FCC RF Test Report

APPLICANT	**:**	**Harpers LLC**
EQUIPMENT	**:**	**Tablet Device**
MODEL NAME	**:**	**X43Z60**
FCC ID	**:**	**YJM-0725**
STANDARD	**:**	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	**:**	**(DTS) Digital Transmission System**

The product was received on Jan. 02, 2012 and completely tested on May 31, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

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

Reviewed by:

Jones Tsai

Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR210222	Rev. 01	Initial issue of report	Jun. 04, 2012

SUMMARY OF WLAN TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	A8.4	Power Output	≤ 30dBm	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	≤ 8dBm	Pass	-
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 4.40 dB at 0.470 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.45 dB at 2388.280 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

SUMMARY OF BLUETOOTH TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
4.1	15.247(a)(1)(iii)	A8.4(2)	Number of Channels	≥ 15Chs	Pass	-
4.2	15.247(a)(1)	A8.1(b)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
4.3	15.247(a)(1)(i)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
4.4	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
4.5	15.247(b)	A8.1(b)	Peak Power Output Measurement	≤125mW for BT	Pass	-
4.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
4.7	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
4.8	15.247(e)	A8.2(b)	Power Spectral Density	≤ 8dBm	Pass	-
4.9	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 4.40 dB at 0.470 MHz
4.10	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.91 dB at 2483.500 MHz
4.11	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Harpers LLC
Suite 5, 2215-B Renaissance Drive Las Vegas, NV 89119

1.2 Feature of Equipment Under Test

Product Specification	
Equipment	Tablet Device
Model Name	X43Z60
FCC ID	YJM-0725
Tx/Rx Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz 802.11a: 5180MHz ~ 5240MHz, 5745~5805MHz. Bluetooth : 2402 MHz ~ 2480 MHz
Channel Spacing	802.11b/g : 5 MHz, 802.11a: 20 MHz, Bluetooth : 1 MHz
Antenna Type	**<2.4GHz>** Ant 1 : Fixed Intenal Antenna with gain 2.00 dBi Ant 2 : Fixed Internal Antenna with gain 2.30 dBi **<5GHz>** Ant 1 : Fixed Internal Antenna with gain 3.50 dBi Ant 2 : Fixed Internal Antenna with gain 2.90 dBi
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth 3.0 : GFSK, π/4-DQPSK, 8-DPSK

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

<table>
<tr><th colspan="2">Product Feature</th></tr>
<tr><td rowspan="3">Maximum Peak Output Power to Antenna</td><td><2.4GHz>
<Legacy Ant 1>
802.11b : 19.40 dBm (0.0871 W)
802.11g : 24.96 dBm (0.3133 W)
<SISO Ant 1>
802.11 n (BW 20MHz) : 23.16 dBm (0.2070 W)
<MIMO Ant 1+2>
802.11 n (BW 20MHz) : 26.37 dBm (0.4335 W)</td></tr>
<tr><td><5GHz>
<Legacy Ant 1>
802.11a : 21.44 dBm / 0.1393 W
<SISO Ant 1>
802.11n (BW 20MHz) : 21.41 dBm / 0.1384 W
802.11n (BW 40MHz) : 21.72 dBm / 0.1486 W
<MIMO Ant 1+2>
802.11n (BW 20MHz) : 24.34 dBm / 0.2717 W
802.11n (BW 40MHz) : 23.18 dBm / 0.2078 W</td></tr>
<tr><td><Ant 2>
Bluetooth (1Mbps) : 9.50 dBm (0.0089 W)
Bluetooth EDR (2Mbps) : 9.44 dBm (0.0088 W)
Bluetooth EDR (3Mbps) : 10.00 dBm (0.0100 W)</td></tr>
<tr><td rowspan="2">Duty Cycle</td><td><2.4GHz>
<Legacy Ant 1>
802.11b : 100.00%
802.11g : 97.95%
<SISO Ant 1>
802.11n (BW 20MHz) : 97.64%
<MIMO Ant 1+2>
802.11n (BW 20MHz) : 95.28%</td></tr>
<tr><td><5GHz>
<Legacy Ant 1>
802.11a : 97.81%
<SISO Ant 1>
802.11n (BW 20MHz) : 96.91%
802.11n (BW 40MHz) : 95.36%
<MIMO Ant 1+2>
802.11n (BW 20MHz) : 95.52% for Ant 1
802.11n (BW 20MHz) : 95.53% for Ant 2
802.11n (BW 40MHz) : 91.49% for Ant 1
802.11n (BW 40MHz) : 91.44% for Ant 2</td></tr>
<tr><td>Antenna Function Description</td><td><table>
<tr><th></th><th>Ant 1.</th><th>Ant 2.</th></tr>
<tr><td>Bluetooth V3.0</td><td>-</td><td>V</td></tr>
<tr><td>802.11 b</td><td>V</td><td>-</td></tr>
<tr><td>802.11 g</td><td>V</td><td>-</td></tr>
<tr><td>802.11 a</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n SISO</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n MIMO</td><td>V</td><td>V</td></tr>
</table></td></tr>
</table>

Note: WLAN and BT can’t transmit simultaneously.

1.3 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st 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.
	CO05-HY	03CH07HY	722060/4086B-1

1.4 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 Public Notice DA 00-705
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01
- ANSI C63.4-2003
- 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, and FCC Part 15E recorded in separated test reports.

1.5 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	DELL	U2410	FCC DoC	N/A	AC I/P: Unshielded, 1.6 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Dell	ST2220Lb	FCC DoC	Shielded, 1.6m	Unshielded,1.8m
5.	Bluetooth Earphone	Sony Ericsson	HPM-78	PY7DDA-2029	N/A	N/A
6.	iPod Earphone	Apple	N/A	FCC DoC	Unshielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 Test Mode

The EUT supports 802.11 a/b/g/n and Bluetooth V3.0 with two diversity antennas, Antenna 1 and 2, and completely uncorrelated MIMO modes. The Antenna 2 is receiver only for WLAN legacy/SISO mode, and dedicates for Bluetooth. The test configurations are reported in following sections.

For conducted test cases, the high, middle, low channels of legacy modes (802.11b,g,a) and 802.11n mode (SISO, MIMO) were tested respectively by choosing the highest RF output power chain, and data rate from preliminary conducted power testing as shown in section 2.3.

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

For radiated measurements, pre-scanned tests were conducted to determine the final configuration from all possible combinations. Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations modes, and the worst mode (Z plane for 2.4G, Z plane for 5G <Legacy / SISO>, and Y plane for 5G <MIMO>) is recorded in this report only, and the worst modes from the legacy modes and n modes were used for the full radiated test measurement.

Test Cases	
Conducted TCs	

<WLAN Legacy Ant 1>

Test Mode	802.11b	802.11g
CH01	Mode 1	Mode 4
CH06	Mode 2	Mode 5
CH11	Mode 3	Mode 6

Test Mode	802.11a
CH149	Mode 7
CH157	Mode 8
CH161	Mode 9

<WLAN SISO Ant 1>

Test Mode	2.4GHz 802.11n (BW 20MHz)
CH01	Mode 10
CH06	Mode 11
CH11	Mode 12

Test Mode	5GHz 802.11n (BW 20MHz)
CH149	Mode 13
CH157	Mode 14
CH161	Mode 15

Test Mode	5GHz 802.11n (BW 40MHz)
CH151	Mode 16
CH159	Mode 17

<WLAN MIMO Ant 1>

Test Mode	2.4GHz 802.11n (BW 20MHz)
CH01	Mode 18
CH06	Mode 19
CH11	Mode 20

Test Mode	5GHz 802.11n (BW 20MHz)
CH149	Mode 21
CH157	Mode 22
CH161	Mode 23

Test Mode	5GHz 802.11n (BW 40MHz)
CH151	Mode 24
CH159	Mode 25

Test Cases	
Conducted TCs	<WLAN MIMO Ant 2>

Test Mode	2.4GHz 802.11n (BW 20MHz)
CH01	Mode 26
CH06	Mode 27
CH11	Mode 28

Test Mode	5GHz 802.11n (BW 20MHz)
CH149	Mode 29
CH157	Mode 30
CH161	Mode 31

Test Mode	5GHz 802.11n (BW 40MHz)
CH151	Mode 32
CH159	Mode 33

<BT>

Test Mode	1Mbps	2Mbps	3Mbps
CH00	Mode 1	Mode 4	Mode 7
CH39	Mode 2	Mode 5	Mode 8
CH78	Mode 3	Mode 6	Mode 9

Test Cases	
Radiated TCs	<WLAN Legacy / SISO Ant 1>

Test Mode	802.11b	802.11g	2.4GHz 802.11n (BW 20MHz)
CH01	Mode 1	Mode 4	Mode 7
CH06	Mode 2	Mode 5	Mode 8
CH11	Mode 3	Mode 6	Mode 9

Test Mode	802.11a	5GHz 802.11n (BW 20MHz)
CH149	Mode 10	Mode 13
CH157	Mode 11	Mode 14
CH161	Mode 12	Mode 15

Test Mode	5GHz 802.11n (BW 40MHz)
CH151	Mode 16
CH159	Mode 17

<WLAN MIMO>

Test Mode	2.4GHz 802.11n (BW 20MHz)
CH01	Mode 18
CH06	Mode 19
CH11	Mode 20

Test Mode	5GHz 802.11n (BW 20MHz)
CH149	Mode 21
CH157	Mode 22
CH161	Mode 23

Test Mode	5GHz 802.11n (BW 40MHz)
CH151	Mode 24
CH159	Mode 25

<BT>

Test Mode	3Mbps
CH00	Mode 1
CH39	Mode 2
CH78	Mode 3

AC Conducted Emission	Mode 1 :WLAN Link + Bluetooth Link + HDMI Cable + USB Cable (Charging from Adapter) + Earphone + MPEG4 + Adapter

2.2 Carrier Frequency Channel

The EUT supports channels number 1~11.

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		

The EUT supports channels number 149~161.

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

For BT has 79 channel numbers with 1MHz channel spacing.

Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78

For example

Channel (n)	Frequency (MHz)
00	2402
39	2441
78	2480

2.3 Pre-Scanned RF Power

2.3.1 WLAN RF Output Power

Preliminary tests were performed in different data rate as below table and the highest power data rates (11b, 11g, 11n (BW 20MHz) modes) were chosen for full test in the following sections to demonstrate compliance to the FCC limit line.

<Legacy Ant 1>

2.4GHz 802.11b mode				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	19.40	19.12	19.07	19.01

2.4GHz 802.11g mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	24.96	24.53	24.16	24.12	24.07	23.93	24.17	23.8

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	21.44	21.11	21.02	21.04	21.10	21.02	20.98	21.00

<SISO Ant 1>

2.4GHz 802.11n (BW 20MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	23.16	22.95	22.7	22.61	22.44	22.59	22.12	22.98

5GHz 802.11n (BW 20MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	21.09	20.9	20.73	20.68	20.7	20.73	20.67	20.73

5GHz 802.11n (BW 40MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	21.72	21.58	21.42	21.34	21.12	21.01	20.94	20.88

<MIMO Ant 1 + 2 >

2.4GHz 802.11n (BW 20MHz) mode								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Peak Power (dBm) MIMO – Ant 1	23.31	23.21	23.01	22.94	23.02	22.91	22.95	22.80
Peak Power (dBm) MIMO – Ant 2	23.40	23.33	23.25	23.02	23.05	22.97	23.11	23.22
MIMO Ant 1 + 2 (Measure and Sum)	26.37	26.28	26.14	25.99	26.05	25.95	26.04	26.03

5GHz 802.11n (BW 20MHz) mode								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Power (dBm) MIMO – Ant 1	20.88	20.44	20.24	20.43	20.19	20.11	20.25	20.30
Power (dBm) MIMO – Ant 2	21.74	21.49	21.51	21.19	21.44	21.38	21.56	21.55
MIMO Ant 1 + 2 (Measure and Sum)	24.34	24.01	23.93	23.84	23.87	23.80	23.96	23.98

5GHz 802.11n (BW 40MHz) mode								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Power (dBm) MIMO – Ant 1	20.11	19.73	19.67	19.57	19.57	19.70	19.51	19.53
Power (dBm) MIMO – Ant 2	20.22	19.79	19.81	19.70	19.75	19.64	19.41	19.50
MIMO Ant 1 + 2 (Measure and Sum)	23.18	22.77	22.75	22.65	22.67	22.68	22.47	22.53

2.3.2 BT RF Output Power

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

<Ant 2>

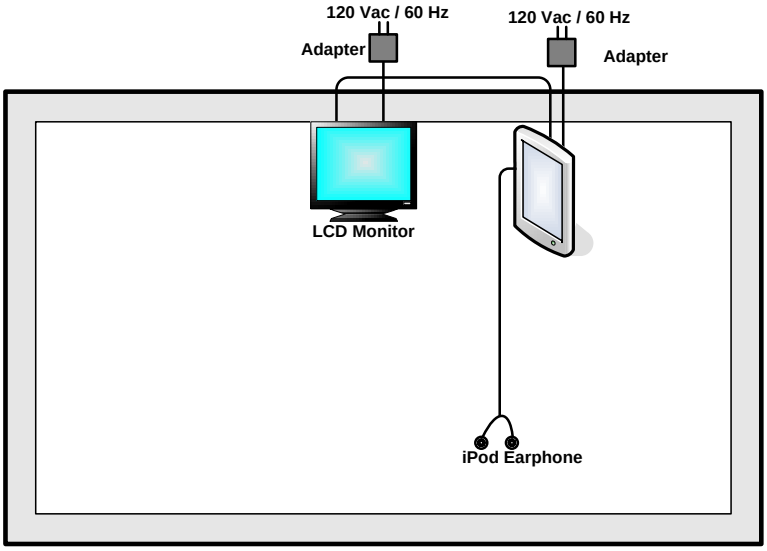
Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	π/4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	9.50 dBm	9.44 dBm	**10.00 dBm**
Ch39	2441MHz	9.26 dBm	9.26 dBm	9.49 dBm
Ch78	2480MHz	8.03 dBm	7.99 dBm	9.47 dBm

Remark:

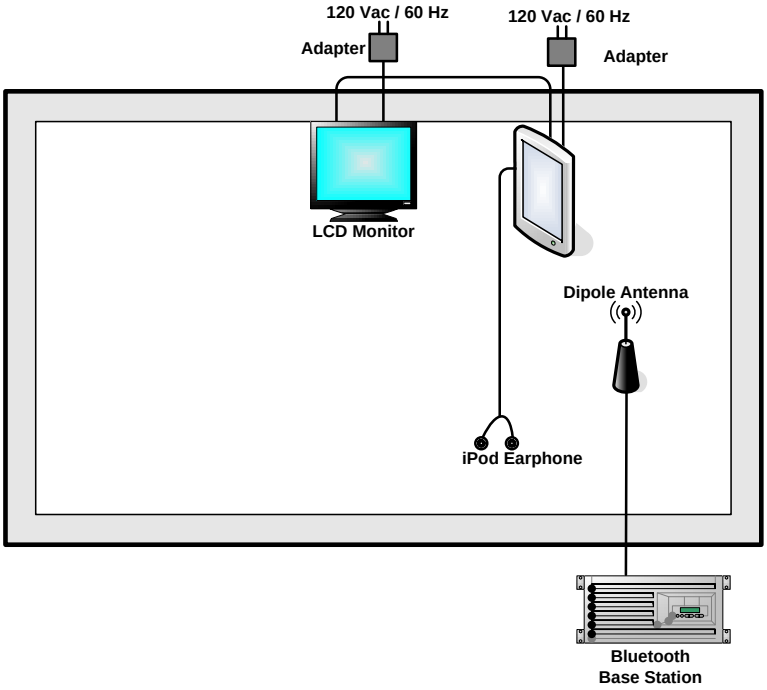
1. All the test data for each data rate were verified, but only the worst case was reported.
2. The data rate was set in 3Mbps for all the test items due to the highest RF output power.
3. The EUT is programmed to transmit signals continuously for all testing.

2.4 Connection Diagram of Test System

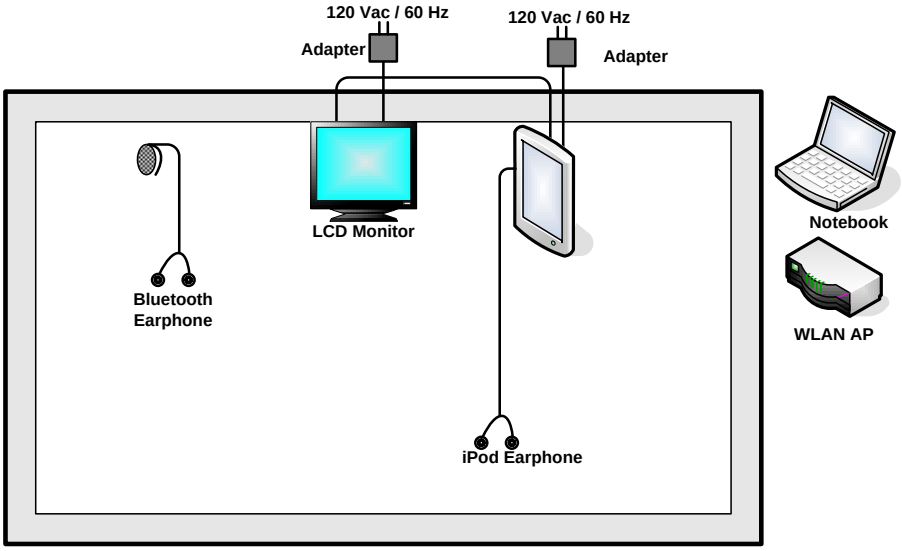
<WLAN Tx Mode>



<BT Tx Mode>



<AC Conducted Emission Mode>



2.5 RF Utility

The programmed RF utility “Compliance Tool”, 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.

3 WLAN Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

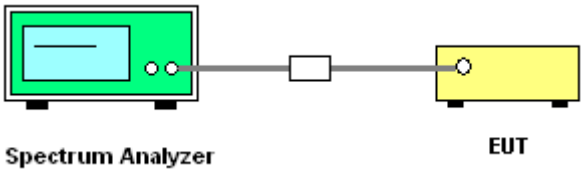
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01.
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. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW).Set the Video bandwidth (VBW) ≥ 3 * RBW in order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 KHz. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Test Mode :	802.11b	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		Legacy Ant 1		
01	2412	8.12	0.5	Pass
06	2437	8.16	0.5	Pass
11	2462	8.20	0.5	Pass

Test Mode :	802.11g	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		Legacy Ant 1		
01	2412	16.00	0.5	Pass
06	2437	16.08	0.5	Pass
11	2462	16.12	0.5	Pass

Test Mode :	2.4GHz 802.11n (BW 20MHz)	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11 n (BW 20MHz) 6dB Bandwidth (MHz)			6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		SISO Ant 1	MIMO Ant 1	MIMO Ant 2		
01	2412	17.40	17.40	17.36	0.5	Pass
06	2437	17.44	17.36	17.44	0.5	Pass
11	2462	17.44	17.32	17.52	0.5	Pass

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11a 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		Legacy Ant 1		
149	5745	15.96	0.5	Pass
157	5785	15.92	0.5	Pass
161	5805	15.88	0.5	Pass

Test Mode :	5GHz 802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

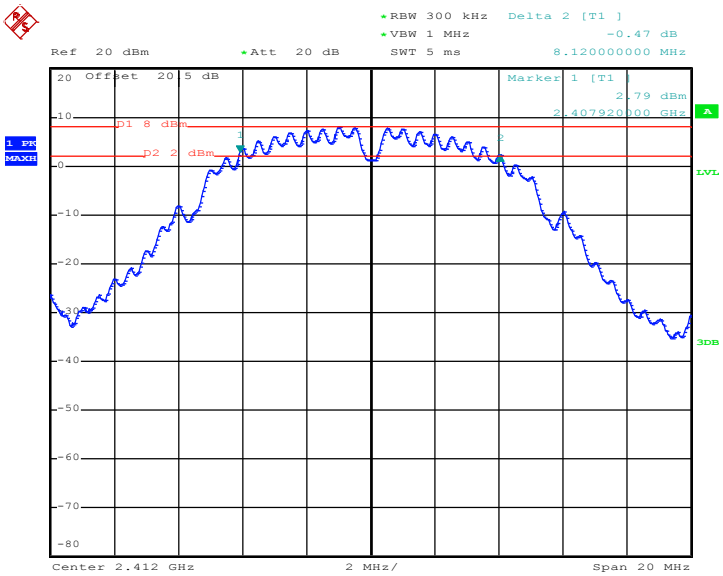
Channel	Frequency (MHz)	5GHz 802.11n (BW 20MHz, SISO, MIMO) 6dB Bandwidth (MHz)			6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		SISO Ant 1	MIMO Ant 1	MIMO Ant 2		
149	5745	16.76	16.52	16.52	0.5	Pass
157	5785	17.14	16.86	17.04	0.5	Pass
161	5805	17.00	17.08	16.80	0.5	Pass

Test Mode :	5GHz 802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	5GHz 802.11n (BW 40MHz, SISO, MIMO) 6dB Bandwidth (MHz)			6dB Bandwidth Min. Limit (MHz)	Pass/Fail
		SISO Ant 1	MIMO Ant 1	MIMO Ant 2		
151	5755	35.16	36.32	35.92	0.5	Pass
159	5795	35.44	36.08	36.08	0.5	Pass

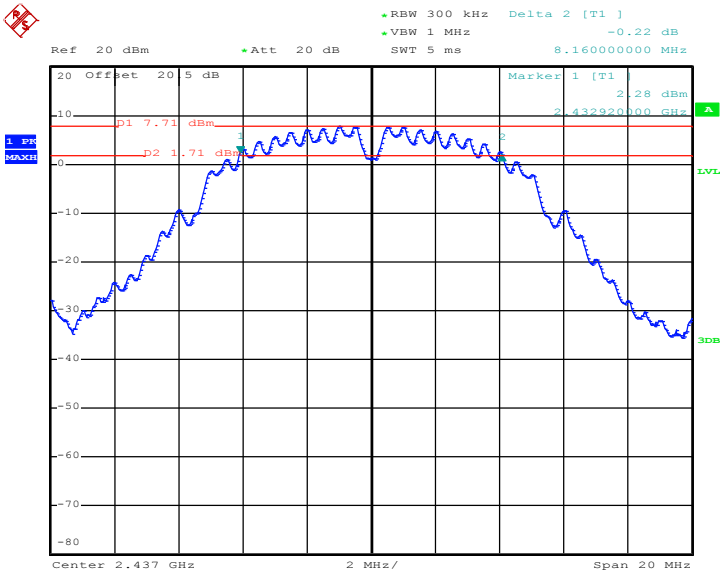
3.1.6 Test Result of 6dB Bandwidth Plots

6 dB Bandwidth Plot on 802.11b Channel 01 – Legacy Ant 1



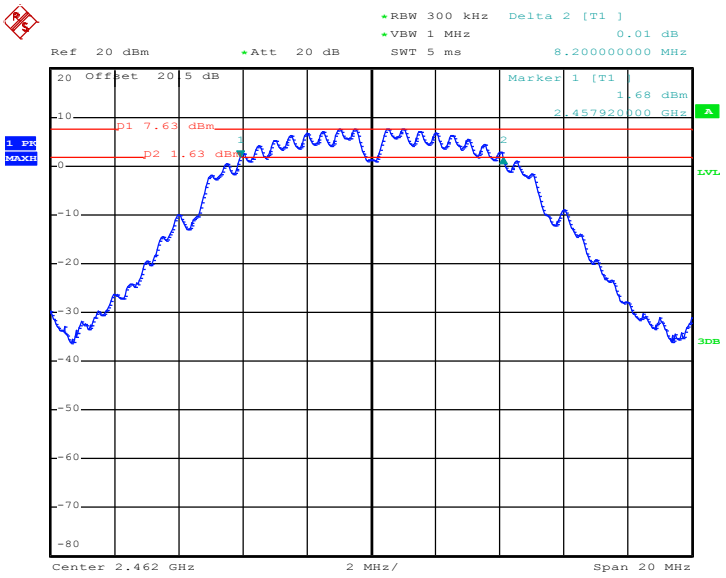
Date: 30.APR.2012 14:19:55

6 dB Bandwidth Plot on 802.11b Channel 06 – Legacy Ant 1



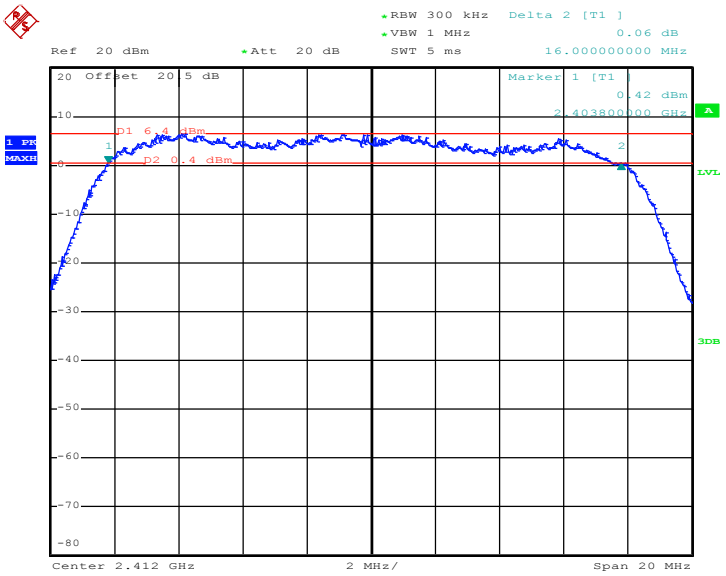
Date: 30.APR.2012 14:25:28

6 dB Bandwidth Plot on 802.11b Channel 11 – Legacy Ant 1



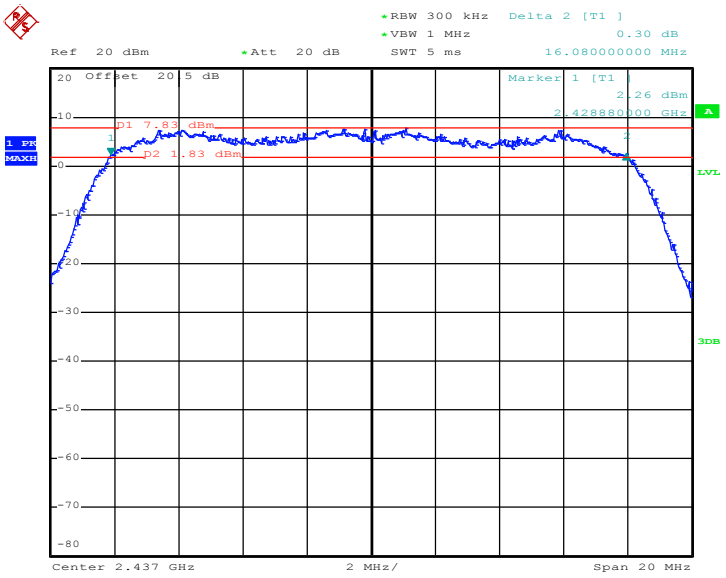
Date: 30.APR.2012 14:28:07

6 dB Bandwidth Plot on 802.11g Channel 01 – Legacy Ant 1



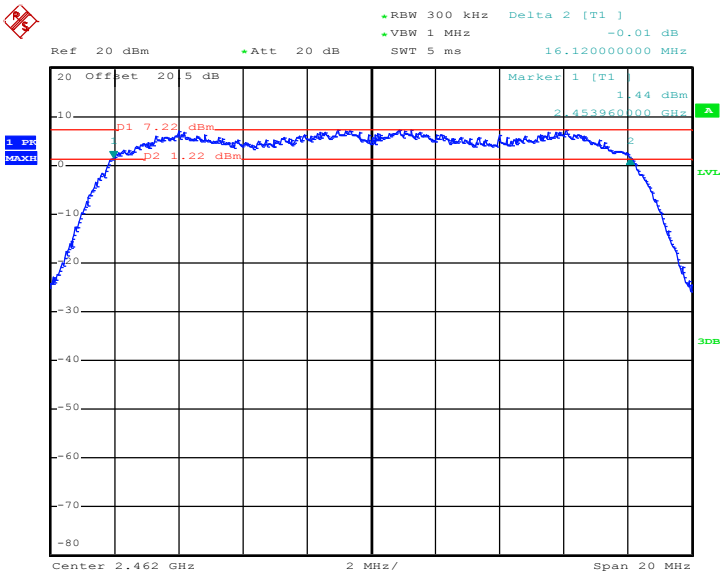
Date: 30.APR.2012 14:50:00

6 dB Bandwidth Plot on 802.11g Channel 06 – Legacy Ant 1



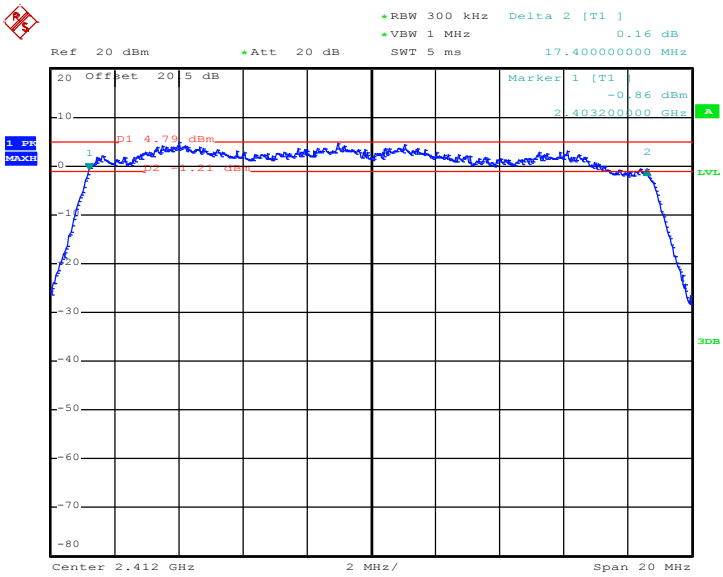
Date: 30.APR.2012 14:41:27

6 dB Bandwidth Plot on 802.11g Channel 11 – Legacy Ant 1



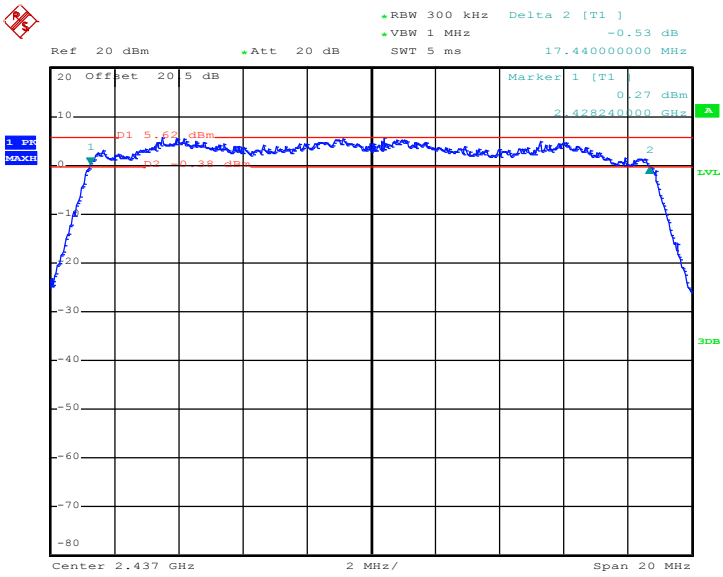
Date: 30.APR.2012 14:38:08

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01 – SISO ANT 1



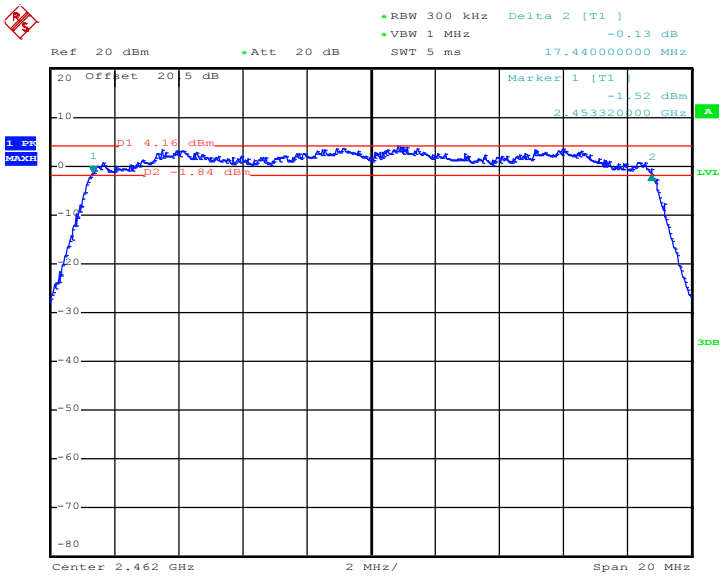
Date: 30.APR.2012 14:56:22

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 06 – SISO ANT 1



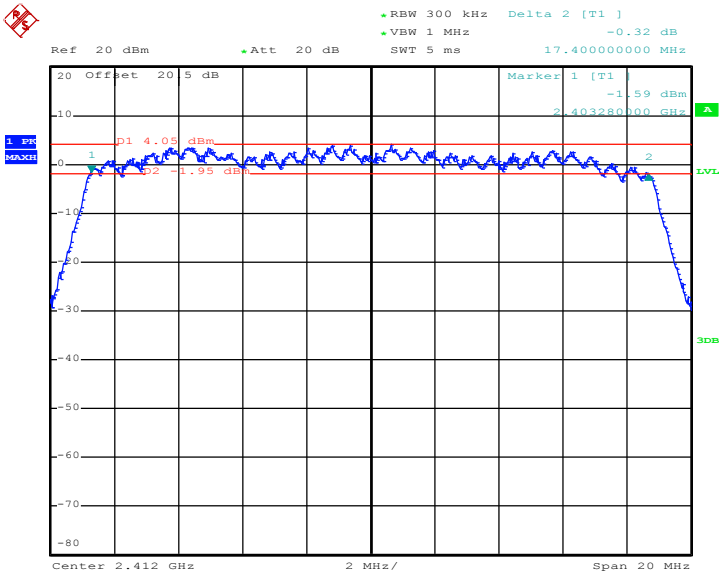
Date: 30.APR.2012 15:00:56

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11 – SISO ANT 1



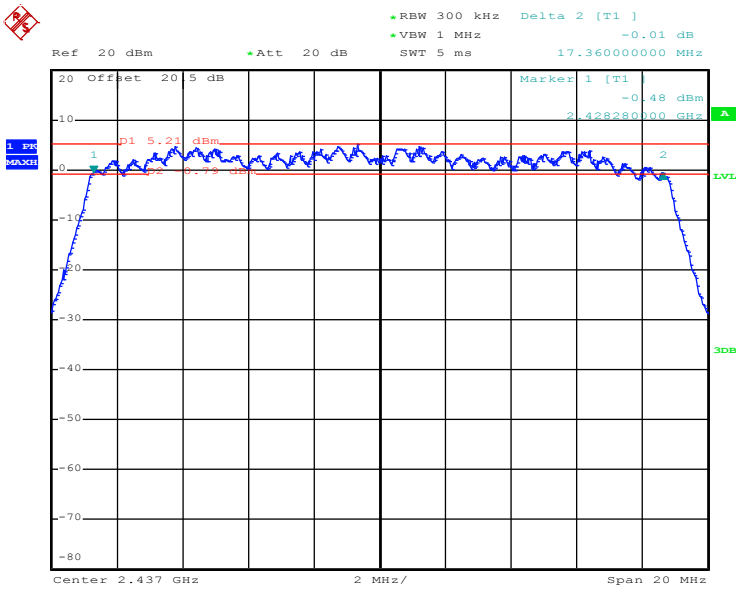
Date: 30.APR.2012 15:04:03

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01 – MIMO ANT 1



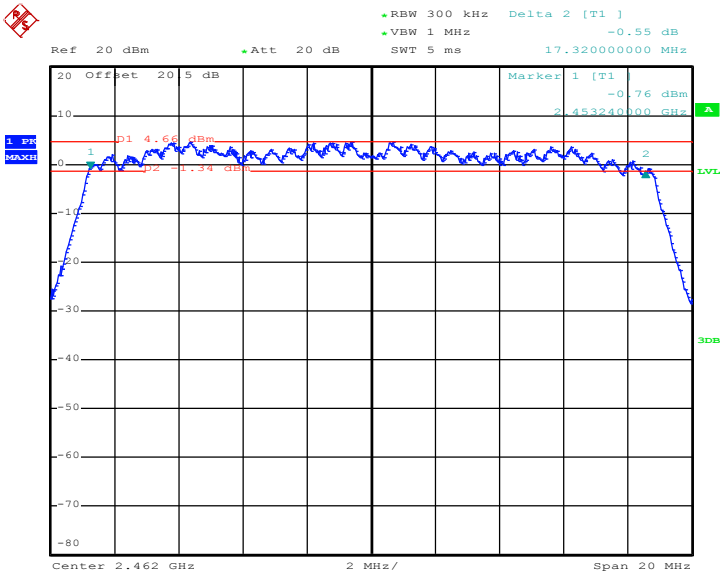
Date: 11.MAY.2012 11:10:07

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 06 – MIMO ANT 1



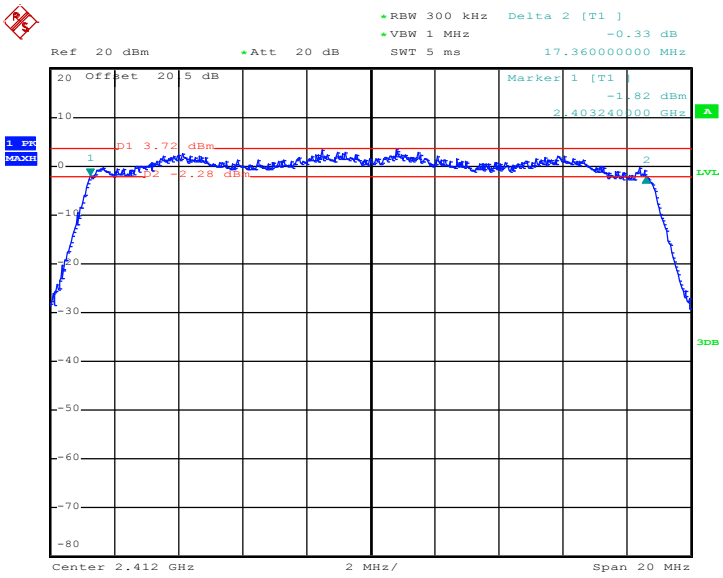
Date: 11.MAY.2012 11:17:47

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11 – MIMO ANT 1



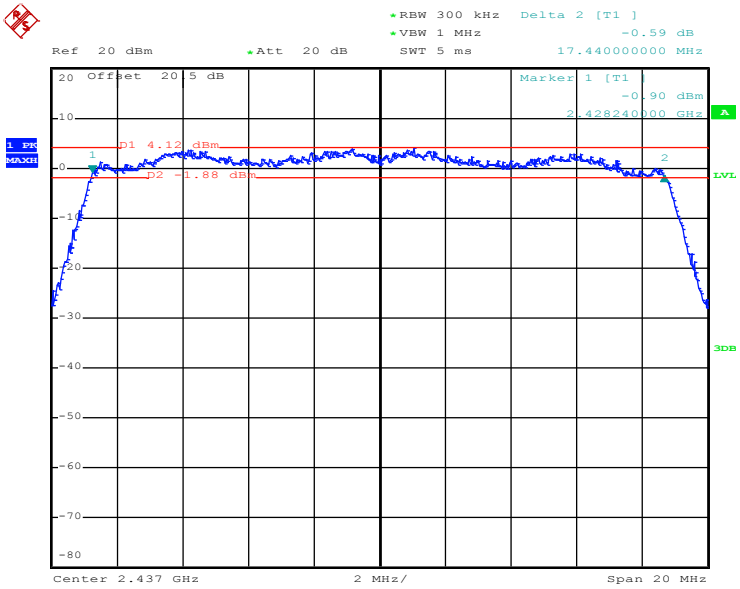
Date: 11.MAY.2012 11:24:03

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01 – MIMO ANT 2



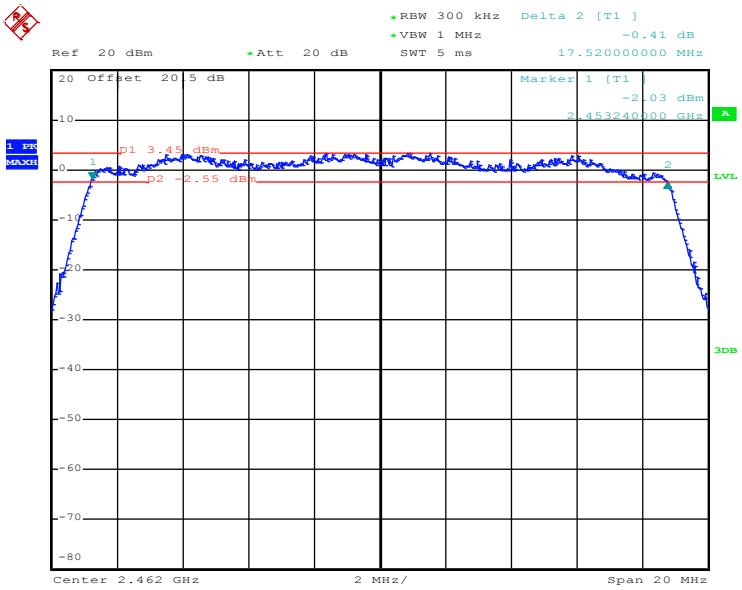
Date: 11.MAY.2012 11:48:42

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 06 – MIMO ANT 2



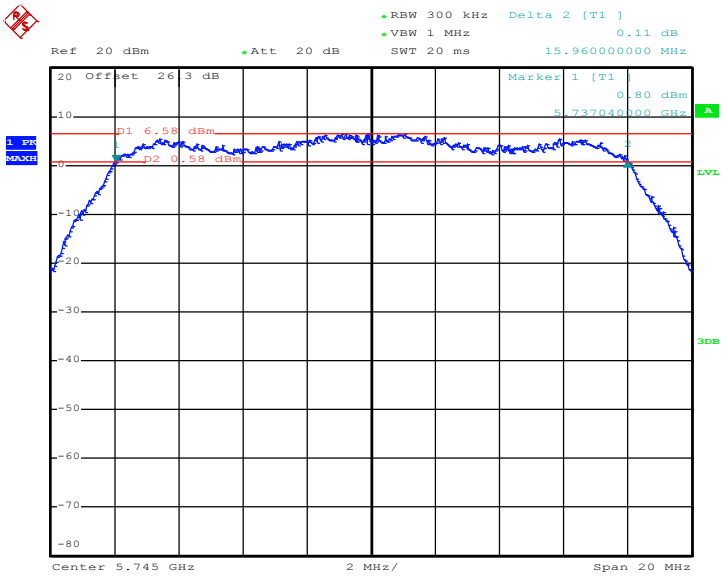
Date: 11.MAY.2012 11:42:31

6 dB Bandwidth Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11 – MIMO ANT 2



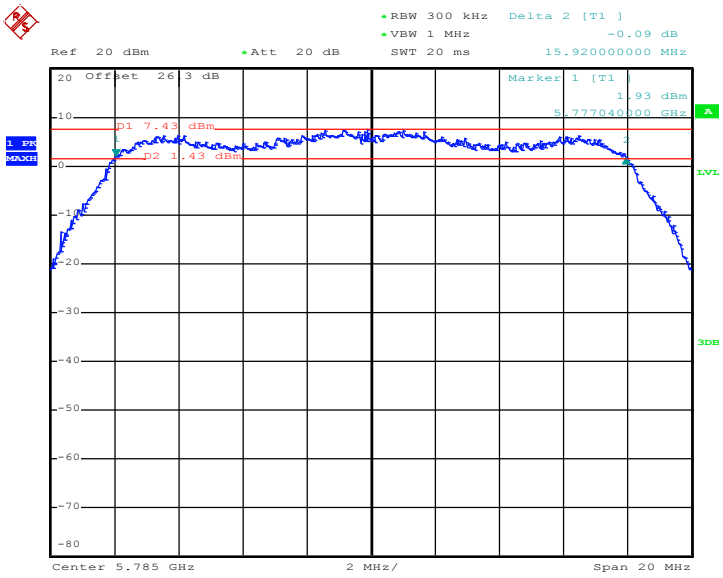
Date: 11.MAY.2012 11:39:49

6 dB Bandwidth Plot on 802.11a Channel 149 - Legacy Ant 1



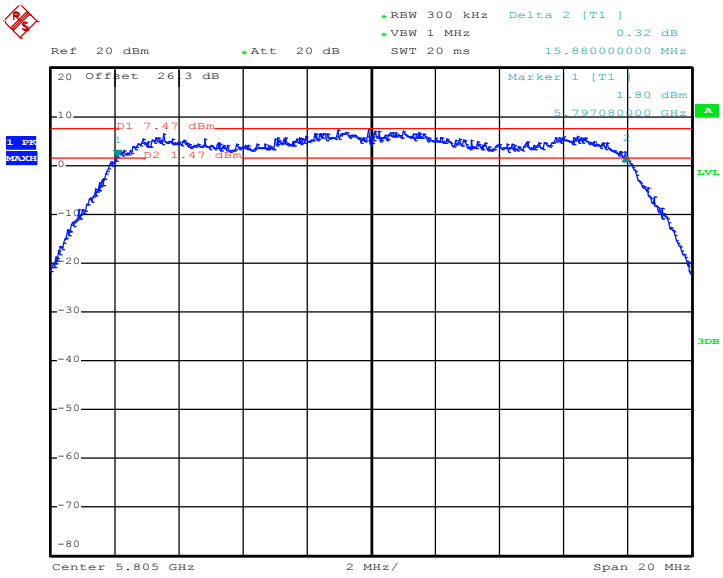
Date: 30.MAY.2012 14:27:26

6 dB Bandwidth Plot on 802.11a Channel 157 - Legacy Ant 1



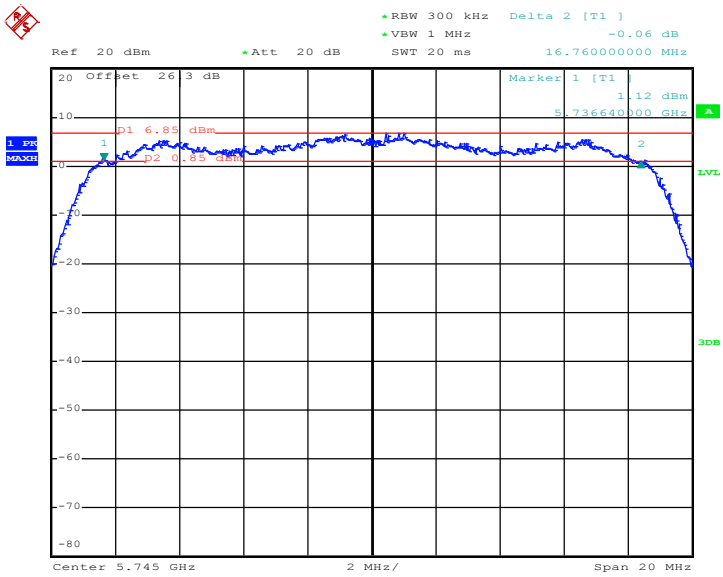
Date: 30.MAY.2012 14:36:37

6 dB Bandwidth Plot on 802.11a Channel 161 - Legacy Ant 1



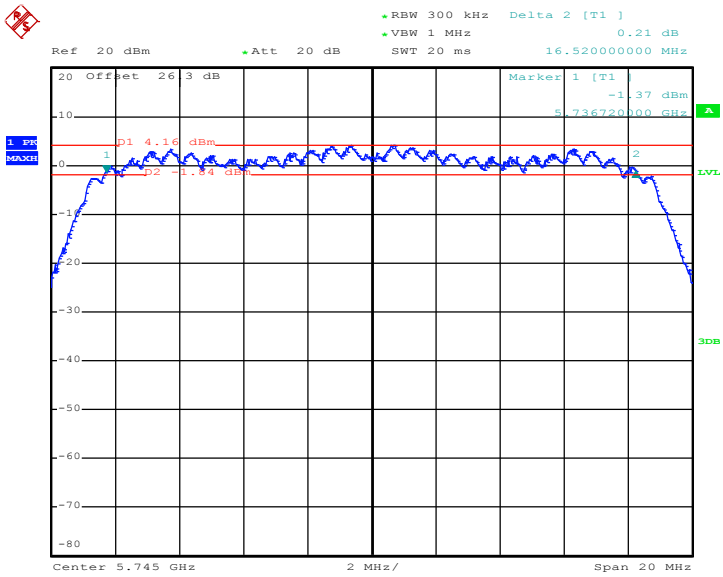
Date: 30.MAY.2012 19:16:54

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 149 - SISO Ant 1



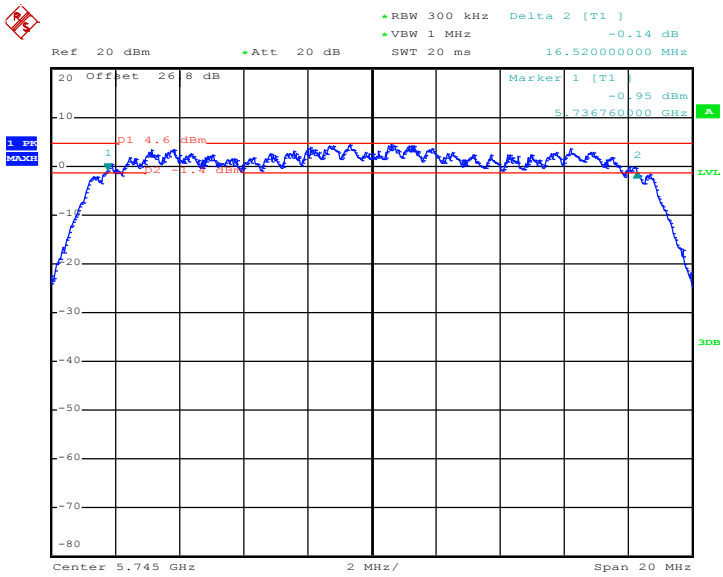
Date: 30.MAY.2012 15:16:18

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 149 - MIMO Ant 1



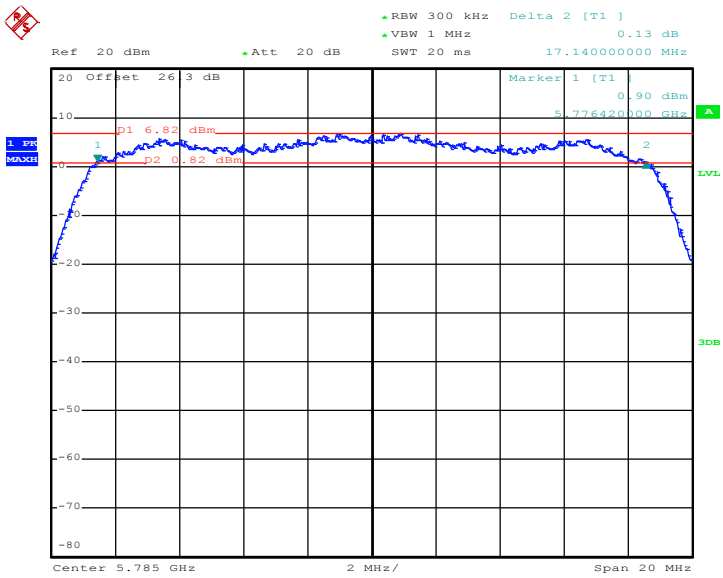
Date: 30.MAY.2012 19:31:33

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 149 - MIMO Ant 2



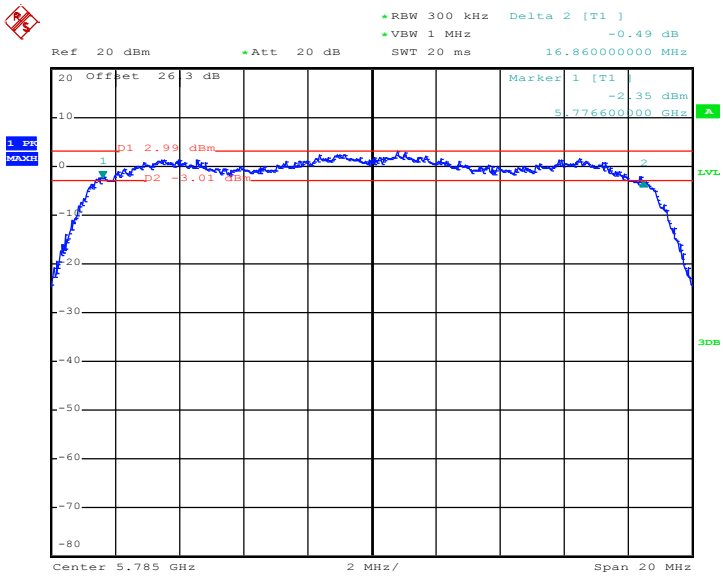
Date: 30.MAY.2012 18:25:21

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 157 - SISO Ant 1



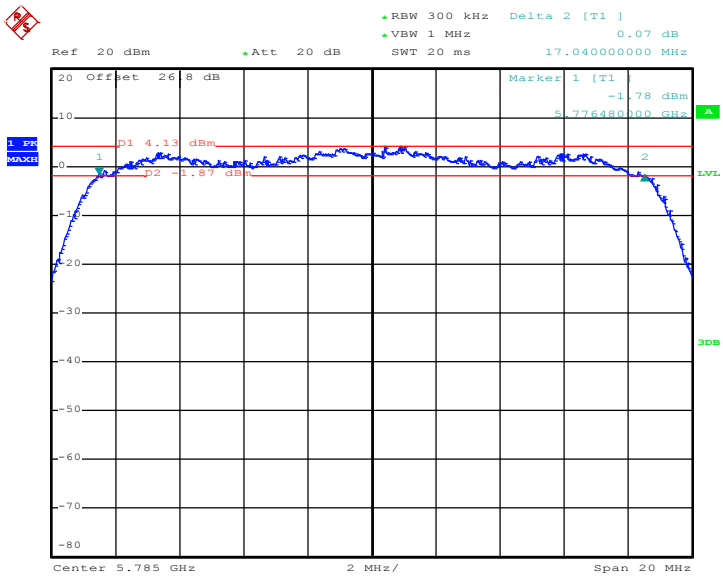
Date: 30.MAY.2012 15:05:49

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 157 - MIMO Ant 1



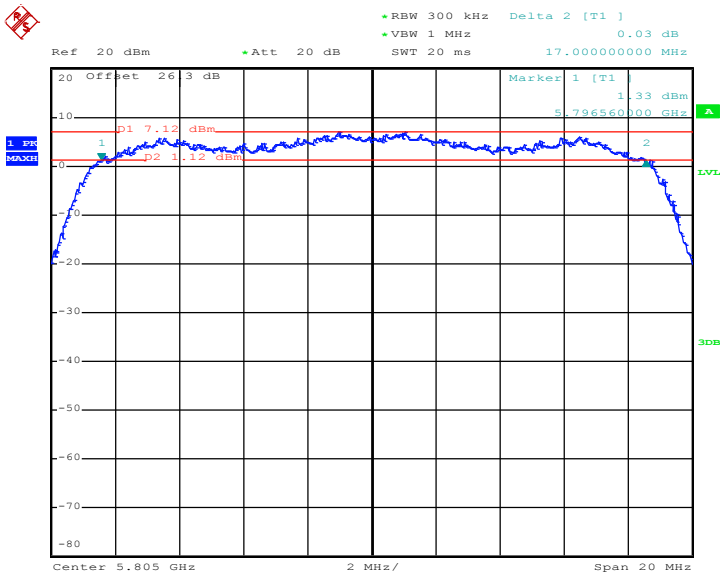
Date: 30.MAY.2012 16:14:58

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 157 - MIMO Ant 2



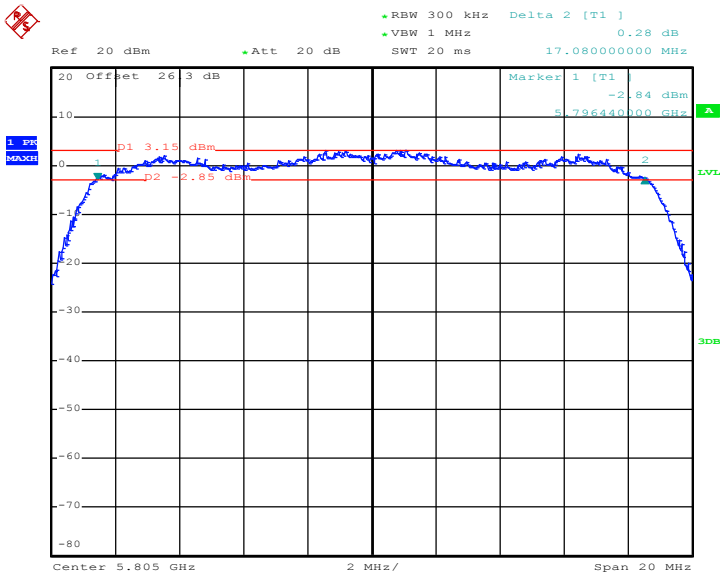
Date: 30.MAY.2012 22:13:24

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 161 - SISO Ant 1



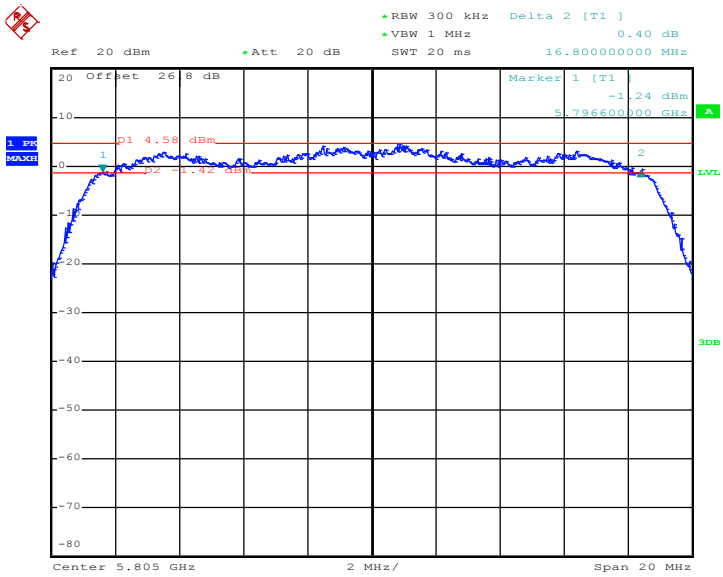
Date: 30.MAY.2012 16:39:23

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 161 - MIMO Ant 1



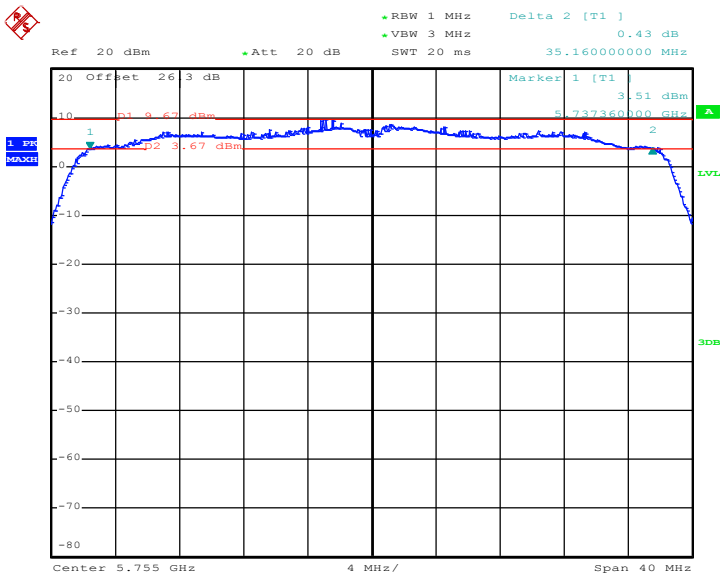
Date: 30.MAY.2012 16:29:51

6 dB Bandwidth Plot on 5GHz 802.11n (BW 20MHz) Channel 161 - MIMO Ant 2



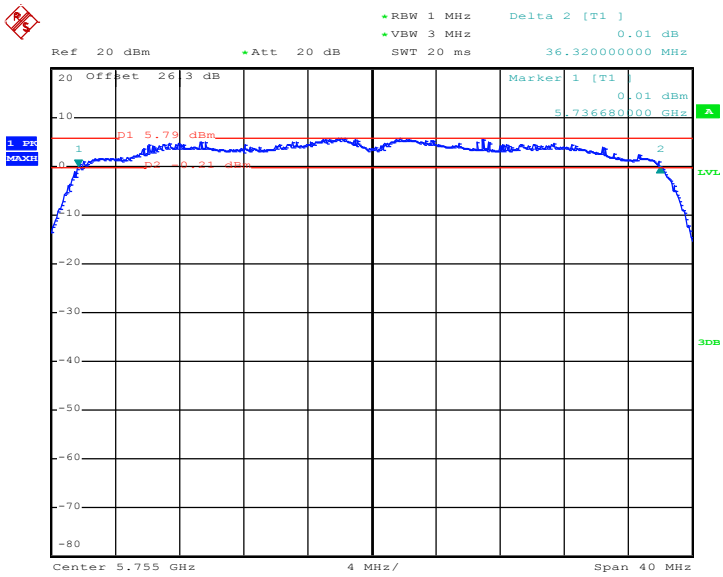
Date: 30.MAY.2012 18:30:48

6 dB Bandwidth Plot on 5GHz 802.11n (BW 40MHz) Channel 151 - SISO Ant 1



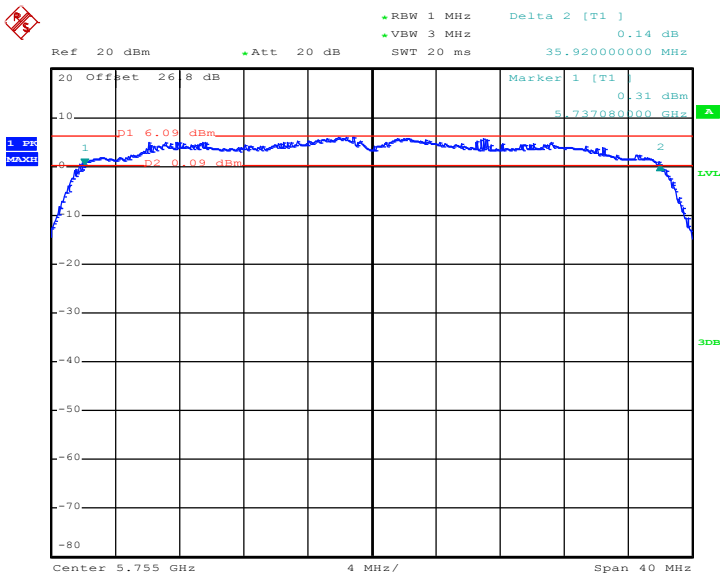
Date: 30.MAY.2012 15:40:05

6 dB Bandwidth Plot on 5GHz 802.11n (BW 40MHz) Channel 151 - MIMO Ant 1



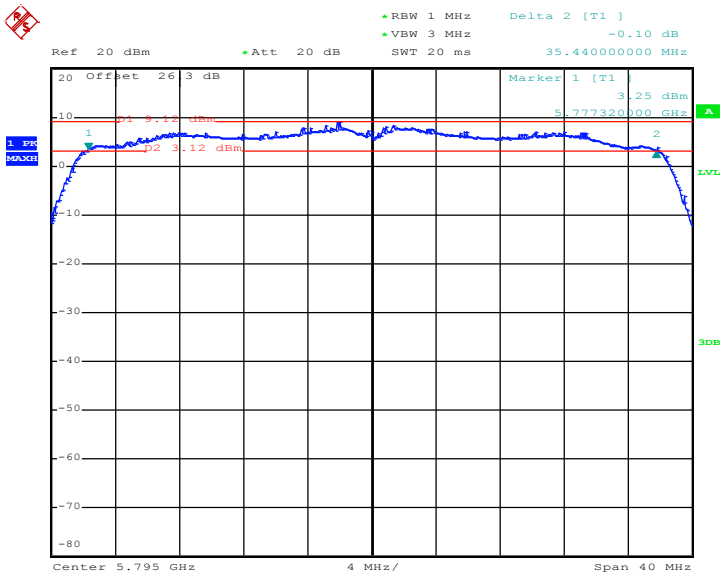
Date: 30.MAY.2012 16:51:06

6 dB Bandwidth Plot on 5GHz 802.11n (BW 40MHz) Channel 151 - MIMO Ant 2



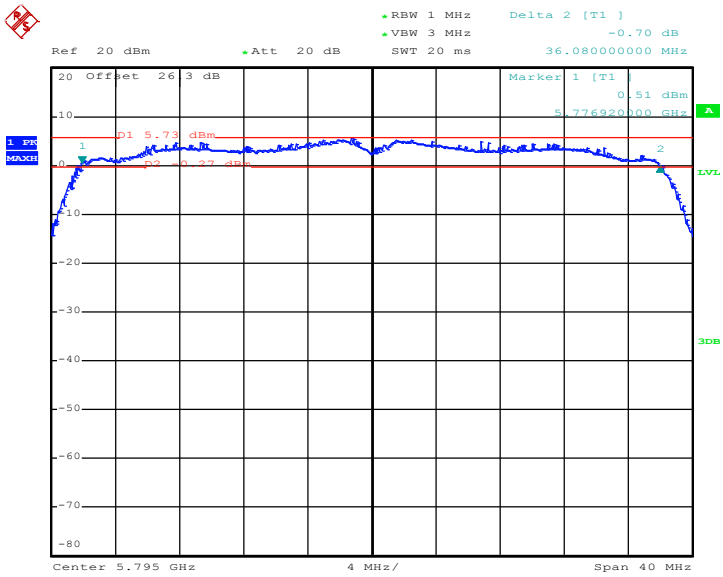
Date: 30.MAY.2012 19:39:11

6 dB Bandwidth Plot on 5GHz 802.11n (BW 40MHz) Channel 159 - SISO Ant 1



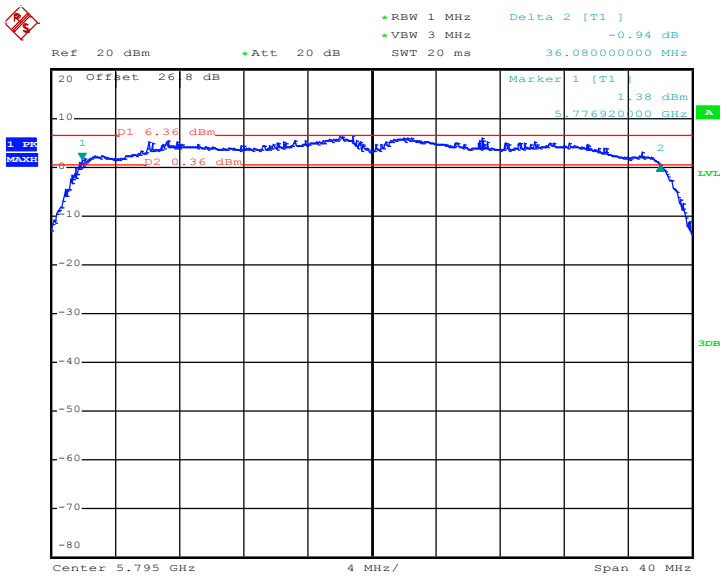
Date: 30.MAY.2012 15:36:21

6 dB Bandwidth Plot on 5GHz 802.11n (BW 40MHz) Channel 159 - MIMO Ant 1



Date: 30.MAY.2012 16:43:15

6 dB Bandwidth Plot on 5GHz 802.11n (BW 40MHz) Channel 159 - MIMO Ant 2



Date: 30.MAY.2012 17:59:11

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.

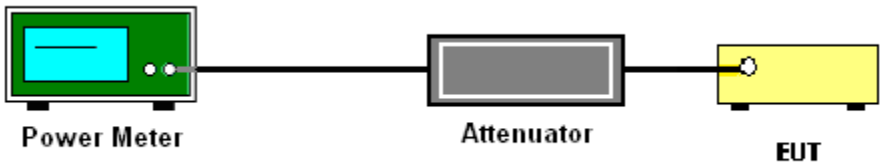
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure 7.2.1.3 Option 3(peak power meter method) and 7.2.2.3 Option 3(average power meter method) of FCC KDB No. 558074 DTS Meas. Guidance DR01.
2. The RF output of EUT was connected to the power meter by a low loss cable
3. Measure the power by power meter.
4. 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℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11b Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
		Legacy Ant 1		
01	2412	19.27	30	Pass
06	2437	19.40	30	Pass
11	2462	19.02	30	Pass

Test Mode :	802.11g	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
		Legacy Ant 1		
01	2412	23.35	30	Pass
06	2437	24.96	30	Pass
11	2462	24.78	30	Pass

Test Mode :	2.4GHz 802.11n (BW 20MHz)	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n (BW 20MHz) Peak Output Power (dBm)				Max. Limits (dBm)	Pass/Fail
		SISO ANT 1	MIMO ANT 1	MIMO ANT 2	MIMO ANT 1+2		
01	2412	20.63	20.55	21.02	23.80	30	Pass
06	2437	23.16	23.31	23.40	26.37	30	Pass
11	2462	22.83	22.46	22.94	25.71	30	Pass

Note : MIMO ANT 1+2 is a calculated result from sum of the power MIMO 1 and MIMO 2.

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11a Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
		Legacy Ant 1		
149	5745	20.87	30	Pass
157	5785	21.44	30	Pass
161	5805	21.38	30	Pass

Test Mode :	5GHz 802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	5GHz 802.11n (BW 20MHz) Peak Output Power (dBm)				Max. Limits (dBm)	Pass/Fail
		SISO ANT 1	MIMO ANT 1	MIMO ANT 2	MIMO ANT 1+2		
149	5745	21.09	20.25	21.47	23.91	30	Pass
157	5785	21.41	19.91	21.66	23.88	30	Pass
161	5805	21.32	20.88	21.74	24.34	30	Pass

Test Mode :	5GHz 802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	5GHz 802.11n (BW 40MHz) Peak Output Power (dBm)				Max. Limits (dBm)	Pass/Fail
		SISO ANT 1	MIMO ANT 1	MIMO ANT 2	MIMO ANT 1+2		
151	5755	21.58	20.11	20.22	23.18	30	Pass
159	5795	21.72	19.74	19.76	22.76	30	Pass

Note : MIMO ANT 1+2 is a calculated result from sum of the power MIMO 1 and MIMO 2.

3.2.6 Test Result of Average output Power

Test Mode :	802.11b	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11b Average Output Power (dBm)
		Legacy Ant 1
01	2412	15.66
06	2437	15.73
11	2462	15.42

Test Mode :	802.11g	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	802.11g Average Output Power (dBm)
		Legacy Ant 1
01	2412	13.70
06	2437	14.80
11	2462	14.74

Test Mode :	2.4GHz 802.11n (BW 20MHz)	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	Frequency (MHz)	2.4GHz 802.11n (BW 20MHz) Average Output Power (dBm)			
		SISO ANT 1	MIMO ANT 1	MIMO ANT 2	MIMO ANT 1+2
01	2412	9.47	9.67	10.76	13.26
06	2437	12.36	13.32	13.00	16.17
11	2462	12.01	12.31	12.74	15.54

Note :

1. MIMO ANT 1+2 is a calculated result from sum of the power MIMO ANT 1 and MIMO ANT 2.
2. The average power is measured by power meter with average power sensor and is reporting only.

Test Mode :	802.11a	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	**Frequency (MHz)**	**802.11a Average Output Power (dBm)**
		Legacy Ant 1
149	5745	12.18
157	5785	13.07
161	5805	12.98

Test Mode :	5GHz 802.11n (BW 20MHz)	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	**Frequency (MHz)**	**5GHz 802.11n (BW 20MHz) Average Output Power (dBm)**			
		SISO ANT 1	**MIMO ANT 1**	**MIMO ANT 2**	**MIMO ANT 1+2**
149	5745	12.49	9.97	10.61	13.31
157	5785	12.91	9.63	10.46	13.07
161	5805	12.86	10.48	10.82	13.66

Test Mode :	5GHz 802.11n (BW 40MHz)	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu	**Relative Humidity :**	50~53%

Channel	**Frequency (MHz)**	**5GHz 802.11n (BW 40MHz) Average Output Power (dBm)**			
		SISO ANT 1	**MIMO ANT 1**	**MIMO ANT 2**	**MIMO ANT 1+2**
151	5755	12.65	10.15	10.16	13.16
159	5795	12.85	9.98	10.21	13.10

Note :

3. MIMO ANT 1+2 is a calculated result from sum of the power MIMO ANT 1 and MIMO ANT 2.
4. The average power is measured by power meter with average power sensor and is reporting only.

3.3 Band Edges Measurement

3.3.1 Limit of Band Edges

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).

3.3.2 Measuring Instruments

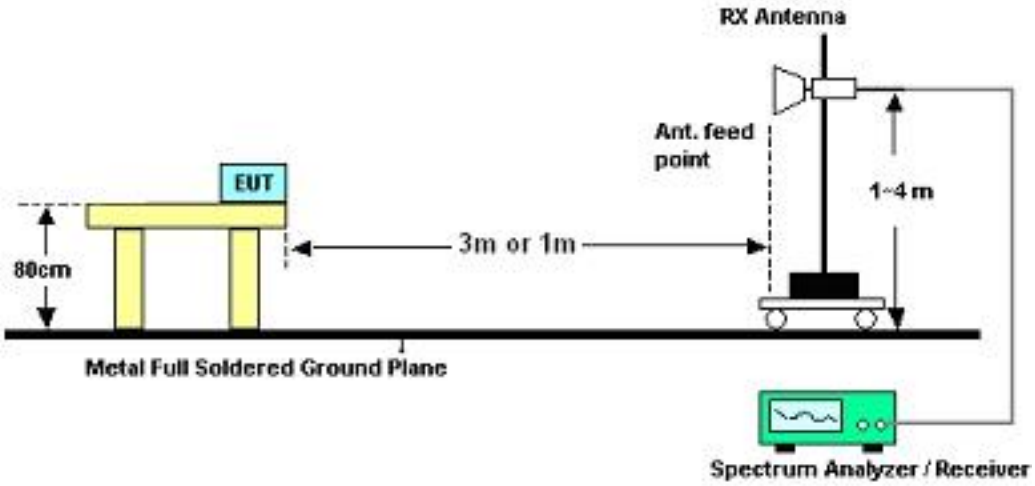
See list of measuring instruments of this test report.

3.3.3 Test Procedures

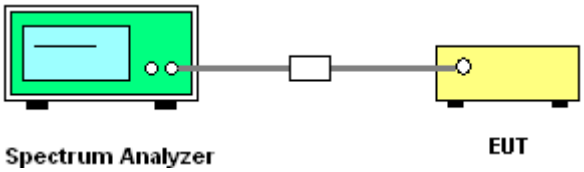
1. The testing follows the guidelines in the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01 and ANSI C63.4-2003.
2. For Unwanted Emissions into Non-Restricted Frequency Bands:
   Conducted emission test:
   Set RBW = 100 KHz, VBW=300 KHz, Peak Detector. Unwanted Emissions 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.
3. For Unwanted Emissions into Restricted Frequency Bands:
   Radiated emission test:
   Apply to band edge emissions that falling on the restricted bands listed in FCC Section 15.205. The maximum field strength limit is listed in FCC Section 15.209. For Radiated band edge measurement, it set RBW = 1 MHz, VBW = 3 MHz, Peak Detector for Peak measurement, and then set VBW=10Hz, while maintaining all of the other instrument settings for Average measurement.

3.3.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.3.5 Test Result of Radiated Band Edges

Test Mode :	802.11b <Ant 1>	**Temperature :**	23~25°C
Test Channel :	01	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

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
2389.8	61.49	-12.51	74	57.36	32.06	6.03	33.96	109	343	Peak
2389.8	50.41	-3.59	54	46.28	32.06	6.03	33.96	109	343	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
2389.99	55.93	-18.07	74	51.8	32.06	6.03	33.96	100	99	Peak
2389.99	45.05	-8.95	54	40.92	32.06	6.03	33.96	100	99	Average

Test Mode :	802.11b <Ant 1>	**Temperature :**	23~25°C
Test Channel :	11	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

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
2483.85	59.17	-14.83	74	54.81	32.18	6.18	34	111	347	Peak
2483.85	50.21	-3.79	54	45.85	32.18	6.18	34	111	347	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
2483.5	53.41	-20.59	74	49.05	32.18	6.18	34	122	95	Peak
2483.5	43.87	-10.13	54	39.51	32.18	6.18	34	122	95	Average

Test Mode :	802.11g <Ant 1>	**Temperature :**	23~25°C
Test Channel :	01	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

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
2388.28	70.98	-3.02	74	66.85	32.06	6.03	33.96	138	5	Peak
2388.28	53.55	-0.45	54	49.42	32.06	6.03	33.96	138	5	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.9	70.09	-3.91	74	65.96	32.06	6.03	33.96	127	29	Peak
2387.9	51.33	-2.67	54	47.2	32.06	6.03	33.96	127	29	Average

Test Mode :	802.11g <Ant 1>	**Temperature :**	23~25°C
Test Channel :	11	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

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
2483.66	70.76	-3.24	74	66.4	32.18	6.18	34	194	96	Peak
2483.66	51.37	-2.63	54	47.01	32.18	6.18	34	194	96	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
2483.5	63.95	-10.05	74	59.59	32.18	6.18	34	156	103	Peak
2483.5	45.67	-8.33	54	41.31	32.18	6.18	34	156	103	Average

Test Mode :	2.4GHz 802.11n (BW 20MHz) <SISO Ant 1>	**Temperature :**	23~25°C
Test Channel :	01	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

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**
2389.8	68.38	-5.62	74	64.25	32.06	6.03	33.96	100	94	Peak
2389.8	52.16	-1.84	54	48.03	32.06	6.03	33.96	100	94	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**
2389.8	62.97	-11.03	74	58.84	32.06	6.03	33.96	100	96	Peak
2389.8	46.81	-7.19	54	42.68	32.06	6.03	33.96	100	96	Average

Test Mode :	2.4GHz 802.11n (BW 20MHz) <SISO Ant 1>	**Temperature :**	23~25°C
Test Channel :	11	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

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**
2483.66	67.86	-6.14	74	63.5	32.18	6.18	34	111	344	Peak
2483.66	49.6	-4.4	54	45.24	32.18	6.18	34	111	344	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**
2483.66	56.26	-17.74	74	51.9	32.18	6.18	34	121	86	Peak
2483.66	39.37	-14.63	54	35.01	32.18	6.18	34	121	86	Average

Test Mode :	2.4GHz 802.11n (BW 20MHz) <MIMO>	**Temperature :**	23~25°C
Test Channel :	01	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

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**
2389.99	69.86	-4.14	74	65.73	32.06	6.03	33.96	140	12	Peak
2389.99	53.29	-0.71	54	49.16	32.06	6.03	33.96	140	12	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**
2389.99	65.35	-8.65	74	61.22	32.06	6.03	33.96	100	97	Peak
2389.99	46.93	-7.07	54	42.8	32.06	6.03	33.96	100	97	Average

Test Mode :	2.4GHz 802.11n (BW 20MHz) <MIMO>	**Temperature :**	23~25°C
Test Channel :	11	**Relative Humidity :**	52~54%
Test Engineer :	Kyle Zhuang		

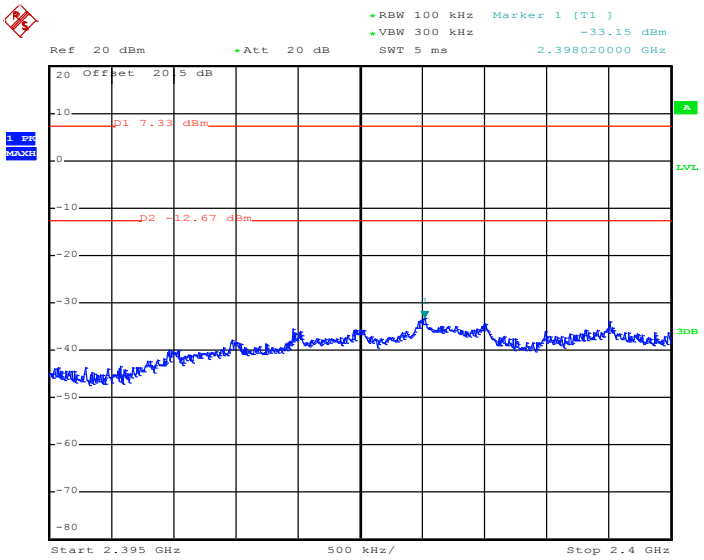
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2483.5	67.62	-6.38	74	63.26	32.18	6.18	34	113	341	Peak
2483.5	52.96	-1.04	54	48.6	32.18	6.18	34	113	341	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**
2483.5	57.99	-16.01	74	53.63	32.18	6.18	34	168	106	Peak
2483.5	42.77	-11.23	54	38.41	32.18	6.18	34	168	106	Average

3.3.6 Test Result of Conducted Band Edges

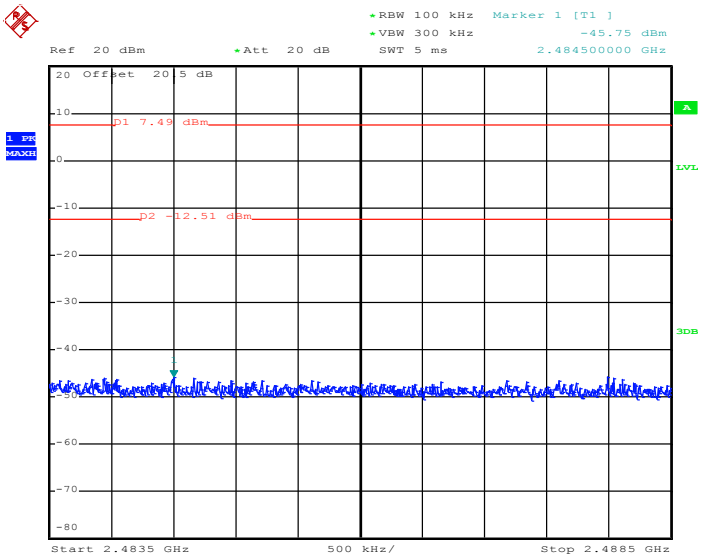
Test Mode :	<Legacy Ant 1>	Temperature :	24~26℃
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11b Channel 01



Date: 30.APR.2012 14:20:55

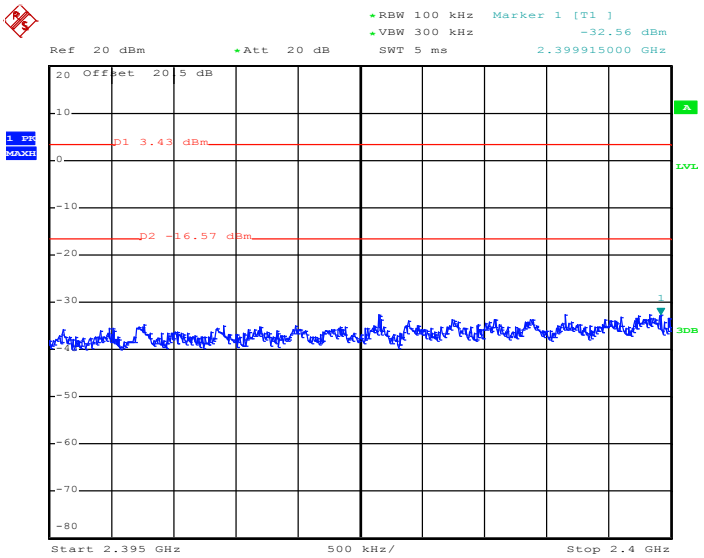
High Band Edge Plot on 802.11b Channel 11



Date: 30.APR.2012 14:28:55

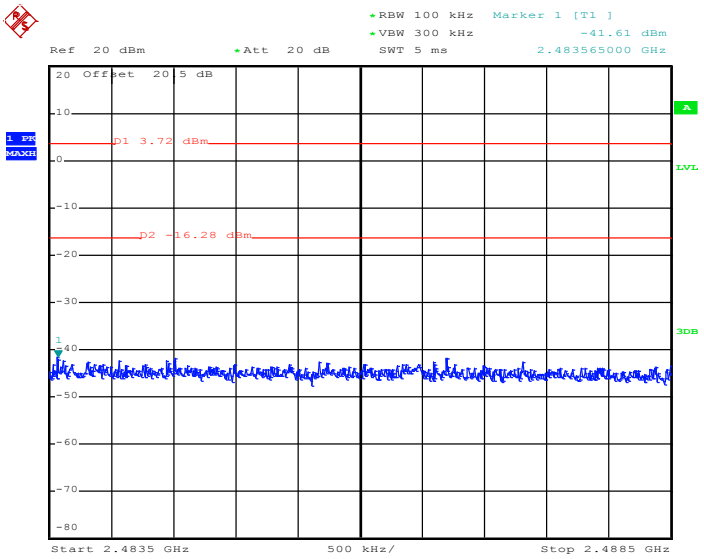
Test Mode :	<Legacy Ant 1>	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11g Channel 01



Date: 30.APR.2012 14:51:13

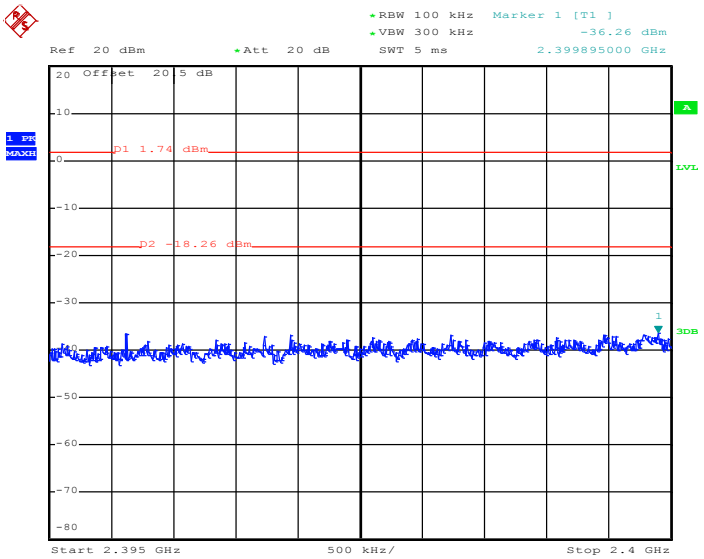
High Band Edge Plot on 802.11g Channel 11



Date: 30.APR.2012 14:38:56

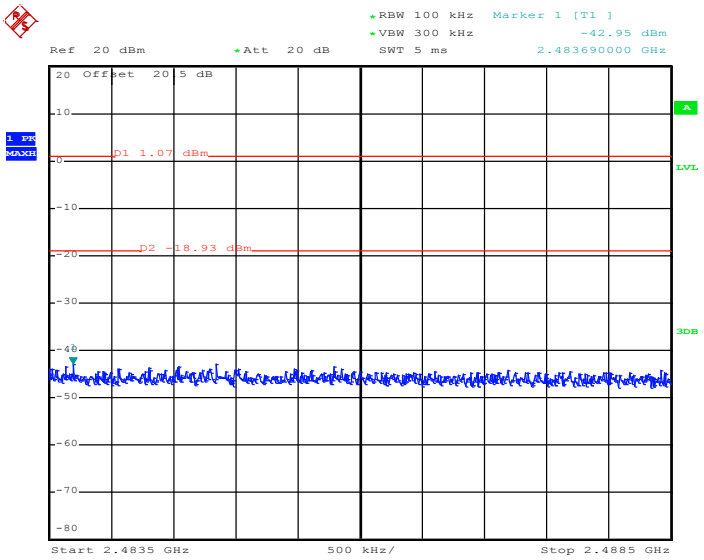
Test Mode :	<SISO Ant 1>	Temperature :	24~26℃
Test Band :	2.4GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01



Date: 30.APR.2012 14:57:22

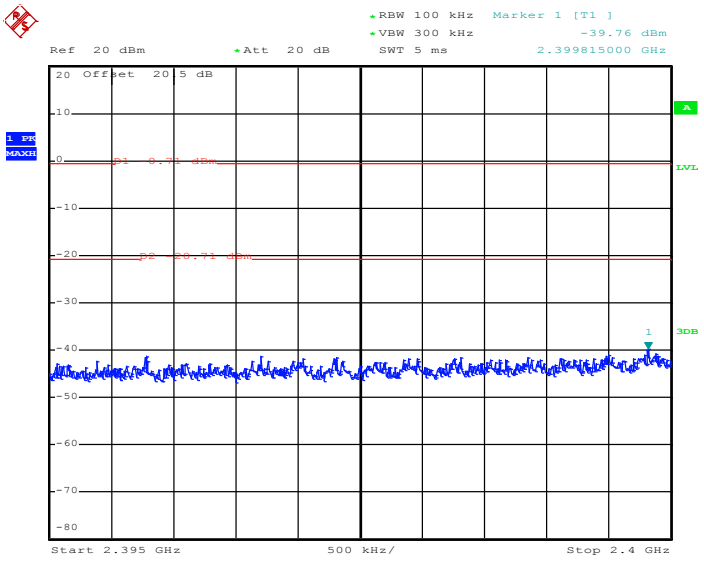
High Band Edge Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11



Date: 30.APR.2012 15:04:52

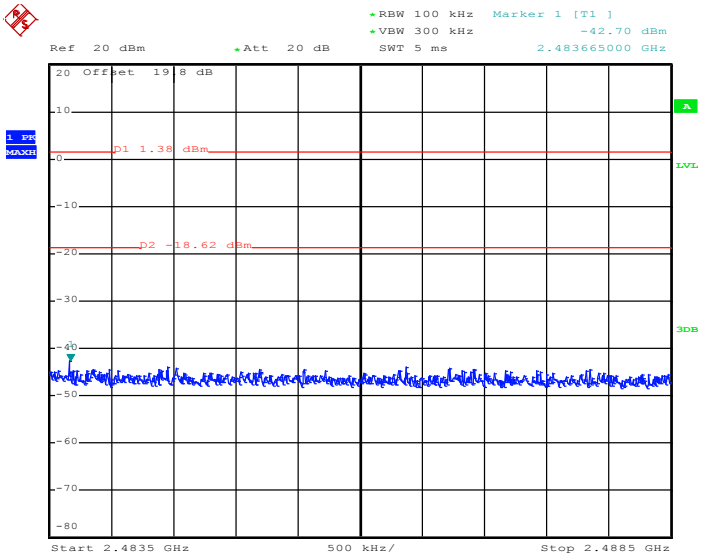
Test Mode :	<MIMO Ant 1>	Temperature :	24~26℃
Test Band :	2.4GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01



Date: 11.MAY.2012 11:11:53

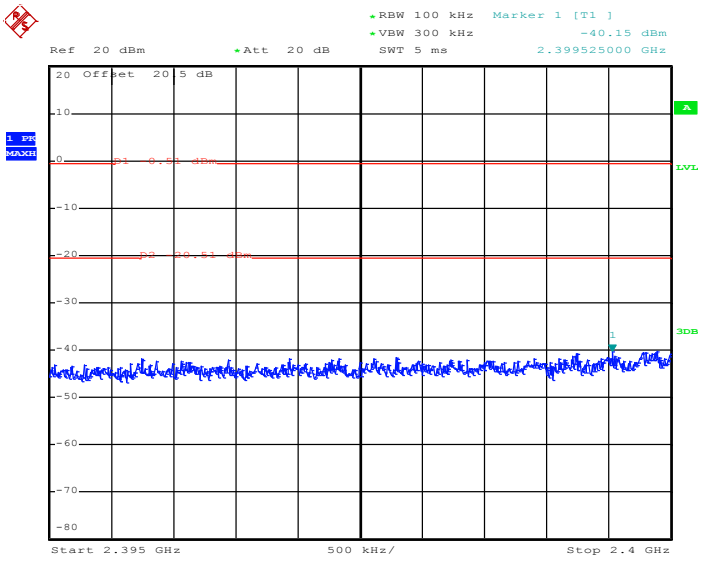
High Band Edge Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11



Date: 21.MAY.2012 10:03:22

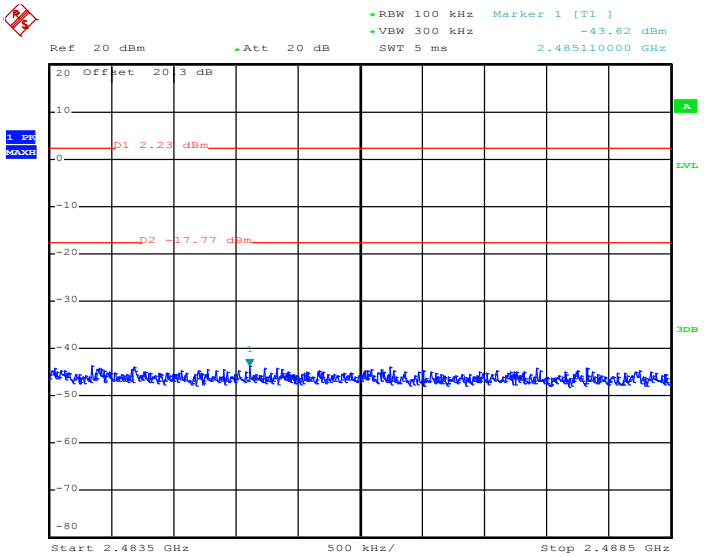
Test Mode :	<MIMO Ant 2>	**Temperature :**	24~26℃
Test Band :	2.4GHz 802.11n (BW 20MHz)	**Relative Humidity :**	50~53%
Test Channel :	01 and 11	**Test Engineer :**	Pinkston Tu

Low Band Edge Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01



Date: 11.MAY.2012 11:49:46

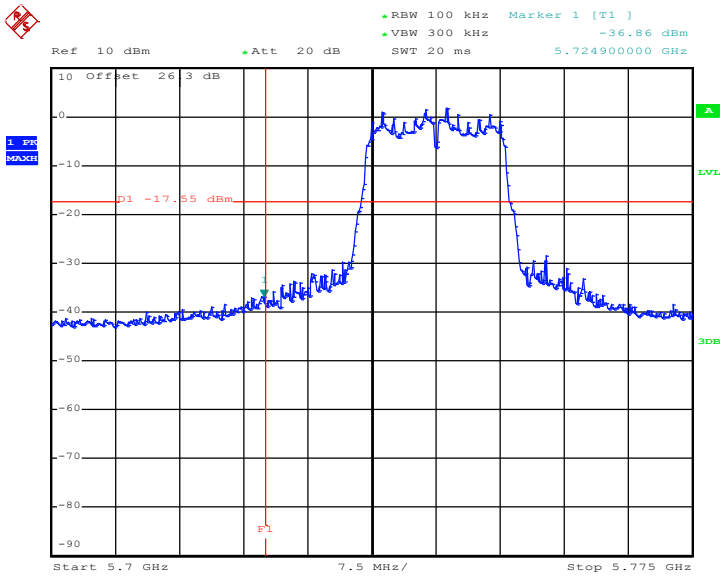
High Band Edge Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11



Date: 21.MAY.2012 10:07:24

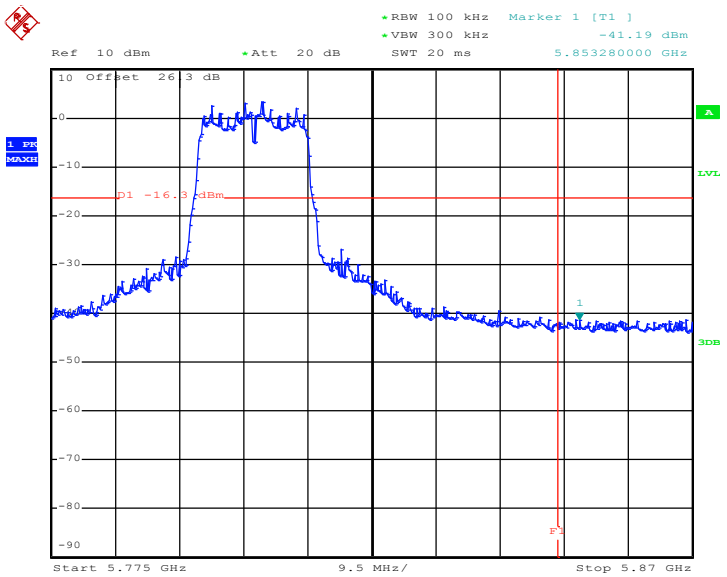
Test Mode :	<Legacy Ant 1>	Temperature :	24~26℃
Test Band :	802.11a	Relative Humidity :	50~53%
Test Channel :	149 and 161	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11a Channel 149



Date: 31.MAY.2012 03:47:51

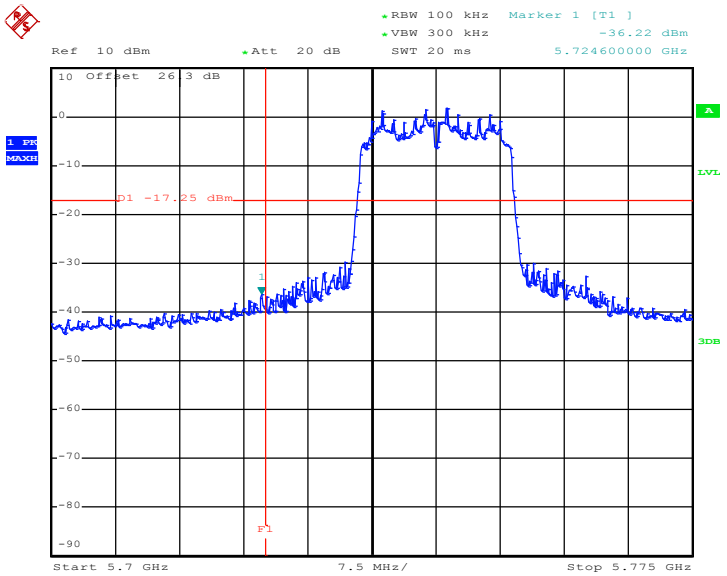
High Band Edge Plot on 802.11a Channel 161



Date: 31.MAY.2012 03:54:55

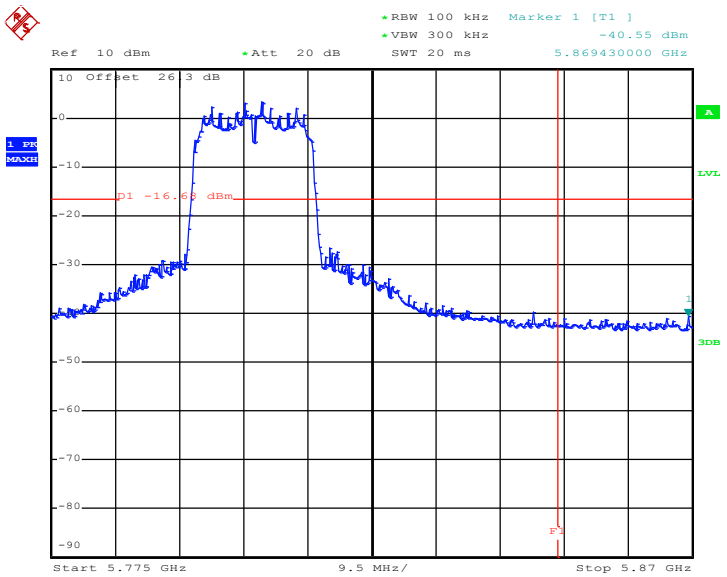
Test Mode :	<SISO Ant 1>	Temperature :	24~26℃
Test Band :	5GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	149 and 161	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 5GHz 802.11n (BW 20MHz) Channel 149



Date: 31.MAY.2012 03:46:19

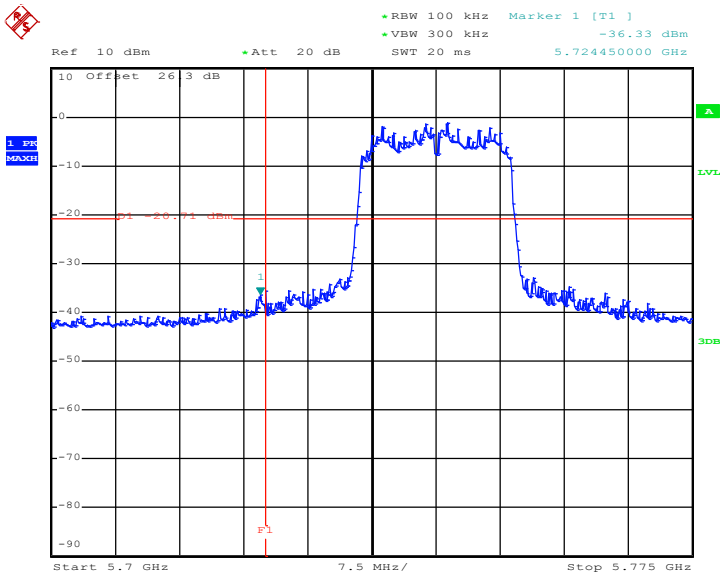
High Band Edge Plot on 5GHz 802.11n (BW 20MHz) Channel 161



Date: 31.MAY.2012 03:53:25

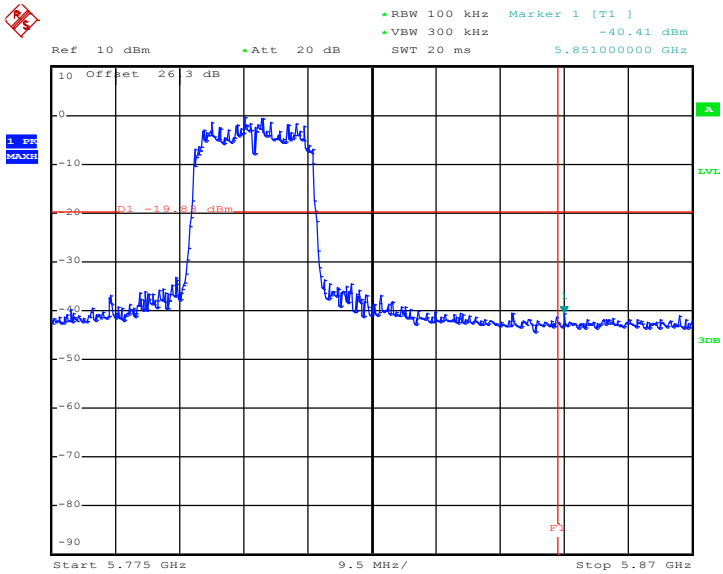
Test Mode :	<MIMO Ant 1>	Temperature :	24~26℃
Test Band :	5GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	149 and 161	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 5GHz 802.11n (BW 20MHz) Channel 149



Date: 31.MAY.2012 03:10:19

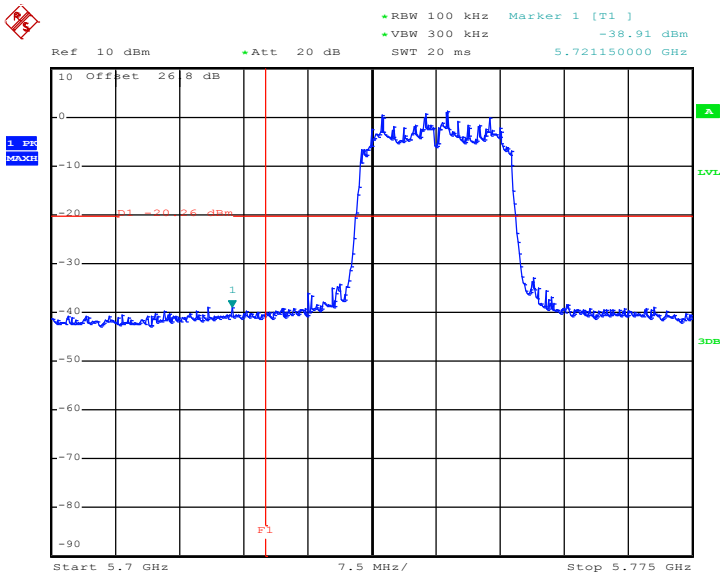
High Band Edge Plot on 5GHz 802.11n (BW 20MHz) Channel 161



Date: 31.MAY.2012 03:24:17

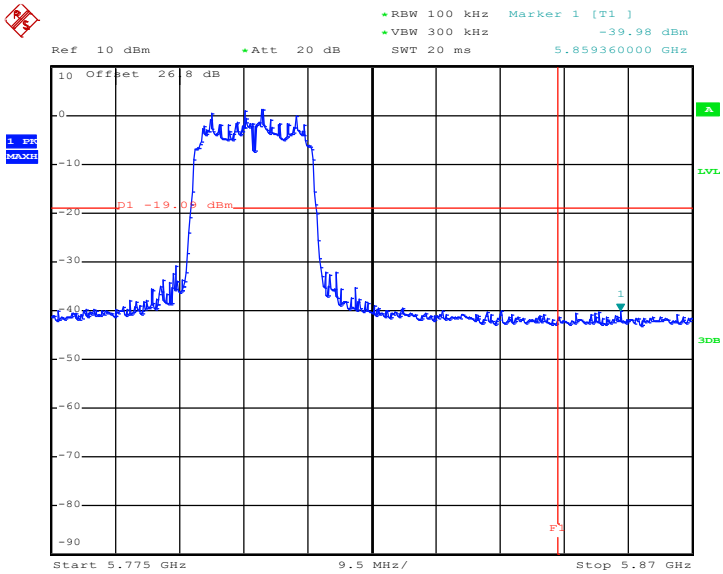
Test Mode :	<MIMO Ant 2>	Temperature :	24~26℃
Test Band :	5GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	149 and 161	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 5GHz 802.11n (BW 20MHz) Channel 149



Date: 31.MAY.2012 03:38:28

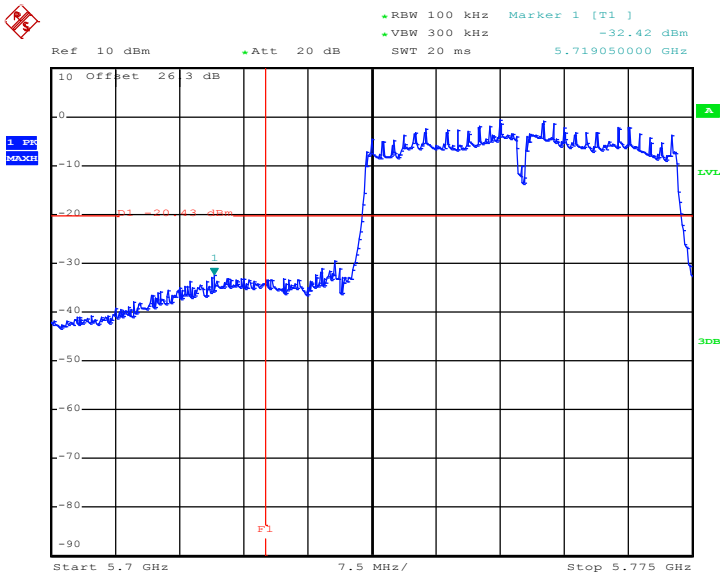
High Band Edge Plot on 5GHz 802.11n (BW 20MHz) Channel 161



Date: 31.MAY.2012 03:36:15

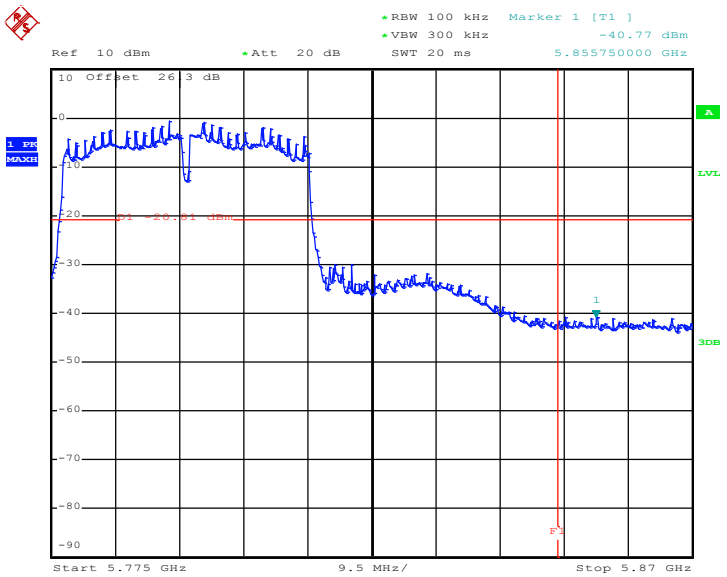
Test Mode :	<SISO Ant 1>	Temperature :	24~26℃
Test Band :	5GHz 802.11n (BW 40MHz)	Relative Humidity :	50~53%
Test Channel :	151 and 159	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 5GHz 802.11n (BW 40MHz) Channel 151



Date: 31.MAY.2012 03:49:14

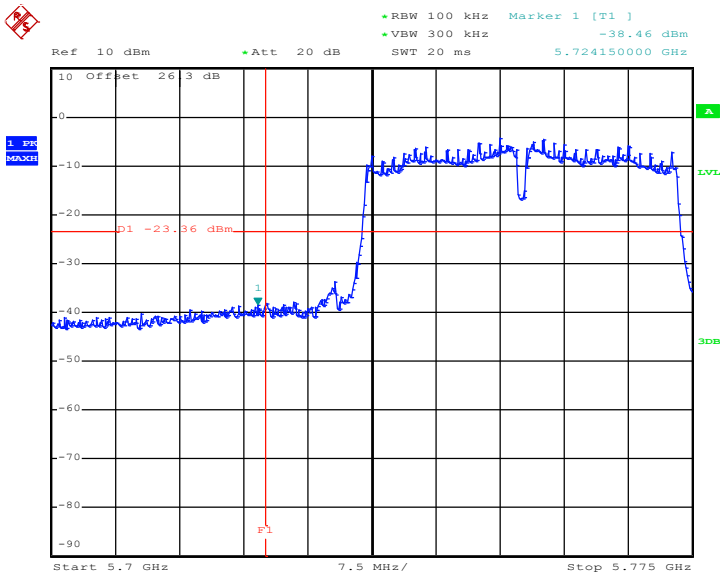
High Band Edge Plot on 5GHz 802.11n (BW 40MHz) Channel 159



Date: 31.MAY.2012 03:51:05

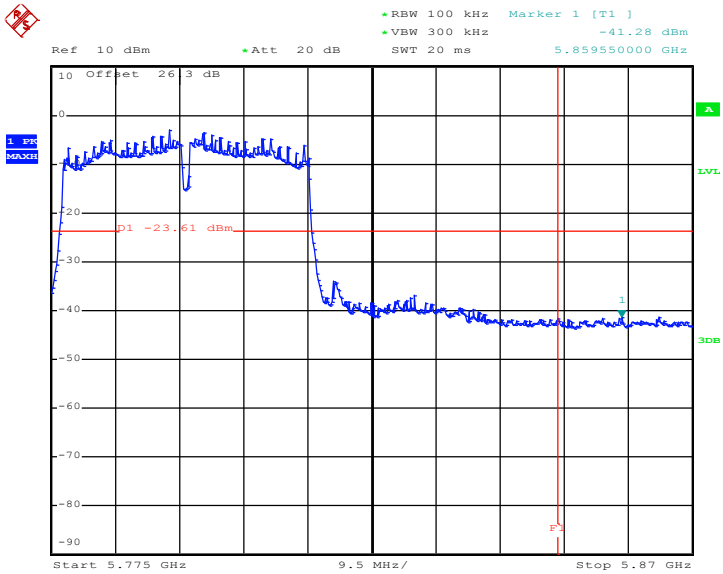
Test Mode :	<MIMO Ant 1>	**Temperature :**	24~26℃
Test Band :	5GHz 802.11n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	151 and 159	**Test Engineer :**	Pinkston Tu

Low Band Edge Plot on 5GHz 802.11n (BW 40MHz) Channel 151



Date: 31.MAY.2012 03:29:18

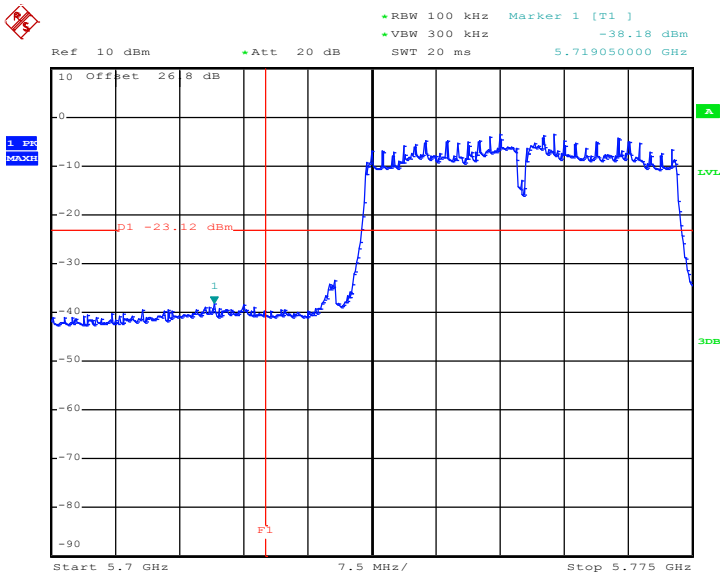
High Band Edge Plot on 5GHz 802.11n (BW 40MHz) Channel 159



Date: 31.MAY.2012 03:26:11

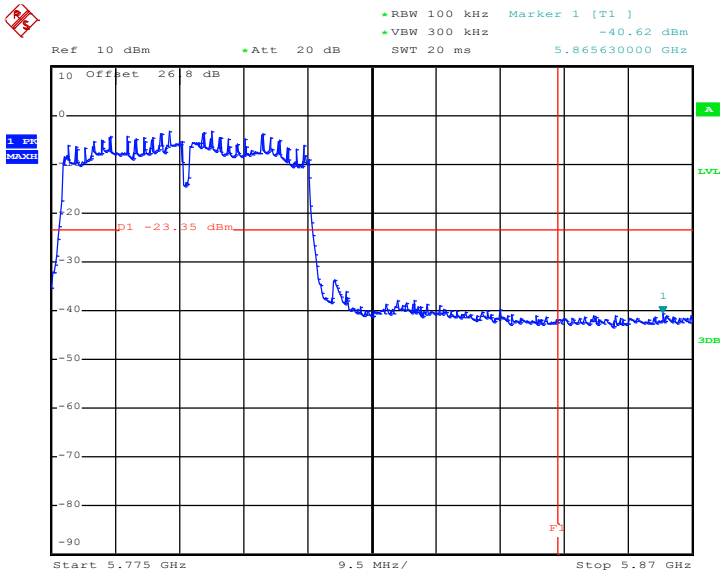
Test Mode :	<MIMO Ant 2>	**Temperature :**	24~26℃
Test Band :	5GHz 802.11n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	151 and 159	**Test Engineer :**	Pinkston Tu

Low Band Edge Plot on 5GHz 802.11n (BW 40MHz) Channel 151



Date: 31.MAY.2012 03:32:00

High Band Edge Plot on 5GHz 802.11n (BW 40MHz) Channel 159



Date: 31.MAY.2012 03:34:04

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

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

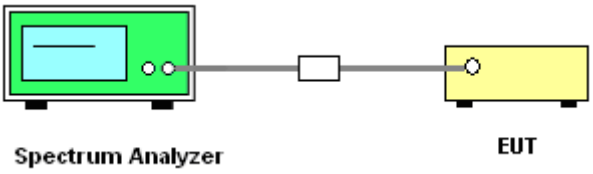
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

1. The testing follows the guidelines in the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01 and ANSI C63.4-2003
2. 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.

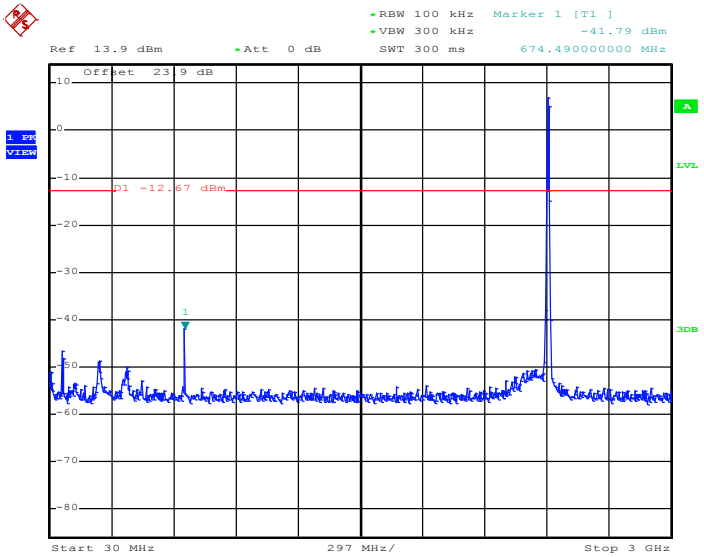
3.4.4 Test Setup



3.4.5 Test Result of Spurious Emission

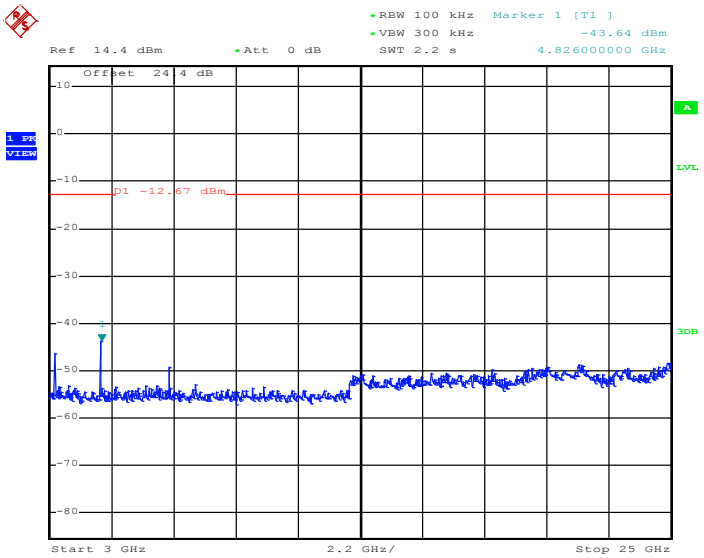
Test Mode :	<Legacy Ant 1>	**Temperature :**	24~26℃
Test Band :	802.11b	**Relative Humidity :**	50~53%
Test Channel :	01, 06, 11	**Test Engineer :**	Pinkston Tu

Conducted Spurious Emission Plot on 802.11b CH01 between 30 MHz~3 GHz



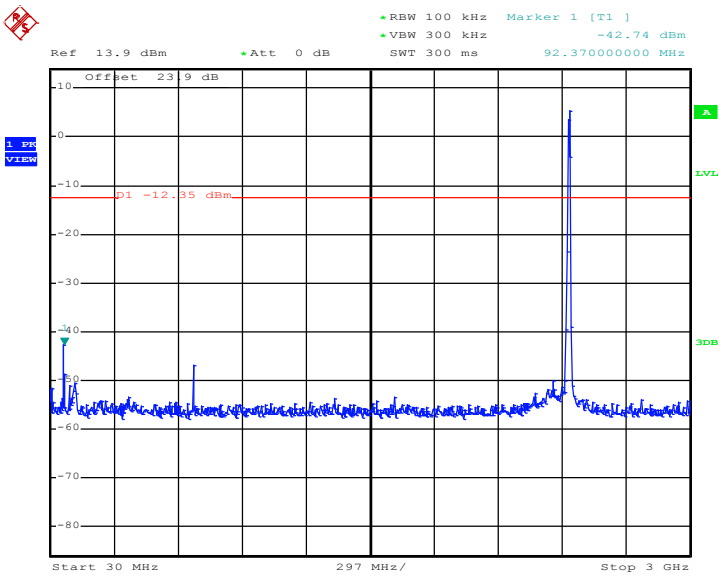
Date: 30.MAY.2012 22:33:40

Conducted Spurious Emission Plot on 802.11b CH01 between 3 GHz~25 GHz



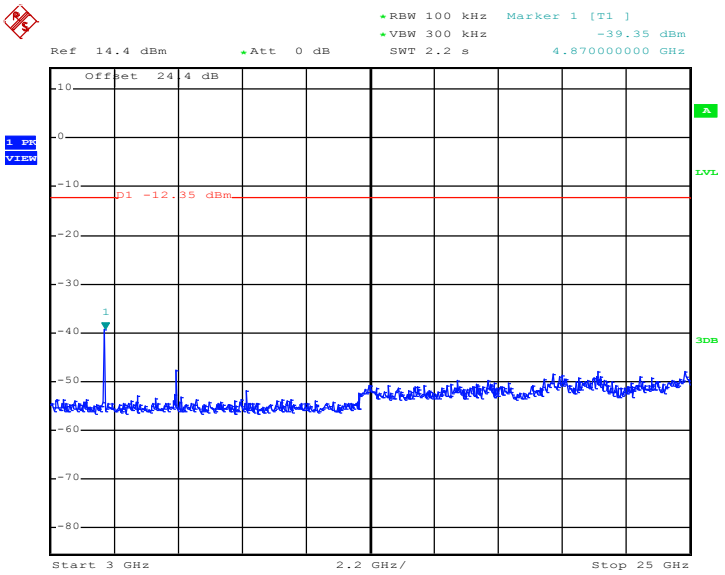
Date: 30.MAY.2012 22:33:58

Conducted Spurious Emission Plot on 802.11b CH06 between 30 MHz~3 GHz



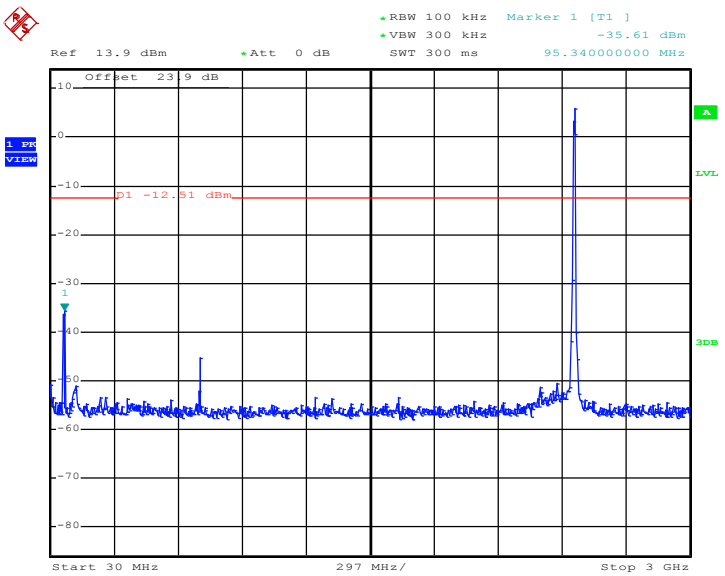
Date: 31.MAY.2012 02:04:16

Conducted Spurious Emission Plot on 802.11b CH06 between 3 GHz~25 GHz



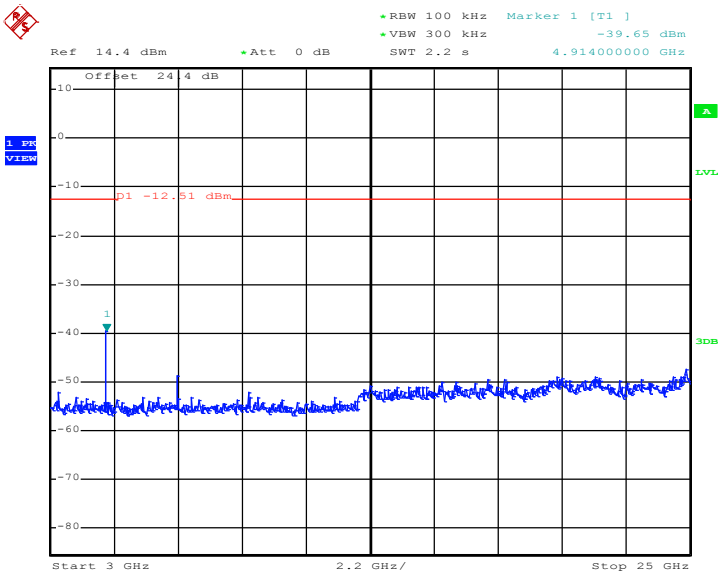
Date: 31.MAY.2012 02:04:34

Conducted Spurious Emission Plot on 802.11b CH11 between 30 MHz~3 GHz



Date: 31.MAY.2012 02:05:17

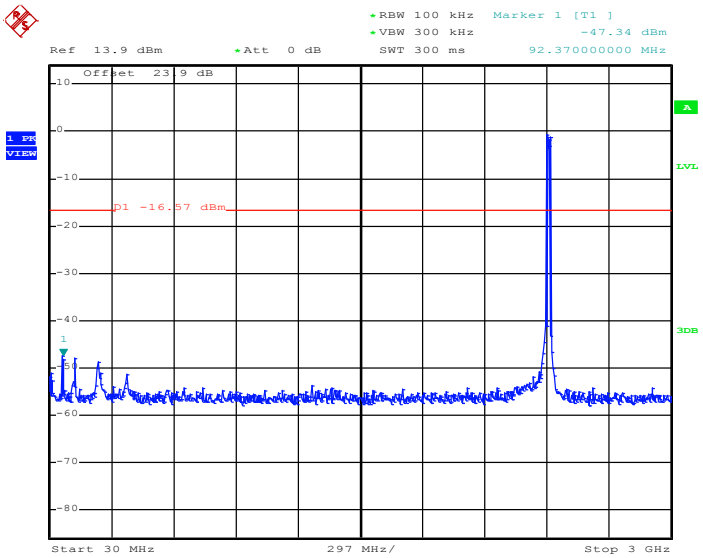
Conducted Spurious Emission Plot on 802.11b CH11 between 3 GHz~25 GHz



Date: 31.MAY.2012 02:05:35

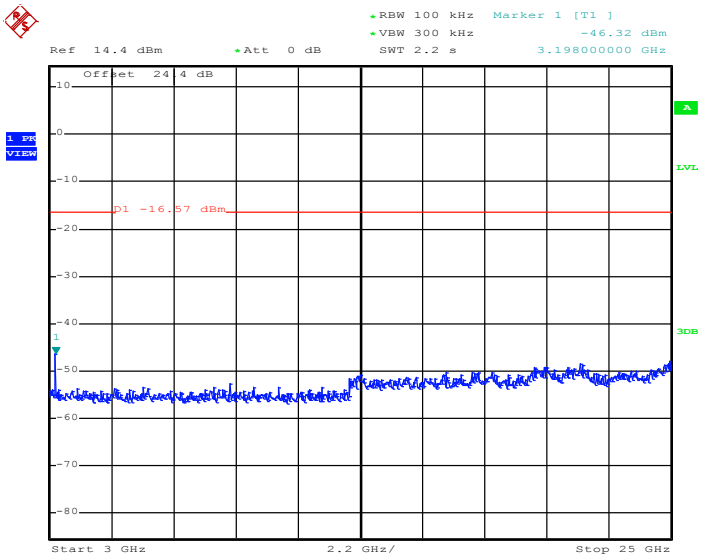
Test Mode :	<Legacy Ant 1>	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot on 802.11g CH01 between 30 MHz~3 GHz



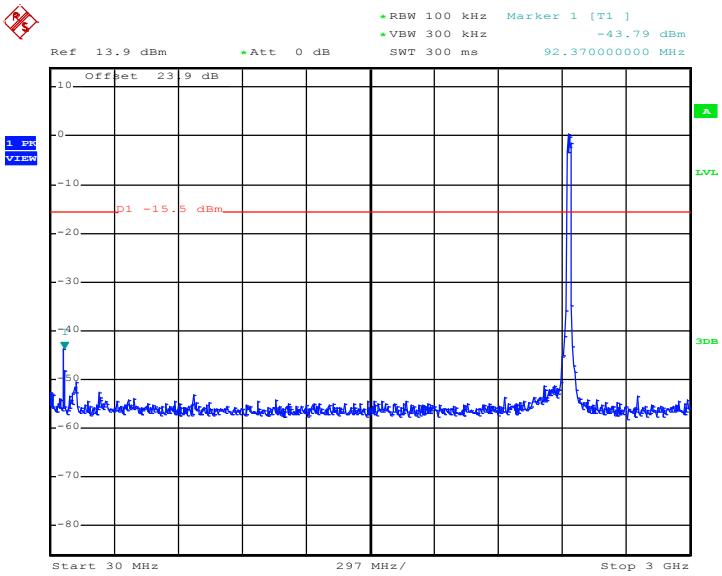
Date: 30.MAY.2012 22:52:50

Conducted Spurious Emission Plot on 802.11g CH01 between 3 GHz~25 GHz



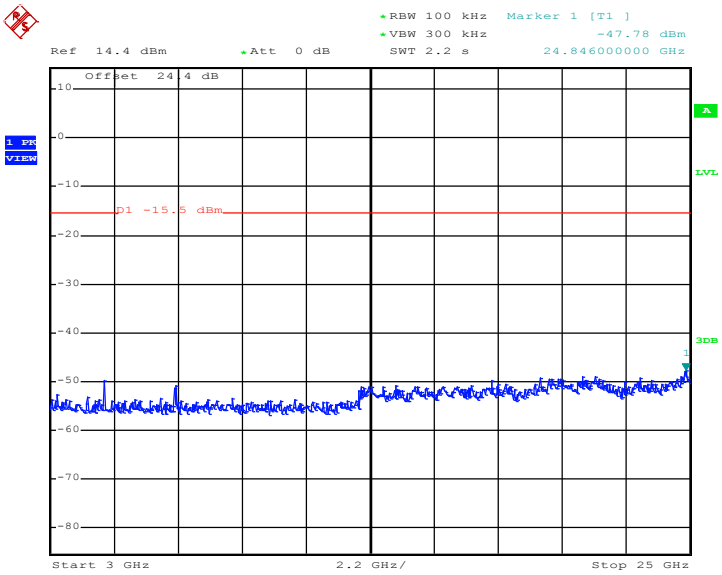
Date: 30.MAY.2012 22:53:08

Conducted Spurious Emission Plot on 802.11g CH06 between 30 MHz~3 GHz



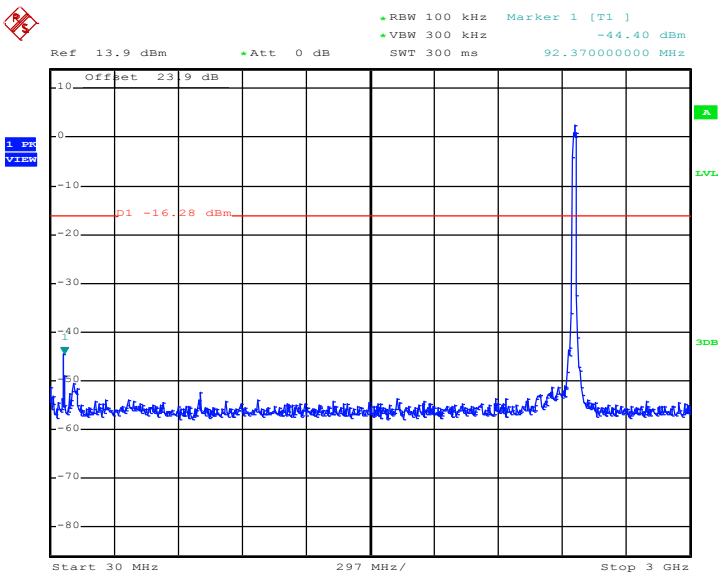
Date: 31.MAY.2012 02:08:45

Conducted Spurious Emission Plot on 802.11g CH06 between 3 GHz~25 GHz



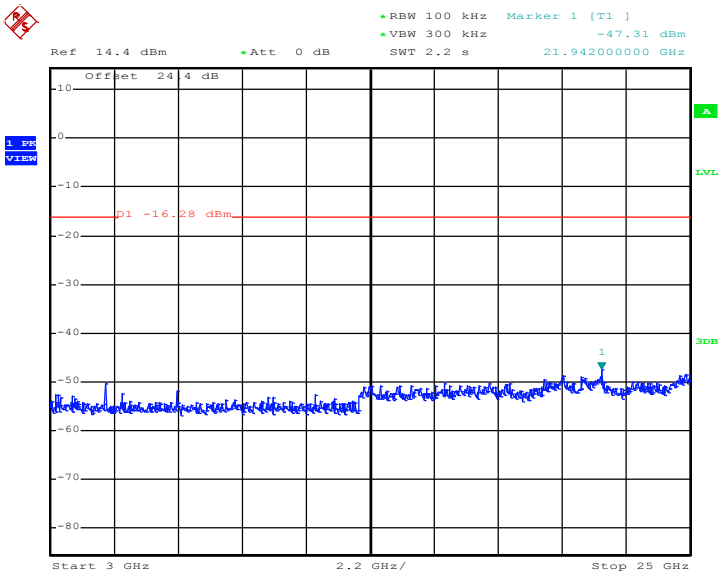
Date: 31.MAY.2012 02:09:04

Conducted Spurious Emission Plot on 802.11g CH11 between 30 MHz~3 GHz



Date: 31.MAY.2012 02:07:42

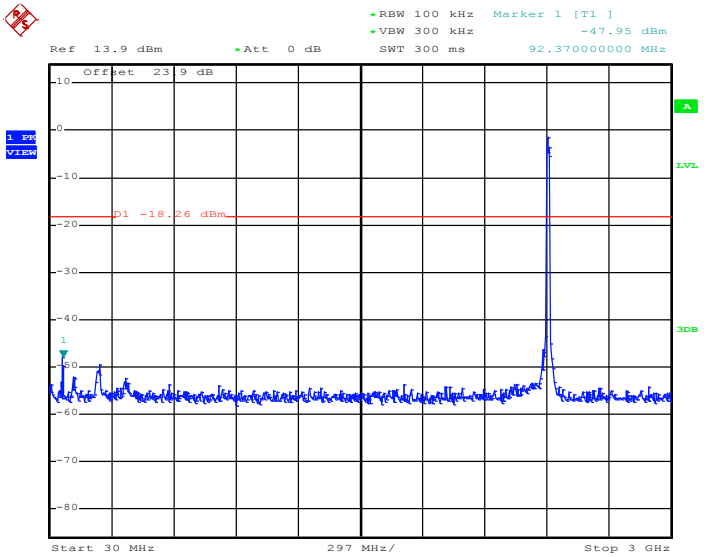
Conducted Spurious Emission Plot on 802.11g CH11 between 3 GHz~25 GHz



Date: 31.MAY.2012 02:08:01

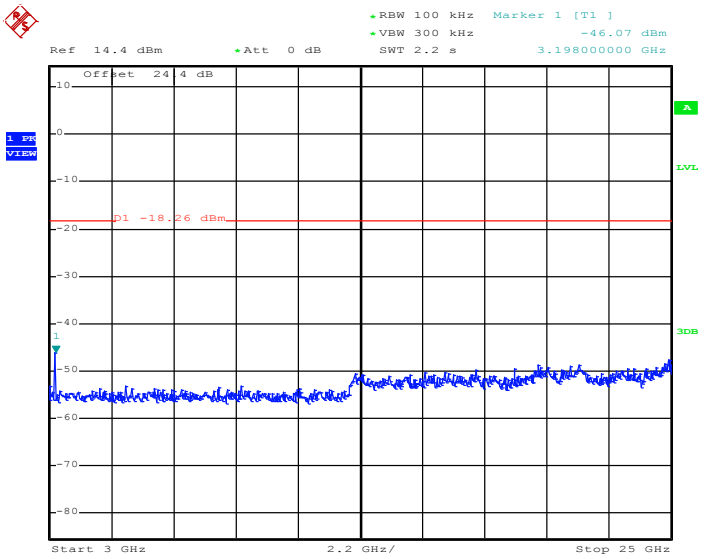
Test Mode :	<SISO Ant 1>	Temperature :	24~26℃
Test Band :	2.4GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH01 between 30 MHz~3 GHz



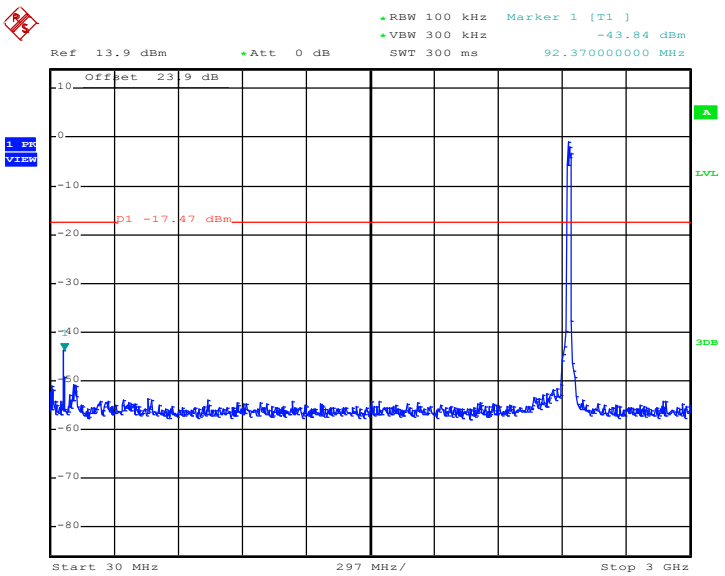
Date: 30.MAY.2012 22:58:58

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH01 between 3 GHz~25 GHz



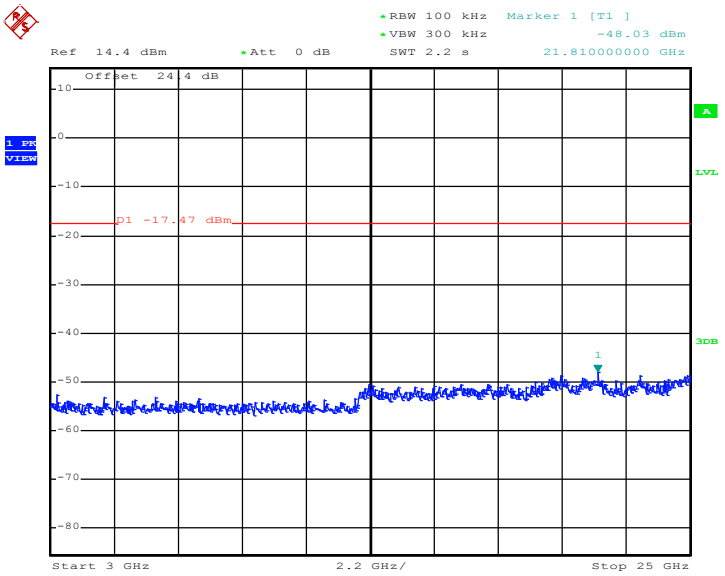
Date: 30.MAY.2012 22:59:16

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH06 between 30 MHz~3 GHz



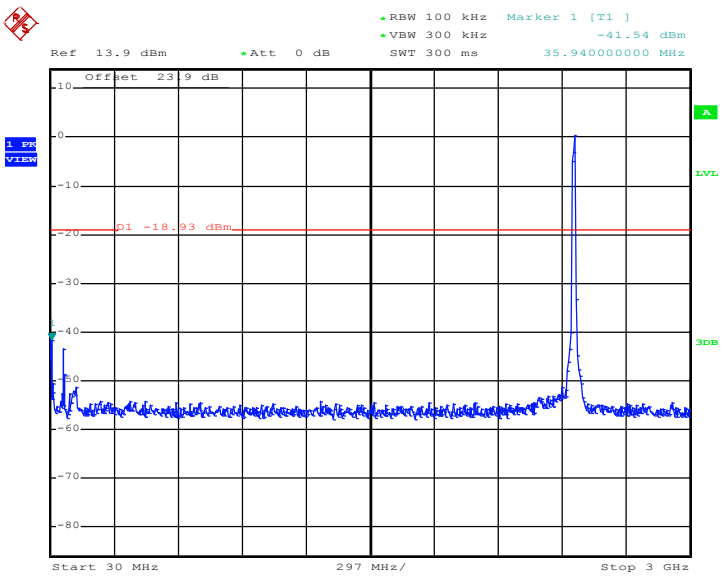
Date: 31.MAY.2012 02:11:52

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH06 between 3 GHz~25 GHz



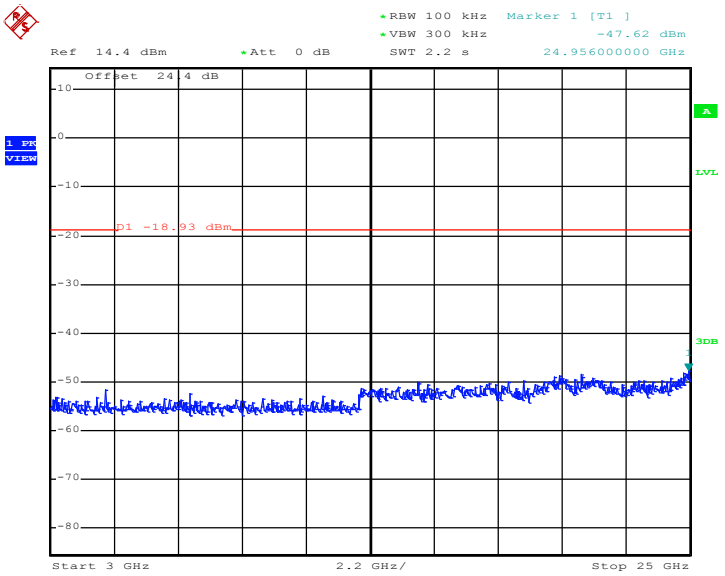
Date: 31.MAY.2012 02:12:12

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH11 between 30 MHz~3 GHz



Date: 31.MAY.2012 02:13:02

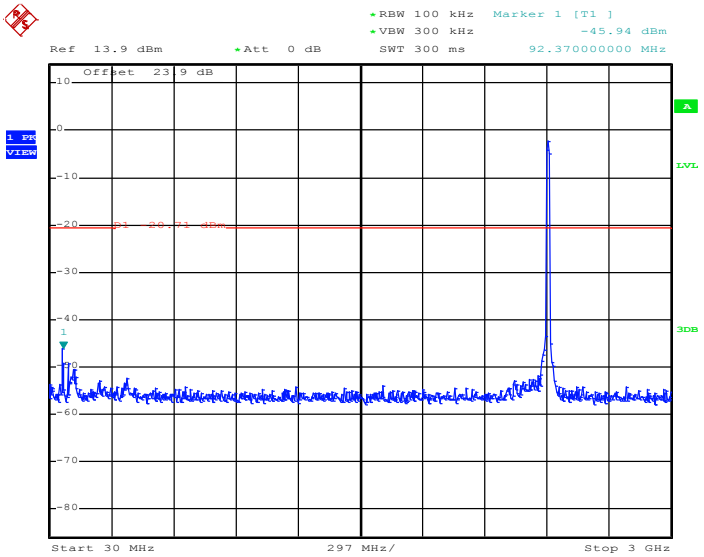
Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH11 between 3 GHz~25 GHz



Date: 31.MAY.2012 02:13:23

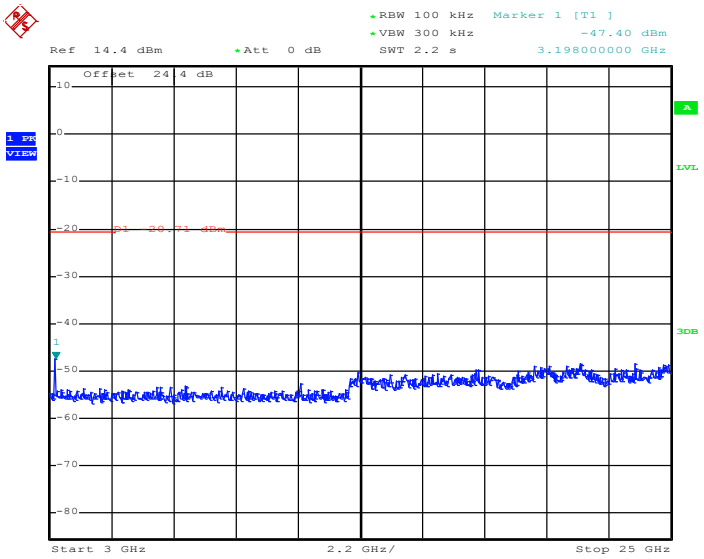
Test Mode :	<MIMO Ant 1>	Temperature :	24~26℃
Test Band :	2.4GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH01 between 30 MHz~3 GHz



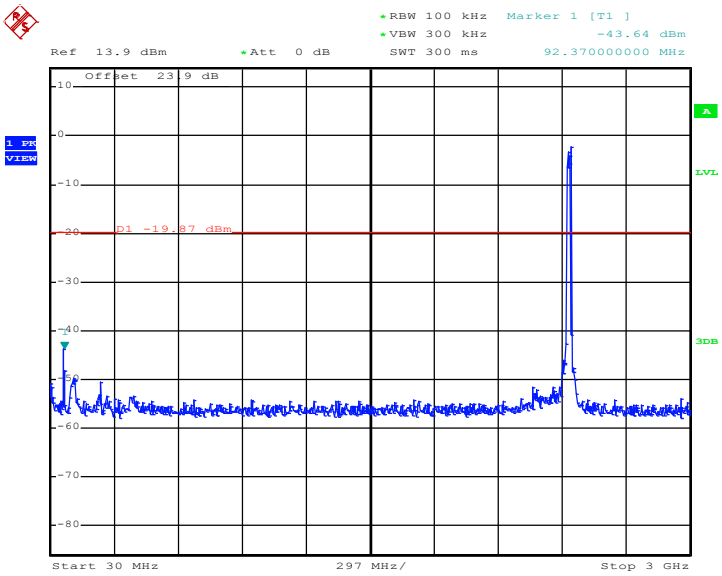
Date: 31.MAY.2012 01:09:37

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH01 between 3 GHz~25 GHz



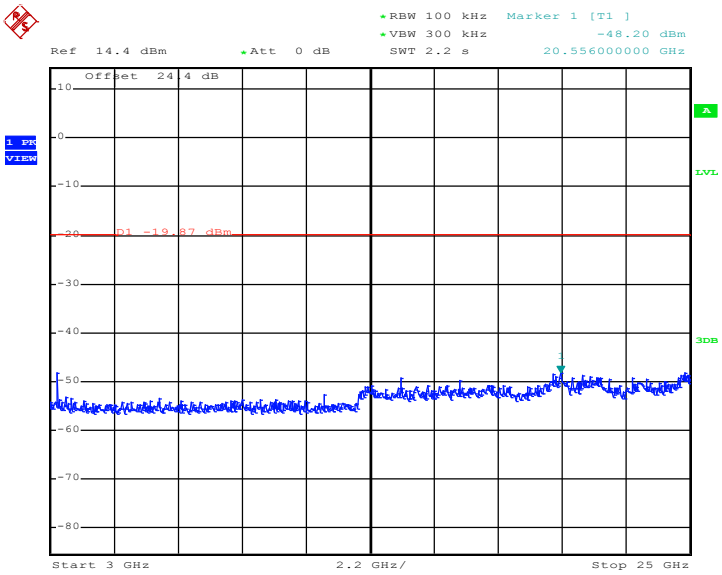
Date: 31.MAY.2012 01:09:56

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH06 between 30 MHz~3 GHz



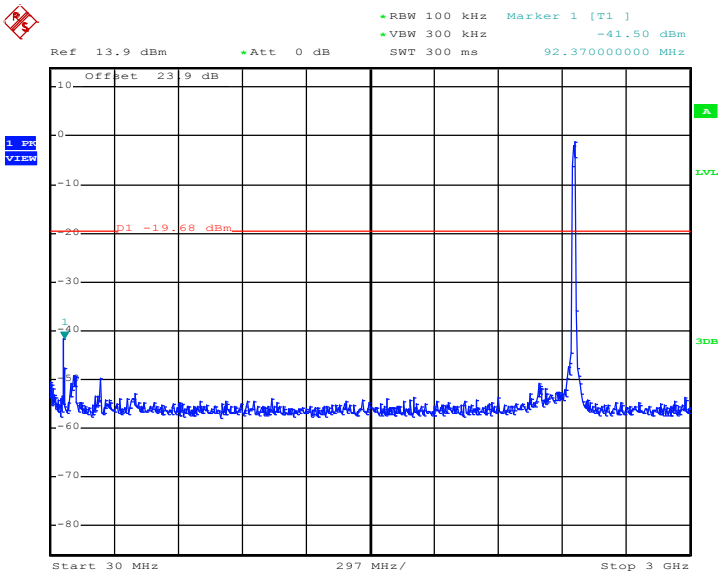
Date: 31.MAY.2012 02:22:21

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH06 between 3 GHz~25 GHz



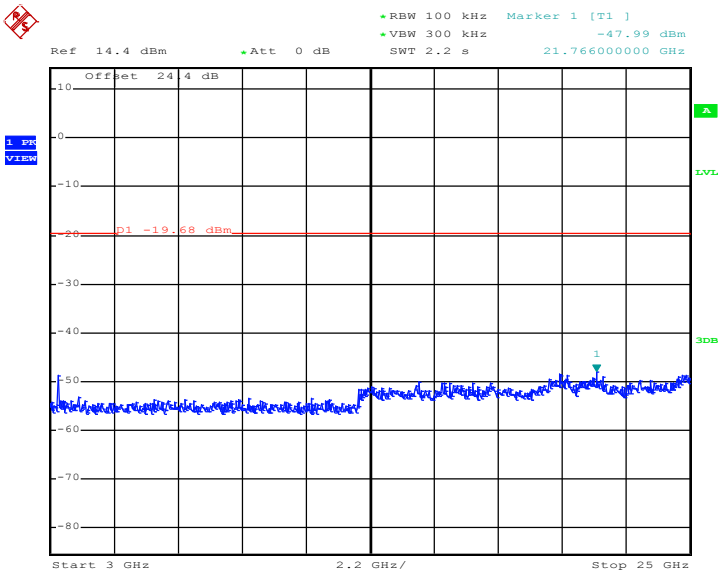
Date: 31.MAY.2012 02:22:39

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH11 between 30 MHz~3 GHz



Date: 31.MAY.2012 02:19:30

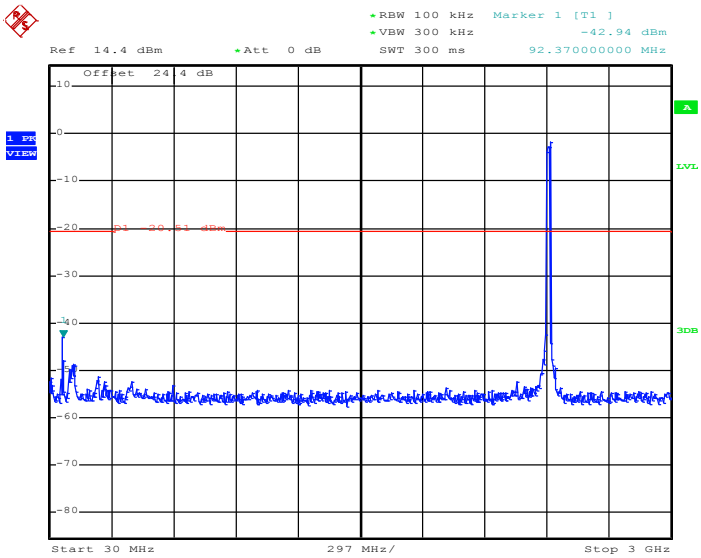
Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH11 between 3 GHz~25 GHz



Date: 31.MAY.2012 02:19:49

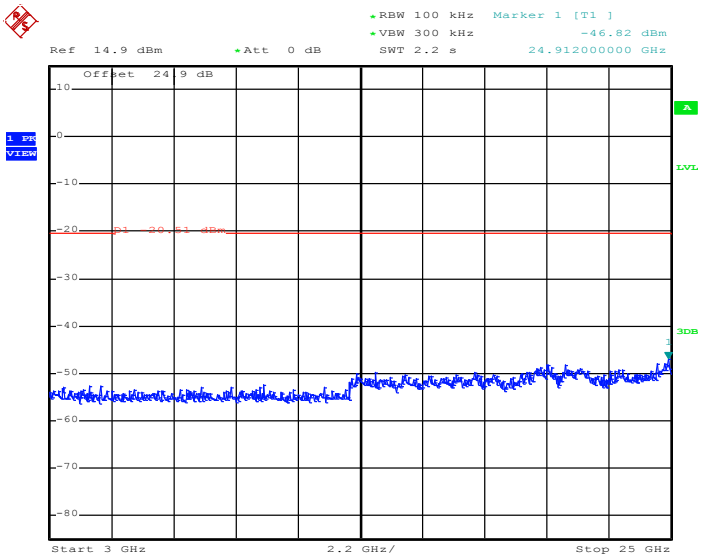
Test Mode :	<MIMO Ant 2>	Temperature :	24~26℃
Test Band :	2.4GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01, 06, 11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH01 between 30 MHz~3 GHz



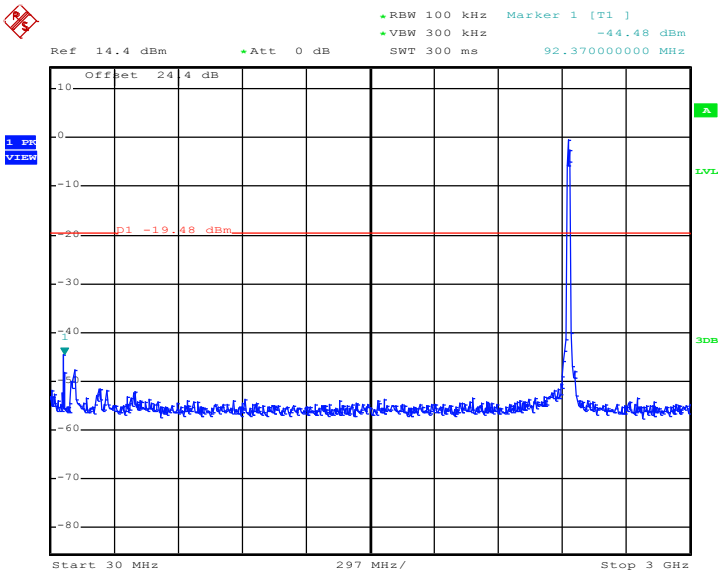
Date: 31.MAY.2012 02:26:42

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH01 between 3 GHz~25 GHz



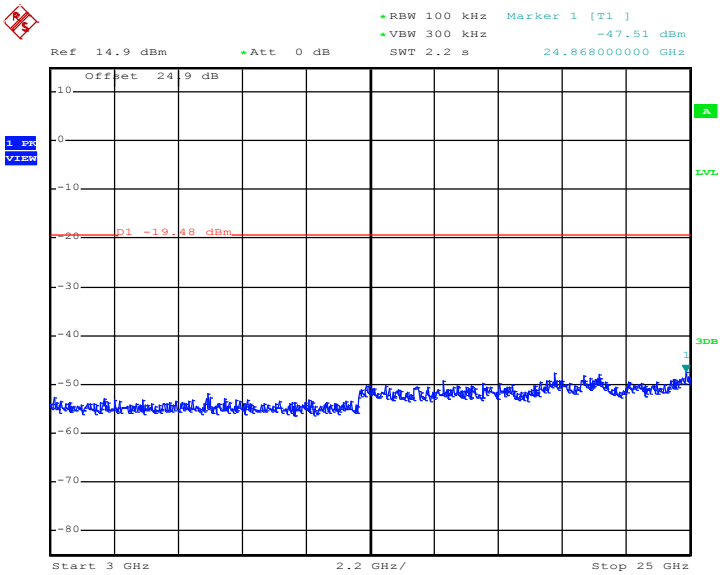
Date: 31.MAY.2012 02:27:02

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH06 between 30 MHz~3 GHz



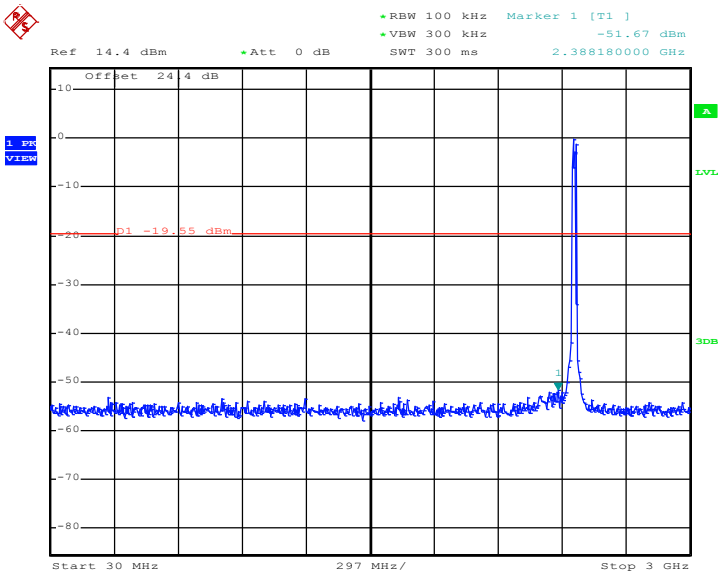
Date: 31.MAY.2012 02:24:03

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH06 between 3 GHz~25 GHz



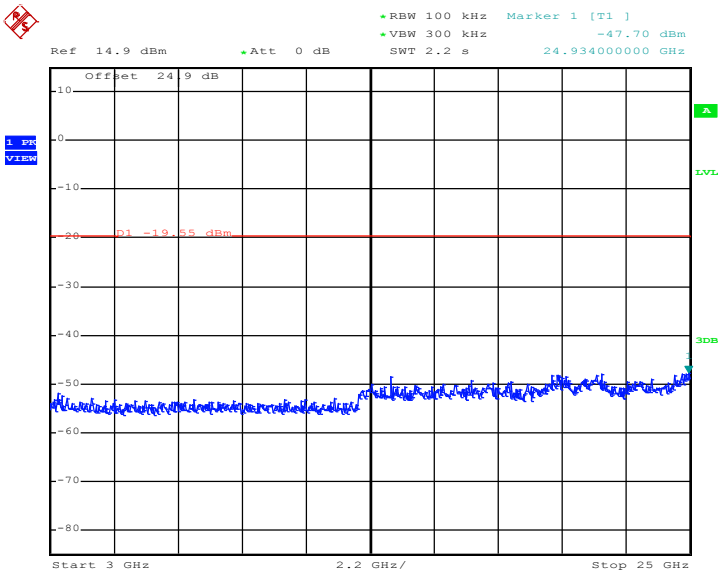
Date: 31.MAY.2012 02:24:21

Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH11 between 30 MHz~3 GHz



Date: 31.MAY.2012 04:57:25

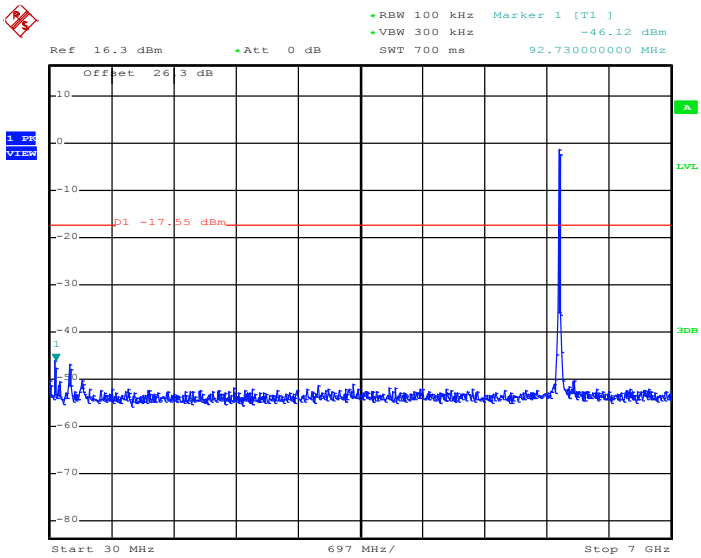
Conducted Spurious Emission Plot on 2.4GHz 802.11 n (BW 20MHz) CH11 between 3 GHz~25 GHz



Date: 31.MAY.2012 04:57:44

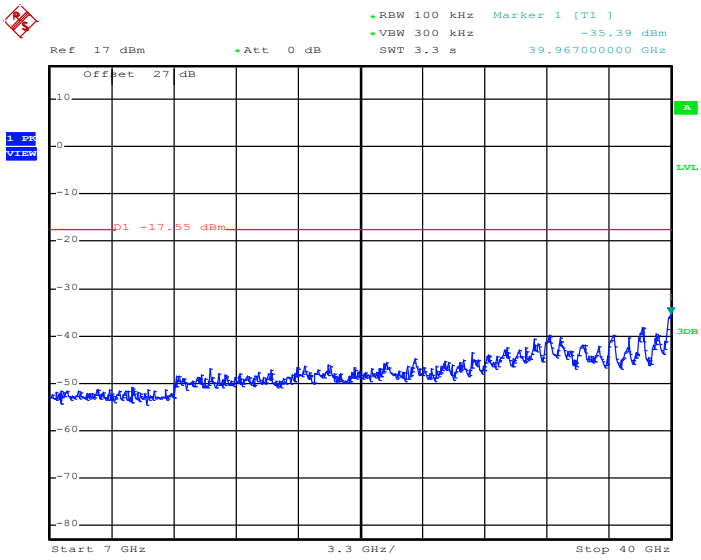
Test Mode :	<Legacy Ant 1>	Temperature :	24~26℃
Test Band :	802.11a	Relative Humidity :	50~53%
Test Channel :	149, 157, 161	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot on 802.11a CH149 between 30 MHz~3 GHz



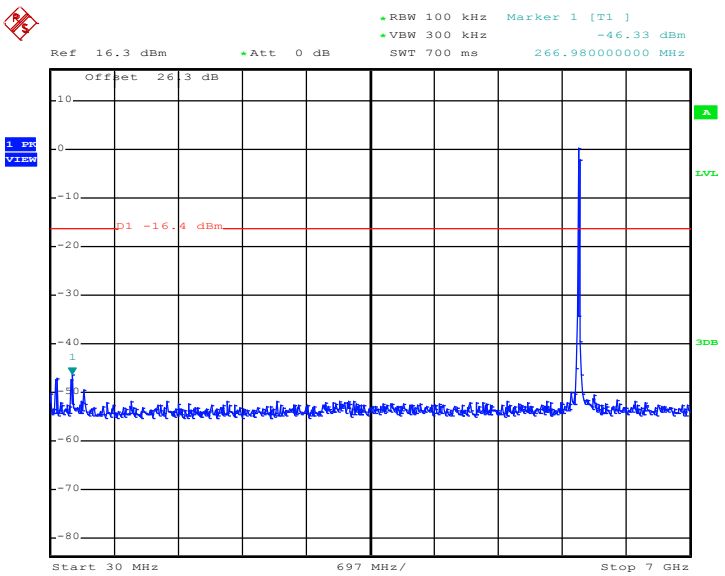
Date: 30.MAY.2012 23:10:10

Conducted Spurious Emission Plot on 802.11a CH149 between 3 GHz~25 GHz



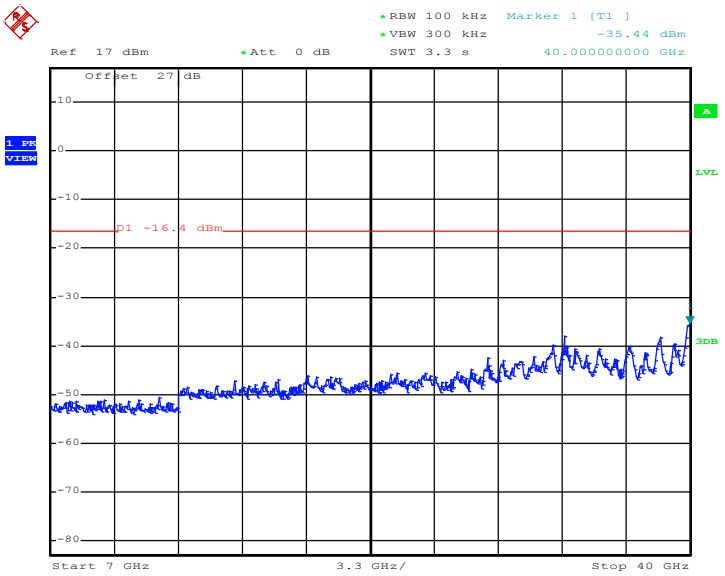
Date: 30.MAY.2012 23:10:29

Conducted Spurious Emission Plot on 802.11a CH157 between 30 MHz~3 GHz



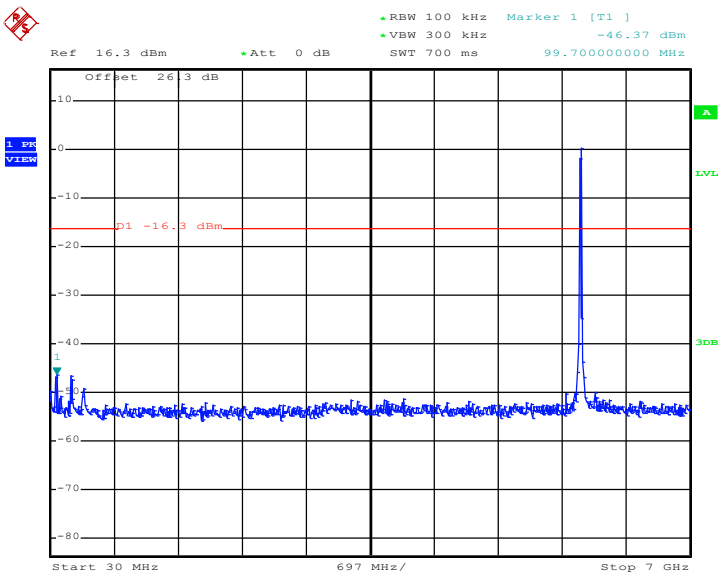
Date: 30.MAY.2012 23:11:22

Conducted Spurious Emission Plot on 802.11a CH157 between 3 GHz~25 GHz



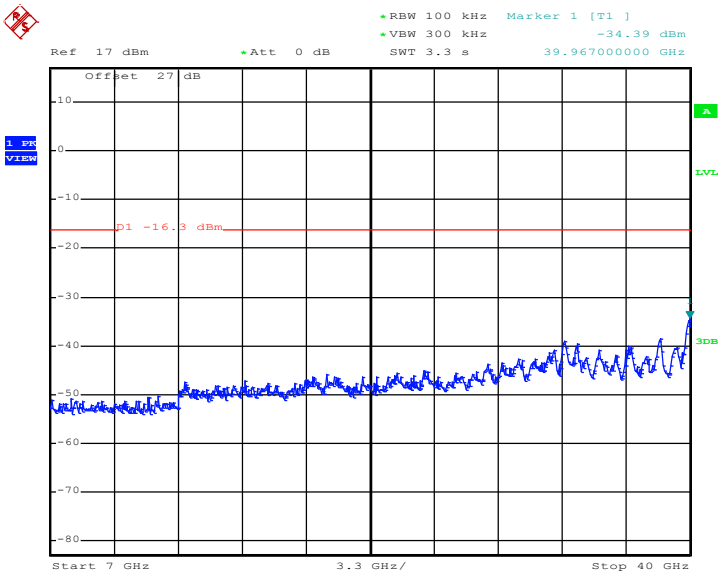
Date: 30.MAY.2012 23:11:40

Conducted Spurious Emission Plot on 802.11a CH161 between 30 MHz~3 GHz



Date: 30.MAY.2012 23:12:32

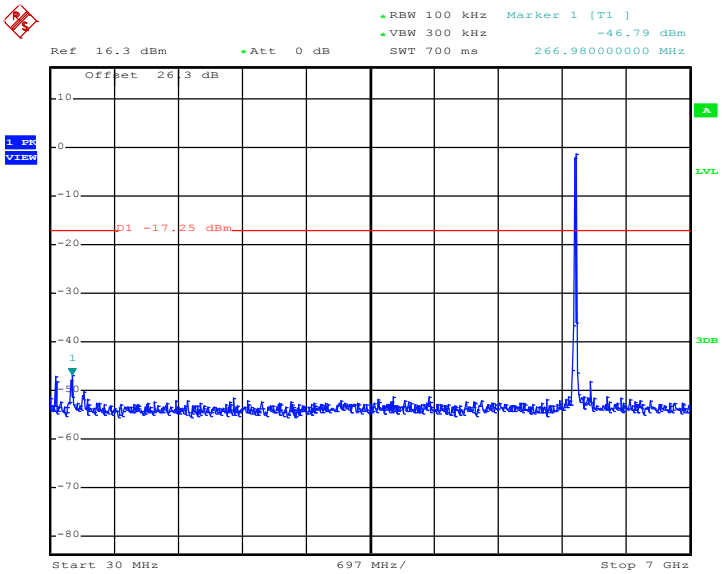
Conducted Spurious Emission Plot on 802.11a CH161 between 3 GHz~25 GHz



Date: 30.MAY.2012 23:12:50

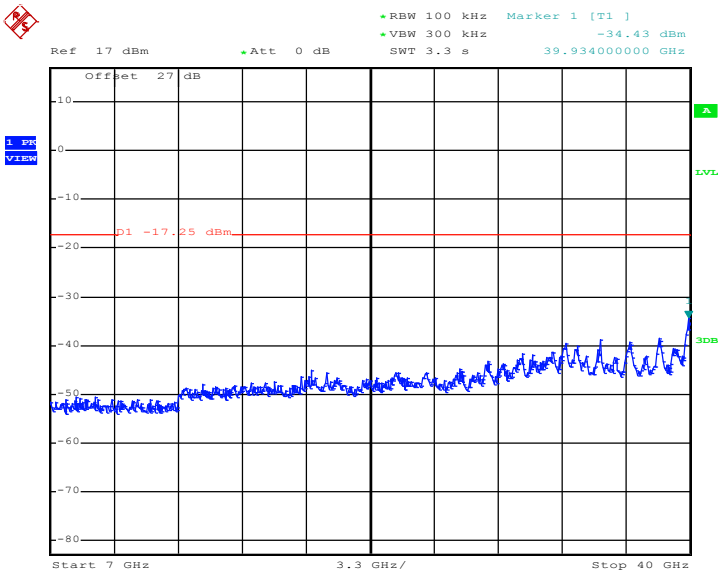
Test Mode :	<SISO Ant 1>	Temperature :	24~26℃
Test Band :	5GHz 802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	149, 157, 161	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH149 between 30 MHz~3 GHz



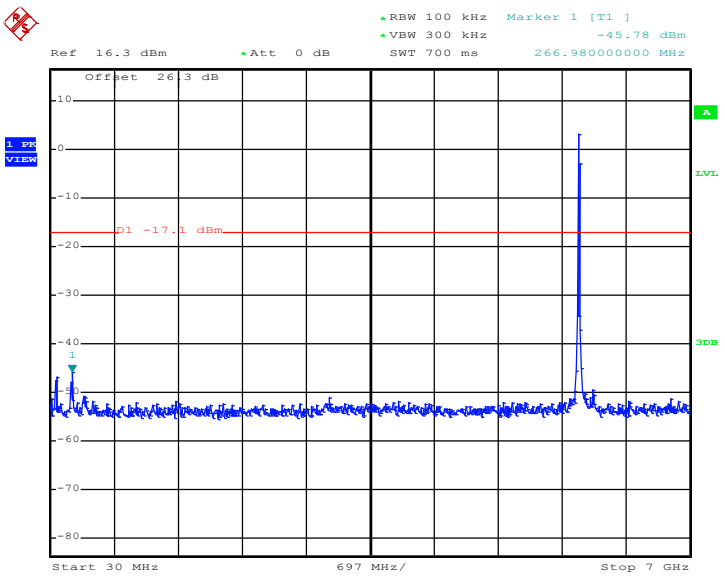
Date: 30.MAY.2012 23:15:23

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH149 between 3 GHz~25 GHz



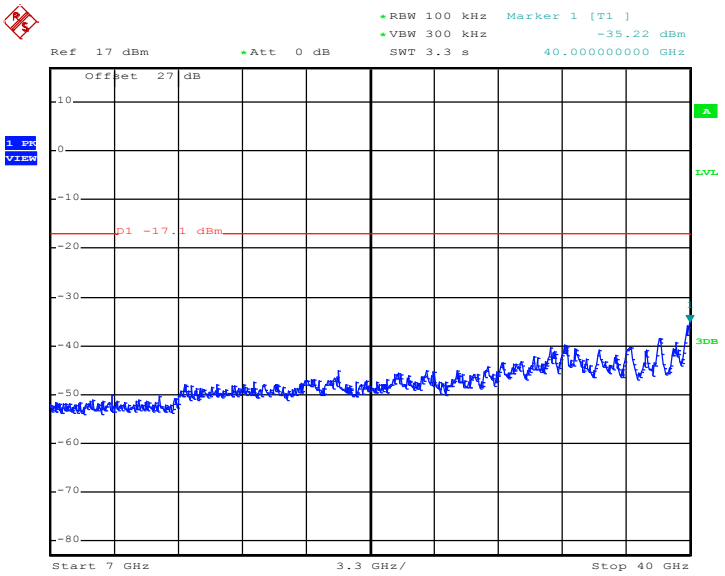
Date: 30.MAY.2012 23:15:42

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH157 between 30 MHz~3 GHz



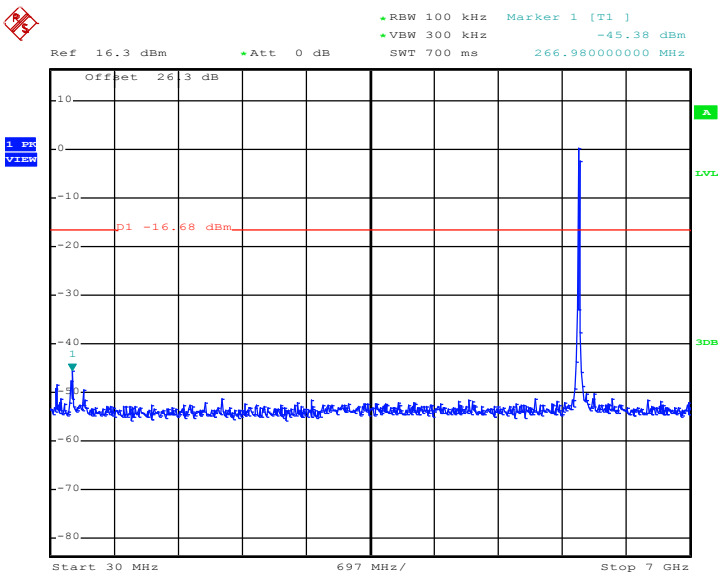
Date: 30.MAY.2012 23:16:38

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH157 between 3 GHz~25 GHz



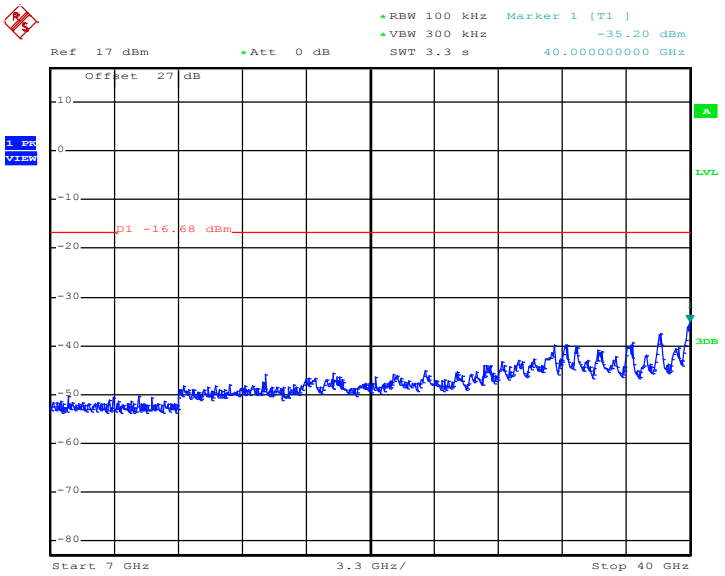
Date: 30.MAY.2012 23:16:57

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH161 between 30 MHz~3 GHz



Date: 30.MAY.2012 23:17:46

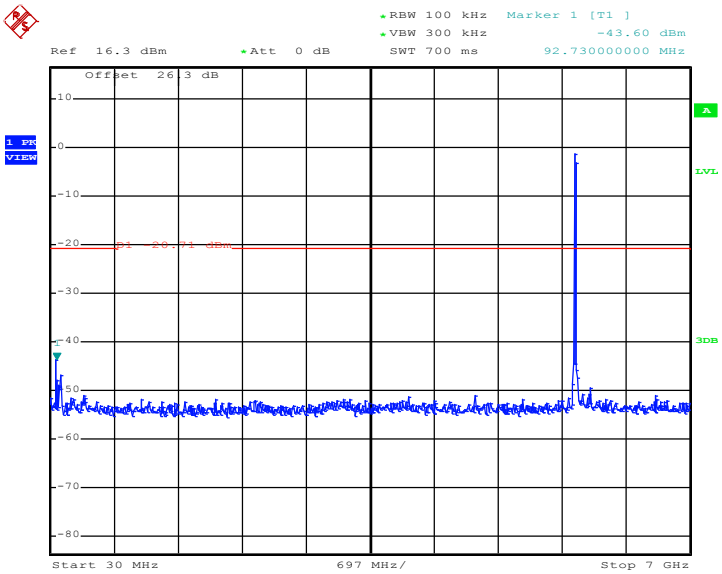
Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH161 between 3 GHz~25 GHz



Date: 30.MAY.2012 23:18:05

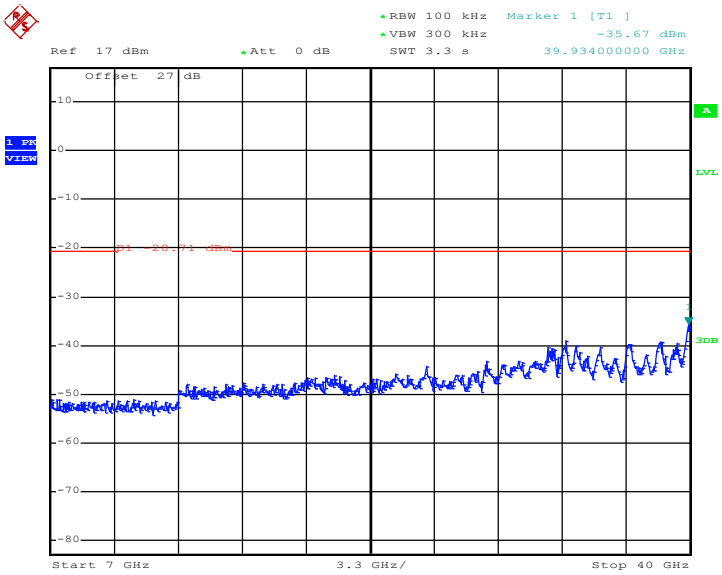
Test Mode :	<MIMO Ant 1>	**Temperature :**	24~26℃
Test Band :	5GHz 802.11n (BW 20MHz)	**Relative Humidity :**	50~53%
Test Channel :	149, 157, 161	**Test Engineer :**	Pinkston Tu

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH149 between 30 MHz~3 GHz



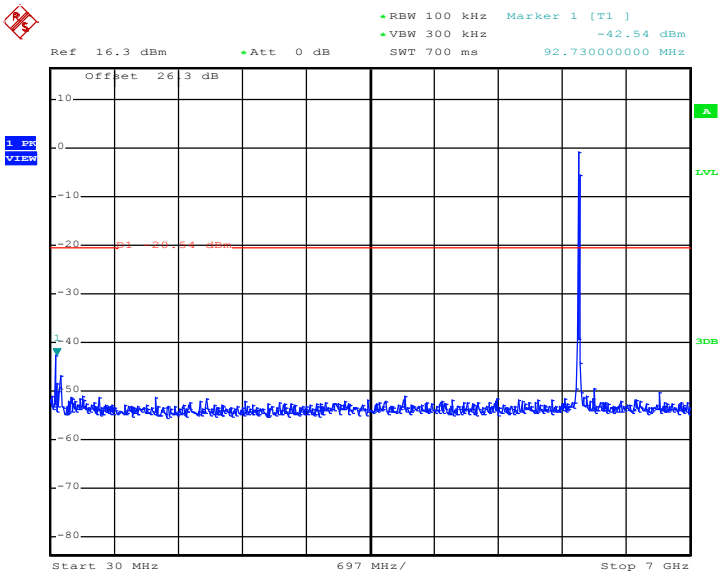
Date: 31.MAY.2012 00:48:38

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH149 between 3 GHz~25 GHz



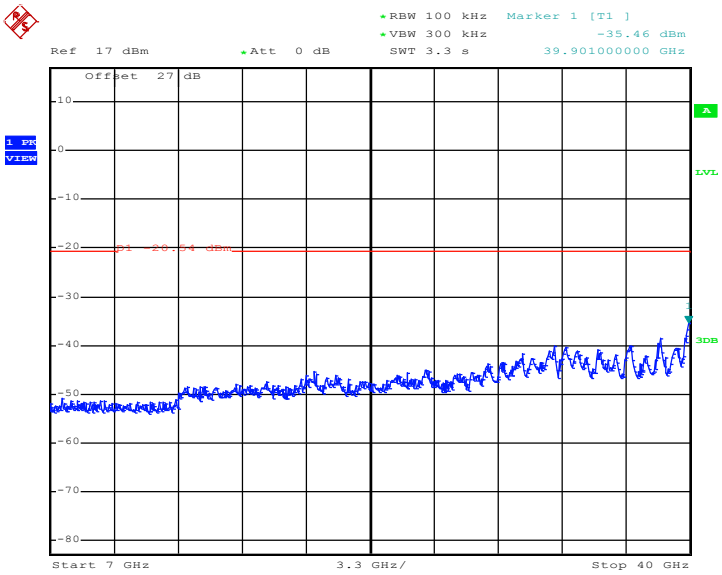
Date: 31.MAY.2012 00:48:59

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH157 between 30 MHz~3 GHz



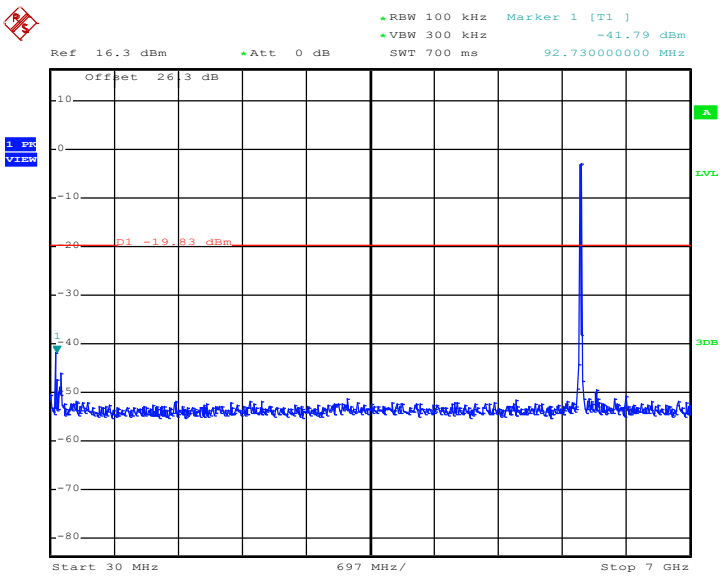
Date: 31.MAY.2012 00:49:54

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH157 between 3 GHz~25 GHz



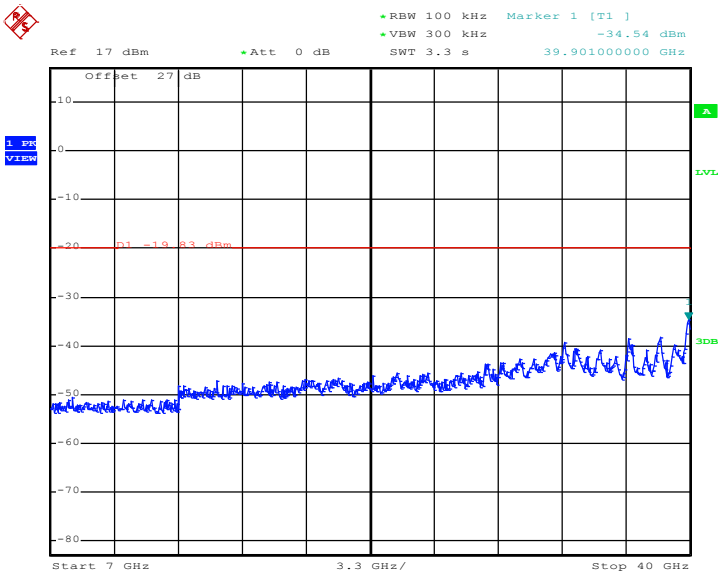
Date: 31.MAY.2012 00:50:13

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH161 between 30 MHz~3 GHz



Date: 31.MAY.2012 00:51:06

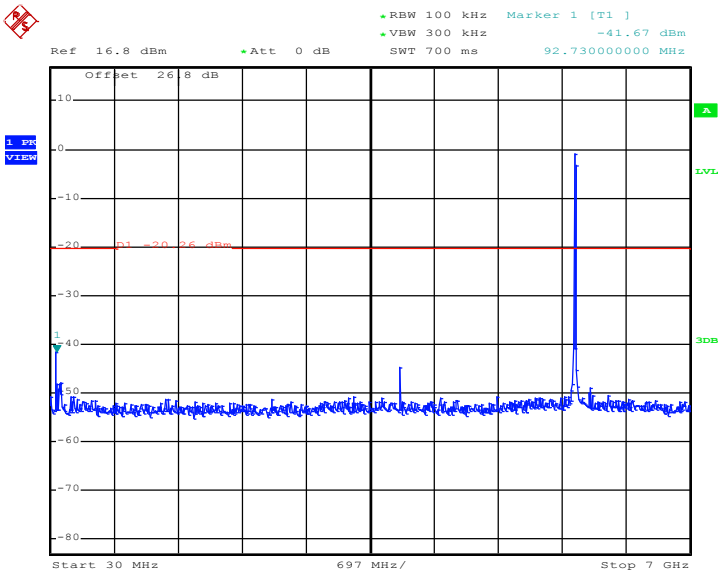
Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH161 between 3 GHz~25 GHz



Date: 31.MAY.2012 00:51:25

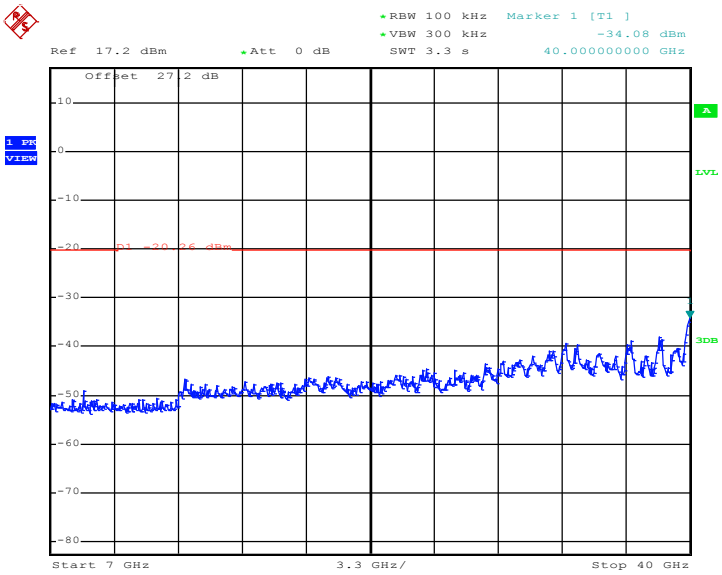
Test Mode :	<MIMO Ant 2>	**Temperature :**	24~26℃
Test Band :	5GHz 802.11n (BW 20MHz)	**Relative Humidity :**	50~53%
Test Channel :	149, 157, 161	**Test Engineer :**	Pinkston Tu

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH149 between 30 MHz~3 GHz



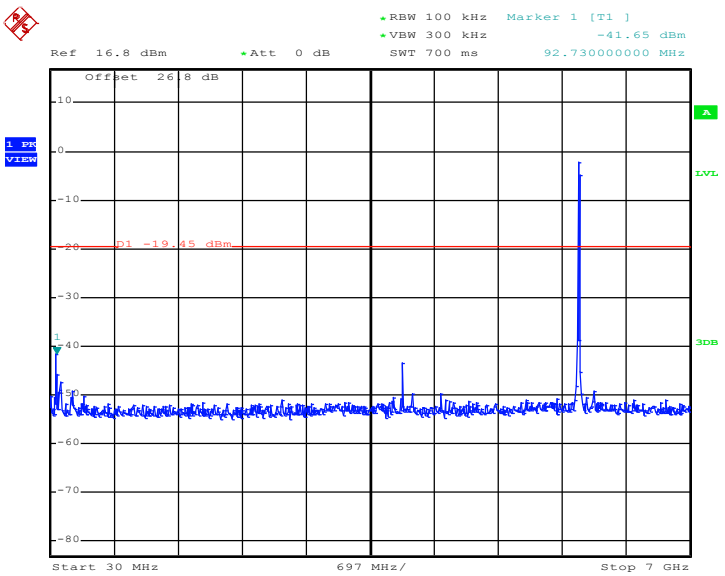
Date: 31.MAY.2012 00:56:57

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH149 between 3 GHz~25 GHz



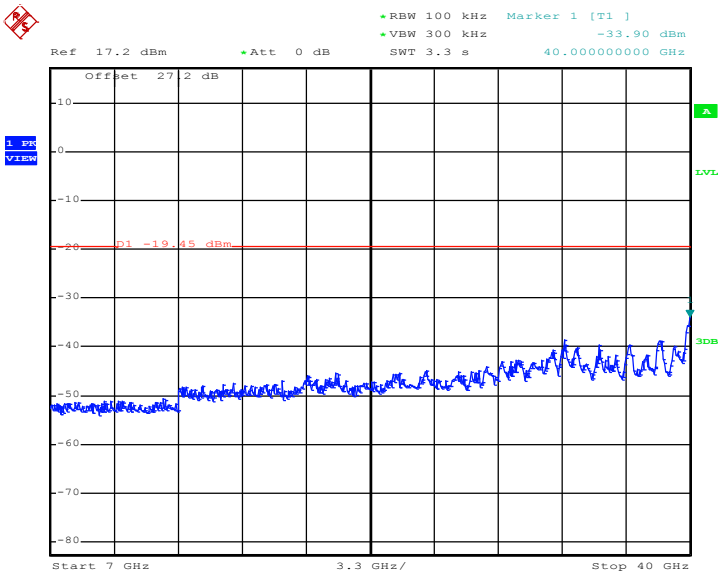
Date: 31.MAY.2012 00:57:15

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH157 between 30 MHz~3 GHz



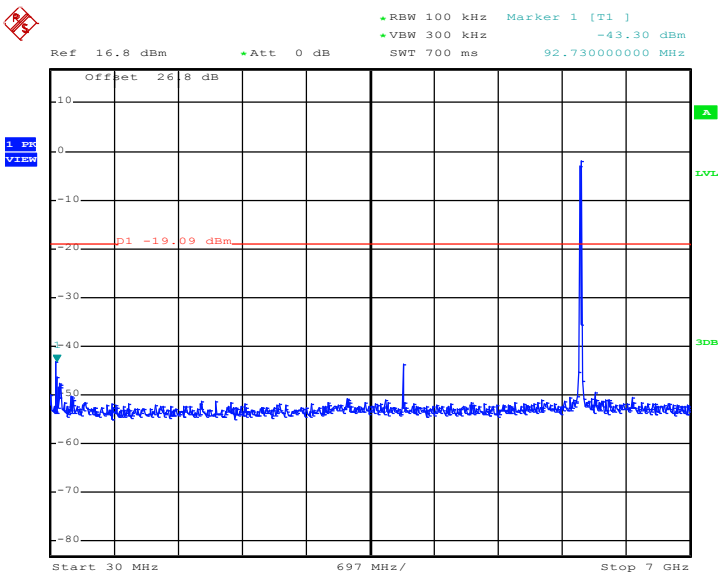
Date: 31.MAY.2012 00:55:48

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH157 between 3 GHz~25 GHz



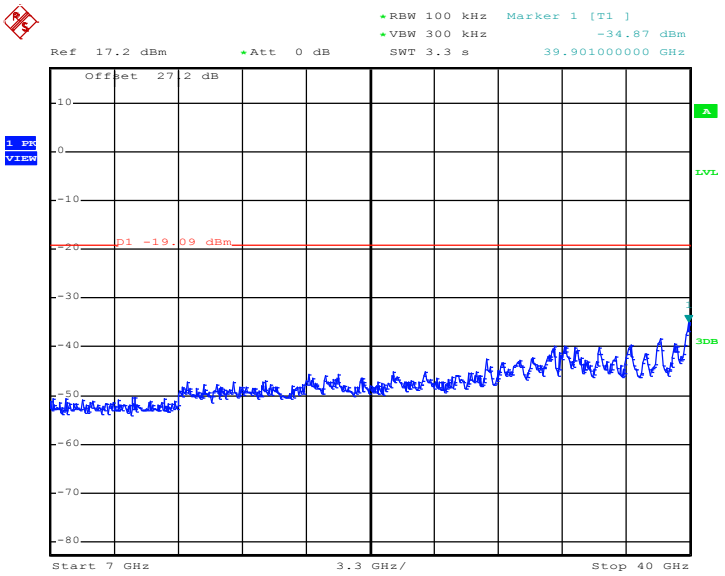
Date: 31.MAY.2012 00:56:08

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH161 between 30 MHz~3 GHz



Date: 31.MAY.2012 00:54:13

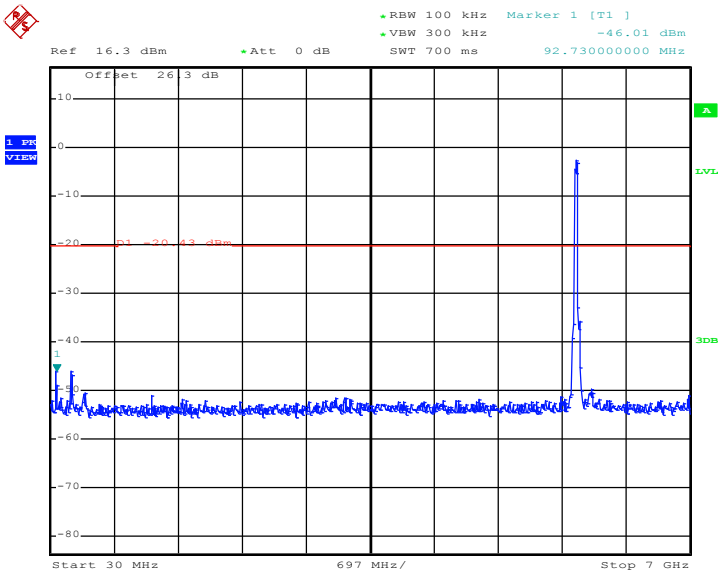
Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 20MHz) CH161 between 3 GHz~25 GHz



Date: 31.MAY.2012 00:54:33

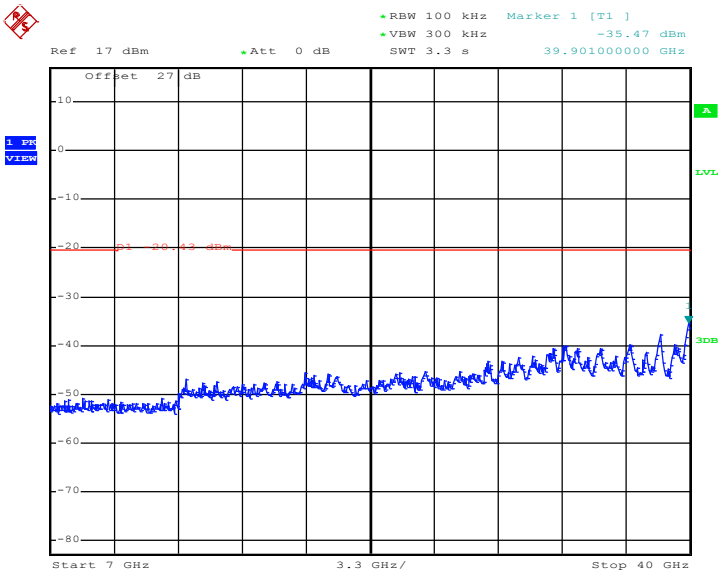
Test Mode :	<SISO Ant 1>	**Temperature :**	24~26℃
Test Band :	5GHz 802.11n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	151, 159	**Test Engineer :**	Pinkston Tu

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH151 between 30 MHz~3 GHz



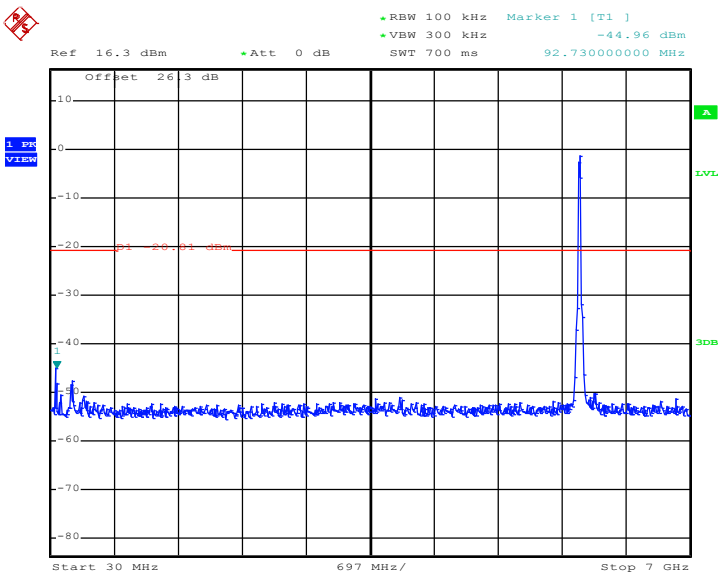
Date: 30.MAY.2012 23:19:10

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH151 between 3 GHz~25 GHz



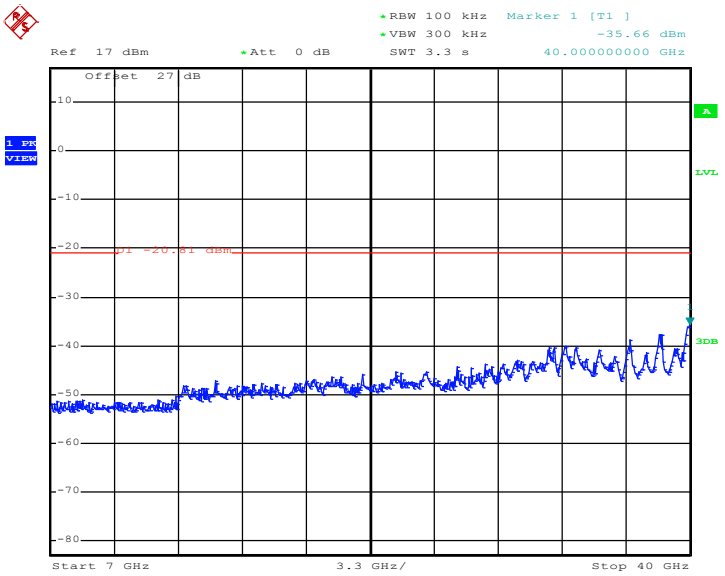
Date: 30.MAY.2012 23:19:29

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH159 between 30 MHz~3 GHz



Date: 30.MAY.2012 23:20:32

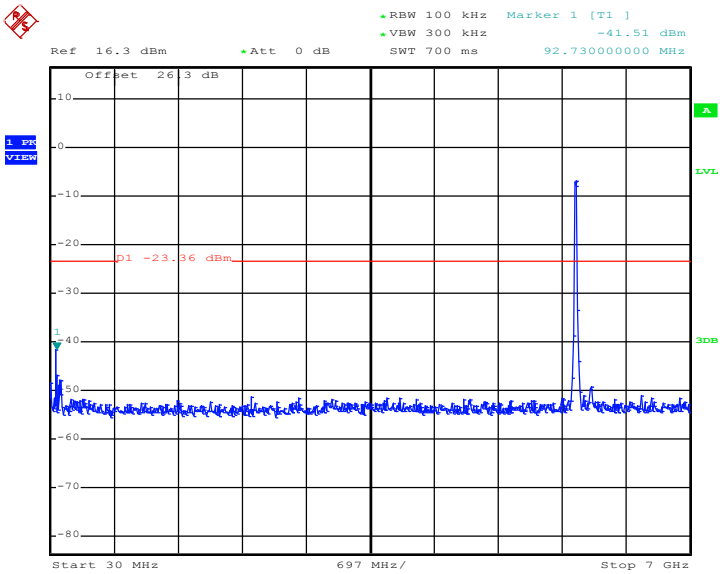
Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH159 between 3 GHz~25 GHz



Date: 30.MAY.2012 23:20:51

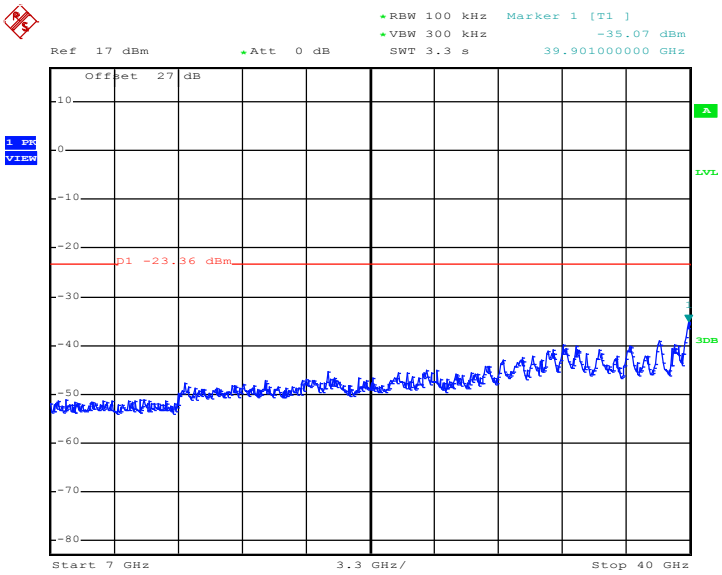
Test Mode :	<MIMO Ant 1>	**Temperature :**	24~26℃
Test Band :	5GHz 802.11n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	151, 159	**Test Engineer :**	Pinkston Tu

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH151 between 30 MHz~3 GHz



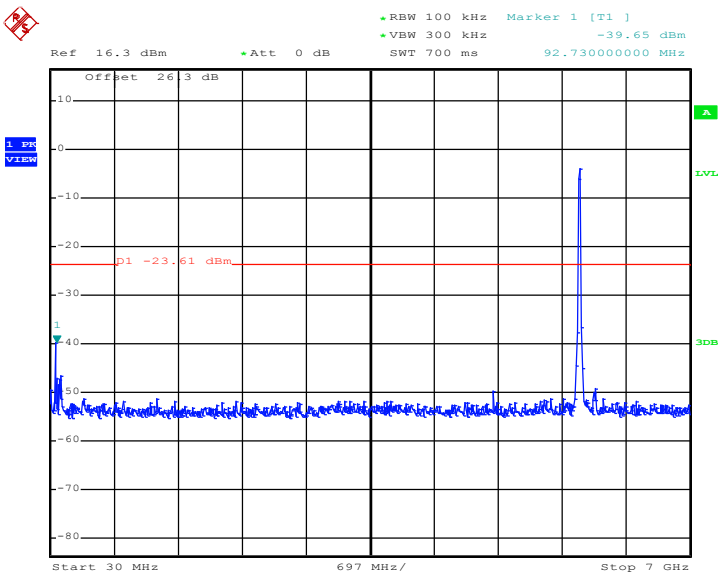
Date: 31.MAY.2012 01:04:23

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH151 between 3 GHz~25 GHz



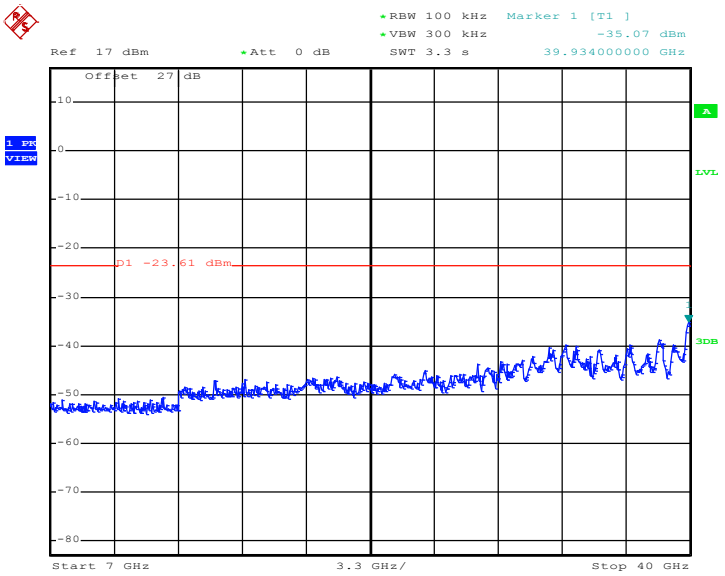
Date: 31.MAY.2012 01:04:42

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH159 between 30 MHz~3 GHz



Date: 31.MAY.2012 01:03:13

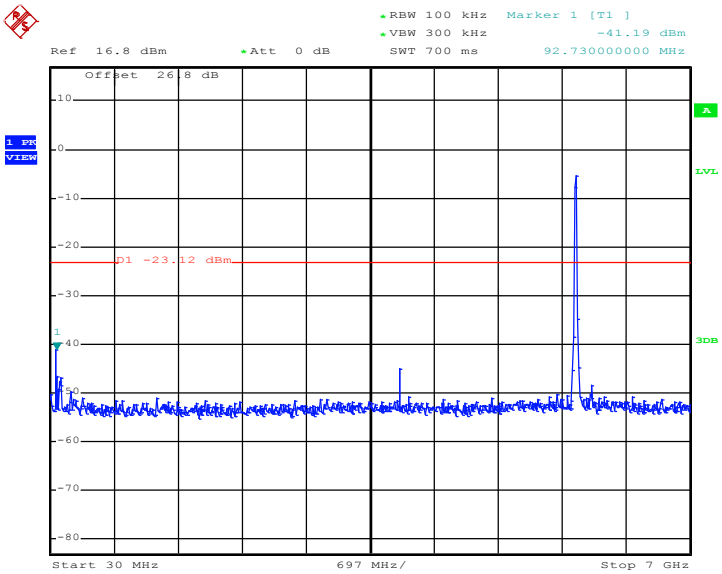
Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH159 between 3 GHz~25 GHz



Date: 31.MAY.2012 01:03:32

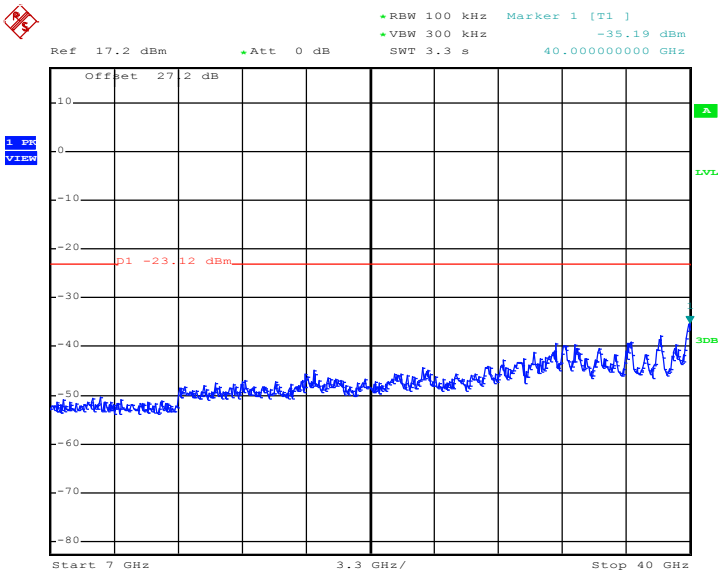
Test Mode :	<MIMO Ant 2>	**Temperature :**	24~26℃
Test Band :	5GHz 802.11n (BW 40MHz)	**Relative Humidity :**	50~53%
Test Channel :	151, 159	**Test Engineer :**	Pinkston Tu

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH151 between 30 MHz~3 GHz



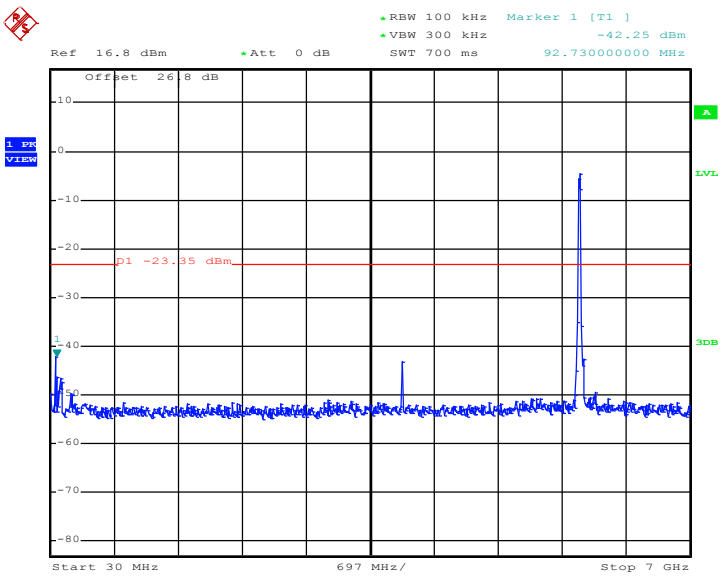
Date: 31.MAY.2012 00:58:25

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH151 between 3 GHz~25 GHz



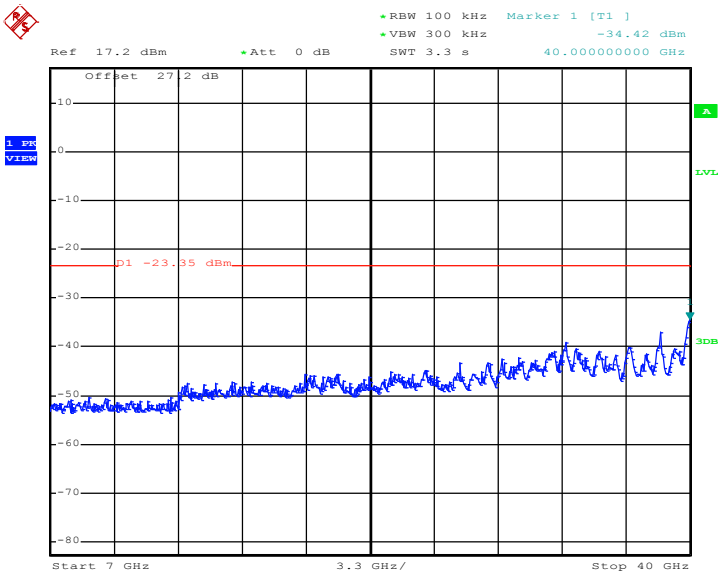
Date: 31.MAY.2012 00:58:45

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH159 between 30 MHz~3 GHz



Date: 31.MAY.2012 00:59:42

Conducted Spurious Emission Plot on 5GHz 802.11 n (BW 40MHz) CH159 between 3 GHz~25 GHz



Date: 31.MAY.2012 01:00:01

3.5 Power Spectral Density Measurement

3.5.1 Limit of Power Spectral Density

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

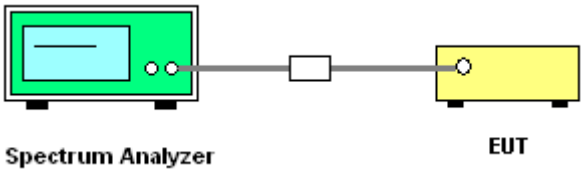
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows Measurement Procedure Option 1 (Peak PSD) of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01.
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. Record the measurement data derived from spectrum analyzer.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 KHz. Video bandwidth (VBW) >= 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. 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 = 10log (3 kHz/100 kHz = -15.2 dB).
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v01r01.

3.5.4 Test Setup



3.5.5 Test Result of Power Spectral Density

Test Mode :	802.11b	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm)	Pass /Fail
		Legacy Ant 1			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	7.33	-7.87	8	Pass
06	2437	7.65	-7.55	8	Pass
11	2462	7.49	-7.71	8	Pass

Test Mode :	802.11g	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm)	Pass /Fail
		Legacy Ant 1			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	3.43	-11.77	8	Pass
06	2437	4.50	-10.70	8	Pass
11	2462	3.72	-11.48	8	Pass

Test Mode :	2.4GHz 802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Ch.	Freq. (MHz)	2.4GHz 802.11n (BW20 MHz) Power Density						Max. Limits (dBm)	Pass /Fail
		SISO ANT 1		MIMO ANT 1		MIMO ANT 2			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10LOG2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10LOG2		
01	2412	1.74	-13.46	-0.71	-12.90	-0.51	-12.70	8	Pass
06	2437	2.53	-12.67	4.23	-7.96	5.01	-7.18	8	Pass
11	2462	1.07	-14.13	1.38	-10.81	2.23	-9.96	8	Pass

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11a Power Density		Max. Limits (dBm)	Pass /Fail
		Legacy Ant 1			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
149	5745	2.45	-12.75	8	Pass
157	5785	3.60	-11.60	8	Pass
161	5805	3.70	-11.50	8	Pass

Test Mode :	5GHz 802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Ch.	Freq. (MHz)	5GHz 802.11n (BW20 MHz) Power Density						Max. Limits (dBm)	Pass /Fail
		SISO ANT 1		MIMO ANT 1		MIMO ANT 2			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10LOG2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10LOG2		
149	5745	2.75	-12.45	-0.71	-12.90	-0.26	-12.45	8	Pass
157	5785	2.90	-12.30	-0.54	-12.73	0.55	-11.64	8	Pass
161	5805	3.32	-11.88	0.17	-12.02	0.91	-11.28	8	Pass

Test Mode :	5GHz 802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

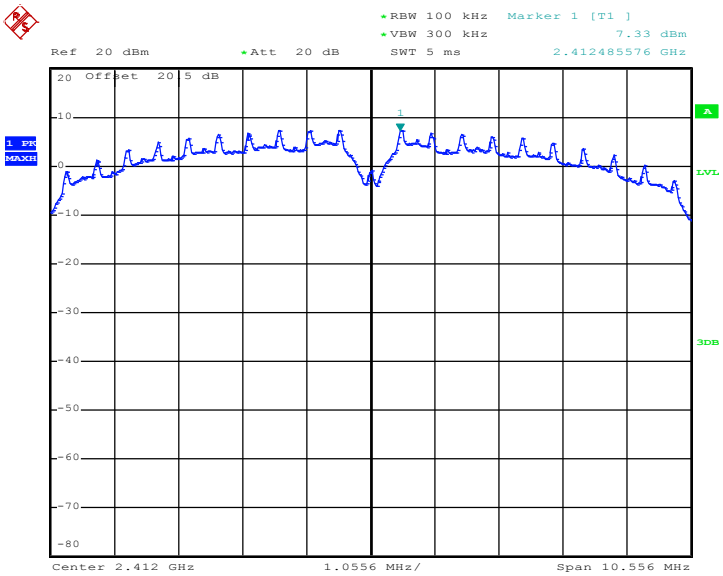
Ch.	Freq. (MHz)	5GHz 802.11n (BW40 MHz) Power Density						Max. Limits (dBm)	Pass /Fail
		SISO ANT 1		MIMO ANT 1		MIMO ANT 2			
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10LOG2	Measured PSD/100KHz (dBm)	PSD/3KHz (dBm) +10LOG2		
151	5755	-0.43	-15.63	-3.36	-15.55	-3.12	-15.31	8	Pass
159	5795	-0.81	-16.01	-3.61	-15.80	-3.35	-15.54	8	Pass

Note:

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

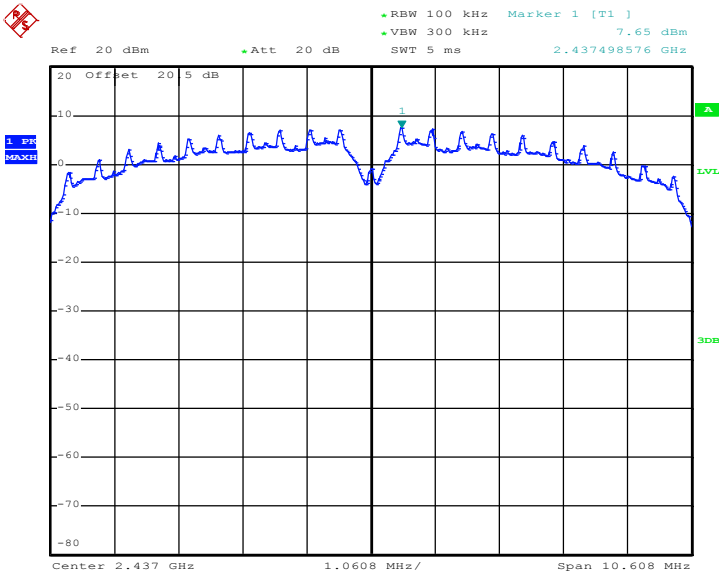
3.5.6 Test Result of Power Spectral Density Plots

PSD Plot on 802.11b Channel 01 – Legacy Ant 1



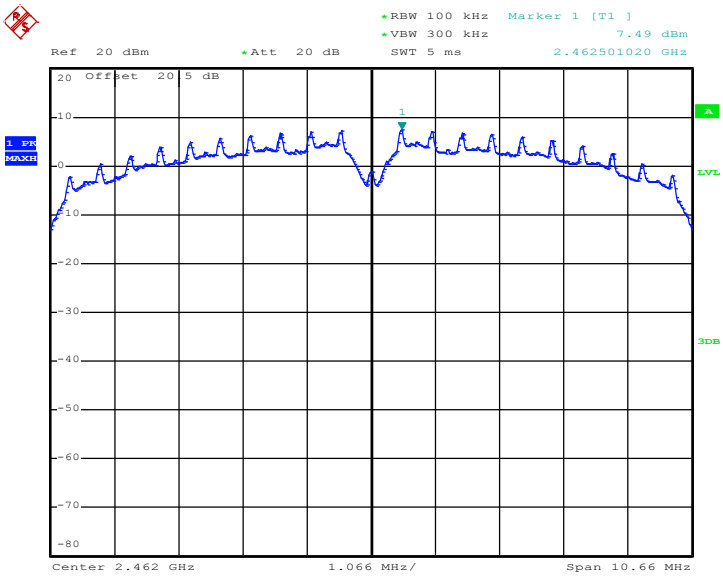
Date: 30.APR.2012 14:20:18

PSD Plot on 802.11b Channel 06 – Legacy Ant 1



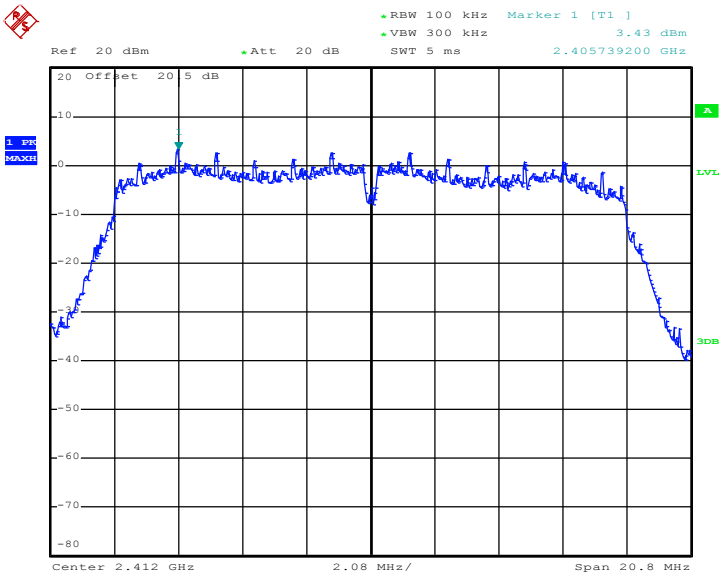
Date: 30.APR.2012 14:25:47

PSD Plot on 802.11b Channel 11 – Legacy Ant 1



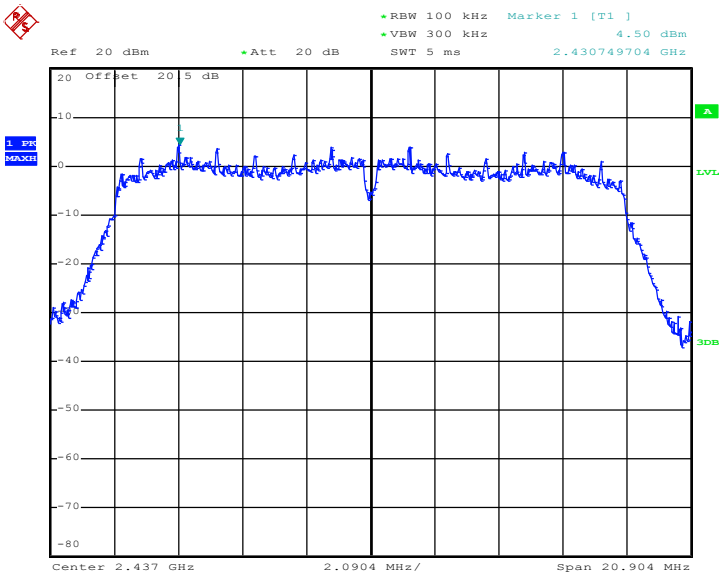
Date: 30.APR.2012 14:28:28

PSD Plot on 802.11g Channel 01 – Legacy Ant 1



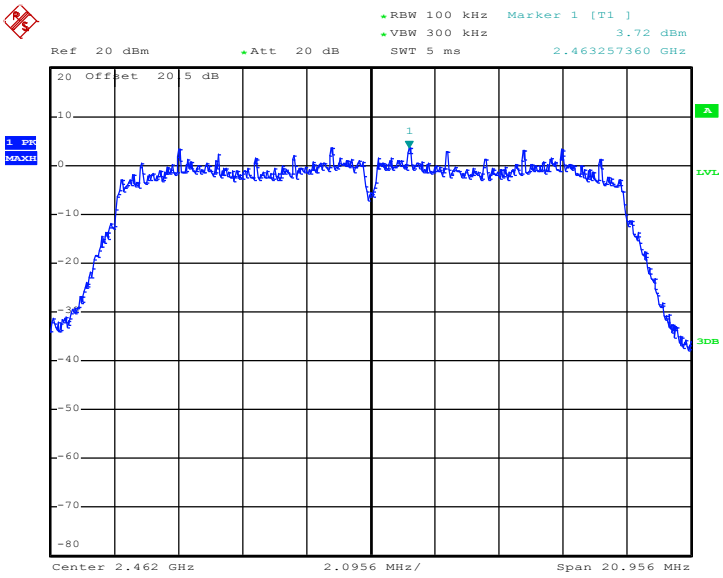
Date: 30.APR.2012 14:50:23

PSD Plot on 802.11g Channel 06 – Legacy Ant 1



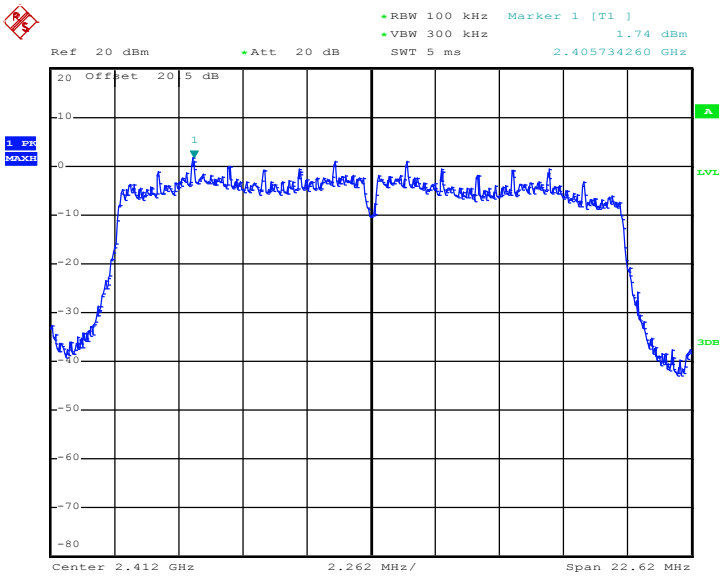
Date: 30.APR.2012 14:41:48

PSD Plot on 802.11g Channel 11 – Legacy Ant 1



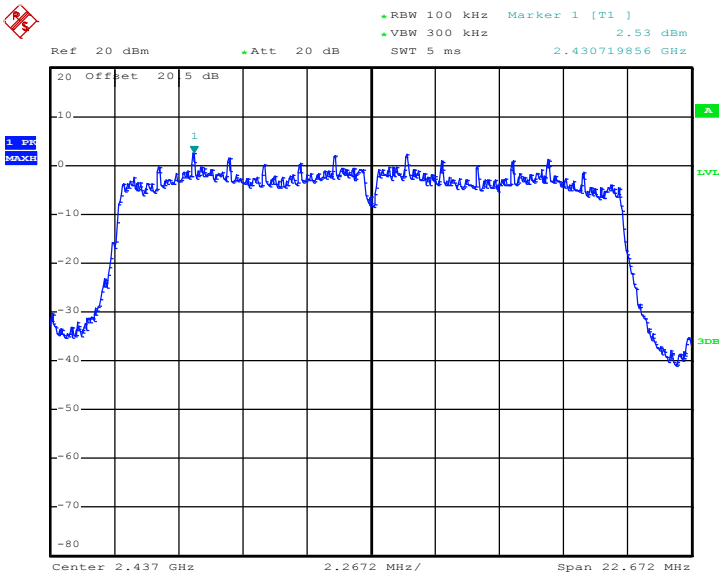
Date: 30.APR.2012 14:38:29

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01 – SISO ANT 1



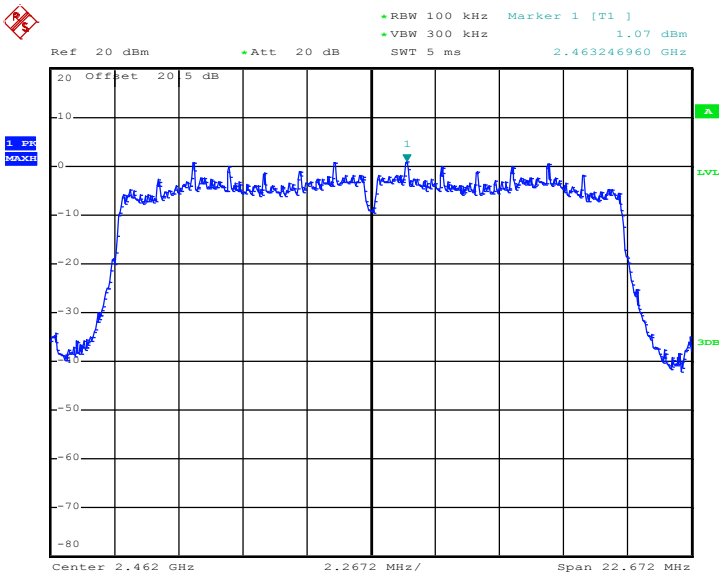
Date: 30.APR.2012 14:56:43

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 06 – SISO ANT 1



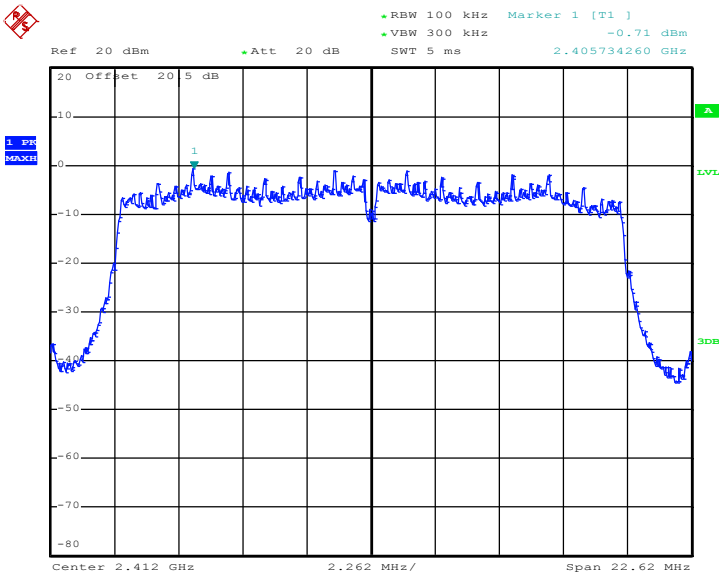
Date: 30.APR.2012 15:01:16

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11 – SISO ANT 1



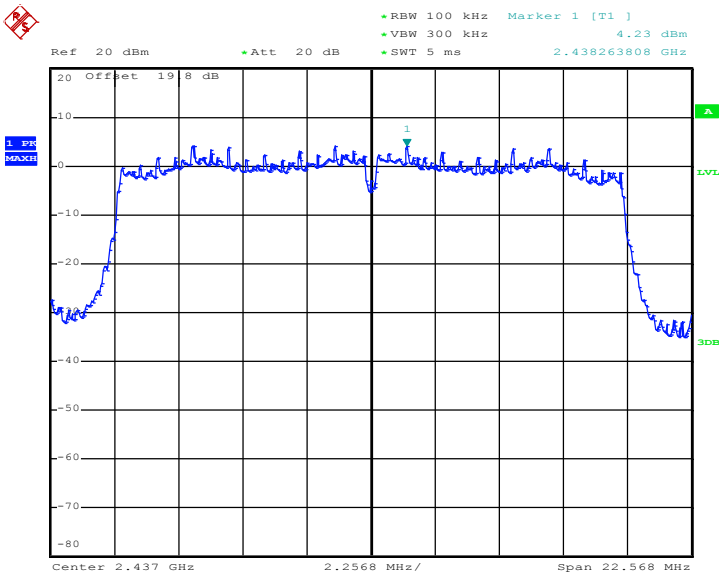
Date: 30.APR.2012 15:04:22

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01 – MIMO ANT 1



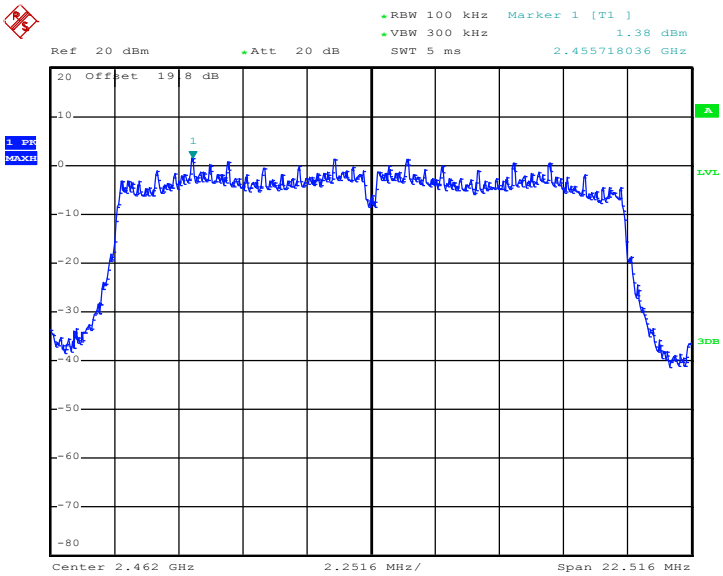
Date: 11.MAY.2012 11:11:15

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 06 – MIMO ANT 1



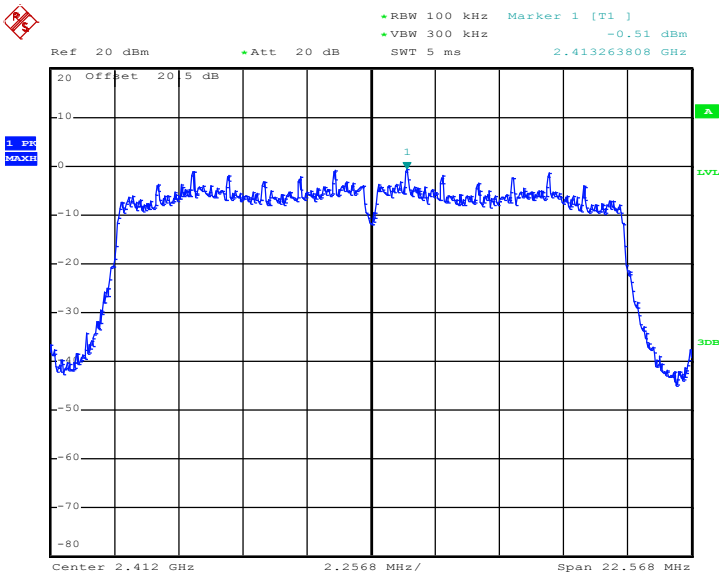
Date: 16.MAY.2012 11:52:01

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11 – MIMO ANT 1



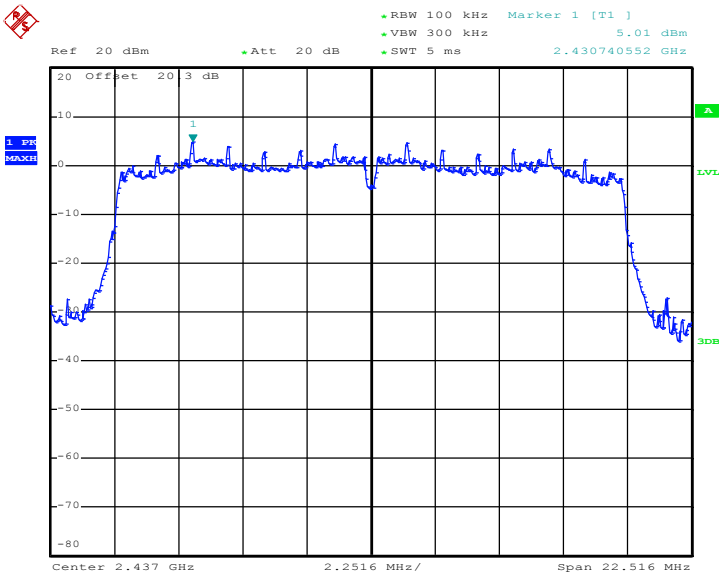
Date: 21.MAY.2012 10:02:56

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 01 – MIMO ANT 2



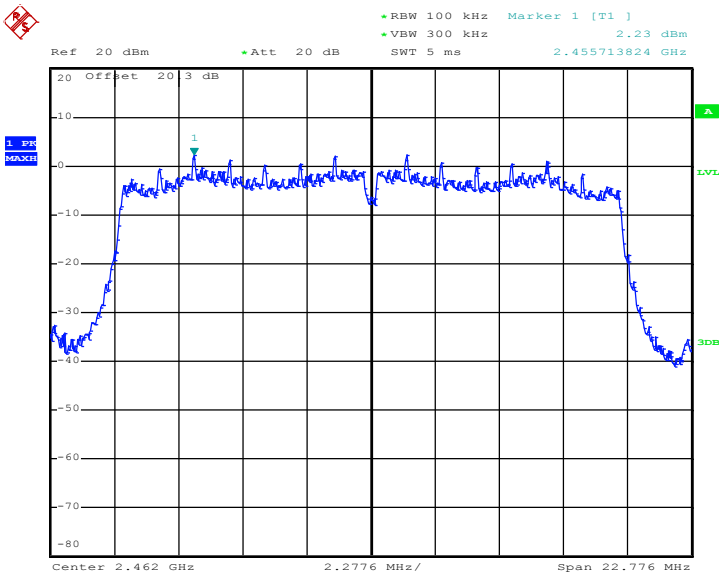
Date: 11.MAY.2012 11:49:02

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 06 – MIMO ANT 2



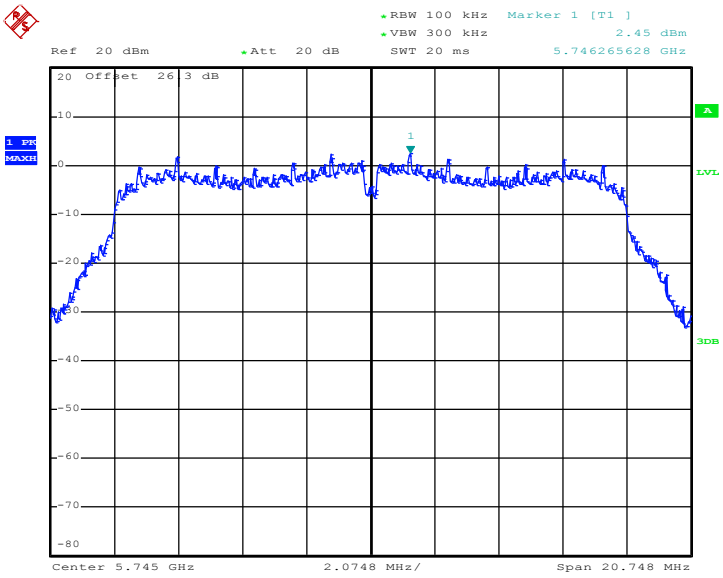
Date: 16.MAY.2012 11:57:35

PSD Plot on 2.4GHz 802.11n (BW 20MHz) Channel 11 – MIMO ANT 2



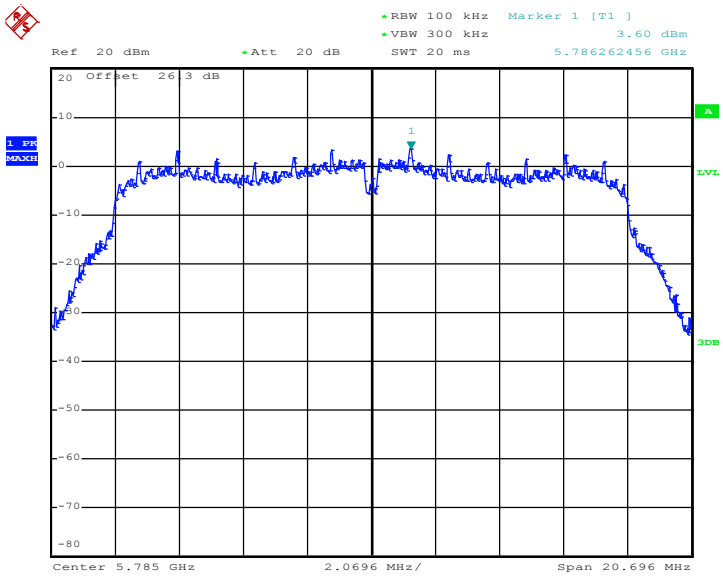
Date: 21.MAY.2012 10:04:56

PSD Plot on 802.11a Channel 149 - Legacy Ant 1



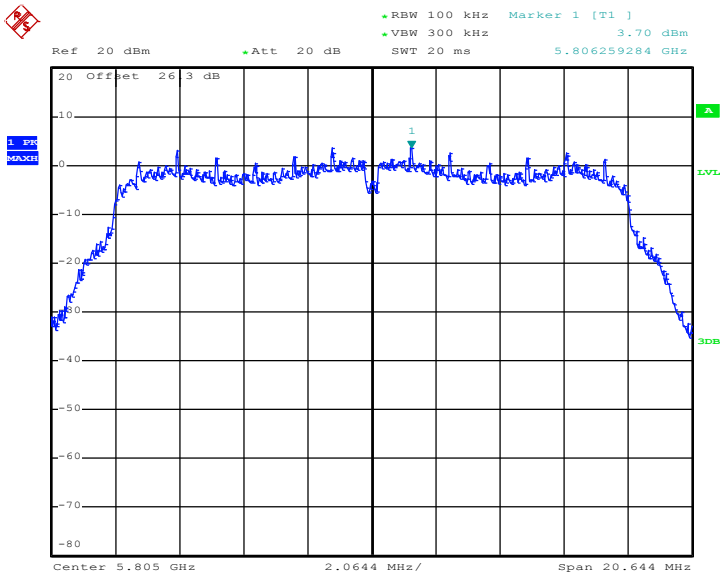
Date: 30.MAY.2012 15:30:32

PSD Plot on 802.11a Channel 157 - Legacy Ant 1



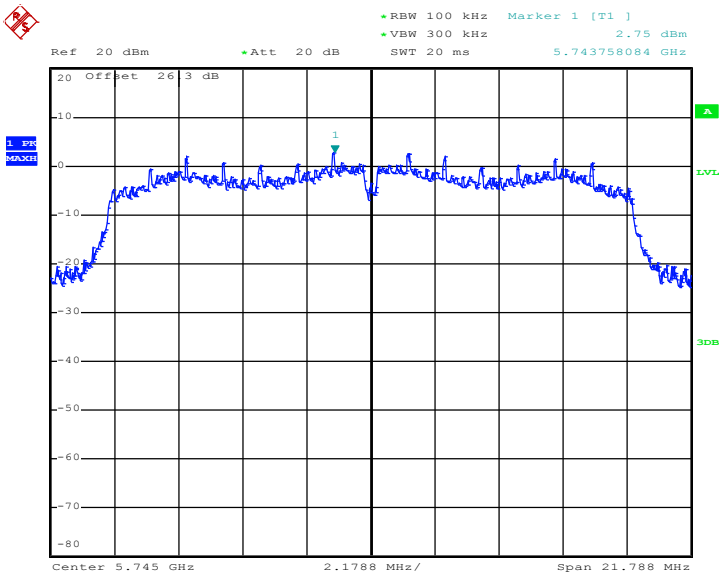
Date: 30.MAY.2012 15:32:17

PSD Plot on 802.11a Channel 161 - Legacy Ant 1



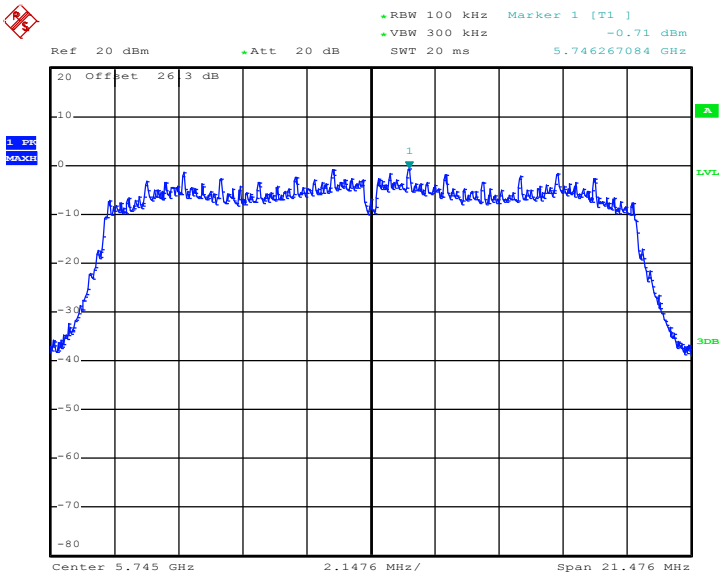
Date: 30.MAY.2012 19:17:14

PSD Plot on 5GHz 802.11n (BW 20MHz) Channel 149 - SISO Ant 1



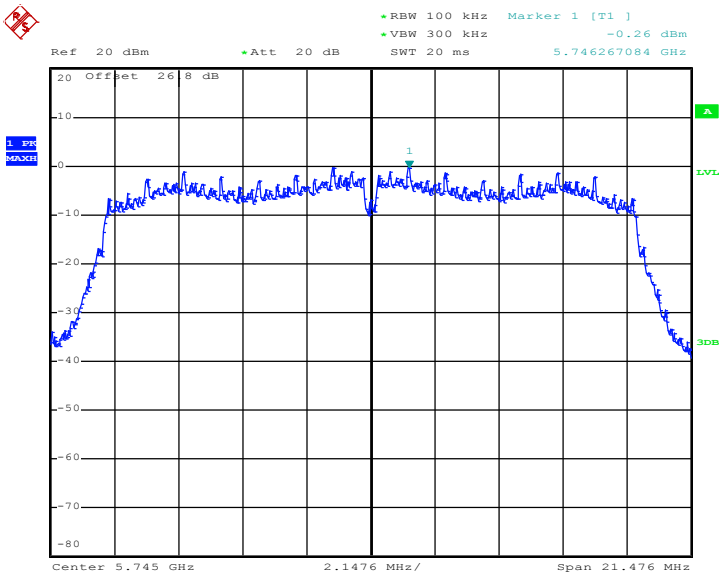
Date: 30.MAY.2012 15:27:45

PSD Plot on 5GHz 802.11n (BW 20MHz) Channel 149 - MIMO Ant 1



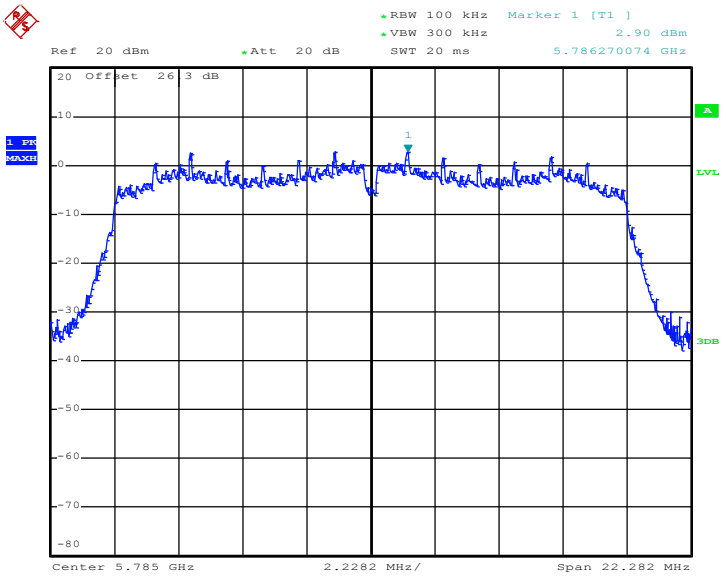
Date: 30.MAY.2012 19:31:55

PSD Plot on 5GHz 802.11n (BW 20MHz) Channel 149 - MIMO Ant 2



Date: 30.MAY.2012 18:25:44

PSD Plot on 5GHz 802.11n (BW 20MHz) Channel 157 - SISO Ant 1



Date: 30.MAY.2012 15:24:45