FCC RADIO TEST REPORT

FCC ID	:	**ACJFZL1A**
Equipment	:	**Tablet Computer**
Brand Name	:	**Panasonic**
Model Name	:	**FZ-L1AC**
Marketing Name	:	**FZ-L1**
Applicant	:	**Panasonic Corporation of North America** **Two Riverfront Plaza, 9th Floor, Newark, NJ 07102-5490**
Manufacturer	:	**Panasonic Mobile Communications Co., Ltd.** **600 Saedo-cho, Tsuzuki-ku, Yokohama City 224-8539, Japan**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Jul. 04, 2018 and testing was started from Oct. 20, 2018 and completed on Nov. 21, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Joseph Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

Table of Contents

History of this test report **3**

Summary of Test Result **4**

1 General Description **5**

1.1 Product Feature of Equipment Under Test 5
1.2 Modification of EUT 5
1.3 Testing Location 5
1.4 Applicable Standards 6

2 Test Configuration of Equipment Under Test **7**

2.1 Carrier Frequency and Channel 7
2.2 Test Mode 7
2.3 Connection Diagram of Test System 8
2.4 Support Unit used in test configuration and system 8
2.5 EUT Operation Test Setup 8
2.6 Measurement Results Explanation Example 9

3 Test Result **10**

3.1 6dB and 99% Bandwidth Measurement 10
3.2 Output Power Measurement 20
3.3 Power Spectral Density Measurement 21
3.4 Conducted Band Edges and Spurious Emission Measurement 23
3.5 Radiated Band Edges and Spurious Emission Measurement 33
3.6 AC Conducted Emission Measurement 37
3.7 Antenna Requirements 39

4 List of Measuring Equipment **40**

5 Uncertainty of Evaluation **42**

Appendix A. Conducted Test Results

Appendix B. AC Conducted Emission Test Result

Appendix C. Radiated Spurious Emission

Appendix D. Radiated Spurious Emission Plots

Appendix E. Duty Cycle Plots

Appendix F. Setup Photographs

History of this test report

Report No.	Version	Description	Issued Date
FR870418C	01	Initial issue of report	Nov. 13, 2018
FR870418C	02	Add all of the test plots of 6dB and 99% bandwidth in section 3.1.5 and 3.1.6	Nov. 19, 2018
FR870418C	03	Add 802.11g/n HT20 CH02 & CH10 test data of conducted power in appendix A and radiated band edge in appendix C and D	Nov. 23, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 4.49 dB at 886.600 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 5.01 dB at 13.560 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Reviewed by: Wii Chang

Report Producer: Polly Tsai

1 General Description

1.1 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n, NFC, and GNSS.

Product Specification subjective to this standard	
Sample 1	With BCR Landscape
Sample 2	With BCR Portrait
Sample 3	Without BCR
Antenna Type	WLAN: Monopole Antenna Bluetooth: Monopole Antenna GNSS: Monopole Antenna NFC: Loop Antenna

1.2 Modification of EUT

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

1.3 Testing Location

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

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

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH13-HY

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

1.4 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- 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 modes are considering the modulation and worse data rates as below table.

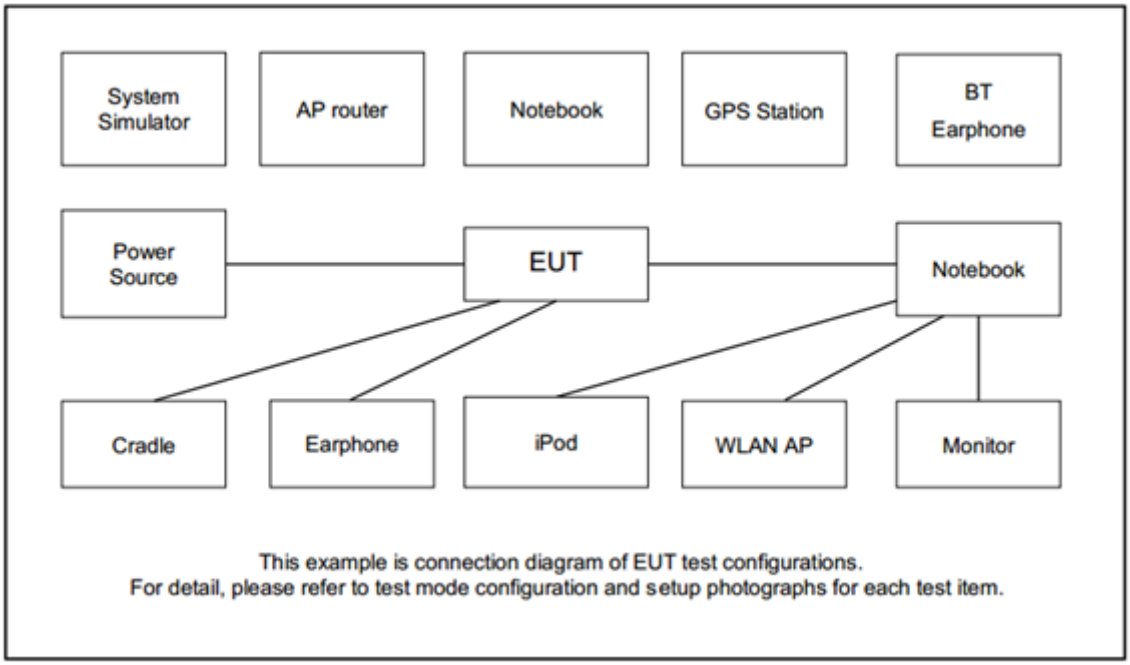
Modulation	Data Rate
802.11b	**1 Mbps**
802.11g	**6 Mbps**
802.11n HT20	**MCS0**

Test Cases	
AC Conducted Emission	Mode 1: Bluetooth Link + WLAN (2.4GHz) Link + NFC On + Earphone + SD Card + USB Cable 2 (Data Link with Notebook) + Cradle (Charging from Adapter) for Sample 3

Remark:

1. For Radiated Test Cases, the tests were performed with USB Cable 1 and Sample 3.
2. Data Linking with Notebook means data application transferred mode between EUT and Notebook.

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.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	iPod
4.	IPod Earphone	Apple	N/A	FCC DoC	Shielded, 1.2 m	N/A
5.	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
6.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

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

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

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.

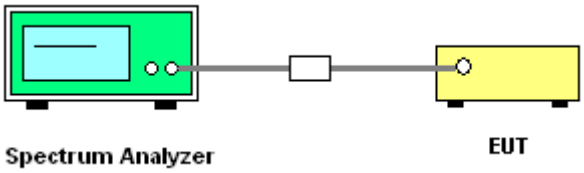
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v05.
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) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
6. Measure and record the results in the test report.

3.1.4 Test Setup

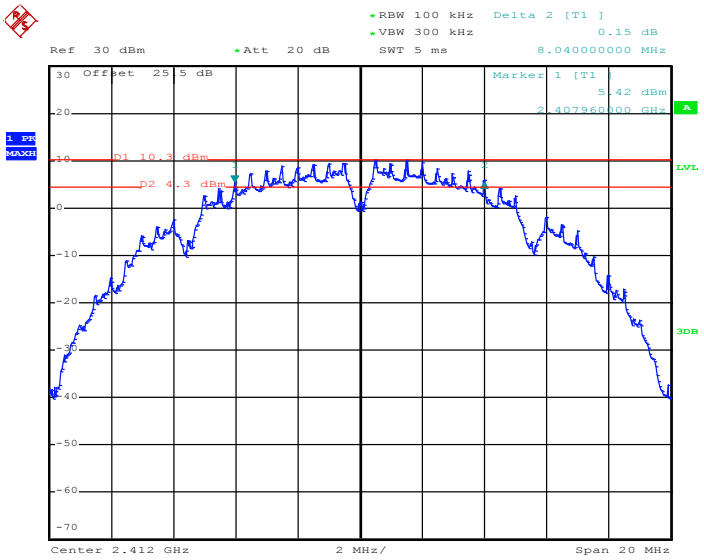


3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

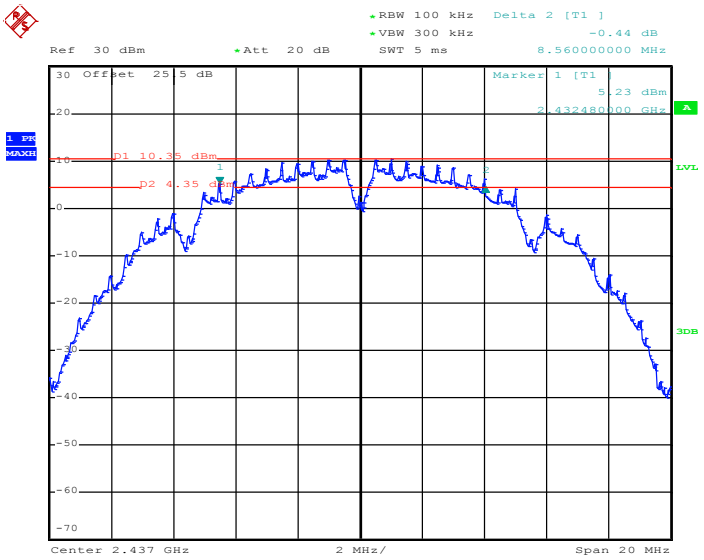
<802.11b>

6 dB Bandwidth Plot on Channel 01



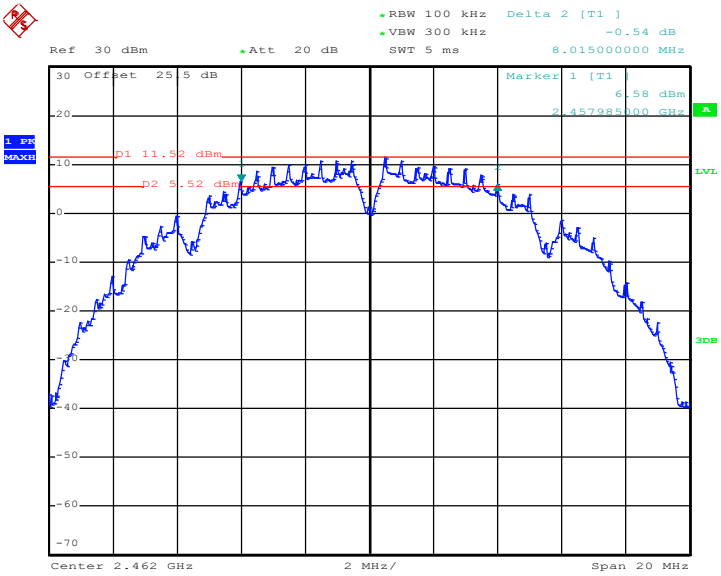
Date: 30.OCT.2018 01:56:12

6 dB Bandwidth Plot on Channel 06



Date: 30.OCT.2018 02:00:48

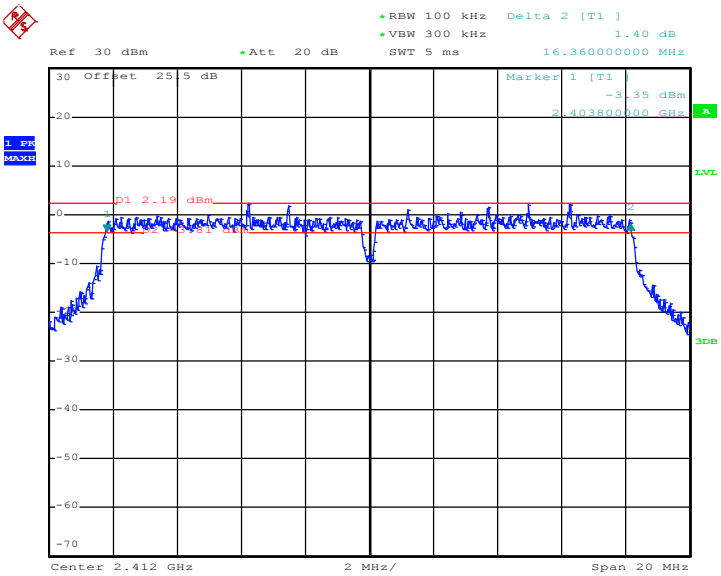
6 dB Bandwidth Plot on Channel 11



Date: 30.OCT.2018 02:04:46

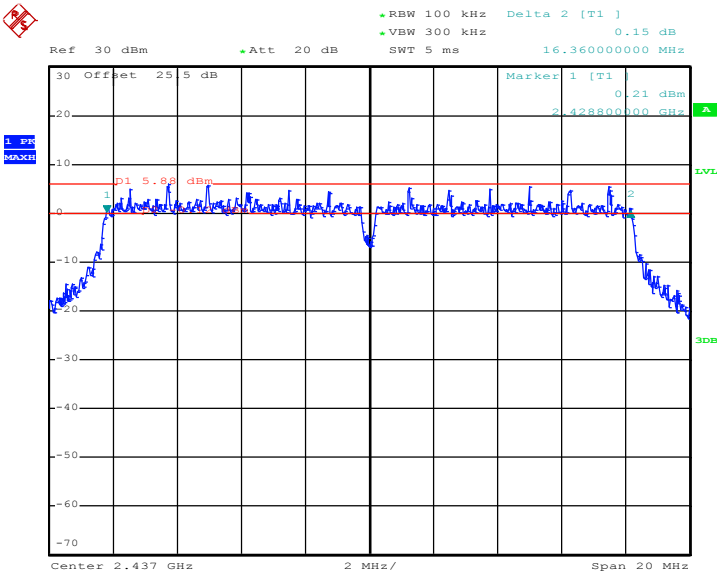
<802.11g>

6 dB Bandwidth Plot on Channel 01



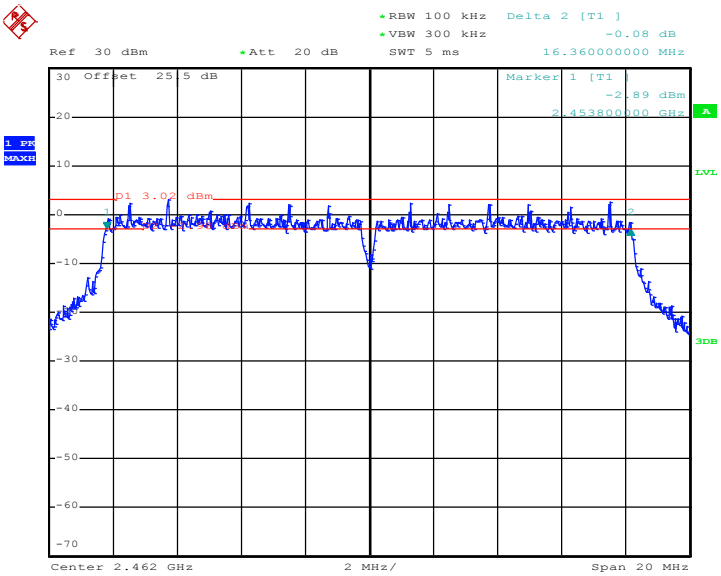
Date: 30.OCT.2018 02:16:30

6 dB Bandwidth Plot on Channel 06



Date: 30.OCT.2018 02:19:58

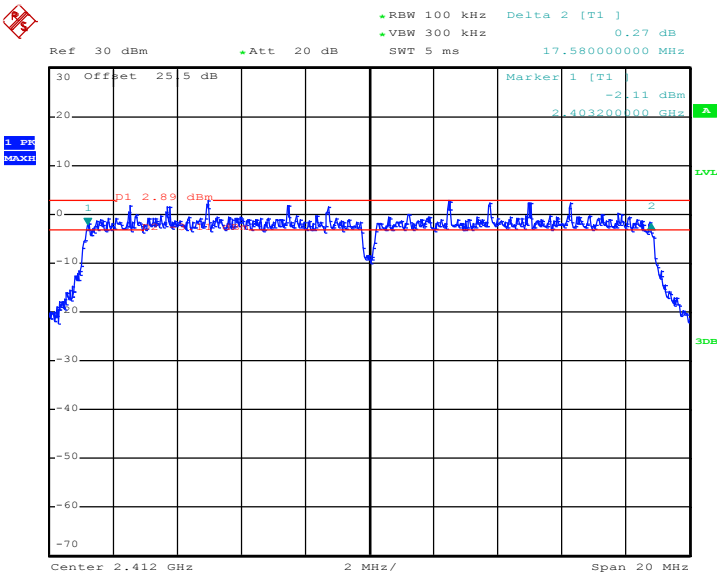
6 dB Bandwidth Plot on Channel 11



Date: 30.OCT.2018 02:23:58

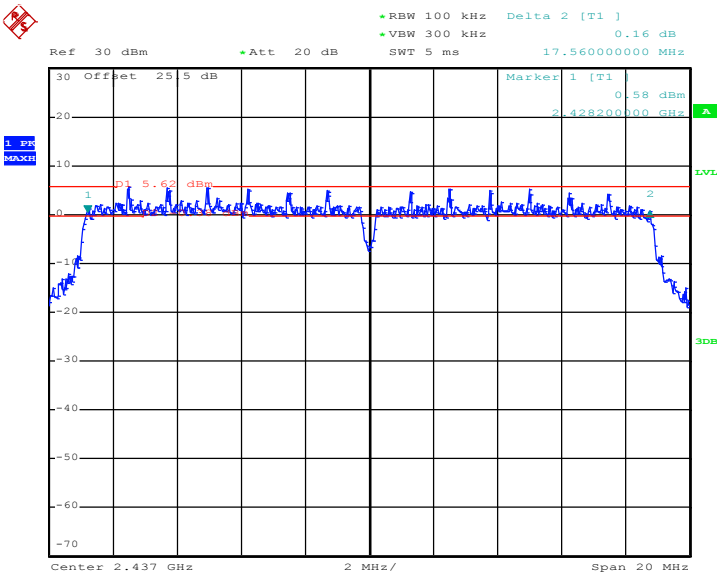
<802.11n HT20>

6 dB Bandwidth Plot on Channel 01



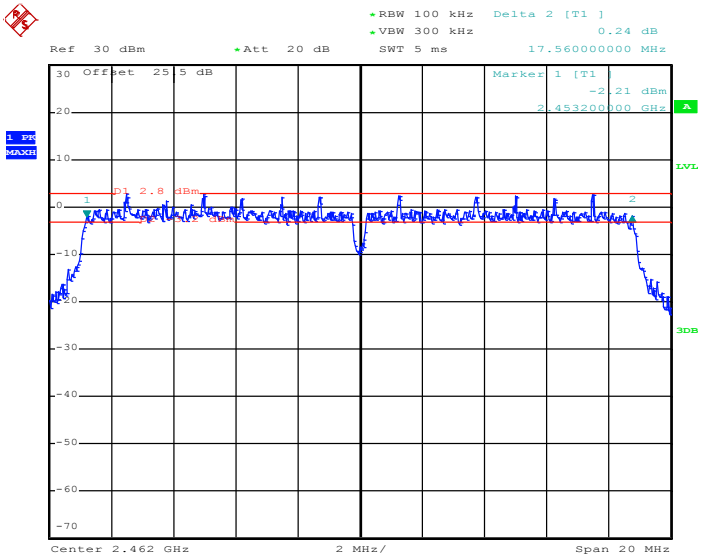
Date: 30.OCT.2018 02:29:57

6 dB Bandwidth Plot on Channel 06



Date: 30.OCT.2018 02:47:51

6 dB Bandwidth Plot on Channel 11



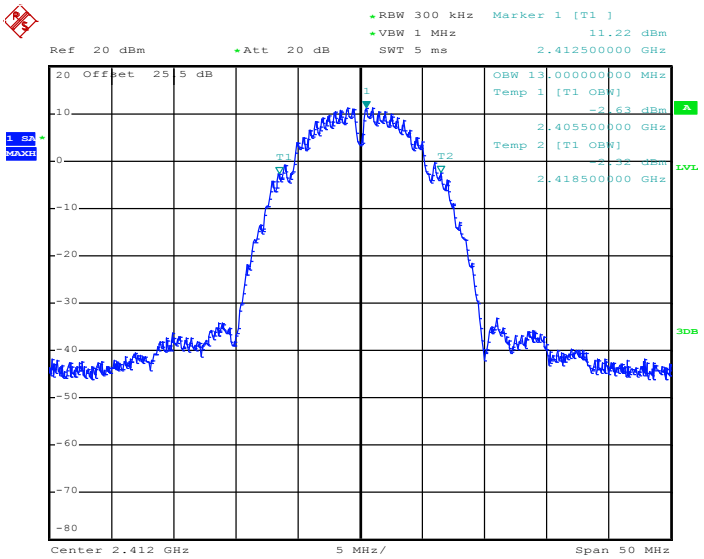
Date: 30.OCT.2018 02:53:40

3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

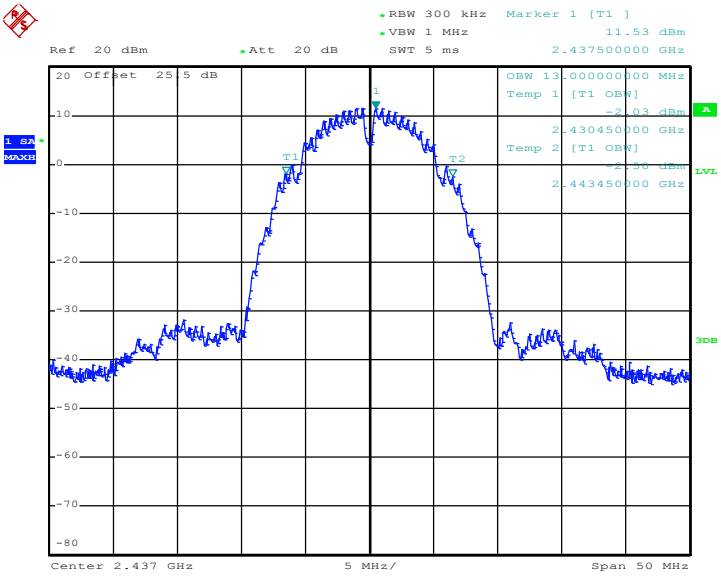
<802.11b>

99% Bandwidth Plot on Channel 01



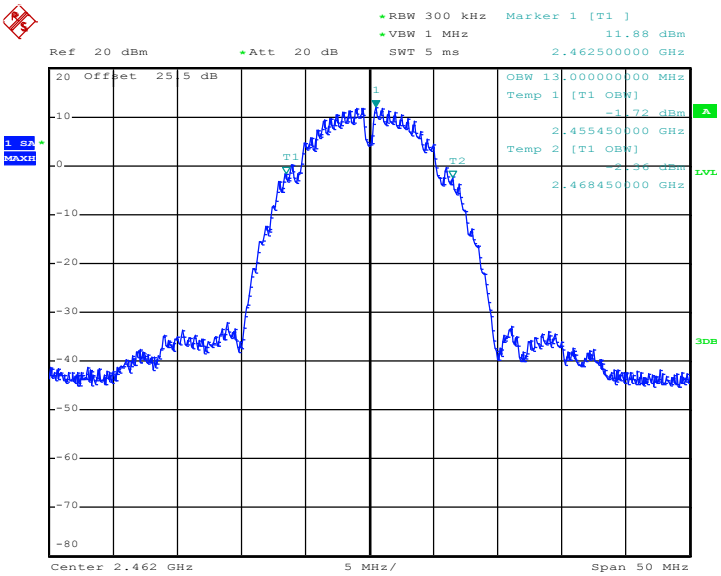
Date: 30.OCT.2018 01:59:32

99% Occupied Bandwidth Plot on Channel 06



Date: 30.OCT.2018 02:02:49

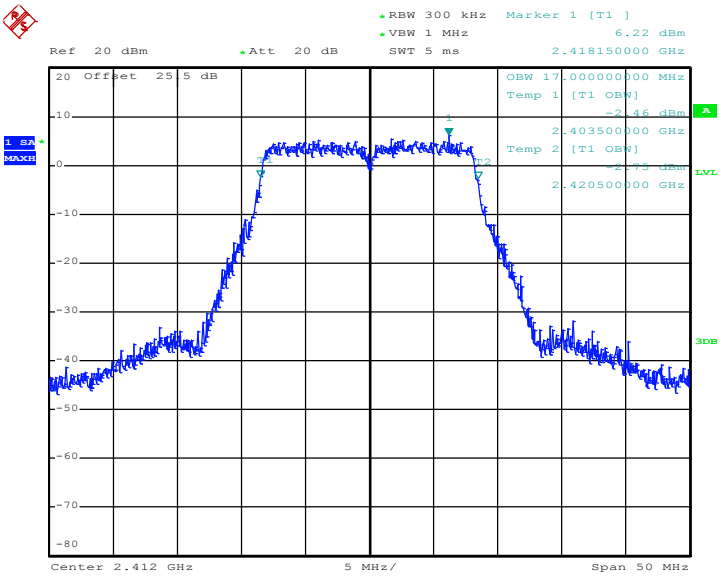
99% Occupied Bandwidth Plot on Channel 11



Date: 30.OCT.2018 02:06:40

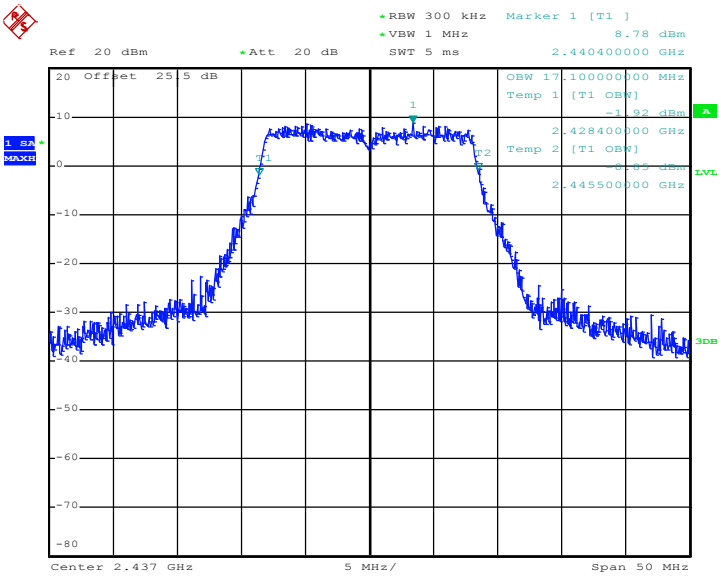
<802.11g>

99% Bandwidth Plot on Channel 01



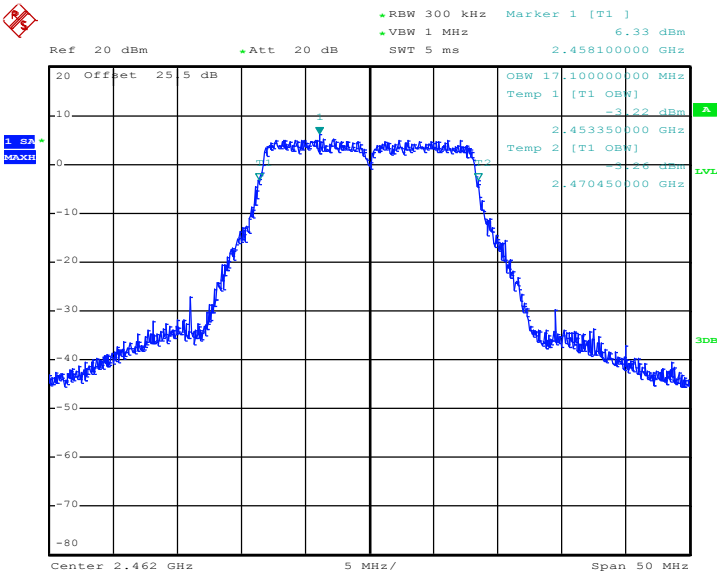
Date: 30.OCT.2018 02:18:27

99% Occupied Bandwidth Plot on Channel 06



Date: 30.OCT.2018 02:22:47

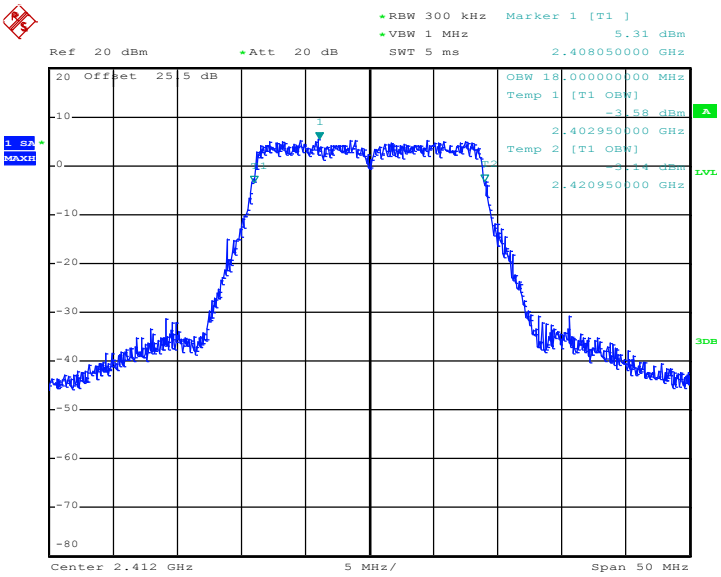
99% Occupied Bandwidth Plot on Channel 11



Date: 30.OCT.2018 02:28:12

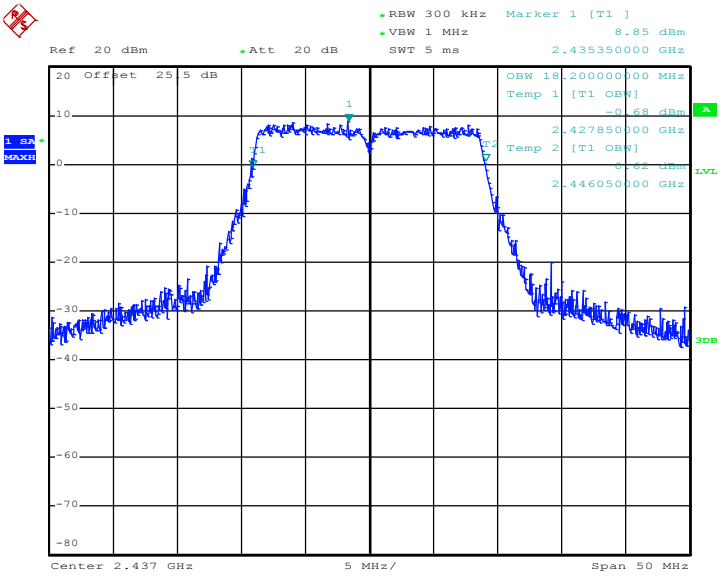
<802.11n HT20>

99% Bandwidth Plot on Channel 01



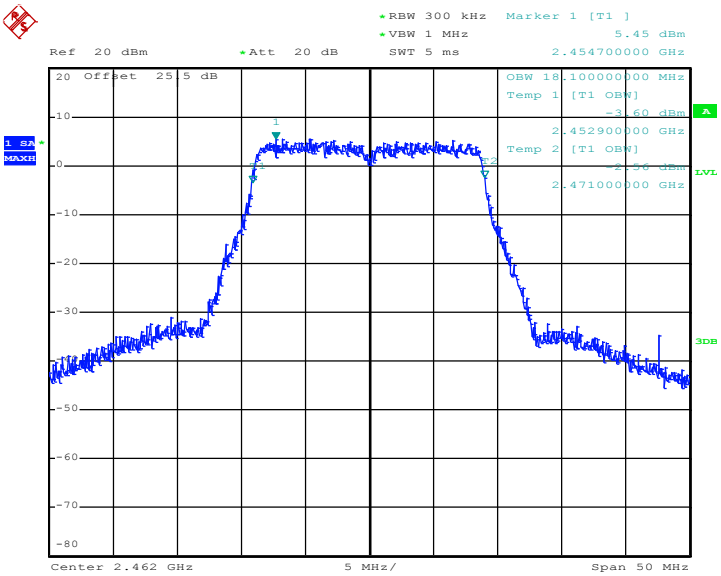
Date: 30.OCT.2018 02:46:03

99% Occupied Bandwidth Plot on Channel 06



Date: 30.OCT.2018 02:52:25

99% Occupied Bandwidth Plot on Channel 11



Date: 30.OCT.2018 02:55:53

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 with directional gain greater than 6dBi is 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.

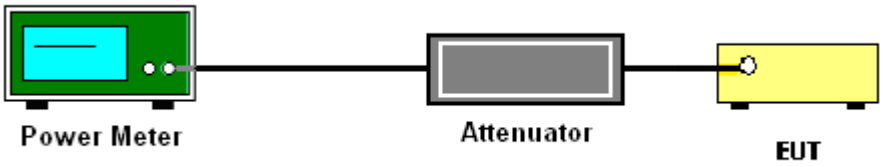
3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

1. For Peak Power, the testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v05 section 9.1.3 PKPM1 Peak power meter method.
2. For Average Power, the testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v05 section 9.2.3.1 Method AVGPM.
3. 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.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. 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.

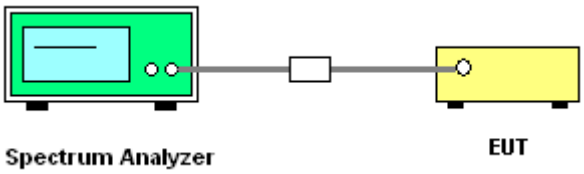
3.3.2 Measuring Instruments

See list of measuring equipment 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 v05
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.

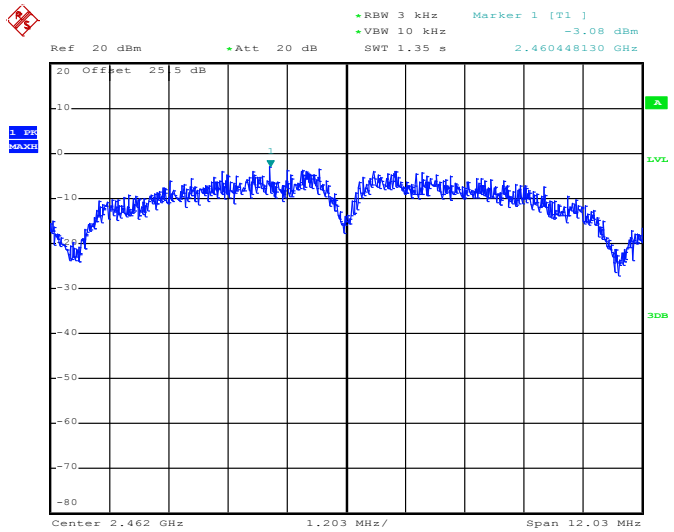
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz)



Date: 30.OCT.2018 03:04:14

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.

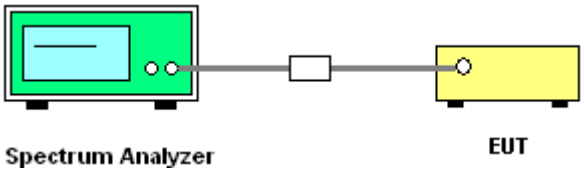
3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05.
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

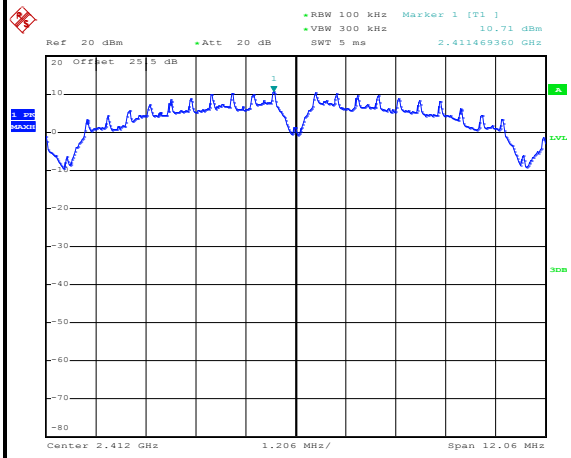


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	Shiming Liu and Shiang Wang	**Temperature :**	21~25℃
		Relative Humidity :	51~54%

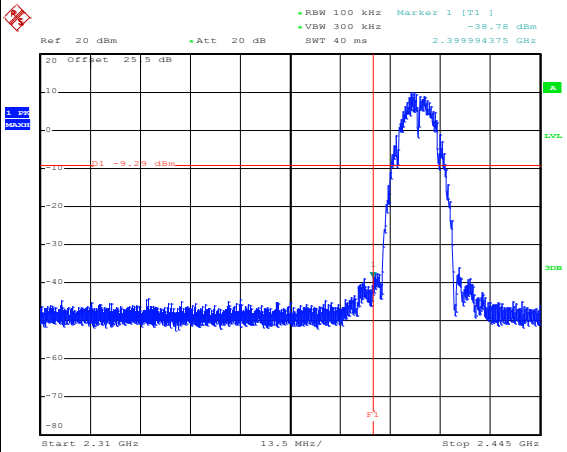
Test Mode :	802.11b	**Test Channel :**	01

100kHz PSD reference Level



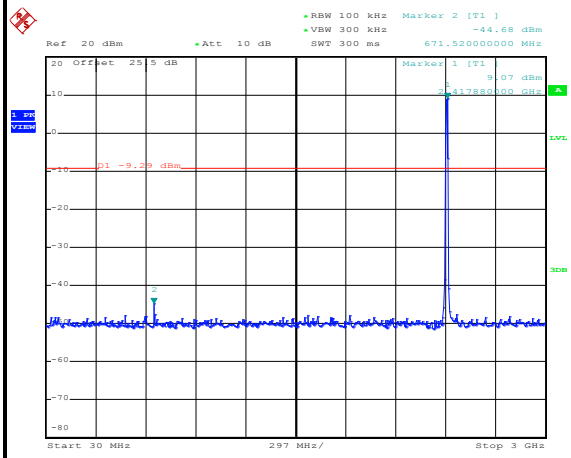
Date: 30.OCT.2018 01:56:54

Channel Plot



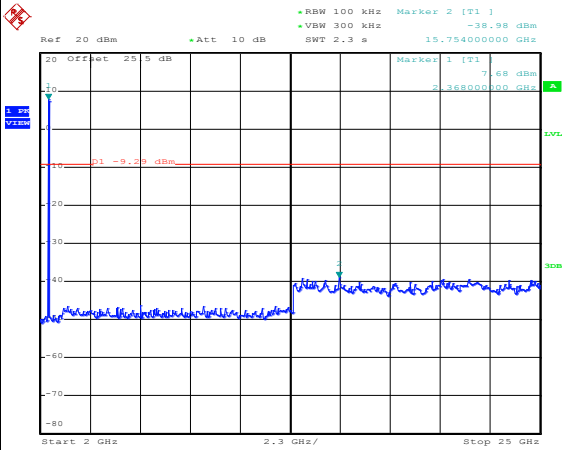
Date: 30.OCT.2018 01:57:08

Spurious Emission 30MHz~3GHz



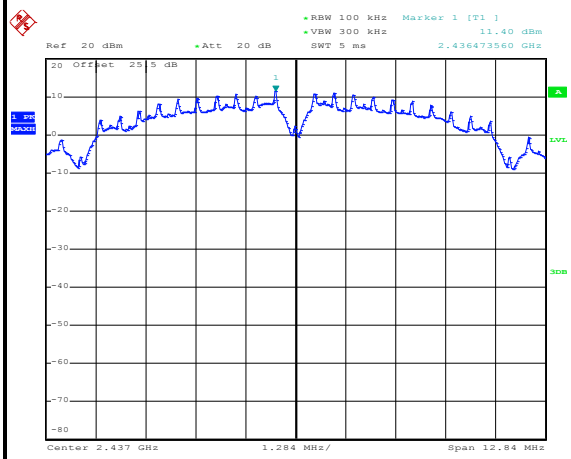
Date: 30.OCT.2018 01:59:02

Spurious Emission 2GHz~25GHz

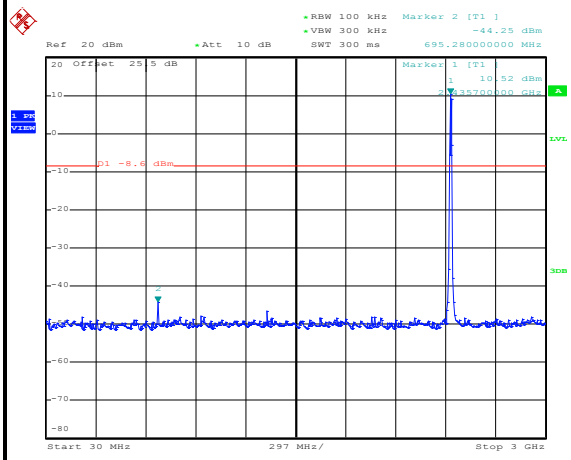
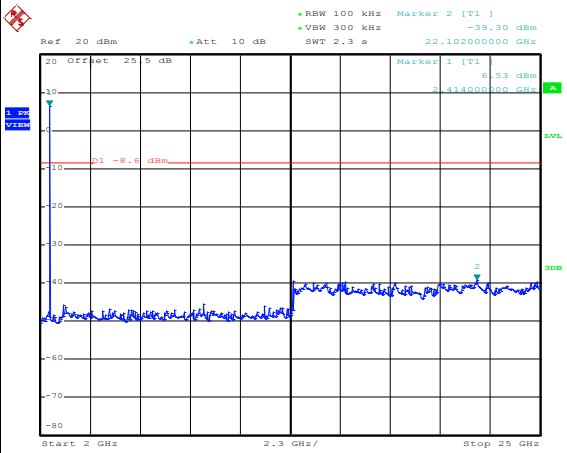


Date: 30.OCT.2018 01:59:16

Test Mode :	802.11b	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

Date: 30.OCT.2018 02:01:39

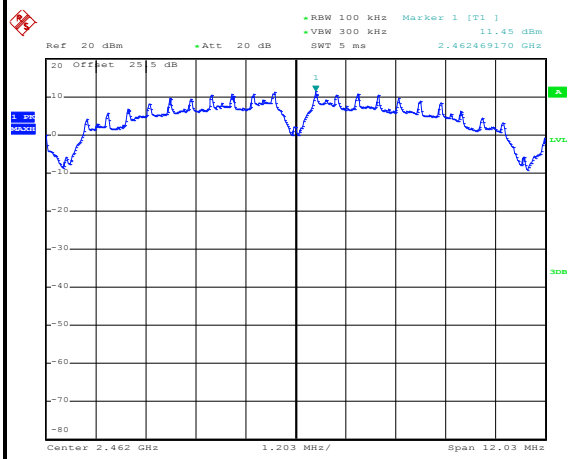
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Date: 30.OCT.2018 02:02:11

Date: 30.OCT.2018 02:02:27

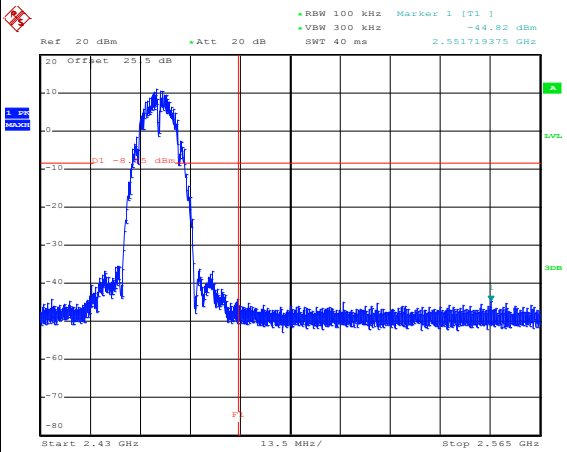
Test Mode :	802.11b	Test Channel :	11

100kHz PSD reference Level



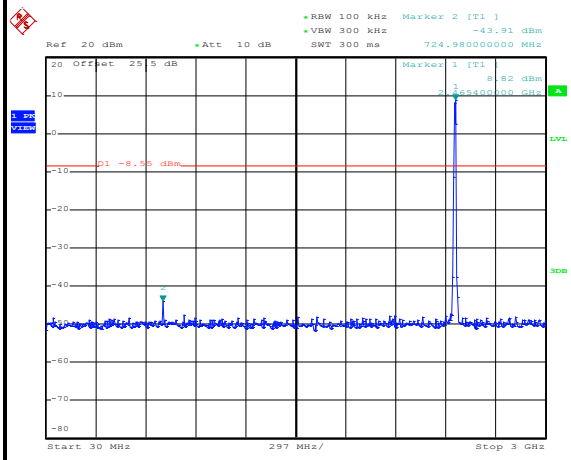
Date: 30.OCT.2018 02:05:26

Channel Plot



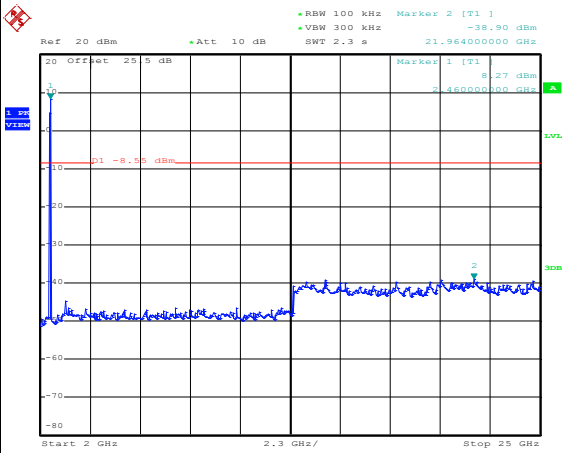
Date: 30.OCT.2018 02:05:40

Spurious Emission 30MHz~3GHz



Date: 30.OCT.2018 02:06:06

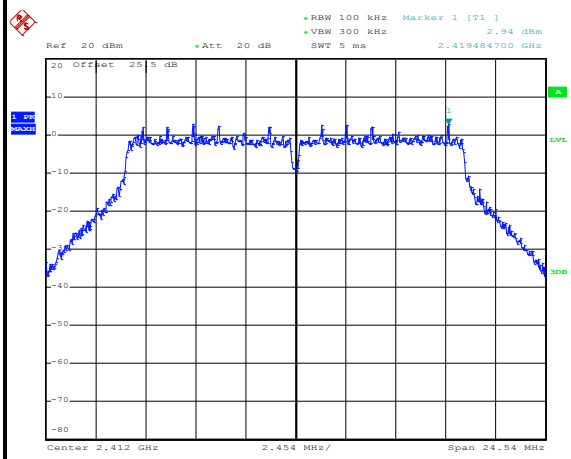
Spurious Emission 2GHz~25GHz



Date: 30.OCT.2018 02:06:22

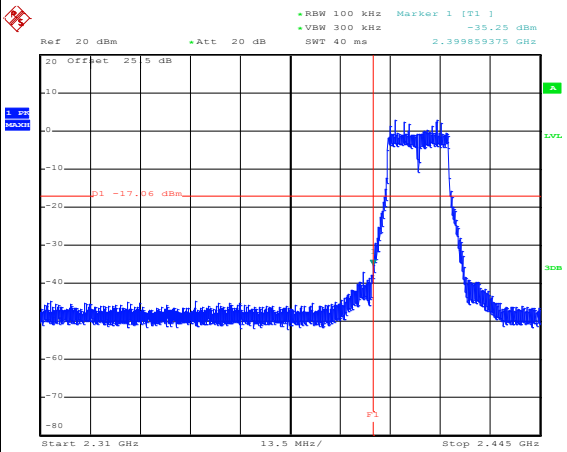
Test Mode :	802.11g	Test Channel :	01

100kHz PSD reference Level



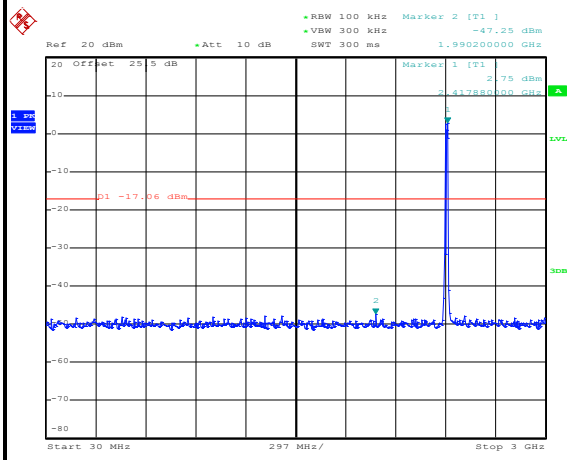
Date: 30.OCT.2018 02:17:10

Channel Plot



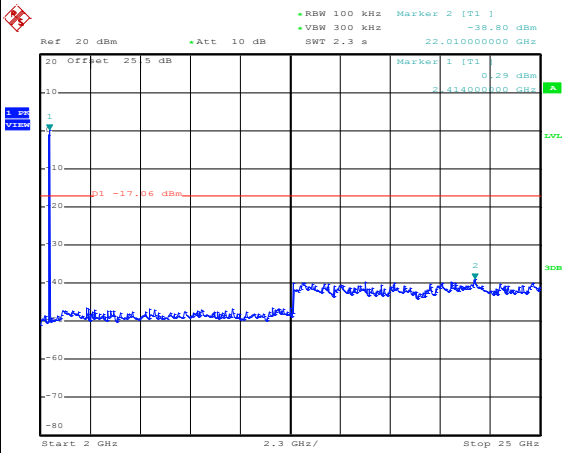
Date: 30.OCT.2018 02:17:27

Spurious Emission 30MHz~3GHz



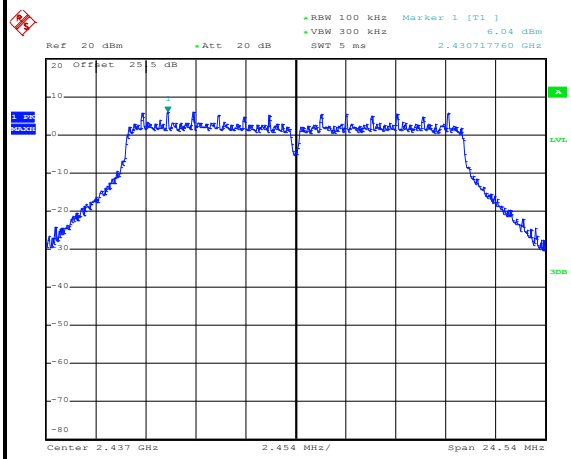
Date: 30.OCT.2018 02:17:57

Spurious Emission 2GHz~25GHz

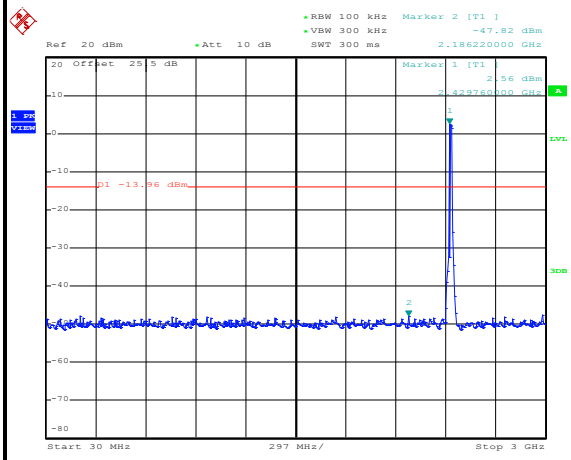
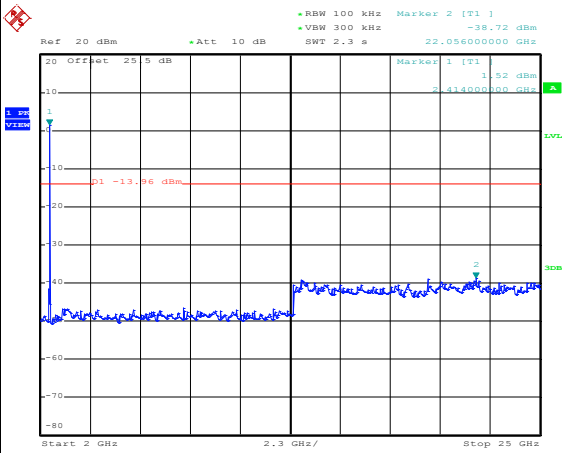


Date: 30.OCT.2018 02:18:13

Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

Date: 30.OCT.2018 02:21:39

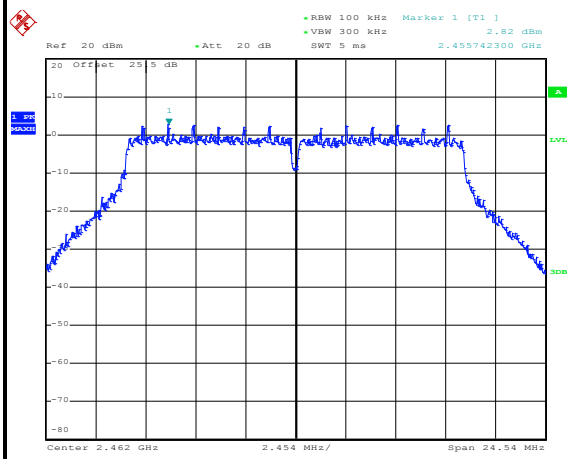
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Date: 30.OCT.2018 02:21:55

Date: 30.OCT.2018 02:22:23

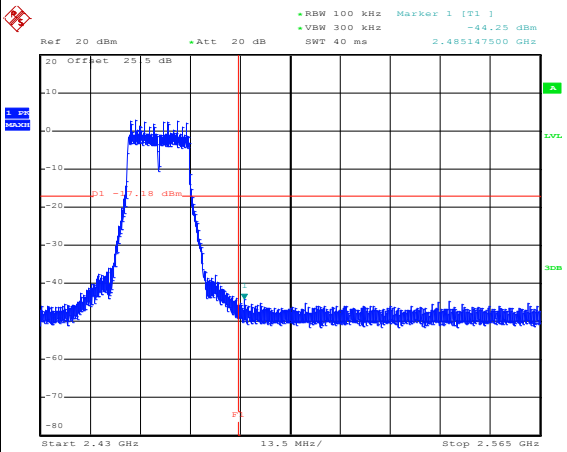
Test Mode :	802.11g	Test Channel :	11

100kHz PSD reference Level



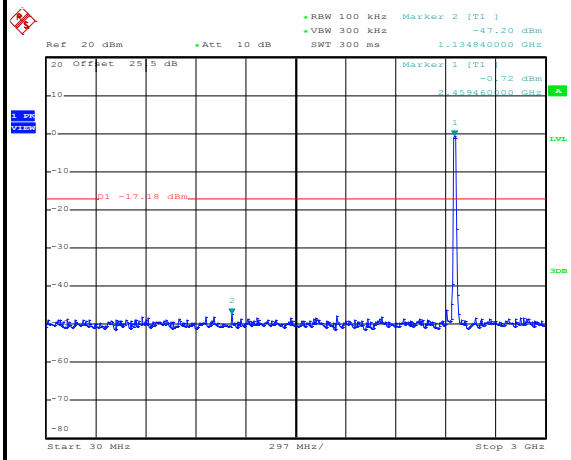
Date: 30.OCT.2018 02:24:44

Channel Plot



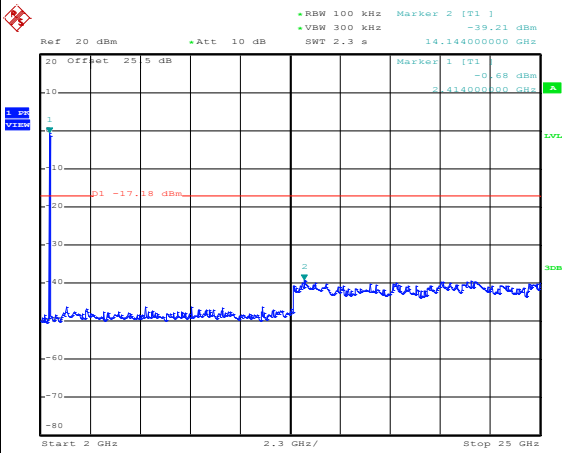
Date: 30.OCT.2018 02:25:05

Spurious Emission 30MHz~3GHz



Date: 30.OCT.2018 02:26:09

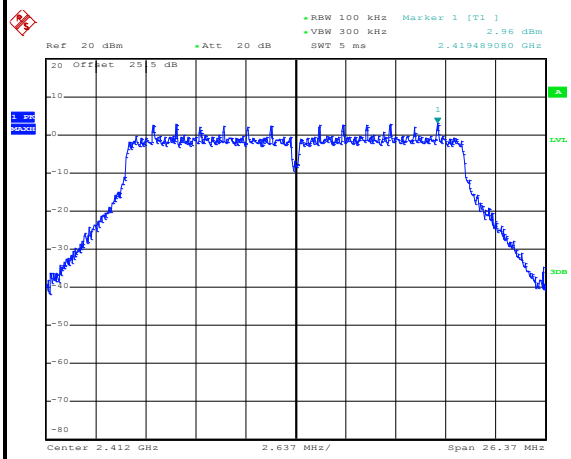
Spurious Emission 2GHz~25GHz



Date: 30.OCT.2018 02:26:25

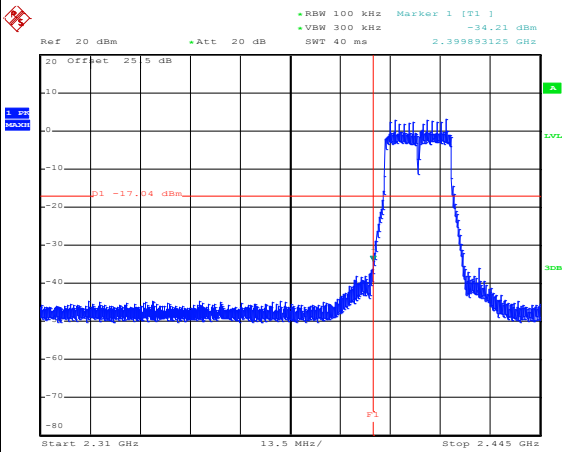
Test Mode :	802.11n HT20	Test Channel :	01

100kHz PSD reference Level



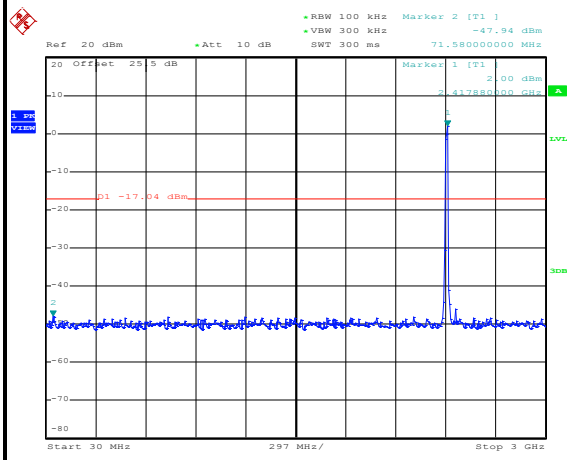
Date: 30.OCT.2018 02:30:57

Channel Plot



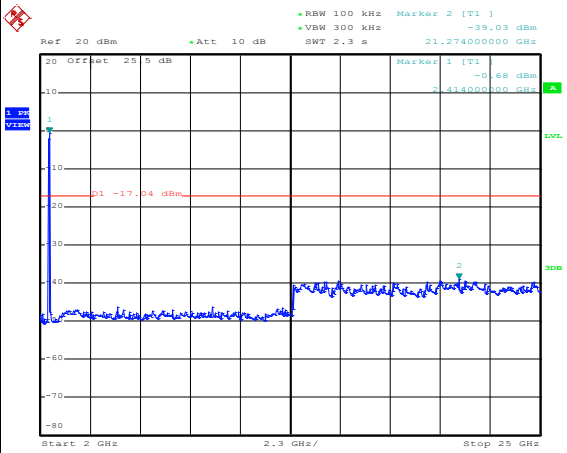
Date: 30.OCT.2018 02:31:32

Spurious Emission 30MHz~3GHz



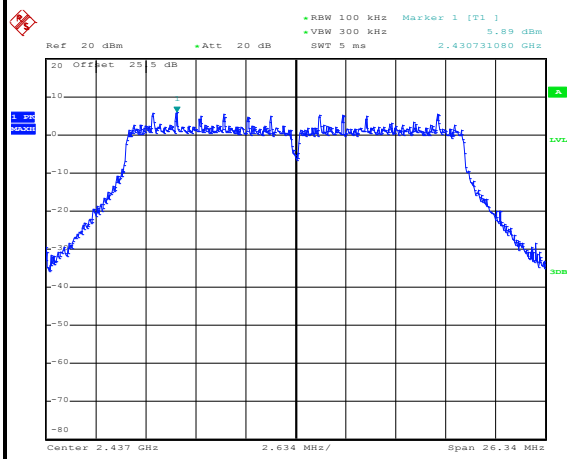
Date: 30.OCT.2018 02:32:40

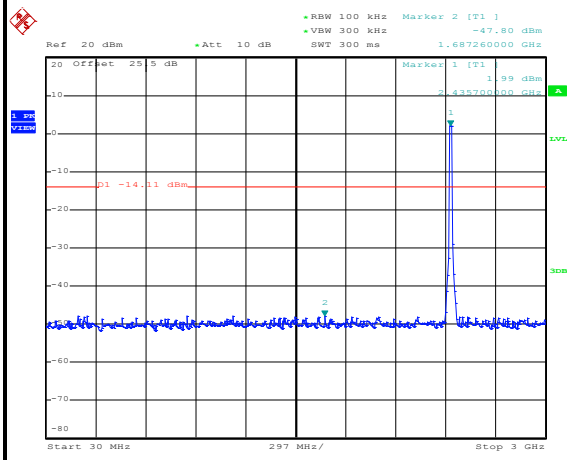
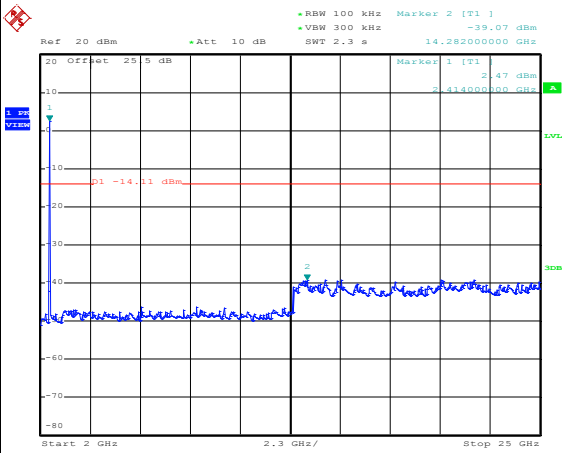
Spurious Emission 2GHz~25GHz



Date: 30.OCT.2018 02:33:06

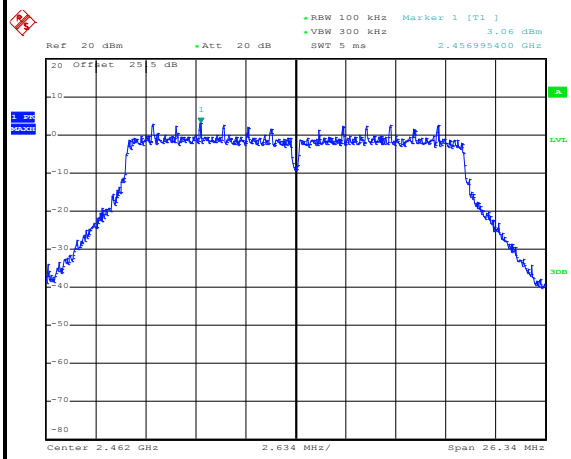
Test Mode :	802.11n HT20	Test Channel :	06

100kHz PSD reference Level	Channel Plot
 Date: 30.OCT.2018 02:49:58	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
 Date: 30.OCT.2018 02:50:20	 Date: 30.OCT.2018 02:51:47

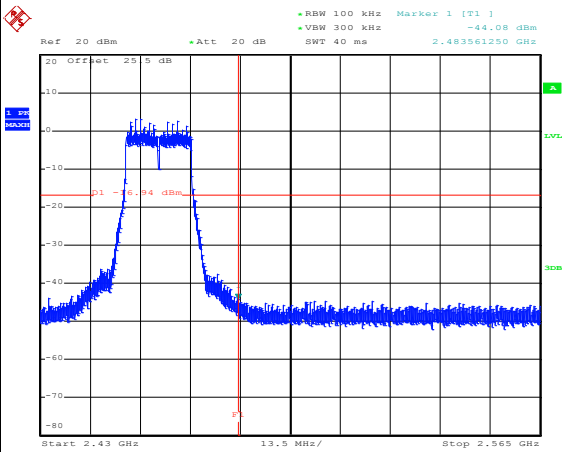
Test Mode :	802.11n HT20	Test Channel :	11

100kHz PSD reference Level



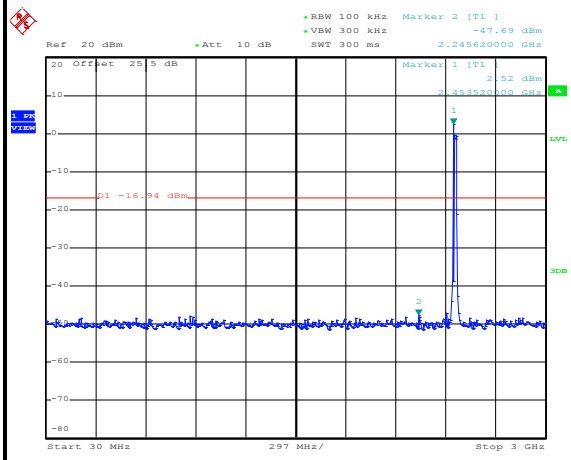
Date: 30.OCT.2018 02:54:25

Channel Plot



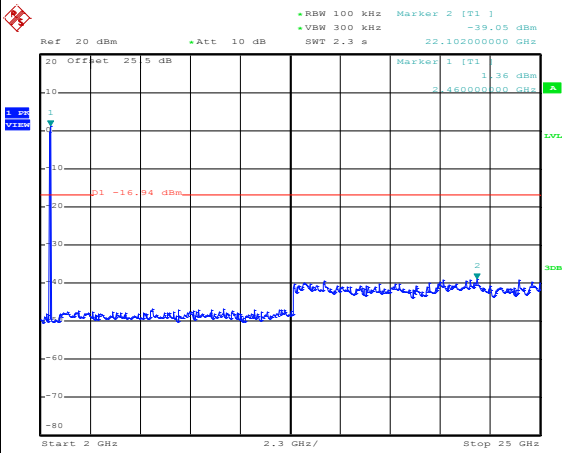
Date: 30.OCT.2018 02:54:46

Spurious Emission 30MHz~3GHz



Date: 30.OCT.2018 02:55:19

Spurious Emission 2GHz~25GHz



Date: 30.OCT.2018 02:55:33

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

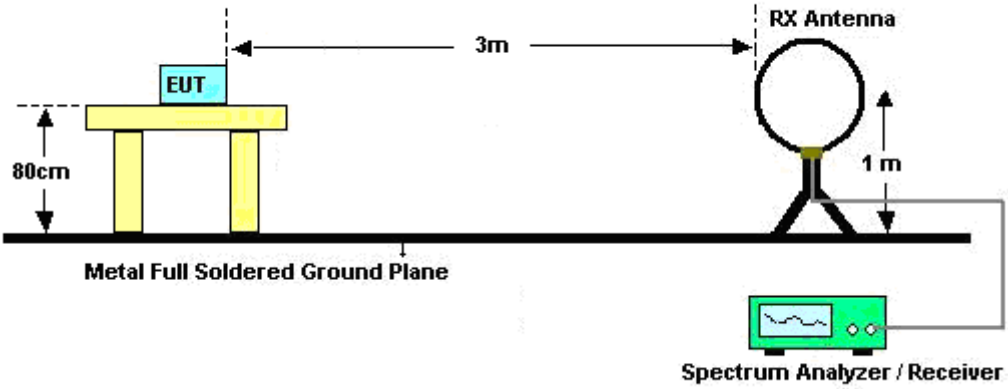
See list of measuring equipment of this test report.

3.5.3 Test Procedures

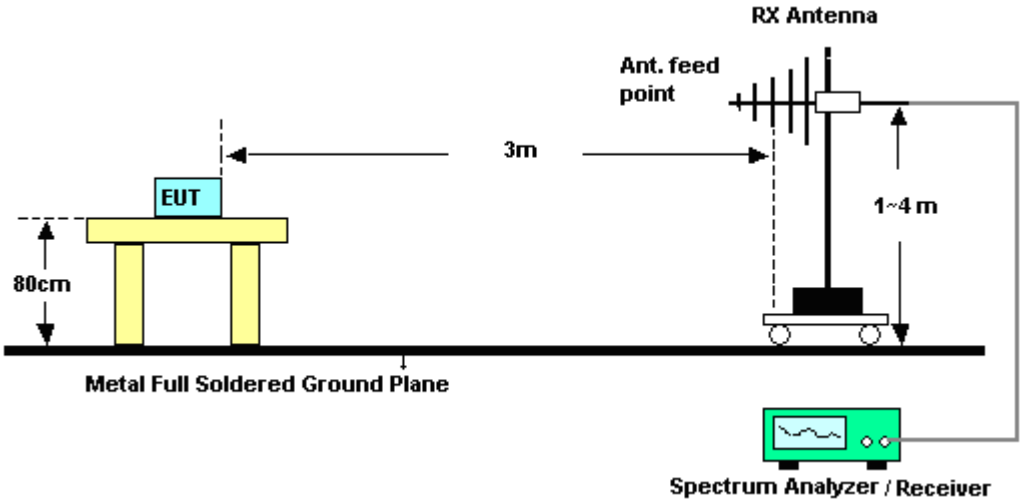
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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 testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. 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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

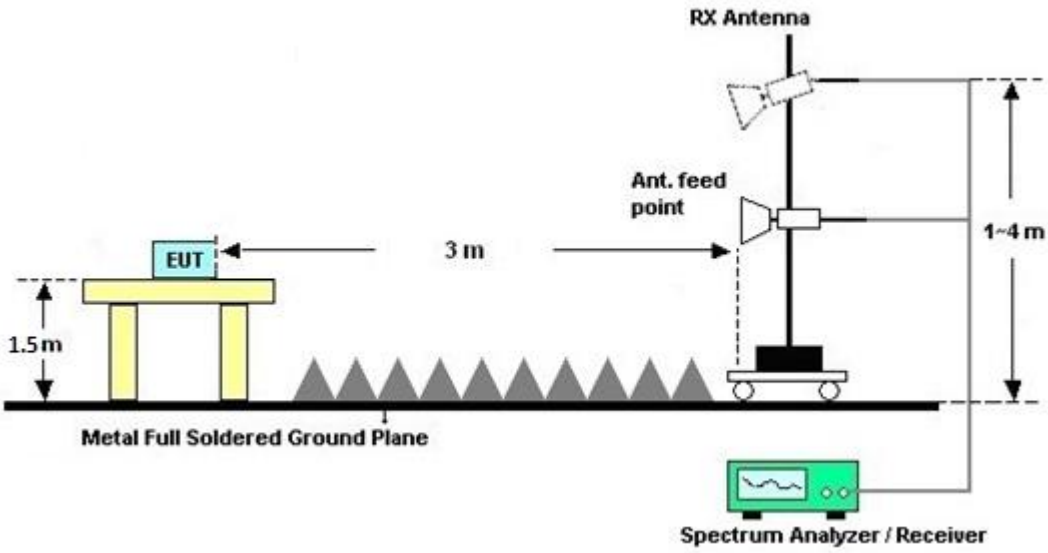
For radiated emissions below 30MHz



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.

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

3.5.6 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 (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

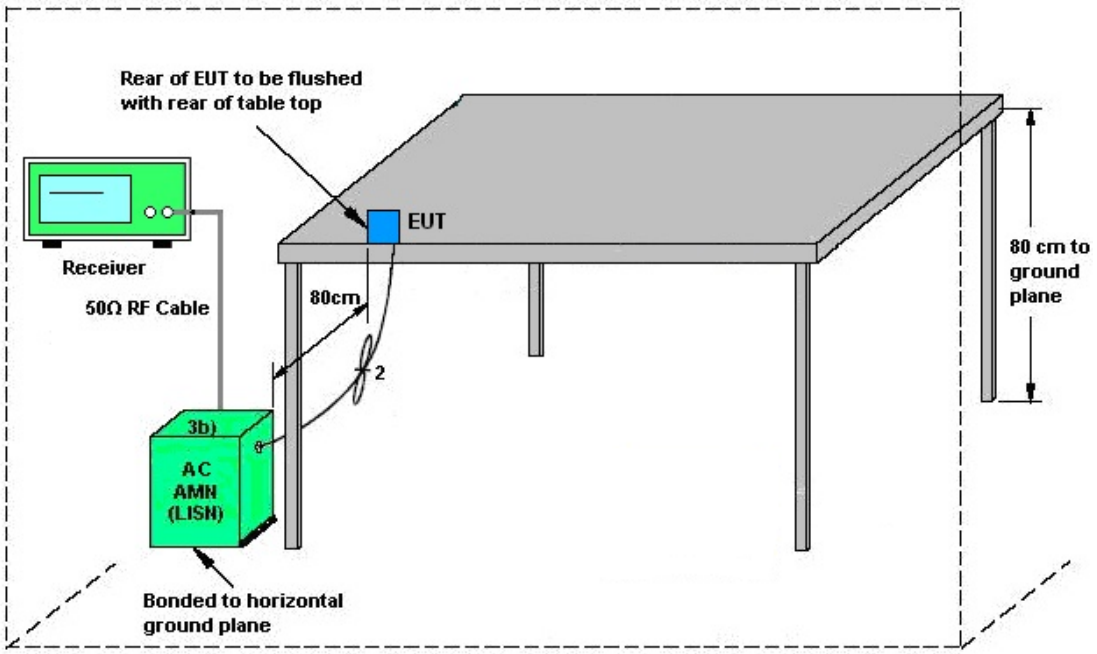
3.6.2 Measuring Instruments

See list of measuring equipment 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



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

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. 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	1132003	N/A	Aug. 16, 2018	Oct. 20, 2018~ Nov. 21, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1126017	300MHz~40GHz	Aug. 16, 2018	Oct. 20, 2018~ Nov. 21, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 21, 2017	Oct. 20, 2018~ Oct. 30, 2018	Nov. 20, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSQ	200578/026	20Hz~26.5GHz	May 28, 2018	Nov. 21, 2018	May 27, 2019	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 07, 2017	Oct. 20, 2018~ Oct. 30, 2018	Nov. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101408	10Hz~40GHz	Jul. 30, 2018	Nov. 21, 2018	Jul. 29, 2019	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Oct. 20, 2018~ Nov. 21, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 25, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Dec. 08, 2017	Oct. 25, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Oct. 25, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 25, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Oct. 25, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Oct. 25, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Filter	Microwave	H3G018G1	SN477219	3.0G High Pass	Nov. 21, 2017	Oct. 23, 2018~ Nov. 01, 2018	Nov. 20, 2018	Radiation (03CH13-HY)
Filter	Microwave	H3G018G1	SN477219	3.0G High Pass	Nov. 02, 2018	Nov. 21, 2018	Nov. 01, 2019	Radiation (03CH13-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 16, 2018	Oct. 23, 2018~ Nov. 21, 2018	Jan. 15, 2019	Radiation (03CH13-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Oct. 23, 2018~ Nov. 01, 2018	Nov. 09, 2018	Radiation (03CH13-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Nov. 21, 2018	Nov. 22, 2018	Radiation (03CH13-HY)
Filter	Wainwright	WLKS1200-8SS	SN3	1.2G Low Pass	Nov. 21, 2017	Oct. 23, 2018~ Nov. 01, 2018	Nov. 20, 2018	Radiation (03CH13-HY)
Filter	Wainwright	WLKS1200-8SS	SN3	1.2G Low Pass	Nov. 02, 2018	Nov. 21, 2018	Nov. 01, 2019	Radiation (03CH13-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2018	Oct. 23, 2018~ Nov. 21, 2018	Jul. 15, 2019	Radiation (03CH13-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Dec. 21, 2016	Oct. 23, 2018~ Nov. 21, 2018	Dec. 20, 2018	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800N1D01N-06	40103&07	30MHz to 1GHz	Jan. 10, 2018	Oct. 23, 2018~ Nov. 21, 2018	Jan. 09, 2019	Radiation (03CH13-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jun. 29, 2018	Oct. 23, 2018~ Nov. 21, 2018	Jun. 28, 2019	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May 21, 2018	Oct. 23, 2018~ Nov. 21, 2018	May 20, 2019	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Feb. 02, 2018	Oct. 23, 2018~ Nov. 21, 2018	Feb. 01, 2019	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 15, 2018	Oct. 23, 2018~ Nov. 21, 2018	Mar. 14, 2019	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 23, 2018~ Nov. 21, 2018	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 23, 2018~ Nov. 21, 2018	N/A	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Oct. 23, 2018~ Nov. 21, 2018	Nov. 26, 2018	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-00101800	2025787	1GHZ~18GHZ	Mar. 12, 2018	Oct. 23, 2018~ Nov. 21, 2018	Mar. 11, 2019	Radiation (03CH13-HY)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800054001	1GHZ~18GHZ	Apr. 16, 2018	Oct. 23, 2018~ Nov. 21, 2018	Apr. 15, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30M-18G	Jan. 22, 2018	Oct. 23, 2018~ Nov. 21, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	335041/4	30M-18G	Jan. 22, 2018	Oct. 23, 2018~ Nov. 21, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30M~18GHz	Jan. 22, 2018	Oct. 23, 2018~ Nov. 21, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30M~40GHz	Mar. 14, 2018	Oct. 23, 2018~ Nov. 21, 2018	Mar. 13, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30M~40GHz	Mar. 14, 2018	Oct. 23, 2018~ Nov. 21, 2018	Mar. 13, 2019	Radiation (03CH13-HY)
Software	AUDIX	E3 6.2009-8-24c	RK-001124	N/A	N/A	Oct. 23, 2018~ Nov. 21, 2018	N/A	Radiation (03CH13-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.2

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.4

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.3

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Shiming Liu/Shiang Wang	Temperature:	21~25	°C
Test Date:	2018/10/20~2018/11/21	Relative Humidity:	51~54	%

Report Number : FR870418C

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
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	1	1	2412	13.00	-	8.04	-	0.50	Pass
11b	1Mbps	1	6	2437	13.00	-	8.56	-	0.50	Pass
11b	1Mbps	1	11	2462	13.00	-	8.02	-	0.50	Pass
11g	6Mbps	1	1	2412	17.00	-	16.36	-	0.50	Pass
11g	6Mbps	1	6	2437	17.10	-	16.36	-	0.50	Pass
11g	6Mbps	1	11	2462	17.10	-	16.36	-	0.50	Pass
HT20	MCS0	1	1	2412	18.00	-	17.58	-	0.50	Pass
HT20	MCS0	1	6	2437	18.20	-	17.56	-	0.50	Pass
HT20	MCS0	1	11	2462	18.10	-	17.56	-	0.50	Pass

Report Number : FR870418C

TEST RESULTS DATA
Peak Output Power

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
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	21.91	-	-	30.00	-	0.00	-	21.91	-	36.00	-	Pass
11b	1Mbps	1	6	2437	22.55	-	-	30.00	-	0.00	-	22.55	-	36.00	-	Pass
11b	1Mbps	1	11	2462	22.22	-	-	30.00	-	0.00	-	22.22	-	36.00	-	Pass
11g	6Mbps	1	1	2412	24.32	-	-	30.00	-	0.00	-	24.32	-	36.00	-	Pass
11g	6Mbps	1	2	2417	25.78	-	-	30.00	-	0.00	-	25.78	-	36.00	-	Pass
11g	6Mbps	1	6	2437	26.30	-	-	30.00	-	0.00	-	26.30	-	36.00	-	Pass
11g	6Mbps	1	10	2457	25.60	-	-	30.00	-	0.00	-	25.60	-	36.00	-	Pass
11g	6Mbps	1	11	2462	24.30	-	-	30.00	-	0.00	-	24.30	-	36.00	-	Pass
HT20	MCS0	1	1	2412	24.35	-	-	30.00	-	0.00	-	24.35	-	36.00	-	Pass
HT20	MCS0	1	2	2417	25.80	-	-	30.00	-	0.00	-	25.80	-	36.00	-	Pass
HT20	MCS0	1	6	2437	26.13	-	-	30.00	-	0.00	-	26.13	-	36.00	-	Pass
HT20	MCS0	1	10	2457	25.62	-	-	30.00	-	0.00	-	25.62	-	36.00	-	Pass
HT20	MCS0	1	11	2462	24.15	-	-	30.00	-	0.00	-	24.15	-	36.00	-	Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.00	-	19.20	-	-
11b	1Mbps	1	6	2437	0.00	-	19.48	-	
11b	1Mbps	1	11	2462	0.00	-	19.37	-	
11g	6Mbps	1	1	2412	0.58	-	14.49	-	
11g	6Mbps	1	2	2417	0.58	-	17.28	-	
11g	6Mbps	1	6	2437	0.58	-	17.31	-	
11g	6Mbps	1	10	2457	0.58	-	17.17	-	
11g	6Mbps	1	11	2462	0.58	-	14.48	-	
HT20	MCS0	1	1	2412	0.63	-	14.48	-	
HT20	MCS0	1	2	2417	0.63	-	17.30	-	
HT20	MCS0	1	6	2437	0.63	-	17.31	-	
HT20	MCS0	1	10	2457	0.63	-	17.26	-	
HT20	MCS0	1	11	2462	0.63	-	14.43	-	

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR870418C

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-3.27	-	-	0.00	-	8.00	-	Pass
11b	1Mbps	1	6	2437	-3.30	-	-	0.00	-	8.00	-	Pass
11b	1Mbps	1	11	2462	-3.08	-	-	0.00	-	8.00	-	Pass
11g	6Mbps	1	1	2412	-10.66	-	-	0.00	-	8.00	-	Pass
11g	6Mbps	1	6	2437	-8.52	-	-	0.00	-	8.00	-	Pass
11g	6Mbps	1	11	2462	-10.11	-	-	0.00	-	8.00	-	Pass
HT20	MCS0	1	1	2412	-10.16	-	-	0.00	-	8.00	-	Pass
HT20	MCS0	1	6	2437	-8.45	-	-	0.00	-	8.00	-	Pass
HT20	MCS0	1	11	2462	-10.77	-	-	0.00	-	8.00	-	Pass

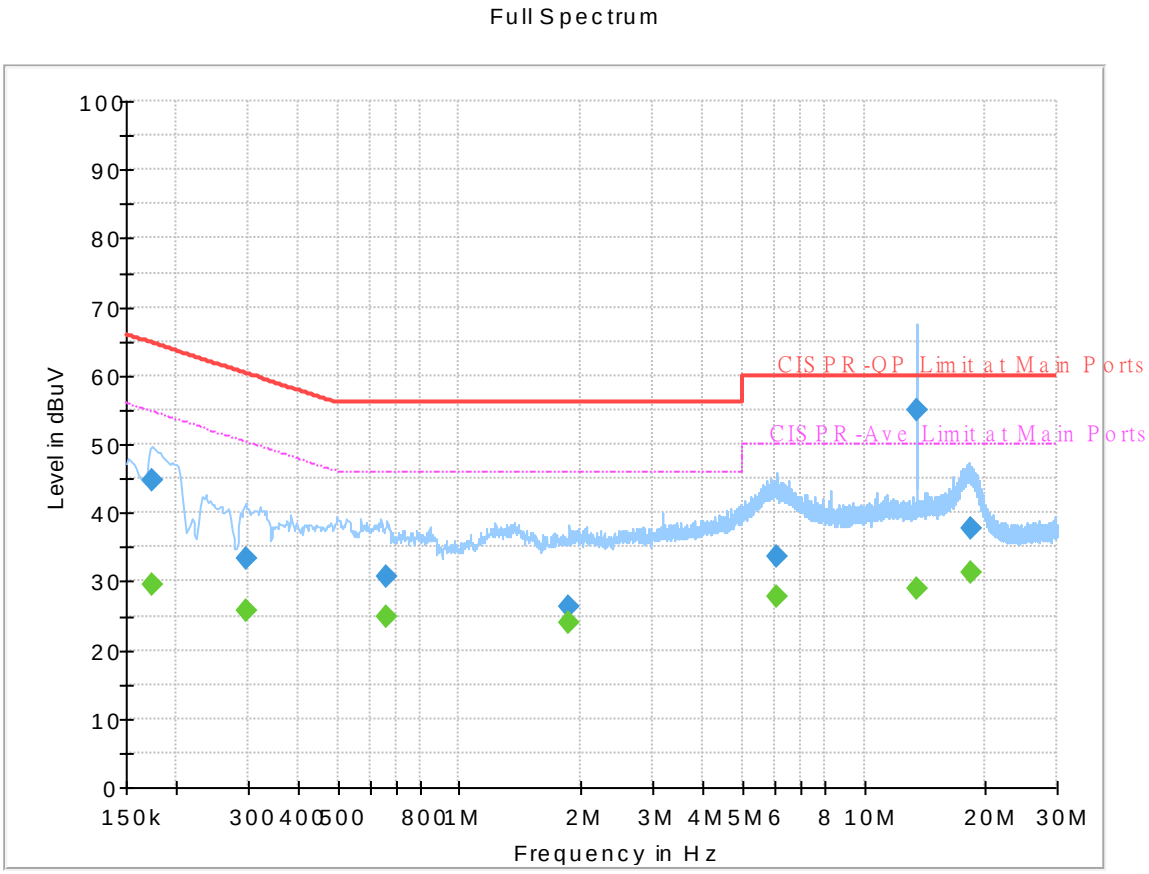
Measured power density (dBm) has offset with cable loss.

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Jimmy Chang	**Temperature :**	24~26℃
		Relative Humidity :	50~52%

EUT Information

Report NO :	870418
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line



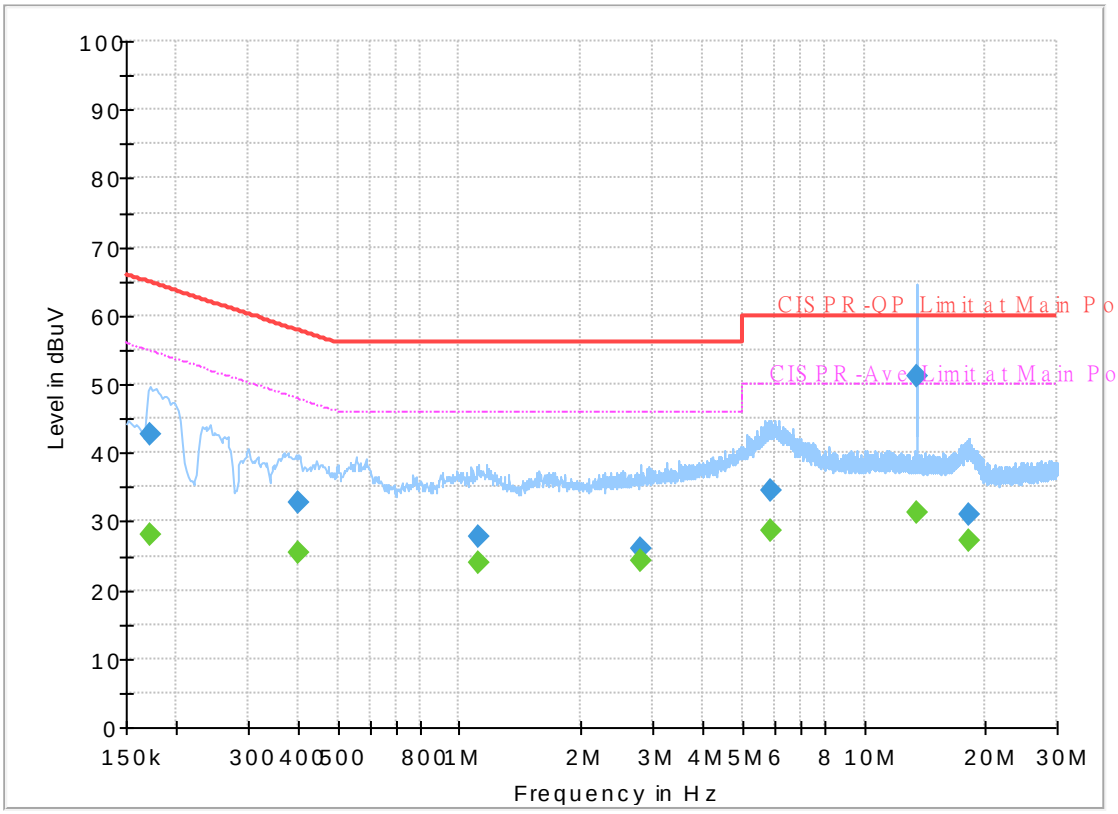
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.174750	---	29.42	54.73	25.31	L1	OFF	19.5
0.174750	44.60	---	64.73	20.13	L1	OFF	19.5
0.296250	---	25.74	50.35	24.61	L1	OFF	19.5
0.296250	33.28	---	60.35	27.07	L1	OFF	19.5
0.663000	---	24.91	46.00	21.09	L1	OFF	19.6
0.663000	30.56	---	56.00	25.44	L1	OFF	19.6
1.869000	---	23.84	46.00	22.16	L1	OFF	19.6
1.869000	26.34	---	56.00	29.66	L1	OFF	19.6
6.103500	---	27.81	50.00	22.19	L1	OFF	19.8
6.103500	33.59	---	60.00	26.41	L1	OFF	19.8
13.560000	---	28.98	50.00	21.02	L1	OFF	20.0
13.560000	54.99	---	60.00	5.01	L1	OFF	20.0
18.390750	---	31.20	50.00	18.80	L1	OFF	20.2
18.390750	37.72	---	60.00	22.28	L1	OFF	20.2

EUT Information

Report NO :	870418
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.172500	---	28.03	54.84	26.81	N	OFF	19.5
0.172500	42.80	---	64.84	22.04	N	OFF	19.5
0.399750	---	25.41	47.86	22.45	N	OFF	19.5
0.399750	32.74	---	57.86	25.12	N	OFF	19.5
1.113000	---	23.93	46.00	22.07	N	OFF	19.6
1.113000	27.84	---	56.00	28.16	N	OFF	19.6
2.793750	---	24.14	46.00	21.86	N	OFF	19.6
2.793750	25.99	---	56.00	30.01	N	OFF	19.6
5.894250	---	28.62	50.00	21.38	N	OFF	19.8
5.894250	34.58	---	60.00	25.42	N	OFF	19.8
13.560000	---	31.31	50.00	18.69	N	OFF	20.1
13.560000	51.13	---	60.00	8.87	N	OFF	20.1
18.098250	---	27.07	50.00	22.93	N	OFF	20.2
18.098250	30.89	---	60.00	29.11	N	OFF	20.2

Appendix C. Radiated Spurious Emission

Test Engineer :	Alex Jheng, Fu Chen, and Wilson Wu	Temperature :	24~25°C
		Relative Humidity :	48~50%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2362.605	53.65	-20.35	74	40.95	27.14	15.47	29.91	332	343	P	H
		2388.015	42.47	-11.53	54	29.65	27.23	15.49	29.9	332	343	A	H
	*	2412	101.02	-	-	88.1	27.28	15.53	29.89	332	343	P	H
	*	2412	97.63	-	-	84.71	27.28	15.53	29.89	332	343	A	H
													H
													H
		2321.445	53.37	-20.63	74	40.8	27.05	15.43	29.91	126	261	P	V
		2387.805	42.43	-11.57	54	29.61	27.23	15.49	29.9	126	261	A	V
	*	2412	99.49	-	-	86.57	27.28	15.53	29.89	126	261	P	V
	*	2412	96.18	-	-	83.26	27.28	15.53	29.89	126	261	A	V
													V
													V
802.11b CH 06 2437MHz		2343.88	53.88	-20.12	74	41.24	27.1	15.45	29.91	374	350	P	H
		2364.6	43.34	-10.66	54	30.63	27.14	15.47	29.9	374	350	A	H
	*	2437	103.28	-	-	90.25	27.37	15.55	29.89	374	350	P	H
	*	2437	99.79	-	-	86.76	27.37	15.55	29.89	374	350	A	H
		2486.35	53.61	-20.39	74	40.42	27.46	15.61	29.88	374	350	P	H
		2496.29	43.78	-10.22	54	30.54	27.5	15.61	29.87	374	350	A	H
		2362.22	53.9	-20.1	74	41.2	27.14	15.47	29.91	130	272	P	V
		2385.18	43.51	-10.49	54	30.73	27.19	15.49	29.9	130	272	A	V
	*	2437	100.82	-	-	87.79	27.37	15.55	29.89	130	272	P	V
	*	2437	97.41	-	-	84.38	27.37	15.55	29.89	130	272	A	V
		2487.89	53.16	-20.84	74	39.93	27.5	15.61	29.88	130	272	P	V
		2485.44	43.8	-10.2	54	30.61	27.46	15.61	29.88	130	272	A	V

802.11b CH 11 2462MHz	*	2462	103.15	-	-	90.05	27.41	15.57	29.88	370	351	P	H
	*	2462	99.48	-	-	86.38	27.41	15.57	29.88	370	351	A	H
		2497.16	53.75	-20.25	74	40.51	27.5	15.61	29.87	370	351	P	H
		2488.04	44.05	-9.95	54	30.82	27.5	15.61	29.88	370	351	A	H
													H
													H
	*	2462	99.63	-	-	86.53	27.41	15.57	29.88	100	271	P	V
	*	2462	96.25	-	-	83.15	27.41	15.57	29.88	100	271	A	V
		2486.92	54.12	-19.88	74	40.93	27.46	15.61	29.88	100	271	P	V
		2485.72	43.83	-10.17	54	30.64	27.46	15.61	29.88	100	271	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	40.55	-33.45	74	58.62	31.26	8.22	57.55	100	0	P	H
													H
													H
													H
		4824	37.65	-36.35	74	55.72	31.26	8.22	57.55	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4874	42.28	-31.72	74	59.93	31.36	8.44	57.45	100	0	P	H
		7311	44.24	-29.76	74	54.65	36.18	10.68	57.27	100	0	P	H
													H
													H
		4874	40.77	-33.23	74	58.42	31.36	8.44	57.45	100	0	P	V
		7311	43.03	-30.97	74	53.44	36.18	10.68	57.27	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4924	42.14	-31.86	74	59.35	31.46	8.68	57.35	100	0	P	H
		7386	43.92	-30.08	74	54.24	36.37	10.67	57.36	100	0	P	H
													H
													H
		4924	41.07	-32.93	74	58.28	31.46	8.68	57.35	100	0	P	V
		7386	44.51	-29.49	74	54.83	36.37	10.67	57.36	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 802.11g (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2359.245	53.39	-20.61	74	40.69	27.14	15.47	29.91	382	348	P	H
		2389.065	43.56	-10.44	54	30.74	27.23	15.49	29.9	382	348	A	H
	*	2412	99.57	-	-	86.65	27.28	15.53	29.89	382	348	P	H
	*	2412	91.02	-	-	78.1	27.28	15.53	29.89	382	348	A	H
													H
													H
		2349.795	53.41	-20.59	74	40.77	27.1	15.45	29.91	112	270	P	V
		2389.38	43.61	-10.39	54	30.79	27.23	15.49	29.9	112	270	A	V
	*	2412	96.37	-	-	83.45	27.28	15.53	29.89	112	270	P	V
	*	2412	88.02	-	-	75.1	27.28	15.53	29.89	112	270	A	V
													V
													V
802.11g CH 02 2417MHz		2386.86	53.72	-20.28	74	40.89	27.23	15.5	29.9	325	346	P	H
		2389.94	44.04	-9.96	54	31.2	27.23	15.5	29.89	325	346	A	H
	*	2417	101.78	-	-	88.86	27.28	15.53	29.89	325	346	P	H
	*	2417	93.58	-	-	80.66	27.28	15.53	29.89	325	346	A	H
													H
													H
		2389.38	54.04	-19.96	74	41.21	27.23	15.5	29.9	100	283	P	V
		2389.94	44.05	-9.95	54	31.21	27.23	15.5	29.89	100	283	A	V
	*	2417	98.32	-	-	85.4	27.28	15.53	29.89	100	283	P	V
	*	2417	90.59	-	-	77.67	27.28	15.53	29.89	100	283	A	V
													V
													V

802.11g CH 06 2437MHz		2320.22	53.47	-20.53	74	40.92	27.05	15.41	29.91	374	351	P	H
		2380.84	43.42	-10.58	54	30.64	27.19	15.49	29.9	374	351	A	H
	*	2437	102.5	-	-	89.47	27.37	15.55	29.89	374	351	P	H
	*	2437	94.84	-	-	81.81	27.37	15.55	29.89	374	351	A	H
		2495.45	53.34	-20.66	74	40.1	27.5	15.61	29.87	374	351	P	H
		2489.64	43.88	-10.12	54	30.65	27.5	15.61	29.88	374	351	A	H
		2353.12	53.63	-20.37	74	40.95	27.14	15.45	29.91	127	262	P	V
		2388.54	43.46	-10.54	54	30.64	27.23	15.49	29.9	127	262	A	V
	*	2437	100.4	-	-	87.37	27.37	15.55	29.89	127	262	P	V
	*	2437	92.55	-	-	79.52	27.37	15.55	29.89	127	262	A	V
		2495.59	53.86	-20.14	74	40.62	27.5	15.61	29.87	127	262	P	V
		2489.57	43.78	-10.22	54	30.55	27.5	15.61	29.88	127	262	A	V
802.11g CH 10 2457MHz	*	2457	103.08	-	-	89.98	27.41	15.57	29.88	400	346	P	H
	*	2457	94.18	-	-	81.08	27.41	15.57	29.88	400	346	A	H
		2484.04	58.02	-15.98	74	44.84	27.46	15.6	29.88	400	346	P	H
		2483.98	45.18	-8.82	54	32	27.46	15.6	29.88	400	346	A	H
												P	H
												A	H
	*	2457	98.45	-	-	85.35	27.41	15.57	29.88	100	249	P	V
	*	2457	90.57	-	-	77.47	27.41	15.57	29.88	100	249	A	V
		2483.56	54.91	-19.09	74	41.73	27.46	15.6	29.88	100	249	P	V
		2483.62	44.16	-9.84	54	30.98	27.46	15.6	29.88	100	249	A	V
												P	V
												A	V

802.11g CH 11 2462MHz	*	2462	98.96	-	-	85.86	27.41	15.57	29.88	375	350	P	H
	*	2462	91.12	-	-	78.02	27.41	15.57	29.88	375	350	A	H
		2498.04	55.07	-18.93	74	41.83	27.5	15.61	29.87	375	350	P	H
		2483.6	44.57	-9.43	54	31.38	27.46	15.61	29.88	375	350	A	H
													H
													H
	*	2462	96.75	-	-	83.65	27.41	15.57	29.88	102	231	P	V
	*	2462	88.36	-	-	75.26	27.41	15.57	29.88	102	231	A	V
		2483.84	54.26	-19.74	74	41.07	27.46	15.61	29.88	102	231	P	V
		2484.08	44.1	-9.9	54	30.91	27.46	15.61	29.88	102	231	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 802.11g (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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	38.17	-35.83	74	56.24	31.26	8.22	57.55	100	0	P	H
													H
													H
													H
		4824	37.24	-36.76	74	55.31	31.26	8.22	57.55	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4874	37.41	-36.59	74	55.06	31.36	8.44	57.45	100	0	P	H
		7311	43.65	-30.35	74	54.06	36.18	10.68	57.27	100	0	P	H
													H
													H
		4874	36.24	-37.76	74	53.89	31.36	8.44	57.45	100	0	P	V
		7311	42.77	-31.23	74	53.18	36.18	10.68	57.27	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4924	38.05	-35.95	74	55.26	31.46	8.68	57.35	100	0	P	H
		7386	44.33	-29.67	74	54.65	36.37	10.67	57.36	100	0	P	H
													H
													H
		4924	36.13	-37.87	74	53.34	31.46	8.68	57.35	100	0	P	V
		7386	43.33	-30.67	74	53.65	36.37	10.67	57.36	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 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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2366.175	53.38	-20.62	74	40.67	27.14	15.47	29.9	324	342	P	H
		2389.485	43.57	-10.43	54	30.75	27.23	15.49	29.9	324	342	A	H
	*	2412	97.66	-	-	84.74	27.28	15.53	29.89	324	342	P	H
	*	2412	89.56	-	-	76.64	27.28	15.53	29.89	324	342	A	H
802.11n													H
HT20													H
CH 01		2342.025	53.33	-20.67	74	40.69	27.1	15.45	29.91	125	262	P	V
2412MHz		2390	43.78	-10.22	54	30.95	27.23	15.49	29.89	125	262	A	V
	*	2412	96.92	-	-	84	27.28	15.53	29.89	125	262	P	V
	*	2412	88.01	-	-	75.09	27.28	15.53	29.89	125	262	A	V
													V
													V
		2315.04	53.68	-20.32	74	41.16	27.01	15.42	29.91	323	349	P	H
		2389.94	44.39	-9.61	54	31.55	27.23	15.5	29.89	323	349	A	H
	*	2417	101.44	-	-	88.52	27.28	15.53	29.89	323	349	P	H
	*	2417	93.1	-	-	80.18	27.28	15.53	29.89	323	349	A	H
802.11n													H
HT20													H
CH 02		2388.96	55.04	-18.96	74	42.21	27.23	15.5	29.9	100	241	P	V
2417MHz		2389.52	44.23	-9.77	54	31.4	27.23	15.5	29.9	100	241	A	V
	*	2417	97.78	-	-	84.86	27.28	15.53	29.89	100	241	P	V
	*	2417	89.82	-	-	76.9	27.28	15.53	29.89	100	241	A	V
													V
													V

802.11n HT20 CH 06 2437MHz		2377.34	53.32	-20.68	74	40.54	27.19	15.49	29.9	400	0	P	H
		2376.36	43.23	-10.77	54	30.45	27.19	15.49	29.9	400	0	A	H
	*	2437	100.79	-	-	87.76	27.37	15.55	29.89	400	0	P	H
	*	2437	92.28	-	-	79.25	27.37	15.55	29.89	400	0	A	H
		2485.23	54.23	-19.77	74	41.04	27.46	15.61	29.88	400	0	P	H
		2488.31	43.86	-10.14	54	30.63	27.5	15.61	29.88	400	0	A	H
		2386.02	53.47	-20.53	74	40.65	27.23	15.49	29.9	145	264	P	V
		2382.24	43.25	-10.75	54	30.47	27.19	15.49	29.9	145	264	A	V
	*	2437	99.15	-	-	86.12	27.37	15.55	29.89	145	264	P	V
	*	2437	91.25	-	-	78.22	27.37	15.55	29.89	145	264	A	V
		2495.1	53.91	-20.09	74	40.67	27.5	15.61	29.87	145	264	P	V
		2488.59	43.96	-10.04	54	30.73	27.5	15.61	29.88	145	264	A	V
802.11n HT20 CH 10 2457MHz	*	2457	101.05	-	-	87.95	27.41	15.57	29.88	353	348	P	H
	*	2457	93.29	-	-	80.19	27.41	15.57	29.88	353	348	A	H
		2483.74	58.46	-15.54	74	45.28	27.46	15.6	29.88	353	348	P	H
		2483.5	46.28	-7.72	54	33.1	27.46	15.6	29.88	353	348	A	H
												P	H
												A	H
	*	2457	97.85	-	-	84.75	27.41	15.57	29.88	100	249	P	V
	*	2457	89.99	-	-	76.89	27.41	15.57	29.88	100	249	A	V
		2483.74	54.67	-19.33	74	41.49	27.46	15.6	29.88	100	249	P	V
		2484.22	44.4	-9.6	54	31.22	27.46	15.6	29.88	100	249	A	V
												P	V
												A	V

802.11n HT20 CH 11 2462MHz	*	2462	99.11	-	-	86.01	27.41	15.57	29.88	400	340	P	H
	*	2462	89.89	-	-	76.79	27.41	15.57	29.88	400	340	A	H
		2483.72	55.02	-18.98	74	41.83	27.46	15.61	29.88	400	340	P	H
		2483.6	44.8	-9.2	54	31.61	27.46	15.61	29.88	400	340	A	H
													H
													H
	*	2462	96.06	-	-	82.96	27.41	15.57	29.88	101	263	P	V
	*	2462	87.97	-	-	74.87	27.41	15.57	29.88	101	263	A	V
		2484	54.65	-19.35	74	41.46	27.46	15.61	29.88	101	263	P	V
		2483.84	43.93	-10.07	54	30.74	27.46	15.61	29.88	101	263	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)	Path 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	37.02	-36.98	74	55.09	31.26	8.22	57.55	100	0	P	H
													H
													H
													H
		4824	35.55	-38.45	74	53.62	31.26	8.22	57.55	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4874	37.79	-36.21	74	55.44	31.36	8.44	57.45	100	0	P	H
		7311	42.08	-31.92	74	52.49	36.18	10.68	57.27	100	0	P	H
													H
													H
		4874	36.18	-37.82	74	53.83	31.36	8.44	57.45	100	0	P	V
		7311	43.37	-30.63	74	53.78	36.18	10.68	57.27	100	0	P	V
													V
													V
802.11n HT20 CH 11 2462MHz		4924	36.88	-37.12	74	54.09	31.46	8.68	57.35	100	0	P	H
		7386	42.9	-31.1	74	53.22	36.37	10.67	57.36	100	0	P	H
													H
													H
		4924	36.13	-37.87	74	53.34	31.46	8.68	57.35	100	0	P	V
		7386	42.94	-31.06	74	53.26	36.37	10.67	57.36	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

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		37.02	24.58	-15.42	40	34.85	21.24	0.82	32.33	-	-	P	H
		52.68	26.01	-13.99	40	43.64	13.72	0.97	32.32	-	-	P	H
		92.64	29.71	-13.79	43.5	45.31	15.36	1.33	32.29	-	-	P	H
		886.6	41.51	-4.49	46	40.55	28.99	3.54	31.57	100	0	P	H
		892.2	39.15	-6.85	46	38.15	29.01	3.54	31.55	-	-	P	H
		955.2	33.87	-12.13	46	30.26	30.91	3.71	31.01	-	-	P	H
													H
													H
													H
													H
													H
													H
		30	35.32	-4.68	40	42.55	24.39	0.72	32.34	100	0	P	V
		33.51	34.46	-5.54	40	43.34	22.69	0.77	32.34	-	-	P	V
		40.53	30.13	-9.87	40	42.47	19.14	0.85	32.33	-	-	P	V
		621.3	27.93	-18.07	46	31.22	25.91	3	32.2	-	-	P	V
		804.7	31.17	-14.83	46	31.66	28.06	3.42	31.97	-	-	P	V
		953.8	33.55	-12.45	46	30.05	30.81	3.71	31.02	-	-	P	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	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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

Appendix D. Radiated Spurious Emission Plots

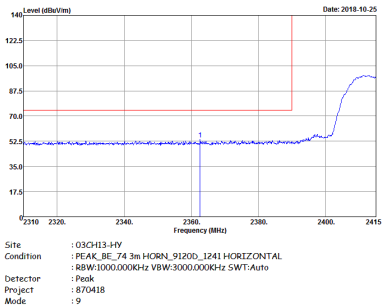
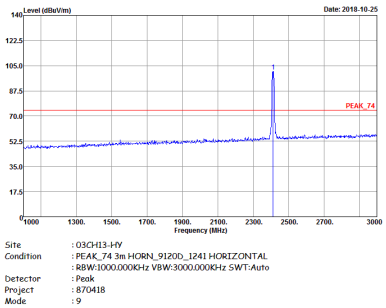
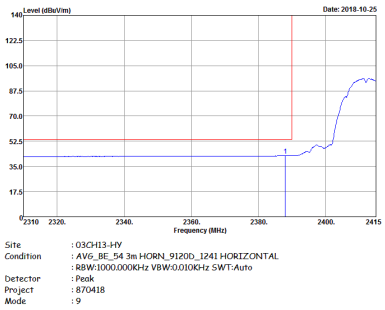
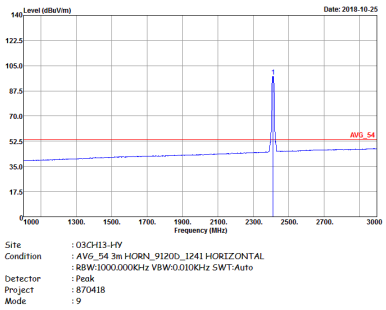
Test Engineer :	Alex Jheng, Fu Chen, and Wilson Wu	**Temperature :**	24.5~25°C
		Relative Humidity :	48~50%

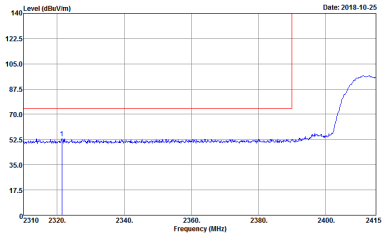
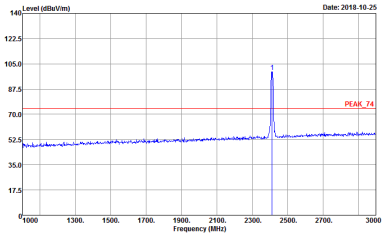
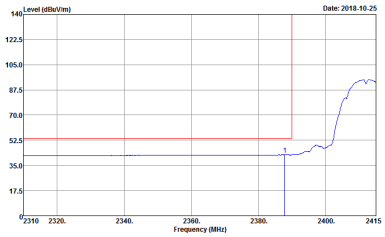
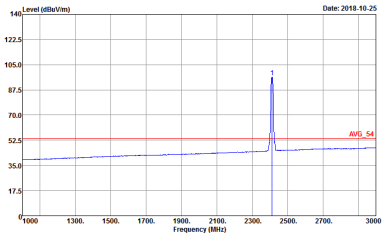
Note symbol

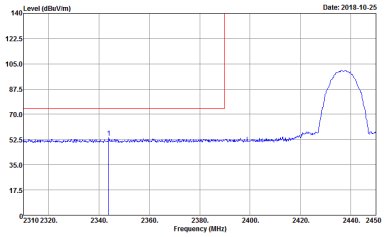
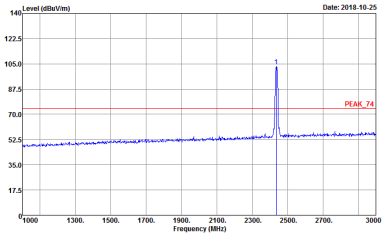
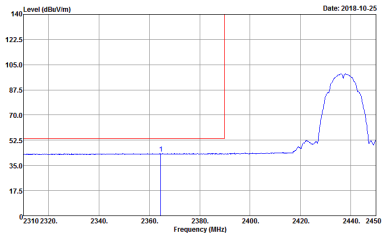
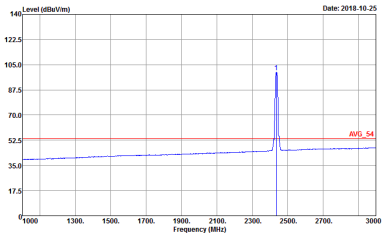
-L	**Low channel location**
-R	**High channel location**

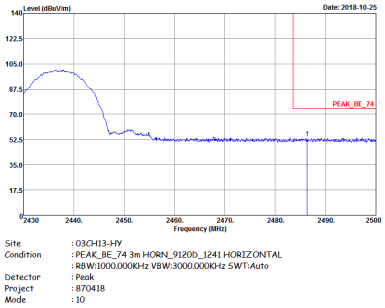
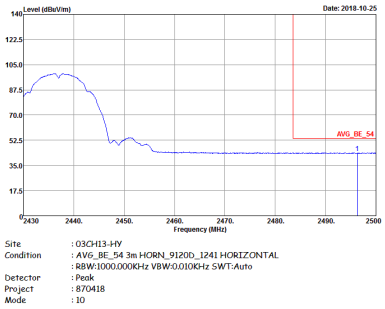
2.4GHz 2400~2483.5MHz

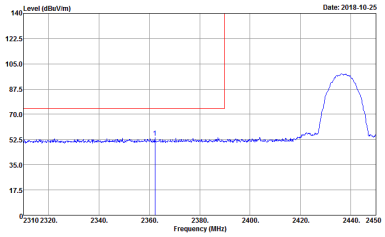
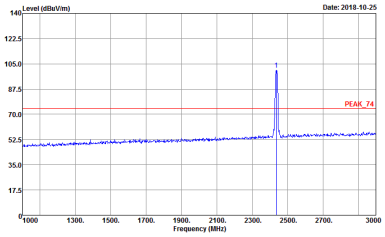
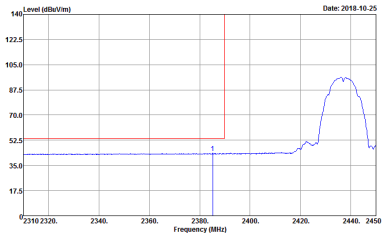
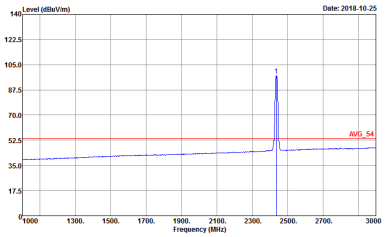
WIFI 802.11b (Band Edge @ 3m)

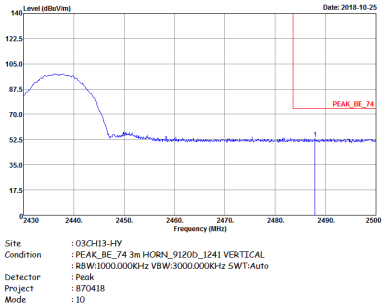
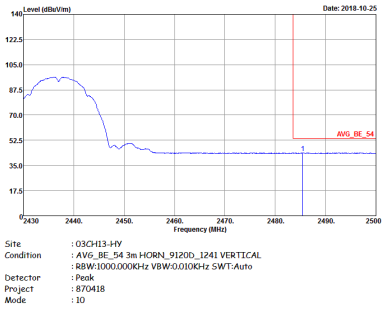
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

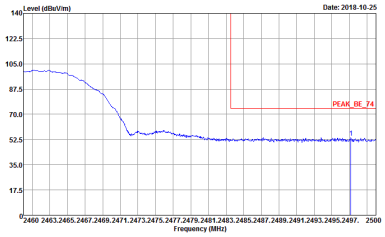
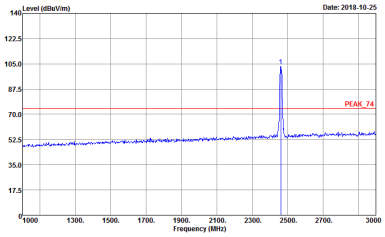
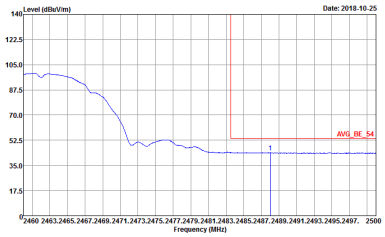
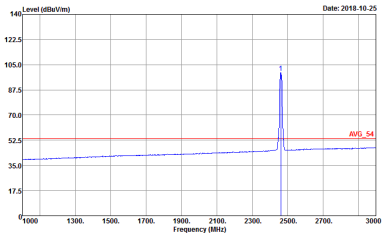
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 9	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 9
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 9	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 9

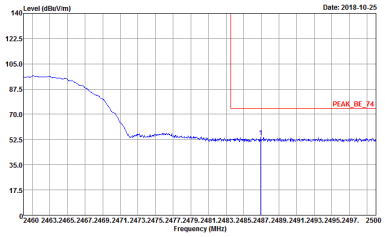
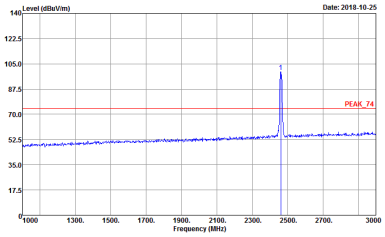
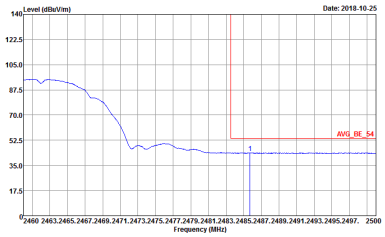
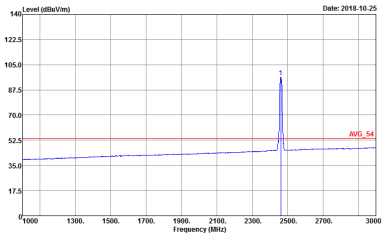
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 10

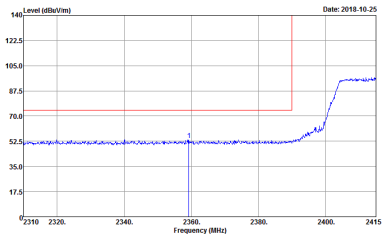
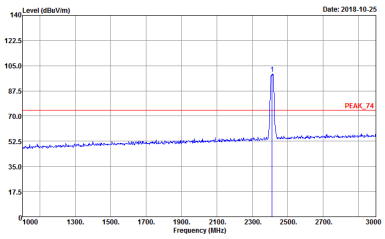
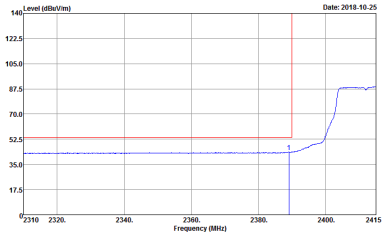
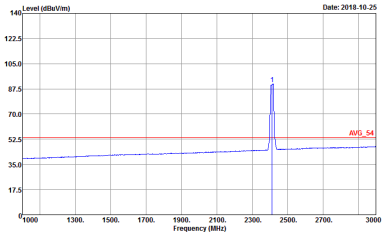
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

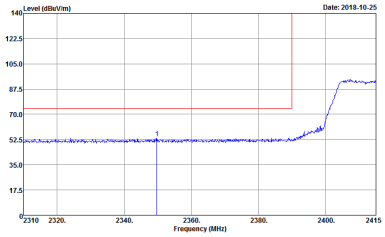
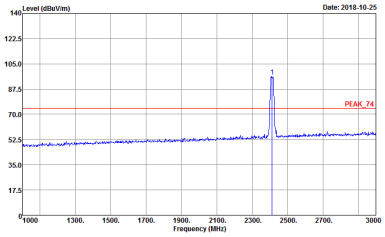
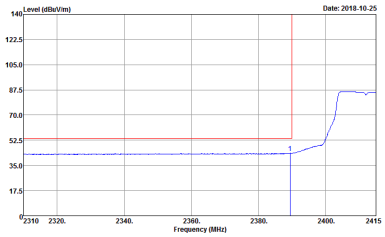
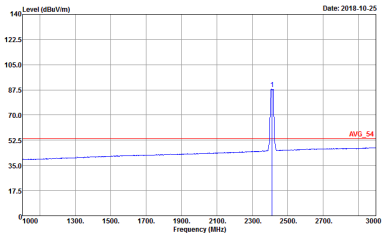
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11

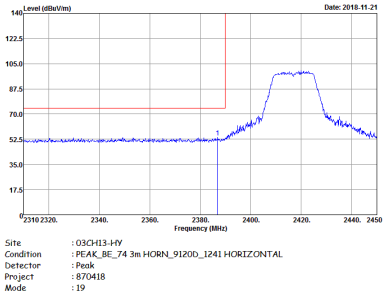
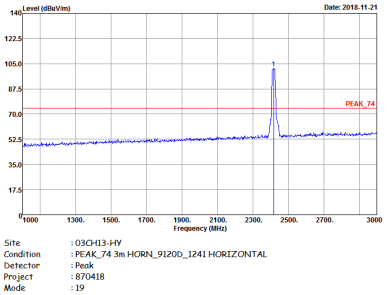
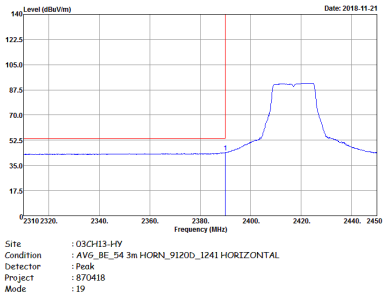
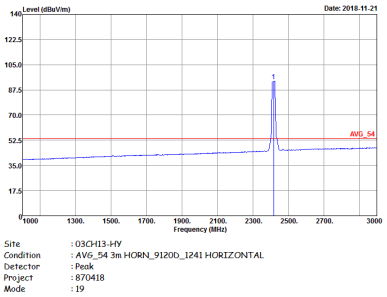
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 870418 Mode : 11

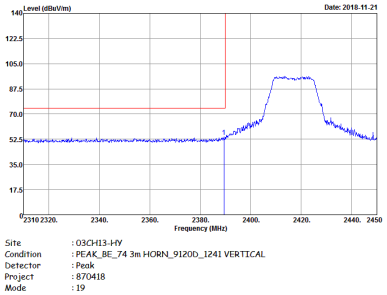
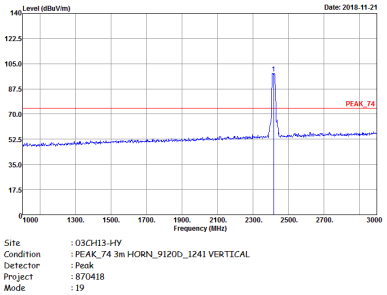
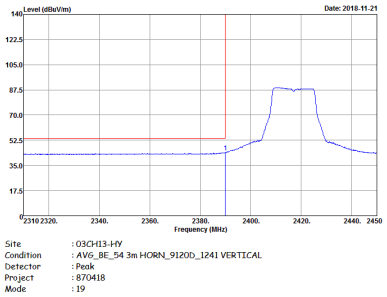
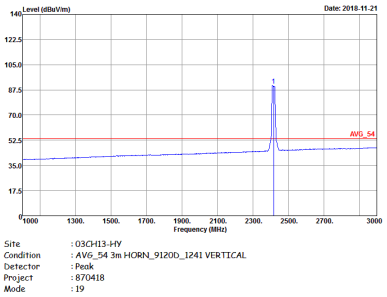
2.4GHz 2400~2483.5MHz

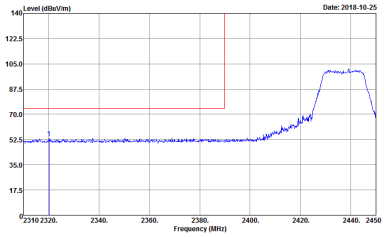
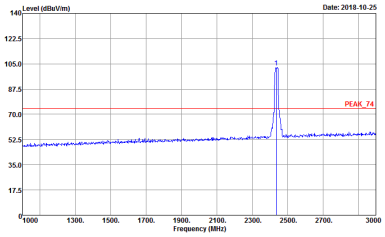
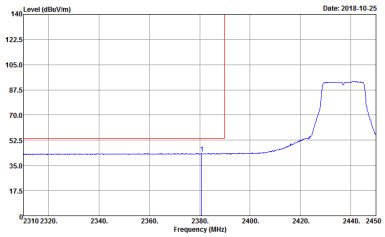
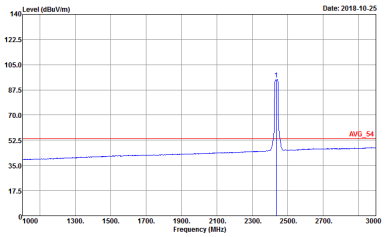
WIFI 802.11g (Band Edge @ 3m)

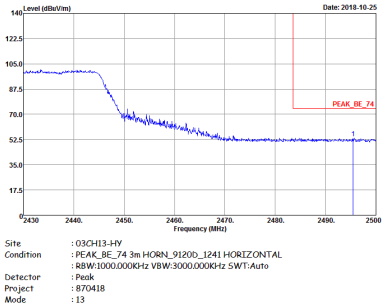
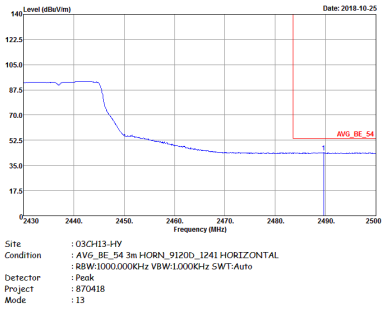
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12

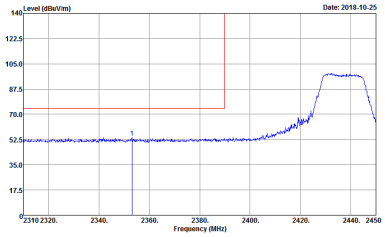
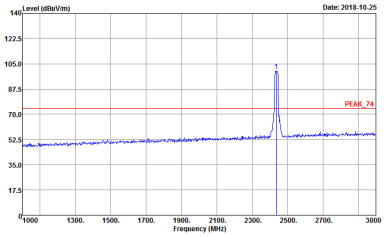
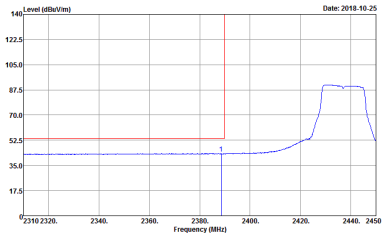
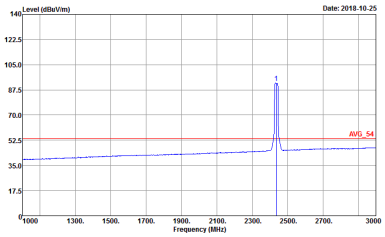
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 12

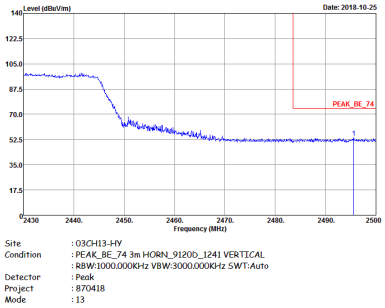
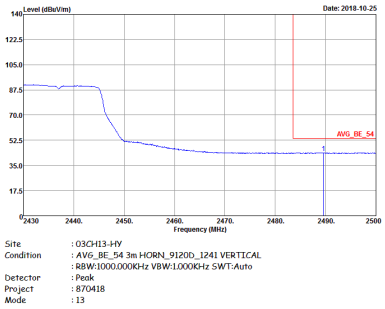
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH02 2417MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

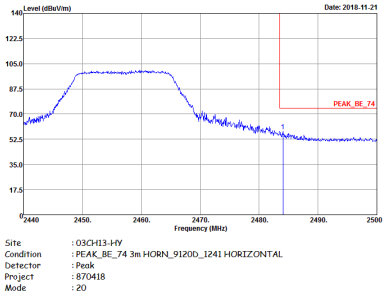
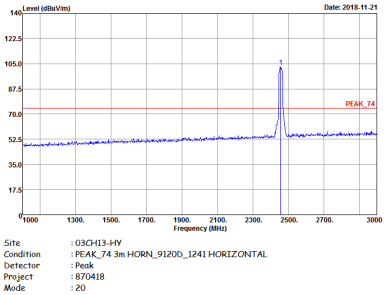
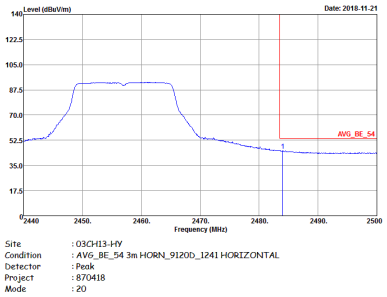
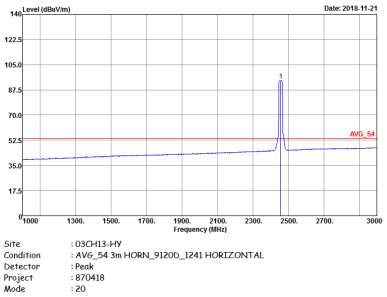
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH02 2417MHz	
1	Vertical	Fundamental
Peak		
Avg.		

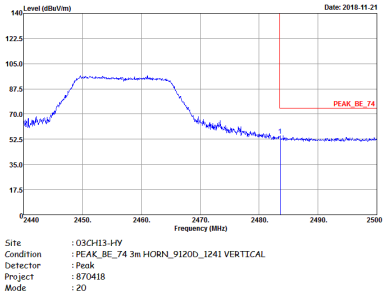
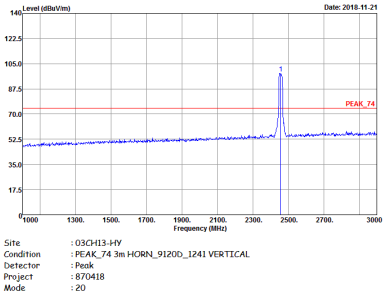
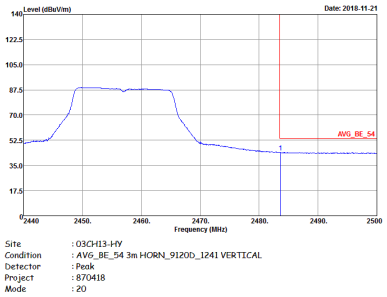
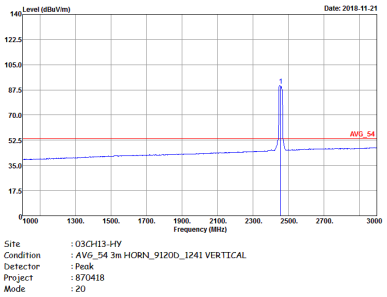
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13

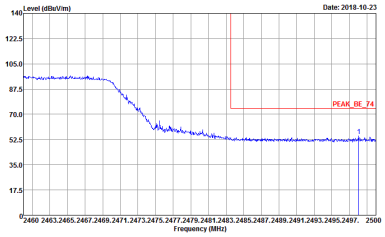
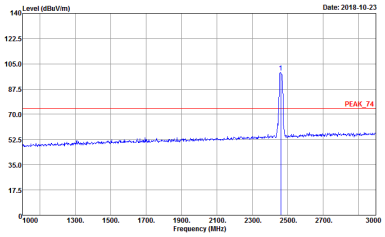
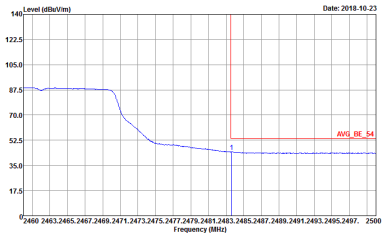
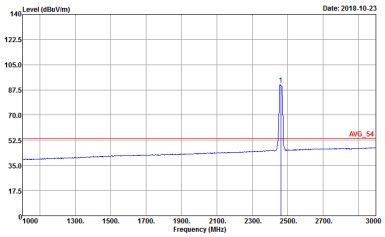
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

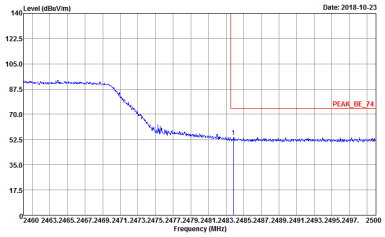
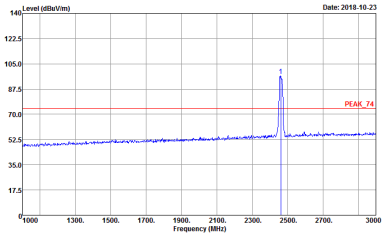
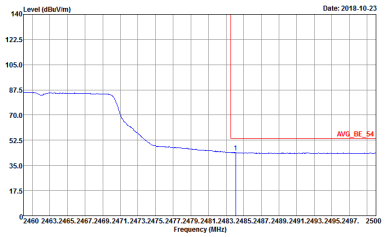
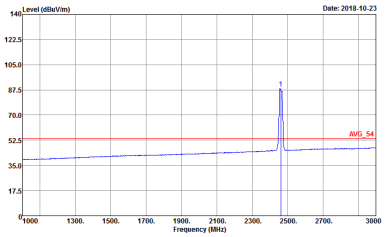
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 13

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

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH10 2457MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

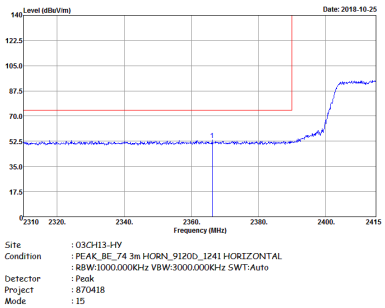
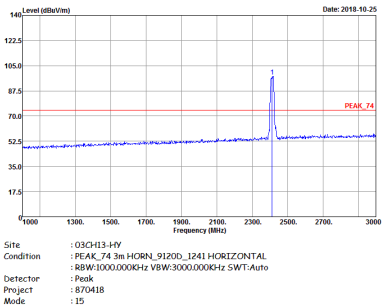
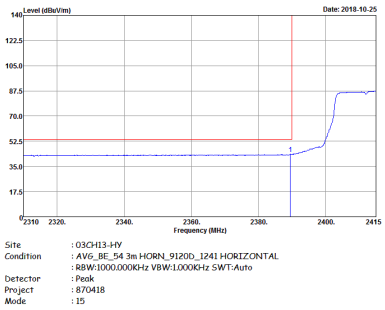
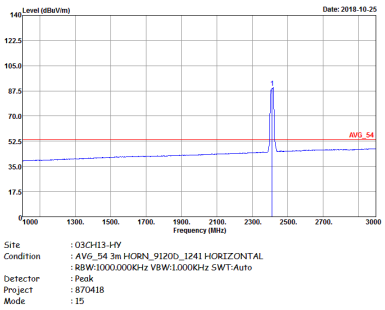
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH10 2457MHz	
1	Vertical	Fundamental
Peak		
Avg.		

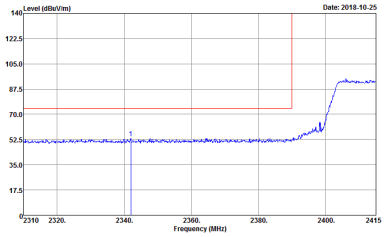
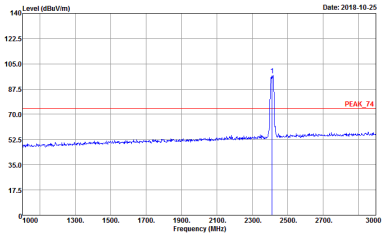
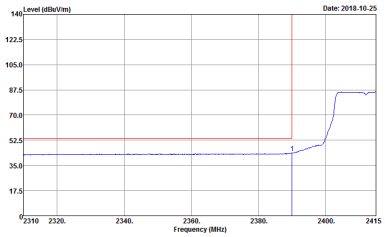
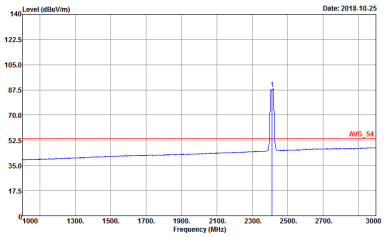
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14

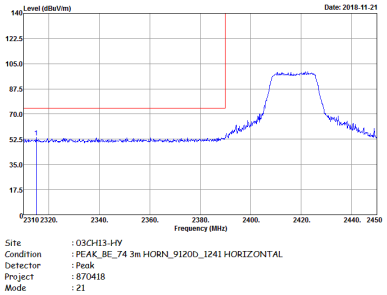
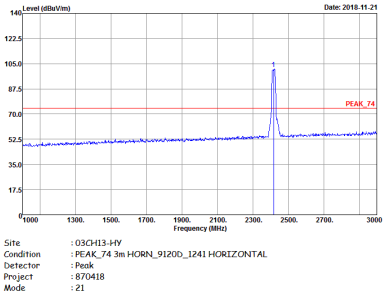
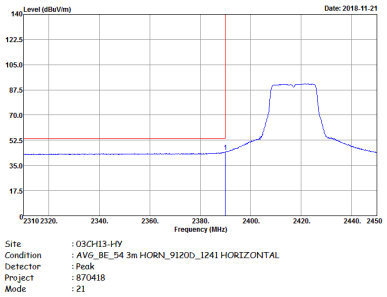
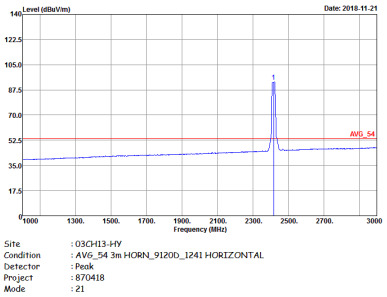
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 14

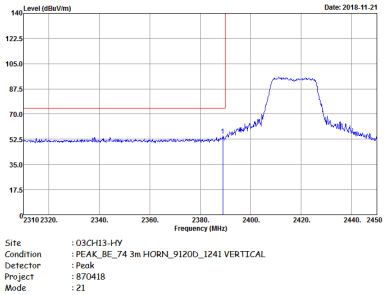
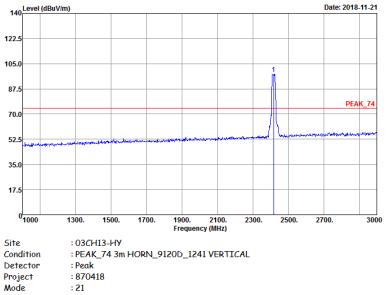
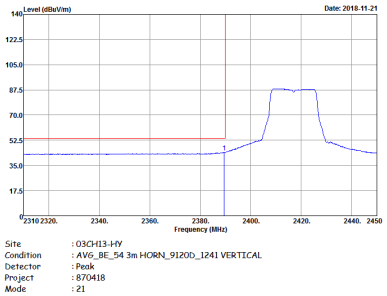
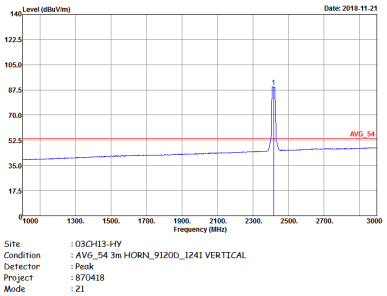
2.4GHz 2400~2483.5MHz

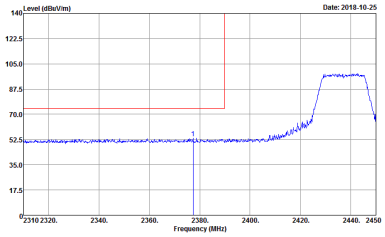
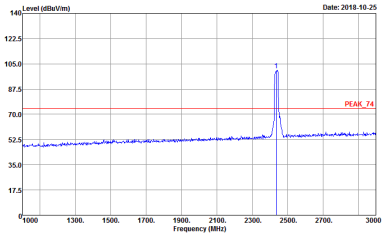
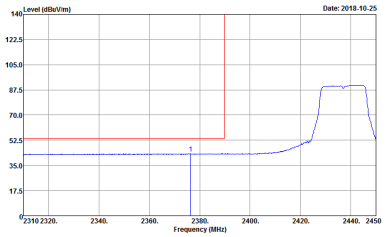
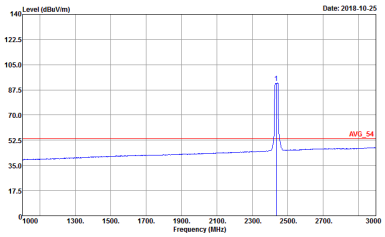
WIFI 802.11n HT20 (Band Edge @ 3m)

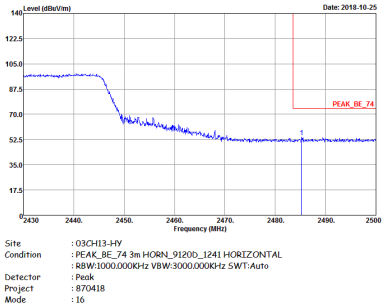
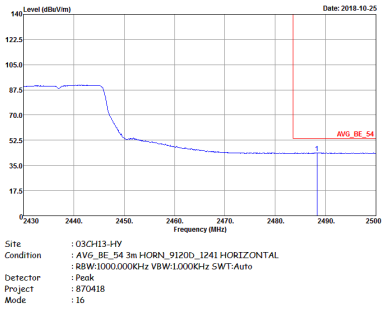
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

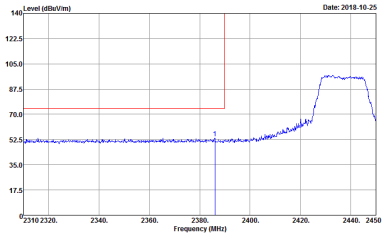
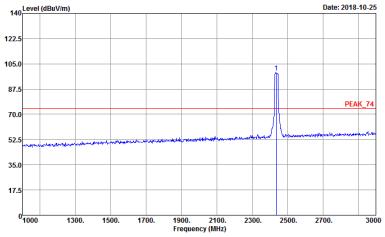
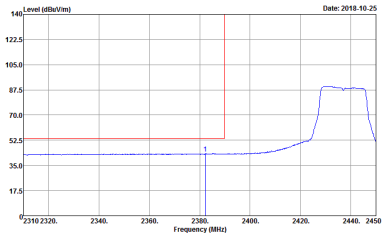
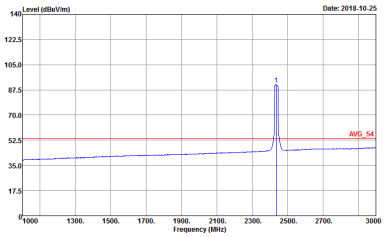
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 15	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 15
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 15	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 15

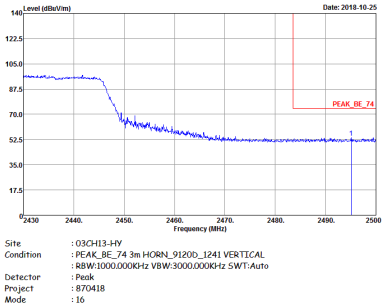
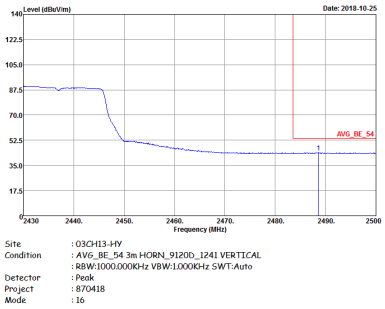
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH02 2417MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

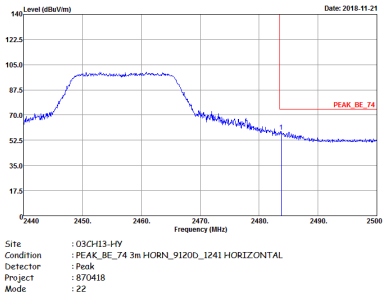
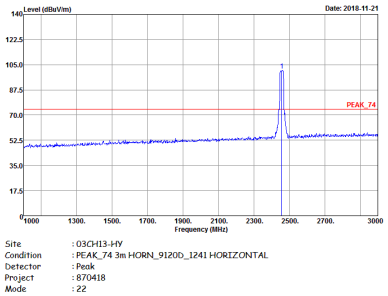
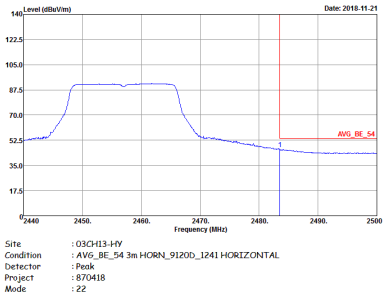
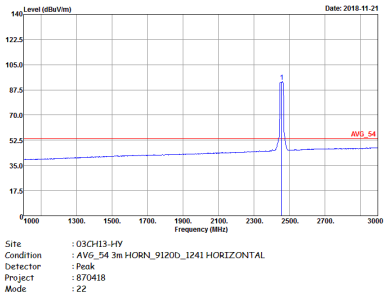
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH02 2417MHz	
1	Vertical	Fundamental
Peak		
Avg.		

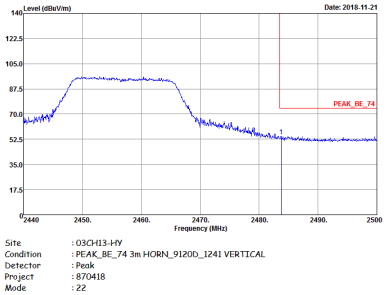
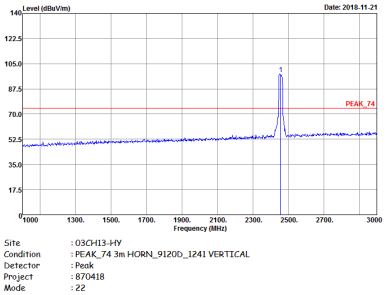
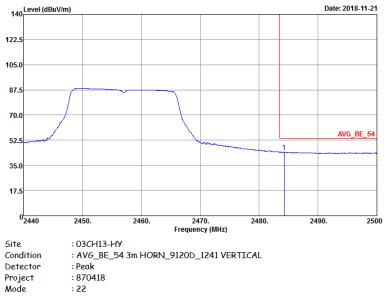
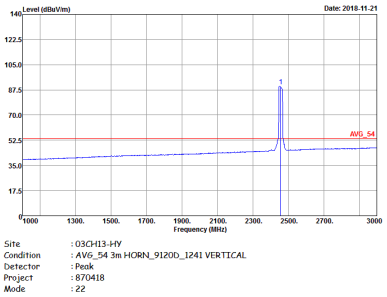
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16

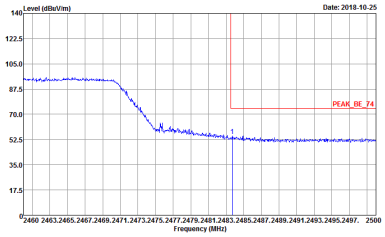
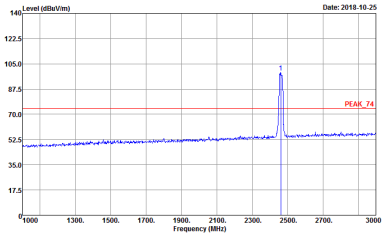
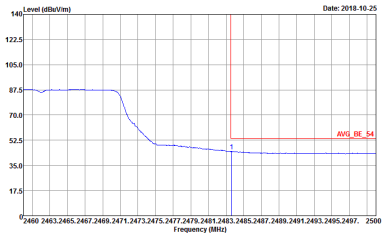
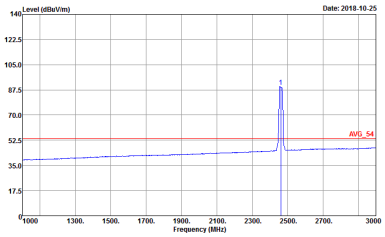
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

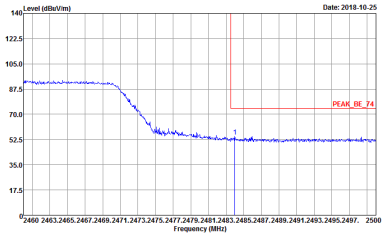
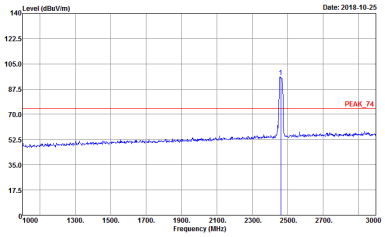
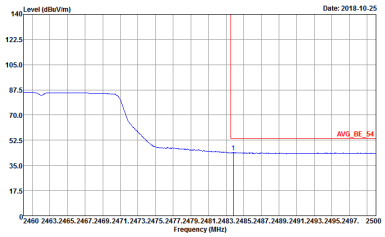
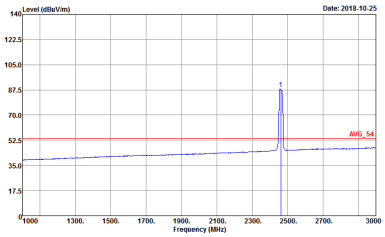
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 16

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 CH10 2457MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

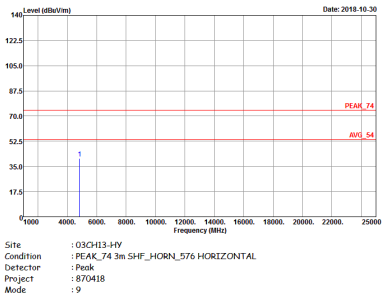
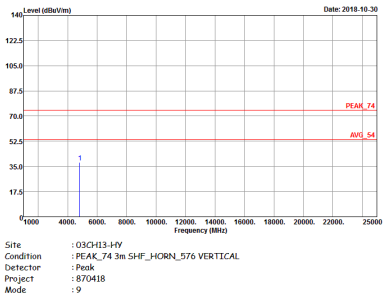
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH10 2457MHz	
1	Vertical	Fundamental
Peak		
Avg.		

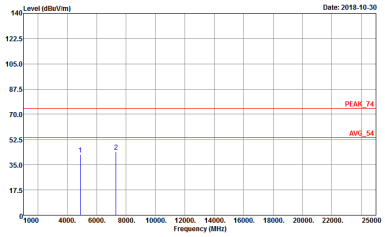
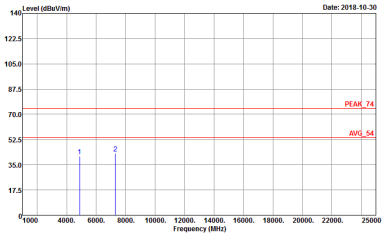
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17

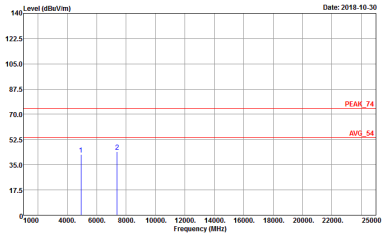
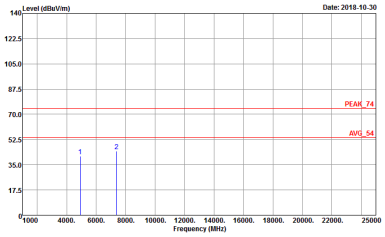
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 870418 Mode : 17

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

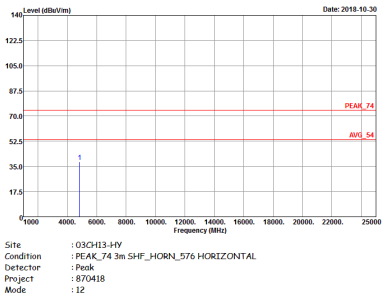
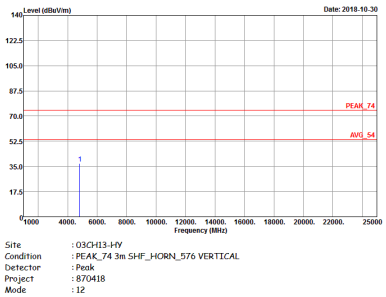
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

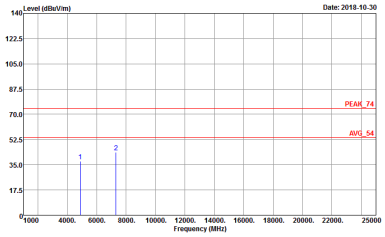
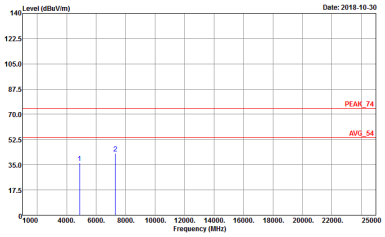
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 HORIZONTAL Detector : Peak Project : 870418 Mode : 10	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 VERTICAL Detector : Peak Project : 870418 Mode : 10

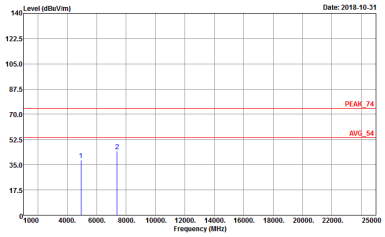
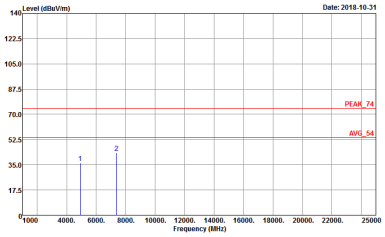
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 HORIZONTAL Detector : Peak Project : 870418 Mode : 11	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 VERTICAL Detector : Peak Project : 870418 Mode : 11

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

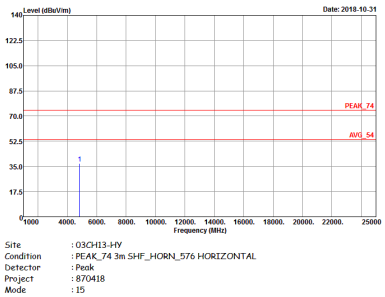
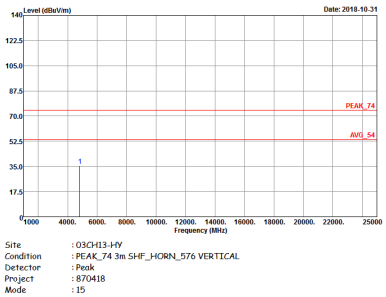
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

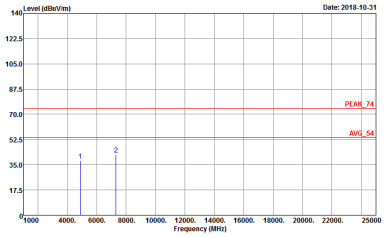
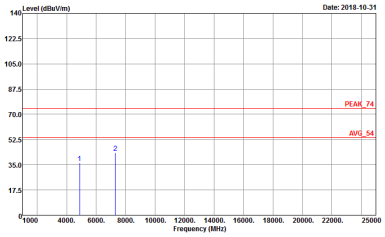
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 HORIZONTAL Detector : Peak Project : 870418 Mode : 13	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 VERTICAL Detector : Peak Project : 870418 Mode : 13

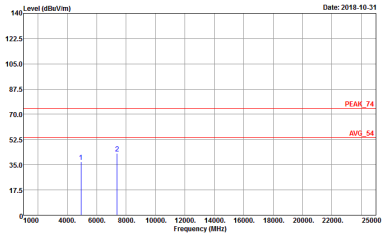
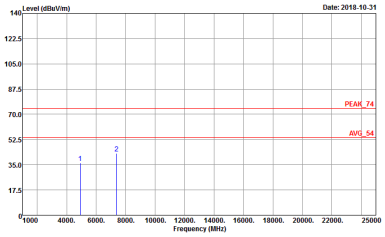
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 HORIZONTAL Detector : Peak Project : 870418 Mode : 14	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 VERTICAL Detector : Peak Project : 870418 Mode : 14

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

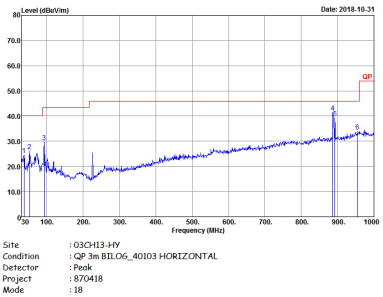
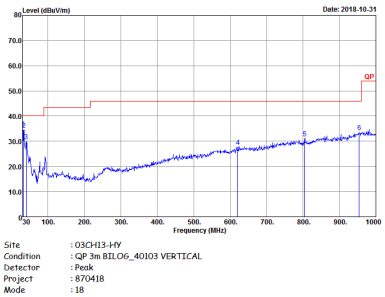
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 HORIZONTAL Detector : Peak Project : 870418 Mode : 16	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 VERTICAL Detector : Peak Project : 870418 Mode : 16

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 HORIZONTAL Detector : Peak Project : 870418 Mode : 17	 Site : 03CH13-HY Condition : PEAK_74 3m SHF_HORN_576 VERTICAL Detector : Peak Project : 870418 Mode : 17

Emission below 1GHz

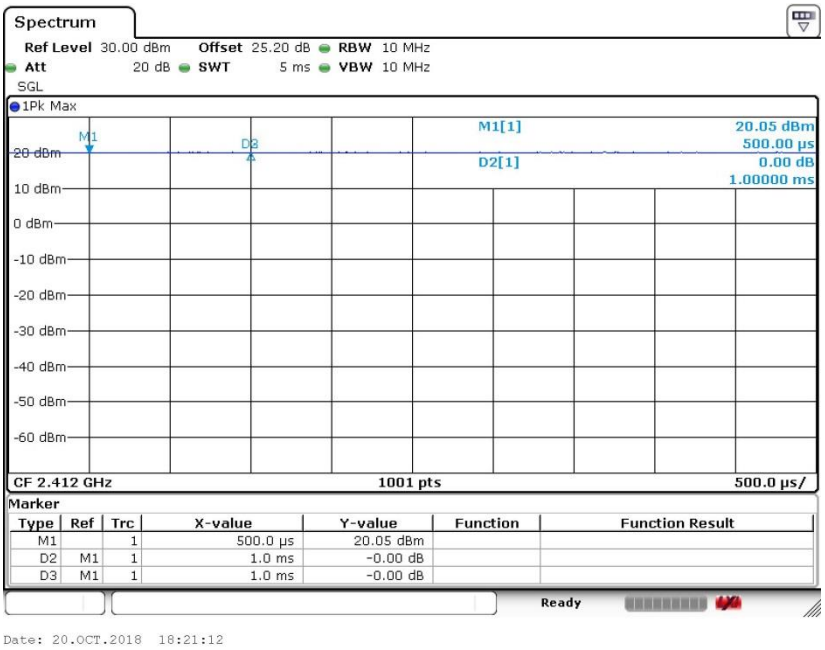
2.4GHz WIFI 802.11n HT20 (LF)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11n HT20 LF	
1	Horizontal	Vertical
QP / Peak		

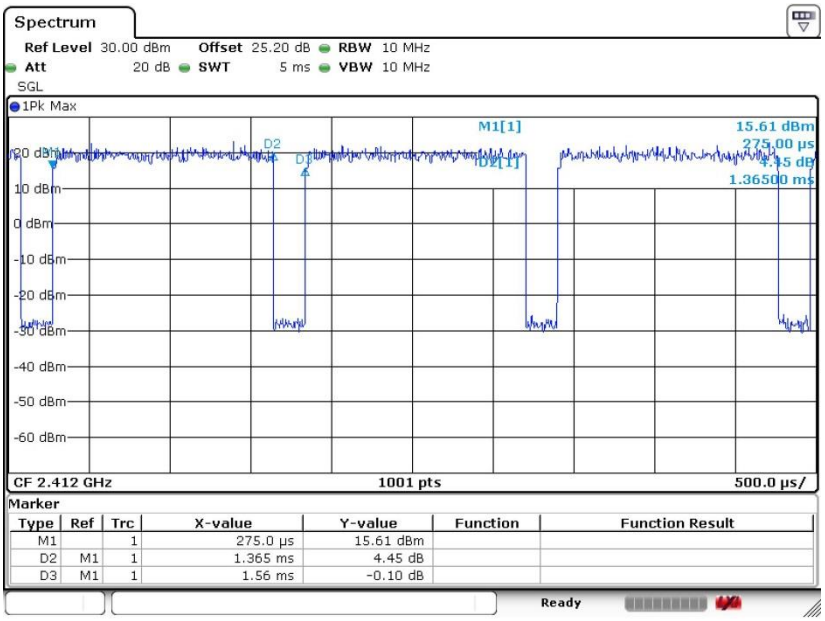
Appendix E. Duty Cycle Plots

Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor (dB)
802.11b	100.00	-	-	10Hz	0.00
802.11g	87.50	1365.00	0.73	1kHz	0.58
2.4GHz 802.11n HT20	86.44	1275.00	0.78	1kHz	0.63

802.11b

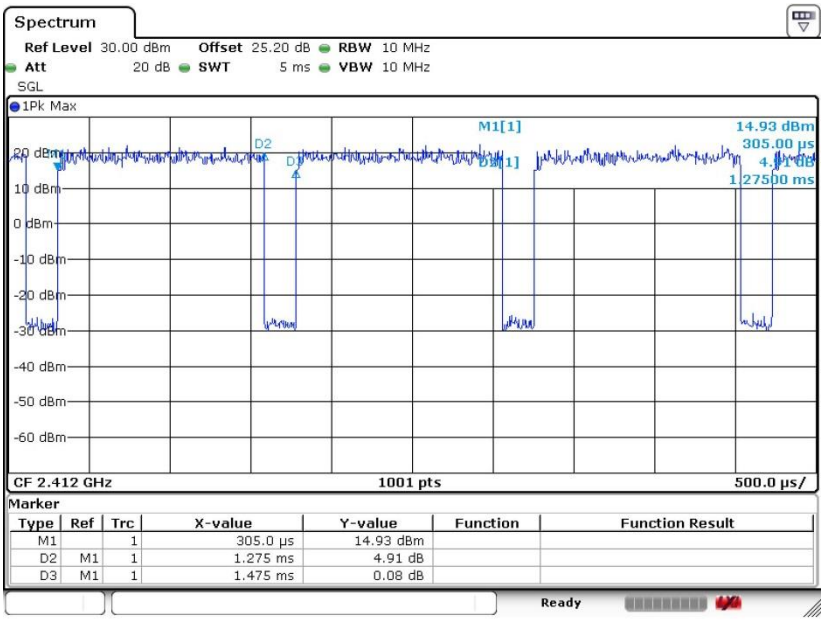


802.11g



Date: 20.OCT.2018 18:33:47

802.11n HT20



Date: 20.OCT.2018 18:43:12