

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment : 802.11abgn Wireless USB Module
Brand Name : SparkLAN
Model No. : WUBR-507N(LFG)
Filing Type : New Application
Applicant : SparkLAN Communications, Inc.
8F., No.257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan
FCC ID : RYK-WUBR507NLFG
Manufacturer : SparkLAN Communications, Inc.
8F., No.257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan
Received Date : Nov. 08, 2010
Final Test Date : Jan. 30, 2012

Statement

Test result included is only for the printed antenna 802.11a/n (5150~5350MHz; 5470~5725MHz) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart E**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

SPORTON International Inc.

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



Table of Contents

1 SUMMARY OF THE TEST RESULT 2

2 GENERAL INFORMATION..... 3

2.1 Product Details 3

2.2 Table for Filed Antenna 4

2.3 Table for Carrier Frequencies 5

2.4 Table for Test Modes 6

2.5 Table for Testing Locations 6

2.6 Table for Supporting Units 7

2.7 Table for Parameters of Test Software Setting 7

2.8 EUT Operation during Test 8

2.9 Test Configuration 8

3 TEST RESULT 10

3.1 AC Power Line Conducted Emissions Measurement 10

3.2 99% Occupied Bandwidth Measurement 14

3.3 Maximum Conducted Output Power Measurement 64

3.4 Power Spectral Density Measurement 68

3.5 Peak Excursion Measurement 95

3.6 Radiated Emissions Measurement 122

3.7 Band Edge and Fundamental Emissions Measurement 178

3.8 Frequency Stability Measurement 188

3.9 Antenna Requirements 191

4 LIST OF MEASURING EQUIPMENTS 192

5 TEST LOCATION 194

6 TAF CERTIFICATE OF ACCREDITATION 195

APPENDIX A. MAXIMUM PERMISSIBLE EXPOSURE A1 ~ A3

APPENDIX B. TEST PHOTOS B1 ~ B7

APPENDIX C. PHOTOGRAPHS OF EUT C1 ~ C10

History of This Test Report

Original Issue Date: Mar. 27, 2012

Report No.: FR210523-01AN

■ No additional attachment.

Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment : 802.11abgn Wireless USB Module

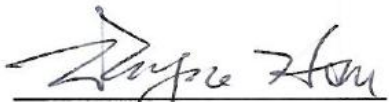
Model No. : WUBR-507N(LFG)

Brand Name : SparkLAN

Applicant : SparkLAN Communications, Inc.

8F., No.257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 08, 2010 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.


Wayne Hsu / Assistant Manager

SPORTON International Inc.

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

1 SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	Rule Section	Description of Test	Result	Under Limit
3.1	15.207	AC Power Line Conducted Emissions	Complies	3.54 dB
3.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
3.3	15.407(a)	Maximum Conducted Output Power	Complies	4.59 dB
3.4	15.407(a)	Power Spectral Density	Complies	3.43 dB
3.5	15.407(a)	Peak Excursion	Complies	5.19 dB
3.6	15.407(b)	Radiated Emissions	Complies	3.62 dB
3.7	15.407(b)	Band Edge Emissions	Complies	3.44 dB
3.8	15.407(g)	Frequency Stability	Complies	-
3.9	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.5dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
Peak Excursion	±0.5dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	±8.5×10 ⁻⁸	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7°C	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2 GENERAL INFORMATION

2.1 Product Details

Only the radio detail of IEEE 802.11a/n is shown in this report. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Power Type	Power from host
Modulation	OFDM for IEEE 802.11a
Data Rate (Mbps)	See the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Frequency Range	5150~5350MHz; 5470~5725MHz
Channel Band Width (99%)	1TX-802.11a: Band 1: 16.56 MHz ; Band 2: 16.56 MHz ; Band 3: 16.52 MHz 2TX-802.11n MCS 8: (20MHz) Band 1: 17.52 MHz ; Band 2: 17.48 MHz ; Band 3: 17.56 MHz (40MHz) Band 1: 36.08 MHz ; Band 2: 36.08 MHz ; Band 3: 36.16 MHz
Conducted Output Power	1TX-802.11a: Band 1: 11.49 dBm ; Band 2: 11.73 dBm ; Band 3: 11.93 dBm 2TX-802.11n MCS 8: (20MHz) Band 1: 12.41 dBm ; Band 2: 12.49 dBm ; Band 3: 12.12 dBm (40MHz) Band 1: 12.32 dBm ; Band 2: 12.00 dBm ; Band 3: 12.00 dBm

IEEE 802.11n Modulation Scheme

MCS Index	Nss	Modulation	R	NBPSK	NCBPS		NDBPS		Data rate(Mbps) 800nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSK	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

2.2 Table for Filed Antenna

Antenna Category Information	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input checked="" type="checkbox"/>	Temporary RF connector provided
<input type="checkbox"/>	No temporary RF connector provided
<input type="checkbox"/>	External antenna (dedicated antennas)
<input type="checkbox"/>	Single power level with corresponding antenna(s)
<input type="checkbox"/>	Multiple power settings and corresponding antenna(s)
<input type="checkbox"/>	Professional Install
<input type="checkbox"/>	Unique antenna connector
<input type="checkbox"/>	BIOS lock.

Antenna General Information						
Ant. No.	Category	Type	Brand	Model	Gain (dBi)	
					2.4G	5G
1	Internal	Printed	--	--	1.78	3.33
	Internal	Printed	--	--	1.78	3.33
<input type="checkbox"/> EUT is consist of single model antenna assembly for spatial multiplexing MIMO configuration. <input checked="" type="checkbox"/> EUT is consist of multiple model antennas assembly (secondary source multiple model antennas regardless of spatial multiplexing MIMO configuration), the test (except DFS test) should be performed with highest antenna gain of each antenna type. Then Ant. No. 1 shall be performed the test. <input type="checkbox"/> EUT is consist of multiple model antennas assembly for spatial multiplexing MIMO configuration (e.g. model A shall be installed in Port A and model B shall be installed in Port B...).						

Transmitter Outputs & Receiver Inputs Information				
Modulation	Transmitter Outputs	Receiver Inputs	Transmitter Output Signals	Co-location
802.11a	1	1	Correlated	No
802.11n HT20 / HT40	2 (SM)	2	Uncorrelated	No
Note 1: CDD - Cyclic Delay Diversity (CDD) modes (e.g., legacy modes in 802.11n devices). In CDD modes, the same digital data is carried by each transmit antenna, but with different cyclic delays. Note 2: STBC - Space Time Block Codes (STBC) for which different digital data is carried by each transmit antenna during any symbol period. Note 3: SM - Spatial Multiplexing MIMO (SM-MIMO), for which independent data streams are sent to each transmit antenna. Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other.				

Antenna Directional Gain					
Port No.	Modulaton	Transmitter Outputs Signals Correlated	Transmitter Outputs (N)	Antenna Gain Combination (dBi)	Directional Gain (dBi)
1	802.11a	Correlated	1	3.33	3.33
1+2	802.11n HT20 / HT40	Uncorrelated	2	3.33, 3.33	3.33
<input checked="" type="checkbox"/> For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows ♦ Any transmit signals are correlated, Directional Gain = GANT + 10 log(N) dBi ♦ All transmit signals are completely uncorrelated, Directional Gain = GANT <input type="checkbox"/> For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows: ♦ Any transmit signals are correlated, Directional Gain = 10 log $[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$ dBi ♦ All transmit signals are completely uncorrelated, Directional Gain = 10 log $[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N]$ dBi					

2.3 Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency (20MHz)	Channel No.	Frequency (40MHz)
5150~5250 MHz Band 1	36	5180 MHz	38	5190 MHz
	40	5200 MHz	46	5230 MHz
	44	5220 MHz	-	-
	48	5240 MHz	-	-

Frequency Band	Channel No.	Frequency (20MHz)	Channel No.	Frequency (40MHz)
5250~5350 MHz Band 2	52	5260 MHz	54	5270 MHz
	56	5280 MHz	62	5310 MHz
	60	5300 MHz	-	-
	64	5320 MHz	-	-

Frequency Band	Channel No.	Frequency (20MHz)
5470~5725 MHz Band 3	100	5500 MHz
	104	5520 MHz
	108	5540 MHz
	112	5560 MHz
	116	5580 MHz
	132	5660 MHz
	136	5680 MHz
	140	5700 MHz
	Channel No.	Frequency (40MHz)
	102	5510 MHz
	110	5550 MHz
	134	5670 MHz

2.4 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on the entire possible Configuration for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Conducted Emission	Normal Mode	Auto	-	-
Max. Conducted Output Power	11a Band 1~2/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140	1
	11n Band 1~2/BPSK MCS 8 (20MHz)	13Mbps	36/40/48/52/56 /64/100/116/140	1/2 ; 1+2
	11n Band 1~2/BPSK MCS 8 (40MHz)	27Mbps	38/46/54/62/102/110/134	
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	11a Band 1~2/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140	1
	11n Band 1~2/BPSK MCS 8 (20MHz)	13Mbps	36/40/48/52/56 /64/100/116/140	1/2 ; 1+2
	11n Band 1~2/BPSK MCS 8 (40MHz)	27Mbps	38/46/54/62/102/110/134	
Radiated Emission Below 1GHz	Normal Mode	Auto	-	-
Radiated Emission Above 1GHz	11a Band 1~2/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140	1
	11n Band 1~2/BPSK MCS 8 (20MHz)	13Mbps	36/40/48/52/56 /64/100/116/140	1+2
	11n Band 1~2/BPSK MCS 8 (40MHz)	27Mbps	38/46/54/62/102/110/134	
Band Edge Emission	11a Band 1~2/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140	1
	11n Band 1~2/BPSK MCS 8 (20MHz)	13Mbps	36/40/48/52/56 /64/100/116/140	1+2
	11n Band 1~2/BPSK MCS 8 (40MHz)	27Mbps	38/46/54/62/102/110/134	

2.5 Table for Testing Locations

Test Site No.	Site Category	Location
CO04-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
03CH02-HY	SAC	Hwa Ya

Semi Anechoic Chamber (SAC).

2.6 Table for Supporting Units

Support Unit	Brand	Model	FCC ID	Remark
Notebook	DELL	PP20L	N/A	Conducted Emissions
(USB) Mouse	Microsoft	1004	N/A	
iPod Nano	Apple	A1119	N/A	
Wireless AP (Remote Workstation)	EDIMAX	BR-6204WG	NDD9562040507	
Mouse	Microsoft	1004	R31264	Radiated Emissions
Notebook	DELL	E5520	DoC	
iPod	APPLE	A1199	DoC	

2.7 Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. 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.

For Single Chain:

Power Parameters of IEEE 802.11a

Test Software Version	Ralink RT3x7xQA		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11n	0B	0B	0B
Frequency	5260 MHz	5280 MHz	5320 MHz
IEEE 802.11n	0C	0C	0D
Frequency	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11n	0D	0C	0E

For Two Chain:

Power Parameters of IEEE 802.11n (20MHz)

Test Software Version	Ralink RT3x7xQA		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11n	00 / 01	00 / 01	00 / 02
Frequency	5260 MHz	5280 MHz	5320 MHz
IEEE 802.11n	02 / 02	02 / 02	01 / 02
Frequency	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11n	03 / 03	03 / 03	05 / 05

Power Parameters of IEEE 802.11n (40MHz)

Test Software Version	Ralink RT3x7xQA		
Frequency	5190 MHz	5230 MHz	5270 MHz
IEEE 802.11n	00 / 01	00 / 01	01 / 02
Frequency	5310 MHz	5510 MHz	5550 MHz
IEEE 802.11n	01 / 02	02 / 02	04 / 03
Frequency		5670 MHz	
IEEE 802.11n		04 / 04	

2.8 EUT Operation during Test

An executive program, "EMCTEST.EXE" under WIN XP, which generates a complete line of continuously repeating "H" pattern was used as the test software.

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The NB reads the test program "Winthrax.exe" was executed to read and write data from EUT.
- c. The NB sends "H" messages to the panel and displays "H" patterns on the screen.
- d. Repeat the steps from b to c.

At the same time, the following programs were executed:

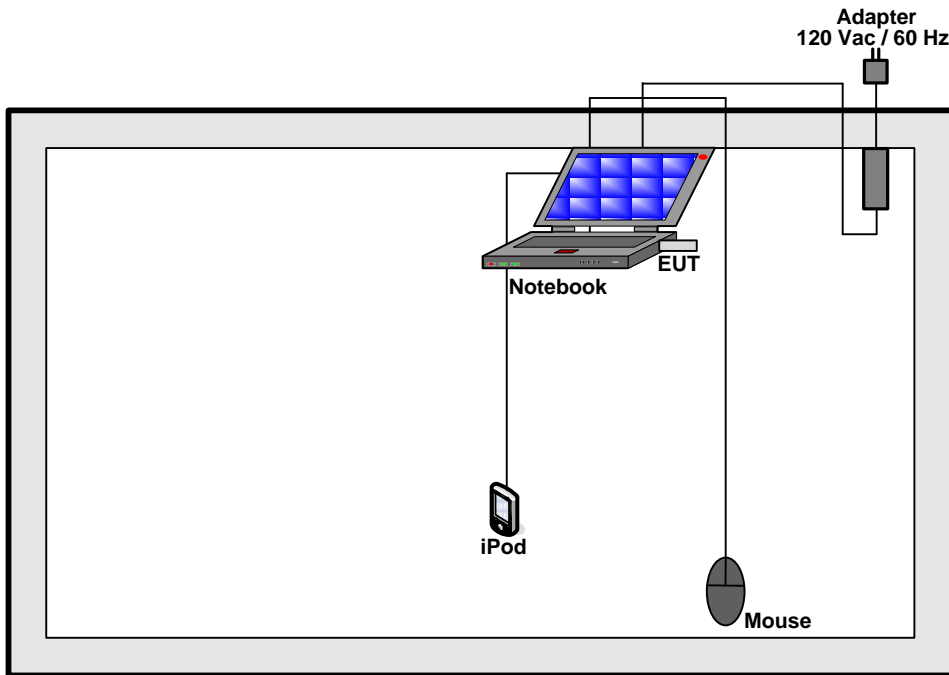
- Executed "Winthrax.exe" to read and write data from iPod.
- Executed "ping.exe" to link with the remote workstation to receive and transmit data by WLAN.

Only Radiated used:

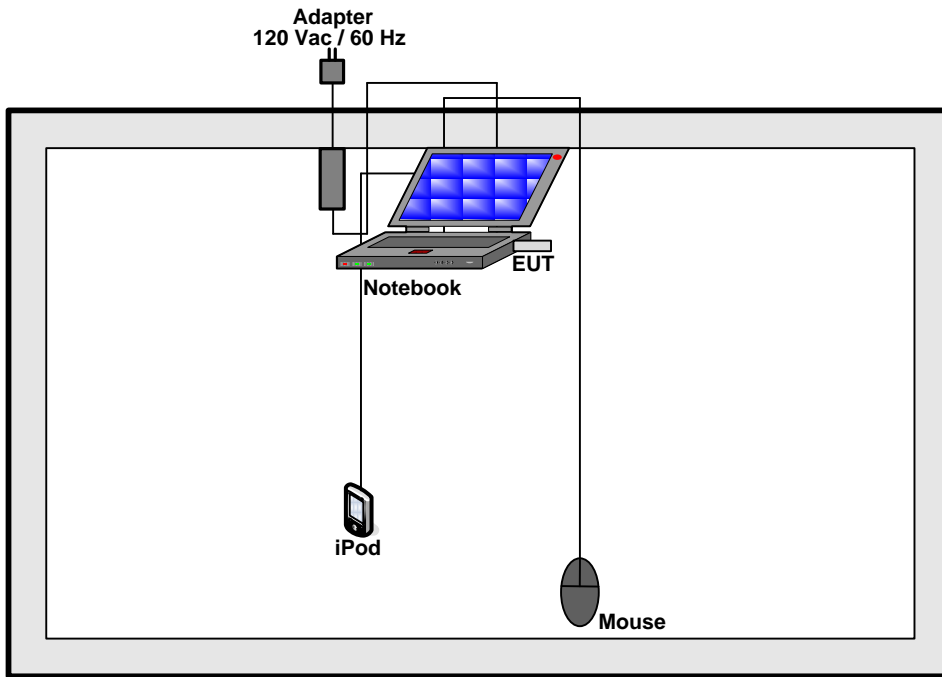
- Executed "Ralink RT3x7xQA" to keep transmitting signals at fixed frequency.

2.9 Test Configuration

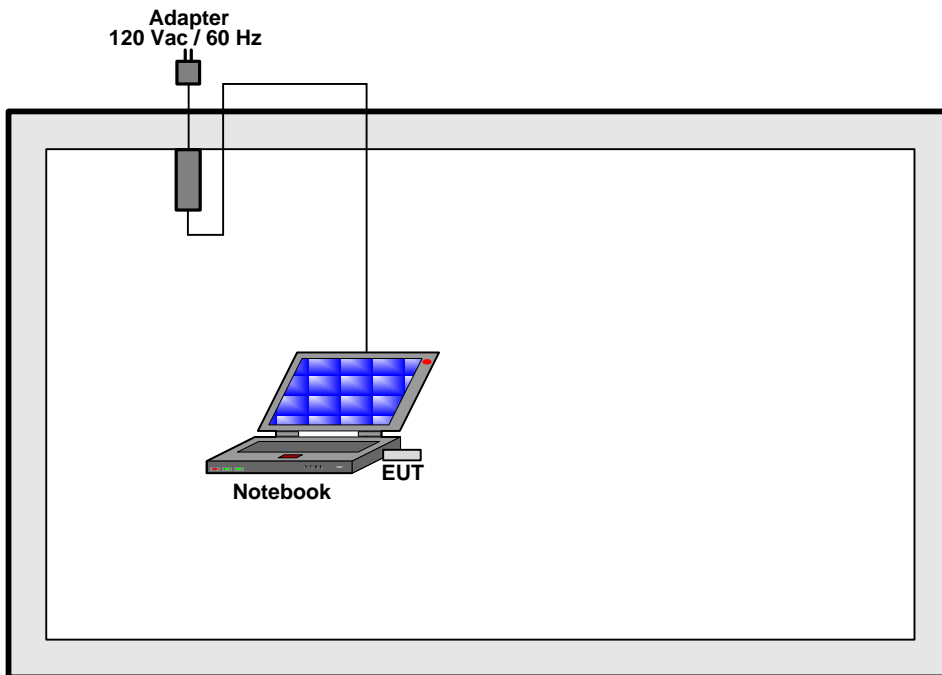
For conducted emissions



For radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Class B

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2 Measuring Instruments and Setting

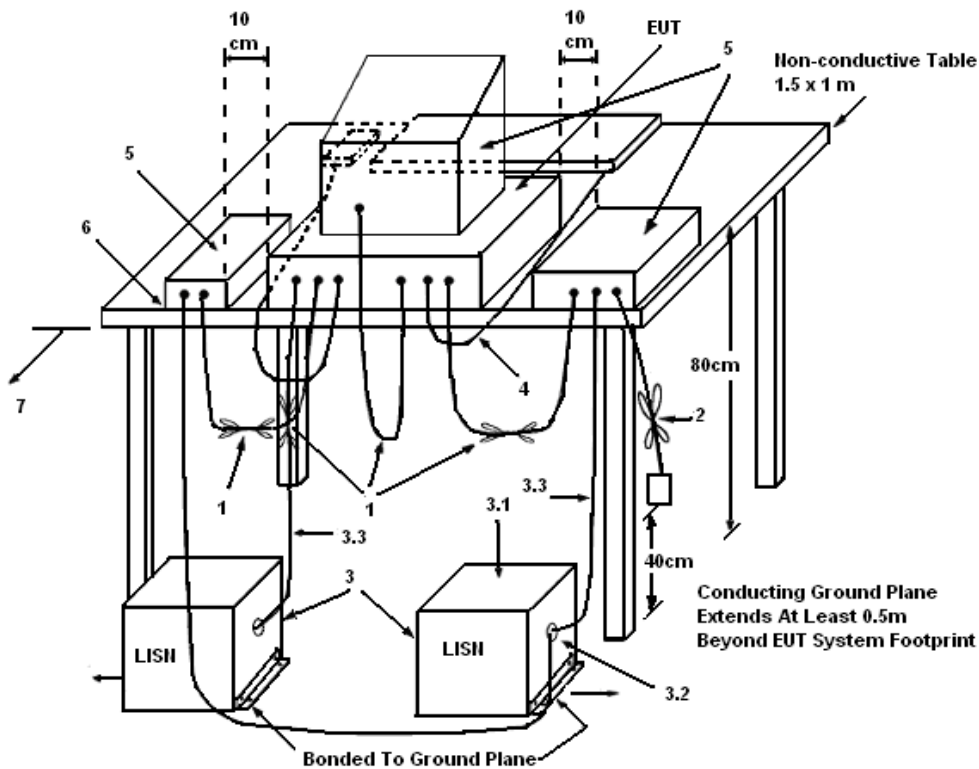
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.1.3 Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

3.1.4 Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.
- (3.1) All other equipment powered from additional LISN(s).
- (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
- (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

3.1.5 Test Deviation

There is no deviation with the original standard.

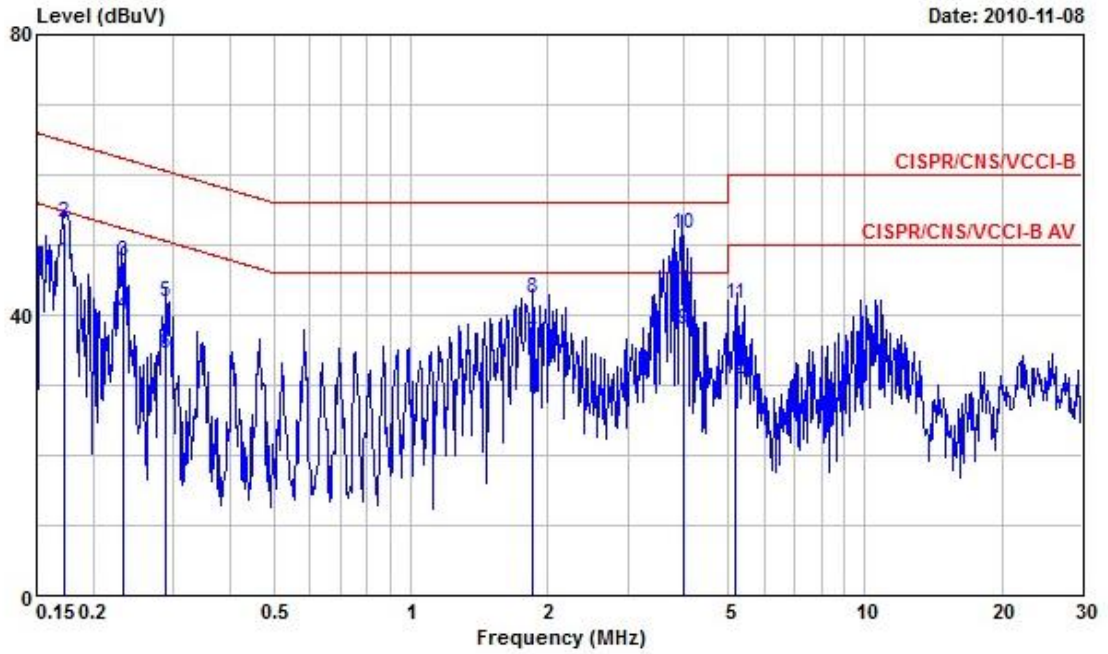
3.1.6 EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

3.1.7 Results of AC Power Line Conducted Emissions Measurement

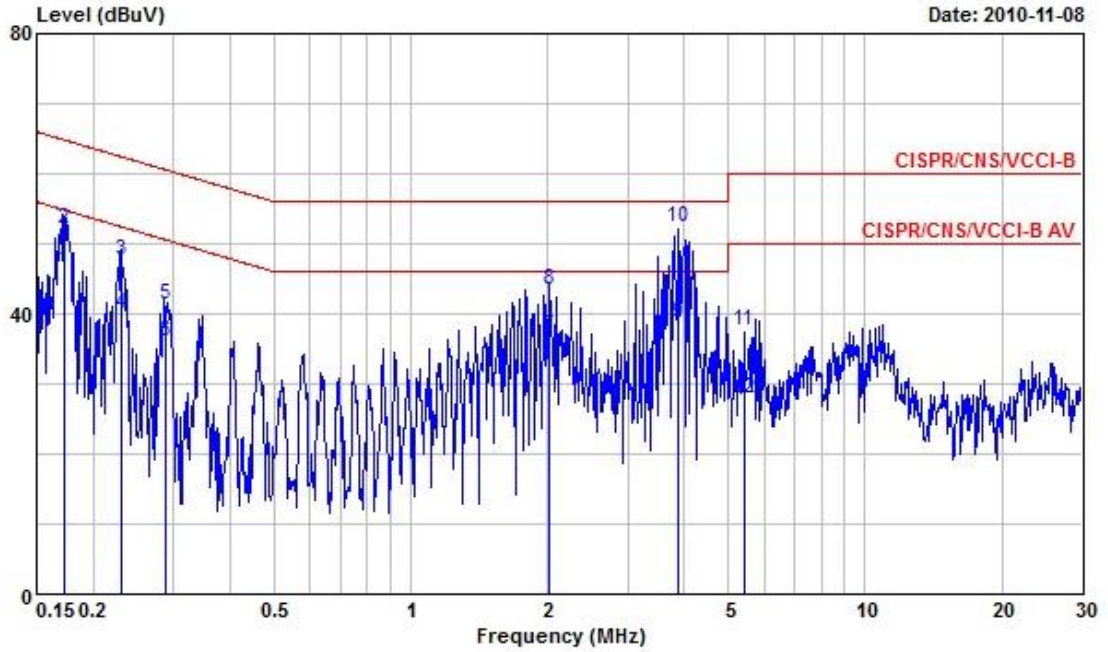
Final Test Date	Nov. 08, 2010	Test Site No.	CO04-HY
Temperature	24.9°C	Humidity	47.2%
Test Engineer	Jason	Configuration	Normal Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1730540	47.68	-7.13	54.81	47.31	0.08	0.29	Average
2	0.1730540	53.18	-11.63	64.81	52.81	0.08	0.29	QP
3	0.2316380	47.76	-14.63	62.39	47.40	0.08	0.28	QP
4	0.2316380	39.96	-12.43	52.39	39.60	0.08	0.28	Average
5	0.2893470	41.89	-18.65	60.54	41.59	0.09	0.21	QP
6	0.2893470	34.39	-16.15	50.54	34.09	0.09	0.21	Average
7	1.850	35.97	-10.03	46.00	35.70	0.13	0.14	Average
8	1.850	42.37	-13.63	56.00	42.10	0.13	0.14	QP
9	4.000	37.78	-8.22	46.00	37.40	0.16	0.22	Average
10	4.000	51.48	-4.52	56.00	51.10	0.16	0.22	QP
11	5.200	41.65	-18.35	60.00	41.21	0.19	0.25	QP
12	5.200	30.75	-19.25	50.00	30.31	0.19	0.25	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1720450	46.27	-8.59	54.86	45.90	0.08	0.29	Average
2	0.1720450	52.14	-12.72	64.86	51.77	0.08	0.29	QP
3	0.2303960	47.66	-14.78	62.44	47.30	0.08	0.28	QP
4	0.2303960	39.96	-12.48	52.44	39.60	0.08	0.28	Average
5	0.2882840	41.39	-19.18	60.57	41.10	0.08	0.21	QP
6	0.2882840	35.99	-14.58	50.57	35.70	0.08	0.21	Average
7	2.020	36.95	-9.05	46.00	36.70	0.11	0.14	Average
8	2.020	43.55	-12.45	56.00	43.30	0.11	0.14	QP
9	3.870	38.76	-7.24	46.00	38.39	0.15	0.22	Average
10	3.870	52.46	-3.54	56.00	52.09	0.15	0.22	QP
11	5.420	37.75	-22.25	60.00	37.30	0.19	0.26	QP
12	5.420	27.95	-22.05	50.00	27.50	0.19	0.26	Average

Note:
Level = Read Level + LISN Factor + Cable Loss.

3.2 99% Occupied Bandwidth Measurement

3.2.1 Limit

No restriction limits. But resolution bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

3.2.2 Measuring Instruments and Setting

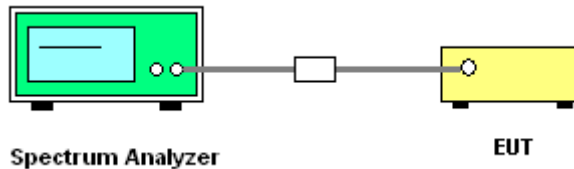
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RB	300 kHz
VB	1000 kHz
Detector	Sample
Trace	Max Hold
Sweep Time	Auto

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in sample hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.
4. For 99% Occupied Bandwidth the resolution Bandwidth \geq 1% of the selected span.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7 Test Result of 99% Occupied Bandwidth

Final Test Date	Jan. 17, 2012	Test Site No.	TH01-HY
Temperature	21.4°C	Humidity	25%
Test Engineer	Shiming	Configurations	802.11a/n

**For Single Chain:
Configuration of IEEE 802.11a**

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	20.00	16.56
40	5200 MHz	19.50	16.56
48	5240 MHz	19.60	16.48
52	5260 MHz	19.70	16.48
56	5280 MHz	19.60	16.48
64	5320 MHz	19.80	16.56
100	5500 MHz	19.60	16.48
116	5580 MHz	19.70	16.52
140	5700 MHz	19.50	16.52

For Two Chains:**Configuration IEEE 802.11n Port 1 (20MHz)**

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	20.00	17.44
40	5200 MHz	19.90	17.48
48	5240 MHz	19.90	17.48
52	5260 MHz	19.90	17.48
56	5280 MHz	20.00	17.48
64	5320 MHz	20.00	17.48
100	5500 MHz	20.00	17.44
116	5580 MHz	19.80	17.48
140	5700 MHz	20.10	17.48

Configuration IEEE 802.11n Port 2 (20MHz)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	19.60	17.48
40	5200 MHz	19.80	17.48
48	5240 MHz	19.40	17.52
52	5260 MHz	19.60	17.48
56	5280 MHz	19.40	17.48
64	5320 MHz	19.60	17.48
100	5500 MHz	19.70	17.48
116	5580 MHz	19.50	17.48
140	5700 MHz	19.70	17.56

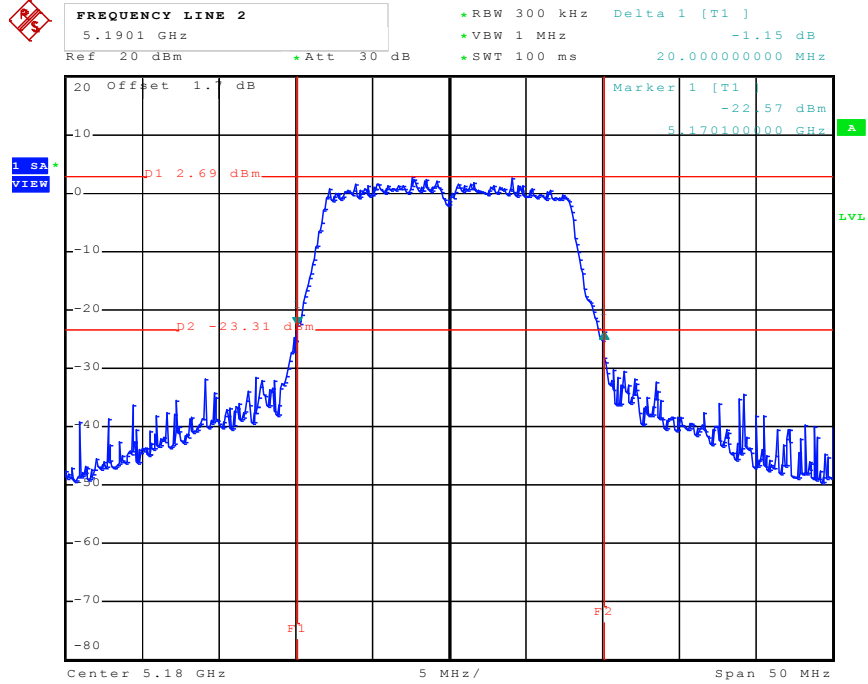
Configuration IEEE 802.11n Port 1 (40MHz)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	39.20	36.08
46	5230 MHz	38.80	36.08
54	5270 MHz	39.40	35.92
62	5310 MHz	39.00	36.08
102	5510 MHz	38.80	36.00
110	5550 MHz	39.00	36.16
134	5670 MHz	39.20	36.08

Configuration IEEE 802.11n Port 2 (40MHz)

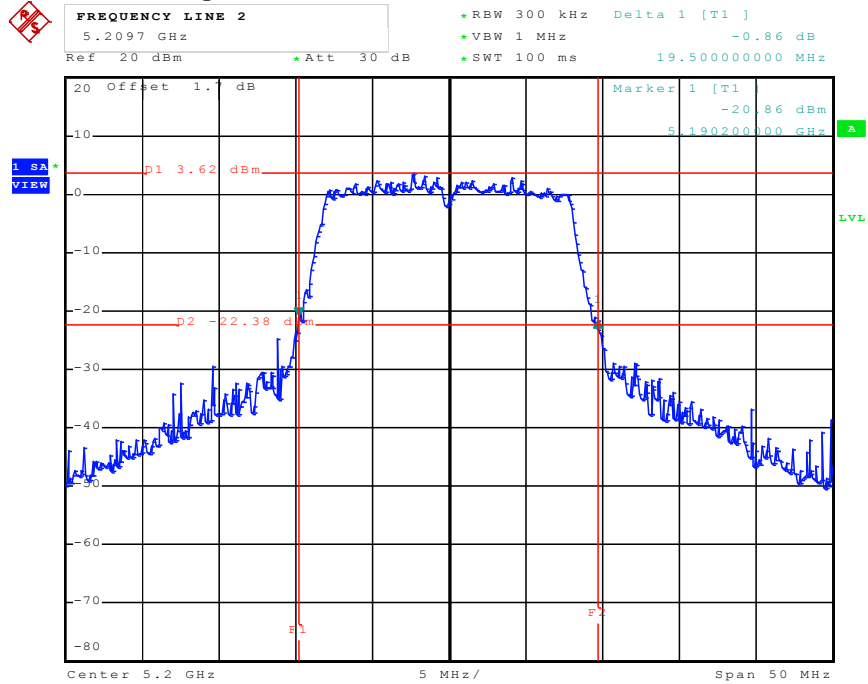
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	39.00	36.08
46	5230 MHz	39.00	36.08
54	5270 MHz	38.80	36.00
62	5310 MHz	39.20	36.08
102	5510 MHz	38.60	36.00
110	5550 MHz	39.00	36.00
134	5670 MHz	39.00	36.08

For Single Chain:
26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5180 MHz



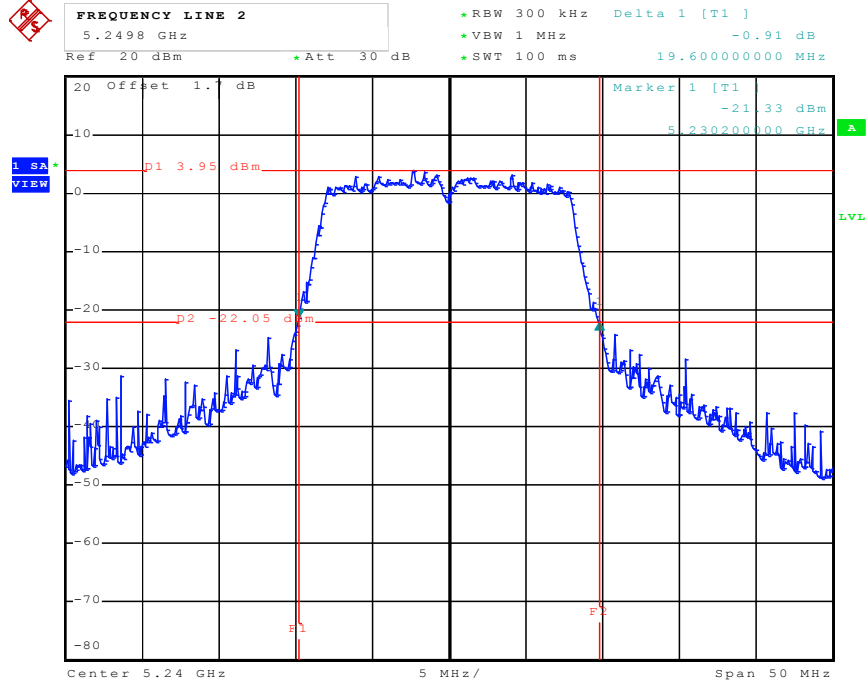
Date: 14.JAN.2012 11:49:14

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5200 MHz



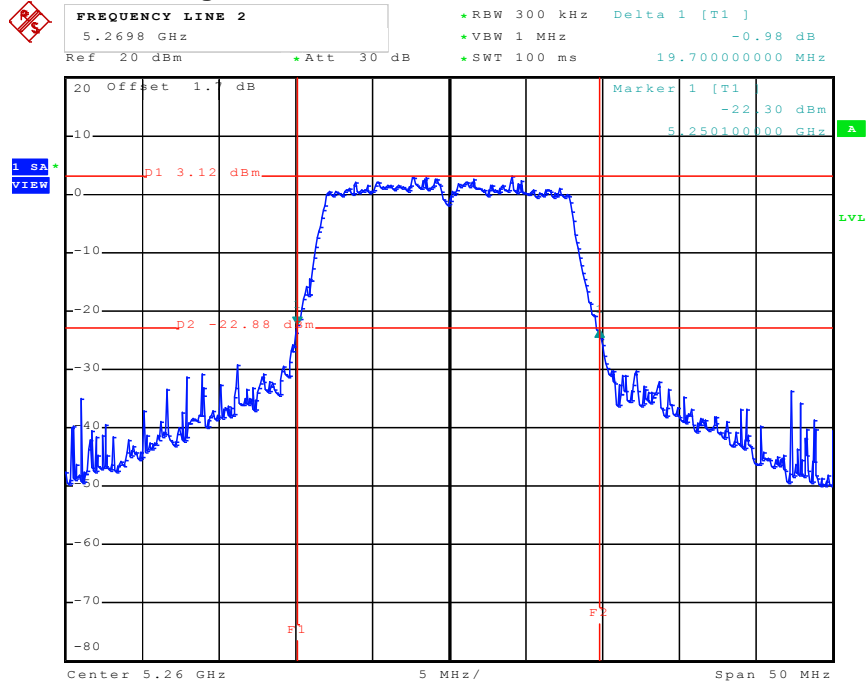
Date: 14.JAN.2012 12:15:18

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5240 MHz



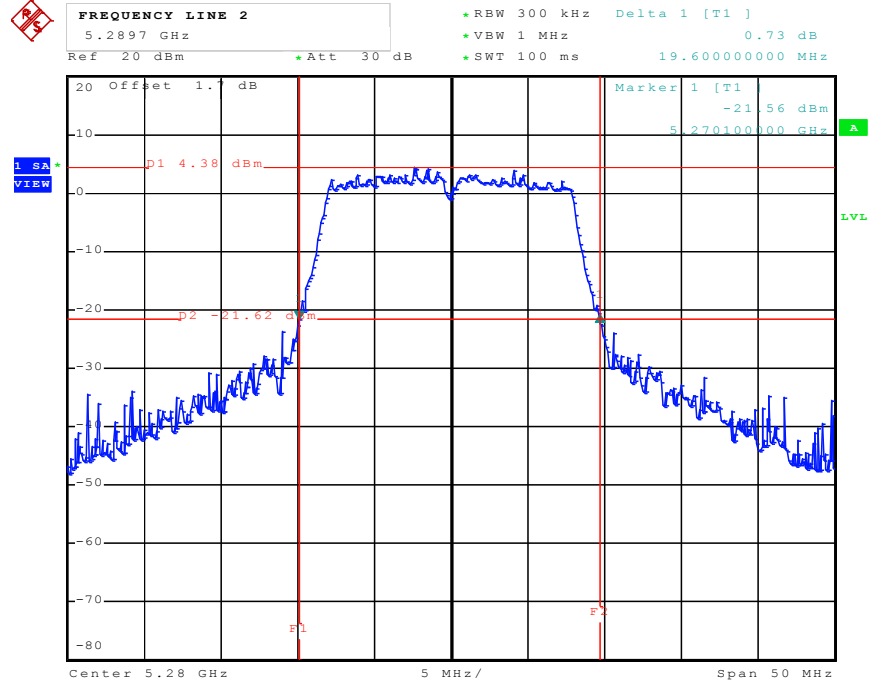
Date: 14.JAN.2012 12:29:47

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5260 MHz



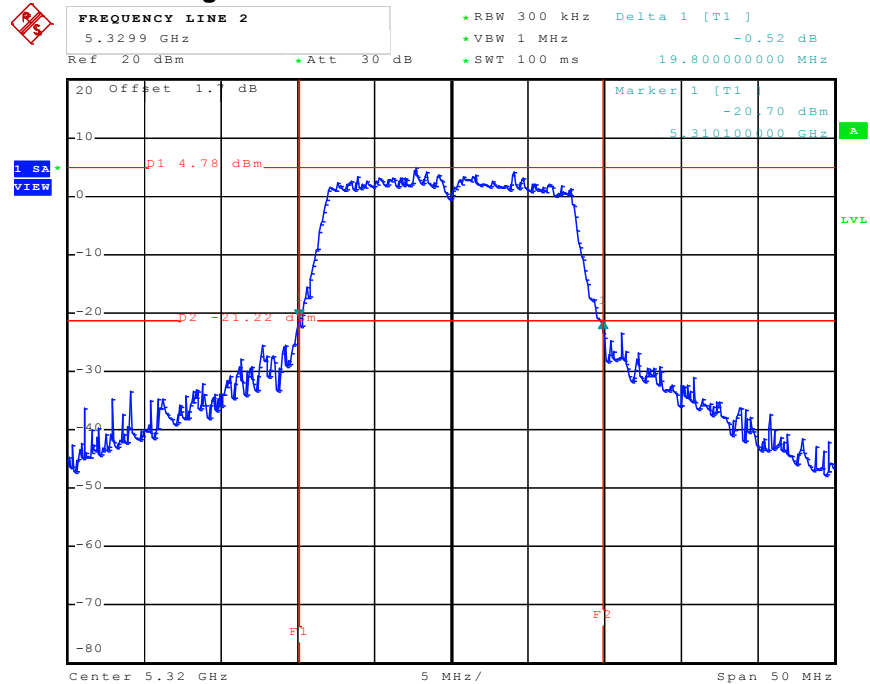
Date: 14.JAN.2012 12:44:22

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5280 MHz



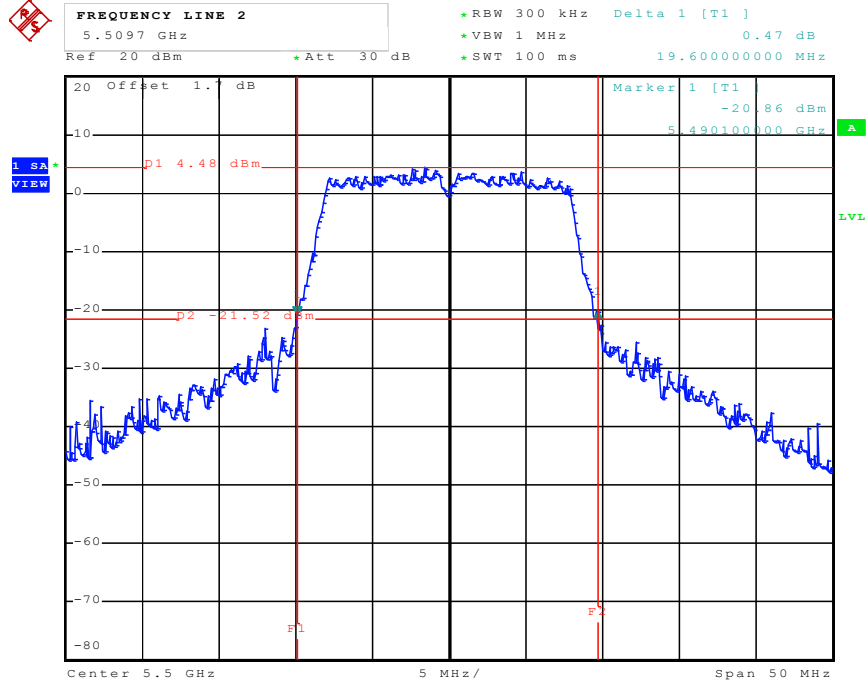
Date: 14.JAN.2012 12:59:20

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5320 MHz



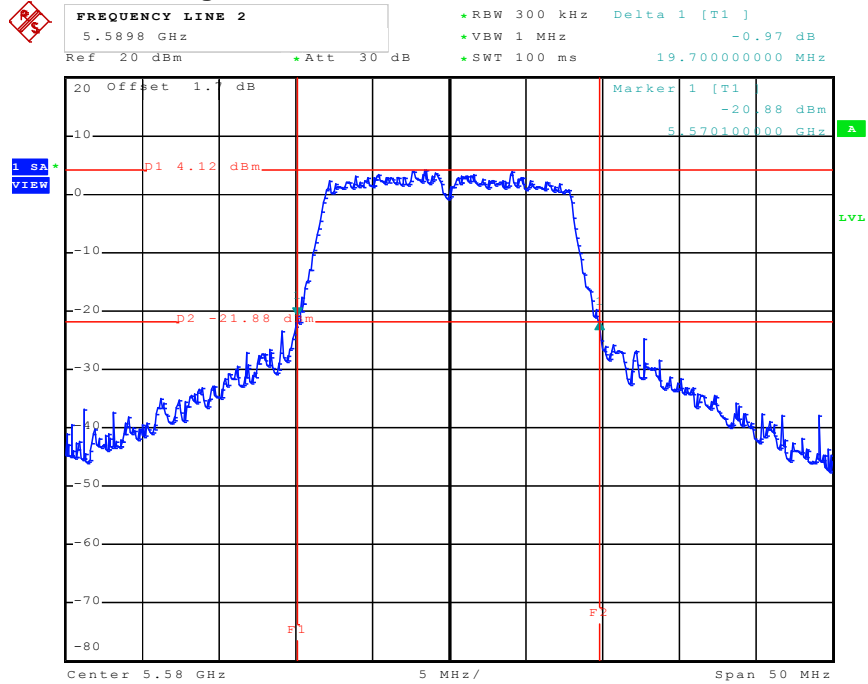
Date: 14.JAN.2012 13:10:21

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1/ 5500 MHz



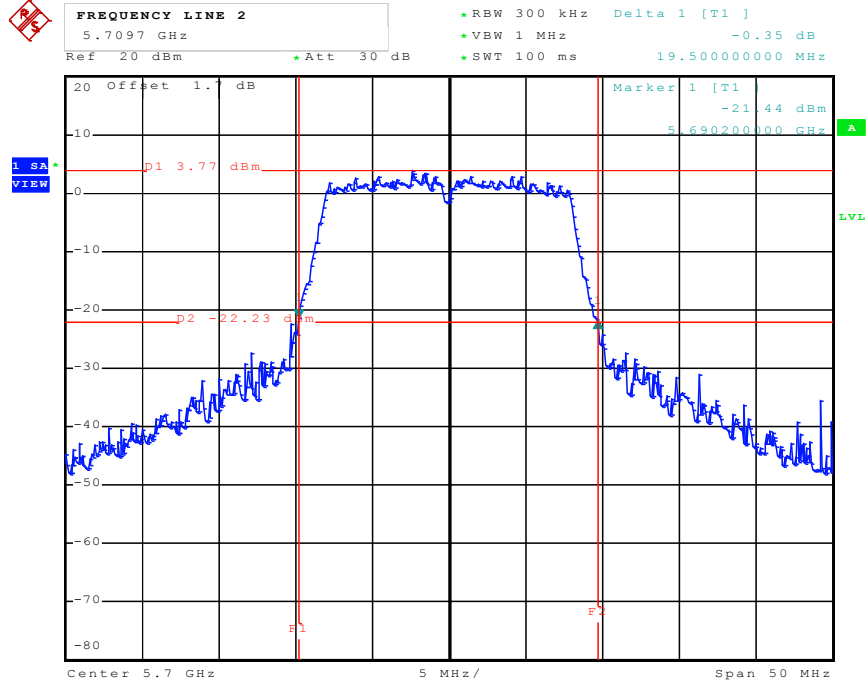
Date: 14.JAN.2012 13:21:05

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1/ 5580 MHz



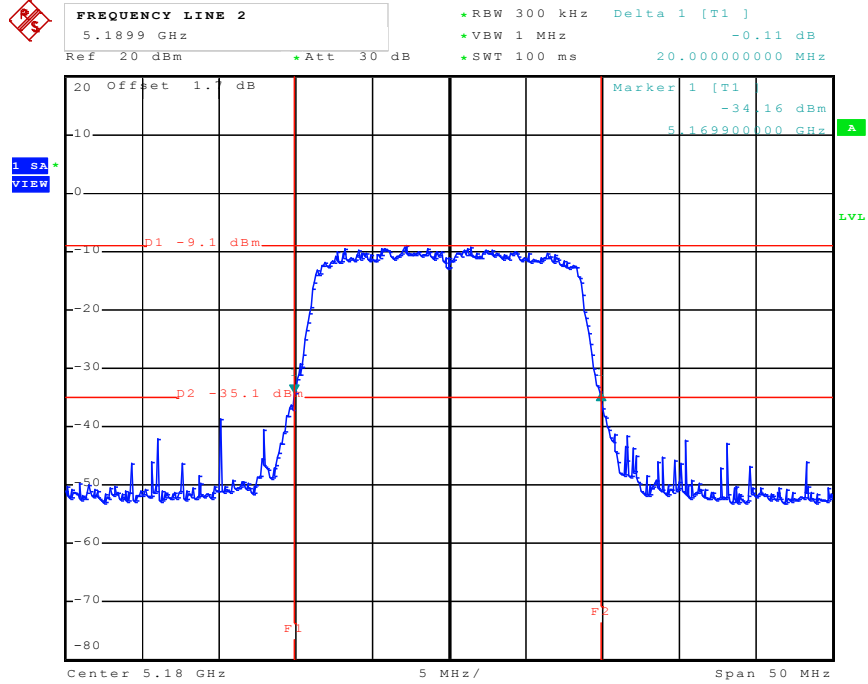
Date: 14.JAN.2012 13:34:53

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5700 MHz



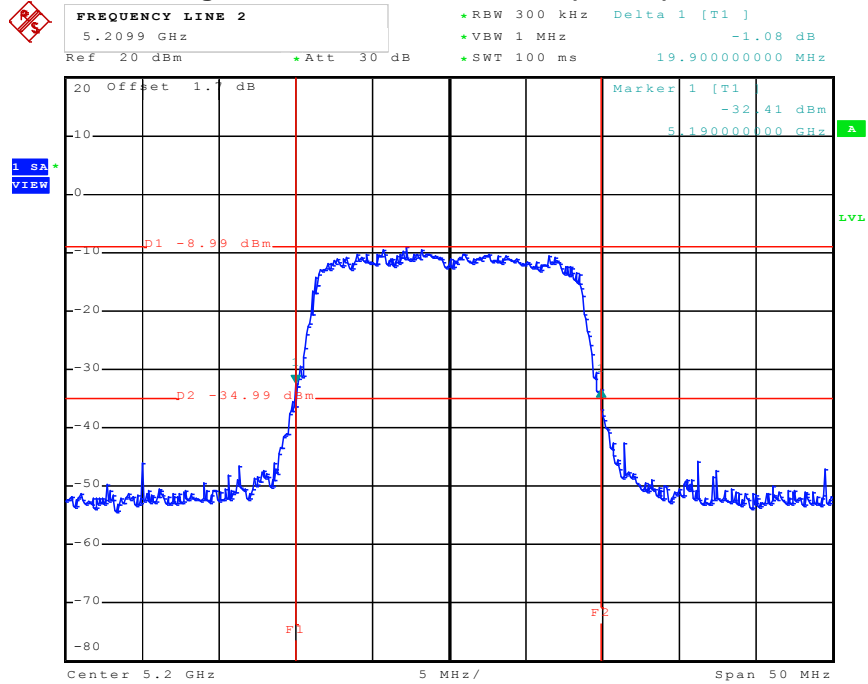
Date: 14.JAN.2012 13:52:13

For Two Chains:
26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz)/ 5180 MHz



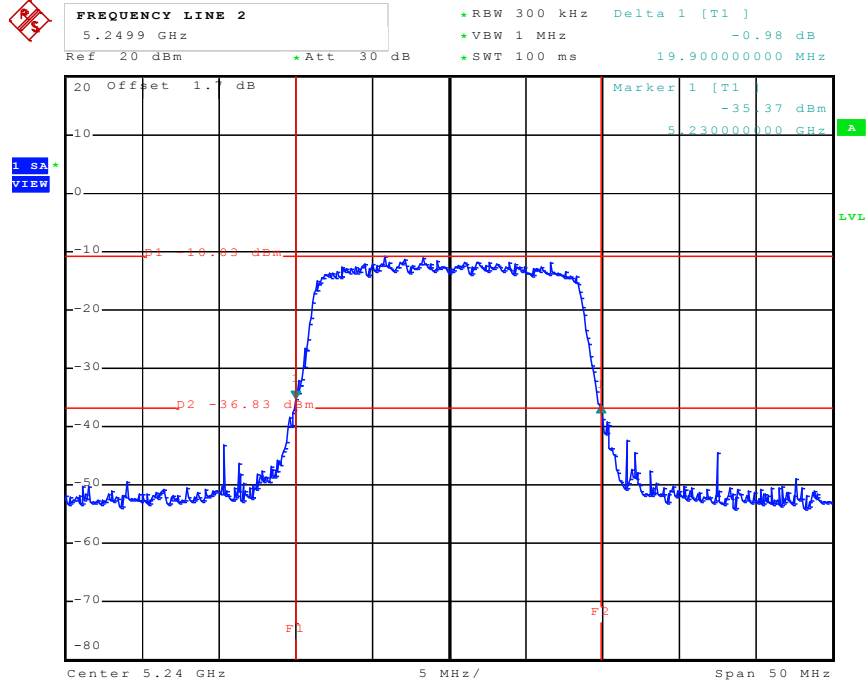
Date: 17.JAN.2012 14:41:57

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5200 MHz



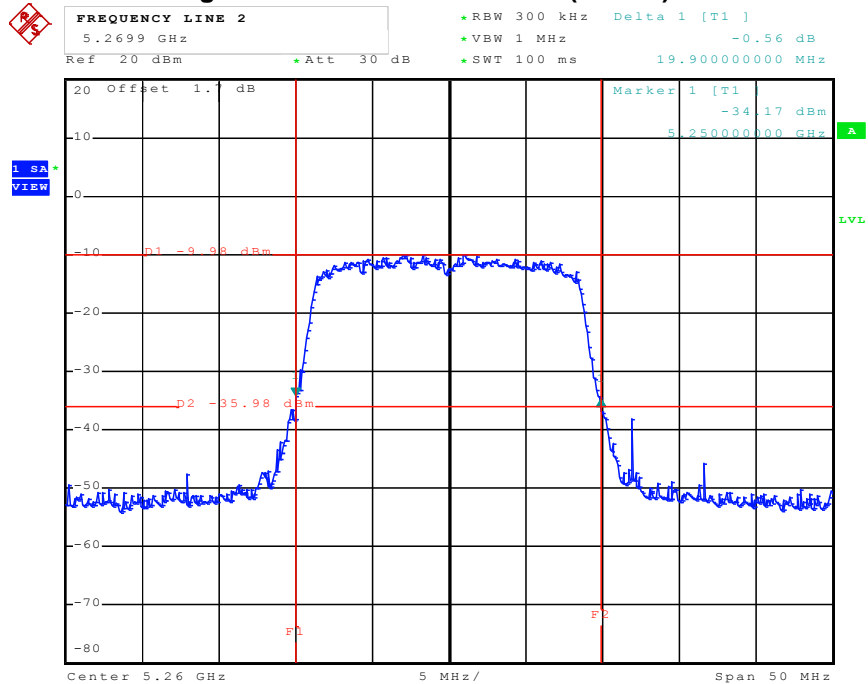
Date: 17.JAN.2012 15:13:55

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5240 MHz



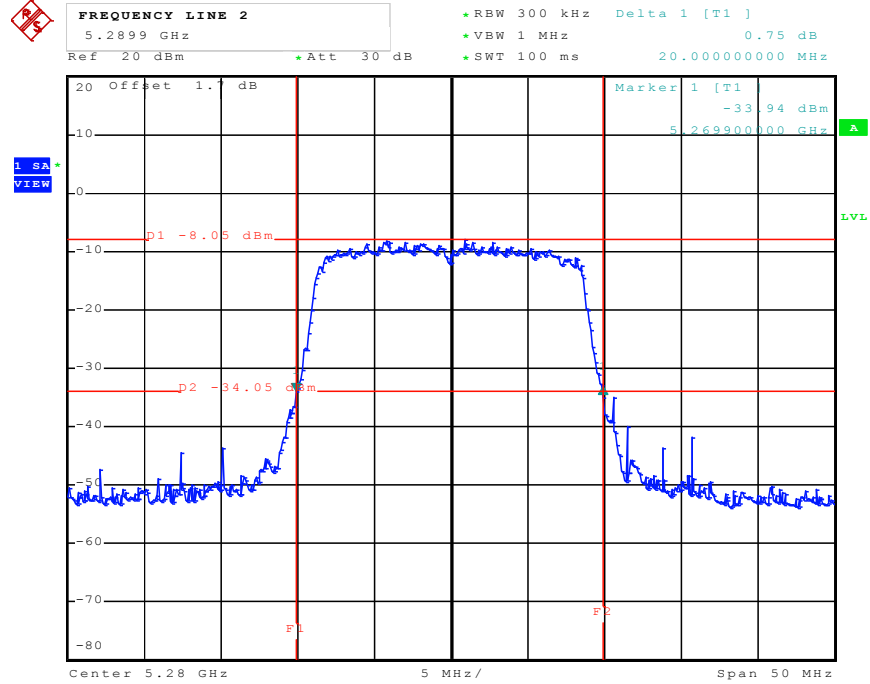
Date: 17.JAN.2012 15:27:47

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5260 MHz



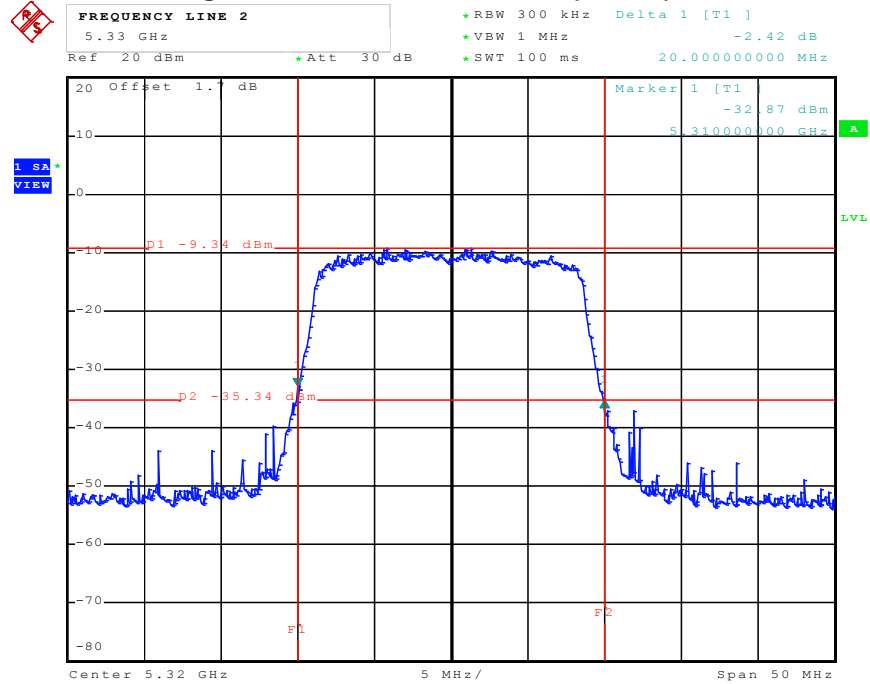
Date: 17.JAN.2012 16:07:20

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5280 MHz



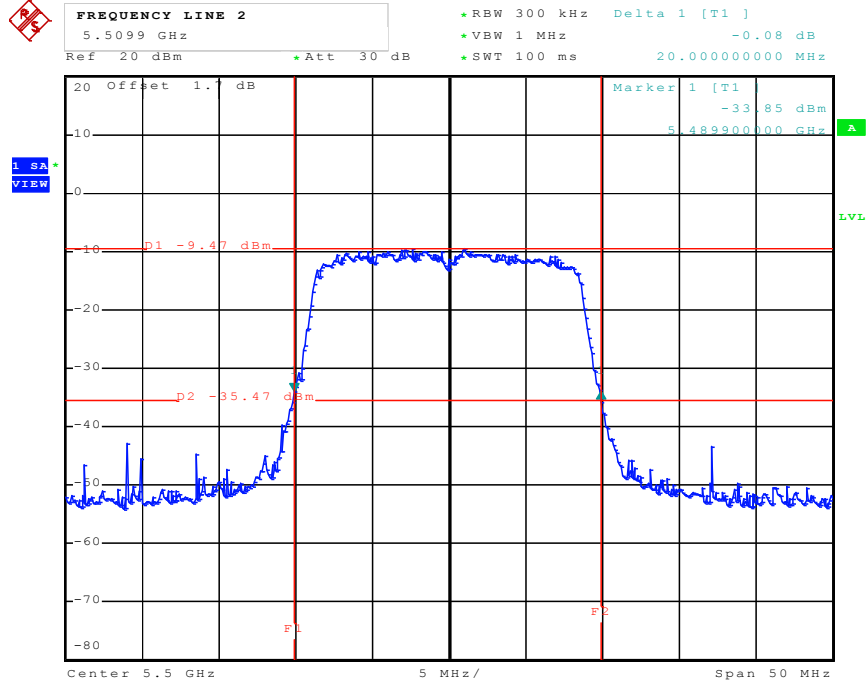
Date: 17.JAN.2012 16:48:11

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5320 MHz



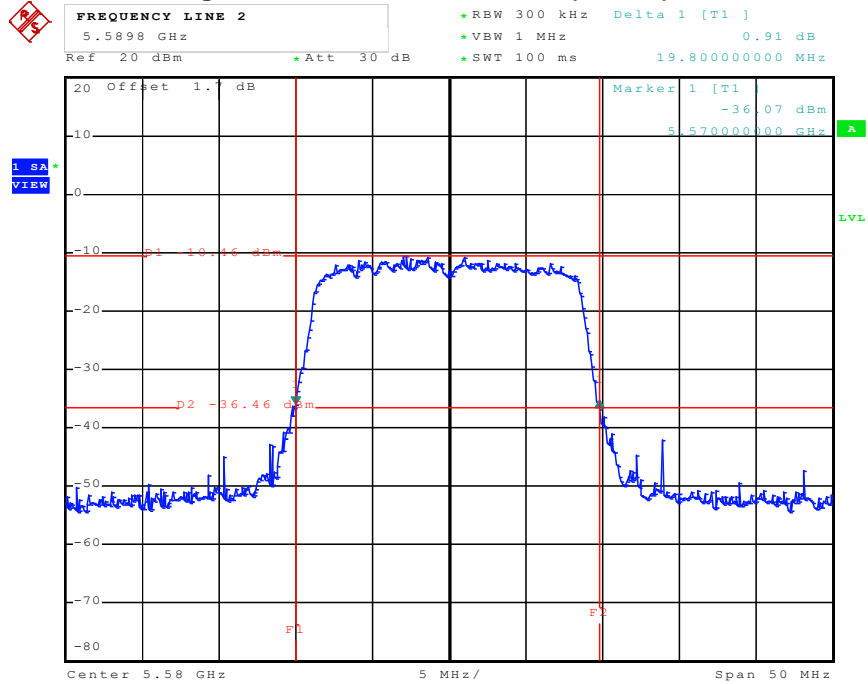
Date: 17.JAN.2012 17:15:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz)/ 5500 MHz



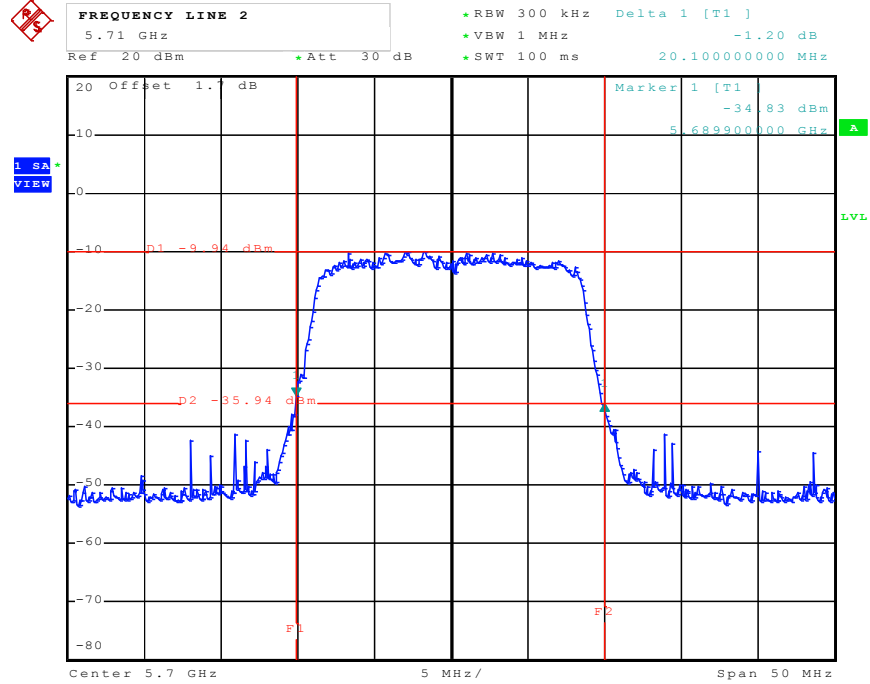
Date: 17.JAN.2012 17:23:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5580 MHz



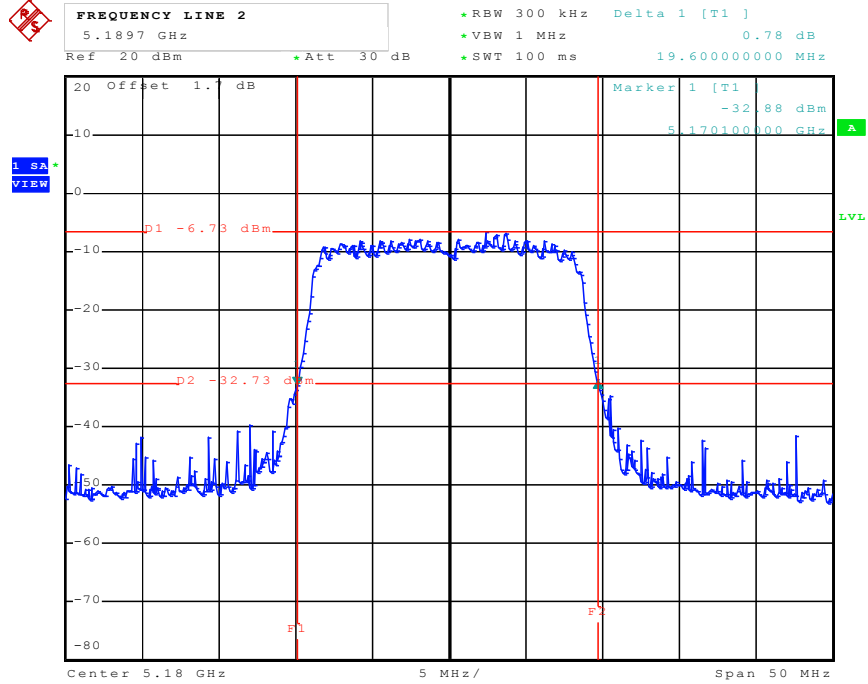
Date: 17.JAN.2012 17:47:13

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5700 MHz



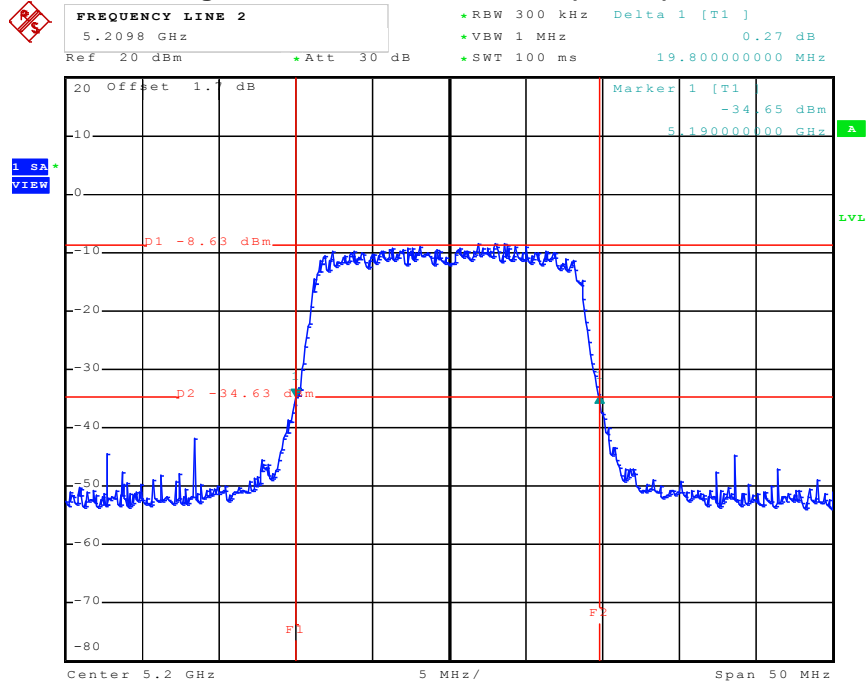
Date: 17.JAN.2012 17:57:11

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz)/ 5180 MHz



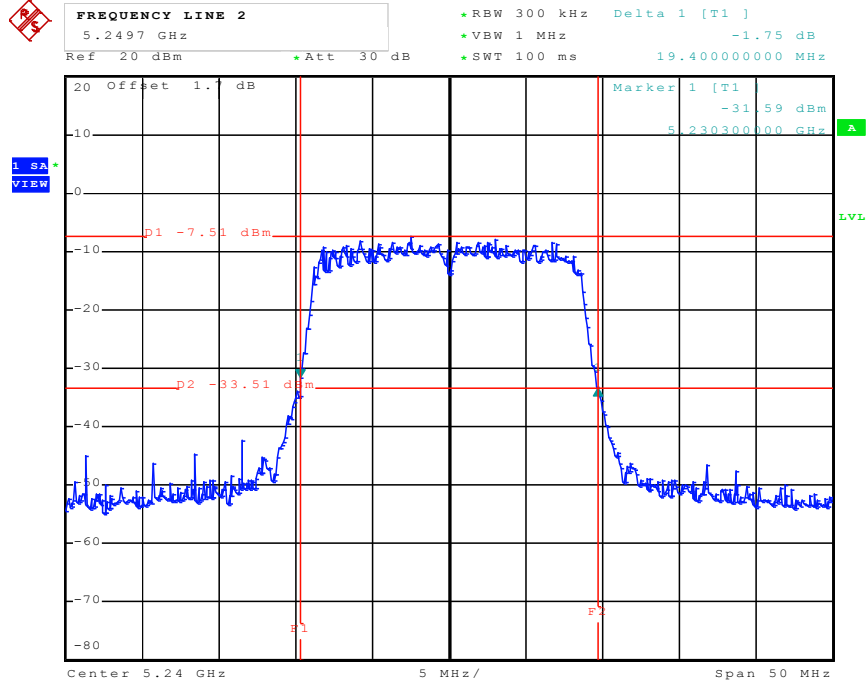
Date: 17.JAN.2012 14:21:02

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5200 MHz



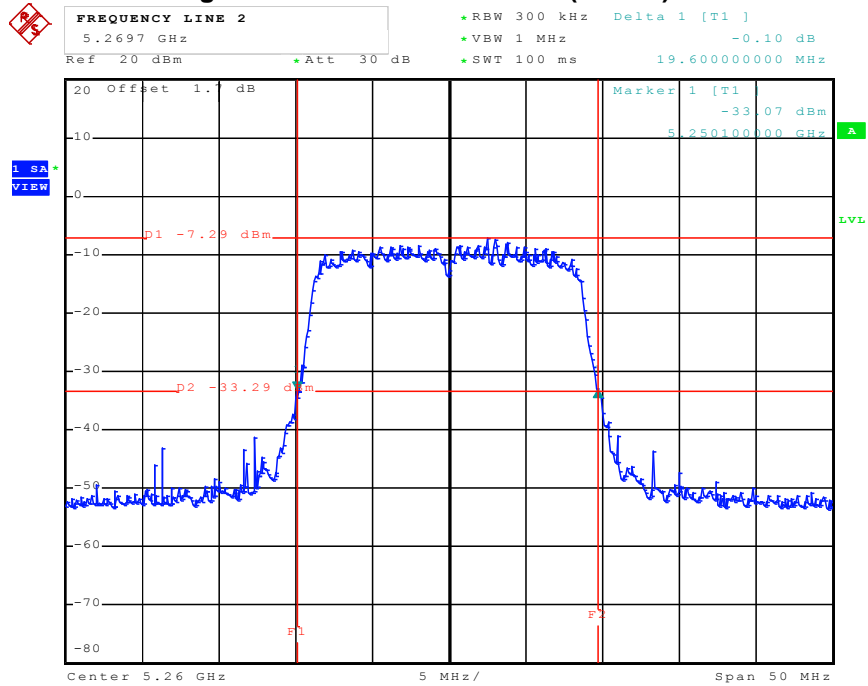
Date: 17.JAN.2012 14:52:30

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5240 MHz



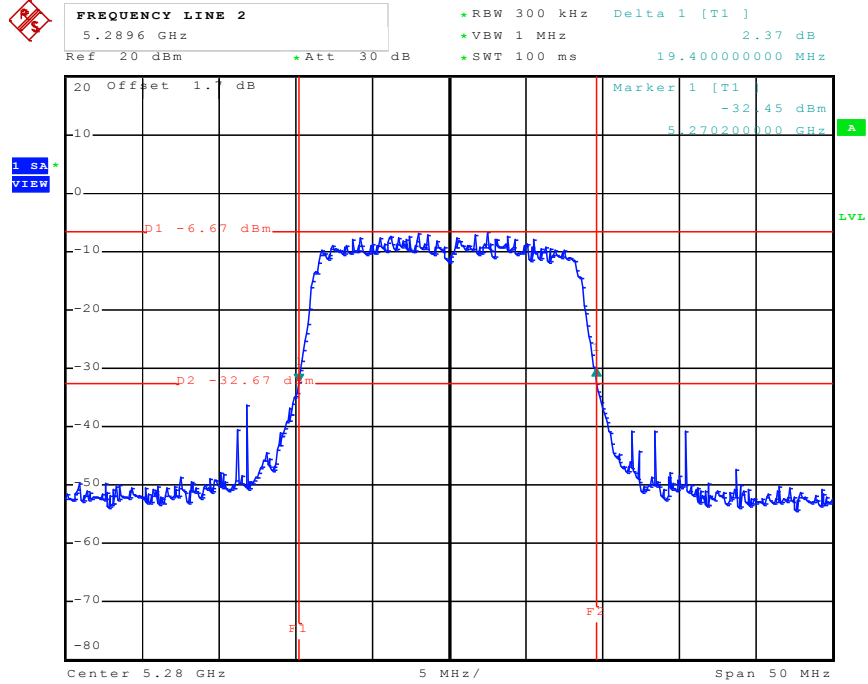
Date: 17.JAN.2012 15:59:24

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5260 MHz



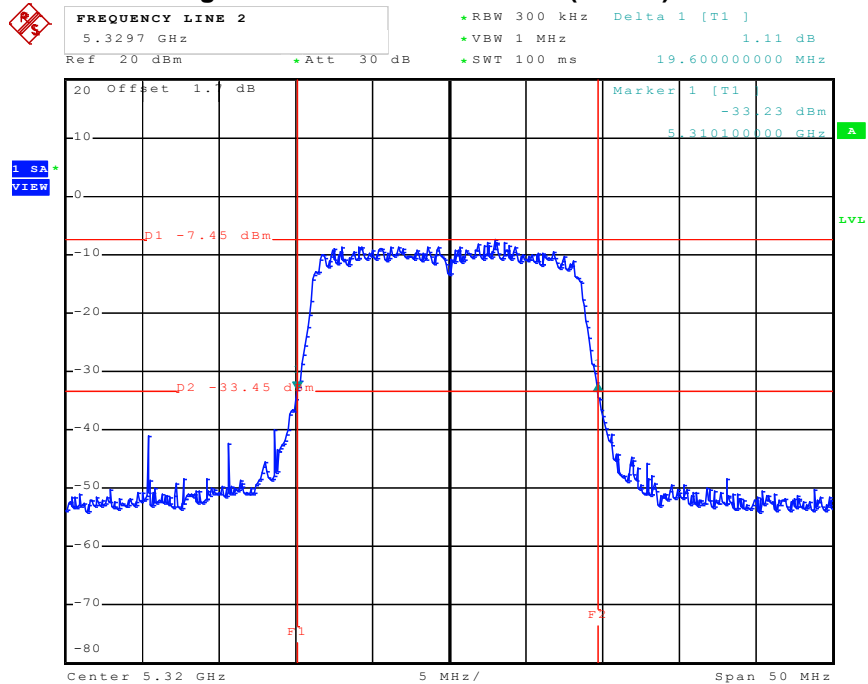
Date: 17.JAN.2012 15:49:34

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5280 MHz



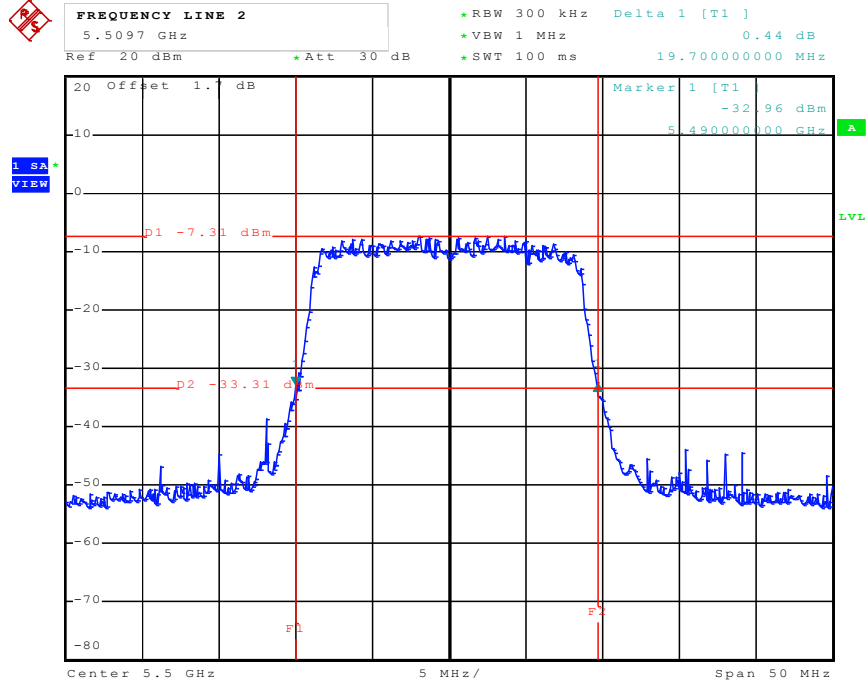
Date: 17.JAN.2012 16:59:06

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5320 MHz



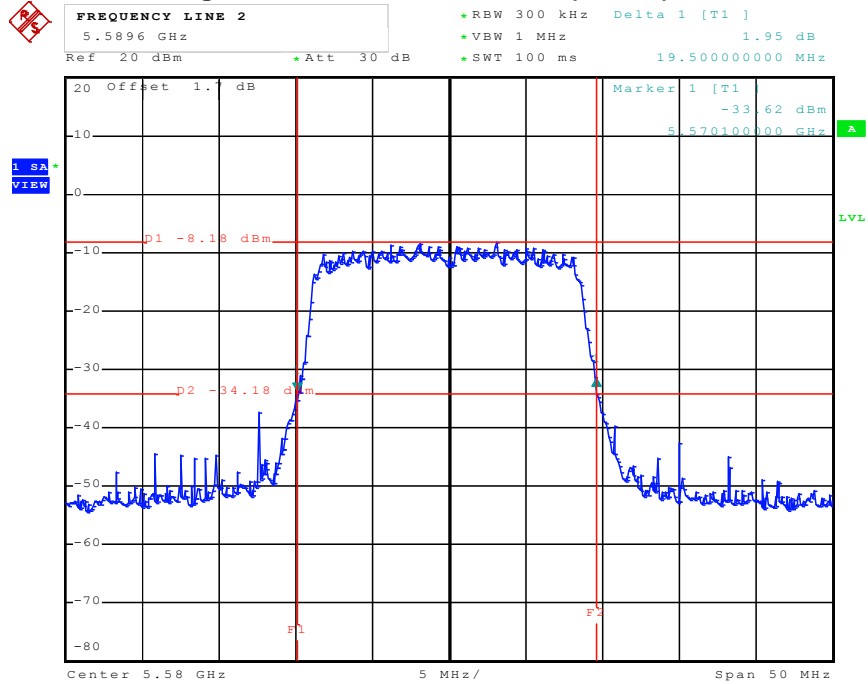
Date: 17.JAN.2012 17:07:48

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz)/ 5500 MHz



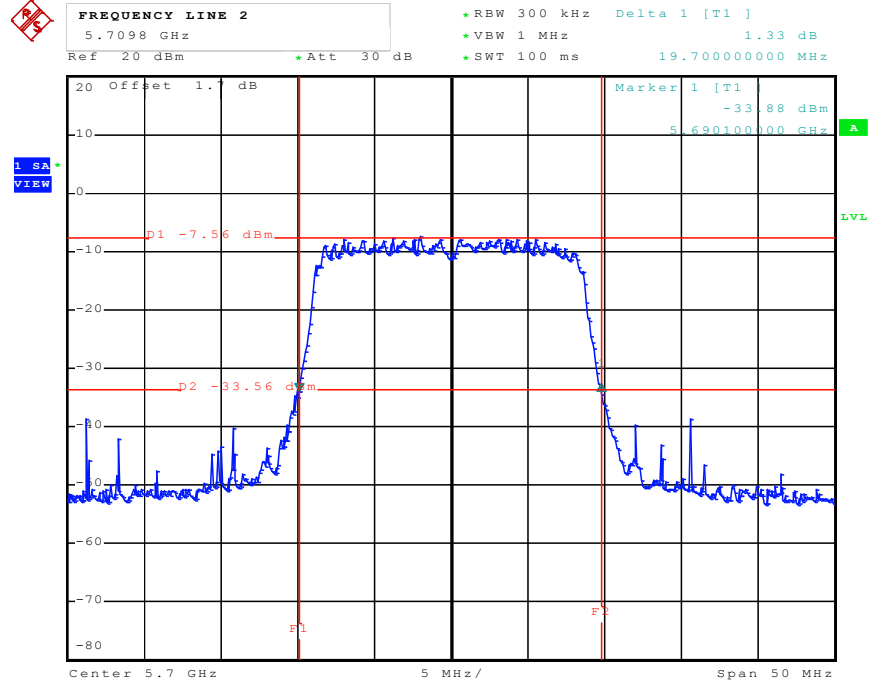
Date: 17.JAN.2012 17:32:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5580 MHz



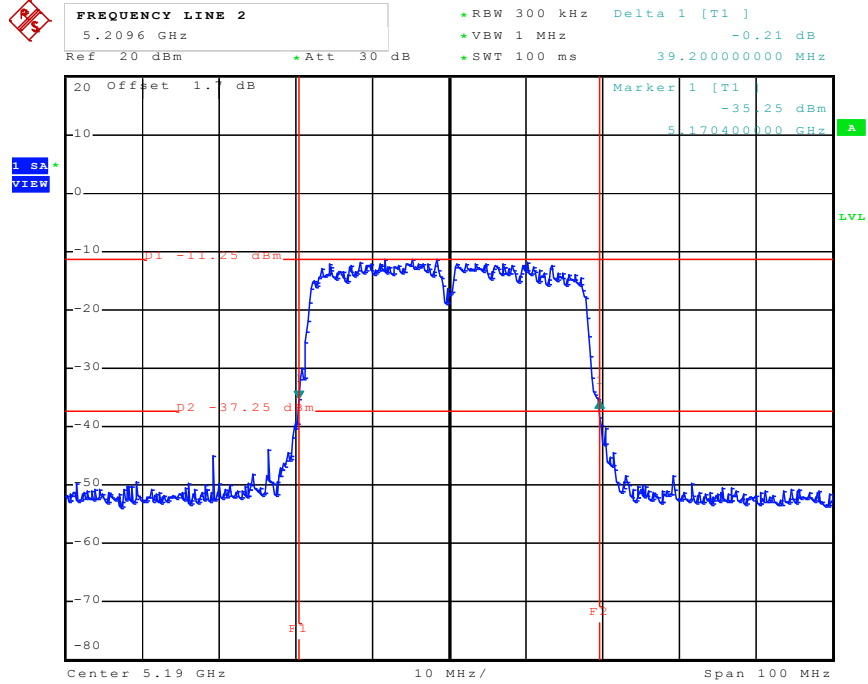
Date: 17.JAN.2012 17:38:55

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5700 MHz



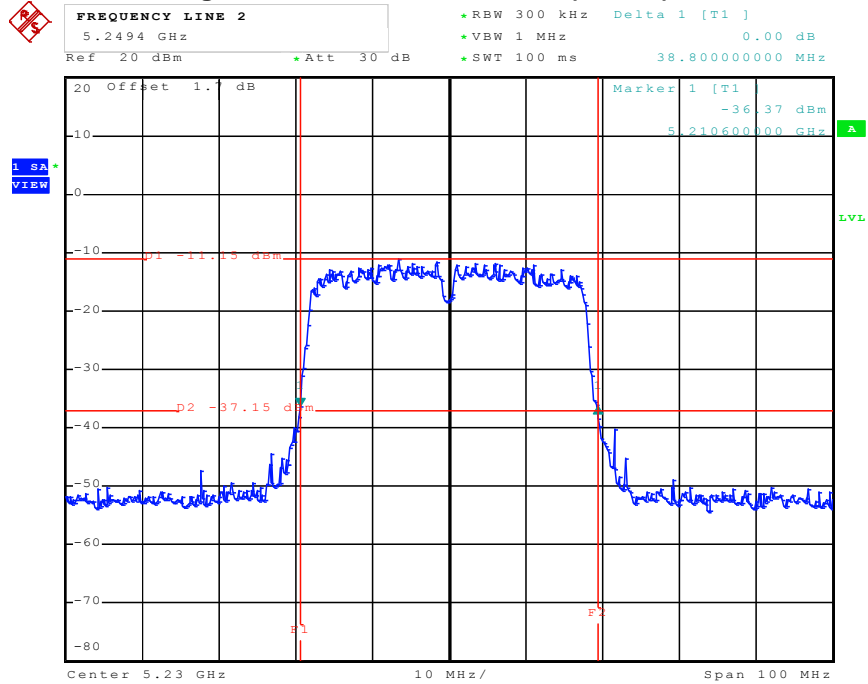
Date: 17.JAN.2012 18:05:04

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5190 MHz



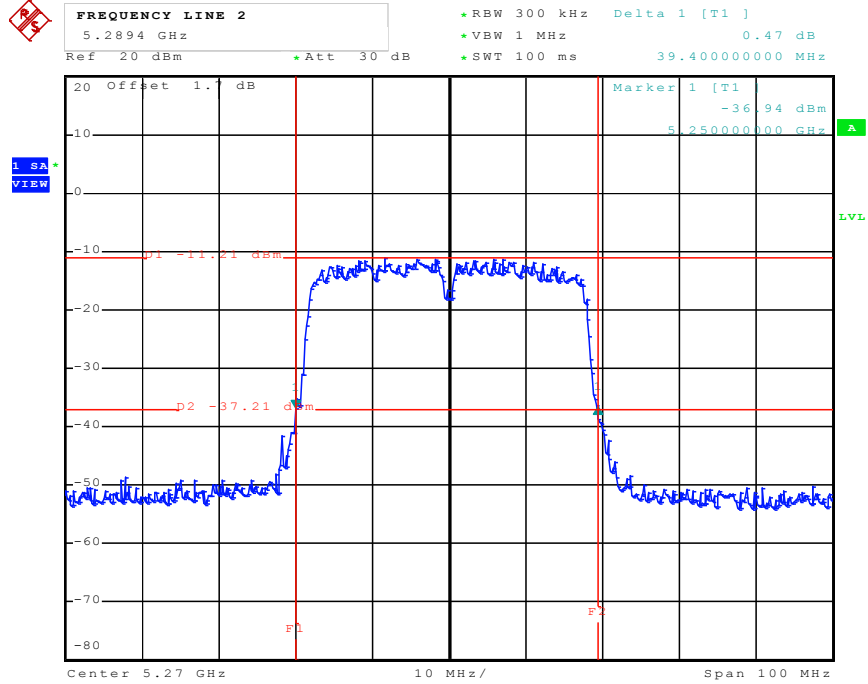
Date: 17.JAN.2012 18:41:05

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5230 MHz



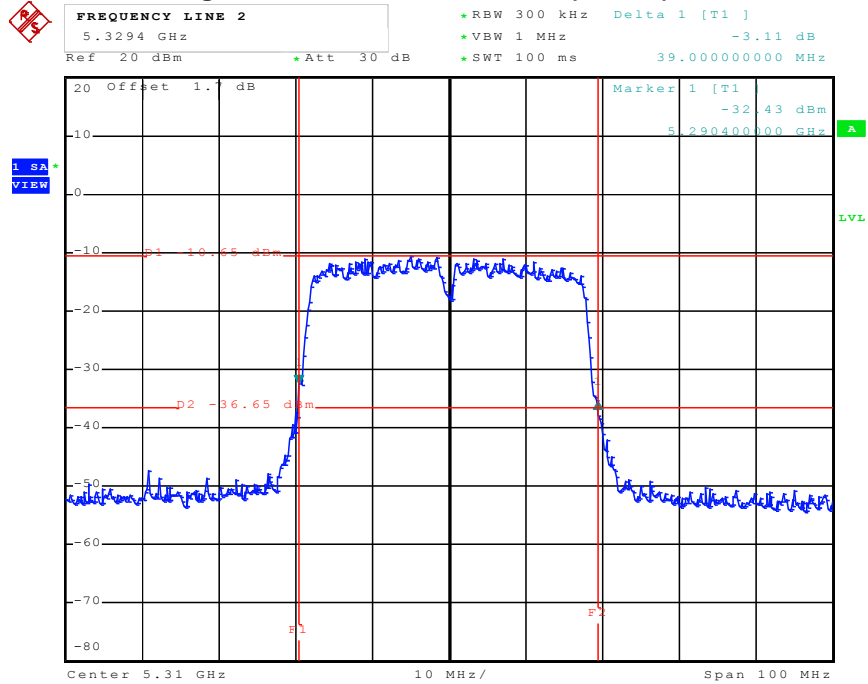
Date: 17.JAN.2012 18:49:23

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5270 MHz



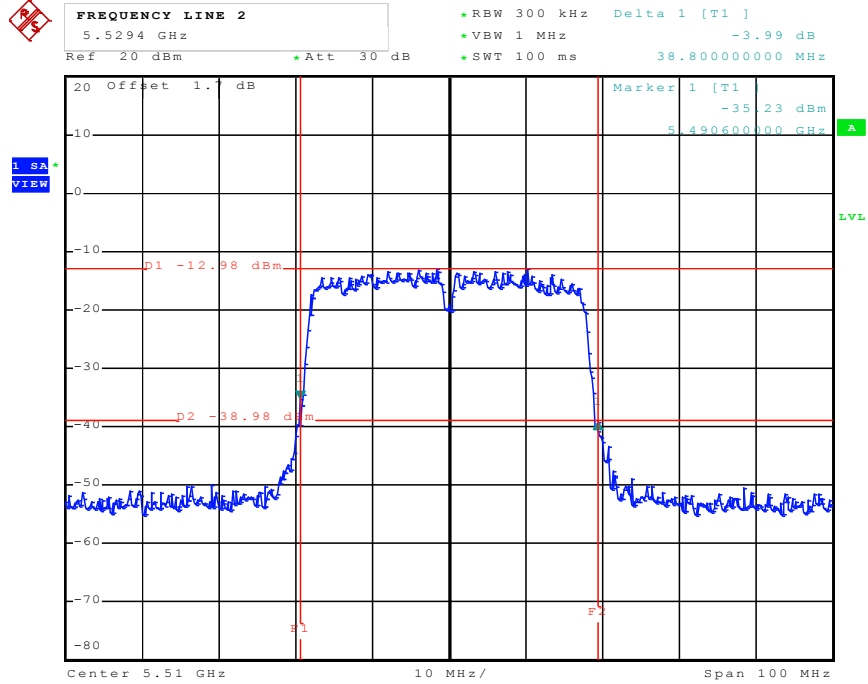
Date: 17.JAN.2012 19:11:17

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5310 MHz



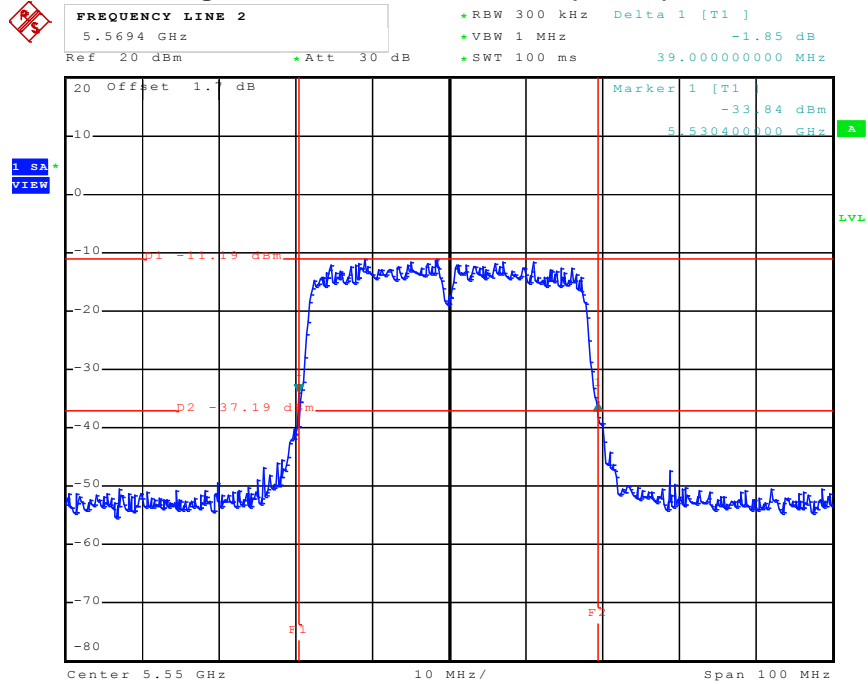
Date: 17.JAN.2012 19:18:59

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5510 MHz



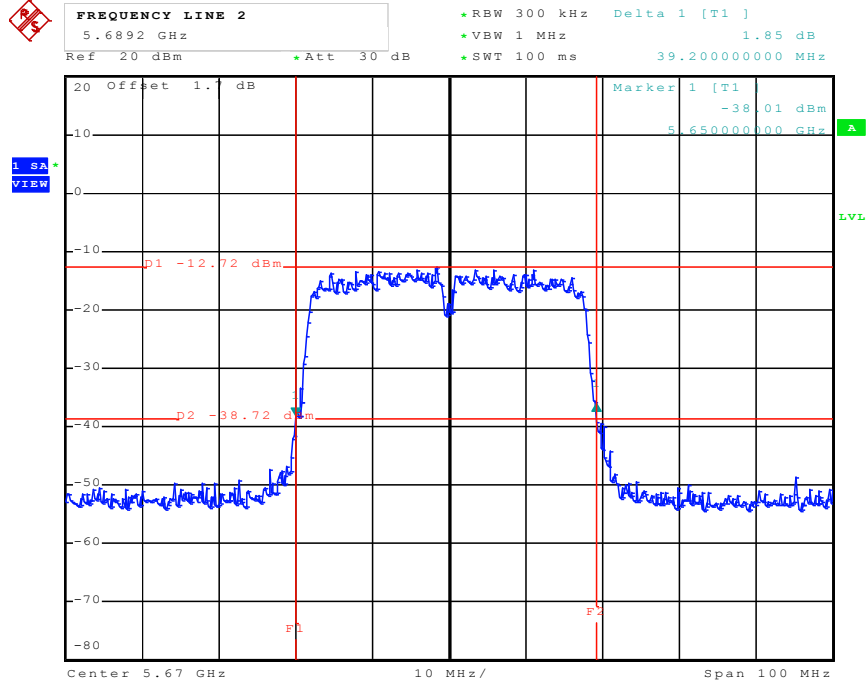
Date: 17.JAN.2012 19:42:31

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5550 MHz



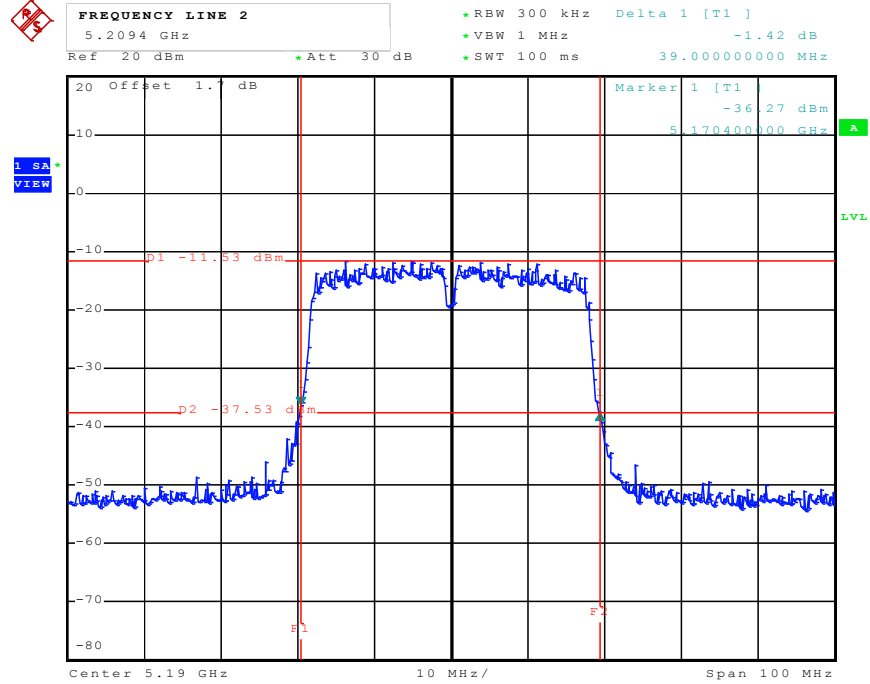
Date: 17.JAN.2012 19:49:45

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5670 MHz



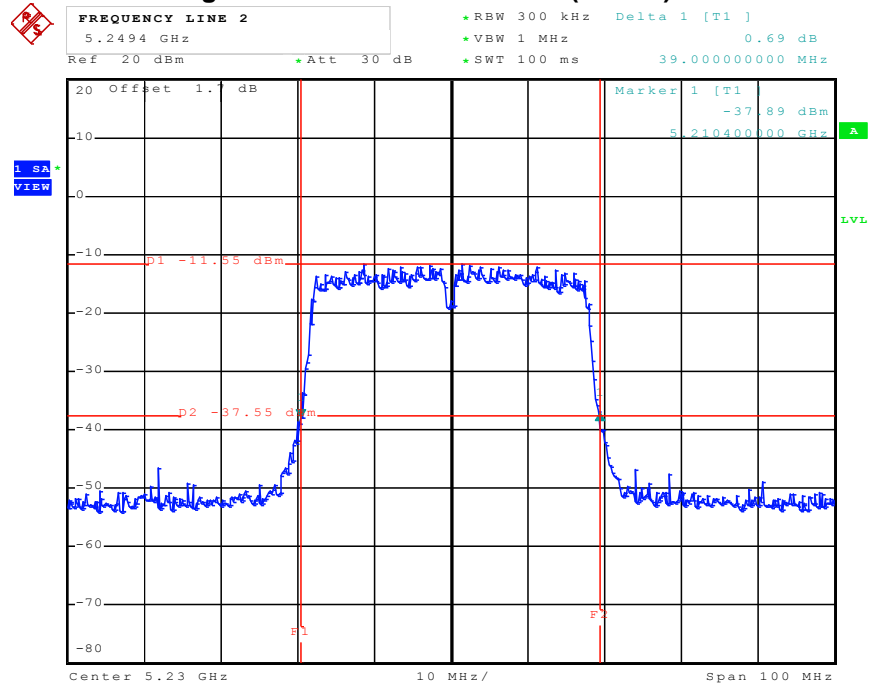
Date: 17.JAN.2012 20:09:09

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5190 MHz



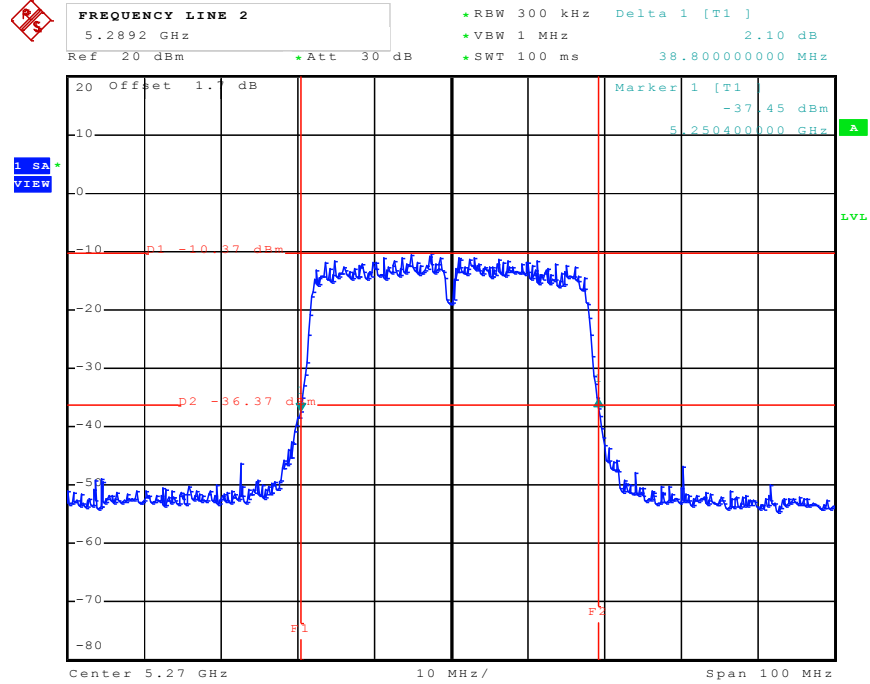
Date: 17.JAN.2012 18:34:19

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5230 MHz



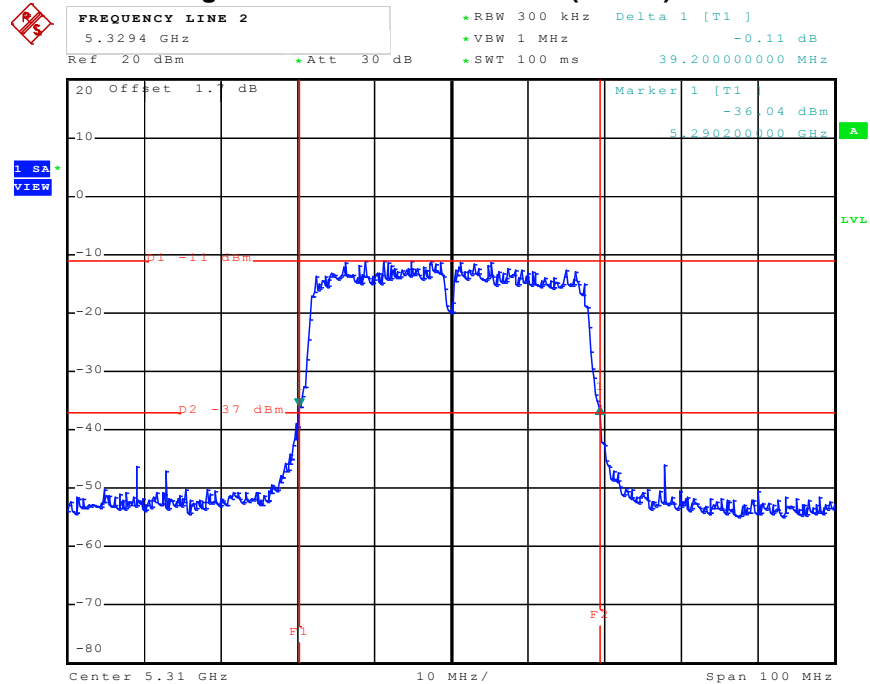
Date: 17.JAN.2012 18:56:56

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5270 MHz



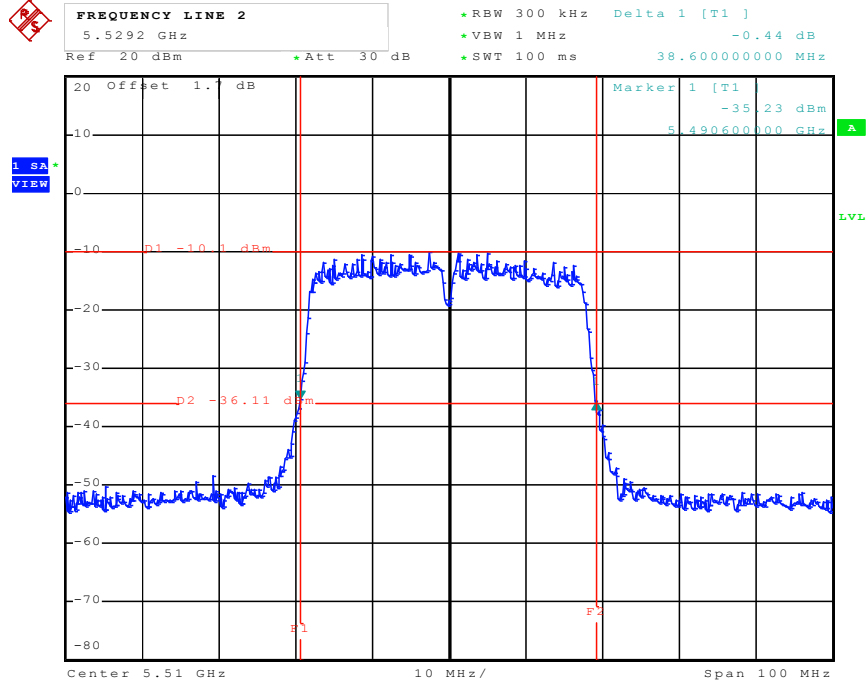
Date: 17.JAN.2012 19:03:43

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5310 MHz



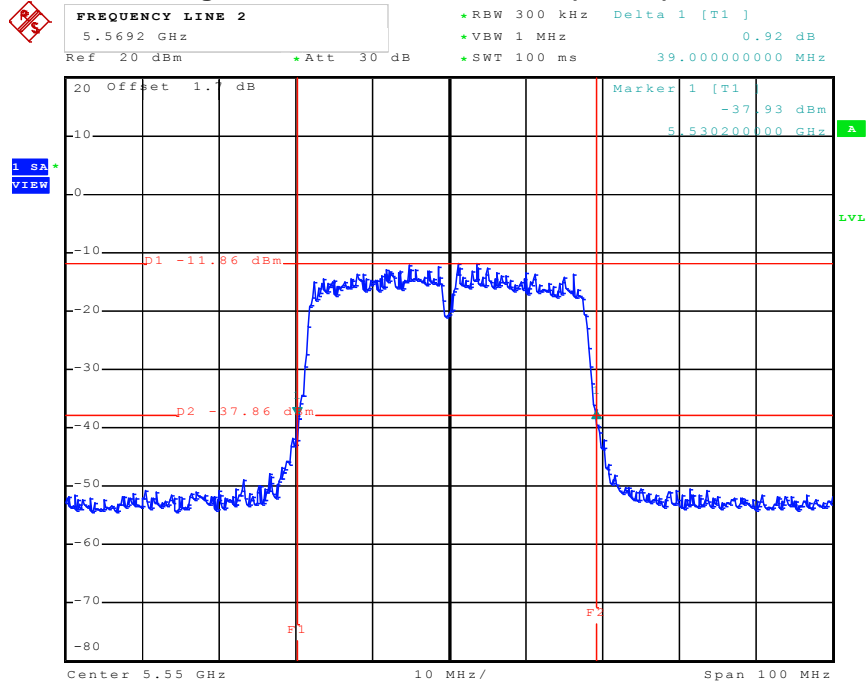
Date: 17.JAN.2012 19:25:38

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5510 MHz



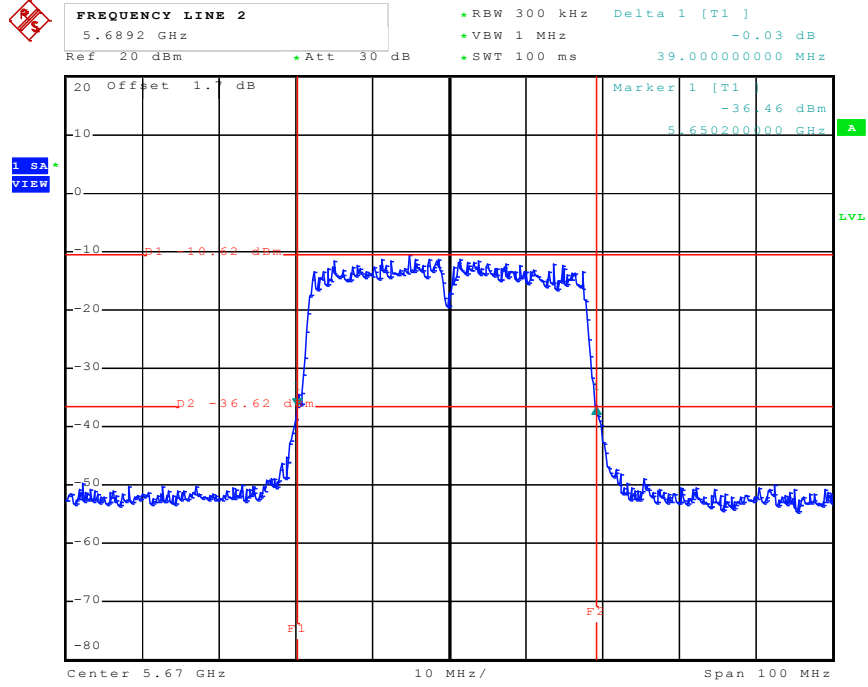
Date: 17.JAN.2012 19:35:04

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5550 MHz



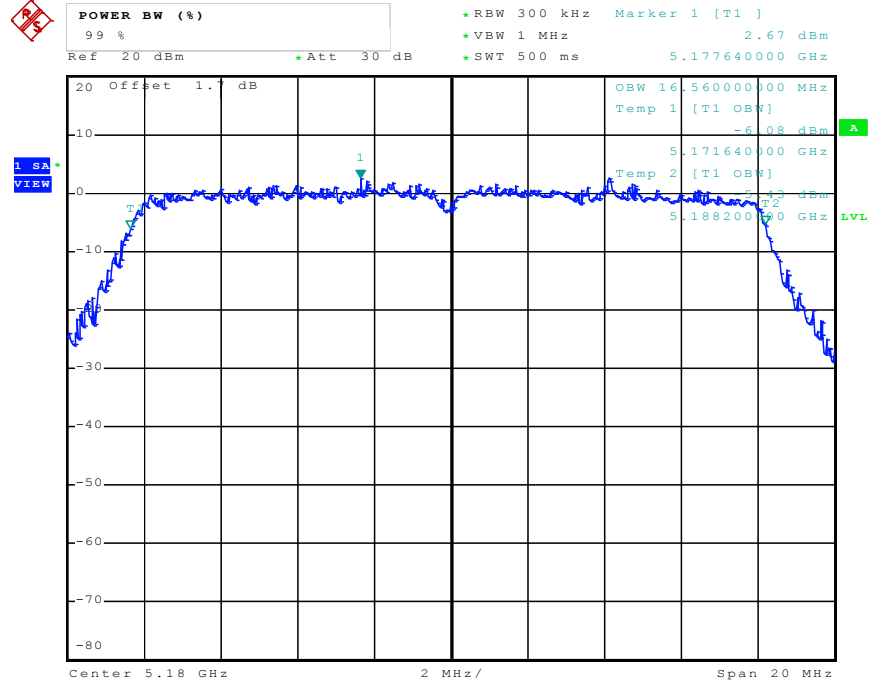
Date: 17.JAN.2012 19:55:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5670 MHz



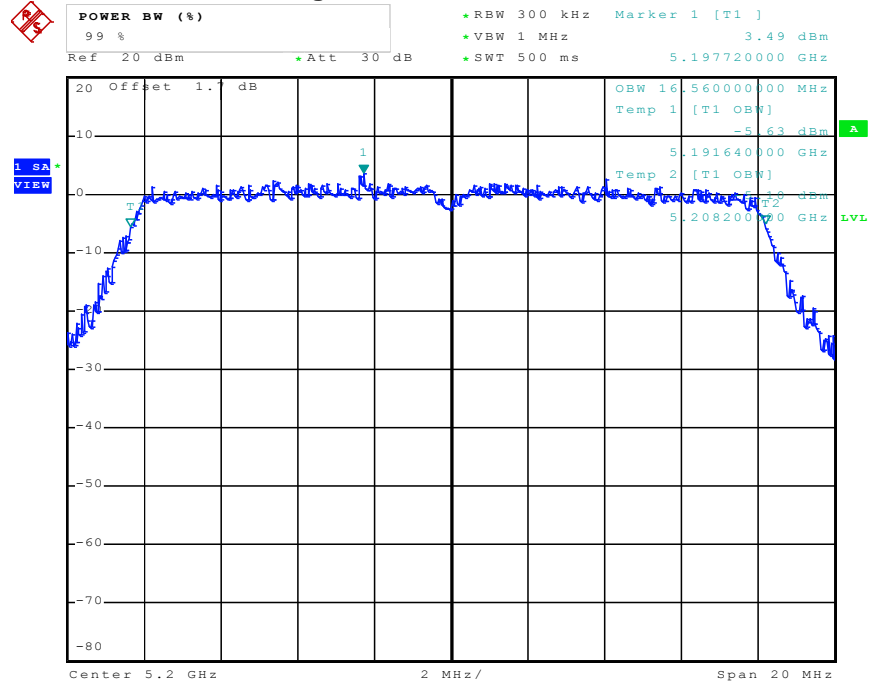
Date: 17.JAN.2012 20:02:08

For Single Chain:
99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5180 MHz



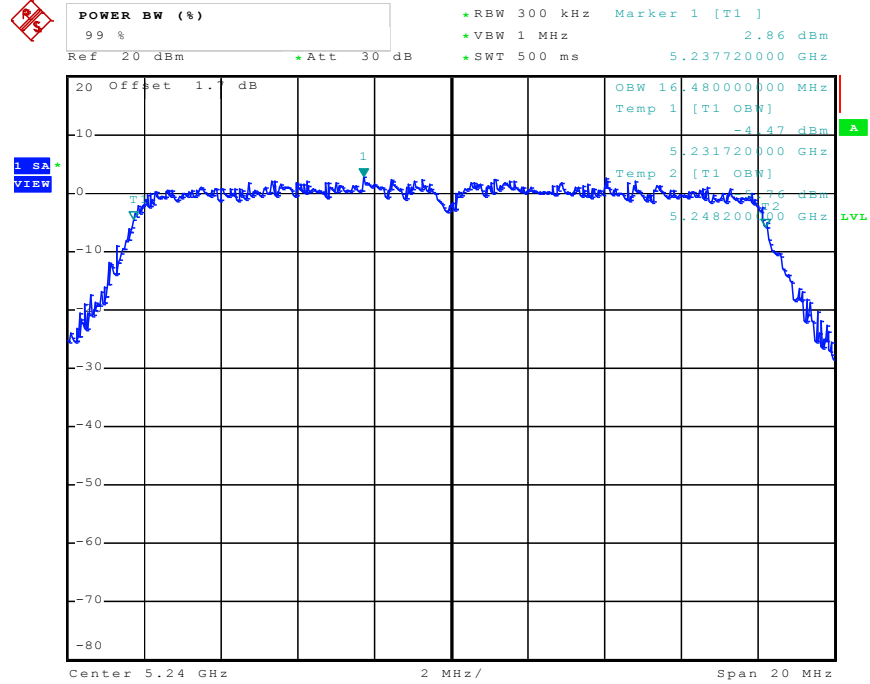
Date: 14.JAN.2012 11:52:29

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5200 MHz



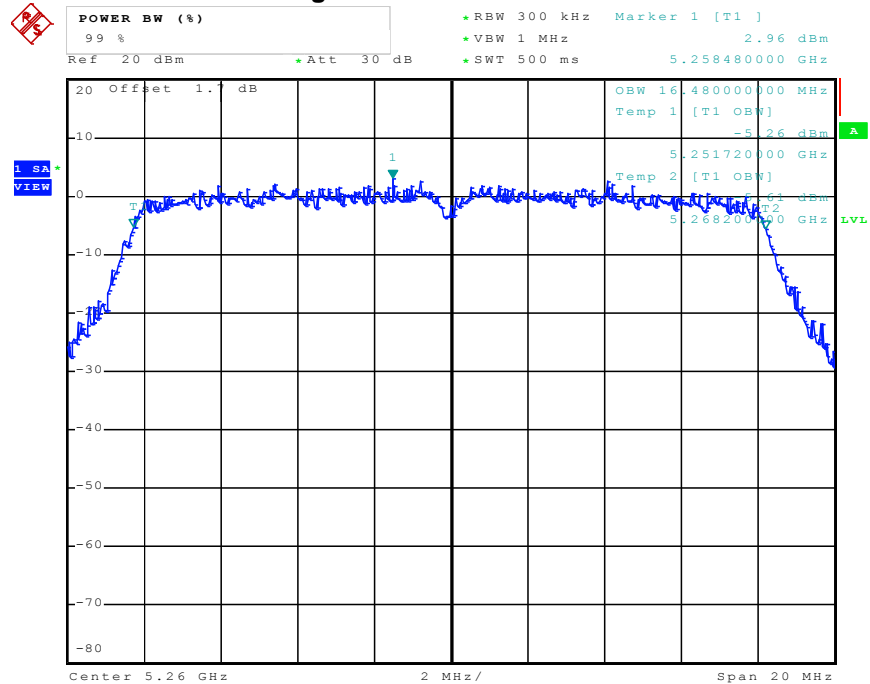
Date: 14.JAN.2012 12:17:40

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5240 MHz



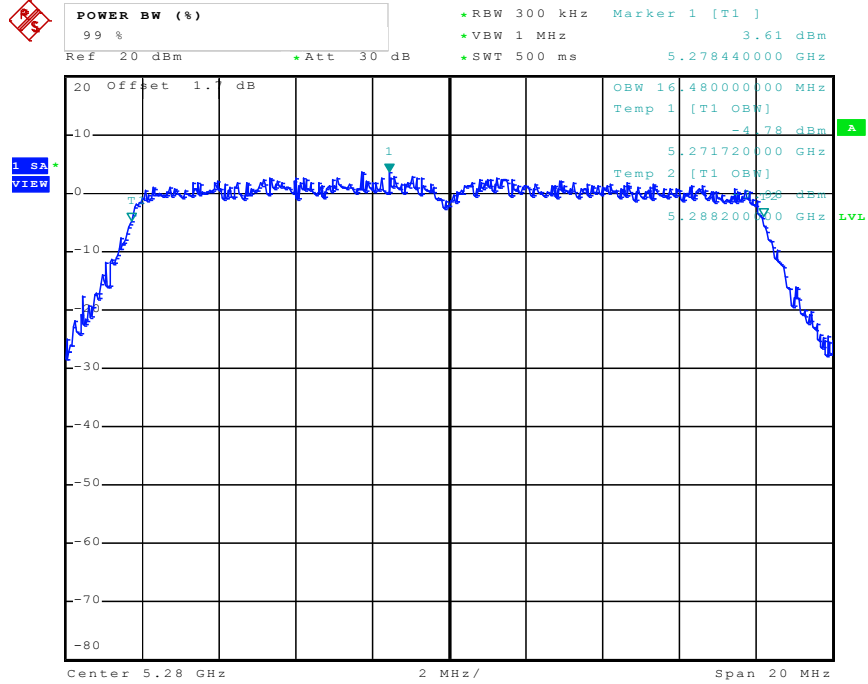
Date: 14.JAN.2012 12:31:56

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5260 MHz



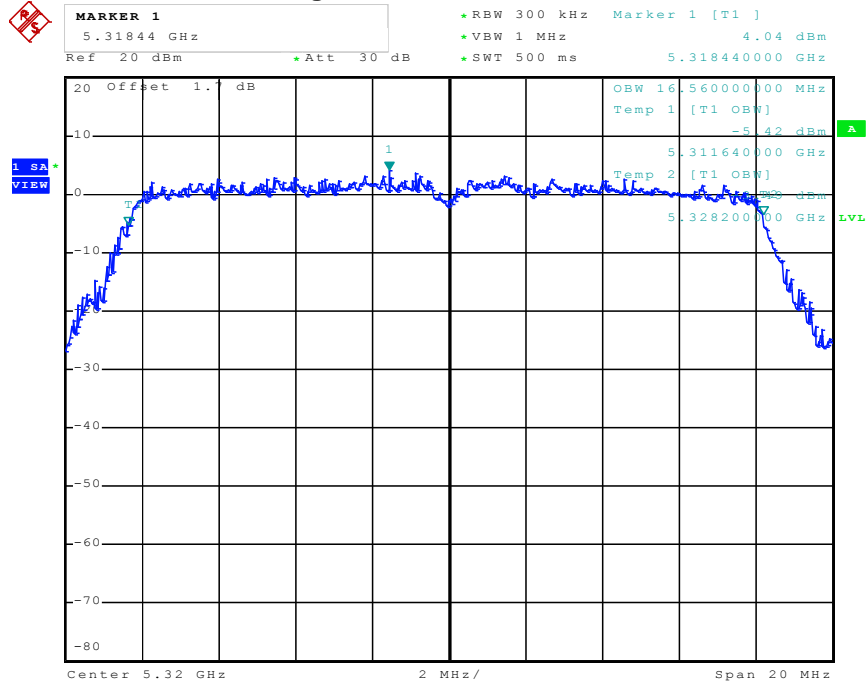
Date: 14.JAN.2012 12:46:37

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5280 MHz



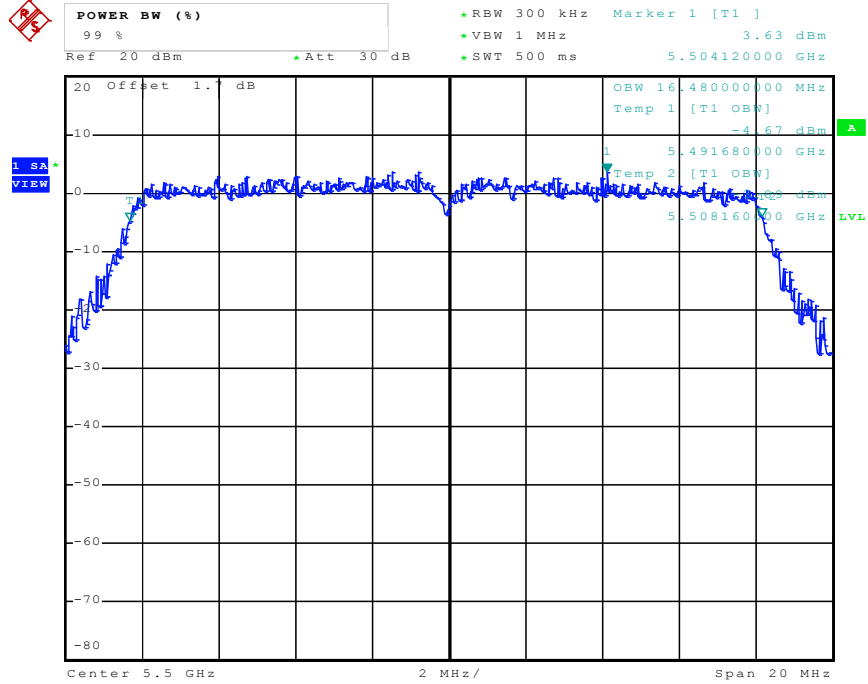
Date: 14.JAN.2012 13:01:08

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5320 MHz



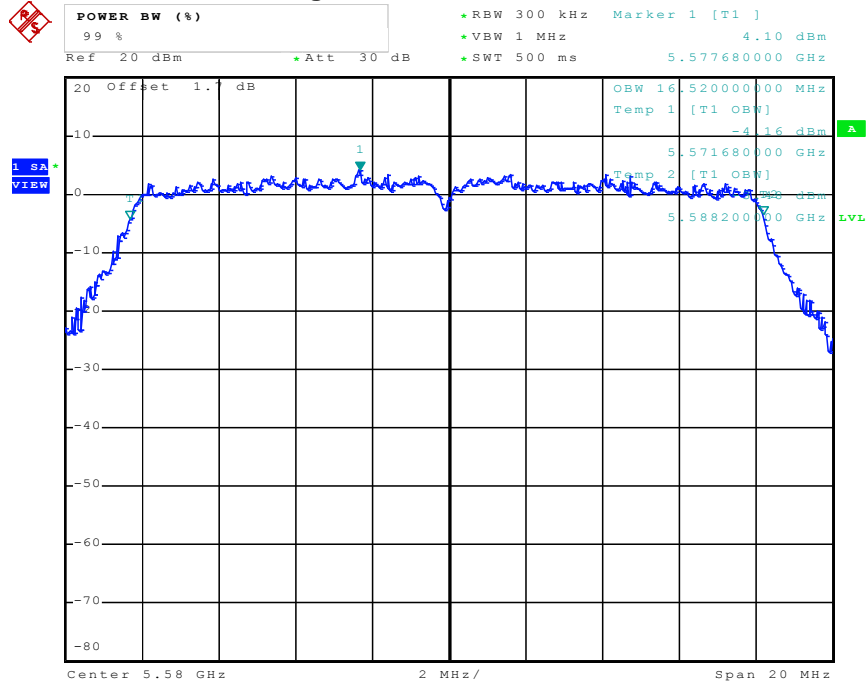
Date: 14.JAN.2012 13:12:25

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1/ 5500 MHz



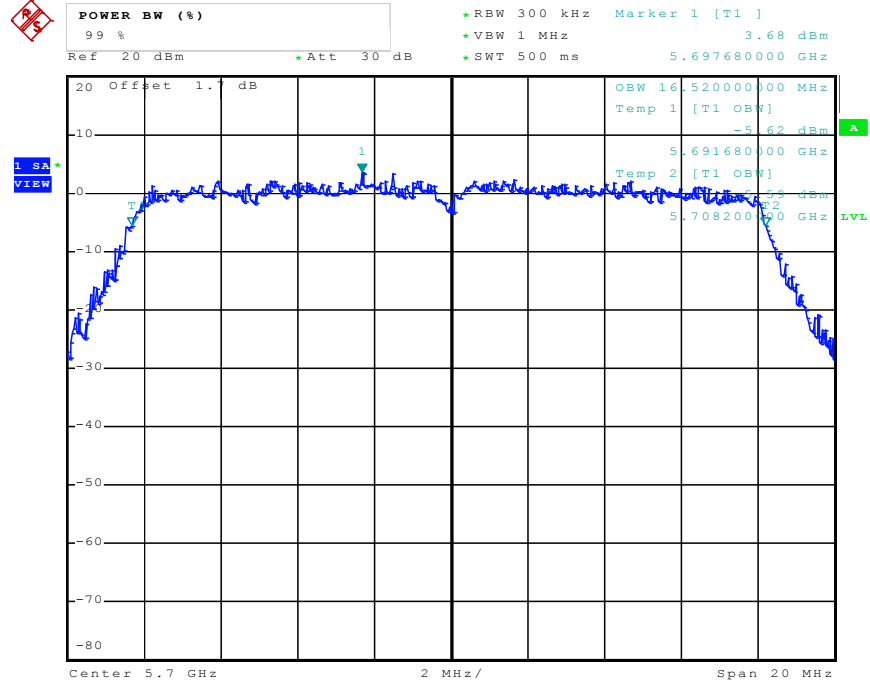
Date: 14.JAN.2012 13:25:28

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5580 MHz



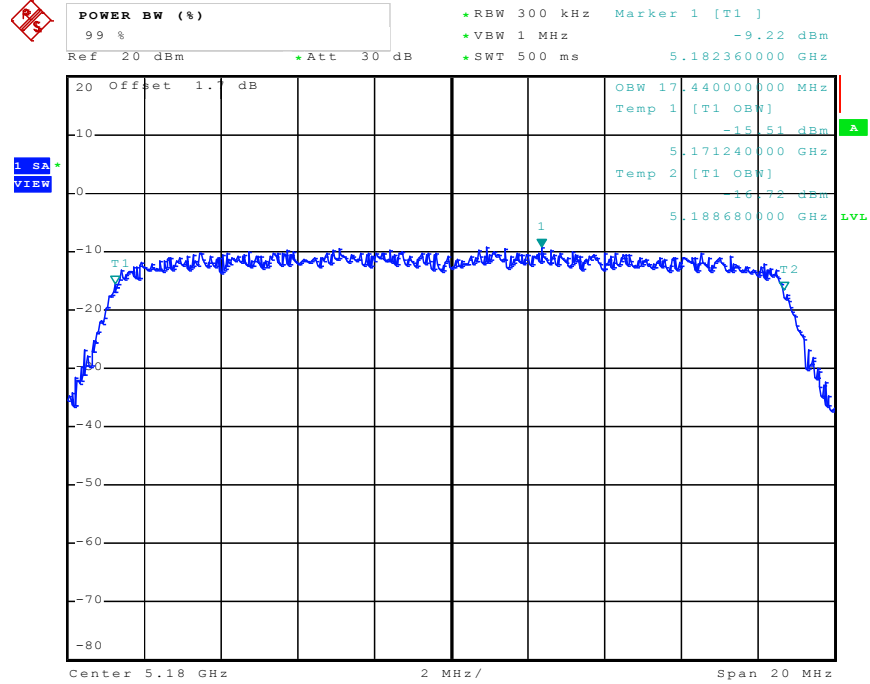
Date: 14.JAN.2012 13:38:13

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5700 MHz



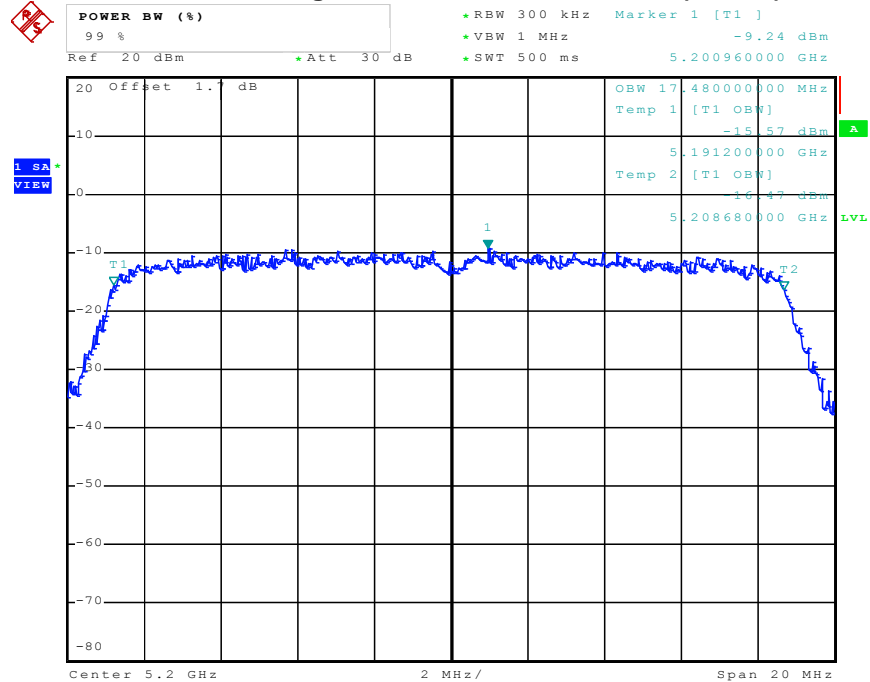
Date: 14.JAN.2012 13:54:26

For Two Chains:
 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz)/ 5180 MHz



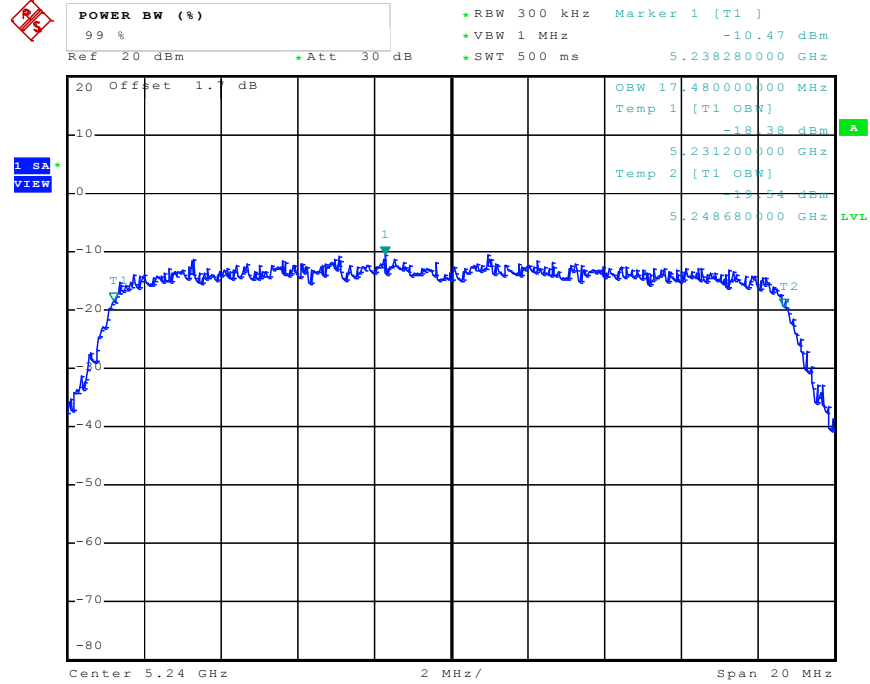
Date: 17.JAN.2012 14:43:35

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5200 MHz



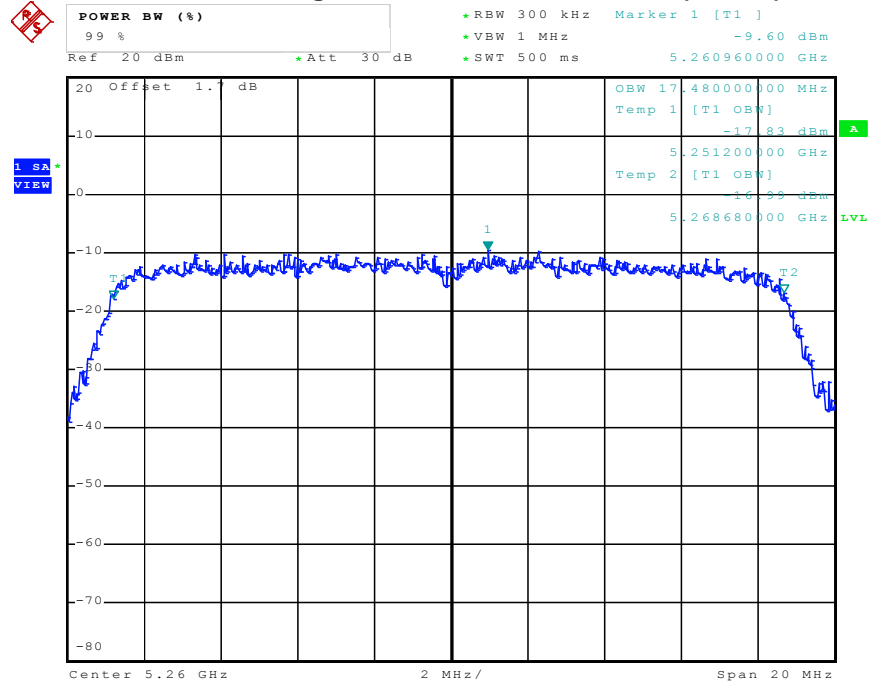
Date: 17.JAN.2012 15:15:59

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5240 MHz



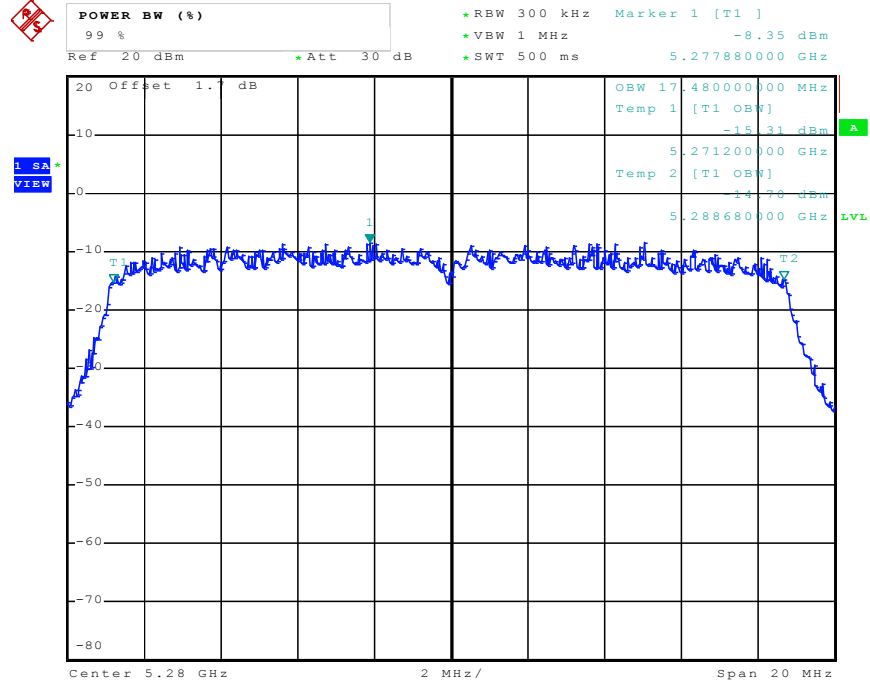
Date: 17.JAN.2012 15:29:49

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5260 MHz



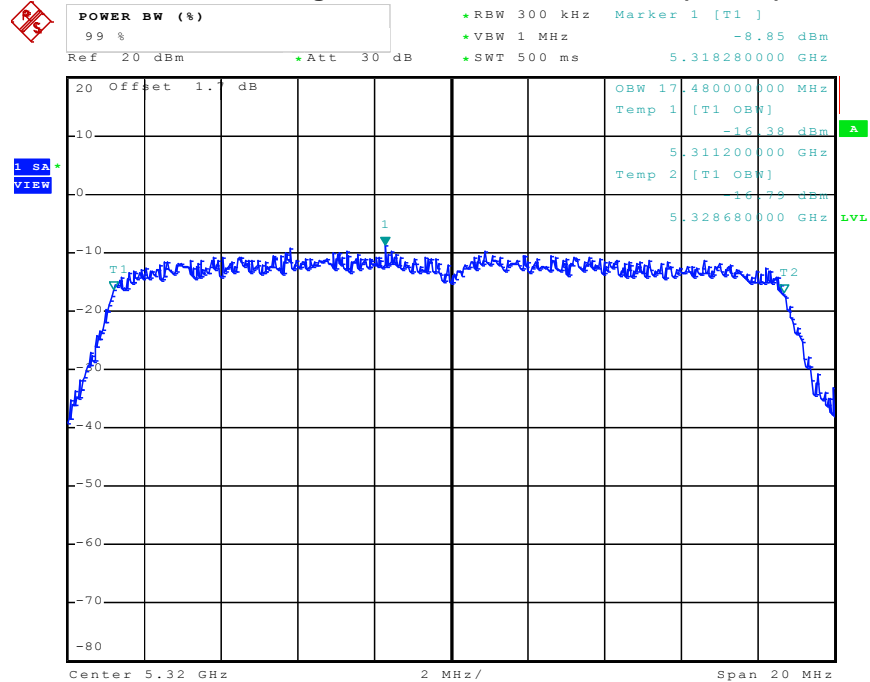
Date: 17.JAN.2012 16:08:32

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5280 MHz



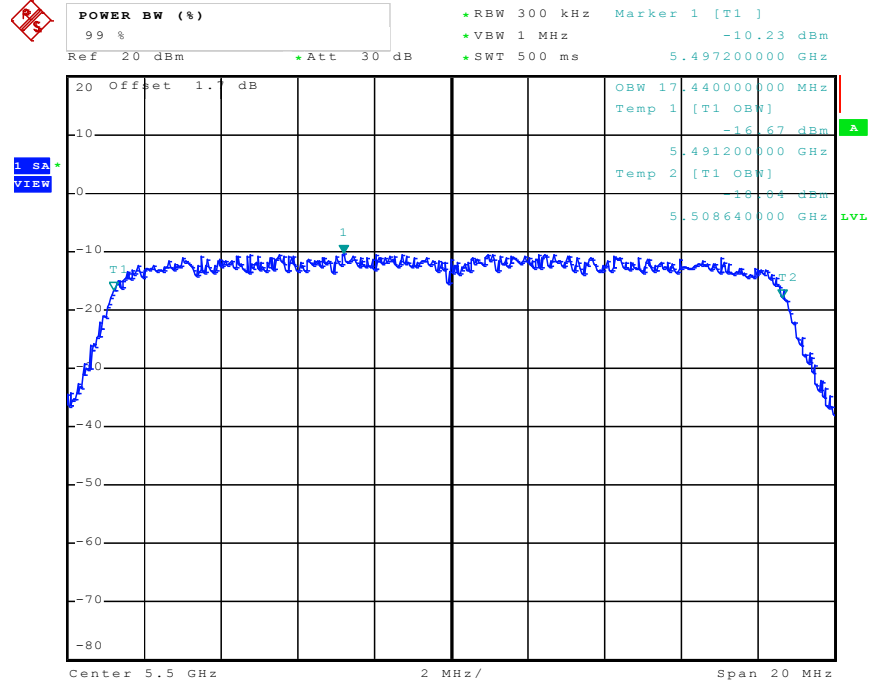
Date: 17.JAN.2012 16:50:16

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5320 MHz



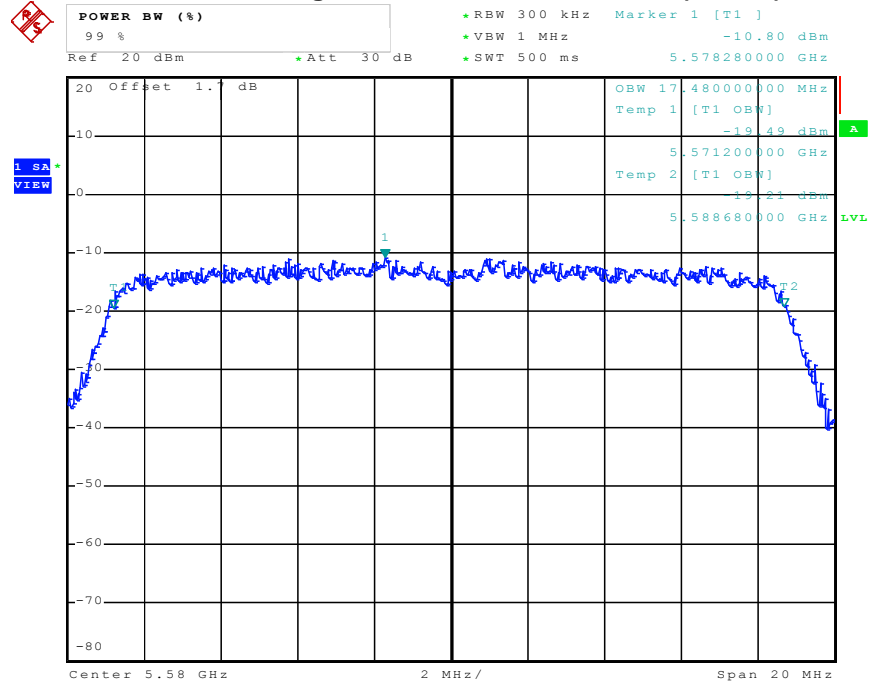
Date: 17.JAN.2012 17:16:39

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz)/ 5500 MHz



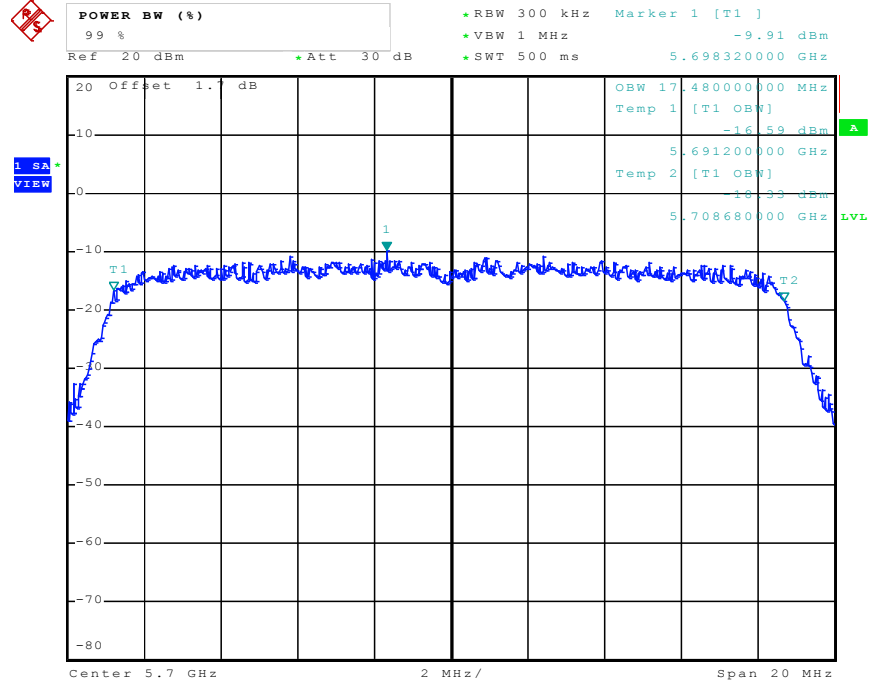
Date: 17.JAN.2012 17:24:57

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5580 MHz



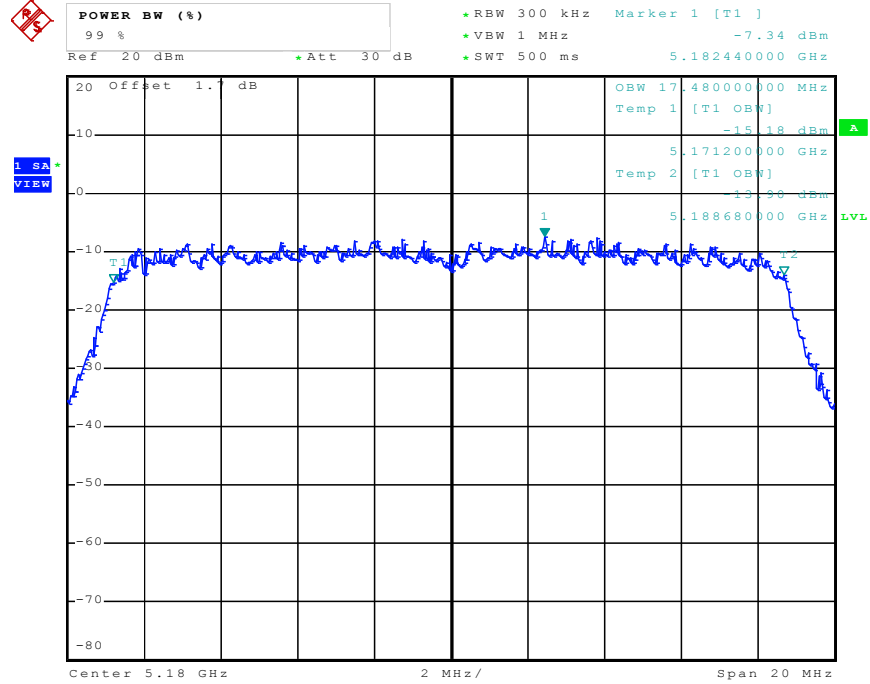
Date: 17.JAN.2012 17:48:28

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5700 MHz



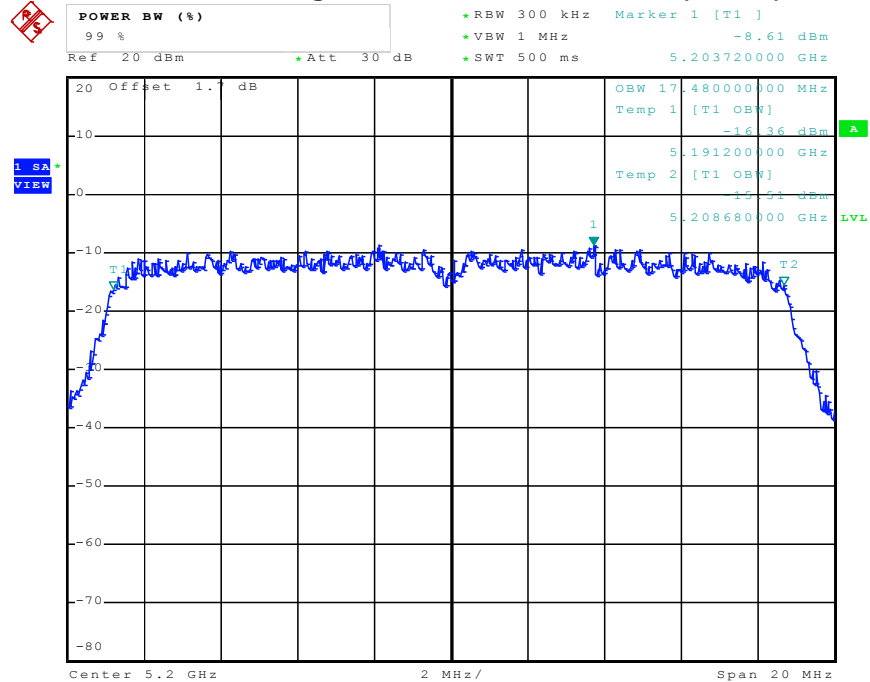
Date: 17.JAN.2012 17:58:22

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz)/ 5180 MHz



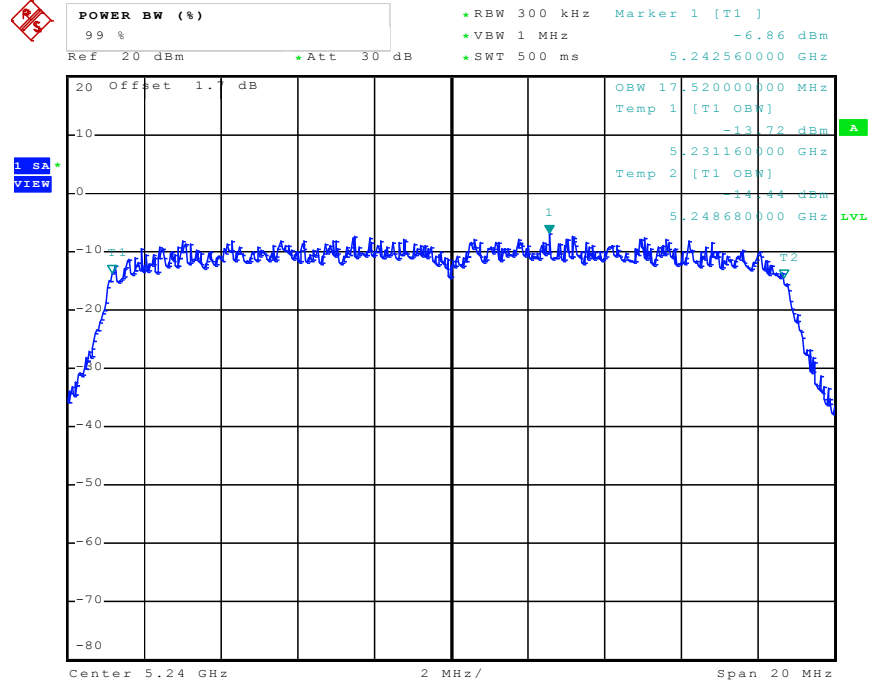
Date: 17.JAN.2012 14:23:32

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5200 MHz



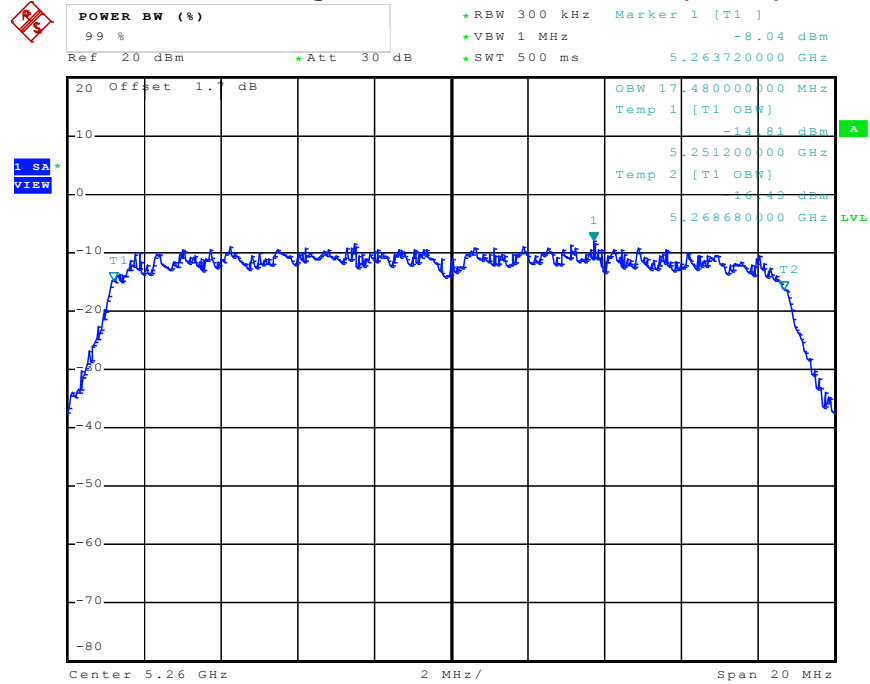
Date: 17.JAN.2012 14:54:01

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5240 MHz



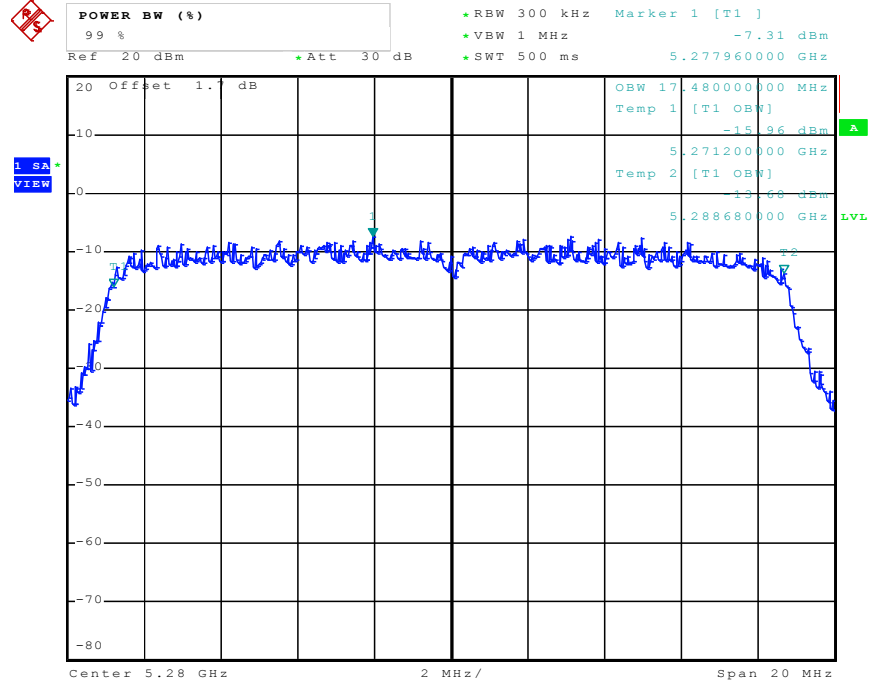
Date: 17.JAN.2012 15:40:34

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5260 MHz



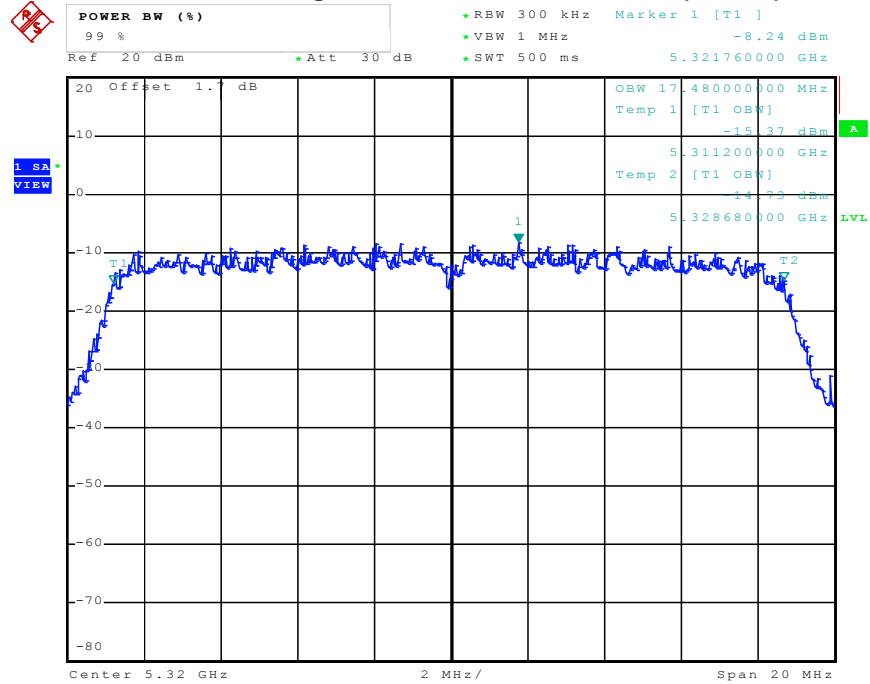
Date: 17.JAN.2012 15:51:38

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5280 MHz



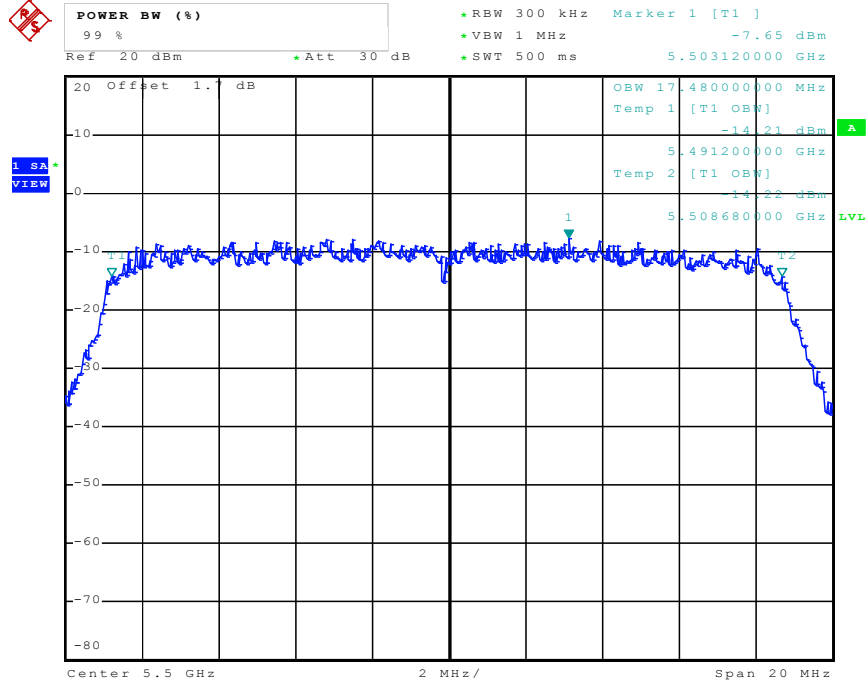
Date: 17.JAN.2012 17:01:03

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5320 MHz



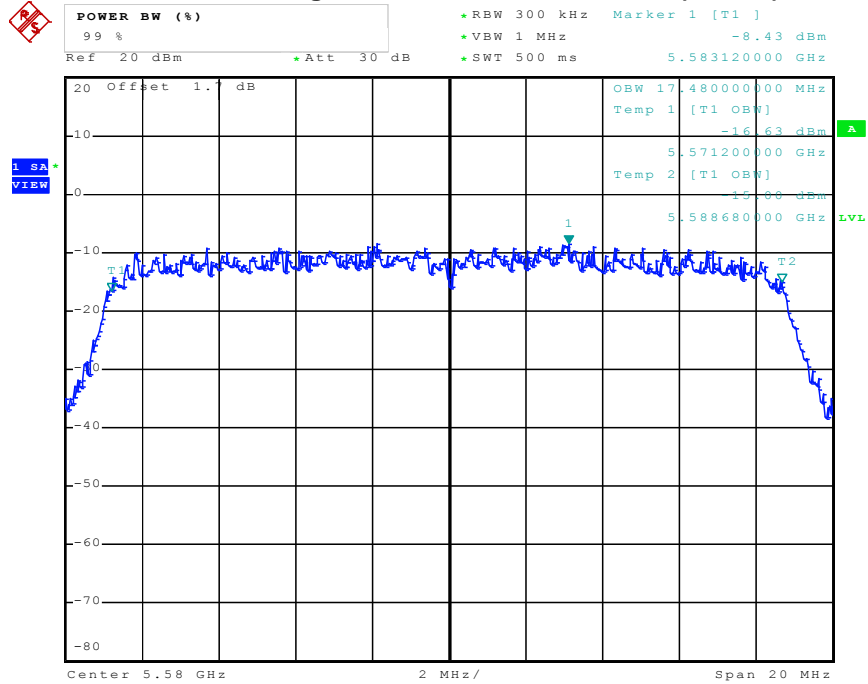
Date: 17.JAN.2012 17:09:03

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz)/ 5500 MHz



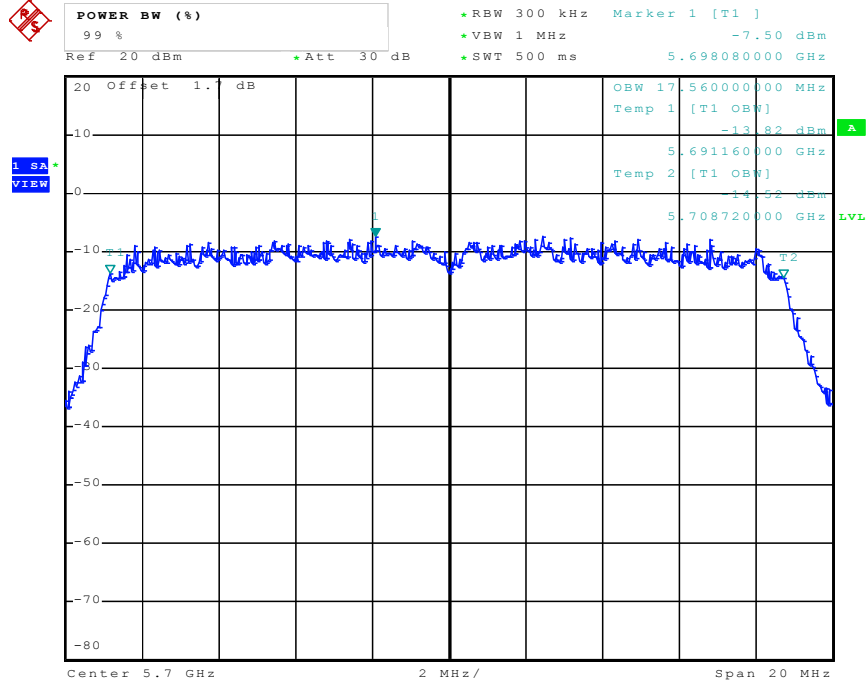
Date: 17.JAN.2012 17:33:46

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5580 MHz



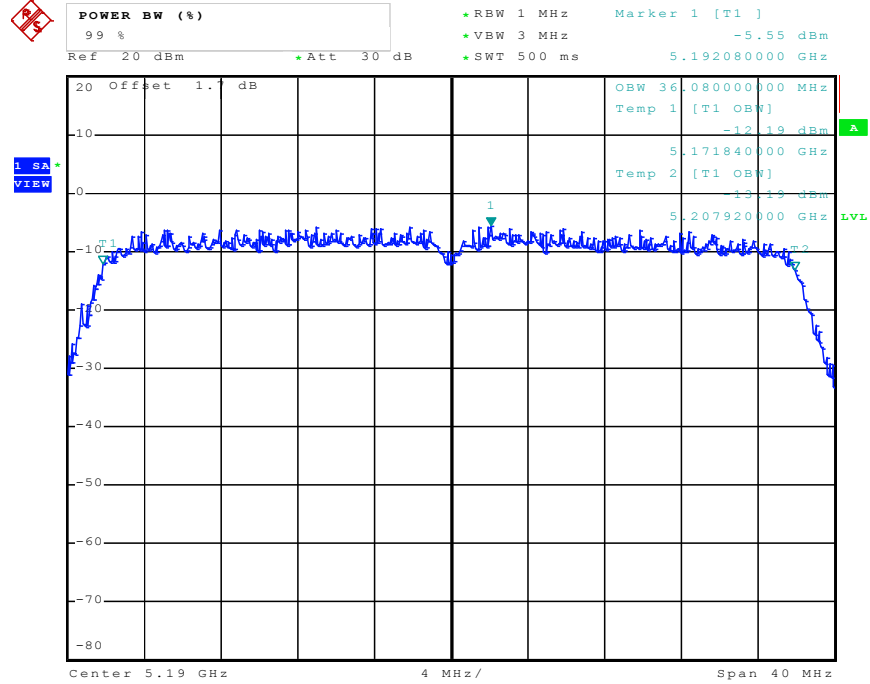
Date: 17.JAN.2012 17:40:12

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5700 MHz



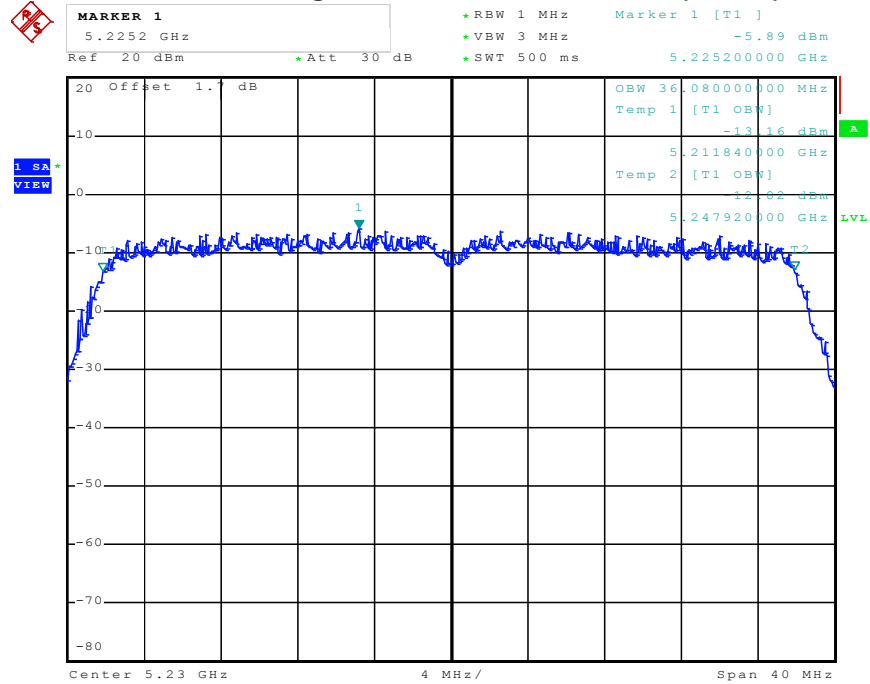
Date: 17.JAN.2012 18:06:43

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5190 MHz



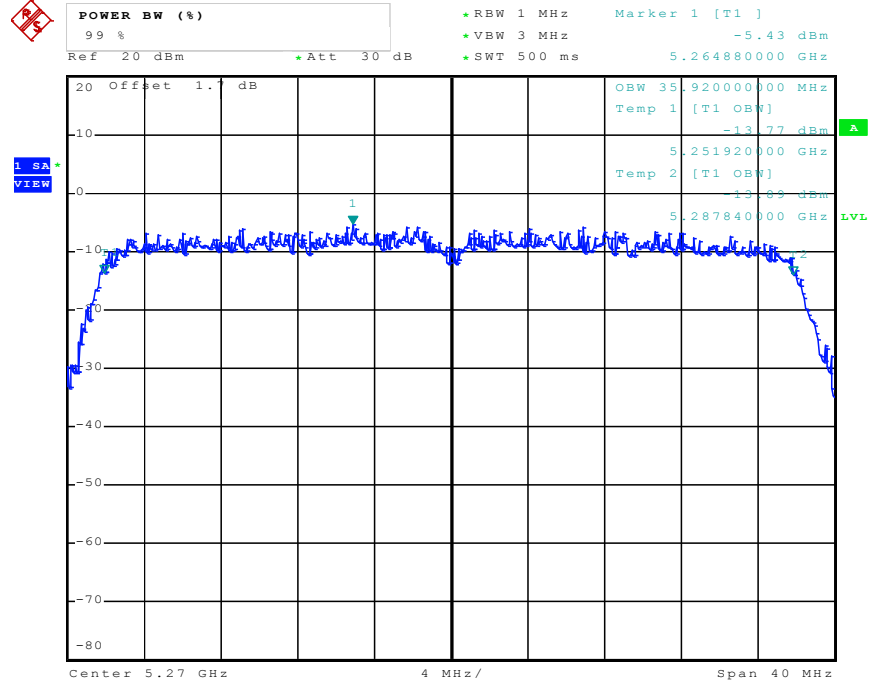
Date: 17.JAN.2012 18:42:44

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5230 MHz



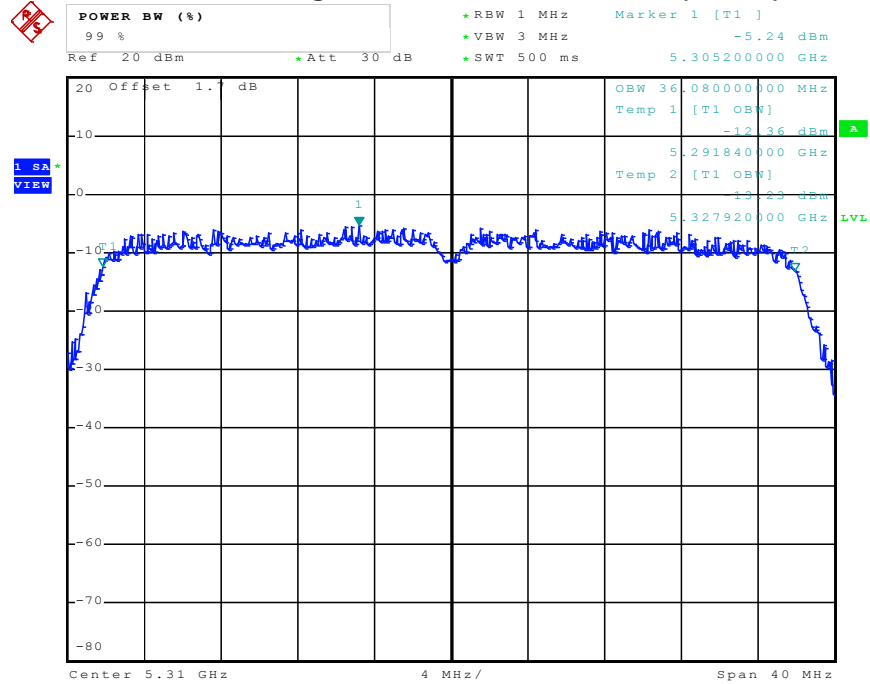
Date: 17.JAN.2012 18:51:28

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5270 MHz



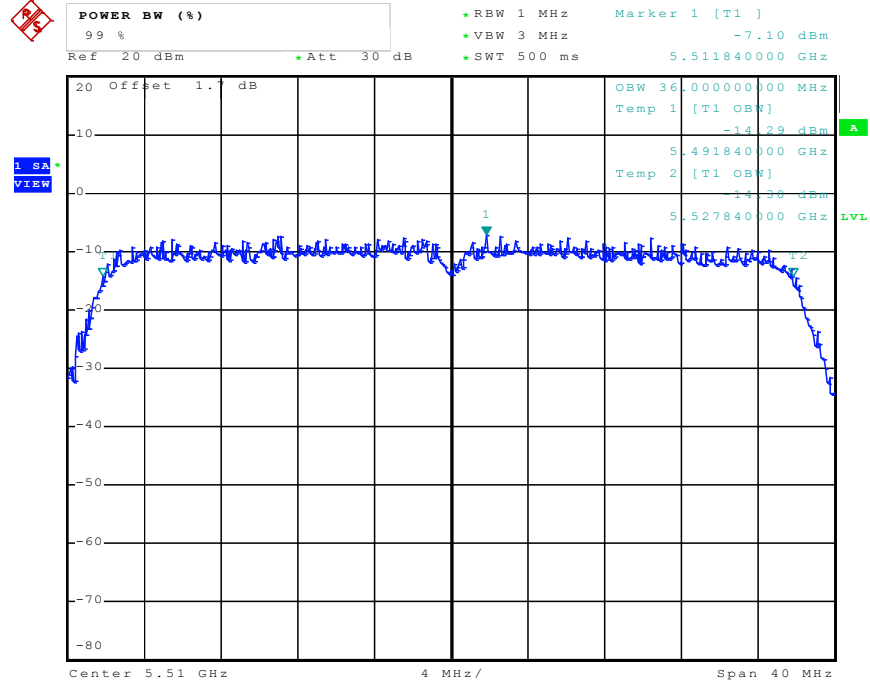
Date: 17.JAN.2012 19:12:30

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5310 MHz



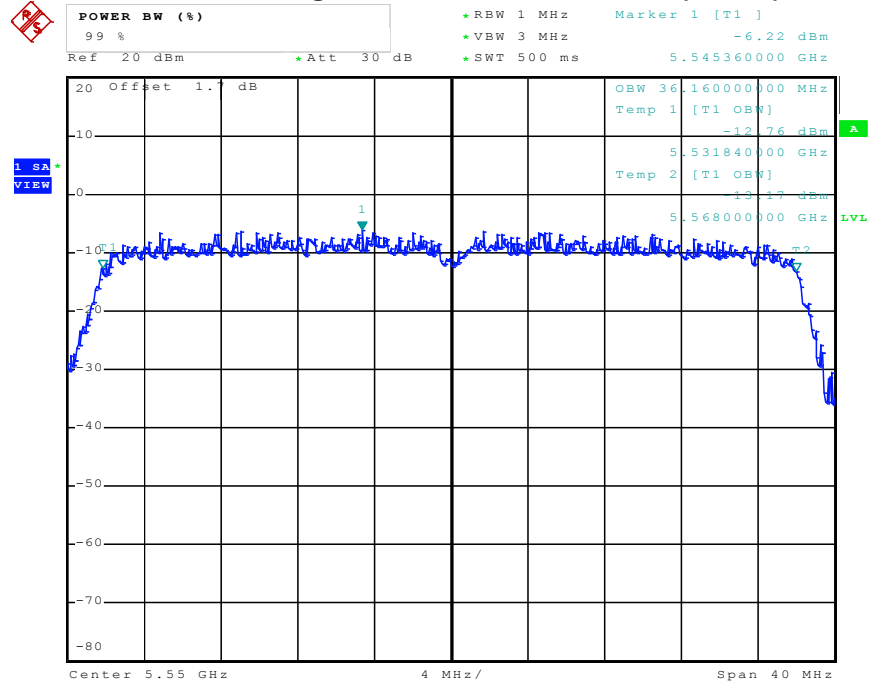
Date: 17.JAN.2012 19:20:31

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5510 MHz



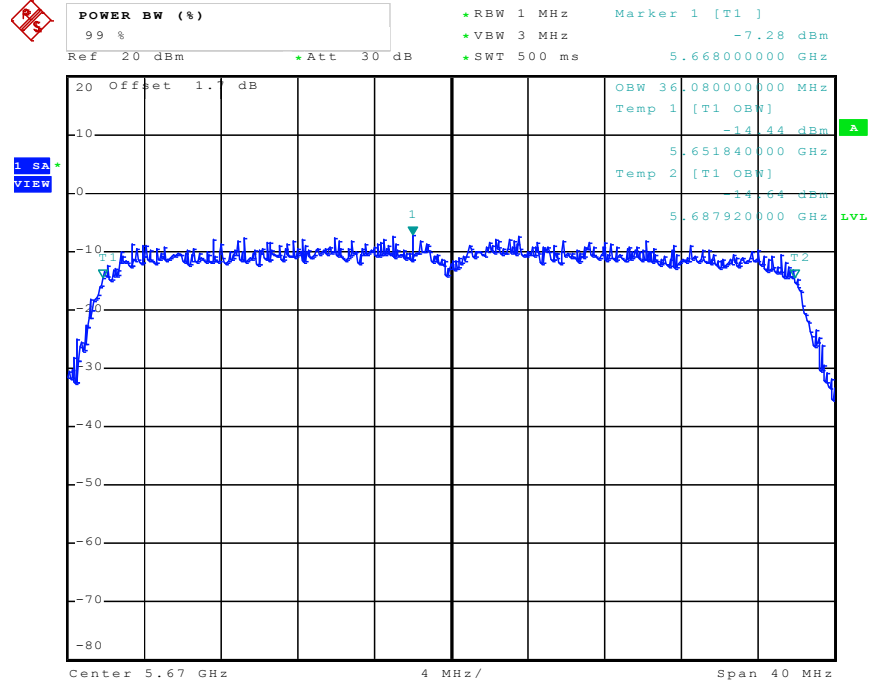
Date: 17.JAN.2012 19:43:59

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5550 MHz



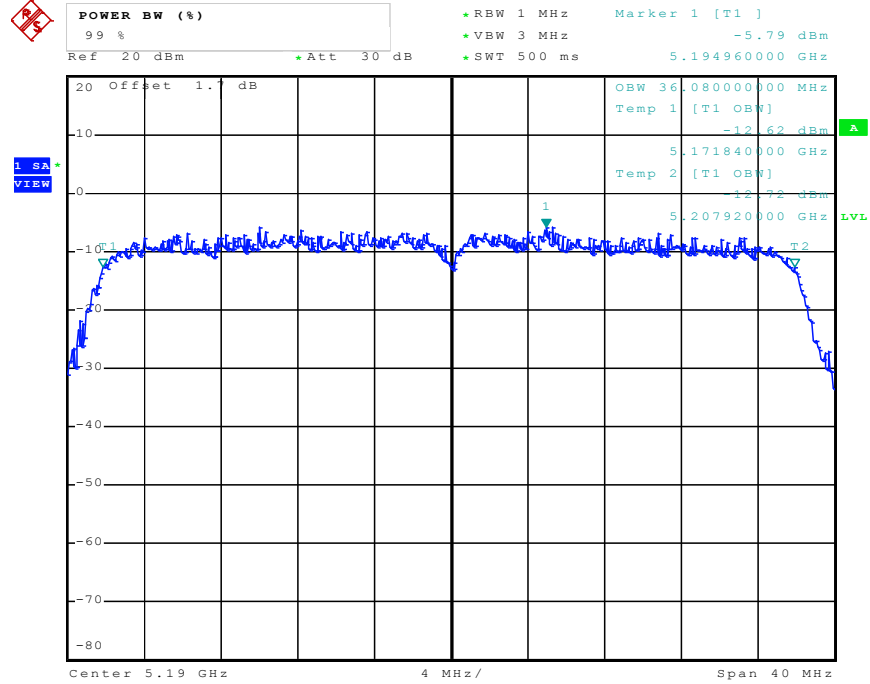
Date: 17.JAN.2012 19:51:10

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5670 MHz



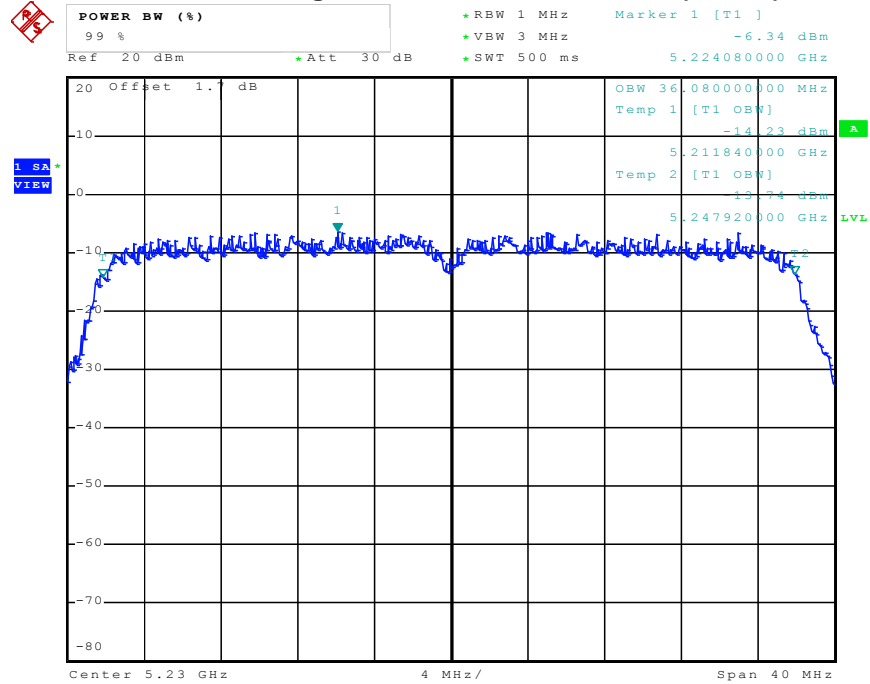
Date: 17.JAN.2012 20:10:07

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5190 MHz



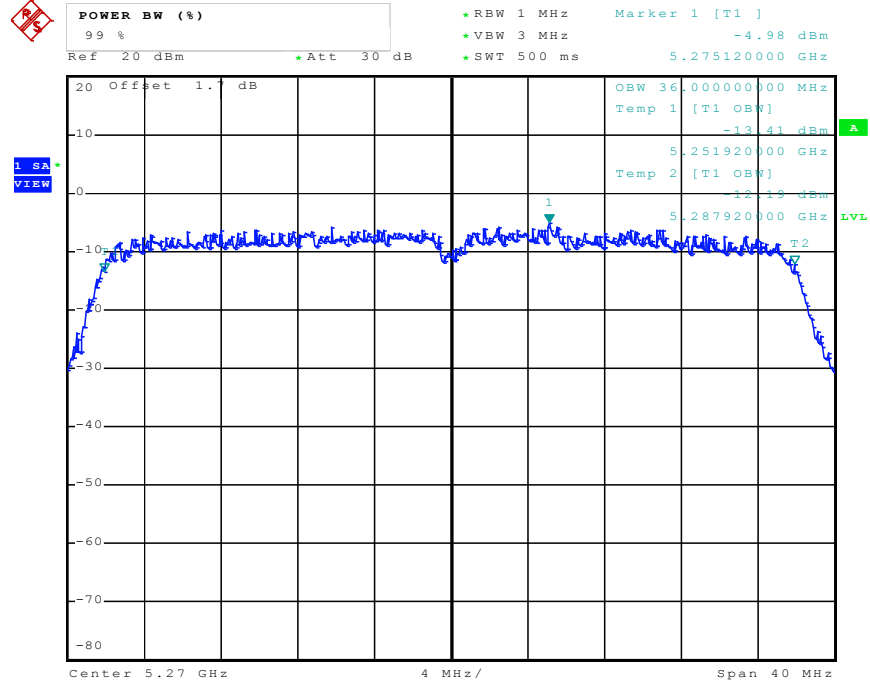
Date: 17.JAN.2012 18:36:01

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5230 MHz



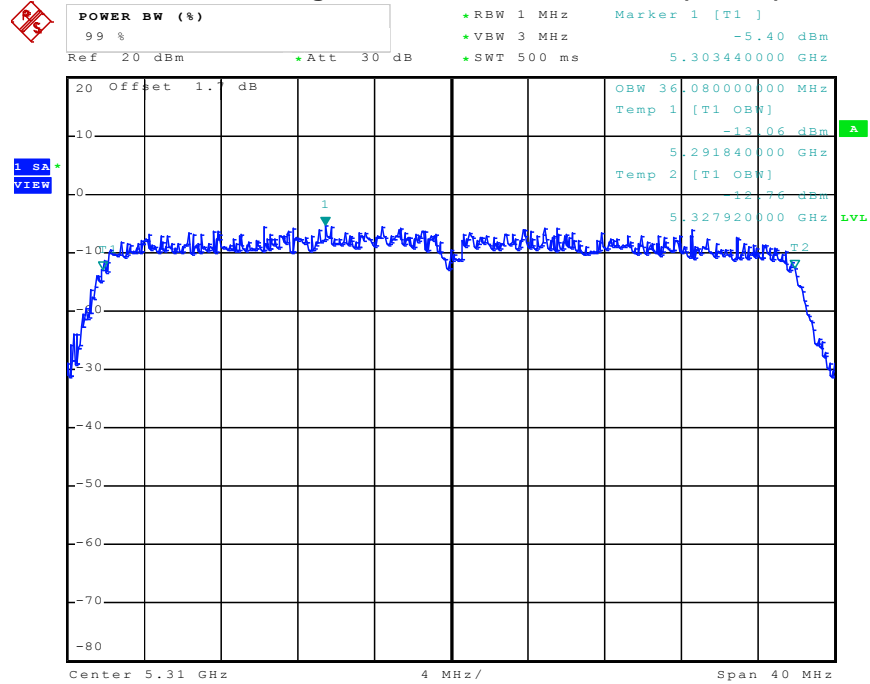
Date: 17.JAN.2012 18:58:34

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5270 MHz



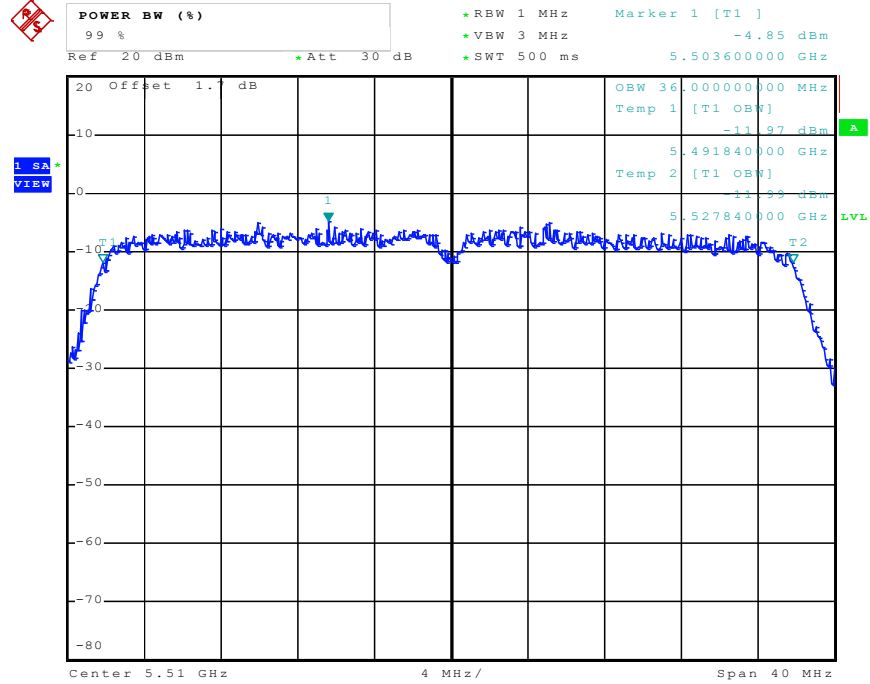
Date: 17.JAN.2012 19:05:37

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5310 MHz



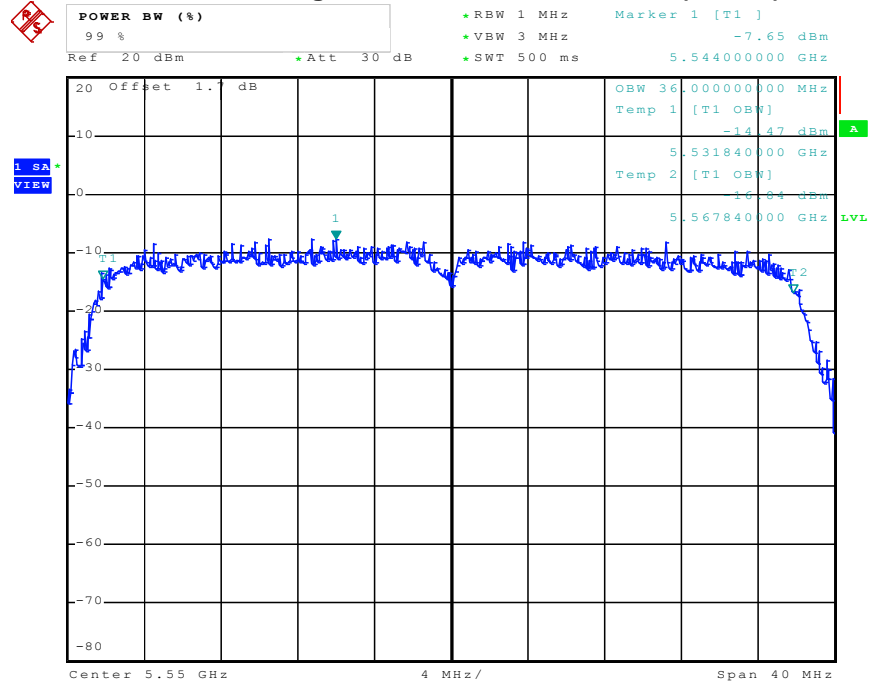
Date: 17.JAN.2012 19:26:56

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5510 MHz



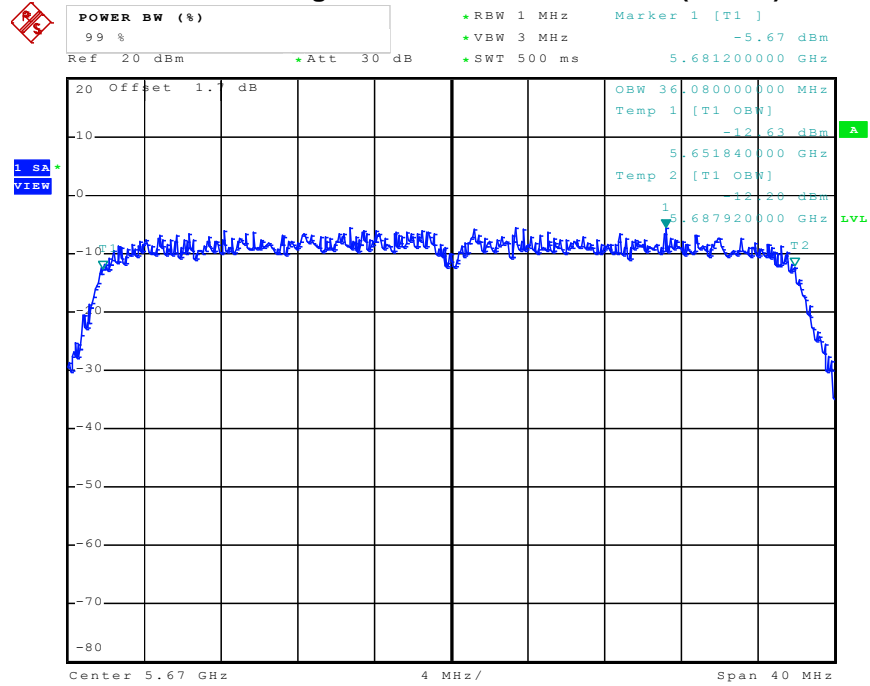
Date: 17.JAN.2012 19:37:17

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5550 MHz



Date: 17.JAN.2012 19:56:11

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5670 MHz



Date: 17.JAN.2012 20:03:10

3.3 Maximum Conducted Output Power Measurement

3.3.1 Limit

For the band 5.15~5.25 GHz, 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, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, 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. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W (30dBm) or 17 dBm + 10log B. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power and peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

Maximum Conducted Output Power mean that the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level

3.3.2 Measuring Instruments and Setting

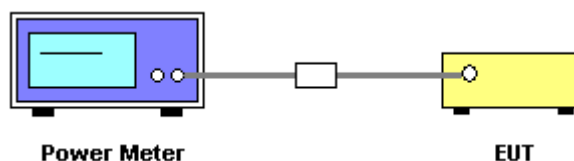
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Sensor	MA2411B

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the wideband power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.
4. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of Maximum Conducted Output Power

Final Test Date	Jan. 17, 2012	Test Site No.	TH01-HY
Temperature	21.4°C	Humidity	25%
Test Engineer	Shiming	Configurations	802.11a/n

**For Single Chain:
Configuration of IEEE 802.11a Port 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.92	17.00	Complies
40	5200 MHz	11.49	17.00	Complies
48	5240 MHz	10.98	17.00	Complies
52	5260 MHz	11.52	24.00	Complies
56	5280 MHz	11.21	24.00	Complies
64	5320 MHz	11.73	24.00	Complies
100	5500 MHz	11.93	24.00	Complies
116	5580 MHz	11.09	24.00	Complies
140	5700 MHz	11.01	24.00	Complies

For Two Chains:

Configuration IEEE 802.11n Port 1 (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	9.83	17.00	Complies
40	5200 MHz	9.60	17.00	Complies
48	5240 MHz	7.53	17.00	Complies
52	5260 MHz	8.37	24.00	Complies
56	5280 MHz	9.84	24.00	Complies
64	5320 MHz	8.57	24.00	Complies
100	5500 MHz	8.60	24.00	Complies
116	5580 MHz	7.92	24.00	Complies
140	5700 MHz	7.84	24.00	Complies

Configuration IEEE 802.11n Port 2 (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	8.93	17.00	Complies
40	5200 MHz	8.35	17.00	Complies
48	5240 MHz	9.38	17.00	Complies
52	5260 MHz	7.93	24.00	Complies
56	5280 MHz	9.09	24.00	Complies
64	5320 MHz	8.51	24.00	Complies
100	5500 MHz	9.57	24.00	Complies
116	5580 MHz	8.75	24.00	Complies
140	5700 MHz	9.88	24.00	Complies

Configuration IEEE 802.11n Port 1+ Port 2 (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.41	17.00	Complies
40	5200 MHz	12.03	17.00	Complies
48	5240 MHz	11.56	17.00	Complies
52	5260 MHz	11.17	24.00	Complies
56	5280 MHz	12.49	24.00	Complies
64	5320 MHz	11.55	24.00	Complies
100	5500 MHz	12.12	24.00	Complies
116	5580 MHz	11.37	24.00	Complies
140	5700 MHz	11.99	24.00	Complies

Configuration IEEE 802.11n Port 1A (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	9.75	17.00	Complies
46	5230 MHz	9.08	17.00	Complies
54	5270 MHz	9.32	24.00	Complies
62	5310 MHz	9.38	24.00	Complies
102	5510 MHz	8.06	24.00	Complies
110	5550 MHz	9.36	24.00	Complies
134	5670 MHz	8.09	24.00	Complies

Configuration IEEE 802.11n Port 2 (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	8.83	17.00	Complies
46	5230 MHz	8.65	17.00	Complies
54	5270 MHz	8.58	24.00	Complies
62	5310 MHz	8.56	24.00	Complies
102	5510 MHz	8.23	24.00	Complies
110	5550 MHz	8.59	24.00	Complies
134	5670 MHz	8.52	24.00	Complies

Configuration IEEE 802.11n Port 1+ Port 2 (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.32	17.00	Complies
46	5230 MHz	11.88	17.00	Complies
54	5270 MHz	11.98	24.00	Complies
62	5310 MHz	12.00	24.00	Complies
102	5510 MHz	11.16	24.00	Complies
110	5550 MHz	12.00	24.00	Complies
134	5670 MHz	11.32	24.00	Complies

3.4 Power Spectral Density Measurement

3.4.1 Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits and decrease power density limit rule refer to section 3.3.1.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	4
5.25-5.35 GHz	11
5.470-5.725	11

3.4.2 Measuring Instruments and Setting

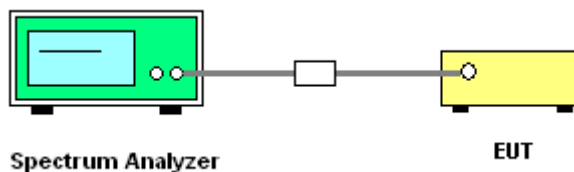
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	RMS
Trace	Max Hold
Sweep Time	Auto

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 3000kHz. Set Detector to RMS, Trace to Max Hold. Mark the frequency with maximum peak power as the center of the display of the spectrum.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.4.7 Test Result of Power Spectral Density

Final Test Date	Jan. 17, 2012	Test Site No.	TH01-HY
Temperature	21.4°C	Humidity	25%
Test Engineer	Shiming	Configurations	802.11a/n

**For Single Chain:
Configuration of IEEE 802.11a Port 1**

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-0.25	4.00	Complies
5200 MHz	0.57	4.00	Complies
5240 MHz	0.42	4.00	Complies
5260 MHz	0.22	11.00	Complies
5280 MHz	1.13	11.00	Complies
5320 MHz	1.49	11.00	Complies
5500 MHz	1.64	11.00	Complies
5580 MHz	1.35	11.00	Complies
5700 MHz	0.42	11.00	Complies

**For Two Chains:
Configuration IEEE 802.11n Port 1 (20MHz)**

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-10.70	4.00	Complies
5200 MHz	-10.87	4.00	Complies
5240 MHz	-12.77	4.00	Complies
5260 MHz	-11.66	11.00	Complies
5280 MHz	-9.75	11.00	Complies
5320 MHz	-11.33	11.00	Complies
5500 MHz	-11.09	11.00	Complies
5580 MHz	-12.59	11.00	Complies
5700 MHz	-12.56	11.00	Complies

Configuration IEEE 802.11n Port 2 (20MHz)

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-10.16	4.00	Complies
5200 MHz	-11.19	4.00	Complies
5240 MHz	-9.70	4.00	Complies
5260 MHz	-10.88	11.00	Complies
5280 MHz	-9.57	11.00	Complies
5320 MHz	-11.61	11.00	Complies
5500 MHz	-9.34	11.00	Complies
5580 MHz	-10.44	11.00	Complies
5700 MHz	-9.61	11.00	Complies

Configuration IEEE 802.11n Port 1+ Port 2 (20MHz)

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-7.41	4.00	Complies
5200 MHz	-8.02	4.00	Complies
5240 MHz	-7.96	4.00	Complies
5260 MHz	-8.24	11.00	Complies
5280 MHz	-6.56	11.00	Complies
5320 MHz	-8.46	11.00	Complies
5500 MHz	-7.12	11.00	Complies
5580 MHz	-8.37	11.00	Complies
5700 MHz	-7.83	11.00	Complies

Configuration IEEE 802.11n Port 1 (40MHz)

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-13.37	4.00	Complies
5230 MHz	-13.56	4.00	Complies
5270 MHz	-12.95	11.00	Complies
5310 MHz	-13.19	11.00	Complies
5510 MHz	-14.96	11.00	Complies
5550 MHz	-13.54	11.00	Complies
5670 MHz	-15.14	11.00	Complies

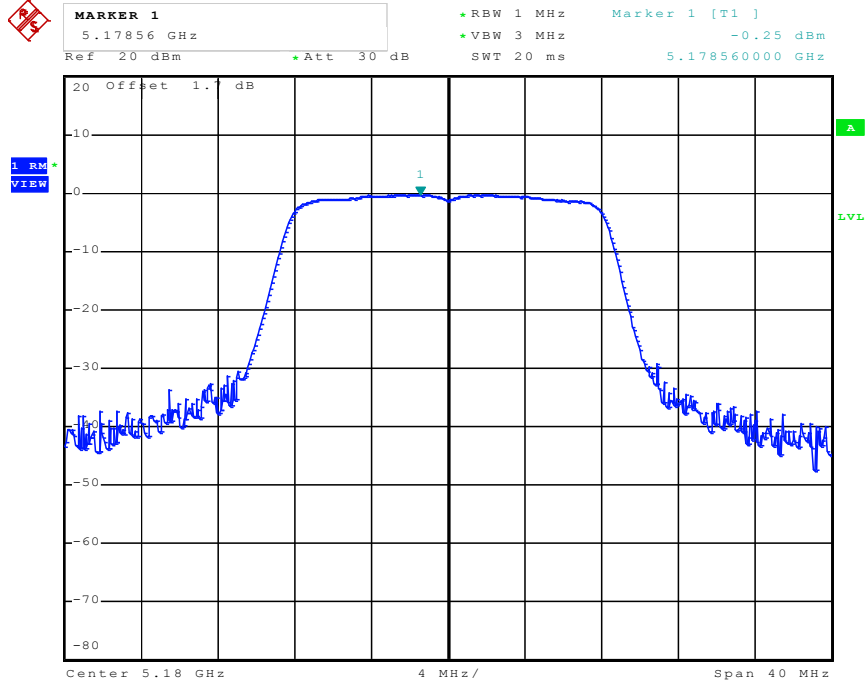
Configuration IEEE 802.11n Port 2 (40MHz)

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-13.93	4.00	Complies
5230 MHz	-13.36	4.00	Complies
5270 MHz	-12.70	11.00	Complies
5310 MHz	-12.90	11.00	Complies
5510 MHz	-13.14	11.00	Complies
5550 MHz	-14.70	11.00	Complies
5670 MHz	-12.98	11.00	Complies

Configuration IEEE 802.11n Port 1+ Port 2 (40MHz)

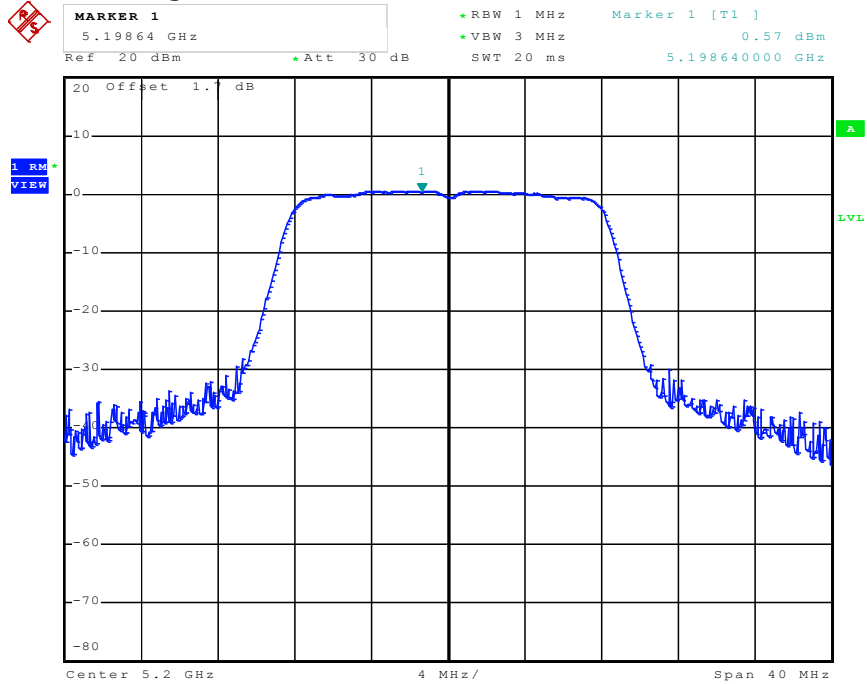
Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-10.63	4.00	Complies
5230 MHz	-10.45	4.00	Complies
5270 MHz	-9.81	11.00	Complies
5310 MHz	-10.03	11.00	Complies
5510 MHz	-10.95	11.00	Complies
5550 MHz	-11.07	11.00	Complies
5670 MHz	-10.92	11.00	Complies

For Single Chain:
Power Density Plot on Configuration IEEE 802.11a Port 1 / 5180 MHz



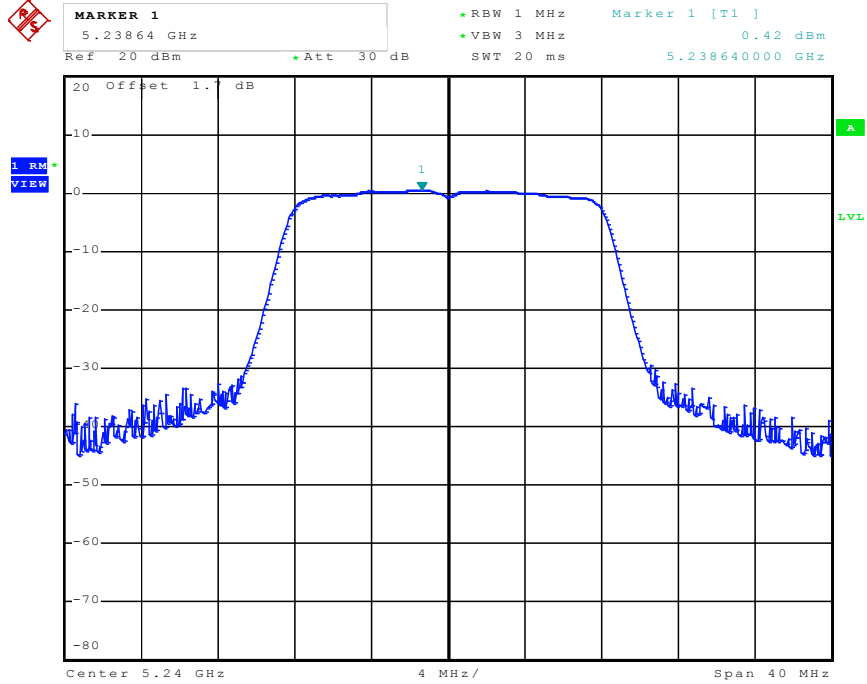
Date: 14.JAN.2012 12:01:58

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5200 MHz



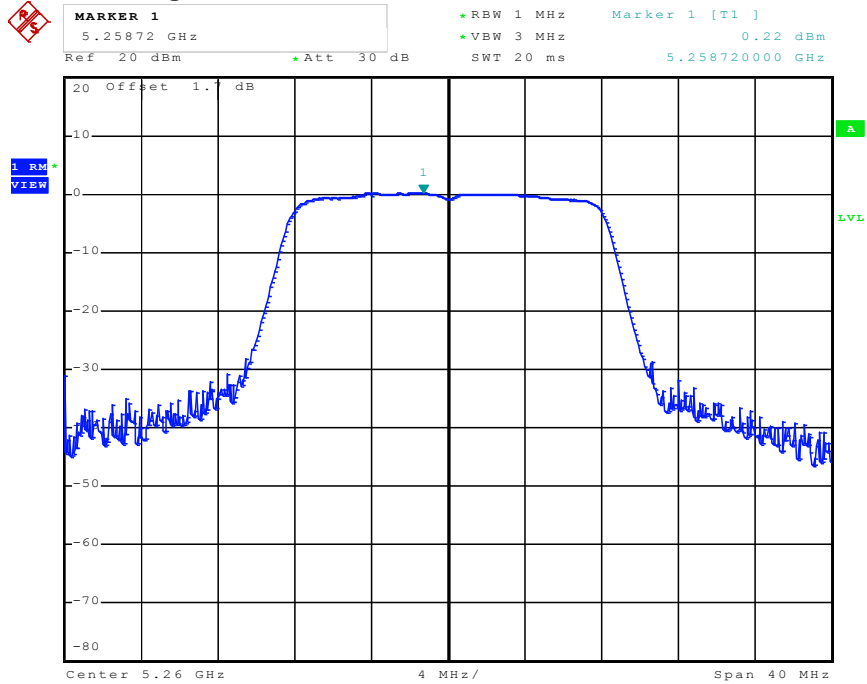
Date: 14.JAN.2012 12:22:57

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5240 MHz



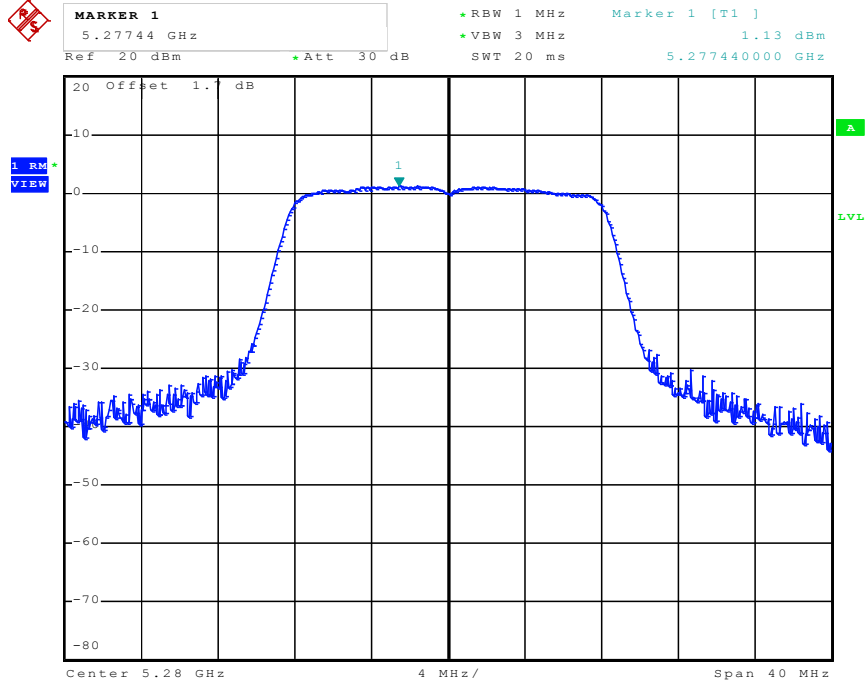
Date: 14. JAN. 2012 12:35:29

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5260 MHz



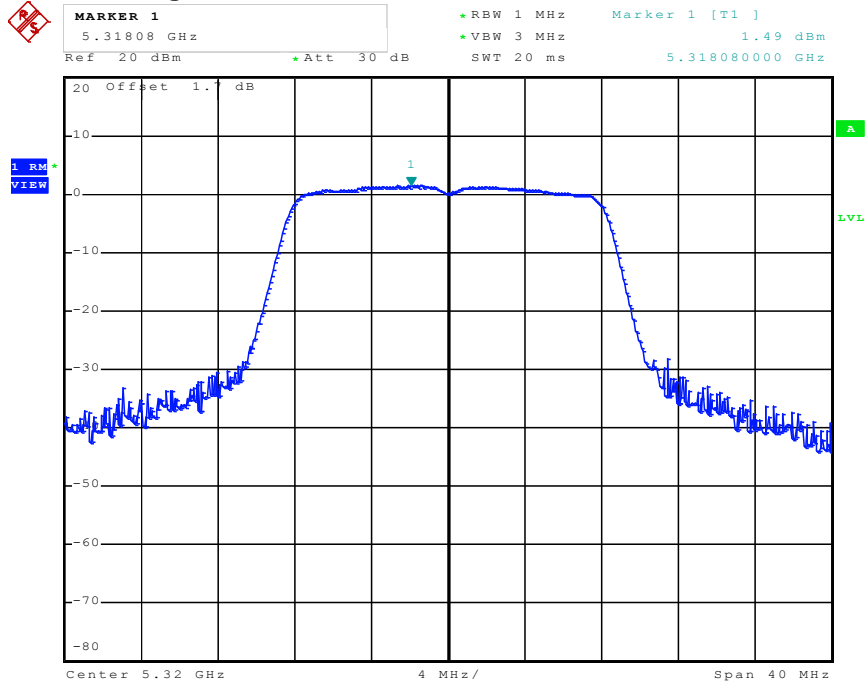
Date: 14. JAN. 2012 12:51:45

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5280 MHz



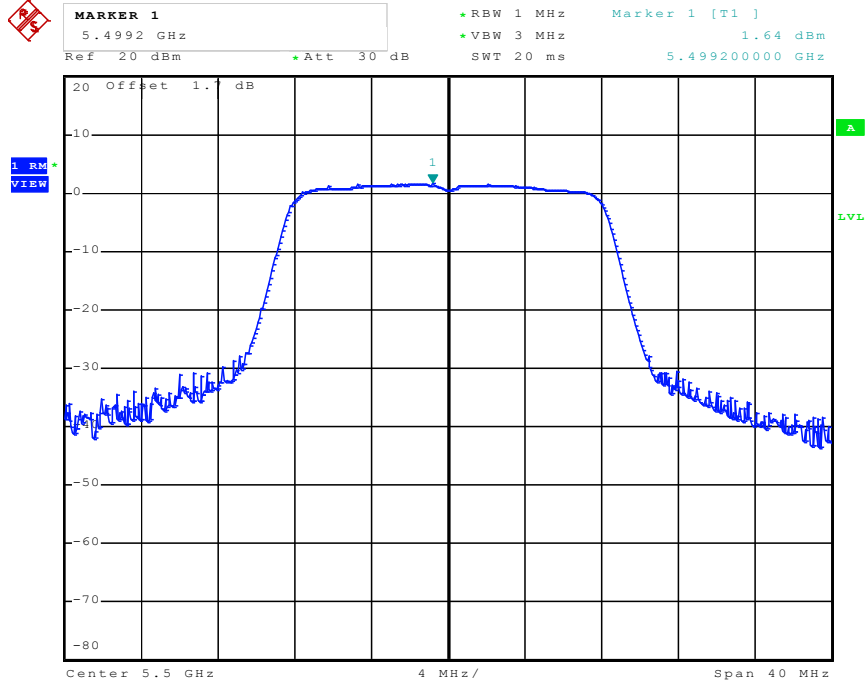
Date: 14.JAN.2012 13:05:10

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5320 MHz



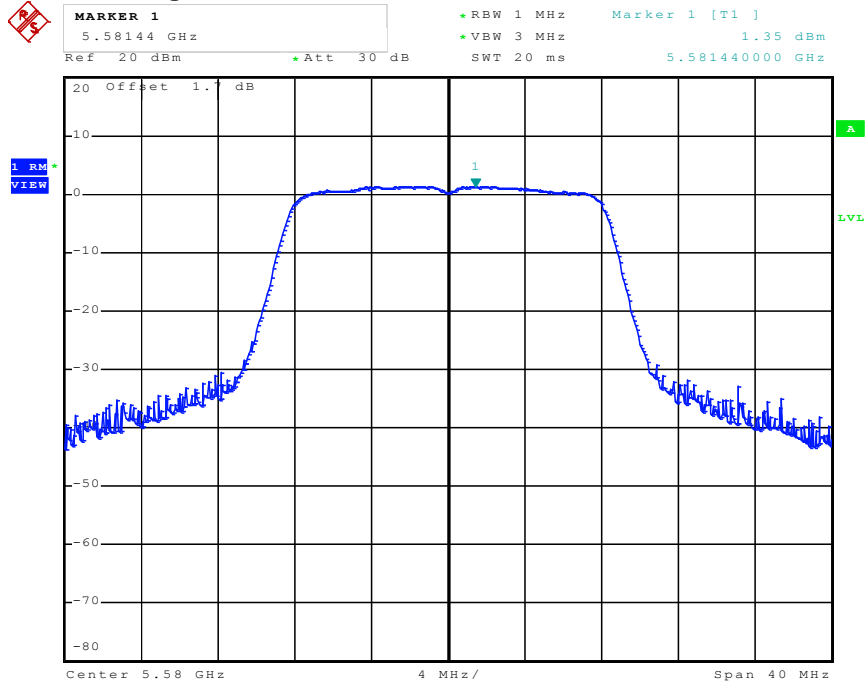
Date: 14.JAN.2012 13:16:31

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5500 MHz



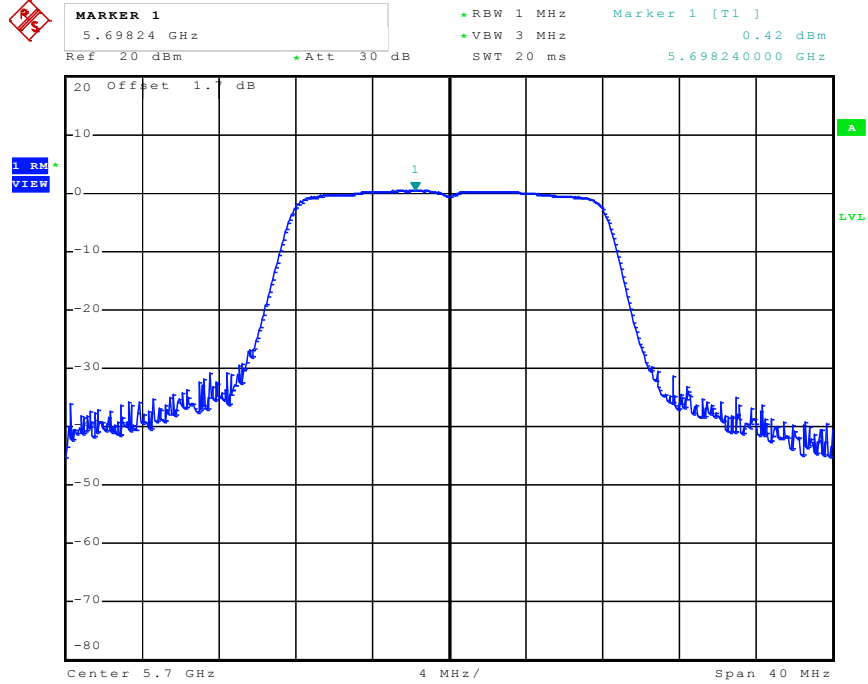
Date: 14.JAN.2012 13:29:06

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5580 MHz



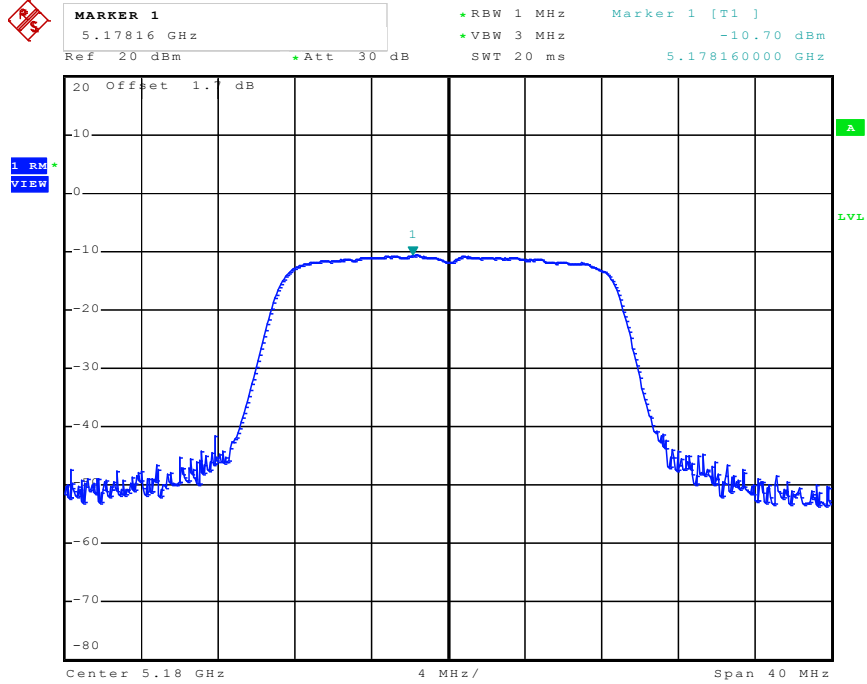
Date: 14.JAN.2012 13:44:10

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5700 MHz



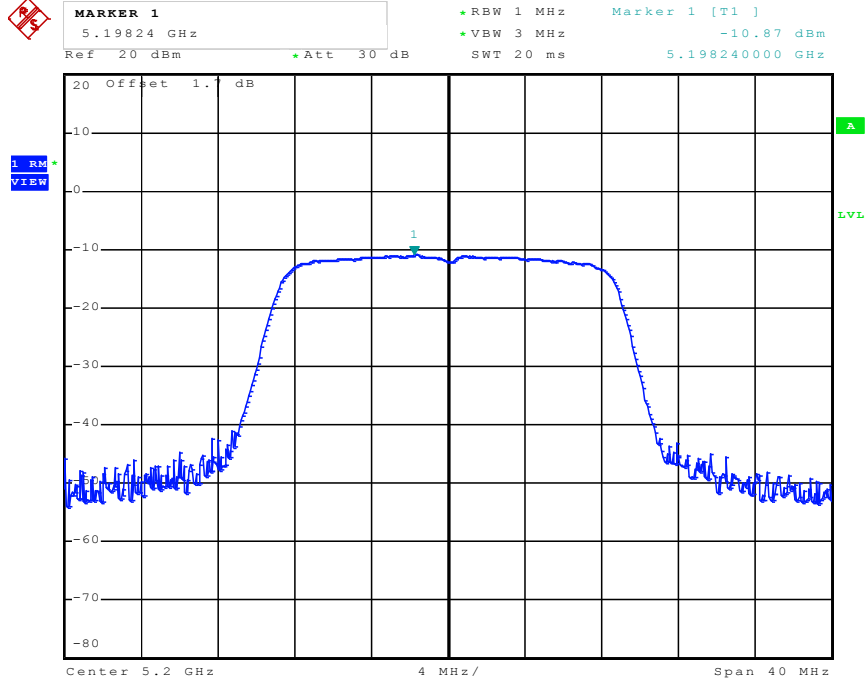
Date: 14.JAN.2012 13:58:47

For Two Chains:
Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5180 MHz



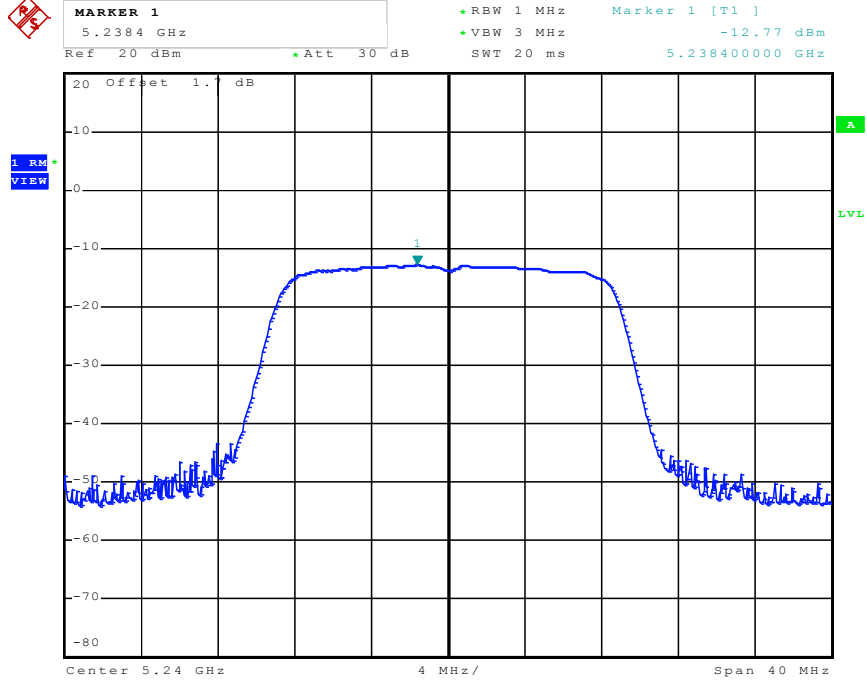
Date: 17. JAN. 2012 14:47:03

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5200 MHz



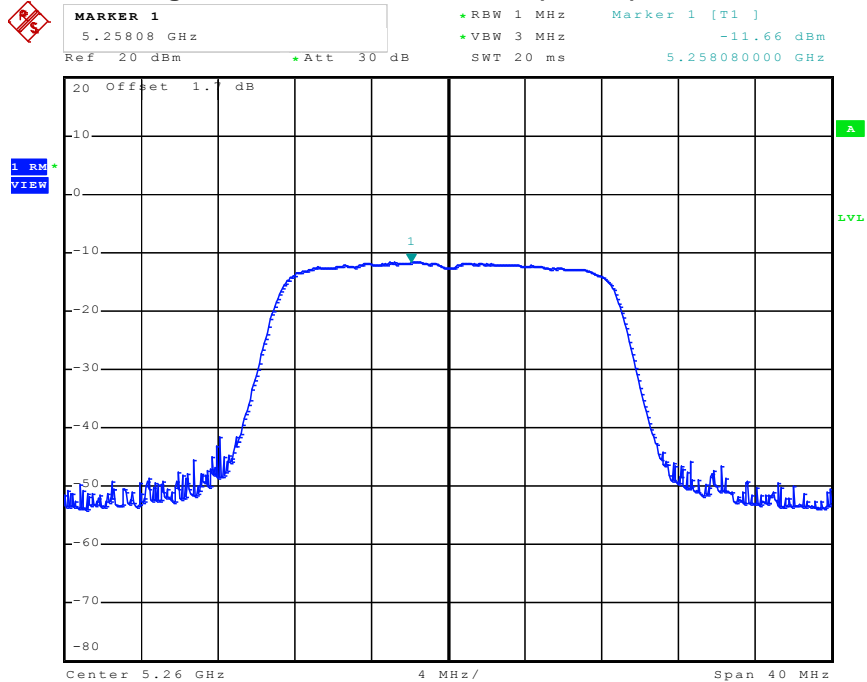
Date: 17. JAN. 2012 15:19:49

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5240 MHz



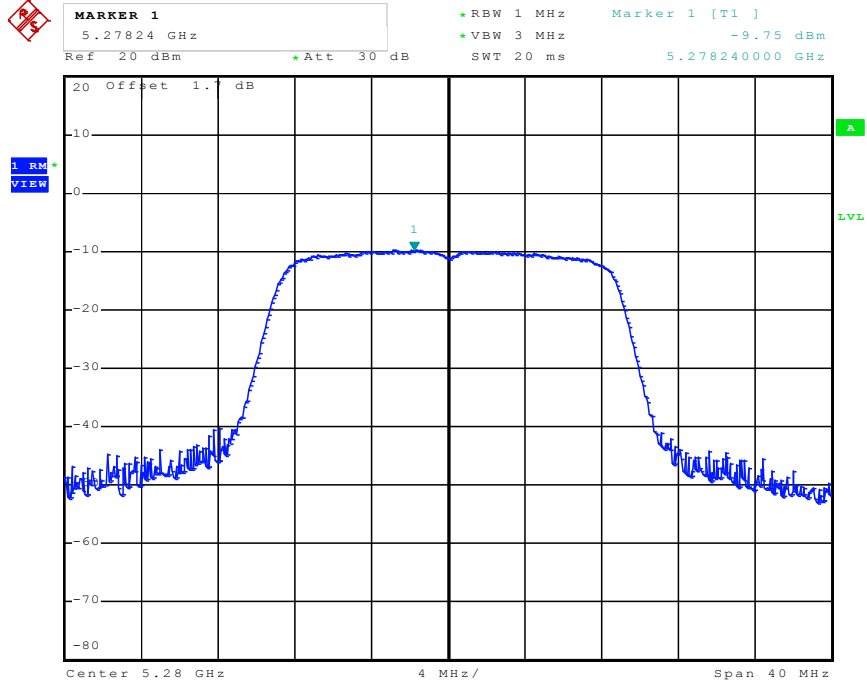
Date: 17. JAN. 2012 15:33:06

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5260 MHz



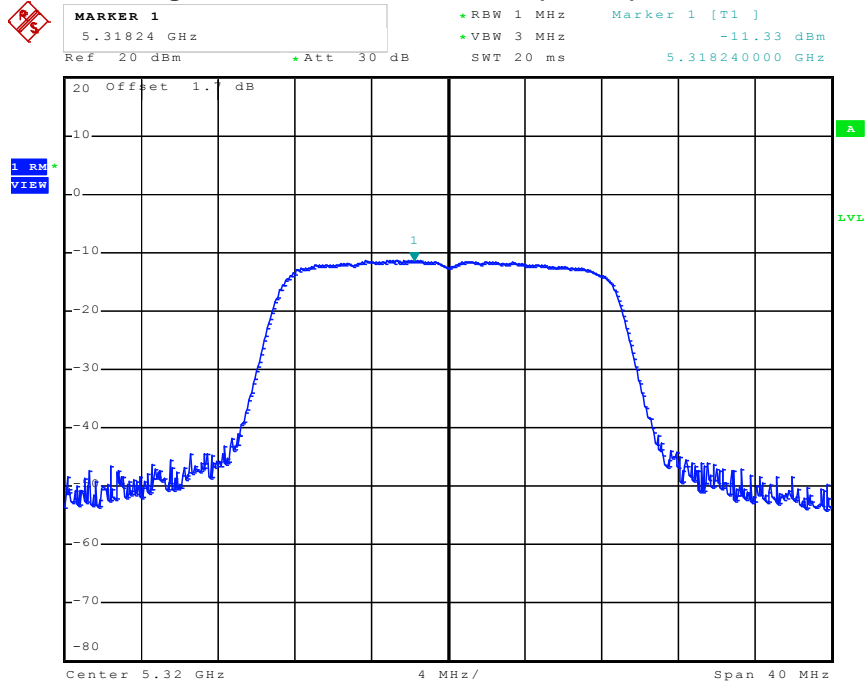
Date: 17. JAN. 2012 16:11:04

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5280 MHz



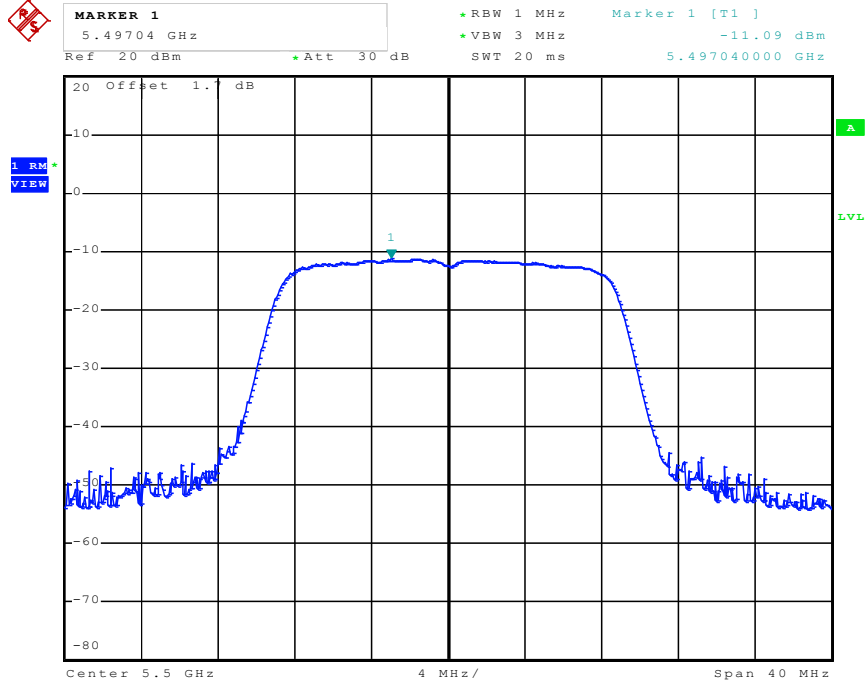
Date: 17. JAN. 2012 16:54:29

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5320 MHz



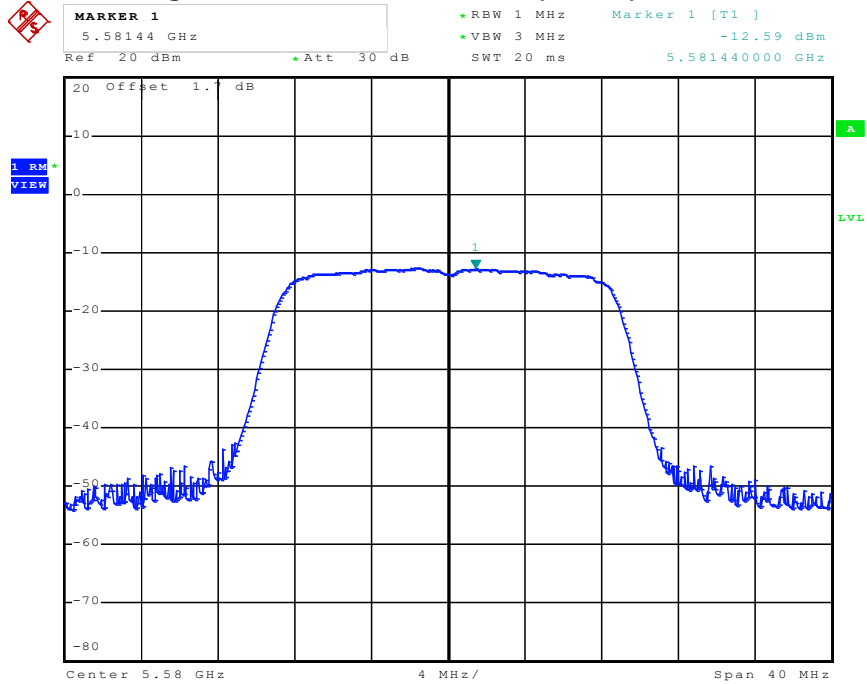
Date: 17. JAN. 2012 17:19:24

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5500 MHz



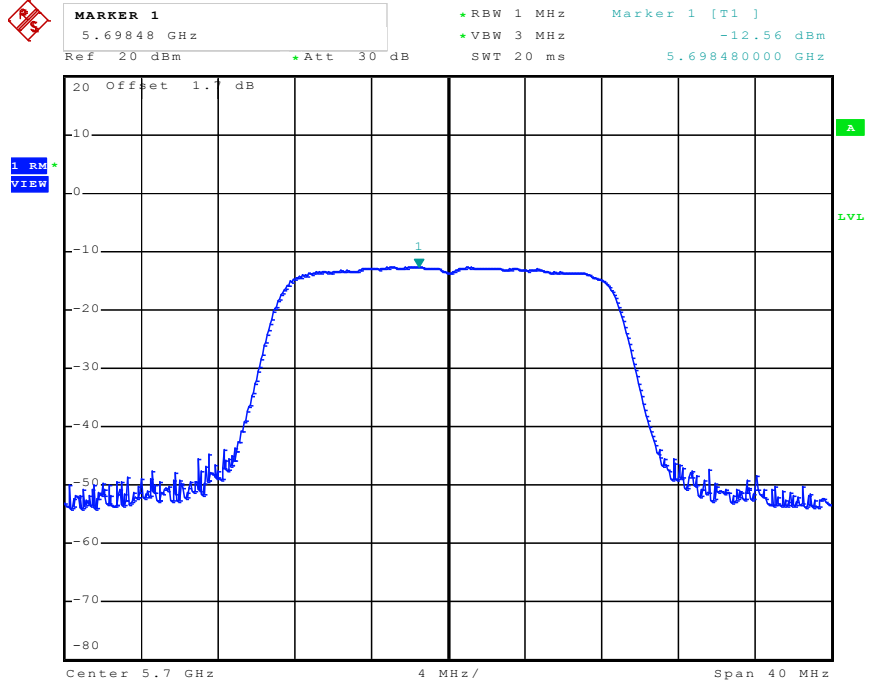
Date: 17.JAN.2012 17:29:02

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5580 MHz



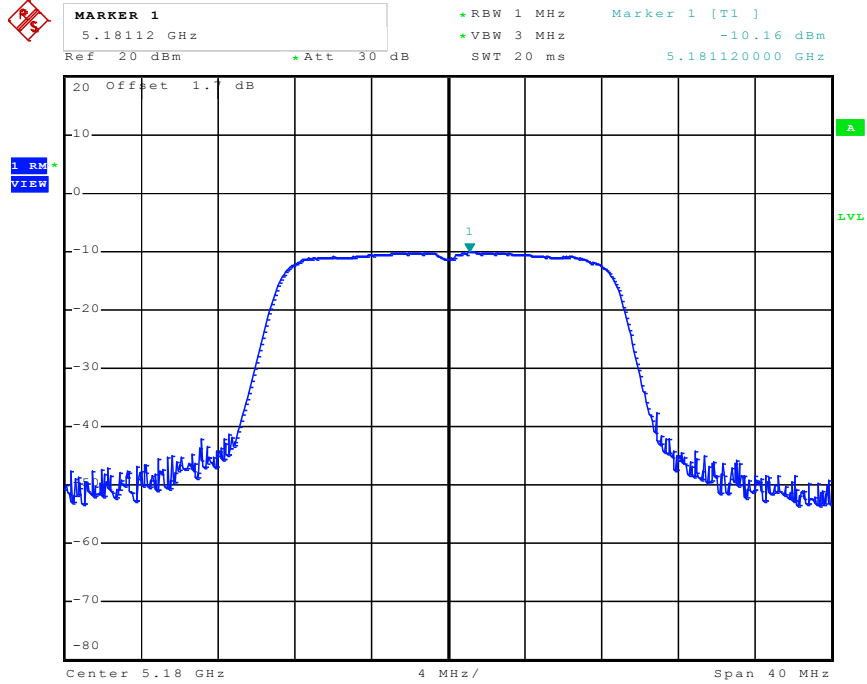
Date: 17.JAN.2012 17:50:55

Power Density Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5700 MHz



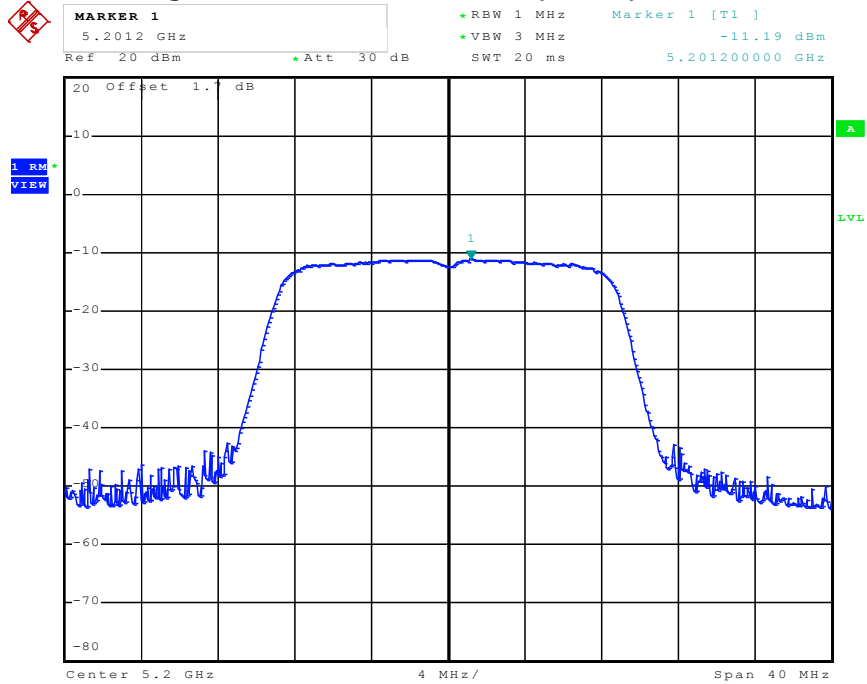
Date: 17.JAN.2012 18:00:47

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5180 MHz



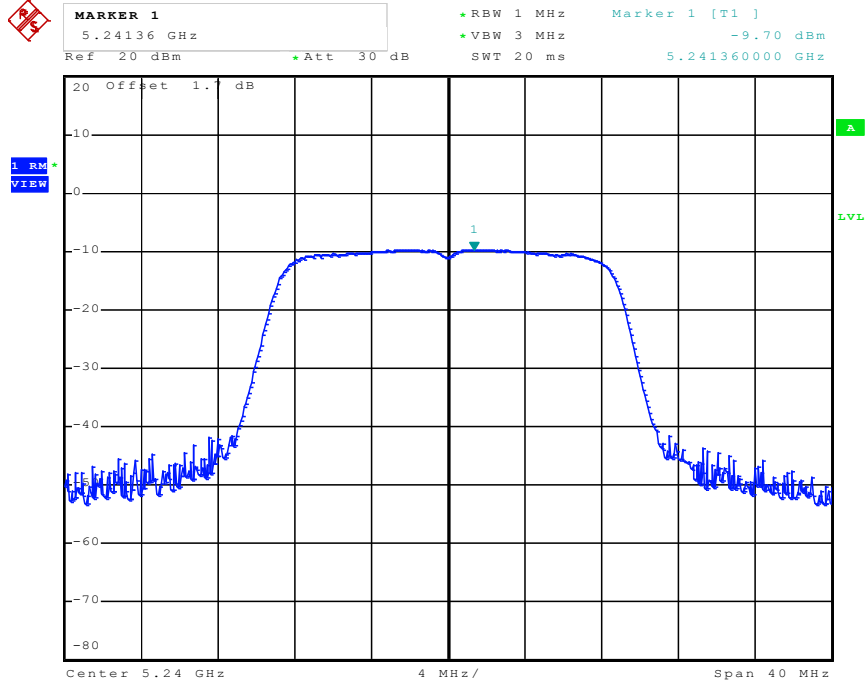
Date: 17. JAN. 2012 14:27:32

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5200 MHz



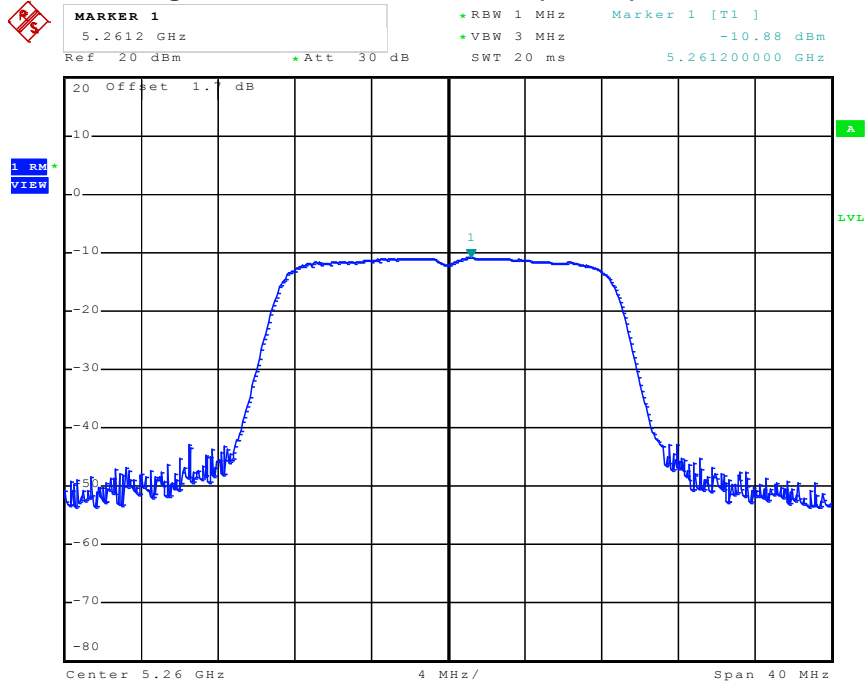
Date: 17. JAN. 2012 14:57:29

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5240 MHz



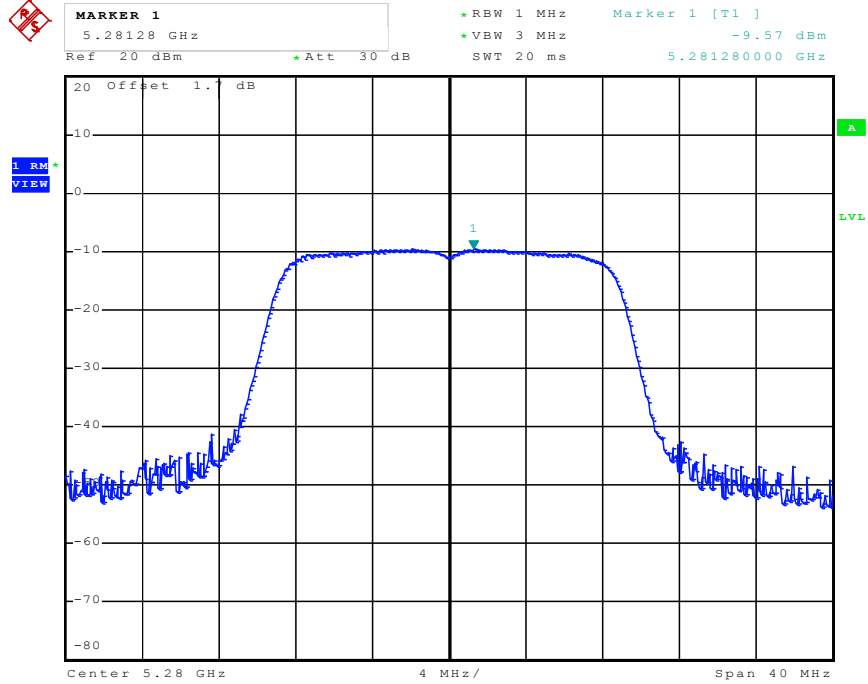
Date: 17. JAN. 2012 15:43:55

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5260 MHz



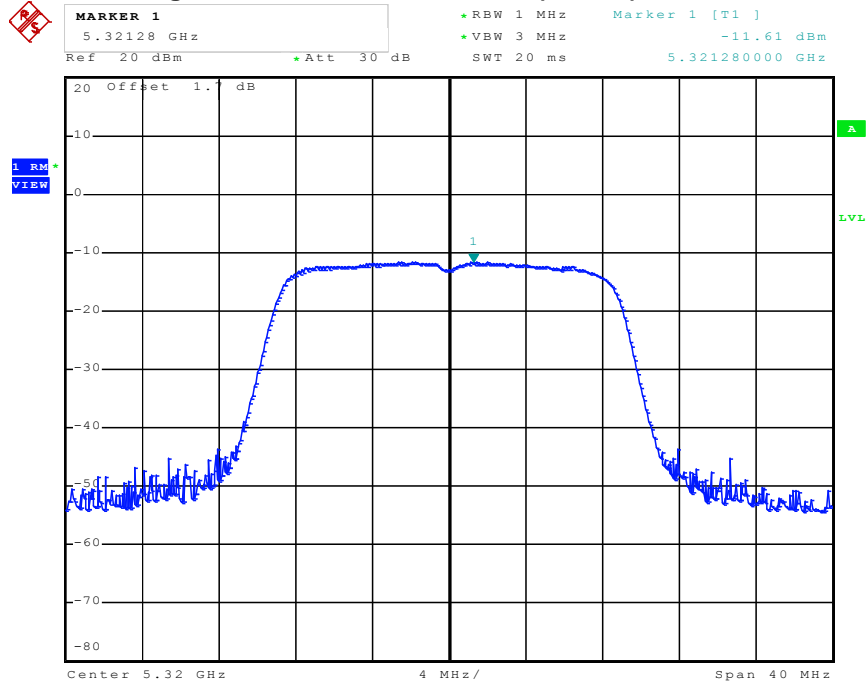
Date: 17. JAN. 2012 15:55:26

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5280 MHz



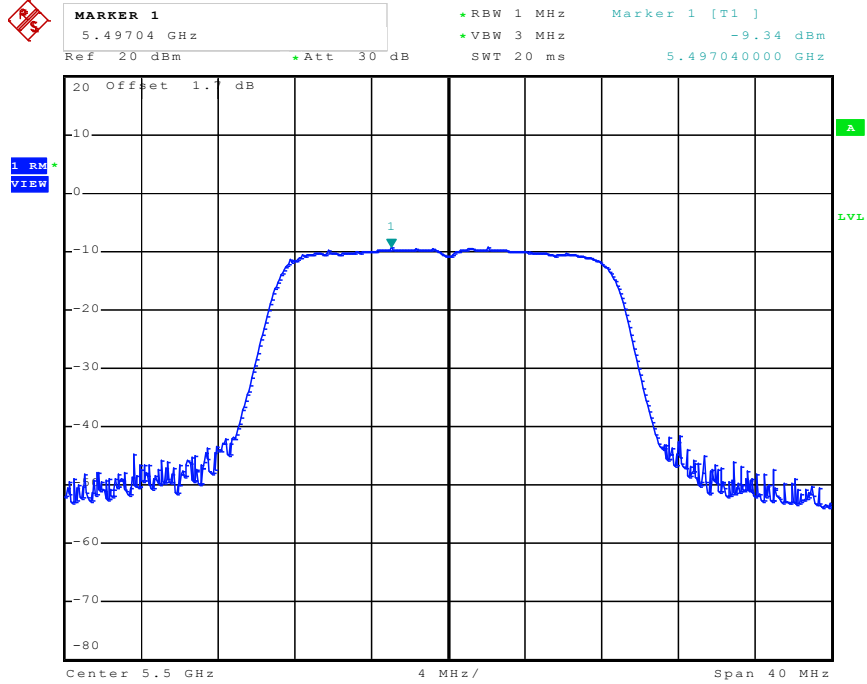
Date: 17.JAN.2012 17:04:13

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5320 MHz



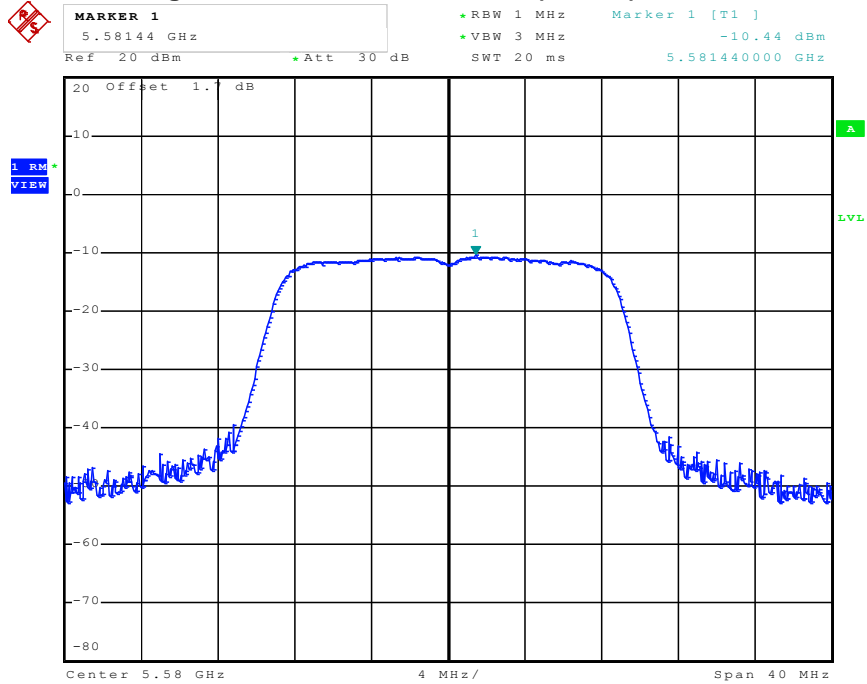
Date: 17.JAN.2012 17:11:07

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5500 MHz



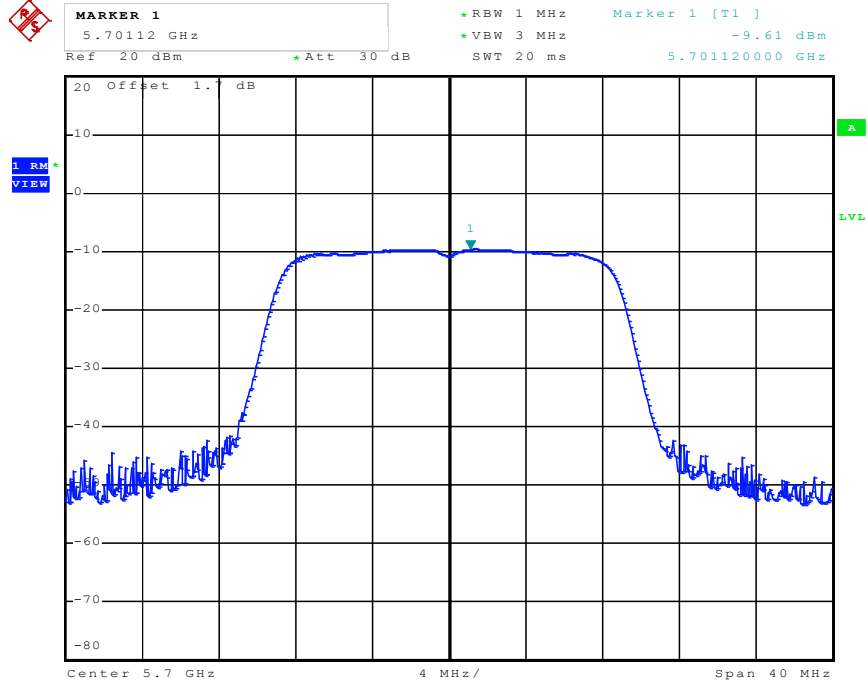
Date: 17. JAN. 2012 17:36:02

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5580 MHz



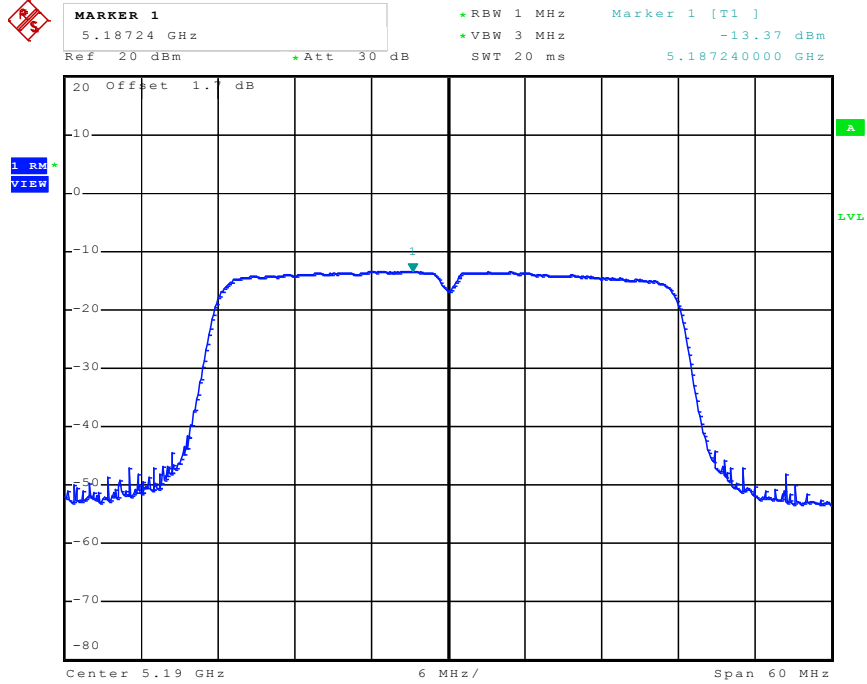
Date: 17. JAN. 2012 17:44:11

Power Density Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5700 MHz



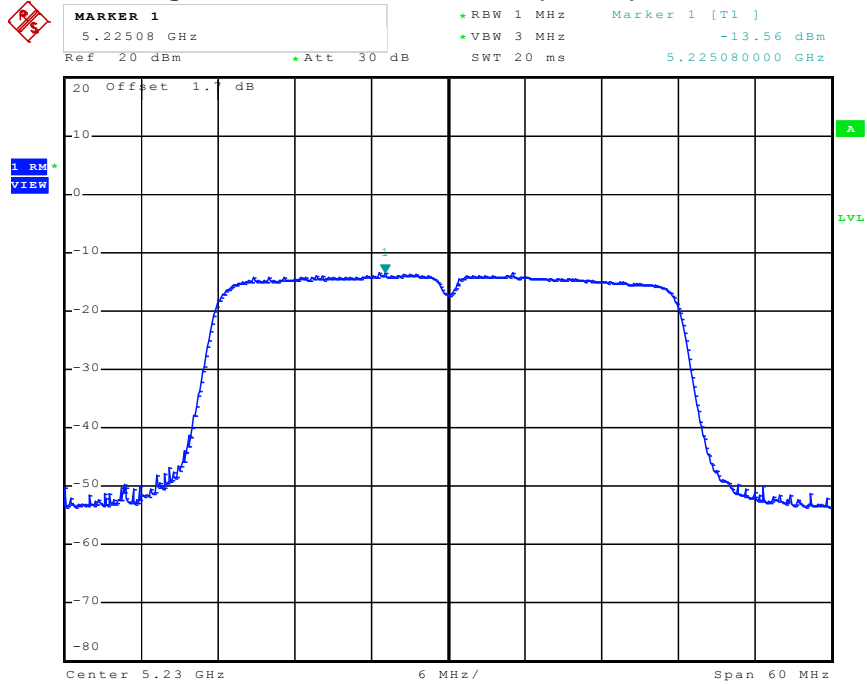
Date: 17.JAN.2012 18:09:32

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5190 MHz



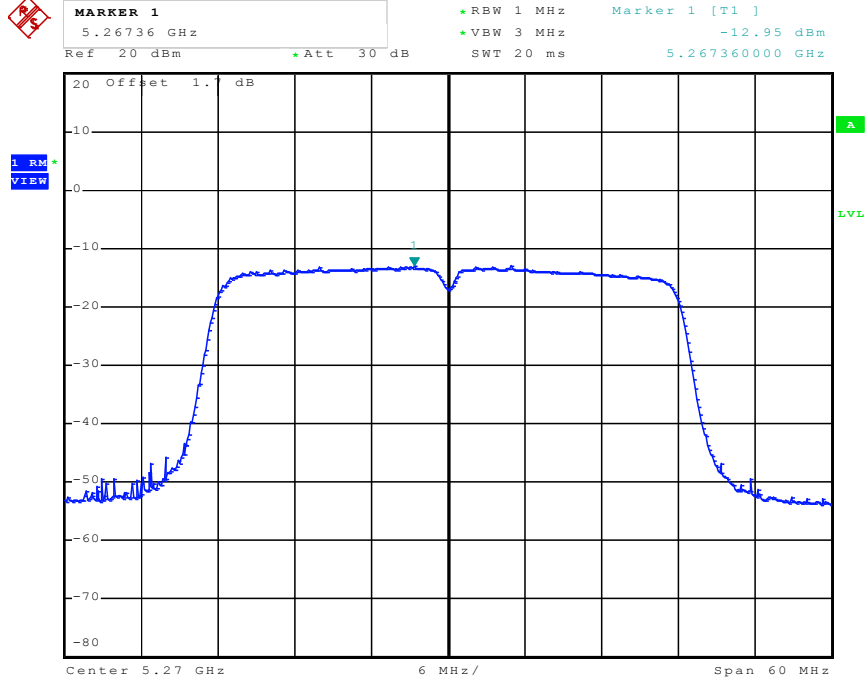
Date: 17. JAN. 2012 18:45:30

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5230 MHz



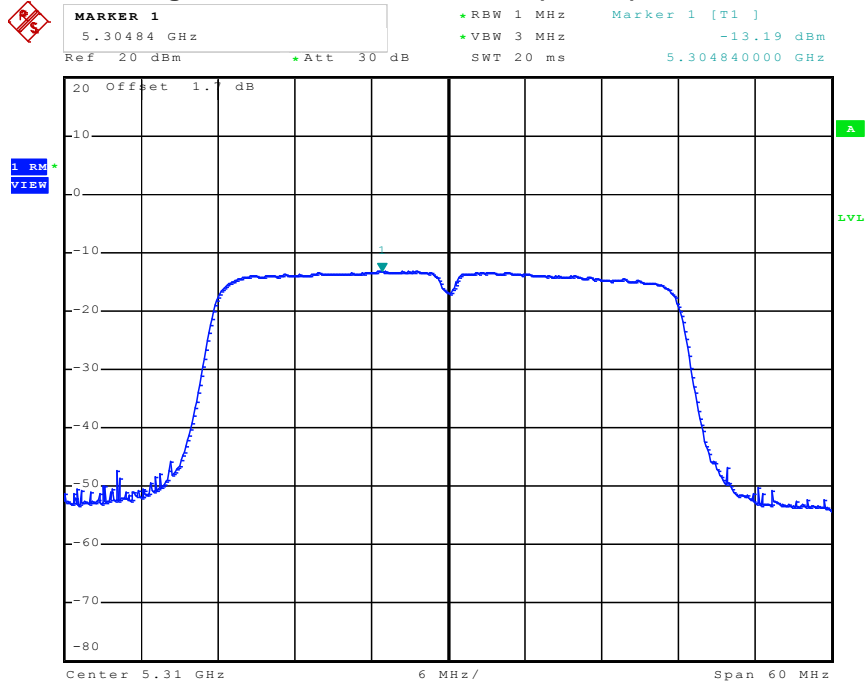
Date: 17. JAN. 2012 18:53:22

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5270 MHz



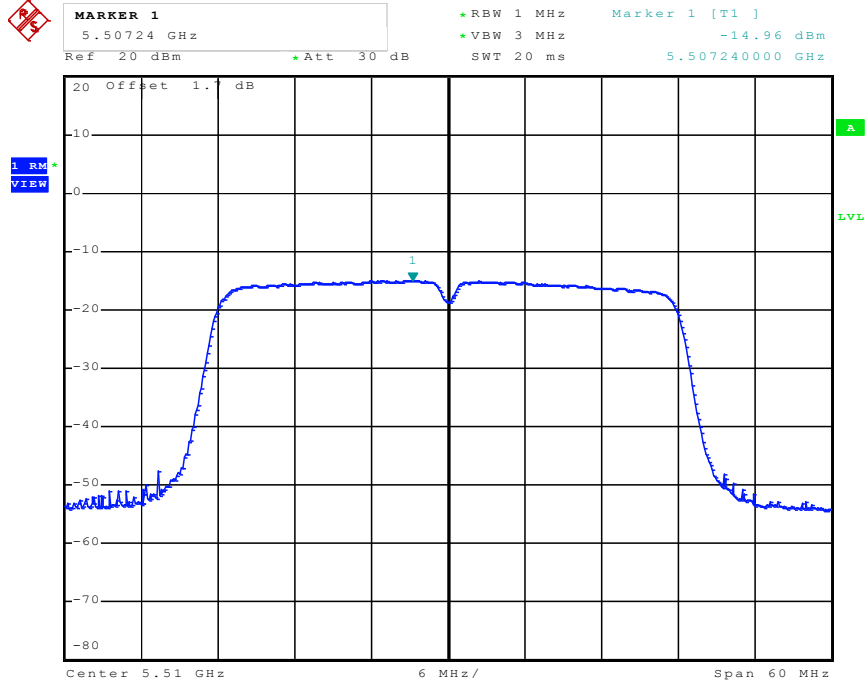
Date: 17. JAN. 2012 19:14:24

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5310 MHz



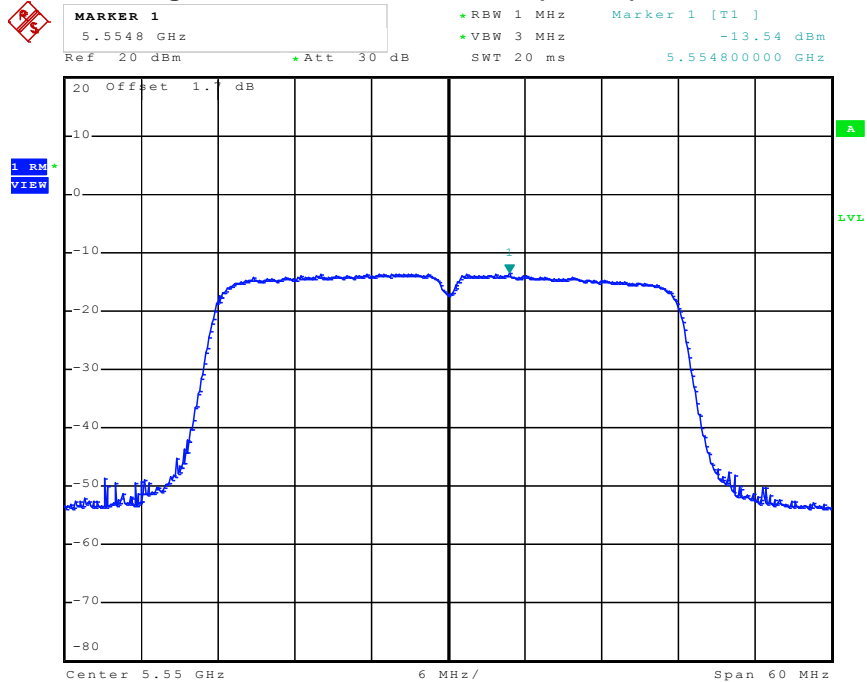
Date: 17. JAN. 2012 19:22:36

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5510 MHz



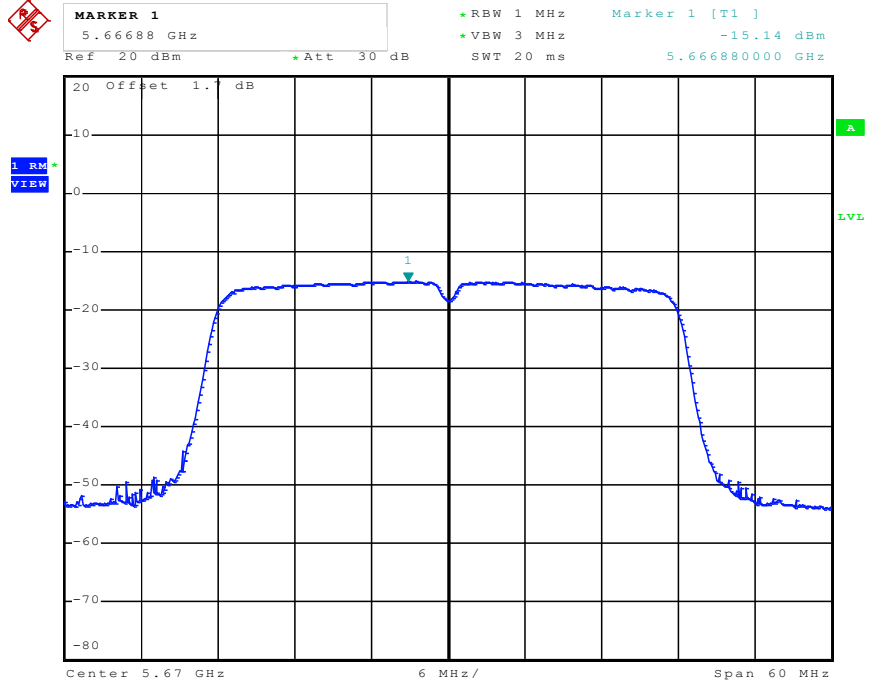
Date: 17. JAN. 2012 19:45:25

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5550 MHz



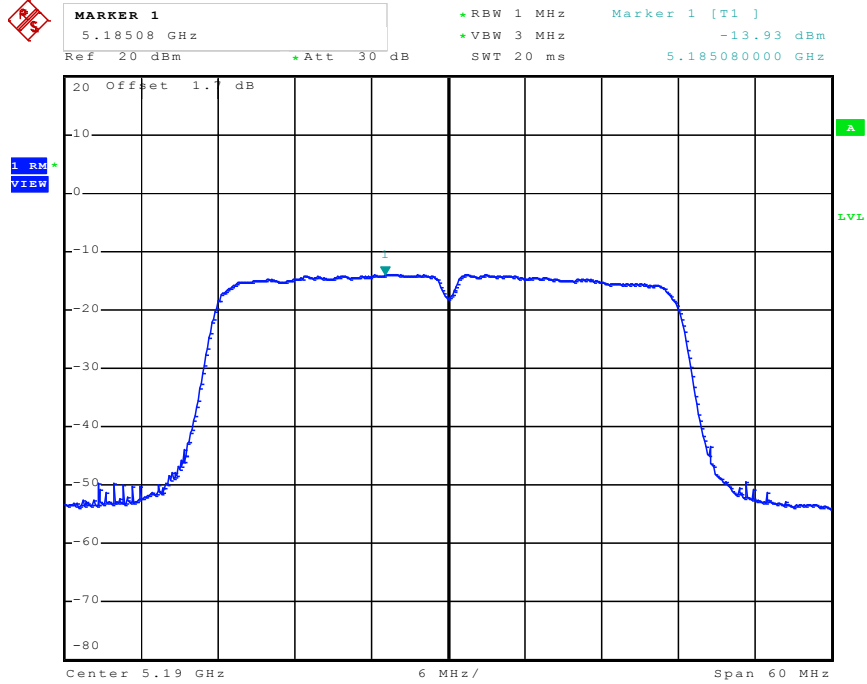
Date: 17. JAN. 2012 19:52:33

Power Density Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5670 MHz



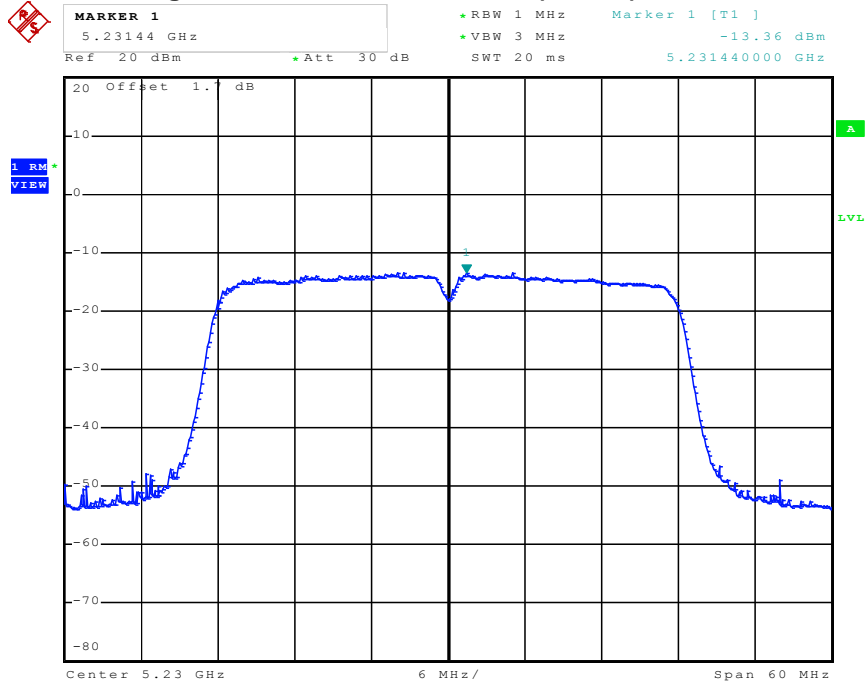
Date: 17.JAN.2012 20:12:01

Power Density Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5190 MHz



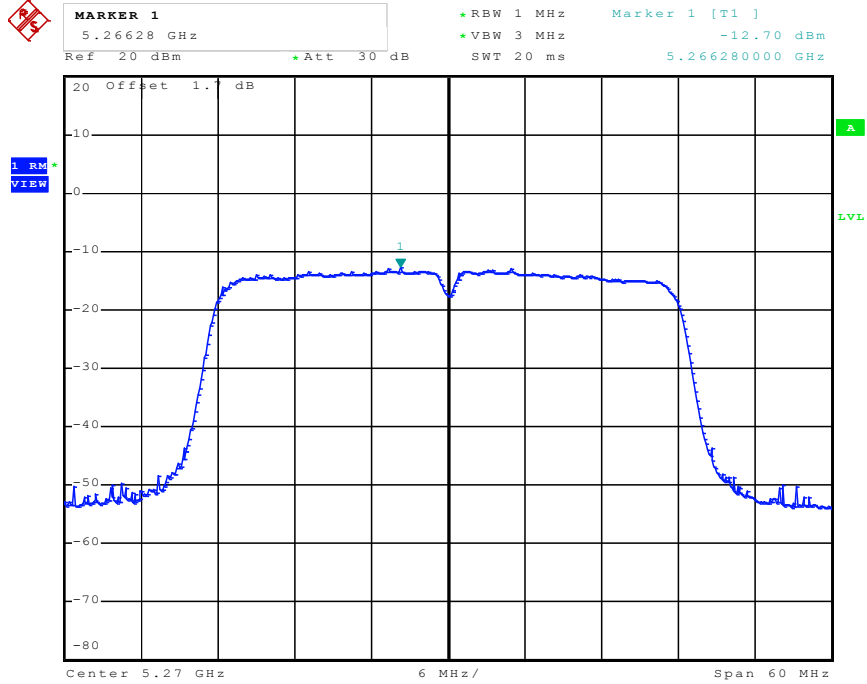
Date: 17. JAN. 2012 18:37:39

Power Density Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5230 MHz



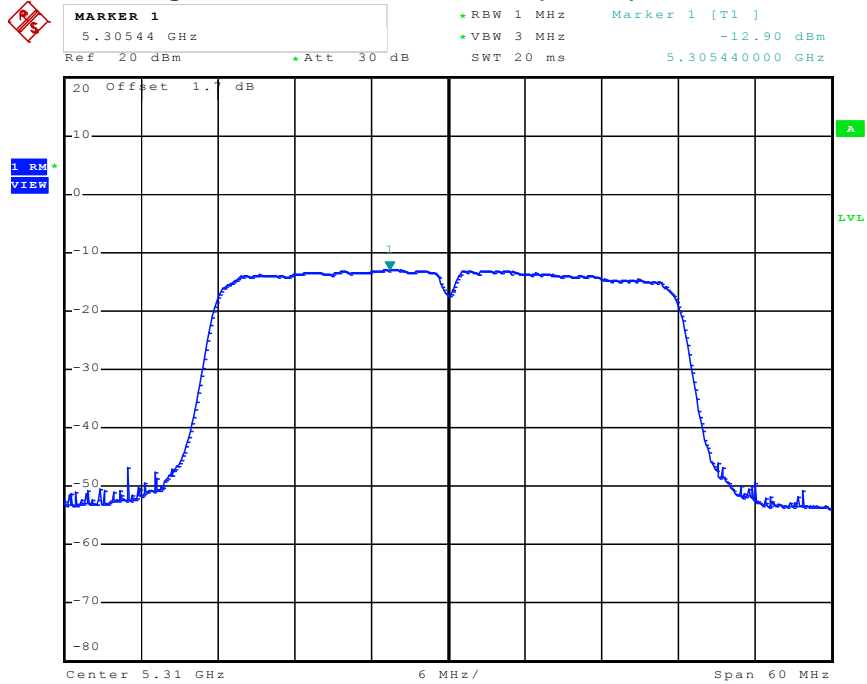
Date: 17. JAN. 2012 19:00:11

Power Density Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5270 MHz



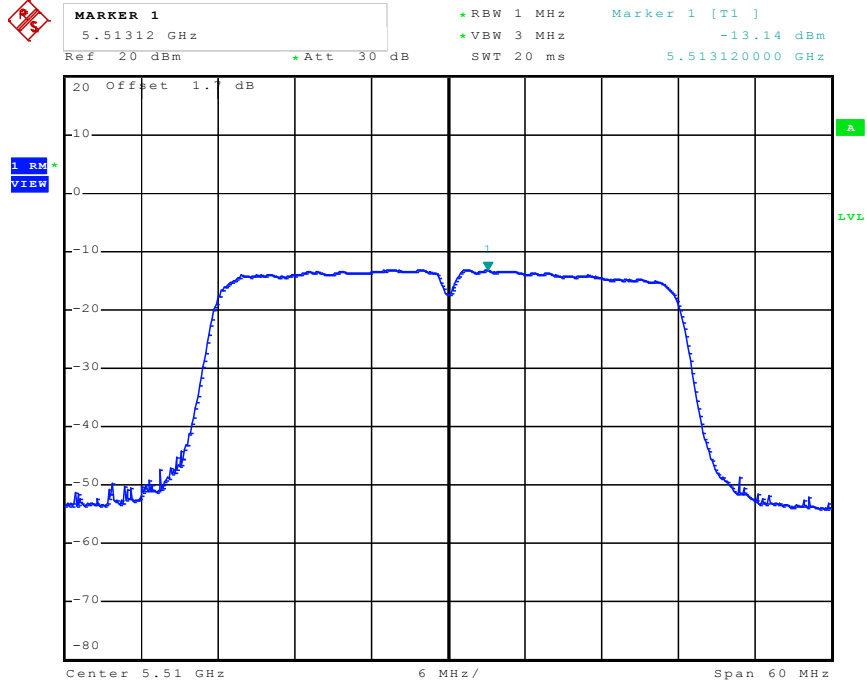
Date: 17. JAN. 2012 19:07:26

Power Density Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5310 MHz



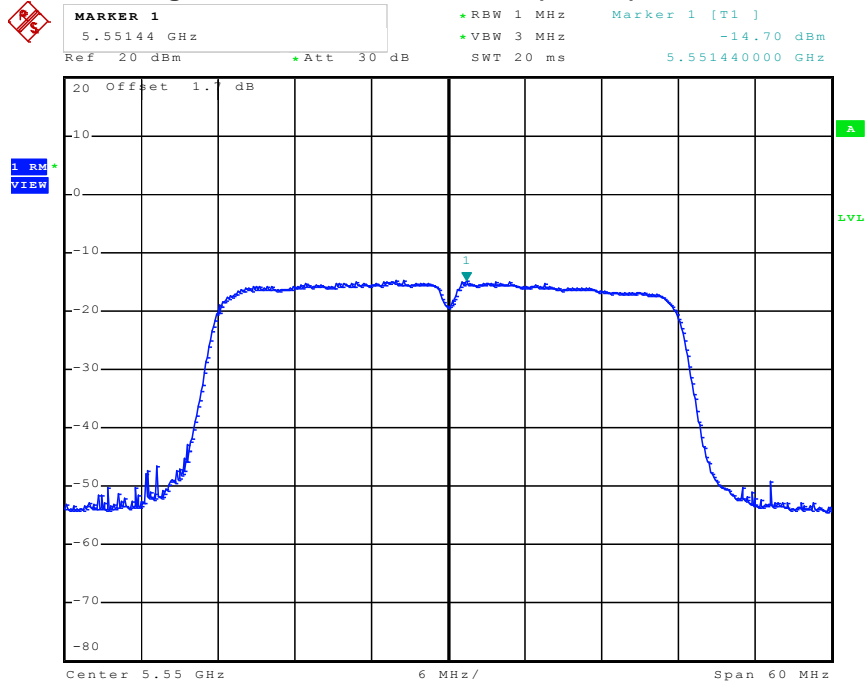
Date: 17. JAN. 2012 19:29:21

Power Density Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5510 MHz



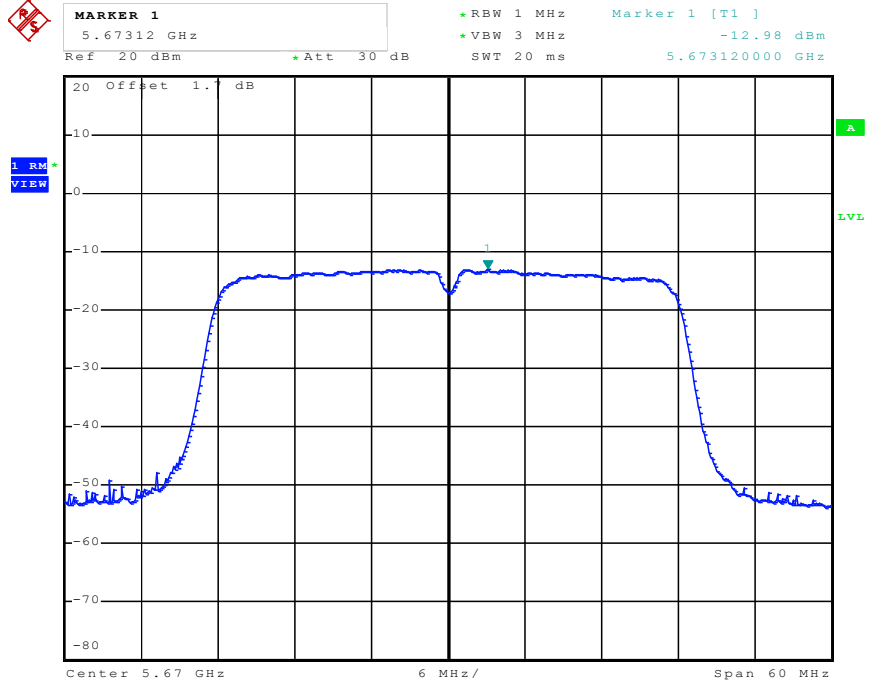
Date: 17. JAN. 2012 19:38:58

Power Density Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5550 MHz



Date: 17. JAN. 2012 19:57:40

Power Density Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5670 MHz



Date: 17.JAN.2012 20:04:28

3.5 Peak Excursion Measurement

3.5.1 Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.

3.5.2 Measuring Instruments and Setting

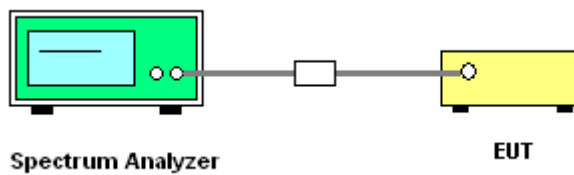
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz (Peak Trace) / 1000 kHz (Average Trace)
VB	3000 kHz (Peak Trace) / 300 kHz (Average Trace)
Detector	Peak (Peak Trace) / RMS (Average Trace)
Trace	Max Hold
Sweep Time	60s

3.5.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emissions bandwidth. The largest difference between the following two traces (Peak Trace and Average Trace) must be ≤ 13 dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and max-hold settings.
4. Average Trace: Method #3—video averaging with max hold--and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to "free run". Set RBW = 1 MHz. Set VBW $\geq 1/T$ (IEEE 802.11a VBW = 300kHz $\geq 1/4\mu$ s). Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode. Set max hold. Allow max hold to run for 60 seconds.

3.5.4 Test Setup Layout



3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.5.7 Test Result of Peak Excursion

Final Test Date	Jan. 17, 2012	Test Site No.	TH01-HY
Temperature	21.4°C	Humidity	25%
Test Engineer	Shiming	Configurations	802.11a/n

**For Single Chain:
Configuration of IEEE 802.11a Port 1**

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	5.22	13	Complies
5200 MHz	5.25	13	Complies
5240 MHz	5.24	13	Complies
5260 MHz	5.27	13	Complies
5280 MHz	5.27	13	Complies
5320 MHz	5.30	13	Complies
5500 MHz	5.28	13	Complies
5580 MHz	5.26	13	Complies
5700 MHz	5.21	13	Complies

**For Two Chains:
Configuration IEEE 802.11n Port 1 (20MHz)**

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	4.89	13	Complies
5200 MHz	4.98	13	Complies
5240 MHz	4.93	13	Complies
5260 MHz	4.99	13	Complies
5280 MHz	5.02	13	Complies
5320 MHz	4.95	13	Complies
5500 MHz	4.93	13	Complies
5580 MHz	4.94	13	Complies
5700 MHz	4.98	13	Complies

Configuration IEEE 802.11n Port 2 (20MHz)

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	6.68	13	Complies
5200 MHz	6.70	13	Complies
5240 MHz	6.80	13	Complies
5260 MHz	6.69	13	Complies
5280 MHz	6.68	13	Complies
5320 MHz	7.81	13	Complies
5500 MHz	6.60	13	Complies
5580 MHz	6.55	13	Complies
5700 MHz	6.63	13	Complies

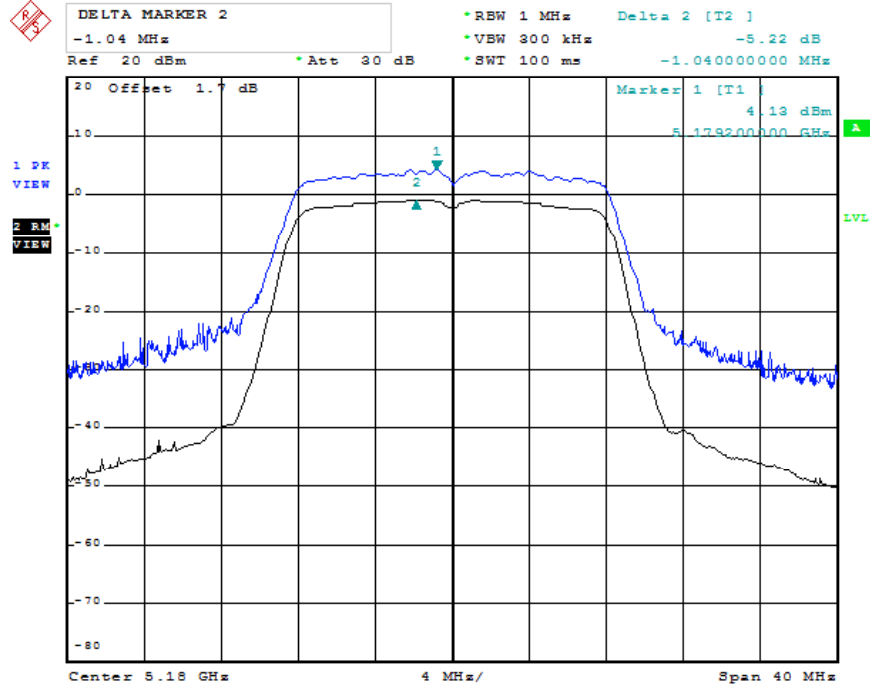
Configuration IEEE 802.11n Port 1 (40MHz)

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5190 MHz	6.02	13	Complies
5230 MHz	6.13	13	Complies
5270 MHz	6.09	13	Complies
5310 MHz	6.21	13	Complies
5510 MHz	6.05	13	Complies
5550 MHz	6.07	13	Complies
5670 MHz	6.01	13	Complies

Configuration IEEE 802.11n Port 2 (40MHz)

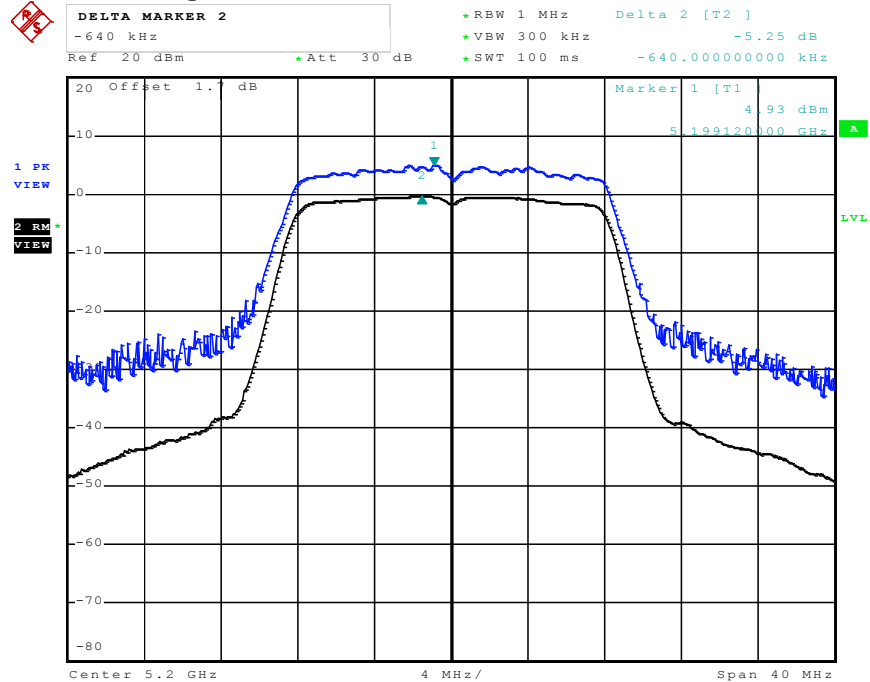
Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5190 MHz	6.79	13	Complies
5230 MHz	6.88	13	Complies
5270 MHz	6.79	13	Complies
5310 MHz	6.72	13	Complies
5510 MHz	6.81	13	Complies
5550 MHz	6.83	13	Complies
5670 MHz	6.97	13	Complies

For Single Chain:
Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5180 MHz



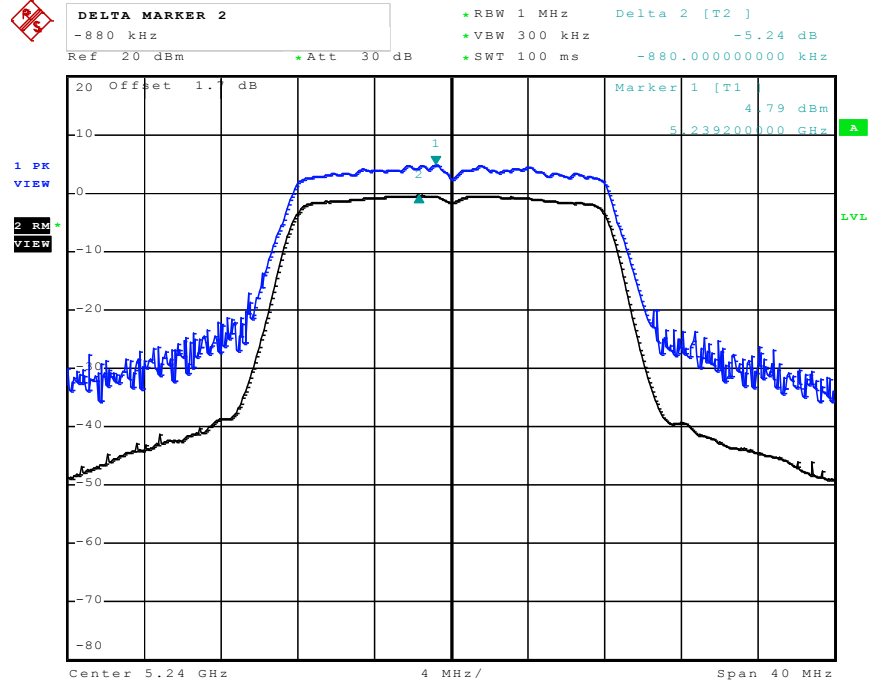
Date: 14.JAN.2012 11:59:04

Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5200 MHz



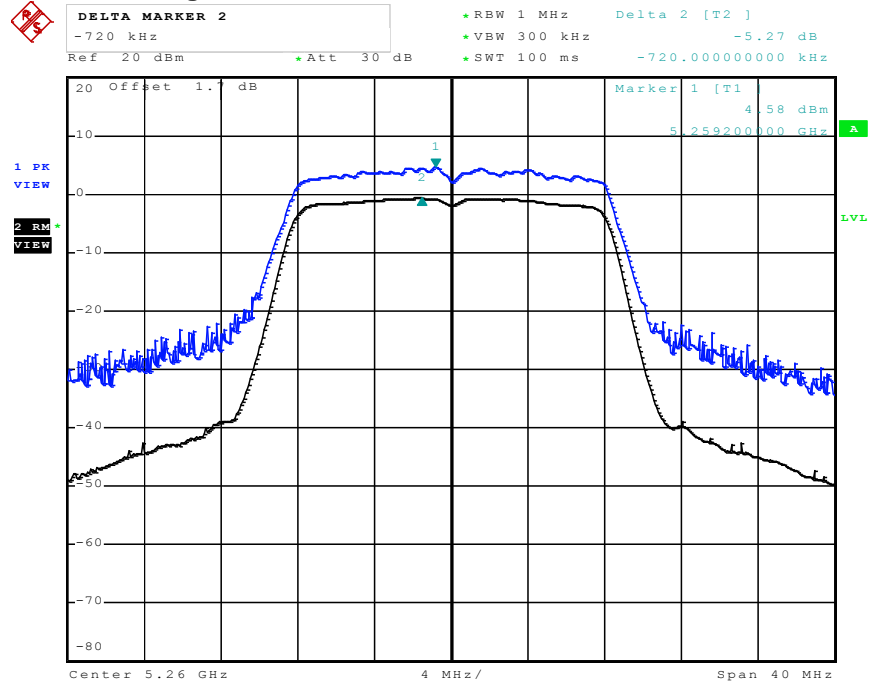
Date: 14.JAN.2012 12:20:52

Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5240 MHz



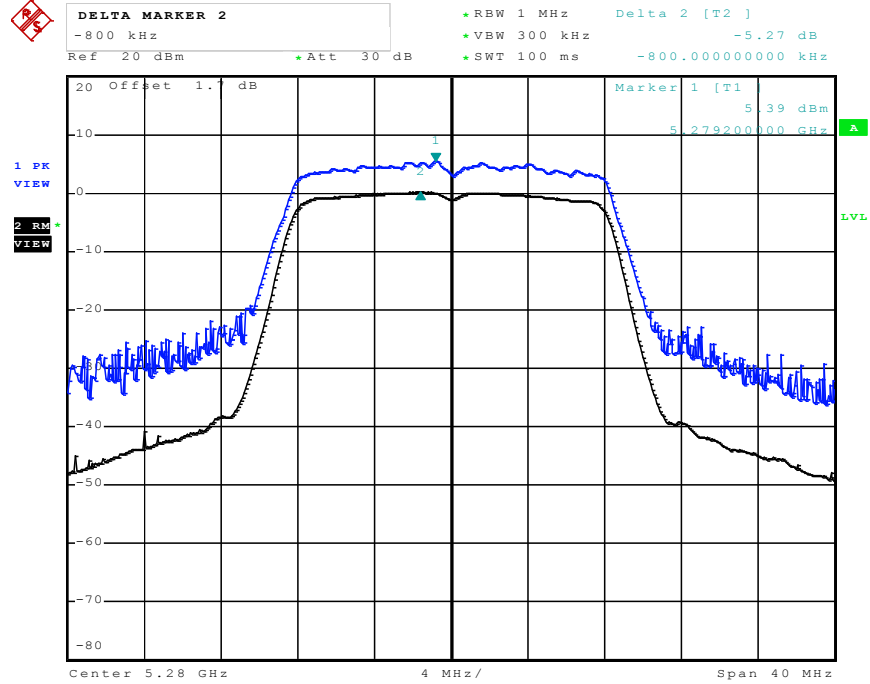
Date: 14.JAN.2012 12:33:49

Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5260 MHz



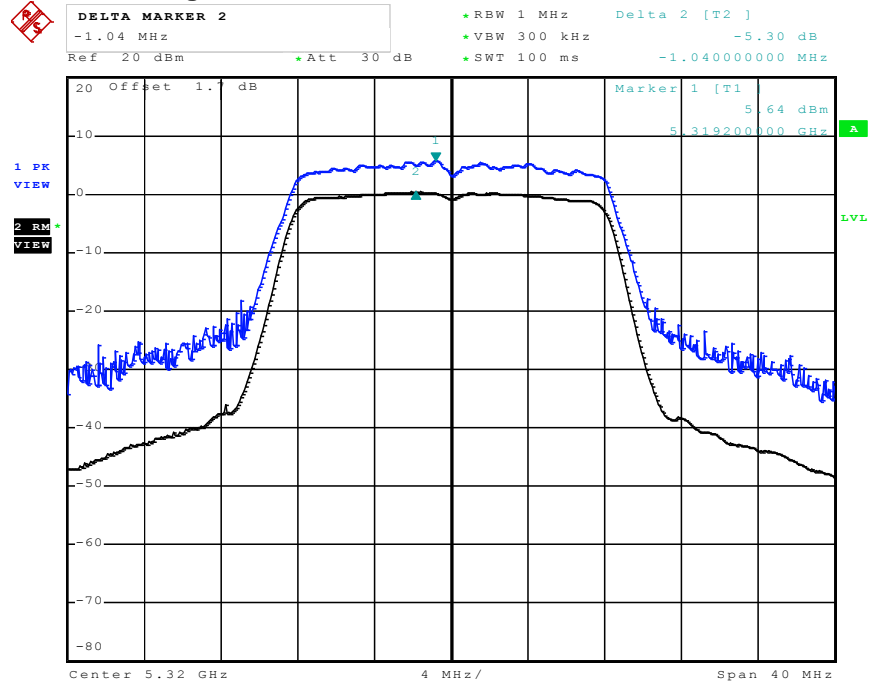
Date: 14.JAN.2012 12:49:54

Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5280 MHz



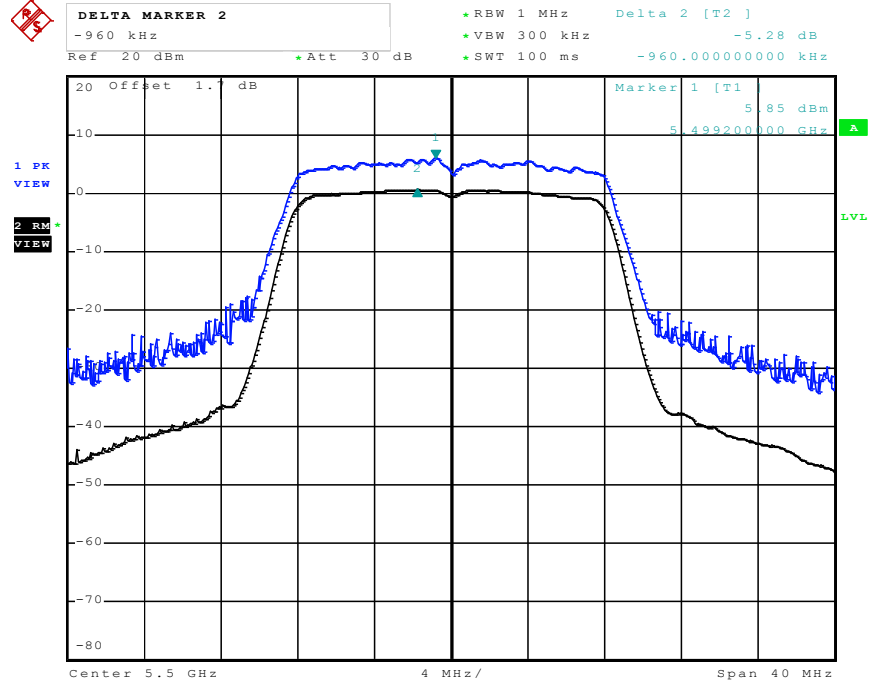
Date: 14.JAN.2012 13:02:23

Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5320 MHz



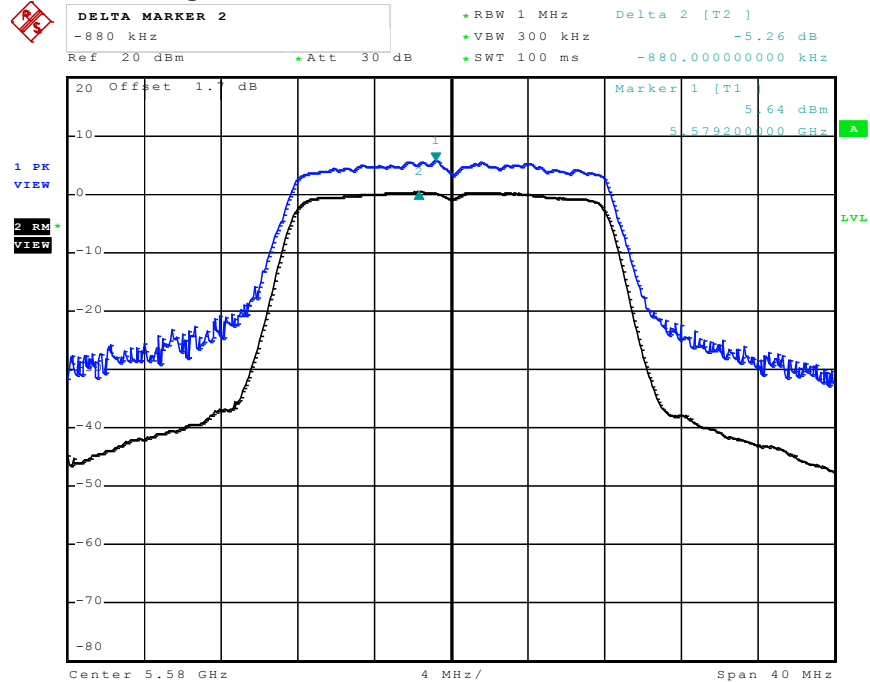
Date: 14.JAN.2012 13:14:37

Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5500 MHz



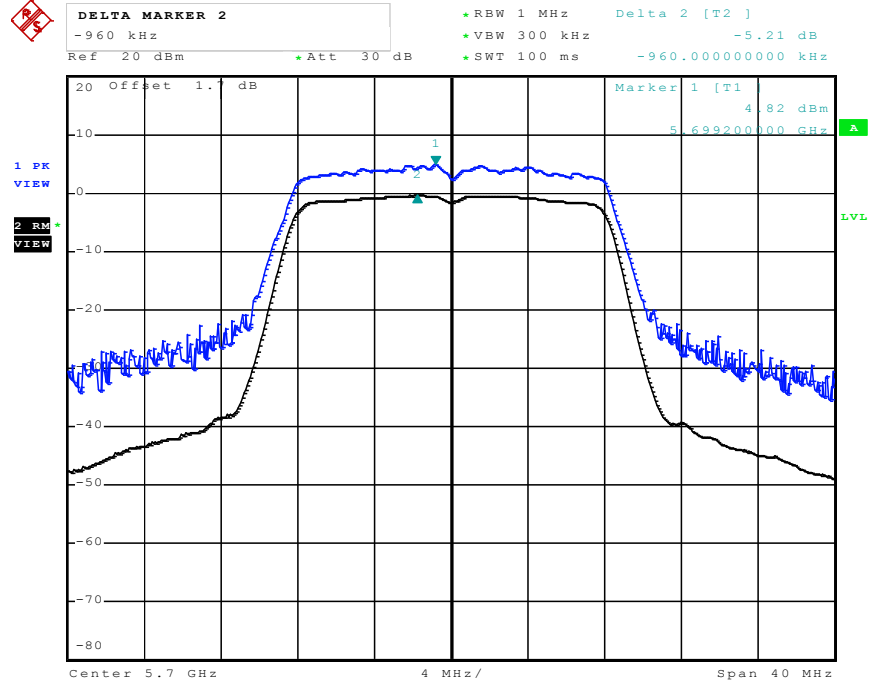
Date: 14.JAN.2012 13:27:16

Peak Excursion Plot on Configuration IEEE 802.11a Port 1/ 5580 MHz



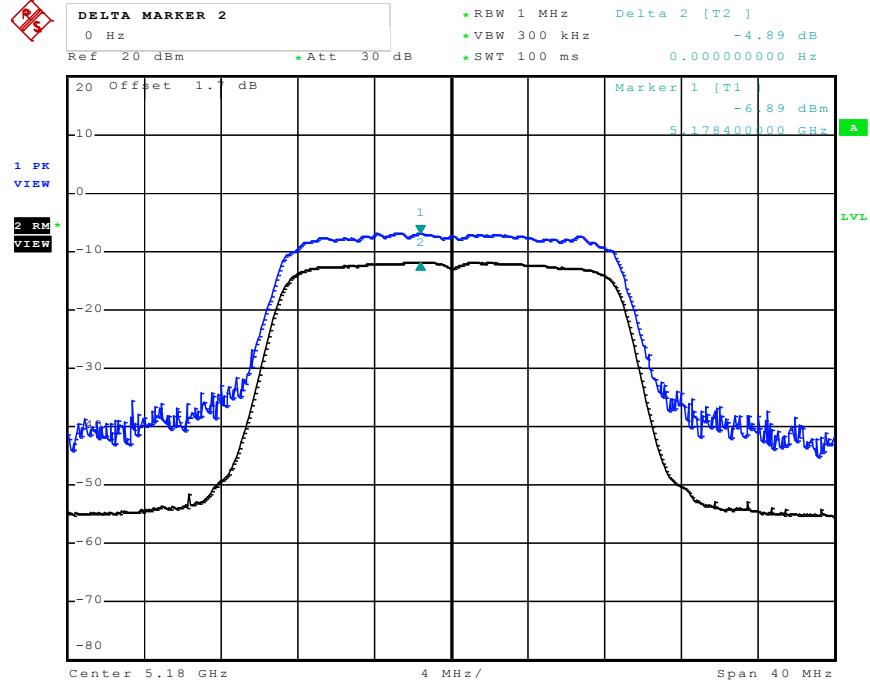
Date: 14.JAN.2012 13:42:45

Peak Excursion Plot on Configuration IEEE 802.11a Port 1/ 5700 MHz



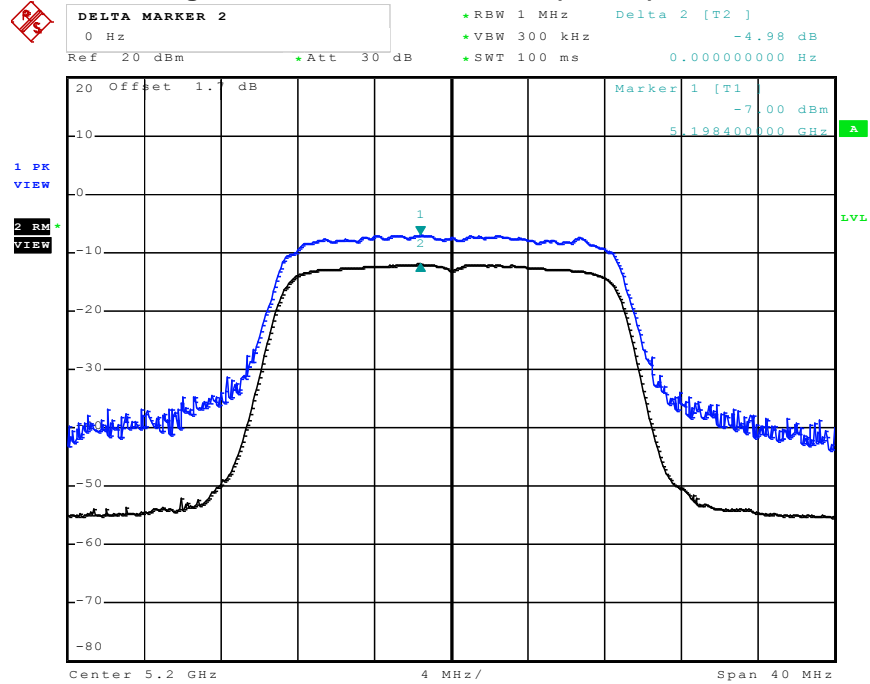
Date: 14.JAN.2012 13:56:39

For Two Chains:
Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5180 MHz



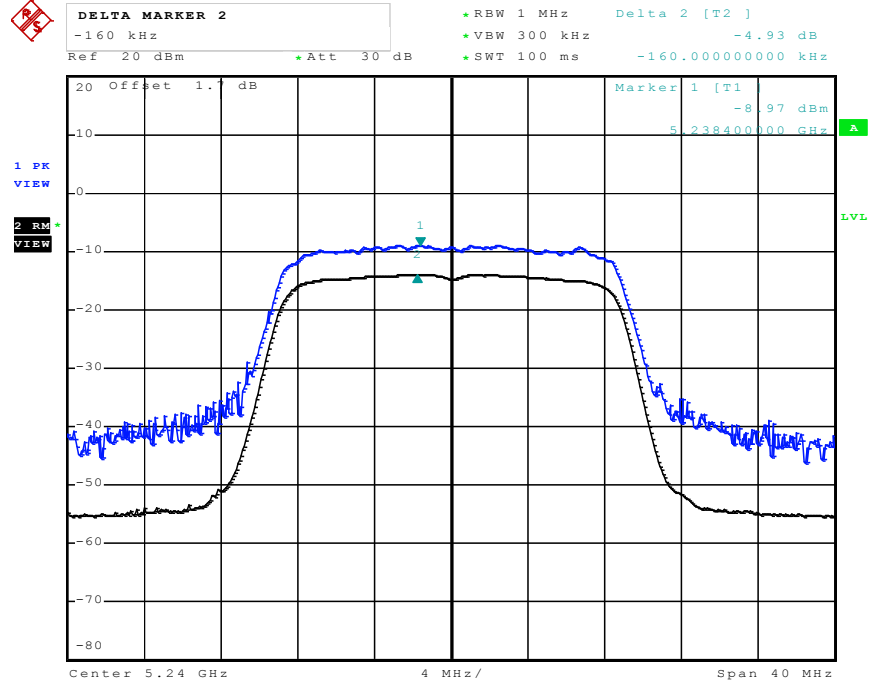
Date: 17.JAN.2012 14:45:20

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5200 MHz



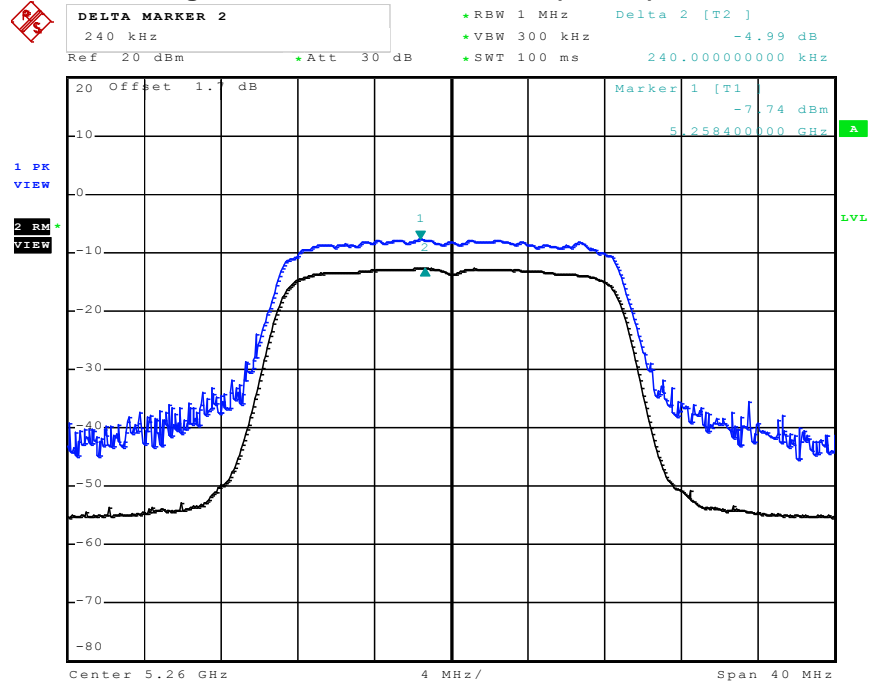
Date: 17.JAN.2012 15:18:28

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5240 MHz



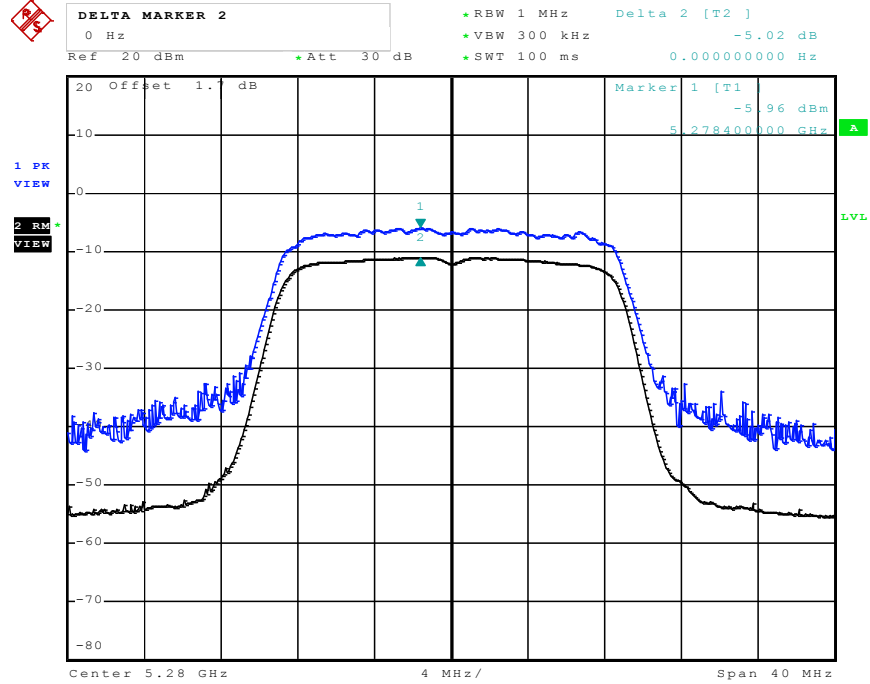
Date: 17.JAN.2012 15:32:00

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5260 MHz



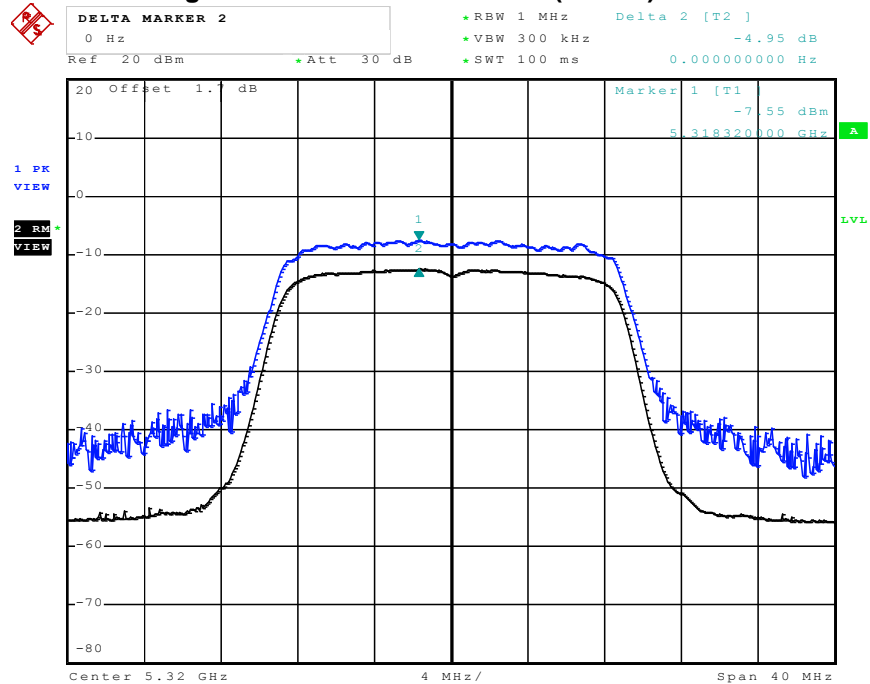
Date: 17.JAN.2012 16:10:15

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5280 MHz



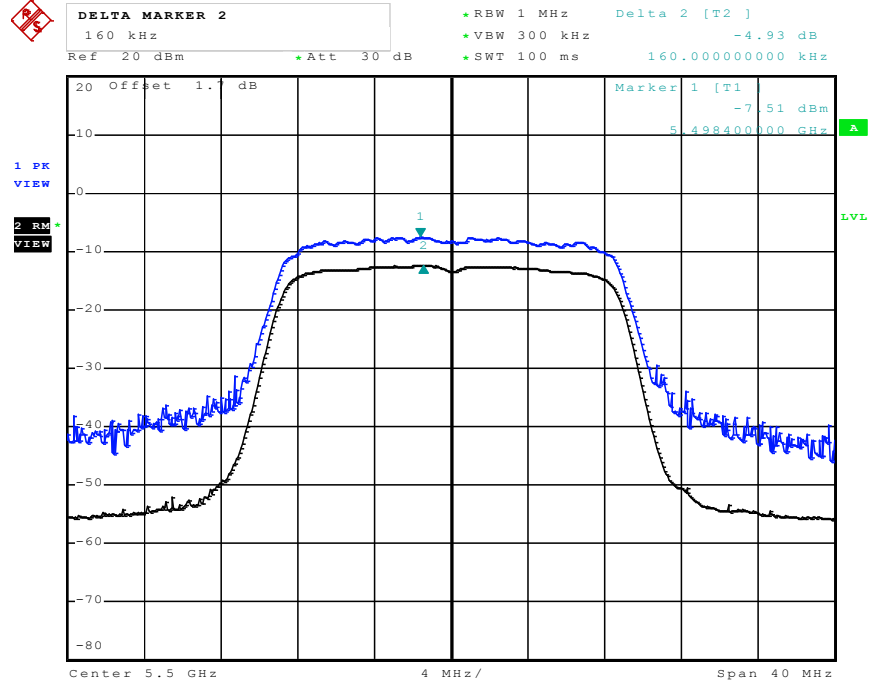
Date: 17.JAN.2012 16:52:02

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5320 MHz



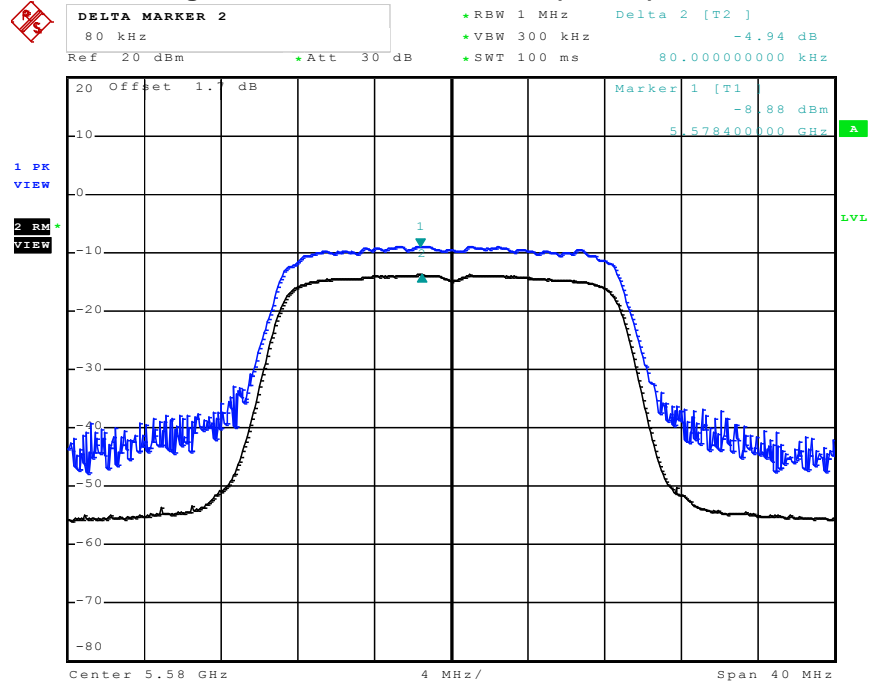
Date: 17.JAN.2012 17:17:39

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5500 MHz



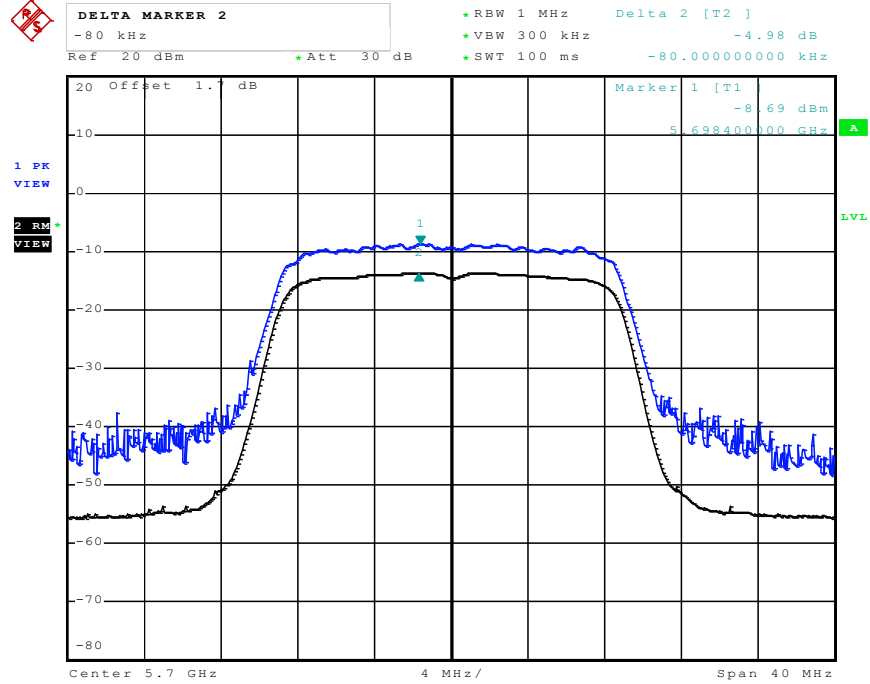
Date: 17.JAN.2012 17:26:42

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5580 MHz



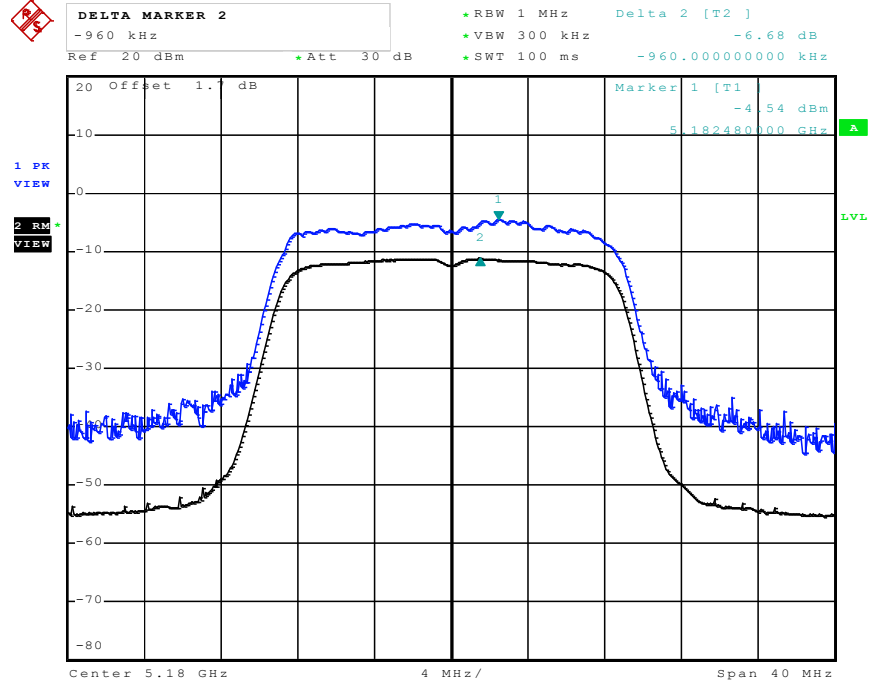
Date: 17.JAN.2012 17:49:48

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (20MHz) / 5700 MHz



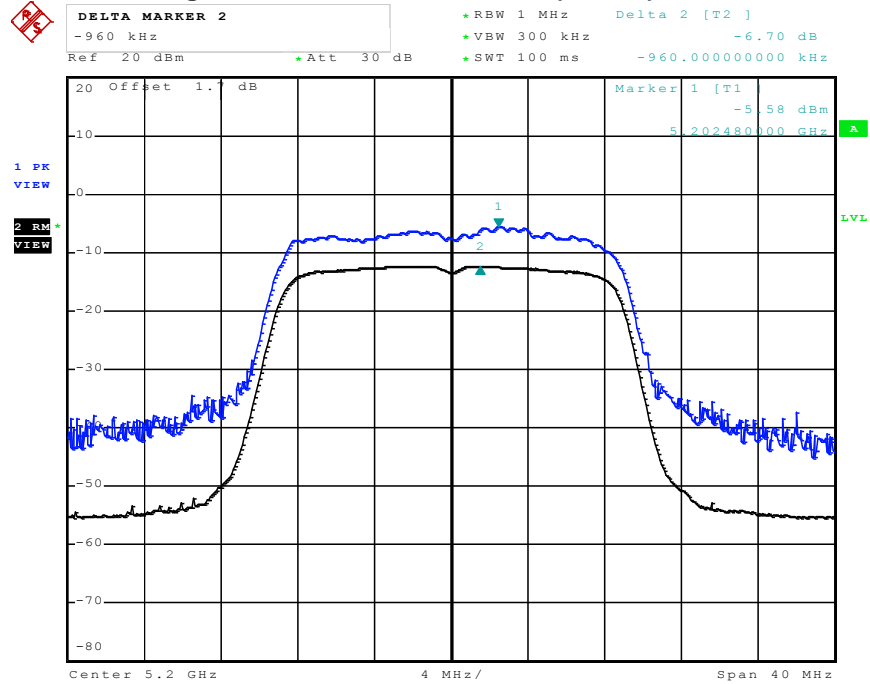
Date: 17.JAN.2012 17:59:39

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5180 MHz



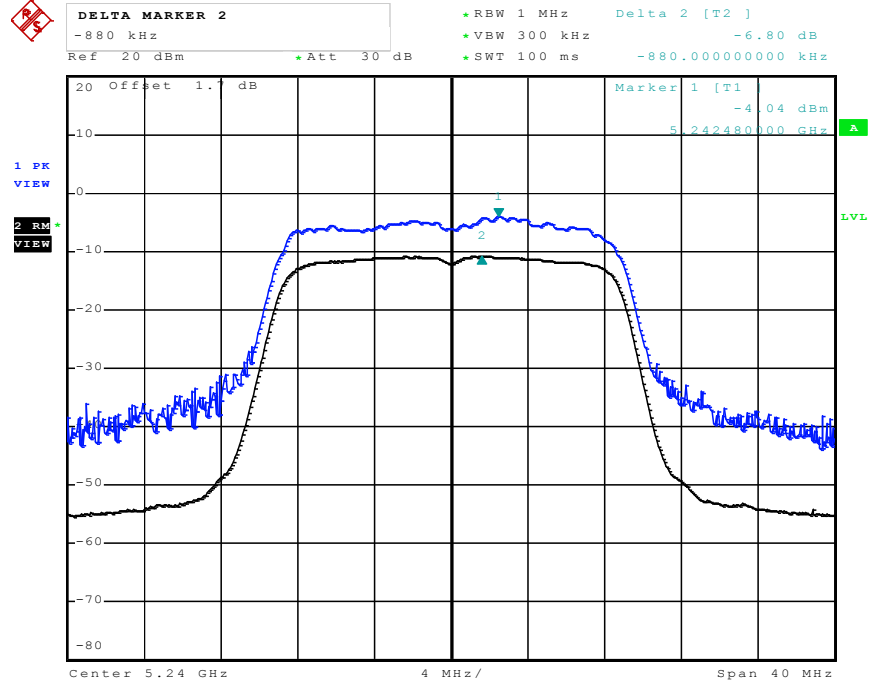
Date: 17. JAN. 2012 14:25:41

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5200 MHz



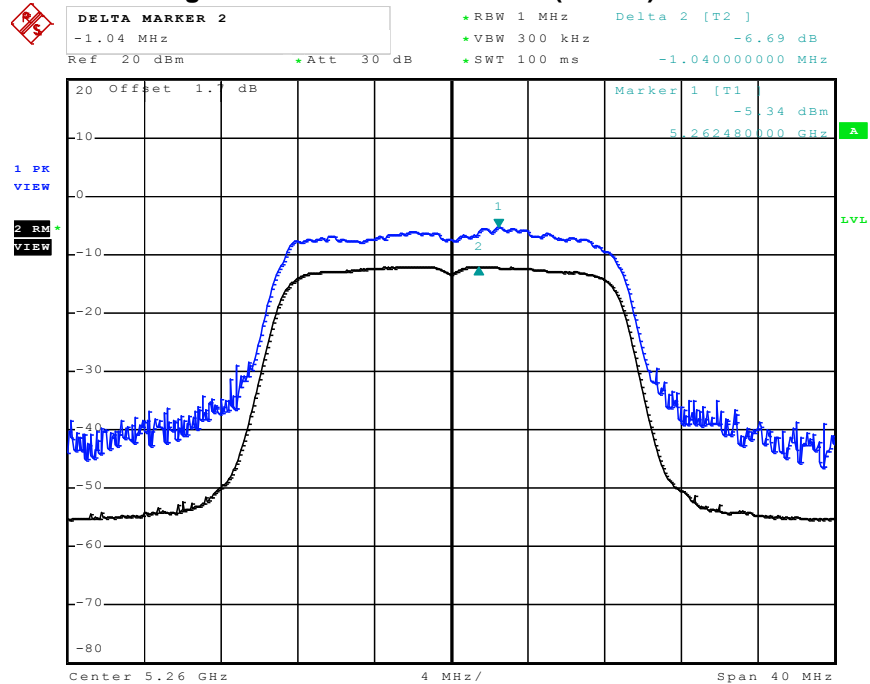
Date: 17. JAN. 2012 14:56:20

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5240 MHz



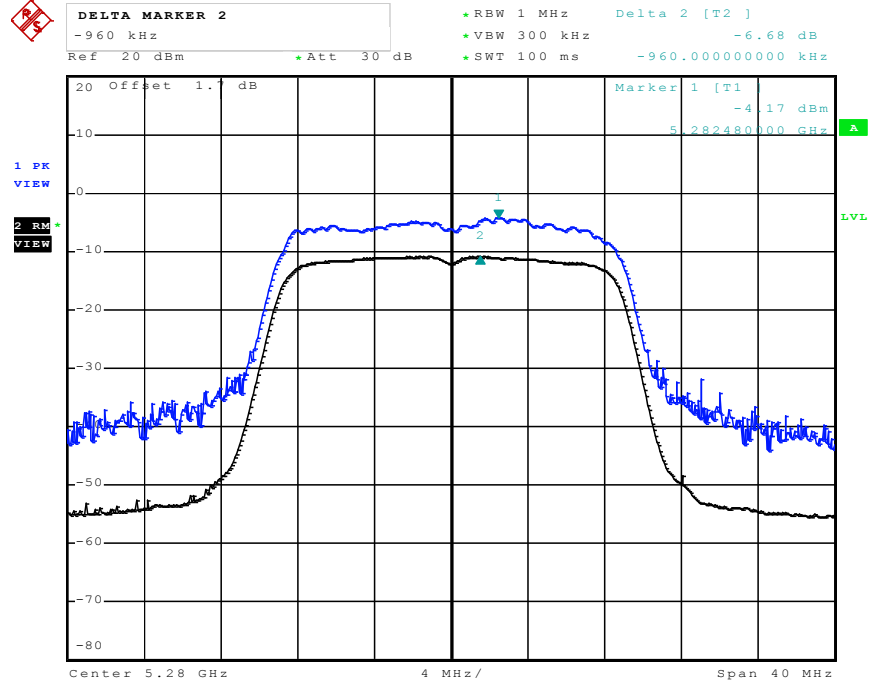
Date: 17.JAN.2012 15:42:32

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5260 MHz



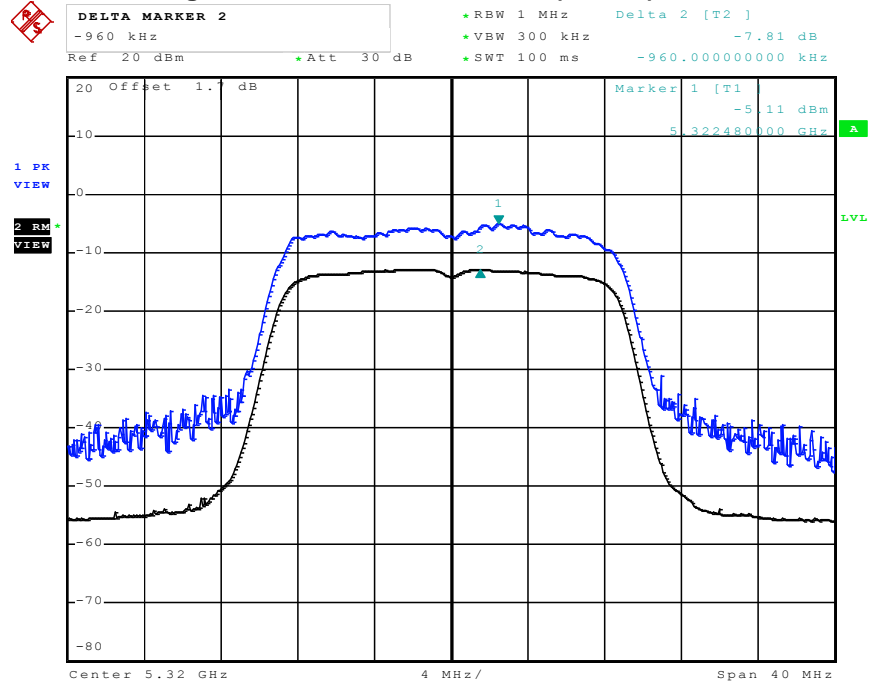
Date: 17.JAN.2012 15:54:10

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5280 MHz



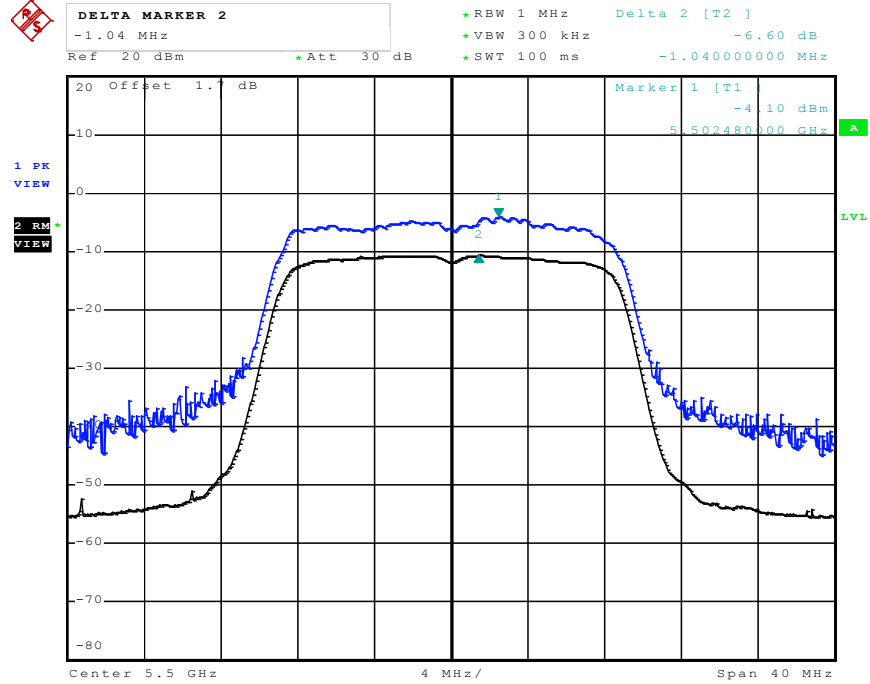
Date: 17.JAN.2012 17:02:51

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5320 MHz



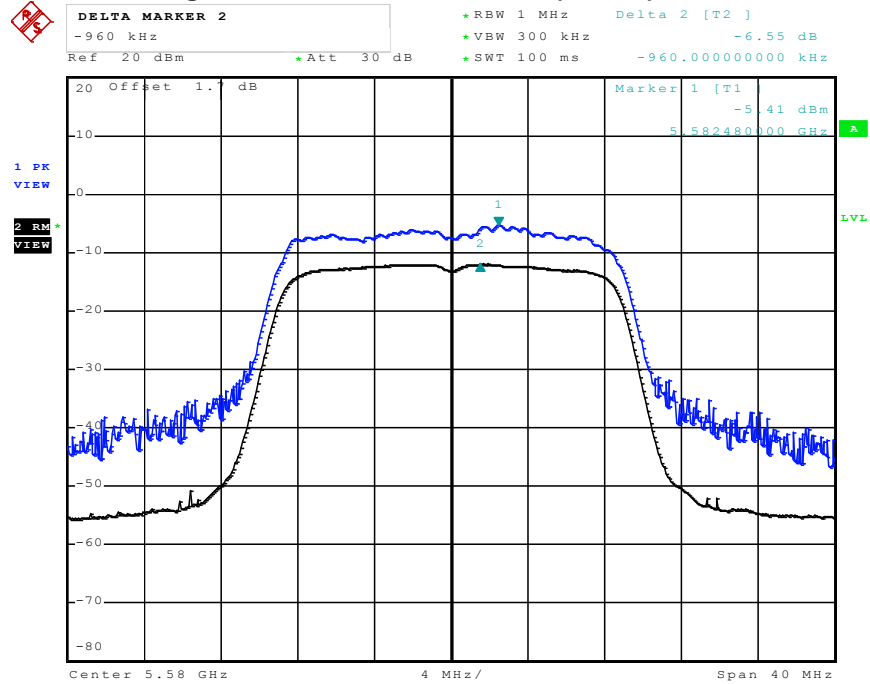
Date: 17.JAN.2012 17:10:09

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5500 MHz



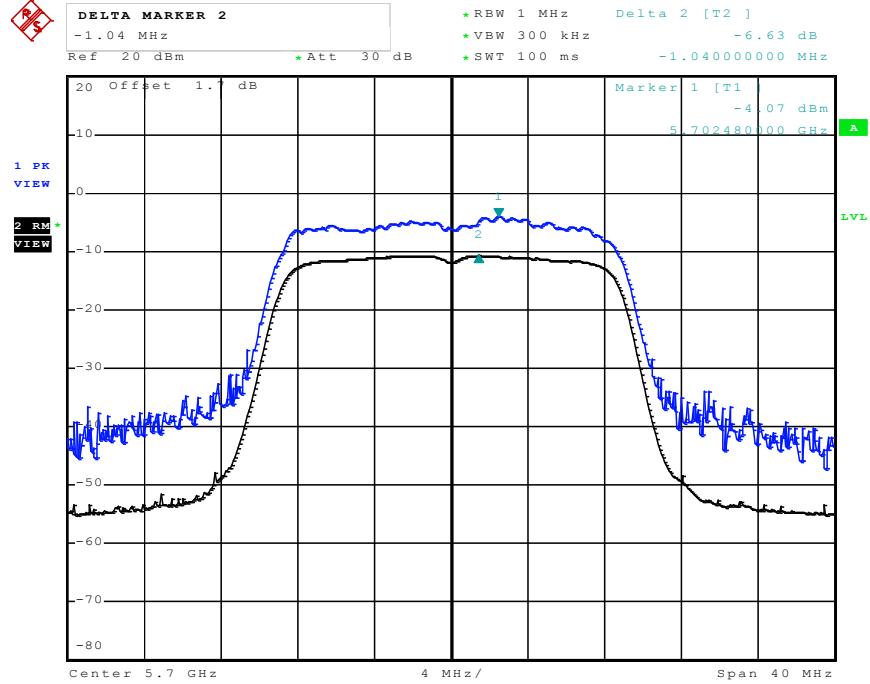
Date: 17.JAN.2012 17:35:03

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5580 MHz

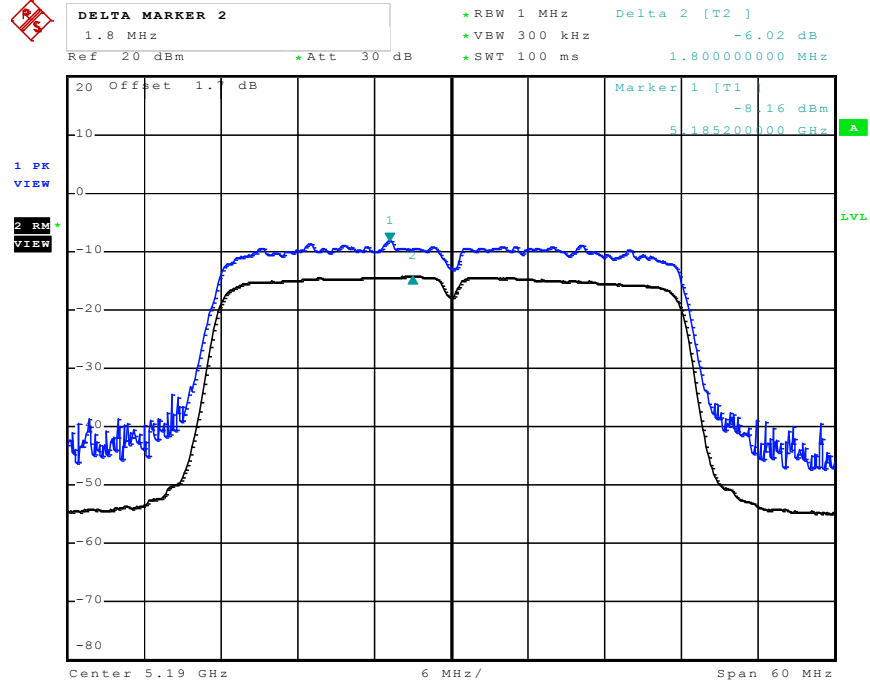


Date: 17.JAN.2012 17:41:32

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (20MHz) / 5700 MHz

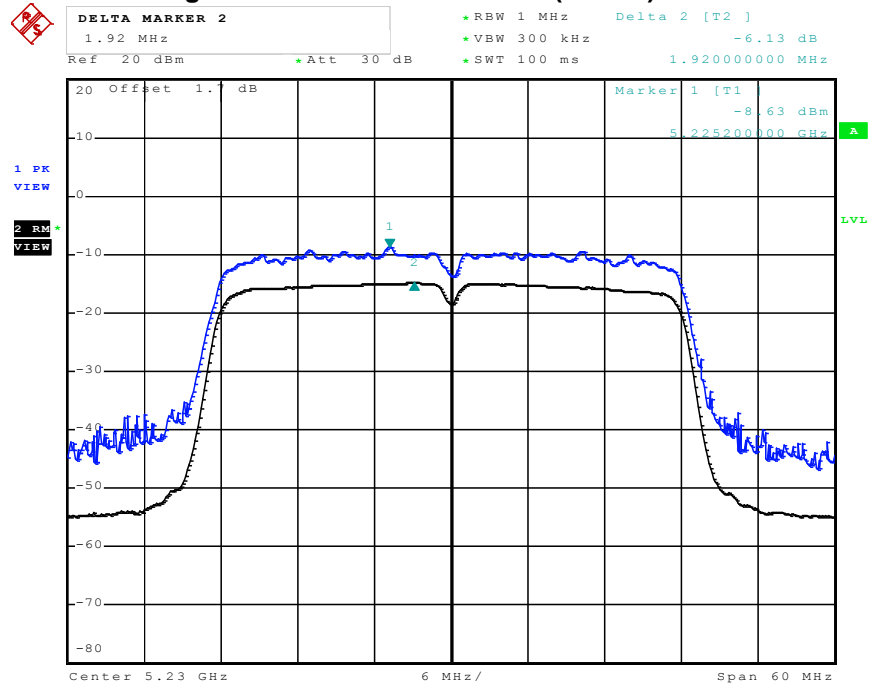


Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5190 MHz



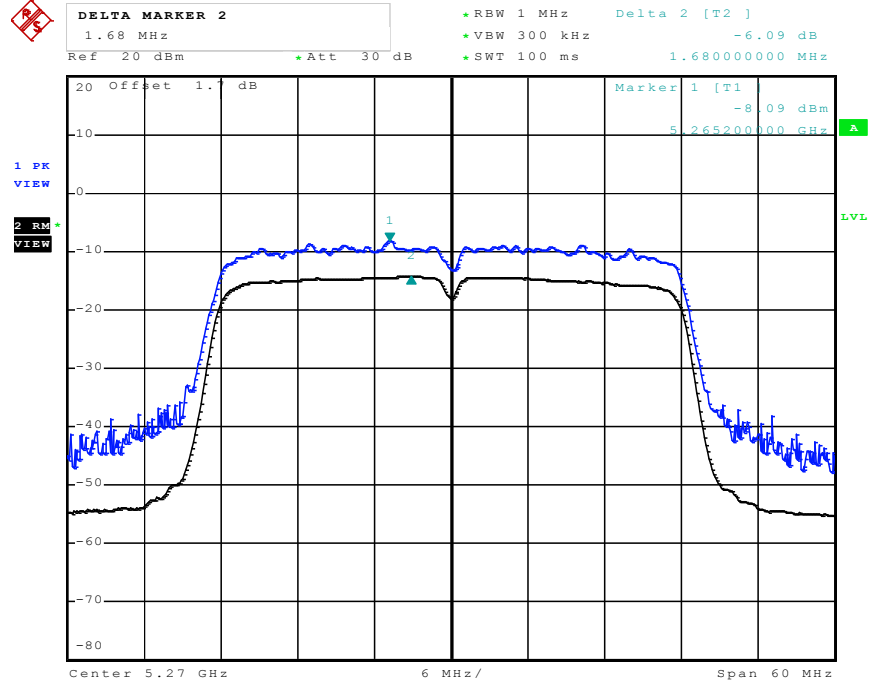
Date: 17.JAN.2012 18:44:15

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5230 MHz



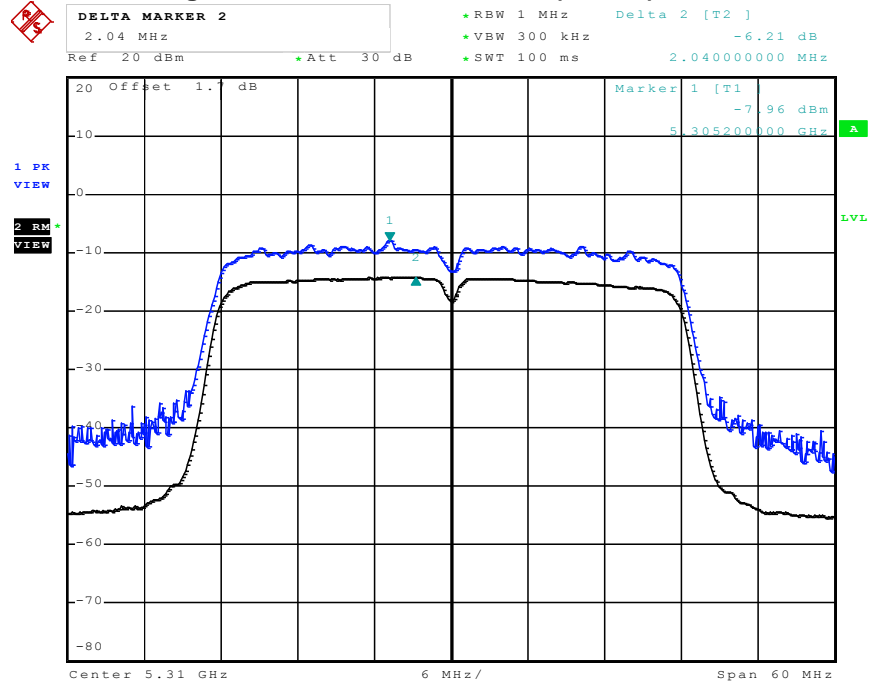
Date: 17.JAN.2012 18:52:44

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5270 MHz



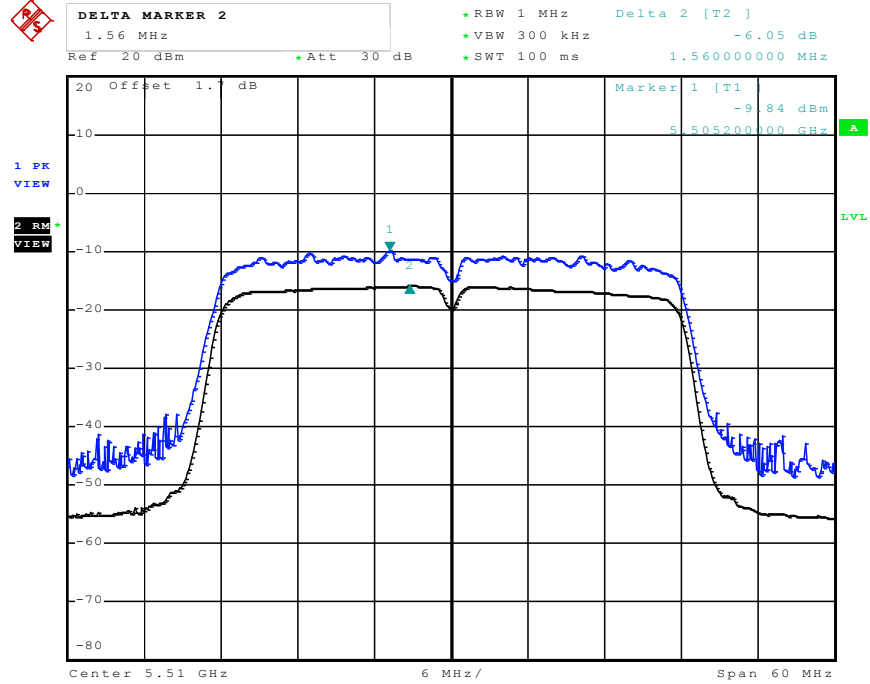
Date: 17. JAN. 2012 19:13:53

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5310 MHz



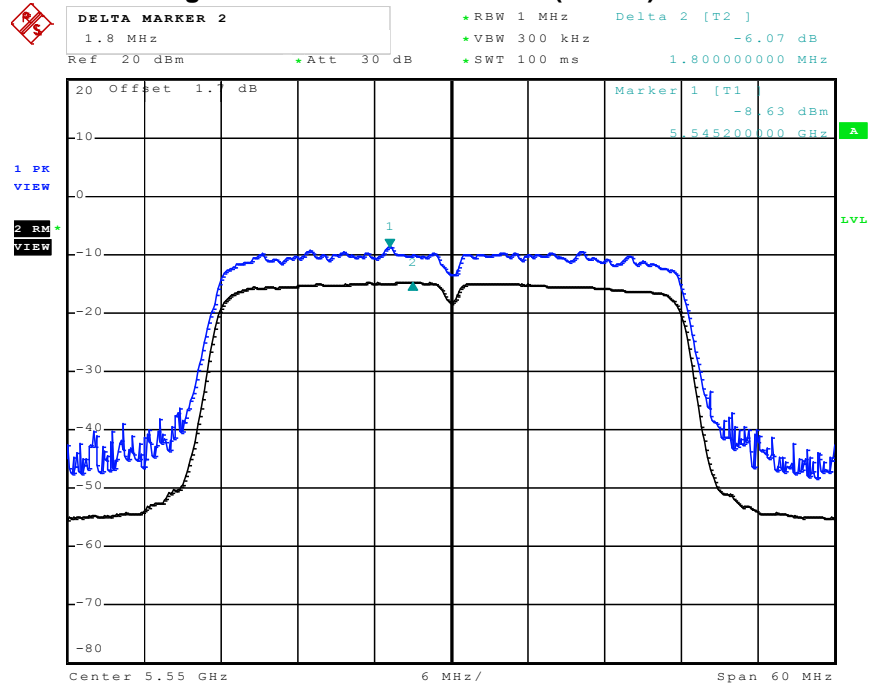
Date: 17. JAN. 2012 19:22:02

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5510 MHz



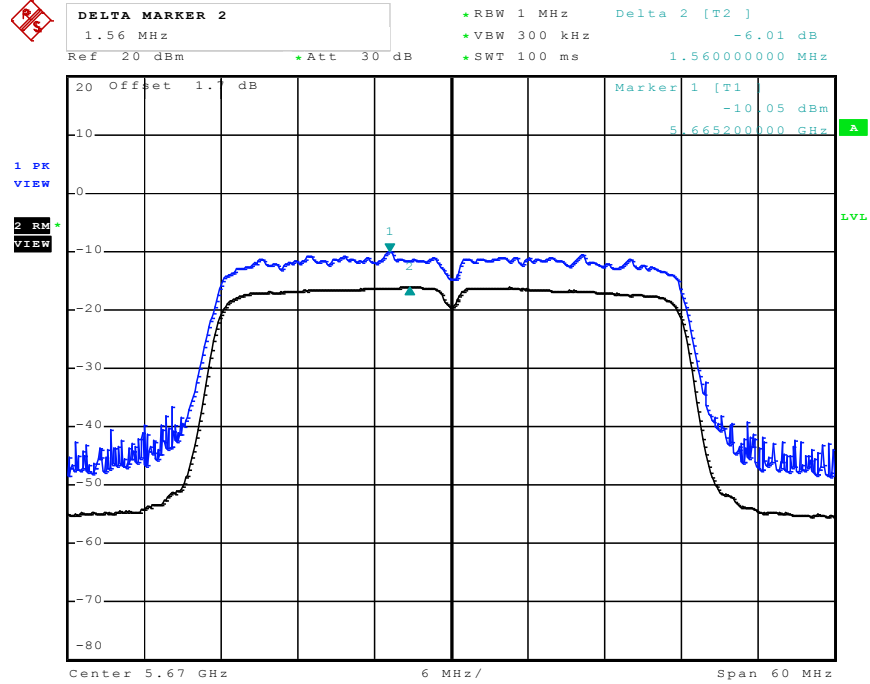
Date: 17.JAN.2012 19:44:57

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5550 MHz



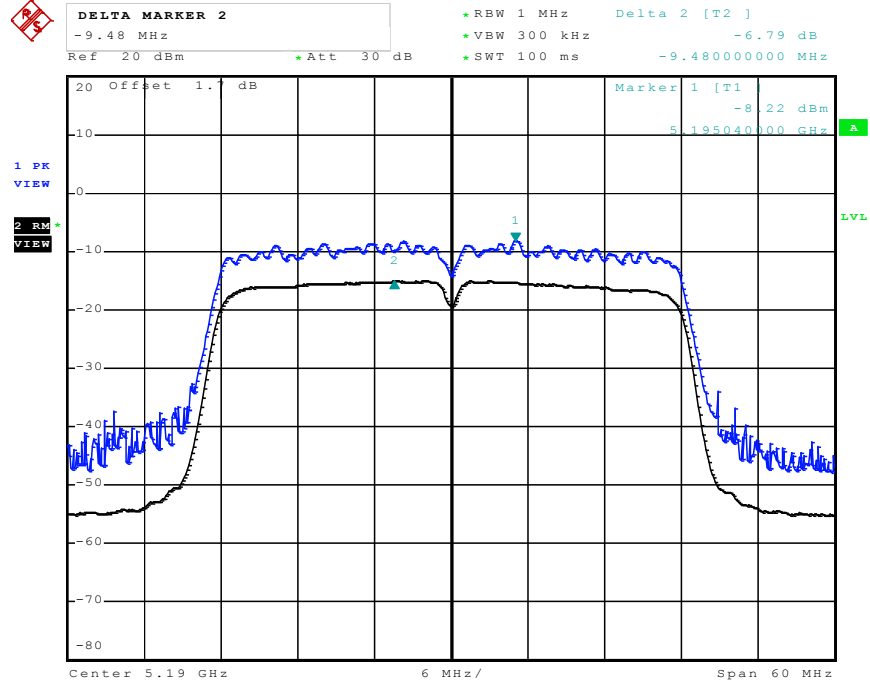
Date: 17.JAN.2012 19:52:00

Peak Excursion Plot on Configuration IEEE 802.11n Port 1 (40MHz) / 5670 MHz



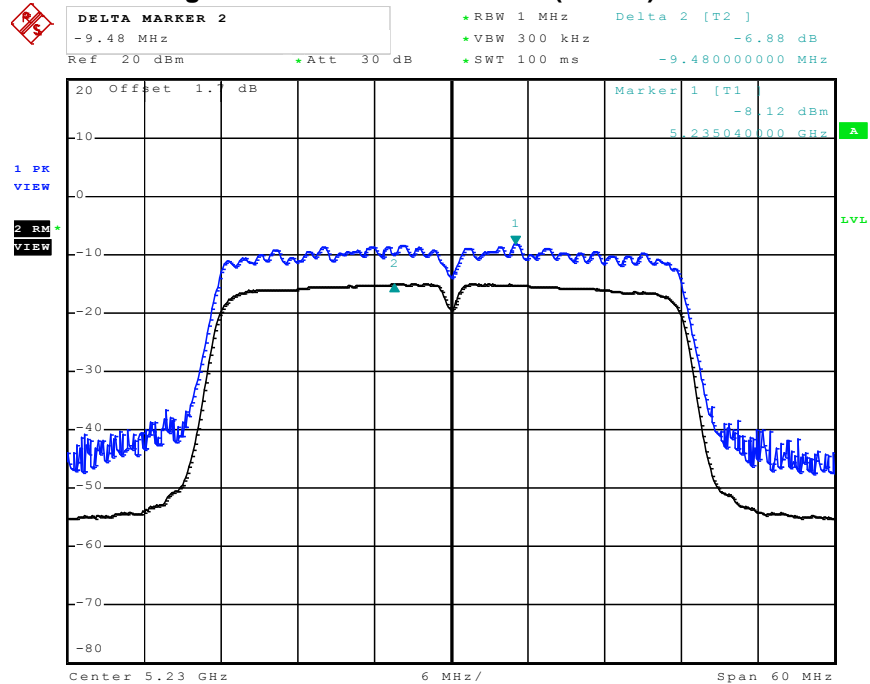
Date: 17.JAN.2012 20:11:01

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5190 MHz



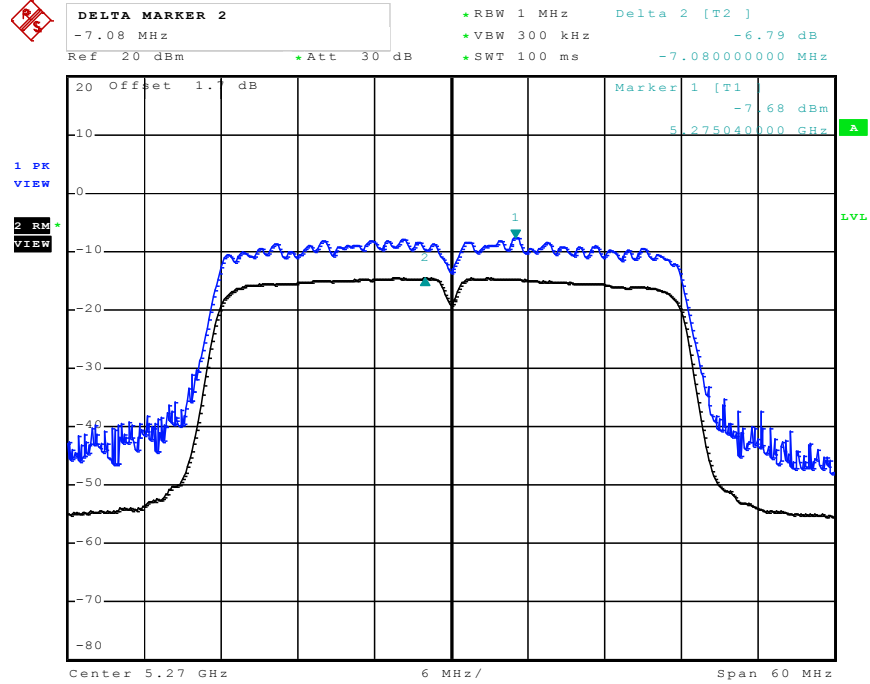
Date: 17. JAN. 2012 18:36:58

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5230 MHz



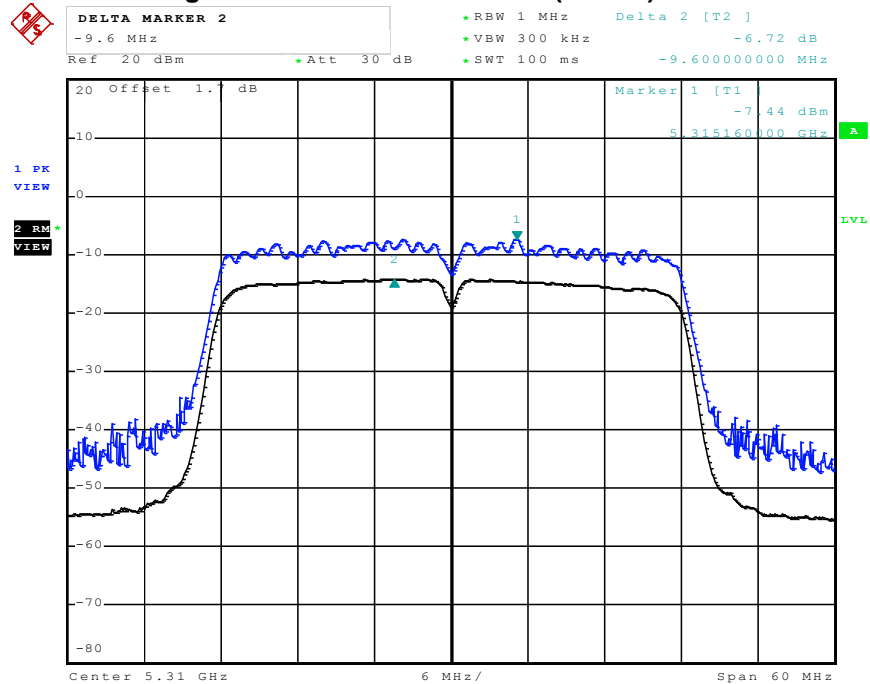
Date: 17. JAN. 2012 18:59:32

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5270 MHz



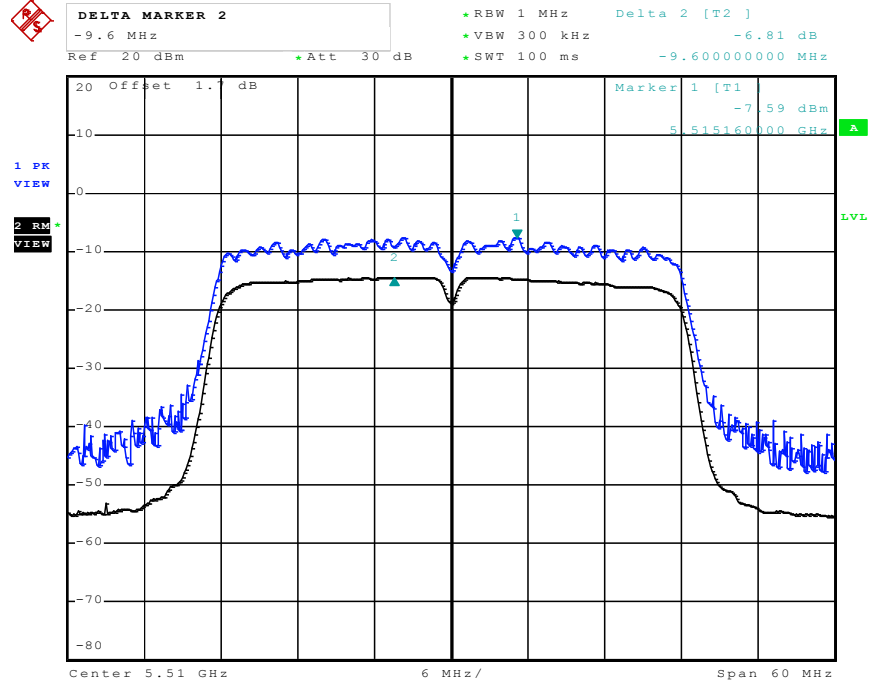
Date: 17. JAN. 2012 19:06:51

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5310 MHz



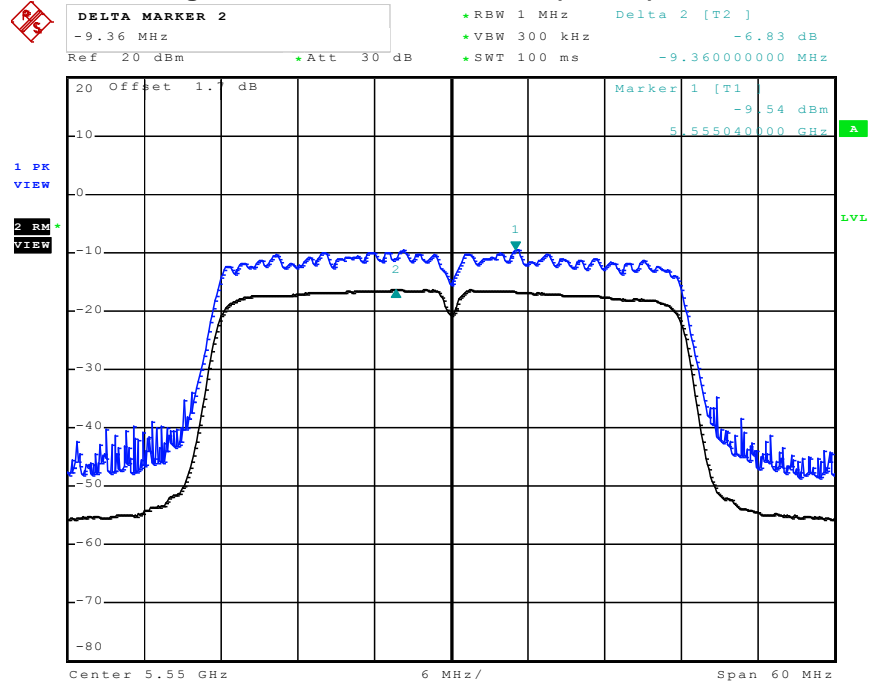
Date: 17. JAN. 2012 19:28:41

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5510 MHz



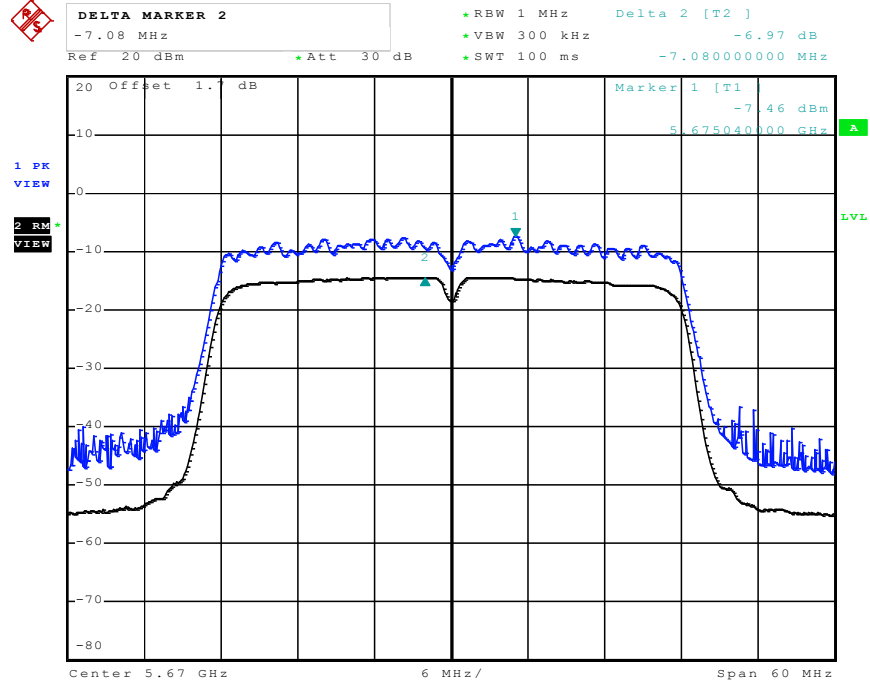
Date: 17. JAN. 2012 19:38:24

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5550 MHz



Date: 17. JAN. 2012 19:57:03

Peak Excursion Plot on Configuration IEEE 802.11n Port 2 (40MHz) / 5670 MHz



Date: 17.JAN.2012 20:03:57

3.6 Radiated Emissions Measurement

3.6.1 Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

3.6.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz z for peak

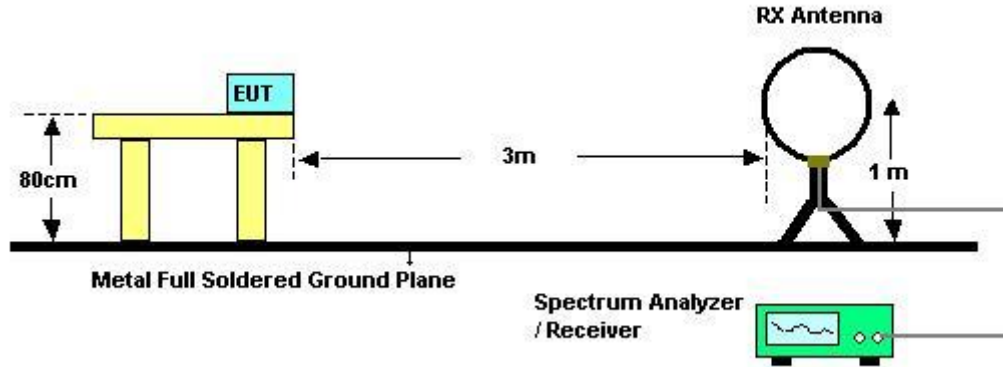
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.6.3 Test Procedures

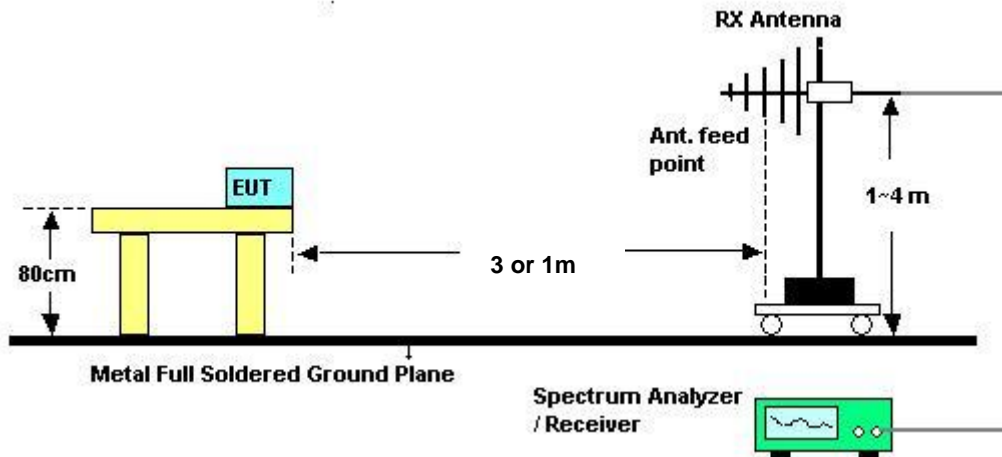
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.6.4 Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
 Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);
 Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.6.5 Test Deviation

There is no deviation with the original standard.

3.6.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.6.7 Results of Radiated Emissions (9kHz~30MHz)

Final Test Date	Jan. 17, 2012	Test Site No.	03CH02-HY
Temperature	20°C	Humidity	66%
Test Engineer	Streak		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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

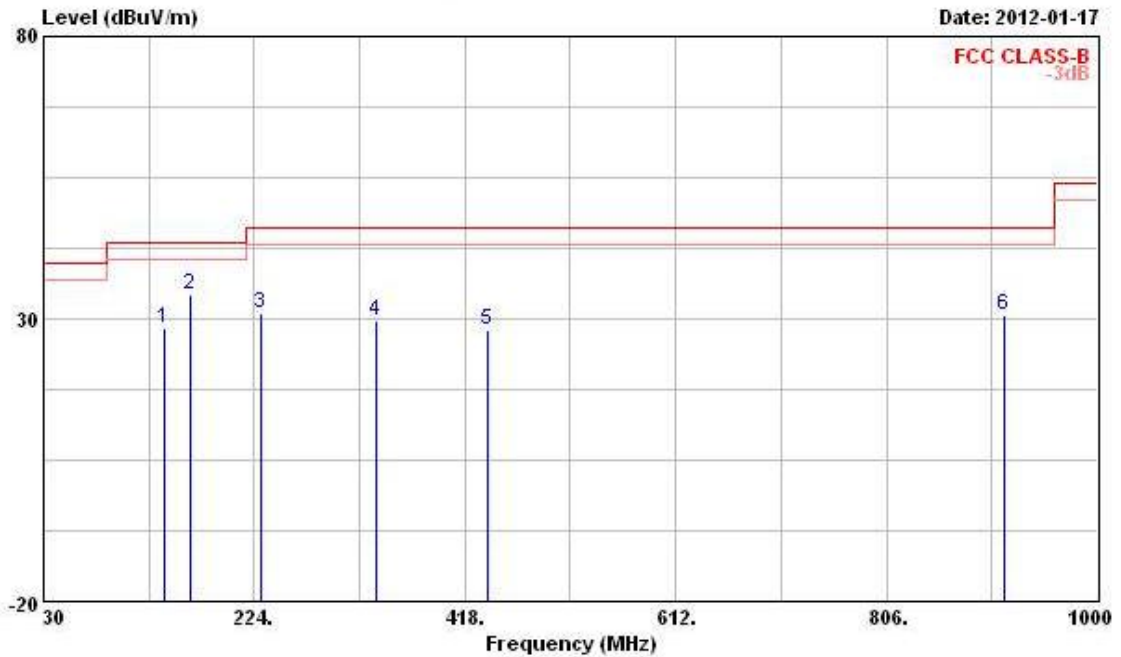
Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

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

3.6.8 Results of Radiated Emissions (30MHz~1GHz)

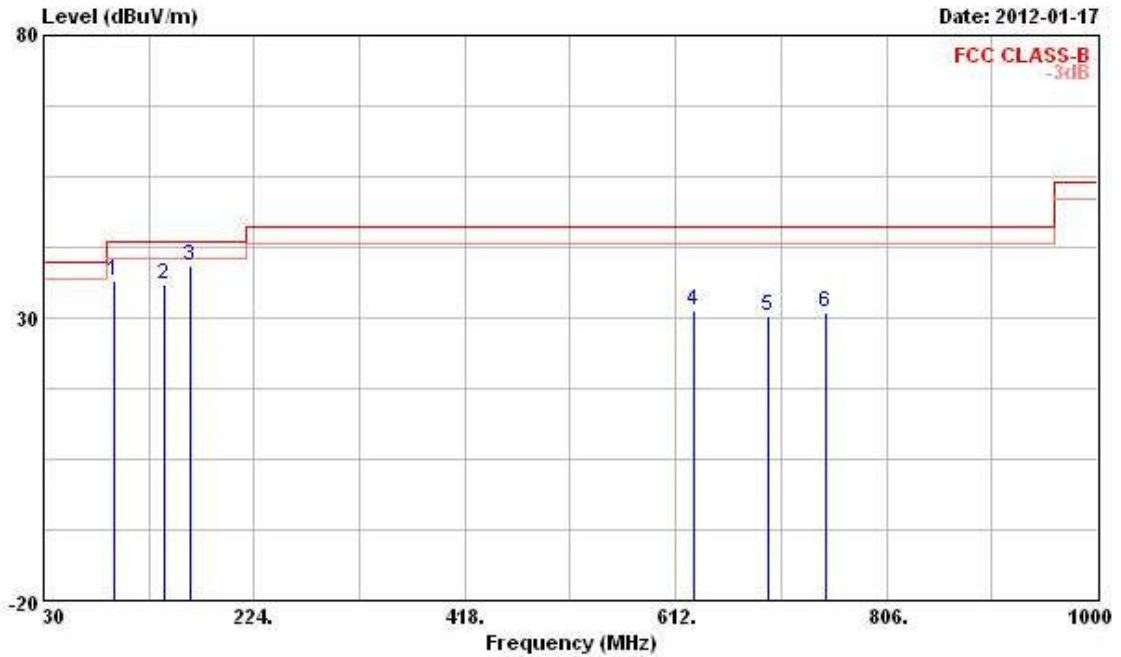
Final Test Date	Jan. 17, 2012	Test Site No.	03CH02-HY
Temperature	20°C	Humidity	66%
Test Engineer	Streak	Configurations	Normal Mode

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	141.550	28.30	-15.20	43.50	42.19	11.78	2.00	27.67	Peak	---	---
2	164.830	34.30	-9.20	43.50	49.38	10.34	2.14	27.56	Peak	---	---
3	230.790	31.13	-14.87	46.00	43.45	12.37	2.64	27.33	Peak	---	---
4	335.550	29.60	-16.40	46.00	39.63	14.26	3.12	27.41	Peak	---	---
5	439.340	28.13	-17.87	46.00	36.61	16.06	3.53	28.07	Peak	---	---
6	913.670	30.72	-15.28	46.00	32.57	20.37	5.33	27.55	Peak	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	94.990	36.51	-6.99	43.50	52.42	10.34	1.60	27.85	Peak	---	---
2	141.550	36.03	-7.47	43.50	49.92	11.78	2.00	27.67	Peak	---	---
3	164.830	39.13	-4.37	43.50	54.21	10.34	2.14	27.56	Peak	---	---
4	629.460	31.19	-14.81	46.00	35.48	19.79	4.33	28.41	Peak	---	---
5	696.390	30.35	-15.65	46.00	35.22	18.89	4.53	28.29	Peak	---	---
6	749.740	31.09	-14.91	46.00	34.94	19.55	4.71	28.11	Peak	---	---

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.