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FCC RADIO TEST REPORT

Applicant's company	Mikrotiks SIA
Applicant Address	46 Pernavas str., Riga LV-1009, LATVIA
FCC ID	TV7R52N
Manufacturer's company	Mikrotiks SIA
Manufacturer Address	46 Pernavas str., Riga LV-1009, LATVIA

Product Name	WLAN a/b/g/n mini-PCI Module
Brand Name	RouterBOARD
Model Name	R52n
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Mar. 18, 2009
Final Test Date	Apr. 30, 2009
Submission Type	Original Equipment



Statement

Test result included is for the Draft n and 802.11a (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.



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History of This Test Report

Original Issue Date: May. 04, 2009

Report No.: FR931819-04AA

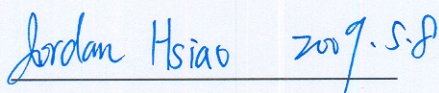
- No additional attachment.
- Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name : WLAN a/b/g/n mini-PCI Module
Brand Name : RouterBOARD
Model Name : R52n
Applicant : Mikrotiks SIA
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Mar. 18, 2009 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.

 2009.5.8

Jordan Hsiao

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	0.66 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.13 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.14 dB
4.5	15.407(a)	Peak Excursion	Complies	6.70 dB
4.6	15.407(b)	Radiated Emissions	Complies	2.65 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.26 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

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

3. GENERAL INFORMATION

3.1. Product Details

Draft n

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	see the below table for draft n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for Draft n
Frequency Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	19 for 20MHz bandwidth ; 9 for 40MHz bandwidth
Channel Band Width (99%)	MCS0 (20MHz): 24.48 MHz ; MCS0 (40MHz): 36.64 MHz
Conducted Output Power	Band 1: MCS0 (20MHz): 16.41 dBm ; MCS0 (40MHz): 16.50 dBm Band 2: MCS0 (20MHz): 23.57 dBm ; MCS0 (40MHz): 20.82 dBm Band 3: MCS0 (20MHz): 23.81 dBm ; MCS0 (40MHz): 19.88 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11a

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	19
Channel Band Width (99%)	Band 1: 17.12 MHz ; Band 2: 18.72 MHz ; Band 3: 19.04 MHz
Conducted Output Power	Band 1: 16.87 dBm ; Band 2: 23.80 dBm ; Band 3: 23.61 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)		Two (TX)	
	20 MHz	40 MHz	20 MHz	40 MHz
Band width Mode				
802.11a	X	X	V	X
Draft n	X	X	V	V

Draft n spec

MCS Index	Nss	Modulation	R	NBPS	NCBPS		NDBPS		Datarate(Mbps)			
					20MHz	40MHz	20MHz	40MHz	800nsGI		400nsGI	
									20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300

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

3.2. Accessories

N/A

3.3. Table for Filed Antenna

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A	LCU	F1B-204406-52	DIPOLE Antenna	Reversed-SMA	2.5	TX/RX
B	LCU	F1B-204406-52	DIPOLE Antenna	Reversed-SMA	2.5	TX/RX

Note: The EUT has two Antennas.

Both antenna A and B can be used as transmitting/receiving antenna.

Connect with Ant. A

Connect with Ant. B



3.4. Table for Carrier Frequencies

Frequency Allocation for 802.11a

There are two bandwidth systems for draft n.

For both 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140.

For both 40MHz bandwidth systems, use Channel 38, 46, 54, 62, 102, 110, 118, 126, 134.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
5250~5350 MHz Band 2	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
5470~5725 MHz Band 3	100	5500 MHz	120	5600 MHz
	102	5510MHz	124	5620 MHz
	104	5520 MHz	126	5630 MHz
	108	5540 MHz	128	5640 MHz
	110	5550 MHz	132	5660 MHz
	112	5560 MHz	134	5670 MHz
	116	5580 MHz	136	5680 MHz
	118	5590 MHz	140	5700 MHz

3.5. 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 all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode		Data Rate	Channel	Antenna
AC Power Conducted Emission	Normal Link		Auto	-	-
Max. Conducted Output Power	MCS0/20MHz	Band 1~2	6.5Mbps	36/40/48/52/60/64	A/B/A+B
		Band 3	13.5Mbps	100/116/140	A/B/A+B
	MCS0/40MHz	Band 1~2	13.5Mbps	38/46/54/62	A/B/A+B
		Band 3	13.5Mbps	102/110/134	A/B/A+B
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	A/B/A+B
		Band 3	6Mbps	100/116/140	A/B/A+B
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	MCS0/20MHz	Band 1~2	13Mbps	36/40/48/52/60/64	A+B
		Band 3	6.5Mbps	100/116/140	A+B
	MCS0/40MHz	Band 1~2	13.5Mbps	38/46/54/62	A+B
		Band 3	13.5Mbps	102/110/134	A+B
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	A+B
		Band 3	6Mbps	100/116/140	A+B
Radiated Emission Below 1GHz	Normal Link		Auto	-	-
Radiated Emission Above 1GHz	MCS0/20MHz	Band 1~2	6.5Mbps	36/40/48/52/60/64	A+B
		Band 3	6.5Mbps	100/116/140	A+B
	MCS0/40MHz	Band 1~2	13.5Mbps	38/46/54/62	A+B
		Band 3	13.5Mbps	102/110/134	A+B
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	A+B
		Band 3	6Mbps	100/116/140	A+B
Band Edge Emission	MCS0/20MHz	Band 1~2	6.5Mbps	36/40/48/52/60/64	A+B
		Band 3	6.5Mbps	100/116/140	A+B
	MCS0/40MHz	Band 1~2	13.5Mbps	38/46/54/62	A+B
		Band 3	13.5Mbps	102/110/134	A+B
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	A+B
		Band 3	6Mbps	100/116/140	A+B
Frequency Stability	Un-modulation		-	60	N/A

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-
CO04-HY	Conduction	Hwa Ya	101377	IC 4088	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL
Mouse	HP	M-UAE96	DoC
Wireless AP	Planex	GW-AP54SGX	DoC
Modem	ACEEX	DM1414	IFAXDM1414

3.8. 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 Draft n MCS0 20MHz

Test Software Version	ART								
Frequency	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
Draft n MCS0 20MHz	12.5	12.5	12.5	19.5	16	12.5	10.5	20	10.5

Power Parameters of Draft n MCS0 40MHz

Test Software Version	ART						
Frequency	5190 MHz	5230 MHz	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz
Draft n MCS0 40MHz	10.5	12	16.5	11	9	15	13

Power Parameters of IEEE 802.11a

Test Software Version	ART								
Frequency	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11a	12	12	12.5	19.5	18	13.5	11	19	10.5

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 the panel displays " H " patterns on the screen.
- c. The NB sends " H " messages to the modem.
- d. Repeat the steps from b to C.

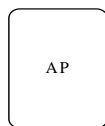
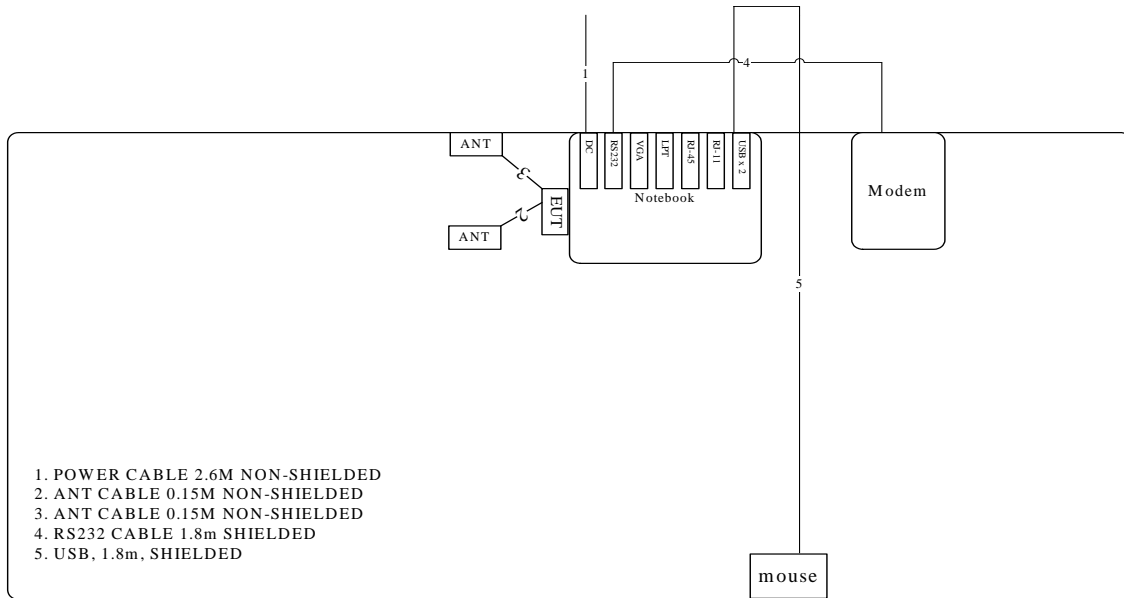
At the same time, the following programs were executed:

Executed "ping.exe" to link with the remote workstation to receive and transmit signal by WLAN.

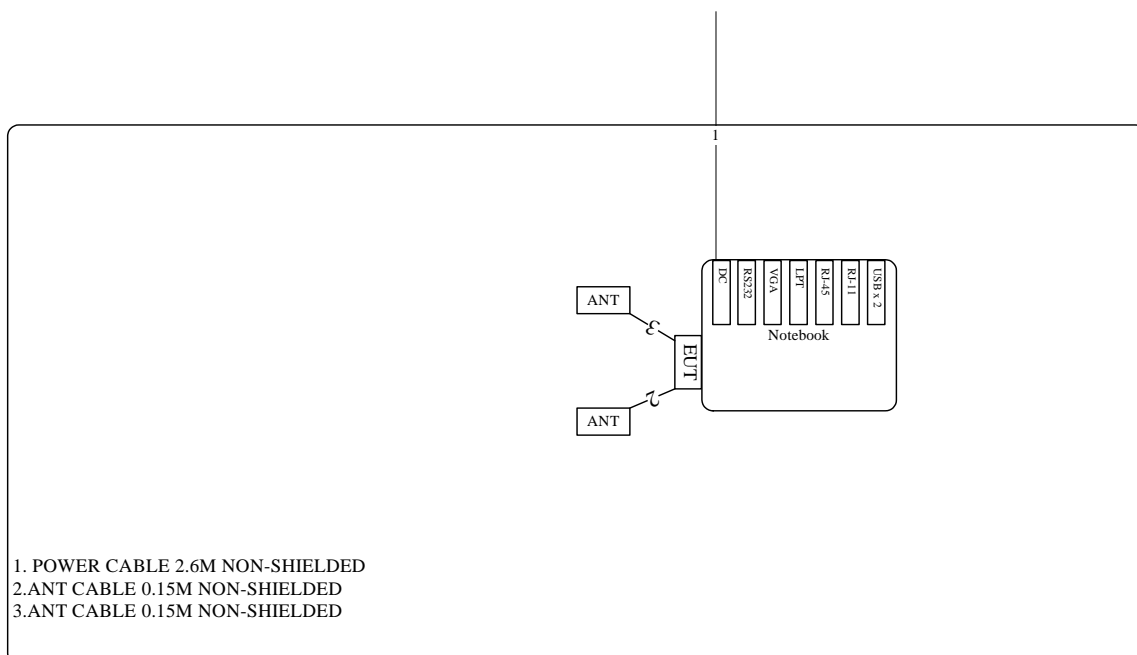
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

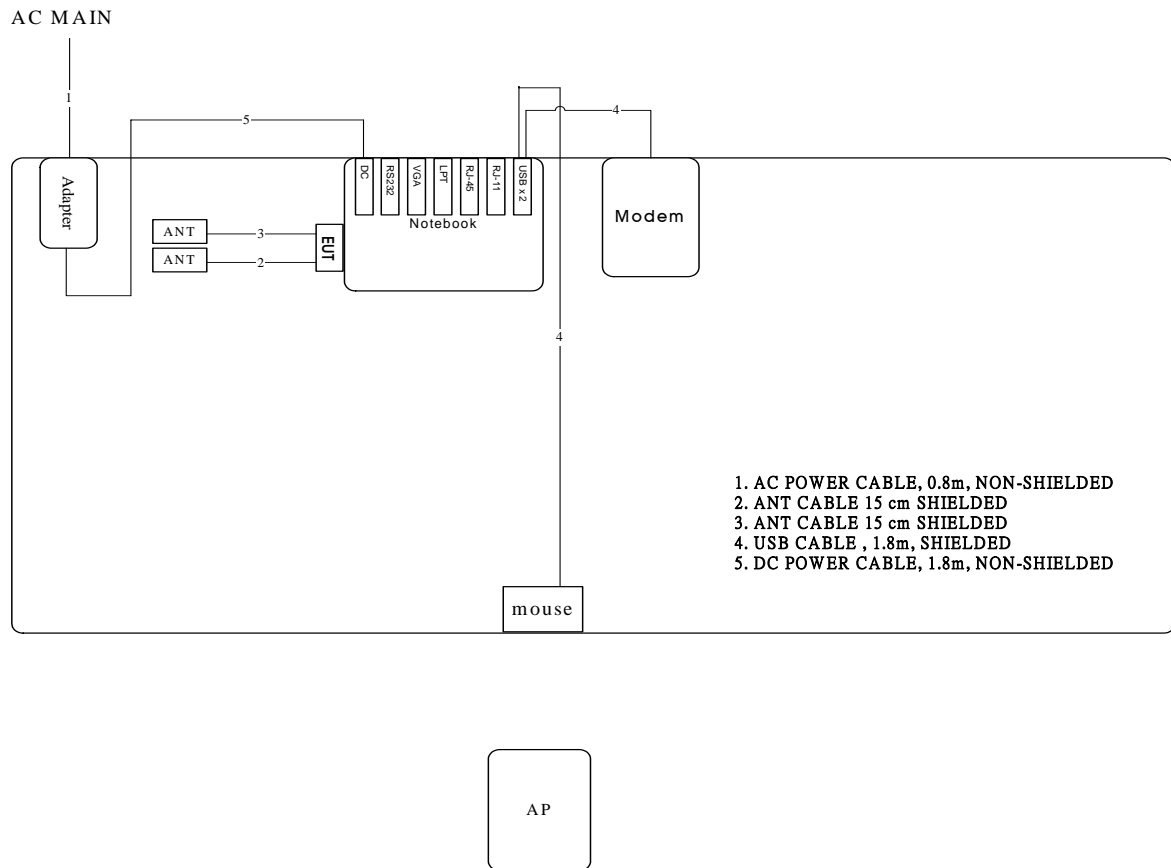
Test Configuration: 9kHz~1GHz



Test Configuration: above 1GHz



3.9.2. AC Power Line Conduction Emissions Test Configuration



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect 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.

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

4.1.2. Measuring Instruments and Setting

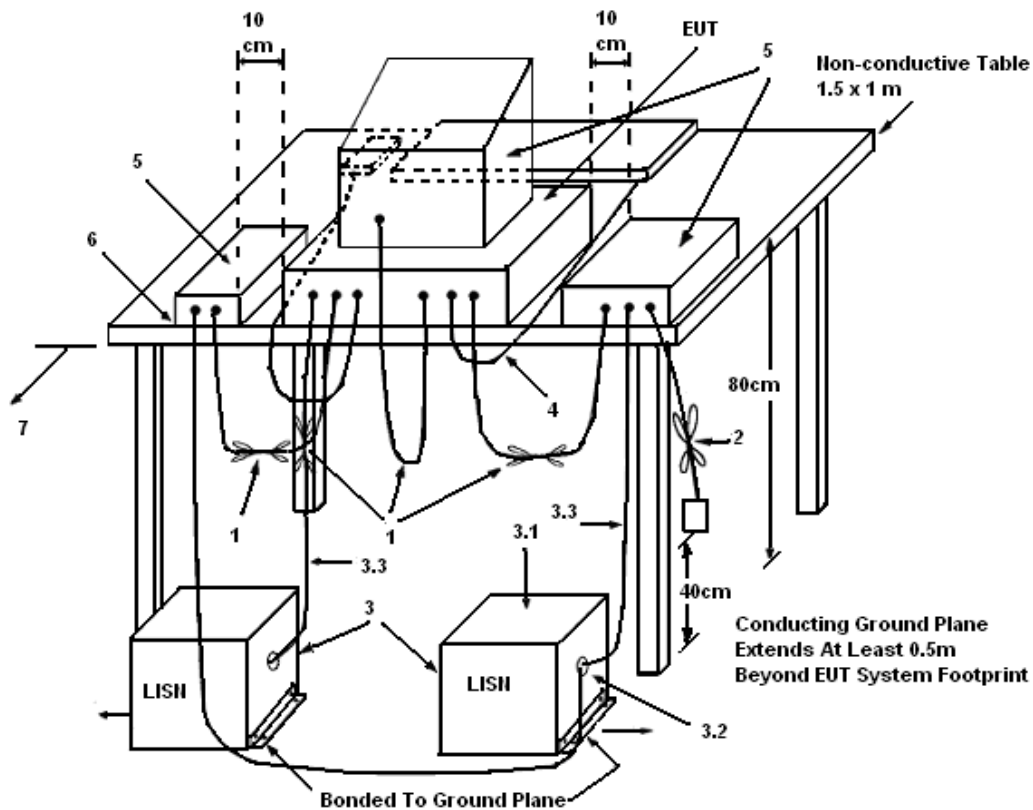
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

1. 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.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. 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.

4.1.5. Test Deviation

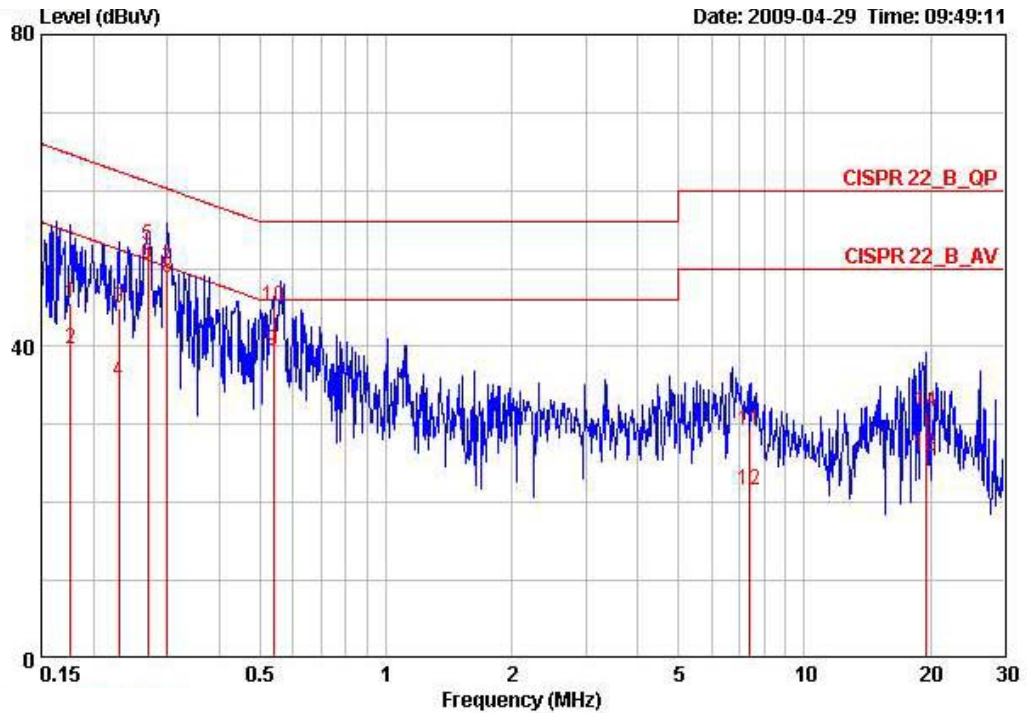
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

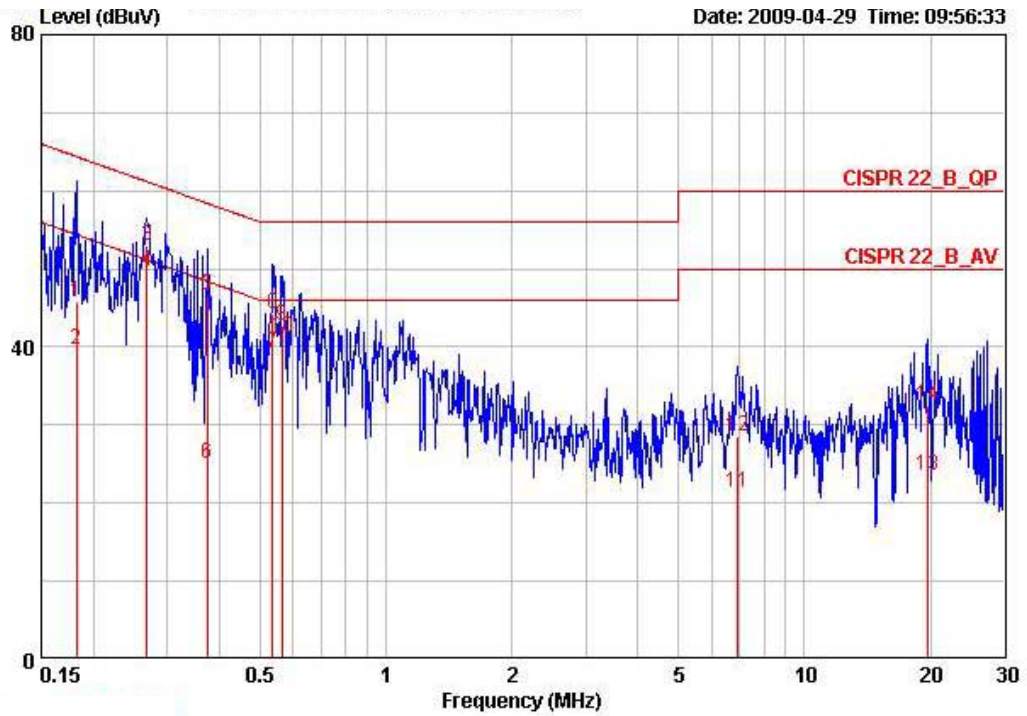
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	50%
Test Engineer	Howar Sung	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17664	45.64	-19.00	64.64	45.38	0.06	0.20	QP
2	0.17664	39.66	-14.98	54.64	39.40	0.06	0.20	AVERAGE
3	0.23040	44.99	-17.45	62.44	44.74	0.05	0.20	QP
4	0.23040	35.50	-16.94	52.44	35.25	0.05	0.20	AVERAGE
5	0.26918	52.93	-8.21	61.14	52.69	0.04	0.20	QP
6	0.26918	50.48	-0.66	51.14	50.24	0.04	0.20	AVERAGE
7	0.30028	49.91	-10.33	60.24	49.67	0.04	0.20	QP
8	0.30028	48.88	-1.36	50.24	48.64	0.04	0.20	AVERAGE
9	0.53761	39.46	-6.54	46.00	39.23	0.03	0.20	AVERAGE
10	0.53761	45.07	-10.93	56.00	44.84	0.03	0.20	QP
11	7.418	29.30	-30.70	60.00	28.65	0.27	0.38	QP
12	7.418	21.58	-28.42	50.00	20.93	0.27	0.38	AVERAGE
13	19.587	25.98	-24.03	50.00	24.67	0.80	0.50	AVERAGE
14	19.587	31.64	-28.37	60.00	30.33	0.80	0.50	QP

Temperature	25°C	Humidity	50%
Test Engineer	Howar Sung	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.18249	45.87	-18.50	64.37	45.58	0.09	0.20	QP
2	0.18249	39.77	-14.60	54.37	39.48	0.09	0.20	AVERAGE
3	0.26866	53.07	-8.09	61.16	52.79	0.08	0.20	QP
4	0.26866	49.81	-1.35	51.16	49.53	0.08	0.20	AVERAGE
5	0.37314	46.63	-11.80	58.43	46.36	0.07	0.20	QP
6	0.37314	25.08	-23.35	48.43	24.81	0.07	0.20	AVERAGE
7	0.53498	39.20	-16.80	56.00	38.93	0.07	0.20	QP
8	0.53498	44.16	-1.84	46.00	43.89	0.07	0.20	AVERAGE
9	0.56409	42.62	-13.38	56.00	42.35	0.07	0.20	QP
10	0.56409	41.10	-4.90	46.00	40.83	0.07	0.20	AVERAGE
11	6.914	21.34	-28.66	50.00	20.74	0.29	0.31	AVERAGE
12	6.914	28.61	-31.39	60.00	28.01	0.29	0.31	QP
13	19.635	23.49	-26.51	50.00	22.20	0.79	0.50	AVERAGE
14	19.635	32.57	-27.43	60.00	31.28	0.79	0.50	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. 99% Occupied Bandwidth Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

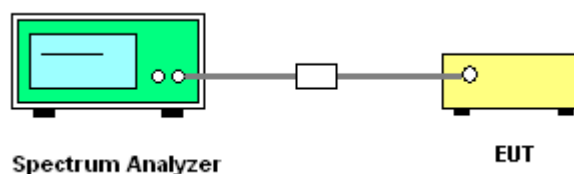
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.2.3. 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.
4. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 99% Occupied Bandwidth

Temperature	24°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n

Configuration Draft n MCS0 20MHz Ant. A + Ant. B

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.44	18.40
40	5200 MHz	25.60	18.40
48	5240 MHz	25.60	18.40
52	5260 MHz	38.08	19.68
60	5300 MHz	25.12	18.40
64	5320 MHz	25.12	18.40
100	5500 MHz	24.96	18.40
116	5580 MHz	40.32	24.48
140	5700 MHz	25.28	18.40

Configuration Draft n MCS0 40MHz Ant. A + Ant. B

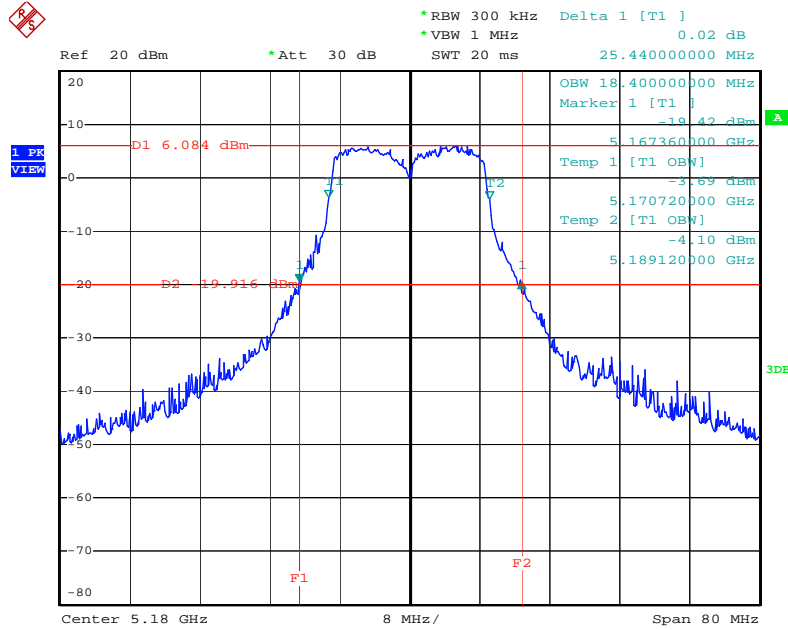
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	46.56	36.48
46	5230 MHz	47.04	36.64
54	5270 MHz	57.60	36.64
62	5310 MHz	45.92	36.48
102	5510MHz	47.36	36.64
110	5550 MHz	55.36	36.64
134	5670 MHz	46.88	36.64

Temperature	24°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11a

Configuration IEEE 802.11a Ant. A + Ant. B

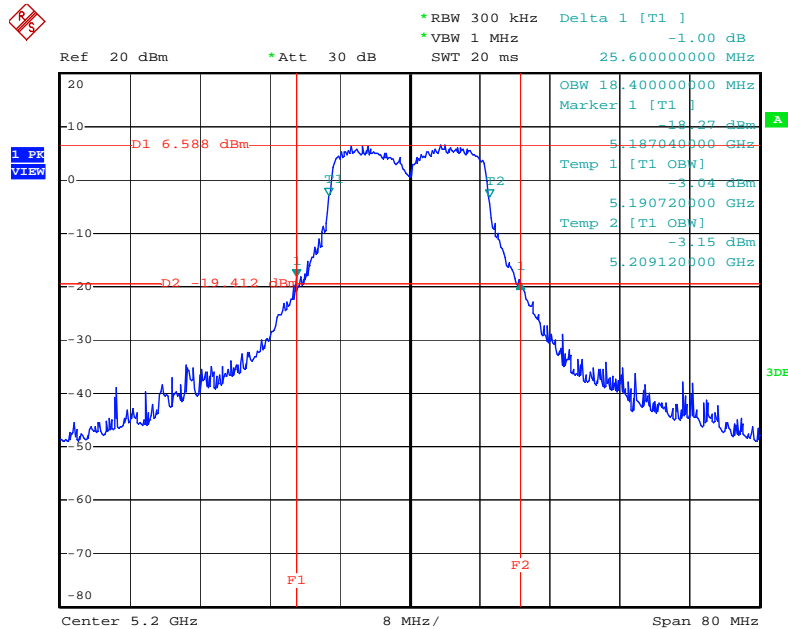
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.52	16.96
40	5200 MHz	23.52	17.12
48	5240 MHz	23.68	16.96
52	5260 MHz	35.52	18.72
60	5300 MHz	32.32	18.08
64	5320 MHz	24.80	17.44
100	5500 MHz	23.52	16.96
116	5580 MHz	37.92	19.04
140	5700 MHz	24.80	17.60

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5180 MHz



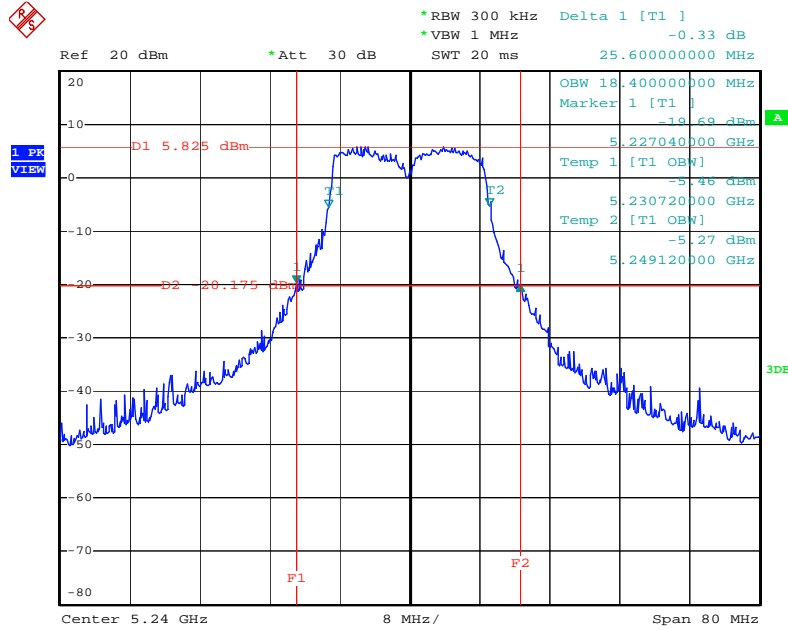
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26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5200 MHz



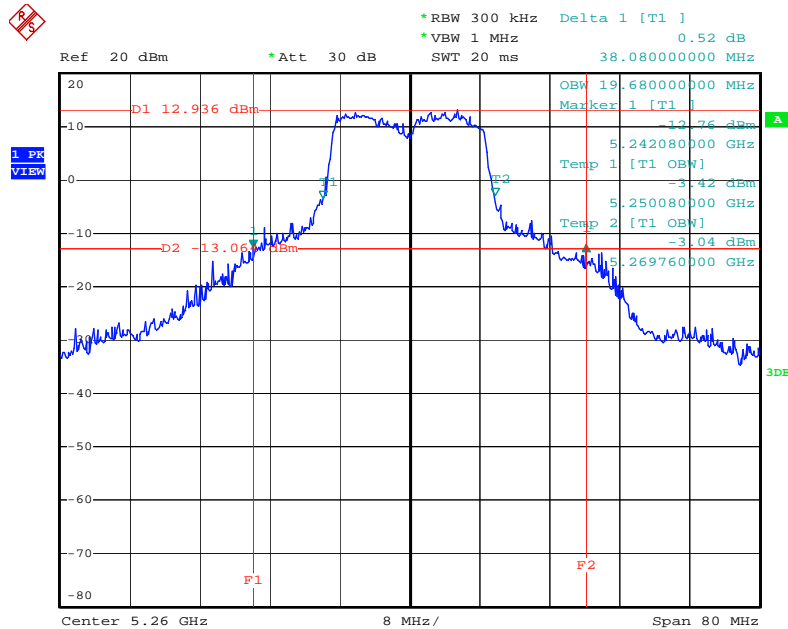
Date: 26.MAR.2009 13:23:41

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5240 MHz



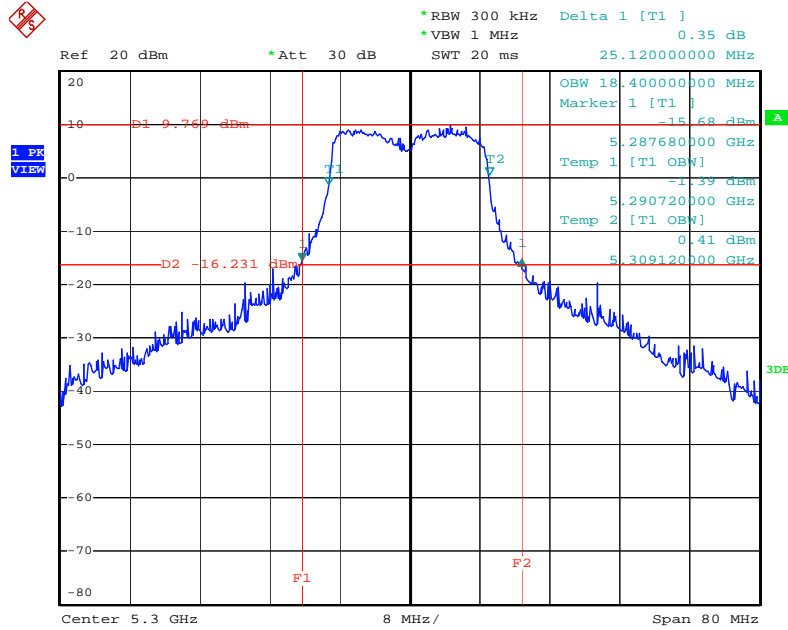
Date: 26.MAR.2009 13:22:56

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5260 MHz



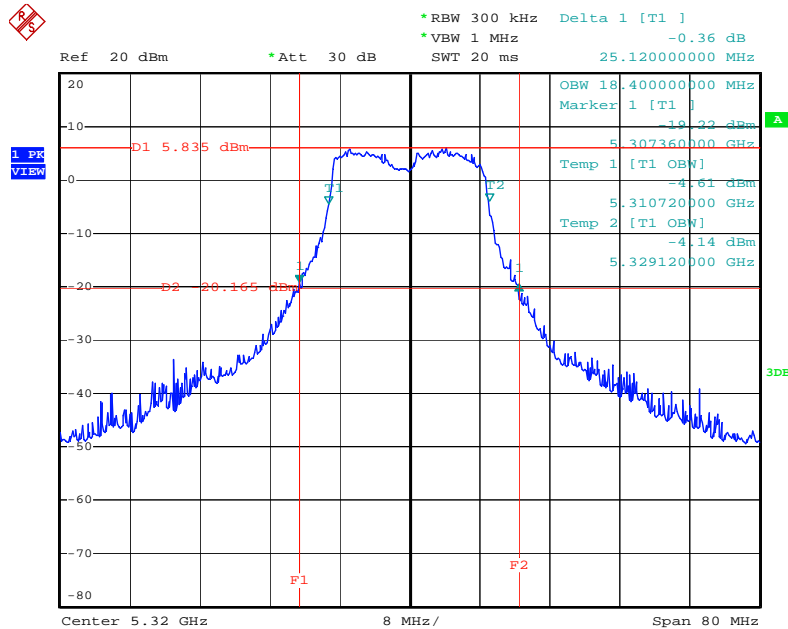
Date: 26.MAR.2009 13:22:06

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5300 MHz



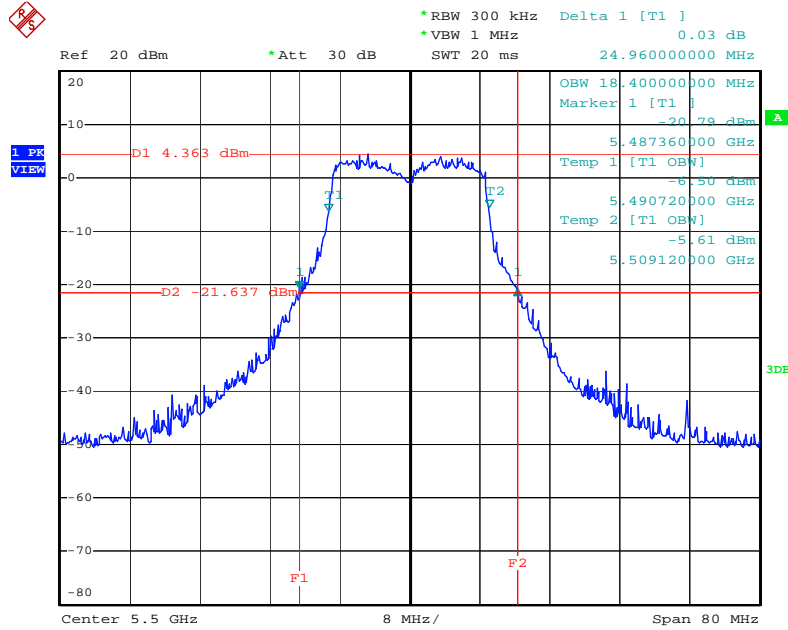
Date: 26.MAR.2009 13:21:17

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5320 MHz



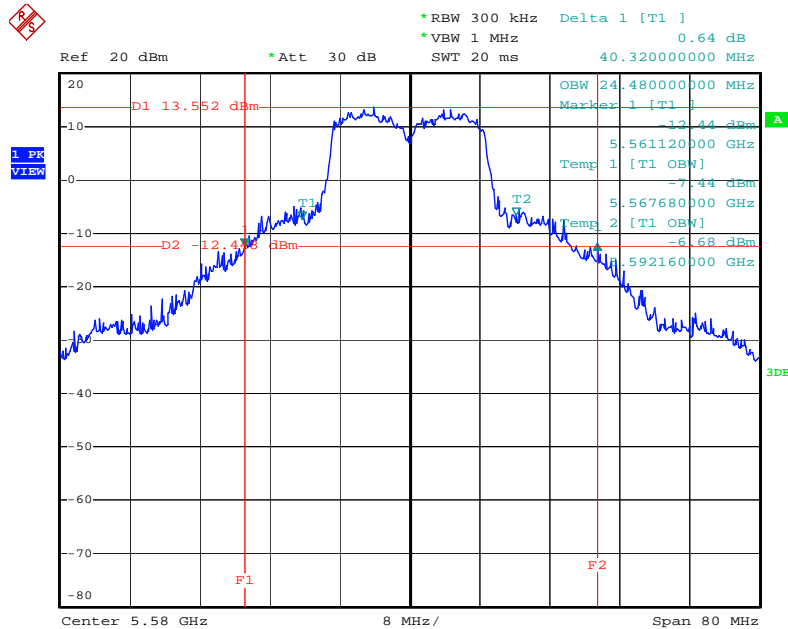
Date: 26.MAR.2009 13:20:32

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5500 MHz



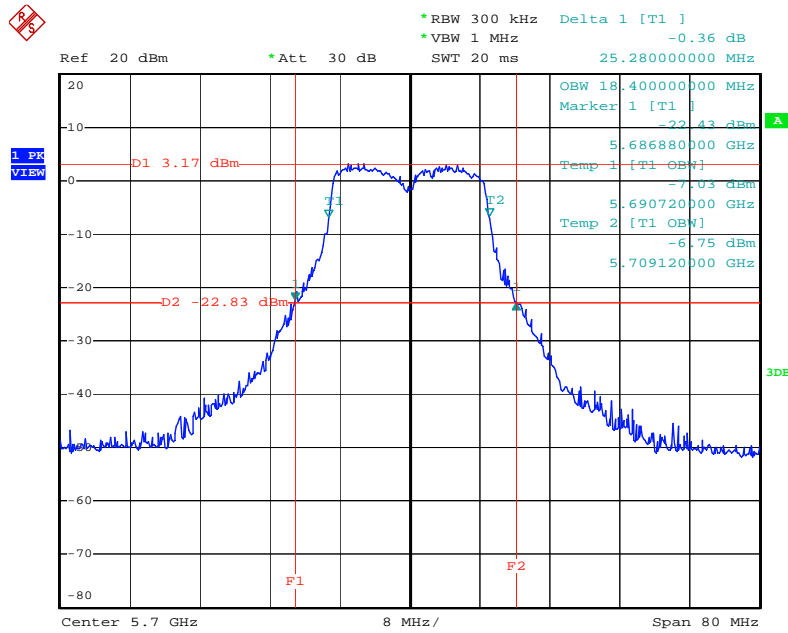
Date: 26.MAR.2009 13:19:19

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5580 MHz



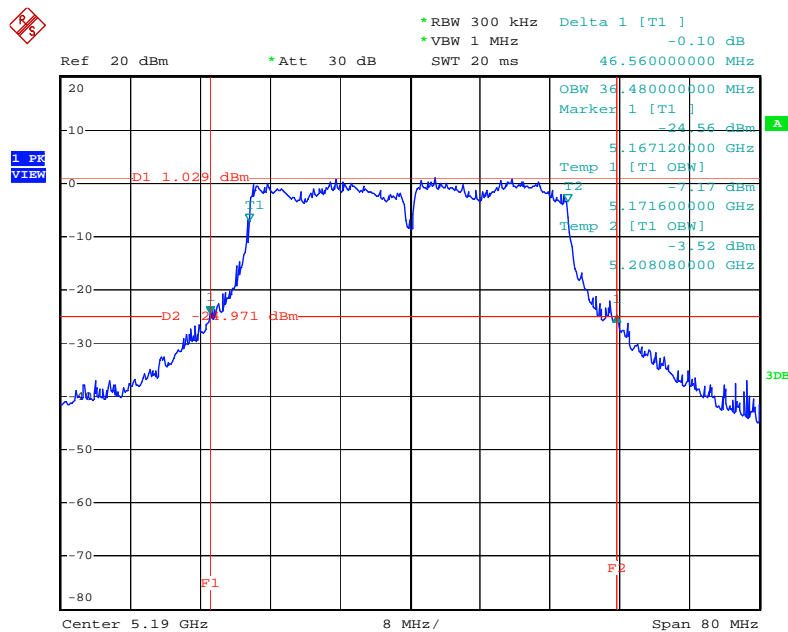
Date: 26.MAR.2009 13:18:25

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. A + Ant. B / 5700 MHz



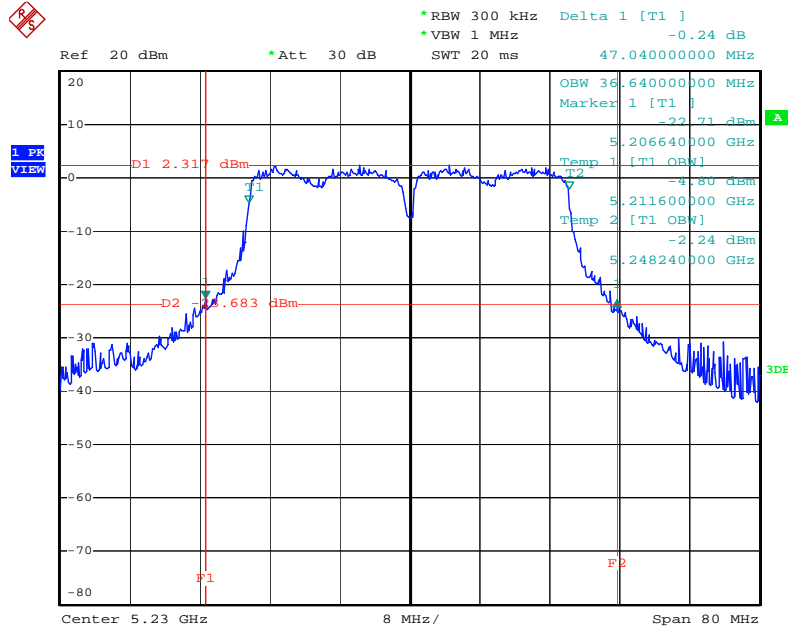
Date: 26.MAR.2009 14:56:28

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. A + Ant. B / 5190 MHz



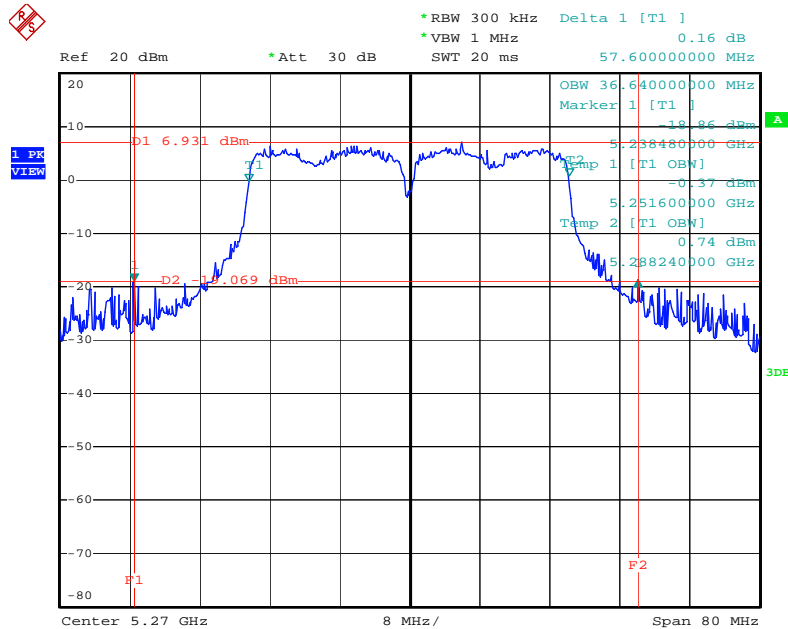
Date: 29.APR.2009 10:24:34

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. A + Ant. B / 5230 MHz



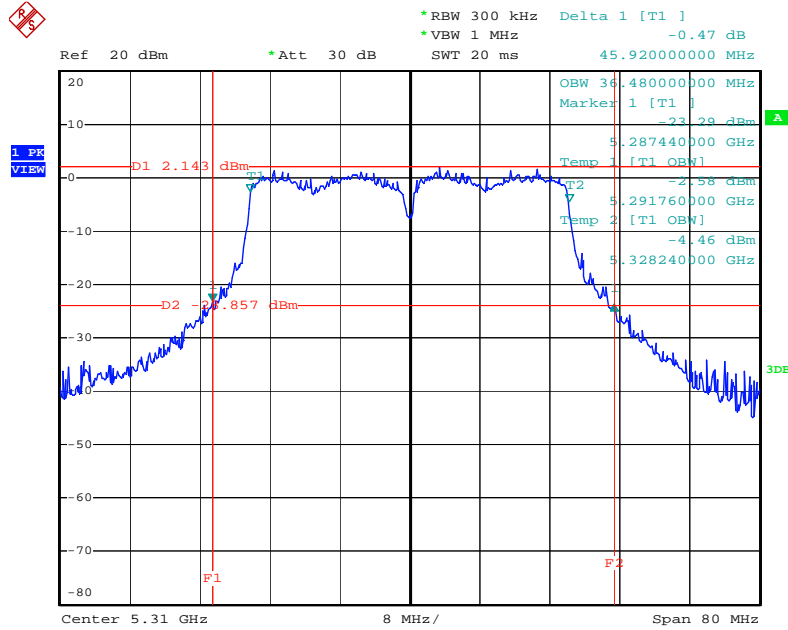
Date: 26.MAR.2009 13:30:11

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. A + Ant. B / 5270 MHz



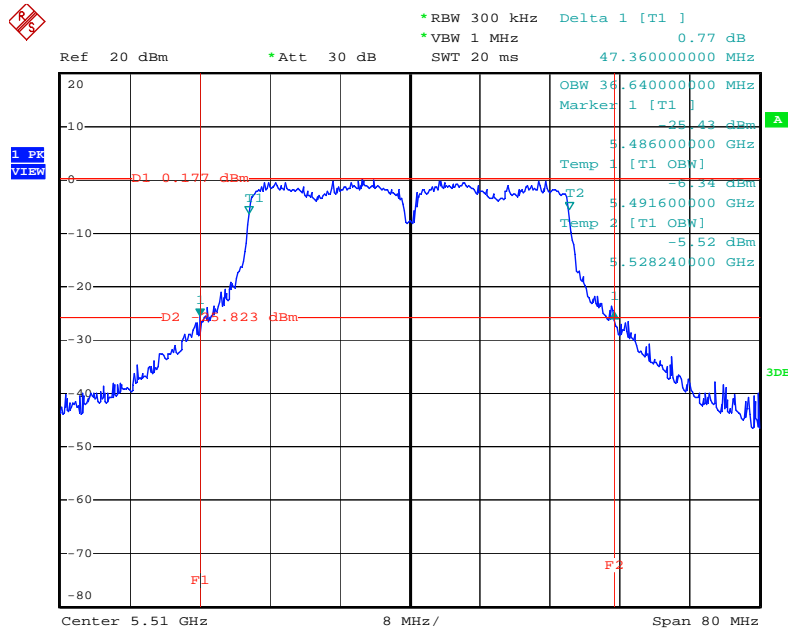
Date: 26.MAR.2009 13:31:07

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. A + Ant. B / 5310 MHz



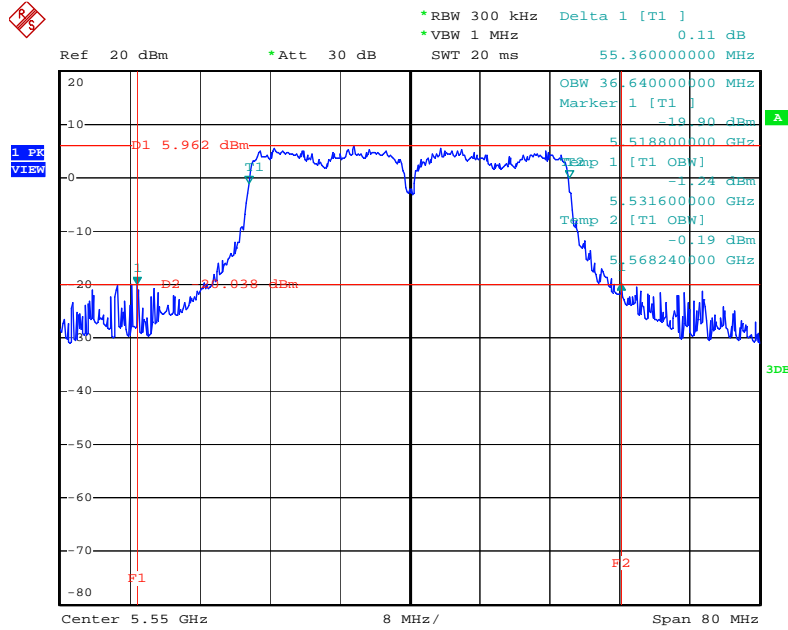
Date: 26.MAR.2009 13:32:12

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. A + Ant. B / 5510MHz



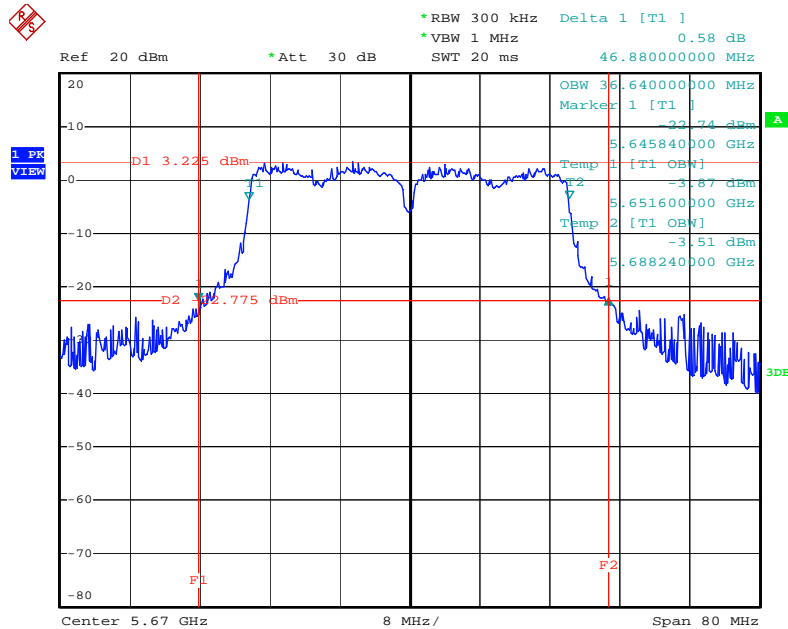
Date: 26.MAR.2009 13:34:13

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. A + Ant. B / 5550 MHz



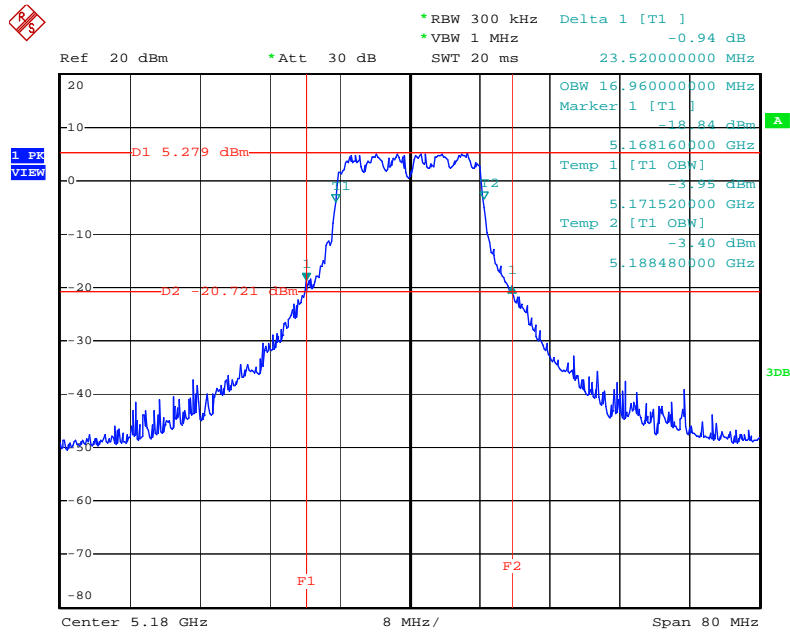
Date: 26.MAR.2009 13:35:00

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. A + Ant. B / 5670 MHz



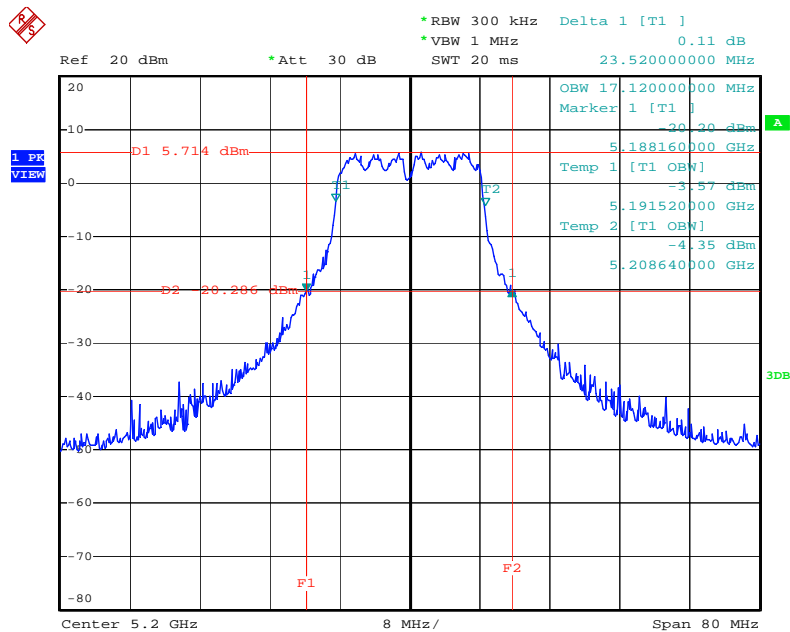
Date: 26.MAR.2009 13:35:45

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



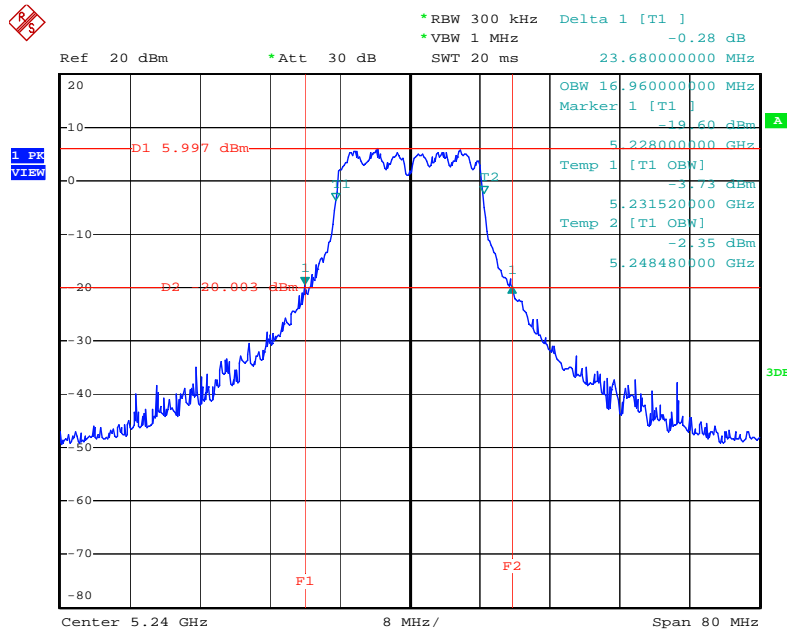
Date: 26.MAR.2009 13:04:04

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



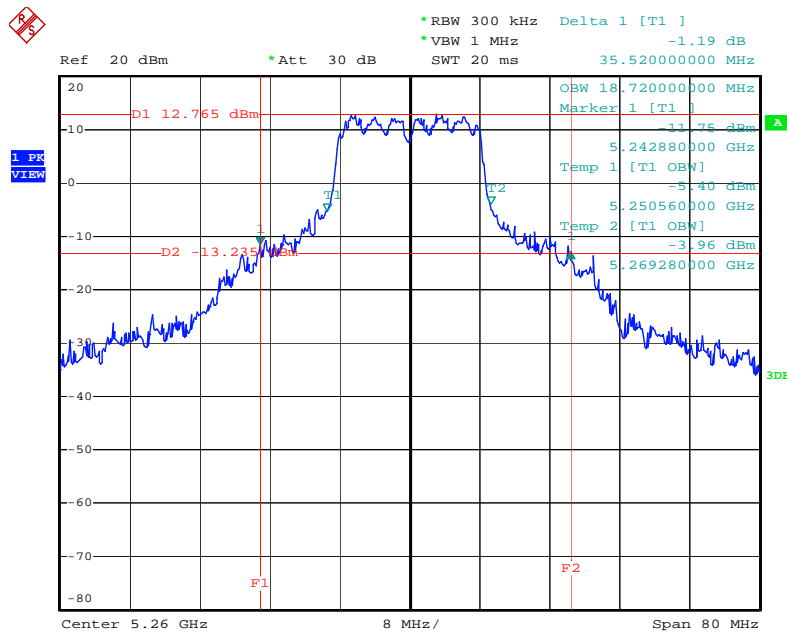
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26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A + Ant. B / 5240 MHz



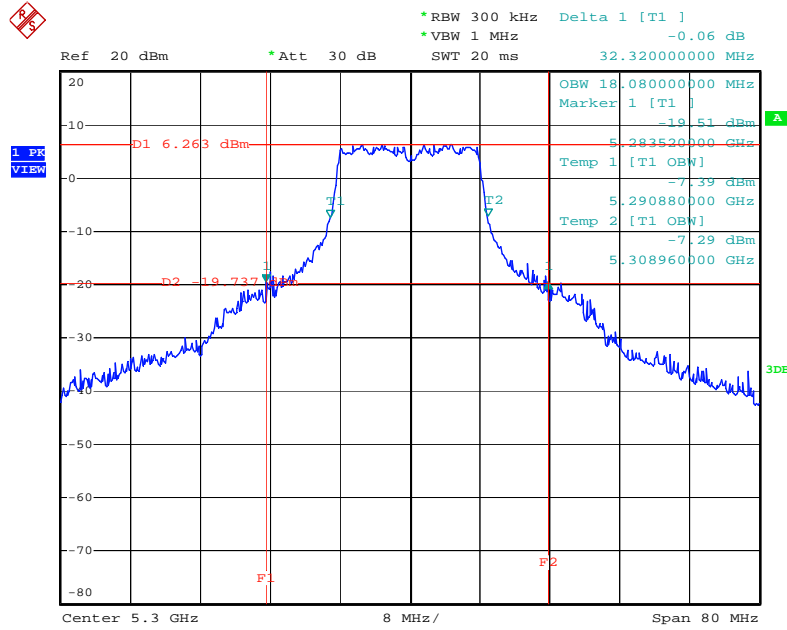
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26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A + Ant. B / 5260 MHz



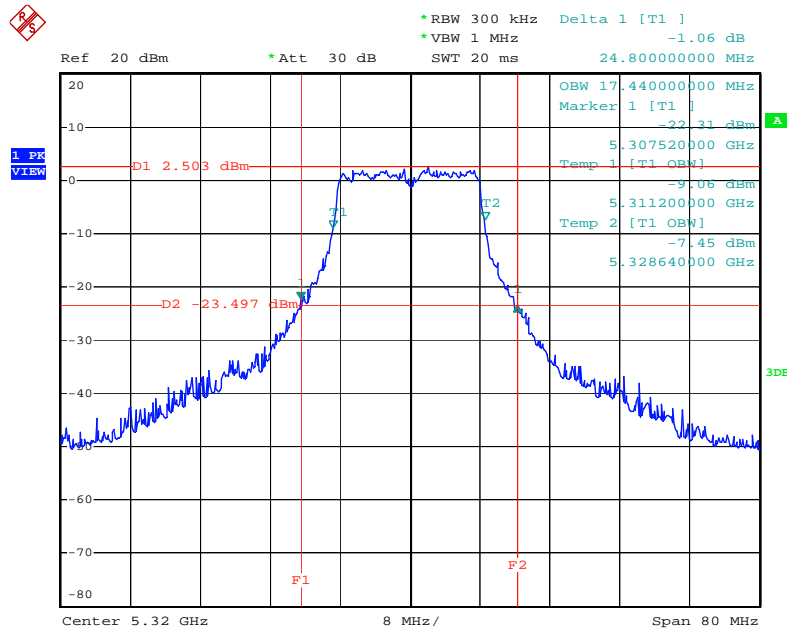
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26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. A + Ant. B / 5300 MHz



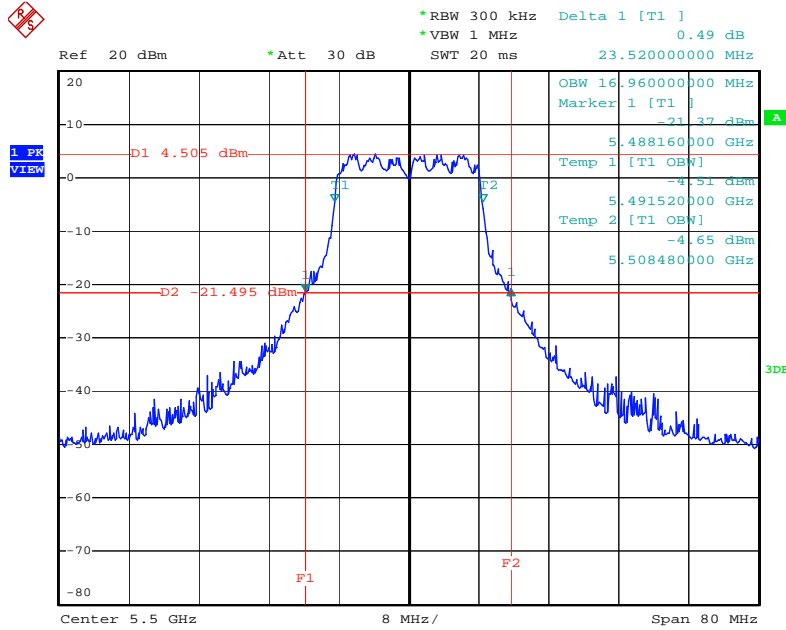
Date: 29.APR.2009 10:29:32

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



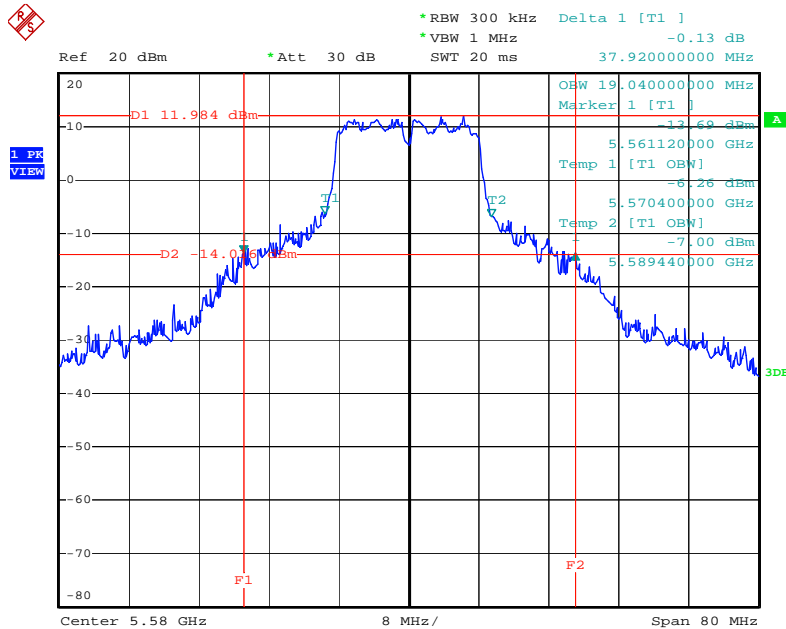
Date: 29.APR.2009 10:30:28

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



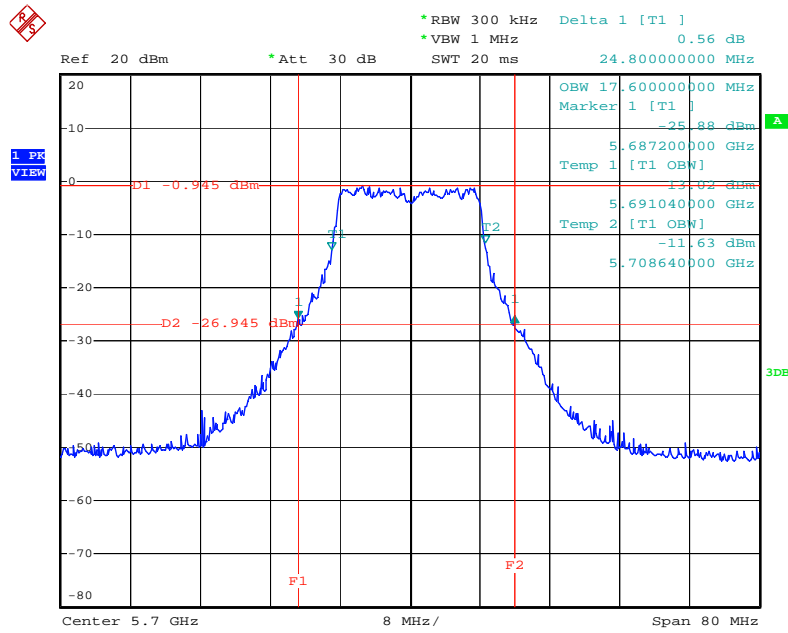
Date: 26.MAR.2009 13:14:11

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



Date: 26.MAR.2009 13:15:16

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



Date: 29.APR.2009 10:31:58

4.3. Maximum Conducted Output Power Measurement

4.3.1. 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 $4 \text{ dBm} + 10\log B$, 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 5.470-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or $11 \text{ dBm} + 10\log B$. 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 $17 \text{ dBm} + 10\log B$. 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.

4.3.2. Measuring Instruments and Setting

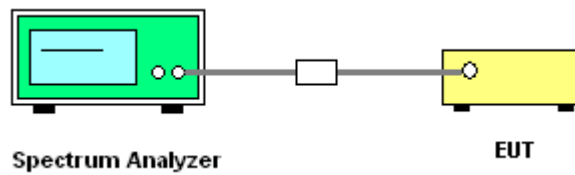
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with FCC Public Notice DA 02-2138, August 30, 2002.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	24°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n

Configuration Draft n MCS0 20MHz Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.51	17.00	Complies
40	5200 MHz	13.84	17.00	Complies
48	5240 MHz	13.50	17.00	Complies
52	5260 MHz	20.60	24.00	Complies
60	5300 MHz	17.92	24.00	Complies
64	5320 MHz	14.34	24.00	Complies
100	5500 MHz	12.55	24.00	Complies
116	5580 MHz	20.75	24.00	Complies
140	5700 MHz	12.00	24.00	Complies

Configuration Draft n MCS0 20MHz Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.22	17.00	Complies
40	5200 MHz	12.90	17.00	Complies
48	5240 MHz	13.13	17.00	Complies
52	5260 MHz	20.51	24.00	Complies
60	5300 MHz	18.24	24.00	Complies
64	5320 MHz	14.69	24.00	Complies
100	5500 MHz	13.38	24.00	Complies
116	5580 MHz	20.85	24.00	Complies
140	5700 MHz	11.88	24.00	Complies

Configuration Draft n MCS0 20MHz Ant. A + Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.38	17.00	Complies
40	5200 MHz	16.41	17.00	Complies
48	5240 MHz	16.33	17.00	Complies
52	5260 MHz	23.57	24.00	Complies
60	5300 MHz	21.09	24.00	Complies
64	5320 MHz	17.53	24.00	Complies
100	5500 MHz	16.00	24.00	Complies
116	5580 MHz	23.81	24.00	Complies
140	5700 MHz	14.95	24.00	Complies

Configuration Draft n MCS0 40MHz Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.83	17.00	Complies
46	5230 MHz	13.81	17.00	Complies
54	5270 MHz	17.64	24.00	Complies
62	5310 MHz	12.54	24.00	Complies
102	5510MHz	11.58	24.00	Complies
110	5550 MHz	16.54	24.00	Complies
134	5670 MHz	14.18	24.00	Complies

Configuration Draft n MCS0 40MHz Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.18	17.00	Complies
46	5230 MHz	13.14	17.00	Complies
54	5270 MHz	17.98	24.00	Complies
62	5310 MHz	13.19	24.00	Complies
102	5510MHz	10.89	24.00	Complies
110	5550 MHz	17.18	24.00	Complies
134	5670 MHz	14.24	24.00	Complies

Configuration Draft n MCS0 40MHz Ant. A + Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	14.53	17.00	Complies
46	5230 MHz	16.50	17.00	Complies
54	5270 MHz	20.82	24.00	Complies
62	5310 MHz	15.89	24.00	Complies
102	5510MHz	14.26	24.00	Complies
110	5550 MHz	19.88	24.00	Complies
134	5670 MHz	17.22	24.00	Complies

Temperature	24°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11a

Configuration IEEE 802.11a Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.84	17.00	Complies
40	5200 MHz	14.02	17.00	Complies
48	5240 MHz	14.10	17.00	Complies
52	5260 MHz	20.68	24.00	Complies
60	5300 MHz	19.04	24.00	Complies
64	5320 MHz	15.04	24.00	Complies
100	5500 MHz	12.83	24.00	Complies
116	5580 MHz	20.53	24.00	Complies
140	5700 MHz	11.32	24.00	Complies

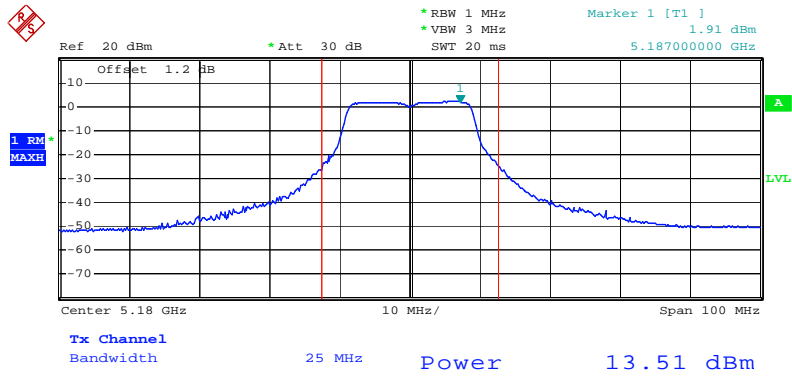
Configuration IEEE 802.11a Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.73	17.00	Complies
40	5200 MHz	13.65	17.00	Complies
48	5240 MHz	13.60	17.00	Complies
52	5260 MHz	20.89	24.00	Complies
60	5300 MHz	18.97	24.00	Complies
64	5320 MHz	15.17	24.00	Complies
100	5500 MHz	13.66	24.00	Complies
116	5580 MHz	20.66	24.00	Complies
140	5700 MHz	11.16	24.00	Complies

Configuration IEEE 802.11a Ant. A + Ant. B

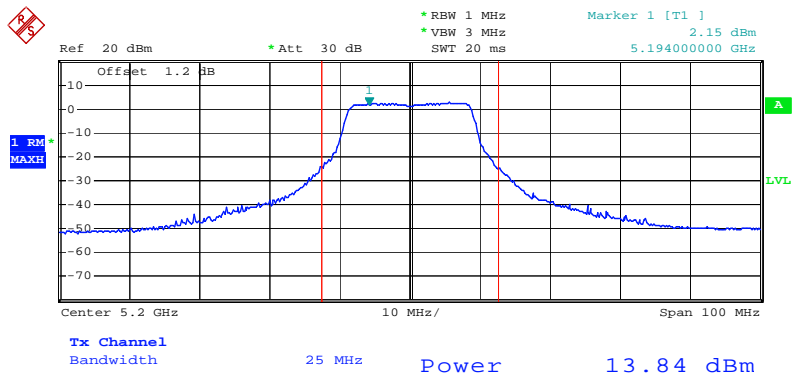
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.80	17.00	Complies
40	5200 MHz	16.85	17.00	Complies
48	5240 MHz	16.87	17.00	Complies
52	5260 MHz	23.80	24.00	Complies
60	5300 MHz	22.02	24.00	Complies
64	5320 MHz	18.12	24.00	Complies
100	5500 MHz	16.28	24.00	Complies
116	5580 MHz	23.61	24.00	Complies
140	5700 MHz	14.25	24.00	Complies

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5180 MHz



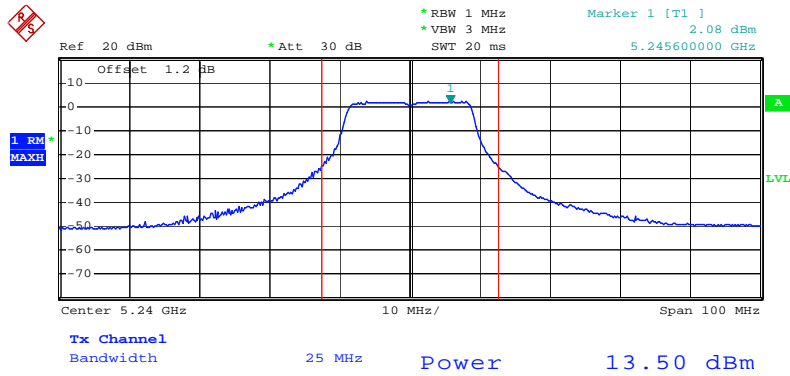
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5200 MHz



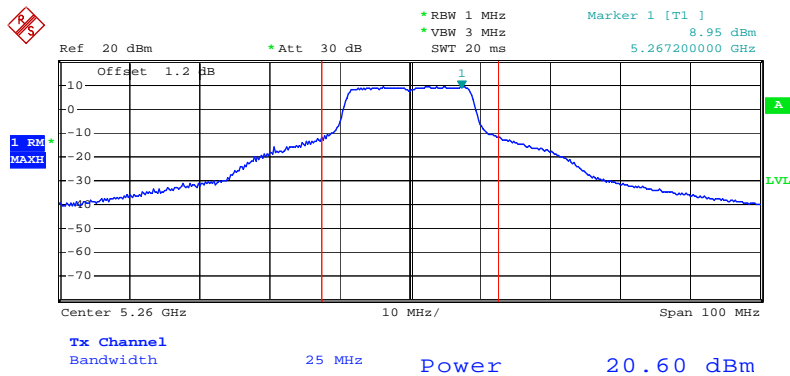
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5240 MHz



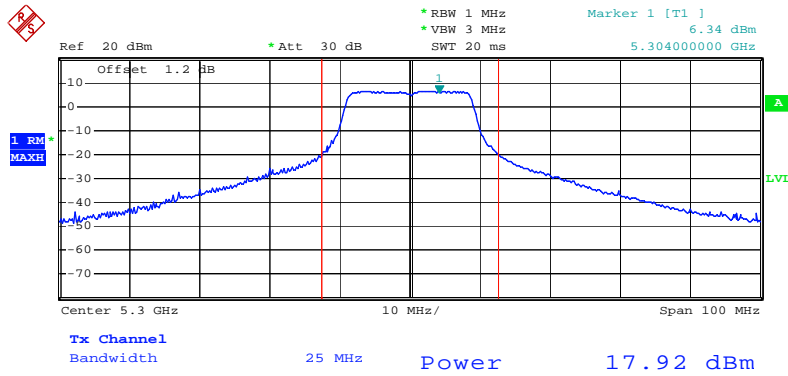
Date: 25.MAR.2009 17:31:54

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5260 MHz



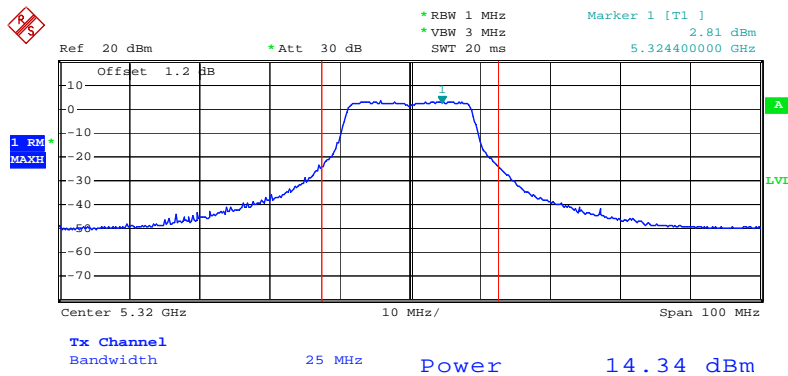
Date: 25.MAR.2009 17:35:37

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5300 MHz



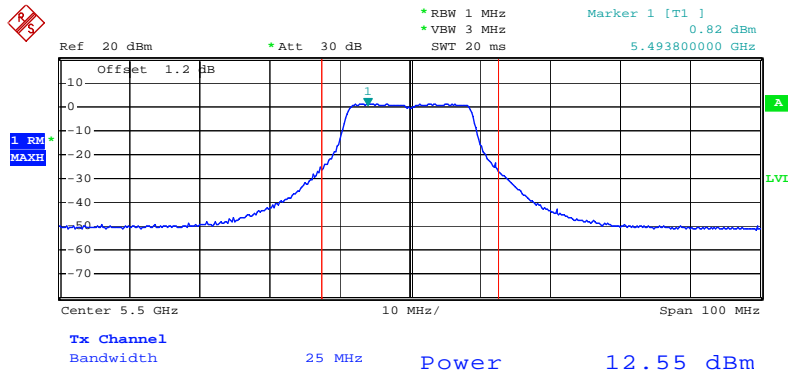
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5320 MHz



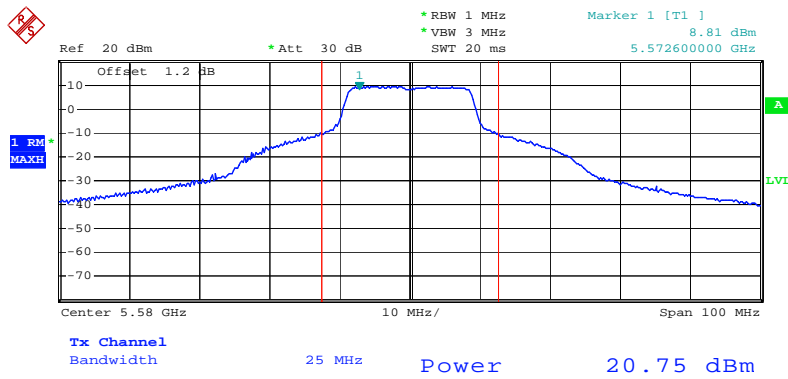
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5500 MHz



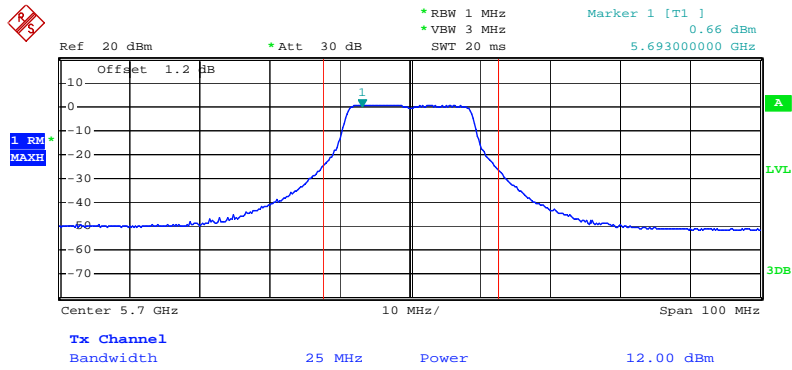
Date: 25.MAR.2009 17:38:29

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5580 MHz



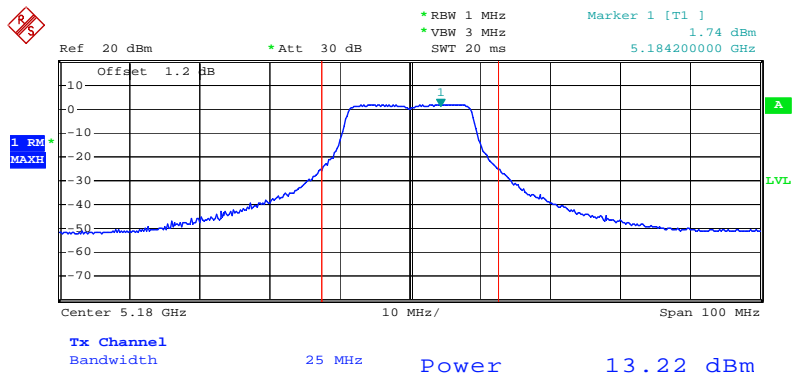
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5700 MHz



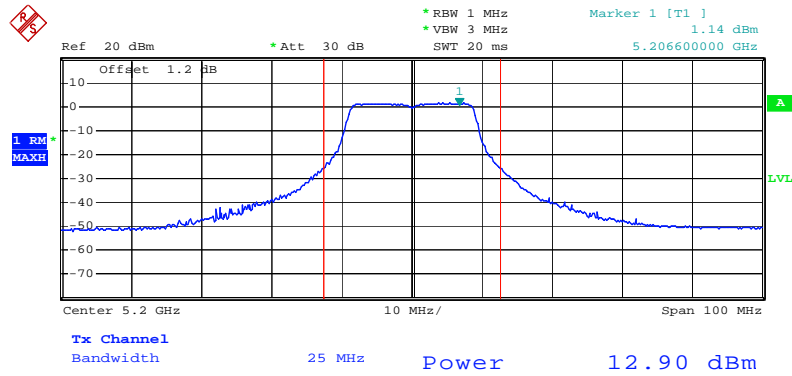
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5180 MHz



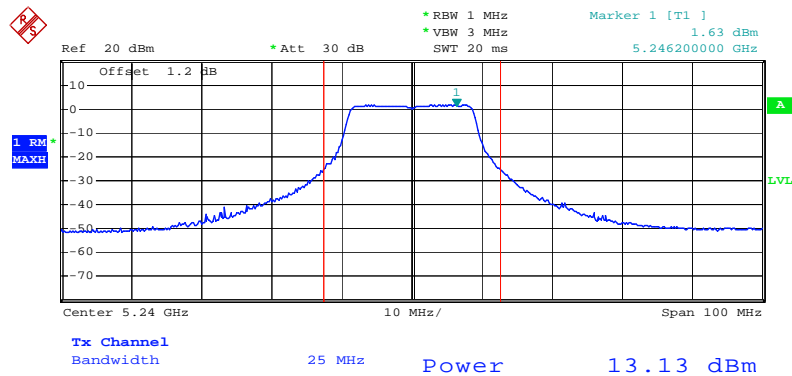
Date: 25.MAR.2009 17:29:02

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5200 MHz



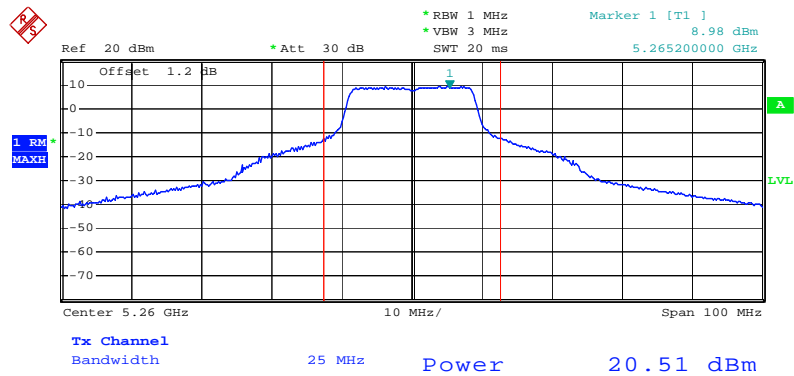
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Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5240 MHz



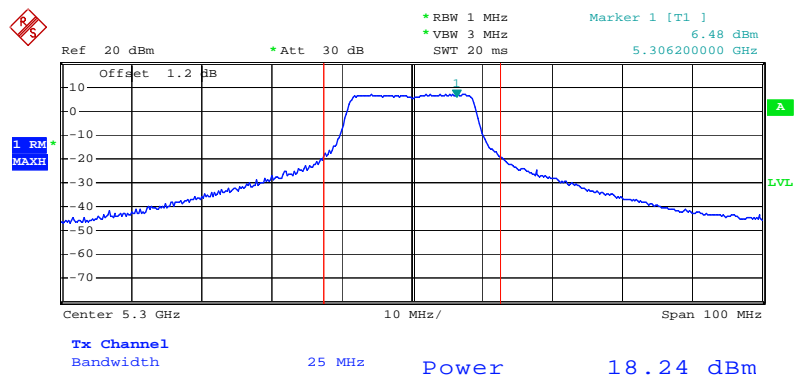
Date: 25.MAR.2009 17:32:18

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5260 MHz



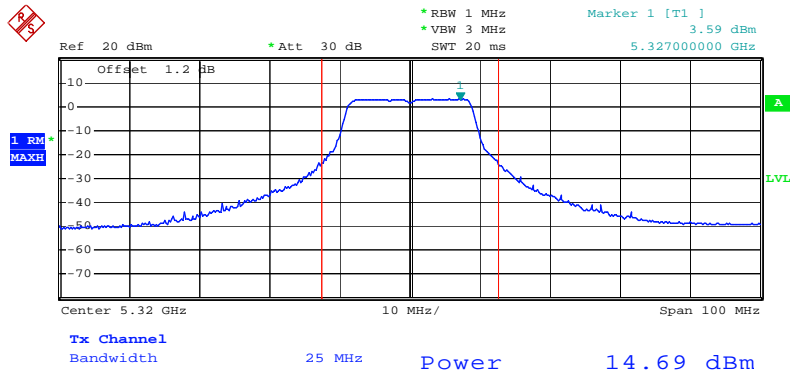
Date: 25.MAR.2009 17:35:00

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5300 MHz



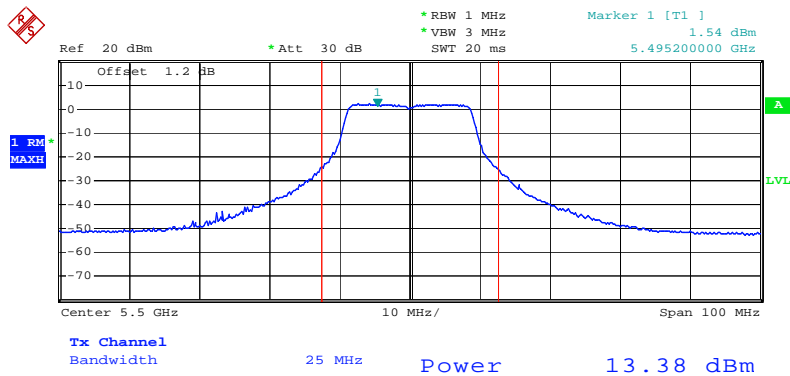
Date: 25.MAR.2009 17:36:50

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5320 MHz



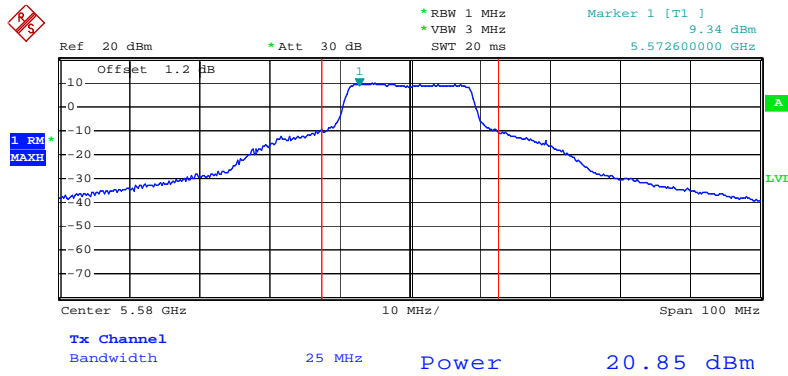
Date: 25.MAR.2009 17:37:26

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5500 MHz



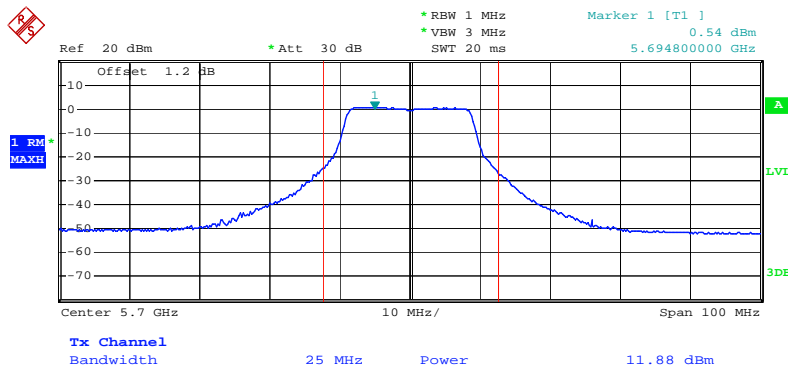
Date: 25.MAR.2009 17:38:49

Conducted Output Power Plot on Configuration Drafft n MCS0 20MHz Ant. B / 5580 MHz



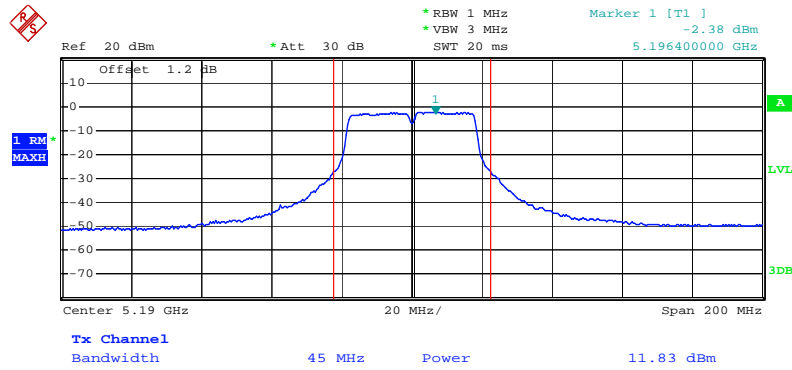
Date: 25.MAR.2009 17:43:59

Conducted Output Power Plot on Configuration Drafft n MCS0 20MHz Ant. B / 5700 MHz



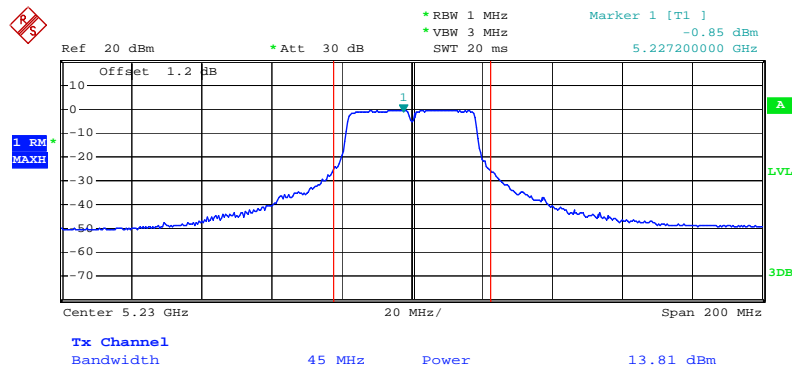
Date: 25.MAR.2009 11:55:02

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5190 MHz



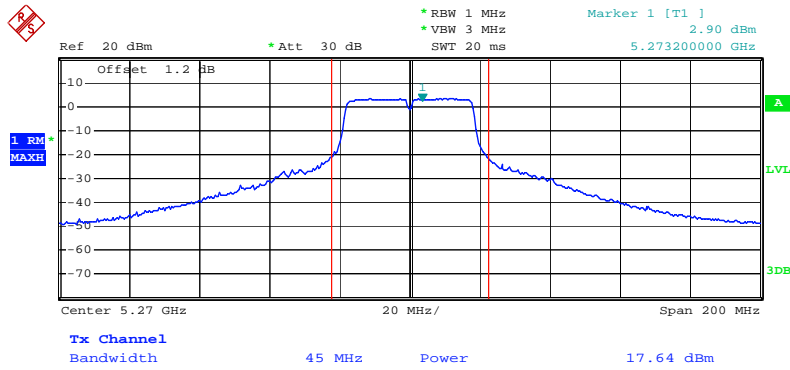
Date: 29.APR.2009 10:15:13

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5230 MHz



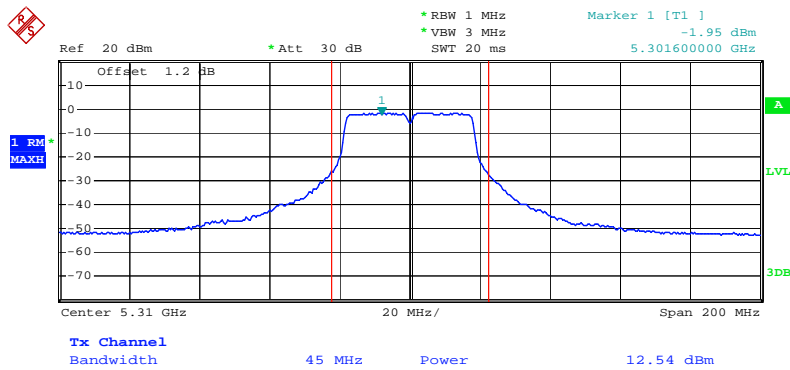
Date: 25.MAR.2009 11:59:15

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5270 MHz



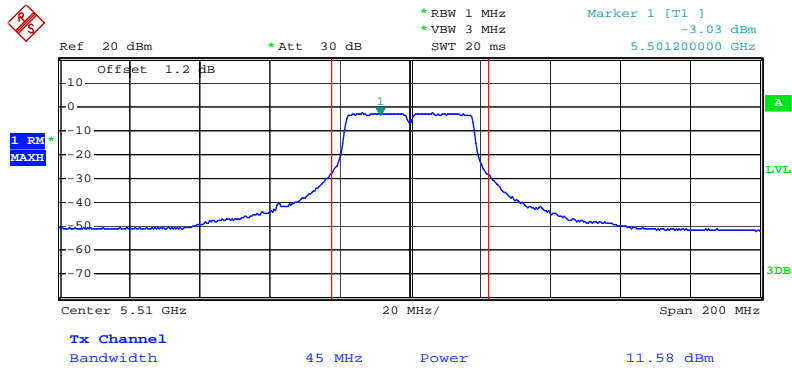
Date: 25.MAR.2009 12:04:35

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5310 MHz



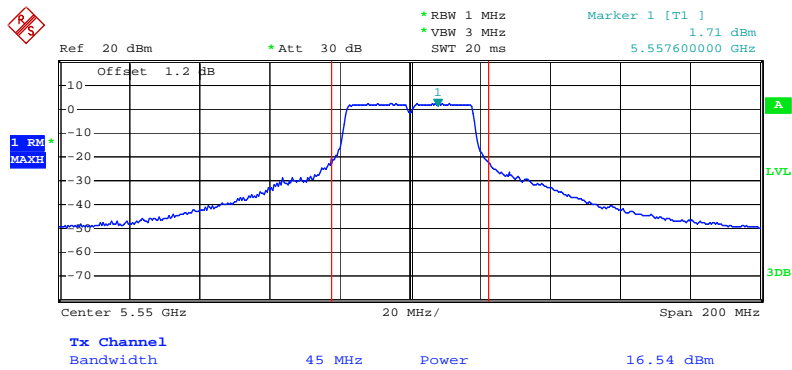
Date: 25.MAR.2009 12:08:20

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5510MHz



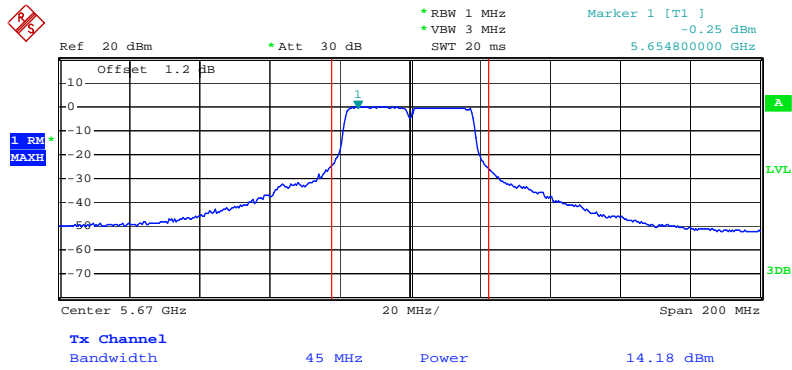
Date: 25.MAR.2009 12:13:39

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5550 MHz



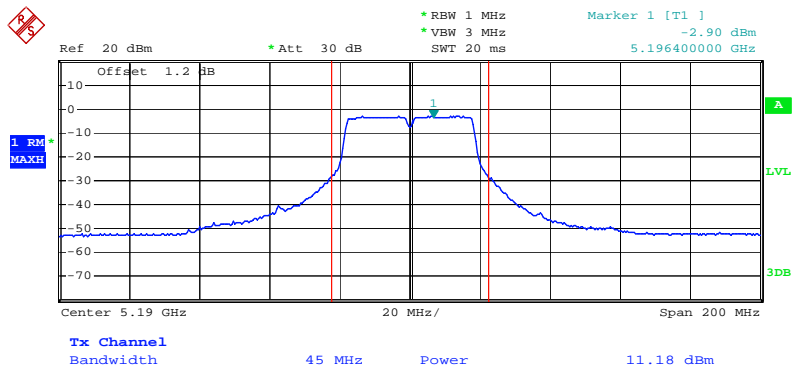
Date: 25.MAR.2009 12:18:51

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5670 MHz



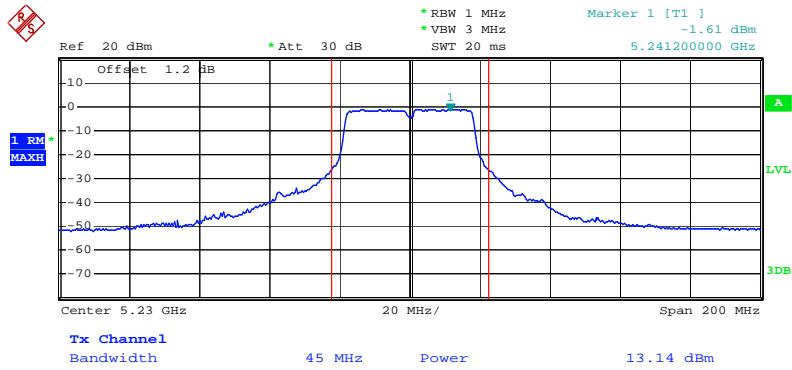
Date: 26.MAR.2009 15:07:08

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5190 MHz



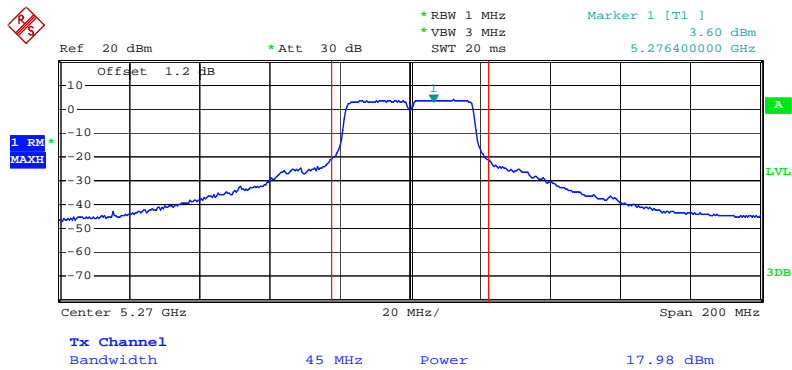
Date: 29.APR.2009 10:16:55

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5230 MHz



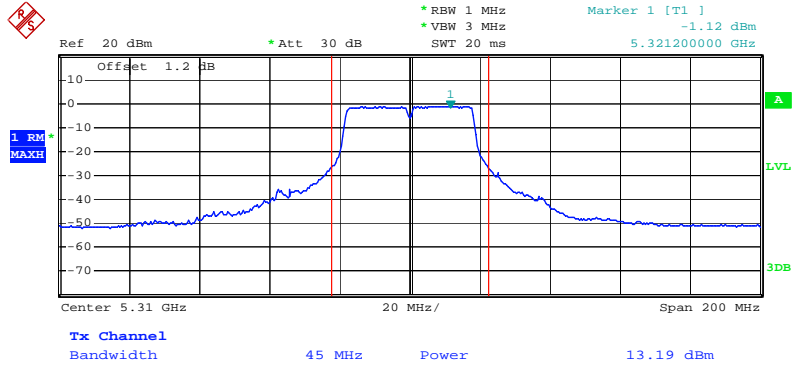
Date: 25.MAR.2009 12:00:35

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5270 MHz



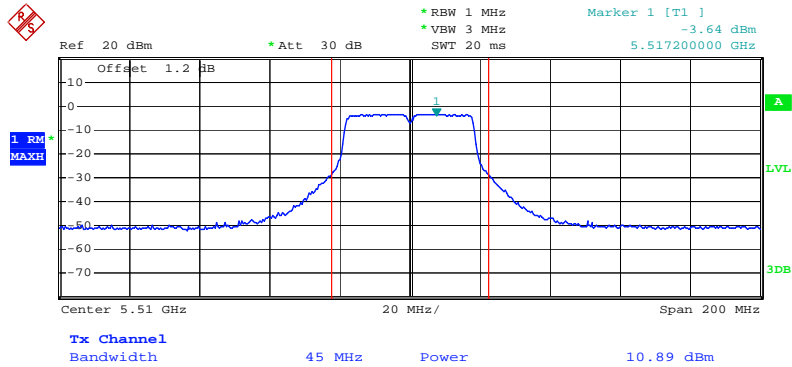
Date: 25.MAR.2009 12:03:26

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5310 MHz



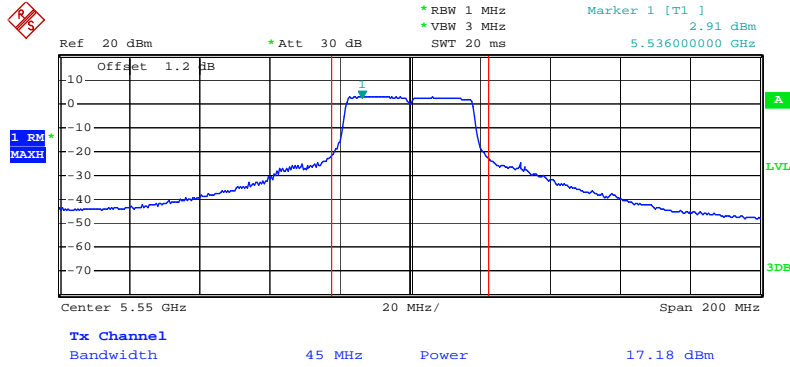
Date: 25.MAR.2009 12:06:32

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5510MHz



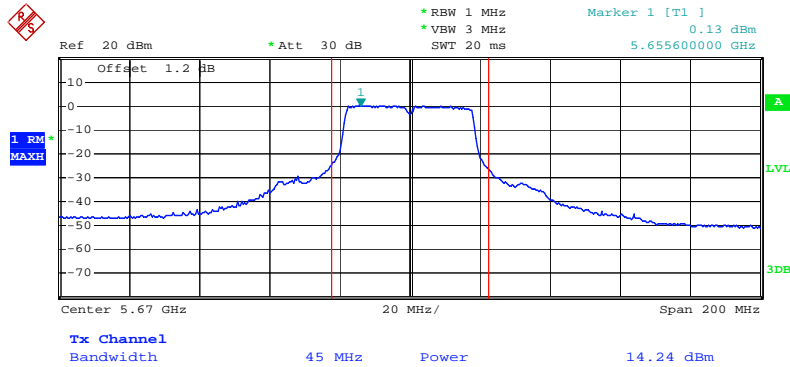
Date: 25.MAR.2009 12:10:52

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5550 MHz



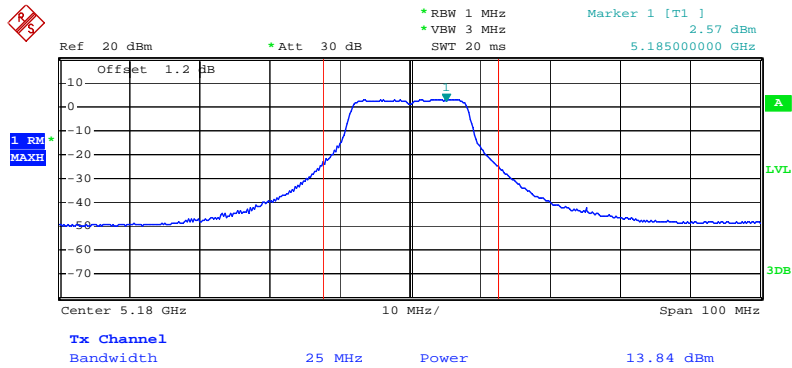
Date: 25.MAR.2009 12:16:55

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5670 MHz



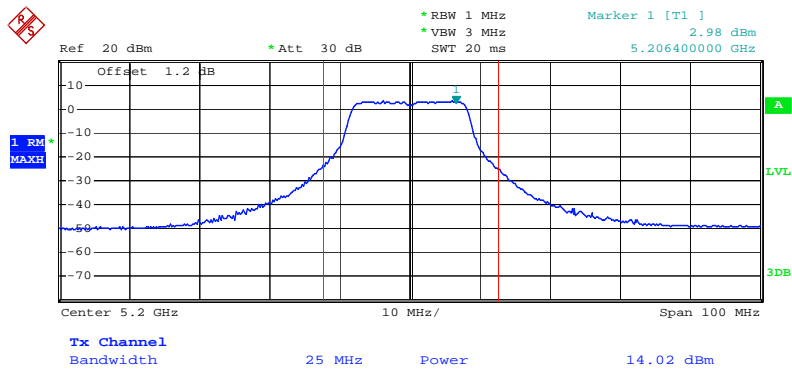
Date: 26.MAR.2009 15:08:01

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



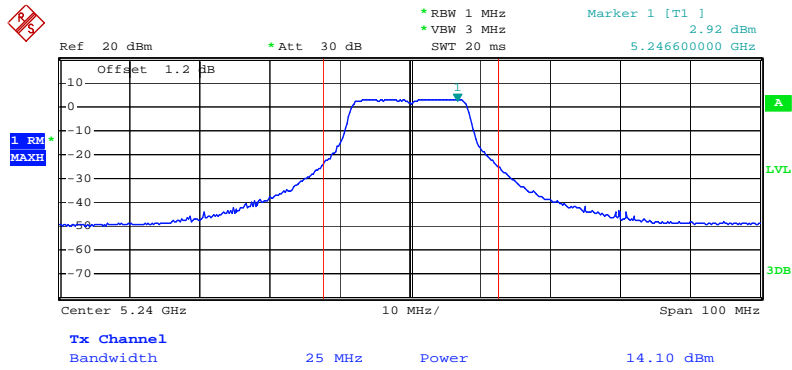
Date: 25.MAR.2009 10:51:22

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



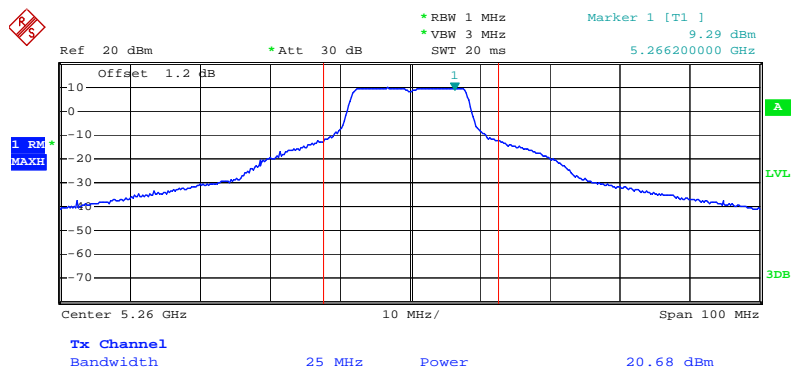
Date: 25.MAR.2009 10:53:59

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



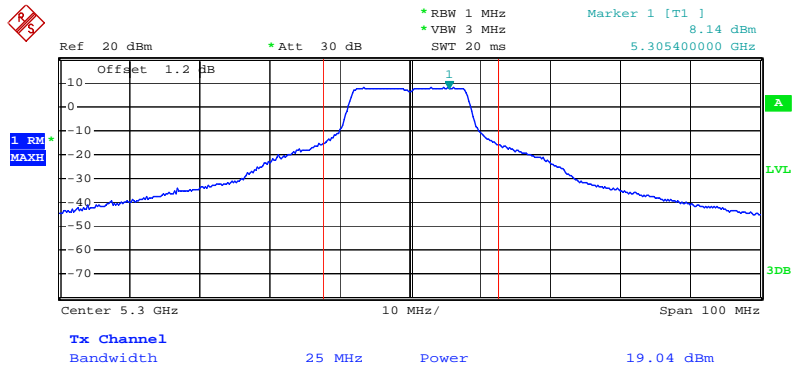
Date: 25.MAR.2009 10:56:19

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



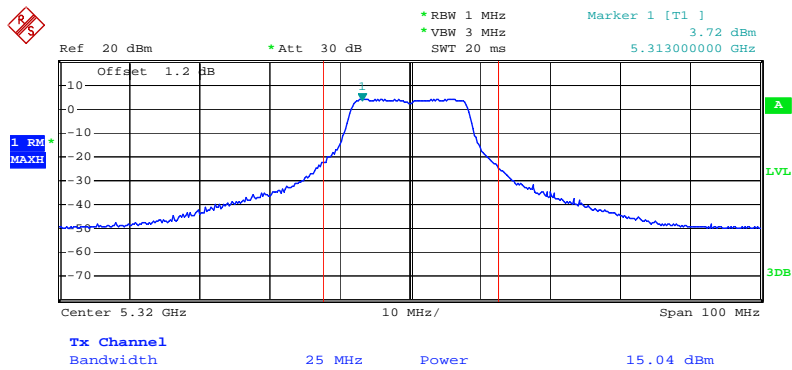
Date: 25.MAR.2009 11:05:00

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. A / 5300 MHz



Date: 29.APR.2009 10:02:37

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



Date: 29.APR.2009 10:06:28