NCC RADIO TEST REPORT

Equipment	:	無線音箱
Brand Name	:	**Marshall**
Model Name	:	**WOBURN MULTI-ROOM**
Applicant	:	百滋國際股份有限公司 台北市松山區寶清街 **17** 號 **5** 樓之 **1**
Manufacturer	:	**Zound Industries International AB** **Room 411-412, 4th Floor, Main Building, No. 99 Qiao Cheng East Road, Nanshan District, Shenzhen City, China**
Standard	:	**NCC LP0002 (2018-01-10)**

The product was received on May 09, 2018, and testing was started from Jun. 05, 2018 and completed on Jul. 03, 2018. We, SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in NCC LP0002 (2018-01-10) and shown 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 INTERTIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Jones Tsai

Approved by: Jones Tsai

SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory

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

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History of this test report

Report No.	Version	Description	Issue Date
TR850937C	01	Initial issue of report	Jul. 13, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	LP0002 3.10.1.6(2)(A)	6dB Bandwidth	Pass	-
3.1	-	99% Bandwidth	Pass	-
3.2	LP0002 3.10.1.2(1)(C)	Power Output Measurement	Pass	-
3.3	LP0002 3.10.1.6(2)(B)	Power Spectral Density	Pass	-
3.4	LP0002 3.10.1.5	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	LP0002 3.10.1.5	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 0.23 dB at 2390.000 MHz
3.6	LP0002 2.11	Receiver Radiated Emission	Pass	Under limit 6.62 dB at 35.40 MHz
3.7	LP0002 2.3	AC Conducted Emission	Pass	Under limit 13.83 dB at 0.191 MHz
3.8	LP0002 2.2 3.10.1.3 3.10.1.4	Antenna Requirement	Pass	-
3.9	LP0002 2.2 5.20.2	Maximum Power Density	Pass	-

Reviewed by: Joseph Lin
Report Producer: Natasha Hsieh

1 General Description

1.1 Product Feature of Equipment Under Test

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

Product Specification subjective to this standard	
Antenna Type	WLAN: FPCB Antenna Bluetooth: FPCB 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, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH05-HY	CO05-HY

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH11-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:

- NCC LP0002 (2018-01-10)
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

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		

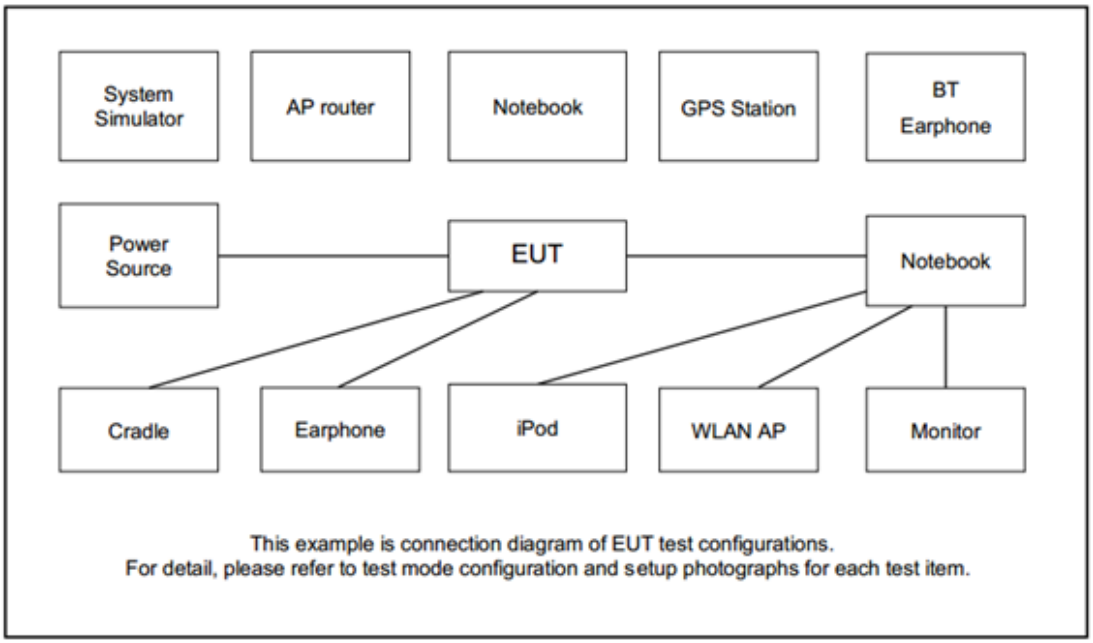
2.2 Test Mode

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 + AUX In (Load with iPod) + RCA In (Load with iPod) + Phone Play MP3 via Bluetooth Function + Power Cord Mode 2: WLAN (2.4GHz) Link + AUX In (Load with iPod) + RCA In (Load with iPod) + Phone Play MP3 via WLAN (2.4GHz) Function + Power Cord Mode 3: WLAN (5GHz) Link + AUX In (Load with iPod) + RCA In (Load with iPod) + Phone Play MP3 via WLAN (5GHz) Function + Power Cord Mode 4: Bluetooth Idle + AUX In (Load with iPod) + RCA In (Load with iPod) + Power Cord Mode 5: WLAN (2.4GHz) Idle + AUX In (Load with iPod) + RCA In (Load with iPod) + Power Cord Mode 6: WLAN (5GHz) Idle + AUX In (Load with iPod) + RCA In (Load with iPod) + Power Cord
Receiver Radiated Emission	Mode 1: WLAN (2.4GHz) Idle + Power Cord
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.	

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.	iPhone	Apple	A1687	BCG-E2944A	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8m
3.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0m	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “Putty” 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.

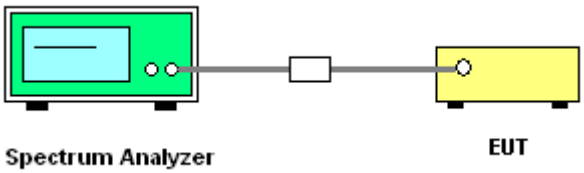
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

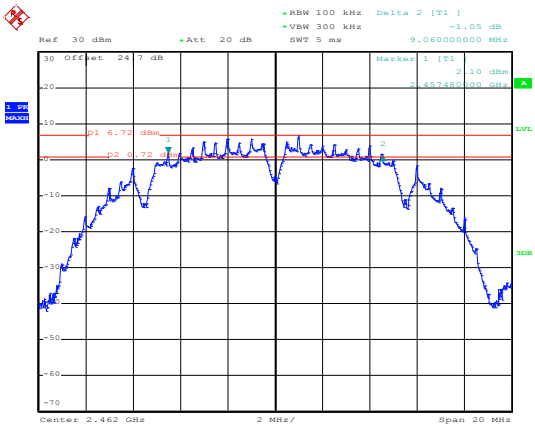
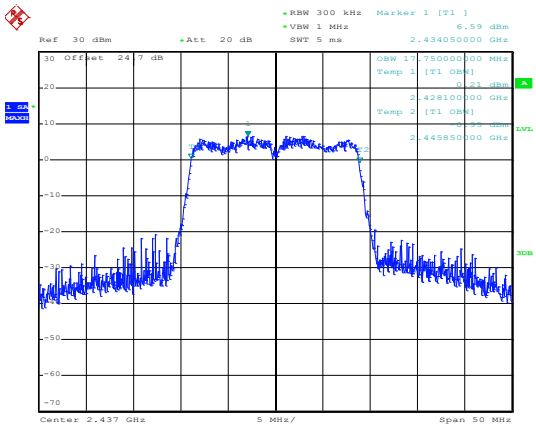
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit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

3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	
Date: 3.JUL.2018 06:38:36	Date: 3.JUL.2018 07:12:16

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.

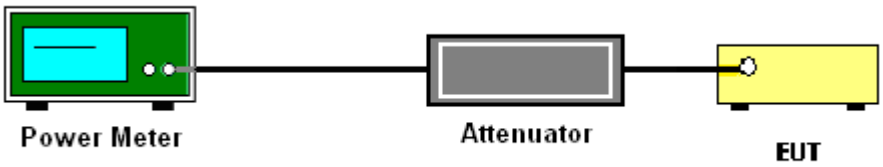
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

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

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

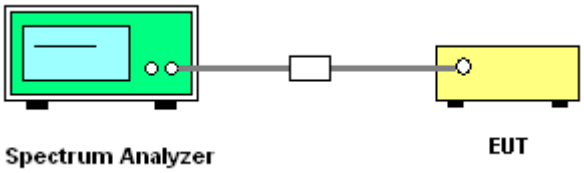
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

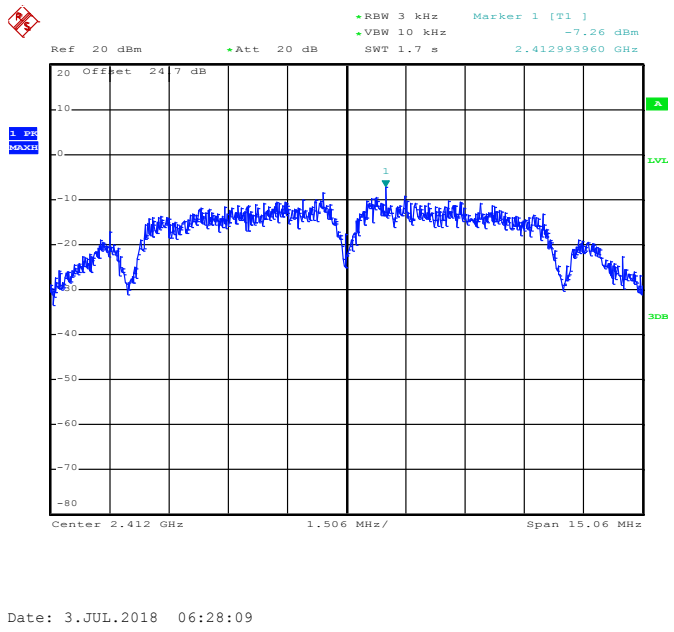
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz)



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 and radiated emissions which fall in the restricted bands, as defined in NCC LP0002 section 2.7, must also comply with the radiated emission limits specified in NCC LP0002 section 2.8.

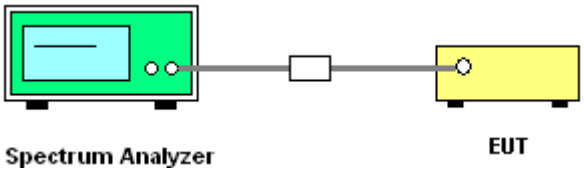
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

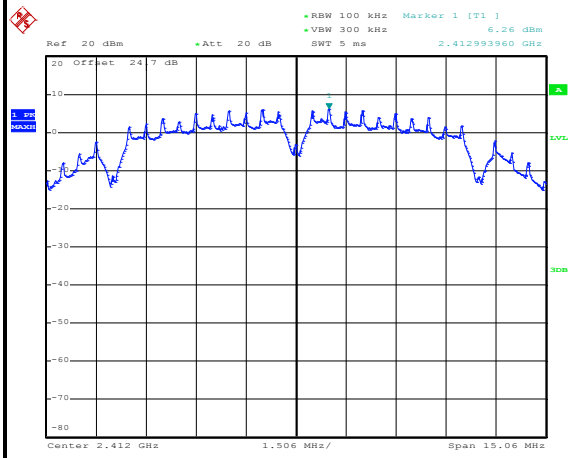


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	Rebecca Li, Lena Lo, and Shiming Liu	**Temperature :**	21~25℃
		Relative Humidity :	51~54%

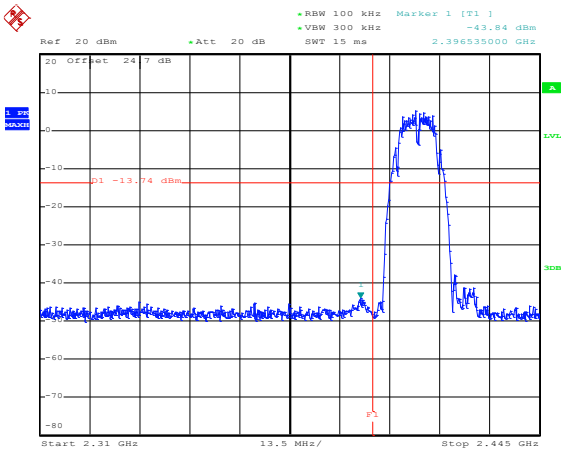
Test Mode :	802.11b	**Test Channel :**	01

100kHz PSD reference Level



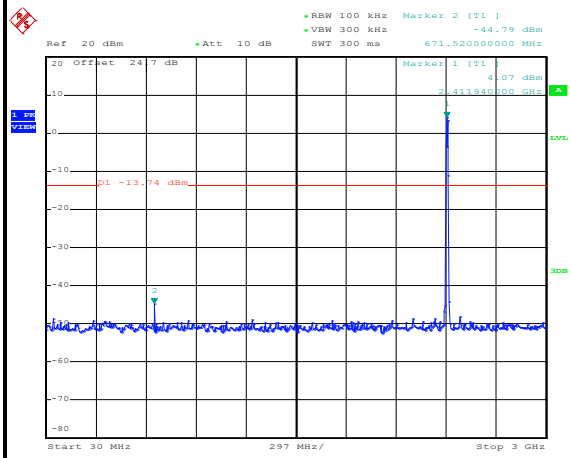
Date: 3.JUL.2018 06:28:46

Channel Plot



Date: 3.JUL.2018 06:29:26

Spurious Emission 30MHz~3GHz



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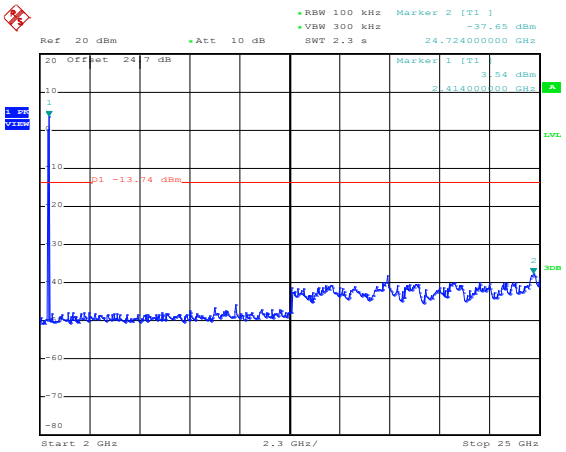
Spurious Emission 2GHz~25GHz



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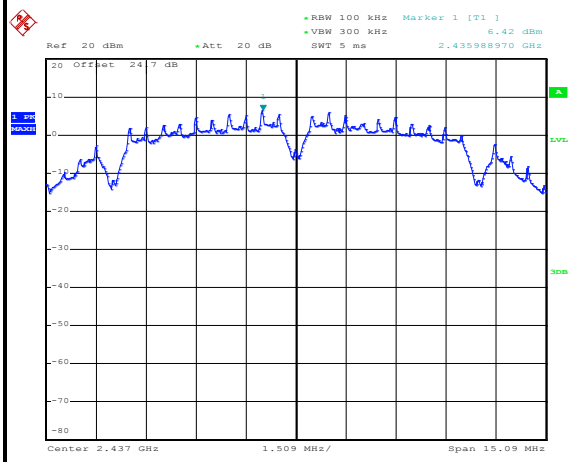
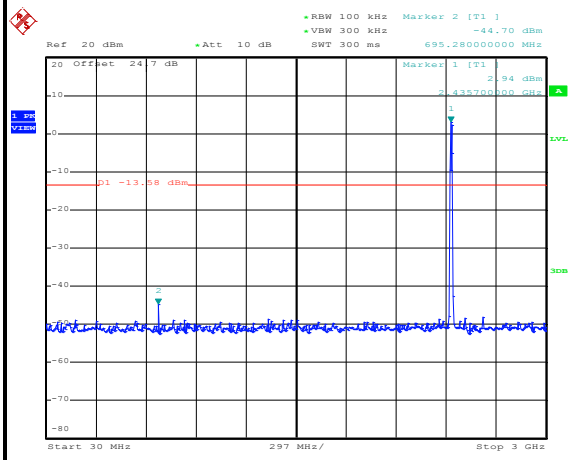
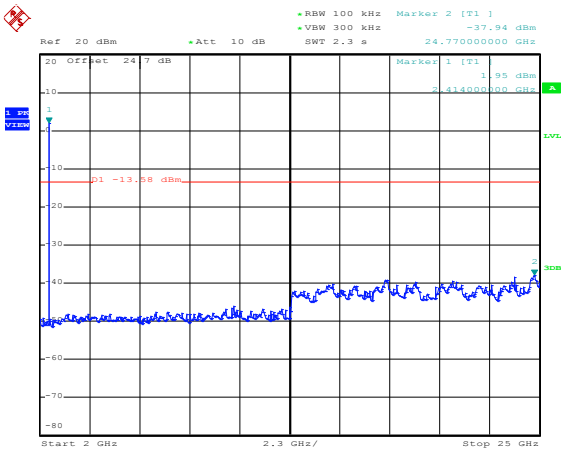
Test Mode :	802.11b	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

Date: 3.JUL.2018 06:34:40

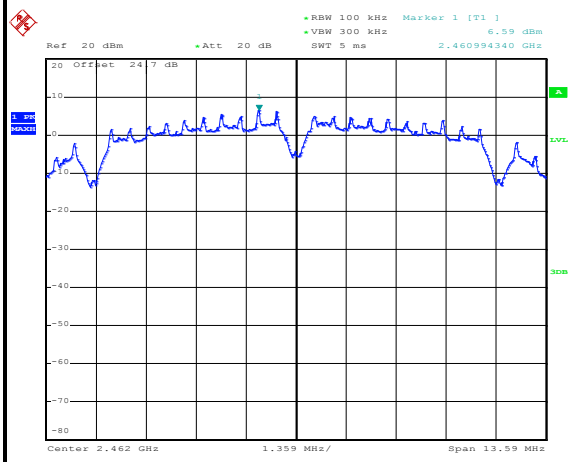
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Date: 3.JUL.2018 06:35:09

Date: 3.JUL.2018 06:35:24

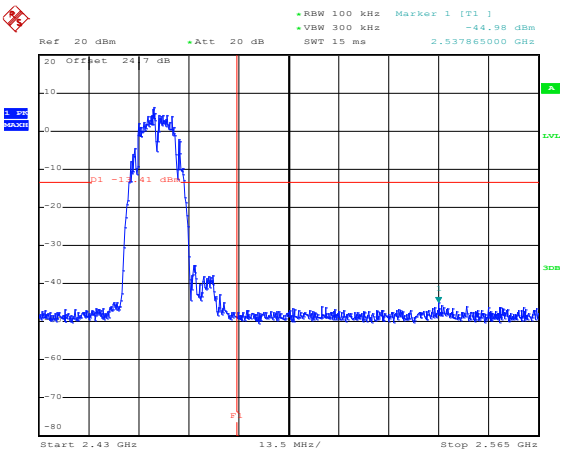
Test Mode :	802.11b	Test Channel :	11

100kHz PSD reference Level



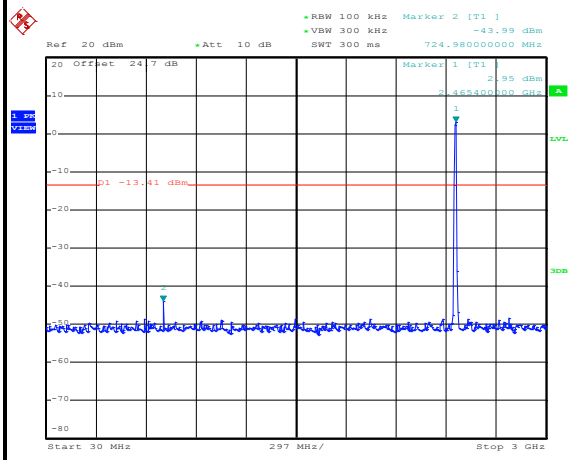
Date: 3.JUL.2018 06:39:44

Channel Plot



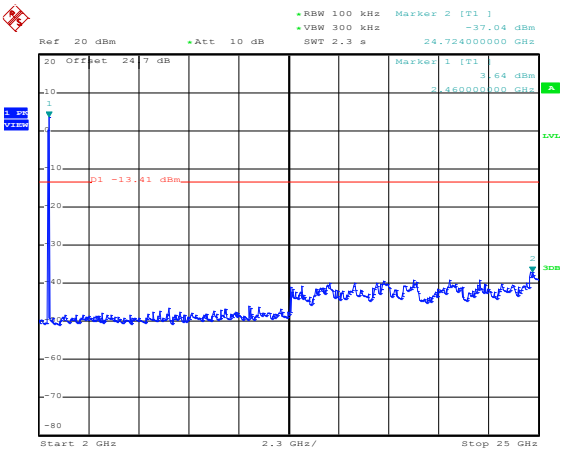
Date: 3.JUL.2018 06:40:54

Spurious Emission 30MHz~3GHz



Date: 3.JUL.2018 06:41:30

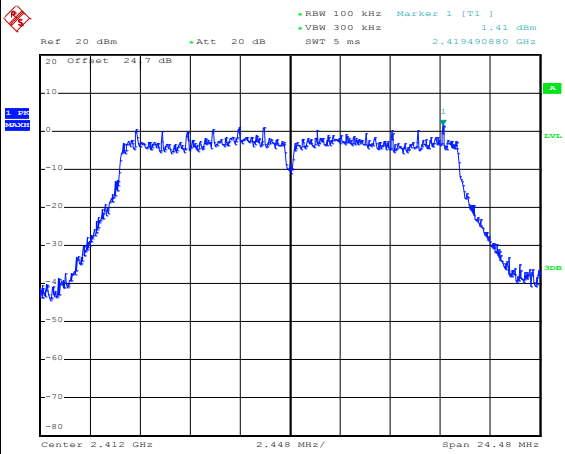
Spurious Emission 2GHz~25GHz



Date: 3.JUL.2018 06:41:45

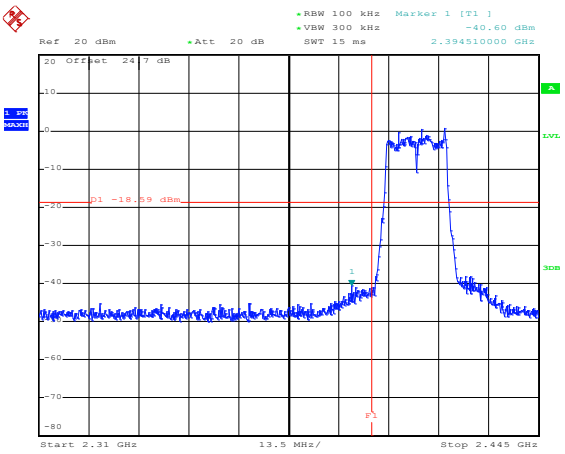
Test Mode :	802.11g	Test Channel :	01

100kHz PSD reference Level



Date: 3.JUL.2018 06:49:58

Channel Plot



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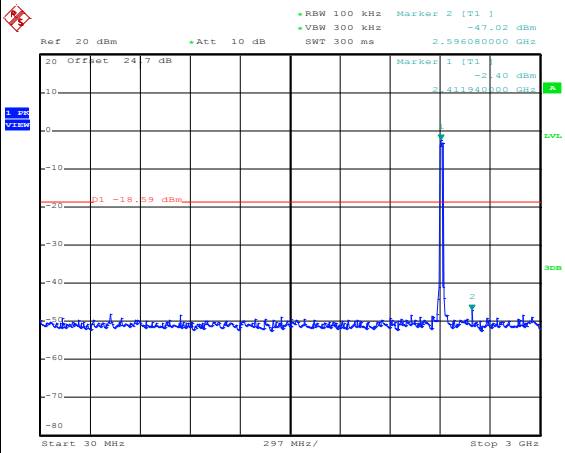
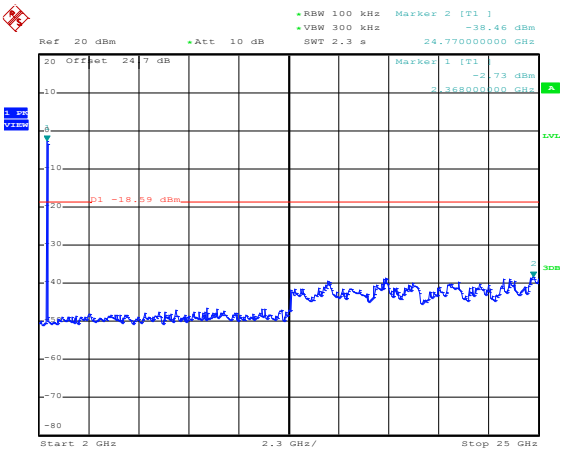
Spurious Emission 30MHz~3GHz



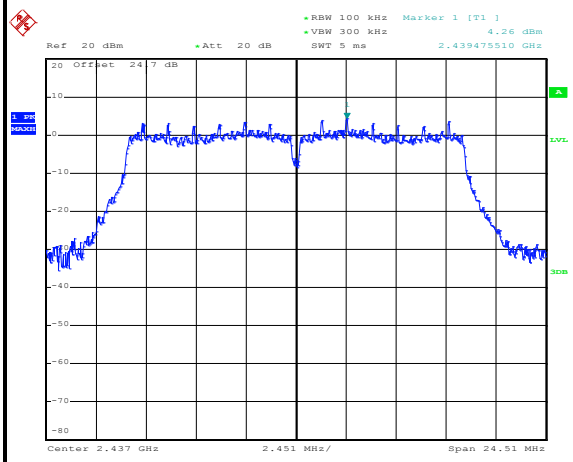
Date: 3.JUL.2018 06:51:04

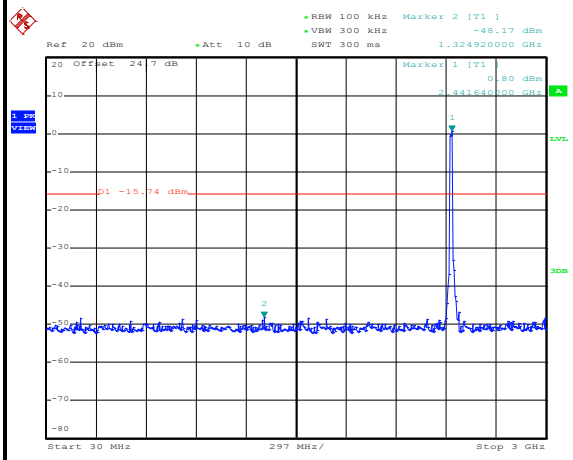
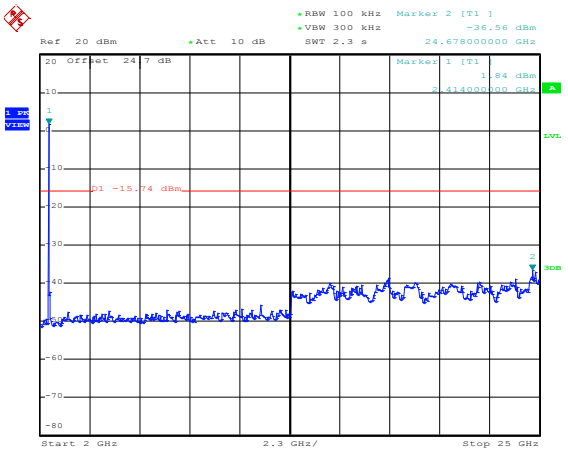
Spurious Emission 2GHz~25GHz



Date: 3.JUL.2018 06:51:21

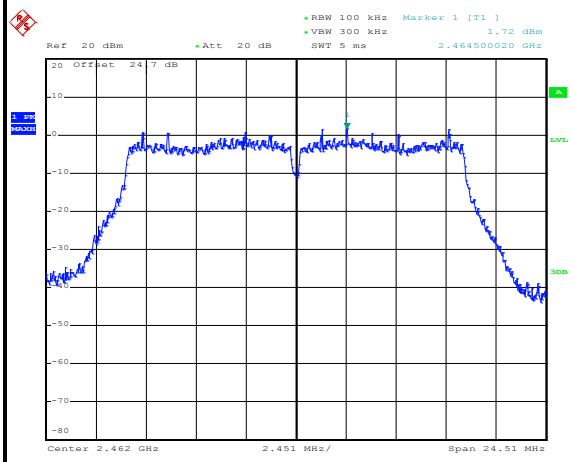
Test Mode :	802.11g	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

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

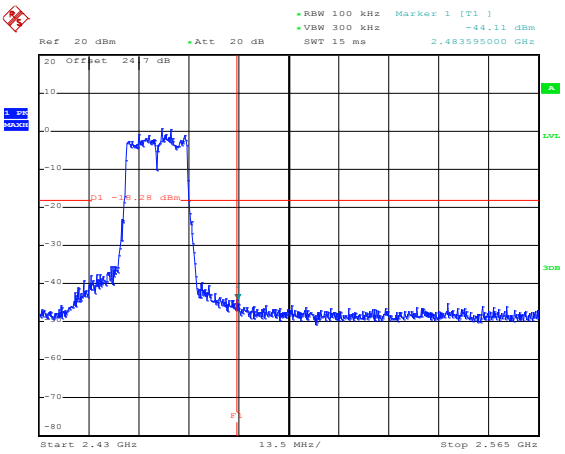
Test Mode :	802.11g	Test Channel :	11

100kHz PSD reference Level



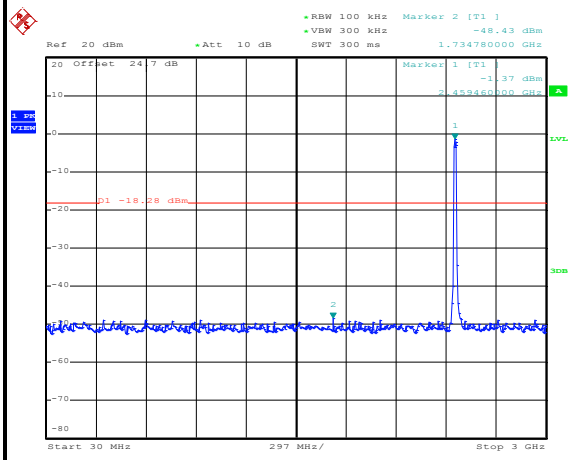
Date: 3.JUL.2018 06:59:56

Channel Plot



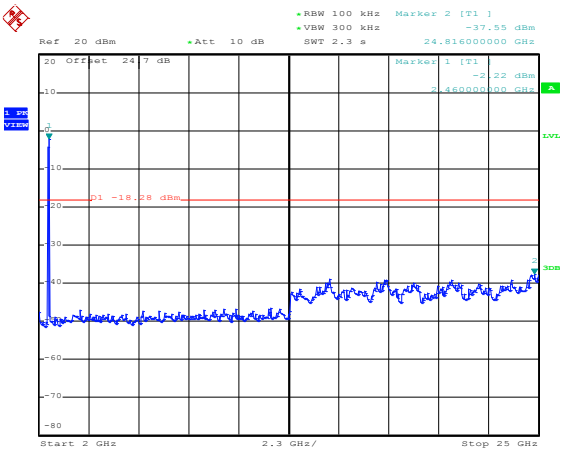
Date: 3.JUL.2018 07:00:10

Spurious Emission 30MHz~3GHz



Date: 3.JUL.2018 07:00:44

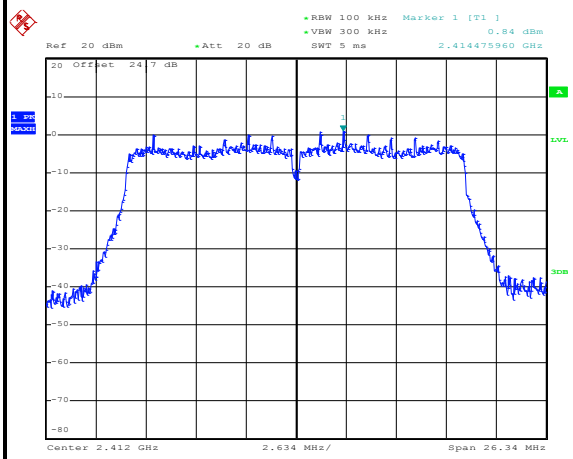
Spurious Emission 2GHz~25GHz



Date: 3.JUL.2018 07:01:00

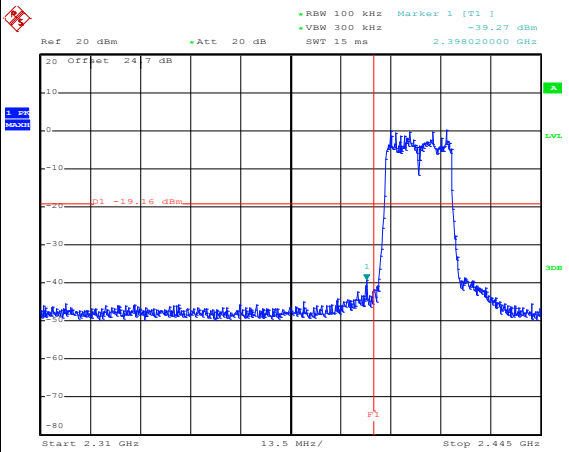
Test Mode :	802.11n HT20	Test Channel :	01

100kHz PSD reference Level



Date: 3.JUL.2018 07:06:26

Channel Plot



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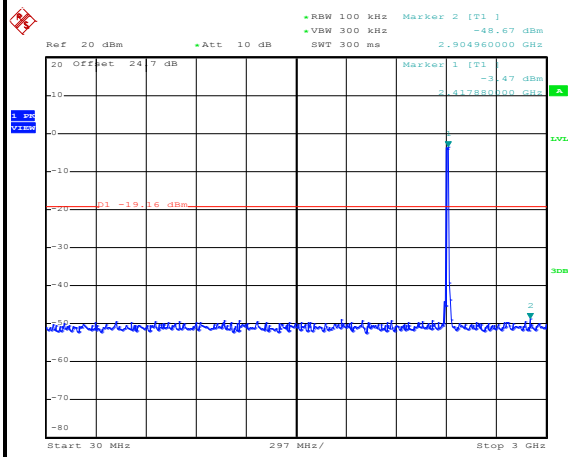
Spurious Emission 30MHz~3GHz



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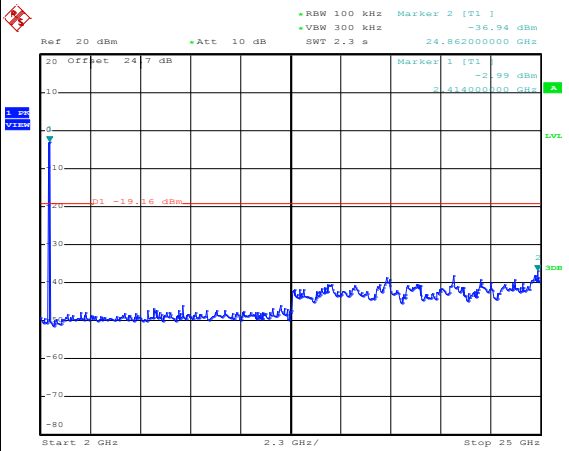
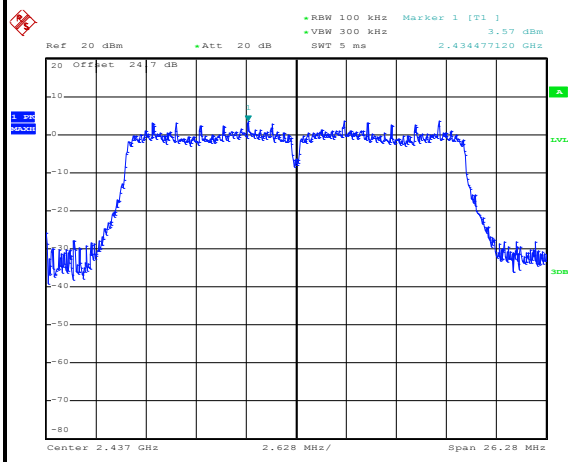
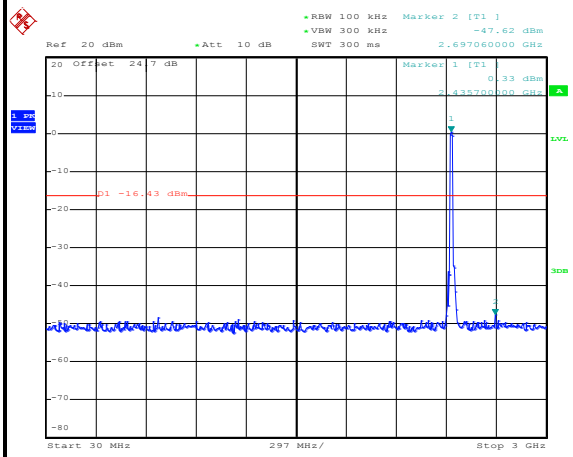
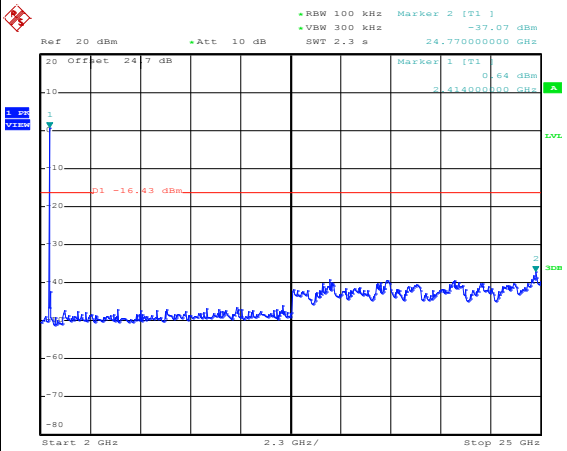
Spurious Emission 2GHz~25GHz



Date: 3.JUL.2018 07:07:57

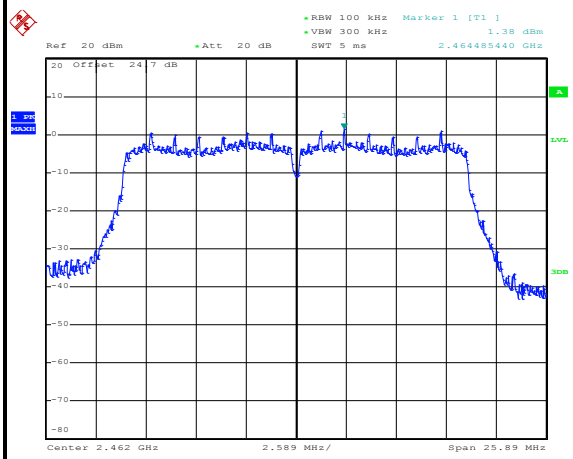
Test Mode :	802.11n HT20	Test Channel :	06

100kHz PSD reference Level	Channel Plot
 Date: 3.JUL.2018 07:10:46	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
 Date: 3.JUL.2018 07:11:43	 Date: 3.JUL.2018 07:11:58

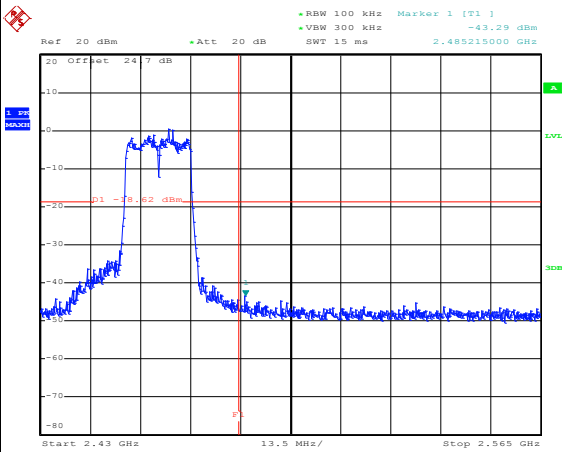
Test Mode :	802.11n HT20	Test Channel :	11

100kHz PSD reference Level



Date: 3.JUL.2018 07:16:16

Channel Plot



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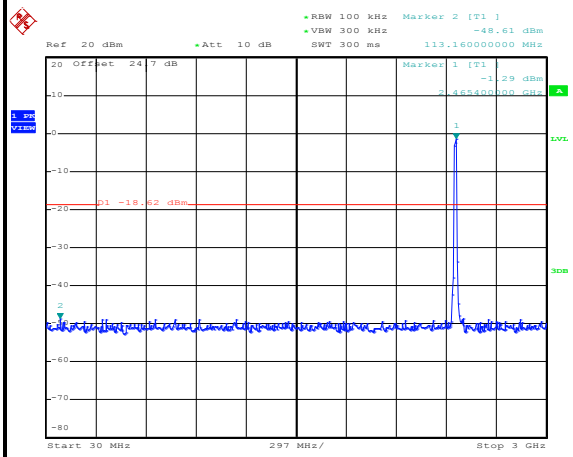
Spurious Emission 30MHz~3GHz



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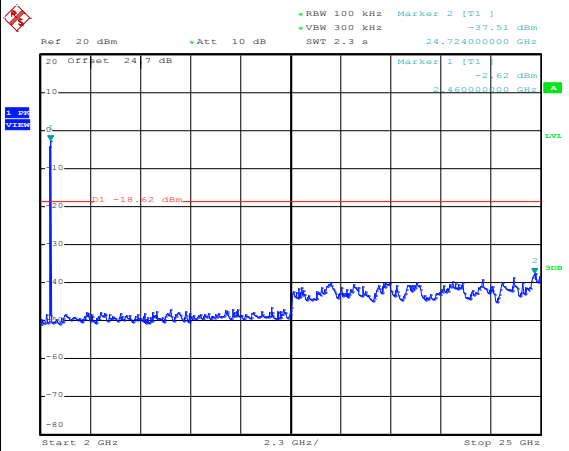
Spurious Emission 2GHz~25GHz



Date: 3.JUL.2018 07:18:34

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 NCC LP0002 section 2.8 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

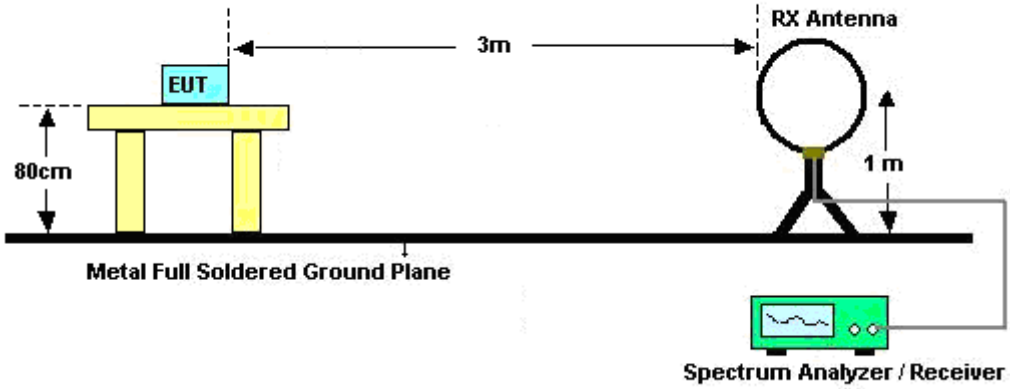
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

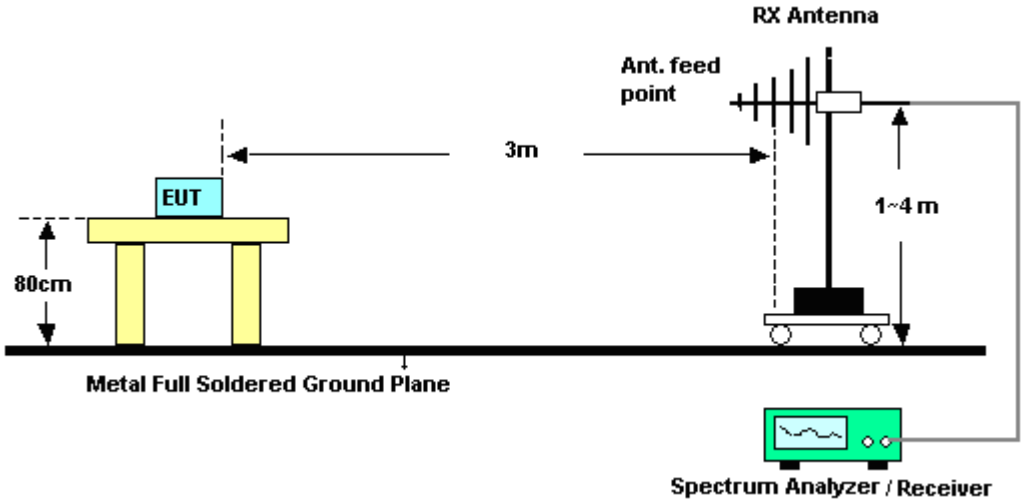
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For 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

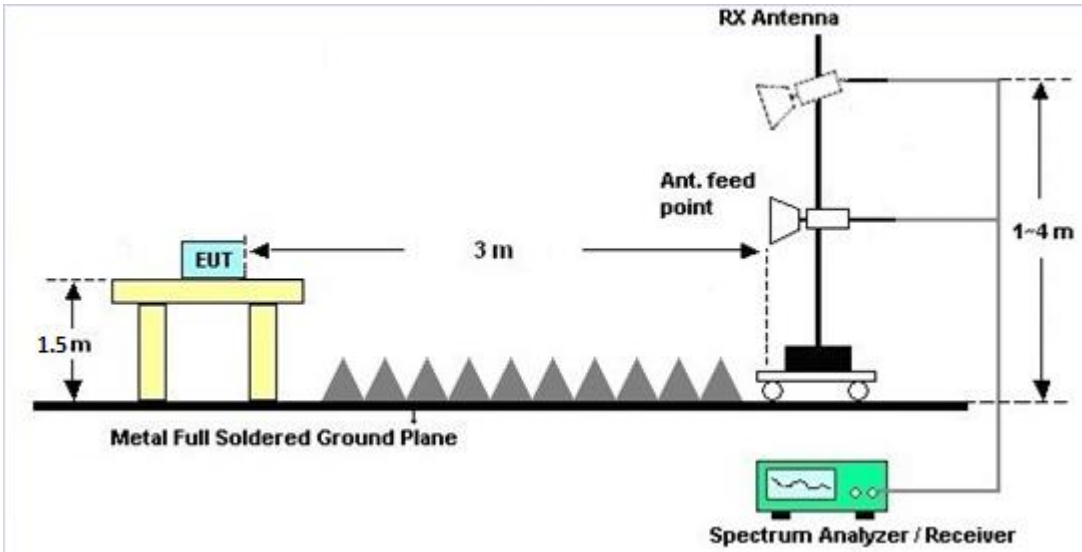
For radiated emissions below 30MHz



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 per NCC LP0002 section 5.13 was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 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 Test of Receiver Radiated Emission Measurement

3.6.1 Limit of Receiver Radiated Emission

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

3.6.2 Measuring Instruments

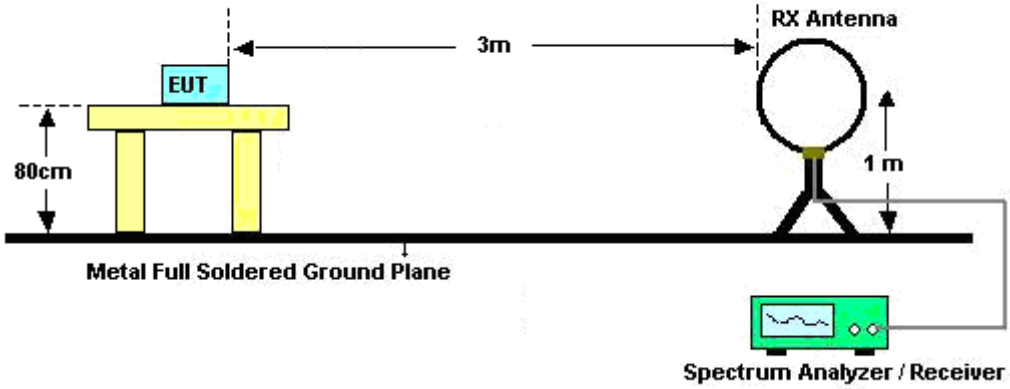
The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

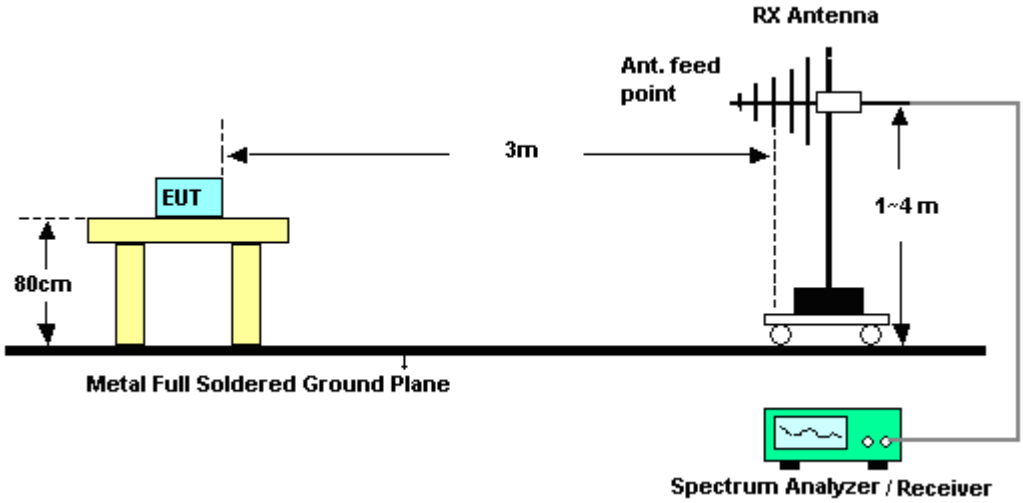
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.6.4 Test Setup

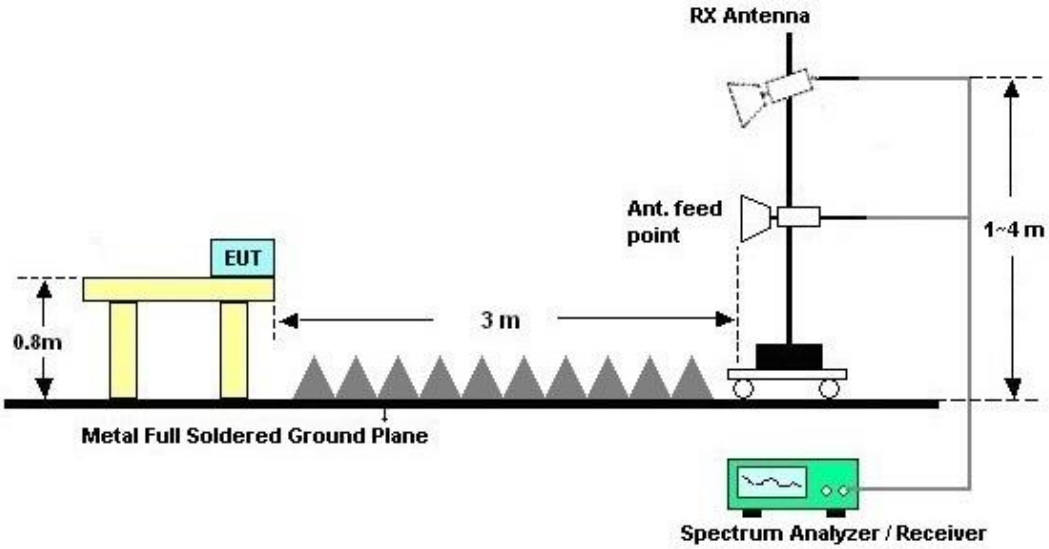
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.6.5 Test Result of Receiver 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 per NCC LP0002 section 5.13 was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.6.6 Test Result of Receiver Radiated Spurious Emission (30MHz ~ 5th Harmonic)

Please refer to Appendix D.

3.7 AC Conducted Emission Measurement

3.7.1 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.

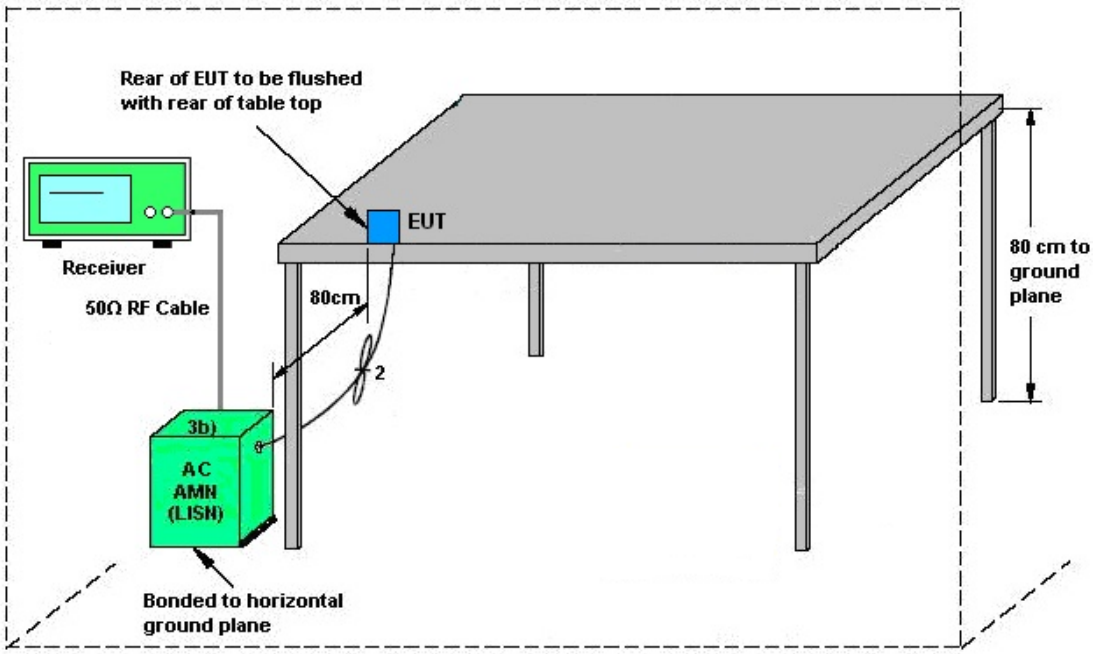
3.7.2 Measuring Instruments

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

3.7.3 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.

3.7.4 Test Setup



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

3.7.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.8 Antenna Requirements

3.8.1 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 LP0002 Section 2.2, Section 3.10.1.3, and Section 3.10.1.4.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 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.

3.9 Maximum Power Density

3.9.1 RF Exposure Limit Introduction

According to NCC LP0002, the criteria listed in Table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §5.20.2.1 and §5.20.2.2.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

3.9.2 Standalone Power Density Calculation

Please refer to Appendix A.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 26, 2017	Jun. 05, 2018~ Jul. 03, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 26, 2017	Jun. 05, 2018~ Jul. 03, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	Jun. 05, 2018~ Jul. 03, 2018	Nov. 12, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Jun. 05, 2018~ Jul. 03, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 12, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Jun. 12, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jun. 12, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jun. 12, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Jun. 12, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Jun. 12, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Jun. 16, 2018~ Jun. 22, 2018	Nov. 22, 2018	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-06	35414&AT-N0602	30MHz~1GHz	Oct. 14, 2017	Jun. 16, 2018~ Jun. 22, 2018	Oct. 13, 2018	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 16, 2017	Jun. 16, 2018~ Jun. 22, 2018	Oct. 15, 2018	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Jun. 16, 2018~ Jun. 22, 2018	Nov. 26, 2018	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Jan. 16, 2018	Jun. 16, 2018~ Jun. 22, 2018	Jan. 15, 2019	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-303K	1710001800054002	1GHz~18GHz	Apr. 17, 2018	Jun. 16, 2018~ Jun. 22, 2018	Apr. 16, 2019	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Jan. 16, 2018	Jun. 16, 2018~ Jun. 22, 2018	Jan. 15, 2020	Radiation (03CH11-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jun. 16, 2018~ Jun. 22, 2018	Jul. 17, 2018	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHz	Oct. 19, 2017	Jun. 16, 2018~ Jun. 22, 2018	Oct. 18, 2018	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jun. 16, 2018~ Jun. 22, 2018	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jun. 16, 2018~ Jun. 22, 2018	N/A	Radiation (03CH11-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4	9K-30M	Mar. 20, 2018	Jun. 16, 2018~ Jun. 22, 2018	Mar. 19, 2019	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4	30M-18G	Mar. 15, 2018	Jun. 16, 2018~ Jun. 22, 2018	Mar. 14, 2019	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2589/2	30M-18G	Mar. 15, 2018	Jun. 16, 2018~ Jun. 22, 2018	Mar. 14, 2019	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN3	2.7G High Pass	Sep. 18, 2017	Jun. 16, 2018~ Jun. 22, 2018	Sep. 17, 2018	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN11	1G Low Pass	Sep. 18, 2017	Jun. 16, 2018~ Jun. 22, 2018	Sep. 17, 2018	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Jun. 16, 2018~ Jun. 22, 2018	N/A	Radiation (03CH11-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.7

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.2

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.5

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.2

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Rebecca Li/Lena Lo/Shiming Liu	Temperature:	21~25	°C
Test Date:	2018/6/5~2018/7/3	Relative Humidity:	51~54	%

Maximum Power Density				
Max. Power	Gain	EIRP	20 cm PSD	PSD Limit
15.63	1.90	17.53	0.01	1.00
dBm	dBi	dBm	mW/cm^2	mW/cm^2

Report Number : TR850937C

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	13.25	-	10.04	-	0.50	Pass
11b	1Mbps	1	6	2437	13.25	-	10.06	-	0.50	Pass
11b	1Mbps	1	11	2462	13.25	-	9.06	-	0.50	Pass
11g	6Mbps	1	1	2412	16.80	-	16.32	-	0.50	Pass
11g	6Mbps	1	6	2437	16.75	-	16.34	-	0.50	Pass
11g	6Mbps	1	11	2462	16.65	-	16.34	-	0.50	Pass
HT20	MCS0	1	1	2412	17.70	-	17.56	-	0.50	Pass
HT20	MCS0	1	6	2437	17.75	-	17.52	-	0.50	Pass
HT20	MCS0	1	11	2462	17.70	-	17.26	-	0.50	Pass

Report Number : TR850937C

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	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	18.59	-	30.00	-	1.90	-	20.49	-	36.00	-	Pass
11b	1Mbps	1	6	2437	18.36	-	30.00	-	1.90	-	20.26	-	36.00	-	Pass
11b	1Mbps	1	11	2462	18.48	-	30.00	-	1.90	-	20.38	-	36.00	-	Pass
11g	6Mbps	1	1	2412	22.80	-	30.00	-	1.90	-	24.70	-	36.00	-	Pass
11g	6Mbps	1	6	2437	23.66	-	30.00	-	1.90	-	25.56	-	36.00	-	Pass
11g	6Mbps	1	11	2462	22.25	-	30.00	-	1.90	-	24.15	-	36.00	-	Pass
HT20	MCS0	1	1	2412	21.32	-	30.00	-	1.90	-	23.22	-	36.00	-	Pass
HT20	MCS0	1	6	2437	24.03	-	30.00	-	1.90	-	25.93	-	36.00	-	Pass
HT20	MCS0	1	11	2462	22.27	-	30.00	-	1.90	-	24.17	-	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	
11b	1Mbps	1	1	2412	0.00	-	15.56	-	-
11b	1Mbps	1	6	2437	0.00	-	15.33	-	
11b	1Mbps	1	11	2462	0.00	-	15.44	-	
11g	6Mbps	1	1	2412	0.09	-	12.34	-	
11g	6Mbps	1	6	2437	0.09	-	15.63	-	
11g	6Mbps	1	11	2462	0.09	-	12.06	-	
HT20	MCS0	1	1	2412	0.09	-	11.34	-	
HT20	MCS0	1	6	2437	0.09	-	15.32	-	
HT20	MCS0	1	11	2462	0.09	-	12.31	-	

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

Report Number : TR850937C

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	-7.26	-	-	1.90	-	8.00	-	Pass
11b	1Mbps	1	6	2437	-7.55	-	-	1.90	-	8.00	-	Pass
11b	1Mbps	1	11	2462	-8.04	-	-	1.90	-	8.00	-	Pass
11g	6Mbps	1	1	2412	-14.04	-	-	1.90	-	8.00	-	Pass
11g	6Mbps	1	6	2437	-12.02	-	-	1.90	-	8.00	-	Pass
11g	6Mbps	1	11	2462	-14.51	-	-	1.90	-	8.00	-	Pass
HT20	MCS0	1	1	2412	-13.54	-	-	1.90	-	8.00	-	Pass
HT20	MCS0	1	6	2437	-9.01	-	-	1.90	-	8.00	-	Pass
HT20	MCS0	1	11	2462	-11.69	-	-	1.90	-	8.00	-	Pass

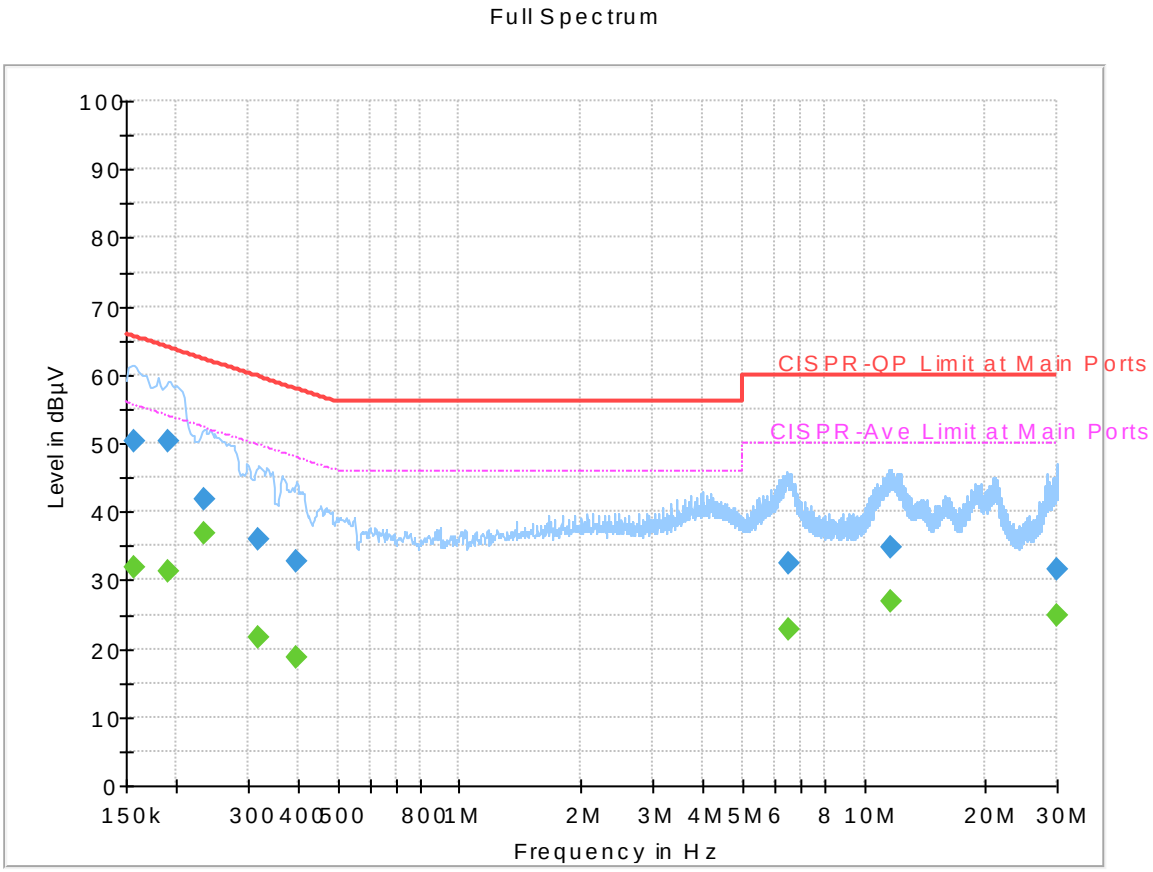
Measured power density (dBm) has offset with cable loss.

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Kai-Chun Chu	**Temperature :**	25~27℃
		Relative Humidity :	50~52%

EUT Information

Report NO :	850937
Test Mode :	Mode 2
Test Voltage :	110Vac/60Hz
Phase :	Line

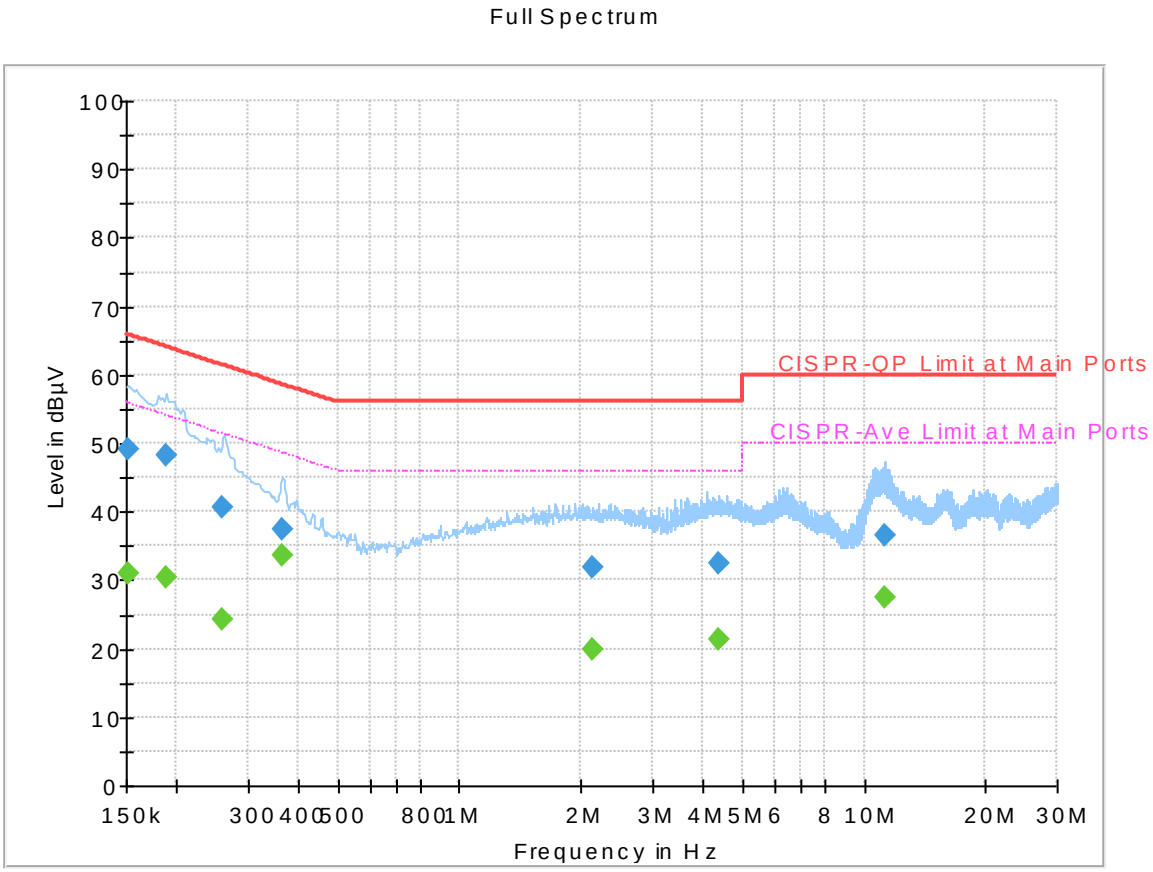


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.156750	---	31.87	55.63	23.76	L1	OFF	19.5
0.156750	50.44	---	65.63	15.19	L1	OFF	19.5
0.190500	---	31.35	54.02	22.67	L1	OFF	19.5
0.190500	50.19	---	64.02	13.83	L1	OFF	19.5
0.233250	---	36.71	52.33	15.62	L1	OFF	19.5
0.233250	41.91	---	62.33	20.42	L1	OFF	19.5
0.318750	---	21.50	49.74	28.24	L1	OFF	19.5
0.318750	35.97	---	59.74	23.77	L1	OFF	19.5
0.395250	---	18.58	47.95	29.37	L1	OFF	19.5
0.395250	32.72	---	57.95	25.23	L1	OFF	19.5
6.481500	---	22.89	50.00	27.11	L1	OFF	19.6
6.481500	32.59	---	60.00	27.41	L1	OFF	19.6
11.625000	---	26.82	50.00	23.18	L1	OFF	19.7
11.625000	34.84	---	60.00	25.16	L1	OFF	19.7
29.971500	---	24.85	50.00	25.15	L1	OFF	19.8
29.971500	31.54	---	60.00	28.46	L1	OFF	19.8

EUT Information

Report NO :	850937
Test Mode :	Mode 2
Test Voltage :	110Vac/60Hz
Phase :	Neutral



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	30.92	55.88	24.96	N	OFF	19.5
0.152250	49.18	---	65.88	16.70	N	OFF	19.5
0.188250	---	30.47	54.11	23.64	N	OFF	19.5
0.188250	48.18	---	64.11	15.93	N	OFF	19.5
0.260250	---	24.29	51.42	27.13	N	OFF	19.5
0.260250	40.70	---	61.42	20.72	N	OFF	19.5
0.366000	---	33.50	48.59	15.09	N	OFF	19.5
0.366000	37.56	---	58.59	21.03	N	OFF	19.5
2.141250	---	19.78	46.00	26.22	N	OFF	19.4
2.141250	31.89	---	56.00	24.11	N	OFF	19.4
4.353000	---	21.49	46.00	24.51	N	OFF	19.6
4.353000	32.35	---	56.00	23.65	N	OFF	19.6
11.235750	---	27.63	50.00	22.37	N	OFF	19.7
11.235750	36.47	---	60.00	23.53	N	OFF	19.7

Appendix C. Radiated Spurious Emission

Test Engineer :	Hao Hsu and Ken Wu	Temperature :	22~25°C
		Relative Humidity :	50~55%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	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)
1													
802.11b CH 01 2412MHz		2378.64	51.98	-22.02	74	42.27	27.09	16.22	33.6	272	143	P	H
		2386.32	41.51	-12.49	54	31.69	27.13	16.29	33.6	272	143	A	H
	*	2412	99.14	-	-	89.25	27.18	16.3	33.59	272	143	P	H
	*	2412	95.98	-	-	86.09	27.18	16.3	33.59	272	143	A	H
		2488.3	53.65	-20.35	74	43.51	27.4	16.32	33.58	272	143	P	H
		2486	42.21	-11.79	54	32.11	27.36	16.32	33.58	272	143	A	H
		2388.72	53.97	-20.03	74	44.15	27.13	16.29	33.6	225	172	P	V
		2386	45.17	-8.83	54	35.35	27.13	16.29	33.6	225	172	A	V
	*	2412	109.57	-	-	99.68	27.18	16.3	33.59	225	172	P	V
	*	2412	105.91	-	-	96.02	27.18	16.3	33.59	225	172	A	V
		2487.5	55.07	-18.93	74	44.93	27.4	16.32	33.58	225	172	P	V
		2485.5	46.89	-7.11	54	36.79	27.36	16.32	33.58	225	172	A	V
802.11b CH 06 2437MHz		2357.52	51.87	-22.13	74	42.21	27.04	16.22	33.6	268	139	P	H
		2362.96	41.35	-12.65	54	31.69	27.04	16.22	33.6	268	139	A	H
	*	2437	99.32	-	-	89.33	27.27	16.31	33.59	268	139	P	H
	*	2437	96.17	-	-	86.18	27.27	16.31	33.59	268	139	A	H
		2495.44	52.25	-21.75	74	42.1	27.4	16.32	33.57	268	139	P	H
		2485.76	41.39	-12.61	54	31.29	27.36	16.32	33.58	268	139	A	H
		2365.04	53.71	-20.29	74	44.05	27.04	16.22	33.6	243	173	P	V
		2363.12	46.35	-7.65	54	36.69	27.04	16.22	33.6	243	173	A	V
	*	2437	107.65	-	-	97.66	27.27	16.31	33.59	243	173	P	V
	*	2437	104.52	-	-	94.53	27.27	16.31	33.59	243	173	A	V
		2496.24	52.62	-21.38	74	42.47	27.4	16.32	33.57	243	173	P	V
		2487.12	41.69	-12.31	54	31.59	27.36	16.32	33.58	243	173	A	V

802.11b CH 11 2462MHz		2384.4	52.07	-21.93	74	42.29	27.09	16.29	33.6	272	135	P	H
		2388.08	41.89	-12.11	54	32.07	27.13	16.29	33.6	272	135	A	H
	*	2462	100.42	-	-	90.38	27.31	16.31	33.58	272	135	P	H
	*	2462	96.73	-	-	86.69	27.31	16.31	33.58	272	135	A	H
		2484.45	52.5	-21.5	74	42.4	27.36	16.32	33.58	272	135	P	H
		2483.55	41.64	-12.36	54	31.55	27.36	16.31	33.58	272	135	A	H
		2386.16	54.63	-19.37	74	44.81	27.13	16.29	33.6	273	174	P	V
		2388.24	47.75	-6.25	54	37.93	27.13	16.29	33.6	273	174	A	V
	*	2462	108.82	-	-	98.78	27.31	16.31	33.58	273	174	P	V
	*	2462	105.66	-	-	95.62	27.31	16.31	33.58	273	174	A	V
		2484	53.07	-20.93	74	42.98	27.36	16.31	33.58	273	174	P	V
		2488.7	43.41	-10.59	54	33.27	27.4	16.32	33.58	273	174	A	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	48.4	-25.6	74	63.66	31.29	10.02	56.57	100	0	P	H
													H
													H
													H
		4824	46.54	-27.46	74	61.8	31.29	10.02	56.57	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4874	46.4	-27.6	74	61.58	31.38	9.99	56.55	100	0	P	H
		7311	40.87	-33.13	74	49.05	36.28	11.77	56.23	100	0	P	H
													H
													H
		4874	45.86	-28.14	74	61.04	31.38	9.99	56.55	100	0	P	V
		7311	40.6	-33.4	74	48.78	36.28	11.77	56.23	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4924	46.32	-27.68	74	61.38	31.48	9.99	56.53	100	0	P	H
		7386	40.67	-33.33	74	48.64	36.47	11.68	56.12	100	0	P	H
													H
													H
		4924	46.63	-27.37	74	61.69	31.48	9.99	56.53	100	0	P	V
		7386	41.57	-32.43	74	49.54	36.47	11.68	56.12	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		2389.065	55.67	-18.33	74	45.85	27.13	16.29	33.6	271	139	P	H
		2390	45.34	-8.66	54	35.51	27.13	16.29	33.59	271	139	A	H
	*	2412	99.43	-	-	89.54	27.18	16.3	33.59	271	139	P	H
	*	2412	91.63	-	-	81.74	27.18	16.3	33.59	271	139	A	H
		2499.7	52.61	-21.39	74	42.46	27.4	16.32	33.57	271	139	P	H
		2484.4	42.5	-11.5	54	32.4	27.36	16.32	33.58	271	139	A	H
		2390	68.34	-5.66	74	58.51	27.13	16.29	33.59	260	174	P	V
		2390	53.68	-0.32	54	43.85	27.13	16.29	33.59	260	174	A	V
	*	2412	108.81	-	-	98.92	27.18	16.3	33.59	260	174	P	V
	*	2412	101.06	-	-	91.17	27.18	16.3	33.59	260	174	A	V
		2489.6	54.25	-19.75	74	44.11	27.4	16.32	33.58	260	174	P	V
		2484.3	45.49	-8.51	54	35.39	27.36	16.32	33.58	260	174	A	V
802.11g CH 06 2437MHz		2366.8	52.55	-21.45	74	42.89	27.04	16.22	33.6	299	139	P	H
		2369.84	42.27	-11.73	54	32.56	27.09	16.22	33.6	299	139	A	H
	*	2437	101.53	-	-	91.54	27.27	16.31	33.59	299	139	P	H
	*	2437	94.07	-	-	84.08	27.27	16.31	33.59	299	139	A	H
		2484.96	53.57	-20.43	74	43.47	27.36	16.32	33.58	299	139	P	H
		2485.2	42.39	-11.61	54	32.29	27.36	16.32	33.58	299	139	A	H
		2370.16	55.23	-18.77	74	45.52	27.09	16.22	33.6	243	175	P	V
		2365.2	46.59	-7.41	54	36.93	27.04	16.22	33.6	243	175	A	V
	*	2437	110.97	-	-	100.98	27.27	16.31	33.59	243	175	P	V
	*	2437	103.3	-	-	93.31	27.27	16.31	33.59	243	175	A	V
		2484.88	58.63	-15.37	74	48.53	27.36	16.32	33.58	243	175	P	V
		2483.92	43.58	-10.42	54	33.49	27.36	16.31	33.58	243	175	A	V

802.11g CH 11 2462MHz		2372.08	51.87	-22.13	74	42.16	27.09	16.22	33.6	296	134	P	H
		2388.88	42.03	-11.97	54	32.21	27.13	16.29	33.6	296	134	A	H
	*	2462	99.64	-	-	89.6	27.31	16.31	33.58	296	134	P	H
	*	2462	92.27	-	-	82.23	27.31	16.31	33.58	296	134	A	H
		2483.6	57.5	-16.5	74	47.41	27.36	16.31	33.58	296	134	P	H
		2483.5	46.39	-7.61	54	36.3	27.36	16.31	33.58	296	134	A	H
		2389.2	54.06	-19.94	74	44.24	27.13	16.29	33.6	271	174	P	V
		2389.36	45.64	-8.36	54	35.82	27.13	16.29	33.6	271	174	A	V
	*	2462	108.71	-	-	98.67	27.31	16.31	33.58	271	174	P	V
	*	2462	100.64	-	-	90.6	27.31	16.31	33.58	271	174	A	V
		2483.55	63.87	-10.13	74	53.78	27.36	16.31	33.58	271	174	P	V
		2483.5	52.81	-1.19	54	42.72	27.36	16.31	33.58	271	174	A	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	41.19	-32.81	74	56.45	31.29	10.02	56.57	100	0	P	H
													H
													H
													H
		4824	41.91	-32.09	74	57.17	31.29	10.02	56.57	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4874	44.63	-29.37	74	59.81	31.38	9.99	56.55	100	0	P	H
		7311	44.52	-29.48	74	52.7	36.28	11.77	56.23	100	0	P	H
													H
													H
		4874	45.32	-28.68	74	60.5	31.38	9.99	56.55	100	0	P	V
		7311	43.17	-30.83	74	51.35	36.28	11.77	56.23	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4924	42.05	-31.95	74	57.11	31.48	9.99	56.53	100	0	P	H
		7386	41.43	-32.57	74	49.4	36.47	11.68	56.12	100	0	P	H
													H
													H
		4924	41.78	-32.22	74	56.84	31.48	9.99	56.53	100	0	P	V
		7386	41.66	-32.34	74	49.63	36.47	11.68	56.12	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)
802.11n HT20 CH 01 2412MHz		2389.59	55.5	-18.5	74	45.68	27.13	16.29	33.6	271	141	P	H
		2390	45.21	-8.79	54	35.38	27.13	16.29	33.59	271	141	A	H
	*	2412	98.05	-	-	88.16	27.18	16.3	33.59	271	141	P	H
	*	2412	90.2	-	-	80.31	27.18	16.3	33.59	271	141	A	H
		2486	52	-22	74	41.9	27.36	16.32	33.58	271	141	P	H
		2485.1	42.41	-11.59	54	32.31	27.36	16.32	33.58	271	141	A	H
		2390	67.39	-6.61	74	57.56	27.13	16.29	33.59	264	176	P	V
		2390	53.77	-0.23	54	43.94	27.13	16.29	33.59	264	176	A	V
	*	2412	107.54	-	-	97.65	27.18	16.3	33.59	264	176	P	V
	*	2412	99.79	-	-	89.9	27.18	16.3	33.59	264	176	A	V
		2485	54.51	-19.49	74	44.41	27.36	16.32	33.58	264	176	P	V
		2483.9	45.02	-8.98	54	34.93	27.36	16.31	33.58	264	176	A	V
802.11n HT20 CH 06 2437MHz		2386.16	52.62	-21.38	74	42.8	27.13	16.29	33.6	296	138	P	H
		2364.72	42.44	-11.56	54	32.78	27.04	16.22	33.6	296	138	A	H
	*	2437	101.65	-	-	91.66	27.27	16.31	33.59	296	138	P	H
	*	2437	93.81	-	-	83.82	27.27	16.31	33.59	296	138	A	H
		2483.6	55.75	-18.25	74	45.66	27.36	16.31	33.58	296	138	P	H
		2487.92	42.4	-11.6	54	32.26	27.4	16.32	33.58	296	138	A	H
		2387.28	60.35	-13.65	74	50.53	27.13	16.29	33.6	241	177	P	V
		2364.88	46.82	-7.18	54	37.16	27.04	16.22	33.6	241	177	A	V
	*	2437	111.01	-	-	101.02	27.27	16.31	33.59	241	177	P	V
	*	2437	102.89	-	-	92.9	27.27	16.31	33.59	241	177	A	V
		2487.44	65.51	-8.49	74	55.41	27.36	16.32	33.58	241	177	P	V
		2483.52	45.38	-8.62	54	35.29	27.36	16.31	33.58	241	177	A	V

802.11n HT20 CH 11 2462MHz		2327.44	52.31	-21.69	74	42.89	26.95	16.08	33.61	296	135	P	H
		2388.24	42.26	-11.74	54	32.44	27.13	16.29	33.6	296	135	A	H
	*	2462	99.94	-	-	89.9	27.31	16.31	33.58	296	135	P	H
	*	2462	92.16	-	-	82.12	27.31	16.31	33.58	296	135	A	H
		2484.9	60.87	-13.13	74	50.77	27.36	16.32	33.58	296	135	P	H
		2483.5	46.69	-7.31	54	36.6	27.36	16.31	33.58	296	135	A	H
		2388.88	53.23	-20.77	74	43.41	27.13	16.29	33.6	237	191	P	V
		2389.68	44.42	-9.58	54	34.6	27.13	16.29	33.6	237	191	A	V
	*	2462	107.64	-	-	97.6	27.31	16.31	33.58	237	191	P	V
	*	2462	100.28	-	-	90.24	27.31	16.31	33.58	237	191	A	V
		2483.85	68.13	-5.87	74	58.04	27.36	16.31	33.58	237	191	P	V
		2483.85	53.7	-0.3	54	43.61	27.36	16.31	33.58	237	191	A	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	43.28	-30.72	74	58.54	31.29	10.02	56.57	100	0	P	H
													H
													H
													H
		4824	41.57	-32.43	74	56.83	31.29	10.02	56.57	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4874	44.97	-29.03	74	60.15	31.38	9.99	56.55	100	0	P	H
		7311	44.94	-29.06	74	53.12	36.28	11.77	56.23	100	0	P	H
													H
													H
		4874	44.88	-29.12	74	60.06	31.38	9.99	56.55	100	0	P	V
		7311	42.39	-31.61	74	50.57	36.28	11.77	56.23	100	0	P	V
													V
													V
802.11n HT20 CH 11 2462MHz		4924	41.55	-32.45	74	56.61	31.48	9.99	56.53	100	0	P	H
		7386	41.83	-32.17	74	49.8	36.47	11.68	56.12	100	0	P	H
													H
													H
		4924	41.77	-32.23	74	56.83	31.48	9.99	56.53	100	0	P	V
		7386	41.4	-32.6	74	49.37	36.47	11.68	56.12	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

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)
2.4GHz 802.11n HT20 LF		122.88	31.36	-12.14	43.5	45.01	17.26	1.55	32.46	-	-	P	H
		221.16	36.36	-9.64	46	51.79	15.18	1.78	32.39	100	0	P	H
		270.3	33.28	-12.72	46	44.3	19.19	2.17	32.38	-	-	P	H
		417.6	34.83	-11.17	46	42.06	22.43	2.68	32.34	-	-	P	H
		491.8	28.98	-17.02	46	34.88	23.59	2.89	32.38	-	-	P	H
		930	32.63	-13.37	46	30.33	29.69	3.99	31.38	-	-	P	H
													H
													H
													H
													H
													H
													H
		31.89	32.63	-7.37	40	41.04	23.24	0.84	32.49	-	-	P	V
		44.58	32.79	-7.21	40	47.71	16.55	1.02	32.49	100	0	P	V
		221.16	33.01	-12.99	46	48.44	15.18	1.78	32.39	-	-	P	V
		417.6	32.44	-13.56	46	39.67	22.43	2.68	32.34	-	-	P	V
		565.3	29.53	-16.47	46	32.95	25.89	3.12	32.43	-	-	P	V
		909	33.94	-12.06	46	32.44	29.13	3.95	31.58	-	-	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

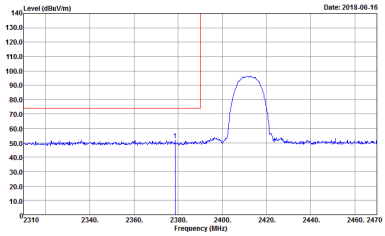
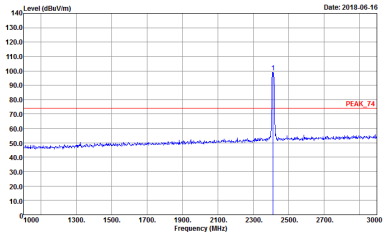
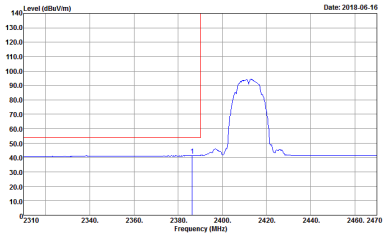
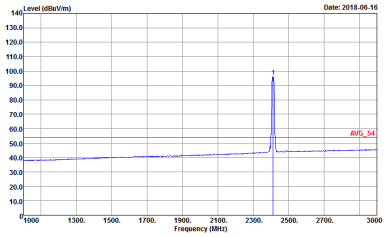
Test Engineer :	Hao Hsu and Ken Wu	**Temperature :**	22~25°C
		Relative Humidity :	50~55%

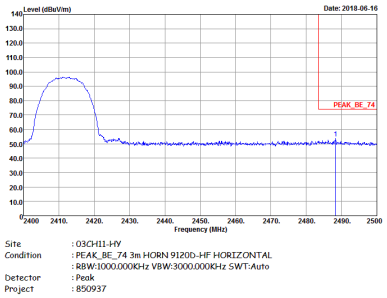
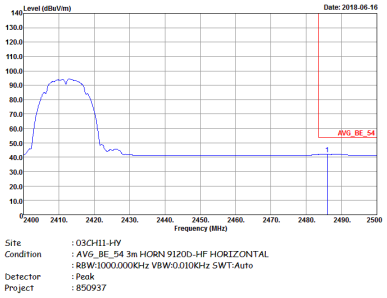
Note symbol

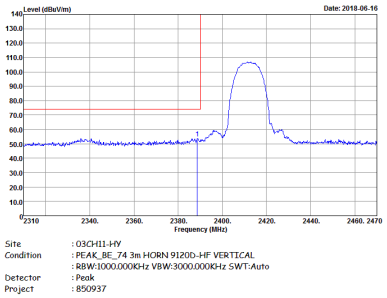
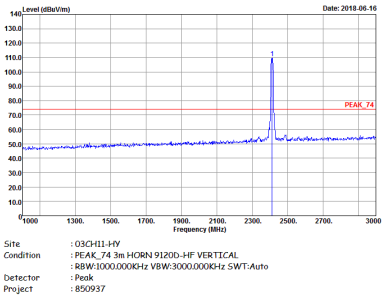
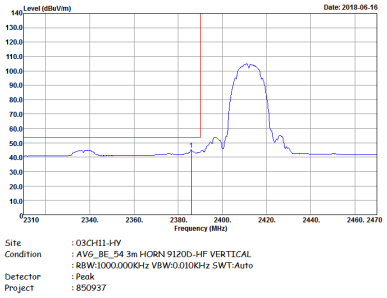
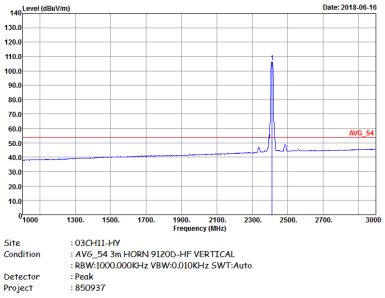
-L	**Low channel location**
-R	**High channel location**

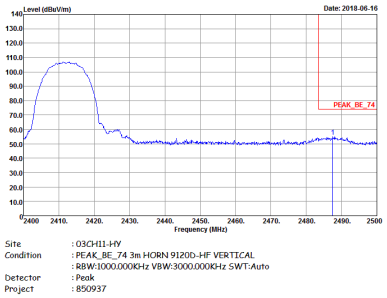
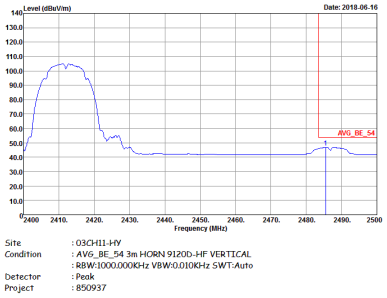
2.4GHz 2400~2483.5MHz

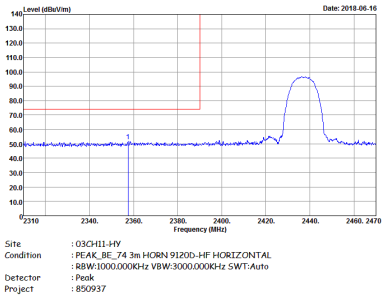
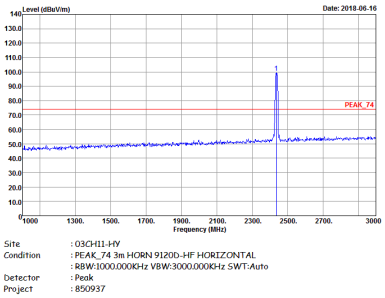
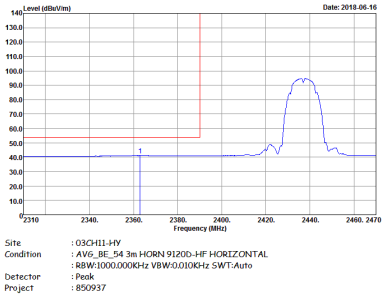
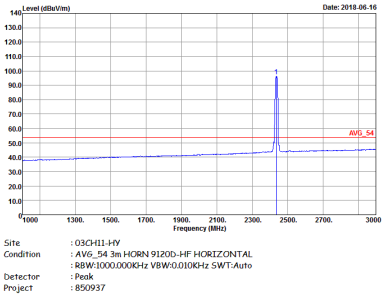
WIFI 802.11b (Band Edge @ 3m)

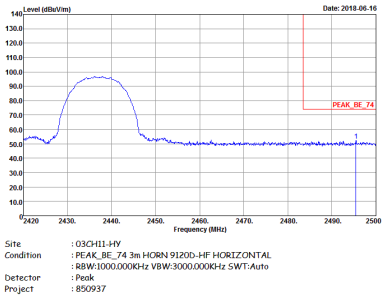
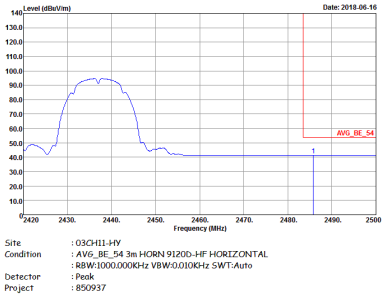
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 850937	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 850937

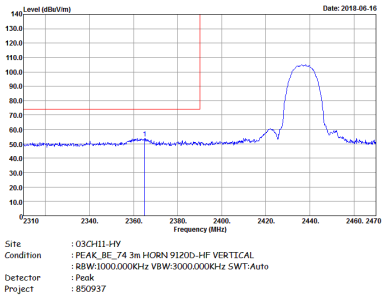
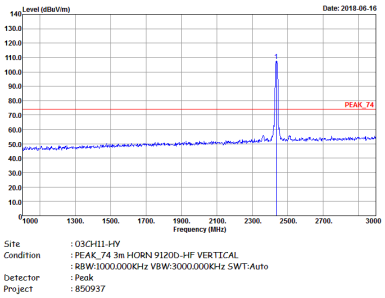
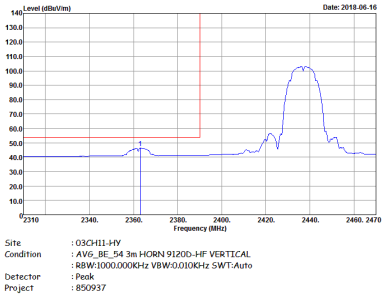
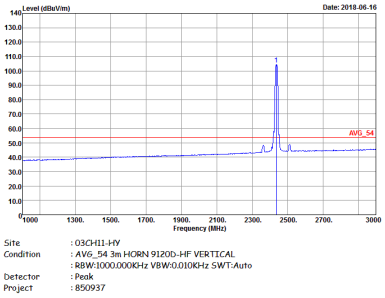
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

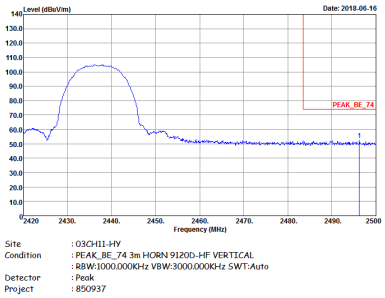
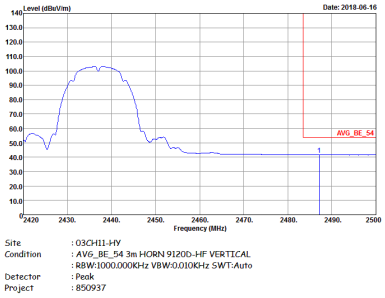
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

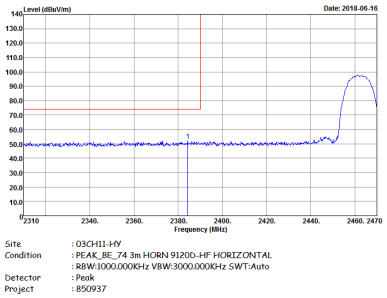
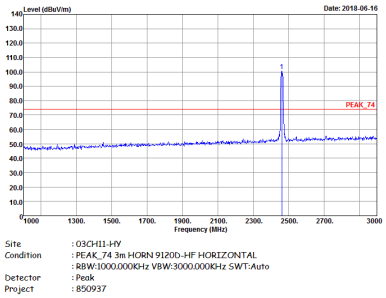
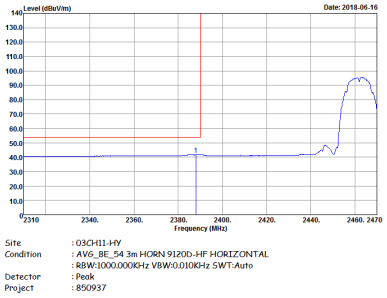
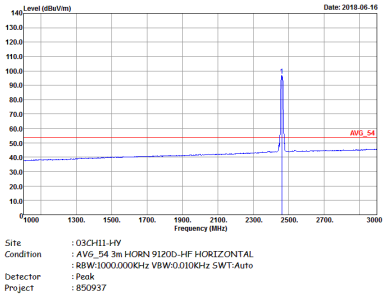
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

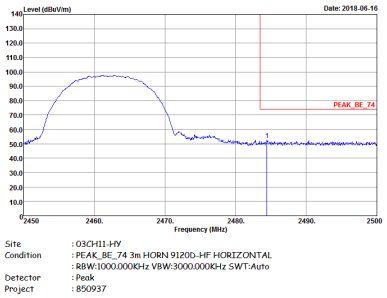
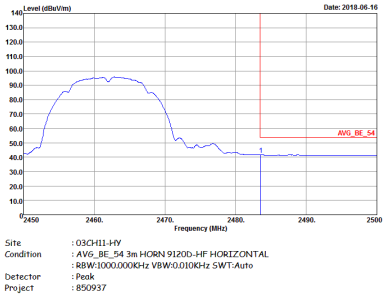
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		

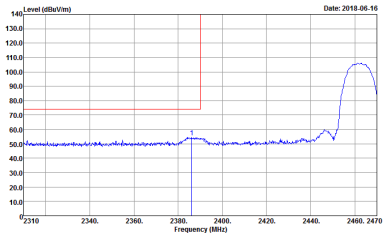
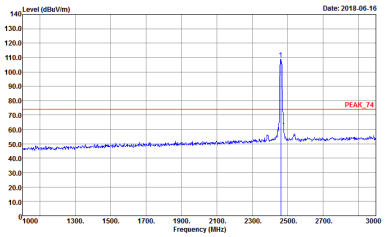
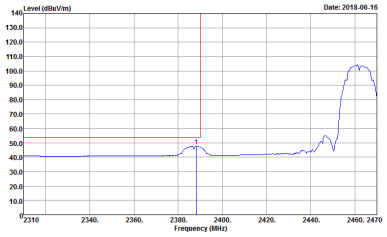
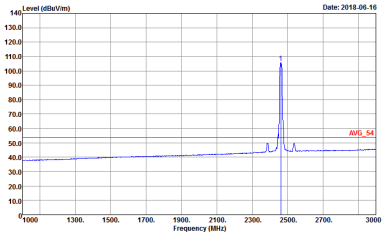
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

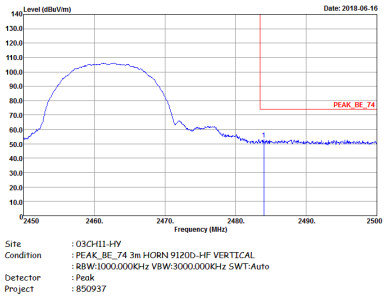
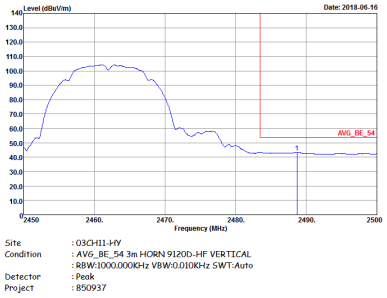
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

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 - L	
1	Horizontal	Fundamental
Peak		
Avg.		

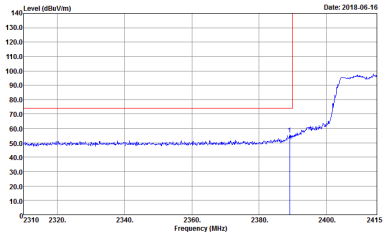
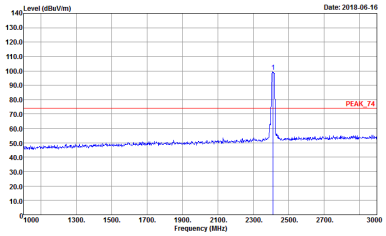
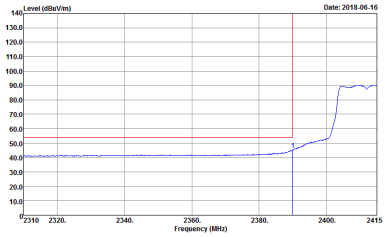
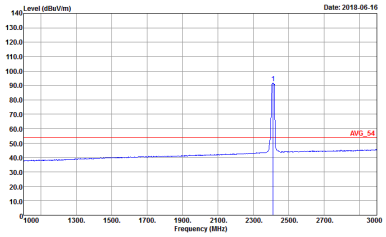
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

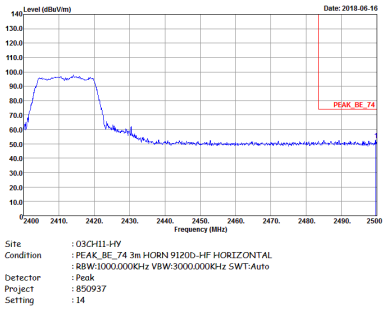
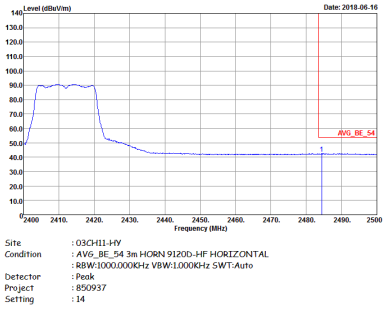
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 850937	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 850937

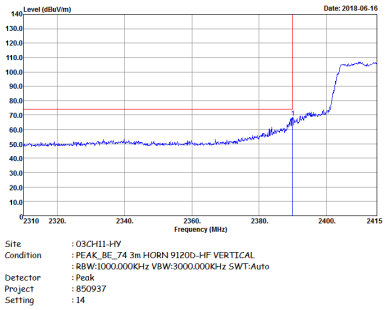
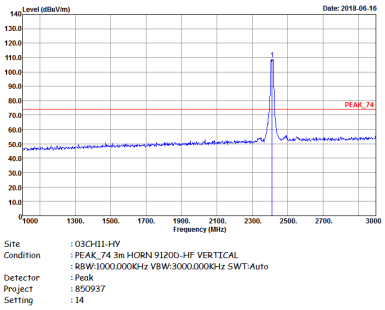
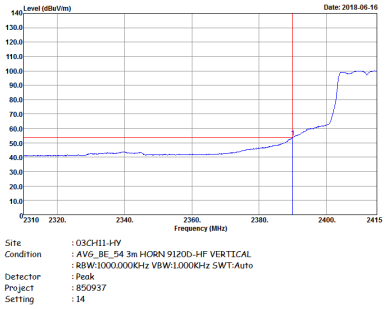
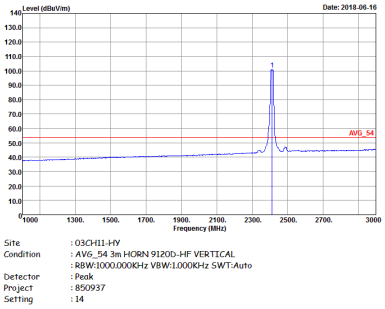
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

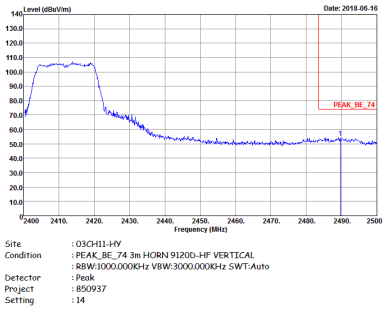
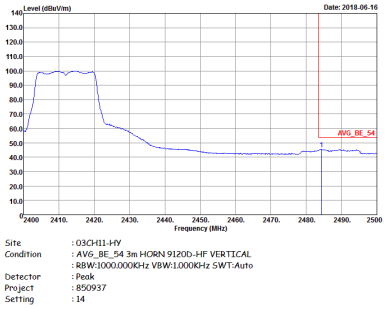
2.4GHz 2400~2483.5MHz

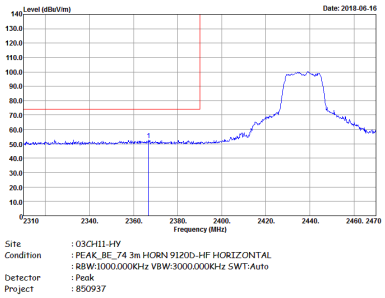
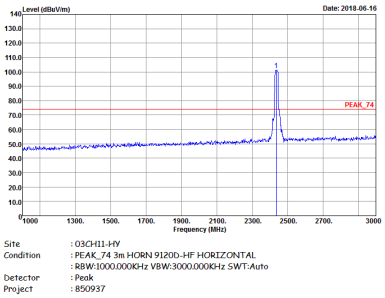
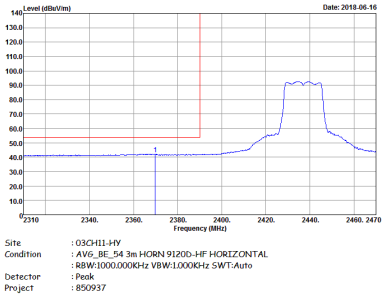
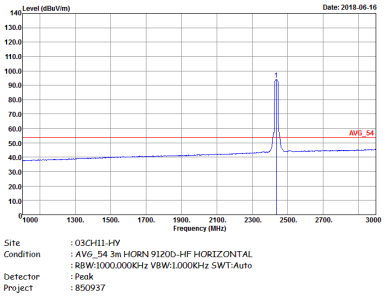
WIFI 802.11g (Band Edge @ 3m)

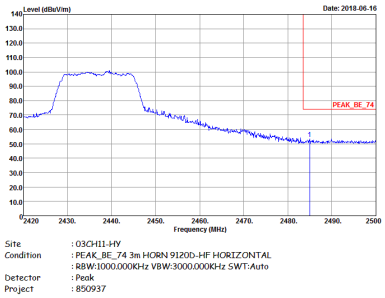
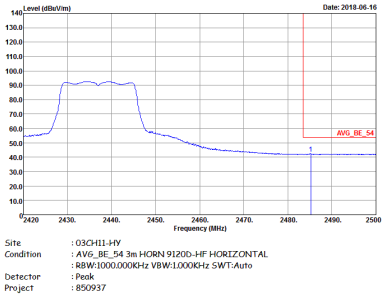
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14

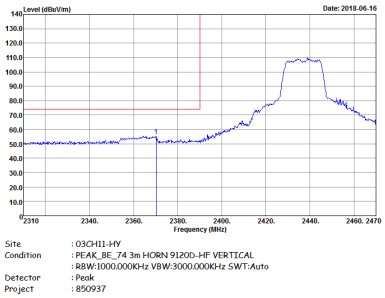
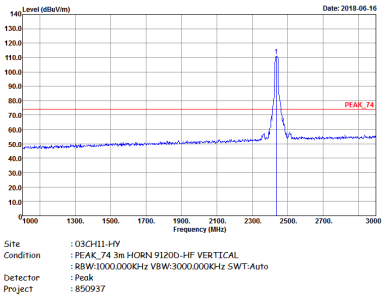
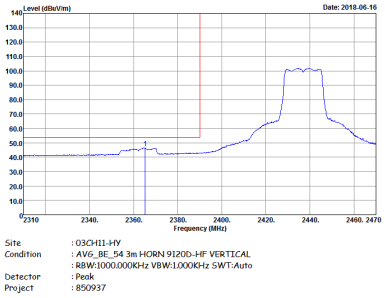
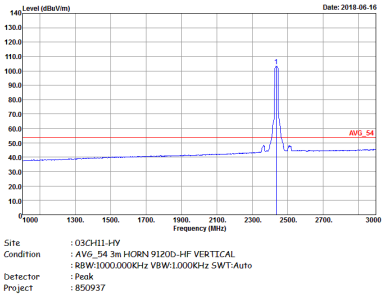
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

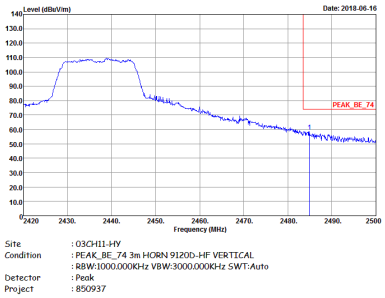
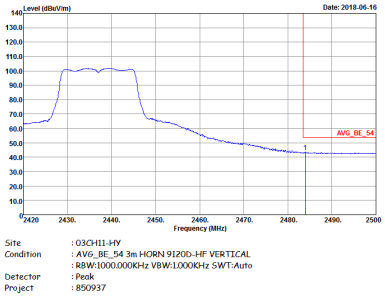
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

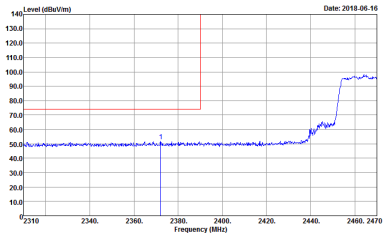
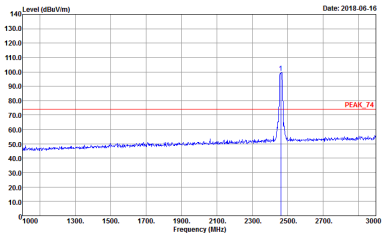
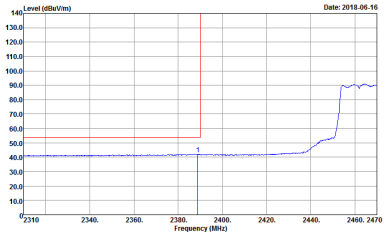
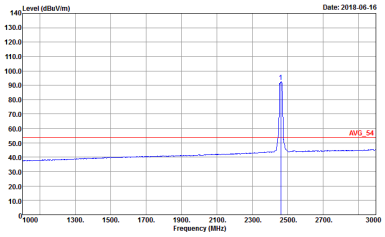
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

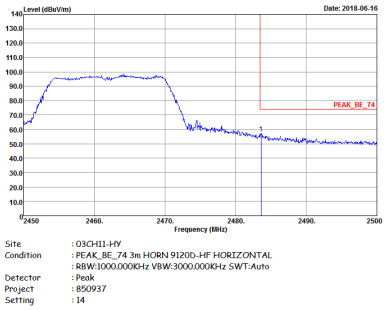
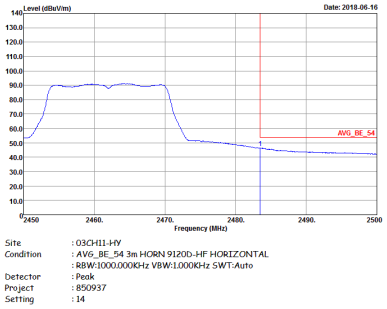
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		

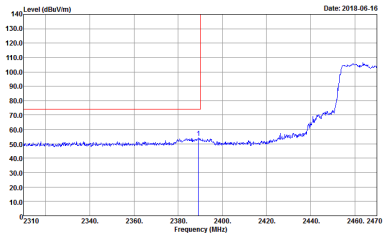
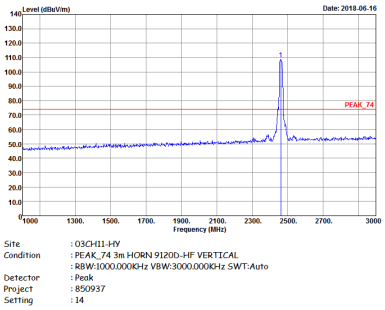
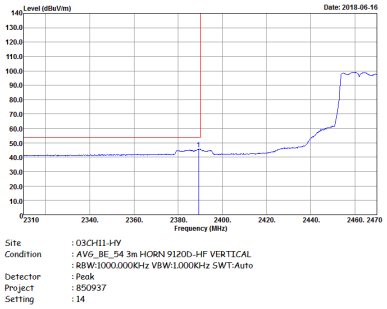
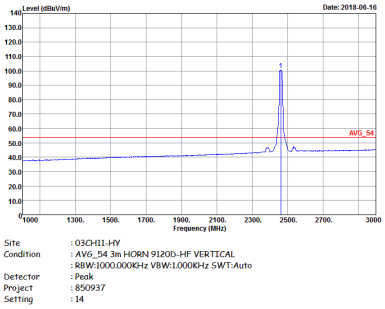
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

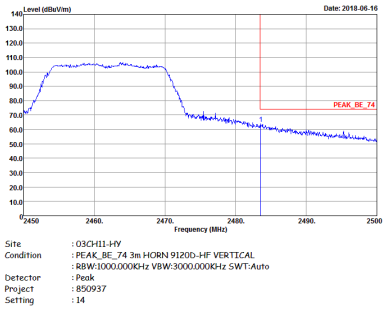
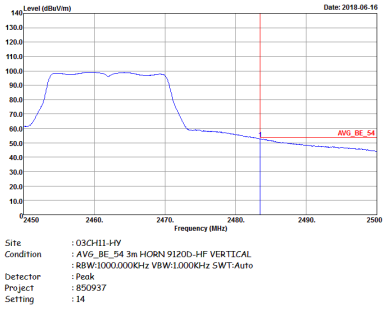
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

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 CH11 2462MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 14

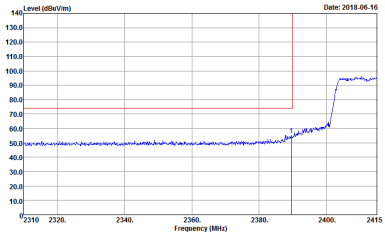
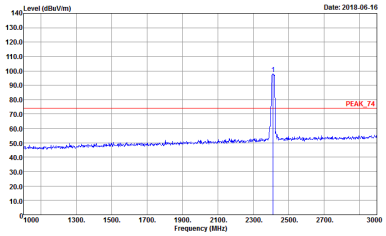
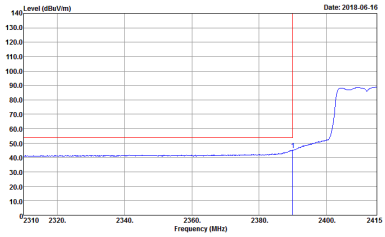
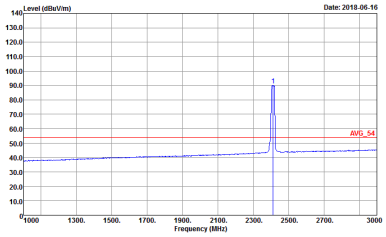
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

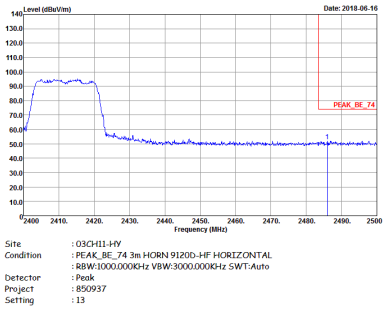
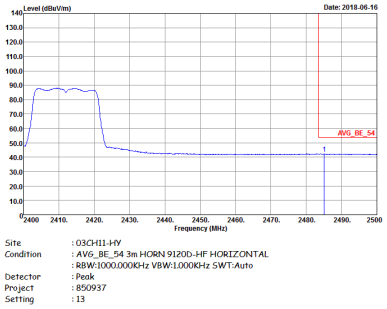
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

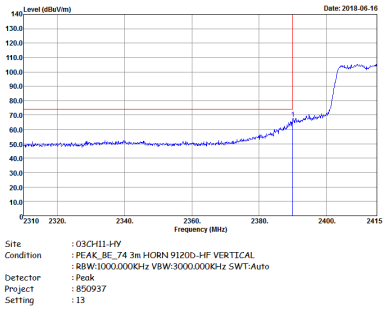
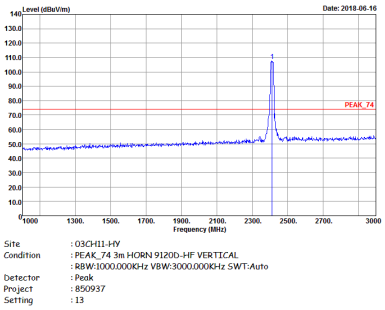
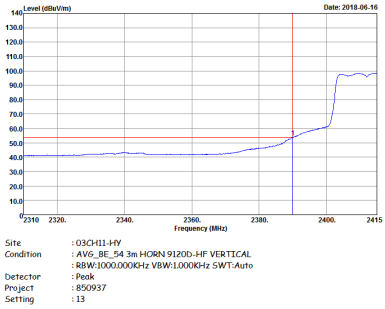
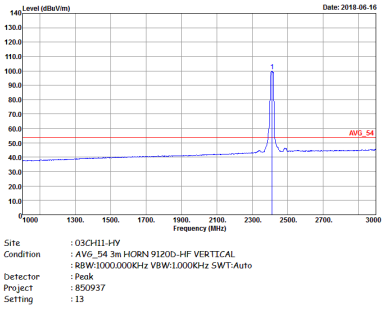
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

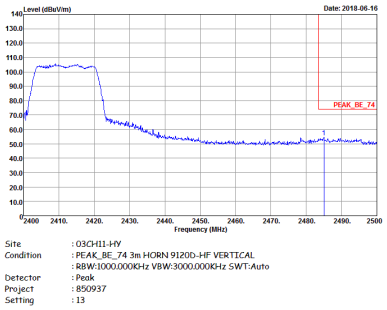
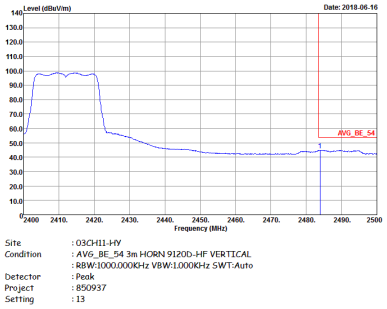
2.4GHz 2400~2483.5MHz

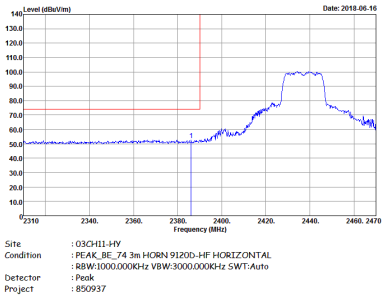
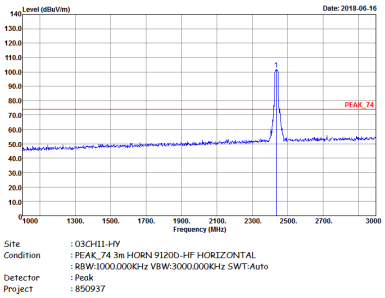
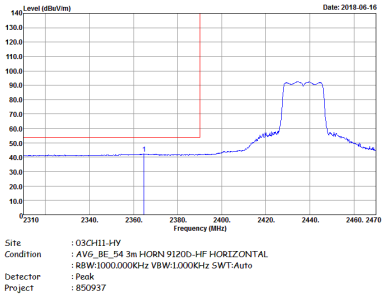
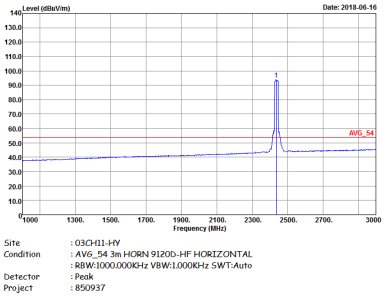
WIFI 802.11n HT20 (Band Edge @ 3m)

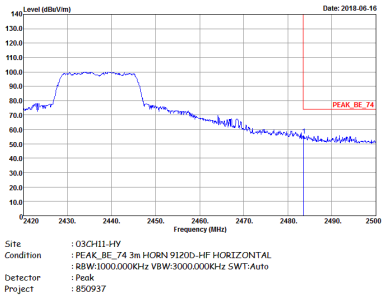
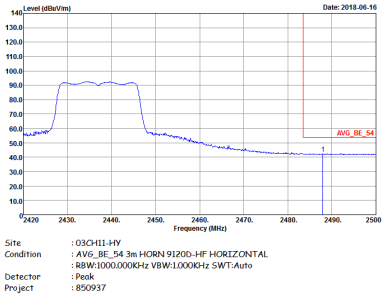
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz - L	
1	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 13	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 13
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 13	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 850937 Setting : 13

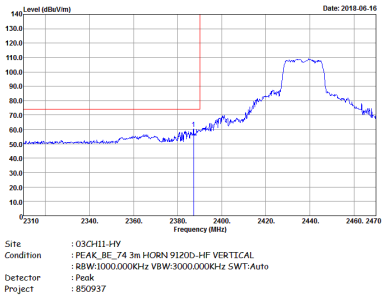
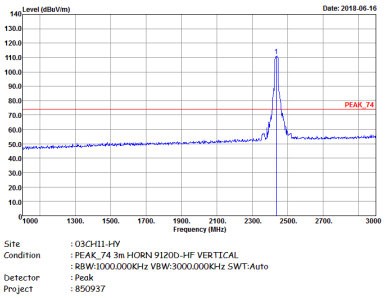
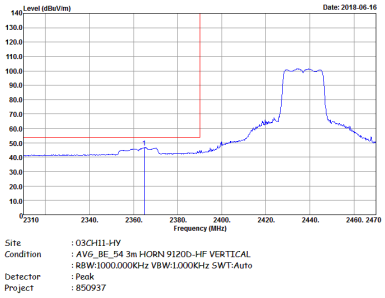
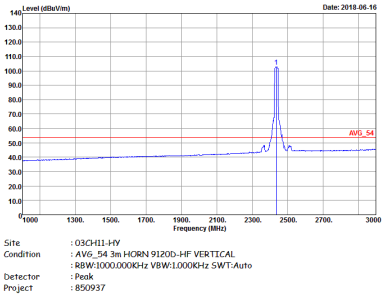
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

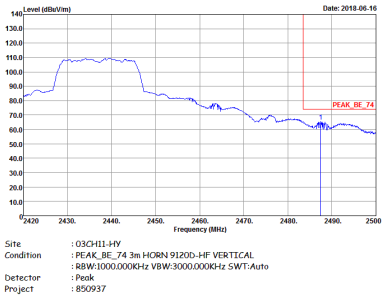
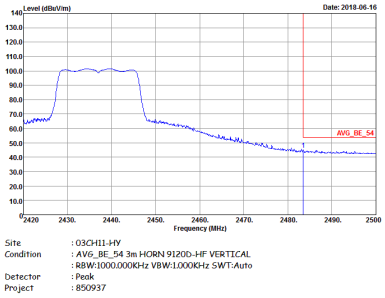
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

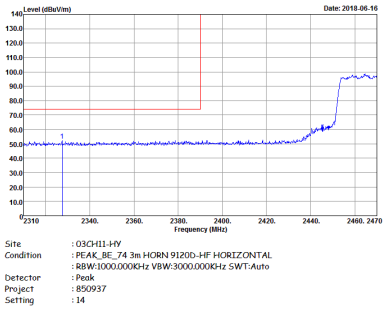
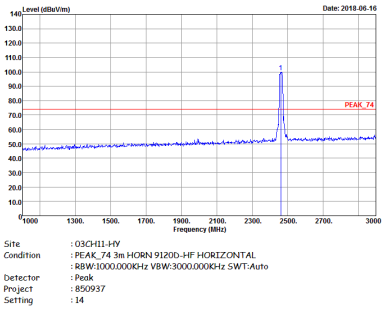
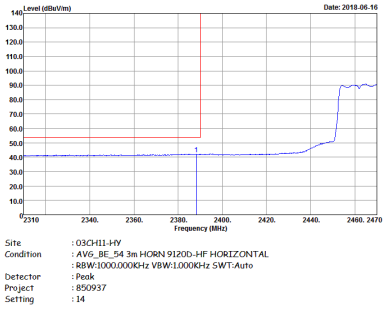
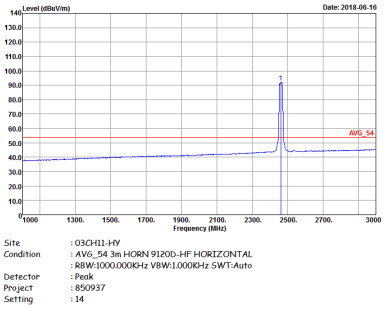
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

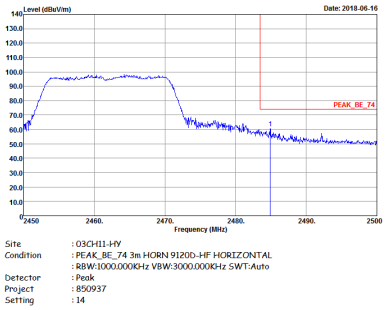
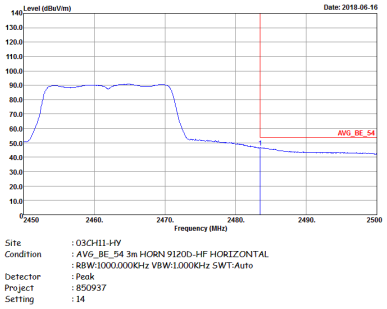
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		

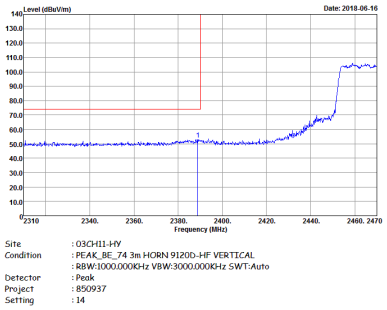
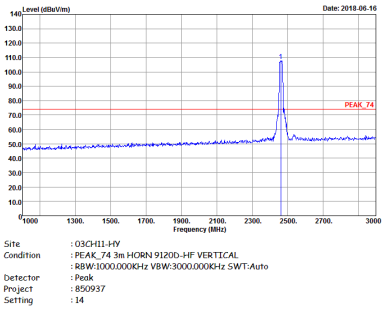
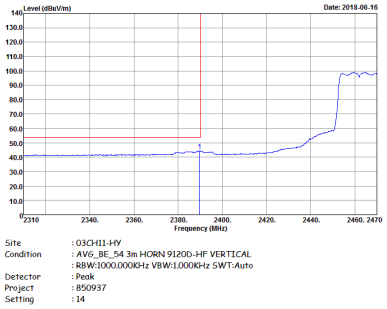
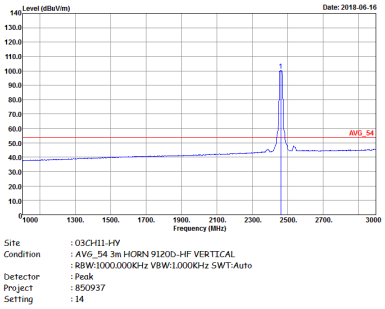
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

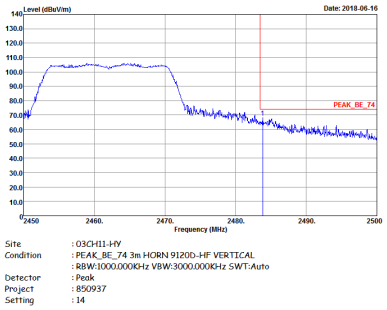
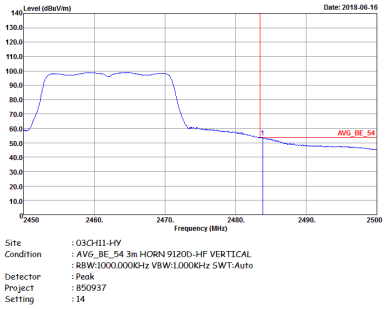
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

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

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		

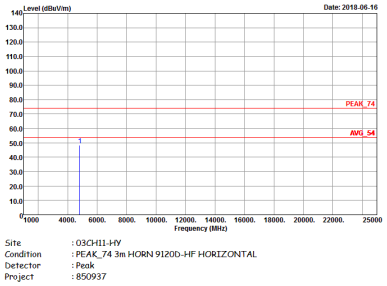
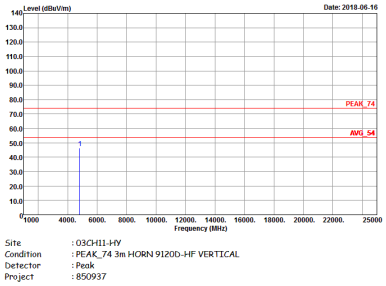
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz - R	
1	Horizontal	Fundamental
Peak		Left Blank
Avg.		Left Blank

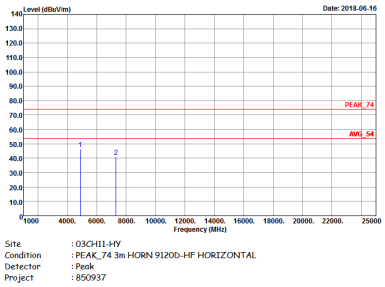
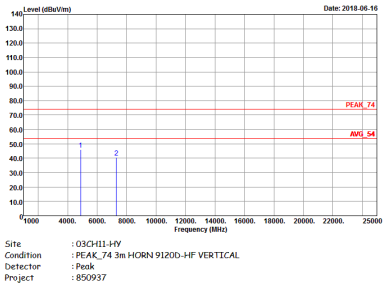
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz - L	
1	Vertical	Fundamental
Peak		
Avg.		

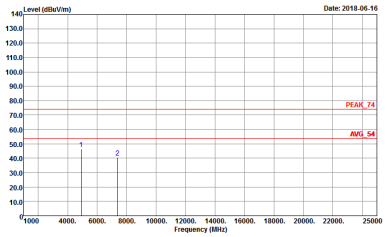
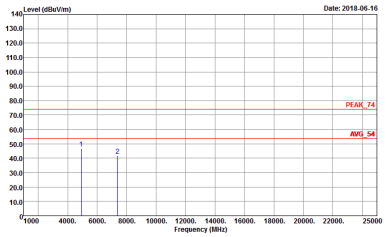
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz - R	
1	Vertical	Fundamental
Peak		Left Blank
Avg.		Left Blank

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

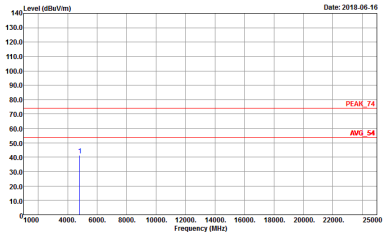
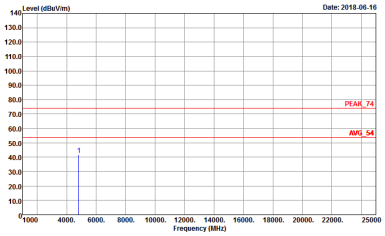
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

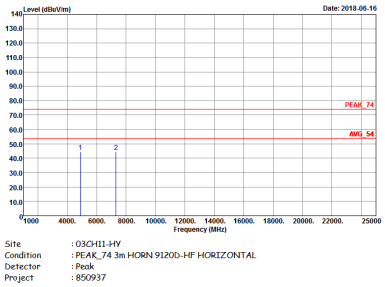
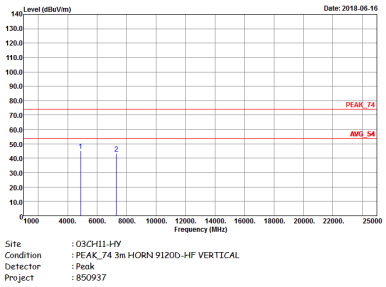
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.		

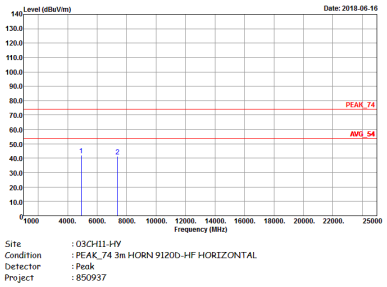
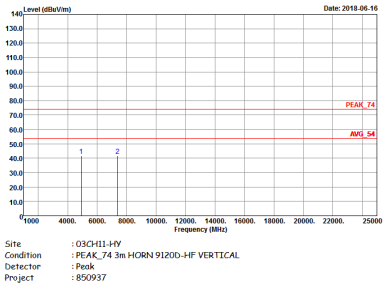
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 850937	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 850937

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

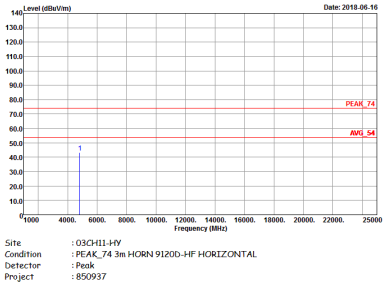
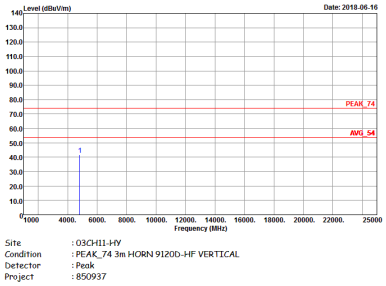
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 850937	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 850937

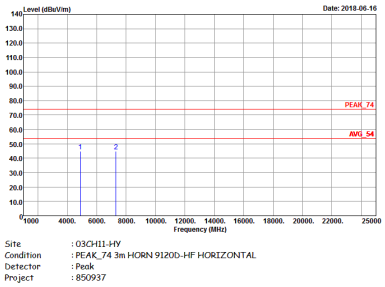
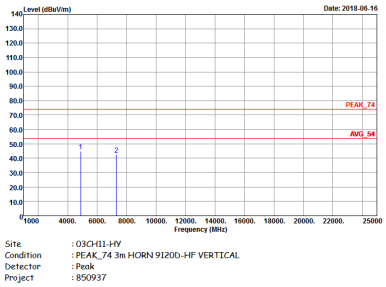
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.		

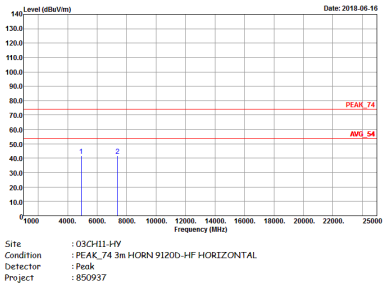
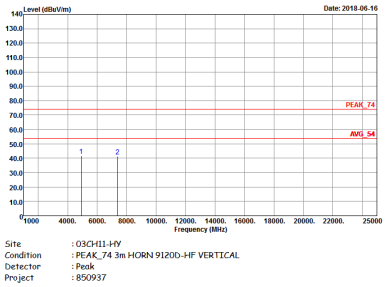
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

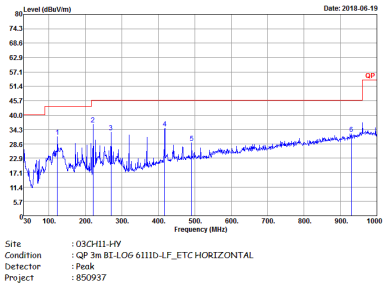
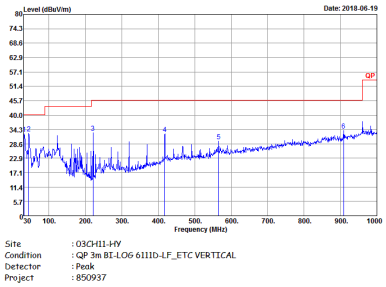
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

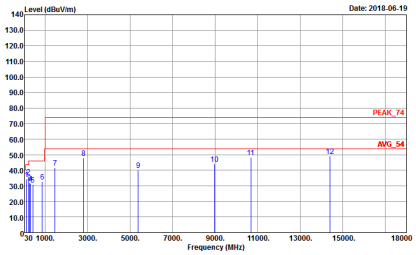
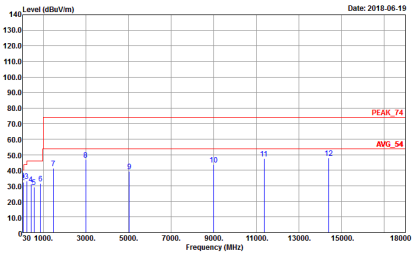
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.		

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.		

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		

	WLAN 2.4G_Idle	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 850937	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 850937

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	122.88	34.20	-9.30	43.50	47.85	17.26	1.51	32.46	100	0	Peak
2	221.16	35.92	-10.08	46.00	51.35	15.18	1.72	32.39	---	---	Peak
3	270.30	31.78	-14.22	46.00	42.80	19.19	2.09	32.38	---	---	Peak
4	319.60	31.40	-14.60	46.00	42.14	19.23	2.31	32.36	---	---	Peak
5	417.60	30.68	-15.32	46.00	37.91	22.43	2.63	32.34	---	---	Peak
6	860.00	32.75	-13.25	46.00	31.76	29.04	3.67	31.87	---	---	Peak
7	1468.00	41.59	-32.41	74.00	46.05	25.26	4.81	34.53	---	---	Peak
8	2812.00	47.94	-26.06	74.00	46.64	28.16	6.68	33.54	---	---	Peak
9	5385.00	40.06	-33.94	74.00	54.59	31.98	9.75	56.65	---	---	Peak
10	8985.00	43.99	-30.01	74.00	50.00	37.67	12.98	56.88	---	---	Peak
11	10680.00	48.18	-25.82	74.00	53.90	39.84	14.86	60.71	---	---	Peak
12	14400.00	49.26	-24.74	74.00	49.19	41.72	17.18	59.37	100	0	Peak

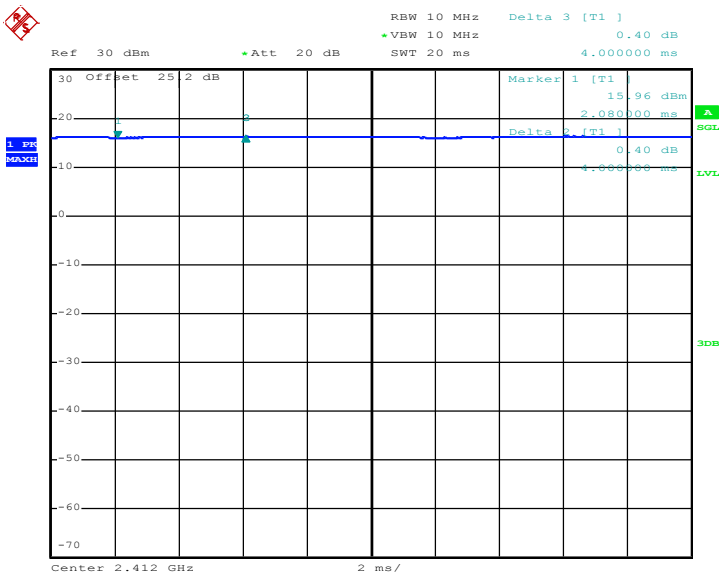
Vertical

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	35.40	33.38	-6.62	40.00	43.74	21.31	0.82	32.49	100	0	Peak
2	45.12	32.49	-7.51	40.00	47.82	16.14	1.02	32.49	---	---	Peak
3	221.16	33.23	-12.77	46.00	48.66	15.18	1.72	32.39	---	---	Peak
4	417.60	31.09	-14.91	46.00	38.32	22.43	2.63	32.34	---	---	Peak
5	565.30	29.36	-16.64	46.00	32.78	25.89	3.03	32.43	---	---	Peak
6	860.00	31.75	-14.25	46.00	30.76	29.04	3.67	31.87	---	---	Peak
7	1484.00	41.27	-32.73	74.00	45.58	25.26	4.86	34.43	---	---	Peak
8	2994.00	46.84	-27.16	74.00	44.92	28.56	6.88	33.52	---	---	Peak
9	5040.00	39.53	-34.47	74.00	54.86	31.65	9.54	56.52	---	---	Peak
10	9000.00	43.81	-30.19	74.00	49.99	37.70	13.02	56.90	---	---	Peak
11	11370.00	47.49	-26.51	74.00	53.68	40.03	15.35	61.57	---	---	Peak
12	14400.00	47.84	-26.16	74.00	48.31	41.72	17.18	59.37	100	0	Peak

Appendix E. Duty Cycle Plots

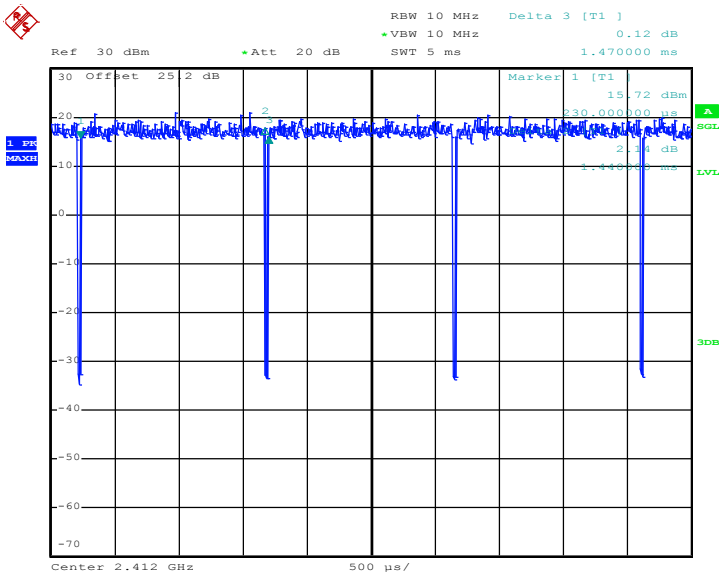
Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
802.11b	100.00	-	-	10Hz	0.00
802.11g	97.96	1440.00	0.69	1kHz	0.09
2.4GHz 802.11n HT20	97.96	1340.00	0.75	1kHz	0.09

802.11b



Date: 1.MAY.2018 15:42:59

802.11g



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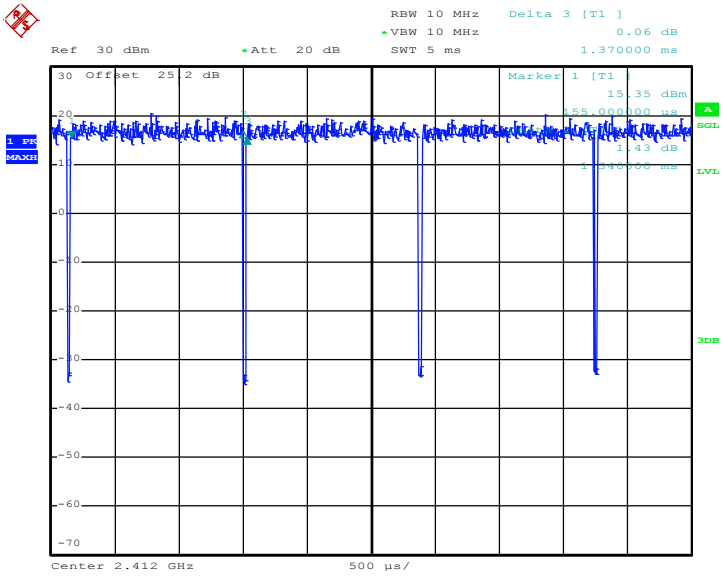
802.11n HT20



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