

FCC RF Test Report

APPLICANT : Hewlett-Packard Company
EQUIPMENT : 2x2 802.11a/b/g/n - BT Combo SDIO module
BRAND NAME : hp
MODEL NAME : HSTNN-QR03
FCC ID : B94HNQR03
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Aug. 23, 2012 and completely tested on Sep. 07, 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:



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DTS v1.0

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TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test	5
1.4 Testing Site	7
1.5 Applied Standards	7
1.6 Ancillary Equipment List	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Carrier Frequency and Channel	8
2.2 Pre-Scanned RF Power	9
2.3 Antenna Information	12
2.4 Test Mode	13
2.5 Connection Diagram of Test System	15
2.6 RF Utility	16
3 TEST RESULT	17
3.1 6dB and 99% Bandwidth Measurement	17
3.2 Output Power Measurement	56
3.3 Power Spectral Density Measurement	62
3.4 Conducted Band Edges and Spurious Emission Measurement	83
3.5 Radiated Band Edges and Spurious Emission Measurement	132
3.6 AC Conducted Emission Measurement	169
3.7 Antenna Requirements	173
4 LIST OF MEASURING EQUIPMENT	174
5 UNCERTAINTY OF EVALUATION	175
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR282317C	Rev. 01	Initial issue of report	Sep. 18, 2012
FR282317C	Rev. 02	Update report for section 1.3 and antenna information	Oct. 03, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.1	-	Gen 4.6.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)	A8.4	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm/3kHz}$	Pass	-
3.2.6	15.247(d)	A8.5	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	
			Conducted Spurious Emission		Pass	
3.2.6	15.247(d)	A8.5	Radiated Band Edges	15.209(a) & 15.247(d)	Pass	Under limit 0.18 dB at 2390.000 MHz
			Radiated Spurious Emission		Pass	
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 12.10 dB at 0.158.000 MHz
3.6	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Hewlett-Packard Company

3000 Hanover Street, Palo Alto, California 94304, USA

1.2 Manufacturer

Qualcomm Atheros

1700 Technology Drive, San Jose, CA95110, United States

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	2x2 802.11a/b/g/n - BT Combo SDIO module
Brand Name	hp
Model Name	HSTNN-QR03
FCC ID	B94HNQR03
Radios application	WLAN 11abgn / Bluetooth
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.

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		<2400 MHz ~ 2483.5 MHz> 802.11b : 21.01 dBm (0.1262 W) 802.11g : 24.59 dBm (0.2877 W) 802.11n HT20(400GI): 24.38 dBm (0.2742 W) 802.11n HT20(800GI): 24.40 dBm (0.2754 W) <5725 MHz ~ 5850 MHz> 802.11a : 19.27 dBm (0.0845 W) 802.11n HT20(400GI): 18.73 dBm (0.0746 W) 802.11n HT20(800GI): 19.43 dBm (0.0877 W) 802.11n HT40(400GI): 18.72 dBm (0.0745 W) 802.11n HT40(800GI): 18.82 dBm (0.0762 W)		
99% Occupied Bandwidth		<2412 MHz ~ 2462 MHz> <Ant. 0+1(0)> 802.11b : 12.70MHz 802.11g : 18.70MHz 802.11n HT20 : 19.65MHz <Ant. 0+1(1)> 802.11b : 12.60MHz 802.11g : 18.90MHz 802.11n HT20 : 19.80MHz <5745 MHz ~ 5825 MHz> <Ant. 0+1(0)> 802.11a : 25.45MHz 802.11n HT20 : 21.15MHz 802.11n HT40 : 42.30MHz <Ant. 0+1(1)> 802.11a : 26.80MHz 802.11n HT20 : 24.60MHz 802.11n HT40 : 54.80MHz		
Antenna Type		<2.4G> PIFA Antenna with gain 3.62 dBi <5G> PIFA Antenna with gain 4.76 dBi		
Type of Modulation		802.11b : DSSS (BPSK / QPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function for Transmitter				
	SISO		MIMO	
	Ant. 0	Ant.1	Ant. 0	Ant.1
802.11 b	Yes	No	Yes	Yes
802.11 g	Yes	No	Yes	Yes
802.11 a	Yes	No	Yes	Yes
802.11 n	Yes	No	Yes	Yes

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.			
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH02-HY	CO05-HY	03CH05-HY	722060/4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01
- ♦ TCB Workshop 2012, April
- ♦ ANSI C63.4-2003 and ANSI C63.10-2009
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3

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.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
3.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz) and radiated emission (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane for 5GHz & Y plane for 2.4G) were recorded in this report.

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

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

For 802.11n GI 800/400 ns conducted power mode, the worst case were fall on 800ns, so all test items were tested by using GI 800ns mode.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

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

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.

<MIMO Ant. 0+1(0)>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	18.14	18.13	17.87	18.00

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	21.63	21.59	21.30	21.45	21.29	21.31	21.48	21.37

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	21.49	21.43	21.44	21.41	21.37	21.37	21.32	21.41
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	21.45	21.43	21.37	21.30	21.33	21.41	21.42	21.37

802.11a								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	16.30	16.23	15.93	15.90	16.22	16.09	16.12	16.14

5GHz 802.11n HT20								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Peak Power (dBm)	16.33	16.22	15.62	15.65	15.73	16.20	16.15	16.33
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	15.26	15.23	15.42	15.00	15.96	15.79	15.89	15.96

5GHz 802.11n HT40								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Peak Power (dBm)	15.57	15.17	15.45	14.73	14.47	14.30	14.22	14.51
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	14.11	13.83	13.63	13.54	13.58	13.05	13.28	13.51

<MIMO Ant. 0+1(1)>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	17.85	17.69	17.72	17.65

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	21.53	21.46	21.37	21.39	21.34	21.35	21.30	21.27

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	21.29	21.19	21.27	21.22	21.23	21.27	21.20	21.16
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	21.23	21.12	21.10	21.12	21.00	20.98	20.90	21.04

802.11a								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	16.21	16.17	16.12	16.16	16.10	16.16	16.18	16.20

5GHz 802.11n HT20								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Peak Power (dBm)	16.50	16.45	16.36	16.39	16.38	16.35	16.45	16.47
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	16.32	16.15	16.13	16.05	16.23	16.12	16.03	16.34

5GHz 802.11n HT40								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Peak Power (dBm)	16.04	15.75	15.97	15.83	14.87	15.33	15.11	15.48
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	15.36	14.56	14.72	14.58	14.49	14.00	14.01	13.60

<MIMO Ant. 0+1>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	21.01	20.93	20.81	20.84

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	24.59	24.54	24.35	24.43	24.33	24.34	24.40	24.33

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	24.40	24.32	24.37	24.33	24.31	24.33	24.27	24.30
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	24.35	24.29	24.25	24.22	24.18	24.21	24.18	24.22

802.11a								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	19.27	19.21	19.04	19.04	19.17	19.14	19.16	19.18

5GHz 802.11n HT20								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Peak Power (dBm)	19.43	19.35	19.02	19.05	19.08	19.29	19.31	19.41
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	18.83	18.72	18.80	18.57	19.11	18.97	18.97	19.16

5GHz 802.11n HT40								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Peak Power (dBm)	18.82	18.48	18.73	18.33	17.68	17.86	17.70	18.03
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm)	17.79	17.22	17.22	17.10	17.07	16.56	16.67	16.57

Note:

1. MIMO Ant 0+1 is a calculated result from sum of the power MIMO Ant 0 and MIMO Ant 1.
2. SISO Ant 0 power setting = MIMO Ant 0+1(0) power setting

2.3 Antenna Information

Brand / Model Name	Type	Frequency Range (MHz)	Antenna Gain (dBi)	Directional Gain (dBi)
Wistron Neweb Corporation / EBJ Aux. + EBJ Aux.	PIFA	2400 ~ 2483.5	3.62	6.63
Wistron Neweb Corporation / EBJ Main + EBJ Main	PIFA	5725 ~ 5850	4.76	7.77

	Antenna port 0	Antenna port 1	Note
1X1+BT	11a/b/g/n(MCS0~7)	BT	WLAN/BT concurrent
2X2+BT	11a/b/g/n(MCS0~15)	11a/b/g/n(MCS0~15) +BT	WLAN/BT timely share Antenna port 1
2X2 WLAN only	11a/b/g/n(MCS0~15)	11a/b/g/n(MCS0~15)	
2X2 WLAN 5G+BT	11a/n(MCS0~15)	11a/n(MCS0~15)+BT	WLAN/BT concurrent

2.4 Test Mode

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

<2.4GHz>

Test Cases				
Conducted TCs	Test Items	Mode	Data Rate	Test Channel
	6dB and 99% BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	6.5 Mbps	1/6/11
		802.11n HT40	13.5 Mbps	3/6/9
	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
		802.11n HT40	13.5 Mbps	3/6/9
	Conducted Band EDGE	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	6.5 Mbps	1/11
		802.11n HT40	13.5 Mbps	3/9
	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
		802.11n HT40	13.5 Mbps	3/6/9
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
		802.11n HT40	13.5 Mbps	3/9
	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
		802.11n HT40	13.5 Mbps	3/6/9

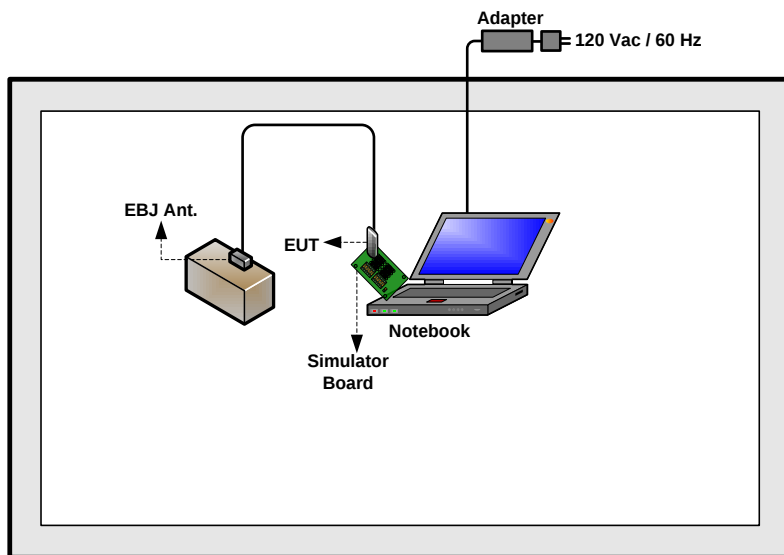
<5GHz>

Test Cases				
Conducted TCs	Test Items	Mode	Data Rate	Test Channel
	6dB and 99% BW Power Spectral Density	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165
		802.11n HT40	13.5 Mbps	151/159
	Output Power	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165
		802.11n HT40	13.5 Mbps	151/159
	Conducted Band EDGE	802.11a	6 Mbps	149/165
		802.11n HT20	6.5 Mbps	149/165
		802.11n HT40	13.5 Mbps	151/159
	Conducted Spurious Emission	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165
		802.11n HT40	13.5 Mbps	151/159
Radiated TCs	Radiated Band EDGE	802.11a	6 Mbps	149/165
		802.11n HT20	6.5 Mbps	149/165
		802.11n HT40	13.5 Mbps	151/159
	Radiated Spurious Emission	802.11a	6 Mbps	149/157/165
		802.11n HT20	6.5 Mbps	149/157/165
		802.11n HT40	13.5 Mbps	151/159

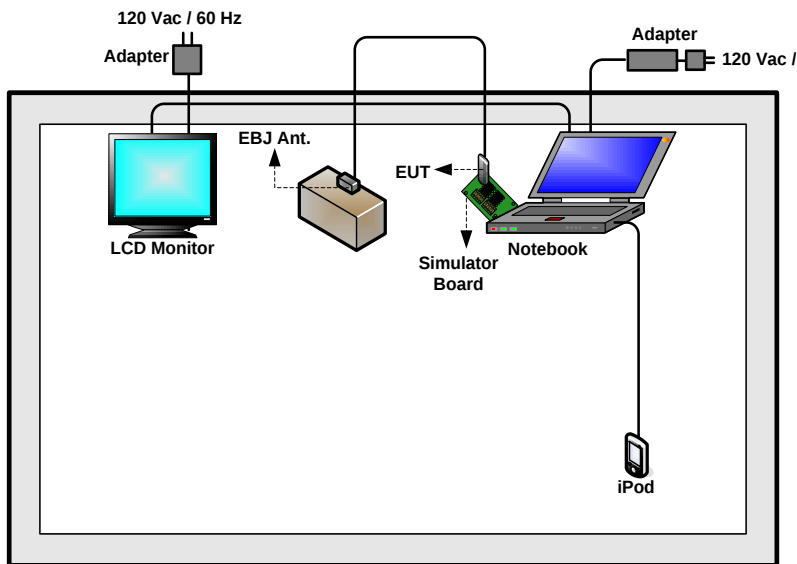
Test Cases	
AC Conducted Emission	Mode 1 : WLAN (2.4G) Tx 11b Ch06 + EBJ Ant. Mode 2 Bluetooth Tx Ch39 + EBJ Ant.
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.	

2.5 Connection Diagram of Test System

<WLAN Tx Mode>



<EUT with Notebook Mode>





2.6 RF Utility

The programmed RF utility “BtUART”, is installed in 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.

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

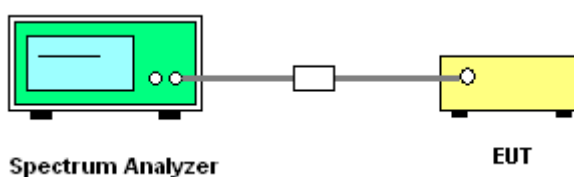
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. 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) = 1-5% of the emission bandwidth (EBW). Set the Video bandwidth (VBW) $\geq 3 * RBW$. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 KHz.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)		
01	2412	7.16	7.20	0.5	Pass
06	2437	7.20	7.60	0.5	Pass
11	2462	7.60	7.64	0.5	Pass

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)		
01	2412	16.44	16.36	0.5	Pass
06	2437	16.44	16.44	0.5	Pass
11	2462	16.48	16.52	0.5	Pass

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)		
01	2412	17.68	17.64	0.5	Pass
06	2437	17.60	17.68	0.5	Pass
11	2462	17.60	17.76	0.5	Pass

Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11a 6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)		
149	5745	16.44	16.48	0.5	Pass
157	5785	16.40	16.44	0.5	Pass
165	5825	16.40	16.48	0.5	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	5GHz 802.11n HT20 6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)		
149	5745	17.48	17.44	0.5	Pass
157	5785	17.48	17.52	0.5	Pass
165	5825	17.60	17.52	0.5	Pass

Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	5GHz 802.11n HT40 6dB Bandwidth (MHz)		6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)		
151	5755	36.40	36.48	0.5	Pass
159	5795	36.08	36.56	0.5	Pass

3.1.6 Test Result of 99% Occupied Bandwidth

Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11b 99% Occupied Bandwidth (MHz)		Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	
01	2412	12.30	12.25	Pass
06	2437	12.60	12.60	Pass
11	2462	12.70	12.40	Pass

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11g 99% Occupied Bandwidth (MHz)		Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	
01	2412	18.10	17.95	Pass
06	2437	18.70	18.90	Pass
11	2462	18.50	18.45	Pass

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	2.4GHz 802.11n HT20 99% Occupied Bandwidth (MHz)		Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	
01	2412	19.20	19.05	Pass
06	2437	19.65	19.80	Pass
11	2462	19.45	19.40	Pass

Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11a 99% Occupied Bandwidth (MHz)		Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	
149	5745	25.45	26.80	Pass
157	5785	18.80	20.85	Pass
165	5825	20.75	24.50	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	5GHz 802.11n HT20 99% Occupied Bandwidth (MHz)		Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	
149	5745	19.65	20.10	Pass
157	5785	19.10	22.15	Pass
165	5825	21.15	24.60	Pass

Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

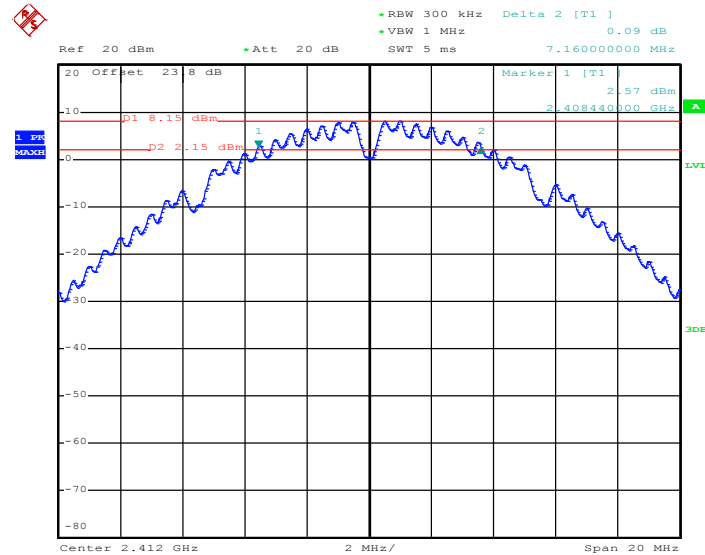
Channel	Frequency (MHz)	5GHz 802.11n HT40 99% Occupied Bandwidth (MHz)		Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	
151	5755	37.10	38.80	Pass
159	5795	42.30	54.80	Pass

3.1.7 Test Result of 6dB Bandwidth Plots

<802.11b>

802.11b –MIMO Ant. 0+1(0)

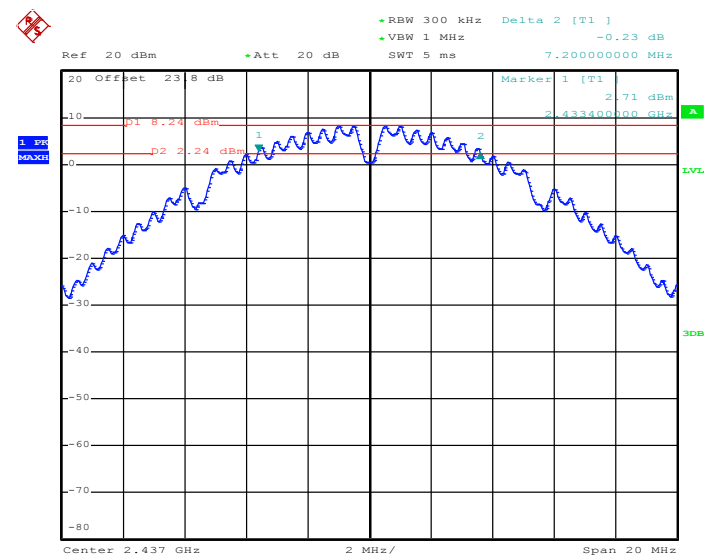
6 dB Bandwidth Plot on Channel 01



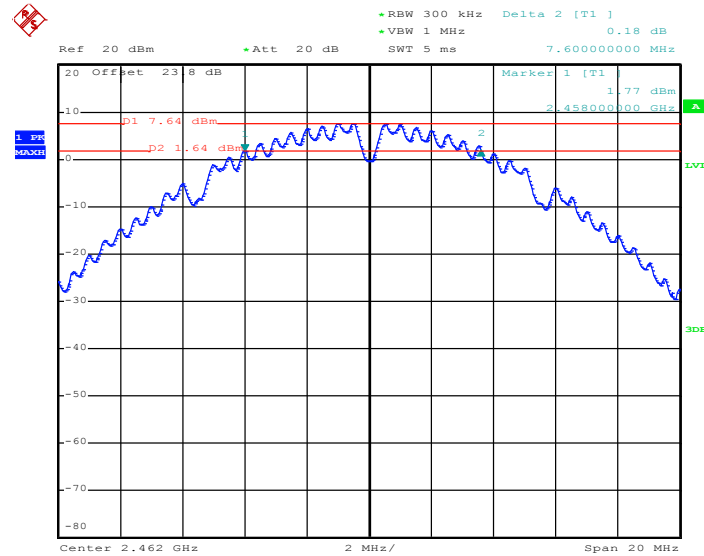
Date: 29.AUG.2012 23:17:07

802.11b –MIMO Ant. 0+1(0)

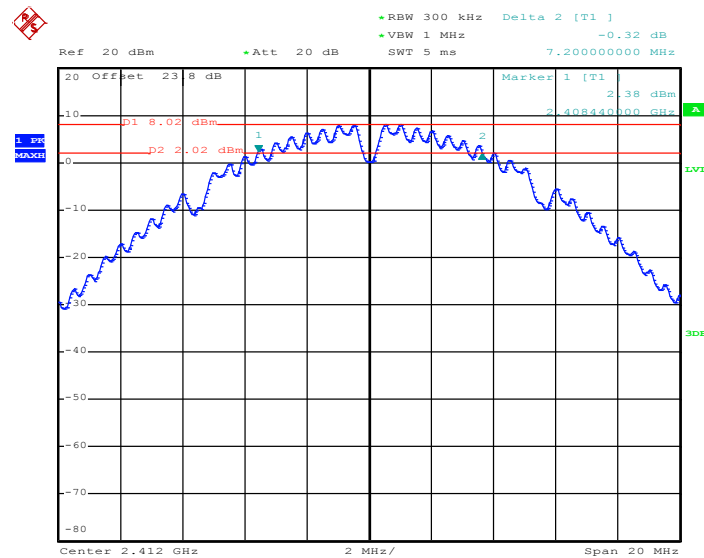
6 dB Bandwidth Plot on Channel 06



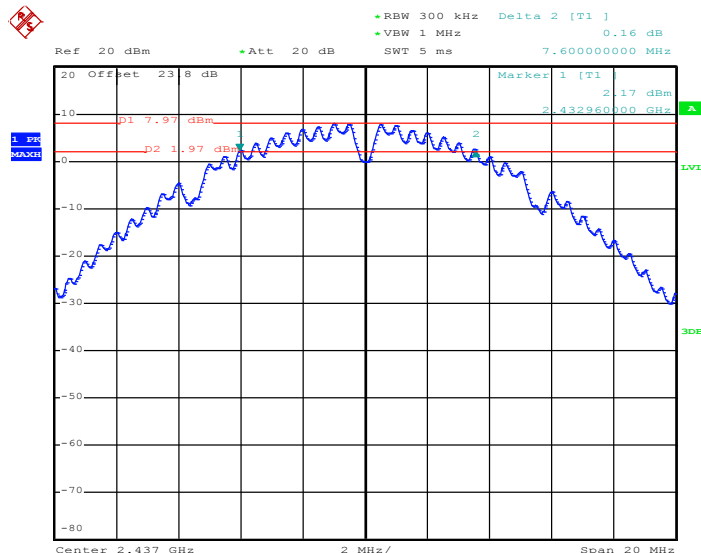
Date: 29.AUG.2012 23:34:49

802.11b –MIMO Ant. 0+1(0)
6 dB Bandwidth Plot on Channel 11


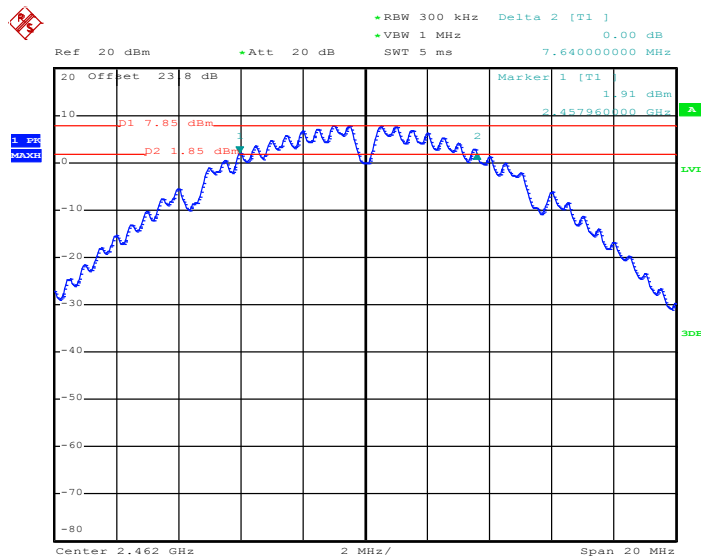
Date: 29.AUG.2012 23:44:13

802.11b –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 01


Date: 29.AUG.2012 23:24:10

802.11b –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 06


Date: 29.AUG.2012 23:31:12

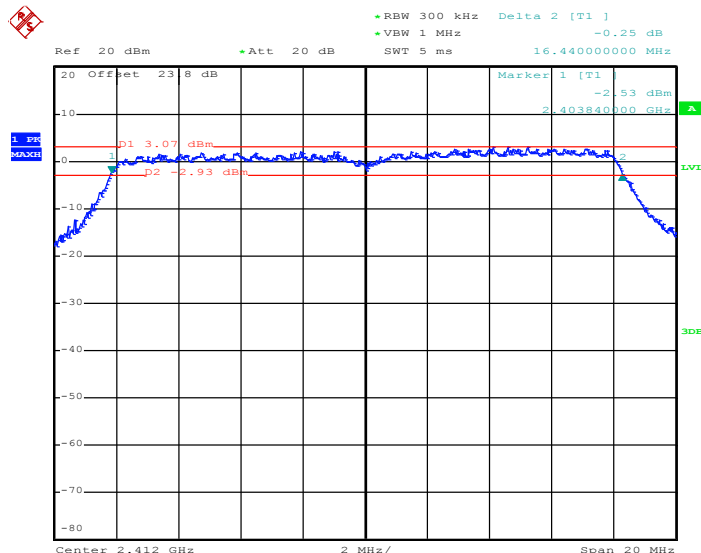
802.11b –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 11


Date: 29.AUG.2012 23:57:03

<802.11g>

802.11g –MIMO Ant. 0+1(0)

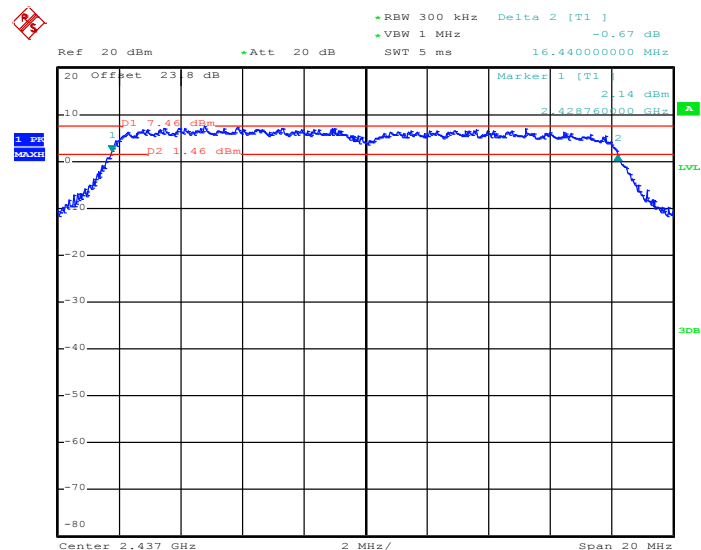
6 dB Bandwidth Plot on Channel 01



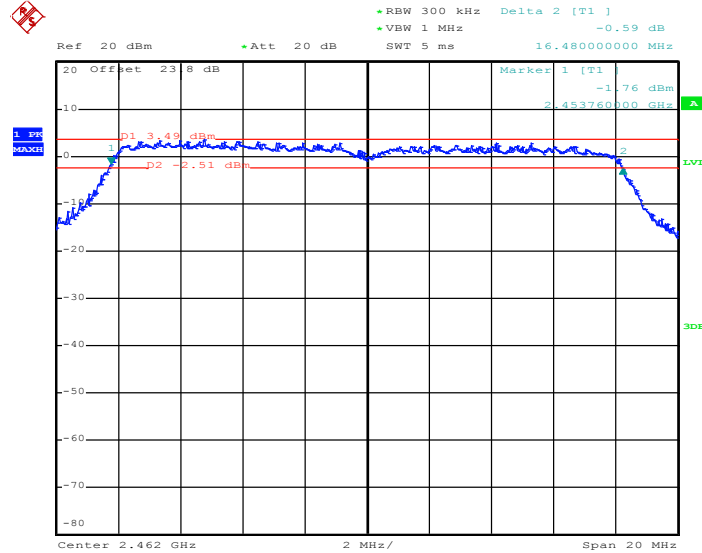
Date: 4.SEP.2012 21:45:25

802.11g –MIMO Ant. 0+1(0)

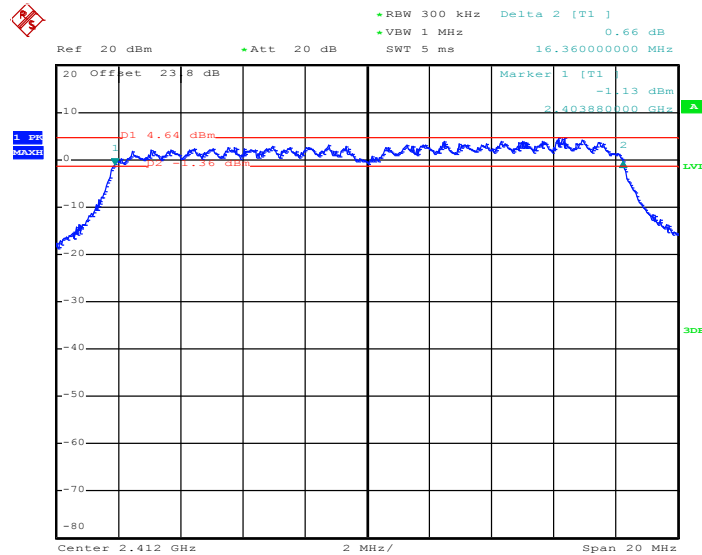
6 dB Bandwidth Plot on Channel 06



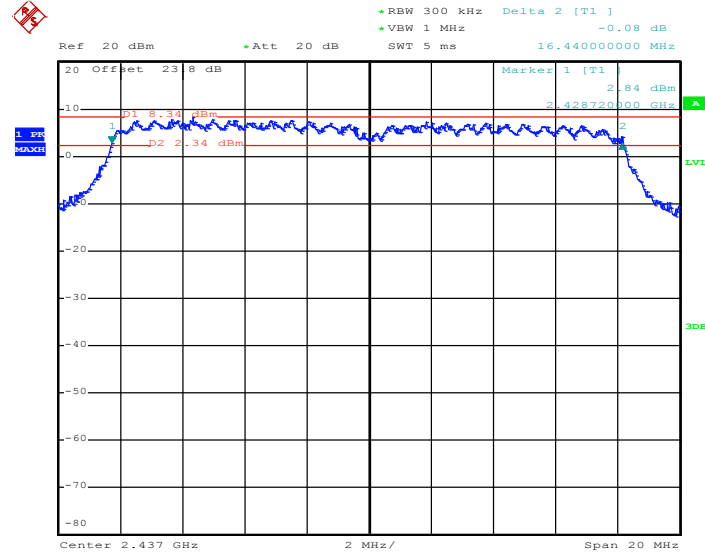
Date: 30.AUG.2012 00:45:47

802.11g –MIMO Ant. 0+1(0)
6 dB Bandwidth Plot Channel 11


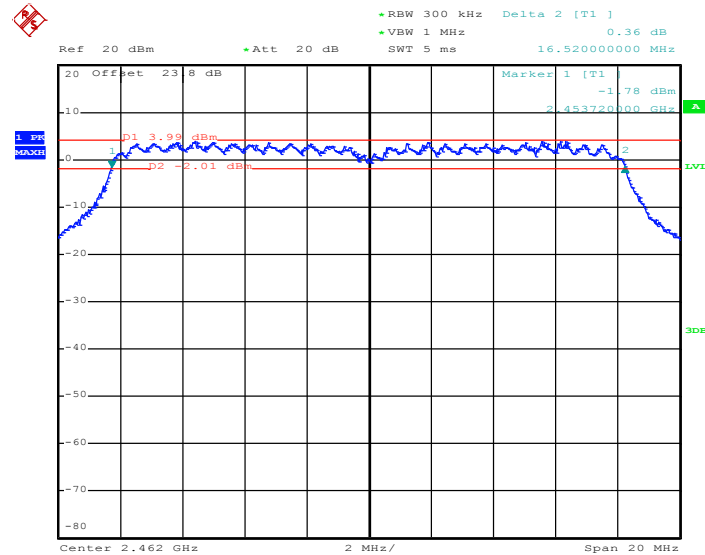
Date: 4.SEP.2012 21:48:52

802.11g –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 01


Date: 4.SEP.2012 22:00:01

802.11g –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 06


Date: 30.AUG.2012 00:49:13

802.11g –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot Channel 11


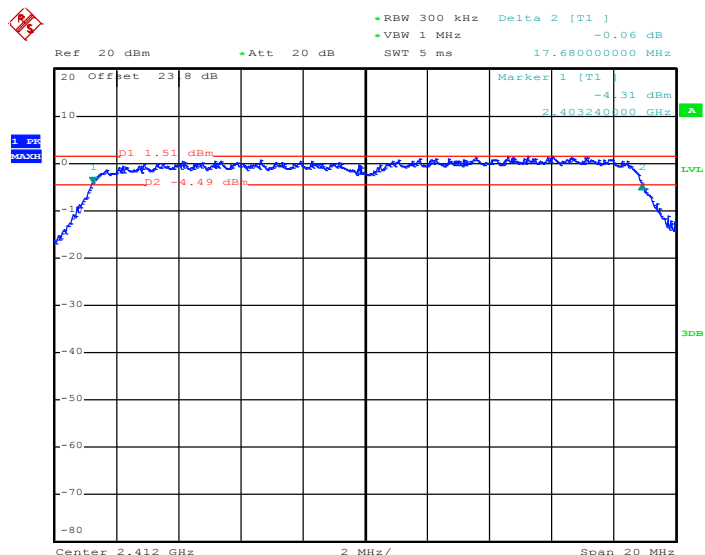
Date: 4.SEP.2012 21:56:55



<2.4GHz 802.11n HT20>

802.11n HT20 –MIMO Ant. 0+1(0)

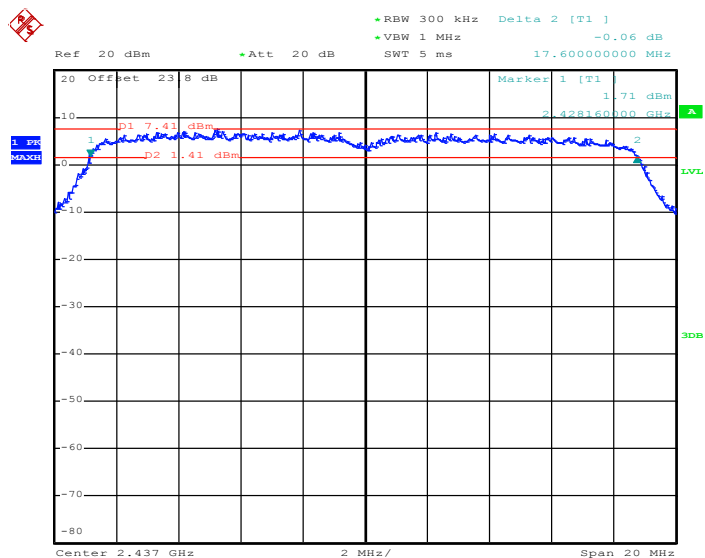
6 dB Bandwidth Plot on Channel 01



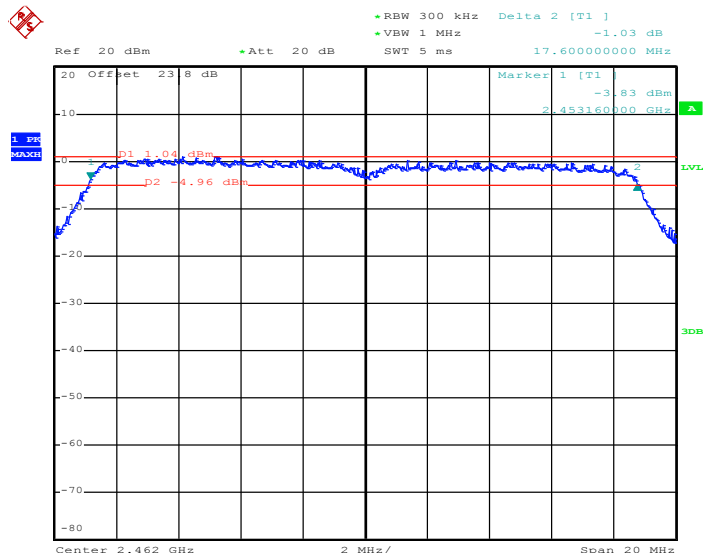
Date: 4.SEP.2012 22:25:27

802.11n HT20 –MIMO Ant. 0+1(0)

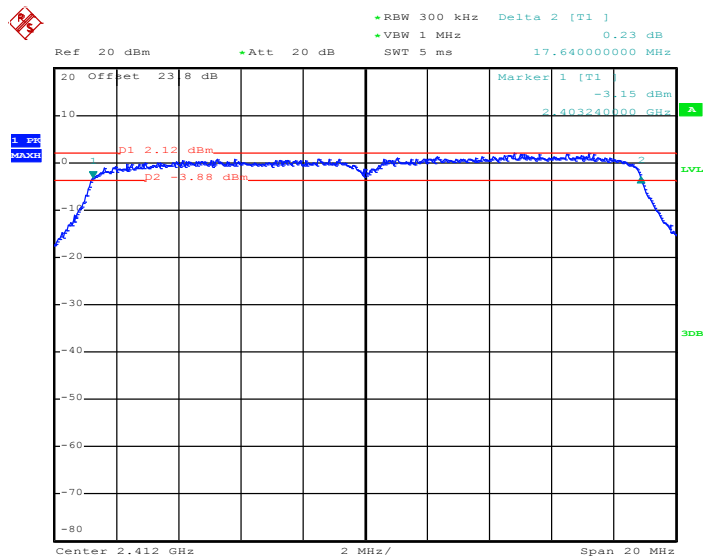
6 dB Bandwidth Plot on Channel 06



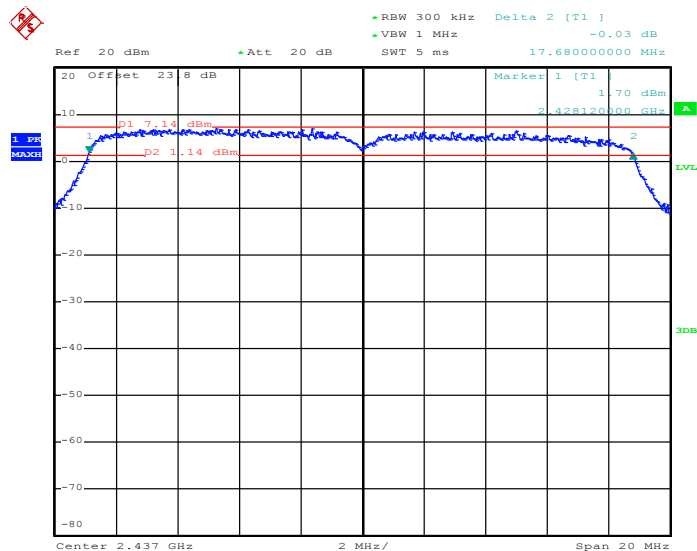
Date: 30.AUG.2012 01:18:42

802.11n HT20 –MIMO Ant. 0+1(0)
6 dB Bandwidth Plot on Channel 11


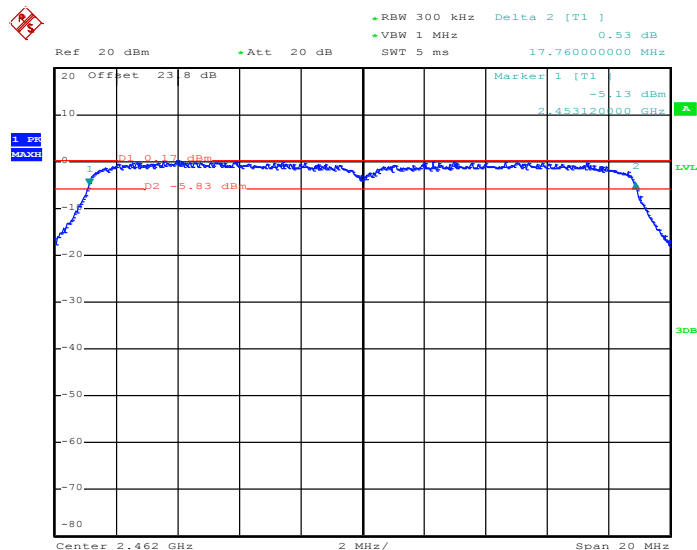
Date: 4.SEP.2012 22:21:45

802.11n HT20 –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 01


Date: 4.SEP.2012 22:05:19

802.11n HT20 –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 06


Date: 30.AUG.2012 01:14:04

802.11n HT20 –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 11


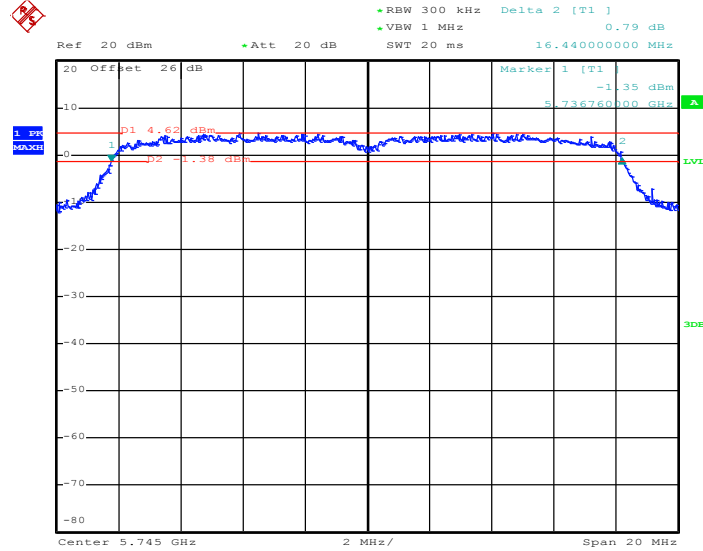
Date: 4.SEP.2012 22:09:51



<802.11a>

802.11a MIMO Ant. 0+1(0)

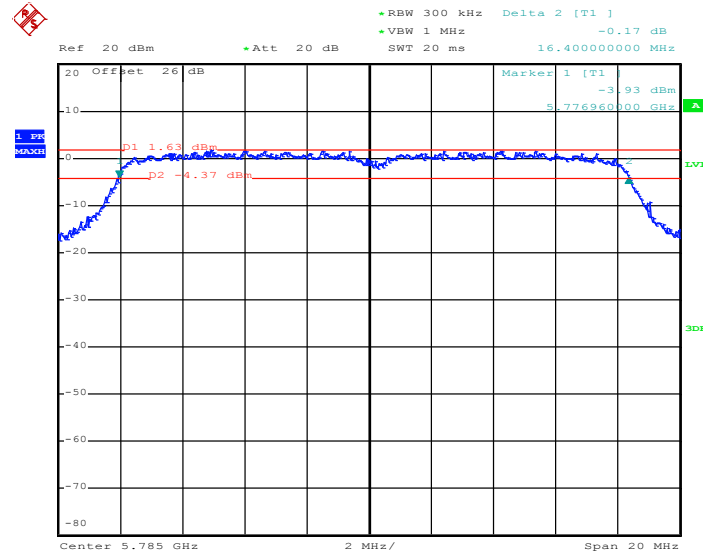
6 dB Bandwidth Plot on Channel 149



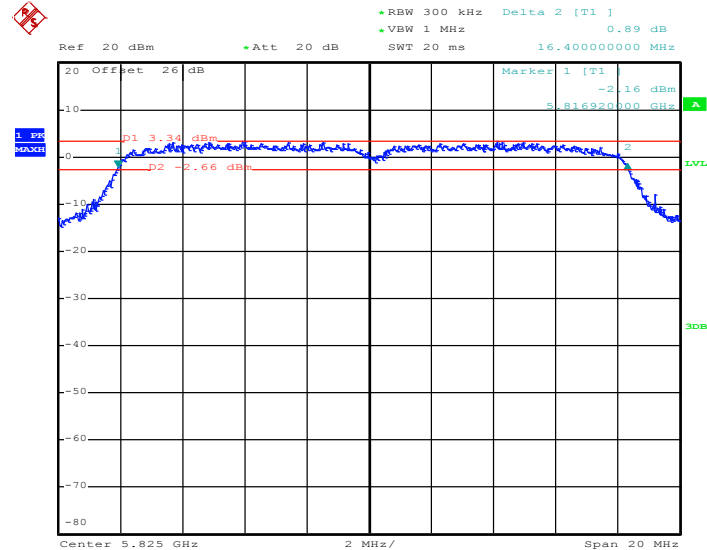
Date: 6.SEP.2012 16:55:36

802.11a MIMO Ant. 0+1(0)

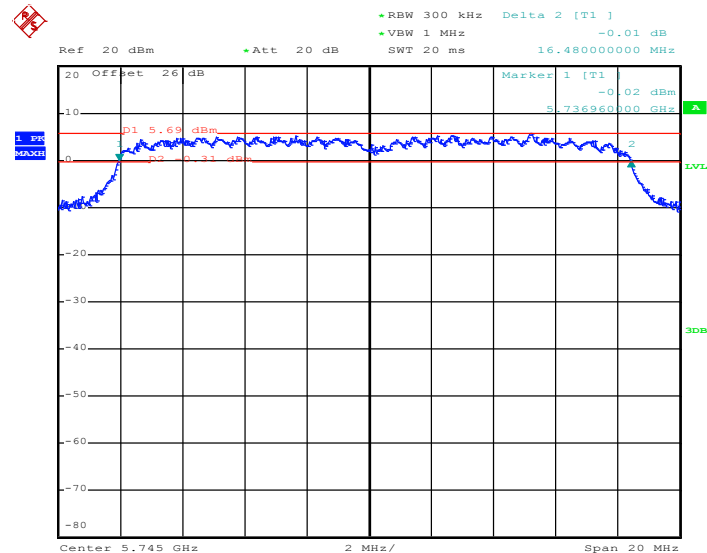
6 dB Bandwidth Plot on Channel 157



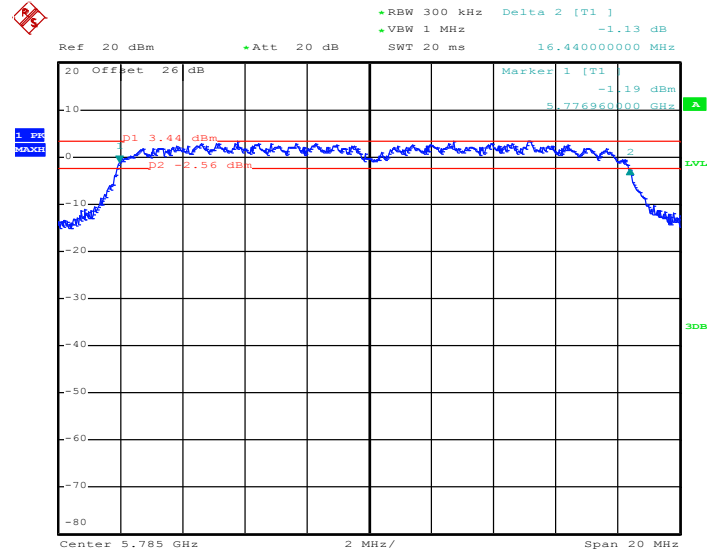
Date: 6.SEP.2012 17:06:27

802.11a MIMO Ant. 0+1(0)
6 dB Bandwidth Plot on Channel 165


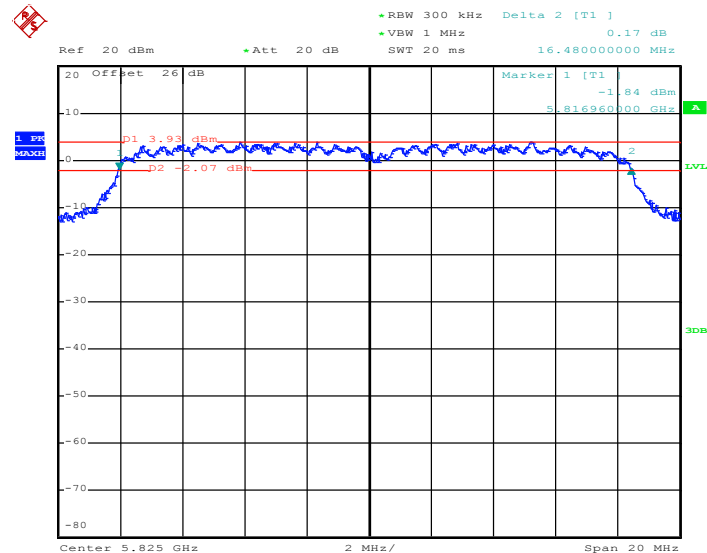
Date: 6.SEP.2012 17:09:39

802.11a MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 149


Date: 6.SEP.2012 17:00:33

802.11a MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 157


Date: 6.SEP.2012 17:03:50

802.11a MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 165


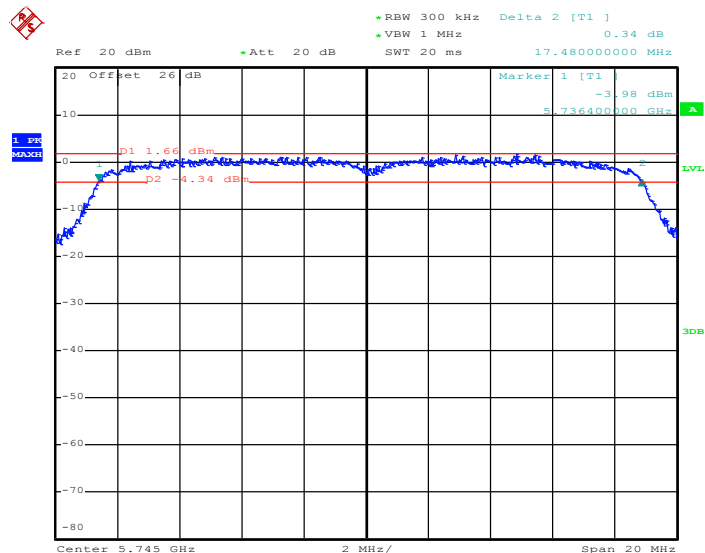
Date: 6.SEP.2012 17:12:52



<5GHz 802.11n HT20>

802.11n HT20 –MIMO Ant. 0+1(0)

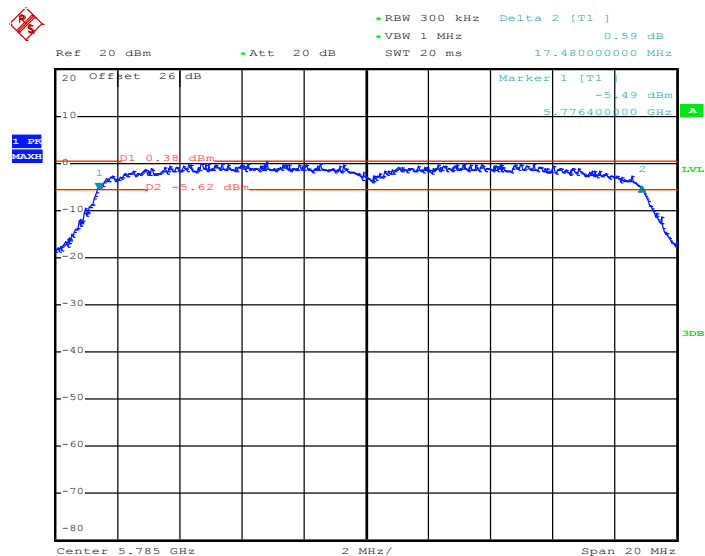
6 dB Bandwidth Plot on Channel 149



Date: 6.SEP.2012 17:21:45

802.11n HT20 –MIMO Ant. 0+1(0)

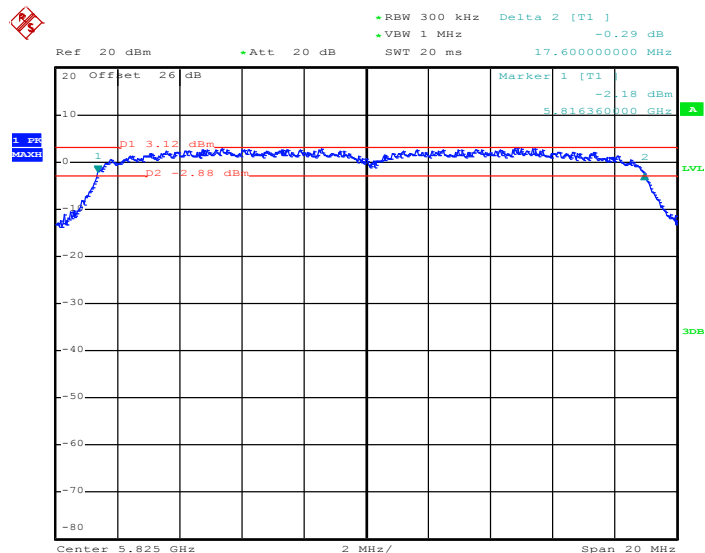
6 dB Bandwidth Plot on Channel 157



Date: 6.SEP.2012 17:31:40



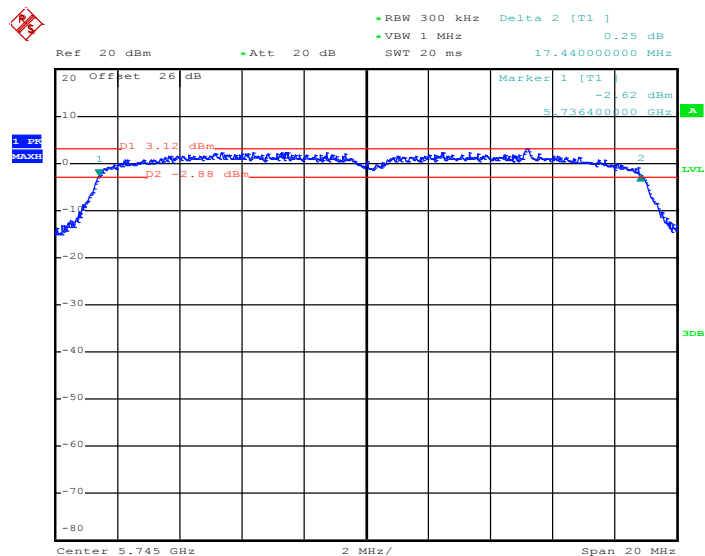
6 dB Bandwidth Plot on Channel 165



Date: 6.SEP.2012 17:19:06

802.11n HT20 –MIMO Ant. 0+1(1)

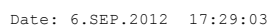
6 dB Bandwidth Plot on Channel 149



Date: 6.SEP.2012 17:24:24

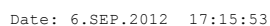


6 dB Bandwidth Plot on Channel 157



802.11n HT20 –MIMO Ant. 0+1(1)

6 dB Bandwidth Plot on Channel 165

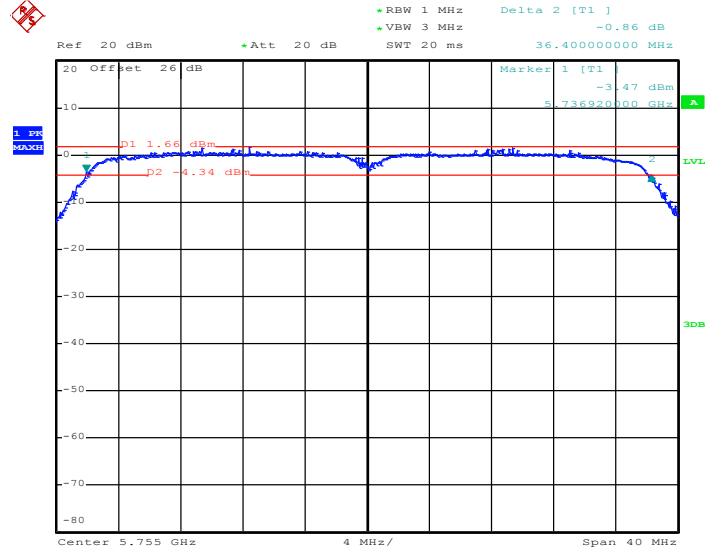




<5GHz 802.11n HT40>

802.11n HT40 –MIMO Ant. 0+1(0)

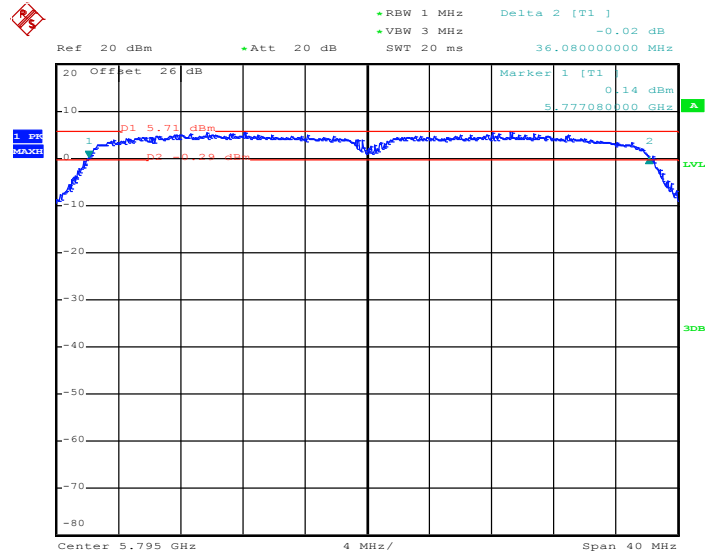
6 dB Bandwidth Plot on Channel 151



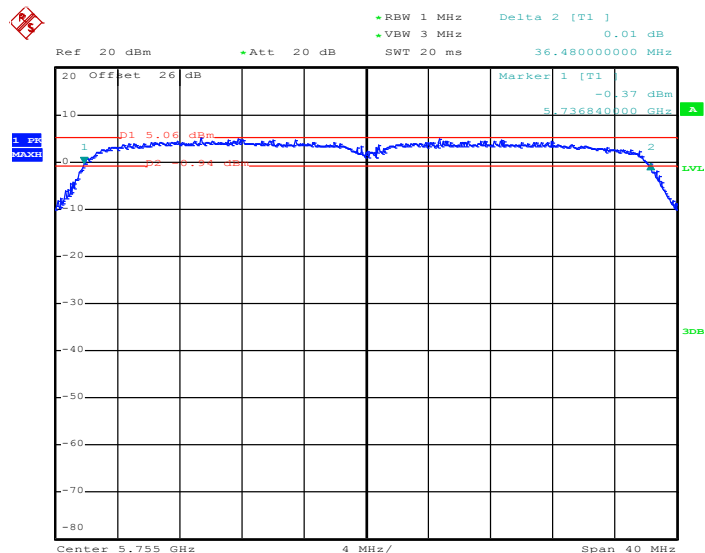
Date: 6.SEP.2012 17:36:47

802.11n HT40 –MIMO Ant. 0+1(0)

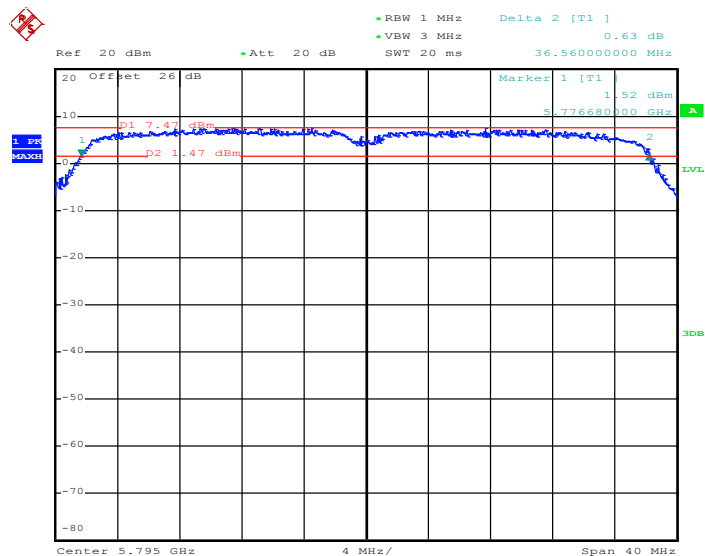
6 dB Bandwidth Plot on Channel 159



Date: 6.SEP.2012 17:58:45

802.11n HT40 –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 151


Date: 6.SEP.2012 17:40:56

802.11n HT40 –MIMO Ant. 0+1(1)
6 dB Bandwidth Plot on Channel 159


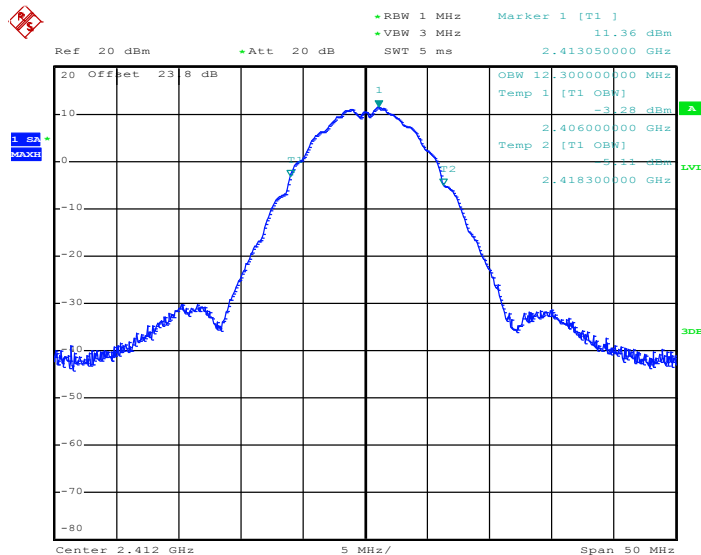
Date: 6.SEP.2012 17:55:51

3.1.8 Test Result of 99% Bandwidth Plots

<802.11b>

802.11b – MIMO Ant. 0+1(0)

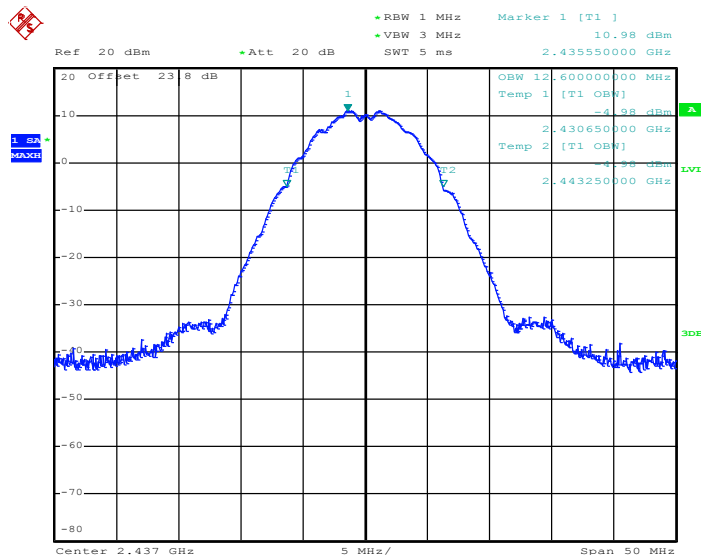
99% Occupied Bandwidth Plot on Channel 01



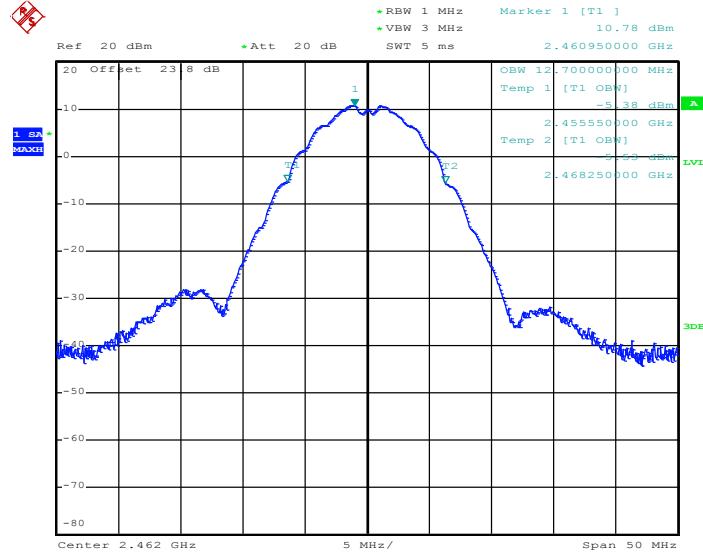
Date: 29.AUG.2012 23:19:38

802.11b –MIMO Ant. 0+1(0)

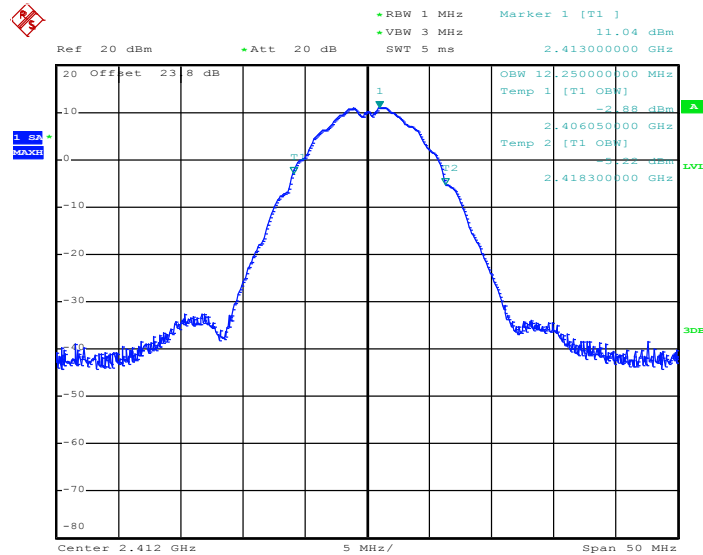
99% Occupied Bandwidth Plot on Channel 06



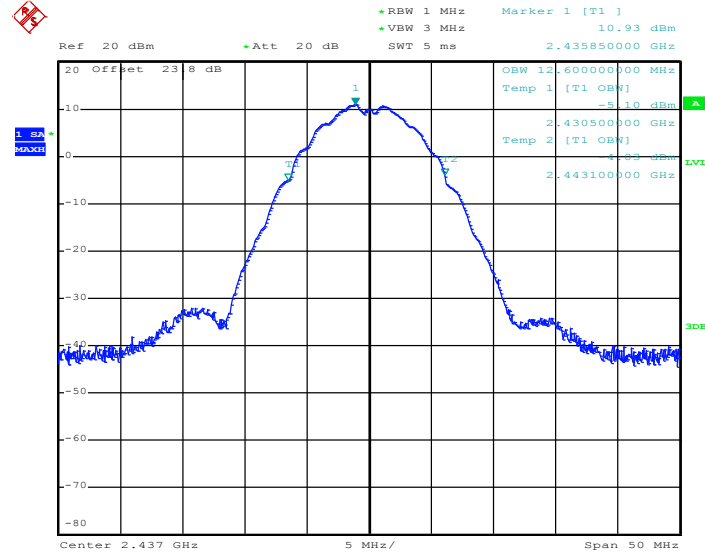
Date: 29.AUG.2012 23:35:59

802.11b –MIMO Ant. 0+1(0)
99% Occupied Bandwidth Plot on Channel 11


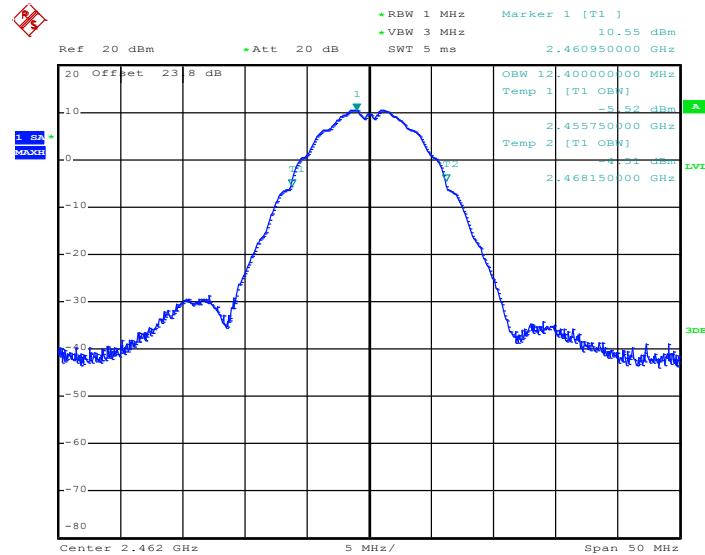
Date: 29.AUG.2012 23:48:14

802.11b –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 01


Date: 29.AUG.2012 23:26:23

802.11b –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 06


Date: 29.AUG.2012 23:32:23

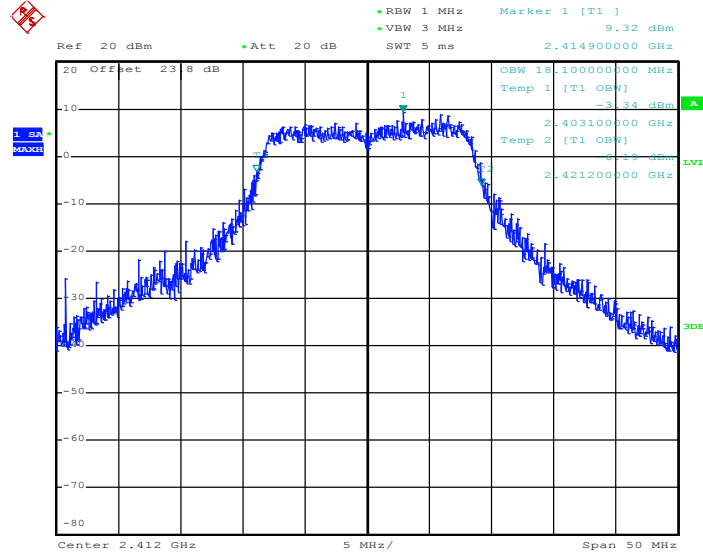
802.11b –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 11


Date: 29.AUG.2012 23:58:22

<802.11g>

802.11g –MIMO Ant. 0+1(0)

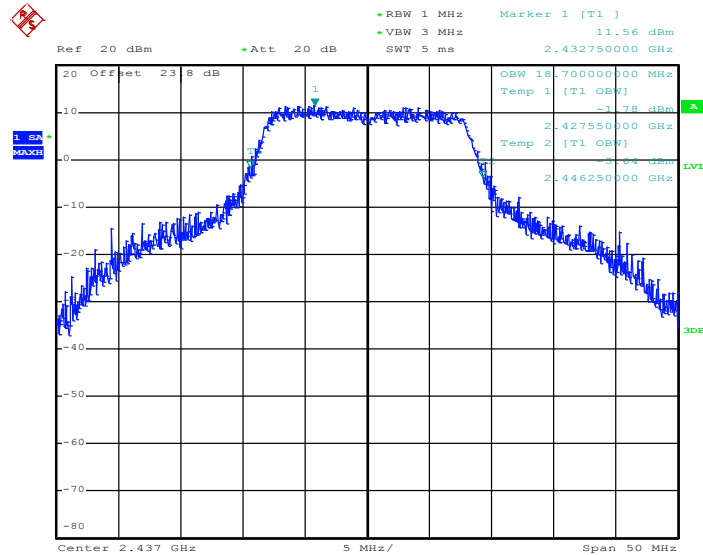
99% Occupied Bandwidth Plot on Channel 01



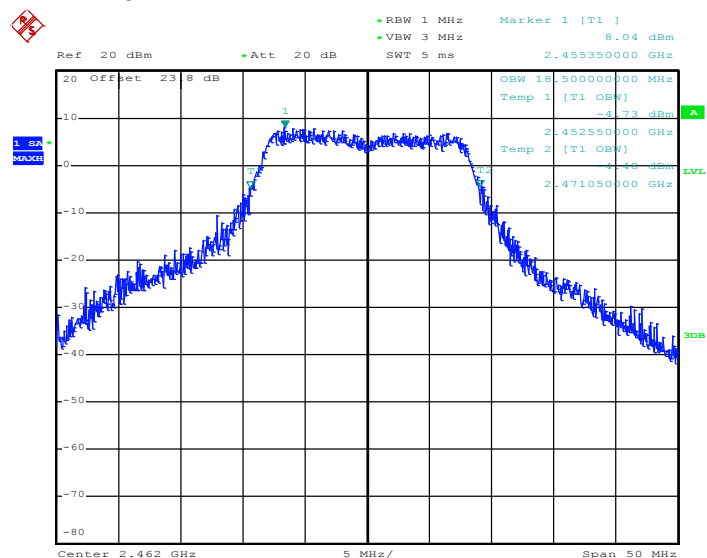
Date: 4.SEP.2012 21:47:16

802.11g –MIMO Ant. 0+1(0)

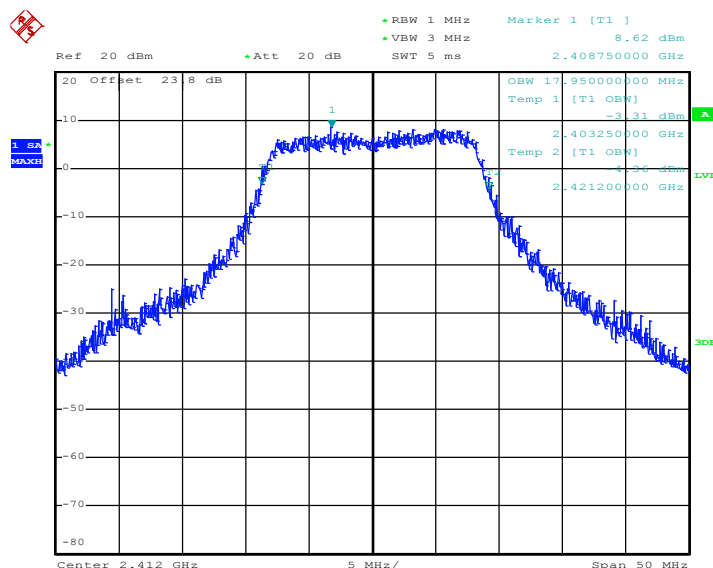
99% Occupied Bandwidth Plot on Channel 06



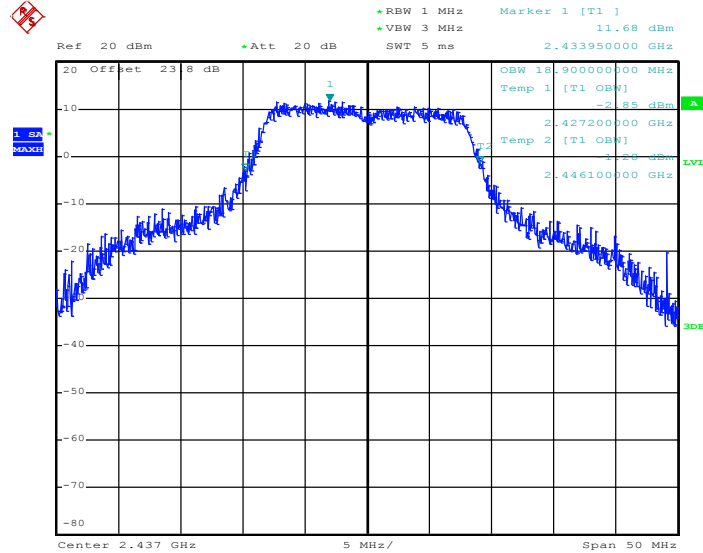
Date: 30.AUG.2012 00:46:54

802.11g –MIMO Ant. 0+1(0)
99% Occupied Bandwidth Plot Channel 11


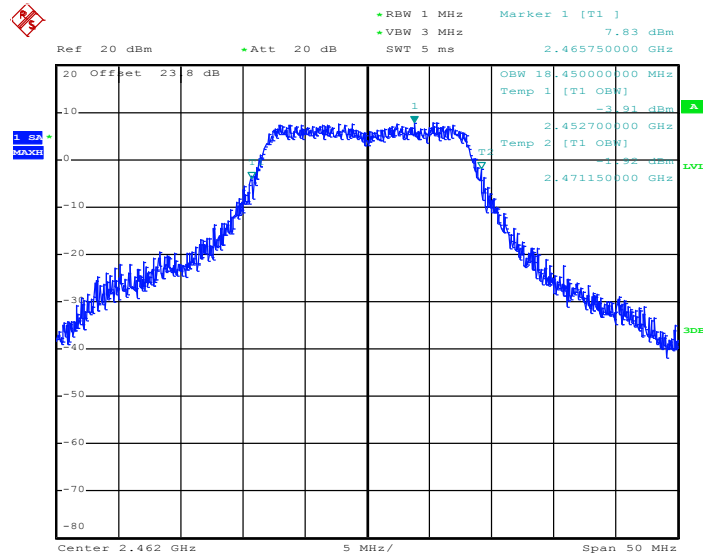
Date: 4.SEP.2012 21:50:32

802.11g –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 01


Date: 4.SEP.2012 22:01:28

802.11g –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 06


Date: 30.AUG.2012 00:50:24

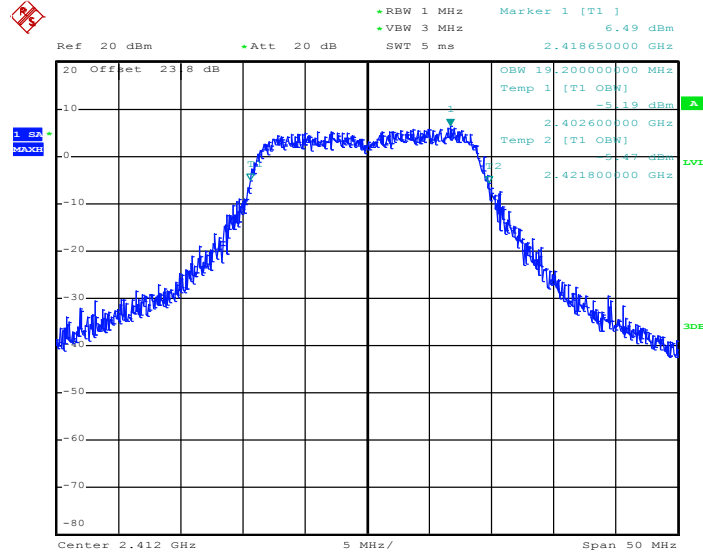
802.11g – MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot Channel 11


Date: 4.SEP.2012 21:58:23

<2.4GHz 802.11n HT20>

802.11n HT20 – MIMO Ant. 0+1(0)

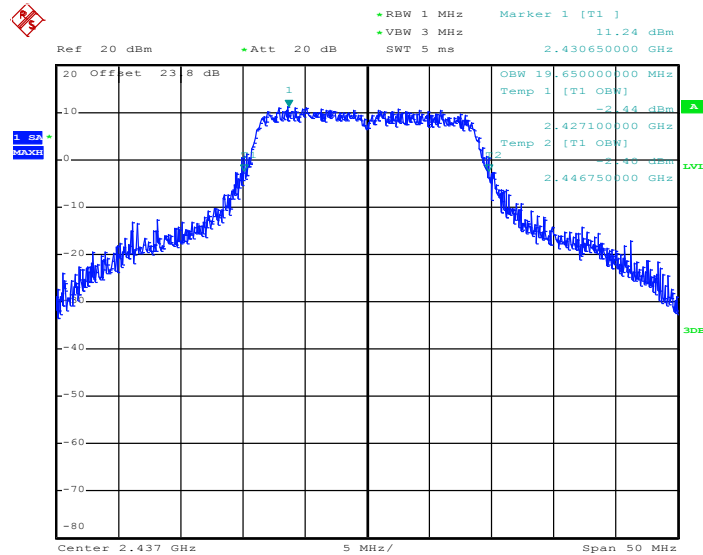
99% Occupied Bandwidth Plot on Channel 01



Date: 4.SEP.2012 22:26:57

802.11n HT20 – MIMO Ant. 0+1(0)

99% Occupied Bandwidth Plot on Channel 06

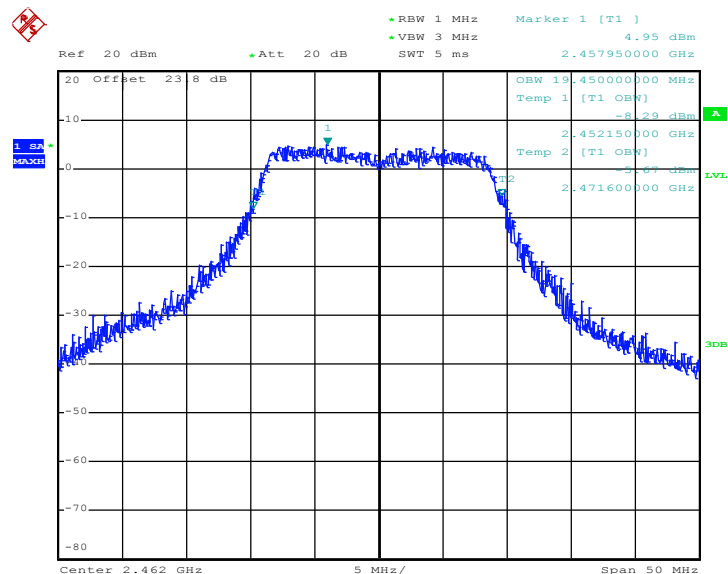


Date: 30.AUG.2012 01:19:49



802.11n HT20 – MIMO Ant. 0+1(0)

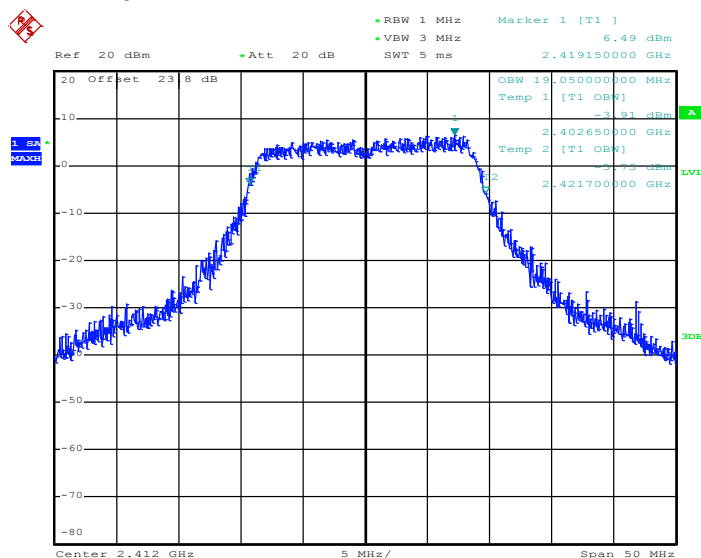
99% Occupied Bandwidth Plot on Channel 11



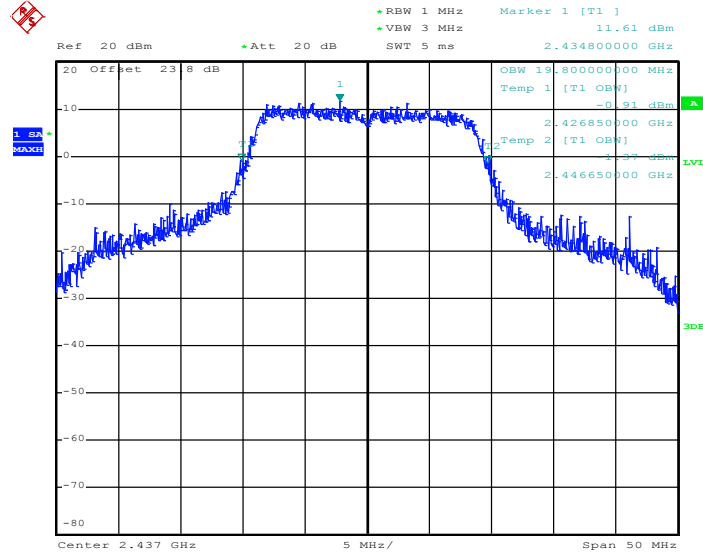
Date: 4.SEP.2012 22:23:12

802.11n HT20 –MIMO Ant. 0+1(1)

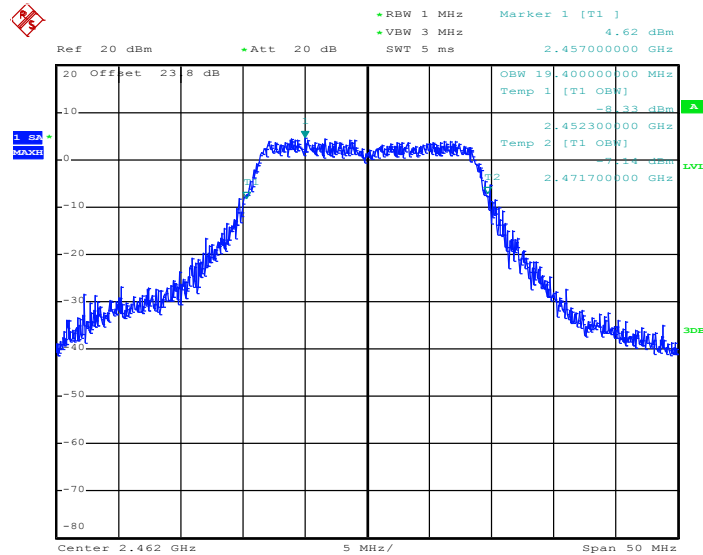
99% Occupied Bandwidth Plot on Channel 01



Date: 4.SEP.2012 22:06:59

802.11n HT20 –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 06


Date: 30.AUG.2012 01:15:15

802.11n HT20 –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 11


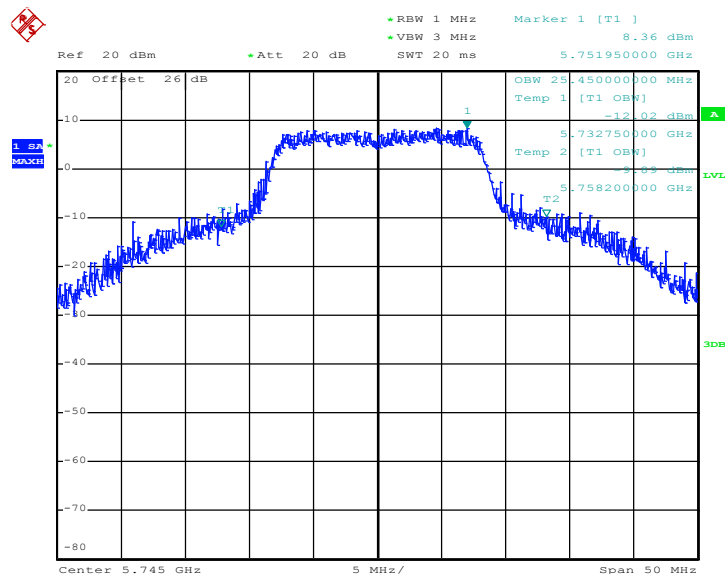
Date: 4.SEP.2012 22:11:32



<802.11a>

802.11a –MIMO Ant. 0+1(0)

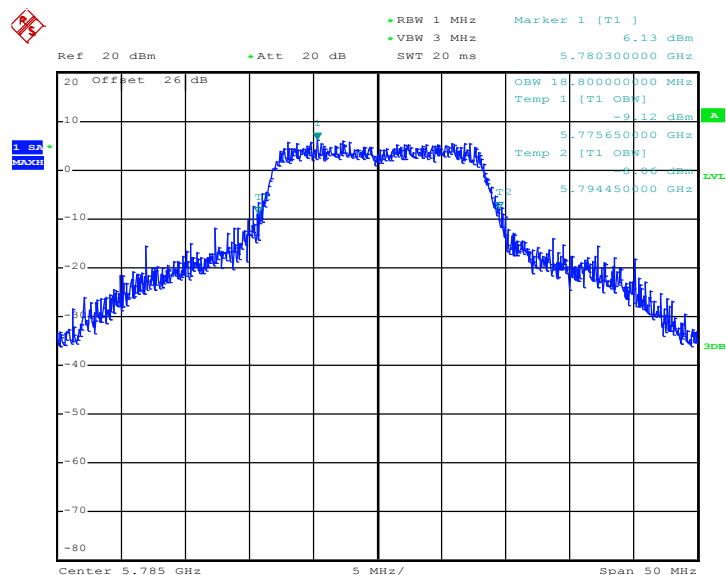
99% Occupied Bandwidth Plot on Channel 149



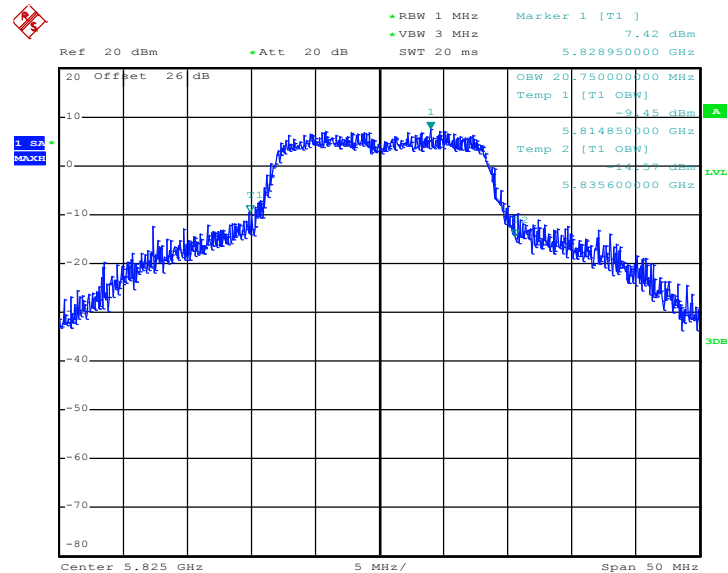
Date: 6.SEP.2012 16:58:15

802.11a –MIMO Ant. 0+1(0)

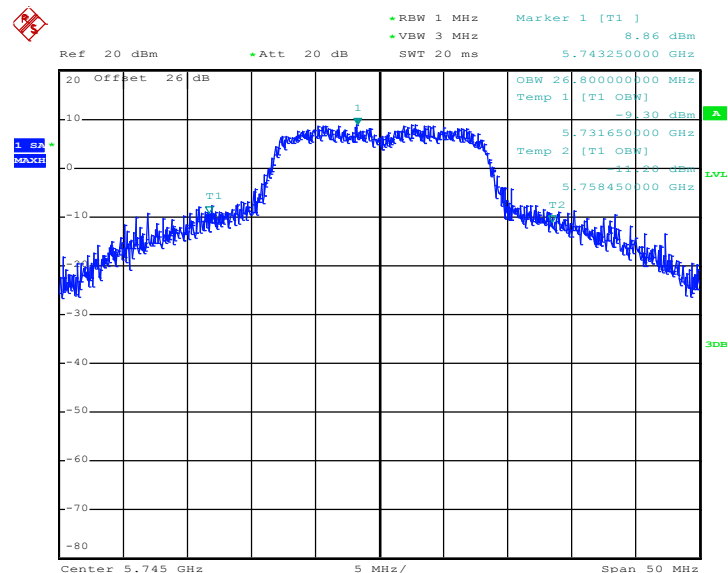
99% Occupied Bandwidth Plot on Channel 157



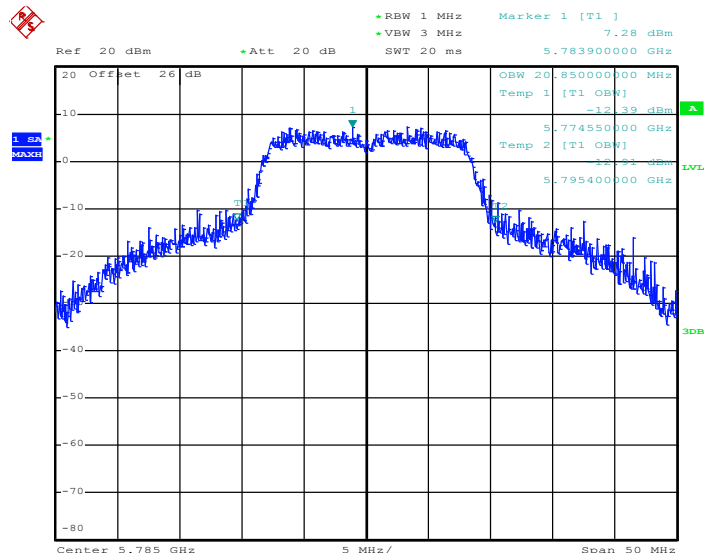
Date: 6.SEP.2012 17:08:36

802.11a –MIMO Ant. 0+1(0)
99% Occupied Bandwidth Plot on Channel 165


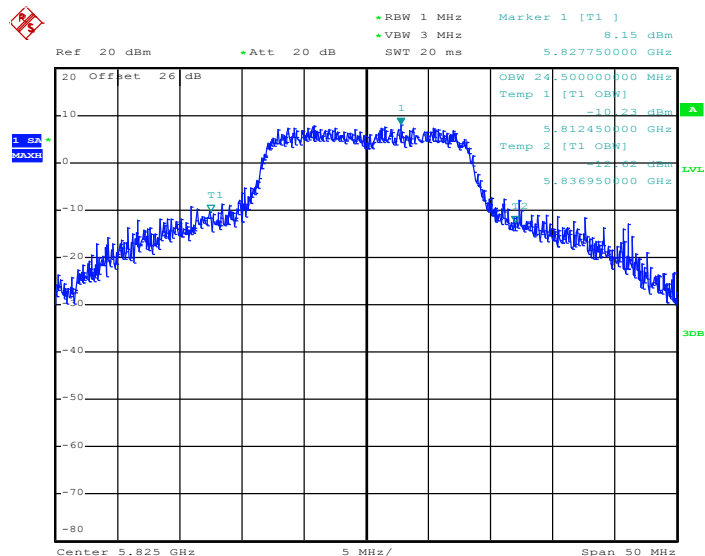
Date: 6.SEP.2012 17:11:52

802.11a –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 149


Date: 6.SEP.2012 17:02:10

802.11a –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 157


Date: 6.SEP.2012 17:05:12

802.11a –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 165


Date: 6.SEP.2012 17:14:37



802.11n HT20 –MIMO Ant. 0+1(0)

99% Occupied Bandwidth Plot on Channel 149



802.11n HT20 –MIMO Ant. 0+1(0)

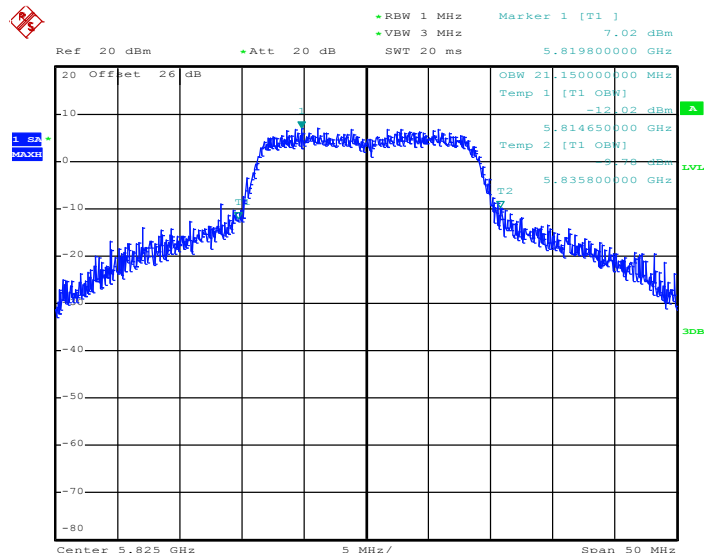
99% Occupied Bandwidth Plot on Channel 157





802.11n HT20 –MIMO Ant. 0+1(0)

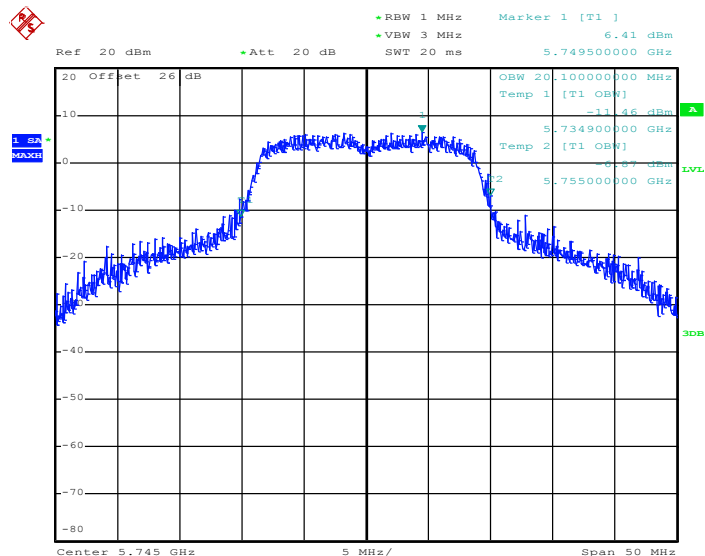
99% Occupied Bandwidth Plot on Channel 165



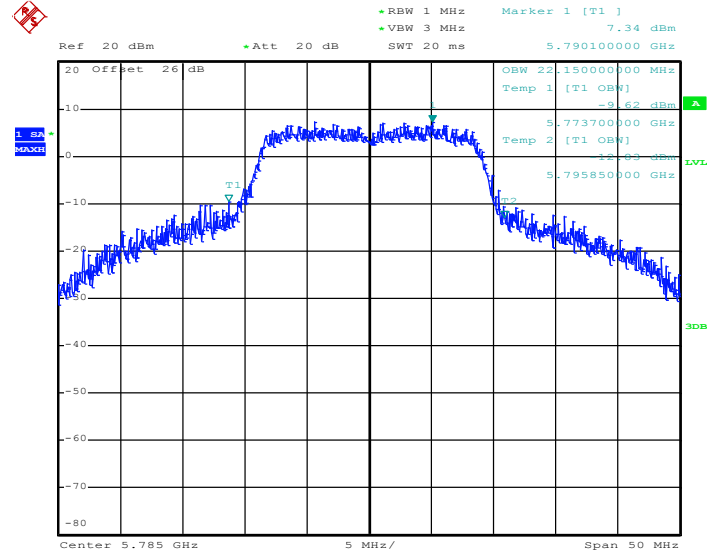
Date: 6.SEP.2012 17:20:49

802.11n HT20 –MIMO Ant. 0+1(1)

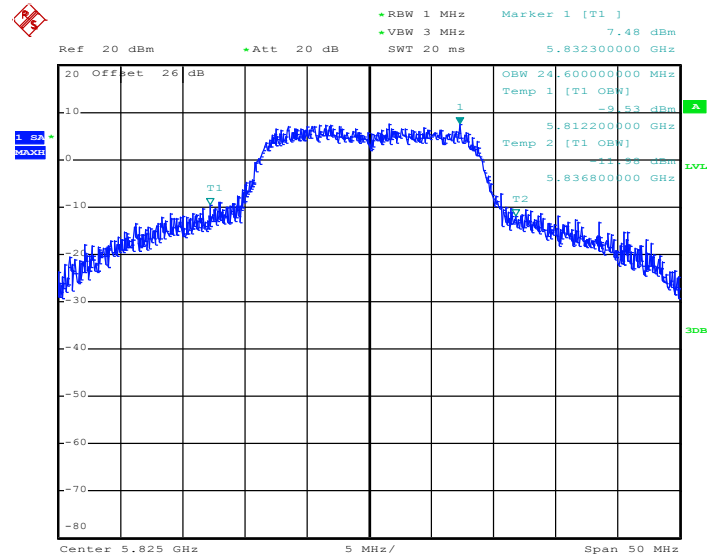
99% Occupied Bandwidth Plot on Channel 149



Date: 6.SEP.2012 17:26:33

802.11n HT20 –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 157


Date: 6.SEP.2012 17:30:44

802.11n HT20 –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 165


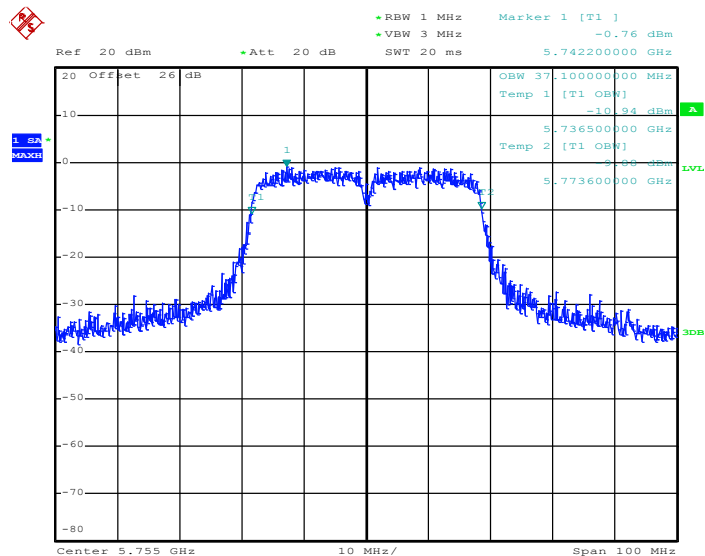
Date: 6.SEP.2012 17:17:58



<5GHz 802.11n HT40>

802.11n HT40 –MIMO Ant. 0+1(0)

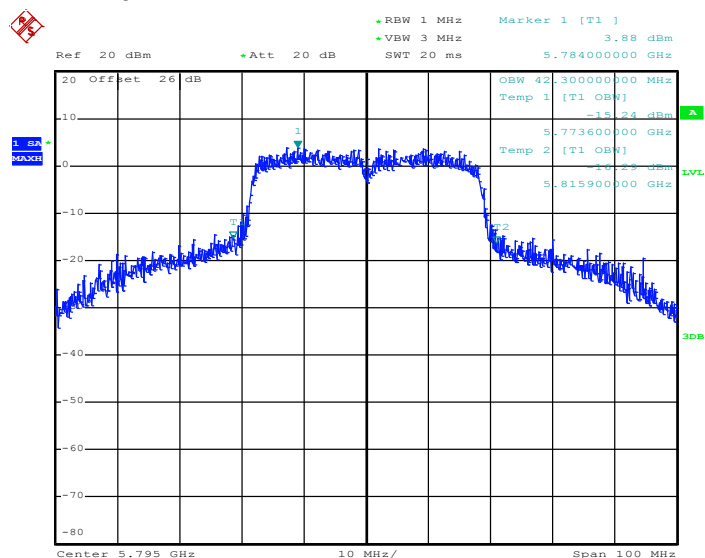
99% Occupied Bandwidth Plot on Channel 151



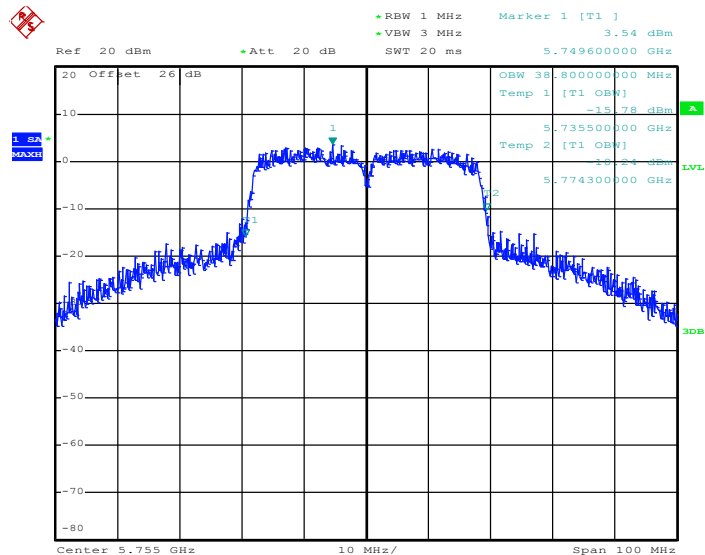
Date: 6.SEP.2012 17:39:54

802.11n HT40 –MIMO Ant. 0+1(0)

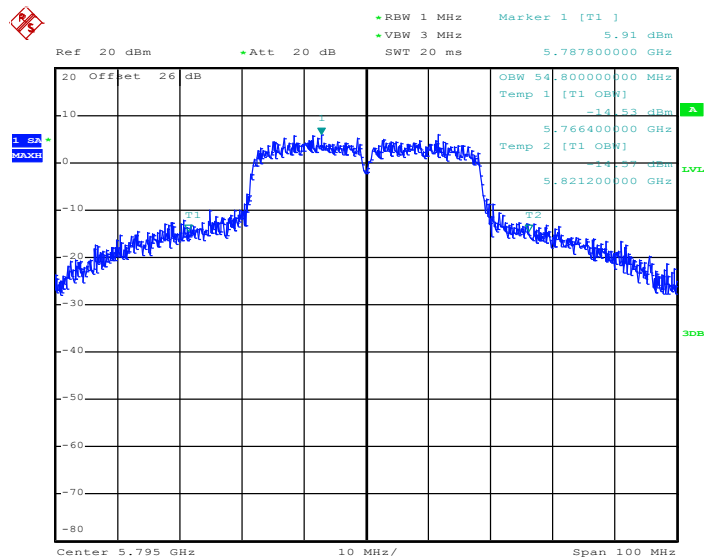
99% Occupied Bandwidth Plot on Channel 159



Date: 6.SEP.2012 18:00:13

802.11n HT40 –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 151


Date: 6.SEP.2012 17:42:46

802.11n HT40 –MIMO Ant. 0+1(1)
99% Occupied Bandwidth Plot on Channel 159


Date: 6.SEP.2012 17:57:24

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.

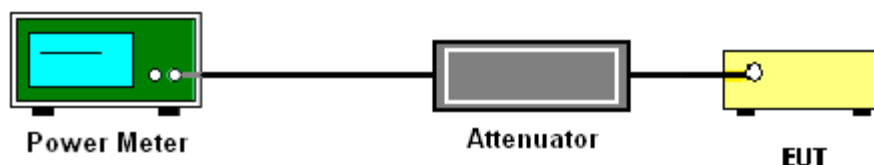
3.2.2 Measuring Instruments

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 and TCB Workshop 2012, April.
2. The RF output of EUT was connected to the power meter by a low loss cable
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v01r01.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Test Mode :	802.11b	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)			Max. Limits (dBm)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1		
01	2412	17.82	18.05	20.95	29.37	Pass
06	2437	18.14	17.85	21.01	29.37	Pass
11	2462	17.77	18.20	21.00	29.37	Pass

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)			Max. Limits (dBm)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1		
01	2412	19.53	19.77	22.66	29.37	Pass
06	2437	21.63	21.53	24.59	29.37	Pass
11	2462	19.78	19.45	22.63	29.37	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11n HT20 Peak Output Power (dBm)			Max. Limits (dBm)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1		
01	2412	18.76	18.74	21.76	29.37	Pass
06	2437	21.49	21.29	24.40	29.37	Pass
11	2462	18.15	17.84	21.01	29.37	Pass

Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11a Measured Output Power (dBm)			Max. Limits (dBm)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1		
149	5745	16.11	16.36	19.25	28.23	Pass
157	5785	15.99	15.95	18.98	28.23	Pass
165	5825	16.30	16.21	19.27	28.23	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11n HT20 Peak Output Power (dBm)			Max. Limits (dBm)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1		
149	5745	16.33	16.50	19.43	28.23	Pass
157	5785	16.36	16.22	19.30	28.23	Pass
165	5825	16.43	16.34	19.40	28.23	Pass

Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11n HT40 Peak Output Power (dBm)			Max. Limits (dBm)	Pass/Fail
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1		
151	5755	15.57	16.04	18.82	28.23	Pass
159	5795	15.55	15.93	18.75	28.23	Pass

Note:

1. MIMO Ant 0+1 is a calculated result from sum of the power MIMO Ant 0 and MIMO Ant 1.
2. SISO Ant 0 power setting = MIMO Ant 0+1(0) power setting

3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	802.11b	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%
Duty Cycle:	100%	Duty Factor:	0.00dB

Channel	Frequency (MHz)	802.11b Average Output Power (dBm)		
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1
01	2412	15.12	15.23	18.19
06	2437	15.21	15.24	18.24
11	2462	15.22	15.25	18.25

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%
Duty Cycle:	97.13%	Duty Factor:	0.13dB

Channel	Frequency (MHz)	802.11g Average Output Power (dBm)		
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1
01	2412	10.51	10.67	13.60
06	2437	15.16	15.08	18.13
11	2462	11.39	10.78	14.10

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%
Duty Cycle:	96.92%	Duty Factor:	0.14dB

Channel	Frequency (MHz)	802.11n HT20 Average Output Power (dBm)		
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1
01	2412	9.46	9.38	12.43
06	2437	15.13	15.08	18.11
11	2462	9.15	8.52	11.85

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%
Duty Cycle:	98.07%	Duty Factor:	0.08dB

Channel	Frequency (MHz)	802.11a Average Output Power (dBm)		
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1
149	5745	11.86	11.90	14.90
157	5785	11.80	11.97	14.90
165	5825	11.59	12.23	14.93

Test Mode :	802.11n HT20	Temperature :	24~26℃
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%
Duty Cycle:	97.93% for MIMO Ant. 0+1(0) 98.45% for MIMO Ant. 0+1(1)	Duty Factor:	0.09dB for MIMO Ant. 0+1(0) 0.07dB for MIMO Ant. 0+1(1)

Channel	Frequency (MHz)	802.11a Average Output Power (dBm)		
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1
149	5745	11.87	12.42	15.16
157	5785	11.73	12.51	15.15
165	5825	11.64	12.42	15.06

Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%
Duty Cycle:	96.27% for MIMO Ant. 0+1(0) 96.25% for MIMO Ant. 0+1(1)	Duty Factor:	0.16dB for MIMO Ant. 0+1(0) 0.17dB for MIMO Ant. 0+1(1)

Channel	Frequency (MHz)	802.11a Average Output Power (dBm)		
		MIMO Ant. 0+1(0)	MIMO Ant. 0+1(1)	MIMO Ant. 0+1
151	5755	10.69	11.57	14.16
159	5795	10.37	11.47	13.96

Note :

1. MIMO Ant 0+1 is a calculated result from sum of the power MIMO Ant 0 and MIMO Ant 1.
2. SISO Ant 0 power setting = MIMO Ant 0+1(0) power setting
3. The average power is measured by power meter with average power sensor and is reporting only.



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 5.3.1 (Peak PSD) of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. 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. Video bandwidth (VBW) $\geq$ 300 KHz In order to make an accurate measurement, set the span to 5-30% greater than Emission Bandwidth (EBW)
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 in any 100 kHz band segment within the fundamental EBW.
6. Record the measurement data derived from spectrum analyzer.
7. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3\text{ kHz}/100\text{ kHz}) = -15.2\text{ dB}$.
8. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v01r01.

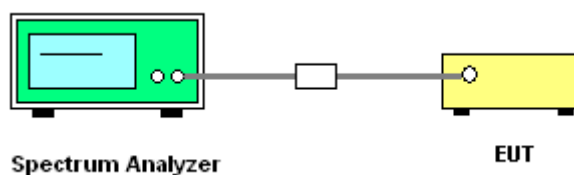
If measurements performed using method (2) plus $10\log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

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

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

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

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Test Mode :	802.11b	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11b Power Density				Max. Limits (dBm)	Pass /Fail
		MIMO Ant. 0+1(0)		MIMO Ant. 0+1(1)			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2		
01	2412	7.27	-4.92	7.33	-4.86	7.37	Pass
06	2437	7.15	-5.04	6.98	-5.21	7.37	Pass
11	2462	6.62	-5.57	6.59	-5.60	7.37	Pass

Test Mode :	802.11g	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Channel	Frequency (MHz)	802.11g Power Density				Max. Limits (dBm)	Pass /Fail
		MIMO Ant. 0+1(0)		MIMO Ant. 0+1(1)			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2		
01	2412	-0.59	-12.78	0.24	-11.95	7.37	Pass
06	2437	4.00	-8.19	4.26	-7.93	7.37	Pass
11	2462	-0.23	-12.42	-0.51	-12.70	7.37	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Ch.	Frequency (MHz)	802.11n HT20 Power Density				Max. Limits (dBm)	Pass /Fail
		MIMO Ant. 0+1(0)		MIMO Ant. 0+1(1)			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2		
01	2412	-1.93	-14.12	-1.29	-13.48	7.37	Pass
06	2437	4.07	-8.12	4.02	-8.17	7.37	Pass
11	2462	-2.60	-14.79	-3.46	-15.65	7.37	Pass

Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Ch.	Freq. (MHz)	802.11a Power Density				Max. Limits (dBm)	Pass /Fail
		MIMO Ant. 0+1(0)		MIMO Ant. 0+1(1)			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2		
149	5745	2.99	-9.20	3.66	-8.53	6.23	Pass
157	5785	-0.23	-12.42	1.19	-11.00	6.23	Pass
165	5825	1.23	-10.96	1.84	-10.35	6.23	Pass

Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Ch.	Freq. (MHz)	802.11n HT20 Power Density				Max. Limits (dBm)	Pass /Fail
		MIMO Ant. 0+1(0)		MIMO Ant. 0+1(1)			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2		
149	5745	-0.20	-12.39	0.95	-11.24	6.23	Pass
157	5785	-1.86	-14.05	1.95	-10.24	6.23	Pass
165	5825	1.34	-10.85	1.85	-10.34	6.23	Pass

Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Reece Li	Relative Humidity :	55~58%

Ch.	Freq. (MHz)	802.11n HT40 Power Density				Max. Limits (dBm)	Pass /Fail
		MIMO Ant. 0+1(0)		MIMO Ant. 0+1(1)			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10log2		
151	5755	-7.20	-19.39	-2.97	-15.16	6.23	Pass
159	5795	-2.46	-14.65	-0.96	-13.15	6.23	Pass

Note:

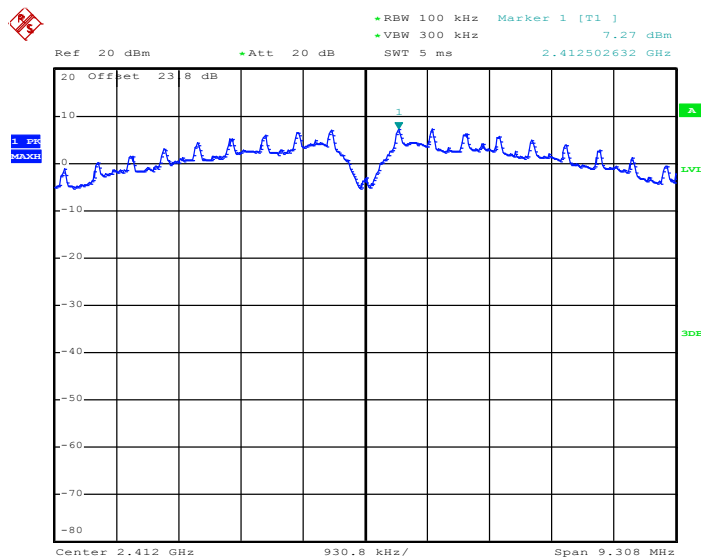
1. Measured power density (dBm) has offset with cable loss.
2. $BWCF (dB) = 10 \log (3k/100k) = -15.2 \text{ dB}$
3. $\text{Power Density/ 3KHz (dBm)} = \text{Measured power density/ 100KHz (dBm)} + BWCF (dB)$
4. $\text{MIMO Power Density/ 3KHz (dBm)} = \text{Measured power density/ 100KHz (dBm)} + BWCF (dB) + 10\text{LOG}(N=2), \text{where } N=2 \text{ transmitters.}$

3.3.6 Test Result of Power Spectral Density Plots

<802.11b>

802.11b – MIMO Ant. 0+1(0)

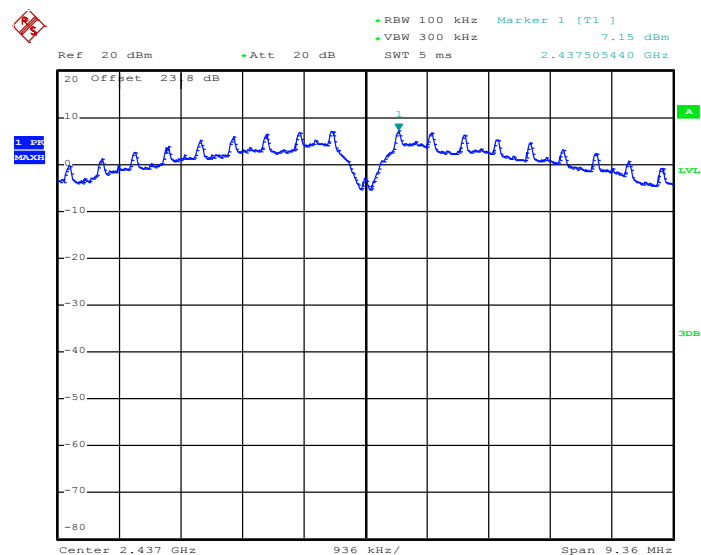
PSD Plot on Channel 01



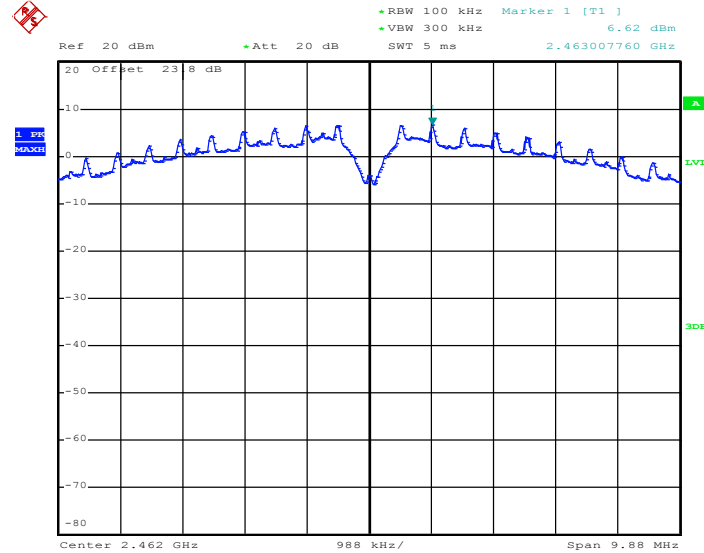
Date: 29.AUG.2012 23:17:29

802.11b – MIMO Ant. 0+1(0)

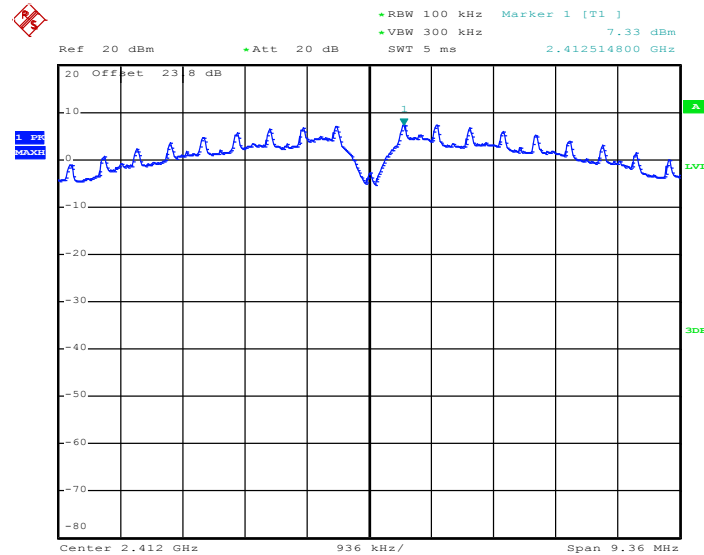
PSD Plot on Channel 06



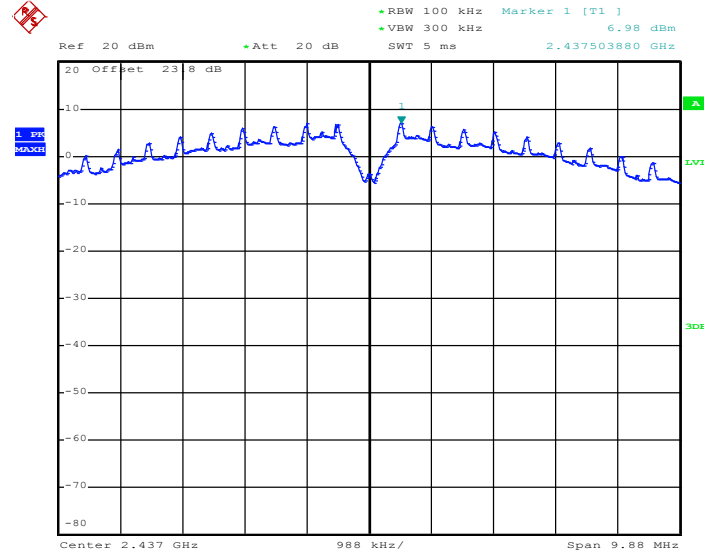
Date: 29.AUG.2012 23:35:10

802.11b – MIMO Ant. 0+1(0)
PSD Plot on Channel 11


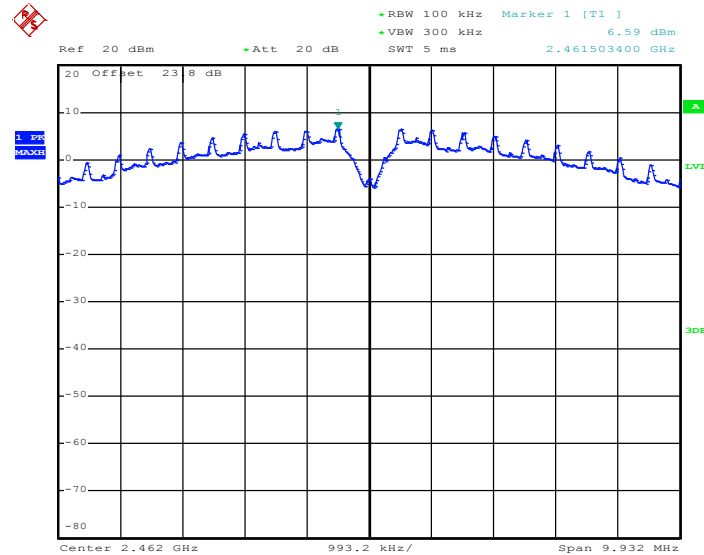
Date: 29.AUG.2012 23:44:38

802.11b – MIMO Ant. 0+1(1)
PSD Plot on Channel 01


Date: 29.AUG.2012 23:24:31

802.11b – MIMO Ant. 0+1(1)
PSD Plot on Channel 06


Date: 29.AUG.2012 23:31:33

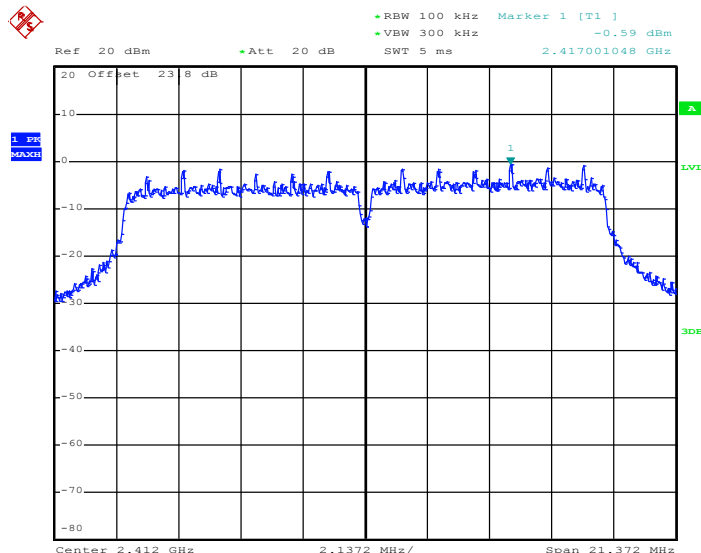
802.11b – MIMO Ant. 0+1(1)
PSD Plot on Channel 11


Date: 29.AUG.2012 23:57:22

<802.11g>

802.11g – MIMO Ant. 0+1(0)

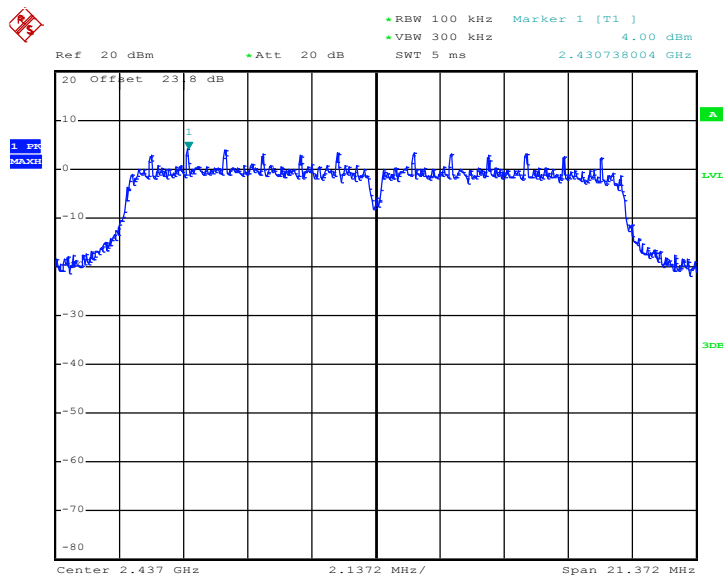
PSD Plot on Channel 01



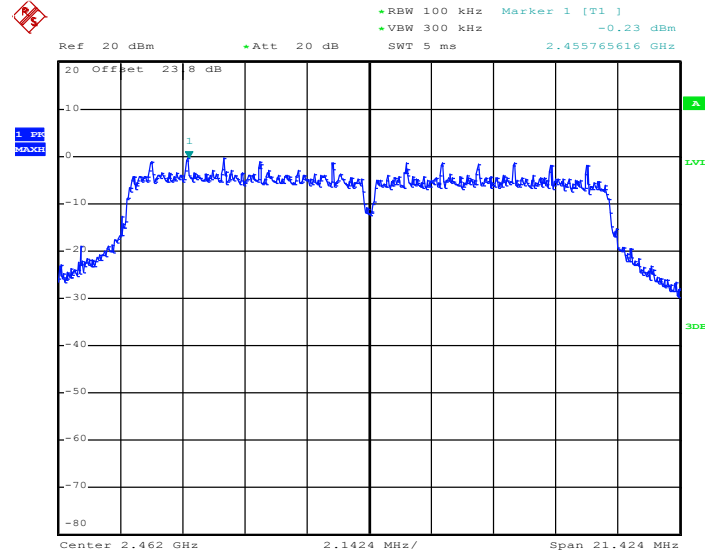
Date: 4.SEP.2012 21:45:48

802.11g – MIMO Ant. 0+1(0)

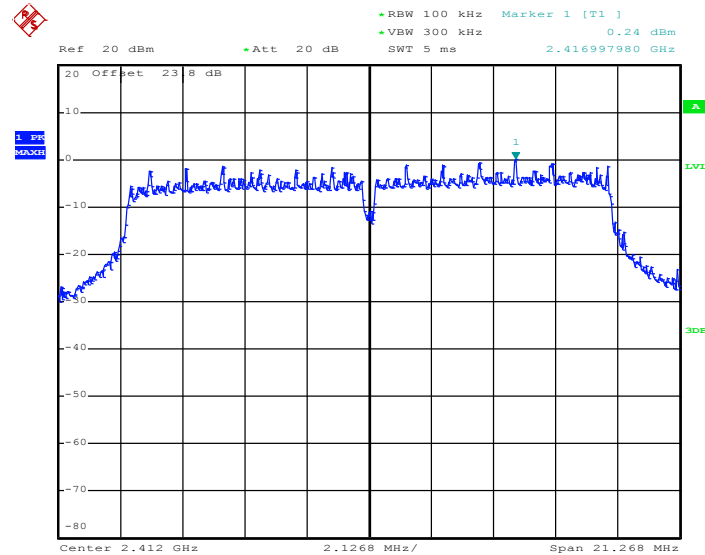
PSD Plot on Channel 06



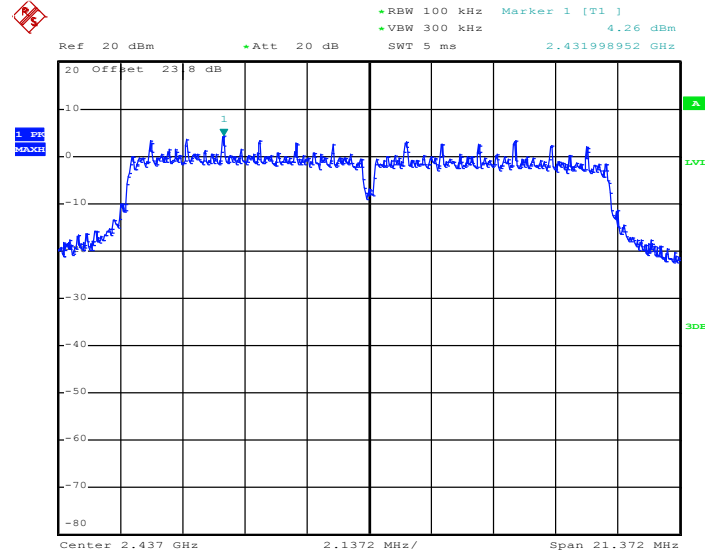
Date: 30.AUG.2012 00:46:06

802.11g – MIMO Ant. 0+1(0)
PSD Plot Channel 11


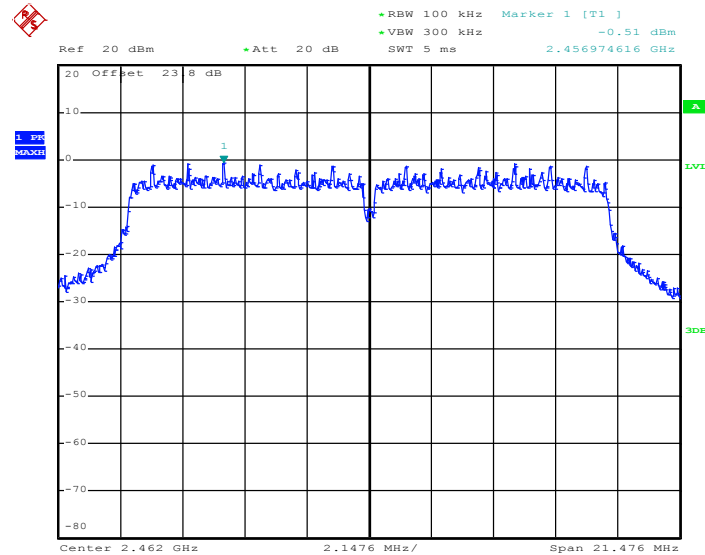
Date: 4.SEP.2012 21:49:17

802.11g – MIMO Ant. 0+1(1)
PSD Plot on Channel 01


Date: 4.SEP.2012 22:00:24

802.11g – MIMO Ant. 0+1(1)
PSD Plot on Channel 06


Date: 30.AUG.2012 00:49:33

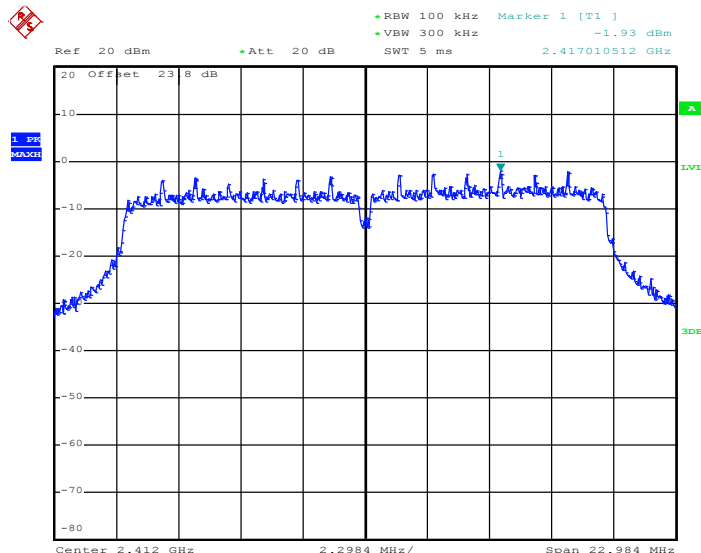
802.11g – MIMO Ant. 0+1(1)
PSD Plot Channel 11


Date: 4.SEP.2012 21:57:16

<2.4GHz 802.11n HT20>

802.11n HT20 – MIMO Ant. 0+1(0)

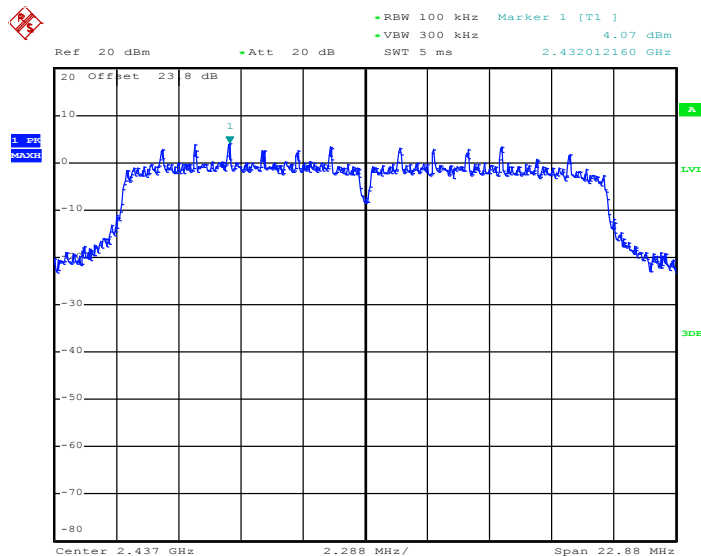
PSD Plot on Channel 01



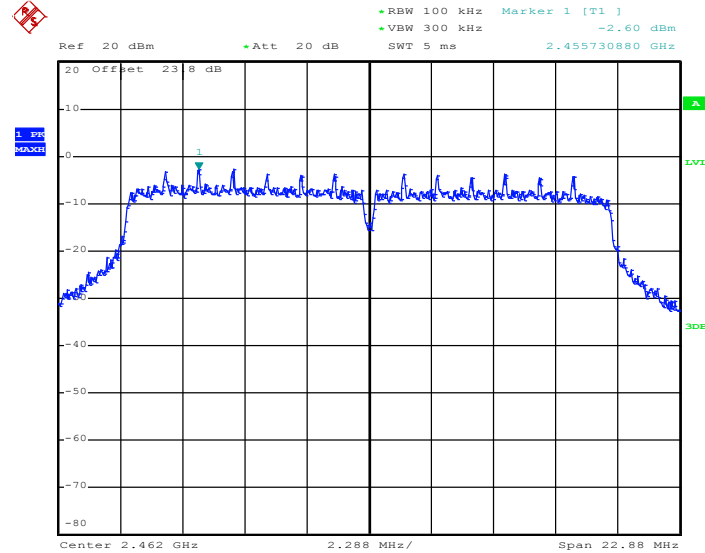
Date: 4.SEP.2012 22:25:49

802.11n HT20 – MIMO Ant. 0+1(0)

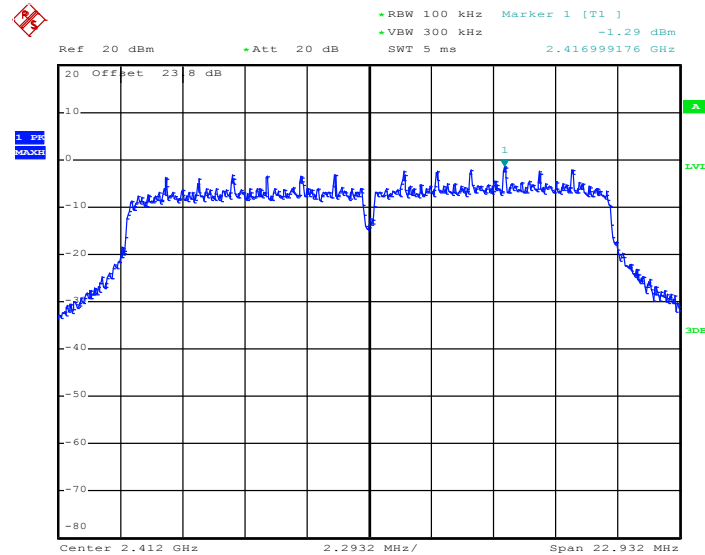
PSD Plot on Channel 06



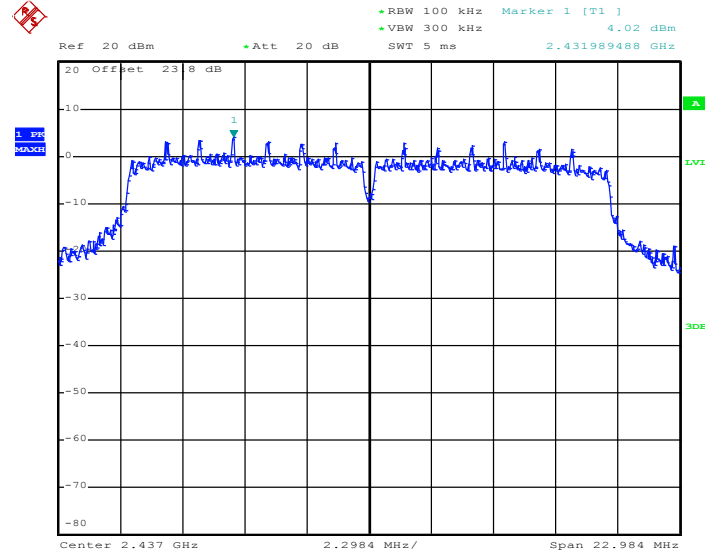
Date: 30.AUG.2012 01:19:02

802.11n HT20 – MIMO Ant. 0+1(0)
PSD Plot on Channel 11


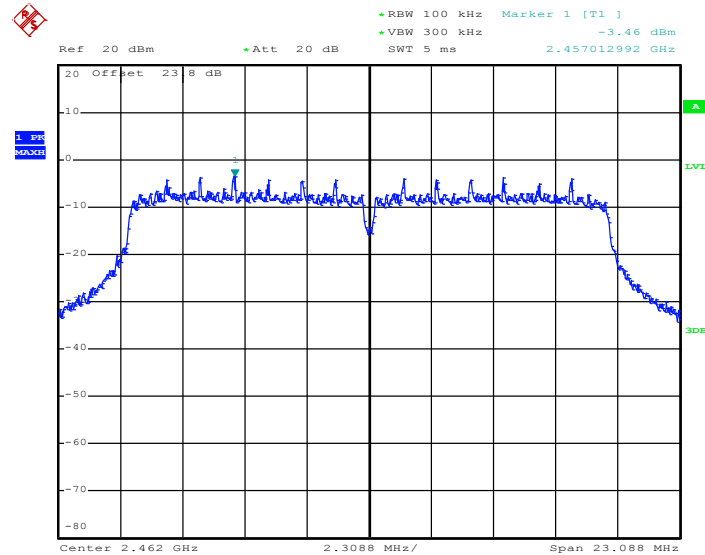
Date: 4.SEP.2012 22:22:07

802.11n HT20 – MIMO Ant. 0+1(1)
PSD Plot on Channel 01


Date: 4.SEP.2012 22:05:40

802.11n HT20 – MIMO Ant. 0+1(1)
PSD Plot on Channel 06


Date: 30.AUG.2012 01:14:23

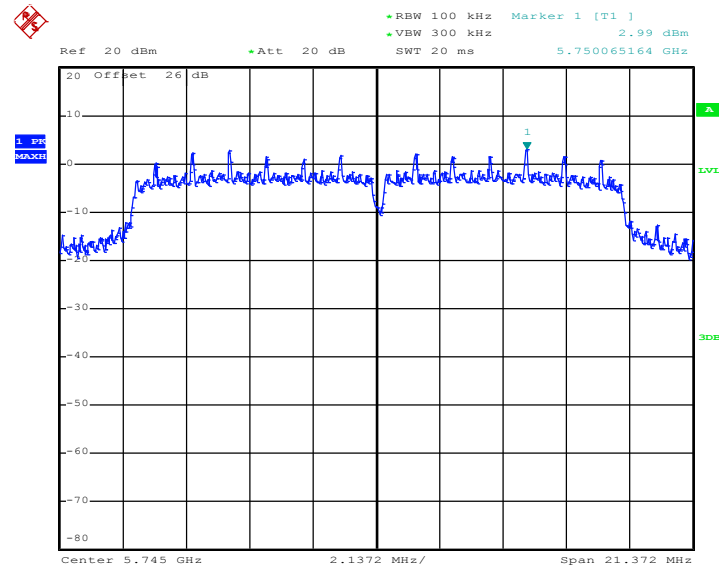
802.11n HT20 – MIMO Ant. 0+1(1)
PSD Plot on Channel 11


Date: 4.SEP.2012 22:10:12

<802.11a>

802.11a – MIMO Ant. 0+1(0)

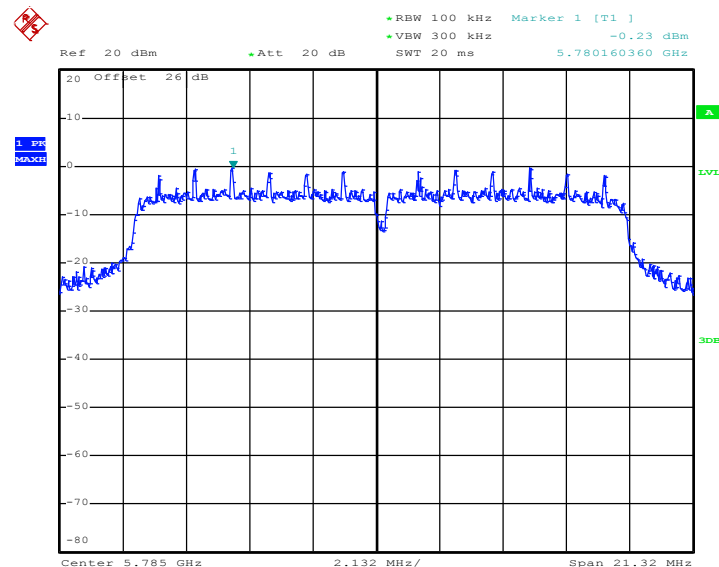
PSD Plot on Channel 149



Date: 6.SEP.2012 16:56:15

802.11a – MIMO Ant. 0+1(0)

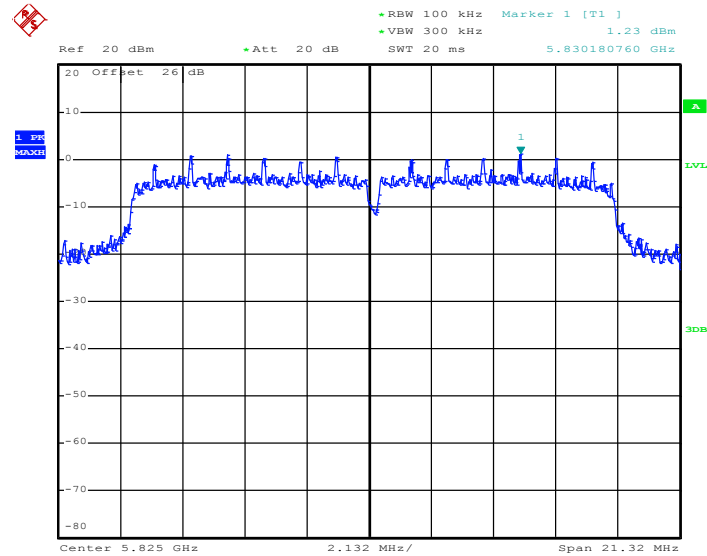
PSD Plot on Channel 157



Date: 6.SEP.2012 17:06:46

802.11a – MIMO Ant. 0+1(0)

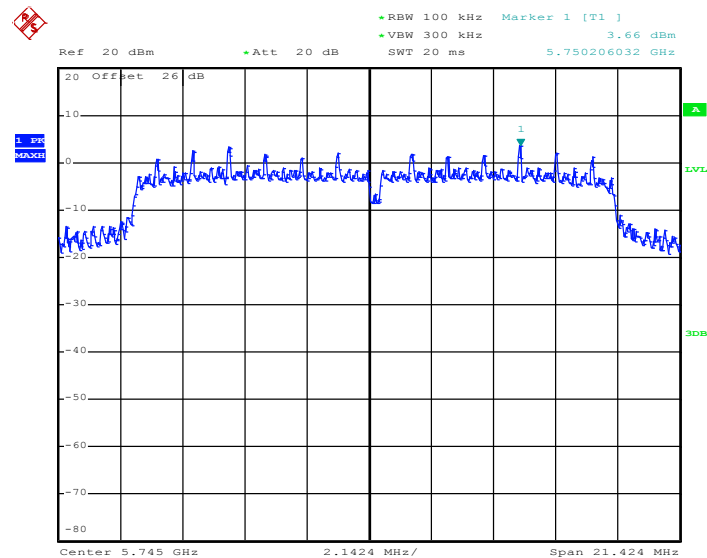
PSD Plot on Channel 165



Date: 6.SEP.2012 17:10:23

802.11a – MIMO Ant. 0+1(1)

PSD Plot on Channel 149



Date: 6.SEP.2012 17:00:53



PSD Plot on Channel 157



PSD Plot on Channel 165

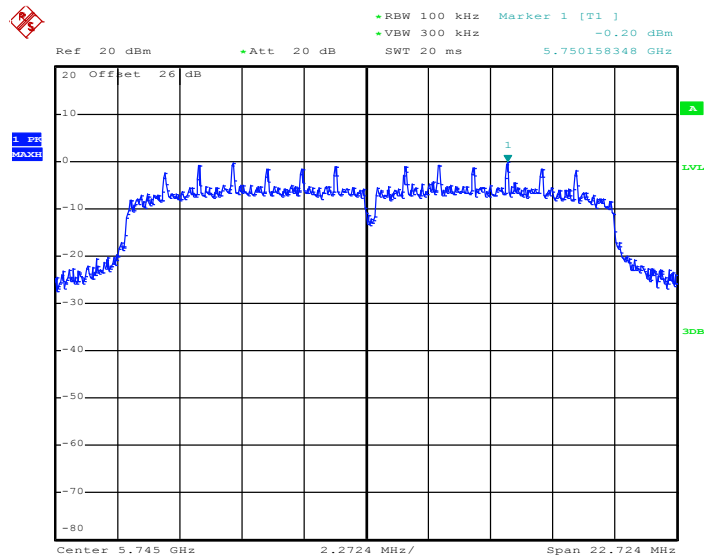




<5GHz 802.11n HT20>

802.11n HT20 – MIMO Ant. 0+1(0)

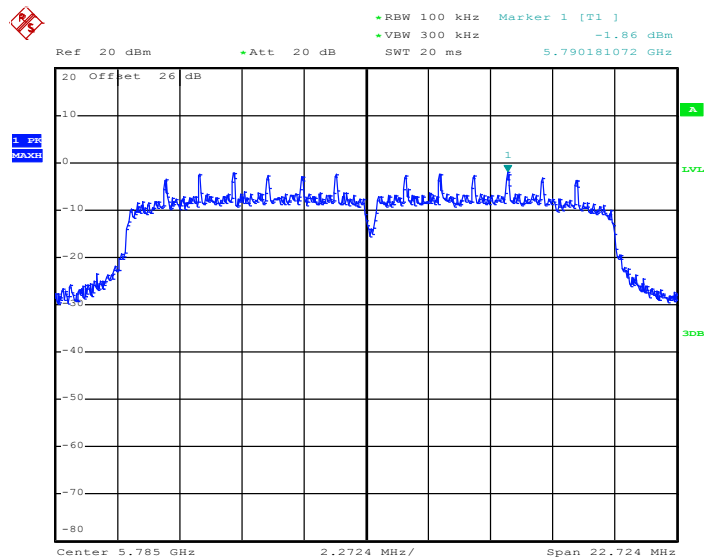
PSD Plot on Channel 149



Date: 6.SEP.2012 17:22:04

802.11n HT20 – MIMO Ant. 0+1(0)

PSD Plot on Channel 157

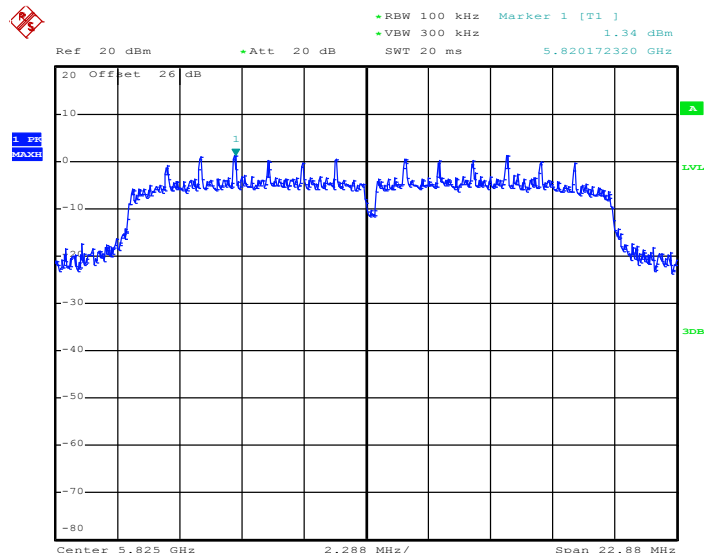


Date: 6.SEP.2012 17:32:01



802.11n HT20 – MIMO Ant. 0+1(0)

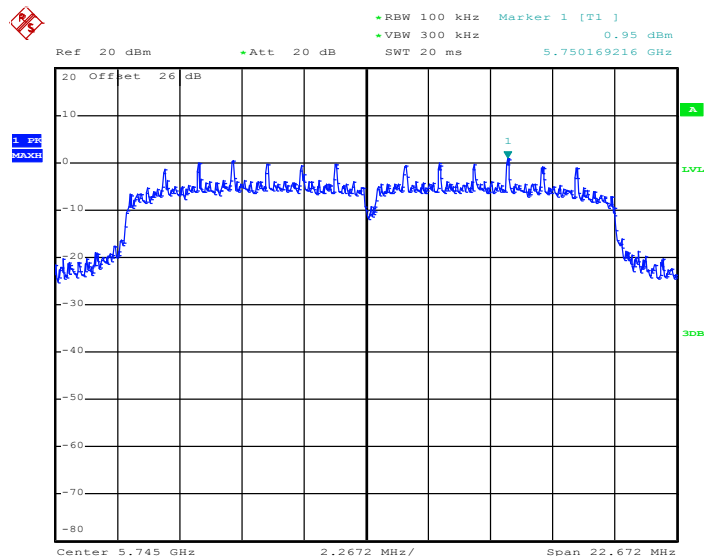
PSD Plot on Channel 165



Date: 6.SEP.2012 17:19:27

802.11n HT20 – MIMO Ant. 0+1(1)

PSD Plot on Channel 149



Date: 6.SEP.2012 17:24:44



802.11n HT20 – MIMO Ant. 0+1(1)

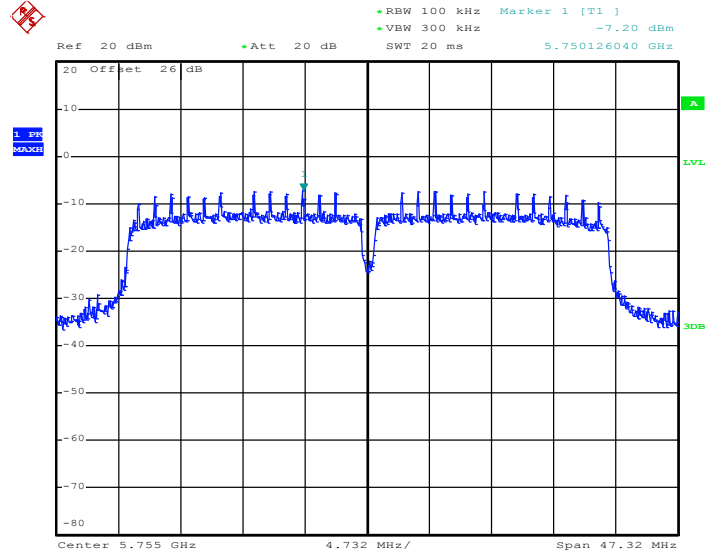




<5GHz 802.11n HT40>

802.11n HT40 – MIMO Ant. 0+1(0)

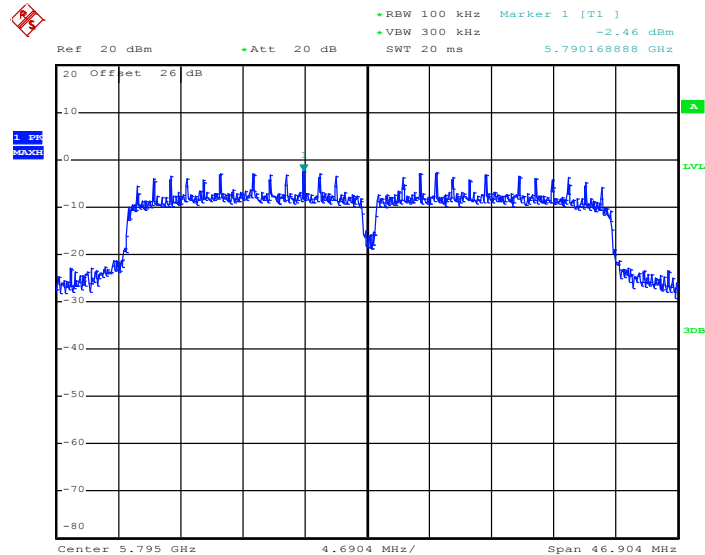
PSD Plot on Channel 151



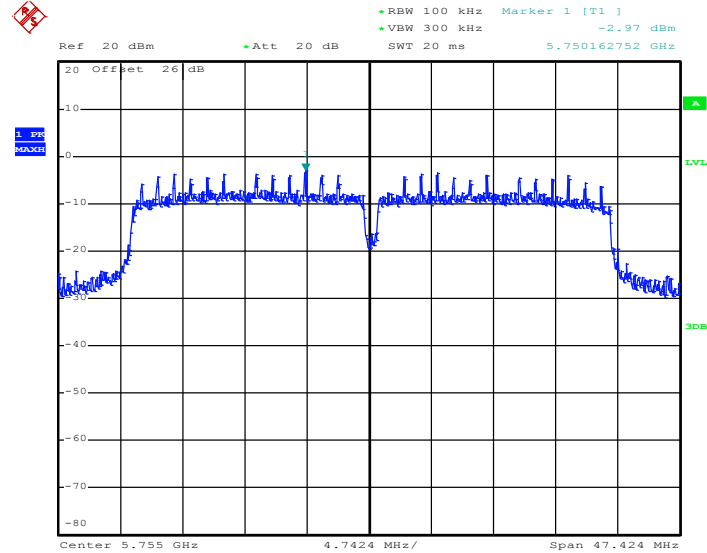
Date: 6.SEP.2012 17:37:09

802.11n HT40 – MIMO Ant. 0+1(0)

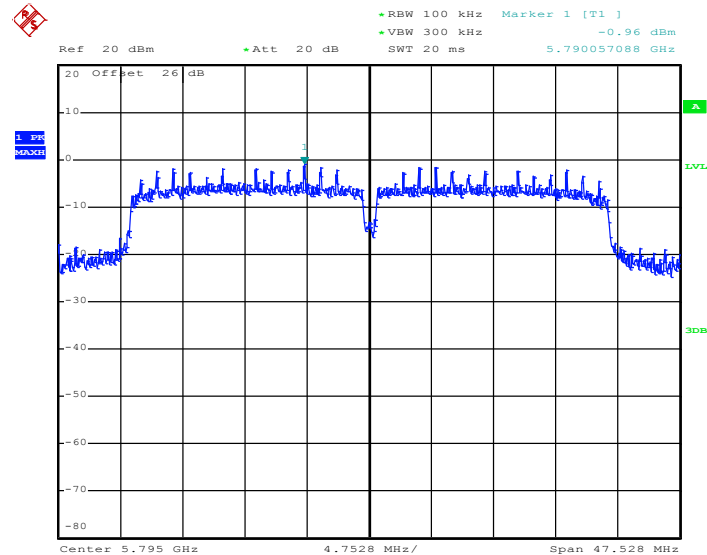
PSD Plot on Channel 159



Date: 6.SEP.2012 17:59:05

802.11n HT40 – MIMO Ant. 0+1(1)
PSD Plot on Channel 151


Date: 6.SEP.2012 17:41:22

802.11n HT40 – MIMO Ant. 0+1(1)
PSD Plot on Channel 159


Date: 6.SEP.2012 17:56:12

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

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

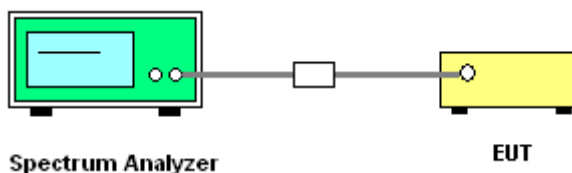
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The testing follows the guidelines in the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance, ANSI C63.4-2003, and ANSI C63.10-2009.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 KHz, VBW=300 KHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz, when maximum peak conducted output power procedure is used. The attenuation is set to 30dB, when maximum conducted output power procedure is used.
4. Measure and record the results in the test report.

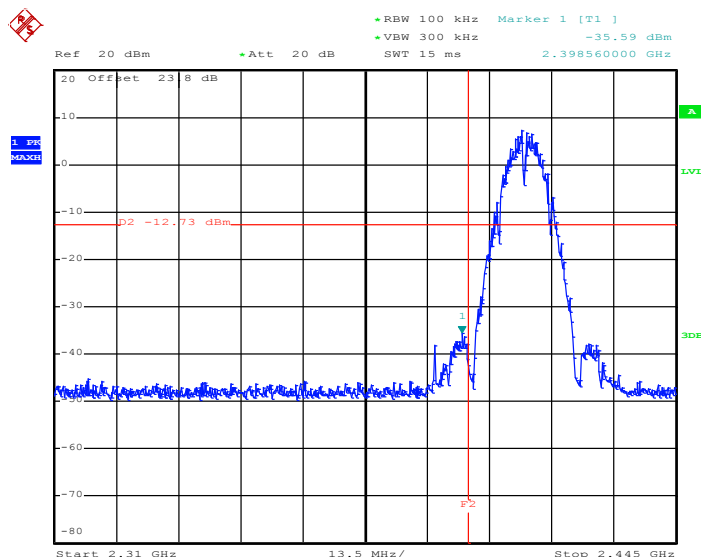
3.4.4 Test Setup



3.4.5 Test Result of Conducted Spurious at Band Edges

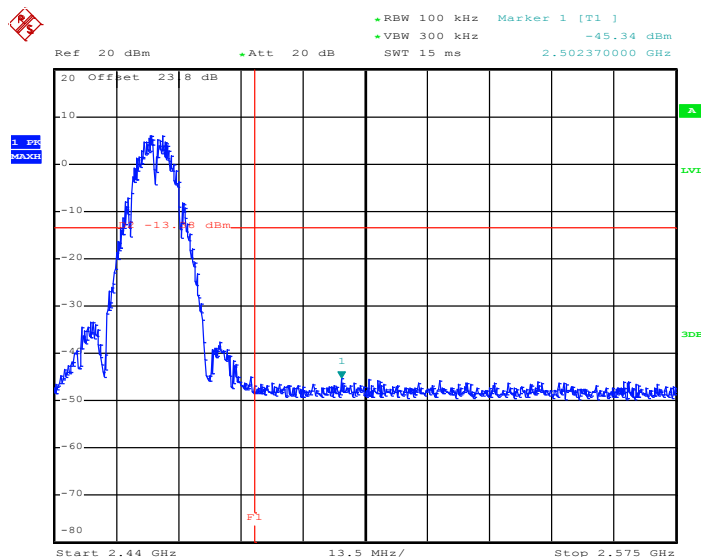
Test Mode :	802.11b <MIMO Ant. 0+1(0)>	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	01 and 11	Test Engineer :	Kenny Chen and Reece Li

802.11b - Low Band Edge Plot on Channel 01



Date: 29.AUG.2012 23:17:47

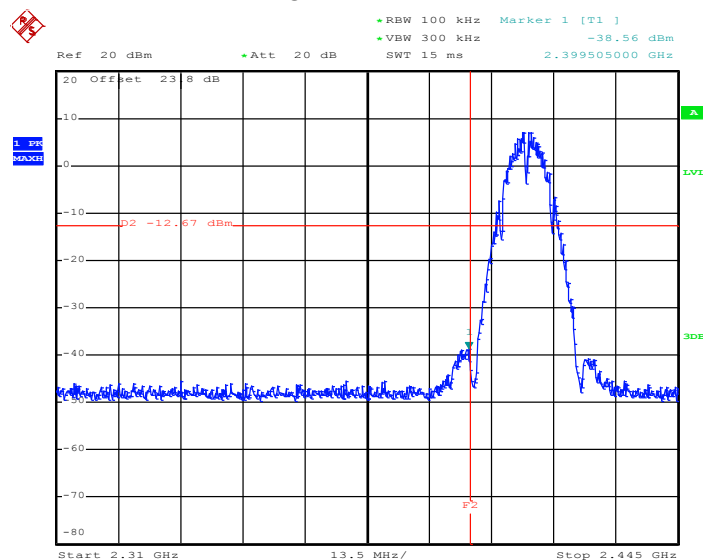
802.11b - High Band Edge Plot on Channel 11



Date: 29.AUG.2012 23:44:59

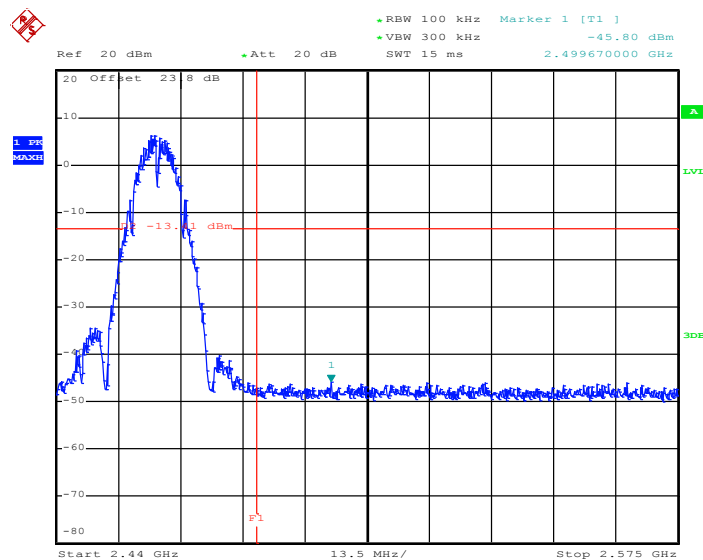
Test Mode :	802.11b <MIMO Ant. 0+1(1)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	01 and 11	Test Engineer :	Kenny Chen and Reece Li

802.11b - Low Band Edge Plot on Channel 01



Date: 29.AUG.2012 23:24:45

802.11b - High Band Edge Plot on Channel 11

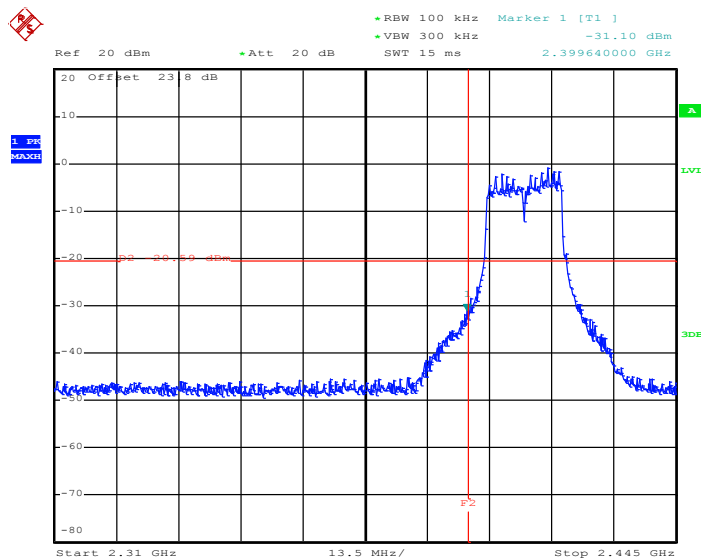


Date: 29.AUG.2012 23:57:36



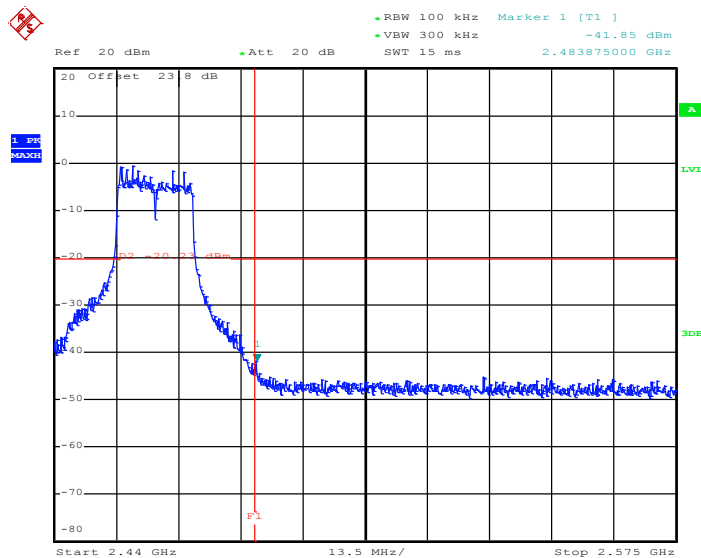
Test Mode :	802.11g <MIMO Ant. 0+1(0)>	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	01 and 11	Test Engineer :	Kenny Chen and Reece Li

802.11g- Low Band Edge Plot on Channel 01



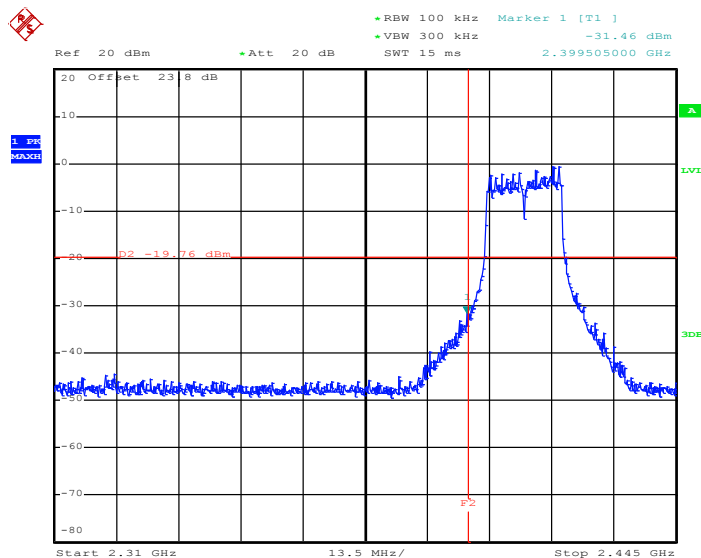
Date: 4.SEP.2012 21:46:02

802.11g- High Band Edge Plot on Channel 11

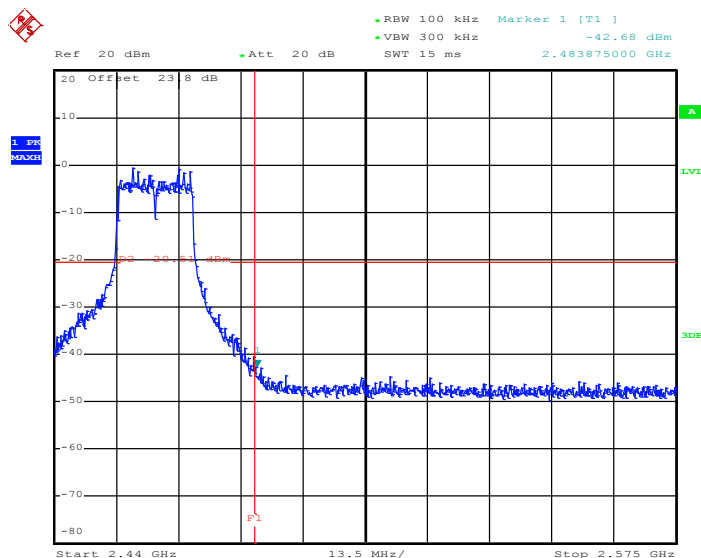


Date: 4.SEP.2012 21:49:35

Test Mode :	802.11g <MIMO Ant. 0+1(1)>	Temperature :	24~26°C
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	01 and 11	Test Engineer :	Kenny Chen and Reece Li

802.11g- Low Band Edge Plot on Channel 01


Date: 4.SEP.2012 22:00:38

802.11g- High Band Edge Plot on Channel 11


Date: 4.SEP.2012 21:57:29



802.11n HT20 - Low Band Edge Plot on Channel 01



Ref 20 dBm Att 20 dB RBW 100 kHz Marker 1 [T1] -44.70 dBm
VBW 300 kHz SWT 15 ms 2.572435000 GHz

20 Offset 23.8 dB

1.5% NOISE

P2 -22.6 dBm

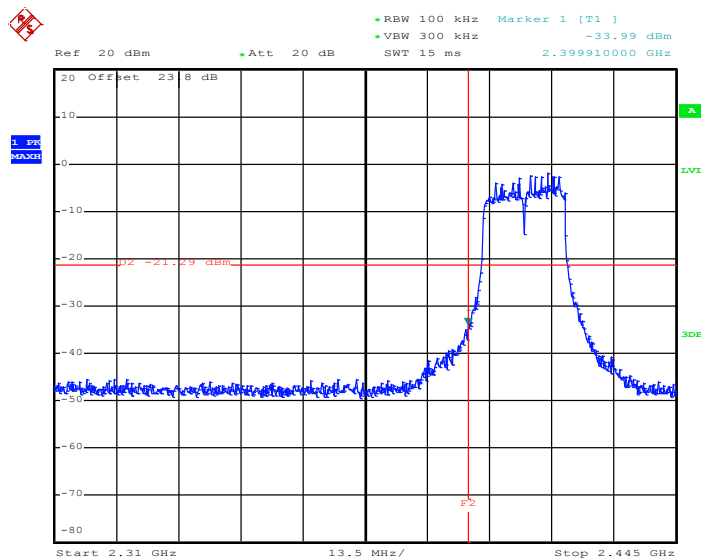
F1

Start 2.44 GHz 13.5 MHz/ Stop 2.575 GHz

Date: 4.SEP.2012 22:22:22

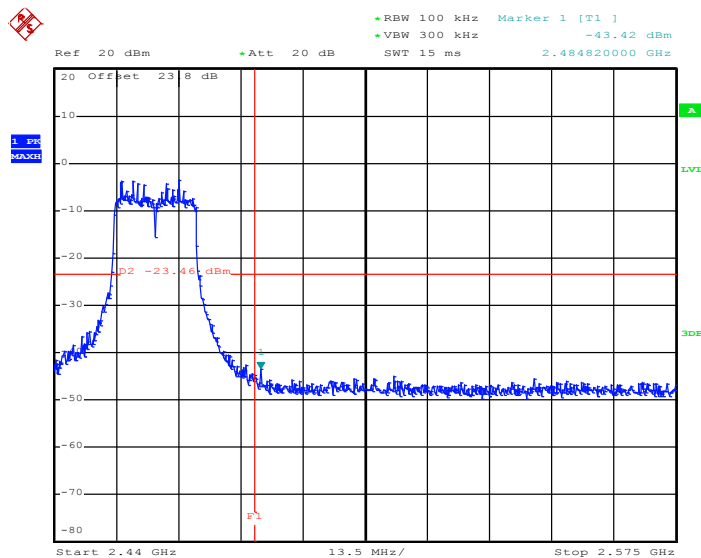
Test Mode :	802.11n HT20 <MIMO Ant. 0+1(1)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	01 and 11	Test Engineer :	Kenny Chen and Reece Li

802.11n HT20 - Low Band Edge Plot on Channel 01



Date: 4.SEP.2012 22:06:06

802.11n HT20 - High Band Edge Plot on Channel 11



Date: 4.SEP.2012 22:10:29



Test Mode :	802.11a <MIMO Ant. 0+1(0)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	149 and 165	Test Engineer :	Kenny Chen and Reece Li

Ref 20 dBm Att 20 dB RBW 100 kHz VBW 300 kHz Marker 1 [T1] -27.56 dBm
 5.724700000 GHz

20 Offset 26 dB

1. Freq SEARCH

D2 -17.01 dBm

F2

Start 5.675 GHz 10 MHz/ Stop 5.775 GHz

Date: 6.SEP.2012 16:56:32

Ref 20 dBm Att 20 dB RBW 100 kHz VBW 300 kHz SWT 20 ms Marker 1 [T1] -38.90 dBm 5.850300000 GHz

20 Offset 26 dB

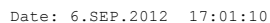
1. Pk 0.2 -18.77 dBm

Start 5.775 GHz 10 MHz/ Stop 5.875 GHz

Date: 6.SEP.2012 17:10:41



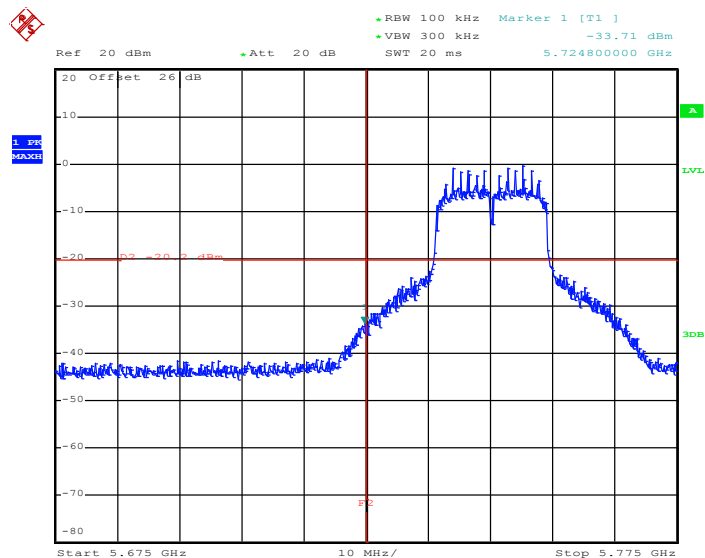
Test Mode :	802.11a <MIMO Ant. 0+1(1)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	149 and 165	Test Engineer :	Kenny Chen and Reece Li





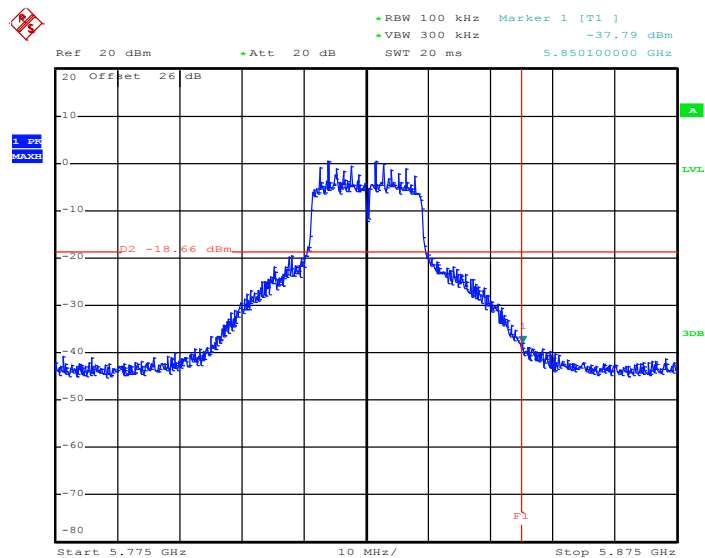
Test Mode :	802.11n HT20 <MIMO Ant. 0+1(0)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	149 and 165	Test Engineer :	Kenny Chen and Reece Li

802.11n HT20 - Low Band Edge Plot on Channel 149



Date: 6.SEP.2012 17:22:21

802.11n HT20 - High Band Edge Plot on Channel 165

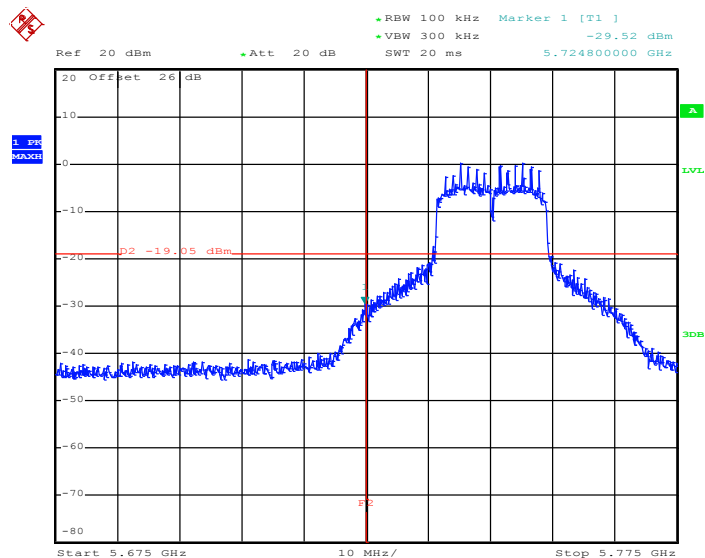


Date: 6.SEP.2012 17:19:47



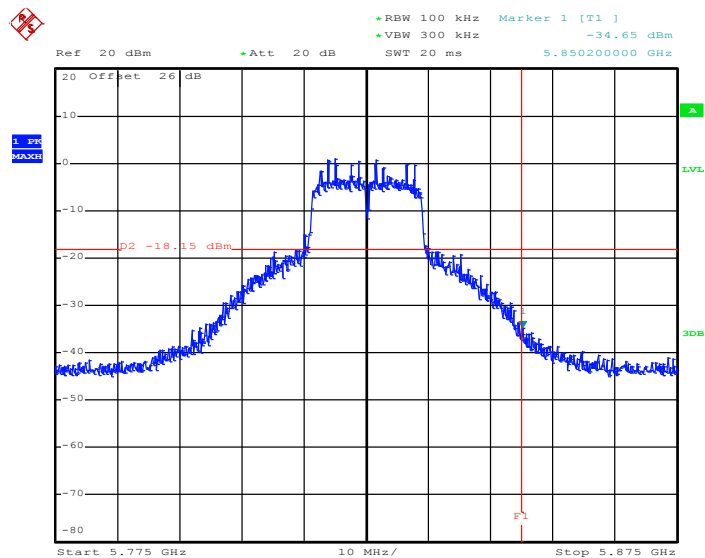
Test Mode :	802.11n HT20 <MIMO Ant. 0+1(1)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	149 and 165	Test Engineer :	Kenny Chen and Reece Li

802.11n HT20 - Low Band Edge Plot on Channel 149



Date: 6.SEP.2012 17:25:01

802.11n HT20 - High Band Edge Plot on Channel 165

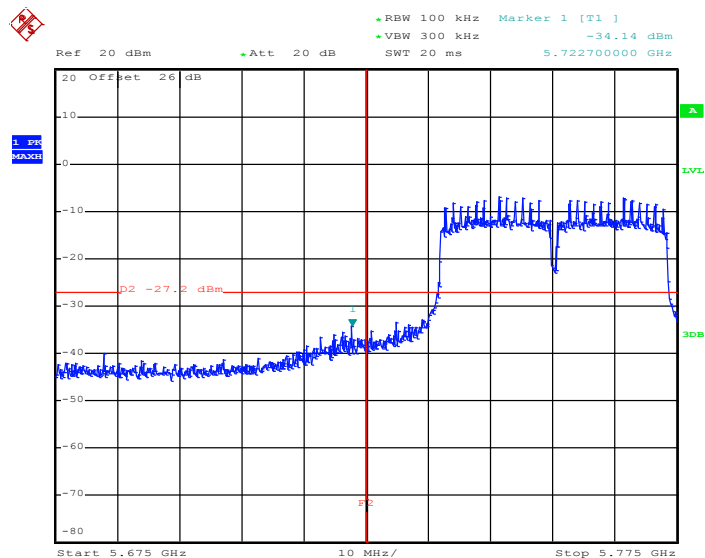


Date: 6.SEP.2012 17:16:56



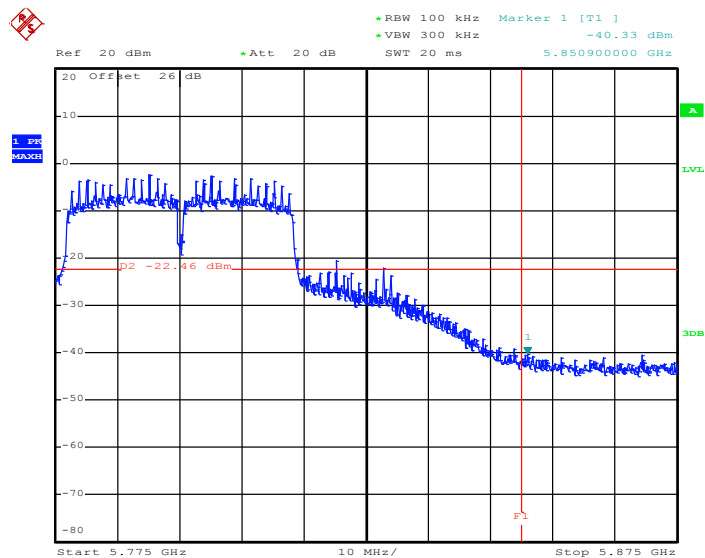
Test Mode :	802.11n HT40 <MIMO Ant. 0+1(0)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	151 and 159	Test Engineer :	Kenny Chen and Reece Li

802.11n HT40 - Low Band Edge Plot on Channel 151



Date: 6.SEP.2012 17:37:31

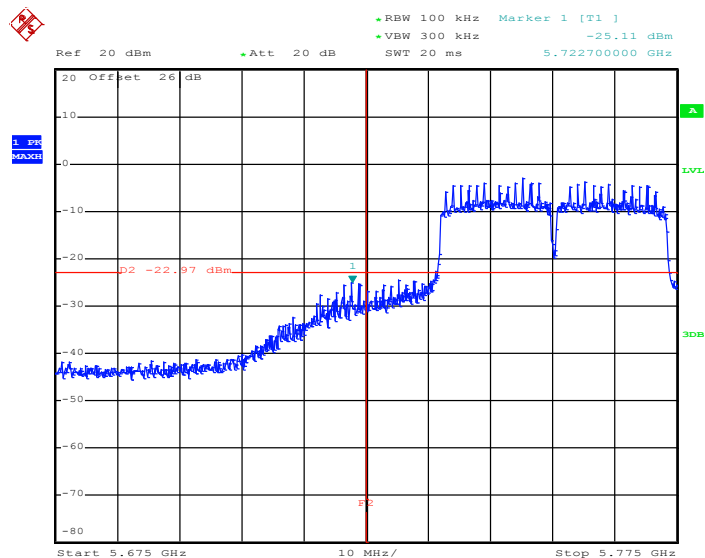
802.11n HT40 - High Band Edge Plot on Channel 159



Date: 6.SEP.2012 17:59:21

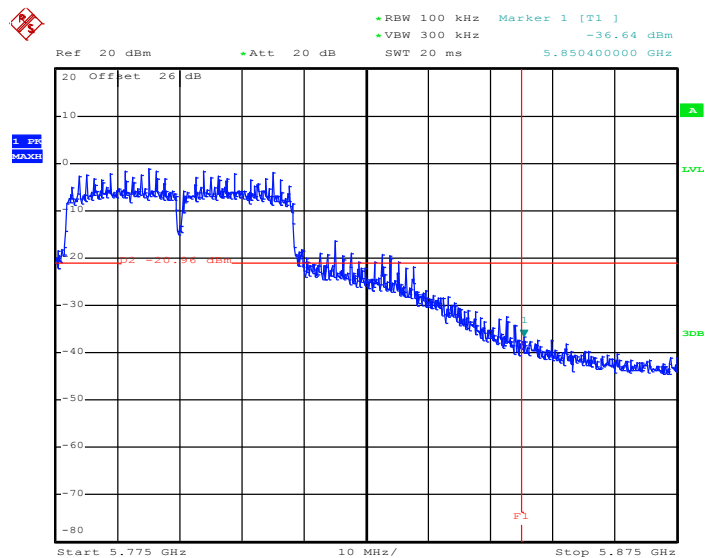
Test Mode :	802.11n HT40 <MIMO Ant. 0+1(1)>	Temperature :	24~26℃
Test Band :	Low and High	Relative Humidity :	55~58%
Test Channel :	151 and 159	Test Engineer :	Kenny Chen and Reece Li

802.11n HT40 - Low Band Edge Plot on Channel 151



Date: 6.SEP.2012 17:41:41

802.11n HT40 - High Band Edge Plot on Channel 159



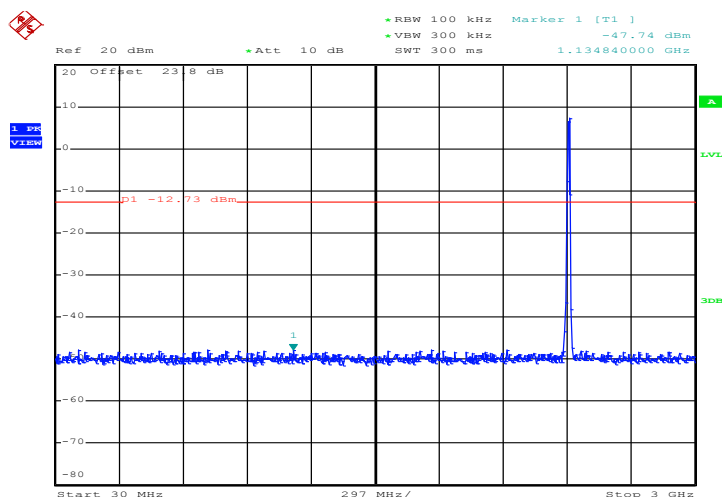
Date: 6.SEP.2012 17:56:29

3.4.5 Test Result of Conducted Spurious Emission

Test Mode :	802.11b <MIMO Ant. 0+1(0)>	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	55~58%
Test Channel :	01, 06, 11	Test Engineer :	Kenny Chen and Reece Li

802.11b 30 MHz~3 GHz

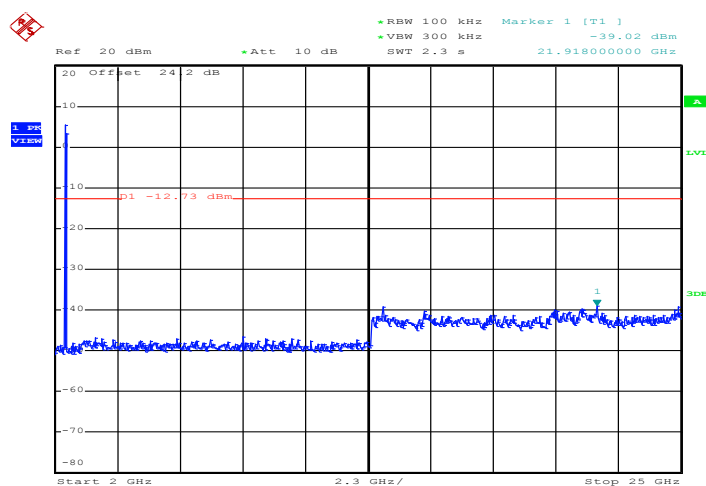
Conducted Spurious Emission Plot on Channel 01



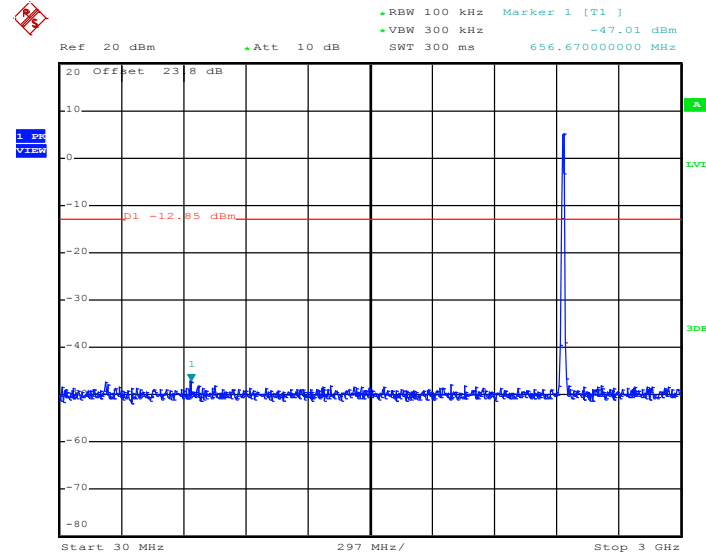
Date: 29.AUG.2012 23:19:09

802.11b 2 GHz~ 25 GHz

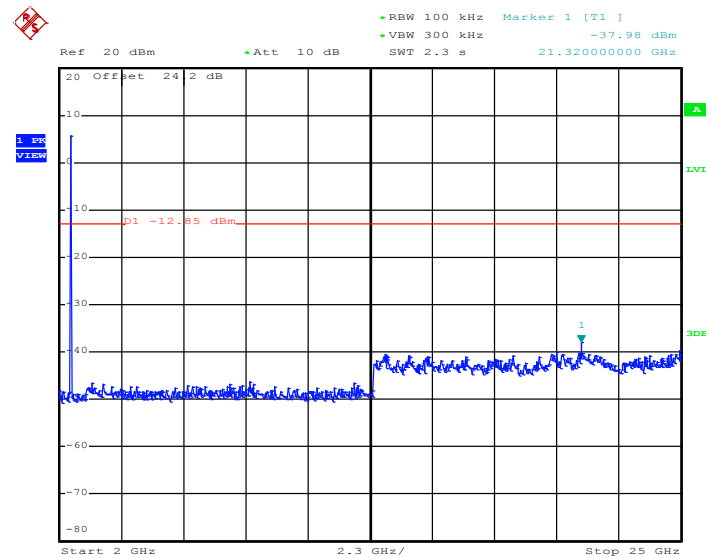
Conducted Spurious Emission Plot on Channel 01



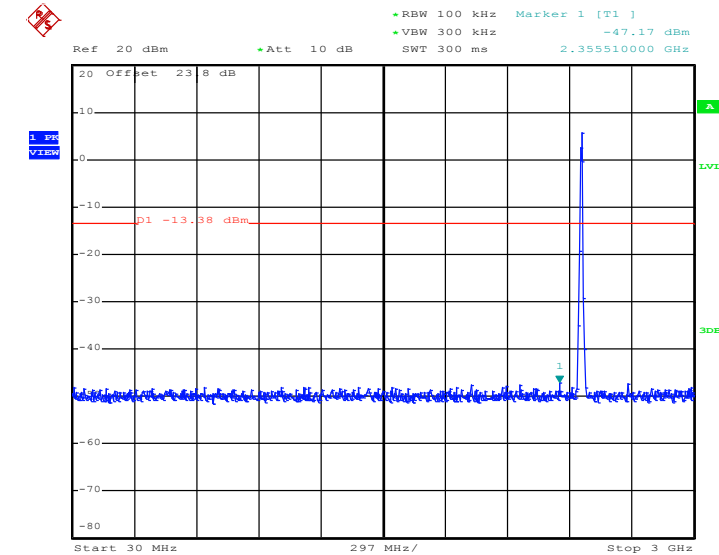
Date: 29.AUG.2012 23:19:26

802.11b 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 06


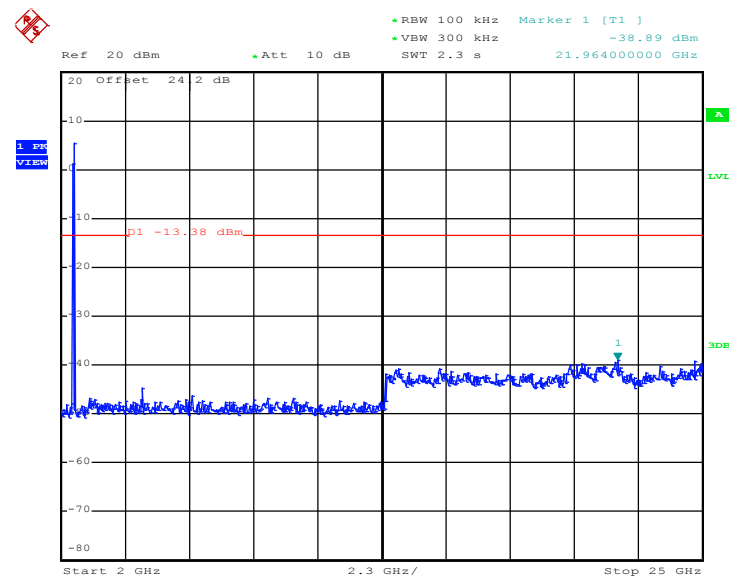
Date: 29.AUG.2012 23:35:30

802.11b 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 29.AUG.2012 23:35:47

802.11b 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 11


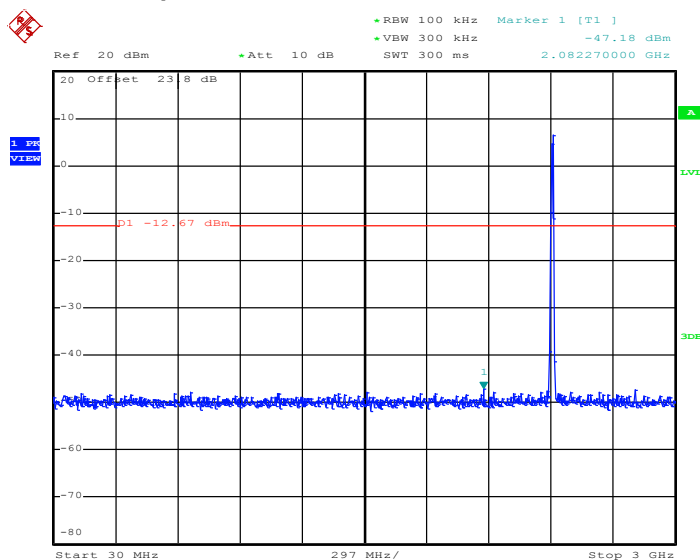
Date: 29.AUG.2012 23:47:45

802.11b 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 11


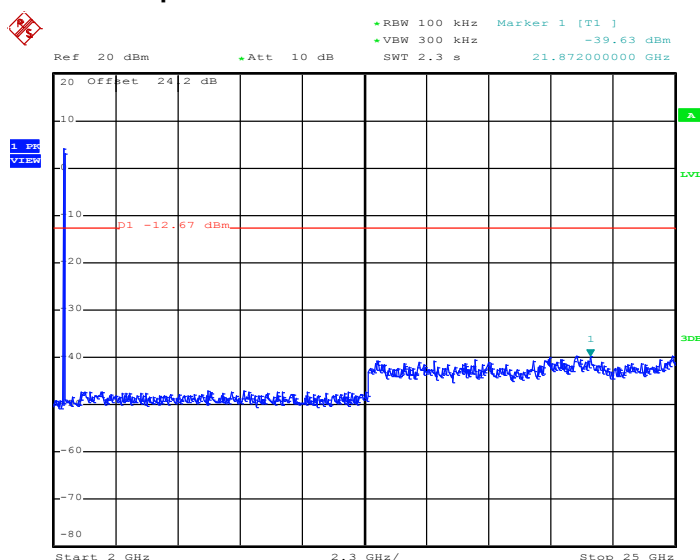
Date: 29.AUG.2012 23:48:02



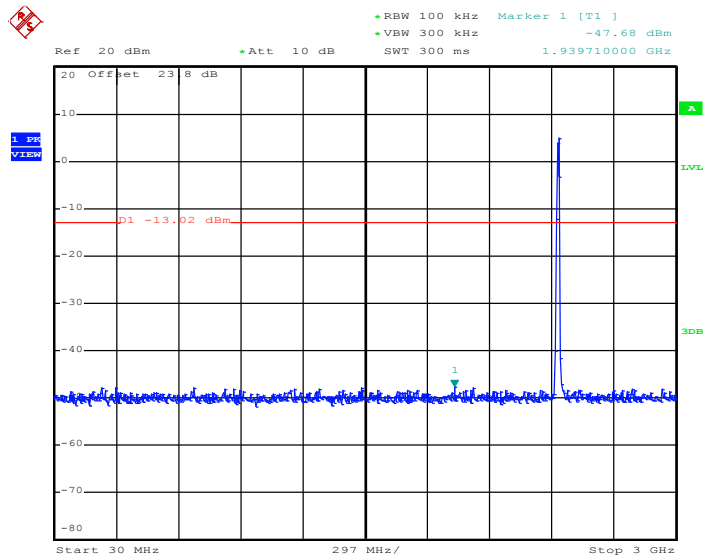
Test Mode :	802.11b <MIMO Ant. 0+1(1)>	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	55~58%
Test Channel :	01, 06, 11	Test Engineer :	Kenny Chen and Reece Li

802.11b 30 MHz~3 GHz**Conducted Spurious Emission Plot on Channel 01**

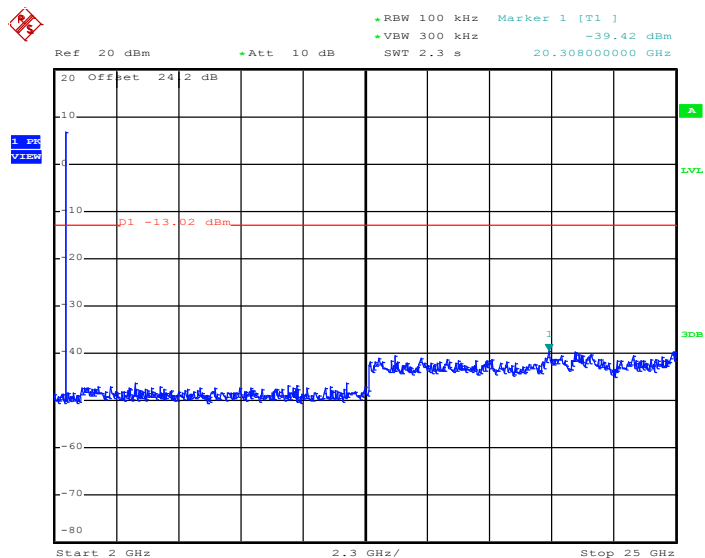
Date: 29.AUG.2012 23:25:05

802.11b 2 GHz~25 GHz**Conducted Spurious Emission Plot on Channel 01**

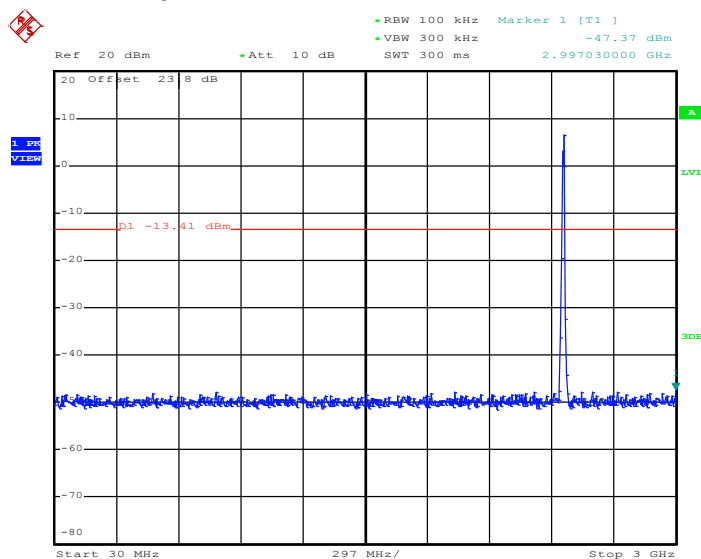
Date: 29.AUG.2012 23:25:22

802.11b 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 06


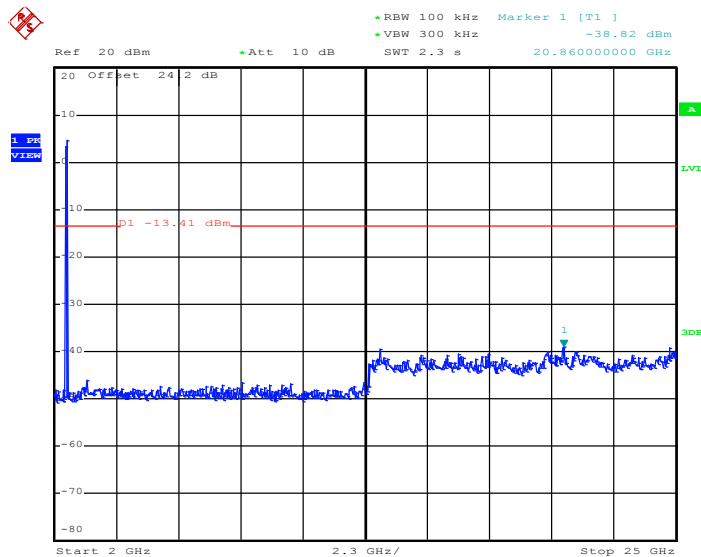
Date: 29.AUG.2012 23:31:55

802.11b 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 29.AUG.2012 23:32:12

802.11b 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 29.AUG.2012 23:57:55

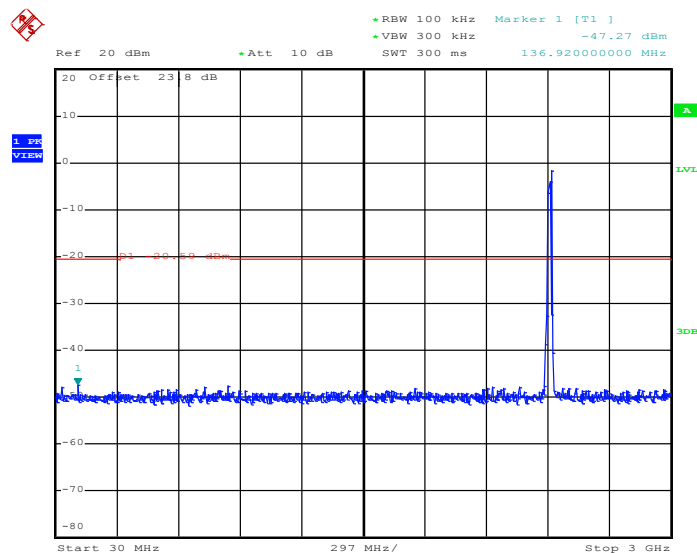
802.11b 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 29.AUG.2012 23:58:12

Test Mode :	802.11g <MIMO Ant. 0+1(0)>	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	55~58%
Test Channel :	01, 06, 11	Test Engineer :	Kenny Chen and Reece Li

802.11g 30 MHz~3 GHz

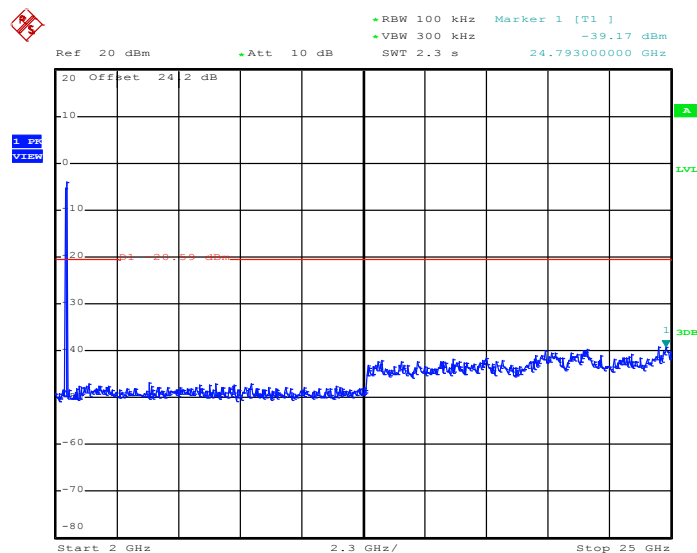
Conducted Spurious Emission Plot on Channel 01



Date: 4.SEP.2012 21:46:30

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 01

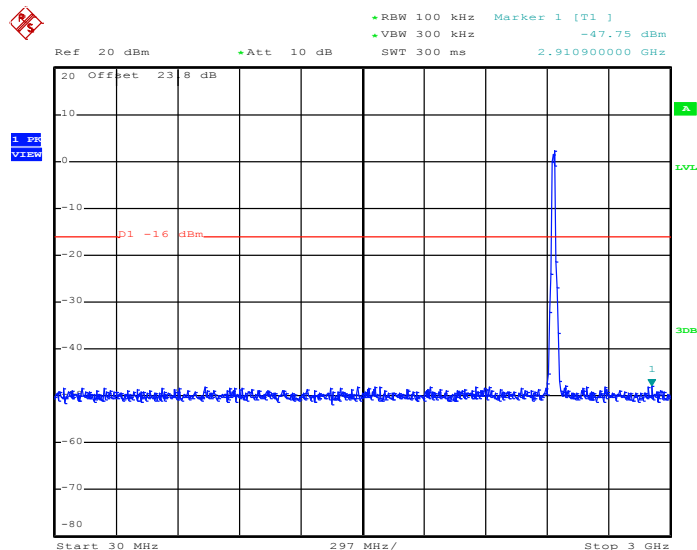


Date: 4.SEP.2012 21:46:47



802.11g 30 MHz~3 GHz

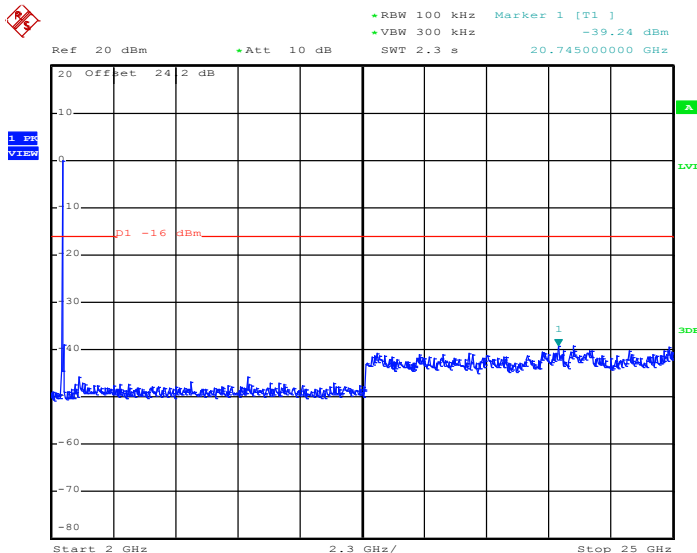
Conducted Spurious Emission Plot on Channel 06



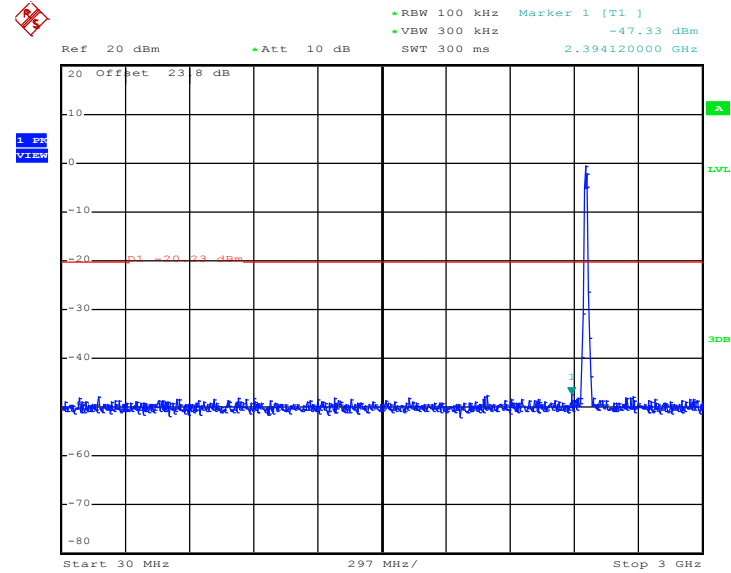
Date: 30.AUG.2012 00:46:26

802.11g 2 GHz~25 GHz

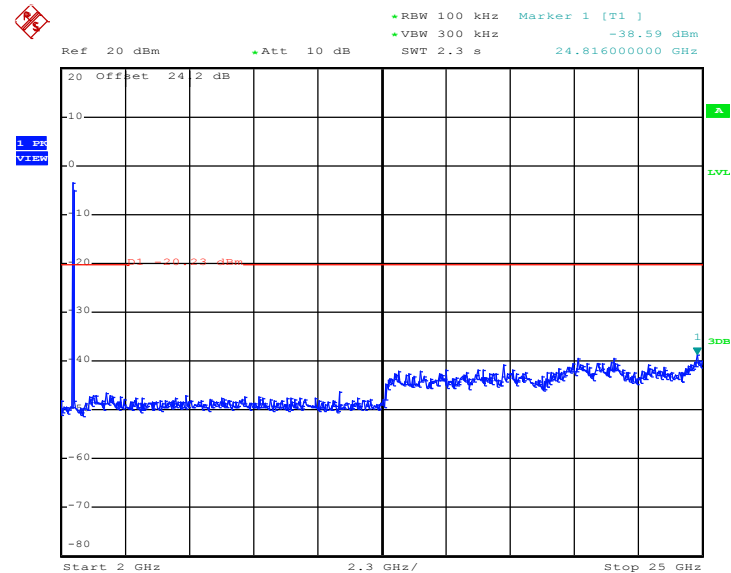
Conducted Spurious Emission Plot on Channel 06



Date: 30.AUG.2012 00:46:43

802.11g 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 4.SEP.2012 21:50:00

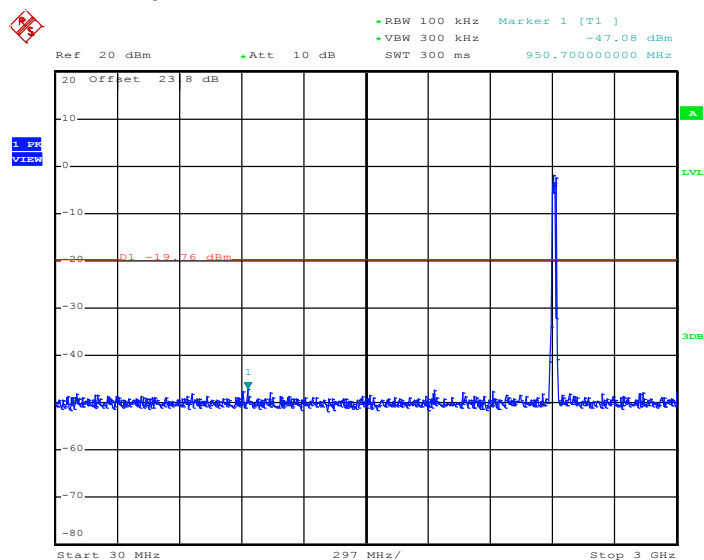
802.11g 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 4.SEP.2012 21:50:17

Test Mode :	802.11g <MIMO Ant. 0+1(1)>	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	55~58%
Test Channel :	01, 06, 11	Test Engineer :	Kenny Chen and Reece Li

802.11g 30 MHz~3 GHz

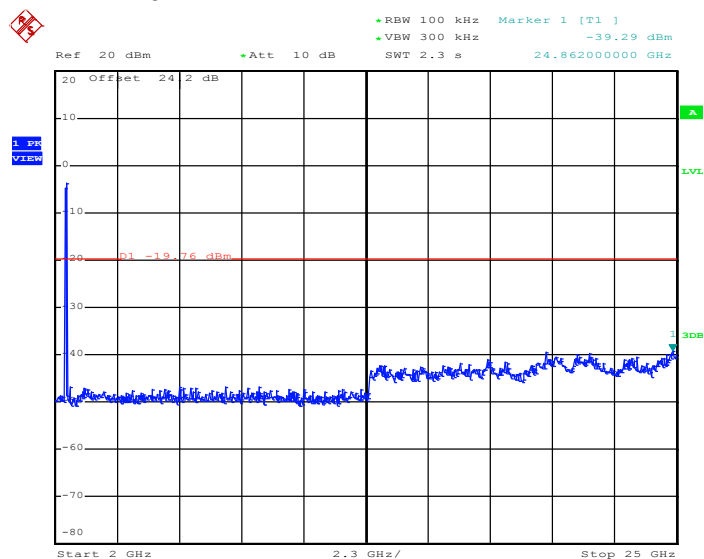
Conducted Spurious Emission Plot on Channel 01



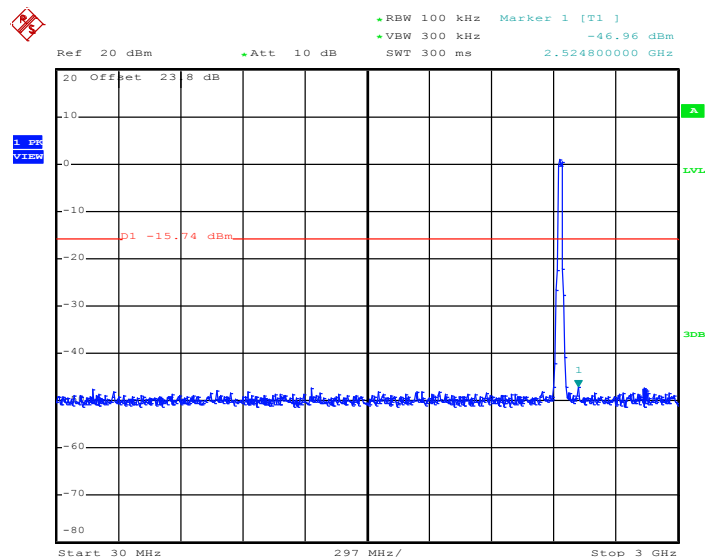
Date: 4.SEP.2012 22:01:00

802.11g 2 GHz~25 GHz

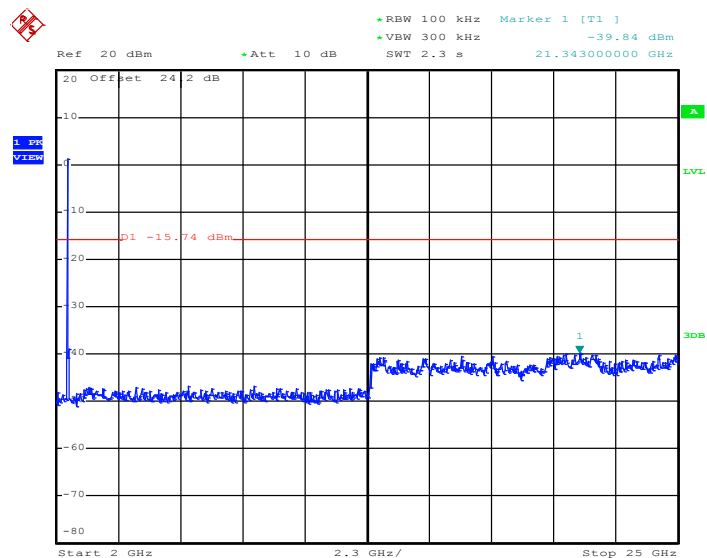
Conducted Spurious Emission Plot on Channel 01



Date: 4.SEP.2012 22:01:17

802.11g 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 30.AUG.2012 00:49:55

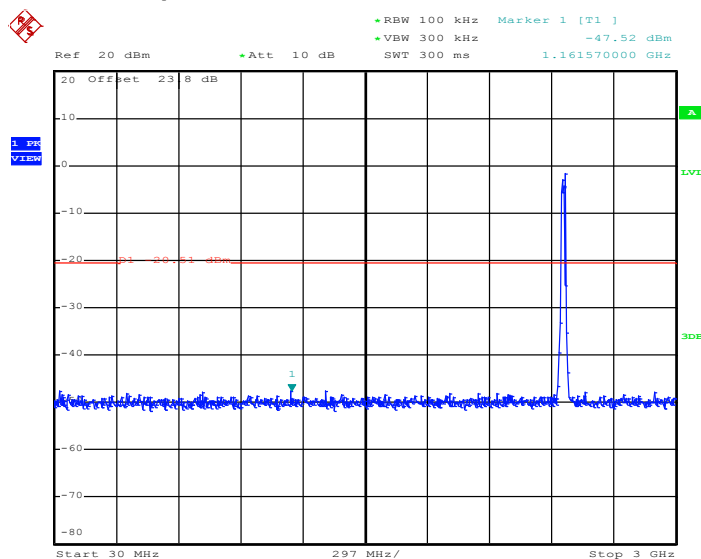
802.11g 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 30.AUG.2012 00:50:12



802.11g 30 MHz~3 GHz

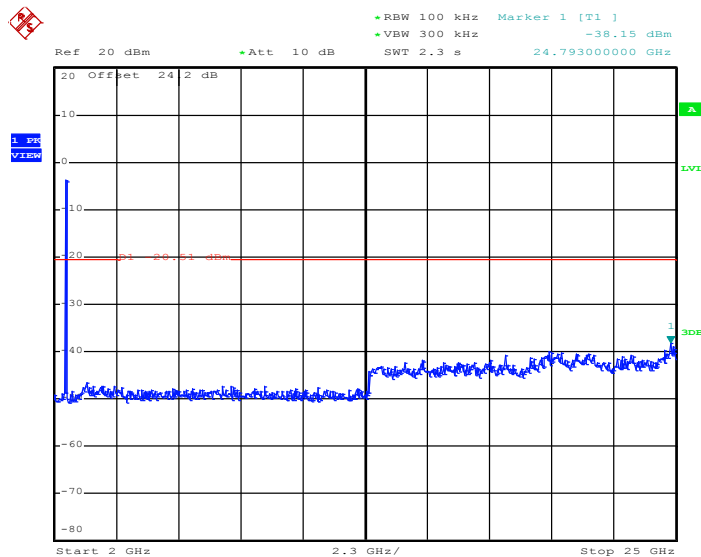
Conducted Spurious Emission Plot on Channel 11



Date: 4.SEP.2012 21:57:49

802.11g 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



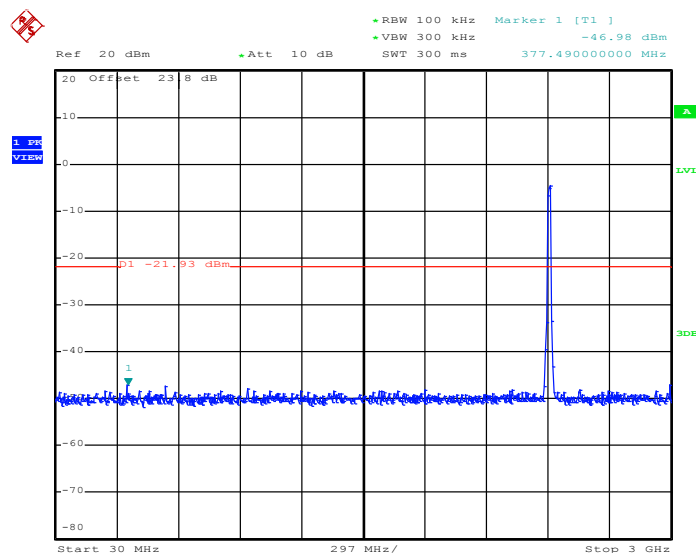
Date: 4.SEP.2012 21:58:07



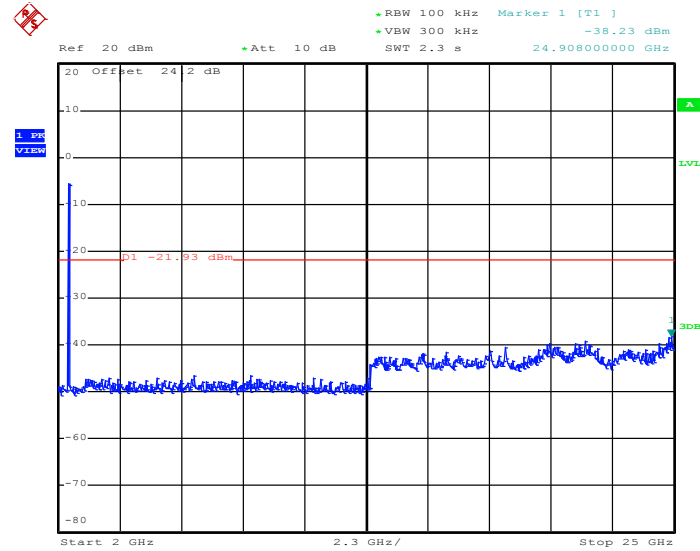
Test Mode :	802.11n HT20 <MIMO Ant. 0+1(0)>	Temperature :	24~26℃
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	55~58%
Test Channel :	01, 06, 11	Test Engineer :	Kenny Chen and Reece Li

802.11n HT20 30 MHz~3 GHz

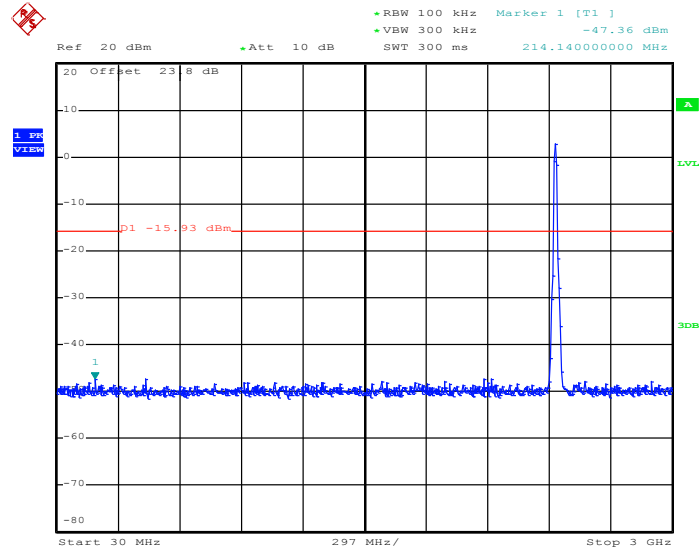
Conducted Spurious Emission Plot on Channel 01



Date: 4.SEP.2012 22:26:25

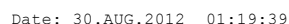
802.11n HT20 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 01


Date: 4.SEP.2012 22:26:42

802.11n HT20 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 06


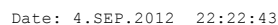


Conducted Spurious Emission Plot on Channel 06



802.11n HT20 30 MHz~3 GHz

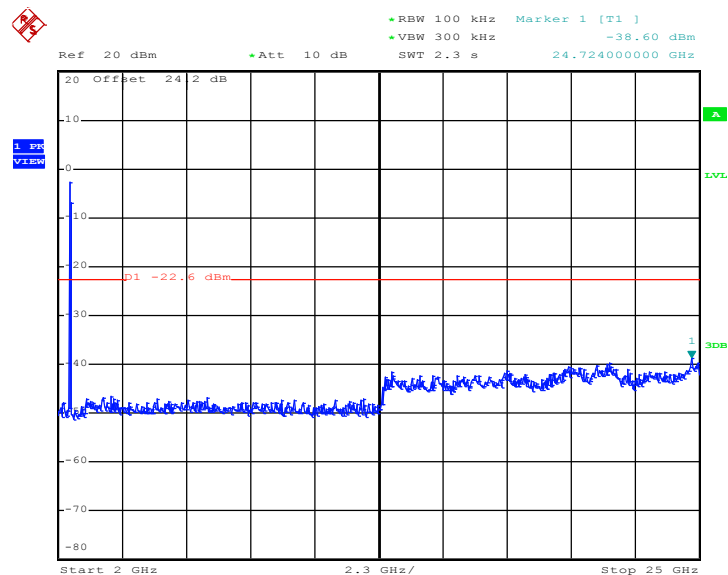
Conducted Spurious Emission Plot on Channel 11





802.11n HT20 2 GHz~25 GHz

Conducted Spurious Emission Plot on Channel 11



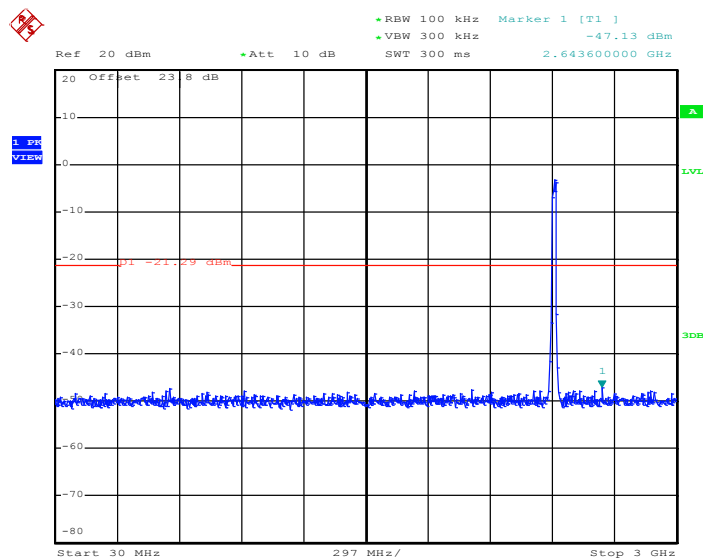
Date: 4.SEP.2012 22:23:01



Test Mode :	802.11n HT20 <MIMO Ant. 0+1(1)>	Temperature :	24~26°C
Test Band :	30MHz-3GHz and 2G-25GHz	Relative Humidity :	55~58%
Test Channel :	01, 06, 11	Test Engineer :	Kenny Chen and Reece Li

802.11n HT20 30 MHz~3 GHz

Conducted Spurious Emission Plot on Channel 01



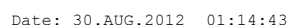
Date: 4.SEP.2012 22:06:28

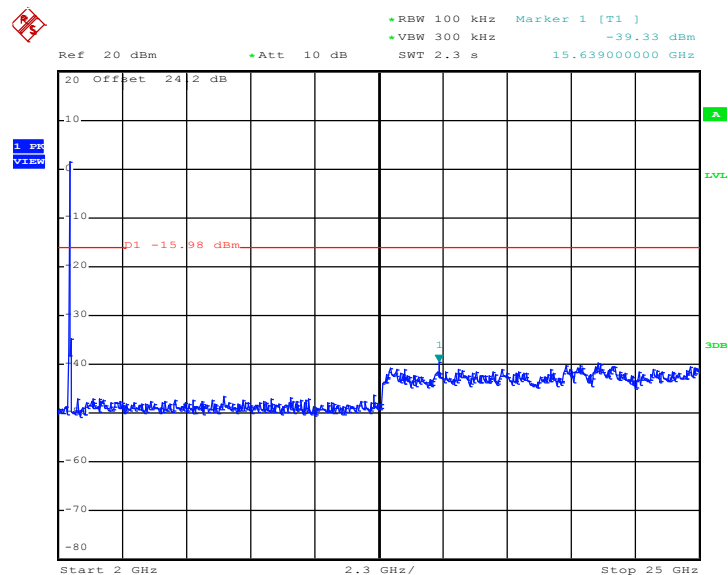


Conducted Spurious Emission Plot on Channel 01

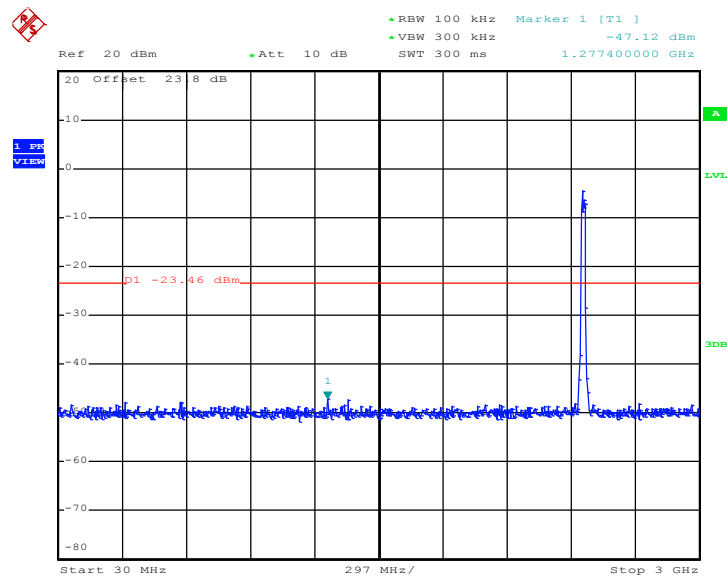


Conducted Spurious Emission Plot on Channel 06



802.11n HT20 2 GHz~25 GHz
Conducted Spurious Emission Plot on Channel 06


Date: 30.AUG.2012 01:15:01

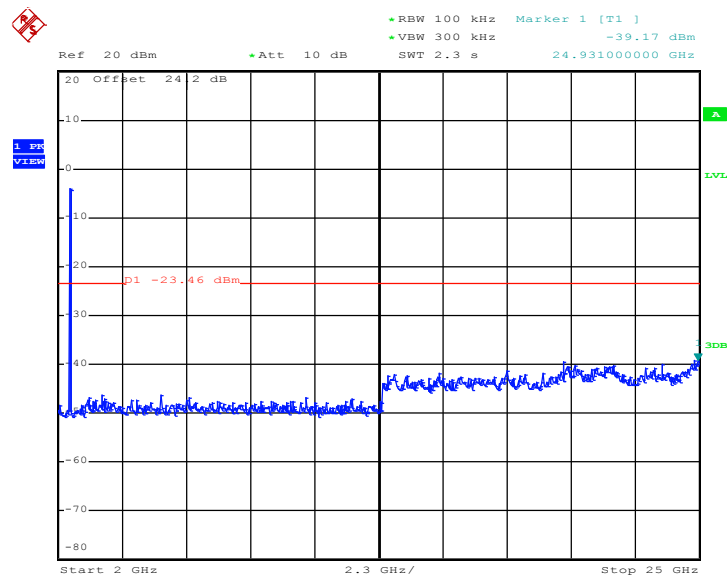
802.11n HT20 30 MHz~3 GHz
Conducted Spurious Emission Plot on Channel 11


Date: 4.SEP.2012 22:11:01



802.11n HT20 2 GHz~25 GHz

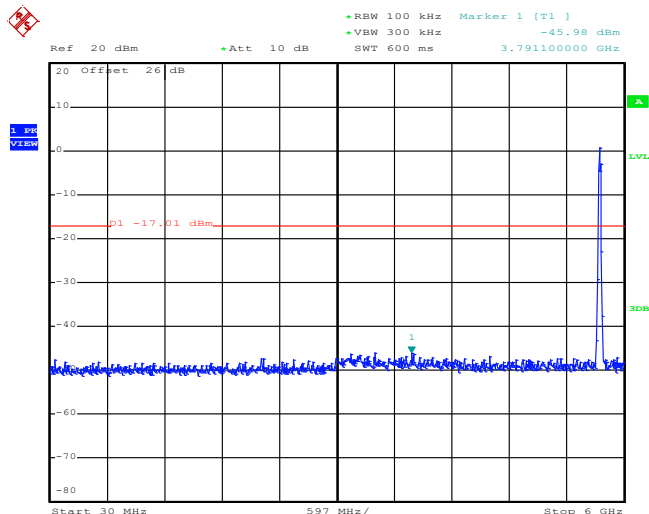
Conducted Spurious Emission Plot on Channel 11



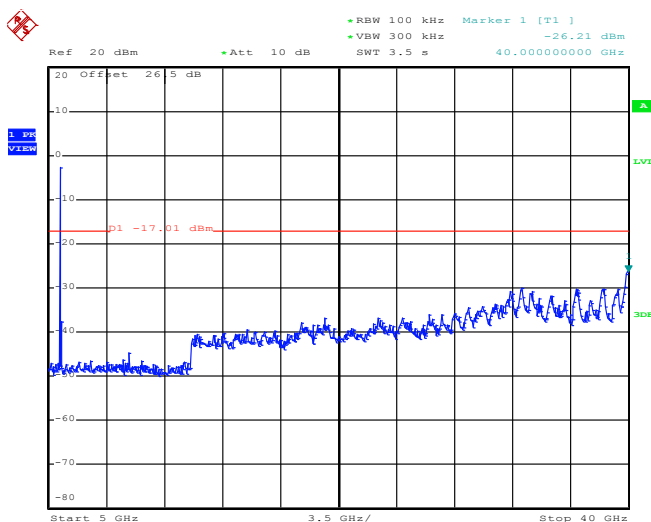
Date: 4.SEP.2012 22:11:18



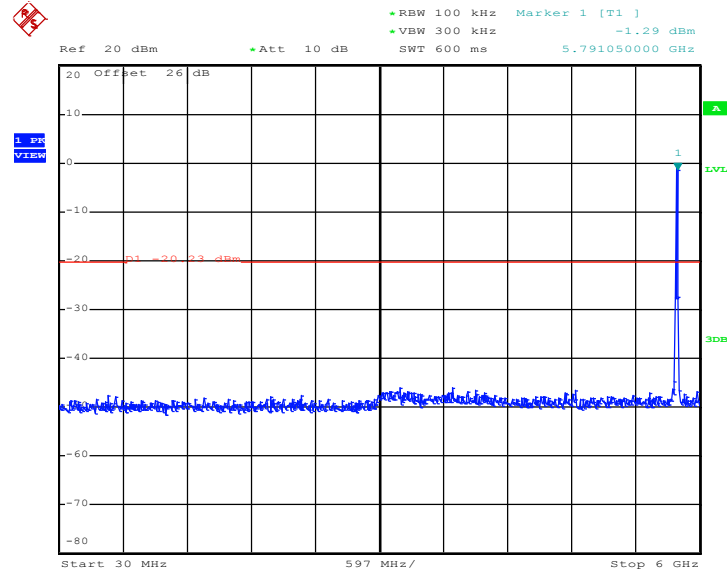
Test Mode :	802.11a <MIMO Ant. 0+1(0)>	Temperature :	24~26°C
Test Band :	30MHz-6GHz and 5G-40GHz	Relative Humidity :	55~58%
Test Channel :	149, 157, 165	Test Engineer :	Kenny Chen and Reece Li

802.11a 30 MHz~6 GHz**Conducted Spurious Emission Plot on Channel 149**

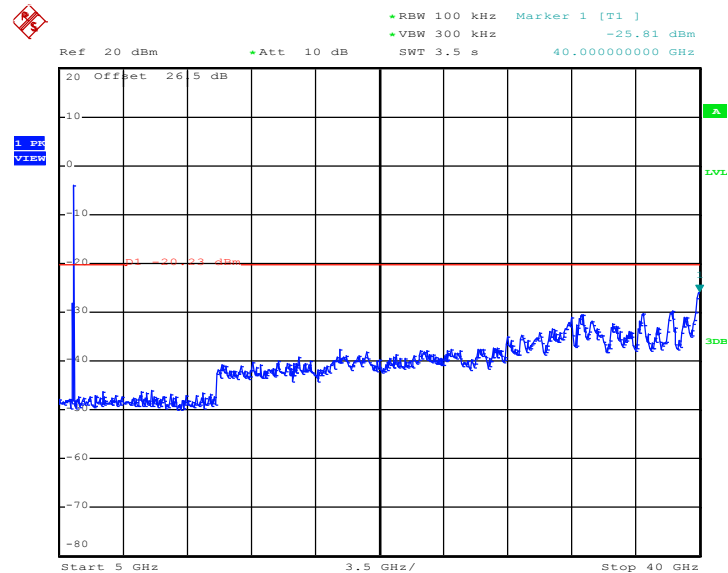
Date: 6.SEP.2012 16:57:46

802.11a 5 GHz~40 GHz**Conducted Spurious Emission Plot on Channel 149**

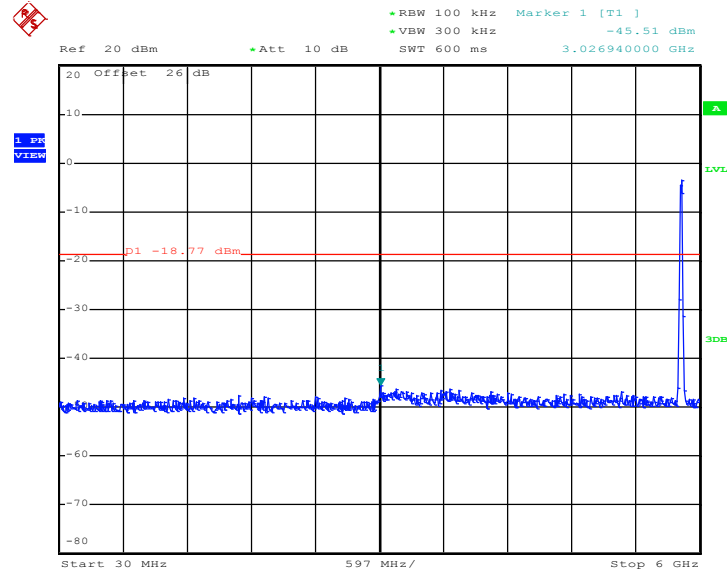
Date: 6.SEP.2012 16:58:04

802.11a 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 157


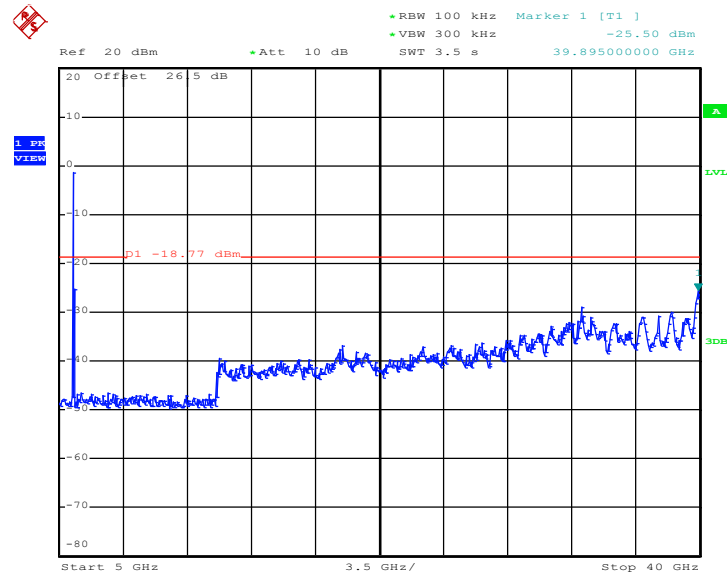
Date: 6.SEP.2012 17:07:16

802.11a 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 157


Date: 6.SEP.2012 17:07:33

802.11a 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 165


Date: 6.SEP.2012 17:11:23

802.11a 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 165


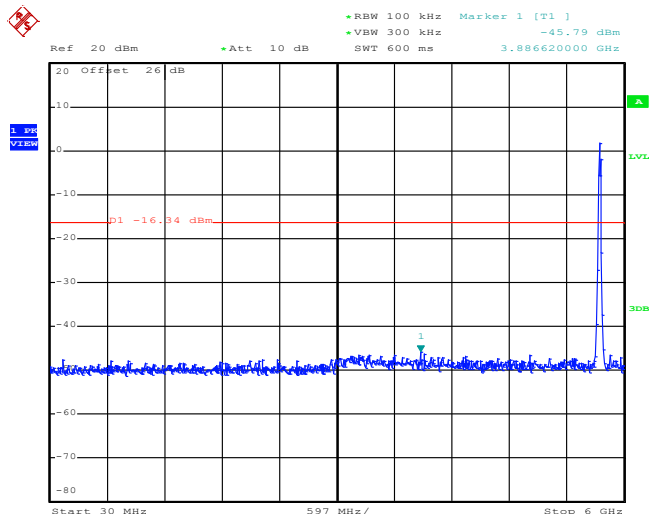
Date: 6.SEP.2012 17:11:41



Test Mode :	802.11a <MIMO Ant. 0+1(1)>	Temperature :	24~26°C
Test Band :	30MHz-6GHz and 5G-40GHz	Relative Humidity :	55~58%
Test Channel :	149, 157, 165	Test Engineer :	Kenny Chen and Reece Li

802.11a 30 MHz~6 GHz

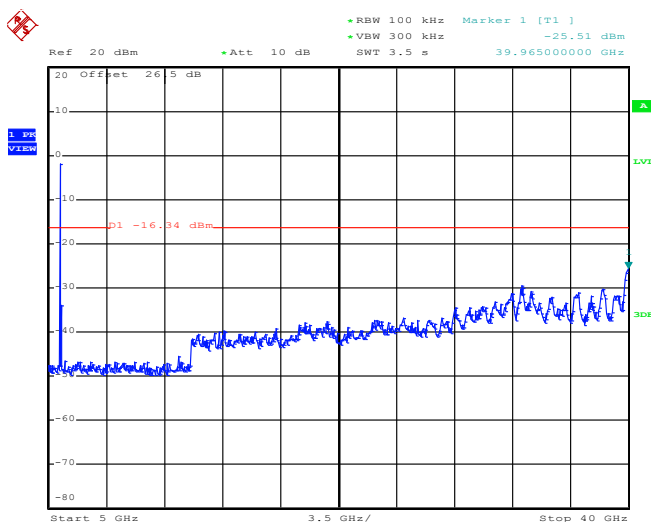
Conducted Spurious Emission Plot on Channel 149



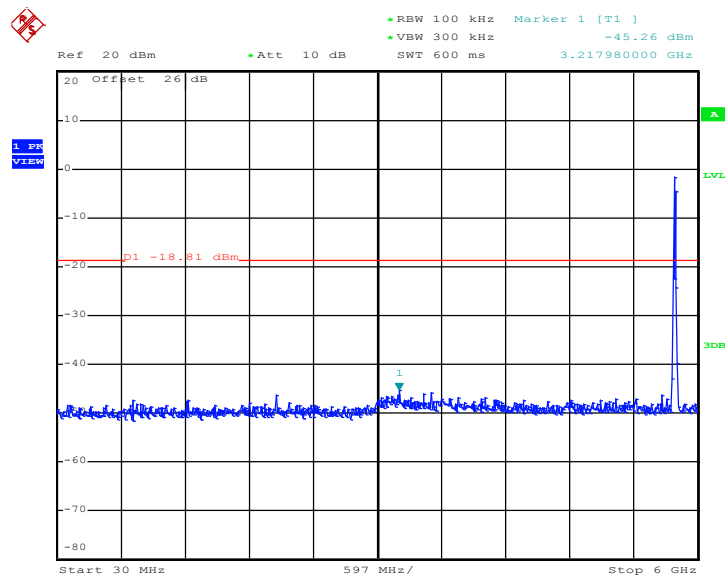
Date: 6.SEP.2012 17:01:38

802.11a 5 GHz~40 GHz

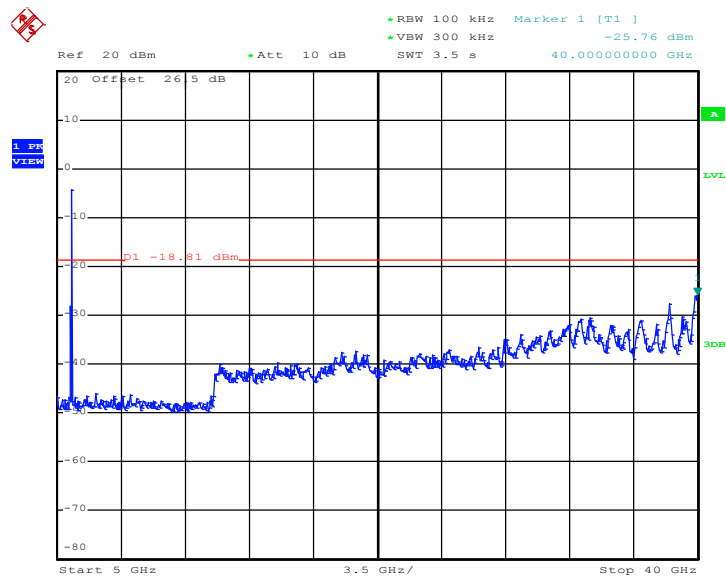
Conducted Spurious Emission Plot on Channel 149



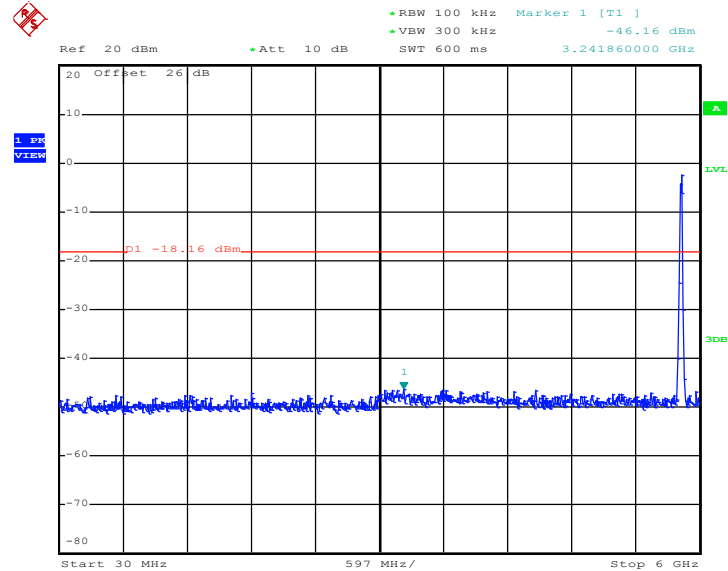
Date: 6.SEP.2012 17:01:55

802.11a 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 157


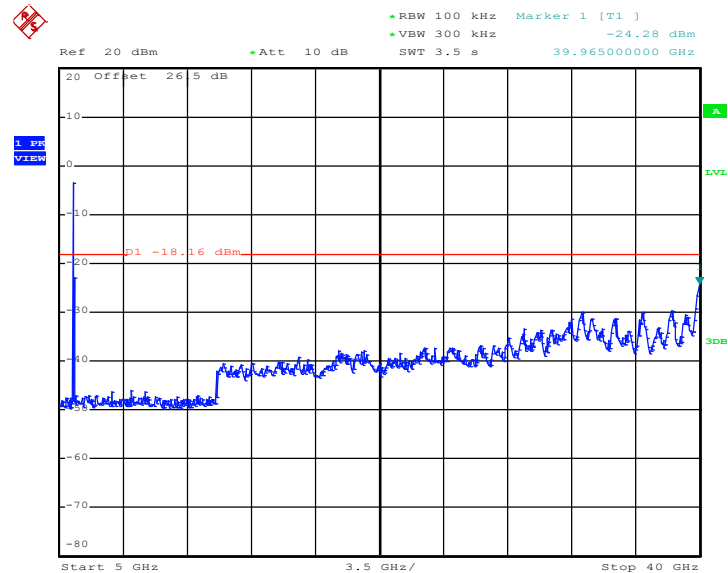
Date: 6.SEP.2012 17:04:36

802.11a 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 157


Date: 6.SEP.2012 17:04:53

802.11a 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 165


Date: 6.SEP.2012 17:14:02

802.11a 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 165


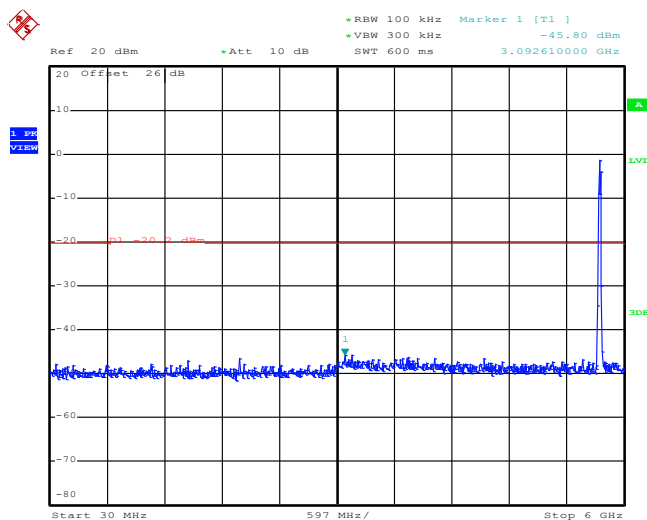
Date: 6.SEP.2012 17:14:20



Test Mode :	802.11n HT20 <MIMO Ant. 0+1(0)>	Temperature :	24~26℃
Test Band :	30MHz-6GHz and 5G-40GHz	Relative Humidity :	55~58%
Test Channel :	149, 157, 165	Test Engineer :	Kenny Chen and Reece Li

802.11n HT20 30 MHz~6 GHz

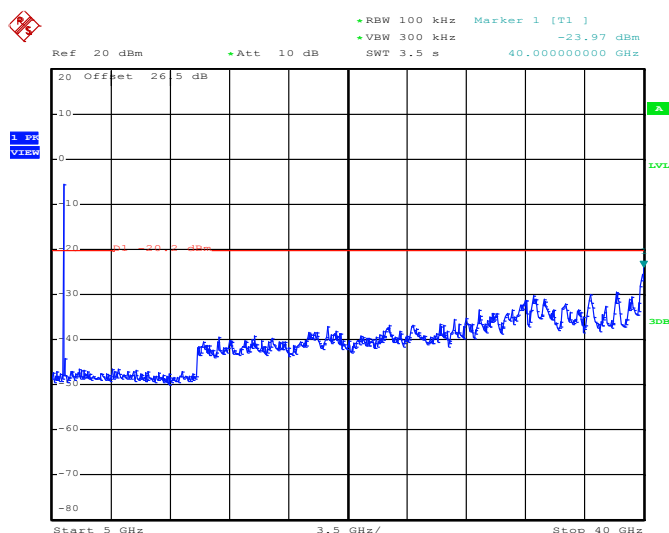
Conducted Spurious Emission Plot on Channel 149



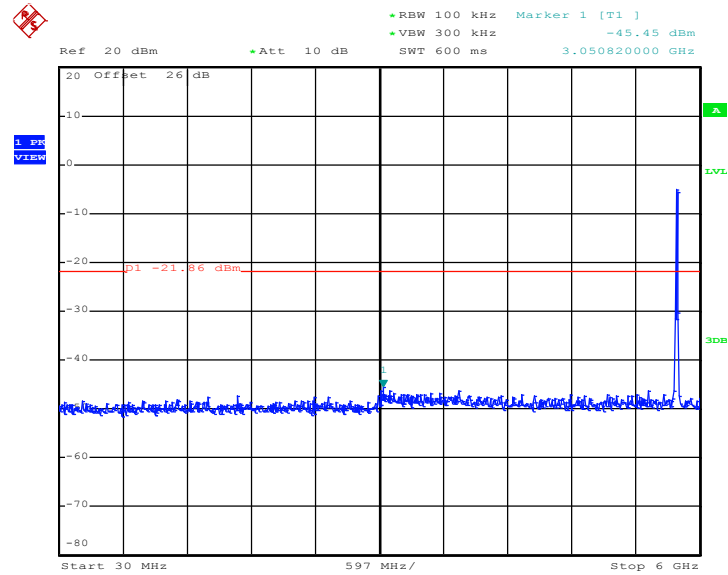
Date: 6.SEP.2012 17:22:48

802.11n HT20 5 GHz~40 GHz

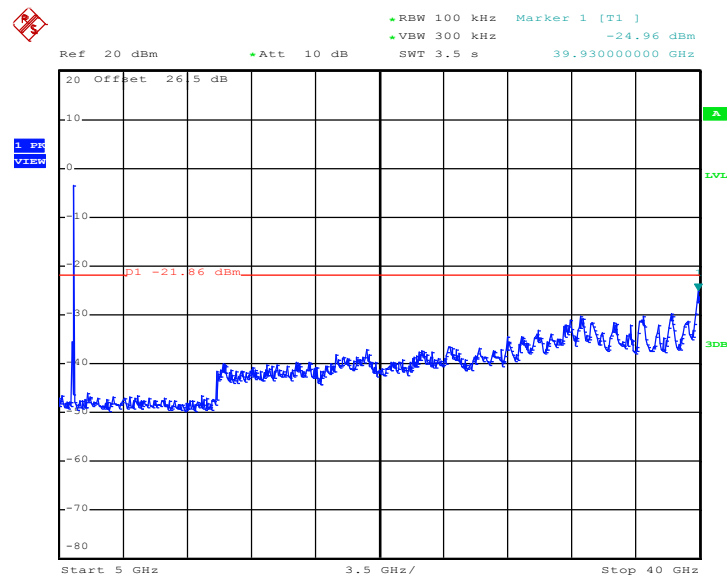
Conducted Spurious Emission Plot on Channel 149



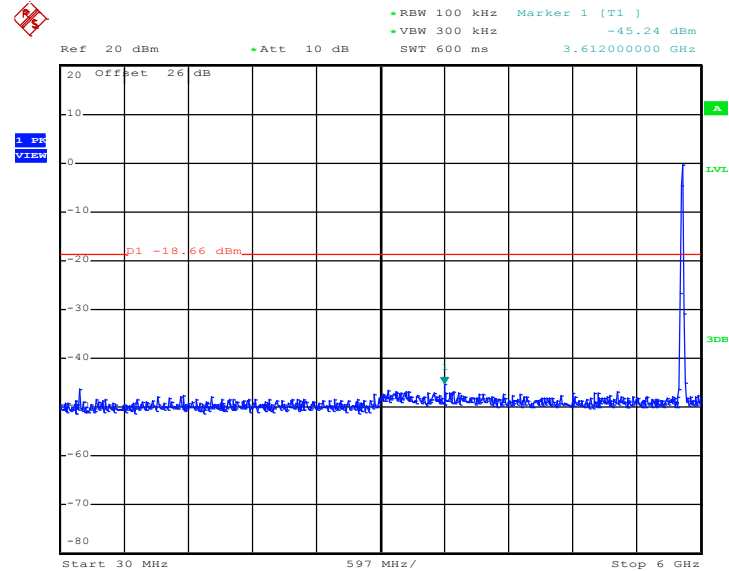
Date: 6.SEP.2012 17:23:06

802.11n HT20 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 157


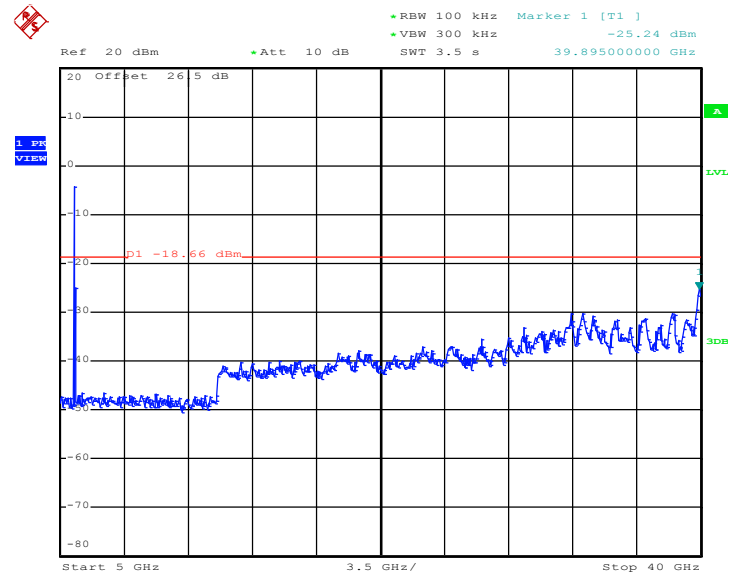
Date: 6.SEP.2012 17:32:23

802.11n HT20 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 157


Date: 6.SEP.2012 17:32:40

802.11n HT20 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 165


Date: 6.SEP.2012 17:20:17

802.11n HT20 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 165


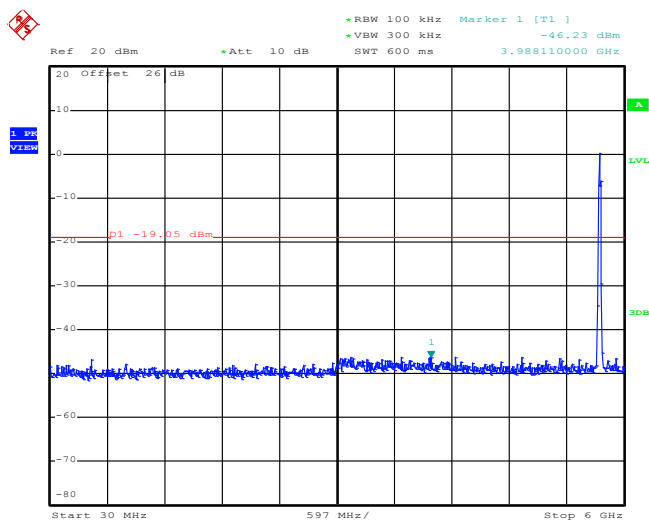
Date: 6.SEP.2012 17:20:34



Test Mode :	802.11n HT20 <MIMO Ant. 0+1(1)>	Temperature :	24~26℃
Test Band :	30MHz-6GHz and 5G-40GHz	Relative Humidity :	55~58%
Test Channel :	149, 157, 165	Test Engineer :	Kenny Chen and Reece Li

802.11n HT20 30 MHz~6 GHz

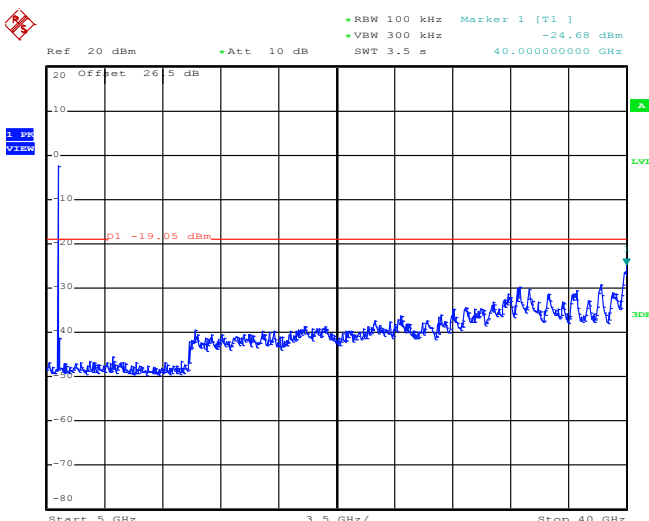
Conducted Spurious Emission Plot on Channel 149



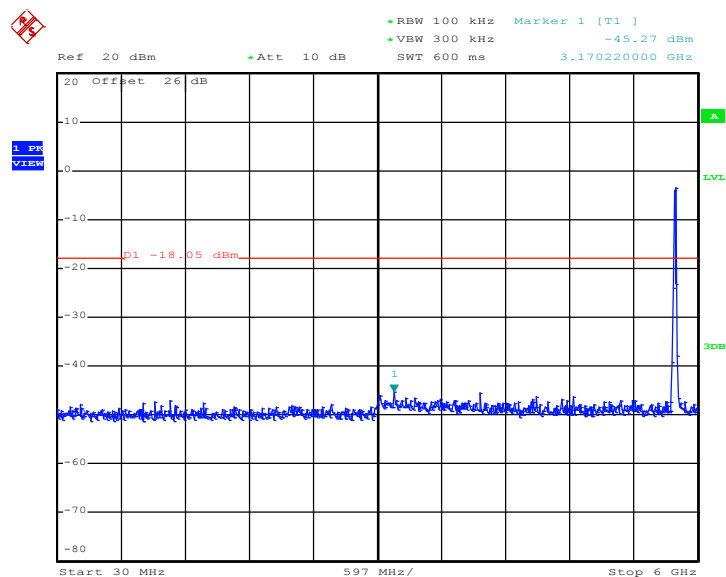
Date: 6.SEP.2012 17:26:01

802.11n HT20 5 GHz~40 GHz

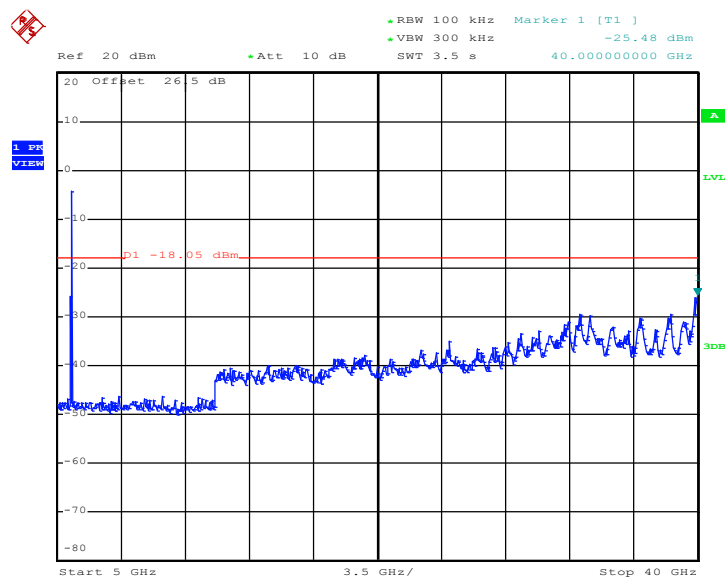
Conducted Spurious Emission Plot on Channel 149



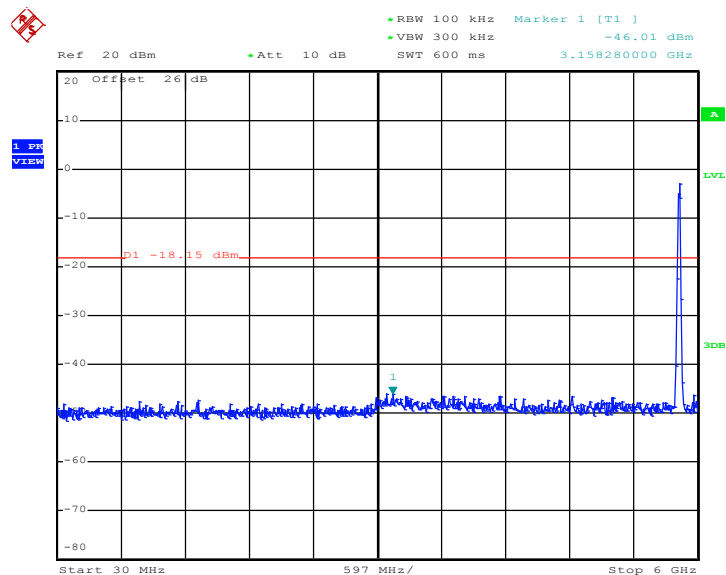
Date: 6.SEP.2012 17:26:18

802.11n HT20 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 157


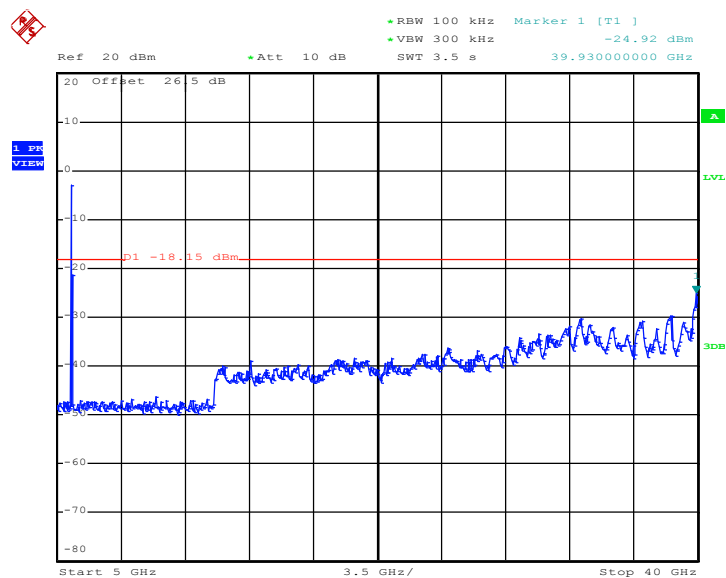
Date: 6.SEP.2012 17:29:57

802.11n HT20 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 157


Date: 6.SEP.2012 17:30:14

802.11n HT20 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 165


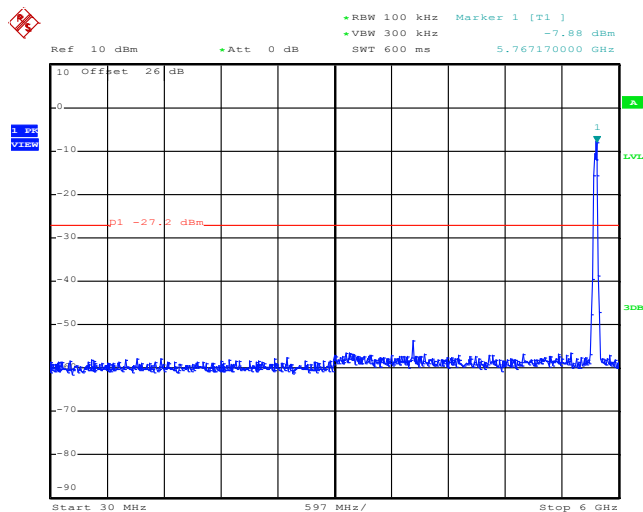
Date: 6.SEP.2012 17:17:29

802.11n HT20 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 165


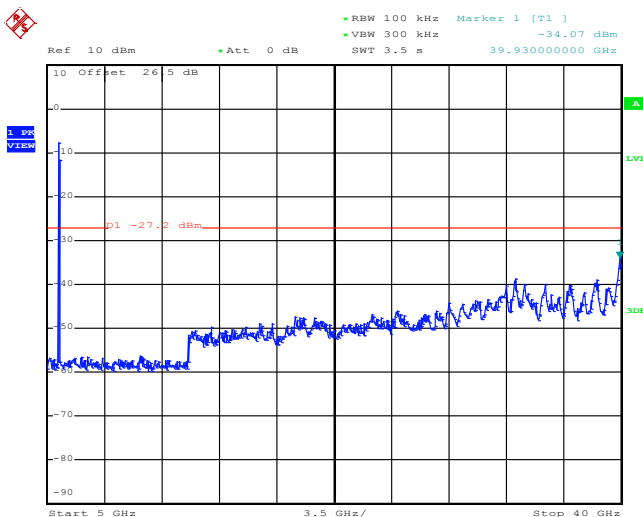
Date: 6.SEP.2012 17:17:46



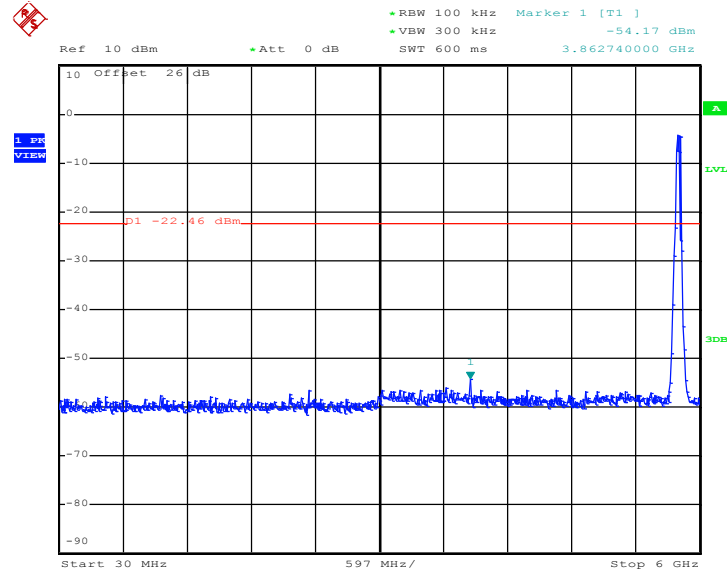
Test Mode :	802.11n HT40 <MIMO Ant. 0+1(0)>	Temperature :	24~26°C
Test Band :	30MHz-6GHz and 5G-40GHz	Relative Humidity :	55~58%
Test Channel :	151 and 159	Test Engineer :	Kenny Chen and Reece Li

802.11n HT40 30 MHz~6 GHz**Conducted Spurious Emission Plot on Channel 151**

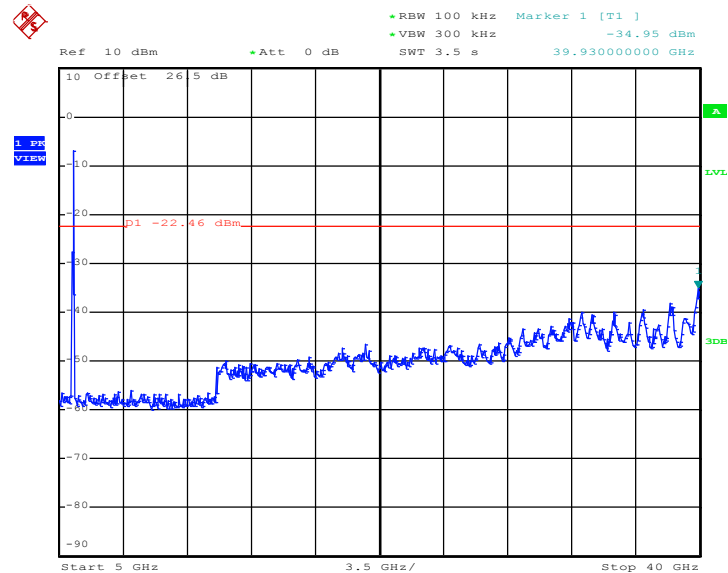
Date: 6.SEP.2012 17:39:24

802.11n HT40 5 GHz~40 GHz**Conducted Spurious Emission Plot on Channel 151**

Date: 6.SEP.2012 17:39:41

802.11n HT40 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 159


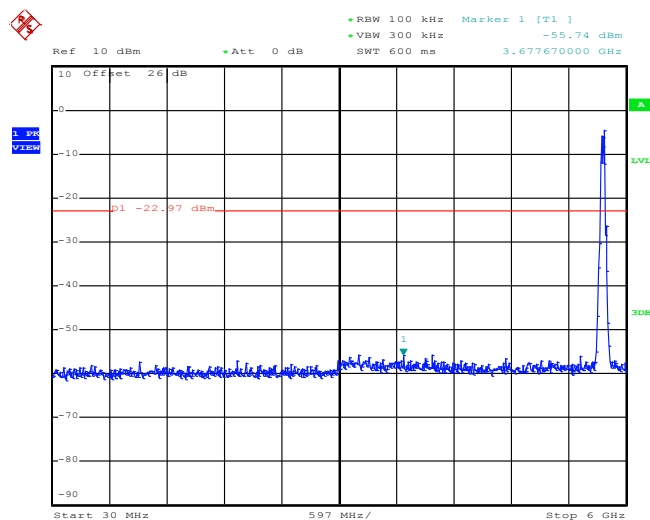
Date: 6.SEP.2012 17:59:43

802.11n HT40 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 159


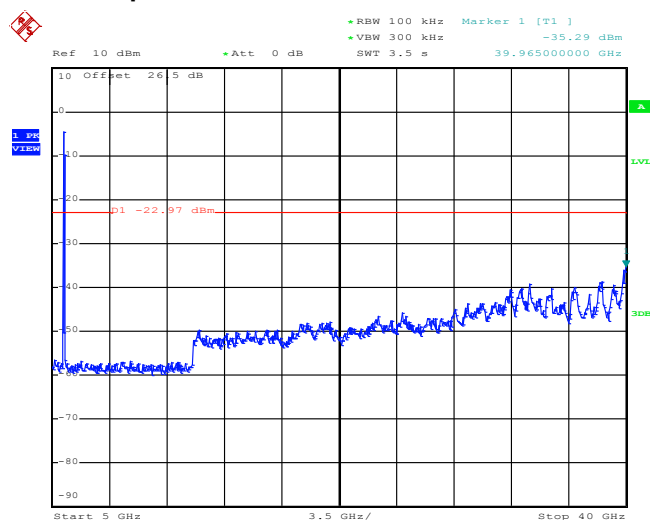
Date: 6.SEP.2012 18:00:01



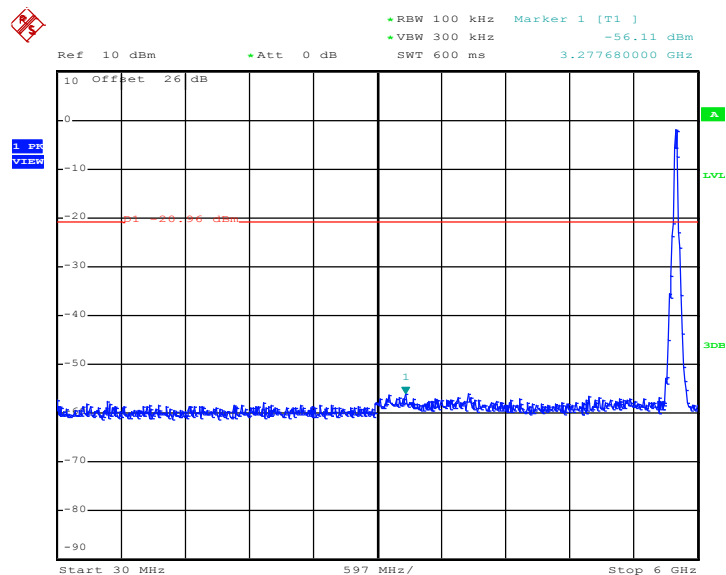
Test Mode :	802.11n HT40 <MIMO Ant. 0+1(1)>	Temperature :	24~26℃
Test Band :	30MHz-6GHz and 5G-40GHz	Relative Humidity :	55~58%
Test Channel :	151 and 159	Test Engineer :	Kenny Chen and Reece Li

802.11n HT40 30 MHz~6 GHz**Conducted Spurious Emission Plot on Channel 151**

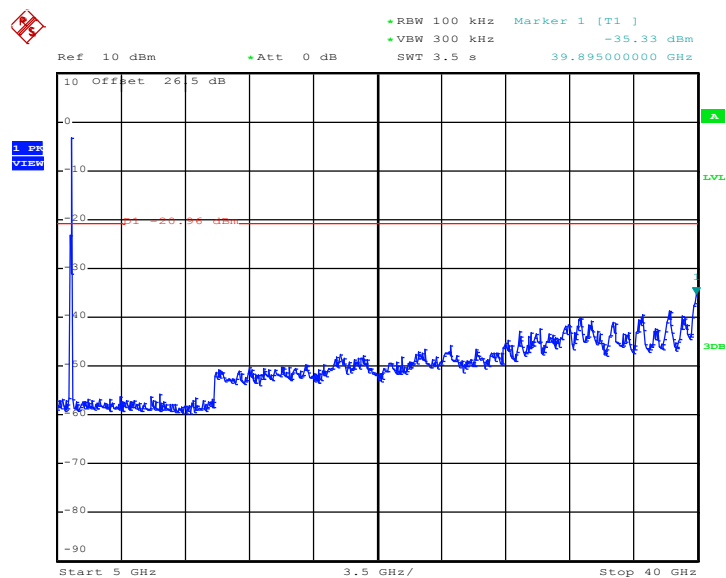
Date: 6.SEP.2012 17:42:15

802.11n HT40 5 GHz~40 GHz**Conducted Spurious Emission Plot on Channel 151**

Date: 6.SEP.2012 17:42:33

802.11n HT40 30 MHz~6 GHz
Conducted Spurious Emission Plot on Channel 159


Date: 6.SEP.2012 17:56:52

802.11n HT40 5 GHz~40 GHz
Conducted Spurious Emission Plot on Channel 159


Date: 6.SEP.2012 17:57:09

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 Procedure

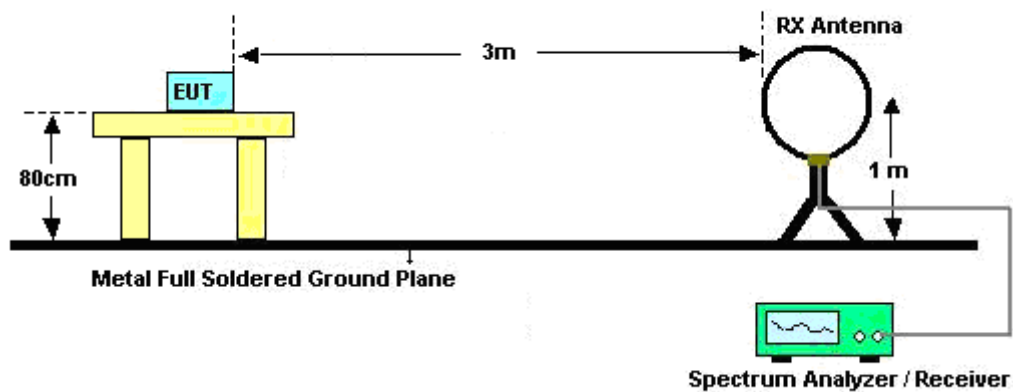
1. The testing follows the guidelines in ANSI C63. 10-2009
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 KHz for $f < 1$ GHz; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle(%)	T(us)	1/T(KHz)	VBW Setting
0 +1	802.11b for Ant 0	100.00	-	-	10Hz
0 +1	802.11b for Ant 1	100.00	-	-	10Hz
0 +1	802.11g for Ant 0	97.13	2030.00	0.493	1KHz
0 +1	802.11g for Ant 1	97.13	2030.00	0.493	1KHz
0 +1	2.4G 802.11n HT20 for Ant 0	96.92	1890.00	0.529	1KHz
0 +1	2.4G 802.11n HT20 for Ant 1	96.92	1890.00	0.529	1KHz
0 +1	802.11a for Ant 0	98.07	-	-	10Hz
0 +1	802.11a for Ant 1	98.07	-	-	10Hz
0 +1	5G 802.11n HT20 for Ant 0	97.93	1890.00	0.529	1KHz
0 +1	5G 802.11n HT20 for Ant 1	98.45	-	-	10Hz
0 +1	5G 802.11n HT40 for Ant 0	96.27	930.00	1.075	3KHz
0 +1	5G 802.11n HT40 for Ant 1	96.25	924.00	1.082	3KHz

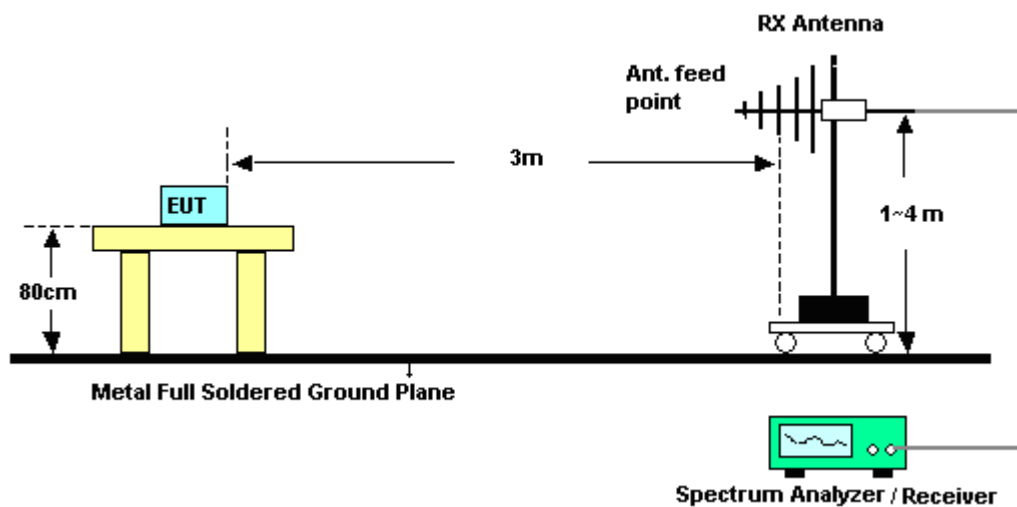
Note: For average measurement with duty cycle < 98%, use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.

3.5.4 Test Setup

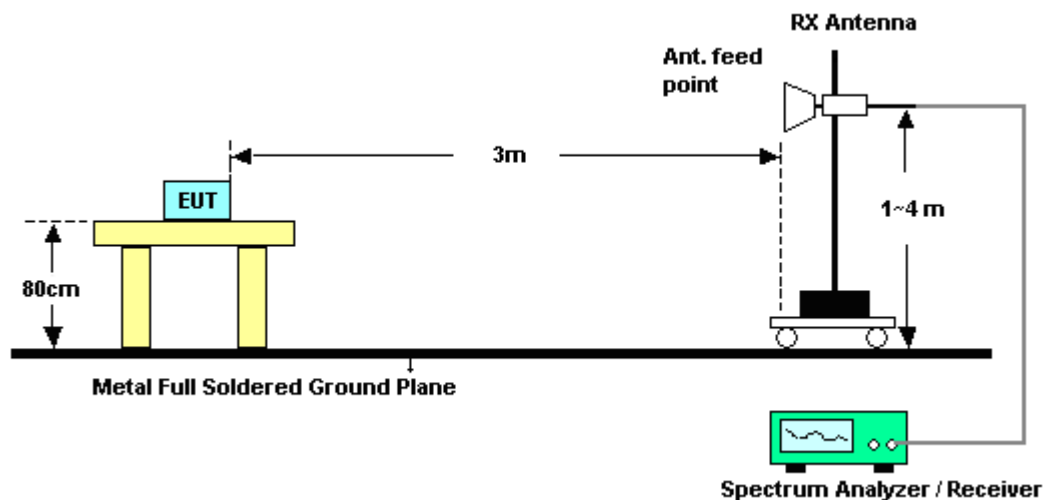
For radiated emissions below 30MHz



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 Spurious at Band Edges

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	44~47%
Test Channel :	01	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.93	57.46	-16.54	74	56.58	32.18	4.58	35.88	100	73	Peak
2390	40.78	-13.22	54	39.88	32.18	4.58	35.86	100	73	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
2385.33	52.97	-21.03	74	52.11	32.16	4.58	35.88	108	327	Peak
2389.65	37.52	-16.48	54	36.64	32.18	4.58	35.88	108	327	Average

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	44~47%
Test Channel :	11	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2486.1	56.56	-17.44	74	55.45	32.28	4.64	35.81	100	82	Peak
2486.84	42.3	-11.7	54	41.19	32.28	4.64	35.81	100	82	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2485.3	53.02	-20.98	74	51.91	32.28	4.64	35.81	104	318	Peak
2487.08	38.94	-15.06	54	37.83	32.28	4.64	35.81	104	318	Average



Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	44~47%
Test Channel :	01	Test Engineer :	David Yang

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
2389.56	72.55	-1.45	74	71.67	32.18	4.58	35.88	126	213	Peak
2390	52.95	-1.05	54	52.05	32.18	4.58	35.86	126	213	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
2389.83	69.35	-4.65	74	68.45	32.18	4.58	35.86	103	249	Peak
2390	49.49	-4.51	54	48.59	32.18	4.58	35.86	103	249	Average

Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	44~47%
Test Channel :	11	Test Engineer :	David Yang

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
2483.62	73.3	-0.7	74	72.19	32.28	4.64	35.81	100	217	Peak
2483.56	52.36	-1.64	54	51.25	32.28	4.64	35.81	100	217	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
2483.64	68.23	-5.77	74	67.12	32.28	4.64	35.81	103	253	Peak
2483.56	46.84	-7.16	54	45.73	32.28	4.64	35.81	103	253	Average



Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	44~47%
Test Channel :	01	Test Engineer :	David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.84	72.95	-1.05	74	72.07	32.18	4.58	35.88	123	222	Peak
2390	53.82	-0.18	54	52.92	32.18	4.58	35.86	123	222	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	64.53	-9.47	74	63.63	32.18	4.58	35.86	100	299	Peak
2390	43.77	-10.23	54	42.87	32.18	4.58	35.86	100	299	Average

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	44~47%
Test Channel :	11	Test Engineer :	David Yang

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
2484.9	73.61	-0.39	74	72.5	32.28	4.64	35.81	118	222	Peak
2483.76	51.65	-2.35	54	50.54	32.28	4.64	35.81	118	222	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
2484.78	68.49	-5.51	74	67.38	32.28	4.64	35.81	104	322	Peak
2483.54	46.33	-7.67	54	45.22	32.28	4.64	35.81	104	322	Average



Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	44~47%
Test Channel :	149	Test Engineer :	David Yang

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
5745	93.8	-	-	86.37	35.09	7.19	34.85	113	126	Average
5745	107.5	-	-	100.07	35.09	7.19	34.85	113	126	Peak
5725	83.37	-4.13	87.5	75.98	35.07	7.17	34.85	113	126	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
5745	94.69	-	-	87.26	35.09	7.19	34.85	100	231	Average
5745	107.77	-	-	100.36	35.09	7.17	34.85	100	231	Peak
5725	81.61	-6.16	87.77	74.22	35.07	7.17	34.85	100	231	Peak

Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	44~47%
Test Channel :	165	Test Engineer :	David Yang

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
5825	93.91	-	-	86.32	35.19	7.27	34.87	102	123	Average
5825	107.9	-	-	100.31	35.19	7.27	34.87	102	123	Peak
5850	70.4	-17.5	87.9	62.77	35.21	7.29	34.87	102	123	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
5825	94.75	-	-	87.16	35.19	7.27	34.87	150	280	Average
5825	108.68	-	-	101.09	35.19	7.27	34.87	150	280	Peak
5850	70.67	-18.01	88.68	63.04	35.21	7.29	34.87	150	280	Peak



Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	44~47%
Test Channel :	149	Test Engineer :	David Yang

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
5745	93.62	-	-	86.19	35.09	7.19	34.85	112	130	Average
5745	107.33	-	-	99.9	35.09	7.19	34.85	112	130	Peak
5725	79.03	-8.3	87.33	71.64	35.07	7.17	34.85	112	130	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
5745	93.83	-	-	86.4	35.09	7.19	34.85	119	93	Average
5745	107.77	-	-	100.34	35.09	7.19	34.85	119	93	Peak
5725	80.71	-7.06	87.77	73.32	35.07	7.17	34.85	119	93	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	44~47%
Test Channel :	165	Test Engineer :	David Yang

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
5825	93.76	-	-	86.17	35.19	7.27	34.87	101	128	Average
5825	108.54	-	-	100.95	35.19	7.27	34.87	101	128	Peak
5850	71.33	-17.21	88.54	63.7	35.21	7.29	34.87	101	128	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
5825	94.76	-	-	87.17	35.19	7.27	34.87	107	95	Average
5825	109.19	-	-	101.6	35.19	7.27	34.87	107	95	Peak
5850	73.42	-15.77	89.19	65.79	35.21	7.29	34.87	107	95	Peak

Test Mode :	802.11n HT40 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	Low	Relative Humidity :	44~47%
Test Channel :	151	Test Engineer :	David Yang

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
5755	94.19	-	-	86.74	35.11	7.19	34.85	103	128	Average
5755	104.15	-	-	96.72	35.09	7.19	34.85	103	128	Peak
5725	78.63	-5.52	84.15	71.24	35.07	7.17	34.85	103	128	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
5755	94.62	-	-	87.17	35.11	7.19	34.85	108	91	Average
5755	104.89	-	-	97.41	35.11	7.22	34.85	108	91	Peak
5725	80.08	-4.81	84.89	72.69	35.07	7.17	34.85	108	91	Peak

Test Mode :	802.11n HT40 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Band :	High	Relative Humidity :	44~47%
Test Channel :	159	Test Engineer :	David Yang

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
5795	94.37	-	-	86.84	35.15	7.24	34.86	102	125	Average
5795	104.1	-	-	96.59	35.15	7.22	34.86	102	125	Peak
5850	58.83	-25.27	84.1	51.2	35.21	7.29	34.87	102	125	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
5795	95.1	-	-	87.57	35.15	7.24	34.86	107	99	Average
5795	105	-	-	97.51	35.13	7.22	34.86	107	99	Peak
5850	59.22	-25.78	85	51.59	35.21	7.29	34.87	107	99	Peak

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

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7239 MHz and 9648 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 111.83 dBuV/m - 20dB = 91.83 dBuV/m. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	106.96	-	-	106.03	32.2	4.59	35.86	100	73	Average
2412	111.83	-	-	110.9	32.2	4.59	35.86	100	73	Peak
4824	48.73	-25.27	74	66.97	34.27	6.51	59.02	100	0	Peak
7239	47.26	-44.57	91.83	60.79	36.05	8.29	57.87	100	0	Peak
9648	49.38	-42.45	91.83	58.75	37.09	9.48	55.94	100	0	Peak

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 2412 MHz is Fundamental signal which can be ignored. 2. 7236 MHz is not within a restricted band 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	102.91	-	-	101.98	32.2	4.59	35.86	108	327	Average
2412	107.9	-	-	106.97	32.2	4.59	35.86	108	327	Peak
4824	46.81	-27.19	74	65.05	34.27	6.51	59.02	100	0	Peak
7236	46.49	-41.41	87.9	60.02	36.05	8.29	57.87	100	0	Peak

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2437 MHz is Fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	105.82	-	-	104.81	32.24	4.61	35.84	100	172	Average
2437	110.42	-	-	109.41	32.24	4.61	35.84	100	172	Peak
4875	47.56	-26.44	74	65.63	34.28	6.53	58.88	100	0	Peak
7311	46.45	-27.55	74	59.98	36.04	8.42	57.99	100	0	Peak

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 2437 MHz is Fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	102.75	-	-	101.74	32.24	4.61	35.84	106	248	Average
2437	107.17	-	-	106.16	32.24	4.61	35.84	106	248	Peak
4875	49.09	-24.91	74	67.16	34.28	6.53	58.88	100	0	Peak

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. 9849 MHz is not within a restricted band. 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
2462	108.27	-	-	107.22	32.26	4.62	35.83	100	82	Average
2462	112.9	-	-	111.85	32.26	4.62	35.83	100	82	Peak
4926	51.69	-2.31	54	69.58	34.29	6.56	58.74	157	152	Average
4926	53.86	-20.14	74	71.75	34.29	6.56	58.74	157	152	Peak
7386	45.79	-28.21	74	59.35	36.02	8.55	58.13	100	0	Peak
9849	51.14	-41.76	92.9	60.13	37.33	9.51	55.83	100	0	Peak

Test Mode :	802.11b <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal which can be ignored.		

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	104.44	-	-	103.39	32.26	4.62	35.83	104	318	Average
2462	109.65	-	-	108.6	32.26	4.62	35.83	104	318	Peak
4926	48.63	-5.37	54	66.52	34.29	6.56	58.74	100	210	Average
4926	51.19	-22.81	74	69.08	34.29	6.56	58.74	100	210	Peak

Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2412 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
2412	97.73	-	-	96.8	32.2	4.59	35.86	126	213	Average
2412	107.91	-	-	106.98	32.2	4.59	35.86	126	213	Peak
4821	45.4	-28.6	74	63.64	34.27	6.51	59.02	100	0	Peak

Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 2412 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
2412	94.49	-	-	93.56	32.2	4.59	35.86	103	249	Average
2412	104.54	-	-	103.61	32.2	4.59	35.86	103	249	Peak
4827	44.3	-29.7	74	62.54	34.27	6.51	59.02	100	0	Peak

Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. 9756 MHz is not within a restricted band. 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
2437	101.44	-	-	100.43	32.24	4.61	35.84	101	156	Average
2437	111.49	-	-	110.48	32.24	4.61	35.84	101	156	Peak
4866	48.81	-25.19	74	66.93	34.27	6.53	58.92	100	0	Peak
7314	50.34	-23.66	74	63.87	36.04	8.42	57.99	100	0	Peak
9756	48.82	-42.67	91.49	58	37.21	9.5	55.89	100	0	Peak

Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	98.81	-	-	97.8	32.24	4.61	35.84	127	248	Average
2437	109.09	-	-	108.08	32.24	4.61	35.84	127	248	Peak
4872	45.89	-28.11	74	63.96	34.28	6.53	58.88	100	0	Peak
7311	48.92	-25.08	74	62.45	36.04	8.42	57.99	100	0	Peak

Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. 9843 MHz is not within a restricted band. 3. “ * ” are 25MHz harmonics and from extender card which is provided by Applicant, declared to ignore those signal due to not from WiFi module. 4. 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
74.82	43.67	*	40	67.41	6.7	0.96	31.4	-	-	Peak
99.66	43.16	*	43.5	63.61	9.9	1.09	31.44	-	-	Peak
124.77	61.19	*	43.5	79.51	11.8	1.22	31.34	-	-	Peak
143.94	39.6	-3.9	43.5	58.42	11.17	1.27	31.26	-	-	Peak
149.88	63.96	*	43.5	82.74	11.2	1.27	31.25	-	-	Peak
162.03	40.11	-3.39	43.5	59.61	10.34	1.35	31.19	100	215	Peak
174.18	63.07	*	43.5	83.64	9.1	1.38	31.05	-	-	Peak
191.73	36.09	-7.41	43.5	57.02	8.74	1.44	31.11	-	-	Peak
199.29	57.55	*	43.5	78.11	9.1	1.46	31.12	-	-	Peak
224.94	59.57	*	46	79.2	9.75	1.56	30.94	-	-	Peak
250.05	53.11	*	46	69.75	12.6	1.66	30.9	-	-	Peak
274.08	58.3	*	46	74.75	12.95	1.72	31.12	-	-	Peak
298.92	57.93	*	46	73.72	13.39	1.78	30.96	-	-	Peak
323.1	47.54	*	46	63.05	13.59	1.84	30.94	-	-	Peak
349.7	43.43	*	46	58.13	14.5	1.9	31.1	-	-	Peak
374.9	43.88	*	46	57.88	15.05	1.96	31.01	-	-	Peak
399.4	54.75	*	46	67.94	16	2.01	31.2	-	-	Peak
424.6	59.91	*	46	72.22	16.65	2.08	31.04	-	-	Peak
435.8	37.72	-8.28	46	49.8	16.81	2.1	30.99	-	-	Peak
449.8	61.43	*	46	73.08	17.2	2.14	30.99	-	-	Peak
460.3	41.87	-4.13	46	53.29	17.42	2.16	31	-	-	Peak

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
475	66.57	*	46	77.51	17.65	2.18	30.77	-	-	Peak
485.5	39.34	-6.66	46	49.99	17.82	2.2	30.67	-	-	Peak
498.1	49.81	*	46	60.11	18.06	2.23	30.59	-	-	Peak
522.6	49.7	*	46	59.89	18.33	2.28	30.8	-	-	Peak
549.9	40.35	*	46	49.28	19.8	2.33	31.06	-	-	Peak
574.4	39.65	*	46	48.16	19.86	2.37	30.74	-	-	Peak
599.6	36.08	*	46	44.18	19.89	2.42	30.41	-	-	Peak
624.8	54.07	*	46	61.28	20.55	2.5	30.26	-	-	Peak
672.4	54.26	*	46	61.48	20.32	2.62	30.16	-	-	Peak
724.9	48.31	*	46	54.03	21.78	2.7	30.2	-	-	Peak
749.4	44.64	*	46	49.68	22.4	2.75	30.19	-	-	Peak
771.8	34.36	*	46	39.42	22.18	2.79	30.03	-	-	Peak
797	46.87	*	46	51.83	22.04	2.83	29.83	-	-	Peak
821.5	45.44	*	46	49.64	22.69	2.87	29.76	-	-	Peak
849.5	41.37	*	46	44.74	23.4	2.92	29.69	-	-	Peak
874.7	42.18	*	46	45.95	23.1	2.97	29.84	-	-	Peak
899.9	37.76	*	46	41.45	23.3	3.01	30	-	-	Peak
925.1	44	*	46	46.97	24.05	3.04	30.06	-	-	Peak
946.1	31.79	*	46	34.11	24.72	3.06	30.1	-	-	Peak
971.3	40.04	*	54	41.8	25.08	3.14	29.98	-	-	Peak
2462	99.48	-	-	98.43	32.26	4.62	35.83	100	217	Average
2462	109.5	-	-	108.45	32.26	4.62	35.83	100	217	Peak
4917	44.47	-29.53	74	62.43	34.28	6.55	58.79	100	0	Peak
9843	48.16	-41.34	89.5	57.19	37.31	9.5	55.84	100	0	Peak

Test Mode :	802.11g <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. “ * ” are 25MHz harmonics and from extender card which is provided by Applicant, declared to ignore those signal due to not from WiFi module. 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
32.97	34.52	-5.48	40	47.67	17.76	0.72	31.63	121	216	Peak
74.82	37.45	*	40	61.19	6.7	0.96	31.4	-	-	Peak
99.93	38.4	*	43.5	58.85	9.9	1.09	31.44	-	-	Peak
124.77	55.03	*	43.5	73.35	11.8	1.22	31.34	-	-	Peak
143.94	33.96	-9.54	43.5	52.78	11.17	1.27	31.26	-	-	Peak
149.88	59.53	*	43.5	78.31	11.2	1.27	31.25	-	-	Peak
156.09	33.71	-9.79	43.5	52.8	10.82	1.32	31.23	-	-	Peak
174.99	62.5	*	43.5	83.05	9.1	1.38	31.03	-	-	Peak
199.29	52.48	*	43.5	73.04	9.1	1.46	31.12	-	-	Peak
224.94	50.55	*	46	70.18	9.75	1.56	30.94	-	-	Peak
249.78	46.03	*	46	62.67	12.6	1.66	30.9	-	-	Peak
274.89	51.63	*	46	68.09	12.95	1.72	31.13	-	-	Peak
298.92	51.88	*	46	67.67	13.39	1.78	30.96	-	-	Peak
324.5	45.75	*	46	61.21	13.65	1.84	30.95	-	-	Peak
349.7	37.3	*	46	52	14.5	1.9	31.1	-	-	Peak
374.9	39.35	*	46	53.35	15.05	1.96	31.01	-	-	Peak
399.4	47.89	*	46	61.08	16	2.01	31.2	-	-	Peak
423.2	53.61	*	46	65.96	16.63	2.07	31.05	-	-	Peak
435.1	30.19	-15.81	46	42.27	16.81	2.1	30.99	-	-	Peak
447.7	54.71	*	46	66.41	17.14	2.14	30.98	-	-	Peak
460.3	33.6	-12.4	46	45.02	17.42	2.16	31	-	-	Peak
474.3	59.63	*	46	70.6	17.64	2.18	30.79	-	-	Peak



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
485.5	33.27	-12.73	46	43.92	17.82	2.2	30.67	-	-	Peak
498.1	45.95	*	46	56.25	18.06	2.23	30.59	-	-	Peak
522.6	48.96	*	46	59.15	18.33	2.28	30.8	-	-	Peak
547.8	37.14	*	46	46.27	19.58	2.33	31.04	-	-	Peak
574.4	39.21	*	46	47.72	19.86	2.37	30.74	-	-	Peak
599.6	35.08	*	46	43.18	19.89	2.42	30.41	-	-	Peak
624.8	49.94	*	46	57.15	20.55	2.5	30.26	-	-	Peak
647.2	31.92	*	46	39.08	20.39	2.58	30.13	-	-	Peak
674.5	48.27	*	46	55.47	20.34	2.62	30.16	-	-	Peak
722.1	40.61	*	46	46.4	21.71	2.7	30.2	-	-	Peak
746.6	34.99	*	46	40.07	22.37	2.74	30.19	-	-	Peak
796.3	37.82	*	46	42.82	22.02	2.82	29.84	-	-	Peak
825	36.37	*	46	40.37	22.87	2.88	29.75	-	-	Peak
846.7	36.44	*	46	39.86	23.37	2.91	29.7	-	-	Peak
874.7	35.82	*	46	39.59	23.1	2.97	29.84	-	-	Peak
896.4	32.04	*	46	35.8	23.22	3	29.98	-	-	Peak
925.1	36.78	*	46	39.75	24.05	3.04	30.06	-	-	Peak
974.8	32.85	*	54	34.67	25	3.15	29.97	-	-	Peak
2462	94.92	-	-	93.87	32.26	4.62	35.83	103	253	Average
2462	104.97	-	-	103.92	32.26	4.62	35.83	103	253	Peak
4926	45.25	-28.75	74	63.14	34.29	6.56	58.74	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7206 MHz is not within a restricted band. 3. “ * ” are 25MHz harmonics and from extender card which is provided by Applicant, declared to ignore those signal due to not from WiFi module. 4. 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
74.82	43.66	*	40	67.4	6.7	0.96	31.4	-	-	Peak
99.93	42.86	*	43.5	63.31	9.9	1.09	31.44	-	-	Peak
124.77	61.01	*	43.5	79.33	11.8	1.22	31.34	-	-	Peak
143.67	40.46	-3.04	43.5	59.28	11.17	1.27	31.26	110	201	Peak
149.88	63.89	*	43.5	82.67	11.2	1.27	31.25	-	-	Peak
155.01	40.09	-3.41	43.5	59.12	10.9	1.31	31.24	-	-	Peak
162.03	38.92	-4.58	43.5	58.42	10.34	1.35	31.19	-	-	Peak
174.99	63.07	*	43.5	83.62	9.1	1.38	31.03	-	-	Peak
199.29	57.27	*	43.5	77.83	9.1	1.46	31.12	-	-	Peak
224.94	59.63	*	46	79.26	9.75	1.56	30.94	-	-	Peak
248.97	52.87	*	46	69.62	12.49	1.66	30.9	-	-	Peak
274.89	58.45	*	46	74.91	12.95	1.72	31.13	-	-	Peak
300	57.74	*	46	73.5	13.4	1.78	30.94	-	-	Peak
323.1	47.5	*	46	63.01	13.59	1.84	30.94	-	-	Peak
349.7	43.8	*	46	58.5	14.5	1.9	31.1	-	-	Peak
374.9	43.96	*	46	57.96	15.05	1.96	31.01	-	-	Peak
399.4	55.02	*	46	68.21	16	2.01	31.2	-	-	Peak
423.2	60.44	*	46	72.79	16.63	2.07	31.05	-	-	Peak
435.8	37.93	-8.07	46	50.01	16.81	2.1	30.99	-	-	Peak
449.8	61.04	*	46	72.69	17.2	2.14	30.99	-	-	Peak
462.4	39.68	-6.32	46	51.03	17.45	2.16	30.96	-	-	Peak



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
474.3	66.65	*	46	77.62	17.64	2.18	30.79	-	-	Peak
485.5	38.9	-7.1	46	49.55	17.82	2.2	30.67	-	-	Peak
498.1	52.19	*	46	62.49	18.06	2.23	30.59	-	-	Peak
522.6	49.96	*	46	60.15	18.33	2.28	30.8	-	-	Peak
547.8	39.76	*	46	48.89	19.58	2.33	31.04	-	-	Peak
574.4	39.85	*	46	48.36	19.86	2.37	30.74	-	-	Peak
599.6	36.42	*	46	44.52	19.89	2.42	30.41	-	-	Peak
624.8	54.82	*	46	62.03	20.55	2.5	30.26	-	-	Peak
672.4	54.56	*	46	61.78	20.32	2.62	30.16	-	-	Peak
699.7	37.21	*	46	44.08	20.69	2.65	30.21	-	-	Peak
722.1	48.74	*	46	54.53	21.71	2.7	30.2	-	-	Peak
749.4	45.77	*	46	50.81	22.4	2.75	30.19	-	-	Peak
774.6	35.88	*	46	40.94	22.15	2.79	30	-	-	Peak
799.8	46.99	*	46	51.87	22.1	2.83	29.81	-	-	Peak
825	48.07	*	46	52.07	22.87	2.88	29.75	-	-	Peak
846.7	43.03	*	46	46.45	23.37	2.91	29.7	-	-	Peak
874.7	45.84	*	46	49.61	23.1	2.97	29.84	-	-	Peak
899.9	37.22	*	46	40.91	23.3	3.01	30	-	-	Peak
921.6	44.64	*	46	47.73	23.93	3.03	30.05	-	-	Peak
949.6	30.81	*	46	33.06	24.8	3.06	30.11	-	-	Peak
971.3	40.79	*	54	42.55	25.08	3.14	29.98	-	-	Peak
2412	98.11	-	-	97.18	32.2	4.59	35.86	123	222	Average
2412	108.39	-	-	107.46	32.2	4.59	35.86	123	222	Peak
4824	43.83	-30.17	74	62.07	34.27	6.51	59.02	100	0	Peak
7206	44.83	-43.56	88.39	58.33	36.06	8.25	57.81	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	01	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. 7206 MHz is not within a restricted band. 3. “ * ” are 25MHz harmonics and from extender card which is provided by Applicant, declared to ignore those signal due to not from WiFi module. 4. 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
32.97	34.81	-5.19	40	47.96	17.76	0.72	31.63	100	219	Peak
74.82	37.4	*	40	61.14	6.7	0.96	31.4	-	-	Peak
99.66	38.17	*	43.5	58.62	9.9	1.09	31.44	-	-	Peak
124.77	54.9	*	43.5	73.22	11.8	1.22	31.34	-	-	Peak
143.94	34.87	-8.63	43.5	53.69	11.17	1.27	31.26	-	-	Peak
149.88	59.5	*	43.5	78.28	11.2	1.27	31.25	-	-	Peak
156.09	36.19	-7.31	43.5	55.28	10.82	1.32	31.23	-	-	Peak
174.99	62.34	*	43.5	82.89	9.1	1.38	31.03	-	-	Peak
199.29	51.96	*	43.5	72.52	9.1	1.46	31.12	-	-	Peak
224.94	50.3	*	46	69.93	9.75	1.56	30.94	-	-	Peak
249.78	45.06	*	46	61.7	12.6	1.66	30.9	-	-	Peak
274.89	50.91	*	46	67.37	12.95	1.72	31.13	-	-	Peak
300	51.5	*	46	67.26	13.4	1.78	30.94	-	-	Peak
324.5	47.13	*	46	62.59	13.65	1.84	30.95	-	-	Peak
349.7	41.7	*	46	56.4	14.5	1.9	31.1	-	-	Peak
374.9	45.42	*	46	59.42	15.05	1.96	31.01	-	-	Peak
399.4	52.27	*	46	65.46	16	2.01	31.2	-	-	Peak
424.6	58.4	*	46	70.71	16.65	2.08	31.04	-	-	Peak
437.2	35.31	-10.69	46	47.33	16.85	2.11	30.98	-	-	Peak
449.8	58.99	*	46	70.64	17.2	2.14	30.99	-	-	Peak
460.3	37.24	-8.76	46	48.66	17.42	2.16	31	-	-	Peak



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
472.9	62.73	*	46	73.73	17.63	2.18	30.81	-	-	Peak
485.5	35.67	-10.33	46	46.32	17.82	2.2	30.67	-	-	Peak
498.1	51.54	*	46	61.84	18.06	2.23	30.59	-	-	Peak
522.6	51.2	*	46	61.39	18.33	2.28	30.8	-	-	Peak
547.8	39.8	*	46	48.93	19.58	2.33	31.04	-	-	Peak
574.4	45.3	*	46	53.81	19.86	2.37	30.74	-	-	Peak
597.5	37.79	*	46	45.95	19.87	2.41	30.44	-	-	Peak
624.8	54.08	*	46	61.29	20.55	2.5	30.26	-	-	Peak
647.2	31.7	*	46	38.86	20.39	2.58	30.13	-	-	Peak
672.4	52.65	*	46	59.87	20.32	2.62	30.16	-	-	Peak
696.9	31.72	*	46	38.6	20.67	2.65	30.2	-	-	Peak
722.1	44.26	*	46	50.05	21.71	2.7	30.2	-	-	Peak
749.4	38.19	*	46	43.23	22.4	2.75	30.19	-	-	Peak
771.8	29.56	*	46	34.62	22.18	2.79	30.03	-	-	Peak
799.8	41.05	*	46	45.93	22.1	2.83	29.81	-	-	Peak
825	42.18	*	46	46.18	22.87	2.88	29.75	-	-	Peak
846.7	39.98	*	46	43.4	23.37	2.91	29.7	-	-	Peak
874.7	40.65	*	46	44.42	23.1	2.97	29.84	-	-	Peak
899.2	32.31	*	46	36.02	23.28	3.01	30	-	-	Peak
921.6	42.53	*	46	45.62	23.93	3.03	30.05	-	-	Peak
949.6	31.37	*	46	33.62	24.8	3.06	30.11	-	-	Peak
971.3	40.43	*	54	42.19	25.08	3.14	29.98	-	-	Peak
2412	90.69	-	-	89.76	32.2	4.59	35.86	100	299	Average
2412	100.73	-	-	99.78	32.2	4.59	35.84	100	299	Peak
4824	42.18	-31.82	74	60.42	34.27	6.51	59.02	100	0	Peak
7206	43.36	-37.37	80.73	56.86	36.06	8.25	57.81	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	102.65	-	-	101.64	32.24	4.61	35.84	100	221	Average
2437	112.86	-	-	111.87	32.22	4.61	35.84	100	221	Peak
4872	48.77	-25.23	74	66.84	34.28	6.53	58.88	100	0	Peak
7296	49.07	-24.93	74	62.61	36.04	8.38	57.96	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	06	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. 9735 MHz is not within a restricted band. 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
2437	96.94	-	-	95.93	32.24	4.61	35.84	101	310	Average
2437	107.16	-	-	106.15	32.24	4.61	35.84	101	310	Peak
4869	48.22	-25.78	74	66.29	34.28	6.53	58.88	100	0	Peak
9735	50.58	-36.58	87.16	59.79	37.19	9.49	55.89	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	96.86	-	-	95.81	32.26	4.62	35.83	118	222	Average
2462	107.4	-	-	106.35	32.26	4.62	35.83	118	222	Peak
4926	42.6	-31.4	74	60.49	34.29	6.56	58.74	100	0	Peak
7389	43.76	-30.24	74	57.32	36.02	8.55	58.13	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	11	Relative Humidity :	44~47%
Test Engineer :	David Yang	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	92.46	-	-	91.41	32.26	4.62	35.83	104	322	Average
2462	102.75	-	-	101.7	32.26	4.62	35.83	104	322	Peak
4932	42.48	-31.52	74	60.37	34.29	6.56	58.74	100	0	Peak
7383	43.89	-30.11	74	57.42	36.02	8.55	58.1	100	0	Peak

Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5745 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
5745	93.8	-	-	86.37	35.09	7.19	34.85	113	126	Average
5745	107.5	-	-	100.07	35.09	7.19	34.85	113	126	Peak
11496	49.08	-24.92	74	55.55	38.48	10.26	55.21	100	0	Peak

Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	5745 MHz is fundamental signal which can be ignored.		

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
5745	94.69	-	-	87.26	35.09	7.19	34.85	100	231	Average
5745	107.77	-	-	100.36	35.09	7.17	34.85	100	231	Peak
11499	46.49	-7.51	54	52.93	38.5	10.26	55.2	100	166	Average
11499	58.19	-15.81	74	64.63	38.5	10.26	55.2	100	166	Peak

Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5785 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
5785	93.64	-	-	86.15	35.13	7.22	34.86	102	126	Average
5785	108.02	-	-	100.49	35.15	7.24	34.86	102	126	Peak
11571	49.86	-24.14	74	56.3	38.56	10.3	55.3	100	0	Peak

Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	5785 MHz is fundamental signal which can be ignored.		

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
5785	94.35	-	-	86.86	35.13	7.22	34.86	106	239	Average
5785	108.55	-	-	101.04	35.15	7.22	34.86	106	239	Peak
11580	47.01	-6.99	54	53.43	38.56	10.32	55.3	100	166	Average
11580	58.71	-15.29	74	65.13	38.56	10.32	55.3	100	166	Peak

Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5825 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
5825	93.91	-	-	86.32	35.19	7.27	34.87	102	123	Average
5825	107.9	-	-	100.31	35.19	7.27	34.87	102	123	Peak
11649	50.28	-23.72	74	56.69	38.61	10.37	55.39	100	0	Peak

Test Mode :	802.11a <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	5825 MHz is fundamental signal which can be ignored.		

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
5825	94.75	-	-	87.16	35.19	7.27	34.87	150	280	Average
5825	108.68	-	-	101.09	35.19	7.27	34.87	150	280	Peak
11652	44.77	-9.23	54	51.19	38.62	10.37	55.41	100	15	Average
11652	56.1	-17.9	74	62.52	38.62	10.37	55.41	100	15	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5745 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
5745	93.62	-	-	86.19	35.09	7.19	34.85	112	130	Average
5745	107.33	-	-	99.9	35.09	7.19	34.85	112	130	Peak
11493	49	-25	74	55.47	38.48	10.26	55.21	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	149	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	5745 MHz is fundamental signal which can be ignored.		

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
5745	93.83	-	-	86.4	35.09	7.19	34.85	119	93	Average
5745	107.77	-	-	100.34	35.09	7.19	34.85	119	93	Peak
11493	45.5	-8.5	54	51.97	38.48	10.26	55.21	100	166	Average
11493	57.65	-16.35	74	64.12	38.48	10.26	55.21	100	166	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5785 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
5785	93.25	-	-	85.76	35.13	7.22	34.86	102	129	Average
5785	107.8	-	-	100.27	35.15	7.24	34.86	102	129	Peak
11574	50.43	-23.57	74	56.85	38.56	10.32	55.3	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	157	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	5785 MHz is fundamental signal which can be ignored.		

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
5785	94.2	-	-	86.71	35.13	7.22	34.86	107	99	Average
5785	108.04	-	-	100.55	35.13	7.22	34.86	107	99	Peak
11574	46.28	-7.72	54	52.7	38.56	10.32	55.3	100	166	Average
11574	57.77	-16.23	74	64.19	38.56	10.32	55.3	100	166	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5825 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
5825	93.76	-	-	86.17	35.19	7.27	34.87	101	128	Average
5825	108.54	-	-	100.95	35.19	7.27	34.87	101	128	Peak
11652	49.62	-24.38	74	56.04	38.62	10.37	55.41	100	0	Peak

Test Mode :	802.11n HT20 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	165	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	5825 MHz is fundamental signal which can be ignored.		

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
5825	94.76	-	-	87.17	35.19	7.27	34.87	107	95	Average
5825	109.19	-	-	101.6	35.19	7.27	34.87	107	95	Peak
11655	44.56	-9.44	54	50.98	38.62	10.37	55.41	105	157	Average
11655	57.17	-16.83	74	63.59	38.62	10.37	55.41	105	157	Peak

Test Mode :	802.11n HT40 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	151	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. “ * ” are 25MHz harmonics and from extender card which is provided by Applicant, declared to ignore those signal due to not from WiFi module.		

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
74.82	43.71	*	40	67.45	6.7	0.96	31.4	-	-	Peak
99.93	42.84	*	43.5	63.29	9.9	1.09	31.44	-	-	Peak
124.77	60.95	*	43.5	79.27	11.8	1.22	31.34	-	-	Peak
146.1	39.51	-3.99	43.5	58.38	11.12	1.27	31.26	-	-	Peak
149.88	63.9	*	43.5	82.68	11.2	1.27	31.25	-	-	Peak
153.66	39.84	-3.66	43.5	58.77	11.02	1.29	31.24	100	305	Peak
169.05	39.3	-4.2	43.5	59.43	9.62	1.36	31.11	-	-	Peak
174.99	63.09	*	43.5	83.64	9.1	1.38	31.03	-	-	Peak
199.29	57.19	*	43.5	77.75	9.1	1.46	31.12	-	-	Peak
224.94	58.9	*	46	78.53	9.75	1.56	30.94	-	-	Peak
249.78	51.75	*	46	68.39	12.6	1.66	30.9	-	-	Peak
274.08	57.68	*	46	74.13	12.95	1.72	31.12	-	-	Peak
298.92	55.58	*	46	71.37	13.39	1.78	30.96	-	-	Peak
323.1	47.06	*	46	62.57	13.59	1.84	30.94	-	-	Peak
349.7	43.33	*	46	58.03	14.5	1.9	31.1	-	-	Peak
374.9	43.57	*	46	57.57	15.05	1.96	31.01	-	-	Peak
399.4	52.83	*	46	66.02	16	2.01	31.2	-	-	Peak
424.6	61.18	*	46	73.49	16.65	2.08	31.04	-	-	Peak
435.8	39.23	-6.77	46	51.31	16.81	2.1	30.99	-	-	Peak
449.8	62.65	*	46	74.3	17.2	2.14	30.99	-	-	Peak
460.3	40.74	-5.26	46	52.16	17.42	2.16	31	-	-	Peak
475	66.25	*	46	77.19	17.65	2.18	30.77	-	-	Peak



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
485.5	38.75	-7.25	46	49.4	17.82	2.2	30.67	-	-	Peak
498.1	50.88	*	46	61.18	18.06	2.23	30.59	-	-	Peak
522.6	49.26	*	46	59.45	18.33	2.28	30.8	-	-	Peak
549.9	38.84	*	46	47.77	19.8	2.33	31.06	-	-	Peak
574.4	39.41	*	46	47.92	19.86	2.37	30.74	-	-	Peak
599.6	36.07	*	46	44.17	19.89	2.42	30.41	-	-	Peak
624.8	54.51	*	46	61.72	20.55	2.5	30.26	-	-	Peak
650	32.41	*	46	39.63	20.3	2.59	30.11	-	-	Peak
674.5	54.89	*	46	62.09	20.34	2.62	30.16	-	-	Peak
696.9	38	*	46	44.88	20.67	2.65	30.2	-	-	Peak
722.1	48.22	*	46	54.01	21.71	2.7	30.2	-	-	Peak
749.4	45.93	*	46	50.97	22.4	2.75	30.19	-	-	Peak
774.6	37.82	*	46	42.88	22.15	2.79	30	-	-	Peak
799.8	47.97	*	46	52.85	22.1	2.83	29.81	-	-	Peak
825	48.74	*	46	52.74	22.87	2.88	29.75	-	-	Peak
846.7	43.95	*	46	47.37	23.37	2.91	29.7	-	-	Peak
874.7	48.61	*	46	52.38	23.1	2.97	29.84	-	-	Peak
899.9	38.34	*	46	42.03	23.3	3.01	30	-	-	Peak
921.6	46.43	*	46	49.52	23.93	3.03	30.05	-	-	Peak
946.1	30.82	*	46	33.14	24.72	3.06	30.1	-	-	Peak
971.3	41.51	*	54	43.27	25.08	3.14	29.98	-	-	Peak
5755	94.19	-	-	86.74	35.11	7.19	34.85	103	128	Average
5755	104.15	-	-	96.72	35.09	7.19	34.85	103	128	Peak

Test Mode :	802.11n HT40 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	151	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. “ * ” are 25MHz harmonics and from extender card which is provided by Applicant, declared to ignore those signal due to not from WiFi module.		

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
32.97	35.11	-4.89	40	48.26	17.76	0.72	31.63	112	246	Peak
74.55	36.99	*	40	60.73	6.7	0.96	31.4	-	-	Peak
99.66	37.93	*	43.5	58.38	9.9	1.09	31.44	-	-	Peak
124.77	55.06	*	43.5	73.38	11.8	1.22	31.34	-	-	Peak
143.94	33.92	-9.58	43.5	52.74	11.17	1.27	31.26	-	-	Peak
149.88	59.18	*	43.5	77.96	11.2	1.27	31.25	-	-	Peak
162.03	34.99	-8.51	43.5	54.49	10.34	1.35	31.19	-	-	Peak
174.18	62.32	*	43.5	82.89	9.1	1.38	31.05	-	-	Peak
199.29	51.5	*	43.5	72.06	9.1	1.46	31.12	-	-	Peak
224.94	50.29	*	46	69.92	9.75	1.56	30.94	-	-	Peak
249.78	44.87	*	46	61.51	12.6	1.66	30.9	-	-	Peak
274.89	50.47	*	46	66.93	12.95	1.72	31.13	-	-	Peak
300	51.4	*	46	67.16	13.4	1.78	30.94	-	-	Peak
323.1	46.89	*	46	62.4	13.59	1.84	30.94	-	-	Peak
349.7	41.69	*	46	56.39	14.5	1.9	31.1	-	-	Peak
374.9	45.43	*	46	59.43	15.05	1.96	31.01	-	-	Peak
399.4	51.14	*	46	64.33	16	2.01	31.2	-	-	Peak
424.6	57.71	*	46	70.02	16.65	2.08	31.04	-	-	Peak
449.8	58.78	*	46	70.43	17.2	2.14	30.99	-	-	Peak
460.3	37.26	-8.74	46	48.68	17.42	2.16	31	-	-	Peak
472.9	62.23	*	46	73.23	17.63	2.18	30.81	-	-	Peak
485.5	36.03	-9.97	46	46.68	17.82	2.2	30.67	-	-	Peak
497.4	51.1	*	46	61.42	18.05	2.22	30.59	-	-	Peak



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
510	31.11	-14.89	46	41.33	18.2	2.25	30.67	-	-	Peak
522.6	51.25	*	46	61.44	18.33	2.28	30.8	-	-	Peak
547.8	39.86	*	46	48.99	19.58	2.33	31.04	-	-	Peak
574.4	44.53	*	46	53.04	19.86	2.37	30.74	-	-	Peak
599.6	37.49	*	46	45.59	19.89	2.42	30.41	-	-	Peak
624.8	53.47	*	46	60.68	20.55	2.5	30.26	-	-	Peak
650	31.44	*	46	38.66	20.3	2.59	30.11	-	-	Peak
674.5	52.42	*	46	59.62	20.34	2.62	30.16	-	-	Peak
696.9	33.1	*	46	39.98	20.67	2.65	30.2	-	-	Peak
722.1	43.91	*	46	49.7	21.71	2.7	30.2	-	-	Peak
750.1	39.56	*	46	44.6	22.4	2.75	30.19	-	-	Peak
774.6	30	*	46	35.06	22.15	2.79	30	-	-	Peak
796.3	41.01	*	46	46.01	22.02	2.82	29.84	-	-	Peak
825	43.23	*	46	47.23	22.87	2.88	29.75	-	-	Peak
846.7	41.26	*	46	44.68	23.37	2.91	29.7	-	-	Peak
871.2	41.46	*	46	45.22	23.1	2.96	29.82	-	-	Peak
896.4	33.37	*	46	37.13	23.22	3	29.98	-	-	Peak
925.1	43.12	*	46	46.09	24.05	3.04	30.06	-	-	Peak
946.1	29.35	*	46	31.67	24.72	3.06	30.1	-	-	Peak
971.3	40.54	*	54	42.3	25.08	3.14	29.98	-	-	Peak
5755	94.62	-	-	87.17	35.11	7.19	34.85	108	91	Average
5755	104.89	-	-	97.41	35.11	7.22	34.85	108	91	Peak
11511	43.69	-10.31	54	50.12	38.5	10.27	55.2	100	166	Average
11511	53.81	-20.19	74	60.24	38.5	10.27	55.2	100	166	Peak

Test Mode :	802.11n HT40 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	159	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Horizontal
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. All other emission found more than 20dB below limit line is not reported.		

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
5795	94.37	-	-	86.84	35.15	7.24	34.86	102	125	Average
5795	104.1	-	-	96.59	35.15	7.22	34.86	102	125	Peak

Test Mode :	802.11n HT40 <MIMO Ant. 0+1>	Temperature :	23~25°C
Test Channel :	159	Relative Humidity :	44~47%
Test Engineer :	David Yang	Polarization :	Vertical
Remark :	5795 MHz is fundamental signal which can be ignored.		

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
5795	95.1	-	-	87.57	35.15	7.24	34.86	107	99	Average
5795	105	-	-	97.51	35.13	7.22	34.86	107	99	Peak
11592	42.55	-11.45	54	48.98	38.57	10.32	55.32	100	164	Average
11592	54.9	-19.1	74	61.33	38.57	10.32	55.32	100	164	Peak

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

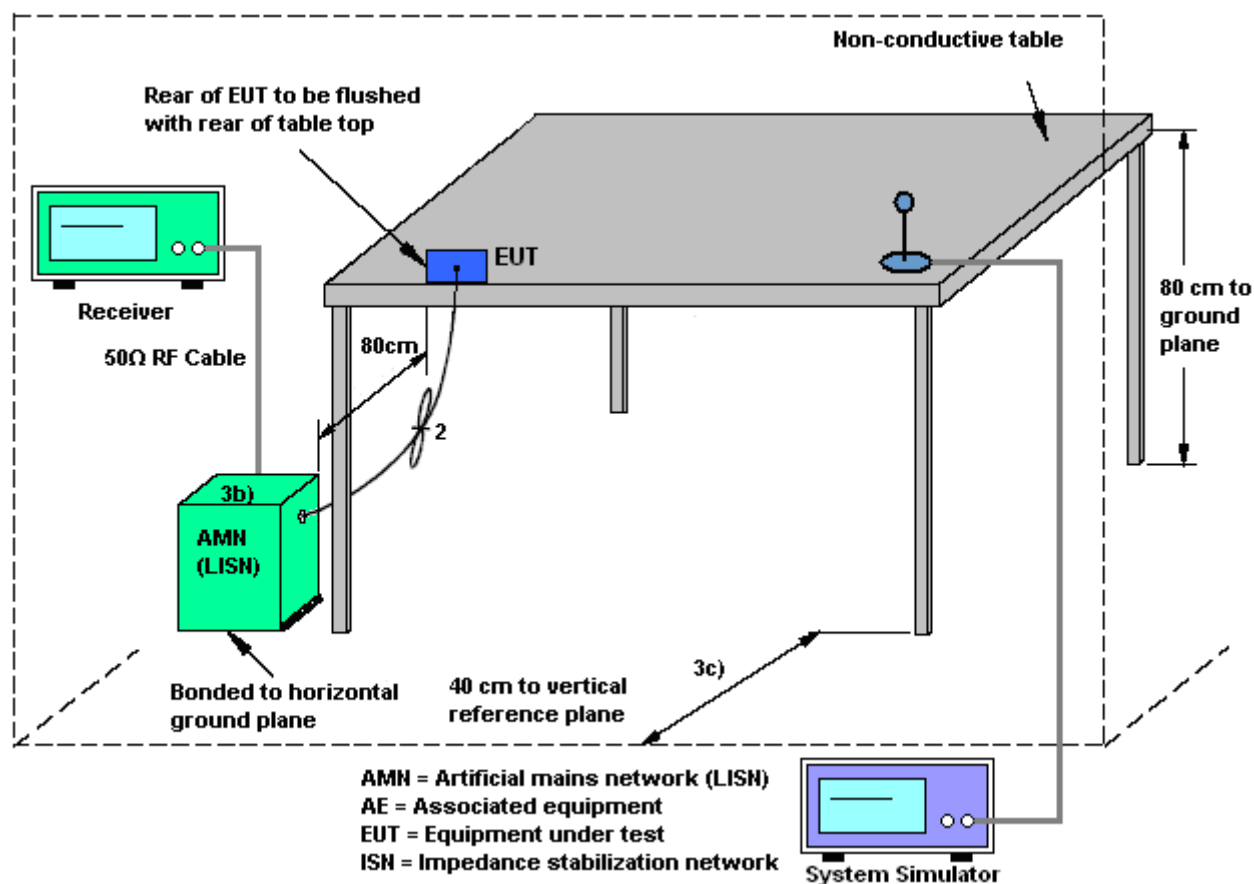
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

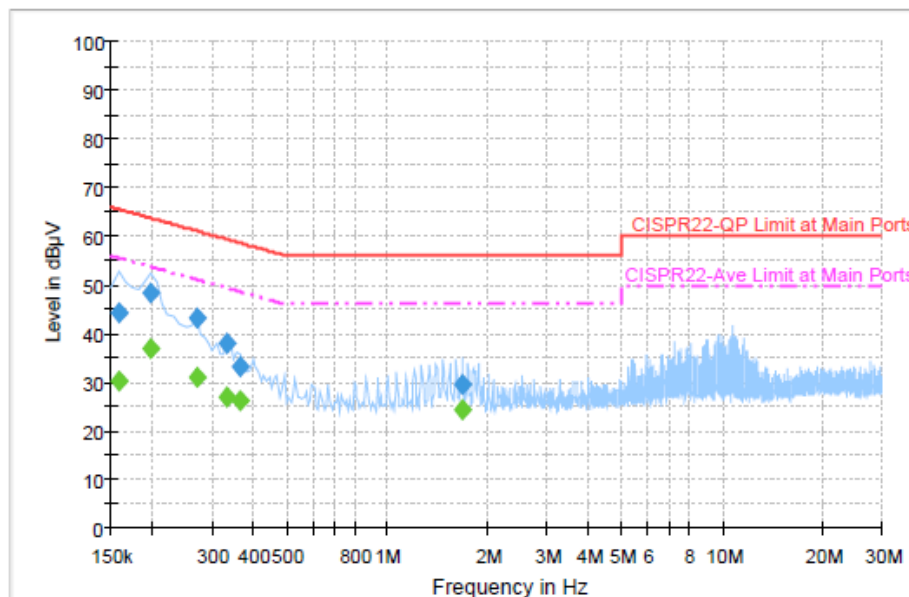
1. The testing follows the guidelines in ANSI C63.10-2009 and fulfills ANSI C63.4-2003 test site requirement.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power 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 2	Temperature :	20~22℃
Test Engineer :	Slash Huang	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Tx Ch39 + EBJ Ant.		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



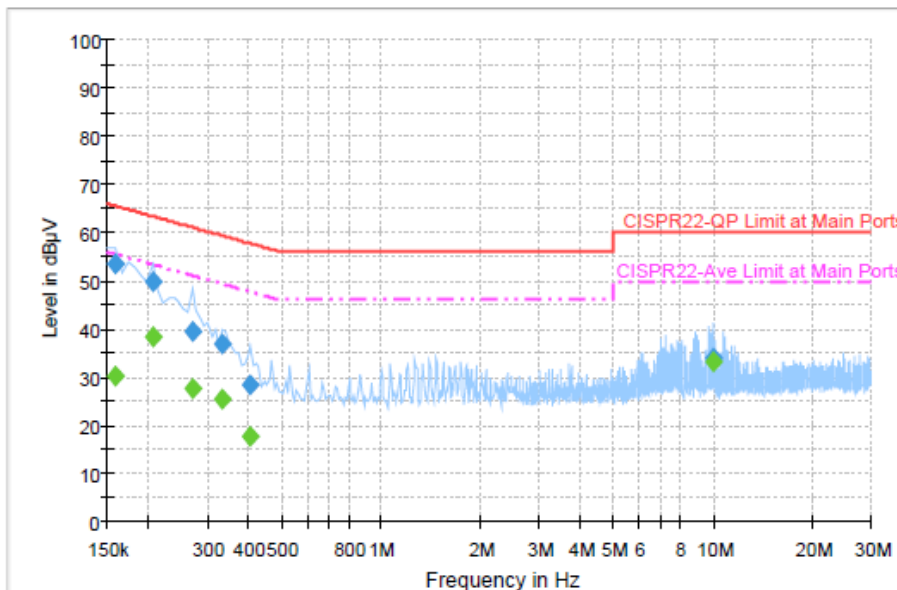
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	44.2	Off	L1	19.3	21.4	65.6
0.198000	48.4	Off	L1	19.3	15.3	63.7
0.270000	43.1	Off	L1	19.3	18.0	61.1
0.334000	38.0	Off	L1	19.4	21.4	59.4
0.366000	33.3	Off	L1	19.4	25.3	58.6
1.678000	29.6	Off	L1	19.5	26.4	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	30.1	Off	L1	19.3	25.5	55.6
0.198000	36.8	Off	L1	19.3	16.9	53.7
0.270000	31.0	Off	L1	19.3	20.1	51.1
0.334000	27.0	Off	L1	19.4	22.4	49.4
0.366000	26.2	Off	L1	19.4	22.4	48.6
1.678000	24.2	Off	L1	19.5	21.8	46.0

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Slash Huang	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Tx Ch39 + EBJ Ant.		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	53.5	Off	N	19.3	12.1	65.6
0.206000	49.9	Off	N	19.4	13.5	63.4
0.270000	39.4	Off	N	19.4	21.7	61.1
0.334000	36.8	Off	N	19.4	22.6	59.4
0.406000	28.4	Off	N	19.4	29.3	57.7
9.998000	33.9	Off	N	19.7	26.1	60.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	30.2	Off	N	19.3	25.4	55.6
0.206000	38.2	Off	N	19.4	15.2	53.4
0.270000	27.7	Off	N	19.4	23.4	51.1
0.334000	25.5	Off	N	19.4	23.9	49.4
0.406000	17.8	Off	N	19.4	29.9	47.7
9.998000	33.4	Off	N	19.7	16.6	50.0

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the Antenna exceeds 6 dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.7.2 Antenna 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. The EUT supports completely correlated MIMO mode. The composite antenna gain for 2.4GHz is 6.63 dBi. The composite antenna gain for 5GHz is 7.77 dBi as following table.

	2.4GHz	5GHz
ANT. 0 GAIN (dBi)	3.62	4.76
ANT. 1 GAIN (dBi)	3.62	4.76
COMPOSITE GAIN (dBi)	6.63	7.77

FCC KDB 662911 D01 Multiple Transmitter Output v01r01

Unequal antenna gains, with equal transmit powers.

For antenna gains given by $G_1, G_2, \dots, G_N$ dBi.

If transmit signals are *correlated*, then

Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})/N]$ dBi

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	Aug. 27, 2012 ~ Sep. 07, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Aug. 27, 2012 ~ Sep. 07, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Aug. 27, 2012 ~ Sep. 07, 2012	Sep. 17, 2012	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	Sep. 07, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Sep. 07, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Sep. 07, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Sep. 07, 2012	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	ESU26	100390	20Hz ~ 26.5GHz	Dec. 22, 2011	Aug. 30, 2012 ~ Sep. 01, 2012	Dec. 21, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 2GHz	Oct. 22, 2011	Aug. 30, 2012 ~ Sep. 01, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	Aug. 30, 2012 ~ Sep. 01, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	Aug. 30, 2012 ~ Sep. 01, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 10, 2012	Aug. 30, 2012 ~ Sep. 01, 2012	Aug. 09, 2013	Radiation (03CH05-HY)
Pre Amplifier	COM-POWER	PA-103A	161075	10Hz ~ 1000MHz Gain:32dB	Feb. 27, 2012	Aug. 30, 2012 ~ Sep. 01, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159087	1GHz~18GHz	Feb. 27, 2012	Aug. 30, 2012 ~ Sep. 01, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A026 65	1GHz~26.5GHz	Aug. 28, 2012	Aug. 30, 2012 ~ Sep. 01, 2012	Aug. 27, 2013	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 251	15GHz ~ 40GHz	Oct. 21, 2011	Aug. 30, 2012 ~ Sep. 01, 2012	Oct. 20, 2012	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/00 1	9KHz ~ 30MHz	Jul. 03, 2012	Aug. 30, 2012 ~ Sep. 01, 2012	Jul. 02, 2014	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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Appendix A. Photographs of EUT

Please refer to Sporton report number EP282317 as below.