



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	Proxim Wireless Corporation
Applicant Address	1561 Buckeye Drive, Milpitas, CA 95035 USA
FCC ID	HZB-USABGNR01
Manufacturer's company	Wistron NeWeb Corporation
Manufacturer Address	No.10-1,Li-hsin Road I,Hsinchu Science Park,Hsinchu 300,Taiwan, R.O.C.

Product Name	ORiNOCO 802.11 a/b/g/n USB Adapter
Brand Name	ORiNOCO
Model Name	8494-US
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Oct. 30. 2008
Final Test Date	Apr. 24, 2009
Submission Type	Original Equipment
Operating Mode	Client (without radar detection function)



### 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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## 1. CERTIFICATE OF COMPLIANCE

Product Name : ORINOCO 802.11 a/b/g/n USB Adapter  
Brand Name : ORINOCO  
Model Name : 8494-US  
Applicant : Proxim Wireless Corporation  
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 Oct. 30, 2008 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.

A handwritten signature in blue ink, appearing to read 'Wayne Hsu 2009.4.28', is written over a horizontal line.

Wayne Hsu

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	6.94 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	1.75 dB
4.4	15.407(a)	Power Spectral Density	Complies	3.86 dB
4.5	15.407(a)	Peak Excursion	Complies	7.16 dB
4.6	15.407(b)	Radiated Emissions	Complies	0.15 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.21 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 <sup>-8</sup>	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): 17.92 MHz ; MCS0 (40MHz): 36.48 MHz
Conducted Output Power	Band 1: MCS0 (20MHz): 14.24 dBm ; MCS0 (40MHz): 15.07 dBm Band 2: MCS0 (20MHz): 13.31 dBm ; MCS0 (40MHz): 13.20 dBm Band 3: MCS0 (20MHz): 15.81 dBm ; MCS0 (40MHz): 15.20 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	11a: 19
Channel Band Width (99%)	11a: 16.80 MHz
Conducted Output Power	Band 1: 15.25 dBm ; Band 2: 13.53 dBm ; Band 3: 15.98 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
802.11a	X	X	V	X
802.11b	X	X	V	X
802.11g	X	X	V	X
Draft n	X	X	V	V

**Draft n spec**

MCS Index	Nss	Modulation	R	NBPCS	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
NBPCS	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

Others	
USB Cable	1.4m, Shilded

### 3.3. Table for Filed Antenna

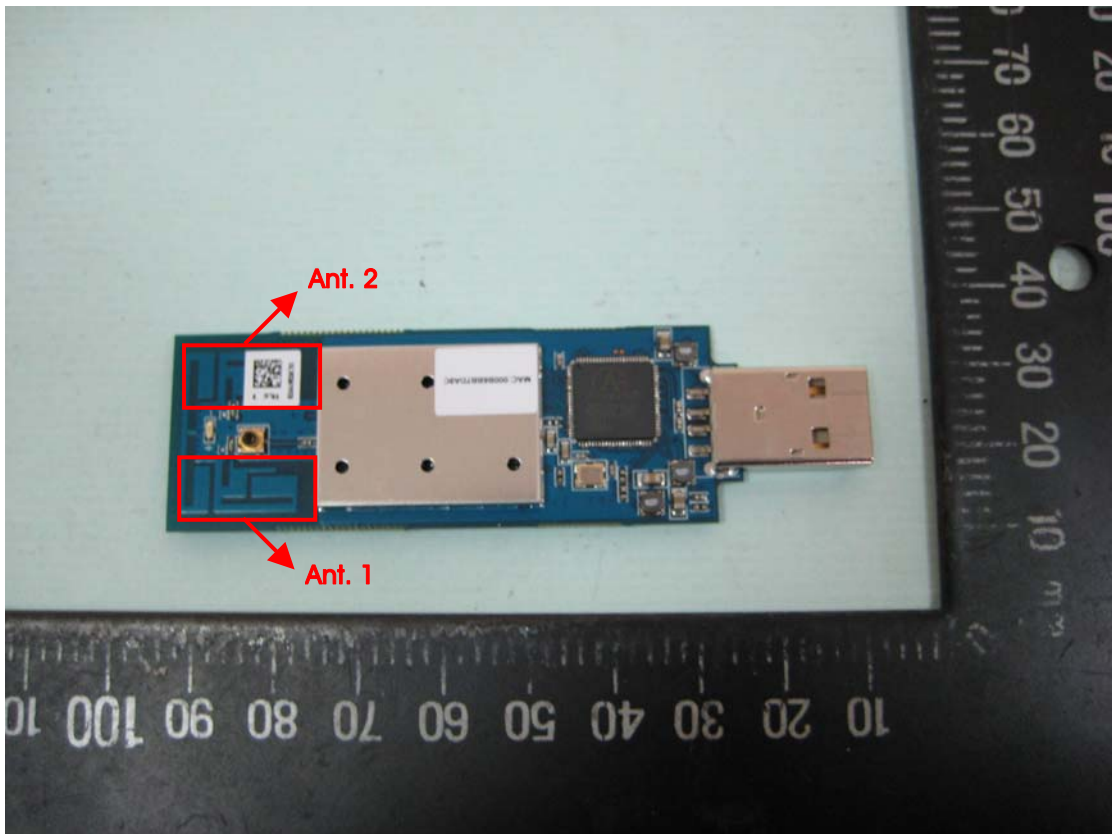
<For 5GHz Band>

Ant.	Brand	Model No	Antenna Type	Connector	Gain (dBi)	Remark
1	-	-	Printed Antenna	N/A	4.02	TX/RX
2	-	-	Printed Antenna	N/A	1.91	TX/RX

Note: The EUT has two antennas (2TX, 2RX).

Ant. 1 and Ant. 2 will transmit the same signal simultaneously.

Ant. 1 and Ant. 2 will receive the same signal simultaneously.





### 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 (USA/Canada) Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
5250~5350 MHz (USA/Canada/Taiwan) 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	MCSO/20MHz	Band 1~2	6.5Mbps	36/40/48/52/60/64	1 / 2 / 1+2
		Band 3	13.5Mbps	100/116/140	1 / 2 / 1+2
	MCSO/40MHz	Band 1~2	13.5Mbps	38/46/54/62	1 / 2 / 1+2
		Band 3	13.5Mbps	102/110/134	1 / 2 / 1+2
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	1 / 2 / 1+2
		Band 3	12Mbps	100/116/140	1 / 2 / 1+2
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	MCSO/20MHz	Band 1~2	6.5Mbps	36/40/48/52/60/64	1+2
		Band 3	6.5Mbps	100/116/140	1+2
	MCSO/40MHz	Band 1~2	13.5Mbps	38/46/54/62	1+2
		Band 3	13.5Mbps	102/110/134	1+2
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	1+2
		Band 3	12Mbps	100/116/140	1+2
Radiated Emission Below 1GHz	Normal Link		Auto	-	-
Radiated Emission Above 1GHz	MCSO/20MHz	Band 1~2	6.5Mbps	36/40/48/52/60/64	1+2
		Band 3	6.5Mbps	100/116/140	1+2
	MCSO/40MHz	Band 1~2	13.5Mbps	38/46/54/62	1+2
		Band 3	13.5Mbps	102/110/134	1+2
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	1+2
		Band 3	12Mbps	100/116/140	1+2
Band Edge Emission	MCSO/20MHz	Band 1~2	6.5Mbps	36/40/48/52/60/64	1+2
		Band 3	6.5Mbps	100/116/140	1+2
	MCSO/40MHz	Band 1~2	13.5Mbps	38/46/54/62	1+2
		Band 3	13.5Mbps	102/110/134	1+2
	11a/BPSK	Band 1~2	6Mbps	36/40/48/52/60/64	1+2
		Band 3	12Mbps	100/116/140	1+2
Frequency Stability	Un-modulation		-	60	N/A

Note:

The test modes were illustrated as below.

Test Mode 1: EUT

Test Mode 2: EUT with USB Cable

<For Conducted Emissions>:

Due to Mode 1 generated the worst test result, so it was recorded in this report.

<For Radiated Emissions Below 1GHz>:

Due to Mode 2 generated the worst test result, so it was recorded in this report.

### 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	M1330	E2KWM3945ABG
Mouse	HP	M-UAE96	DoC
Wireless AP	Planex	GW-AP54SGX	N/A

### 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 Ant. 1 / Ant. 2

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 20MHz	11	10.5	11	10.5	10.5	11	11.5	12.5	11.5

#### Power Parameters of Draft n MCS0 40MHz Ant. 1 / Ant. 2

Test Software Version	ART						
Frequency	5190 MHz	5230 MHz	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz
Draft n 40MHz	11.5	12.5	10.5	10.5	11.5	11.5	12.5

#### Power Parameters of IEEE 802.11a Ant. 1 / Ant. 2

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	11	10.5	12	11	11	11	11.5	12.5	11.5

During the test, the following program under WIN XP was executed:

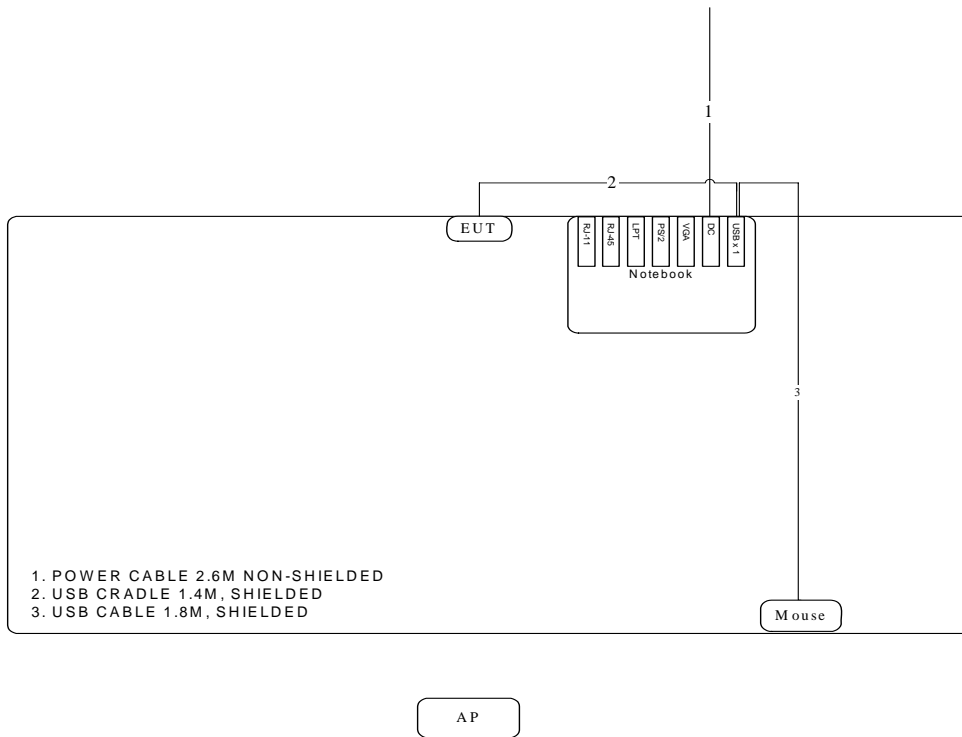
At the same time, "ART" was executed to control the EUT continuously transmit RF signal.

### 3.9. Test Configurations

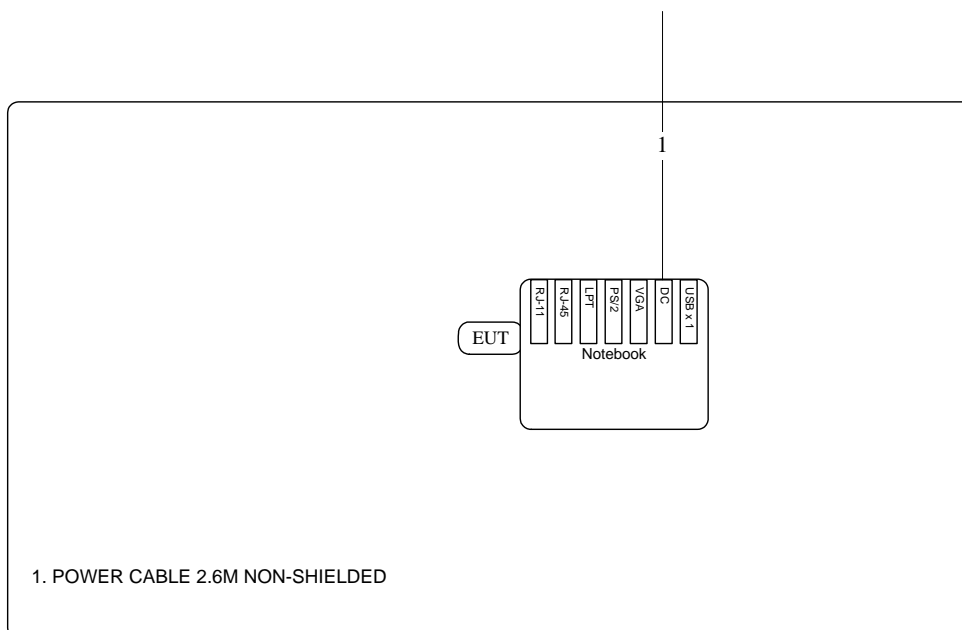
#### 3.9.1. Radiation Emissions Test Configuration

Test Configuration: 9kHz~1GHz

Test Mode: Mode 2

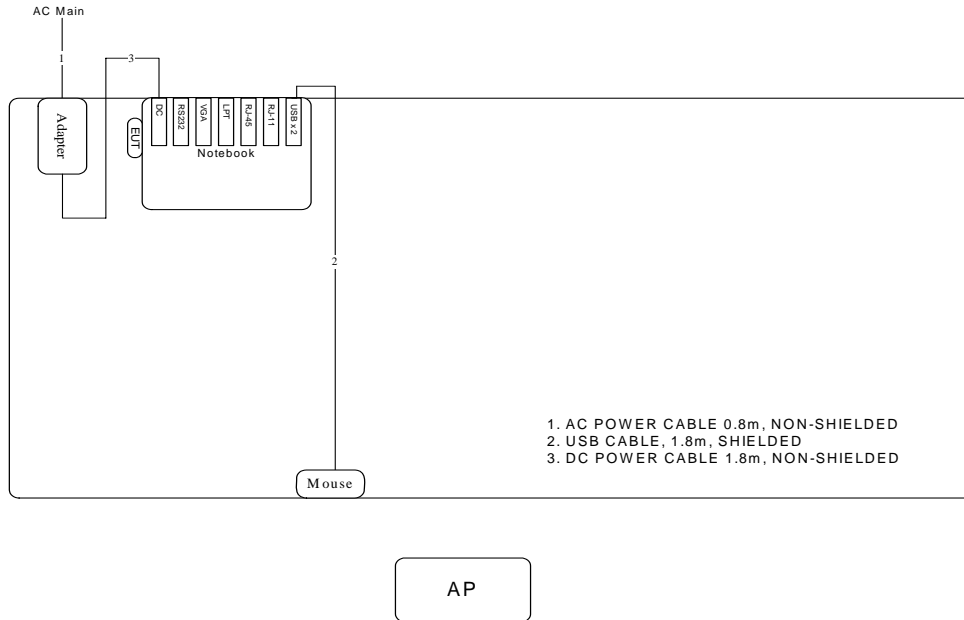


Test Configuration: Above 1GHz



### 3.9.2. AC Power Line Conduction Emissions Test Configuration

Test Mode: Mode 1



## 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.



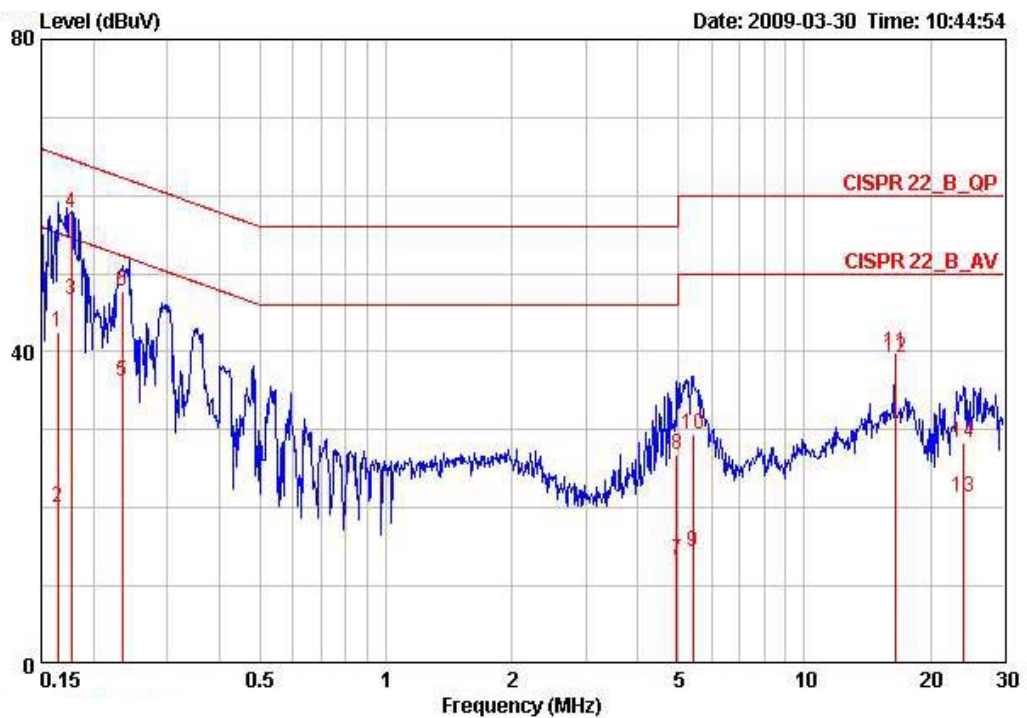


#### 4.1.6. EUT Operation during Test

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

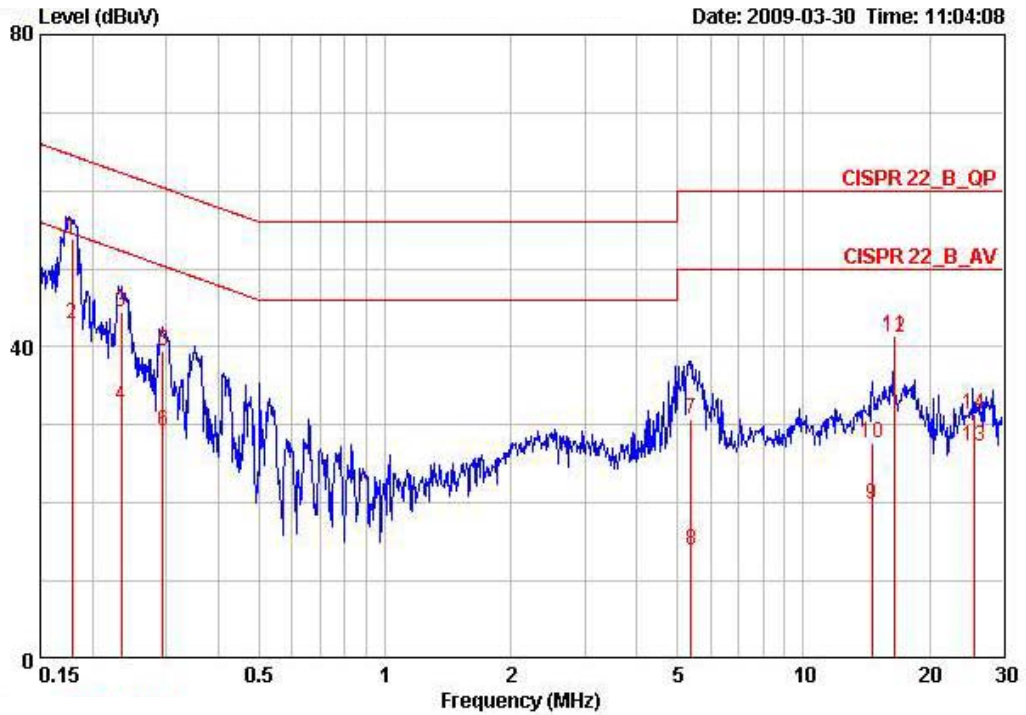
#### 4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	21°C	Humidity	55%
Test Engineer	Howar Sung	Phase	Line
Configuration	Mode 1		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.16414	42.46	-22.79	65.25	42.19	0.07	0.20	QP
2	0.16414	20.10	-35.15	55.25	19.83	0.07	0.20	AVERAGE
3	0.17714	46.69	-7.93	54.62	46.43	0.06	0.20	AVERAGE
4	0.17714	57.68	-6.94	64.62	57.42	0.06	0.20	QP
5	0.23473	36.28	-16.01	52.28	36.03	0.05	0.20	AVERAGE
6	0.23473	47.85	-14.44	62.28	47.60	0.05	0.20	QP
7	4.952	13.25	-32.75	46.00	12.79	0.16	0.30	AVERAGE
8	4.952	26.73	-29.27	56.00	26.27	0.16	0.30	QP
9	5.424	14.46	-35.54	50.00	13.98	0.18	0.30	AVERAGE
10	5.424	29.42	-30.58	60.00	28.94	0.18	0.30	QP
11	16.464	39.85	-20.15	60.00	38.81	0.64	0.40	QP
12	16.464	39.22	-10.78	50.00	38.18	0.64	0.40	AVERAGE
13	24.015	21.44	-28.56	50.00	19.87	1.07	0.50	AVERAGE
14	24.015	28.38	-31.62	60.00	26.81	1.07	0.50	QP

Temperature	24°C	Humidity	56%
Test Engineer	Howar Sung	Phase	Neutral
Configuration	Mode 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17872	53.91	-10.64	64.54	53.62	0.09	0.20	QP
2	0.17872	42.90	-11.65	54.54	42.61	0.09	0.20	AVERAGE
3	0.23409	44.51	-17.80	62.30	44.23	0.08	0.20	QP
4	0.23409	32.55	-19.76	52.30	32.27	0.08	0.20	AVERAGE
5	0.29398	39.51	-20.90	60.41	39.24	0.07	0.20	QP
6	0.29398	29.31	-21.10	50.41	29.04	0.07	0.20	AVERAGE
7	5.390	30.83	-29.17	60.00	30.31	0.22	0.30	QP
8	5.390	14.00	-36.00	50.00	13.48	0.22	0.30	AVERAGE
9	14.594	19.93	-30.07	50.00	18.97	0.56	0.40	AVERAGE
10	14.594	27.66	-32.34	60.00	26.70	0.56	0.40	QP
11	16.464	41.40	-18.60	60.00	40.35	0.65	0.40	QP
12	16.464	41.16	-8.84	50.00	40.11	0.65	0.40	AVERAGE
13	25.489	27.29	-22.71	50.00	25.48	1.21	0.60	AVERAGE
14	25.489	31.44	-28.56	60.00	29.63	1.21	0.60	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

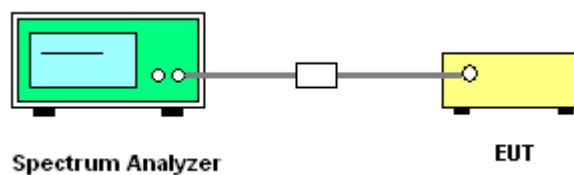
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	23°C	Humidity	56%
Test Engineer	Sam Chen	Configurations	Draft n
Test Date	Apr. 22, 2009 ~ Apr. 24, 2009		

## Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 2

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.04	17.92
40	5200 MHz	23.52	17.92
48	5240 MHz	23.36	17.92
52	5260 MHz	23.68	17.92
60	5300 MHz	23.84	17.92
64	5320 MHz	23.20	17.92
100	5500 MHz	23.36	17.92
116	5580 MHz	23.52	17.92
140	5700 MHz	23.36	17.92

## Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 2

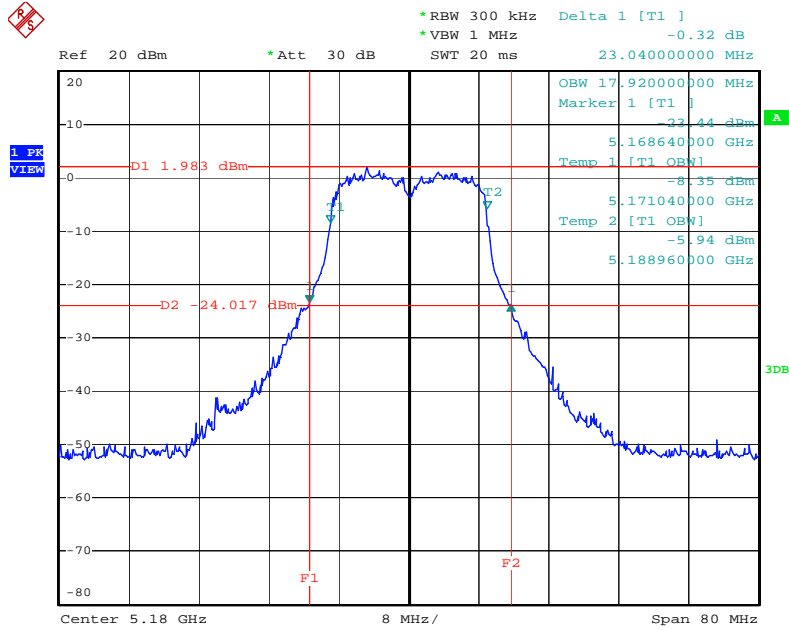
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	44.64	36.48
46	5230 MHz	44.48	36.32
54	5270 MHz	44.32	36.48
62	5310 MHz	44.96	36.48
102	5510MHz	43.84	36.48
110	5550 MHz	43.68	36.32
134	5670 MHz	43.68	36.48

<b>Temperature</b>	23°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	802.11a
<b>Test Date</b>	Apr. 22, 2009 ~ Apr. 24, 2009		

**Configuration IEEE 802.11a Ant. 1 + Ant. 2**

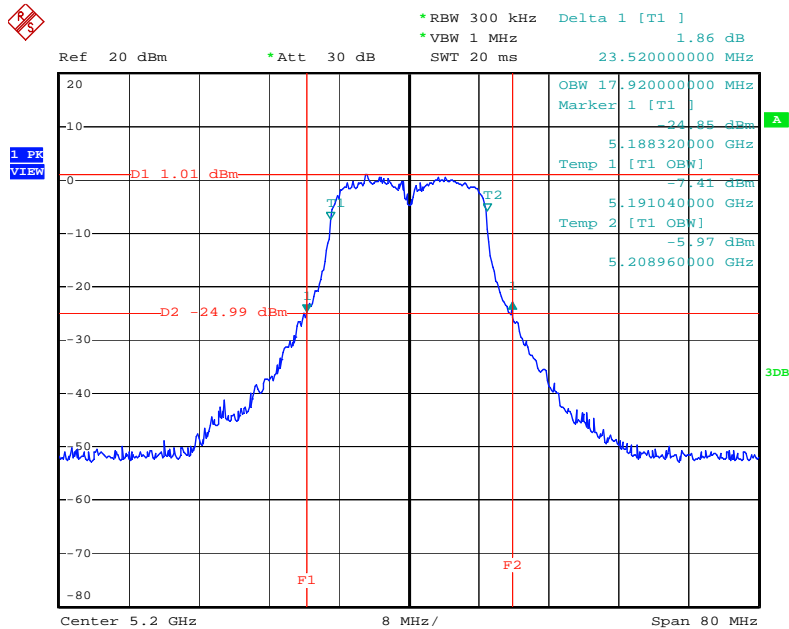
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	21.76	16.64
40	5200 MHz	21.92	16.80
48	5240 MHz	21.76	16.80
52	5260 MHz	21.76	16.80
60	5300 MHz	21.76	16.80
64	5320 MHz	21.76	16.80
100	5500 MHz	21.92	16.80
116	5580 MHz	21.76	16.80
140	5700 MHz	21.76	16.80

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5180 MHz



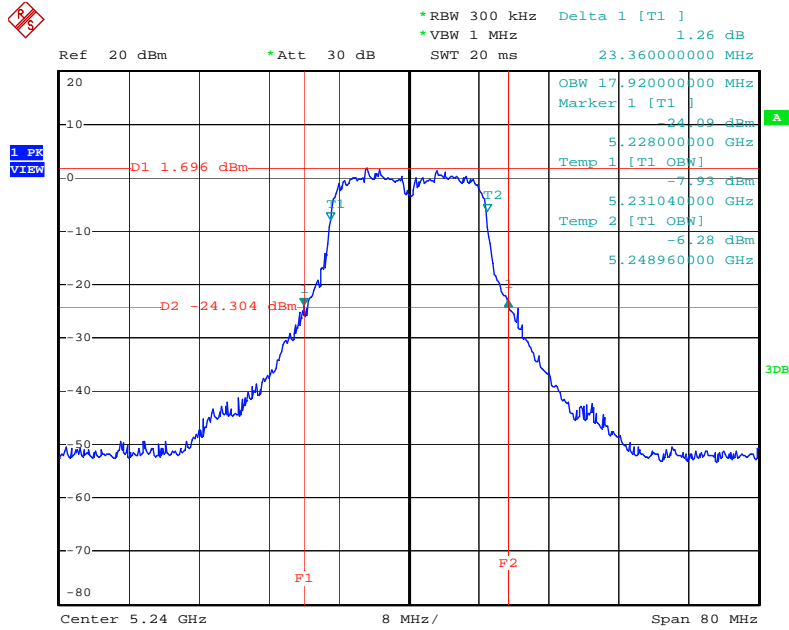
Date: 24.APR.2009 04:12:33

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5200 MHz



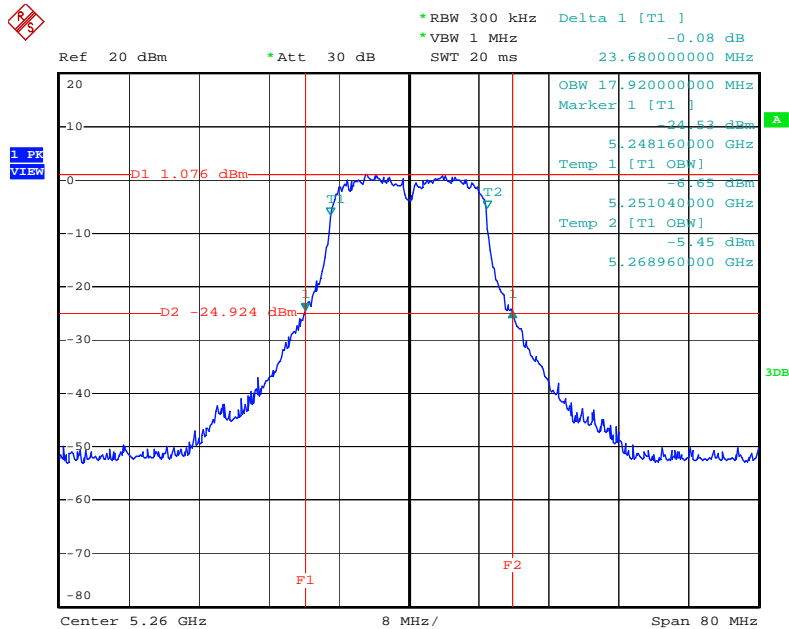
Date: 24.APR.2009 04:11:48

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5240 MHz



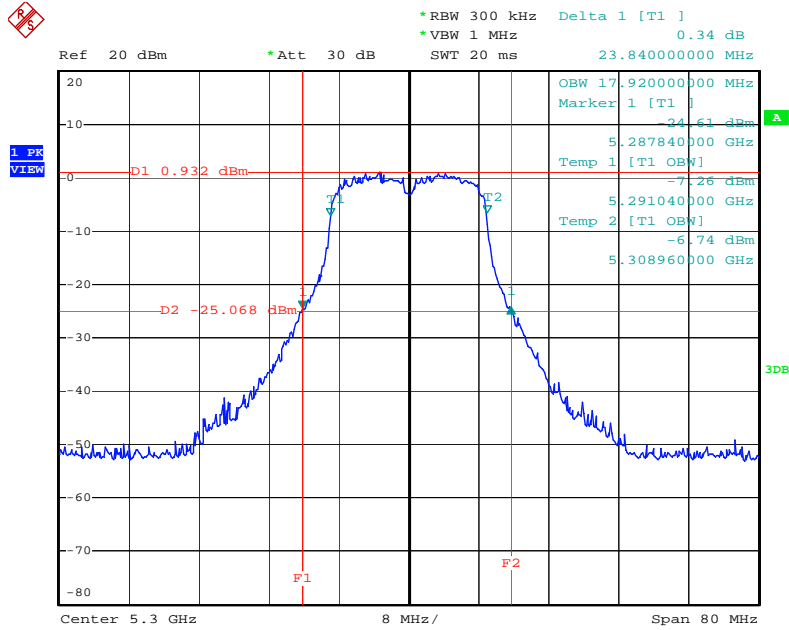
Date: 24.APR.2009 04:10:25

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5260 MHz



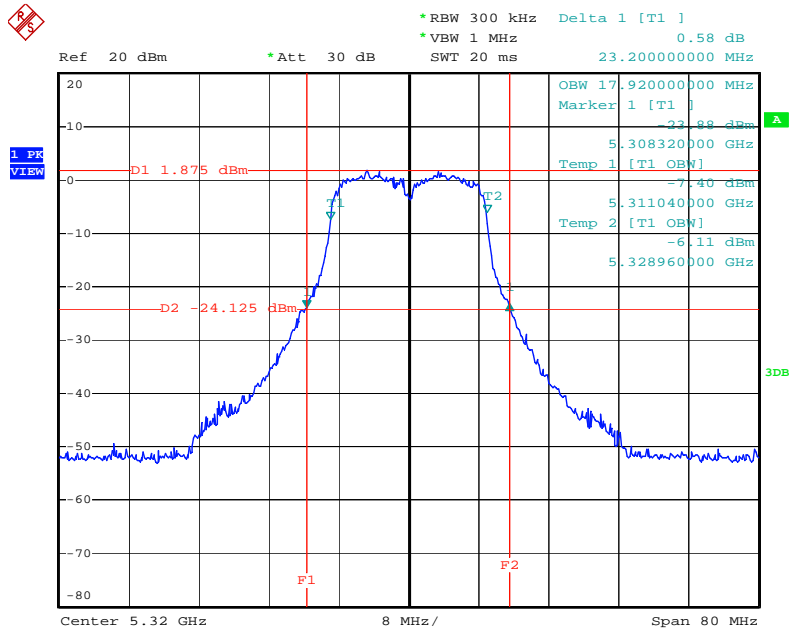
Date: 24.APR.2009 04:09:34

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5300 MHz



Date: 24.APR.2009 04:08:48

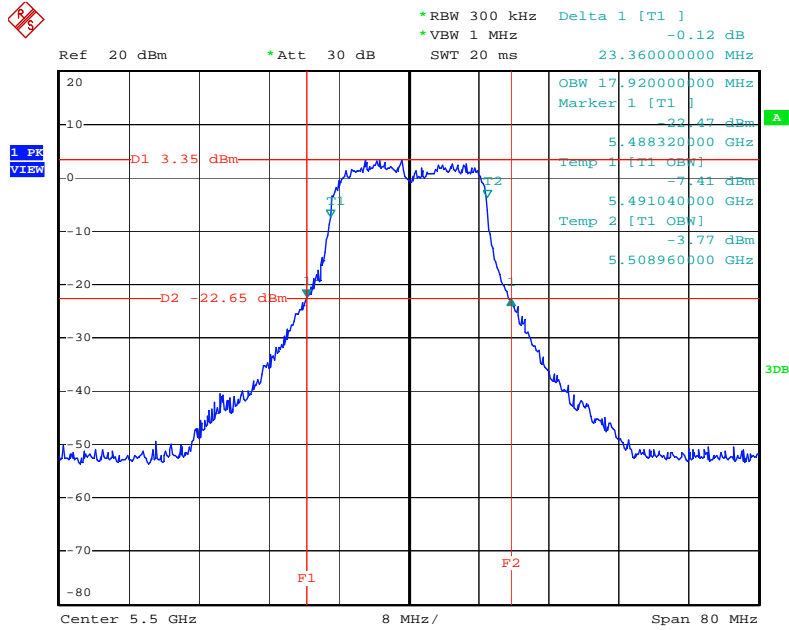
26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5320 MHz



Date: 24.APR.2009 04:07:54

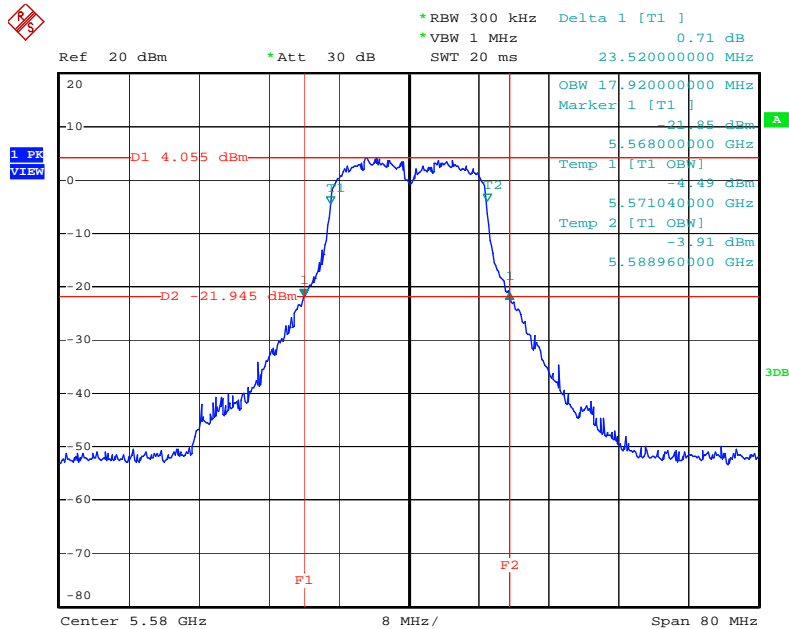


26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5500 MHz



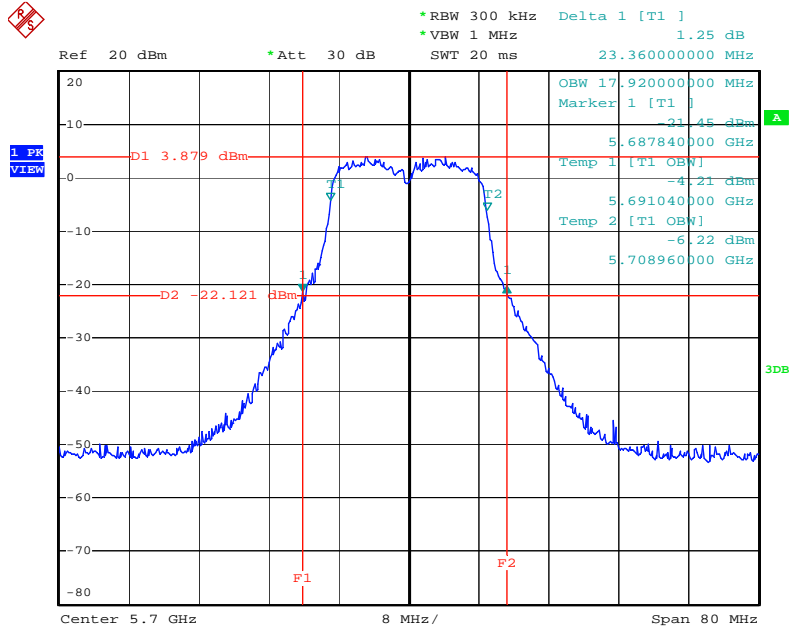
Date: 24.APR.2009 04:06:51

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5580 MHz



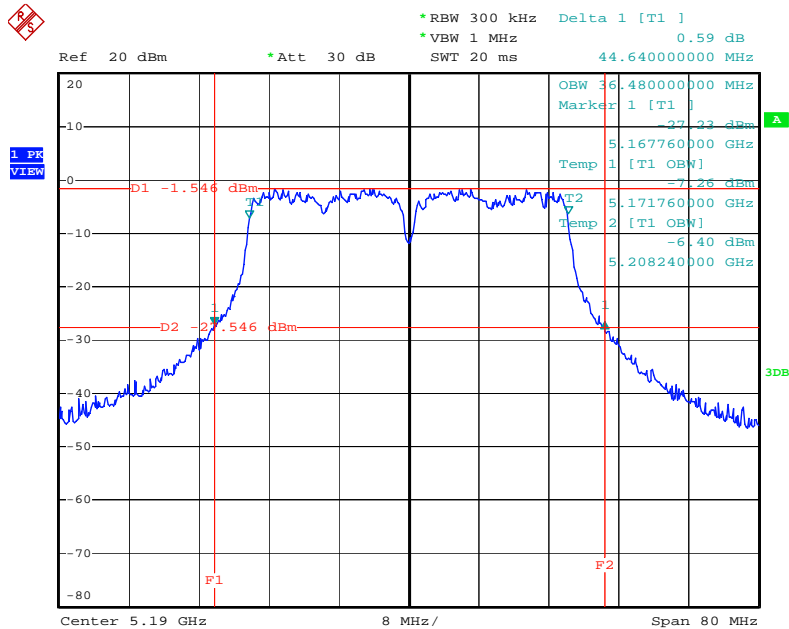
Date: 24.APR.2009 04:05:56

26 dB Bandwidth Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5700 MHz



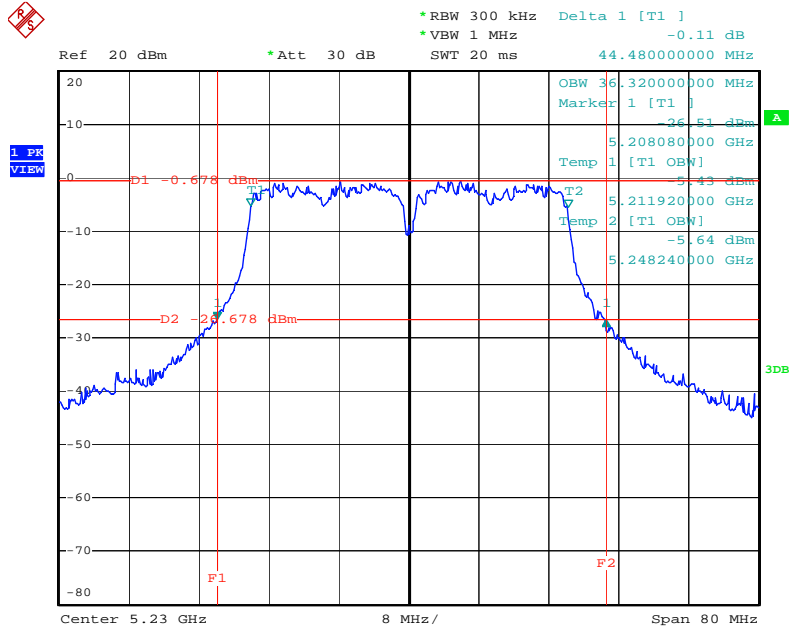
Date: 24.APR.2009 04:04:56

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5190 MHz



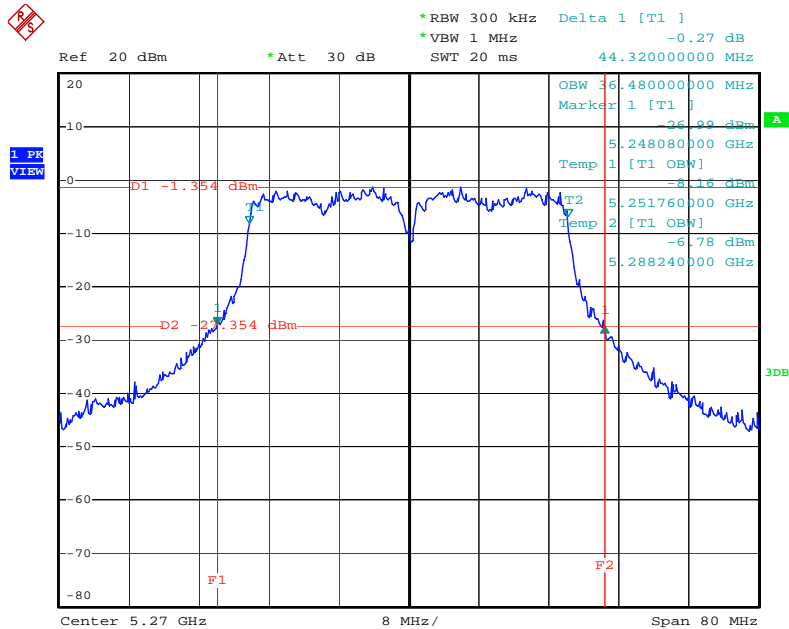
Date: 24.APR.2009 04:14:35

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5230 MHz



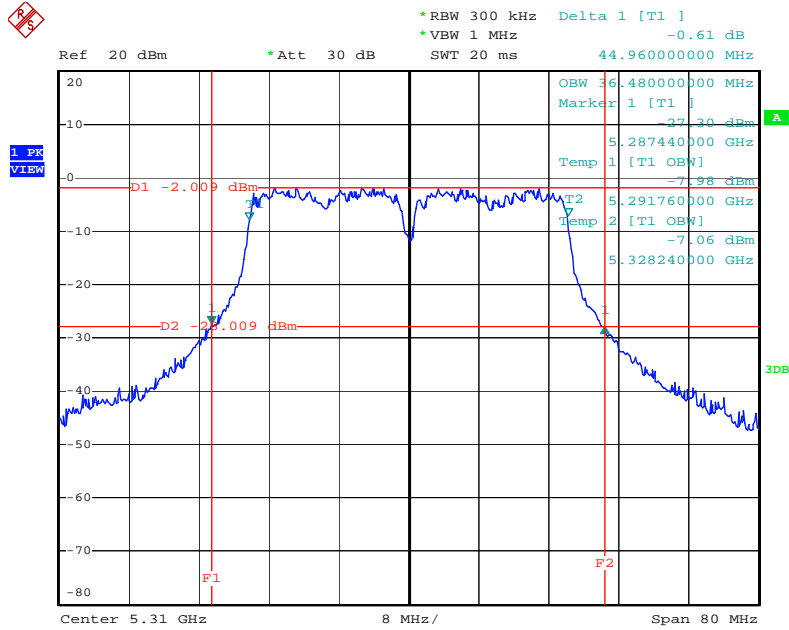
Date: 24.APR.2009 04:15:33

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5270 MHz



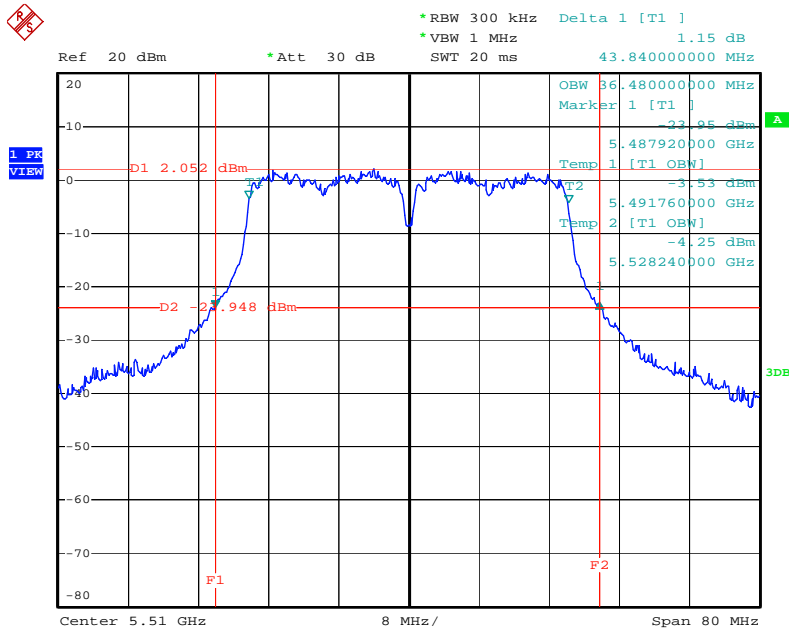
Date: 24.APR.2009 04:16:36

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5310 MHz



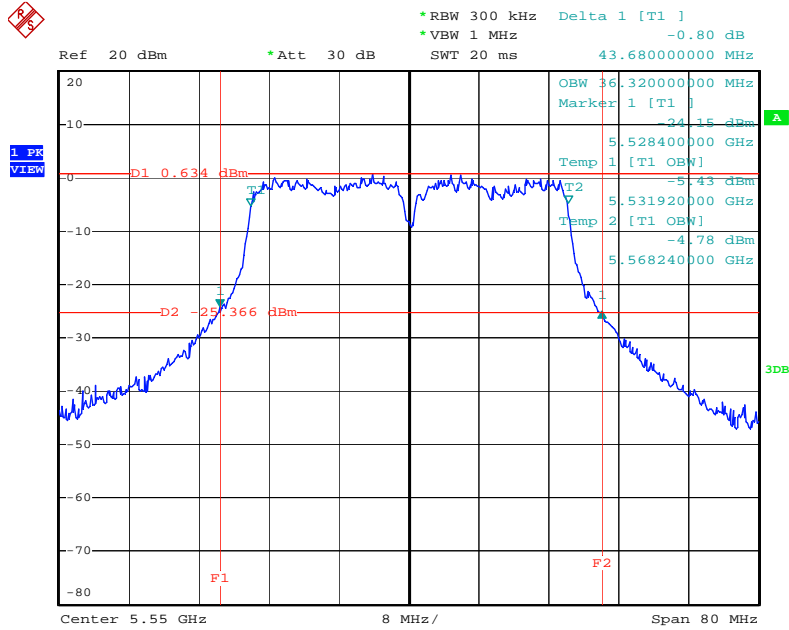
Date: 24.APR.2009 04:17:31

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5510MHz



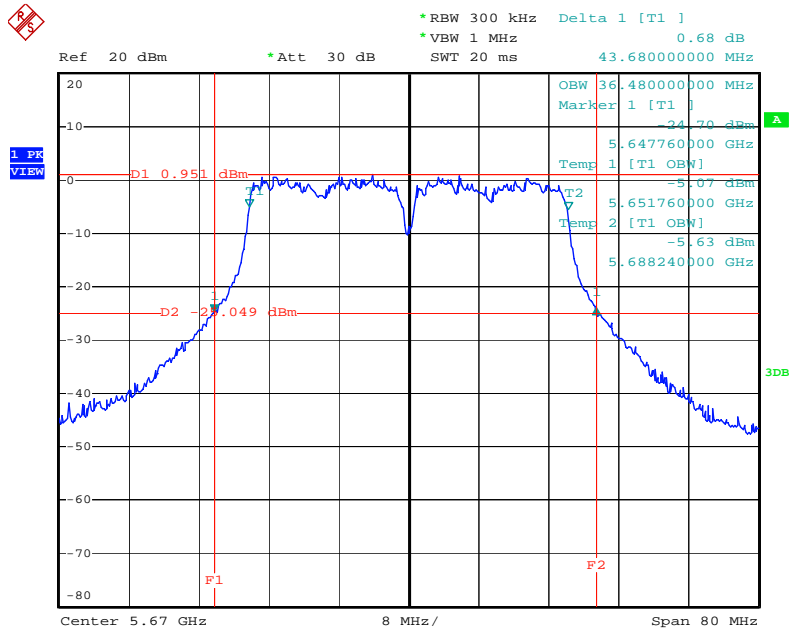
Date: 28.MAR.2009 14:34:55

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5550 MHz



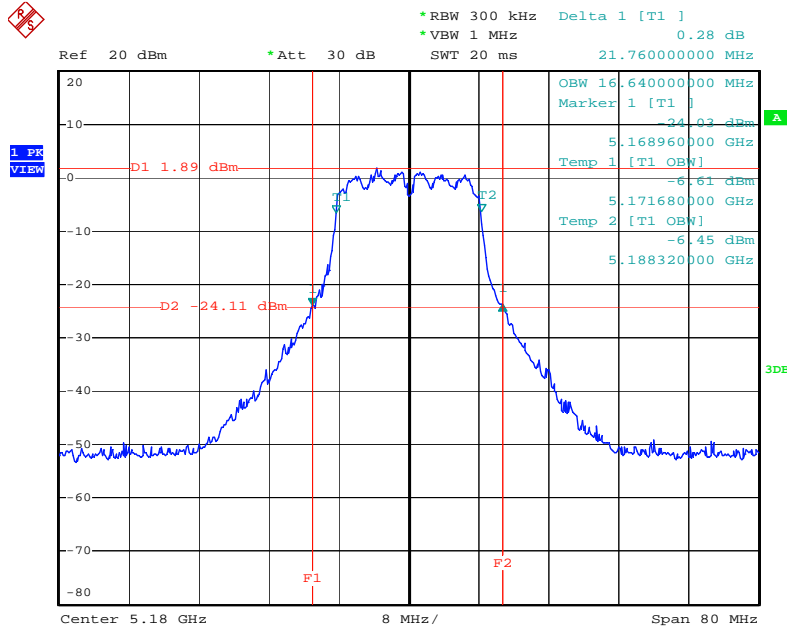
Date: 24.APR.2009 04:20:08

26 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5670 MHz



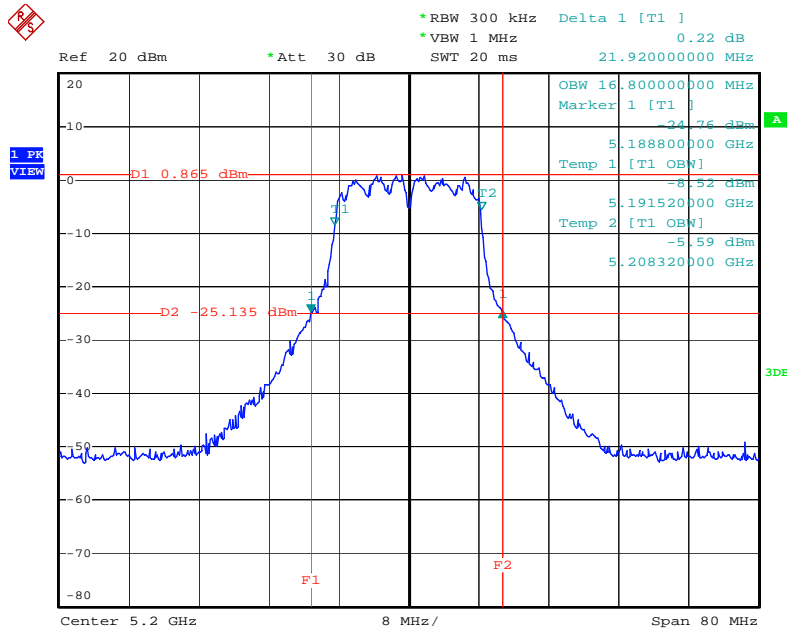
Date: 24.APR.2009 04:21:04

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5180 MHz



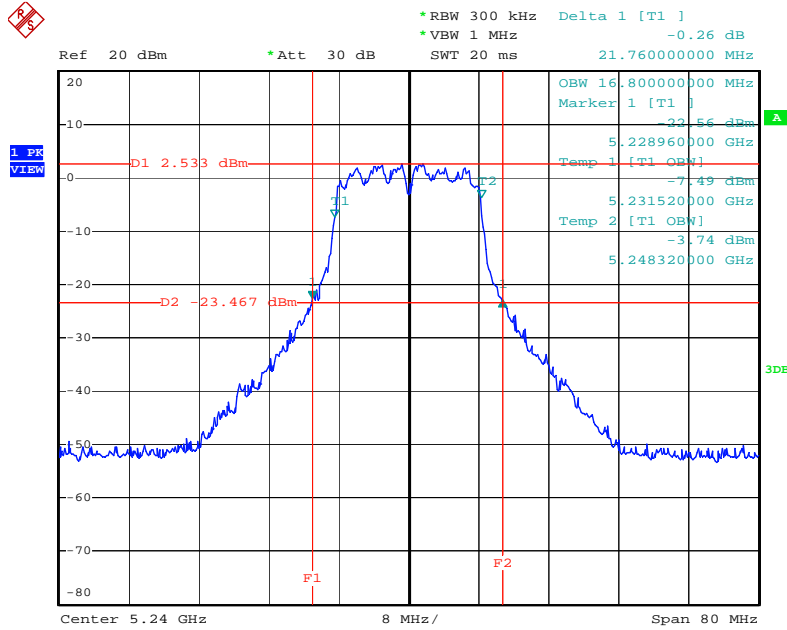
Date: 24.APR.2009 03:55:19

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5200 MHz



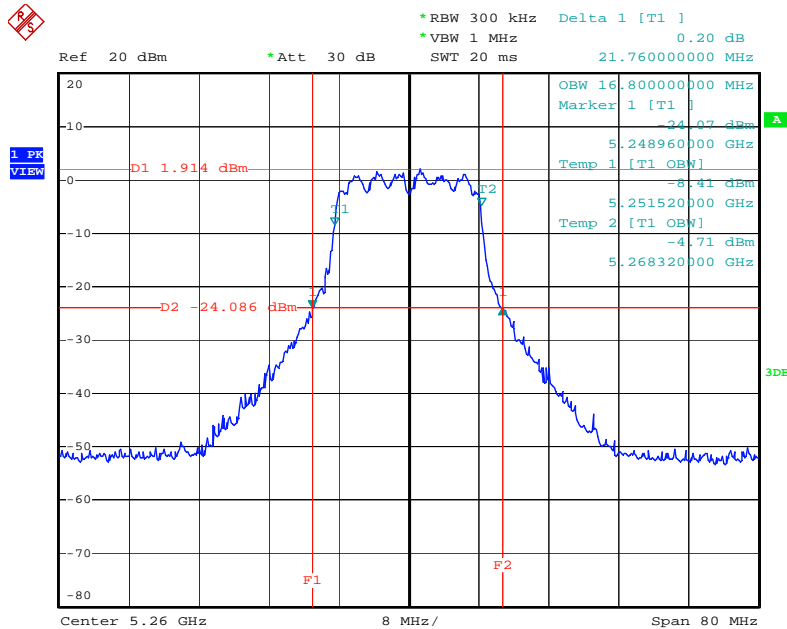
Date: 24.APR.2009 03:56:44

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5240 MHz



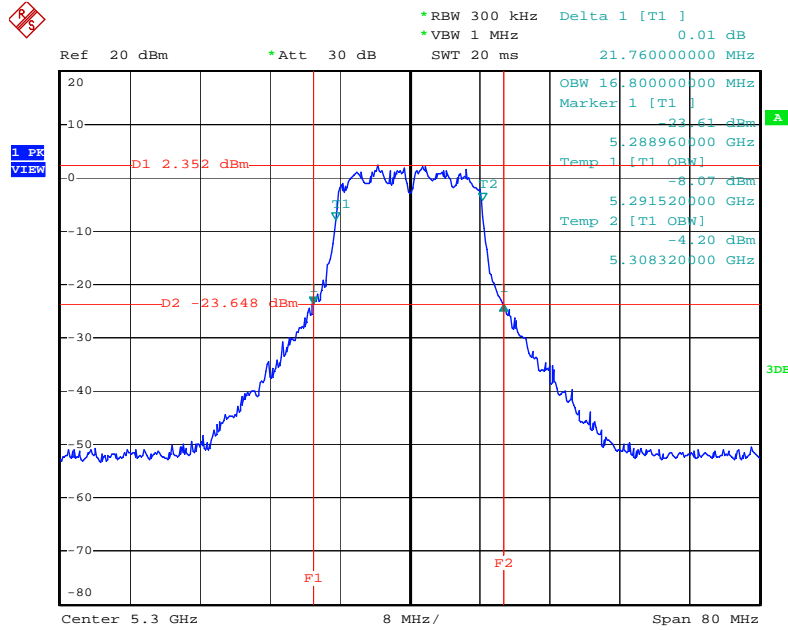
Date: 24.APR.2009 03:57:52

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5260 MHz



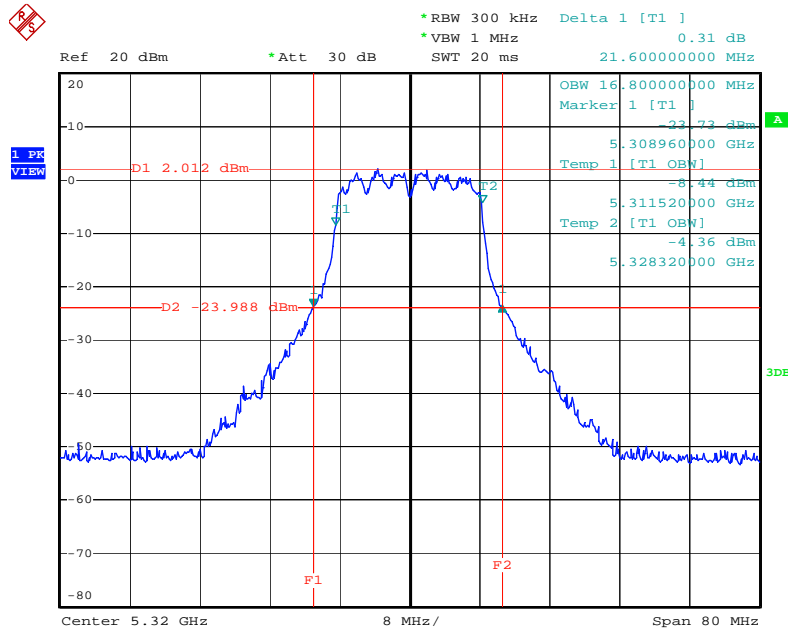
Date: 24.APR.2009 03:58:46

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5300 MHz



Date: 24.APR.2009 03:59:44

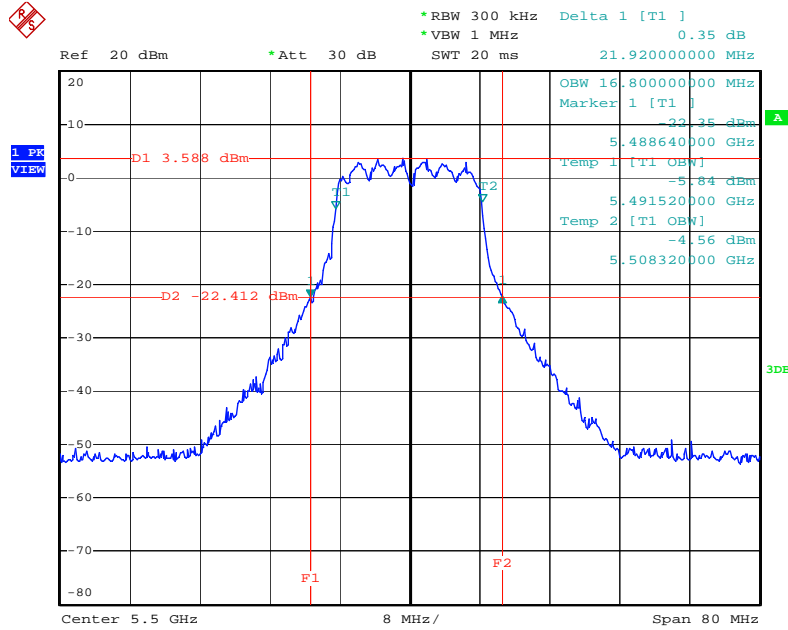
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5320 MHz



Date: 24.APR.2009 04:00:35

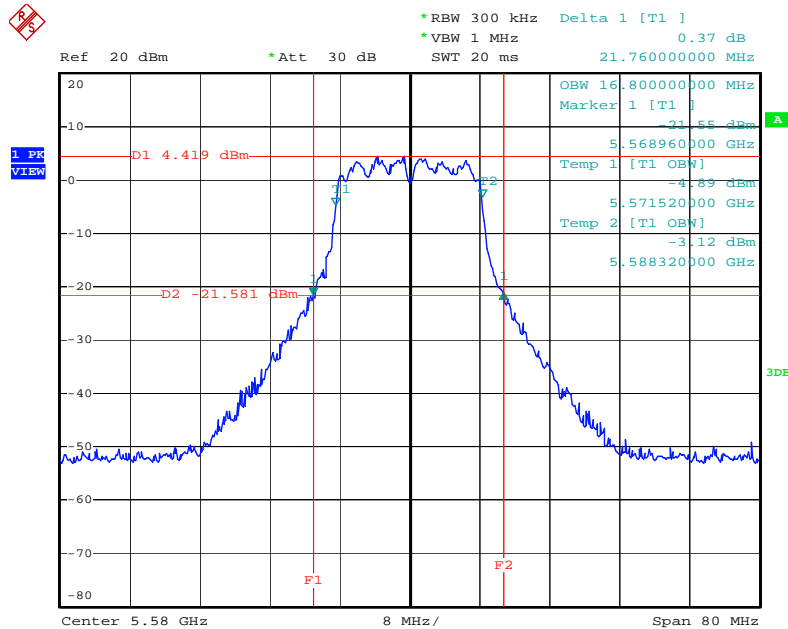


26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5500 MHz



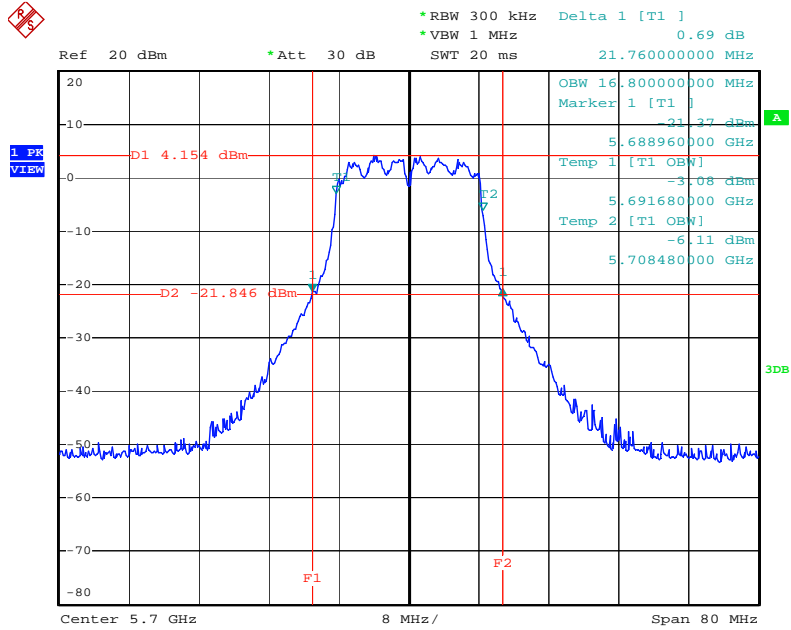
Date: 24.APR.2009 04:01:36

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5580 MHz



Date: 24.APR.2009 04:02:46

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5700 MHz



Date: 24.APR.2009 04:03:44

### 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

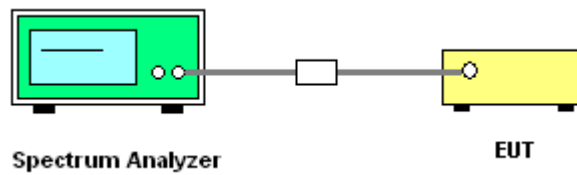
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

<b>Temperature</b>	23°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	Draft n
<b>Test Date</b>	Apr. 22, 2009 ~ Apr. 24, 2009		

##### Configuration Draft n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.17	17.00	Complies
40	5200 MHz	10.06	17.00	Complies
48	5240 MHz	11.47	17.00	Complies
52	5260 MHz	10.20	24.00	Complies
60	5300 MHz	9.34	24.00	Complies
64	5320 MHz	9.81	24.00	Complies
100	5500 MHz	12.38	24.00	Complies
116	5580 MHz	12.47	24.00	Complies
140	5700 MHz	12.10	24.00	Complies

##### Configuration Draft n MCS0 20MHz Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.74	17.00	Complies
40	5200 MHz	10.14	17.00	Complies
48	5240 MHz	10.98	17.00	Complies
52	5260 MHz	10.40	24.00	Complies
60	5300 MHz	9.28	24.00	Complies
64	5320 MHz	9.68	24.00	Complies
100	5500 MHz	11.63	24.00	Complies
116	5580 MHz	13.10	24.00	Complies
140	5700 MHz	11.22	24.00	Complies

Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.47	17.00	Complies
40	5200 MHz	13.11	17.00	Complies
48	5240 MHz	14.24	17.00	Complies
52	5260 MHz	13.31	24.00	Complies
60	5300 MHz	12.32	24.00	Complies
64	5320 MHz	12.76	24.00	Complies
100	5500 MHz	15.03	24.00	Complies
116	5580 MHz	15.81	24.00	Complies
140	5700 MHz	14.69	24.00	Complies

**Configuration Draft n MCS0 40MHz Ant. 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	10.26	17.00	Complies
46	5230 MHz	12.17	17.00	Complies
54	5270 MHz	10.20	24.00	Complies
62	5310 MHz	9.60	24.00	Complies
102	5510MHz	12.45	24.00	Complies
110	5550 MHz	12.20	24.00	Complies
134	5670 MHz	12.18	24.00	Complies

**Configuration Draft n MCS0 40MHz Ant. 2**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	10.53	17.00	Complies
46	5230 MHz	11.95	17.00	Complies
54	5270 MHz	10.18	24.00	Complies
62	5310 MHz	9.20	24.00	Complies
102	5510MHz	11.88	24.00	Complies
110	5550 MHz	12.18	24.00	Complies
134	5670 MHz	11.55	24.00	Complies

**Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 2**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	13.41	17.00	Complies
46	5230 MHz	15.07	17.00	Complies
54	5270 MHz	13.20	24.00	Complies
62	5310 MHz	12.41	24.00	Complies
102	5510MHz	15.18	24.00	Complies
110	5550 MHz	15.20	24.00	Complies
134	5670 MHz	14.89	24.00	Complies

<b>Temperature</b>	23°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	802.11a
<b>Test Date</b>	Apr. 22, 2009 ~ Apr. 24, 2009		

**Configuration IEEE 802.11a Ant. 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.34	17.00	Complies
40	5200 MHz	10.04	17.00	Complies
48	5240 MHz	11.97	17.00	Complies
52	5260 MHz	10.42	24.00	Complies
60	5300 MHz	9.92	24.00	Complies
64	5320 MHz	9.72	24.00	Complies
100	5500 MHz	12.27	24.00	Complies
116	5580 MHz	12.57	24.00	Complies
140	5700 MHz	12.14	24.00	Complies

**Configuration IEEE 802.11a Ant. 2**

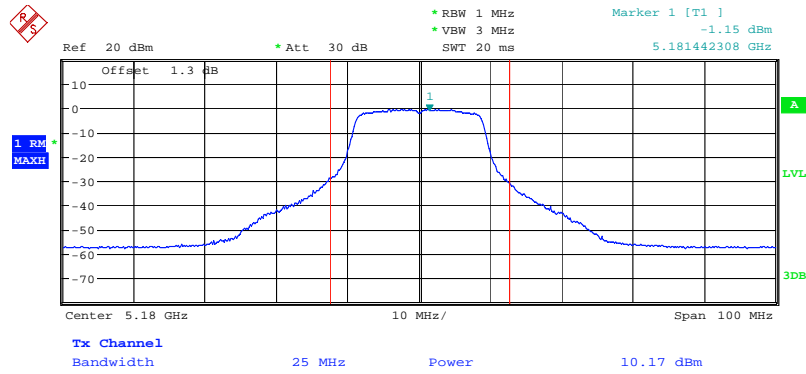
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.74	17.00	Complies
40	5200 MHz	10.20	17.00	Complies
48	5240 MHz	12.49	17.00	Complies
52	5260 MHz	10.62	24.00	Complies
60	5300 MHz	9.61	24.00	Complies
64	5320 MHz	9.87	24.00	Complies
100	5500 MHz	11.78	24.00	Complies
116	5580 MHz	13.33	24.00	Complies
140	5700 MHz	11.50	24.00	Complies



Configuration IEEE 802.11a Ant. 1 + Ant. 2

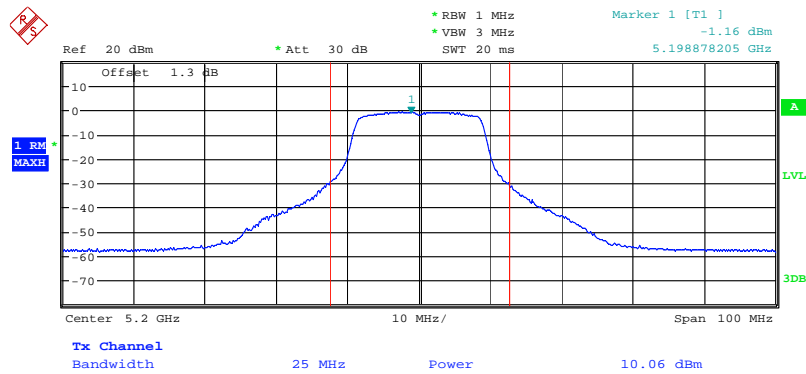
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.55	17.00	Complies
40	5200 MHz	13.13	17.00	Complies
48	5240 MHz	15.25	17.00	Complies
52	5260 MHz	13.53	24.00	Complies
60	5300 MHz	12.78	24.00	Complies
64	5320 MHz	12.81	24.00	Complies
100	5500 MHz	15.04	24.00	Complies
116	5580 MHz	15.98	24.00	Complies
140	5700 MHz	14.84	24.00	Complies

### Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 5180 MHz



Date: 22.APR.2009 22:11:15

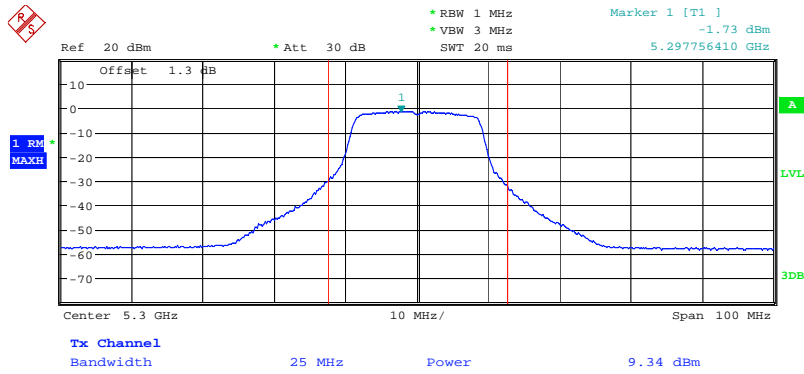
### Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 5200 MHz



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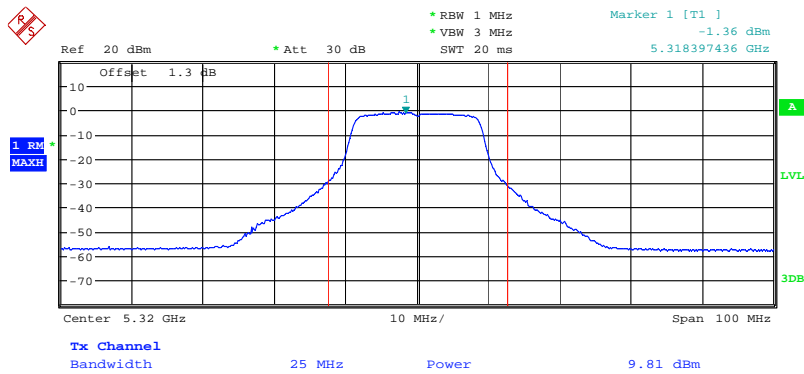


Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 5300 MHz



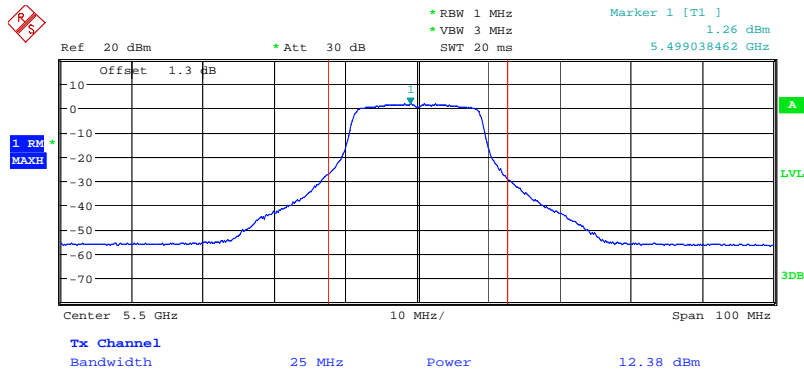
Date: 22.APR.2009 22:17:51

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 5320 MHz



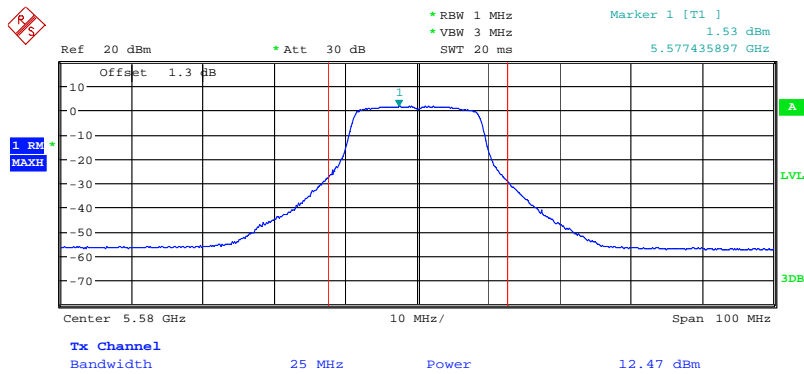
Date: 22.APR.2009 22:20:19

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 5500 MHz



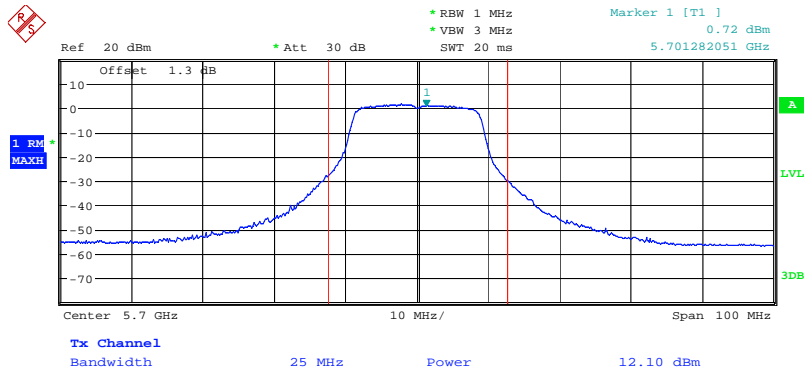
Date: 22.APR.2009 22:01:16

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 5580 MHz



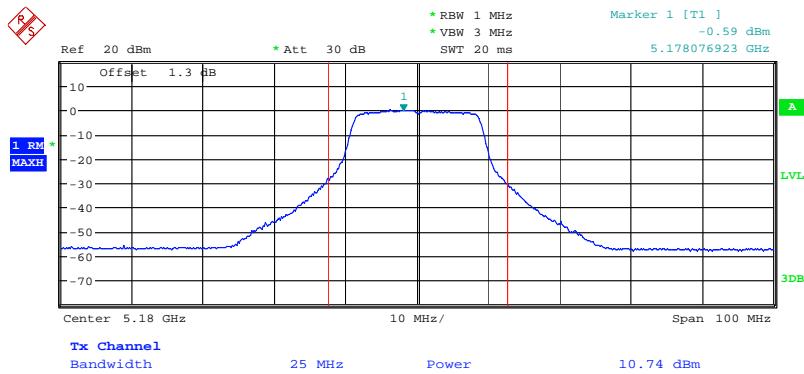
Date: 22.APR.2009 21:52:42

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 5700 MHz



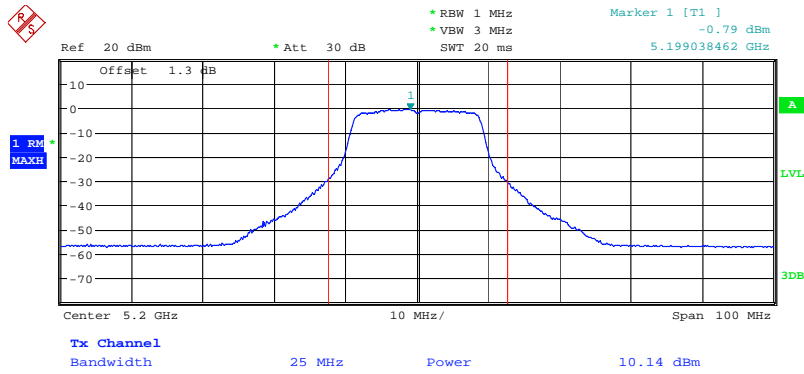
Date: 22.APR.2009 21:44:28

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5180 MHz



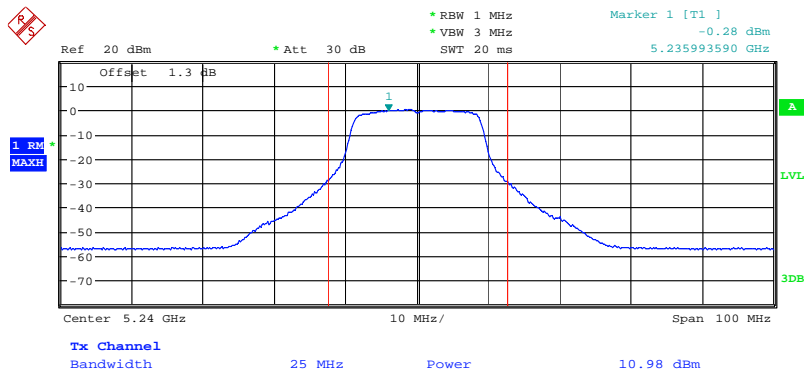
Date: 22.APR.2009 22:12:42

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5200 MHz



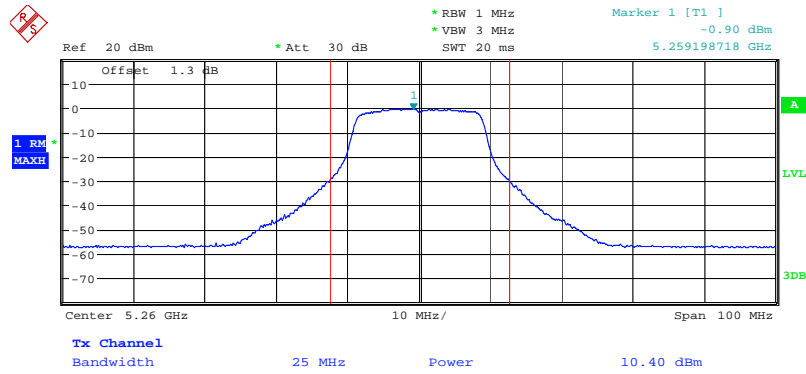
Date: 22.APR.2009 22:08:18

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5240 MHz



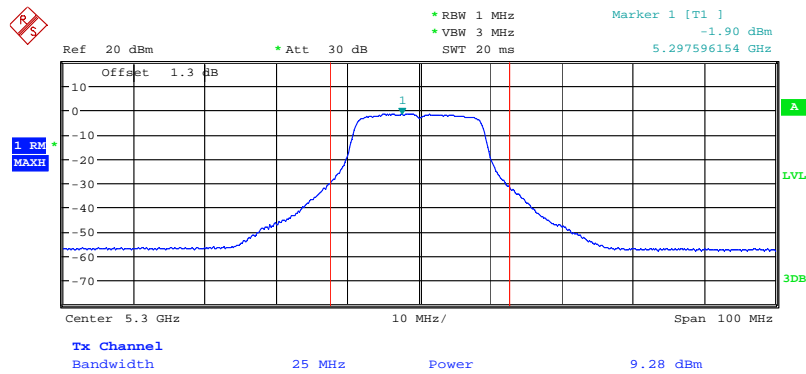
Date: 22.APR.2009 22:07:05

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5260 MHz



Date: 22.APR.2009 22:14:52

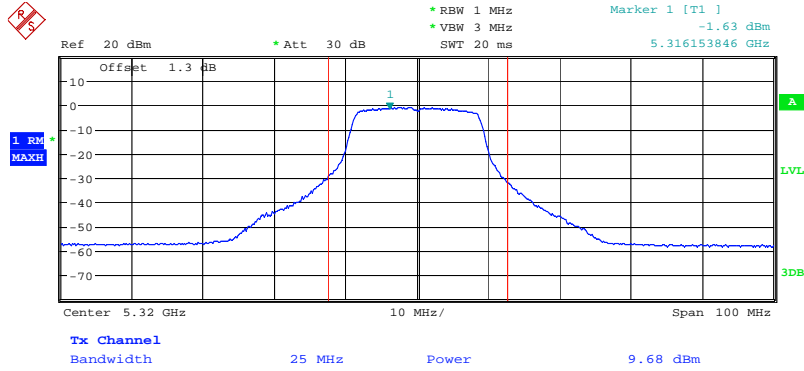
Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5300 MHz



Date: 22.APR.2009 22:18:54

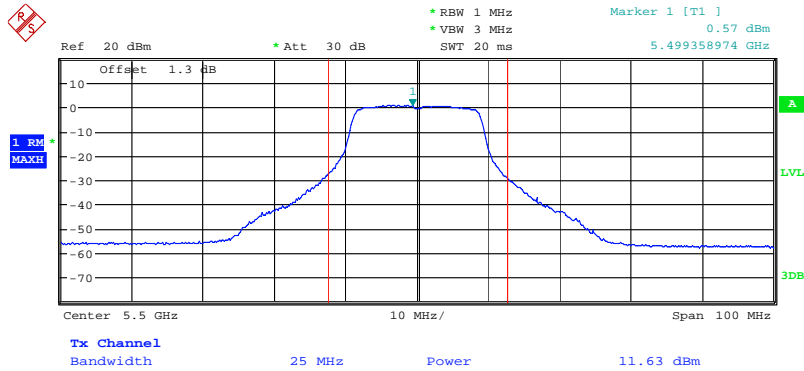


Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5320 MHz



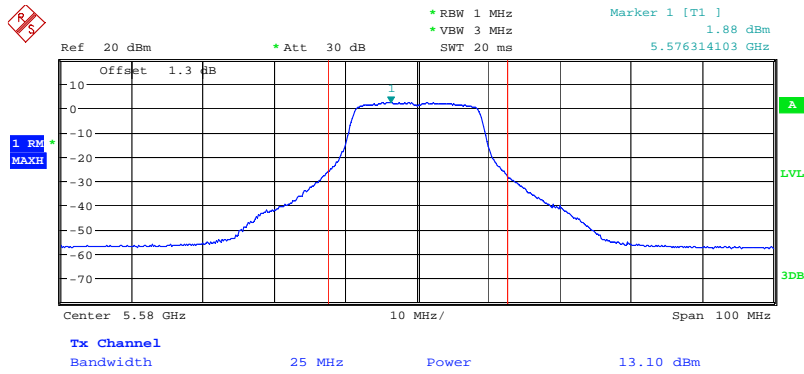
Date: 22.APR.2009 22:21:08

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5500 MHz



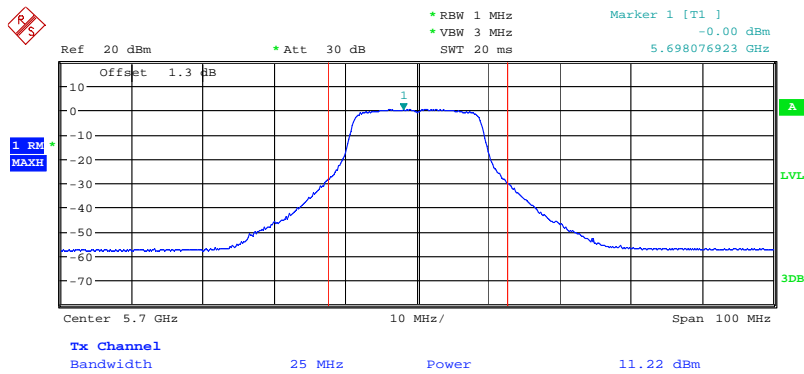
Date: 22.APR.2009 22:00:02

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5580 MHz



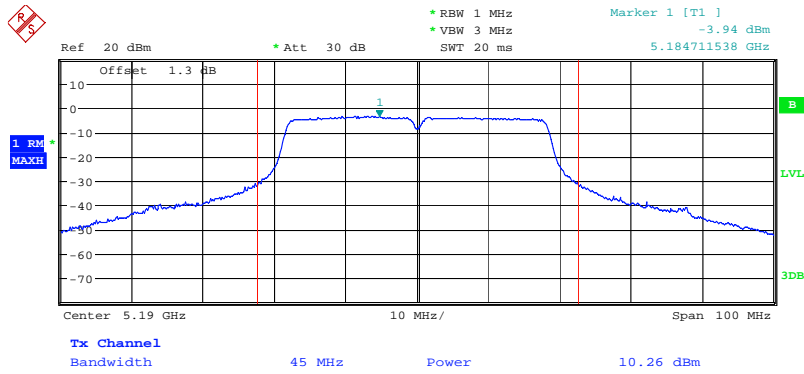
Date: 22.APR.2009 21:52:06

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 2 / 5700 MHz



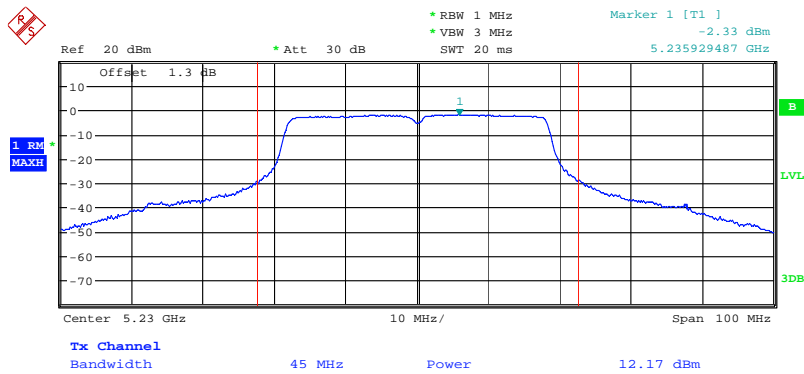
Date: 22.APR.2009 21:45:20

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 5190 MHz



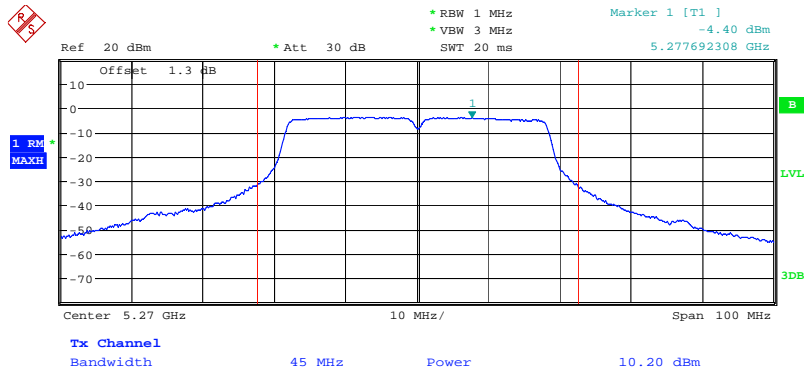
Date: 22.APR.2009 23:07:16

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 5230 MHz



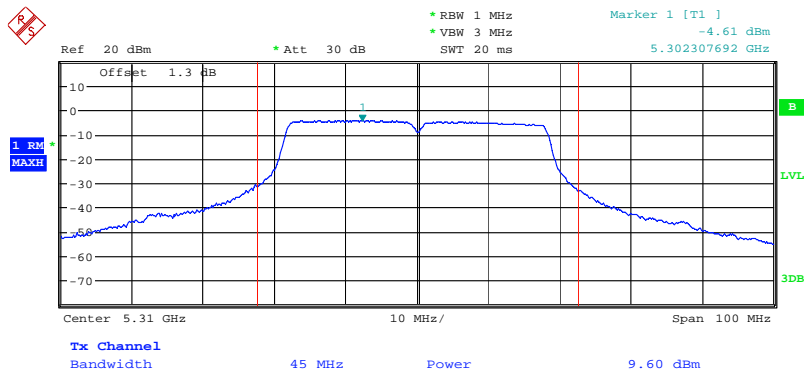
Date: 22.APR.2009 23:03:11

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 5270 MHz



Date: 22.APR.2009 22:56:03

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 5310 MHz



Date: 22.APR.2009 22:54:35





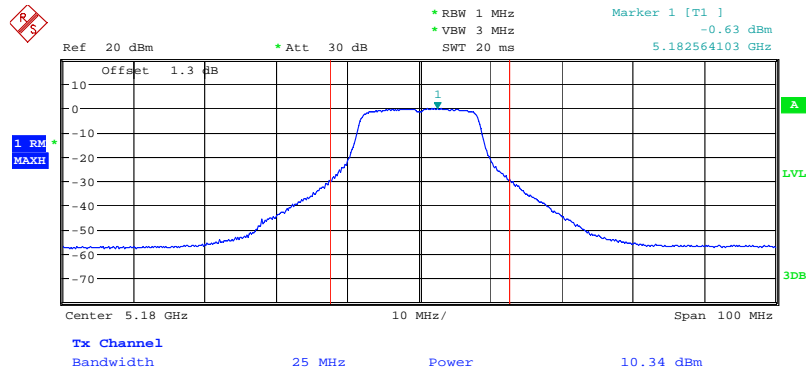






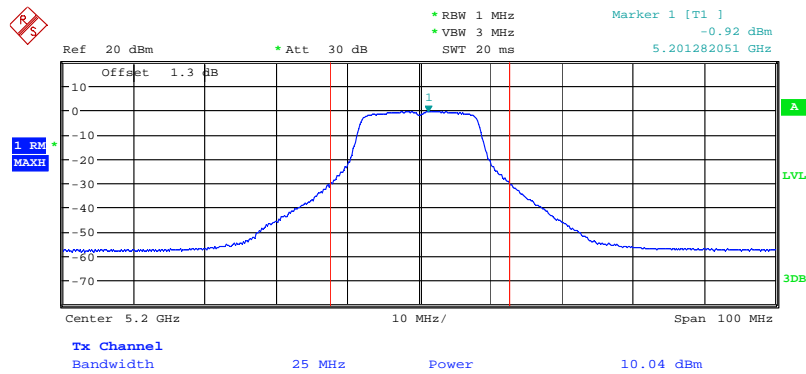


### Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1 / 5180 MHz



Date: 22.APR.2009 20:25:52

### Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1 / 5200 MHz



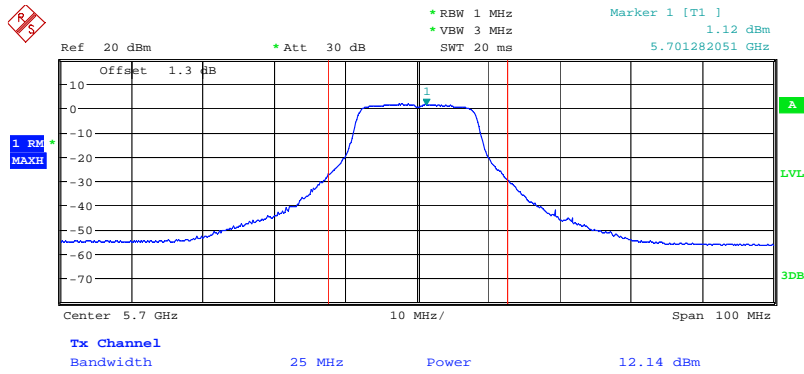
Date: 22.APR.2009 20:30:04





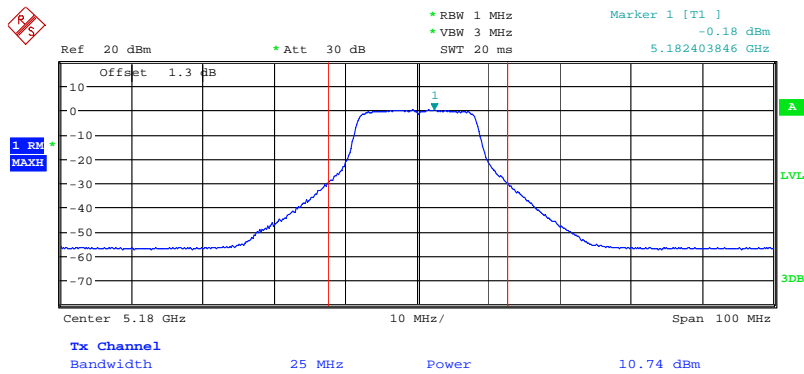


**Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1 / 5700 MHz**



Date: 22.APR.2009 21:05:45

**Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 2 / 5180 MHz**



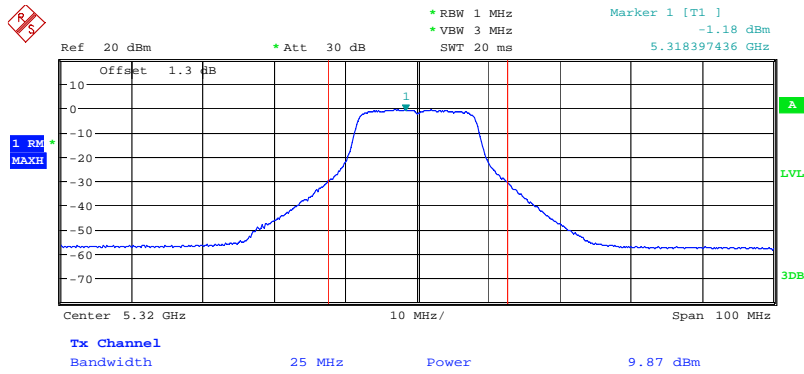
Date: 22.APR.2009 20:26:54





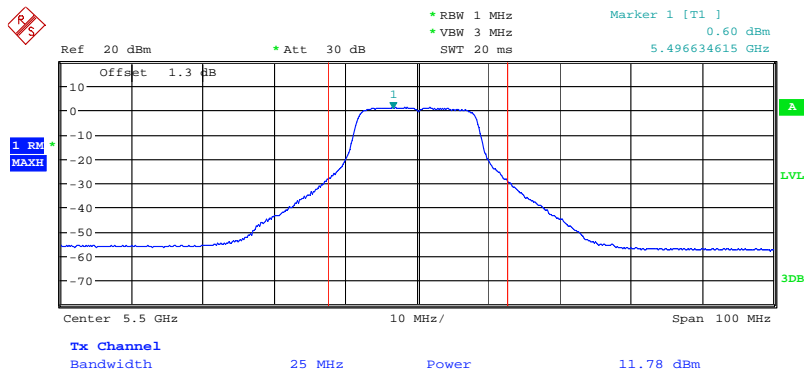


### Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 2 / 5320 MHz



Date: 22.APR.2009 20:42:28

### Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 2 / 5500 MHz



Date: 22.APR.2009 21:03:07



## 4.4. Power Spectral Density Measurement

### 4.4.1. 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 4.3.1.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	4
5.25-5.35 GHz	11
5470-5725	11

### 4.4.2. Measuring Instruments and Setting

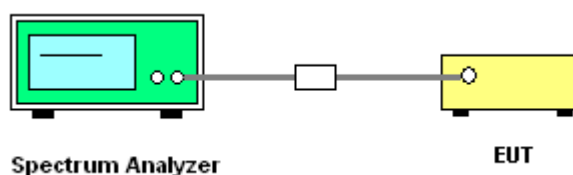
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

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

### 4.4.4. Test Setup Layout



### 4.4.5. Test Deviation

There is no deviation with the original standard.

#### 4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.4.7. Test Result of Power Spectral Density

<b>Temperature</b>	23°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	Draft n
<b>Test Date</b>	Apr. 22, 2009 ~ Apr. 24, 2009		

##### Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	-1.09	4.00	Complies
40	5200 MHz	-1.51	4.00	Complies
48	5240 MHz	-1.23	4.00	Complies
52	5260 MHz	-1.45	11.00	Complies
60	5300 MHz	-1.06	11.00	Complies
64	5320 MHz	-0.60	11.00	Complies
100	5500 MHz	1.41	11.00	Complies
116	5580 MHz	1.89	11.00	Complies
140	5700 MHz	1.00	11.00	Complies

##### Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 2

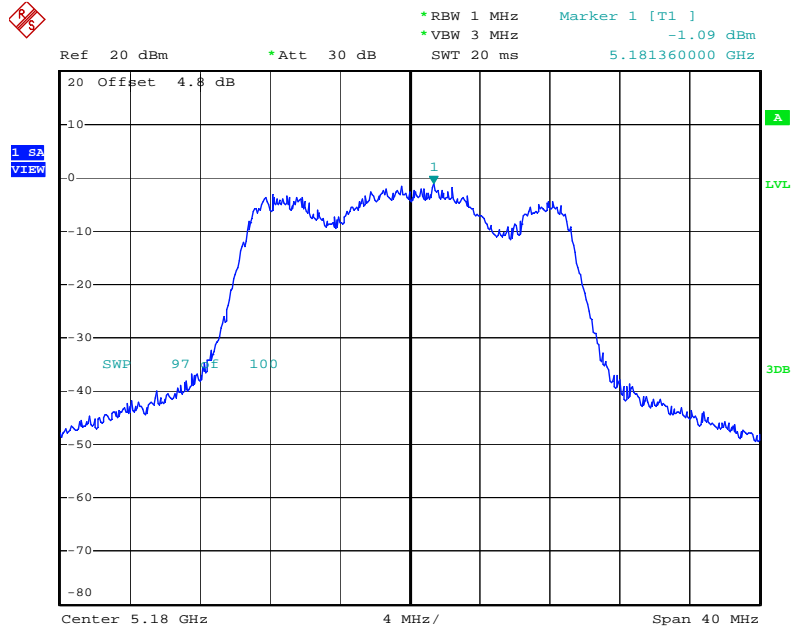
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	-4.13	4.00	Complies
46	5230 MHz	-3.54	4.00	Complies
54	5270 MHz	-4.37	11.00	Complies
62	5310 MHz	-4.56	11.00	Complies
102	5510MHz	-2.90	11.00	Complies
110	5550 MHz	-2.45	11.00	Complies
134	5670 MHz	-2.27	11.00	Complies

<b>Temperature</b>	23°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	802.11a
<b>Test Date</b>	Apr. 22, 2009 ~ Apr. 24, 2009		

**Configuration IEEE 802.11a Ant. 1 + Ant. 2**

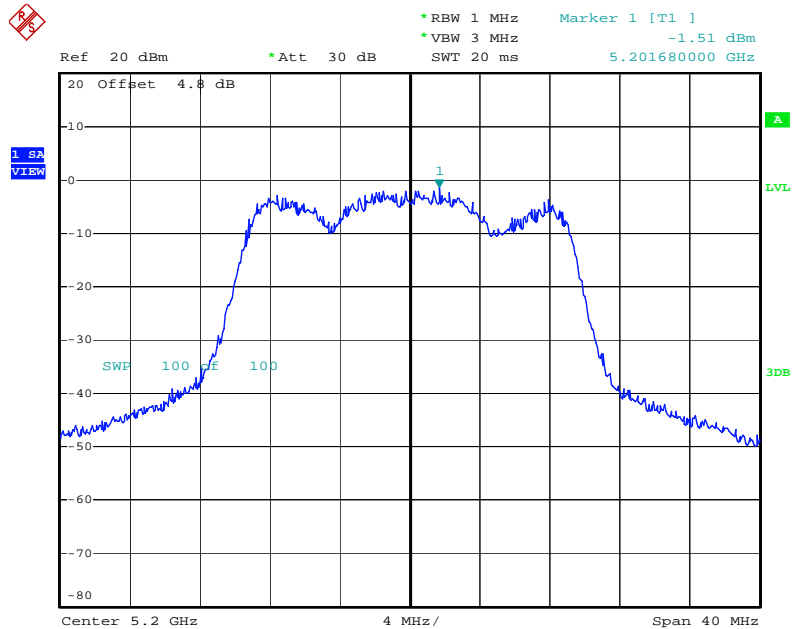
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	-0.44	4.00	<b>Complies</b>
40	5200 MHz	-1.60	4.00	<b>Complies</b>
48	5240 MHz	0.14	4.00	<b>Complies</b>
52	5260 MHz	-0.30	11.00	<b>Complies</b>
60	5300 MHz	-0.11	11.00	<b>Complies</b>
64	5320 MHz	-0.31	11.00	<b>Complies</b>
100	5500 MHz	1.14	11.00	<b>Complies</b>
116	5580 MHz	2.21	11.00	<b>Complies</b>
140	5700 MHz	1.40	11.00	<b>Complies</b>

**Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5180 MHz**



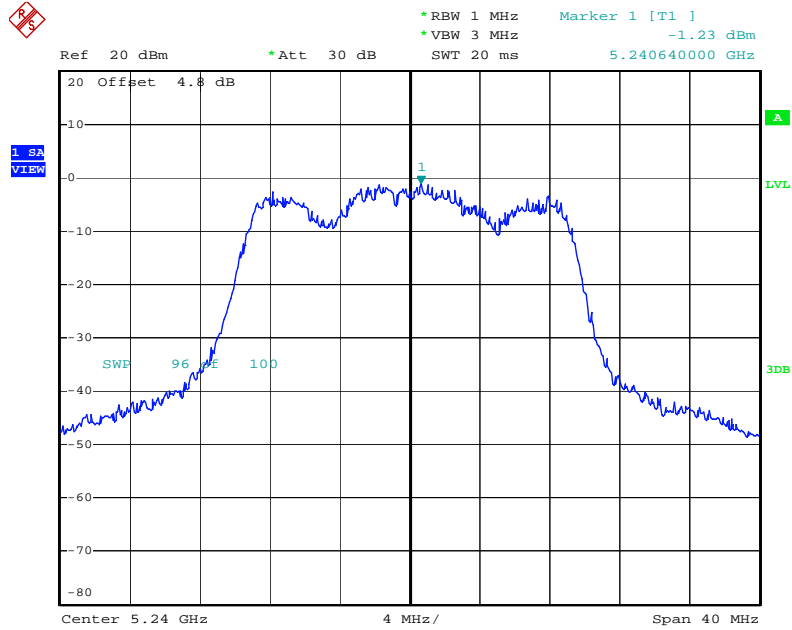
Date: 24.APR.2009 04:12:40

**Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5200 MHz**



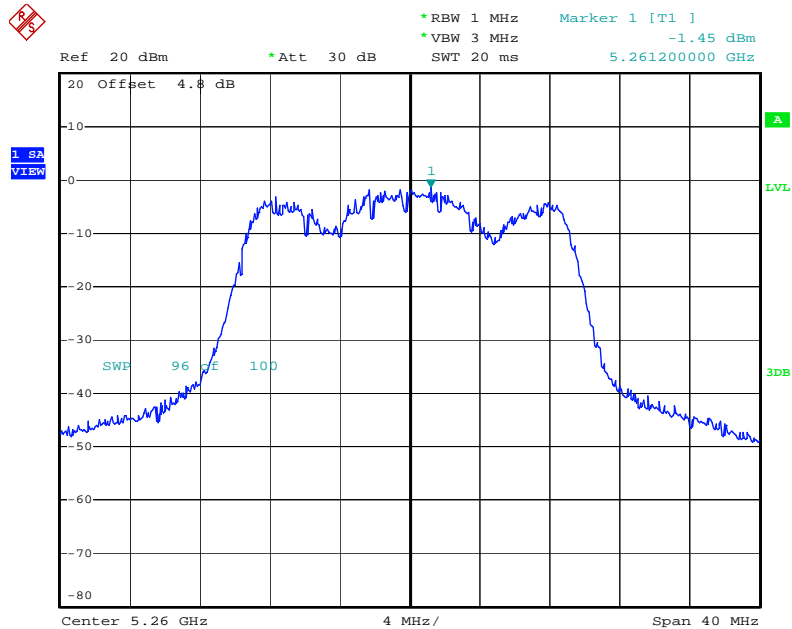
Date: 24.APR.2009 04:11:55

Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5240 MHz



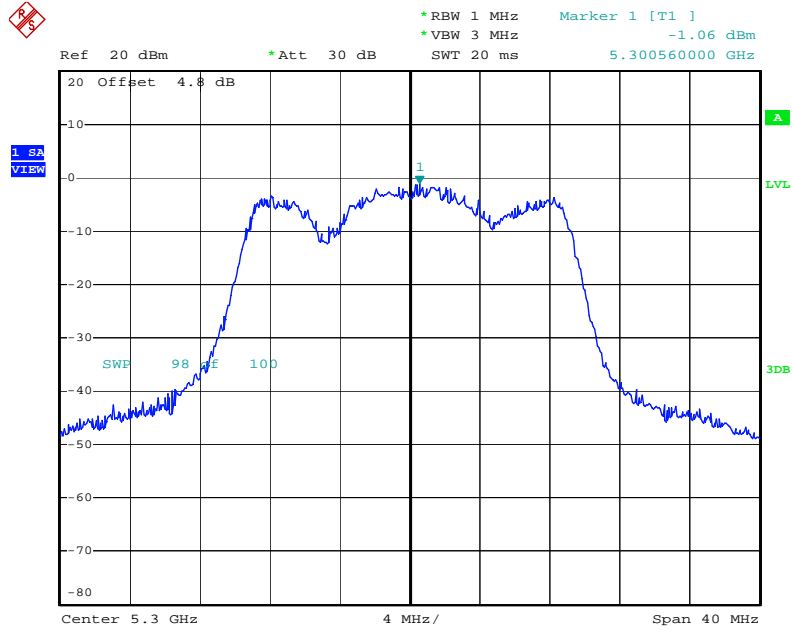
Date: 24.APR.2009 04:10:32

Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5260 MHz



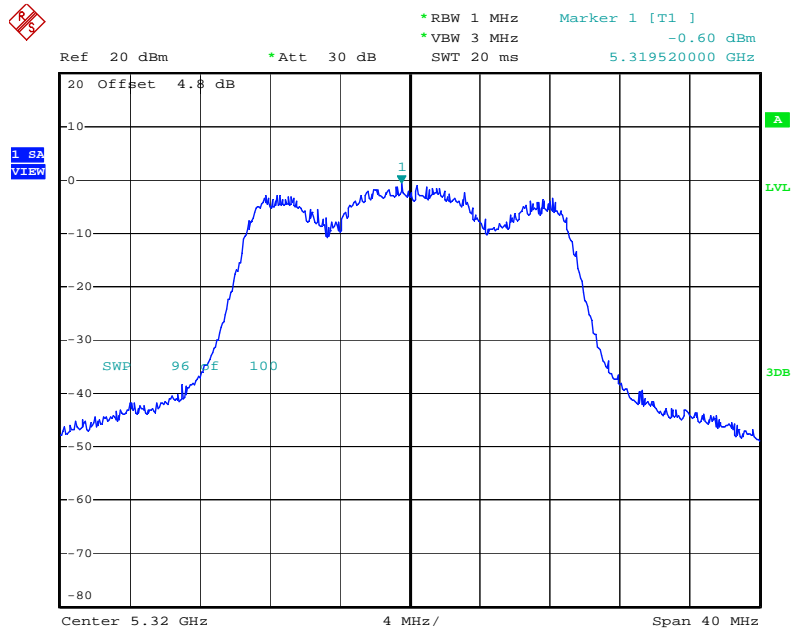
Date: 24.APR.2009 04:09:40

Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5300 MHz



Date: 24.APR.2009 04:08:55

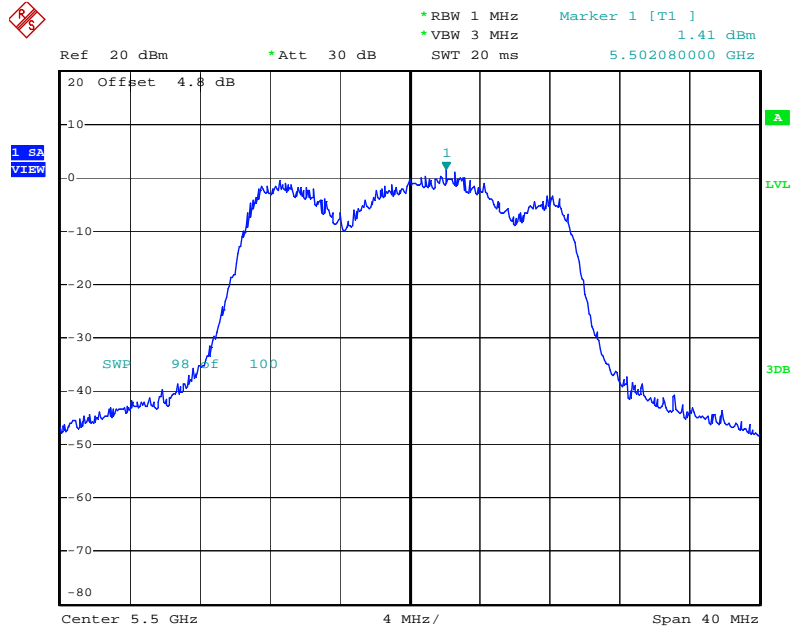
Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5320 MHz



Date: 24.APR.2009 04:08:01

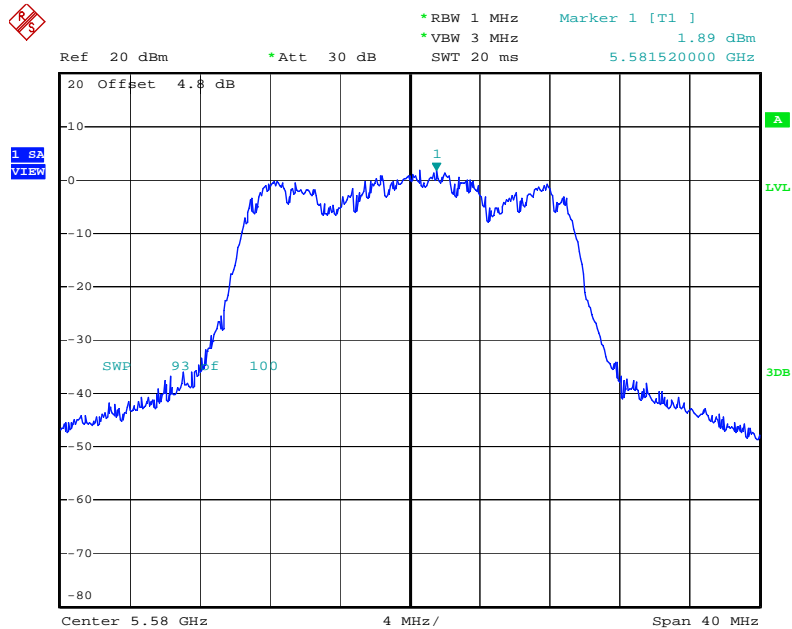


Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5500 MHz



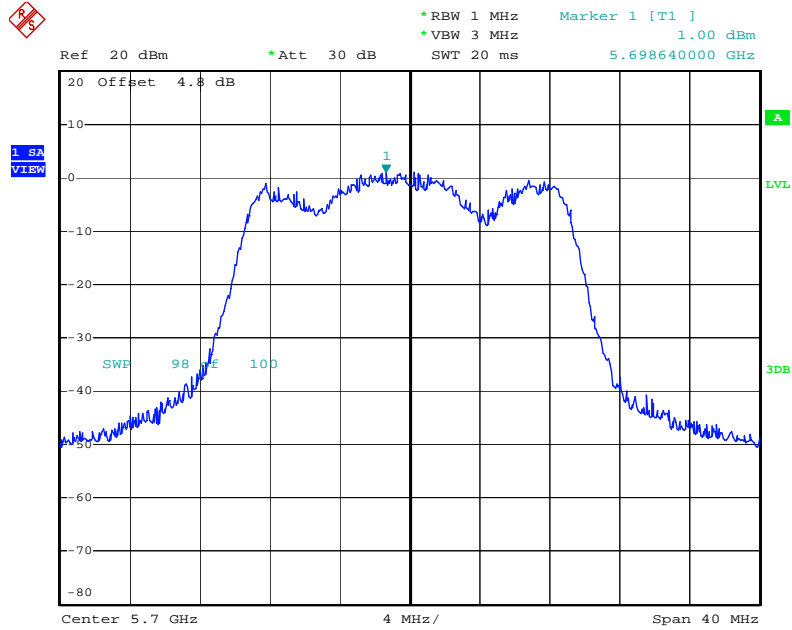
Date: 24.APR.2009 04:06:58

Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5580 MHz



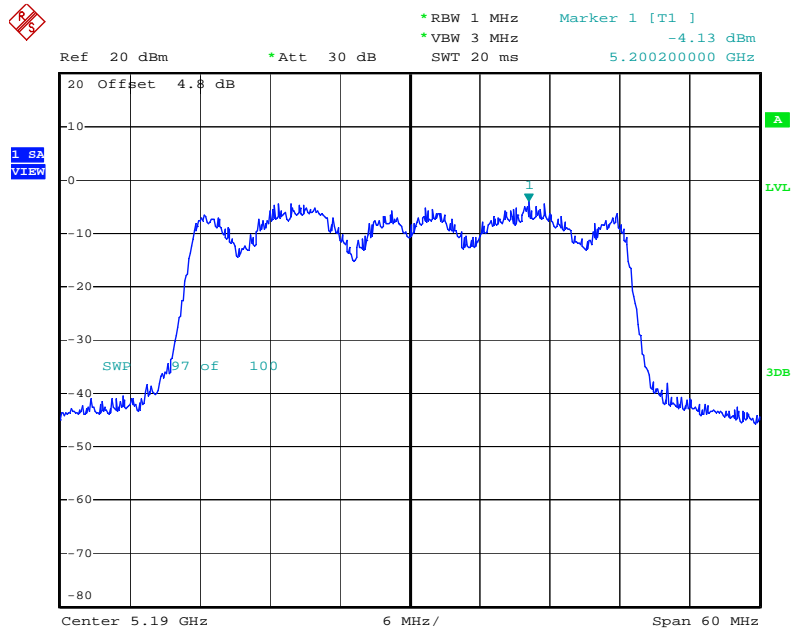
Date: 24.APR.2009 04:06:03

**Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5700 MHz**



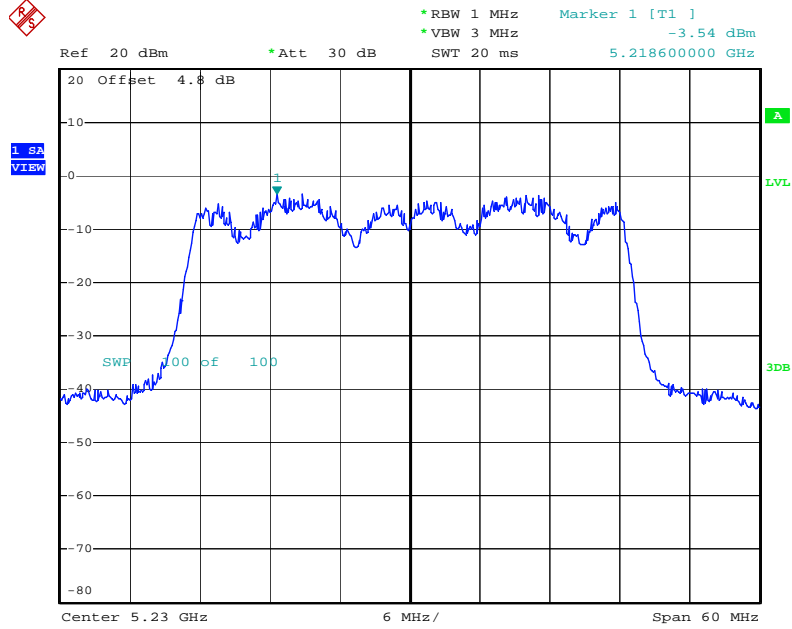
Date: 24.APR.2009 04:05:04

**Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5190 MHz**



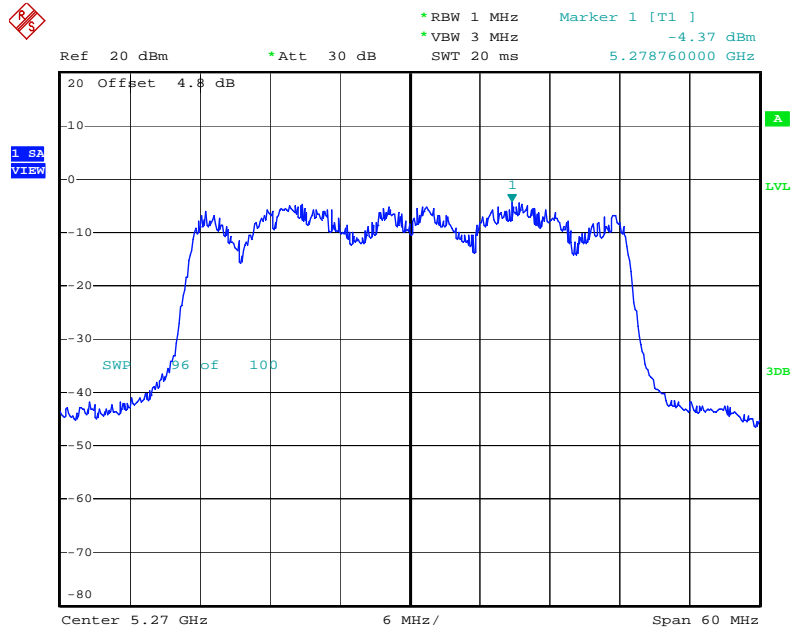
Date: 24.APR.2009 04:14:42

**Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5230 MHz**



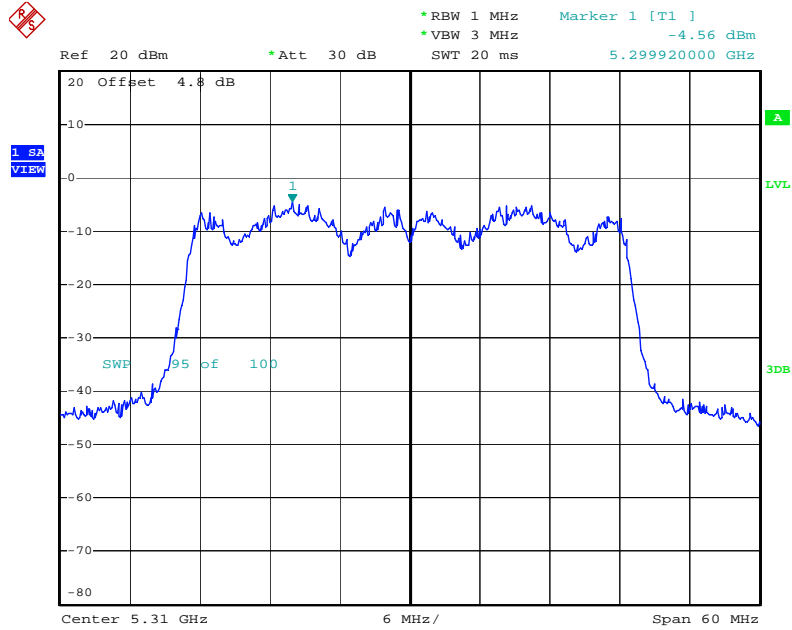
Date: 24.APR.2009 04:15:40

**Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5270 MHz**



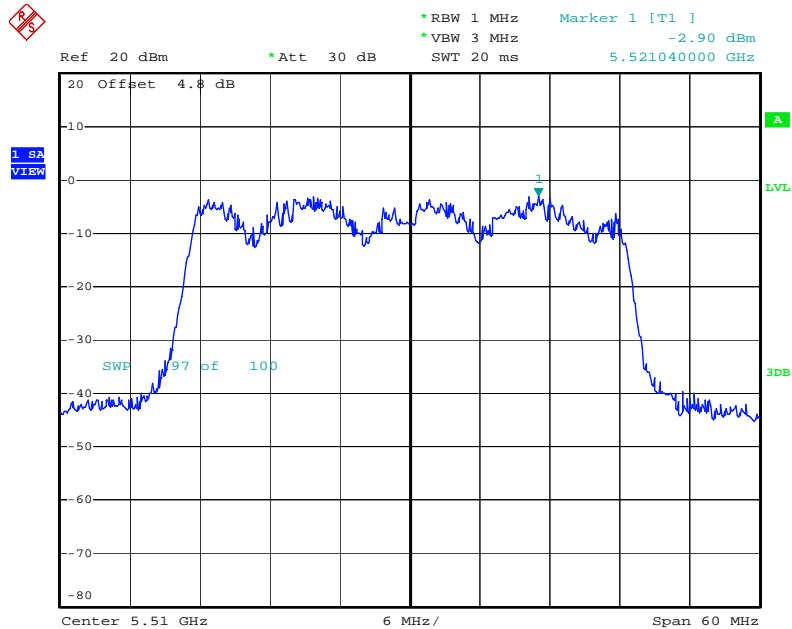
Date: 24.APR.2009 04:16:43

Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5310 MHz



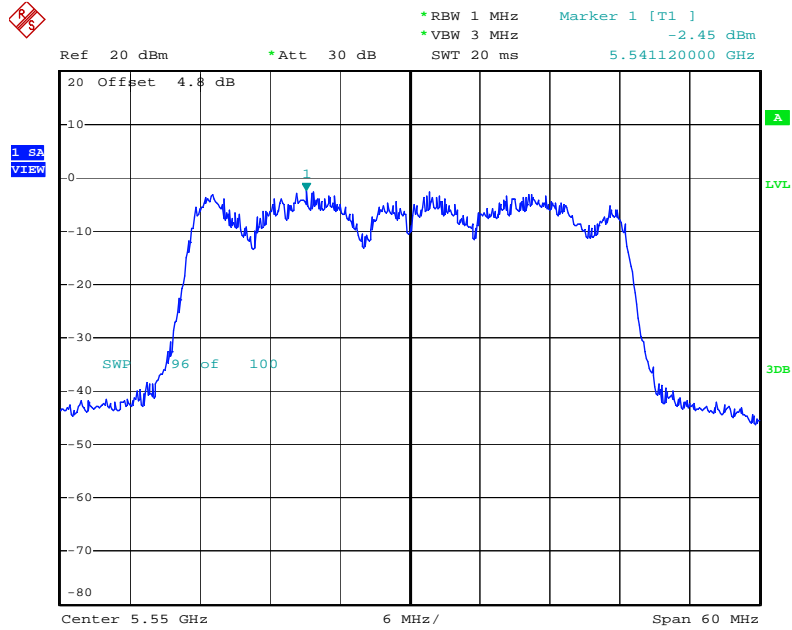
Date: 24.APR.2009 04:17:37

Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5510MHz



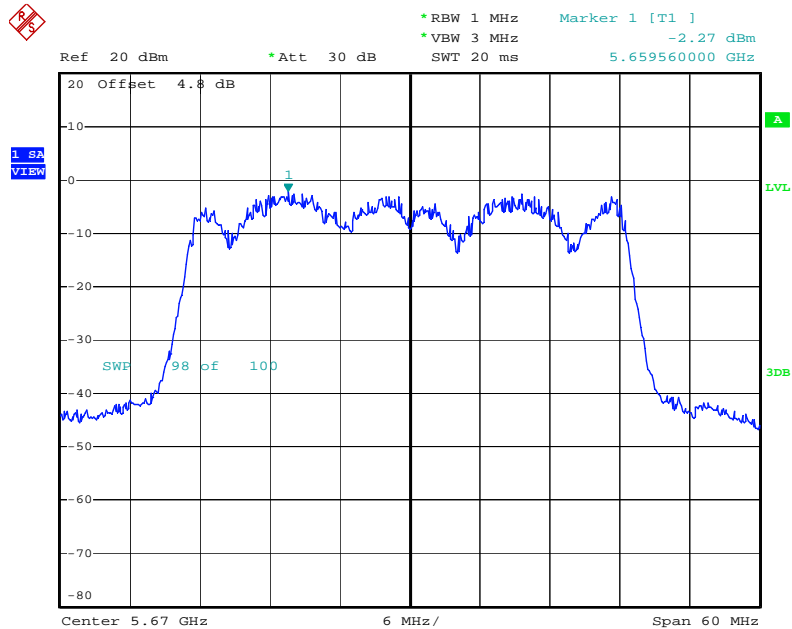
Date: 24.APR.2009 04:18:59

**Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5550 MHz**



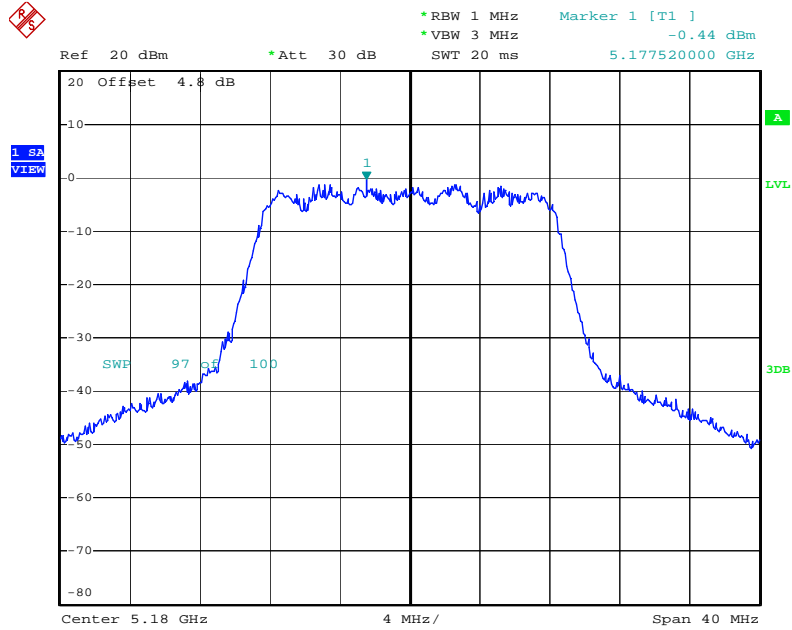
Date: 24.APR.2009 04:20:15

**Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5670 MHz**



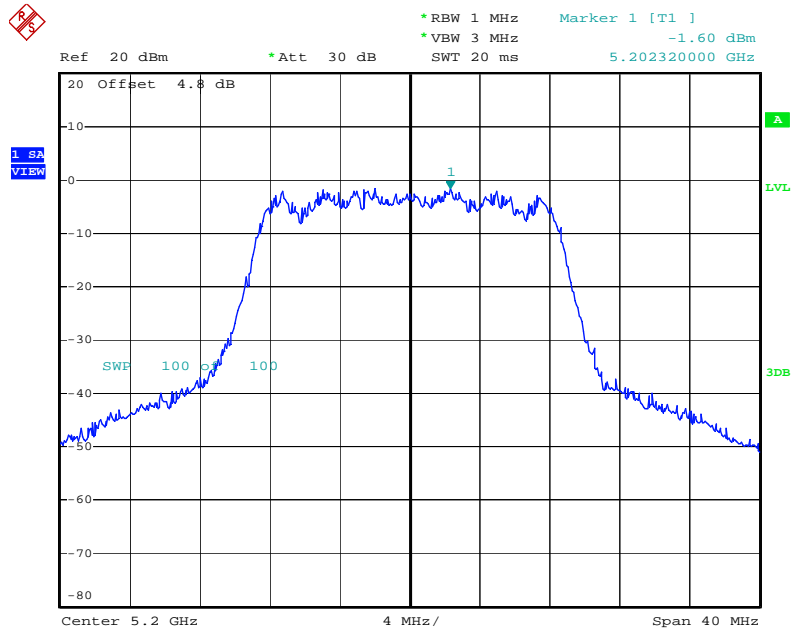
Date: 24.APR.2009 04:21:10

**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5180 MHz**



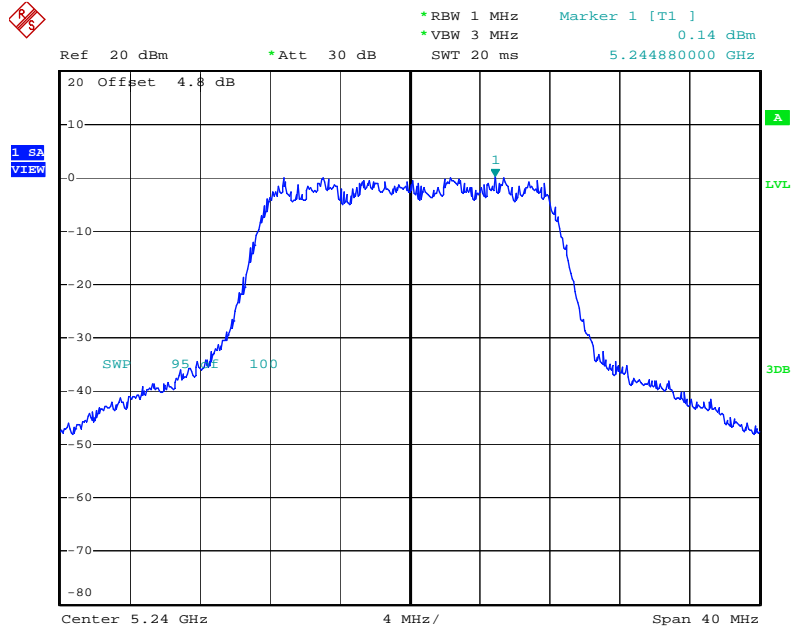
Date: 24.APR.2009 03:55:25

**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5200 MHz**



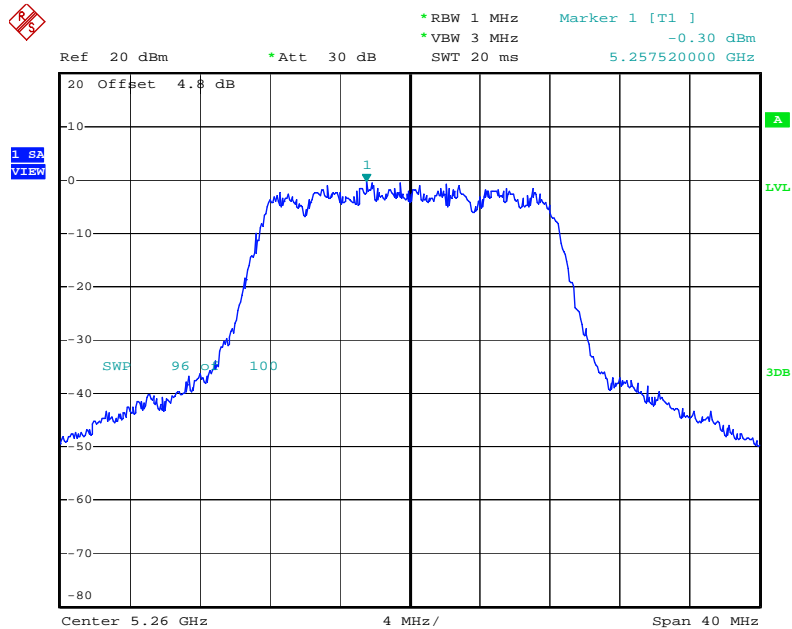
Date: 24.APR.2009 03:56:51

**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5240 MHz**



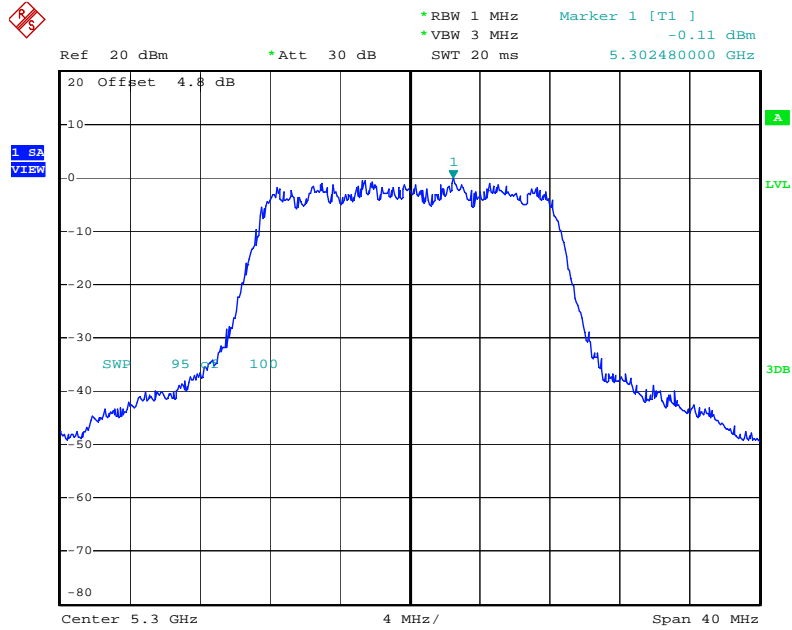
Date: 24.APR.2009 03:57:59

**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5260 MHz**



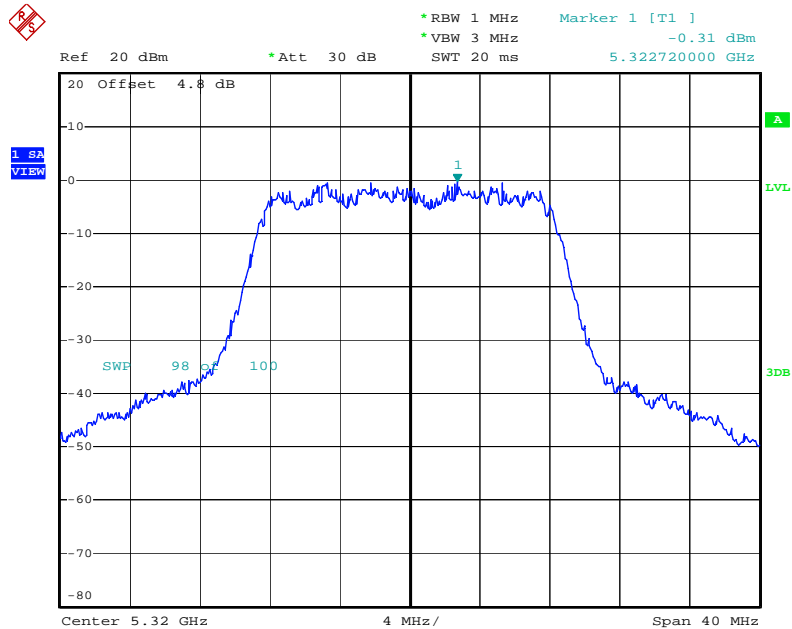
Date: 24.APR.2009 03:58:53

**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5300 MHz**



Date: 24.APR.2009 03:59:51

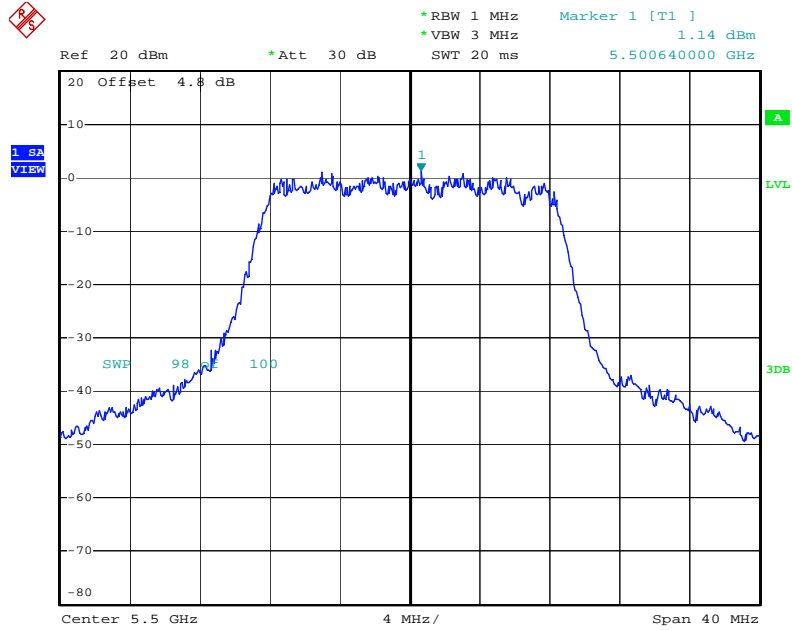
**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5320 MHz**



Date: 24.APR.2009 04:00:42

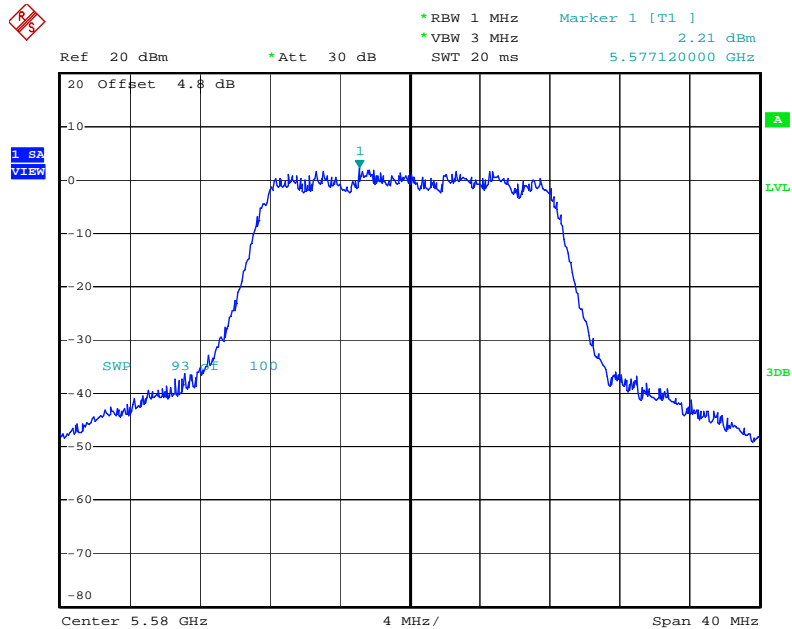


**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5500 MHz**



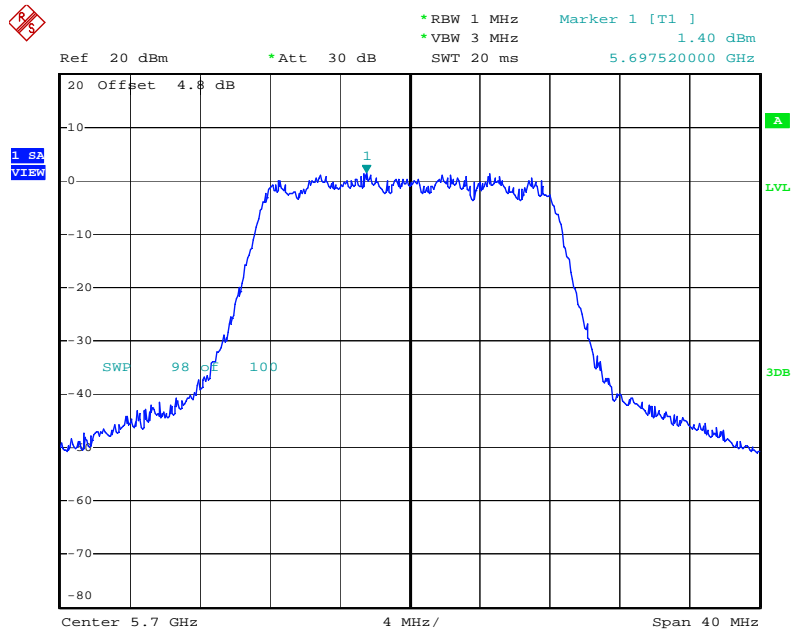
Date: 24.APR.2009 04:01:44

**Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5580 MHz**



Date: 24.APR.2009 04:02:54

### Power Density Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5700 MHz



Date: 24.APR.2009 04:03:52

## 4.5. Peak Excursion Measurement

### 4.5.1. 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.

### 4.5.2. Measuring Instruments and Setting

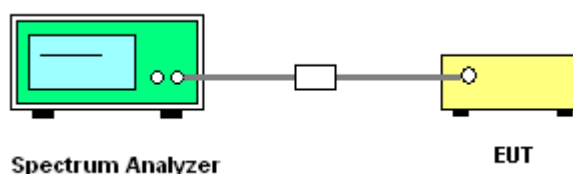
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz (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

### 4.5.3. 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  $\leq 13$  dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW  $\geq 3$  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  $\geq 1/T$  (Draft n VBW = 300kHz  $\geq 1/4\mu$ s). Use sample detector mode if bin width (i.e., span/number of points in spectrum)  $< 0.5$  RBW. Otherwise use peak detector mode. Set max hold. Allow max hold to run for 60 seconds.
5. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

### 4.5.4. Test Setup Layout



#### 4.5.5. Test Deviation

There is no deviation with the original standard.

#### 4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.5.7. Test Result of Peak Excursion

<b>Temperature</b>	23°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	Draft n
<b>Test Date</b>	Apr. 22, 2009 ~ Apr. 24, 2009		

#### Configuration Draft n MCS0 20MHz Ant. 1 + Ant. 2

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.45	13	Complies
40	5200 MHz	5.84	13	Complies
48	5240 MHz	4.90	13	Complies
52	5260 MHz	4.95	13	Complies
60	5300 MHz	5.08	13	Complies
64	5320 MHz	5.09	13	Complies
100	5500 MHz	4.96	13	Complies
116	5580 MHz	5.57	13	Complies
140	5700 MHz	5.79	13	Complies

#### Configuration Draft n MCS0 40MHz Ant. 1 + Ant. 2

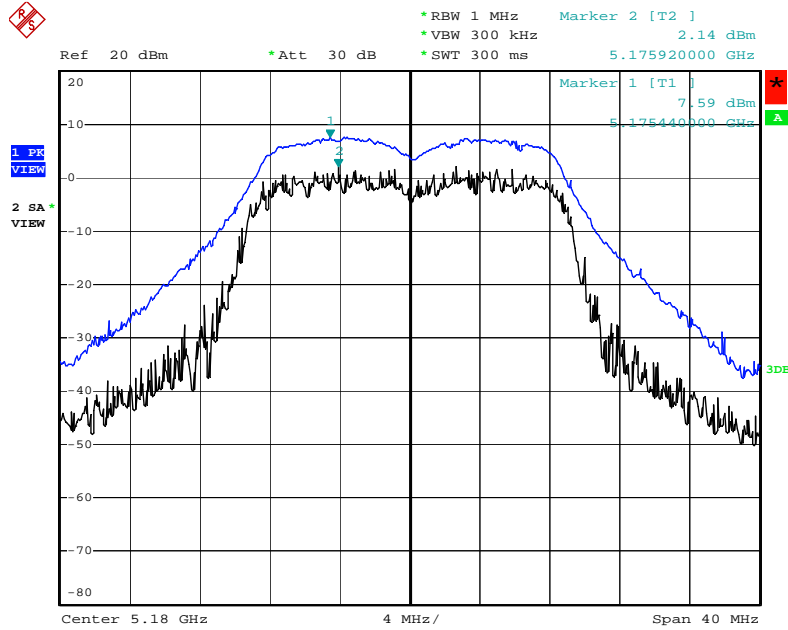
Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	5.46	13	Complies
46	5230 MHz	5.08	13	Complies
54	5270 MHz	4.57	13	Complies
62	5310 MHz	5.25	13	Complies
102	5510MHz	4.93	13	Complies
110	5550 MHz	5.01	13	Complies
134	5670 MHz	6.10	13	Complies

<b>Temperature</b>	23°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	802.11a
<b>Test Date</b>	Apr. 22, 2009 ~ Apr. 24, 2009		

**Configuration IEEE 802.11a Ant. 1 + Ant. 2**

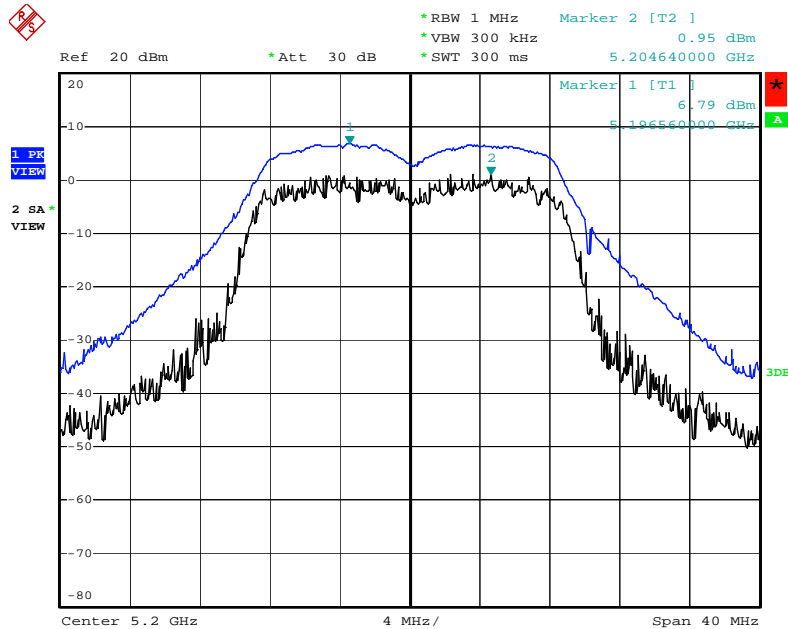
Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	4.96	13	Complies
40	5200 MHz	3.90	13	Complies
48	5240 MHz	4.75	13	Complies
52	5260 MHz	5.23	13	Complies
60	5300 MHz	5.19	13	Complies
64	5320 MHz	4.96	13	Complies
100	5500 MHz	4.66	13	Complies
116	5580 MHz	4.27	13	Complies
140	5700 MHz	4.68	13	Complies

Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5180 MHz



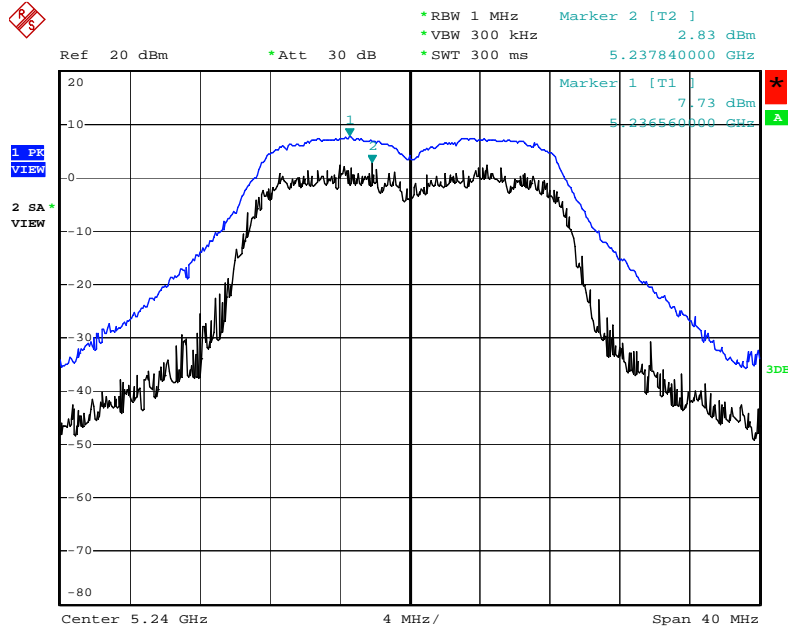
Date: 24.APR.2009 04:12:52

Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5200 MHz



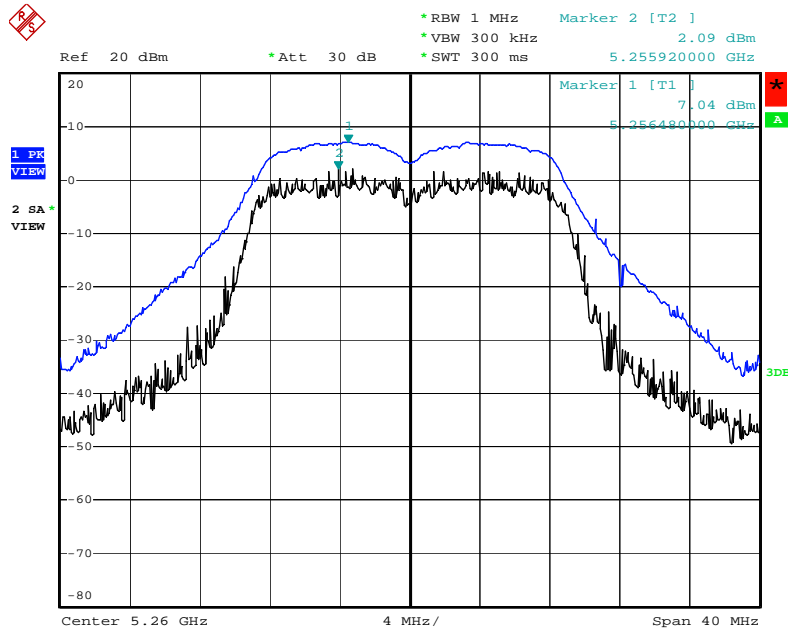
Date: 24.APR.2009 04:12:07

Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5240 MHz



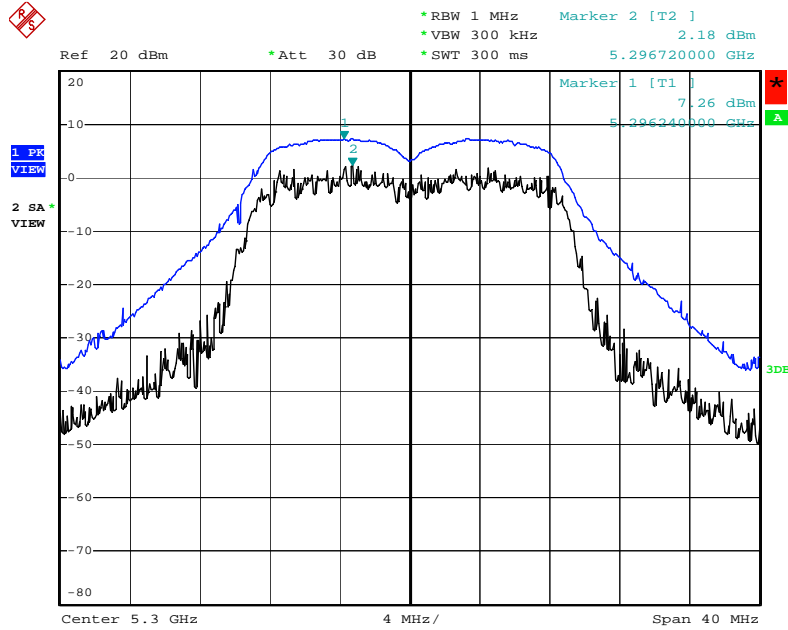
Date: 24.APR.2009 04:10:44

Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5260 MHz



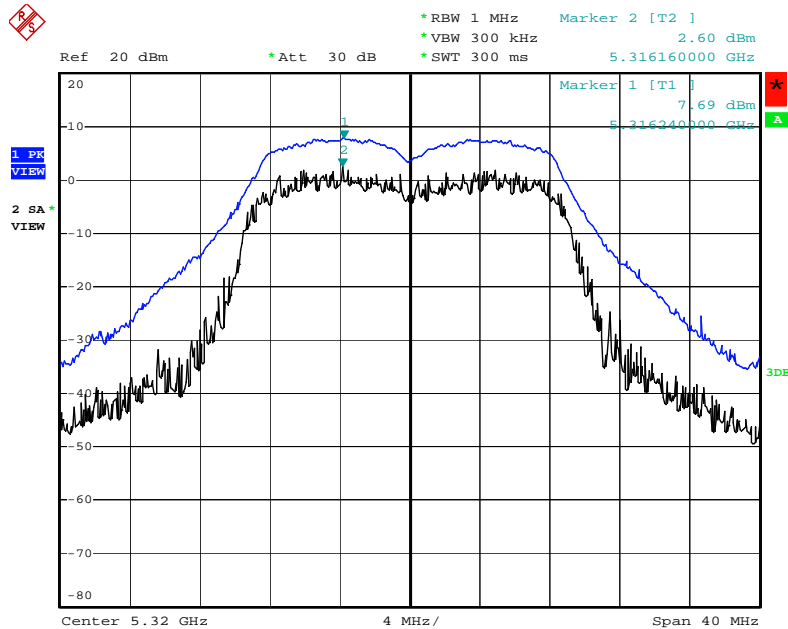
Date: 24.APR.2009 04:09:52

Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5300 MHz



Date: 24.APR.2009 04:09:07

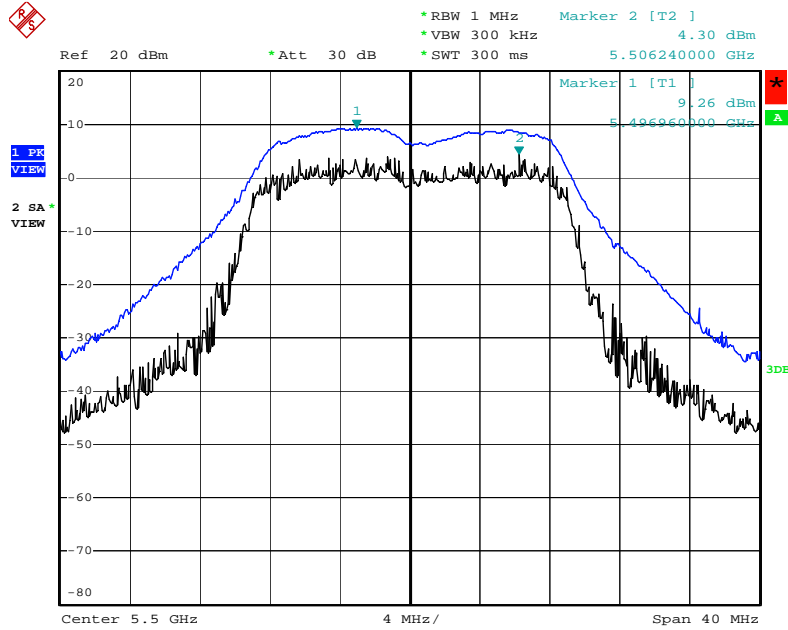
Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5320 MHz



Date: 24.APR.2009 04:08:13

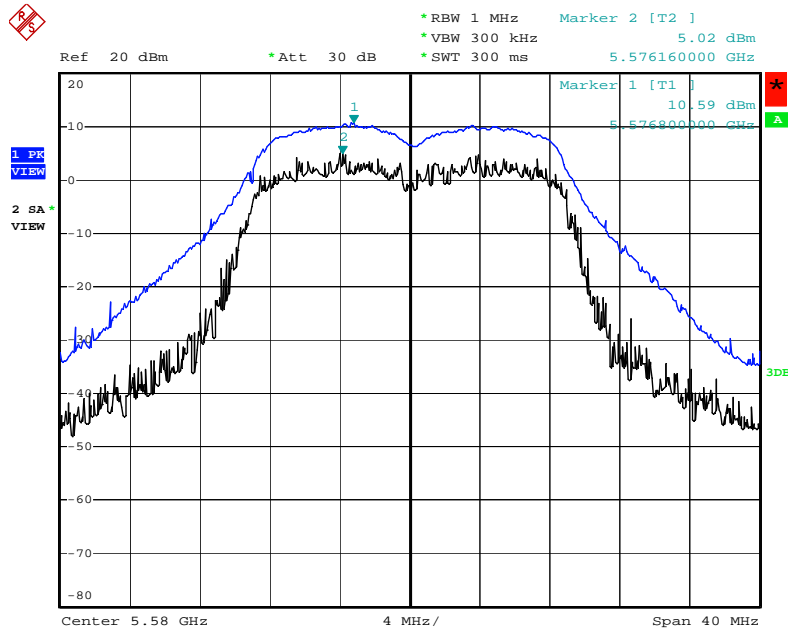


Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5500 MHz



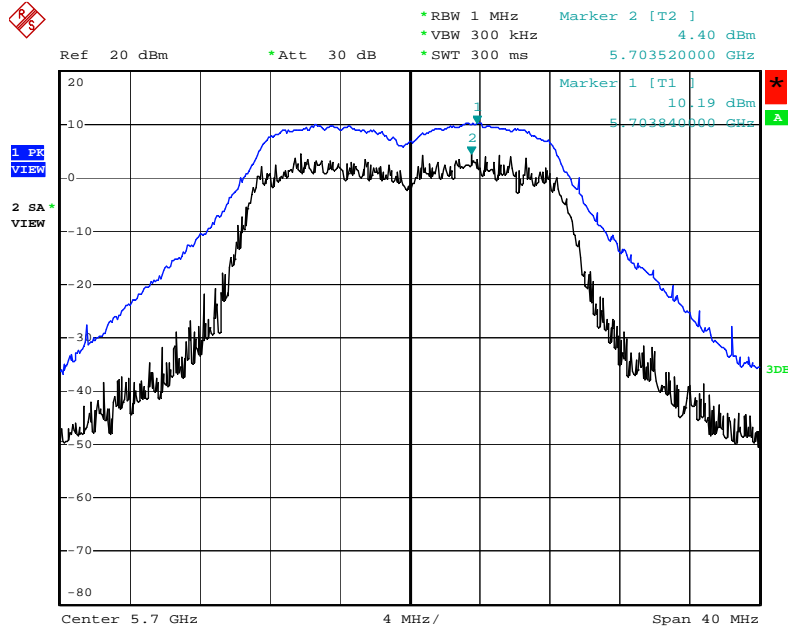
Date: 24.APR.2009 04:07:11

Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5580 MHz



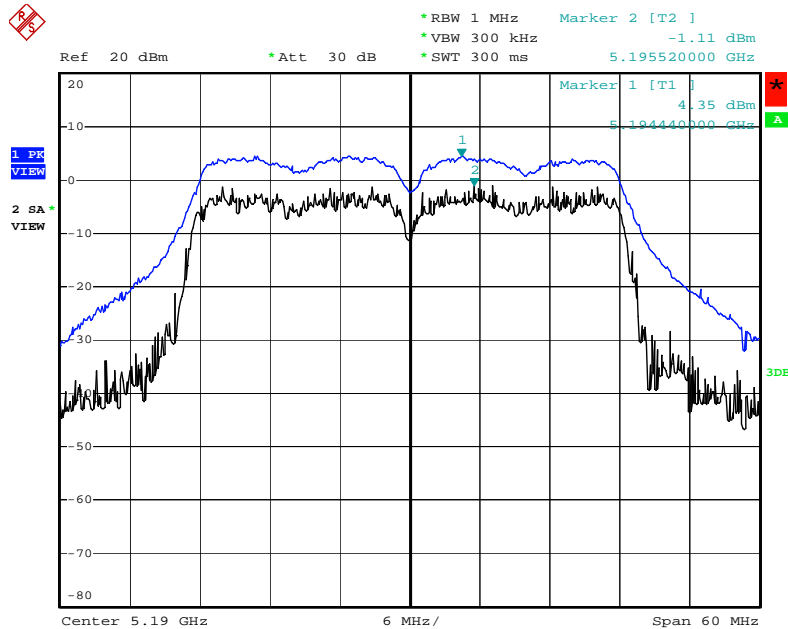
Date: 24.APR.2009 04:06:16

Peak Excursion Plot on Configuration Drafft n MCS0 20MHz Ant. 1 + Ant. 2 / 5700 MHz



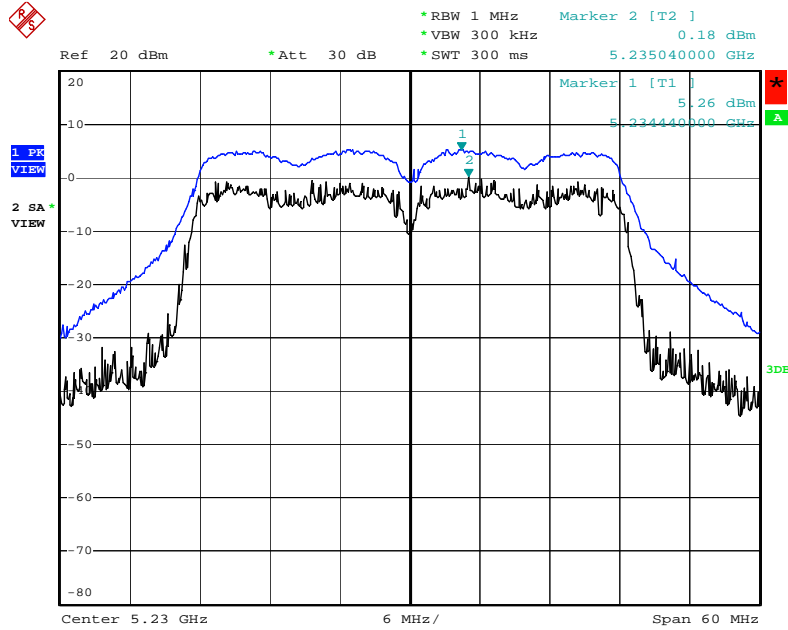
Date: 24.APR.2009 04:05:17

Peak Excursion Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5190 MHz



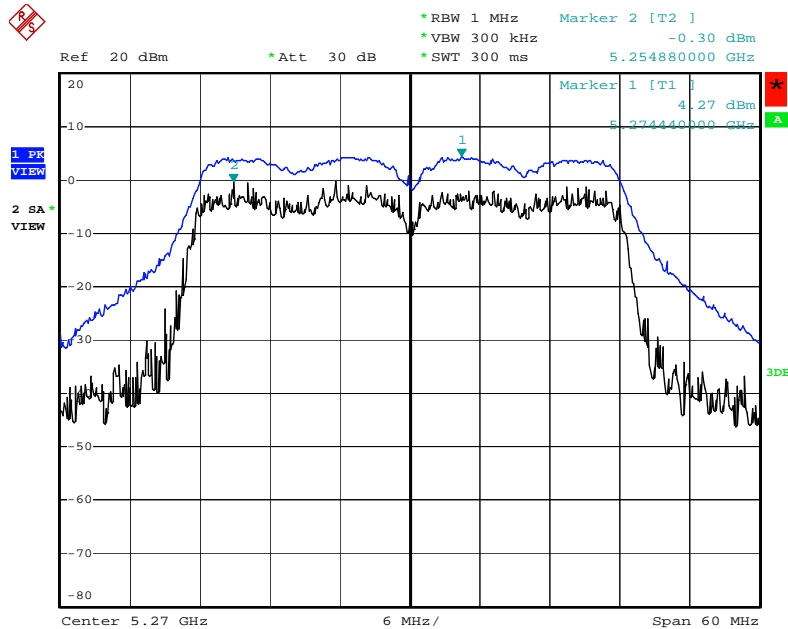
Date: 24.APR.2009 04:14:54

Peak Excursion Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5230 MHz



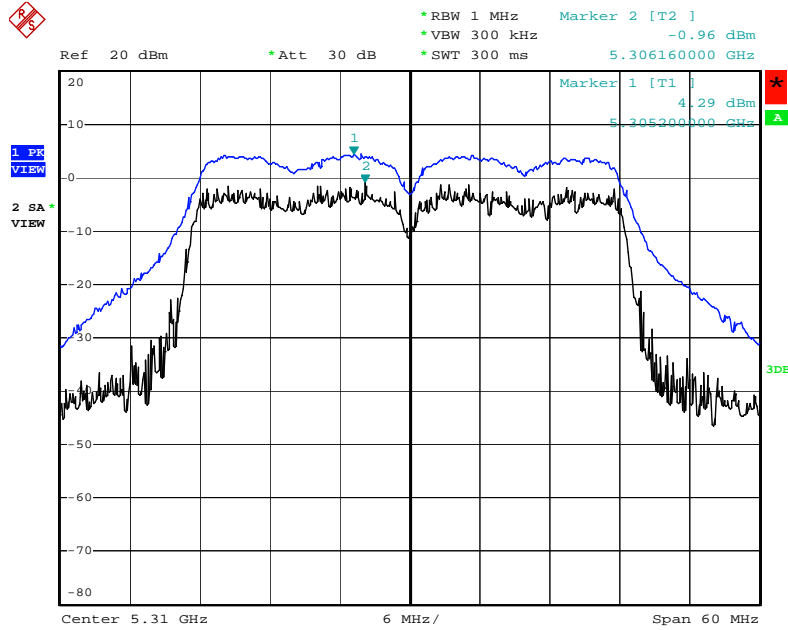
Date: 24.APR.2009 04:15:52

Peak Excursion Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5270 MHz



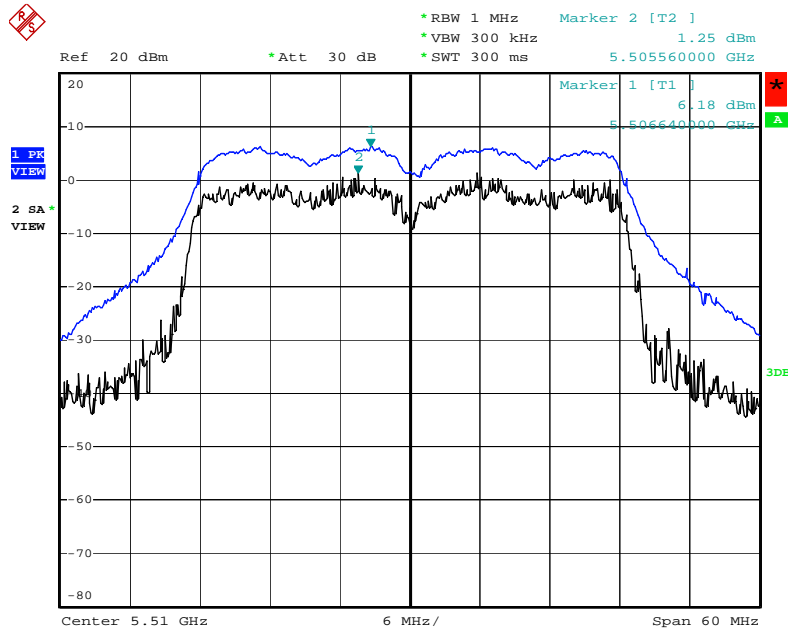
Date: 24.APR.2009 04:16:55

Peak Excursion Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5310 MHz



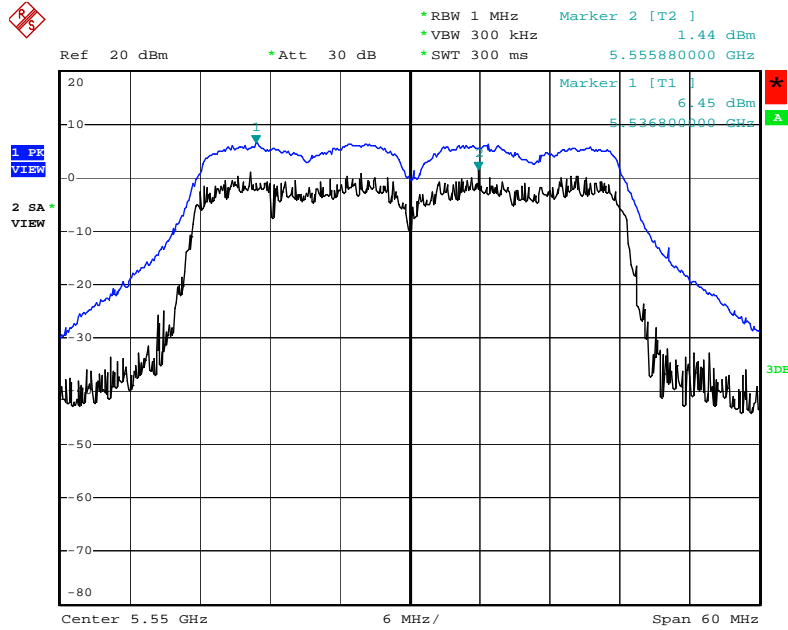
Date: 24.APR.2009 04:17:49

Peak Excursion Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5510MHz



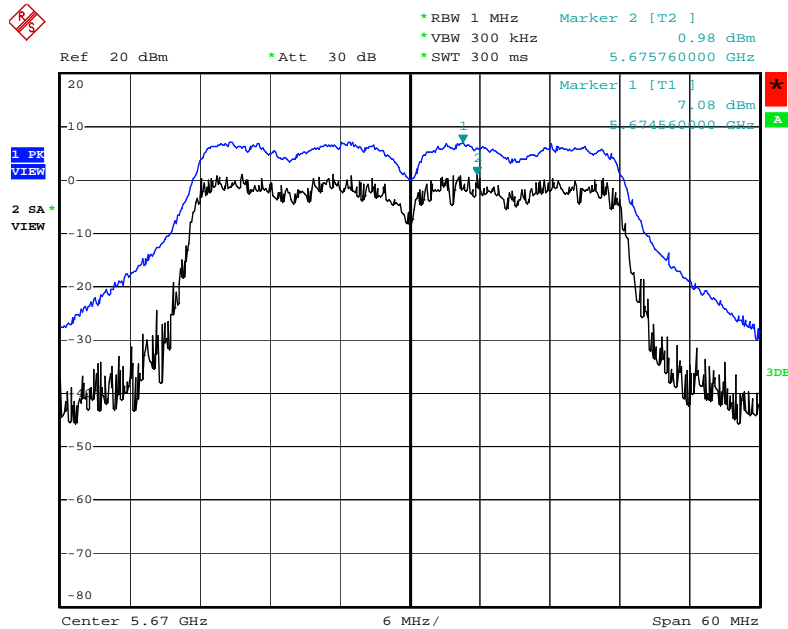
Date: 24.APR.2009 04:19:11

Peak Excursion Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5550 MHz



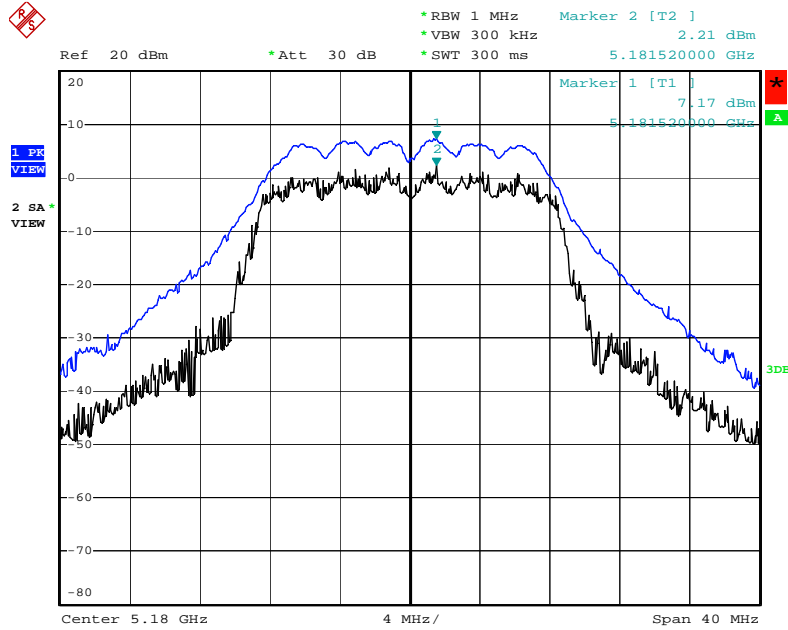
Date: 24.APR.2009 04:20:27

Peak Excursion Plot on Configuration Drafft n MCS0 40MHz Ant. 1 + Ant. 2 / 5670 MHz



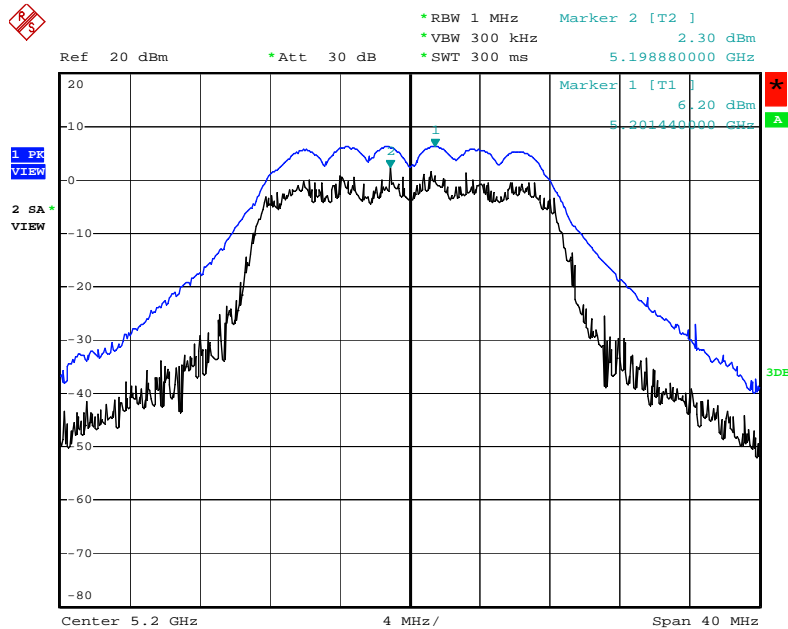
Date: 24.APR.2009 04:21:22

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5180 MHz



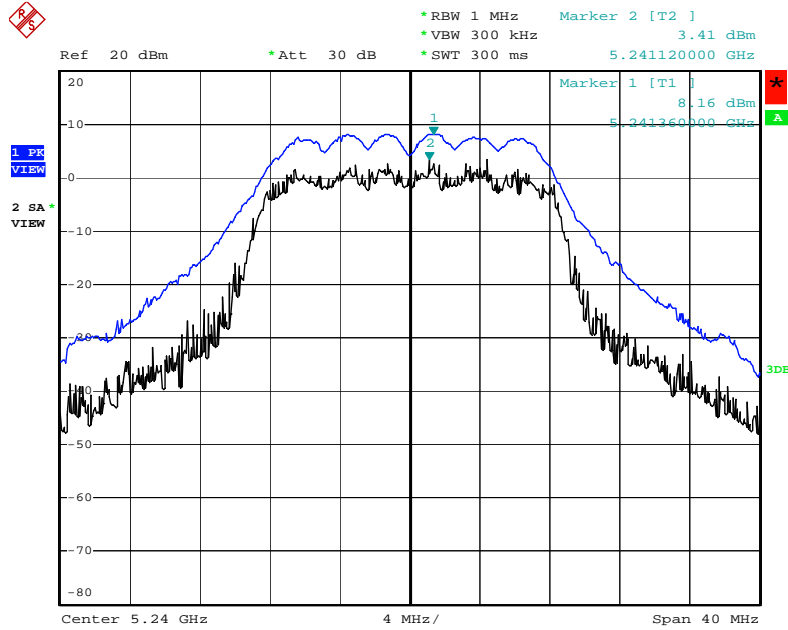
Date: 24.APR.2009 03:55:38

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5200 MHz



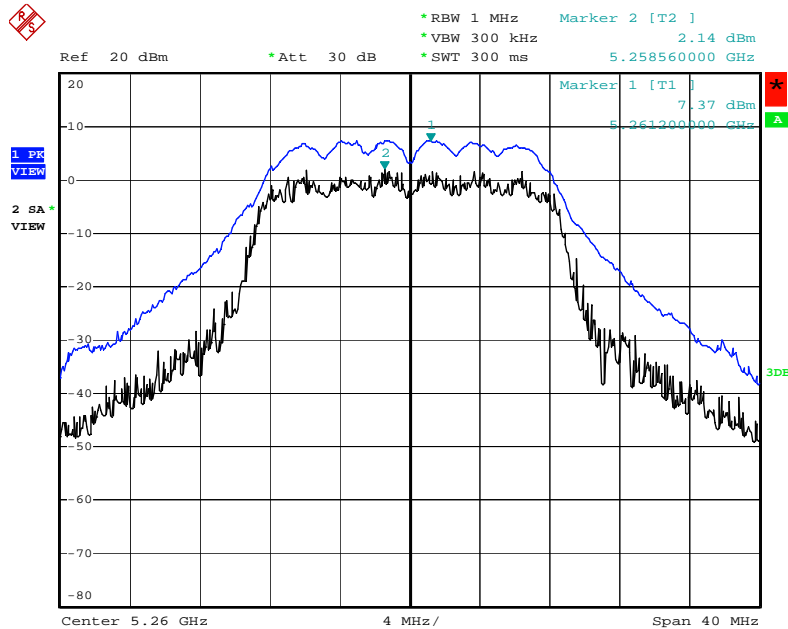
Date: 24.APR.2009 03:57:03

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5240 MHz



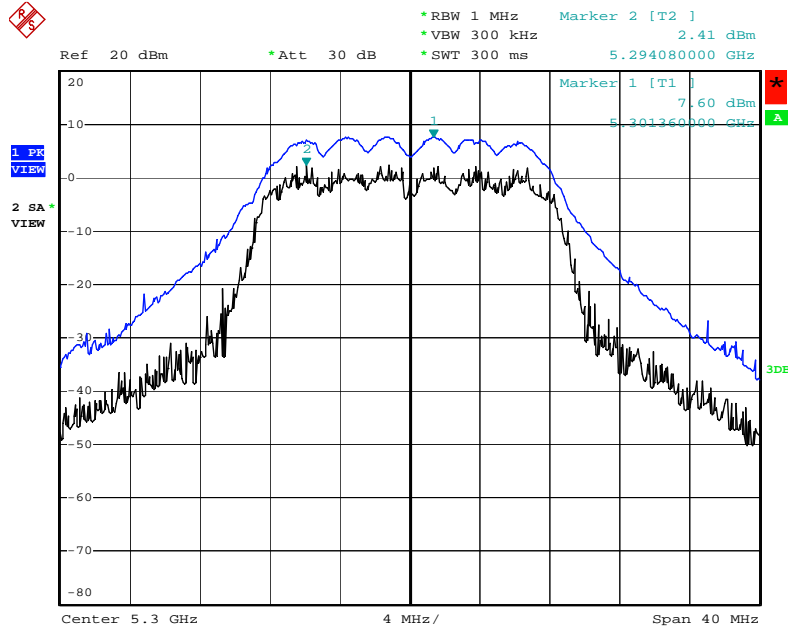
Date: 24.APR.2009 03:58:11

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5260 MHz



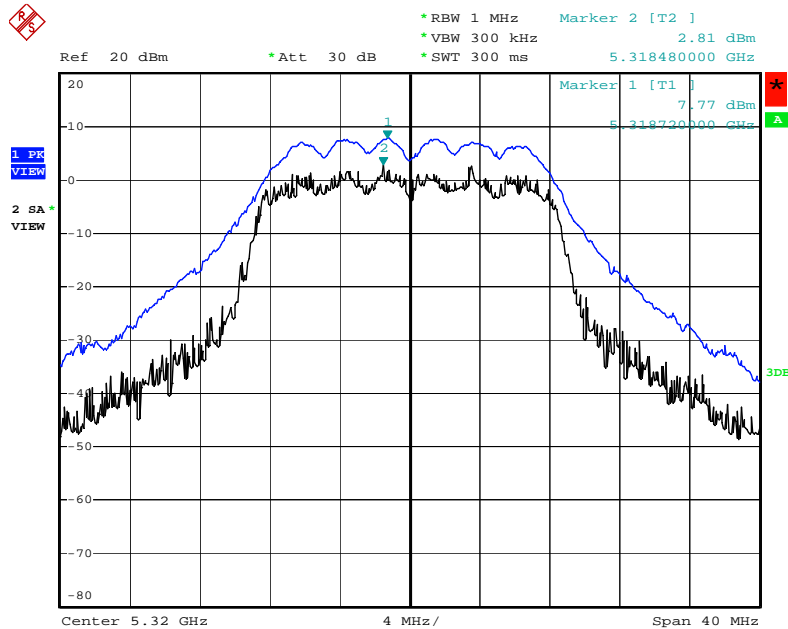
Date: 24.APR.2009 03:59:06

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5300 MHz



Date: 24.APR.2009 04:00:03

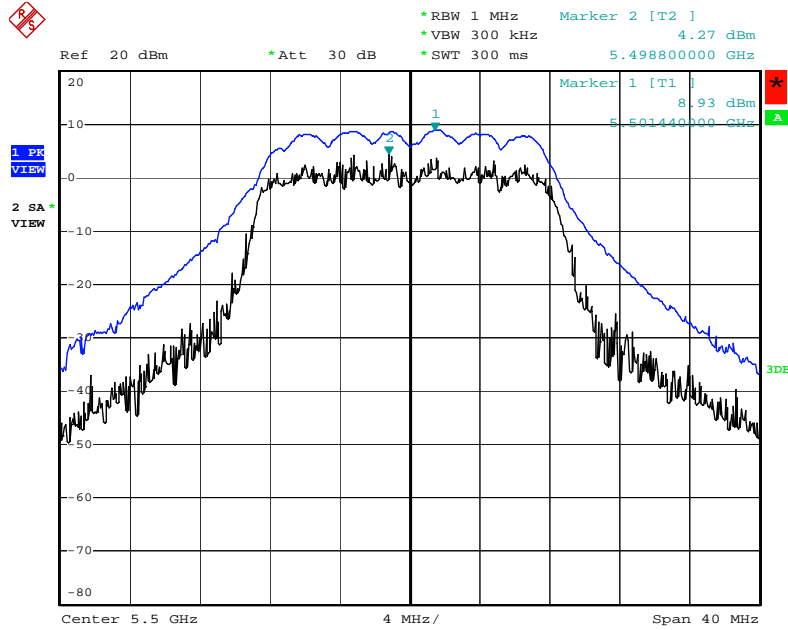
Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5320 MHz



Date: 24.APR.2009 04:00:54

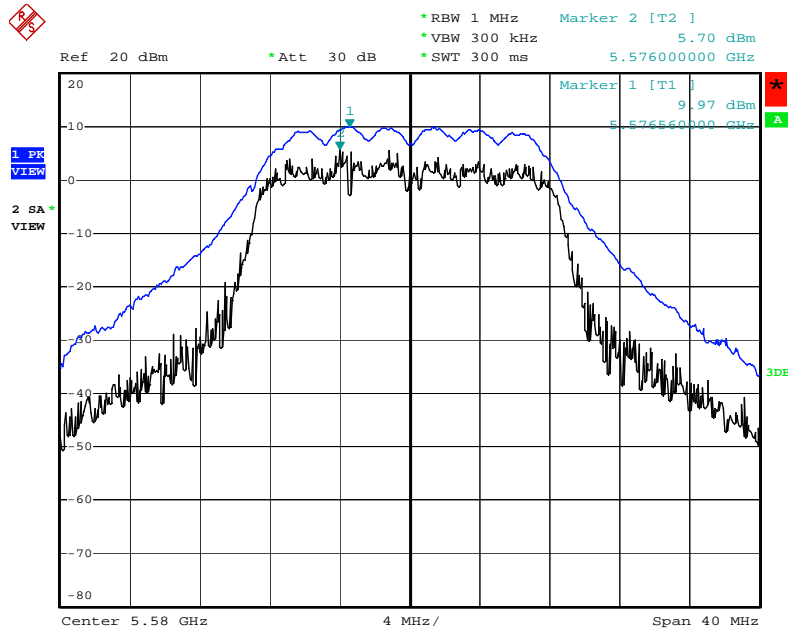


Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5500 MHz



Date: 24.APR.2009 04:01:57

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 1 + Ant. 2 / 5580 MHz



Date: 24.APR.2009 04:03:07



## 4.6. Radiated Emissions Measurement

### 4.6.1. 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 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, in case the emission falls 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

### 4.6.2. Measuring Instruments and Setting

Please refer to section 5 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)	1000KHz / 1000KHz for peak

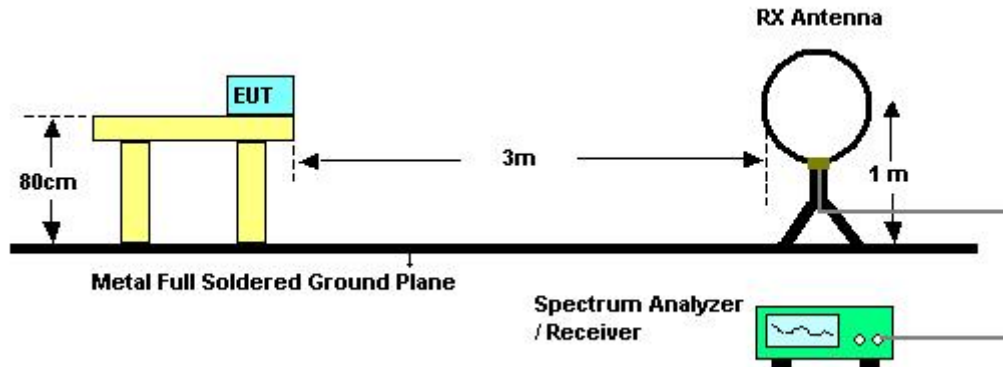
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

#### 4.6.3. Test Procedures

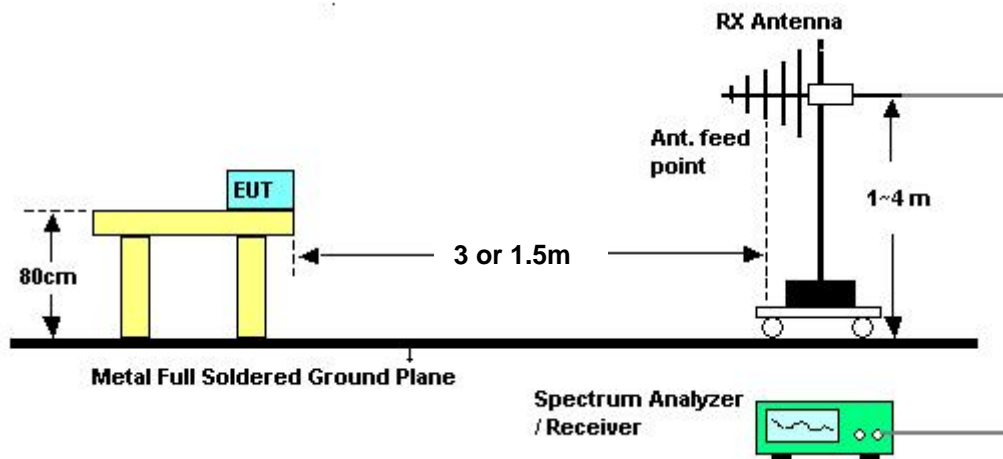
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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.

#### 4.6.4. 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 1.5m.

Distance extrapolation factor =  $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

#### 4.6.5. Test Deviation

There is no deviation with the original standard.

#### 4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Results of Radiated Emissions (9kHz~30MHz)

<b>Temperature</b>	24.3°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Roy Huang	<b>Configurations</b>	Normal Link

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.

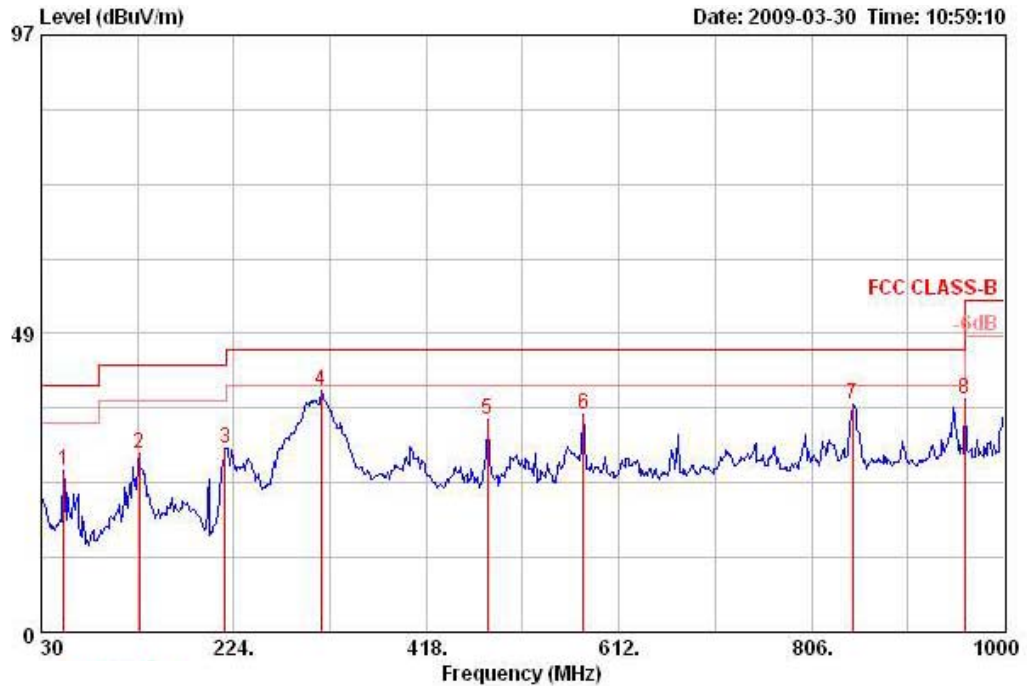
Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB);

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

4.6.8. Results of Radiated Emissions (30MHz~1GHz)

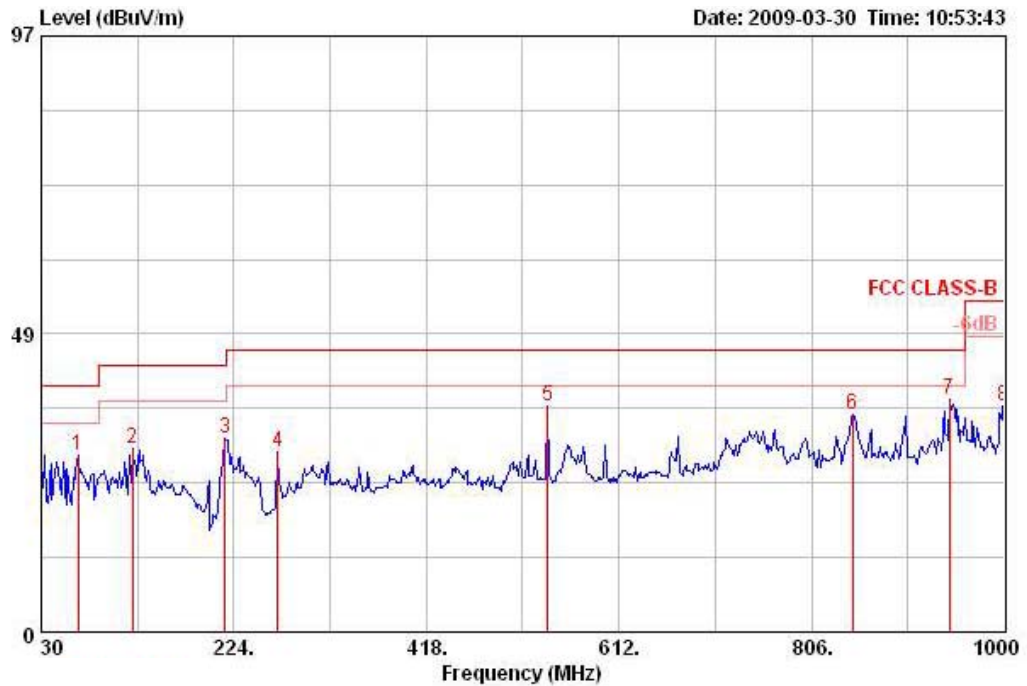
Temperature	24.3°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Normal Link / Mode 2

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	52.310	26.34	-13.66	40.00	45.22	8.18	27.79	0.74	Peak	HORIZONTAL	0	100
2	128.940	28.91	-14.59	43.50	42.82	12.25	27.45	1.29	Peak	HORIZONTAL	0	100
3	215.270	29.97	-13.53	43.50	45.09	10.19	27.07	1.76	Peak	HORIZONTAL	0	100
4	312.270	39.15	-6.85	46.00	50.30	13.70	26.98	2.13	Peak	HORIZONTAL	233	100
5	479.110	34.64	-11.36	46.00	42.68	17.30	27.99	2.66	Peak	HORIZONTAL	0	100
6	576.110	35.25	-10.75	46.00	42.00	18.49	28.10	2.85	Peak	HORIZONTAL	0	100
7	847.710	36.95	-9.05	46.00	40.93	20.13	27.51	3.40	Peak	HORIZONTAL	0	100
8	960.230	37.92	-16.08	54.00	40.47	20.99	27.16	3.62	Peak	HORIZONTAL	0	100

**Vertical**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	66.860	28.87	-11.13	40.00	49.06	6.68	27.73	0.86	Peak	VERTICAL	0	400
2	122.150	29.83	-13.67	43.50	43.70	12.40	27.49	1.22	Peak	VERTICAL	0	400
3	215.270	31.44	-12.06	43.50	46.56	10.19	27.07	1.76	Peak	VERTICAL	0	400
4	268.620	29.20	-16.80	46.00	41.20	12.99	26.96	1.97	Peak	VERTICAL	0	400
5	540.220	36.66	-9.34	46.00	43.90	18.08	28.10	2.78	Peak	VERTICAL	0	400
6	847.710	35.30	-10.70	46.00	39.28	20.13	27.51	3.40	Peak	VERTICAL	0	400
7	944.710	37.84	-8.16	46.00	40.59	20.87	27.22	3.60	Peak	VERTICAL	121	100
8	1000.000	36.68	-17.32	54.00	38.69	21.29	27.00	3.70	Peak	VERTICAL	0	400

**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).

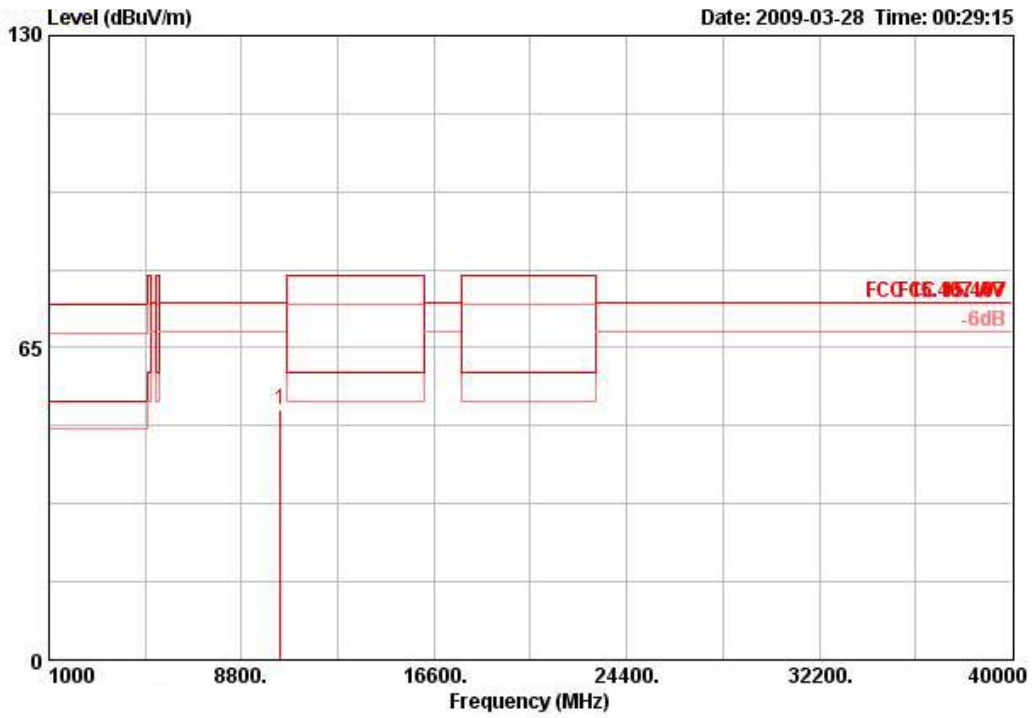
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.



4.6.9. Results for Radiated Emissions (1GHz~40GHz)

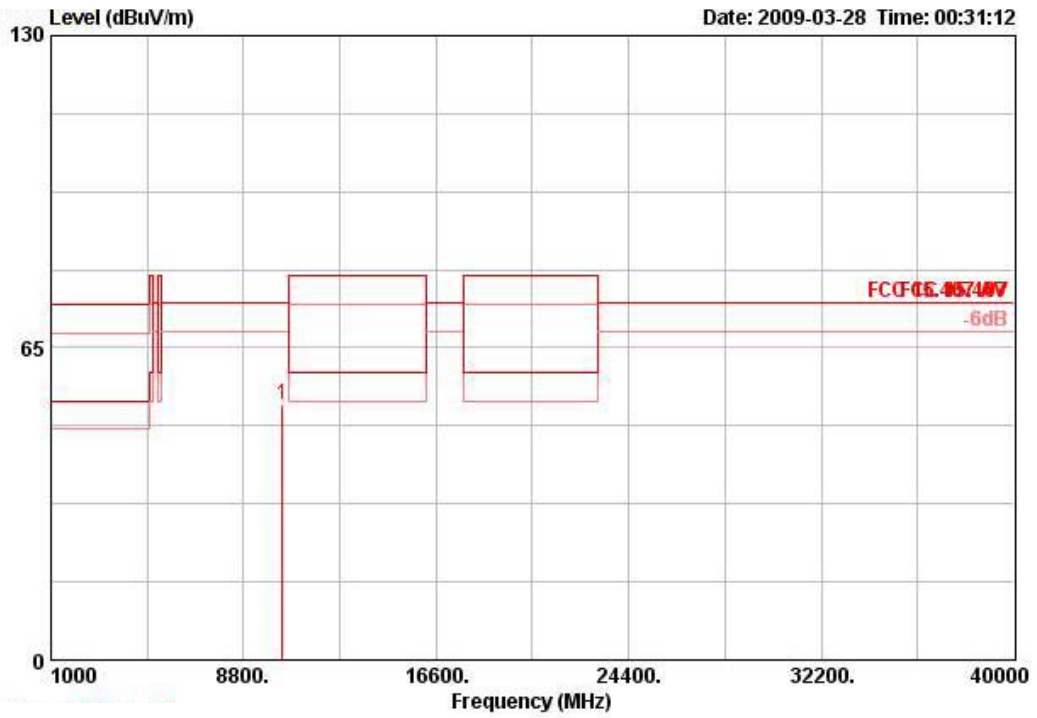
Temperature	24.3°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 20MHz Ch 36 / Ant. 1 + Ant. 2

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Antenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	10356.580	52.02	-22.28	74.30	43.12	38.51	5.75	35.36	PEAK	100	360	HORIZONTAL

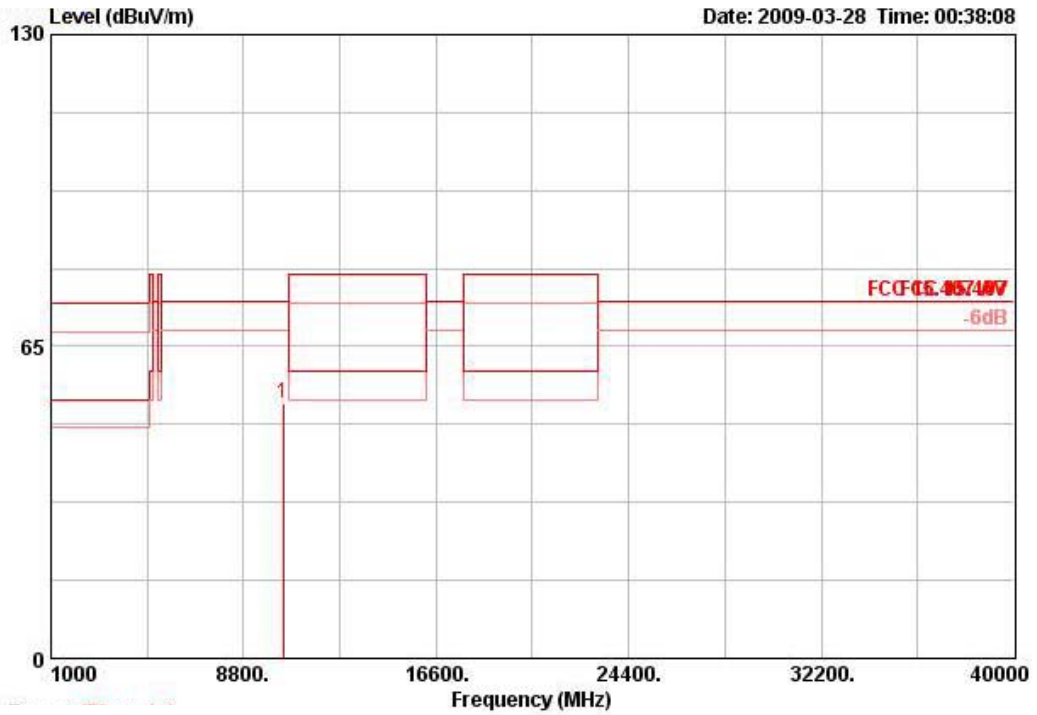
Vertical



	Over	Limit	Read	Antenna	Cable	Preamp		Ant	Table
Freq	Level	Limit	Level	Factor	Loss	Factor	Remark	Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
10358.420	53.29	-21.01	74.30	44.40	38.51	5.75	35.36 PEAK	100	0 VERTICAL

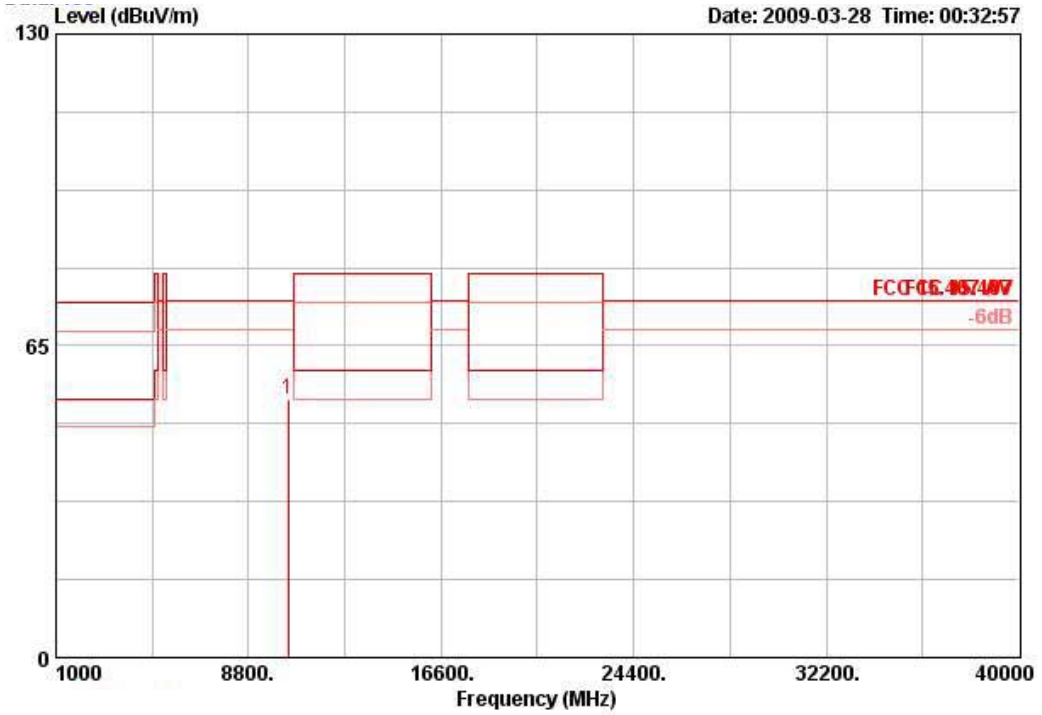
<b>Temperature</b>	24.3°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Roy Huang	<b>Configurations</b>	Draft n MCS0 20MHz Ch 40 / Ant. 1 + Ant. 2

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	10396.960	53.01	-21.29	74.30	44.00	38.54	5.77	35.30	PEAK	100	0	HORIZONTAL

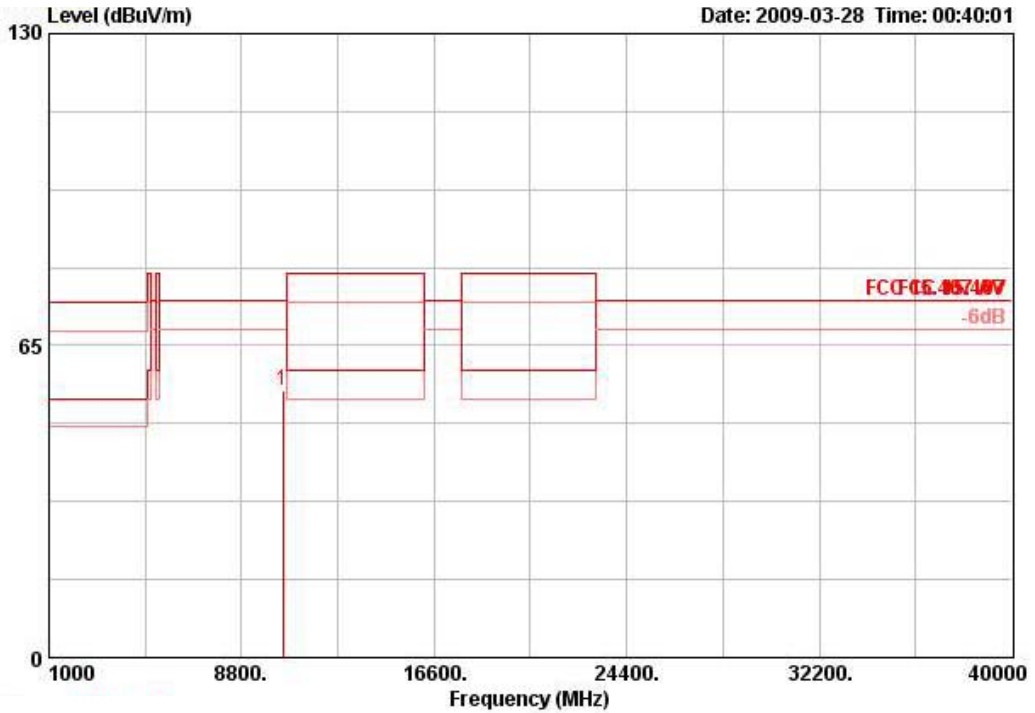
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	10399.500	53.72	-20.58	74.30	44.71	38.54	5.77	35.30	PEAK	100	360	VERTICAL

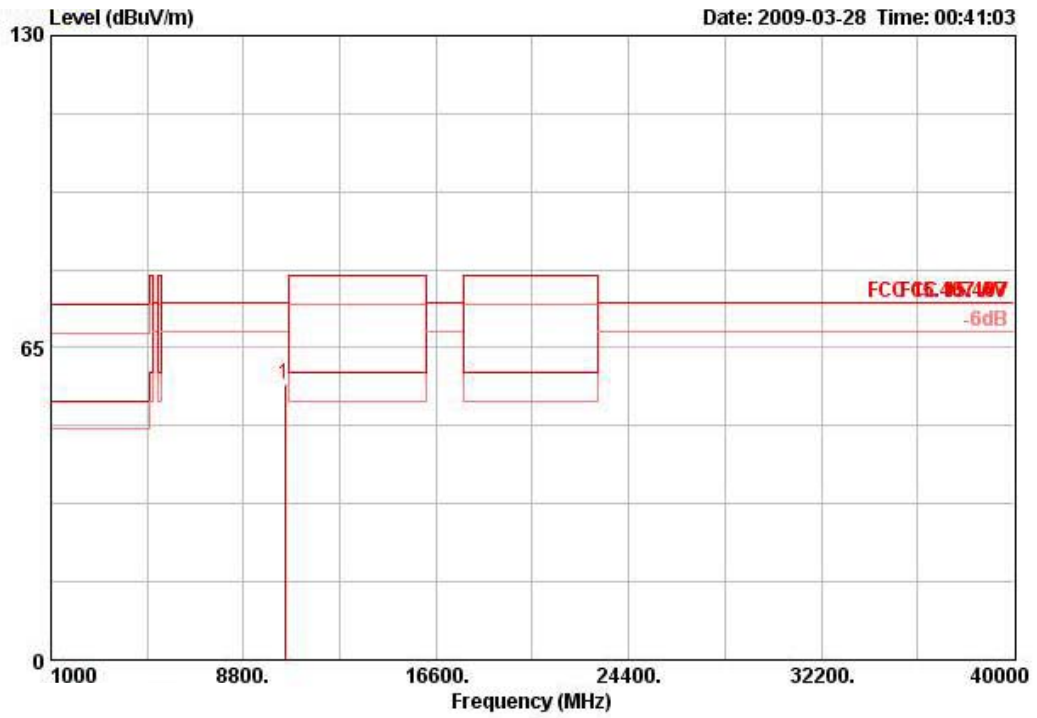
<b>Temperature</b>	24.3°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Roy Huang	<b>Configurations</b>	Draft n MCS0 20MHz Ch 48 / Ant. 1 + Ant. 2

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Antenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	10481.200	55.58	-18.72	74.30	46.39	38.59	5.81	35.21	PEAK	100	359	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	10478.400	57.34	-16.96	74.30	48.16	38.59	5.81	35.21	PEAK	100	0	VERTICAL