

# FCC RF Test Report

**APPLICANT** : Sony Corporation  
**EQUIPMENT** : Tablet device  
**BRAND NAME** : VAIO  
**MODEL NAME** : SVJ202B15L  
**FCC ID** : AK8SVJ202B15L  
**STANDARD** : FCC Part 15 Subpart E §15.407  
**CLASSIFICATION** : (NII) Unlicensed National Information Infrastructure

The product was received on Feb. 20, 2013 and completely tested on Mar. 05, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

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

Reviewed by:



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Reviewed by:



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## SPORTON INTERNATIONAL INC.

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## SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	RSS-210 A9.2	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	RSS-210 A9.2	Maximum Conducted Output Power	≤ 17, 24, 30 dBm (depend on band)	Pass	-
3.3	15.407(a)	RSS-210 A9.2	Power Spectral Density	≤ 4, 11, 17 dBm (depend on band)	Pass	-
3.4	15.407(a)(6)	RSS-210 A9.3	Peak Excursion Ratio	≤ 13dB	Pass	-
3.5	15.407(b)	RSS-210 A9.3	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 0.36 dB at 5470.000 MHz
3.6	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 8.90 dB at 0.158 MHz
3.7	15.407(g)	RSS-210 A9.5	Frequency Stability	Within Operation Band	Pass	-
3.8	15.407(c)	RSS-210 A9.5	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.9	15.203 & 15.407(a)	RSS-210 A9.2	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

Sony Corporation

1-7-1 Konan Minato-ku, Tokyo, 108-0075 JAPAN

## 1.2 Manufacturer

Foxconn

Foxconn Industrial District, Export Processing Zone, No.50, Beijing Zhong Road, Yantai Economic And Technological Development Area, Shandong, P.R.China

## 1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Tablet device
Brand Name	VAIO
Model Name	SVJ202B15L
FCC ID	AK8SVJ202B15L
EUT supports Radios application	WLAN 11abgn / Bluetooth 2.1/3.0/4.0/NFC
EUT Stage	Identical Prototype

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

## 1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5580 MHz 5660 MHz ~ 5700 MHz
Maximum Output Power	<p><b>&lt;5180 MHz ~ 5240 MHz&gt;</b></p> <p><b>&lt;Ant. 1&gt;</b> 802.11a : 14.32 dBm / 0.0270 W</p> <p><b>&lt;Ant. 2&gt;</b> 802.11a : 14.18 dBm / 0.0262 W</p> <p><b>&lt;SISO Ant. 1&gt;</b> 802.11n HT20 : 14.38 dBm / 0.0274 W 802.11n HT40 : 13.56 dBm / 0.0227 W</p> <p><b>&lt;SISO Ant. 2&gt;</b> 802.11n HT20 : 14.25 dBm / 0.0266 W 802.11n HT40 : 13.52 dBm / 0.0225 W</p> <p><b>&lt;MIMO Ant. 1+2&gt;</b> 802.11n HT20 : 14.53 dBm / 0.0284 W 802.11n HT40 : 14.44 dBm / 0.0278 W</p>



	<p><b>&lt;5260 MHz ~ 5320 MHz&gt;</b>  <b>&lt;Ant. 1&gt;</b>              802.11a : 14.31 dBm / 0.0270 W  <b>&lt;Ant. 2&gt;</b>              802.11a : 14.37 dBm / 0.0274 W  <b>&lt;SISO Ant. 1&gt;</b>              802.11n HT20 : 14.33 dBm / 0.0271 W              802.11n HT40 : 13.77 dBm / 0.0238 W  <b>&lt;SISO Ant. 2&gt;</b>              802.11n HT20 : 14.18 dBm / 0.0262 W              802.11n HT40 : 13.54 dBm / 0.0226 W  <b>&lt; MIMO Ant. 1+2&gt;</b>              802.11n HT20 : 14.82 dBm / 0.0303 W              802.11n HT40 : 14.63 dBm / 0.0290 W</p> <p><b>&lt;5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz &gt;</b>  <b>&lt;Ant. 1&gt;</b>              802.11a : 14.48 dBm / 0.0281 W  <b>&lt;Ant. 2&gt;</b>              802.11a : 14.38 dBm / 0.0274 W  <b>&lt;SISO Ant. 1&gt;</b>              802.11n HT20 : 14.22 dBm / 0.0264 W              802.11n HT40 : 14.47 dBm / 0.0280 W  <b>&lt;SISO Ant. 2&gt;</b>              802.11n HT20 : 14.16 dBm / 0.0261 W              802.11n HT40 : 14.24 dBm / 0.0265 W  <b>&lt; MIMO Ant. 1+2&gt;</b>              802.11n HT20 : 14.89 dBm / 0.0308 W              802.11n HT40 : 14.43 dBm / 0.0277 W</p>
<p>99% Occupied Bandwidth</p>	<p><b>&lt;5180 MHz ~ 5240 MHz&gt;</b>  <b>&lt;Ant. 1&gt;</b>              802.11a : 17.70 MHz  <b>&lt;SISO Ant. 1&gt;</b>              802.11n HT20 : 18.55 MHz              802.11n HT40 : 36.36 MHz  <b>&lt;MIMO Ant. 1+2(1)&gt;</b>              802.11n HT20 : 18.50 MHz              802.11n HT40 : 36.45 MHz  <b>&lt;MIMO Ant. 1+2(2)&gt;</b>              802.11n HT20 : 18.45 MHz              802.11n HT40 : 36.36 MHz</p> <p><b>&lt;5260 MHz ~ 5320 MHz&gt;</b>  <b>&lt;Ant. 1&gt;</b>              802.11a : 17.65 MHz  <b>&lt;SISO Ant. 1&gt;</b>              802.11n HT20 : 18.55 MHz              802.11n HT40 : 36.36 MHz  <b>&lt;MIMO Ant. 1+2(1)&gt;</b>              802.11n HT20 : 18.50 MHz              802.11n HT40 : 36.45 MHz  <b>&lt;MIMO Ant. 1+2(2)&gt;</b>              802.11n HT20 : 18.50 MHz              802.11n HT40 : 36.36 MHz</p>



	<p>&lt;5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz &gt;  <b>&lt;Ant. 1&gt;</b>              802.11a : 17.90 MHz  <b>&lt;SISO Ant. 1&gt;</b>              802.11n HT20 : 18.70 MHz              802.11n HT40 : 36.54 MHz  <b>&lt;MIMO Ant. 1+2(1)&gt;</b>              802.11n HT20 : 18.55 MHz              802.11n HT40 : 36.45 MHz  <b>&lt;MIMO Ant. 1+2(2)&gt;</b>              802.11n HT20 : 18.50 MHz              802.11n HT40 : 36.45 MHz</p>												
<p><b>Antenna Type</b></p>	<p><b>Ant. 1 (Main Antenna):</b>  <b>&lt;5180 MHz ~ 5240 MHz&gt;</b>              PIFA Antenna with gain 1.74 dBi  <b>&lt;5260 MHz ~ 5320 MHz&gt;</b>              PIFA Antenna with gain 1.74 dBi  <b>&lt;5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz &gt;</b>              PIFA Antenna with gain 1.78 dBi  <b>Ant. 2 (Aux. Antenna):</b>  <b>&lt;5180 MHz ~ 5240 MHz&gt;</b>              PIFA Antenna with gain 1.32 dBi  <b>&lt;5260 MHz ~ 5320 MHz&gt;</b>              PIFA Antenna with gain 1.32 dBi  <b>&lt;5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz &gt;</b>              PIFA Antenna with gain 0.66 dBi</p>												
<p><b>Type of Modulation</b></p>	<p>OFDM (BPSK / QPSK / 16QAM / 64QAM)</p>												
<p><b>Antenna Function Description</b></p>	<table border="1" data-bbox="767 1146 1430 1346"> <thead> <tr> <th></th> <th>Ant. 1.</th> <th>Ant. 2.</th> </tr> </thead> <tbody> <tr> <td>802.11 a</td> <td>V</td> <td>V</td> </tr> <tr> <td>802.11 n SISO</td> <td>V</td> <td>V</td> </tr> <tr> <td>802.11 n MIMO</td> <td>V</td> <td>V</td> </tr> </tbody> </table> <p>Note: MIMO mode is completely uncorrelated</p>		Ant. 1.	Ant. 2.	802.11 a	V	V	802.11 n SISO	V	V	802.11 n MIMO	V	V
	Ant. 1.	Ant. 2.											
802.11 a	V	V											
802.11 n SISO	V	V											
802.11 n MIMO	V	V											

## 1.5 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.			
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978			
<b>Test Site No.</b>	<b>Sporton Site No.</b>			<b>FCC/IC Registration No.</b>
	TH02-HY	CO05-HY	03CH07-HY	722060/4086B-1

## 1.6 Applied Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D01 General UNII Test Procedures v01r02
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v01r02.
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issued 8
- ♦ IC RSS-Gen Issue 3
- ♦ NOTICE 2012-DRS0126

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. Per the section 2.2.3 of Notice of 2012-DRS0126, " Receivers Excluded from Industry Canada Requirements", only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements.



## **2 Test Configuration of Equipment Under Test**

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz) and radiated emission (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane for Ant. 1 and Ant. 2; Y plane for MIMO Ant. 1+2) were recorded in this report.

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

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



## 2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1	36	5180	44	5220
	<b>38</b>	<b>5190</b>	<b>46</b>	<b>5230</b>
	40	5200	48	5240

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2	52	5260	60	5300
	<b>54</b>	<b>5270</b>	<b>62</b>	<b>5310</b>
	56	5280	64	5320

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5600 MHz and 5650-5725 MHz Band 3	100	5500	116	5580
	<b>102</b>	<b>5510</b>	132	5660
	104	5520	<b>134</b>	<b>5670</b>
	108	5540	136	5680
	<b>110</b>	<b>5550</b>	140	5700
	112	5560		

**Note:** The above Frequency and Channel in boldface were 802.11n HT40.

## 2.2 Pre-Scanned RF Power

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

<Ant. 1>

5GHz 802.11a mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.32	14.22	14.13	14.27	13.96	13.98	14.13	14.12

5GHz 802.11a mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.31	14.29	14.26	14.27	14.28	14.26	14.27	14.28

5GHz 802.11a mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.48	14.32	14.46	14.45	14.44	14.47	14.45	14.46

<SISO Ant. 1>

5GHz 802.11n HT20 mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.38	14.31	14.26	14.19	14.20	14.22	14.25	14.27

5GHz 802.11n HT20 mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.33	14.28	14.31	14.22	14.20	14.17	14.19	14.20

5GHz 802.11n HT20 mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.22	13.99	13.89	13.87	13.86	13.85	13.86	13.85



5GHz 802.11n HT40 mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	13.56	13.55	13.45	13.44	13.55	13.50	13.47	13.50

5GHz 802.11n HT40 mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	13.77	13.74	13.71	13.68	13.74	13.68	13.67	13.66

5GHz 802.11n HT40 mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.47	14.45	14.44	14.45	14.46	14.43	14.41	14.43

<Ant. 2>

5GHz 802.11a mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.18	14.14	14.16	14.13	14.08	14.12	14.13	14.13

5GHz 802.11a mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.37	14.34	14.32	14.33	14.22	14.25	14.33	14.29

5GHz 802.11a mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	14.38	14.35	14.25	14.26	14.22	14.20	14.28	14.15



<SISO Ant. 2>

5GHz 802.11n HT20 mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.25	14.20	14.03	14.08	14.16	14.11	14.13	14.06

5GHz 802.11n HT20 mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.18	14.14	14.15	14.17	14.16	14.15	14.14	14.16

5GHz 802.11n HT20 mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.16	14.03	13.86	13.90	13.92	14.00	14.02	14.01

5GHz 802.11n HT40 mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	13.52	13.51	13.48	13.39	13.48	13.45	13.49	13.46

5GHz 802.11n HT40 mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	13.54	13.53	13.53	13.52	13.48	13.45	13.47	13.40

5GHz 802.11n HT40 mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	14.24	14.23	14.22	14.18	14.19	14.21	14.17	14.16



<MIMO Ant. 1+2>

5GHz 802.11n HT20 mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Average Power (dBm)	14.53	14.41	14.46	14.41	14.41	14.49	14.44	14.49

5GHz 802.11n HT20 mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Average Power (dBm)	14.82	14.80	14.76	14.77	14.65	14.81	14.76	14.75

5GHz 802.11n HT20 mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Average Power (dBm)	14.89	14.81	14.78	14.77	14.79	14.88	14.83	14.84

5GHz 802.11n HT40 mode <5180 MHz ~ 5240 MHz>								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Average Power (dBm)	14.44	14.27	14.21	14.14	14.21	14.29	14.26	14.38

5GHz 802.11n HT40 mode <5260 MHz ~ 5320 MHz>								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Average Power (dBm)	14.63	14.52	14.54	14.55	14.62	14.62	14.56	14.60

5GHz 802.11n HT40 mode <5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz>								
Data Rate (MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
Average Power (dBm)	14.43	14.41	14.39	14.30	14.42	14.41	14.39	14.41

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

### 2.3 Test Mode

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

Test Cases				
	Test Items	Mode	Data rate	Test Channel
Conducted TCs	26dB and 99% BW Power Spectral Density	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
		802.11n HT40	13.5 Mbps	L/M/H
	Output Power	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
		802.11n HT40	13.5 Mbps	L/M/H
	Peak Excursion	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
		802.11n HT40	13.5 Mbps	L/M/H
	Frequency Stability	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
		802.11n HT40	13.5 Mbps	L/M/H
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	L/H
		802.11n HT20	6.5 Mbps	L/H
		802.11n HT40	13.5 Mbps	L/H
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H
		802.11n HT20	6.5 Mbps	L/M/H
		802.11n HT40	13.5 Mbps	L/M/H
AC Conducted Emission	Mode 1 : WLAN (5G) Link + Bluetooth Link + Camera + H Pattern + MPEG4 + Adapter + RJ-45 Link + USB3.0 HD + SD Card + Earphone			



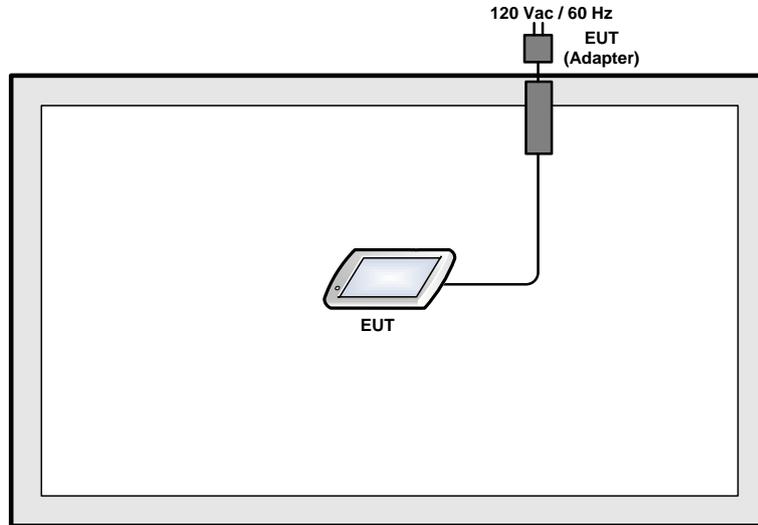
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5600 MHz and 5650-5725MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5600 MHz and 5650-5725MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

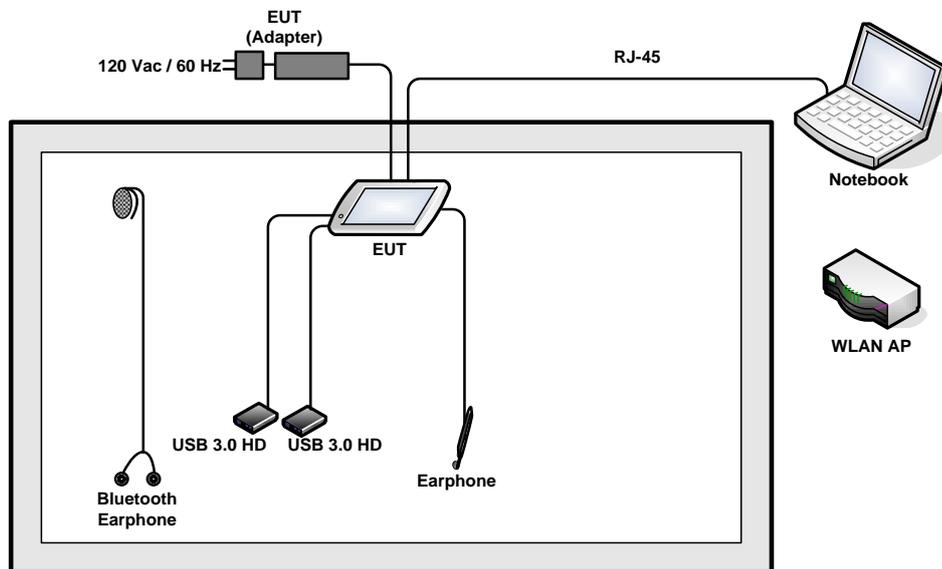
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5600 MHz and 5650-5725MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134

## 2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



## 2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
4.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
5.	USB 3.0 HD	WD	WDBPCK5000ABK-PESN	FCC DoC	Shielded, 0.5 m	N/A
6.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

## 2.6 Description of RF Function Operation Test Setup

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



## **2.7 Measurement Results Explanation Example**

**For all conducted test items:**

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

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

*Offset = RF cable loss + attenuator factor.*

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

Example :

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

### 3 Test Result

#### 3.1 26dB & 99% Bandwidth Measurement

##### 3.1.1 Description of 26dB & 99% Bandwidth

There is no restriction limits for bandwidth. The maximum conducted output power can be limited by measured emission bandwidth (B). For the band 5150-5250 MHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B. For the bands 5250-5350 MHz and 5470-5600 MHz and 5650-5725MHz, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B.

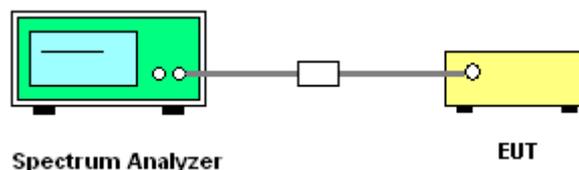
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r02.  
Section D) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW)  $\geq 3 * RBW$ .
8. Measure and record the results in the test report.

##### 3.1.4 Test Setup





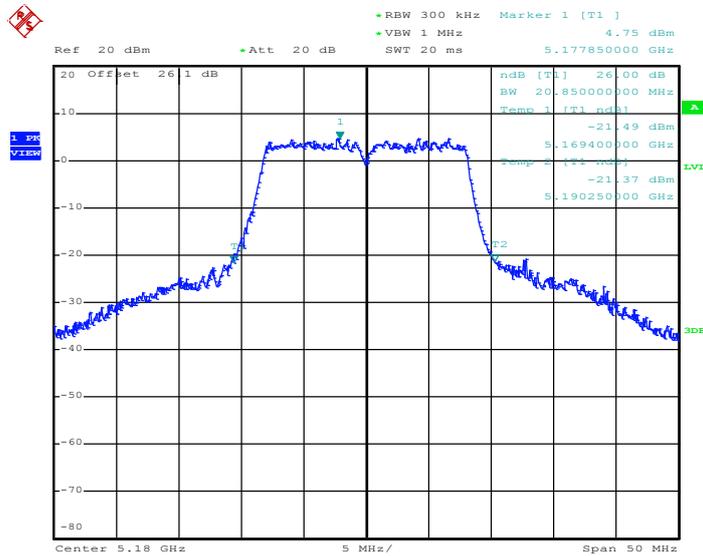
3.1.5 Test Result of 26dB Bandwidth

Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%

Band	Channel	Frequency (MHz)	802.11a 26dB Bandwidth (MHz)		Pass/Fail
			Ant. 1		
NII Band 1	36	5180	20.85		N/A
	44	5220	21.55		N/A
	48	5240	20.85		N/A
NII Band 2	52	5260	20.80		N/A
	60	5300	20.90		N/A
	64	5320	20.70		N/A
NII Band 3	100	5500	21.25		N/A
	116	5580	21.70		N/A
	140	5700	22.75		N/A

802.11a – Ant. 1

26 dB Bandwidth Plot on 802.11a Channel 36

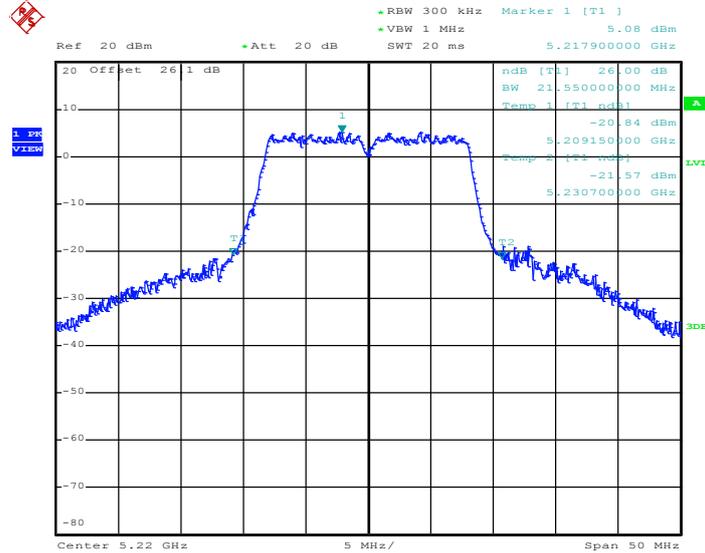


Date: 5.MAR.2013 14:21:25



802.11a – Ant. 1

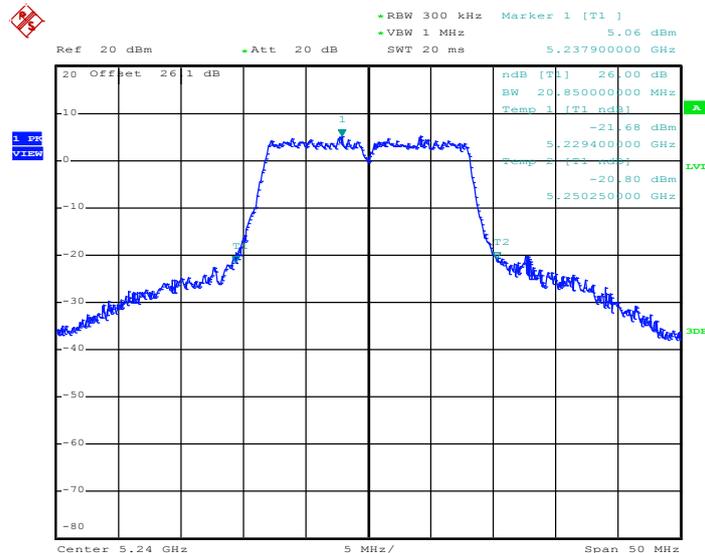
26 dB Bandwidth Plot on 802.11a Channel 44



Date: 5.MAR.2013 14:30:07

802.11a – Ant. 1

26 dB Bandwidth Plot on 802.11a Channel 48

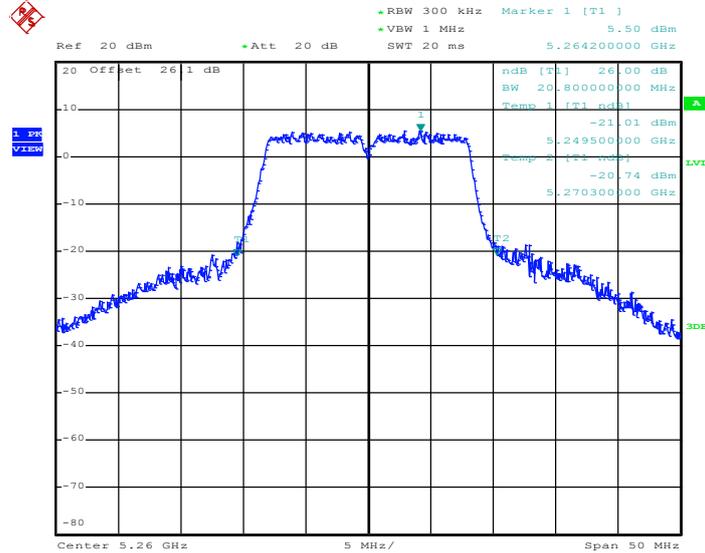


Date: 5.MAR.2013 14:35:01



802.11a – Ant. 1

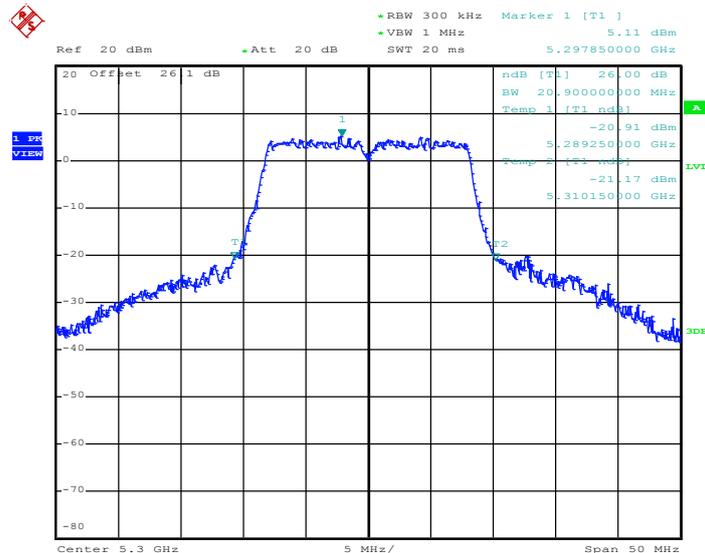
26 dB Bandwidth Plot on 802.11a Channel 52



Date: 5.MAR.2013 14:38:37

802.11a – Ant. 1

26 dB Bandwidth Plot on 802.11a Channel 60

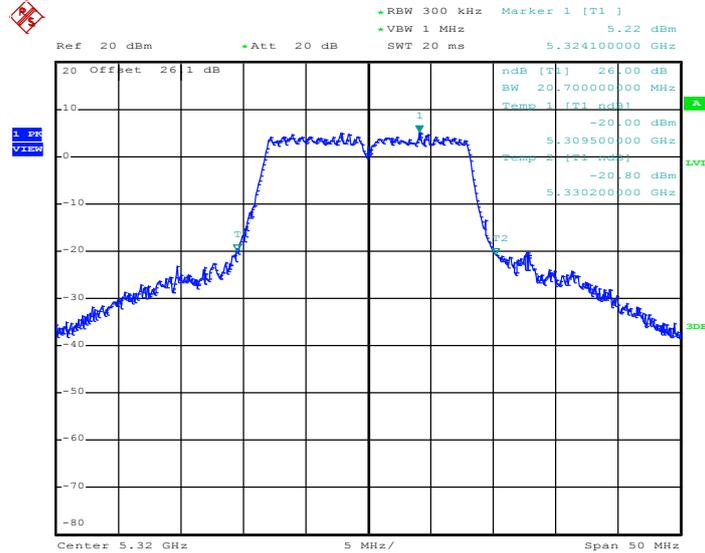


Date: 5.MAR.2013 14:41:08



802.11a – Ant. 1

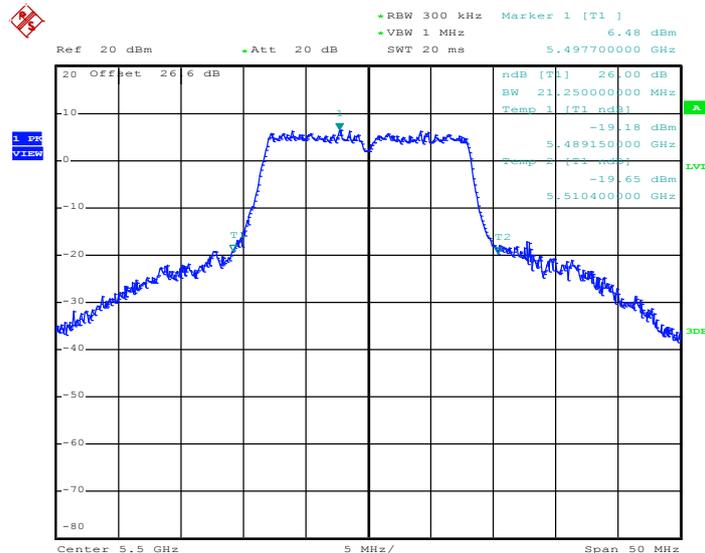
26 dB Bandwidth Plot on 802.11a Channel 64



Date: 5.MAR.2013 14:44:14

802.11a – Ant. 1

26 dB Bandwidth Plot on 802.11a Channel 100

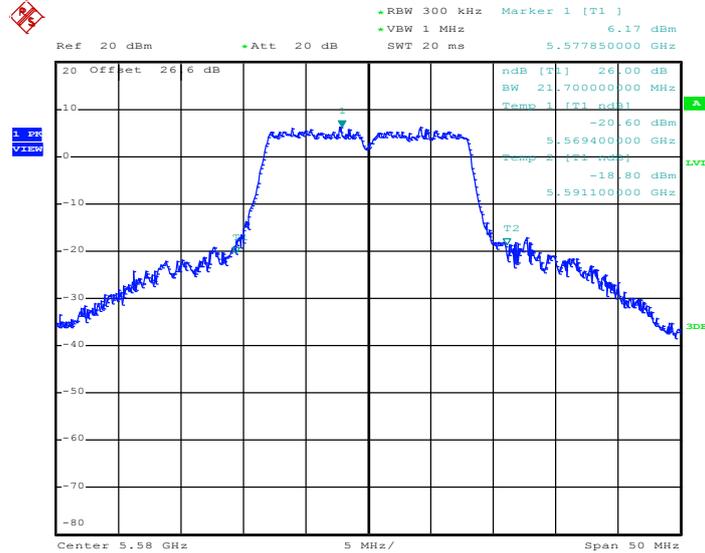


Date: 5.MAR.2013 14:47:51



802.11a – Ant. 1

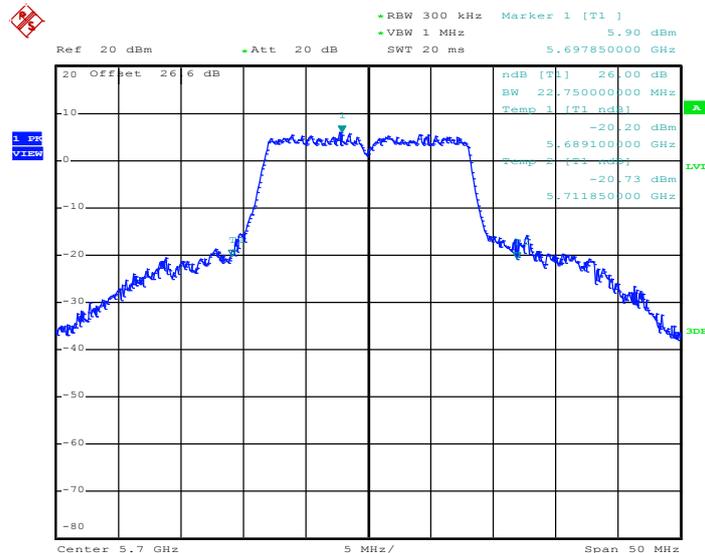
26 dB Bandwidth Plot on 802.11a Channel 116



Date: 5.MAR.2013 14:53:20

802.11a – Ant. 1

26 dB Bandwidth Plot on 802.11a Channel 140



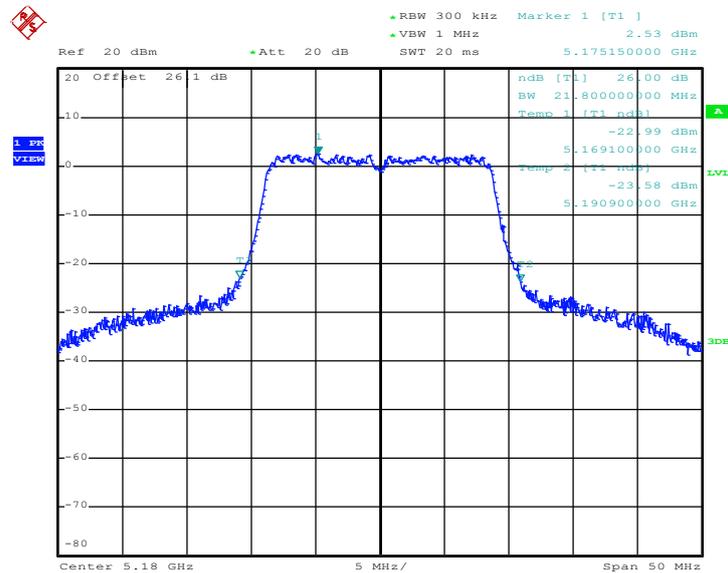
Date: 5.MAR.2013 14:58:18



Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%

Band	Channel	Frequency (MHz)	802.11n HT20 26dB Bandwidth (MHz)			Pass/Fail
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	
NII Band 1	36	5180	21.80	20.90	21.05	N/A
	44	5220	22.05	20.95	21.05	N/A
	48	5240	21.90	21.00	21.10	N/A
NII Band 2	52	5260	22.00	20.90	21.05	N/A
	60	5300	21.75	20.75	21.05	N/A
	64	5320	21.85	20.95	21.00	N/A
NII Band 3	100	5500	22.60	21.10	21.15	N/A
	116	5580	21.75	20.80	21.05	N/A
	140	5700	22.70	21.10	21.30	N/A

802.11n HT20 – SISO Ant. 1  
26 dB Bandwidth Plot on Channel 36

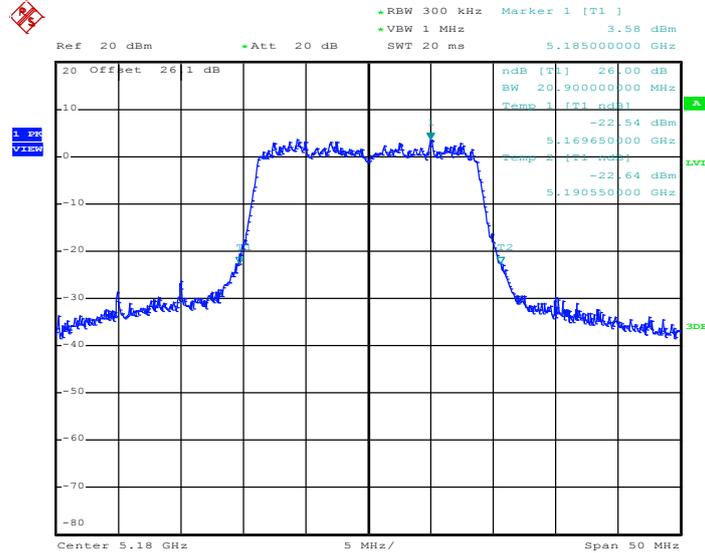


Date : 5.MAR.2013 15:32:31



802.11n HT20 – MIMO Ant. 1

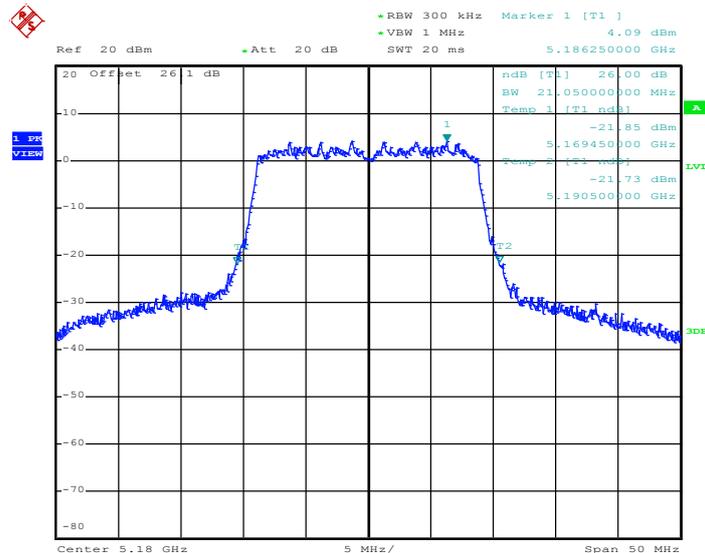
26 dB Bandwidth Plot on Channel 36



Date: 5.MAR.2013 15:48:41

802.11n HT20 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 36

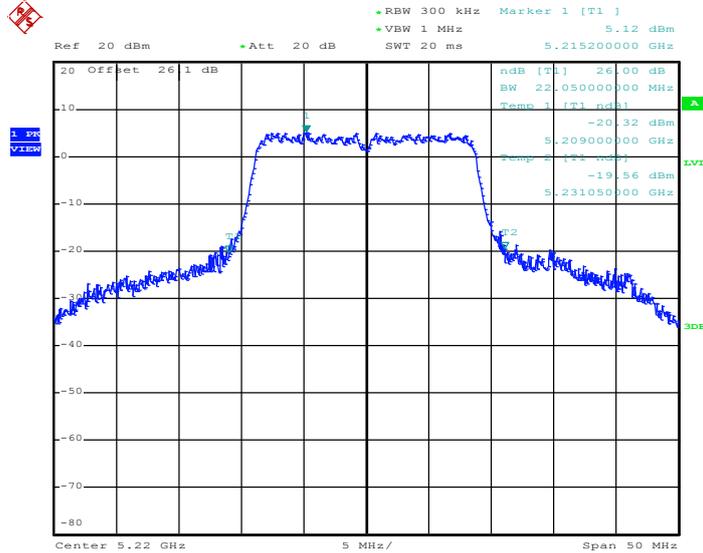


Date: 5.MAR.2013 15:48:15



802.11n HT20 – SISO Ant. 1

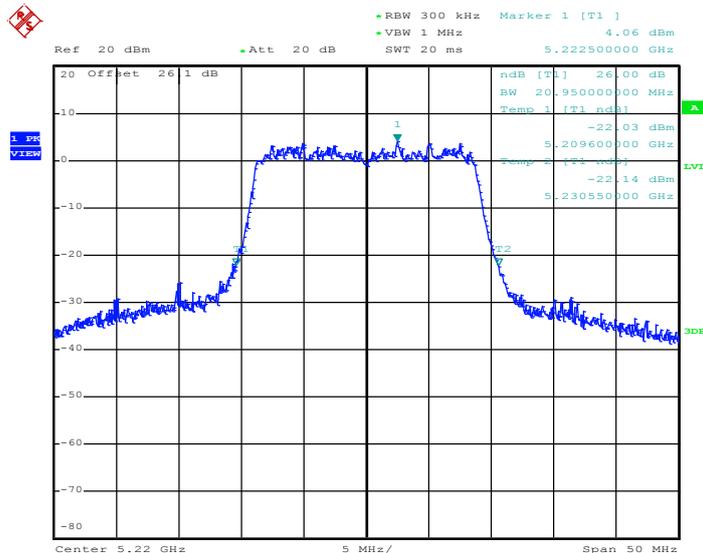
26 dB Bandwidth Plot on Channel 44



Date: 5.MAR.2013 15:28:50

802.11n HT20 – MIMO Ant. 1

26 dB Bandwidth Plot on Channel 44

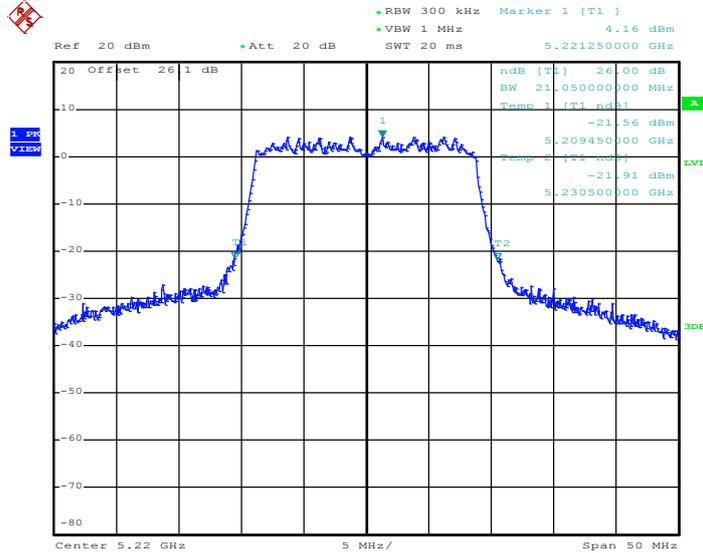


Date: 5.MAR.2013 15:55:12



802.11n HT20 – MIMO Ant. 2

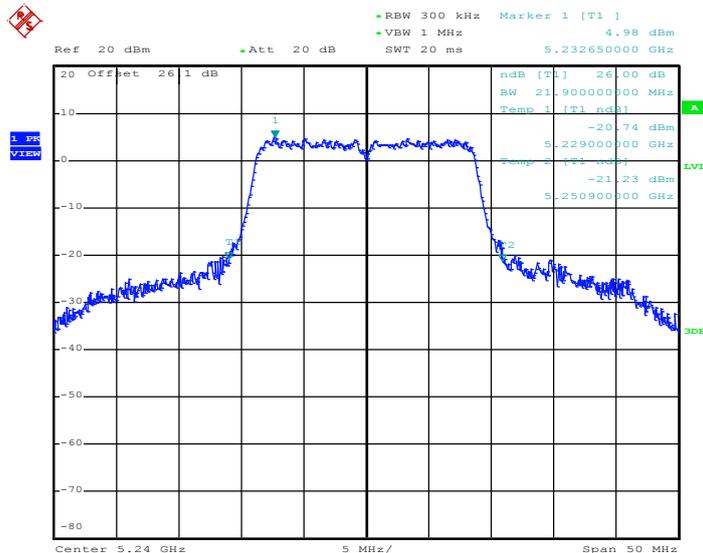
26 dB Bandwidth Plot on Channel 44



Date: 5.MAR.2013 15:58:06

802.11n HT20 – SISO Ant. 1

26 dB Bandwidth Plot on Channel 48

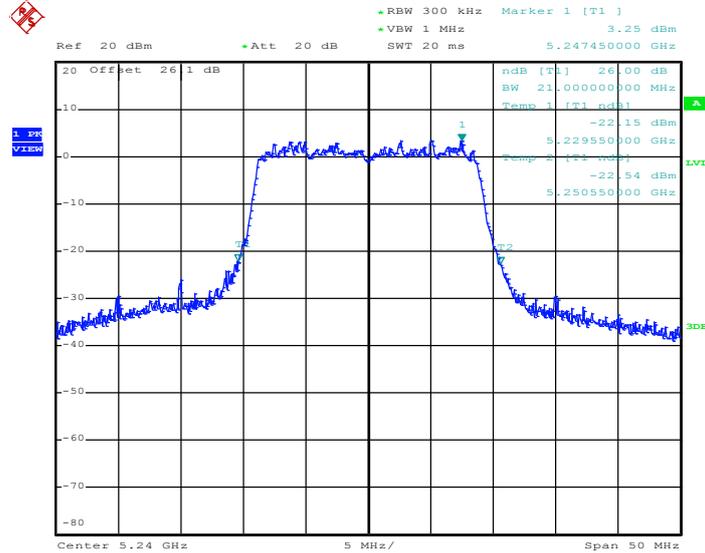


Date: 5.MAR.2013 15:26:33



802.11n HT20 – MIMO Ant. 1

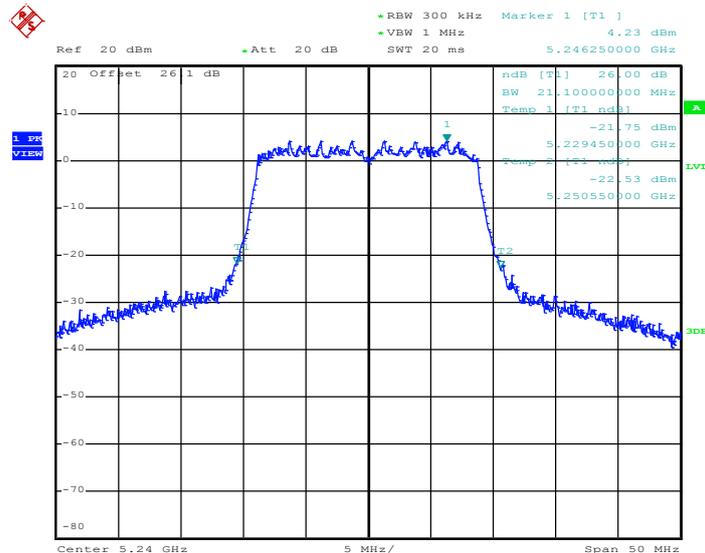
26 dB Bandwidth Plot on Channel 48



Date: 5.MAR.2013 15:59:30

802.11n HT20 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 48

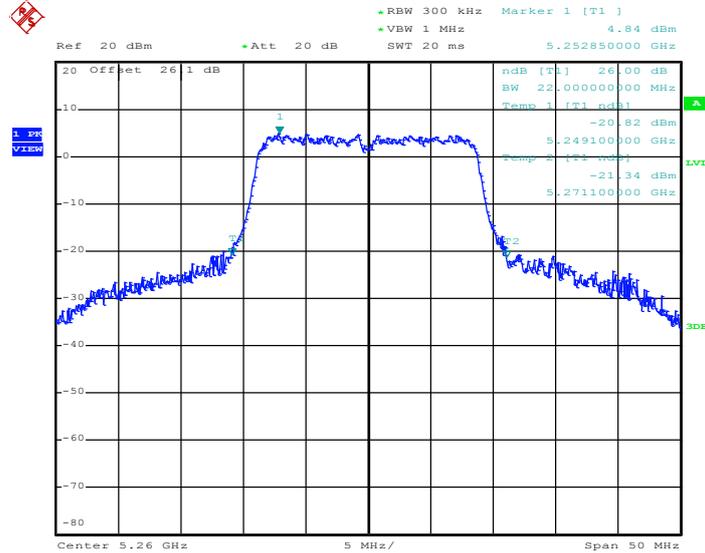


Date: 5.MAR.2013 16:02:24



802.11n HT20 – SISO Ant. 1

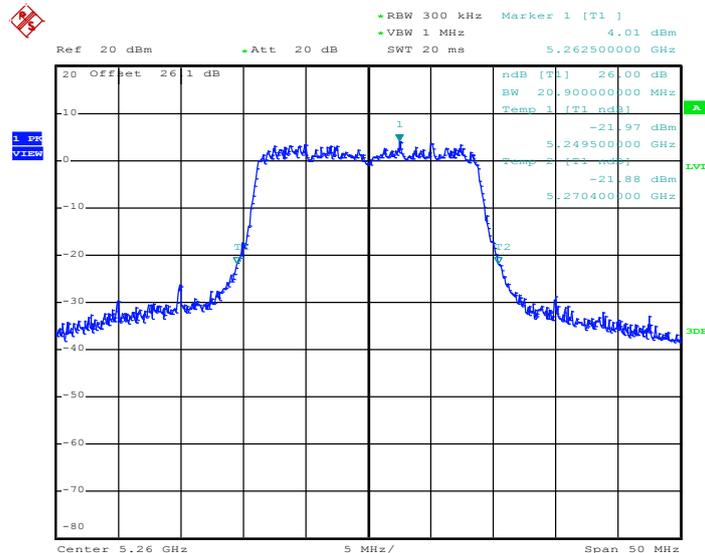
26 dB Bandwidth Plot on Channel 52



Date: 5.MAR.2013 15:23:43

802.11n HT20 – MIMO Ant. 1

26 dB Bandwidth Plot on Channel 52

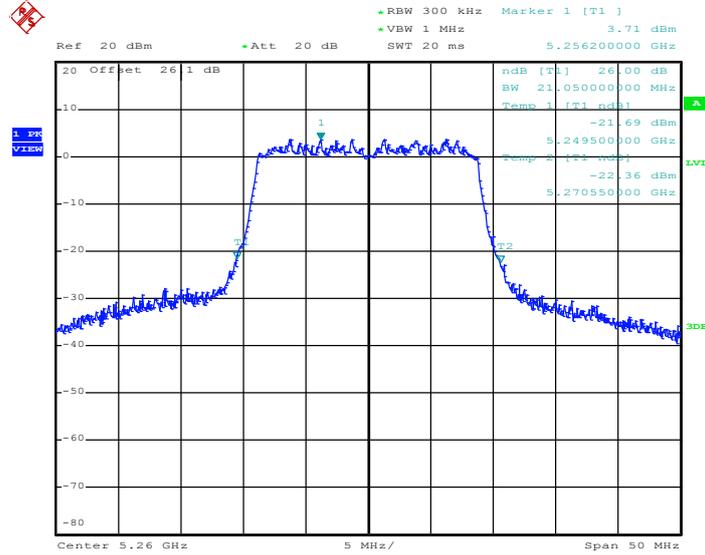


Date: 5.MAR.2013 16:05:27



802.11n HT20 – MIMO Ant. 2

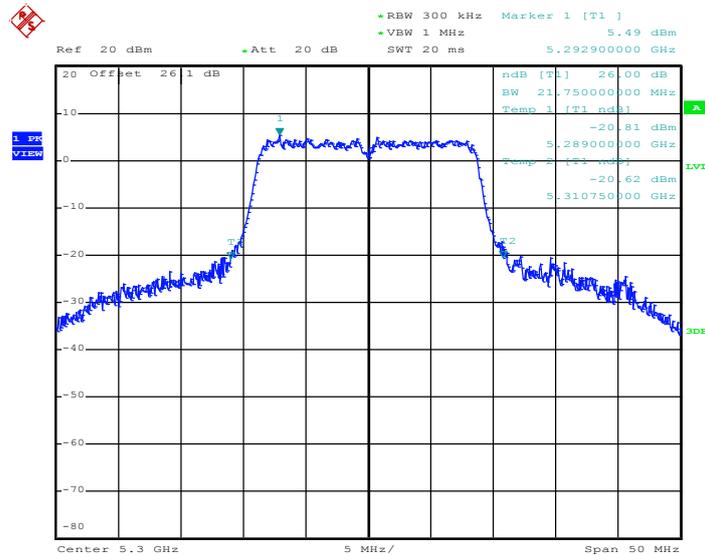
26 dB Bandwidth Plot on Channel 52



Date: 5.MAR.2013 16:08:50

802.11n HT20 – SISO Ant. 1

26 dB Bandwidth Plot on Channel 60

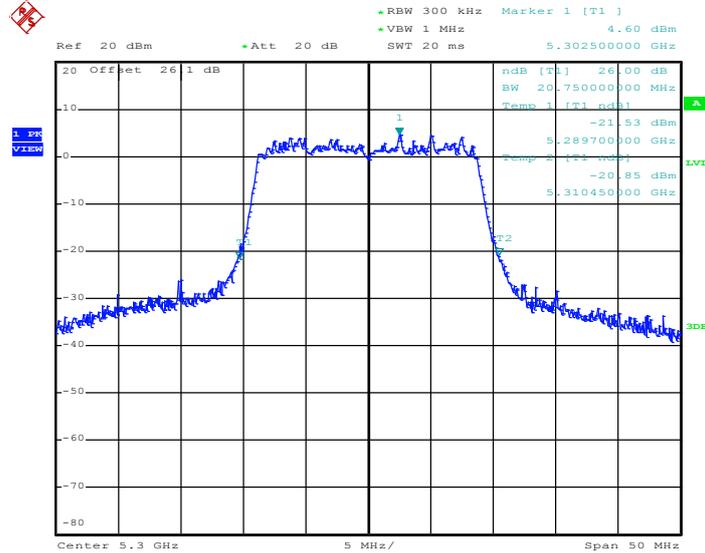


Date: 5.MAR.2013 15:21:18



802.11n HT20 – MIMO Ant. 1

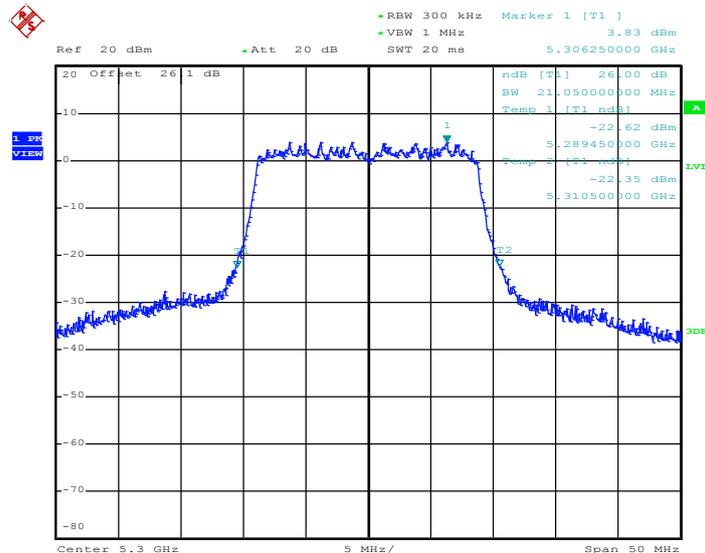
26 dB Bandwidth Plot on Channel 60



Date: 5.MAR.2013 16:11:27

802.11n HT20 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 60

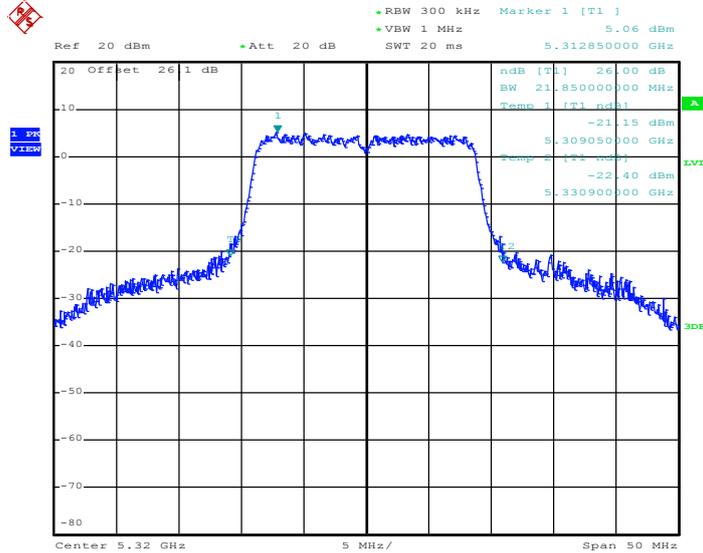


Date: 5.MAR.2013 16:14:22



802.11n HT20 – SISO Ant. 1

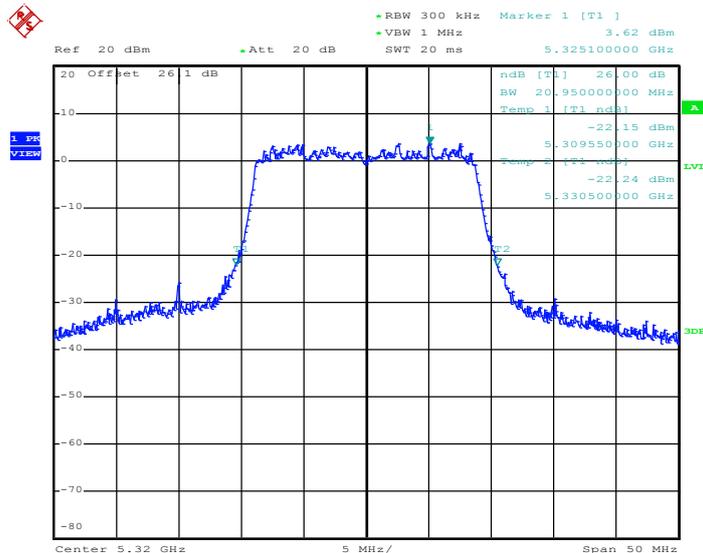
26 dB Bandwidth Plot on Channel 64



Date: 5.MAR.2013 15:18:03

802.11n HT20 – MIMO Ant. 1

26 dB Bandwidth Plot on Channel 64

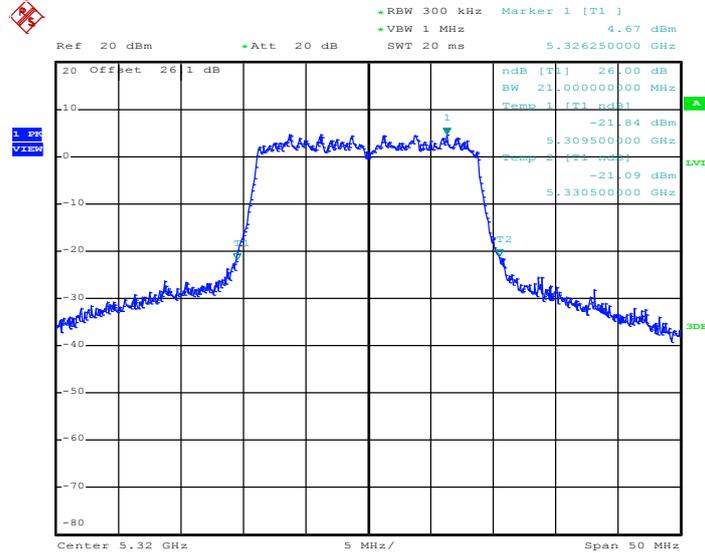


Date: 5.MAR.2013 16:16:29



802.11n HT20 – MIMO Ant. 2

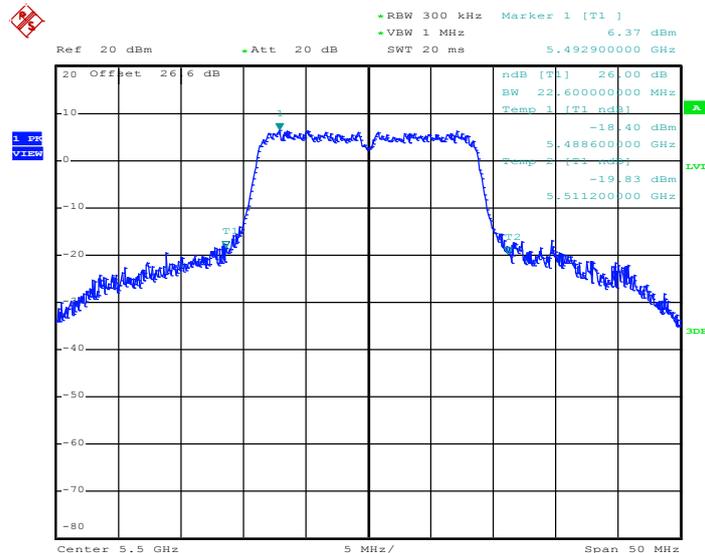
26 dB Bandwidth Plot on Channel 64



Date: 5.MAR.2013 16:19:44

802.11n HT20 – SISO Ant. 1

26 dB Bandwidth Plot on Channel 100

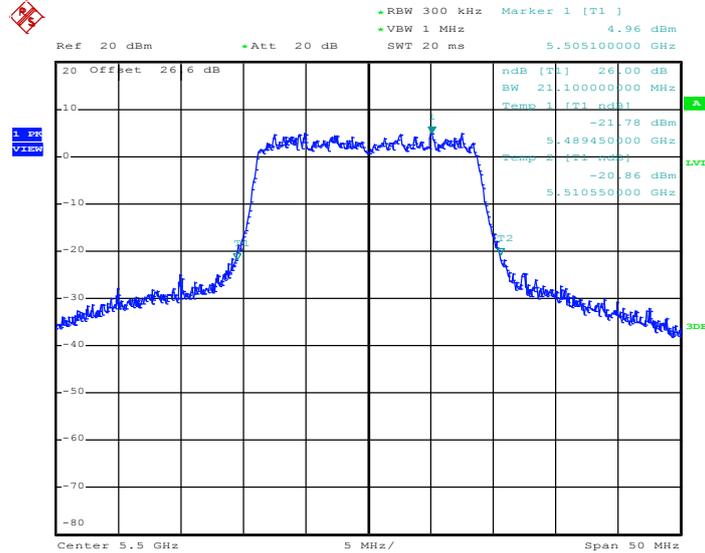


Date: 5.MAR.2013 15:15:33



802.11n HT20 – MIMO Ant. 1

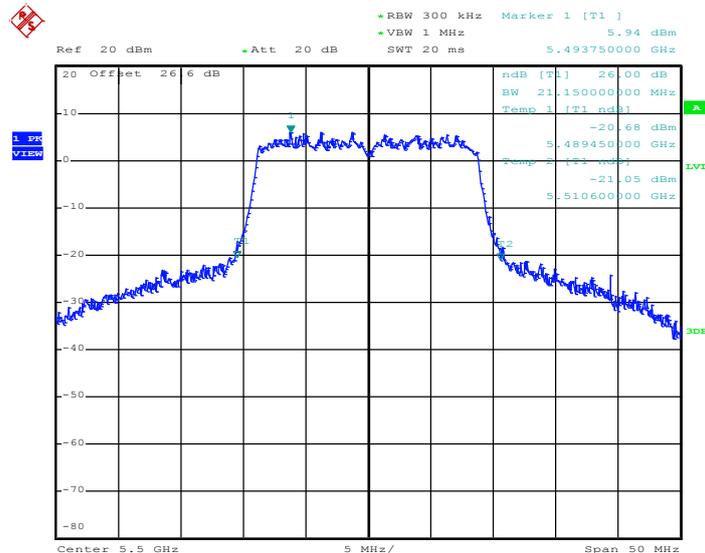
26 dB Bandwidth Plot on Channel 100



Date: 5.MAR.2013 16:22:26

802.11n HT20 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 100

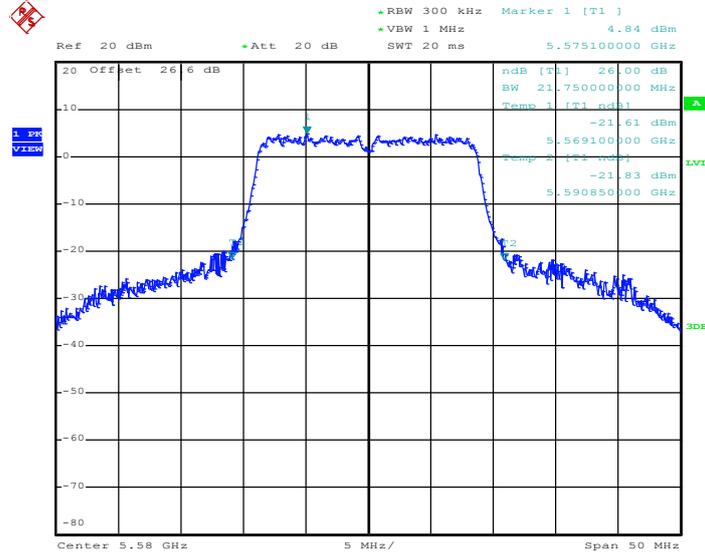


Date: 5.MAR.2013 16:25:27



802.11n HT20 – SISO Ant. 1

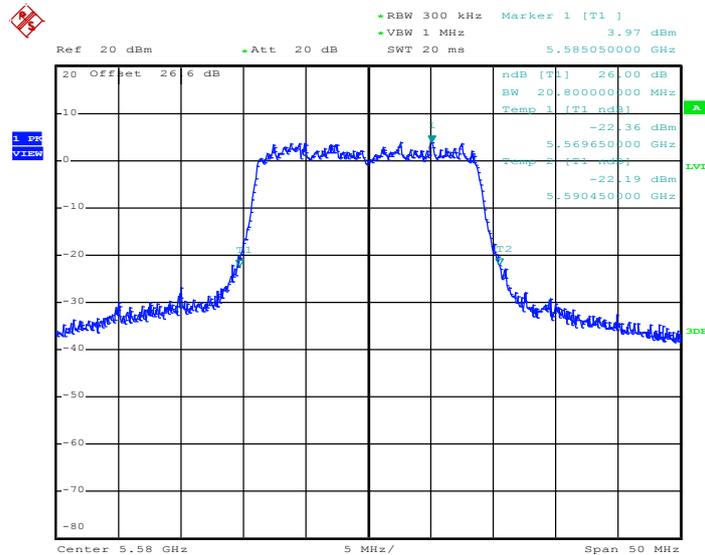
26 dB Bandwidth Plot on Channel 116



Date: 5.MAR.2013 15:10:40

802.11n HT20 – MIMO Ant. 1

26 dB Bandwidth Plot on Channel 116

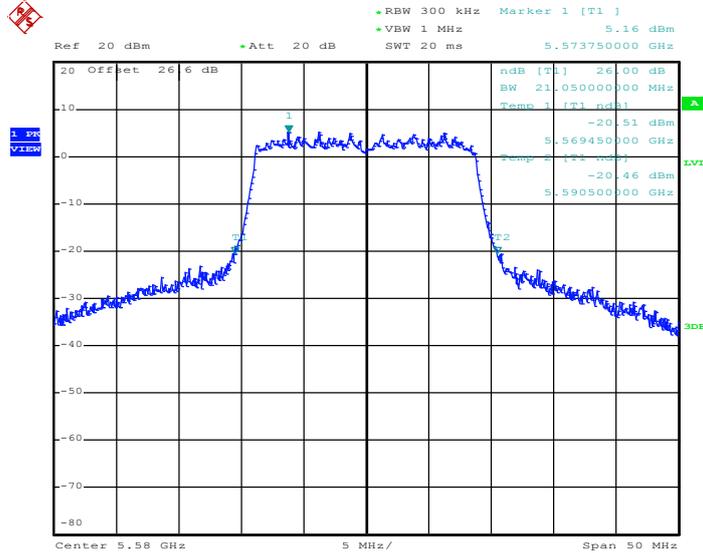


Date: 5.MAR.2013 16:28:02



802.11n HT20 – MIMO Ant. 2

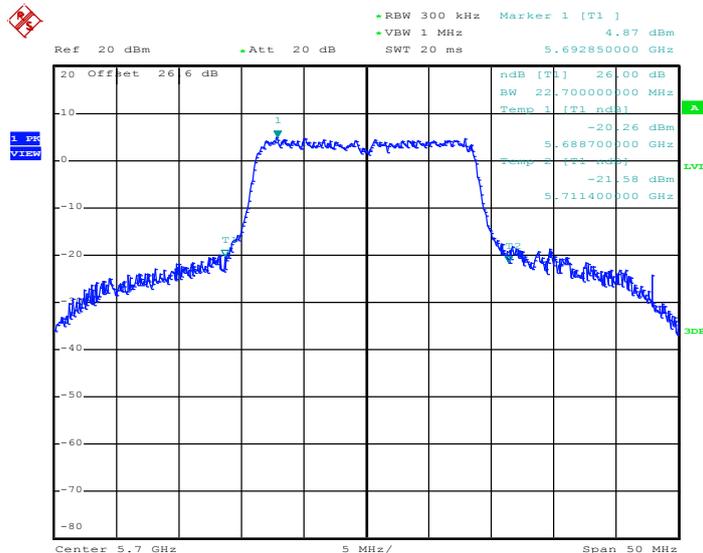
26 dB Bandwidth Plot on Channel 116



Date: 5.MAR.2013 16:31:03

802.11n HT20 – SISO Ant. 1

26 dB Bandwidth Plot on Channel 140

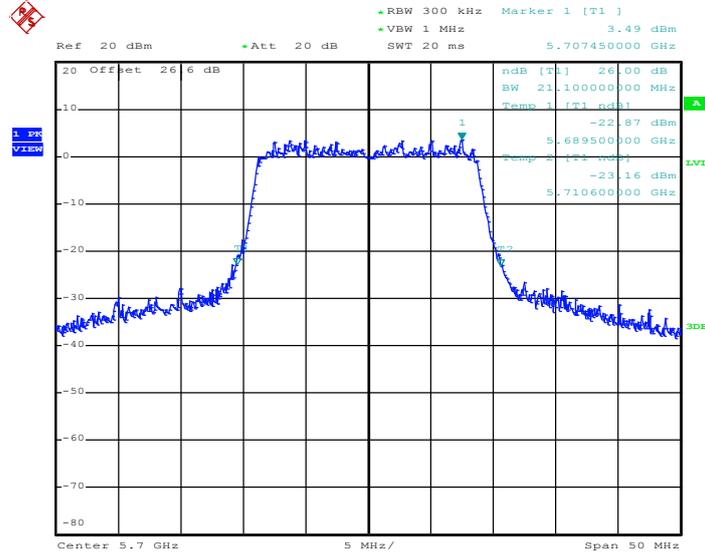


Date: 5.MAR.2013 15:07:48



802.11n HT20 – MIMO Ant. 1

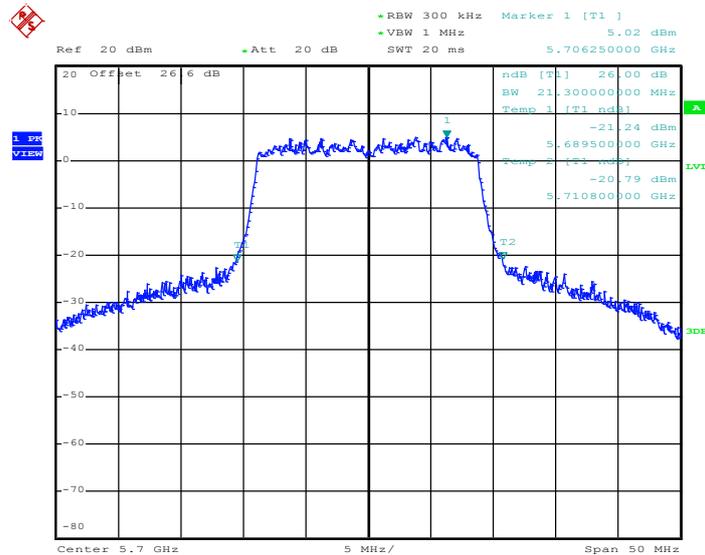
26 dB Bandwidth Plot on Channel 140



Date: 5.MAR.2013 16:33:31

802.11n HT20 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 140



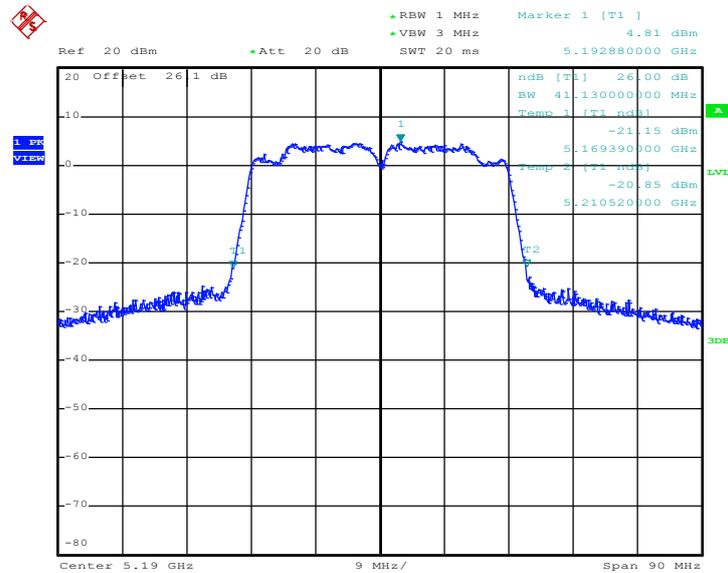
Date: 5.MAR.2013 16:36:25



Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%

Band	Channel	Frequency (MHz)	802.11n HT40 26dB Bandwidth (MHz)			Pass/Fail
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	
NII Band 1	38	5190	41.13	40.68	40.95	N/A
	46	5230	41.13	40.68	40.50	N/A
NII Band 2	54	5270	41.31	40.77	40.59	N/A
	62	5310	41.13	40.59	40.68	N/A
NII Band 3	102	5510	41.13	40.86	40.59	N/A
	110	5550	45.72	40.59	40.86	N/A
	134	5670	44.82	40.77	40.95	N/A

802.11n HT40 – SISO Ant. 1  
26 dB Bandwidth Plot on Channel 38

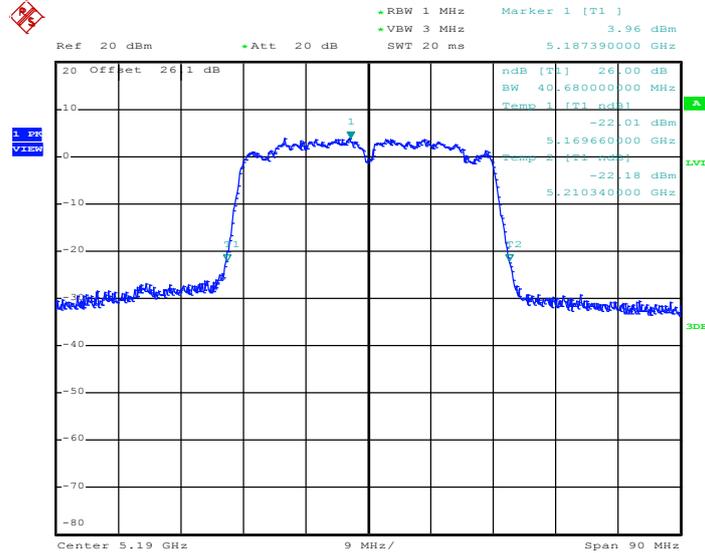


Date: 5.MAR.2013 17:08:41



802.11n HT40 – MIMO Ant. 1

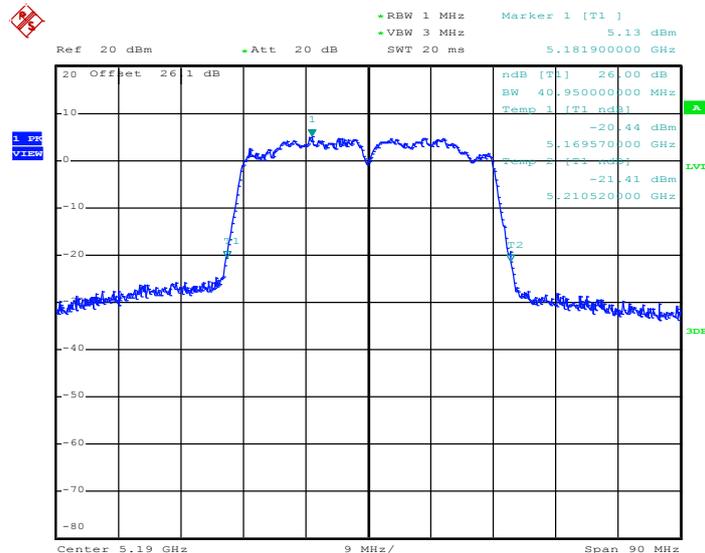
26 dB Bandwidth Plot on Channel 38



Date: 5.MAR.2013 17:11:46

802.11n HT40 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 38

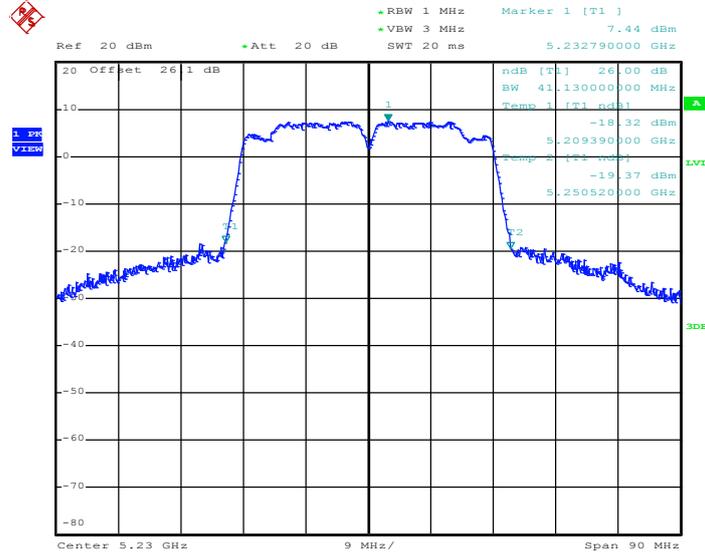


Date: 5.MAR.2013 17:17:36



802.11n HT40 – SISO Ant. 1

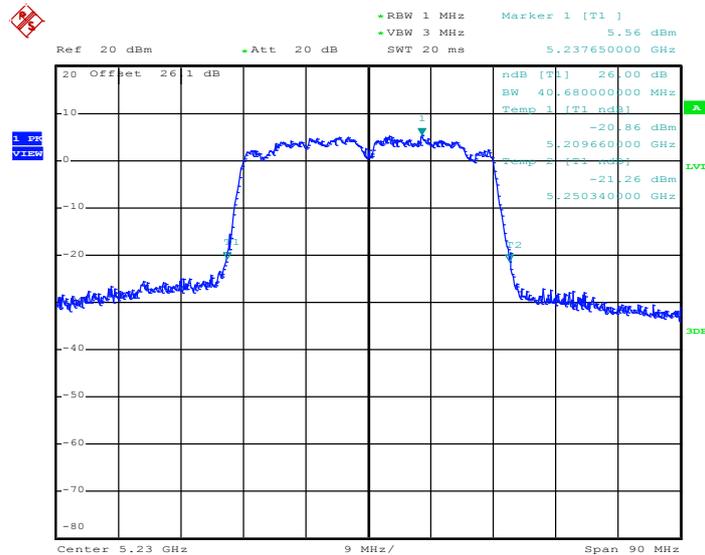
26 dB Bandwidth Plot on Channel 46



Date: 5.MAR.2013 17:05:46

802.11n HT40 – MIMO Ant. 1

26 dB Bandwidth Plot on Channel 46

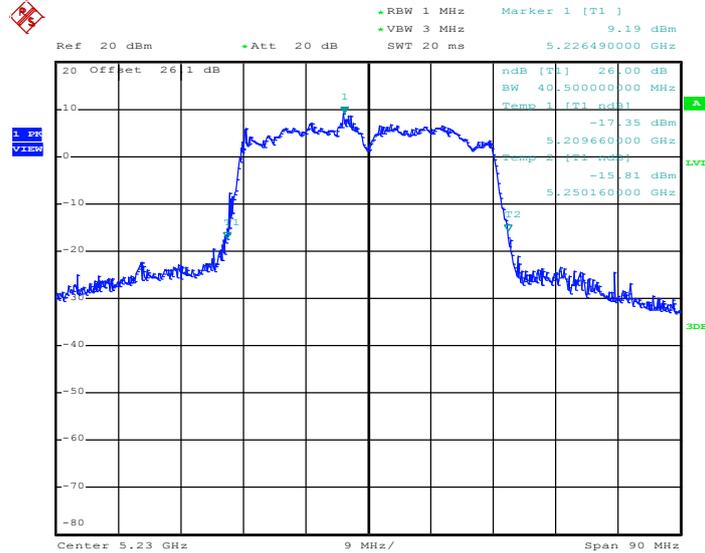


Date: 5.MAR.2013 17:19:58



802.11n HT40 – MIMO Ant. 2

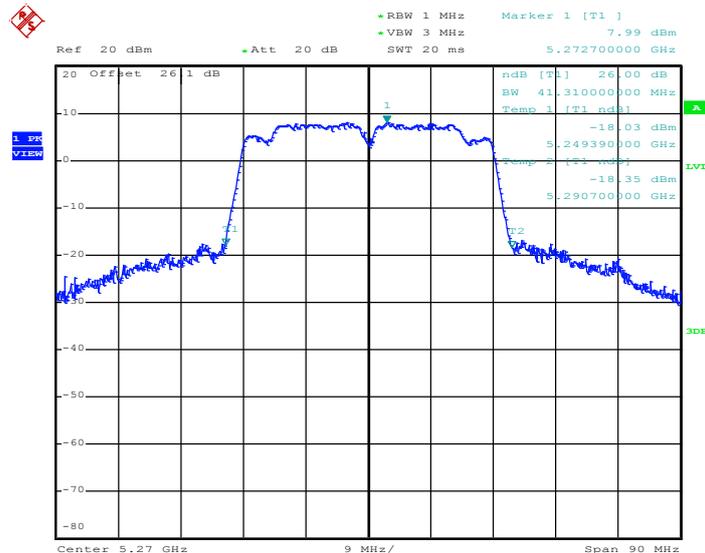
26 dB Bandwidth Plot on Channel 46



Date: 5.MAR.2013 17:23:10

802.11n HT40 – SISO Ant. 1

26 dB Bandwidth Plot on Channel 54

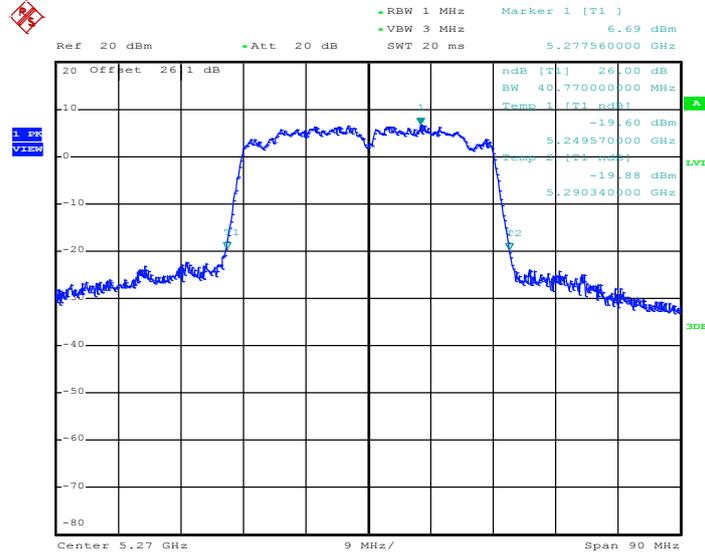


Date: 5.MAR.2013 16:58:30



802.11n HT40 – MIMO Ant. 1

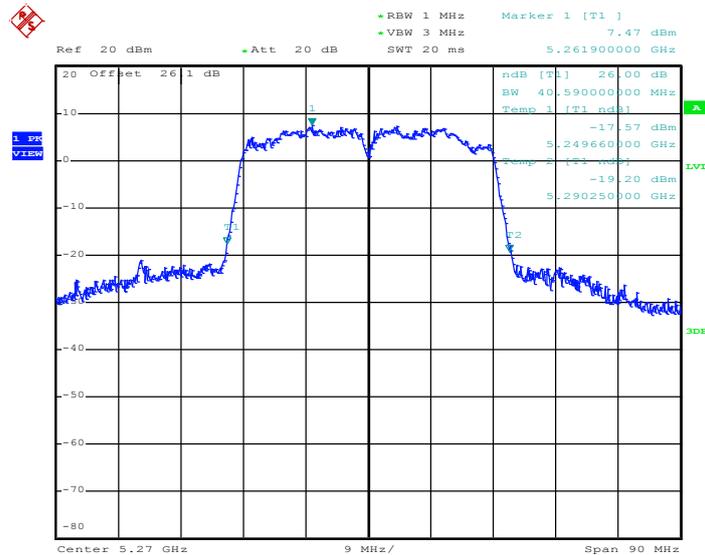
26 dB Bandwidth Plot on Channel 54



Date: 5.MAR.2013 17:25:34

802.11n HT40 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 54

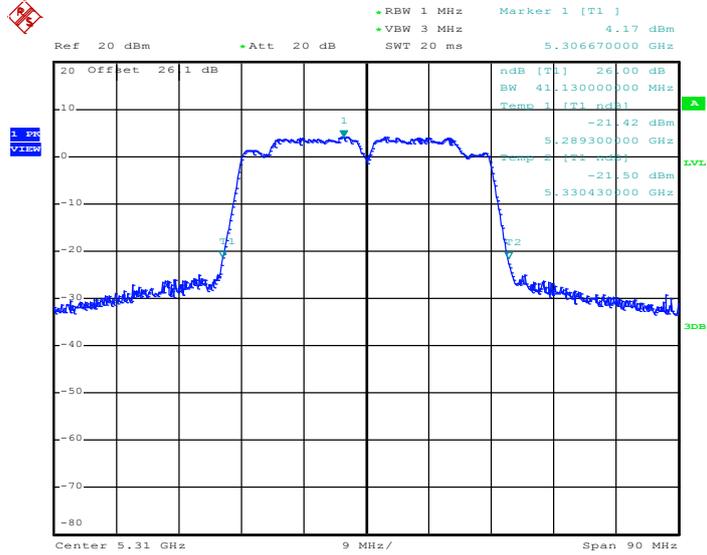


Date: 5.MAR.2013 17:28:54



802.11n HT40 – SISO Ant. 1

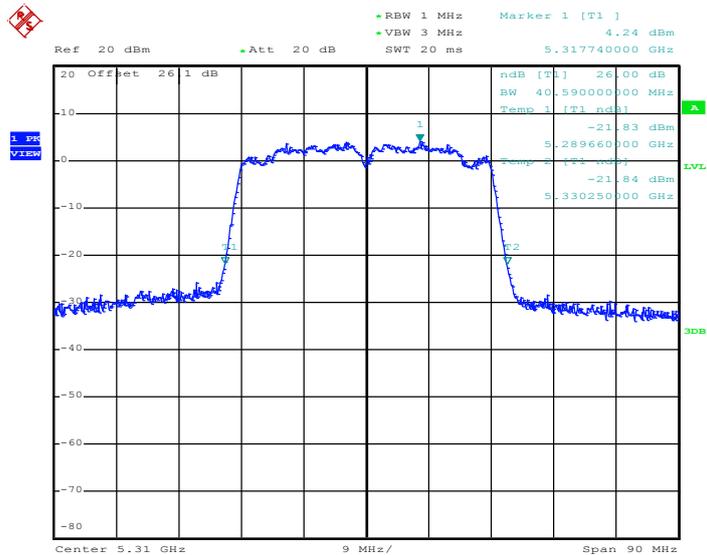
26 dB Bandwidth Plot on Channel 62



Date: 5.MAR.2013 16:55:36

802.11n HT40 – MIMO Ant. 1

26 dB Bandwidth Plot on Channel 62

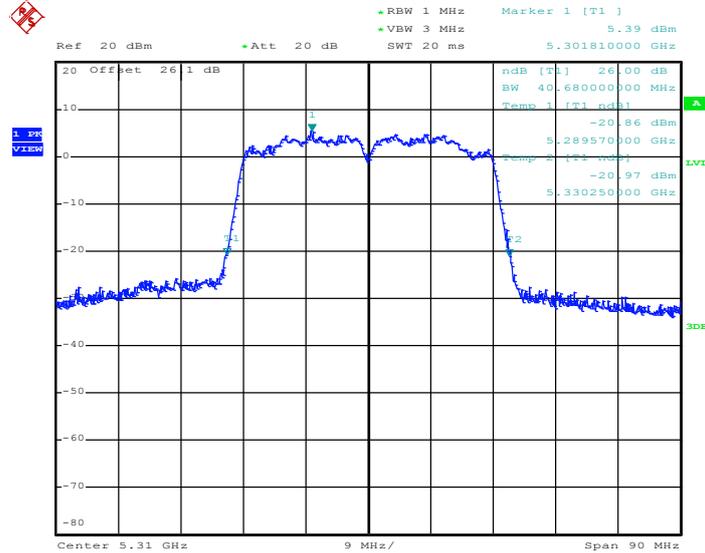


Date: 5.MAR.2013 17:31:14



802.11n HT40 – MIMO Ant. 2

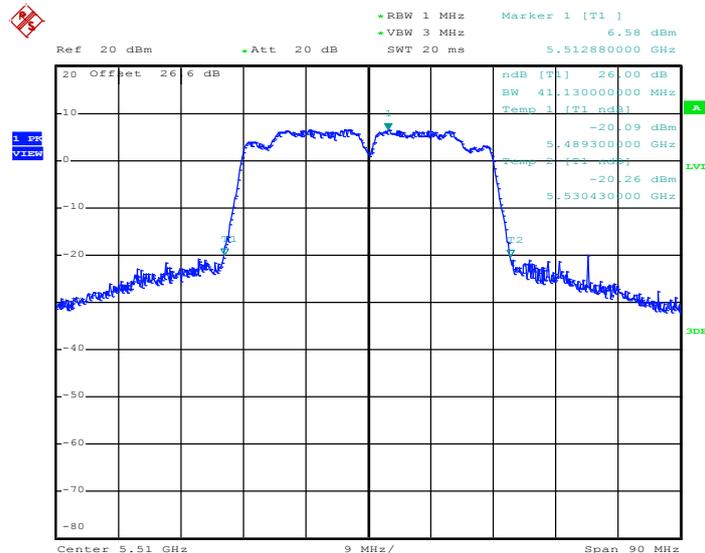
26 dB Bandwidth Plot on Channel 62



Date: 5.MAR.2013 17:34:40

802.11n HT40 – SISO Ant. 1

26 dB Bandwidth Plot on Channel 102

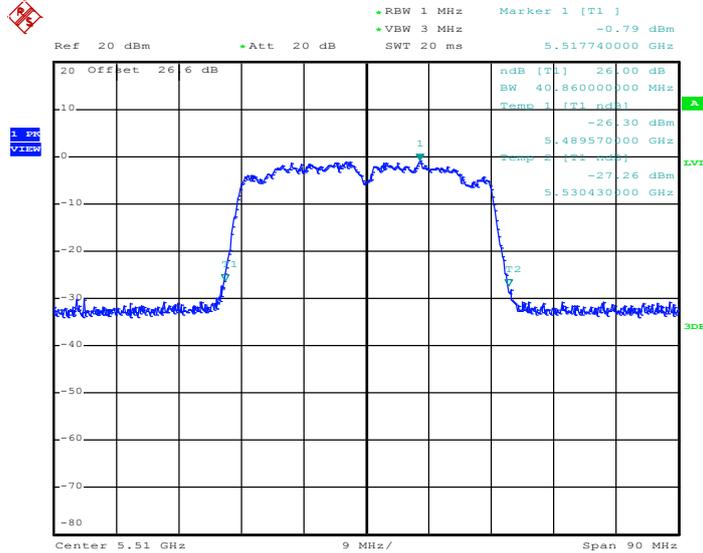


Date: 5.MAR.2013 16:52:10



802.11n HT40 – MIMO Ant. 1

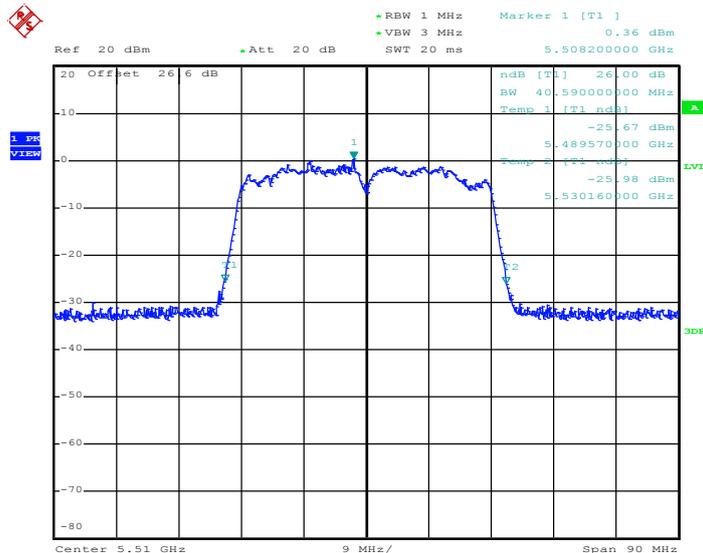
26 dB Bandwidth Plot on Channel 102



Date: 5.MAR.2013 17:37:20

802.11n HT40 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 102

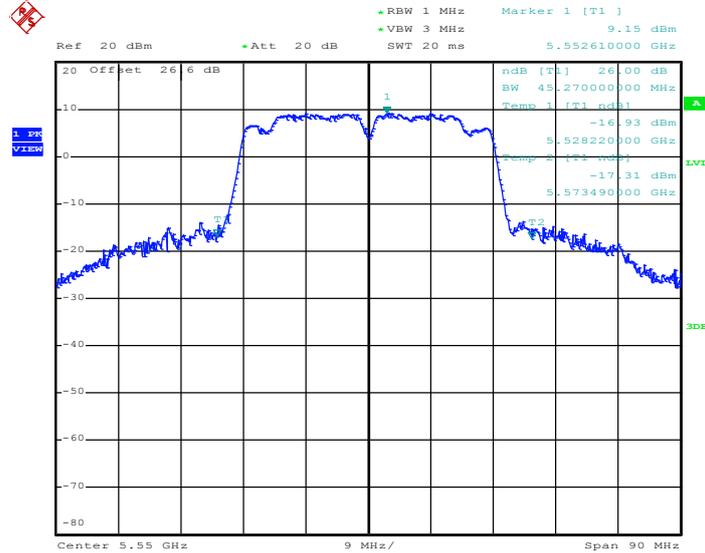


Date: 5.MAR.2013 17:43:21



802.11n HT40 – SISO Ant. 1

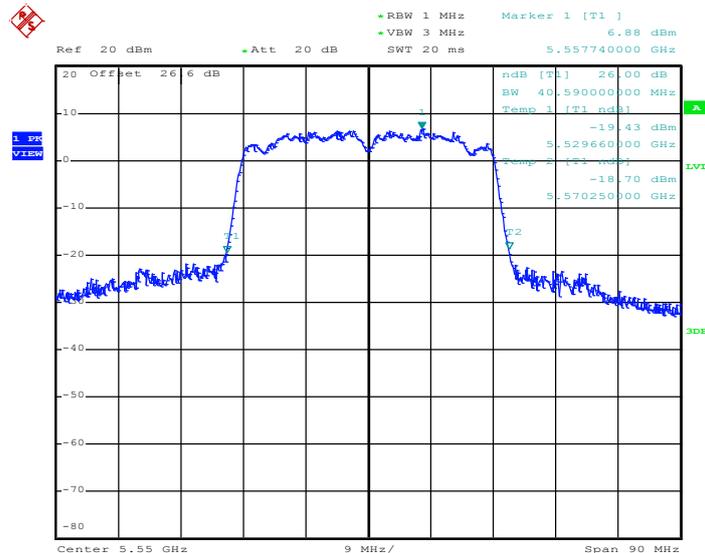
26 dB Bandwidth Plot on Channel 110



Date: 5.MAR.2013 16:49:27

802.11n HT40 – MIMO Ant. 1

26 dB Bandwidth Plot on Channel 110

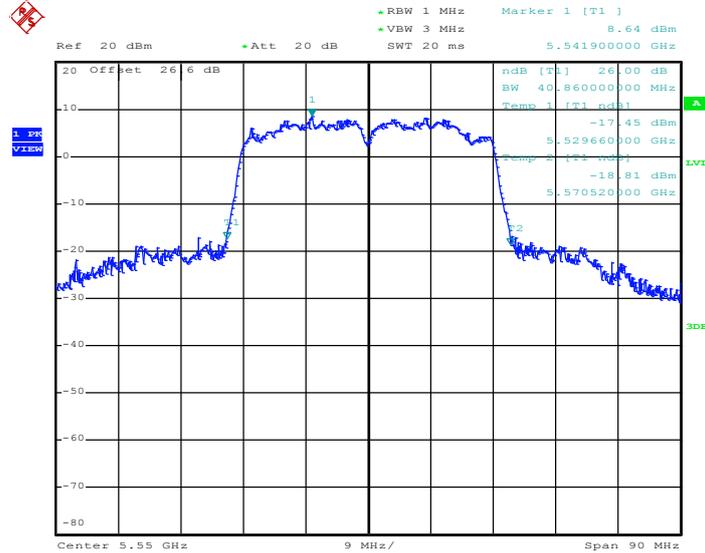


Date: 5.MAR.2013 19:07:58



802.11n HT40 – MIMO Ant. 2

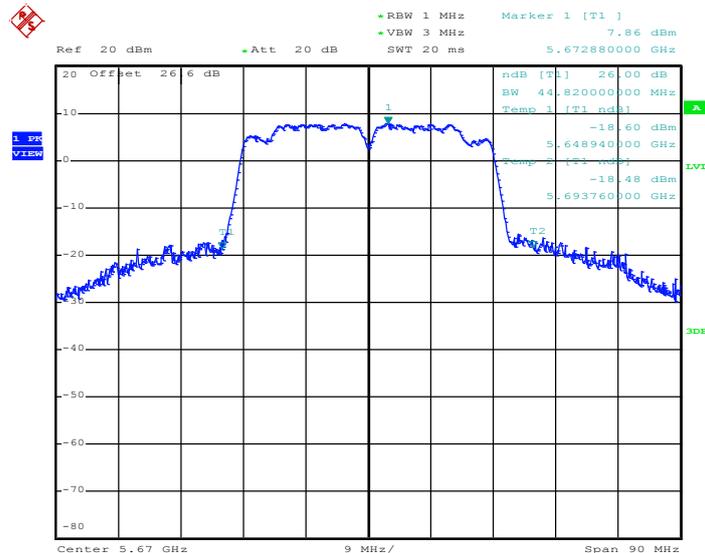
26 dB Bandwidth Plot on Channel 110



Date: 5.MAR.2013 19:22:55

802.11n HT40 – SISO Ant. 1

26 dB Bandwidth Plot on Channel 134

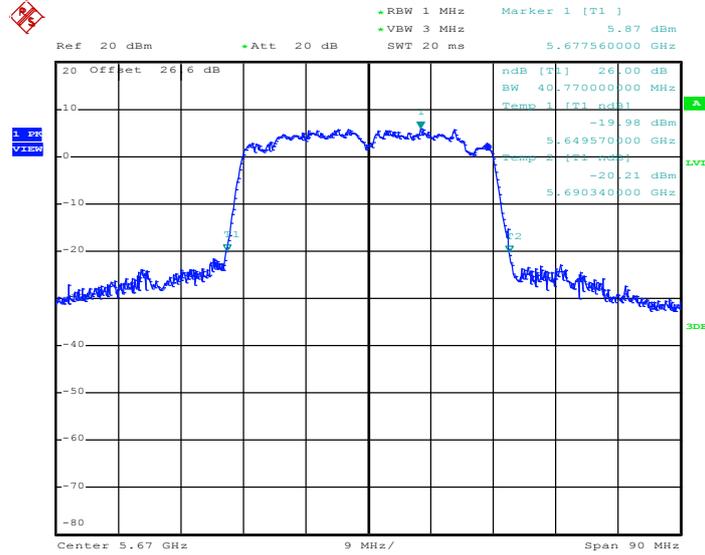


Date: 5.MAR.2013 16:46:40



802.11n HT40 – MIMO Ant. 1

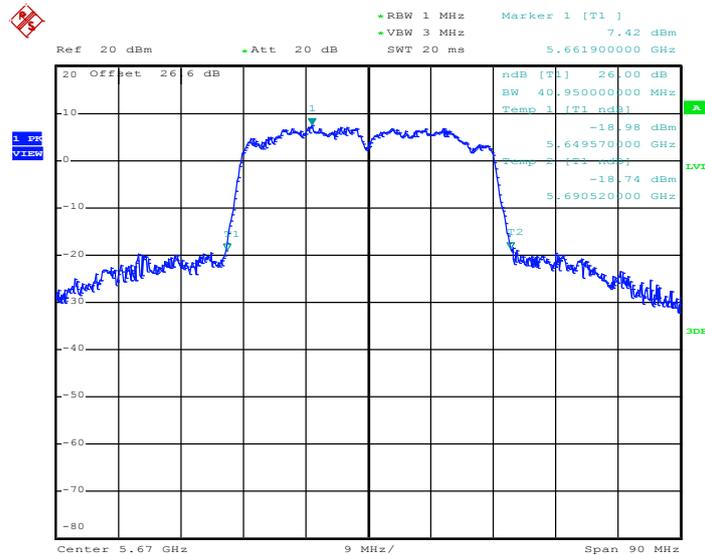
26 dB Bandwidth Plot on Channel 134



Date: 5.MAR.2013 19:26:19

802.11n HT40 – MIMO Ant. 2

26 dB Bandwidth Plot on Channel 134



Date: 5.MAR.2013 19:28:20



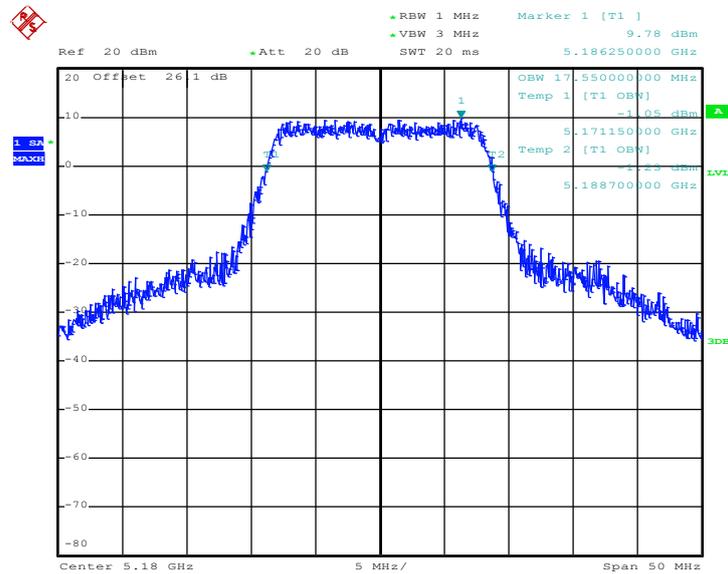
3.1.6 Test Result of 99% Occupied Bandwidth

Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%

Band	Channel	Frequency (MHz)	802.11a 99% Occupied Bandwidth (MHz)	Pass/Fail
			Ant. 1	
NII Band 1	36	5180	17.55	N/A
	44	5220	17.60	N/A
	48	5240	17.70	N/A
NII Band 2	52	5260	17.55	N/A
	60	5300	17.65	N/A
	64	5320	17.65	N/A
NII Band 3	100	5500	17.70	N/A
	116	5580	17.60	N/A
	140	5700	17.90	N/A

802.11a – Ant. 1

99% Occupied Bandwidth Plot on 802.11a Channel 36

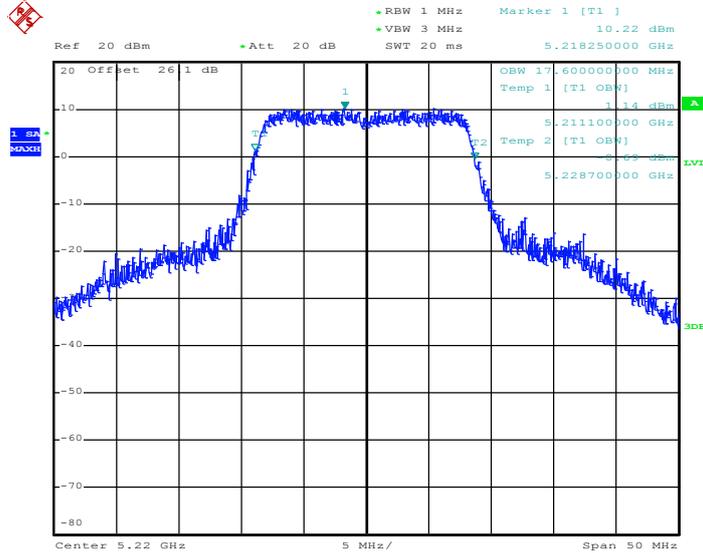


Date: 5.MAR.2013 14:26:53



802.11a – Ant. 1

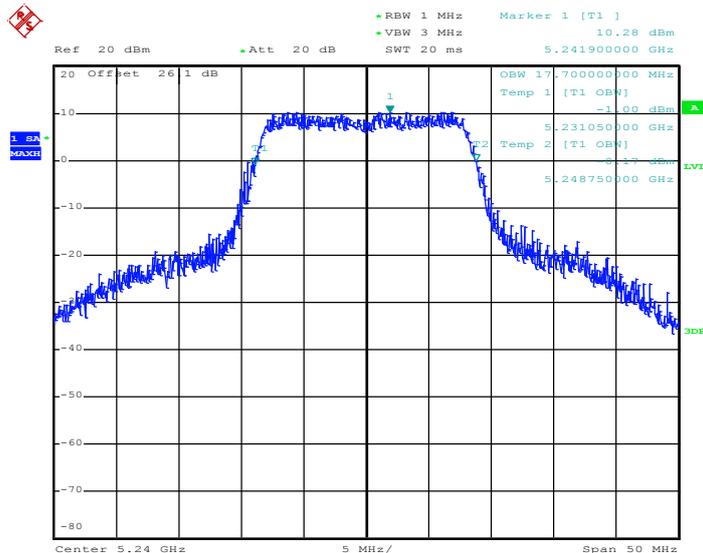
99% Occupied Bandwidth Plot on 802.11a Channel 44



Date: 5.MAR.2013 14:34:38

802.11a – Ant. 1

99% Occupied Bandwidth Plot on 802.11a Channel 48

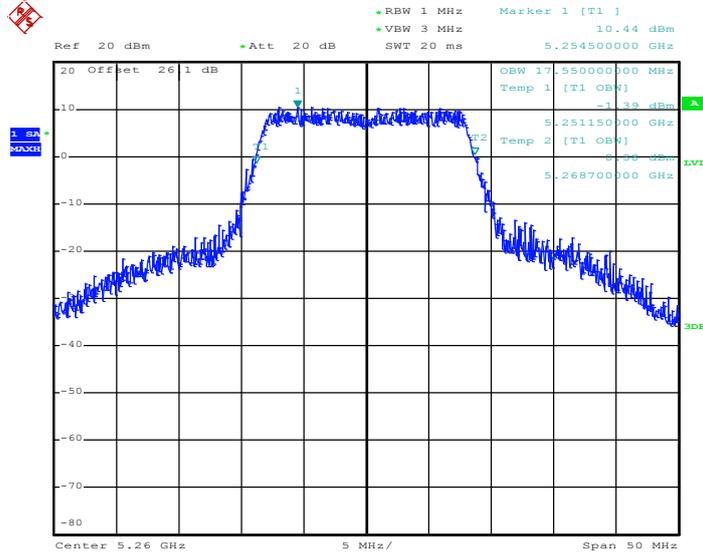


Date: 5.MAR.2013 14:37:43



802.11a – Ant. 1

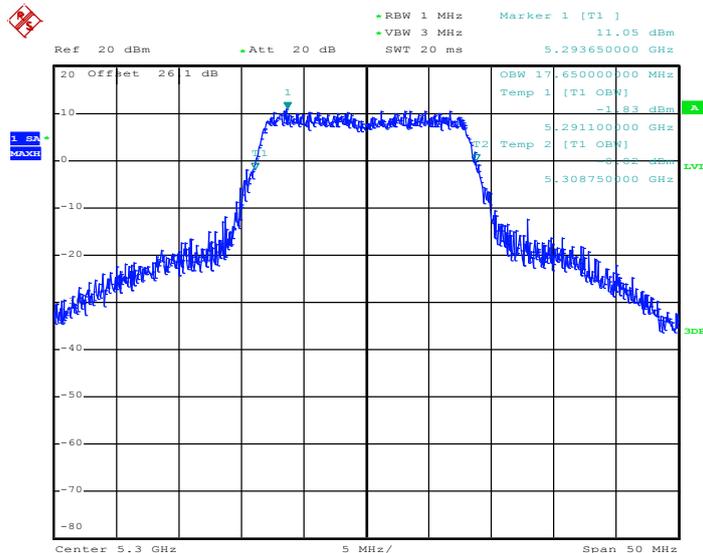
99% Occupied Bandwidth Plot on 802.11a Channel 52



Date: 5.MAR.2013 14:40:41

802.11a – Ant. 1

99% Occupied Bandwidth Plot on 802.11a Channel 60

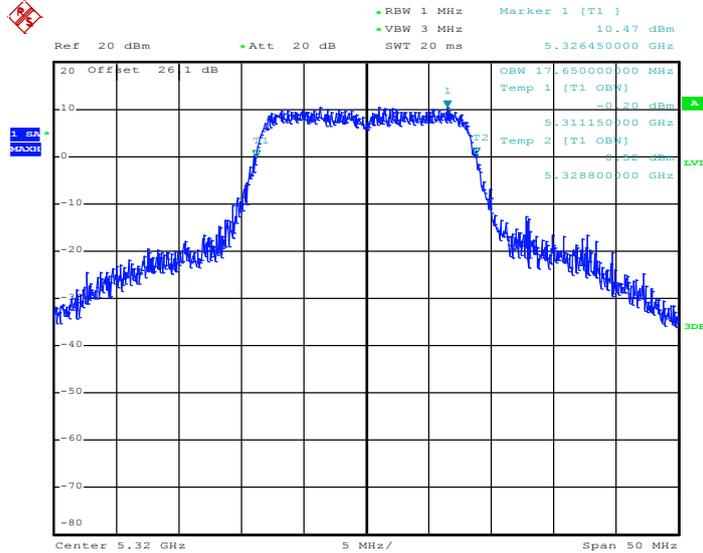


Date: 5.MAR.2013 14:43:50



802.11a – Ant. 1

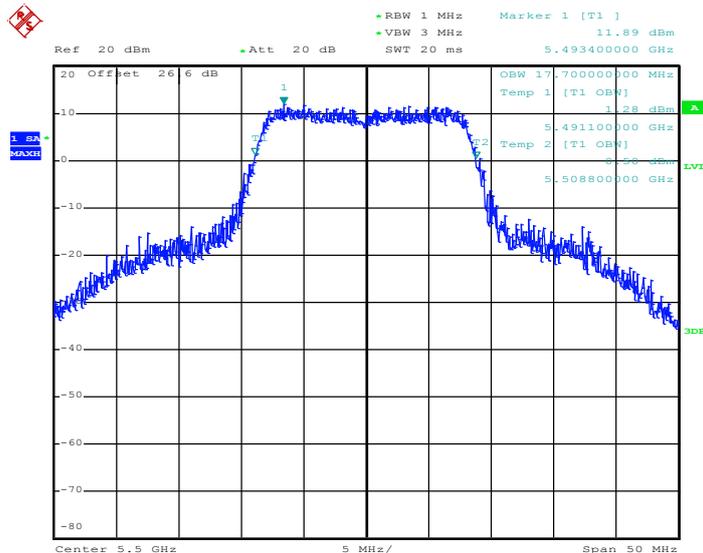
99% Occupied Bandwidth Plot on 802.11a Channel 64



Date: 5.MAR.2013 14:47:22

802.11a – Ant. 1

99% Occupied Bandwidth Plot on 802.11a Channel 100

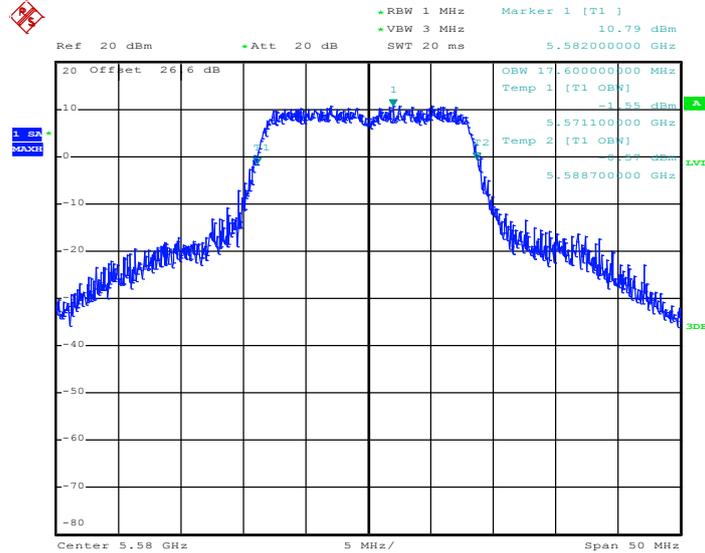


Date: 5.MAR.2013 14:50:05



802.11a – Ant. 1

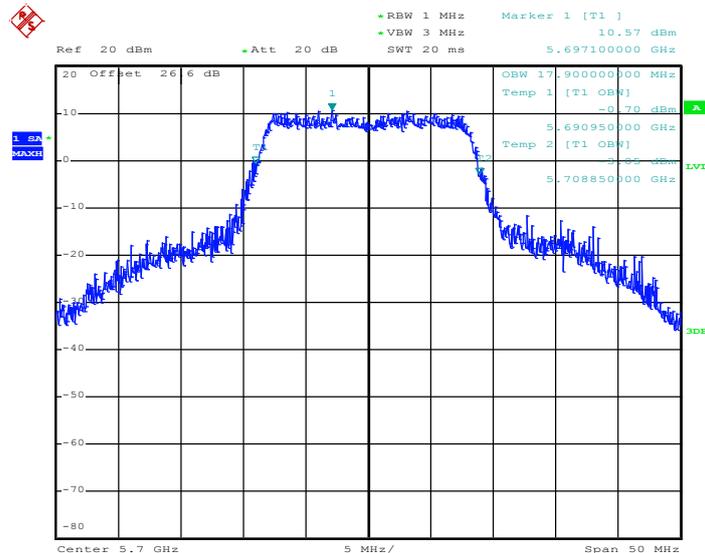
99% Occupied Bandwidth Plot on 802.11a Channel 116



Date: 5.MAR.2013 14:56:39

802.11a – Ant. 1

99% Occupied Bandwidth Plot on 802.11a Channel 140



Date: 5.MAR.2013 15:07:10

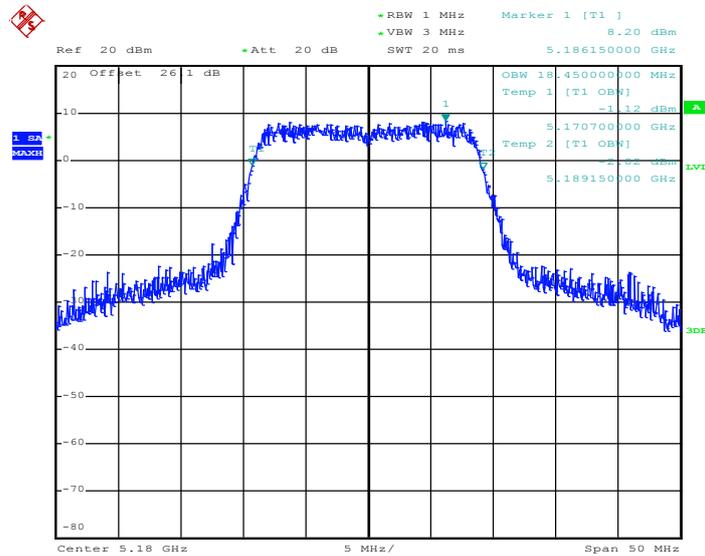


Test Mode :	802.11n HT20	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%

Band	Channel	Frequency (MHz)	802.11n HT20 99% Occupied Bandwidth (MHz)			Pass/Fail
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	
NII Band 1	36	5180	18.45	18.40	18.40	N/A
	44	5220	18.55	18.50	18.45	N/A
	48	5240	18.50	18.50	18.45	N/A
NII Band 2	52	5260	18.50	18.50	18.45	N/A
	60	5300	18.50	18.45	18.40	N/A
	64	5320	18.55	18.50	18.50	N/A
NII Band 3	100	5500	18.55	18.55	18.50	N/A
	116	5580	18.50	18.45	18.45	N/A
	140	5700	18.70	18.55	18.50	N/A

802.11n HT20 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 36

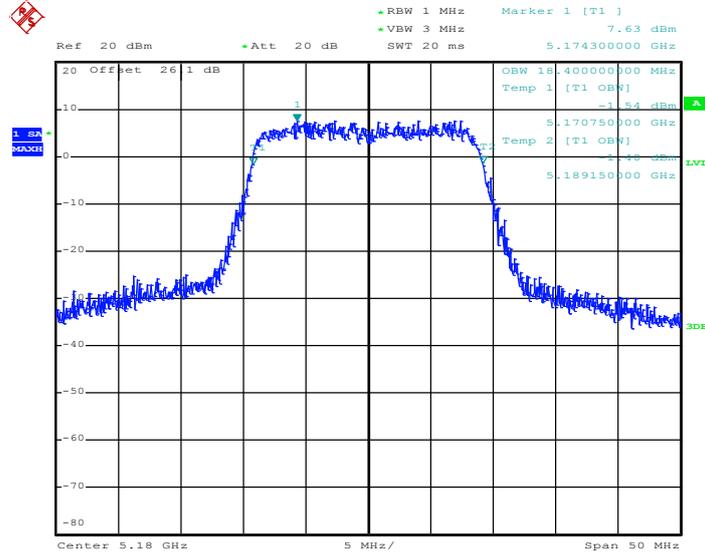


Date: 5.MAR.2013 15:34:46



802.11n HT20 – MIMO Ant. 1

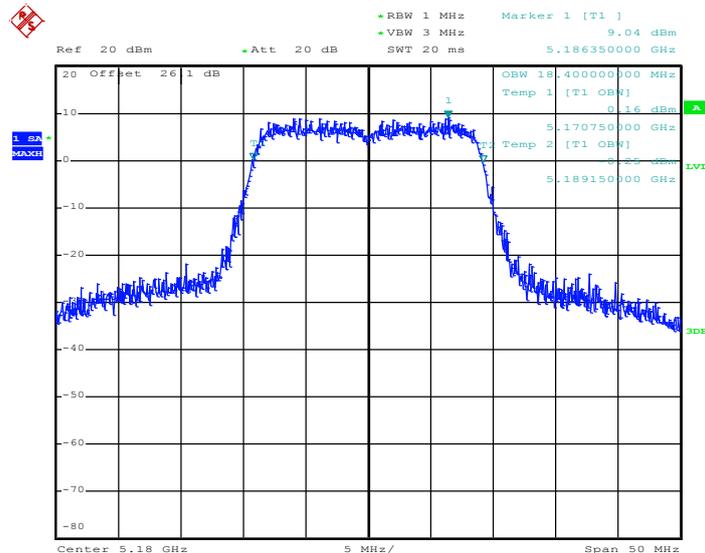
99% Occupied Bandwidth Plot on Channel 36



Date: 5.MAR.2013 15:45:06

802.11n HT20 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 36

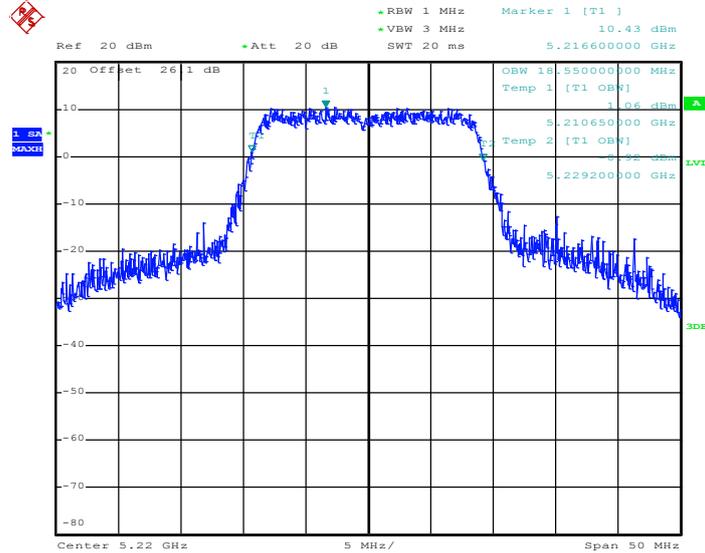


Date: 5.MAR.2013 15:50:35



802.11n HT20 – SISO Ant. 1

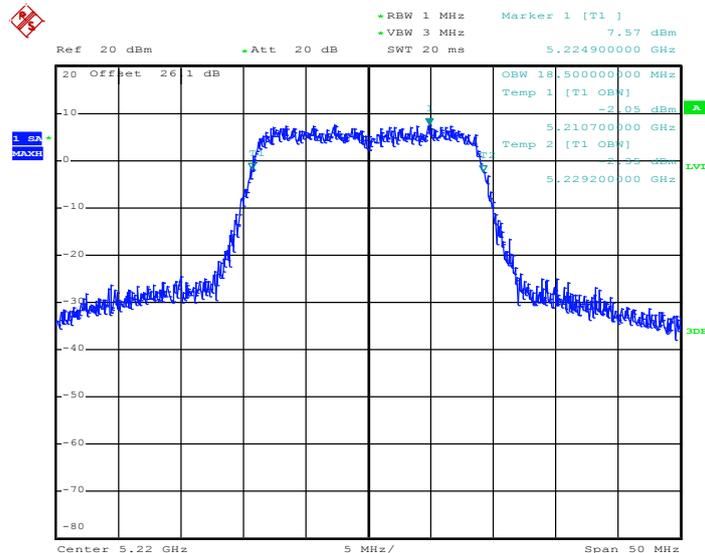
99% Occupied Bandwidth Plot on Channel 44



Date: 5.MAR.2013 15:32:07

802.11n HT20 – MIMO Ant. 1

99% Occupied Bandwidth Plot on Channel 44

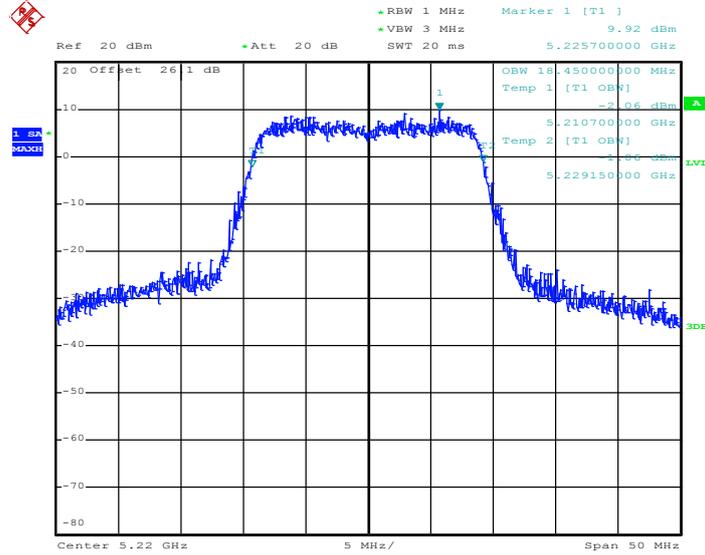


Date: 5.MAR.2013 15:57:25



802.11n HT20 – MIMO Ant. 2

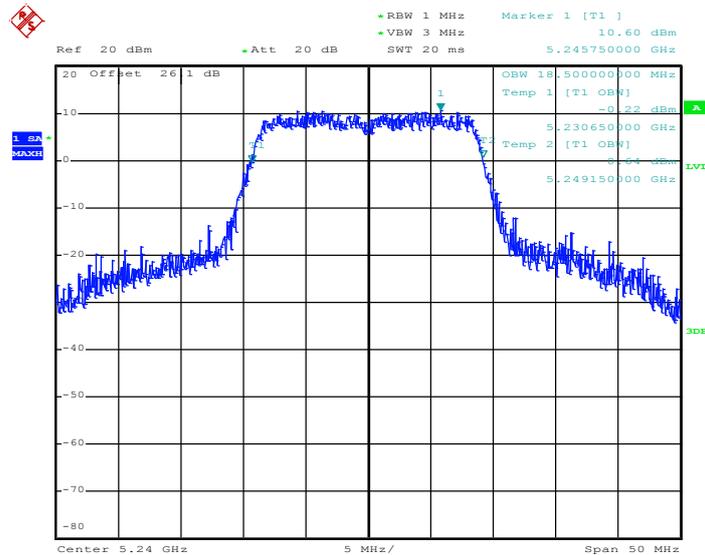
99% Occupied Bandwidth Plot on Channel 44



Date: 5.MAR.2013 15:53:49

802.11n HT20 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 48

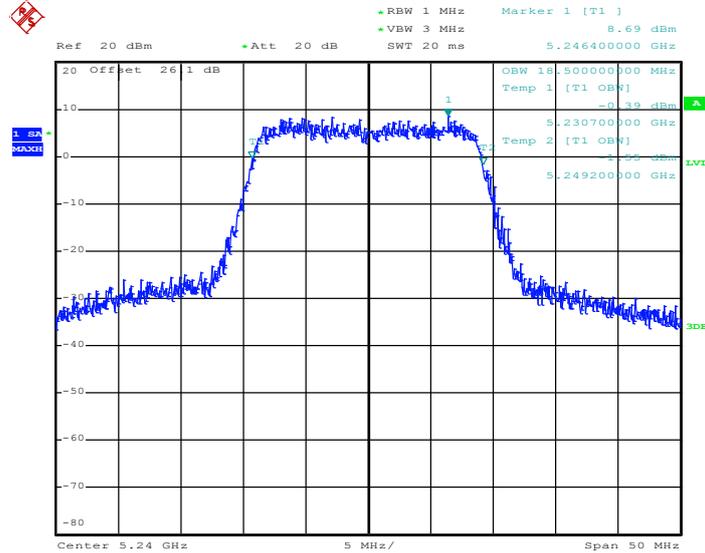


Date: 5.MAR.2013 15:28:28



802.11n HT20 – MIMO Ant. 1

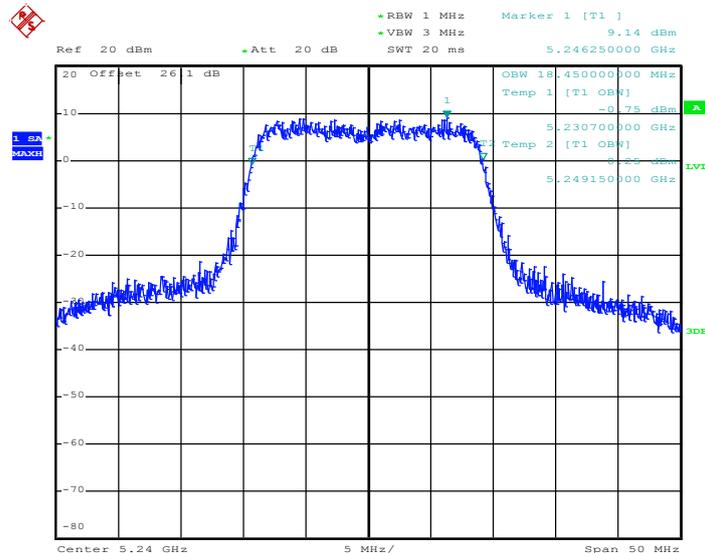
99% Occupied Bandwidth Plot on Channel 48



Date: 5.MAR.2013 16:01:03

802.11n HT20 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 48

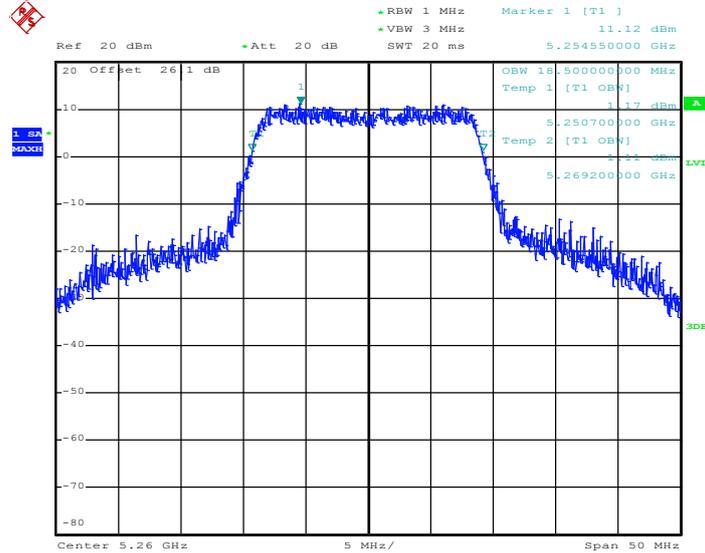


Date: 5.MAR.2013 16:04:05



802.11n HT20 – SISO Ant. 1

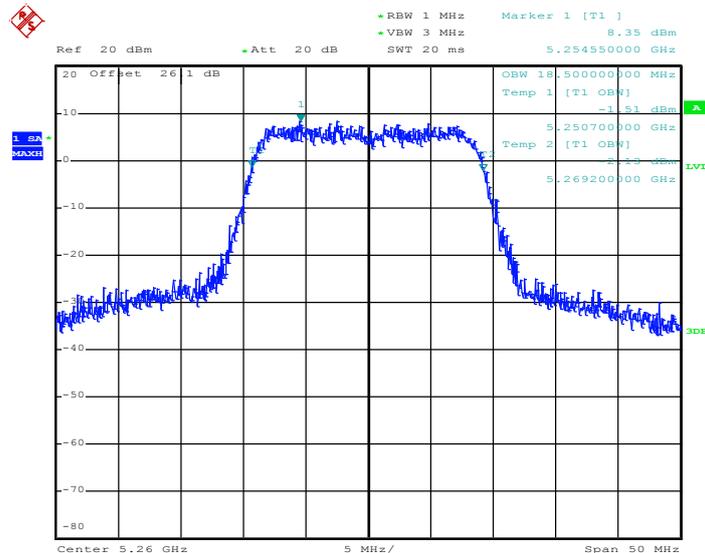
99% Occupied Bandwidth Plot on Channel 52



Date: 5.MAR.2013 15:26:07

802.11n HT20 – MIMO Ant. 1

99% Occupied Bandwidth Plot on Channel 52

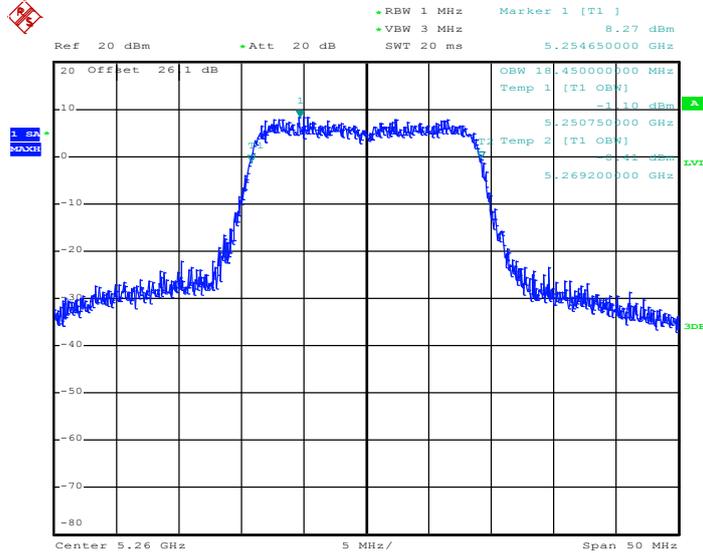


Date: 5.MAR.2013 16:07:12



802.11n HT20 – MIMO Ant. 2

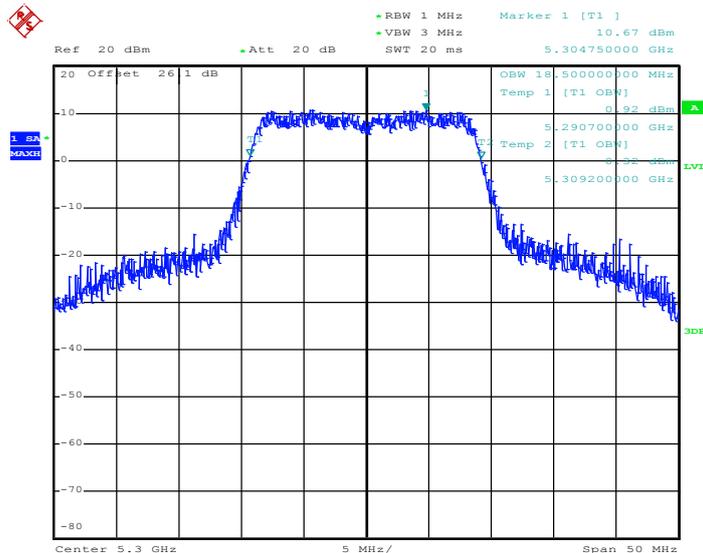
99% Occupied Bandwidth Plot on Channel 52



Date: 5.MAR.2013 16:10:32

802.11n HT20 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 60

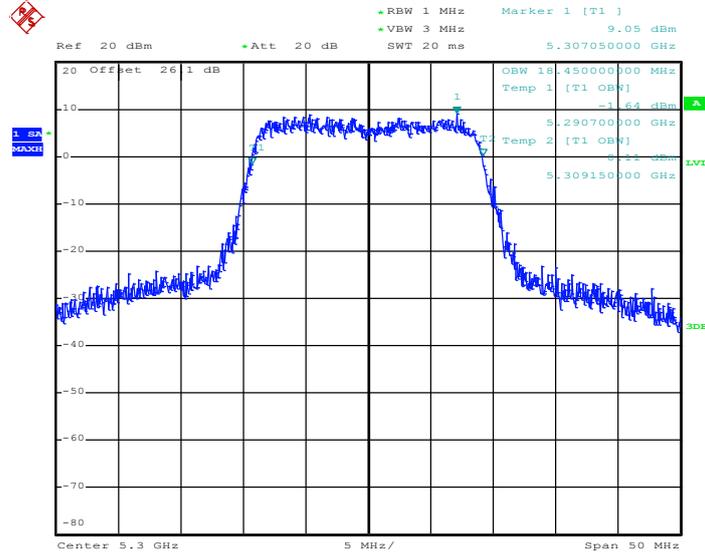


Date: 5.MAR.2013 15:23:17



802.11n HT20 – MIMO Ant. 1

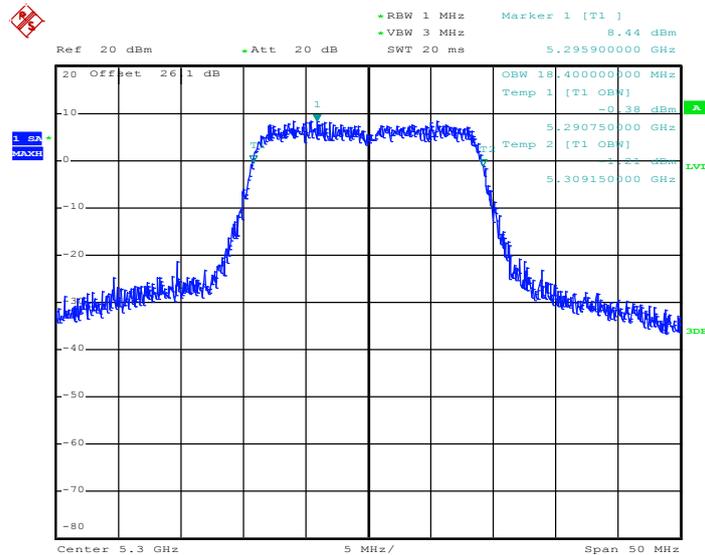
99% Occupied Bandwidth Plot on Channel 60



Date: 5.MAR.2013 16:13:02

802.11n HT20 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 60

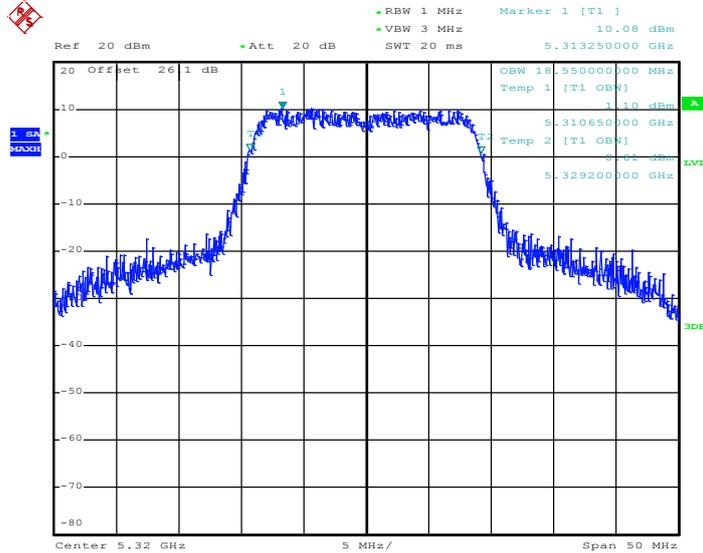


Date: 5.MAR.2013 16:15:59



802.11n HT20 – SISO Ant. 1

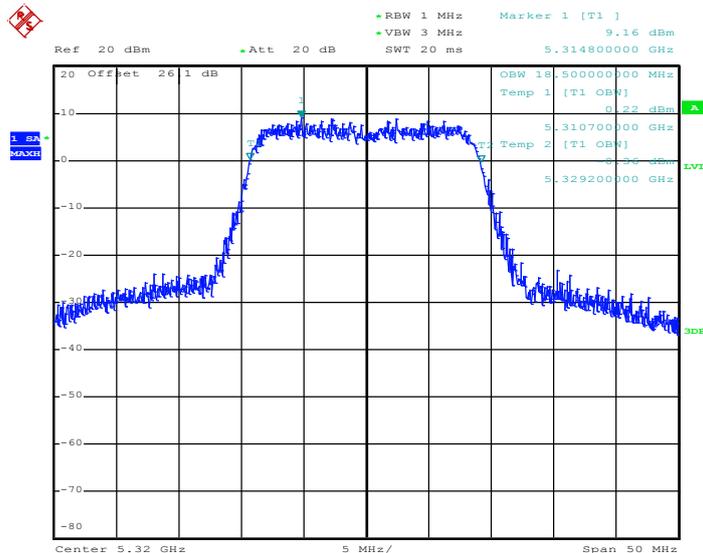
99% Occupied Bandwidth Plot on Channel 64



Date: 5.MAR.2013 15:20:13

802.11n HT20 – MIMO Ant. 1

99% Occupied Bandwidth Plot on Channel 64

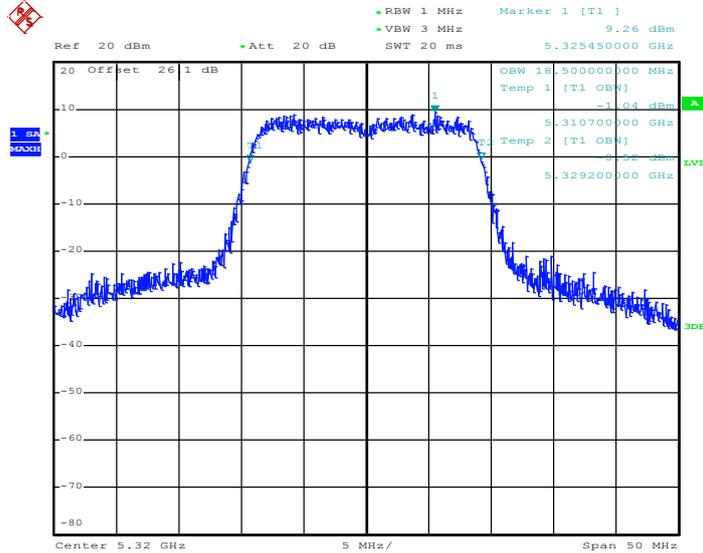


Date: 5.MAR.2013 16:18:22



802.11n HT20 – MIMO Ant. 2

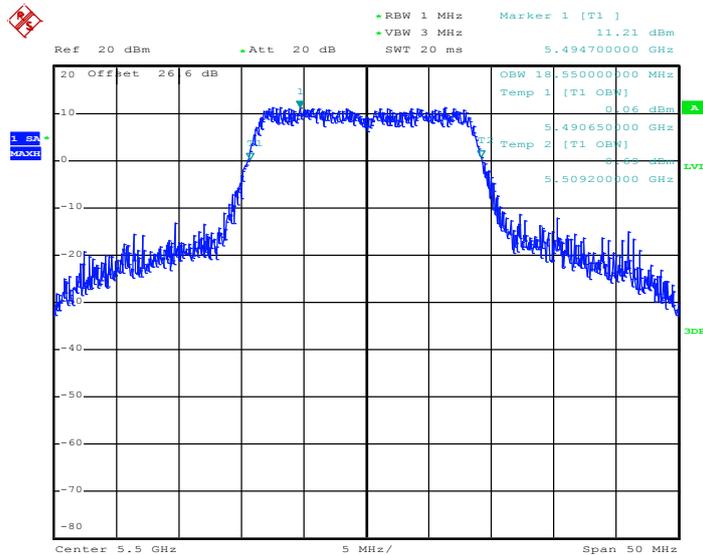
99% Occupied Bandwidth Plot on Channel 64



Date: 5.MAR.2013 16:21:24

802.11n HT20 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 100

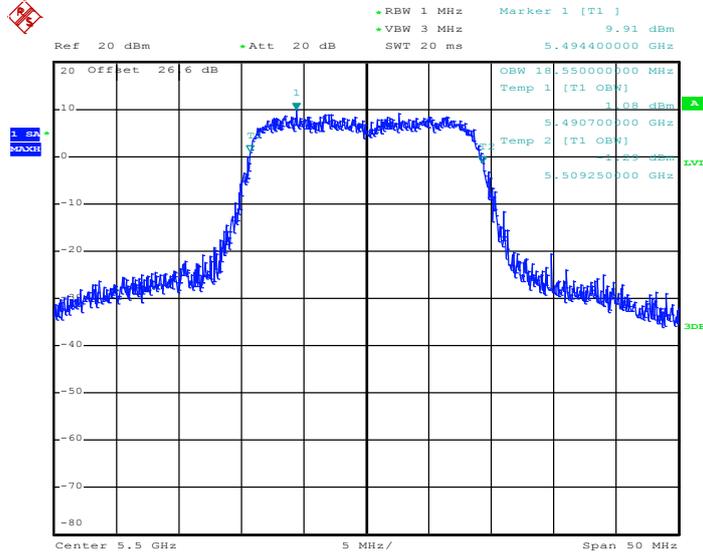


Date: 5.MAR.2013 15:17:32



802.11n HT20 – MIMO Ant. 1

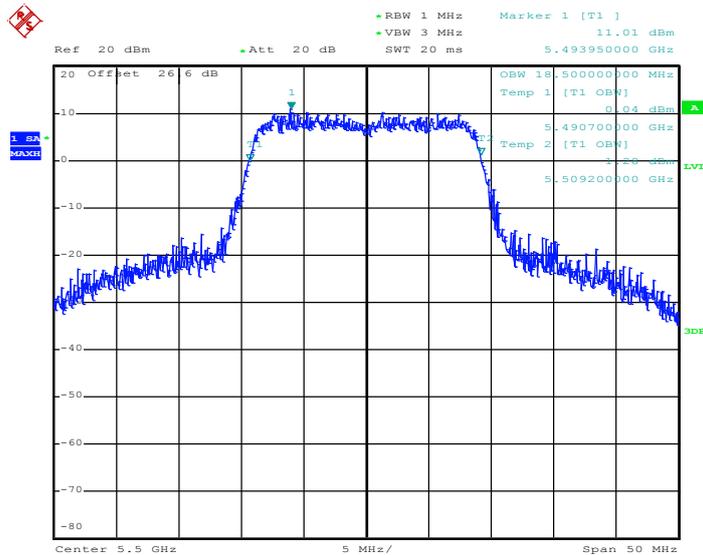
99% Occupied Bandwidth Plot on Channel 100



Date: 5.MAR.2013 16:24:01

802.11n HT20 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 100

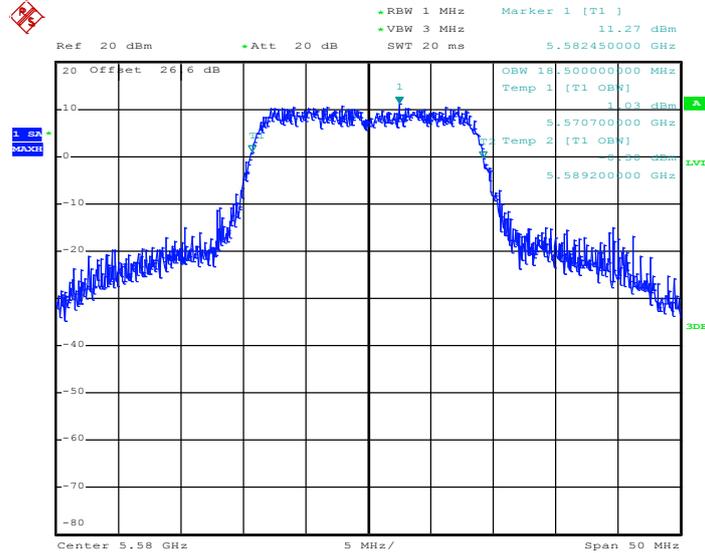


Date: 5.MAR.2013 16:27:11



802.11n HT20 – SISO Ant. 1

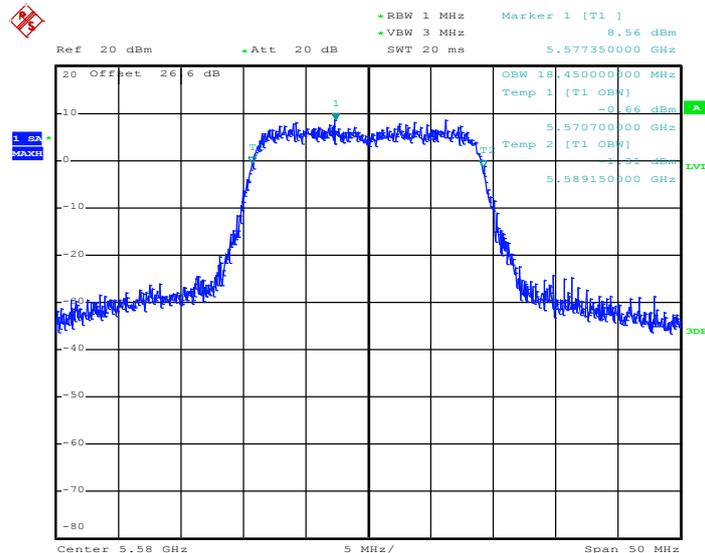
99% Occupied Bandwidth Plot on Channel 116



Date: 5.MAR.2013 15:14:52

802.11n HT20 – MIMO Ant. 1

99% Occupied Bandwidth Plot on Channel 116

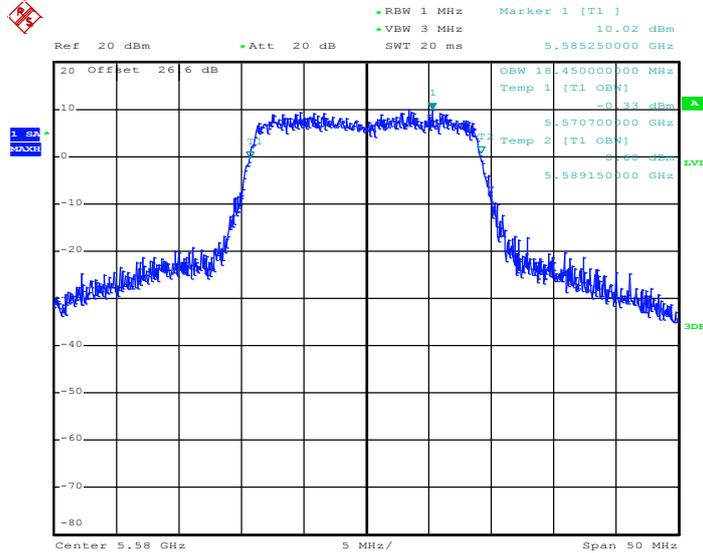


Date: 5.MAR.2013 16:29:44



802.11n HT20 – MIMO Ant. 2

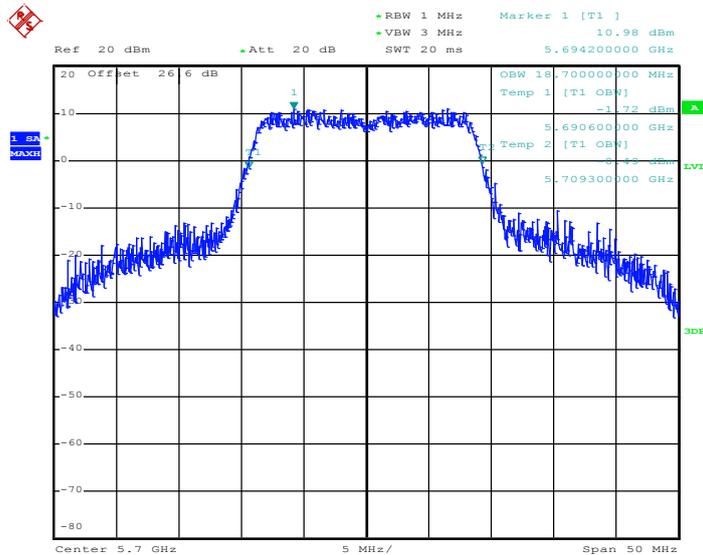
99% Occupied Bandwidth Plot on Channel 116



Date: 5.MAR.2013 16:32:40

802.11n HT20 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 140

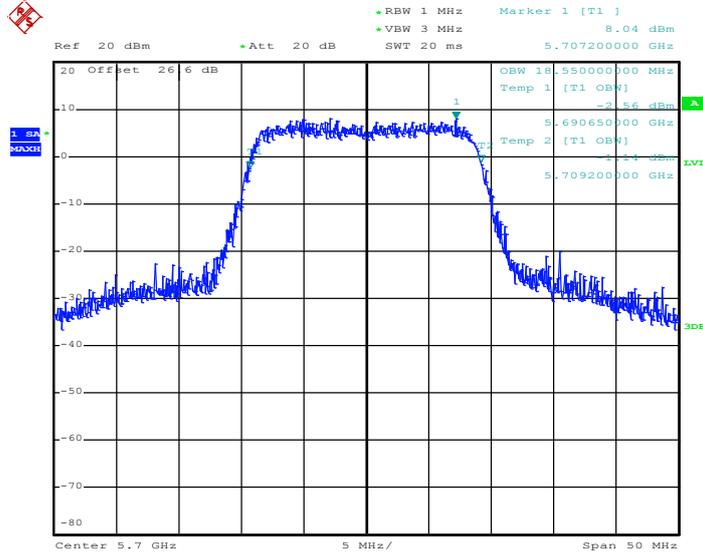


Date: 5.MAR.2013 15:10:08



802.11n HT20 – MIMO Ant. 1

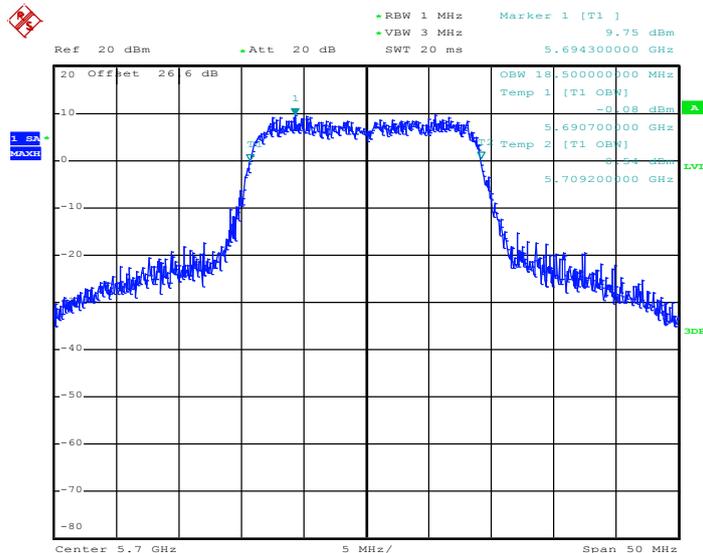
99% Occupied Bandwidth Plot on Channel 140



Date: 5.MAR.2013 16:35:11

802.11n HT20 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 140



Date: 5.MAR.2013 16:38:02

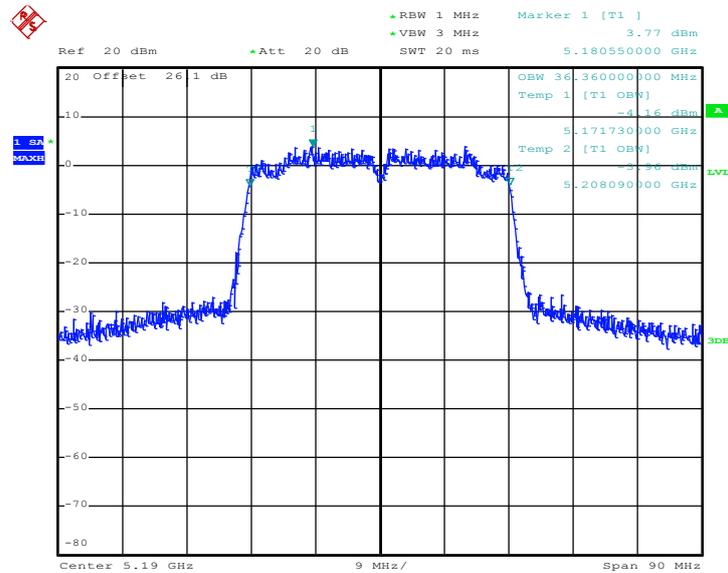


Test Mode :	802.11n HT40	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%

Band	Channel	Frequency (MHz)	802.11n HT40 99% Occupied Bandwidth (MHz)			Pass/Fail
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	
NII Band 1	38	5190	36.36	36.45	36.36	N/A
	46	5230	36.36	36.45	36.36	N/A
NII Band 2	54	5270	36.36	36.45	36.36	N/A
	62	5310	36.36	36.45	36.36	N/A
NII Band 3	102	5510	36.36	36.45	36.36	N/A
	110	5550	36.54	36.45	36.45	N/A
	134	5670	36.54	36.36	36.36	N/A

802.11n HT40 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 38

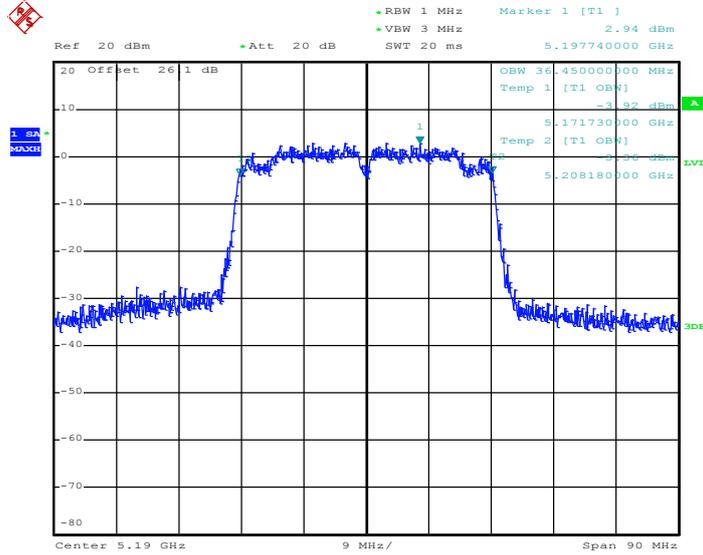


Date: 5.MAR.2013 17:10:39



802.11n HT40 – MIMO Ant. 1

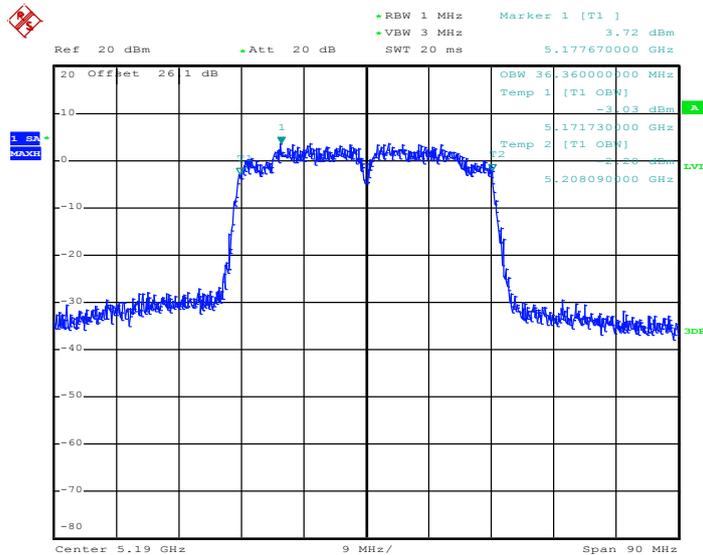
99% Occupied Bandwidth Plot on Channel 38



Date: 5.MAR.2013 17:15:35

802.11n HT40 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 38



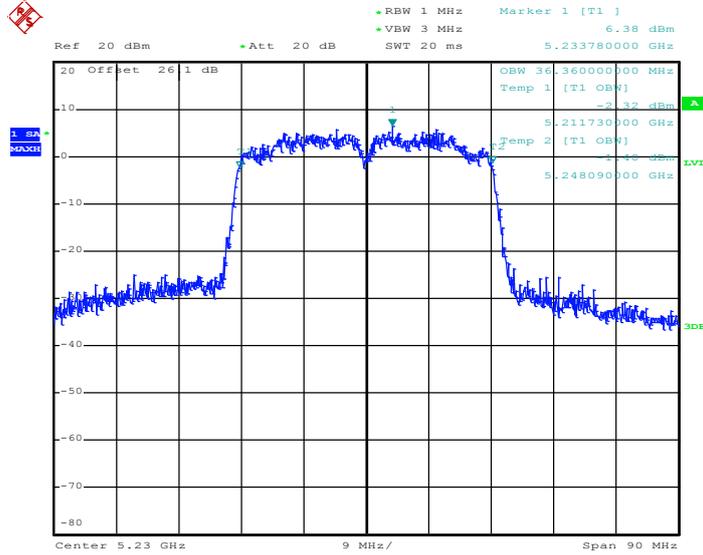
Date: 5.MAR.2013 17:19:25





802.11n HT40 – MIMO Ant. 2

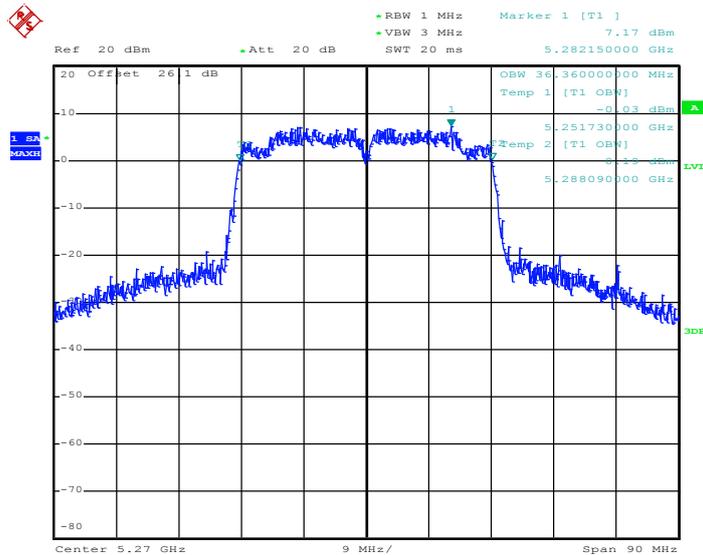
99% Occupied Bandwidth Plot on Channel 46



Date: 5.MAR.2013 17:24:57

802.11n HT40 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 54

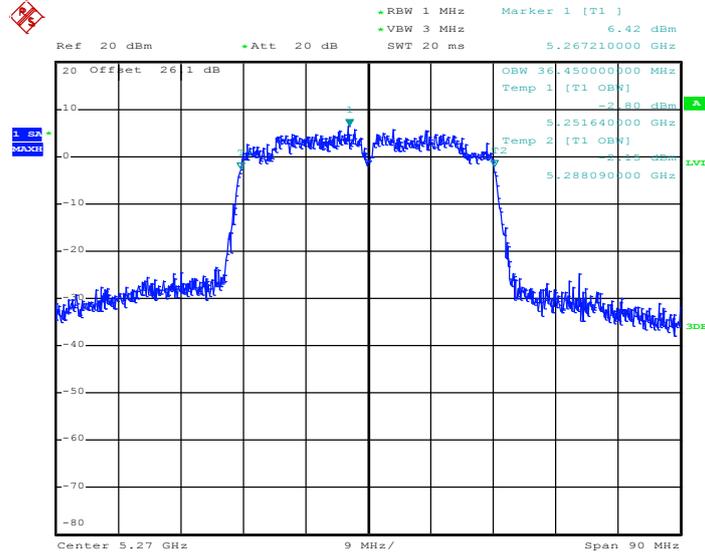


Date: 5.MAR.2013 17:01:37



802.11n HT40 – MIMO Ant. 1

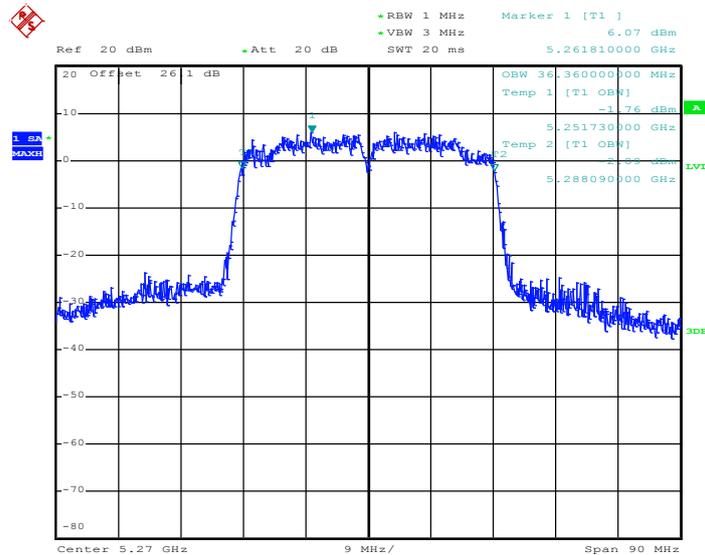
99% Occupied Bandwidth Plot on Channel 54



Date: 5.MAR.2013 17:27:05

802.11n HT40 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 54

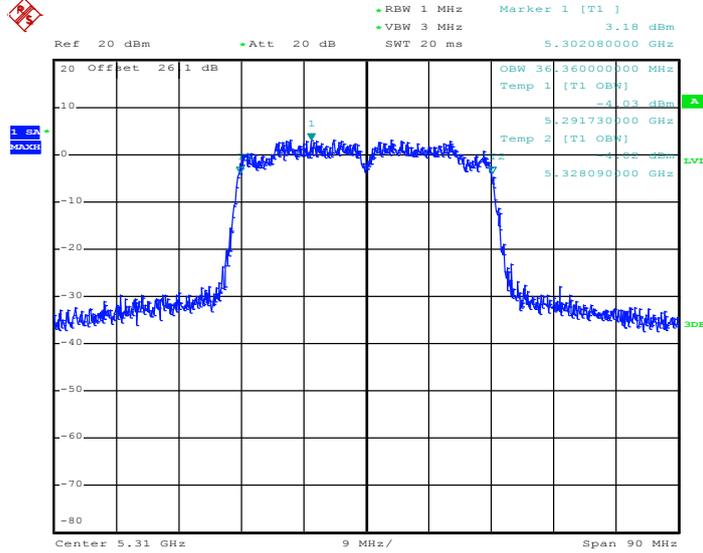


Date: 5.MAR.2013 17:30:36



802.11n HT40 – SISO Ant. 1

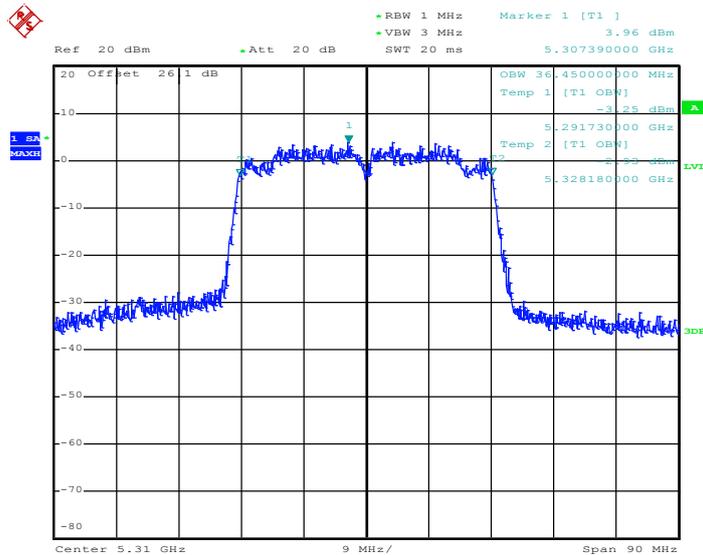
99% Occupied Bandwidth Plot on Channel 62



Date: 5.MAR.2013 16:57:51

802.11n HT40 – MIMO Ant. 1

99% Occupied Bandwidth Plot on Channel 62

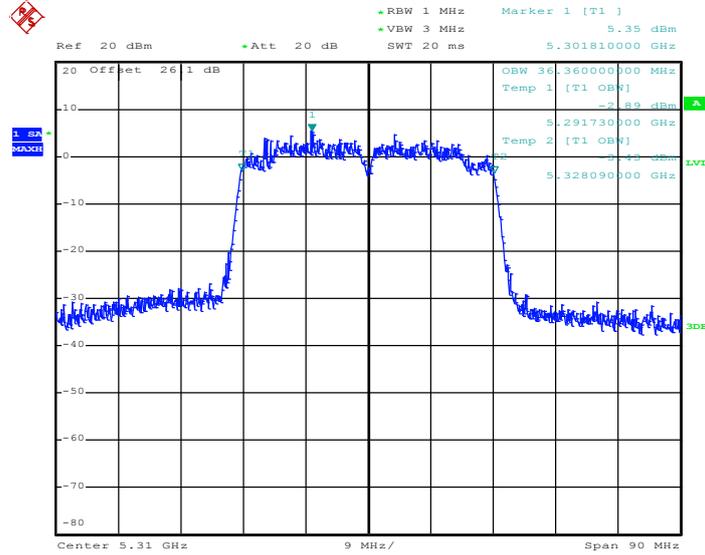


Date: 5.MAR.2013 17:33:24



802.11n HT40 – MIMO Ant. 2

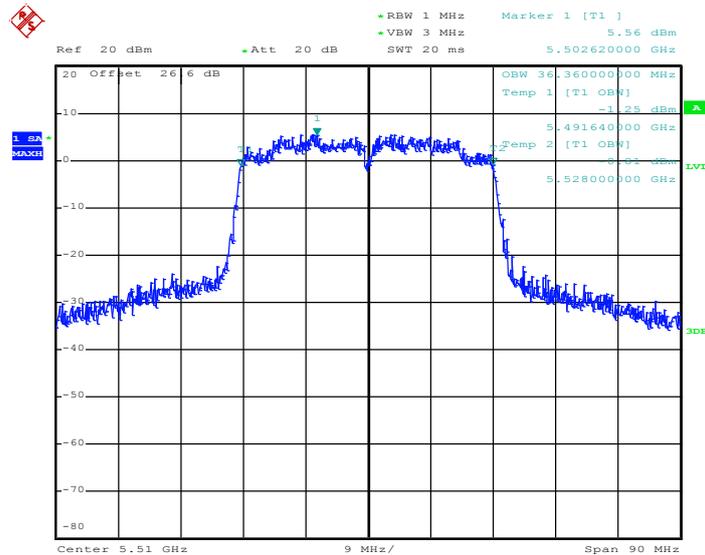
99% Occupied Bandwidth Plot on Channel 62



Date: 5.MAR.2013 17:36:24

802.11n HT40 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 102

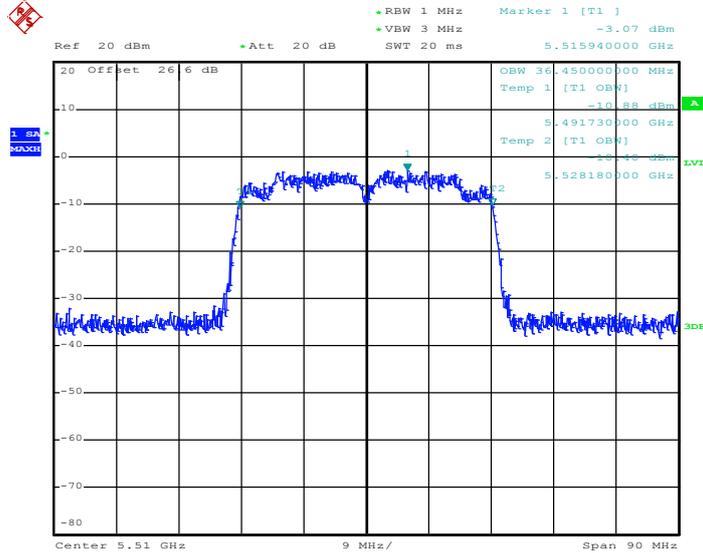


Date: 5.MAR.2013 16:54:08



802.11n HT40 – MIMO Ant. 1

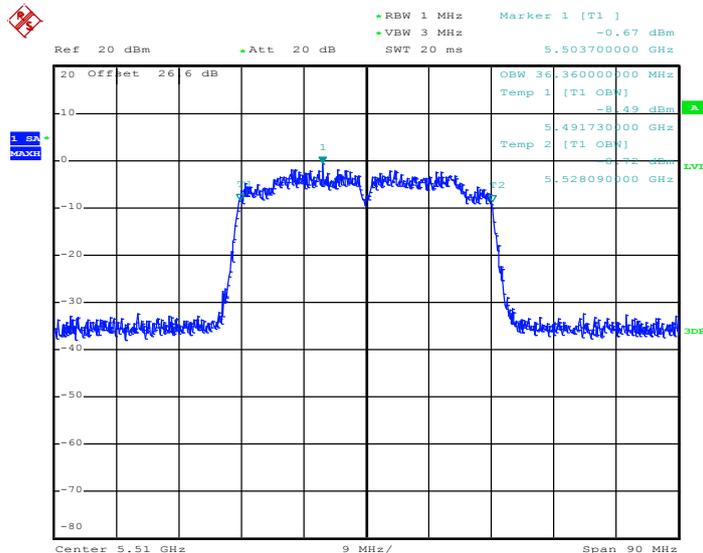
99% Occupied Bandwidth Plot on Channel 102



Date: 5.MAR.2013 17:42:04

802.11n HT40 – MIMO Ant. 2

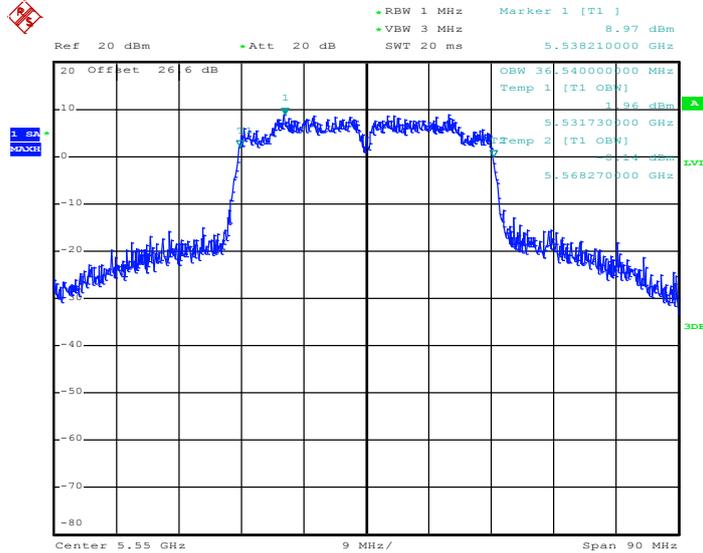
99% Occupied Bandwidth Plot on Channel 102



Date: 5.MAR.2013 17:45:00

802.11n HT40 – SISO Ant. 1

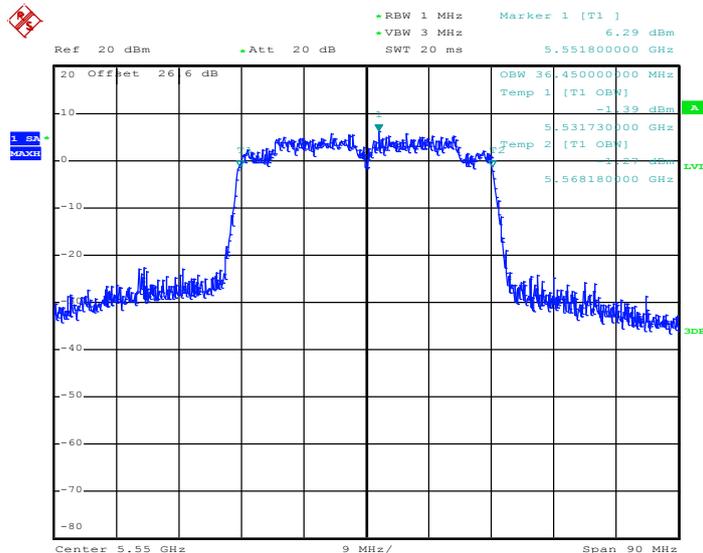
99% Occupied Bandwidth Plot on Channel 110



Date: 5.MAR.2013 16:51:39

802.11n HT40 – MIMO Ant. 1

99% Occupied Bandwidth Plot on Channel 110

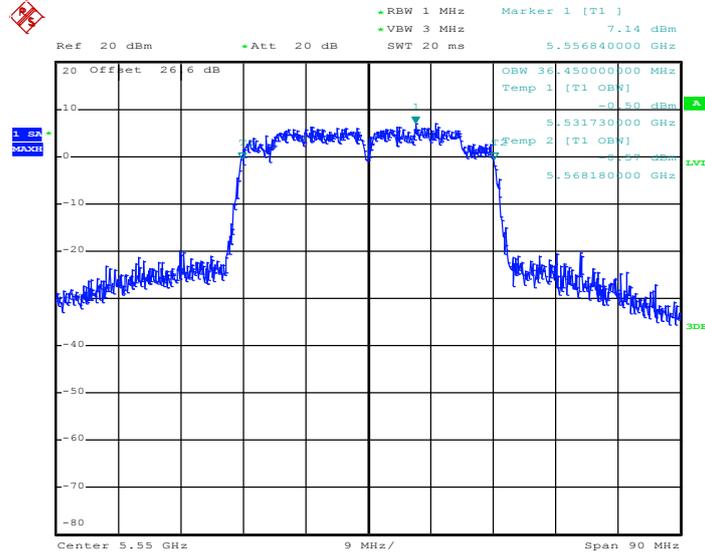


Date: 5.MAR.2013 19:22:28



802.11n HT40 – MIMO Ant. 2

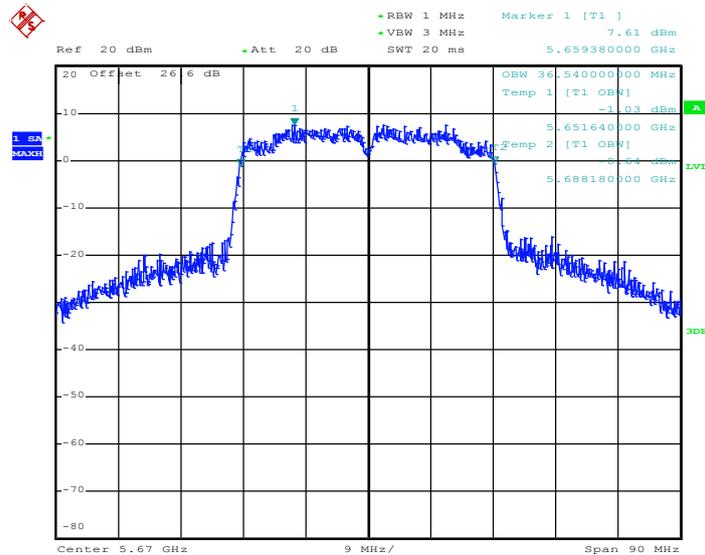
99% Occupied Bandwidth Plot on Channel 110



Date: 5.MAR.2013 19:25:16

802.11n HT40 – SISO Ant. 1

99% Occupied Bandwidth Plot on Channel 134

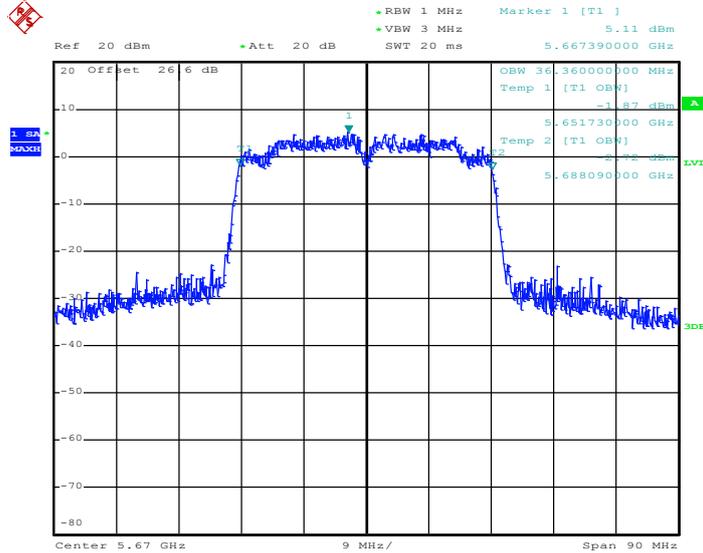


Date: 5.MAR.2013 16:48:51



802.11n HT40 – MIMO Ant. 1

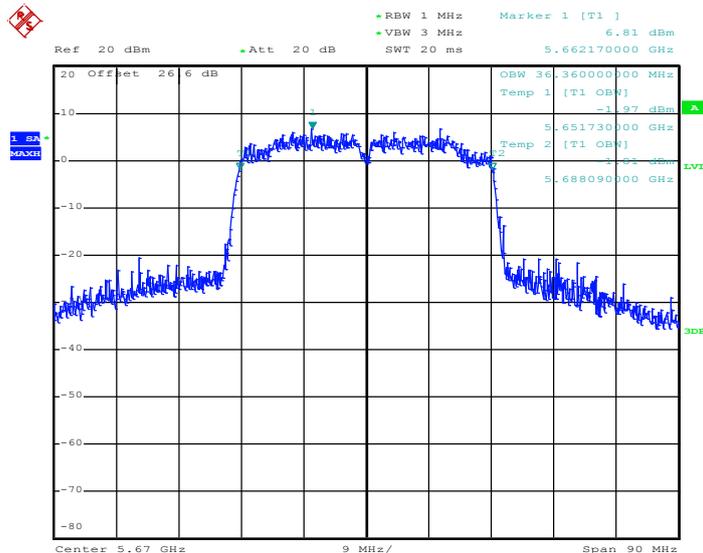
99% Occupied Bandwidth Plot on Channel 134



Date: 5.MAR.2013 19:27:57

802.11n HT40 – MIMO Ant. 2

99% Occupied Bandwidth Plot on Channel 134



Date: 5.MAR.2013 19:29:38

## 3.2 Maximum Conducted Output Power Measurement

### 3.2.1 Limit of Maximum Conducted Output Power

For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or  $4 \text{ dBm} + 10\log B$ , where B is the 26 dB emissions bandwidth in 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the bands 5250-5350 MHz and 5470-5600 MHz and 5650-5725 MHz, bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or  $11 \text{ dBm} + 10\log B$ , where B is the 26 dB emissions bandwidth in 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

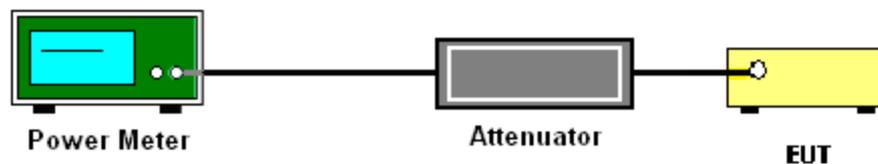
### 3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D01 General UNII Test Procedures v01r02.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor,  $10 \log(1/x)$ , where x is the duty cycle.

### 3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%
Duty Cycle	98.48% for Ant. 1	Duty Factor	0.07dB for Ant. 1

Band	Channel	Frequency (MHz)	802.11a Output Power (dBm)		Max. Limits (dBm)	Pass /Fail
			Measured	Final		
			Ant. 1	Ant. 1		
NII Band 1	36	5180	12.85	12.92	17	Pass
	44	5220	14.25	14.32	17	Pass
	48	5240	14.23	14.30	17	Pass
NII Band 2	52	5260	14.22	14.29	24	Pass
	60	5300	14.24	14.31	24	Pass
	64	5320	14.17	14.24	24	Pass
NII Band 3	100	5500	14.41	14.48	24	Pass
	116	5580	14.39	14.46	24	Pass
	140	5700	14.36	14.43	24	Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
3. For the 5250-5350 MHz and 5470-5600MHz and 5650-5725MHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log (26dB BW).



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Kenny Chen and Bill Kuo	<b>Relative Humidity :</b>	45~49%
<b>Duty Cycle</b>	98.61% for SISO Ant. 1 97.65% for MIMO Ant. 1 97.46% for MIMO Ant. 2	<b>Duty Factor</b>	0.06dB for SISO Ant. 1 0.10dB for MIMO Ant. 1 0.11dB for MIMO Ant. 2

Band	Channel	Frequency (MHz)	802.11n HT20 Peak Output Power (dBm)							Max. Limits (dBm)	Pass /Fail
			Measured			Final					
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	MIMO Ant. 1+2		
NII Band 1	36	5180	11.95	10.69	11.43	12.01	10.79	11.54	14.19	17	Pass
	44	5220	14.32	11.02	11.77	14.38	11.12	11.88	14.53	17	Pass
	48	5240	14.26	10.97	11.63	14.32	11.07	11.74	14.43	17	Pass
NII Band 2	52	5260	14.25	11.01	11.41	14.31	11.11	11.52	14.33	24	Pass
	60	5300	14.27	11.39	11.54	14.33	11.49	11.65	14.58	24	Pass
	64	5320	13.82	11.58	11.82	13.88	11.68	11.93	14.82	24	Pass
NII Band 3	100	5500	14.11	11.30	12.19	14.17	11.40	12.30	14.89	24	Pass
	116	5580	14.16	10.98	12.05	14.22	11.08	12.16	14.67	24	Pass
	140	5700	14.12	10.78	12.26	14.18	10.88	12.37	14.70	24	Pass

**Note:**

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
3. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
4. For the 5250-5350 MHz and 5470-5600MHz and 5650-5725MHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log (26dB BW).



<b>Test Mode :</b>	802.11n HT40	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Kenny Chen and Bill Kuo	<b>Relative Humidity :</b>	45~49%
<b>Duty Cycle</b>	97.55% for SISO Ant. 1 94.55% for MIMO Ant. 1 95.39% for MIMO Ant. 2	<b>Duty Factor</b>	0.11dB for SISO Ant. 1 0.24dB for MIMO Ant. 1 0.20dB for MIMO Ant. 2

Band	Channel	Frequency (MHz)	802.11n HT40 Peak Output Power (dBm)							Max. Limits (dBm)	Pass /Fail
			Measured			Final					
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	MIMO Ant. 1+2		
NII Band 1	38	5190	9.71	8.27	8.78	9.82	8.51	8.98	11.77	17	Pass
	46	5230	13.45	10.71	11.66	13.56	10.95	11.86	14.44	17	Pass
NII Band 2	54	5270	13.66	11.19	11.59	13.77	11.43	11.79	14.63	24	Pass
	62	5310	9.78	8.91	8.75	9.89	9.15	8.95	12.07	24	Pass
NII Band 3	102	5510	11.07	4.39	4.24	11.18	4.63	4.44	7.55	24	Pass
	110	5550	14.36	10.61	11.71	14.47	10.85	11.91	14.43	24	Pass
	134	5670	14.30	10.36	11.66	14.41	10.60	11.86	14.29	24	Pass

**Note:**

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
3. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
4. For the 5250-5350 MHz and 5470-5600MHz and 5650-5725MHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log (26dB BW).



### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

For the band 5150-5250 MHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. For the bands 5250-5350 MHz and 5470-5600 and 5650-5725 MHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r02.

Section E) Peak power spectral density (PPSD).

Note: Though the rule refers to “peak power spectral density”, the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission.

##### # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r02.
  - Measure the duty cycle.
  - Set span to encompass the entire emission bandwidth (EBW) of the signal.
  - Set RBW = 1 MHz.
  - Set VBW  $\geq$  3 MHz.
  - Number of points in sweep  $\geq$  2 Span / RBW.
  - Sweep time = auto.
  - Detector = sample
  - Trace average at least 100 traces in power averaging mode.
  - Add  $10 \log(1/x)$ , where  $x$  is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add  $10 \log(1/0.25) = 6$  dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and

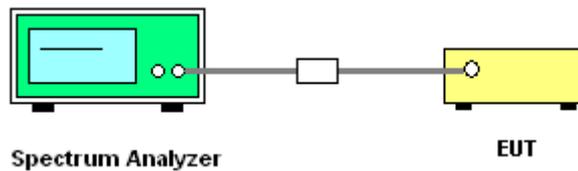
record it.

4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v01r02.

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

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

### 3.3.4 Test Setup



### 3.3.5 Test Result of Power Spectral Density

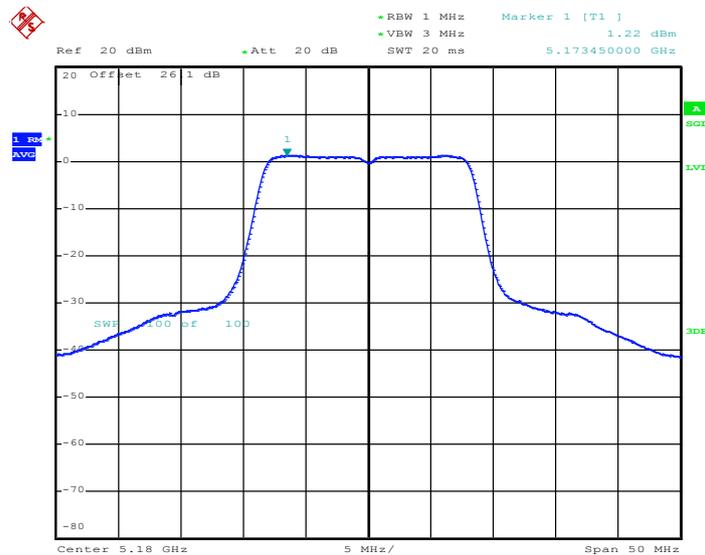
Test Mode :	802.11a	Temperature :	24~26°C
Test Engineer :	Kenny Chen and Bill Kuo	Relative Humidity :	45~49%
Duty Cycle:	98.48% for Ant. 1	Duty Factor:	0.07dB for Ant. 1

Band	Channel	Frequency (MHz)	802.11a Measured PSD (dBm)		Max. Limits (dBm)	Pass /Fail
			Measured	Final		
			Ant. 1	Ant. 1		
NII Band 1	36	5180	1.22	1.29	4	Pass
	44	5220	2.13	2.20	4	Pass
	48	5240	2.33	2.40	4	Pass
NII Band 2	52	5260	2.40	2.47	11	Pass
	60	5300	2.22	2.29	11	Pass
	64	5320	2.68	2.75	11	Pass
NII Band 3	100	5500	3.90	3.97	11	Pass
	116	5580	3.16	3.23	11	Pass
	140	5700	2.57	2.64	11	Pass

**Note:** Result of Final PSD equals to Measured PSD adds the duty factor.

#### 802.11a - Ant. 1

#### PSD Plot on Channel 36

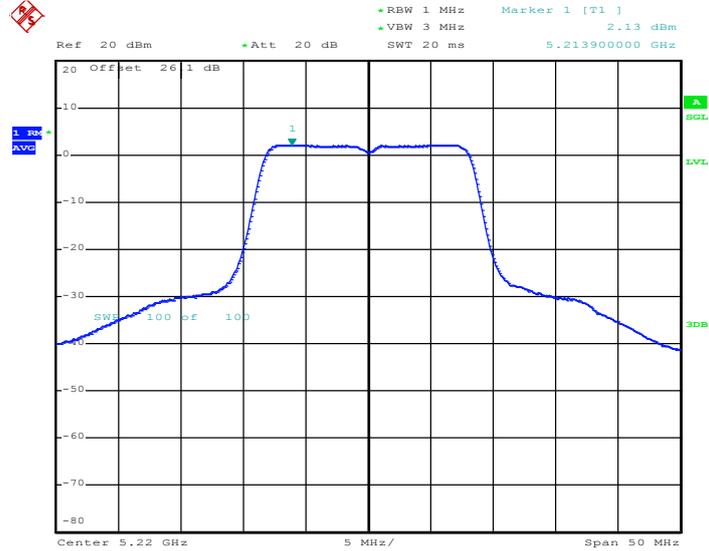


Date: 5.MAR.2013 14:24:29



802.11a - Ant. 1

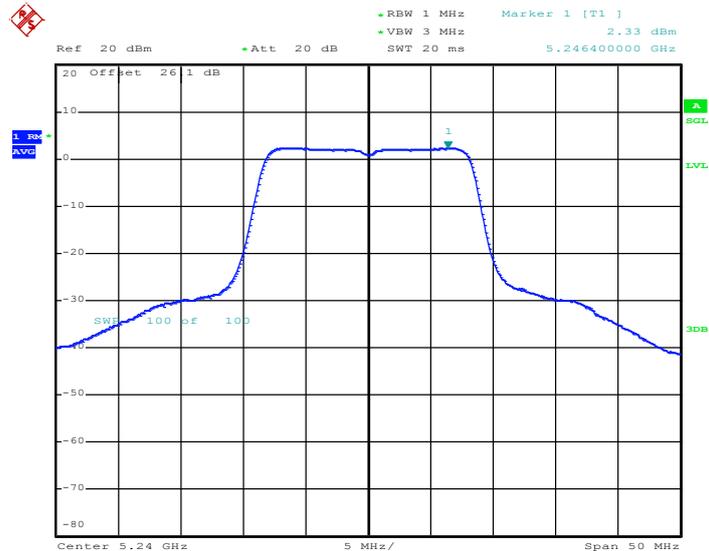
PSD Plot on Channel 44



Date: 5.MAR.2013 14:30:30

802.11a - Ant. 1

PSD Plot on Channel 48

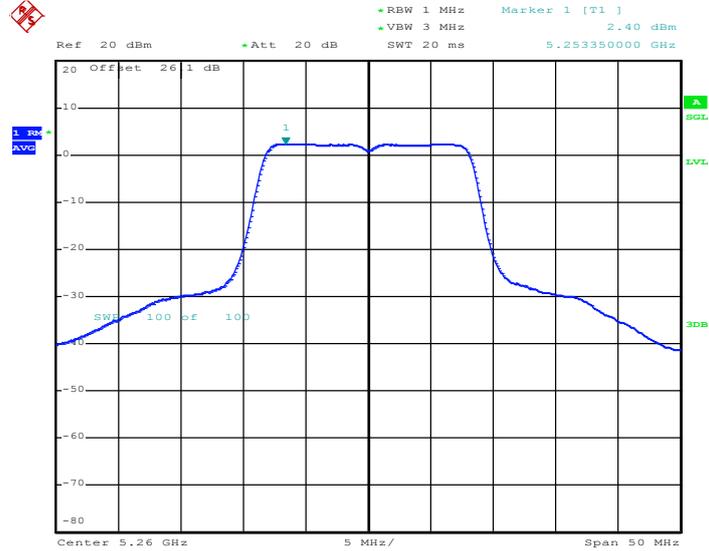


Date: 5.MAR.2013 14:35:23



802.11a - Ant. 1

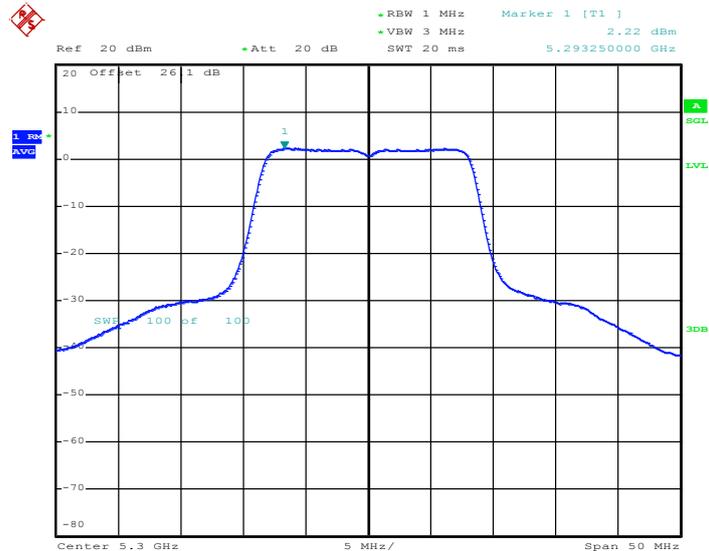
PSD Plot on Channel 52



Date: 5.MAR.2013 14:39:09

802.11a - Ant. 1

PSD Plot on Channel 60

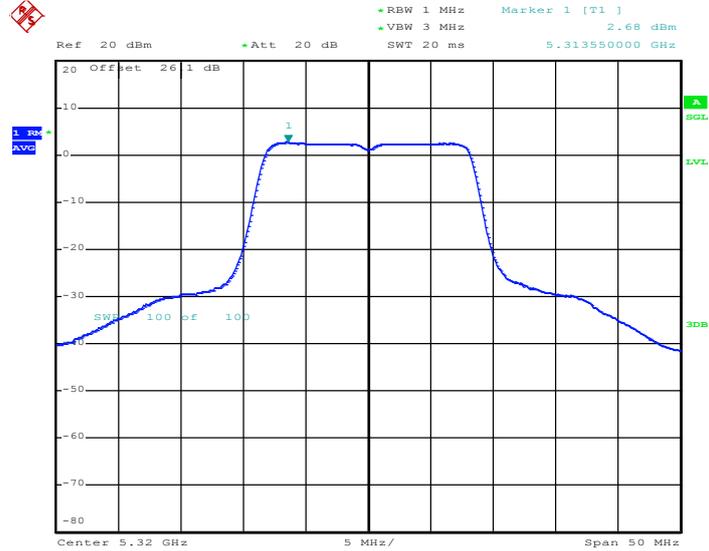


Date: 5.MAR.2013 14:41:41



802.11a - Ant. 1

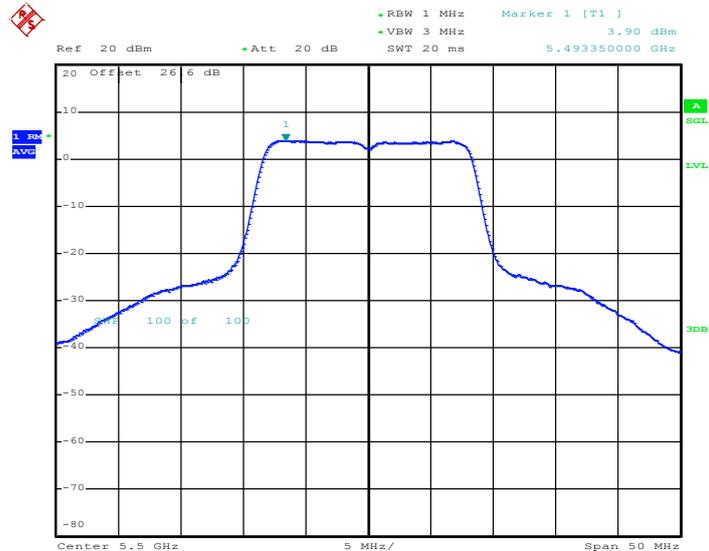
PSD Plot on Channel 64



Date: 5.MAR.2013 14:44:38

802.11a - Ant. 1

PSD Plot on Channel 100

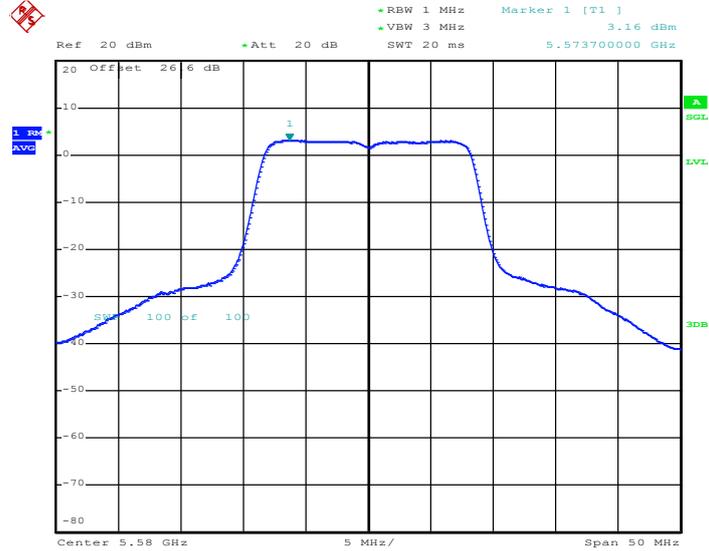


Date: 5.MAR.2013 14:48:17



802.11a - Ant. 1

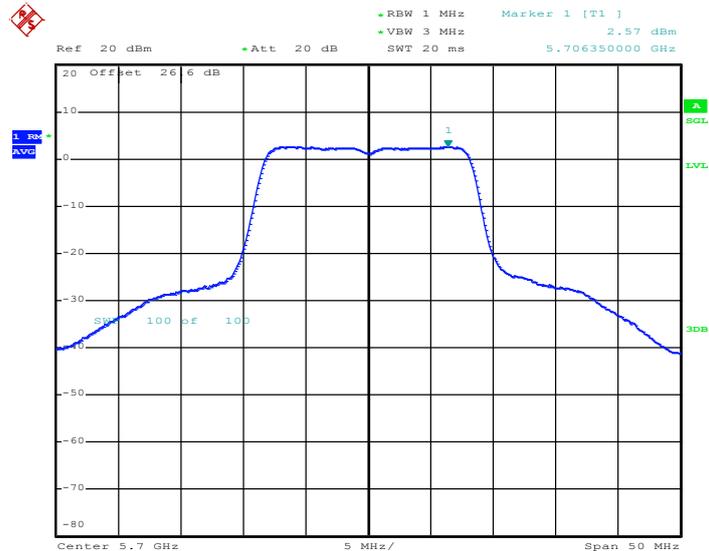
PSD Plot on Channel 116



Date: 5.MAR.2013 14:54:46

802.11a - Ant. 1

PSD Plot on Channel 140



Date: 5.MAR.2013 14:58:39



<b>Test Mode :</b>	802.11n HT20	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Kenny Chen and Bill Kuo	<b>Relative Humidity :</b>	45~49%
<b>Duty Cycle:</b>	98.61% for SISO Ant. 1 97.65% for MIMO Ant. 1 97.46% for MIMO Ant. 2	<b>Duty Factor:</b>	0.06dB for SISO Ant. 1 0.10dB for MIMO Ant. 1 0.11dB for MIMO Ant. 2

Band	Channel	Frequency (MHz)	802.11n HT20 PSD (dBm)					Max. Limits (dBm)	Pass /Fail
			Measured			Final			
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	SISO Ant. 1	MIMO Ant. 1+2		
NII Band 1	36	5180	-0.20	-0.91	-0.31	-0.14	2.38	4	Pass
	44	5220	2.16	-0.64	0.14	2.22	2.69	4	Pass
	48	5240	2.24	-0.60	0.03	2.30	2.68	4	Pass
NII Band 2	52	5260	2.28	-0.54	-0.56	2.34	2.46	11	Pass
	60	5300	2.16	0.14	-0.16	2.22	2.99	11	Pass
	64	5320	1.95	0.29	0.11	2.01	3.10	11	Pass
NII Band 3	100	5500	3.38	0.71	1.99	3.44	4.28	11	Pass
	116	5580	2.44	-0.45	1.03	2.50	3.36	11	Pass
	140	5700	2.45	-0.50	0.94	2.51	3.25	11	Pass

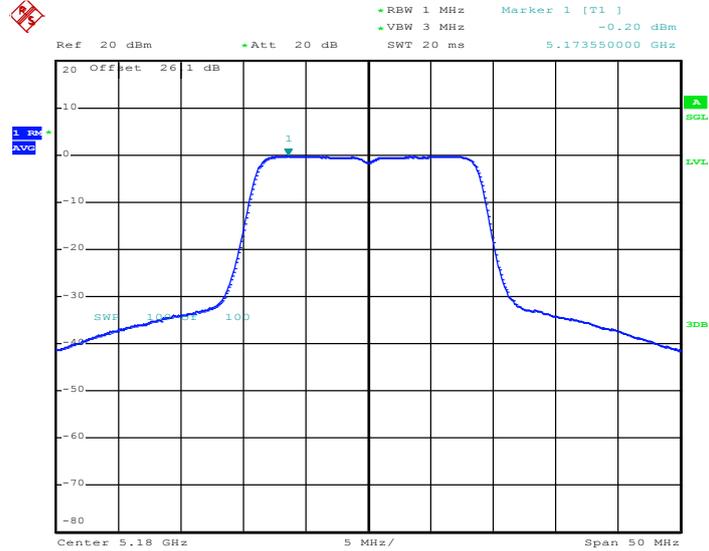
**Note:**

1. Result of Final PSD equals to Measured PSD adds the duty factor.
2. Final MIMO Ant. 1+2 is the bin-by-bin combination result from MIMO Ant. 1 and MIMO Ant. 2.



802.11n HT20 – SISO Ant. 1

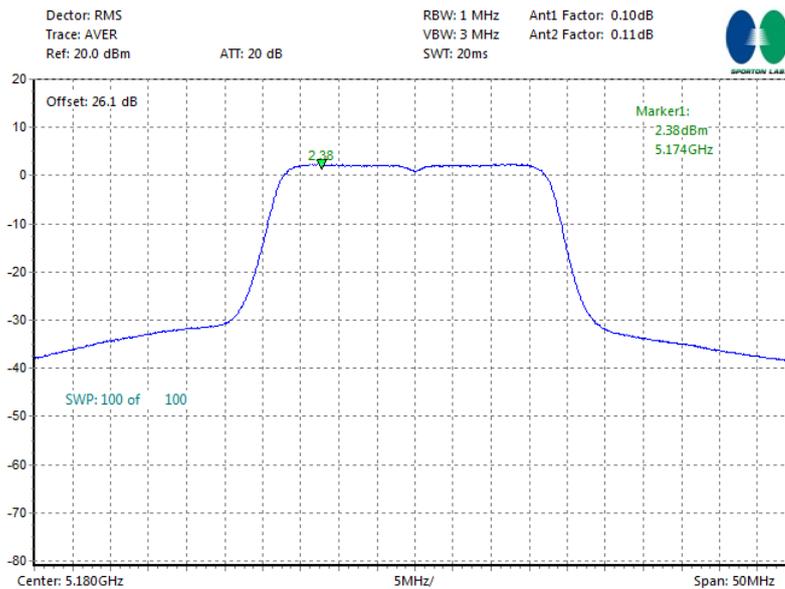
PSD Plot on Channel 36



Date: 5.MAR.2013 15:32:53

802.11n HT20 – MIMO Ant. 1+2

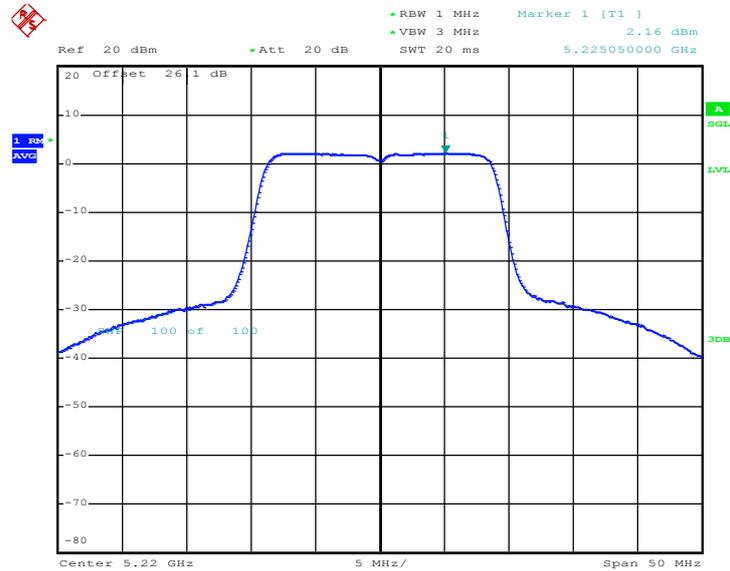
PSD Plot on Channel 36





802.11n HT20 – SISO Ant. 1

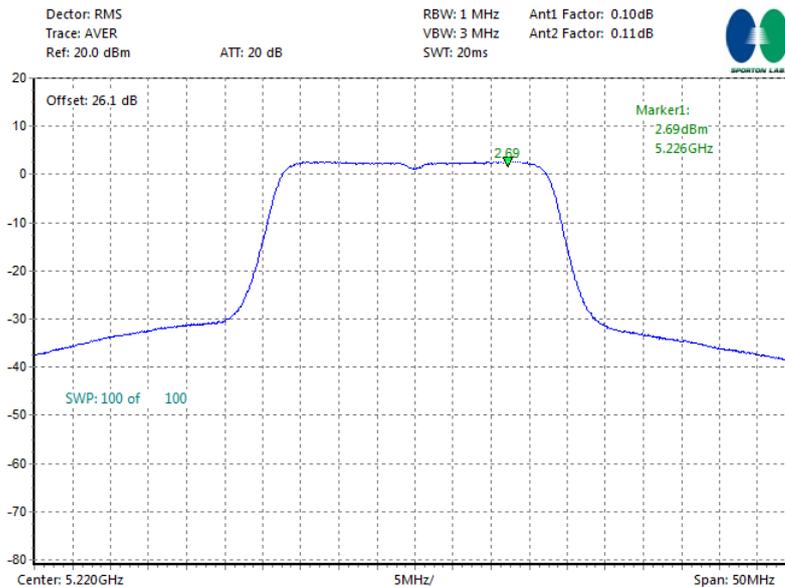
PSD Plot on Channel 44



Date: 5.MAR.2013 15:29:10

802.11n HT20 – MIMO Ant. 1+2

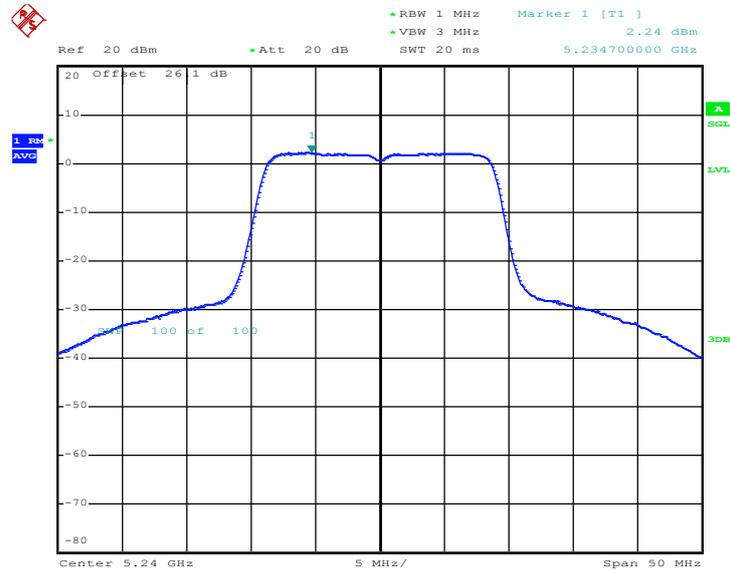
PSD Plot on Channel 44





802.11n HT20 – SISO Ant. 1

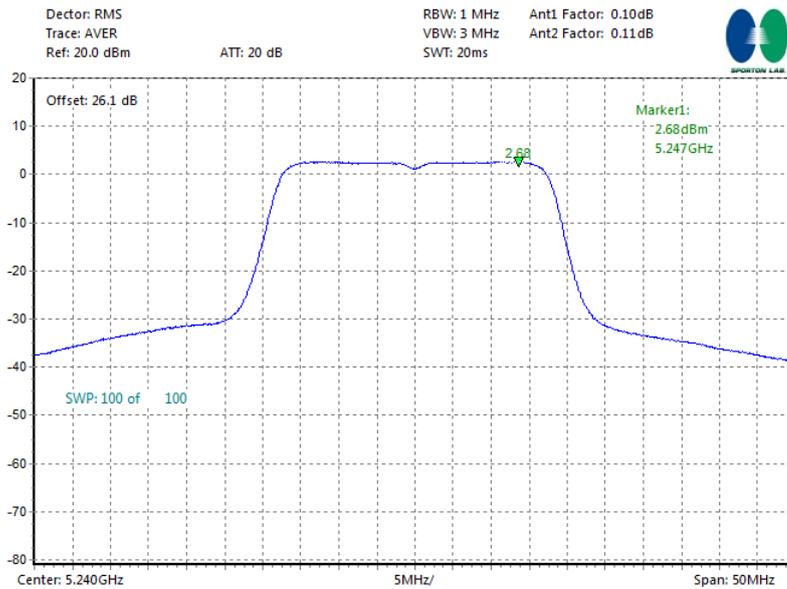
PSD Plot on Channel 48



Date: 5.MAR.2013 15:26:53

802.11n HT20 – MIMO Ant. 1+2

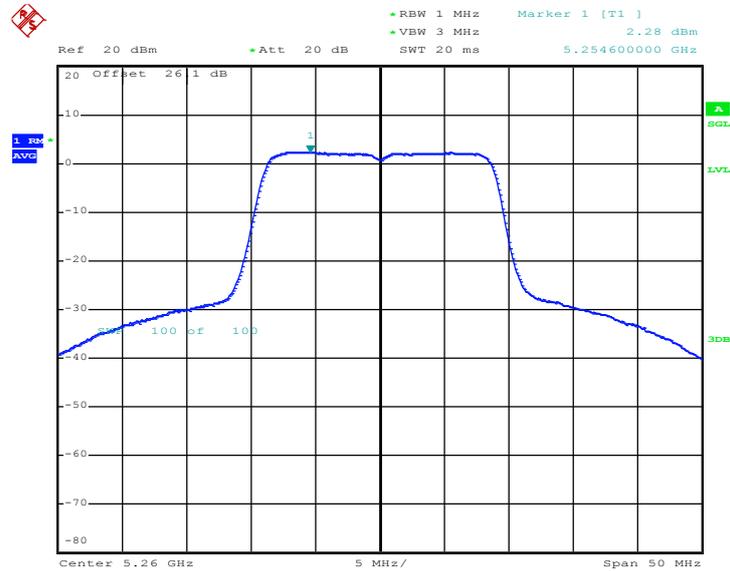
PSD Plot on Channel 48





802.11n HT20 – SISO Ant. 1

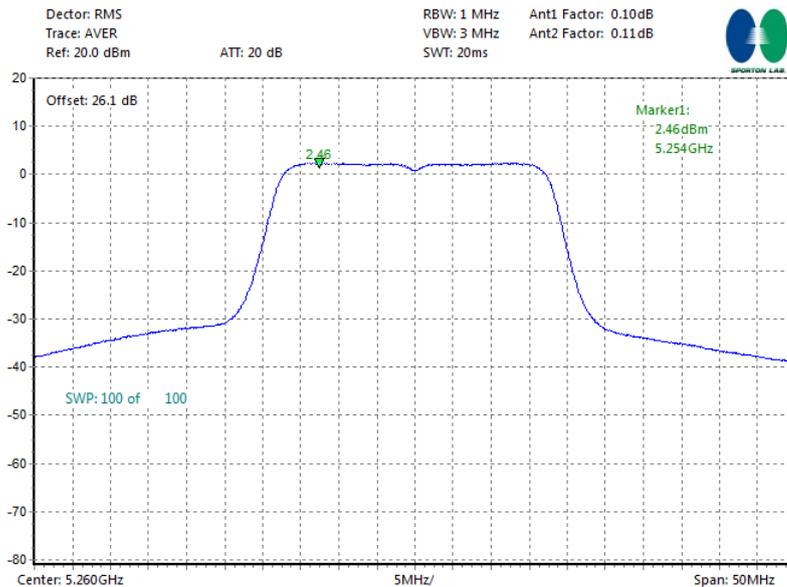
PSD Plot on Channel 52



Date: 5.MAR.2013 15:24:08

802.11n HT20 – MIMO Ant. 1+2

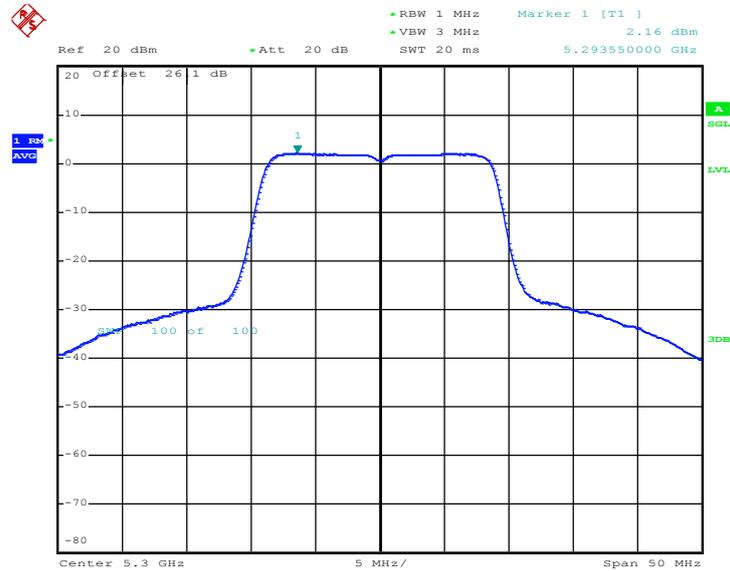
PSD Plot on Channel 52





802.11n HT20 – SISO Ant. 1

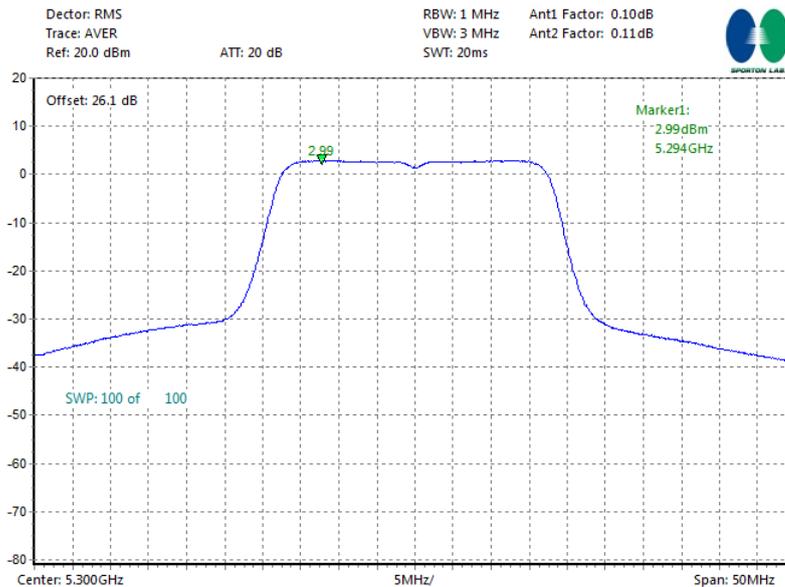
PSD Plot on Channel 60



Date: 5.MAR.2013 15:21:37

802.11n HT20 – MIMO Ant. 1+2

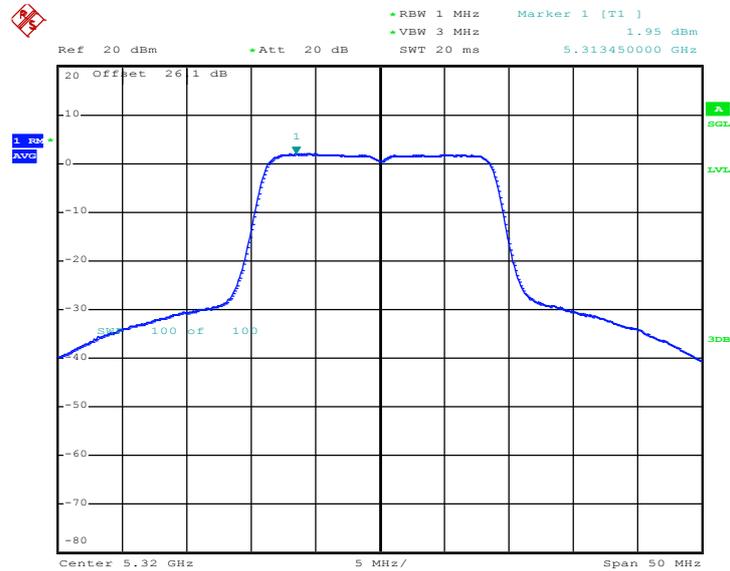
PSD Plot on Channel 60





802.11n HT20 – SISO Ant. 1

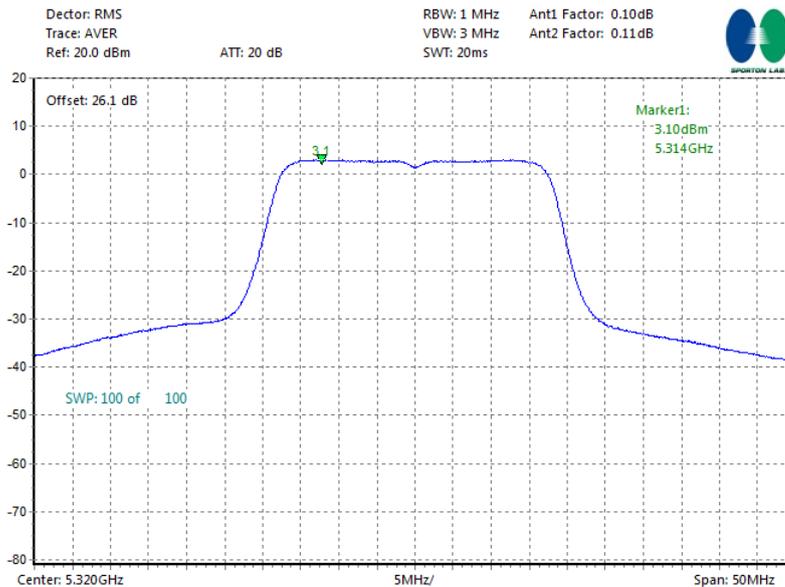
PSD Plot on Channel 64



Date: 5.MAR.2013 15:18:32

802.11n HT20 – MIMO Ant. 1+2

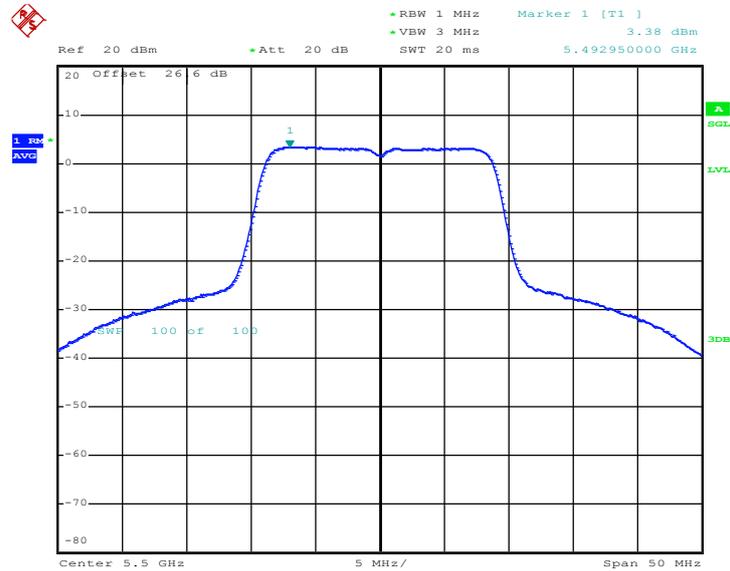
PSD Plot on Channel 64





802.11n HT20 – SISO Ant. 1

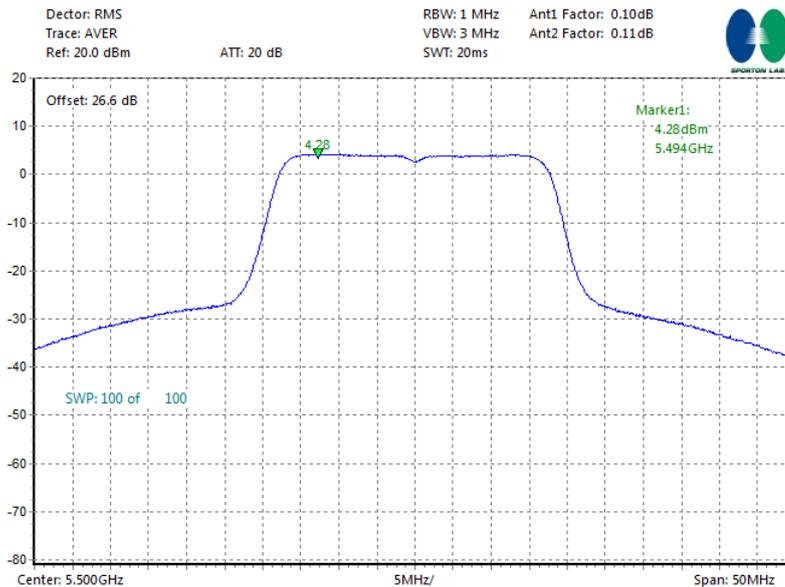
PSD Plot on Channel 100



Date: 5.MAR.2013 15:15:56

802.11n HT20 – MIMO Ant. 1+2

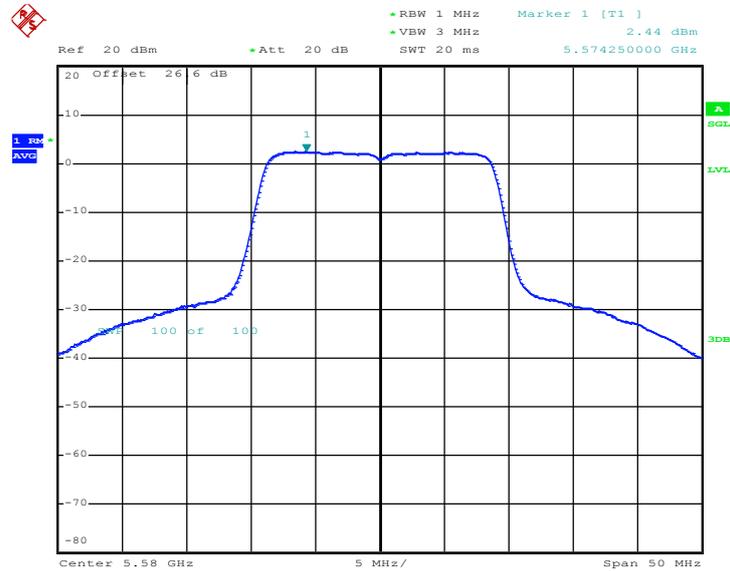
PSD Plot on Channel 100





802.11n HT20 – SISO Ant. 1

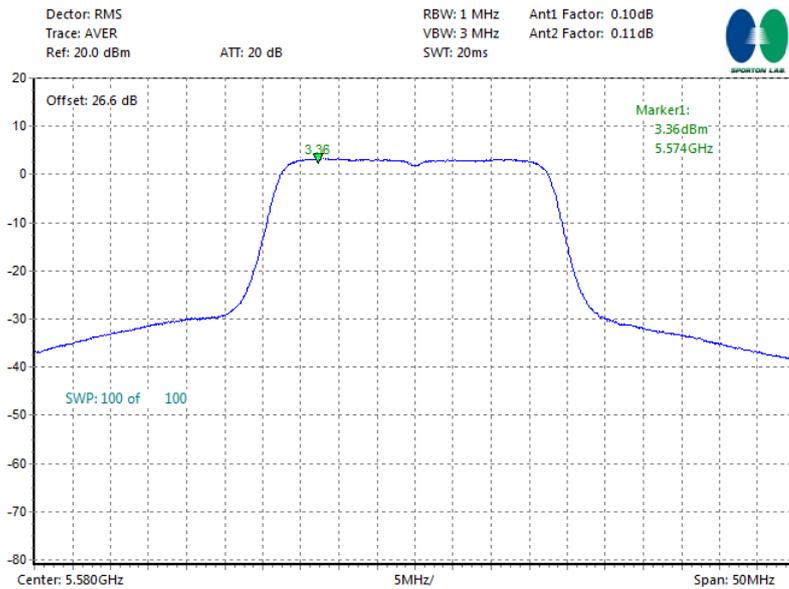
PSD Plot on Channel 116



Date: 5.MAR.2013 15:10:59

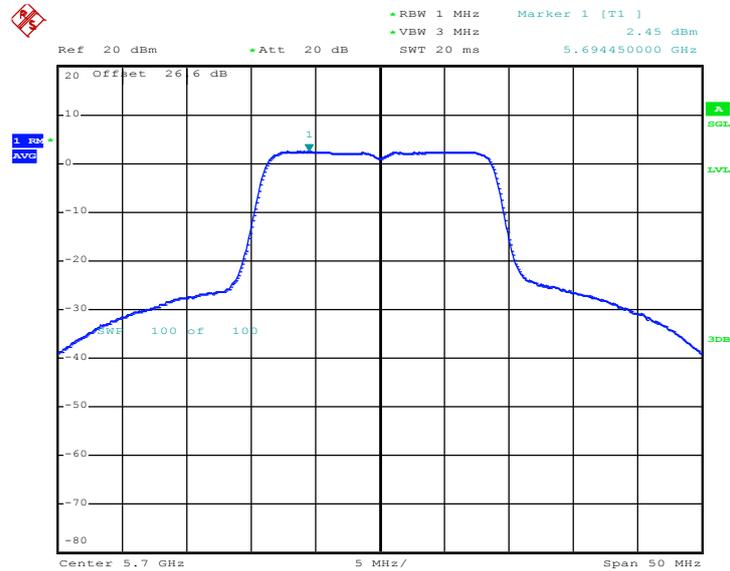
802.11n HT20 – MIMO Ant. 1+2

PSD Plot on Channel 116



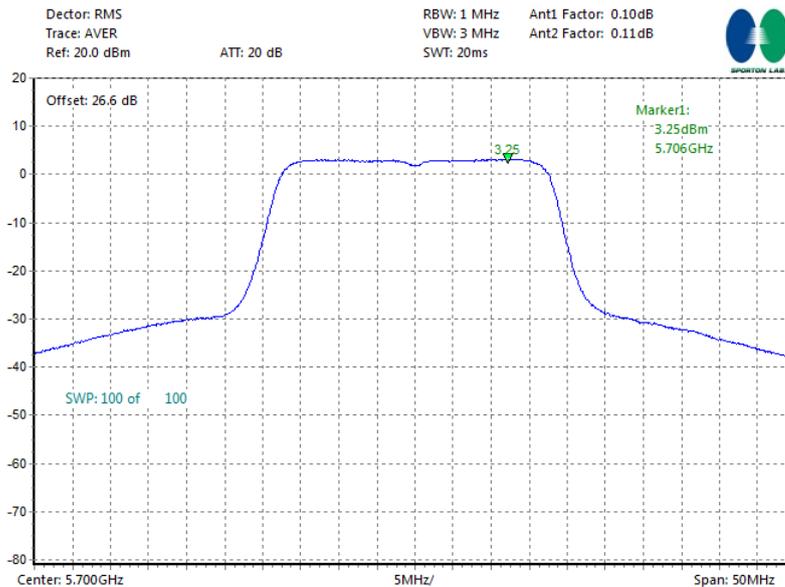


802.11n HT20 – SISO Ant. 1  
PSD Plot on Channel 140



Date: 5.MAR.2013 15:08:23

802.11n HT20 – MIMO Ant. 1+2  
PSD Plot on Channel 140





<b>Test Mode :</b>	802.11n HT40	<b>Temperature :</b>	24~26°C
<b>Test Engineer :</b>	Kenny Chen and Bill Kuo	<b>Relative Humidity :</b>	45~49%
<b>Duty Cycle:</b>	97.55% for SISO Ant. 1 94.55% for MIMO Ant. 1 95.39% for MIMO Ant. 2	<b>Duty Factor:</b>	0.11dB for SISO Ant. 1 0.24dB for MIMO Ant. 1 0.20dB for MIMO Ant. 2

Band	Channel	Frequency (MHz)	802.11n HT40 PSD (dBm)					Max. Limits (dBm)	Pass /Fail
			Measured			Final			
			SISO Ant. 1	MIMO Ant. 1	MIMO Ant. 2	SISO Ant. 1	MIMO Ant. 1+2		
NII Band 1	38	5190	-4.28	-5.33	-4.46	-4.17	-1.99	4	Pass
	46	5230	-0.40	-3.42	-2.2	-0.29	0.21	4	Pass
NII Band 2	54	5270	-0.81	-2.51	-2.35	-0.70	0.53	11	Pass
	62	5310	-4.65	-4.62	-4.71	-4.54	-1.68	11	Pass
NII Band 3	102	5510	-2.12	-10.79	-10.32	-2.01	-7.54	11	Pass
	110	5550	0.76	-2.60	-1.29	0.87	1.11	11	Pass
	134	5670	-0.07	-3.37	-1.85	0.04	0.42	11	Pass

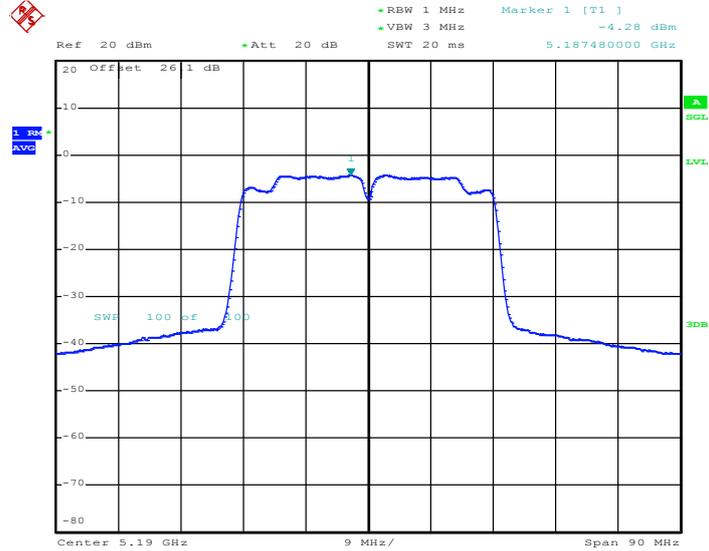
**Note:**

1. Result of Final PSD equals to Measured PSD adds the duty factor if less than 98%.
2. Final MIMO Ant. 1+2 is the bin-by-bin combination result from MIMO Ant. 1 and MIMO Ant. 2.



802.11n HT40 – SISO Ant. 1

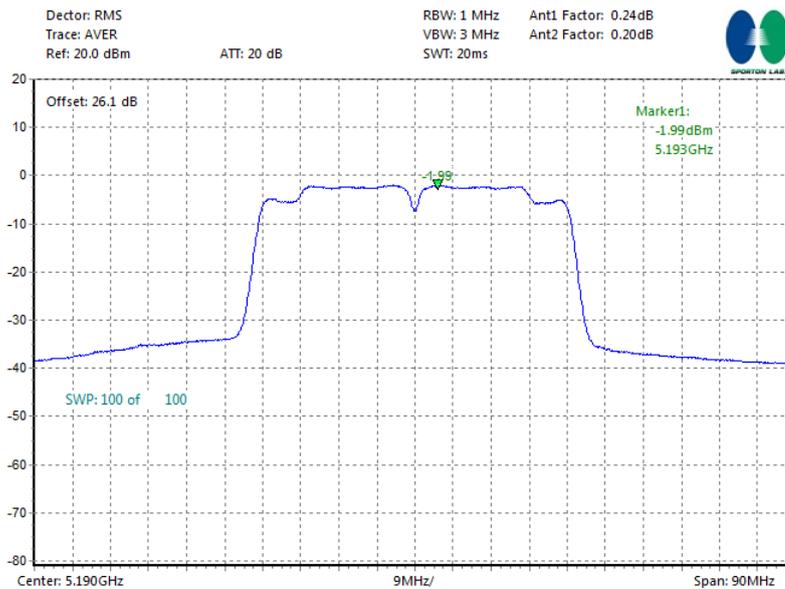
PSD Plot on Channel 38



Date: 5.MAR.2013 17:09:05

802.11n HT40 – MIMO Ant. 1+2

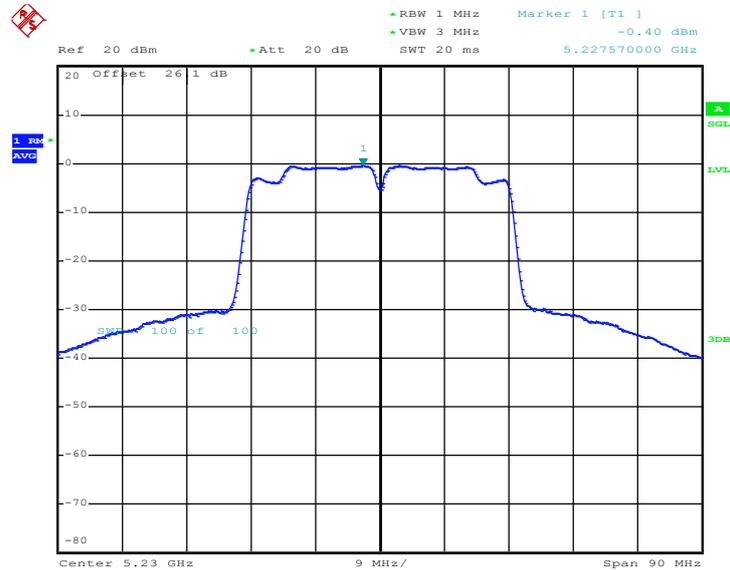
PSD Plot on Channel 38





802.11n HT40 – SISO Ant. 1

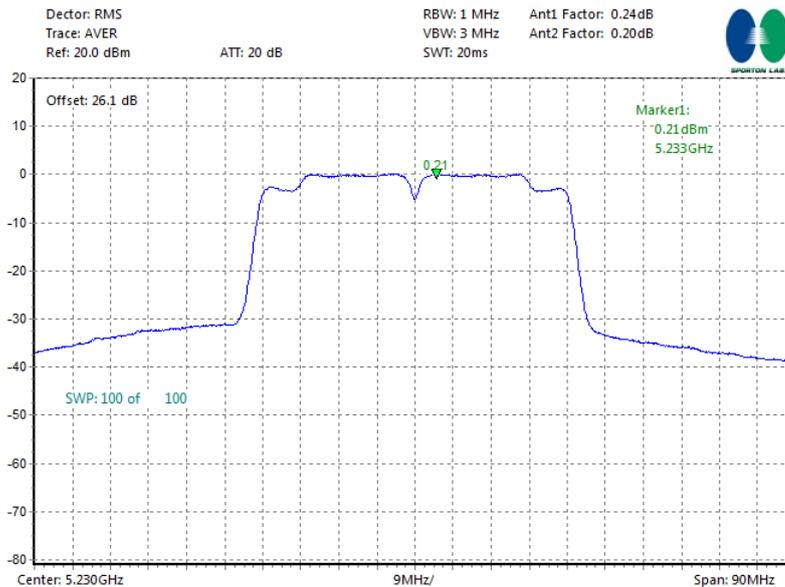
PSD Plot on Channel 46



Date: 5.MAR.2013 17:06:12

802.11n HT40 – MIMO Ant. 1+2

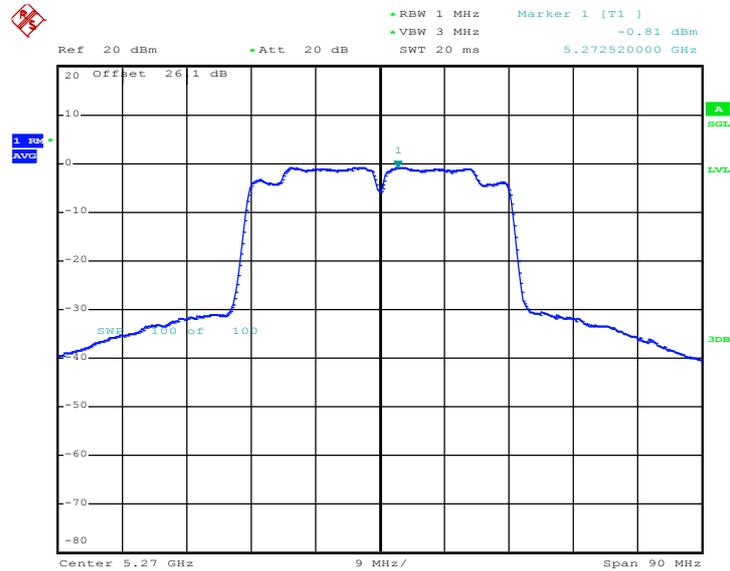
PSD Plot on Channel 46





802.11n HT40 – SISO Ant. 1

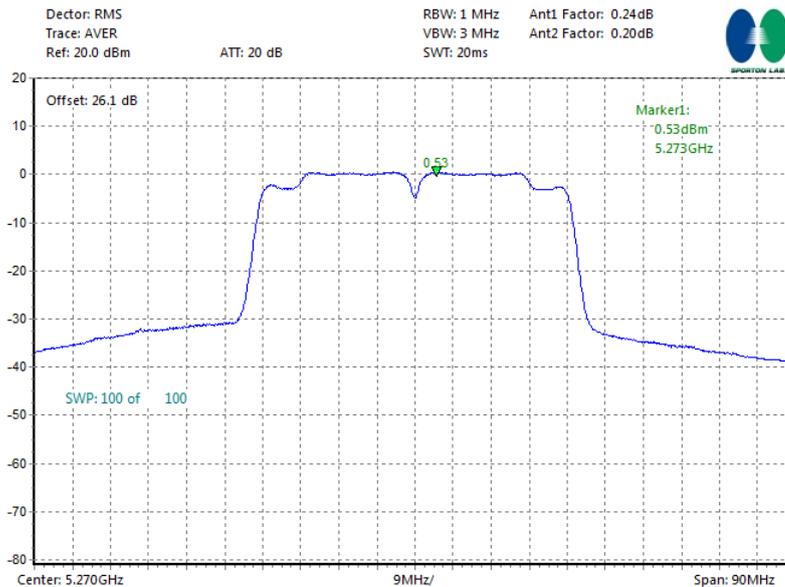
PSD Plot on Channel 54



Date: 5.MAR.2013 16:59:07

802.11n HT40 – MIMO Ant. 1+2

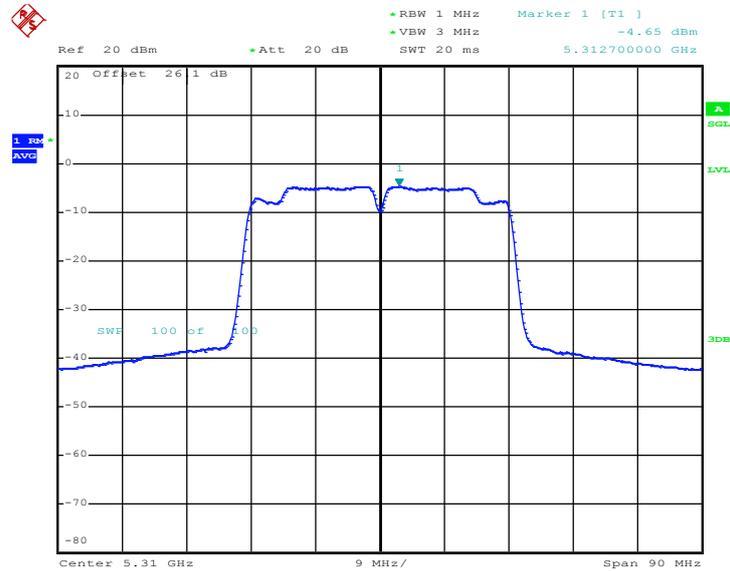
PSD Plot on Channel 54





802.11n HT40 – SISO Ant. 1

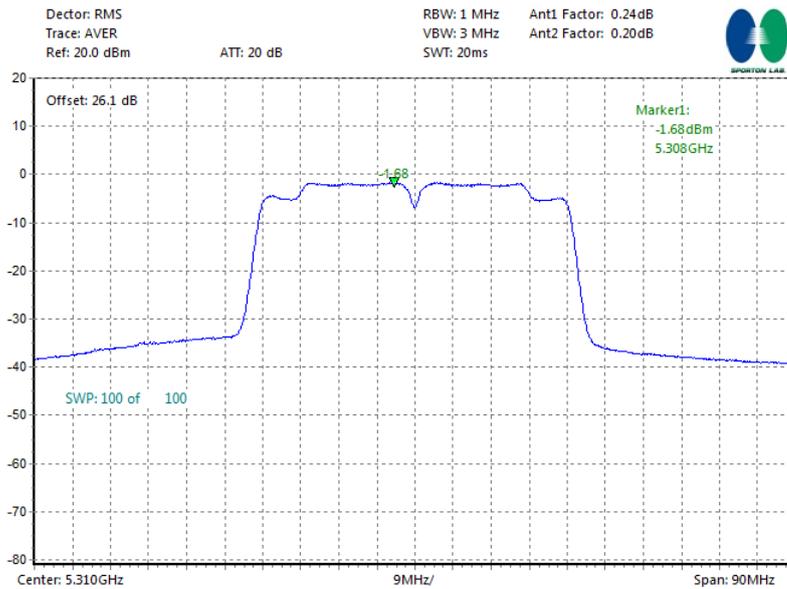
PSD Plot on Channel 62



Date: 5.MAR.2013 16:56:08

802.11n HT40 – MIMO Ant. 1+2

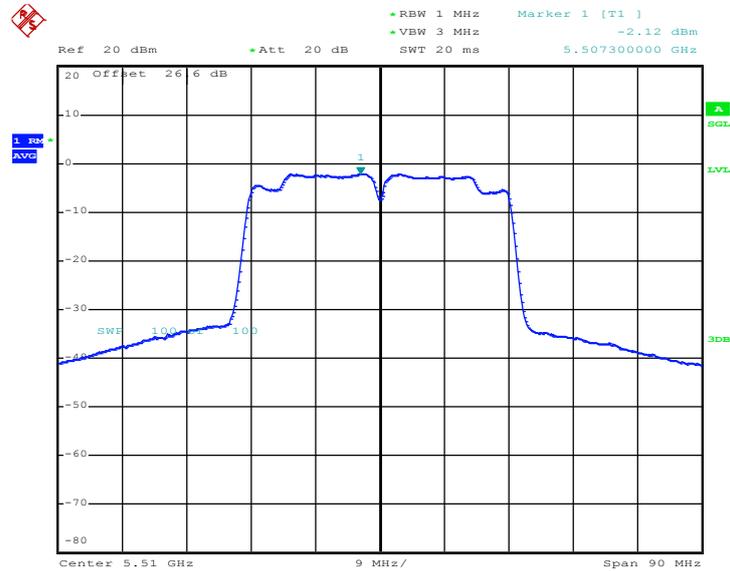
PSD Plot on Channel 62





802.11n HT40 – SISO Ant. 1

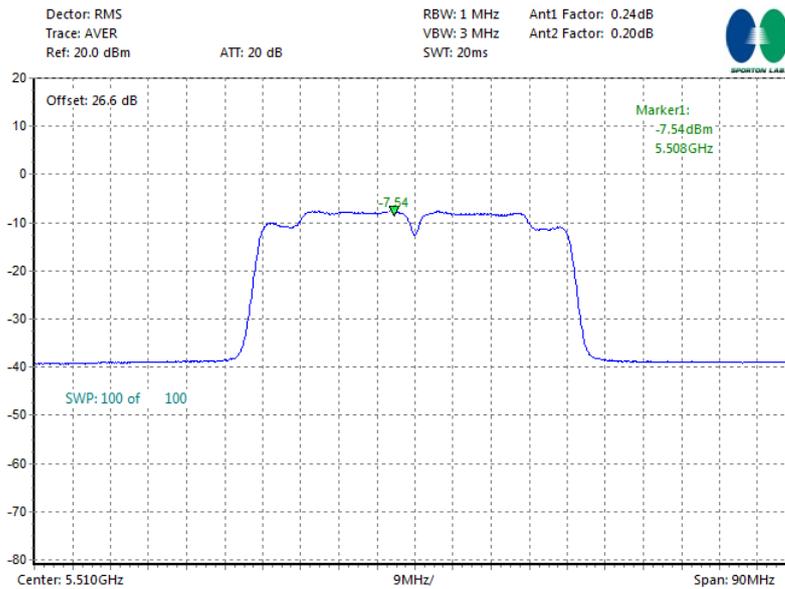
PSD Plot on Channel 102



Date: 5.MAR.2013 16:52:38

802.11n HT40 – MIMO Ant. 2

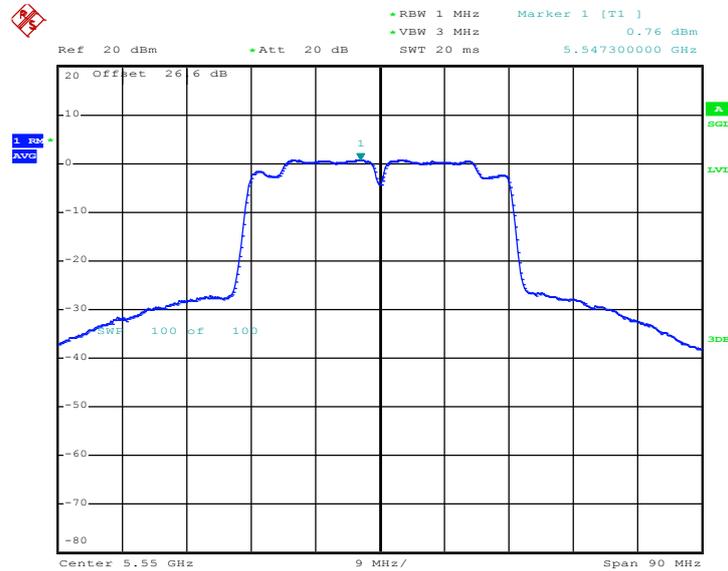
PSD Plot on Channel 102





802.11n HT40 – SISO Ant. 1

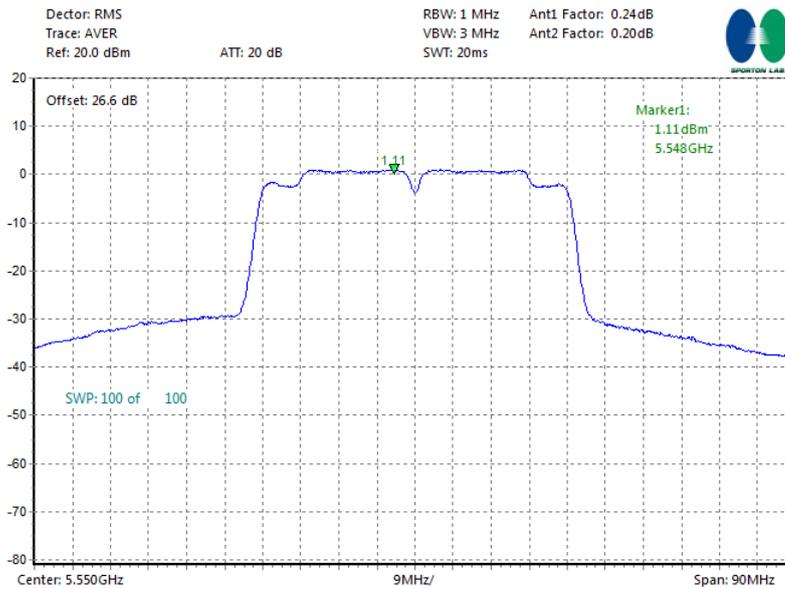
PSD Plot on Channel 110



Date: 5.MAR.2013 16:49:54

802.11n HT40 – MIMO Ant. 1+2

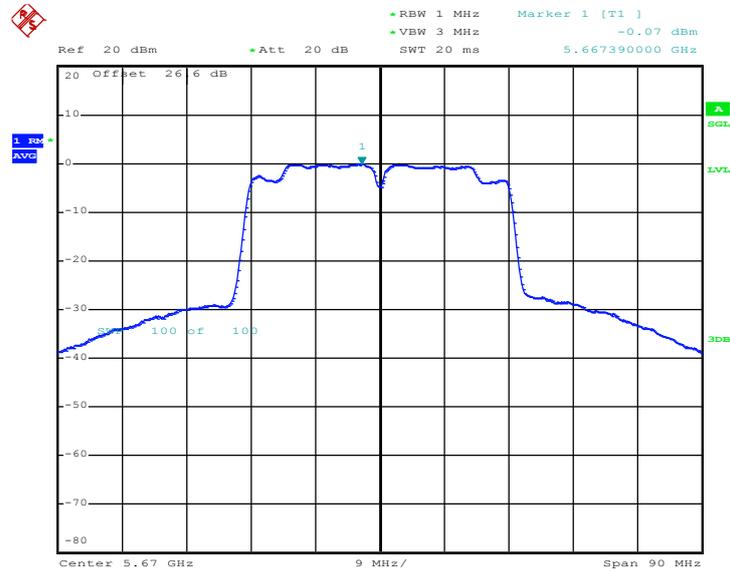
PSD Plot on Channel 110





802.11n HT40 – SISO Ant. 1

PSD Plot on Channel 134



Date: 5.MAR.2013 16:47:05

802.11n HT40 – MIMO Ant. 1+2

PSD Plot on Channel 134

