FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	CDMA 1X-EVDO Digital Mobile Phone
BRAND NAME	:	ZTE
MODEL NAME	:	Z665C
FCC ID	:	Q78-Z665C
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Jan. 28, 2013 and completely tested on Apr. 12, 2013. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

Testing Laboratory
2627

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APPENDIX A. PHOTOGRAPHS OF EUT

APPENDIX B. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR312809B	Rev. 01	Initial issue of report	Apr. 22, 2013
FR312809B	Rev. 02	Update the report for revising HW Version	Jun. 03, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges	15.209(a) & 15.247(d)	Pass	-
		Radiated Spurious Emission		Pass	Under limit 1.19 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.20 dB at 0.430 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	CDMA 1X-EVDO Digital Mobile Phone
Brand Name	ZTE
Model Name	Z665C
FCC ID	Q78-Z665C
EUT supports Radios application	CDMA/EV-DO/WLAN 11bgn / Bluetooth EDR
HW Version	Z665CHWV1.0
SW Version	TF_US_Z665CV0.0.0B04
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 Frequency Range	2412 MHz ~ 2462 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Maximum Output Power to Antenna	802.11b : 14.53 dBm (0.0284 W) 802.11g : 22.39 dBm (0.1734 W) 802.11n HT20 : 21.76 dBm (0.1500 W)
Antenna Type	IFA Antenna with gain -3.5 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH01-KS	CO01-KS	03CH01-KS	149928/4086E-1

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

1.6 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 C63.10-2009

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 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 antenna configurations as following table and the highest power data rates were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	13.32	13.39	13.37	13.48
CH 06	2437 MHz	14.05	14.15	14.18	14.21
CH 11	2462 MHz	**14.53**	14.47	14.45	14.48

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	21.35	21.22	21.14	21.06	21.09	20.89	20.99	21.12
CH 06	2437 MHz	21.95	21.98	21.86	21.85	21.92	21.82	21.84	21.87
CH 11	2462 MHz	**22.39**	21.73	21.92	21.79	21.88	21.91	21.88	21.96

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	20.93	20.79	20.75	20.71	20.66	20.65	20.72	20.74
CH 06	2437 MHz	21.75	21.65	21.52	21.59	21.48	21.52	21.63	21.62
CH 11	2462 MHz	**21.76**	21.65	21.69	21.59	21.68	21.62	21.57	21.62

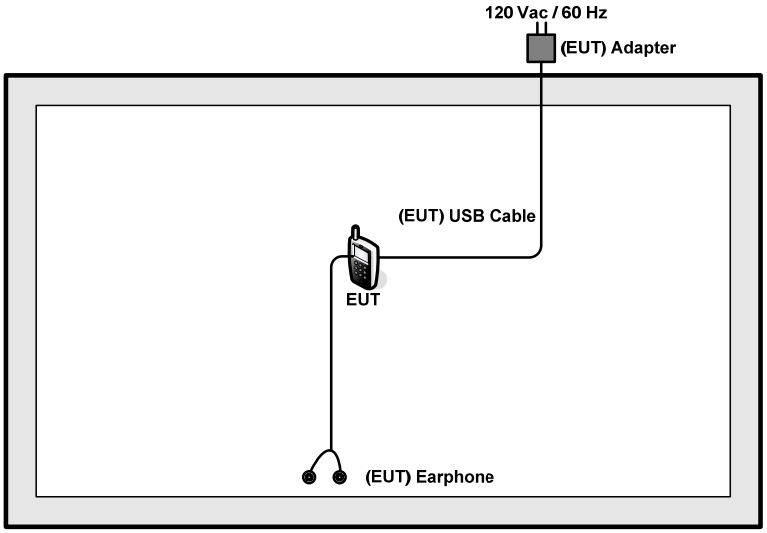
2.3 Test Mode

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

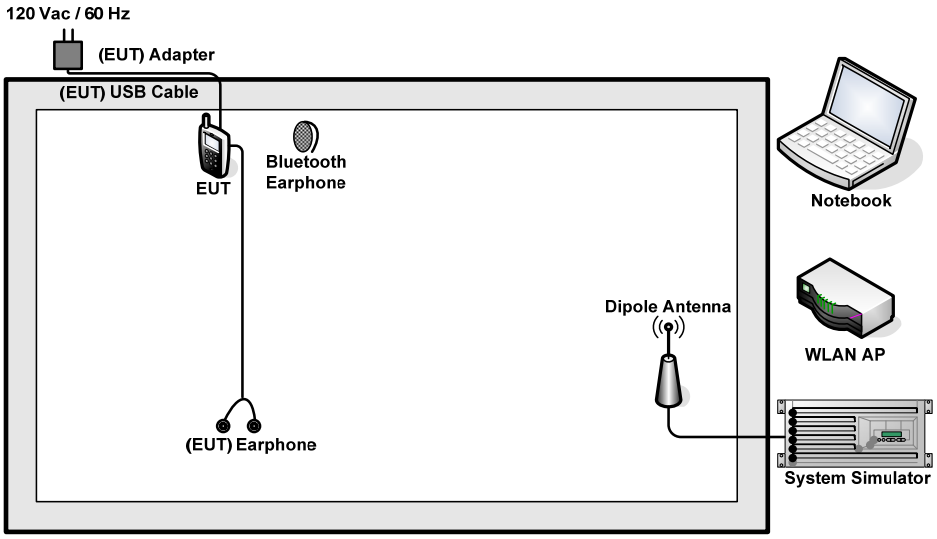
Test Cases				
	Test Items	Mode	Data Rate	Test Channel
Conducted TCs	6dB BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
	Conducted Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	6.5 Mbps	1/11
	Conducted Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
Radiated TCs	Radiated Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	6.5 Mbps	1/11
	Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
AC Conducted Emission	Mode 1 : CDMA850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone			

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.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	N/A	N/A

2.6 RF Utility

For WLAN function, programmed RF utility, “ADB” 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 conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and 10dB attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and 10dB attenuator factor.
Offset = RF cable loss + attenuator factor.
Following table shows an offset computation example with cable loss 5.6 dB.

Example :
Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 5.6 + 10 = 15.6 (dB)

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.

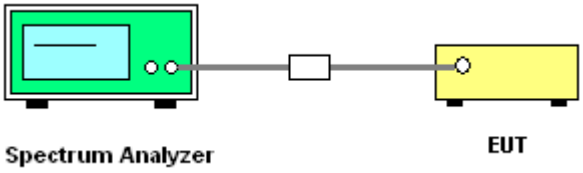
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 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 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

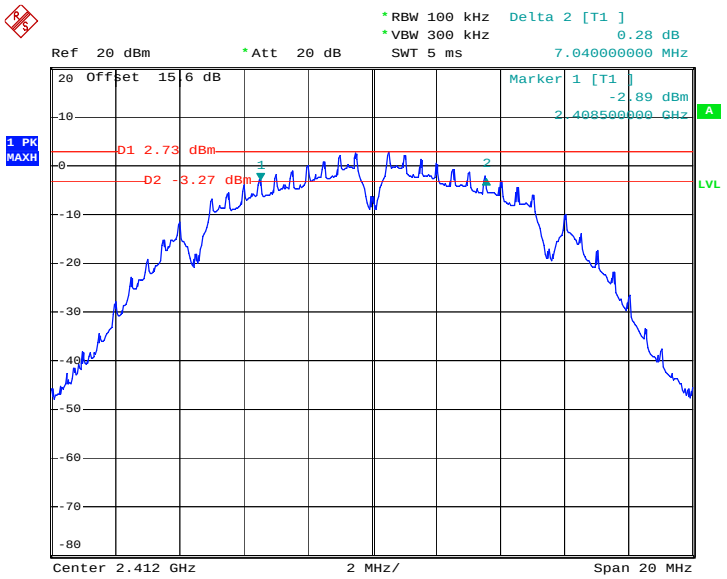


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Engineer :	Lizy Li	**Relative Humidity :**	47~48%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	7.04	0.5	Pass
06	2437	7.52	0.5	Pass
11	2462	7.04	0.5	Pass

6 dB Bandwidth Plot on 802.11b Channel 01



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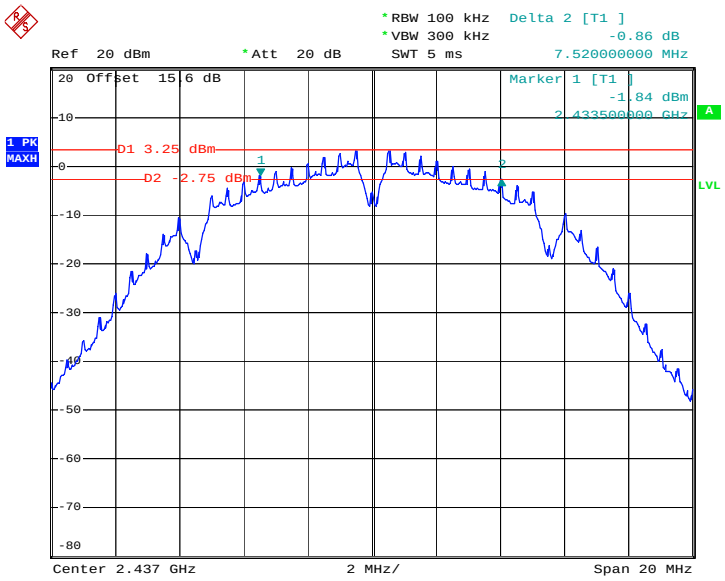
6 dB Bandwidth Plot on 802.11b Channel 06



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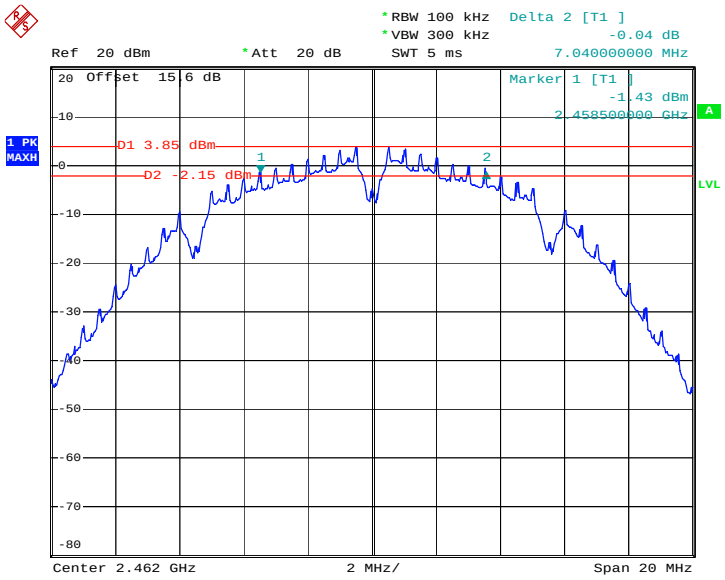
6 dB Bandwidth Plot on 802.11b Channel 11



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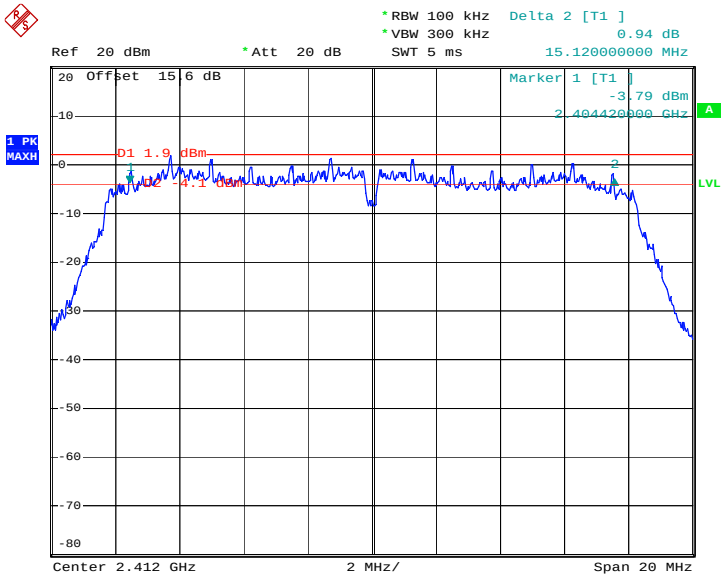
Test Mode :	802.11g	Temperature :	23~24℃
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.12	0.5	Pass
06	2437	15.12	0.5	Pass
11	2462	15.08	0.5	Pass

6 dB Bandwidth Plot on 802.11g Channel 01



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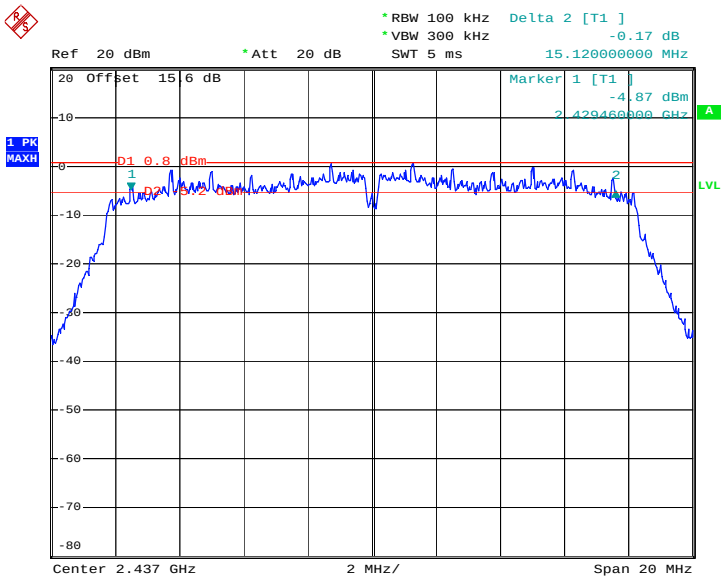
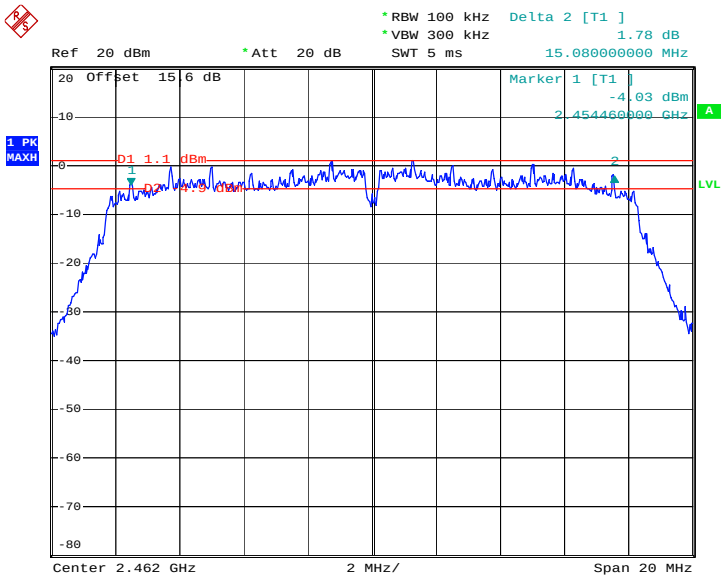
6 dB Bandwidth Plot on 802.11g Channel 06



Date: 31.MAR.2013 07:04:21

6 dB Bandwidth Plot on 802.11g Channel 11



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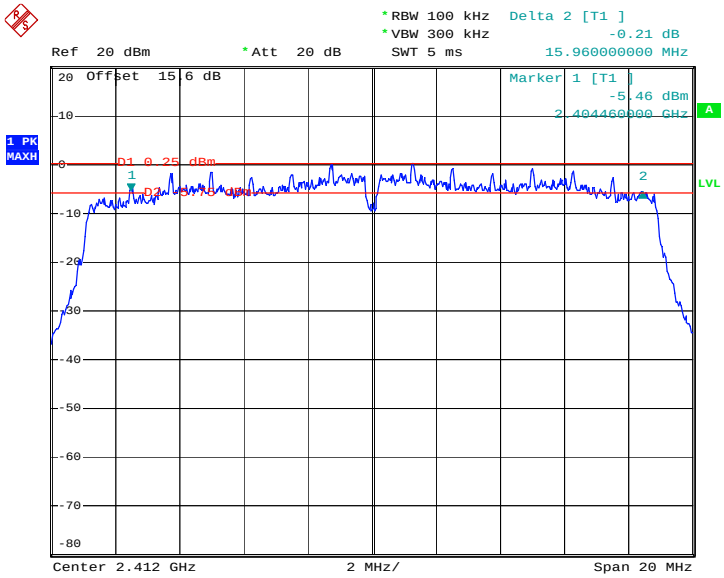
Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.96	0.5	Pass
06	2437	15.92	0.5	Pass
11	2462	16.04	0.5	Pass

6 dB Bandwidth Plot on 802.11n HT20 Channel 01



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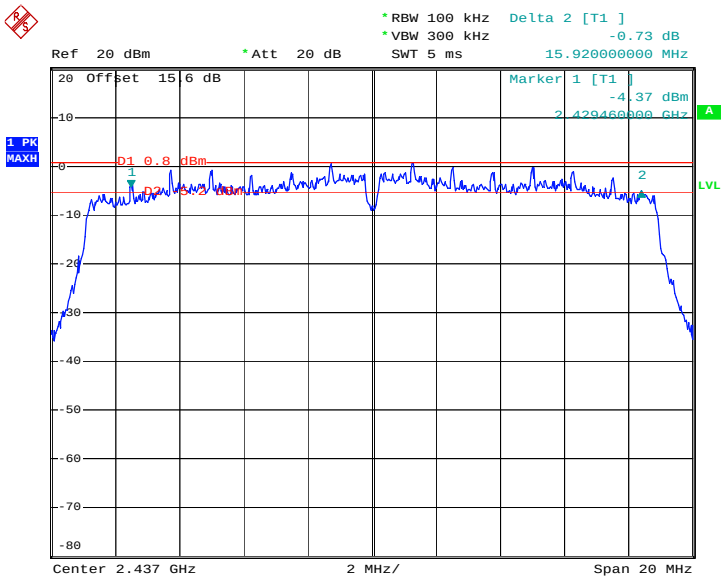
6 dB Bandwidth Plot on 802.11n HT20 Channel 06



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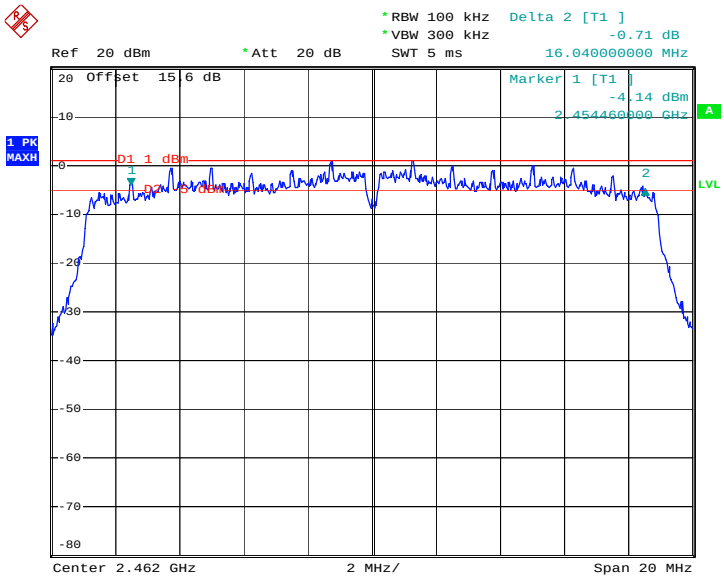
6 dB Bandwidth Plot on 802.11n HT20 Channel 11



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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.

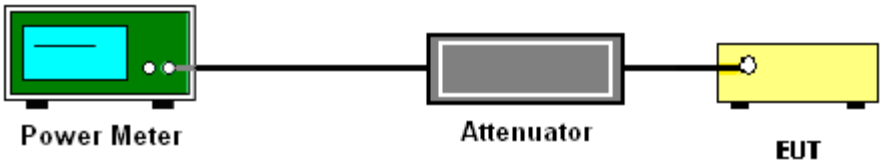
3.2.2 Measuring Instruments

See list of measuring instruments 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 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. 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 :	802.11b	Temperature :	23~24℃
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	13.32	30	Pass
06	2437	14.05	30	Pass
11	2462	14.53	30	Pass

Test Mode :	802.11g	Temperature :	23~24℃
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	21.35	30	Pass
06	2437	21.95	30	Pass
11	2462	22.39	30	Pass

Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Engineer :	Lizy Li	Relative Humidity :	47~48%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.93	30	Pass
06	2437	21.75	30	Pass
11	2462	21.76	30	Pass

3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Engineer :	Lizy Li	**Relative Humidity :**	47~48%
Duty Cycle:	94.57%	**Duty Factor:**	0.24dB

Channel	Frequency (MHz)	802.11b Average Output Power (dBm)
01	2412	10.06
06	2437	10.97
11	2462	11.25

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Engineer :	Lizy Li	**Relative Humidity :**	47~48%
Duty Cycle:	93.51%	**Duty Factor:**	0.29dB

Channel	Frequency (MHz)	802.11g Average Output Power (dBm)
01	2412	11.15
06	2437	11.89
11	2462	12.18

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Engineer :	Lizy Li	**Relative Humidity :**	47~48%
Duty Cycle:	92.77%	**Duty Factor:**	0.33dB

Channel	Frequency (MHz)	802.11n HT20 Average Output Power (dBm)
01	2412	10.92
06	2437	11.57
11	2462	12.01

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

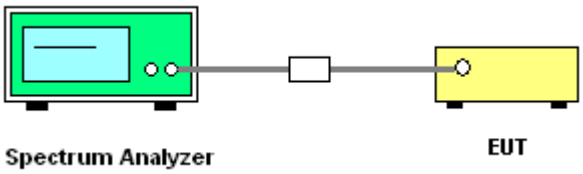
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Option 1 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 :	802.11b	**Temperature :**	23~24℃
Test Engineer :	Lizy Li	**Relative Humidity :**	47~48%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	2.07	-11.44	8	Pass
06	2437	2.82	-11.31	8	Pass
11	2462	3.23	-11.10	8	Pass

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Engineer :	Lizy Li	**Relative Humidity :**	47~48%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	1.11	-13.20	8	Pass
06	2437	0.69	-13.42	8	Pass
11	2462	-0.17	-13.21	8	Pass

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Engineer :	Lizy Li	**Relative Humidity :**	47~48%

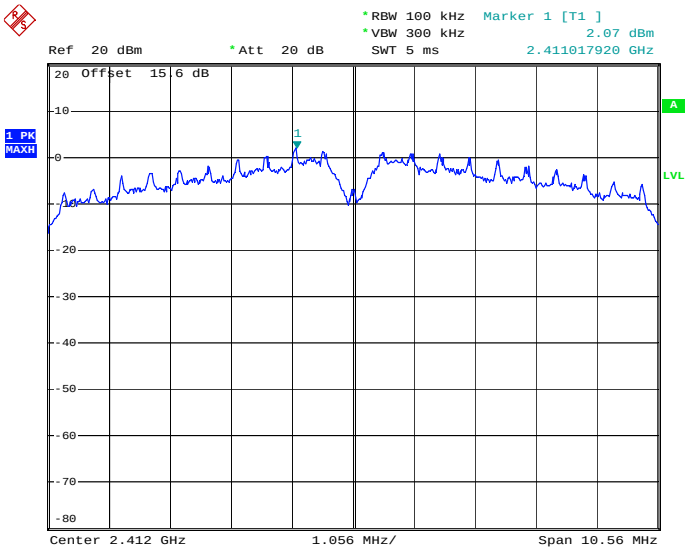
Channel	Frequency (MHz)	802.11n HT20 Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	-1.63	-13.40	8	Pass
06	2437	0.65	-12.74	8	Pass
11	2462	0.98	-12.68	8	Pass

Note:

1. *Measured power density (dBm) has offset with cable loss.*
2. *The Measured power density (dBm)/ 100KHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.*

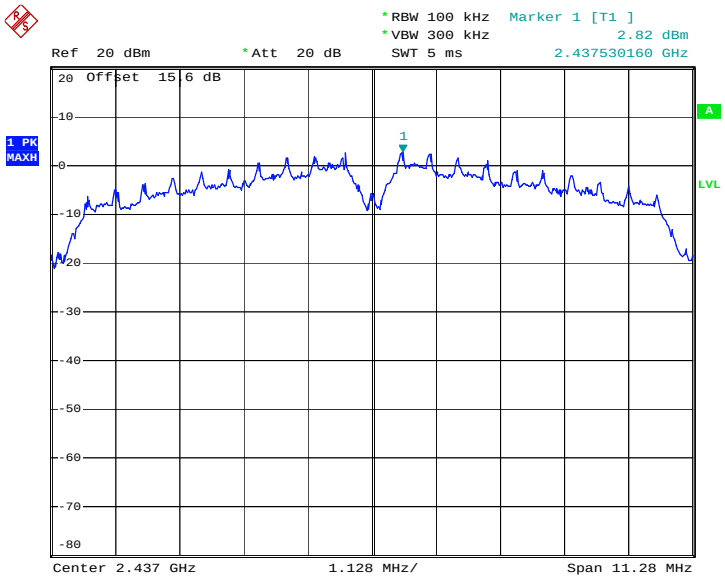
3.3.6 Test Result of Power Spectral Density Plots (100kHz)

PSD 100kHz Plot on 802.11b Channel 01



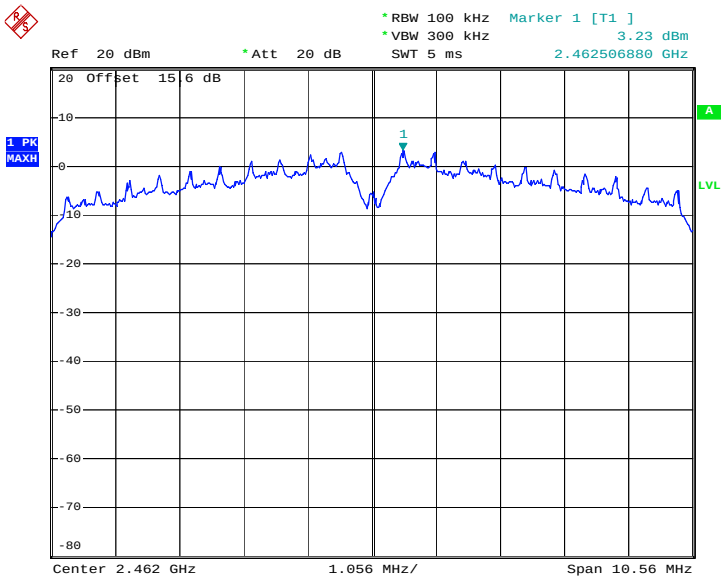
Date: 31.MAR.2013 06:42:36

PSD 100kHz Plot on 802.11b Channel 06



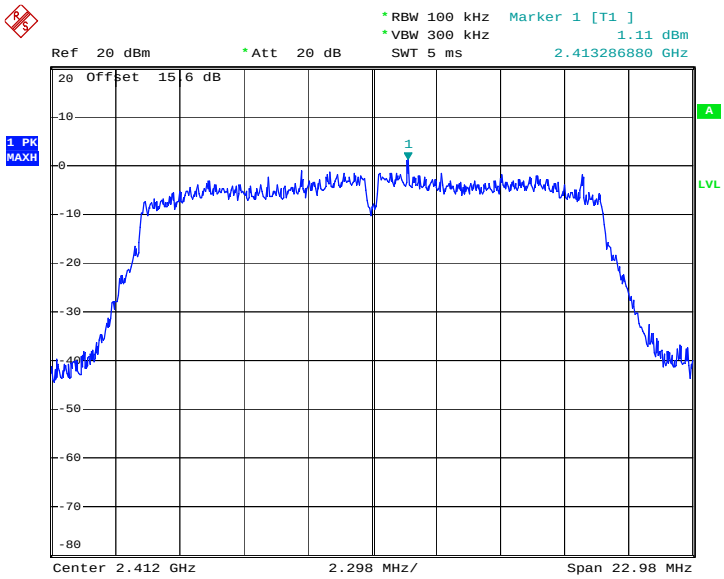
Date: 31.MAR.2013 06:53:13

PSD 100kHz Plot on 802.11b Channel 11



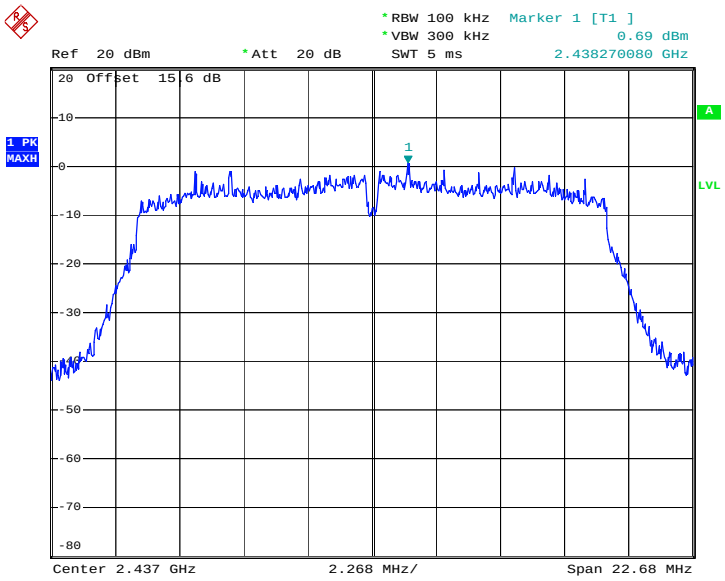
Date: 31.MAR.2013 06:50:10

PSD 100kHz Plot on 802.11g Channel 01



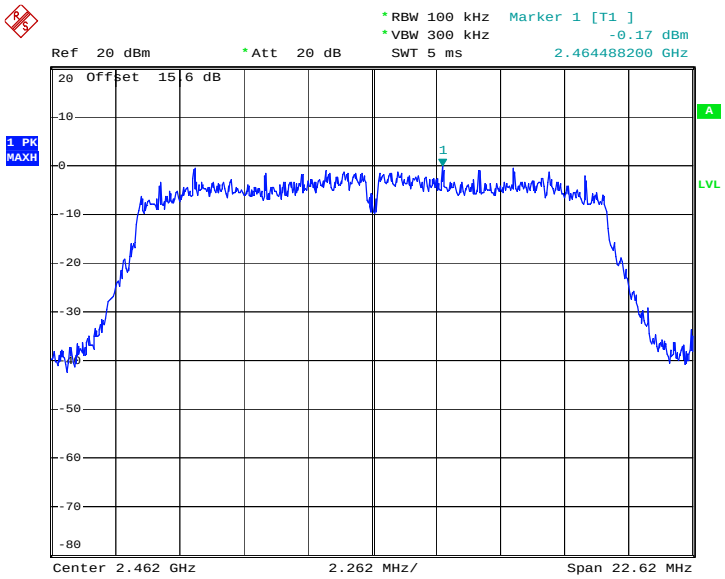
Date: 31.MAR.2013 06:57:15

PSD 100kHz Plot on 802.11g Channel 06



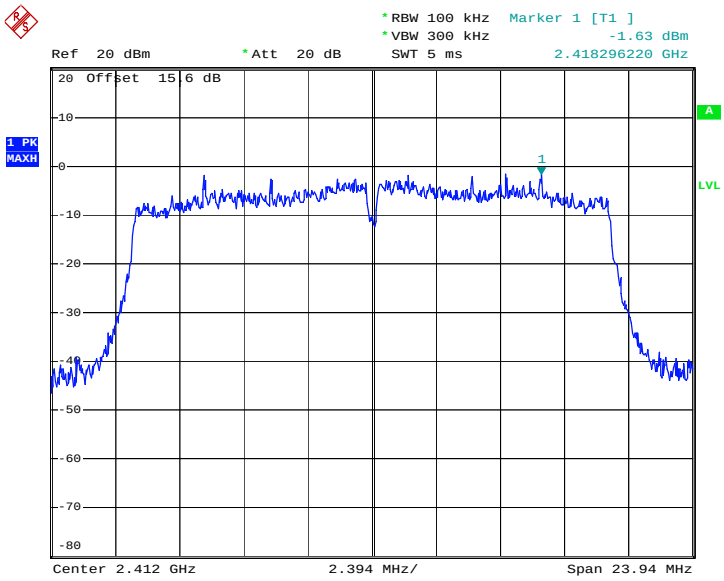
Date: 31.MAR.2013 07:04:52

PSD 100kHz Plot on 802.11g Channel 11



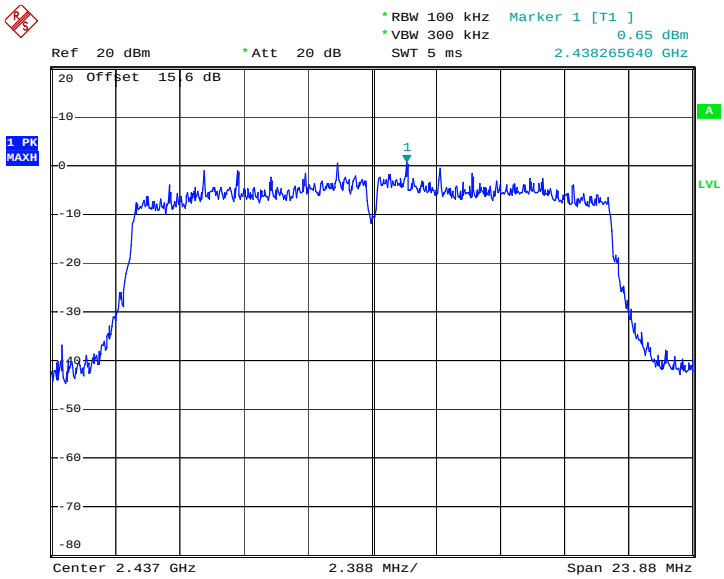
Date: 31.MAR.2013 07:07:45

PSD 100kHz Plot on 802.11n HT20 Channel 01



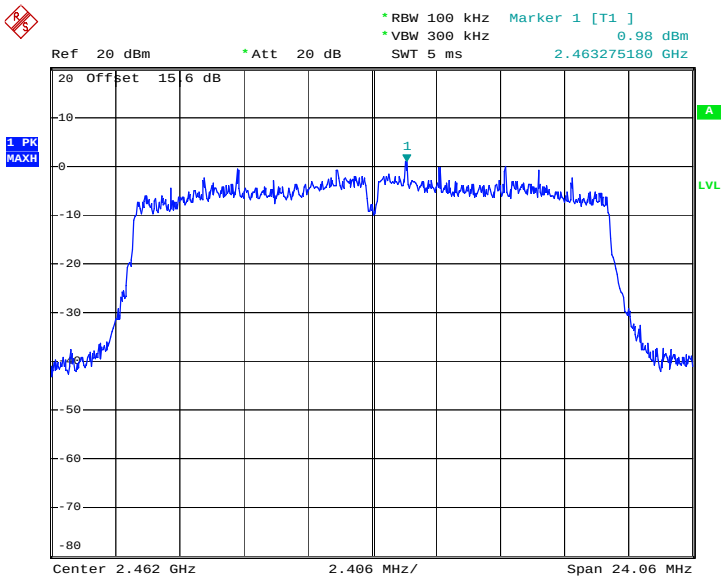
Date: 31.MAR.2013 07:15:29

PSD 100kHz Plot on 802.11n HT20 Channel 06



Date: 31.MAR.2013 07:18:08

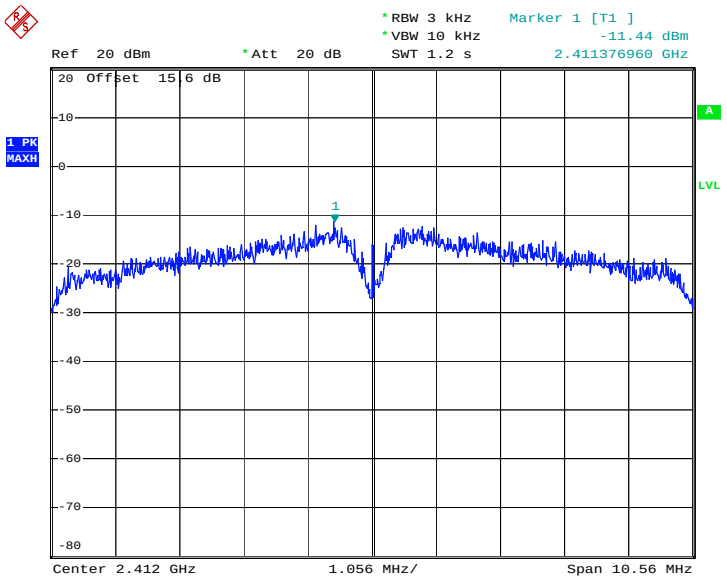
PSD 100kHz Plot on 802.11n HT20 Channel 11



Date: 31.MAR.2013 07:21:06

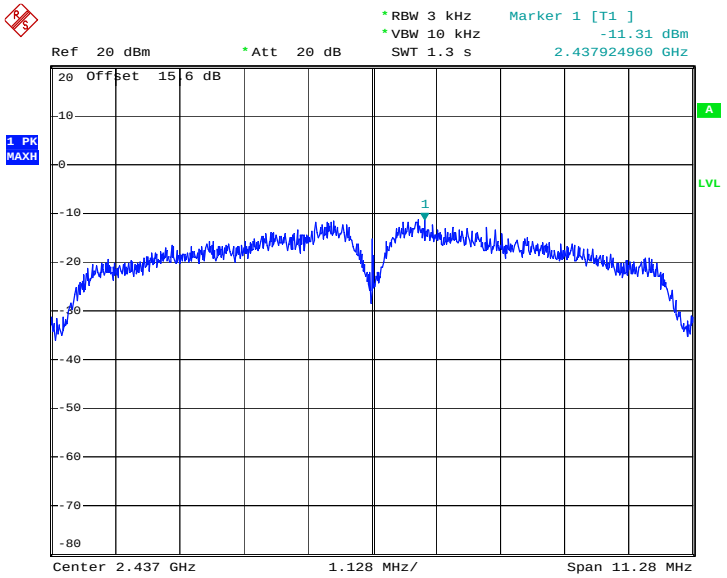
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

PSD 3kHz Plot on 802.11b Channel 01



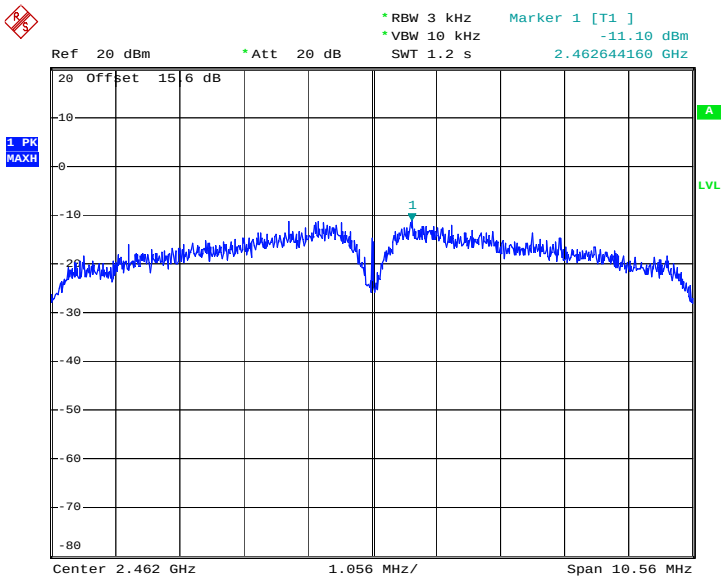
Date: 31.MAR.2013 06:42:26

PSD 3kHz Plot on 802.11b Channel 06



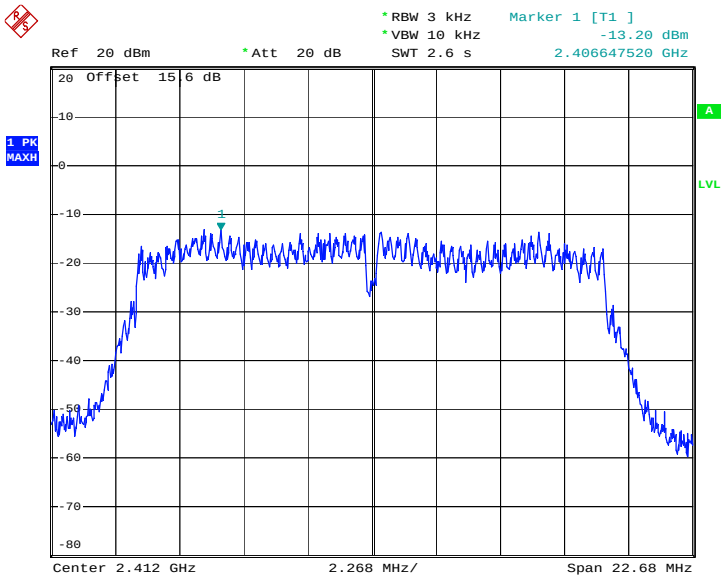
Date: 31.MAR.2013 06:53:03

PSD 3kHz Plot on 802.11b Channel 11



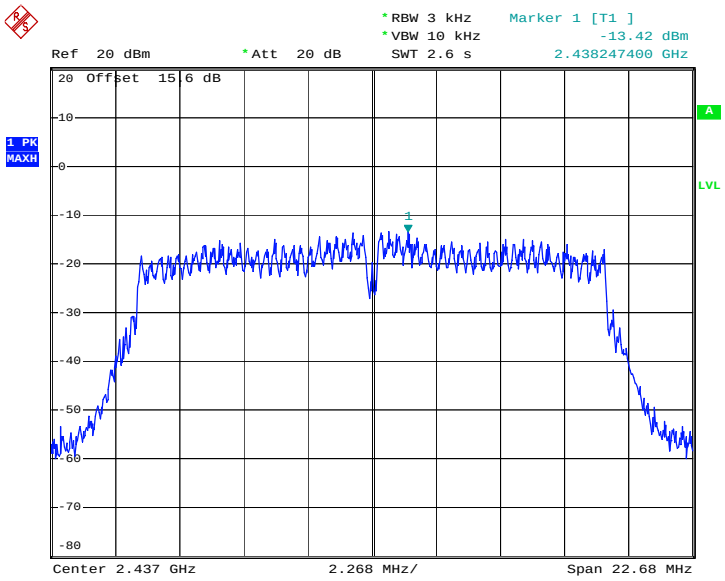
Date: 31.MAR.2013 06:50:00

PSD 3kHz Plot on 802.11g Channel 01



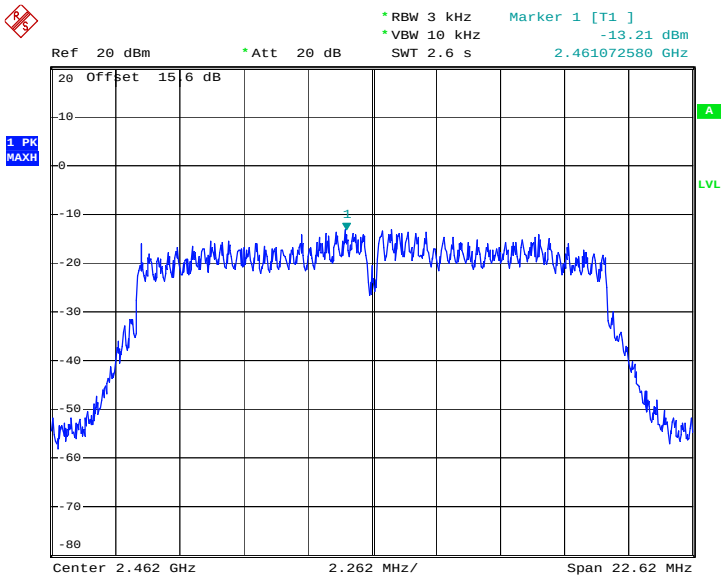
Date: 31.MAR.2013 08:23:59

PSD 3kHz Plot on 802.11g Channel 06



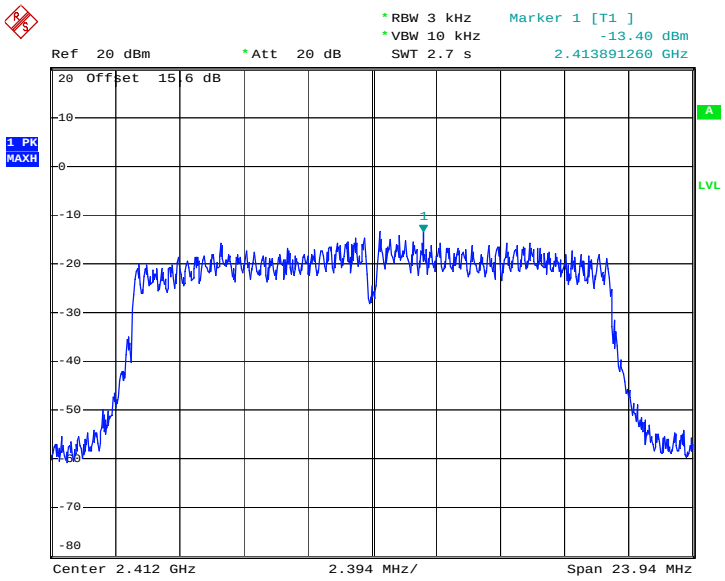
Date: 31.MAR.2013 07:04:42

PSD 3kHz Plot on 802.11g Channel 11



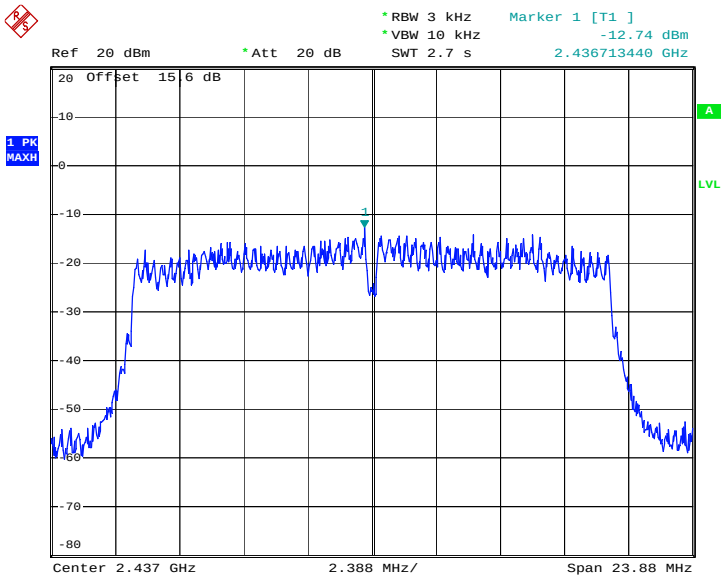
Date: 31.MAR.2013 07:07:35

PSD 3kHz Plot on 802.11n HT20 Channel 01



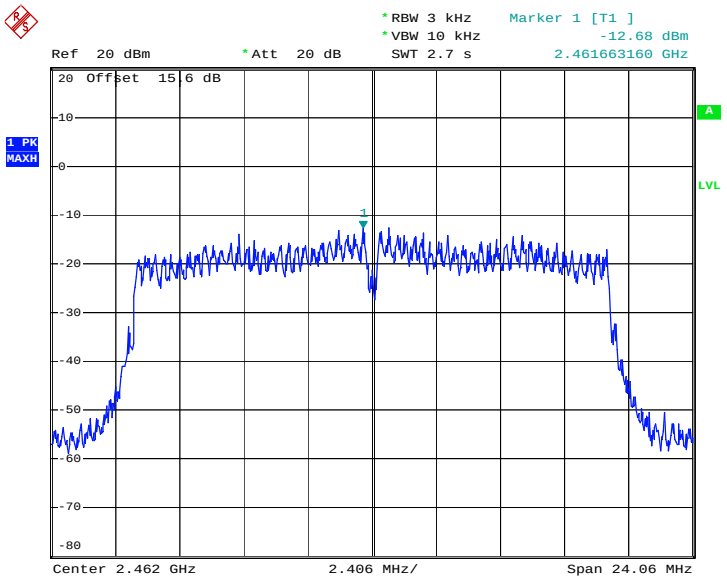
Date: 31.MAR.2013 07:15:19

PSD 3kHz Plot on 802.11n HT20 Channel 06



Date: 31.MAR.2013 07:17:58

PSD 3kHz Plot on 802.11n HT20 Channel 11



Date: 31.MAR.2013 07:20:56

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).

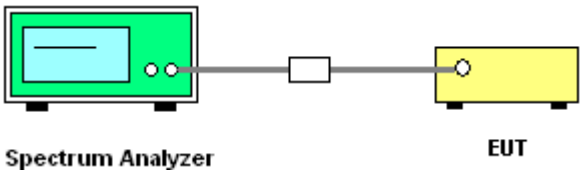
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 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 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. The attenuation is set to 30dB, when maximum conducted output power procedure is used.
5. Measure and record the results in the test report.

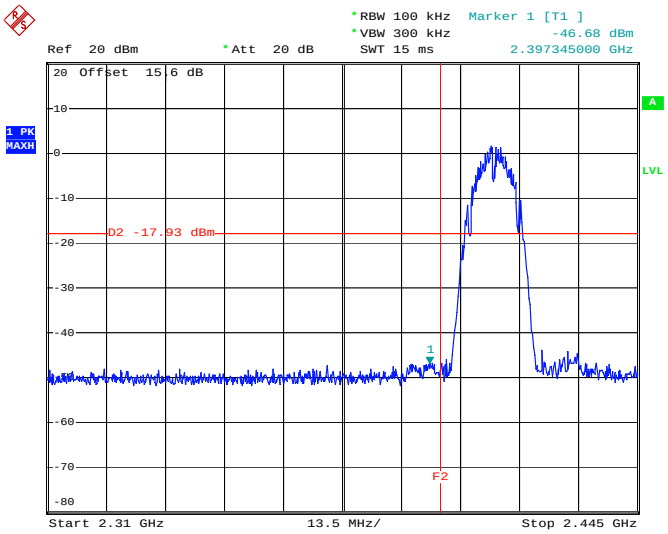
3.4.4 Test Setup



3.4.5 Test Plots of Conducted Band Edges

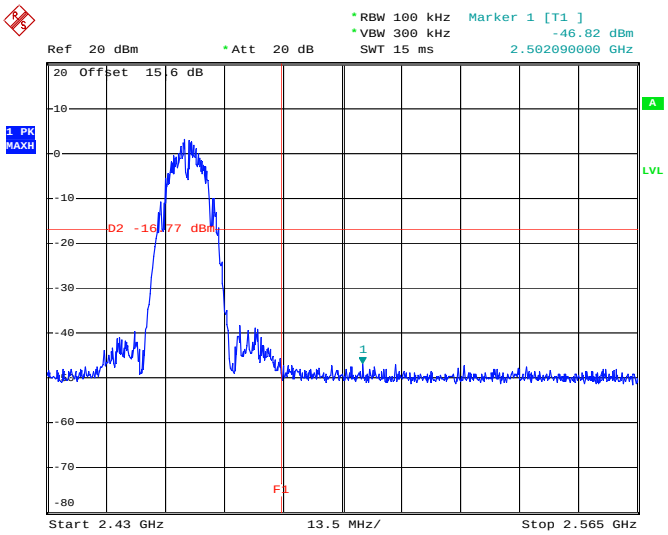
Test Mode :	802.11b	**Temperature :**	23~24℃
Test Band :	Low and High	**Relative Humidity :**	47~48%
Test Channel :	01 and 11	**Test Engineer :**	Lizy Li

Low Band Edge Plot on 802.11b Channel 01



Date: 31.MAR.2013 06:42:52

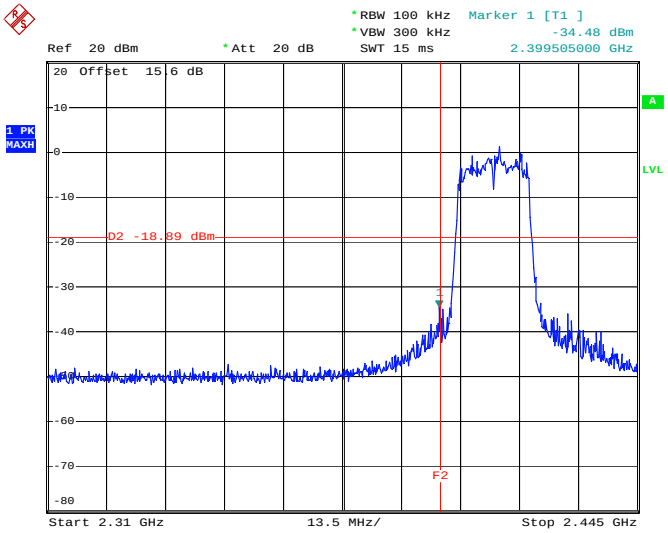
High Band Edge Plot on 802.11b Channel 11



Date: 31.MAR.2013 06:50:26

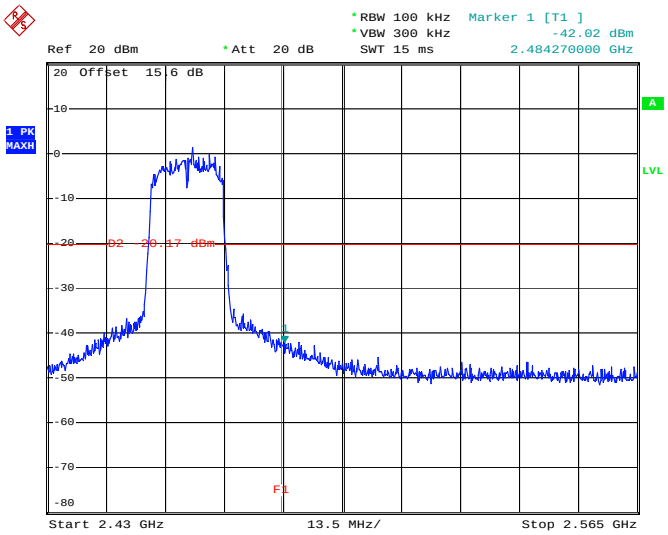
Test Mode :	802.11g	**Temperature :**	23~24℃
Test Band :	Low and High	**Relative Humidity :**	47~48%
Test Channel :	01 and 11	**Test Engineer :**	Lizy Li

Low Band Edge Plot on 802.11g Channel 01



Date: 31.MAR.2013 06:57:31

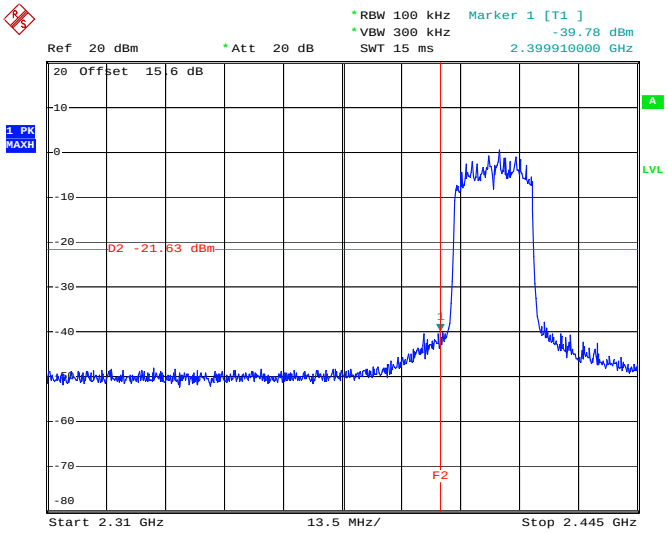
High Band Edge Plot on 802.11g Channel 11



Date: 31.MAR.2013 07:08:01

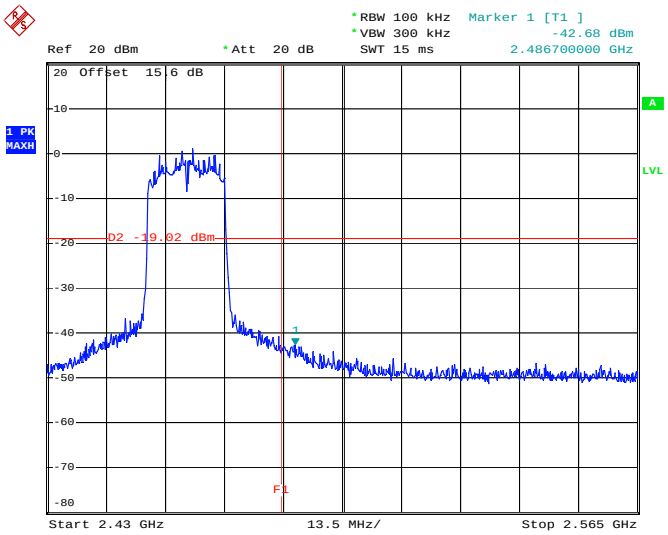
Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Band :	Low and High	Relative Humidity :	47~48%
Test Channel :	01 and 11	Test Engineer :	Lizy Li

Low Band Edge Plot on 802.11n HT20 Channel 01



Date: 31.MAR.2013 07:15:45

High Band Edge Plot on 802.11n HT20 Channel 11



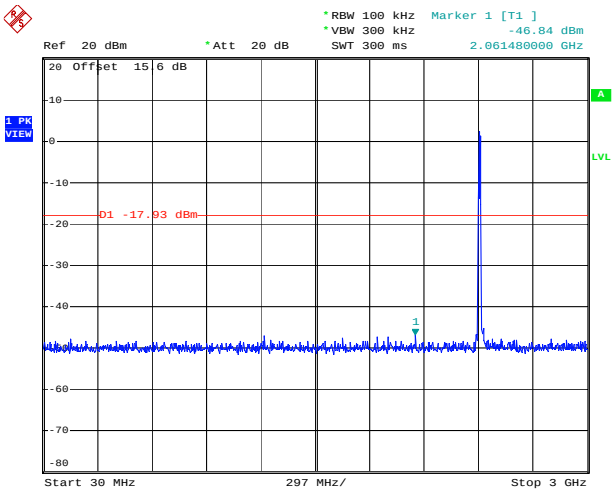
Date: 31.MAR.2013 07:21:22

3.4.6 Test Plots of Spurious Emission

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Band :	30MHz-3GHz and 2G-25GHz	**Relative Humidity :**	47~48%
Test Channel :	01, 06, 11	**Test Engineer :**	Lizy Li

802.11b 30 MHz~3 GHz

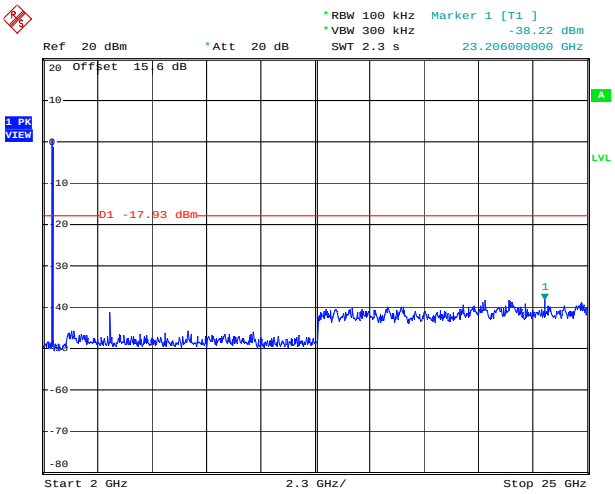
Conducted Spurious Emission Plot on Channel 01



Date: 31.MAR.2013 06:43:10

802.11b 2 GHz~25 GHz

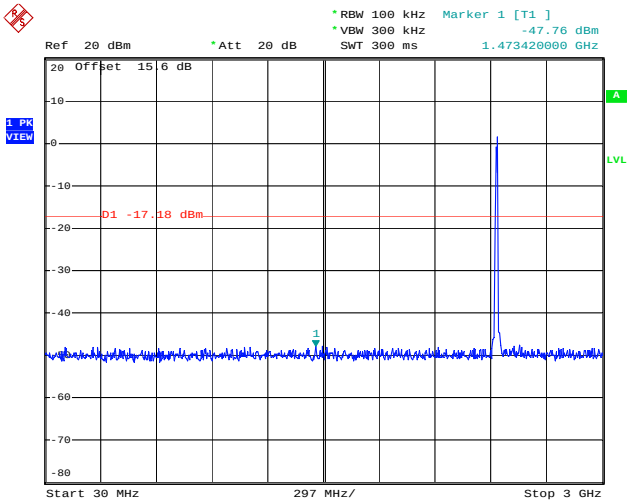
Conducted Spurious Emission Plot on Channel 01



Date: 31.MAR.2013 06:43:29

802.11b 30 MHz~3 GHz

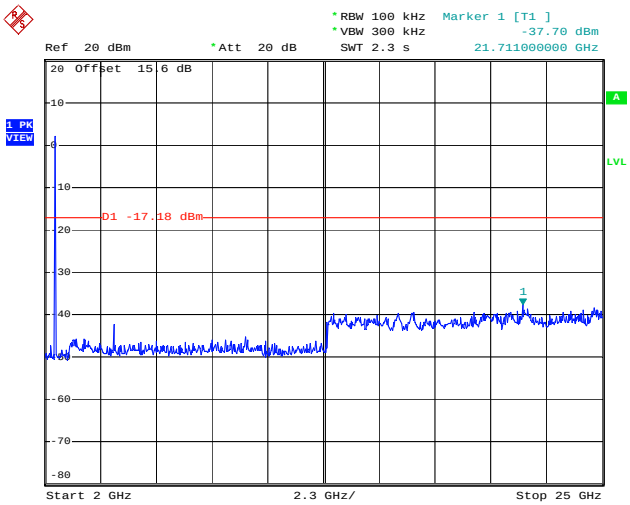
Conducted Spurious Emission Plot on Channel 06



Date: 31.MAR.2013 06:54:28

802.11b 2 GHz~25 GHz

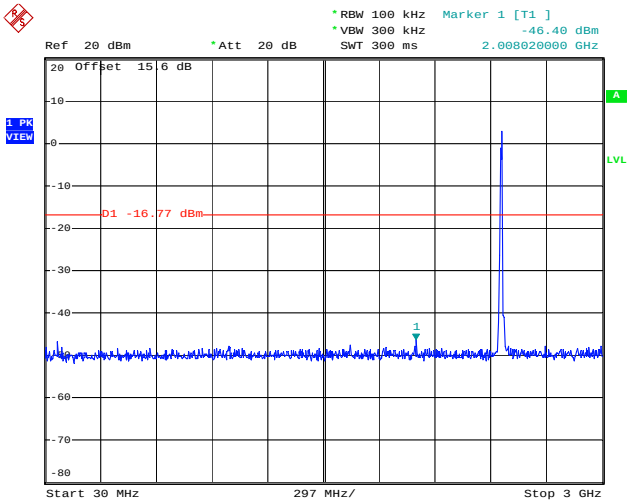
Conducted Spurious Emission Plot on Channel 06



Date: 31.MAR.2013 06:54:46

802.11b 30 MHz~3 GHz

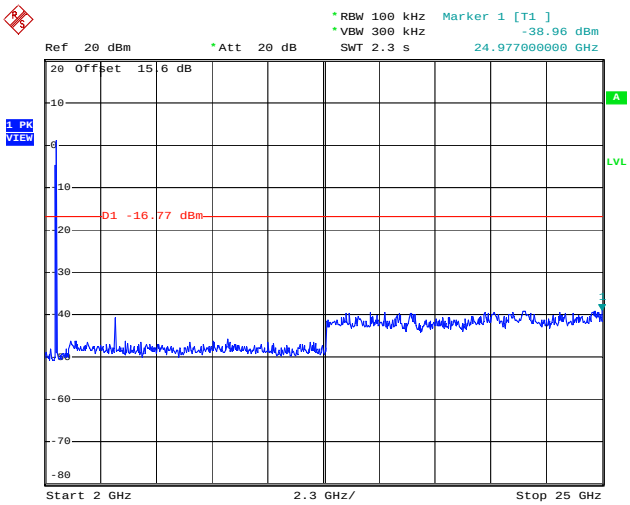
Conducted Spurious Emission Plot on Channel 11



Date: 31.MAR.2013 06:50:45

802.11b 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11

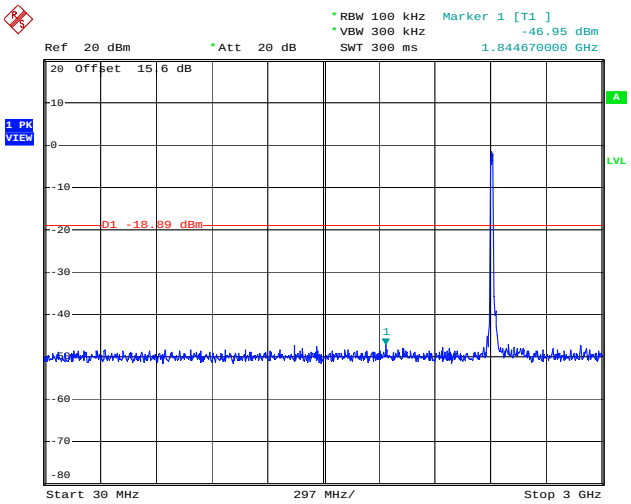


Date: 31.MAR.2013 06:51:03

Test Mode :	802.11g	Temperature :	23~24℃
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	47~48%
Test Channel :	01, 06, 11	Test Engineer :	Lizy Li

802.11g 30 MHz~3 GHz

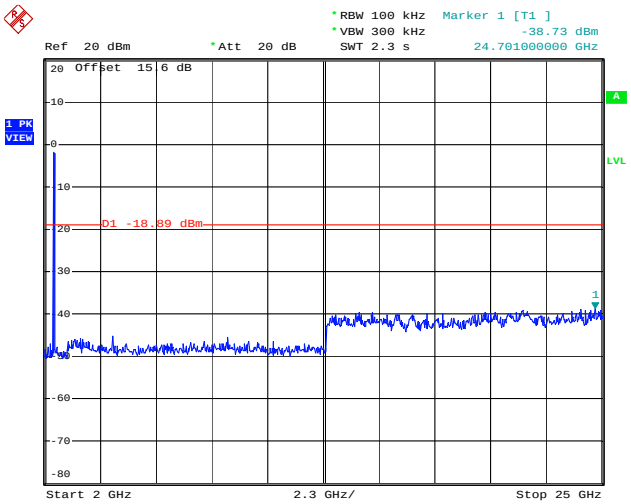
Conducted Spurious Emission Plot on Channel 01



Date: 31.MAR.2013 06:57:49

802.11g 2 GHz~25 GHz

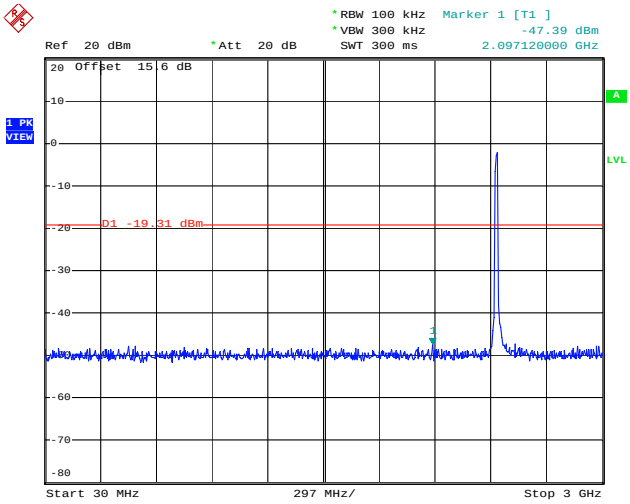
Conducted Spurious Emission Plot on Channel 01



Date: 31.MAR.2013 06:58:08

802.11g 30 MHz~3 GHz

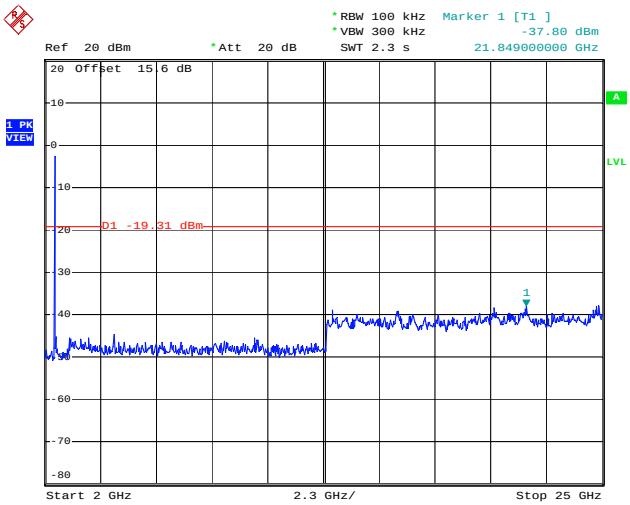
Conducted Spurious Emission Plot on Channel 06



Date: 31.MAR.2013 07:05:13

802.11g 2 GHz~25 GHz

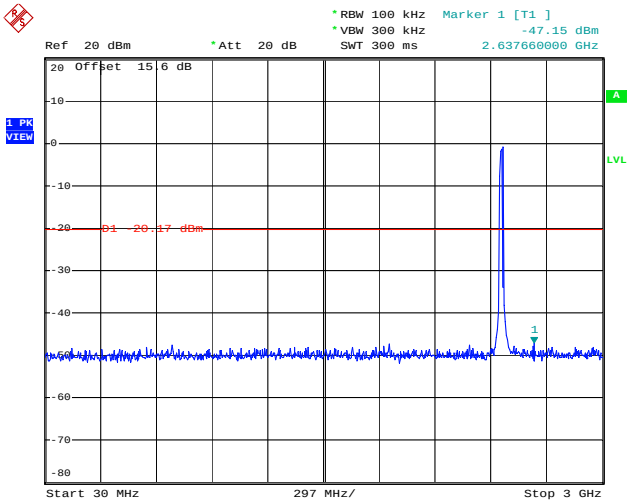
Conducted Spurious Emission Plot on Channel 06



Date: 31.MAR.2013 07:05:32

802.11g 30 MHz~3 GHz

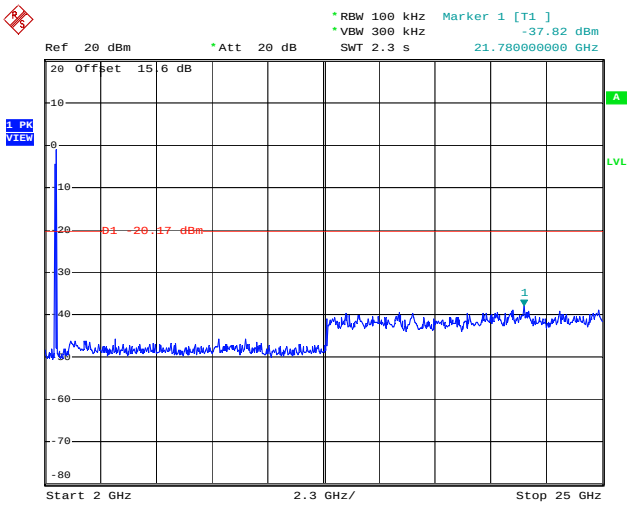
Conducted Spurious Emission Plot on Channel 11



Date: 31.MAR.2013 07:09:18

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11

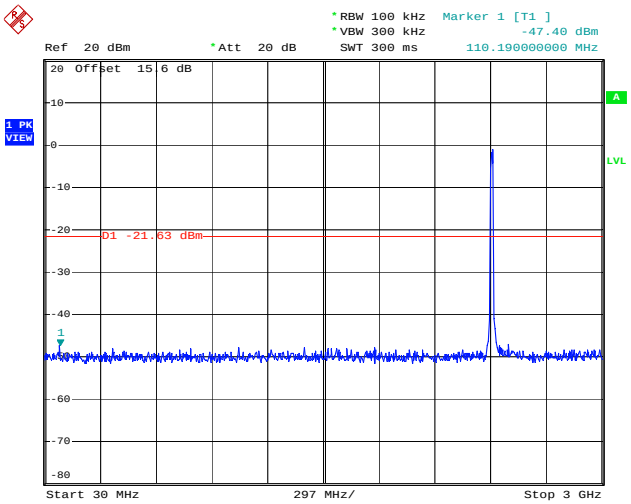


Date: 31.MAR.2013 07:09:36

Test Mode :	802.11n HT20	Temperature :	23~24℃
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	47~48%
Test Channel :	01, 06, 11	Test Engineer :	Lizy Li

802.11n HT20 30 MHz~3 GHz

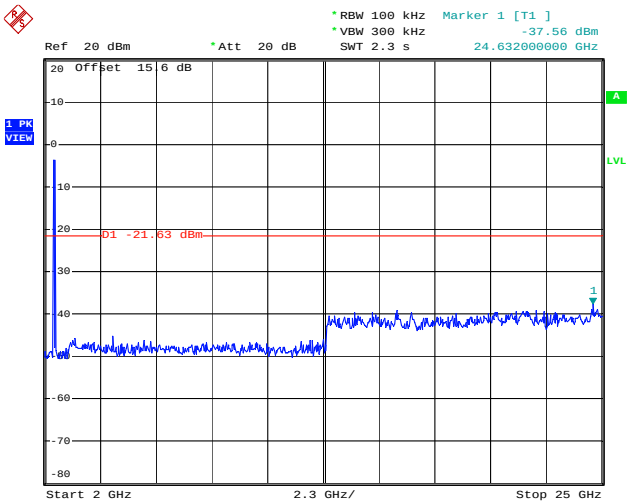
Conducted Spurious Emission Plot on Channel 01



Date: 31.MAR.2013 07:16:03

802.11n HT20 2 GHz~25 GHz

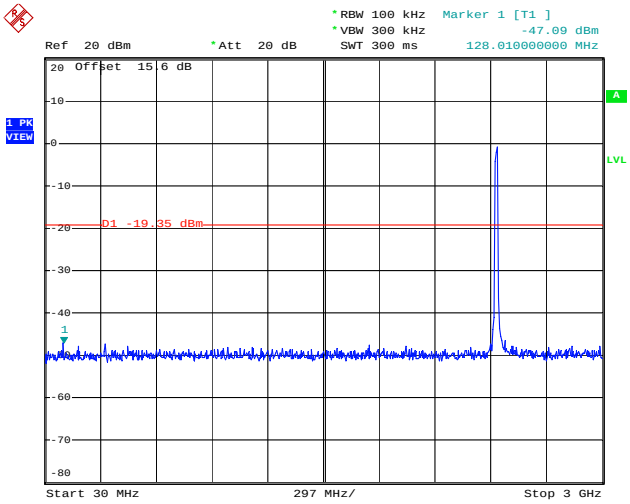
Conducted Spurious Emission Plot on Channel 01



Date: 31.MAR.2013 07:16:22

802.11n HT20 30 MHz~3 GHz

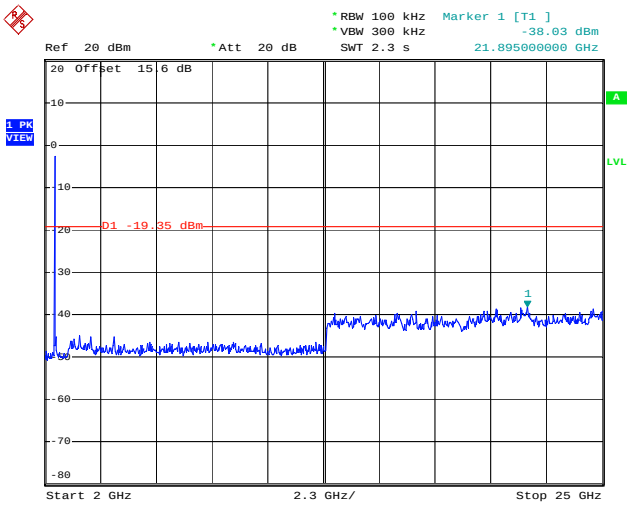
Conducted Spurious Emission Plot on Channel 06



Date: 31.MAR.2013 07:18:29

802.11n HT20 2 GHz~25 GHz

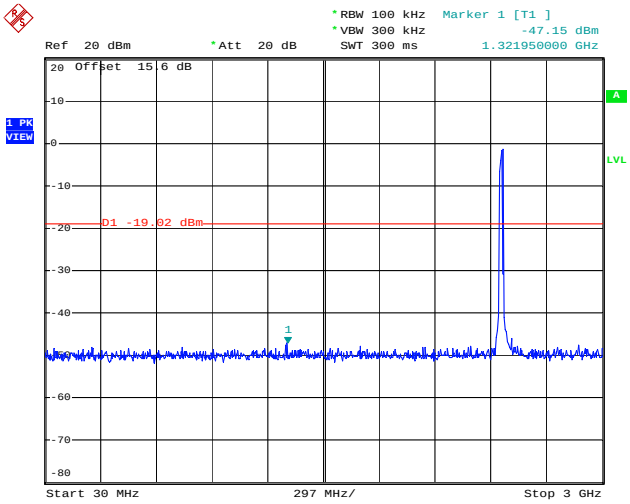
Conducted Spurious Emission Plot on Channel 06



Date: 31.MAR.2013 07:18:48

802.11n HT20 30 MHz~3 GHz

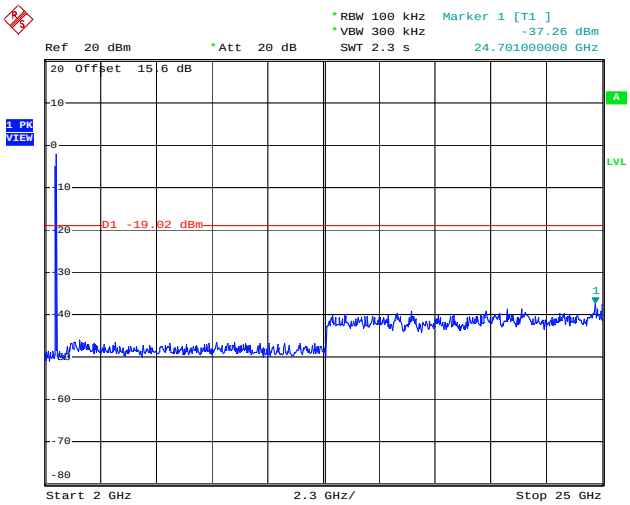
Conducted Spurious Emission Plot on Channel 11



Date: 31.MAR.2013 07:21:40

802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



Date: 31.MAR.2013 07:21:59

3.5 Radiated Emission Measurement

3.5.1 Limit of Radiated Emission

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

See list of measuring instruments of this test report.

3.5.3 Test Procedures

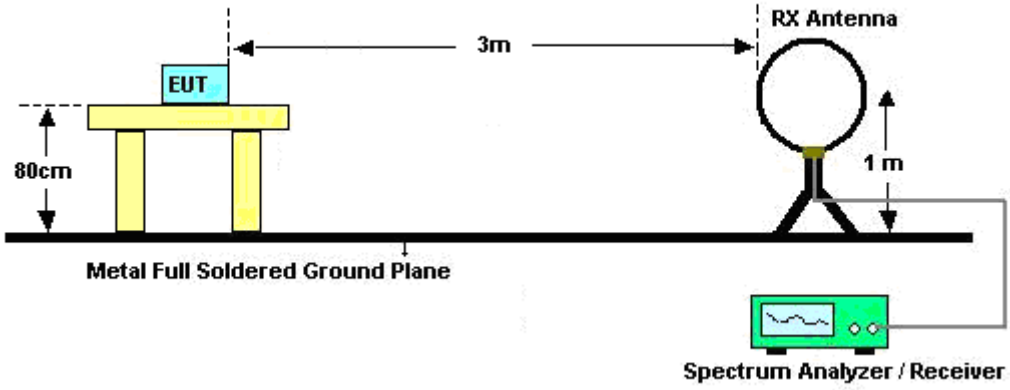
1. The testing follows the guidelines in ANSI C63. 10-2009
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better 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 ≥ 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.

Band	Duty Cycle(%)	T(ms)	1/T(KHz)	VBW Setting
802.11b	98.624	-	-	10Hz
802.11g	93.506	1.440	0.694	1KHz
2.4G 802.11n HT20	92.768	1.334	0.750	1KHz

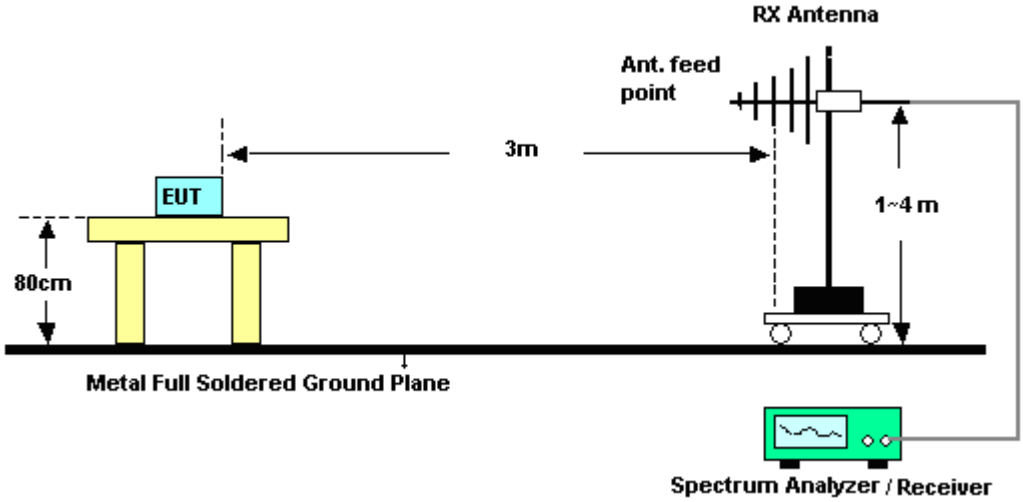
Note: For average measurement with duty cycle < 98%, use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.

3.5.4 Test Setup

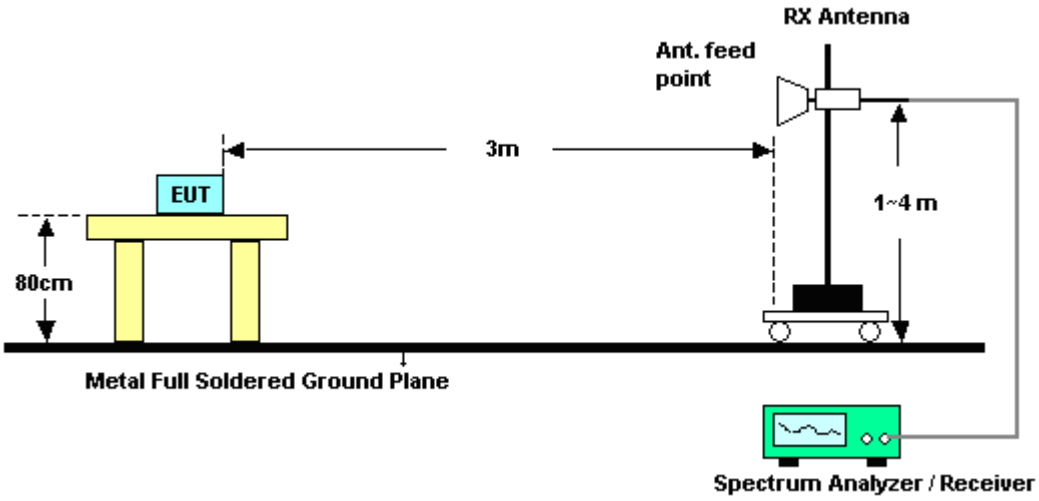
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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 Band Edges

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Band :	Low	**Relative Humidity :**	43~44%
Test Channel :	01	**Test Engineer :**	Stone Gu

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
2389.38	53.07	-20.93	74	49.61	32.86	2.11	31.51	106	39	Peak
2389.38	42.09	-11.91	54	38.63	32.86	2.11	31.51	109	26	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
2389.38	50.82	-23.18	74	47.36	32.86	2.11	31.51	100	0	Peak
2389.29	37.49	-16.51	54	34.03	32.86	2.11	31.51	190	355	Average

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Band :	High	**Relative Humidity :**	43~44%
Test Channel :	11	**Test Engineer :**	Stone Gu

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
2488.27	57.1	-16.9	74	53.39	33.05	2.17	31.51	102	24	Peak
2485.06	44.87	-9.13	54	41.21	33.01	2.16	31.51	102	24	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
2487.79	54.36	-19.64	74	50.65	33.05	2.17	31.51	112	280	Peak
2485	42.25	-11.75	54	38.59	33.01	2.16	31.51	114	272	Average

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Band :	Low	**Relative Humidity :**	43~44%
Test Channel :	01	**Test Engineer :**	Stone Gu

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
2389.47	60.63	-13.37	74	57.17	32.86	2.11	31.51	165	143	Peak
2390	40.5	-13.5	54	37.04	32.86	2.11	31.51	165	143	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
2390	63.04	-10.96	74	59.58	32.86	2.11	31.51	101	318	Peak
2390	42.41	-11.59	54	38.95	32.86	2.11	31.51	101	318	Average

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Band :	High	**Relative Humidity :**	43~44%
Test Channel :	11	**Test Engineer :**	Stone Gu

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
2486.62	71.84	-2.16	74	68.18	33.01	2.16	31.51	200	327	Peak
2483.68	51.39	-2.61	54	47.73	33.01	2.16	31.51	200	327	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
2488.51	70.4	-3.6	74	66.69	33.05	2.17	31.51	199	353	Peak
2484.1	48.96	-5.04	54	45.3	33.01	2.16	31.51	199	353	Average

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Band :	Low	**Relative Humidity :**	43~44%
Test Channel :	01	**Test Engineer :**	Stone Gu

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
2389.74	61.1	-12.9	74	57.64	32.86	2.11	31.51	102	31	Peak
2390	44.63	-9.37	54	41.17	32.86	2.11	31.51	103	31	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
2388.39	57.8	-16.2	74	54.34	32.86	2.11	31.51	115	245	Peak
2390	41.35	-12.65	54	37.89	32.86	2.11	31.51	115	245	Average

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Band :	High	**Relative Humidity :**	43~44%
Test Channel :	11	**Test Engineer :**	Stone Gu

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
2486.98	72.55	-1.45	74	68.89	33.01	2.16	31.51	123	27	Peak
2483.5	52.81	-1.19	54	49.15	33.01	2.16	31.51	123	28	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
2483.68	67.45	-6.55	74	63.79	33.01	2.16	31.51	107	9	Peak
2483.5	47.42	-6.58	54	43.76	33.01	2.16	31.51	109	12	Average

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

NOTE: Below 1GHz for radiated emission measurement, pre-scanned all test modes and only choose the worst case mode was recorded in the report.

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2396.94 and 7236 MHz are not within a restricted band, and their limit line is 20dB below the highest emission level. For example, 106.43dBuV/m - 20dB = 86.43dBuV/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
2396.94	57.42	-29.01	86.43	53.96	32.86	2.11	31.51	106	37	Peak
2412	106.43	-	-	102.93	32.89	2.12	31.51	106	37	Peak
2412	101.66	-	-	98.16	32.89	2.12	31.51	106	37	Average
4824	49.14	-24.86	74	42.41	35.17	3.09	31.53	100	0	Peak
7236	50.21	-36.22	86.43	41.74	36.18	3.24	30.95	200	0	Peak

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2395.5 and 7236 MHz are not within a restricted band, and their 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
2395.5	51.8	-27.52	79.32	48.34	32.86	2.11	31.51	190	355	Peak
2412	99.32	-	-	95.82	32.89	2.12	31.51	190	355	Peak
2412	94.53	-	-	91.03	32.89	2.12	31.51	190	355	Average
4824	50.05	-23.95	74	43.32	35.17	3.09	31.53	100	0	Peak
7236	51.29	-28.03	79.32	42.82	36.18	3.24	30.95	200	0	Peak

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Horizontal
Remark :	1. 2437 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
2437	106.98	-	-	103.4	32.95	2.14	31.51	116	46	Peak
2437	101.7	-	-	98.12	32.95	2.14	31.51	116	46	Average
4874	49.58	-24.42	74	42.8	35.18	3.12	31.52	100	0	Peak
7312	50.89	-23.11	74	42.42	36.2	3.21	30.94	200	0	Peak

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
Remark :	1. 2437 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
2437	102.68	-	-	99.1	32.95	2.14	31.51	106	210	Peak
2437	97.8	-	-	94.22	32.95	2.14	31.51	106	210	Average
4874	48.88	-25.12	74	42.1	35.18	3.12	31.52	100	0	Peak
7312	49.2	-24.8	74	40.73	36.2	3.21	30.94	100	0	Peak

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**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	107.16	-	-	103.54	32.98	2.15	31.51	102	24	Peak
2462	102.18	-	-	98.56	32.98	2.15	31.51	102	24	Average
4924	49.37	-24.63	74	42.54	35.19	3.15	31.51	100	0	Peak
7386	50.14	-23.86	74	41.64	36.24	3.19	30.93	200	0	Peak

Test Mode :	802.11b	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
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	103.42	-	-	99.8	32.98	2.15	31.51	114	272	Peak
2462	98.12	-	-	94.5	32.98	2.15	31.51	114	272	Average
4924	50.56	-23.44	74	43.73	35.19	3.15	31.51	200	0	Peak
7386	50.87	-23.13	74	42.37	36.24	3.19	30.93	100	0	Peak

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2398.47 and 7236 MHz are not within a restricted band, and their 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
2398.47	70.19	-17.68	87.87	66.73	32.86	2.11	31.51	138	328	Peak
2412	107.87	-	-	104.37	32.89	2.12	31.51	138	328	Peak
2412	96.42	-	-	92.92	32.89	2.12	31.51	138	328	Average
4824	48.94	-25.06	74	42.21	35.17	3.09	31.53	156	97	Peak
7236	50.15	-37.72	87.87	41.68	36.18	3.24	30.95	100	230	Peak

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2397.39 and 7236 MHz are not within a restricted band, and their 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
2397.39	72.98	-14.02	87	69.52	32.86	2.11	31.51	121	328	Peak
2412	107	-	-	103.5	32.89	2.12	31.51	121	328	Peak
2412	94.36	-	-	90.86	32.89	2.12	31.51	121	328	Average
4824	48.81	-25.19	74	42.08	35.17	3.09	31.53	127	333	Peak
7236	49.09	-37.91	87	40.62	36.18	3.24	30.95	157	80	Peak

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Horizontal
Remark :	1. 2437 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
2437	110.64	-	-	107.06	32.95	2.14	31.51	103	25	Peak
2437	99.21	-	-	95.63	32.95	2.14	31.51	103	25	Average
4874	49.35	-24.65	74	42.57	35.18	3.12	31.52	125	49	Peak
7311	49.68	-24.32	74	41.21	36.2	3.21	30.94	127	84	Peak

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
Remark :	1. 2437 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
2437	106.06	-	-	102.48	32.95	2.14	31.51	105	1	Peak
2437	95.9	-	-	92.32	32.95	2.14	31.51	105	1	Average
4874	49.51	-24.49	74	42.73	35.18	3.12	31.52	100	0	Peak
7311	49.68	-24.32	74	41.21	36.2	3.21	30.94	127	43	Peak

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**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	107.85	-	-	104.23	32.98	2.15	31.51	104	321	Peak
2462	95.47	-	-	91.85	32.98	2.15	31.51	104	321	Average
4924	48.53	-25.47	74	41.7	35.19	3.15	31.51	105	87	Peak
7386	49.24	-24.76	74	40.74	36.24	3.19	30.93	136	166	Peak

Test Mode :	802.11g	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
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	108.59	-	-	104.97	32.98	2.15	31.51	144	342	Peak
2462	96.18	-	-	92.56	32.98	2.15	31.51	144	342	Average
4924	49.68	-24.32	74	42.85	35.19	3.15	31.51	103	66	Peak
7386	50.12	-23.88	74	41.62	36.24	3.19	30.93	135	44	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2398.02 and 7236 MHz are not within a restricted band, and their 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
2398.02	71.36	-15.75	87.11	67.9	32.86	2.11	31.51	102	28	Peak
2412	107.11	-	-	103.61	32.89	2.12	31.51	102	28	Peak
2412	95.33	-	-	91.83	32.89	2.12	31.51	102	28	Average
4824	48.52	-25.48	74	41.79	35.17	3.09	31.53	200	0	Peak
7236	50.62	-36.49	87.11	42.15	36.18	3.24	30.95	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Channel :	01	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2398.56 and 7236 MHz are not within a restricted band, and their 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
2398.56	68.65	-16.23	84.88	65.19	32.86	2.11	31.51	115	245	Peak
2412	104.88	-	-	101.38	32.89	2.12	31.51	115	245	Peak
2412	92.85	-	-	89.35	32.89	2.12	31.51	115	245	Average
4824	49.49	-24.51	74	42.76	35.17	3.09	31.53	110	0	Peak
7236	49.98	-34.9	84.88	41.51	36.18	3.24	30.95	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Horizontal
Remark :	1. 2437 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
2437	108.76	-	-	105.18	32.95	2.14	31.51	193	298	Peak
2437	97.11	-	-	93.53	32.95	2.14	31.51	193	298	Average
4874	49.72	-24.28	74	42.94	35.18	3.12	31.52	200	0	Peak
7312	50.38	-23.62	74	41.91	36.2	3.21	30.94	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Channel :	06	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
Remark :	1. 2437 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
2437	106.61	-	-	103.03	32.95	2.14	31.51	112	280	Peak
2437	94.89	-	-	91.31	32.95	2.14	31.51	112	280	Average
4874	49.1	-24.9	74	42.32	35.18	3.12	31.52	100	0	Peak
7312	50.01	-23.99	74	41.54	36.2	3.21	30.94	200	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**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
52.575	19.23	-20.77	40	45.35	7.01	0.45	33.58	-	-	Peak
91.816	23.25	-20.25	43.5	46.96	9.35	0.56	33.62	-	-	Peak
149.486	26.32	-17.18	43.5	49.1	10.07	0.73	33.58	100	0	Peak
256.521	23.67	-22.33	46	44.07	12.1	0.93	33.43	-	-	Peak
403.25	23.63	-22.37	46	39.76	16.02	1.15	33.3	-	-	Peak
948.761	27.22	-18.78	46	37.18	20.73	1.75	32.44	-	-	Peak
2462	109.17	-	-	105.55	32.98	2.15	31.51	123	27	Peak
2462	97.79	-	-	94.17	32.98	2.15	31.51	123	27	Average
4924	49.88	-24.12	74	43.05	35.19	3.15	31.51	100	0	Peak
7386	50.57	-23.43	74	42.07	36.24	3.19	30.93	100	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24℃
Test Channel :	11	**Relative Humidity :**	43~44%
Test Engineer :	Stone Gu	**Polarization :**	Vertical
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
34.88	23.32	-16.68	40	41.46	15.1	0.37	33.61	-	-	Peak
44.12	22.69	-17.31	40	46.3	9.6	0.41	33.62	-	-	Peak
87.42	24.59	-15.41	40	49.57	8.09	0.55	33.62	-	-	Peak
151.6	26.99	-16.51	43.5	49.88	9.96	0.73	33.58	-	-	Peak
499.43	24	-22	46	38.61	17.19	1.33	33.13	-	-	Peak
942.13	31.01	-14.99	46	41	20.7	1.75	32.44	100	0	Peak
2462	104.16	-	-	100.54	32.98	2.15	31.51	108	9	Peak
2462	92.06	-	-	88.44	32.98	2.15	31.51	108	9	Average
4924	50.06	-23.94	74	43.23	35.19	3.15	31.51	100	0	Peak
7386	49.46	-24.54	74	40.96	36.24	3.19	30.93	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 (dBuV)	
	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.

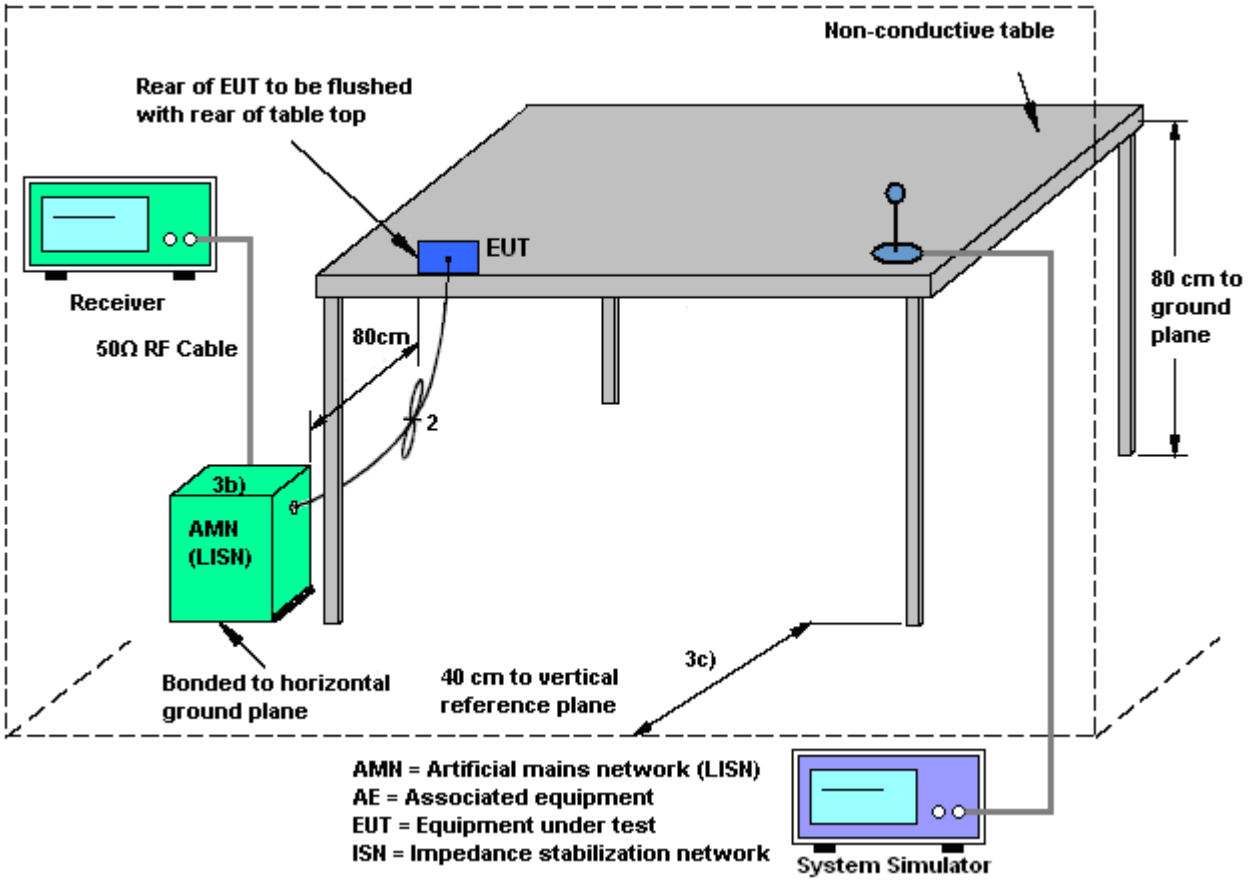
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

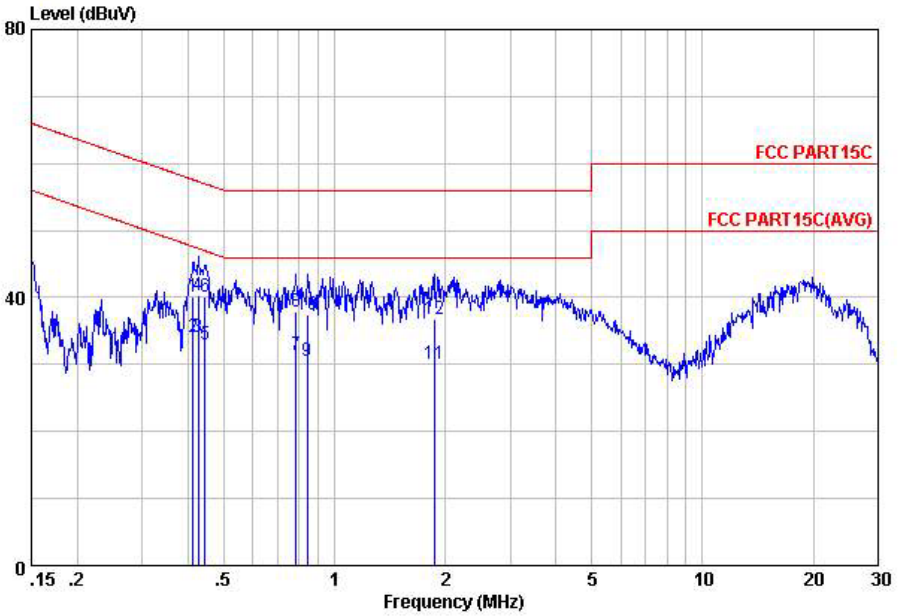
1. The testing follows the guidelines in ANSI C63.10-2009.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 KHz to 30 MHz was searched.
9. 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

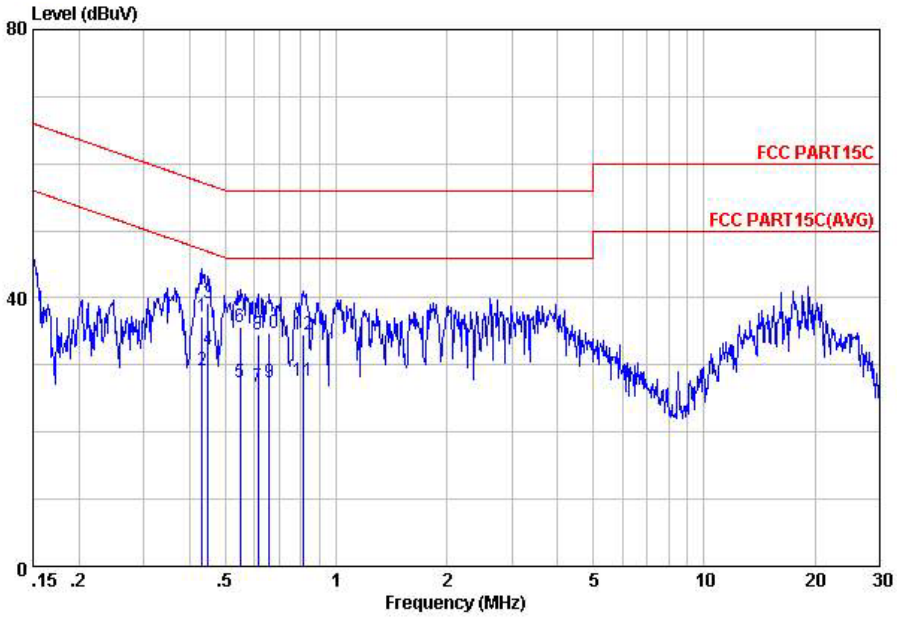
Test Mode :	Mode 1	**Temperature :**	19~20℃
Test Engineer :	Tom Wang	**Relative Humidity :**	39~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	CDMA850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC PART15C LISN-L20130306 LINE
Project : (FR) 312809
mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.41	40.15	-17.44	57.59	29.60	0.30	10.25	QP
2	0.41	34.05	-13.54	47.59	23.50	0.30	10.25	Average
3	0.43	34.13	-13.20	47.33	23.60	0.28	10.25	Average
4	0.43	40.43	-16.90	57.33	29.90	0.28	10.25	QP
5	0.44	32.91	-14.07	46.98	22.41	0.25	10.25	Average
6	0.44	40.11	-16.87	56.98	29.61	0.25	10.25	QP
7	0.79	31.35	-14.65	46.00	20.90	0.17	10.28	Average
8	0.79	37.85	-18.15	56.00	27.40	0.17	10.28	QP
9	0.84	30.52	-15.48	46.00	20.09	0.15	10.28	Average
10	0.84	37.52	-18.48	56.00	27.09	0.15	10.28	QP
11	1.87	30.00	-16.00	46.00	19.60	0.10	10.30	Average
12	1.87	36.70	-19.30	56.00	26.30	0.10	10.30	QP

Test Mode :	Mode 1	**Temperature :**	19~20℃
Test Engineer :	Tom Wang	**Relative Humidity :**	39~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	CDMA850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC PART15C LISN-N20130306 NEUTRAL
Project : (FR) 312809
mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.43	37.21	-19.99	57.20	26.60	0.36	10.25	QP
2	0.43	29.21	-17.99	47.20	18.60	0.36	10.25	Average
3	0.45	39.20	-17.69	56.89	28.61	0.34	10.25	QP
4	0.45	32.30	-14.59	46.89	21.71	0.34	10.25	Average
5	0.55	27.44	-18.56	46.00	16.90	0.28	10.26	Average
6	0.55	35.64	-20.36	56.00	25.10	0.28	10.26	QP
7	0.61	26.80	-19.20	46.00	16.31	0.23	10.26	Average
8	0.61	34.50	-21.50	56.00	24.01	0.23	10.26	QP
9	0.66	27.38	-18.62	46.00	16.90	0.21	10.27	Average
10	0.66	34.68	-21.32	56.00	24.20	0.21	10.27	QP
11	0.81	27.54	-18.46	46.00	17.10	0.16	10.28	Average
12	0.81	34.64	-21.36	56.00	24.20	0.16	10.28	QP

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 Connected Construction

Non-standard connector 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	R&S	FSP40	100319	9kHz~40GHz	Dec. 29, 2012	Mar. 26, 2013~ Apr. 12, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 22, 2012	Mar. 26, 2013~ Apr. 12, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 22, 2012	Mar. 26, 2013~ Apr. 12, 2013	Aug. 21, 2013	Conducted (TH01-KS)
DC Power Supply	GWINSTEK	GPS-3030D	E1884515	N/A	Aug. 22, 2012	Mar. 26, 2013~ Apr. 12, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Dec. 29, 2012	Mar. 26, 2013~ Apr. 12, 2013	Dec. 28, 2013	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 08, 2012	Apr. 02, 2013	Nov. 07, 2013	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	100400	9kHz~30GHz	Jun. 01, 2012	Apr. 02, 2013	May 31, 2013	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2012	Apr. 02, 2013	Dec. 06, 2013	Radiation (03CH01-KS)
HFH2-Z2 Loop Antenna	R&S	HFH2-Z2	100321	9KHZ-30MHZ	N/A	Apr. 02, 2013	N/A	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	1908/7/13	00075957	1GHz~18GHz	Dec. 07, 2012	Apr. 02, 2013	Dec. 06, 2013	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz	Jun. 01, 2012	Apr. 02, 2013	May 31, 2013	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 29, 2012	Apr. 02, 2013	Dec. 28, 2013	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2012	Apr. 02, 2013	Nov. 06, 2013	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170249	15GHz~40GHz	Nov. 23, 2012	Apr. 02, 2013	Nov. 22, 2013	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 01, 2012	Mar. 29, 2013	May 31, 2013	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Dec. 29, 2012	Mar. 29, 2013	Dec. 28, 2013	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Dec. 29, 2012	Mar. 29, 2013	Dec. 28, 2013	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	N/A	Nov. 15, 2012	Mar. 29, 2013	Nov. 14, 2013	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/066	2G Full-Band	Dec. 29, 2012	Mar. 29, 2013	Dec. 28, 2013	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

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))	2.54

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.72

Appendix A. Photographs of EUT

Please refer to Sporton report number EP312809 as below.