

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment : Marathon
Model No. : FX1
Brand Name : Marathon
Filing Type : New Application
Applicant : LXE Inc
125 Technology Parkway, Norcross GA 30092
FCC ID : KDZLXE-FX1
Manufacturer : NEXCOM International Co., Ltd.
5F, 7F, 8F, 9F, 10F & 12F, No. 63, Sec. 1, Sanmin Rd.,
Banqiao Dist, New Taipei City, Taiwan
Received Date : Apr. 21, 2011
Final Test Date : May 04, 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. 02, 2011

Report No.: FR130939AN

■ 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 : Marathon

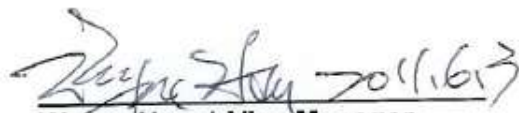
Model No. : FX1

Brand Name : Marathon

Applicant : LXE Inc

125 Technology Parkway, Norcross GA 30092

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Apr. 21, 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	5.65 dB
3.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
3.3	15.407(a)	Maximum Conducted Output Power	Complies	4.41 dB
3.4	15.407(a)	Power Spectral Density	Complies	2.19 dB
3.5	15.407(a)	Peak Excursion	Complies	5.19 dB
3.6	15.407(b)	Radiated Emissions	Complies	3.79 dB
3.7	15.407(b)	Band Edge Emissions	Complies	1.12 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℃	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 specifications or user's manual.

Items	Description
Power Type	19Vdc Adapter / 11.1V Li-Ion Wh Rechargeable
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: 17.60 MHz ; Band 2~Band 3: 17.60 MHz 802.11n MCS 0: (20MHz) Band 1: 18.00 MHz ; Band 2: 18.00 MHz ; Band 3: 18.000 MHz (40MHz) Band 1~Band 3: 36.40 MHz
Conducted Output Power	802.11a: Band 1: 12.32 dBm ; Band 2: 13.79 dBm ; Band 3: 13.90 dBm 802.11n MCS 0: (20MHz) Band 1: 8.13 dBm ; Band 2: 14.04 dBm ; Band 3: 13.36 dBm (40MHz) Band 1: 9.87 dBm ; Band 2: 12.84 dBm ; Band 3: 12.14 dBm

2.2 Table for Filed Antenna

Antenna & Bandwidth

Antenna Mode	Single 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	2.4GHz Gain (dBi)	5GHz Gain (dBi)
A	PIFA Antenna	I-PEX	2.97	2.82

Note : The antenna was 1T1R Spatial Multiplexing MIMO configuration.

IEEE 802.11n Modulation Scheme

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate(Mbps)	
					20MHz	40MHz	20MHz	40MHz	800nsGI	
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

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 Line Conducted Emissions Radiated Emissions Below 1GHz	Normal Mode	Auto	-	A
Max. Conducted Output Power	11a Band 1~3/BPSK	6.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (20MHz)	13.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (40MHz)	6.5 Mbps	38/46/54/62/102/ 110/134	A
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	11a Band 1~3/BPSK	13.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (20MHz)	6.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (40MHz)	13.5 Mbps	38/46/54/62/102/ 110/134	A
Radiated Emission Above 1GHz	11a Band 1~3/BPSK	6.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (20MHz)	13.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (40MHz)	6.5 Mbps	38/46/54/62/102/ 110/134	A
Band Edge Emission	11a Band 1~3/BPSK	13.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (20MHz)	6.5 Mbps	36/40/48/52/56 /64/100/116/140	A
	11n Band 1~3/BPSK MCS 0 (40MHz)	13.5 Mbps	38/46/54/62/102/ 110/134	A

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
Mouse	Microsoft	1004	DoC
Headset	HAWK	03-MSB301	N/A
USB 2.0 HDD	WD	WD6400H1CS-00	N/A
AP (Remote Workstation)	D-Link	DNS-G120	DoC
Bluetooth Headset (Remote Workstation)	SONY	Z354	N/A

Note : The EUT was tested alone for radiation emission test only.

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.

Power Parameters of IEEE 802.11a

Test Software Version	SRU XP v3.02.09		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11n	100	100	100
Frequency	5260 MHz	5280 MHz	5320 MHz
IEEE 802.11n	100	100	100
Frequency	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11n	100	100	100

Power Parameters of IEEE 802.11n (20MHz)

Test Software Version	SRU XP v3.02.09		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11n	100	100	100
Frequency	5260 MHz	5280 MHz	5320 MHz
IEEE 802.11n	100	100	100
Frequency	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11n	100	100	100

Power Parameters of IEEE 802.11n Ant. (40MHz)

Test Software Version	SRU XP v3.02.09		
Frequency	5190 MHz	5230 MHz	5270 MHz
IEEE 802.11n	100	100	100
Frequency	5310 MHz	5510 MHz	5550 MHz
IEEE 802.11n	100	100	100
Frequency	5670 MHz		
IEEE 802.11n	100		

2.8 EUT Operation during Test

An executive program, "BURNIN TEST (5.1).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 EUT reads the test program from the hard disk drive and runs it.
- c. The EUT sends "H" messages to the monitor, and the monitor displays "H" patterns on the screen.
- d. The EUT sends messages to the modem.
- e. The EUT sends "H" messages to the internal hard disk, and the hard disk reads and writes the message.
- f. Repeat the steps from c to e.

At the same time, the following programs were executed:

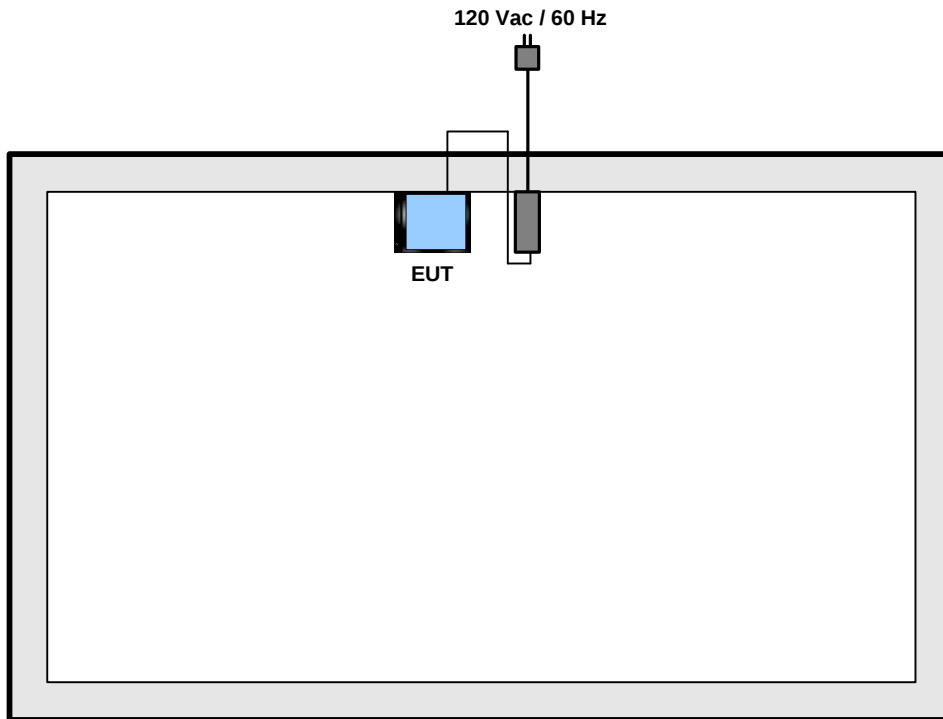
- Executed "BURNIN TEST.exe" to read/write data from external USB 2.0 devices.
- Executed "AMCAP.exe" to capture image from CCD.
- Executed "Ping.exe" to link with the remote workstation AP to receive and transmit data via Wireless.
- Executed "Bluetooth.exe" to link with the remote workstation to receive and transmit data via Bluetooth.
- Executed "SSIContainer.exe" to run barcode function.
- Executed "MSR Configure.exe" to swipe card tested.
- Executed "SRU XP v3.02.09" to keep transmitting signals at fixed frequency.

(Only radiated emissions tested)

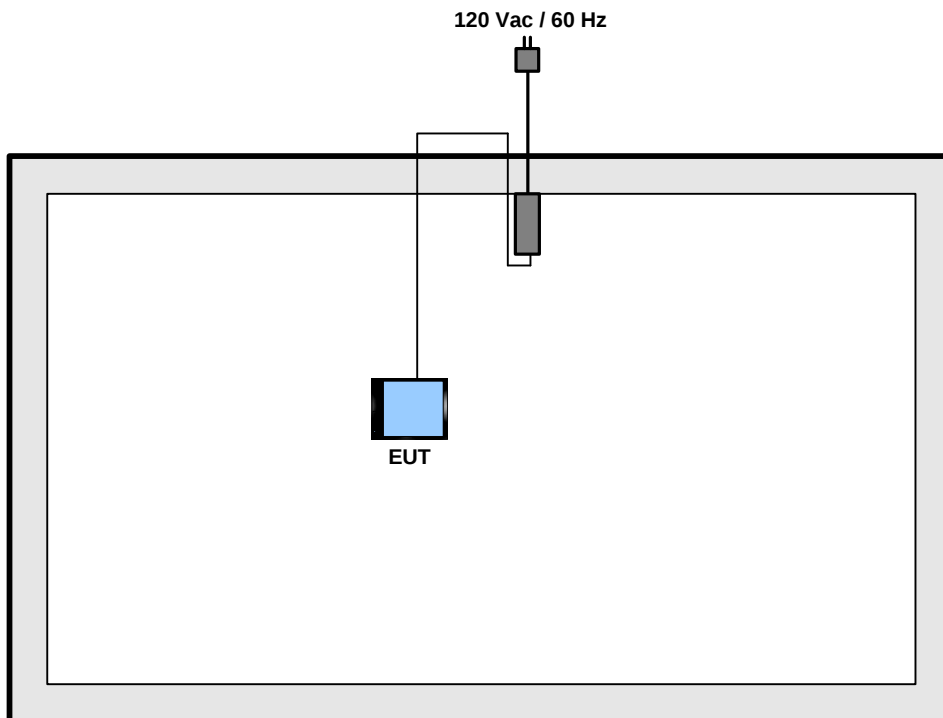
2.9 Test Configuration

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

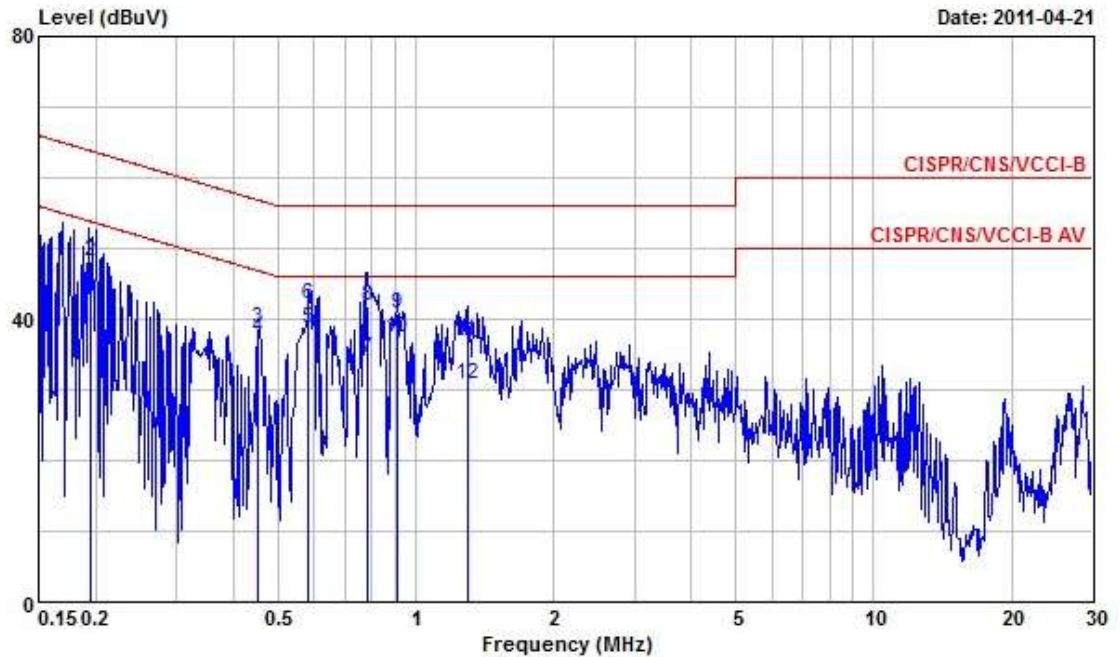
3.1.3 Test Procedures

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.

3.1.7 Results of AC Power Line Conducted Emissions Measurement

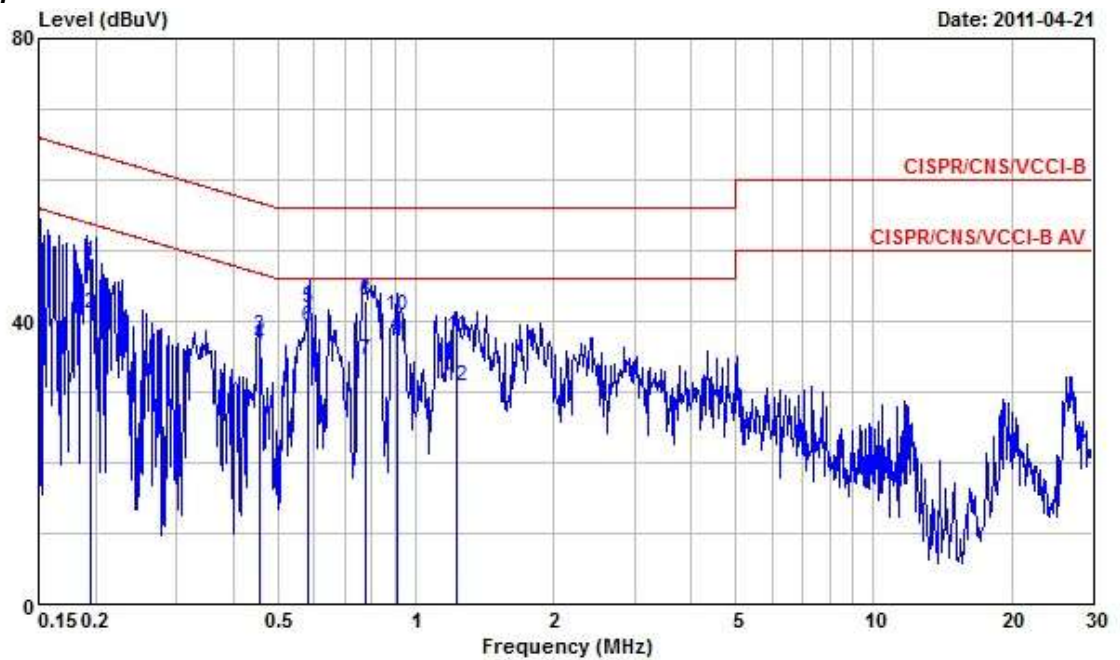
Final Test Date	Apr. 21, 2011	Test Site No.	CO04-HY
Temperature	23.7°C	Humidity	51.2%
Test Engineer	Jason	Configuration	Normal Mode AC 120V/60Hz 1024*768 60Hz

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1947900	41.49	-12.34	53.83	41.31	0.08	0.10	Average
2	0.1947900	48.17	-15.66	63.83	47.99	0.08	0.10	QP
3	0.4528600	38.69	-18.13	56.82	38.49	0.09	0.11	QP
4	0.4528600	37.37	-9.45	46.82	37.17	0.09	0.11	Average
5	0.5823110	38.68	-7.32	46.00	38.44	0.10	0.14	Average
6	0.5823110	42.16	-13.84	56.00	41.92	0.10	0.14	QP
7	0.7834520	34.39	-11.61	46.00	34.12	0.10	0.17	Average
8	0.7834520	41.91	-14.09	56.00	41.64	0.10	0.17	QP
9	0.9085710	40.69	-15.31	56.00	40.39	0.11	0.19	QP
10	0.9085710	37.29	-8.71	46.00	36.99	0.11	0.19	Average
11	1.297	36.73	-19.27	56.00	36.41	0.12	0.20	QP
12	1.297	30.79	-15.21	46.00	30.47	0.12	0.20	Average

Neutral

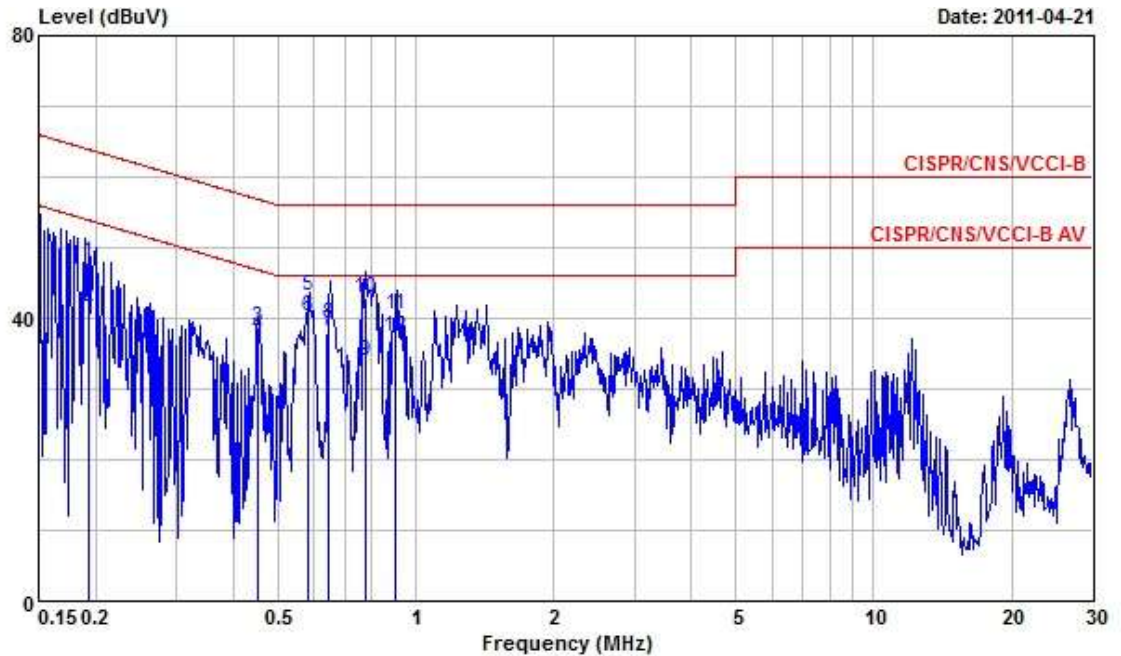


	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1947620	48.31	-15.52	63.83	48.13	0.08	0.10	QP
2	0.1947620	41.04	-12.79	53.83	40.86	0.08	0.10	Average
3	0.4539490	37.94	-18.86	56.80	37.75	0.08	0.11	QP
4	0.4539490	36.55	-10.25	46.80	36.36	0.08	0.11	Average
5	0.5825290	41.93	-14.07	56.00	41.70	0.09	0.14	QP
6	0.5825290	39.10	-6.90	46.00	38.87	0.09	0.14	Average
7	0.7791940	34.44	-11.56	46.00	34.18	0.09	0.17	Average
8	0.7791940	42.77	-13.23	56.00	42.51	0.09	0.17	QP
9	0.9073690	37.44	-8.56	46.00	37.15	0.10	0.19	Average
10	0.9073690	40.70	-15.30	56.00	40.41	0.10	0.19	QP
11	1.230	37.96	-18.04	56.00	37.66	0.10	0.20	QP
12	1.230	30.77	-15.23	46.00	30.47	0.10	0.20	Average

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

Final Test Date	Apr. 21, 2011	Test Site No.	CO04-HY
Temperature	23.7°C	Humidity	51.2%
Test Engineer	Jason	Configuration	Normal Mode AC 120V/60Hz 800*600 Hz

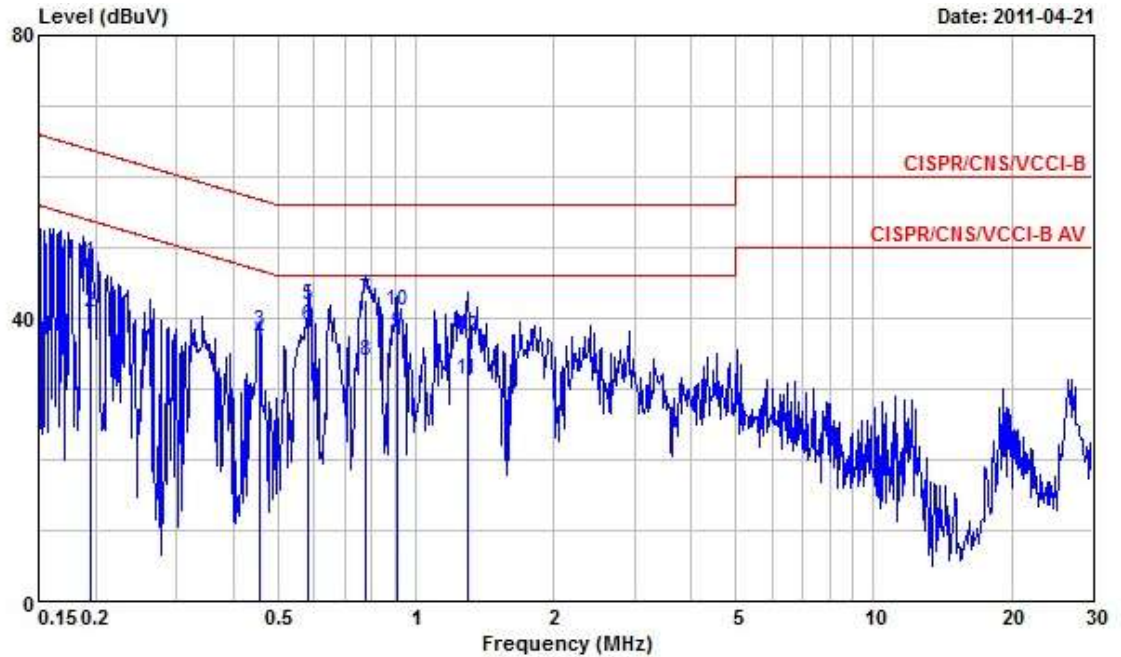
Line



SPORTR000001 00

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1937560	47.80	-16.07	63.87	47.62	0.08	0.10	QP
2	0.1937560	41.69	-12.18	53.87	41.51	0.08	0.10	Average
3	0.4525500	38.69	-18.14	56.83	38.49	0.09	0.11	QP
4	0.4525500	37.55	-9.28	46.83	37.35	0.09	0.11	Average
5	0.5834040	43.18	-12.82	56.00	42.94	0.10	0.14	QP
6	0.5834040	40.35	-5.65	46.00	40.11	0.10	0.14	Average
7	0.6463440	38.09	-7.91	46.00	37.84	0.10	0.15	Average
8	0.6463440	39.20	-16.80	56.00	38.95	0.10	0.15	QP
9	0.7751940	34.04	-11.96	46.00	33.77	0.10	0.17	Average
10	0.7751940	42.88	-13.12	56.00	42.61	0.10	0.17	QP
11	0.9054940	40.47	-15.53	56.00	40.17	0.11	0.19	QP
12	0.9054940	37.29	-8.71	46.00	36.99	0.11	0.19	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1953850	47.97	-15.83	63.80	47.79	0.08	0.10	QP
2	0.1953850	40.77	-13.03	53.80	40.59	0.08	0.10	Average
3	0.4539490	38.06	-18.74	56.80	37.87	0.08	0.11	QP
4	0.4539490	36.95	-9.85	46.80	36.76	0.08	0.11	Average
5	0.5823110	41.89	-14.11	56.00	41.66	0.09	0.14	QP
6	0.5823110	39.03	-6.97	46.00	38.80	0.09	0.14	Average
7	0.7751940	42.53	-13.47	56.00	42.27	0.09	0.17	QP
8	0.7751940	33.91	-12.09	46.00	33.65	0.09	0.17	Average
9	0.9069440	37.85	-8.15	46.00	37.56	0.10	0.19	Average
10	0.9069440	40.98	-15.02	56.00	40.69	0.10	0.19	QP
11	1.296	31.29	-14.71	46.00	30.99	0.10	0.20	Average
12	1.296	37.27	-18.73	56.00	36.97	0.10	0.20	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

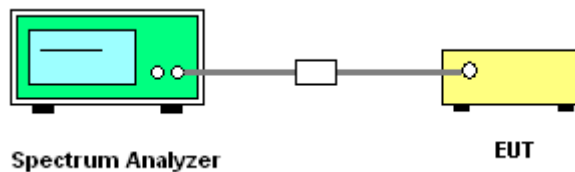
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	May 10, 2011	Test Site No.	TH01-HY
Temperature	24.7°C	Humidity	63.2%
Test Engineer	Cain	Configurations	802.11a/n

Configuration of IEEE 802.11a

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.10	17.60
40	5200 MHz	23.00	17.50
48	5240 MHz	23.50	17.60
52	5260 MHz	23.00	17.60
56	5280 MHz	23.60	17.60
64	5320 MHz	23.00	17.50
100	5500 MHz	23.50	17.60
116	5580 MHz	23.20	17.60
140	5700 MHz	25.50	17.50

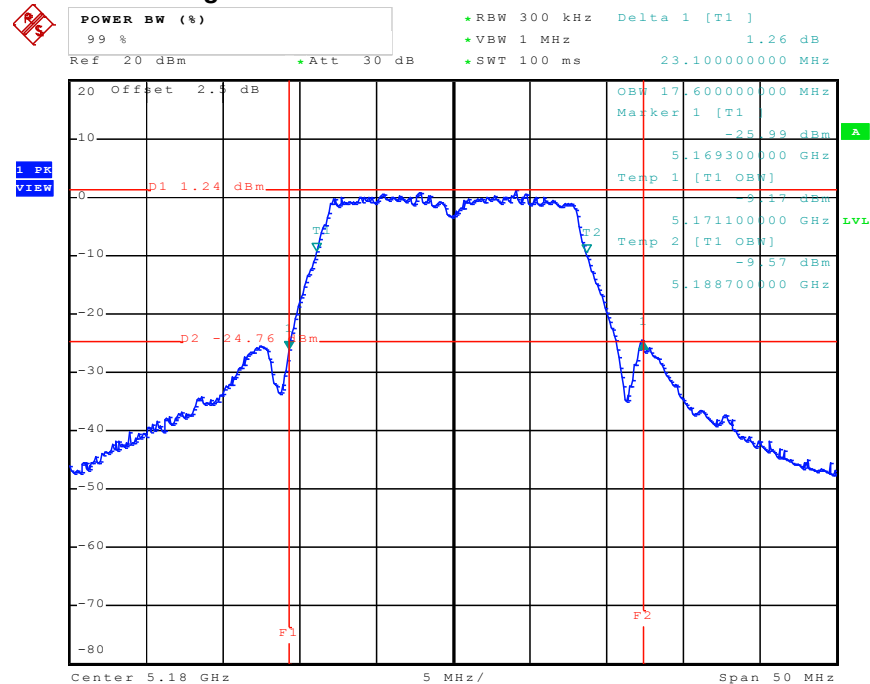
Configuration IEEE 802.11n (20MHz)

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	21.30	18.00
40	5200 MHz	21.20	17.90
48	5240 MHz	21.20	17.90
52	5260 MHz	21.30	18.00
56	5280 MHz	23.30	18.00
64	5320 MHz	21.10	18.00
100	5500 MHz	23.40	18.00
116	5580 MHz	26.00	18.00
140	5700 MHz	23.20	18.00

Configuration IEEE 802.11n (40MHz)

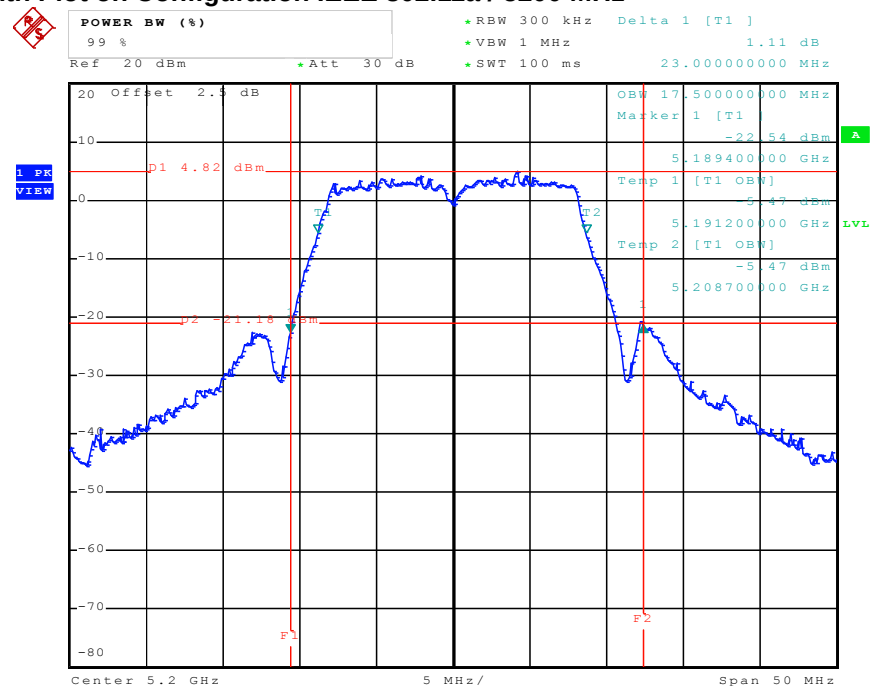
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	42.80	36.40
46	5230 MHz	44.60	36.40
54	5270 MHz	45.00	36.40
62	5310 MHz	44.80	36.40
102	5510 MHz	45.40	36.40
110	5550 MHz	45.00	36.40
134	5670 MHz	45.00	36.40

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



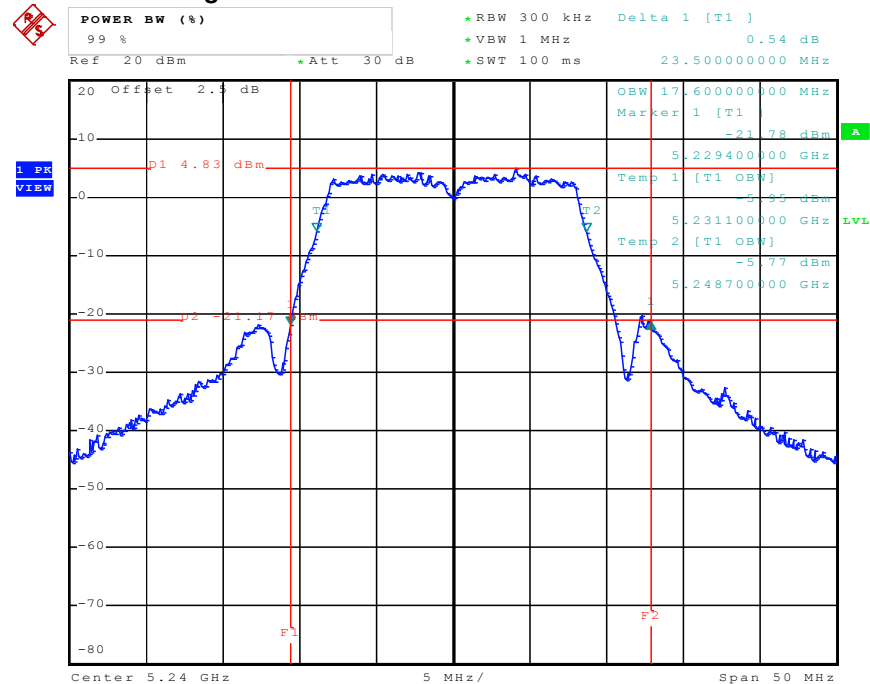
Date: 9.MAY.2011 12:15:11

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



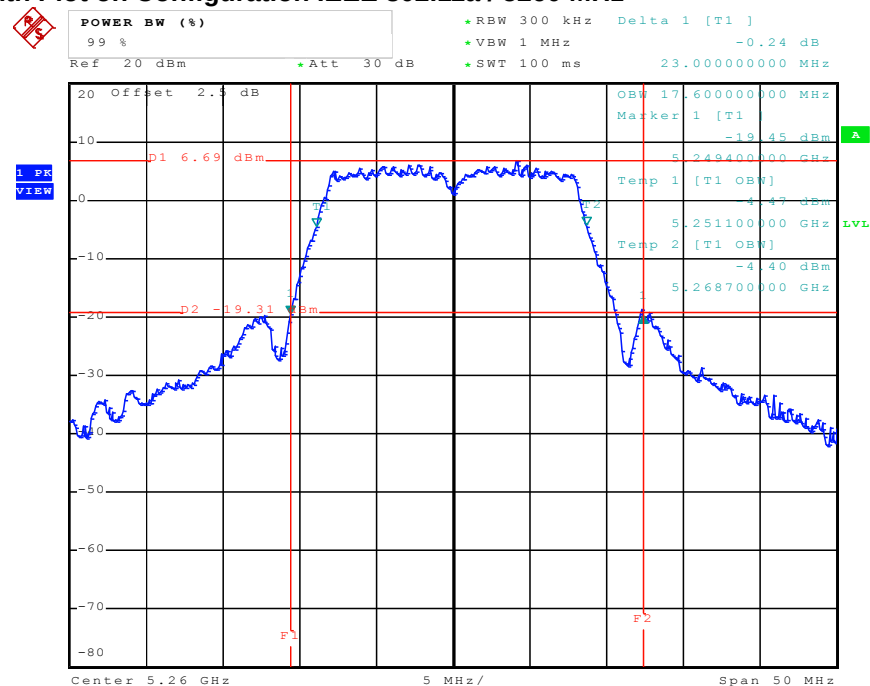
Date: 9.MAY.2011 14:15:38

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



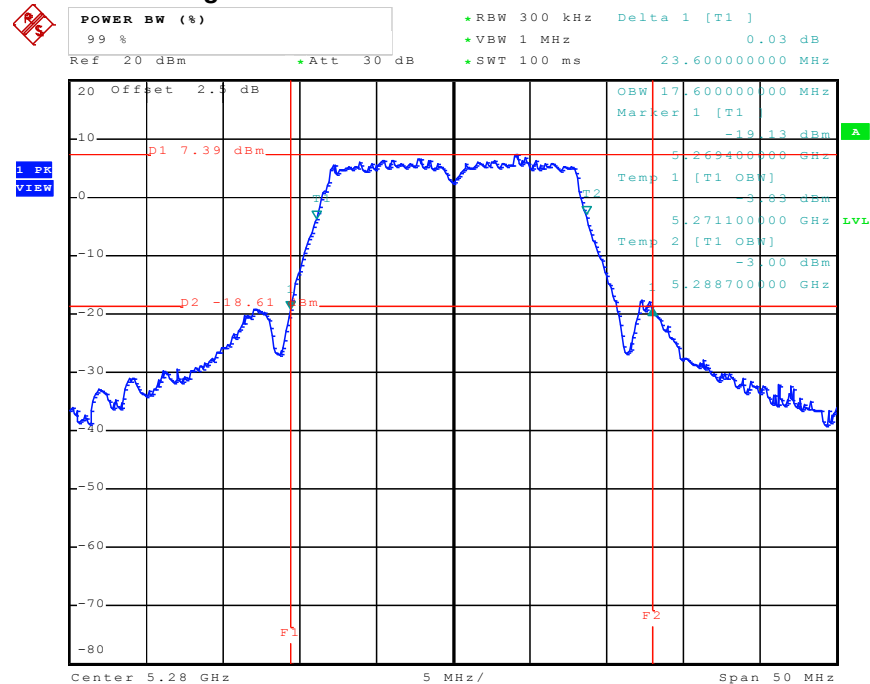
Date: 9.MAY.2011 14:23:20

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



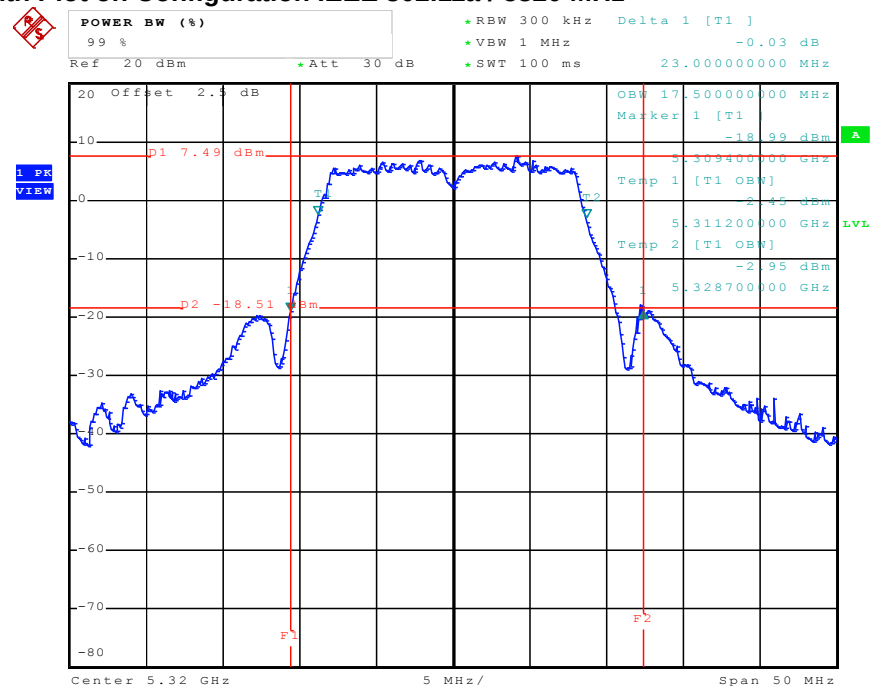
Date: 9.MAY.2011 14:56:11

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



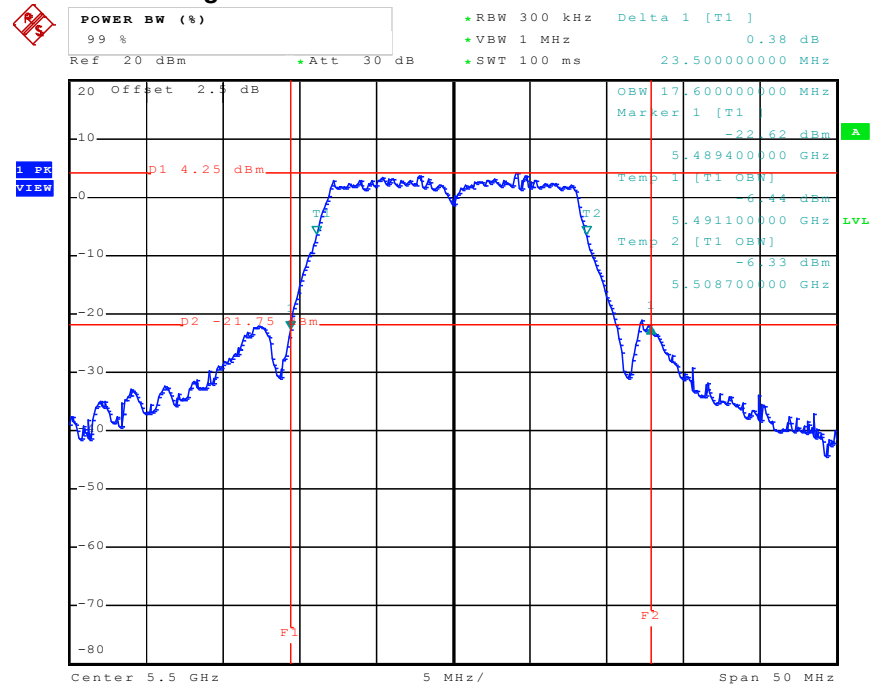
Date: 9.MAY.2011 14:59:15

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



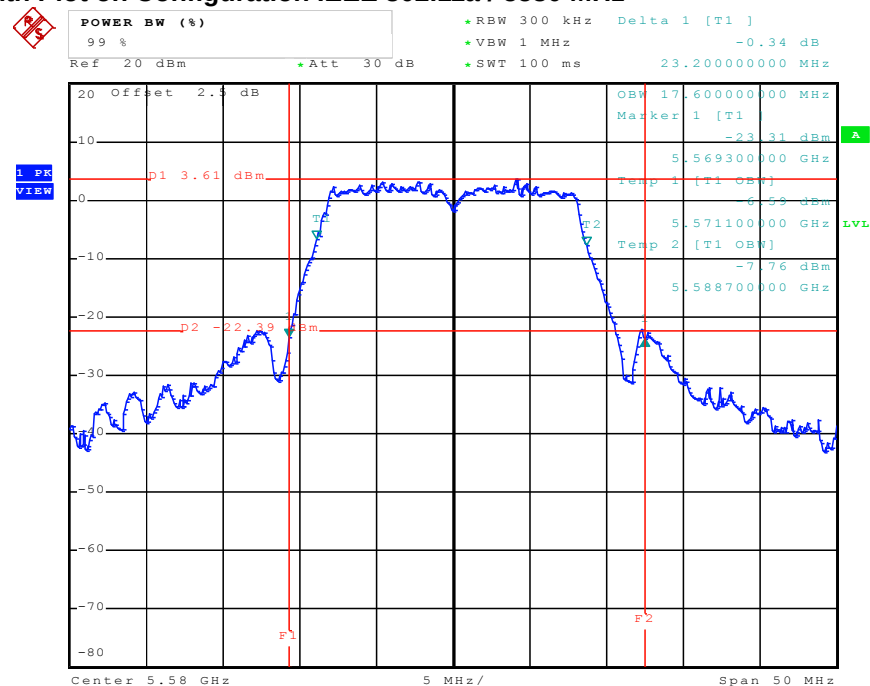
Date: 9.MAY.2011 16:06:08

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



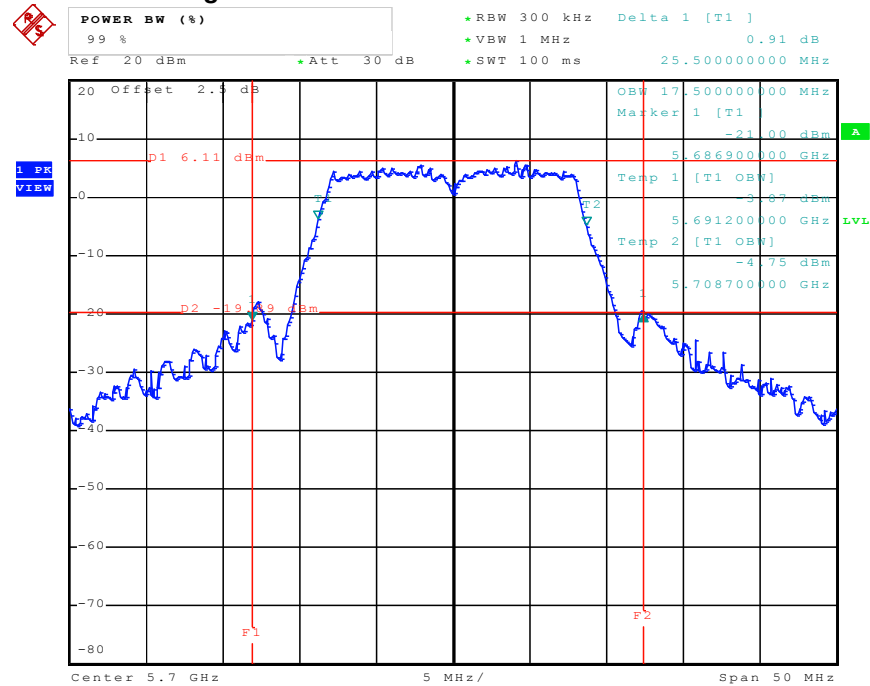
Date: 9.MAY.2011 16:10:57

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



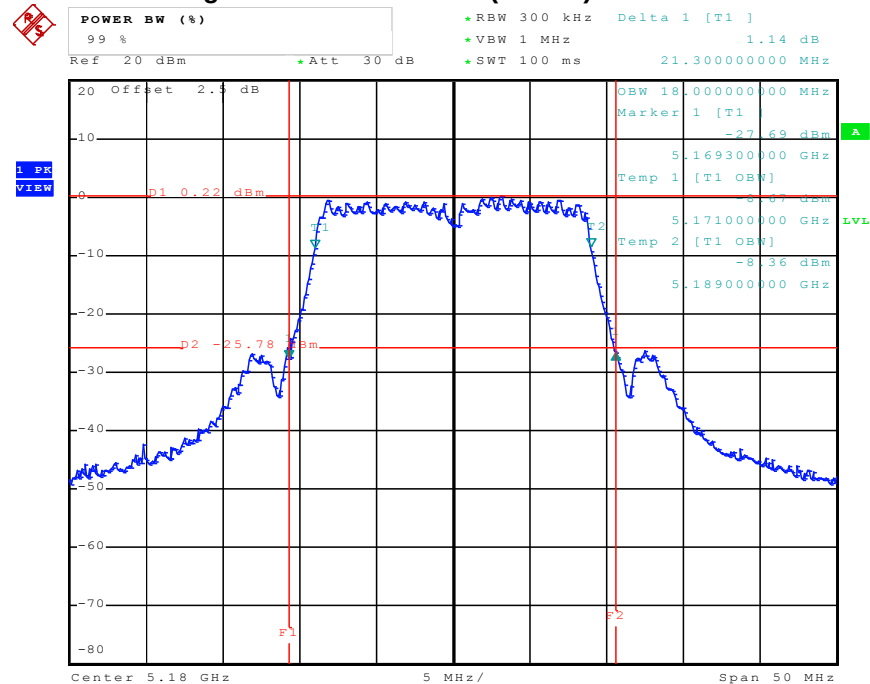
Date: 9.MAY.2011 16:18:04

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



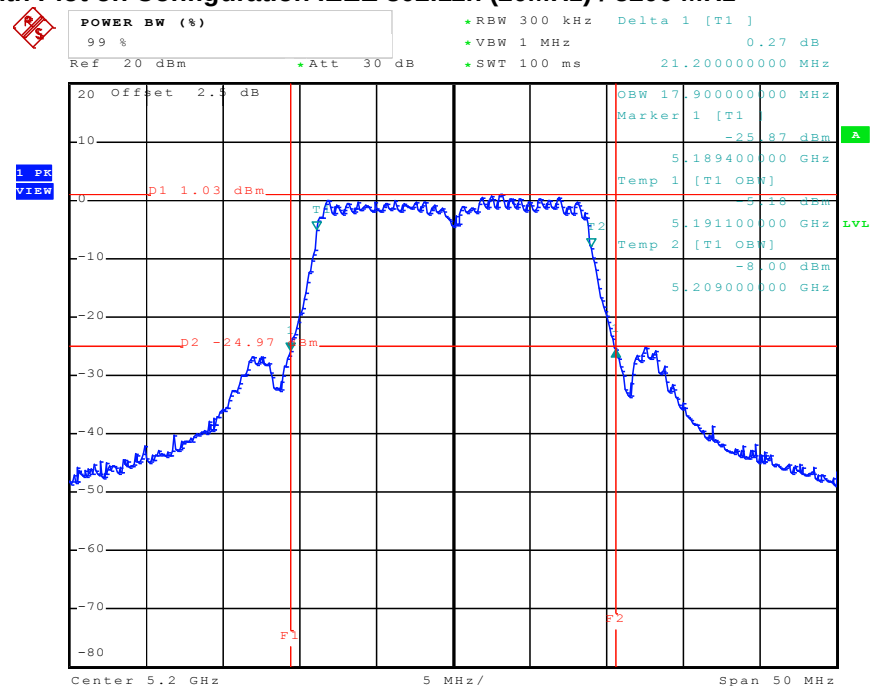
Date: 9.MAY.2011 16:26:27

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



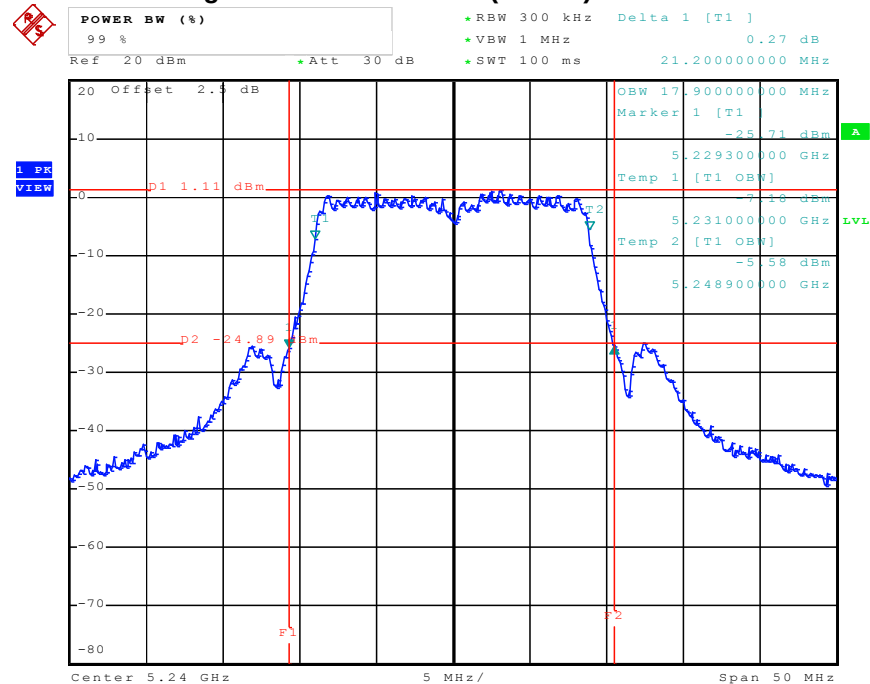
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26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) / 5200 MHz



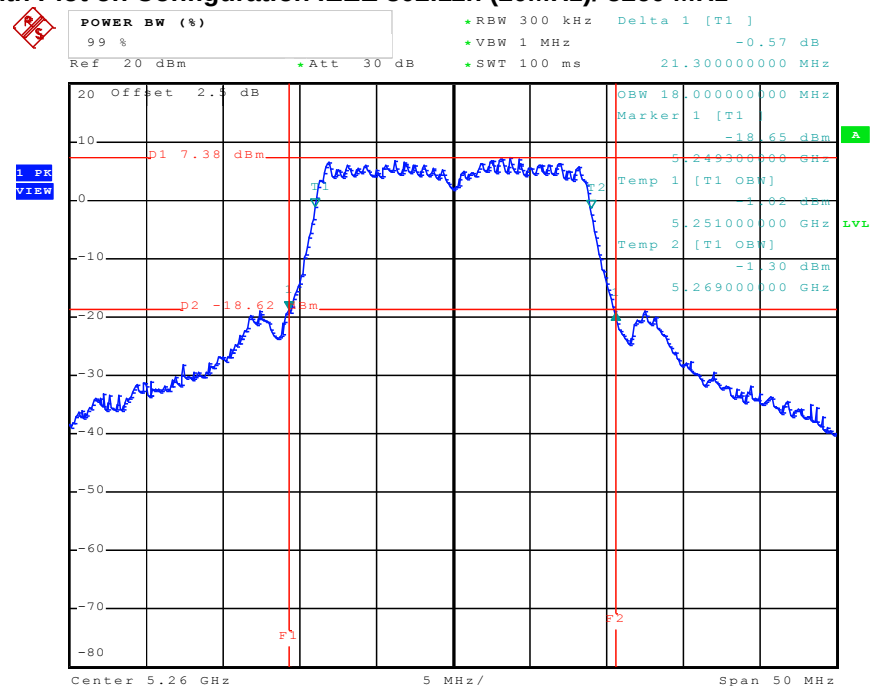
Date: 9.MAY.2011 18:43:19

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



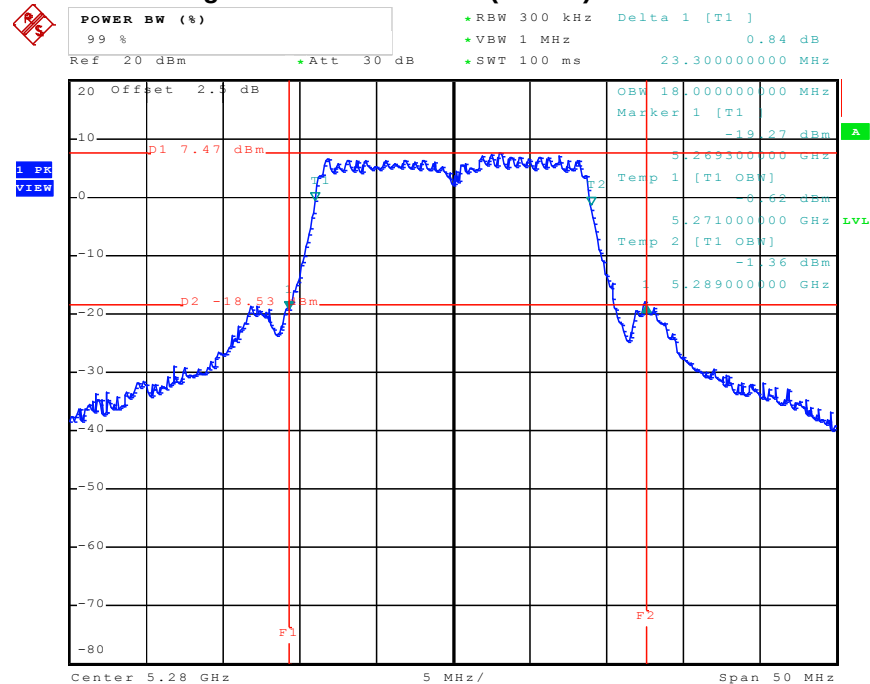
Date: 9.MAY.2011 18:45:49

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



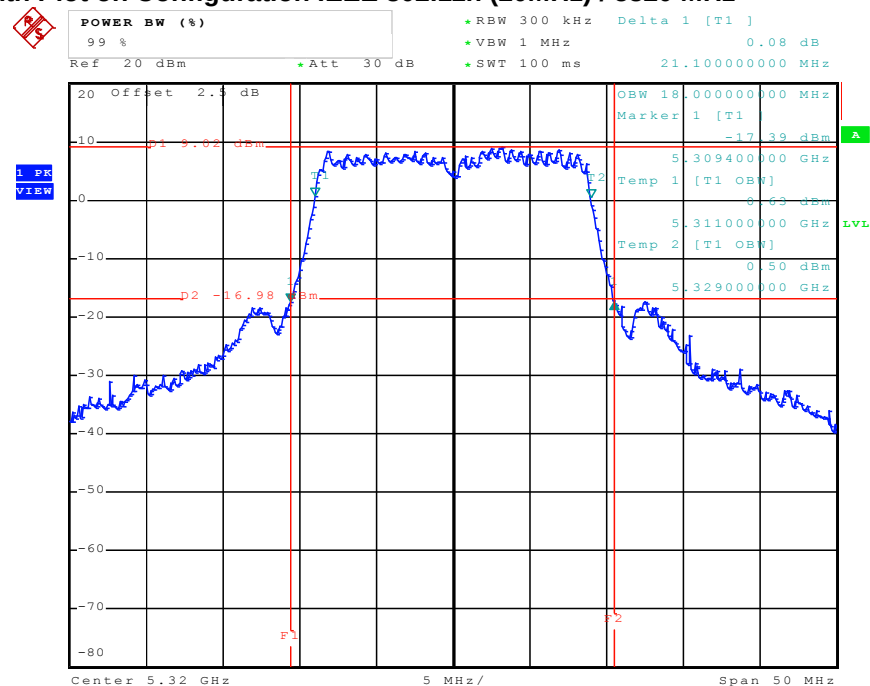
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26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) / 5280 MHz



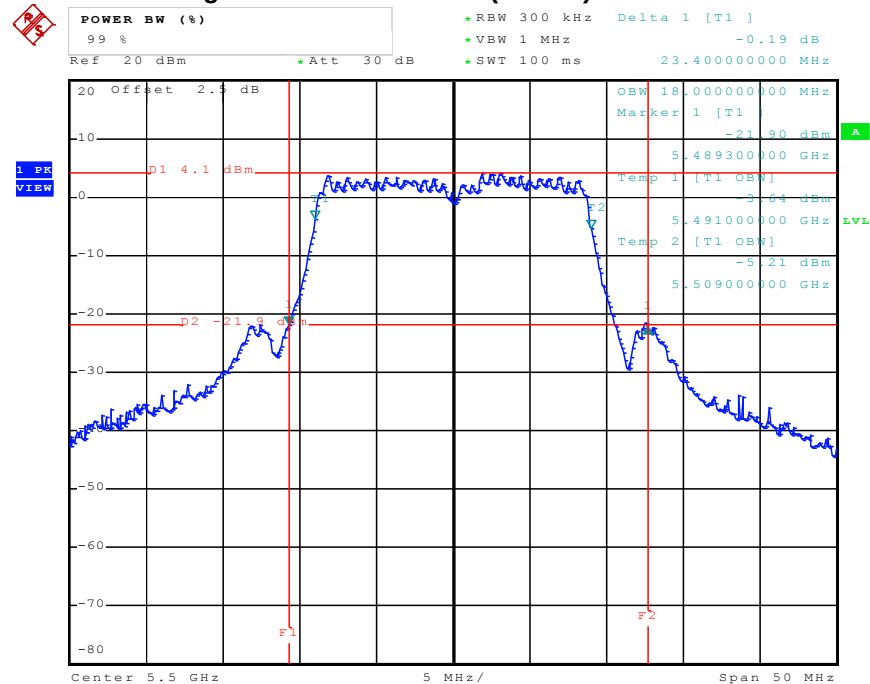
Date: 9.MAY.2011 19:51:38

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



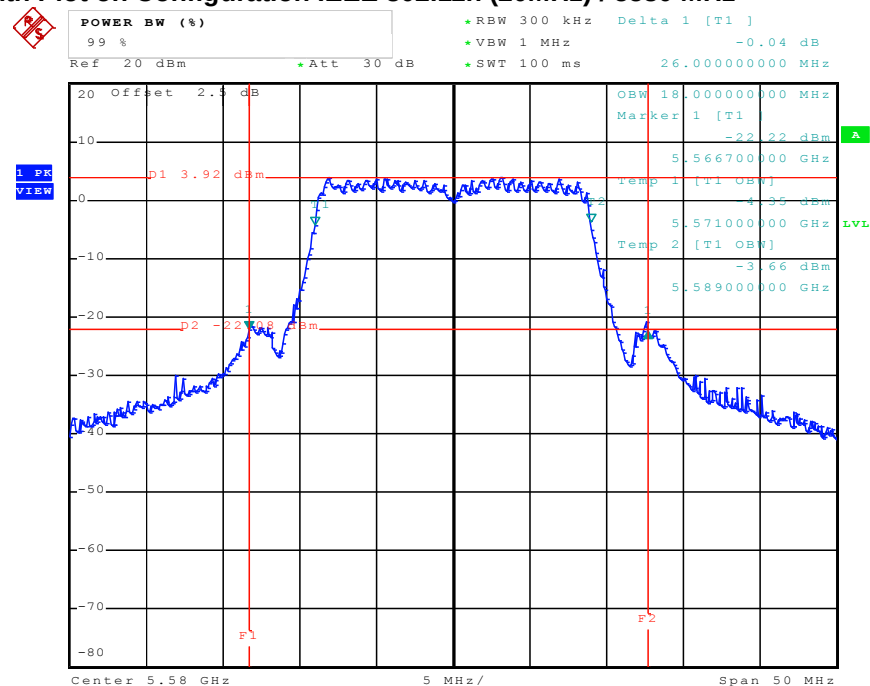
Date: 9.MAY.2011 20:02:27

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



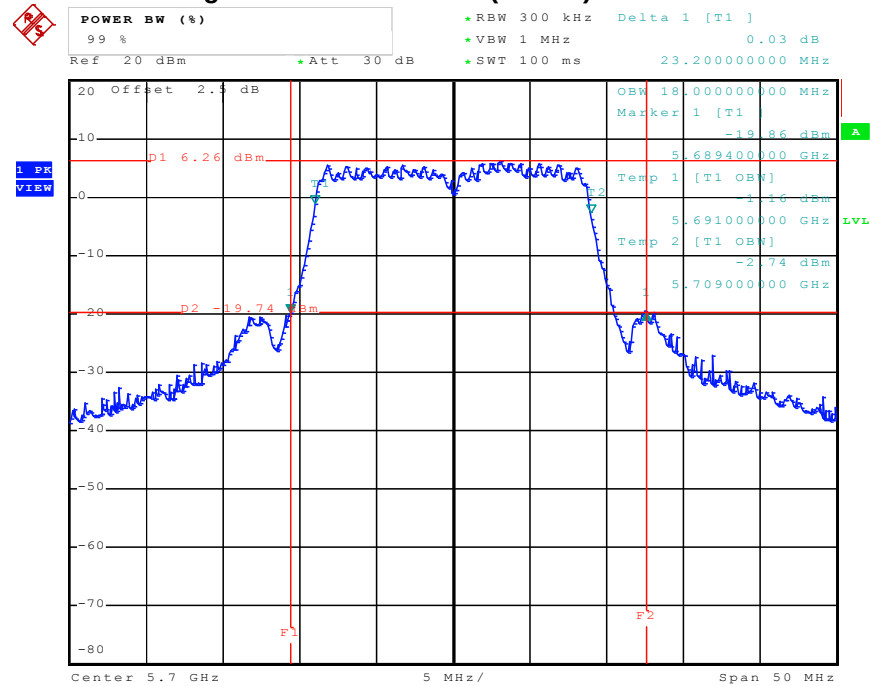
Date: 9.MAY.2011 20:08:01

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



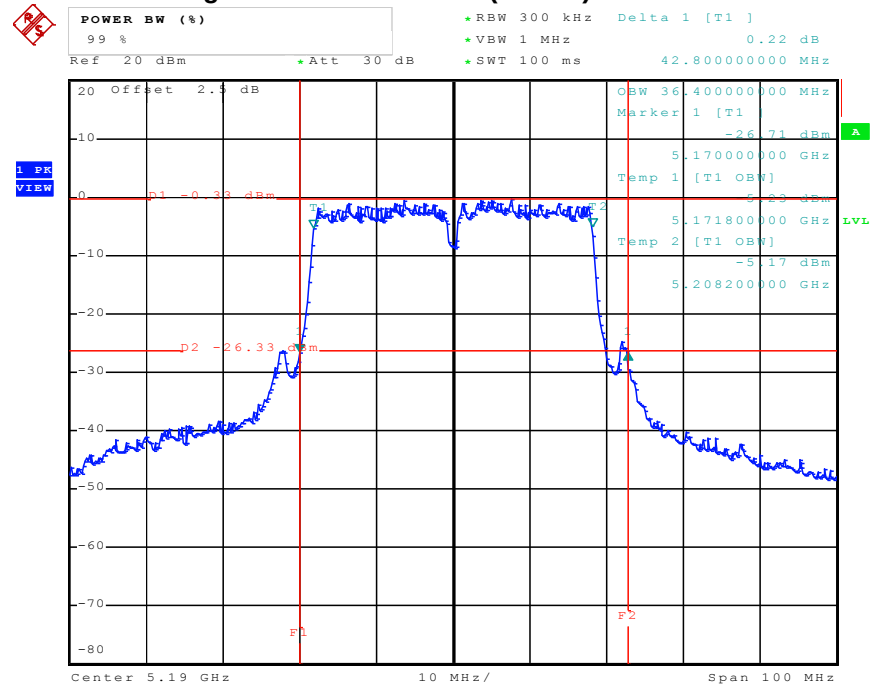
Date: 9.MAY.2011 20:42:09

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



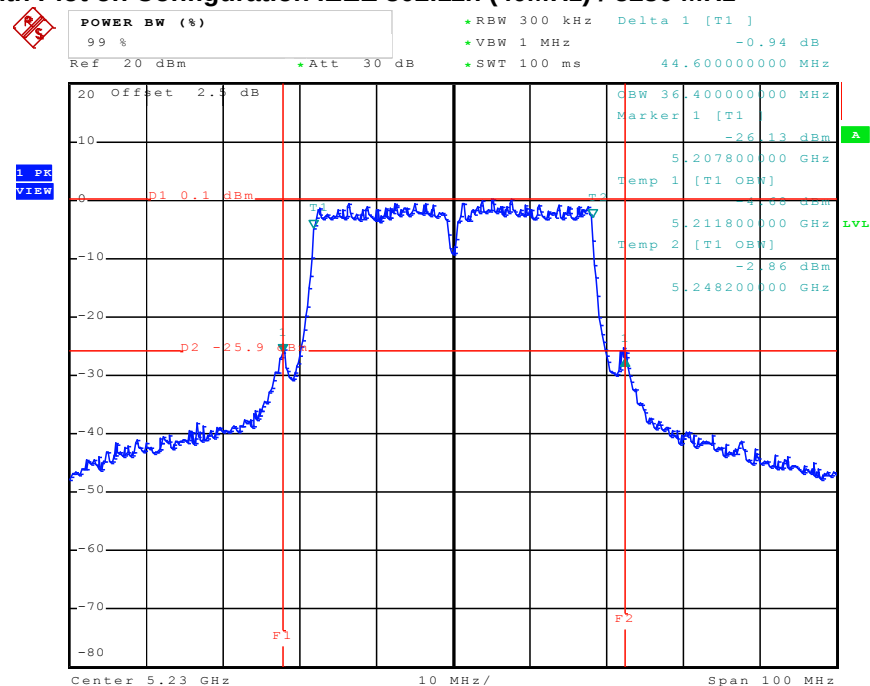
Date: 9.MAY.2011 20:59:03

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



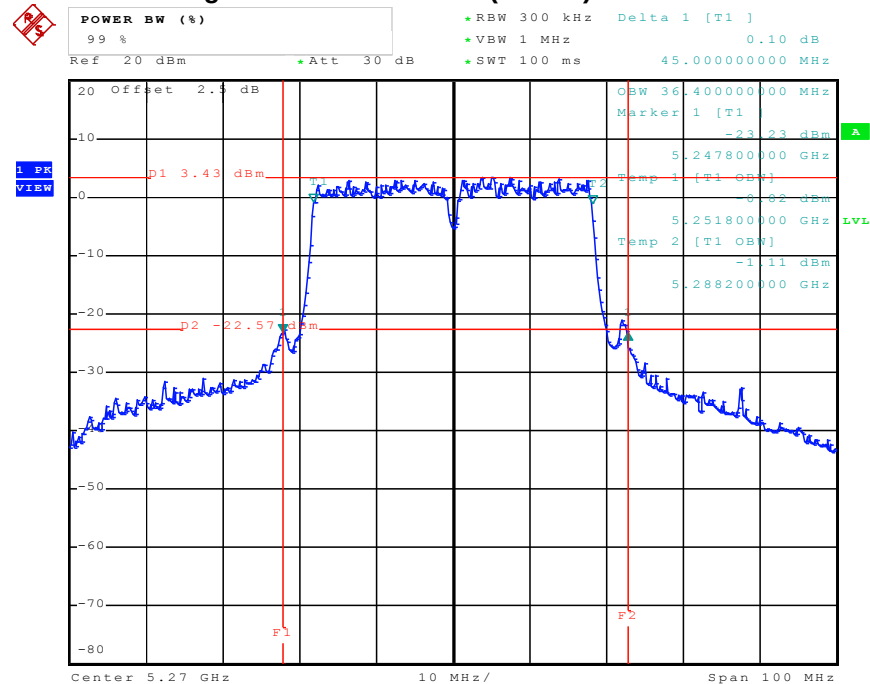
Date: 10.MAY.2011 10:00:45

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



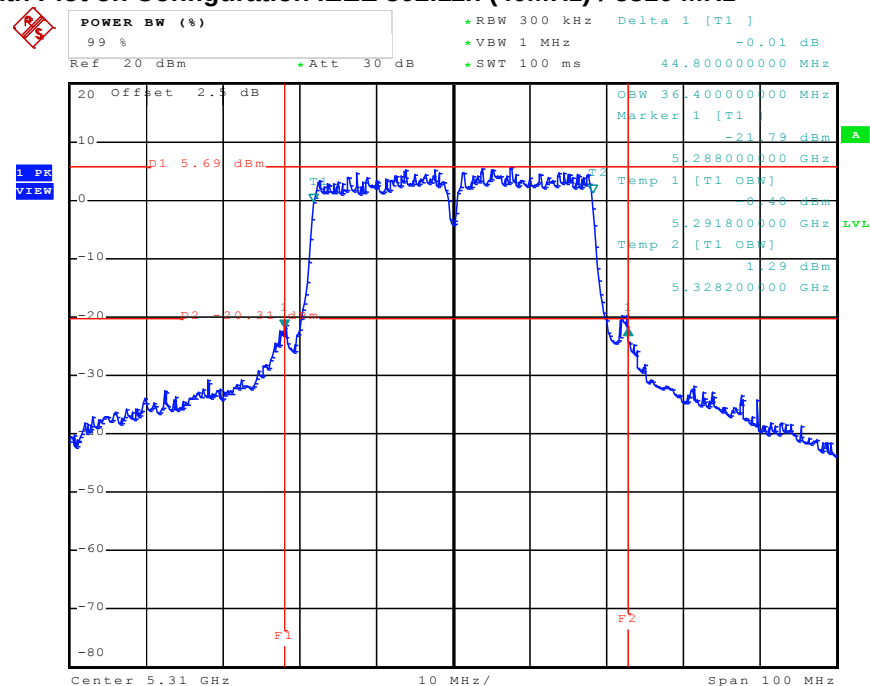
Date: 10.MAY.2011 10:33:07

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



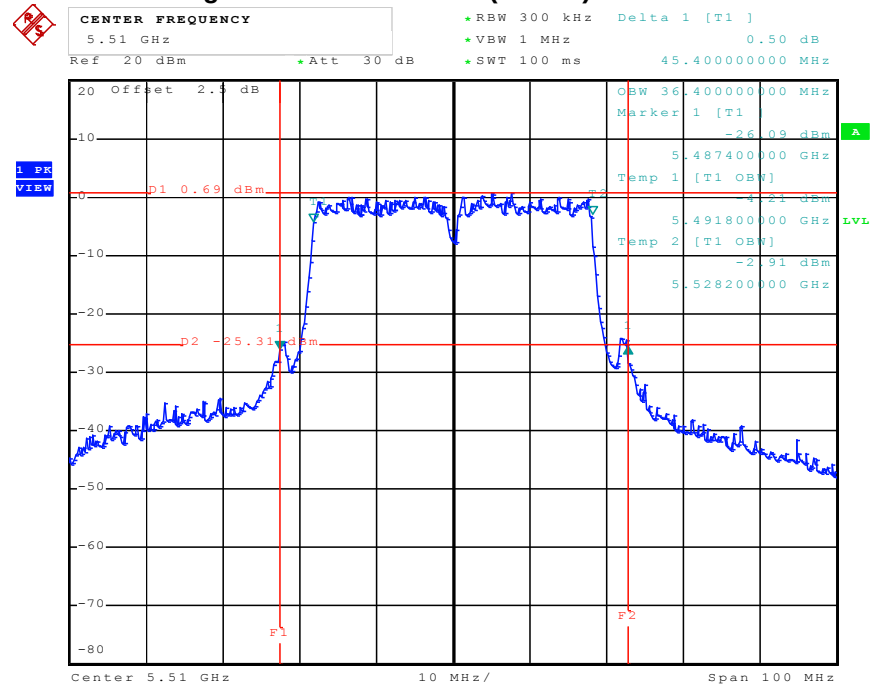
Date: 10.MAY.2011 10:37:03

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



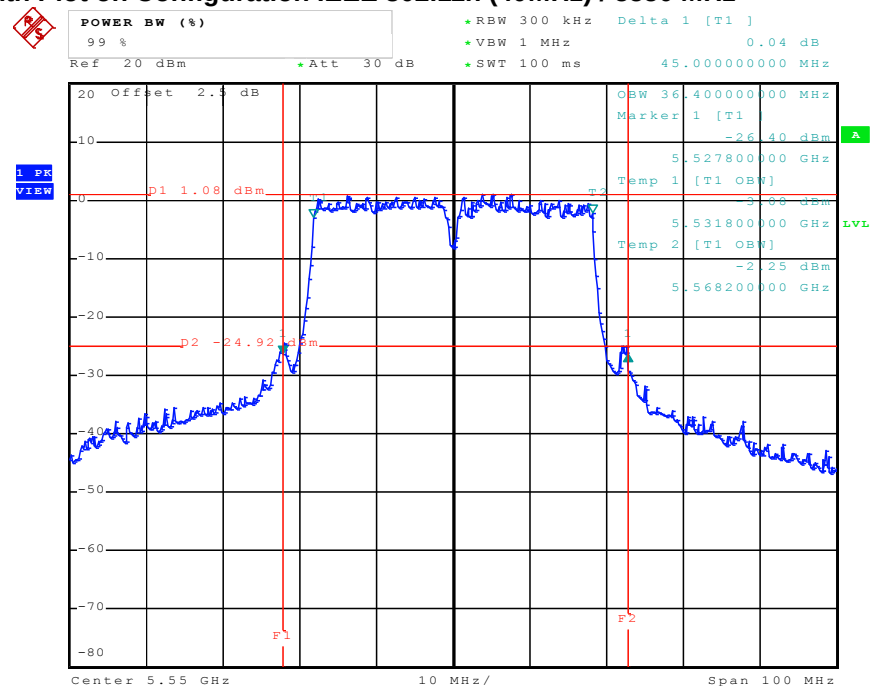
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26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) / 5510 MHz



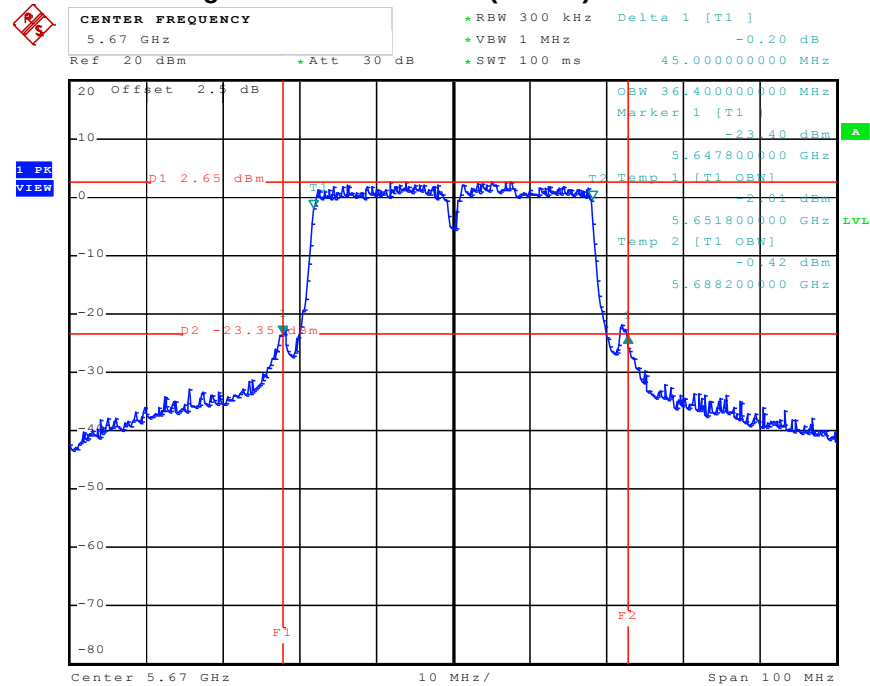
Date: 10.MAY.2011 12:47:16

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



Date: 10.MAY.2011 15:28:29

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



Date: 10.MAY.2011 16:47:26

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

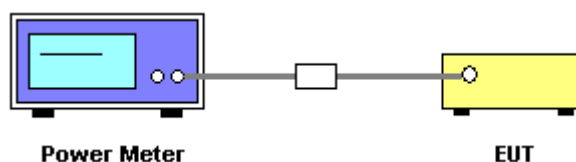
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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.

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	May 10, 2011	Test Site No.	TH01-HY
Temperature	24.7°C	Humidity	63.2%
Test Engineer	Cain	Configurations	802.11a/n

Configuration of IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.98	17.00	Complies
40	5200 MHz	12.32	17.00	Complies
48	5240 MHz	11.71	17.00	Complies
52	5260 MHz	13.76	24.00	Complies
56	5280 MHz	13.79	24.00	Complies
64	5320 MHz	12.76	24.00	Complies
100	5500 MHz	13.18	24.00	Complies
116	5580 MHz	13.57	24.00	Complies
140	5700 MHz	13.90	24.00	Complies

Configuration IEEE 802.11n (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	8.13	17.00	Complies
40	5200 MHz	8.08	17.00	Complies
48	5240 MHz	7.81	17.00	Complies
52	5260 MHz	13.71	24.00	Complies
56	5280 MHz	13.74	24.00	Complies
64	5320 MHz	14.04	24.00	Complies
100	5500 MHz	12.80	24.00	Complies
116	5580 MHz	13.36	24.00	Complies
140	5700 MHz	12.87	24.00	Complies

Configuration IEEE 802.11n (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	9.87	17.00	Complies
46	5230 MHz	9.72	17.00	Complies
54	5270 MHz	12.59	24.00	Complies
62	5310 MHz	12.84	24.00	Complies
102	5510 MHz	11.95	24.00	Complies
110	5550 MHz	12.14	24.00	Complies
134	5670 MHz	12.08	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

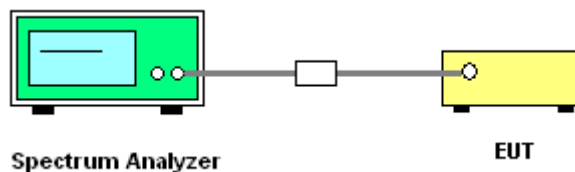
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	May 10, 2011	Test Site No.	TH01-HY
Temperature	24.7°C	Humidity	63.2%
Test Engineer	Cain	Configurations	802.11a/n

Configuration of IEEE 802.11a

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-1.78	4.00	Complies
5200 MHz	1.71	4.00	Complies
5240 MHz	1.81	4.00	Complies
5260 MHz	3.74	11.00	Complies
5280 MHz	4.14	11.00	Complies
5320 MHz	4.77	11.00	Complies
5500 MHz	1.28	11.00	Complies
5580 MHz	0.68	11.00	Complies
5700 MHz	2.67	11.00	Complies

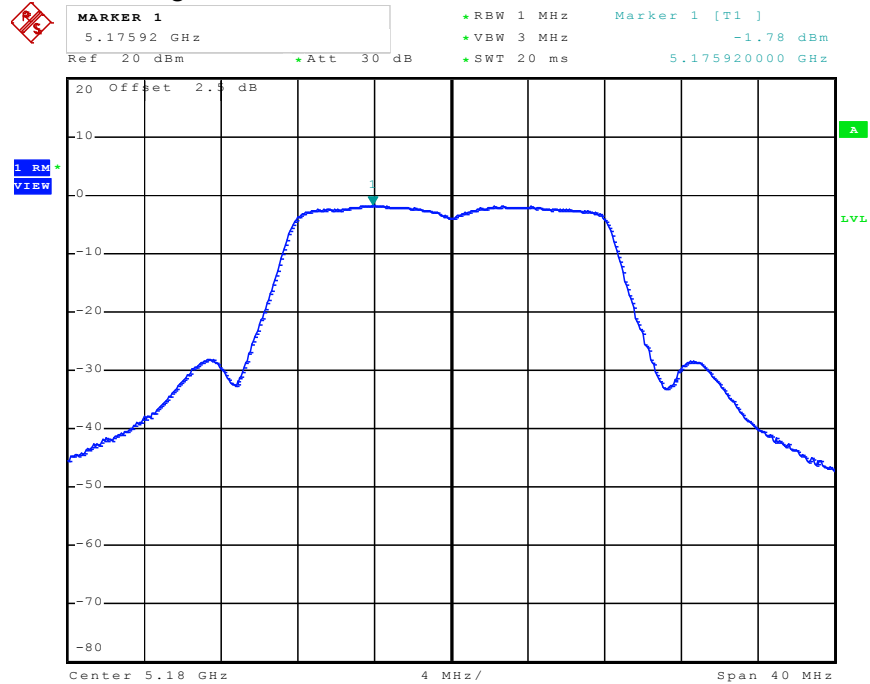
Configuration IEEE 802.11n (20MHz)

Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5180 MHz	-2.99	4.00	Complies
5200 MHz	-2.47	4.00	Complies
5240 MHz	-2.56	4.00	Complies
5260 MHz	3.68	11.00	Complies
5280 MHz	4.31	11.00	Complies
5320 MHz	6.16	11.00	Complies
5500 MHz	0.79	11.00	Complies
5580 MHz	0.55	11.00	Complies
5700 MHz	2.80	11.00	Complies

Configuration IEEE 802.11n (40MHz)

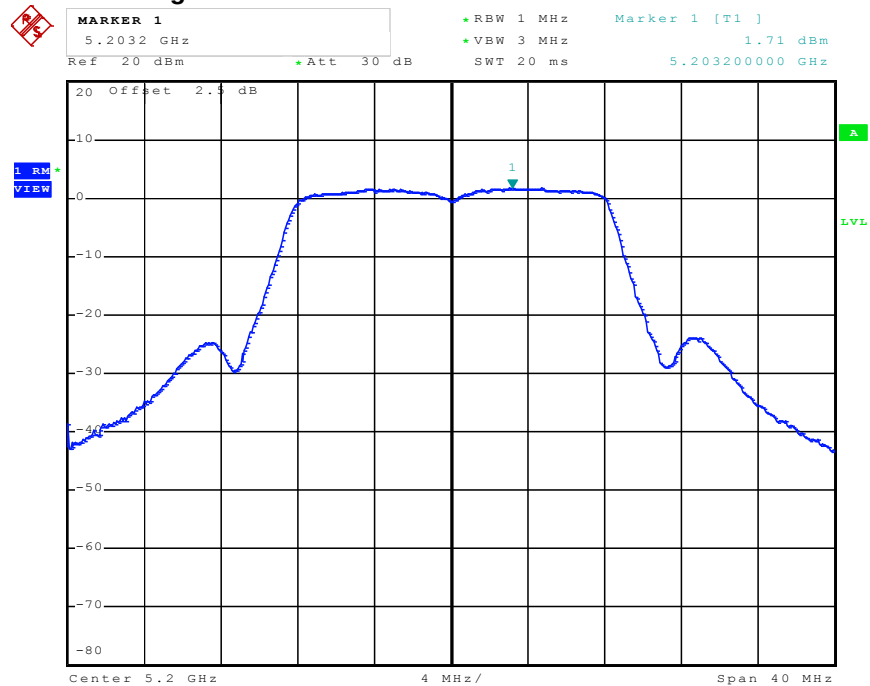
Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-3.37	4.00	Complies
5230 MHz	-2.74	4.00	Complies
5270 MHz	0.70	11.00	Complies
5310 MHz	2.27	11.00	Complies
5510 MHz	-2.40	11.00	Complies
5550 MHz	-1.51	11.00	Complies
5670 MHz	-0.55	11.00	Complies

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



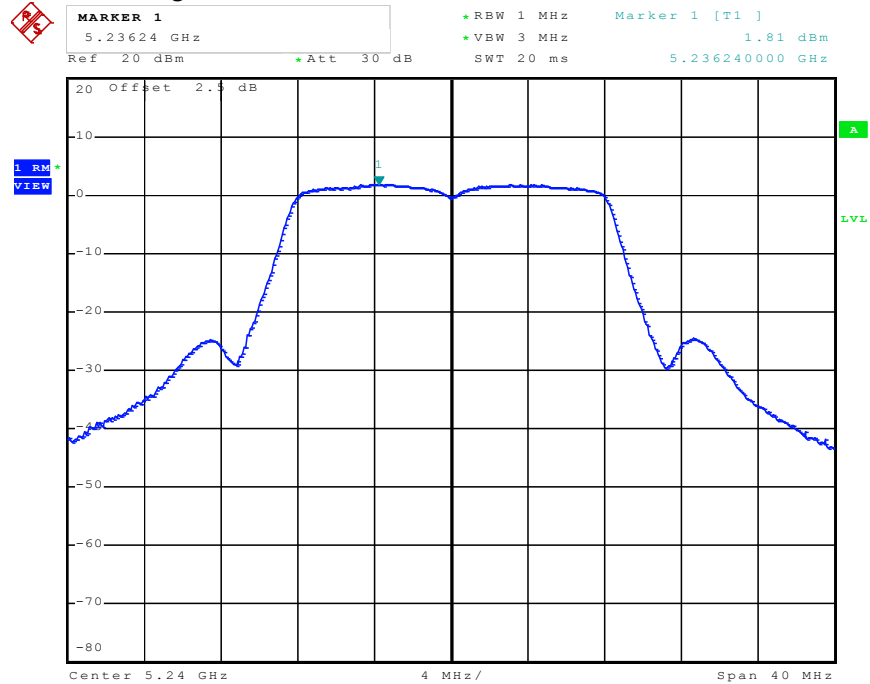
Date: 9.MAY.2011 12:19:06

Power Density Plot on Configuration IEEE 802.11a / 5200 MHz



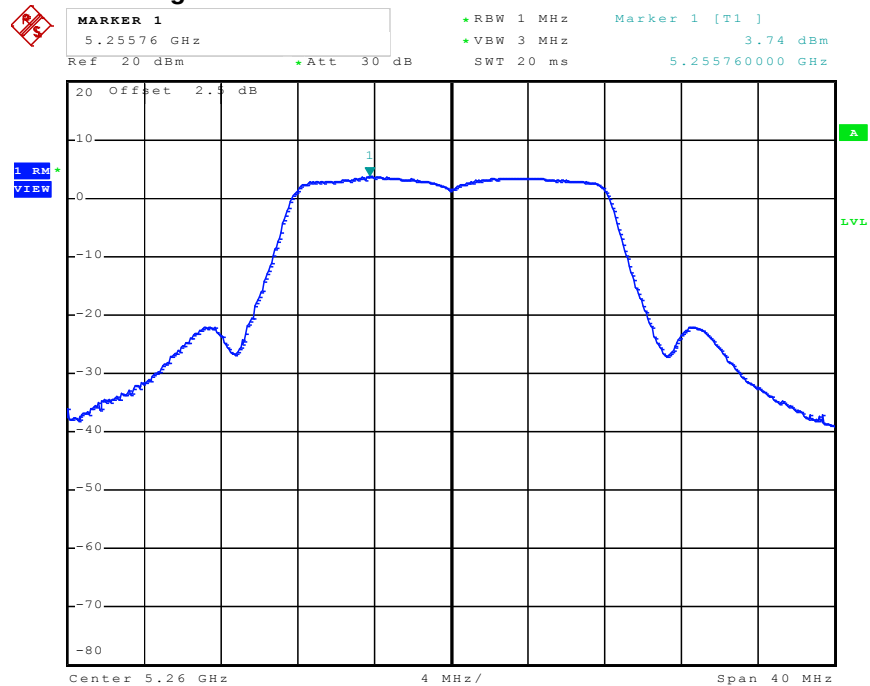
Date: 9.MAY.2011 14:10:39

Power Density Plot on Configuration IEEE 802.11a / 5240 MHz



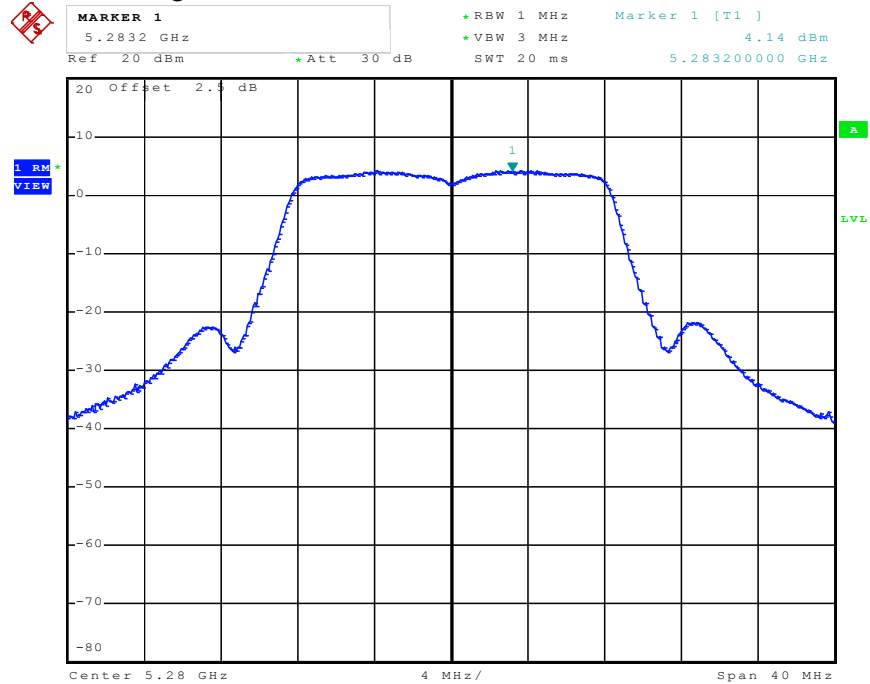
Date: 9.MAY.2011 14:28:24

Power Density Plot on Configuration IEEE 802.11a / 5260 MHz



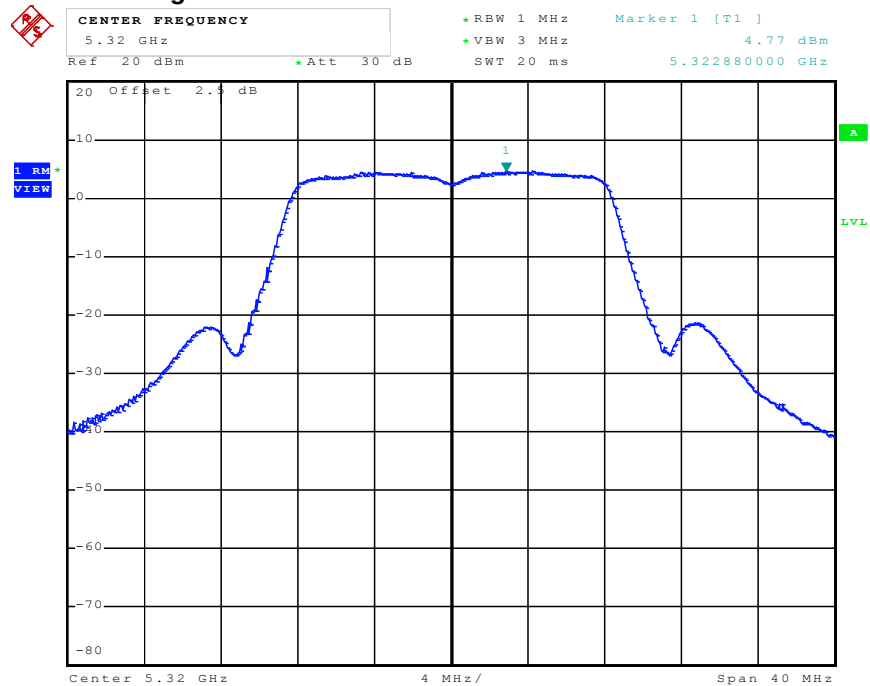
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Power Density Plot on Configuration IEEE 802.11a / 5280 MHz



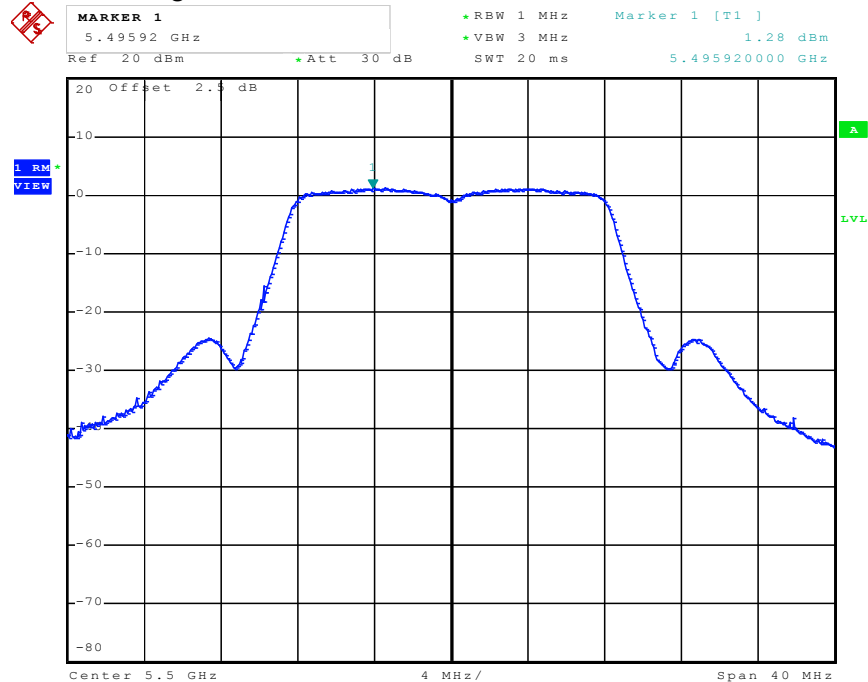
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Power Density Plot on Configuration IEEE 802.11a / 5320 MHz



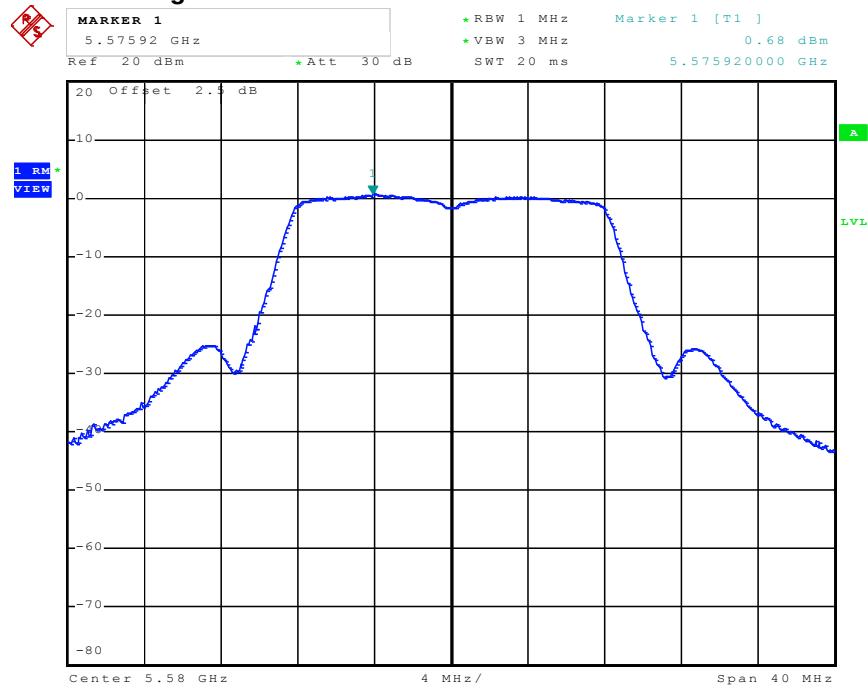
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Power Density Plot on Configuration IEEE 802.11a / 5500 MHz



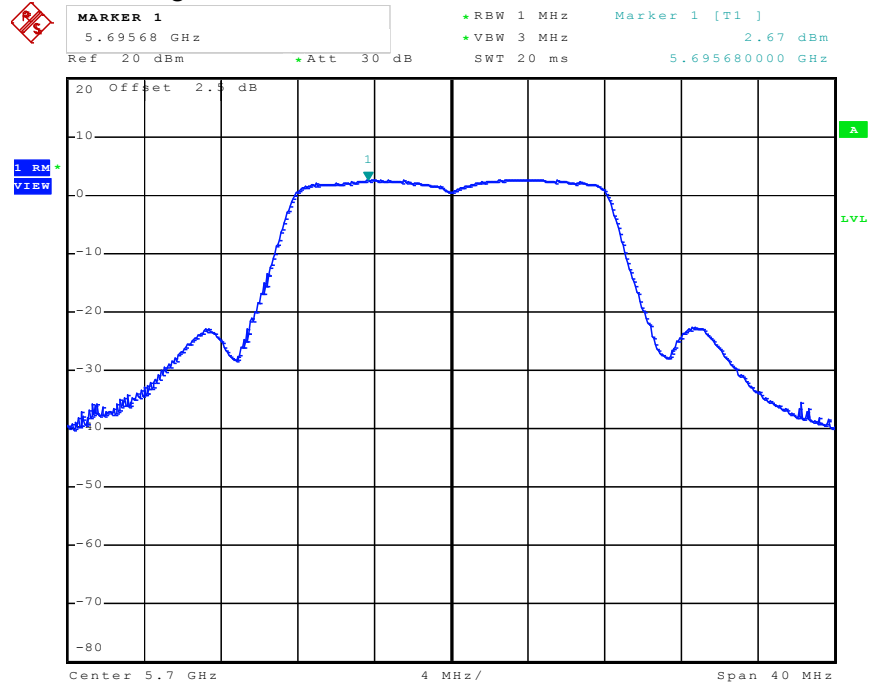
Date: 9.MAY.2011 16:13:06

Power Density Plot on Configuration IEEE 802.11a / 5580 MHz



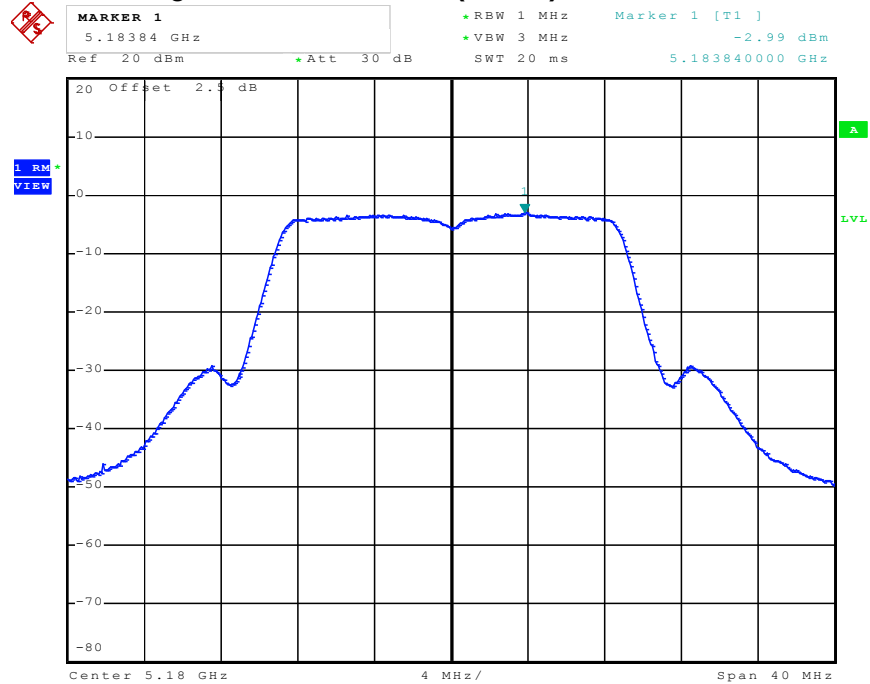
Date: 9.MAY.2011 16:15:30

Power Density Plot on Configuration IEEE 802.11a / 5700 MHz



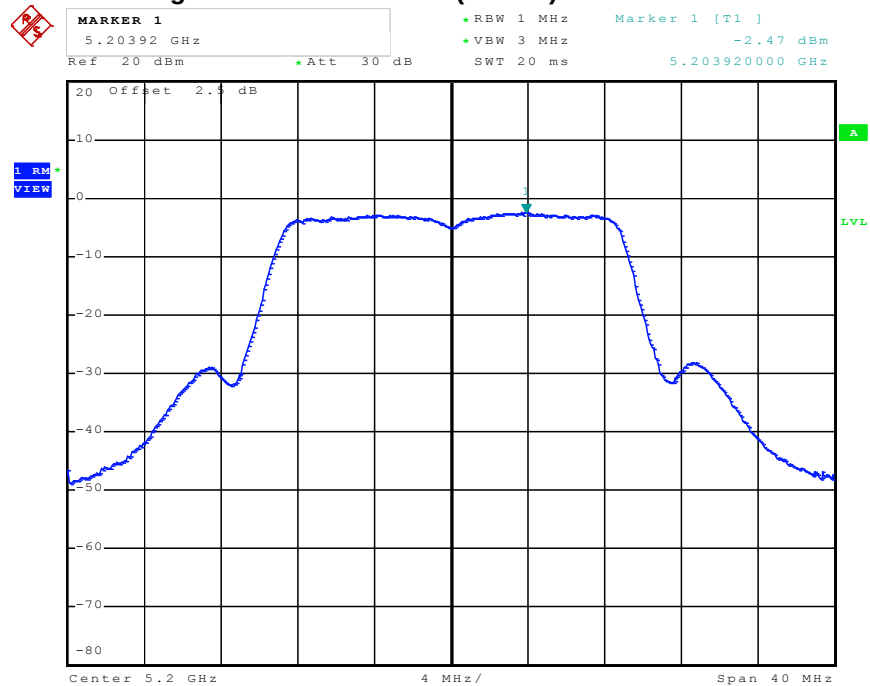
Date: 9.MAY.2011 16:28:02

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



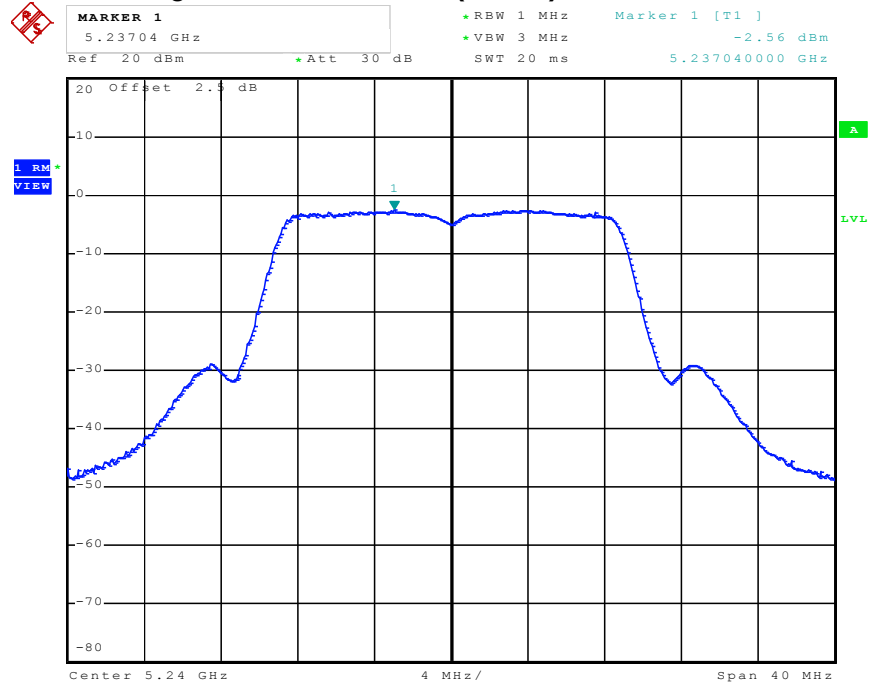
Date: 9.MAY.2011 18:37:03

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



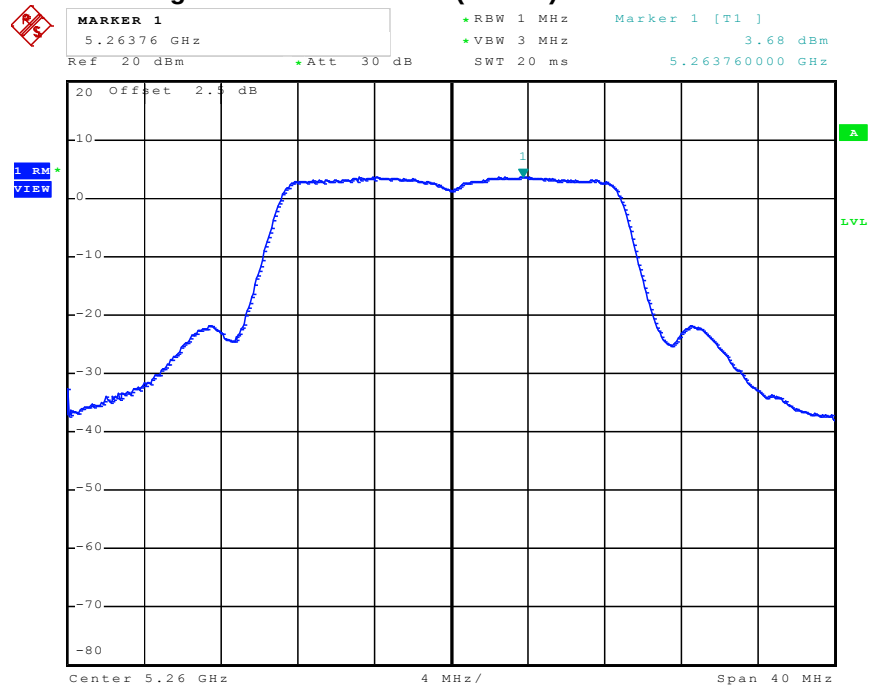
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Power Density Plot on Configuration IEEE 802.11n (20MHz) / 5240 MHz



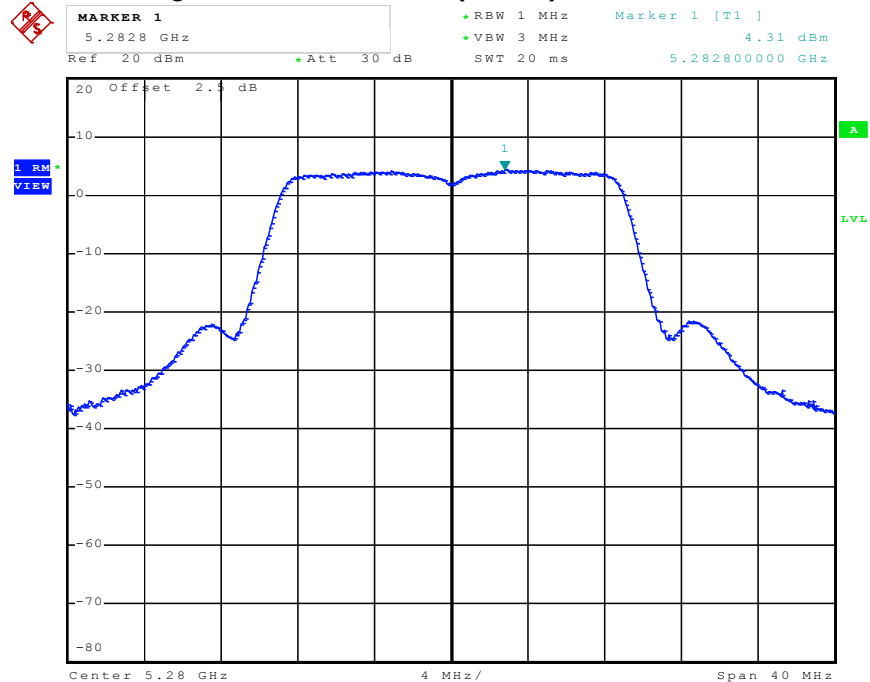
Date: 9.MAY.2011 18:47:17

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



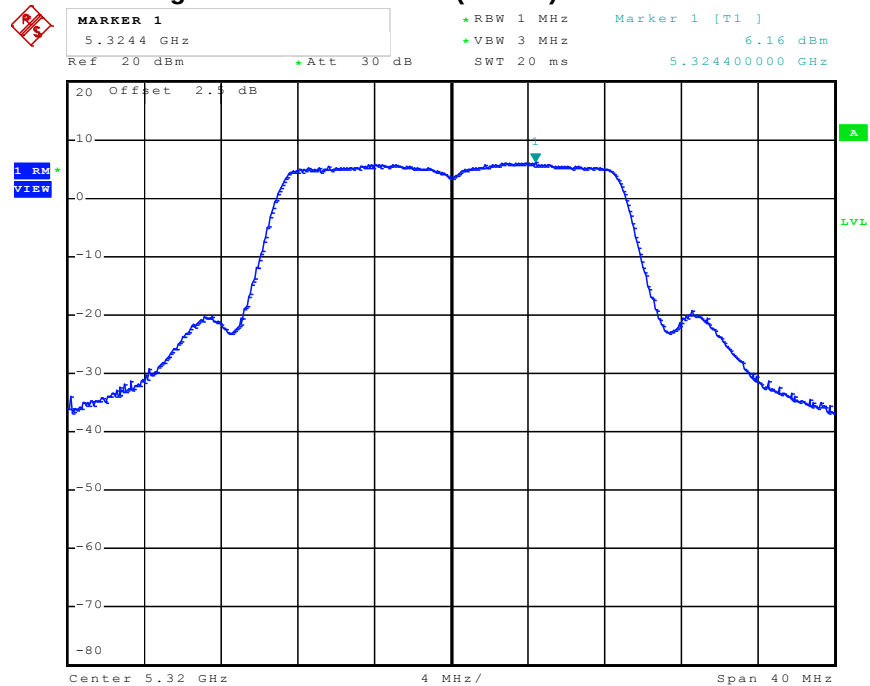
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Power Density Plot on Configuration IEEE 802.11n (20MHz) / 5280 MHz



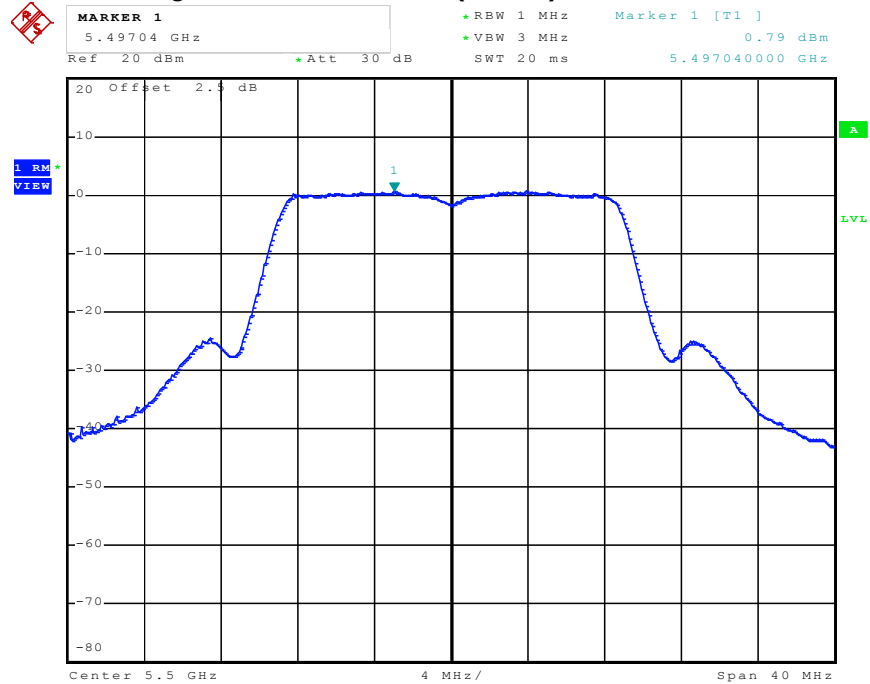
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Power Density Plot on Configuration IEEE 802.11n (20MHz) / 5320 MHz



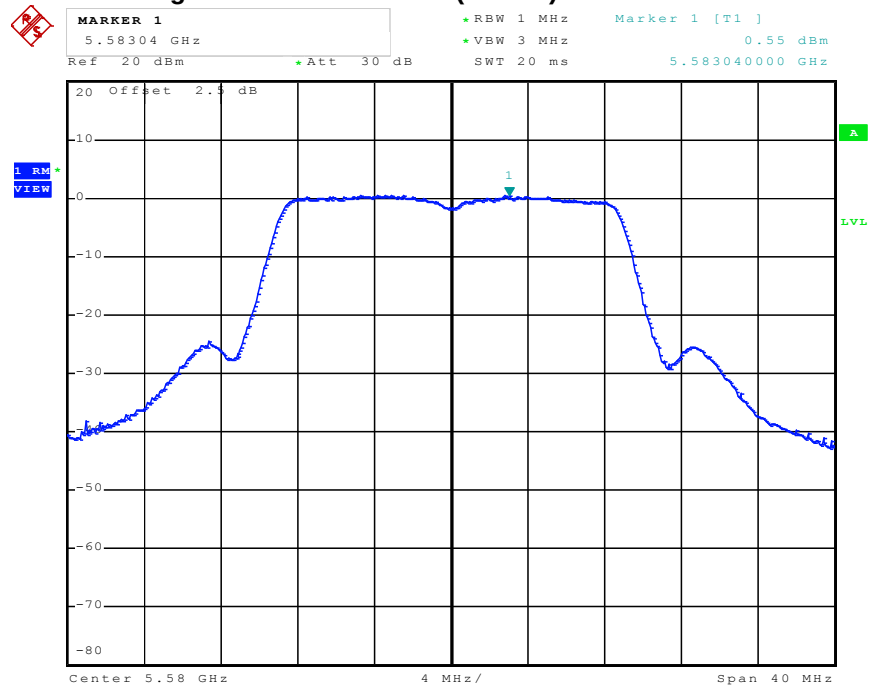
Date: 9.MAY.2011 20:00:23

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



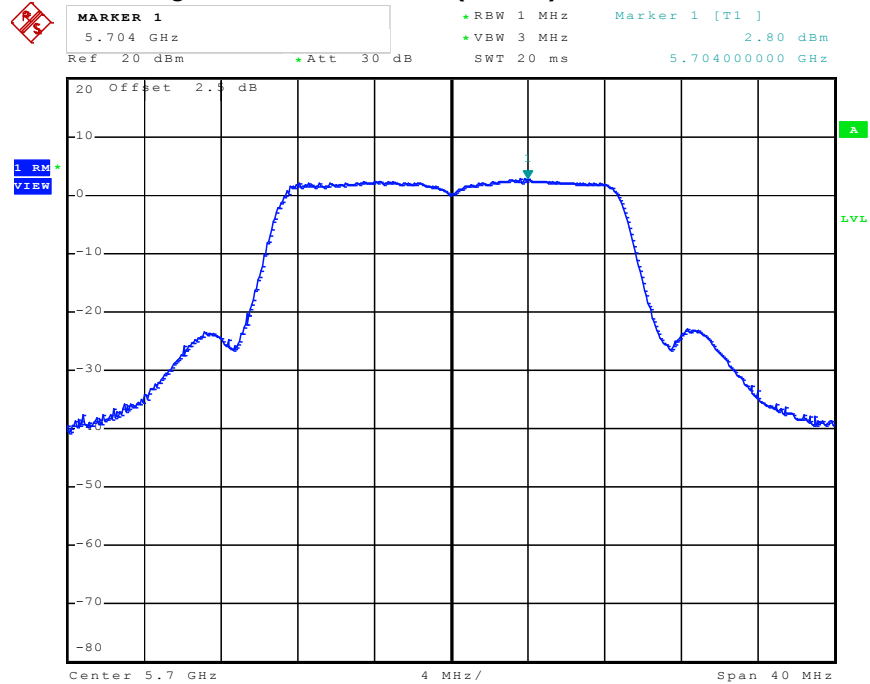
Date: 9.MAY.2011 20:10:07

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



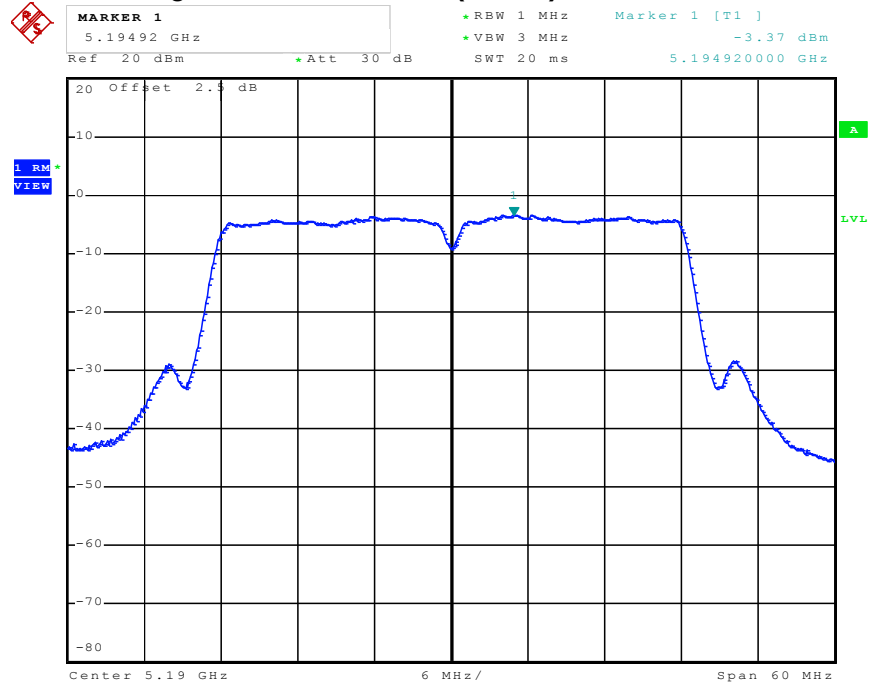
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Power Density Plot on Configuration IEEE 802.11n (20MHz) / 5700 MHz



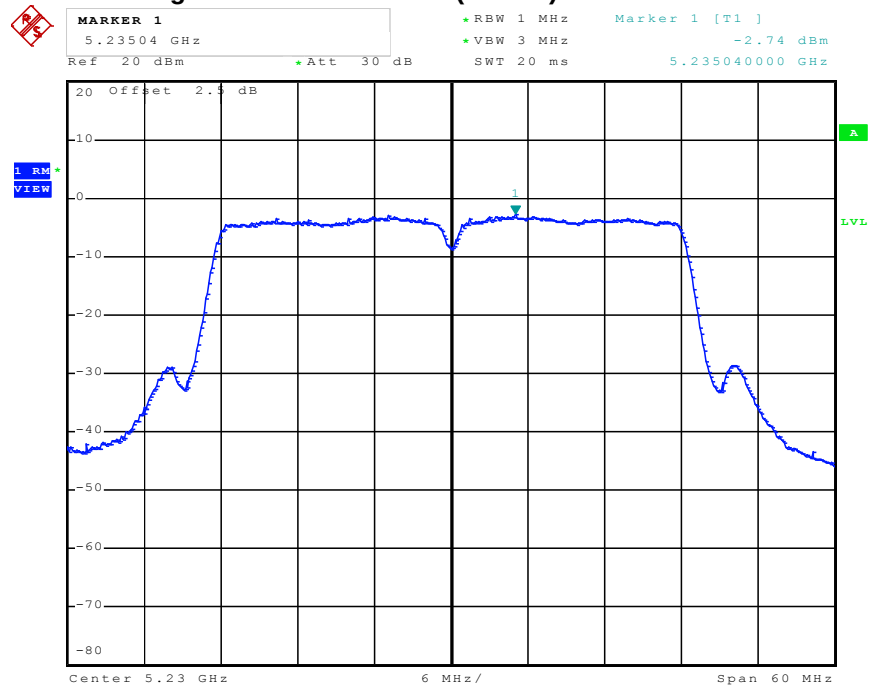
Date: 9.MAY.2011 21:00:07

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



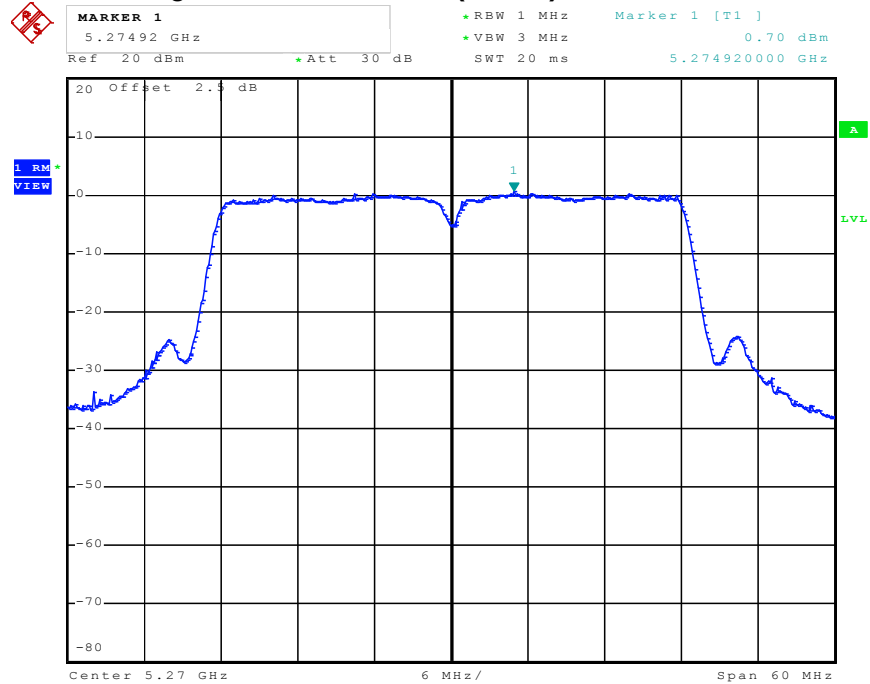
Date: 10.MAY.2011 10:27:45

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



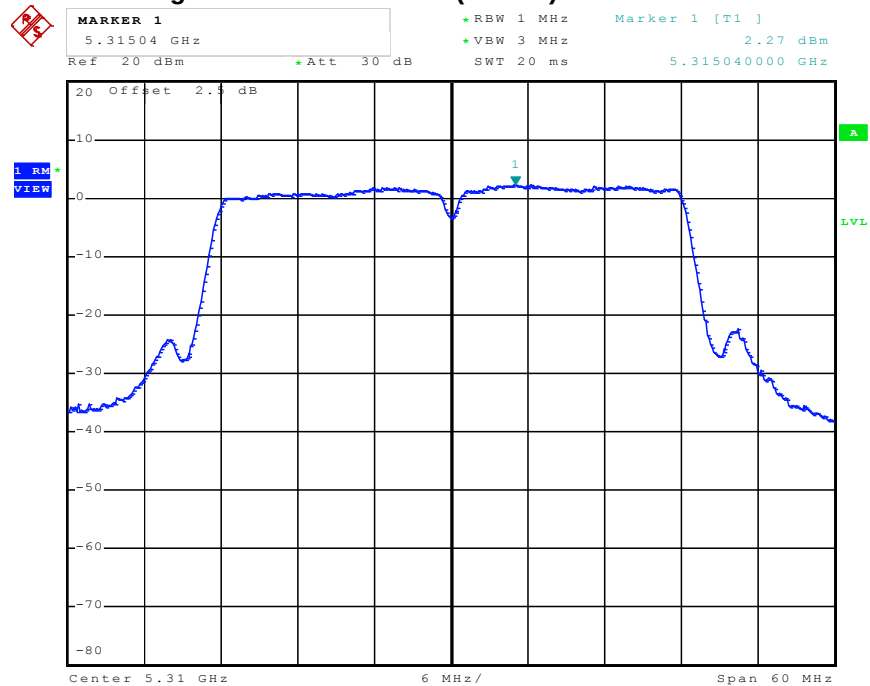
Date: 10.MAY.2011 10:30:15

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



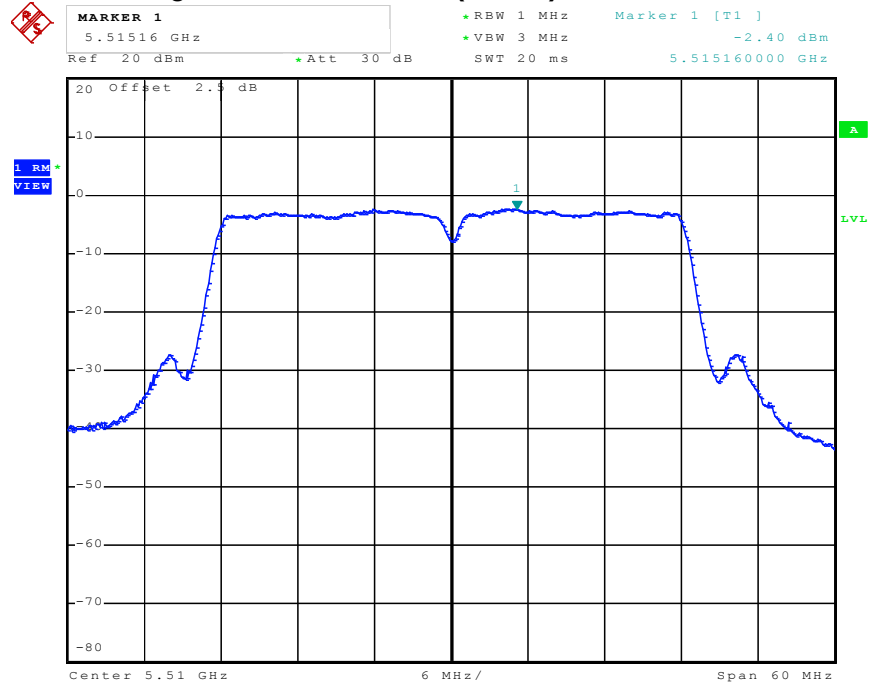
Date: 10.MAY.2011 10:38:22

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



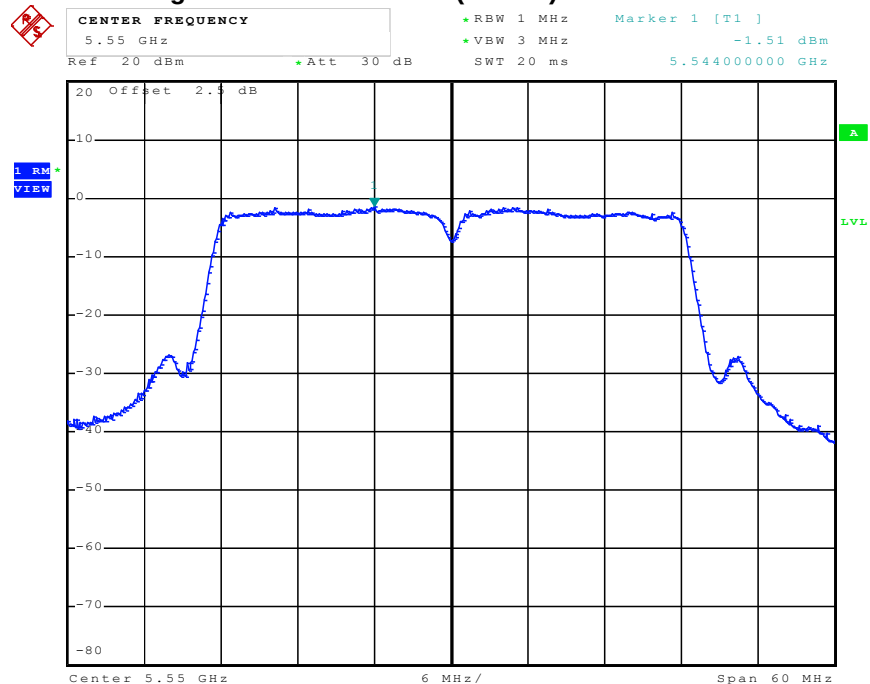
Date: 10.MAY.2011 10:40:15

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



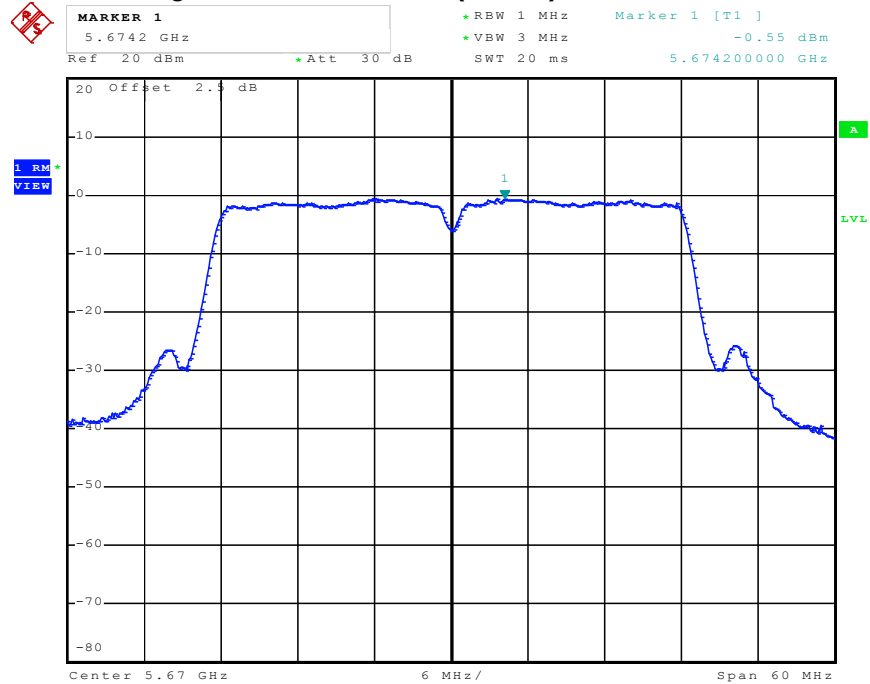
Date: 10.MAY.2011 13:56:32

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



Date: 10.MAY.2011 15:24:26

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



Date: 10.MAY.2011 17:05:07

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

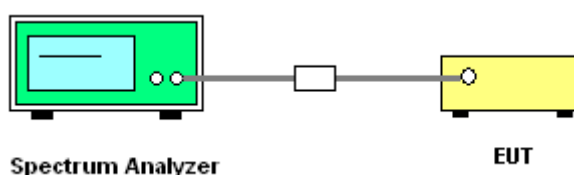
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 $\geq 1/T$ (IEEE 802.11a VBW = 300kHz $\geq 1/4\mu\text{s}$). 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.
5. Measuring multiple antennas, the connectors are required to link with Spectrum Analyzer through a combiner.

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	May 10, 2011	Test Site No.	TH01-HY
Temperature	24.7°C	Humidity	63.2%
Test Engineer	Cain	Configurations	802.11a/n

Configuration of IEEE 802.11a

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	6.00	13	Complies
5200 MHz	6.44	13	Complies
5240 MHz	6.08	13	Complies
5260 MHz	6.12	13	Complies
5280 MHz	5.48	13	Complies
5320 MHz	6.06	13	Complies
5500 MHz	5.48	13	Complies
5580 MHz	5.35	13	Complies
5700 MHz	5.52	13	Complies

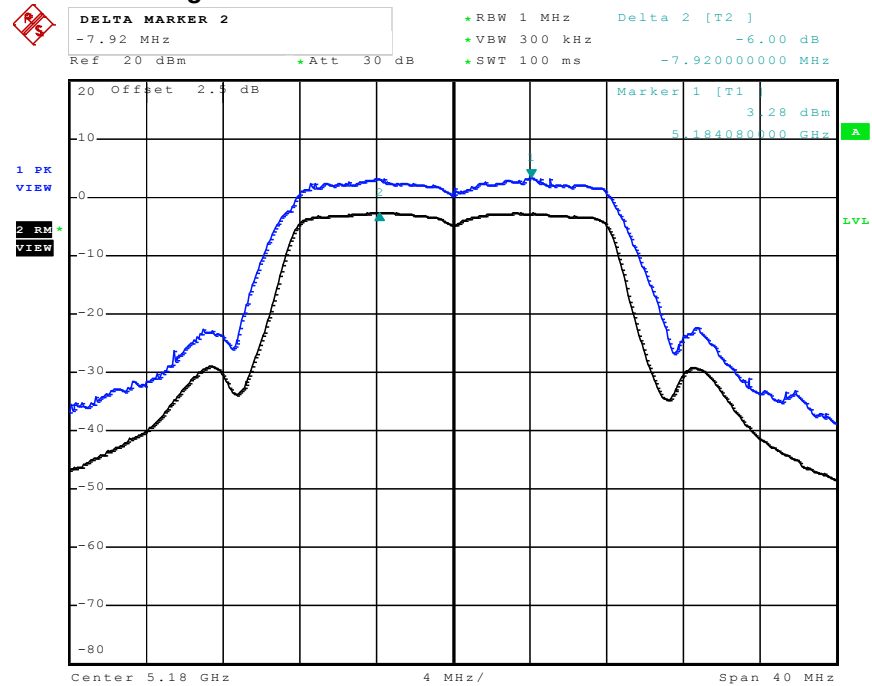
Configuration IEEE 802.11n (20MHz)

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5180 MHz	6.54	13	Complies
5200 MHz	6.54	13	Complies
5240 MHz	6.85	13	Complies
5260 MHz	7.04	13	Complies
5280 MHz	6.39	13	Complies
5320 MHz	6.93	13	Complies
5500 MHz	6.92	13	Complies
5580 MHz	6.31	13	Complies
5700 MHz	6.55	13	Complies

Configuration IEEE 802.11n (40MHz)

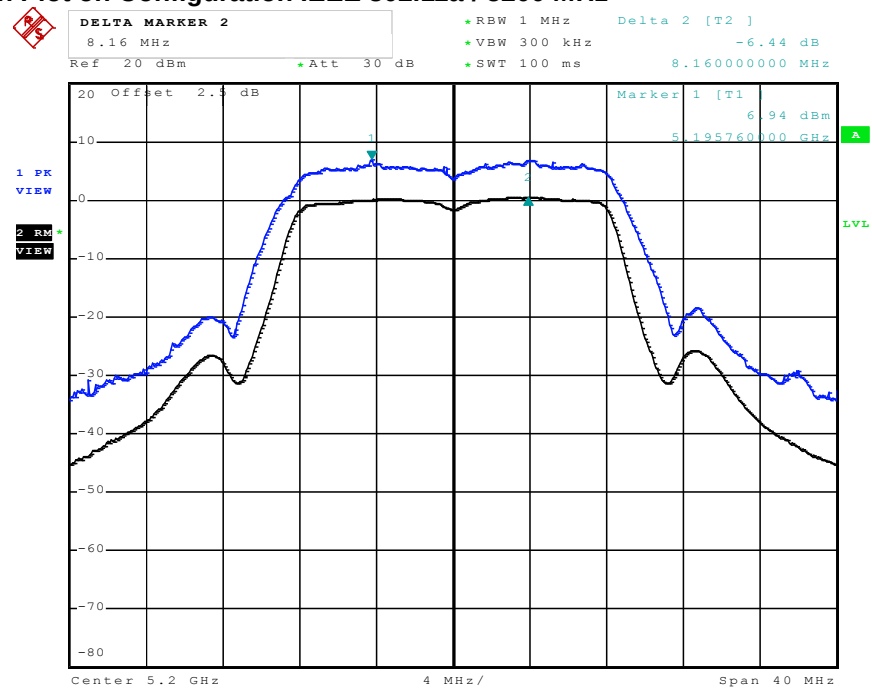
Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5190 MHz	7.81	13	Complies
5230 MHz	7.33	13	Complies
5270 MHz	7.28	13	Complies
5310 MHz	7.00	13	Complies
5510 MHz	6.89	13	Complies
5550 MHz	7.13	13	Complies
5670 MHz	7.14	13	Complies

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



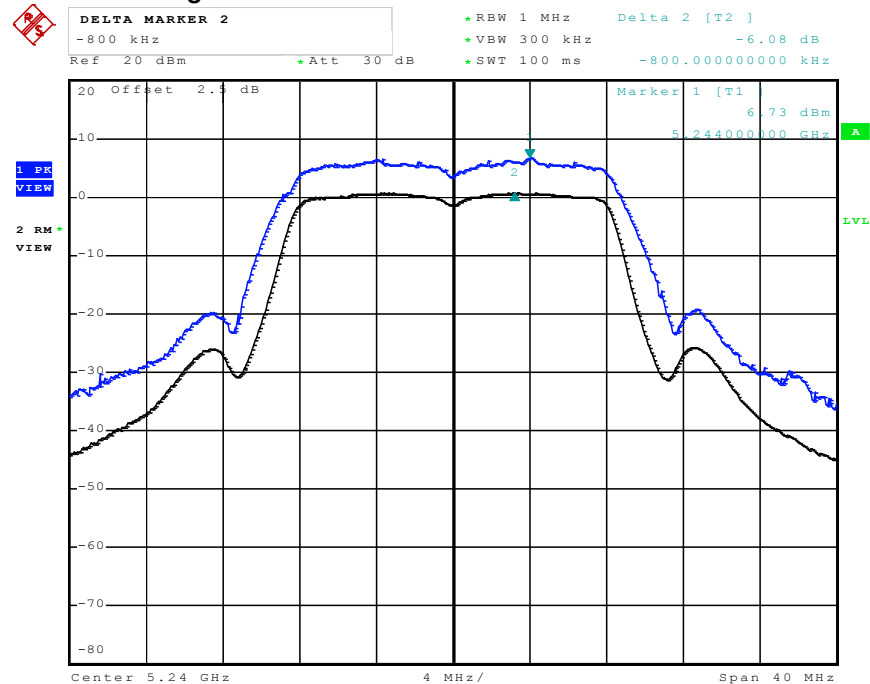
Date: 9.MAY.2011 12:18:07

Peak Excursion Plot on Configuration IEEE 802.11a / 5200 MHz



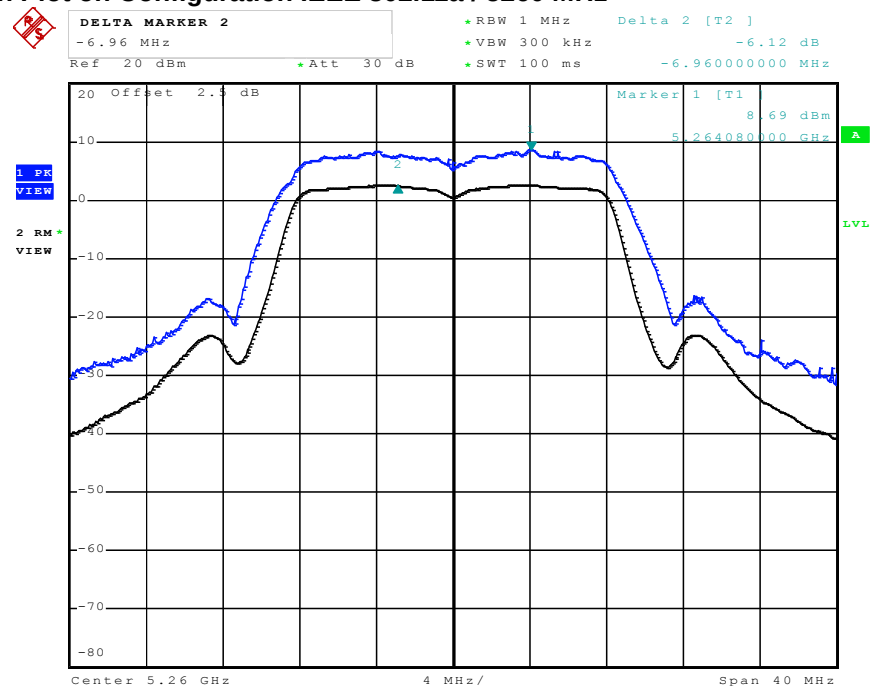
Date: 9.MAY.2011 14:13:34

Peak Excursion Plot on Configuration IEEE 802.11a / 5240 MHz



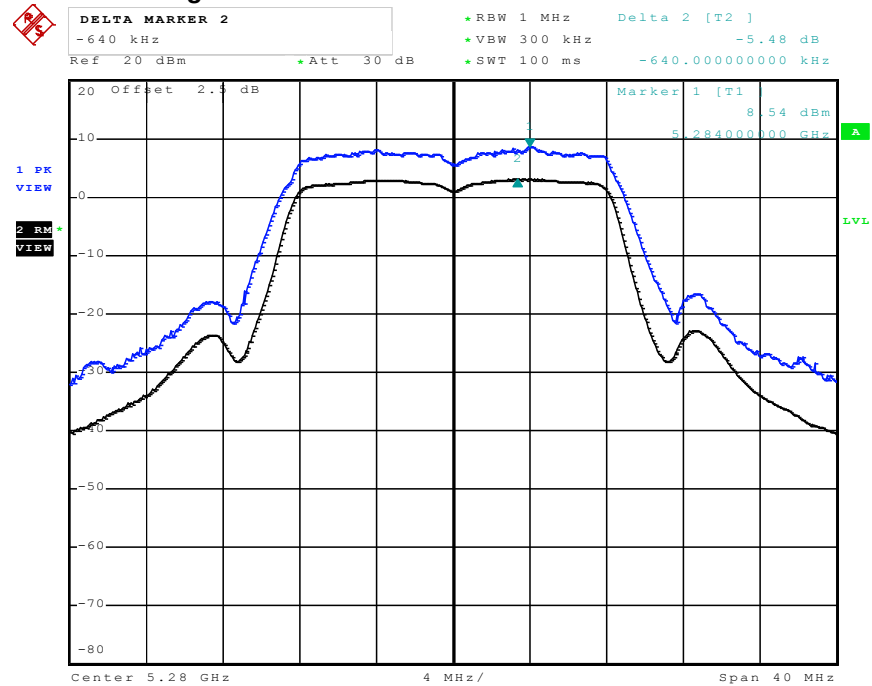
Date: 9.MAY.2011 14:26:45

Peak Excursion Plot on Configuration IEEE 802.11a / 5260 MHz



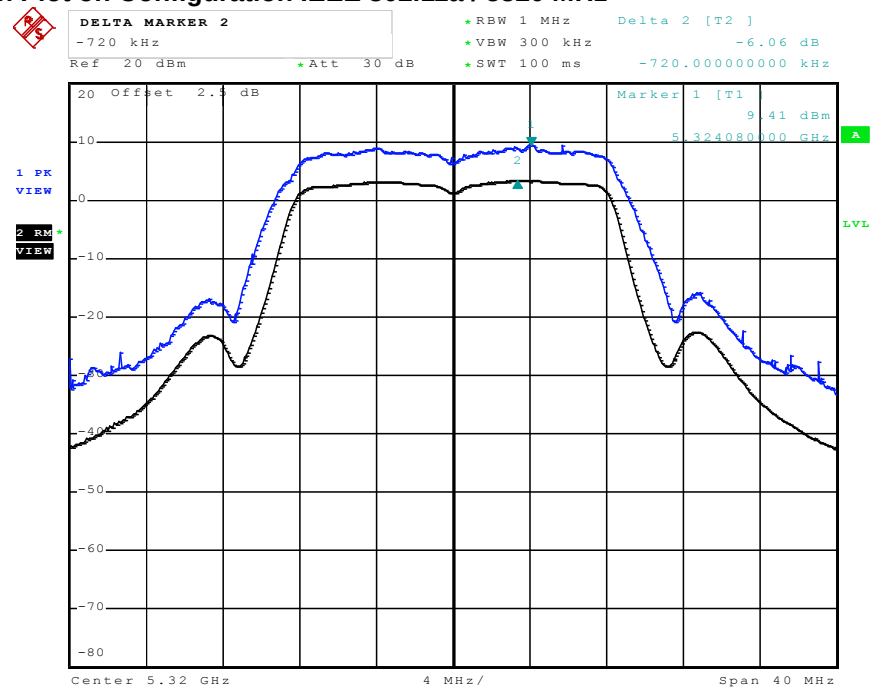
Date: 9.MAY.2011 14:53:28

Peak Excursion Plot on Configuration IEEE 802.11a / 5280 MHz



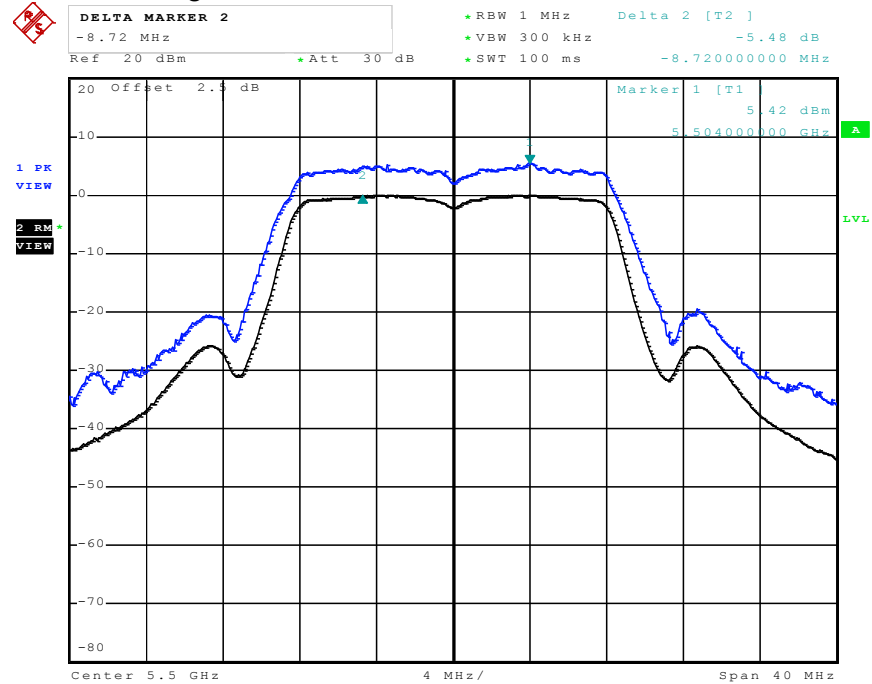
Date: 9.MAY.2011 15:07:28

Peak Excursion Plot on Configuration IEEE 802.11a / 5320 MHz



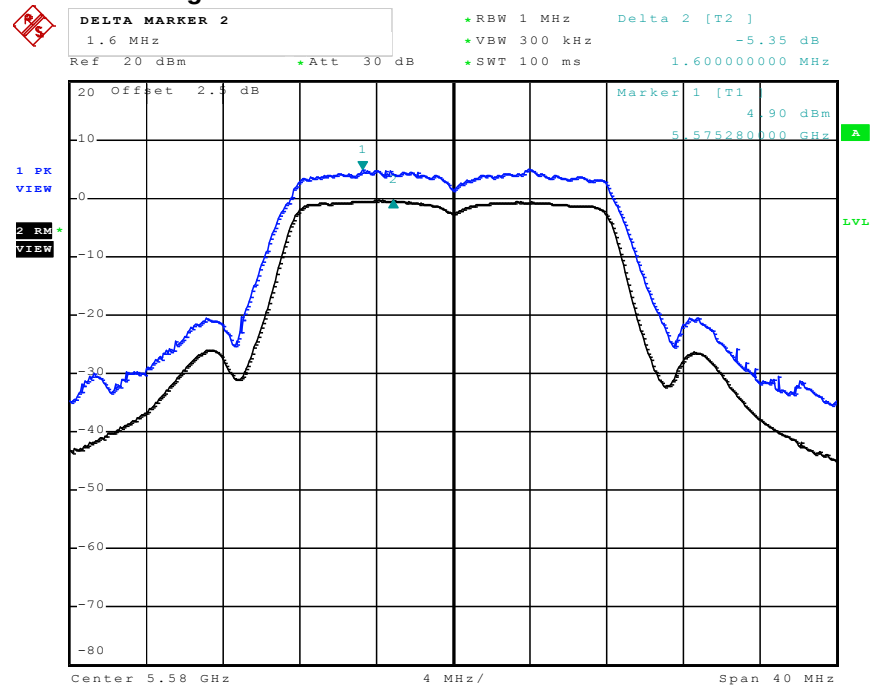
Date: 9.MAY.2011 16:04:27

Peak Excursion Plot on Configuration IEEE 802.11a / 5500 MHz



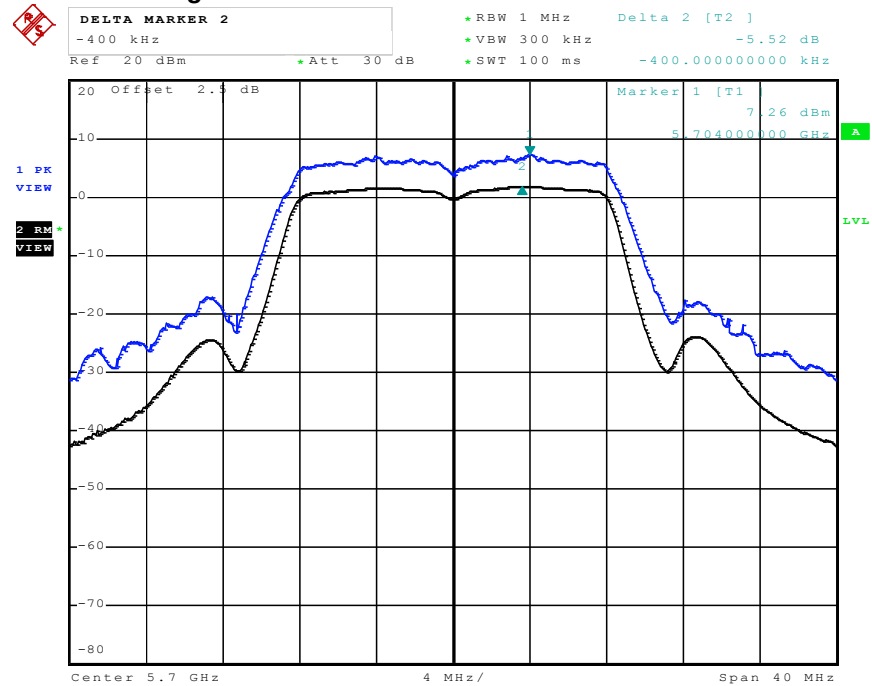
Date: 9.MAY.2011 16:11:46

Peak Excursion Plot on Configuration IEEE 802.11a / 5580 MHz



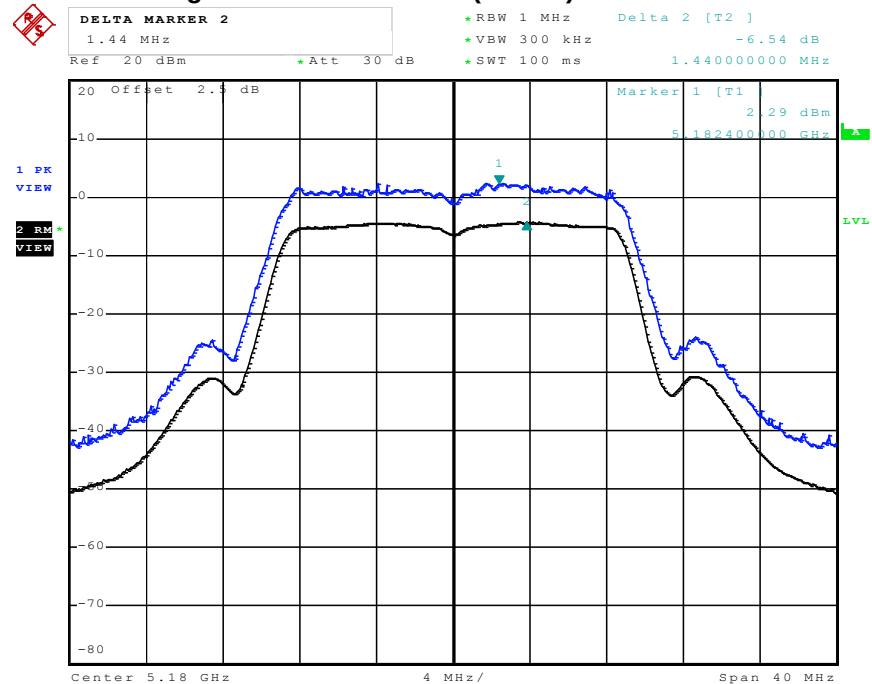
Date: 9.MAY.2011 16:16:26

Peak Excursion Plot on Configuration IEEE 802.11a / 5700 MHz



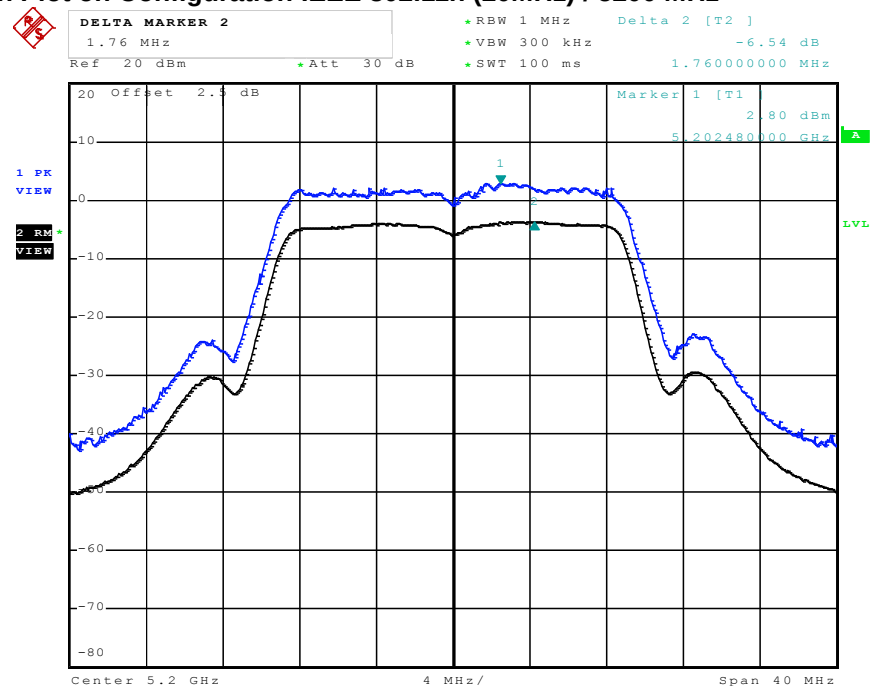
Date: 9.MAY.2011 16:27:14

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



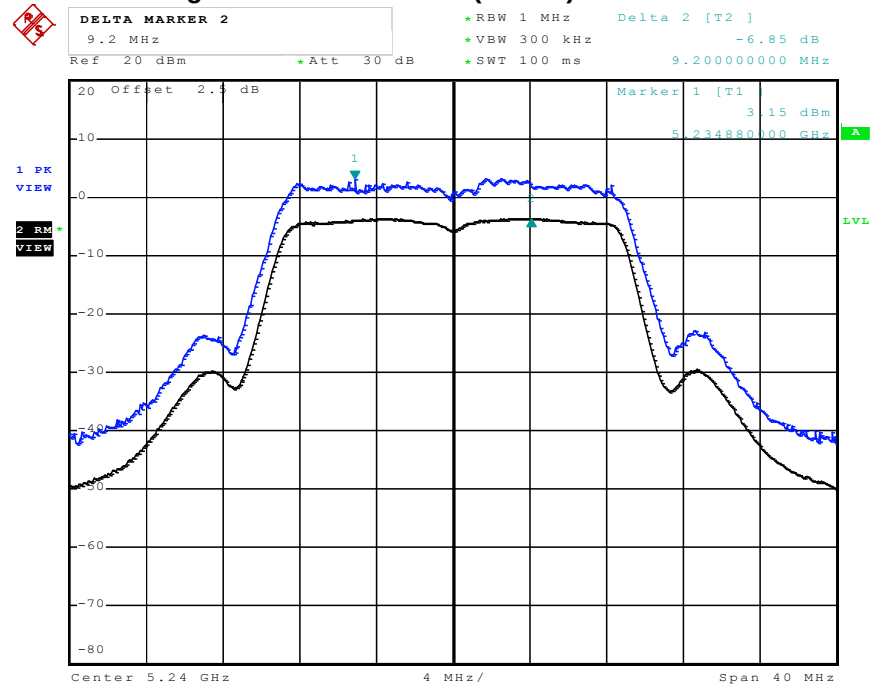
Date: 9.MAY.2011 18:36:00

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



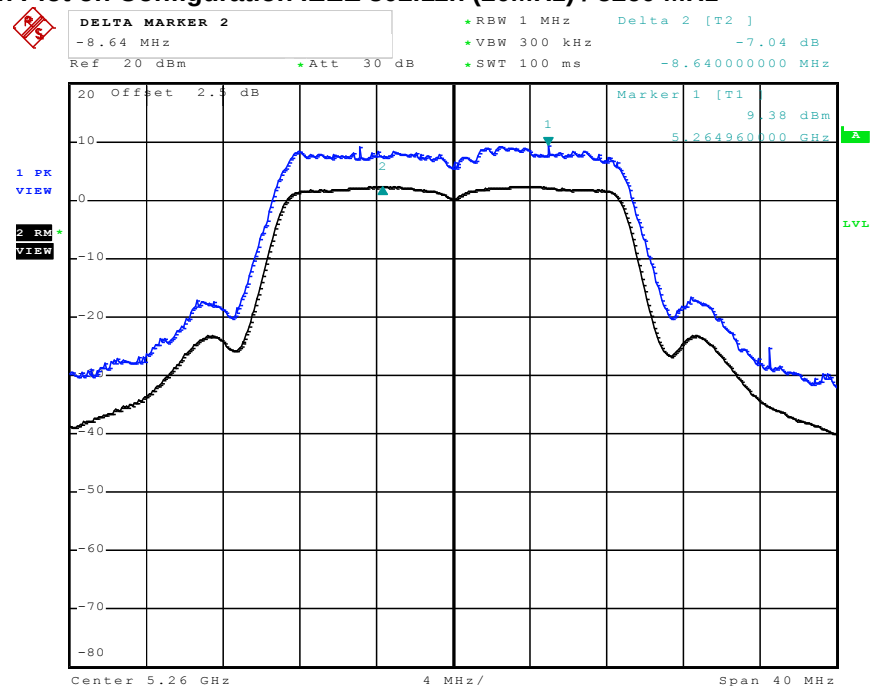
Date: 9.MAY.2011 18:41:42

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



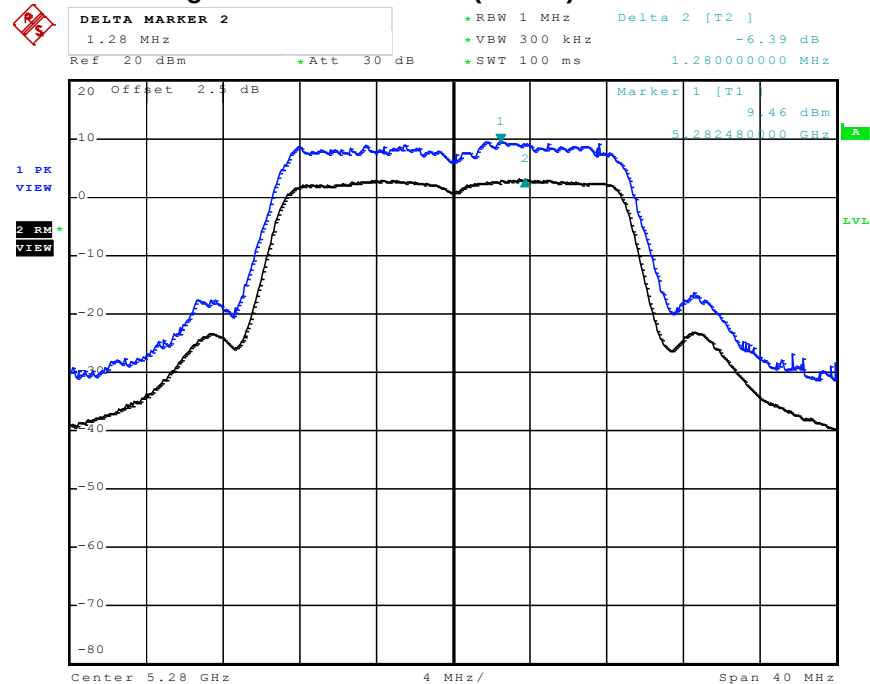
Date: 9.MAY.2011 18:46:45

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



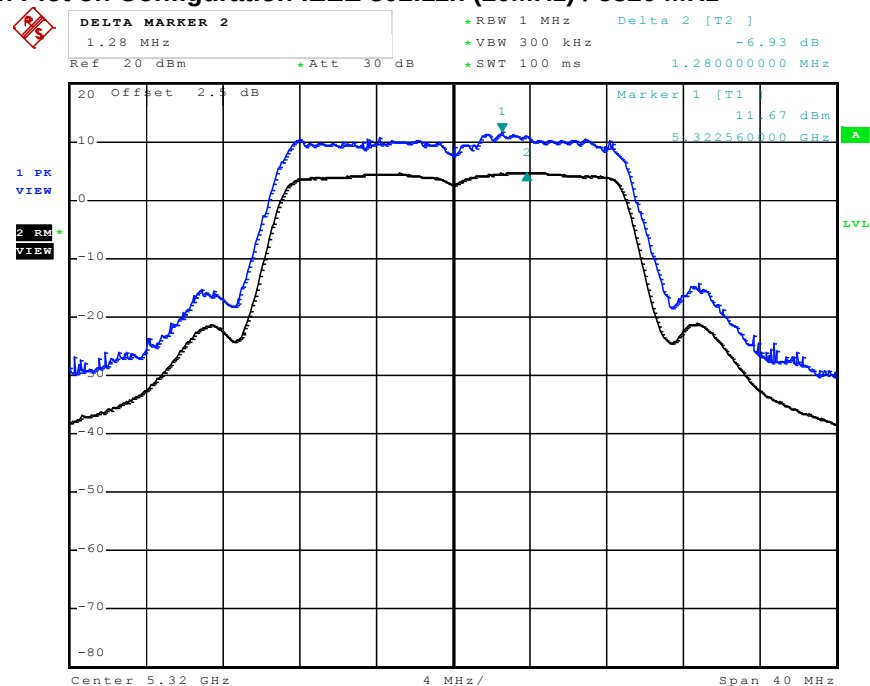
Date: 9.MAY.2011 18:51:18

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



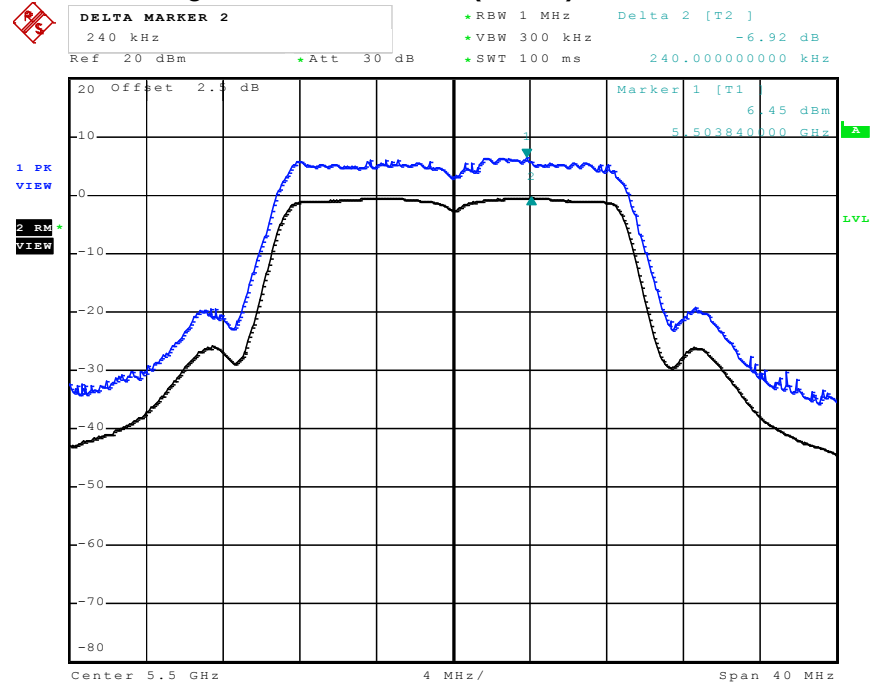
Date: 9.MAY.2011 19:52:21

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



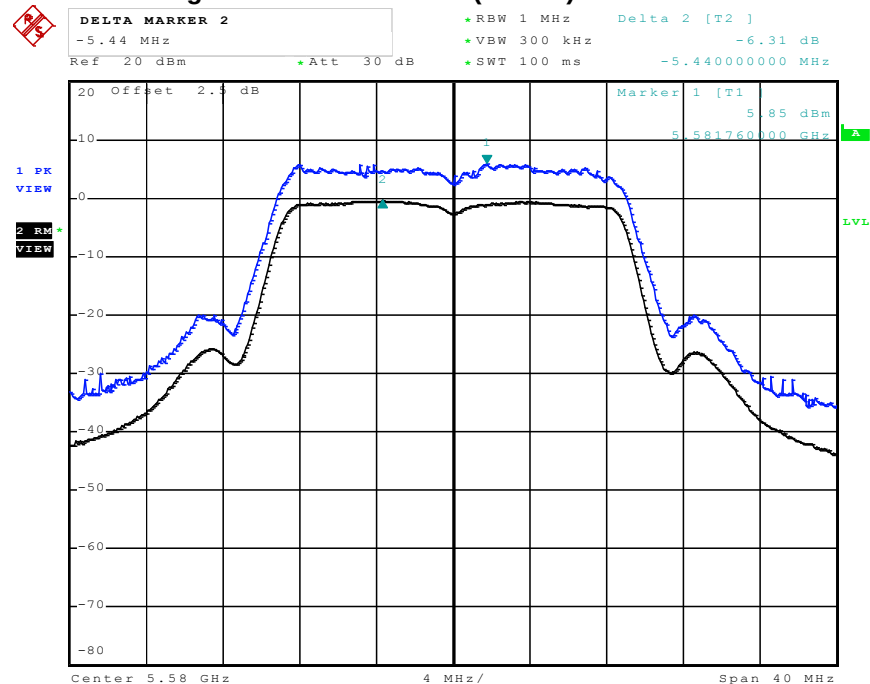
Date: 9.MAY.2011 20:01:15

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



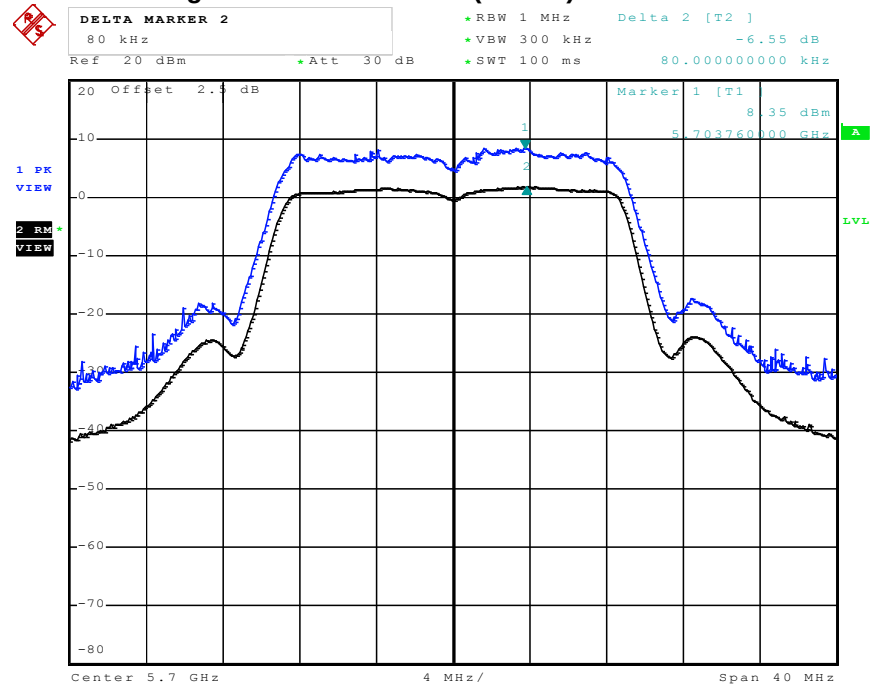
Date: 9.MAY.2011 20:09:32

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



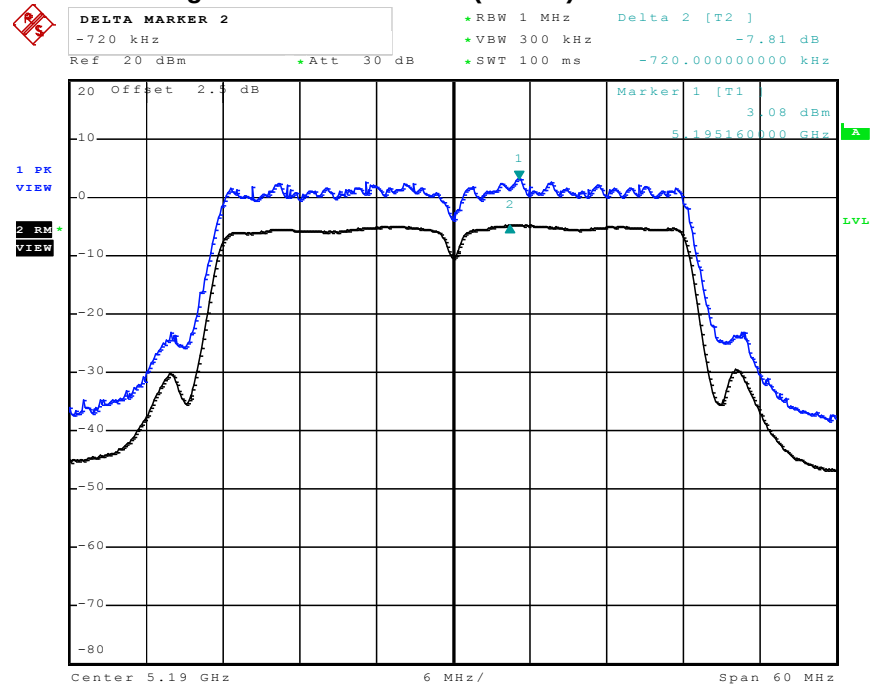
Date: 9.MAY.2011 20:16:56

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



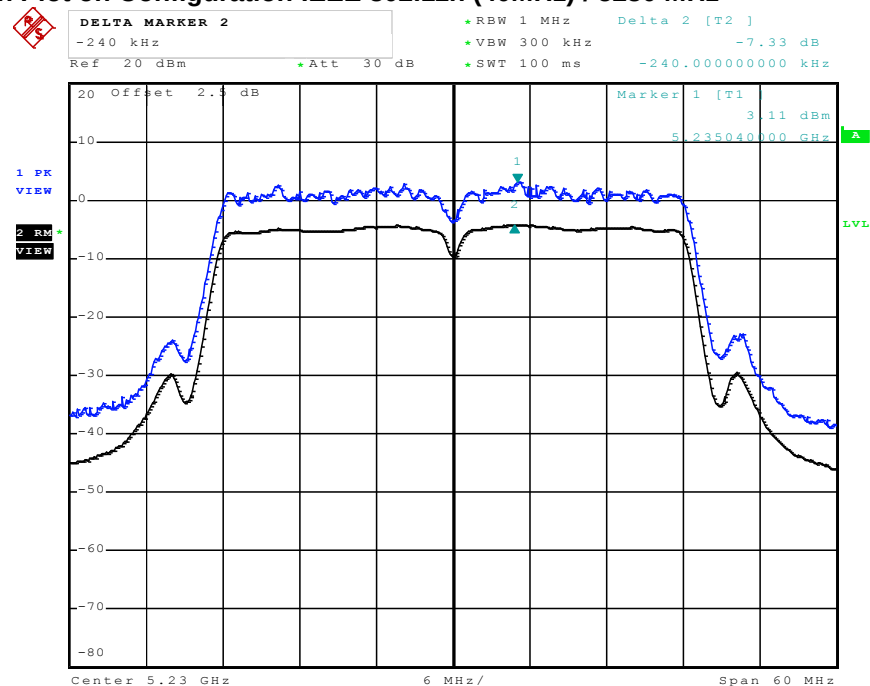
Date: 9.MAY.2011 20:59:44

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



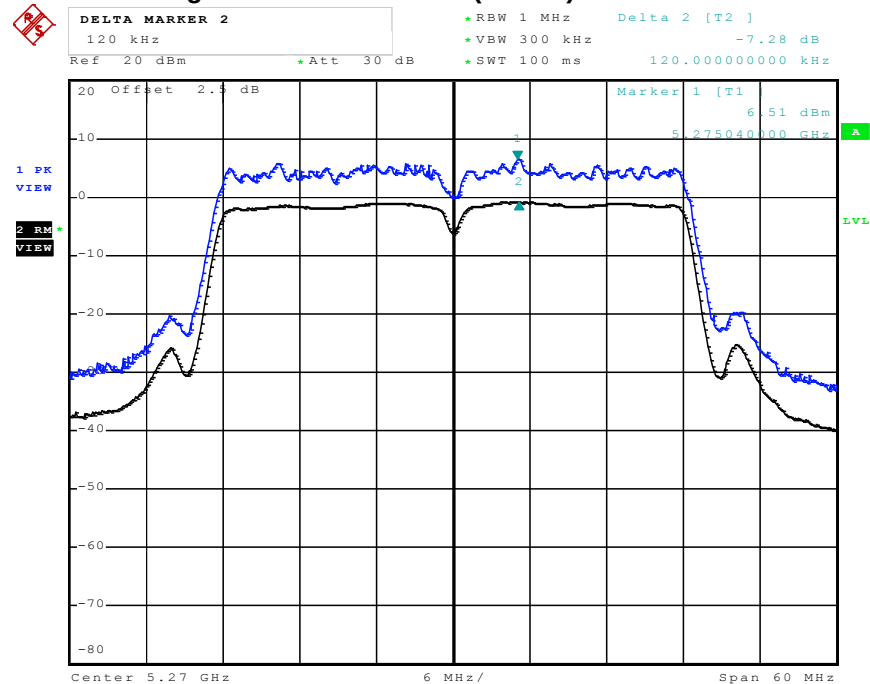
Date: 10.MAY.2011 10:22:13

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



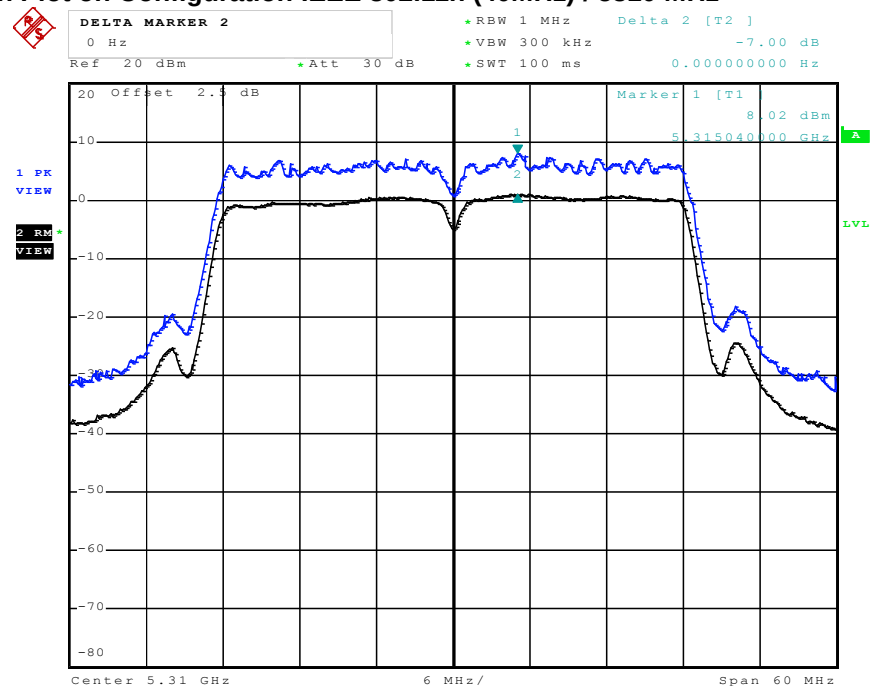
Date: 10.MAY.2011 10:31:47

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

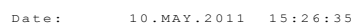
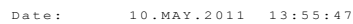


Date: 10.MAY.2011 10:37:58

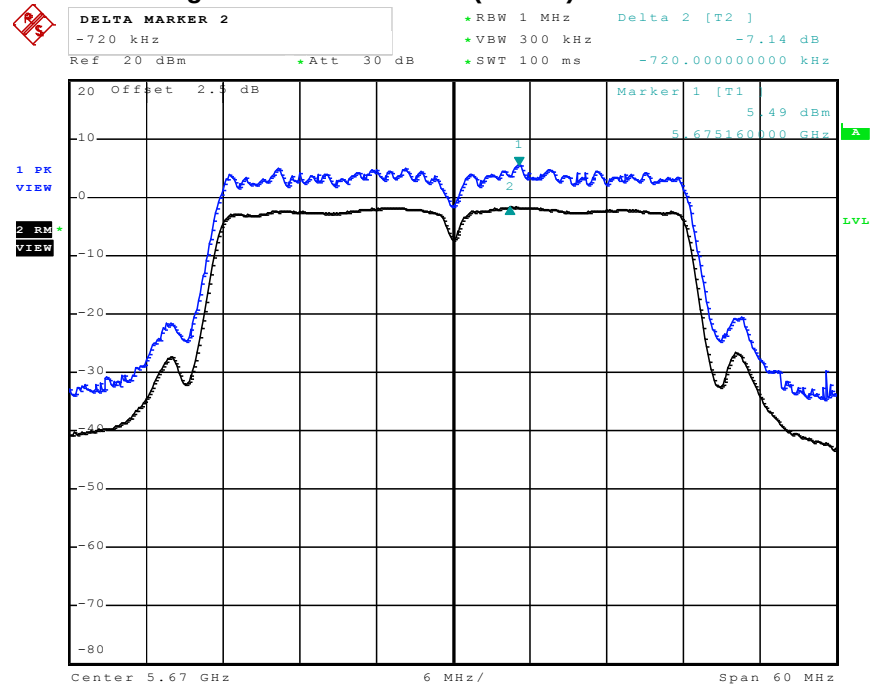
Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) / 5310 MHz



Date: 10.MAY.2011 10:42:16



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



Date: 10.MAY.2011 17:04:32

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

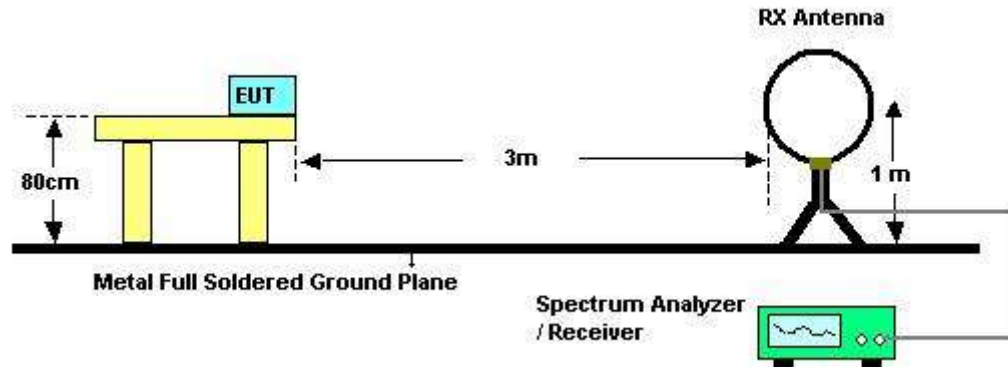
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.6.3 Test Procedures

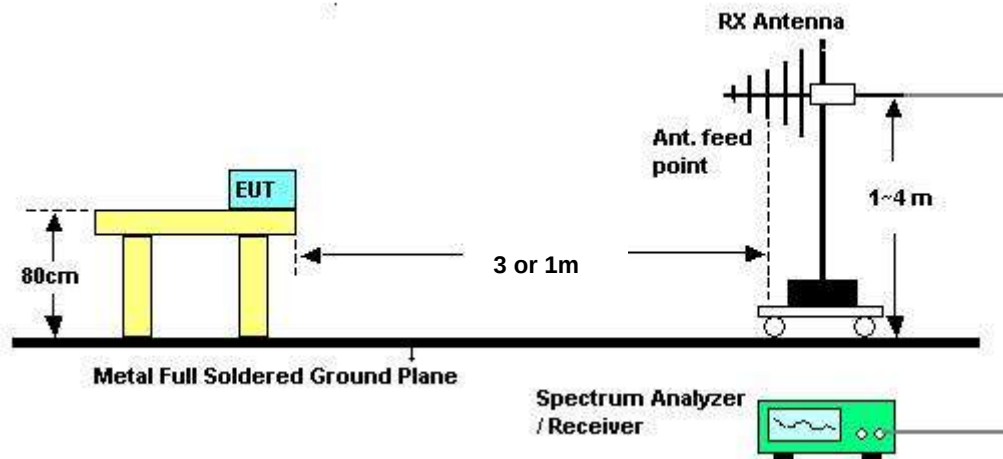
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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	May 04, 2011	Test Site No.	03CH02-HY
Temperature	22.9℃	Humidity	53%
Test Engineer	Daniel		

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

Note:

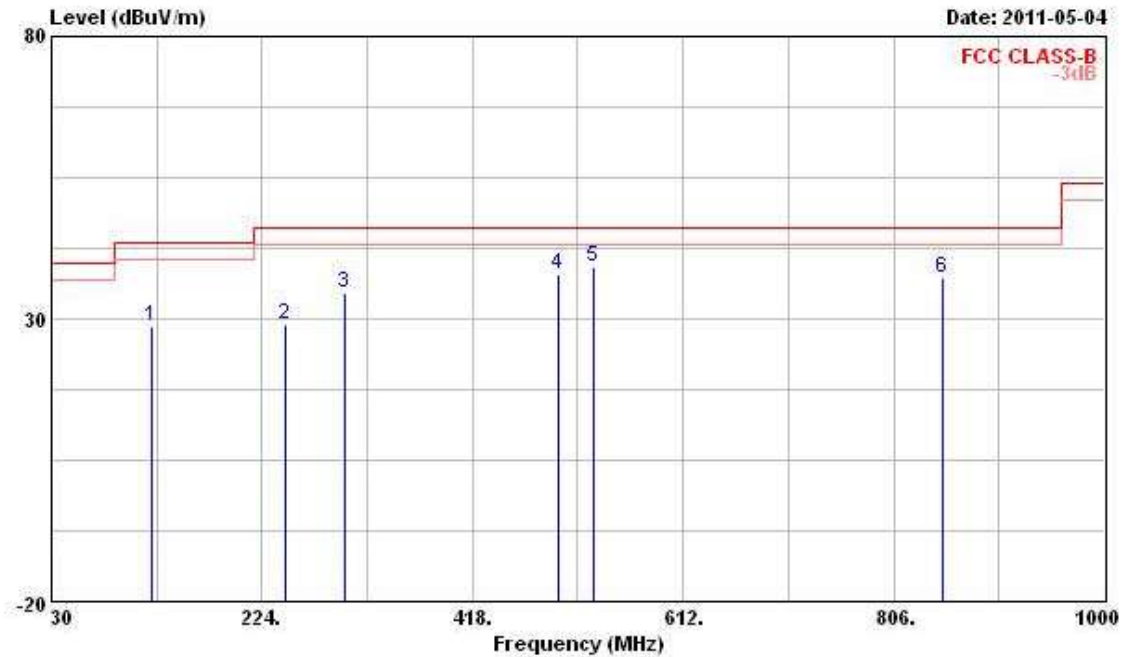
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

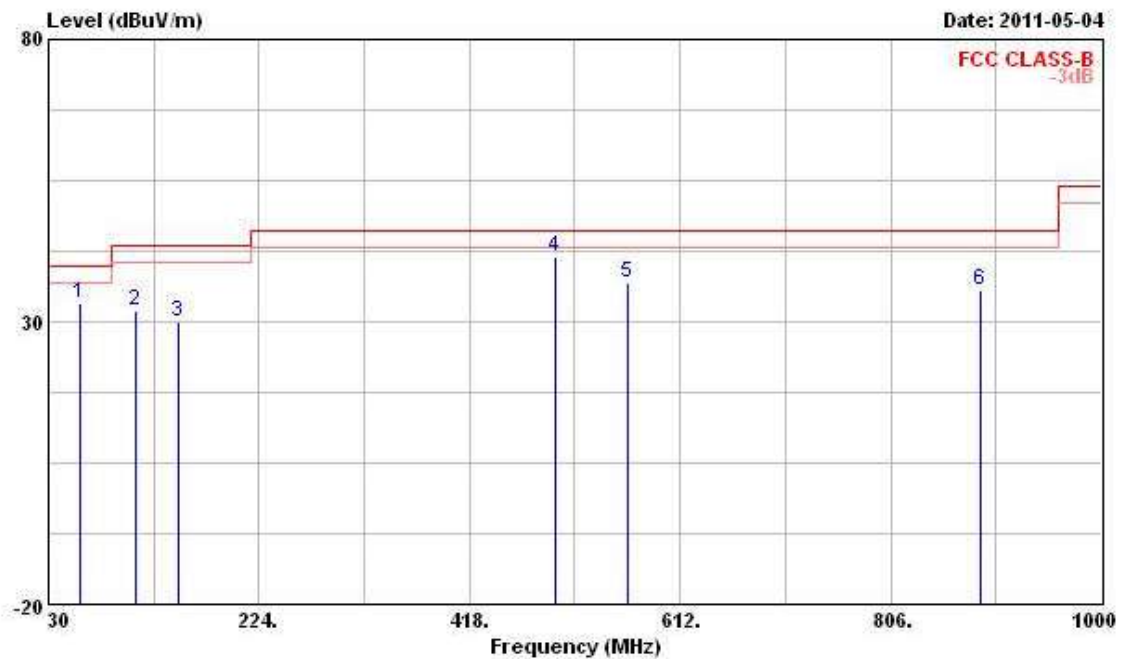
3.6.8 Results of Radiated Emissions (30MHz~1GHz)

Final Test Date	May 04, 2011	Test Site No.	03CH02-HY
Temperature	22.9℃	Humidity	53%
Test Engineer	Daniel	Configurations	Normal Mode

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	122.150	28.73	-14.77	43.50	41.13	13.34	1.80	27.54	Peak	---	---
2	246.310	29.13	-16.87	46.00	40.43	12.87	2.66	26.83	Peak	---	---
3	299.660	34.58	-11.42	46.00	44.76	13.70	2.91	26.79	Peak	---	---
4	497.540	37.91	-8.09	46.00	45.07	17.24	3.78	28.18	Peak	---	---
5	529.550	39.30	-6.70	46.00	45.57	18.12	3.78	28.17	Peak	---	---
6	850.620	37.34	-8.66	46.00	39.84	20.15	4.87	27.52	Peak	---	---

Vertical



	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	59.100	33.25	-6.75	40.00	52.39	7.38	1.24	27.76	Peak	---	---
2	110.510	31.96	-11.54	43.50	45.37	12.46	1.70	27.57	Peak	---	---
3	149.310	29.95	-13.55	43.50	44.46	10.90	2.02	27.43	Peak	---	---
4	497.540	41.48	-4.52	46.00	48.64	17.24	3.78	28.18	Peak	---	---
5	563.500	36.87	-9.13	46.00	42.08	19.11	3.84	28.16	Peak	---	---
6	889.420	35.67	-10.33	46.00	38.04	20.05	4.97	27.39	Peak	---	---

Note:

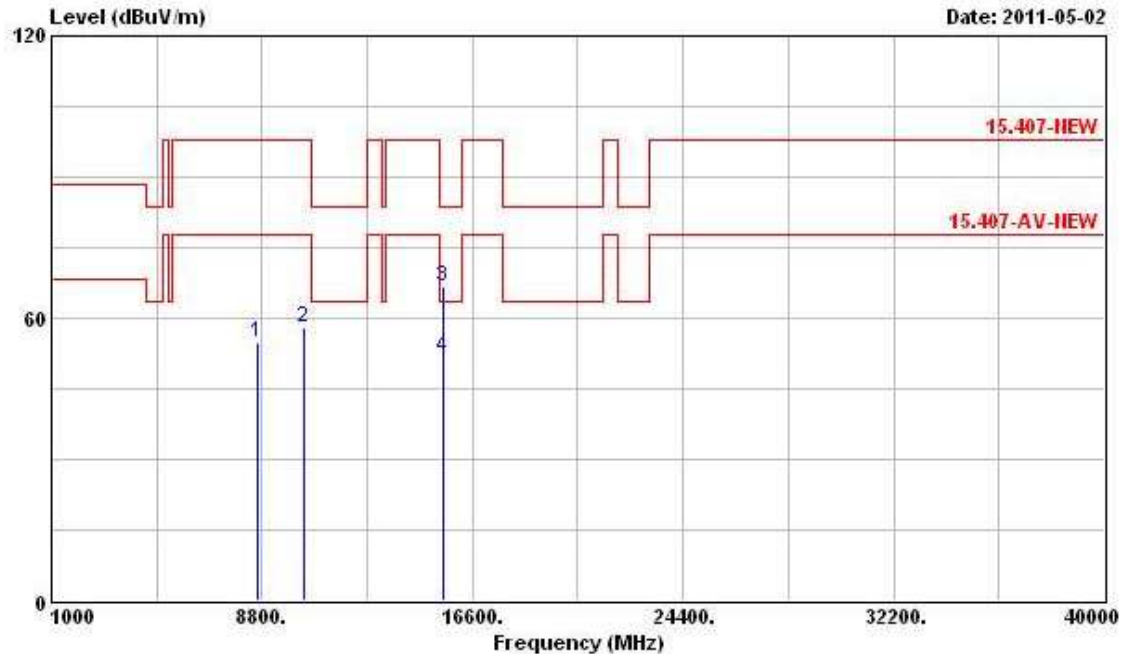
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

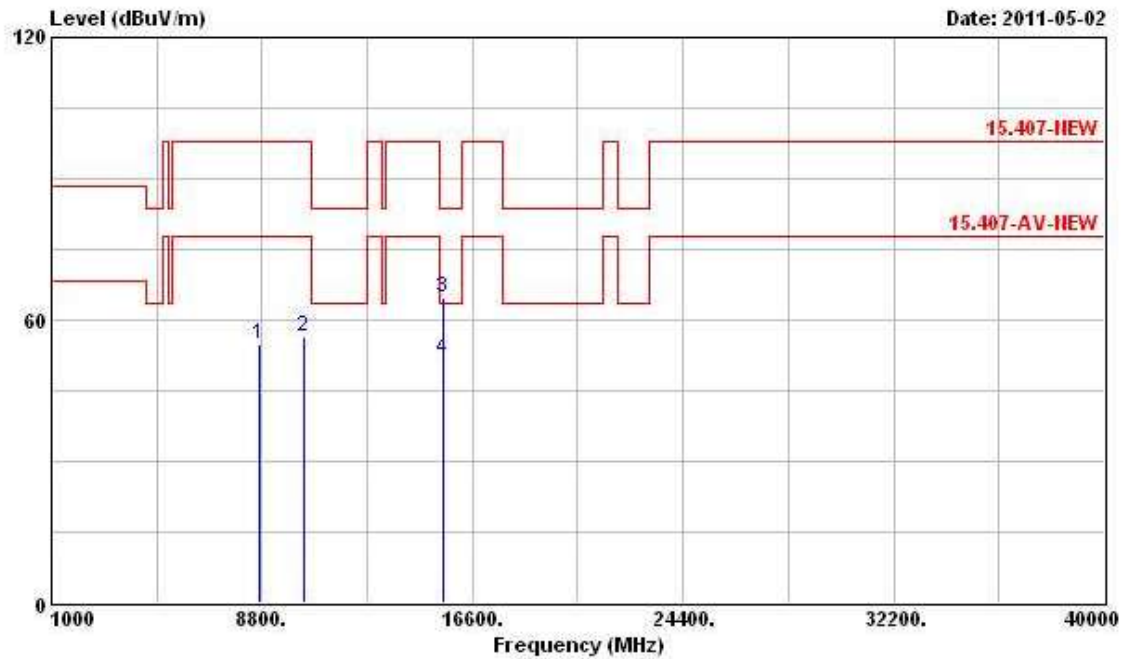
3.6.9 Results for Radiated Emissions (1GHz~40GHz)

Final Test Date	May 02, 2011	Test Site No.	03CH02-HY
Temperature	22.9°C	Humidity	53%
Test Engineer	Daniel	Configuration	802.11a Ch. 36

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	8611.000	54.83	-43.01	97.84	44.74	38.41	5.99	34.31	Peak	---	---
2	10360.000	57.84	-40.00	97.84	45.25	40.02	6.71	34.14	Peak	---	---
3	15540.000	66.63	-16.91	83.54	48.21	42.81	8.45	32.84	Peak	---	---
4	15540.000	51.58	-11.96	63.54	33.16	42.81	8.45	32.84	Average	---	---

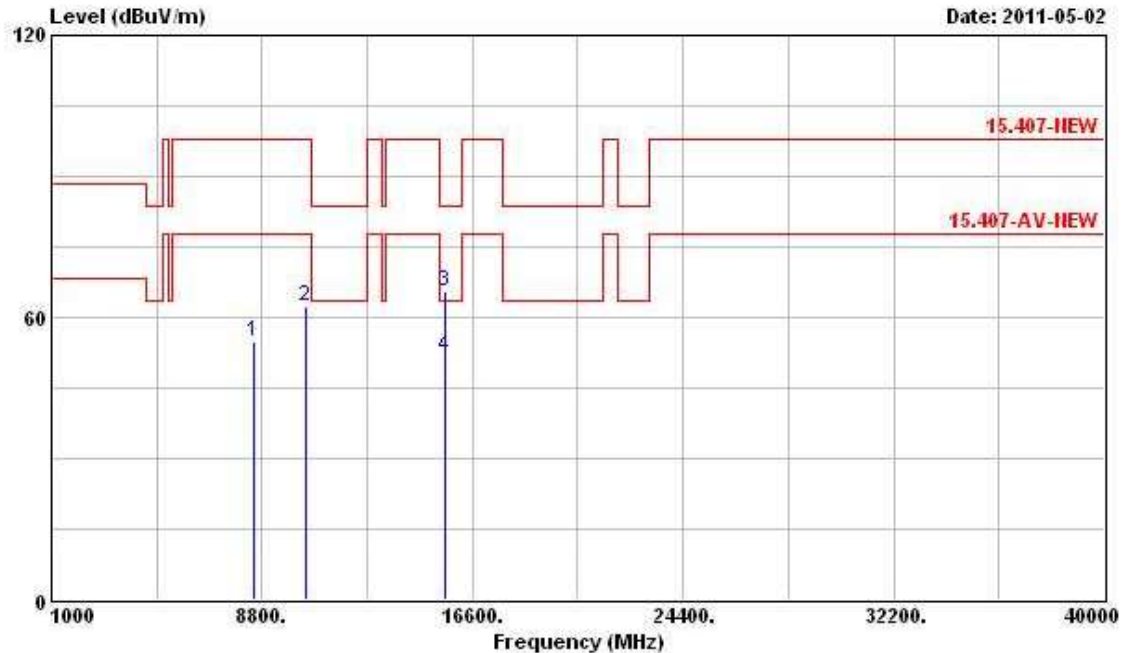
Vertical



PROGRAM

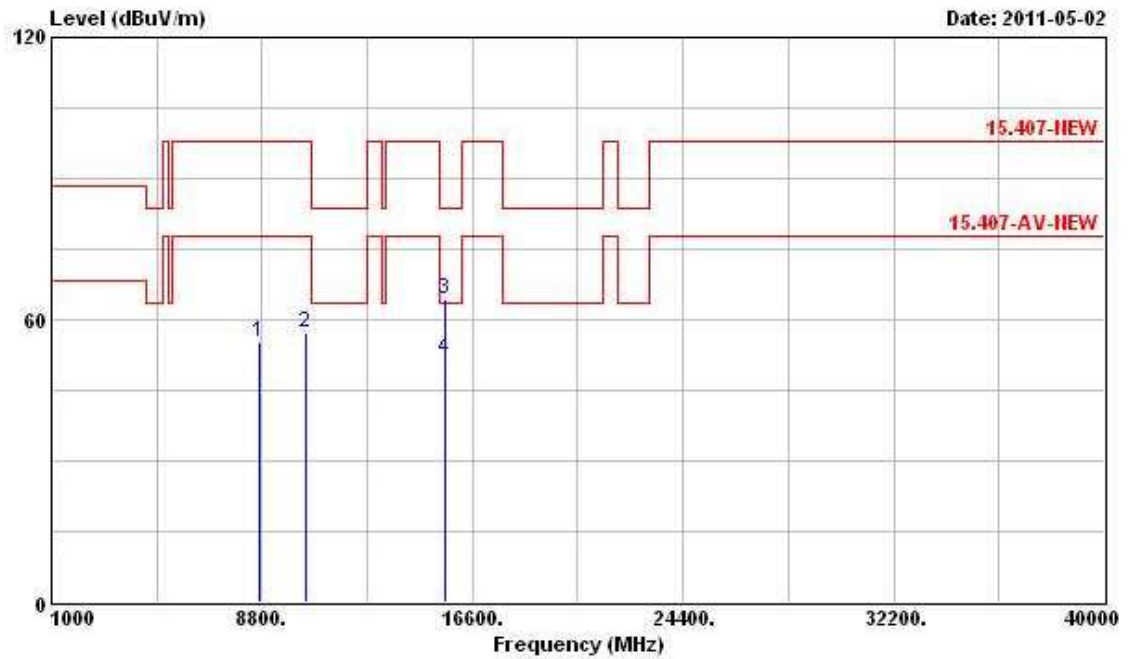
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8683.000	54.96	-42.88	97.84	44.98	38.35	6.02	34.39	Peak	---	---
2	10360.000	56.44	-41.40	97.84	43.85	40.02	6.71	34.14	Peak	---	---
3	15540.000	64.56	-18.98	83.54	46.14	42.81	8.45	32.84	Peak	---	---
4	15540.000	51.59	-11.95	63.54	33.17	42.81	8.45	32.84	Average	---	---

Final Test Date	May 02, 2011	Test Site No.	03CH02-HY
Temperature	22.9°C	Humidity	53%
Test Engineer	Daniel	Configuration	802.11a Ch. 40

Horizontal

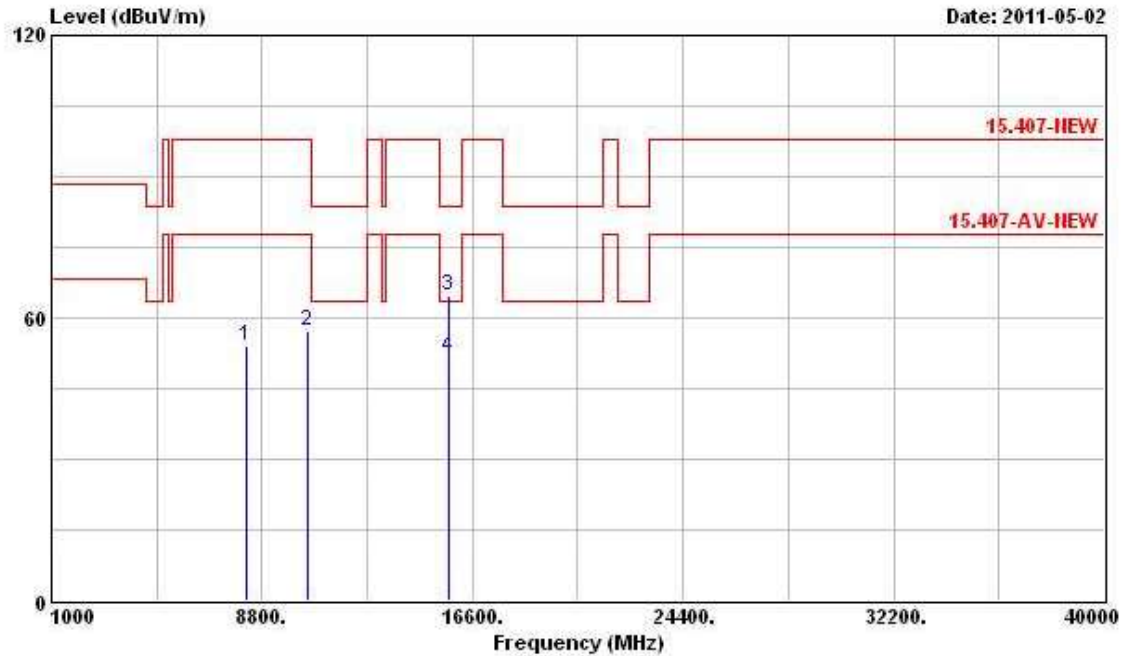
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8485.660	55.02	-22.82	77.84	44.79	38.49	5.94	34.20	PK	---	---
2	10400.000	62.38	-35.46	97.84	49.69	40.04	6.75	34.10	Peak	---	---
3	15600.000	65.65	-17.89	83.54	47.30	42.82	8.45	32.92	Peak	---	---
4	15600.000	51.58	-11.96	63.54	33.23	42.82	8.45	32.92	Average	---	---

Vertical



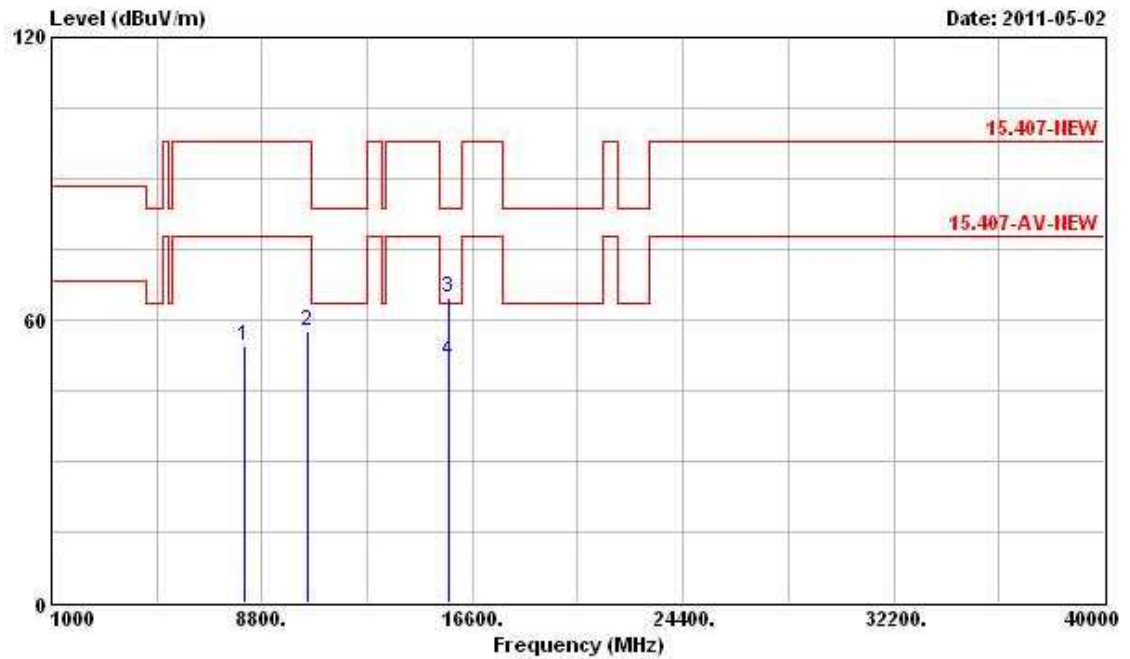
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8683.000	55.24	-42.60	97.84	45.26	38.35	6.02	34.39	Peak	---	---
2	10400.000	57.28	-40.56	97.84	44.59	40.04	6.75	34.10	Peak	---	---
3	15600.000	64.37	-19.17	83.54	46.02	42.82	8.45	32.92	Peak	---	---
4	15600.000	51.59	-11.95	63.54	33.24	42.82	8.45	32.92	Average	---	---

Final Test Date	May 02, 2011	Test Site No.	03CH02-HY
Temperature	22.9°C	Humidity	53%
Test Engineer	Daniel	Configuration	802.11a Ch. 48

Horizontal

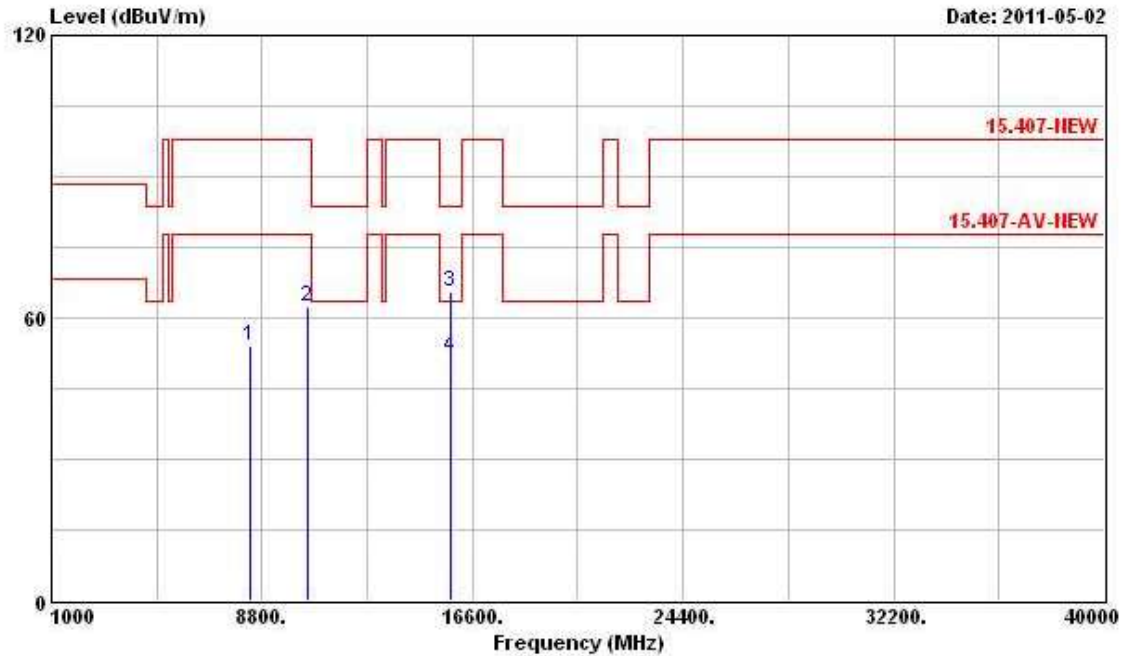
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8251.000	54.15	-23.69	77.84	44.20	38.36	5.88	34.29	PK	---	---
2	10480.000	57.25	-40.59	97.84	44.37	40.09	6.82	34.03	Peak	---	---
3	15720.000	64.90	-18.64	83.54	46.63	42.84	8.46	33.03	Peak	---	---
4	15720.000	51.81	-11.73	63.54	33.54	42.84	8.46	33.03	Average	---	---

Vertical



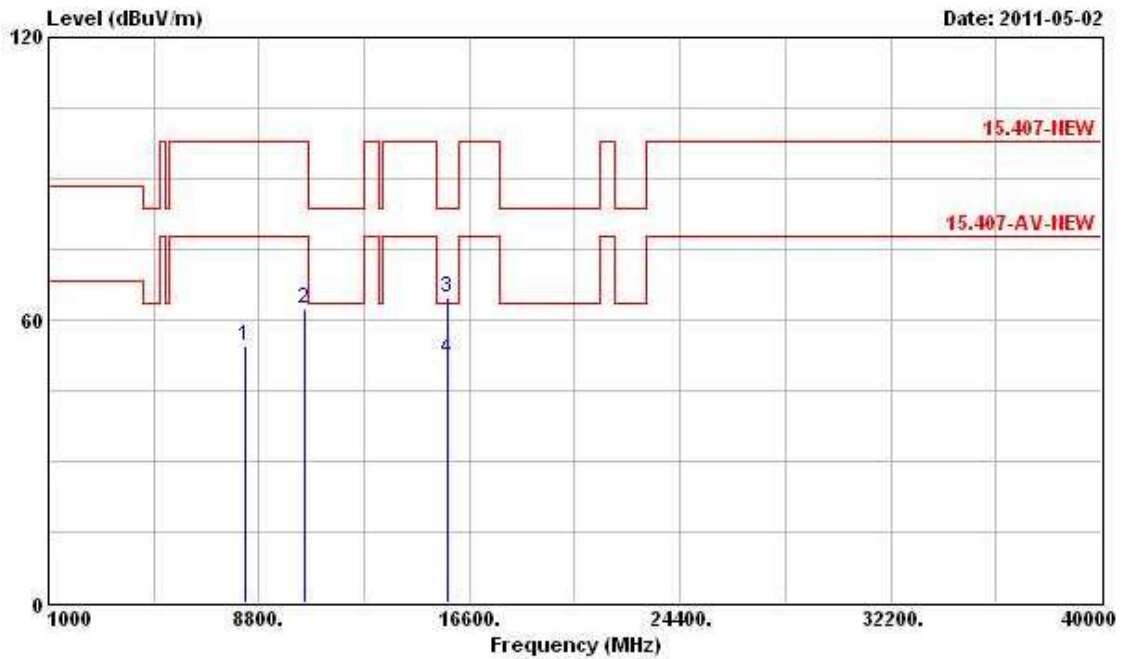
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8134.000	54.62	-23.22	77.84	44.83	38.28	5.84	34.33	PK	---	---
2	10480.000	57.61	-40.23	97.84	44.73	40.09	6.82	34.03	Peak	---	---
3	15720.000	64.59	-18.95	83.54	46.32	42.84	8.46	33.03	Peak	---	---
4	15720.000	51.38	-12.16	63.54	33.11	42.84	8.46	33.03	Average	---	---

Final Test Date	May 02, 2011	Test Site No.	03CH02-HY
Temperature	22.9°C	Humidity	53%
Test Engineer	Daniel	Configuration	802.11a Ch. 52

Horizontal

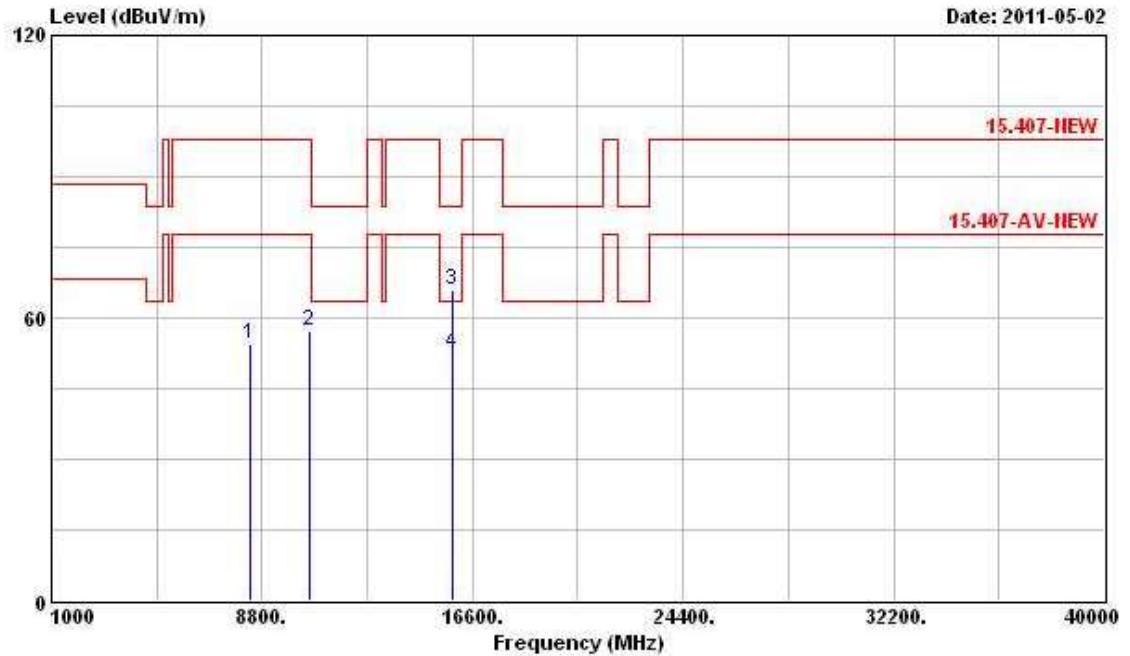
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8359.000	54.15	-23.69	77.84	44.07	38.42	5.91	34.25	PK	---	---
2	10520.000	62.25	-35.59	97.84	49.29	40.11	6.85	34.00	Peak	---	---
3	15780.000	65.45	-18.09	83.54	47.24	42.86	8.46	33.11	Peak	---	---
4	15780.000	51.54	-12.00	63.54	33.33	42.86	8.46	33.11	Average	---	---

Vertical



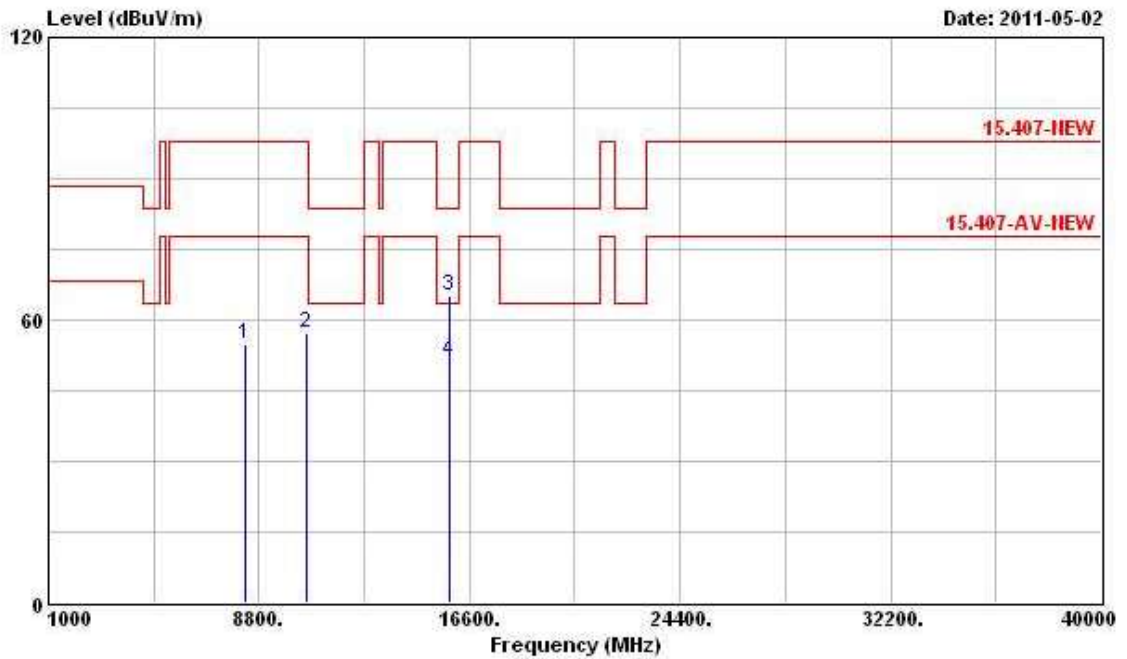
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8278.000	54.67	-23.17	77.84	44.69	38.37	5.89	34.28	PK	---	---
2	10520.000	62.49	-35.35	97.84	49.53	40.11	6.85	34.00	Peak	---	---
3	15780.000	64.87	-18.67	83.54	46.66	42.86	8.46	33.11	Peak	---	---
4	15780.000	51.53	-12.01	63.54	33.32	42.86	8.46	33.11	Average	---	---

Final Test Date	May 02, 2011	Test Site No.	03CH02-HY
Temperature	22.9°C	Humidity	53%
Test Engineer	Daniel	Configuration	802.11a Ch. 56

Horizontal

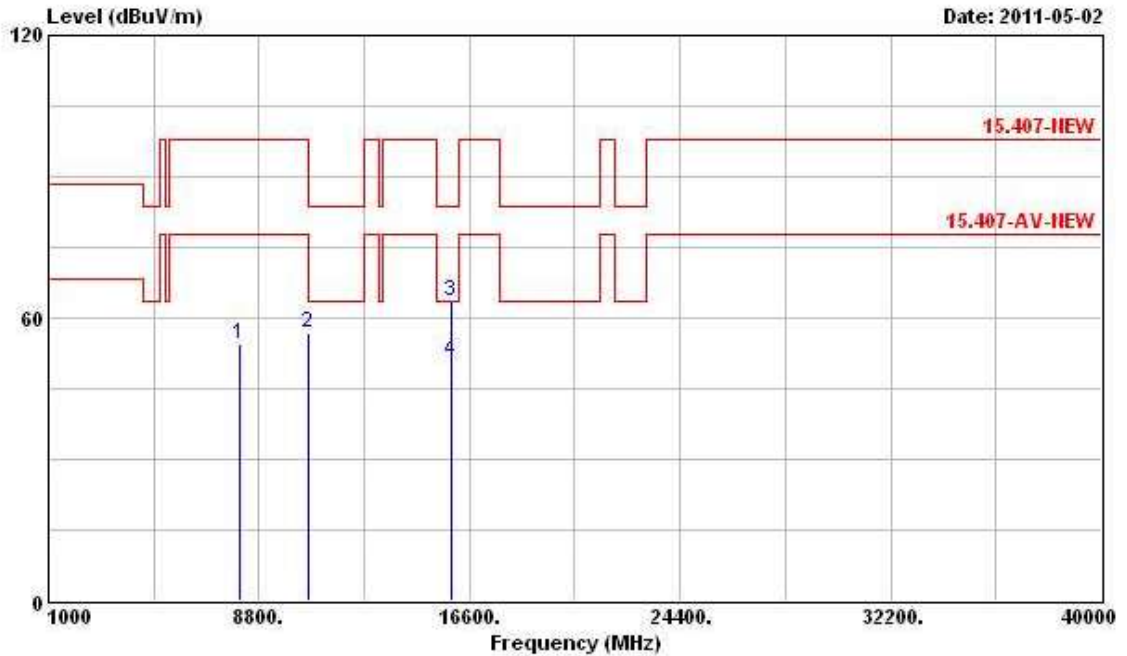
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8359.000	54.64	-23.20	77.84	44.56	38.42	5.91	34.25	PK	---	---
2	10560.000	57.39	-40.45	97.84	44.32	40.13	6.88	33.94	Peak	---	---
3	15840.000	66.03	-17.51	83.54	47.86	42.87	8.46	33.16	Peak	---	---
4	15840.000	52.55	-10.99	63.54	34.38	42.87	8.46	33.16	Average	---	---

Vertical



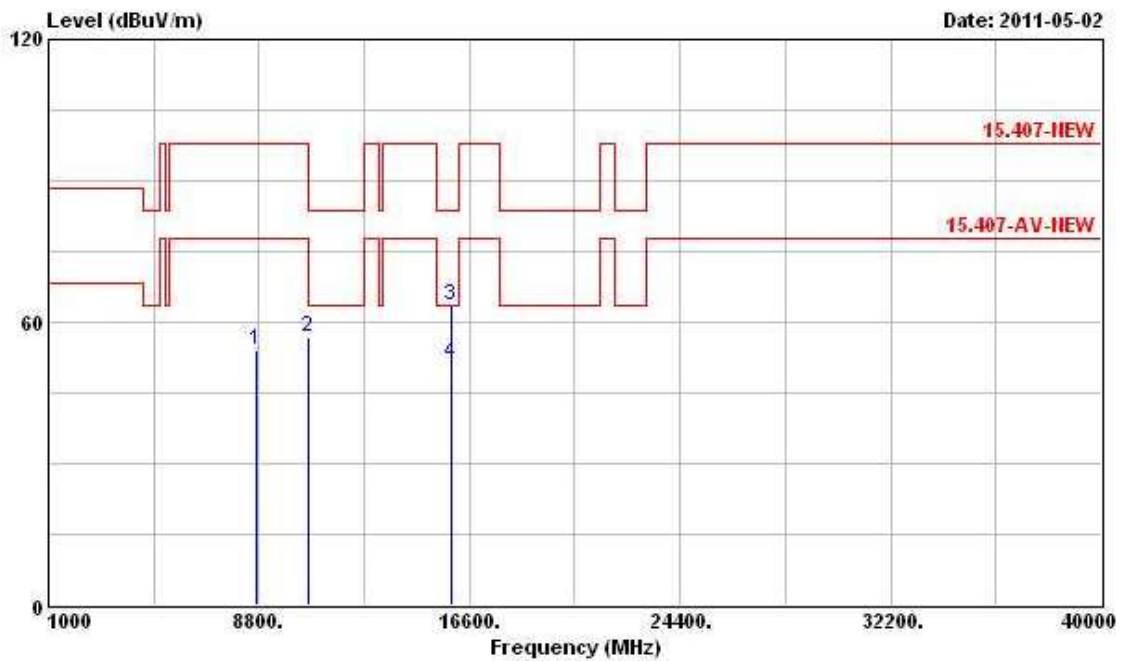
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	8323.000	54.74	-23.10	77.84	44.70	38.40	5.90	34.26	PK	---	---
2	10560.000	57.34	-40.50	97.84	44.27	40.13	6.88	33.94	Peak	---	---
3	15840.000	65.10	-18.44	83.54	46.93	42.87	8.46	33.16	Peak	---	---
4	15840.000	51.18	-12.36	63.54	33.01	42.87	8.46	33.16	Average	---	---

Final Test Date	May 02, 2011	Test Site No.	03CH02-HY
Temperature	22.9°C	Humidity	53%
Test Engineer	Daniel	Configuration	802.11a Ch. 64

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	8062.000	54.36	-23.48	77.84	44.66	38.23	5.82	34.35	PK	---	---
2	10640.000	56.89	-6.65	63.54	43.62	40.18	6.93	33.84	PK	---	---
3	15960.000	63.58	-19.96	83.54	45.51	42.89	8.47	33.29	Peak	---	---
4	15960.000	50.82	-12.72	63.54	32.75	42.89	8.47	33.29	Average	---	---

Vertical



	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	8674.000	54.01	-43.83	97.84	44.01	38.37	6.02	34.39	Peak	0	0
2	10640.000	56.69	-6.85	63.54	43.42	40.18	6.93	33.84	PK	0	0
3	15960.000	63.37	-20.17	83.54	45.30	42.89	8.47	33.29	Peak	0	0
4	15960.000	51.22	-12.32	63.54	33.15	42.89	8.47	33.29	Average	0	0