



FCC RF Test Report

APPLICANT : HTC Corporation
EQUIPMENT : Smartphone
MODEL NAME : 2Q3F300
FCC ID : NM82Q3F300
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on May 23, 2017 and testing was completed on Jun. 28, 2017. 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 : NM82Q3F300

Page Number : 1 of 36

Report Issued Date : Sep. 04, 2017

Report Version : Rev. 01

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR752311C	Rev. 01	Initial issue of report	Sep. 04, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	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 0.25 dB at 4874.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.50 dB at 13.558 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

HTC Corporation

No. 23, Xinghua Rd., Taoyuan District, Taoyuan City, Taiwan 330

1.2 Manufacturer

HTC Corporation

No. 23, Xinghua Rd., Taoyuan District, Taoyuan City, Taiwan 330

1.3 Product Feature of Equipment Under Test

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

Product Specification subjective to this standard	
Sample 1	EUT with battery 1 and 1st PCB
Sample 2	EUT with battery 2 and 1st PCB
Sample 3	EUT with battery 1 and 2nd PCB
Antenna Type	WWAN: Fixed Internal Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS/GLONASS/BDS: PIFA Antenna NFC: Loop Antenna

Remark:

1. There are 1st PCB and 2nd PCB, the hardware change are USB board, antenna board and speaker module. Regarding the differences, perform full RSE testing on sample 1 and sample 3.
2. For the LTE setting which controlled by software, there are two Skus of device. Sku 1 supports LTE category 9 (up to 450 Mbps), and Sku 2 support category 11 (up to 600 Mbps) and 256QAM downlink. Since the differences, we only performed on Sku 2 device.
3. All tests were performed with sample 1.

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.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	TH05-HY	CO05-HY

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

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855	
Test Site No.	Sporton Site No.	
	03CH12-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 (Y 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	-	-

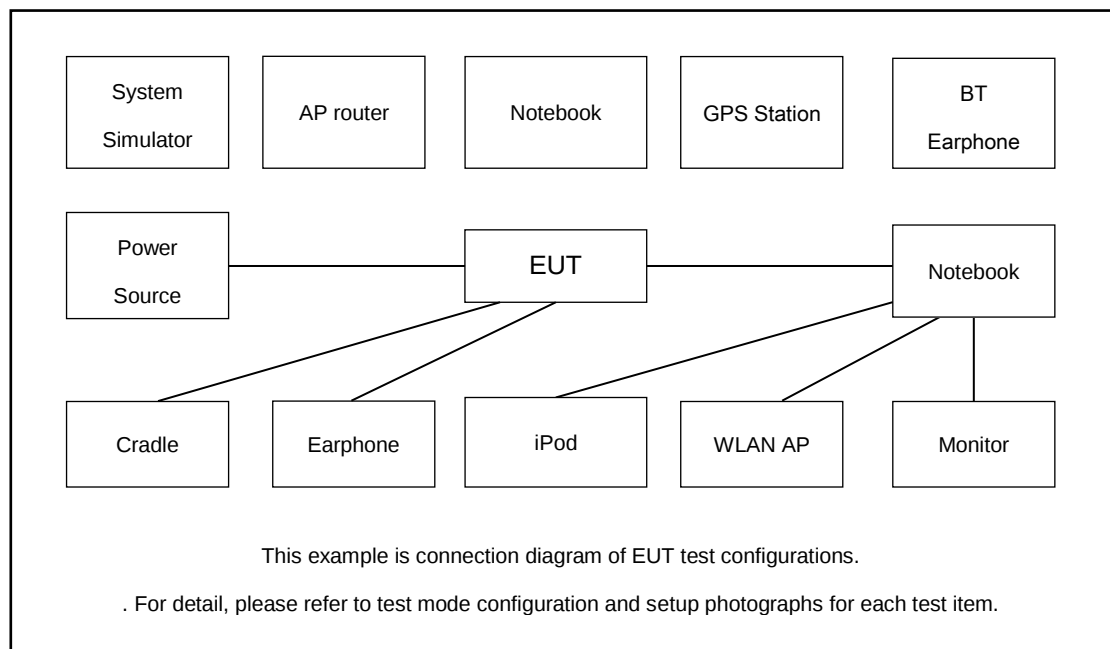
2.2 Test Mode

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
802.11n HT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1: Bluetooth Link + WLAN (2.4GHz) Link + Ant+ Link + NFC Link + USB Cable 1 (Charging from Adapter 1)
Remark: For Radiated Test Cases, The tests were performance with Adapter 1 and USB Cable 1.	

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.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8m
3.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	NFC Card	N/A	N/A	N/A	N/A	N/A
5.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items utility, "HTC SSD Test Tool" was installed in EUT which was programmed in order to make the EUT get into the engineering modes 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.

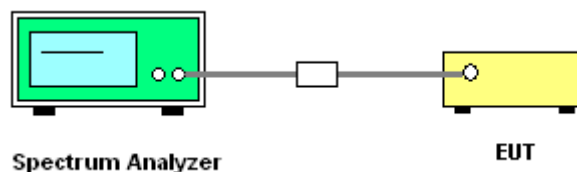
3.1.2 Measuring Instruments

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.

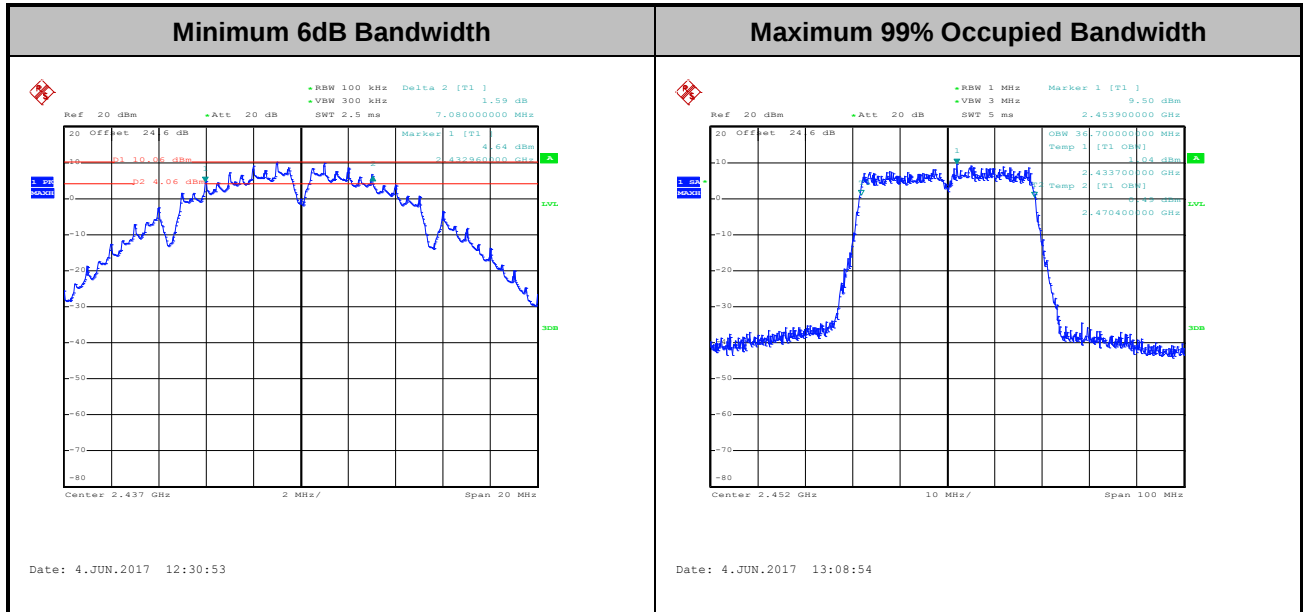
3.1.4 Test Setup





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.

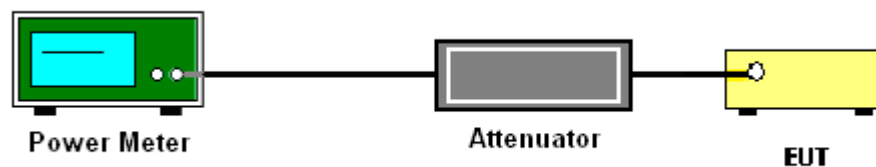
3.2.2 Measuring Instruments

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.

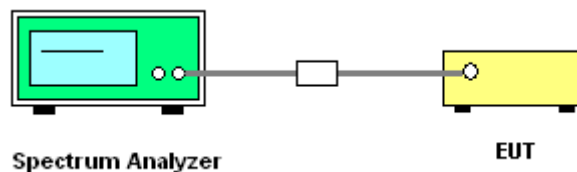
3.3.2 Measuring Instruments

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.

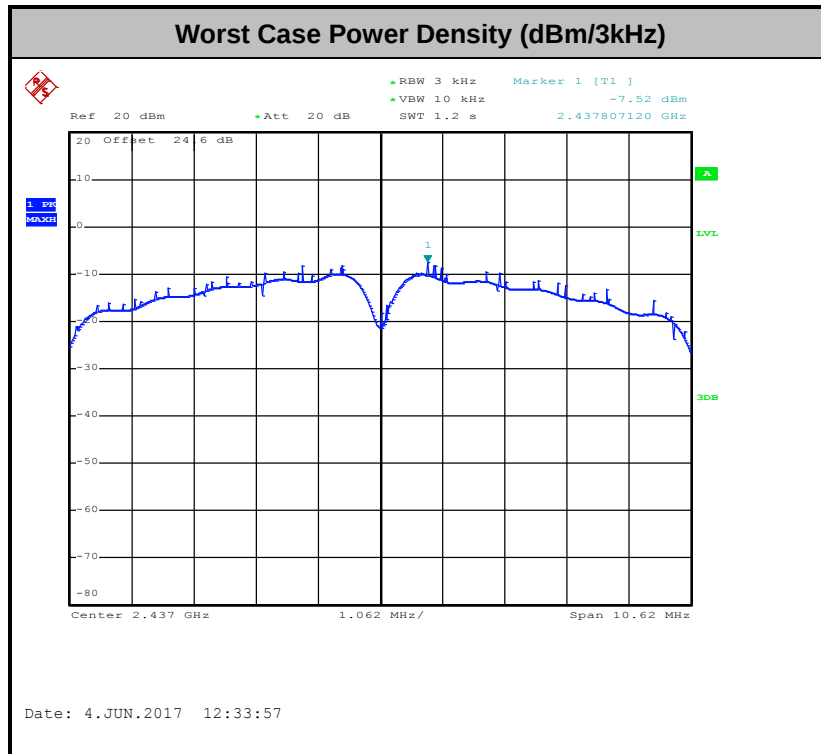
3.3.4 Test Setup





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.

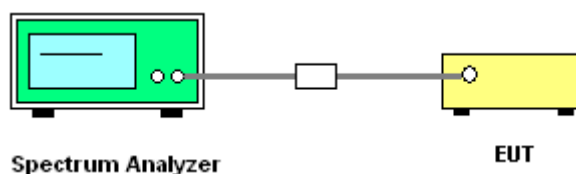
3.4.2 Measuring Instruments

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



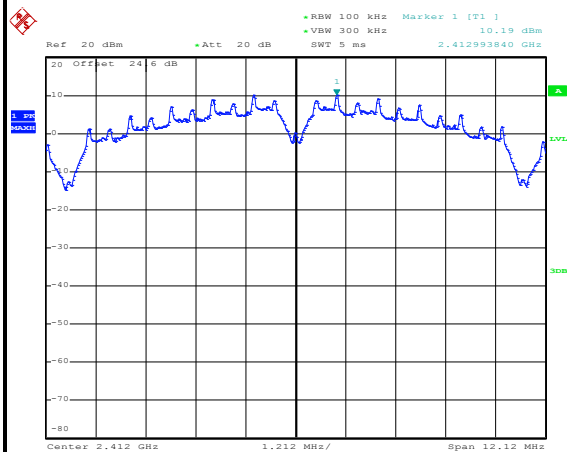


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

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

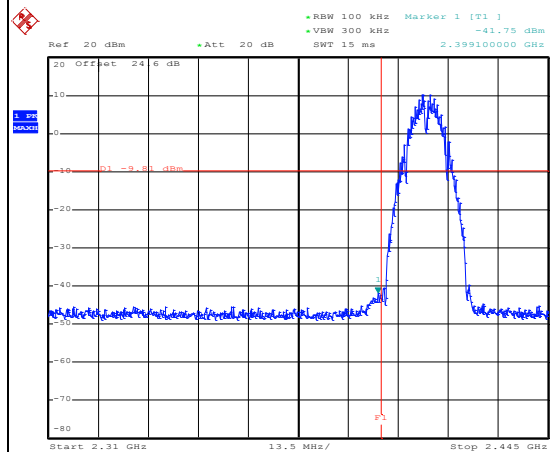
WLAN 802.11b Channel 01

100kHz PSD reference Level



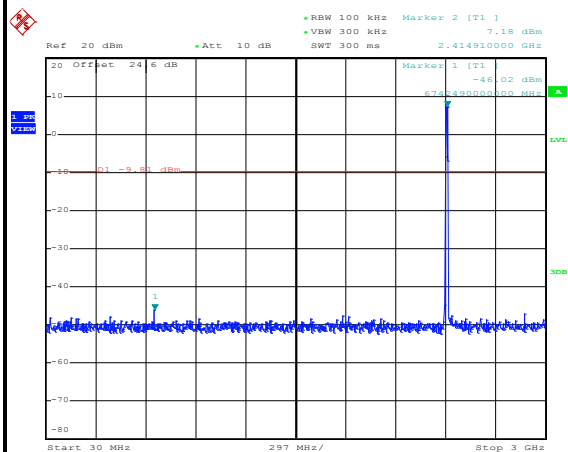
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Low Channel Plot



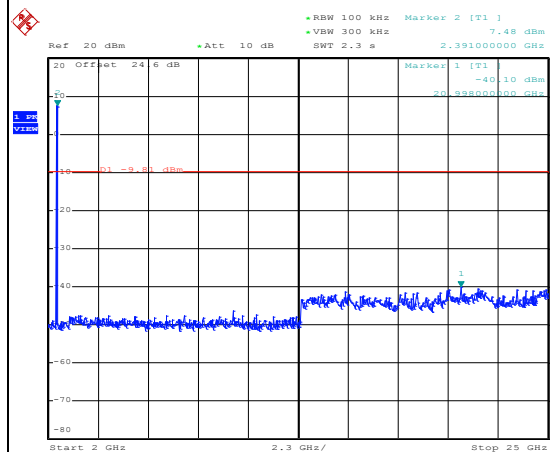
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Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:29:20

Spurious Emission 2GHz~25GHz



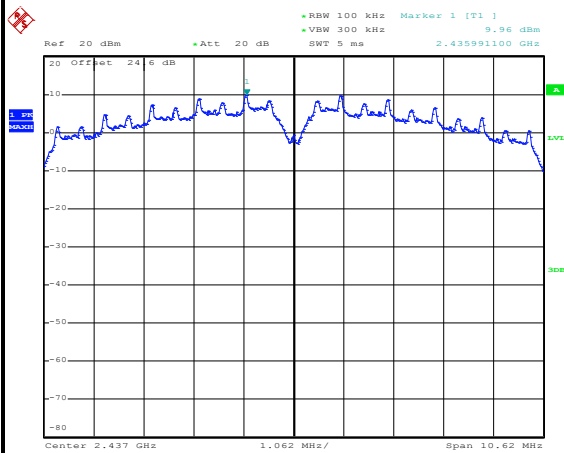
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Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54 %
Test Channel :	06	Test Engineer :	Shiming Liu and Bill Kuo

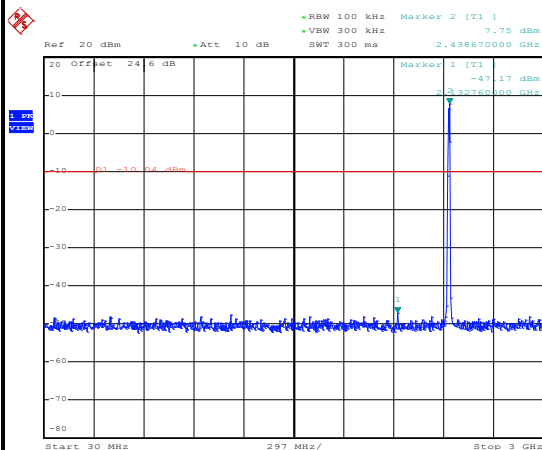
WLAN 802.11b Channel 06

100kHz PSD reference Level



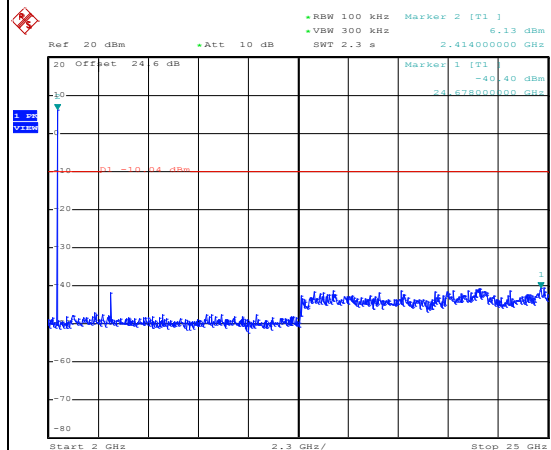
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Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:34:44

Spurious Emission 2GHz~25GHz



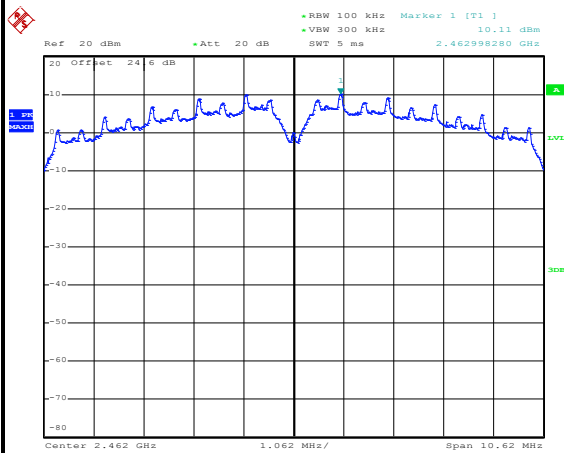
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Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54 %
Test Channel :	11	Test Engineer :	Shiming Liu and Bill Kuo

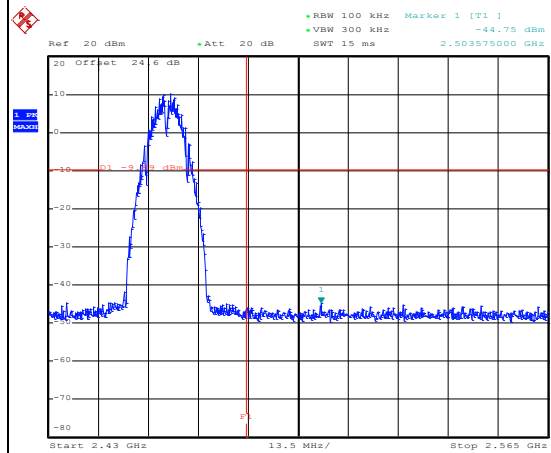
WLAN 802.11b Channel 11

100kHz PSD reference Level



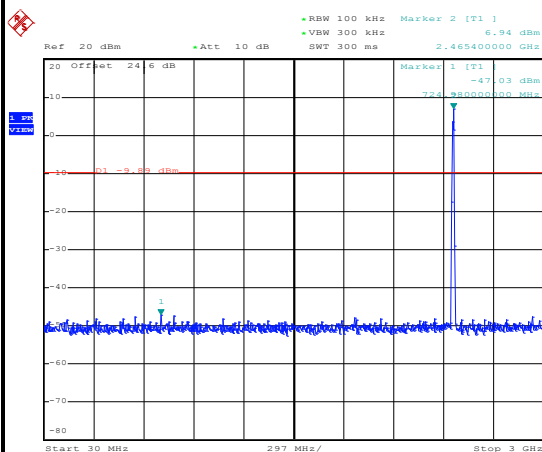
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High Channel Plot



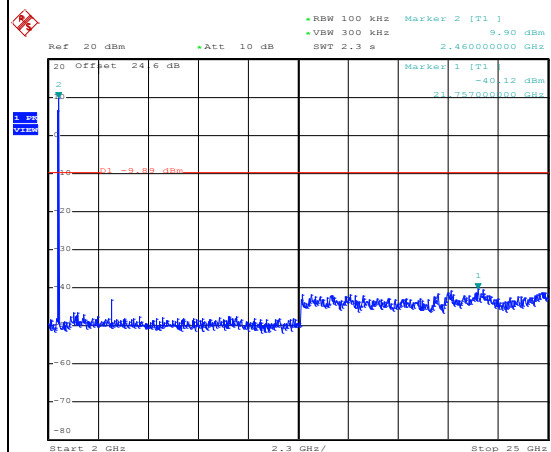
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Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:37:02

Spurious Emission 2GHz~25GHz



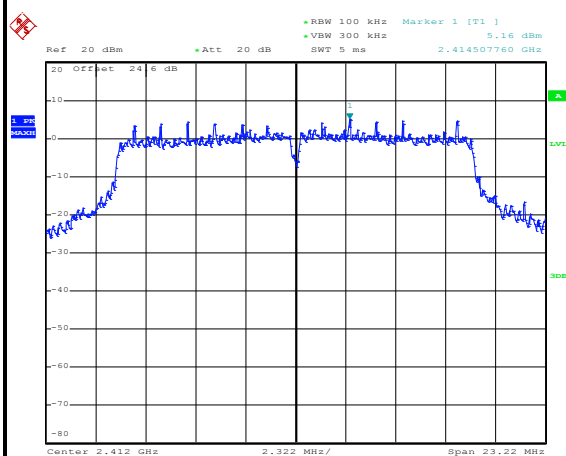
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Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54 %
Test Channel :	01	Test Engineer :	Shiming Liu and Bill Kuo

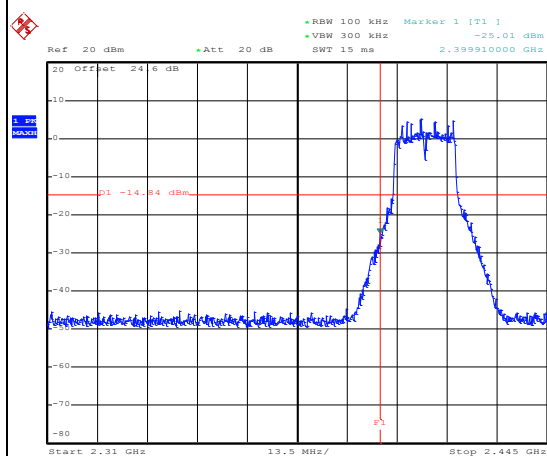
WLAN 802.11g Channel 01

100kHz PSD reference Level



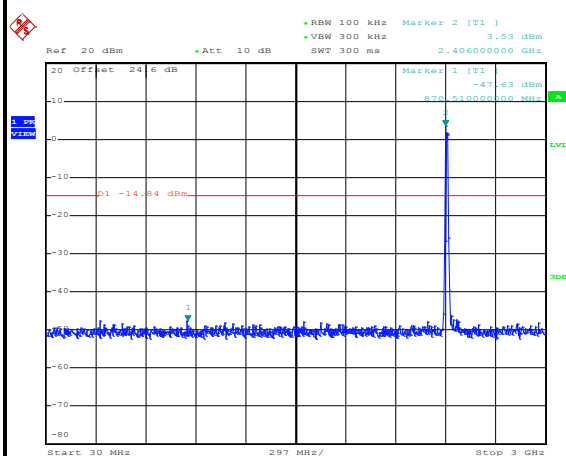
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Low Channel Plot



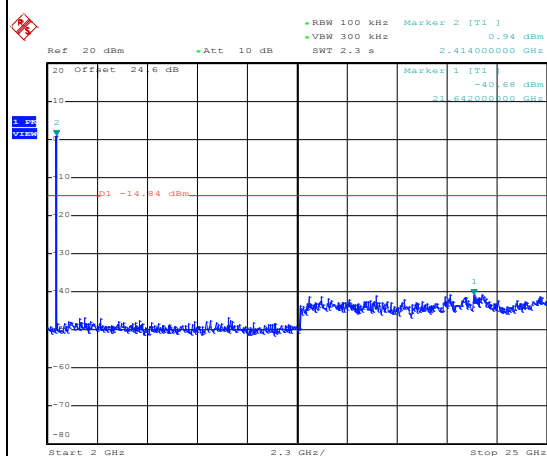
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Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:39:54

Spurious Emission 2GHz~25GHz



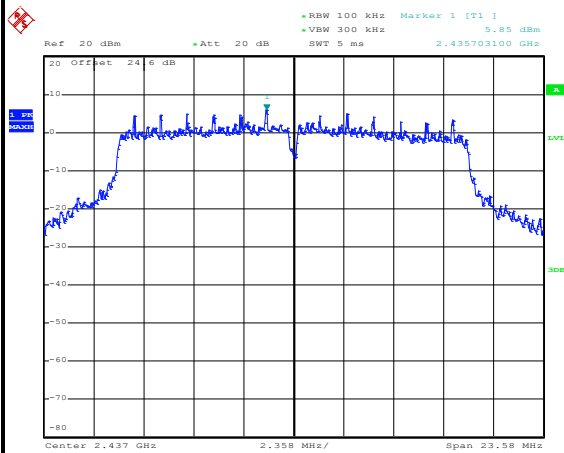
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Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54 %
Test Channel :	06	Test Engineer :	Shiming Liu and Bill Kuo

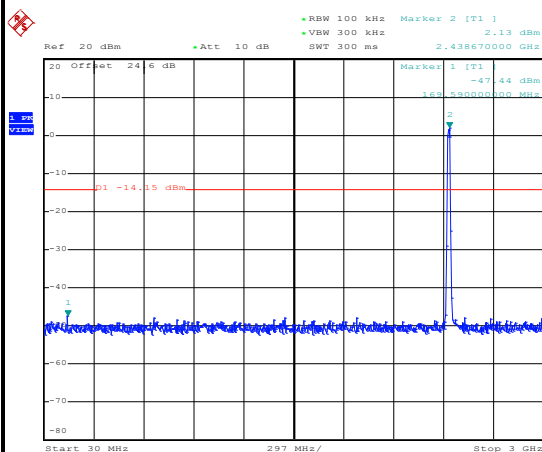
WLAN 802.11g Channel 06

100kHz PSD reference Level



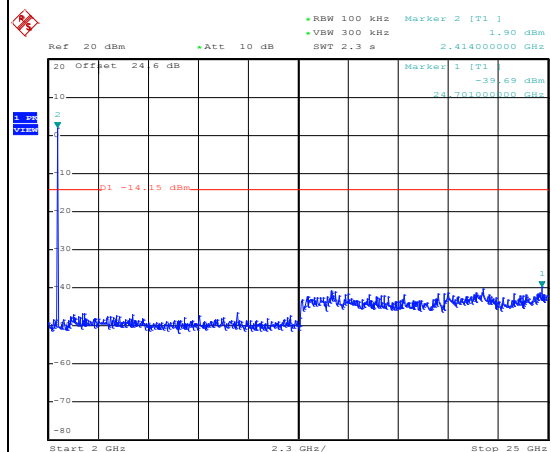
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Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:42:09

Spurious Emission 2GHz~25GHz



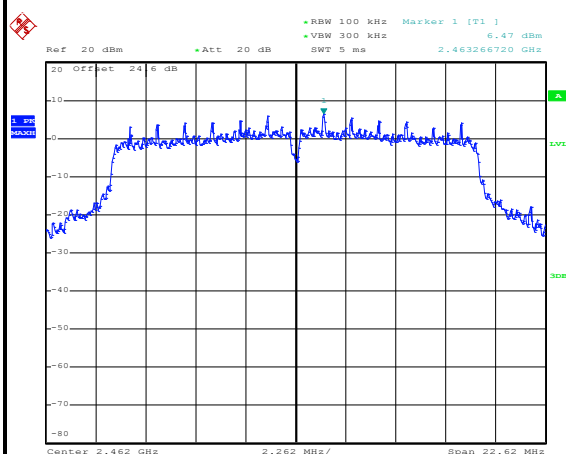
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Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54 %
Test Channel :	11	Test Engineer :	Shiming Liu and Bill Kuo

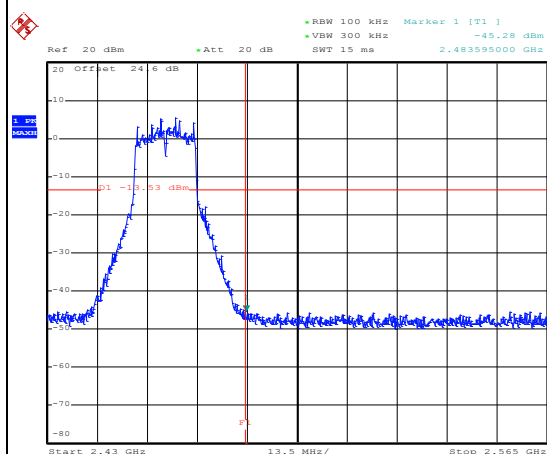
WLAN 802.11g Channel 11

100kHz PSD reference Level



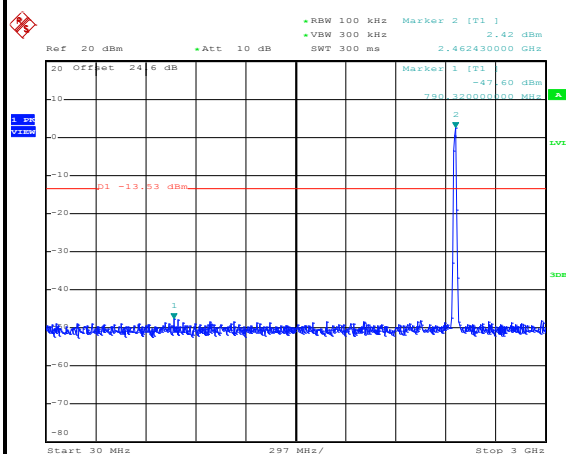
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High Channel Plot



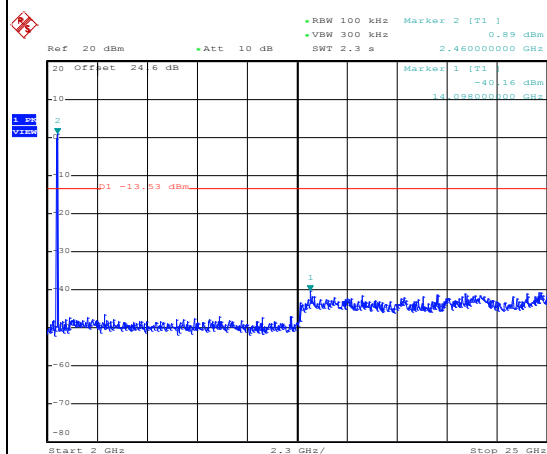
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Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:44:44

Spurious Emission 2GHz~25GHz



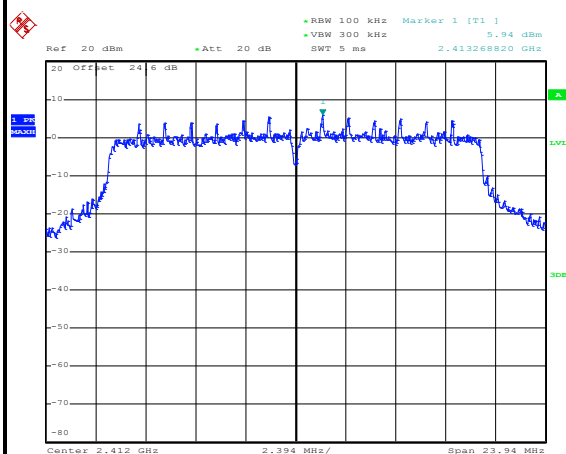
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Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54 %
Test Channel :	01	Test Engineer :	Shiming Liu and Bill Kuo

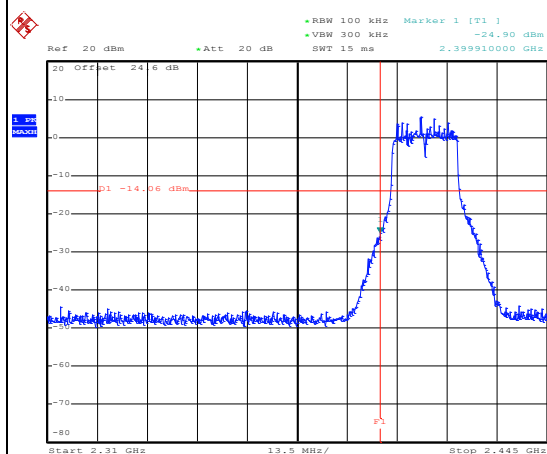
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



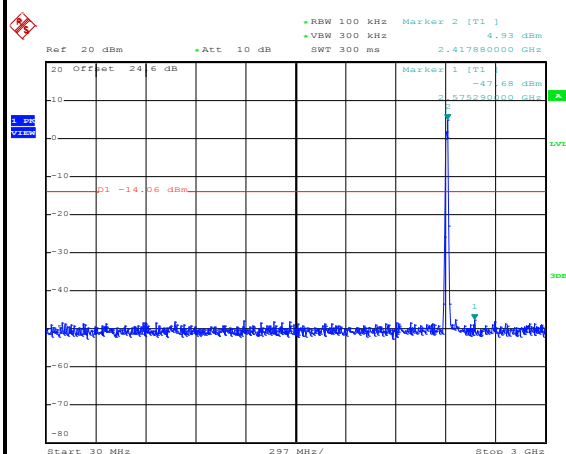
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Low Channel Plot



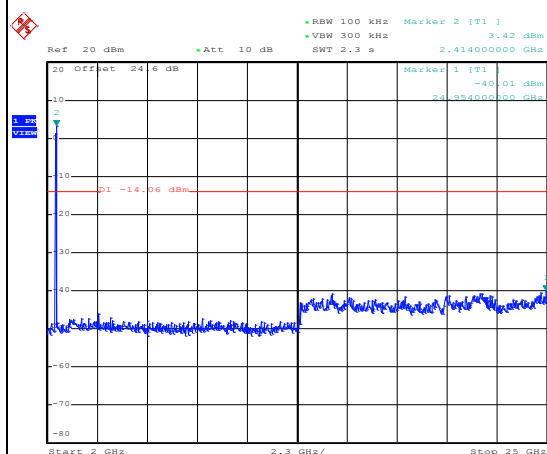
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Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:48:36

Spurious Emission 2GHz~25GHz

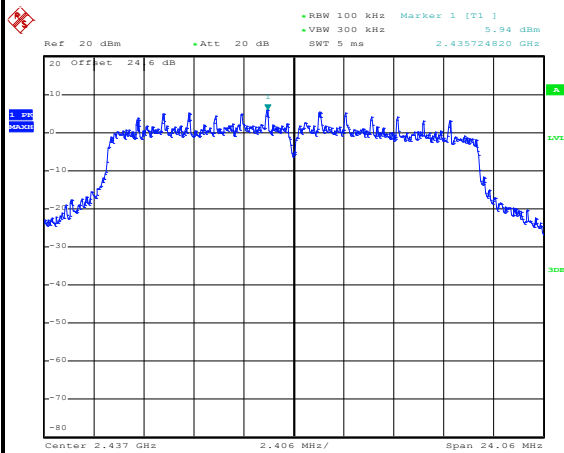


Date: 4.JUN.2017 12:48:45

Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54 %
Test Channel :	06	Test Engineer :	Shiming Liu and Bill Kuo

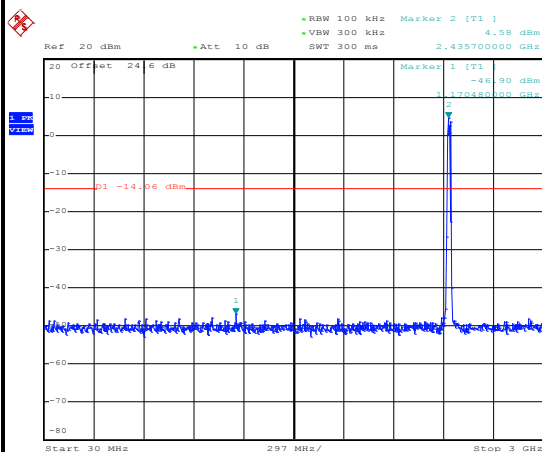
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



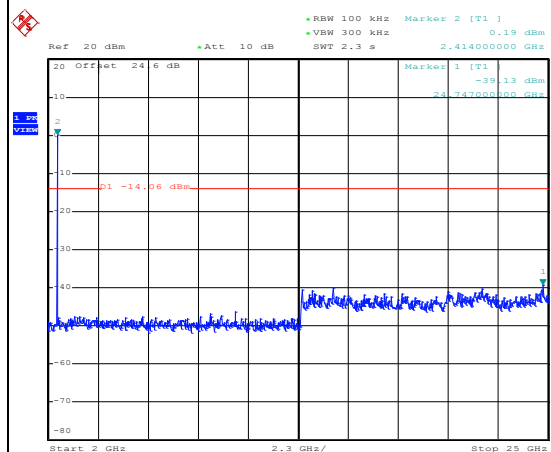
Date: 4.JUN.2017 12:51:56

Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:53:07

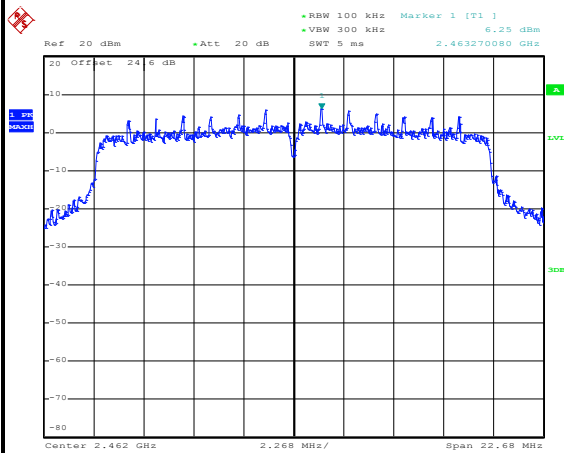
Spurious Emission 2GHz~25GHz



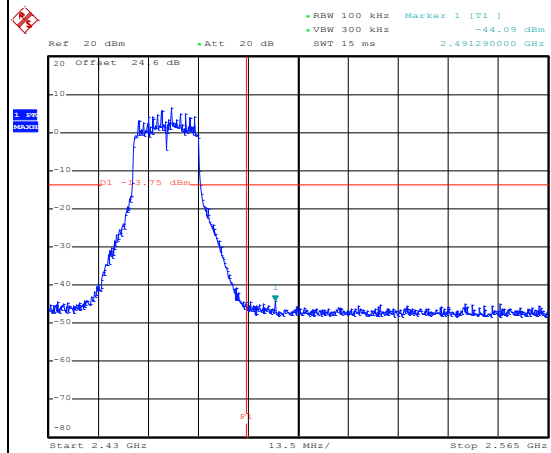
Date: 4.JUN.2017 12:53:16



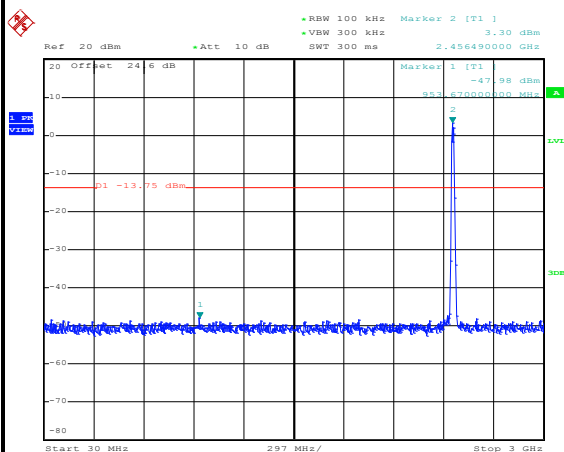
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54 %
Test Channel :	11	Test Engineer :	Shiming Liu and Bill Kuo

WLAN 802.11n HT20 Channel 11**100kHz PSD reference Level**

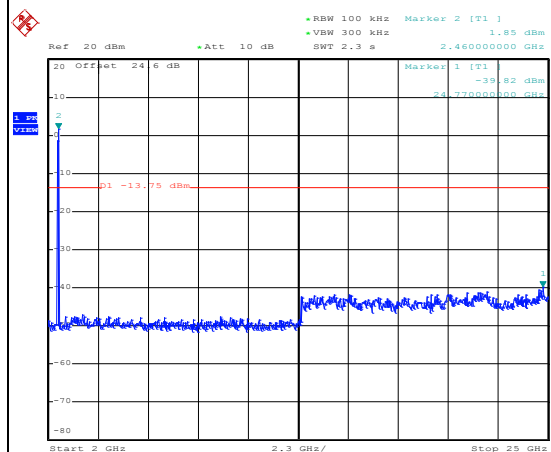
Date: 4.JUN.2017 12:55:10

High Channel Plot

Date: 4.JUN.2017 12:55:46

Spurious Emission 30MHz~3GHz

Date: 4.JUN.2017 12:55:58

Spurious Emission 2GHz~25GHz

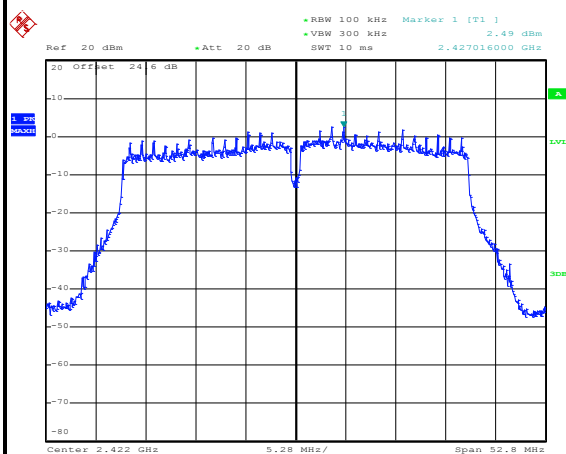
Date: 4.JUN.2017 12:56:06



Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54 %
Test Channel :	03	Test Engineer :	Shiming Liu and Bill Kuo

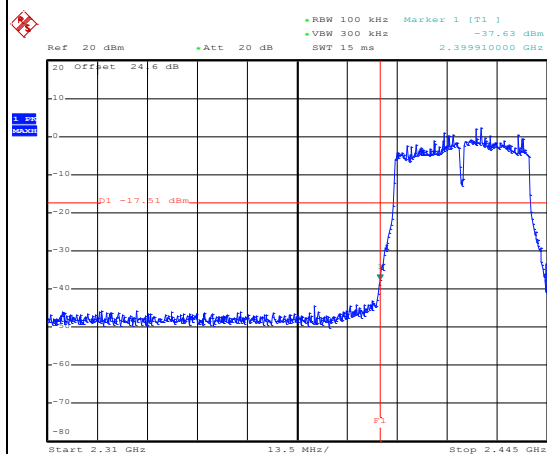
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



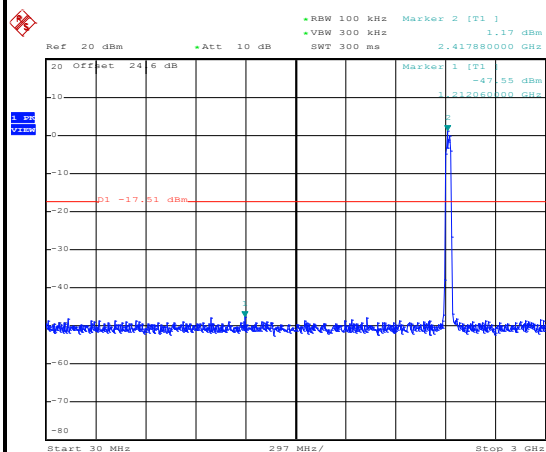
Date: 4.JUN.2017 12:58:15

Low Channel Plot



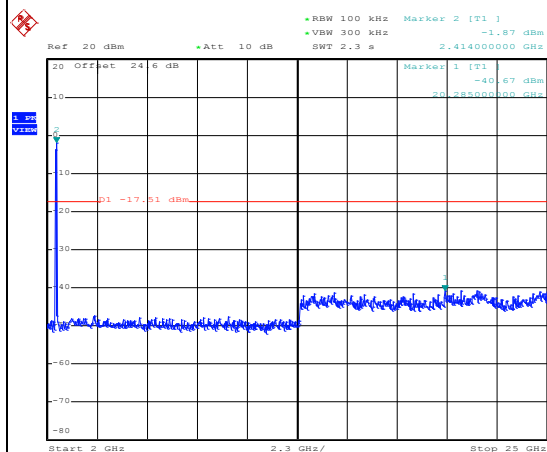
Date: 4.JUN.2017 12:58:27

Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 12:59:21

Spurious Emission 2GHz~25GHz



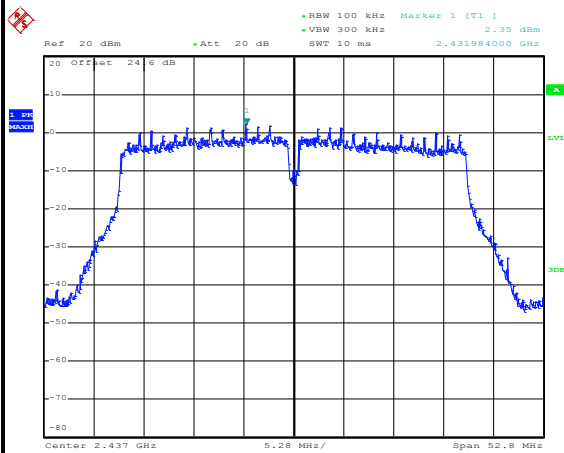
Date: 4.JUN.2017 12:59:30



Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54 %
Test Channel :	06	Test Engineer :	Shiming Liu and Bill Kuo

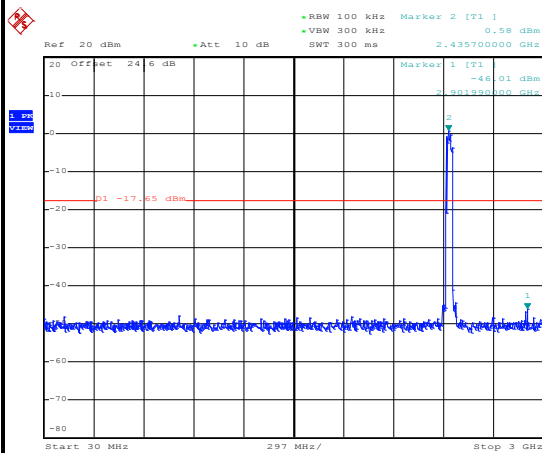
WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



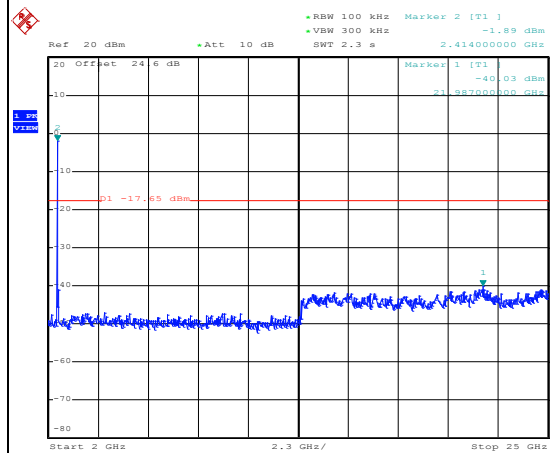
Date: 4.JUN.2017 13:01:31

Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 13:02:10

Spurious Emission 2GHz~25GHz



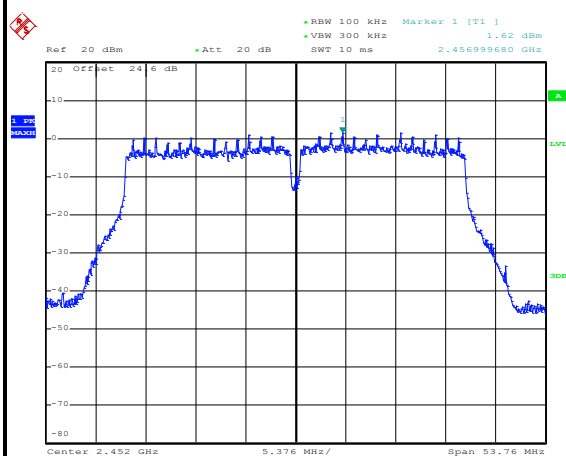
Date: 4.JUN.2017 13:02:18



Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54 %
Test Channel :	09	Test Engineer :	Shiming Liu and Bill Kuo

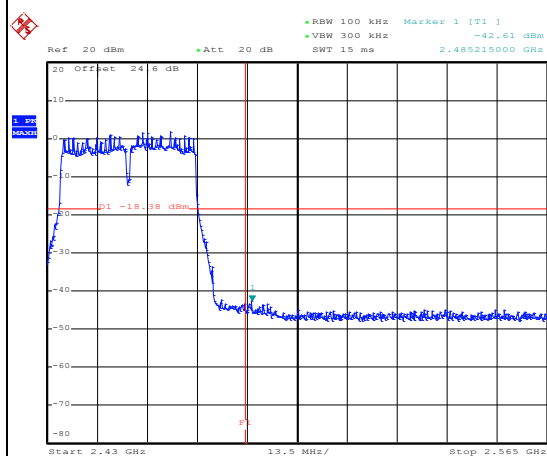
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



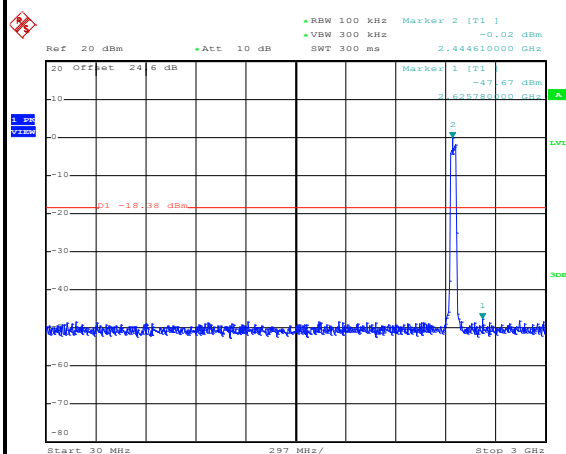
Date: 4.JUN.2017 13:06:44

High Channel Plot



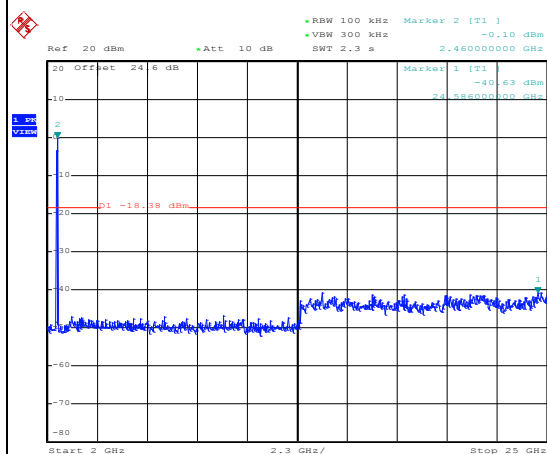
Date: 4.JUN.2017 13:08:15

Spurious Emission 30MHz~3GHz



Date: 4.JUN.2017 13:09:06

Spurious Emission 2GHz~25GHz



Date: 4.JUN.2017 13:09:14

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

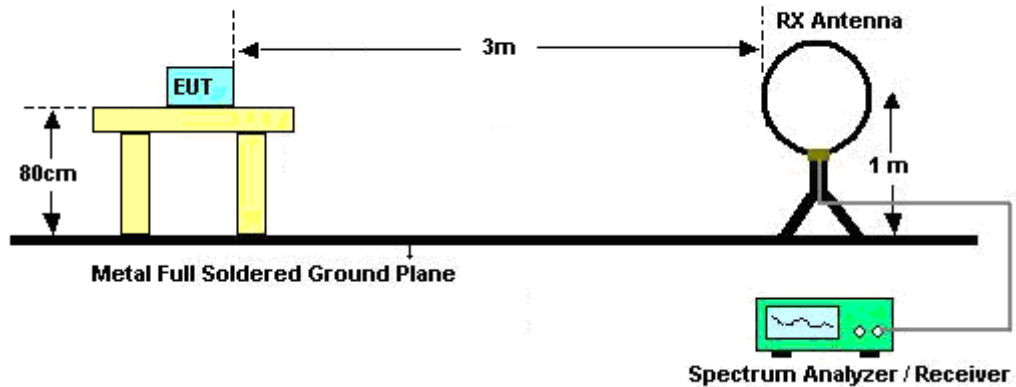
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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:

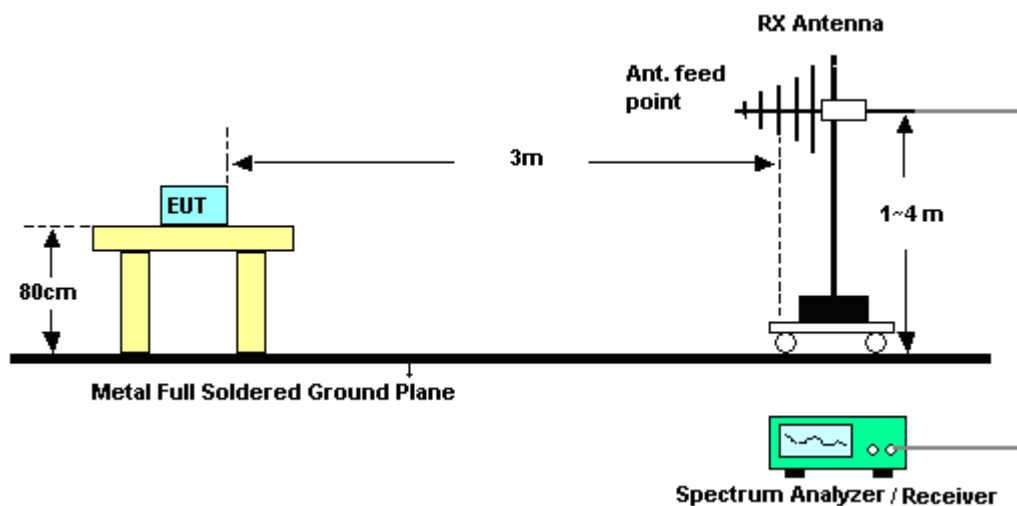
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

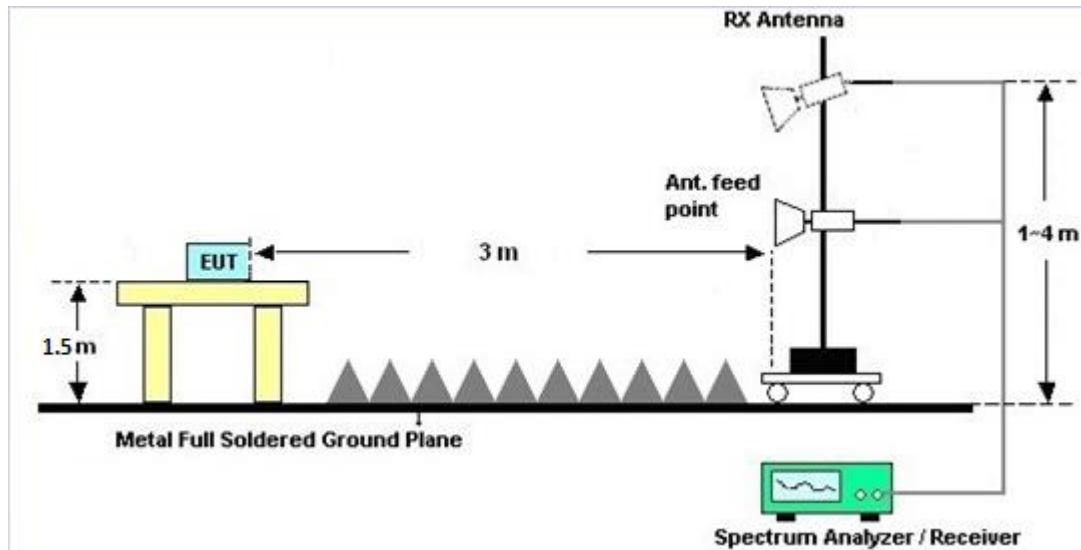
For radiated emissions below 30MHz



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 ~ 10th 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 μ 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.

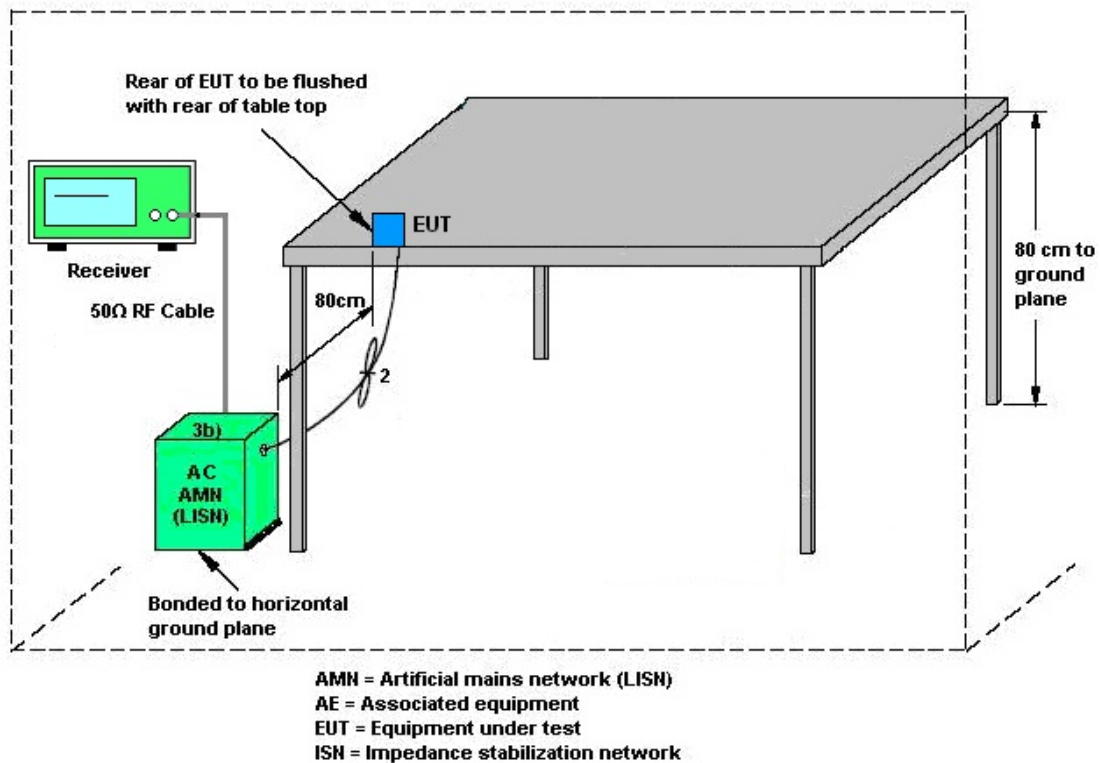
3.6.2 Measuring Instruments

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	0932001	300MHz~40GHz	Sep. 29, 2016	May 31, 2017 ~ Jun. 28, 2017	Sep. 28, 2017	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 29, 2016	May 31, 2017 ~ Jun. 28, 2017	Sep. 28, 2017	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz-40GHz	Jul. 17, 2016	May 31, 2017 ~ Jun. 28, 2017	Jul. 16, 2017	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 11, 2016	May 31, 2017 ~ Jun. 28, 2017	Oct. 10, 2017	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 25, 2017	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 30, 2016	Jun. 25, 2017	Aug. 29, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 29, 2016	Jun. 25, 2017	Nov. 28, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 06, 2016	Jun. 25, 2017	Dec. 05, 2017	Conduction (CO05-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 23, 2017	Jun. 13, 2017 ~ Jun. 21, 2017	Mar. 22, 2018	Radiation (03CH12-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Oct. 20, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Oct. 19, 2018	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	37059&01	30MHz~1GHz	Oct. 15, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Oct. 14, 2017	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 23, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Dec. 22, 2017	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 25, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Oct. 24, 2017	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1815698	1GHz~18GHz	Dec. 01, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Nov. 30, 2017	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 12, 2017	Jun. 13, 2017 ~ Jun. 21, 2017	Jan. 11, 2018	Radiation (03CH12-HY)
Filter	Wainwright	WLJ4-1000-1 530-6000-40S T	SN3	1.53 GHz Lowpass	Jul. 07, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Jul. 06, 2017	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60ST	SN2	3 GHz Highpass	Jul. 07, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Jul. 06, 2017	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Jun. 13, 2017 ~ Jun. 21, 2017	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jun. 13, 2017 ~ Jun. 21, 2017	N/A	Radiation (03CH12-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Jul. 15, 2017	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 08, 2016	Jun. 13, 2017 ~ Jun. 21, 2017	Nov. 07, 2017	Radiation (03CH12-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.70
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7
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Appendix A. Conducted Test Results

Report Number : FR752311C

Test Engineer:	Shiming Liu/Bill Kuo	Temperature:	21~25	°C
Test Date:	2017/05/31 ~ 2017/06/28	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band								
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	12.90	8.08	0.50	Pass
11b	1Mbps	1	6	2437	12.70	7.08	0.50	Pass
11b	1Mbps	1	11	2462	12.55	7.08	0.50	Pass
11g	6Mbps	1	1	2412	17.60	15.48	0.50	Pass
11g	6Mbps	1	6	2437	17.50	15.72	0.50	Pass
11g	6Mbps	1	11	2462	17.35	15.08	0.50	Pass
HT20	MCS0	1	1	2412	18.90	15.96	0.50	Pass
HT20	MCS0	1	6	2437	18.75	16.04	0.50	Pass
HT20	MCS0	1	11	2462	18.50	15.12	0.50	Pass
HT40	MCS0	1	3	2422	36.40	35.20	0.50	Pass
HT40	MCS0	1	6	2437	36.40	35.20	0.50	Pass
HT40	MCS0	1	9	2452	36.70	35.84	0.50	Pass

TEST RESULTS DATA
Peak Power Table

2.4GHz Band										
Mod.	Data Rate	NTX	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	20.60	30.00	-2.10	18.50	36.00	Pass
11b	1Mbps	1	6	2437	19.91	30.00	-2.10	17.81	36.00	Pass
11b	1Mbps	1	11	2462	20.78	30.00	-2.10	18.68	36.00	Pass
11g	6Mbps	1	1	2412	20.35	30.00	-2.10	18.25	36.00	Pass
11g	6Mbps	1	6	2437	20.60	30.00	-2.10	18.50	36.00	Pass
11g	6Mbps	1	11	2462	20.90	30.00	-2.10	18.80	36.00	Pass
HT20	MCS0	1	1	2412	20.35	30.00	-2.10	18.25	36.00	Pass
HT20	MCS0	1	6	2437	20.76	30.00	-2.10	18.66	36.00	Pass
HT20	MCS0	1	11	2462	20.77	30.00	-2.10	18.67	36.00	Pass
HT40	MCS0	1	3	2422	21.81	30.00	-2.10	19.71	36.00	Pass
HT40	MCS0	1	6	2437	21.93	30.00	-2.10	19.83	36.00	Pass
HT40	MCS0	1	9	2452	21.78	30.00	-2.10	19.68	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

2.4GHz Band						
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	18.10
11b	1Mbps	1	6	2437	0.00	17.03
11b	1Mbps	1	11	2462	0.00	18.01
11g	6Mbps	1	1	2412	0.30	15.84
11g	6Mbps	1	6	2437	0.30	15.96
11g	6Mbps	1	11	2462	0.30	15.97
HT20	MCS0	1	1	2412	0.31	15.87
HT20	MCS0	1	6	2437	0.31	15.98
HT20	MCS0	1	11	2462	0.31	15.99
HT40	MCS0	1	3	2422	0.58	15.70
HT40	MCS0	1	6	2437	0.58	15.88
HT40	MCS0	1	9	2452	0.58	15.63

TEST RESULTS DATA
Peak Power Density

2.4GHz Band								
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-7.90	-2.10	8.00	Pass
11b	1Mbps	1	6	2437	-7.52	-2.10	8.00	Pass
11b	1Mbps	1	11	2462	-8.11	-2.10	8.00	Pass
11g	6Mbps	1	1	2412	-11.58	-2.10	8.00	Pass
11g	6Mbps	1	6	2437	-11.87	-2.10	8.00	Pass
11g	6Mbps	1	11	2462	-10.81	-2.10	8.00	Pass
HT20	MCS0	1	1	2412	-10.76	-2.10	8.00	Pass
HT20	MCS0	1	6	2437	-11.18	-2.10	8.00	Pass
HT20	MCS0	1	11	2462	-10.48	-2.10	8.00	Pass
HT40	MCS0	1	3	2422	-15.55	-2.10	8.00	Pass
HT40	MCS0	1	6	2437	-14.53	-2.10	8.00	Pass
HT40	MCS0	1	9	2452	-15.00	-2.10	8.00	Pass



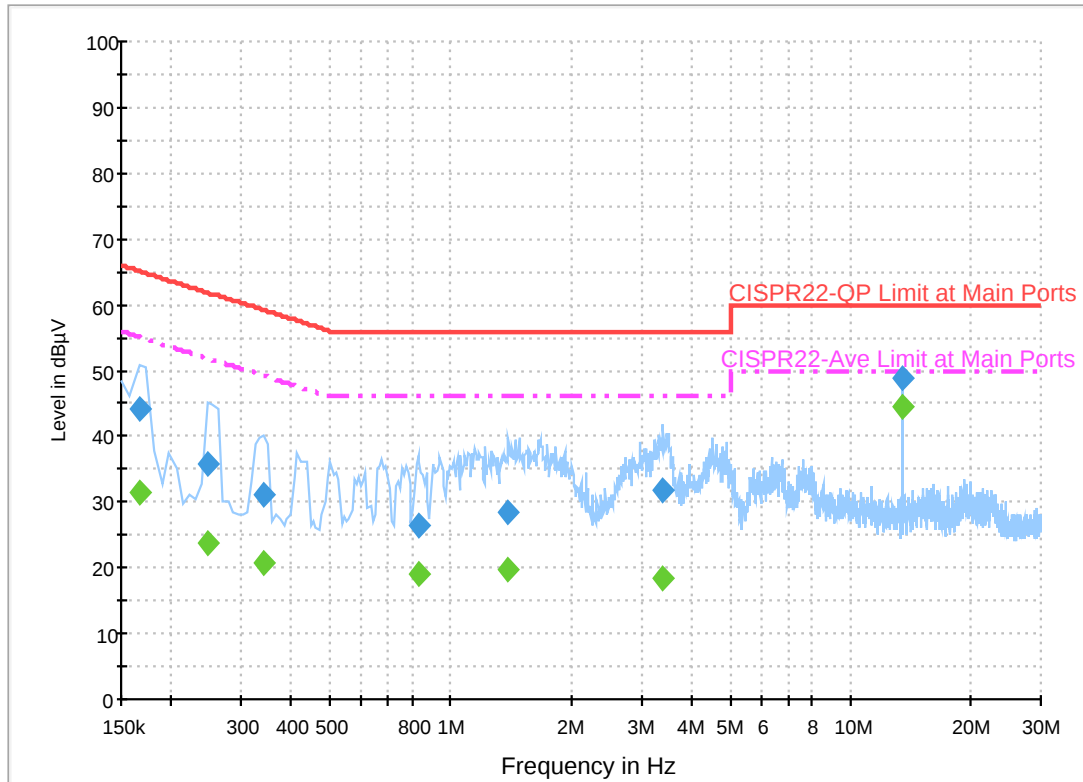
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Kai-Chun Chu	Temperature :	24~25°C
		Relative Humidity :	44~45%

EUT Information

Report NO : 752311
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)
0.166000	44.1	Off	L1	19.6	21.1	65.2
0.246000	35.6	Off	L1	19.6	26.3	61.9
0.342000	31.0	Off	L1	19.6	28.2	59.2
0.830000	26.5	Off	L1	19.6	29.5	56.0
1.398000	28.3	Off	L1	19.6	27.7	56.0
3.414000	31.8	Off	L1	19.6	24.2	56.0
13.558000	48.8	Off	L1	20.2	11.2	60.0

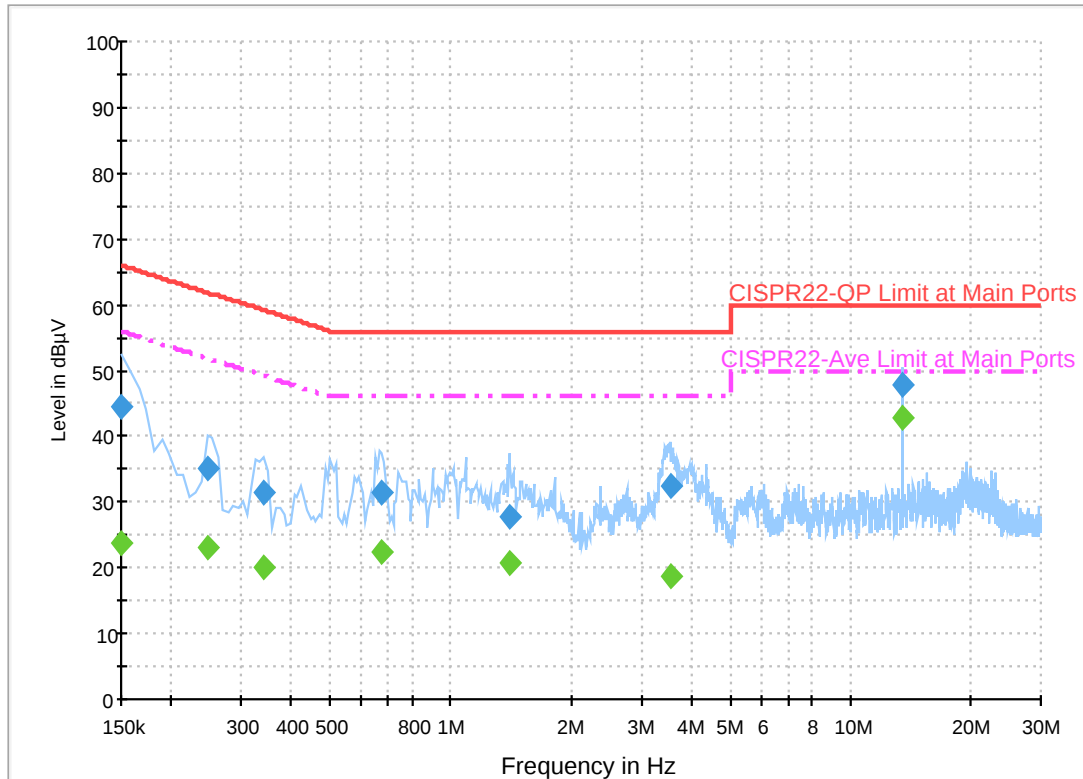
Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	31.3	Off	L1	19.6	23.9	55.2
0.246000	23.8	Off	L1	19.6	28.1	51.9
0.342000	20.9	Off	L1	19.6	28.3	49.2
0.830000	19.1	Off	L1	19.6	26.9	46.0
1.398000	19.6	Off	L1	19.6	26.4	46.0
3.414000	18.4	Off	L1	19.6	27.6	46.0
13.558000	44.5	Off	L1	20.2	5.5	50.0

EUT Information

Report NO : 752311
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	44.5	Off	N	19.5	21.5	66.0
0.246000	35.0	Off	N	19.5	26.9	61.9
0.342000	31.6	Off	N	19.5	27.6	59.2
0.670000	31.5	Off	N	19.5	24.5	56.0
1.406000	27.9	Off	N	19.6	28.1	56.0
3.550000	32.3	Off	N	19.6	23.7	56.0
13.558000	47.8	Off	N	20.3	12.2	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	23.8	Off	N	19.5	32.2	56.0
0.246000	23.2	Off	N	19.5	28.7	51.9
0.342000	20.0	Off	N	19.5	29.2	49.2
0.670000	22.5	Off	N	19.5	23.5	46.0
1.406000	20.8	Off	N	19.6	25.2	46.0
3.550000	18.8	Off	N	19.6	27.2	46.0
13.558000	42.9	Off	N	20.3	7.1	50.0



Appendix C. Radiated Spurious Emission

Test Engineer :	Peter Liao and Nick Yu	Temperature :	21~23°C
		Relative Humidity :	54~56%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)
802.11b CH 01 2412MHz		2352.105	53.91	-20.09	74	44.42	26.96	4	31.5	319	27	P	H
		2390	41.28	-12.72	54	31.64	27.07	4.03	31.49	319	27	A	H
	*	2412	105.32	-	-	95.59	27.14	4.05	31.49	319	27	P	H
	*	2412	100.95	-	-	91.22	27.14	4.05	31.49	319	27	A	H
													H
													H
		2321.865	53.35	-20.65	74	43.98	26.87	3.98	31.51	267	302	P	V
		2390	41.33	-12.67	54	31.69	27.07	4.03	31.49	267	302	A	V
	*	2412	106.12	-	-	96.39	27.14	4.05	31.49	267	302	P	V
	*	2412	101.77	-	-	92.04	27.14	4.05	31.49	267	302	A	V
													V
													V
802.11b CH 06 2437MHz		2336.04	53.35	-20.65	74	43.94	26.91	3.98	31.51	268	33	P	H
		2388.82	41.31	-12.69	54	31.67	27.07	4.03	31.49	268	33	A	H
	*	2437	104.23	-	-	94.4	27.21	4.07	31.48	268	33	P	H
	*	2437	99.99	-	-	90.16	27.21	4.07	31.48	268	33	A	H
		2496.01	53.81	-20.19	74	43.74	27.39	4.11	31.46	268	33	P	H
		2497.13	41.61	-12.39	54	31.54	27.39	4.11	31.46	268	33	A	H
		2349.76	54.03	-19.97	74	44.55	26.95	4	31.5	261	298	P	V
		2389.1	41.24	-12.76	54	31.6	27.07	4.03	31.49	261	298	A	V
	*	2437	105.4	-	-	95.57	27.21	4.07	31.48	261	298	P	V
	*	2437	101.13	-	-	91.3	27.21	4.07	31.48	261	298	A	V
		2495.38	53.12	-20.88	74	43.05	27.39	4.11	31.46	261	298	P	V
		2484.74	41.56	-12.44	54	31.54	27.35	4.11	31.47	261	298	A	V



802.11b CH 11 2462MHz	*	2462	103.94	-	-	94.01	27.29	4.08	31.47	341	25	P	H
	*	2462	99.55	-	-	89.62	27.29	4.08	31.47	341	25	A	H
		2483.72	54.02	-19.98	74	44	27.35	4.11	31.47	341	25	P	H
		2483.88	41.58	-12.42	54	31.56	27.35	4.11	31.47	341	25	A	H
													H
													H
	*	2462	105.3	-	-	95.37	27.29	4.08	31.47	400	324	P	V
	*	2462	100.94	-	-	91.01	27.29	4.08	31.47	400	324	A	V
		2498.56	53.86	-20.14	74	43.78	27.4	4.11	31.46	400	324	P	V
		2484.52	41.62	-12.38	54	31.6	27.35	4.11	31.47	400	324	A	V
													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 802.11b (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	52.56	-21.44	74	71.99	32.18	6.17	58.31	194	0	P	H
		4824	49.07	-4.93	54	68.5	32.18	6.17	58.31	194	0	A	H
													H
													H
		4824	50.55	-23.45	74	69.98	32.18	6.17	58.31	182	204	P	V
		4824	46.18	-7.82	54	65.61	32.18	6.17	58.31	182	204	A	V
													V
													V
802.11b CH 06 2437MHz		4874	56.59	-17.41	74	75.83	32.27	6.21	58.24	206	0	P	H
		4874	53.75	-0.25	54	72.99	32.27	6.21	58.24	206	0	A	H
		7311	43.72	-30.28	74	57.77	36.97	7.72	59.09	100	0	P	H
													H
		4874	55.43	-18.57	74	74.67	32.27	6.21	58.24	154	205	P	V
		4874	52.24	-1.76	54	71.48	32.27	6.21	58.24	154	205	A	V
		7311	43.89	-30.11	74	57.94	36.97	7.72	59.09	100	0	P	V
													V
802.11b CH 11 2462MHz		4924	56.14	-17.86	74	75.23	32.36	6.23	58.18	187	0	P	H
		4924	53.2	-0.8	54	72.29	32.36	6.23	58.18	187	0	A	H
		7386	44.36	-29.64	74	58.31	37.18	7.72	59.14	100	0	P	H
													H
		4924	54.54	-19.46	74	73.63	32.36	6.23	58.18	202	193	P	V
		4924	51.26	-2.74	54	70.35	32.36	6.23	58.18	202	193	A	V
		7386	43.74	-30.26	74	57.69	37.18	7.72	59.14	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		2331.105	53.44	-20.56	74	44.05	26.89	3.98	31.51	319	27	P	H
		2389.275	42.25	-11.75	54	32.61	27.07	4.03	31.49	319	27	A	H
	*	2412	103.31	-	-	93.58	27.14	4.05	31.49	319	27	P	H
	*	2412	93.85	-	-	84.12	27.14	4.05	31.49	319	27	A	H
													H
													H
		2348.745	53.36	-20.64	74	43.88	26.95	4	31.5	241	307	P	V
		2388.75	42.25	-11.75	54	32.61	27.07	4.03	31.49	241	307	A	V
	*	2412	105.1	-	-	95.37	27.14	4.05	31.49	241	307	P	V
	*	2412	95.01	-	-	85.28	27.14	4.05	31.49	241	307	A	V
													V
													V
802.11n HT20 CH 06 2437MHz		2386.58	53.22	-20.78	74	43.59	27.06	4.03	31.49	317	26	P	H
		2389.66	42.09	-11.91	54	32.45	27.07	4.03	31.49	317	26	A	H
	*	2437	103.43	-	-	93.6	27.21	4.07	31.48	317	26	P	H
	*	2437	93.79	-	-	83.96	27.21	4.07	31.48	317	26	A	H
		2490.62	53.49	-20.51	74	43.45	27.37	4.11	31.47	317	26	P	H
		2487.96	42.7	-11.3	54	32.67	27.36	4.11	31.47	317	26	A	H
		2369.36	53.88	-20.12	74	44.32	27.01	4.01	31.49	262	305	P	V
		2385.88	42.01	-11.99	54	32.38	27.06	4.03	31.49	262	305	A	V
	*	2437	105.6	-	-	95.77	27.21	4.07	31.48	262	305	P	V
	*	2437	95.5	-	-	85.67	27.21	4.07	31.48	262	305	A	V
		2492.02	53.91	-20.09	74	43.85	27.38	4.11	31.46	262	305	P	V
		2487.61	42.58	-11.42	54	32.55	27.36	4.11	31.47	262	305	A	V



802.11n HT20 CH 11 2462MHz	*	2462	102.64	-	-	92.71	27.29	4.08	31.47	303	26	P	H
	*	2462	92.43	-	-	82.5	27.29	4.08	31.47	303	26	A	H
		2485.32	54.26	-19.74	74	44.23	27.36	4.11	31.47	303	26	P	H
		2483.76	43.15	-10.85	54	33.13	27.35	4.11	31.47	303	26	A	H
													H
													H
	*	2462	104.6	-	-	94.67	27.29	4.08	31.47	255	304	P	V
	*	2462	94.13	-	-	84.2	27.29	4.08	31.47	255	304	A	V
		2483.76	54.61	-19.39	74	44.59	27.35	4.11	31.47	255	304	P	V
		2483.76	43.37	-10.63	54	33.35	27.35	4.11	31.47	255	304	A	V
													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 (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	45.29	-28.71	74	64.72	32.18	6.17	58.31	100	0	P	H
													H
													H
													H
		4824	44.56	-29.44	74	63.99	32.18	6.17	58.31	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4874	56.63	-17.37	74	75.87	32.27	6.21	58.24	167	345	P	H
		4874	40.5	-13.5	54	59.74	32.27	6.21	58.24	167	345	A	H
		7311	45.23	-28.77	74	59.28	36.97	7.72	59.09	100	0	P	H
													H
		4874	54.6	-19.4	74	73.84	32.27	6.21	58.24	400	185	P	V
		4874	38.32	-15.68	54	57.56	32.27	6.21	58.24	400	185	A	V
		7311	45.51	-28.49	74	59.56	36.97	7.72	59.09	100	0	P	V
													V
802.11n HT20 CH 11 2462MHz		4924	49.73	-24.27	74	68.82	32.36	6.23	58.18	100	0	P	H
		7386	45.28	-28.72	74	59.23	37.18	7.72	59.14	100	0	P	H
													H
													H
		4924	48.45	-25.55	74	67.54	32.36	6.23	58.18	100	0	P	V
		7386	45.59	-28.41	74	59.54	37.18	7.72	59.14	100	0	P	V
													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 HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 03 2422MHz		2374.12	53.34	-20.66	74	43.77	27.02	4.01	31.49	309	27	P	H
		2389.66	43.2	-10.8	54	33.56	27.07	4.03	31.49	309	27	A	H
	*	2422	101.78	-	-	92.01	27.17	4.05	31.48	309	27	P	H
	*	2422	91.84	-	-	82.07	27.17	4.05	31.48	309	27	A	H
		2499.65	53.48	-20.52	74	43.4	27.4	4.11	31.46	309	27	P	H
		2488.31	43.1	-10.9	54	33.07	27.36	4.11	31.47	309	27	A	H
		2361.38	53.69	-20.31	74	44.17	26.98	4.01	31.5	331	322	P	V
		2389.52	43.81	-10.19	54	34.17	27.07	4.03	31.49	331	322	A	V
	*	2422	102.09	-	-	92.32	27.17	4.05	31.48	331	322	P	V
	*	2422	93.1	-	-	83.33	27.17	4.05	31.48	331	322	A	V
		2493.21	53.32	-20.68	74	43.26	27.38	4.11	31.46	331	322	P	V
		2490.41	43.39	-10.61	54	33.35	27.37	4.11	31.47	331	322	A	V
802.11n HT40 CH 06 2437MHz		2330.72	53.12	-20.88	74	43.73	26.89	3.98	31.51	311	28	P	H
		2334.92	42.79	-11.21	54	33.39	26.9	3.98	31.51	311	28	A	H
	*	2437	101.02	-	-	91.19	27.21	4.07	31.48	311	28	P	H
	*	2437	91.16	-	-	81.33	27.21	4.07	31.48	311	28	A	H
		2485.3	54.52	-19.48	74	44.49	27.36	4.11	31.47	311	28	P	H
		2483.69	43.46	-10.54	54	33.44	27.35	4.11	31.47	311	28	A	H
		2389.1	53.67	-20.33	74	44.03	27.07	4.03	31.49	302	335	P	V
		2374.4	42.74	-11.26	54	33.17	27.02	4.01	31.49	302	335	A	V
	*	2437	101.57	-	-	91.74	27.21	4.07	31.48	302	335	P	V
	*	2437	92.07	-	-	82.24	27.21	4.07	31.48	302	335	A	V
		2496.64	53.41	-20.59	74	43.34	27.39	4.11	31.46	302	335	P	V
		2488.45	43.18	-10.82	54	33.14	27.37	4.11	31.47	302	335	A	V



802.11n HT40 CH 09 2452MHz		2325.82	52.9	-21.1	74	43.52	26.88	3.98	31.51	339	23	P	H
		2387	42.89	-11.11	54	33.26	27.06	4.03	31.49	339	23	A	H
	*	2452	100.19	-	-	90.29	27.26	4.08	31.47	339	23	P	H
	*	2452	90.21	-	-	80.31	27.26	4.08	31.47	339	23	A	H
		2484.74	54.42	-19.58	74	44.4	27.35	4.11	31.47	339	23	P	H
		2484.11	44.37	-9.63	54	34.35	27.35	4.11	31.47	339	23	A	H
		2362.78	54.29	-19.71	74	44.76	26.99	4.01	31.5	293	331	P	V
		2367.26	42.84	-11.16	54	33.29	27	4.01	31.49	293	331	A	V
	*	2452	101.82	-	-	91.92	27.26	4.08	31.47	293	331	P	V
	*	2452	91.68	-	-	81.78	27.26	4.08	31.47	293	331	A	V
		2484.67	54.6	-19.4	74	44.58	27.35	4.11	31.47	293	331	P	V
		2483.69	45.26	-8.74	54	35.24	27.35	4.11	31.47	293	331	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11b (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 802.11b LF		30.54	24.03	-15.97	40	29.89	23.89	0.48	30.19	100	0	P	H
		90.48	20.81	-22.69	43.5	35.56	14.84	0.76	30.41	-	-	P	H
		193.89	20.13	-23.37	43.5	34.07	15.06	1.14	30.28	-	-	P	H
		565.3	27.95	-18.05	46	29.54	26.09	1.92	29.71	-	-	P	H
		735.4	30.01	-15.99	46	29.29	27.9	2.18	29.46	-	-	P	H
		975.5	34.11	-19.89	54	29.28	31.08	2.53	29.01	-	-	P	H
													H
													H
													H
													H
													H
													H
		36.75	30.04	-9.96	40	38.8	21.05	0.48	30.27	100	0	P	V
		89.94	21.99	-21.51	43.5	36.74	14.84	0.76	30.41	-	-	P	V
		261.39	20.76	-25.24	46	29.56	19.92	1.32	30.19	-	-	P	V
		662.6	29.25	-16.75	46	30.13	26.54	2.05	29.58	-	-	P	V
		860.7	32.87	-13.13	46	30.15	29.46	2.36	29.23	-	-	P	V
		976.2	34.23	-19.77	54	29.4	31.08	2.53	29.01	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



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 :	Peter Liao and Nick Yu	Temperature :	21~23℃
		Relative Humidity :	54~56%

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	Site : 03CH12-HY Condition : PEAK, BE, 74 3m HORN, 91200, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 13	Site : 03CH12-HY Condition : PEAK, 74 3m HORN, 91200, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 13
Avg.	Site : 03CH12-HY Condition : AVG, BE, 54 3m HORN, 91200, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 13	Site : 03CH12-HY Condition : AVG, 54 3m HORN, 91200, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 13

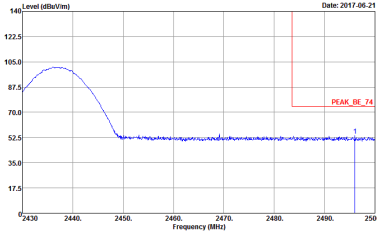
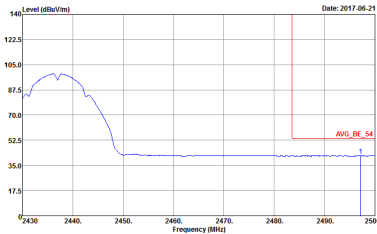


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Vertical	Fundamental
Peak	Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 13	Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 13
Avg.	Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 : 13	Site : 03CH12-HY Condition : AVG_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 : 13

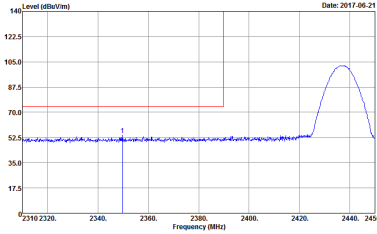
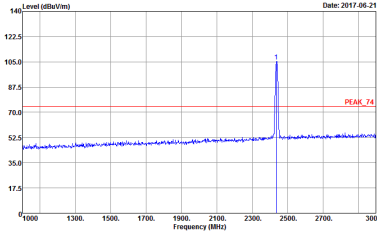
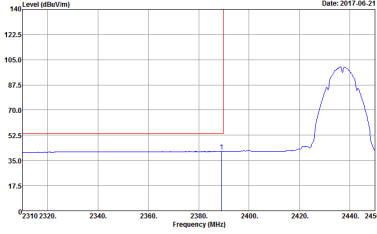
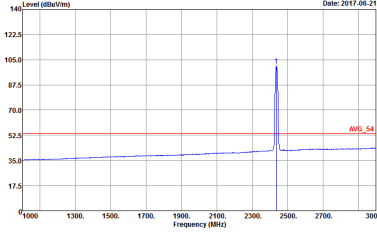


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	Site Condition : 03CH12-HY : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 14 Setting : 17	Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 14 Setting : 17
Avg.	Site Condition : 03CH12-HY : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 14 Setting : 17	Site Condition : 03CH12-HY : AVG_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 14 Setting : 17

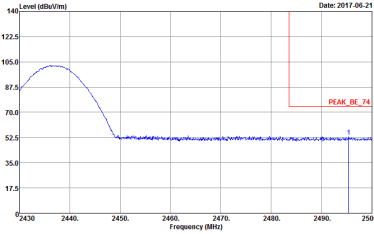
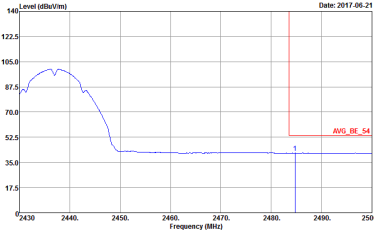


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, BE_74 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 : 17	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG, BE_54 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 : 17	Left blank

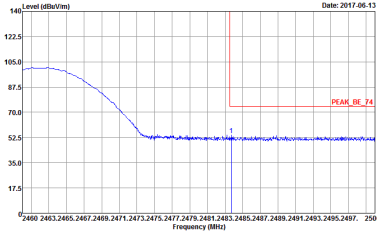
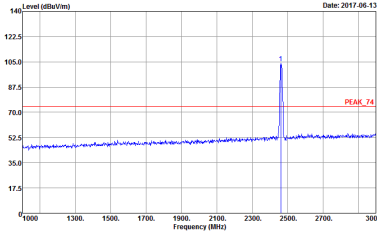
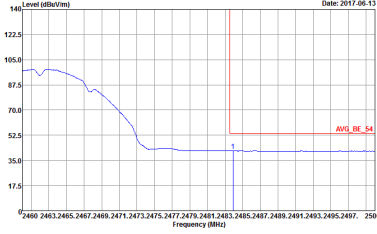
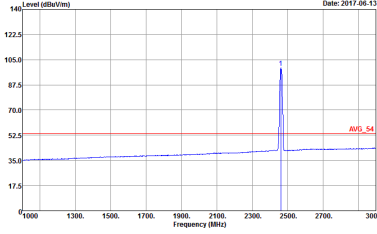


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 Setting : 17	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 Setting : 17
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 Setting : 17	 Site : 03CH12-HY Condition : AVG_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 Setting : 17



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 : 17	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 Setting : 14 : 17	Left blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site Condition : 03CH12-HY PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 15	 Site Condition : 03CH12-HY PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 15
Avg.	 Site Condition : 03CH12-HY AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 15	 Site Condition : 03CH12-HY AVG_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Project : Peak Mode : 752311 15

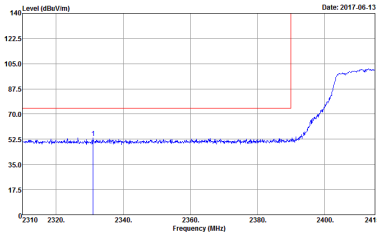
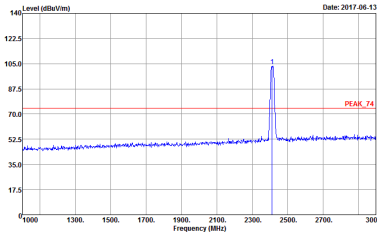
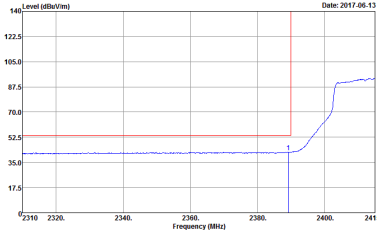
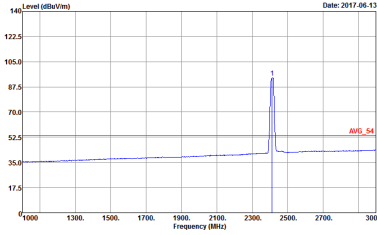


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Vertical	Fundamental
Peak	Site Condition : 03CH12-HY : PEAK_BE_74 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 15	Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 15
Avg.	Site Condition : 03CH12-HY : AVG_BE_54 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 752311 Mode : 15	Site Condition : 03CH12-HY : AVG_54 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 752311 Mode : 15



2.4GHz 2400~2483.5MHz

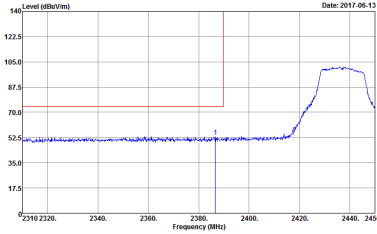
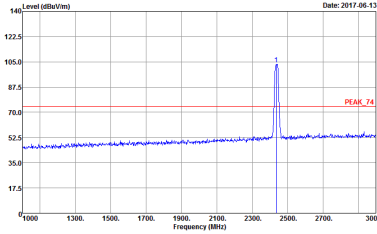
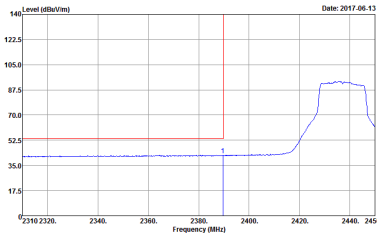
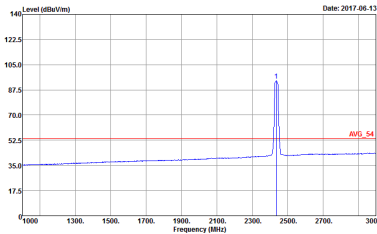
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, BE, 74 3m HORN, 9120D, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 19	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN, 9120D, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 19
Avg.	 Site : 03CH12-HY Condition : AVG, BE, 54 3m HORN, 9120D, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 : 19	 Site : 03CH12-HY Condition : AVG, 54 3m HORN, 9120D, 1328 HORIZONTAL Detector : RBW:1000.000KHz YBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 : 19

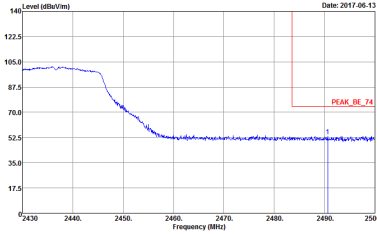
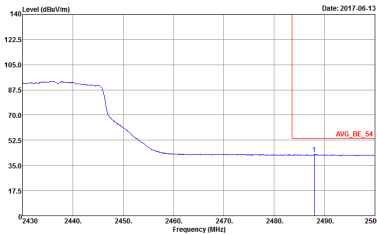


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Vertical	Fundamental
Peak	Site : 03CH12-HY Condition : PEAK, RE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	Site : 03CH12-HY Condition : PEAK, 74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13
Avg.	Site : 03CH12-HY Condition : AVG, RE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	Site : 03CH12-HY Condition : AVG, 54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13

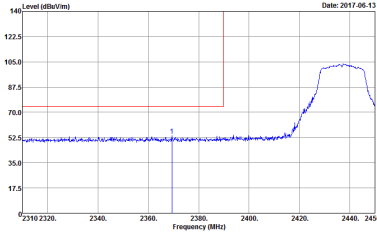
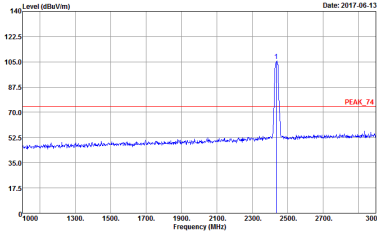
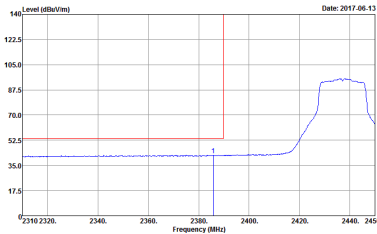
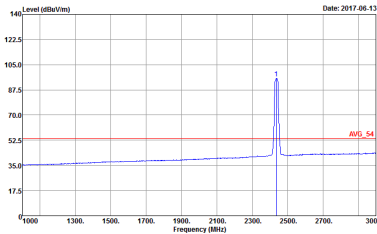


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, RE_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13
Avg.	 Site : 03CH12-HY Condition : AVG, RE_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	 Site : 03CH12-HY Condition : AVG, 54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 752311 Mode : 20	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak 752311 Mode : 20	Left blank

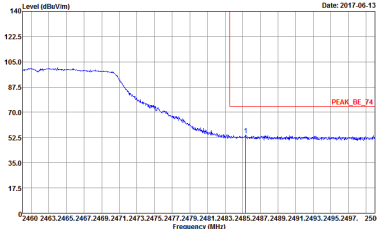
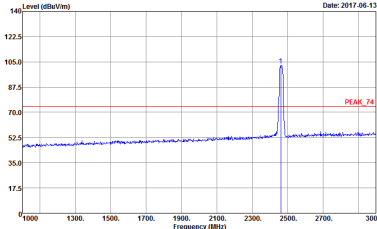
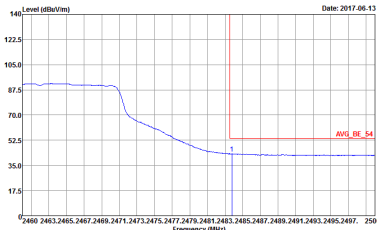
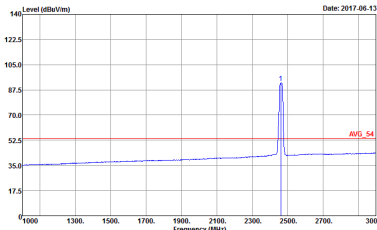


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, RE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13
Avg.	 Site : 03CH12-HY Condition : AVG, RE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	 Site : 03CH12-HY Condition : AVG, 54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13

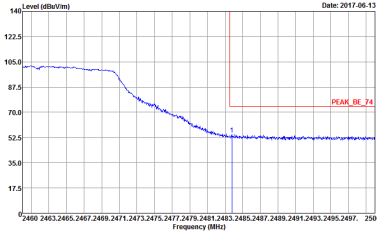
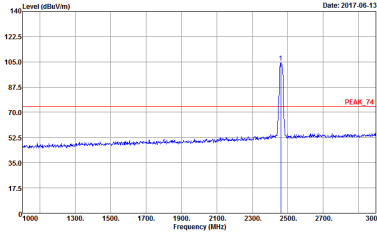
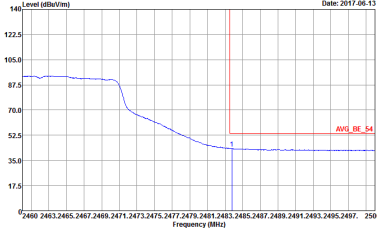
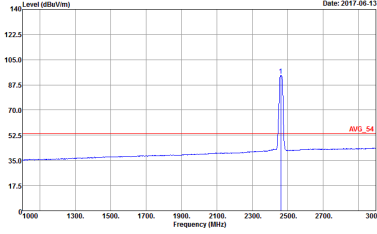


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Vertical	Fundamental
Peak		Left Blank
Avg.		Left Blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 21	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 21
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 : 21	 Site : 03CH12-HY Condition : AVG_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Project : Peak Mode : 752311 : 21



WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 21	 Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 21
Avg.	 Site Condition : 03CH12-HY : AVG_54 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 21	 Site Condition : 03CH12-HY : AVG_54 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 21

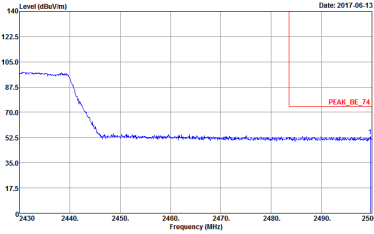
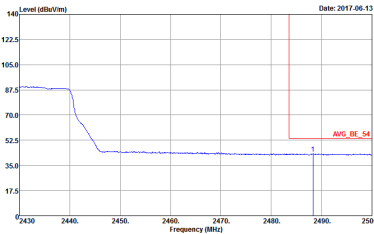


2.4GHz 2400~2483.5MHz

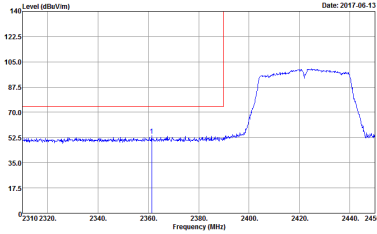
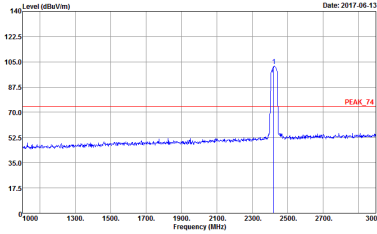
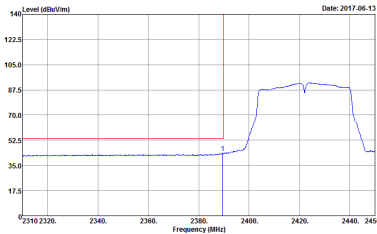
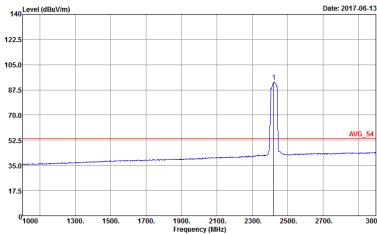
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH03 2422MHz - L	
1	Horizontal	Fundamental
Peak	Site Condition : 03CH12-HY : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22	Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22
Avg.	Site Condition : 03CH12-HY : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22	Site Condition : 03CH12-HY : AVG_54 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22

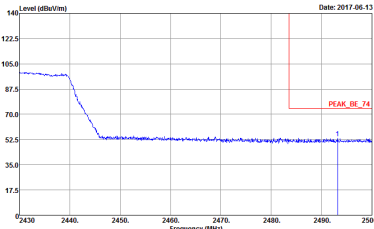
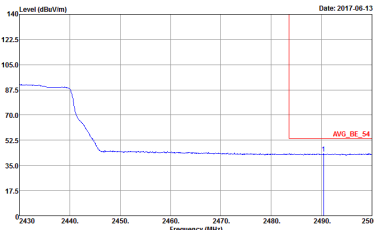


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH03 2422MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 752311 Mode : 22	Left Blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak 752311 Mode : 22	Left Blank

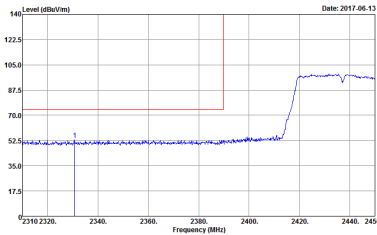
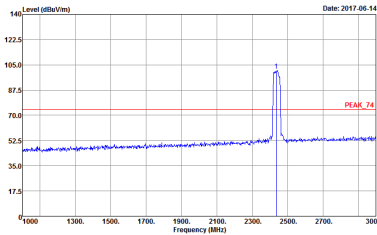
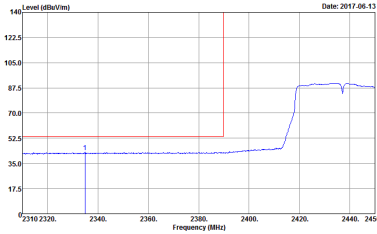
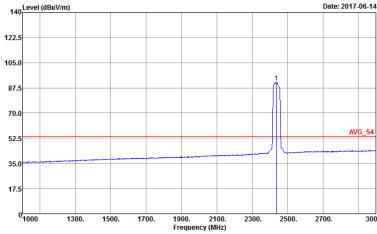


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH03 2422MHz - L	
1	Vertical	Fundamental
Peak	 Site Condition : 03CH12-HY : PEAK_BE_74 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22	 Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22
Avg.	 Site Condition : 03CH12-HY : AVG_BE_54 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22	 Site Condition : 03CH12-HY : AVG_54 3m HORN_9120D_1338 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 752311 Mode : 22

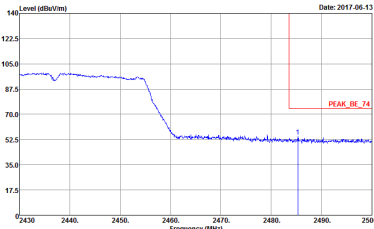
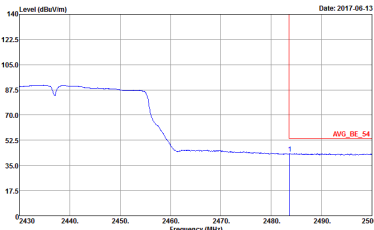


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH03 2422MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 22	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_91200_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 22	Left blank

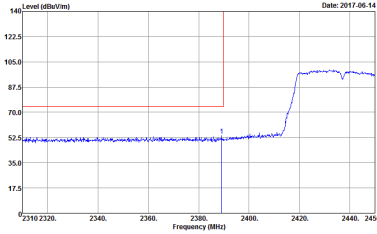
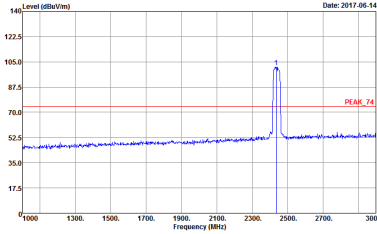
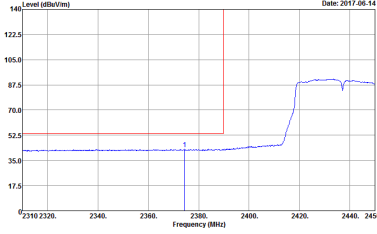
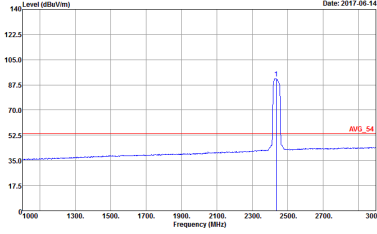


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, BE, 74 3m HORN, 9120D_1378 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN, 9120D_1378 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14
Avg.	 Site : 03CH12-HY Condition : AVG, BE, 54 3m HORN, 9120D_1378 HORIZONTAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-13	 Site : 03CH12-HY Condition : AVG, 54 3m HORN, 9120D_1378 HORIZONTAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14

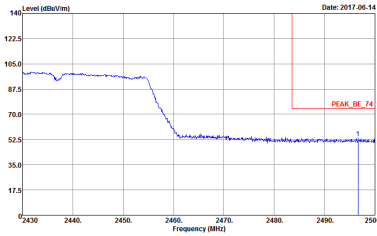
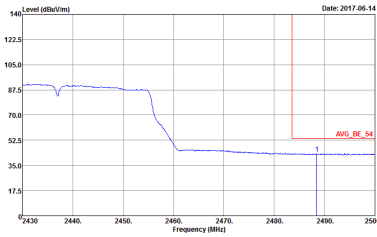


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 23	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_91200_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 : 23	Left blank

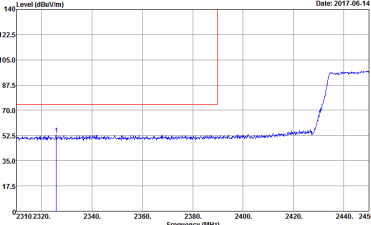
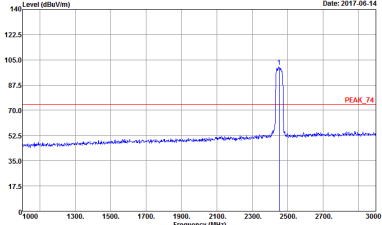
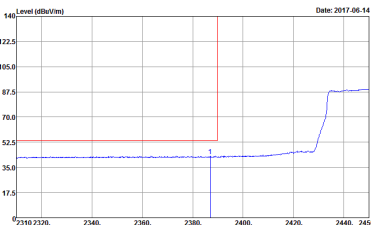
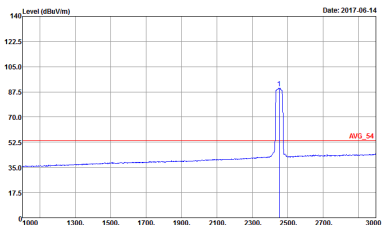


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, RE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14
Avg.	 Site : 03CH12-HY Condition : AVG, RE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14	 Site : 03CH12-HY Condition : AVG, 54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14

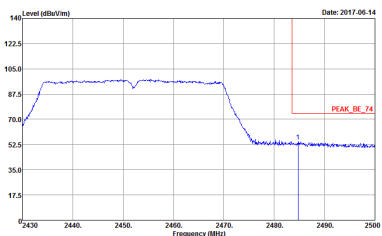
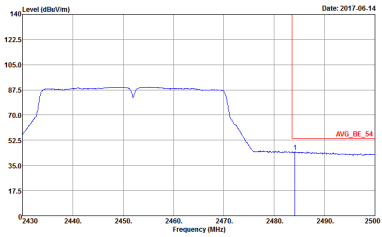


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak	 Site: 03CH12-HY Condition: PEAK_BE_74 3m HORN_91200_1338 VERTICAL Detector: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project: Peak Mode: 752311 23	Left blank
Avg.	 Site: 03CH12-HY Condition: AVG_BE_54 3m HORN_91200_1338 VERTICAL Detector: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project: Peak Mode: 752311 23	Left blank

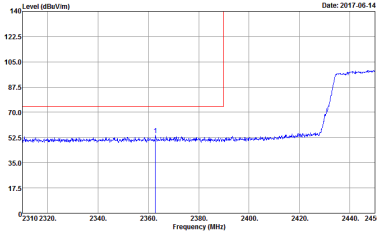
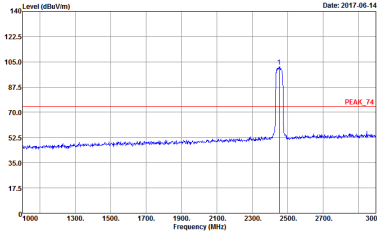
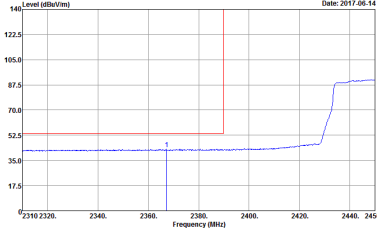
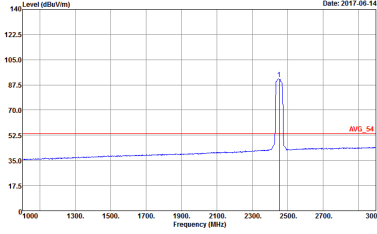


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH09 2452MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, RE_74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311
Avg.	 Site : 03CH12-HY Condition : AVG, RE_54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 752311	 Site : 03CH12-HY Condition : AVG, 54 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 752311

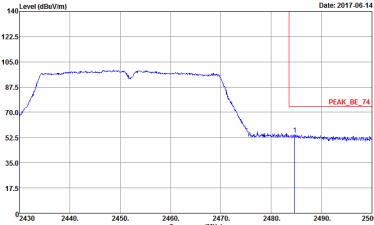
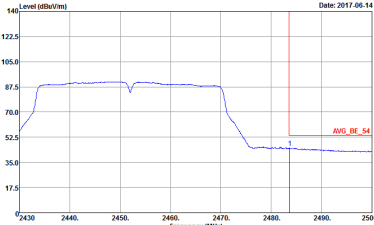


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH09 2452MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, BE_74 3m HORN, 91200_1338 HORIZONTAL Detector : RBW:1000.000KHz VSW:3.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG, BE_54 3m HORN, 91200_1338 HORIZONTAL Detector : RBW:1000.000KHz VSW:3.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14	Left blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH09 2452MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK, RE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14	 Site : 03CH12-HY Condition : PEAK, 74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14
Avg.	 Site : 03CH12-HY Condition : AVG, RE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14	 Site : 03CH12-HY Condition : AVG, 54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 752311 Date: 2017-06-14

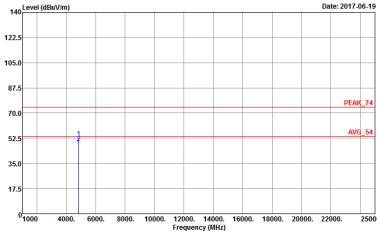
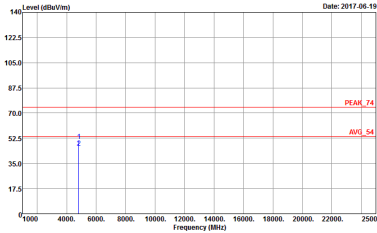


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH09 2452MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1378 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:auto Project : Peak Mode : 752311 Date: 2017.06.14	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_91200_1378 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:auto Project : Peak Mode : 752311 Date: 2017.06.14	Left blank

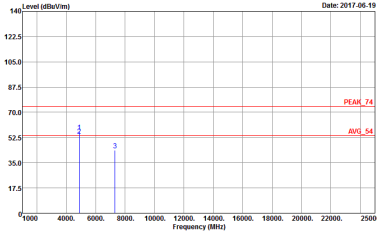
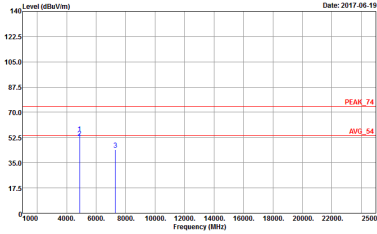


2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 752311 Mode : 13 Setting : 10.5	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 752311 Mode : 13 Setting : 10.5



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site Condition : 03CH12-HY Detector : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Project : Peak Mode : 752311 Setting : 14	 Site Condition : 03CH12-HY Detector : PEAK_74 3m HORN_9120D_1328 VERTICAL Project : Peak Mode : 752311 Setting : 14

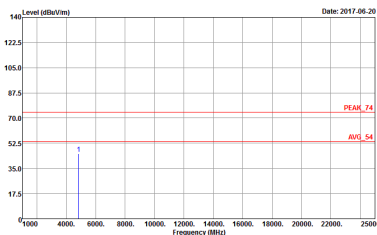
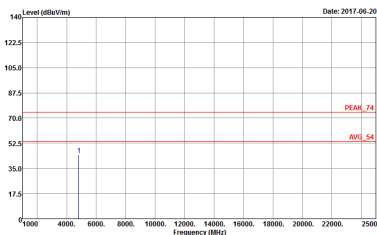


WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	Site Condition : 03CH12-HY Detector : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Project : 752311 Mode : 15 Setting : 17.5	Site Condition : 03CH12-HY Detector : PEAK_74 3m HORN_9120D_1328 VERTICAL Project : 752311 Mode : 15 Setting : 17.5

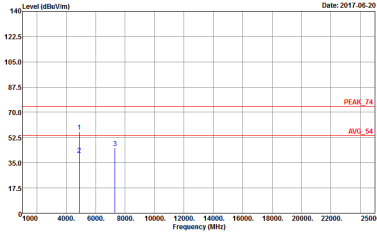
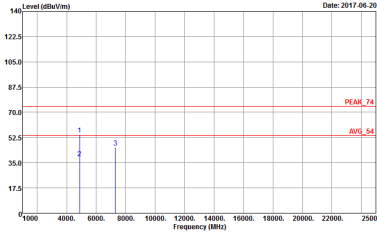


2.4GHz 2400~2483.5MHz

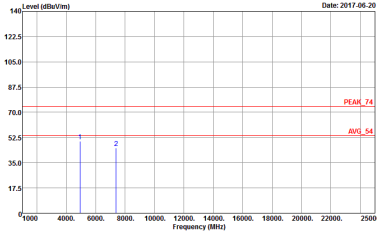
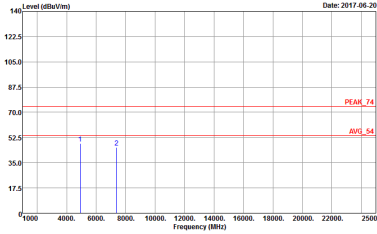
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 752311 Mode : 19	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 752311 Mode : 19



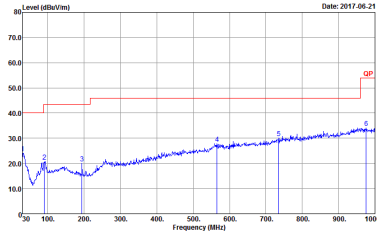
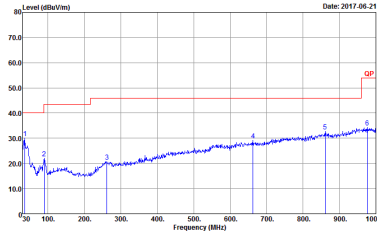
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 752311 Mode : 20	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 752311 Mode : 20



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 752311 Mode : 21	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 752311 Mode : 21



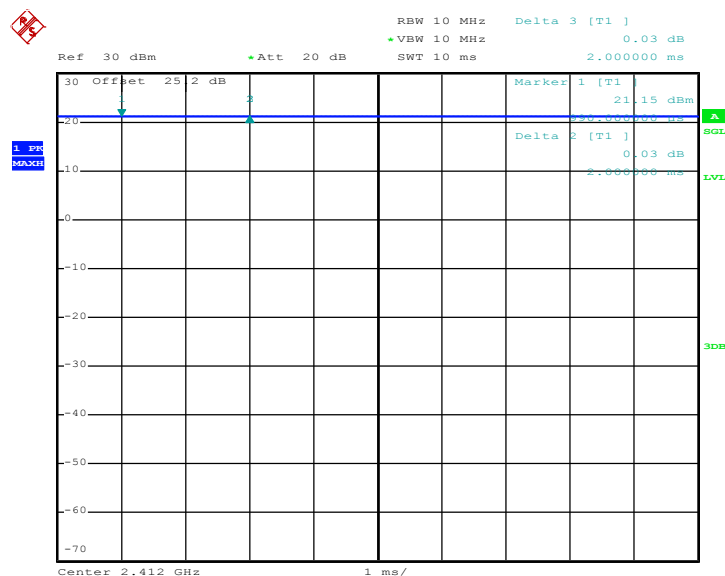
Emission below 1GHz
2.4GHz WIFI 802.11b (LF)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11b LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH12-HY Condition : QP 3m BILOG_6111D_37059 HORIZONTAL Detector : Peak Project : 752311 Mode : 2B	 Site : 03CH12-HY Condition : QP 3m BILOG_6111D_37059 VERTICAL Detector : Peak Project : 752311 Mode : 2B

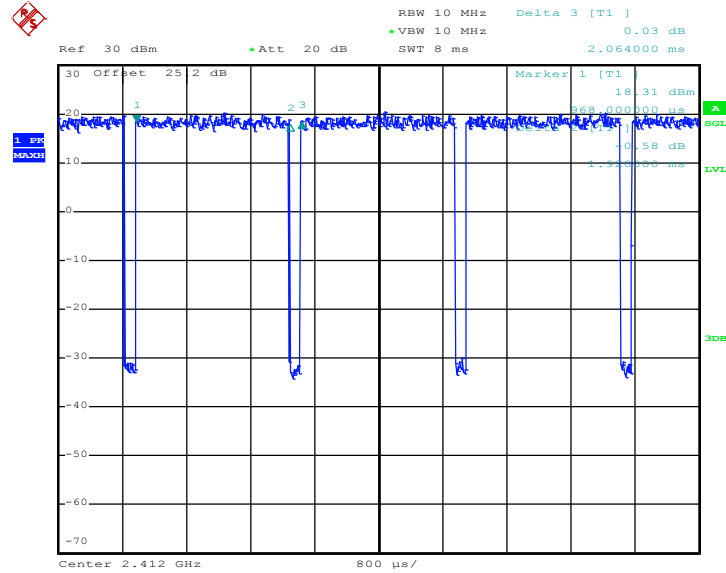
Appendix E. Duty Cycle Plots

Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting
802.11b	100	-	-	10Hz
2.4GHz 802.11n HT20	93.02	1920.00	0.52	1kHz
2.4GHz 802.11n HT40	87.41	944.00	1.06	3kHz

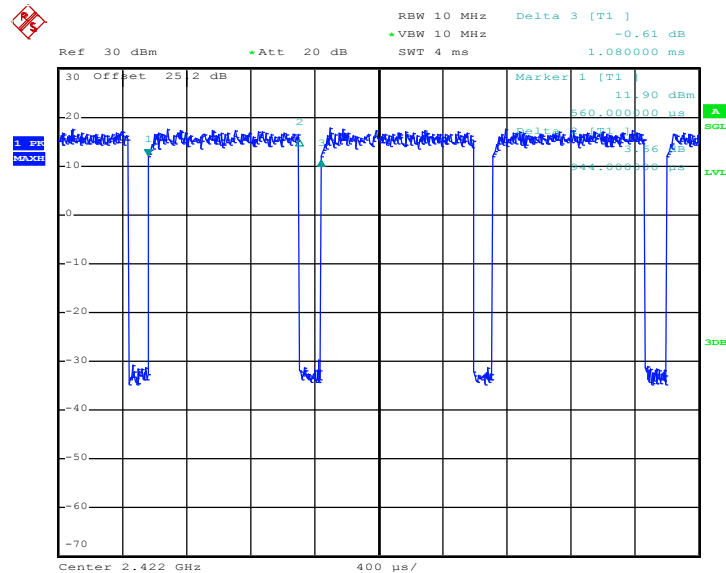
802.11b



Date: 31.MAY.2017 23:30:45

802.11n HT20


Date: 31.MAY.2017 23:44:22

802.11n HT40


Date: 31.MAY.2017 23:57:23