FCC RF Test Report

APPLICANT	:	Nest Labs Inc.
EQUIPMENT	:	Outdoor Security Camera
MODEL NAME	:	Nest Cam IQ
MODEL NUMBER	:	A0055
FCC ID	:	ZQANC41
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was completed on Sep. 07, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR6N0107-01C	Rev. 01	Initial issue of report	Aug. 29, 2017
FR6N0107-01C	Rev. 02	Revising conducted emission test mode in section 2.3 and connection diagram of test system in section 2.4, and add test description of peak output power in section 3.2.5.	Sep. 05, 2017
FR6N0107-01C	Rev. 03	Revising conducted emission data of appendix B and connection diagram of test system in section 2.3, removing peak power data of appendix A and updating setup photographs.	Sep. 07, 2017
FR6N0107-01C	Rev. 04	Revising conducted emission test mode in section 2.2 and connection diagram of test system in section 2.3 and updating setup photographs.	Sep. 08, 2017
FR6N0107-01C	Rev. 05	Update report of revising conduction emission test mode	Sep. 11, 2017

SUMMARY OF TEST RESULT

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

1 General Description

1.1 Applicant

Nest Labs Inc.
3400 Hillview Ave.Palo Alto, CA 94304 USA

1.2 Product Feature of Equipment Under Test

Bluetooth-LE, Wi-Fi 2.4GHz 802.11b/g/n/ac, and Wi-Fi 5GHz 802.11a/n/ac, 15.4.

Product Specification subjective to this standard	
Antenna Type	WLAN: IFA Antenna Bluetooth: IFA Antenna 15.4: IFA Antenna

1.3 Modification of EUT

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

1.4 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. 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.

1.5 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- ANSI C63.10-2013

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

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in four orthogonal panels, X, Y, Z, Back. The worst cases (Z plane for Ant. 1 and Back plane for Ant. 2 and MIMO Ant. 1 + 2) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

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

Single Antenna

Modulation	Data Rate
802.11b	1 Mbps

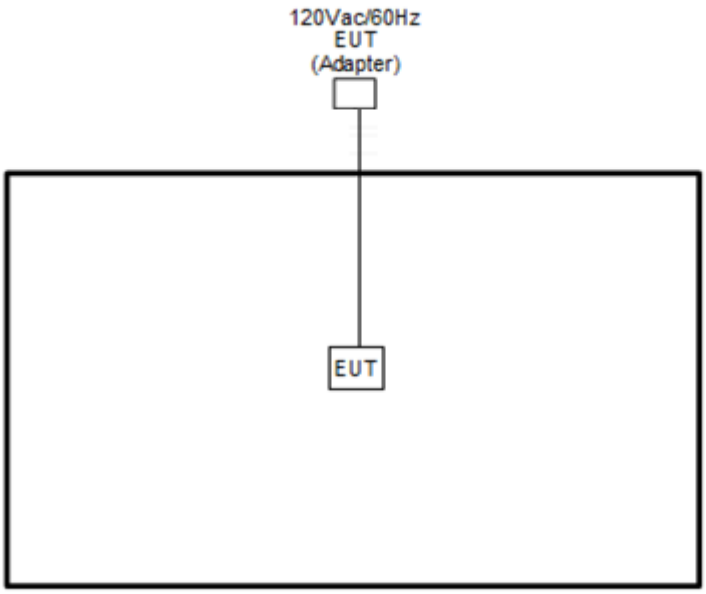
MIMO Antenna

Modulation	Data Rate
802.11g	6 Mbps
802.11n HT20	MCS0

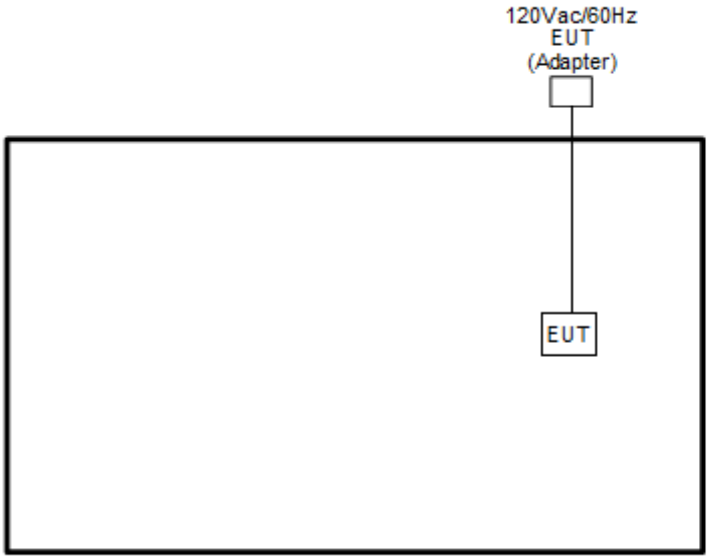
Test Cases	
AC Conducted Emission	Mode 1 : WLAN Tx + 15.4 Tx + Speaker on + LED on + RR LED on + IR CUT on + Memory + Camera on + USB Cable (Charging from Adapter 1)
Remark: For radiated spurious emissions, the tests were performed with USB Cable and Adapter 1.	

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8m
2.	iPod	Apple	A1285	DoC	Shielded, 1.0m	N/A
3.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	USB Cable	N/A	N/A	N/A	Unshielded, 1.93 m	Unshielded, 1.93 m

2.5 EUT Operation Test Setup

The RF test items, programmed RF utility, “CMD” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

The laptop used for engineering setting purpose only was removed from the EUT, after configured.

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.

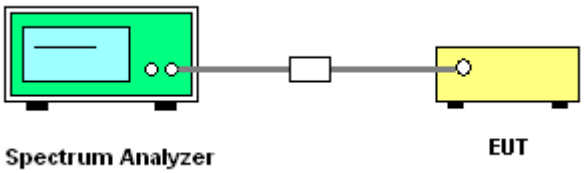
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

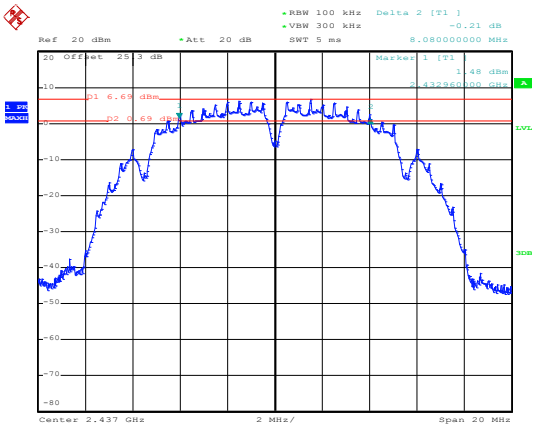
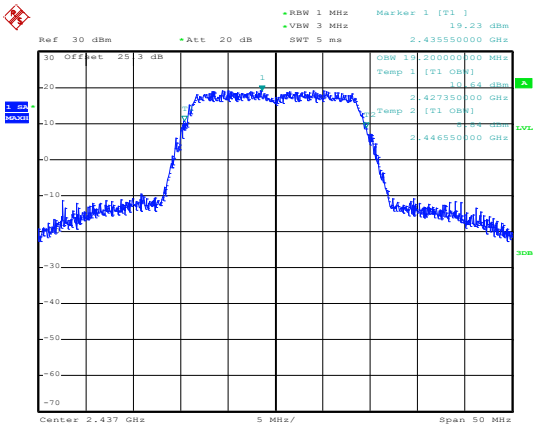
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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: 21.JUL.2017 23:05:24	Date: 21.JUL.2017 23:40:37

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 output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the 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.

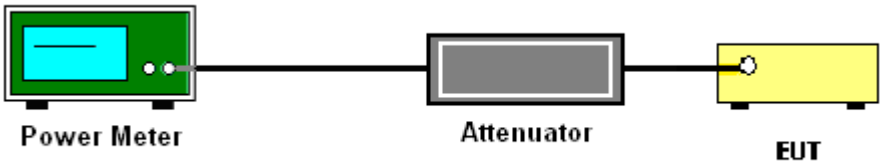
3.2.2 Measuring Instruments

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 9.2.3.1 Method AVGPM.
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.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Average output Power

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

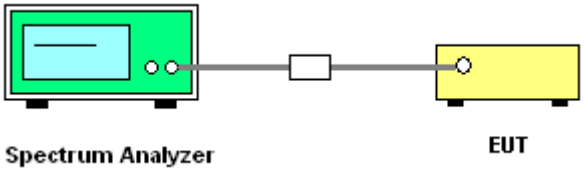
The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

Method AVGPSD-2

1. The testing follows Measurement Procedure 10.5 Method AVGPSD-2 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) = 10 kHz. Video bandwidth VBW = 30 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW).
5. Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins).
6. Detector = RMS, Sweep time = auto couple.
7. Trace average at least 100 traces in power averaging mode.
8. Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.
9. Measure and record the results in the test report.For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
   Method (c): Measure and add 10 log(N_{ANT}) dB.
   With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity 10 log(N_{ANT}) dB is added to each spectrum value before comparing to the emission limit. The addition of 10 log(N_{ANT}) dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{ANT}$ th of the PSD limit .

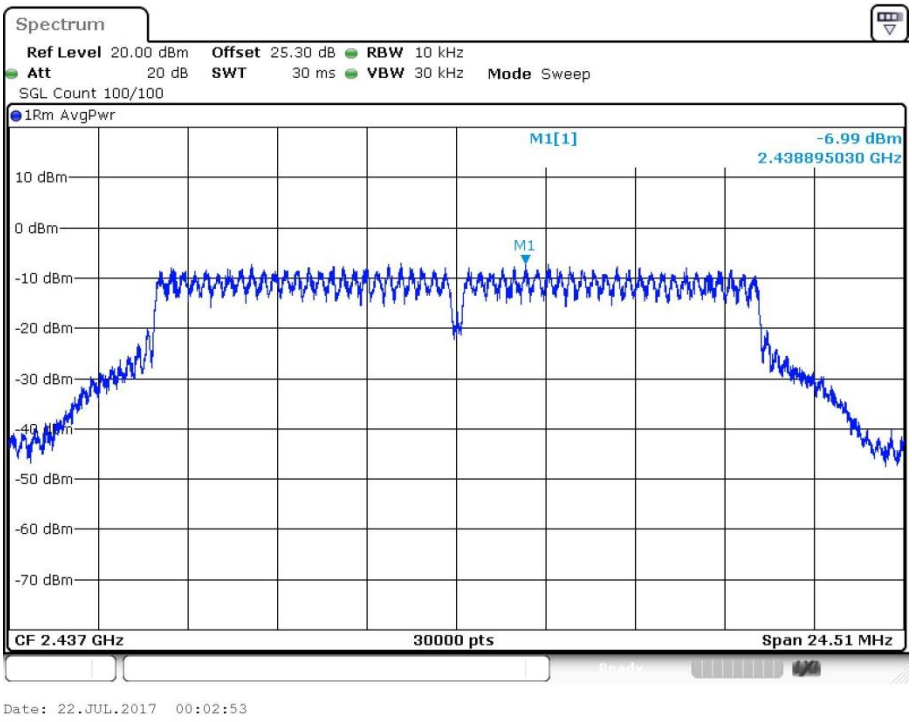
3.3.4 Test Setup



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.

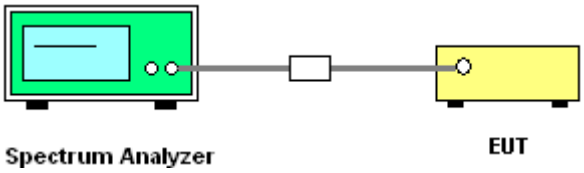
3.4.2 Measuring Instruments

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



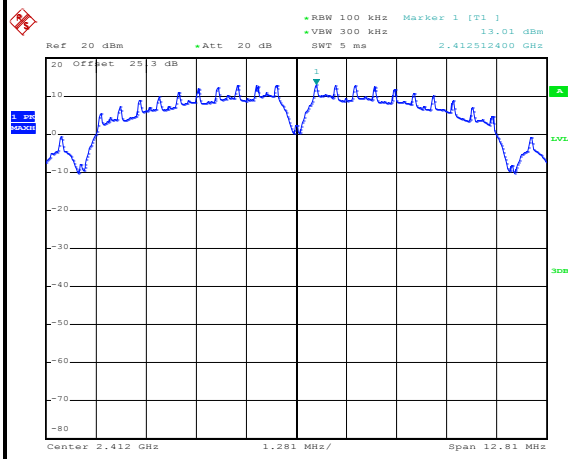
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 1, Ant. 1 (Measured)

Number of TX	1	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Aking Chang

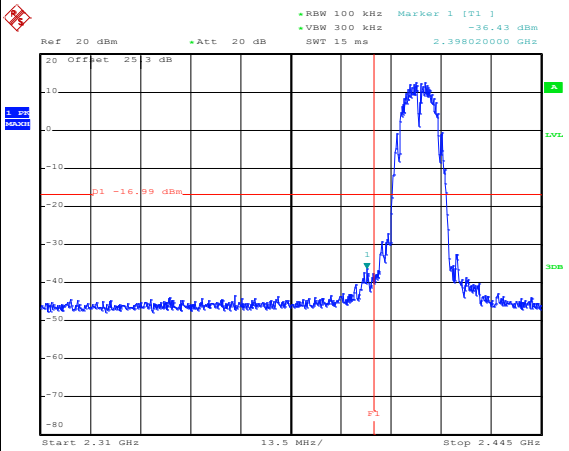
WLAN 802.11b Channel 01

100kHz PSD reference Level



Date: 21.JUL.2017 22:51:28

Low Channel Plot



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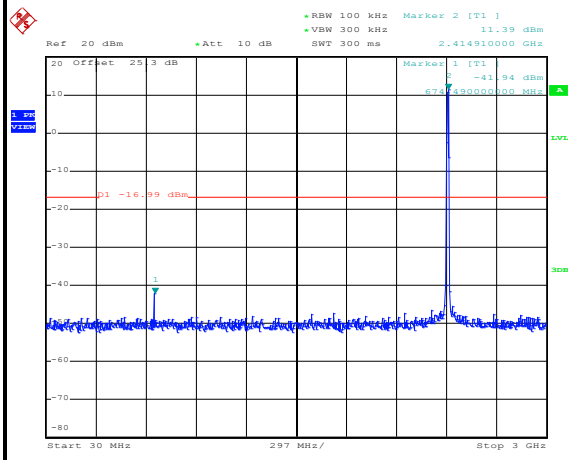
Spurious Emission 30MHz~3GHz



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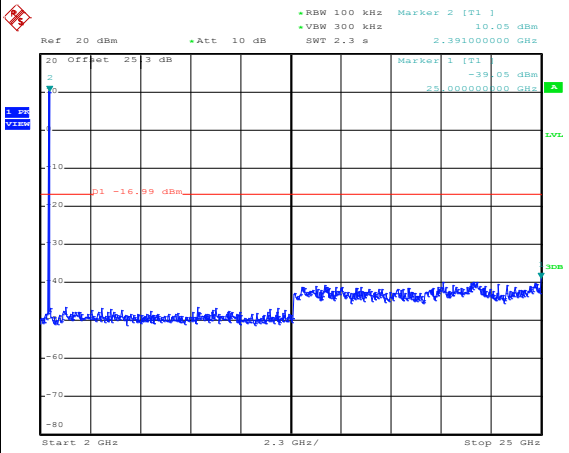
Spurious Emission 2GHz~25GHz



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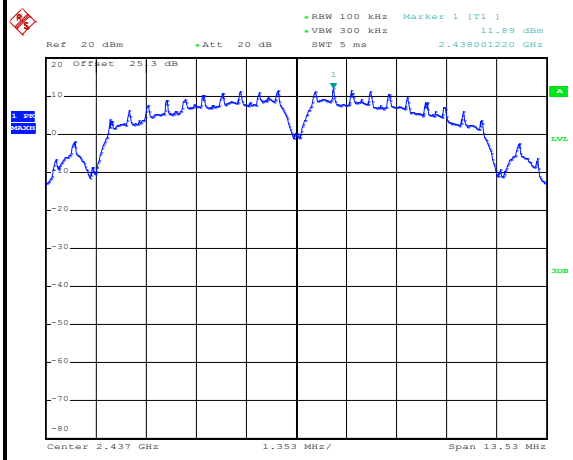
Number of TX :	1	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Aking Chang

WLAN 802.11b Channel 06

100kHz PSD reference Level



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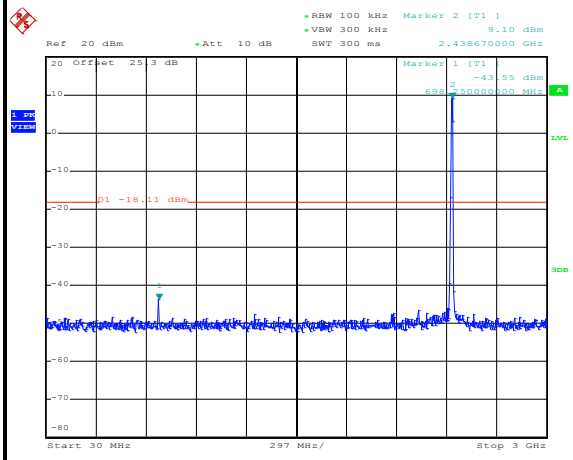
Mid Channel Plot

Spurious Emission 30MHz~3GHz



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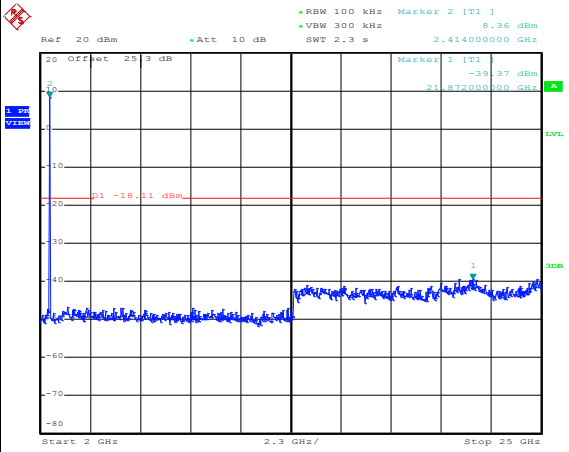
Spurious Emission 2GHz~25GHz



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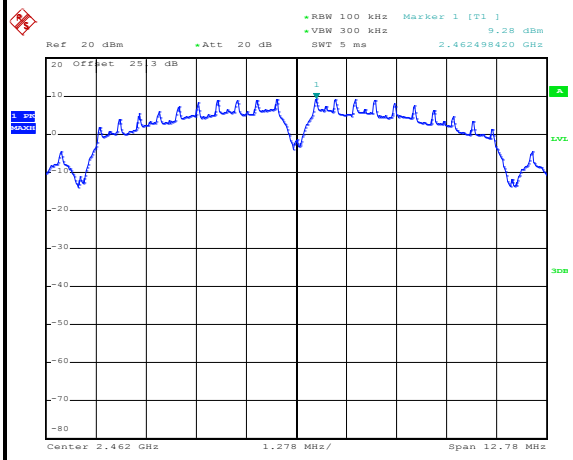
Number of TX :	1	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Aking Chang

WLAN 802.11b Channel 11

100kHz PSD reference Level



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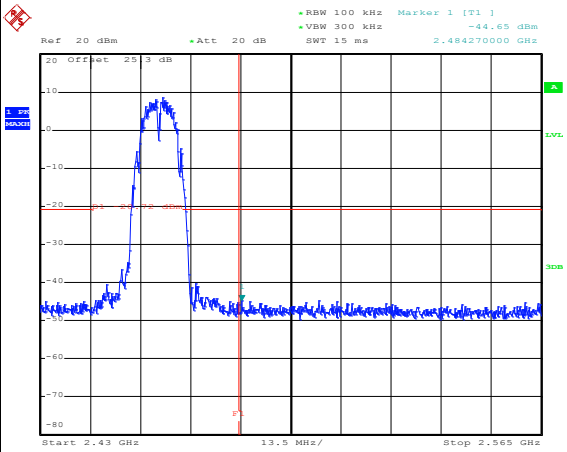
High Channel Plot



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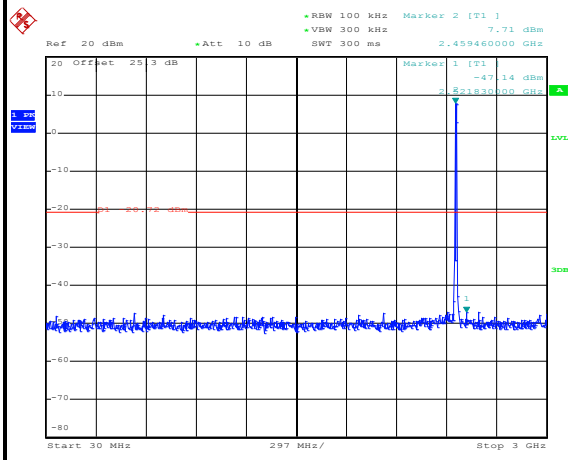
Spurious Emission 30MHz~3GHz



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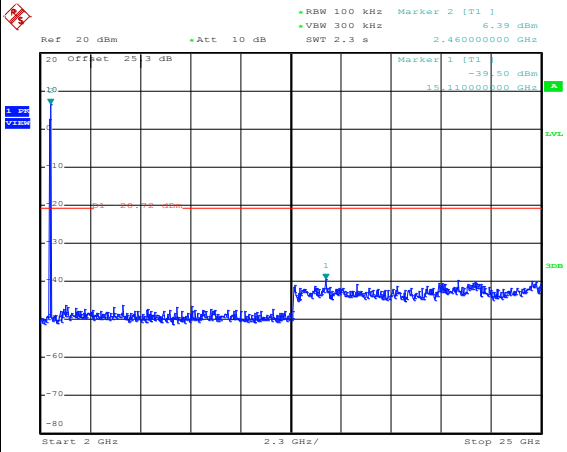
Spurious Emission 2GHz~25GHz



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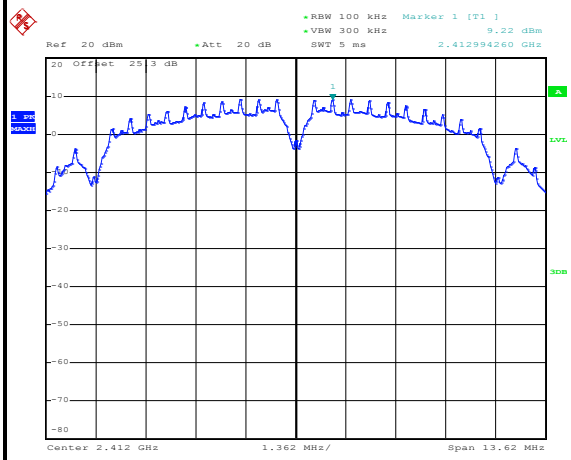
Number of TX = 1, Ant. 2 (Measured)

Number of TX	1	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Aking Chang

WLAN 802.11b Channel 01

100kHz PSD reference Level



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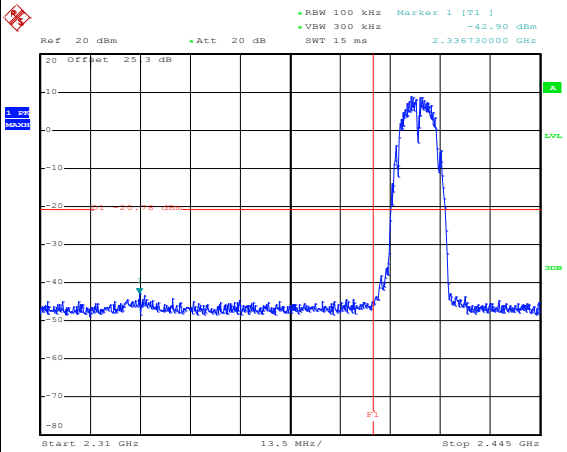
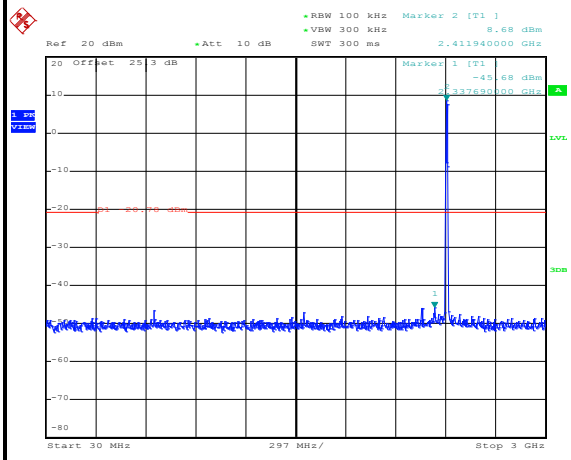
Low Channel Plot



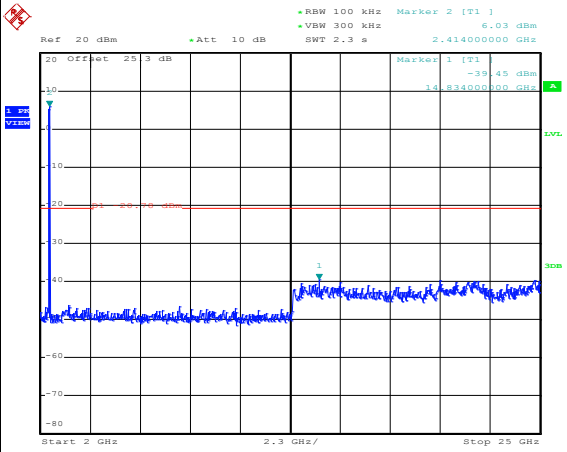
Date: 21.JUL.2017 23:03:34

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:03:46

Spurious Emission 2GHz~25GHz

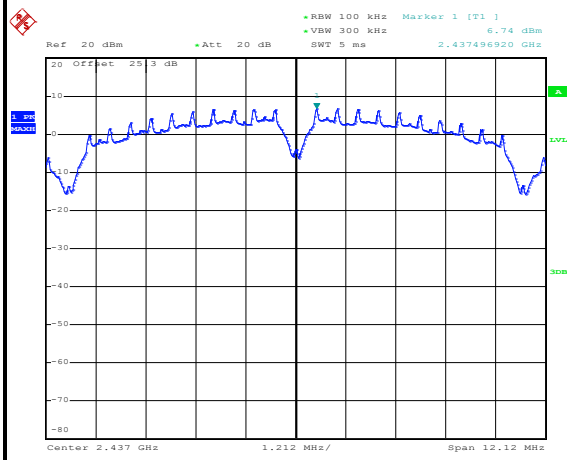


Date: 21.JUL.2017 23:03:54

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Aking Chang

WLAN 802.11b Channel 06

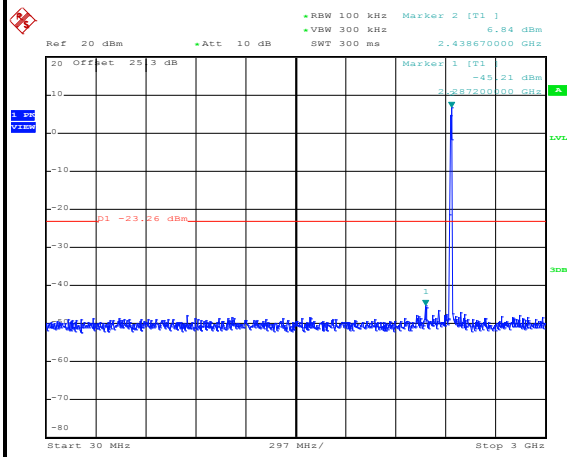
100kHz PSD reference Level



Date: 21.JUL.2017 23:06:20

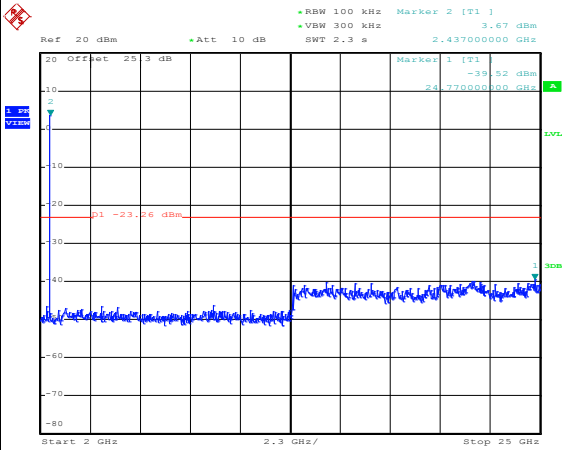
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:06:35

Spurious Emission 2GHz~25GHz

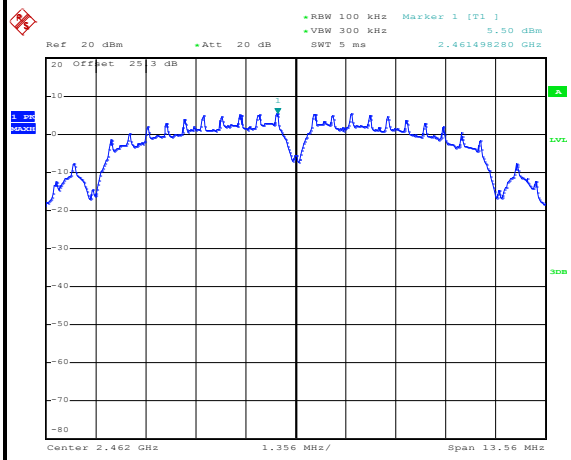


Date: 21.JUL.2017 23:06:43

Number of TX :	1	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Aking Chang

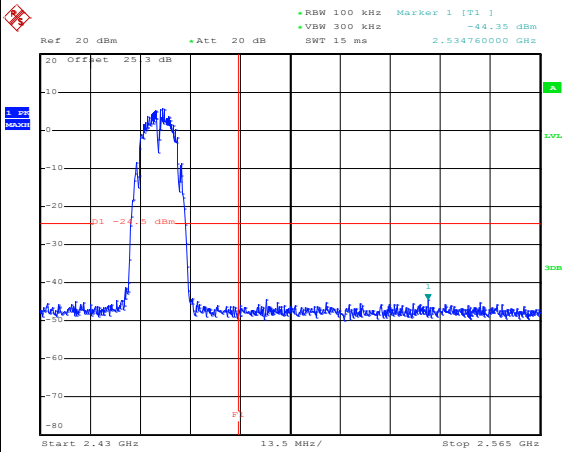
WLAN 802.11b Channel 11

100kHz PSD reference Level



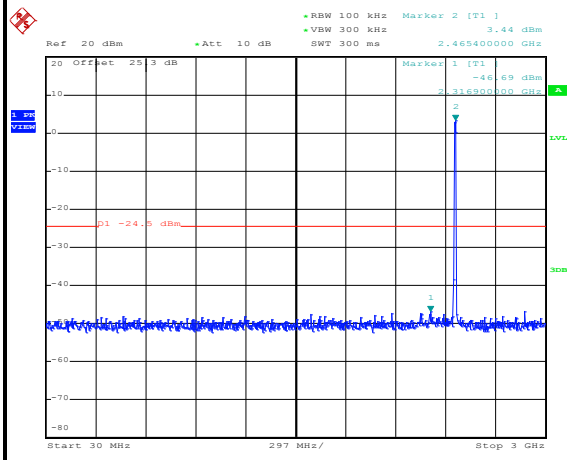
Date: 21.JUL.2017 23:08:39

High Channel Plot



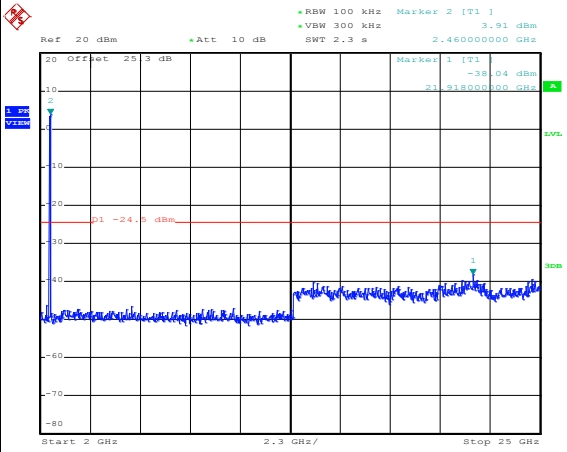
Date: 21.JUL.2017 23:09:11

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:09:23

Spurious Emission 2GHz~25GHz



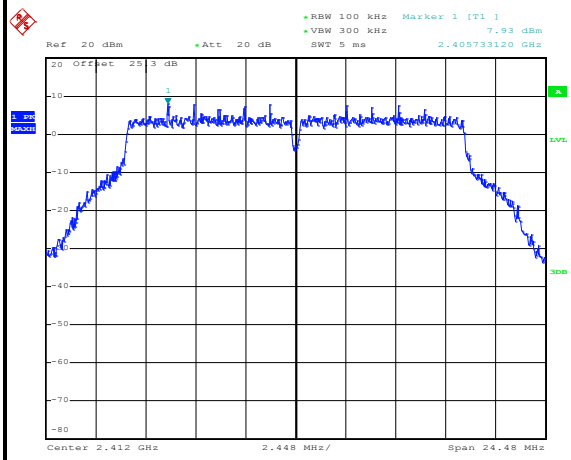
Date: 21.JUL.2017 23:09:31

Number of TX = 2, Ant. 1 (Measured)

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Aking Chang

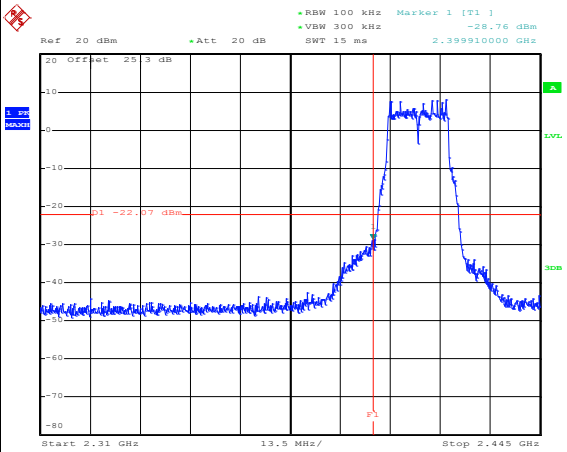
WLAN 802.11g Channel 01

100kHz PSD reference Level



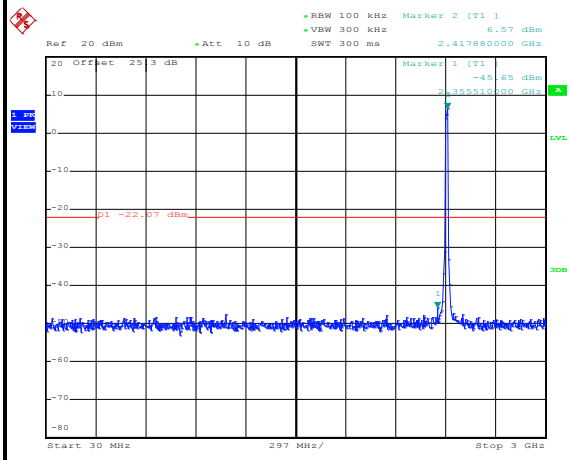
Date: 21.JUL.2017 23:12:18

Low Channel Plot



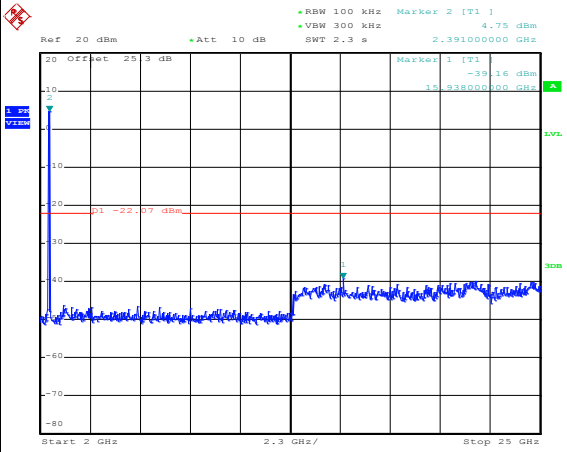
Date: 21.JUL.2017 23:12:31

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:12:43

Spurious Emission 2GHz~25GHz

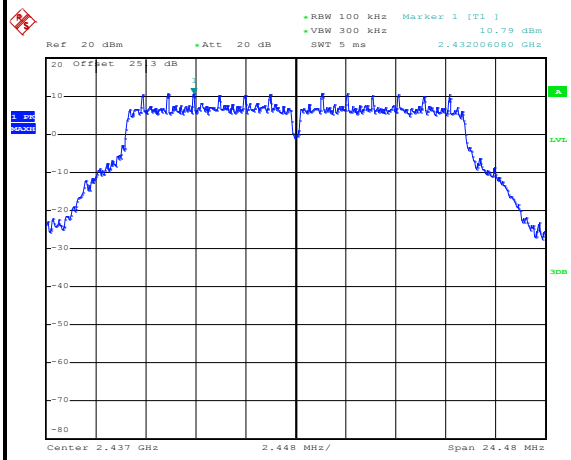


Date: 21.JUL.2017 23:12:52

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Aking Chang

WLAN 802.11g Channel 06

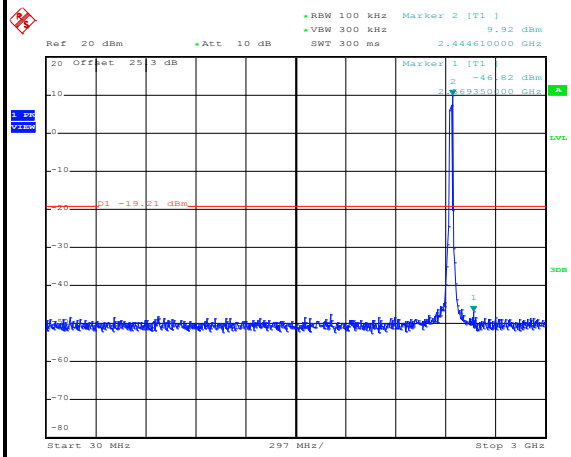
100kHz PSD reference Level



Date: 21.JUL.2017 23:18:43

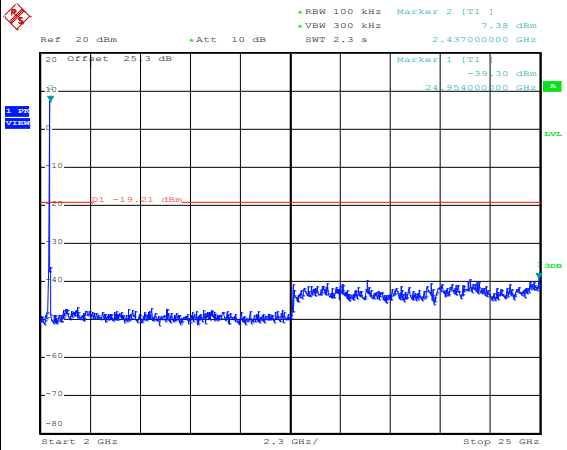
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:19:17

Spurious Emission 2GHz~25GHz

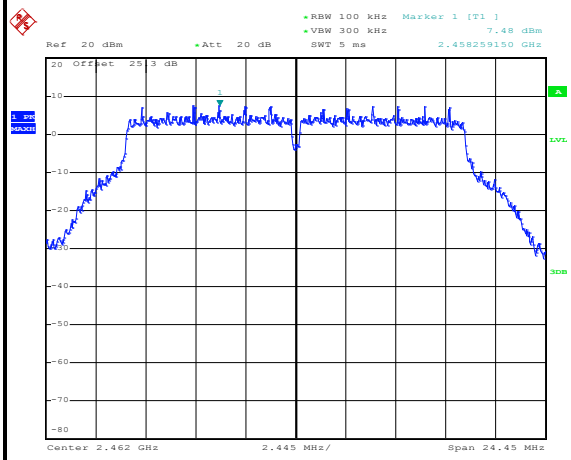


Date: 21.JUL.2017 23:19:26

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Aking Chang

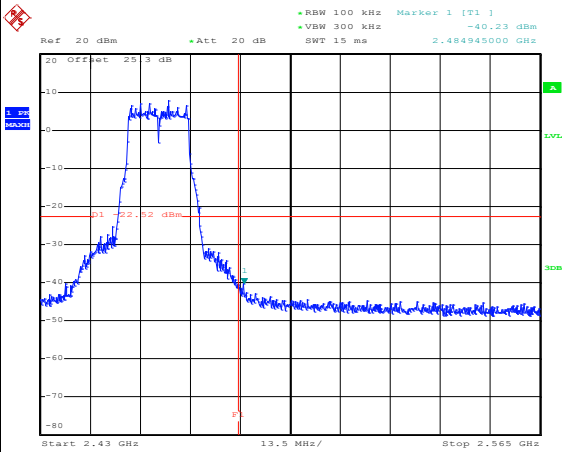
WLAN 802.11g Channel 11

100kHz PSD reference Level



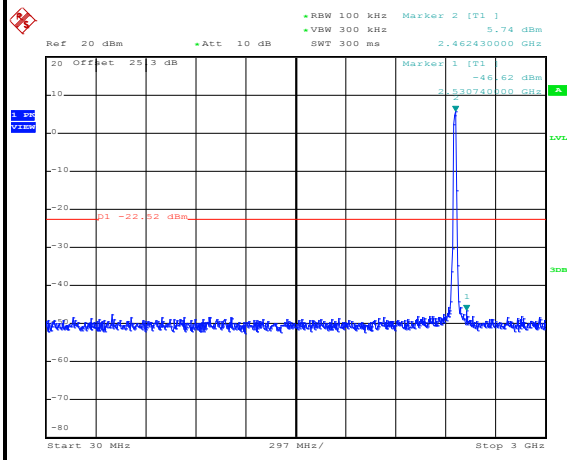
Date: 21.JUL.2017 23:26:18

High Channel Plot



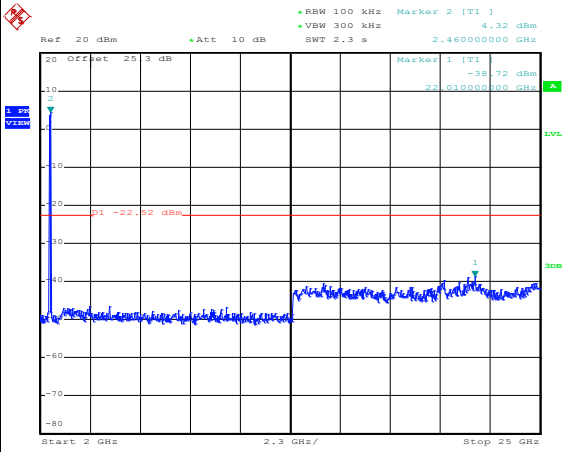
Date: 21.JUL.2017 23:26:42

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:26:53

Spurious Emission 2GHz~25GHz

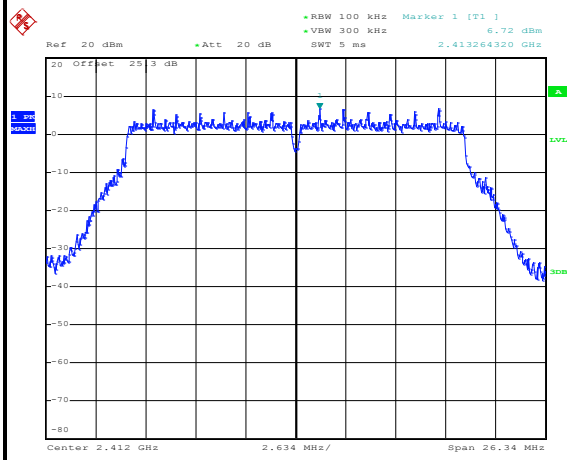


Date: 21.JUL.2017 23:27:02

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Aking Chang

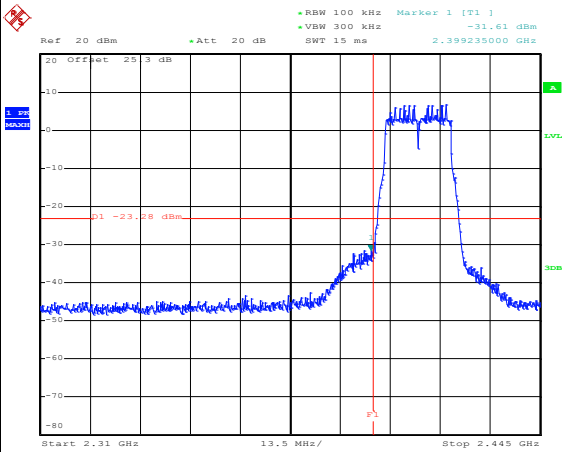
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



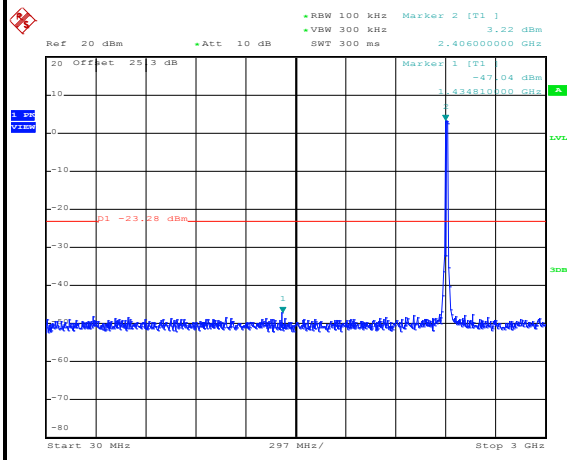
Date: 21.JUL.2017 23:33:57

Low Channel Plot



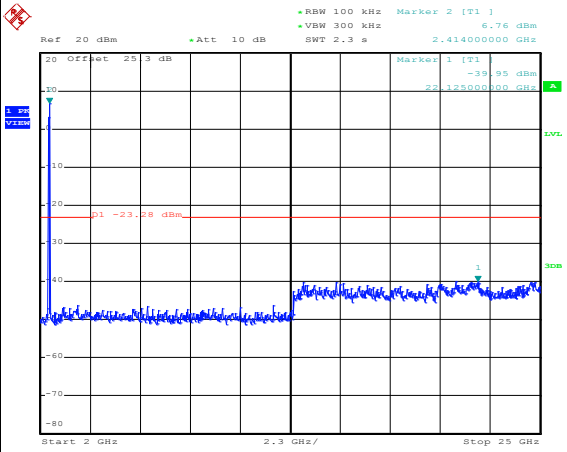
Date: 21.JUL.2017 23:34:18

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:34:34

Spurious Emission 2GHz~25GHz

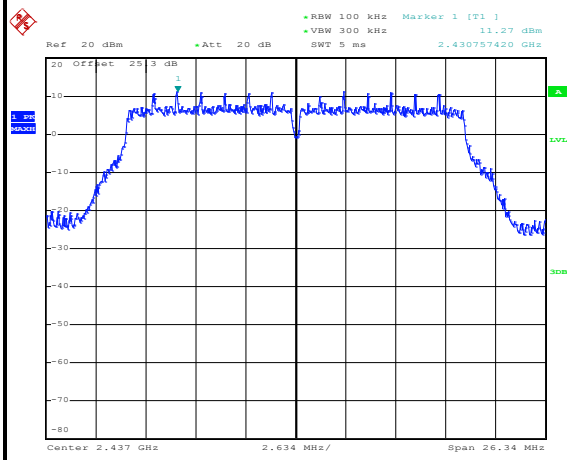


Date: 21.JUL.2017 23:34:42

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Aking Chang

WLAN 802.11n HT20 Channel 06

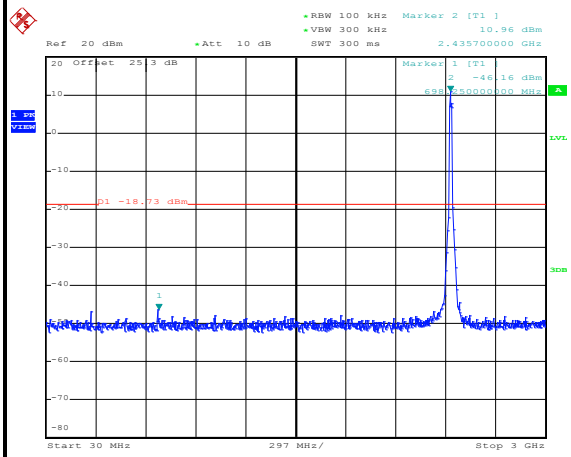
100kHz PSD reference Level



Date: 21.JUL.2017 23:39:08

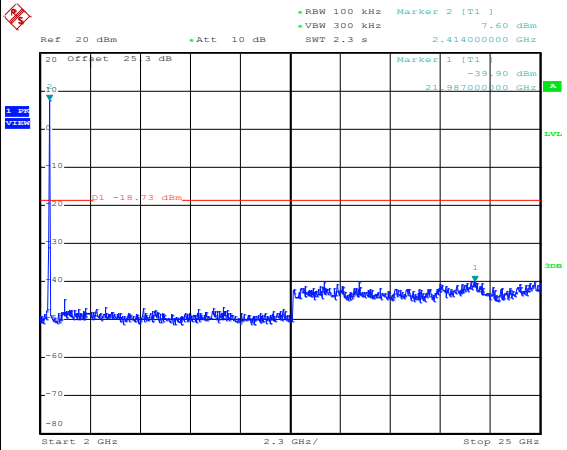
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:39:23

Spurious Emission 2GHz~25GHz

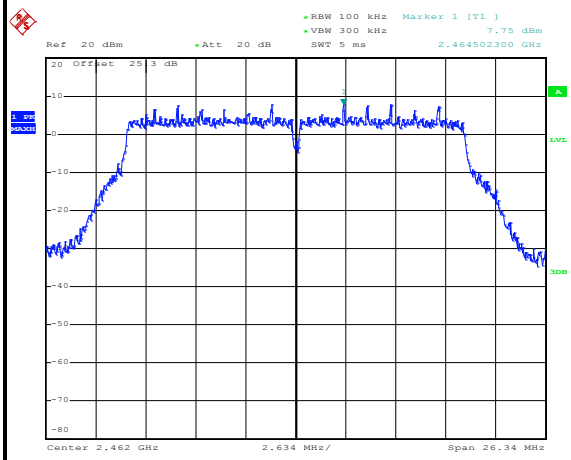


Date: 21.JUL.2017 23:39:31

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Aking Chang

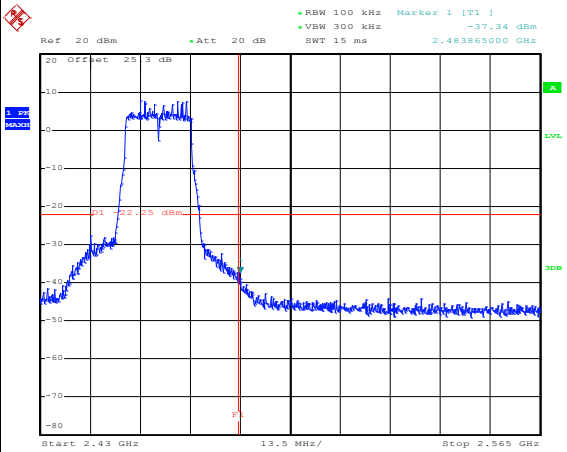
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



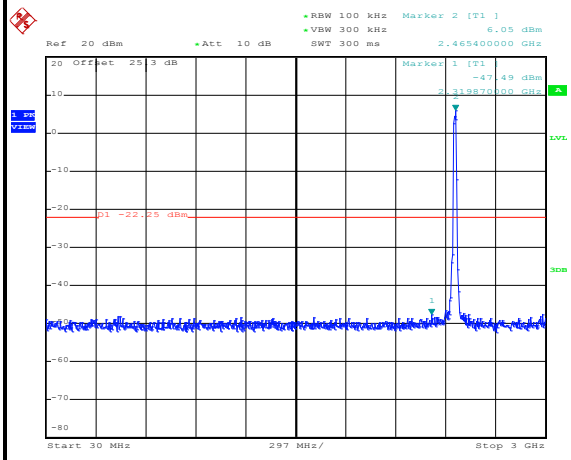
Date: 21.JUL.2017 23:45:24

High Channel Plot



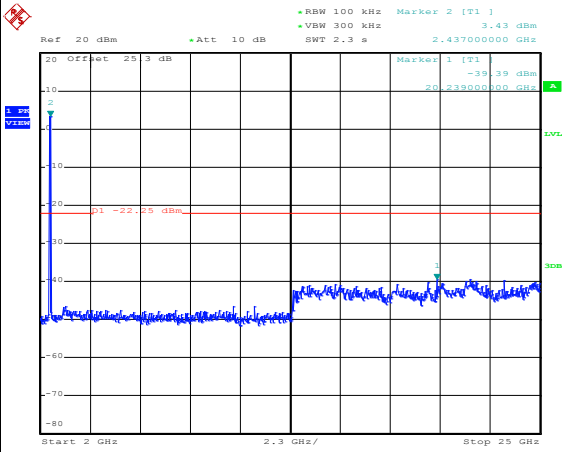
Date: 21.JUL.2017 23:46:12

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:46:25

Spurious Emission 2GHz~25GHz



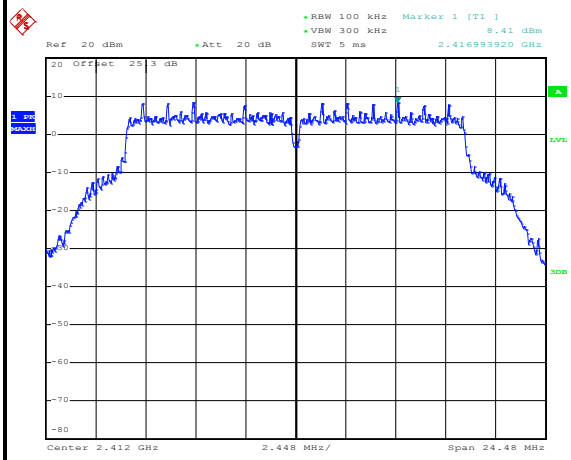
Date: 21.JUL.2017 23:46:33

Number of TX = 2, Ant. 2 (Measured)

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Aking Chang

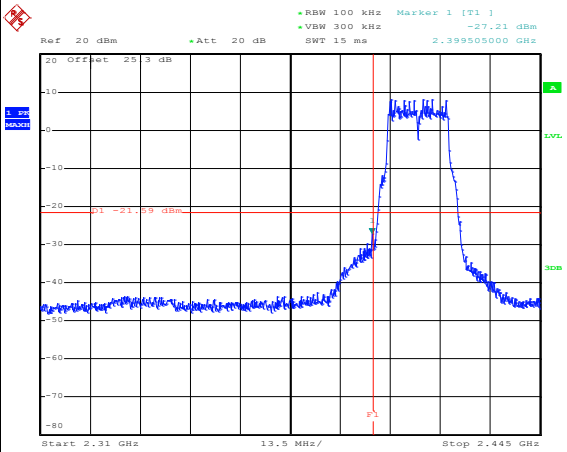
WLAN 802.11g Channel 01

100kHz PSD reference Level



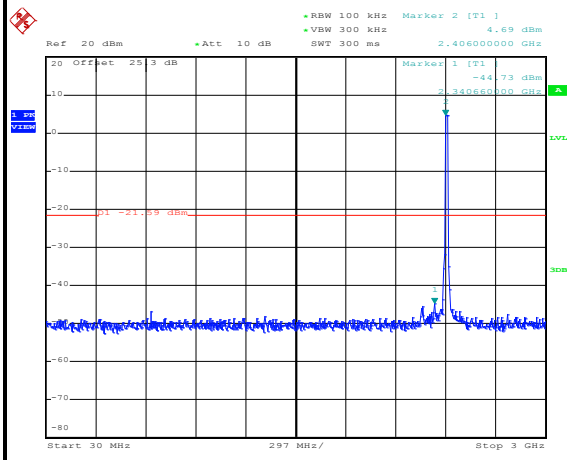
Date: 21.JUL.2017 23:14:17

Low Channel Plot



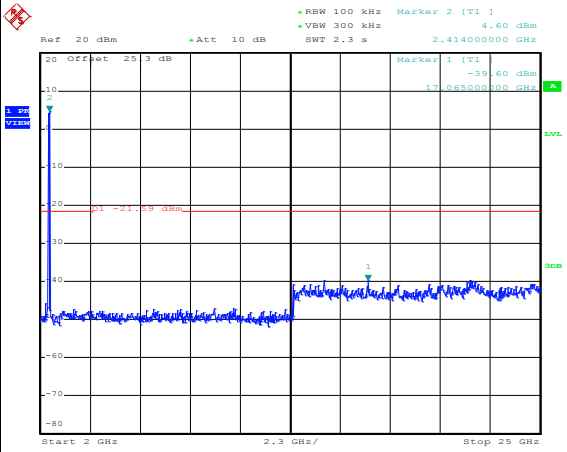
Date: 21.JUL.2017 23:14:42

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:14:55

Spurious Emission 2GHz~25GHz

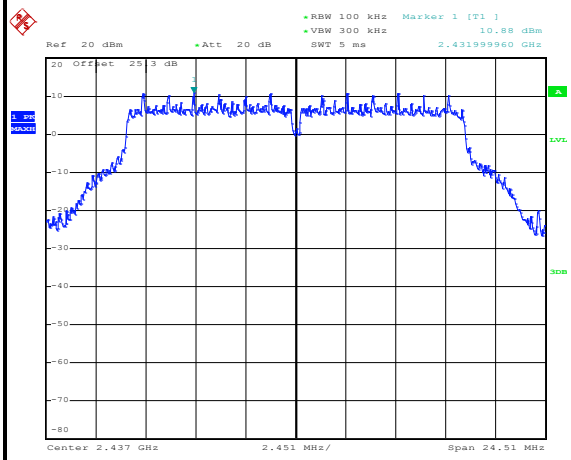


Date: 21.JUL.2017 23:15:03

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Aking Chang

WLAN 802.11g Channel 06

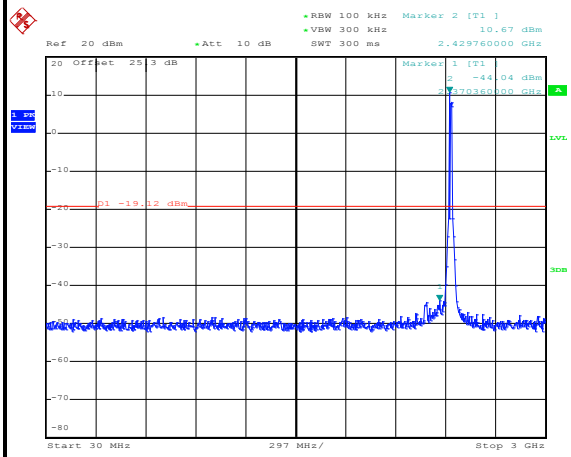
100kHz PSD reference Level



Date: 21.JUL.2017 23:22:00

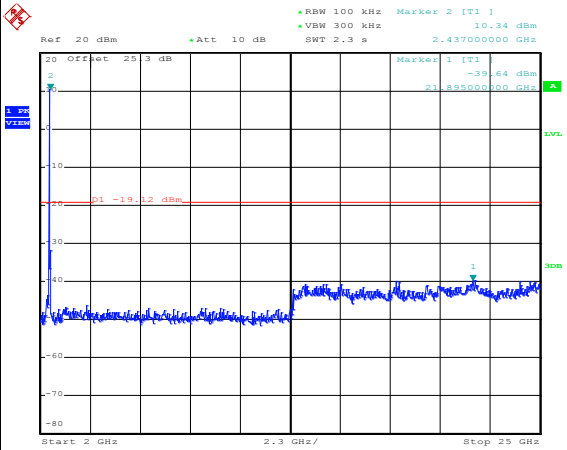
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:22:25

Spurious Emission 2GHz~25GHz

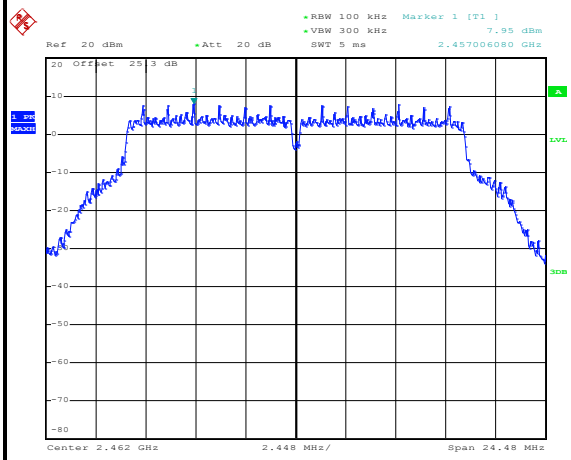


Date: 21.JUL.2017 23:22:34

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Aking Chang

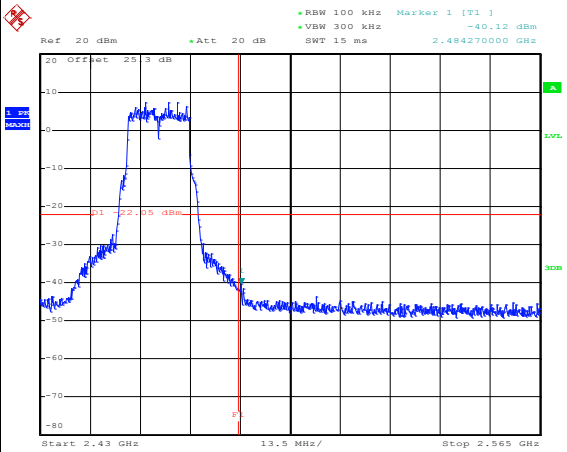
WLAN 802.11g Channel 11

100kHz PSD reference Level



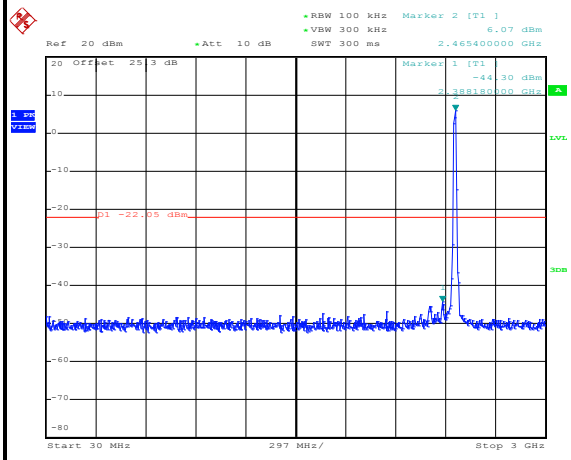
Date: 21.JUL.2017 23:30:43

High Channel Plot



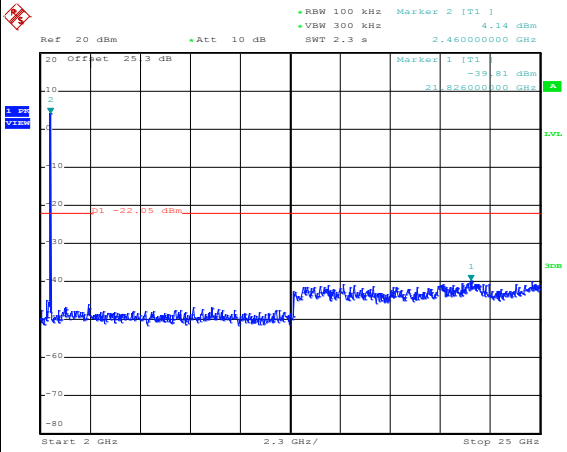
Date: 21.JUL.2017 23:31:07

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:31:23

Spurious Emission 2GHz~25GHz

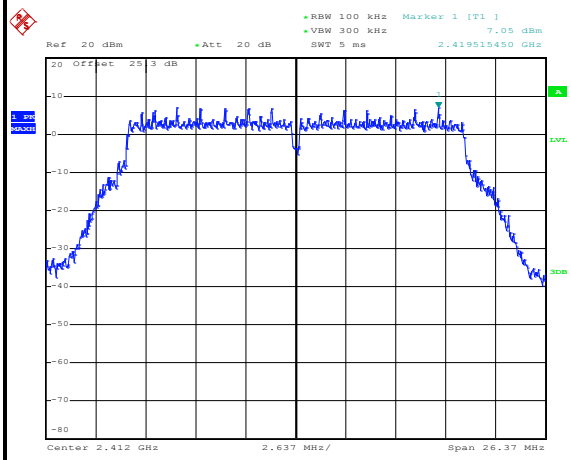


Date: 21.JUL.2017 23:31:31

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Aking Chang

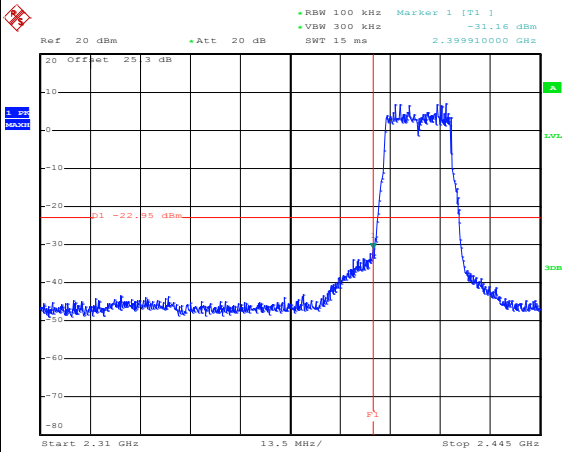
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



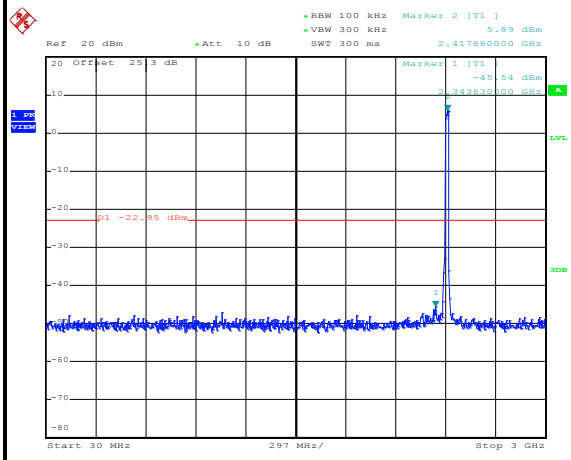
Date: 21.JUL.2017 23:36:13

Low Channel Plot



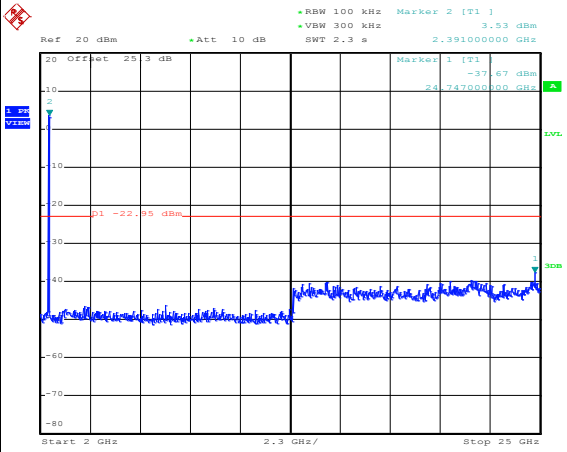
Date: 21.JUL.2017 23:36:27

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:36:39

Spurious Emission 2GHz~25GHz

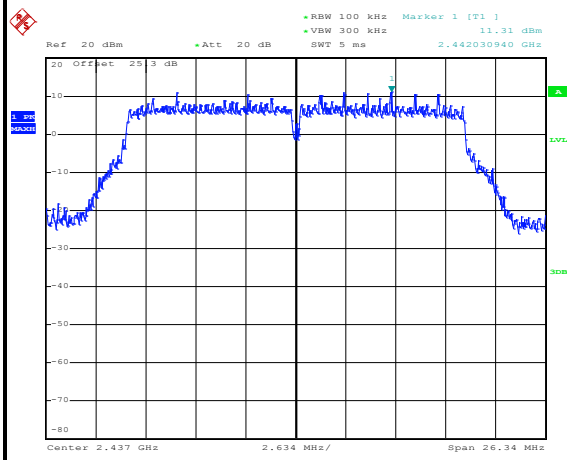


Date: 21.JUL.2017 23:36:47

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Aking Chang

WLAN 802.11n HT20 Channel 06

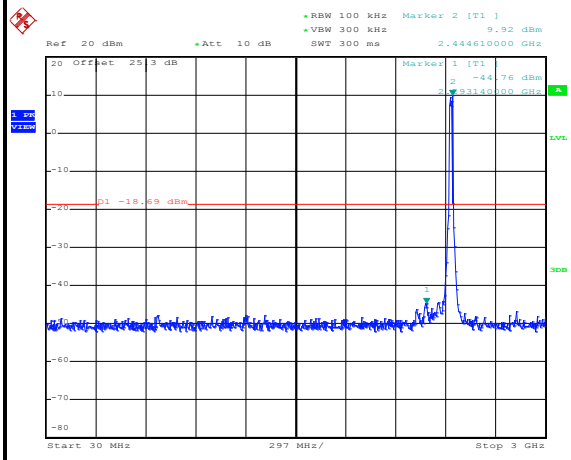
100kHz PSD reference Level



Date: 21.JUL.2017 23:41:37

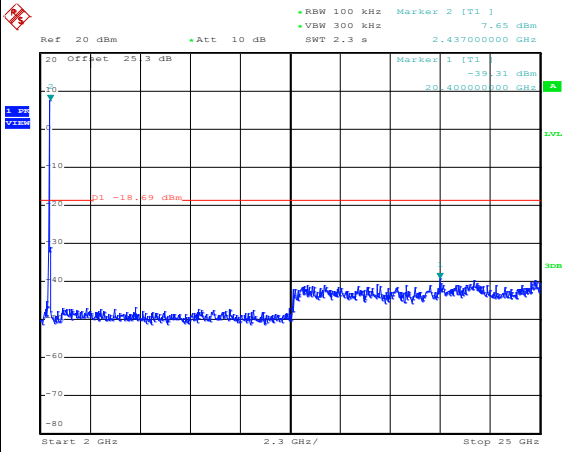
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:41:49

Spurious Emission 2GHz~25GHz

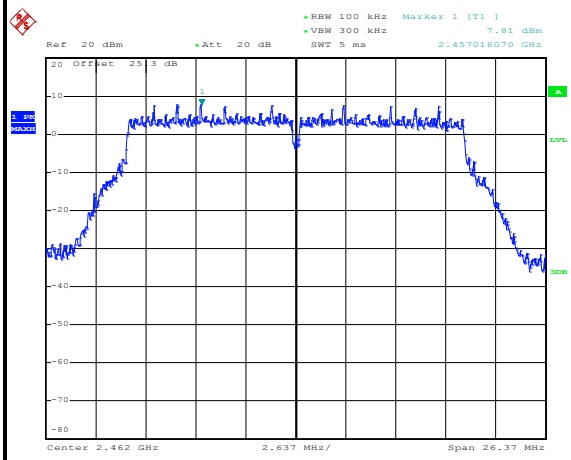


Date: 21.JUL.2017 23:41:58

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Aking Chang

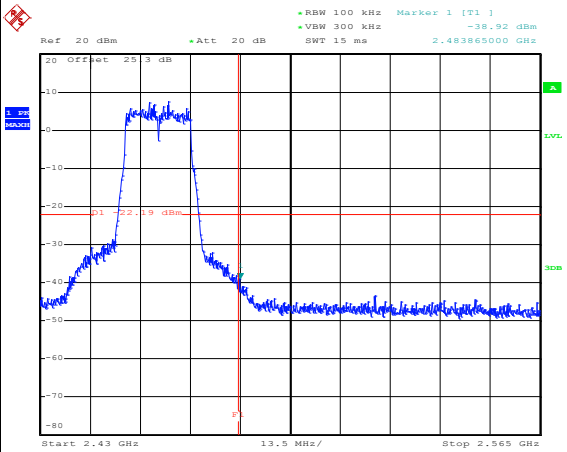
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



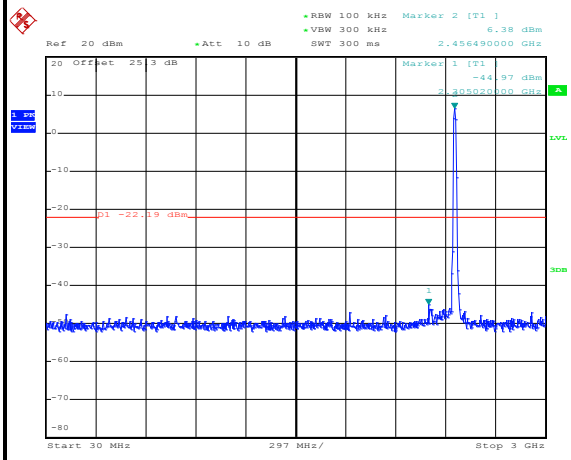
Date: 21.JUL.2017 23:48:30

High Channel Plot



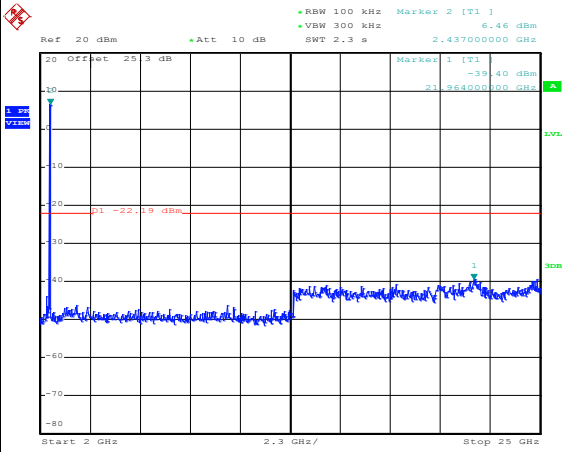
Date: 21.JUL.2017 23:49:05

Spurious Emission 30MHz~3GHz



Date: 21.JUL.2017 23:49:17

Spurious Emission 2GHz~25GHz



Date: 21.JUL.2017 23:49:26

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

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

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

3.5.2 Measuring Instruments

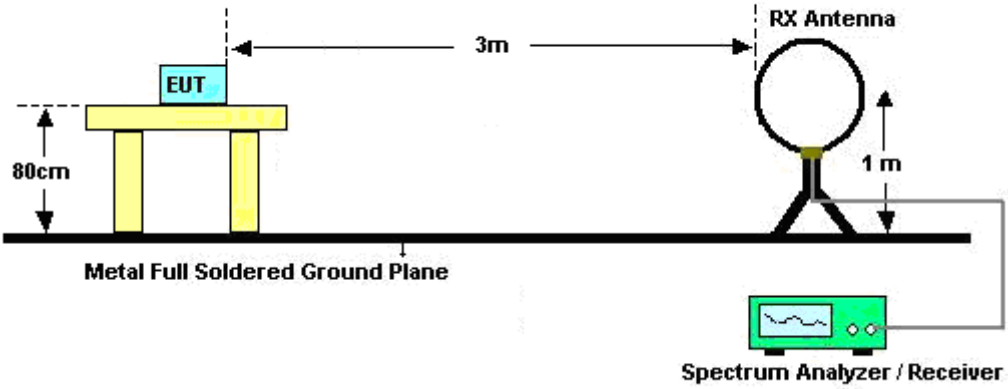
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

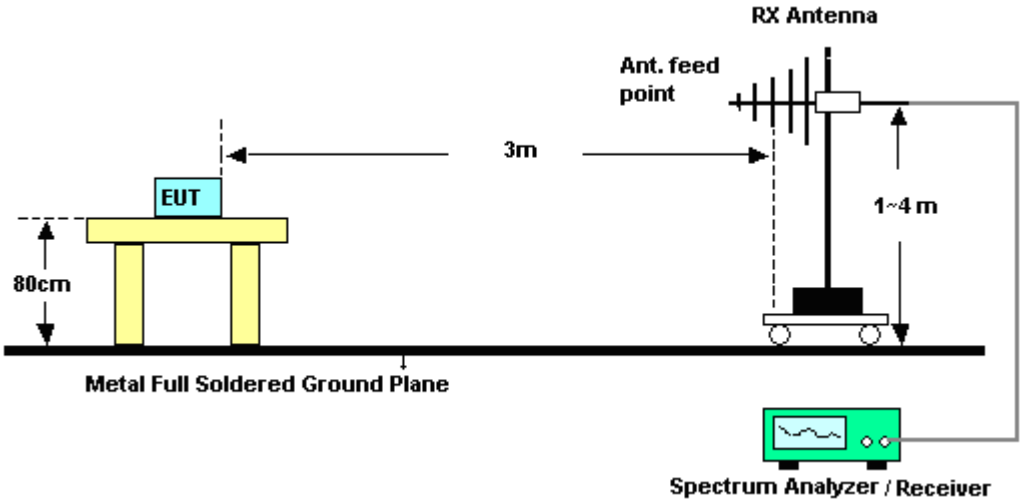
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

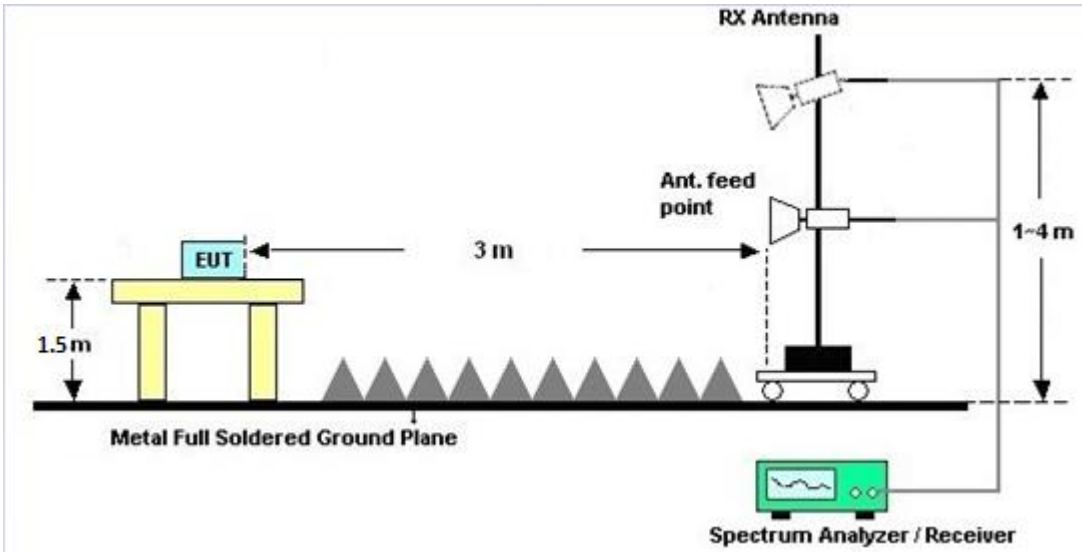
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

There is a comparison data of both open-field test site and 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 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

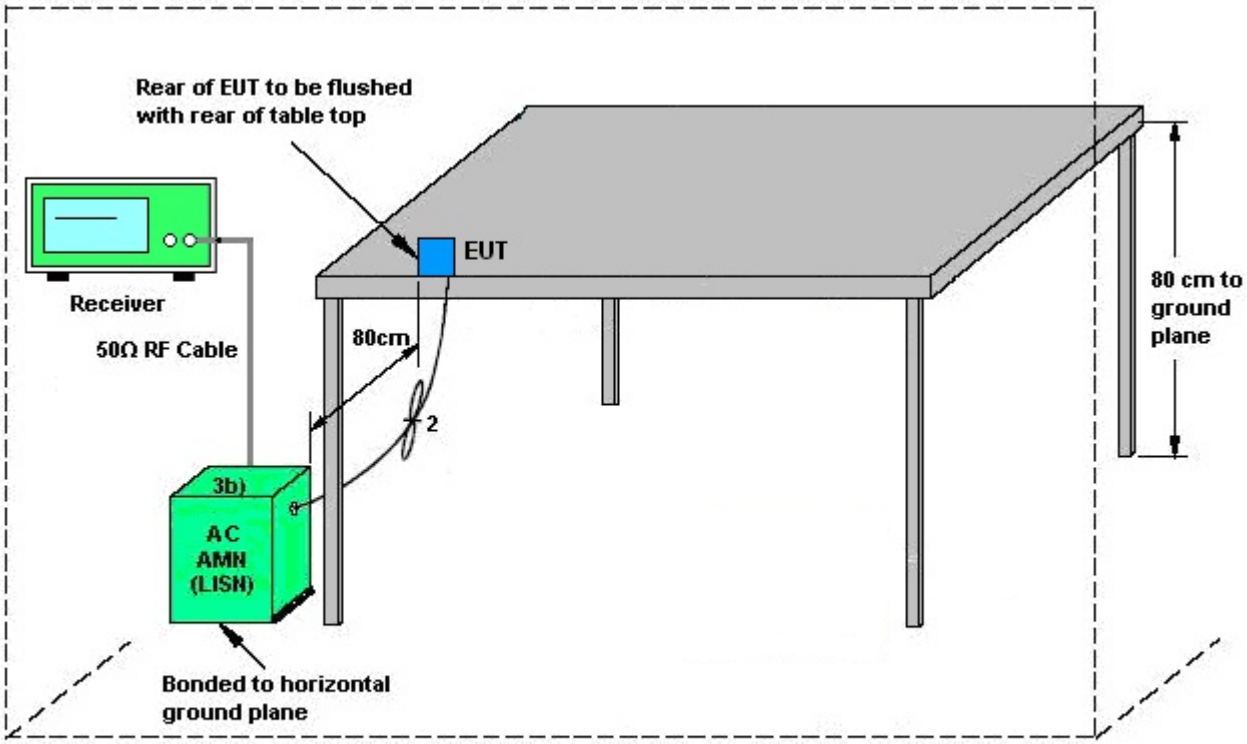
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



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

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

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

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	4.48	2.78	4.48	6.68	0.00	0.68

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

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. 29, 2016	Jul. 04, 2017 ~ Jul. 22, 2017	Sep. 28, 2017	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 29, 2016	Jul. 04, 2017 ~ Jul. 22, 2017	Sep. 28, 2017	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 25, 2016	Jul. 04, 2017 ~ Jul. 22, 2017	Nov. 24, 2017	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Sep. 07, 2017	N/A	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 29, 2016	Sep. 07, 2017	Nov. 28, 2017	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Dec. 29, 2016	Sep. 07, 2017	Dec. 28, 2017	Conduction (CO05-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHz	Oct. 12, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Oct. 11, 2017	Radiation (03CH11-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 12, 2017	Jul. 14, 2017 ~ Jul. 25, 2017	Jan. 11, 2018	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Oct. 20, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Oct. 19, 2018	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-06	35414&AT-N0602	30MHz~1GHz	Oct. 15, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Oct. 14, 2017	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 07, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Oct. 06, 2017	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 08, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Nov. 07, 2017	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 10, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Nov. 09, 2017	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 10, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Nov. 09, 2017	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1902247	1GHz~18GHz	Jun. 23, 2017	Jul. 14, 2017 ~ Jul. 25, 2017	Jun. 22, 2018	Radiation (03CH11-HY)
Preamplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 13, 2016	Jul. 14, 2017 ~ Jul. 25, 2017	Oct. 12, 2017	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jul. 14, 2017 ~ Jul. 25, 2017	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jul. 14, 2017 ~ Jul. 25, 2017	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))	2.70

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.20

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.50

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.20

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Aking chang	Temperature:	21~25	°C
Test Date:	2017/7/4~2017/7/22	Relative Humidity:	51~54	%

Report Number : FR6N0107-01C

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	11.75	11.85	8.54	9.08	0.50	Pass
11b	1Mbps	1	6	2437	11.75	11.85	9.02	8.08	0.50	Pass
11b	1Mbps	1	11	2462	11.75	11.85	8.52	9.04	0.50	Pass
11g	6Mbps	2	1	2412	18.30	18.10	16.32	16.32	0.50	Pass
11g	6Mbps	2	6	2437	18.40	18.25	16.32	16.34	0.50	Pass
11g	6Mbps	2	11	2462	18.30	18.05	16.30	16.32	0.50	Pass
HT20	MCS0	2	1	2412	19.00	19.00	17.56	17.58	0.50	Pass
HT20	MCS0	2	6	2437	19.20	19.10	17.56	17.56	0.50	Pass
HT20	MCS0	2	11	2462	19.05	19.00	17.56	17.58	0.50	Pass

Report Number : FR6N0107-01C

TEST RESULTS DATA
Average Output Power

2.4GHz Band																			
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Duty Factor (dB)		Average 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	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	0.00	0.00	22.25	22.19		30.00	30.00	4.48	2.78	26.73	24.97	36.00	36.00	Pass
11b	1Mbps	1	6	2437	0.00	0.00	22.19	22.13		30.00	30.00	4.48	2.78	26.67	24.91	36.00	36.00	Pass
11b	1Mbps	1	11	2462	0.00	0.00	22.15	22.30		30.00	30.00	4.48	2.78	26.63	25.08	36.00	36.00	Pass
11g	6Mbps	1	1	2412	0.05	0.06	19.23	19.20		30.00	30.00	4.48	2.78	23.71	21.98	36.00	36.00	Pass
11g	6Mbps	1	6	2437	0.05	0.06	22.06	22.10		30.00	30.00	4.48	2.78	26.54	24.88	36.00	36.00	Pass
11g	6Mbps	1	11	2462	0.05	0.06	19.00	18.86		30.00	30.00	4.48	2.78	23.48	21.64	36.00	36.00	Pass
HT20	MCS0	1	1	2412	0.07	0.04	17.78	17.74		30.00	30.00	4.48	2.78	22.26	20.52	36.00	36.00	Pass
HT20	MCS0	1	6	2437	0.07	0.04	22.06	22.04		30.00	30.00	4.48	2.78	26.54	24.82	36.00	36.00	Pass
HT20	MCS0	1	11	2462	0.07	0.04	18.88	18.93		30.00	30.00	4.48	2.78	23.36	21.71	36.00	36.00	Pass
VHT20	MCS0	1	1	2412	0.04	0.07	17.75	17.72		30.00	30.00	4.48	2.78	22.23	20.50	36.00	36.00	Pass
VHT20	MCS0	1	6	2437	0.04	0.07	21.99	22.02		30.00	30.00	4.48	2.78	26.47	24.80	36.00	36.00	Pass
VHT20	MCS0	1	11	2462	0.04	0.07	18.84	18.89		30.00	30.00	4.48	2.78	23.32	21.67	36.00	36.00	Pass
11g	6Mbps	2	1	2412	0.04	0.06	19.14	19.50	22.34	30.00		4.48		26.82		36.00		Pass
11g	6Mbps	2	6	2437	0.04	0.06	21.85	22.41	25.15	30.00		4.48		29.63		36.00		Pass
11g	6Mbps	2	11	2462	0.04	0.06	19.01	19.16	22.10	30.00		4.48		26.58		36.00		Pass
HT20	MCS0	2	1	2412	0.07	0.04	18.16	18.20	21.19	30.00		4.48		25.67		36.00		Pass
HT20	MCS0	2	6	2437	0.07	0.04	22.08	22.61	25.36	30.00		4.48		29.84		36.00		Pass
HT20	MCS0	2	11	2462	0.07	0.04	18.97	19.00	22.00	30.00		4.48		26.48		36.00		Pass
VHT20	MCS0	2	1	2412	0.04	0.07	18.03	18.22	21.14	30.00		4.48		25.62		36.00		Pass
VHT20	MCS0	2	6	2437	0.04	0.07	22.04	22.62	25.35	30.00		4.48		29.83		36.00		Pass
VHT20	MCS0	2	11	2462	0.04	0.07	18.89	18.97	21.94	30.00		4.48		26.42		36.00		Pass

Report Number : FR6N0107-01C

TEST RESULTS DATA
Average Power Spectral Density

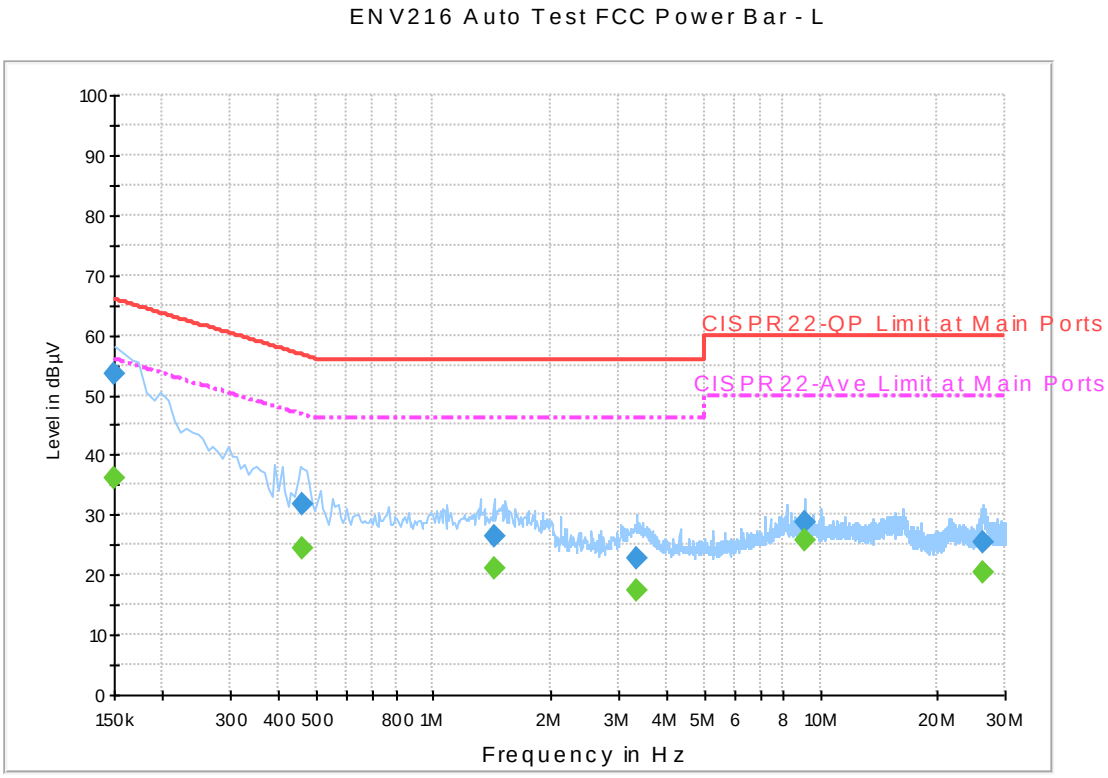
2.4GHz Band													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average PSD (dBm/3kHz)			DG (dBi)		Average PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-5.99	-9.68	-	4.48	2.78	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-7.13	-11.80		4.48	2.78	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-9.41	-13.03		4.48	2.78	8.00	8.00	Pass
11g	6Mbps	2	1	2412	-9.15	-9.13	-6.12	6.68		7.32		Pass
11g	6Mbps	2	6	2437	-6.88	-6.93	-3.87	6.68		7.32		Pass
11g	6Mbps	2	11	2462	-9.83	-9.26	-6.25	6.68		7.32		Pass
HT20	MCS0	2	1	2412	-11.31	-12.01	-8.30	6.68		7.32		Pass
HT20	MCS0	2	6	2437	-7.34	-7.66	-4.33	6.68		7.32		Pass
HT20	MCS0	2	11	2462	-11.15	-11.46	-8.14	6.68		7.32		Pass

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Kai-Chun Chu	**Temperature :**	26~27℃
		Relative Humidity :	54~55%

EUT Information

Report NO :	6N0107-01
Test Mode :	Mode 2
Test Voltage :	120Vac/60Hz
Phase :	Line



Final Result 1

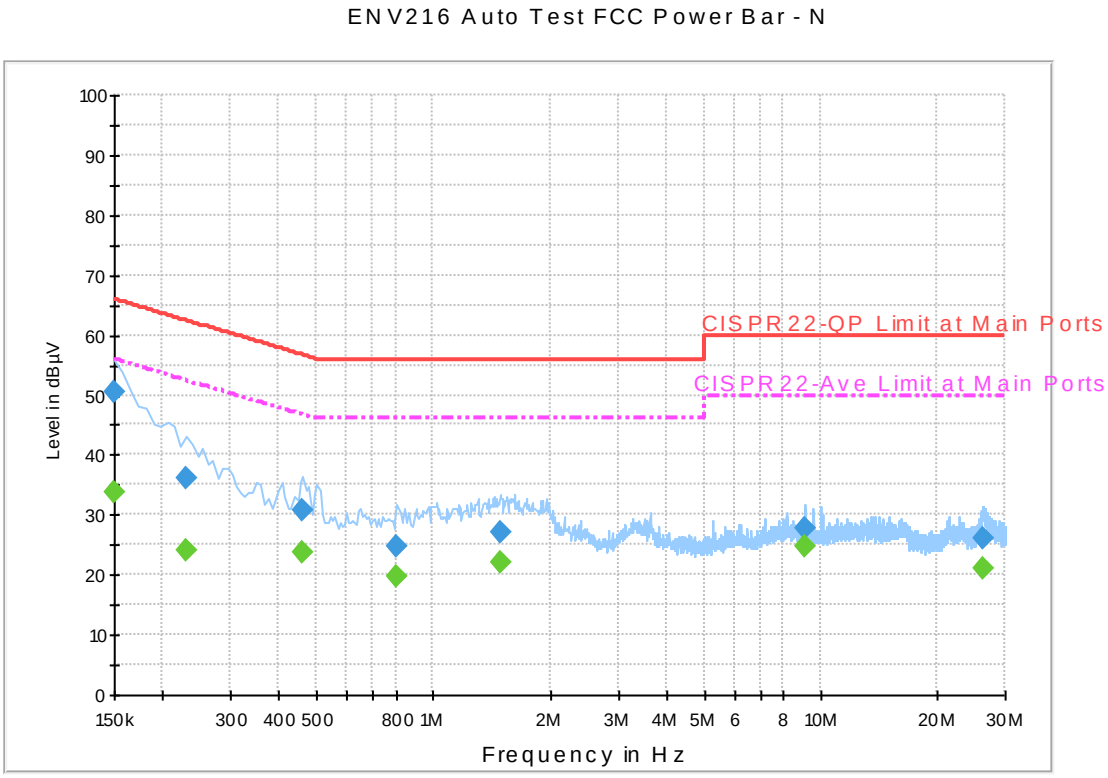
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	53.5	Off	L1	19.6	12.5	66.0
0.462000	31.8	Off	L1	19.6	24.9	56.7
1.438000	26.3	Off	L1	19.6	29.7	56.0
3.350000	22.6	Off	L1	19.6	33.4	56.0
9.110000	28.6	Off	L1	20.0	31.4	60.0
26.254000	25.4	Off	L1	20.9	34.6	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	36.2	Off	L1	19.6	19.8	56.0
0.462000	24.5	Off	L1	19.6	22.2	46.7
1.438000	21.1	Off	L1	19.6	24.9	46.0
3.350000	17.4	Off	L1	19.6	28.6	46.0
9.110000	25.7	Off	L1	20.0	24.3	50.0
26.254000	20.5	Off	L1	20.9	29.5	50.0

EUT Information

Report NO :	6N0107-01
Test Mode :	Mode 2
Test Voltage :	120Vac/60Hz
Phase :	Neutral



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	50.6	Off	N	19.5	15.4	66.0
0.230000	36.3	Off	N	19.5	26.1	62.4
0.462000	30.9	Off	N	19.5	25.8	56.7
0.806000	24.8	Off	N	19.6	31.2	56.0
1.486000	27.2	Off	N	19.6	28.8	56.0
9.110000	27.7	Off	N	20.0	32.3	60.0
26.302000	26.0	Off	N	21.0	34.0	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	33.9	Off	N	19.5	22.1	56.0
0.230000	24.2	Off	N	19.5	28.2	52.4
0.462000	23.6	Off	N	19.5	23.1	46.7
0.806000	19.9	Off	N	19.6	26.1	46.0
1.486000	22.1	Off	N	19.6	23.9	46.0
9.110000	24.8	Off	N	20.0	25.2	50.0
26.302000	21.0	Off	N	21.0	29.0	50.0

Appendix C. Radiated Spurious Emission

Test Engineer :	J.C. Liang, Jacky Huang, Ken Wu	Temperature :	20~24℃
		Relative Humidity :	50~54%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		2385.705	58.23	-15.77	74	48.67	26.87	6.36	33.6	119	199	P	H
		2389.905	48.62	-5.38	54	39.05	26.87	6.36	33.59	119	199	A	H
	*	2412	114.09	-	-	104.46	26.92	6.37	33.59	119	199	P	H
	*	2412	110.94	-	-	101.31	26.92	6.37	33.59	119	199	A	H
		2389.695	55.15	-18.85	74	45.59	26.87	6.36	33.6	303	152	P	V
		2389.905	44.99	-9.01	54	35.42	26.87	6.36	33.59	303	152	A	V
	*	2412	110.14	-	-	100.51	26.92	6.37	33.59	303	152	P	V
	*	2412	106.9	-	-	97.27	26.92	6.37	33.59	303	152	A	V
802.11b CH 06 2437MHz		2381.54	57.05	-16.95	74	47.55	26.81	6.36	33.6	145	201	P	H
		2363.2	46.51	-7.49	54	37.13	26.76	6.29	33.6	145	201	A	H
	*	2437	114.12	-	-	104.37	27.03	6.38	33.59	145	201	P	H
	*	2437	111.21	-	-	101.46	27.03	6.38	33.59	145	201	A	H
		2498.6	56.56	-17.44	74	46.61	27.2	6.39	33.57	145	201	P	H
		2483.97	45.88	-8.12	54	36.01	27.14	6.38	33.58	145	201	A	H
		2371.04	53.91	-20.09	74	44.48	26.81	6.29	33.6	299	149	P	V
		2381.96	43.66	-10.34	54	34.16	26.81	6.36	33.6	299	149	A	V
	*	2437	109.11	-	-	99.36	27.03	6.38	33.59	299	149	P	V
	*	2437	105.71	-	-	95.96	27.03	6.38	33.59	299	149	A	V
		2499.72	53.71	-20.29	74	43.76	27.2	6.39	33.57	299	149	P	V
		2483.76	43.57	-10.43	54	33.7	27.14	6.38	33.58	299	149	A	V

802.11b CH 11 2462MHz	*	2462	114.39	-	-	104.57	27.09	6.38	33.58	110	201	P	H
	*	2462	111.18	-	-	101.36	27.09	6.38	33.58	110	201	A	H
		2484.2	59.45	-14.55	74	49.57	27.14	6.39	33.58	110	201	P	H
		2483.52	47.77	-6.23	54	37.9	27.14	6.38	33.58	110	201	A	H
	*	2462	110.67	-	-	100.85	27.09	6.38	33.58	362	146	P	V
	*	2462	107.51	-	-	97.69	27.09	6.38	33.58	362	146	A	V
		2485	56.25	-17.75	74	46.37	27.14	6.39	33.58	362	146	P	V
		2483.52	45.78	-8.22	54	35.91	27.14	6.38	33.58	362	146	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	49.94	-24.06	74	71.28	31.62	9.59	62.98	100	0	P	H
		4824	54.3	-19.7	74	76.07	31.62	9.59	62.98	100	239	P	V
		4824	51.74	-2.26	54	73.51	31.62	9.59	62.98	100	239	A	V
802.11b CH 06 2437MHz		2234	54.71	-19.29	74	46.09	26.37	5.94	33.63	145	201	P	H
		2234	47.42	-6.58	54	38.8	26.37	5.94	33.63	145	201	A	H
		4874	49.86	-24.14	74	71.03	31.71	9.56	62.87	100	0	P	H
		7311	44.4	-29.6	74	57.89	37.43	11.31	62.69	100	0	P	H
		2230	54.14	-19.86	74	45.57	26.32	5.94	33.63	299	149	P	V
		2230	44.49	-9.51	54	35.92	26.32	5.94	33.63	299	149	A	V
		4874	53.57	-20.43	74	75.17	31.71	9.56	62.87	100	0	P	V
		4874	51.92	-2.08	54	73.52	31.71	9.56	62.87	100	0	A	V
		7311	42.99	-31.01	74	56.94	37.43	11.31	62.69	100	0	P	V
802.11b CH 11 2462MHz		2260	56.52	-17.48	74	47.76	26.43	6.01	33.62	110	201	P	H
		2260	47.72	-6.28	54	38.96	26.43	6.01	33.62	110	201	A	H
		4924	48.43	-25.57	74	69.4	31.79	9.55	62.75	100	0	P	H
		7386	43.64	-30.36	74	56.88	37.82	11.3	62.74	100	0	P	H
		4924	53.7	-20.3	74	75.11	31.79	9.55	62.75	238	243	P	V
		4924	52.15	-1.85	54	73.56	31.79	9.55	62.75	238	243	A	V
		7386	43.04	-30.96	74	56.66	37.82	11.3	62.74	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		30.27	21.94	-18.06	40	29.23	24.36	0.82	32.5	-	-	P	H
		122.07	24.9	-18.6	43.5	38.3	17.51	1.51	32.46	-	-	P	H
		151.77	25.53	-17.97	43.5	39.38	16.89	1.61	32.43	-	-	P	H
		425.3	25.3	-20.7	46	32.12	22.84	2.63	32.34	-	-	P	H
		741.7	31.01	-14.99	46	31.78	28.05	3.4	32.35	-	-	P	H
		935.6	34.44	-11.56	46	31.57	30.21	3.82	31.33	100	0	P	H
		35.4	27.73	-12.27	40	38.1	21.3	0.82	32.49			P	V
		40.8	28.38	-11.62	40	41.21	18.83	0.82	32.49	100	0	P	V
		62.13	24.75	-15.25	40	44.44	11.76	1.02	32.49	-	-	P	V
		556.2	28.16	-17.84	46	31.61	25.9	2.98	32.42	-	-	P	V
		739.6	30.6	-15.4	46	31.39	28.03	3.4	32.35	-	-	P	V
		958.7	33.73	-12.27	46	29.63	31.14	3.9	31.12	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2379.405	56.12	-17.88	74	46.69	26.81	6.29	33.6	155	202	P	H
		2335.935	46.68	-7.32	54	37.44	26.7	6.22	33.61	155	202	A	H
	*	2412	112.77	-	-	103.14	26.92	6.37	33.59	155	202	P	H
	*	2412	109.66	-	-	100.03	26.92	6.37	33.59	155	202	A	H
		2371.74	56.26	-17.74	74	46.83	26.81	6.29	33.6	130	179	P	V
		2336.355	47.08	-6.92	54	37.84	26.7	6.22	33.61	130	179	A	V
	*	2412	113.11	-	-	103.48	26.92	6.37	33.59	130	179	P	V
	*	2412	109.54	-	-	99.91	26.92	6.37	33.59	130	179	A	V
802.11b CH 06 2437MHz		2364.32	55.31	-18.69	74	45.93	26.76	6.29	33.6	177	193	P	H
		2363.9	47.15	-6.85	54	37.77	26.76	6.29	33.6	177	193	A	H
	*	2437	113.05	-	-	103.3	27.03	6.38	33.59	177	193	P	H
	*	2437	110.04	-	-	100.29	27.03	6.38	33.59	177	193	A	H
		2483.83	55.13	-18.87	74	45.26	27.14	6.38	33.58	177	193	P	H
		2483.69	45.02	-8.98	54	35.15	27.14	6.38	33.58	177	193	A	H
		2362.36	56.46	-17.54	74	47.08	26.76	6.29	33.6	131	152	P	V
		2361.38	47.56	-6.44	54	38.18	26.76	6.29	33.6	131	152	A	V
	*	2437	111.6	-	-	101.85	27.03	6.38	33.59	131	152	P	V
	*	2437	107.98	-	-	98.23	27.03	6.38	33.59	131	152	A	V
		2496.15	54.7	-19.3	74	44.75	27.2	6.39	33.57	131	152	P	V
		2483.69	43.93	-10.07	54	34.06	27.14	6.38	33.58	131	152	A	V

802.11b CH 11 2462MHz	*	2462	113.1	-	-	103.28	27.09	6.38	33.58	144	201	P	H
	*	2462	110.06	-	-	100.24	27.09	6.38	33.58	144	201	A	H
		2483.88	56.8	-17.2	74	46.93	27.14	6.38	33.58	144	201	P	H
		2483.52	46.95	-7.05	54	37.08	27.14	6.38	33.58	144	201	A	H
	*	2462	112.96	-	-	103.14	27.09	6.38	33.58	127	165	P	V
	*	2462	108.56	-	-	98.74	27.09	6.38	33.58	127	165	A	V
		2483.64	56.23	-17.77	74	46.36	27.14	6.38	33.58	127	165	P	V
		2483.52	46.98	-7.02	54	37.11	27.14	6.38	33.58	127	165	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. 2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		2262	55.35	-18.65	74	46.59	26.43	6.01	33.62	155	202	P	H
		2262	47.78	-6.22	54	39.02	26.43	6.01	33.62	155	202	A	H
		2488	58.3	-15.7	74	48.36	27.2	6.39	33.58	155	202	P	H
		2488	50.8	-3.2	54	40.86	27.2	6.39	33.58	155	202	A	H
		4824	45.12	-28.88	74	66.46	31.62	9.59	62.98	100	0	P	H
		2264	56.79	-17.21	74	48.03	26.43	6.01	33.62	130	179	P	V
		2264	49.79	-4.21	54	41.03	26.43	6.01	33.62	130	179	A	V
		2486	58.85	-15.15	74	48.97	27.14	6.39	33.58	130	179	P	V
		2486	50.8	-3.2	54	40.92	27.14	6.39	33.58	130	179	A	V
		4824	47.01	-26.99	74	68.78	31.62	9.59	62.98	100	0	P	V
802.11b CH 06 2437MHz		2232	53.61	-20.39	74	45.04	26.32	5.94	33.63	177	193	P	H
		2232	45.71	-8.29	54	37.14	26.32	5.94	33.63	177	193	A	H
		2290	55.99	-18.01	74	47.04	26.54	6.08	33.61	177	193	P	H
		2290	48.26	-5.74	54	39.31	26.54	6.08	33.61	177	193	A	H
		4874	44.24	-29.76	74	65.41	31.71	9.56	62.87	100	0	P	H
		7311	44.41	-29.59	74	57.9	37.43	11.31	62.69	100	0	P	H
		2236	53.71	-20.29	74	45.09	26.37	5.94	33.63	131	152	P	V
		2236	46.07	-7.93	54	37.45	26.37	5.94	33.63	131	152	A	V
		2286	57.17	-16.83	74	48.23	26.54	6.08	33.62	131	152	P	V
		2286	50.55	-3.45	54	41.61	26.54	6.08	33.62	131	152	A	V
		4874	44.96	-29.04	74	66.56	31.71	9.56	62.87	100	0	P	V
		7311	43.52	-30.48	74	57.47	37.43	11.31	62.69	100	0	P	V

802.11b CH 11 2462MHz		2258	54.63	-19.37	74	45.87	26.43	6.01	33.62	144	201	P	H
		2258	47.56	-6.44	54	38.8	26.43	6.01	33.62	144	201	A	H
		2314	57.46	-16.54	74	48.4	26.59	6.15	33.61	144	201	P	H
		2314	50.83	-3.17	54	41.77	26.59	6.15	33.61	144	201	A	H
		2384	57.95	-16.05	74	48.45	26.81	6.36	33.6	144	201	P	H
		2384	50.01	-3.99	54	40.51	26.81	6.36	33.6	144	201	A	H
		4924	44.6	-29.4	74	65.57	31.79	9.55	62.75	100	0	P	H
		7386	43.76	-30.24	74	57	37.82	11.3	62.74	100	0	P	H
		2256	56.39	-17.61	74	47.63	26.43	6.01	33.62	127	165	P	V
		2256	49.1	-4.9	54	40.34	26.43	6.01	33.62	127	165	A	V
		2312	59.17	-14.83	74	50.11	26.59	6.15	33.61	127	165	P	V
		2312	52.23	-1.77	54	43.17	26.59	6.15	33.61	127	165	A	V
		2388	58.05	-15.95	74	48.49	26.87	6.36	33.6	127	165	P	V
		2388	49.84	-4.16	54	40.28	26.87	6.36	33.6	127	165	A	V
		4924	45.31	-28.69	74	66.72	31.79	9.55	62.75	100	0	P	V
		7386	44.24	-29.76	74	57.86	37.82	11.3	62.74	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		30	21.71	-18.29	40	29	24.36	0.82	32.5	-	-	P	H
		123.42	25.56	-17.94	43.5	38.96	17.51	1.51	32.46	-	-	P	H
		151.5	24.59	-18.91	43.5	38.36	16.97	1.61	32.43	-	-	P	H
		458.2	24.2	-21.8	46	30.47	23.35	2.7	32.36	-	-	P	H
		633.9	29.05	-16.95	46	31.84	26.42	3.15	32.46	-	-	P	H
		957.3	33.25	-12.75	46	29.22	31.1	3.9	31.14	100	0	P	H
		33.78	27	-13	40	36.36	22.3	0.82	32.49	-	-	P	V
		38.91	27.35	-12.65	40	39.16	19.85	0.82	32.49	-	-	P	V
		59.97	27.38	-12.62	40	47.13	11.7	1.02	32.49	-	-	P	V
		518.4	25.26	-20.74	46	30.53	24.15	2.91	32.39	-	-	P	V
		843.9	31.45	-14.55	46	30.61	29.04	3.6	31.95	-	-	P	V
		919.5	33.6	-12.4	46	31.58	29.56	3.79	31.49	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		2389.38	64.89	-9.11	74	55.33	26.87	6.36	33.6	267	202	P	H
		2389.8	51.37	-2.63	54	41.8	26.87	6.36	33.59	267	202	A	H
	*	2412	115.83	-	-	106.2	26.92	6.37	33.59	267	202	P	H
	*	2412	108.02	-	-	98.39	26.92	6.37	33.59	267	202	A	H
		2389.485	63.3	-10.7	74	53.74	26.87	6.36	33.6	104	162	P	V
		2390	51.86	-2.14	54	42.29	26.87	6.36	33.59	104	162	A	V
	*	2412	114.51	-	-	104.88	26.92	6.37	33.59	104	162	P	V
	*	2412	106.9	-	-	97.27	26.92	6.37	33.59	104	162	A	V
802.11g CH 06 2437MHz		2387.84	59.06	-14.94	74	49.5	26.87	6.36	33.6	300	193	P	H
		2389.8	48.69	-5.31	54	39.12	26.87	6.36	33.59	300	193	A	H
	*	2437	117.78	-	-	108.03	27.03	6.38	33.59	300	193	P	H
	*	2437	110.62	-	-	100.87	27.03	6.38	33.59	300	193	A	H
		2489.01	58.63	-15.37	74	48.69	27.2	6.39	33.58	300	193	P	H
		2483.5	47.6	-6.4	54	37.73	27.14	6.38	33.58	300	193	A	H
		2381.68	58.03	-15.97	74	48.53	26.81	6.36	33.6	100	162	P	V
		2360.96	48.1	-5.9	54	38.72	26.76	6.29	33.6	100	162	A	V
	*	2437	116.43	-	-	106.68	27.03	6.38	33.59	100	162	P	V
	*	2437	109.11	-	-	99.36	27.03	6.38	33.59	100	162	A	V
		2489.36	59.2	-14.8	74	49.26	27.2	6.39	33.58	100	162	P	V
		2483.55	48.09	-5.91	54	38.22	27.14	6.38	33.58	100	162	A	V

802.11g CH 11 2462MHz	*	2462	115.52	-	-	105.7	27.09	6.38	33.58	257	201	P	H
	*	2462	108.47	-	-	98.65	27.09	6.38	33.58	257	201	A	H
		2483.56	63.88	-10.12	74	54.01	27.14	6.38	33.58	257	201	P	H
		2483.52	52.28	-1.72	54	42.41	27.14	6.38	33.58	257	201	A	H
	*	2462	113.76	-	-	103.94	27.09	6.38	33.58	127	159	P	V
	*	2462	106.64	-	-	96.82	27.09	6.38	33.58	127	159	A	V
		2483.68	61.85	-12.15	74	51.98	27.14	6.38	33.58	127	159	P	V
		2483.8	49.44	-4.56	54	39.57	27.14	6.38	33.58	127	159	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2266	56.09	-17.91	74	47.33	26.43	6.01	33.62	267	202	P	H
		2266	47.97	-6.03	54	39.21	26.43	6.01	33.62	267	202	A	H
		2484	56.61	-17.39	74	46.74	27.14	6.38	33.58	267	202	P	H
		2484	48.45	-5.55	54	38.58	27.14	6.38	33.58	267	202	A	H
		4824	54.54	-19.46	74	75.88	31.62	9.59	62.98	100	162	P	H
		4824	43.79	-10.21	54	65.13	31.62	9.59	62.98	100	162	A	H
		2268	54.93	-19.07	74	46.12	26.48	6.01	33.62	104	162	P	V
		2268	47.02	-6.98	54	38.21	26.48	6.01	33.62	104	162	A	V
		2486	57.47	-16.53	74	47.59	27.14	6.39	33.58	104	162	P	V
		2486	48.25	-5.75	54	38.37	27.14	6.39	33.58	104	162	A	V
		4824	56.8	-17.2	74	78.57	31.62	9.59	62.98	100	221	P	V
		4824	44.48	-9.52	54	66.25	31.62	9.59	62.98	100	221	A	V

802.11g CH 06 2437MHz		2228	52.43	-21.57	74	43.86	26.32	5.94	33.63	300	193	P	H
		2228	45.11	-8.89	54	36.54	26.32	5.94	33.63	300	193	A	H
		2286	58.23	-15.77	74	49.29	26.54	6.08	33.62	300	193	P	H
		2286	49.92	-4.08	54	40.98	26.54	6.08	33.62	300	193	A	H
		2844	54.46	-19.54	74	43.23	28.13	6.71	33.54	300	193	P	H
		2844	48.23	-5.77	54	37	28.13	6.71	33.54	300	193	A	H
		4874	64.54	-9.46	74	85.71	31.71	9.56	62.87	381	191	P	H
		4874	53.36	-0.64	54	74.53	31.71	9.56	62.87	381	191	A	H
		7311	60.47	-13.53	74	73.96	37.43	11.31	62.69	100	219	P	H
		7311	48.91	-5.09	54	62.4	37.43	11.31	62.69	100	219	A	H
		2230	52.45	-21.55	74	43.88	26.32	5.94	33.63	100	162	P	V
		2230	44.82	-9.18	54	36.25	26.32	5.94	33.63	100	162	A	V
		2292	58.45	-15.55	74	49.5	26.54	6.08	33.61	100	162	P	V
		2292	50.27	-3.73	54	41.32	26.54	6.08	33.61	100	162	A	V
		4874	59.14	-14.86	74	80.74	31.71	9.56	62.87	100	5	P	V
		4874	47.99	-6.01	54	69.59	31.71	9.56	62.87	100	5	A	V
		7311	53.31	-20.69	74	67.26	37.43	11.31	62.69	100	349	P	V
		7311	42.8	-11.2	54	56.75	37.43	11.31	62.69	100	349	A	V

802.11g CH 11 2462MHz		2262	52.48	-21.52	74	43.72	26.43	6.01	33.62	257	201	P	H
		2262	44.64	-9.36	54	35.88	26.43	6.01	33.62	257	201	A	H
		2316	59.01	-14.99	74	49.95	26.59	6.15	33.61	257	201	P	H
		2316	51.1	-2.9	54	42.04	26.59	6.15	33.61	257	201	A	H
		2872	55.38	-18.62	74	44.01	28.23	6.74	33.53	257	201	P	H
		2872	48.52	-5.48	54	37.15	28.23	6.74	33.53	257	201	A	H
		4924	65.26	-8.74	74	86.23	31.79	9.55	62.75	376	190	P	H
		4924	53.35	-0.65	54	74.32	31.79	9.55	62.75	376	190	A	H
		7386	54.49	-19.51	74	67.73	37.82	11.3	62.74	100	221	P	H
		7386	44.44	-9.56	54	57.68	37.82	11.3	62.74	100	221	A	H
		2264	53.05	-20.95	74	44.29	26.43	6.01	33.62	127	159	P	V
		2264	45.05	-8.95	54	36.29	26.43	6.01	33.62	127	159	A	V
		2316	56.7	-17.3	74	47.64	26.59	6.15	33.61	127	159	P	V
		2316	48.6	-5.4	54	39.54	26.59	6.15	33.61	127	159	A	V
		4924	60.02	-13.98	74	81.43	31.79	9.55	62.75	153	8	P	V
		4924	48.52	-5.48	54	69.93	31.79	9.55	62.75	153	8	A	V
		7386	49.37	-24.63	74	62.99	37.82	11.3	62.74	100	0	P	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.8	67.7	-6.3	74	58.13	26.87	6.36	33.59	267	198	P	H
		2390	53.15	-0.85	54	43.58	26.87	6.36	33.59	267	198	A	H
	*	2412	113.29	-	-	103.66	26.92	6.37	33.59	267	198	P	H
	*	2412	105.92	-	-	96.29	26.92	6.37	33.59	267	198	A	H
		2388.645	63.8	-10.2	74	54.24	26.87	6.36	33.6	104	162	P	V
		2388.645	49.84	-4.16	54	40.28	26.87	6.36	33.6	104	162	A	V
	*	2412	111.92	-	-	102.29	26.92	6.37	33.59	104	162	P	V
	*	2412	104.54	-	-	94.91	26.92	6.37	33.59	104	162	A	V
802.11n HT20 CH 06 2437MHz		2389.94	59.56	-14.44	74	49.99	26.87	6.36	33.59	300	193	P	H
		2389.94	49.5	-4.5	54	39.93	26.87	6.36	33.59	300	193	A	H
	*	2437	117.6	-	-	107.85	27.03	6.38	33.59	300	193	P	H
	*	2437	110.07	-	-	100.32	27.03	6.38	33.59	300	193	A	H
		2485.65	59.14	-14.86	74	49.26	27.14	6.39	33.58	300	193	P	H
		2485.44	48.43	-5.57	54	38.55	27.14	6.39	33.58	300	193	A	H
		2388.4	58.18	-15.82	74	48.62	26.87	6.36	33.6	300	162	P	V
		2388.54	48.7	-5.3	54	39.14	26.87	6.36	33.6	300	162	A	V
	*	2437	115.96	-	-	106.21	27.03	6.38	33.59	100	162	P	V
	*	2437	108.37	-	-	98.62	27.03	6.38	33.59	100	162	A	V
		2485.86	59.99	-14.01	74	50.11	27.14	6.39	33.58	100	162	P	V
		2483.5	49.22	-4.78	54	39.35	27.14	6.38	33.58	100	162	A	V

802.11n HT20 CH 11 2462MHz	*	2462	114.81	-	-	104.99	27.09	6.38	33.58	257	201	P	H
	*	2462	107.26	-	-	97.44	27.09	6.38	33.58	257	201	A	H
		2483.68	64.12	-9.88	74	54.25	27.14	6.38	33.58	257	201	P	H
		2483.52	51.79	-2.21	54	41.92	27.14	6.38	33.58	257	201	A	H
	*	2462	112.8	-	-	102.98	27.09	6.38	33.58	127	159	P	V
	*	2462	105.3	-	-	95.48	27.09	6.38	33.58	127	159	A	V
		2483.56	64.05	-9.95	74	54.18	27.14	6.38	33.58	127	159	P	V
		2483.52	51.44	-2.56	54	41.57	27.14	6.38	33.58	127	159	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2266	54.64	-19.36	74	45.88	26.43	6.01	33.62	267	198	P	H
		2266	46.36	-7.64	54	37.6	26.43	6.01	33.62	267	198	A	H
		2484	55.94	-18.06	74	46.07	27.14	6.38	33.58	267	198	P	H
		2484	47.65	-6.35	54	37.78	27.14	6.38	33.58	267	198	A	H
		4824	55.1	-18.9	74	76.44	31.62	9.59	62.98	100	200	P	H
		4824	45.09	-8.91	54	66.43	31.62	9.59	62.98	100	200	A	H
		2268	54.1	-19.9	74	45.29	26.48	6.01	33.62	104	162	P	V
		2268	46.15	-7.85	54	37.34	26.48	6.01	33.62	104	162	A	V
		2484	55.79	-18.21	74	45.92	27.14	6.38	33.58	104	162	P	V
		2484	47.21	-6.79	54	37.34	27.14	6.38	33.58	104	162	A	V
		4824	55.32	-18.68	74	77.09	31.62	9.59	62.98	100	309	P	V
		4824	44.66	-9.34	54	66.43	31.62	9.59	62.98	100	309	A	V
802.11n HT20 CH 06 2437MHz		2242	54.73	-19.27	74	46.1	26.37	5.94	33.62	300	193	P	H
		2242	45.32	-8.68	54	36.69	26.37	5.94	33.62	300	193	A	H
		2282	58.5	-15.5	74	49.62	26.48	6.08	33.62	300	193	P	H
		2282	49.84	-4.16	54	40.96	26.48	6.08	33.62	300	193	A	H
		2844	54.57	-19.43	74	43.34	28.13	6.71	33.54	300	193	P	H
		2844	48.3	-5.7	54	37.07	28.13	6.71	33.54	300	193	A	H
		4874	59.66	-14.34	74	80.83	31.71	9.56	62.87	100	200	P	H
		4874	48.98	-5.02	54	70.15	31.71	9.56	62.87	100	200	A	H
		7311	47.94	-26.06	74	61.43	37.43	11.31	62.69	100	0	P	H
		2230	53.27	-20.73	74	44.7	26.32	5.94	33.63	300	162	P	V
		2230	44.61	-9.39	54	36.04	26.32	5.94	33.63	300	162	A	V
		2294	59.18	-14.82	74	50.23	26.54	6.08	33.61	300	162	P	V
		2294	50.37	-3.63	54	41.42	26.54	6.08	33.61	300	162	A	V
		4874	58.99	-15.01	74	80.59	31.71	9.56	62.87	100	293	P	V
		4874	47.32	-6.68	54	68.92	31.71	9.56	62.87	100	293	A	V
		7311	46.74	-27.26	74	60.69	37.43	11.31	62.69	100	0	P	V

802.11n HT20 CH 11 2462MHz		2250	52.81	-21.19	74	44.12	26.43	5.94	33.62	257	201	P	H
		2250	44.23	-9.77	54	35.54	26.43	5.94	33.62	257	201	A	H
		2316	59.88	-14.12	74	50.82	26.59	6.15	33.61	257	201	P	H
		2316	50.58	-3.42	54	41.52	26.59	6.15	33.61	257	201	A	H
		2872	55.39	-18.61	74	44.02	28.23	6.74	33.53	257	201	P	H
		2872	48.52	-5.48	54	37.15	28.23	6.74	33.53	257	201	A	H
		4924	64.34	-9.66	74	85.31	31.79	9.55	62.75	100	195	P	H
		4924	52.31	-1.69	54	73.28	31.79	9.55	62.75	100	195	A	H
		7386	50.23	-23.77	74	63.47	37.82	11.3	62.74	100	0	P	H
		2250	53.53	-20.47	74	44.84	26.43	5.94	33.62	127	159	P	V
		2250	44.44	-9.56	54	35.75	26.43	5.94	33.62	127	159	A	V
		2316	57.51	-16.49	74	48.45	26.59	6.15	33.61	127	159	P	V
		2316	48.35	-5.65	54	39.29	26.59	6.15	33.61	127	159	A	V
		4924	62.46	-11.54	74	83.87	31.79	9.55	62.75	100	301	P	V
		4924	50.73	-3.27	54	72.14	31.79	9.55	62.75	100	301	A	V
		7386	48.47	-25.53	74	62.09	37.82	11.3	62.74	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		30.54	22.55	-17.45	40	30.37	23.84	0.82	32.5	-	-	P	H
		124.23	25.5	-18	43.5	38.9	17.51	1.51	32.46	-	-	P	H
		153.66	24.34	-19.16	43.5	38.25	16.82	1.61	32.43	-	-	P	H
		561.8	27.43	-18.57	46	30.56	26.23	2.98	32.43	-	-	P	H
		760.6	30.71	-15.29	46	31.19	28.23	3.44	32.29	-	-	P	H
		952.4	33.6	-12.4	46	29.81	30.9	3.9	31.18	100	0	P	H
		34.59	26.72	-13.28	40	36.61	21.78	0.82	32.49	-	-	P	V
		43.77	26.7	-13.3	40	40.98	17.19	1.02	32.49	-	--	P	V
		73.2	27.84	-12.16	40	46.65	12.44	1.22	32.49	100	123	P	V
		447.7	24.13	-21.87	46	30.56	23.18	2.7	32.35	-	-	P	V
		736.8	30.09	-15.91	46	31.01	27.91	3.4	32.36	-	-	P	V
		950.3	33.27	-12.73	46	29.66	30.82	3.82	31.2	-	-	P	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	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(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. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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

Appendix D. Radiated Spurious Emission Plots

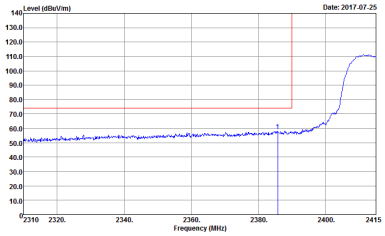
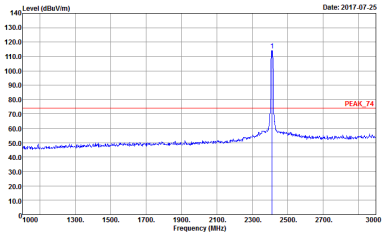
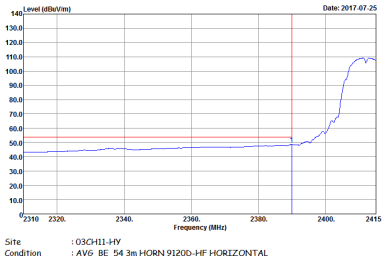
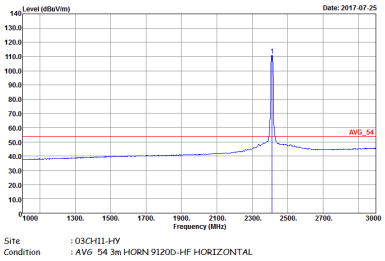
Test Engineer :	J.C. Liang, Jacky Huang, Ken Wu	**Temperature :**	20~24℃
		Relative Humidity :	50~54%

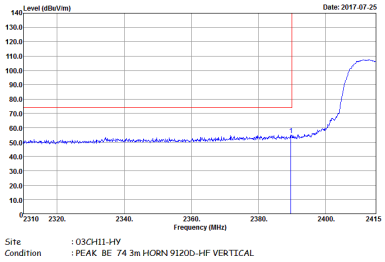
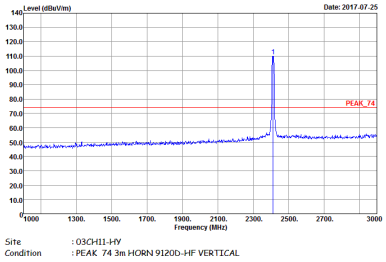
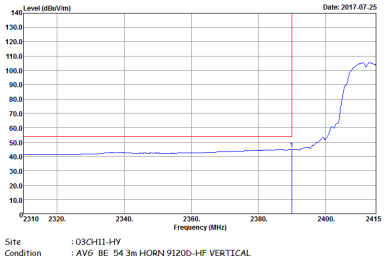
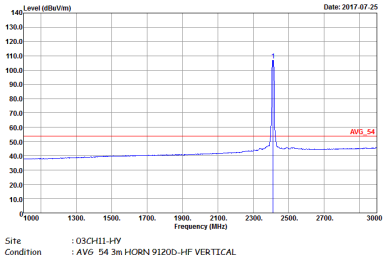
Note symbol

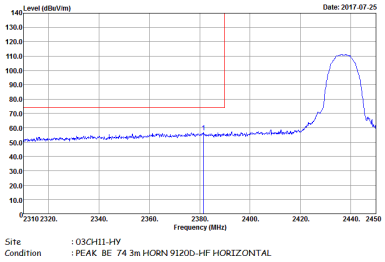
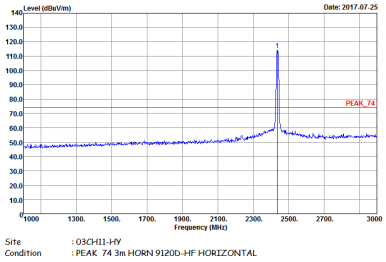
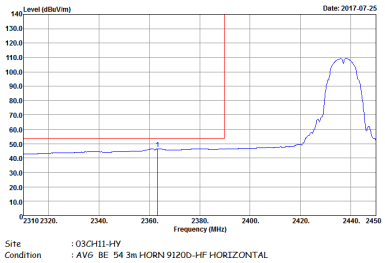
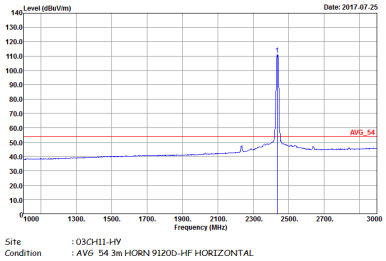
-L	**Low channel location**
-R	**High channel location**

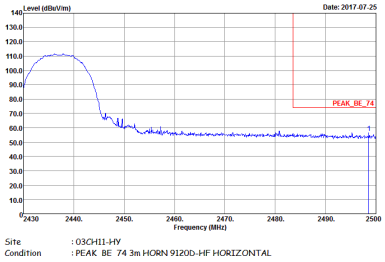
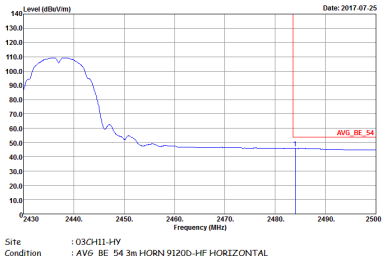
2.4GHz 2400~2483.5MHz

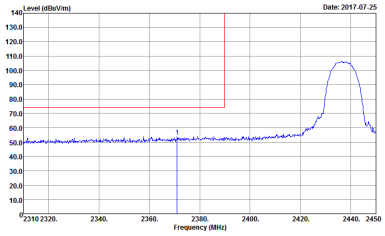
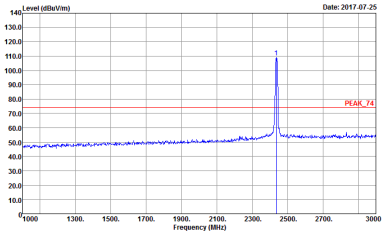
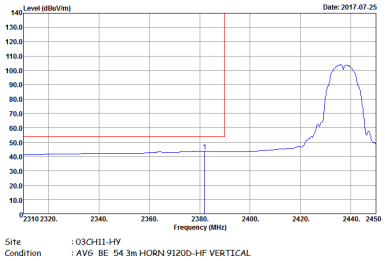
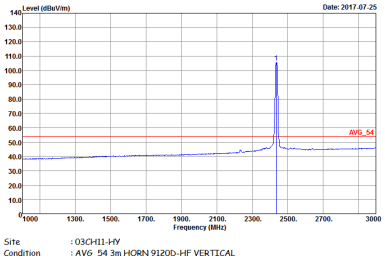
WIFI 802.11b (Band Edge @ 3m)

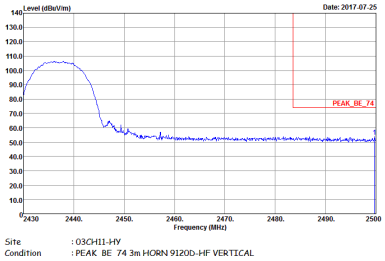
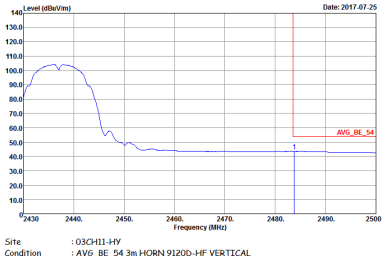
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

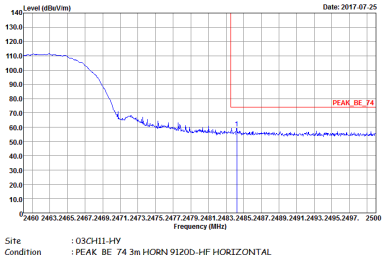
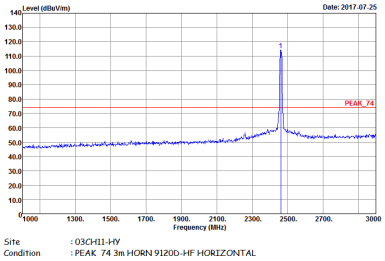
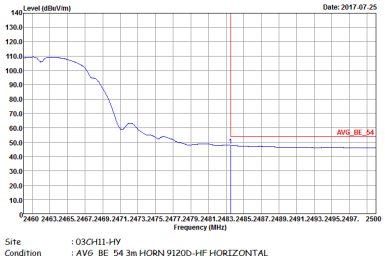
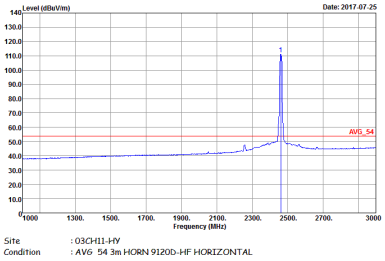
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Vertical	Fundamental
Peak		
Avg.		

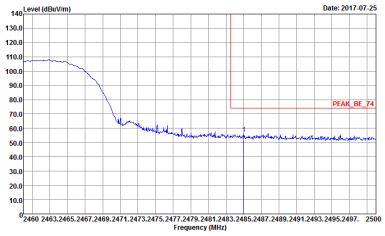
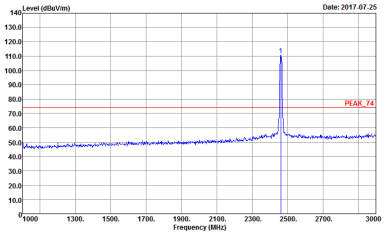
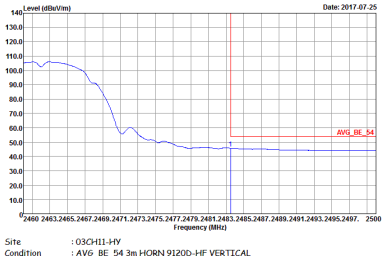
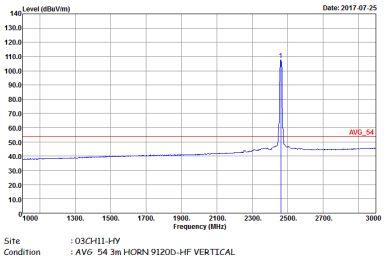
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Fundamental
Peak		
Avg.		

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.		

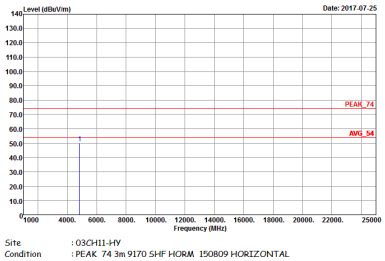
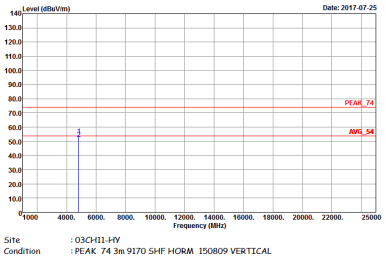
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

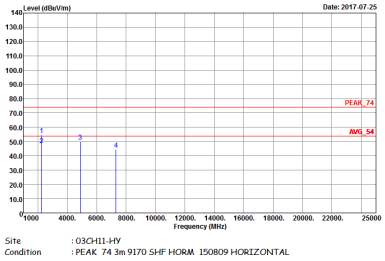
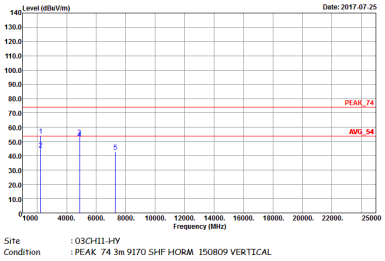
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Fundamental
Peak		
Avg.		

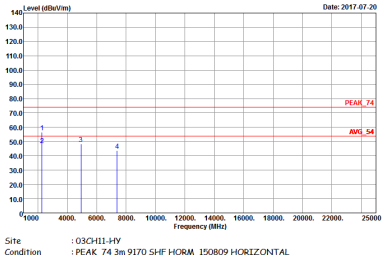
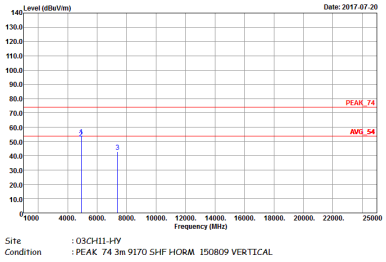
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

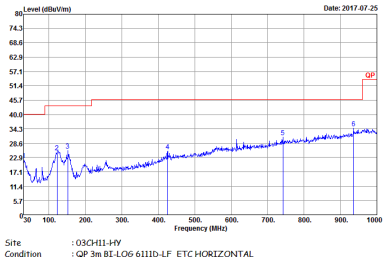
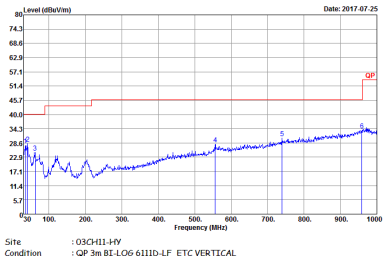
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

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.	 	

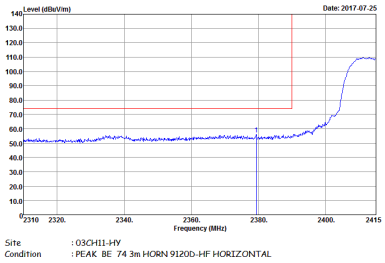
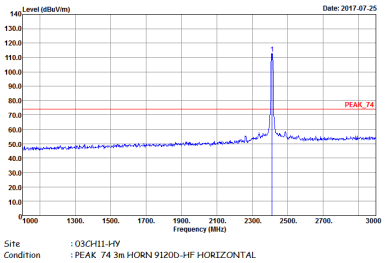
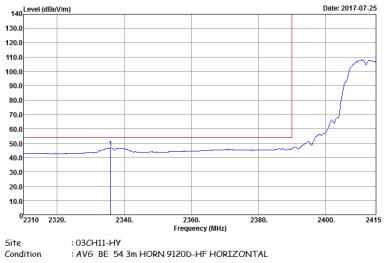
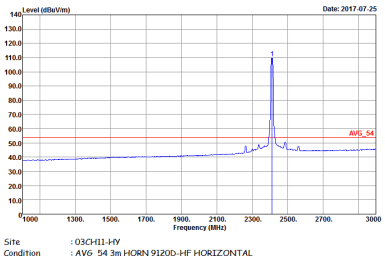
Emission below 1GHz

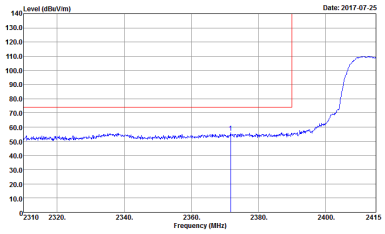
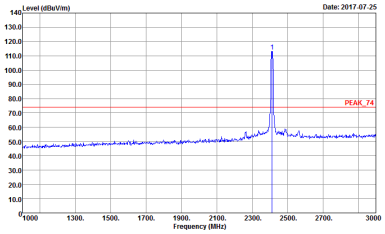
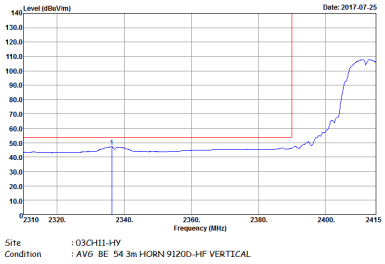
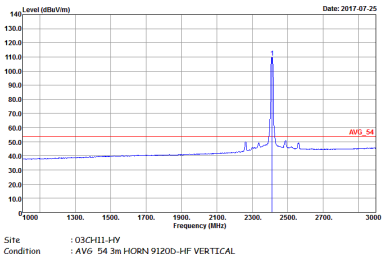
2.4GHz WIFI 802.11b (LF)

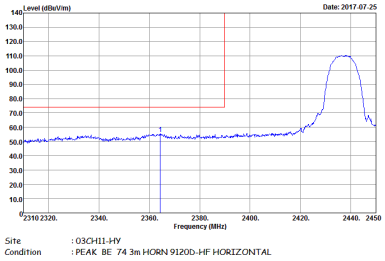
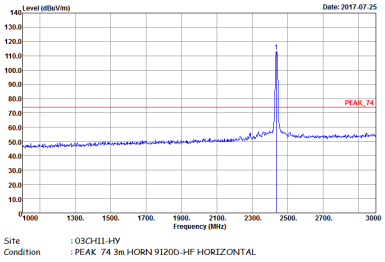
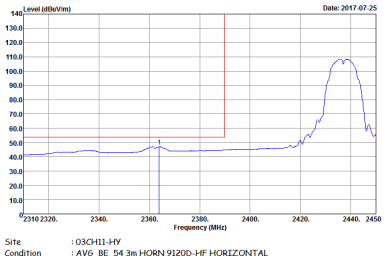
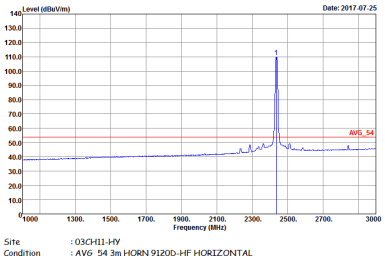
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11b LF	
1	Horizontal	Vertical
QP / Peak		

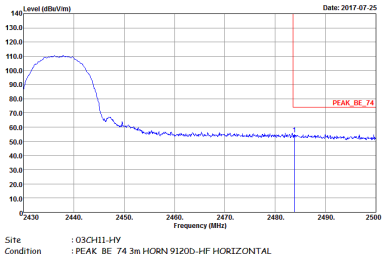
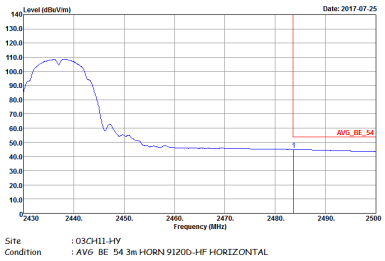
2.4GHz 2400~2483.5MHz

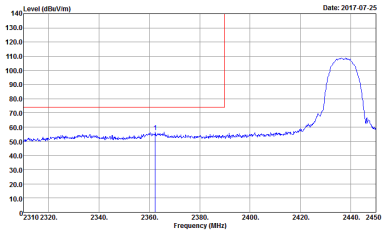
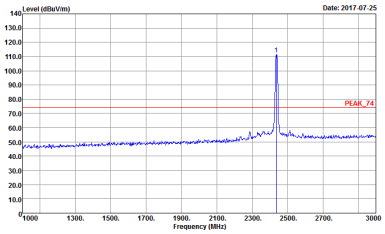
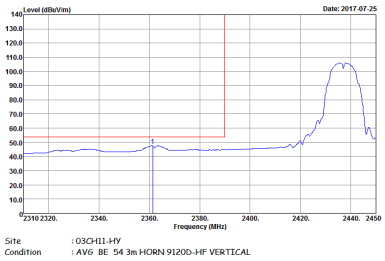
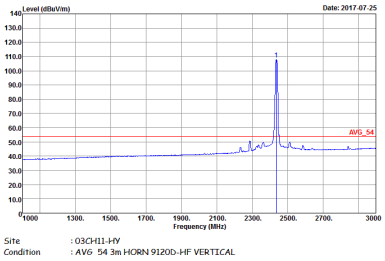
WIFI 802.11b (Band Edge @ 3m)

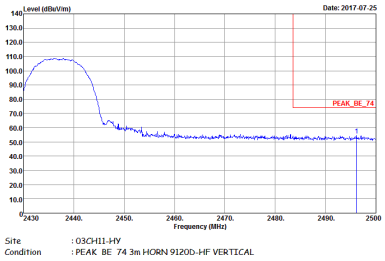
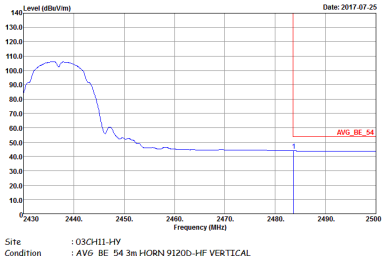
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
2	Horizontal	Fundamental
Peak		
Avg.		

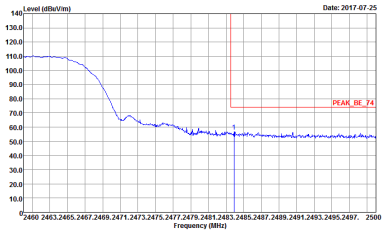
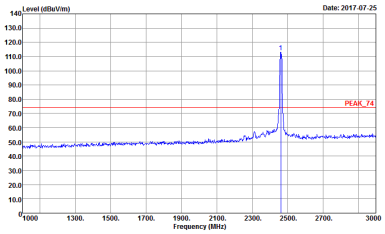
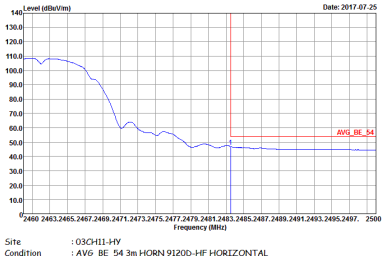
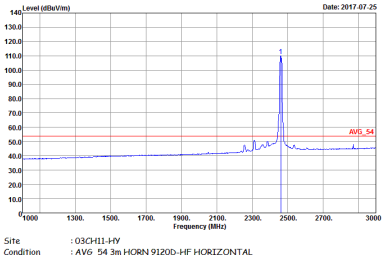
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
2	Vertical	Fundamental
Peak		
Avg.		

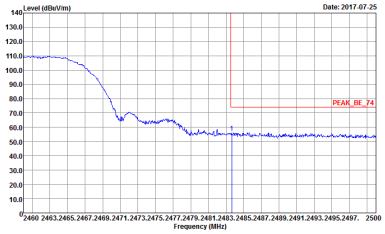
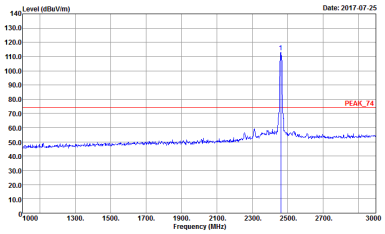
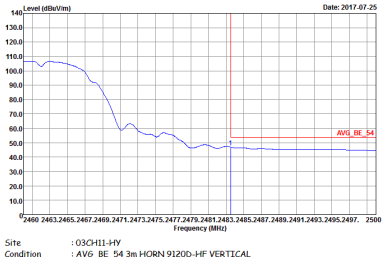
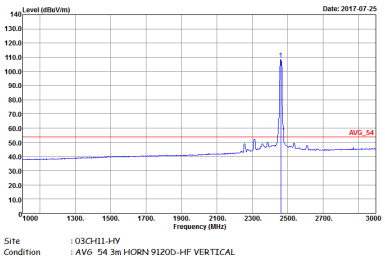
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
2	Horizontal	Fundamental
Peak		
Avg.		

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

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

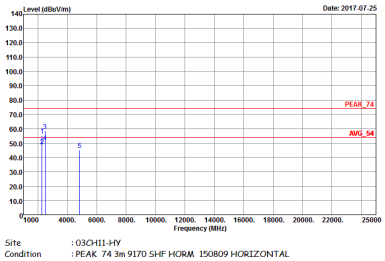
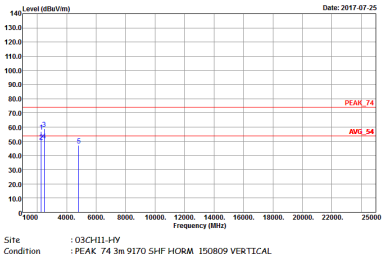
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

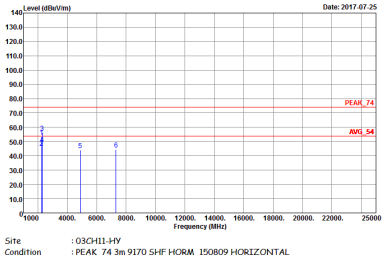
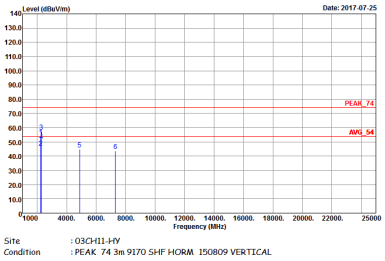
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
2	Horizontal	Fundamental
Peak		
Avg.		

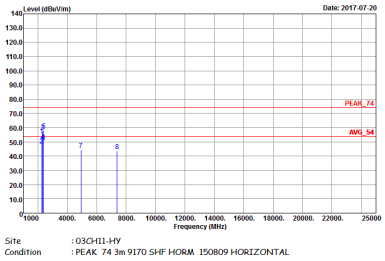
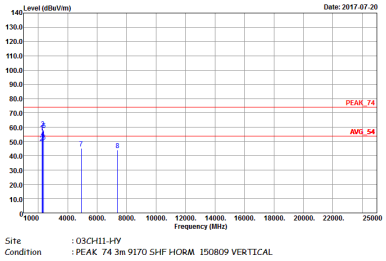
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
2	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

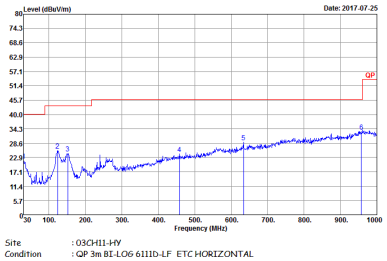
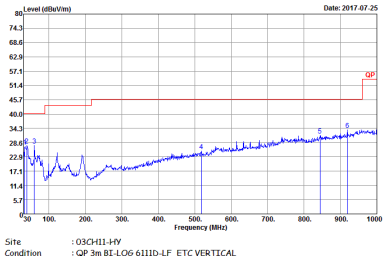
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
2	Horizontal	Vertical
Peak Avg.		

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

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

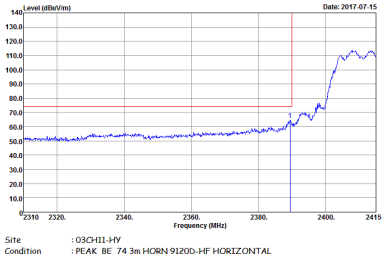
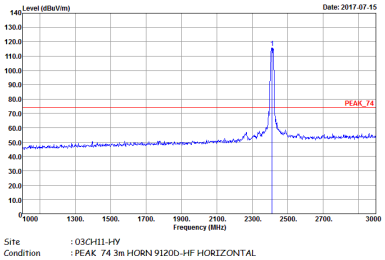
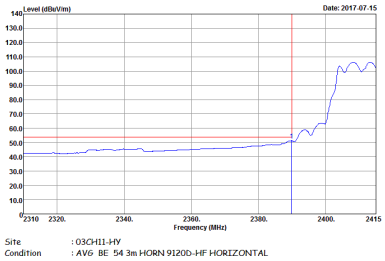
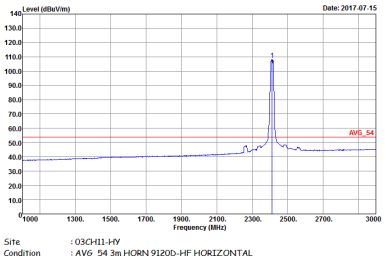
Emission below 1GHz

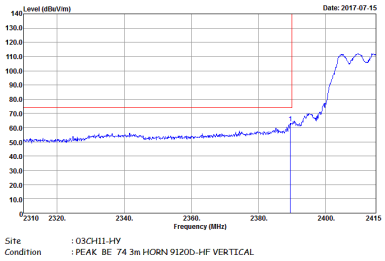
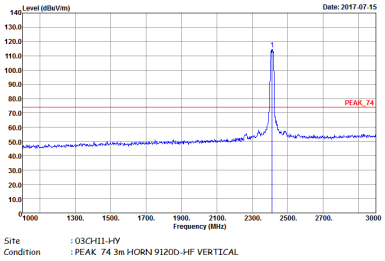
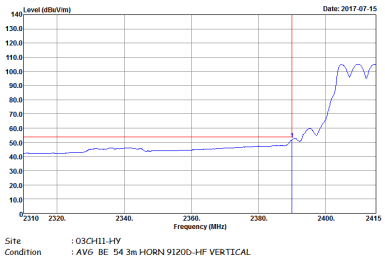
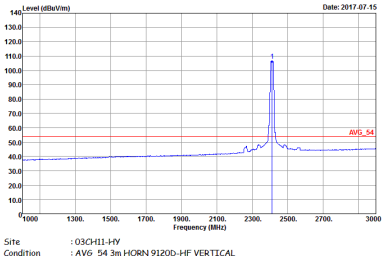
2.4GHz WIFI 802.11b (LF)

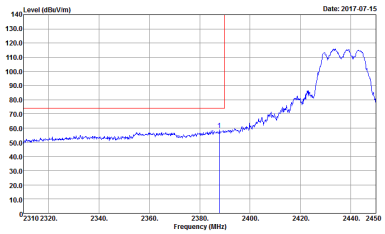
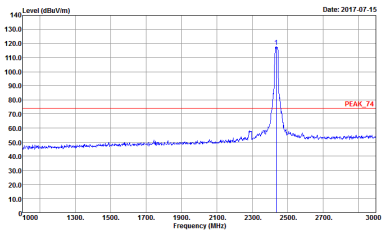
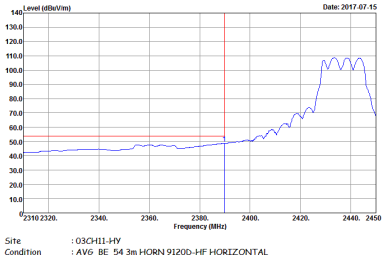
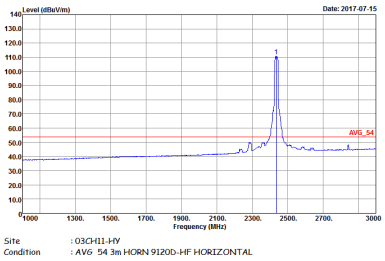
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11b LF	
2	Horizontal	Vertical
QP / Peak		

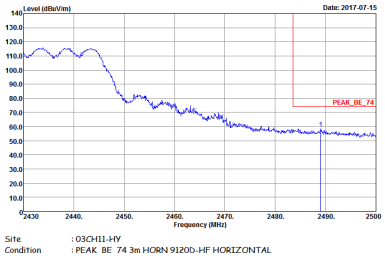
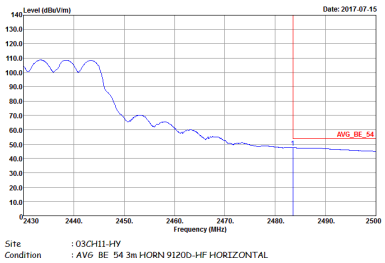
2.4GHz 2400~2483.5MHz

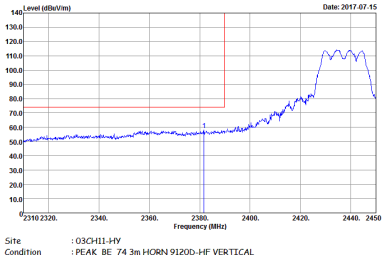
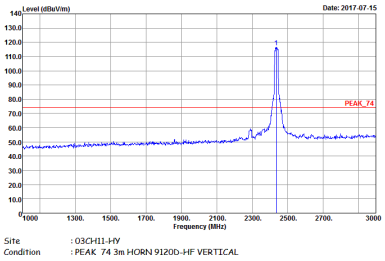
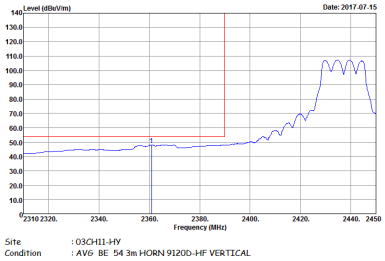
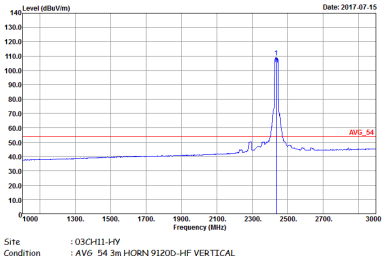
WIFI 802.11g (Band Edge @ 3m)

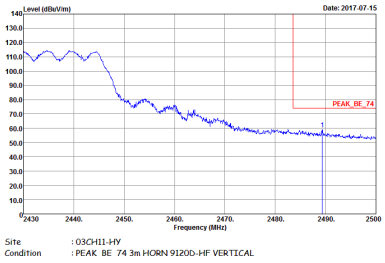
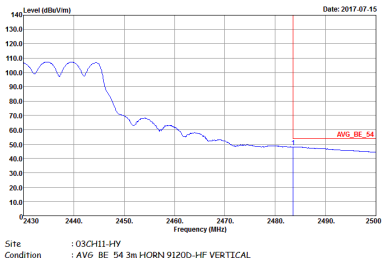
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		

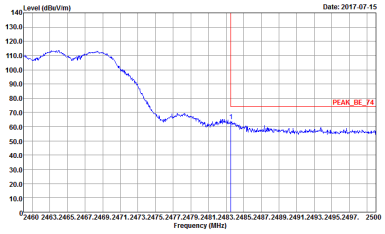
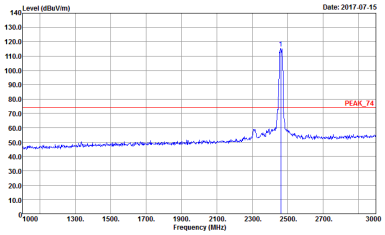
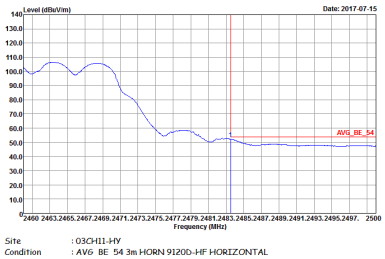
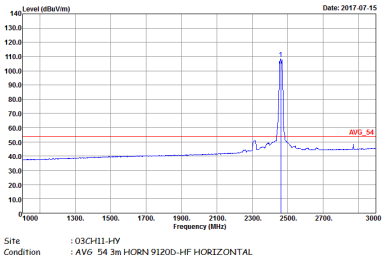
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		

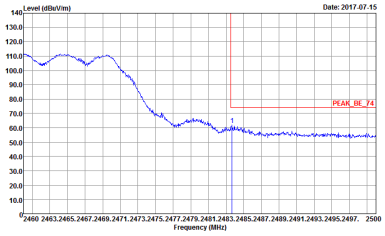
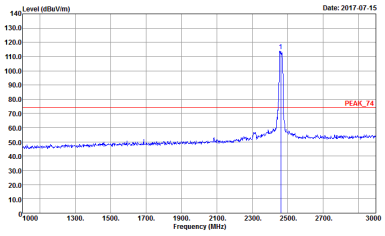
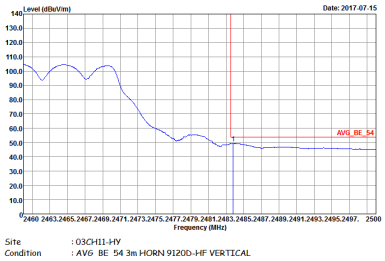
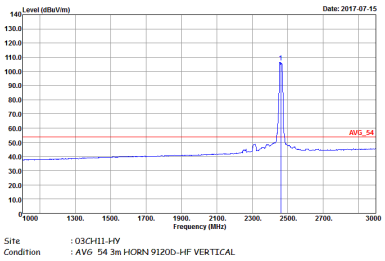
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		

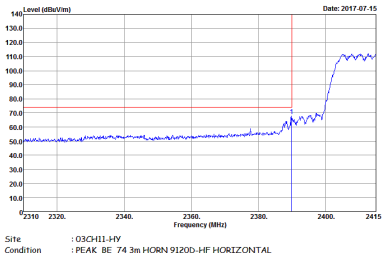
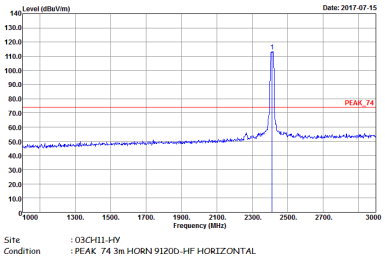
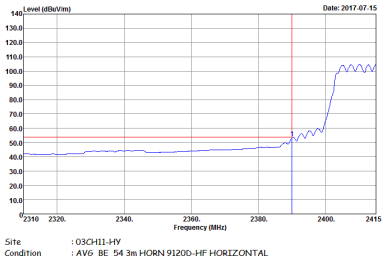
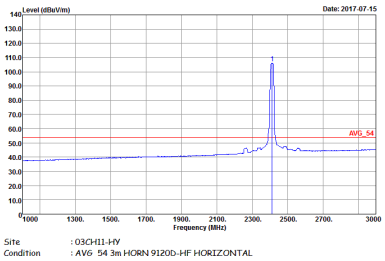
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1+2	Vertical	Fundamental
Peak		Left Blank
Avg.		Left Blank

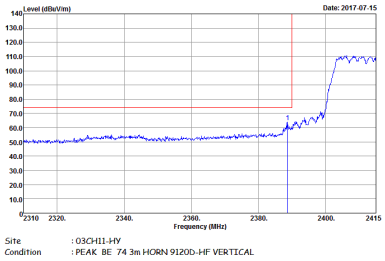
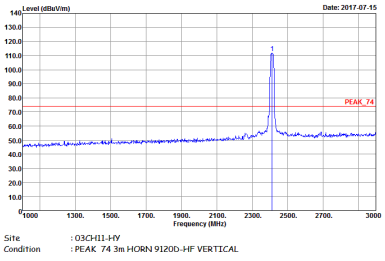
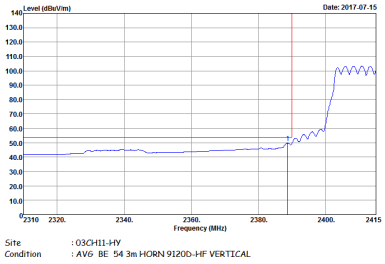
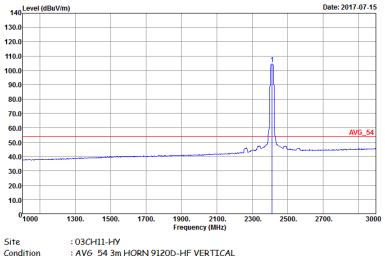
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		

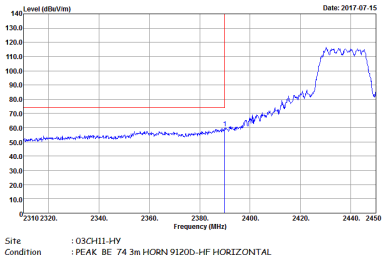
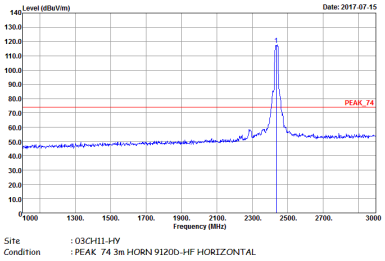
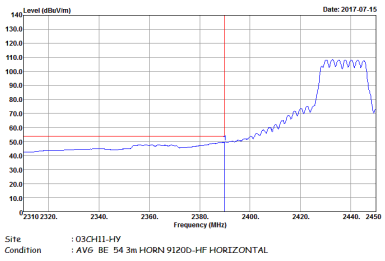
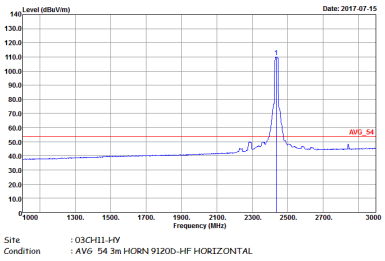
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		

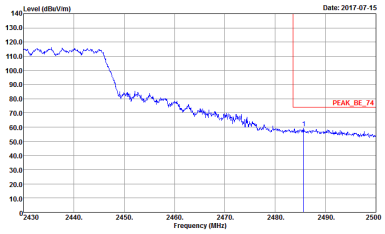
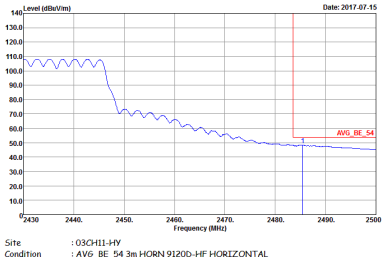
2.4GHz 2400~2483.5MHz

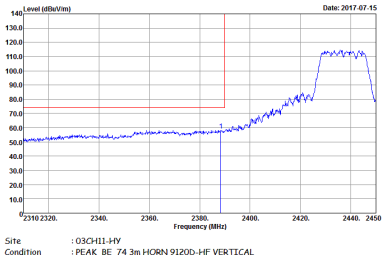
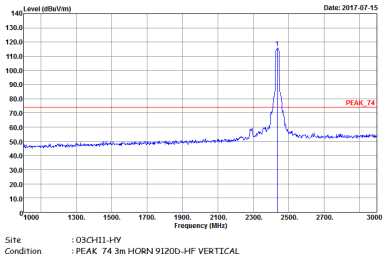
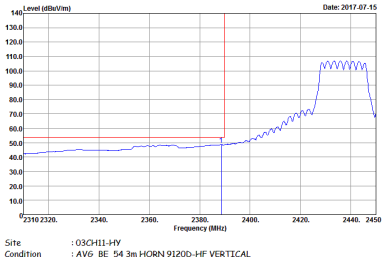
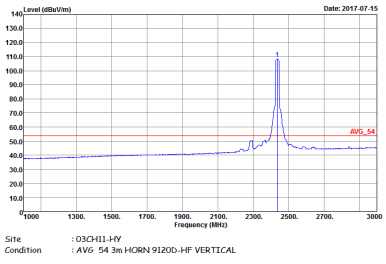
WIFI 802.11n HT20 (Band Edge @ 3m)

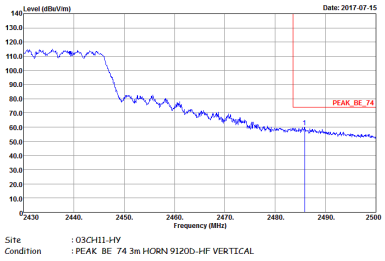
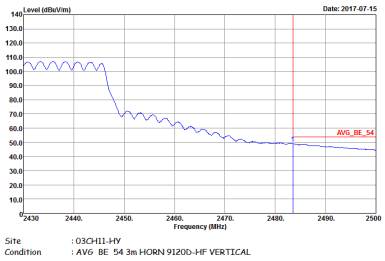
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		

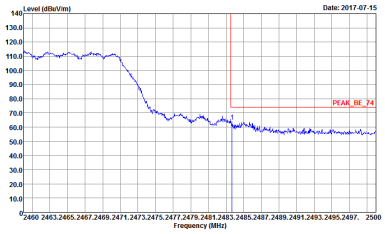
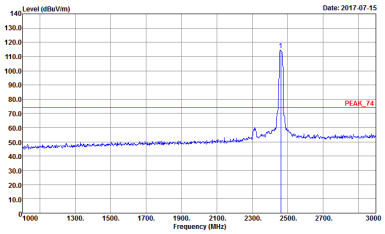
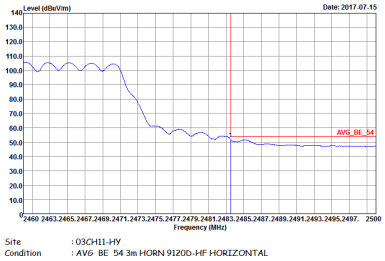
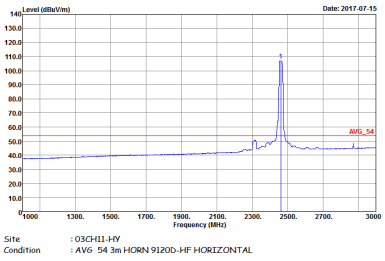
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		

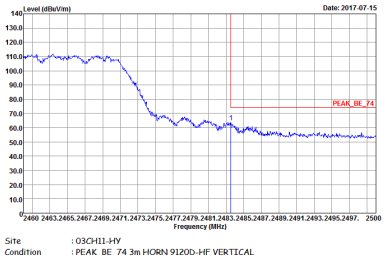
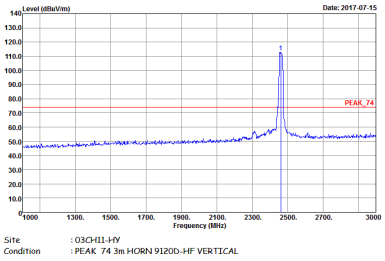
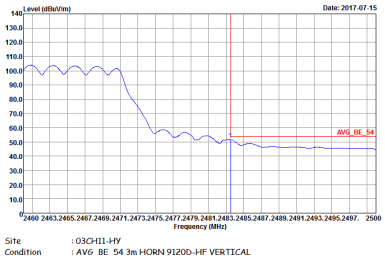
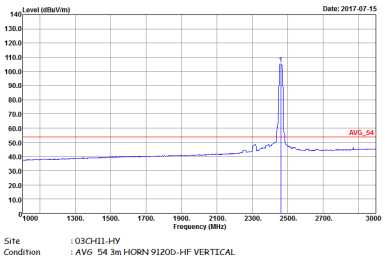
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1+2	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+2	Vertical	Fundamental
Peak		
Avg.		

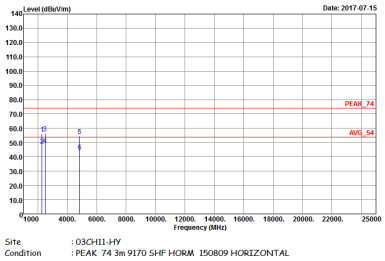
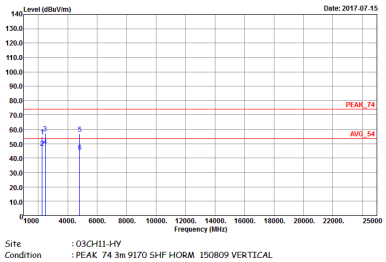
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1+2	Vertical	Fundamental
Peak		Left Blank
Avg.		Left Blank

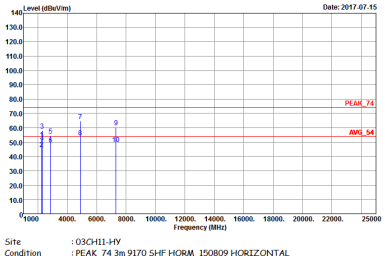
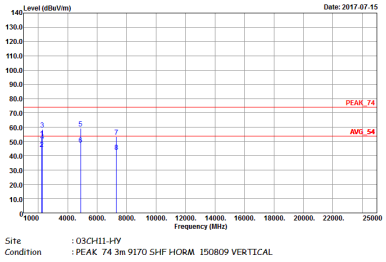
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		

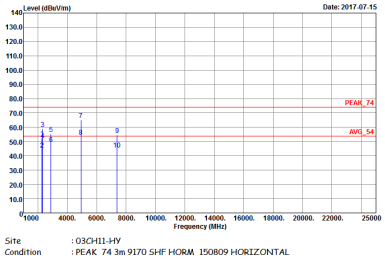
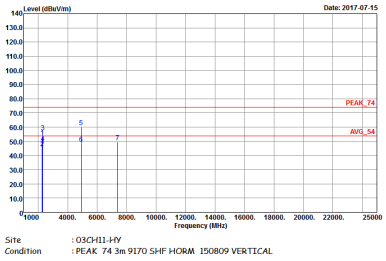
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

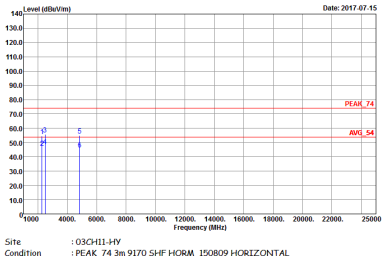
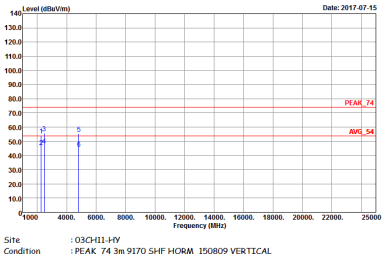
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1+2	Horizontal	Vertical
Peak Avg.		

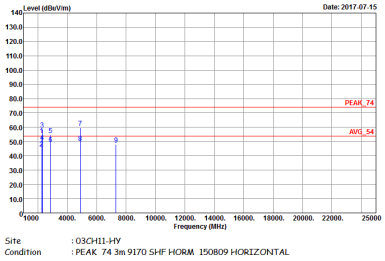
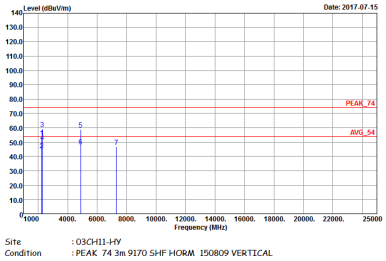
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1+2	Horizontal	Vertical
Peak Avg.		

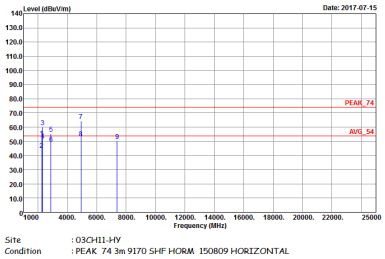
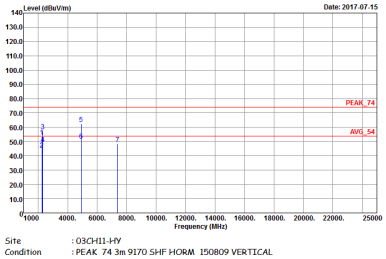
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1+2	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

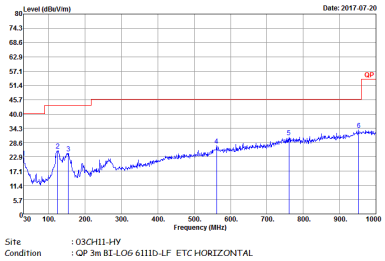
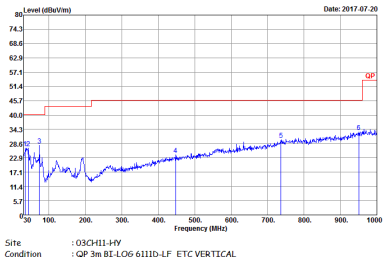
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Horizontal	Vertical
Peak Avg.		

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1+2	Horizontal	Vertical
Peak Avg.		

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

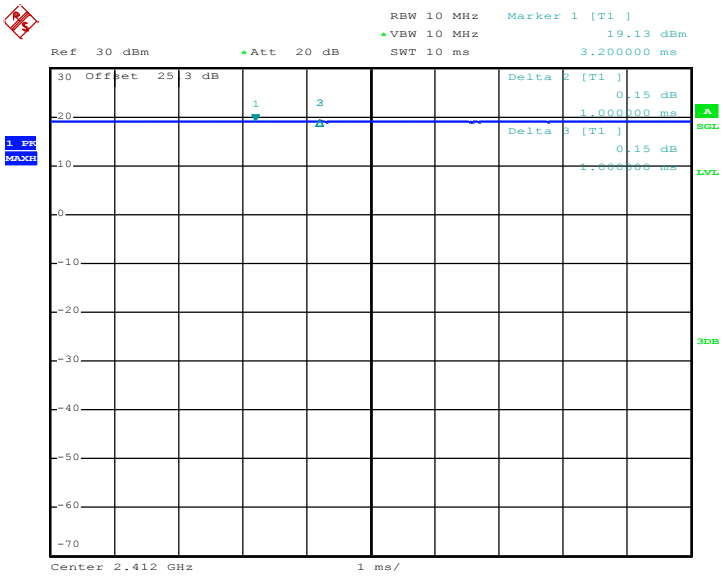
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g LF	
1+2	Horizontal	Vertical
QP / Peak		

Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1	802.11b	100.00	-	-	10Hz
2	802.11b	100.00	-	-	10Hz
1 + 2	802.11g for Ant. 1	99.05	-	-	10Hz
1 + 2	802.11g for Ant. 2	98.57	-	-	10Hz
1 + 2	2.4GHz 802.11n HT20 for Ant. 1	98.46	-	-	10Hz
1 + 2	2.4GHz 802.11n HT20 for Ant. 2	98.97	-	-	10Hz

<Ant. 1>

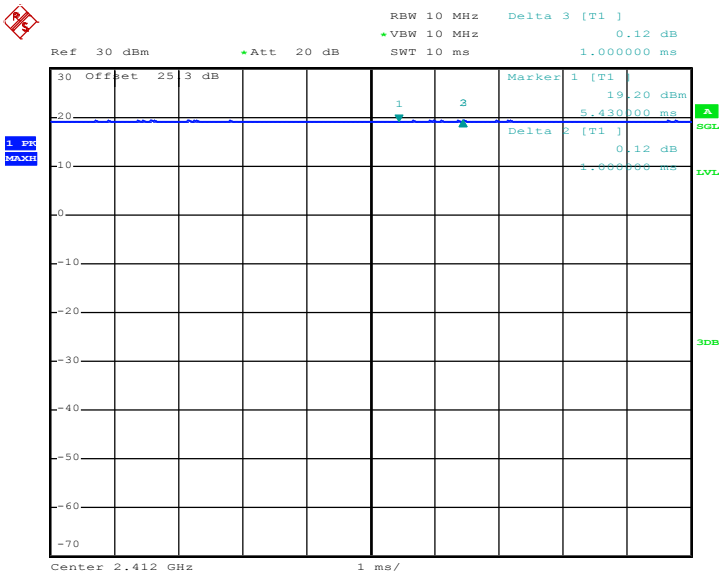
802.11b



Date: 4.JUL.2017 23:17:13

<Ant. 2>

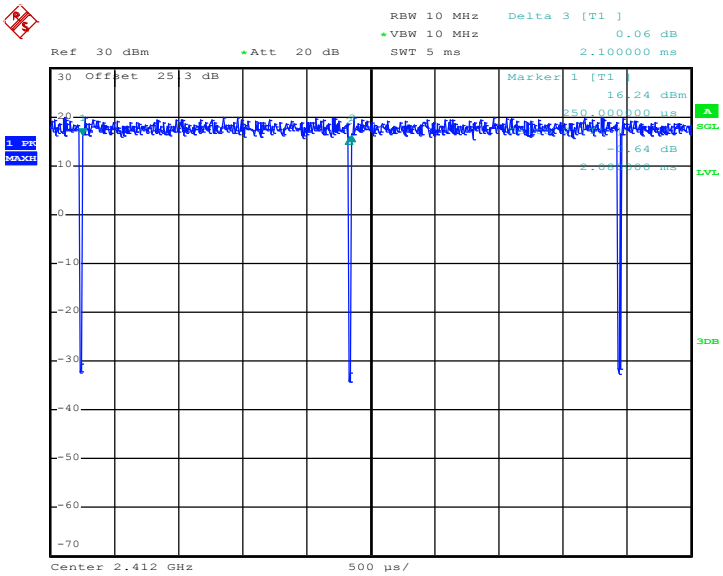
802.11b



Date: 4.JUL.2017 23:18:17

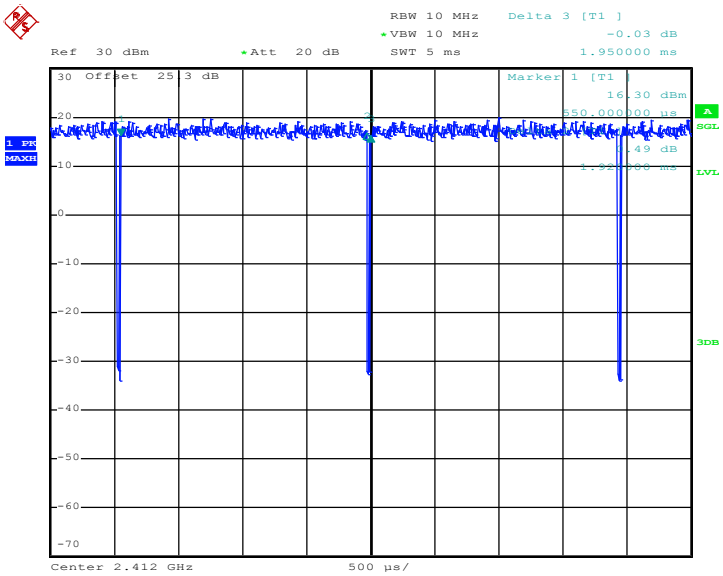
MIMO <Ant. 1>

802.11g



Date: 4.JUL.2017 23:20:58

802.11n HT20



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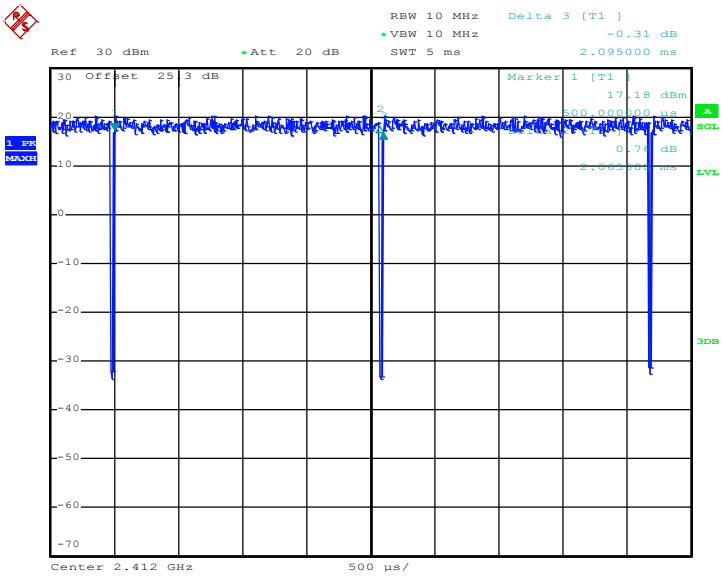
MIMO <Ant. 2>

802.11g



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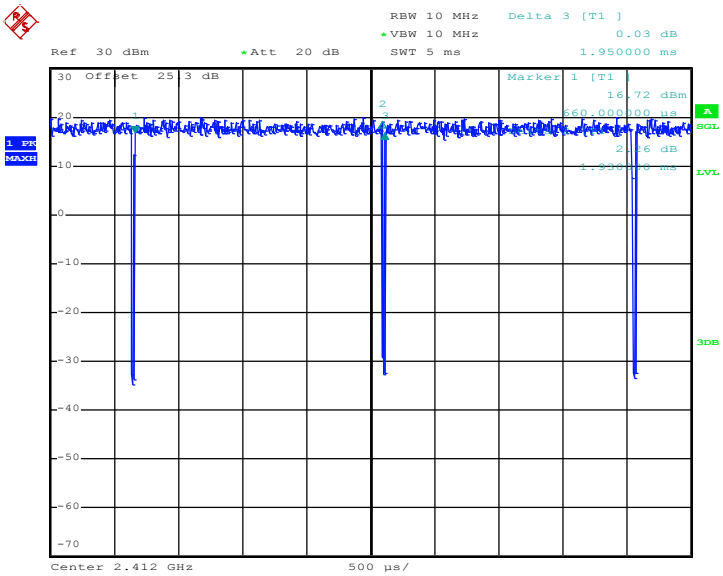

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