

FCC RF Test Report

APPLICANT : Motorola Solutions, Inc.
EQUIPMENT : CONCIERGE HUB
BRAND NAME : Motorola
MODEL NAME : CCHUB1
FCC ID : UZ7CCHUB1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Dec. 12, 2012 and completely tested on Dec. 24, 2012. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st 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
FR2D1407B	Rev. 01	Initial issue of report	Feb. 22, 2013

**SUMMARY OF TEST RESULT**

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	RSS-210 A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	RSS-Gen 4.6.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)	RSS-210 A8.4	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	RSS-210 A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	RSS-210 A8.5	Conducted Band Edges Conducted Spurious Emission	$\leq 20\text{dBc}$	Pass	-
3.5	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.09 dB at 2389.470 MHz
3.6	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 17.89 dB at 0.169 MHz
3.7	15.203 & 15.247(b)	RSS-210 A8.4	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Motorola Solutions, Inc.

One Motorola Plaza, Holtsville, NY 11742-1300 USA

1.2 Manufacturer

Motorola Solutions, Inc.

One Motorola Plaza, Holtsville, NY 11742-1300 USA

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	CONCIERGE HUB
Brand Name	Motorola
Model Name	CCHUB1
FCC ID	UZ7CCHUB1
EUT supports Radios application	WLAN 11abgn / Bluetooth 2.1
HW Version	EV2 (Rev 3.0)
SW Version	90-4AI17-DEV-0600-00-EV-112712
FW Version	3.0.31
EUT Stage	Identical Prototype

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



1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz 802.11a/n: 5745~5825MHz.
Maximum Output Power to Antenna	<2412 MHz ~ 2462 MHz> 802.11b : 19.87 dBm (0.0971 W) 802.11g : 22.38 dBm (0.1730 W) 802.11n HT20 : 22.33 dBm (0.1710 W) <5745 MHz ~ 5825 MHz> 802.11a : 19.77 dBm (0.0948 W) 802.11n HT20 : 19.86 dBm (0.0968 W)
99% Occupied Bandwidth	<2412 MHz ~ 2462 MHz> 802.11b : 14.25MHz 802.11g : 17.90MHz 802.11n HT20 : 19.50MHz <5745 MHz ~ 5825 MHz> 802.11a : 17.70MHz 802.11n HT20 : 18.75MHz
Antenna Type	802.11b/g/n : PCB Antenna with gain 3.15 dBi 802.11a/n : PCB Antenna with gain 4.11 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	TH02-HY	03CH05-HY	722060/4086B-1

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 30-2, Dingfu Tsuen, Linkou Shiang, New Taipei City, Taiwan 244, R.O.C. TEL: +886-2-2603-5367 / +886-2-2601-1640 FAX: +886-2-2601-1695		
Test Site No.	Sporton Site No.		
	CO01-LK		



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 v02
- ♦ ANSI C63.4-2003 and ANSI C63.10-2009
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3
- ♦ NOTICE 2012-DRS0126

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.
3. Per the section 2.2.3 of Notice of 2012-DRS0126, " Receivers Excluded from Industry Canada Requirements", only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements.

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).

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		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4	149	5745	159	5795
	151	5755	161	5805
	157	5785	165	5825

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 Peak Output Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	19.84	19.82	19.43	19.46
CH 06	2437 MHz	19.78	19.76	19.48	19.64
CH 11	2462 MHz	19.87	19.85	19.49	19.61

Channel	Frequency	2.4GHz 802.11g RF Peak Output 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	22.26	22.24	22.18	22.19	22.22	22.18	21.93	21.85
CH 06	2437 MHz	22.38	22.34	22.32	22.29	22.25	22.21	21.93	21.94
CH 11	2462 MHz	21.52	21.48	21.46	21.44	21.37	21.42	21.37	21.42

Channel	Frequency	2.4GHz 802.11n HT20 RF Peak Output Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	22.31	22.29	22.26	22.23	22.26	22.18	21.96	21.62
CH 06	2437 MHz	22.33	22.32	22.27	22.23	22.18	22.08	21.95	21.55
CH 11	2462 MHz	21.51	21.49	21.47	21.41	21.46	21.36	21.34	21.40



Channel	Frequency	5GHz 802.11a RF Peak Output Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH149	5745 MHz	19.77	19.72	19.69	19.73	19.65	19.53	19.48	19.41
CH157	5785 MHz	19.62	19.58	19.52	19.49	19.46	19.23	18.96	18.88
CH165	5825 MHz	19.24	19.18	19.11	19.02	18.97	18.88	18.74	18.66

Channel	Frequency	5GHz 802.11n HT20 RF Peak Output Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH149	5745 MHz	19.86	19.70	19.67	19.66	19.53	19.62	19.42	19.10
CH157	5785 MHz	19.57	19.51	19.48	19.41	19.35	19.13	19.09	18.76
CH165	5825 MHz	19.14	19.08	19.04	18.96	19.02	18.95	18.84	18.32



2.3 Test Mode

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

<2.4GHz>

Test Cases				
	Test Items	Mode	Data Rate	Test Channel
Conducted TCs	6dB and 99% 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



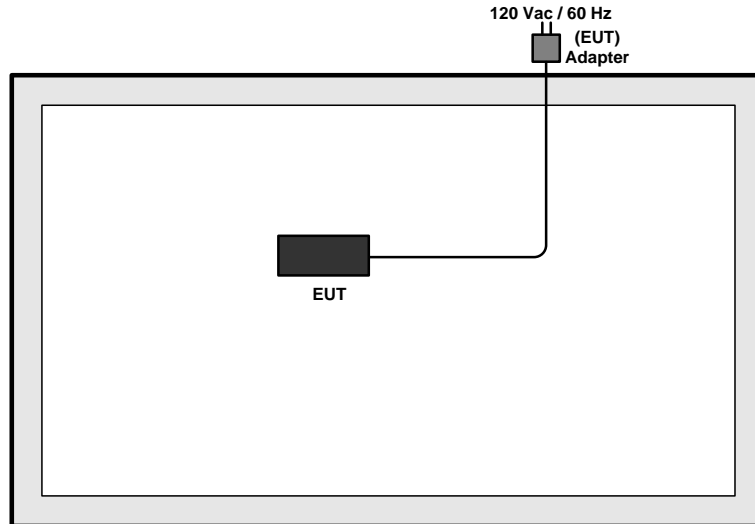
<5GHz>

Test Cases				
	Test Items	Mode	Data Rate	Test Channel
Conducted TCs	6dB and 99% BW Power Spectral Density	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165
	Output Power	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165
	Conducted Band Edge	802.11a	6 Mbps	149/165
		802.11n HT20	6.5 Mbps	149/165
	Conducted Spurious Emission	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	149/165
		802.11n HT20	6.5 Mbps	149/165
	Radiated Spurious Emission	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165

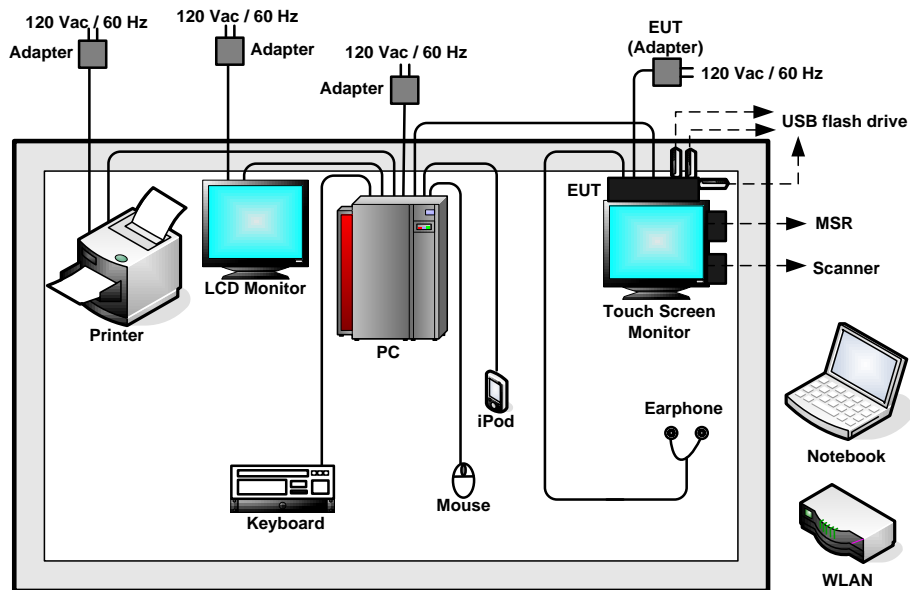
Test Cases	
AC Conducted Emission	Mode 1 : WLAN Link + Bluetooth Link + MSR (Barcode Scanner) + Scanner (Touch Screen) + MPEG4 + Earphone (Audio In) + Camera (Video) + SD Card (Data Copy) + USB flash drive (Data Copy) + RJ45 Load

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.	AP	BUFFALO	WHR-HP-G54	FDI-09101577-0	N/A	N/A
2.	Bluetooth Earphone	NOKIA	BH-102	PYAHS-107W	N/A	N/A
3.	PC	DELL	DCTA	FCC DoC	N/A	Unshielded, 1.8 m
4.	PC	ASUS	AS-D795	FCC DoC	N/A	Unshielded, 1.8 m
5.	LCD Monitor	DELL	2410f	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	Touch Screen Monitor	PLANAR	PX2230MW	FCC DoC	D-Shielded, 1.5m	Braid-Shielded, 0.3m
7.	CRT Monitor	SONY	GDM-17SE2T	AK8GDM17SE2T	D-Shielded, 1.15m	Unshielded, 1.8 m
8.	Printer	EPSON	C2642A	B94C2642X	Shielded, 1.8 m	Unshielded, 1.8 m
9.	(USB) Keyboard	DELL	SK-8175	FCC DoC	AL-F-Shielded, 1.8m	N/A
10.	(PS2) Keyboard	COMPAQ	6511-VA	FCC DoC	AL-F-Shielded, 1.6m	N/A
11.	USB Mouse	DELL	MOC5UO	FCC DoC	AL-F-Shielded, 1.85m	N/A
12.	Mouse	COMPAQ	M-S69	FCC DoC	AL-F-Shielded, 1.7m	N/A
13.	iPod	APPLE	A1137	FCC DoC	D-Shielded, 1.0m	N/A
14.	Earphone	Tsannkuen 3C	MIC03	N/A	Unshielded, 1.8 m	N/A
15.	USB Dongle	D-Link	DWL-G132	KA2DWLG132A1	N/A	N/A
16.	MSR	Motorola	IDRE-335133B	FCC DoC	D-Shielded, 1.9m	N/A
17.	Scanner	Motorola	CCSCN1	N/A	D-Shielded, 2m	N/A
18.	USB flash drive	Transcend	8G	N/A	N/A	N/A
19.	SD Card	SanDisk	32G	N/A	N/A	N/A
20.	IC Card	TAIWAN COOPERATIVE BANK	ATM Card	N/A	N/A	N/A



2.6 Description of RF Function Operation Test Setup

The programmed RF utility "AT Command" is installed in notebook make the EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

2.7 Measurement Results Explanation Example

For all conducted test items:

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

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

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

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

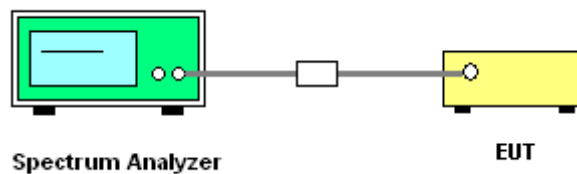
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v02.
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. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
For 99% Bandwidth measurement, the RBW=30kHz, and VBW \geq RBW. Sweep = auto ;
Detector function = sample. Trace = max hold.
6. 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 :	24~26°C
Test Engineer :	Book Lin	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	9.54	0.5	Pass
11	2462	9.08	0.5	Pass

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.10	0.5	Pass
06	2437	15.12	0.5	Pass
11	2462	15.12	0.5	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.74	0.5	Pass
06	2437	15.12	0.5	Pass
11	2462	17.76	0.5	Pass



Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11a 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
149	5745	15.10	0.5	Pass
157	5785	15.14	0.5	Pass
165	5825	15.14	0.5	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	5GHz 802.11n HT20 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
149	5745	15.10	0.5	Pass
157	5785	15.14	0.5	Pass
165	5825	15.14	0.5	Pass

3.1.6 Test Result of 99% Occupied Bandwidth

Test Mode :	802.11b	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	14.10	Pass
06	2437	14.20	Pass
11	2462	14.25	Pass

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	17.65	Pass
06	2437	17.90	Pass
11	2462	17.60	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 99% Occupied Bandwidth (MHz)	Pass/Fail
01	2412	19.50	Pass
06	2437	18.95	Pass
11	2462	19.45	Pass



Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11a 99% Occupied Bandwidth (MHz)	Pass/Fail
149	5745	17.70	Pass
157	5785	17.50	Pass
165	5825	17.70	Pass

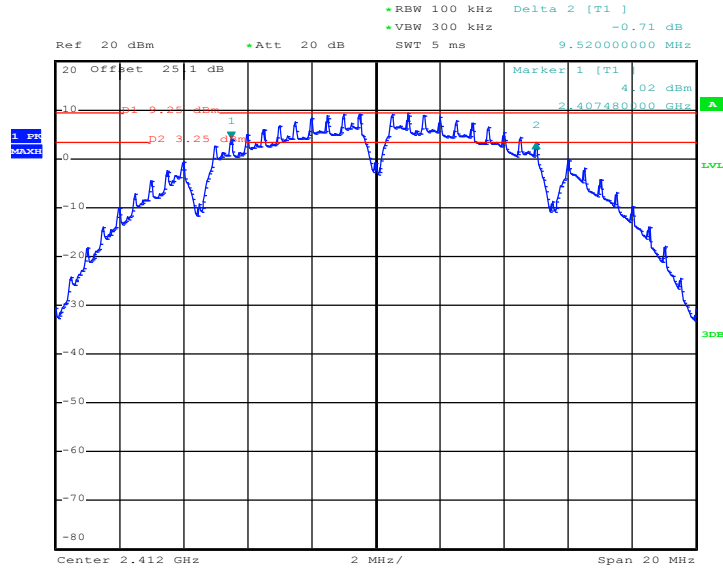
Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	5GHz 802.11n HT20 99% Occupied Bandwidth (MHz)	Pass/Fail
149	5745	18.70	Pass
157	5785	18.70	Pass
165	5825	18.75	Pass



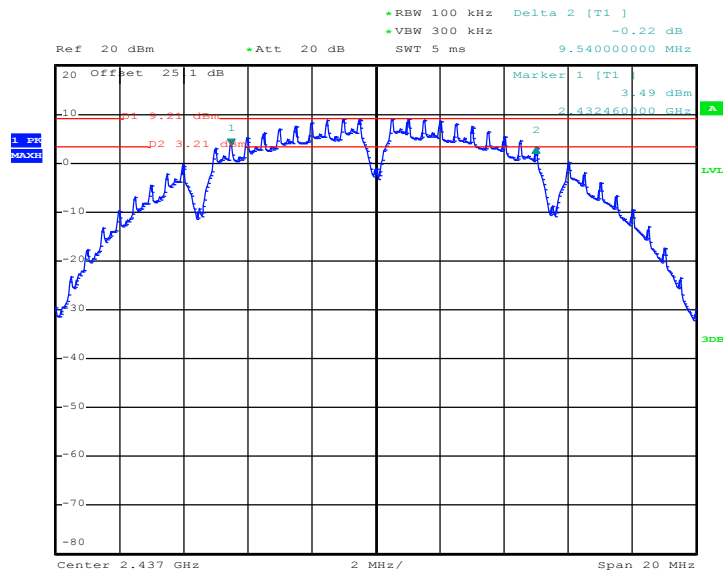
3.1.7 Test Result of 6dB Bandwidth Plots

6 dB Bandwidth Plot on 802.11b Channel 01



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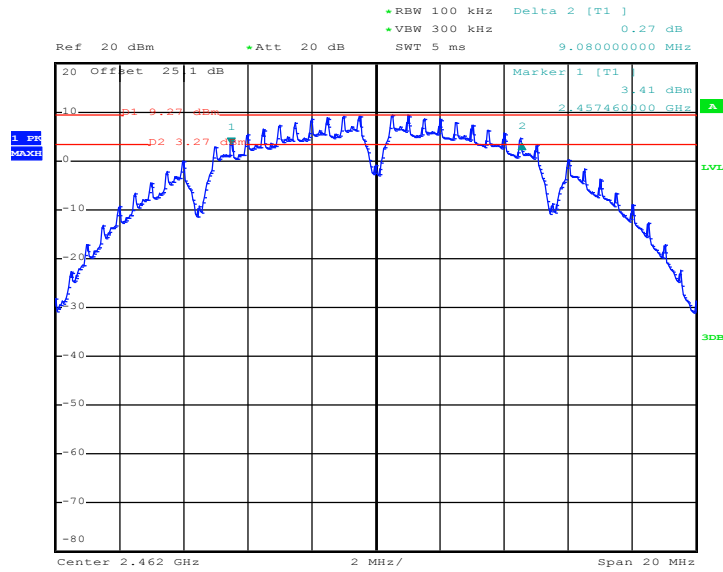
6 dB Bandwidth Plot on 802.11b Channel 06



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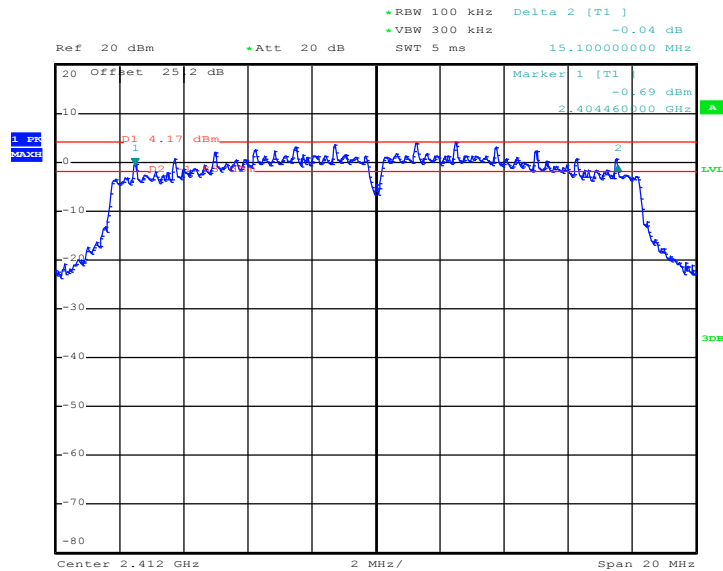


6 dB Bandwidth Plot on 802.11b Channel 11



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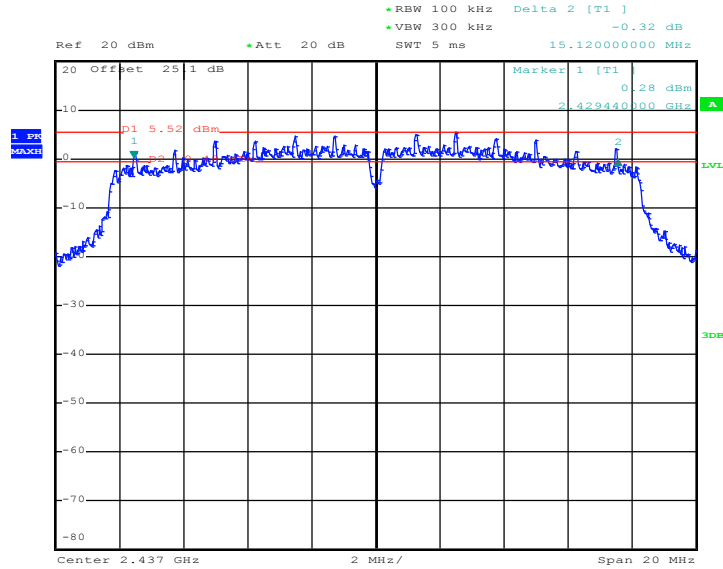
6 dB Bandwidth Plot on 802.11g Channel 01



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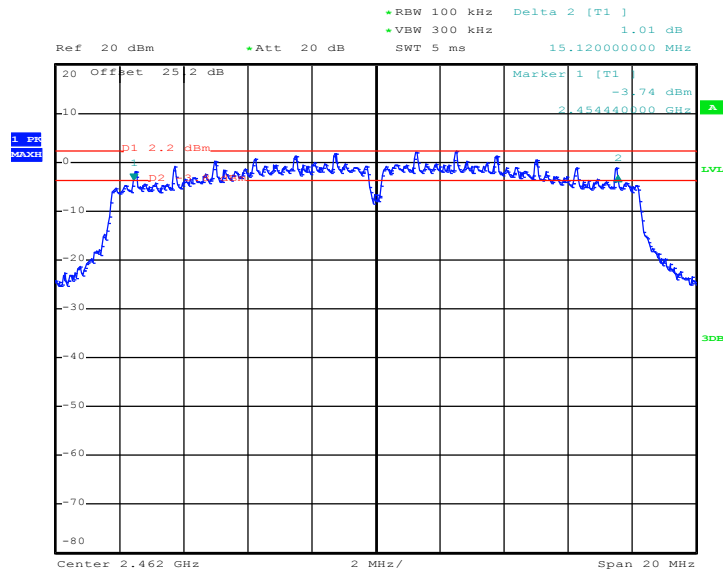


6 dB Bandwidth Plot on 802.11g Channel 06



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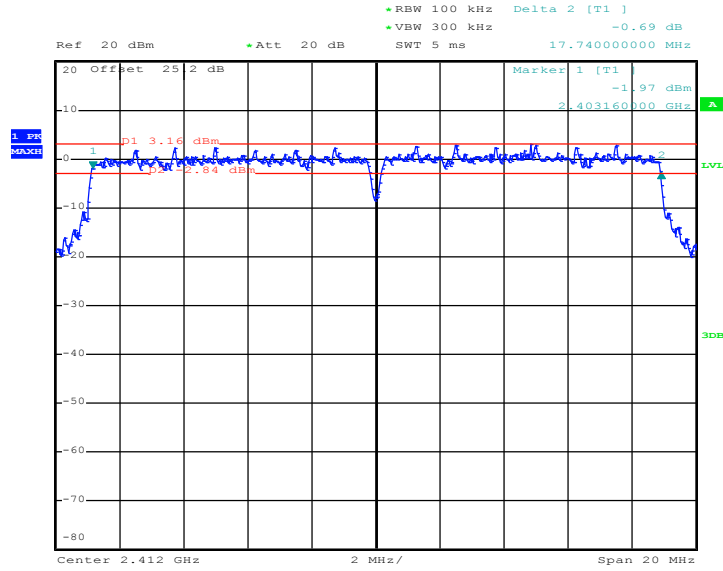
6 dB Bandwidth Plot on 802.11g Channel 11



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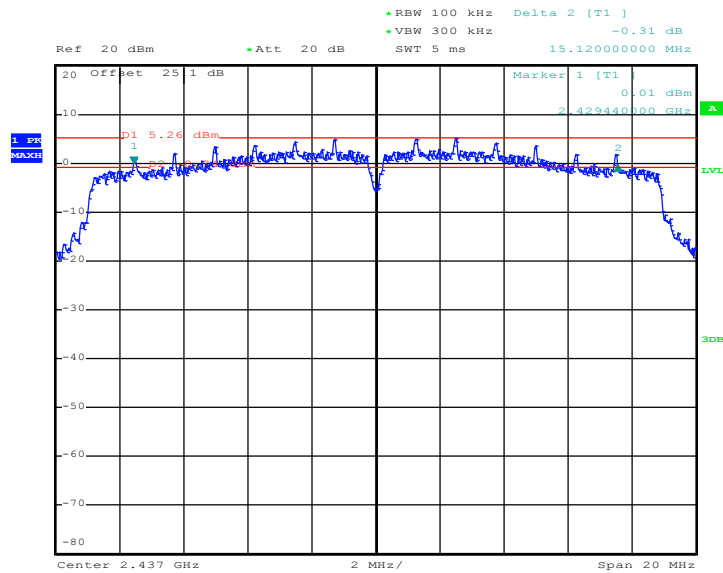


6 dB Bandwidth Plot on 2.4GHz 802.11n HT20 Channel 01



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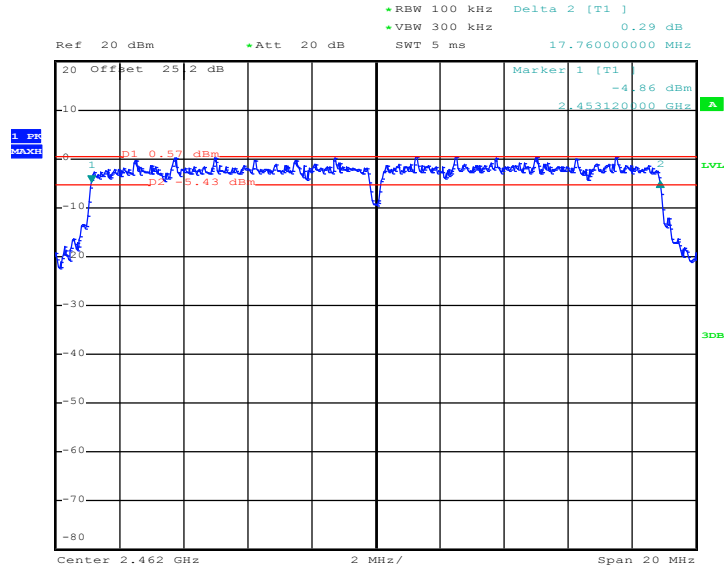
6 dB Bandwidth Plot on 2.4GHz 802.11n HT20 Channel 06



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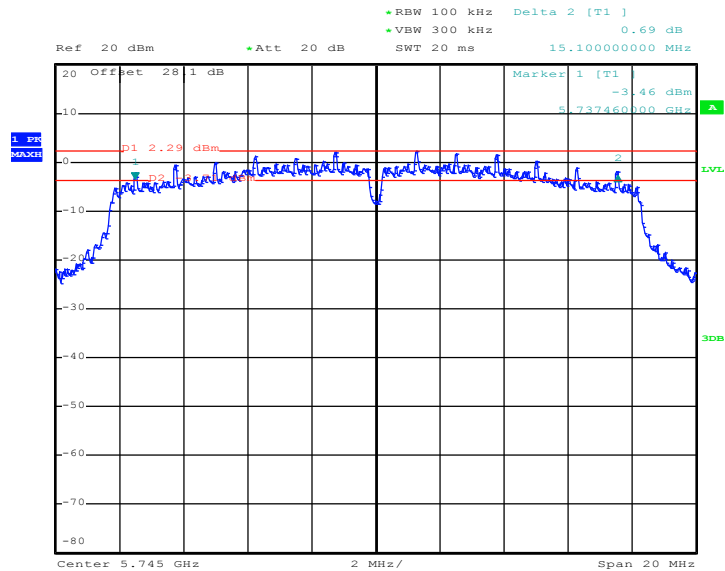


6 dB Bandwidth Plot on 2.4GHz 802.11n HT20 Channel 11



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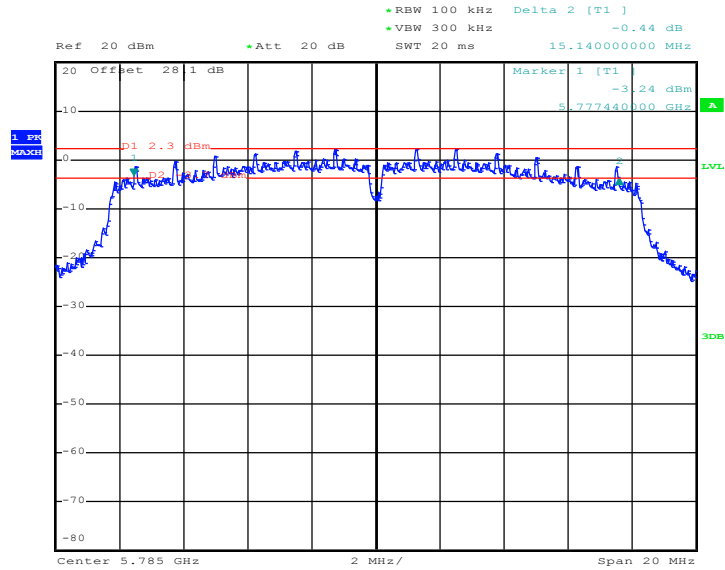
6 dB Bandwidth Plot on 802.11a Channel 149



Date: 20.DEC.2012 21:45:12

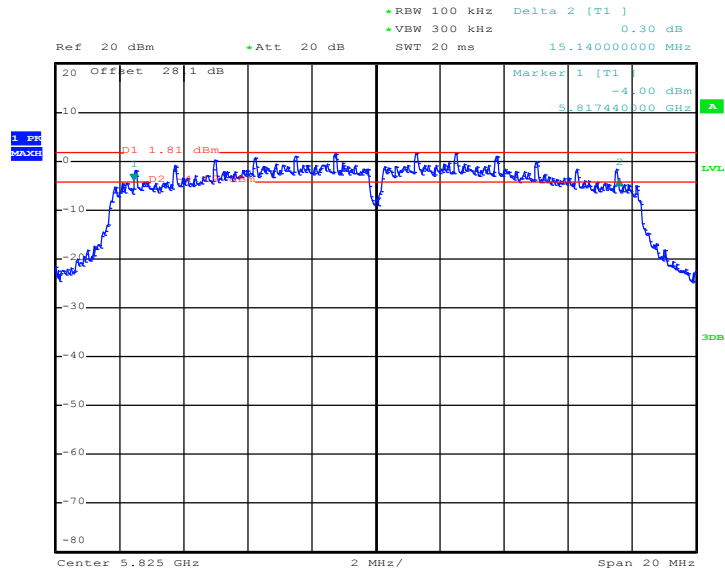


6 dB Bandwidth Plot on 802.11a Channel 157



Date: 20.DEC.2012 21:49:06

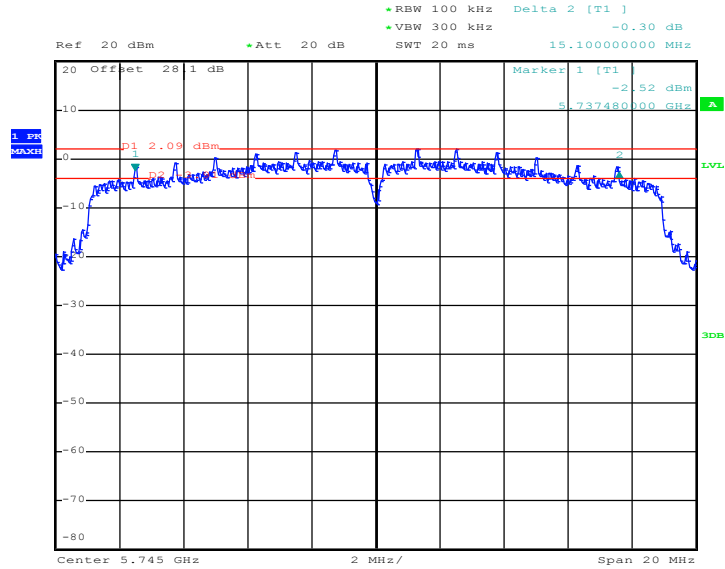
6 dB Bandwidth Plot on 802.11a Channel 165



Date: 20.DEC.2012 21:54:25

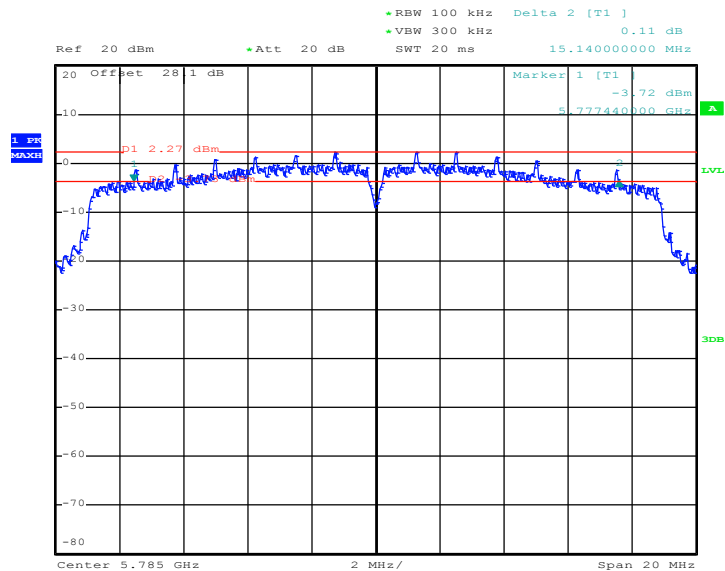


6 dB Bandwidth Plot on 5GHz 802.11n HT20 Channel 149



Date: 20.DEC.2012 22:06:10

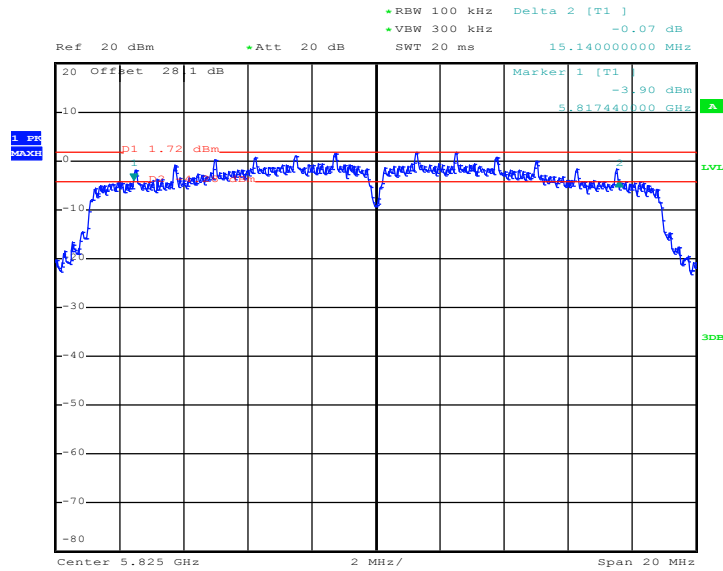
6 dB Bandwidth Plot on 5GHz 802.11n HT20 Channel 157



Date: 20.DEC.2012 22:03:03



6 dB Bandwidth Plot on 5GHz 802.11n HT20 Channel 165

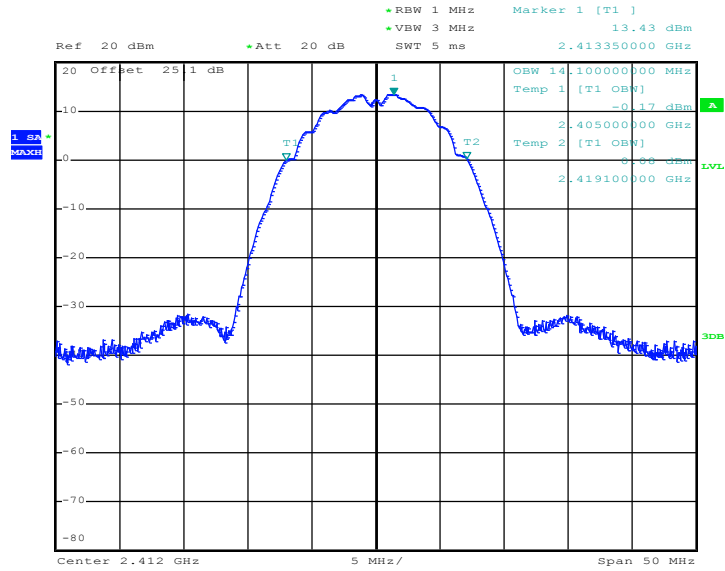


Date: 20.DEC.2012 21:59:37



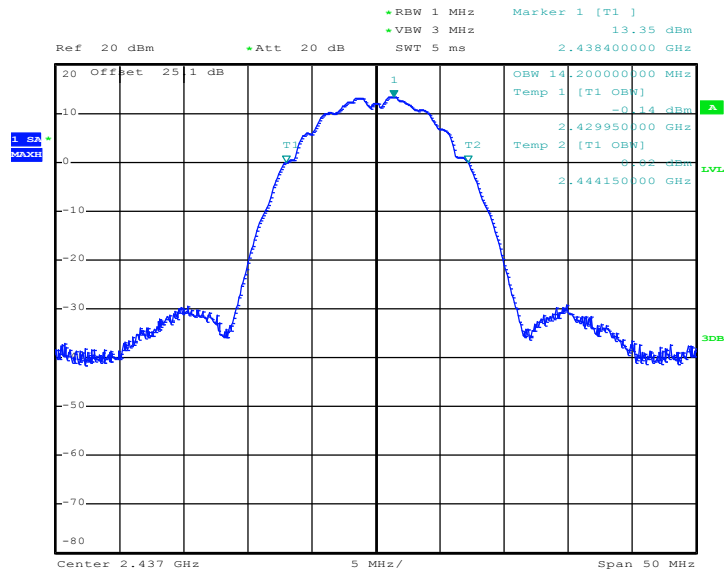
3.1.8 Test Result of 99% Bandwidth Plots

99% Occupied Bandwidth Plot on 802.11b Channel 01



Date: 20.DEC.2012 20:36:05

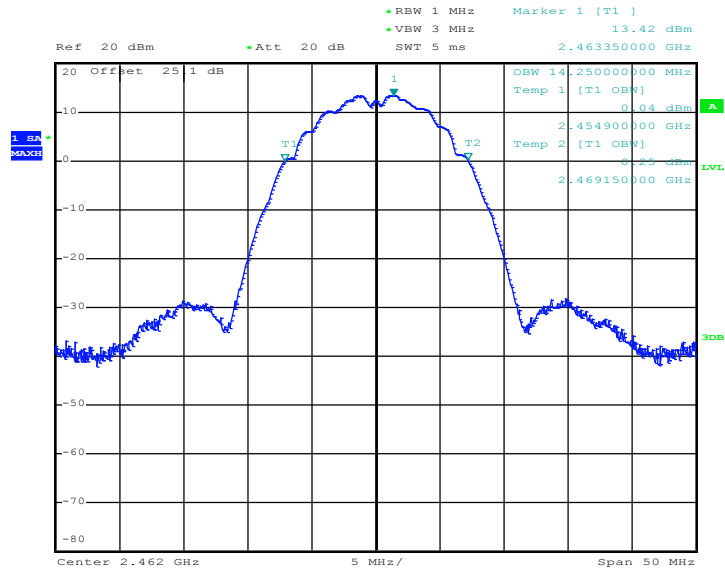
99% Occupied Bandwidth Plot on 802.11b Channel 06



Date: 20.DEC.2012 20:41:35

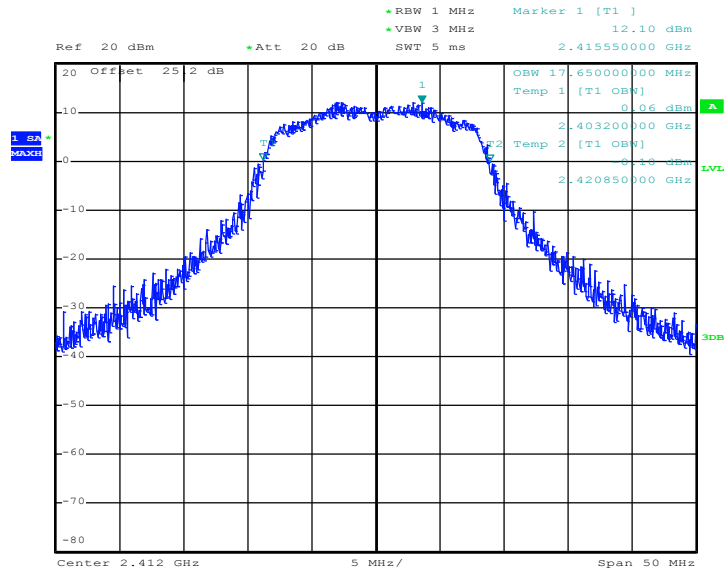


99% Occupied Bandwidth Plot on 802.11b Channel 11



Date: 20.DEC.2012 20:50:24

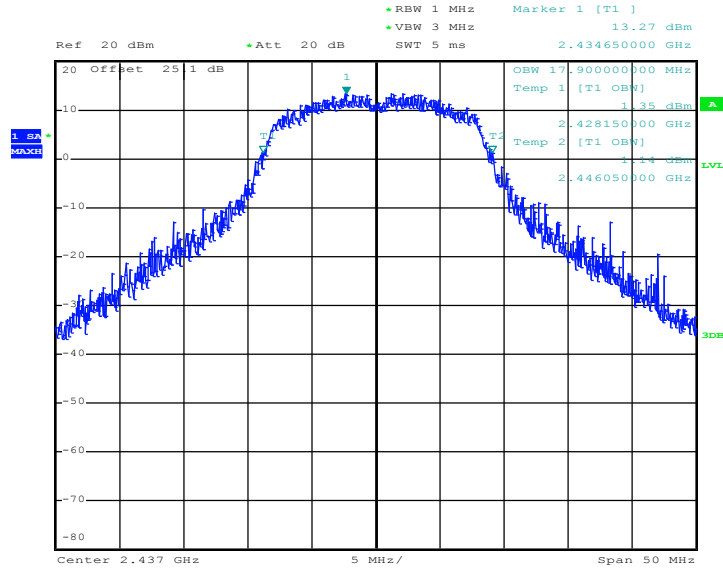
99% Occupied Bandwidth Plot on 802.11g Channel 01



Date: 24.DEC.2012 21:26:59

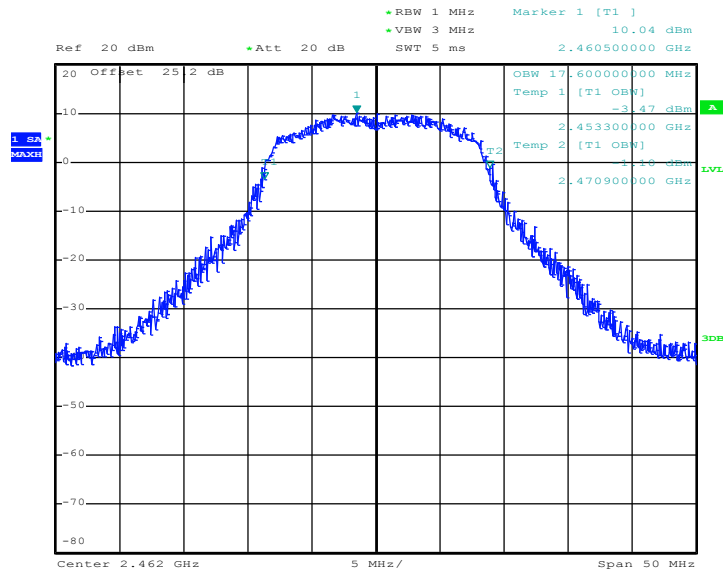


99% Occupied Bandwidth Plot on 802.11g Channel 06



Date: 20.DEC.2012 20:59:28

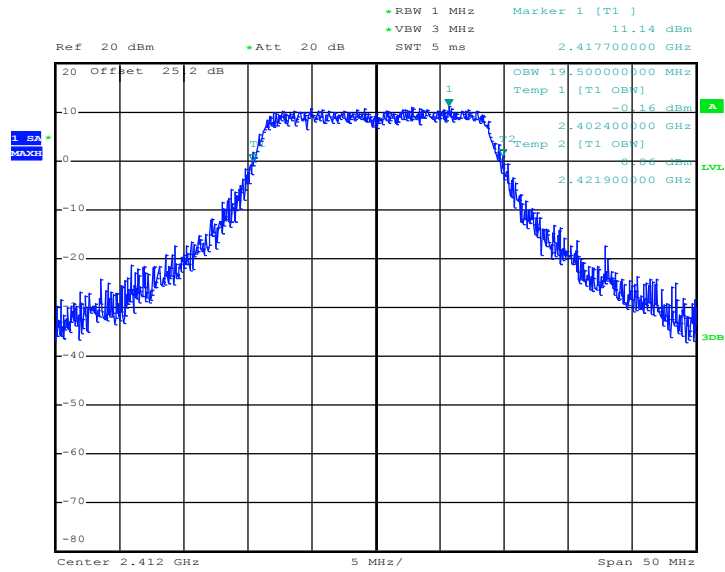
99% Occupied Bandwidth Plot on 802.11g Channel 11



Date: 24.DEC.2012 21:30:17

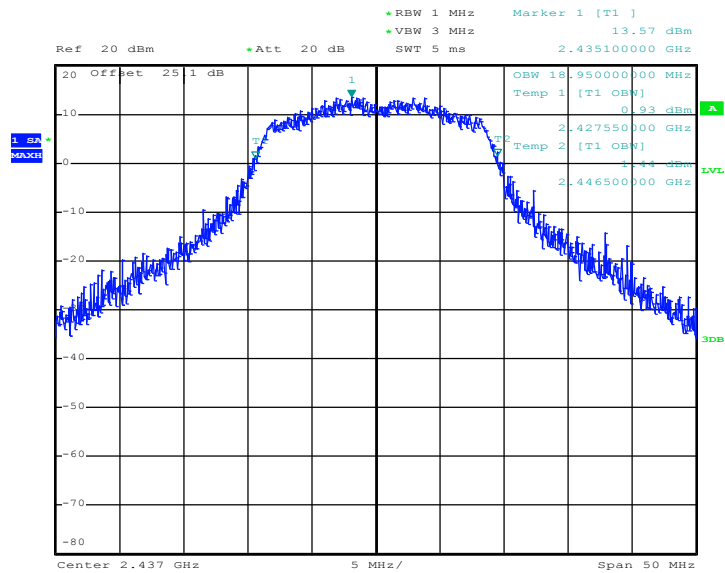


99% Occupied Bandwidth Plot on 2.4GHz 802.11n HT20 Channel 01



Date: 24.DEC.2012 21:37:10

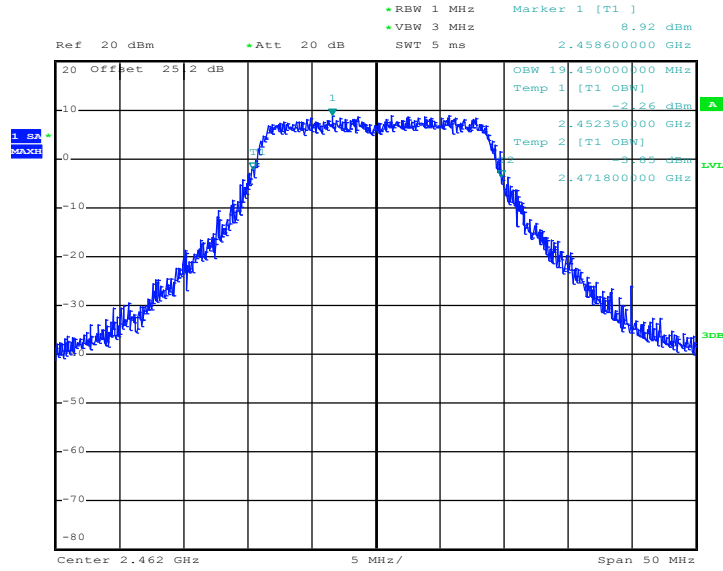
99% Occupied Bandwidth Plot on 2.4GHz 802.11n HT20 Channel 06



Date: 20.DEC.2012 21:11:34

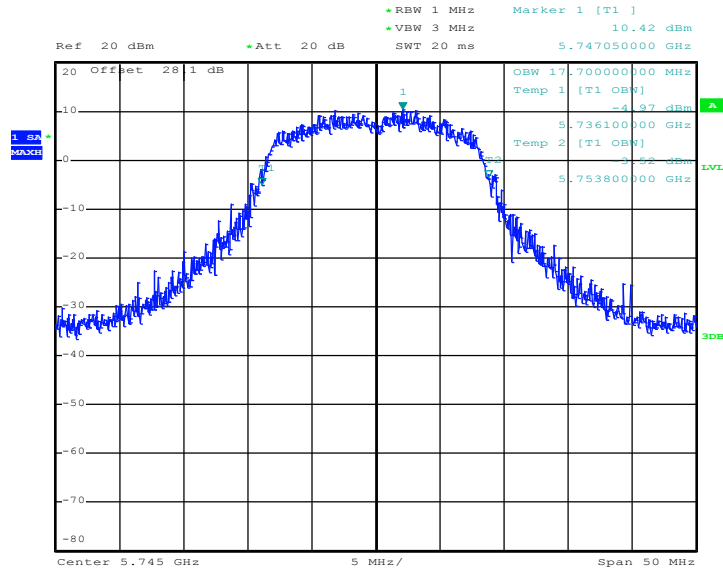


99% Occupied Bandwidth Plot on 2.4GHz 802.11n HT20 Channel 11



Date: 24.DEC.2012 21:34:02

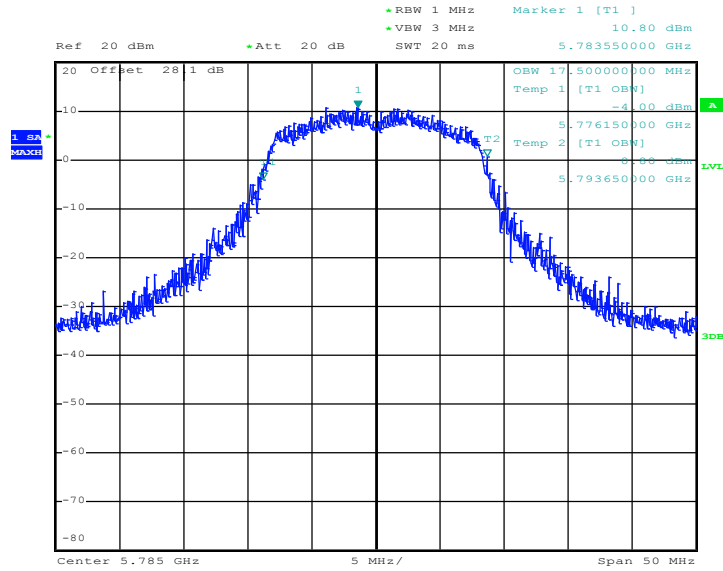
99% Occupied Bandwidth Plot on 802.11a Channel 149



Date: 20.DEC.2012 21:46:44

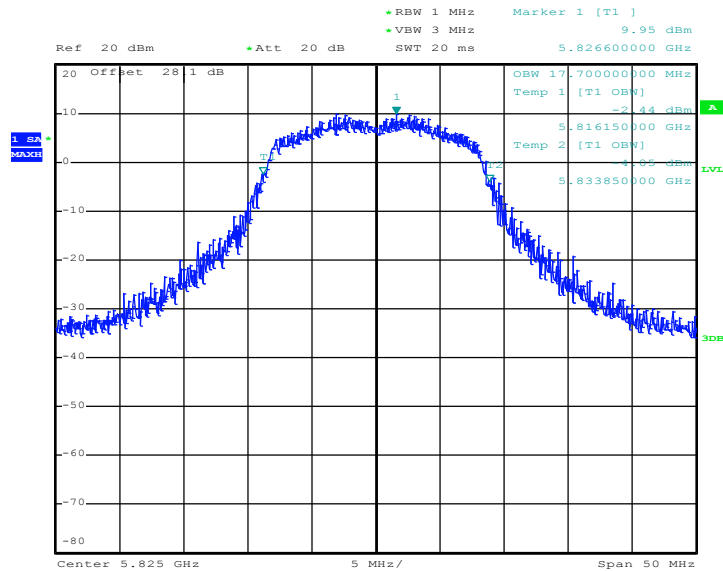


99% Occupied Bandwidth Plot on 802.11a Channel 157



Date: 20.DEC.2012 21:50:25

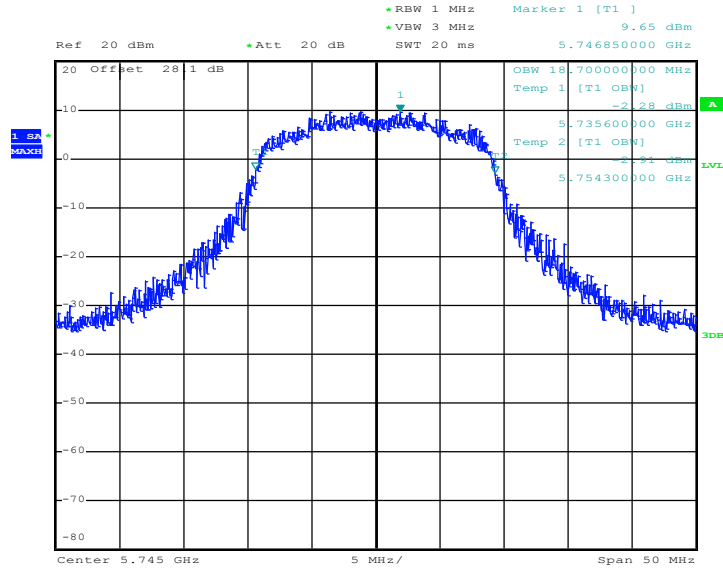
99% Occupied Bandwidth Plot on 802.11a Channel 165



Date: 20.DEC.2012 21:55:57

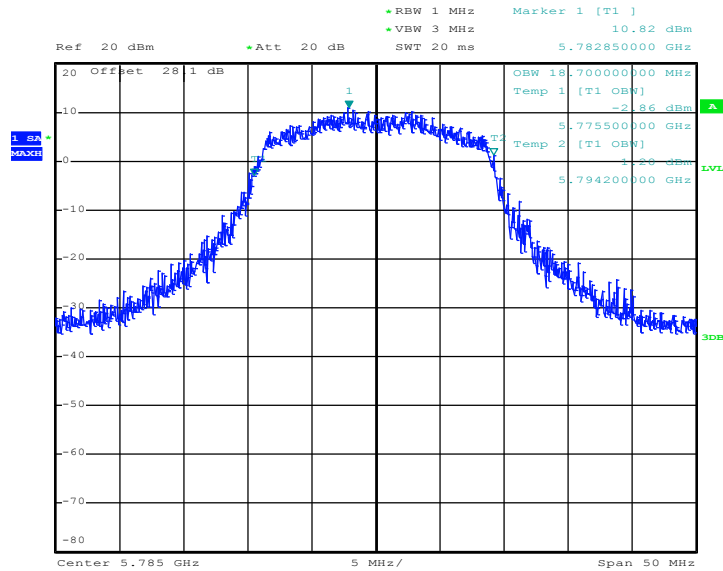


99% Occupied Bandwidth Plot on 5GHz 802.11n HT20 Channel 149



Date: 20.DEC.2012 22:07:42

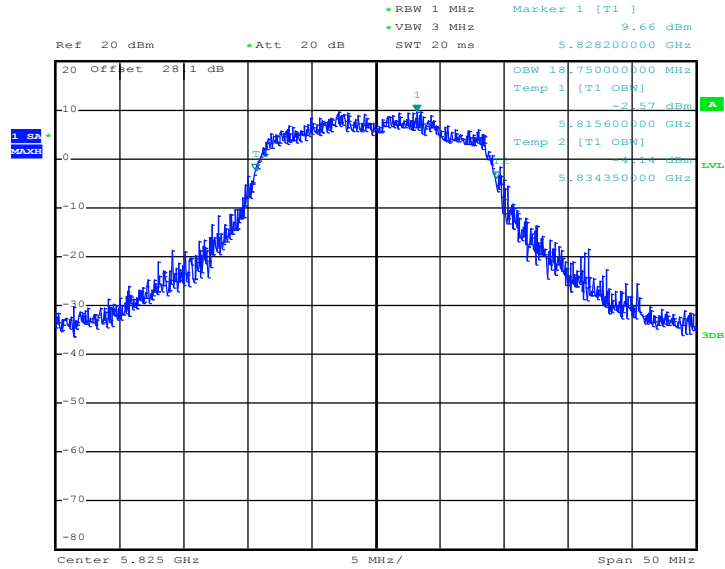
99% Occupied Bandwidth Plot on 5GHz 802.11n HT20 Channel 157



Date: 20.DEC.2012 22:04:23



99% Occupied Bandwidth Plot on 5GHz 802.11n HT20 Channel 165



Date: 20.DEC.2012 22:01:09

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz and 5725-5850MHz, 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.

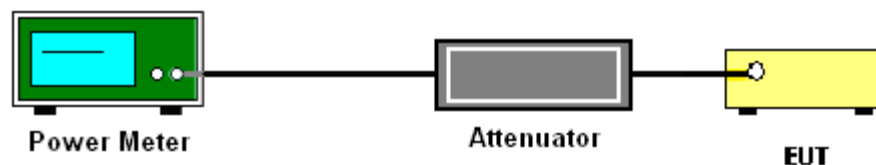
3.2.2 Measuring Instruments

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 v02.
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 :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	19.84	30	Pass
06	2437	19.78	30	Pass
11	2462	19.87	30	Pass

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.26	30	Pass
06	2437	22.38	30	Pass
11	2462	21.52	30	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.31	30	Pass
06	2437	22.33	30	Pass
11	2462	21.51	30	Pass



Test Mode :	802.11 a	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11a Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
149	5745	19.77	30	Pass
157	5785	19.62	30	Pass
165	5825	19.24	30	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	5GHz 802.11n HT20 Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
149	5745	19.86	30	Pass
157	5785	19.57	30	Pass
165	5825	19.14	30	Pass



3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	802.11b	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%
Duty Cycle:	100%	Duty Factor:	0.00dB

Channel	Frequency (MHz)	802.11b Average Output Power (dBm)
01	2412	17.54
06	2437	17.74
11	2462	17.76

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%
Duty Cycle:	98.57%	Duty Factor:	0.06dB

Channel	Frequency (MHz)	802.11g Average Output Power (dBm)
01	2412	14.49
06	2437	15.65
11	2462	12.80

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%
Duty Cycle:	98.19%	Duty Factor:	0.08dB

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 Average Output Power (dBm)
01	2412	14.27
06	2437	15.60
11	2462	12.12



Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%
Duty Cycle:	98.57%	Duty Factor:	0.06dB

Channel	Frequency (MHz)	802.11a Average Output Power (dBm)
149	5745	12.25
157	5785	12.03
165	5825	11.92

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%
Duty Cycle:	98.31%	Duty Factor:	0.07dB

Channel	Frequency (MHz)	5GHz 802.11n HT20 Average Output Power (dBm)
149	5745	12.13
157	5785	11.96
165	5825	11.91

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.

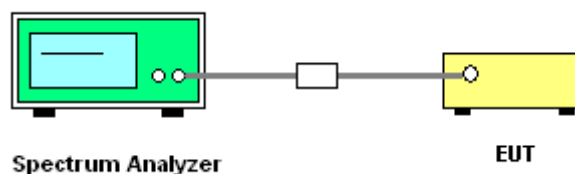
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 9.1 Option 1 of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02
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.
7. The Measured power density (dBm)/ 100KHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup





3.3.5 Test Result of Power Spectral Density

Test Mode :	802.11b	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	8.90	-5.20	8	Pass
06	2437	9.04	-5.43	8	Pass
11	2462	9.05	-5.15	8	Pass

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	4.04	-9.54	8	Pass
06	2437	5.47	-8.63	8	Pass
11	2462	1.92	-11.21	8	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	2.77	-11.94	8	Pass
06	2437	5.19	-8.93	8	Pass
11	2462	0.49	-13.91	8	Pass



Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11a Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
149	5745	2.17	-12.72	8	Pass
157	5785	2.21	-11.07	8	Pass
165	5825	1.66	-11.52	8	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Book Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	5GHz 802.11n HT20 Power Density		Max. Limits (dBm/3KHz)	Pass/Fail
		PSD/100KHz (dBm)	PSD/3KHz (dBm)		
149	5745	2.01	-12.19	8	Pass
157	5785	2.21	-12.39	8	Pass
165	5825	1.67	-13.85	8	Pass

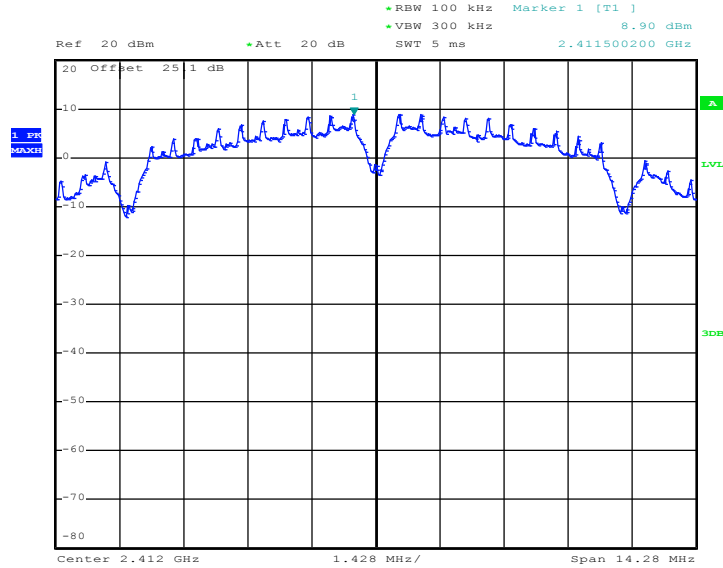
Note:

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.



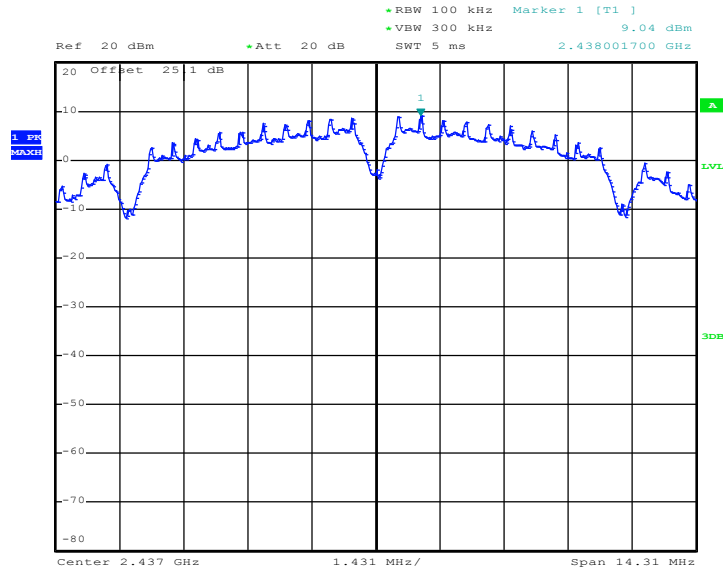
3.3.6 Test Result of Power Spectral Density Plots (100kHz)

PSD 100kHz Plot on 802.11b Channel 01



Date: 20.DEC.2012 20:35:05

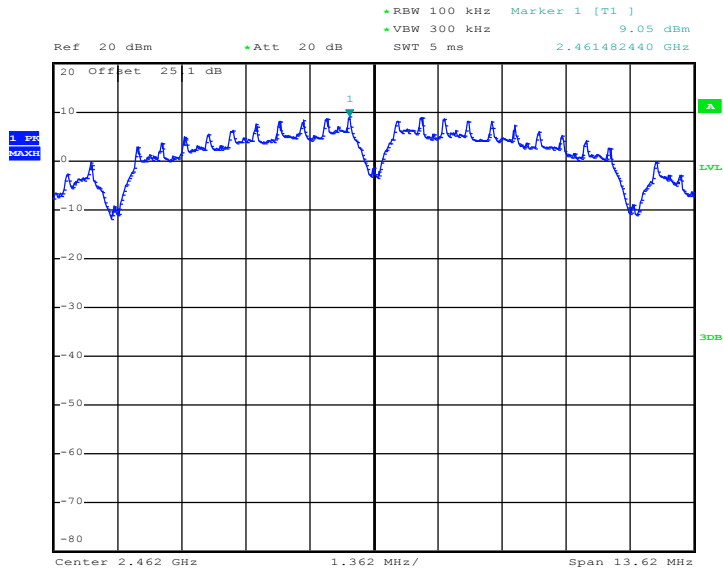
PSD 100kHz Plot on 802.11b Channel 06



Date: 20.DEC.2012 20:40:47

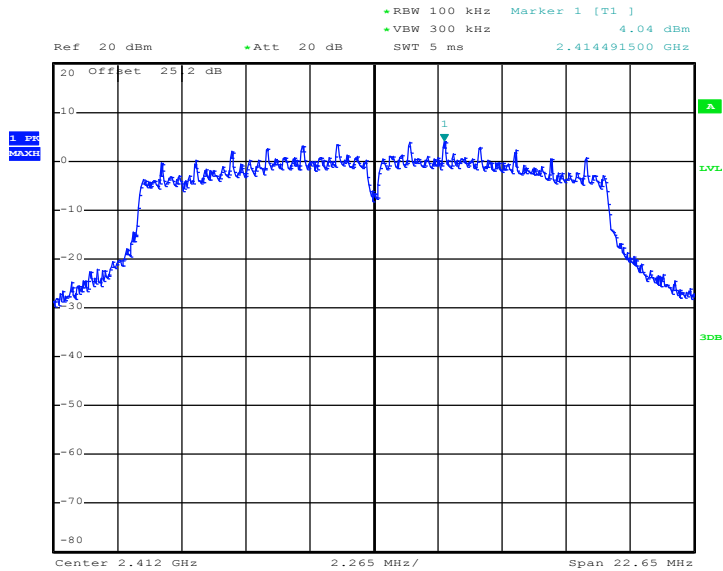


PSD 100kHz Plot on 802.11b Channel 11



Date: 20.DEC.2012 20:49:24

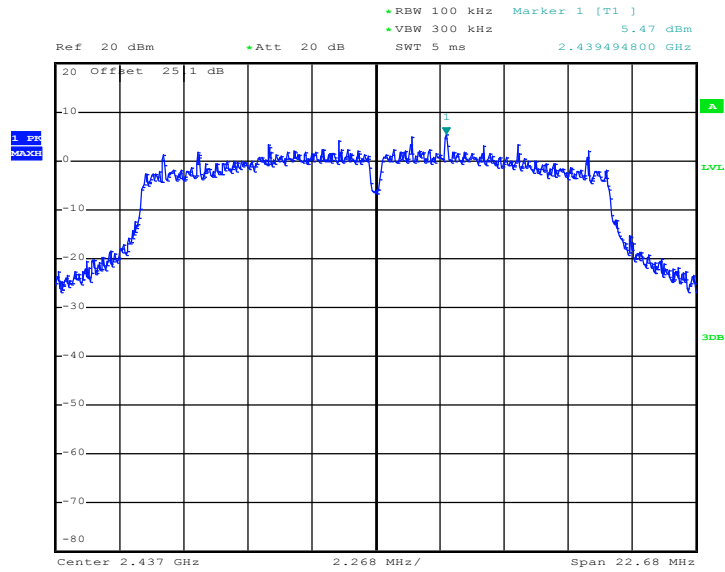
PSD 100kHz Plot on 802.11g Channel 01



Date: 24.DEC.2012 21:25:59

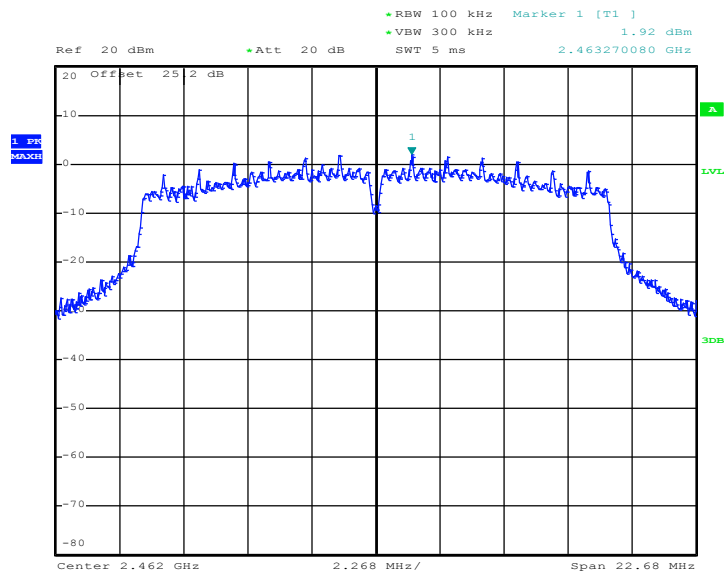


PSD 100kHz Plot 802.11g Channel 06



Date: 20.DEC.2012 20:58:40

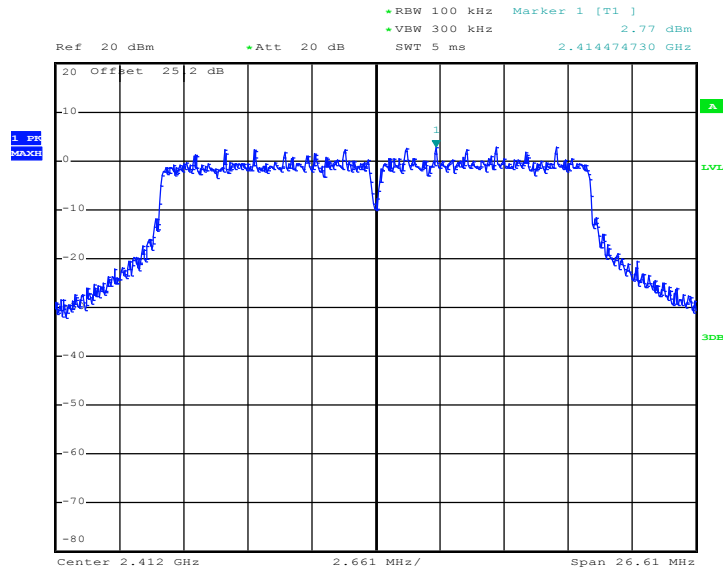
PSD 100kHz Plot 802.11g Channel 11



Date: 24.DEC.2012 21:29:17

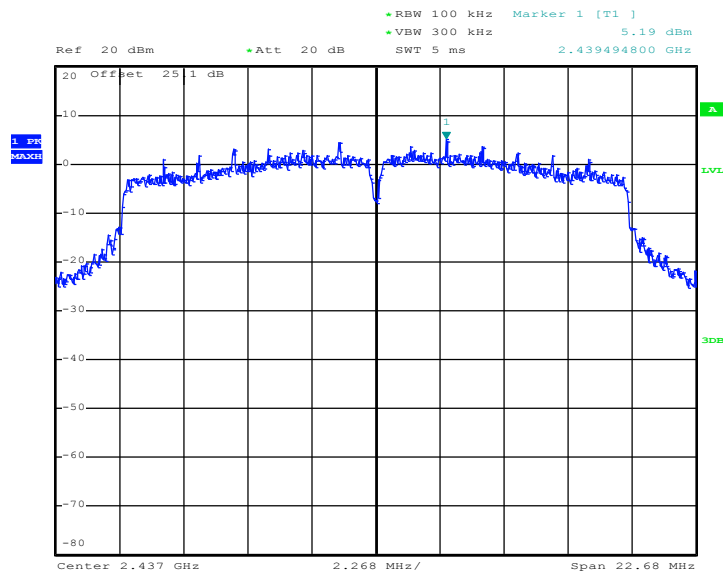


PSD 100kHz Plot on 2.4GHz 802.11n HT20 Channel 01



Date: 24.DEC.2012 21:36:11

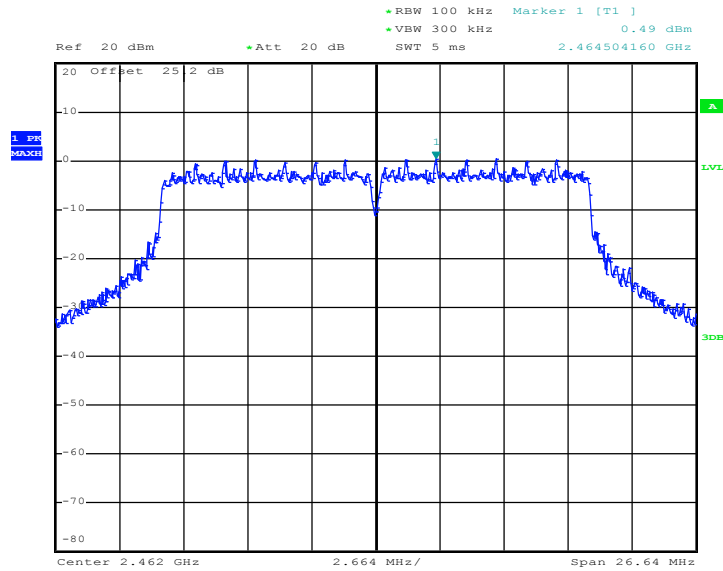
PSD 100kHz Plot on 2.4GHz 802.11n HT20 Channel 06



Date: 20.DEC.2012 21:10:46

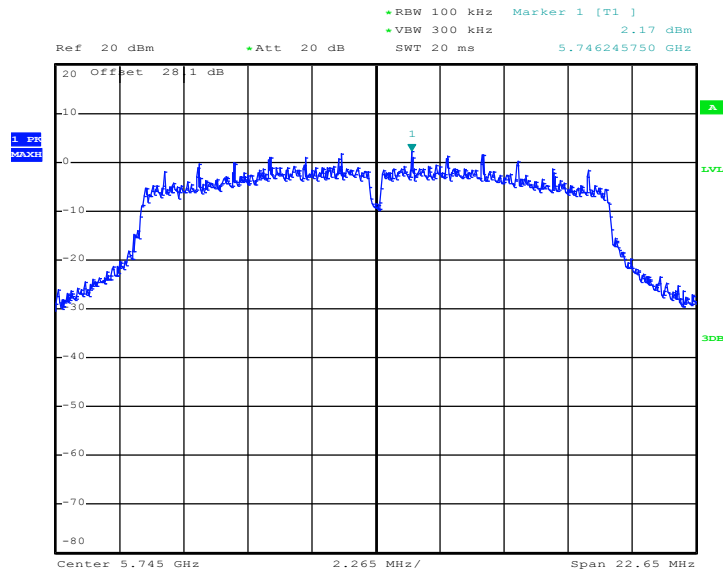


PSD 100kHz Plot on 2.4GHz 802.11n HT20 Channel 11



Date: 24.DEC.2012 21:33:02

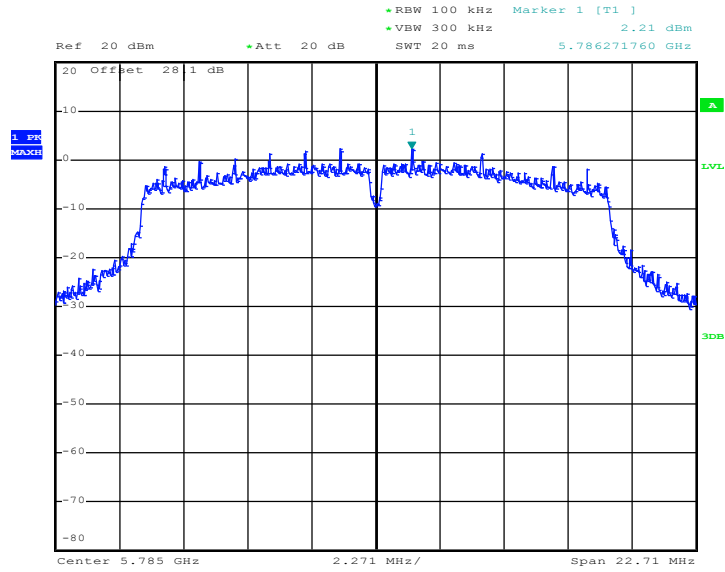
PSD 100kHz Plot on 802.11a Channel 149



Date: 20.DEC.2012 21:45:44

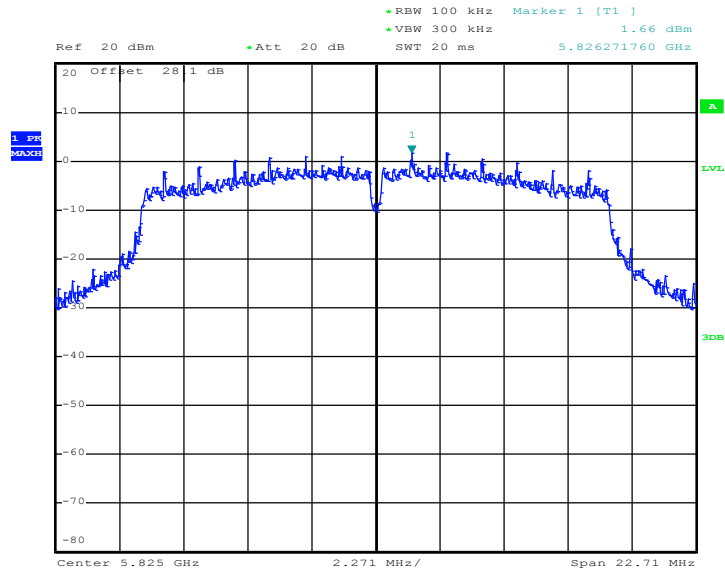


PSD 100kHz Plot on 802.11a Channel 157



Date: 20.DEC.2012 21:49:38

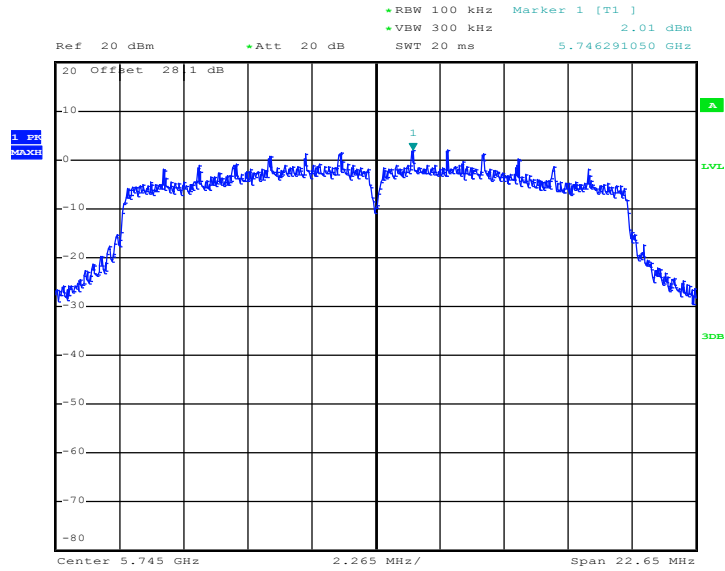
PSD 100kHz Plot on 802.11a Channel 165



Date: 20.DEC.2012 21:54:57

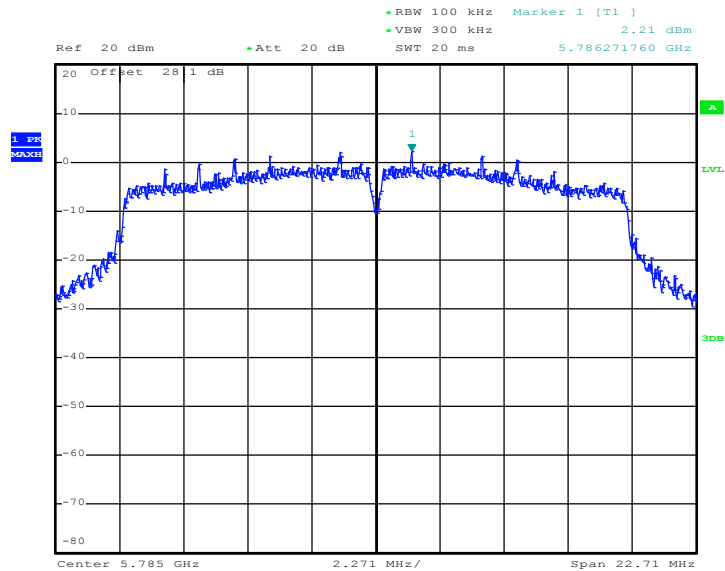


PSD 100kHz Plot on 5GHz 802.11n HT20 Channel 149



Date: 20.DEC.2012 22:06:42

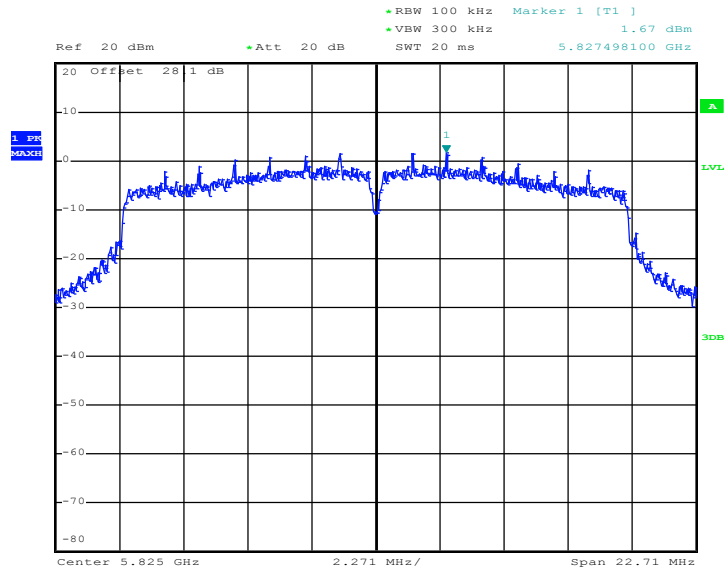
PSD 100kHz Plot on 5GHz 802.11n HT20 Channel 157



Date: 20.DEC.2012 22:03:35



PSD 100kHz Plot on 5GHz 802.11n HT20 Channel 165

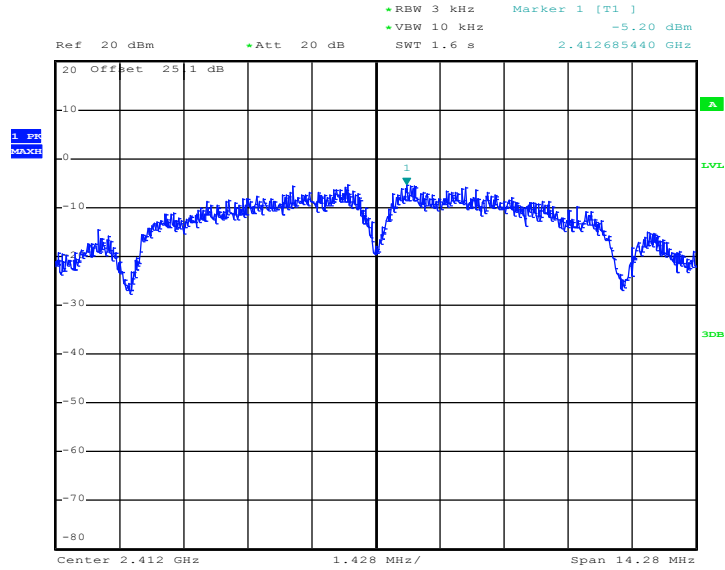


Date: 20.DEC.2012 22:00:09



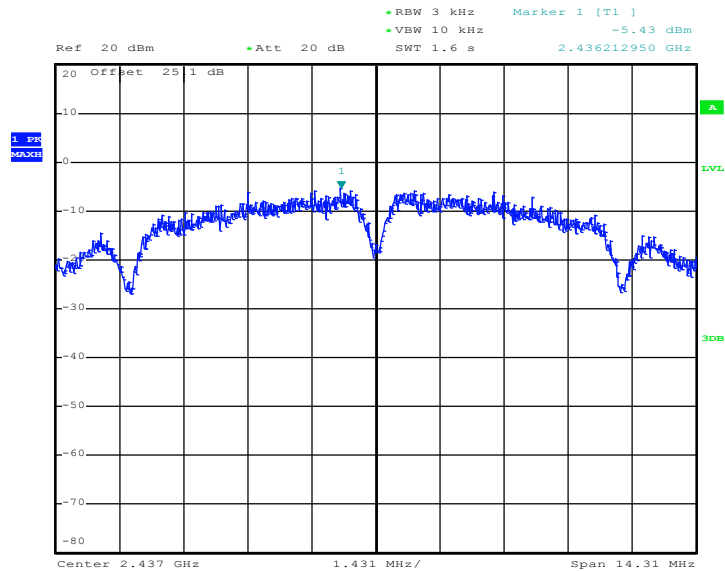
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

PSD 3kHz Plot on 802.11b Channel 01



Date: 20.DEC.2012 20:34:53

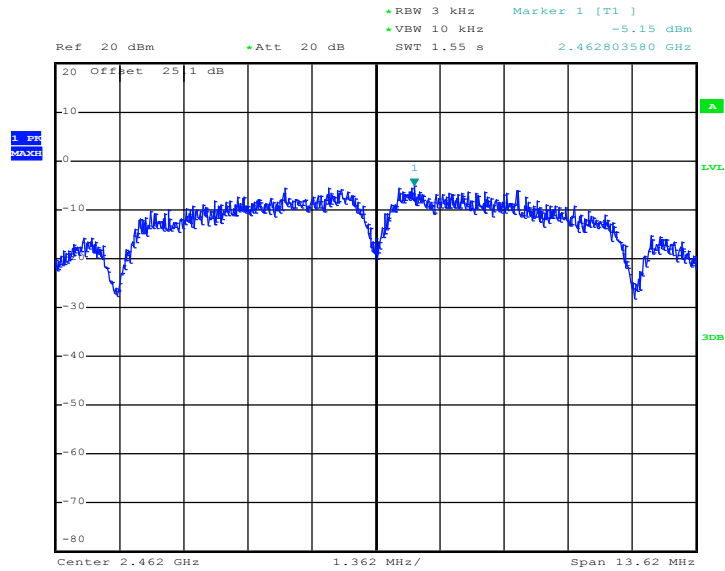
PSD 3kHz Plot on 802.11b Channel 06



Date: 20.DEC.2012 20:40:35

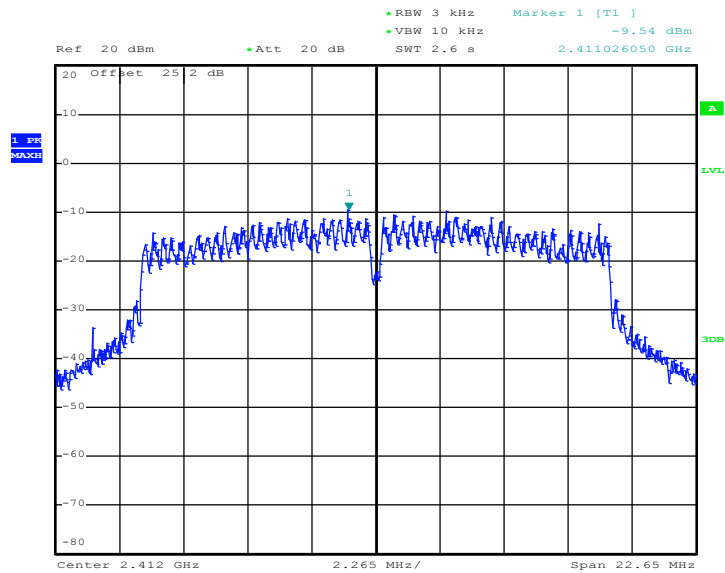


PSD 3kHz Plot on 802.11b Channel 11



Date: 20.DEC.2012 20:49:12

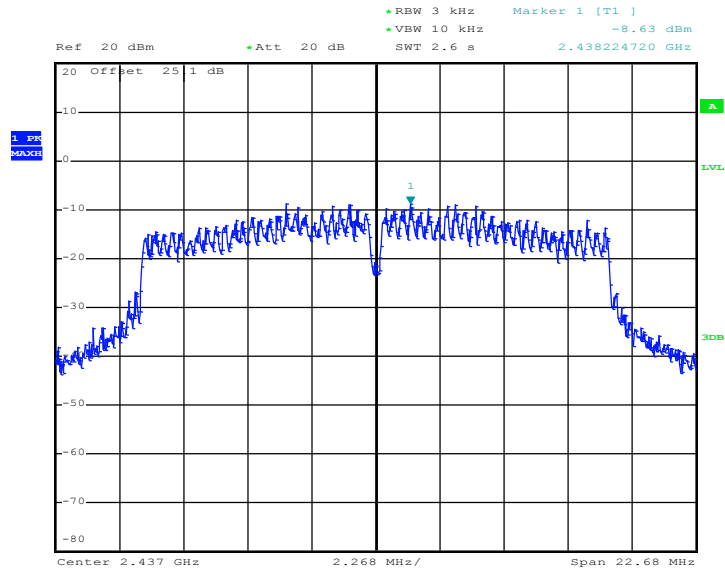
PSD 3kHz Plot on 802.11g Channel 01



Date: 24.DEC.2012 21:25:47

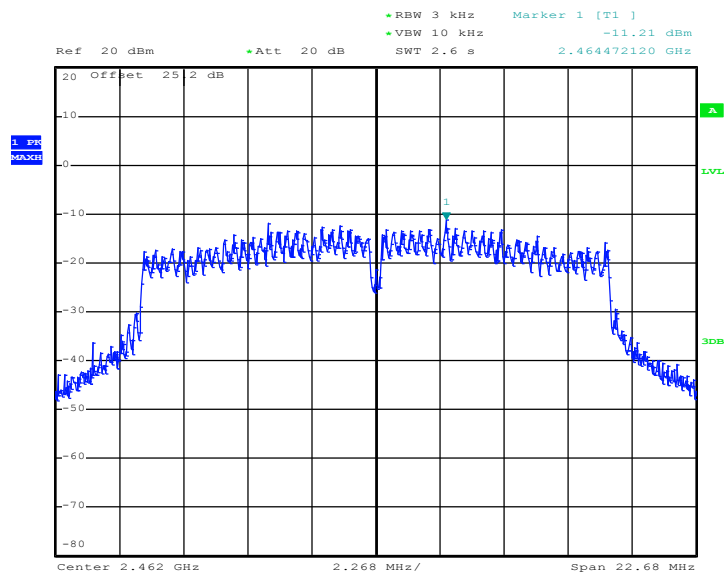


PSD 3kHz Plot on 802.11g Channel 06



Date: 20.DEC.2012 20:58:28

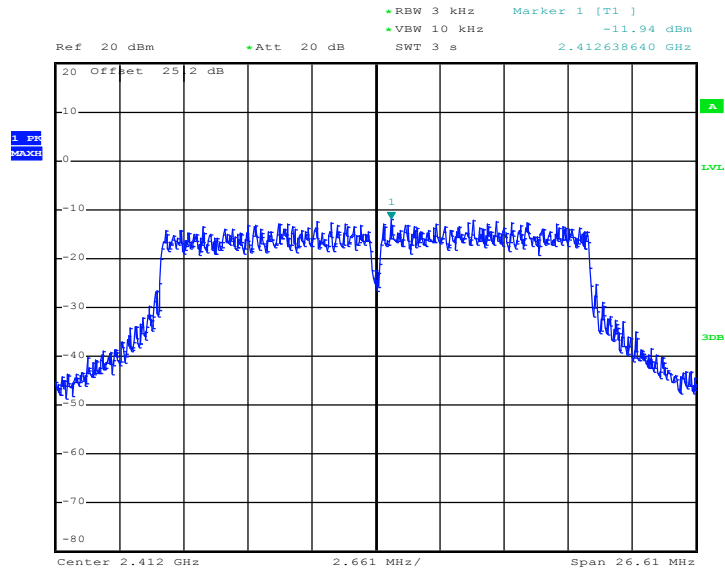
PSD 3kHz Plot on 802.11g Channel 11



Date: 24.DEC.2012 21:29:05

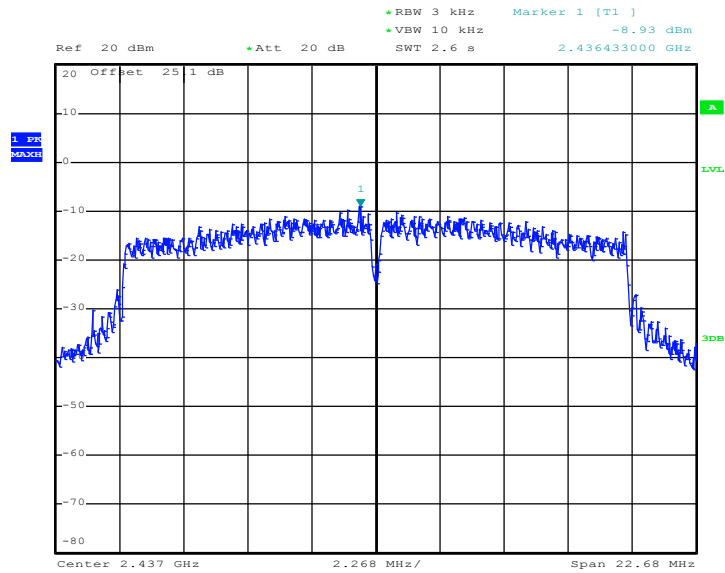


PSD 3kHz Plot on 2.4GHz 802.11n HT20 Channel 01



Date: 24.DEC.2012 21:35:58

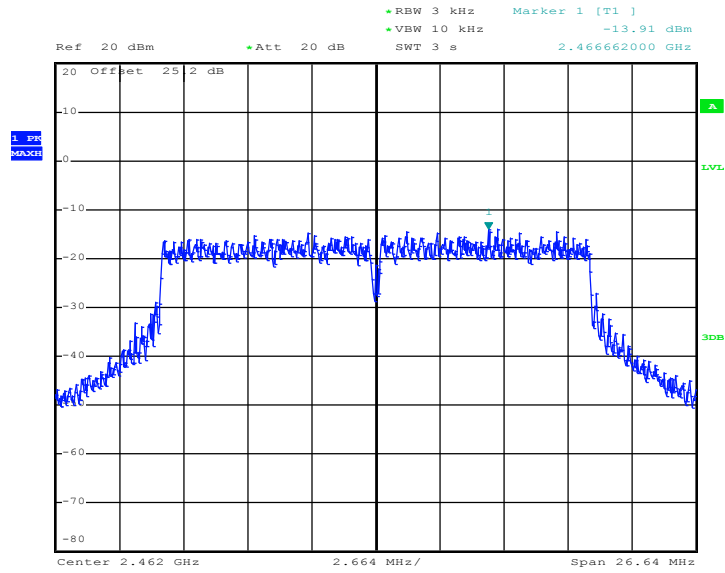
PSD 3kHz Plot on 2.4GHz 802.11n HT20 Channel 06



Date: 20.DEC.2012 21:10:34

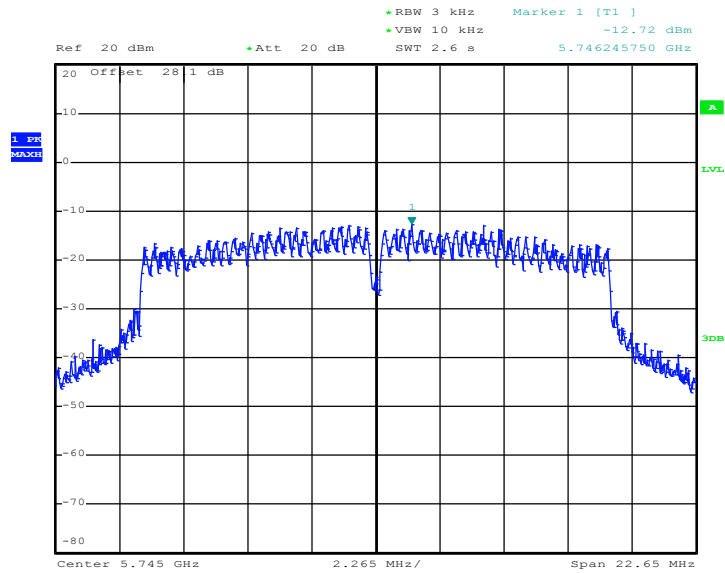


PSD 3kHz Plot on 2.4GHz 802.11n HT20 Channel 11



Date: 24.DEC.2012 21:32:50

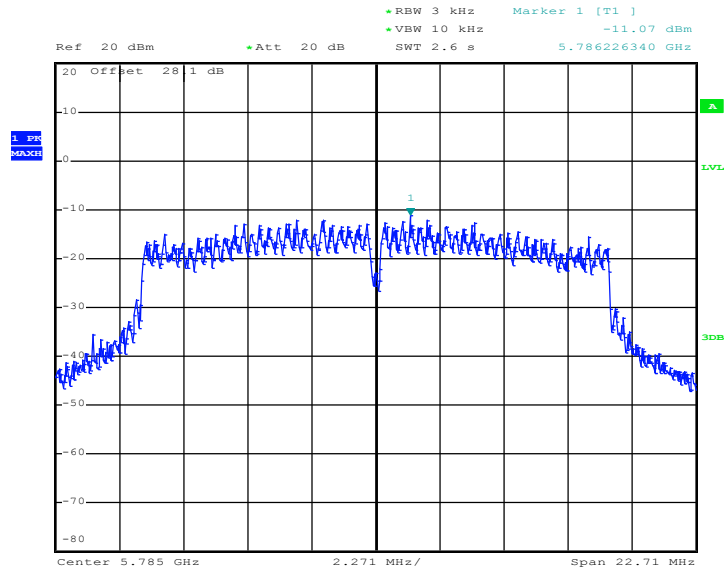
PSD 3kHz Plot on 802.11a Channel 149



Date: 20.DEC.2012 21:45:32

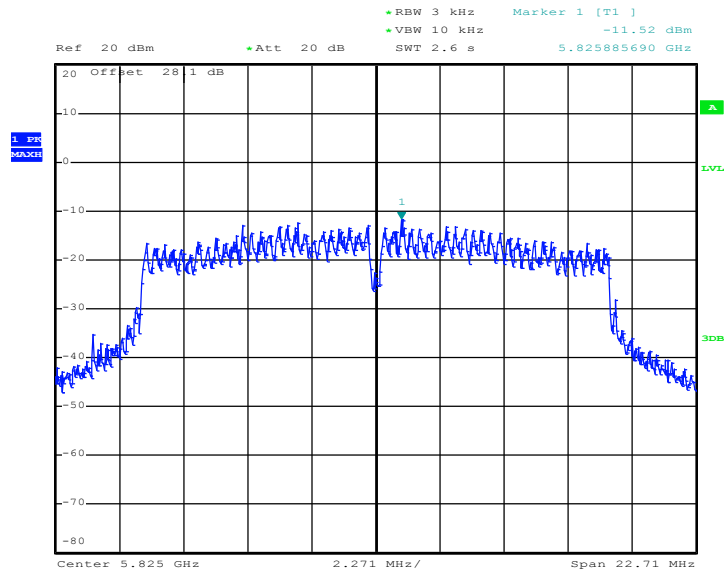


PSD 3kHz Plot on 802.11a Channel 157



Date: 20.DEC.2012 21:49:26

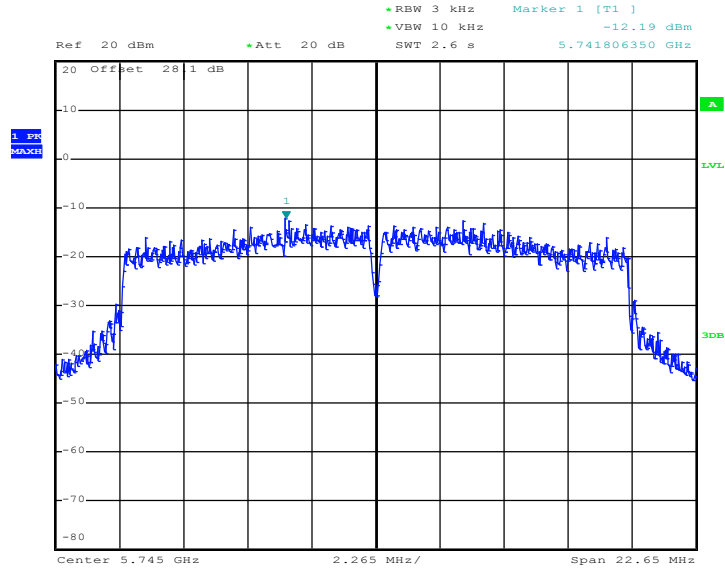
PSD 3kHz Plot on 802.11a Channel 165



Date: 20.DEC.2012 21:54:45

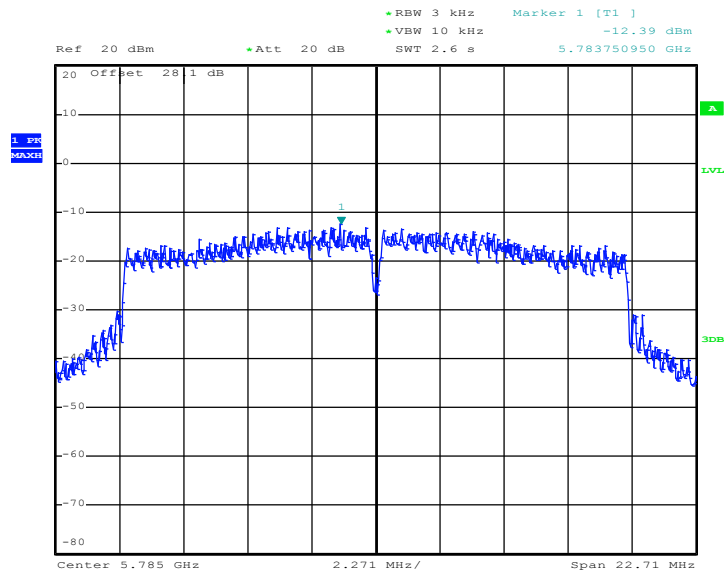


PSD 3kHz Plot on 5GHz 802.11n HT20 Channel 149



Date: 20.DEC.2012 22:06:30

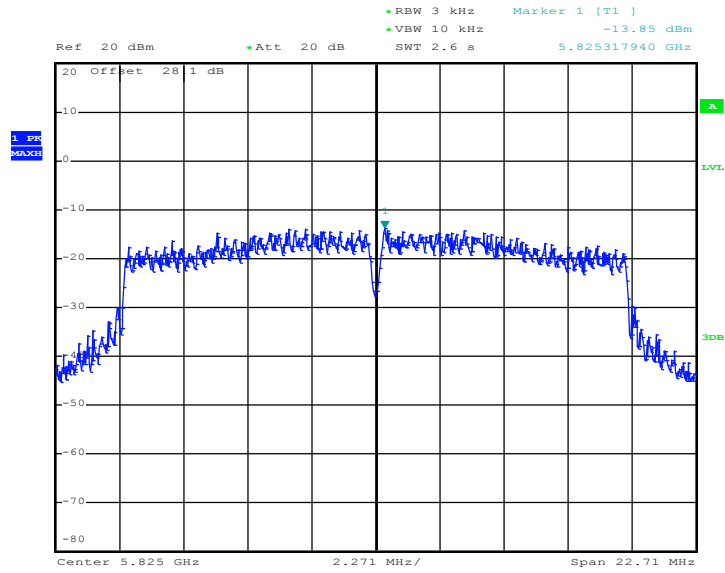
PSD 3kHz Plot on 5GHz 802.11n HT20 Channel 157



Date: 20.DEC.2012 22:03:23



PSD 3kHz Plot on 5GHz 802.11n HT20 Channel 165



Date: 20.DEC.2012 21:59:57

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).

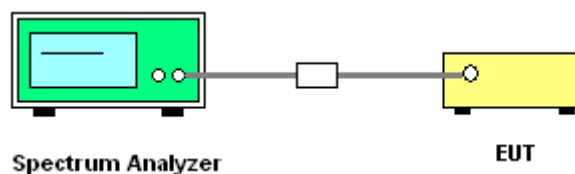
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 KHz, VBW=300 KHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup

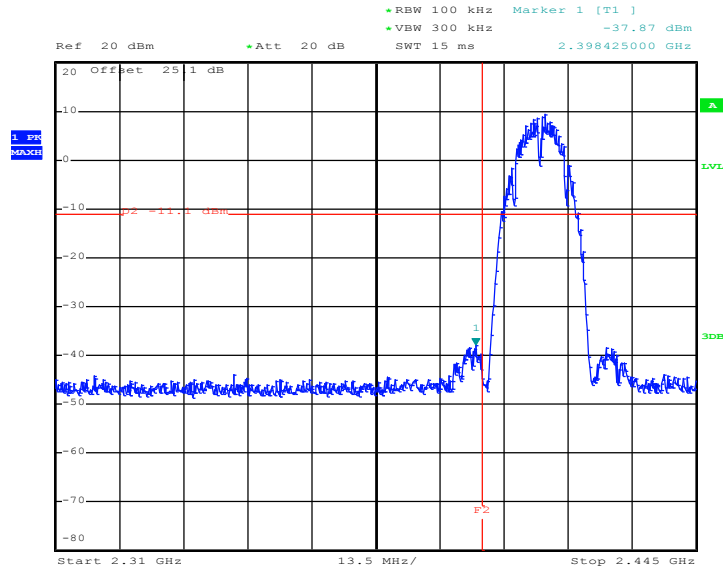




3.4.6 Test Result of Conducted Spurious at Band Edges

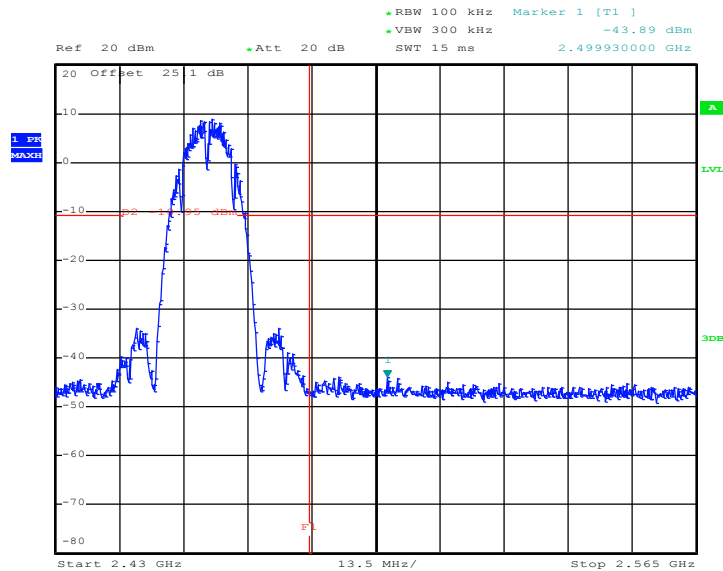
Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Book Lin

Low Band Edge Plot on 802.11b Channel 01



Date: 20.DEC.2012 20:35:21

High Band Edge Plot on 802.11b Channel 11

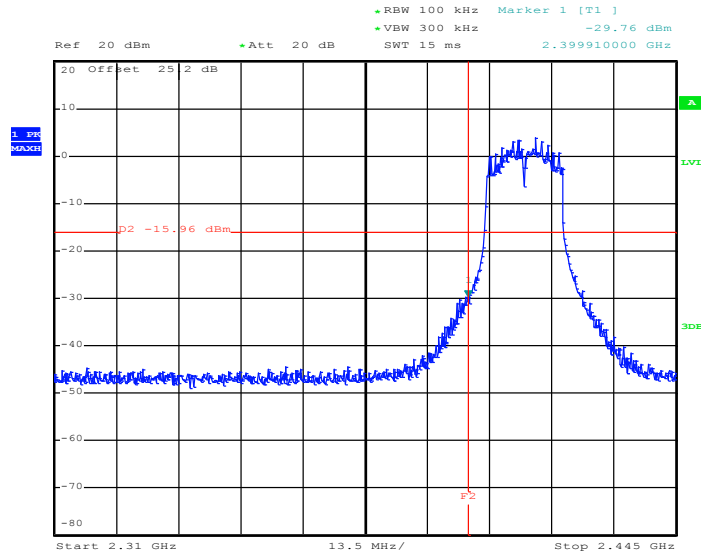


Date: 20.DEC.2012 20:49:40



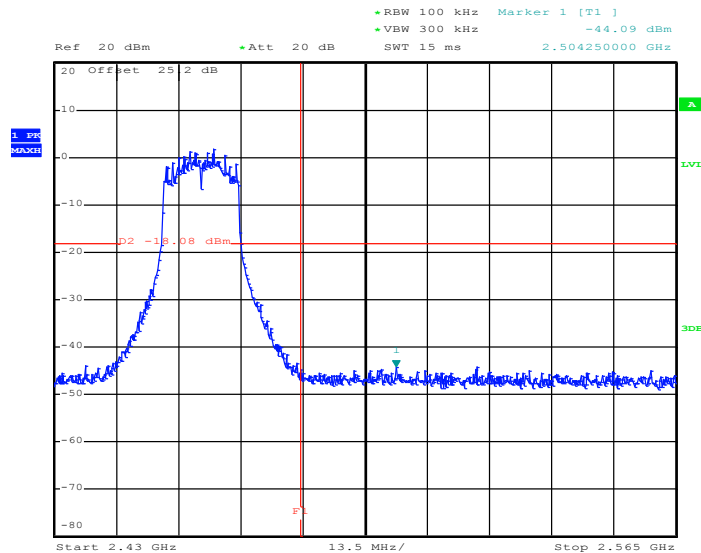
Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Book Lin

Low Band Edge Plot on 802.11g Channel 01



Date: 24.DEC.2012 21:26:14

High Band Edge Plot on 802.11g Channel 11

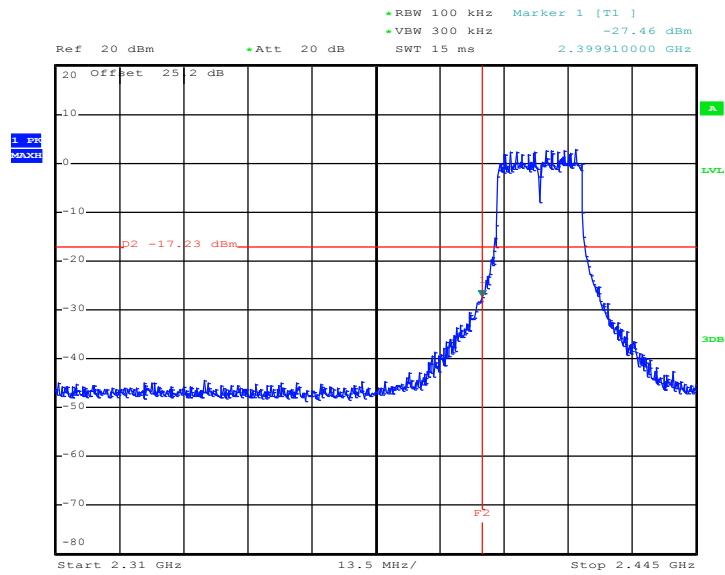


Date: 24.DEC.2012 21:29:33



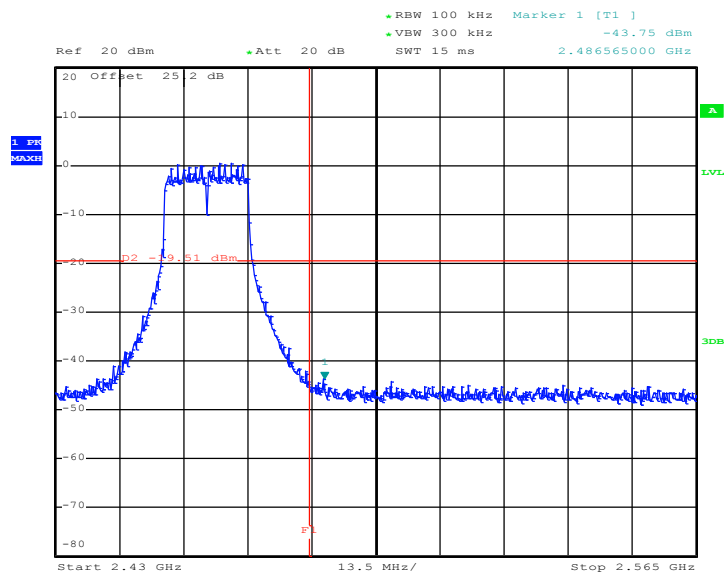
Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Book Lin

Low Band Edge Plot on 2.4GHz 802.11n HT20 Channel 01



Date: 24.DEC.2012 21:36:26

High Band Edge Plot on 2.4GHz 802.11n HT20 Channel 11

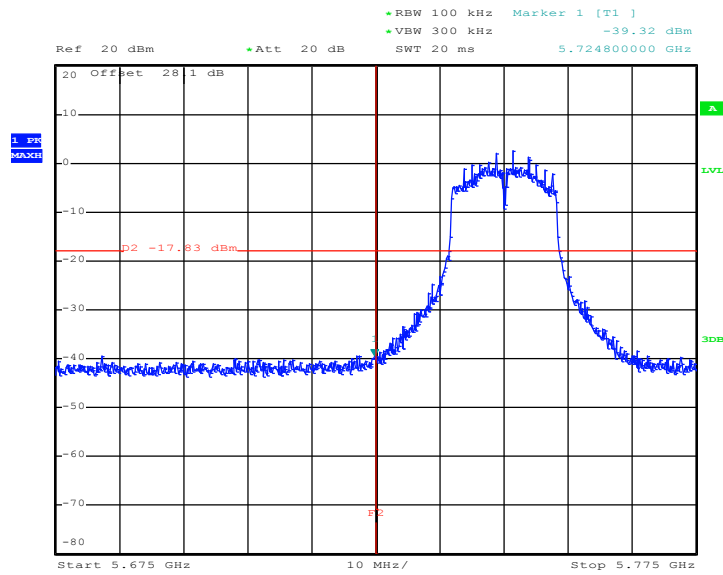


Date: 24.DEC.2012 21:33:17



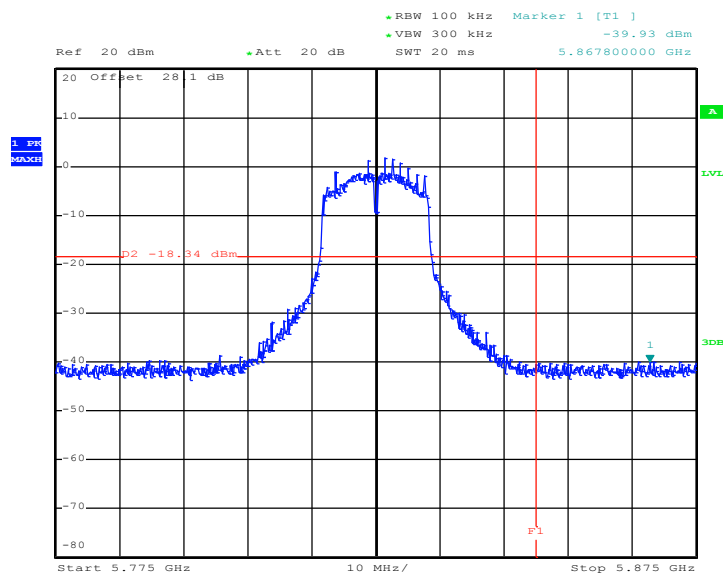
Test Mode :	802.11a	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	149 and 165	Test Engineer :	Book Lin

Low Band Edge Plot on 802.11a Channel 149



Date: 20.DEC.2012 21:46:00

High Band Edge Plot on 802.11a Channel 165

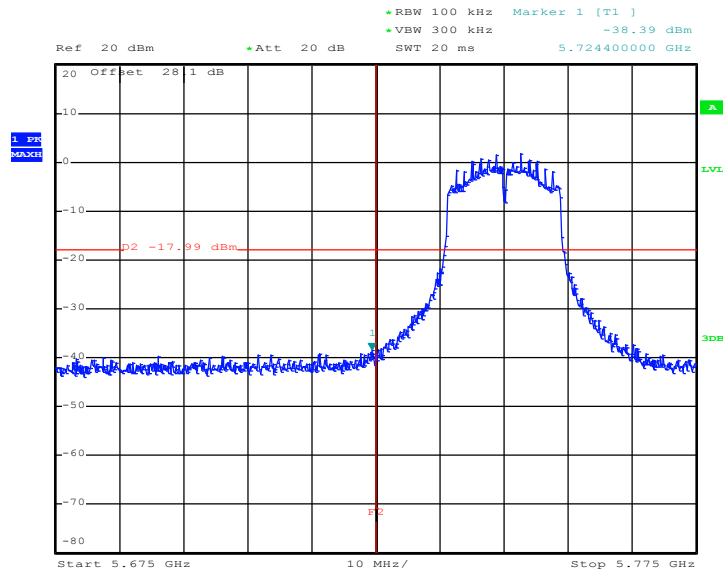


Date: 20.DEC.2012 21:55:12



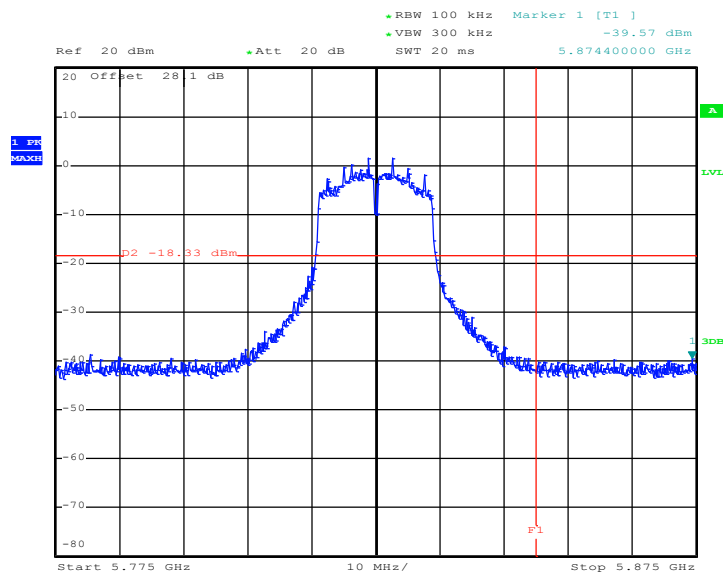
Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	50~53%
Test Channel :	149 and 165	Test Engineer :	Book Lin

Low Band Edge Plot on 5GHz 802.11n HT20 Channel 149



Date: 20.DEC.2012 22:06:58

High Band Edge Plot on 5GHz 802.11n HT20 Channel 165



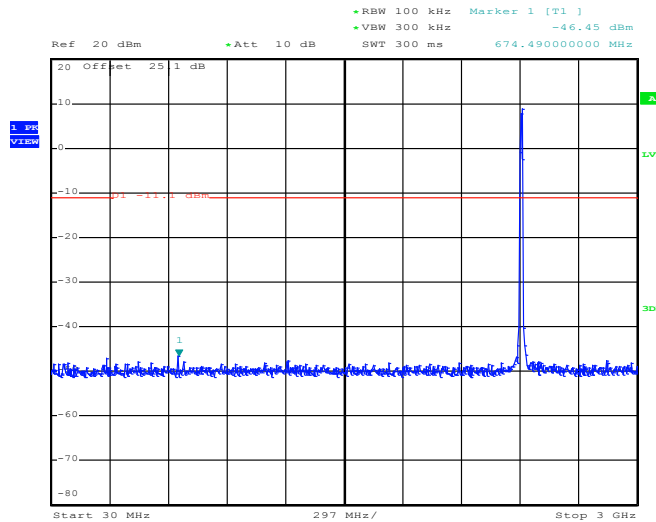
Date: 20.DEC.2012 22:00:24

3.4.7 Test Result of Conducted Spurious Emission

Test Mode :	802.11b	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Book Lin

802.11b 30 MHz~3 GHz

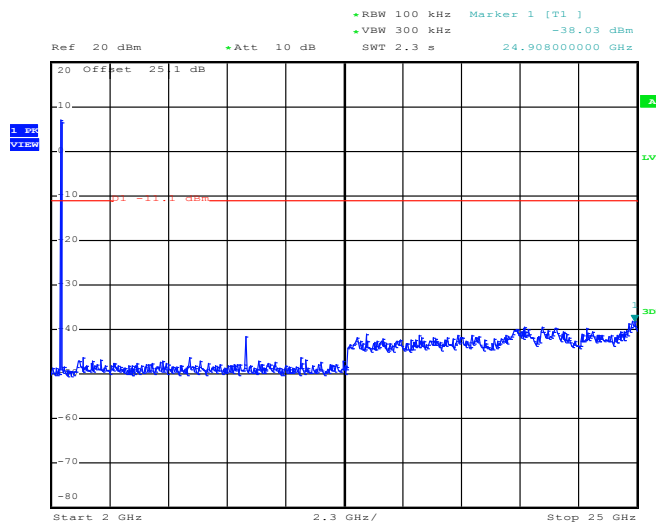
Conducted Spurious Emission Plot on Channel 01



Date: 20.DEC.2012 20:35:38

802.11b 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 01

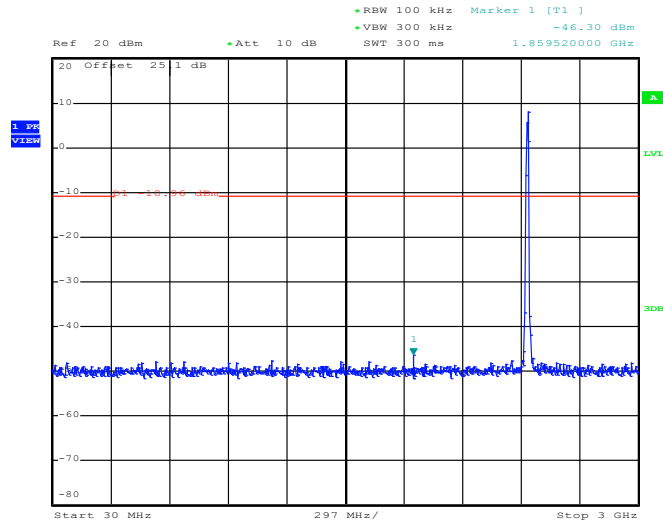


Date: 20.DEC.2012 20:35:56



802.11b 30 MHz~3 GHz

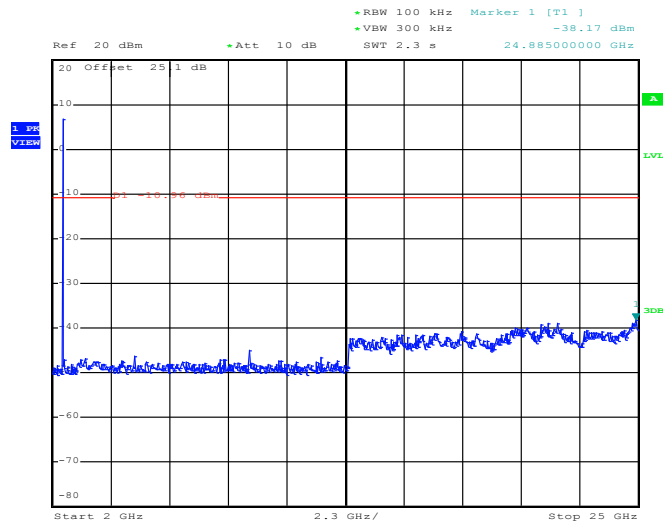
Conducted Spurious Emission Plot on Channel 06



Date: 20.DEC.2012 20:41:08

802.11b 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 06

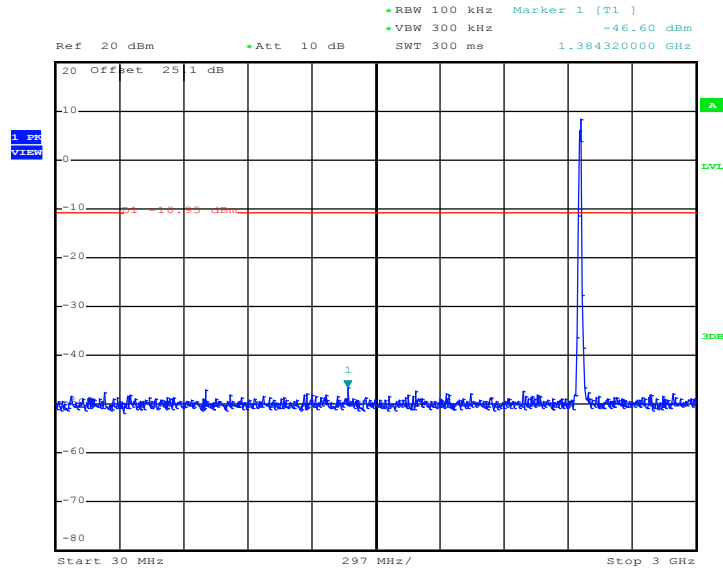


Date: 20.DEC.2012 20:41:25



802.11b 30 MHz~3 GHz

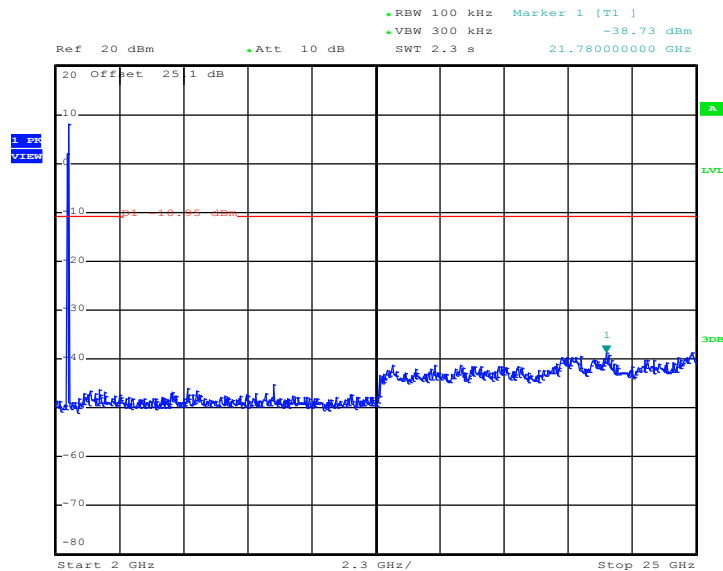
Conducted Spurious Emission Plot on Channel 11



Date: 20.DEC.2012 20:49:57

802.11b 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



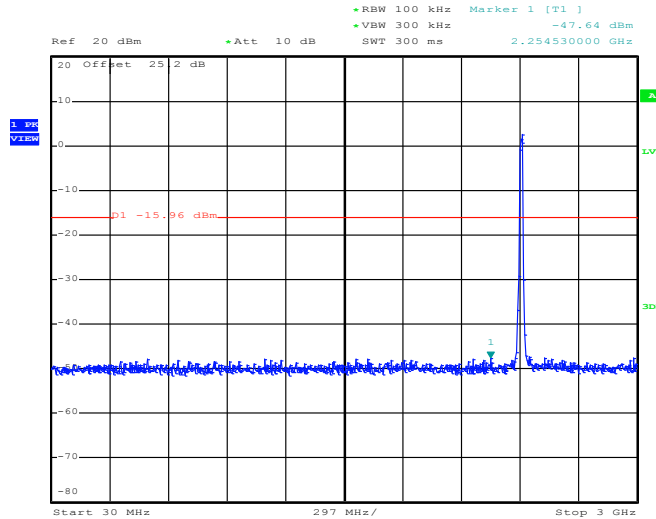
Date: 20.DEC.2012 20:50:15



Test Mode :	802.11g	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Book Lin

802.11g 30 MHz~3 GHz

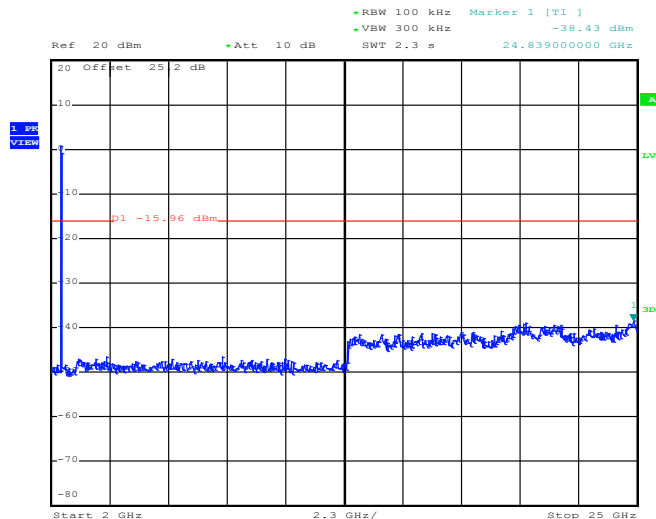
Conducted Spurious Emission Plot on Channel 01



Date: 24.DEC.2012 21:26:32

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 01

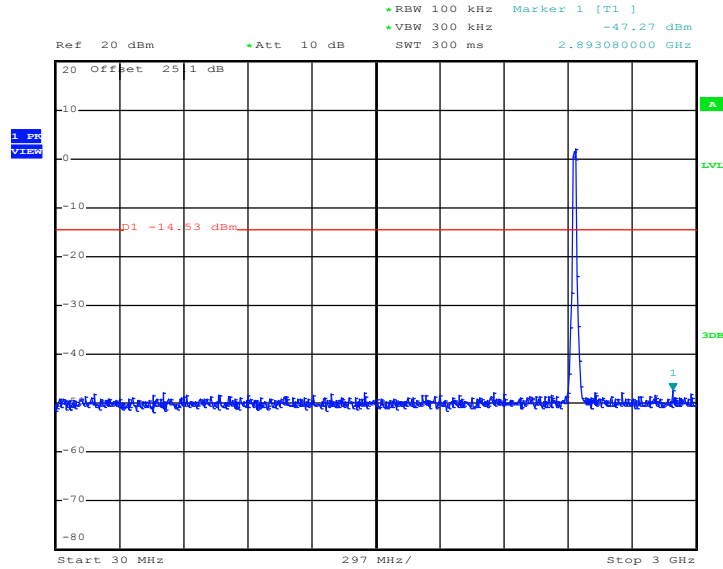


Date: 24.DEC.2012 21:26:49



802.11g 30 MHz~3 GHz

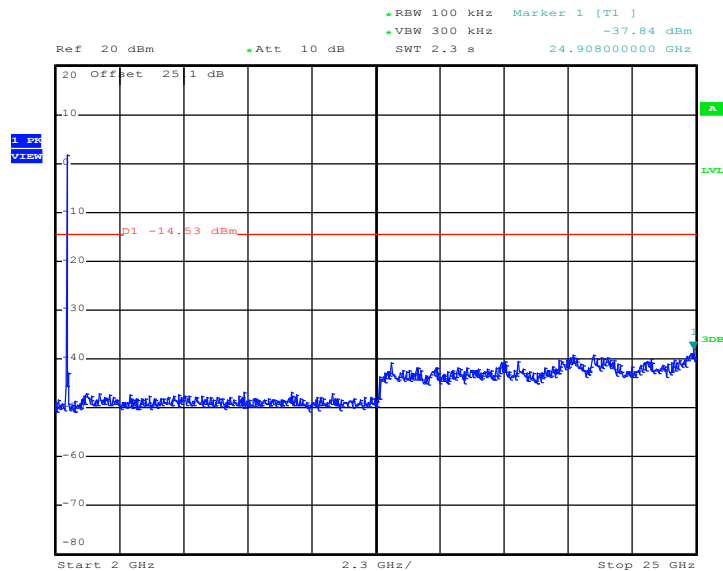
Conducted Spurious Emission Plot on Channel 06



Date: 20.DEC.2012 20:59:01

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 06

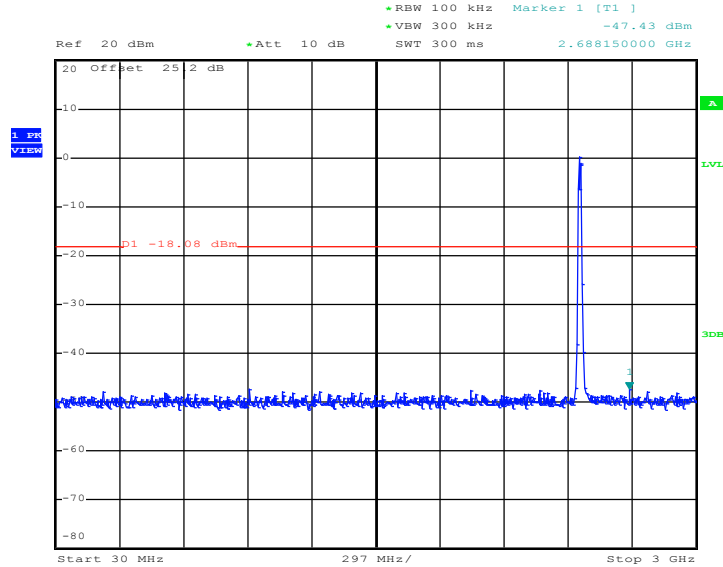


Date: 20.DEC.2012 20:59:19



802.11g 30 MHz~3 GHz

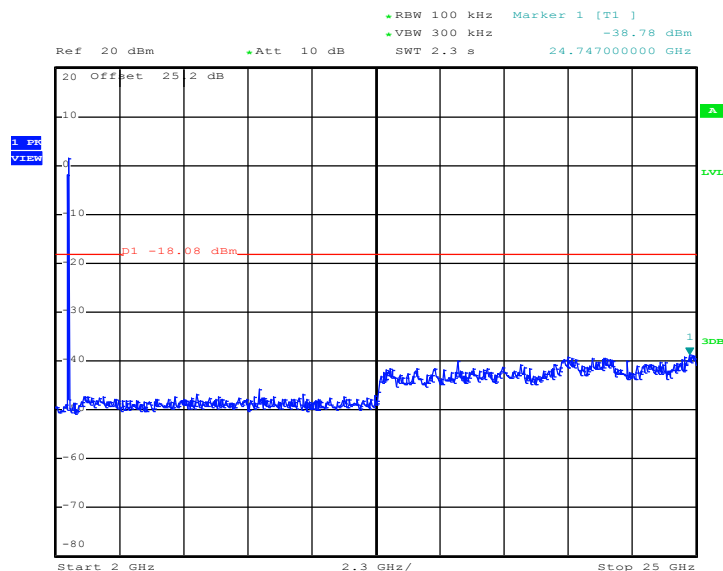
Conducted Spurious Emission Plot on Channel 11



Date: 24.DEC.2012 21:29:50

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



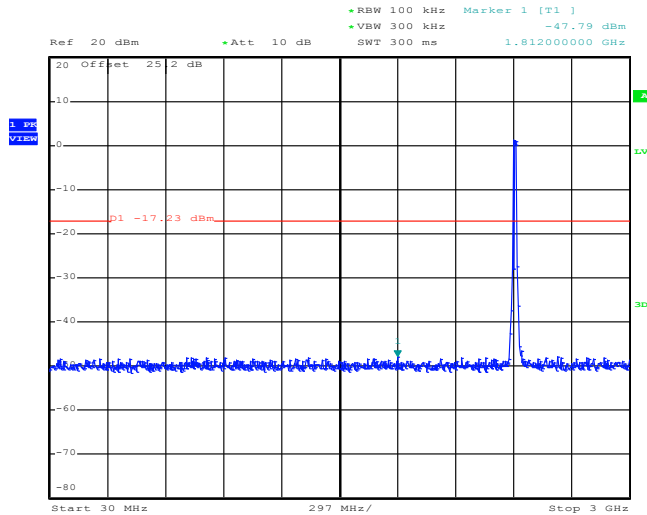
Date: 24.DEC.2012 21:30:08



Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Book Lin

2.4GHz 802.11n HT20 30 MHz~3 GHz

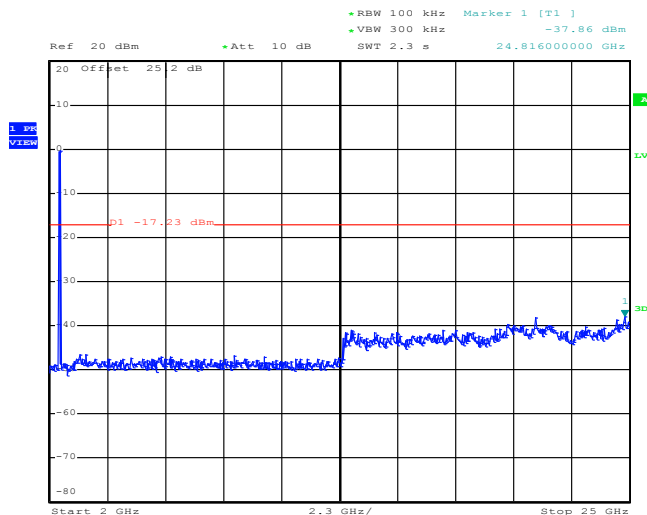
Conducted Spurious Emission Plot on Channel 01



Date: 24.DEC.2012 21:36:43

2.4GHz 802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 01

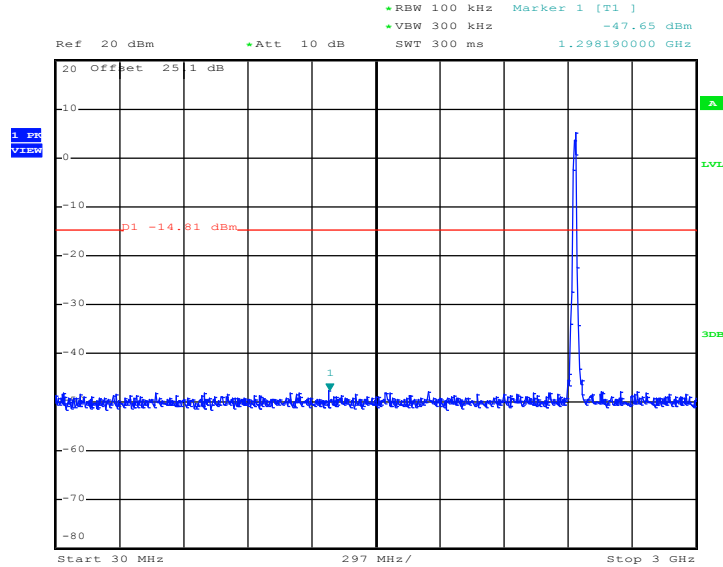


Date: 24.DEC.2012 21:37:01



2.4GHz 802.11n HT20 30 MHz~3 GHz

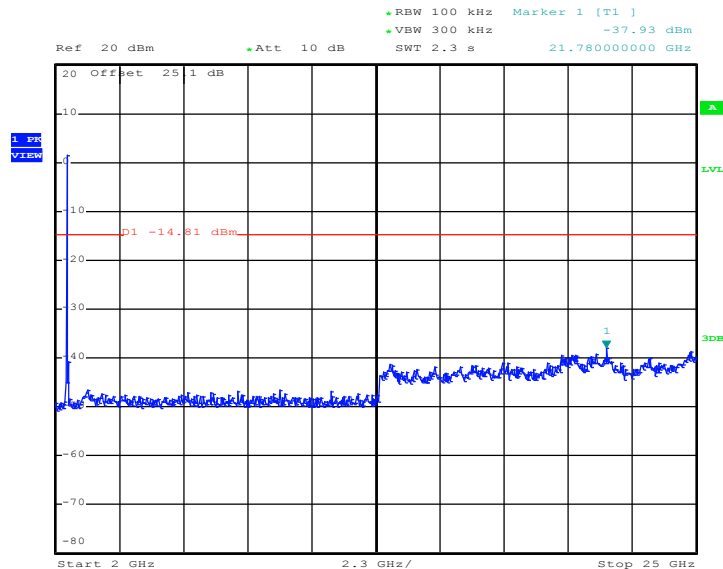
Conducted Spurious Emission Plot on Channel 06



Date: 20.DEC.2012 21:11:07

2.4GHz 802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 06

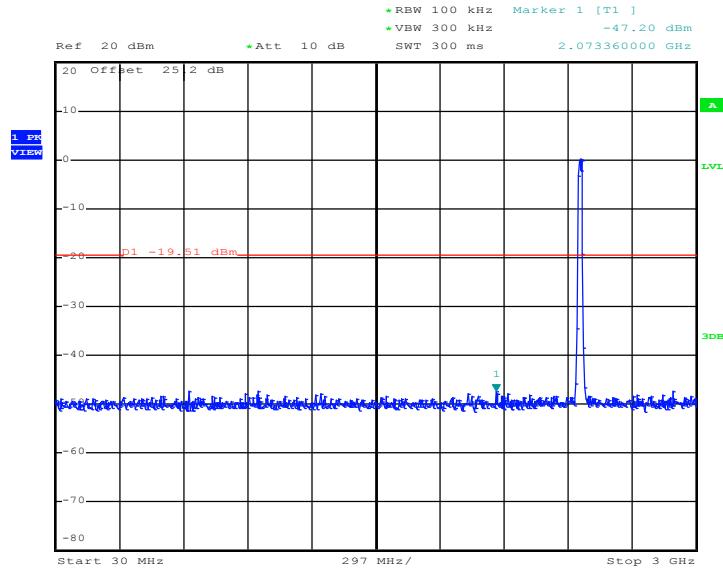


Date: 20.DEC.2012 21:11:25



2.4GHz 802.11n HT20 30 MHz~3 GHz

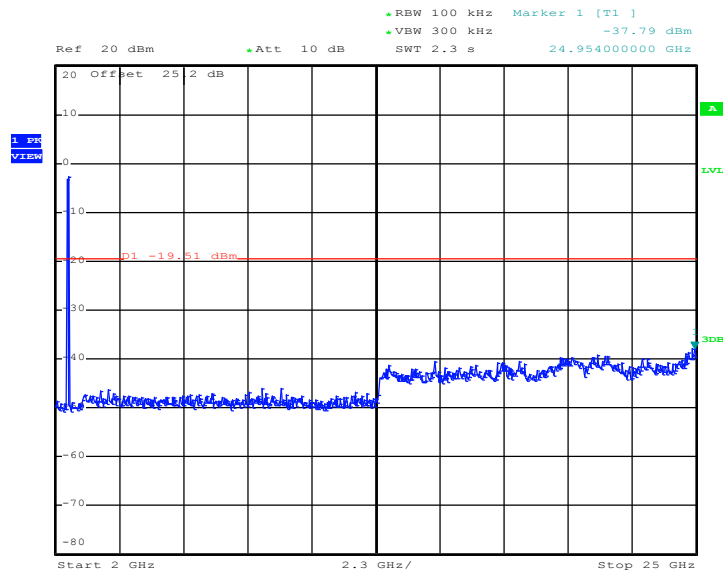
Conducted Spurious Emission Plot on Channel 11



Date: 24.DEC.2012 21:33:35

2.4GHz 802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



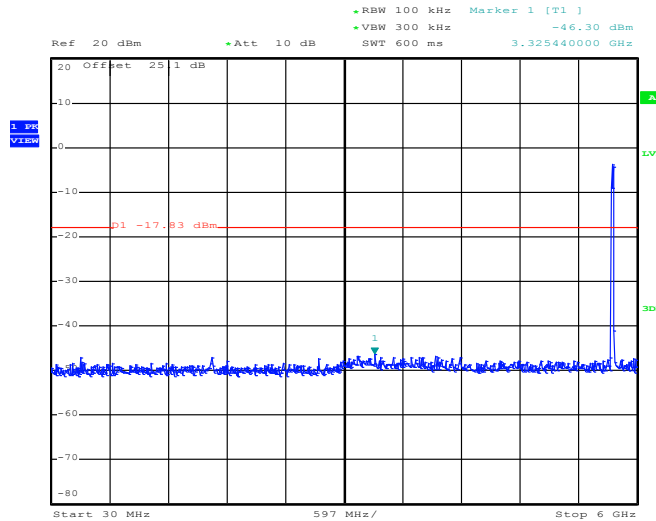
Date: 24.DEC.2012 21:33:52



Test Mode :	802.11a	Temperature :	24~26°C
Test Band :	30MHz-6GHz and 5G-40GHz	Relative Humidity :	50~53%
Test Channel :	149, 157, 165	Test Engineer :	Book Lin

802.11a 30 MHz~6 GHz

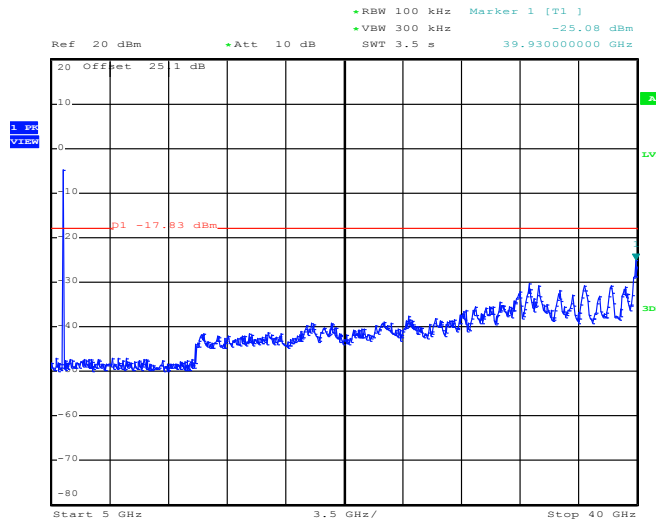
Conducted Spurious Emission Plot on Channel 149



Date: 20.DEC.2012 21:46:17

802.11a 5 GHz~40 GHz

Conducted Spurious Emission Plot on Channel 149

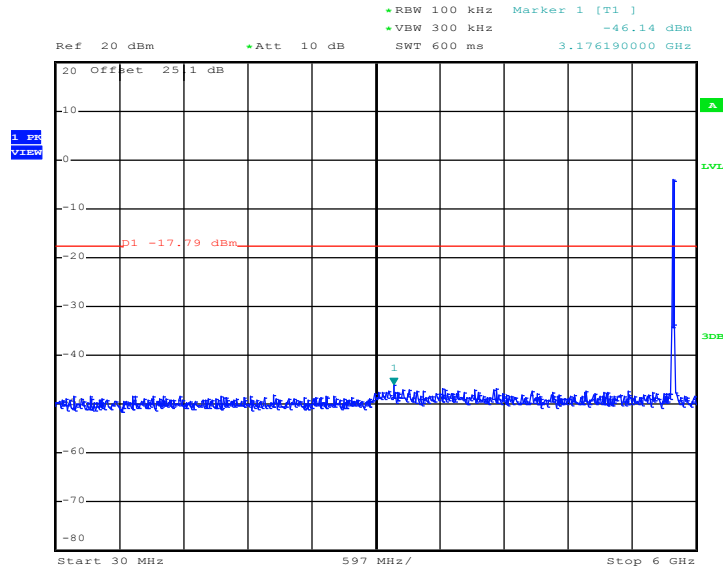


Date: 20.DEC.2012 21:46:35



802.11a 30 MHz~6 GHz

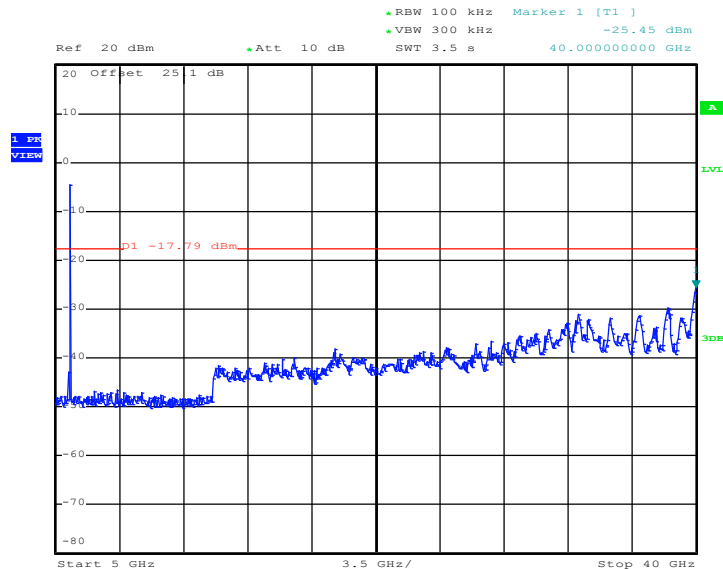
Conducted Spurious Emission Plot on Channel 157



Date: 20.DEC.2012 21:49:59

802.11a 5 GHz~40 GHz

Conducted Spurious Emission Plot on Channel 157

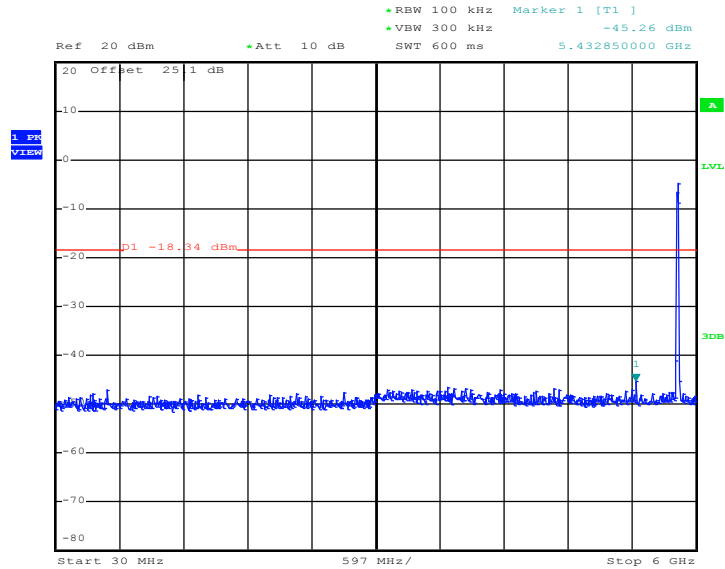


Date: 20.DEC.2012 21:50:16



802.11a 30 MHz~6 GHz

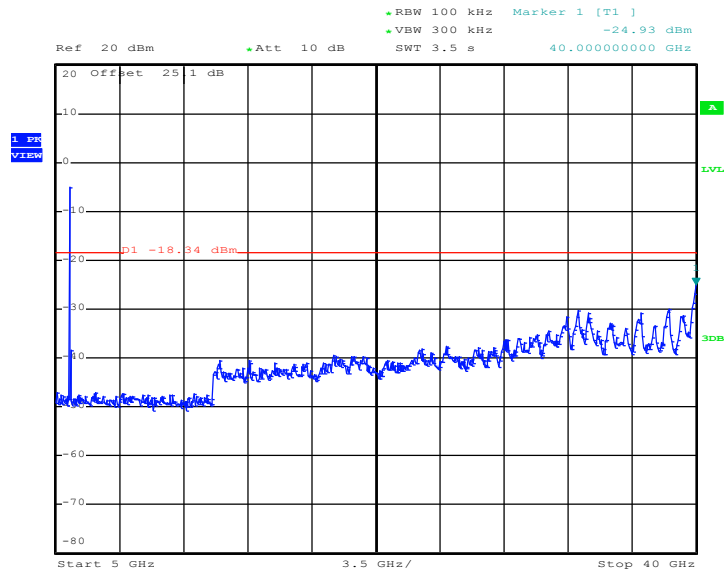
Conducted Spurious Emission Plot on Channel 165



Date: 20.DEC.2012 21:55:30

802.11a 5 GHz~40 GHz

Conducted Spurious Emission Plot on Channel 165



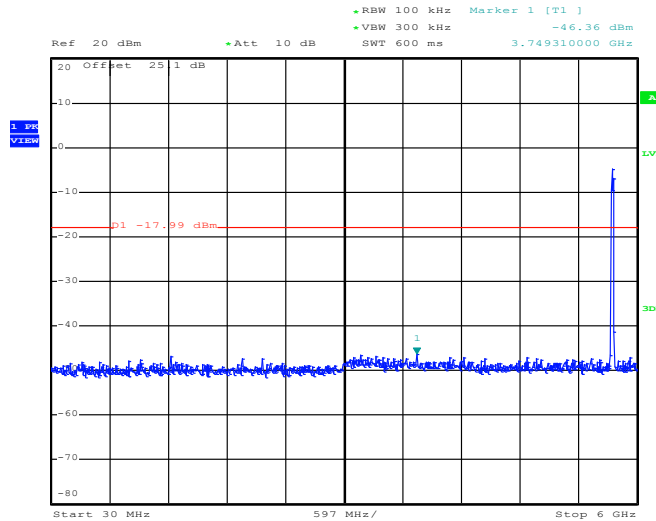
Date: 20.DEC.2012 21:55:48



Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Band :	30MHz-5GHz and 5G-40GHz	Relative Humidity :	50~53%
Test Channel :	149, 157, 165	Test Engineer :	Book Lin

5GHz 802.11n HT20 30 MHz~6 GHz

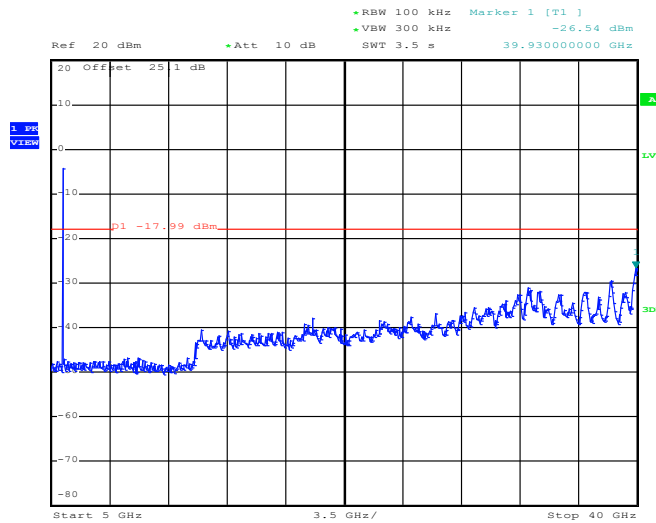
Conducted Spurious Emission Plot on Channel 149



Date: 20.DEC.2012 22:07:15

5GHz 802.11n HT20 5 GHz~40 GHz

Conducted Spurious Emission Plot on Channel 149

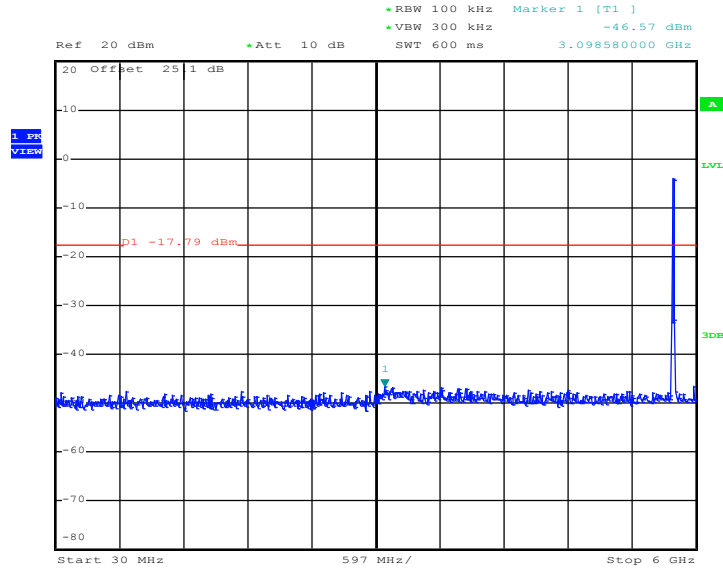


Date: 20.DEC.2012 22:07:33



5GHz 802.11n HT20 30 MHz~6 GHz

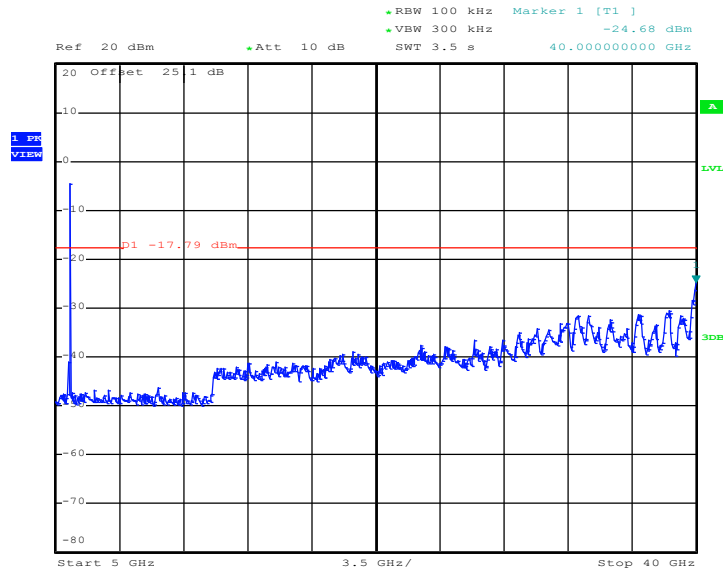
Conducted Spurious Emission Plot on Channel 157



Date: 20.DEC.2012 22:03:56

5GHz 802.11n HT20 5 GHz~40 GHz

Conducted Spurious Emission Plot on Channel 157

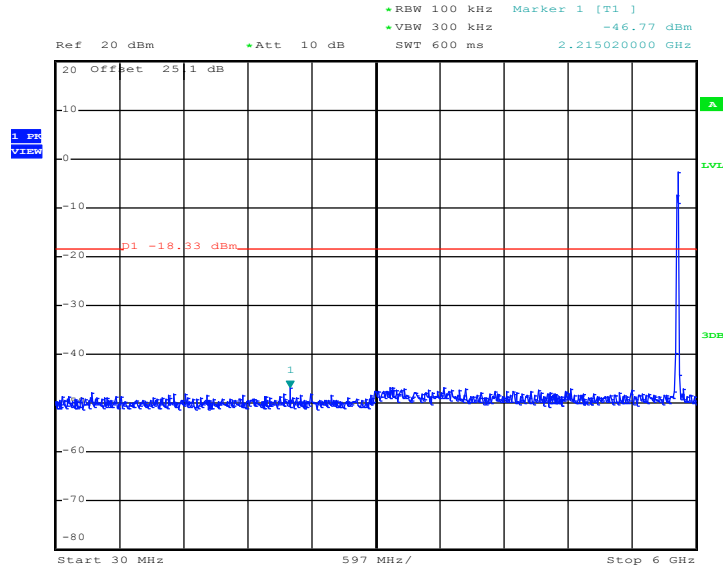


Date: 20.DEC.2012 22:04:13



5GHz 802.11n HT20 30 MHz~6 GHz

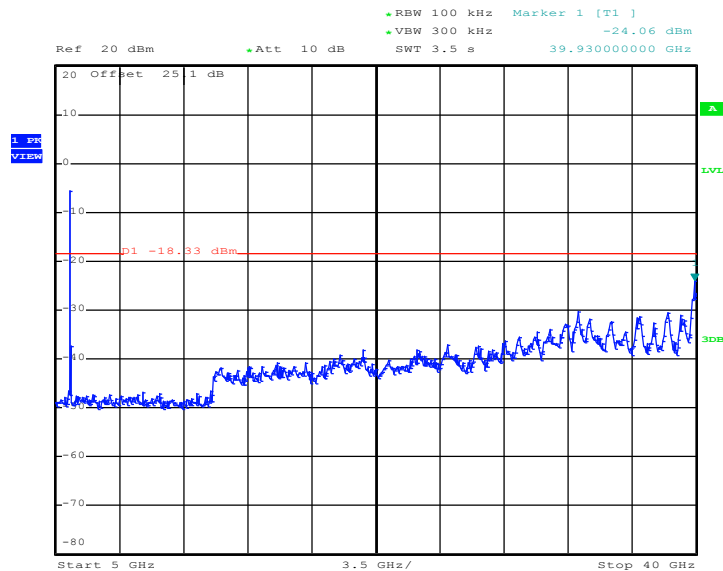
Conducted Spurious Emission Plot on Channel 165



Date: 20.DEC.2012 22:00:42

5GHz 802.11n HT20 5 GHz~40 GHz

Conducted Spurious Emission Plot on Channel 165



Date: 20.DEC.2012 22:01:00



3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 KHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

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

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.



3.5.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003 and 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:

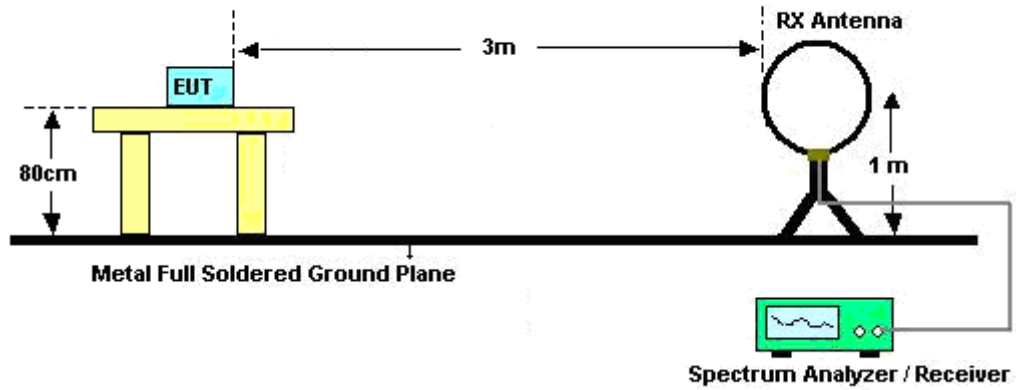
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(us)	1/T(KHz)	VBW Setting
802.11b	100	-	-	10Hz
802.11g	98.57	-	-	10Hz
2.4GHz 802.11n HT20	98.19	-	-	10Hz
802.11a	98.57	-	-	10Hz
5GHz 802.11n HT20	98.31	-	-	10Hz

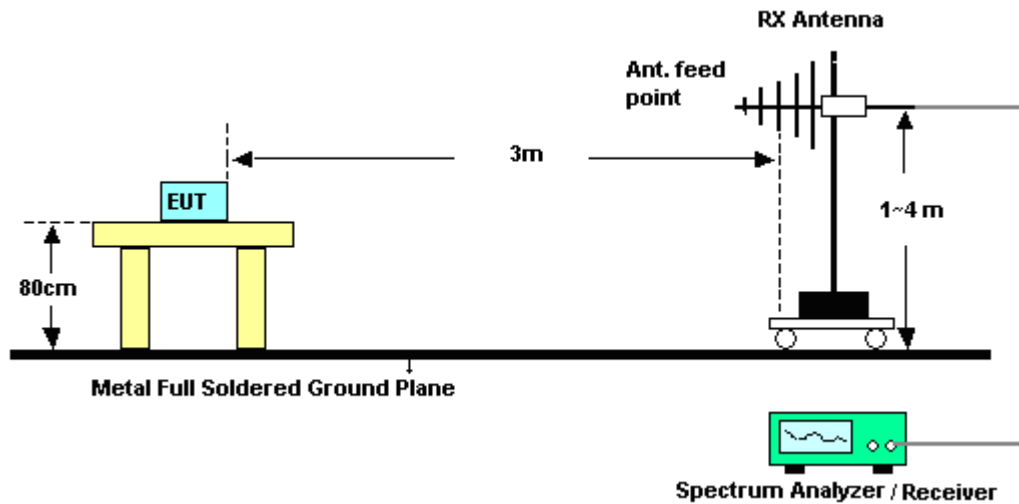
Note: For average measurement with duty cycle < 98%, use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.

3.5.4 Test Setup

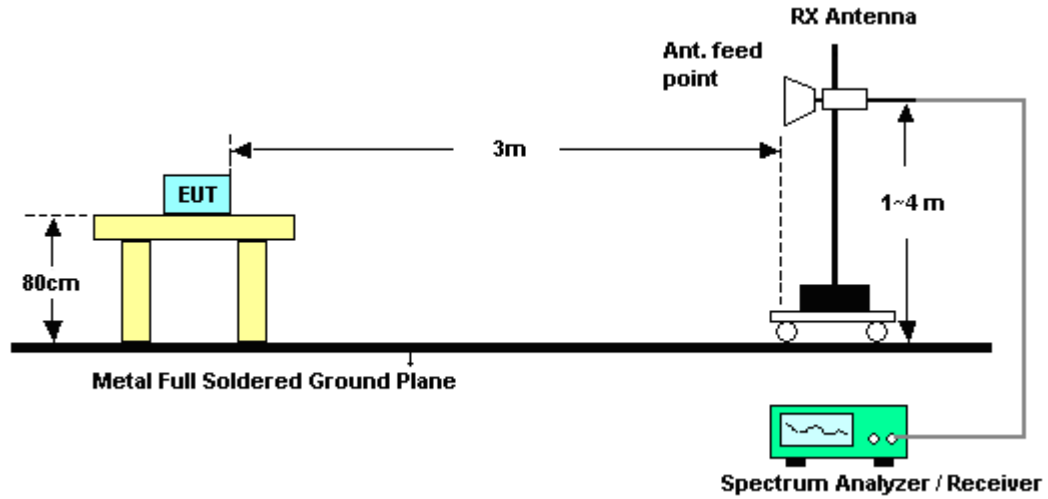
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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



3.5.6 Test Result of Radiated Band Edges

Test Mode :	802.11b	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	53~55%
Test Channel :	01	Test Engineer :	David Ke

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
2385.78	59.19	-14.81	74	58.31	32.18	4.58	35.88	112	239	Peak
2386.14	48.97	-5.03	54	48.09	32.18	4.58	35.88	112	239	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
2385.69	54.93	-19.07	74	54.05	32.18	4.58	35.88	198	252	Peak
2386.05	45.8	-8.2	54	44.92	32.18	4.58	35.88	198	252	Average

Test Mode :	802.11b	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	53~55%
Test Channel :	11	Test Engineer :	David Ke

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
2487.88	59.18	-14.82	74	58.05	32.3	4.64	35.81	108	241	Peak
2488.69	51.57	-2.43	54	50.44	32.3	4.64	35.81	108	241	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
2487.73	58.95	-15.05	74	57.82	32.3	4.64	35.81	200	279	Peak
2488.66	50.83	-3.17	54	49.7	32.3	4.64	35.81	200	279	Average



Test Mode :	802.11g	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	53~55%
Test Channel :	01	Test Engineer :	David Ke

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	72.91	-1.09	74	72.03	32.18	4.58	35.88	108	238	Peak
2390	50.24	-3.76	54	49.34	32.18	4.58	35.86	108	238	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
2389.92	71.18	-2.82	74	70.28	32.18	4.58	35.86	169	277	Peak
2390	46.07	-7.93	54	45.17	32.18	4.58	35.86	169	277	Average

Test Mode :	802.11g	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	53~55%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.74	72.29	-1.71	74	71.18	32.28	4.64	35.81	108	245	Peak
2483.5	49.54	-4.46	54	48.43	32.28	4.64	35.81	108	245	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.55	70.53	-3.47	74	69.42	32.28	4.64	35.81	200	281	Peak
2483.5	48.14	-5.86	54	47.03	32.28	4.64	35.81	200	281	Average



Test Mode :	802.11n HT20	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	53~55%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	72.73	-1.27	74	71.83	32.18	4.58	35.86	140	245	Peak
2390	50.98	-3.02	54	50.08	32.18	4.58	35.86	140	245	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
2388.66	71.35	-2.65	74	70.47	32.18	4.58	35.88	200	263	Peak
2390	49.1	-4.9	54	48.2	32.18	4.58	35.86	200	263	Average

Test Mode :	802.11n HT20	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	53~55%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.46	72.52	-1.48	74	71.41	32.28	4.64	35.81	110	236	Peak
2483.5	50.96	-3.04	54	49.85	32.28	4.64	35.81	110	236	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
2483.65	72.89	-1.11	74	71.78	32.28	4.64	35.81	200	275	Peak
2483.5	49.28	-4.72	54	48.17	32.28	4.64	35.81	200	275	Average



Test Mode :	802.11a	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	53~55%
Test Channel :	149	Test Engineer :	David Ke
Remark :	1. 5746 MHz and 5742 MHz are fundamental signals which can be ignored. 2. 5725 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 108.31 dBμV/m - 20dB = 88.31 dBμV/m.		

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
5725	68.12	-20.19	88.31	60.73	35.07	7.17	34.85	107	233	Peak
5746	96.49	-	-	89.06	35.09	7.19	34.85	107	233	Average
5746	108.31	-	-	100.88	35.09	7.19	34.85	107	233	Peak

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
5725	72.72	-16.54	89.26	65.33	35.07	7.17	34.85	103	149	Peak
5742	97.8	-	-	90.37	35.09	7.19	34.85	103	149	Average
5742	109.26	-	-	101.83	35.09	7.19	34.85	103	149	Peak



Test Mode :	802.11a	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	53~55%
Test Channel :	165	Test Engineer :	David Ke
Remark :	1. 5824 MHz and 5826 MHz are fundamental signals which can be ignored. 2. 5850 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

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
5824	96.15	-	-	88.56	35.19	7.27	34.87	157	235	Average
5824	107.79	-	-	100.2	35.19	7.27	34.87	157	235	Peak
5850	56.76	-31.03	87.79	49.13	35.21	7.29	34.87	157	235	Peak

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
5826	97.5	-	-	89.91	35.19	7.27	34.87	100	148	Average
5826	109.15	-	-	101.56	35.19	7.27	34.87	100	148	Peak
5850	57.23	-31.92	89.15	49.6	35.21	7.29	34.87	100	148	Peak



Test Mode :	802.11n HT20	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	53~55%
Test Channel :	149	Test Engineer :	David Ke
Remark :	1. 5744 MHz and 5742 MHz are fundamental signals which can be ignored. 2. 5725 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

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
5725	66.01	-23.12	89.13	58.62	35.07	7.17	34.85	106	233	Peak
5744	97.02	-	-	89.59	35.09	7.19	34.85	106	233	Average
5744	109.13	-	-	101.7	35.09	7.19	34.85	106	233	Peak

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
5725	73.03	-16.51	89.54	65.64	35.07	7.17	34.85	103	150	Peak
5742	97.13	-	-	89.7	35.09	7.19	34.85	103	150	Average
5742	109.54	-	-	102.11	35.09	7.19	34.85	103	150	Peak



Test Mode :	802.11n HT20	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	53~55%
Test Channel :	165	Test Engineer :	David Ke
Remark :	1. 5828 MHz and 5822 MHz are fundamental signals which can be ignored. 2. 5850 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

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
5828	95.54	-	-	87.95	35.19	7.27	34.87	152	236	Average
5828	107.44	-	-	99.85	35.19	7.27	34.87	152	236	Peak
5850	57.26	-30.18	87.44	49.63	35.21	7.29	34.87	152	236	Peak

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
5822	97.93	-	-	90.34	35.19	7.27	34.87	100	149	Average
5822	109.78	-	-	102.19	35.19	7.27	34.87	100	149	Peak
5850	60.49	-29.29	89.78	52.86	35.21	7.29	34.87	100	149	Peak



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

Test Mode :	802.11b	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 2412 MHz is fundamental signal which can be ignored. 2391 MHz, 7236 MHz and 9648 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 112.16 dBμV/m - 20dB = 92.16 dBμV/m. 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
2391	56.42	-35.74	92.16	55.52	32.18	4.58	35.86	112	239	Peak
2412	107.08	-	-	106.15	32.2	4.59	35.86	112	239	Average
2412	112.16	-	-	111.23	32.2	4.59	35.86	112	239	Peak
4824	47.02	-26.98	74	65.26	34.27	6.51	59.02	100	0	Peak
7236	45.38	-46.78	92.16	58.91	36.05	8.29	57.87	100	0	Peak
9648	53.31	-38.85	92.16	62.68	37.09	9.48	55.94	100	0	Peak



Test Mode :	802.11b	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. 2391 MHz, 7236 MHz and 9648 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2391	52.41	-38.05	90.46	51.51	32.18	4.58	35.86	198	252	Peak
2414	105.47	-	-	104.54	32.2	4.59	35.86	198	252	Average
2414	110.46	-	-	109.53	32.2	4.59	35.86	198	252	Peak
4824	48.32	-25.68	74	66.56	34.27	6.51	59.02	100	0	Peak
7236	47.52	-42.94	90.46	61.05	36.05	8.29	57.87	100	0	Peak
9648	55.91	-34.55	90.46	65.28	37.09	9.48	55.94	100	0	Peak



Test Mode :	802.11b	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 2436 MHz is fundamental signal which can be ignored. 9747 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2436	108.06	-	-	107.07	32.22	4.61	35.84	111	241	Average
2436	113.05	-	-	112.06	32.22	4.61	35.84	111	241	Peak
4875	45.76	-28.24	74	63.83	34.28	6.53	58.88	100	0	Peak
7311	47.26	-26.74	74	60.79	36.04	8.42	57.99	100	0	Peak
9747	53.14	-39.91	93.05	62.33	37.21	9.49	55.89	100	0	Peak

Test Mode :	802.11b	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 2438 MHz is fundamental signal which can be ignored. 9747 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2438	105.59	-	-	104.58	32.24	4.61	35.84	200	278	Average
2438	110.63	-	-	109.62	32.24	4.61	35.84	200	278	Peak
4875	46.66	-27.34	74	64.73	34.28	6.53	58.88	100	0	Peak
7311	47.62	-26.38	74	61.15	36.04	8.42	57.99	100	0	Peak
9747	55.31	-35.32	90.63	64.5	37.21	9.49	55.89	100	0	Peak



Test Mode :	802.11b	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. 9849 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	25.41	-14.59	40	37.65	18.7	0.7	31.64	100	84	Peak
43.5	25.24	-14.76	40	44.45	11.56	0.77	31.54	-	-	Peak
281.91	26.57	-19.43	46	43.14	12.86	1.74	31.17	-	-	Peak
419.7	26.05	-19.95	46	38.55	16.5	2.06	31.06	-	-	Peak
479.9	24.73	-21.27	46	35.64	17.6	2.19	30.7	-	-	Peak
540.1	25.88	-20.12	46	36.04	18.5	2.31	30.97	-	-	Peak
2462	108.74	-	-	107.69	32.26	4.62	35.83	108	241	Average
2462	113.41	-	-	112.36	32.26	4.62	35.83	108	241	Peak
4926	49.12	-24.88	74	67.01	34.29	6.56	58.74	100	0	Peak
7386	46.04	-27.96	74	59.6	36.02	8.55	58.13	100	0	Peak
9849	52.01	-41.4	93.41	61	37.33	9.51	55.83	100	0	Peak



Test Mode :	802.11b	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. 9849 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	21.13	-18.87	40	33.9	18.16	0.71	31.64	100	275	Peak
71.85	12.01	-27.99	40	35.99	6.56	0.93	31.47	-	-	Peak
281.64	18.79	-27.21	46	35.39	12.83	1.74	31.17	-	-	Peak
466.6	22.21	-23.79	46	33.51	17.43	2.17	30.9	-	-	Peak
540.1	22.63	-23.37	46	32.79	18.5	2.31	30.97	-	-	Peak
600.3	24.97	-21.03	46	33.25	19.7	2.42	30.4	-	-	Peak
2462	107.89	-	-	106.84	32.26	4.62	35.83	200	279	Average
2462	112.67	-	-	111.62	32.26	4.62	35.83	200	279	Peak
4926	49.68	-24.32	74	67.57	34.29	6.56	58.74	100	0	Peak
7386	46.58	-27.42	74	60.14	36.02	8.55	58.13	100	0	Peak
9849	55.01	-37.66	92.67	64	37.33	9.51	55.83	100	0	Peak



Test Mode :	802.11g	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2398.29 MHz, 7236 MHz and 9648 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	27.36	-12.64	40	39.6	18.7	0.7	31.64	100	65	Peak
42.42	20.22	-19.78	40	39	12.02	0.76	31.56	-	-	Peak
281.37	22.4	-23.6	46	39	12.83	1.74	31.17	-	-	Peak
419.7	26.35	-19.65	46	38.85	16.5	2.06	31.06	-	-	Peak
479.9	24.73	-21.27	46	35.64	17.6	2.19	30.7	-	-	Peak
540.1	25.62	-20.38	46	35.78	18.5	2.31	30.97	-	-	Peak
2398.29	87.17	-4.33	91.5	86.27	32.18	4.58	35.86	108	238	Peak
2412	99.48	-	-	98.55	32.2	4.59	35.86	108	238	Average
2412	111.5	-	-	110.57	32.2	4.59	35.86	108	238	Peak
4824	41.42	-32.58	74	59.66	34.27	6.51	59.02	100	0	Peak
7236	46.73	-44.77	91.5	60.26	36.05	8.29	57.87	100	0	Peak
9648	48.61	-42.89	91.5	57.98	37.09	9.48	55.94	100	0	Peak



Test Mode :	802.11g	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 2398.74 MHz, 7236 MHz and 9651 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	20.34	-19.66	40	32.58	18.7	0.7	31.64	100	281	Peak
42.42	17.68	-22.32	40	36.46	12.02	0.76	31.56	-	-	Peak
238.44	20.27	-25.73	46	38.52	11.08	1.61	30.94	-	-	Peak
540.1	23.58	-22.42	46	33.74	18.5	2.31	30.97	-	-	Peak
600.3	24.69	-21.31	46	32.97	19.7	2.42	30.4	-	-	Peak
793.5	25.03	-20.97	46	30.17	21.9	2.82	29.86	-	-	Peak
2398.74	82.98	-7.18	90.16	82.08	32.18	4.58	35.86	169	277	Peak
2412	98.29	-	-	97.36	32.2	4.59	35.86	169	277	Average
2412	110.16	-	-	109.23	32.2	4.59	35.86	169	277	Peak
4821	43.98	-30.02	74	62.22	34.27	6.51	59.02	100	0	Peak
7236	47.98	-42.18	90.16	61.51	36.05	8.29	57.87	100	0	Peak
9651	53.8	-36.36	90.16	63.17	37.09	9.48	55.94	100	0	Peak



Test Mode :	802.11g	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 2437 MHz is fundamental signal which can be ignored. 9750 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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	101.57	-	-	100.56	32.24	4.61	35.84	138	232	Average
2437	113.42	-	-	112.41	32.24	4.61	35.84	138	232	Peak
4875	41.29	-32.71	74	59.36	34.28	6.53	58.88	100	0	Peak
7317	46.25	-27.75	74	59.81	36.03	8.42	58.01	100	0	Peak
9750	50.62	-42.8	93.42	59.8	37.21	9.5	55.89	100	0	Peak

Test Mode :	802.11g	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 2436 MHz is fundamental signal which can be ignored. 9753 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2436	100.72	-	-	99.73	32.22	4.61	35.84	172	265	Average
2436	112.5	-	-	111.51	32.22	4.61	35.84	172	265	Peak
4878	43.43	-30.57	74	61.49	34.28	6.54	58.88	100	0	Peak
7314	49.68	-24.32	74	63.21	36.04	8.42	57.99	100	0	Peak
9753	52.81	-39.69	92.5	61.99	37.21	9.5	55.89	100	0	Peak



Test Mode :	802.11g	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 2460 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2460	99	-	-	97.95	32.26	4.62	35.83	108	245	Average
2460	110.77	-	-	109.72	32.26	4.62	35.83	108	245	Peak
4929	43.32	-30.68	74	61.21	34.29	6.56	58.74	100	0	Peak
7386	44.37	-29.63	74	57.93	36.02	8.55	58.13	100	0	Peak

Test Mode :	802.11g	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	53~55%
Test Engineer :	David Ke	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	98.27	-	-	97.22	32.26	4.62	35.83	200	281	Average
2462	110.01	-	-	108.96	32.26	4.62	35.83	200	281	Peak
4926	44.23	-29.77	74	62.12	34.29	6.56	58.74	100	0	Peak
7386	45.98	-28.02	74	59.54	36.02	8.55	58.13	100	0	Peak



Test Mode :	2.4GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 2414 MHz is fundamental signal which can be ignored. 2398.83 MHz and 7236 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2398.83	88.17	-4.65	92.82	87.27	32.18	4.58	35.86	140	245	Peak
2414	100.56	-	-	99.63	32.2	4.59	35.86	140	245	Average
2414	112.82	-	-	111.89	32.2	4.59	35.86	140	245	Peak
4824	40.72	-33.28	74	58.96	34.27	6.51	59.02	100	0	Peak
7236	44.18	-48.64	92.82	57.71	36.05	8.29	57.87	100	0	Peak

Test Mode :	2.4GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 2413 MHz is fundamental signal which can be ignored. 2397.21 MHz and 7236 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2397.21	85	-5.65	90.65	84.1	32.18	4.58	35.86	200	263	Peak
2413	98.07	-	-	97.14	32.2	4.59	35.86	200	263	Average
2413	110.65	-	-	109.72	32.2	4.59	35.86	200	263	Peak
4824	42.03	-31.97	74	60.27	34.27	6.51	59.02	100	0	Peak
7236	47.11	-43.54	90.65	60.64	36.05	8.29	57.87	100	0	Peak



Test Mode :	2.4GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 2438 MHz is fundamental signal which can be ignored. 9747 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
2438	101.13	-	-	100.12	32.24	4.61	35.84	136	235	Average
2438	114.1	-	-	113.09	32.24	4.61	35.84	136	235	Peak
4875	40.83	-33.17	74	58.9	34.28	6.53	58.88	100	0	Peak
7311	46.68	-27.32	74	60.21	36.04	8.42	57.99	100	0	Peak
9747	49.07	-45.03	94.1	58.26	37.21	9.49	55.89	100	0	Peak

Test Mode :	2.4GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 2437 MHz is fundamental signal which can be ignored. 9747 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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	100.41	-	-	99.4	32.24	4.61	35.84	169	273	Average
2437	112.93	-	-	111.92	32.24	4.61	35.84	169	273	Peak
4875	40.84	-33.16	74	58.91	34.28	6.53	58.88	100	0	Peak
7311	45.51	-28.49	74	59.04	36.04	8.42	57.99	100	0	Peak
9747	45.39	-47.54	92.93	54.58	37.21	9.49	55.89	100	0	Peak



Test Mode :	2.4GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 2464 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	33.53	-6.47	40	45.77	18.7	0.7	31.64	100	95	Peak
44.85	27.19	-12.81	40	46.85	11.1	0.77	31.53	-	-	Peak
281.37	23.11	-22.89	46	39.71	12.83	1.74	31.17	-	-	Peak
419.7	25.72	-20.28	46	38.22	16.5	2.06	31.06	-	-	Peak
540.1	26.21	-19.79	46	36.37	18.5	2.31	30.97	-	-	Peak
781.6	25	-21	46	30.09	22.06	2.8	29.95	-	-	Peak
2464	98.33	-	-	97.28	32.26	4.62	35.83	110	236	Average
2464	110.76	-	-	109.71	32.26	4.62	35.83	110	236	Peak
4923	41.76	-32.24	74	59.66	34.29	6.55	58.74	100	0	Peak
7386	43.79	-30.21	74	57.35	36.02	8.55	58.13	100	0	Peak



Test Mode :	2.4GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 2460 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
42.42	23.42	-16.58	40	42.2	12.02	0.76	31.56	-	-	Peak
53.49	26.25	-13.75	40	49.56	7.36	0.82	31.49	121	44	Peak
209.01	19.36	-24.14	43.5	40.06	8.98	1.5	31.18	-	-	Peak
540.1	21.89	-24.11	46	32.05	18.5	2.31	30.97	-	-	Peak
600.3	24.77	-21.23	46	33.05	19.7	2.42	30.4	-	-	Peak
728.4	23.92	-22.08	46	29.68	21.73	2.71	30.2	-	-	Peak
2460	97.71	-	-	96.66	32.26	4.62	35.83	200	275	Average
2460	110.26	-	-	109.21	32.26	4.62	35.83	200	275	Peak
4924	42.02	-31.98	74	59.91	34.29	6.56	58.74	100	0	Peak
7386	44.9	-29.1	74	58.46	36.02	8.55	58.13	100	0	Peak



Test Mode :	802.11a	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 5746 MHz is fundamental signal which can be ignored. 8618 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
5746	96.49	-	-	89.06	35.09	7.19	34.85	107	233	Average
5746	108.31	-	-	100.88	35.09	7.19	34.85	107	233	Peak
8618	46.93	-41.38	88.31	57.93	36.29	9.4	56.69	100	0	Peak
11490	45.93	-28.07	74	52.4	38.48	10.26	55.21	100	0	Peak

Test Mode :	802.11a	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 5742 MHz is fundamental signal which can be ignored. 8618 MHz and 17238 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. 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
5742	97.8	-	-	90.37	35.09	7.19	34.85	103	149	Average
5742	109.26	-	-	101.83	35.09	7.19	34.85	103	149	Peak
8618	46.68	-42.58	89.26	57.68	36.29	9.4	56.69	100	0	Peak
11490	47.13	-26.87	74	53.6	38.48	10.26	55.21	100	0	Peak
17238	49.47	-39.79	89.26	52.24	41.42	12.69	56.88	100	0	Peak



Test Mode :	802.11a	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 5784 MHz is fundamental signal which can be ignored. 8678 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
5784	96.2	-	-	88.71	35.13	7.22	34.86	107	234	Average
5784	107.69	-	-	100.2	35.13	7.22	34.86	107	234	Peak
8678	46.79	-40.9	87.69	57.6	36.35	9.41	56.57	100	0	Peak
11571	47.8	-26.2	74	54.24	38.56	10.3	55.3	100	0	Peak

Test Mode :	802.11a	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 5782 MHz is fundamental signal which can be ignored. 8678 MHz and 17358 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. 		

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
5782	97.83	-	-	90.34	35.13	7.22	34.86	102	150	Average
5782	109.6	-	-	102.11	35.13	7.22	34.86	102	150	Peak
8678	47.91	-41.69	89.6	58.72	36.35	9.41	56.57	100	0	Peak
11571	47.86	-26.14	74	54.3	38.56	10.3	55.3	100	0	Peak
17358	50.63	-38.97	89.6	53.68	41.28	12.88	57.21	100	0	Peak



Test Mode :	802.11a	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 5824 MHz is fundamental signal which can be ignored. 8738 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
5824	96.15	-	-	88.56	35.19	7.27	34.87	157	235	Average
5824	107.79	-	-	100.2	35.19	7.27	34.87	157	235	Peak
8738	47.21	-40.58	87.79	57.87	36.39	9.42	56.47	100	0	Peak
11649	45.86	-28.14	74	52.27	38.61	10.37	55.39	100	0	Peak

Test Mode :	802.11a	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 5826 MHz is fundamental signal which can be ignored. 8740 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
5826	97.5	-	-	89.91	35.19	7.27	34.87	100	148	Average
5826	109.15	-	-	101.56	35.19	7.27	34.87	100	148	Peak
8740	48.7	-40.45	89.15	59.36	36.39	9.42	56.47	100	0	Peak
11649	45.84	-28.16	74	52.25	38.61	10.37	55.39	100	0	Peak



Test Mode :	5GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 5744 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	32.16	-7.84	40	44.4	18.7	0.7	31.64	100	73	Peak
180.12	12.62	-30.88	43.5	33.39	8.8	1.4	30.97	-	-	Peak
281.91	22.4	-23.6	46	38.97	12.86	1.74	31.17	-	-	Peak
419.7	25.54	-20.46	46	38.04	16.5	2.06	31.06	-	-	Peak
479.9	24.85	-21.15	46	35.76	17.6	2.19	30.7	-	-	Peak
540.1	26.52	-19.48	46	36.68	18.5	2.31	30.97	-	-	Peak
5744	97.02	-	-	89.59	35.09	7.19	34.85	106	233	Average
5744	109.13	-	-	101.7	35.09	7.19	34.85	106	233	Peak
11490	45.86	-28.14	74	52.33	38.48	10.26	55.21	100	0	Peak



Test Mode :	5GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 5742 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	20.05	-19.95	40	32.82	18.16	0.71	31.64	104	107	Peak
55.11	12.53	-27.47	40	36.64	6.6	0.83	31.54	-	-	Peak
233.31	20.32	-25.68	46	39.18	10.48	1.59	30.93	-	-	Peak
419.7	21.59	-24.41	46	34.09	16.5	2.06	31.06	-	-	Peak
599.6	24.99	-21.01	46	33.29	19.69	2.42	30.41	-	-	Peak
752.2	24.8	-21.2	46	30.13	22.1	2.75	30.18	-	-	Peak
5742	97.13	-	-	89.7	35.09	7.19	34.85	103	150	Average
5742	109.54	-	-	102.11	35.09	7.19	34.85	103	150	Peak
11490	45.29	-28.71	74	51.76	38.48	10.26	55.21	100	0	Peak



Test Mode :	5GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	1. 5782 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
5782	95.78	-	-	88.29	35.13	7.22	34.86	106	233	Average
5782	108.2	-	-	100.71	35.13	7.22	34.86	106	233	Peak
11571	45.65	-28.35	74	52.09	38.56	10.3	55.3	100	0	Peak

Test Mode :	5GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	1. 5782 MHz is fundamental signal which can be ignored. 2. 8678 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5782	97.47	-	-	89.98	35.13	7.22	34.86	102	149	Average
5782	109.35	-	-	101.86	35.13	7.22	34.86	102	149	Peak
8678	47.74	-41.61	89.35	58.55	36.35	9.41	56.57	100	0	Peak
11571	46.48	-27.52	74	52.92	38.56	10.3	55.3	100	0	Peak



Test Mode :	5GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	<ol style="list-style-type: none"> 5828 MHz is fundamental signal which can be ignored. 8740 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
5828	95.54	-	-	87.95	35.19	7.27	34.87	152	236	Average
5828	107.44	-	-	99.85	35.19	7.27	34.87	152	236	Peak
8740	46.01	-41.43	87.44	56.67	36.39	9.42	56.47	100	0	Peak
11652	46.44	-27.56	74	52.86	38.62	10.37	55.41	100	0	Peak

Test Mode :	5GHz 802.11n-HT20	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	53~55%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	<ol style="list-style-type: none"> 5822 MHz is fundamental signal which can be ignored. 8738 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 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
5822	97.93	-	-	90.34	35.19	7.27	34.87	100	149	Average
5822	109.78	-	-	102.19	35.19	7.27	34.87	100	149	Peak
8738	47.32	-42.46	89.78	57.98	36.39	9.42	56.47	100	0	Peak
11652	46.81	-27.19	74	53.23	38.62	10.37	55.41	100	0	Peak

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

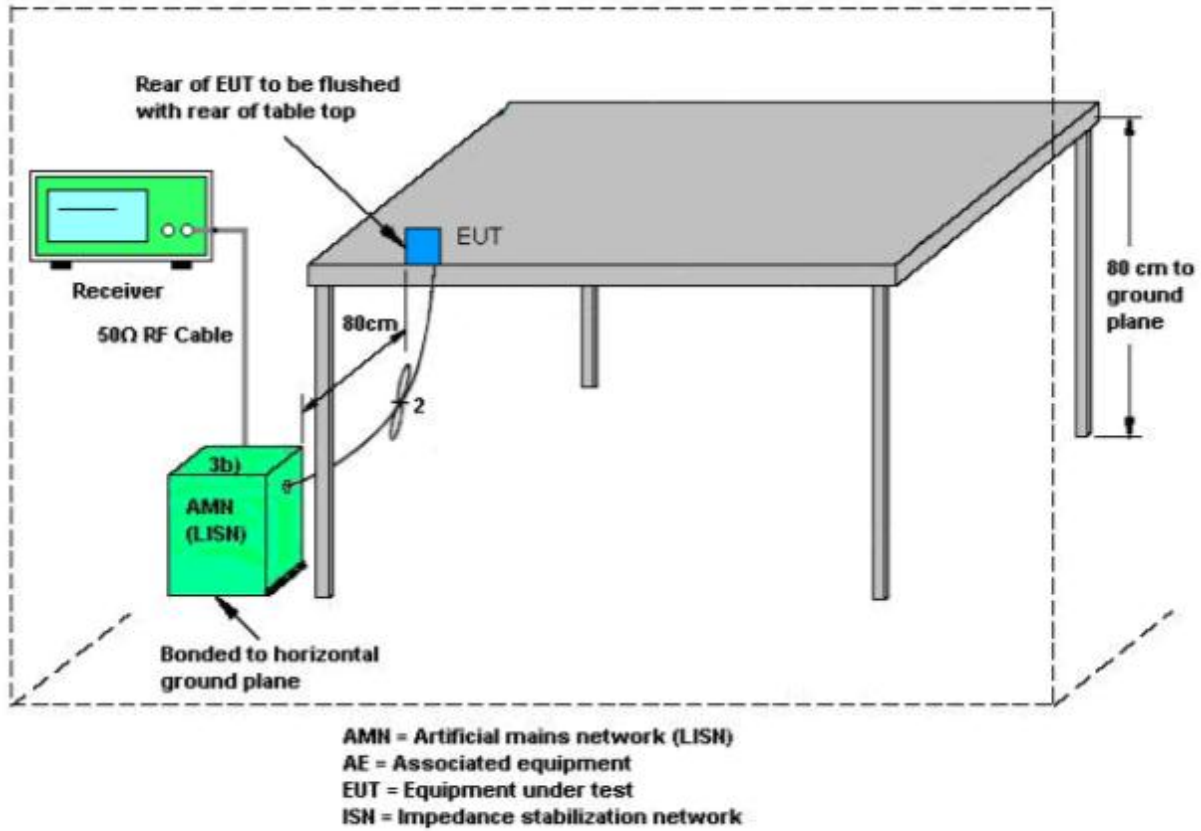
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

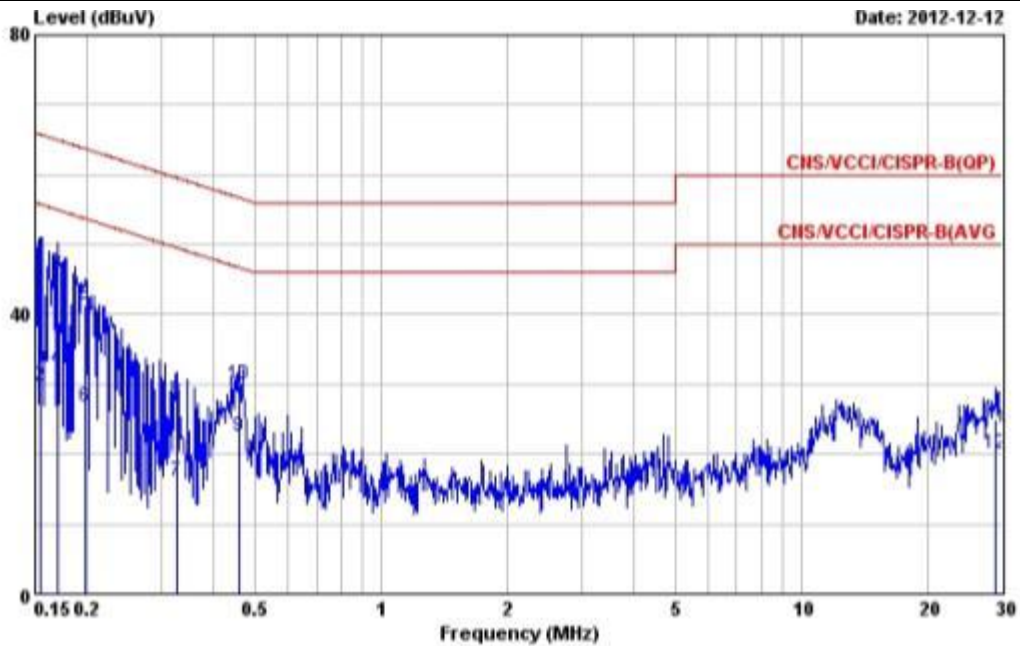
1. The testing follows the guidelines in ANSI C63.4-2003 and ANSI C63.10-2009.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance 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 :	24~25°C
Test Engineer :	Peter Lin	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + MSR (Barcode Scanner) + Scanner (Touch Screen) + MPEG4 + Earphone (Audio In) + Camera (Video) + SD Card (Data Copy) + USB flash drive (Data Copy) + RJ45 Load		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

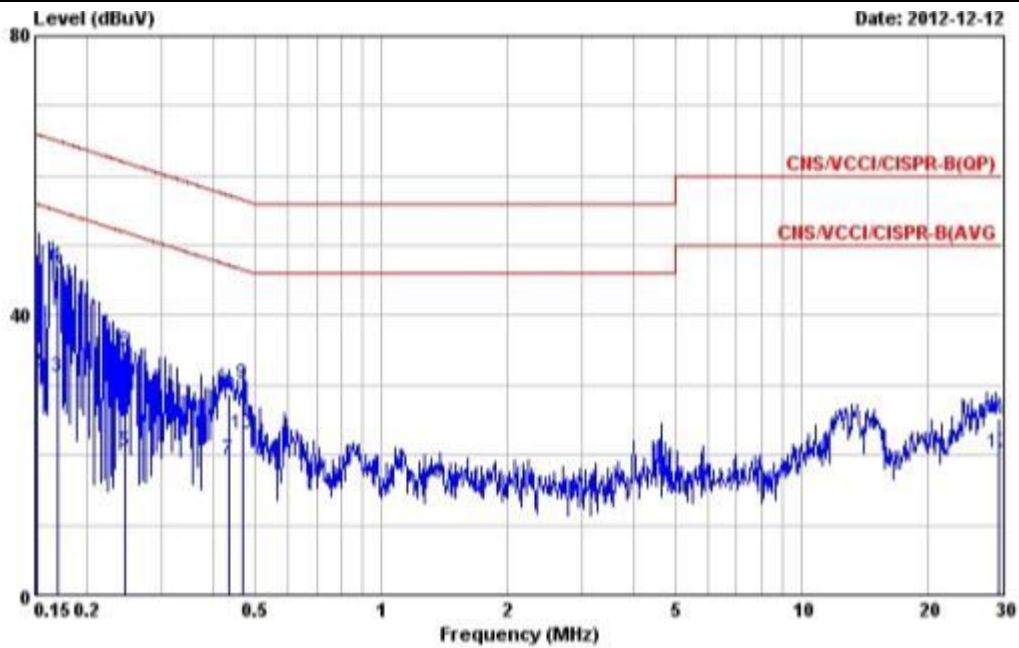


Site : CO01-LK
 Condition : LISN NNB-2/16Z 99081 LINE
 EUT : CCHUB1
 MODEL :
 POWER : 120VAC/60Hz
 MEMO : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.154	47.45	-18.33	65.78	47.27	0.14	0.04	QP
2	0.154	29.68	-26.10	55.78	29.50	0.14	0.04	Average
3	0.170	45.75	-19.21	64.96	45.57	0.14	0.04	QP
4	0.170	32.88	-22.88	54.96	31.90	0.14	0.04	Average
5	0.198	41.45	-22.24	63.69	41.27	0.14	0.04	QP
6	0.198	26.82	-26.87	53.69	26.64	0.14	0.04	Average
7	0.325	16.15	-33.43	49.58	15.95	0.15	0.05	Average
8	0.325	27.60	-31.98	59.58	27.40	0.15	0.05	QP
9	0.459	22.66	-24.05	46.71	22.42	0.15	0.09	Average
10	0.459	29.90	-26.81	56.71	29.66	0.15	0.09	QP
11	28.910	25.89	-34.91	60.00	23.95	0.54	0.60	QP
12	28.910	19.99	-30.01	50.00	18.85	0.54	0.60	Average



Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Peter Lin	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + MSR (Barcode Scanner) + Scanner (Touch Screen) + MPEG4 + Earphone (Audio In) + Camera (Video) + SD Card (Data Copy) + USB flash drive (Data Copy) + RJ45 Load		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-LK
 Condition : LISN NNB-2/16Z 99081 NEUTRAL
 EUT : CCHUB1
 MODEL :
 POWER : 120VAC/60Hz
 MEMO : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	47.59	-18.30	65.89	47.40	0.15	0.04	QP
2	0.152	31.99	-23.90	55.89	31.80	0.15	0.04	Average
3	0.169	31.13	-23.88	55.01	30.94	0.15	0.04	Average
4	0.169	47.12	-17.89	65.01	46.93	0.15	0.04	QP
5	0.245	20.51	-31.43	51.94	20.32	0.15	0.04	Average
6	0.245	34.86	-27.08	61.94	34.67	0.15	0.04	QP
7	0.433	19.41	-27.78	47.19	19.19	0.15	0.07	Average
8	0.433	28.73	-28.46	57.19	28.51	0.15	0.07	QP
9	0.469	30.25	-26.28	56.53	30.01	0.15	0.09	QP
10	0.469	23.09	-23.44	46.53	22.85	0.15	0.09	Average
11	29.370	25.29	-34.71	60.00	24.05	0.64	0.60	QP
12	29.370	20.23	-29.77	50.00	18.99	0.64	0.60	Average



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	100055	9kHz~40GHz	Jun. 06, 2012	Dec. 18, 2012 ~ Dec. 24, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Sep. 08, 2012	Dec. 18, 2012 ~ Dec. 24, 2012	Sep. 07, 2013	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Sep. 08, 2012	Dec. 18, 2012 ~ Dec. 24, 2012	Sep. 07, 2013	Conducted (TH02-HY)
Test Receiver	R&S	ESCS 30	838251/004	9 kHz ~ 2.75 GHz	Feb. 02, 2012	Dec. 12, 2012	Feb. 01, 2013	Conduction (CO01-LK)
LISN	R&S	NNB-2/16Z	99081	9 kHz ~ 30 MHz	Apr. 11, 2012	Dec. 12, 2012	Apr. 10, 2013	Conduction (CO01-LK)
RF Cable-CON	Suhner Switzerland	RG223/U	CB017	9 kHz ~ 30 MHz	Nov. 01, 2012	Dec. 12, 2012	Oct. 31, 2013	Conduction (CO01-LK)
ISN	TESEQ GMBH	ISN T400A	25669	150kHz - 30MHz	Oct. 15, 2012	Dec. 12, 2012	Oct. 14, 2013	Conduction (CO01-LK)
ISN	TESEQ GMBH	ISN T800	26105	150kHz - 30MHz	Oct. 15, 2012	Dec. 12, 2012	Oct. 14, 2013	Conduction (CO01-LK)
ISN	TESEQ GMBH	ST08	24347	150kHz~230MHz	Oct. 16, 2012	Dec. 12, 2012	Oct. 15, 2013	Conduction (CO01-LK)
Spectrum Analyzer	R&S	ESU26	100390	20Hz~26.5GHz	Dec. 14, 2012	Dec. 19, 2012 ~ Dec. 22, 2012	Dec. 13, 2013	Radiation (03CH05-HY)
Bilog Antenna	Schaffner	CBL6111C	2725	30MHz~2GHz	Oct. 06, 2012	Dec. 19, 2012 ~ Dec. 22, 2012	Oct. 05, 2013	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	Dec. 19, 2012 ~ Dec. 22, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	Dec. 19, 2012 ~ Dec. 22, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 10, 2012	Dec. 19, 2012 ~ Dec. 22, 2012	Aug. 09, 2013	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A02665	1GHz~26.5GHz	Aug. 28, 2012	Dec. 19, 2012 ~ Dec. 22, 2012	Aug. 27, 2013	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz ~ 40GHz	Sep. 28, 2012	Dec. 19, 2012 ~ Dec. 22, 2012	Sep. 27, 2013	Radiation (03CH05-HY)
Pre Amplifier	COM-POWER	PA-103	161075	10-1000MHz. 32dB.GAIN	Feb. 27, 2012	Dec. 19, 2012 ~ Dec. 22, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz ~ 30MHz	Jul. 03, 2012	Dec. 19, 2012 ~ Dec. 22, 2012	Jul. 02, 2013	Radiation (03CH05-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

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

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