SPORTON International Inc.
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FCC RADIO TEST REPORT

Applicant's company	**D-Link Co.**
Applicant Address	No.289, Shinhu 3rd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.
FCC ID	**KA2WA160B1**
Manufacturer's company	**Alpha Networks Inc.**
Manufacturer Address	1.No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C. 2.Jiekou Administration Zone, Canghan Town, Dongguan City, Guangdong Province, China

Product Name	Xtreme N Dual Band USB Adapter
Brand Name	D-Link
Model Name	DWA-160
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Nov. 26, 2007
Final Test Date	Feb. 02, 2008
Submission Type	Original Equipment
Operating Mode	Client (without radar detection function)

Statement

Test result included is only for the Draft n (5150 ~ 5350MHz / 5470 ~ 5725MHz) of the product.

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

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

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

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

Testing Laboratory
1190

Table of Contents

History of This Test Report

Original Issue Date: Feb. 25, 2008

Report No.: FR7D1705AA

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Xtreme N Dual Band USB Adapter
Brand Name	:	D-Link
Model Name	:	DWA-160
Applicant	:	D-Link Co.
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 Nov. 26, 2007 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Wayne Hsu
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	6.24 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	1.12 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.50 dB
4.5	15.407(a)	Peak Excursion	Complies	7.63 dB
4.6	15.407(b)	Radiated Emissions	Complies	1.20 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.13 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	$\pm 8.5 \times 10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

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	9 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS8 (20MHz) : 17.82 MHz MCS8 (40MHz) : 36.41 MHz
Conducted Output Power	Band 1: MCS8 (20MHz) : 14.65 dBm MCS8 (40MHz) : 15.88 dBm Band 2: MCS8 (20MHz) : 16.21 dBm MCS8 (40MHz) : 15.36 dBm Band 3: MCS8 (20MHz) : 16.91 dBm MCS8 (40MHz) : 16.32 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

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

Draft n spec

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

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

3.2. Accessories

Others
USB Cable: 1.4m, Shielded

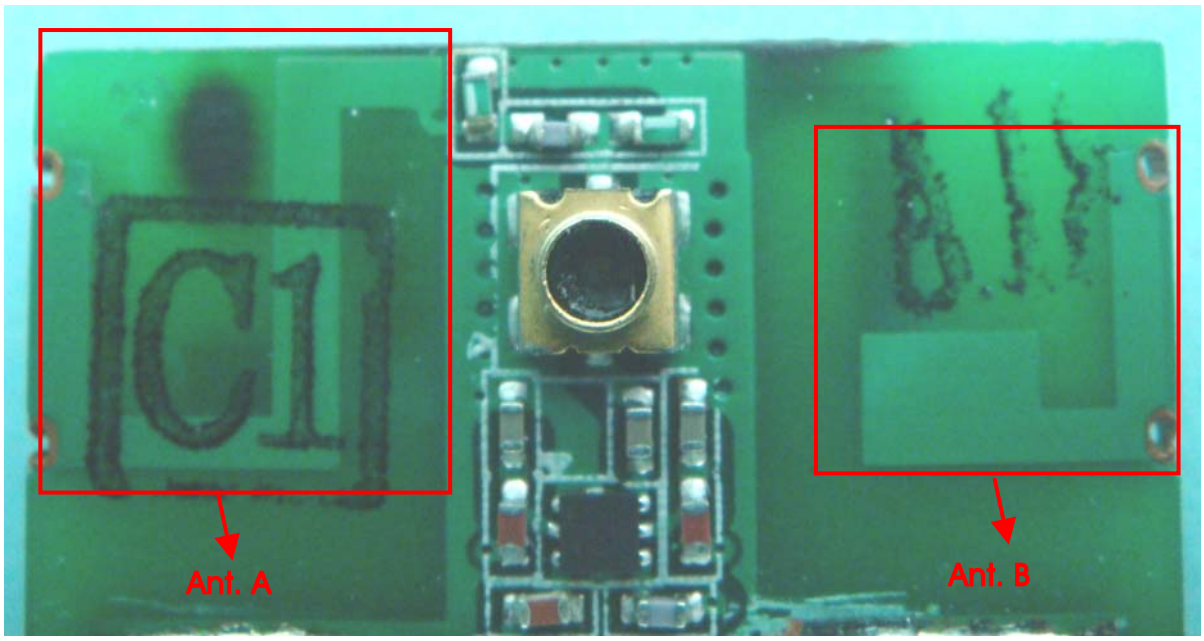
3.3. Table for Filed Antenna

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A	Wha Yu	N/A	Printed Antenna	N/A	3.88	TX / RX Ant.
B	Wha Yu	N/A	Printed Antenna	N/A	3.88	TX / RX Ant.

Note : The EUT has two antennas.

Ant. A & Ant. B could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are two bandwidth systems for draft n.

For both 20MHz bandwidth systems, use Channel 36, 40, 48, 52, 60, 64, 100, 120, 140.

For both 40MHz bandwidth systems, use Channel 38, 46, 54, 62, 102, 118, 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 / Mode 2		Auto	-	-
Max. Conducted Output Power	MCS8/20MHz	Band 1~2	13Mbps	36/40/48/52/60/64	A / B / A+B
		Band 3	13Mbps	100/120/140	A / B / A+B
	MCS8/40MHz	Band 1~2	27Mbps	38/46/54/62	A / B / A+B
		Band 3	27Mbps	102/118/134	A+B
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	MCS8/20MHz	Band 1~2	13Mbps	36/40/48/52/60/64	A+B
		Band 3	13Mbps	100/120/140	A+B
	MCS8/40MHz	Band 1~2	27Mbps	38/46/54/62	A+B
		Band 3	27Mbps	102/118/134	A+B
Radiated Emission Below 1GHz	Normal Link / Mode 2		Auto	-	-
Radiated Emission Above 1GHz	MCS8/20MHz	Band 1~2	13Mbps	36/40/48/52/60/64	A+B
		Band 3	13Mbps	100/120/140	A+B
	MCS8/40MHz	Band 1~2	27Mbps	38/46/54/62	A+B
		Band 3	27Mbps	102/118/134	A+B
Band Edge Emission	MCS8/20MHz	Band 1~2	13Mbps	36/40/60/64	A+B
		Band 3	13Mbps	100/140	A+B
	MCS8/40MHz	Band 1~2	27Mbps	38/46/54/62	A+B
		Band 3	27Mbps	102/118/134	A+B
Frequency Stability	Un-modulation		-	52	A+B

The following test modes were performed for all tests:

Mode 1: Dongle mode

Mode 2: Dongle +USB Cable mode

Cause "mode 2"generated the worst test result, it was reported as final data.

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	QSKY	Lx-619B	DoC
Modem	ACEEX	DM1414	IFAXDM1414
Printer	EPSON	LQ-300	DoC
Wireless AP	Planex	GW-AP54SGX	DoC

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 MCS8 20MHz Ant. A+ Ant. B

Test Software Version	QA					
Frequency	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz
Draft n	03/05	03/04	01/04	03/07	04/08	05/08
Frequency	5500 MHz		5600 MHz		5700 MHz	
Draft n	07/0D		07/0C		08/0A	

Power Parameters of Draft n MCS8 40MHz Ant. A+ Ant. B

Test Software Version	QA						
Frequency	5190 MHz	5230 MHz	5270 MHz	5310 MHz	5510MHz	5590 MHz	5670 MHz
Draft n A	03/06	02/07	02/07	02/06	05/0B	09/0D	08/0B

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 printer, then the printer prints them on the paper.

d. The NB sends " H " messages to the modem.

e. Repeat the steps from b to d.

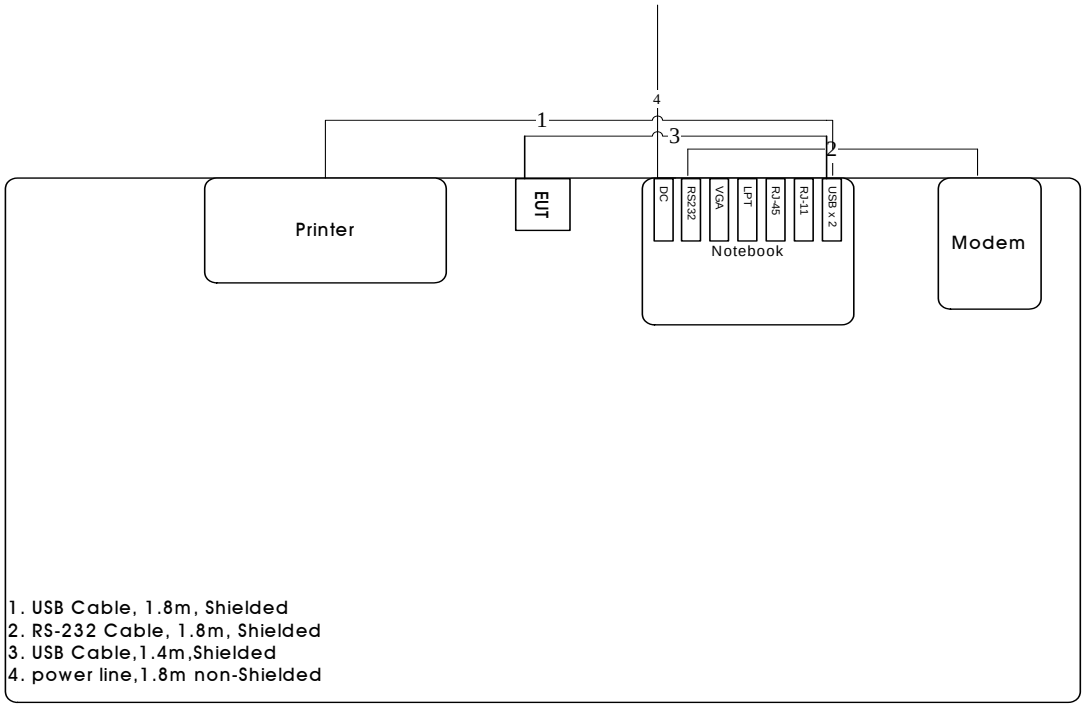
At the same time, "QA" was executed to control the EUT continuously transmit RF signal.

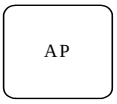
Executed "ping.exe" to link with the remote workstation to receive and transmit signal by WLAN.

3.9. Test Configurations

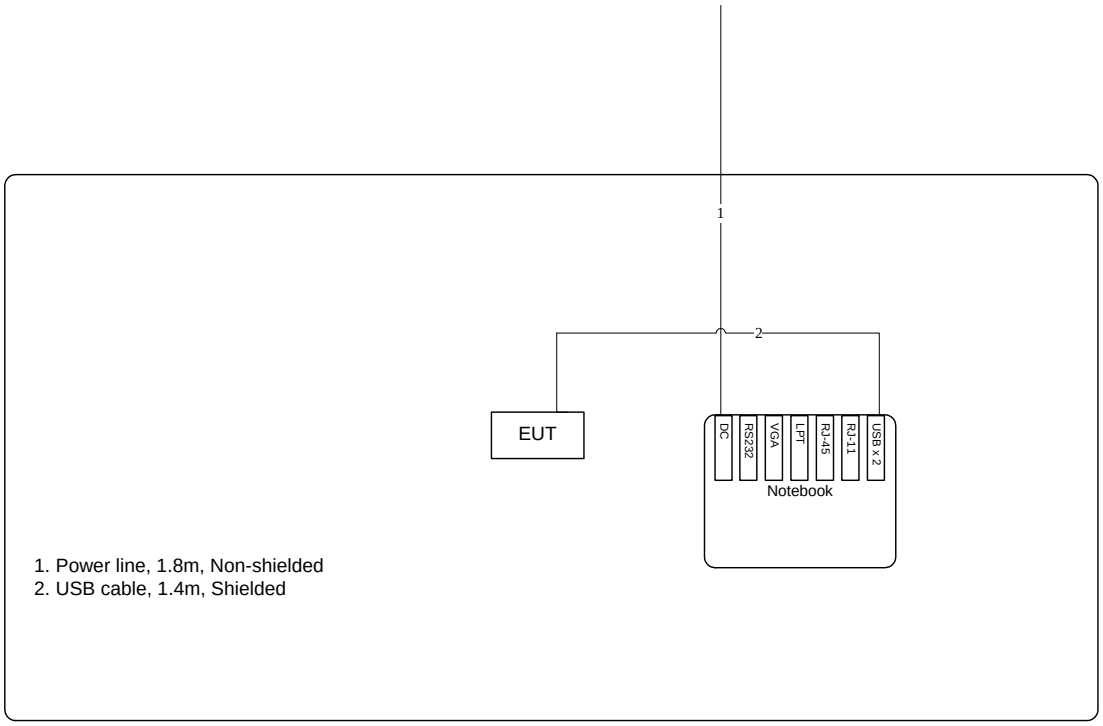
3.9.1. Radiation Emissions Test Configuration

Test Configuration: 9KHz~1GHz

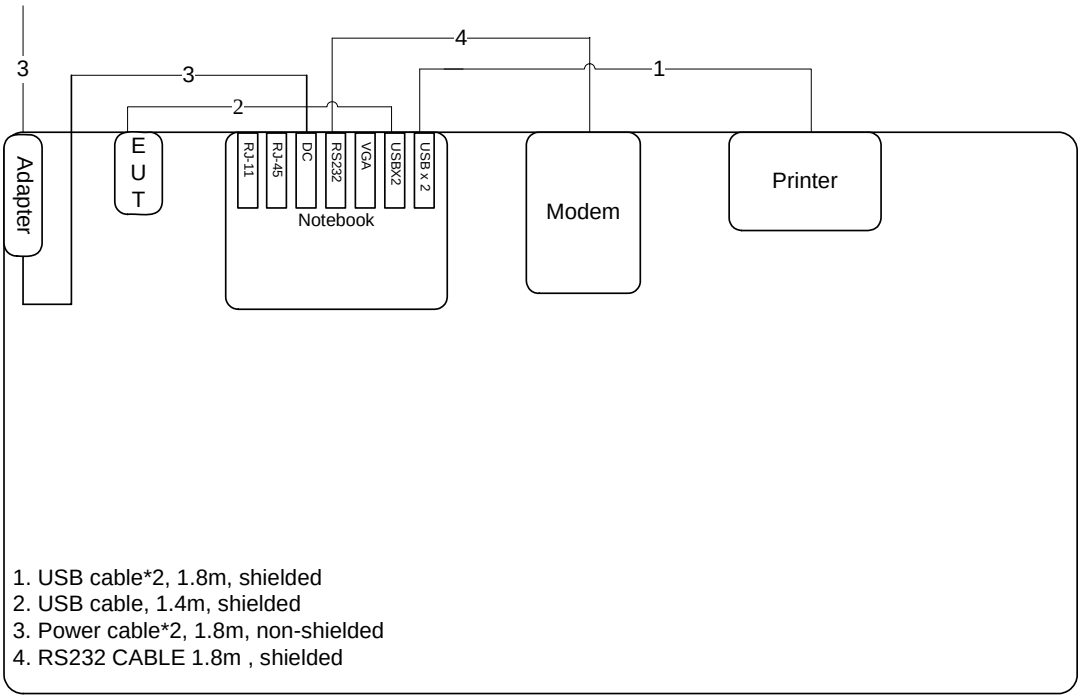




Test Configuration: above 1GHz



3.9.2. AC Power Line Conduction Emissions Test Configuration



1. USB cable*2, 1.8m, shielded
2. USB cable, 1.4m, shielded
3. Power cable*2, 1.8m, non-shielded
4. RS232 CABLE 1.8m , shielded

AP

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

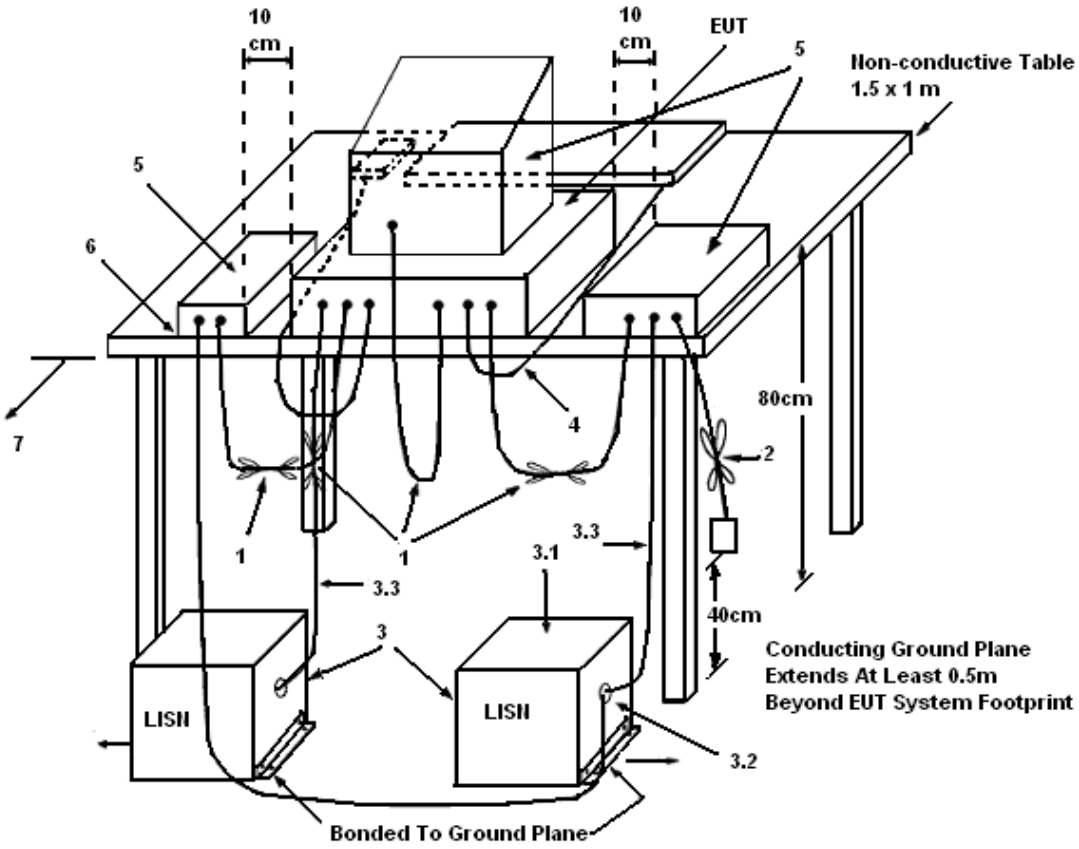
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

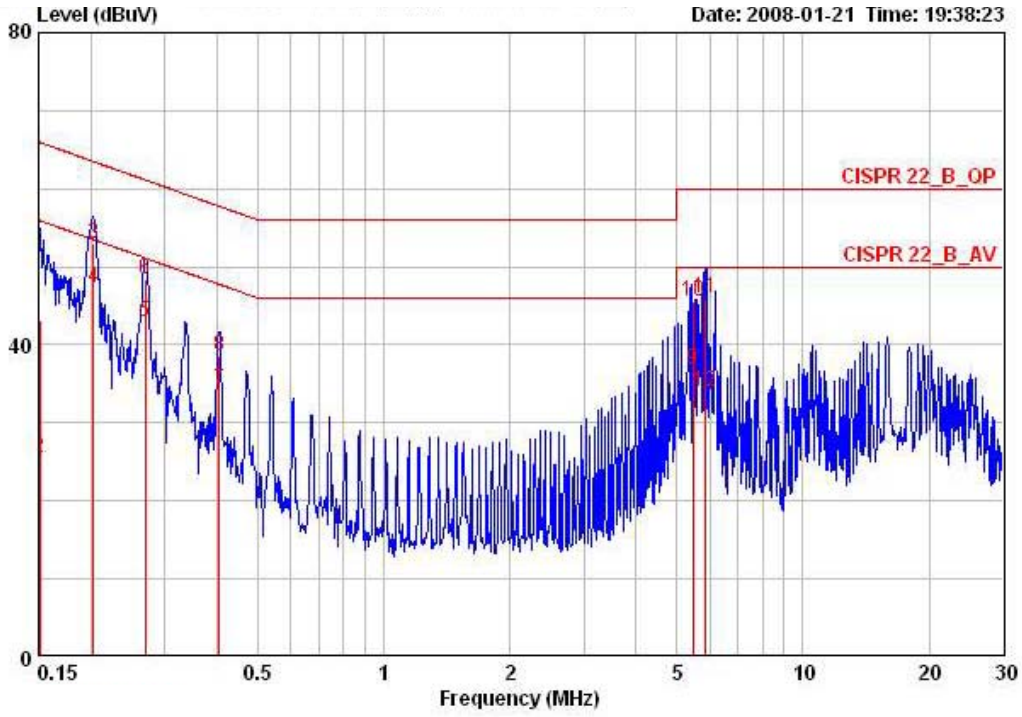
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

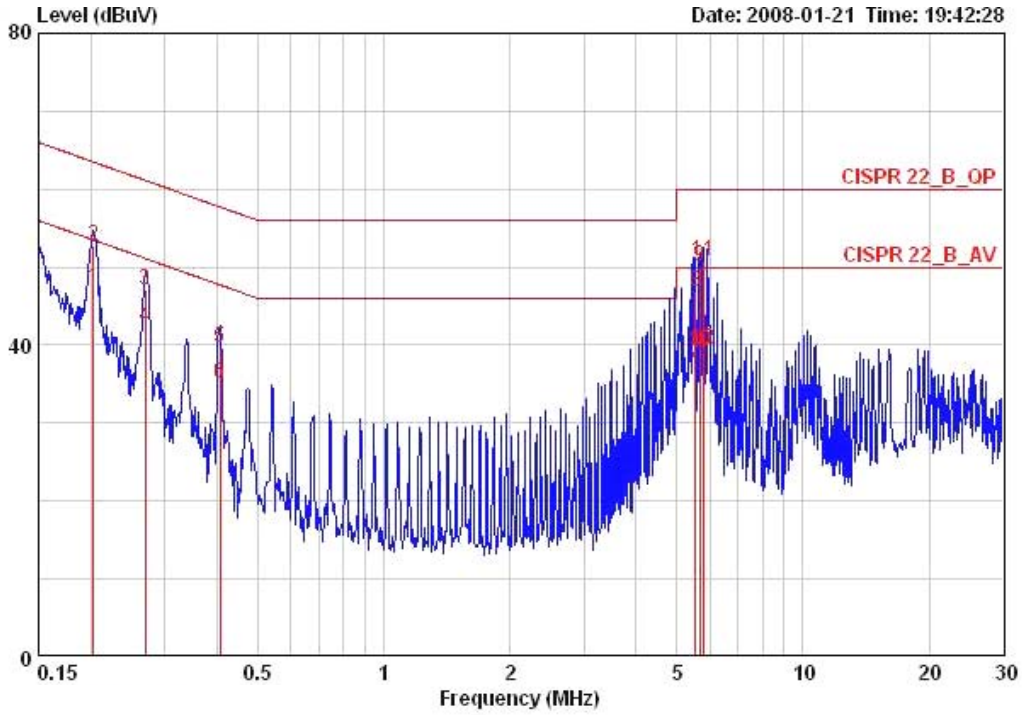
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23℃	Humidity	54%
Test Engineer	Cloud Peng	Phase	Line
Configuration	Mode 2		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15080	43.16	-22.80	65.96	42.76	0.20	0.20	QP	LINE
2	0.15080	25.44	-30.52	55.96	25.04	0.20	0.20	AVERAGE	LINE
3	0.20289	52.89	-10.60	63.49	52.59	0.10	0.20	QP	LINE
4 @	0.20289	47.25	-6.24	53.49	46.95	0.10	0.20	AVERAGE	LINE
5	0.27009	43.02	-8.10	51.12	42.72	0.10	0.20	AVERAGE	LINE
6	0.27009	48.48	-12.64	61.12	48.18	0.10	0.20	QP	LINE
7	0.40400	34.15	-13.63	47.77	33.85	0.10	0.20	AVERAGE	LINE
8	0.40400	38.68	-19.10	57.77	38.38	0.10	0.20	QP	LINE
9	5.467	36.80	-13.20	50.00	36.48	0.02	0.30	AVERAGE	LINE
10	5.467	45.60	-14.40	60.00	45.28	0.02	0.30	QP	LINE
11	5.867	45.95	-14.05	60.00	45.62	0.03	0.30	QP	LINE
12	5.867	33.96	-16.04	50.00	33.63	0.03	0.30	AVERAGE	LINE

Temperature	23℃	Humidity	54%
Test Engineer	Cloud Peng	Phase	Neutral
Configuration	Mode 2		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1 @	0.20289	47.23	-6.26	53.49	46.83	0.20	0.20	AVERAGE	NEUTRAL
2	0.20289	52.68	-10.81	63.49	52.28	0.20	0.20	QP	NEUTRAL
3	0.27009	47.17	-13.95	61.12	46.80	0.17	0.20	QP	NEUTRAL
4	0.27009	42.33	-8.79	51.12	41.96	0.17	0.20	AVERAGE	NEUTRAL
5	0.40615	39.77	-17.96	57.73	39.47	0.10	0.20	QP	NEUTRAL
6	0.40615	35.07	-12.66	47.73	34.77	0.10	0.20	AVERAGE	NEUTRAL
7	5.551	37.82	-12.18	50.00	37.42	0.10	0.30	AVERAGE	NEUTRAL
8	5.551	46.96	-13.04	60.00	46.56	0.10	0.30	QP	NEUTRAL
9	5.683	50.08	-9.92	60.00	49.68	0.10	0.30	QP	NEUTRAL
10	5.683	39.31	-10.69	50.00	38.91	0.10	0.30	AVERAGE	NEUTRAL
11	5.813	50.87	-9.13	60.00	50.47	0.10	0.30	QP	NEUTRAL
12	5.813	39.43	-10.57	50.00	39.03	0.10	0.30	AVERAGE	NEUTRAL

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

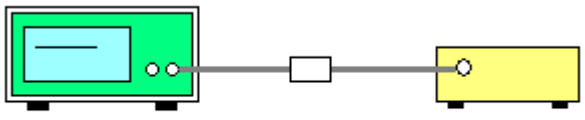
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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℃	Humidity	56%
Test Engineer	Jacky Ho	Configurations	802.11a Draft n

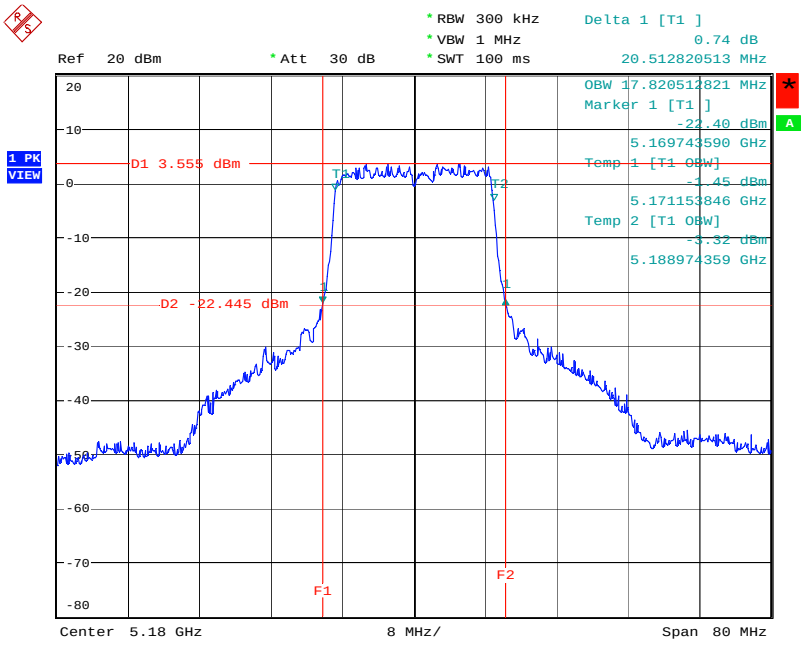
Configuration Draft n MCS8 20MHz Ant. A + Ant. B

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	20.51	17.82
40	5200 MHz	20.38	17.82
48	5240 MHz	20.51	17.82
52	5260 MHz	24.61	17.69
60	5300 MHz	20.51	17.82
64	5320 MHz	22.43	17.82
100	5500 MHz	20.12	17.82
120	5600 MHz	22.56	17.82
140	5700 MHz	25.64	17.82

Configuration Draft n MCS8 40MHz Ant. A + Ant. B

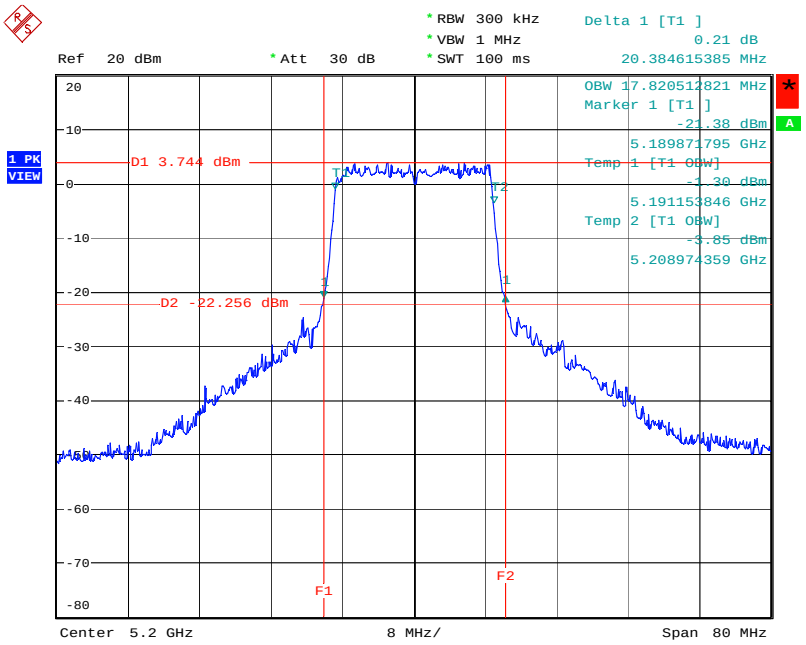
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	39.87	36.02
46	5230 MHz	40.25	36.15
54	5270 MHz	40.00	36.15
62	5310 MHz	39.74	36.15
102	5510MHz	40.25	36.15
118	5590 MHz	48.20	36.28
134	5670 MHz	43.46	36.41

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5180 MHz



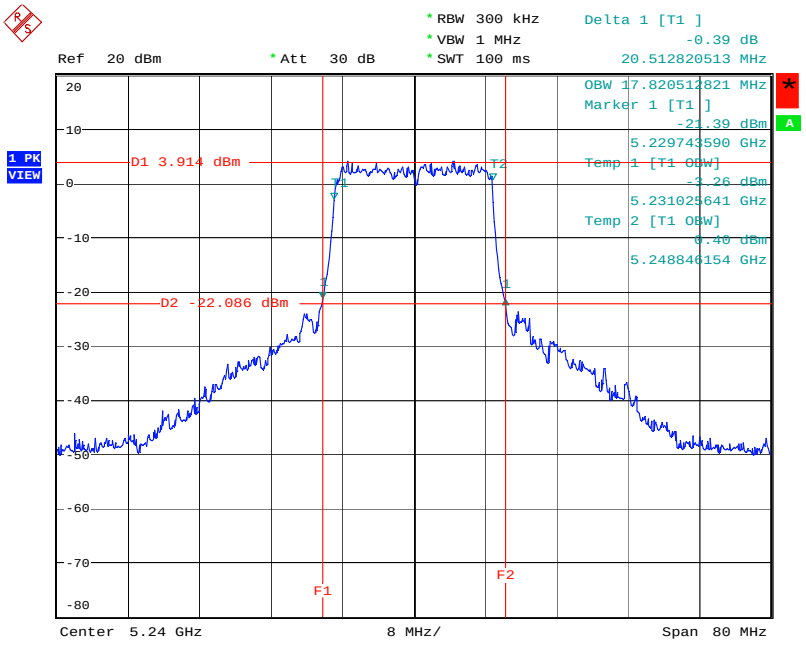
Date: 2.FEB.2008 10:55:37

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5200 MHz



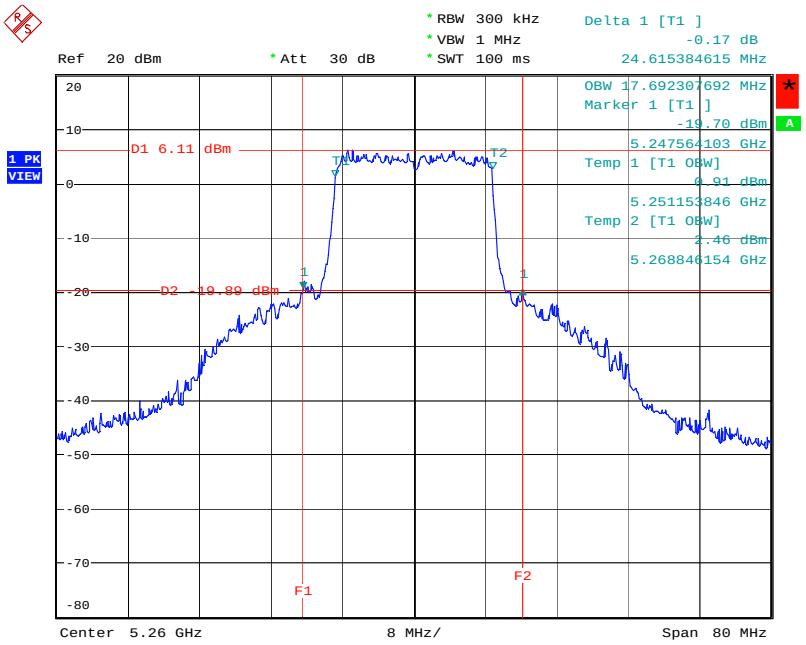
Date: 2.FEB.2008 11:00:32

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5240 MHz



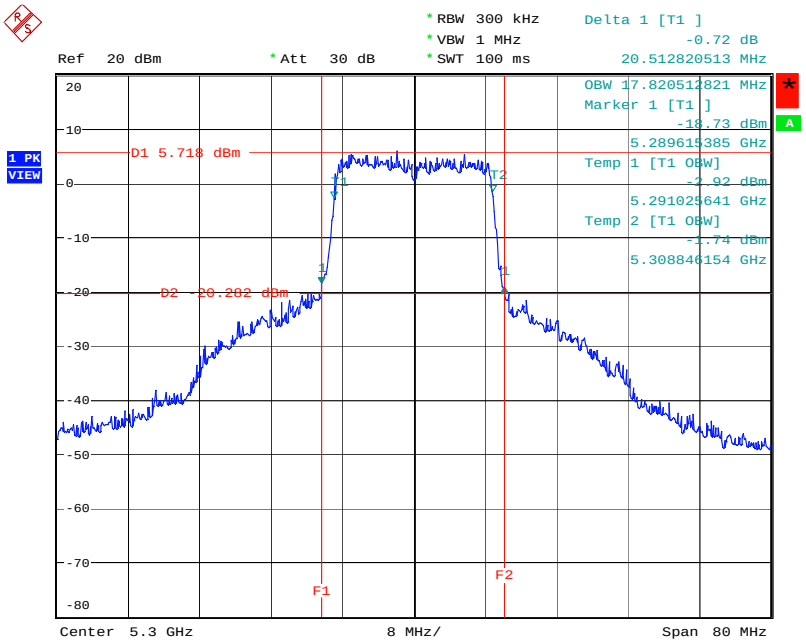
Date: 2.FEB.2008 11:03:55

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5260 MHz



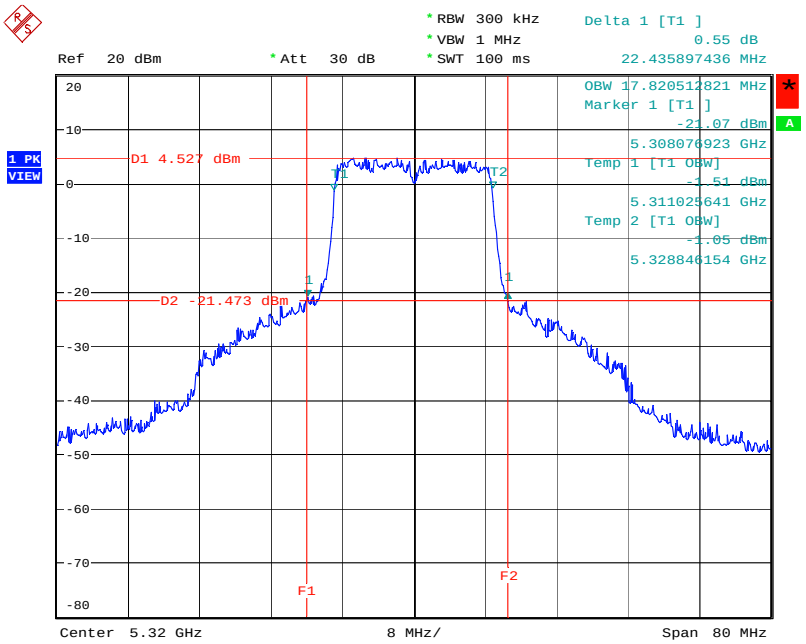
Date: 2.FEB.2008 11:05:23

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5300 MHz



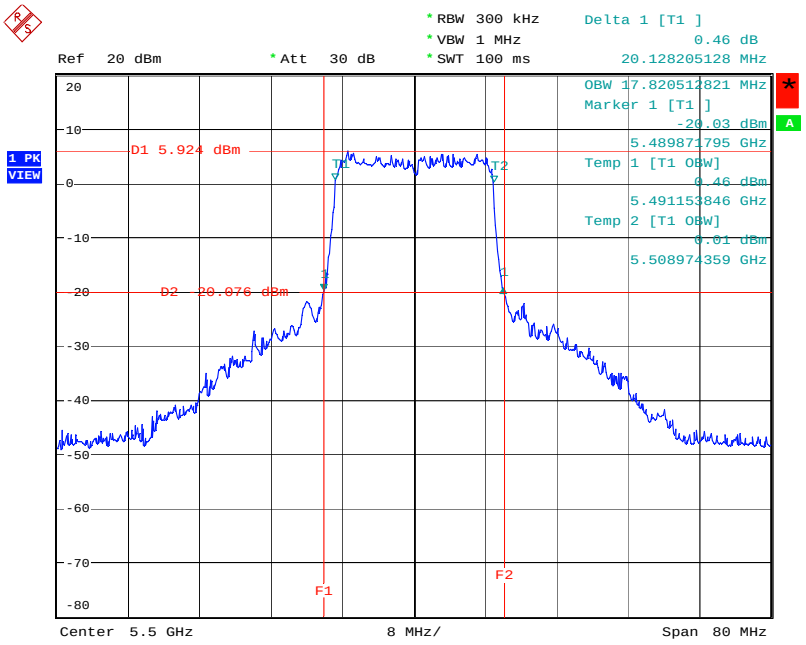
Date: 2.FEB.2008 11:10:46

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5320 MHz



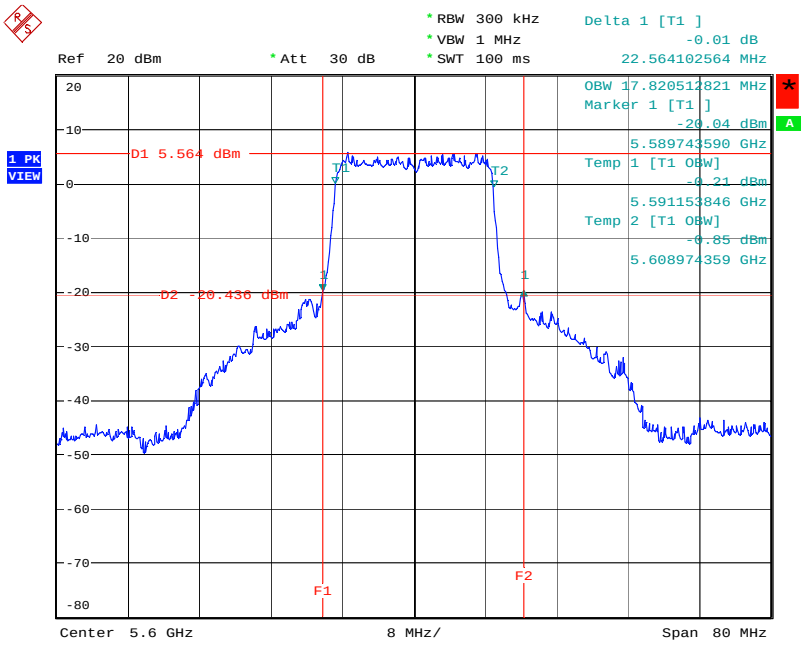
Date: 2.FEB.2008 11:07:34

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5500 MHz



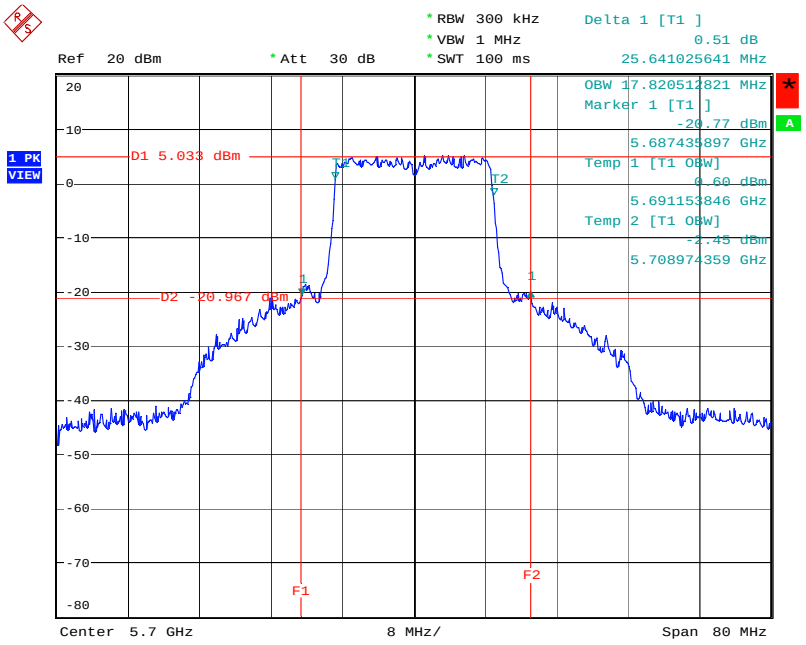
Date: 2.FEB.2008 11:27:28

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5600 MHz



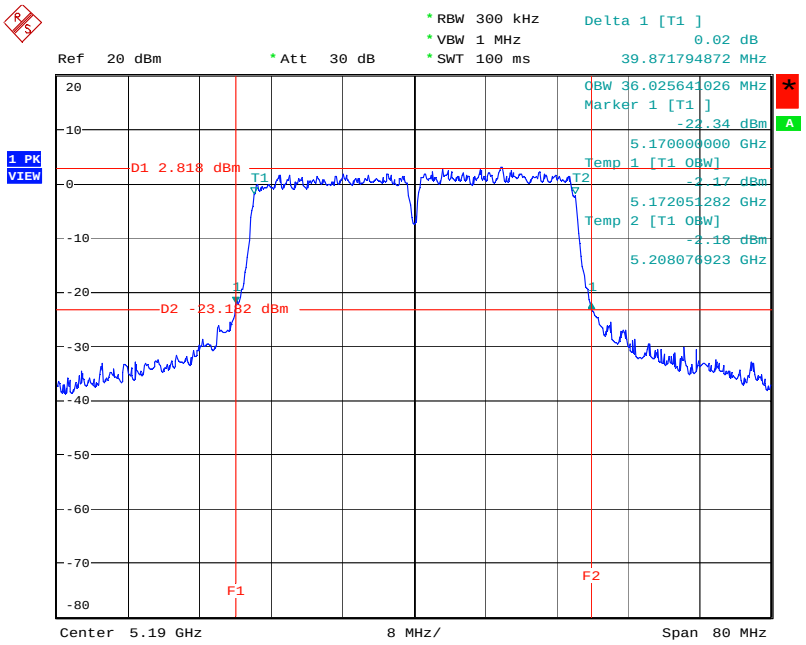
Date: 2.FEB.2008 11:29:05

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5700 MHz



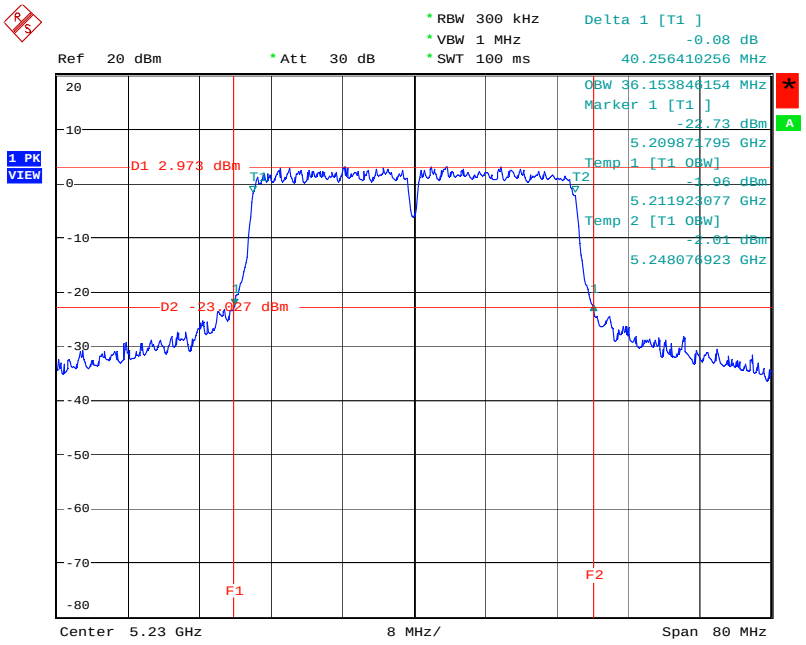
Date: 2.FEB.2008 11:31:04

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5190 MHz



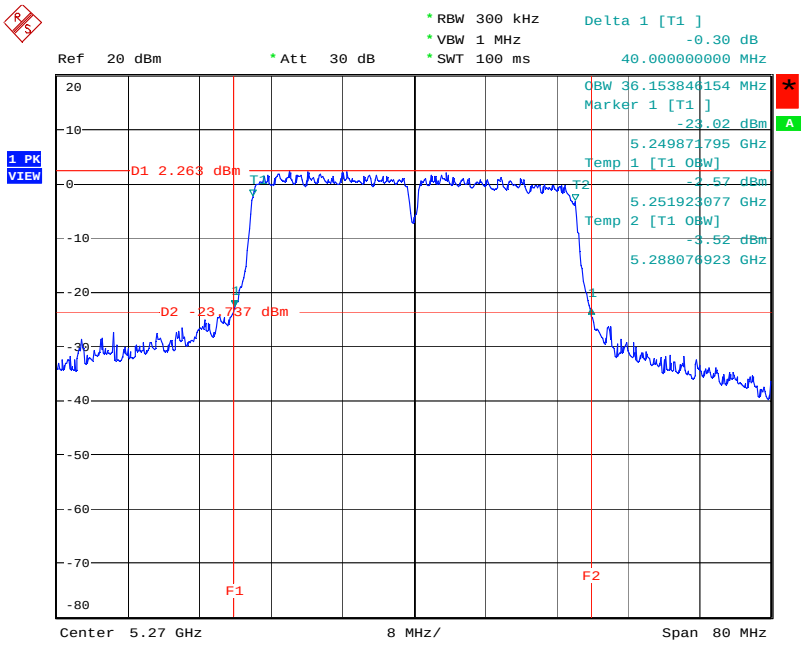
Date: 2.FEB.2008 10:26:19

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5230 MHz



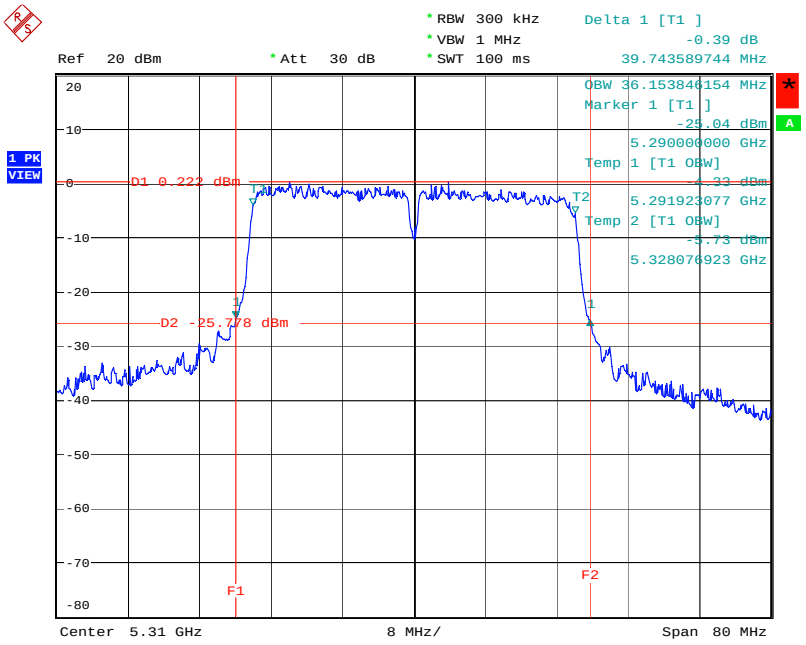
Date: 2.FEB.2008 10:32:45

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5270 MHz



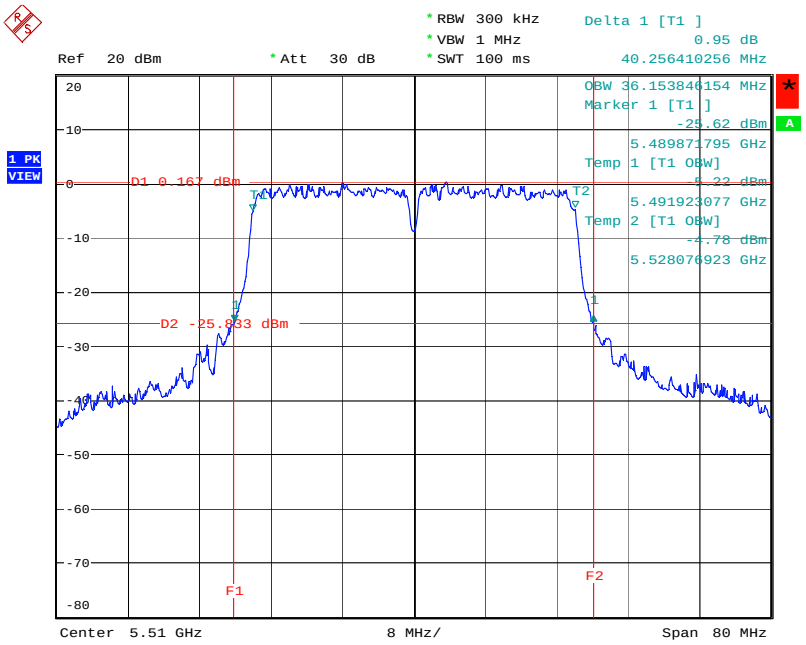
Date: 2.FEB.2008 10:34:56

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5310 MHz



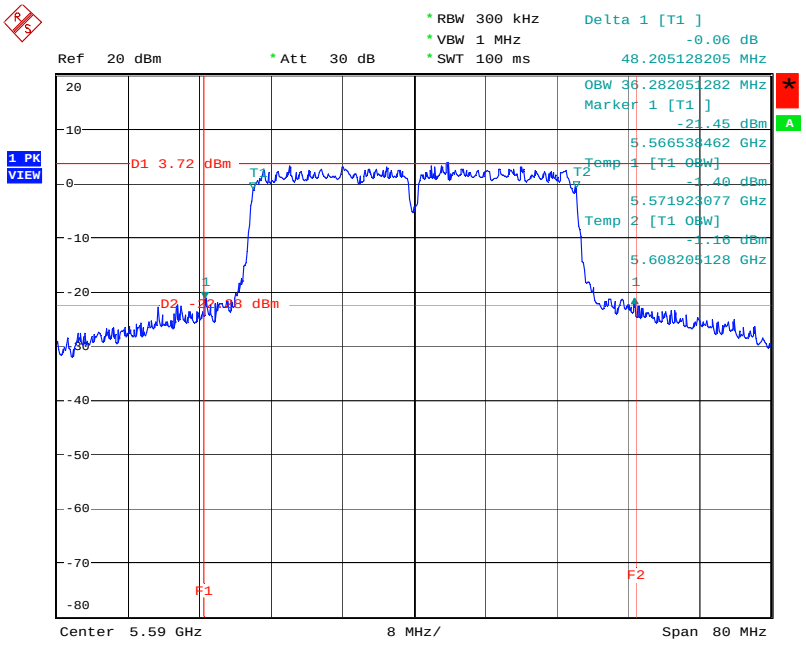
Date: 2.FEB.2008 12:06:54

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5510MHz



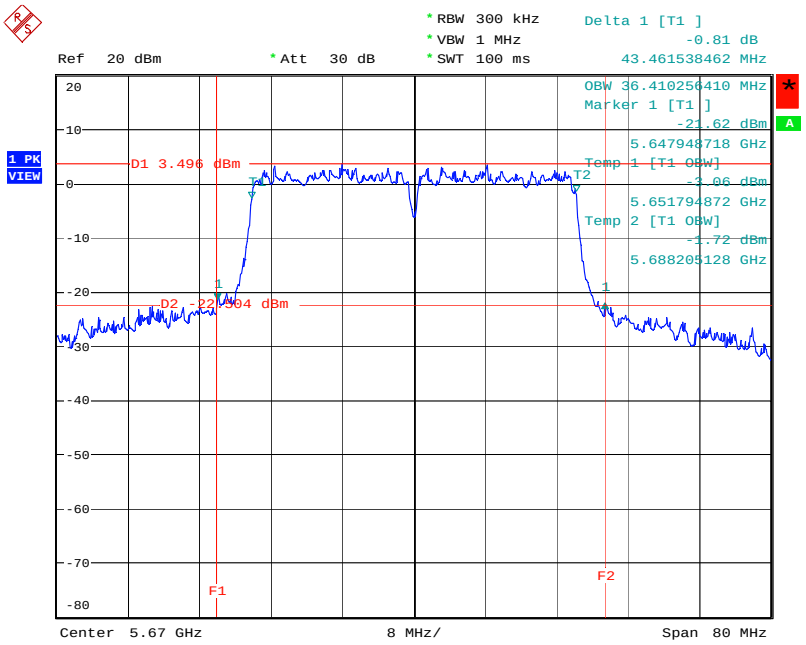
Date: 2.FEB.2008 10:42:29

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5590 MHz



Date: 2.FEB.2008 10:45:07

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5670 MHz



Date: 2.FEB.2008 10:49:03

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 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.470-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

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	Sample
Trace	Average
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 Conference Call, June 10, 2003.
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	20℃	Humidity	70%
Test Engineer	Jacky Ho	Configurations	Draft n

Configuration Draft n MCS0 20MHz Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.66	17.00	Complies
40	5200 MHz	12.50	17.00	Complies
48	5240 MHz	12.41	17.00	Complies
52	5260 MHz	13.77	24.00	Complies
60	5300 MHz	13.12	24.00	Complies
64	5320 MHz	13.25	24.00	Complies
100	5500 MHz	12.73	24.00	Complies
120	5600 MHz	12.65	24.00	Complies
140	5700 MHz	13.72	24.00	Complies

Configuration Draft n MCS0 20MHz Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	10.93	17.00	Complies
40	5200 MHz	10.57	17.00	Complies
48	5240 MHz	9.83	17.00	Complies
52	5260 MHz	12.55	24.00	Complies
60	5300 MHz	12.82	24.00	Complies
64	5320 MHz	13.10	24.00	Complies
100	5500 MHz	12.84	24.00	Complies
120	5600 MHz	12.86	24.00	Complies
140	5700 MHz	14.08	24.00	Complies

Configuration Draft n MCS8 20MHz Ant. A + Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	14.32	17.00	Complies
40	5200 MHz	14.65	17.00	Complies
48	5240 MHz	14.32	17.00	Complies
52	5260 MHz	16.21	24.00	Complies
60	5300 MHz	15.98	24.00	Complies
64	5320 MHz	16.19	24.00	Complies
100	5500 MHz	15.80	24.00	Complies
120	5600 MHz	15.77	24.00	Complies
140	5700 MHz	16.91	24.00	Complies

Configuration Draft n MCS0 40MHz Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.21	17.00	Complies
46	5230 MHz	12.91	17.00	Complies
54	5270 MHz	12.41	24.00	Complies
62	5310 MHz	11.03	24.00	Complies
102	5510MHz	10.50	24.00	Complies
118	5590 MHz	13.43	24.00	Complies
134	5670 MHz	13.02	24.00	Complies

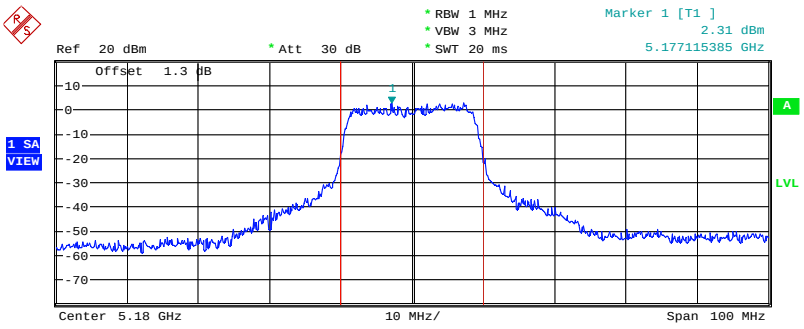
Configuration Draft n MCS0 40MHz Ant. B

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.13	17.00	Complies
46	5230 MHz	12.83	17.00	Complies
54	5270 MHz	12.29	24.00	Complies
62	5310 MHz	10.04	24.00	Complies
102	5510MHz	10.44	24.00	Complies
118	5590 MHz	13.19	24.00	Complies
134	5670 MHz	13.29	24.00	Complies

Configuration Draft n MCS8 40MHz Ant. A + Ant. B

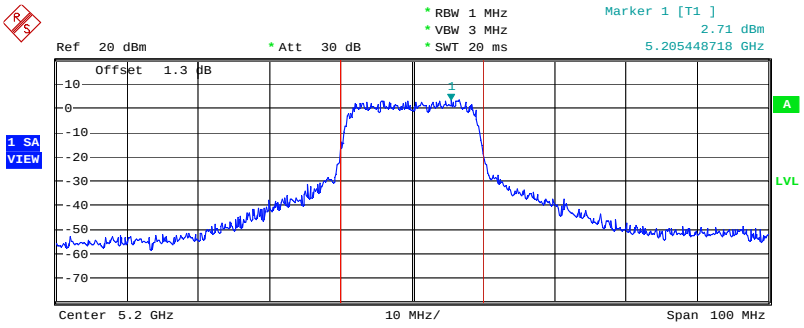
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	15.18	17.00	Complies
46	5230 MHz	15.88	17.00	Complies
54	5270 MHz	15.36	24.00	Complies
62	5310 MHz	13.57	24.00	Complies
102	5510MHz	13.48	24.00	Complies
118	5590 MHz	16.32	24.00	Complies
134	5670 MHz	16.17	24.00	Complies

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



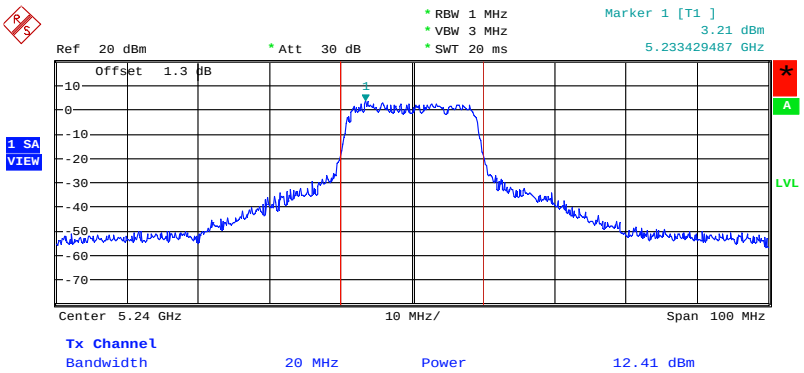
Date: 2.FEB.2008 14:03:23

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



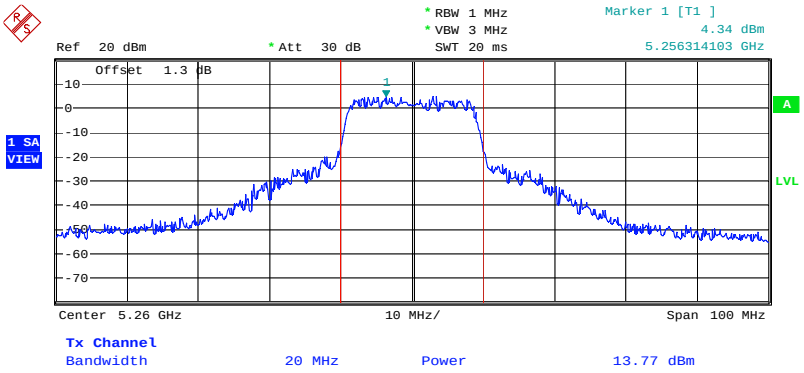
Date: 2.FEB.2008 14:05:16

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



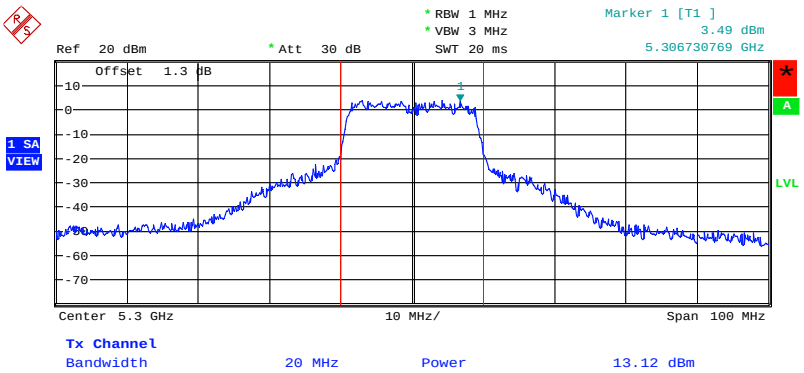
Date: 2.FEB.2008 14:06:02

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



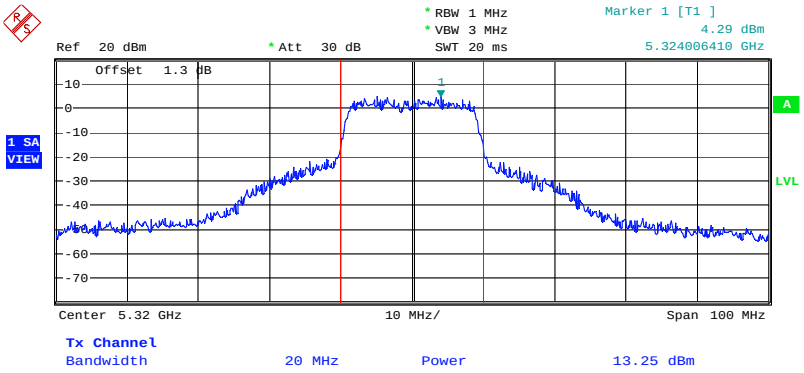
Date: 2.FEB.2008 08:29:05

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



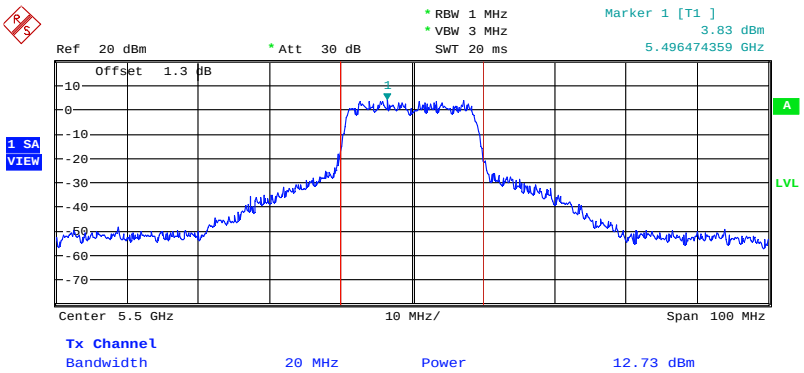
Date: 2.FEB.2008 08:30:21

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



Date: 2.FEB.2008 08:40:54

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



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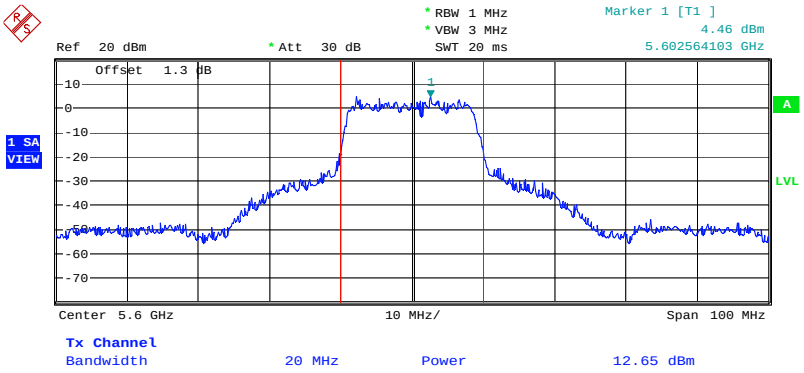
Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5600 MHz



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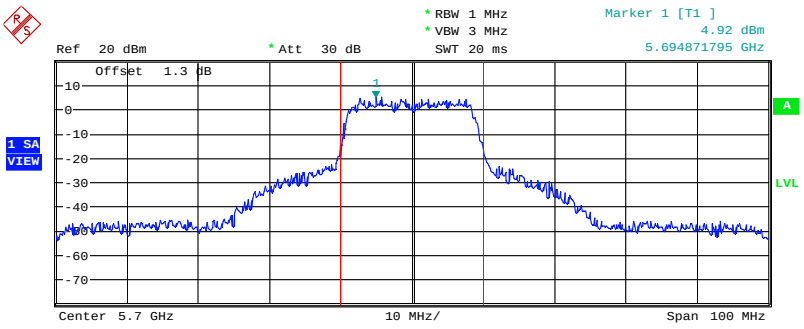
Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. A / 5700 MHz



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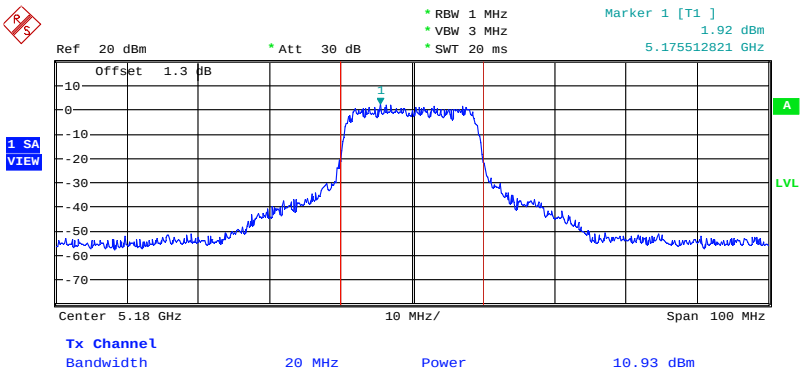
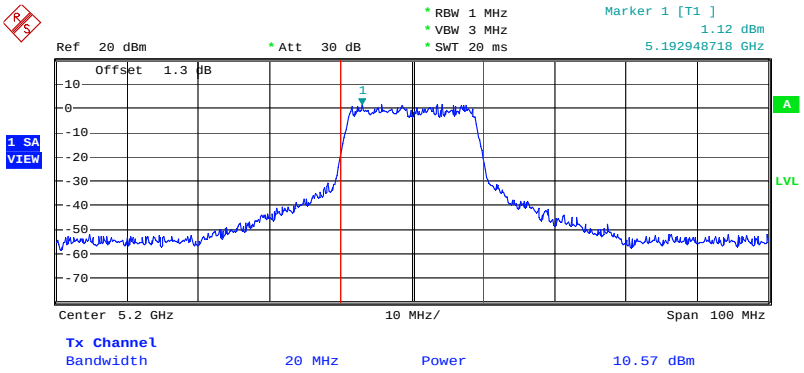
Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5180 MHz



Date: 2.FEB.2008 14:03:57

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



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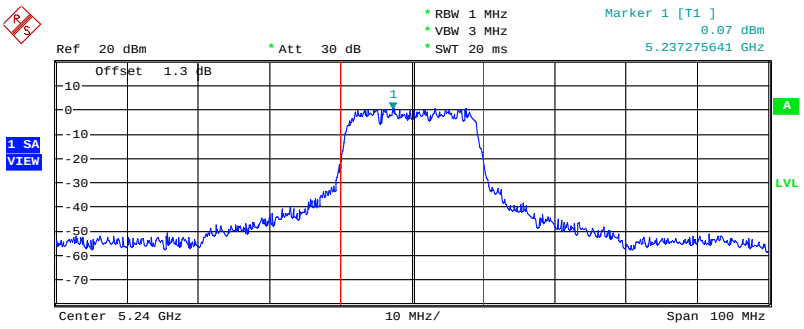
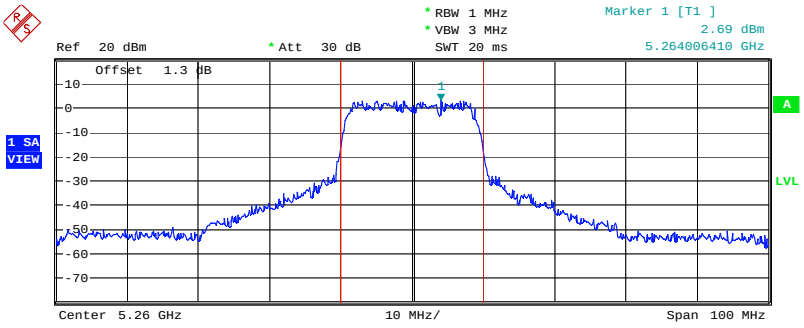
Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5240 MHz



Date: 2.FEB.2008 14:08:03

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



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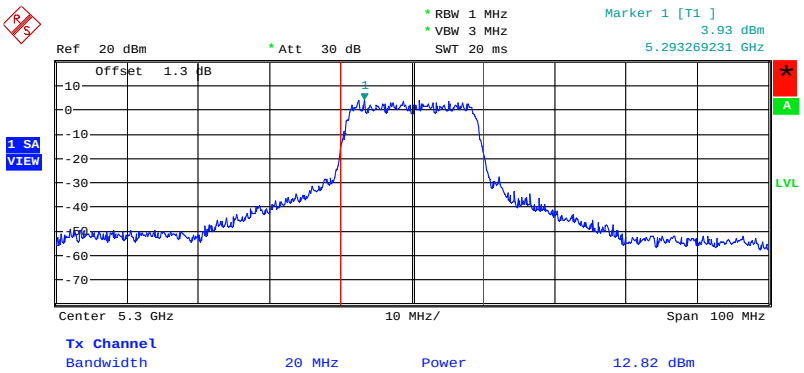
Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5300 MHz



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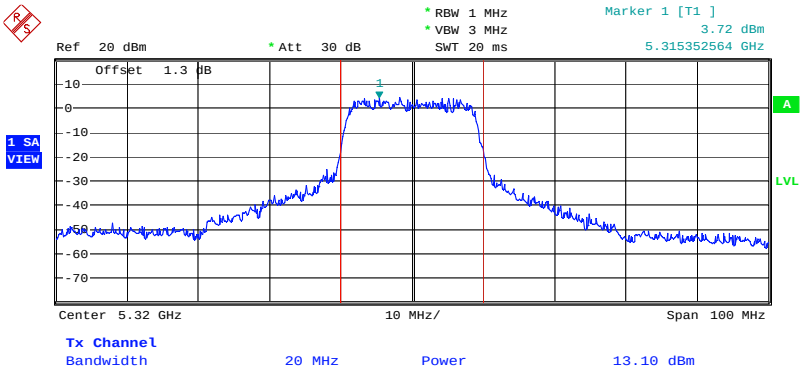
Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5320 MHz



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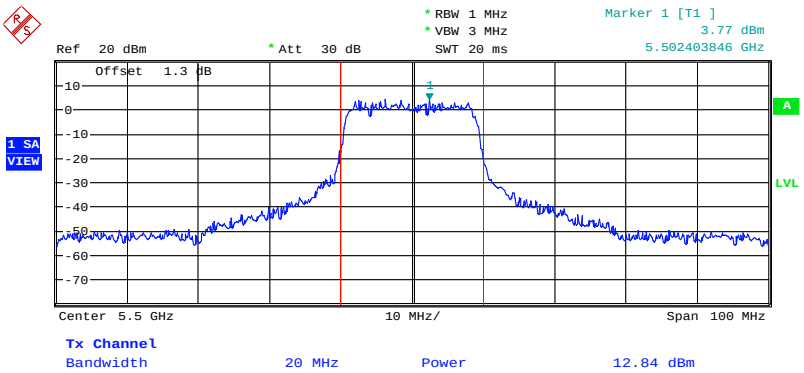
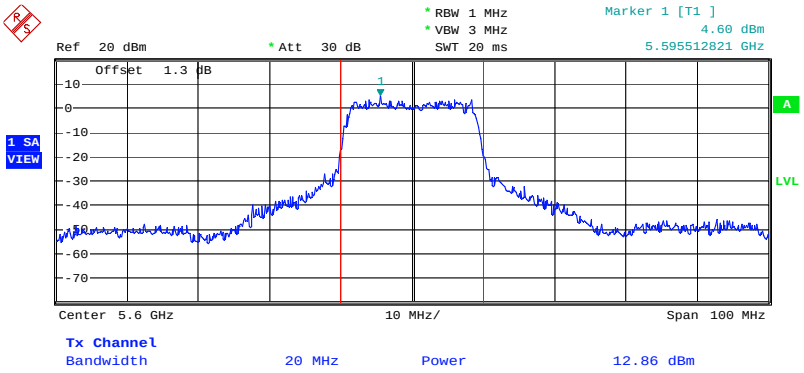
Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5500 MHz



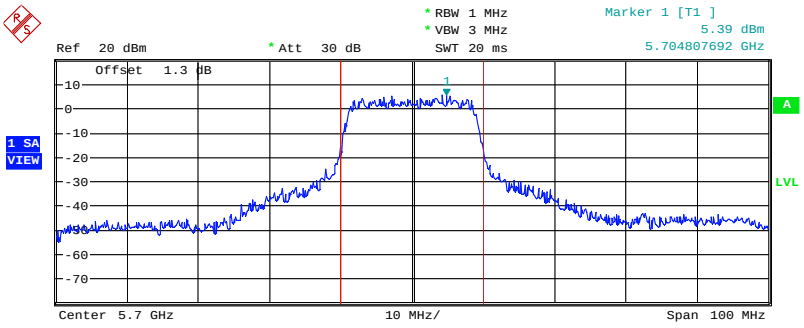
Date: 2.FEB.2008 08:42:45

Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5600 MHz



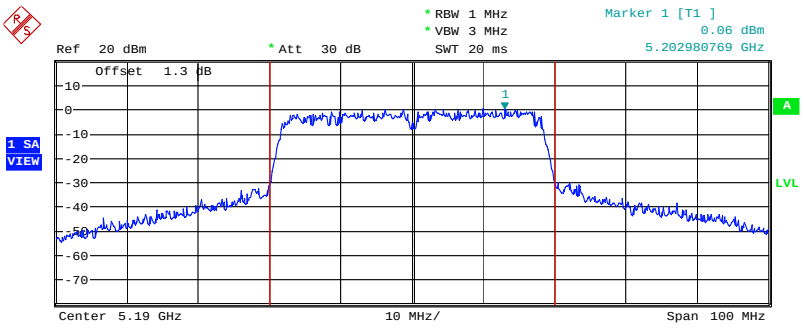
Date: 2.FEB.2008 08:45:04

Channel Output Power Plot on Configuration Draft n MCS0 20MHz Ant. B / 5700 MHz



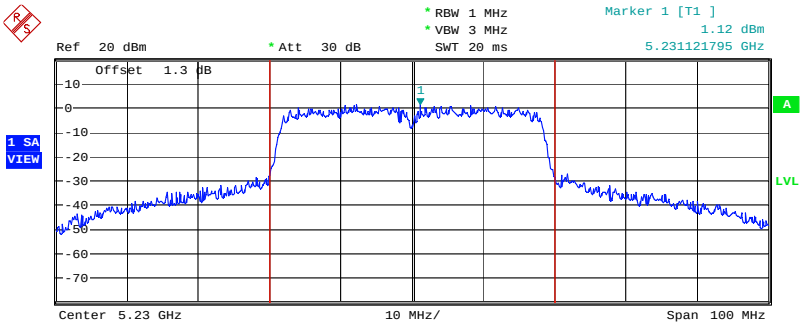
Date: 2.FEB.2008 08:48:35

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



Date: 2.FEB.2008 08:51:30

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



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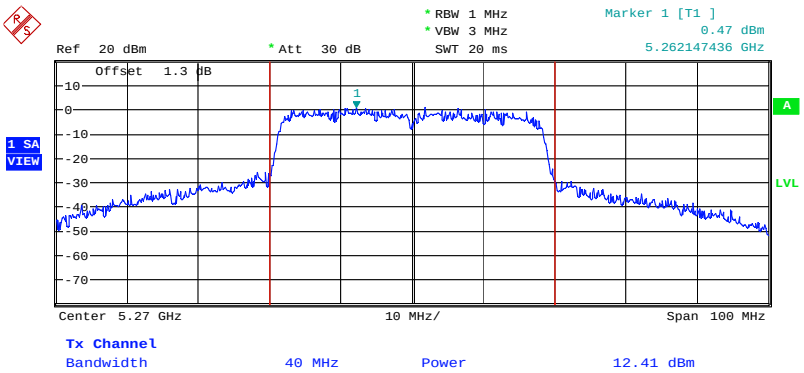
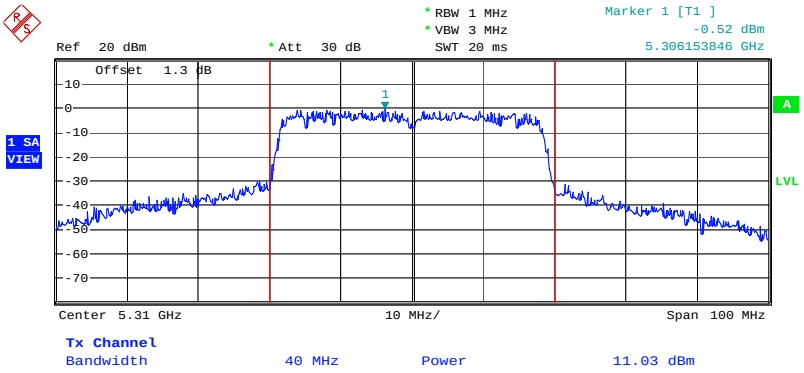
Channel Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5270 MHz



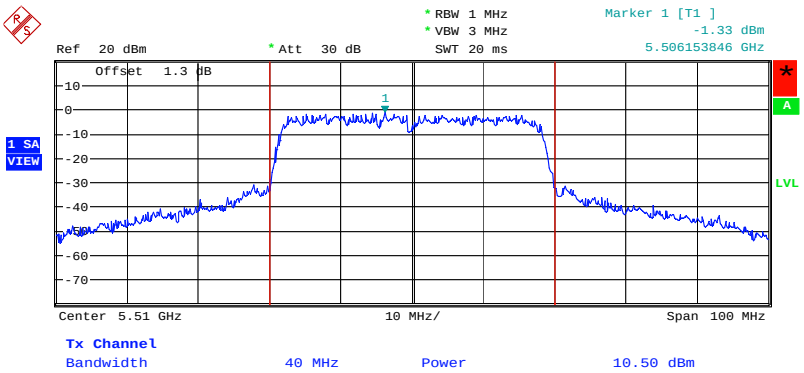
Date: 2.FEB.2008 08:55:26

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



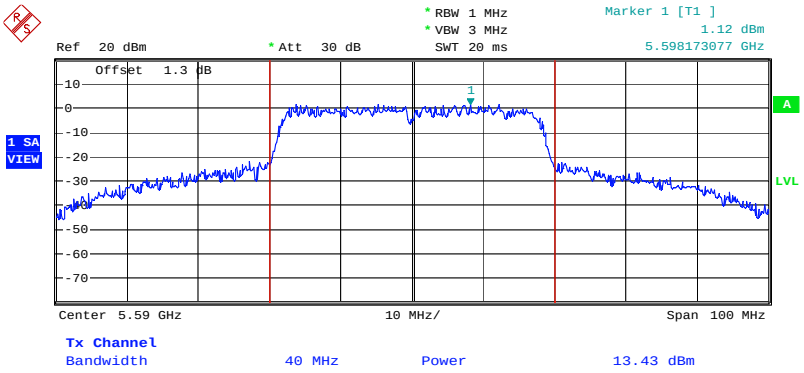
Date: 2.FEB.2008 08:59:18

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



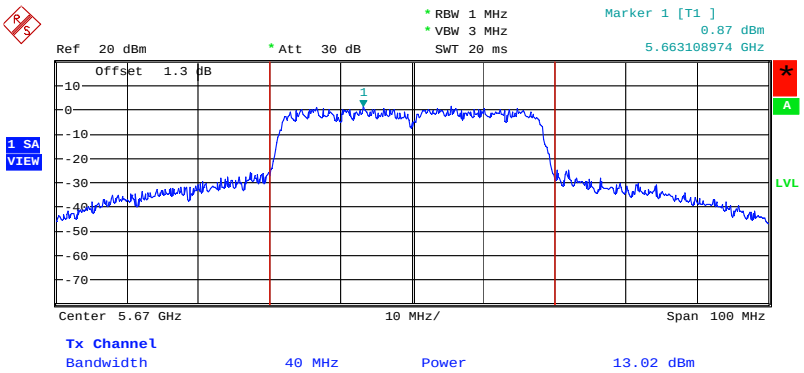
Date: 2.FEB.2008 09:05:44

Channel Output Power Plot on Configuration Draft n MCS0 40MHz Ant. A / 5590 MHz



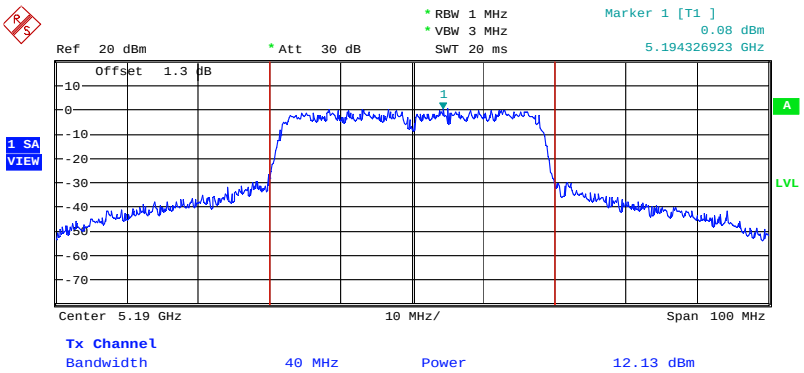
Date: 2.FEB.2008 09:08:01

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



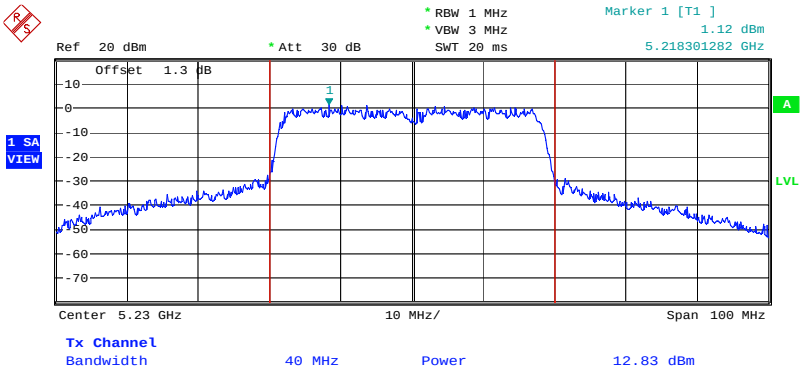
Date: 2.FEB.2008 09:09:27

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



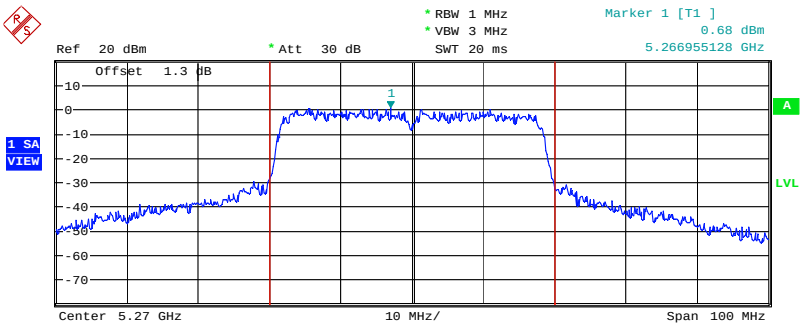
Date: 2.FEB.2008 08:50:34

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



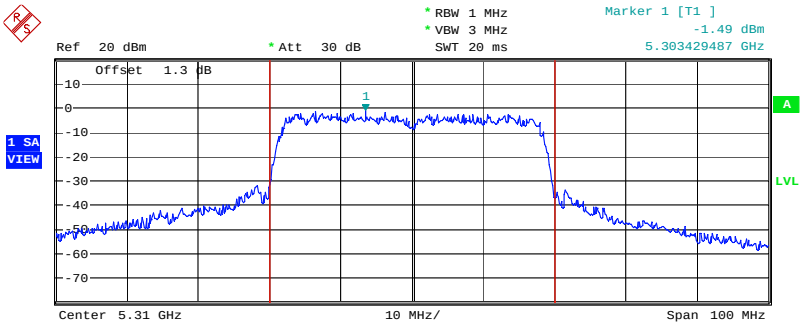
Date: 2.FEB.2008 08:57:30

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



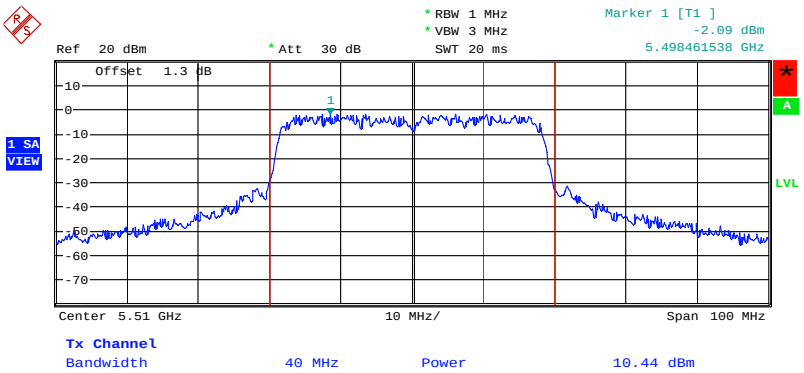
Date: 2.FEB.2008 08:56:26

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



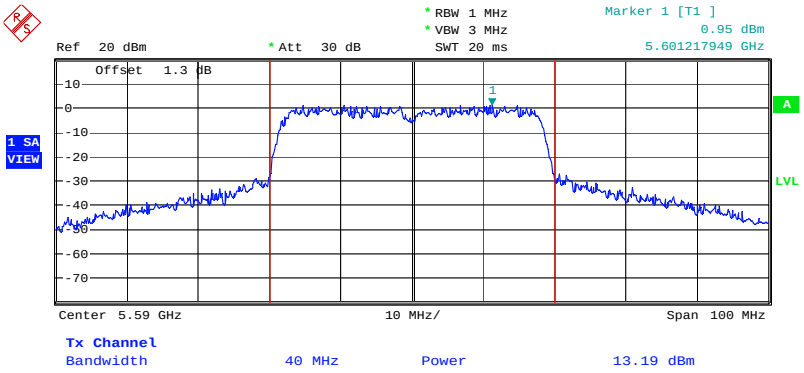
Date: 2.FEB.2008 09:01:47

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



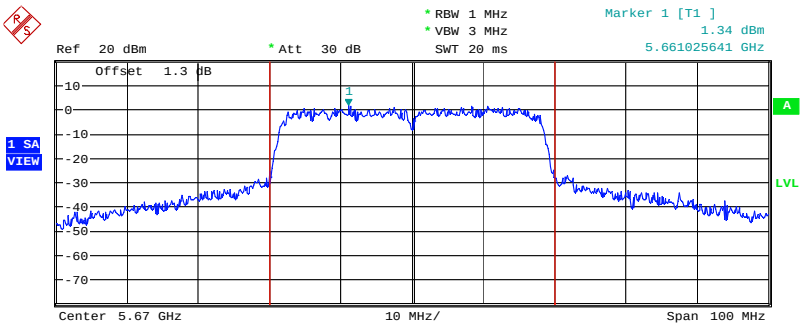
Date: 2.FEB.2008 09:06:25

Channel Output Power Plot on Configuration Draft n MCS0 40MHz Ant. B / 5590 MHz



Date: 2.FEB.2008 09:07:08

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



Date: 2.FEB.2008 09:09:58

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

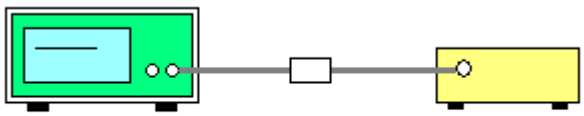
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

Temperature	20℃	Humidity	70%
Test Engineer	Jacky Ho	Configurations	Draft n

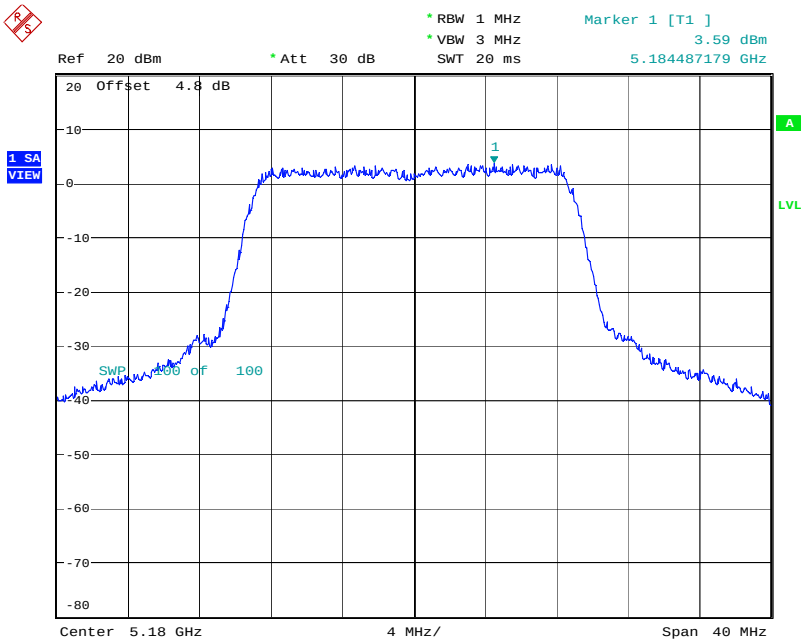
Configuration Draft n MCS8 20MHz Ant. A + Ant. B

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	3.59	4.00	Complies
40	5200 MHz	3.80	4.00	Complies
48	5240 MHz	3.85	4.00	Complies
52	5260 MHz	5.66	11.00	Complies
60	5300 MHz	5.58	11.00	Complies
64	5320 MHz	4.66	11.00	Complies
100	5500 MHz	5.19	11.00	Complies
120	5600 MHz	5.24	11.00	Complies
140	5700 MHz	5.18	11.00	Complies

Configuration Draft n MCS8 40MHz Ant. A + Ant. B

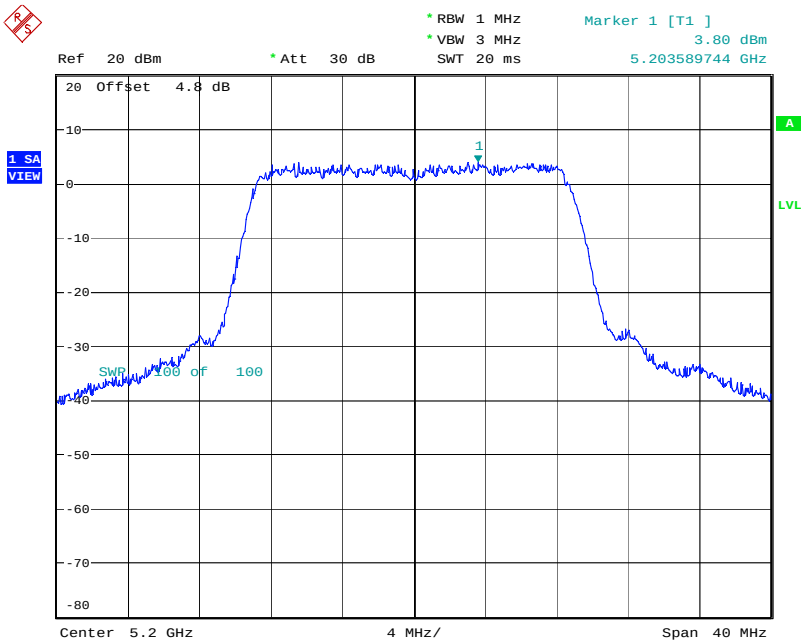
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	2.44	4.00	Complies
46	5230 MHz	3.16	4.00	Complies
54	5270 MHz	2.37	11.00	Complies
62	5310 MHz	-0.01	11.00	Complies
102	5510MHz	0.23	11.00	Complies
118	5590 MHz	3.13	11.00	Complies
134	5670 MHz	2.70	11.00	Complies

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5180 MHz



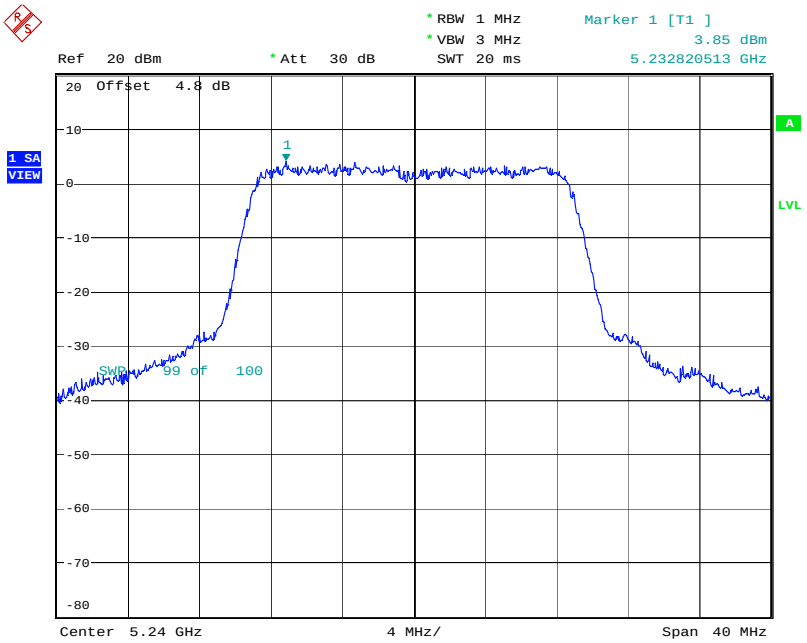
Date: 2.FEB.2008 10:55:45

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5200 MHz



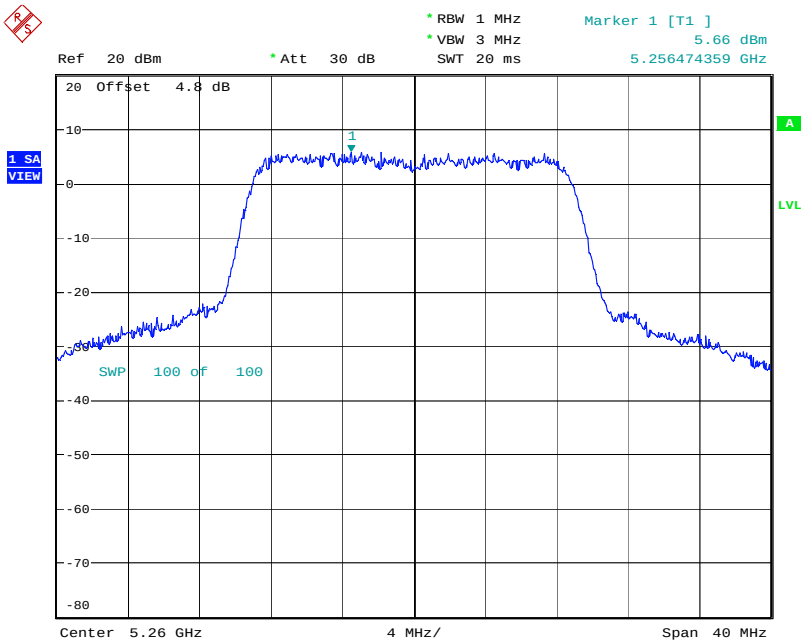
Date: 2.FEB.2008 11:00:39

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5240 MHz



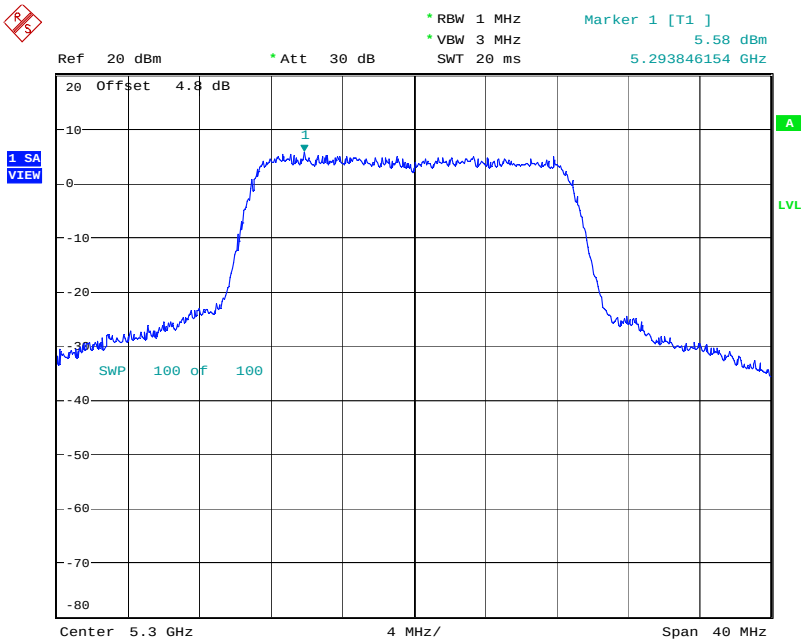
Date: 2.FEB.2008 11:04:03

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5260 MHz



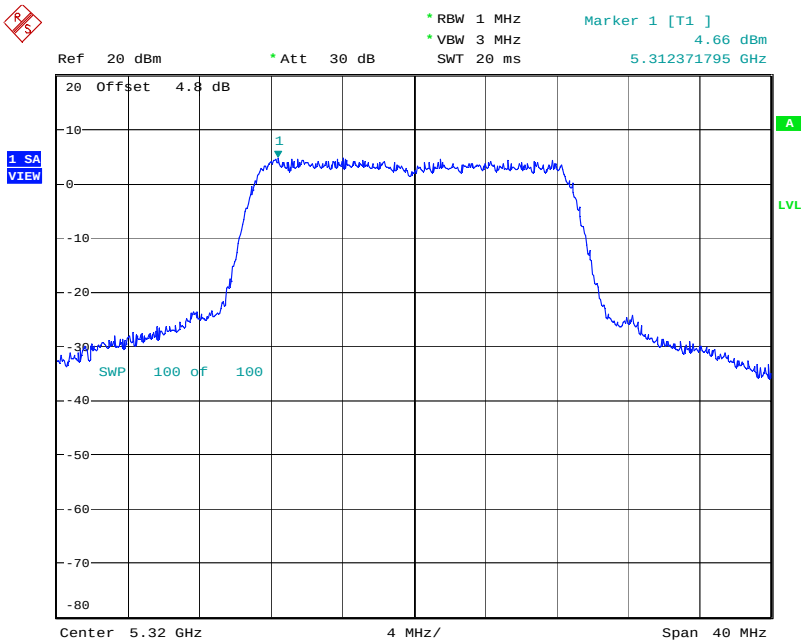
Date: 2.FEB.2008 11:05:30

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5300 MHz



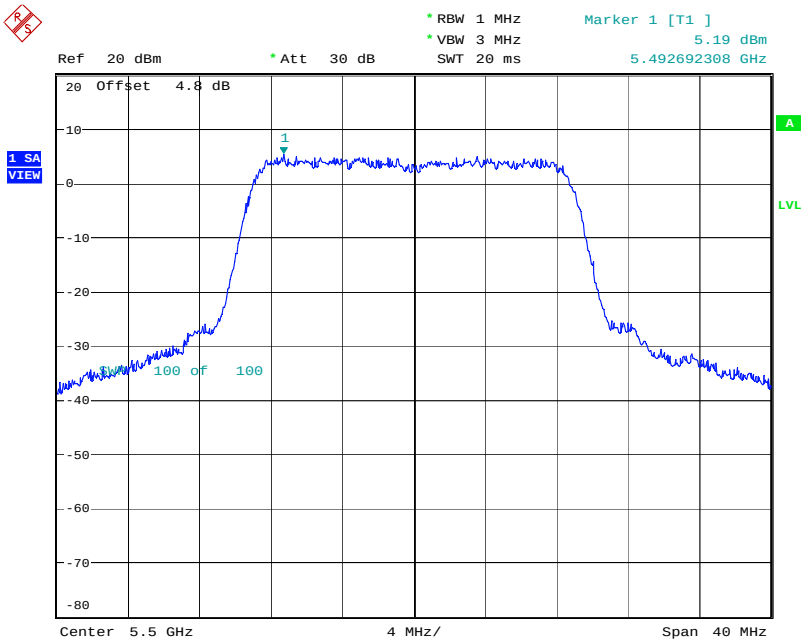
Date: 2.FEB.2008 11:10:53

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5320 MHz



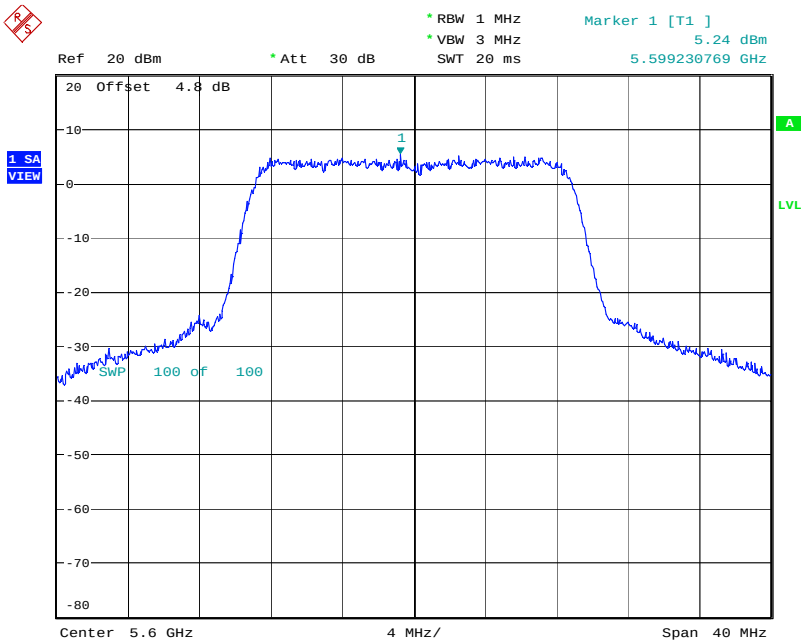
Date: 2.FEB.2008 11:07:41

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5500 MHz



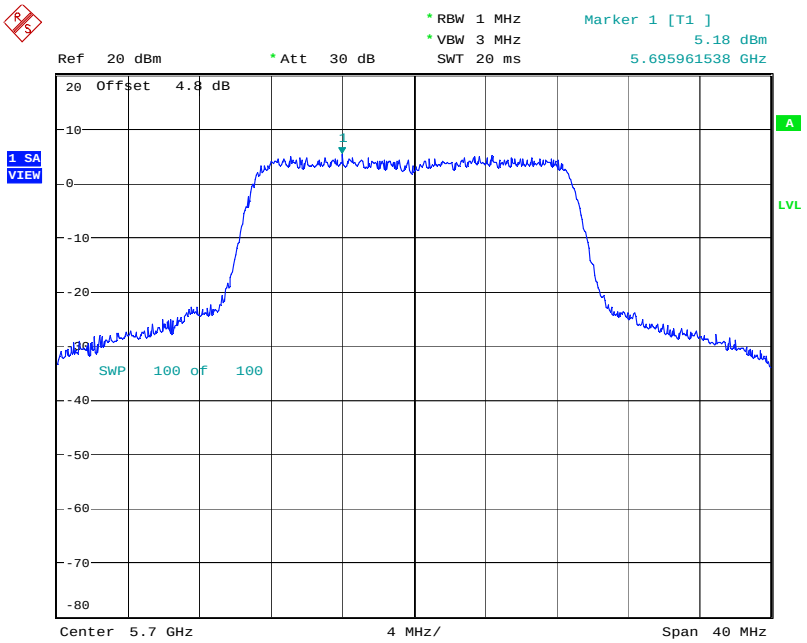
Date: 2.FEB.2008 11:27:36

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5600 MHz



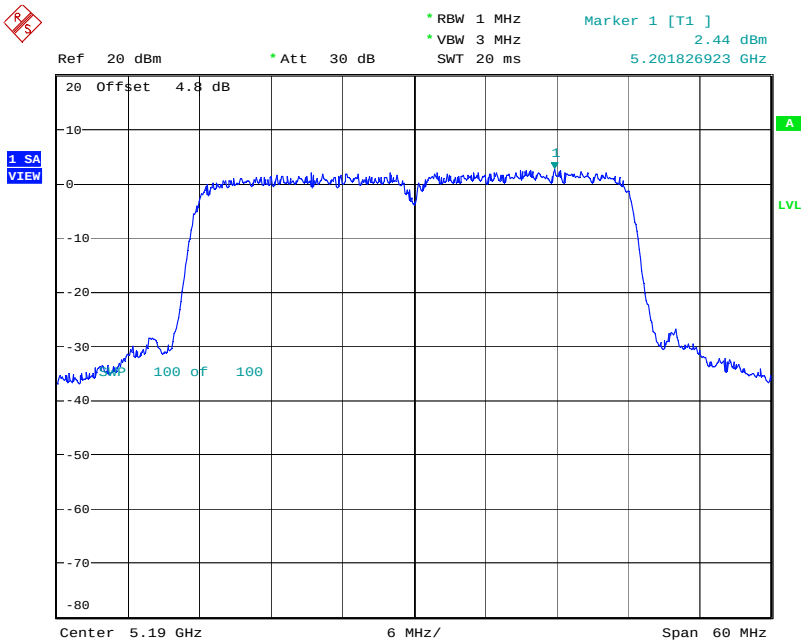
Date: 2.FEB.2008 11:29:13

Power Density Plot on Configuration Draft n MCS8 20MHz Ant. A + Ant. B / 5700 MHz



Date: 2.FEB.2008 11:31:12

Power Density Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5190 MHz



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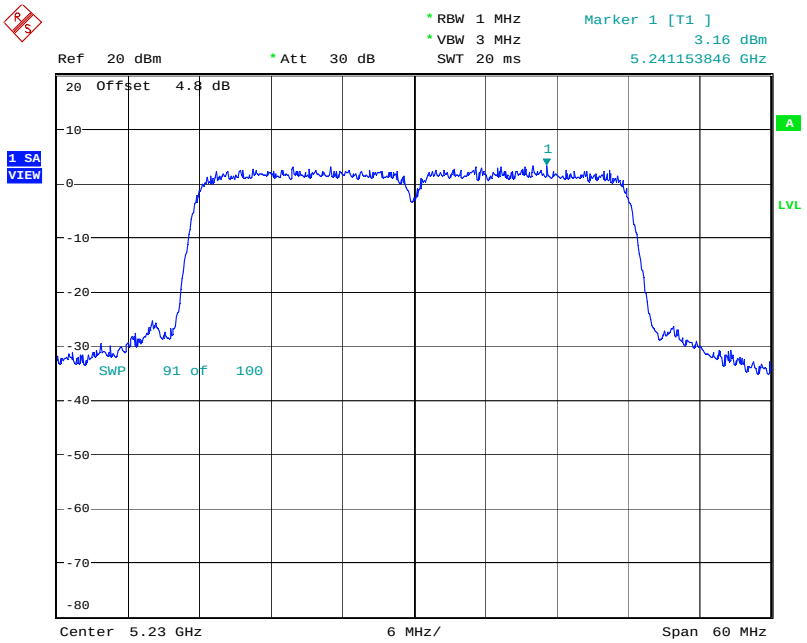
Power Density Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5230 MHz



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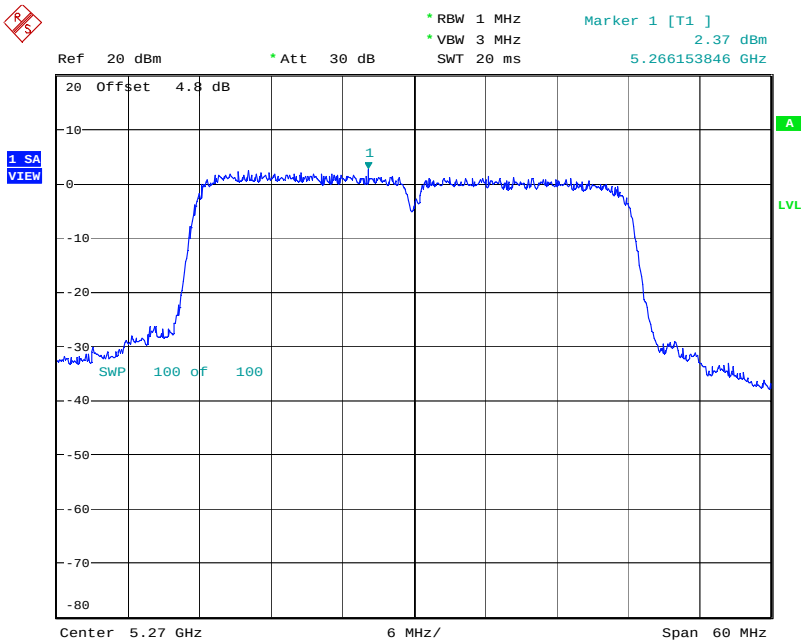
Power Density Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5270 MHz



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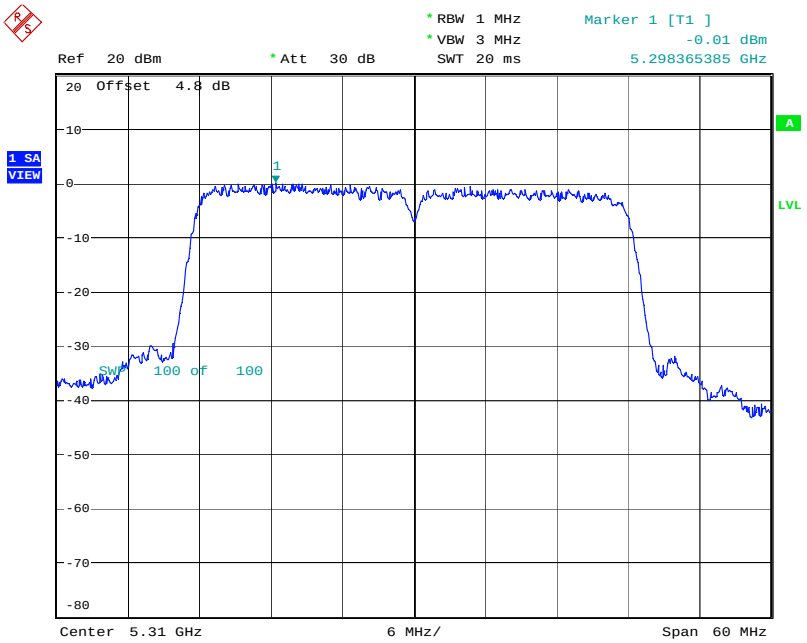
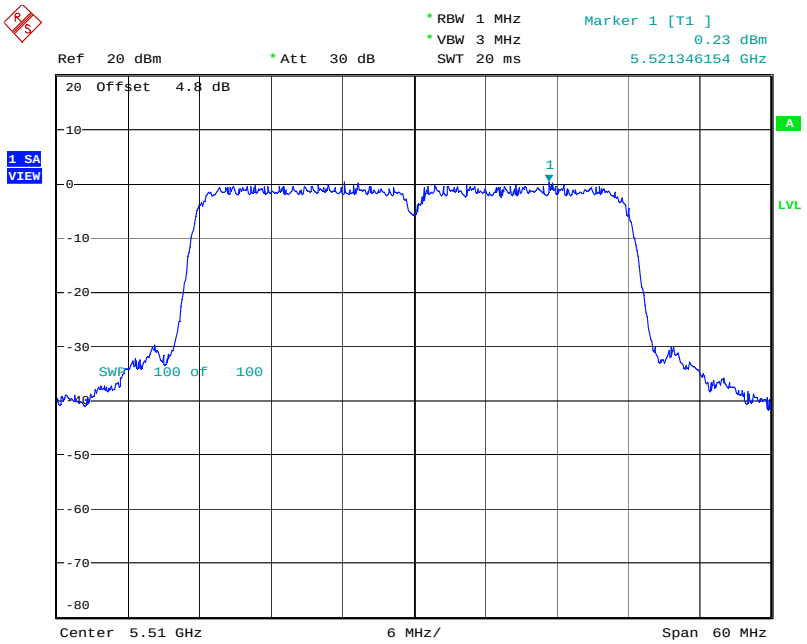
Power Density Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5310 MHz



Date: 2.FEB.2008 12:07:01

Power Density Plot on Configuration Draft n MCS8 40MHz Ant. A + Ant. B / 5510MHz



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