FCC RF Test Report

APPLICANT	:	TP-LINK TECHNOLOGIES CO., LTD.
EQUIPMENT	:	AC1200 Wi-Fi Range Extender
BRAND NAME	:	TP-LINK
MODEL NAME	:	RE350K
MARKETING NAME	:	AC1200 Wi-Fi Range Extender
FCC ID	:	TE7RE350K
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Nov. 02, 2015 and testing was completed on Dec. 07, 2015. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.

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

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APPENDIX A. CONDUCTED TEST RESULTS

APPENDIX B. RADIATED TEST RESULTS

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5N0208A	Rev. 01	Initial issue of report	Dec. 14, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.2	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	Under limit 0.04 dB at 2390.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 15.50 dB at 0.502 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

TP-LINK TECHNOLOGIES CO., LTD.
Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China

1.2 Manufacturer

TP-LINK TECHNOLOGIES CO., LTD.
Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	AC1200 Wi-Fi Range Extender
Brand Name	TP-LINK
Model Name	RE350K
Marketing Name	AC1200 Wi-Fi Range Extender
FCC ID	TE7RE350K
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification subjective to this standard

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>802.11b/g/n : 2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum Output (Average) Power to antenna</td><td>SISO<Ant. 1>
802.11b : 24.09 dBm (0.2564 W)
802.11g : 19.73 dBm (0.0940 W)
802.11n HT20 : 20.33 dBm (0.1079 W)
802.11n HT40 : 15.50 dBm (0.0355 W)
SISO<Ant. 2>
802.11b : 24.25 dBm (0.2661 W)
802.11g : 19.92 dBm (0.0982 W)
802.11n HT20 : 20.77 dBm (0.1194 W)
802.11n HT40 : 15.58 dBm (0.0361 W)
MIMO<Ant. 1+2>
802.11b : 27.26 dBm (0.5321 W)
802.11g : 22.94 dBm (0.1968 W)
802.11n HT20 : 23.79 dBm (0.2393 W)
802.11n HT40 : 18.68 dBm (0.0738 W)</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11b : 14.55MHz
802.11g : 18.60MHz
802.11n HT20 : 19.55MHz
802.11n HT40 : 37.30MHz</td></tr>
<tr><td>Antenna Type</td><td><Ant 1>
Dipole Antenna type with gain 2.21 dBi
<Ant 2>
Dipole Antenna type with gain 2.21 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><th></th><th>Ant. 1</th><th>Ant. 2</th></tr>
<tr><td>802.11 b</td><td>V</td><td>V</td></tr>
<tr><td>802.11 g</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

1.5 Modification of EUT

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

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 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.

1.7 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 v03r03
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

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: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

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 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

<Ant. 1>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Average Power (dBm)	24.09	24.01	24.07	24.07

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	19.73	19.67	19.62	19.56	19.54	19.67	19.60	19.72

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	20.33	20.30	20.27	20.28	20.28	20.31	20.29	20.30

2.4GHz 802.11n HT40								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	15.50	15.48	15.49	15.46	15.46	15.49	15.44	15.40

<Ant. 2>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Average Power (dBm)	24.25	24.21	24.23	24.21

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	19.92	19.85	19.84	19.91	19.82	19.91	19.91	19.86

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	20.77	20.76	20.74	20.74	20.74	20.71	20.65	20.72

2.4GHz 802.11n HT40								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	15.58	15.40	15.47	15.41	15.38	15.27	15.28	15.20

MIMO <Ant. 1+2>

802.11b				
Data Rate (MHz)	**1M bps**	**2M bps**	**5.5M bps**	**11M bps**
Average Power (dBm)	**27.26**	27.17	27.22	27.21

802.11g								
Data Rate (MHz)	**6M bps**	**9M bps**	**12M bps**	**18M bps**	**24M bps**	**36M bps**	**48M bps**	**54M bps**
Average Power (dBm)	**22.94**	22.86	22.78	22.82	22.78	22.84	22.85	22.75

2.4GHz 802.11n HT20								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	**23.79**	23.73	23.68	23.65	23.65	23.67	23.67	23.59

2.4GHz 802.11n HT40								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	**18.68**	18.63	18.57	18.59	18.60	18.61	18.50	18.49

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

Single Antenna

<2.4GHz>

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

MIMO Antenna

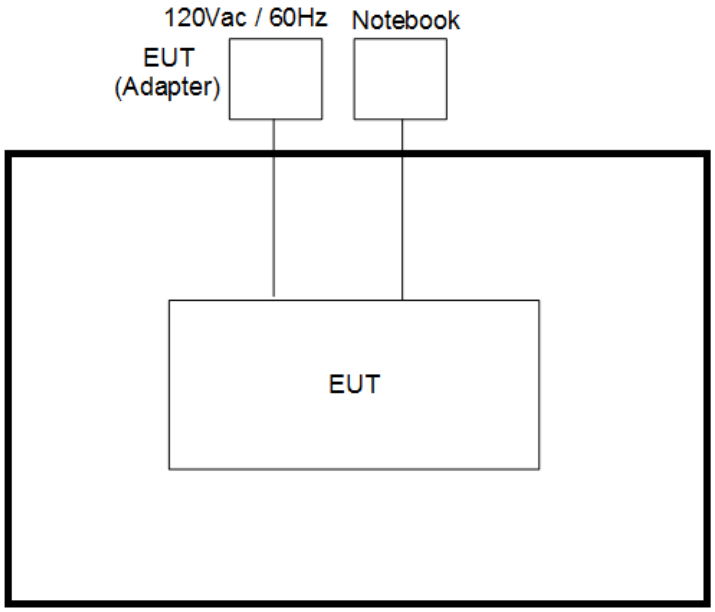
<2.4GHz>

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

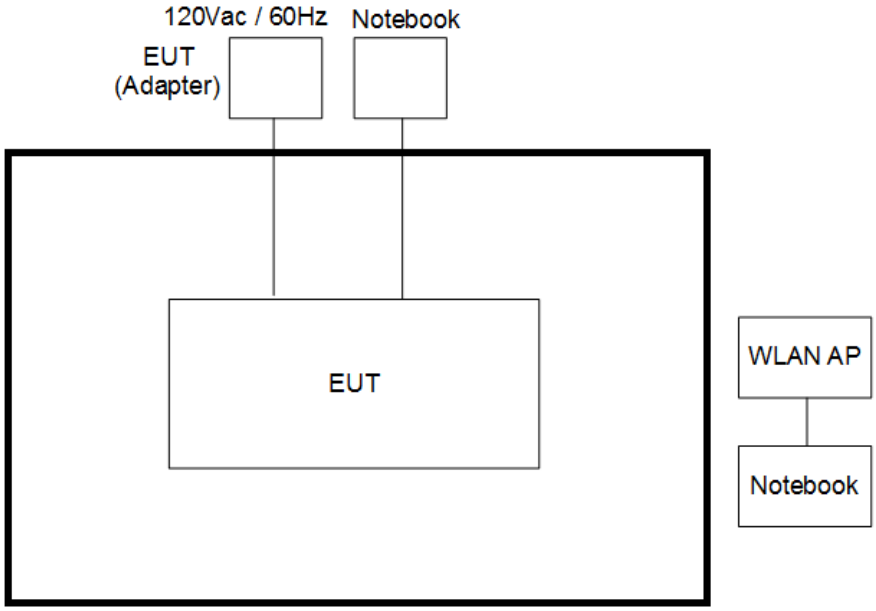
Test Cases	
AC Conducted Emission	Mode 1 : WLAN (2.4GHz) Link + TC
Remark: TC stands for Test Configuration, and consists of Adapter and RJ-45.	

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	DELL	P20G	FCC DoC/ Contains FCC ID: QDS-BRCM1051	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “bin\cart.exe” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

2.7 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.

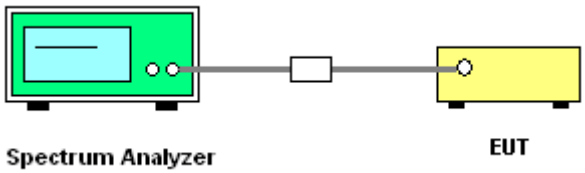
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

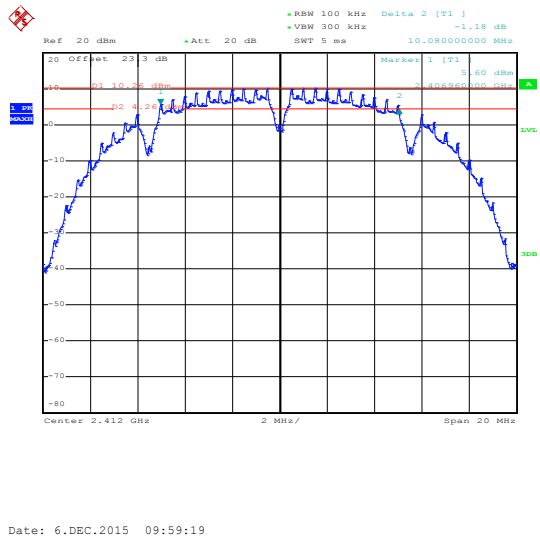
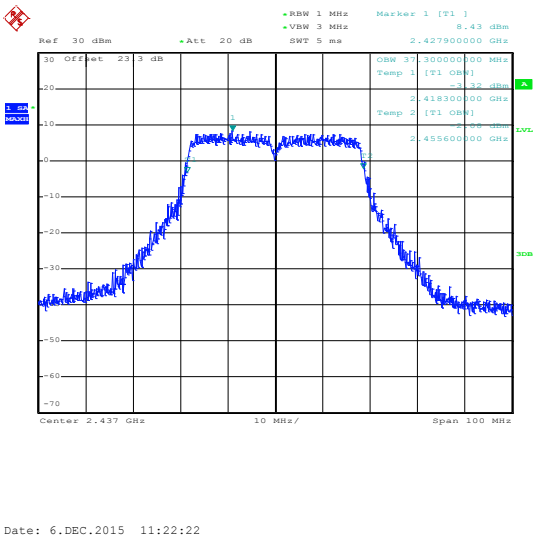
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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 of this test report.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	

Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Average Output Power Measurement

3.2.1 Limit of Average Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for average output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the average 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.

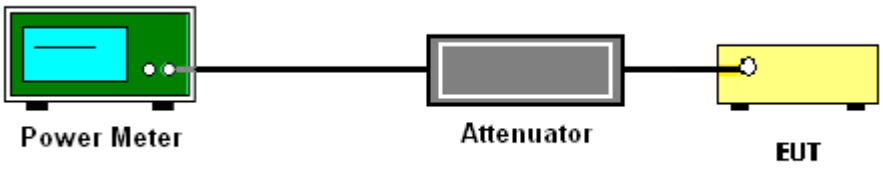
3.2.2 Measuring Instruments

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 v03r03 section 9.2.3.1 Method AVGPM (Measurement using an RF average power meter).
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 of this report.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The testing follows Measurement Procedure AVGSA-3 of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = RMS, Sweep time = auto couple. Allow max hold to run for at least 60 s, or longer as needed to allow the trace to stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

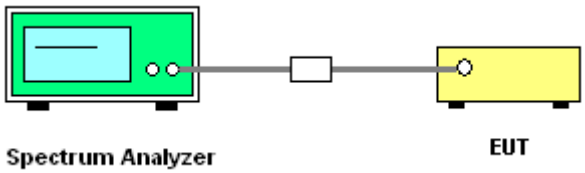
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   Method (1): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

   Method (2): Measure and add 10 log (N) dB, where N is the number of outputs. (N=2)

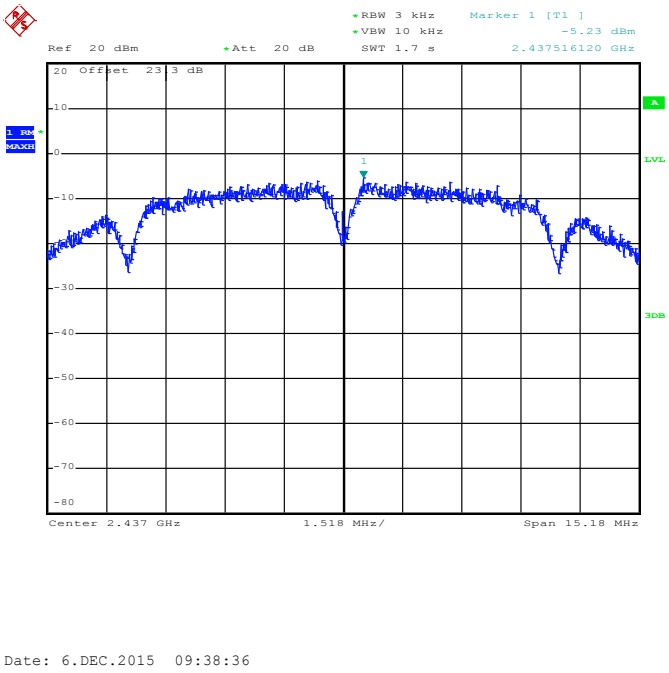
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.

Worst Case Power Density (dBm/3kHz)



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

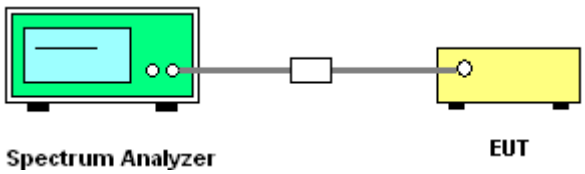
3.4.2 Measuring Instruments

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 v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



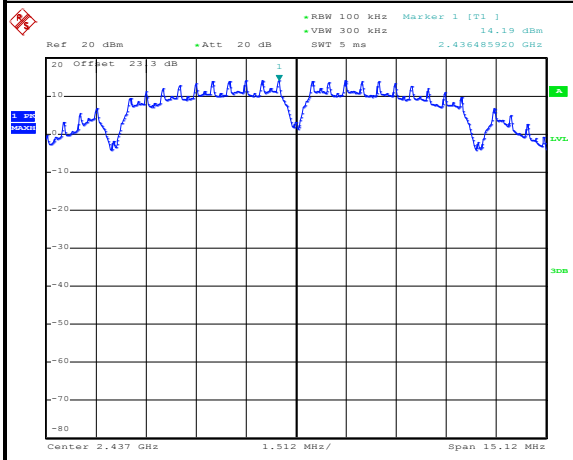
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

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

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	01	**Test Engineer :**	Bill Kuo

WLAN 802.11b Channel 01

100kHz PSD reference Level



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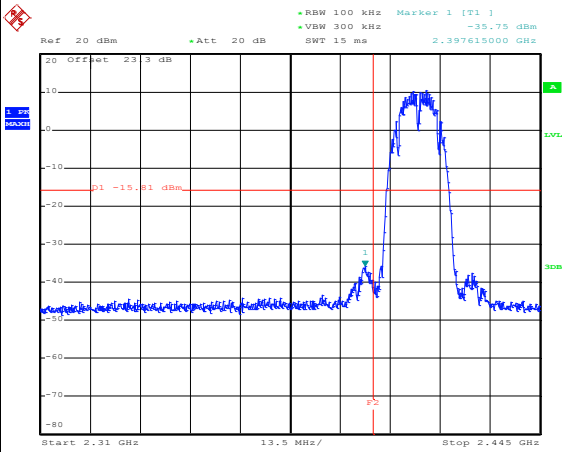
Low Channel Plot



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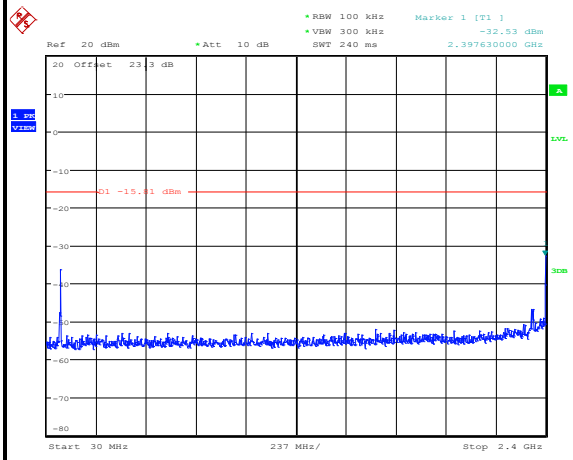
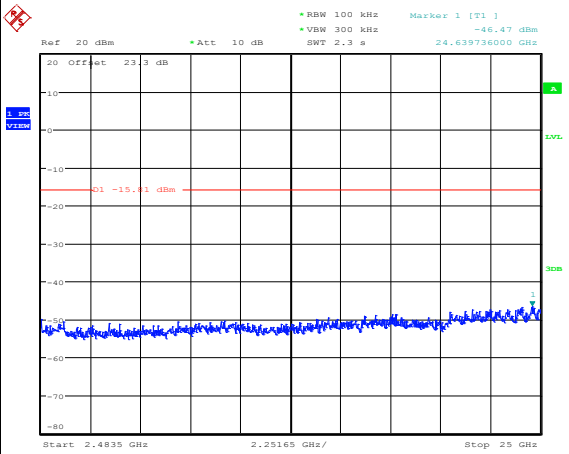
Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:42:28

Spurious Emission 2.4835GHz~25GHz

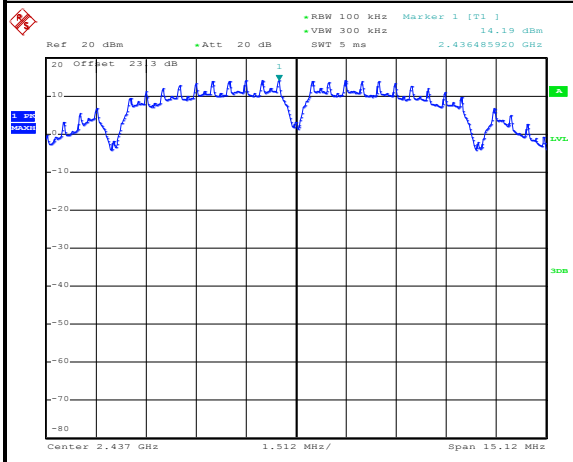


Date: 7.DEC.2015 19:42:36

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

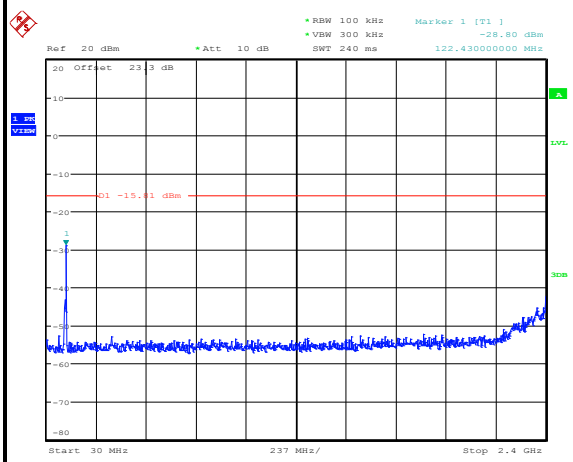
WLAN 802.11b Channel 06

100kHz PSD reference Level



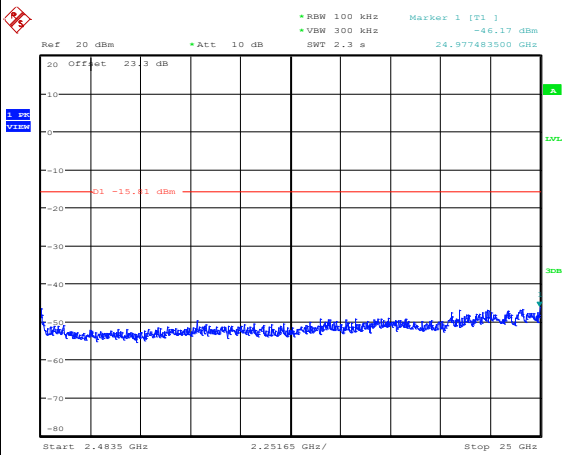
Date: 6.DEC.2015 09:18:20

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:45:48

Spurious Emission 2.4835GHz~25GHz

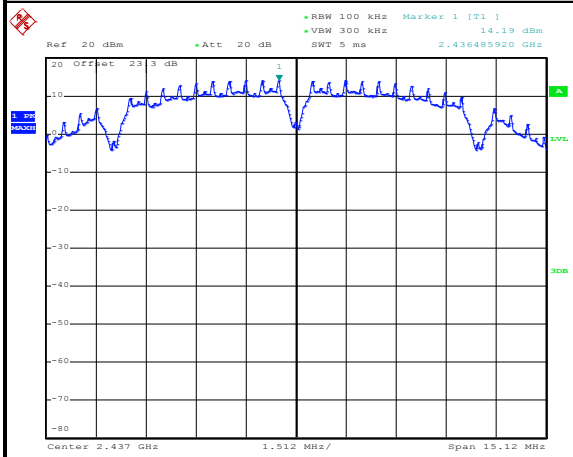


Date: 7.DEC.2015 19:45:56

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	11	**Test Engineer :**	Bill Kuo

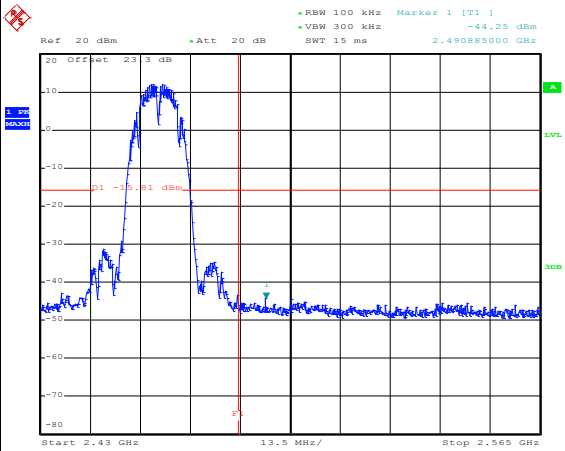
WLAN 802.11b Channel 11

100kHz PSD reference Level



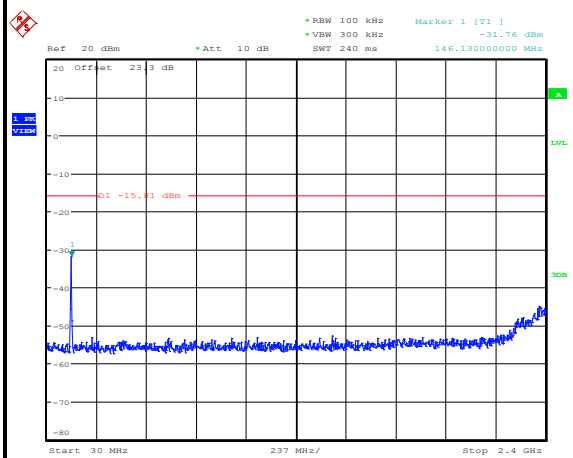
Date: 6.DEC.2015 09:18:20

High Channel Plot



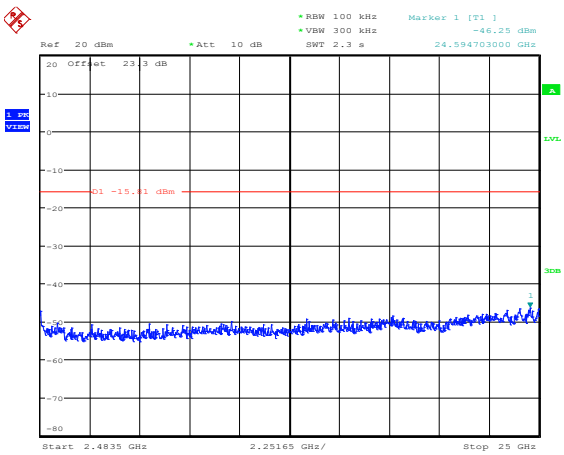
Date: 6.DEC.2015 10:58:17

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:47:19

Spurious Emission 2.4835GHz~25GHz

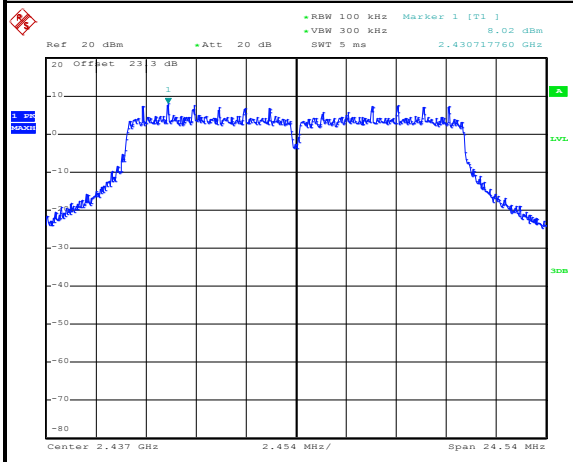


Date: 7.DEC.2015 19:47:27

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	01	**Test Engineer :**	Bill Kuo

WLAN 802.11g Channel 01

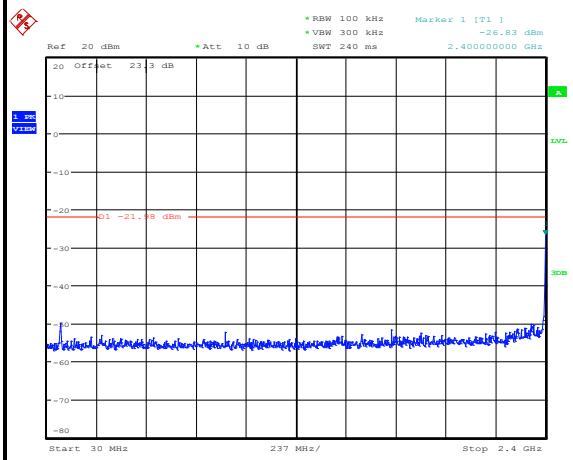
100kHz PSD reference Level



Date: 6.DEC.2015 10:22:21

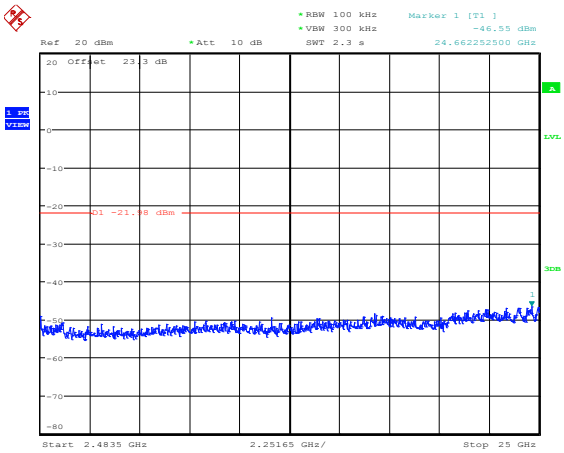
Low Channel Plot

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:48:24

Spurious Emission 2.4835GHz~25GHz

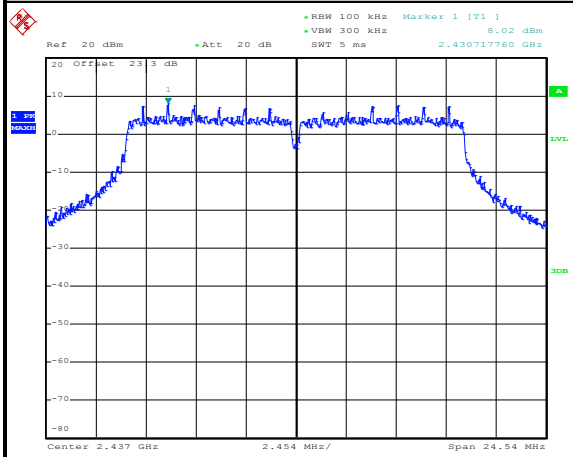


Date: 7.DEC.2015 19:48:32

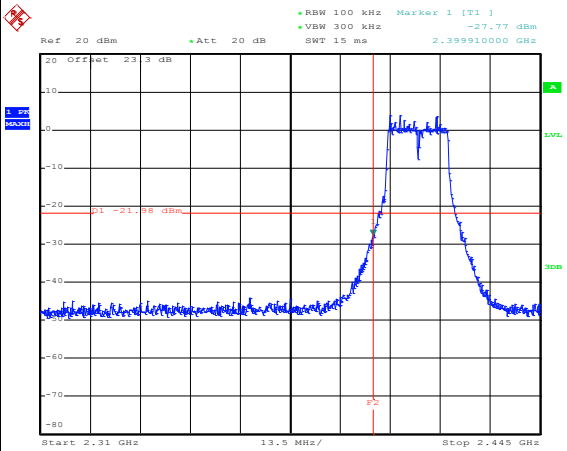
Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

WLAN 802.11g Channel 06

100kHz PSD reference Level

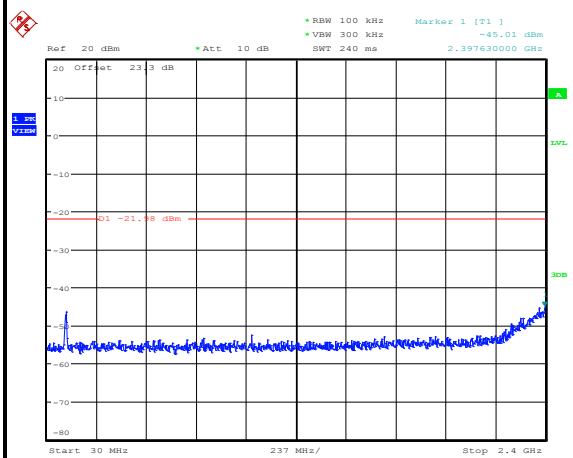


Date: 6.DEC.2015 10:22:21



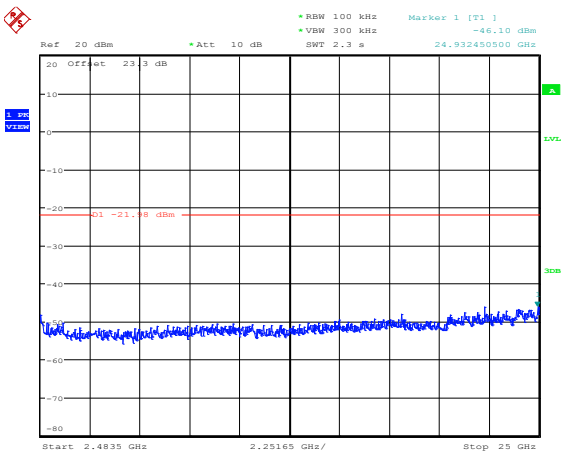
Date: 6.DEC.2015 10:43:26

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:50:15

Spurious Emission 2.4835GHz~25GHz

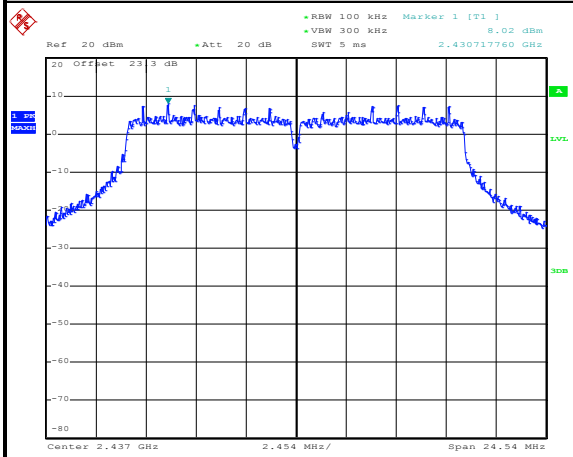


Date: 7.DEC.2015 19:50:23

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	11	**Test Engineer :**	Bill Kuo

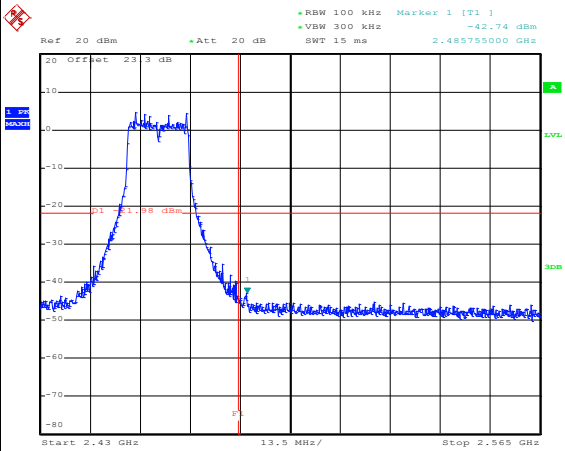
WLAN 802.11g Channel 11

100kHz PSD reference Level



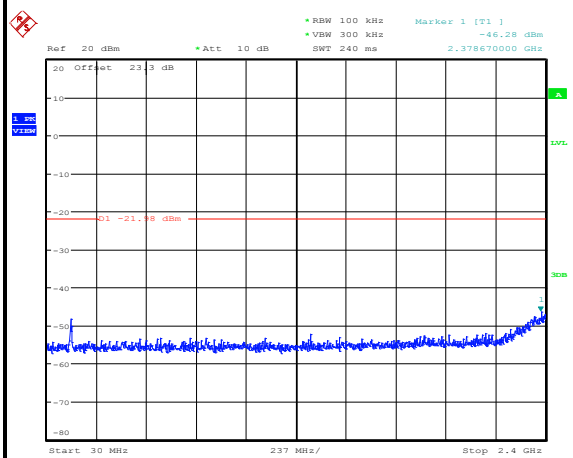
Date: 6.DEC.2015 10:22:21

High Channel Plot



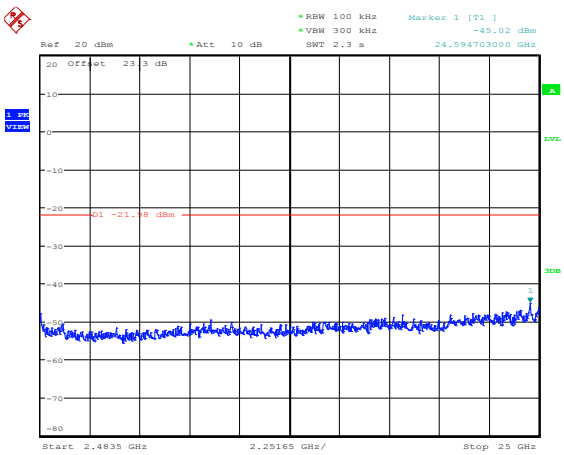
Date: 6.DEC.2015 10:55:40

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:50:53

Spurious Emission 2.4835GHz~25GHz

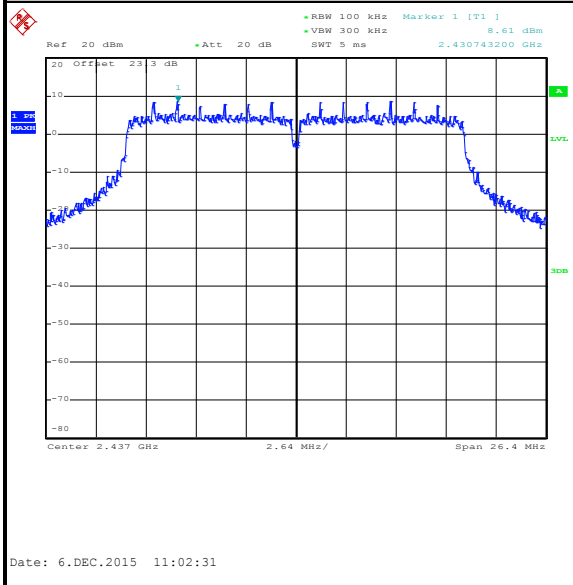


Date: 7.DEC.2015 19:51:01

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	01	**Test Engineer :**	Bill Kuo

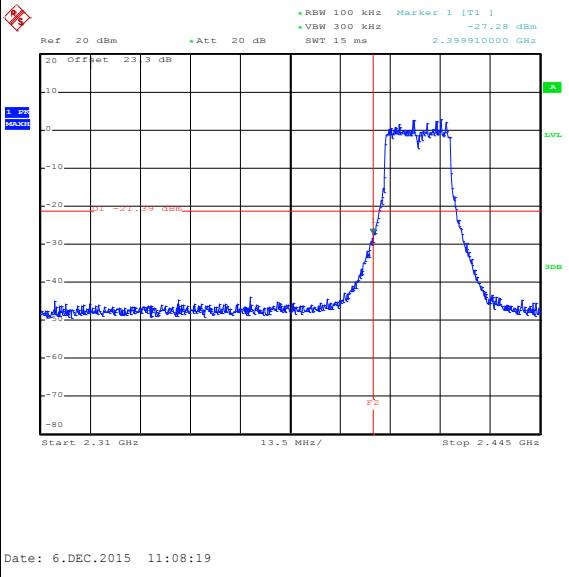
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



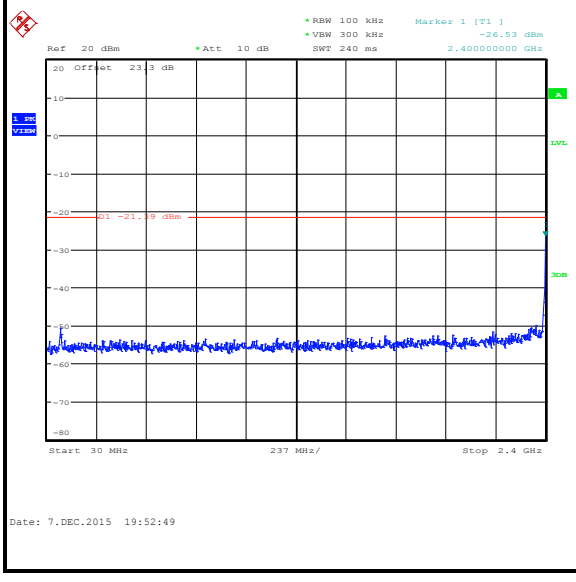
Date: 6.DEC.2015 11:02:31

Low Channel Plot



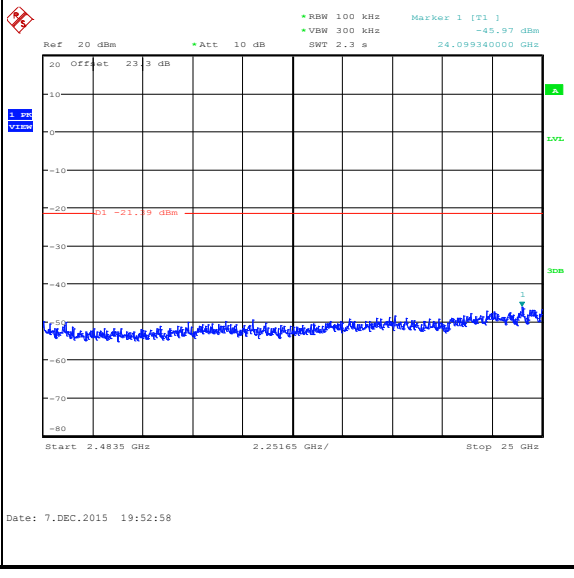
Date: 6.DEC.2015 11:08:19

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:52:49

Spurious Emission 2.4835GHz~25GHz

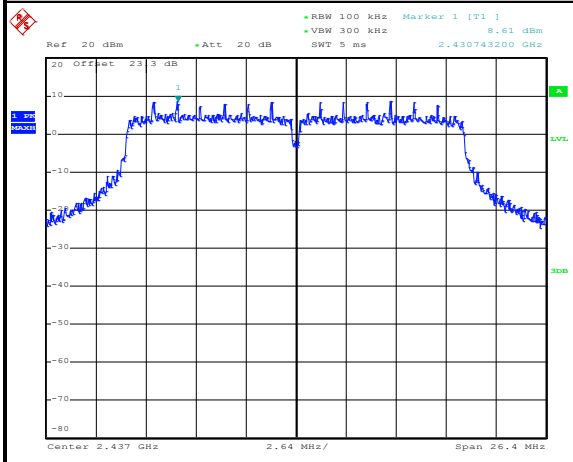


Date: 7.DEC.2015 19:52:58

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

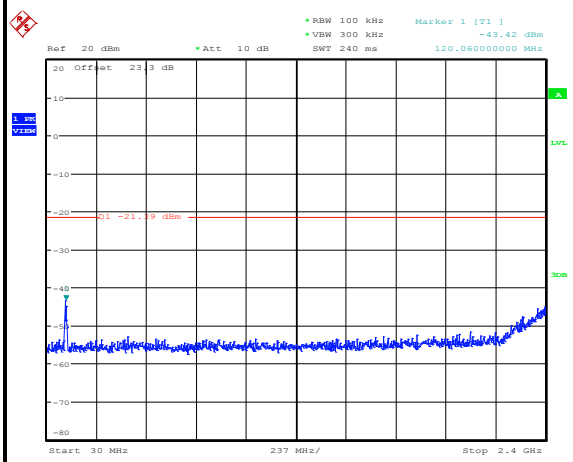
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



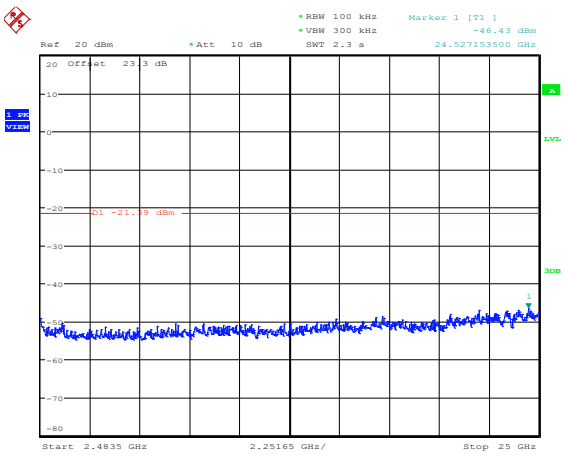
Date: 6.DEC.2015 11:02:31

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:53:31

Spurious Emission 2.4835GHz~25GHz

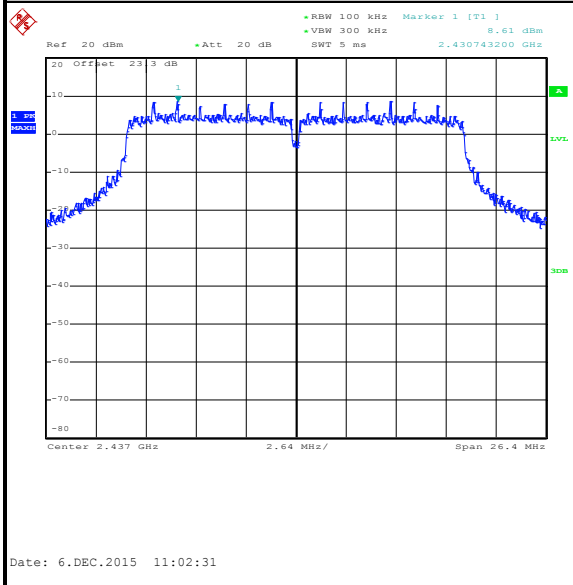


Date: 7.DEC.2015 19:53:39

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	11	**Test Engineer :**	Bill Kuo

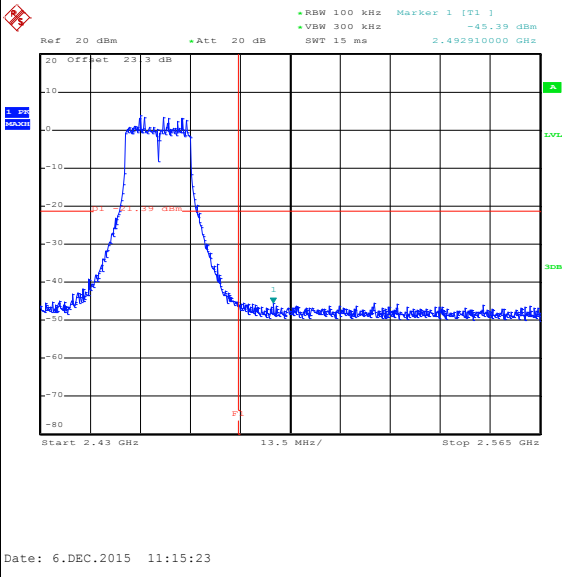
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



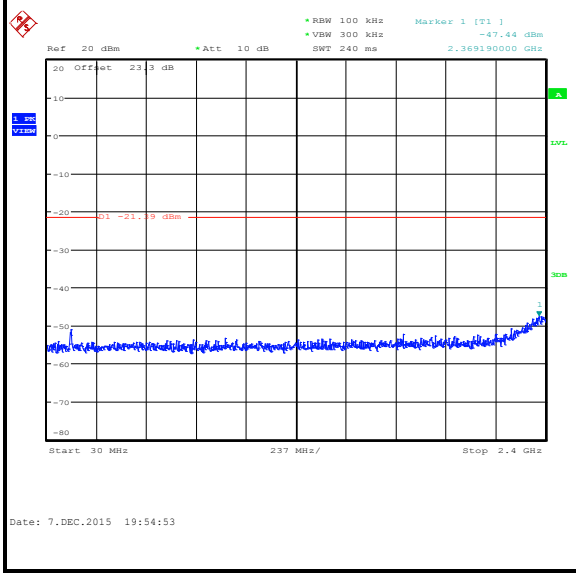
Date: 6.DEC.2015 11:02:31

High Channel Plot



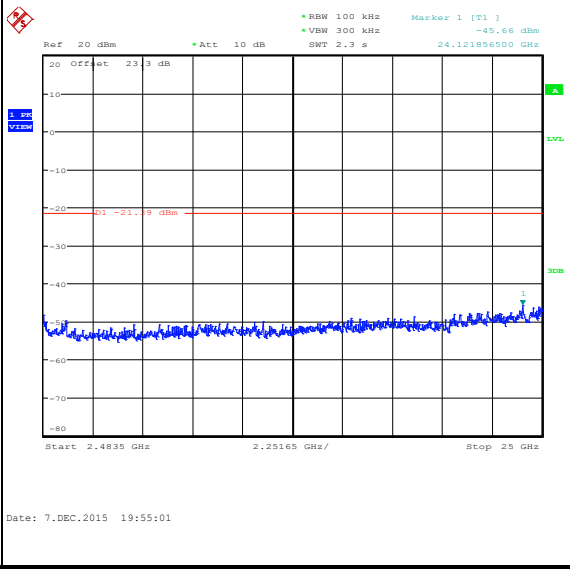
Date: 6.DEC.2015 11:15:23

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:54:53

Spurious Emission 2.4835GHz~25GHz

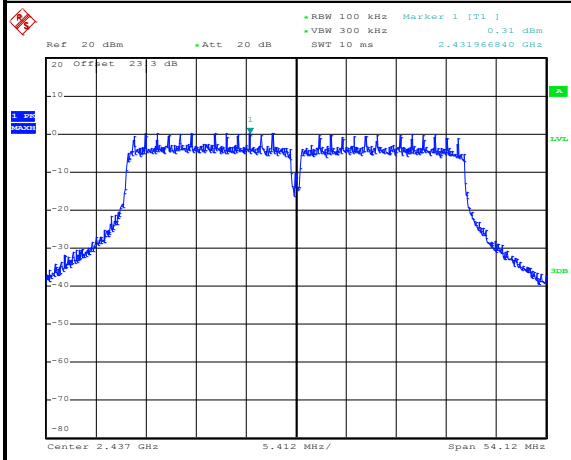


Date: 7.DEC.2015 19:55:01

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT40	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	03	**Test Engineer :**	Bill Kuo

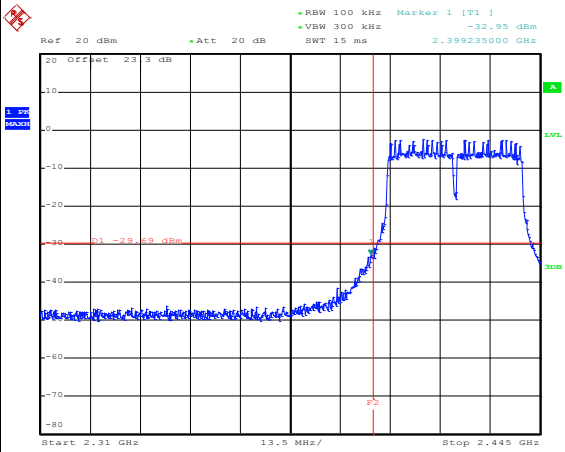
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



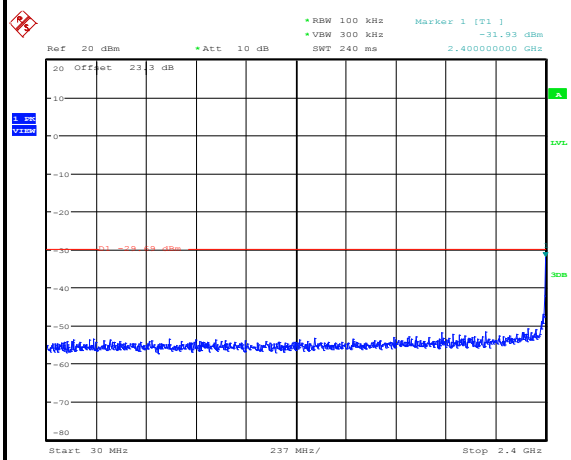
Date: 6.DEC.2015 11:22:11

Low Channel Plot



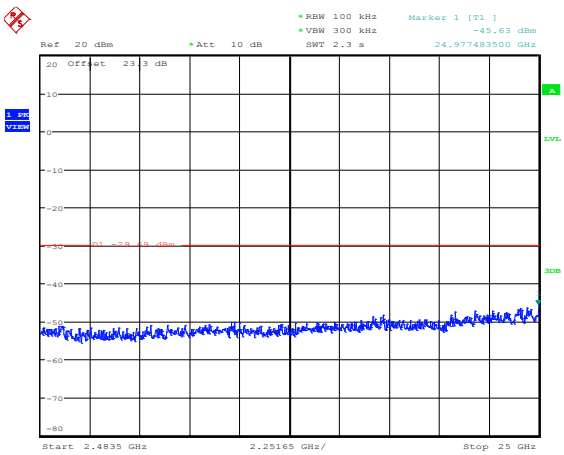
Date: 6.DEC.2015 11:33:12

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:55:48

Spurious Emission 2.4835GHz~25GHz

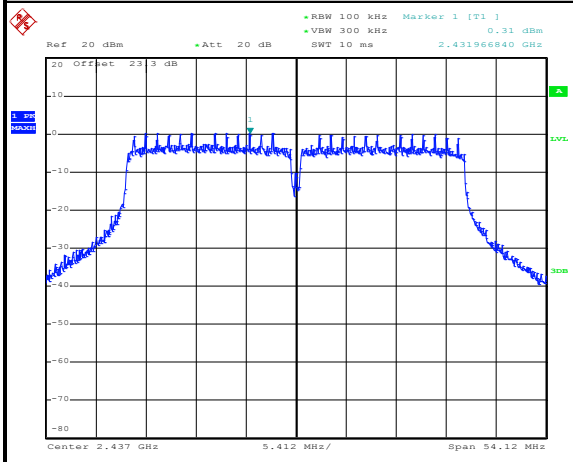


Date: 7.DEC.2015 19:55:56

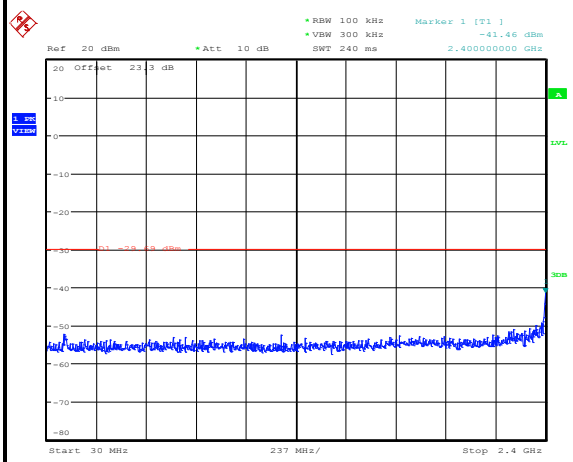
Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT40	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

WLAN 802.11n HT40 Channel 06

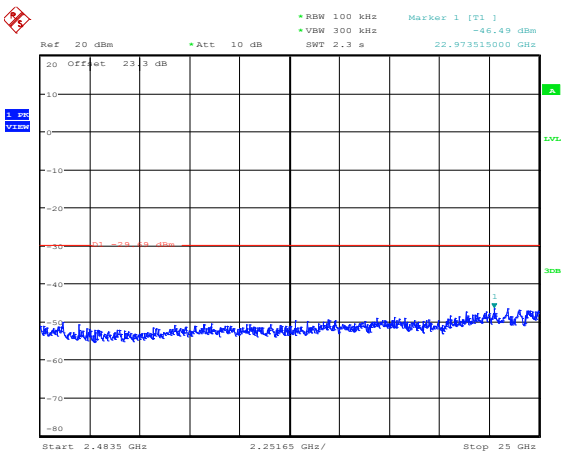
100kHz PSD reference Level



Spurious Emission 30MHz~2.4GHz



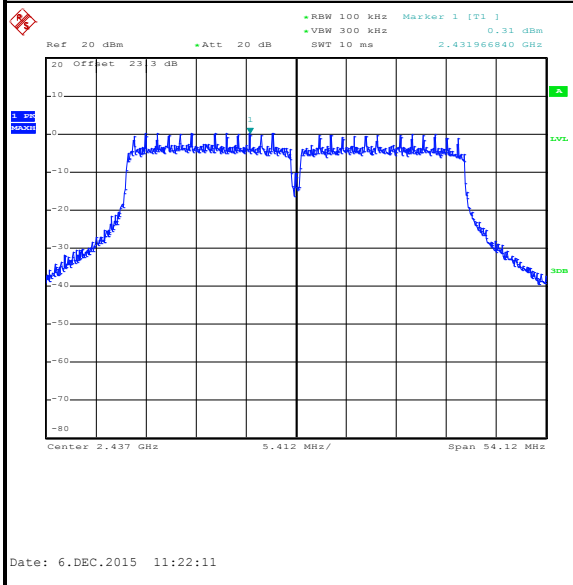
Spurious Emission 2.4835GHz~25GHz



Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT40	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	09	**Test Engineer :**	Bill Kuo

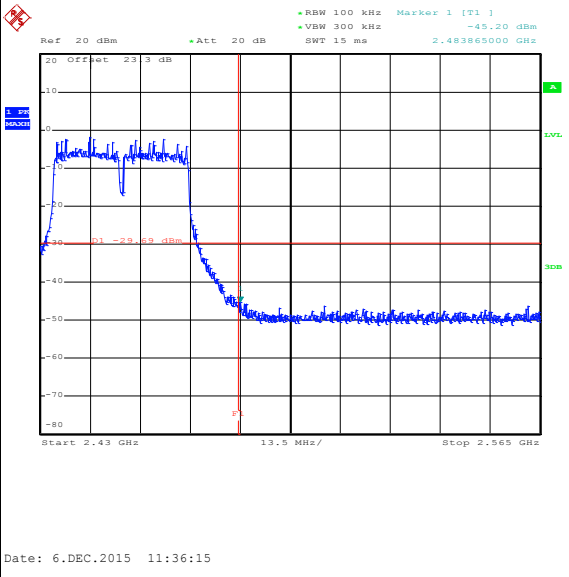
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



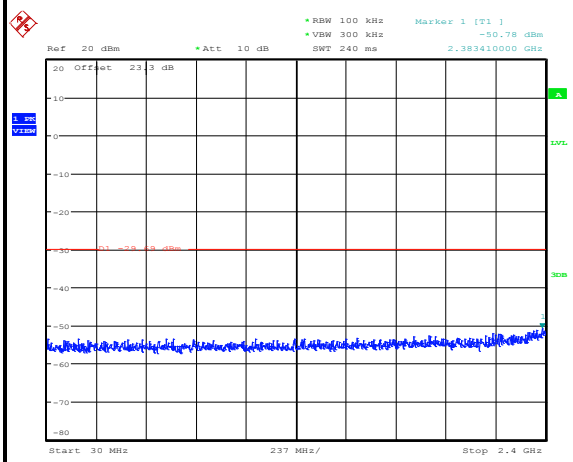
Date: 6.DEC.2015 11:22:11

High Channel Plot



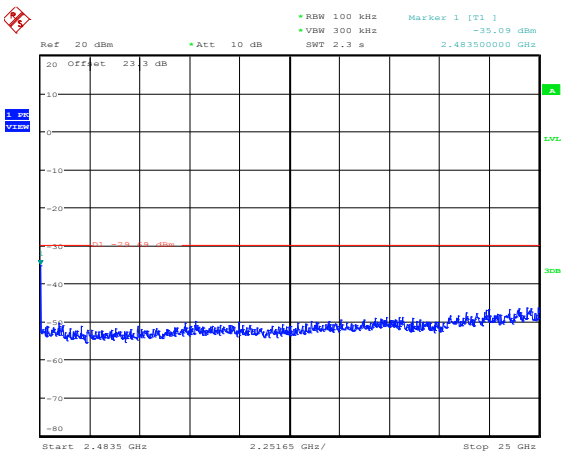
Date: 6.DEC.2015 11:36:15

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:58:23

Spurious Emission 2.4835GHz~25GHz



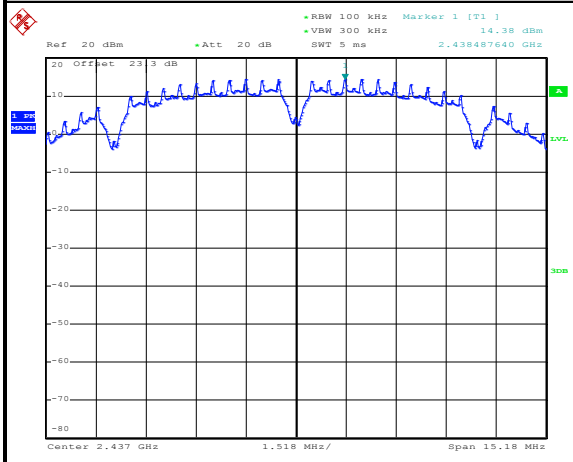
Date: 7.DEC.2015 19:58:31

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

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	01	**Test Engineer :**	Bill Kuo

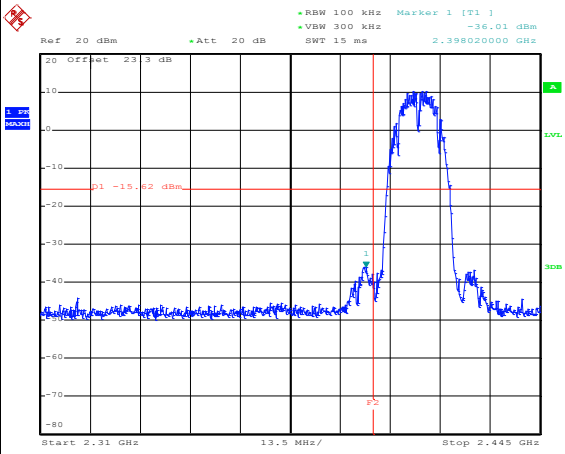
WLAN 802.11b Channel 01

100kHz PSD reference Level



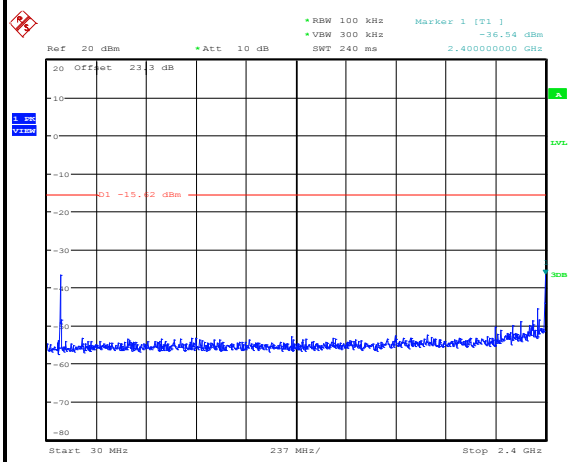
Date: 6.DEC.2015 09:37:32

Low Channel Plot



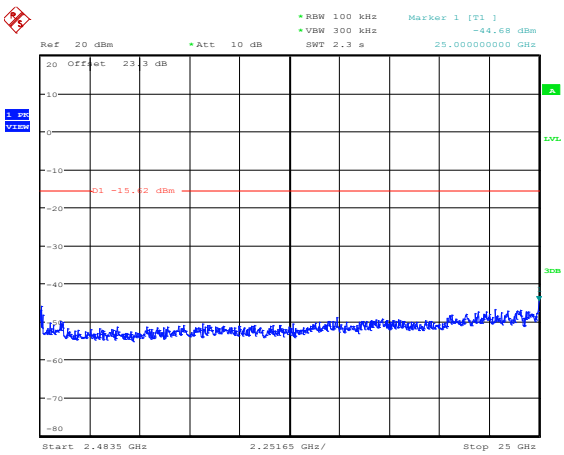
Date: 6.DEC.2015 10:06:10

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:44:15

Spurious Emission 2.4835GHz~25GHz

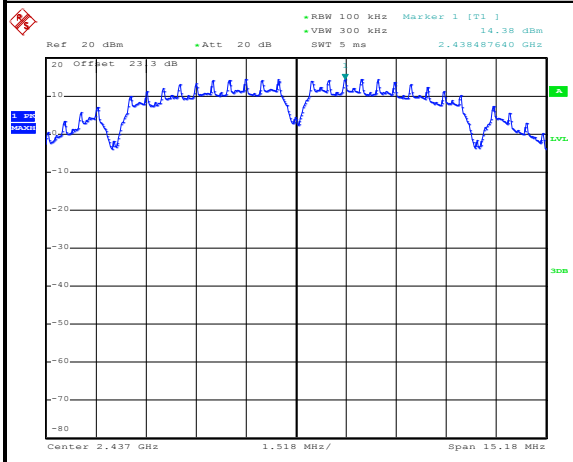


Date: 7.DEC.2015 19:44:23

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

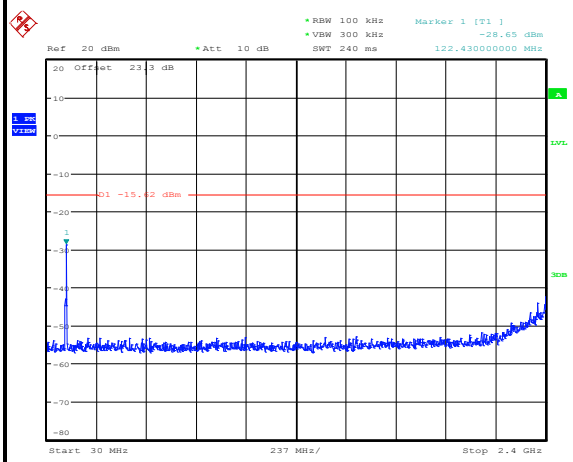
WLAN 802.11b Channel 06

100kHz PSD reference Level



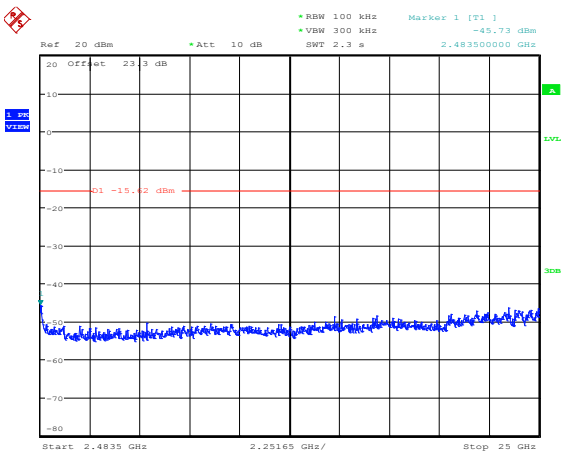
Date: 6.DEC.2015 09:37:32

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:46:16

Spurious Emission 2.4835GHz~25GHz

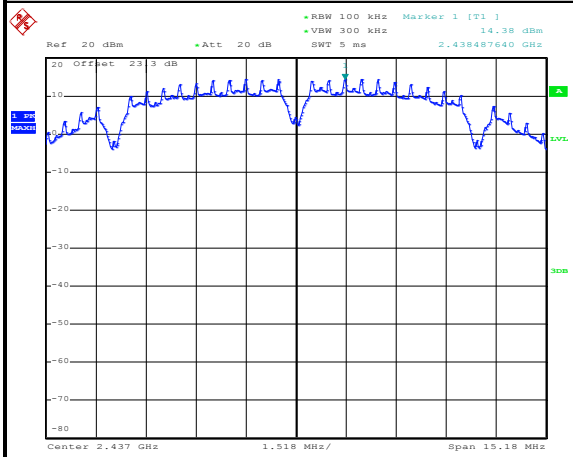


Date: 7.DEC.2015 19:46:24

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	11	**Test Engineer :**	Bill Kuo

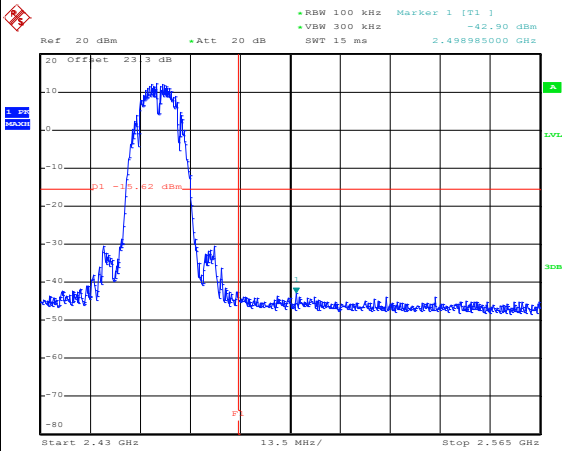
WLAN 802.11b Channel 11

100kHz PSD reference Level



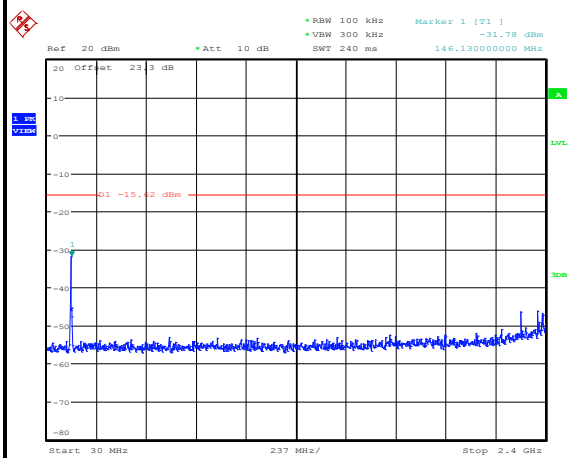
Date: 6.DEC.2015 09:37:32

High Channel Plot



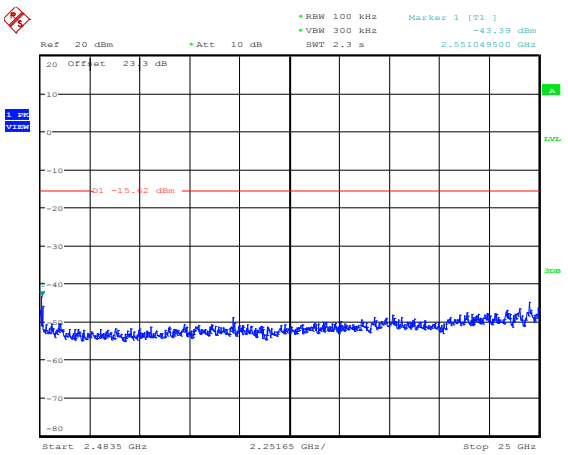
Date: 6.DEC.2015 11:00:07

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:46:51

Spurious Emission 2.4835GHz~25GHz

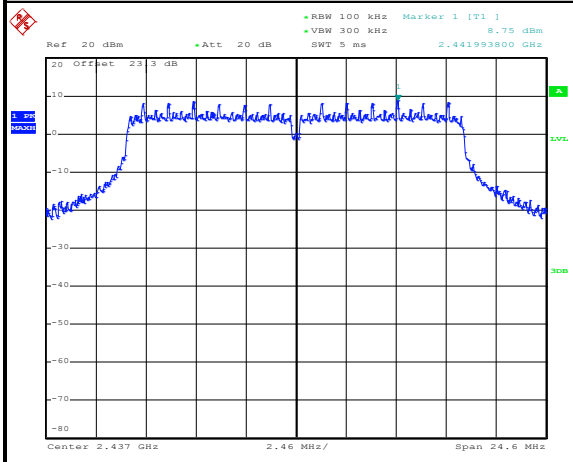


Date: 7.DEC.2015 19:46:59

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	01	**Test Engineer :**	Bill Kuo

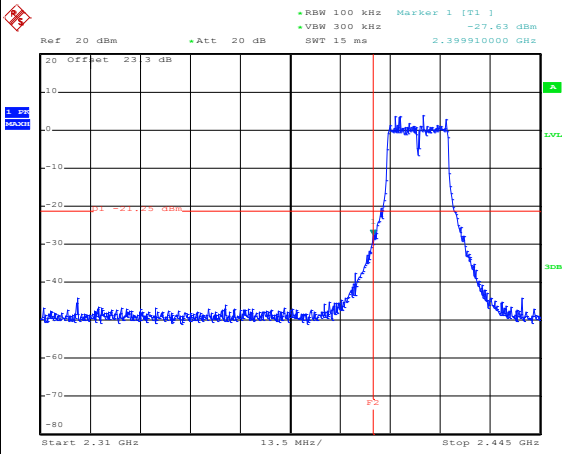
WLAN 802.11g Channel 01

100kHz PSD reference Level



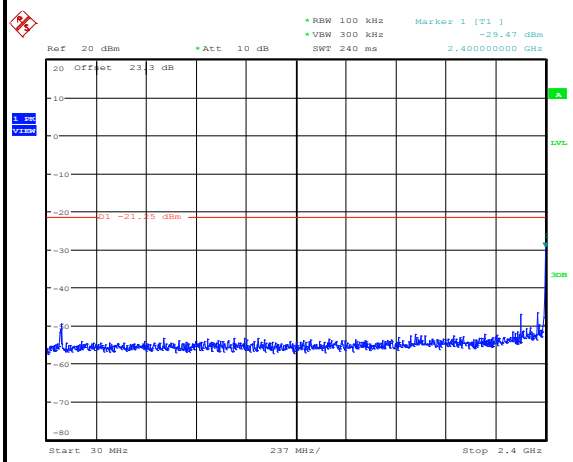
Date: 6.DEC.2015 10:28:58

Low Channel Plot



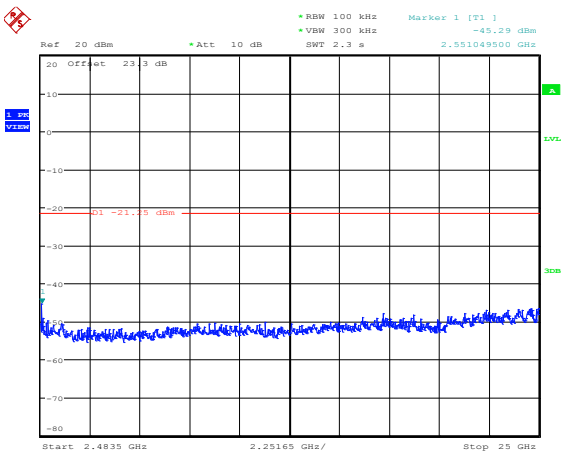
Date: 6.DEC.2015 10:38:32

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:49:05

Spurious Emission 2.4835GHz~25GHz

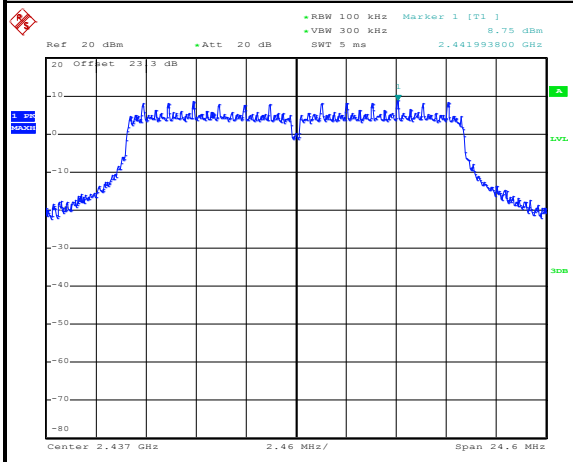


Date: 7.DEC.2015 19:49:13

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

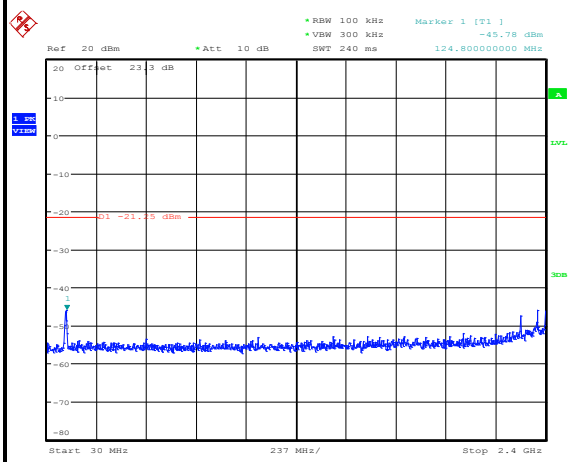
WLAN 802.11g Channel 06

100kHz PSD reference Level



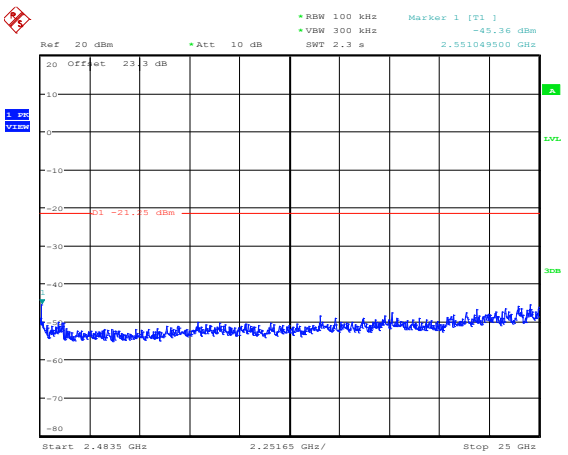
Date: 6.DEC.2015 10:28:58

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:49:50

Spurious Emission 2.4835GHz~25GHz

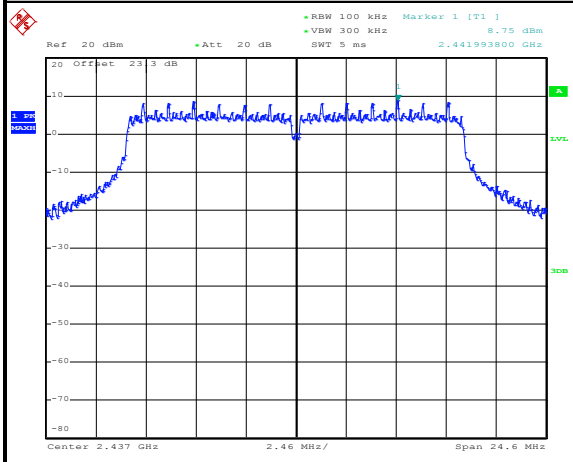


Date: 7.DEC.2015 19:49:58

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	11	**Test Engineer :**	Bill Kuo

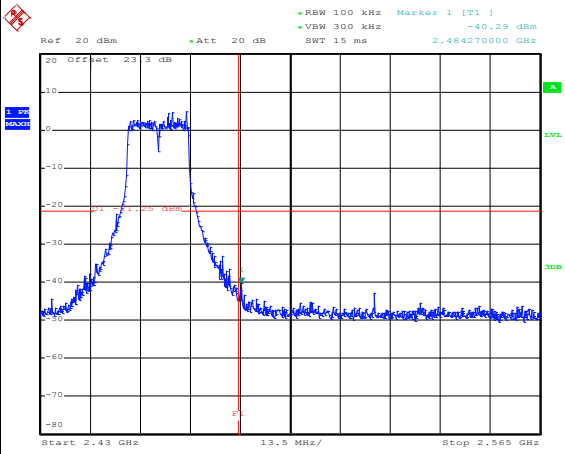
WLAN 802.11g Channel 11

100kHz PSD reference Level



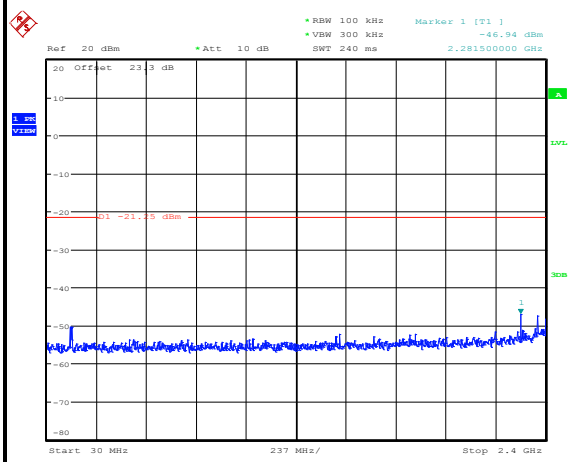
Date: 6.DEC.2015 10:28:58

High Channel Plot



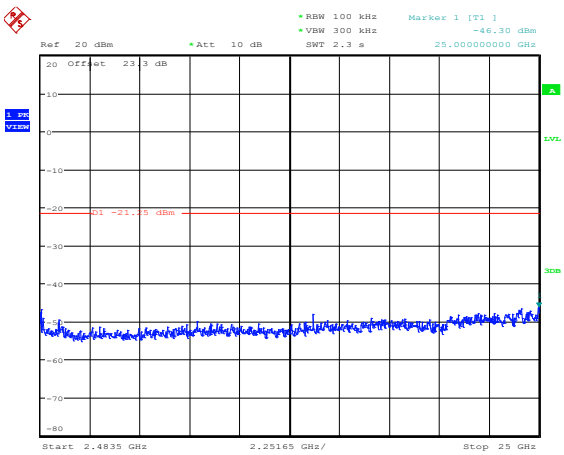
Date: 6.DEC.2015 10:48:22

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:51:19

Spurious Emission 2.4835GHz~25GHz

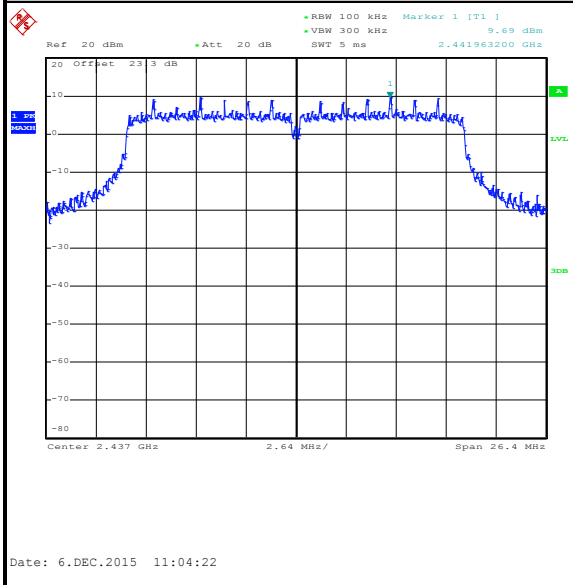


Date: 7.DEC.2015 19:51:27

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	01	**Test Engineer :**	Bill Kuo

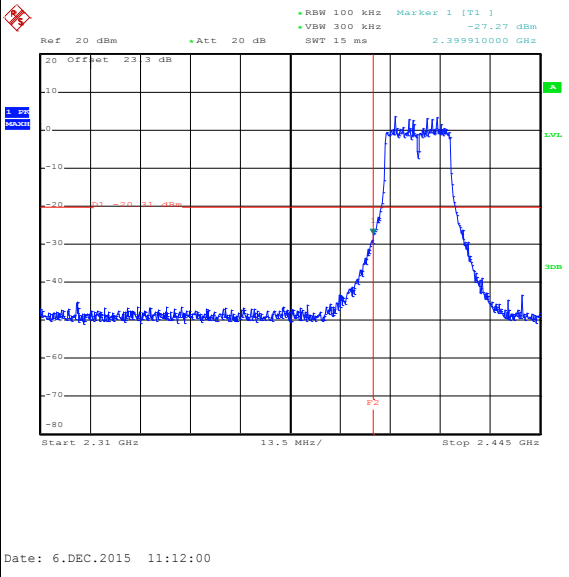
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



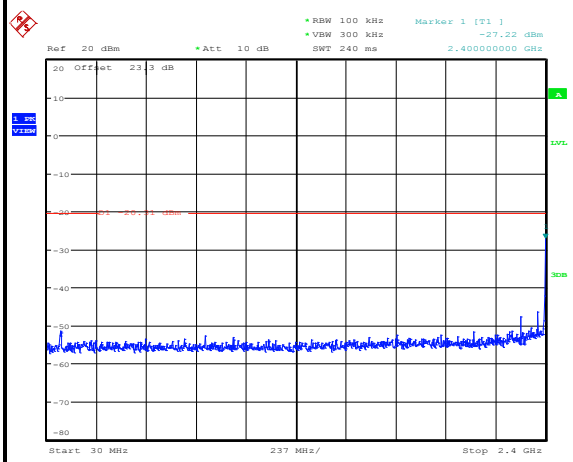
Date: 6.DEC.2015 11:04:22

Low Channel Plot



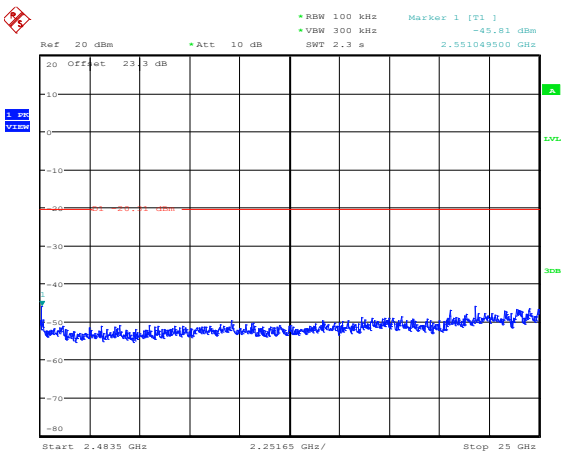
Date: 6.DEC.2015 11:12:00

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:52:17

Spurious Emission 2.4835GHz~25GHz

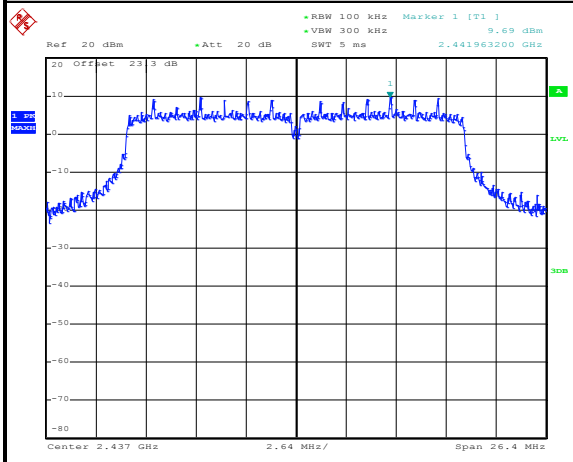


Date: 7.DEC.2015 19:52:25

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

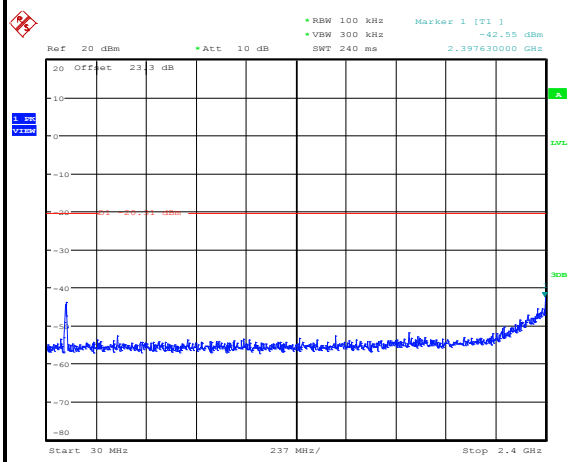
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



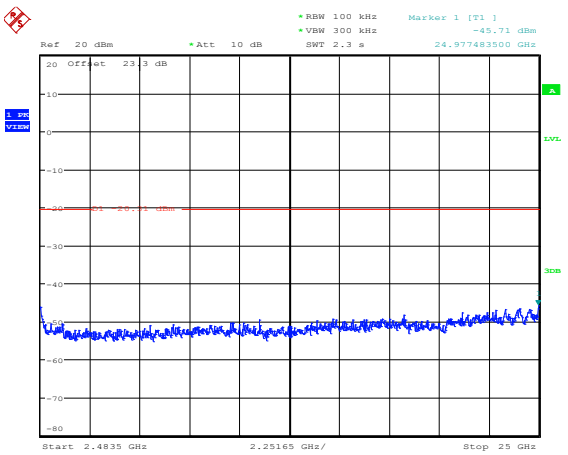
Date: 6.DEC.2015 11:04:22

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:53:55

Spurious Emission 2.4835GHz~25GHz

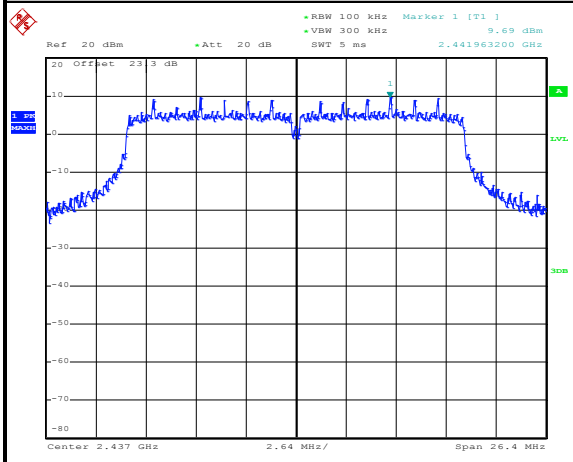


Date: 7.DEC.2015 19:54:03

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	11	**Test Engineer :**	Bill Kuo

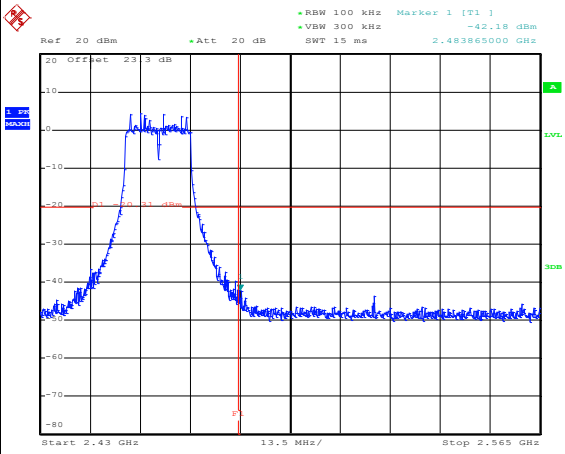
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



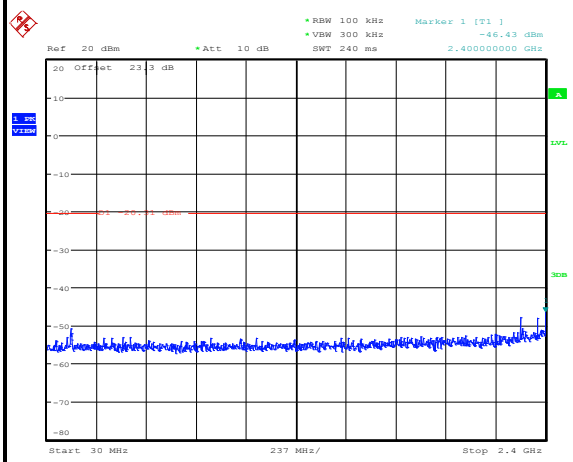
Date: 6.DEC.2015 11:04:22

High Channel Plot



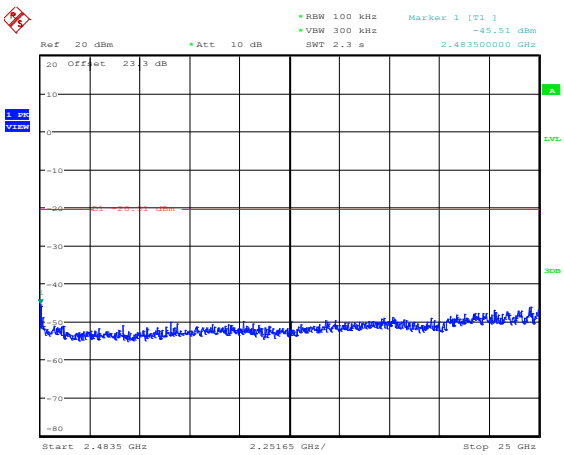
Date: 6.DEC.2015 11:18:06

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:54:28

Spurious Emission 2.4835GHz~25GHz

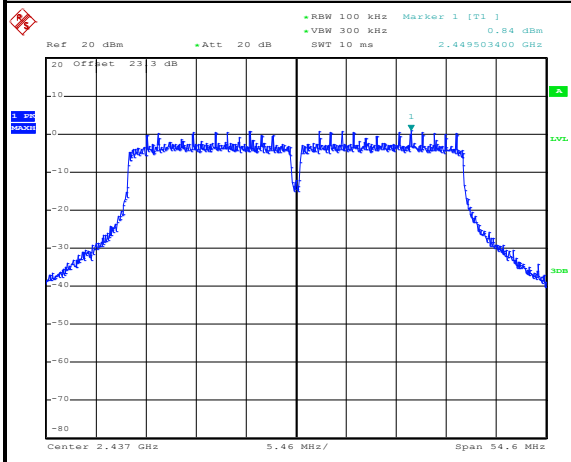


Date: 7.DEC.2015 19:54:36

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT40	**Temperature :**	24~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~49%
Test Channel :	03	**Test Engineer :**	Bill Kuo

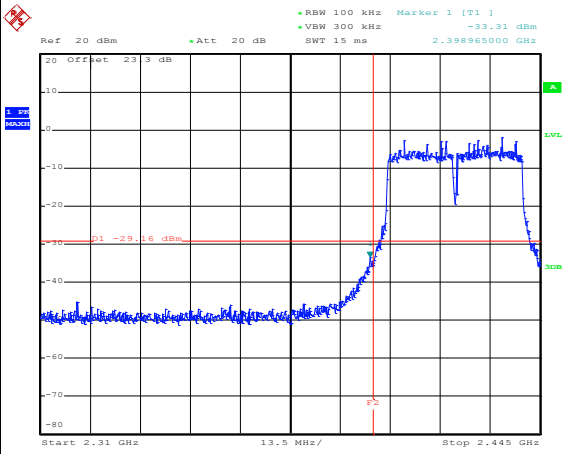
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



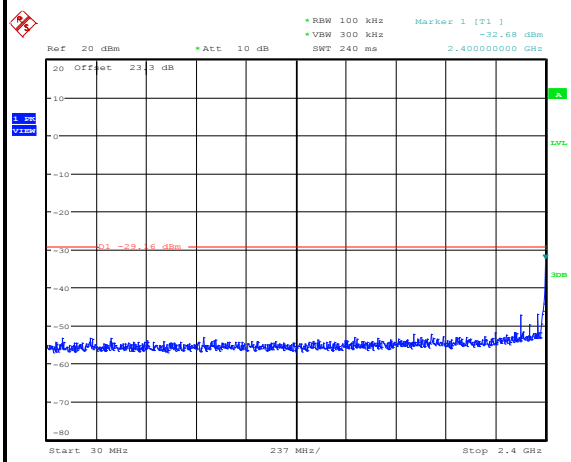
Date: 6.DEC.2015 11:25:26

Low Channel Plot



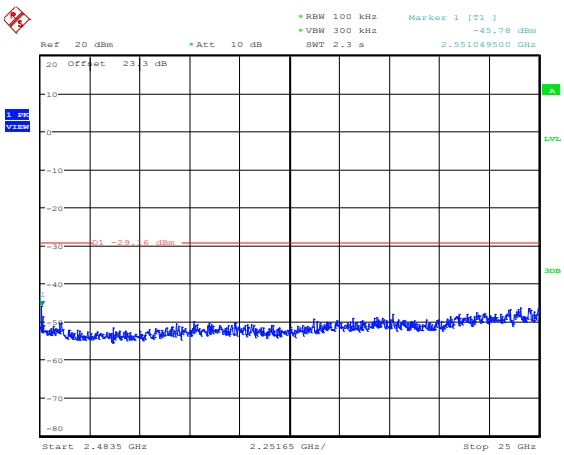
Date: 6.DEC.2015 11:30:18

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:56:18

Spurious Emission 2.4835GHz~25GHz

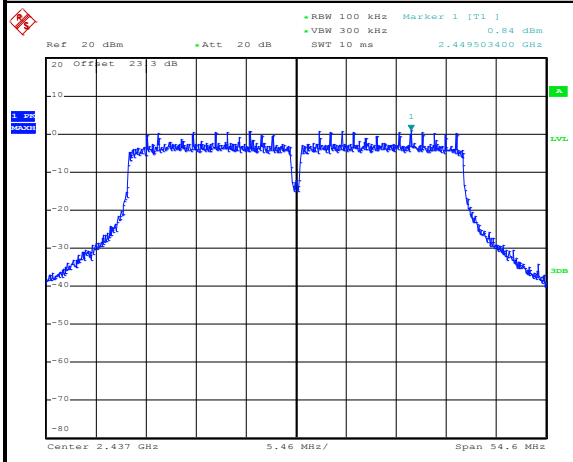


Date: 7.DEC.2015 19:56:26

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT40	**Temperature :**	24~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~49%
Test Channel :	06	**Test Engineer :**	Bill Kuo

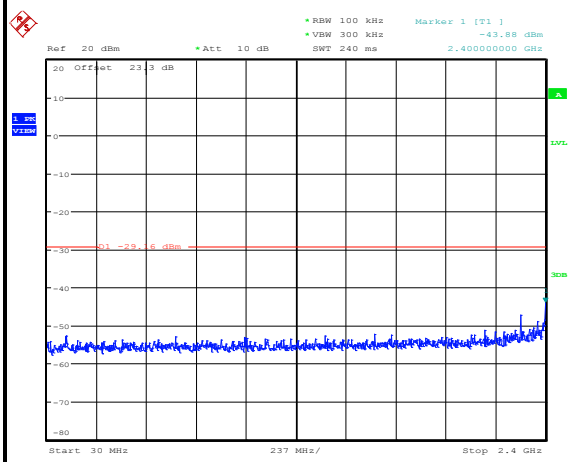
WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



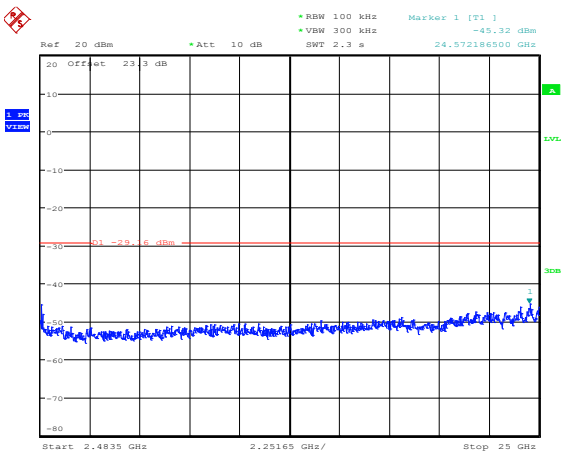
Date: 6.DEC.2015 11:25:26

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:57:06

Spurious Emission 2.4835GHz~25GHz

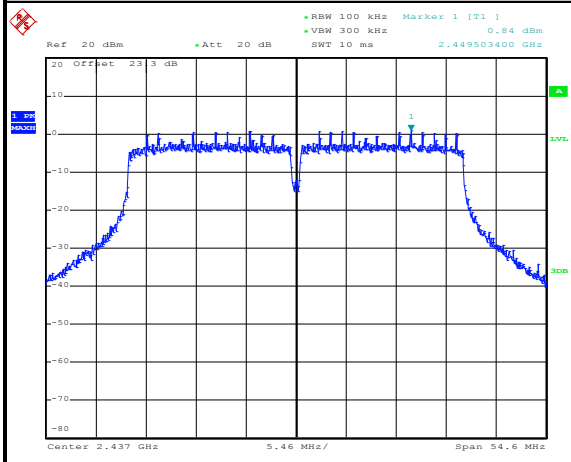


Date: 7.DEC.2015 19:57:14

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT40	**Temperature :**	24~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~49%
Test Channel :	09	**Test Engineer :**	Bill Kuo

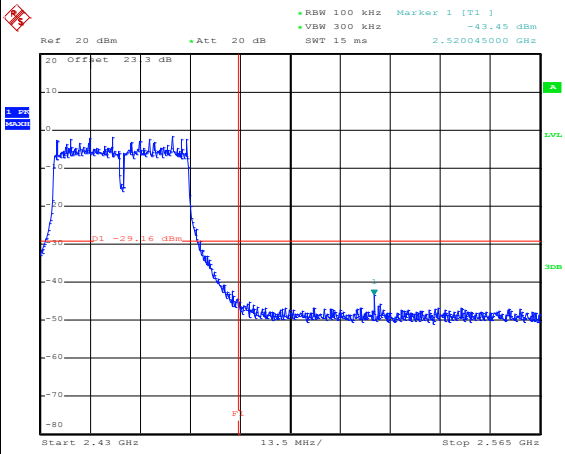
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



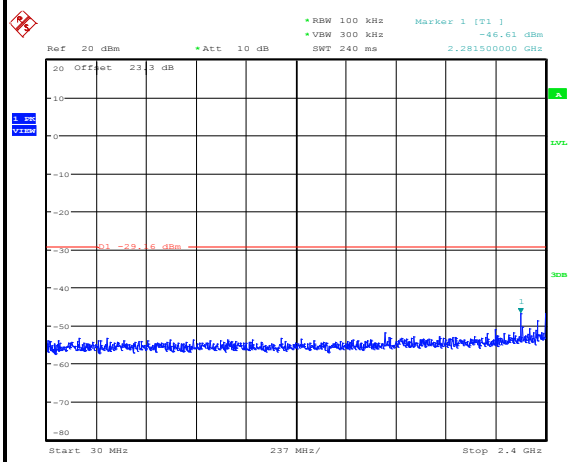
Date: 6.DEC.2015 11:25:26

High Channel Plot



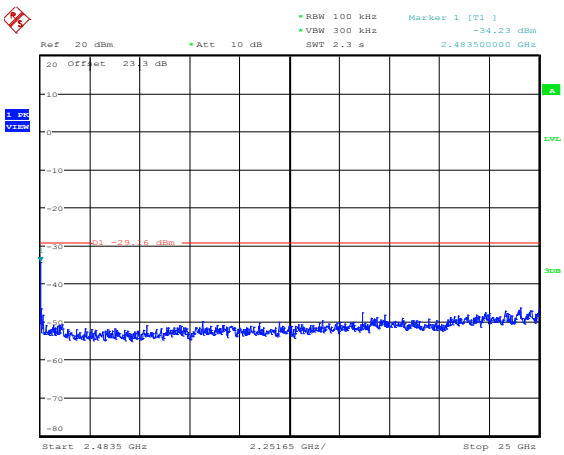
Date: 6.DEC.2015 11:39:12

Spurious Emission 30MHz~2.4GHz



Date: 7.DEC.2015 19:58:47

Spurious Emission 2.4835GHz~25GHz



Date: 7.DEC.2015 19:58:55

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 FCC section 15.209 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.

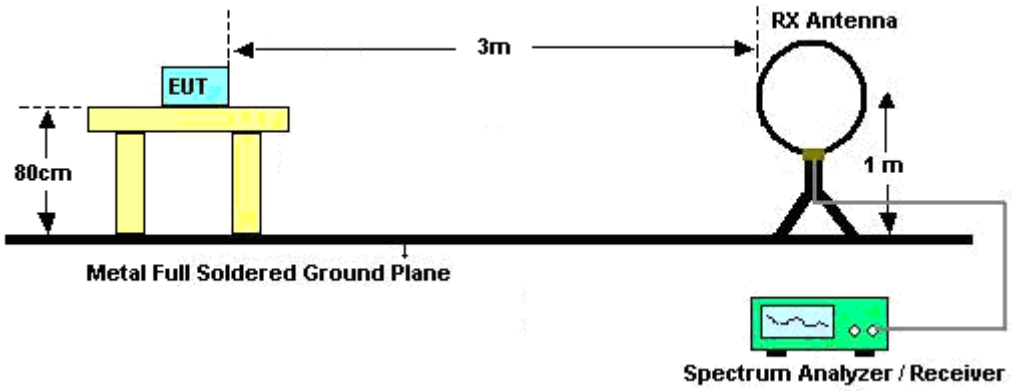
3.5.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ 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.

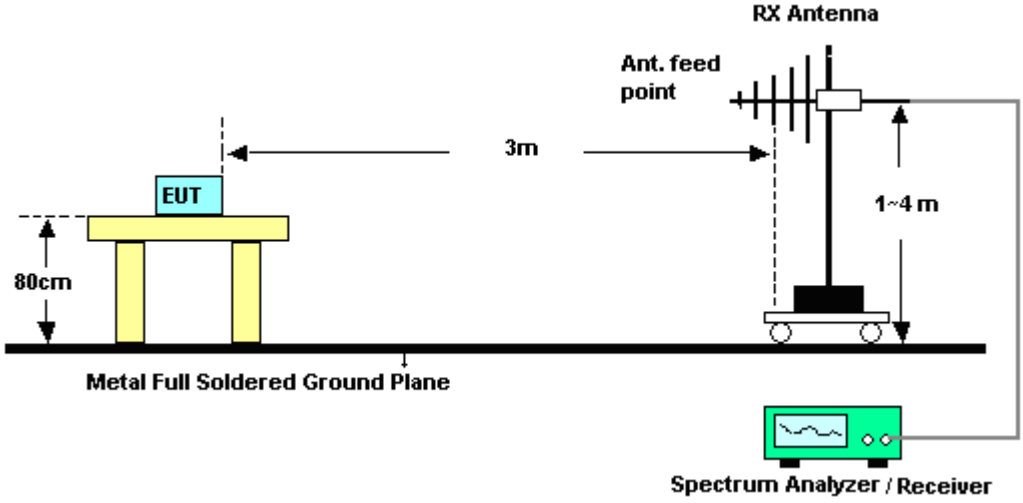
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1	802.11b	100	-	-	10Hz
2	802.11b	100	-	-	10Hz
1 + 2	802.11b for Ant. 1	100	-	-	10Hz
1 + 2	802.11b for Ant. 2	100	-	-	10Hz
1	802.11g	98.26	-	-	10Hz
2	802.11g	98.26	-	-	10Hz
1 + 2	802.11g for Ant. 1	98.26	-	-	10Hz
1 + 2	802.11g for Ant. 2	98.26	-	-	10Hz
1	2.4GHz 802.11n HT20	98.14	-	-	10Hz
2	2.4GHz 802.11n HT20	98.14	-	-	10Hz
1 + 2	2.4GHz 802.11n HT20 for SISO<Ant. 1>	98.13	-	-	10Hz
1 + 2	2.4GHz 802.11n HT20 for SISO<Ant. 2>	98.13	-	-	10Hz
1	2.4GHz 802.11n HT40	97.47	1232	0.811688312	1kHz
2	2.4GHz 802.11n HT40	96.84	1224	0.816993464	1kHz
1 + 2	2.4GHz 802.11n HT40 for SISO<Ant. 1>	96.7	1230	0.81300813	1kHz
1 + 2	2.4GHz 802.11n HT40 for SISO<Ant. 2>	96.86	1232	0.811688312	1kHz

3.5.4 Test Setup

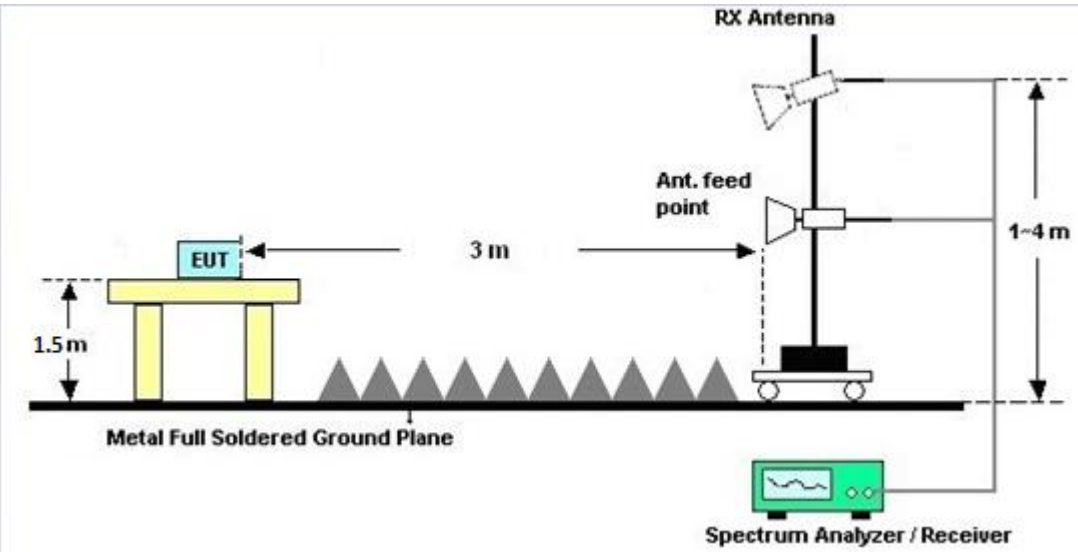
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B of this test report.

3.5.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B of this test report.

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.

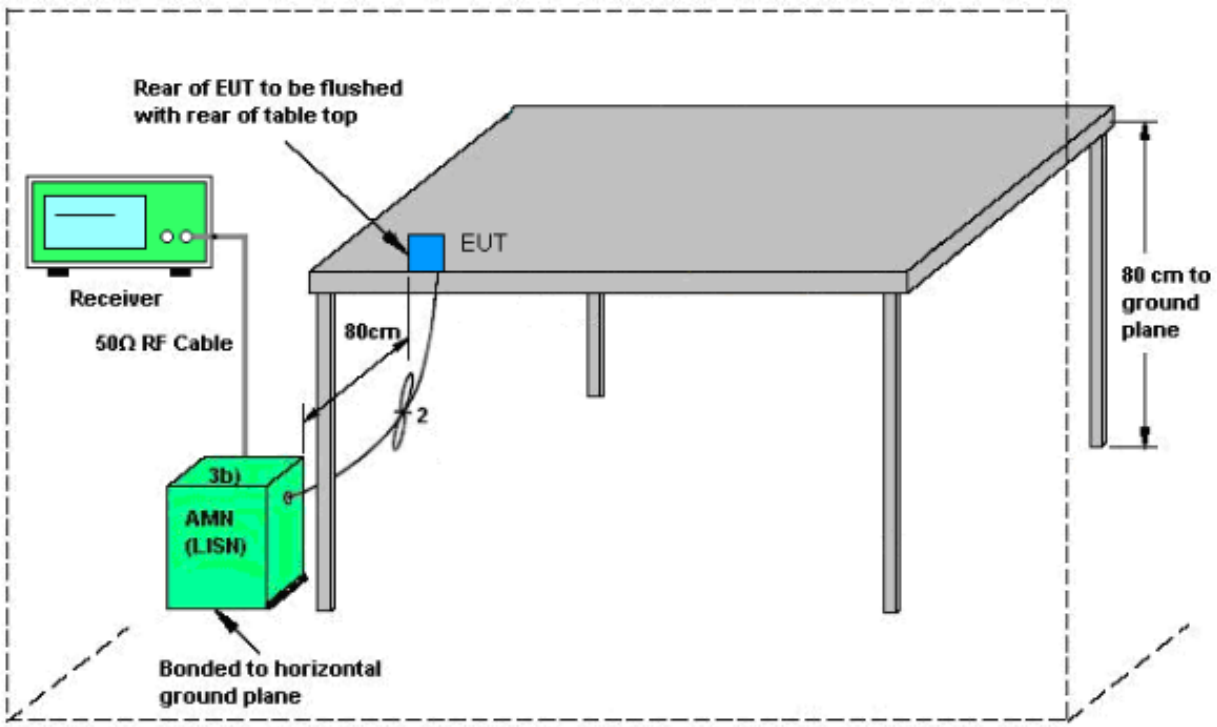
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

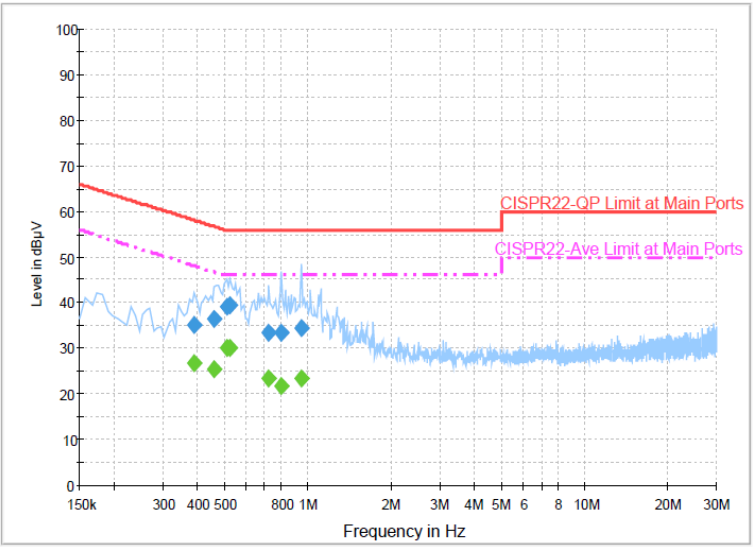
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	Derreck Chen	Relative Humidity :	51~53%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (2.4GHz) Link + TC		



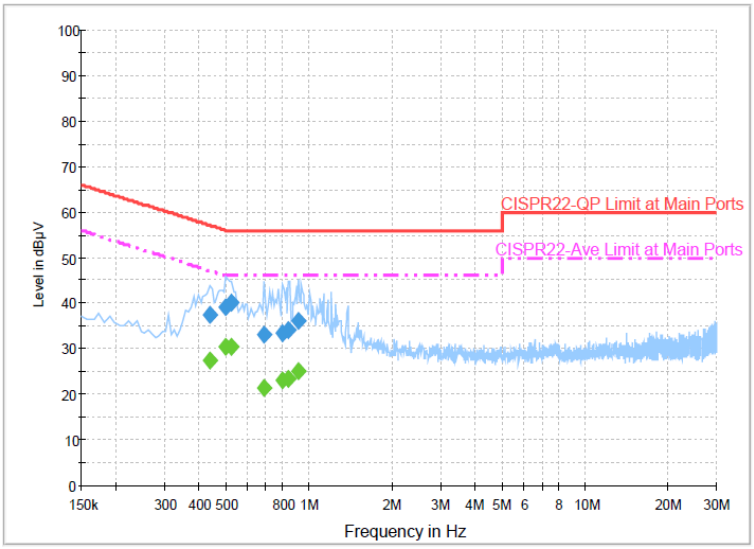
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.390000	35.1	Off	L1	19.6	23.0	58.1
0.462000	36.3	Off	L1	19.5	20.4	56.7
0.510000	39.2	Off	L1	19.5	16.8	56.0
0.526000	39.4	Off	L1	19.5	16.6	56.0
0.726000	33.3	Off	L1	19.6	22.7	56.0
0.806000	33.4	Off	L1	19.6	22.6	56.0
0.950000	34.6	Off	L1	19.6	21.4	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.390000	26.7	Off	L1	19.6	21.4	48.1
0.462000	25.6	Off	L1	19.5	21.1	46.7
0.510000	30.1	Off	L1	19.5	15.9	46.0
0.526000	30.0	Off	L1	19.5	16.0	46.0
0.726000	23.4	Off	L1	19.6	22.6	46.0
0.806000	21.9	Off	L1	19.6	24.1	46.0
0.950000	23.5	Off	L1	19.6	22.5	46.0

Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	Derreck Chen	Relative Humidity :	51~53%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (2.4GHz) Link + TC		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.438000	37.5	Off	N	19.5	19.6	57.1
0.502000	39.2	Off	N	19.5	16.8	56.0
0.526000	40.1	Off	N	19.5	15.9	56.0
0.686000	33.0	Off	N	19.6	23.0	56.0
0.806000	33.5	Off	N	19.6	22.5	56.0
0.846000	34.0	Off	N	19.6	22.0	56.0
0.918000	36.1	Off	N	19.6	19.9	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.438000	27.5	Off	N	19.5	19.6	47.1
0.502000	30.5	Off	N	19.5	15.5	46.0
0.526000	30.4	Off	N	19.5	15.6	46.0
0.686000	21.5	Off	N	19.6	24.5	46.0
0.806000	23.2	Off	N	19.6	22.8	46.0
0.846000	23.5	Off	N	19.6	22.5	46.0
0.918000	25.2	Off	N	19.6	20.8	46.0

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 FCC 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 $N_{ANT} \leq 4$.

The EUT supports CDD mode.

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	2.21	2.21	2.21	5.22	0.00	0.00

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	1240001	300MHz~40GHz	Sep. 17, 2015	Nov. 04, 2015~ Dec. 07, 2015	Sep. 16, 2016	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1207349	300MHz~40GHz	Sep. 17, 2015	Nov. 04, 2015~ Dec. 07, 2015	Sep. 16, 2016	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz-40GHz	Jun. 18, 2015	Nov. 04, 2015~ Dec. 07, 2015	Jun. 17, 2016	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Nov. 06, 2015~ Nov. 07, 2015	Sep. 01, 2016	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 24, 2014	Nov. 06, 2015~ Nov. 07, 2015	Nov. 23, 2015	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 08, 2015	Nov. 06, 2015~ Nov. 07, 2015	Oct. 07, 2016	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTN-303B	TP140325	N/A	Nov. 19, 2014	Nov. 06, 2015~ Nov. 07, 2015	Nov. 18, 2015	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 20, 2014	Nov. 06, 2015~ Nov. 07, 2015	Nov. 19, 2015	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1902247	1GHz~18GHz	Jul. 01, 2015	Nov. 06, 2015~ Nov. 07, 2015	Jun. 30, 2016	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHZ	Sep. 24, 2015	Nov. 06, 2015~ Nov. 07, 2015	Sep. 23, 2016	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Nov. 06, 2015~ Nov. 07, 2015	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0-360 degree	N/A	Nov. 06, 2015~ Nov. 07, 2015	N/A	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D	35419	30MHz to 1GHz	Mar. 30, 2015	Nov. 06, 2015~ Nov. 07, 2015	Mar. 29, 2016	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Apr. 20, 2015	Nov. 06, 2015~ Nov. 07, 2015	Apr. 19, 2016	Radiation (03CH11-HY)
Preamplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 02, 2015	Nov. 06, 2015~ Nov. 07, 2015	Jun. 01, 2016	Radiation (03CH11-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz – 2.75GHz	Dec. 01, 2014	Nov. 12, 2015	Nov. 30, 2015	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Apr. 20, 2015	Nov. 12, 2015	Apr. 19, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2014	Nov. 12, 2015	Dec. 01, 2015	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 08, 2014	Nov. 12, 2015	Dec. 07, 2015	Conduction (CO05-HY)
AC Power Source()	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 12, 2015	N/A	Conduction (CO05-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.90**

Appendix A. Conducted Test Results

Report Number : FR5N0208A

Test Engineer:	Bill Kuo	Temperature:	24~26	°C
Test Date:	2015/11/4~2015/12/7	Relative Humidity:	45~49	%

Report Number : FR5N0208A

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	2	1	2412	14.15	14.15	10.08	10.08	0.50	Pass
11b	1Mbps	2	6	2437	14.40	14.55	10.08	10.12	0.50	Pass
11b	1Mbps	2	11	2462	14.20	14.20	10.08	10.08	0.50	Pass
11g	6Mbps	2	1	2412	18.45	18.20	16.36	16.40	0.50	Pass
11g	6Mbps	2	6	2437	18.50	18.20	16.36	16.40	0.50	Pass
11g	6Mbps	2	11	2462	18.60	18.20	16.40	16.40	0.50	Pass
HT20	MCS0	2	1	2412	19.40	19.25	17.60	17.60	0.50	Pass
HT20	MCS0	2	6	2437	19.45	19.55	17.60	17.60	0.50	Pass
HT20	MCS0	2	11	2462	19.35	19.20	17.64	17.60	0.50	Pass
HT40	MCS0	2	3	2422	37.20	37.30	36.32	36.40	0.50	Pass
HT40	MCS0	2	6	2437	37.30	37.00	36.08	36.40	0.50	Pass
HT40	MCS0	2	9	2452	37.10	37.10	36.08	36.40	0.50	Pass

Report Number : FR5N0208A

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	20.13	20.41		30.00	30.00	2.21	2.21	22.34	22.62	36.00	36.00	Pass
11b	1Mbps	1	6	2437	0.00	0.00	24.09	24.25		30.00	30.00	2.21	2.21	26.30	26.46	36.00	36.00	Pass
11b	1Mbps	1	11	2462	0.00	0.00	22.00	22.00		30.00	30.00	2.21	2.21	24.21	24.21	36.00	36.00	Pass
11g	6Mbps	1	1	2412	0.08	0.08	15.97	15.99		30.00	30.00	2.21	2.21	18.18	18.20	36.00	36.00	Pass
11g	6Mbps	1	6	2437	0.08	0.08	19.73	19.92		30.00	30.00	2.21	2.21	21.94	22.13	36.00	36.00	Pass
11g	6Mbps	1	11	2462	0.08	0.08	16.85	16.92		30.00	30.00	2.21	2.21	19.06	19.13	36.00	36.00	Pass
HT20	MCS0	1	1	2412	0.08	0.08	15.33	15.40		30.00	30.00	2.21	2.21	17.54	17.61	36.00	36.00	Pass
HT20	MCS0	1	6	2437	0.08	0.08	20.33	20.77		30.00	30.00	2.21	2.21	22.54	22.98	36.00	36.00	Pass
HT20	MCS0	1	11	2462	0.08	0.08	15.87	15.95		30.00	30.00	2.21	2.21	18.08	18.16	36.00	36.00	Pass
HT40	MCS0	1	3	2422	0.11	0.14	12.52	12.59		30.00	30.00	2.21	2.21	14.73	14.80	36.00	36.00	Pass
HT40	MCS0	1	6	2437	0.11	0.14	15.50	15.58		30.00	30.00	2.21	2.21	17.71	17.79	36.00	36.00	Pass
HT40	MCS0	1	9	2452	0.11	0.14	12.34	12.69		30.00	30.00	2.21	2.21	14.55	14.90	36.00	36.00	Pass
11b	1Mbps	2	1	2412	0.00	0.00	20.19	20.62	23.42	30.00		2.21		25.63		36.00		Pass
11b	1Mbps	2	6	2437	0.00	0.00	24.09	24.41	27.26	30.00		2.21		29.47		36.00		Pass
11b	1Mbps	2	11	2462	0.00	0.00	22.03	21.95	25.00	30.00		2.21		27.21		36.00		Pass
11g	6Mbps	2	1	2412	0.08	0.08	15.97	16.03	19.01	30.00		2.21		21.22		36.00		Pass
11g	6Mbps	2	6	2437	0.08	0.08	19.83	20.03	22.94	30.00		2.21		25.15		36.00		Pass
11g	6Mbps	2	11	2462	0.08	0.08	16.87	16.97	19.93	30.00		2.21		22.14		36.00		Pass
HT20	MCS0	2	1	2412	0.08	0.08	15.36	15.62	18.50	30.00		2.21		20.71		36.00		Pass
HT20	MCS0	2	6	2437	0.08	0.08	20.57	20.97	23.79	30.00		2.21		26.00		36.00		Pass
HT20	MCS0	2	11	2462	0.08	0.08	15.83	16.10	18.98	30.00		2.21		21.19		36.00		Pass
HT40	MCS0	2	3	2422	0.15	0.14	12.50	12.69	15.60	30.00		2.21		17.81		36.00		Pass
HT40	MCS0	2	6	2437	0.15	0.14	15.79	15.55	18.68	30.00		2.21		20.89		36.00		Pass
HT40	MCS0	2	9	2452	0.15	0.14	12.54	13.33	15.96	30.00		2.21		18.17		36.00		Pass

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

Report Number : FR5N0208A

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-9.03	-8.63	-5.62	5.22		8.00		Pass
11b	1Mbps	2	6	2437	-6.07	-5.23	-2.22	5.22		8.00		Pass
11b	1Mbps	2	11	2462	-8.02	-7.13	-4.12	5.22		8.00		Pass
11g	6Mbps	2	1	2412	-16.85	-15.82	-12.81	5.22		8.00		Pass
11g	6Mbps	2	6	2437	-12.61	-12.55	-9.54	5.22		8.00		Pass
11g	6Mbps	2	11	2462	-15.83	-14.94	-11.93	5.22		8.00		Pass
HT20	MCS0	2	1	2412	-15.76	-16.65	-12.75	5.22		8.00		Pass
HT20	MCS0	2	6	2437	-12.98	-12.34	-9.33	5.22		8.00		Pass
HT20	MCS0	2	11	2462	-16.92	-16.74	-13.73	5.22		8.00		Pass
HT40	MCS0	2	3	2422	-24.79	-23.91	-20.90	5.22		8.00		Pass
HT40	MCS0	2	6	2437	-21.68	-21.43	-18.42	5.22		8.00		Pass
HT40	MCS0	2	9	2452	-24.63	-23.70	-20.69	5.22		8.00		Pass

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

Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2331.69	66.8	-7.2	74	34.03	26.82	5.95	0	147	360	P	H
		2390	52.86	-1.14	54	19.84	27.01	6.01	0	147	360	A	H
	*	2412	116.88	-	-	83.78	27.06	6.04	0	147	360	P	H
	*	2412	113.91	-	-	80.81	27.06	6.04	0	147	360	A	H
													H
													H
		2376.78	60.09	-13.91	74	27.12	26.96	6.01	0	284	341	P	V
		2374.89	48.27	-5.73	54	15.3	26.96	6.01	0	284	341	A	V
	*	2412	104.23	-	-	71.13	27.06	6.04	0	284	341	P	V
	*	2412	101.59	-	-	68.49	27.06	6.04	0	284	341	A	V
													V
													V
802.11b CH 06 2437MHz		2357.07	71.9	-2.1	74	39.04	26.91	5.95	0	195	360	P	H
		2390	53.9	-0.1	54	20.88	27.01	6.01	0	195	360	A	H
	*	2437	121.02	-	-	87.82	27.16	6.04	0	195	360	P	H
	*	2437	116.61	-	-	83.41	27.16	6.04	0	195	360	A	H
		2489.32	64.56	-9.44	74	31.17	27.3	6.09	0	195	360	P	H
		2484.32	52.78	-1.22	54	19.44	27.25	6.09	0	195	360	A	H
		2371.56	61.09	-12.91	74	28.12	26.96	6.01	0	386	268	P	V
		2390	48.48	-5.52	54	15.46	27.01	6.01	0	386	268	A	V
	*	2437	112.89	-	-	79.69	27.16	6.04	0	386	268	P	V
	*	2437	109.91	-	-	76.71	27.16	6.04	0	386	268	A	V
		2494.88	61.99	-12.01	74	28.6	27.3	6.09	0	386	268	P	V
		2483.8	48.95	-5.05	54	15.61	27.25	6.09	0	386	268	A	V

802.11b CH 11 2462MHz	*	2462	118.79	-	-	85.52	27.2	6.07	0	201	0	P	H
	*	2462	115.39	-	-	82.12	27.2	6.07	0	201	0	A	H
		2498.4	65.25	-8.75	74	31.86	27.3	6.09	0	201	0	P	H
		2498.84	53.84	-0.16	54	20.45	27.3	6.09	0	201	0	A	H
													H
													H
	*	2462	105.69	-	-	72.42	27.2	6.07	0	122	228	P	V
	*	2462	102.93	-	-	69.66	27.2	6.07	0	122	228	A	V
		2499.04	61.24	-12.76	74	27.85	27.3	6.09	0	122	228	P	V
		2483.52	49.18	-4.82	54	15.84	27.25	6.09	0	122	228	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	42.16	-31.84	74	67.46	31.12	8.65	65.07	100	0	P	H
													H
													H
													H
		4824	37.04	-36.96	74	62.34	31.12	8.65	65.07	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4874	44.94	-29.06	74	70.06	31.21	8.69	65.02	100	0	P	H
		7311	44.69	-29.31	74	63.28	36.08	10.39	65.06	100	0	P	H
													H
													H
		4874	39.85	-34.15	74	64.97	31.21	8.69	65.02	100	0	P	V
		7311	41.48	-32.52	74	60.07	36.08	10.39	65.06	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4924	40.2	-33.8	74	65.09	31.29	8.79	64.97	100	0	P	H
		7386	41.8	-32.2	74	60.13	36.27	10.48	65.08	100	0	P	H
													H
													H
		4924	38.31	-35.69	74	63.2	31.29	8.79	64.97	100	0	P	V
		7386	39.98	-34.02	74	58.31	36.27	10.48	65.08	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2390	69.09	-4.91	74	36.07	27.01	6.01	0	151	0	P	H
		2390	53.8	-0.2	54	20.78	27.01	6.01	0	151	0	A	H
	*	2412	115.13	-	-	82.03	27.06	6.04	0	151	0	P	H
	*	2412	106.18	-	-	73.08	27.06	6.04	0	151	0	A	H
													H
													H
		2389.65	61.17	-12.83	74	28.15	27.01	6.01	0	284	322	P	V
		2390	48.7	-5.3	54	15.68	27.01	6.01	0	284	322	A	V
	*	2412	105.75	-	-	72.65	27.06	6.04	0	284	322	P	V
	*	2412	97.2	-	-	64.1	27.06	6.04	0	284	322	A	V
													V
													V
802.11g CH 06 2437MHz		2389.02	65.74	-8.26	74	32.72	27.01	6.01	0	115	360	P	H
		2390	53.92	-0.08	54	20.9	27.01	6.01	0	115	360	A	H
	*	2437	118.87	-	-	85.67	27.16	6.04	0	115	360	P	H
	*	2437	110.09	-	-	76.89	27.16	6.04	0	115	360	A	H
		2495.52	64.63	-9.37	74	31.24	27.3	6.09	0	115	360	P	H
		2484.64	52.81	-1.19	54	19.47	27.25	6.09	0	115	360	A	H
		2388.93	61.23	-12.77	74	28.21	27.01	6.01	0	386	275	P	V
		2389.56	48.64	-5.36	54	15.62	27.01	6.01	0	386	275	A	V
	*	2437	110.96	-	-	77.76	27.16	6.04	0	386	275	P	V
	*	2437	102.14	-	-	68.94	27.16	6.04	0	386	275	A	V
		2492.88	62.08	-11.92	74	28.69	27.3	6.09	0	386	275	P	V
		2484.64	48.9	-5.1	54	15.56	27.25	6.09	0	386	275	A	V

802.11g CH 11 2462MHz	*	2462	116.26	-	-	82.99	27.2	6.07	0	145	0	P	H
	*	2462	107.83	-	-	74.56	27.2	6.07	0	145	0	A	H
		2483.8	71.87	-2.13	74	38.53	27.25	6.09	0	145	0	P	H
		2483.52	53.92	-0.08	54	20.58	27.25	6.09	0	145	0	A	H
													H
													H
	*	2462	107.38	-	-	74.11	27.2	6.07	0	278	344	P	V
	*	2462	97.61	-	-	64.34	27.2	6.07	0	278	344	A	V
		2484.48	63.49	-10.51	74	30.15	27.25	6.09	0	278	344	P	V
		2483.64	49.48	-4.52	54	16.14	27.25	6.09	0	278	344	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	35.22	-38.78	74	60.52	31.12	8.65	65.07	100	0	P	H
													H
													H
													H
		4824	34.09	-39.91	74	59.39	31.12	8.65	65.07	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4874	41.08	-32.92	74	66.2	31.21	8.69	65.02	100	0	P	H
		7311	39.05	-34.95	74	57.64	36.08	10.39	65.06	100	0	P	H
													H
													H
		4874	38.57	-35.43	74	63.69	31.21	8.69	65.02	100	0	P	V
		7311	38.98	-35.02	74	57.57	36.08	10.39	65.06	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4924	36.1	-37.9	74	60.99	31.29	8.79	64.97	100	0	P	H
		7386	39.61	-34.39	74	57.94	36.27	10.48	65.08	100	0	P	H
													H
													H
		4924	35.57	-38.43	74	60.46	31.29	8.79	64.97	100	0	P	V
		7386	40.03	-33.97	74	58.36	36.27	10.48	65.08	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2388.21	67.81	-6.19	74	34.79	27.01	6.01	0	149	0	P	H
		2390	53.63	-0.37	54	20.61	27.01	6.01	0	149	0	A	H
	*	2412	115.33	-	-	82.23	27.06	6.04	0	149	0	P	H
	*	2412	105.87	-	-	72.77	27.06	6.04	0	149	0	A	H
802.11n													H
HT20													H
CH 01		2389.74	63.18	-10.82	74	30.16	27.01	6.01	0	332	338	P	V
2412MHz		2390	49.6	-4.4	54	16.58	27.01	6.01	0	332	338	A	V
	*	2412	104.82	-	-	71.72	27.06	6.04	0	332	338	P	V
	*	2412	96.1	-	-	63	27.06	6.04	0	332	338	A	V
													V
													V
		2352.66	68.98	-5.02	74	36.12	26.91	5.95	0	117	0	P	H
		2390	53.96	-0.04	54	20.94	27.01	6.01	0	117	0	A	H
	*	2437	120.01	-	-	86.81	27.16	6.04	0	117	0	P	H
	*	2437	110.62	-	-	77.42	27.16	6.04	0	117	0	A	H
802.11n		2488.24	66.09	-7.91	74	32.7	27.3	6.09	0	117	0	P	H
HT20		2485.16	52.61	-1.39	54	19.27	27.25	6.09	0	117	0	A	H
CH 06		2383.98	61.62	-12.38	74	28.65	26.96	6.01	0	338	271	P	V
2437MHz		2389.65	48.72	-5.28	54	15.7	27.01	6.01	0	338	271	A	V
	*	2437	111.93	-	-	78.73	27.16	6.04	0	338	271	P	V
	*	2437	102.79	-	-	69.59	27.16	6.04	0	338	271	A	V
		2485.88	61.06	-12.94	74	27.72	27.25	6.09	0	338	271	P	V
		2484.24	49.14	-4.86	54	15.8	27.25	6.09	0	338	271	A	V

	*	2462	115.6	-	-	82.33	27.2	6.07	0	141	0	P	H
	*	2462	105.97	-	-	72.7	27.2	6.07	0	141	0	A	H
		2484.48	71.67	-2.33	74	38.33	27.25	6.09	0	141	0	P	H
		2483.52	53.92	-0.08	54	20.58	27.25	6.09	0	141	0	A	H
802.11n													H
HT20													H
CH 11	*	2462	106.1	-	-	72.83	27.2	6.07	0	312	338	P	V
2462MHz	*	2462	96.8	-	-	63.53	27.2	6.07	0	312	338	A	V
		2484.32	62.73	-11.27	74	29.39	27.25	6.09	0	312	338	P	V
		2483.52	49.42	-4.58	54	16.08	27.25	6.09	0	312	338	A	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4824	35.5	-38.5	74	60.8	31.12	8.65	65.07	100	0	P	H
													H
802.11n													H
HT20													H
CH 01		4824	34.24	-39.76	74	59.54	31.12	8.65	65.07	100	0	P	V
2412MHz													V
													V
													V
		4874	42.15	-31.85	74	67.27	31.21	8.69	65.02	100	0	P	H
		7311	39.7	-34.3	74	58.29	36.08	10.39	65.06	100	0	P	H
802.11n													H
HT20													H
CH 06		4874	36.47	-37.53	74	61.59	31.21	8.69	65.02	100	0	P	V
2437MHz		7311	40.1	-33.9	74	58.69	36.08	10.39	65.06	100	0	P	V
													V
													V
		4924	36.14	-37.86	74	61.03	31.29	8.79	64.97	100	0	P	H
		7386	40.06	-33.94	74	58.39	36.27	10.48	65.08	100	0	P	H
802.11n													H
HT20													H
CH 11		4924	36.54	-37.46	74	61.43	31.29	8.79	64.97	100	0	P	V
2462MHz		7386	39.3	-34.7	74	57.63	36.27	10.48	65.08	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2389.47	70.55	-3.45	74	37.53	27.01	6.01	0	154	0	P	H
		2390	53.58	-0.42	54	20.56	27.01	6.01	0	154	0	A	H
	*	2422	108.71	-	-	75.56	27.11	6.04	0	154	0	P	H
	*	2422	99.38	-	-	66.23	27.11	6.04	0	154	0	A	H
802.11n		2487.16	61.15	-12.85	74	27.81	27.25	6.09	0	154	0	P	H
HT40		2488.4	50.28	-3.72	54	16.89	27.3	6.09	0	154	0	A	H
CH 03		2389.92	61.51	-12.49	74	28.49	27.01	6.01	0	293	290	P	V
2422MHz		2390	49.02	-4.98	54	16	27.01	6.01	0	293	290	A	V
	*	2422	99.12	-	-	65.97	27.11	6.04	0	293	290	P	V
	*	2422	89.93	-	-	56.78	27.11	6.04	0	293	290	A	V
		2489.84	61.56	-12.44	74	28.17	27.3	6.09	0	285	290	P	V
		2484.92	49.56	-4.44	54	16.22	27.25	6.09	0	285	290	A	V
		2389.92	67.82	-6.18	74	34.8	27.01	6.01	0	113	0	P	H
		2390	53.55	-0.45	54	20.53	27.01	6.01	0	113	0	A	H
	*	2437	111.55	-	-	78.35	27.16	6.04	0	113	0	P	H
	*	2437	103.46	-	-	70.26	27.16	6.04	0	113	0	A	H
802.11n		2490.44	64.18	-9.82	74	30.79	27.3	6.09	0	113	0	P	H
HT40		2483.56	50.46	-3.54	54	17.12	27.25	6.09	0	113	0	A	H
CH 06		2386.32	59.72	-14.28	74	26.7	27.01	6.01	0	344	275	P	V
2437MHz		2389.11	48.76	-5.24	54	15.74	27.01	6.01	0	344	275	A	V
	*	2437	103.63	-	-	70.43	27.16	6.04	0	344	275	P	V
	*	2437	95.43	-	-	62.23	27.16	6.04	0	344	275	A	V
		2495.6	60.51	-13.49	74	27.12	27.3	6.09	0	344	275	P	V
		2485	49.24	-4.76	54	15.9	27.25	6.09	0	344	275	A	V

		2387.76	62.59	-11.41	74	29.57	27.01	6.01	0	149	0	P	H
		2359.86	51.33	-2.67	54	18.47	26.91	5.95	0	149	0	A	H
	*	2452	109.18	-	-	75.95	27.16	6.07	0	149	0	P	H
	*	2452	100.84	-	-	67.61	27.16	6.07	0	149	0	A	H
802.11n		2483.52	69.17	-4.83	74	35.83	27.25	6.09	0	149	0	P	H
HT40		2483.56	53.9	-0.1	54	20.56	27.25	6.09	0	149	0	A	H
CH 09		2343.03	59.8	-14.2	74	26.98	26.87	5.95	0	280	342	P	V
2452MHz		2360.22	48.94	-5.06	54	16.08	26.91	5.95	0	280	342	A	V
	*	2452	100.21	-	-	66.98	27.16	6.07	0	280	342	P	V
	*	2452	90.93	-	-	57.7	27.16	6.07	0	280	342	A	V
		2492.92	61.32	-12.68	74	27.93	27.3	6.09	0	280	342	P	V
		2491.12	49.65	-4.35	54	16.26	27.3	6.09	0	280	342	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 HT40 (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)
		4844	35.34	-38.66	74	60.56	31.15	8.69	65.06	100	0	P	H
		7266	38.87	-35.13	74	57.58	36.01	10.34	65.06	100	0	P	H
802.11n													H
HT40													H
CH 03		4844	35.02	-38.98	74	60.24	31.15	8.69	65.06	100	0	P	V
2422MHz		7266	39.38	-34.62	74	58.09	36.01	10.34	65.06	100	0	P	V
													V
													V
		4874	35.69	-38.31	74	60.81	31.21	8.69	65.02	100	0	P	H
		7311	39.12	-34.88	74	57.71	36.08	10.39	65.06	100	0	P	H
802.11n													H
HT40													H
CH 06		4874	35.19	-38.81	74	60.31	31.21	8.69	65.02	100	0	P	V
2437MHz		7311	38.82	-35.18	74	57.41	36.08	10.39	65.06	100	0	P	V
													V
													V
		4904	36.1	-37.9	74	61.09	31.26	8.74	64.99	100	0	P	H
		7356	38.52	-35.48	74	56.95	36.2	10.44	65.07	100	0	P	H
802.11n													H
HT40													H
CH 09		4904	35.45	-38.55	74	60.44	31.26	8.74	64.99	100	0	P	V
2452MHz		7356	38.5	-35.5	74	56.93	36.2	10.44	65.07	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		101.01	34.19	-9.31	43.5	54.43	10.26	1.28	31.78	247	156	P	H
		142.05	33.85	-9.65	43.5	53.69	10.48	1.46	31.78			P	H
		288.93	27.94	-18.06	46	44.91	12.68	2.11	31.76			P	H
		600.3	34.54	-11.46	46	45.28	18.41	2.89	32.04			P	H
		720	32.09	-13.91	46	41.47	19.5	3.14	32.02			P	H
		899.9	30.5	-15.5	46	38.28	20.1	3.55	31.43			P	H
													H
													H
													H
													H
2.4GHz													H
802.11n													H
HT20		34.32	39.59	-0.41	40	54.94	15.81	0.67	31.83	315	89	P	V
LF		39.72	38.9	-1.1	40	57.2	12.85	0.67	31.82			P	V
		99.12	33.82	-9.68	43.5	54.35	9.97	1.28	31.78			P	V
		349.7	27.63	-18.37	46	43.05	14.19	2.17	31.78			P	V
		600.3	31.95	-14.05	46	42.69	18.41	2.89	32.04			P	V
		899.9	29.39	-16.61	46	37.17	20.1	3.55	31.43			P	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.

Note symbol

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		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)

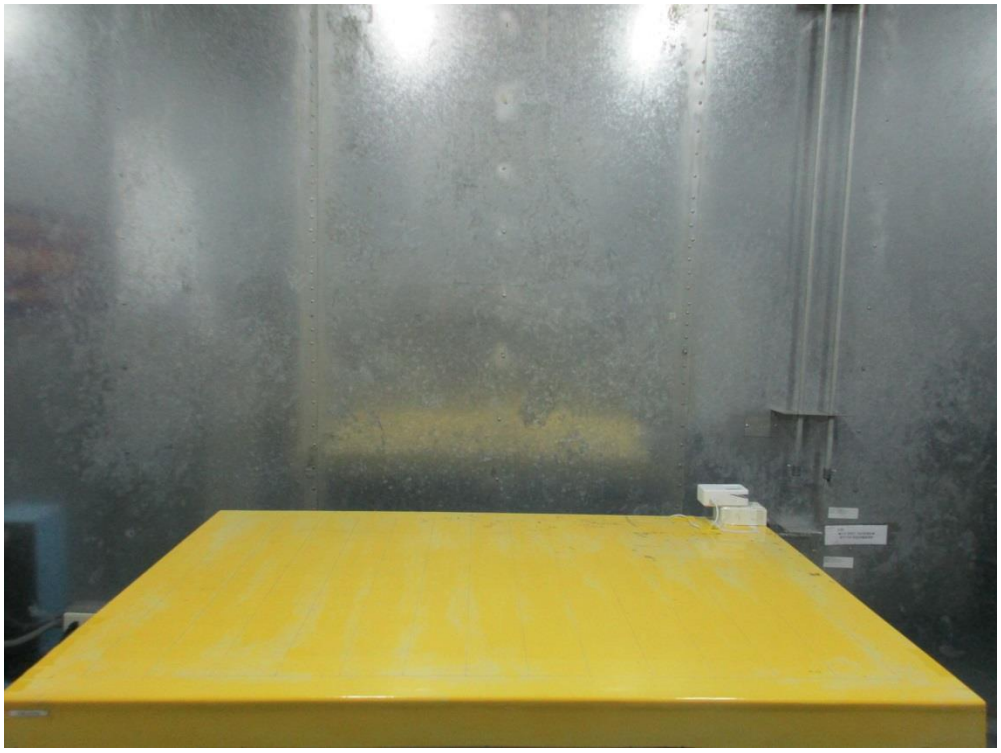
= 43.54(dBµV/m) – 54(dBµV/m)

= -10.46(dB)

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

Appendix C. Setup Photographs

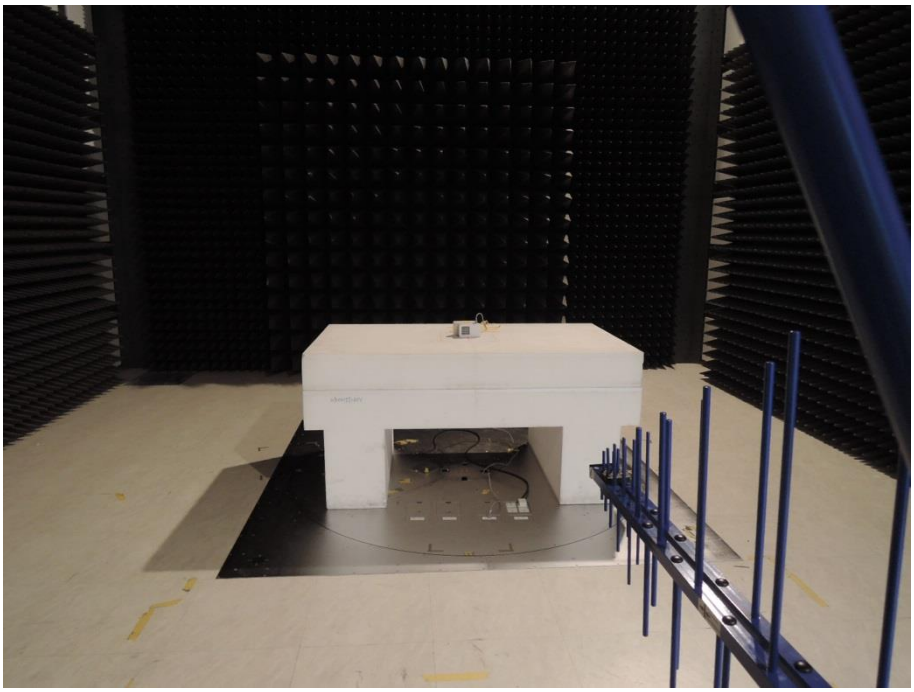
<Conducted Emission>



<Radiated Emission>

Z Plane

LF



HF