

# FCC RF Test Report

**APPLICANT** : Motorola Mobility, Inc.  
**EQUIPMENT** : Mobile Phone  
**BRAND NAME** : MOTOROLA  
**MODEL NAME** : XT531  
**GPPD Number** : 3058  
**FCC ID** : IHDT56MY2  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : Digital Transmission System (DTS)

The product was received on Jun. 22, 2011 and completely tested on Jul. 01, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 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 INC., the test report shall not be reproduced except in full.

Reviewed by:



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Jones Tsai / Manager



## **SPORTON INTERNATIONAL INC.**

**No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.**



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### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR142113-03B	Rev. 01	Initial issue of report	Jul. 11, 2011

**SUMMARY OF TEST RESULT**

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 17.80 dB at 1.55 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 8.15 dB at 34.86 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**Motorola Mobility, Inc.**  
 8F., No. 9, Songgao Rd., Taipei 110, Taiwan, R.O.C.

## 1.2 Manufacturer

**Chi Mei Communication Systems, Inc.**  
 No. 4, Mingsheng Street, Tucheng District, New Taipei City, 23678, Taiwan

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Phone
Brand Name	MOTOROLA
Model Name	XT531
FCC ID	IHDT56MY2
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 17.29 dBm (0.05 W) 802.11g : 20.62 dBm (0.12 W) 802.11n (BW 20MHz) : 19.20 dBm (0.08 W)
Antenna Type	PIFA Antenna with gain 0.72 dBi
HW Version	V3.0
SW Version	V4.170
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

**Remark:**

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	CO05-HY	03CH05-HY	722060/4086B-1

## 1.5 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 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8

### 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 (DoC), recorded in a separate test report.

## 1.6 Ancillary Equipment List

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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

## 2 Test Configuration of Equipment Under Test

### 2.1 RF Power

Preliminary tests were performed in different data rate and recorded the RF power output in the following table:

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	16.73	16.72	16.39	16.48
CH 06	2437 MHz	17.06	17.03	16.85	16.92
CH 11	2462 MHz	17.29	17.27	16.97	17.17

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	19.49	19.40	19.23	19.08	20.11	19.48	19.42	19.45
CH 06	2437 MHz	20.27	20.18	19.91	19.80	20.26	20.05	20.01	20.03
CH 11	2462 MHz	20.62	20.57	20.06	20.01	20.60	20.34	20.19	20.27

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	18.68	18.43	18.10	17.96	17.93	18.67	17.82	17.85
CH 06	2437 MHz	18.86	18.85	18.59	18.41	18.62	18.29	18.41	18.33
CH 11	2462 MHz	19.20	19.05	18.86	18.72	18.81	19.12	18.54	18.66

**Remark:** The EUT is programmed to transmit signals continuously for all testing.

## 2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 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), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

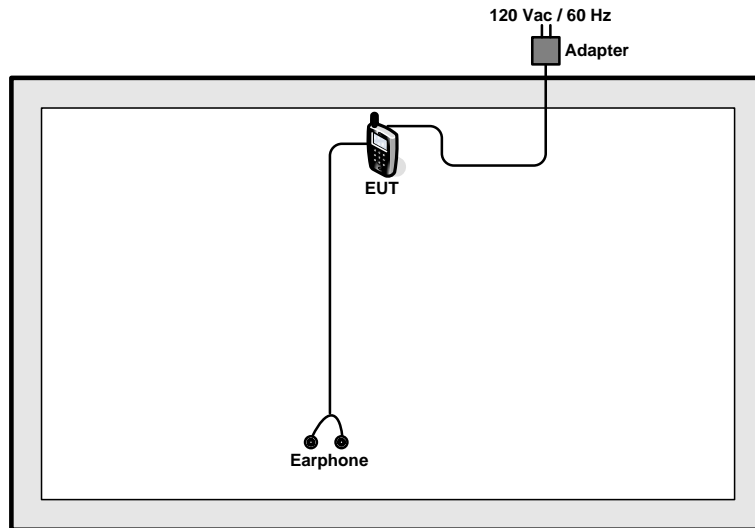
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases and recorded in this report.

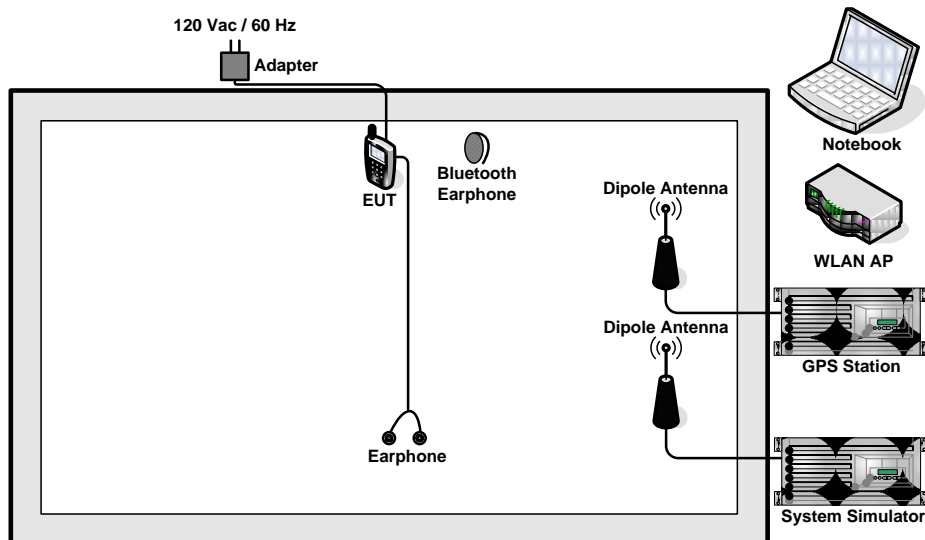
<b>Test Cases</b>		
<b>Test Item</b>	<b>802.11b (Modulation : DSSS)</b>	<b>802.11g/n (Modulation : OFDM)</b>
<b>Conducted TCs</b>	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
<b>Radiated TCs</b>	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
<b>AC Conducted Emission</b>	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Adapter	
<b>Remark:</b> TC stands for Test Configuration, and consists of adapter, battery, and earphone.		

## 2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



## 2.4 RF Utility

For WLAN function, key in “\* # \* # 373 # \* # \*” on the EUT directly. Then, the EUT provides functions like channel selection and power level for continuous transmitting and receiving signals.

### 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.

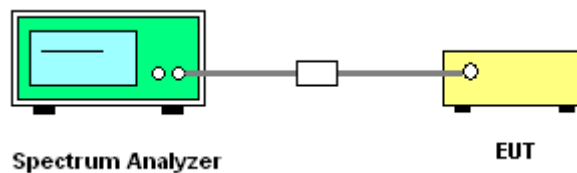
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz.  
In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

##### 3.1.4 Test Setup



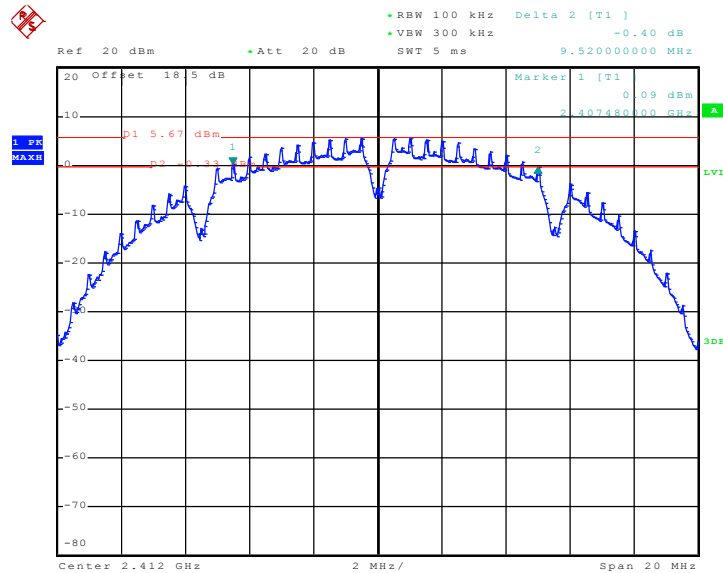


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	9.52	0.5	Pass
06	2437	9.04	0.5	Pass
11	2462	9.04	0.5	Pass

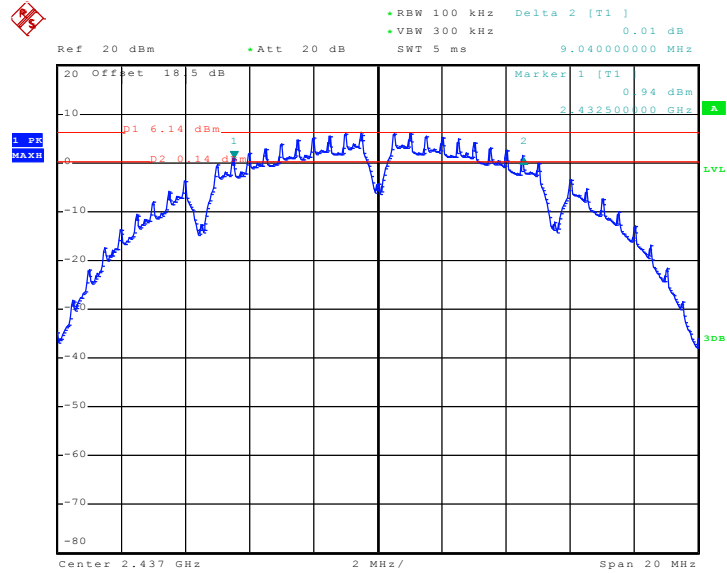
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 26.JUN.2011 09:26:11

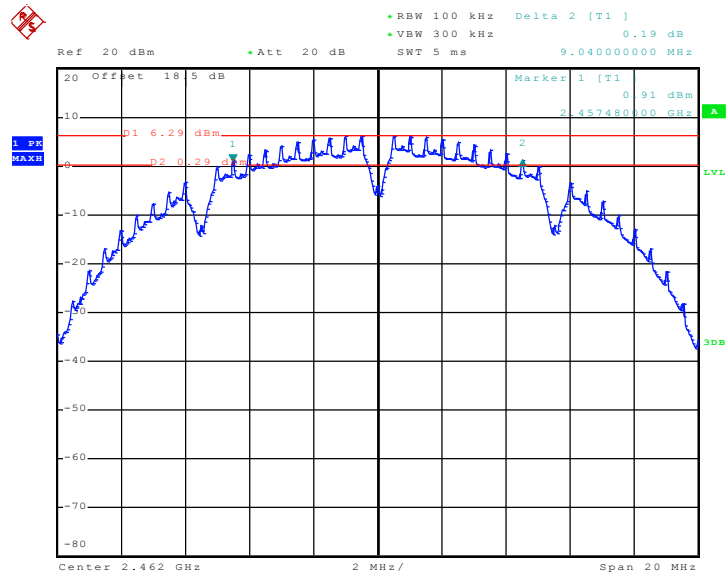


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 26.JUN.2011 09:43:06

Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11



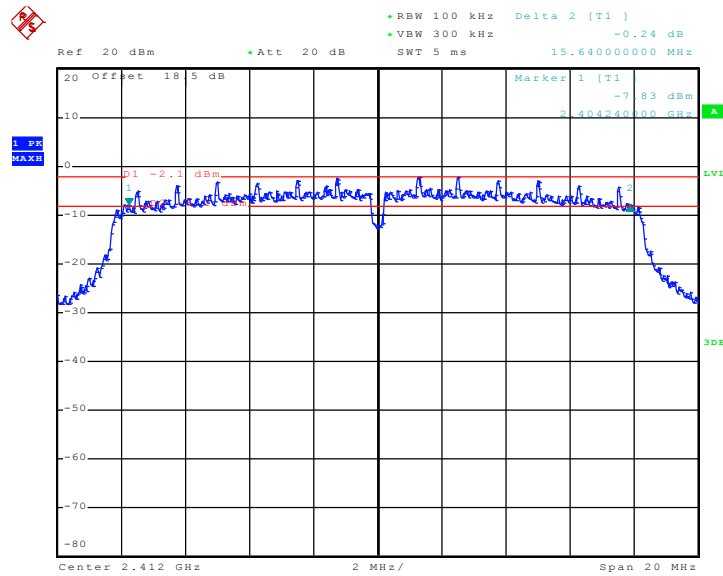
Date: 26.JUN.2011 10:02:41



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.64	0.5	Pass
06	2437	15.68	0.5	Pass
11	2462	15.80	0.5	Pass

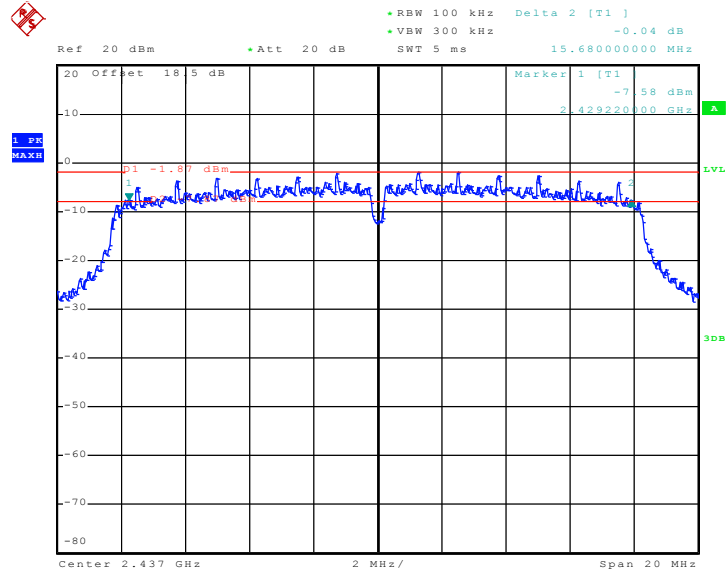
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 26.JUN.2011 10:32:03

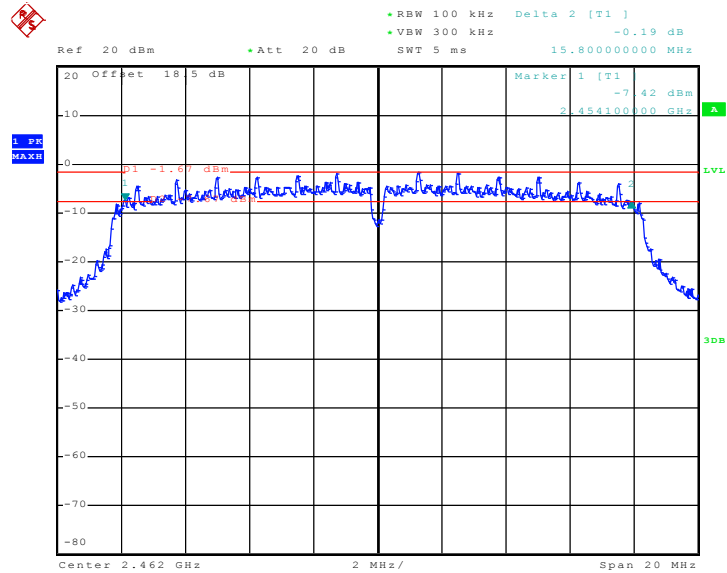


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



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Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11



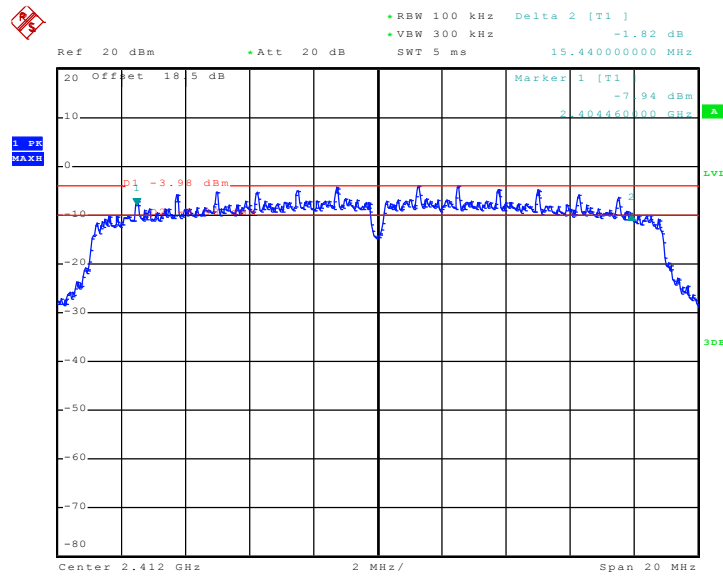
Date: 26.JUN.2011 10:17:10



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.44	0.5	Pass
06	2437	15.72	0.5	Pass
11	2462	15.32	0.5	Pass

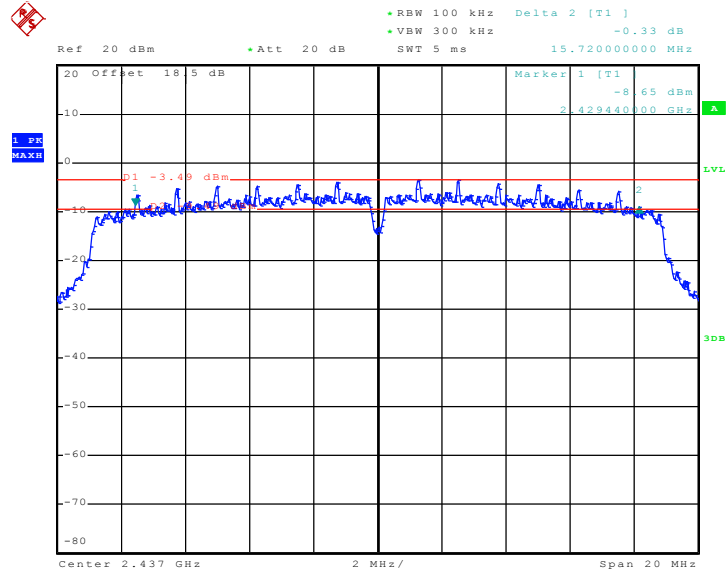
Mode 7 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Date: 26.JUN.2011 11:05:53

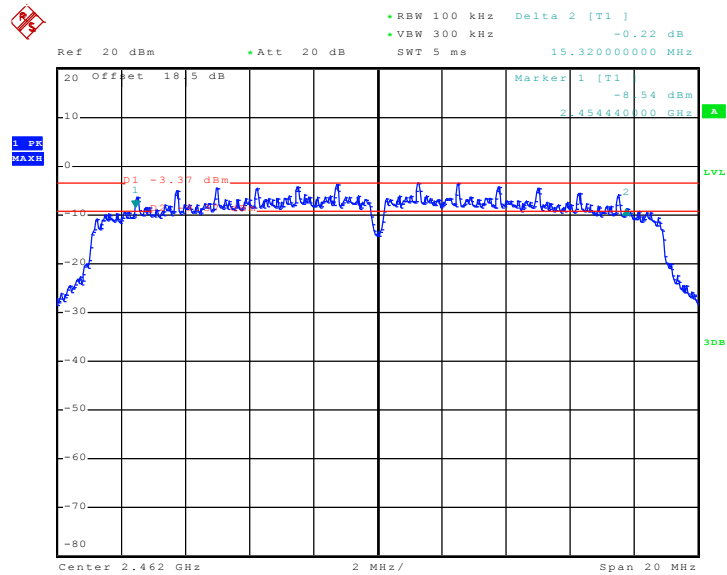


Mode 8 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 06



Date: 26.JUN.2011 11:38:52

Mode 9 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 11



Date: 26.JUN.2011 11:23:11

## 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.

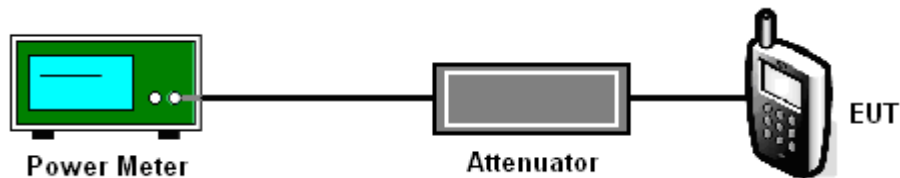
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the power meter by a low loss cable.
3. Measure the power by power meter.

### 3.2.4 Test Setup





3.2.5 Test Result of Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	16.73	30	Pass
06	2437	17.06	30	Pass
11	2462	17.29	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	19.49	30	Pass
06	2437	20.27	30	Pass
11	2462	20.62	30	Pass

Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.68	30	Pass
06	2437	18.86	30	Pass
11	2462	19.20	30	Pass



### **3.3 Band Edges Measurement**

#### **3.3.1 Limit of Band Edges**

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. 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.

#### **3.3.2 Measuring Instruments**

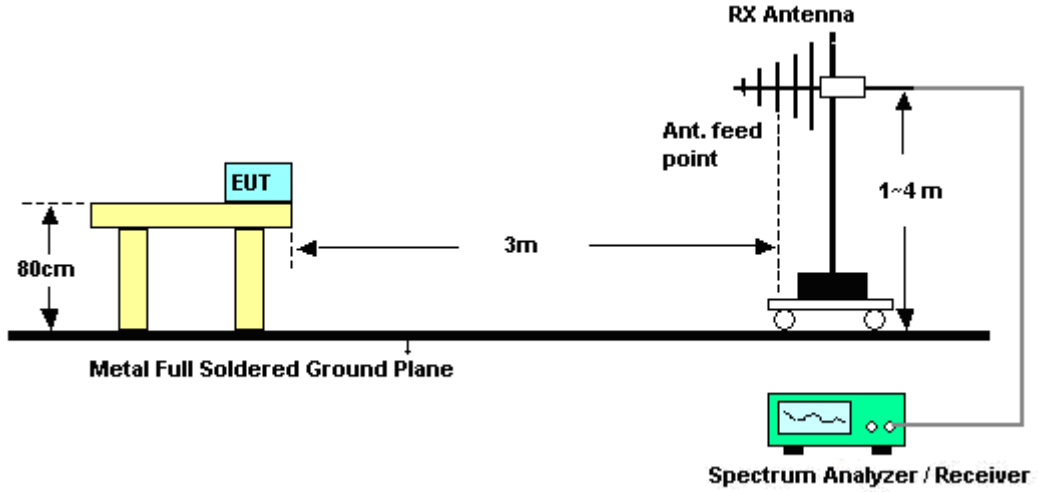
See list of measuring instruments of this test report.

#### **3.3.3 Test Procedures**

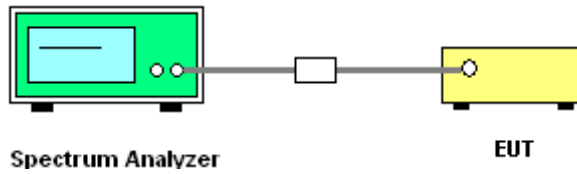
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

### 3.3.4 Test Setup

#### <Radiated Band Edges>



#### <Conducted Band Edges>





3.3.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	48~50%
Test Channel :	01	Test Engineer :	Brian Chang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2385.62	52.54	-21.46	74	50.34	31.7	4.58	34.08	100	22	Peak
2385.62	41.15	-12.85	54	38.95	31.7	4.58	34.08	100	22	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	51.06	-22.94	74	48.86	31.7	4.58	34.08	118	7	Peak
2389.61	39.38	-14.62	54	37.18	31.7	4.58	34.08	118	7	Average

Test Mode :	Mode 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	48~50%
Test Channel :	11	Test Engineer :	Brian Chang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2488.79	48.56	-25.44	74	46.2	31.8	4.64	34.08	121	30	Peak
2488.79	37.86	-16.14	54	35.5	31.8	4.64	34.08	121	30	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2488.41	48.13	-25.87	74	45.77	31.8	4.64	34.08	100	63	Peak
2488.41	36.85	-17.15	54	34.49	31.8	4.64	34.08	100	63	Average



Test Mode :	Mode 4	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	48~50%
Test Channel :	01	Test Engineer :	Brian Chang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.99	51.92	-22.08	74	49.72	31.7	4.58	34.08	100	23	Peak
2389.99	37.08	-16.92	54	34.88	31.7	4.58	34.08	100	23	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.04	51.36	-22.64	74	49.16	31.7	4.58	34.08	100	58	Peak
2389.04	36.39	-17.61	54	34.19	31.7	4.58	34.08	100	58	Average

Test Mode :	Mode 6	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	48~50%
Test Channel :	11	Test Engineer :	Brian Chang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.66	50.87	-23.13	74	48.53	31.78	4.64	34.08	177	40	Peak
2483.66	36.78	-17.22	54	34.44	31.78	4.64	34.08	177	40	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2484.8	50.24	-23.76	74	47.9	31.78	4.64	34.08	100	65	Peak
2484.8	35.66	-18.34	54	33.32	31.78	4.64	34.08	100	65	Average



Test Mode :	Mode 7	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	48~50%
Test Channel :	01	Test Engineer :	Brian Chang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2389.61	48.53	-25.47	74	46.33	31.7	4.58	34.08	103	48	Peak
2389.61	35.52	-18.48	54	33.32	31.7	4.58	34.08	103	48	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2388.47	49.62	-24.38	74	47.42	31.7	4.58	34.08	100	62	Peak
2388.47	34.99	-19.01	54	32.79	31.7	4.58	34.08	100	62	Average

Test Mode :	Mode 9	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	48~50%
Test Channel :	11	Test Engineer :	Brian Chang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	48.66	-25.34	74	46.32	31.78	4.64	34.08	150	43	Peak
2483.5	35.98	-18.02	54	33.64	31.78	4.64	34.08	150	43	Average

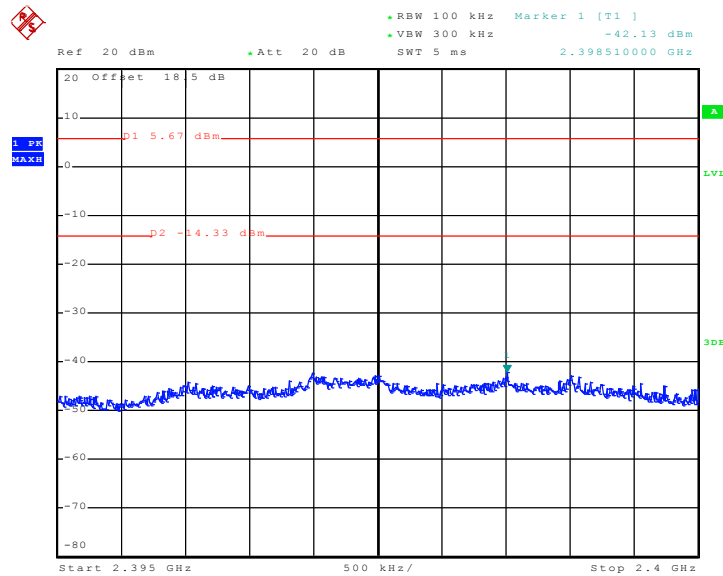
ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.5	50.01	-23.99	74	47.67	31.78	4.64	34.08	117	40	Peak
2483.5	35.99	-18.01	54	33.65	31.78	4.64	34.08	117	40	Average



3.3.6 Test Plots of Conducted Band Edges

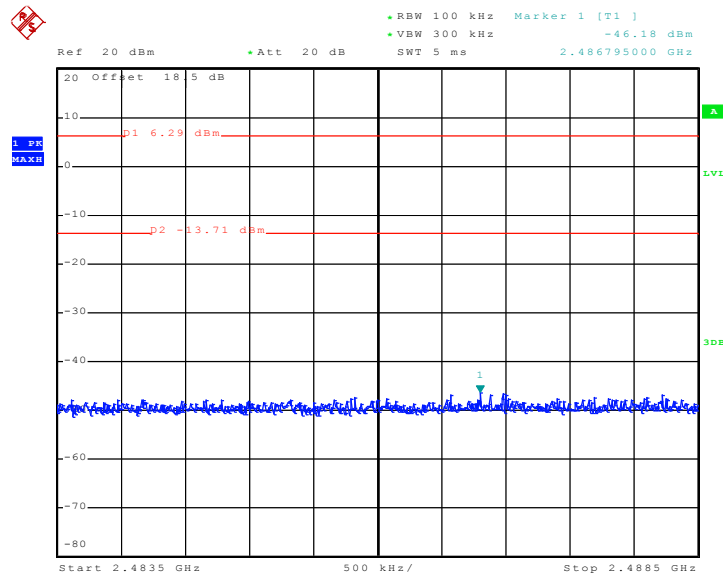
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11b Channel 01



Date: 26.JUN.2011 09:27:23

High Band Edge Plot on 802.11b Channel 11

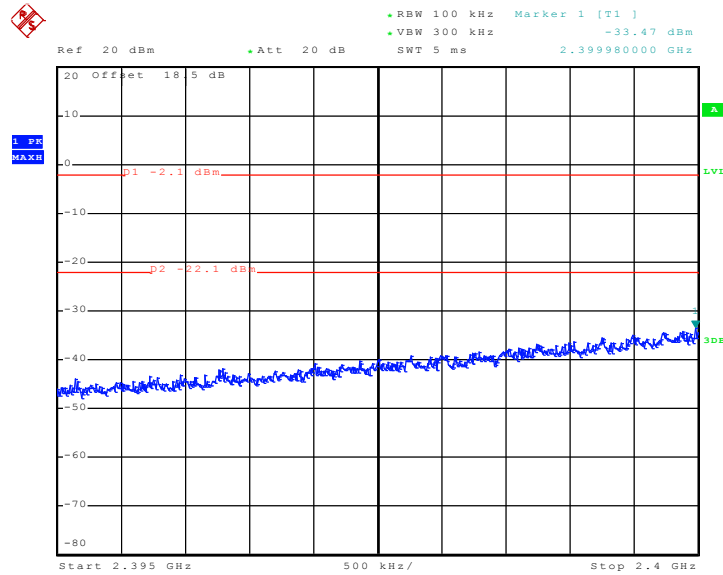


Date: 26.JUN.2011 10:03:29



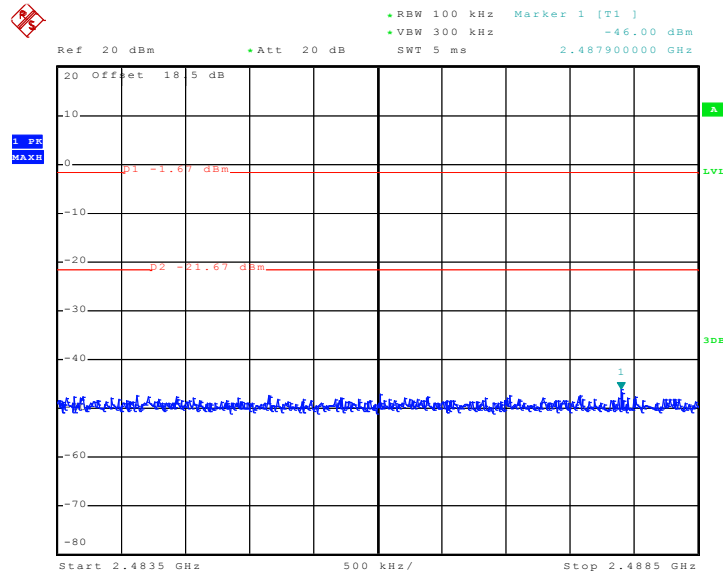
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11g Channel 01



Date: 26.JUN.2011 10:33:16

High Band Edge Plot on 802.11g Channel 11

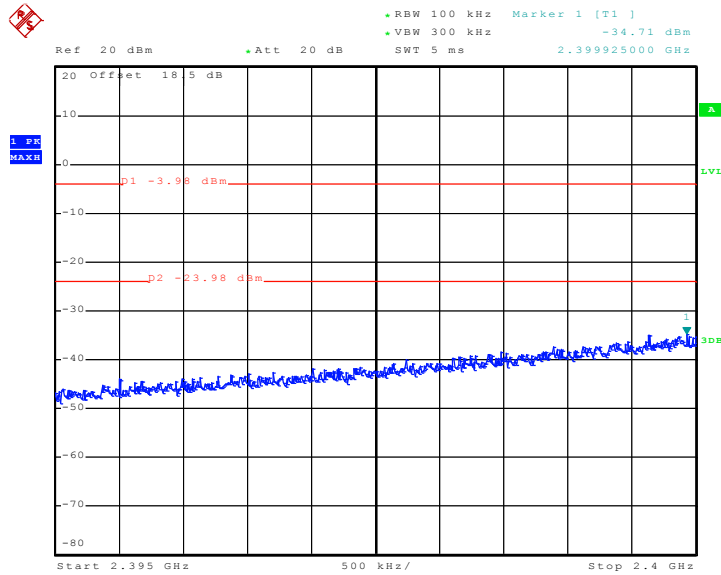


Date: 26.JUN.2011 10:17:58



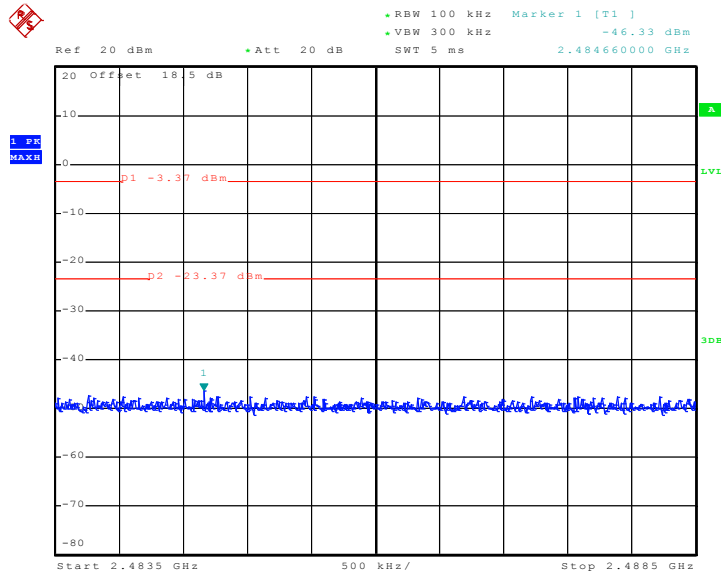
Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 01



Date: 26.JUN.2011 11:07:06

High Band Edge Plot on 802.11n (BW 20MHz) Channel 11



Date: 26.JUN.2011 11:24:00

## 3.4 Spurious Emission Measurement

### 3.4.1 Limit of Spurious Emission Measurement

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

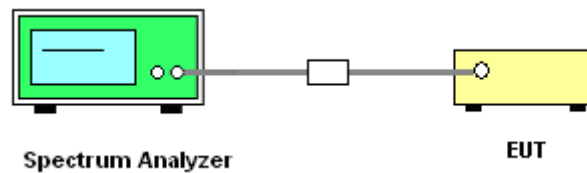
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW)  $\geq$  RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

### 3.4.4 Test Setup

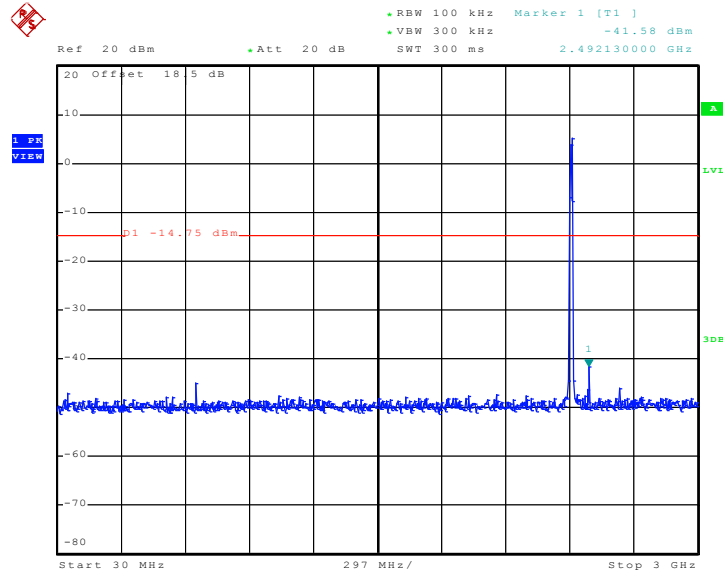




### 3.4.5 Test Plots of Spurious Emission

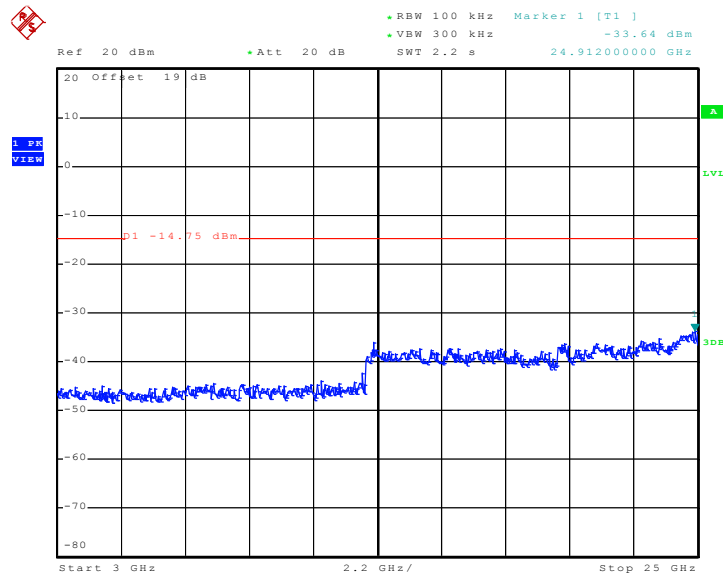
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 09:37:55

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

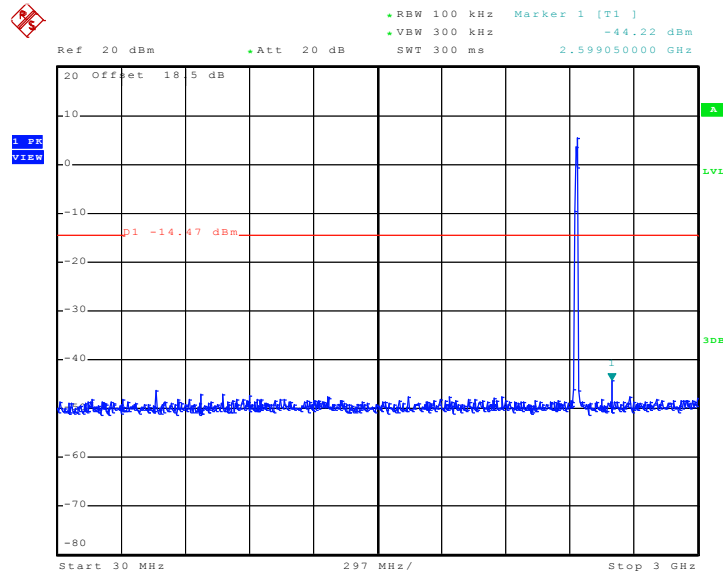


Date: 26.JUN.2011 09:39:05



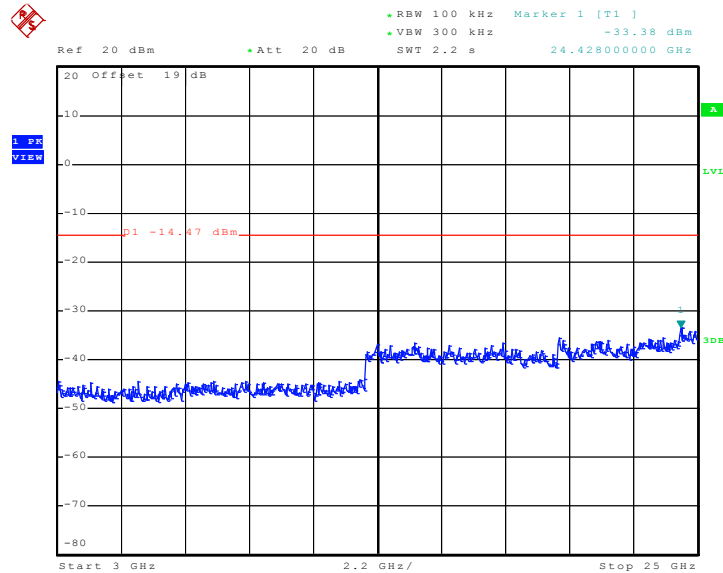
Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 09:54:21

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

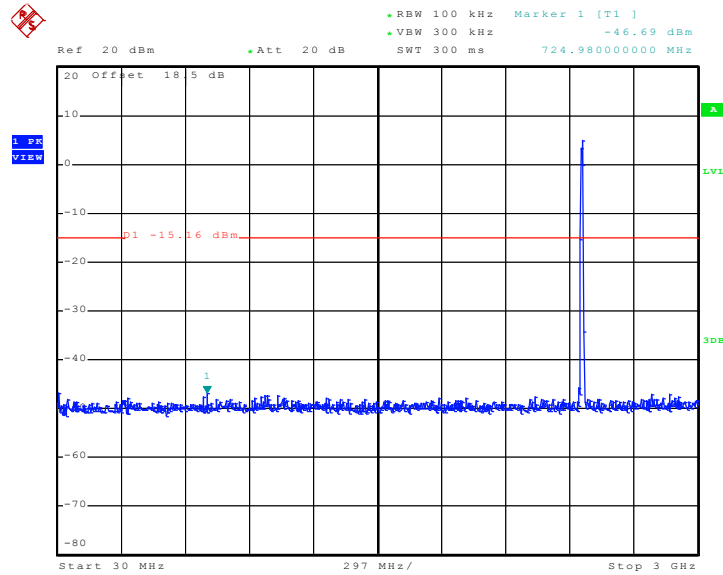


Date: 26.JUN.2011 09:55:13



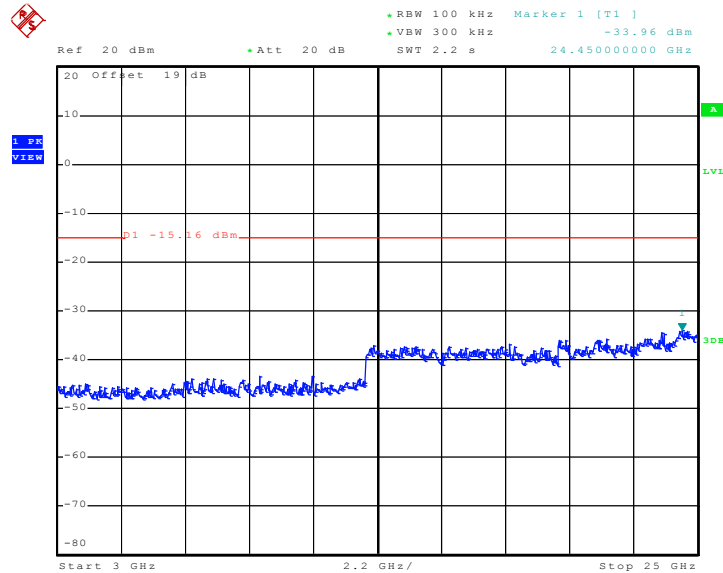
Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 10:12:57

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

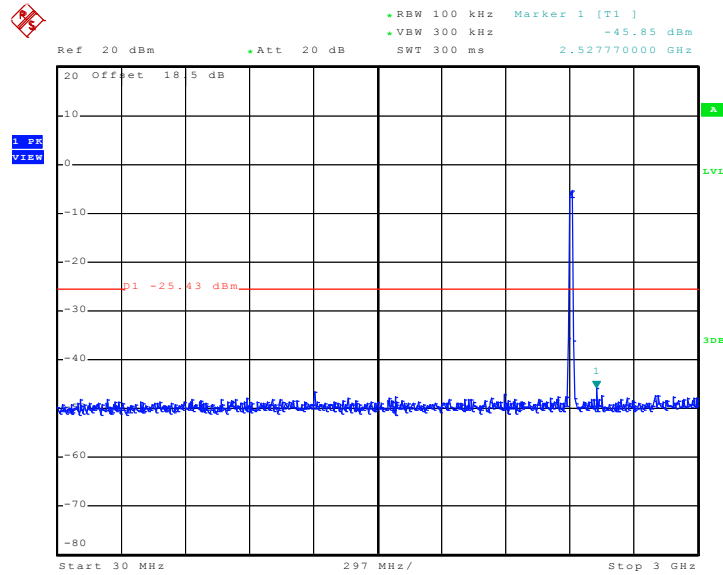


Date: 26.JUN.2011 10:13:46



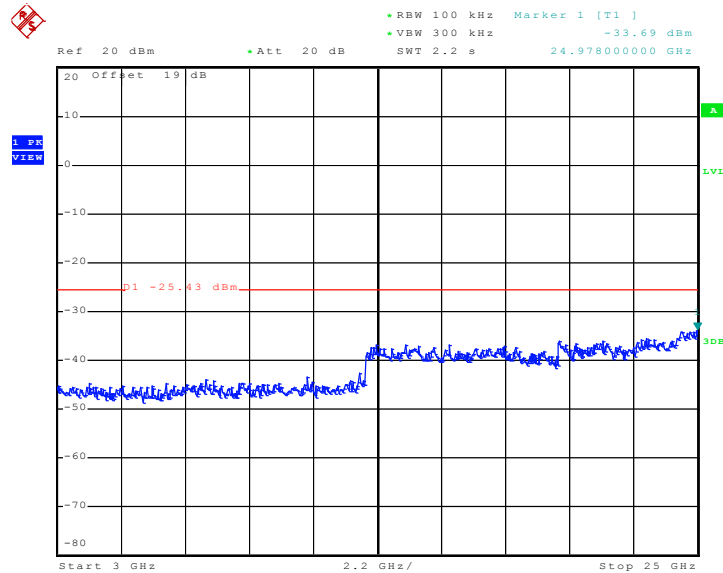
Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 10:42:53

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

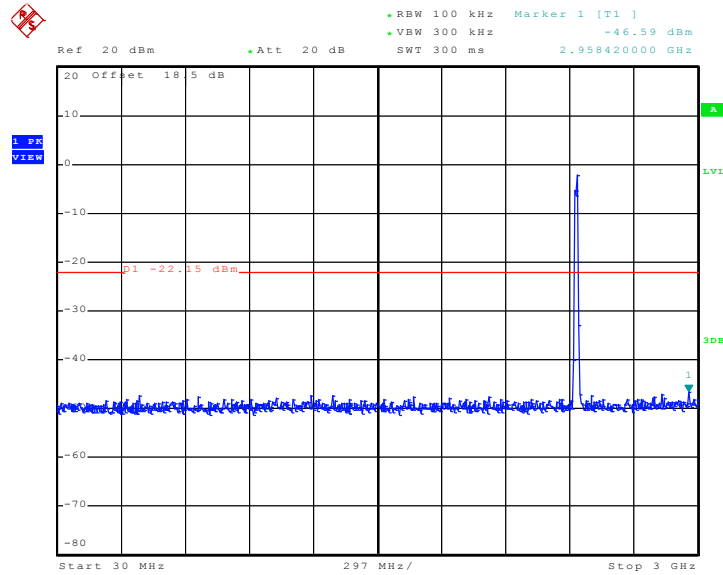


Date: 26.JUN.2011 10:43:52



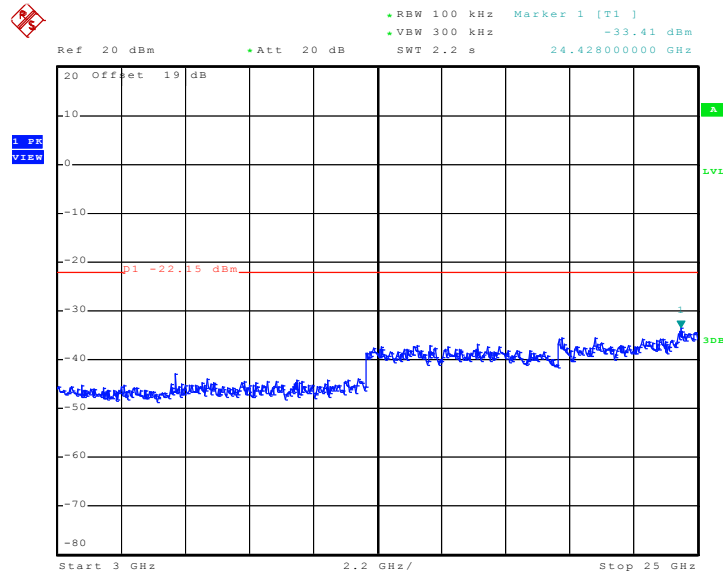
Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50~53
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 10:59:38

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

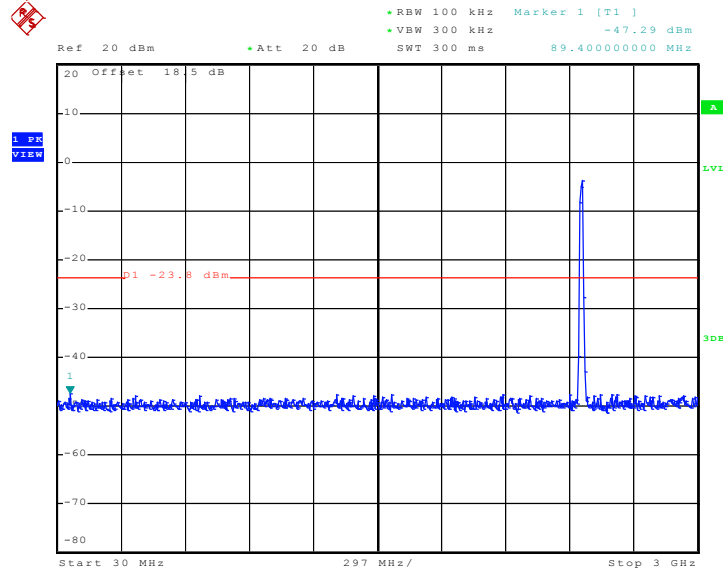


Date: 26.JUN.2011 11:00:31



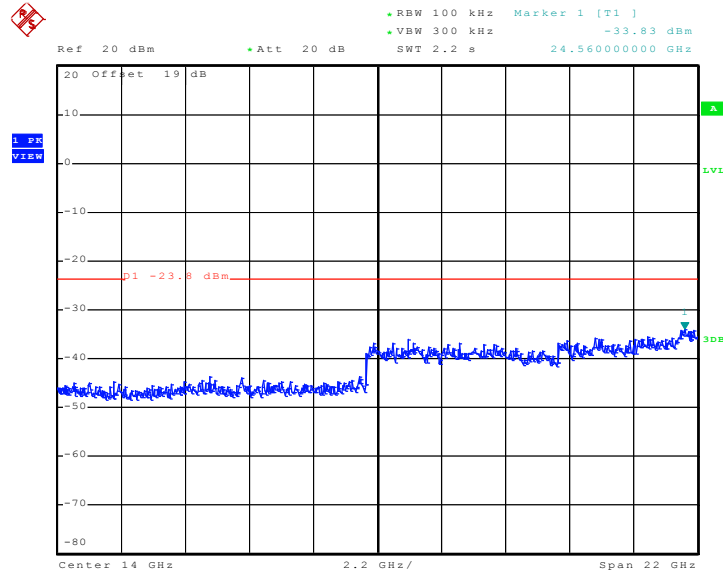
Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 10:27:23

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

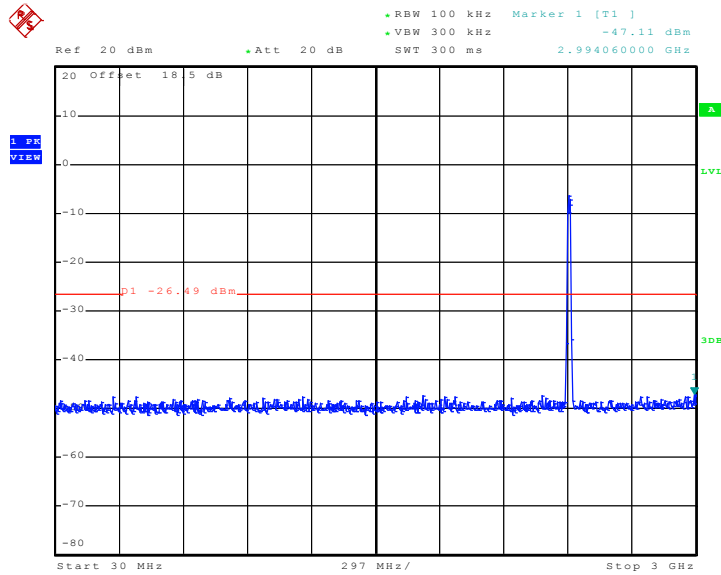


Date: 26.JUN.2011 10:27:59



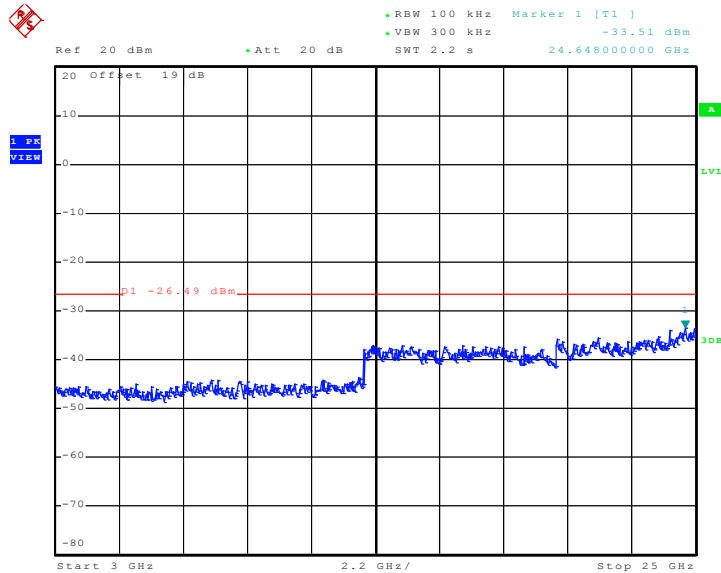
Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 11:19:19

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

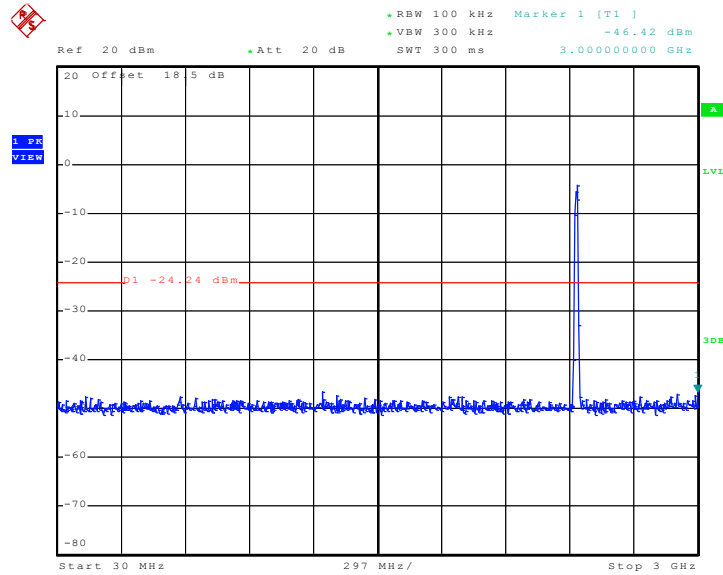


Date: 26.JUN.2011 11:20:07



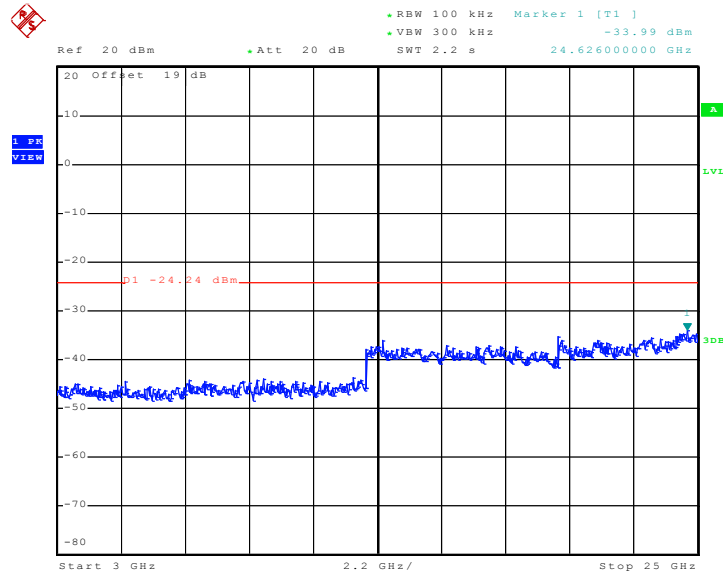
Test Mode :	Mode 8	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 11:49:25

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

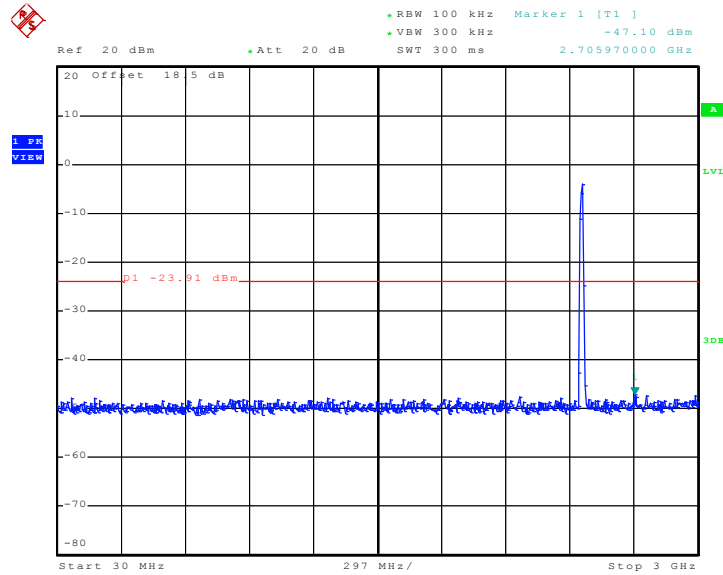


Date: 26.JUN.2011 11:50:21



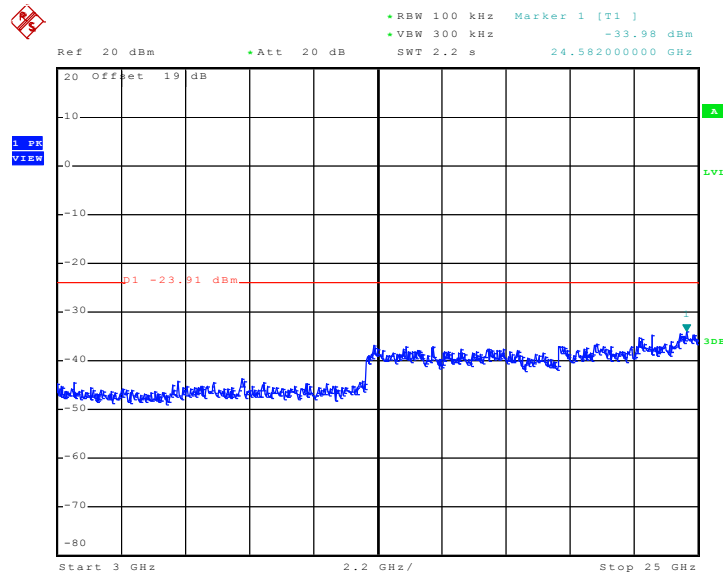
Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.JUN.2011 11:35:08

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 26.JUN.2011 11:35:47

## 3.5 Power Spectral Density Measurement

### 3.5.1 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.

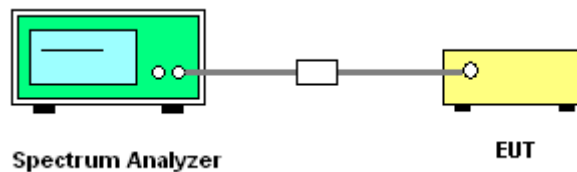
### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.

### 3.5.4 Test Setup



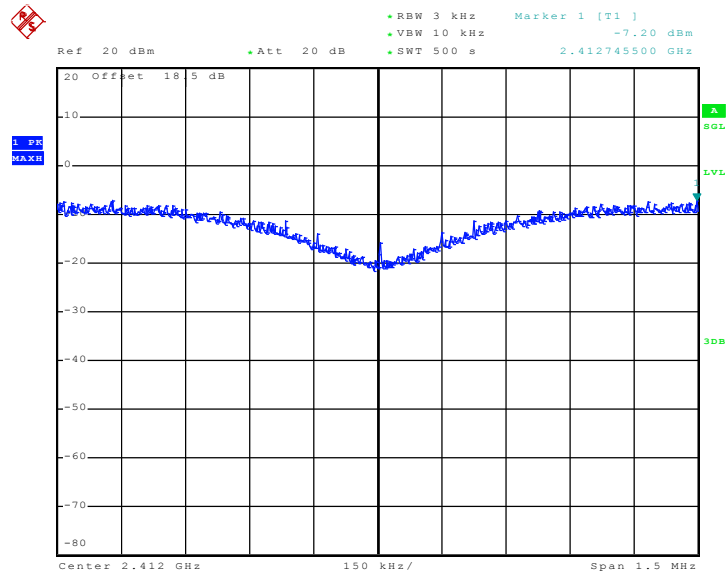


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-7.20	8	Pass
06	2437	-6.85	8	Pass
11	2462	-6.65	8	Pass

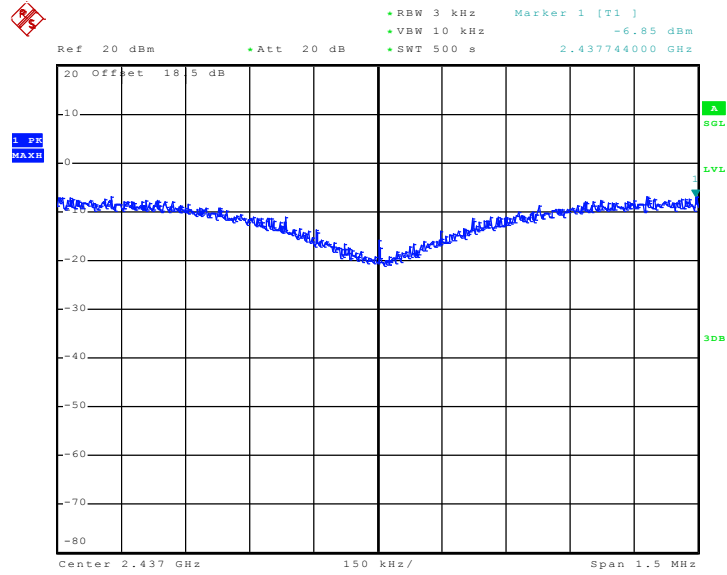
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 26.JUN.2011 09:36:40

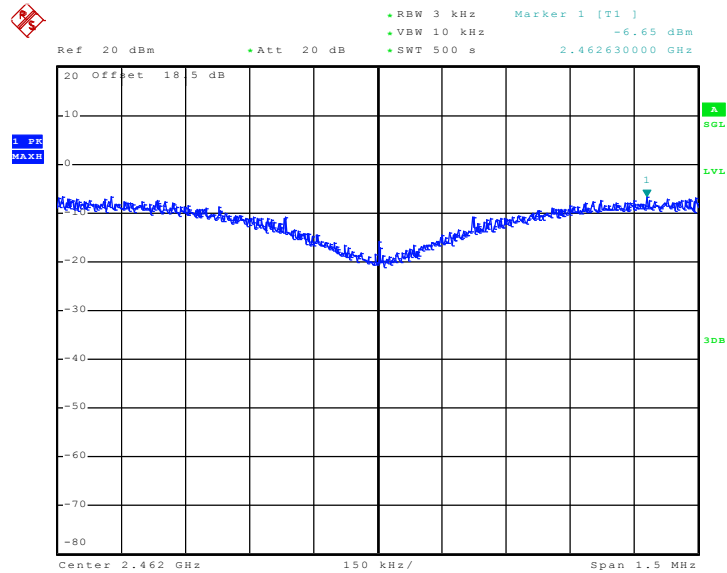


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 26.JUN.2011 09:53:58

Mode 3 : PSD Plot on 802.11b Channel 11



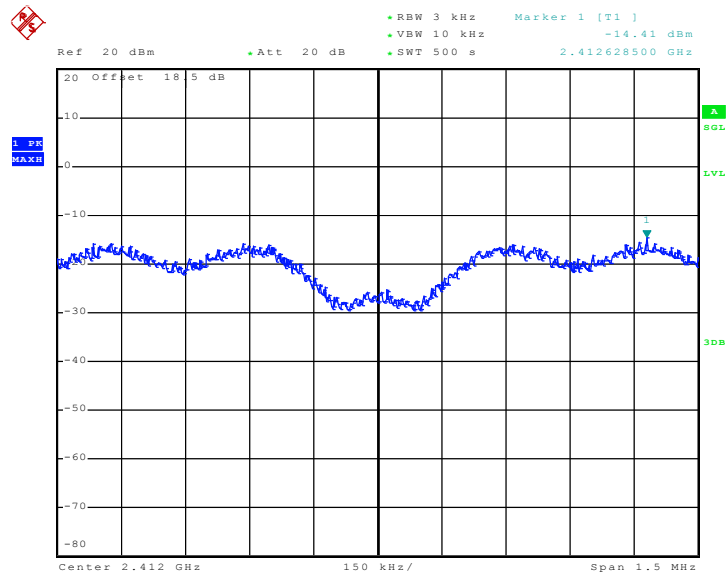
Date: 26.JUN.2011 10:12:34



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-14.41	8	Pass
06	2437	-14.86	8	Pass
11	2462	-14.04	8	Pass

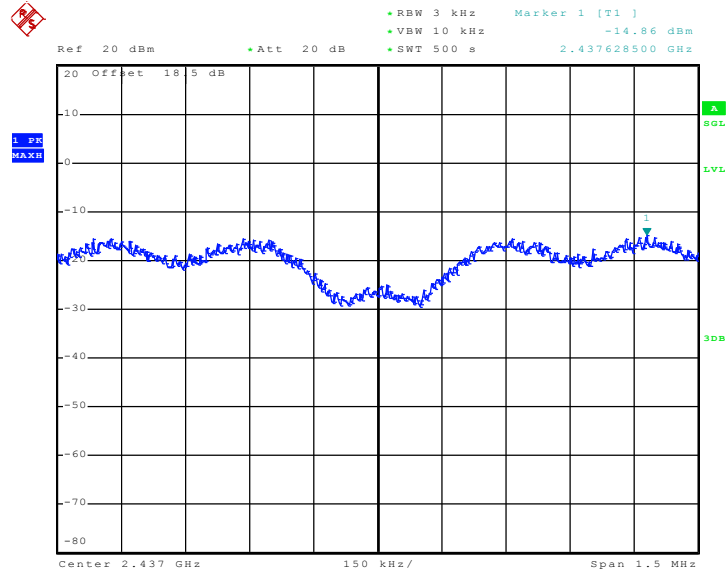
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 26.JUN.2011 10:42:31

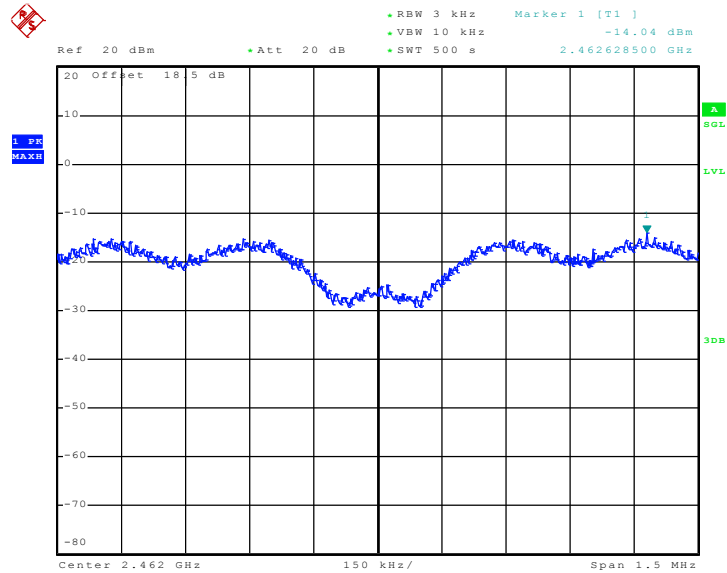


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 26.JUN.2011 10:59:15

Mode 6 : PSD Plot on 802.11g Channel 11



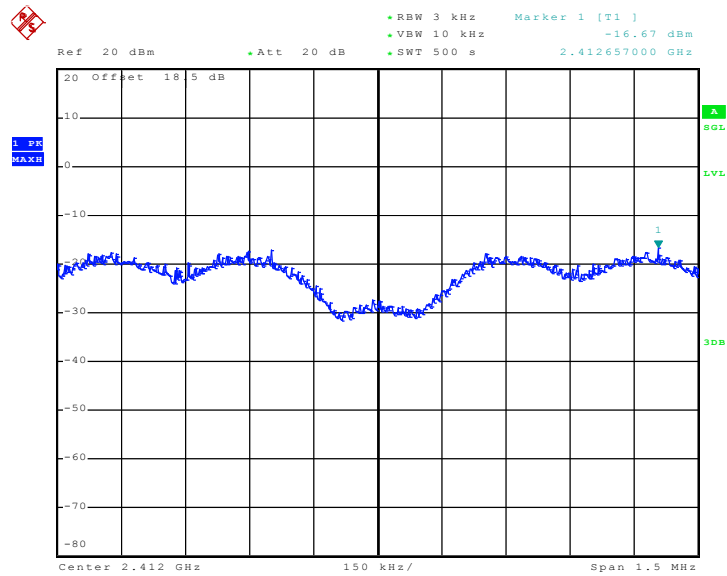
Date: 26.JUN.2011 10:27:00



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-16.67	8	Pass
06	2437	-16.32	8	Pass
11	2462	-15.91	8	Pass

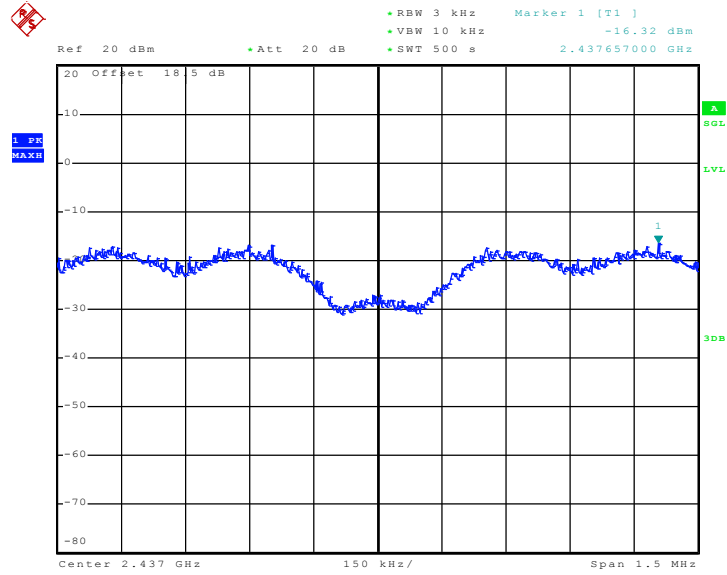
Mode 7 : PSD Plot on 802.11n (BW 20MHz) Channel 01



Date: 26.JUN.2011 11:16:10

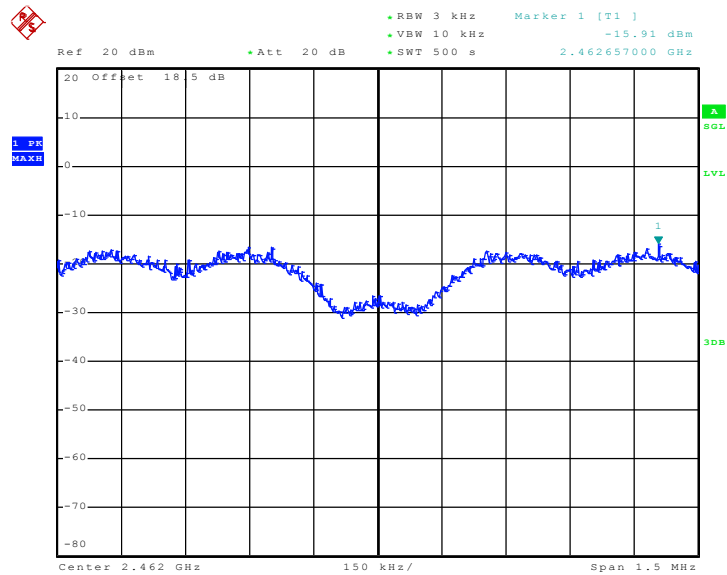


Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06



Date: 26.JUN.2011 11:49:02

Mode 9 : PSD Plot on 802.11n (BW 20MHz) Channel 11



Date: 26.JUN.2011 11:34:45

### 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.

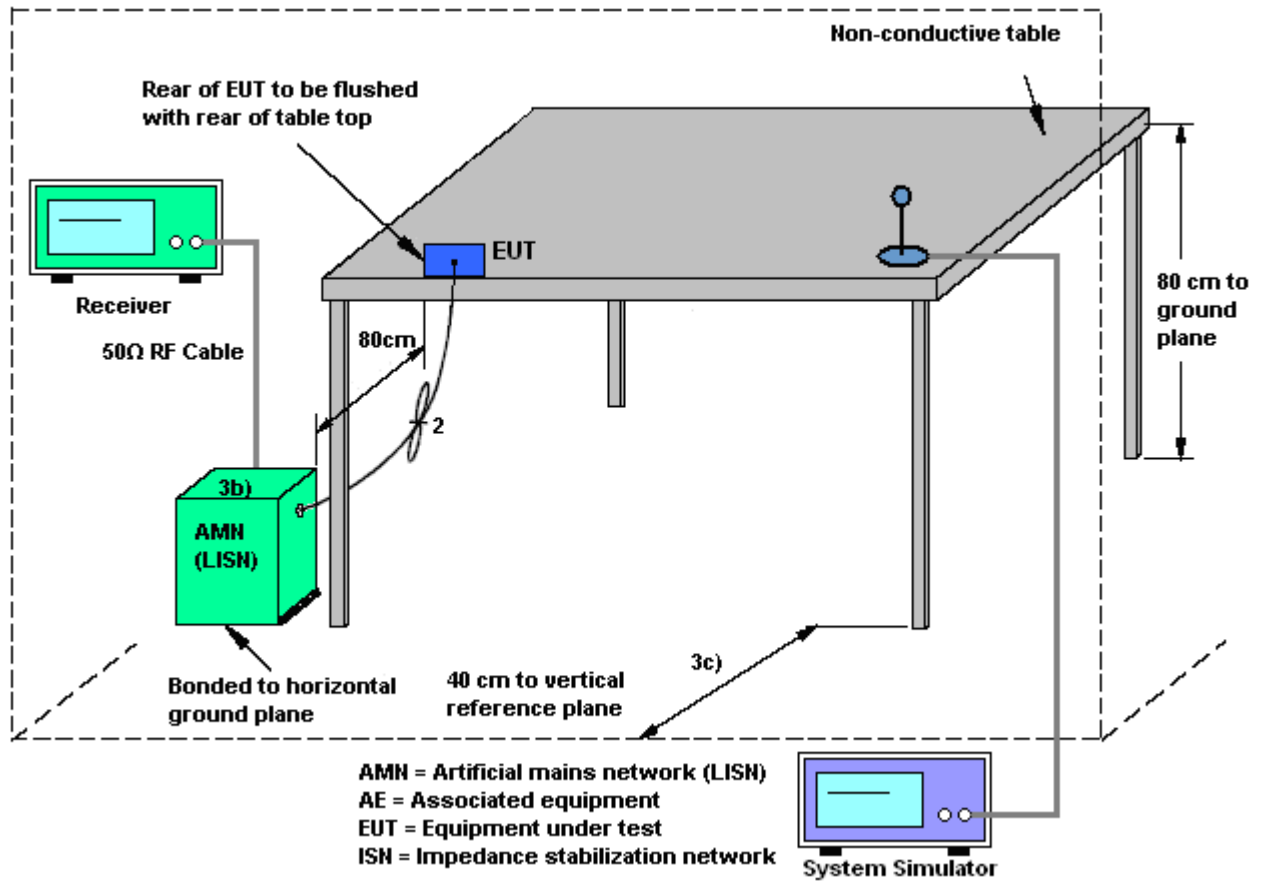
#### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.6.3 Test Procedures

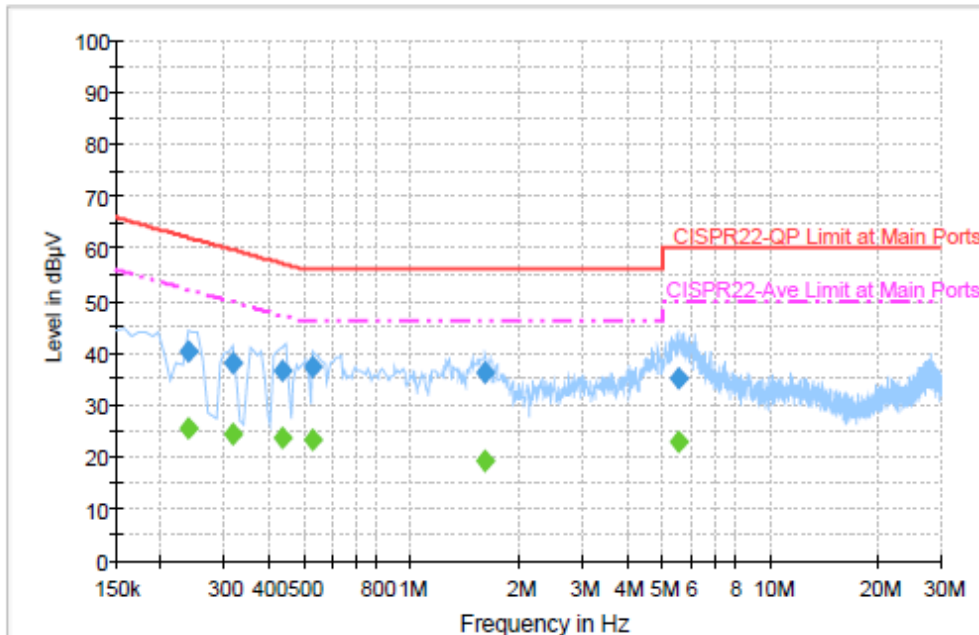
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 :	22~24°C
Test Engineer :	Novic Chiang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



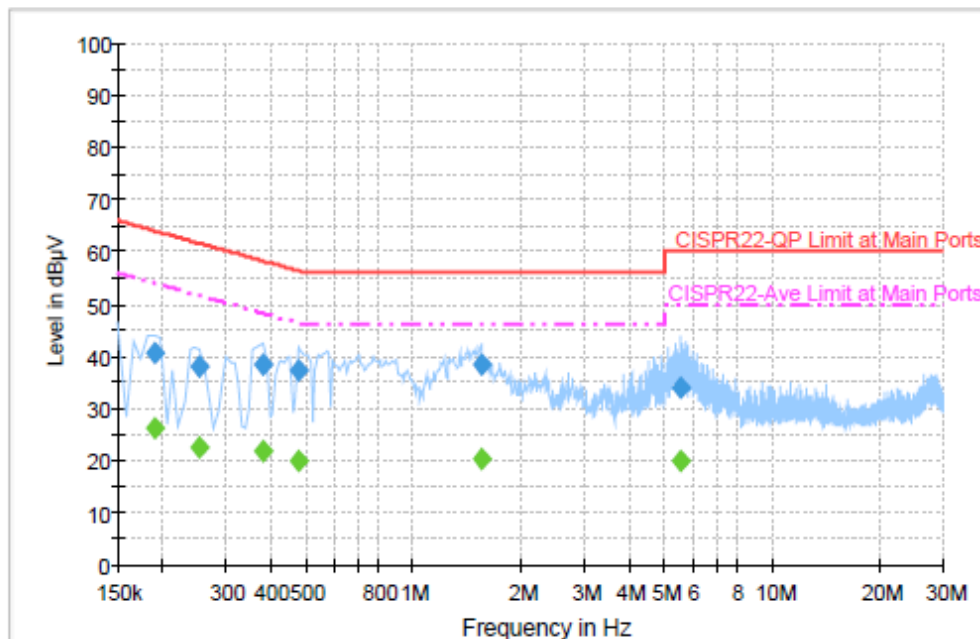
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.238000	40.3	Off	L1	19.4	21.9	62.2
0.318000	37.9	Off	L1	19.3	21.9	59.8
0.438000	36.4	Off	L1	19.4	20.7	57.1
0.534000	37.4	Off	L1	19.3	18.6	56.0
1.606000	36.3	Off	L1	19.4	19.7	56.0
5.574000	35.2	Off	L1	19.5	24.8	60.0

#### Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.238000	25.6	Off	L1	19.4	26.6	52.2
0.318000	24.3	Off	L1	19.3	25.5	49.8
0.438000	23.6	Off	L1	19.4	23.5	47.1
0.534000	23.4	Off	L1	19.3	22.6	46.0
1.606000	19.1	Off	L1	19.4	26.9	46.0
5.574000	22.8	Off	L1	19.5	27.2	50.0

Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Novic Chiang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	40.5	Off	N	19.4	23.5	64.0
0.254000	38.1	Off	N	19.4	23.5	61.6
0.382000	38.4	Off	N	19.4	19.8	58.2
0.478000	37.3	Off	N	19.4	19.1	56.4
1.550000	38.2	Off	N	19.4	17.8	56.0
5.542000	33.8	Off	N	19.5	26.2	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	26.3	Off	N	19.4	27.7	54.0
0.254000	22.6	Off	N	19.4	29.0	51.6
0.382000	21.6	Off	N	19.4	26.6	48.2
0.478000	19.8	Off	N	19.4	26.6	46.4
1.550000	20.4	Off	N	19.4	25.6	46.0
5.542000	20.1	Off	N	19.5	29.9	50.0

### 3.7 Radiated Emission Measurement

#### 3.7.1 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

#### 3.7.2 Measuring Instruments

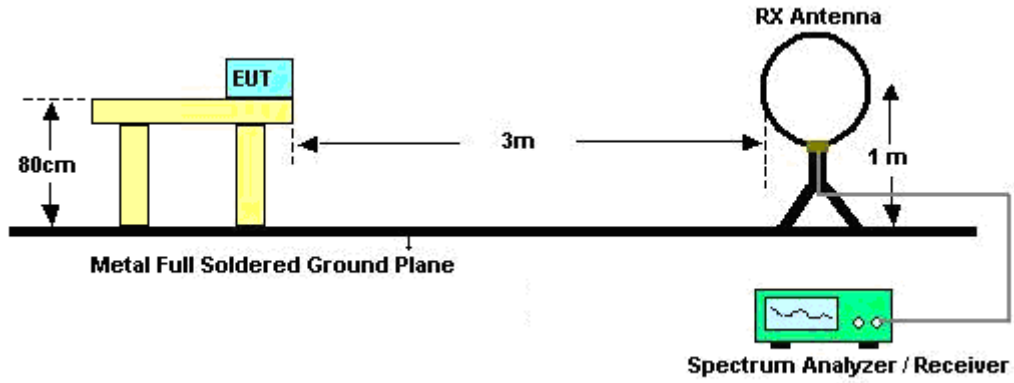
See list of measuring instruments of this test report.

#### 3.7.3 Test Procedures

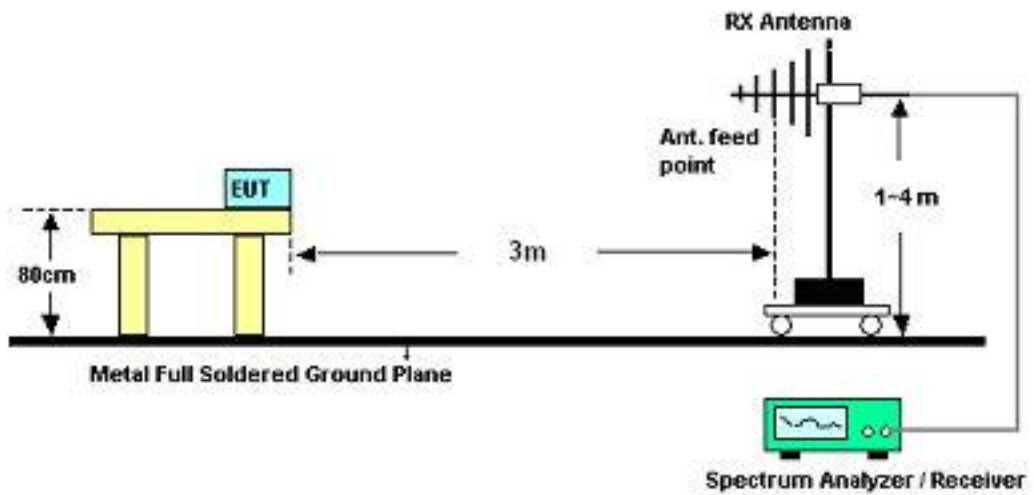
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
  - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.  
 Distance extrapolation factor =  $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$  (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

### 3.7.4 Test Setup

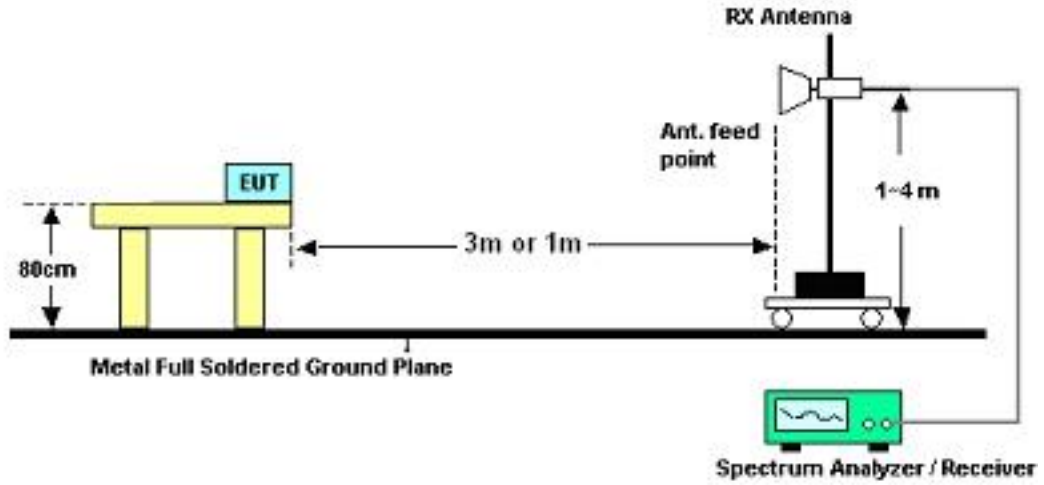
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Brian Chang	Temperature :	23~25°C	
		Relative Humidity :	48~50%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

**Note:**

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.



3.7.6 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)

Test Mode :	Mode 1	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	48~50%
Test Engineer :	Brian Chang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level (dBuV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
35.94	16.8	-23.2	40	32.54	15.04	0.74	31.52	-	-	Peak
124.5	14.67	-28.83	43.5	34.04	10.94	1.21	31.52	-	-	Peak
160.68	12.77	-30.73	43.5	33.35	9.57	1.35	31.5	-	-	Peak
664.7	20.45	-25.55	46	29.61	18.99	2.61	30.76	-	-	Peak
768.3	23	-23	46	30.34	20.42	2.78	30.54	-	-	Peak
892.2	24.23	-21.77	46	29.99	21.72	3	30.48	104	312	Peak
2385.62	41.15	-12.85	54	38.95	31.7	4.58	34.08	100	22	Average
2385.62	52.54	-21.46	74	50.34	31.7	4.58	34.08	100	22	Peak
2412	102.04	-	-	99.82	31.71	4.59	34.08	100	22	Average
2412	106.03	-	-	103.81	31.71	4.59	34.08	100	22	Peak
2496	34.88	-19.12	54	32.52	31.8	4.64	34.08	100	22	Average
2496	56.16	-17.84	74	53.8	31.8	4.64	34.08	100	22	Peak



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	29.81	-10.19	40	45.11	15.48	0.74	31.52	122	309	Peak
52.14	21.95	-18.05	40	45.43	7.25	0.82	31.55	-	-	Peak
245.73	15.79	-30.21	46	34.34	11.33	1.64	31.52	-	-	Peak
666.1	20.74	-25.26	46	29.88	19	2.61	30.75	-	-	Peak
743.8	22.95	-23.05	46	30.81	19.96	2.74	30.56	-	-	Peak
862.8	23.86	-22.14	46	29.91	21.5	2.94	30.49	-	-	Peak
2389.61	39.38	-14.62	54	37.18	31.7	4.58	34.08	118	7	Average
2389.61	51.06	-22.94	74	48.86	31.7	4.58	34.08	118	7	Peak
2412	100.89	-	-	98.67	31.71	4.59	34.08	118	7	Average
2412	104.67	-	-	102.45	31.71	4.59	34.08	118	7	Peak
2488	34.99	-19.01	54	32.63	31.8	4.64	34.08	118	7	Average
2488	57	-17	74	54.64	31.8	4.64	34.08	118	7	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 MHz is Fundamental Signals which can be ignored		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
38.64	16.38	-23.62	40	33.44	13.7	0.75	31.51	-	-	Peak
124.77	13.38	-30.12	43.5	32.72	10.96	1.22	31.52	-	-	Peak
160.68	14.11	-29.39	43.5	34.69	9.57	1.35	31.5	-	-	Peak
656.3	20.36	-25.64	46	29.56	18.96	2.6	30.76	-	-	Peak
759.9	22.01	-23.99	46	29.53	20.25	2.77	30.54	-	-	Peak
888.7	23.05	-22.95	46	28.85	21.69	2.99	30.48	131	299	Peak
2386	35.67	-18.33	54	33.47	31.7	4.58	34.08	121	7	Average
2386	47.51	-26.49	74	45.31	31.7	4.58	34.08	121	7	Peak
2437	101.01	-	-	98.73	31.75	4.61	34.08	121	7	Average
2437	104.92	-	-	102.64	31.75	4.61	34.08	121	7	Peak
2500	36.24	-17.76	54	33.88	31.8	4.64	34.08	121	7	Average
2500	48.31	-25.69	74	45.95	31.8	4.64	34.08	121	7	Peak



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	29.46	-10.54	40	44.76	15.48	0.74	31.52	100	117	Peak
42.42	23.16	-16.84	40	42.41	11.53	0.76	31.54	-	-	Peak
140.43	15.62	-27.88	43.5	35.2	10.66	1.27	31.51	-	-	Peak
668.9	20.66	-25.34	46	29.79	19.01	2.61	30.75	-	-	Peak
760.6	21.53	-24.47	46	29.03	20.27	2.77	30.54	-	-	Peak
855.8	23.14	-22.86	46	29.27	21.44	2.93	30.5	-	-	Peak
2386	35.24	-18.76	54	33.04	31.7	4.58	34.08	115	8	Average
2386	47.39	-26.61	74	45.19	31.7	4.58	34.08	115	8	Peak
2437	99.56	-	-	97.28	31.75	4.61	34.08	115	8	Average
2437	103.85	-	-	101.57	31.75	4.61	34.08	115	8	Peak
2484	36.86	-17.14	54	34.52	31.78	4.64	34.08	115	8	Average
2484	49.08	-24.92	74	46.74	31.78	4.64	34.08	115	8	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
33.24	19.39	-20.61	40	33.58	16.63	0.72	31.54	143	258	Peak
124.77	12.19	-31.31	43.5	31.53	10.96	1.22	31.52	-	-	Peak
159.6	12.06	-31.44	43.5	32.58	9.63	1.35	31.5	-	-	Peak
664	19.54	-26.46	46	28.7	18.99	2.61	30.76	-	-	Peak
744.5	21.54	-24.46	46	29.38	19.98	2.74	30.56	-	-	Peak
823.6	22.21	-23.79	46	28.66	21.2	2.87	30.52	-	-	Peak
2378	33.23	-20.77	54	31.06	31.68	4.57	34.08	121	30	Average
2378	45.26	-28.74	74	43.09	31.68	4.57	34.08	121	30	Peak
2462	101.74	-	-	99.43	31.77	4.62	34.08	121	30	Average
2462	105.64	-	-	103.33	31.77	4.62	34.08	121	30	Peak
2488.79	37.86	-16.14	54	35.5	31.8	4.64	34.08	121	30	Average
2488.79	48.56	-25.44	74	46.2	31.8	4.64	34.08	121	30	Peak



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	28.03	-11.97	40	43.33	15.48	0.74	31.52	209	343	Peak
42.42	20.64	-19.36	40	39.89	11.53	0.76	31.54	-	-	Peak
233.85	12.99	-33.01	46	32.38	10.52	1.59	31.5	-	-	Peak
677.3	20.71	-25.29	46	29.79	19.04	2.62	30.74	-	-	Peak
780.2	22.23	-23.77	46	29.33	20.64	2.8	30.54	-	-	Peak
869.1	23.33	-22.67	46	29.33	21.54	2.95	30.49	-	-	Peak
2318	33.37	-20.63	54	31.3	31.63	4.53	34.09	100	63	Average
2318	46.3	-27.7	74	44.23	31.63	4.53	34.09	100	63	Peak
2462	100.1	-	-	97.79	31.77	4.62	34.08	100	63	Average
2462	103.77	-	-	101.46	31.77	4.62	34.08	100	63	Peak
2488.41	36.85	-17.15	54	34.49	31.8	4.64	34.08	100	63	Average
2488.41	48.13	-25.87	74	45.77	31.8	4.64	34.08	100	63	Peak



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.32	17.41	-22.59	40	32.15	16.06	0.73	31.53	-	-	Peak
172.29	13.87	-29.63	43.5	35.24	8.8	1.37	31.54	-	-	Peak
228.45	14.77	-31.23	46	34.51	10.18	1.58	31.5	-	-	Peak
626.9	20.98	-25.02	46	30.46	18.83	2.51	30.82	-	-	Peak
808.2	23.73	-22.27	46	30.34	21.08	2.84	30.53	-	-	Peak
919.5	24.72	-21.28	46	29.91	22.23	3.03	30.45	144	83	Peak
2389.99	37.08	-16.92	54	34.88	31.7	4.58	34.08	100	23	Average
2389.99	51.92	-22.08	74	49.72	31.7	4.58	34.08	100	23	Peak
2412	90.98	-	-	88.76	31.71	4.59	34.08	100	23	Average
2412	101.73	-	-	99.51	31.71	4.59	34.08	100	23	Peak
2494	33.21	-20.79	54	30.85	31.8	4.64	34.08	100	23	Average
2494	52.31	-21.69	74	49.95	31.8	4.64	34.08	100	23	Peak



<b>Test Mode :</b>	Mode 4	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	31.85	-8.15	40	47.15	15.48	0.74	31.52	122	237	Peak
42.42	24.08	-15.92	40	43.33	11.53	0.76	31.54	-	-	Peak
104.25	18.75	-24.75	43.5	39.44	9.74	1.12	31.55	-	-	Peak
760.6	22.41	-23.59	46	29.91	20.27	2.77	30.54	-	-	Peak
846.7	23.42	-22.58	46	29.64	21.37	2.91	30.5	-	-	Peak
919.5	24.71	-21.29	46	29.9	22.23	3.03	30.45	-	-	Peak
2389.04	36.39	-17.61	54	34.19	31.7	4.58	34.08	100	58	Average
2389.04	51.36	-22.64	74	49.16	31.7	4.58	34.08	100	58	Peak
2412	89.09	-	-	86.87	31.71	4.59	34.08	100	58	Average
2412	100.21	-	-	97.99	31.71	4.59	34.08	100	58	Peak
2500	32.73	-21.27	54	30.37	31.8	4.64	34.08	100	58	Average
2500	50.24	-23.76	74	47.88	31.8	4.64	34.08	100	58	Peak



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
31.62	19.63	-20.37	40	33.24	17.21	0.72	31.54	101	173	Peak
127.47	12.89	-30.61	43.5	32.26	10.93	1.22	31.52	-	-	Peak
246	14.42	-31.58	46	32.9	11.4	1.64	31.52	-	-	Peak
765.5	22.43	-23.57	46	29.84	20.36	2.77	30.54	-	-	Peak
831.3	24.34	-21.66	46	30.7	21.26	2.89	30.51	-	-	Peak
942.6	25.03	-20.97	46	29.62	22.77	3.05	30.41	-	-	Peak
2366	33.55	-20.45	54	31.4	31.66	4.57	34.08	100	46	Average
2366	45.59	-28.41	74	43.44	31.66	4.57	34.08	100	46	Peak
2437	91.24	-	-	88.96	31.75	4.61	34.08	100	46	Average
2437	102.08	-	-	99.8	31.75	4.61	34.08	100	46	Peak
2484	33.94	-20.06	54	31.6	31.78	4.64	34.08	100	46	Average
2484	47.73	-26.27	74	45.39	31.78	4.64	34.08	100	46	Peak



<b>Test Mode :</b>	Mode 5	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	29.51	-10.49	40	44.81	15.48	0.74	31.52	129	145	Peak
42.42	23.77	-16.23	40	43.02	11.53	0.76	31.54	-	-	Peak
127.74	14.7	-28.8	43.5	34.09	10.91	1.22	31.52	-	-	Peak
737.5	21.95	-24.05	46	29.99	19.83	2.72	30.59	-	-	Peak
866.3	23.21	-22.79	46	29.23	21.52	2.95	30.49	-	-	Peak
955.2	24.64	-21.36	46	28.88	23.06	3.08	30.38	-	-	Peak
2368	33.53	-20.47	54	31.38	31.66	4.57	34.08	100	63	Average
2368	45.56	-28.44	74	43.41	31.66	4.57	34.08	100	63	Peak
2437	90.32	-	-	88.04	31.75	4.61	34.08	100	63	Average
2437	101.07	-	-	98.79	31.75	4.61	34.08	100	63	Peak
2484	34.19	-19.81	54	31.85	31.78	4.64	34.08	100	63	Average
2484	45.72	-28.28	74	43.38	31.78	4.64	34.08	100	63	Peak



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	17.11	-22.89	40	32.41	15.48	0.74	31.52	-	-	Peak
132.06	15.83	-27.67	43.5	35.28	10.84	1.23	31.52	-	-	Peak
172.29	13.43	-30.07	43.5	34.8	8.8	1.37	31.54	-	-	Peak
665.4	21.08	-24.92	46	30.23	18.99	2.61	30.75	-	-	Peak
832	23.69	-22.31	46	30.05	21.26	2.89	30.51	-	-	Peak
920.9	24.09	-21.91	46	29.26	22.25	3.03	30.45	133	62	Peak
2364	33.17	-20.83	54	31.02	31.66	4.57	34.08	177	40	Average
2364	44.69	-29.31	74	42.54	31.66	4.57	34.08	177	40	Peak
2462	92.54	-	-	90.23	31.77	4.62	34.08	177	40	Average
2462	102.54	-	-	100.23	31.77	4.62	34.08	177	40	Peak
2483.66	36.78	-17.22	54	34.44	31.78	4.64	34.08	177	40	Average
2483.66	50.87	-23.13	74	48.53	31.78	4.64	34.08	177	40	Peak



<b>Test Mode :</b>	Mode 6	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	30.05	-9.95	40	45.35	15.48	0.74	31.52	139	102	Peak
42.42	23.06	-16.94	40	42.31	11.53	0.76	31.54	-	-	Peak
128.82	14.55	-28.95	43.5	33.96	10.89	1.22	31.52	-	-	Peak
753.6	21.56	-24.44	46	29.2	20.14	2.76	30.54	-	-	Peak
867	23.49	-22.51	46	29.5	21.53	2.95	30.49	-	-	Peak
920.9	23.7	-22.3	46	28.87	22.25	3.03	30.45	-	-	Peak
2388	32.95	-21.05	54	30.75	31.7	4.58	34.08	100	65	Average
2388	46.17	-27.83	74	43.97	31.7	4.58	34.08	100	65	Peak
2462	90.03	-	-	87.72	31.77	4.62	34.08	100	65	Average
2462	100.2	-	-	97.89	31.77	4.62	34.08	100	65	Peak
2484.8	35.66	-18.34	54	33.32	31.78	4.64	34.08	100	65	Average
2484.8	50.24	-23.76	74	47.9	31.78	4.64	34.08	100	65	Peak



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
35.94	17.12	-22.88	40	32.86	15.04	0.74	31.52	-	-	Peak
129.63	13.07	-30.43	43.5	32.5	10.87	1.22	31.52	-	-	Peak
246	14.97	-31.03	46	33.45	11.4	1.64	31.52	-	-	Peak
622.7	20.12	-25.88	46	29.63	18.81	2.5	30.82	-	-	Peak
772.5	21.93	-24.07	46	29.19	20.49	2.79	30.54	-	-	Peak
843.9	24.03	-21.97	46	30.27	21.35	2.91	30.5	107	26	Peak
2389.61	35.52	-18.48	54	33.32	31.7	4.58	34.08	103	48	Average
2389.61	48.53	-25.47	74	46.33	31.7	4.58	34.08	103	48	Peak
2412	88.81	-	-	86.59	31.71	4.59	34.08	103	48	Average
2412	99.3	-	-	97.08	31.71	4.59	34.08	103	48	Peak
2496	33.45	-20.55	54	31.09	31.8	4.64	34.08	103	48	Average
2496	51.51	-22.49	74	49.15	31.8	4.64	34.08	103	48	Peak



<b>Test Mode :</b>	Mode 7	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2412 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
32.97	29.75	-10.25	40	43.94	16.63	0.72	31.54	100	15	Peak
42.42	25.3	-14.7	40	44.55	11.53	0.76	31.54	-	-	Peak
52.14	21.47	-18.53	40	44.95	7.25	0.82	31.55	-	-	Peak
662.6	20.68	-25.32	46	29.85	18.98	2.61	30.76	-	-	Peak
777.4	22.86	-23.14	46	30.01	20.6	2.79	30.54	-	-	Peak
848.1	23.37	-22.63	46	29.57	21.38	2.92	30.5	-	-	Peak
2388.47	34.99	-19.01	54	32.79	31.7	4.58	34.08	100	62	Average
2388.47	49.62	-24.38	74	47.42	31.7	4.58	34.08	100	62	Peak
2412	86.39	-	-	84.17	31.71	4.59	34.08	100	62	Average
2412	96.56	-	-	94.34	31.71	4.59	34.08	100	62	Peak
2498	32.94	-21.06	54	30.58	31.8	4.64	34.08	100	62	Average
2498	46.47	-27.53	74	44.11	31.8	4.64	34.08	100	62	Peak



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.05	17.78	-22.22	40	32.52	16.06	0.73	31.53	-	-	Peak
124.77	13.19	-30.31	43.5	32.53	10.96	1.22	31.52	-	-	Peak
228.99	13.57	-32.43	46	33.31	10.18	1.58	31.5	-	-	Peak
650.7	20.14	-25.86	46	29.39	18.93	2.59	30.77	-	-	Peak
755.7	21.59	-24.41	46	29.19	20.18	2.76	30.54	-	-	Peak
806.1	24.01	-21.99	46	30.65	21.06	2.84	30.54	100	315	Peak
2378	33.61	-20.39	54	31.44	31.68	4.57	34.08	102	45	Average
2378	45.69	-28.31	74	43.52	31.68	4.57	34.08	102	45	Peak
2437	88.5	-	-	86.22	31.75	4.61	34.08	102	45	Average
2437	98.89	-	-	96.61	31.75	4.61	34.08	102	45	Peak
2486	33.93	-20.07	54	31.59	31.78	4.64	34.08	102	45	Average
2486	45.78	-28.22	74	43.44	31.78	4.64	34.08	102	45	Peak



<b>Test Mode :</b>	Mode 8	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	06	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2437 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
32.97	28.15	-11.85	40	42.34	16.63	0.72	31.54	111	253	Peak
57	23.75	-16.25	40	48.4	6.04	0.85	31.54	-	-	Peak
243.03	12.96	-33.04	46	31.65	11.2	1.63	31.52	-	-	Peak
715.1	22.45	-23.55	46	31.03	19.41	2.68	30.67	-	-	Peak
809.6	22.87	-23.13	46	29.46	21.09	2.85	30.53	-	-	Peak
871.9	23.94	-22.06	46	29.9	21.57	2.96	30.49	-	-	Peak
2380	33.54	-20.46	54	31.36	31.68	4.58	34.08	119	37	Average
2380	46	-28	74	43.82	31.68	4.58	34.08	119	37	Peak
2437	86.34	-	-	84.06	31.75	4.61	34.08	119	37	Average
2437	96.92	-	-	94.64	31.75	4.61	34.08	119	37	Peak
2486	33.75	-20.25	54	31.41	31.78	4.64	34.08	119	37	Average
2486	46.15	-27.85	74	43.81	31.78	4.64	34.08	119	37	Peak



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
33.78	17.86	-22.14	40	32.6	16.06	0.73	31.53	-	-	Peak
124.77	13.72	-29.78	43.5	33.06	10.96	1.22	31.52	-	-	Peak
245.73	14.88	-31.12	46	33.43	11.33	1.64	31.52	-	-	Peak
688.5	21.5	-24.5	46	30.5	19.09	2.64	30.73	-	-	Peak
818.7	23.97	-22.03	46	30.48	21.16	2.86	30.53	-	-	Peak
945.4	24.92	-21.08	46	29.44	22.83	3.06	30.41	142	301	Peak
2380	32.9	-21.1	54	30.72	31.68	4.58	34.08	150	43	Average
2380	45.86	-28.14	74	43.68	31.68	4.58	34.08	150	43	Peak
2462	87.9	-	-	85.59	31.77	4.62	34.08	150	43	Average
2462	98.72	-	-	96.41	31.77	4.62	34.08	150	43	Peak
2483.5	35.98	-18.02	54	33.64	31.78	4.64	34.08	150	43	Average
2483.5	48.66	-25.34	74	46.32	31.78	4.64	34.08	150	43	Peak



<b>Test Mode :</b>	Mode 9	<b>Temperature :</b>	23~25°C
<b>Test Channel :</b>	11	<b>Relative Humidity :</b>	48~50%
<b>Test Engineer :</b>	Brian Chang	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2462 MHz is Fundamental Signals which can be ignored.		

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level (dBuV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
34.86	28.5	-11.5	40	43.8	15.48	0.74	31.52	120	62	Peak
57.27	24.66	-15.34	40	49.31	6.04	0.85	31.54	-	-	Peak
128.01	15.75	-27.75	43.5	35.14	10.91	1.22	31.52	-	-	Peak
736.8	21.71	-24.29	46	29.75	19.83	2.72	30.59	-	-	Peak
843.2	24.4	-21.6	46	30.66	21.34	2.91	30.51	-	-	Peak
939.1	25.02	-20.98	46	29.71	22.68	3.05	30.42	-	-	Peak
2390	33.13	-20.87	54	30.93	31.7	4.58	34.08	117	40	Average
2390	44.6	-29.4	74	42.4	31.7	4.58	34.08	117	40	Peak
2462	87.19	-	-	84.88	31.77	4.62	34.08	117	40	Average
2462	97.27	-	-	94.96	31.77	4.62	34.08	117	40	Peak
2483.5	35.99	-18.01	54	33.65	31.78	4.64	34.08	117	40	Average
2483.5	50.01	-23.99	74	47.67	31.78	4.64	34.08	117	40	Peak



## **3.8 Antenna Requirements**

### **3.8.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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.

### **3.8.2 Antenna Connected Construction**

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

### **3.8.3 Antenna Gain**

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



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101329	9kHz-30GHz	May. 03, 2011	May. 02, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	114256	N/A	Feb. 15, 2011	Feb. 14, 2012	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-40GHz	Nov. 03, 2010	Nov. 02, 2011	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161075	1KHz - 1GHz	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 1GHz	Nov. 06, 2010	Nov. 05, 2011	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m - 4 m	N/A	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	00066584	1GHz ~ 18GHz	Aug. 05, 2010	Aug. 04, 2011	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz-30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH05-HY)

## 5 Uncertainty of Evaluation

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

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.13</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.26</b>		

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

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		

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

Contribution	Uncertainty of $X_i$		$u(X_i)$	$C_i$	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				