

FCC RF Test Report

APPLICANT : D-Link Corporation
EQUIPMENT : DC-HSPA+ Mobile Router
BRAND NAME : D-Link
MODEL NAME : DWR-830
FCC ID : KA2WR830A1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Jul. 18, 2013 and testing was completed on Sep. 25, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant with the applicable technical standards.

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



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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FCC ID : KA2WR830A1

Page Number : 1 of 65

Report Issued Date : Oct. 24, 2013

Report Version : Rev. 01



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR371811-01	Rev. 01	Initial issue of report	Oct. 24, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	RSS-210 A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	RSS-210 A8.4	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	RSS-210 A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	RSS-210 A8.5	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
			Conducted Spurious Emission		Pass	-
3.5	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.81 dB at 2483.530 MHz
3.6	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 8.70 dB at 25.622 MHz
3.7	15.203 & 15.247(b)	RSS-210 A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

D-Link Corporation

No. 289, Sinhu 3rd rd., Neihu District, Taipei City 114, Taiwan

1.2 Manufacturer

D-Link Corporation

No. 289, Sinhu 3rd rd., Neihu District, Taipei City 114, Taiwan

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	DC-HSPA+ Mobile Router
Brand Name	D-Link
Model Name	DWR-830
FCC ID	KA2WR830A1
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA WLAN 11b/g/n (HT20/HT40)
HW Version	A1
SW Version	1.00_DI
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 of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz
Maximum Output Power to Antenna	802.11b : 19.73 dBm (0.0940 W) 802.11g : 23.40 dBm (0.2188 W) 802.11n HT20 : 23.29 dBm (0.2133 W) 802.11n HT40 : 23.05 dBm (0.2018 W)
Antenna Type	802.11b/g/n : Fixed Internal Antenna with gain -3.46 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Testing Site

Test Site	SPORTON INTERNATIONAL INC.			
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH02-HY	CO05-HY	03CH08-HY	636805/4086B-2

Note: The test site complies with ANSI C63.4 2003 requirement.

1.7 Applied 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 v03r01
- ♦ ANSI C63.4-2003

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 (X 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 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.

2.4GHz 802.11b mode				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	19.73	19.72	19.69	19.67

2.4GHz 802.11g mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	23.40	23.37	23.33	23.30	23.28	23.24	23.31	23.28

2.4GHz 802.11n HT20 mode									
Data Rate (MHz)		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	400GI	23.27	23.23	23.18	23.11	23.04	22.99	22.92	22.85
	800GI	23.29	23.23	23.20	23.17	23.12	23.08	23.04	22.95

2.4GHz 802.11n HT40 mode									
Data Rate (MHz)		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	400GI	23.04	22.95	22.90	22.86	22.82	22.74	22.69	22.65
	800GI	23.05	22.98	22.92	22.87	22.81	22.79	22.73	22.67

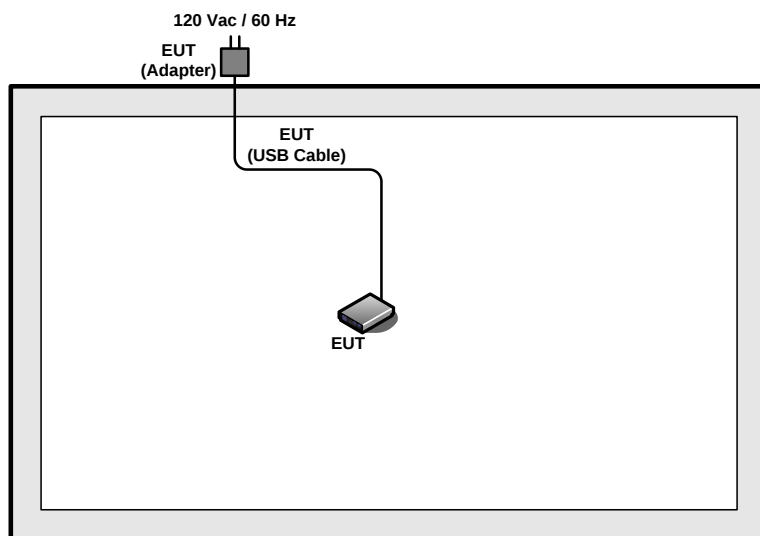
2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

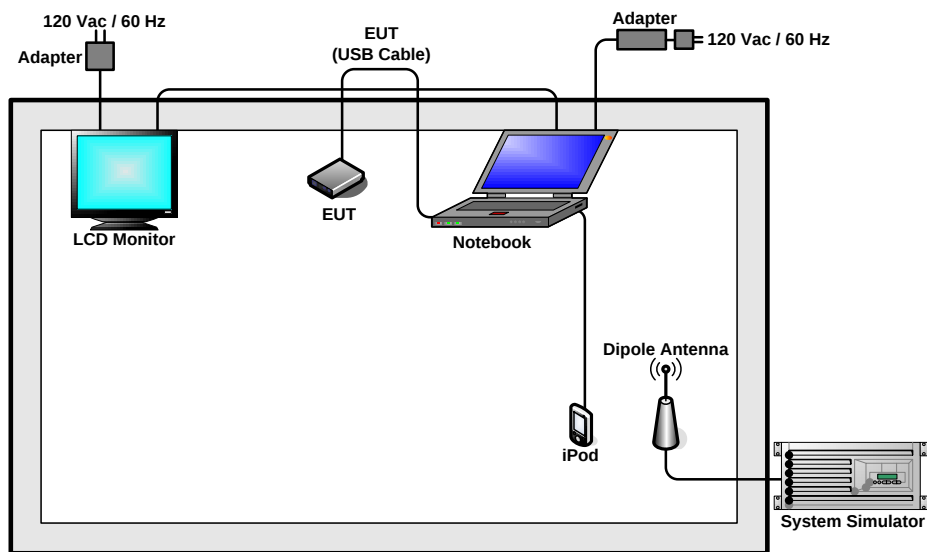
Test Cases				
Conducted TCs	Test Items	Mode	Data Rate	Test Channel
	6dB and 99% BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	3/6/9
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	3/6/9
	Conducted Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS0	1/11
		802.11n HT40	MCS0	3/9
	Conducted Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	3/6/9
Radiated TCs	Radiated Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS0	1/11
		802.11n HT40	MCS0	3/6/9
	Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	3/6/9
AC Conducted Emission	Mode 1 : WCDMA Band II Idle + WLAN Link + Battery + USB Cable (Charging from Notebook)			

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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
4.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, "WIFI Tool" installed in the notebook make the EUT provides 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.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\
 &= 4.2 + 10 = 14.2 \text{ (dB)}
 \end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

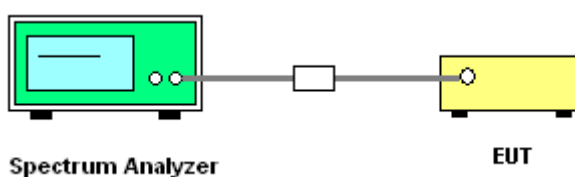
3.1.2 Measuring Instruments

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 v03r01.
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. Measure and record the results in the test report.

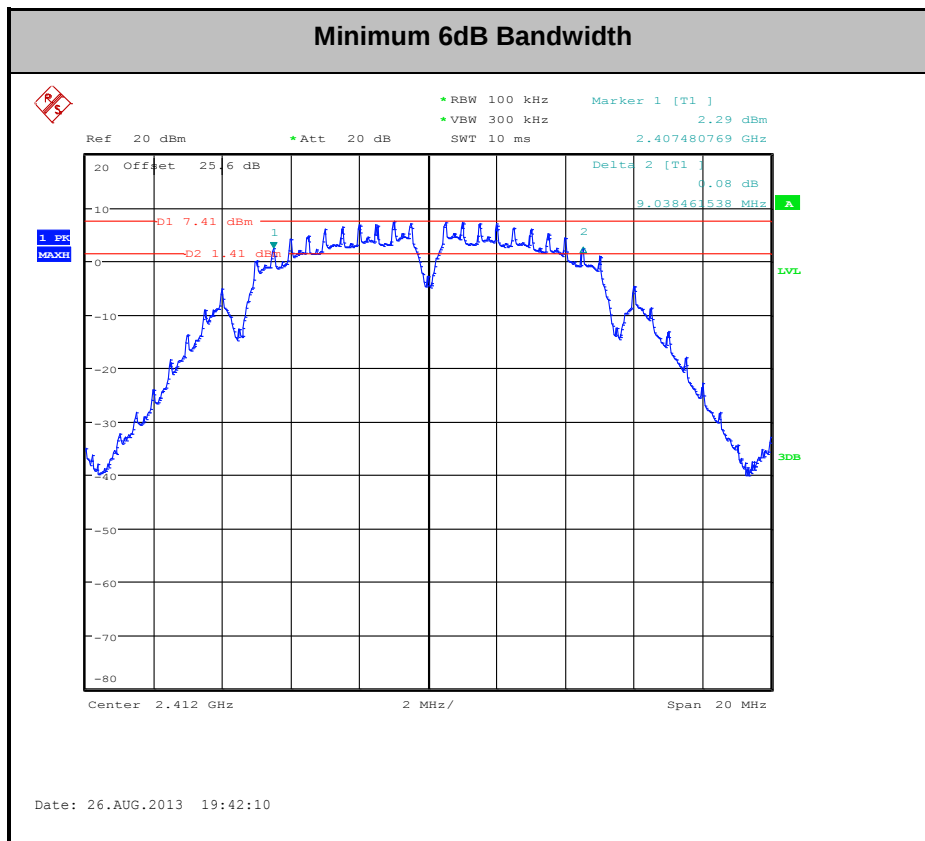
3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Test Band :	2.4GHz	Temperature :	24~26℃
Test Engineer :	Alex Lee and Kenny Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	9.04	0.5	Pass
11b	1Mbps	1	6	2437	9.04	0.5	Pass
11b	1Mbps	1	11	2462	9.04	0.5	Pass
11g	6Mbps	1	1	2412	16.35	0.5	Pass
11g	6Mbps	1	6	2437	16.38	0.5	Pass
11g	6Mbps	1	11	2462	16.04	0.5	Pass
HT20	MCS0	1	1	2412	17.56	0.5	Pass
HT20	MCS0	1	6	2437	17.56	0.5	Pass
HT20	MCS0	1	11	2462	17.04	0.5	Pass
HT40	MCS0	1	3	2422	36.09	0.5	Pass
HT40	MCS0	1	6	2437	36.04	0.5	Pass
HT40	MCS0	1	9	2452	35.36	0.5	Pass



3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting Antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the Antenna exceeds 6dBi.

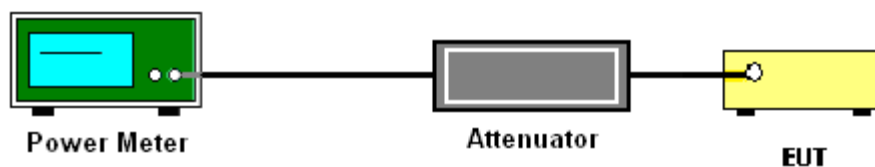
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Test Mode :	2.4GHz	Temperature :	24~26℃
Test Engineer :	Alex Lee and Kenny Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	RF Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	19.73	30	-3.46	Pass
11b	1Mbps	1	6	2437	19.46	30	-3.46	Pass
11b	1Mbps	1	11	2462	19.39	30	-3.46	Pass
11g	6Mbps	1	1	2412	23.40	30	-3.46	Pass
11g	6Mbps	1	6	2437	23.26	30	-3.46	Pass
11g	6Mbps	1	11	2462	21.39	30	-3.46	Pass
HT20	MCS0	1	1	2412	23.29	30	-3.46	Pass
HT20	MCS0	1	6	2437	23.13	30	-3.46	Pass
HT20	MCS0	1	11	2462	21.35	30	-3.46	Pass
HT40	MCS0	1	3	2422	23.05	30	-3.46	Pass
HT40	MCS0	1	6	2437	22.98	30	-3.46	Pass
HT40	MCS0	1	9	2452	21.33	30	-3.46	Pass

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

3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	2.4GHz	Temperature :	24~26℃
Test Engineer :	Alex Lee and Kenny Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	Duty Factor (dB)	Average Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	0.00	16.48	30	-3.46	Pass
11b	1Mbps	1	6	2437	0.00	16.19	30	-3.46	Pass
11b	1Mbps	1	11	2462	0.00	16.12	30	-3.46	Pass
11g	6Mbps	1	1	2412	0.18	15.47	30	-3.46	Pass
11g	6Mbps	1	6	2437	0.18	14.74	30	-3.46	Pass
11g	6Mbps	1	11	2462	0.18	12.70	30	-3.46	Pass
HT20	MCS0	1	1	2412	0.20	14.02	30	-3.46	Pass
HT20	MCS0	1	6	2437	0.20	13.50	30	-3.46	Pass
HT20	MCS0	1	11	2462	0.20	12.65	30	-3.46	Pass
HT40	MCS0	1	3	2422	0.41	13.52	30	-3.46	Pass
HT40	MCS0	1	6	2437	0.41	13.31	30	-3.46	Pass
HT40	MCS0	1	9	2452	0.41	12.82	30	-3.46	Pass

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

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

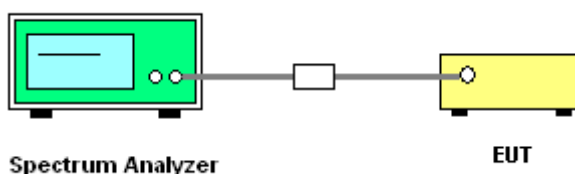
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

3.3.4 Test Setup

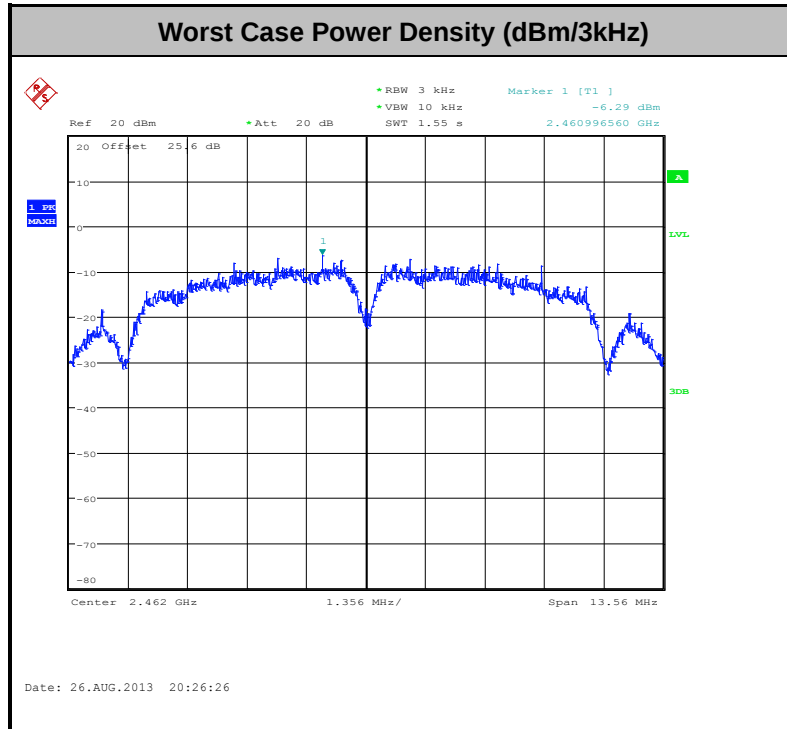


3.3.5 Test Result of Power Spectral Density

Test Mode :	2.4GHz	Temperature :	24~26°C
Test Engineer :	Alex Lee and Kenny Chen	Relative Humidity :	50~53%

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	Peak Power Density (dBm/3kHz)	Max. Limits (dBm/3kHz)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	-6.82	8	-3.46	Pass
11b	1Mbps	1	6	2437	-6.94	8	-3.46	Pass
11b	1Mbps	1	11	2462	-6.29	8	-3.46	Pass
11g	6Mbps	1	1	2412	-10.12	8	-3.46	Pass
11g	6Mbps	1	6	2437	-10.95	8	-3.46	Pass
11g	6Mbps	1	11	2462	-12.55	8	-3.46	Pass
HT20	MCS0	1	1	2412	-11.04	8	-3.46	Pass
HT20	MCS0	1	6	2437	-12.53	8	-3.46	Pass
HT20	MCS0	1	11	2462	-12.26	8	-3.46	Pass
HT40	MCS0	1	3	2422	-14.32	8	-3.46	Pass
HT40	MCS0	1	6	2437	-19.86	8	-3.46	Pass
HT40	MCS0	1	9	2452	-15.69	8	-3.46	Pass

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



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).

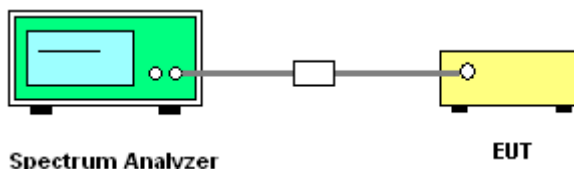
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

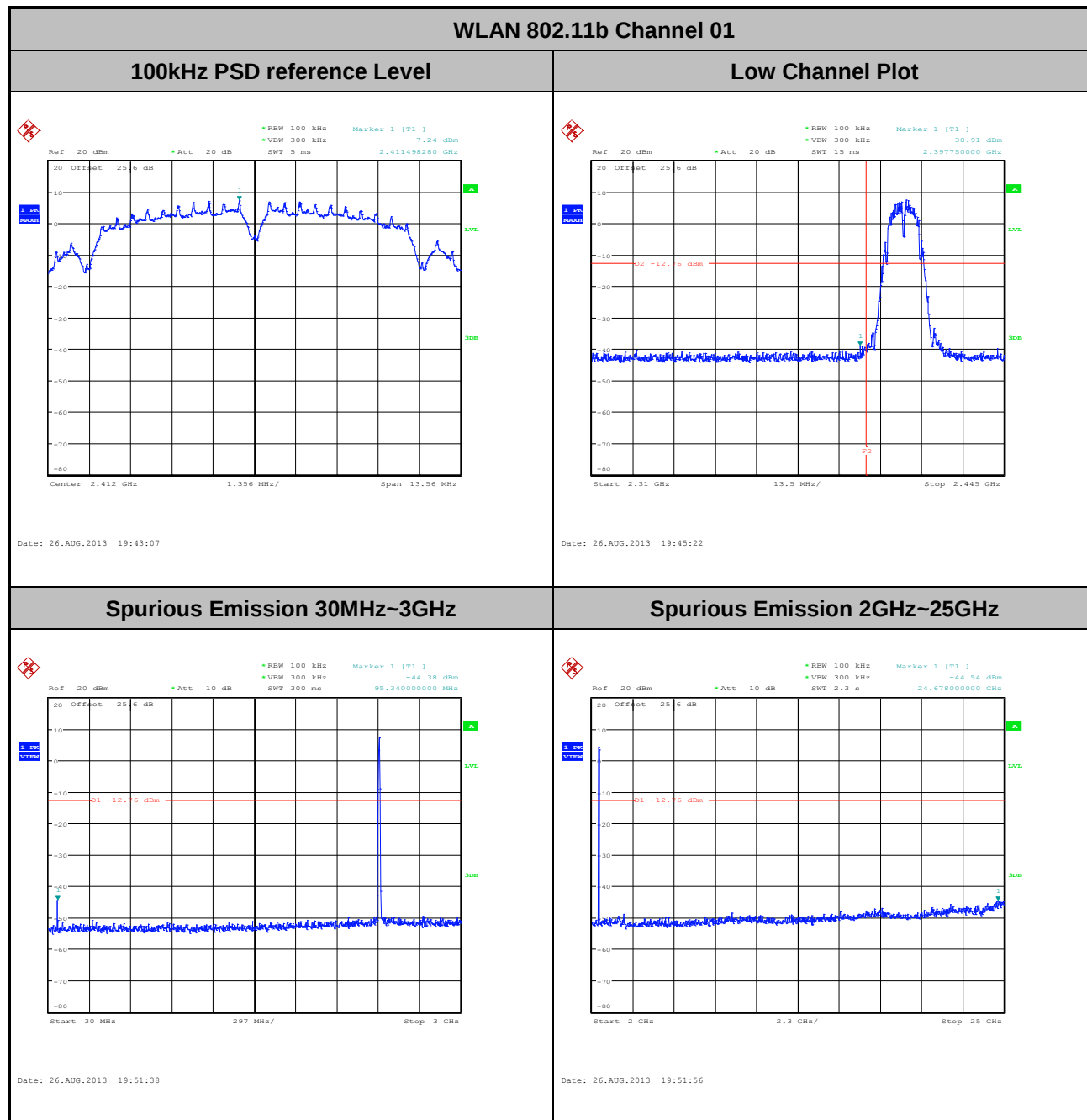
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



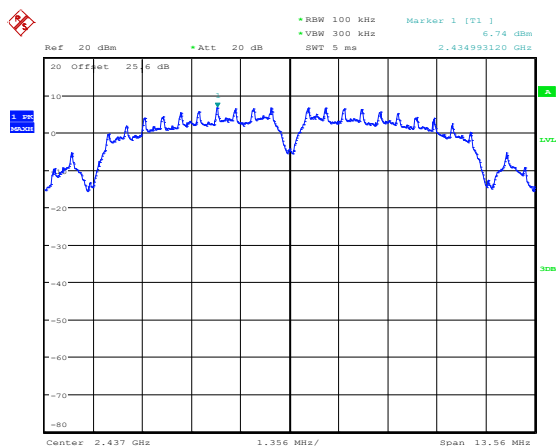
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	Temperature :	24~26℃
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Alex Lee and Kenny Chen

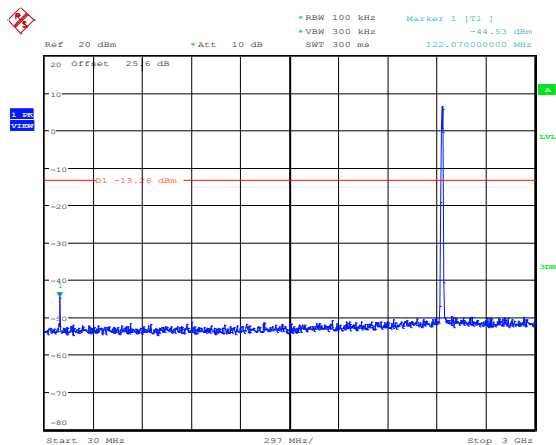




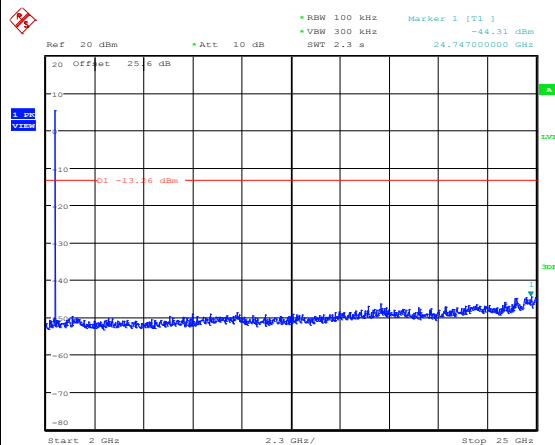
Test Mode :	802.11b	Temperature :	24~26℃
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11b Channel 06**100kHz PSD reference Level**

Date: 26.AUG.2013 19:48:35

Spurious Emission 30MHz~3GHz

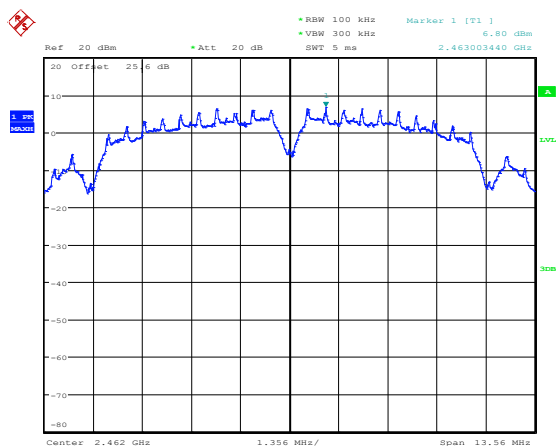
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Spurious Emission 2GHz~25GHz

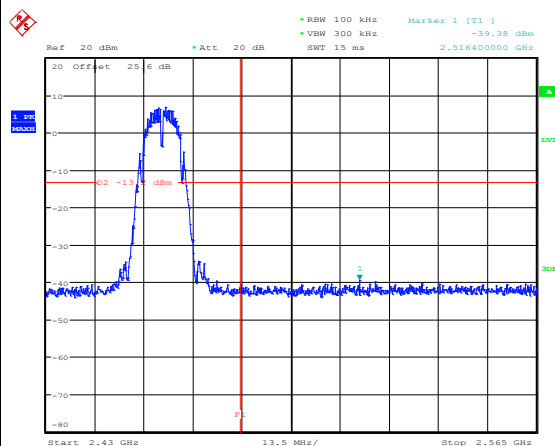
Date: 26.AUG.2013 19:50:03



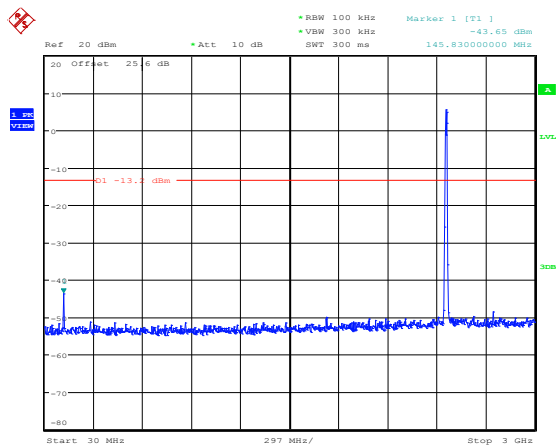
Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11b Channel 11**100kHz PSD reference Level**

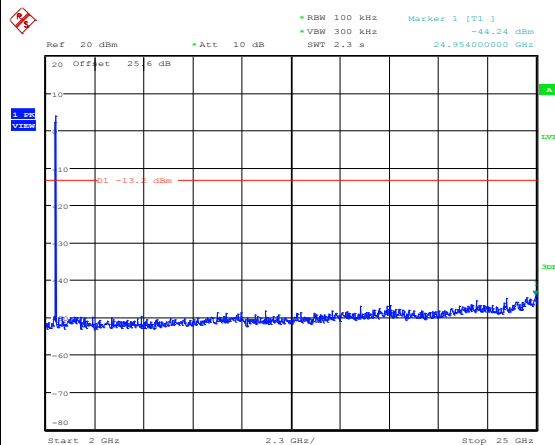
Date: 26.AUG.2013 20:28:09

High Channel Plot

Date: 26.AUG.2013 20:28:35

Spurious Emission 30MHz~3GHz

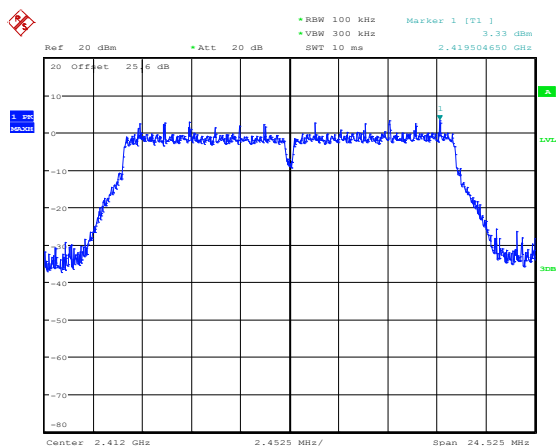
Date: 26.AUG.2013 20:28:56

Spurious Emission 2GHz~25GHz

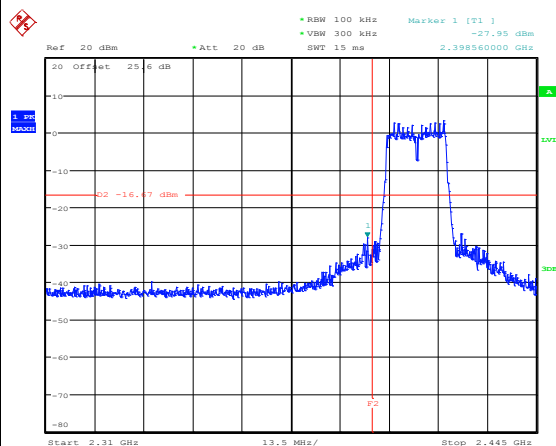
Date: 26.AUG.2013 20:29:14



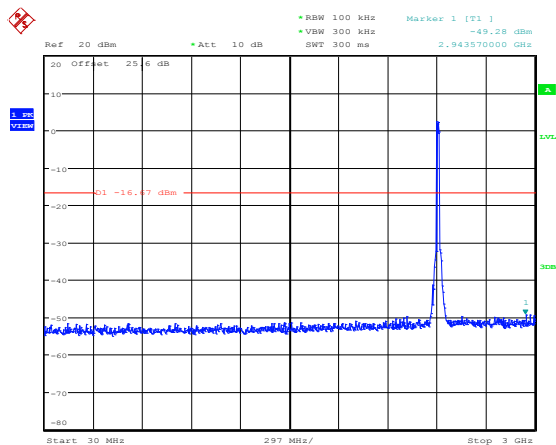
Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11g Channel 01**100kHz PSD reference Level**

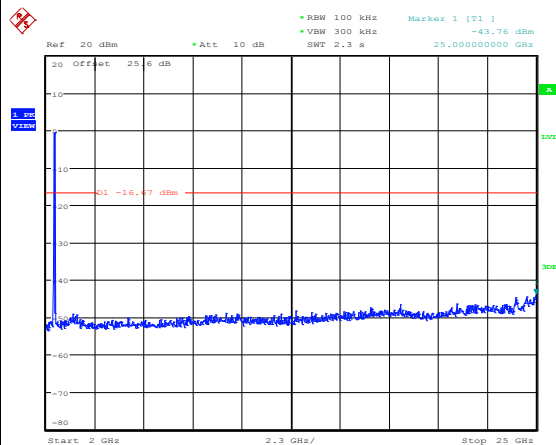
Date: 26.AUG.2013 20:37:16

Low Channel Plot

Date: 26.AUG.2013 20:37:47

Spurious Emission 30MHz~3GHz

Date: 26.AUG.2013 20:38:13

Spurious Emission 2GHz~25GHz

Date: 26.AUG.2013 20:38:31



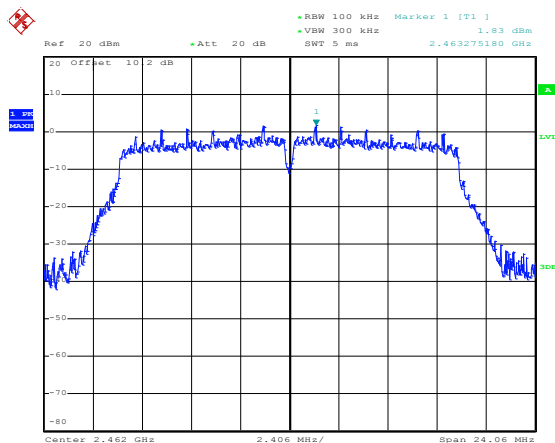
WLAN 802.11g Channel 06	
100kHz PSD reference Level Ref 20 dBm Att 20 dB RBW 100 kHz VSW 300 kHz SWT 10 ms Marker 1 [T1] 2.96 dBm Center 2.437 GHz Span 24.57 MHz	
Date: 26.AUG.2013 20:53:52	
Spurious Emission 30MHz~3GHz Ref 20 dBm Att 10 dB RBW 100 kHz VSW 300 kHz SWT 300 ms Marker 1 [T1] -49.87 dBm Start 30 MHz Stop 3 GHz	
Date: 26.AUG.2013 21:03:34	
Spurious Emission 2GHz~25GHz Ref 20 dBm Att 10 dB RBW 100 kHz VSW 300 kHz SWT 2.3 s Marker 1 [T1] -44.53 dBm Start 2 GHz Stop 25 GHz	
Date: 26.AUG.2013 21:03:52	



Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Alex Lee and Kenny Chen

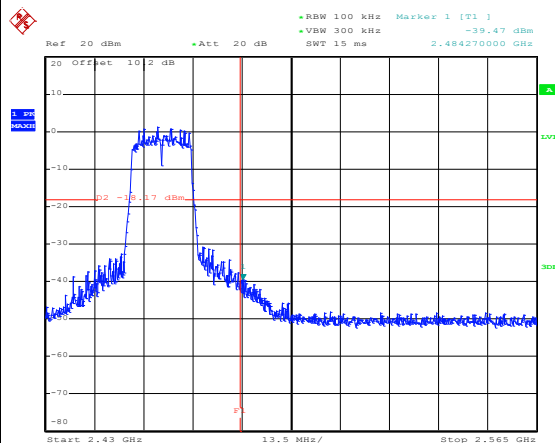
WLAN 802.11g Channel 11

100kHz PSD reference Level



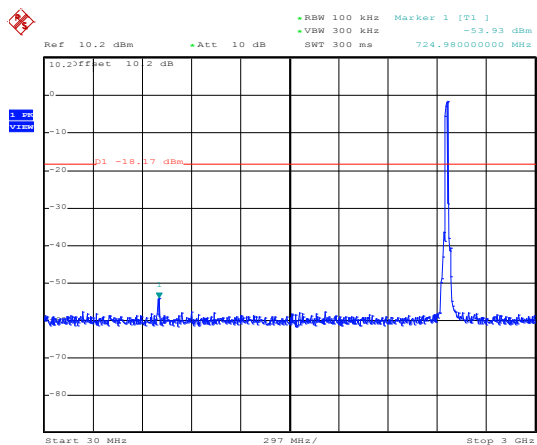
Date: 25.SEP.2013 12:01:41

High Channel Plot



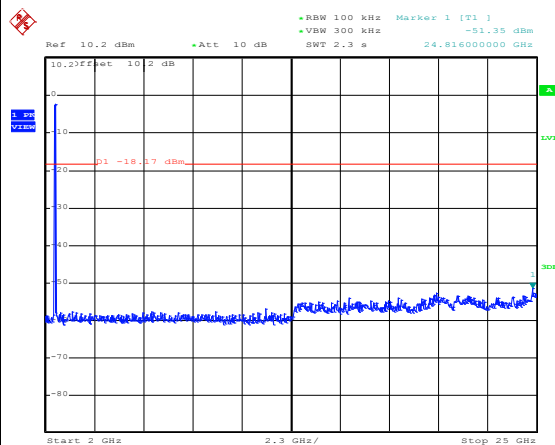
Date: 25.SEP.2013 12:01:56

Spurious Emission 30MHz~3GHz



Date: 25.SEP.2013 13:33:17

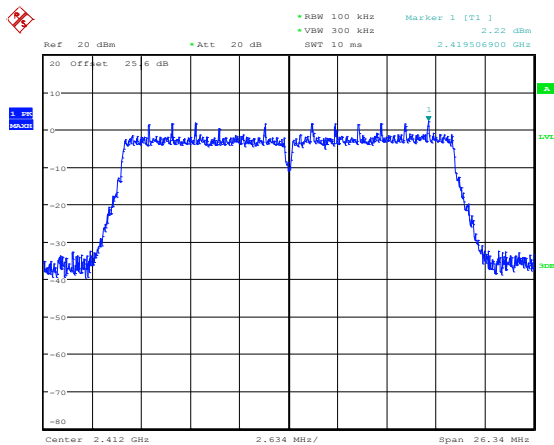
Spurious Emission 2GHz~25GHz



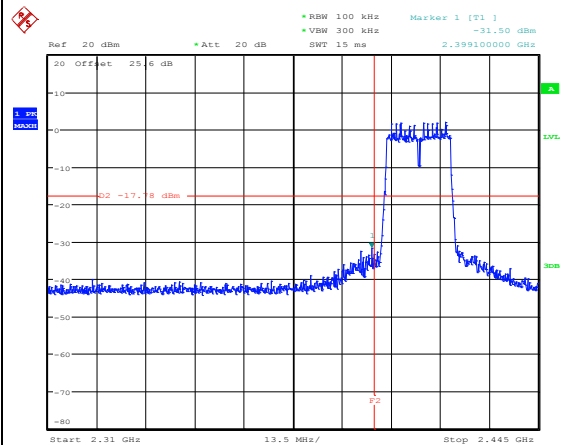
Date: 25.SEP.2013 13:33:36



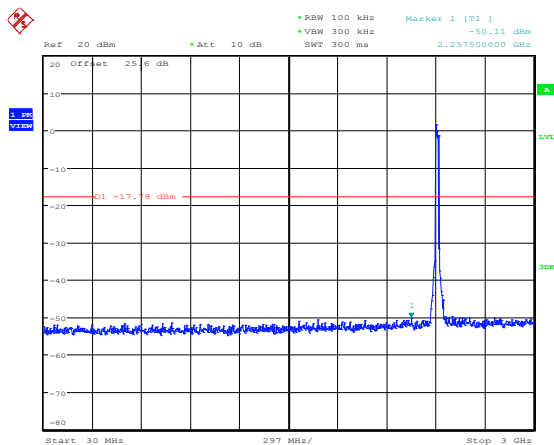
Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11n HT20 Channel 01**100kHz PSD reference Level**

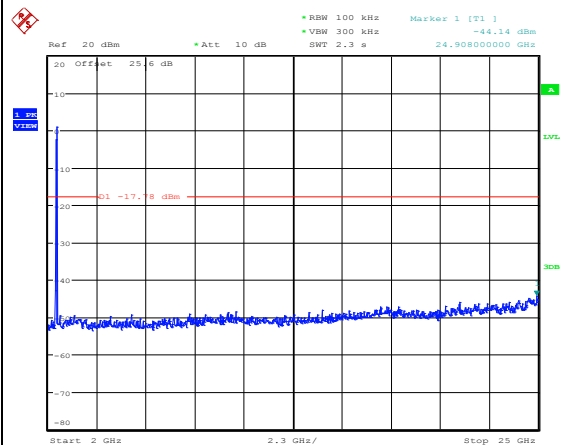
Date: 26.AUG.2013 21:09:34

Low Channel Plot

Date: 26.AUG.2013 21:09:54

Spurious Emission 30MHz~3GHz

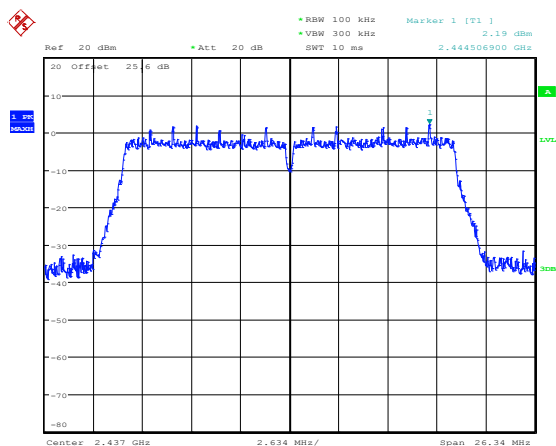
Date: 26.AUG.2013 21:10:21

Spurious Emission 2GHz~25GHz

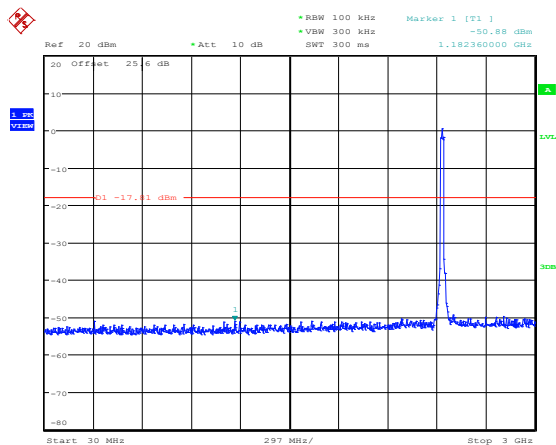
Date: 26.AUG.2013 21:10:39



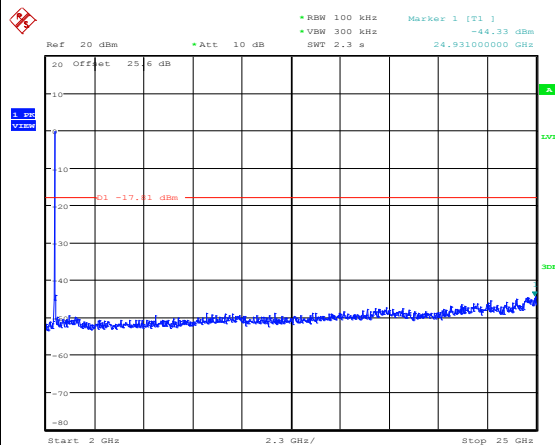
Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11n HT20 Channel 06**100kHz PSD reference Level**

Date: 26.AUG.2013 21:13:48

Spurious Emission 30MHz~3GHz

Date: 26.AUG.2013 21:21:58

Spurious Emission 2GHz~25GHz

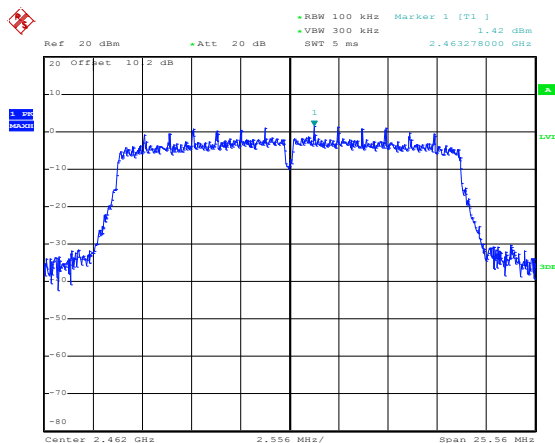
Date: 26.AUG.2013 21:22:16



Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Alex Lee and Kenny Chen

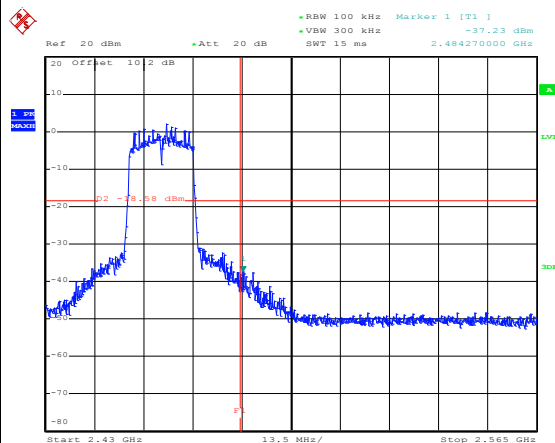
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



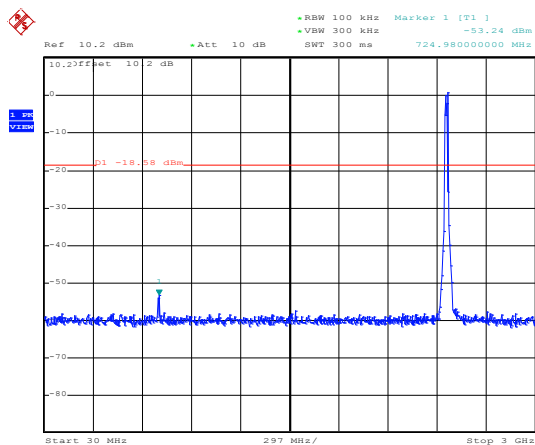
Date: 25.SEP.2013 11:58:19

High Channel Plot



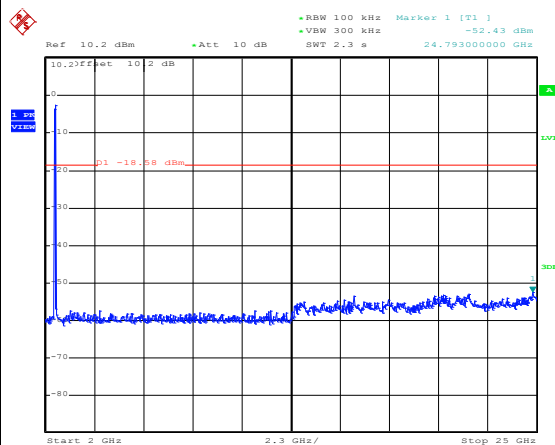
Date: 25.SEP.2013 11:58:35

Spurious Emission 30MHz~3GHz



Date: 25.SEP.2013 11:58:59

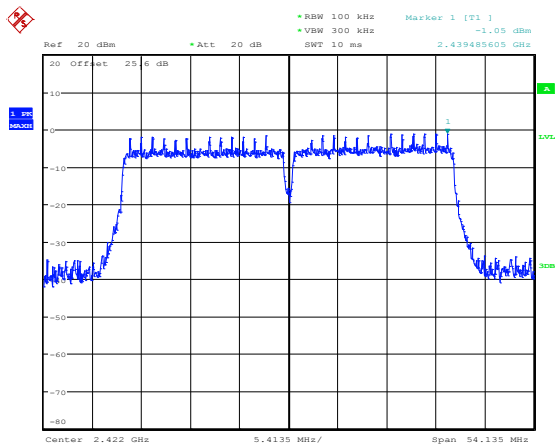
Spurious Emission 2GHz~25GHz



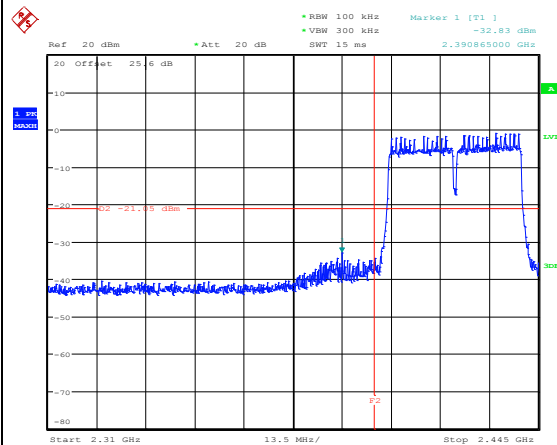
Date: 25.SEP.2013 11:59:18



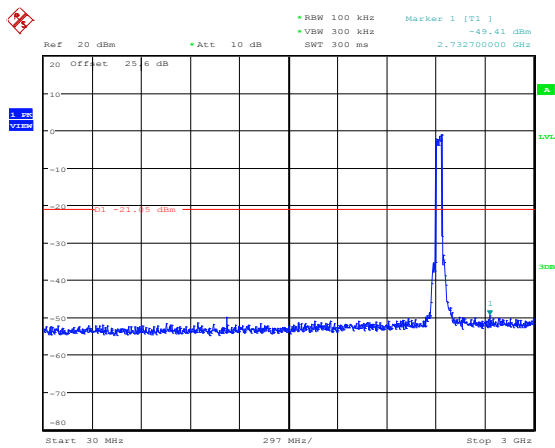
Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Band :	2.4GHz Low	Relative Humidity :	50~53%
Test Channel :	03	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11n HT40 Channel 03**100kHz PSD reference Level**

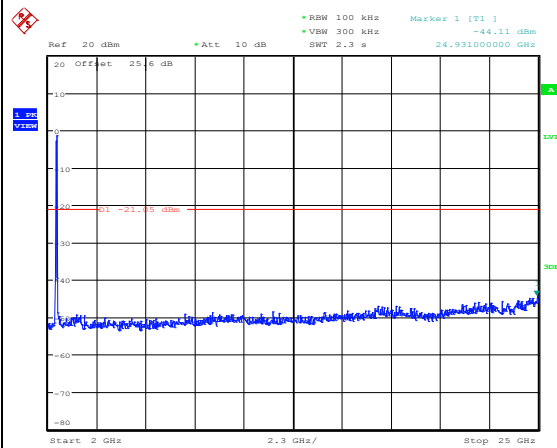
Date: 26.AUG.2013 21:26:56

Low Channel Plot

Date: 26.AUG.2013 21:27:33

Spurious Emission 30MHz~3GHz

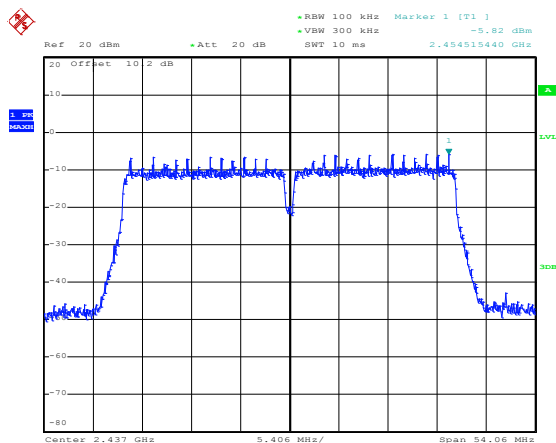
Date: 26.AUG.2013 21:28:01

Spurious Emission 2GHz~25GHz

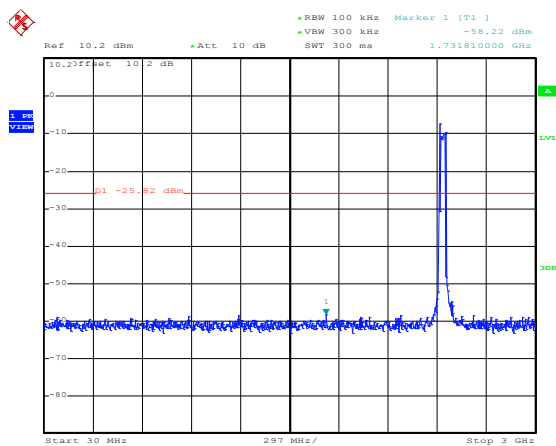
Date: 26.AUG.2013 21:28:19



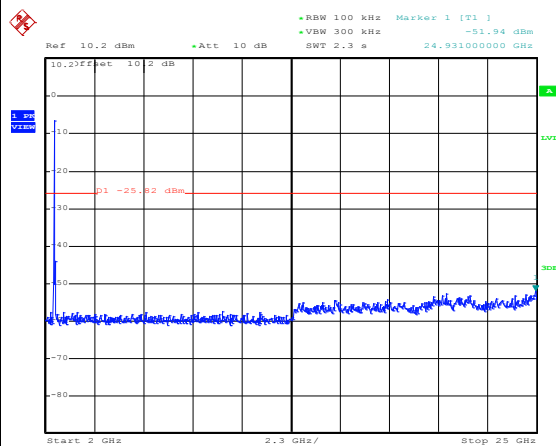
Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Band :	2.4GHz Mid	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11n HT40 Channel 06**100kHz PSD reference Level**

Date: 25.SEP.2013 11:46:54

Spurious Emission 30MHz~3GHz

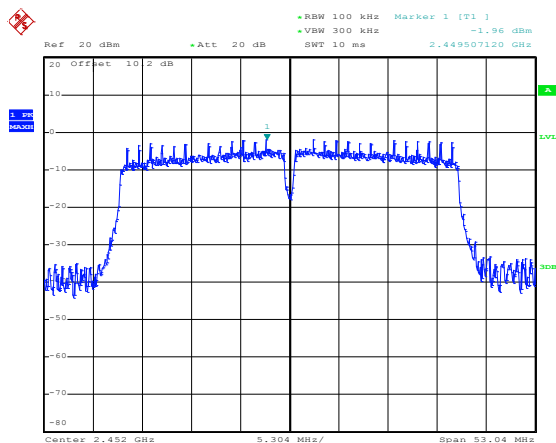
Date: 25.SEP.2013 11:48:10

Spurious Emission 2GHz~25GHz

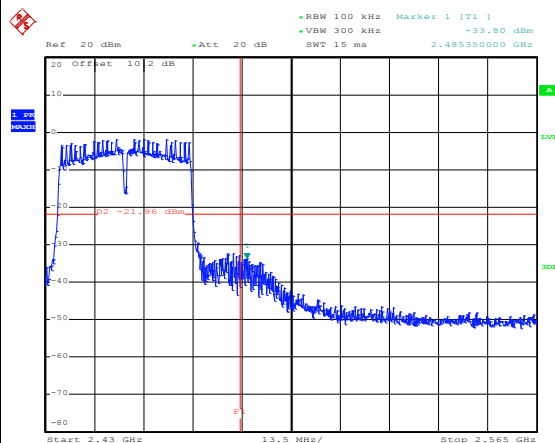
Date: 25.SEP.2013 11:48:29



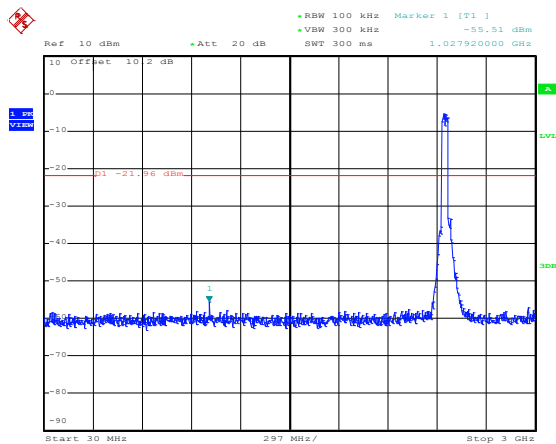
Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Band :	2.4GHz High	Relative Humidity :	50~53%
Test Channel :	09	Test Engineer :	Alex Lee and Kenny Chen

WLAN 802.11n HT40 Channel 09**100kHz PSD reference Level**

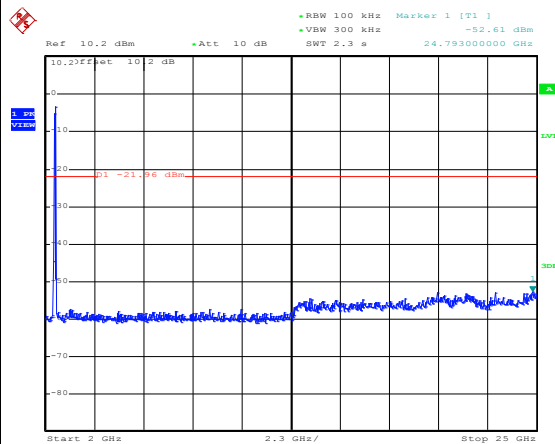
Date: 25.SEP.2013 11:51:00

High Channel Plot

Date: 25.SEP.2013 11:51:16

Spurious Emission 30MHz~3GHz

Date: 25.SEP.2013 13:41:48

Spurious Emission 2GHz~25GHz

Date: 25.SEP.2013 11:54:59

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 Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
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 above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

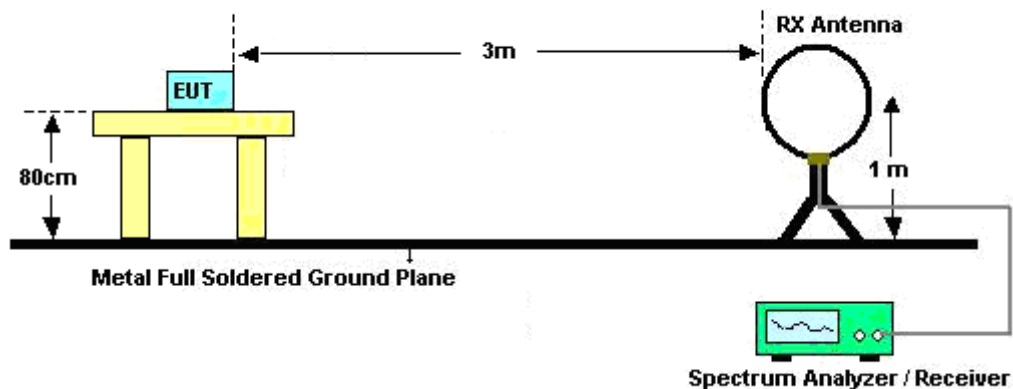
For average measurement:

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

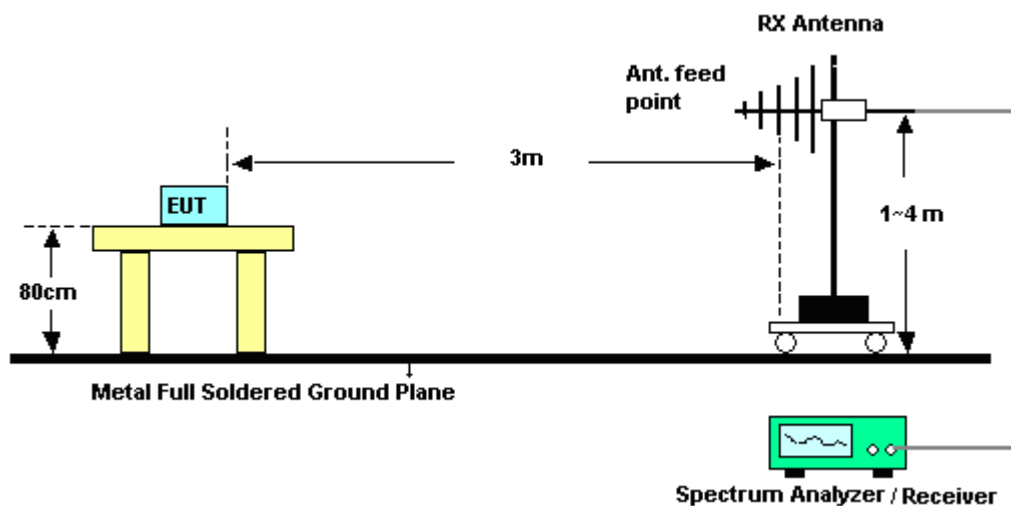
Band	Duty Cycle(%)	T(μ s)	1/T(kHz)	VBW Setting
802.11b	100.00	-	-	10Hz
802.11g	95.89	1400.00	0.71	1Hz
2.4GHz 802.11n HT20	95.56	1290.00	0.78	1Hz
2.4GHz 802.11n HT40	91.06	652.00	1.53	3Hz

3.5.4 Test Setup

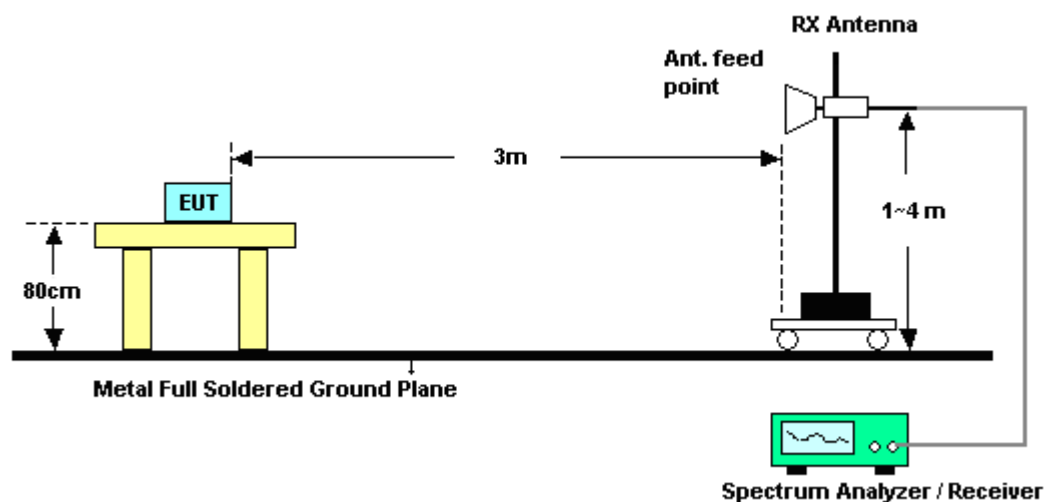
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

3.5.6 Test Result of Radiated Spurious at Band Edges

Test Mode :	802.11b	Temperature :	28~29°C
Test Band :	Low	Relative Humidity :	56~57%
Test Channel :	01	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.92	57.73	-16.27	74	52.72	32.27	6.22	33.48	130	246	Peak
2390	50.17	-3.83	54	45.16	32.27	6.22	33.48	130	246	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.29	53.11	-20.89	74	48.31	32.06	6.22	33.48	200	306	Peak
2390	44.05	-9.95	54	39.25	32.06	6.22	33.48	200	306	Average

Test Mode :	802.11b	Temperature :	28~29°C
Test Band :	High	Relative Humidity :	56~57%
Test Channel :	11	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.01	57.98	-16.02	74	52.36	32.63	6.45	33.46	157	264	Peak
2483.53	47.79	-6.21	54	42.17	32.63	6.45	33.46	157	264	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.89	53.58	-20.42	74	48	32.59	6.45	33.46	129	307	Peak
2483.5	43.01	-10.99	54	37.43	32.59	6.45	33.46	129	307	Average



Test Mode :	802.11g	Temperature :	28~29°C
Test Band :	Low	Relative Humidity :	56~57%
Test Channel :	01	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.94	55.93	-18.07	74	50.92	32.27	6.22	33.48	132	248	Peak
2389.47	42.98	-11.02	54	37.97	32.27	6.22	33.48	132	248	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2335.92	52.18	-21.82	74	47.74	31.74	6.19	33.49	195	307	Peak
2384.43	40.63	-13.37	54	35.94	31.95	6.22	33.48	195	307	Average

Test Mode :	802.11g	Temperature :	28~29°C
Test Band :	High	Relative Humidity :	56~57%
Test Channel :	11	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2485.39	58.42	-15.58	74	52.8	32.63	6.45	33.46	102	252	Peak
2483.65	43.66	-10.34	54	38.04	32.63	6.45	33.46	102	252	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.88	53.9	-20.1	74	48.32	32.59	6.45	33.46	104	308	Peak
2483.5	41.69	-12.31	54	36.11	32.59	6.45	33.46	104	308	Average



Test Mode :	802.11n HT20	Temperature :	28~29°C
Test Band :	Low	Relative Humidity :	56~57%
Test Channel :	01	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.83	60.19	-13.81	74	55.18	32.27	6.22	33.48	103	242	Peak
2390	41.5	-12.5	54	36.49	32.27	6.22	33.48	103	242	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.03	51.47	-22.53	74	46.67	32.06	6.22	33.48	194	291	Peak
2389.83	37.69	-16.31	54	32.89	32.06	6.22	33.48	194	291	Average

Test Mode :	802.11n HT20	Temperature :	28~29°C
Test Band :	High	Relative Humidity :	56~57%
Test Channel :	11	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.86	61.73	-12.27	74	56.11	32.63	6.45	33.46	104	252	Peak
2483.62	43.86	-10.14	54	38.24	32.63	6.45	33.46	104	252	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2485.21	57.23	-16.77	74	51.65	32.59	6.45	33.46	104	308	Peak
2483.89	41.97	-12.03	54	36.39	32.59	6.45	33.46	104	308	Average



Test Mode :	802.11n HT40	Temperature :	28~29°C
Test Band :	Low	Relative Humidity :	56~57%
Test Channel :	03	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.03	62.65	-11.35	74	57.64	32.27	6.22	33.48	197	253	Peak
2388.57	46.47	-7.53	54	41.46	32.27	6.22	33.48	197	253	Average
2483.8	54.47	-19.53	74	48.85	32.63	6.45	33.46	197	253	Peak
2485.33	42.57	-11.43	54	36.95	32.63	6.45	33.46	197	253	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.13	55.35	-18.65	74	50.55	32.06	6.22	33.48	164	292	Peak
2388.39	42.23	-11.77	54	37.43	32.06	6.22	33.48	164	292	Average
2489.29	53.51	-20.49	74	47.82	32.7	6.45	33.46	164	292	Peak
2489.71	42.16	-11.84	54	36.47	32.7	6.45	33.46	164	292	Average



Test Mode :	802.11n HT40	Temperature :	28~29°C
Test Band :	Low	Relative Humidity :	56~57%
Test Channel :	06	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	57.7	-16.3	74	52.69	32.27	6.22	33.48	100	254	Peak
2389.65	43.49	-10.51	54	38.48	32.27	6.22	33.48	100	254	Average
2485.78	67.09	-6.91	74	61.47	32.63	6.45	33.46	100	254	Peak
2483.53	50.19	-3.81	54	44.57	32.63	6.45	33.46	100	254	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.74	52.85	-21.15	74	48.05	32.06	6.22	33.48	126	308	Peak
2389.92	41.36	-12.64	54	36.56	32.06	6.22	33.48	126	308	Average
2486.5	59.54	-14.46	74	53.96	32.59	6.45	33.46	126	308	Peak
2490.52	44.58	-9.42	54	38.89	32.7	6.45	33.46	126	308	Average



Test Mode :	802.11n HT40	Temperature :	28~29°C
Test Band :	High	Relative Humidity :	56~57%
Test Channel :	09	Test Engineer :	Gavin Wu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2330.52	53.06	-20.94	74	48.38	31.99	6.18	33.49	100	253	Peak
2384.34	41.55	-12.45	54	36.61	32.2	6.22	33.48	100	253	Average
2484.61	65.36	-8.64	74	59.74	32.63	6.45	33.46	100	253	Peak
2485.81	47.87	-6.13	54	42.25	32.63	6.45	33.46	100	253	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.76	48.08	-25.92	74	43.28	32.06	6.22	33.48	128	296	Peak
2380.47	37.06	-16.94	54	32.37	31.95	6.22	33.48	128	296	Average
2487.31	60.84	-13.16	74	55.26	32.59	6.45	33.46	128	296	Peak
2485.75	41.51	-12.49	54	35.93	32.59	6.45	33.46	128	296	Average

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

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

Test Mode :	802.11b	Temperature :	28~29°C
Test Channel :	01	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 112.95dBμV/m - 20dB = 92.95dBμV/m. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2414	107.58	-	-	102.44	32.34	6.28	33.48	130	246	Average
2414	112.95	-	-	107.81	32.34	6.28	33.48	130	246	Peak
4824	43.06	-30.94	74	59.52	34.44	8.04	58.94	100	0	Peak
7236	43.38	-49.57	92.95	55.62	35.61	10.48	58.33	100	0	Peak

Test Mode :	802.11b	Temperature :	28~29°C
Test Channel :	01	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	101.14	-	-	96.18	32.16	6.28	33.48	200	306	Average
2412	106.34	-	-	101.38	32.16	6.28	33.48	200	306	Peak
4824	46.73	-27.27	74	59.84	34.44	8.04	55.59	100	0	Peak
7236	46.24	-40.1	86.34	56.58	35.6	10.48	56.42	100	0	Peak

Test Mode :	802.11b	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	104.85	-	-	99.49	32.49	6.34	33.47	196	66	Average
2439	109.95	-	-	104.59	32.49	6.34	33.47	196	66	Peak
4875	41.19	-32.81	74	57.55	34.4	8.11	58.87	100	0	Peak
7311	46.45	-27.55	74	58.82	35.62	10.47	58.46	100	0	Peak

Test Mode :	802.11b	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	98.31	-	-	93.06	32.38	6.34	33.47	192	122	Average
2439	103.45	-	-	98.2	32.38	6.34	33.47	192	122	Peak
4875	44.56	-29.44	74	57.73	34.4	8.11	55.68	100	0	Peak
7311	49.43	-24.57	74	59.68	35.56	10.47	56.28	100	0	Peak

Test Mode :	802.11b	Temperature :	28~29°C
Test Channel :	11	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	105.14	-	-	99.66	32.56	6.39	33.47	157	264	Average
2462	110.29	-	-	104.81	32.56	6.39	33.47	157	264	Peak
4923	41.15	-32.85	74	57.41	34.36	8.18	58.8	100	0	Peak
7386	45.18	-28.82	74	57.68	35.66	10.45	58.61	100	0	Peak

Test Mode :	802.11b	Temperature :	28~29°C
Test Channel :	11	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2464 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2464	99.18	-	-	93.77	32.49	6.39	33.47	129	307	Average
2464	104.32	-	-	98.91	32.49	6.39	33.47	129	307	Peak
4923	44.01	-29.99	74	57.25	34.36	8.18	55.78	100	0	Peak
7386	48.47	-25.53	74	58.64	35.49	10.45	56.11	100	0	Peak

Test Mode :	802.11g	Temperature :	28~29°C
Test Channel :	01	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2414	95.52	-	-	90.38	32.34	6.28	33.48	132	248	Average
2414	106.3	-	-	101.16	32.34	6.28	33.48	132	248	Peak
4824	41.4	-32.6	74	57.86	34.44	8.04	58.94	100	0	Peak
7236	43.11	-43.19	86.3	55.35	35.61	10.48	58.33	100	0	Peak

Test Mode :	802.11g	Temperature :	28~29°C
Test Channel :	01	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2414	88.37	-	-	83.41	32.16	6.28	33.48	195	307	Average
2414	99.17	-	-	94.21	32.16	6.28	33.48	195	307	Peak
4824	43.15	-30.85	74	56.26	34.44	8.04	55.59	100	0	Peak
7236	45.19	-33.98	79.17	55.53	35.6	10.48	56.42	100	0	Peak

Test Mode :	802.11g	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	101.2	-	-	95.84	32.49	6.34	33.47	129	70	Average
2439	111.05	-	-	105.69	32.49	6.34	33.47	129	70	Peak
4875	41.23	-32.77	74	57.59	34.4	8.11	58.87	100	0	Peak
7311	43.08	-30.92	74	55.45	35.62	10.47	58.46	100	0	Peak

Test Mode :	802.11g	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	94.21	-	-	88.96	32.38	6.34	33.47	132	120	Average
2439	104.55	-	-	99.3	32.38	6.34	33.47	132	120	Peak
4875	43.31	-30.69	74	56.48	34.4	8.11	55.68	100	0	Peak
7311	45.89	-28.11	74	56.14	35.56	10.47	56.28	100	0	Peak

Test Mode :	802.11g	Temperature :	28~29°C
Test Channel :	11	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2464 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2464	92.7	-	-	87.22	32.56	6.39	33.47	102	252	Average
2464	101.25	-	-	95.77	32.56	6.39	33.47	102	252	Peak
4923	42.17	-31.83	74	58.43	34.36	8.18	58.8	100	0	Peak
7386	42.31	-31.69	74	54.81	35.66	10.45	58.61	100	0	Peak

Test Mode :	802.11g	Temperature :	28~29°C
Test Channel :	11	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2464 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2464	87.15	-	-	81.74	32.49	6.39	33.47	104	308	Average
2464	97.79	-	-	92.38	32.49	6.39	33.47	104	308	Peak
4923	44.12	-29.88	74	57.36	34.36	8.18	55.78	100	0	Peak
7386	45.66	-28.34	74	55.83	35.49	10.45	56.11	100	0	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	28~29°C
Test Channel :	01	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2414	94.62	-	-	89.48	32.34	6.28	33.48	103	242	Average
2414	105.35	-	-	100.21	32.34	6.28	33.48	103	242	Peak
4824	41	-33	74	57.46	34.44	8.04	58.94	100	0	Peak
7236	42.47	-42.88	85.35	54.71	35.61	10.48	58.33	100	0	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	28~29°C
Test Channel :	01	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2414	87.76	-	-	82.8	32.16	6.28	33.48	194	291	Average
2414	98.59	-	-	93.63	32.16	6.28	33.48	194	291	Peak
4824	43.45	-30.55	74	56.56	34.44	8.04	55.59	100	0	Peak
7236	45.09	-33.5	78.59	55.43	35.6	10.48	56.42	100	0	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	99.65	-	-	94.29	32.49	6.34	33.47	156	66	Average
2439	110	-	-	104.64	32.49	6.34	33.47	156	66	Peak
4875	39.94	-34.06	74	56.3	34.4	8.11	58.87	100	0	Peak
7311	43.19	-30.81	74	55.56	35.62	10.47	58.46	100	0	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	91.74	-	-	86.49	32.38	6.34	33.47	100	141	Average
2439	101.93	-	-	96.68	32.38	6.34	33.47	100	141	Peak
4875	44.05	-29.95	74	57.22	34.4	8.11	55.68	100	0	Peak
7311	45.27	-28.73	74	55.52	35.56	10.47	56.28	100	0	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	28~29°C
Test Channel :	11	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2460 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2460	92.94	-	-	87.46	32.56	6.39	33.47	104	252	Average
2460	103.52	-	-	98.04	32.56	6.39	33.47	104	252	Peak
4923	41.21	-32.79	74	57.47	34.36	8.18	58.8	100	0	Peak
7386	43.23	-30.77	74	55.73	35.66	10.45	58.61	100	0	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	28~29°C
Test Channel :	11	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2464 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2464	86.89	-	-	81.48	32.49	6.39	33.47	104	308	Average
2464	97.46	-	-	92.05	32.49	6.39	33.47	104	308	Peak
4923	44.6	-29.4	74	57.84	34.36	8.18	55.78	100	0	Peak
7386	44.59	-29.41	74	54.76	35.49	10.45	56.11	100	0	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	28~29°C
Test Channel :	03	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2424 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2424	93.23	-	-	88.01	32.41	6.28	33.47	197	253	Average
2424	103.52	-	-	98.3	32.41	6.28	33.47	197	253	Peak
4845	40.75	-33.25	74	57.17	34.43	8.07	58.92	100	0	Peak
7266	41.52	-32.48	74	53.83	35.61	10.48	58.4	100	0	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	28~29°C
Test Channel :	03	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2424 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2424	85.41	-	-	80.33	32.27	6.28	33.47	164	292	Average
2424	95.55	-	-	90.47	32.27	6.28	33.47	164	292	Peak
4845	43.8	-30.2	74	56.92	34.43	8.07	55.62	100	0	Peak
7266	44.32	-29.68	74	54.6	35.59	10.48	56.35	100	0	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
43.77	28.58	-11.42	40	49.17	10.62	0.77	31.98	-	-	Peak
131.52	36.4	-7.1	43.5	55.42	11.49	1.34	31.85	102	229	Peak
140.16	35.12	-8.38	43.5	54.6	10.95	1.38	31.81	-	-	Peak
519.8	20.41	-25.59	46	31.58	17.4	2.64	31.21	-	-	Peak
684.3	20.52	-25.48	46	29.66	18.83	3.02	30.99	-	-	Peak
797.7	20.54	-25.46	46	28.3	19.94	3.26	30.96	-	-	Peak
2439	94.03	-	-	88.67	32.49	6.34	33.47	100	254	Average
2439	104.15	-	-	98.79	32.49	6.34	33.47	100	254	Peak
4875	40.71	-33.29	74	57.07	34.4	8.11	58.87	100	0	Peak
7311	43.24	-30.76	74	55.61	35.62	10.47	58.46	100	0	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	28~29°C
Test Channel :	06	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	34.6	-5.4	40	44.36	21.66	0.64	32.06	-	-	Peak
43.5	43.51	3.51	40	64.69	10.03	0.77	31.98	100	61	Peak
43.5	36.06	-3.94	40	57.24	10.03	0.77	31.98	100	61	QP
51.87	34.62	-5.38	40	59.01	6.66	0.85	31.9	-	-	Peak
363.7	20.58	-25.42	46	35.32	14.75	2.2	31.69	-	-	Peak
529.6	20.4	-25.6	46	31.29	17.68	2.67	31.24	-	-	Peak
673.1	22.54	-23.46	46	31.67	18.87	2.99	30.99	-	-	Peak
2439	87.2	-	-	81.95	32.38	6.34	33.47	126	308	Average
2439	97.14	-	-	91.89	32.38	6.34	33.47	126	308	Peak
4875	43.56	-30.44	74	56.73	34.4	8.11	55.68	100	0	Peak
7311	44.72	-29.28	74	54.97	35.56	10.47	56.28	100	0	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	28~29°C
Test Channel :	09	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 2454 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2454	91.23	-	-	85.75	32.56	6.39	33.47	100	253	Average
2454	101.11	-	-	95.63	32.56	6.39	33.47	100	253	Peak
4905	40.52	-33.48	74	56.79	34.37	8.18	58.82	100	0	Peak
7356	43.04	-30.96	74	55.49	35.64	10.46	58.55	100	0	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	28~29°C
Test Channel :	09	Relative Humidity :	56~57%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 2454 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2454	86.07	-	-	80.66	32.49	6.39	33.47	128	296	Average
2454	96.9	-	-	91.49	32.49	6.39	33.47	128	296	Peak
4905	43.66	-30.34	74	56.85	34.37	8.18	55.74	100	0	Peak
7356	45.36	-28.64	74	55.57	35.51	10.46	56.18	100	0	Peak

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

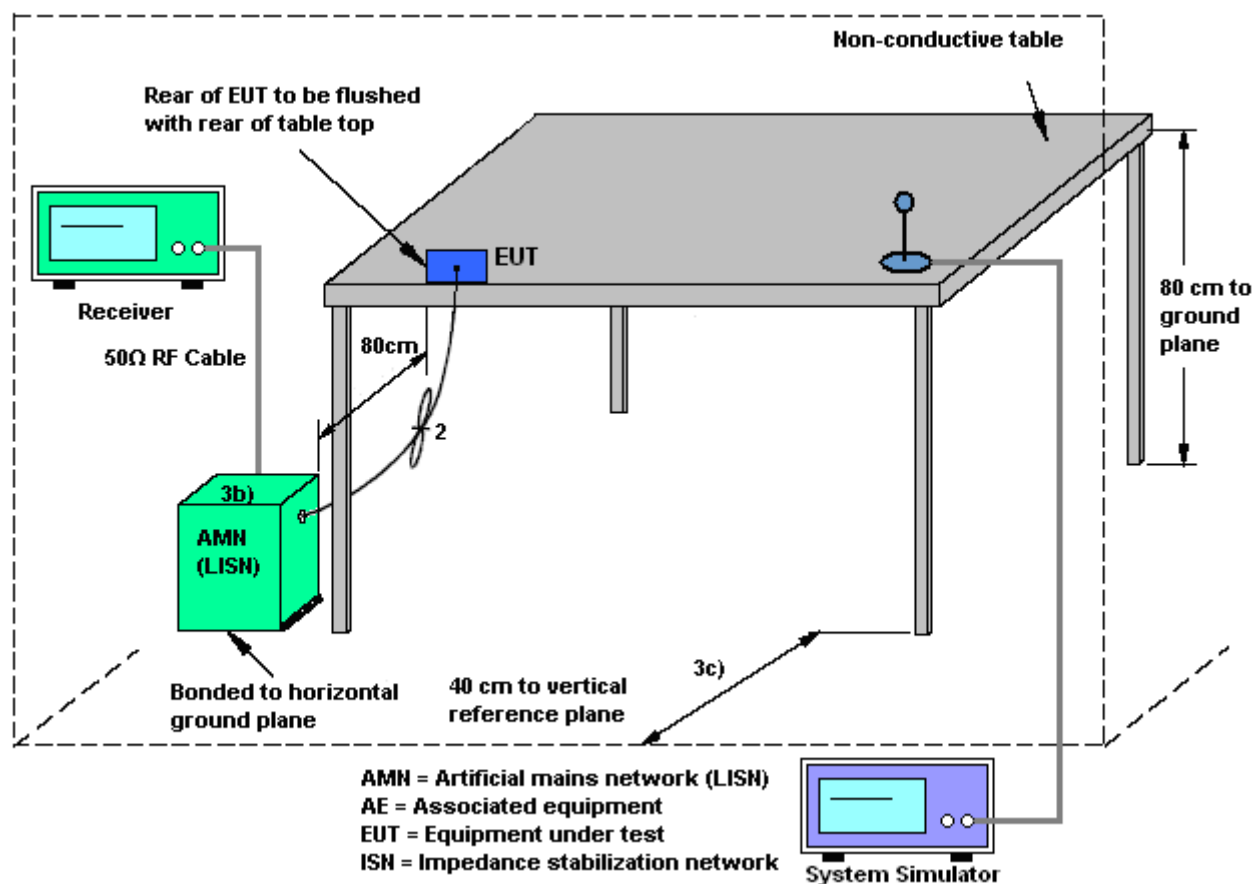
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

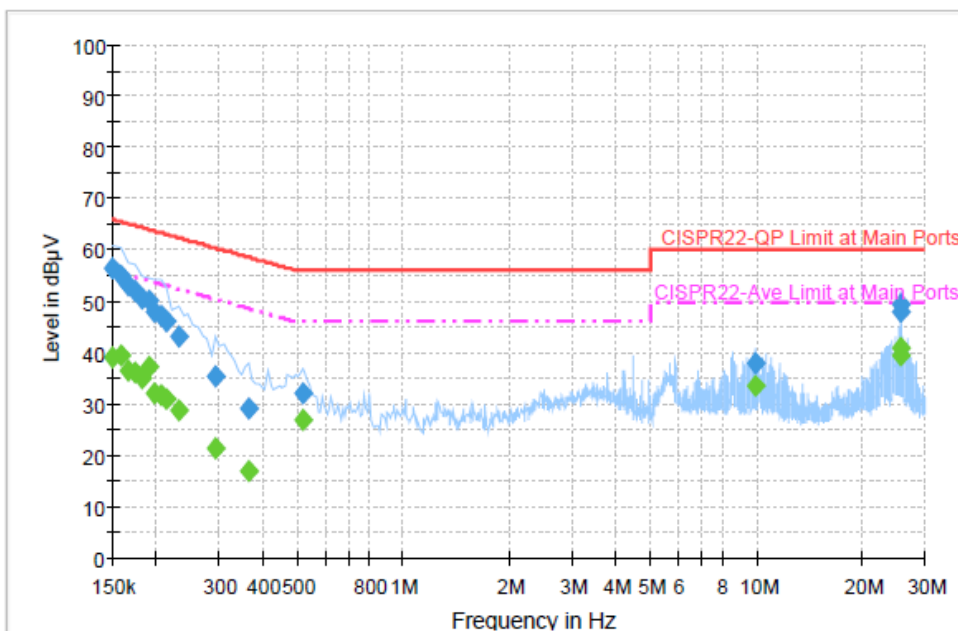
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

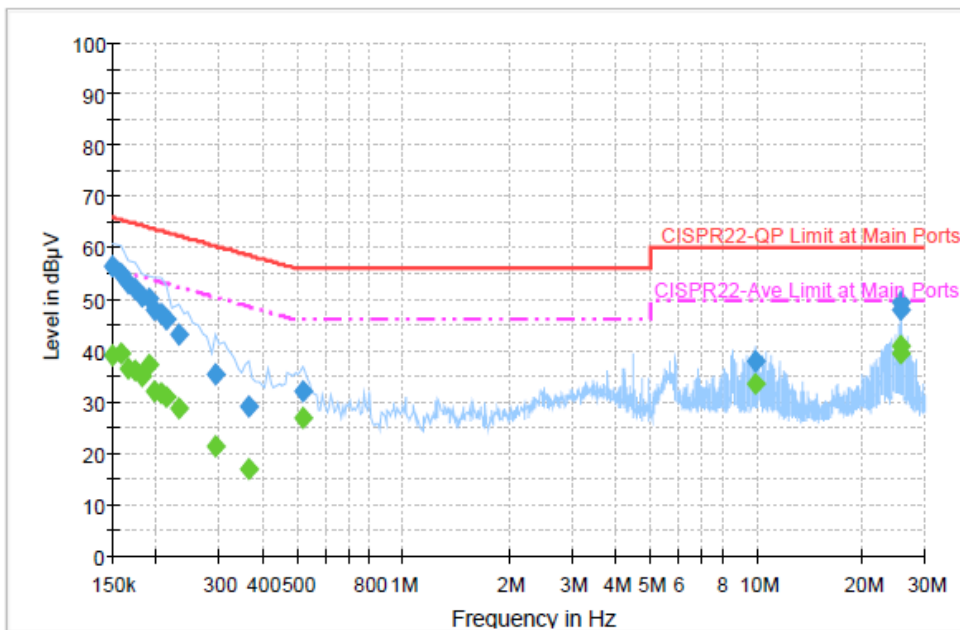
Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band II Idle + WLAN Link + Battery + USB Cable (Charging from Notebook)		



Final Result : Quasi-Peak

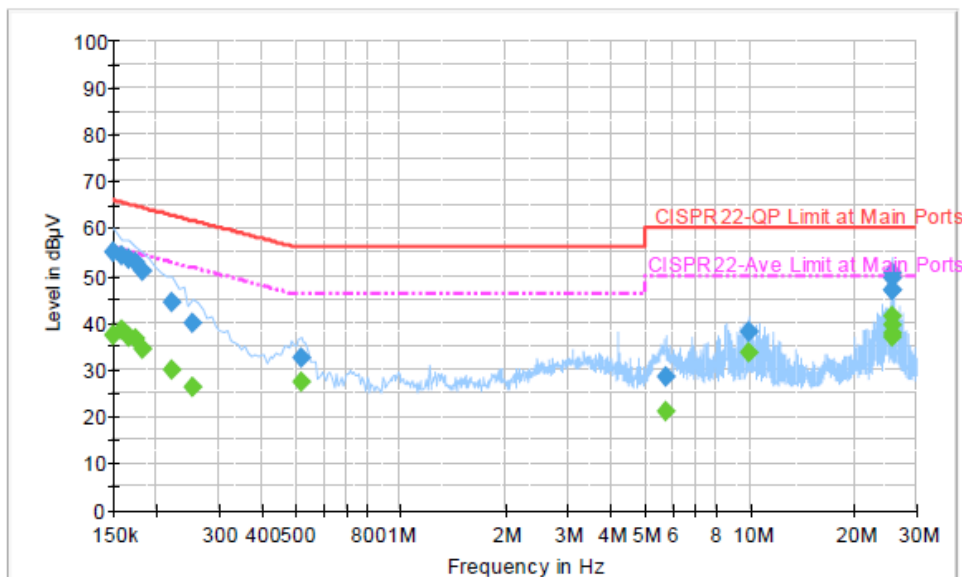
Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	56.6	Off	L1	19.4	9.4	66.0
0.158000	54.9	Off	L1	19.3	10.7	65.6
0.166000	53.0	Off	L1	19.4	12.2	65.2
0.174000	52.2	Off	L1	19.4	12.6	64.8
0.182000	50.6	Off	L1	19.4	13.8	64.4
0.190000	50.1	Off	L1	19.4	13.9	64.0
0.198000	47.9	Off	L1	19.3	15.8	63.7
0.206000	47.1	Off	L1	19.4	16.3	63.4
0.214000	46.0	Off	L1	19.4	17.0	63.0
0.230000	43.3	Off	L1	19.4	19.1	62.4
0.294000	35.6	Off	L1	19.4	24.8	60.4
0.366000	29.3	Off	L1	19.4	29.3	58.6
0.518000	32.3	Off	L1	19.4	23.7	56.0
9.878000	38.0	Off	L1	19.7	22.0	60.0
25.622000	49.3	Off	L1	19.9	10.7	60.0
25.670000	48.1	Off	L1	19.9	11.9	60.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band II Idle + WLAN Link + Battery + USB Cable (Charging from Notebook)		


Final Result : Average

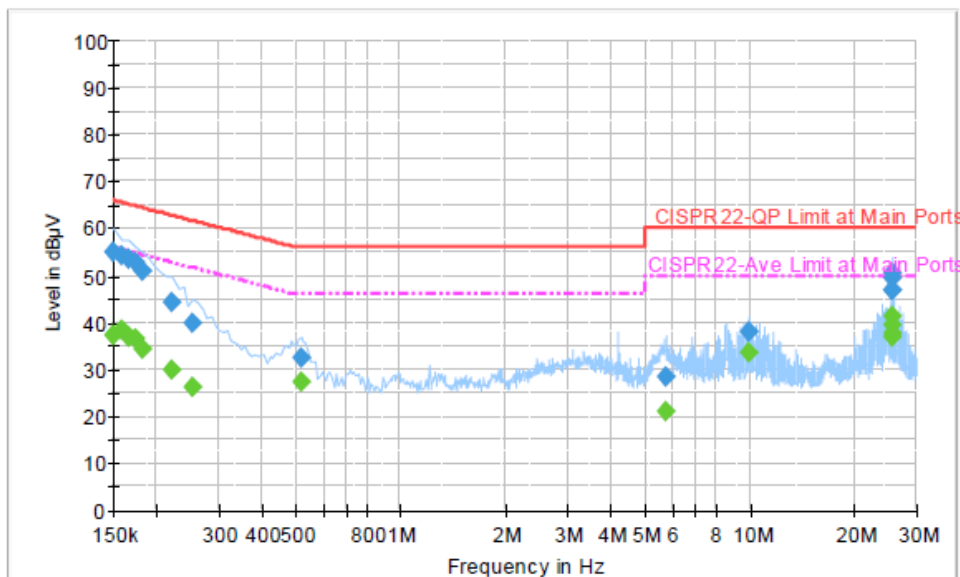
Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	39.3	Off	L1	19.4	16.7	56.0
0.158000	39.4	Off	L1	19.3	16.2	55.6
0.166000	36.6	Off	L1	19.4	18.6	55.2
0.174000	36.0	Off	L1	19.4	18.8	54.8
0.182000	35.1	Off	L1	19.4	19.3	54.4
0.190000	37.3	Off	L1	19.4	16.7	54.0
0.198000	32.3	Off	L1	19.3	21.4	53.7
0.206000	31.8	Off	L1	19.4	21.6	53.4
0.214000	30.8	Off	L1	19.4	22.2	53.0
0.230000	28.6	Off	L1	19.4	23.8	52.4
0.294000	21.5	Off	L1	19.4	28.9	50.4
0.366000	16.8	Off	L1	19.4	31.8	48.6
0.518000	27.1	Off	L1	19.4	18.9	46.0
9.878000	33.7	Off	L1	19.7	16.3	50.0
25.622000	41.1	Off	L1	19.9	8.9	50.0
25.670000	39.4	Off	L1	19.9	10.6	50.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band II Idle + WLAN Link + Battery + USB Cable (Charging from Notebook)		


Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	55.0	Off	N	19.4	11.0	66.0
0.158000	54.2	Off	N	19.3	11.4	65.6
0.166000	53.3	Off	N	19.4	11.9	65.2
0.174000	52.6	Off	N	19.4	12.2	64.8
0.182000	51.0	Off	N	19.4	13.4	64.4
0.222000	44.2	Off	N	19.4	18.5	62.7
0.254000	39.8	Off	N	19.5	21.8	61.6
0.518000	32.6	Off	N	19.4	23.4	56.0
5.742000	28.5	Off	N	19.7	31.5	60.0
9.878000	38.0	Off	N	19.7	22.0	60.0
25.574000	46.7	Off	N	20.0	13.3	60.0
25.622000	50.4	Off	N	20.0	9.6	60.0
25.670000	49.3	Off	N	20.0	10.7	60.0
25.718000	46.7	Off	N	20.0	13.3	60.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band II Idle + WLAN Link + Battery + USB Cable (Charging from Notebook)		


Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	37.1	Off	N	19.4	18.9	56.0
0.158000	38.4	Off	N	19.3	17.2	55.6
0.166000	36.8	Off	N	19.4	18.4	55.2
0.174000	36.4	Off	N	19.4	18.4	54.8
0.182000	34.4	Off	N	19.4	20.0	54.4
0.222000	29.7	Off	N	19.4	23.0	52.7
0.254000	26.0	Off	N	19.5	25.6	51.6
0.518000	27.2	Off	N	19.4	18.8	46.0
5.742000	21.0	Off	N	19.7	29.0	50.0
9.878000	33.7	Off	N	19.7	16.3	50.0
25.574000	37.7	Off	N	20.0	12.3	50.0
25.622000	41.3	Off	N	20.0	8.7	50.0
25.670000	39.5	Off	N	20.0	10.5	50.0
25.718000	37.0	Off	N	20.0	13.0	50.0

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

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 07, 2013	Jul. 29, 2013 ~ Sep. 25, 2013	Jun. 06, 2014	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Sep. 08, 2012	Jul. 29, 2013 ~ Aug. 16, 2013	Sep. 07, 2013	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 17, 2013	Aug. 17, 2013 ~ Sep. 25, 2013	Aug. 16, 2014	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Sep. 08, 2012	Jul. 29, 2013 ~ Aug. 16, 2013	Sep. 07, 2013	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 17, 2013	Aug. 17, 2013 ~ Sep. 25, 2013	Aug. 16, 2014	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 13, 2012	Jul. 26, 2013	Nov. 12, 2013	Conduction (CO05-HY)
Two-LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2012	Jul. 26, 2013	Dec. 11, 2013	Conduction (CO05-HY)
Two-LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 06, 2012	Jul. 26, 2013	Dec. 05, 2013	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Jul. 26, 2013	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz ~ 26.5GHz	Jan. 23, 2013	Sep. 17, 2013 ~ Sep. 25, 2013	Jan. 22, 2014	Radiation (03CH08-HY)
Bilog Antenna	Teseq GmbH	CBL6112D	35379	30MHz~2GHz	Mar. 28, 2013	Sep. 17, 2013 ~ Sep. 25, 2013	Mar. 27, 2014	Radiation (03CH08-HY)
Horn Antenna	ESCO	3117	000143261	1GHz~18GHz	Jan. 08, 2013	Sep. 17, 2013 ~ Sep. 25, 2013	Jan. 07, 2014	Radiation (03CH08-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Sep. 28, 2012	Sep. 17, 2013 ~ Sep. 25, 2013	Sep. 27, 2013	Radiation (03CH08-HY)
Preamplifier	EMCI	EMC011830	980148	1GHz~18GHz	Jun. 21, 2013	Sep. 17, 2013 ~ Sep. 25, 2013	Jun. 20, 2014	Radiation (03CH08-HY)
Pre Amplifier	Agilent	8449B	3008A02665	1GHz~26.5GHz	Sep. 04, 2013	Sep. 17, 2013 ~ Sep. 25, 2013	Sep. 03, 2014	Radiation (03CH08-HY)
Pre Amplifier	EMC INSTRUMENT	EMC011830	980148	100MHz~18GHz	Jun. 21, 2013	Sep. 17, 2013 ~ Sep. 25, 2013	Jun. 20, 2014	Radiation (03CH08-HY)
Preamplifier	COM-POWER	PA-103	161075	10Hz~1000MHz Gain:32dB	Feb. 26, 2013	Sep. 17, 2013 ~ Sep. 25, 2013	Feb. 25, 2014	Radiation (03CH08-HY)
Turn Table	Chaintek	Chaintek 3000	N/A	0~360 Degree	N/A	Sep. 17, 2013 ~ Sep. 25, 2013	N/A	Radiation (03CH08-HY)
Antenna Mast	MF	MFA520BS	N/A	1m~4m	N/A	Sep. 17, 2013 ~ Sep. 25, 2013	N/A	Radiation (03CH08-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
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Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.54
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Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

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