FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment	:	**802.11n,Dual Band, Wireless LAN PCI Express Half Mini Card**
Model No.	:	**WPEA-121N**
Brand Name	:	**Sparklan**
Filing Type	:	**New Application**
Applicant	:	**SparkLAN Communications, Inc**
Manufacturer		8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan.
FCC ID	:	**RYK-WPEA-121N**
Received Date	:	Mar. 22, 2011
Final Test Date	:	Jun. 09, 2011

Statement

Test result included is only for the 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.

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History of This Test Report

Original Issue Date: Jun. 29, 2011
Report No.: FR131667-01AN
□ No additional attachment.
■ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description
FR131667AN	May 02, 2011	Original
FR131667-01AN	Jun. 29, 2011	Additional original filing power.

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment	:	802.11n,Dual Band, Wireless LAN PCI Express Half Mini Card
Model No.	:	WPEA-121N
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 Mar. 22, 2011 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 / Vice 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	12.86 dB
3.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
3.3	15.407(a)	Maximum Conducted Output Power	Complies	3.31 dB
3.4	15.407(a)	Power Spectral Density	Complies	1.27 dB
3.5	15.407(a)	Peak Excursion	Complies	5.26 dB
3.6	15.407(b)	Radiated Emissions	Complies	1.10 dB
3.7	15.407(b)	Band Edge Emissions	Complies	1.00 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	$\pm 8.5\times10^{-8}$	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℃	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 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%)	802.11a: Band 1: 17.71 MHz ; Band 2: 23.70 MHz ; Band 3: 20.60 MHz 802.11n MCS 8 (20MHz) : Band 1: 18.40 MHz ; Band 2: 18.90 MHz 802.11n MCS 8 (20MHz) : Band 3: 21.90 MHz 802.11n MCS 8 (40MHz) : Band 1: 36.80 MHz ; Band 2: 39.20 MHz 802.11n MCS 8 (40MHz) : Band 3: 42.60 MHz
Conducted Output Power	802.11a: Band 1: 12.79 dBm ; Band 2: 19.91 dBm ; Band 3: 19.31 dBm 802.11n MCS 8 (20MHz) : Band 1: 13.24 dBm ; Band 2: 17.89 dBm ; 802.11n MCS 8 (20MHz) : Band 3: 19.28 dBm 802.11n MCS 8 (40MHz) : Band 1: 13.69 dBm ; Band 2: 19.32 dBm ; 802.11n MCS 8 (40MHz) : Band 3: 18.46 dBm

2.2 Table for Filed Antenna

Antenna & Bandwidth

Antenna Mode	Two Chain	
Bandwidth Mode	20 MHz	40 MHz
802.11a (5150~5250MHz)	V	X
802.11a (5250~5350MHz)	V	X
802.11a (5470~5725MHz)	V	X
5G 802.11n (5150~5250MHz)	V	V
5G 802.11n (5250~5350MHz)	V	V
5G 802.11n (5470~5725MHz)	V	V

Ant.	Antenna Type	Connector	Gain (dBi)	Remark
A	Dipole Antenna	Reversed-SMA	2.00	TX / RX
B	Dipole Antenna	Reversed-SMA	2.00	TX / RX

Note:
1. IEEE 802.11a/n used two antennas are for signal transmitting and receiving. (2T2R Spatial Multiplexing MIMO configuration)
2. Directional gain = GANT + 10 log(N) dBi = 2 + 10 log(2) = 5 dBi

IEEE 802.11n Modulation Scheme

MCS Index	Nss	Modulation	R	NBPSC	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
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

2.3 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 Radiated Emission Below 1GHz	Normal Mode	Auto	-	-
Max. Conducted Output Power 26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	11a Band 1~3/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140	A/B A+B
	11n Band 1~3/BPSK MCS 8 (20MHz)	13Mbps	36/40/48/52/56 /64/100/116/140	
	11n Band 1~3/BPSK MCS 8 (40MHz)	27Mbps	38/46/54/62/102/110/134	
Radiated Emission Above 1GHz	11a Band 1~3/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 8 (20MHz)	13Mbps	36/40/48/52/56 /64/100/116/140	A+B
	11n Band 1~3/BPSK MCS 8 (40MHz)	27Mbps	38/46/54/62/102/110/134	
Band Edge Emission	11a Band 1~3/BPSK	6Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 8 (20MHz)	13Mbps	36/40/48/52/56 /64/100/116/140	A+B
	11n Band 1~3/BPSK MCS 8 (40MHz)	27Mbps	38/46/54/62/102/110/134	

2.5 Table for Testing Locations

Test Site No.	Site Category	Location
CO01-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
Notebook	DELL	PP20L	DoC
(USB) Mouse	Microsoft	1004	DoC
iPod nano	Apple	A1051	N/A
Wireless AP (Remote workstation)	D-Link	DNS-G120	N/A

** The EUT tested with test fixture in this report.
** The wireless AP supporting unit only tested by AC power conducted emission.
** For the radiated emissions only tested by using notebook.

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	ART2-GUI		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	10/10	10/10	10/10
Frequency	5260 MHz	5280 MHz	5320 MHz
IEEE 802.11a	16.5/16.5	15.5/15.5	13.5/13.5
Frequency	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11a	16/16	16/16	16/16

For Two Chain:
Power Parameters of IEEE 802.11n (20MHz)

Test Software Version	ART2-GUI		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11n	10/10	10/10	9.5/95
Frequency	5260 MHz	5280 MHz	5320 MHz
IEEE 802.11n	16/16	15/15	13.5/13.5
Frequency	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11n	16/16	16/16	16/16

Power Parameters of IEEE 802.11n (40MHz)

Test Software Version	ART2-GUI		
Frequency	5190 MHz	5230 MHz	5270 MHz
IEEE 802.11n	10/10	11.5/11.5	17/17
Frequency	5310 MHz	5510 MHz	5550 MHz
IEEE 802.11n	10/10	10/10	16/16
Frequency	5670 MHz		
IEEE 802.11n	16/16		

2.8 EUT Operation during Test

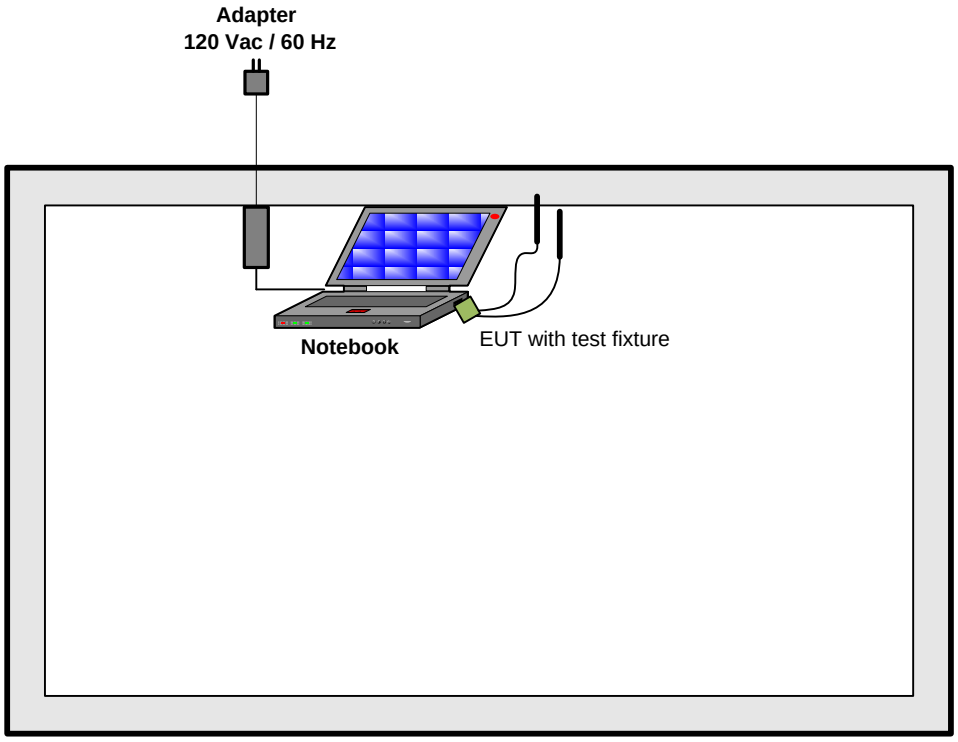
An executive program, “EMCTEST.EXE” under Win XP, which generates a complete line of continuously repeating "H" pattern was used as the test software.
The program was executed as follows :
a. Turn on the power of all equipment.
b. The NB sends "H" messages to the panel and displays "H" patterns on the screen.

At the same time, the following programs were executed:
- Executed "WiFi" to link with the remote workstation to receive and transmit data.
- Executed "ping" to link with the remote workstation to receive and transmit data by WLAN.
- Executed “ART2-GUI” to keep transmitting signals at fixed frequency. (Only for radio tested.)

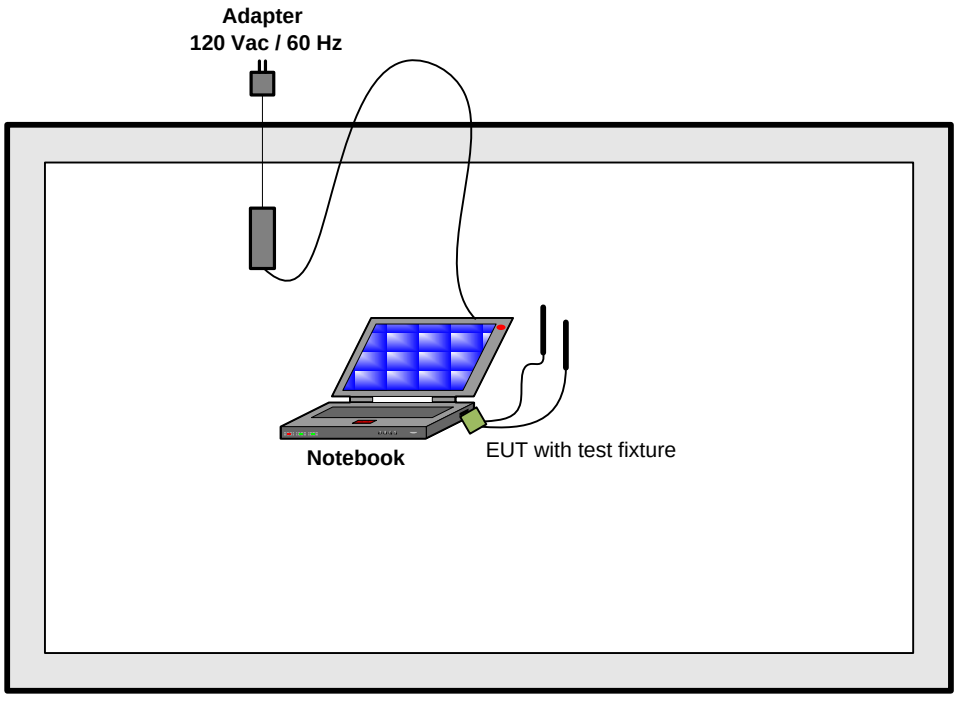
2.9 Test Configuration

2.9.1 Radiation Emissions Test Configuration

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

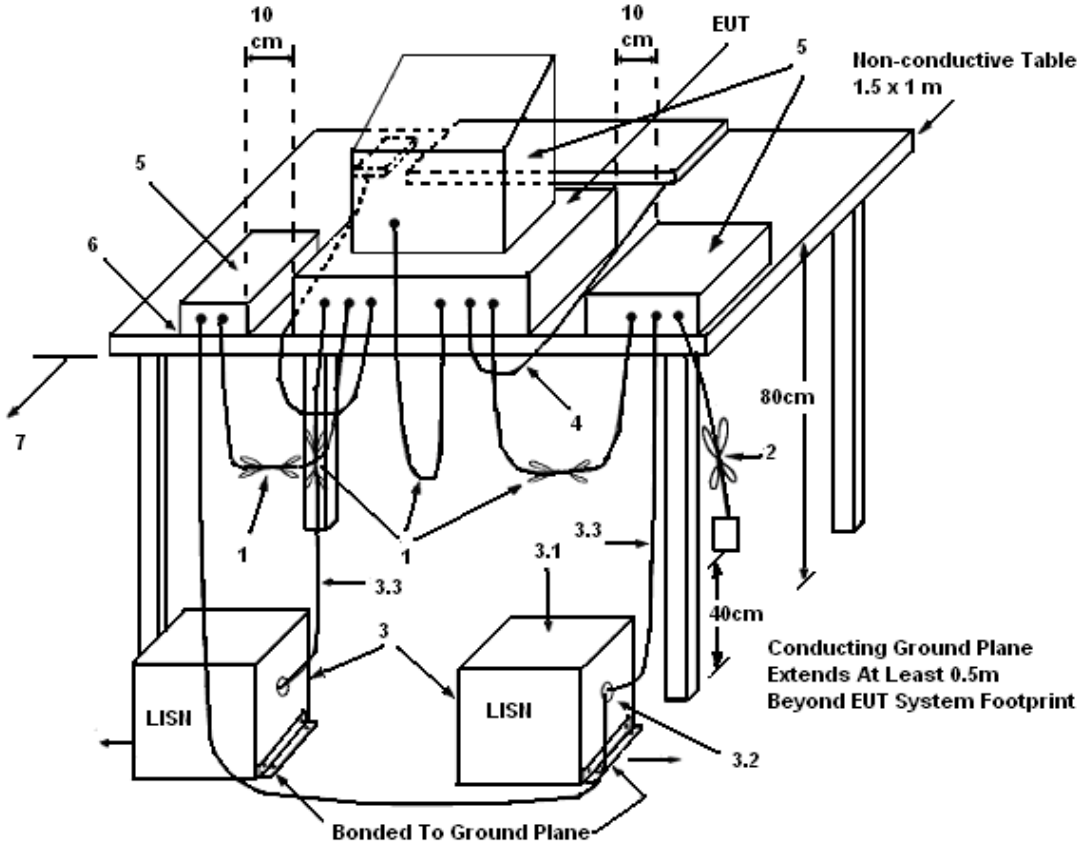
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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.

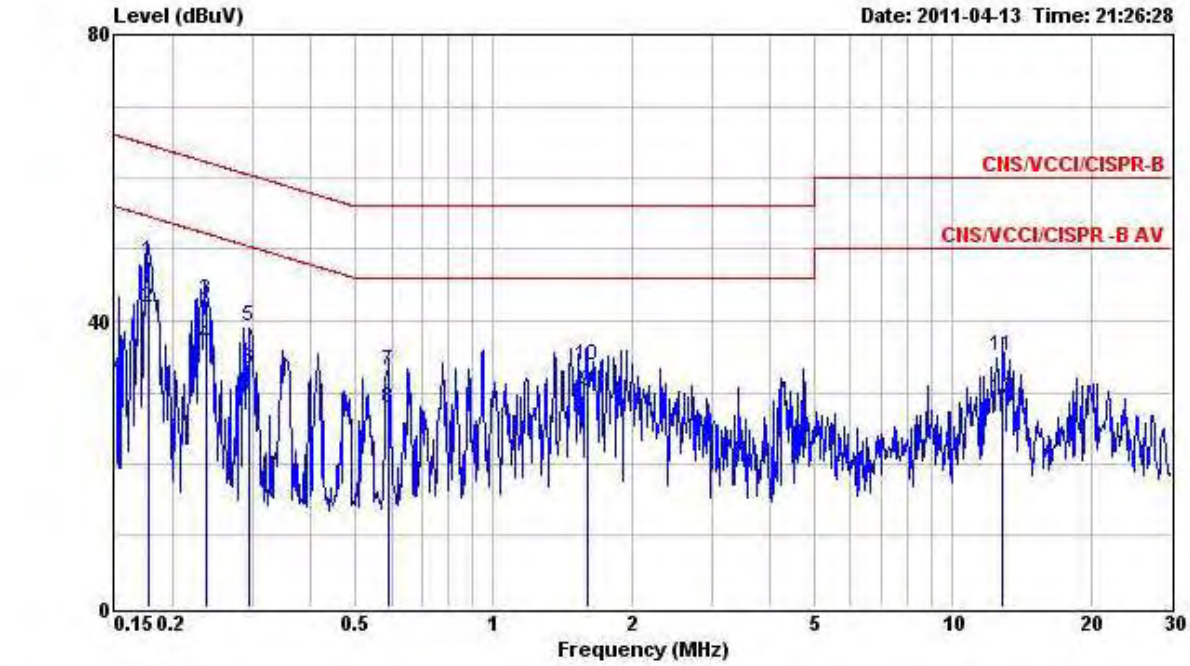
3.1.6 EUT Operation during Test

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

3.1.7 Results of AC Power Line Conducted Emissions Measurement

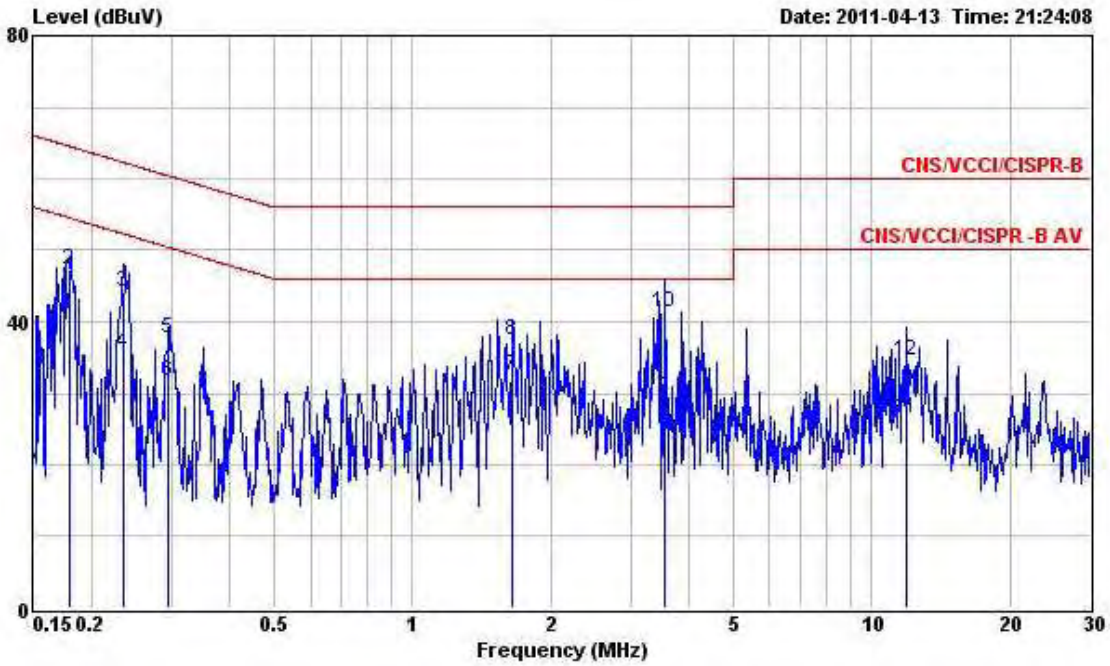
Final Test Date	Apr. 13, 2011	**Test Site No.**	CO01-HY
Temperature	21.2℃	**Humidity**	51.9%
Test Engineer	David	**Configuration**	Normal Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.178	48.42	-16.16	64.58	48.24	0.08	0.10	QP
2	0.178	41.72	-12.86	54.58	41.54	0.08	0.10	Average
3	0.238	42.93	-19.25	62.18	42.75	0.08	0.10	QP
4	0.238	36.65	-15.53	52.18	36.47	0.08	0.10	Average
5	0.294	39.11	-21.30	60.41	38.91	0.09	0.11	QP
6	0.294	33.30	-17.11	50.41	33.10	0.09	0.11	Average
7	0.592	32.91	-23.09	56.00	32.33	0.10	0.48	QP
8	0.592	27.74	-18.26	46.00	27.16	0.10	0.48	Average
9	1.596	30.04	-15.96	46.00	29.52	0.12	0.40	Average
10	1.596	33.90	-22.10	56.00	33.38	0.12	0.40	QP
11	12.867	35.01	-24.99	60.00	34.57	0.31	0.13	QP
12	12.867	29.14	-20.86	50.00	28.70	0.31	0.13	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.179	41.02	-13.51	54.53	40.86	0.06	0.10	Average
2	0.179	47.26	-17.27	64.53	47.10	0.06	0.10	QP
3	0.234	44.28	-18.03	62.31	44.12	0.06	0.10	QP
4	0.234	35.68	-16.63	52.31	35.52	0.06	0.10	Average
5	0.294	37.59	-22.82	60.41	37.41	0.07	0.11	QP
6	0.294	31.66	-18.75	50.41	31.48	0.07	0.11	Average
7	1.650	32.38	-13.62	46.00	31.92	0.10	0.36	Average
8	1.650	37.32	-18.68	56.00	36.86	0.10	0.36	QP
9	3.540	29.31	-16.69	46.00	29.06	0.13	0.12	Average
10	3.540	41.25	-14.75	56.00	41.00	0.13	0.12	QP
11	11.870	26.50	-23.50	50.00	26.06	0.29	0.15	Average
12	11.870	34.52	-25.48	60.00	34.08	0.29	0.15	QP

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	Peak
Trace	Max Hold
Sweep Time	Auto

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak 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.

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	Jun. 09, 2011	**Test Site No.**	TH01-HY
Temperature	30℃	**Humidity**	60%
Test Engineer	Ian	**Configurations**	802.11a/n

Configuration of IEEE 802.11a Ant. A

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.84	17.71
40	5200 MHz	25.16	17.63
48	5240 MHz	25.32	17.71
52	5260 MHz	40.20	23.70
56	5280 MHz	39.80	22.70
64	5320 MHz	38.20	19.10
100	5500 MHz	38.80	20.60
116	5580 MHz	38.80	20.50
140	5700 MHz	33.20	18.60

Configuration of IEEE 802.11a Ant. B

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.60	17.23
40	5200 MHz	24.28	17.23
48	5240 MHz	25.08	17.23
52	5260 MHz	38.40	19.80
56	5280 MHz	35.10	18.50
64	5320 MHz	27.70	17.50
100	5500 MHz	37.60	19.20
116	5580 MHz	37.10	19.00
140	5700 MHz	37.90	19.20

Configuration IEEE 802.11n (20MHz) Ant. A

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.10	18.40
40	5200 MHz	25.20	18.40
48	5240 MHz	25.20	18.40
52	5260 MHz	32.70	18.70
56	5280 MHz	31.70	18.90
64	5320 MHz	32.90	18.70
100	5500 MHz	43.00	21.90
116	5580 MHz	39.60	20.10
140	5700 MHz	34.10	19.00

Configuration IEEE 802.11n (20MHz) Ant. B

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.60	18.40
40	5200 MHz	25.00	18.40
48	5240 MHz	24.90	18.30
52	5260 MHz	29.10	18.60
56	5280 MHz	29.60	18.70
64	5320 MHz	31.40	18.50
100	5500 MHz	41.70	21.20
116	5580 MHz	40.90	20.80
140	5700 MHz	35.20	19.00

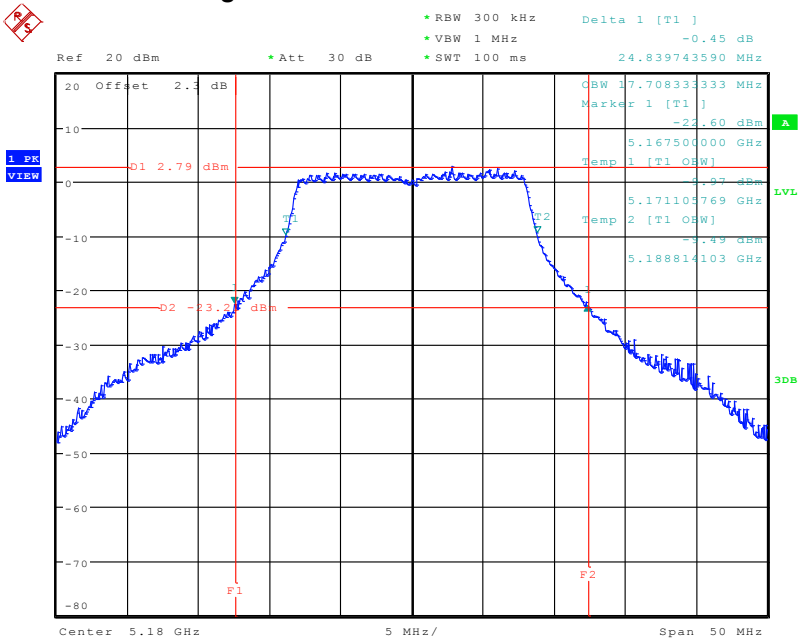
Configuration IEEE 802.11n (40MHz) Ant. A

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	47.60	36.60
46	5230 MHz	49.00	36.80
54	5270 MHz	69.80	39.20
62	5310 MHz	48.00	36.80
102	5510 MHz	47.80	36.60
110	5550 MHz	80.00	41.40
134	5670 MHz	74.40	37.40

Configuration IEEE 802.11n (40MHz) Ant. B

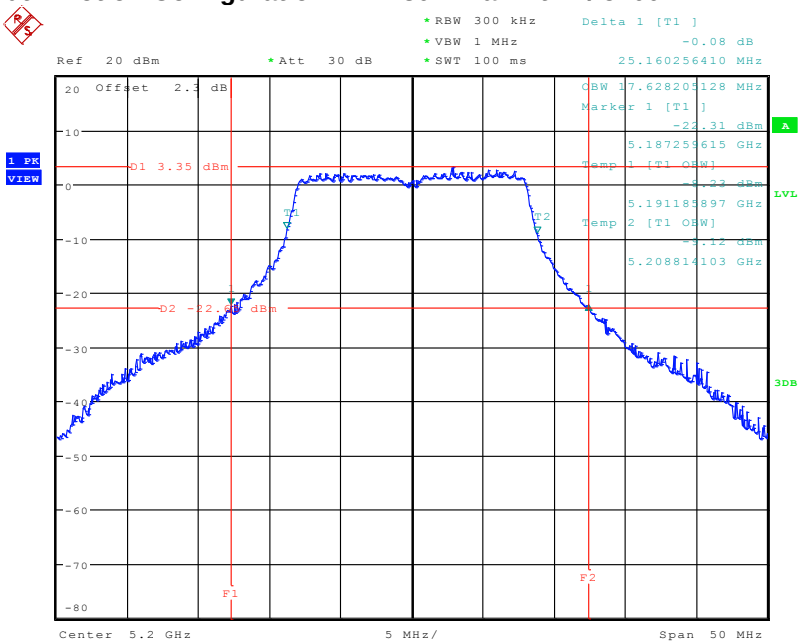
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	46.20	36.60
46	5230 MHz	47.20	36.60
54	5270 MHz	75.60	38.40
62	5310 MHz	47.40	36.60
102	5510 MHz	47.40	36.60
110	5550 MHz	78.60	42.60
134	5670 MHz	74.00	37.60

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5180 MHz



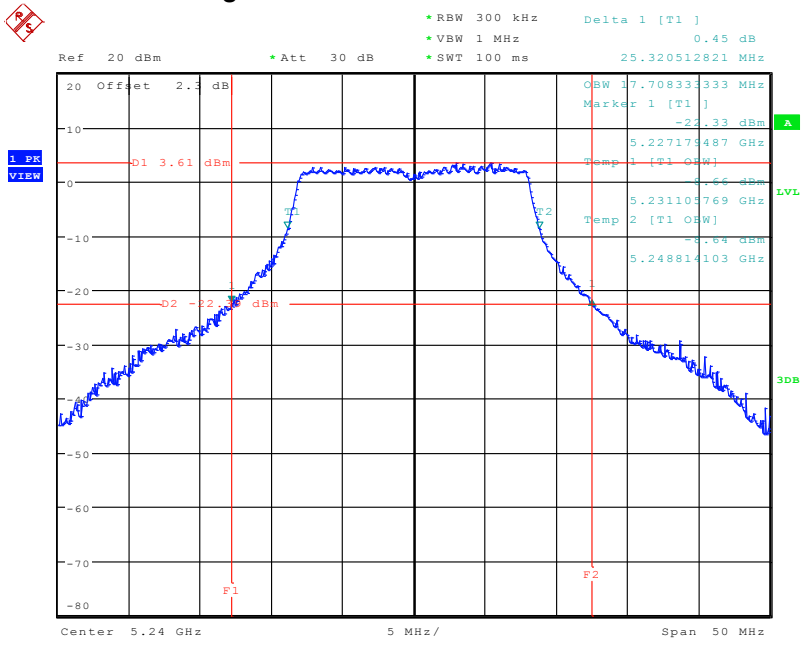
Date: 22.APR.2011 20:55:58

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5200 MHz



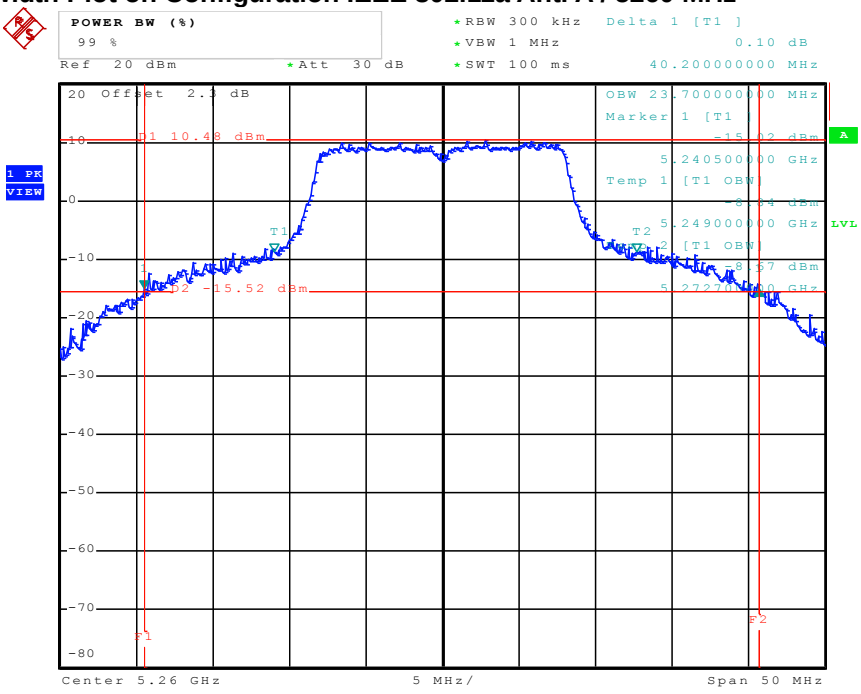
Date: 22.APR.2011 21:09:48

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5240 MHz



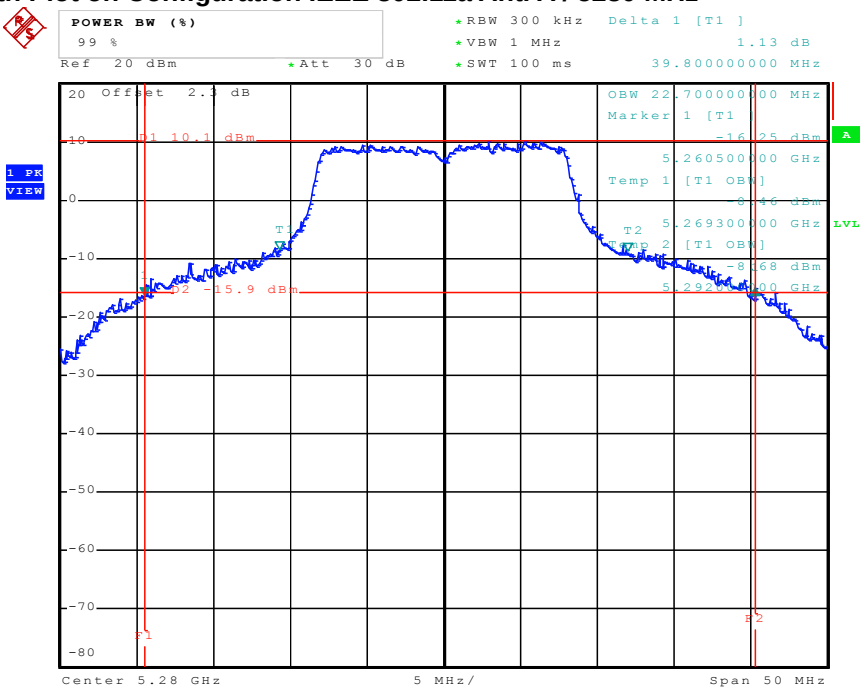
Date: 22.APR.2011 21:23:43

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5260 MHz

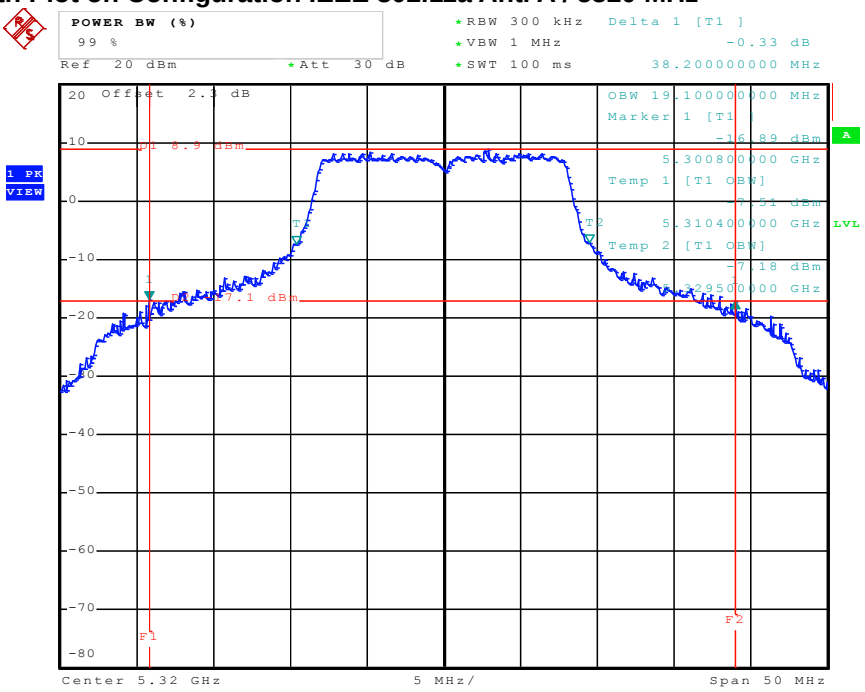


Date: 18.APR.2011 23:13:32

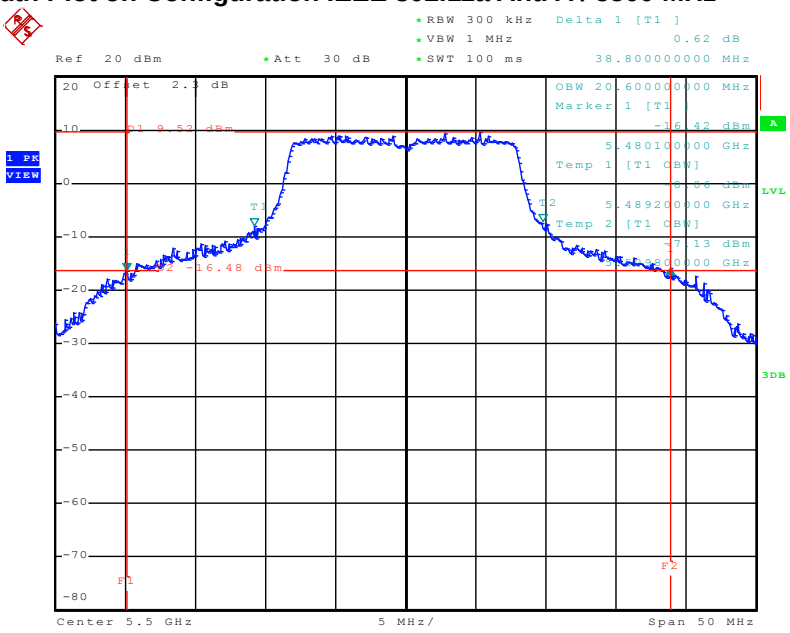
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5280 MHz



26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5320 MHz

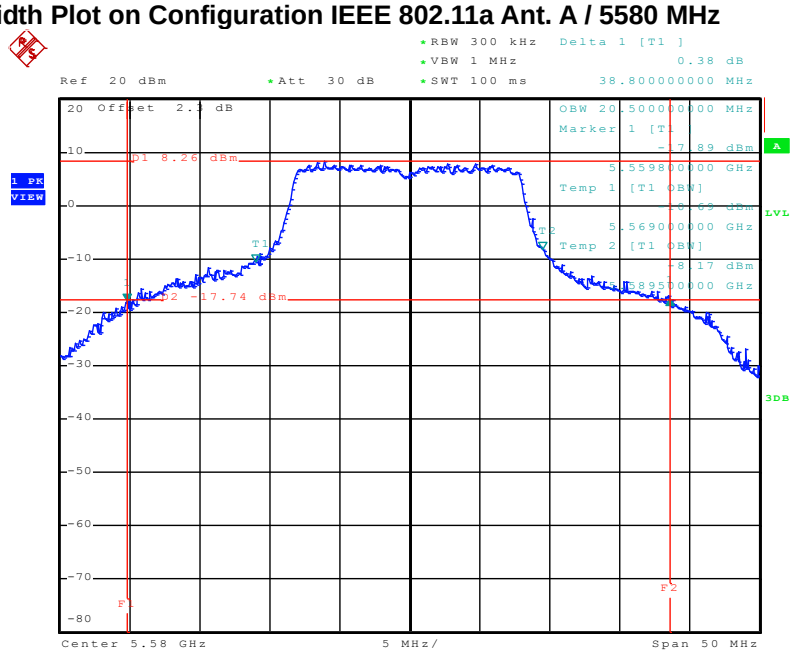


26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5500 MHz



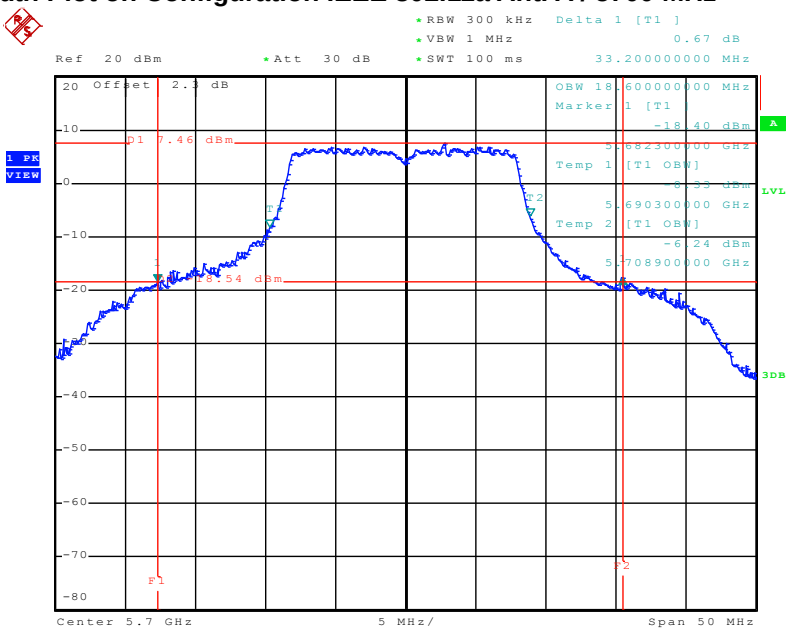
Date: 31.MAY.2011 20:45:48

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5580 MHz



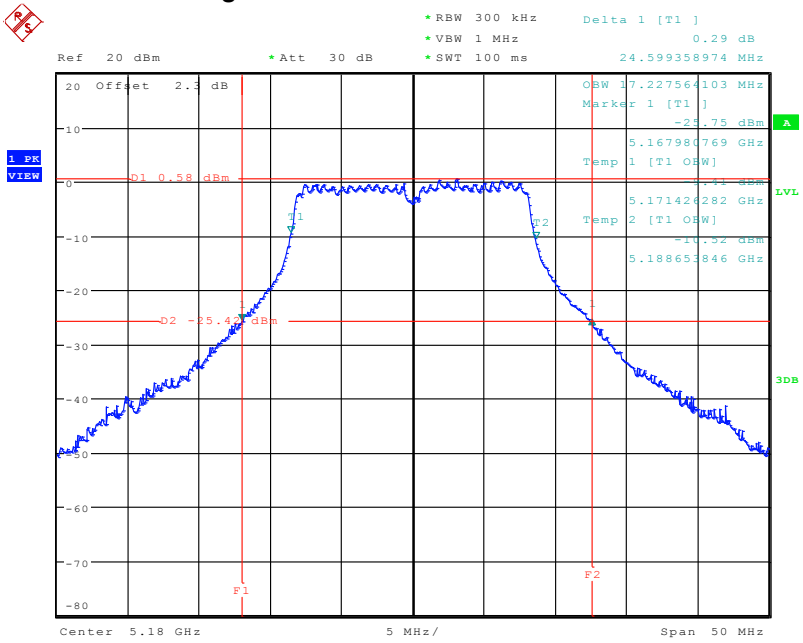
Date: 31.MAY.2011 20:55:42

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A / 5700 MHz



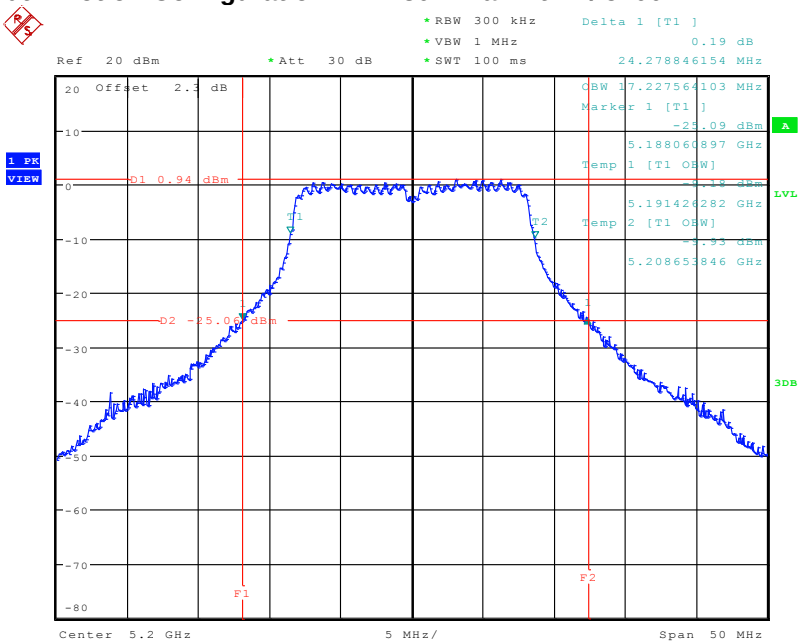
Date: 31.MAY.2011 21:06:56

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5180 MHz



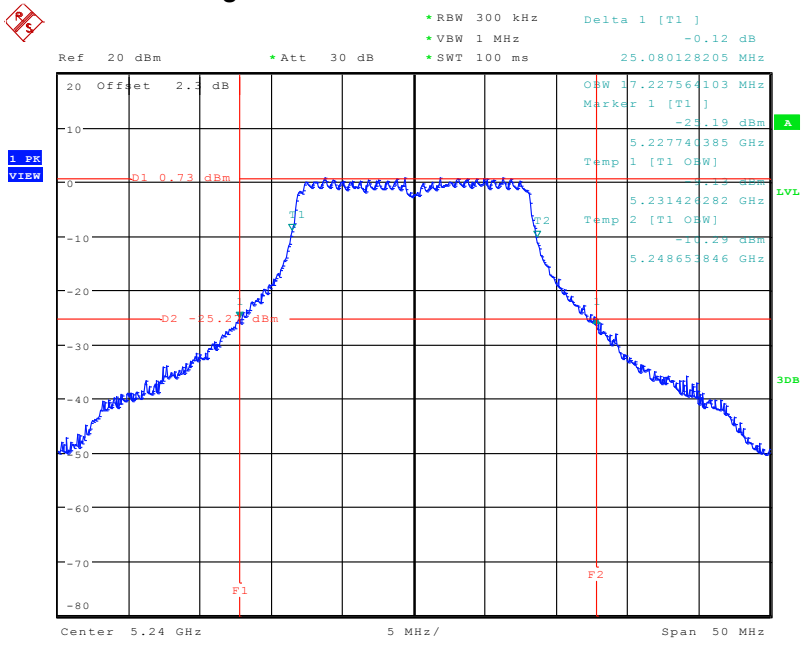
Date: 22.APR.2011 21:01:00

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5200 MHz



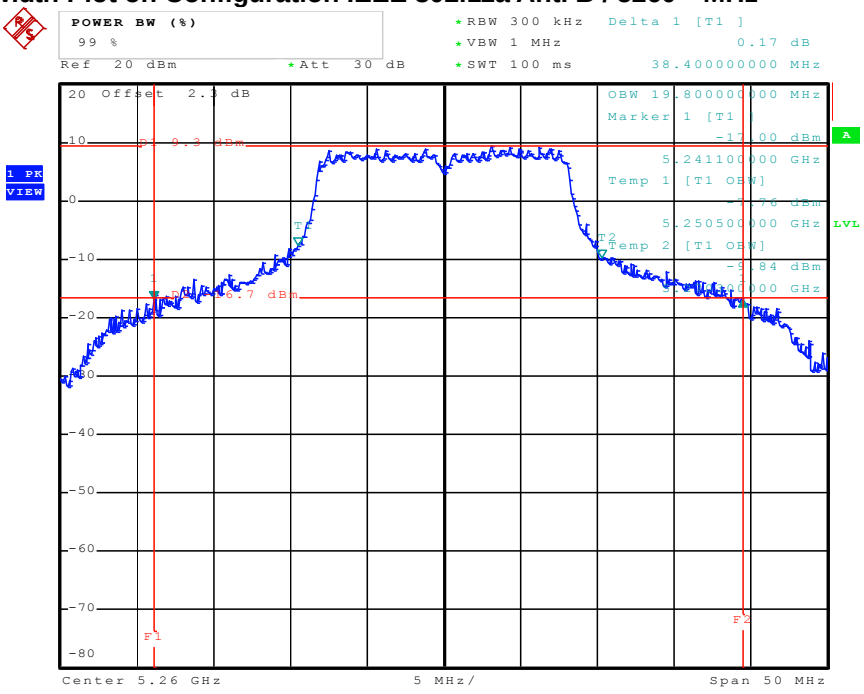
Date: 22.APR.2011 21:13:55

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5240 MHz



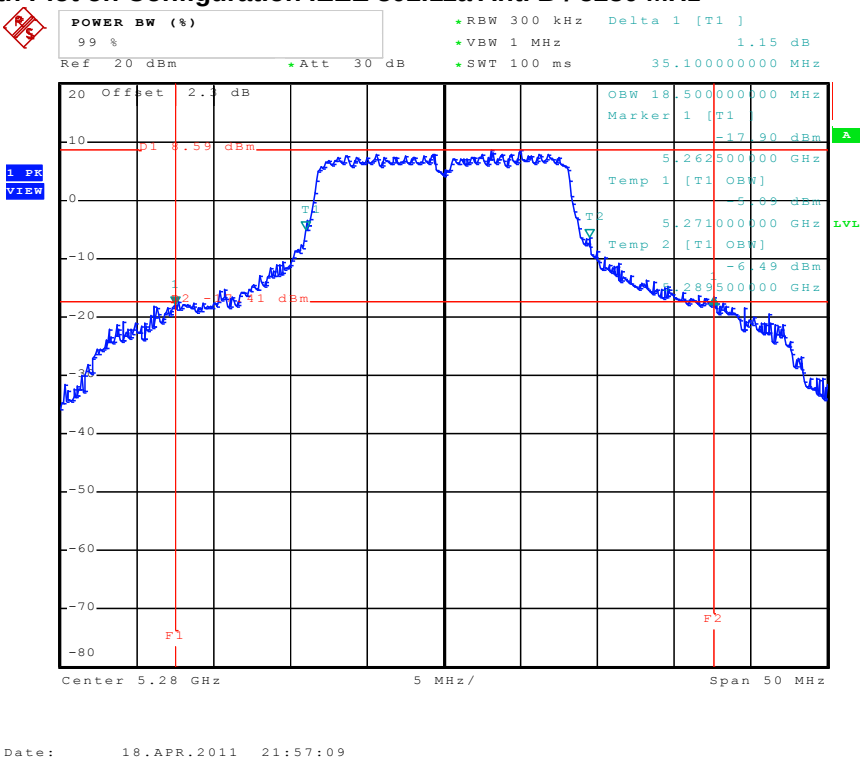
Date: 22.APR.2011 21:19:35

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5260 MHz

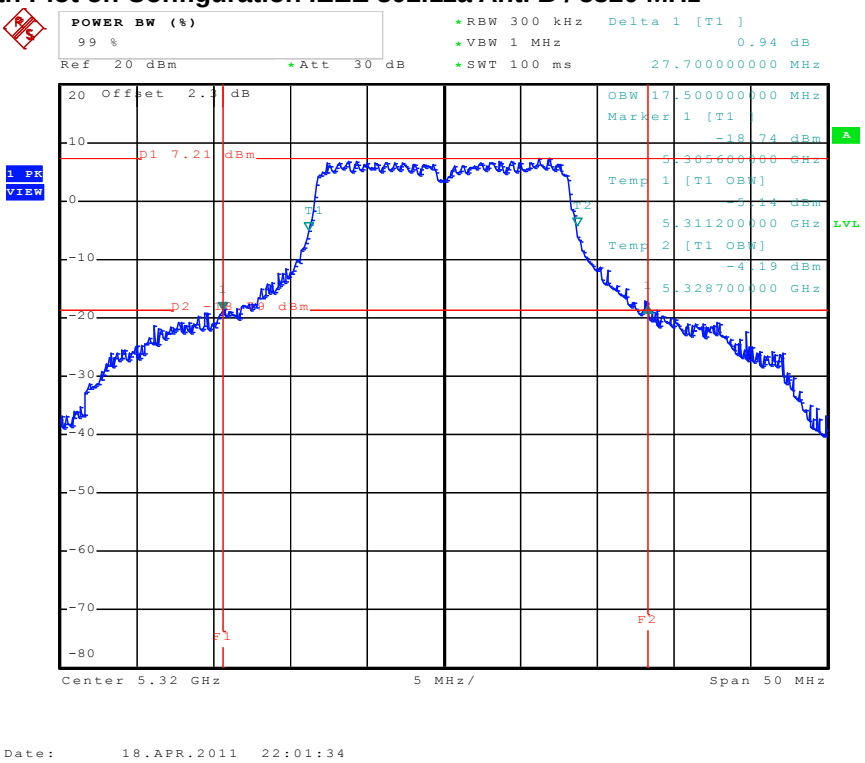


Date: 18.APR.2011 21:52:50

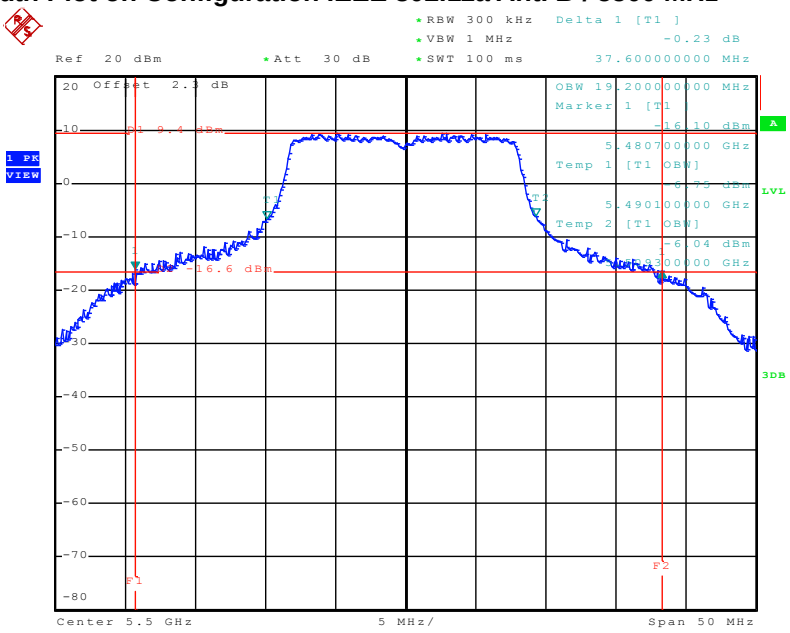
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5280 MHz



26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5320 MHz

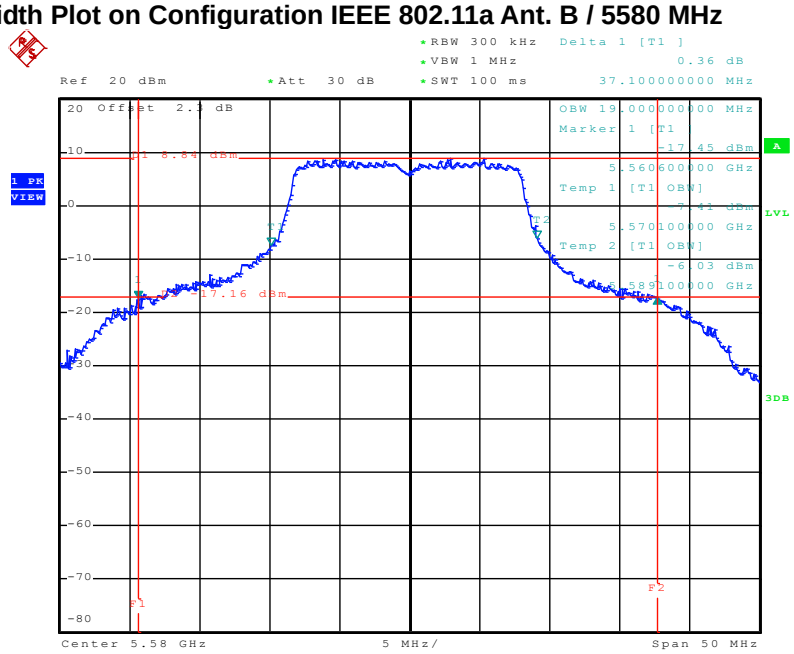


26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5500 MHz



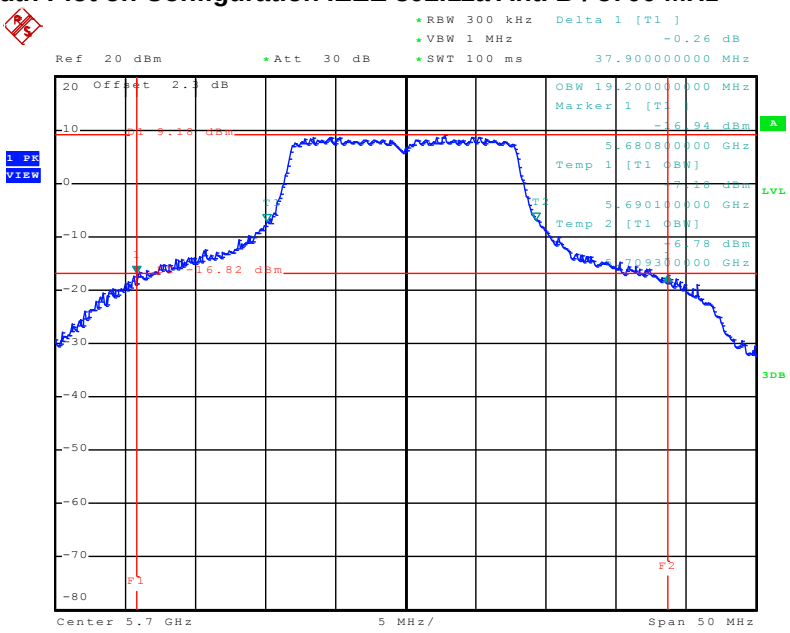
Date: 31.MAY.2011 20:51:48

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5580 MHz



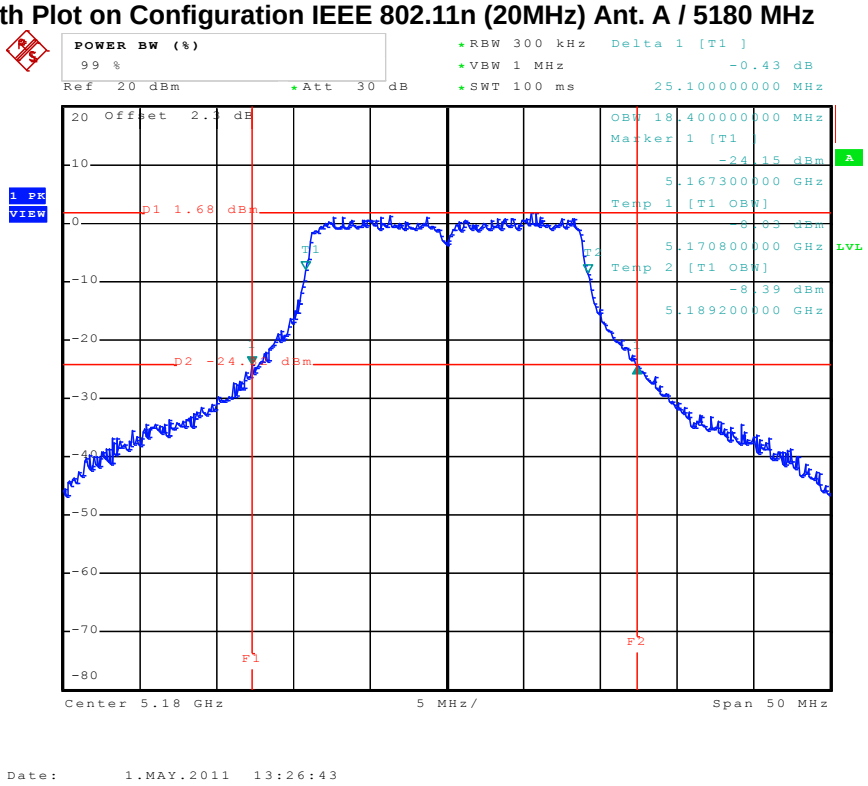
Date: 31.MAY.2011 21:02:00

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. B / 5700 MHz

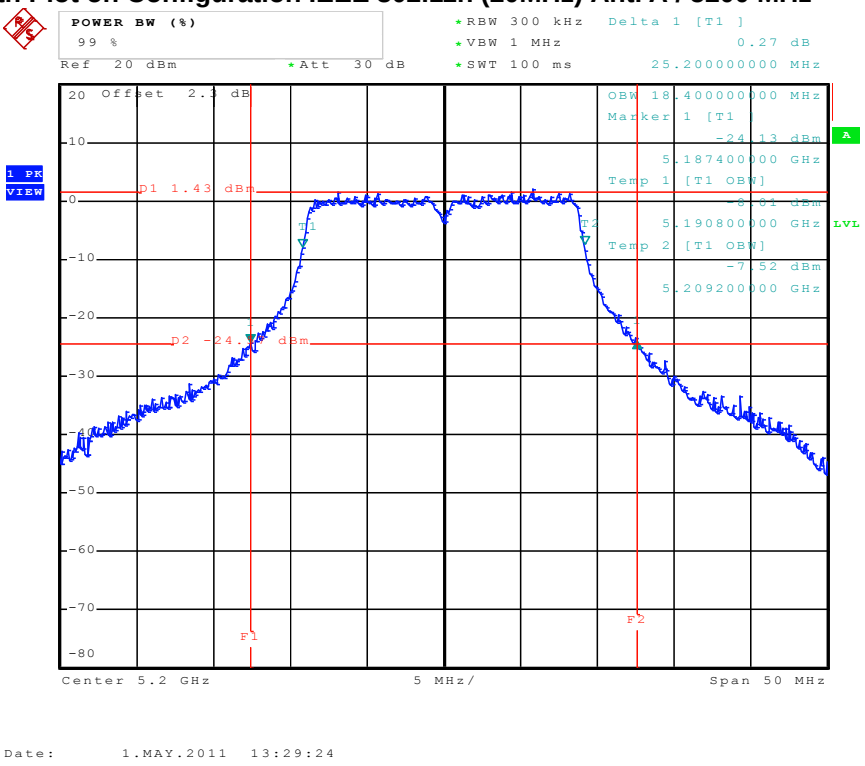


Date: 31.MAY.2011 21:10:23

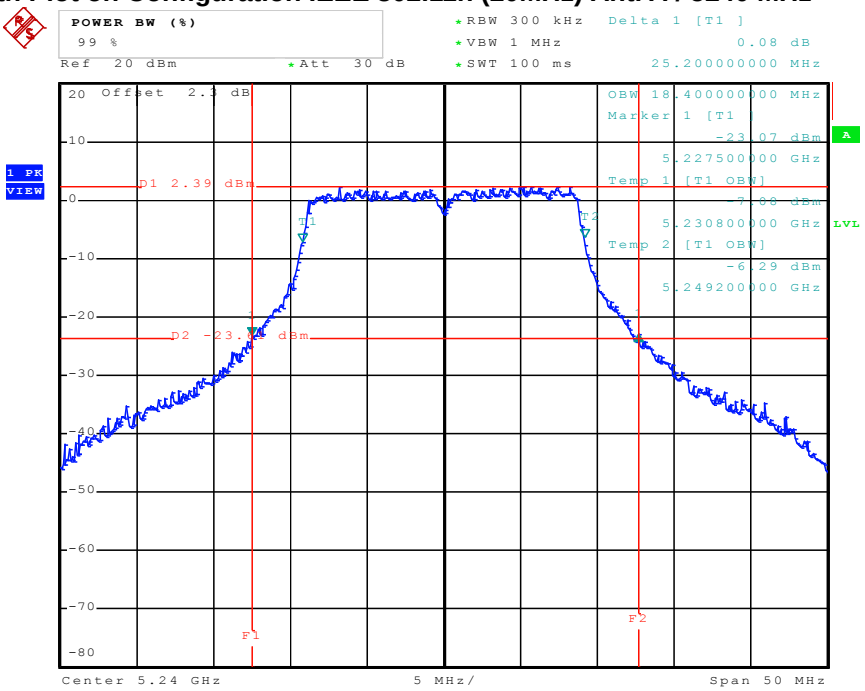
26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5180 MHz



26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5200 MHz

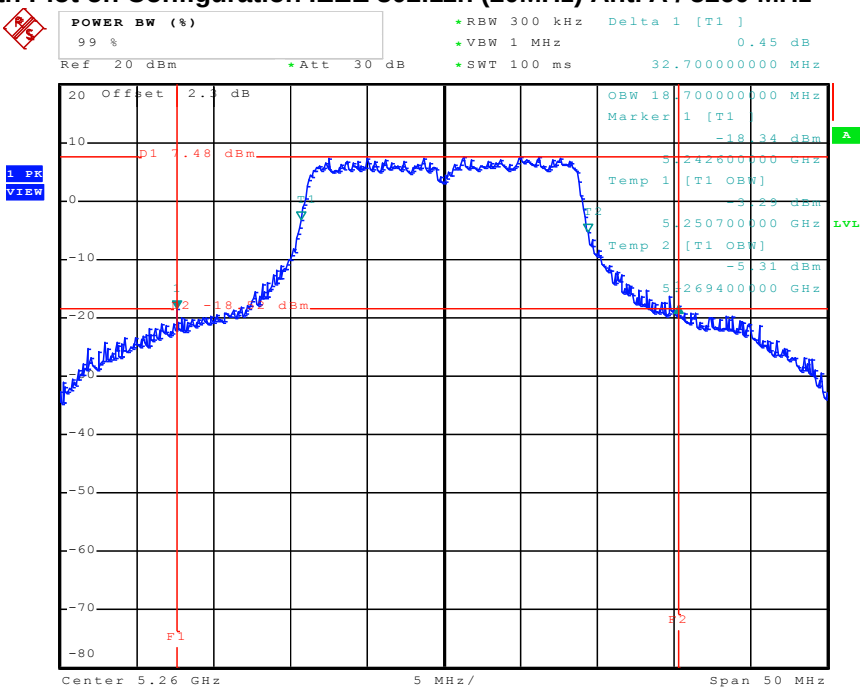


26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5240 MHz



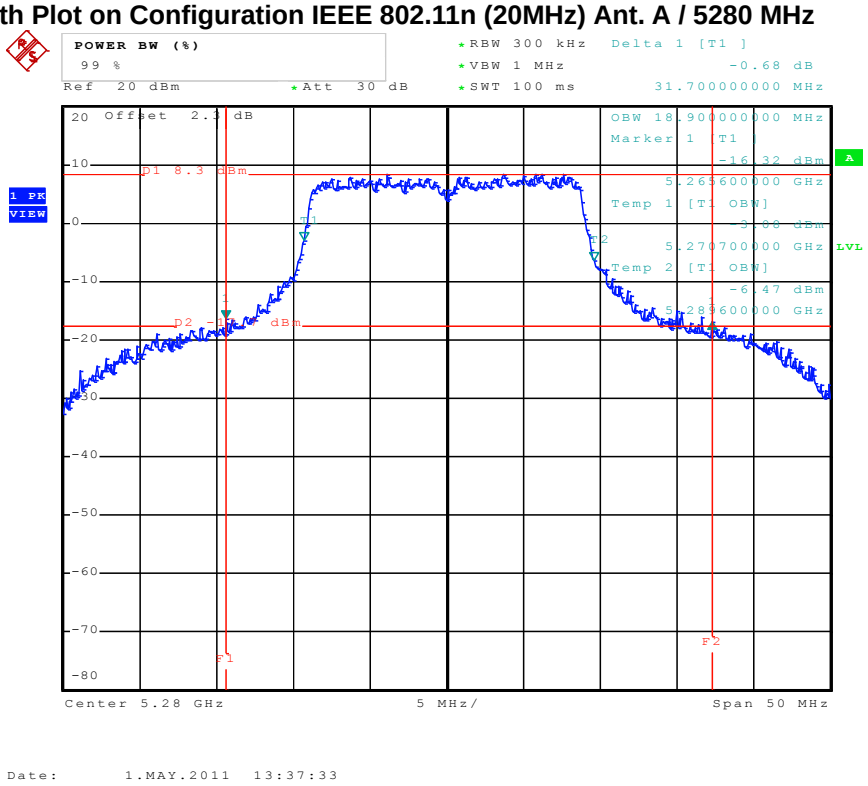
Date: 1.MAY.2011 13:32:24

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5260 MHz



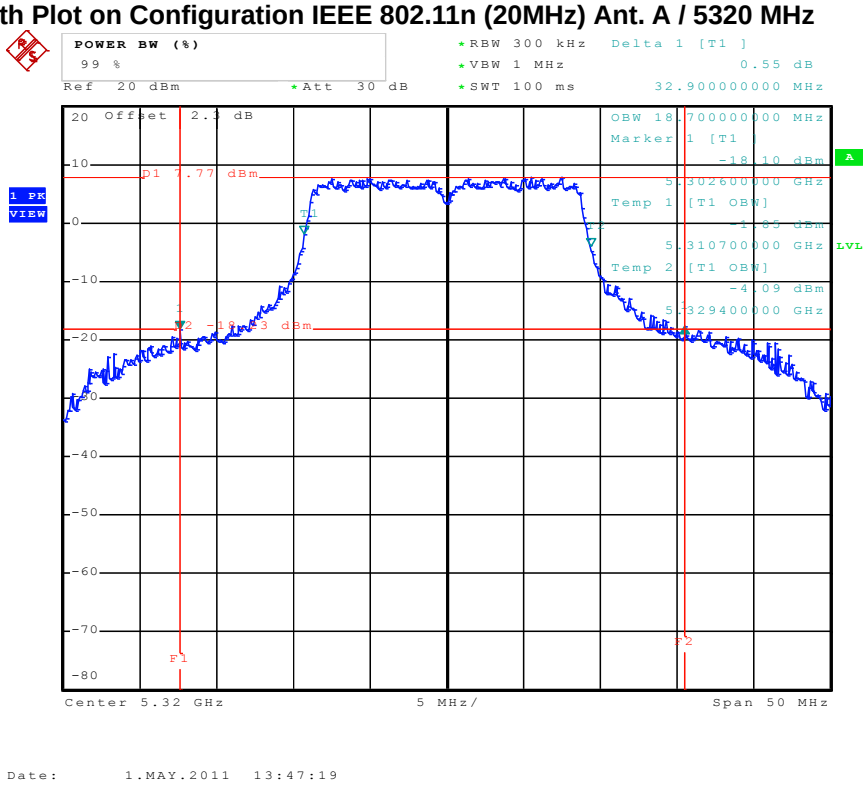
Date: 1.MAY.2011 13:34:54

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5280 MHz



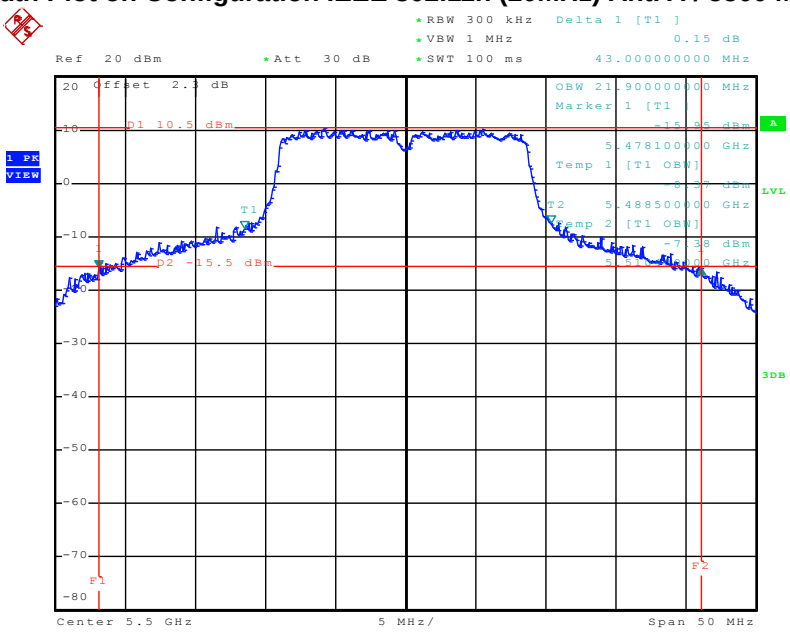
Date: 1.MAY.2011 13:37:33

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5320 MHz



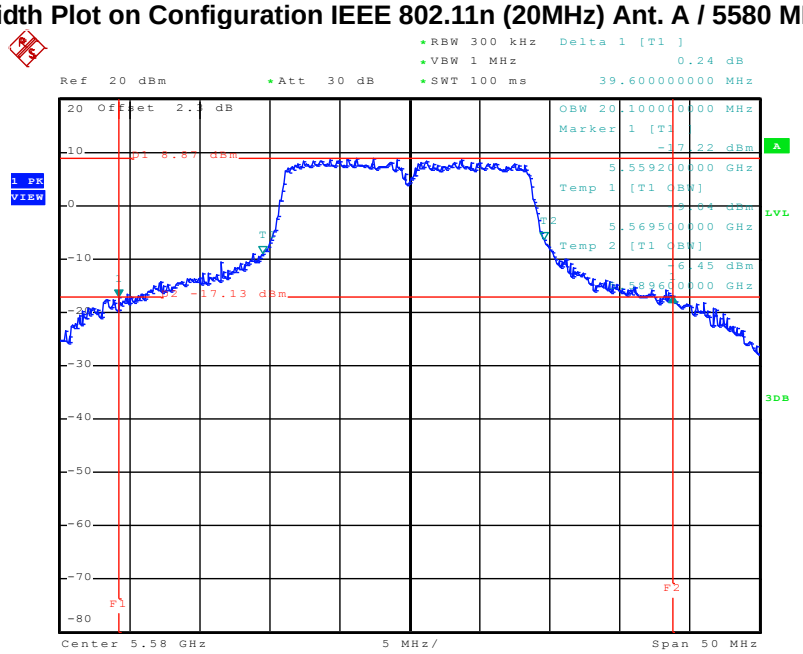
Date: 1.MAY.2011 13:47:19

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5500 MHz



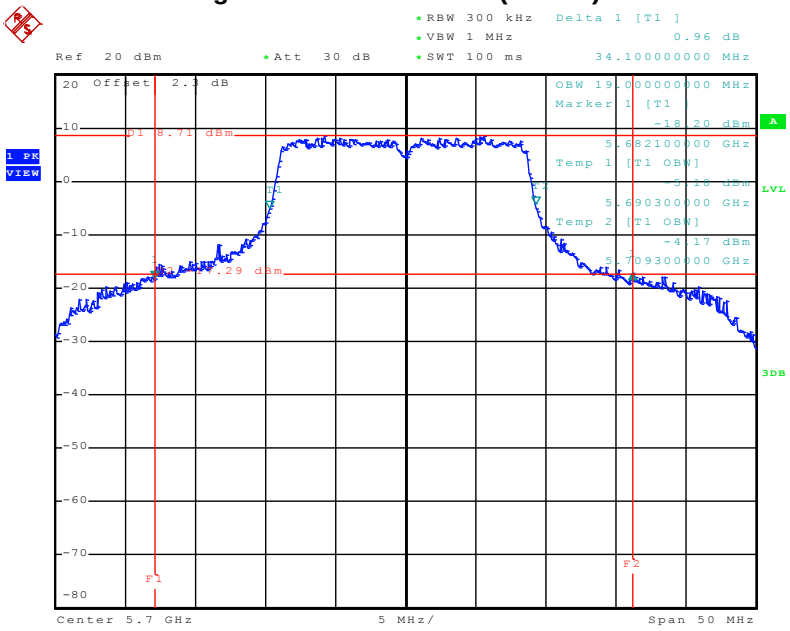
Date: 31.MAY.2011 21:21:05

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5580 MHz



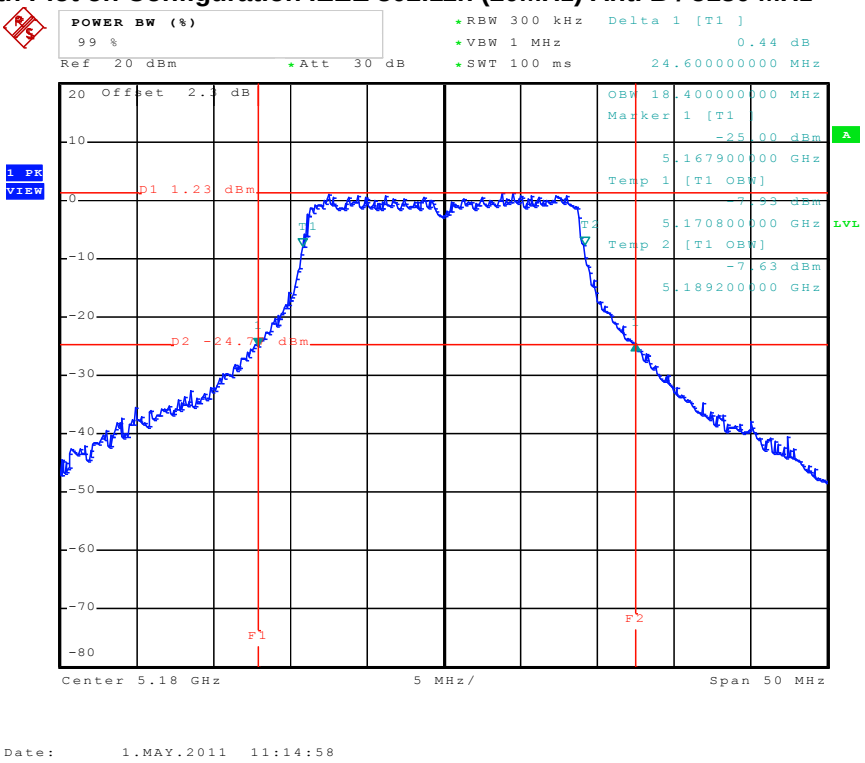
Date: 1.JUN.2011 09:56:44

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5700 MHz

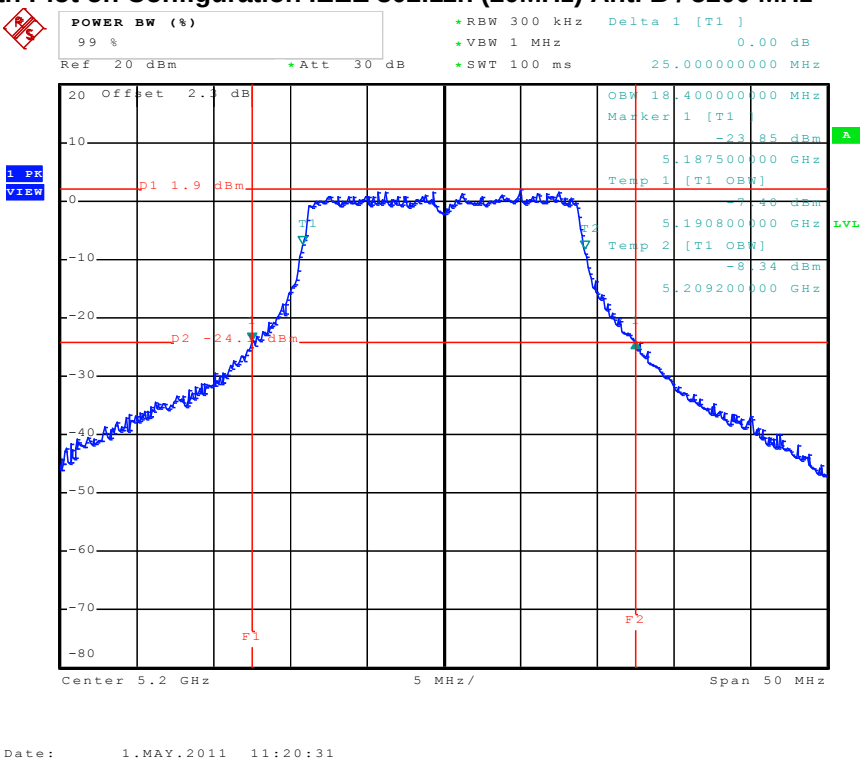


Date: 1.JUN.2011 10:06:43

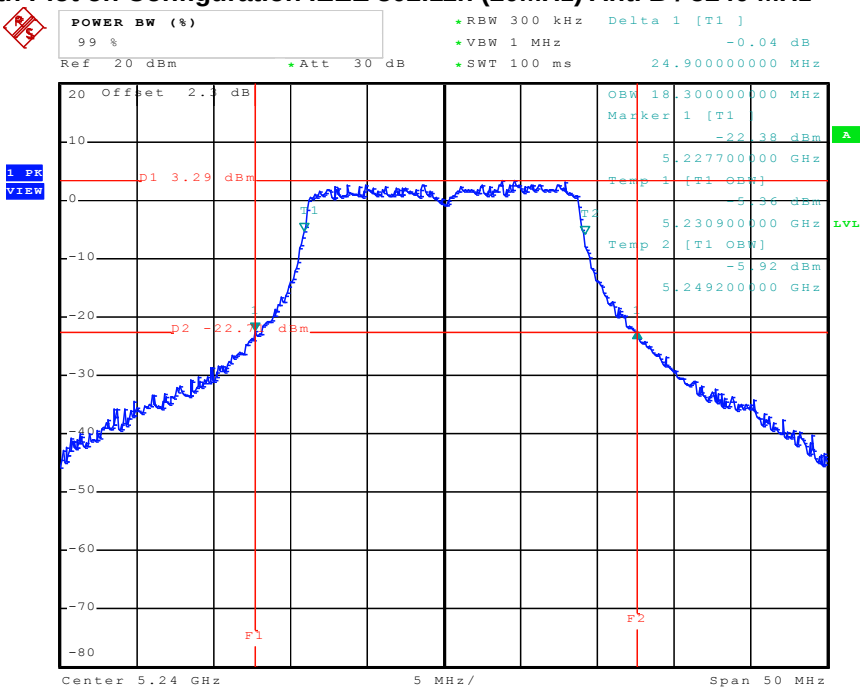
26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5180 MHz



26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5200 MHz

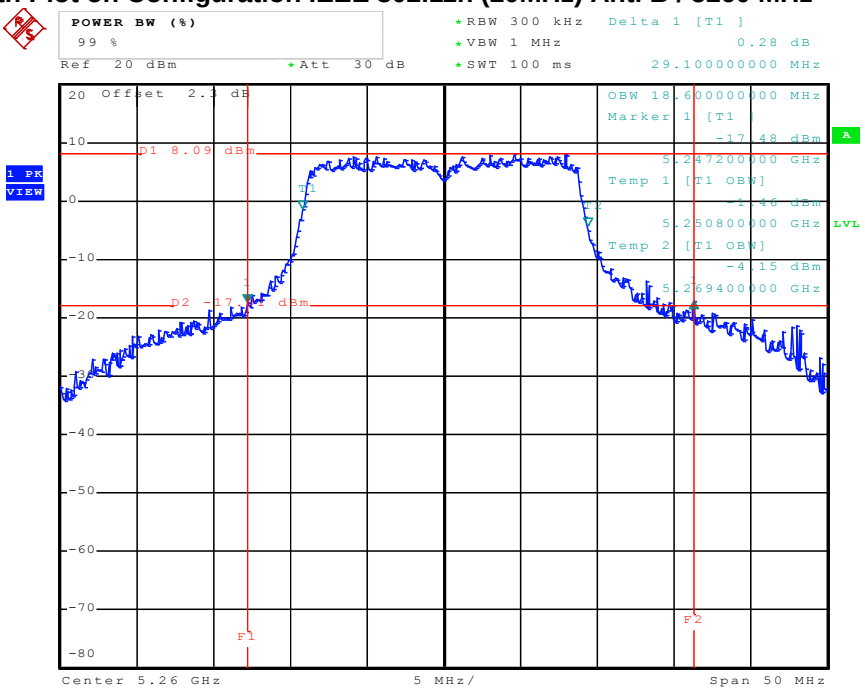


26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5240 MHz



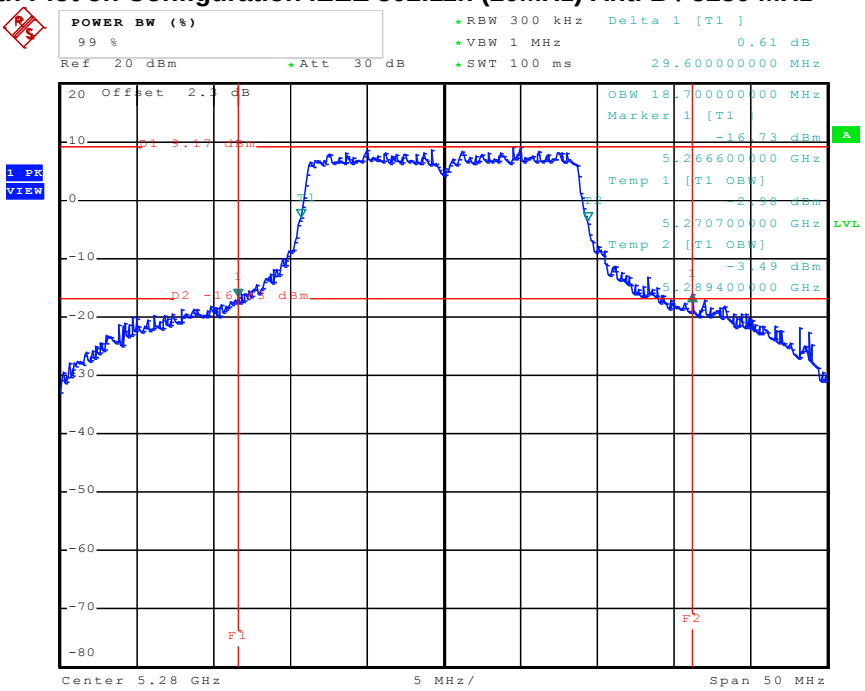
Date: 1.MAY.2011 12:01:19

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5260 MHz

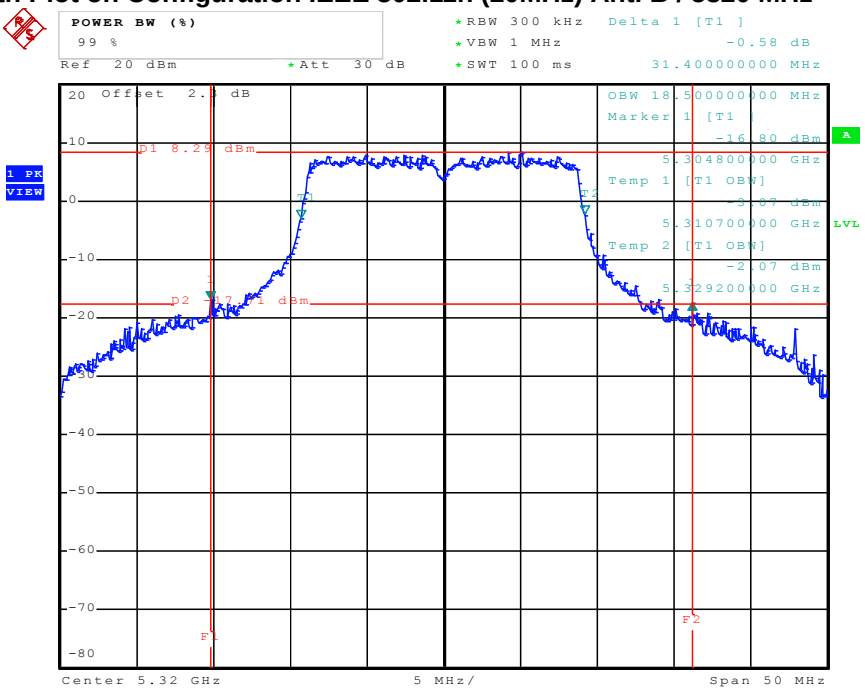


Date: 1.MAY.2011 12:51:48

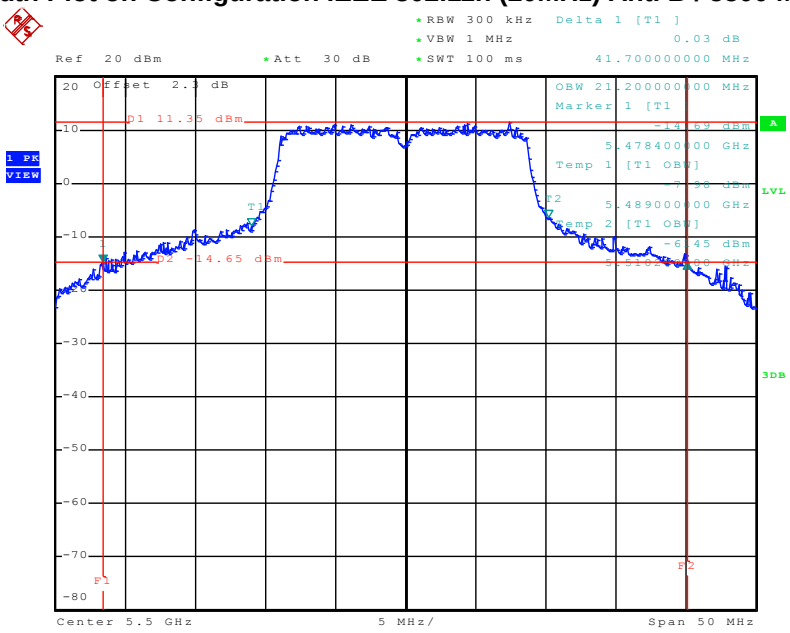
26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5280 MHz



26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5320 MHz

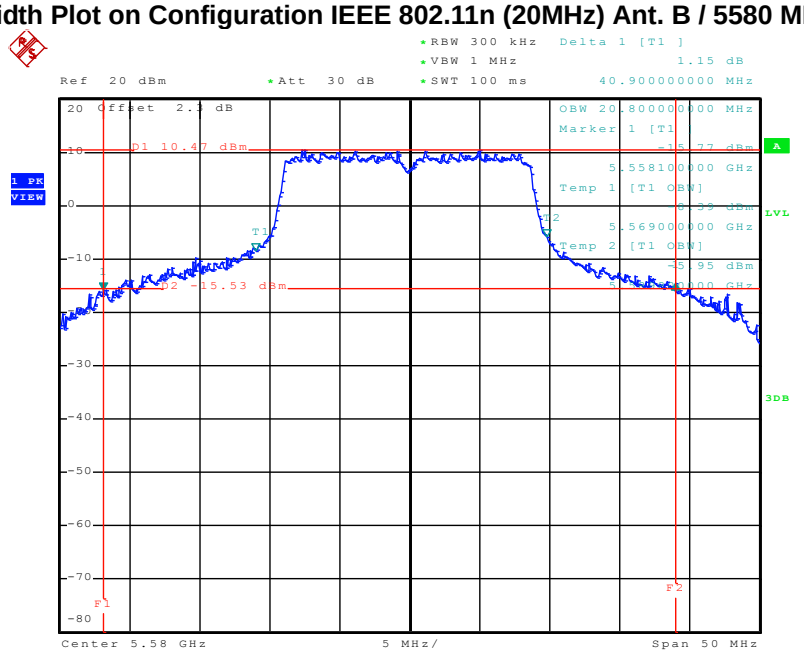


26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5500 MHz



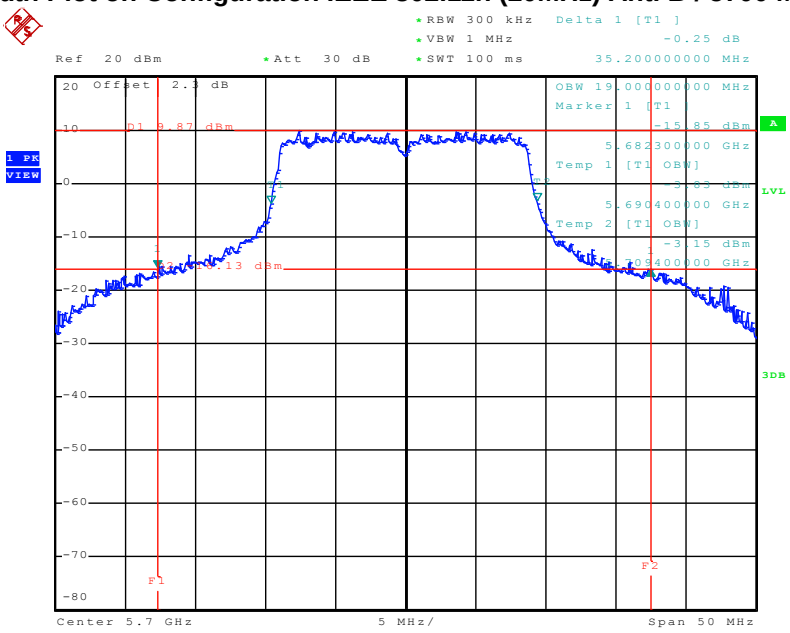
Date: 31.MAY.2011 21:23:53

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5580 MHz



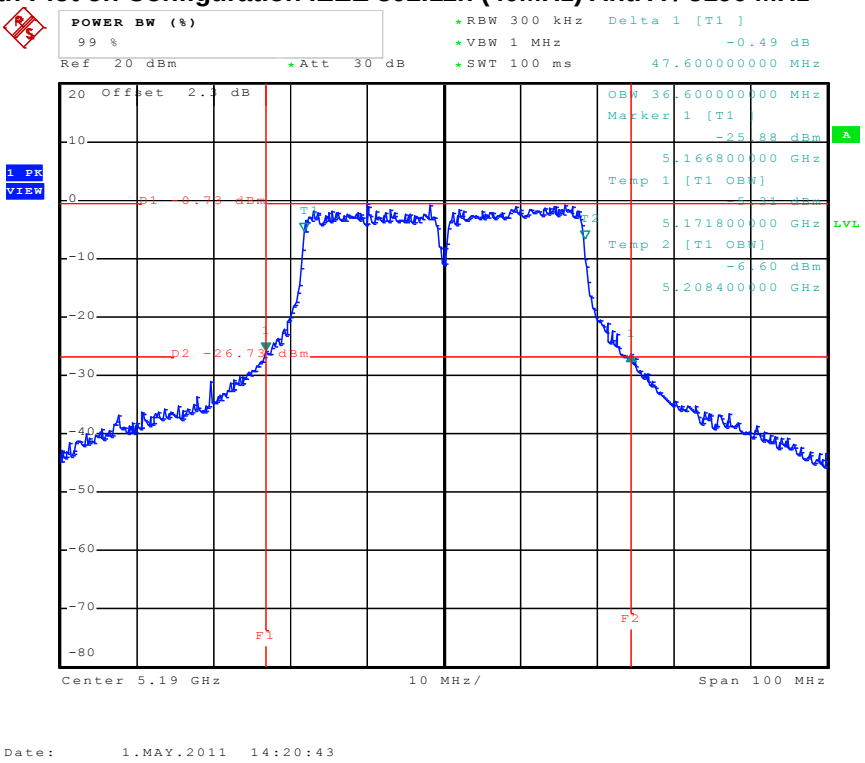
Date: 1.JUN.2011 10:02:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5700 MHz



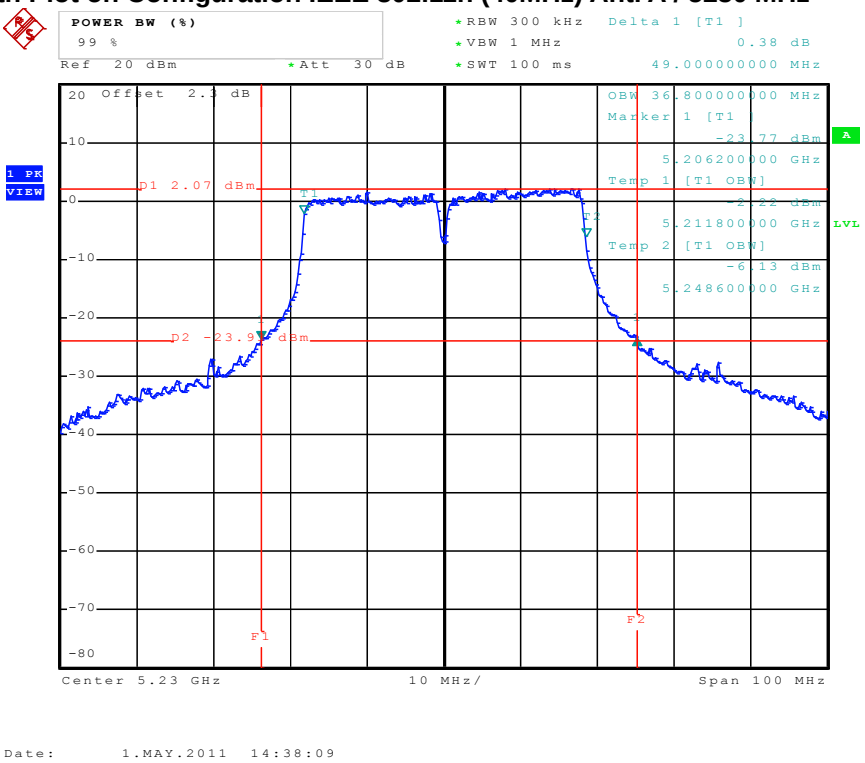
Date: 1.JUN.2011 10:10:13

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5190 MHz



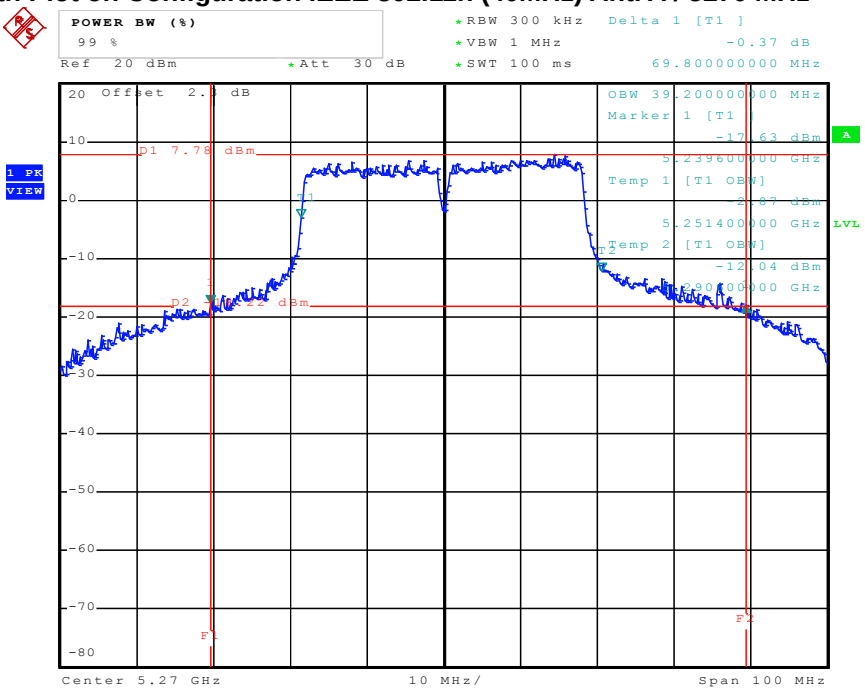
Date: 1.MAY.2011 14:20:43

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5230 MHz



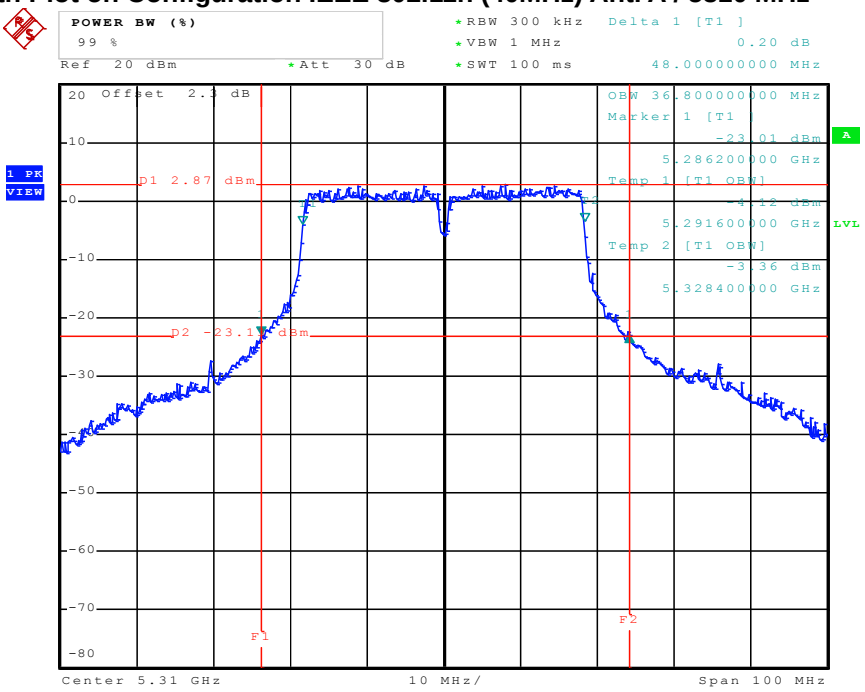
Date: 1.MAY.2011 14:38:09

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5270 MHz



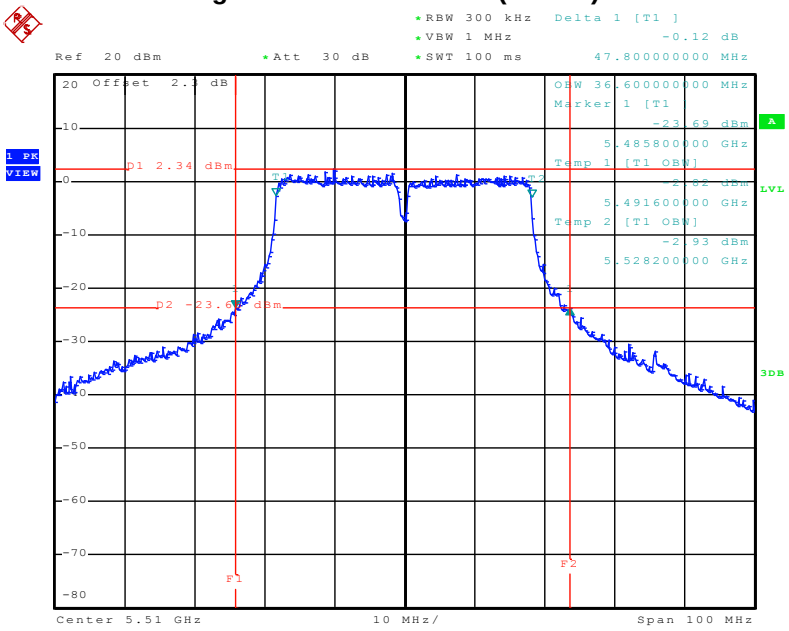
Date: 1.MAY.2011 14:42:03

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5310 MHz



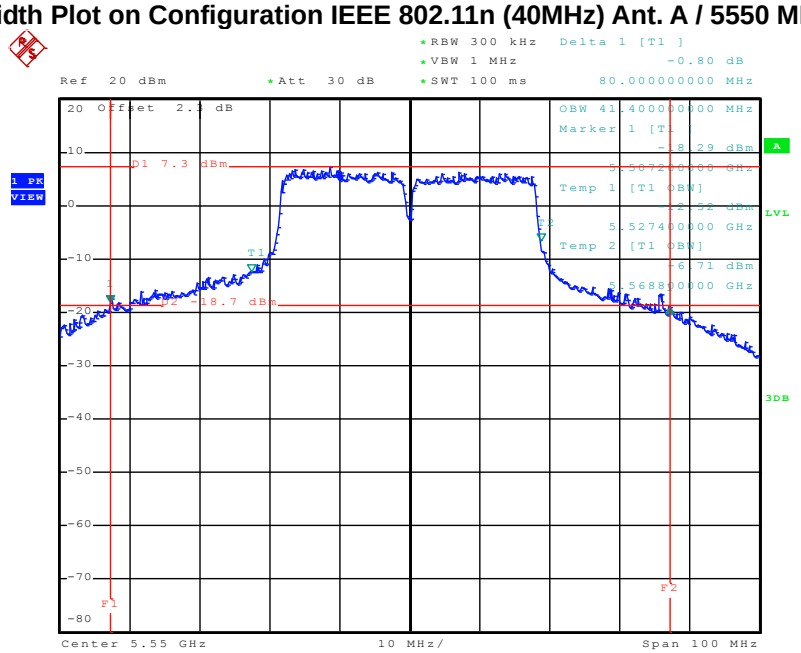
Date: 1.MAY.2011 14:47:07

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5510 MHz



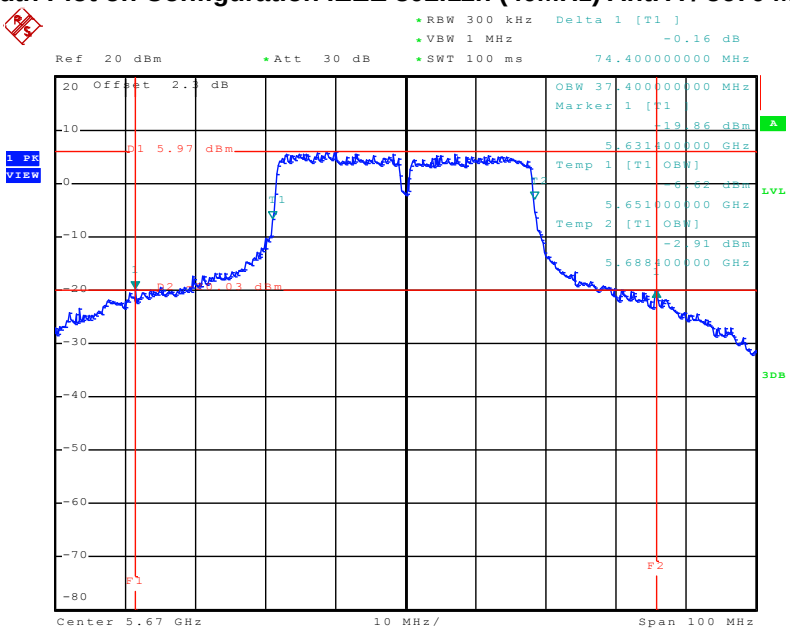
Date: 9.JUN.2011 14:36:20

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5550 MHz



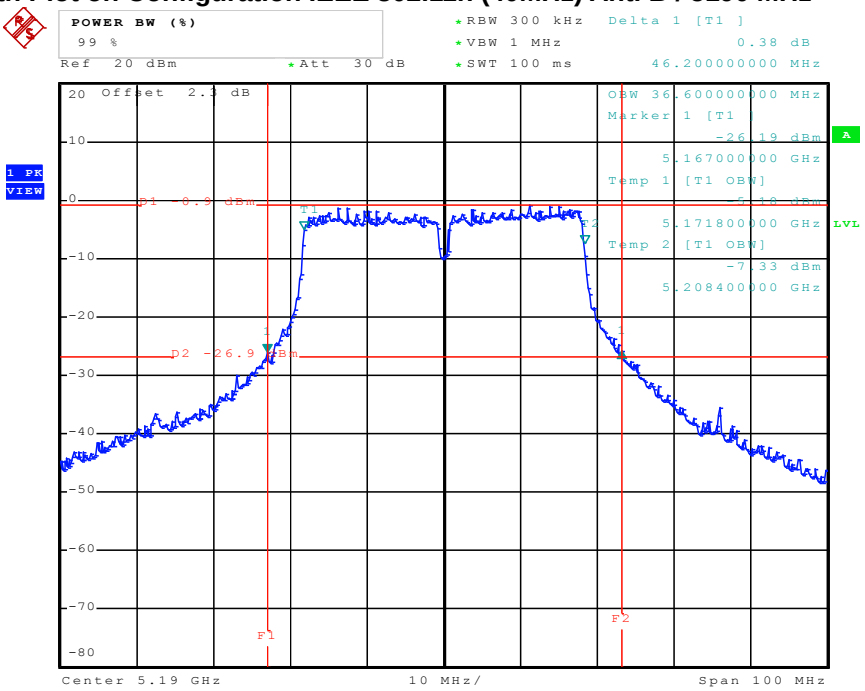
Date: 1.JUN.2011 10:35:44

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5670 MHz

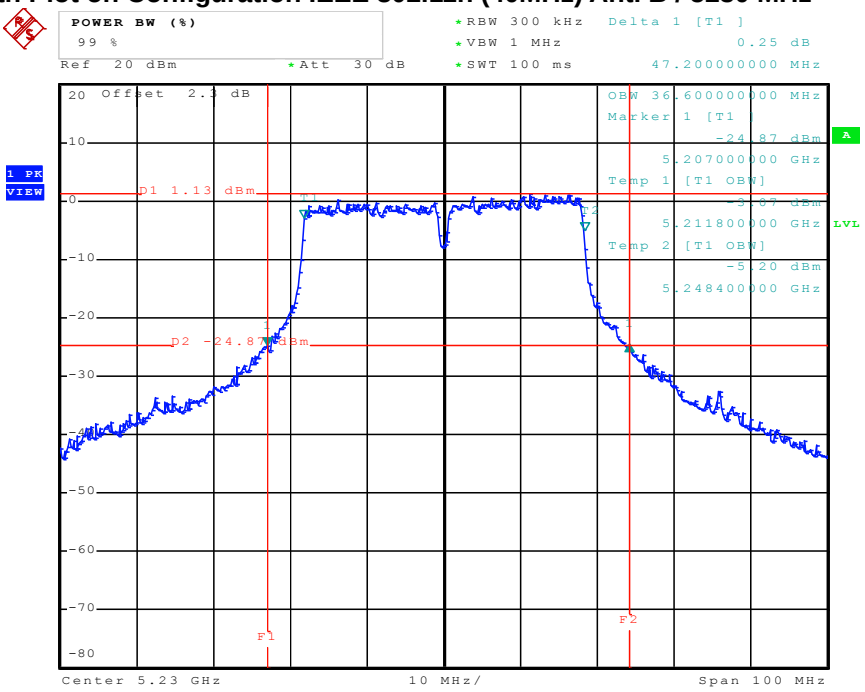


Date: 1.JUN.2011 10:42:44

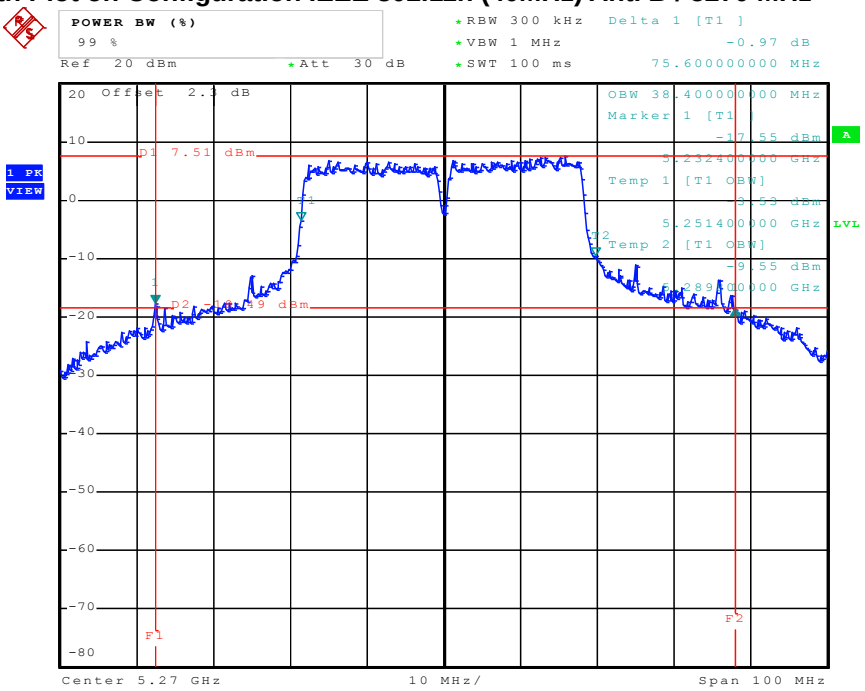
26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5190 MHz



26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5230 MHz

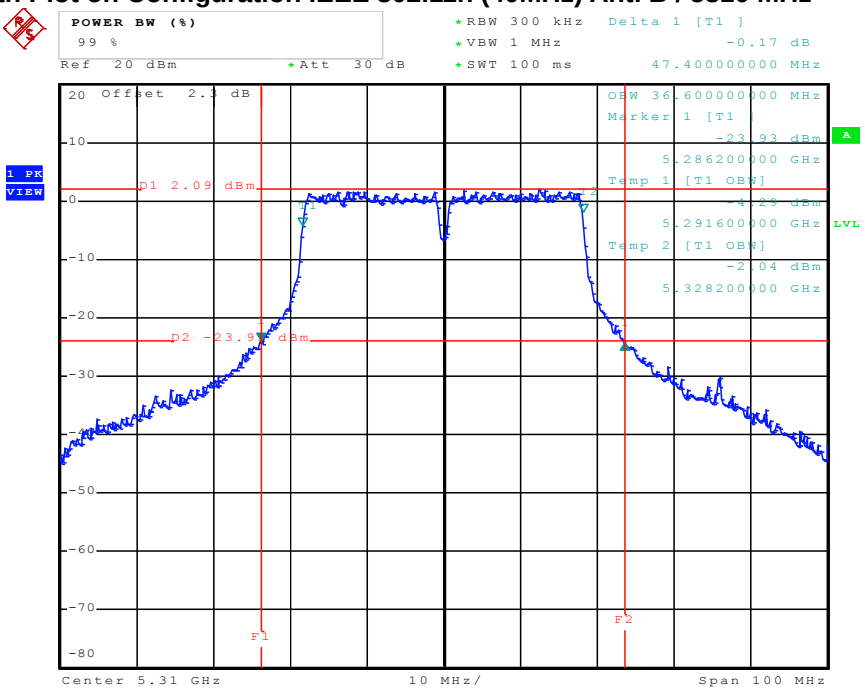


26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5270 MHz



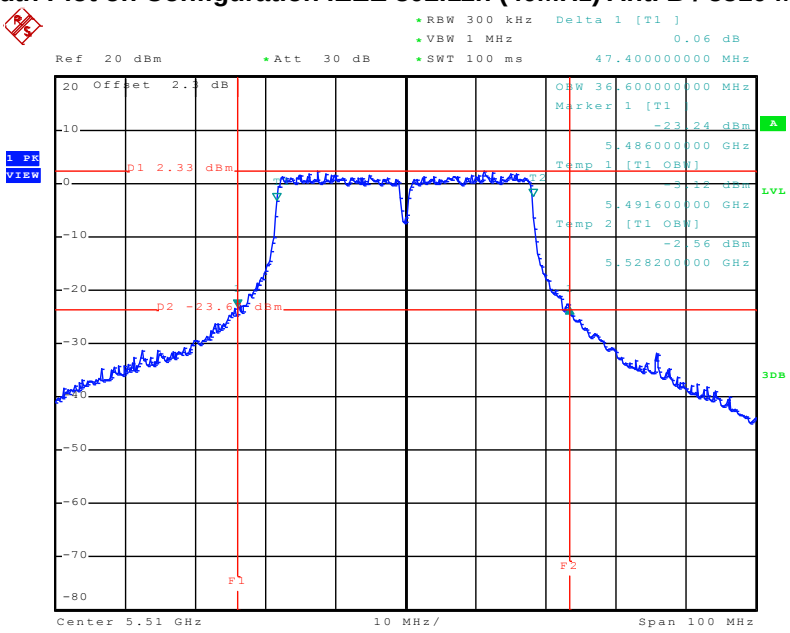
Date: 1.MAY.2011 15:22:26

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5310 MHz



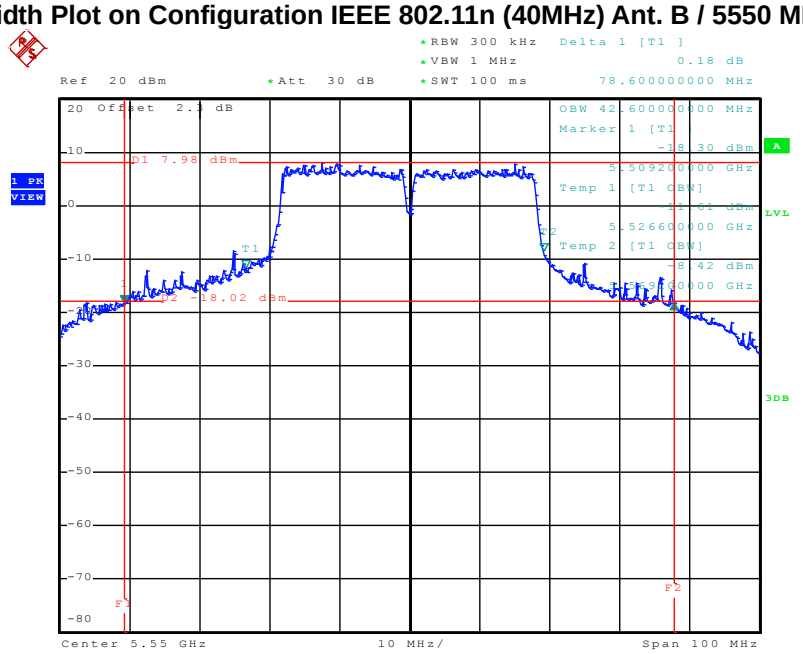
Date: 1.MAY.2011 15:25:42

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5510 MHz



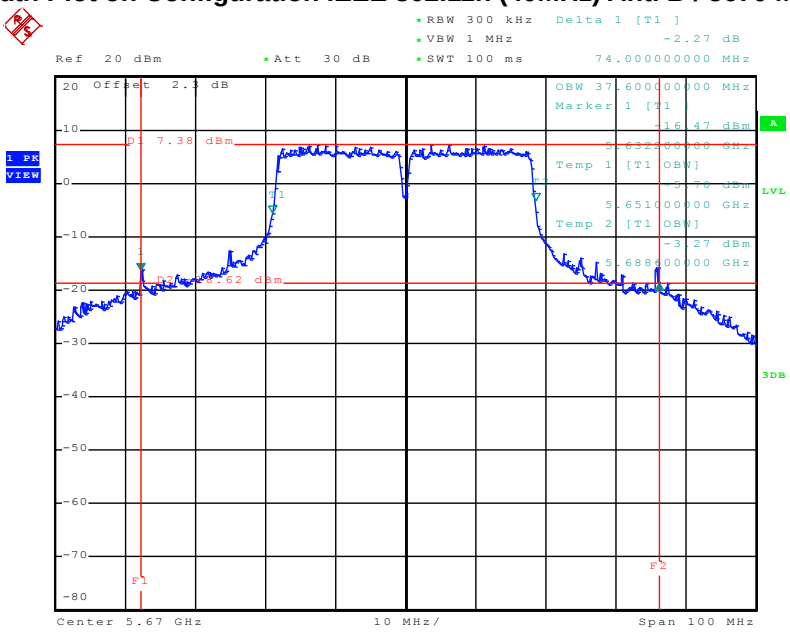
Date: 9.JUN.2011 14:45:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5550 MHz



Date: 1.JUN.2011 10:38:42

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5670 MHz



Date: 1.JUN.2011 10:46:37

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.
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

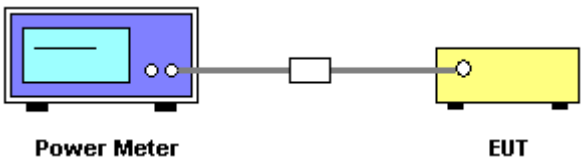
Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

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.

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	Jun. 01, 2011	**Test Site No.**	TH01-HY
Temperature	30℃	**Humidity**	60%
Test Engineer	Ian	**Configurations**	802.11a/n

Configuration of IEEE 802.11a Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	9.87	17.00	**Complies**
40	5200 MHz	9.99	17.00	**Complies**
48	5240 MHz	10.47	17.00	**Complies**
52	5260 MHz	17.65	24.00	**Complies**
56	5280 MHz	16.53	24.00	**Complies**
64	5320 MHz	13.51	24.00	**Complies**
100	5500 MHz	16.12	24.00	**Complies**
116	5580 MHz	15.11	24.00	**Complies**
140	5700 MHz	15.28	24.00	**Complies**

Configuration of IEEE 802.11a Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	7.56	17.00	**Complies**
40	5200 MHz	8.18	17.00	**Complies**
48	5240 MHz	8.96	17.00	**Complies**
52	5260 MHz	15.98	24.00	**Complies**
56	5280 MHz	14.69	24.00	**Complies**
64	5320 MHz	13.39	24.00	**Complies**
100	5500 MHz	16.47	24.00	**Complies**
116	5580 MHz	15.62	24.00	**Complies**
140	5700 MHz	16.99	24.00	**Complies**

Configuration of IEEE 802.11a Ant. A+Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.88	17.00	**Complies**
40	5200 MHz	12.19	17.00	**Complies**
48	5240 MHz	12.79	17.00	**Complies**
52	5260 MHz	19.91	24.00	**Complies**
56	5280 MHz	18.72	24.00	**Complies**
64	5320 MHz	16.46	24.00	**Complies**
100	5500 MHz	19.31	24.00	**Complies**
116	5580 MHz	18.38	24.00	**Complies**
140	5700 MHz	19.23	24.00	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.50	17.00	**Complies**
40	5200 MHz	10.36	17.00	**Complies**
48	5240 MHz	10.96	17.00	**Complies**
52	5260 MHz	15.72	24.00	**Complies**
56	5280 MHz	15.45	24.00	**Complies**
64	5320 MHz	14.09	24.00	**Complies**
100	5500 MHz	15.89	24.00	**Complies**
116	5580 MHz	14.78	24.00	**Complies**
140	5700 MHz	14.86	24.00	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	8.22	17.00	**Complies**
40	5200 MHz	9.18	17.00	**Complies**
48	5240 MHz	9.36	17.00	**Complies**
52	5260 MHz	13.84	24.00	**Complies**
56	5280 MHz	12.53	24.00	**Complies**
64	5320 MHz	12.12	24.00	**Complies**
100	5500 MHz	16.61	24.00	**Complies**
116	5580 MHz	15.76	24.00	**Complies**
140	5700 MHz	16.65	24.00	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. A+Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.52	17.00	**Complies**
40	5200 MHz	12.82	17.00	**Complies**
48	5240 MHz	13.24	17.00	**Complies**
52	5260 MHz	17.89	24.00	**Complies**
56	5280 MHz	17.24	24.00	**Complies**
64	5320 MHz	16.23	24.00	**Complies**
100	5500 MHz	19.28	24.00	**Complies**
116	5580 MHz	18.31	24.00	**Complies**
140	5700 MHz	18.86	24.00	**Complies**

Configuration IEEE 802.11n (40MHz) Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	9.21	17.00	**Complies**
46	5230 MHz	11.52	17.00	**Complies**
54	5270 MHz	16.89	24.00	**Complies**
62	5310 MHz	11.63	24.00	**Complies**
102	5510 MHz	9.15	24.00	**Complies**
110	5550 MHz	14.84	24.00	**Complies**
134	5670 MHz	14.61	24.00	**Complies**

Configuration IEEE 802.11n (40MHz) Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	8.33	17.00	**Complies**
46	5230 MHz	9.63	17.00	**Complies**
54	5270 MHz	15.64	24.00	**Complies**
62	5310 MHz	12.95	24.00	**Complies**
102	5510 MHz	10.10	24.00	**Complies**
110	5550 MHz	15.98	24.00	**Complies**
134	5670 MHz	15.93	24.00	**Complies**

Configuration IEEE 802.11n (40MHz) Ant. A+Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.80	17.00	**Complies**
46	5230 MHz	13.69	17.00	**Complies**
54	5270 MHz	19.32	24.00	**Complies**
62	5310 MHz	15.35	24.00	**Complies**
102	5510 MHz	12.66	24.00	**Complies**
110	5550 MHz	18.46	24.00	**Complies**
134	5670 MHz	18.33	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
5.725-5.825	17

3.4.2 Measuring Instruments and Setting

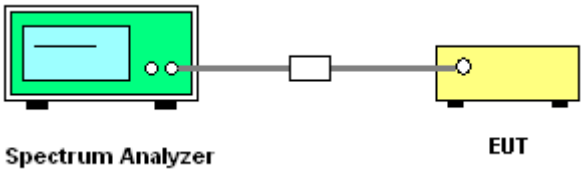
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	Peak
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 Peak, 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	Jun. 0, 2011	**Test Site No.**	TH01-HY
Temperature	30℃	**Humidity**	60%
Test Engineer	Ian	**Configurations**	802.11a/n

Configuration of IEEE 802.11a Ant. A

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-0.11	4.00	**Complies**
5200 MHz	-0.04	4.00	**Complies**
5240 MHz	0.34	4.00	**Complies**
5260 MHz	7.91	11.00	**Complies**
5280 MHz	7.33	11.00	**Complies**
5320 MHz	6.10	11.00	**Complies**
5500 MHz	6.23	11.00	**Complies**
5580 MHz	5.27	11.00	**Complies**
5700 MHz	4.28	11.00	**Complies**

Configuration of IEEE 802.11a Ant. B

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-2.89	4.00	**Complies**
5200 MHz	-2.02	4.00	**Complies**
5240 MHz	-1.11	4.00	**Complies**
5260 MHz	5.97	11.00	**Complies**
5280 MHz	5.59	11.00	**Complies**
5320 MHz	4.18	11.00	**Complies**
5500 MHz	6.70	11.00	**Complies**
5580 MHz	5.78	11.00	**Complies**
5700 MHz	5.86	11.00	**Complies**

Configuration of IEEE 802.11a Ant. A+Ant. B

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	1.73	4.00	**Complies**
5200 MHz	2.09	4.00	**Complies**
5240 MHz	2.69	4.00	**Complies**
5260 MHz	10.06	11.00	**Complies**
5280 MHz	9.56	11.00	**Complies**
5320 MHz	8.26	11.00	**Complies**
5500 MHz	9.48	11.00	**Complies**
5580 MHz	8.54	11.00	**Complies**
5700 MHz	8.15	11.00	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. A

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-2.40	4.00	**Complies**
5200 MHz	-2.32	4.00	**Complies**
5240 MHz	-0.62	4.00	**Complies**
5260 MHz	4.64	11.00	**Complies**
5280 MHz	5.95	11.00	**Complies**
5320 MHz	5.19	11.00	**Complies**
5500 MHz	6.79	11.00	**Complies**
5580 MHz	5.45	11.00	**Complies**
5700 MHz	5.12	11.00	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. B

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-2.14	4.00	**Complies**
5200 MHz	-1.50	4.00	**Complies**
5240 MHz	0.04	4.00	**Complies**
5260 MHz	4.89	11.00	**Complies**
5280 MHz	5.79	11.00	**Complies**
5320 MHz	5.09	11.00	**Complies**
5500 MHz	7.66	11.00	**Complies**
5580 MHz	7.02	11.00	**Complies**
5700 MHz	6.49	11.00	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. A+Ant. B

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	0.74	4.00	**Complies**
5200 MHz	1.12	4.00	**Complies**
5240 MHz	2.73	4.00	**Complies**
5260 MHz	7.78	11.00	**Complies**
5280 MHz	8.88	11.00	**Complies**
5320 MHz	8.15	11.00	**Complies**
5500 MHz	10.26	11.00	**Complies**
5580 MHz	9.32	11.00	**Complies**
5700 MHz	8.87	11.00	**Complies**

Configuration IEEE 802.11n (40MHz) Ant. A

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-4.49	4.00	**Complies**
5230 MHz	-1.41	4.00	**Complies**
5270 MHz	4.00	11.00	**Complies**
5310 MHz	-0.80	11.00	**Complies**
5510 MHz	-2.05	11.00	**Complies**
5550 MHz	3.00	11.00	**Complies**
5670 MHz	2.18	11.00	**Complies**

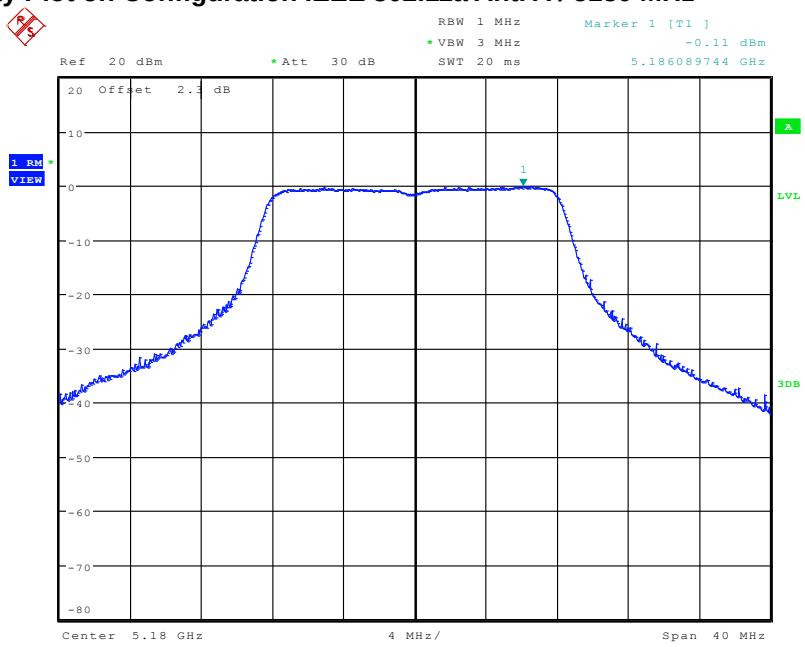
Configuration IEEE 802.11n (40MHz) Ant. B

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-3.96	4.00	**Complies**
5230 MHz	-2.00	4.00	**Complies**
5270 MHz	4.40	11.00	**Complies**
5310 MHz	-0.85	11.00	**Complies**
5510 MHz	-1.53	11.00	**Complies**
5550 MHz	4.17	11.00	**Complies**
5670 MHz	3.83	11.00	**Complies**

Configuration IEEE 802.11n (40MHz) Ant. A+Ant. B

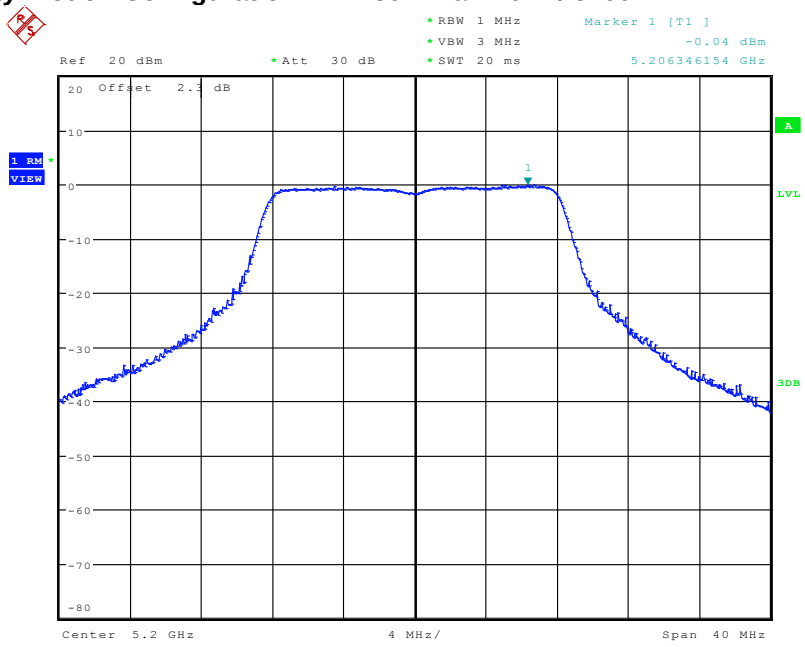
Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-1.21	4.00	**Complies**
5230 MHz	1.32	4.00	**Complies**
5270 MHz	7.21	11.00	**Complies**
5310 MHz	2.19	11.00	**Complies**
5510 MHz	1.23	11.00	**Complies**
5550 MHz	6.63	11.00	**Complies**
5670 MHz	6.09	11.00	**Complies**

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5180 MHz



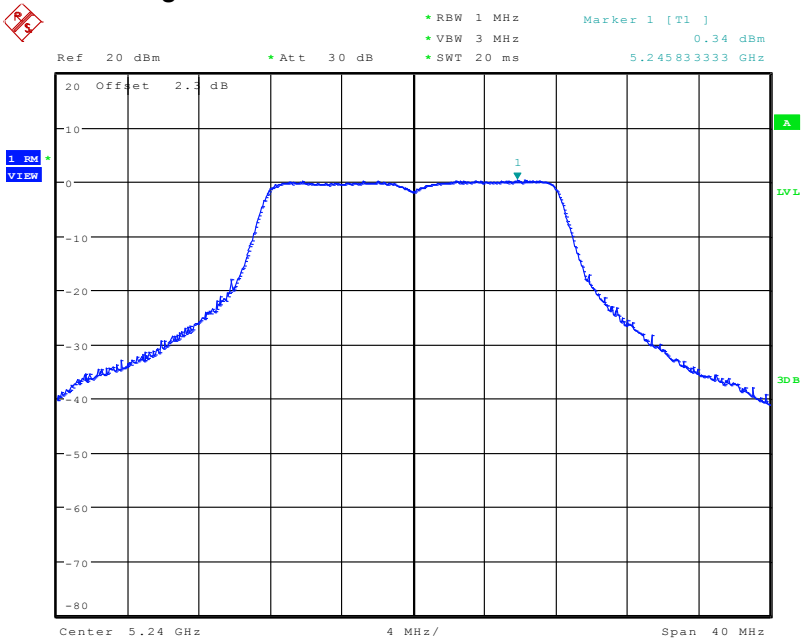
Date: 22.APR.2011 20:51:42

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5200 MHz



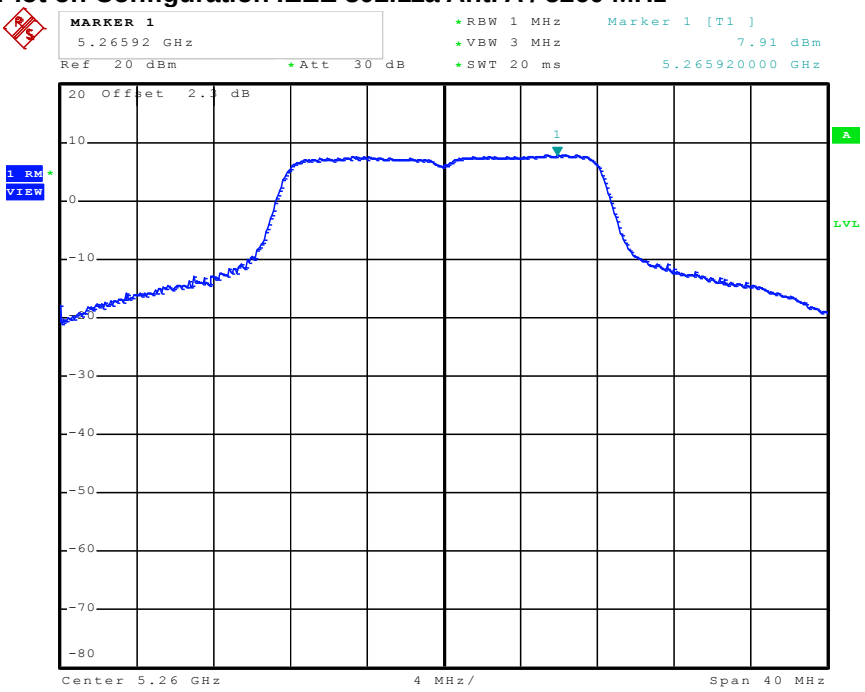
Date: 22.APR.2011 21:08:08

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5240 MHz



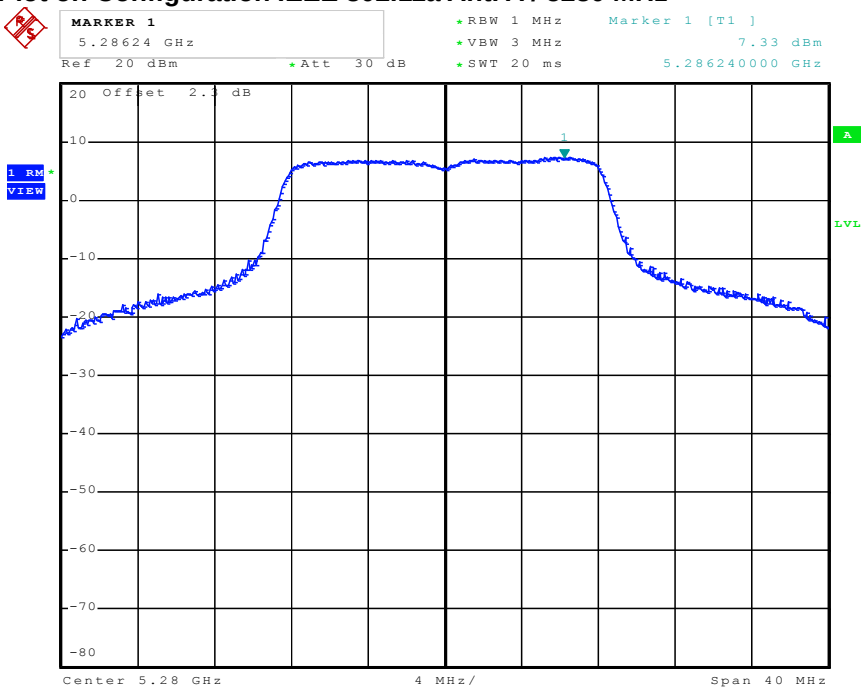
Date: 22.APR.2011 21:22:07

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5260 MHz



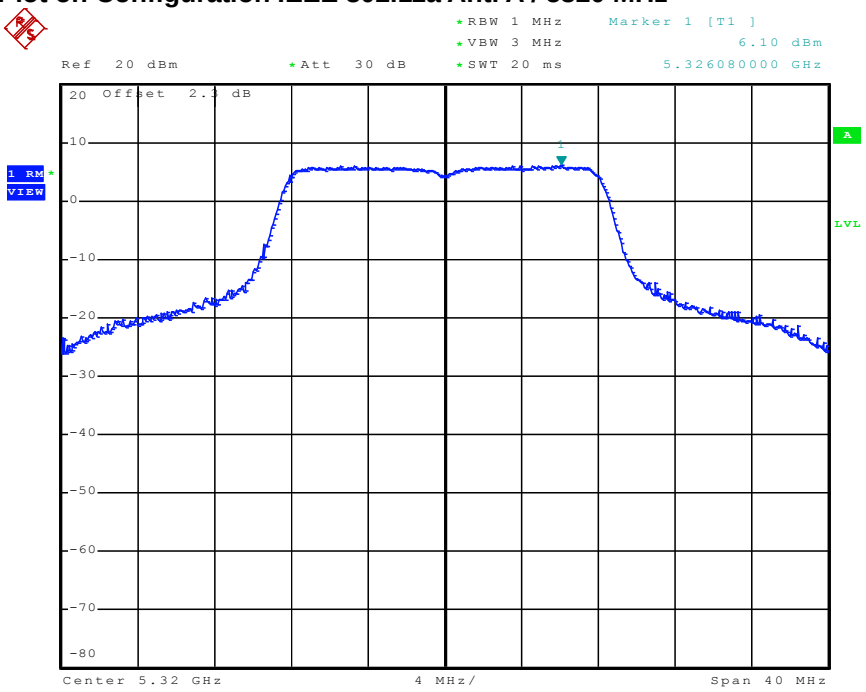
Date: 18.APR.2011 23:11:31

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5280 MHz



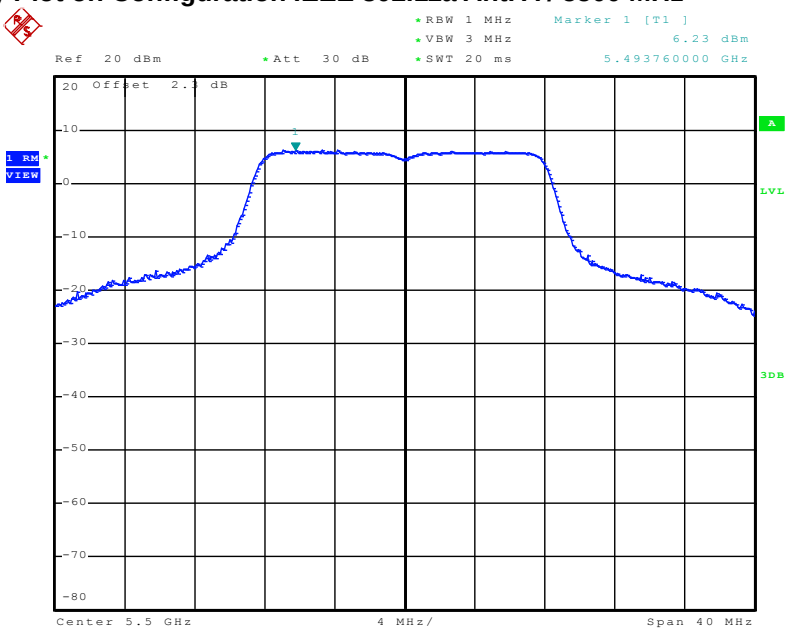
Date: 18.APR.2011 23:06:15

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5320 MHz



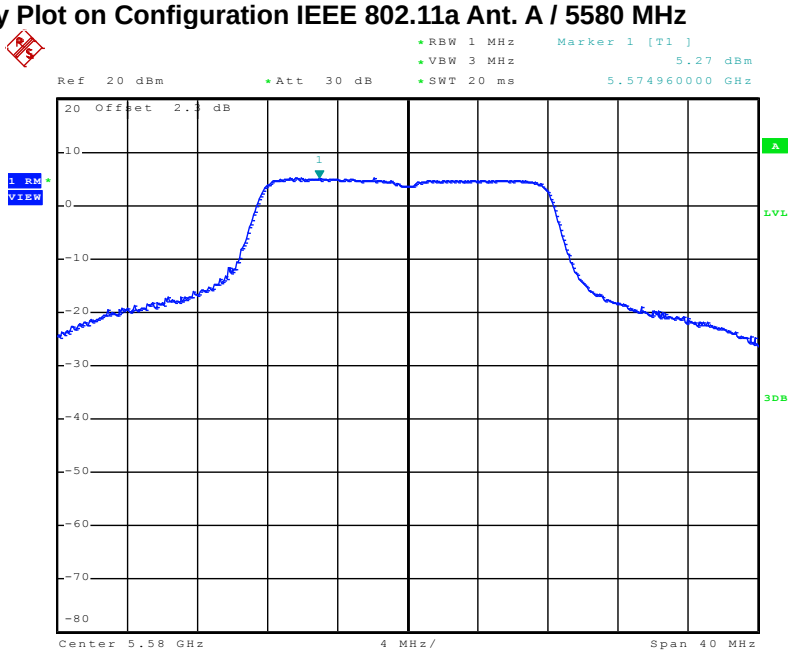
Date: 18.APR.2011 23:02:32

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5500 MHz



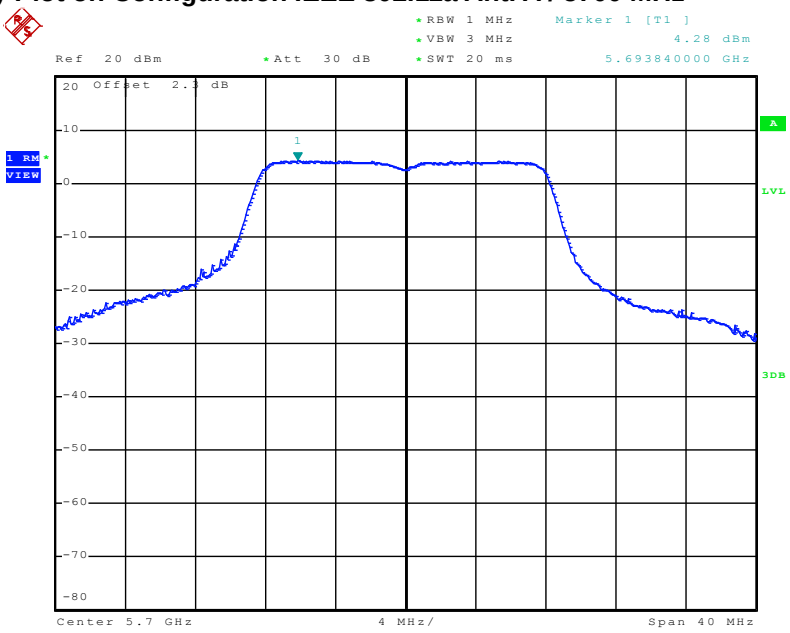
Date: 31.MAY.2011 20:43:27

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5580 MHz



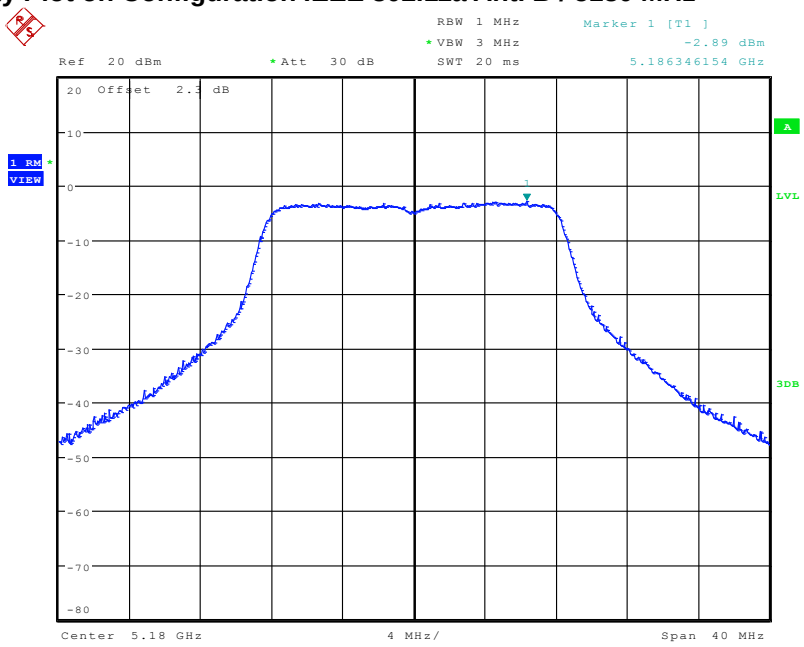
Date: 31.MAY.2011 20:52:58

Power Density Plot on Configuration IEEE 802.11a Ant. A / 5700 MHz



Date: 31.MAY.2011 21:04:24

Power Density Plot on Configuration IEEE 802.11a Ant. B / 5180 MHz



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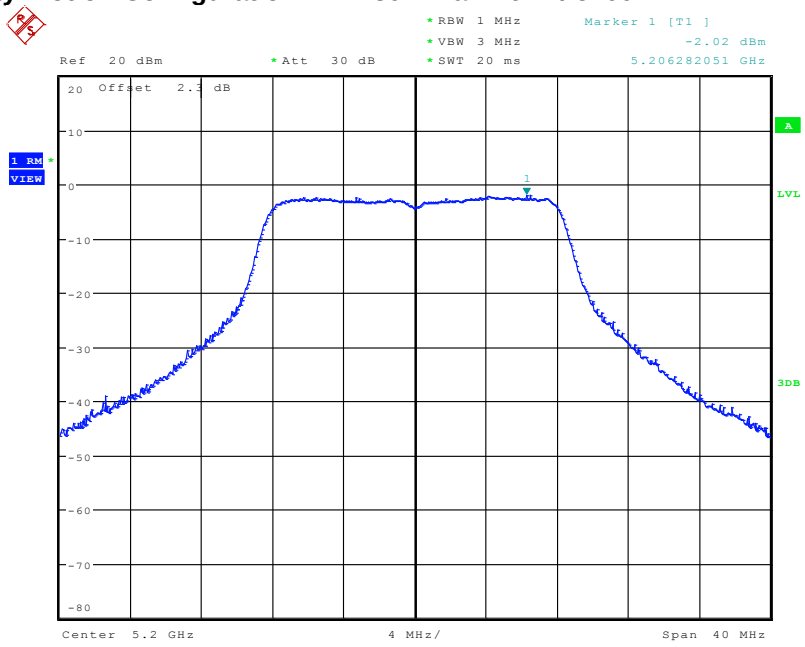
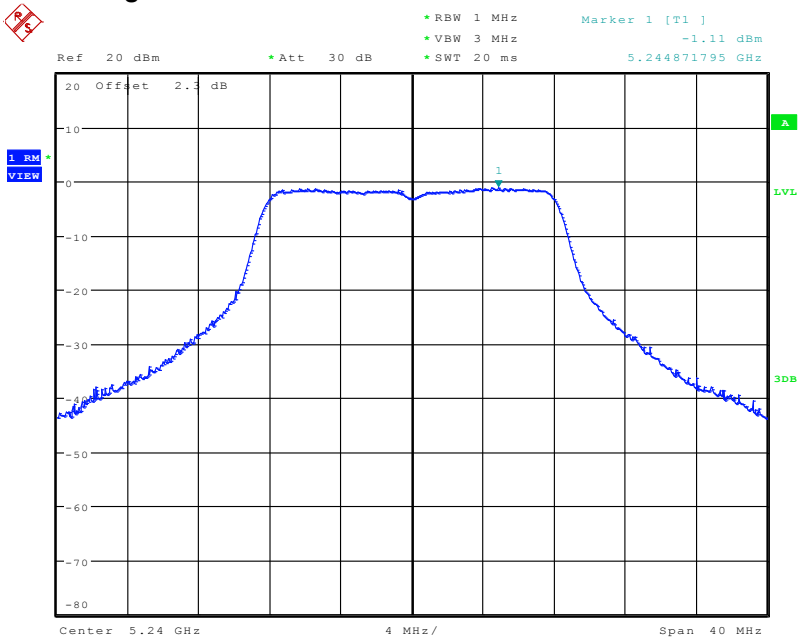
Power Density Plot on Configuration IEEE 802.11a Ant. B / 5200 MHz

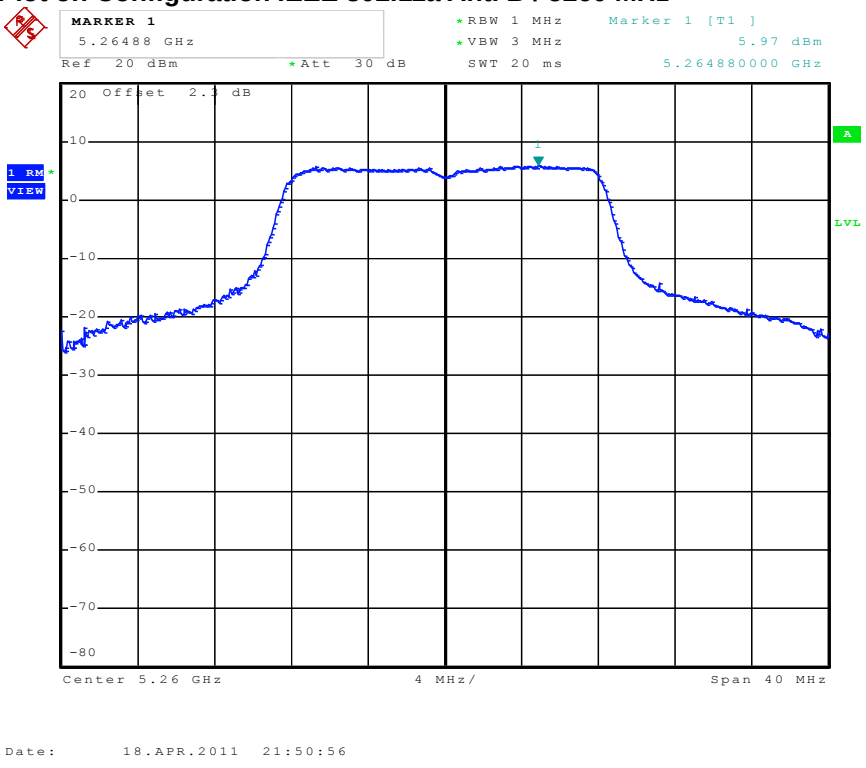


Date: 22.APR.2011 21:12:07

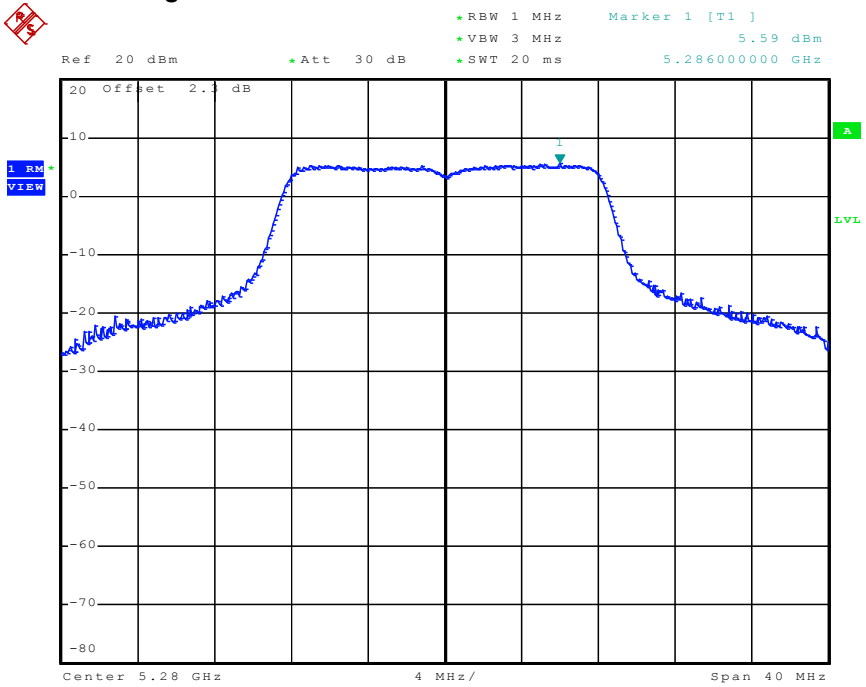
Power Density Plot on Configuration IEEE 802.11a Ant. B / 5240 MHz



Power Density Plot on Configuration IEEE 802.11a Ant. B / 5260 MHz

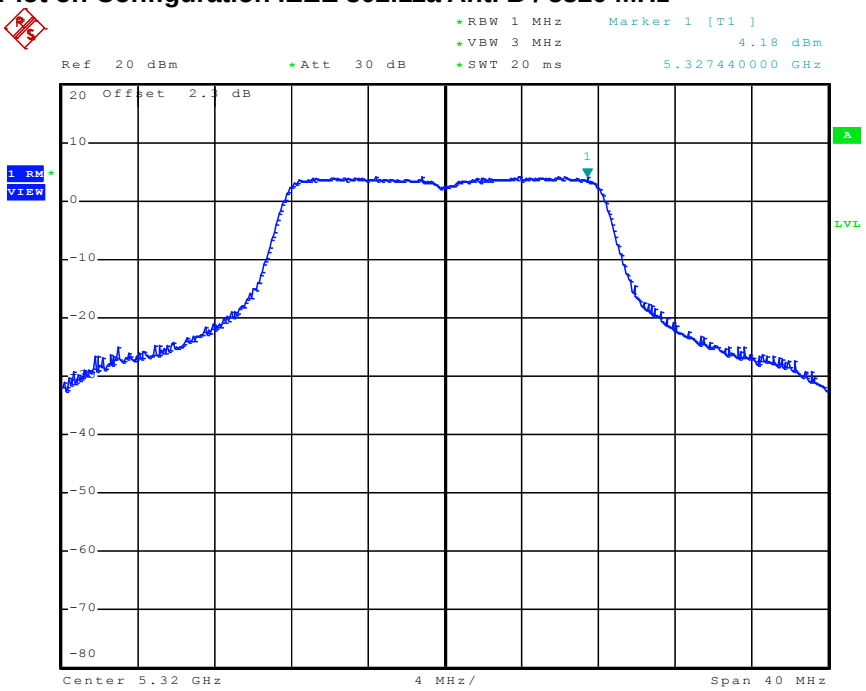


Power Density Plot on Configuration IEEE 802.11a Ant. B / 5280 MHz



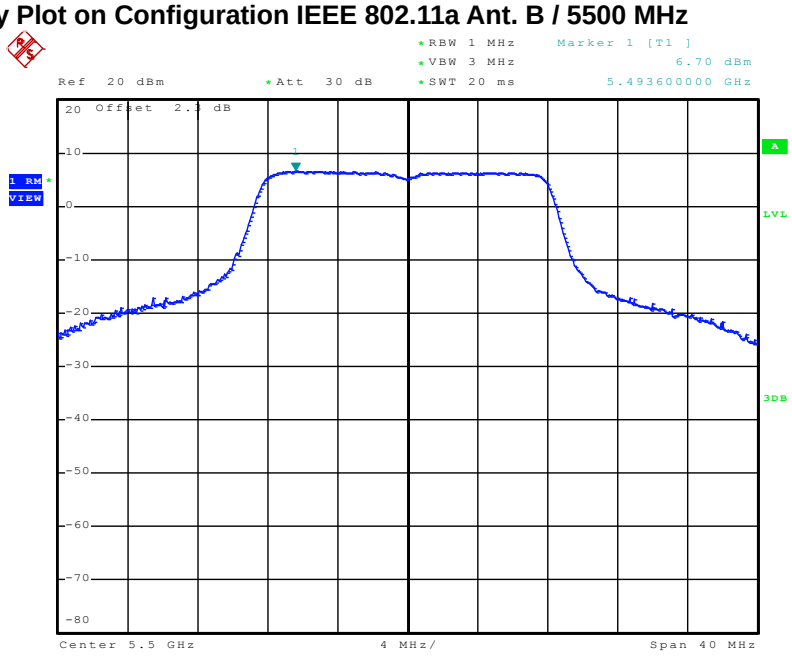
Date: 18.APR.2011 21:54:45

Power Density Plot on Configuration IEEE 802.11a Ant. B / 5320 MHz



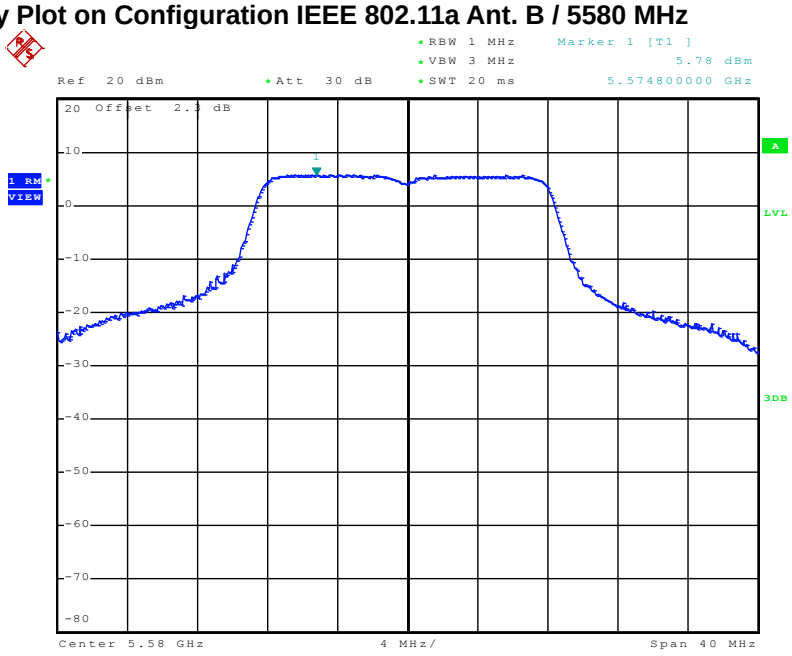
Date: 18.APR.2011 21:58:26

Power Density Plot on Configuration IEEE 802.11a Ant. B / 5500 MHz



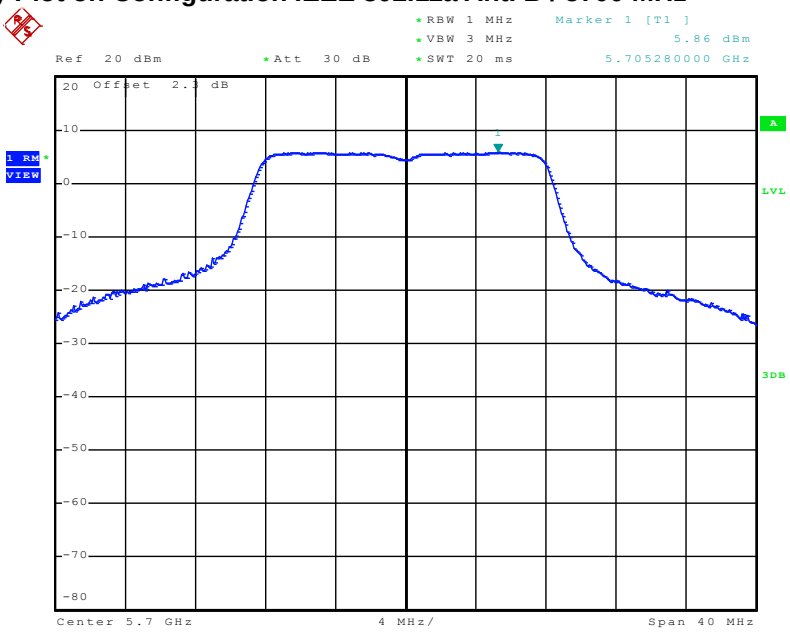
Date: 31.MAY.2011 20:49:57

Power Density Plot on Configuration IEEE 802.11a Ant. B / 5580 MHz



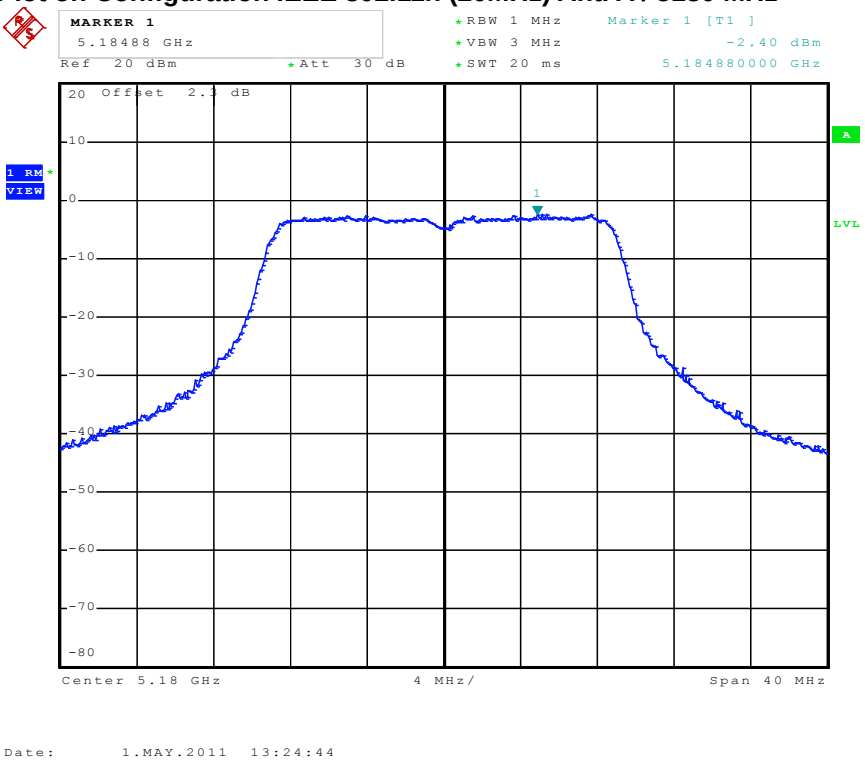
Date: 31.MAY.2011 20:57:52

Power Density Plot on Configuration IEEE 802.11a Ant. B / 5700 MHz

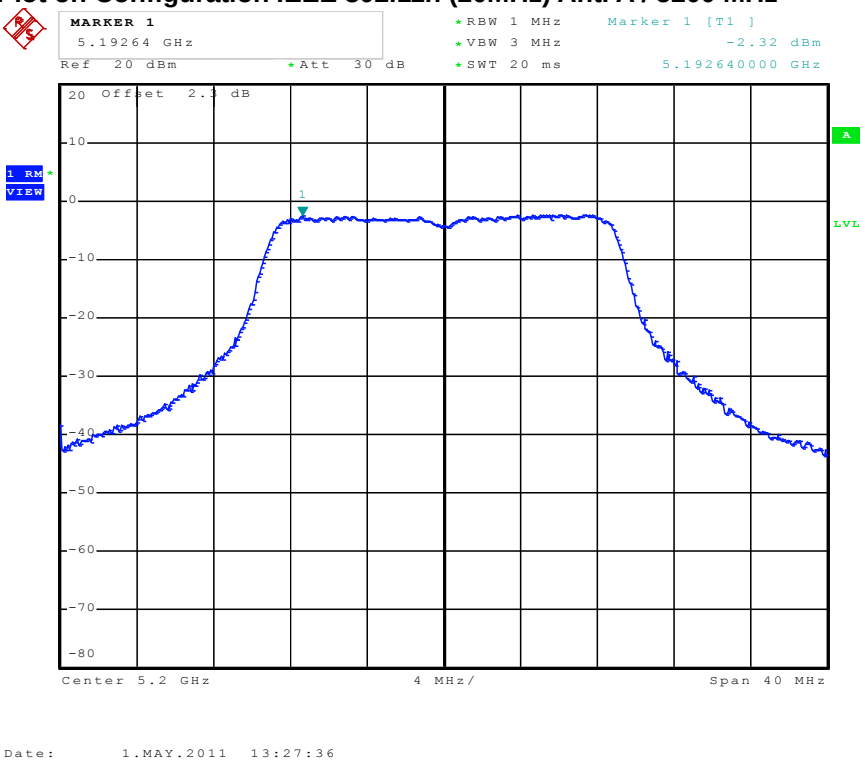


Date: 31.MAY.2011 21:07:57

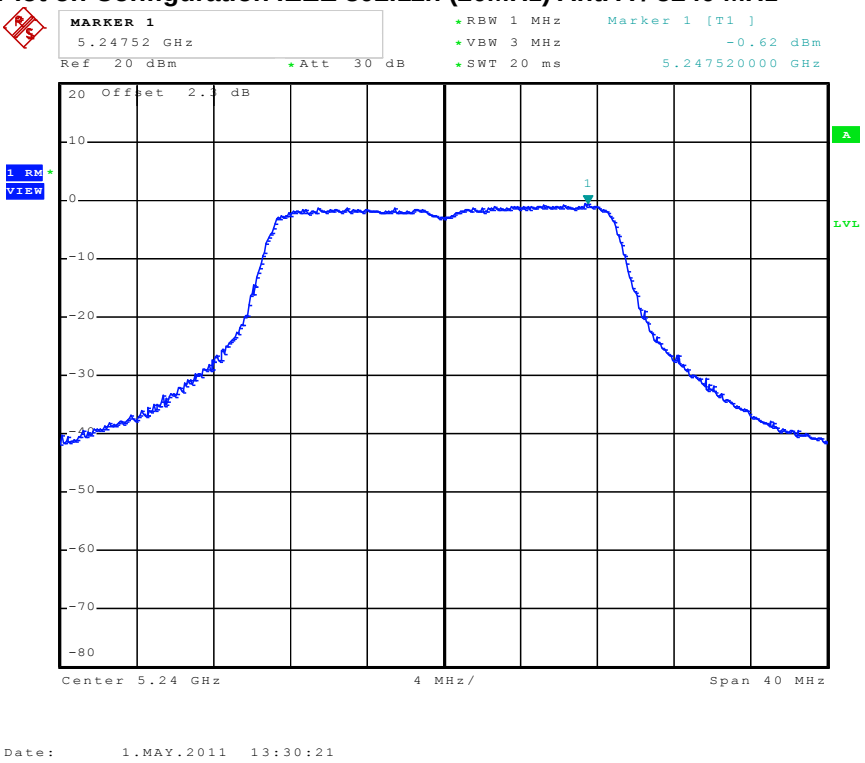
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5180 MHz



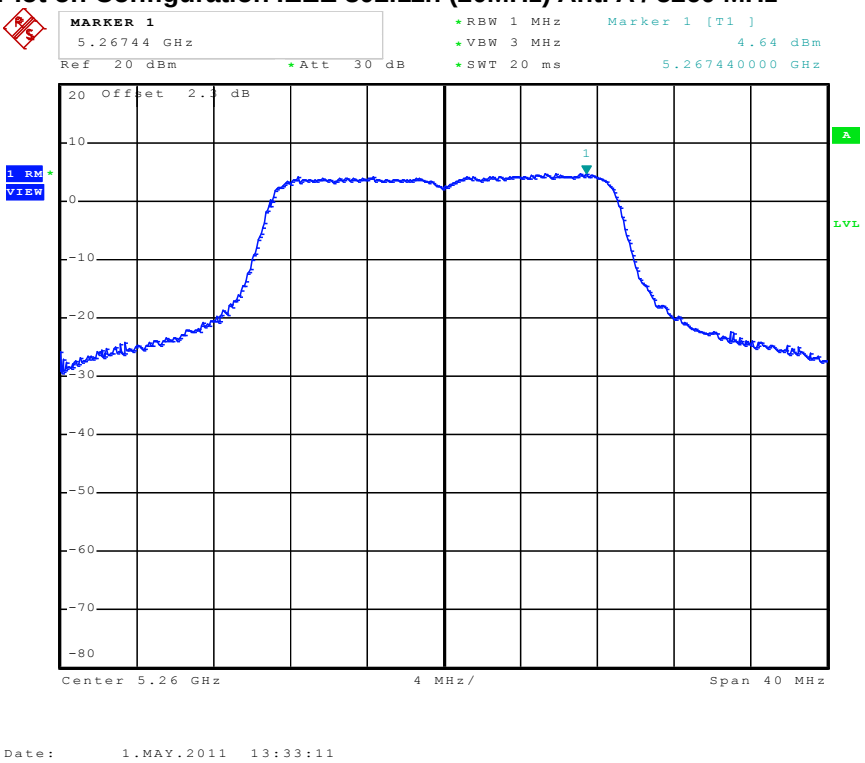
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5200 MHz



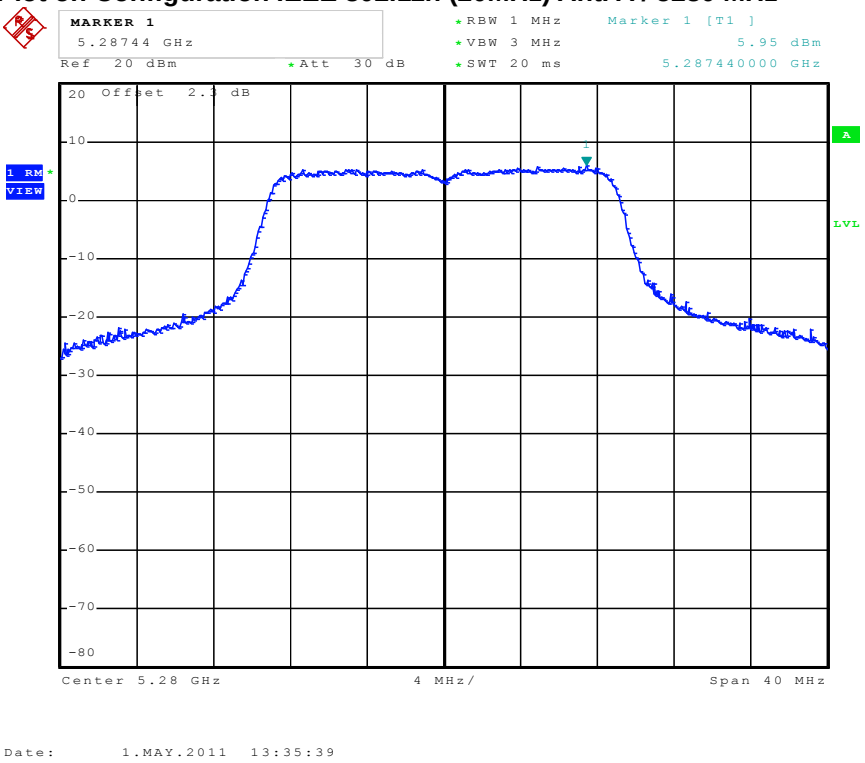
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5240 MHz



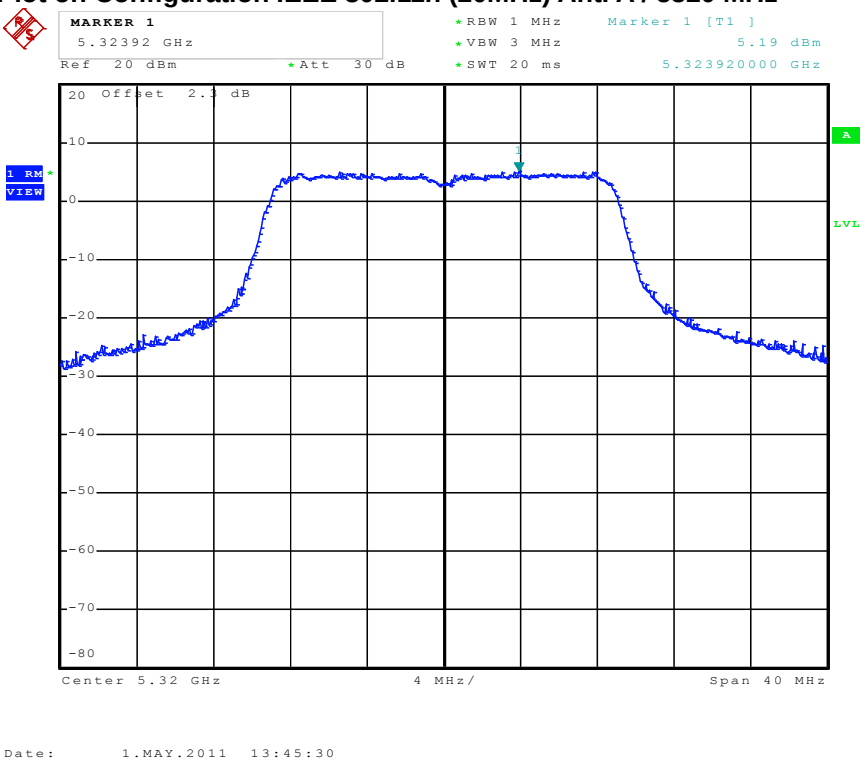
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5260 MHz



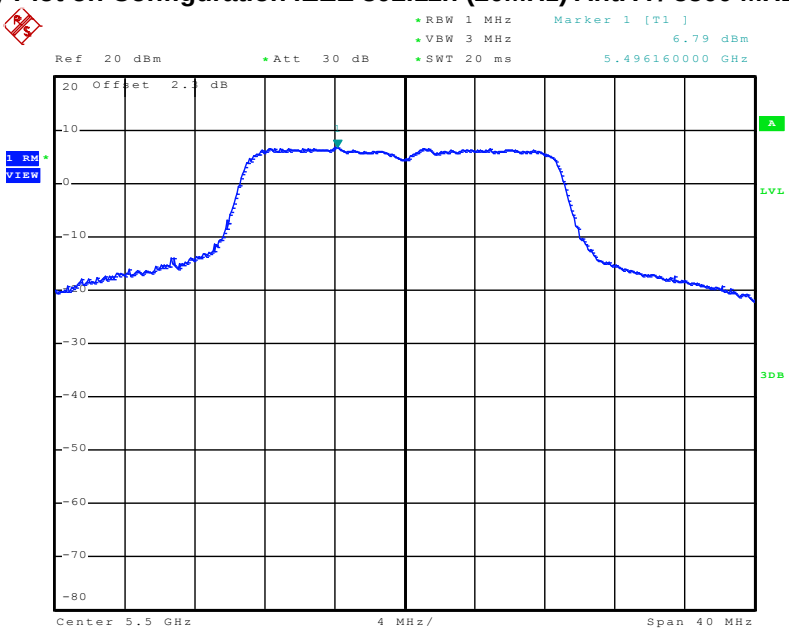
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5280 MHz



Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5320 MHz

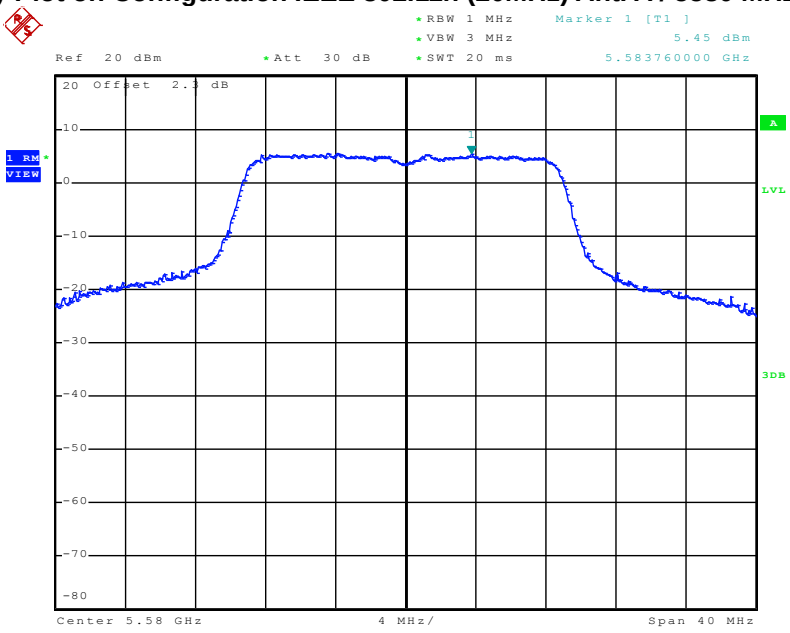


Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5500 MHz



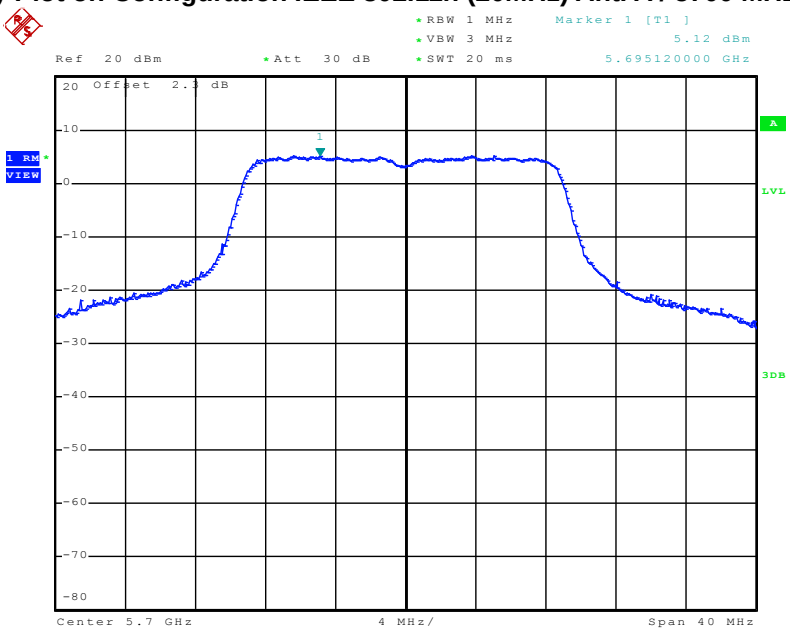
Date: 31.MAY.2011 21:18:52

Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5580 MHz



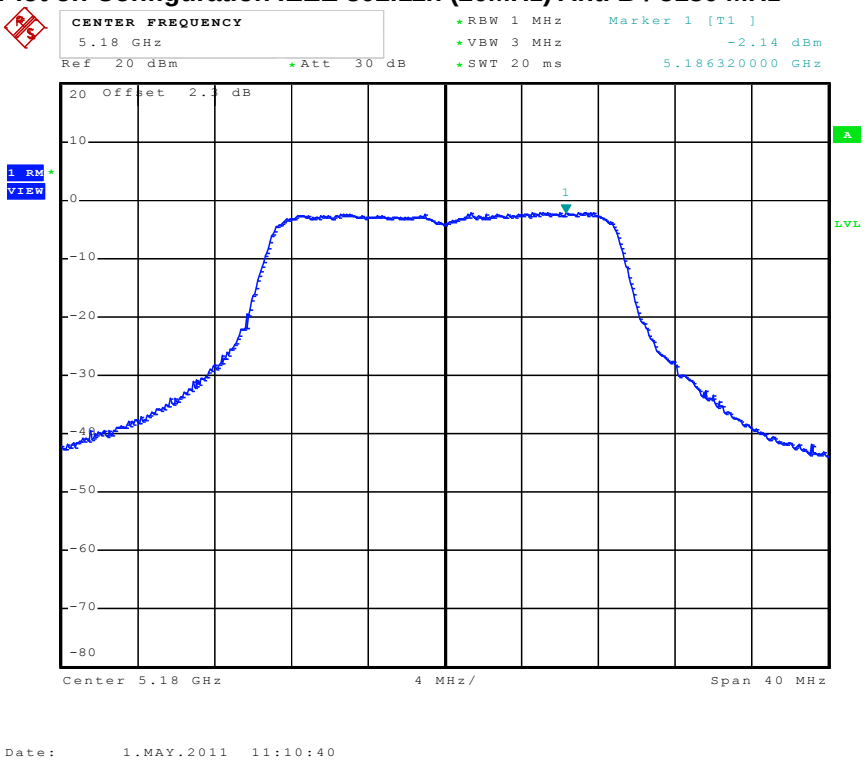
Date: 1.JUN.2011 09:54:24

Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5700 MHz

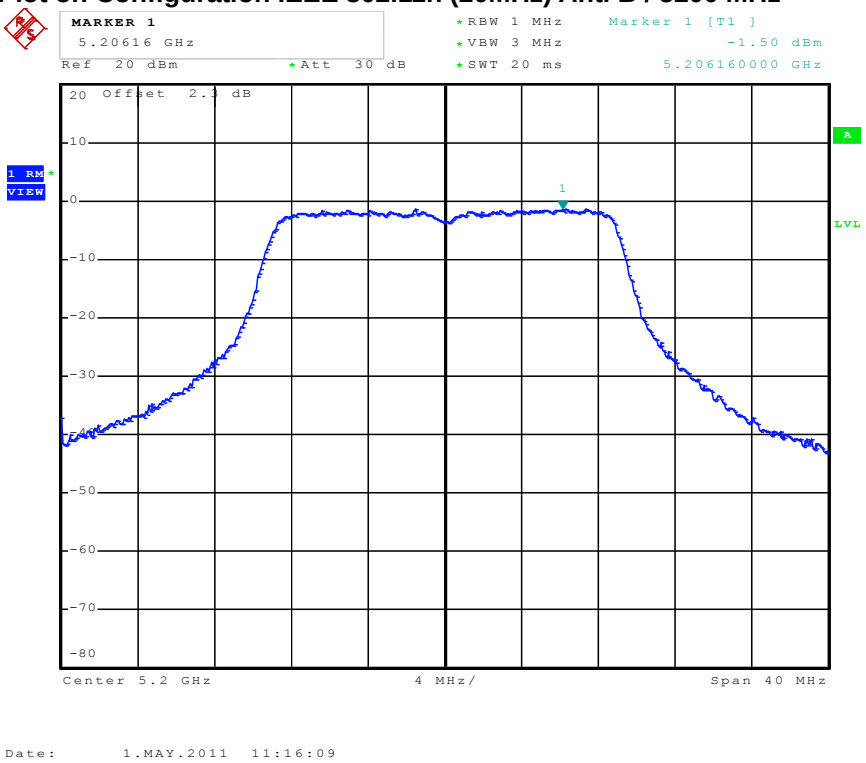


Date: 1.JUN.2011 10:03:54

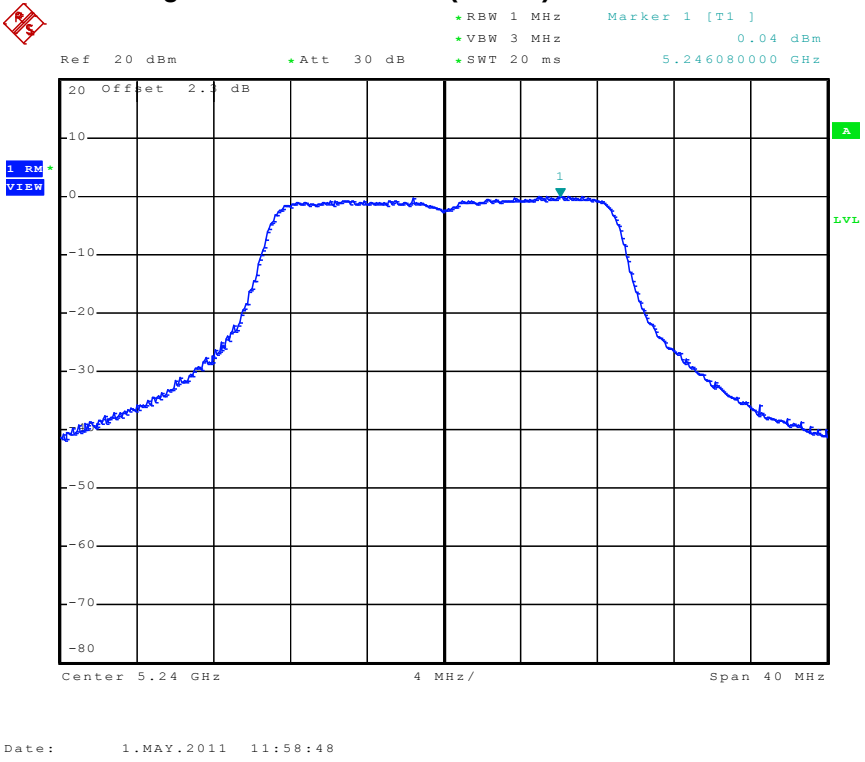
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5180 MHz



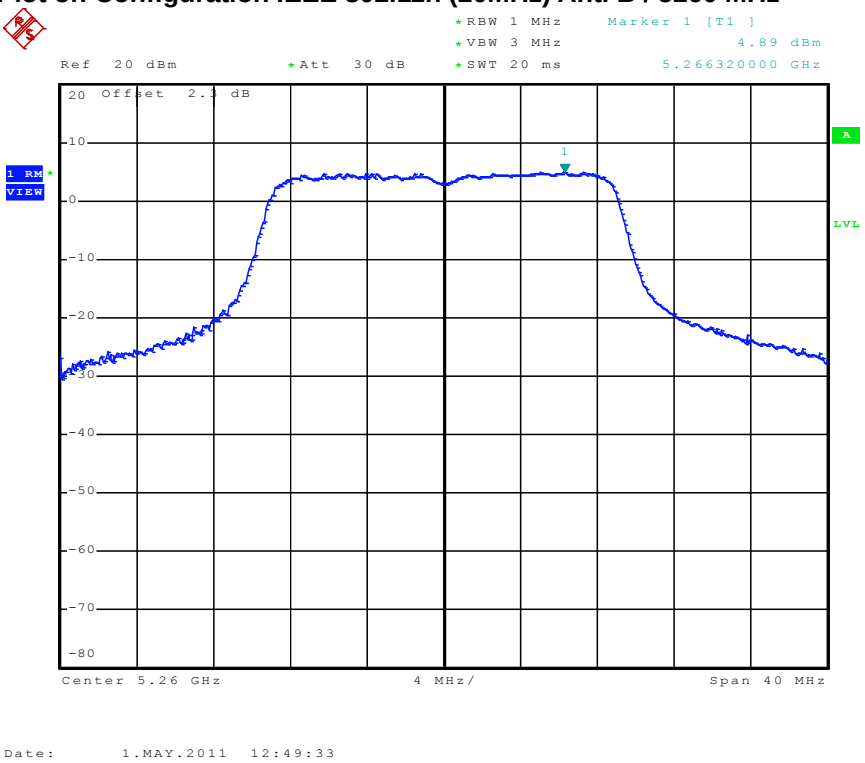
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5200 MHz



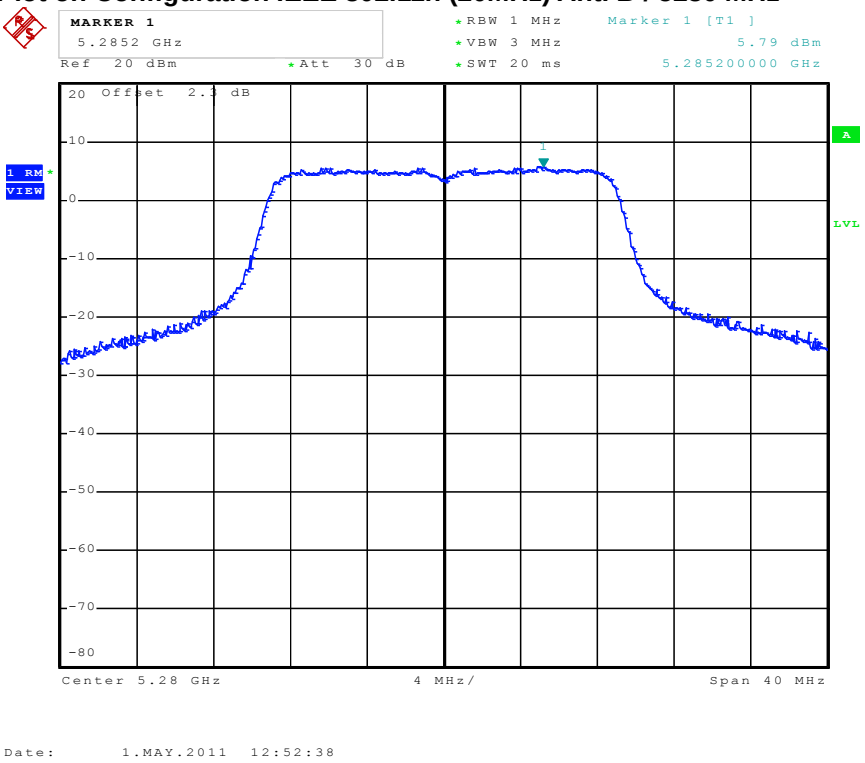
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5240 MHz



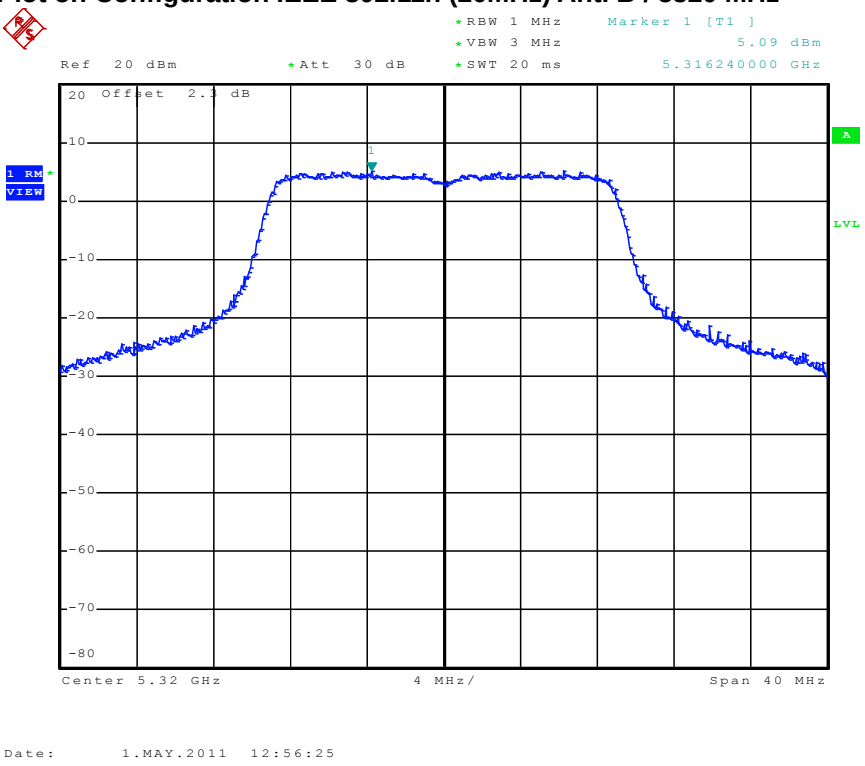
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5260 MHz



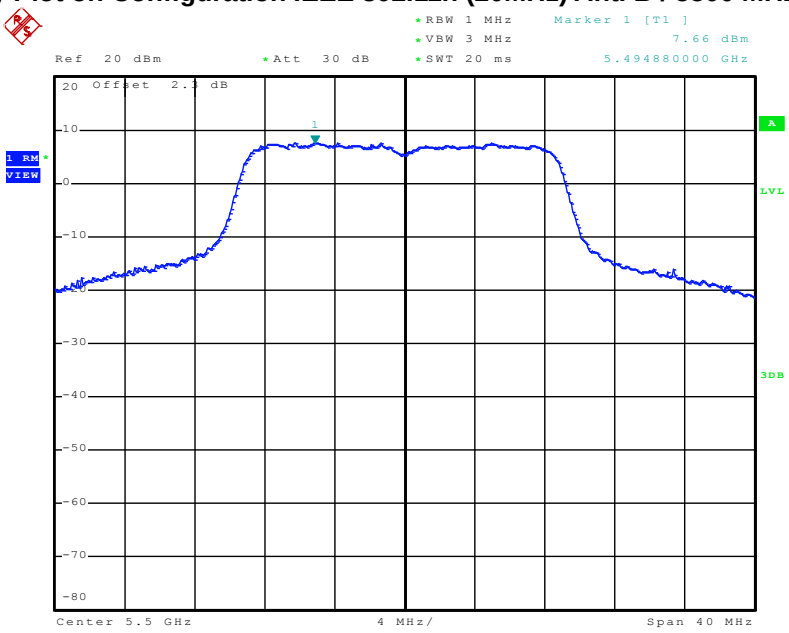
Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5280 MHz



Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5320 MHz

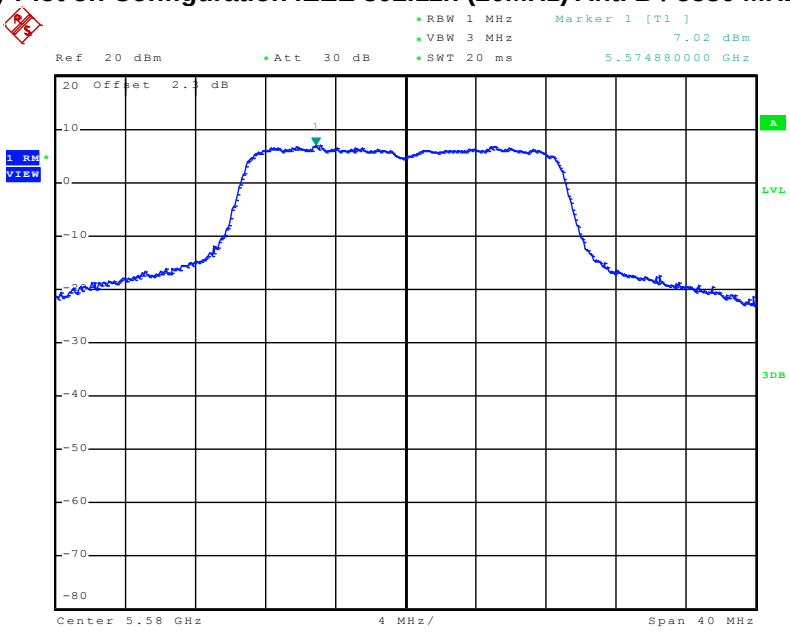


Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5500 MHz



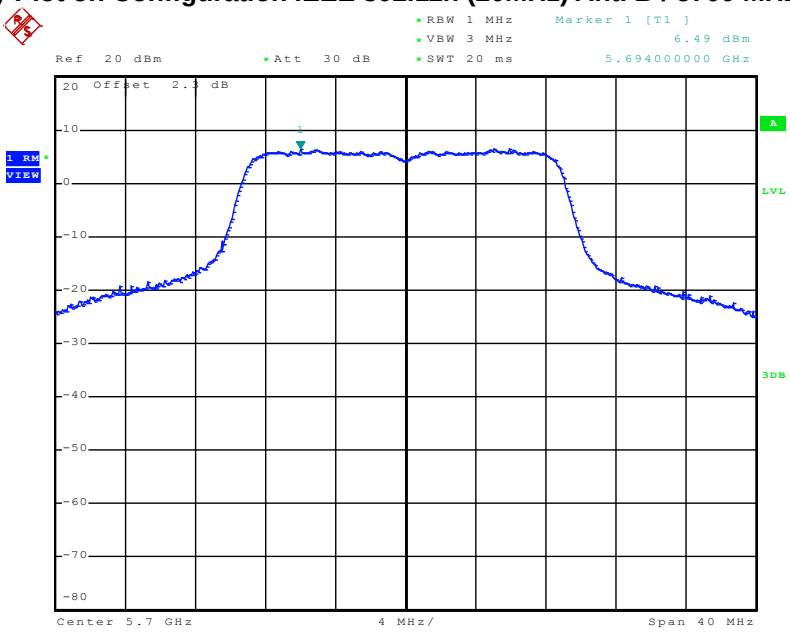
Date: 31.MAY.2011 21:22:02

Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5580 MHz



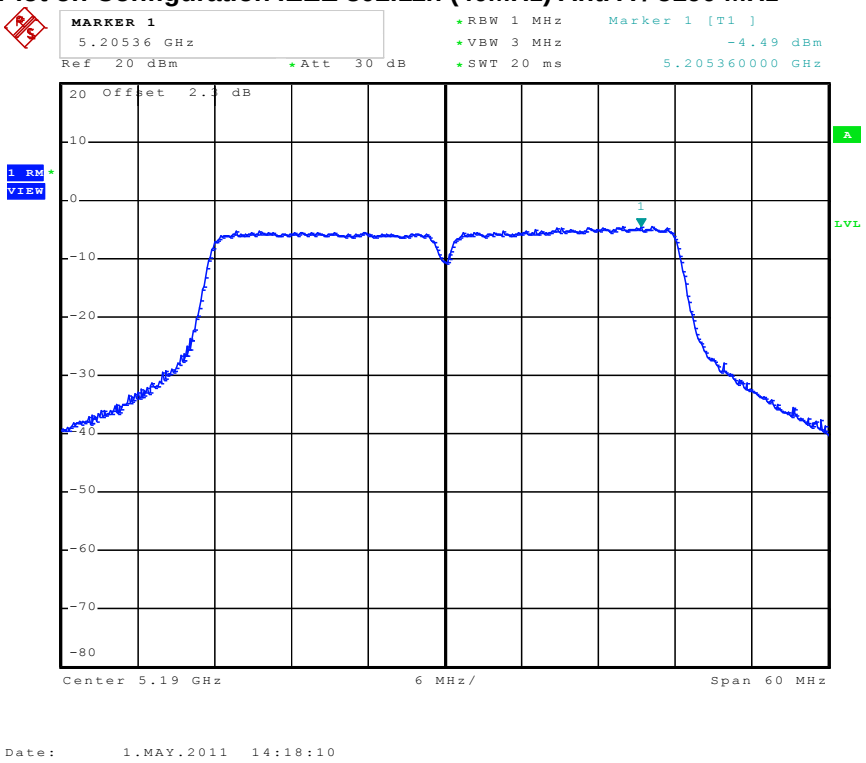
Date: 1.JUN.2011 09:59:30

Power Density Plot on Configuration IEEE 802.11n (20MHz) Ant. B / 5700 MHz

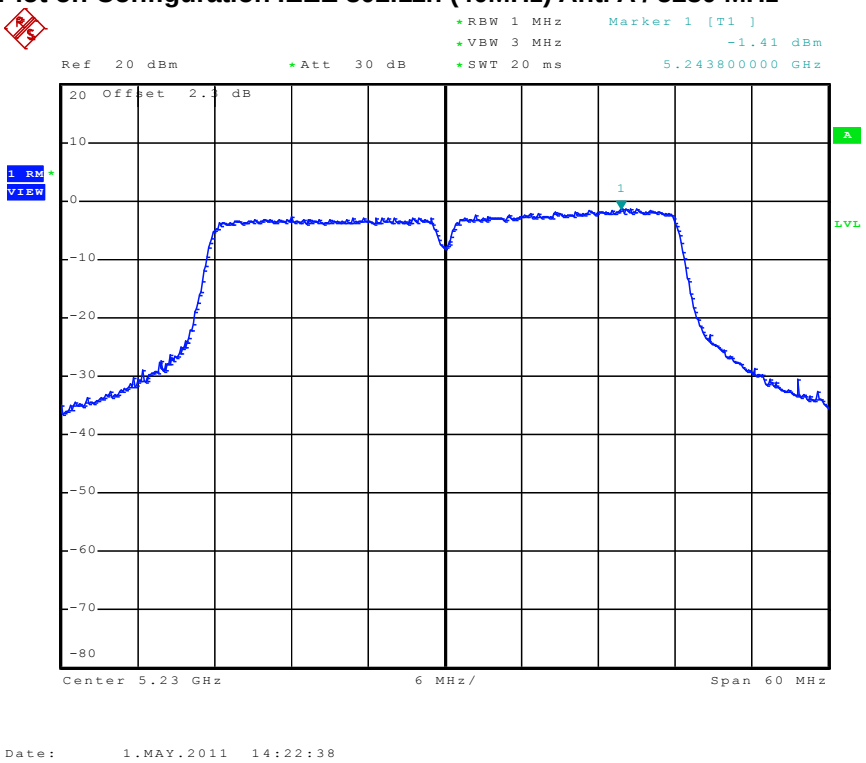


Date: 1.JUN.2011 10:08:03

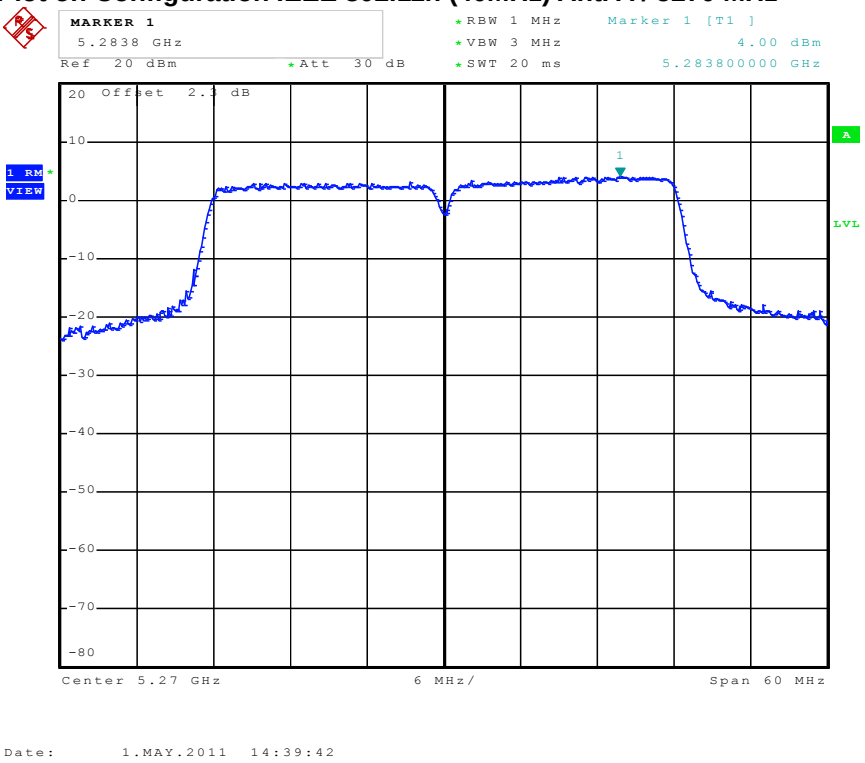
Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5190 MHz



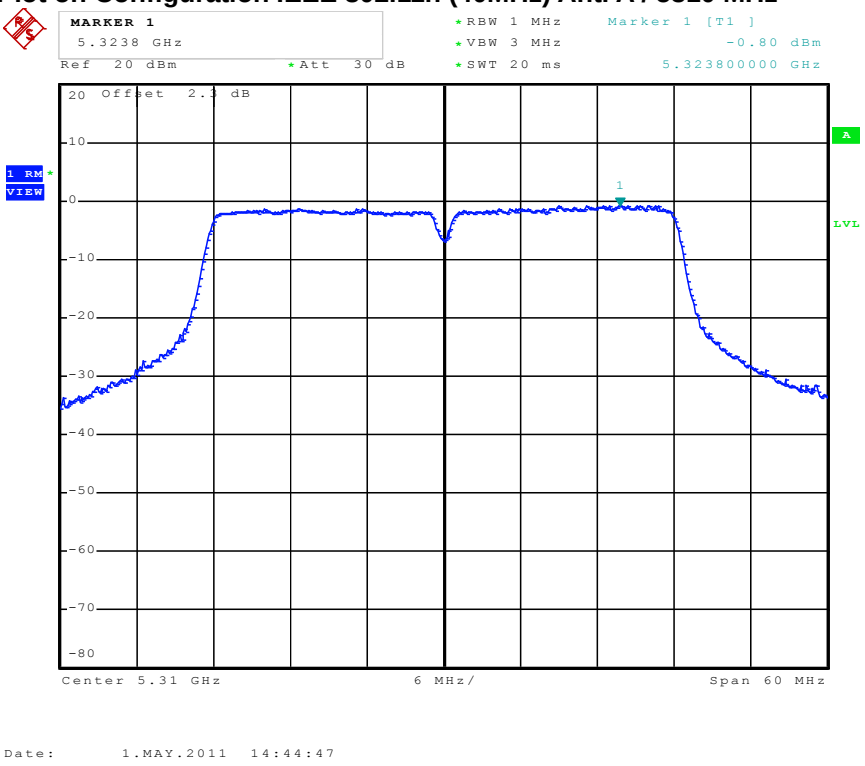
Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5230 MHz



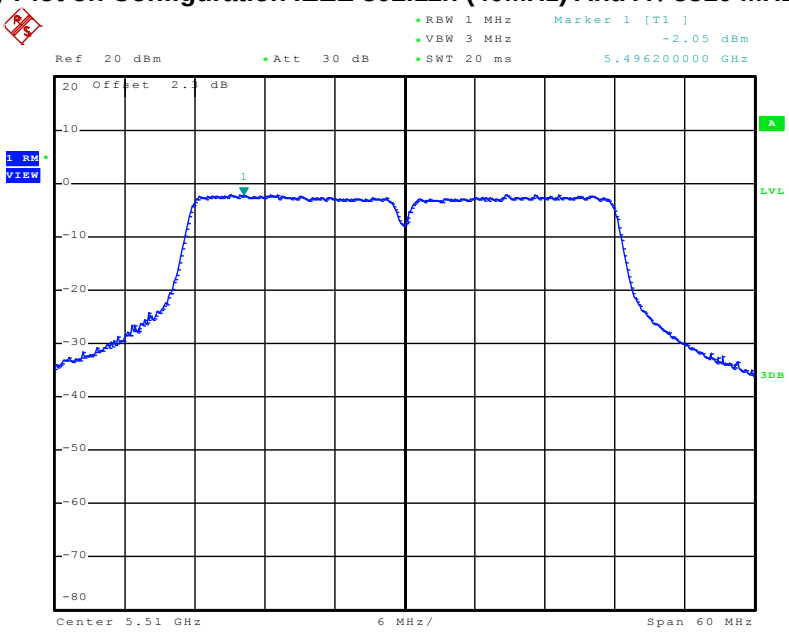
Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5270 MHz



Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5310 MHz

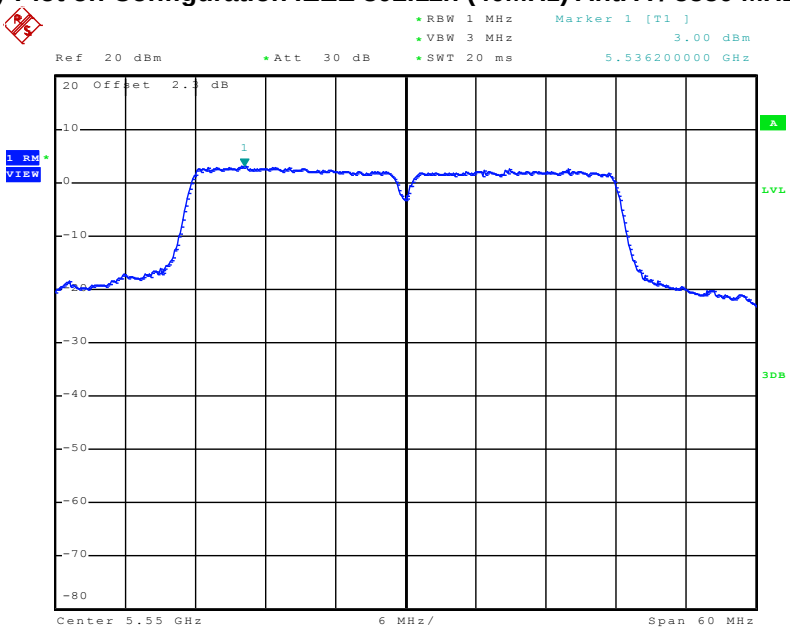


Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5510 MHz



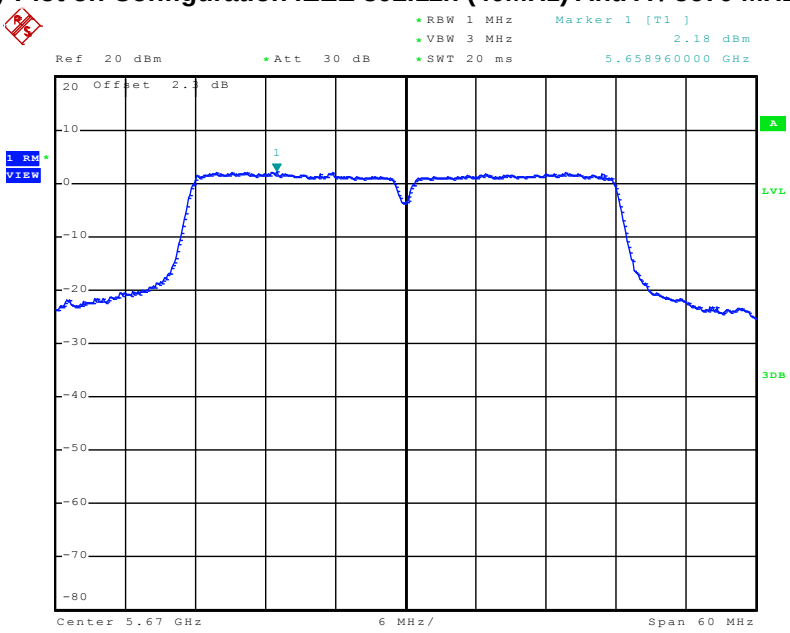
Date: 9.JUN.2011 14:33:47

Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5550 MHz



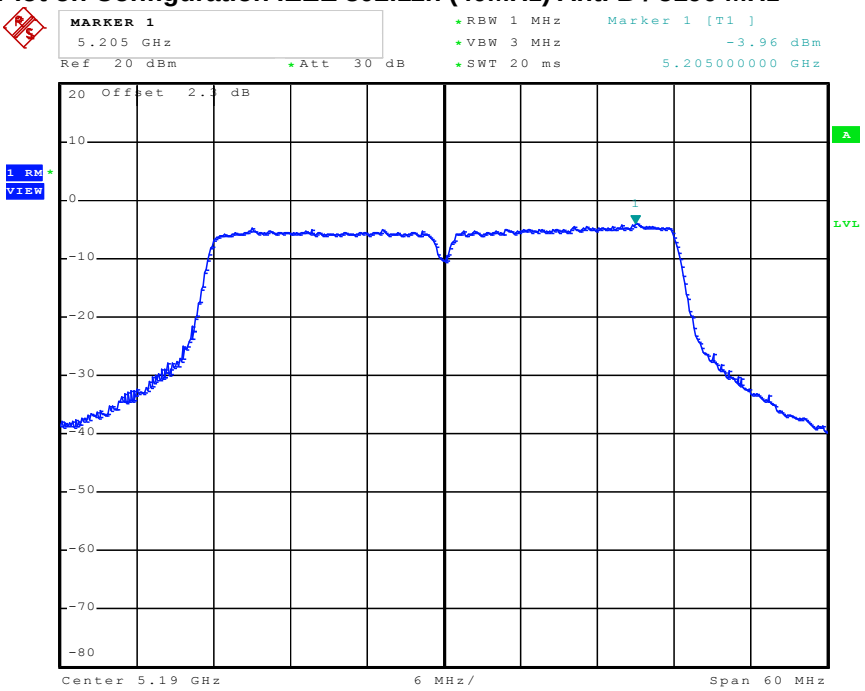
Date: 1.JUN.2011 10:33:11

Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. A / 5670 MHz



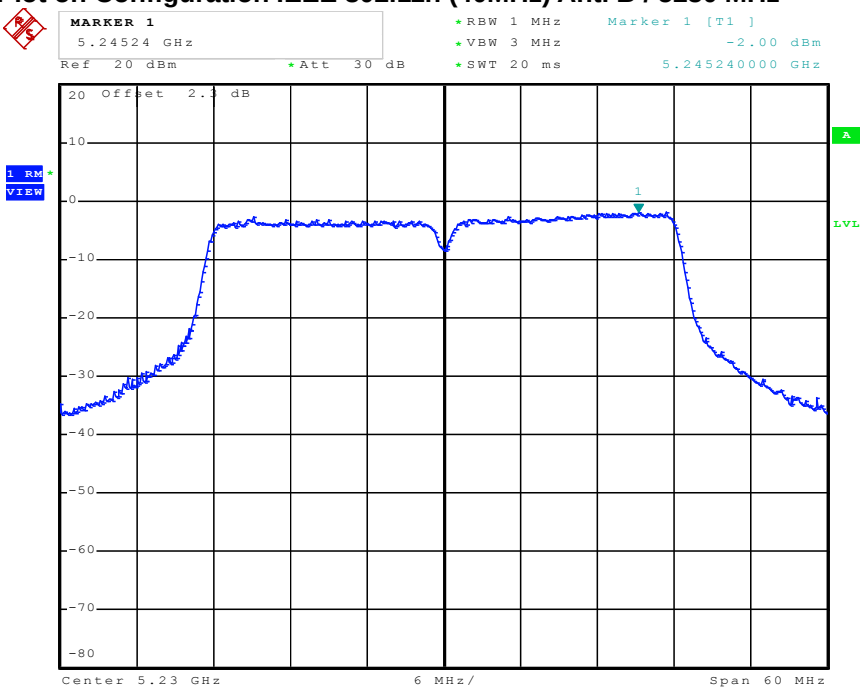
Date: 1.JUN.2011 10:40:32

Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5190 MHz



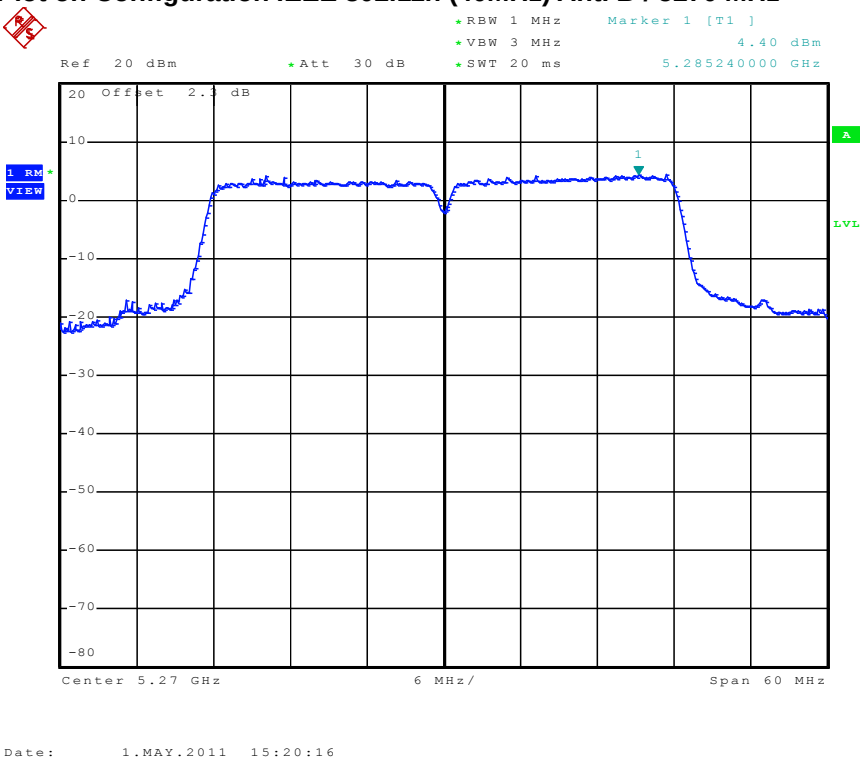
Date: 1.MAY.2011 15:13:55

Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5230 MHz

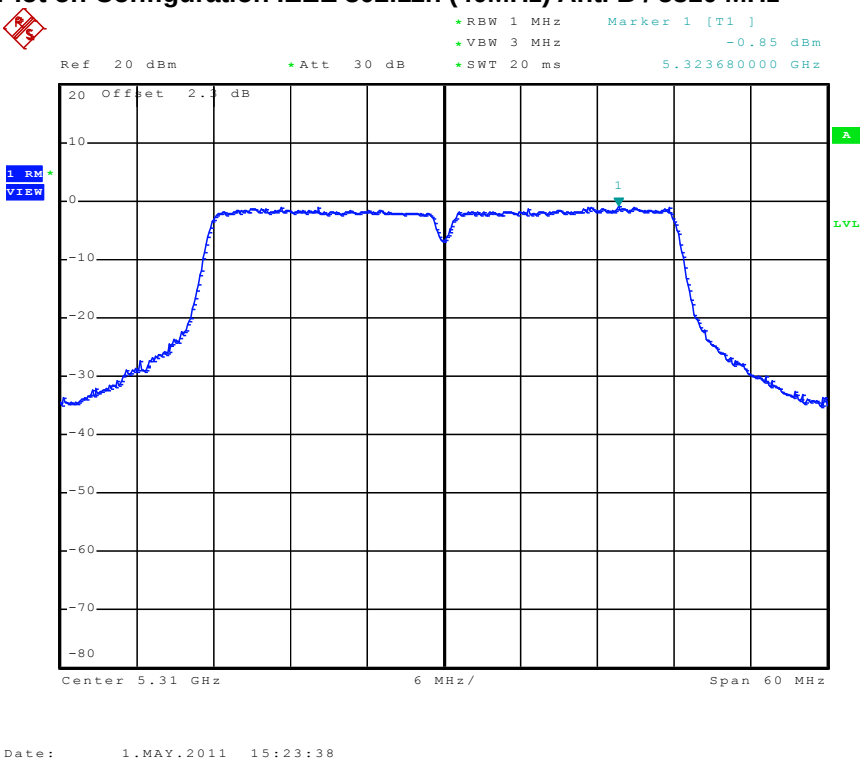


Date: 1.MAY.2011 15:16:59

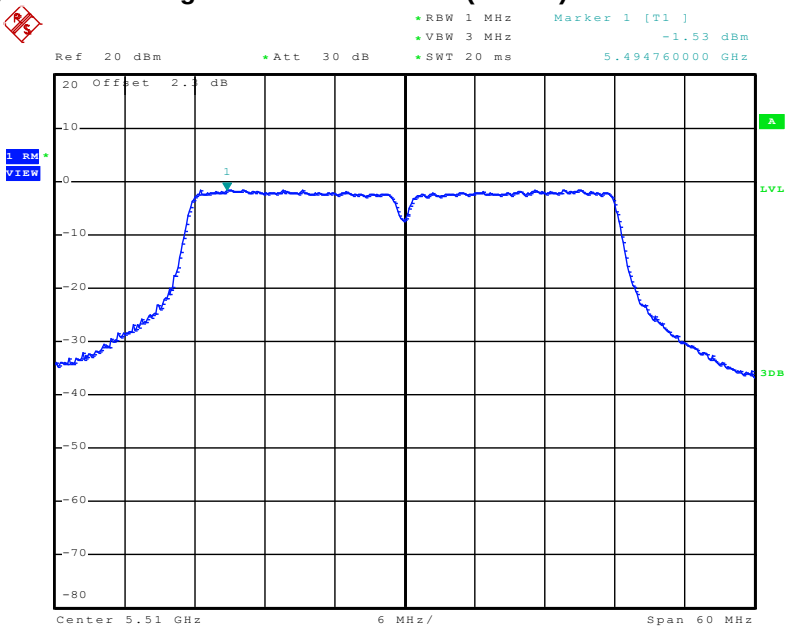
Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5270 MHz



Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5310 MHz

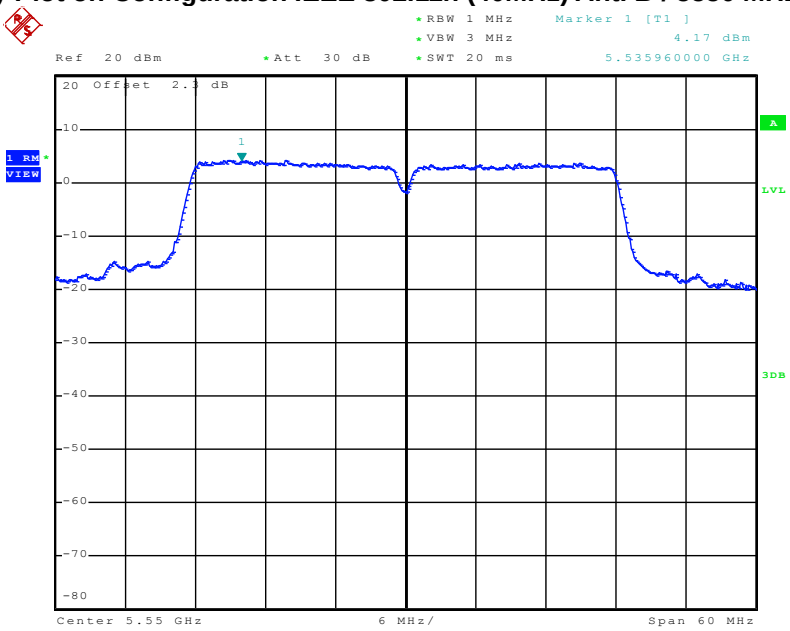


Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5510 MHz



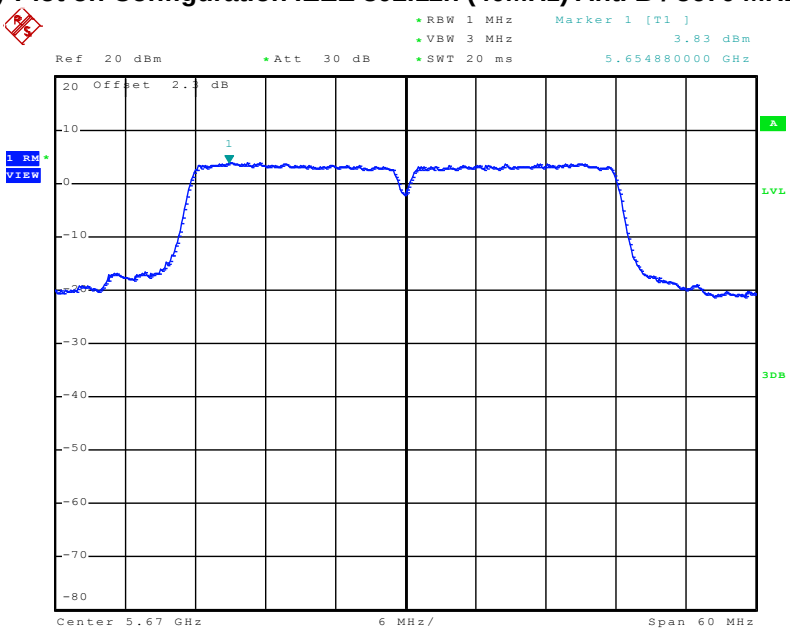
Date: 9.JUN.2011 14:43:07

Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5550 MHz



Date: 1.JUN.2011 10:36:40

Power Density Plot on Configuration IEEE 802.11n (40MHz) Ant. B / 5670 MHz



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

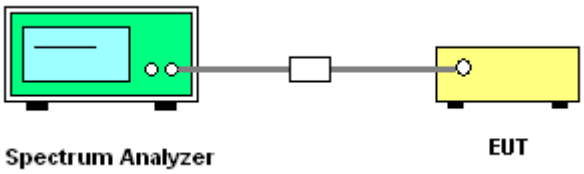
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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) / Sample (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 ≥ 1/T (IEEE 802.11a VBW = 300kHz ≥ 1/4μs). 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	Jun. 09, 2011	**Test Site No.**	TH01-HY
Temperature	30℃	**Humidity**	60%
Test Engineer	Ian	**Configurations**	802.11a/n

Configuration of IEEE 802.11a Ant. A

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	5.80	13	**Complies**
5200 MHz	5.95	13	**Complies**
5240 MHz	5.45	13	**Complies**
5260 MHz	5.59	13	**Complies**
5280 MHz	5.70	13	**Complies**
5320 MHz	5.55	13	**Complies**
5500 MHz	5.67	13	**Complies**
5580 MHz	5.78	13	**Complies**
5700 MHz	5.85	13	**Complies**

Configuration of IEEE 802.11a Ant. B

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	6.53	13	**Complies**
5200 MHz	6.56	13	**Complies**
5240 MHz	6.55	13	**Complies**
5260 MHz	6.69	13	**Complies**
5280 MHz	6.97	13	**Complies**
5320 MHz	6.68	13	**Complies**
5500 MHz	5.64	13	**Complies**
5580 MHz	5.83	13	**Complies**
5700 MHz	5.74	13	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. A

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	7.13	13	**Complies**
5200 MHz	6.03	13	**Complies**
5240 MHz	6.67	13	**Complies**
5260 MHz	6.94	13	**Complies**
5280 MHz	6.70	13	**Complies**
5320 MHz	6.60	13	**Complies**
5500 MHz	7.10	13	**Complies**
5580 MHz	7.11	13	**Complies**
5700 MHz	7.21	13	**Complies**

Configuration IEEE 802.11n (20MHz) Ant. B

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	7.34	13	**Complies**
5200 MHz	7.11	13	**Complies**
5240 MHz	7.74	13	**Complies**
5260 MHz	6.83	13	**Complies**
5280 MHz	7.28	13	**Complies**
5320 MHz	7.36	13	**Complies**
5500 MHz	7.27	13	**Complies**
5580 MHz	7.37	13	**Complies**
5700 MHz	7.33	13	**Complies**

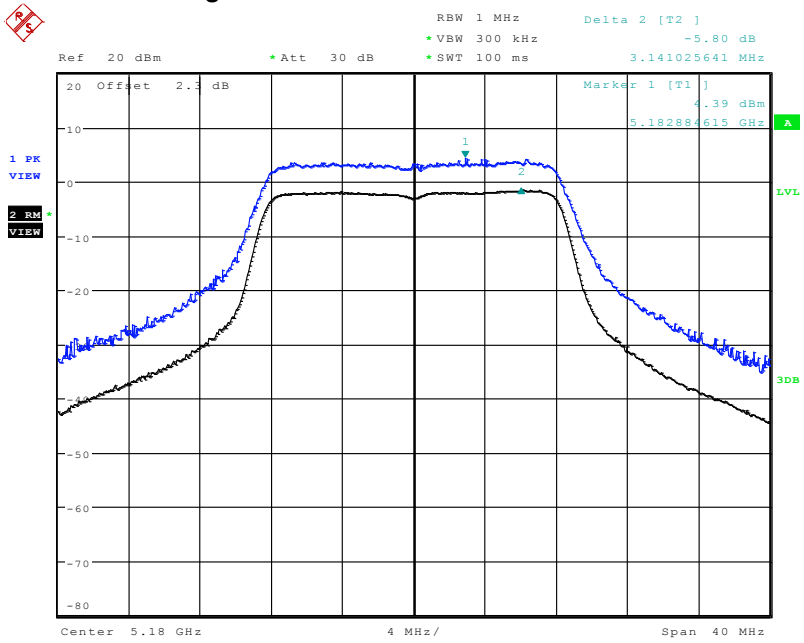
Configuration IEEE 802.11n (40MHz) Ant. A

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5190 MHz	7.19	13	**Complies**
5230 MHz	6.77	13	**Complies**
5270 MHz	6.96	13	**Complies**
5310 MHz	6.74	13	**Complies**
5510 MHz	7.96	13	**Complies**
5550 MHz	7.75	13	**Complies**
5670 MHz	7.52	13	**Complies**

Configuration IEEE 802.11n (40MHz) Ant. B

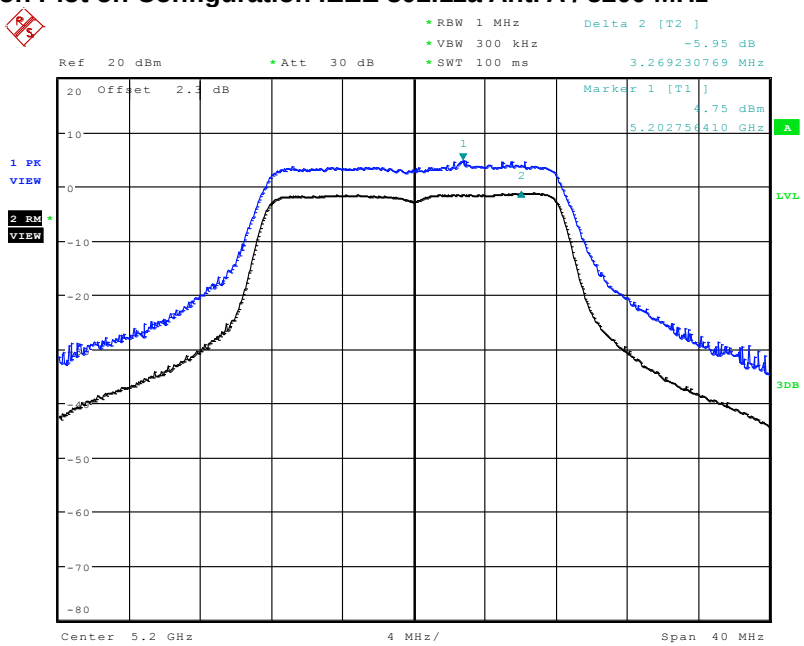
Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5190 MHz	7.19	13	**Complies**
5230 MHz	6.71	13	**Complies**
5270 MHz	6.66	13	**Complies**
5310 MHz	7.24	13	**Complies**
5510 MHz	7.09	13	**Complies**
5550 MHz	7.02	13	**Complies**
5670 MHz	7.32	13	**Complies**

Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5180 MHz



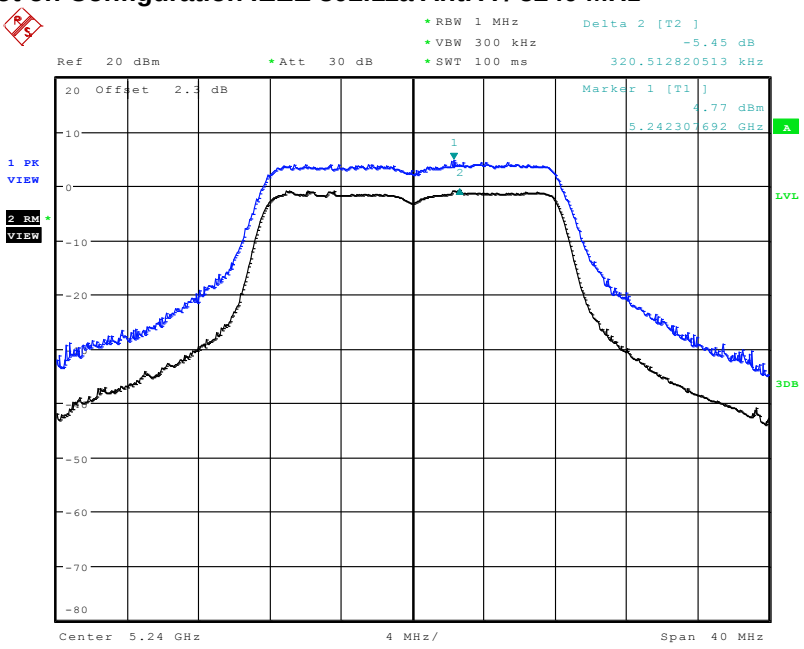
Date: 22.APR.2011 20:54:37

Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5200 MHz



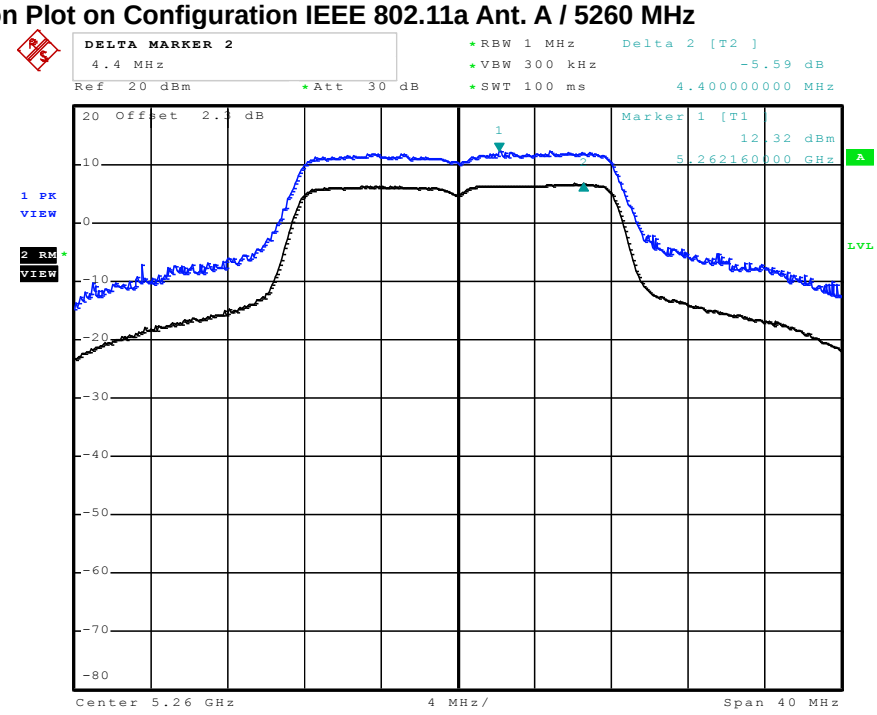
Date: 22.APR.2011 21:08:45

Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5240 MHz



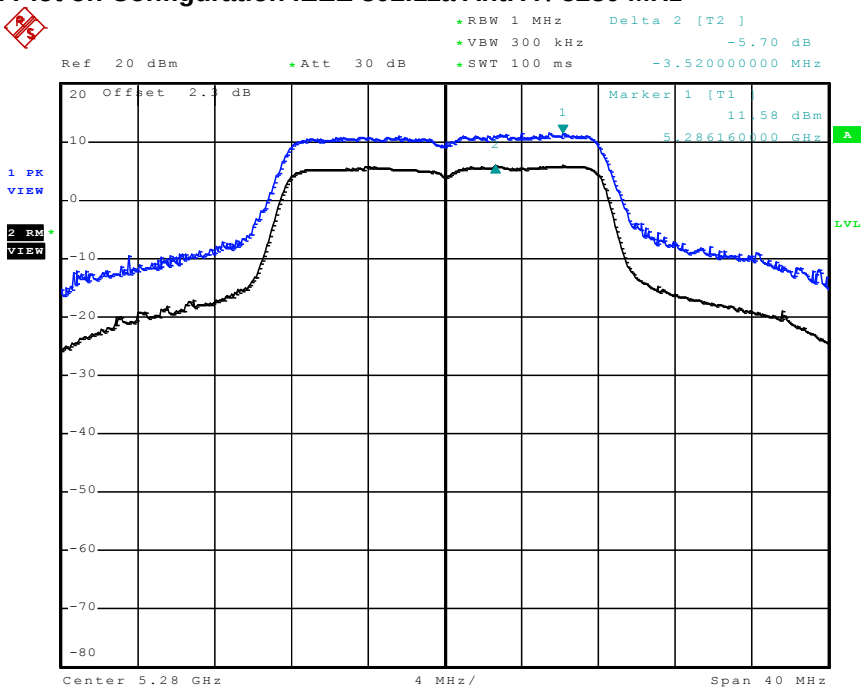
Date: 22.APR.2011 21:22:36

Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5260 MHz

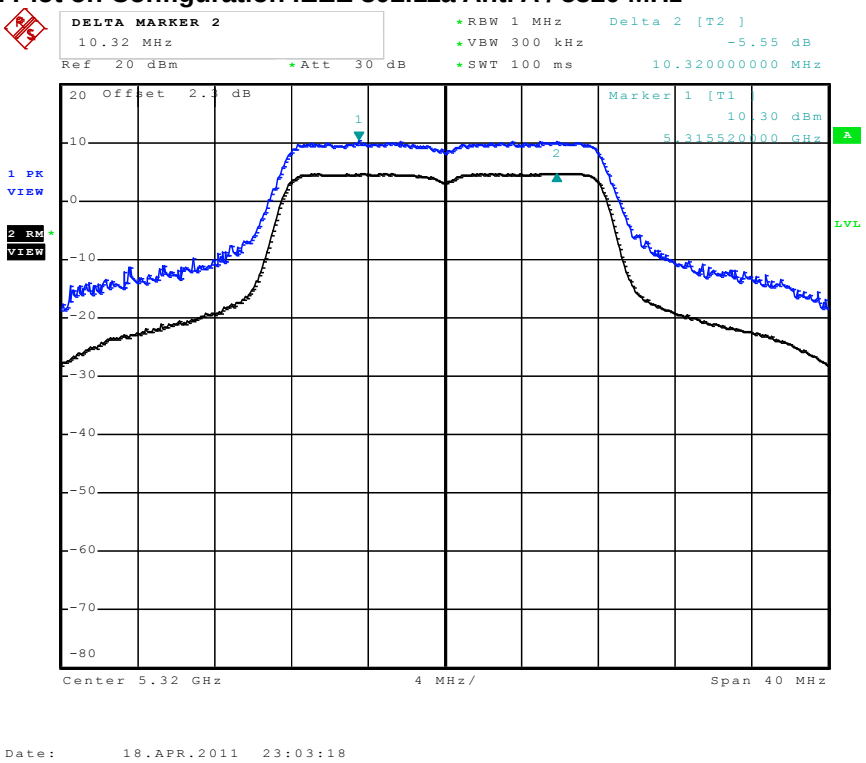


Date: 18.APR.2011 23:12:14

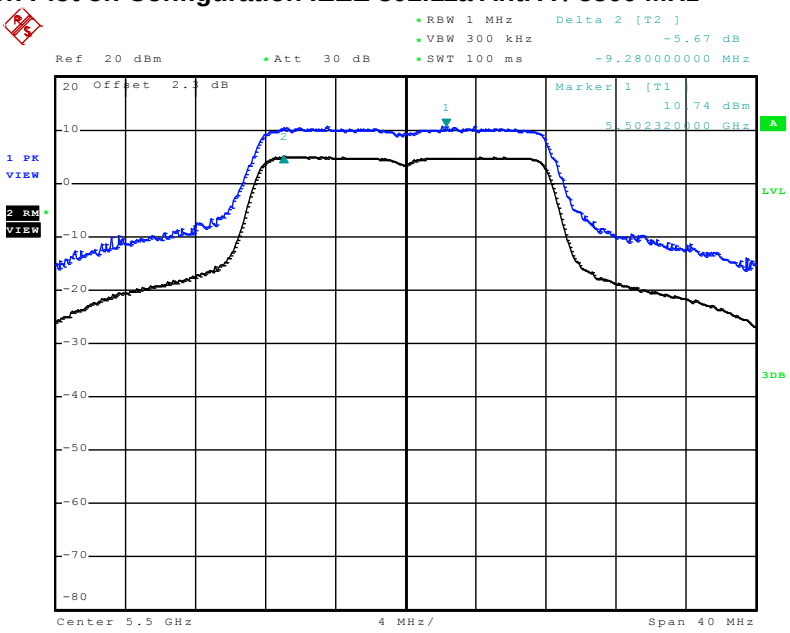
Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5280 MHz



Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5320 MHz

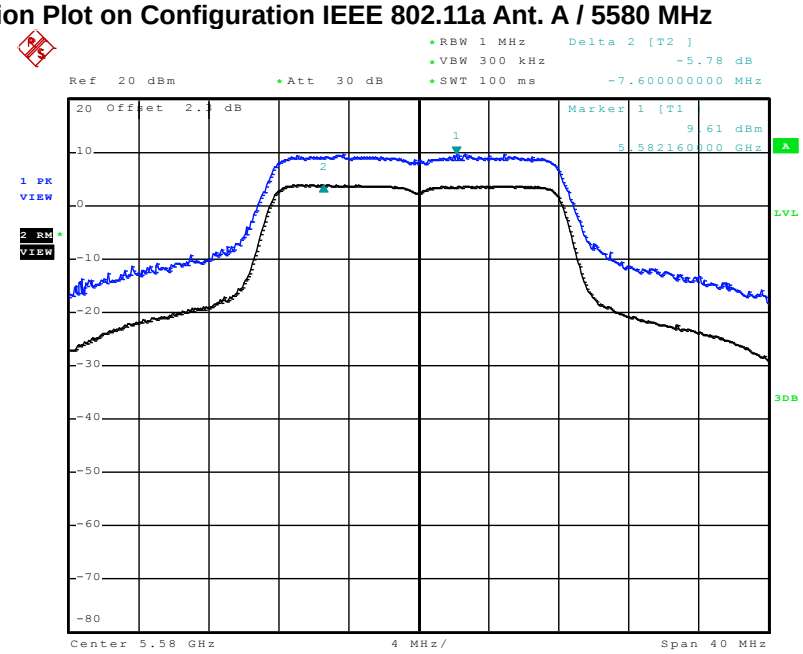


Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5500 MHz



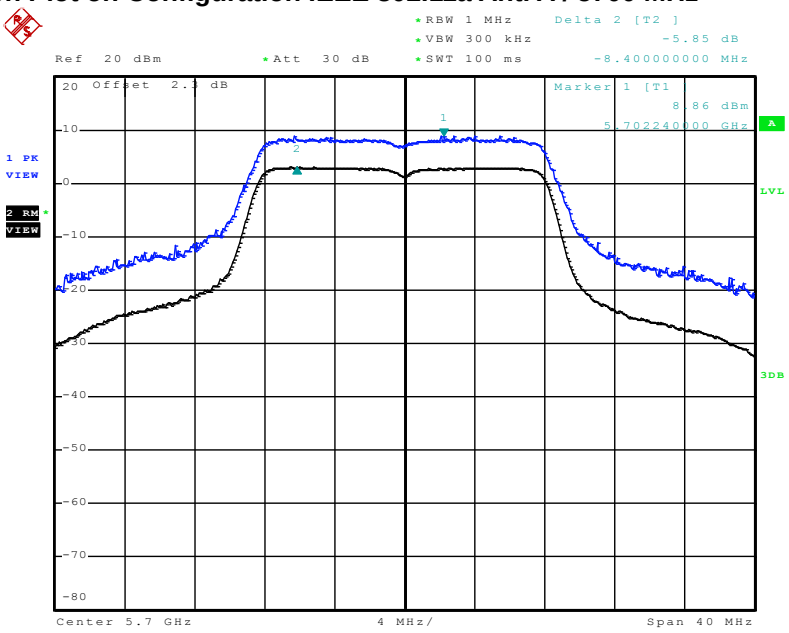
Date: 31.MAY.2011 20:44:16

Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5580 MHz



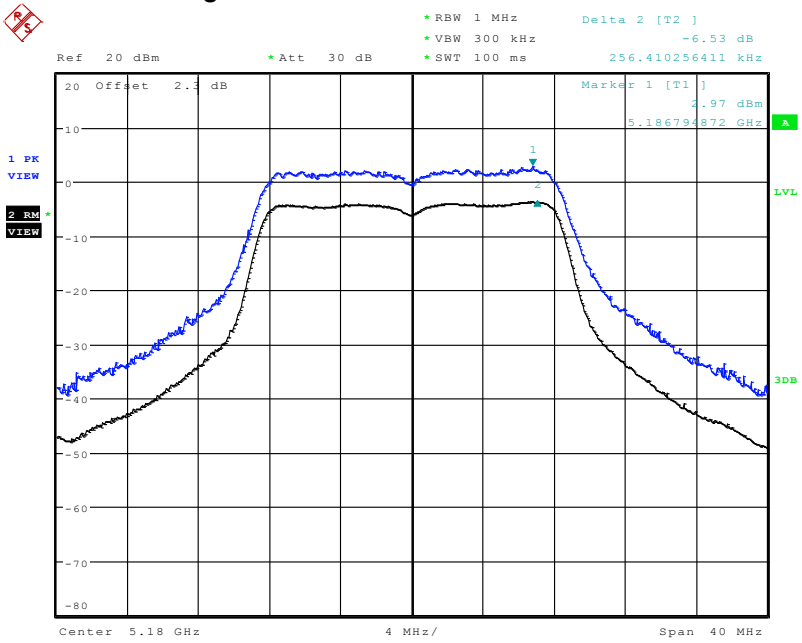
Date: 31.MAY.2011 20:53:44

Peak Excursion Plot on Configuration IEEE 802.11a Ant. A / 5700 MHz



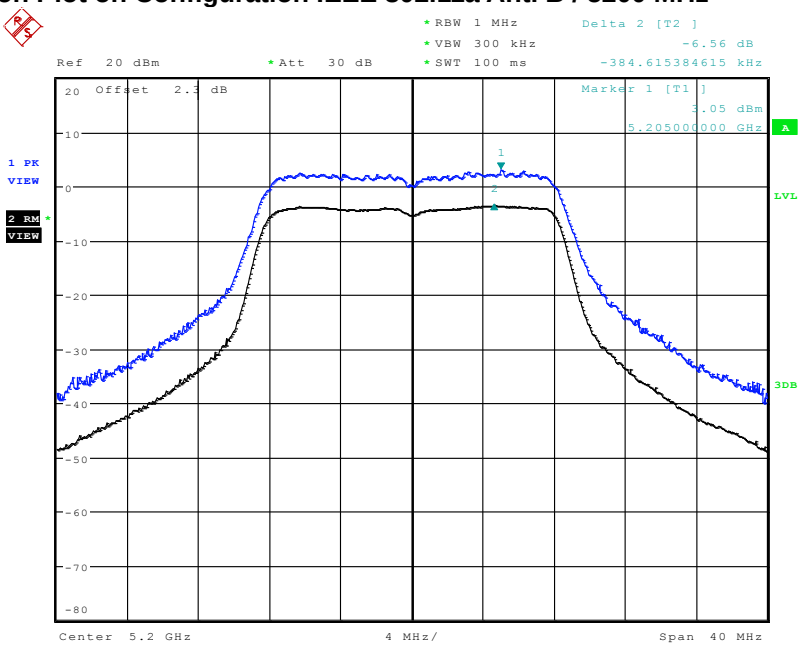
Date: 31.MAY.2011 21:05:05

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5180 MHz



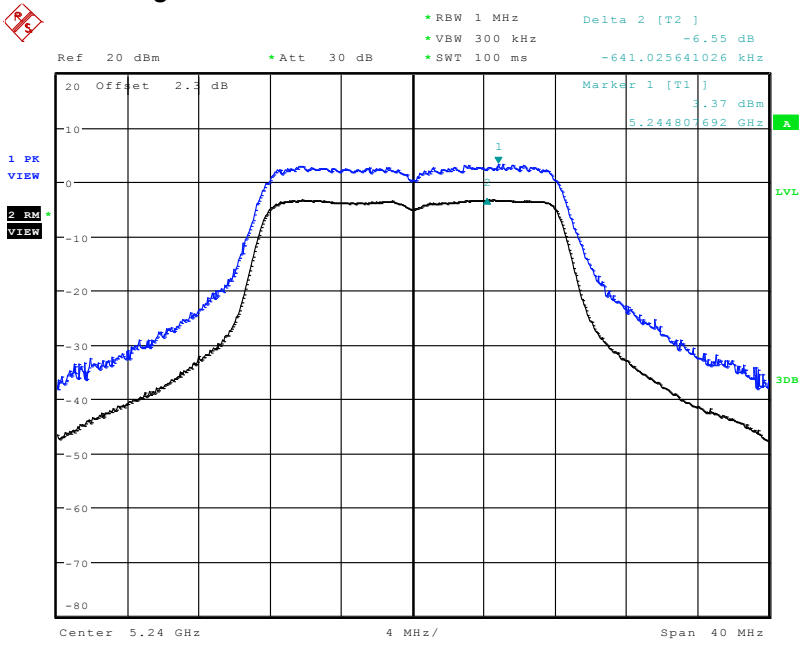
Date: 22.APR.2011 20:59:51

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5200 MHz



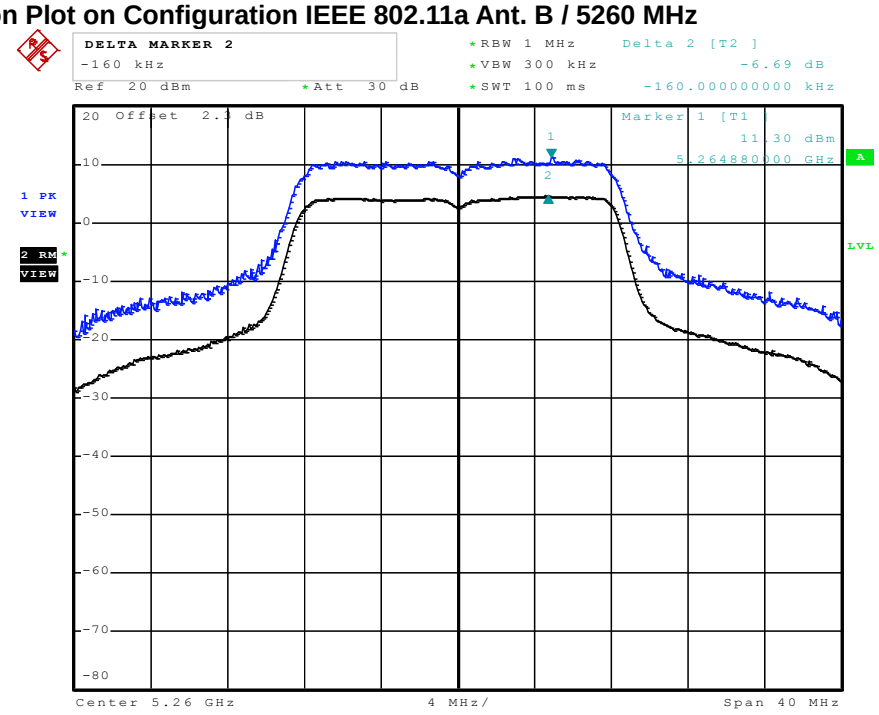
Date: 22.APR.2011 21:12:49

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5240 MHz



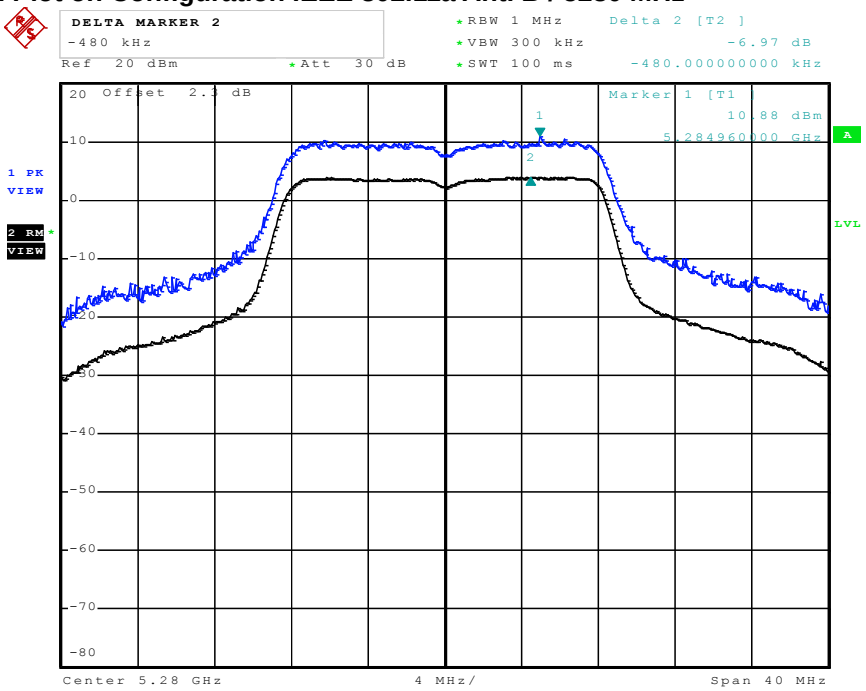
Date: 22.APR.2011 21:18:31

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5260 MHz



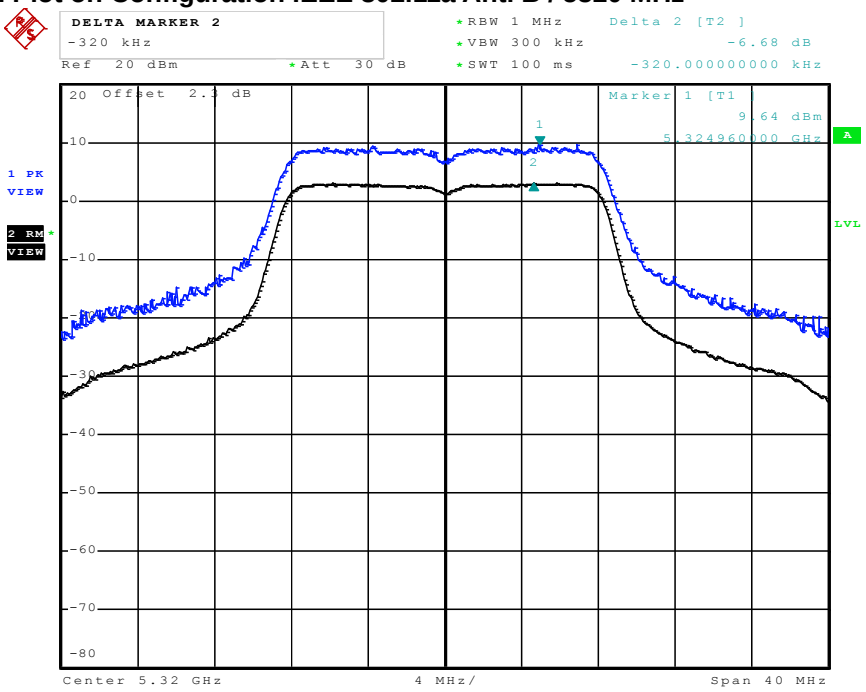
Date: 18.APR.2011 21:51:38

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5280 MHz



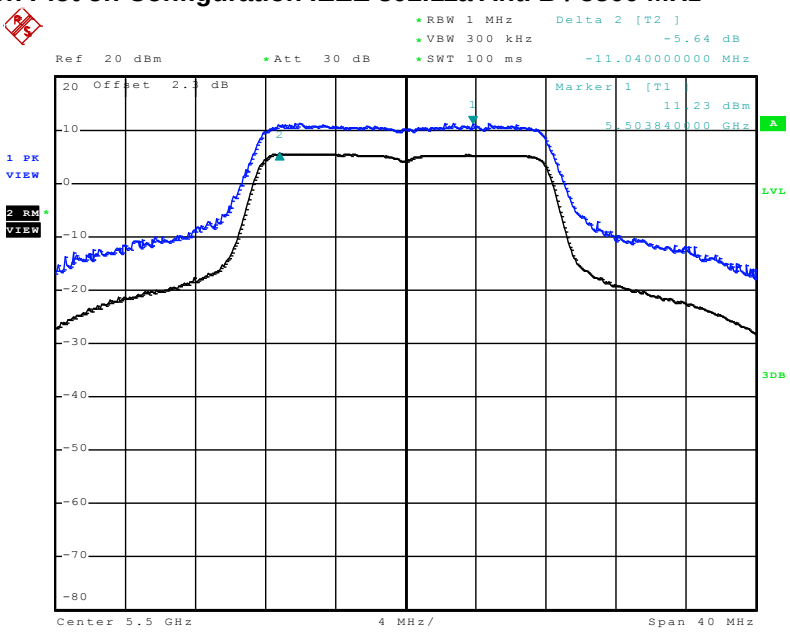
Date: 18.APR.2011 21:55:21

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5320 MHz



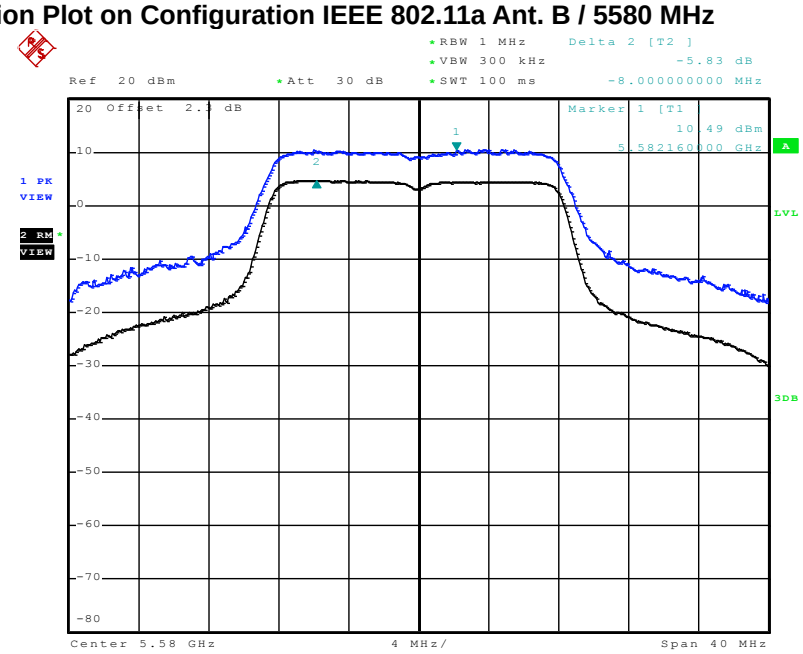
Date: 18.APR.2011 22:00:02

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5500 MHz



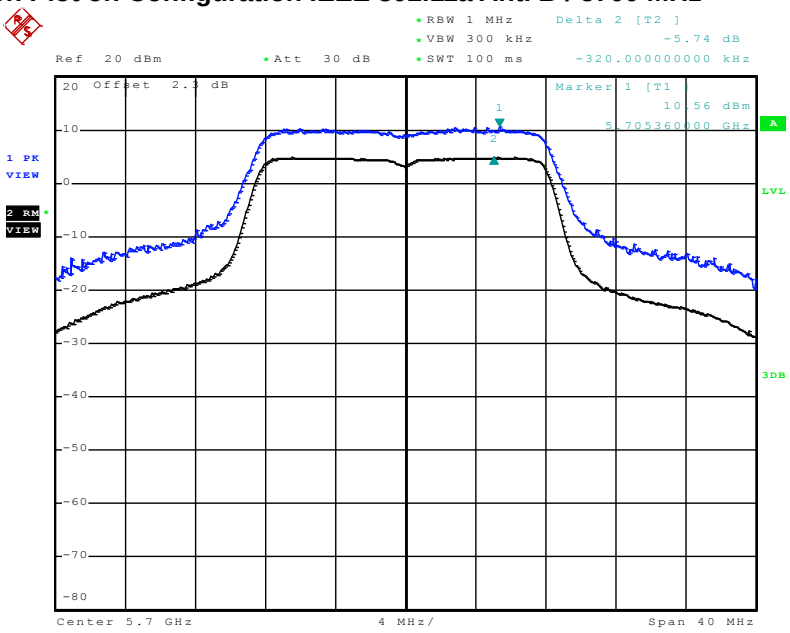
Date: 31.MAY.2011 20:50:32

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5580 MHz



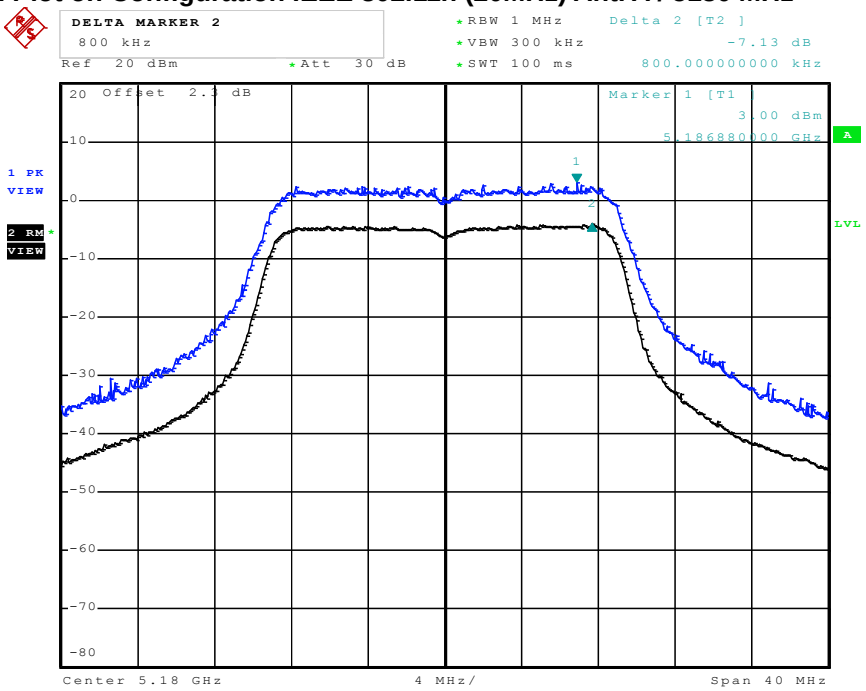
Date: 31.MAY.2011 21:00:22

Peak Excursion Plot on Configuration IEEE 802.11a Ant. B / 5700 MHz

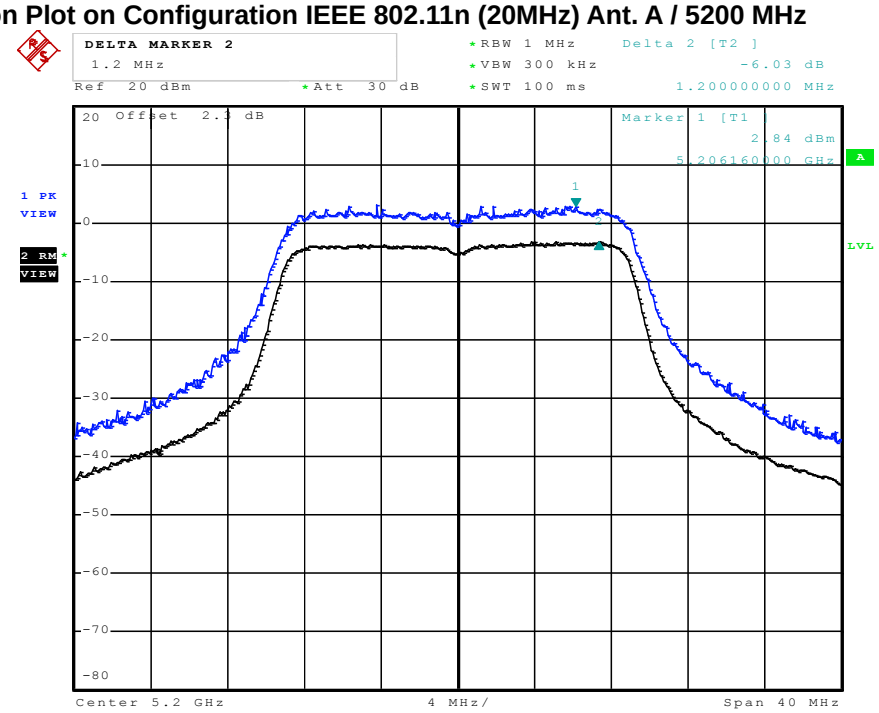


Date: 31.MAY.2011 21:08:52

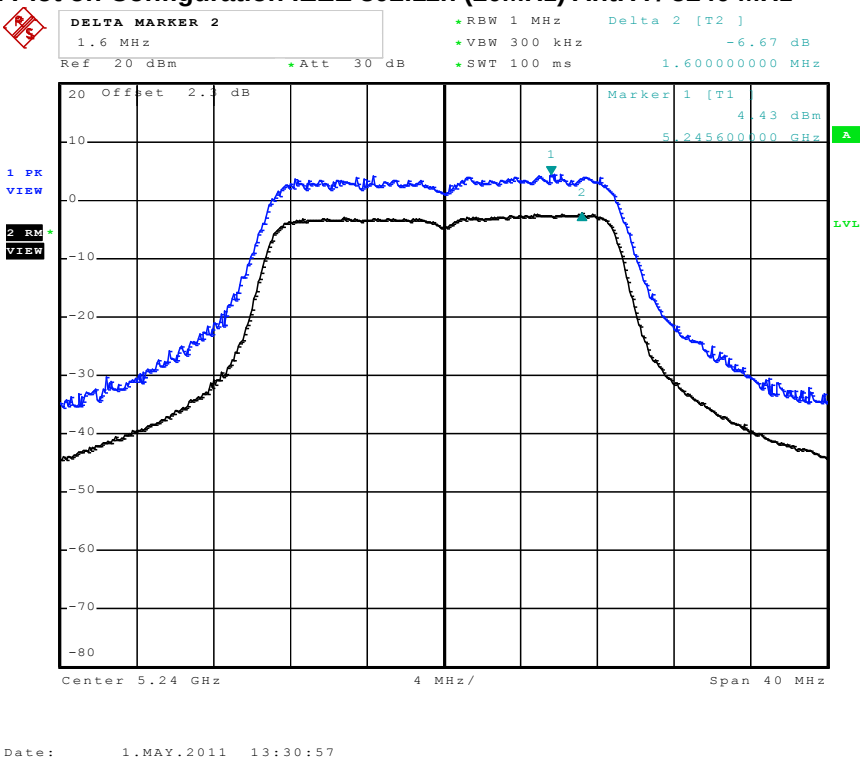
Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5180 MHz



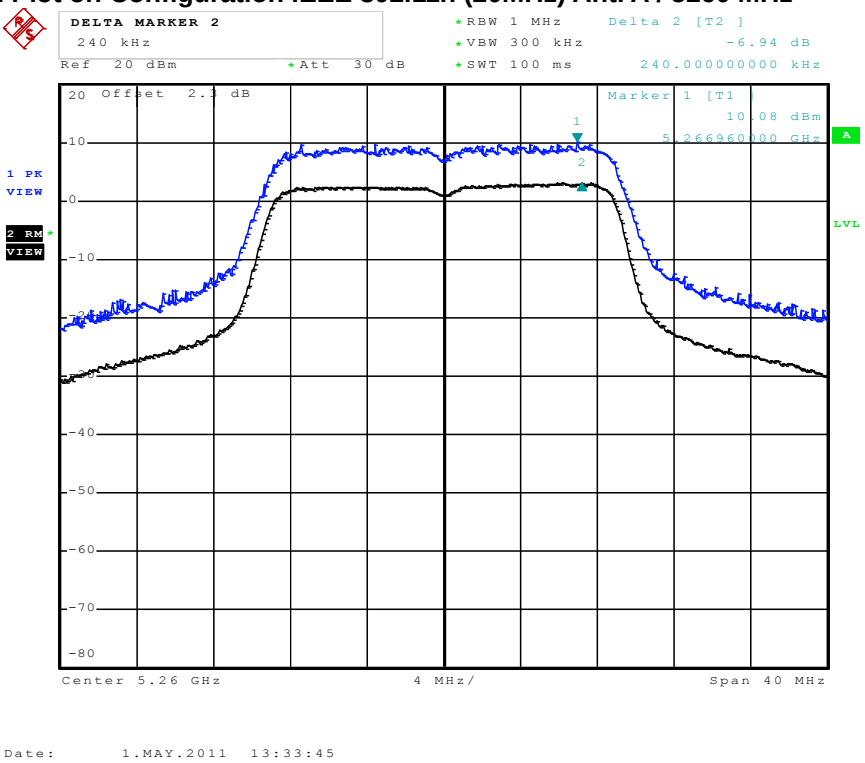
Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5200 MHz



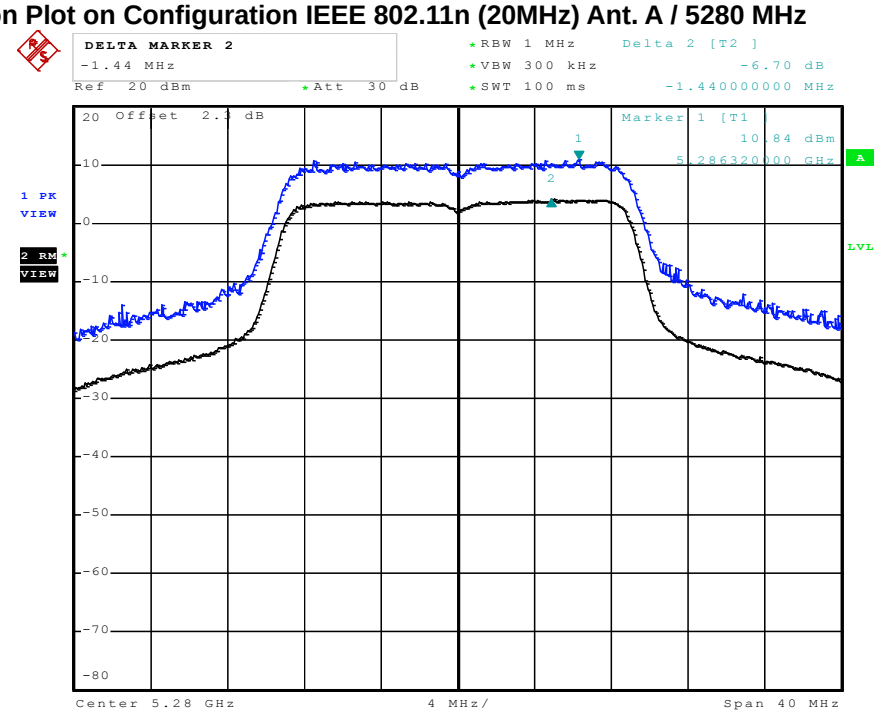
Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5240 MHz



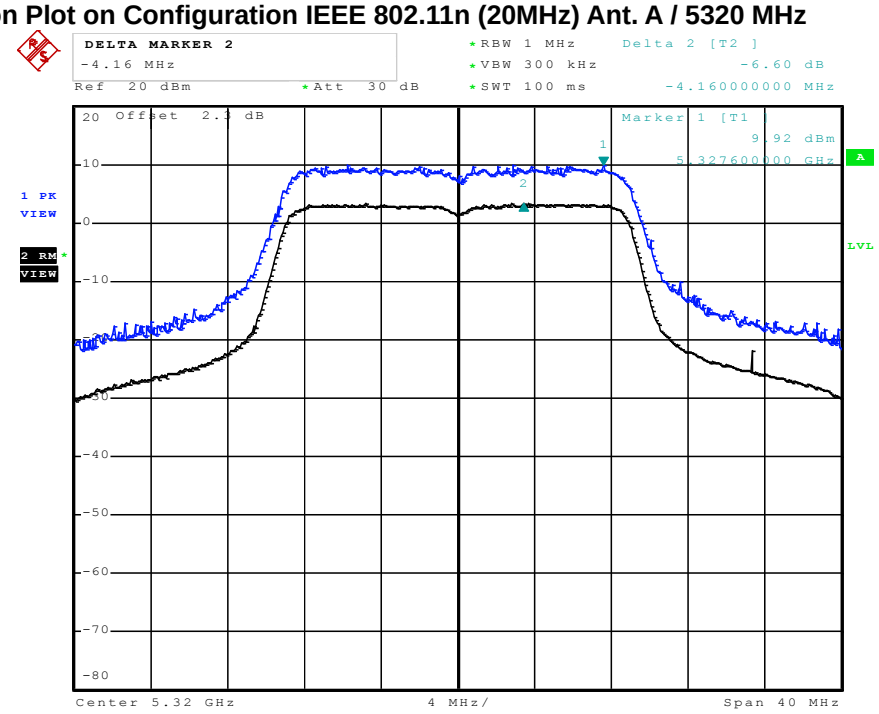
Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5260 MHz



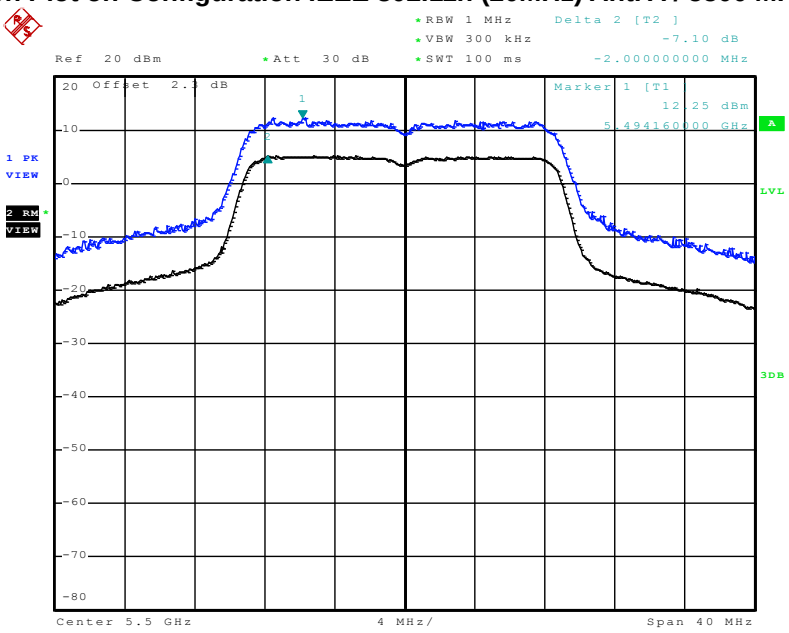
Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5280 MHz



Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5320 MHz

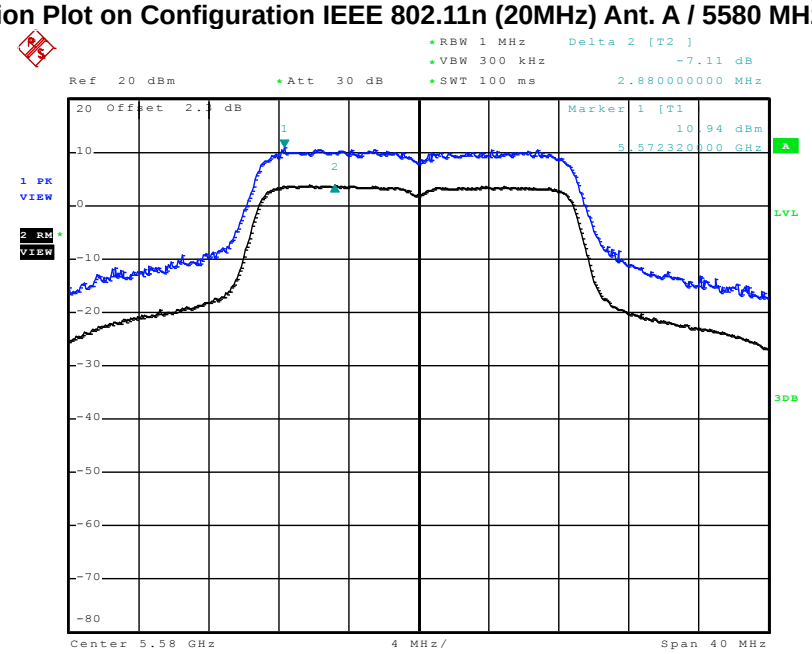


Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5500 MHz



Date: 31.MAY.2011 21:19:43

Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Ant. A / 5580 MHz



Date: 1.JUN.2011 09:55:06