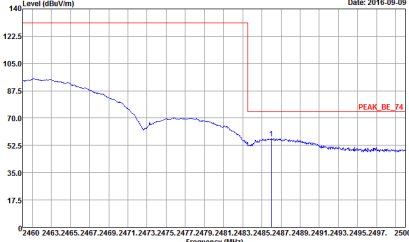
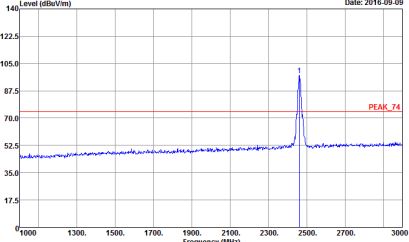
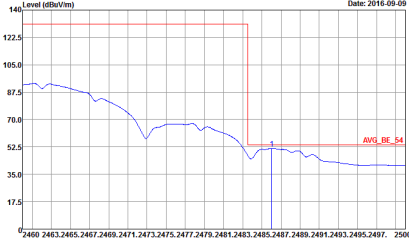
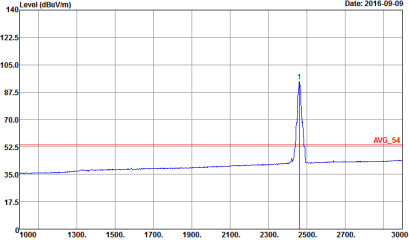


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Vertical	Fundamental
<p><b>Peak</b></p>	 <p>           Date: 2016-09-09            Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak         </p>	<p>Left blank</p>
<p><b>Avg.</b></p>	 <p>           Date: 2016-09-09            Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:0.010KHz SWT:Auto            Detector : Peak         </p>	<p>Left blank</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 2460 to 2500 MHz. A red box highlights the peak at approximately 2462 MHz, labeled 'PEAK_BE_74'. The plot shows a blue line representing the spectrum with a sharp peak at the specified frequency.</p> <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 1000 to 3000 MHz. A red box highlights the peak at approximately 2462 MHz, labeled 'PEAK_74'. The plot shows a blue line representing the spectrum with a sharp peak at the specified frequency.</p> <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 2460 to 2500 MHz. A red box highlights the average level at approximately 2462 MHz, labeled 'AVG_BE_54'. The plot shows a blue line representing the spectrum with a peak at the specified frequency.</p> <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:0.010KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 1000 to 3000 MHz. A red box highlights the average level at approximately 2462 MHz, labeled 'AVG_54'. The plot shows a blue line representing the spectrum with a peak at the specified frequency.</p> <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:0.010KHz SWT:Auto            Detector : Peak</p>



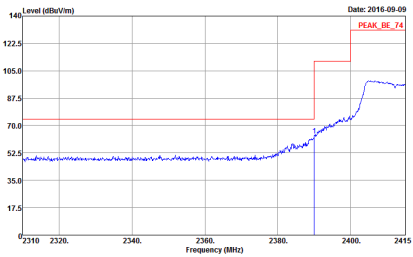
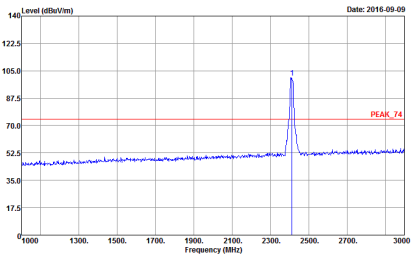
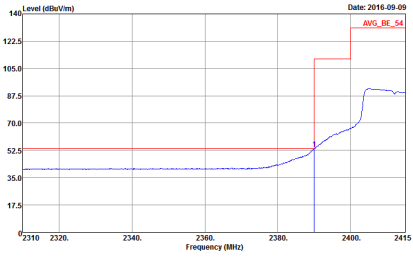
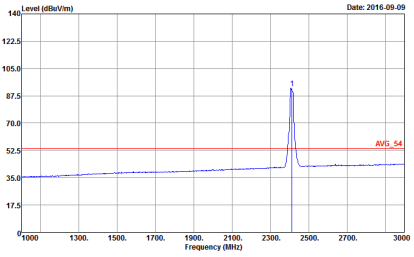
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:0.010KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:0.010KHz SWT:Auto            Detector : Peak</p>



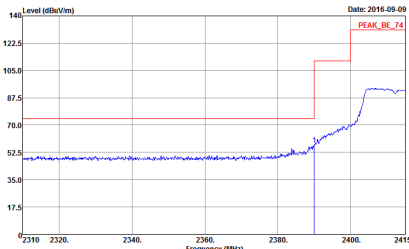
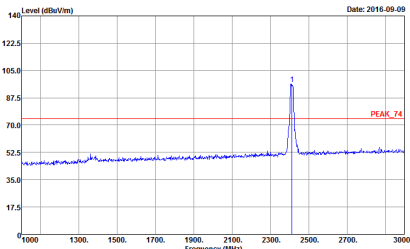
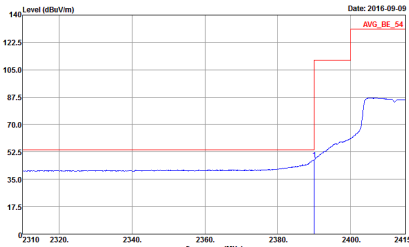
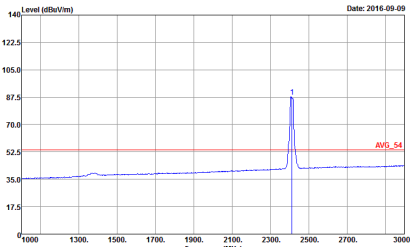


2.4GHz 2400~2483.5MHz

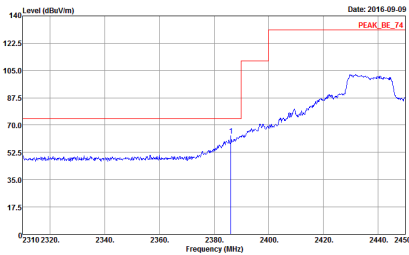
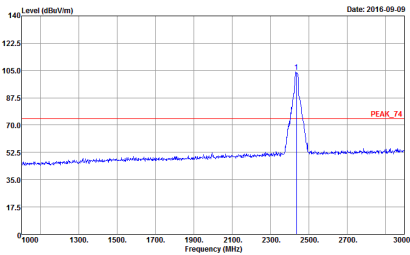
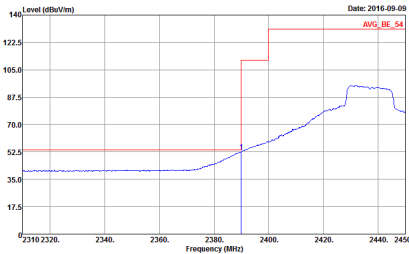
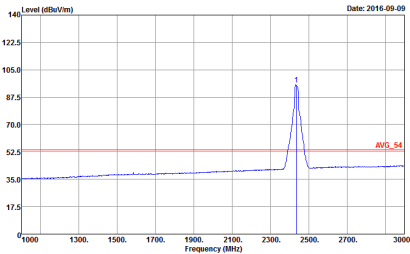
WIFI 802.11g (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 2310 to 2415 MHz. A red horizontal line indicates the peak level at approximately 125 dBuV/m, labeled 'PEAK_BE_74'. The blue spectrum line shows a rising signal starting around 2380 MHz.</p> <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 1000 to 3000 MHz. A red horizontal line indicates the peak level at approximately 70 dBuV/m, labeled 'PEAK_74'. A sharp blue peak is visible at approximately 2412 MHz.</p> <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 2310 to 2415 MHz. A red horizontal line indicates the average level at approximately 105 dBuV/m, labeled 'AVG_BE_54'. The blue spectrum line shows a rising signal starting around 2380 MHz.</p> <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 1000 to 3000 MHz. A red horizontal line indicates the average level at approximately 55 dBuV/m, labeled 'AVG_54'. A sharp blue peak is visible at approximately 2412 MHz.</p> <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>

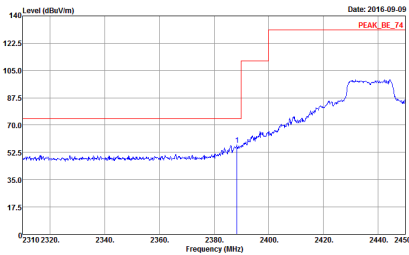
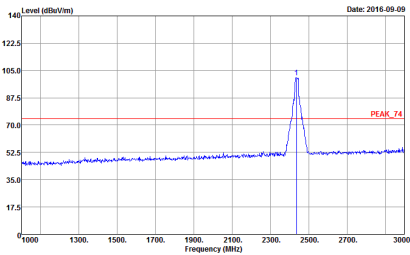
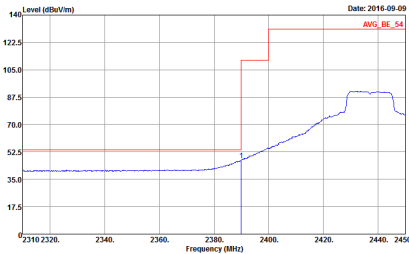
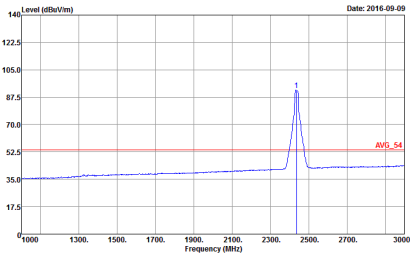


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>

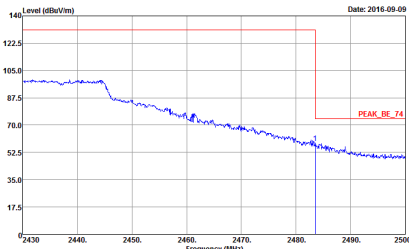
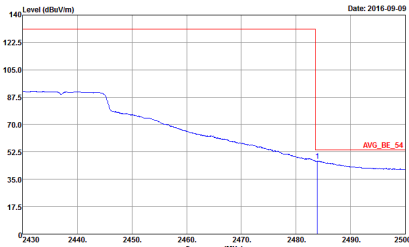


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak</p>	Left blank

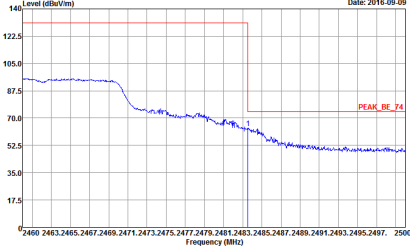
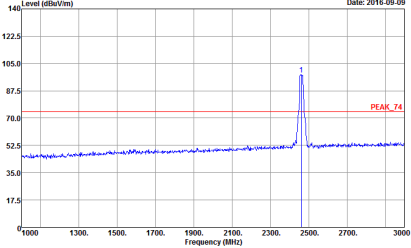
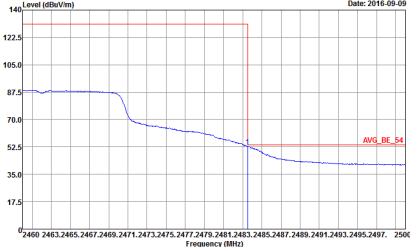
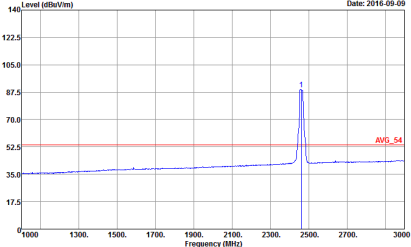


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical Peak. The plot shows a rising signal level from approximately 50 dBuV/m at 2380 MHz to about 100 dBuV/m at 2440 MHz. A red horizontal line indicates the peak level at approximately 130 dBuV/m. The x-axis ranges from 2310 to 2450 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Date: 2016-09-09 PEAK_BE_74</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental Peak. The plot shows a sharp peak at approximately 2437 MHz with a level of about 100 dBuV/m. A red horizontal line indicates the peak level at approximately 70 dBuV/m. The x-axis ranges from 1000 to 3000 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Date: 2016-09-09 PEAK_74</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak</p>
Avg.	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical Average. The plot shows a rising signal level from approximately 50 dBuV/m at 2380 MHz to about 85 dBuV/m at 2440 MHz. A red horizontal line indicates the average level at approximately 130 dBuV/m. The x-axis ranges from 2310 to 2450 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Date: 2016-09-09 AVG_BE_54</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental Average. The plot shows a sharp peak at approximately 2437 MHz with a level of about 85 dBuV/m. A red horizontal line indicates the average level at approximately 60 dBuV/m. The x-axis ranges from 1000 to 3000 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Date: 2016-09-09 AVG_54</p> <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF VERTICAL Detector : Peak</p>

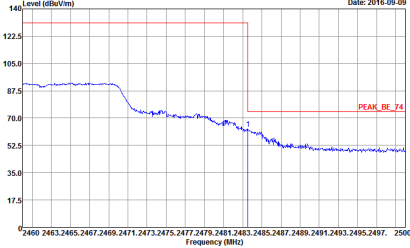
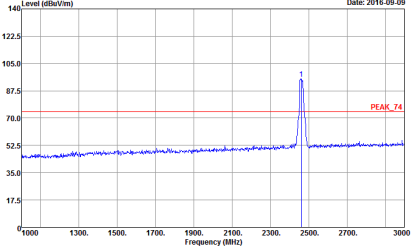
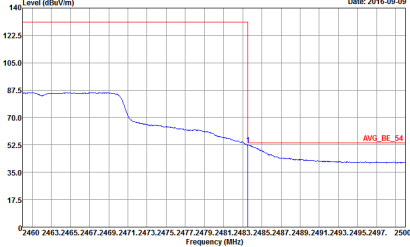
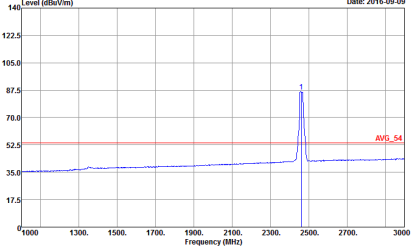


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 <p>Date: 2016-09-09</p> <p>Site : 03CH11-HY  Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL  RBW:1000.000KHz VBW:3000.000KHz SWT:Auto  Detector : Peak</p>	Left Blank
Avg.	 <p>Date: 2016-09-09</p> <p>Site : 03CH11-HY  Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL  RBW:1000.000KHz VBW:1.000KHz SWT:Auto  Detector : Peak</p>	Left Blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>



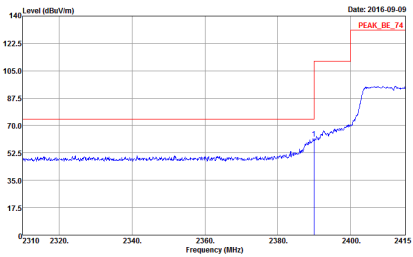
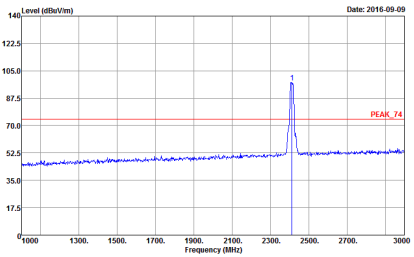
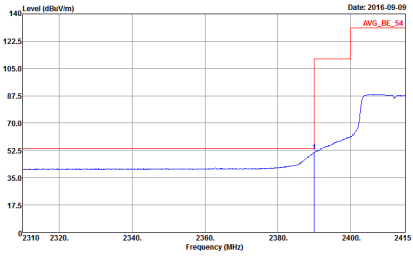
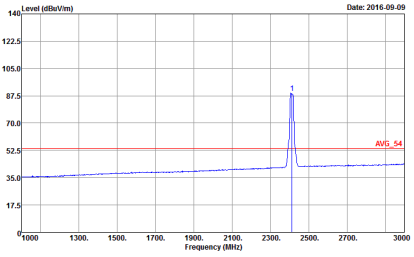
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Vertical	Fundamental
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical Peak. The plot shows a signal level starting at approximately 85 dBuV/m at 2400 MHz, dropping to about 55 dBuV/m by 2462 MHz, and then remaining relatively flat. A red box highlights the peak at 2462 MHz, labeled 'PEAK_BE_74'. The x-axis ranges from 2460 to 2500 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental Peak. The plot shows a signal level starting at approximately 55 dBuV/m at 1000 MHz, rising to about 75 dBuV/m at 2462 MHz, and then dropping sharply. A red box highlights the peak at 2462 MHz, labeled 'PEAK_74'. The x-axis ranges from 1000 to 3000 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical Avg. The plot shows a signal level starting at approximately 85 dBuV/m at 2400 MHz, dropping to about 55 dBuV/m by 2462 MHz, and then remaining relatively flat. A red box highlights the average level at 2462 MHz, labeled 'AVG_BE_54'. The x-axis ranges from 2460 to 2500 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Fundamental Avg. The plot shows a signal level starting at approximately 55 dBuV/m at 1000 MHz, rising to about 75 dBuV/m at 2462 MHz, and then dropping sharply. A red box highlights the average level at 2462 MHz, labeled 'AVG_54'. The x-axis ranges from 1000 to 3000 MHz, and the y-axis ranges from 0 to 140 dBuV/m.</p> <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>



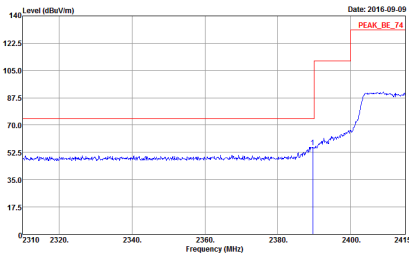
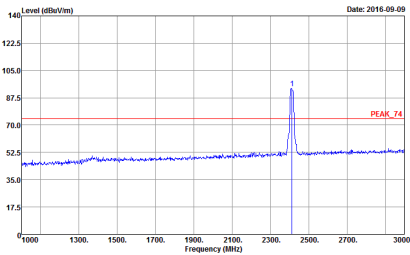
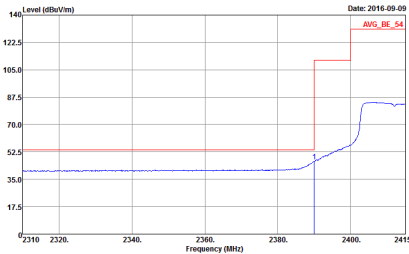
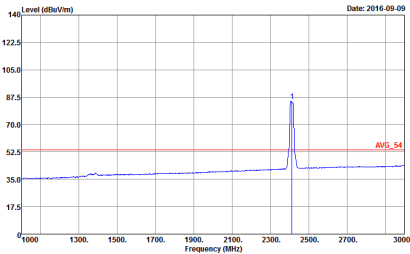


2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 <p>Level (dBu/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBu/m, and the x-axis ranges from 2310 to 2415 MHz. A red line indicates the peak level at approximately 130 dBu/m. A blue line shows the signal level, which rises sharply around 2380 MHz. A red label 'PEAK_BE_74' is present.</p> <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBu/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBu/m, and the x-axis ranges from 1000 to 3000 MHz. A red line indicates the peak level at approximately 70 dBu/m. A blue line shows a sharp peak at approximately 2412 MHz. A red label 'PEAK_74' is present.</p> <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Level (dBu/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 0 to 140 dBu/m, and the x-axis ranges from 2310 to 2415 MHz. A red line indicates the average level at approximately 105 dBu/m. A blue line shows the signal level, which rises sharply around 2380 MHz. A red label 'AVG_BE_54' is present.</p> <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>	 <p>Level (dBu/m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 0 to 140 dBu/m, and the x-axis ranges from 1000 to 3000 MHz. A red line indicates the average level at approximately 55 dBu/m. A blue line shows a sharp peak at approximately 2412 MHz. A red label 'AVG_54' is present.</p> <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>

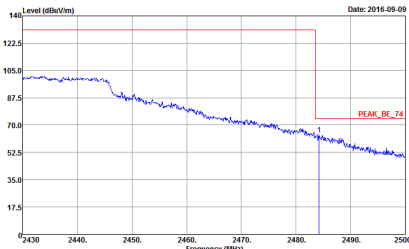
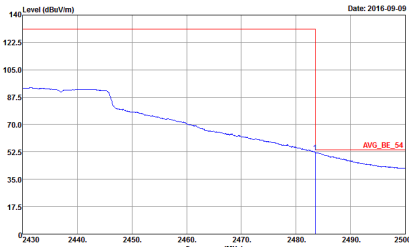


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>

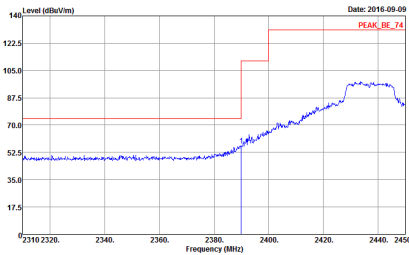
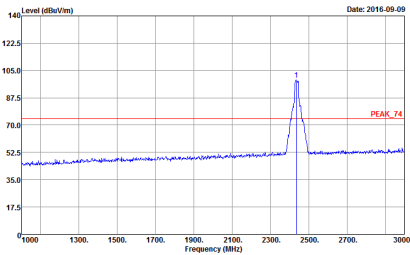
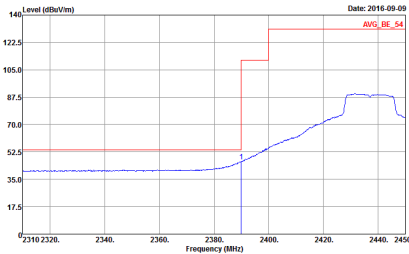
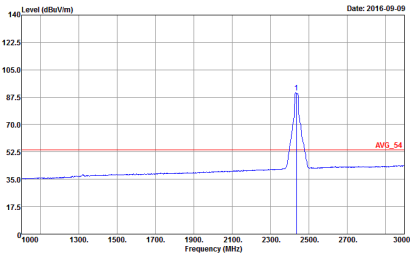


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	<p>Site : 03GH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>	<p>Site : 03GH11-HY            Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>
Avg.	<p>Site : 03GH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>	<p>Site : 03GH11-HY            Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL            Detector : Peak</p>

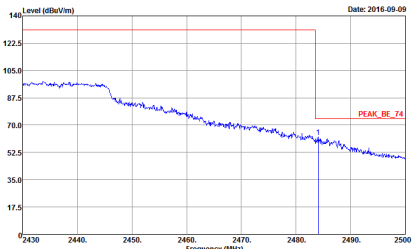
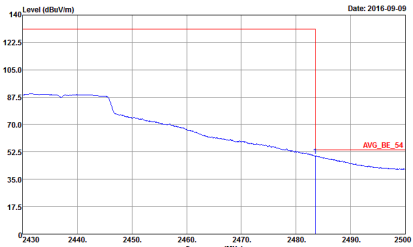


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak</p>	<p>Left blank</p>
<p><b>Avg.</b></p>	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak</p>	<p>Left blank</p>

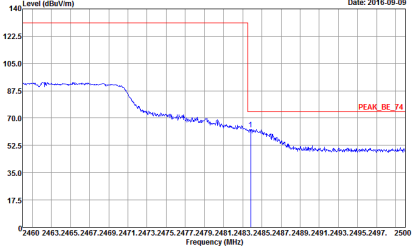
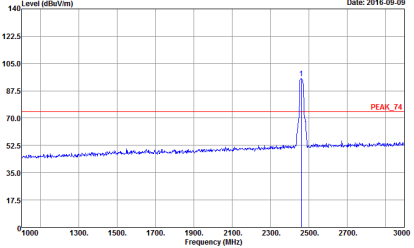
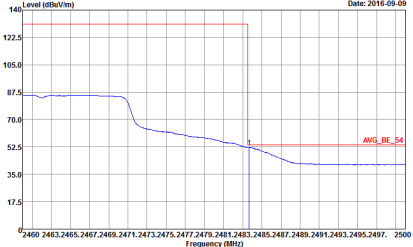
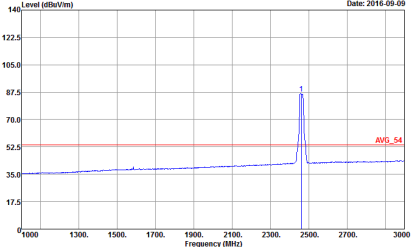


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>

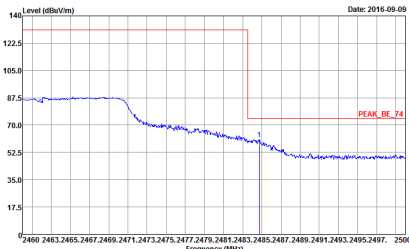
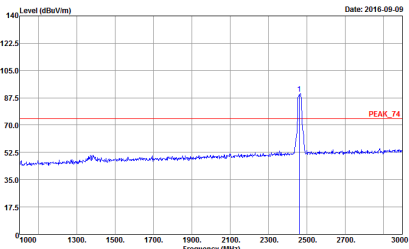
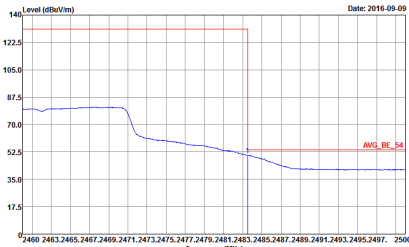
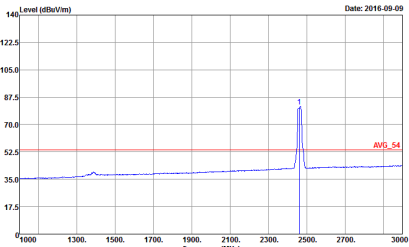


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 <p>           Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak         </p>	Left Blank
Avg.	 <p>           Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak         </p>	Left Blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak</p>	 <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak</p>



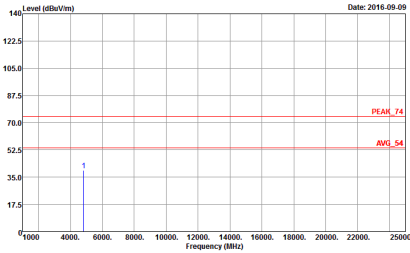
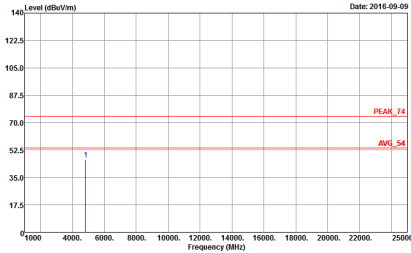
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>
Avg.	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 9120D-HF VERTICAL            Detector : Peak</p>





2.4GHz 2400~2483.5MHz

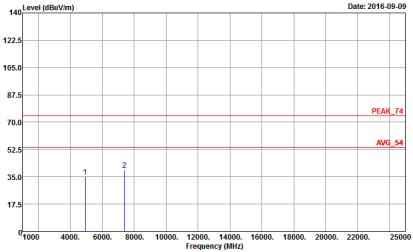
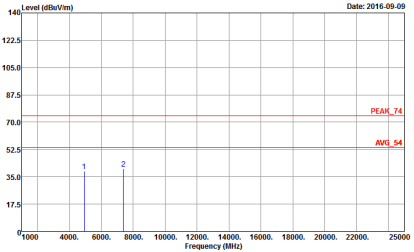
WIFI 802.11b (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
<p><b>Peak</b></p> <p><b>Avg.</b></p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>

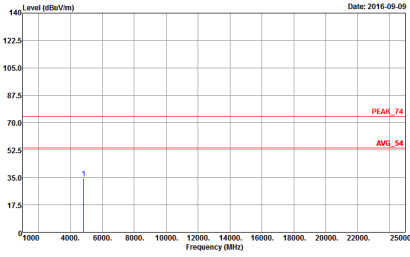
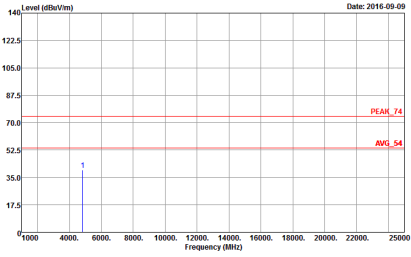


WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>



2.4GHz 2400~2483.5MHz

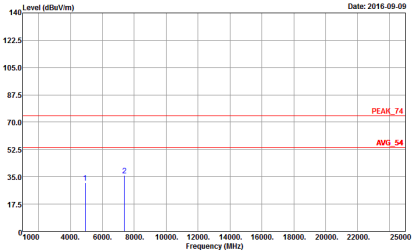
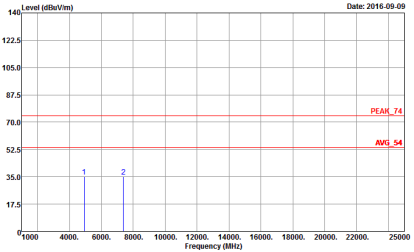
WIFI 802.11g (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

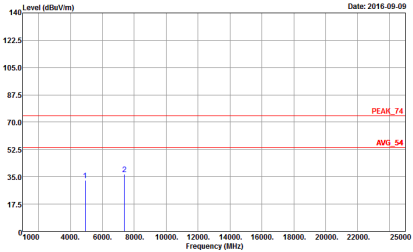
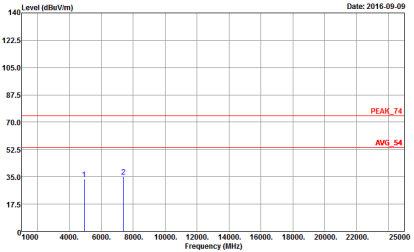
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
<b>Peak</b>  <b>Avg.</b>	<p>Site : 03CH11-HY            Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL            Detector : Peak</p>	<p>Site : 03CH11-HY            Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL            Detector : Peak</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>





WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak</p>



Emission below 1GHz  
2.4GHz WIFI 802.11g (LF)

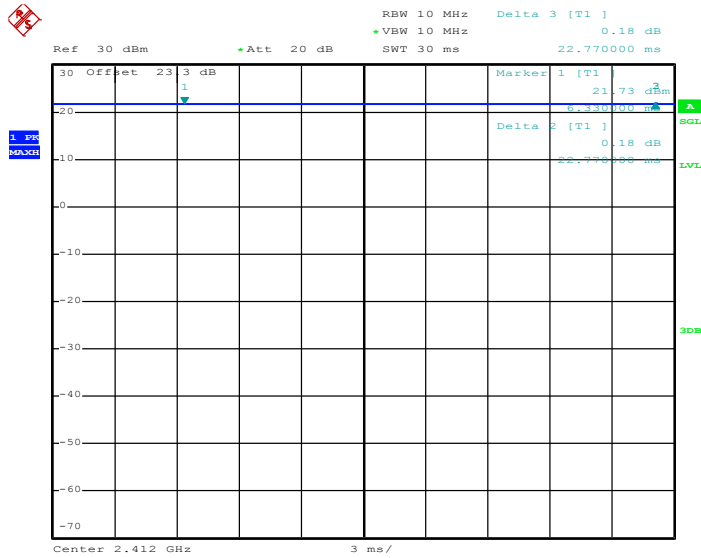
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g LF	
1	Horizontal	Vertical
QP / Peak	<p>Site : 03CH11-HY Condition : QP 3m BI-LOG 6111D-LF_ETC HORIZONTAL Detector : Peak</p>	<p>Site : 03CH11-HY Condition : QP 3m BI-LOG 6111D-LF_ETC VERTICAL Detector : Peak</p>



## Appendix E. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11b	100.00	-	-	10Hz
802.11g	97.18	2070.00	0.48	1kHz
2.4GHz 802.11n HT20	96.99	0.52	1kHz	

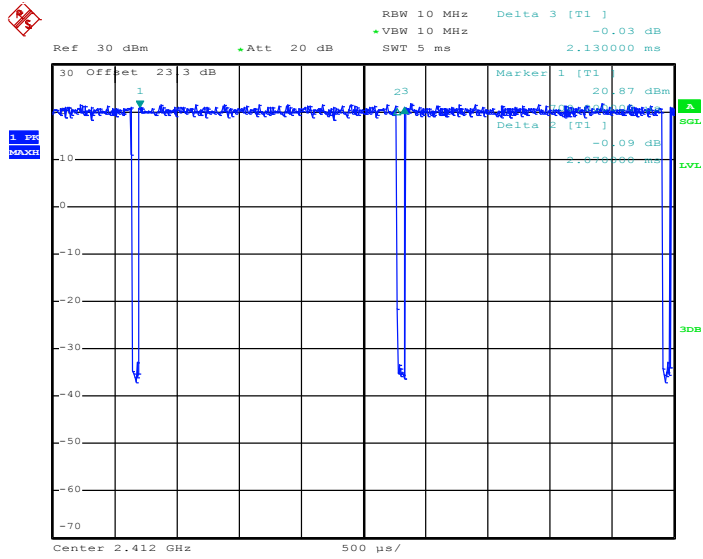
### 802.11b



Date: 10.SEP.2016 14:25:40

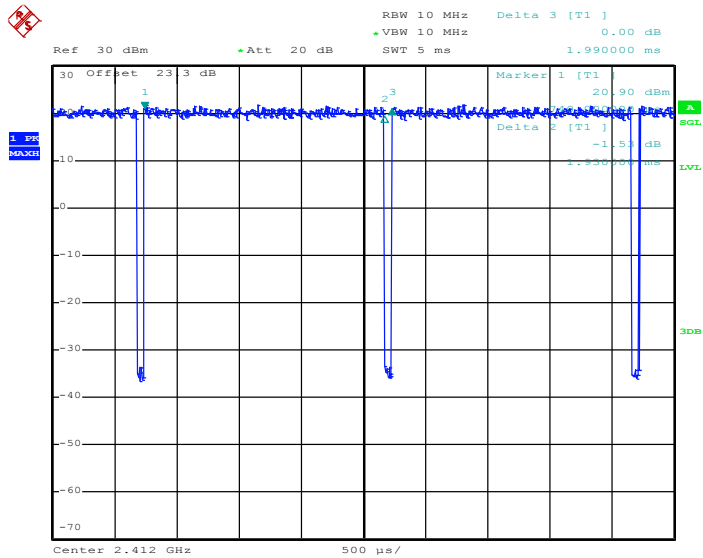


802.11g



Date: 10.SEP.2016 14:26:05

802.11n HT20



Date: 10.SEP.2016 14:26:36