

FCC RADIO TEST REPORT

Applicant's company	NETGEAR Inc.
Applicant Address	4500 Great America Parkway, Santa Clara, CA 95054, USA
FCC ID	PY308100078
Manufacturer's company	Ambit Microsystems (Shanghai) Ltd.
Manufacturer Address	No. 1925, Nanle Road, Songjiang Export Processing Zone, Shanghai, China

Product Name	RangeMax Duo Wireless-N Router
Brand Name	NETGEAR
Model Name	WNDR3300
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Nov. 24, 2007
Final Test Date	Jan. 28, 2008
Submission Type	Original Equipment
Operating Mode	Master



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.

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History of This Test Report

Original Issue Date: Feb. 29, 2008

Report No.: FR7N2806-01AB

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



1. CERTIFICATE OF COMPLIANCE

Product Name : RangeMax Duo Wireless-N Router
Brand Name : NETGEAR
Model Name : WNDR3300
Applicant : NETGEAR Inc.
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. 24, 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.

A handwritten signature in blue ink, appearing to read "Wayne Hsu 3.3.08", 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	7.81 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.01 dB
4.4	15.407(a)	Power Spectral Density	Complies	3.50 dB
4.5	15.407(a)	Peak Excursion	Complies	5.64 dB
4.6	15.407(b)	Radiated Emissions	Complies	0.67 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.14 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

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

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (2TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Adapter
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%)	MCS8 (20MHz) : 17.82 MHz MCS8 (40MHz) : 36.05 MHz
Conducted Output Power	Band 1: MCS8 (20MHz) : 16.07 dBm MCS8 (40MHz) : 15.97 dBm Band 2: MCS8 (20MHz) : 19.80 dBm MCS8 (40MHz) : 19.93 dBm Band 3: MCS8 (20MHz) : 19.97 dBm MCS8 (40MHz) : 19.68 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	$\frac{1}{2}$	1	52	108	26	54	6.5	13.5
1	1	QPSK	$\frac{1}{2}$	2	104	216	52	108	13.0	27.0
2	1	QPSK	$\frac{3}{4}$	2	104	216	78	162	19.5	40.5
3	1	16-QAM	$\frac{1}{2}$	4	208	432	104	216	26.0	54.0
4	1	16-QAM	$\frac{3}{4}$	4	208	432	156	324	39.0	81.0
5	1	64-QAM	$\frac{2}{3}$	6	312	648	208	432	52.0	108.0
6	1	64-QAM	$\frac{3}{4}$	6	312	648	234	486	58.5	121.5
7	1	64-QAM	$\frac{5}{6}$	6	312	648	260	540	65.0	135.0
8	2	BPSK	$\frac{1}{2}$	1	104	216	52	108	13.0	27.0
9	2	QPSK	$\frac{1}{2}$	2	208	432	104	216	26.0	54.0
10	2	QPSK	$\frac{3}{4}$	2	208	432	156	324	39.0	81.0
11	2	16-QAM	$\frac{1}{2}$	4	416	864	208	432	52.0	108.0
12	2	16-QAM	$\frac{3}{4}$	4	416	864	312	648	78.0	162.0
13	2	64-QAM	$\frac{2}{3}$	6	624	1296	416	864	104.0	216.0
14	2	64-QAM	$\frac{3}{4}$	6	624	1296	468	972	117.0	243.0
15	2	64-QAM	$\frac{5}{6}$	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

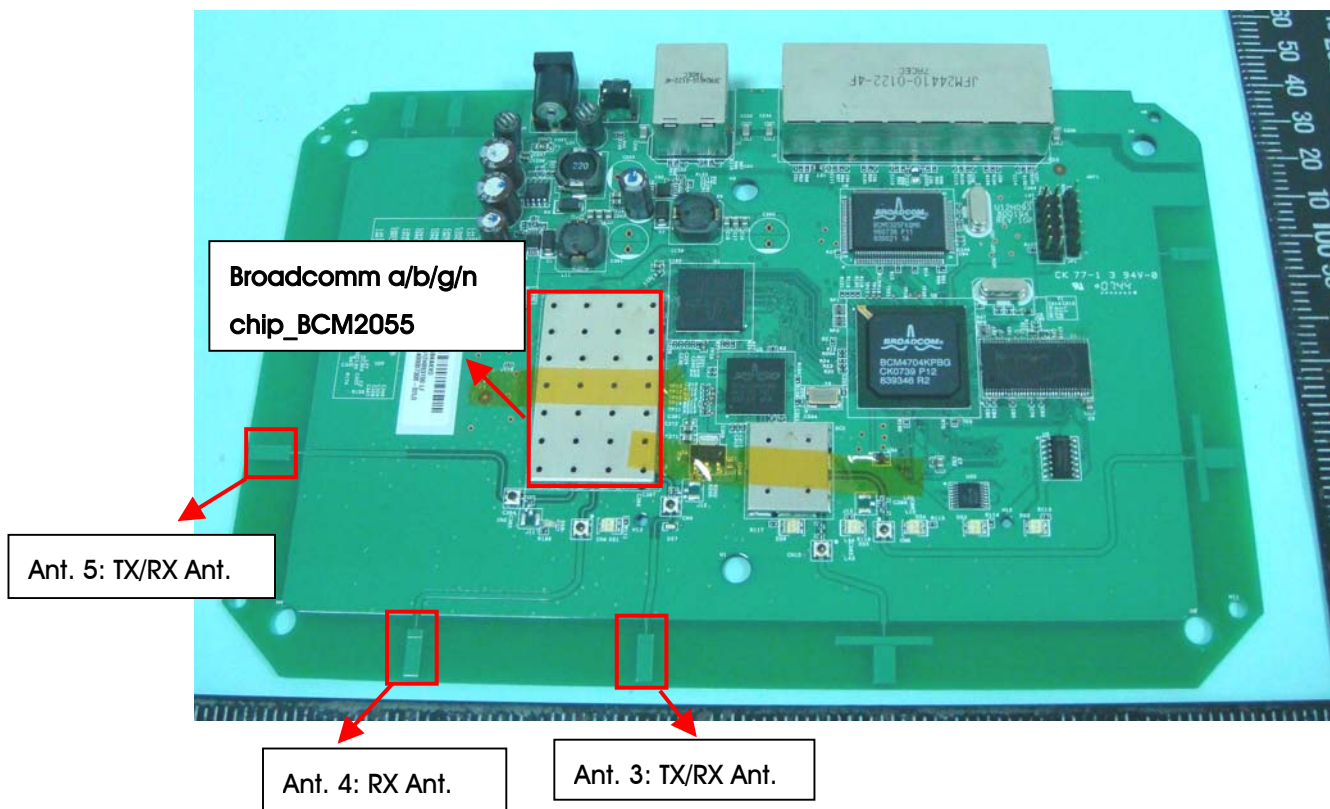
3.2. Accessories

Power	Brand	Model	Rating
Adapter 1	NETGEAR	DSA-20P-10 US 120180	Input: 100-240VAC, 50/60Hz, 0.7A Output: 12VDC, 1.5A
Adapter 2	NETGEAR	MU18-2120150-A1	Input: 100-240VAC, 50/60Hz, 0.6A Output: 12VDC, 1.5A

3.3. Table for Filed Antenna

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
3	-	-	Printed Antenna	NA	6.92	TX / RX Ant.
4	-	-	Printed Antenna	NA	6.50	RX Ant.
5	-	-	Printed Antenna	NA	6.92	TX / RX Ant.



3.4. Table for Carrier Frequencies

There are two bandwidth systems for draft n.

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

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

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

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode		Data Rate	Channel	Antenna
AC Power Conducted Emission	Normal Link / Mode 2		Auto	-	-
Max. Conducted Output Power	MCS8/20MHz	Band 1	13Mbps	36/46/48	3/ 5/ 3+5
	MCS8/20MHz	Band 2	13Mbps	52/60/64	3/ 5/ 3+5
	MCS8/20MHz	Band 3	13Mbps	100/120/140	3/ 5/ 3+5
	MCS8/40MHz	Band 1	27Mbps	38/40	3/ 5/ 3+5
	MCS8/40MHz	Band 2	27Mbps	54/62	3/ 5/ 3+5
	MCS8/40MHz	Band 3	27Mbps	102/118	3/ 5/ 3+5
26dB Spectrum Bandwidth	MCS8/20MHz	Band 1	13Mbps	36/46/48	3+5
99% Occupied Bandwidth	MCS8/20MHz	Band 2	13Mbps	52/60/64	3+5
Measurement	MCS8/20MHz	Band 3	13Mbps	100/120/140	3+5
Power Spectral Density	MCS8/40MHz	Band 1	27Mbps	38/40	3+5
Peak Excursion	MCS8/40MHz	Band 2	27Mbps	54/62	3+5
	MCS8/40MHz	Band 3	27Mbps	102/118	3+5
Radiated Emission Below 1GHz	Normal Link / Mode 2		Auto	-	-
Radiated Emission Above 1GHz	MCS8/20MHz	Band 1	13Mbps	36/46/48	3+5
	MCS8/20MHz	Band 2	13Mbps	52/60/64	3+5
	MCS8/20MHz	Band 3	13Mbps	100/120/140	3+5
	MCS8/40MHz	Band 1	27Mbps	38/40	3+5
	MCS8/40MHz	Band 2	27Mbps	54/62	3+5
	MCS8/40MHz	Band 3	27Mbps	102/118	3+5
Band Edge Emission	MCS8/20MHz	Band 1	13Mbps	36/46/48	3+5
	MCS8/20MHz	Band 2	13Mbps	52/60/64	3+5
	MCS8/20MHz	Band 3	13Mbps	100/120/140	3+5
	MCS8/40MHz	Band 1	27Mbps	38/40	3+5
	MCS8/40MHz	Band 2	27Mbps	54/62	3+5
	MCS8/40MHz	Band 3	27Mbps	102/118	3+5
Frequency Stability	Un-modulation		-	40/ 60	3+5

There have two test mode below:

Mode 1: Broadcomm a/b/g/n chip_BCM2055+Adapter 1

Mode 2: Broadcomm a/b/g/n chip_BCM2055+Adapter 2

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	D505	E2K24GBRL
Notebook	DELL	D505	E2K24GBRL
Notebook	DELL	D400	E2K24GBRL

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

Test Software Version	Telnet		
Frequency	5180 MHz	5200 MHz	5240 MHz
Draft n	3c4a	3d4b	414e
Frequency	5260 MHz	5300 MHz	5320 MHz
Draft n	3642	3a46	3d4a
Frequency	5500 MHz	5600 MHz	5700 MHz
Draft n	464d	4448	3d43

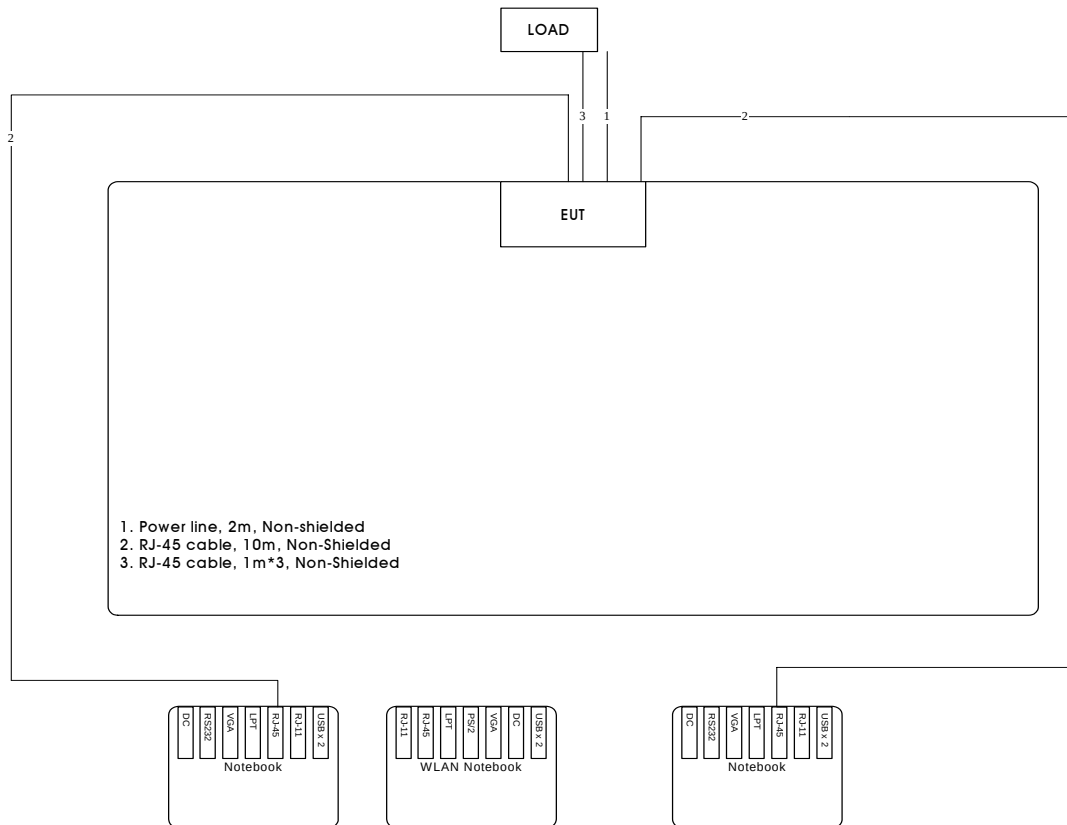
Power Parameters of Draft n MCS8 40MHz

Test Software Version	Telnet			
Frequency	5190 MHz		5230 MHz	
Draft n	3b4d		424f	
Frequency	5270 MHz	5310 MHz	5510 MHz	5590 MHz
Draft n	3a46	3c48	4851	464d

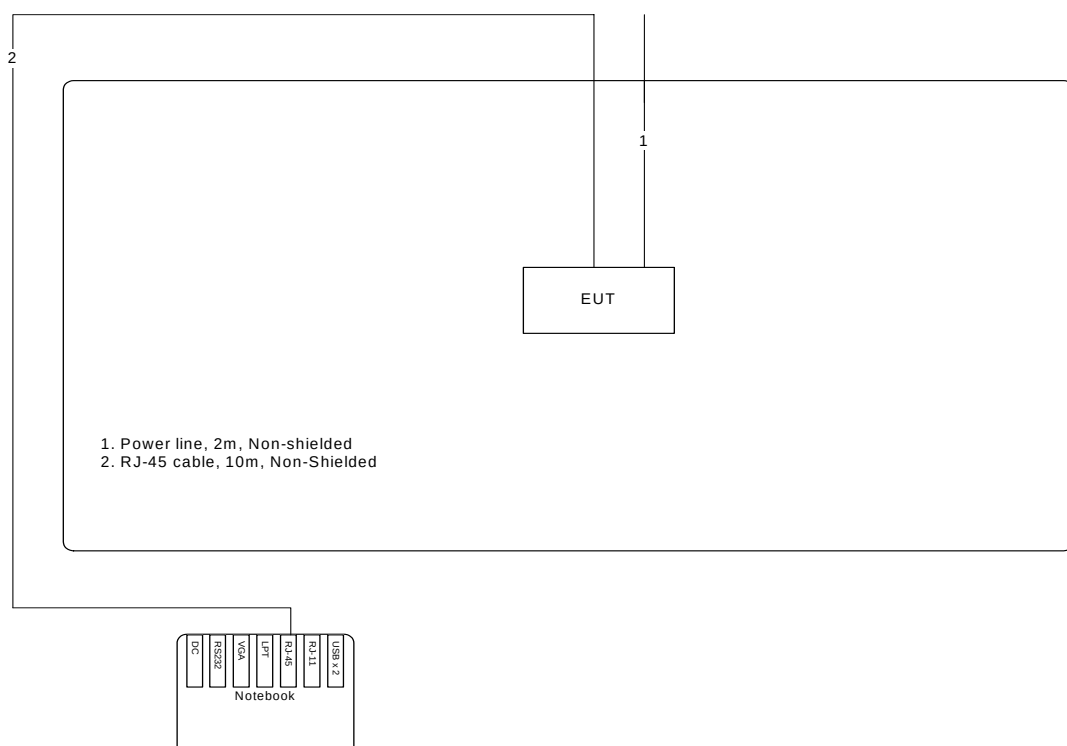
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

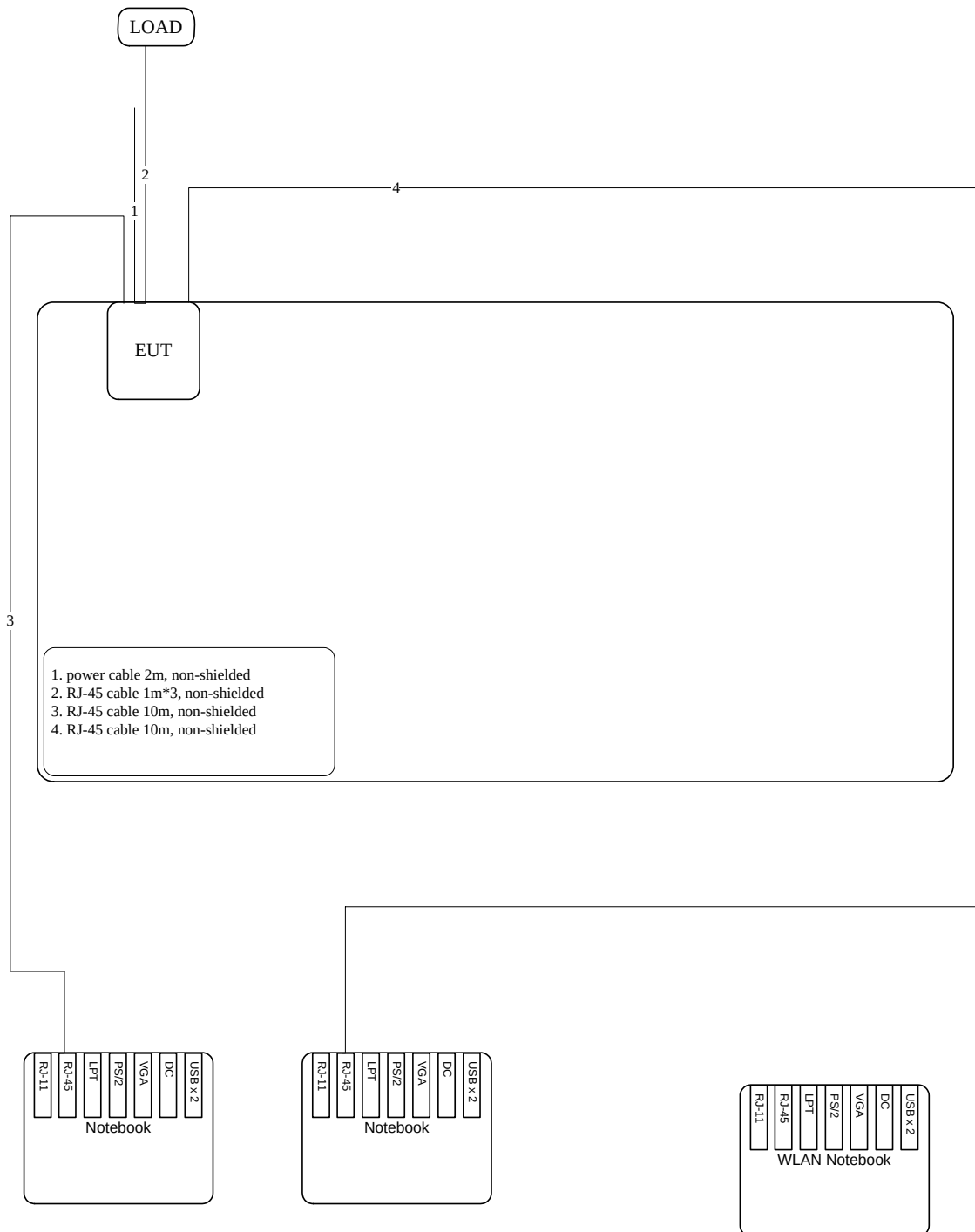
Test Configuration: 9KHz~1GHz



Test Configuration: above 1GHz



3.9.2. AC Power Line Conduction Emissions Test Configuration



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

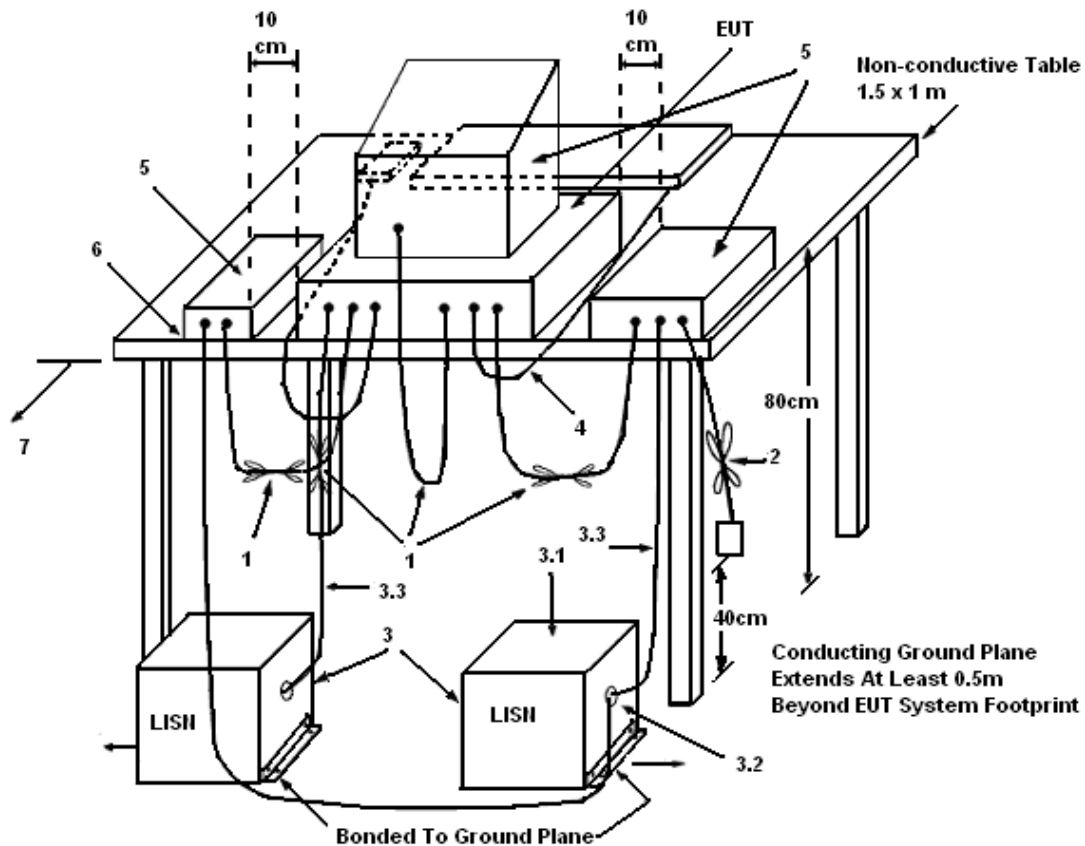
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
 - (3.1) All other equipment powered from additional LISN(s).
 - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
 - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

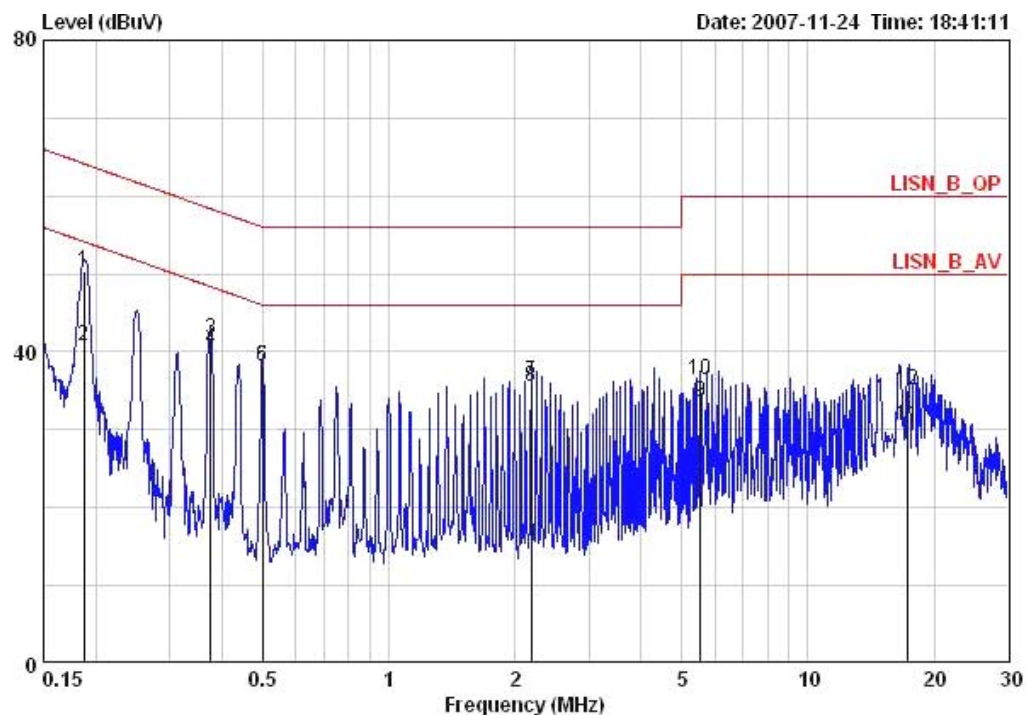
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

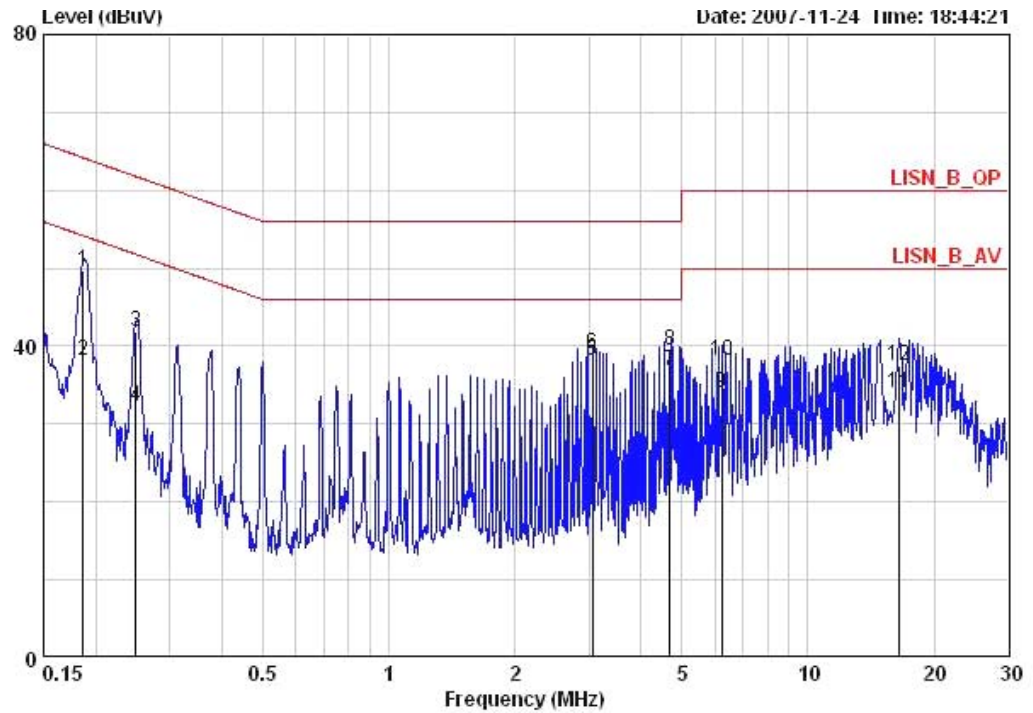
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	54%
Test Engineer	Barry Chen	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.18699	50.37	-13.80	64.17	50.02	0.15	0.20	QP	LINE
2	0.18699	40.77	-13.40	54.17	40.42	0.15	0.20	AVERAGE	LINE
3	0.37512	41.63	-16.76	58.39	41.33	0.10	0.20	QP	LINE
4	0.37512	40.43	-7.96	48.39	40.13	0.10	0.20	AVERAGE	LINE
5	0.49897	38.20	-17.82	56.02	37.92	0.08	0.20	QP	LINE
6	0.49897	38.17	-7.85	46.02	37.89	0.08	0.20	AVERAGE	LINE
7	2.184	36.20	-19.80	56.00	36.00	0.00	0.20	QP	LINE
8	2.184	35.52	-10.48	46.00	35.32	0.00	0.20	AVERAGE	LINE
9	5.553	33.56	-16.44	50.00	33.23	0.03	0.30	AVERAGE	LINE
10	5.553	36.47	-23.53	60.00	36.14	0.03	0.30	QP	LINE
11	17.286	30.50	-19.50	50.00	29.90	0.10	0.50	AVERAGE	LINE
12	17.286	35.20	-24.80	60.00	34.60	0.10	0.50	QP	LINE

Temperature	23°C	Humidity	54%
Test Engineer	Barry Chen	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1 ☐	0.18659	49.63	-14.56	64.19	49.18	0.25	0.20	QP	NEUTRAL
2 ☐	0.18659	38.16	-16.03	54.19	37.71	0.25	0.20	AVERAGE	NEUTRAL
3	0.24958	41.79	-19.98	61.77	41.41	0.18	0.20	QP	NEUTRAL
4	0.24958	32.23	-19.54	51.77	31.85	0.18	0.20	AVERAGE	NEUTRAL
5 ☐	3.058	38.19	-7.81	46.00	37.88	0.10	0.21	AVERAGE	NEUTRAL
6 ☐	3.058	38.97	-17.03	56.00	38.66	0.10	0.21	QP	NEUTRAL
7 ☐	4.680	36.79	-9.21	46.00	36.39	0.10	0.30	AVERAGE	NEUTRAL
8 ☐	4.680	39.50	-16.50	56.00	39.10	0.10	0.30	QP	NEUTRAL
9 ☐	6.238	34.05	-15.95	50.00	33.60	0.10	0.35	AVERAGE	NEUTRAL
10	6.238	38.06	-21.94	60.00	37.61	0.10	0.35	QP	NEUTRAL
11 ☐	16.471	33.94	-16.06	50.00	33.44	0.10	0.40	AVERAGE	NEUTRAL
12	16.471	37.43	-22.57	60.00	36.93	0.10	0.40	QP	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

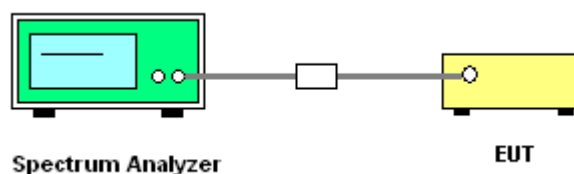
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 Power Meter 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	Beck Wu	Configurations	Draft n

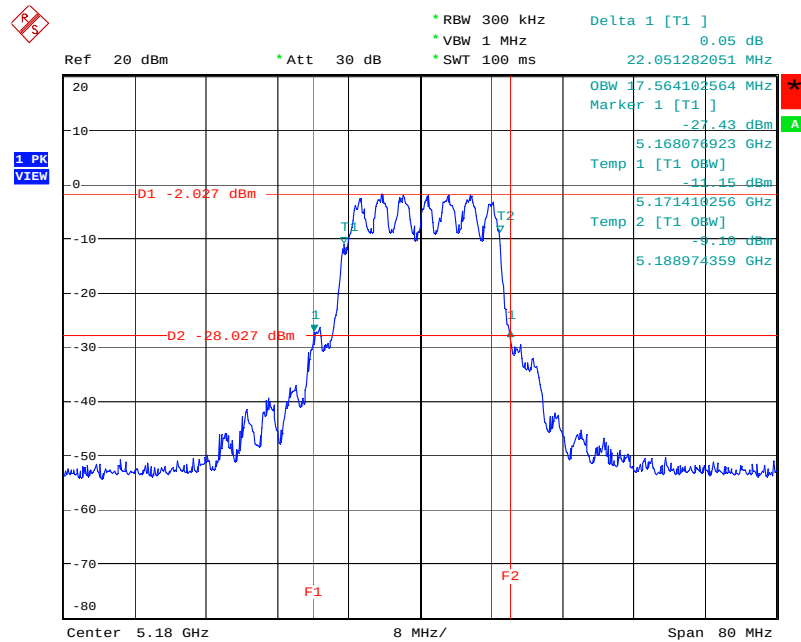
Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.05	17.56
40	5200 MHz	21.79	17.56
48	5240 MHz	22.05	17.43
52	5260 MHz	23.58	17.82
60	5300 MHz	23.58	17.82
64	5320 MHz	23.58	17.82
100	5500 MHz	23.33	17.82
120	5600 MHz	23.20	17.82
140	5700 MHz	23.58	17.82

Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5

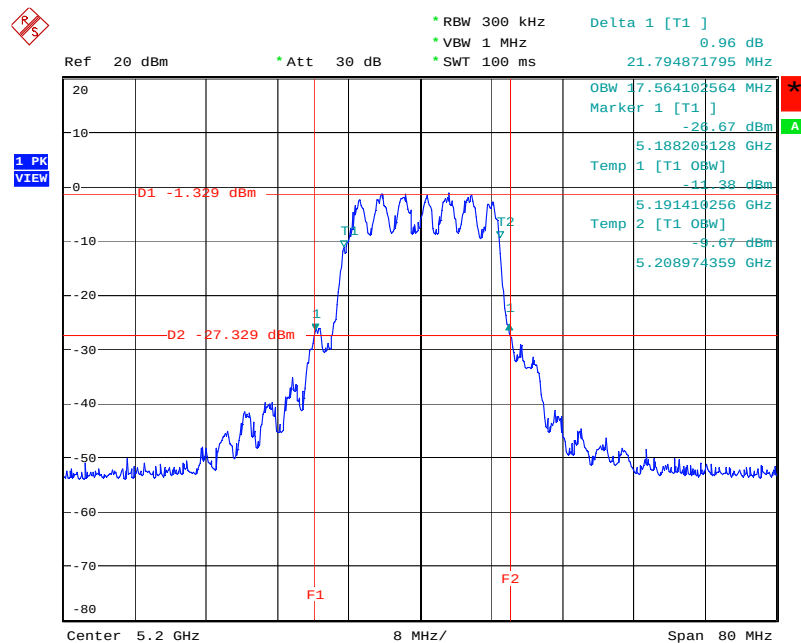
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	38.71	36.02
46	5230 MHz	38.78	36.05
54	5270 MHz	38.71	35.89
62	5310 MHz	38.71	35.76
102	5510 MHz	38.97	35.76
118	5590 MHz	38.58	35.76

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5180 MHz



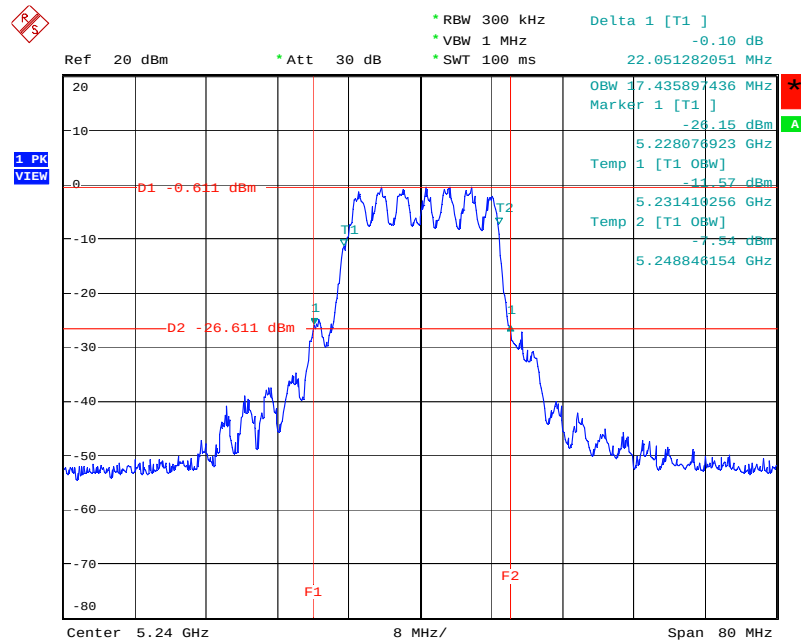
Date: 11.DEC.2007 14:37:43

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5200 MHz



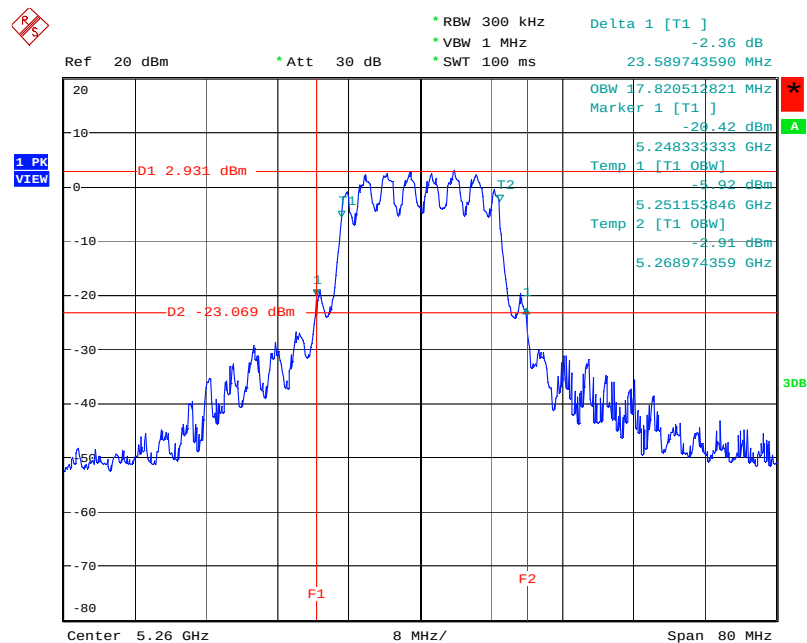
Date: 11.DEC.2007 14:39:52

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5240 MHz



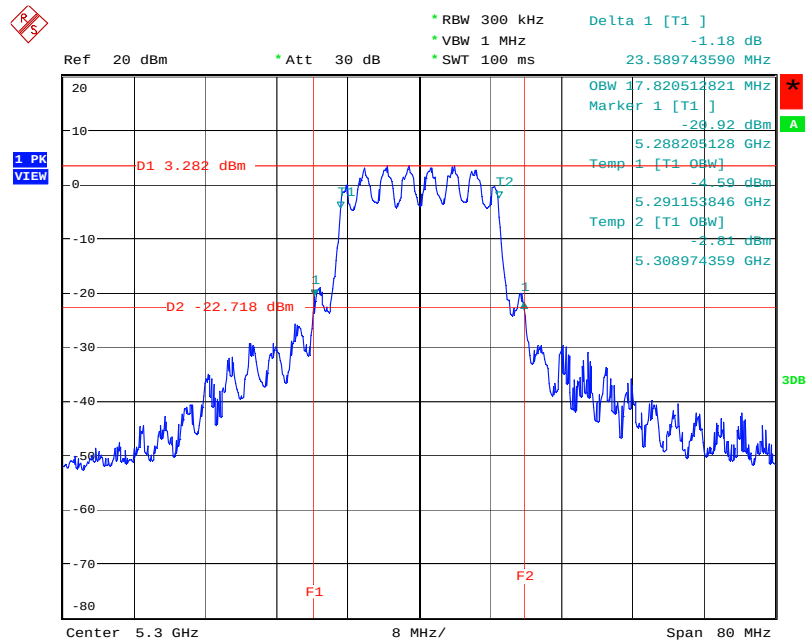
Date: 11.DEC.2007 14:42:00

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5260 MHz



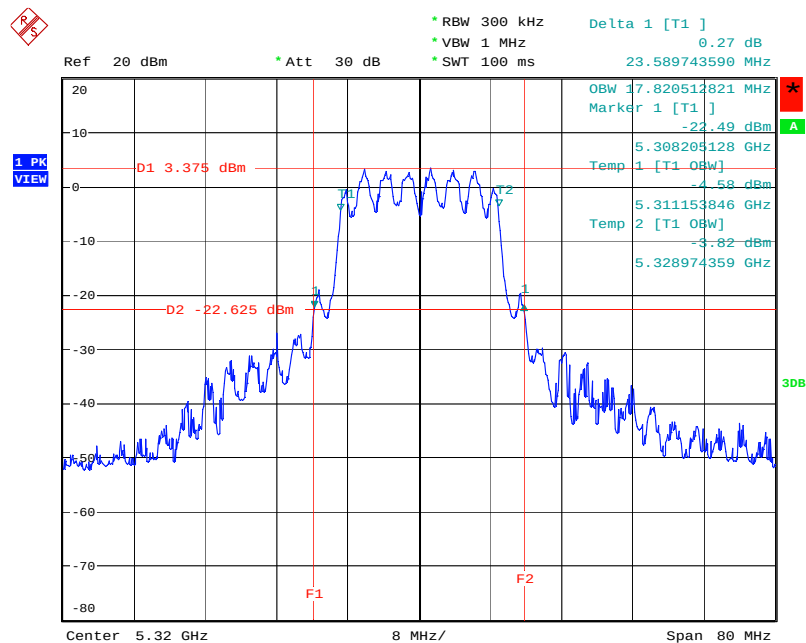
Date: 20.JAN.2008 00:17:55

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5300 MHz



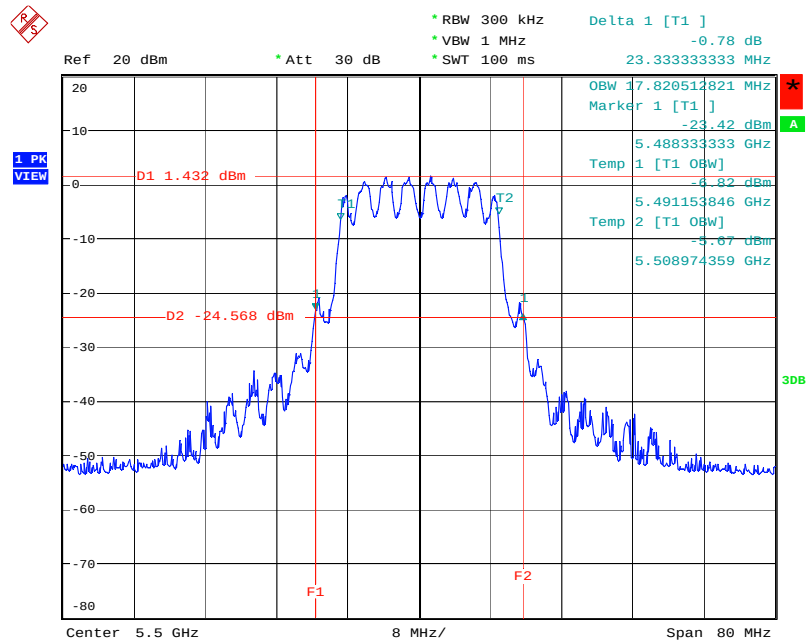
Date: 20.JAN.2008 00:20:28

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5320 MHz



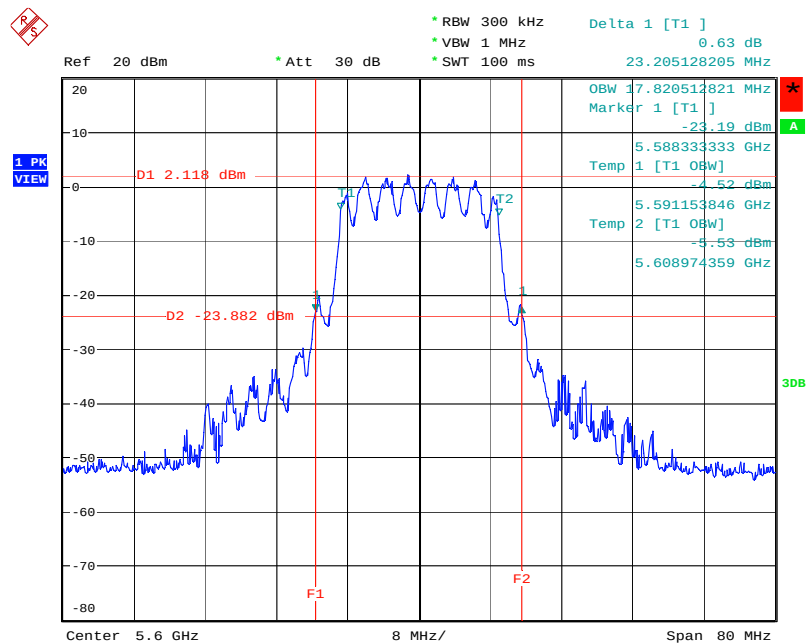
Date: 20.JAN.2008 00:23:22

26 dB Bandwidth Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5500 MHz



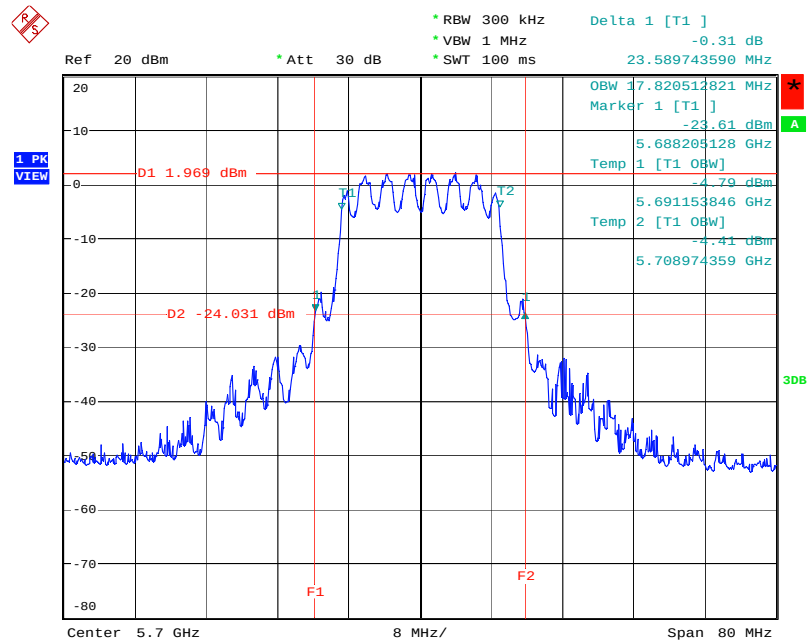
Date: 20.JAN.2008 00:27:42

26 dB Bandwidth Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5600 MHz



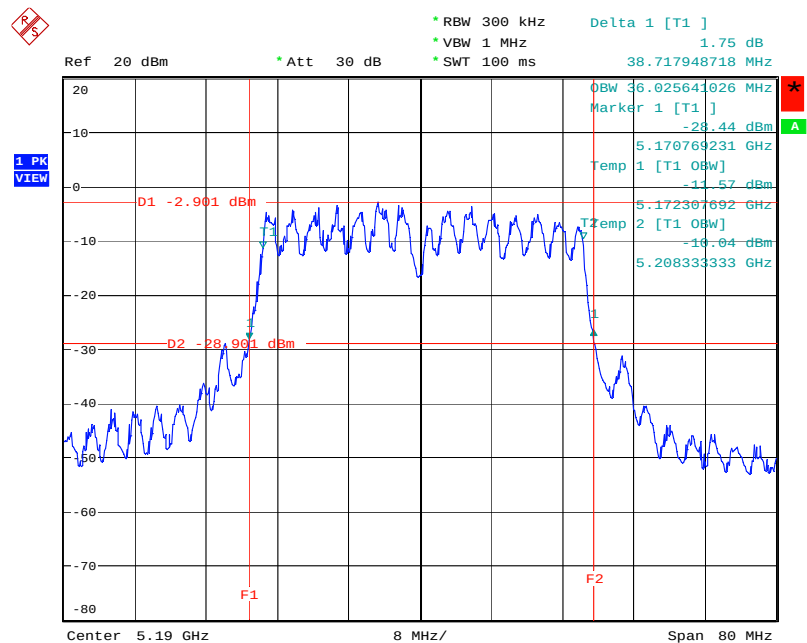
Date: 20.JAN.2008 00:29:35

26 dB Bandwidth Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5700 MHz



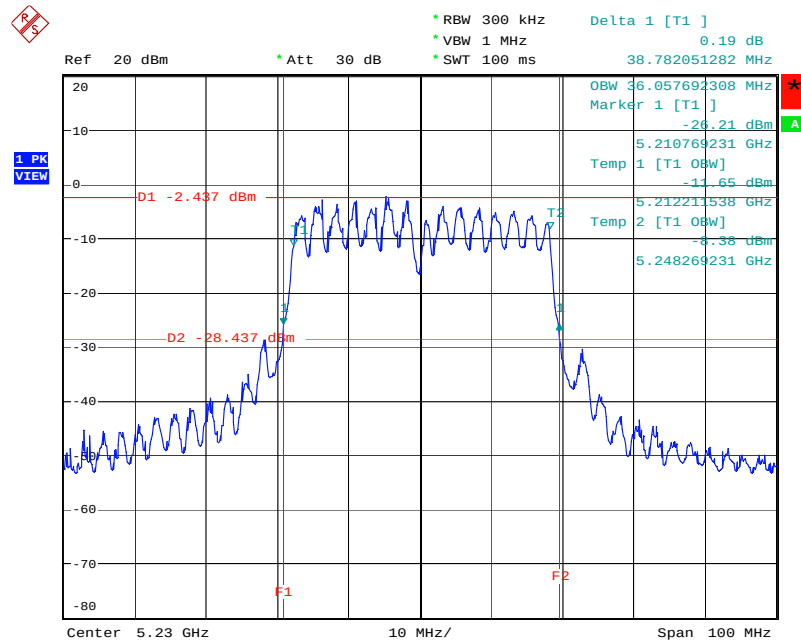
Date: 20.JAN.2008 00:34:05

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5190 MHz



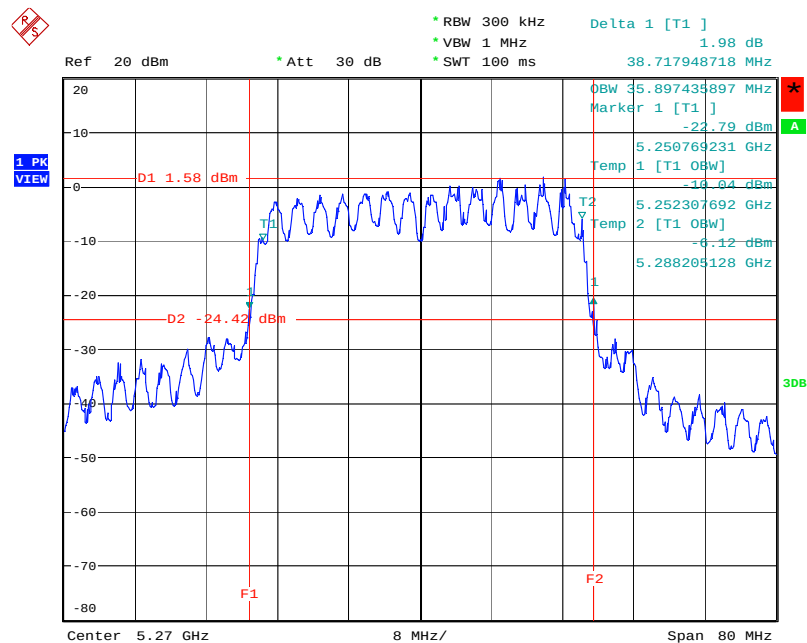
Date: 11.DEC.2007 14:34:13

26 dB Bandwidth Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5230 MHz



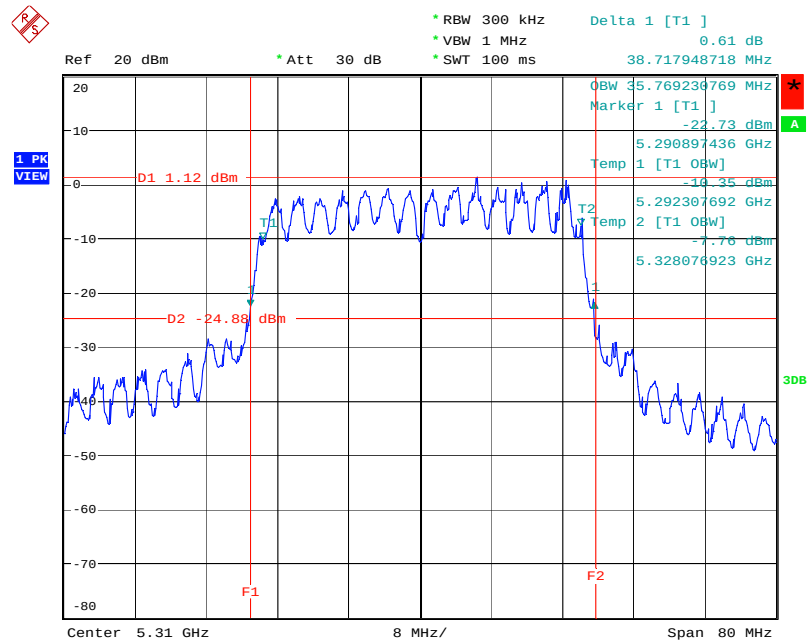
Date: 11.DEC.2007 14:31:25

26 dB Bandwidth Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5270 MHz



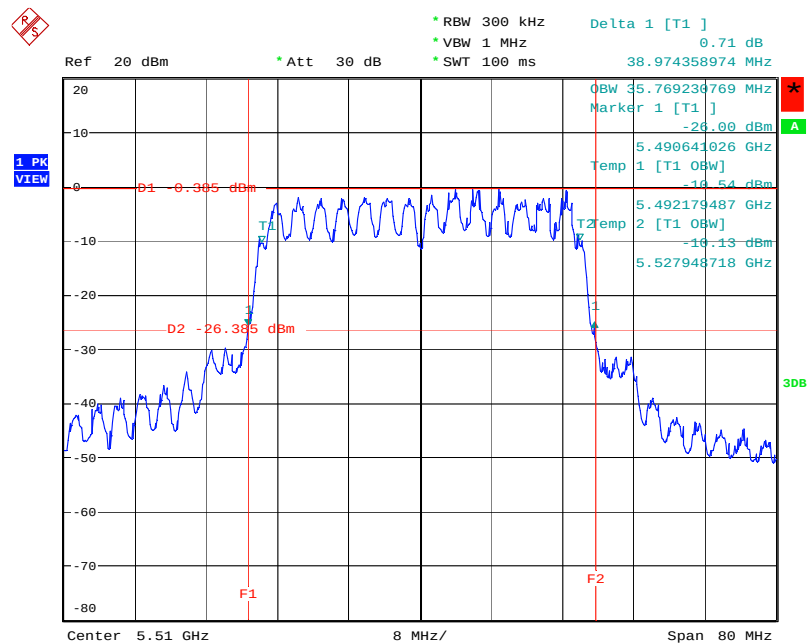
Date: 20.JAN.2008 00:12:58

26 dB Bandwidth Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5310 MHz



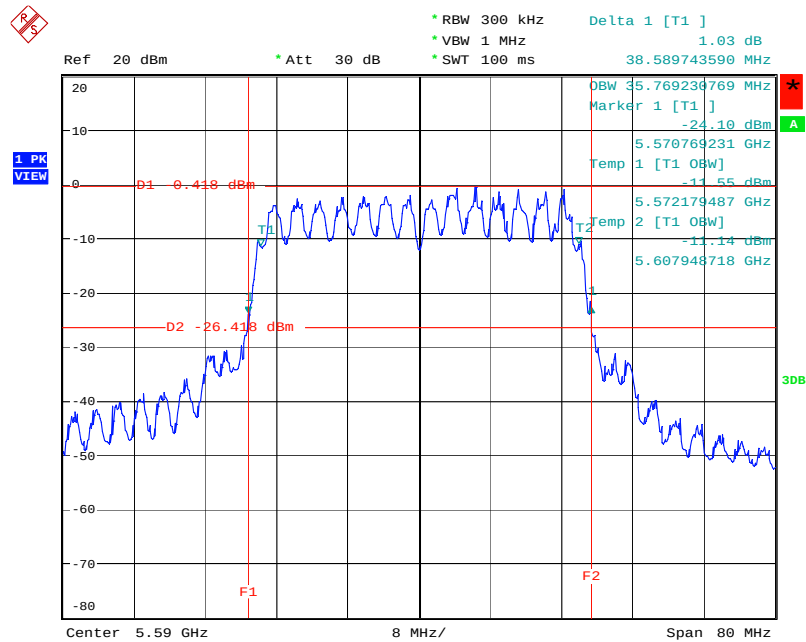
Date: 20.JAN.2008 00:10:56

26 dB Bandwidth Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5510 MHz



Date: 19.JAN.2008 23:59:59

26 dB Bandwidth Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5590 MHz



Date: 19.JAN.2008 23:57:27

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

For the band 5.15~5.35 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.

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

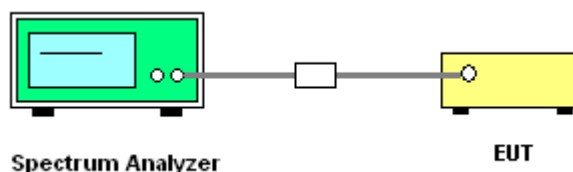
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	500ms

4.3.3. Test Procedures

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

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	23°C	Humidity	56%
Test Engineer	Beck Wu	Configurations	Draft n

Configuration Draft n MCS8 20MHz Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.09	16.08	Complies
40	5200 MHz	13.13	16.08	Complies
48	5240 MHz	13.03	16.08	Complies
52	5260 MHz	16.71	23.08	Complies
60	5300 MHz	16.83	23.08	Complies
64	5320 MHz	16.74	23.08	Complies
100	5500 MHz	16.85	23.08	Complies
120	5600 MHz	16.65	23.08	Complies
140	5700 MHz	16.55	23.08	Complies

Configuration Draft n MCS8 20MHz Ant. 5

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.00	16.08	Complies
40	5200 MHz	12.99	16.08	Complies
48	5240 MHz	12.91	16.08	Complies
52	5260 MHz	16.86	23.08	Complies
60	5300 MHz	16.63	23.08	Complies
64	5320 MHz	16.60	23.08	Complies
100	5500 MHz	17.06	23.08	Complies
120	5600 MHz	16.80	23.08	Complies
140	5700 MHz	16.64	23.08	Complies

Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.06	16.08	Complies
40	5200 MHz	16.07	16.08	Complies
48	5240 MHz	15.98	16.08	Complies
52	5260 MHz	19.80	23.08	Complies
60	5300 MHz	19.74	23.08	Complies
64	5320 MHz	19.68	23.08	Complies
100	5500 MHz	19.97	23.08	Complies
120	5600 MHz	19.74	23.08	Complies
140	5700 MHz	19.61	23.08	Complies

Configuration Draft n MCS8 40MHz Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	13.01	16.08	Complies
46	5230 MHz	13.04	16.08	Complies
54	5270 MHz	16.83	23.08	Complies
62	5310 MHz	16.97	23.08	Complies
102	5510 MHz	16.83	23.08	Complies
118	5590 MHz	16.81	23.08	Complies

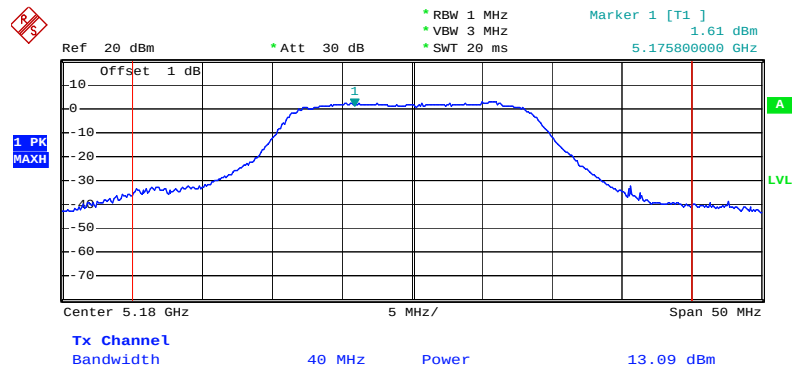
Configuration Draft n MCS8 40MHz Ant. 5

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.90	16.08	Complies
46	5230 MHz	12.87	16.08	Complies
54	5270 MHz	16.52	23.08	Complies
62	5310 MHz	16.87	23.08	Complies
102	5510 MHz	16.47	23.08	Complies
118	5590 MHz	16.53	23.08	Complies

Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5

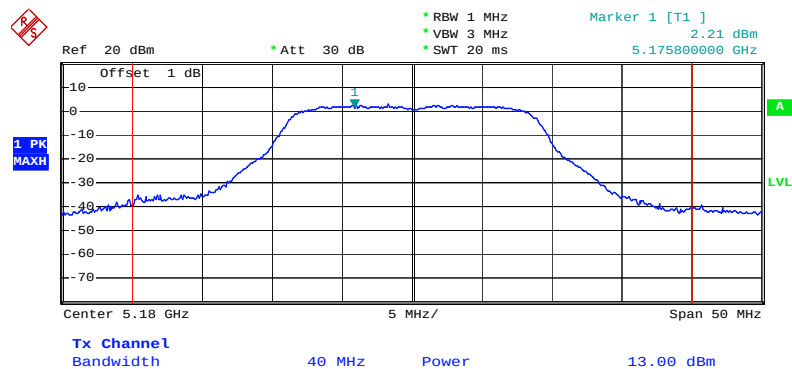
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	15.97	16.08	Complies
46	5230 MHz	15.97	16.08	Complies
54	5270 MHz	19.69	23.08	Complies
62	5310 MHz	19.93	23.08	Complies
102	5510 MHz	19.66	23.08	Complies
118	5590 MHz	19.68	23.08	Complies

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5180 MHz



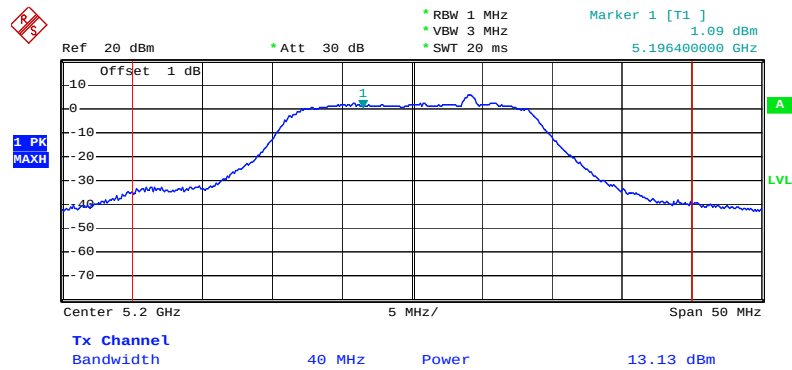
Date: 27.DEC.2007 03:55:08

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5180 MHz



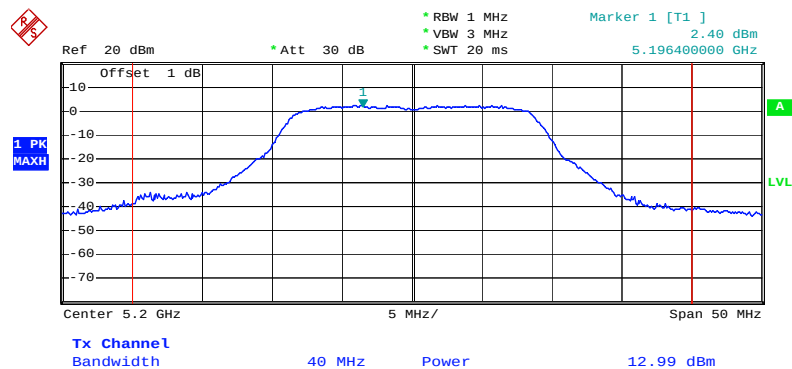
Date: 27.DEC.2007 03:59:33

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5200 MHz



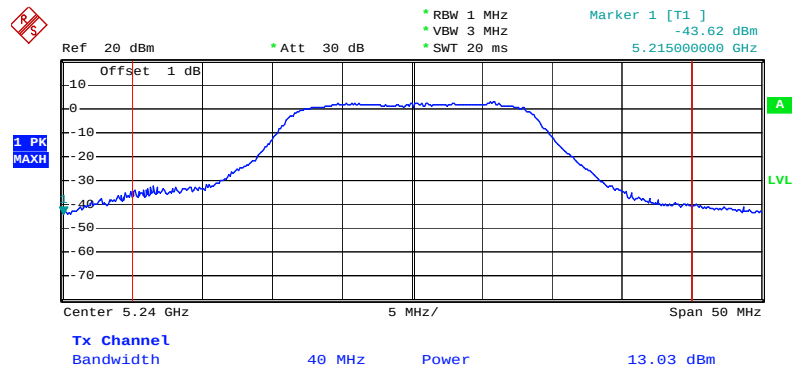
Date: 27.DEC.2007 04:07:03

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5200 MHz



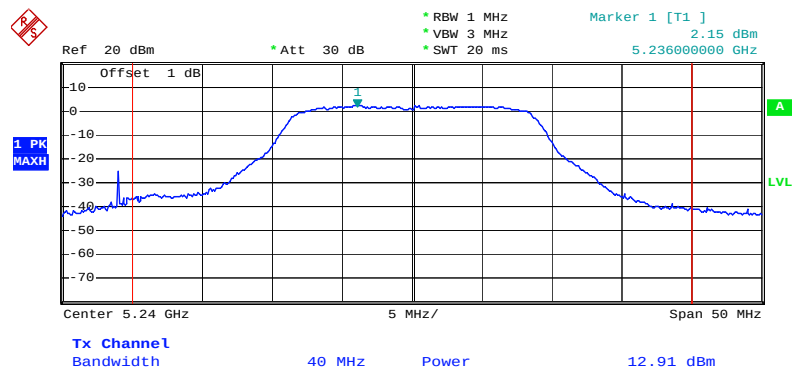
Date: 27.DEC.2007 04:03:43

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5240 MHz



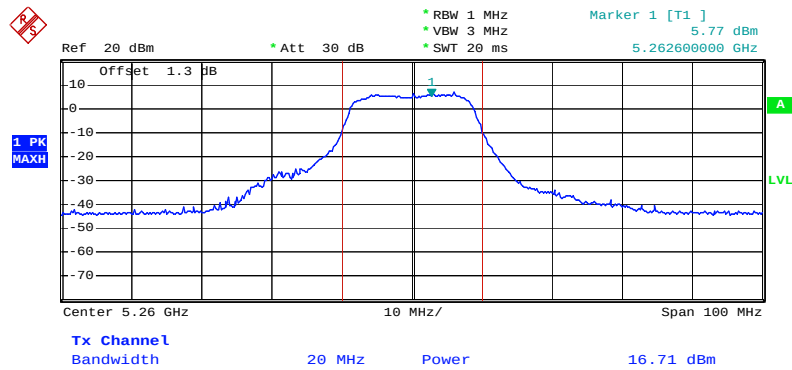
Date: 27.DEC.2007 04:14:43

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5240 MHz



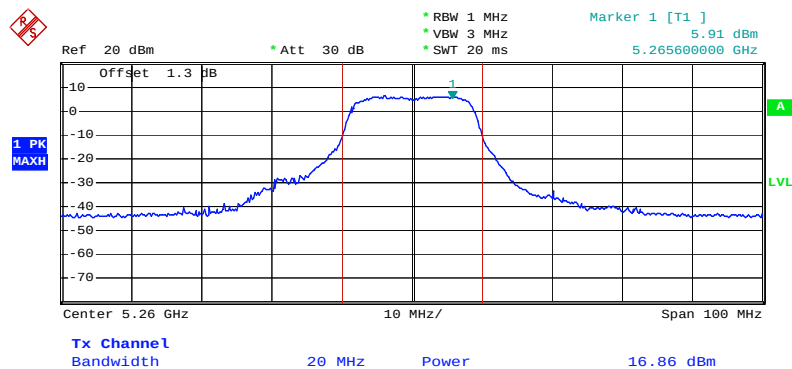
Date: 27.DEC.2007 04:16:21

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5260 MHz



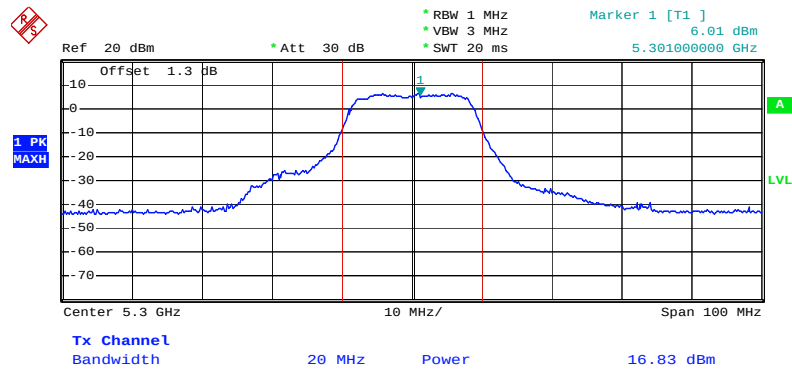
Date: 28.JAN.2008 13:21:00

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5260 MHz



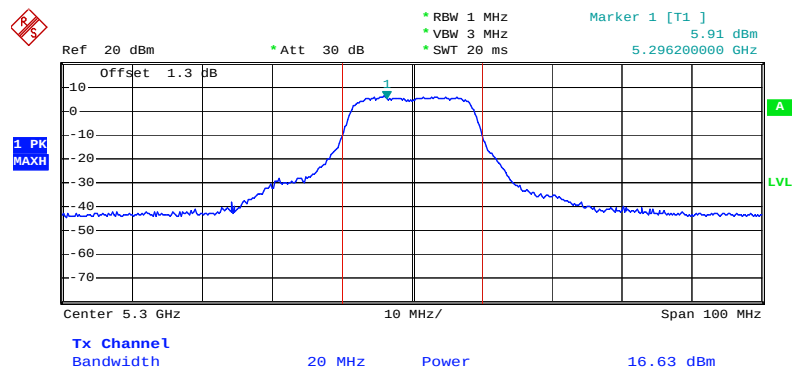
Date: 28.JAN.2008 13:21:44

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5300 MHz



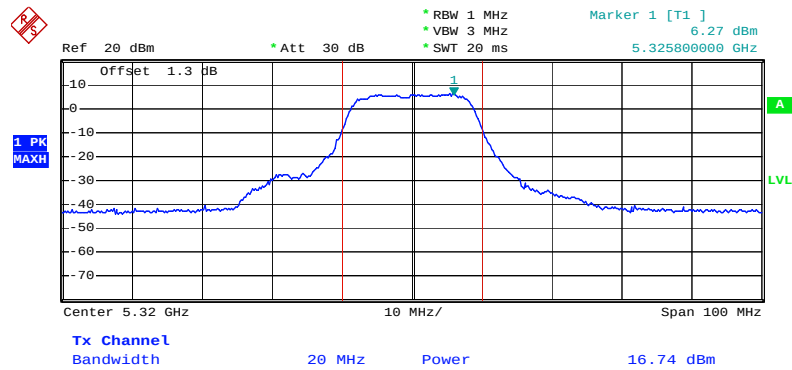
Date: 28.JAN.2008 13:26:07

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5300 MHz



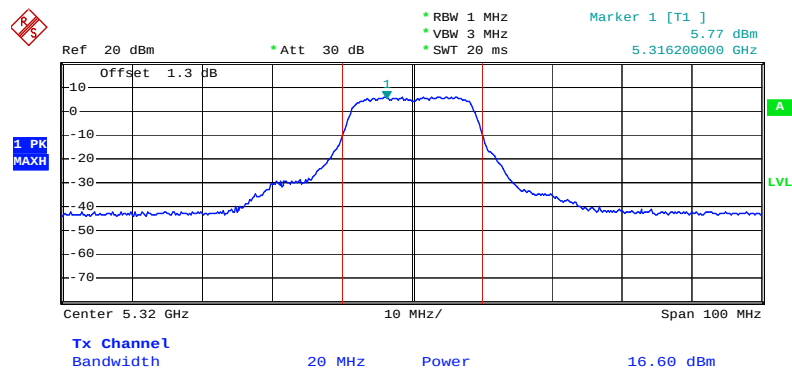
Date: 28.JAN.2008 13:27:29

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5320 MHz



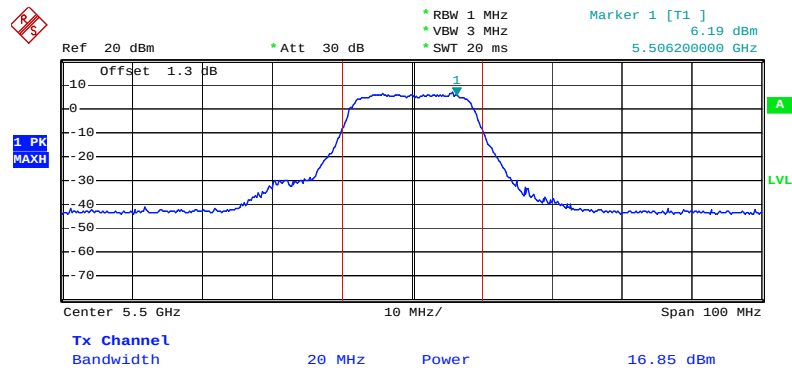
Date: 28.JAN.2008 13:32:13

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5320 MHz



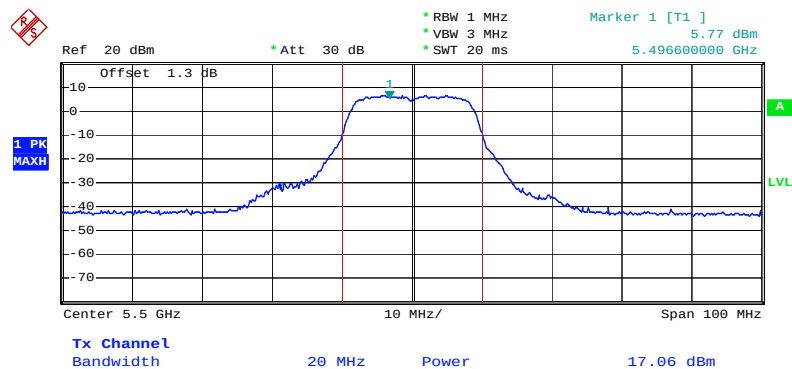
Date: 28.JAN.2008 13:30:49

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5500 MHz



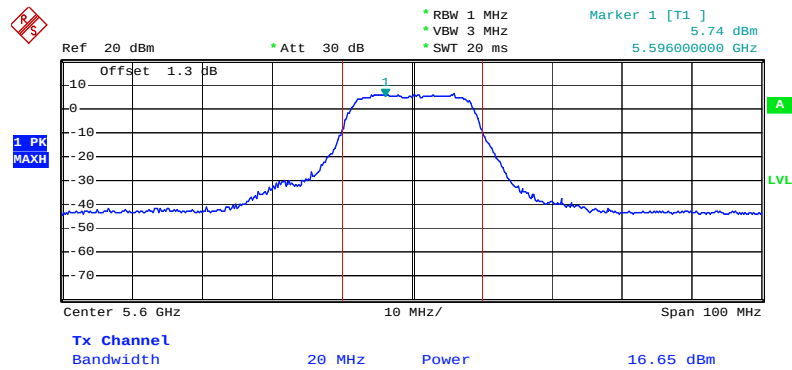
Date: 28.JAN.2008 13:33:59

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5500 MHz



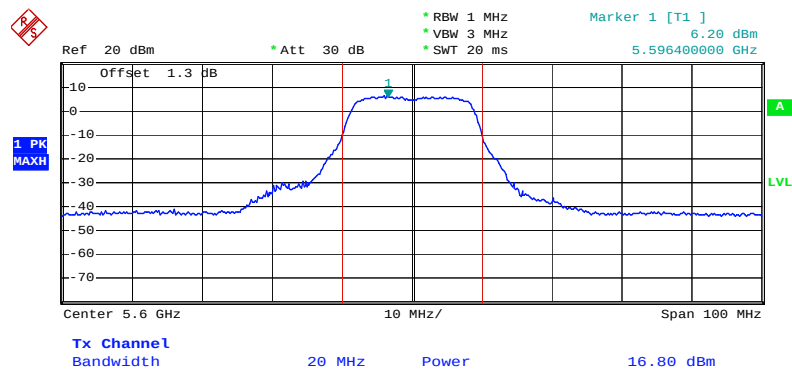
Date: 28.JAN.2008 13:34:31

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5600 MHz



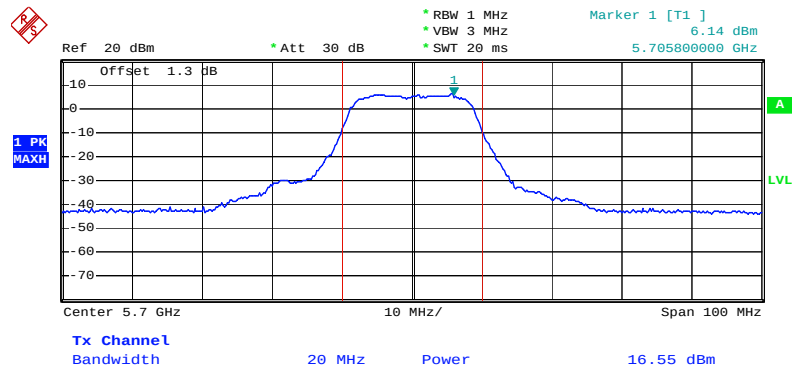
Date: 28.JAN.2008 13:50:23

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5600 MHz



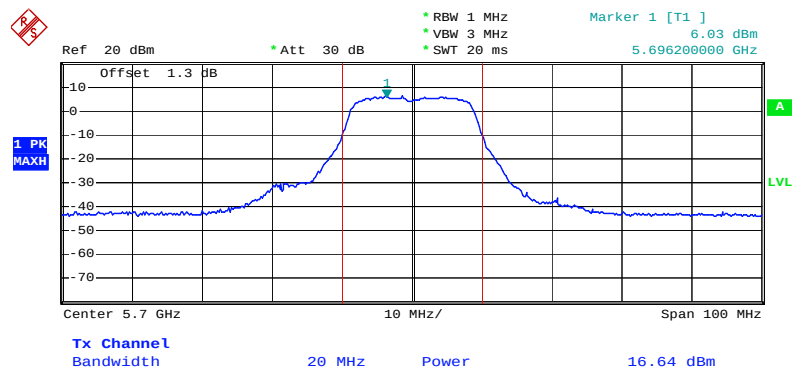
Date: 28.JAN.2008 13:47:57

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 3 / 5700 MHz



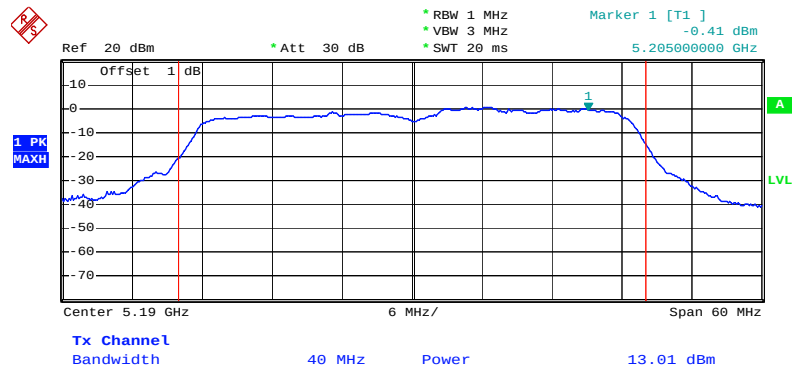
Date: 28.JAN.2008 13:45:51

Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. 5 / 5700 MHz



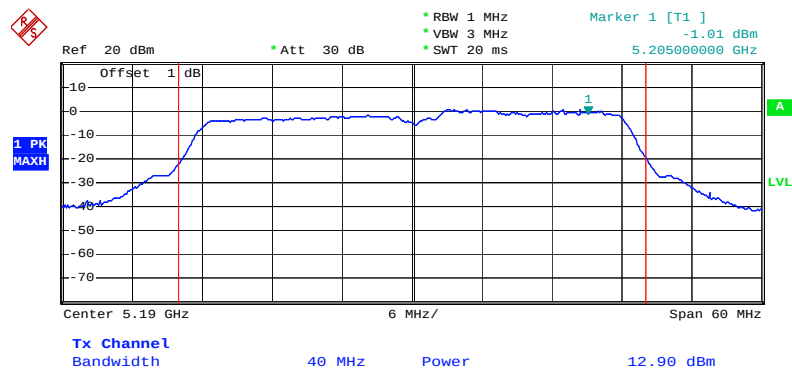
Date: 28.JAN.2008 13:44:03

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 3 / 5190 MHz



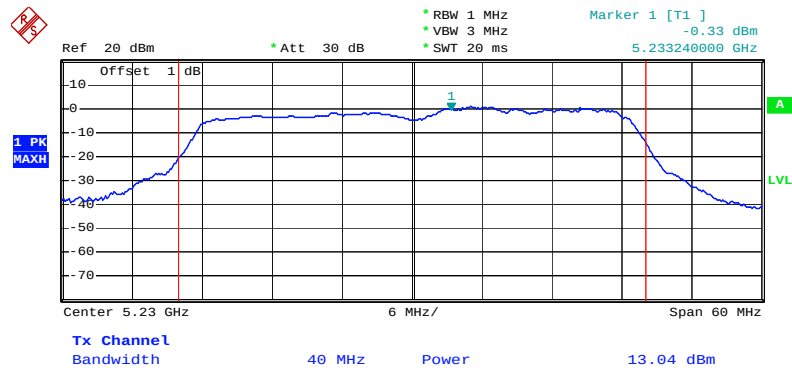
Date: 27.DEC.2007 04:41:13

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 5 / 5190 MHz



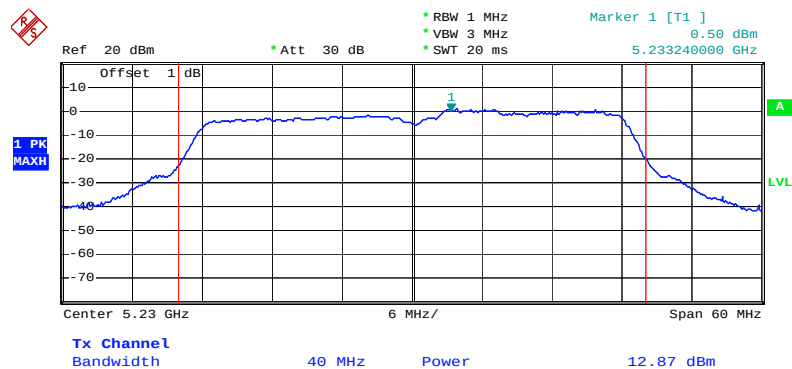
Date: 27.DEC.2007 04:43:12

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 3 / 5230 MHz



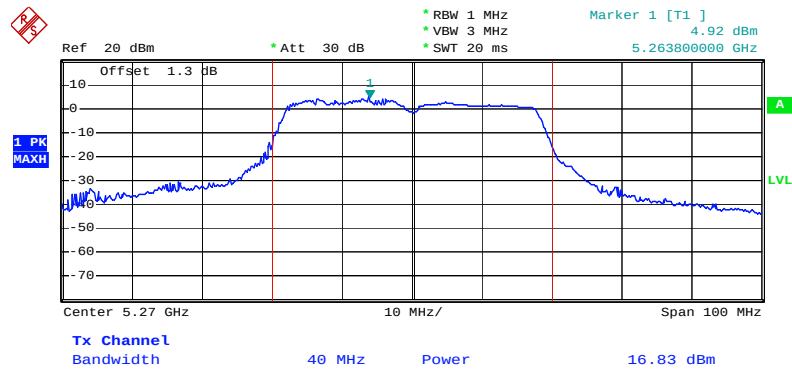
Date: 27.DEC.2007 04:55:56

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 5 / 5230 MHz



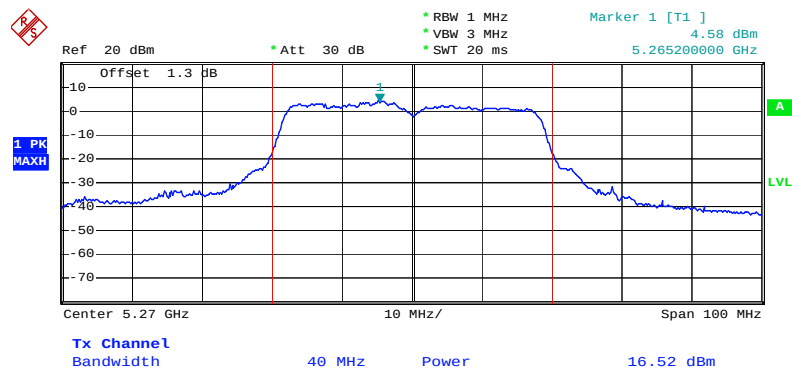
Date: 27.DEC.2007 04:48:39

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 3 / 5270 MHz



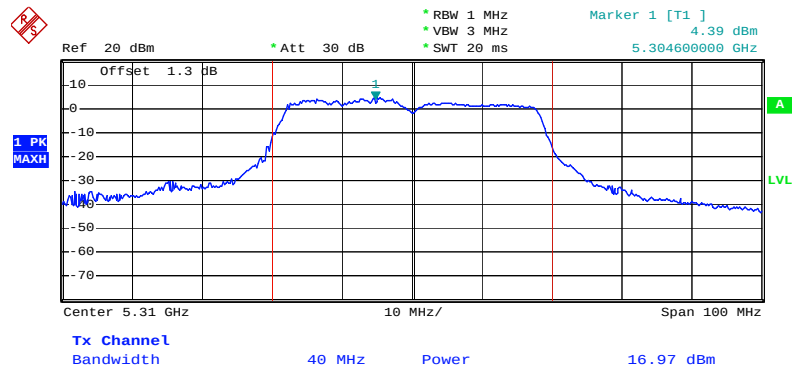
Date: 28.JAN.2008 13:56:32

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 5 / 5270 MHz



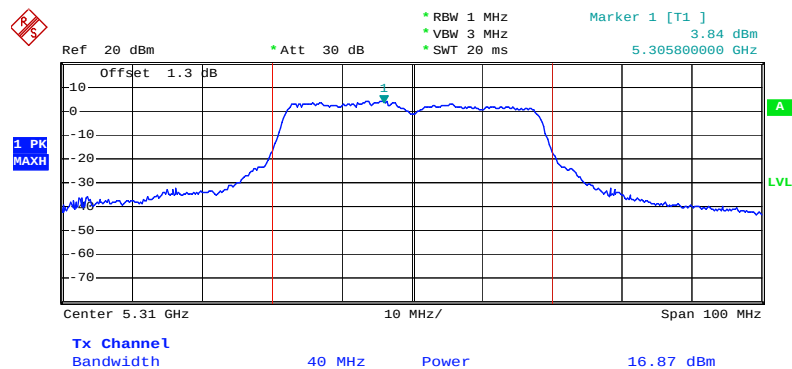
Date: 28.JAN.2008 13:55:27

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 3 / 5310 MHz



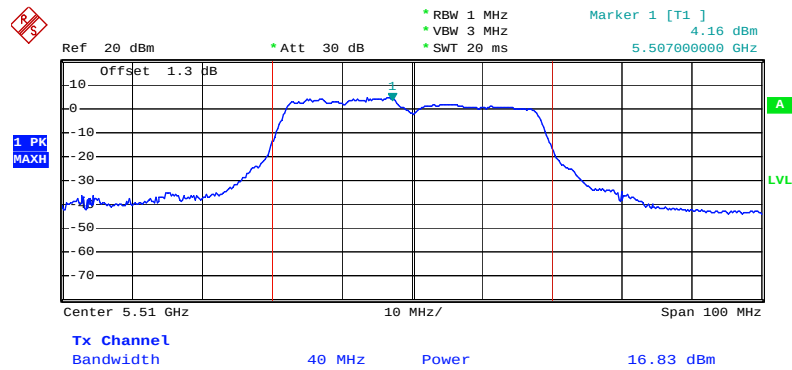
Date: 28.JAN.2008 14:00:42

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 5 / 5310 MHz



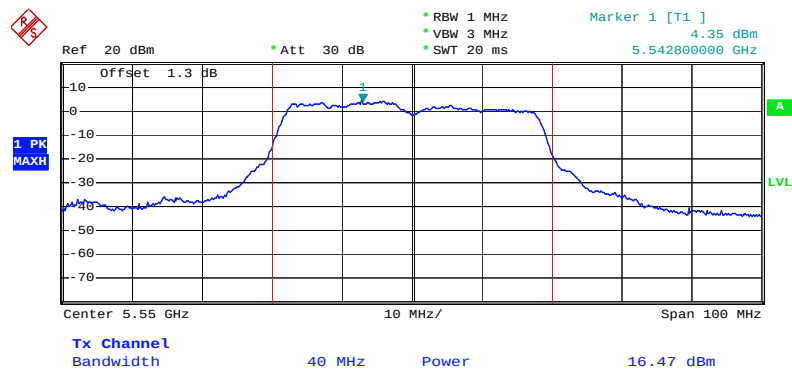
Date: 28.JAN.2008 13:59:38

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 3 / 5510 MHz



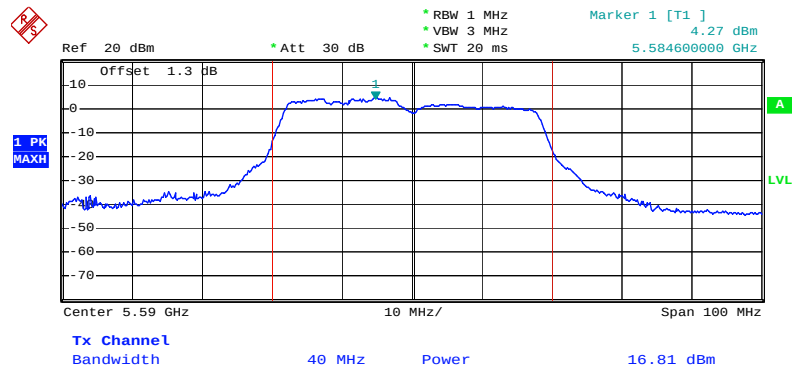
Date: 28.JAN.2008 14:08:45

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 5 / 5510 MHz



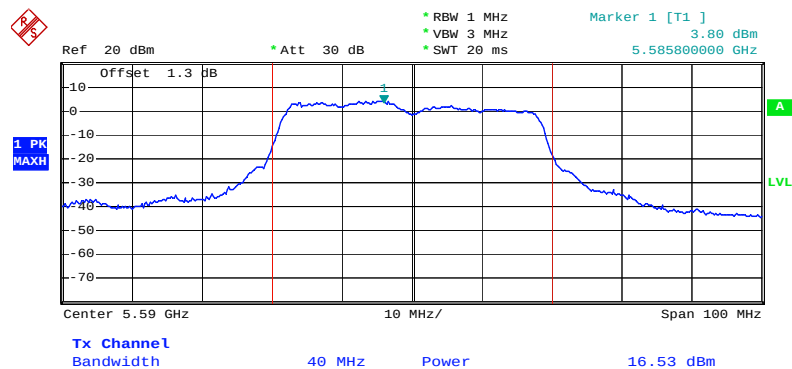
Date: 28.JAN.2008 14:12:24

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 3 / 5590 MHz



Date: 28.JAN.2008 14:15:24

Conducted Output Power Plot on Configuration Draft n MCS8 40MHz Ant. 5 / 5590 MHz



Date: 28.JAN.2008 14:18:01

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

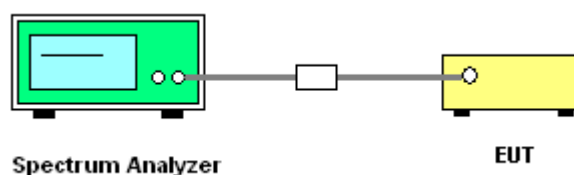
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 Power Meter 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	23°C	Humidity	56%
Test Engineer	Beck Wu	Configurations	Draft n

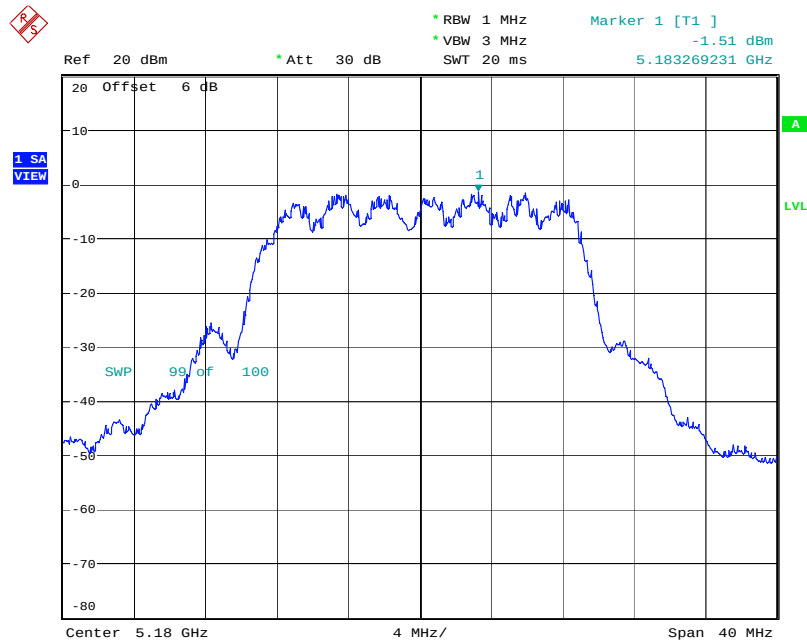
Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	-1.51	4.00	Complies
40	5200 MHz	-0.34	4.00	Complies
48	5240 MHz	0.50	4.00	Complies
52	5260 MHz	2.55	11.00	Complies
60	5300 MHz	2.47	11.00	Complies
64	5320 MHz	2.97	11.00	Complies
100	5500 MHz	0.12	11.00	Complies
120	5600 MHz	0.92	11.00	Complies
140	5700 MHz	1.58	11.00	Complies

Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5

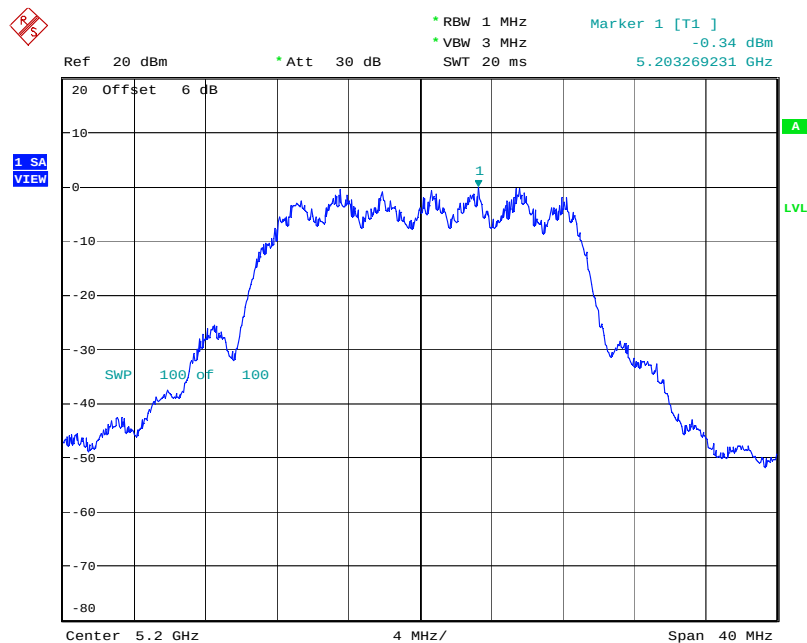
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	-5.14	4.00	Complies
46	5230 MHz	-4.25	4.00	Complies
54	5270 MHz	-2.57	4.00	Complies
62	5310 MHz	-2.08	11.00	Complies
102	5510 MHz	-2.99	11.00	Complies
118	5590 MHz	-4.09	11.00	Complies

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5180 MHz



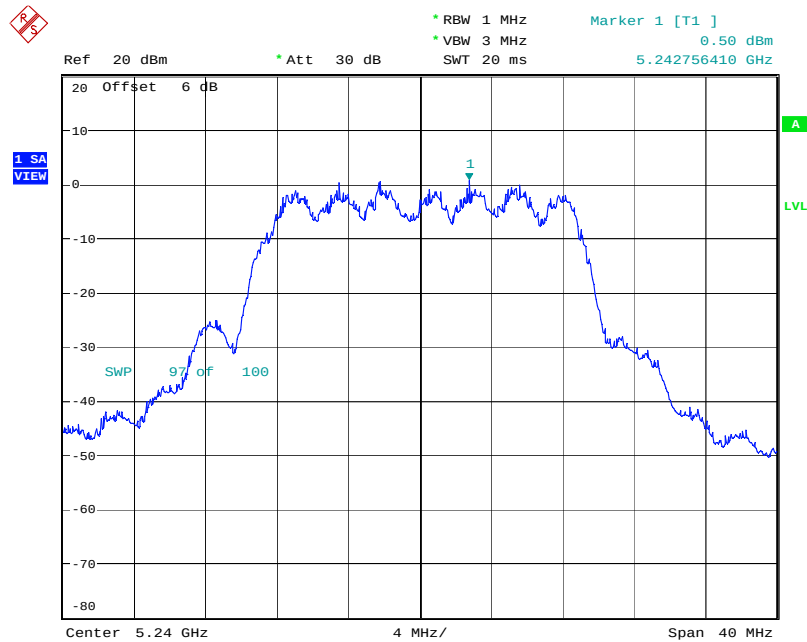
Date: 11.DEC.2007 14:37:50

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5200 MHz



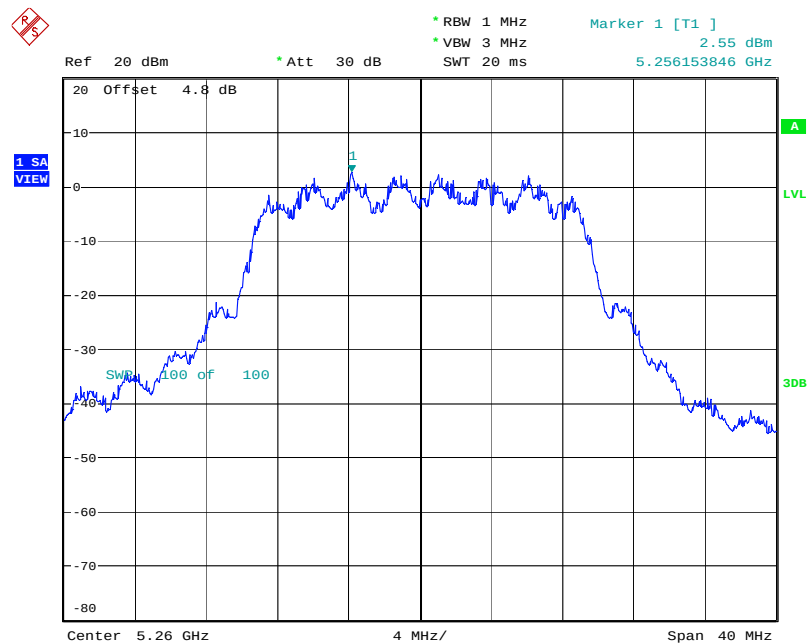
Date: 11.DEC.2007 14:39:59

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5240 MHz



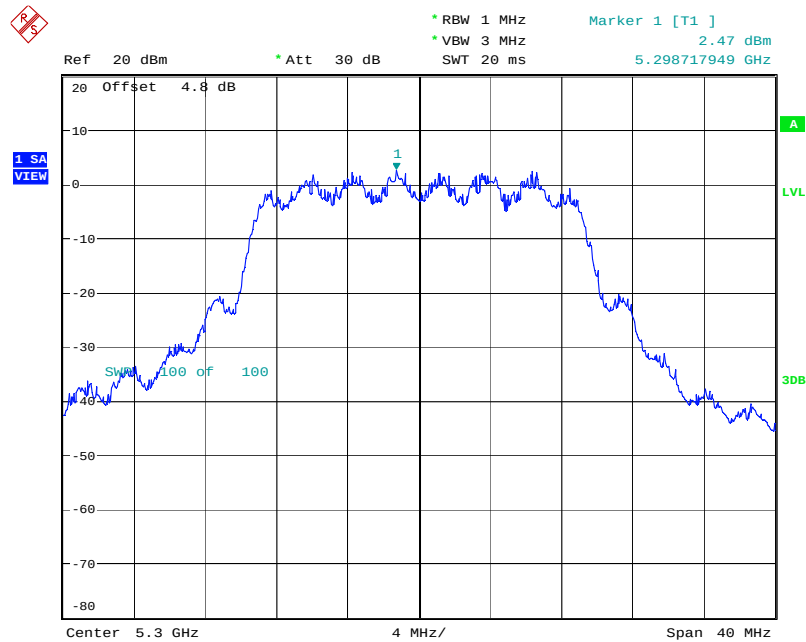
Date: 11.DEC.2007 14:42:07

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5260 MHz



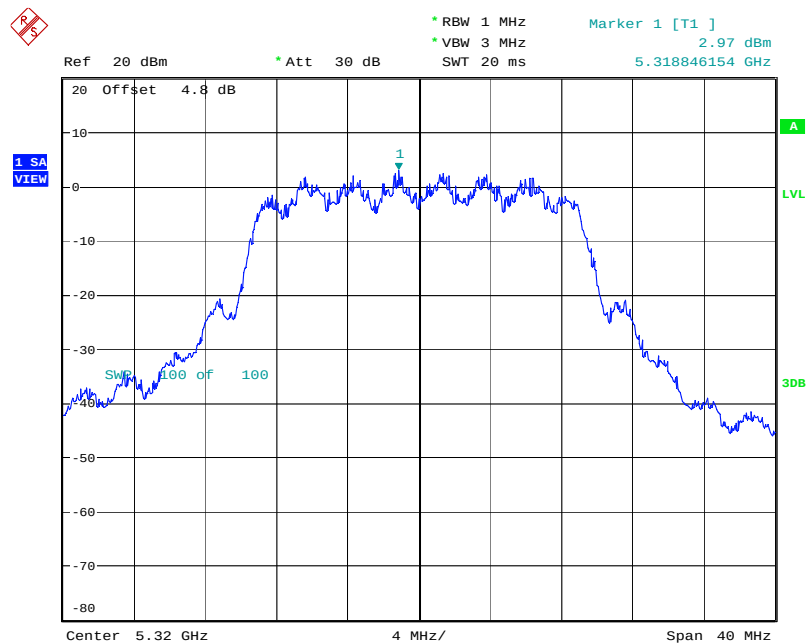
Date: 20.JAN.2008 00:18:02

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5300 MHz



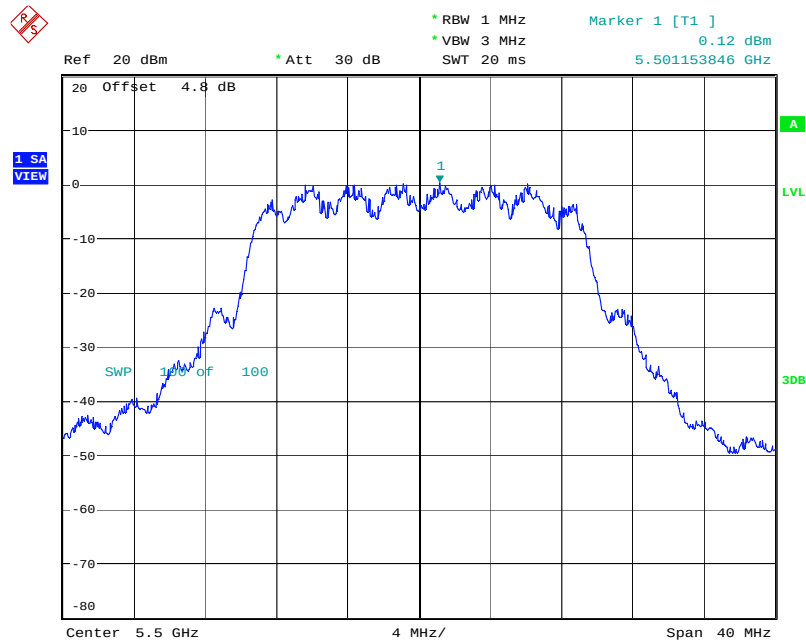
Date: 20.JAN.2008 00:20:35

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5320 MHz



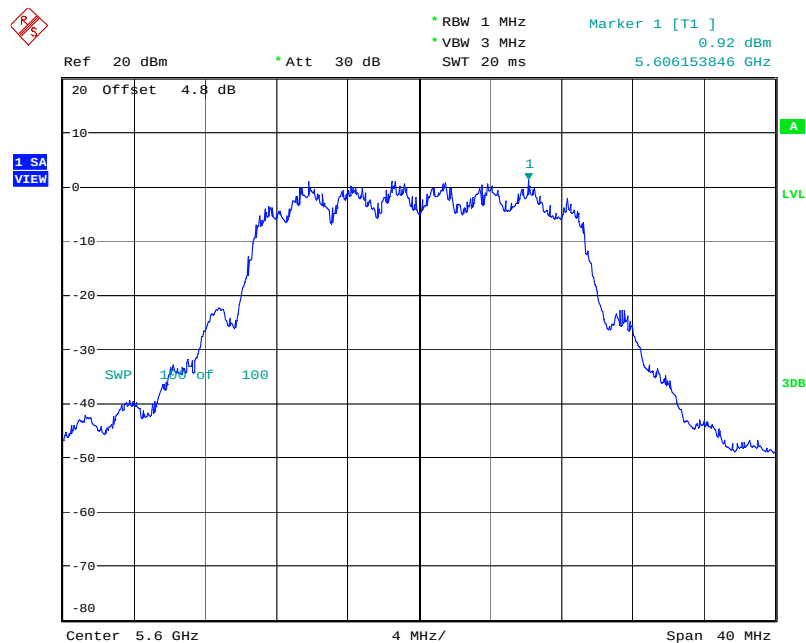
Date: 20.JAN.2008 00:23:29

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5500 MHz



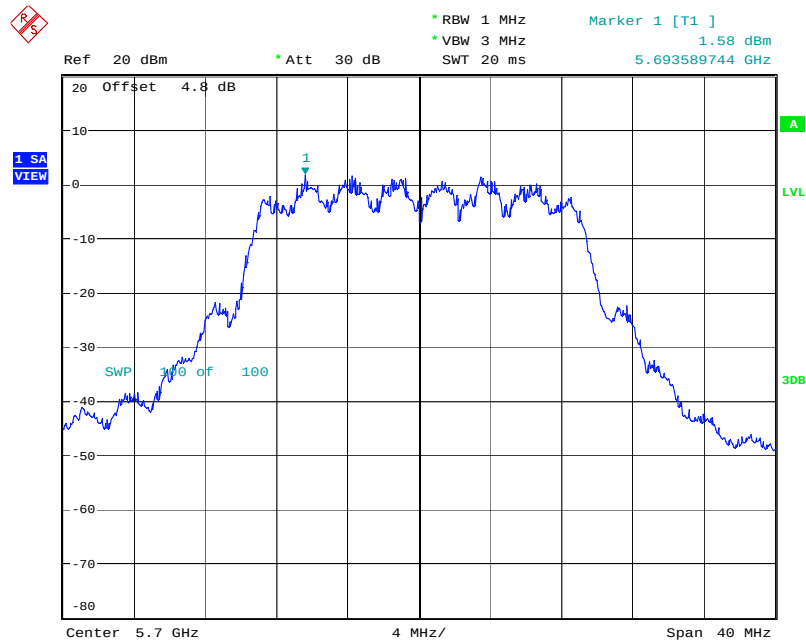
Date: 20.JAN.2008 00:27:50

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5600 MHz



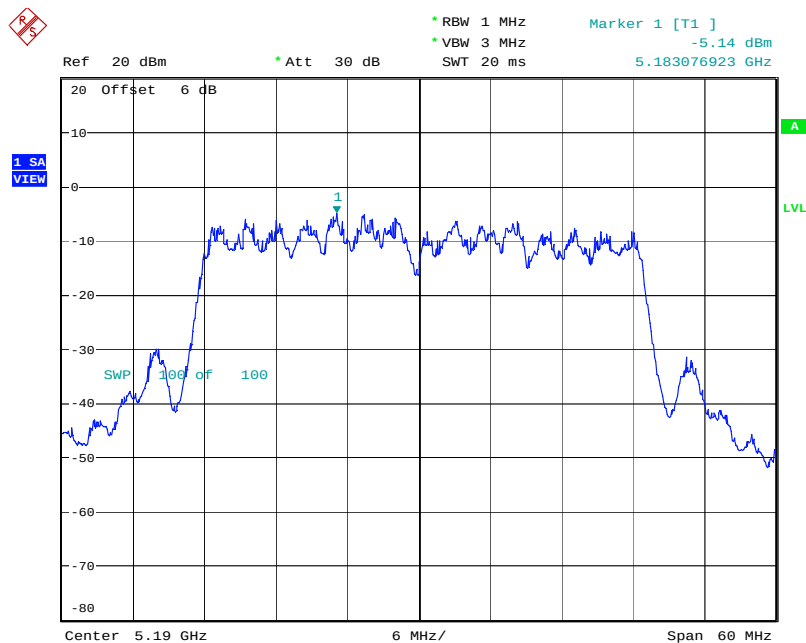
Date: 20.JAN.2008 00:29:43

Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5700 MHz



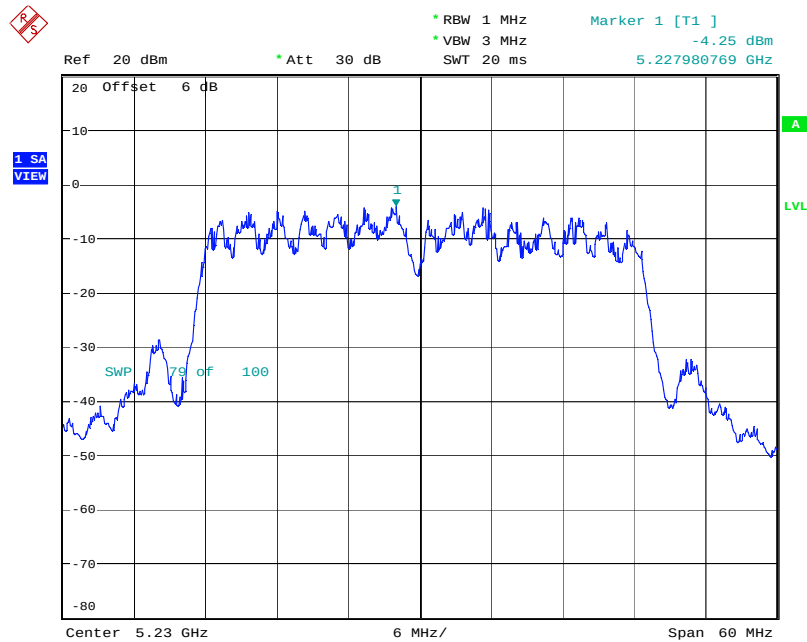
Date: 20.JAN.2008 00:34:13

Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5190 MHz



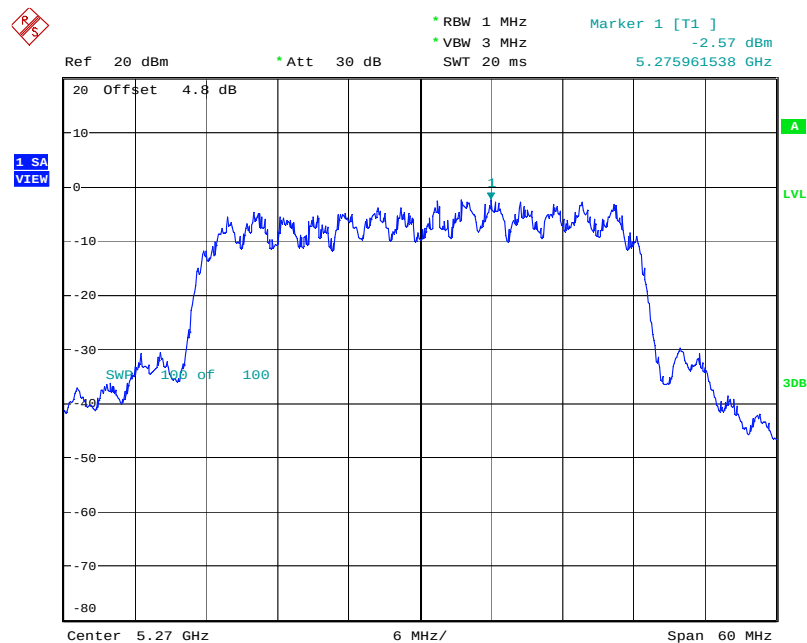
Date: 11.DEC.2007 14:34:20

Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5230 MHz



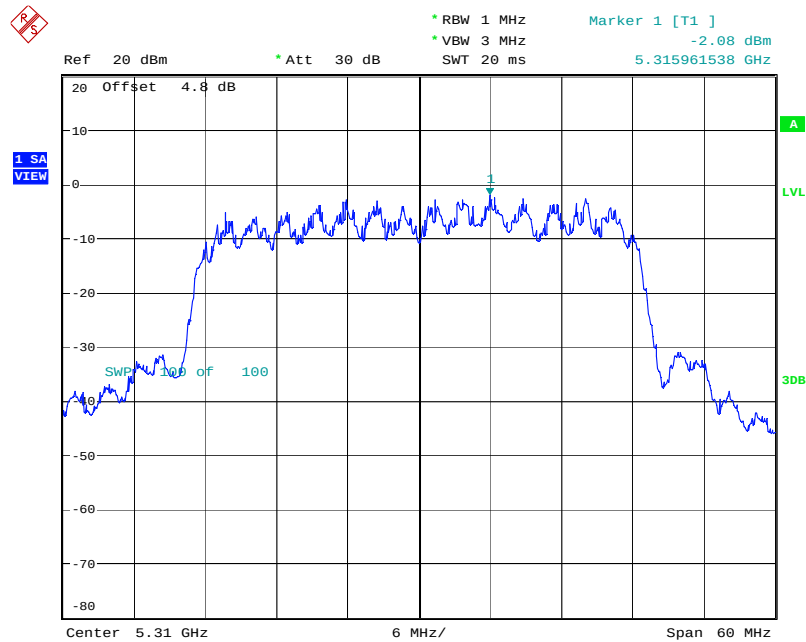
Date: 11.DEC.2007 14:31:33

Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5270 MHz



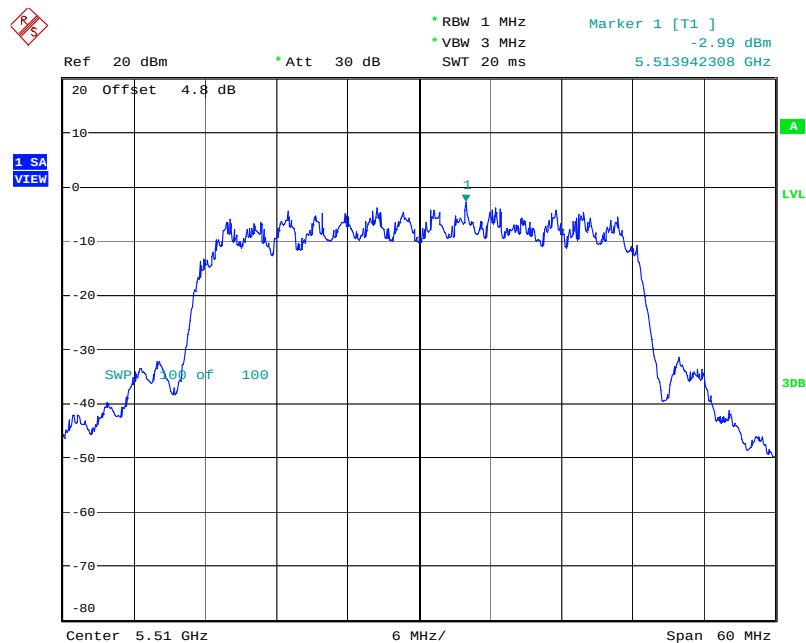
Date: 20.JAN.2008 00:13:04

Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5310 MHz



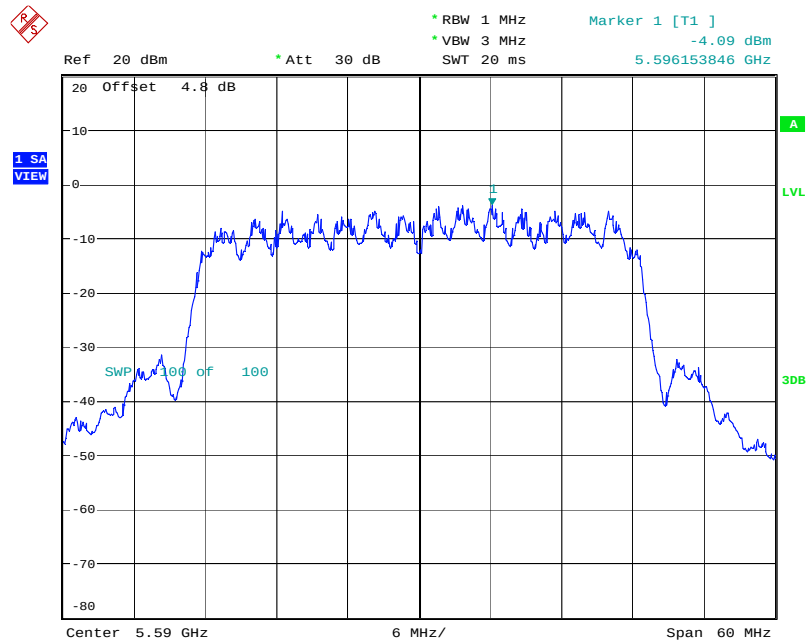
Date: 20.JAN.2008 00:11:03

Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. 3 + Ant. 5 / 5510 MHz



Date: 20.JAN.2008 00:00:06

Power Density Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5590 MHz



Date: 19.JAN.2008 23:57:34

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

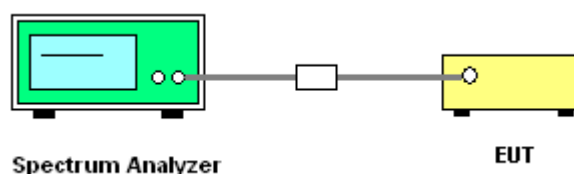
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 ≤ 13 dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and max-hold settings.
4. Average Trace: Method #3—video averaging with max hold--and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to "free run". Set RBW = 1 MHz. Set VBW $\geq 1/T$ (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 Power Meter 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

Temperature	23°C	Humidity	56%
Test Engineer	Beck Wu	Configurations	Draft n

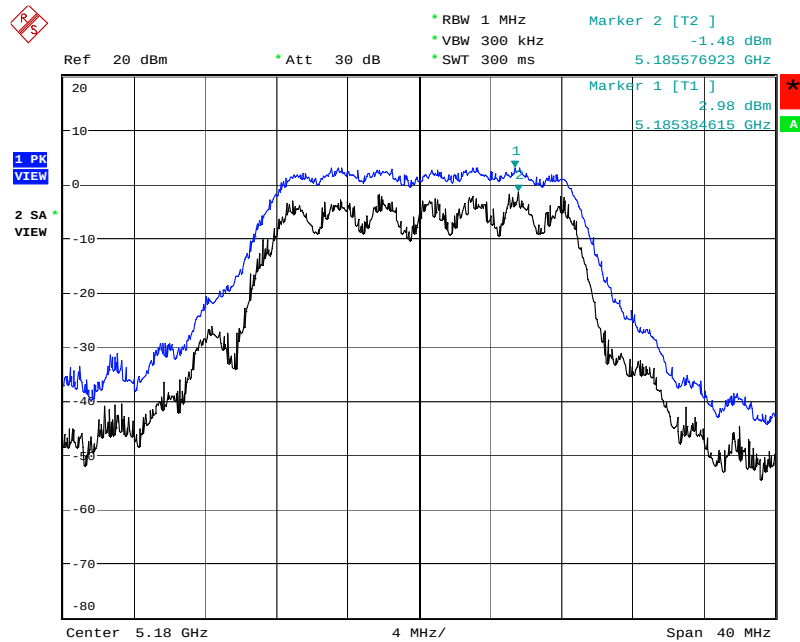
Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	4.46	13	Complies
40	5200 MHz	3.83	13	Complies
48	5240 MHz	4.38	13	Complies
52	5260 MHz	5.41	13	Complies
60	5300 MHz	4.90	13	Complies
64	5320 MHz	4.38	13	Complies
100	5500 MHz	5.22	13	Complies
120	5600 MHz	4.91	13	Complies
140	5700 MHz	4.82	13	Complies

Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5

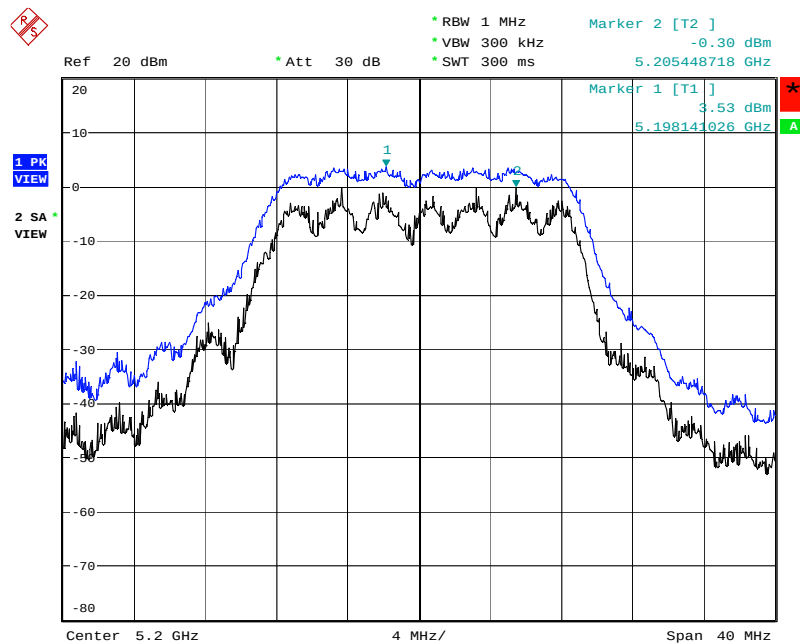
Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	6.35	13	Complies
46	5230 MHz	5.98	13	Complies
54	5270 MHz	6.38	13	Complies
62	5310 MHz	7.12	13	Complies
102	5510 MHz	6.10	13	Complies
118	5590 MHz	7.36	13	Complies

Peak Excursion Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5180 MHz



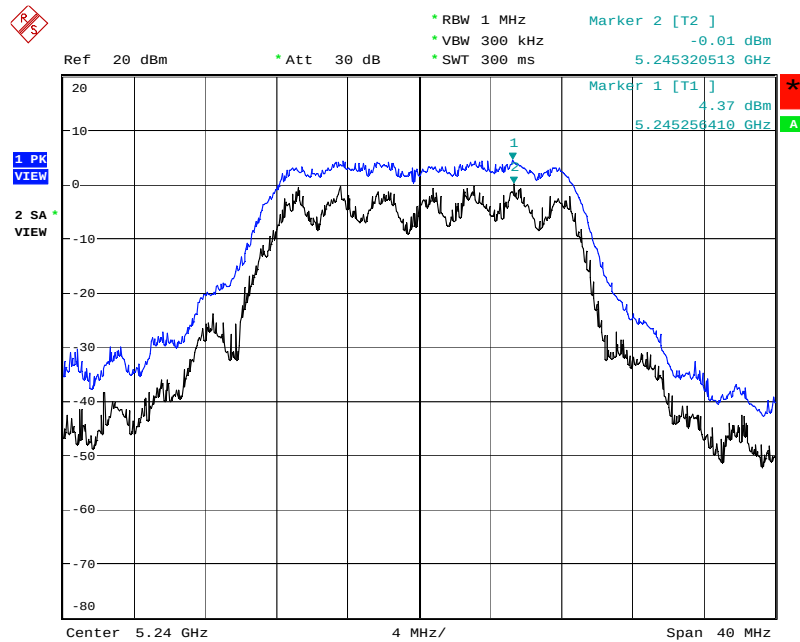
Date: 11.DEC.2007 14:38:38

Peak Excursion Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5200 MHz



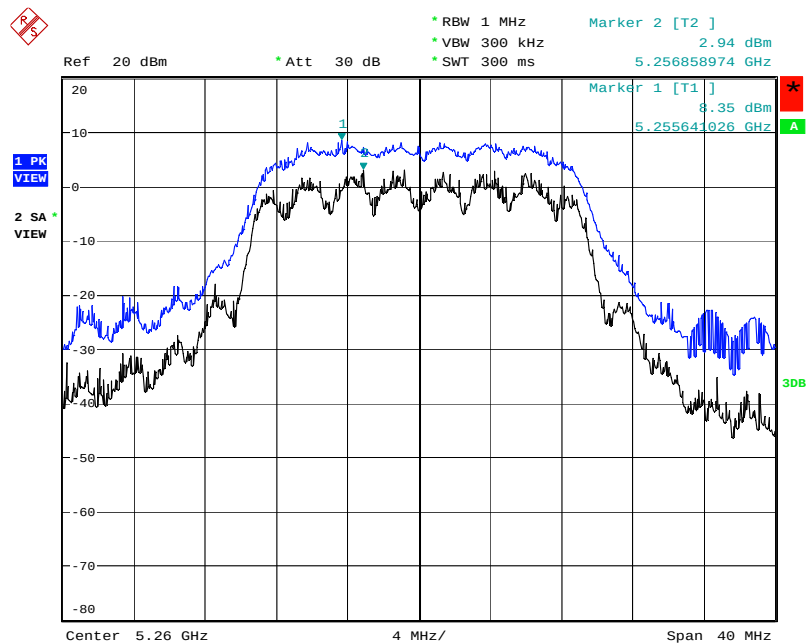
Date: 11.DEC.2007 14:40:46

Peak Excursion Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5240 MHz



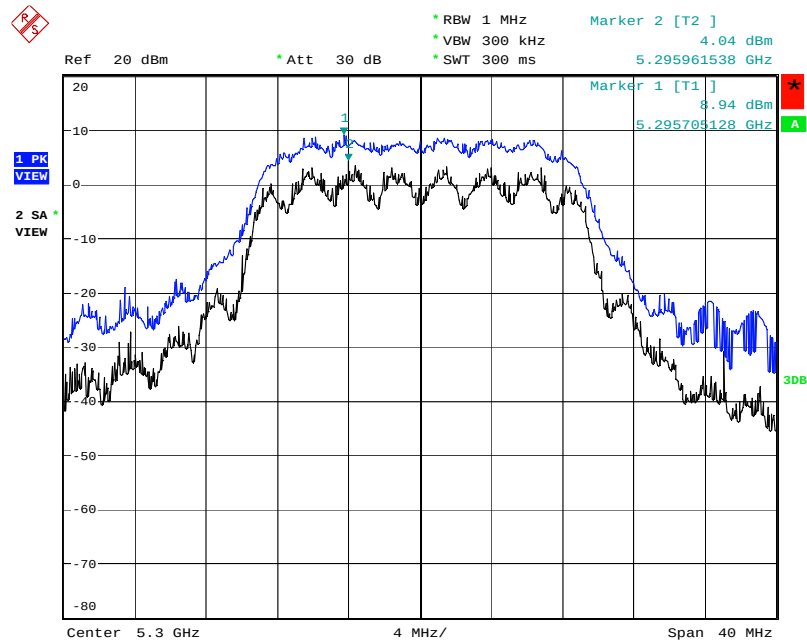
Date: 11.DEC.2007 14:42:54

Peak Excursion Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5260 MHz



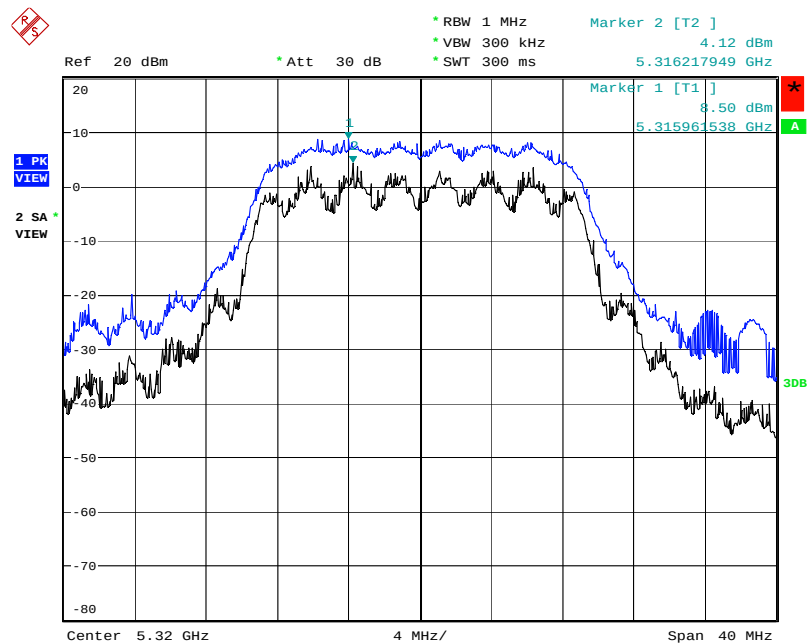
Date: 20.JAN.2008 00:18:47

Peak Excursion Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5300 MHz



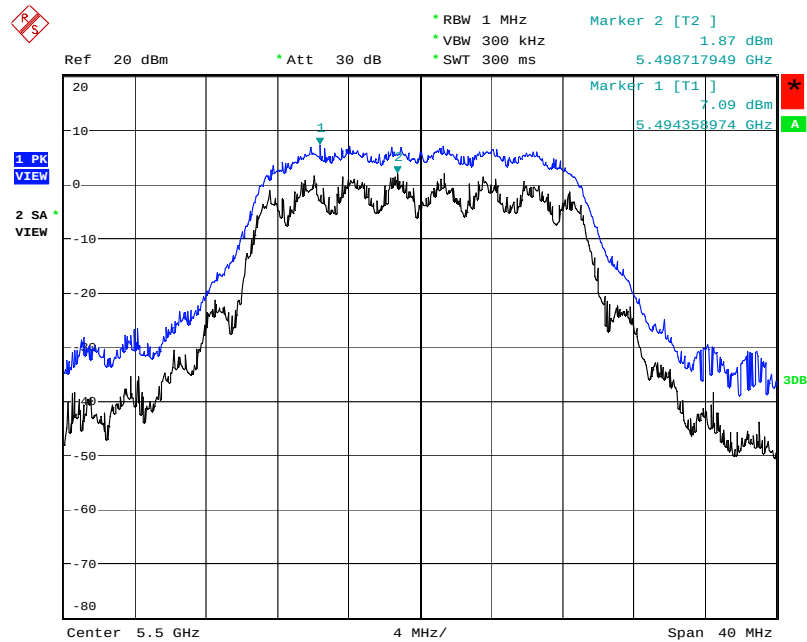
Date: 20.JAN.2008 00:21:20

Peak Excursion Plot on Configuration Drafft n MCS8 20MHz Ant. 3 + Ant. 5 / 5320 MHz



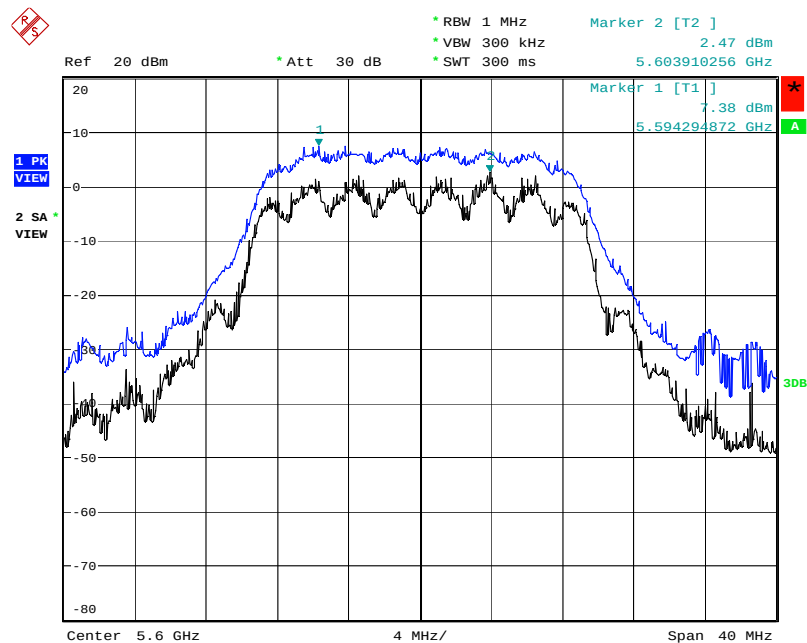
Date: 20.JAN.2008 00:24:15

Peak Excursion Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5500 MHz



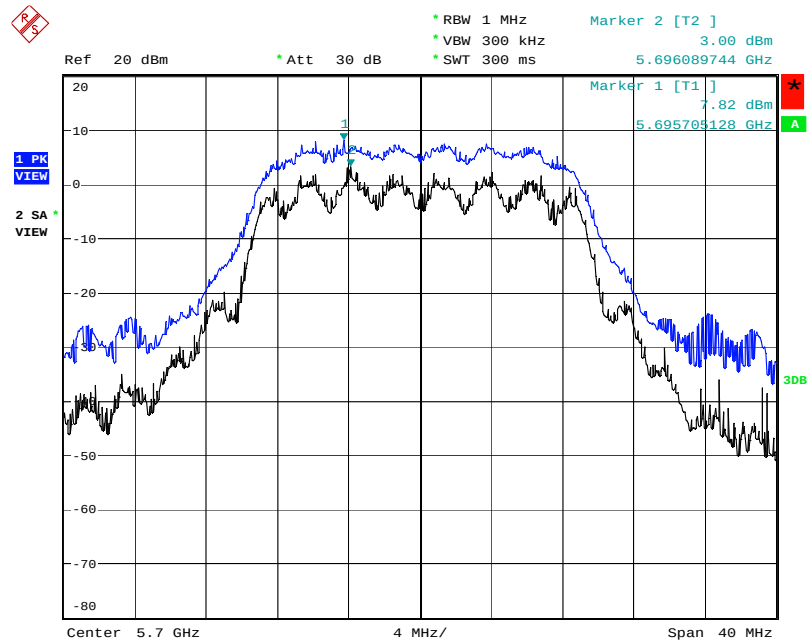
Date: 20.JAN.2008 00:28:38

Peak Excursion Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5600 MHz



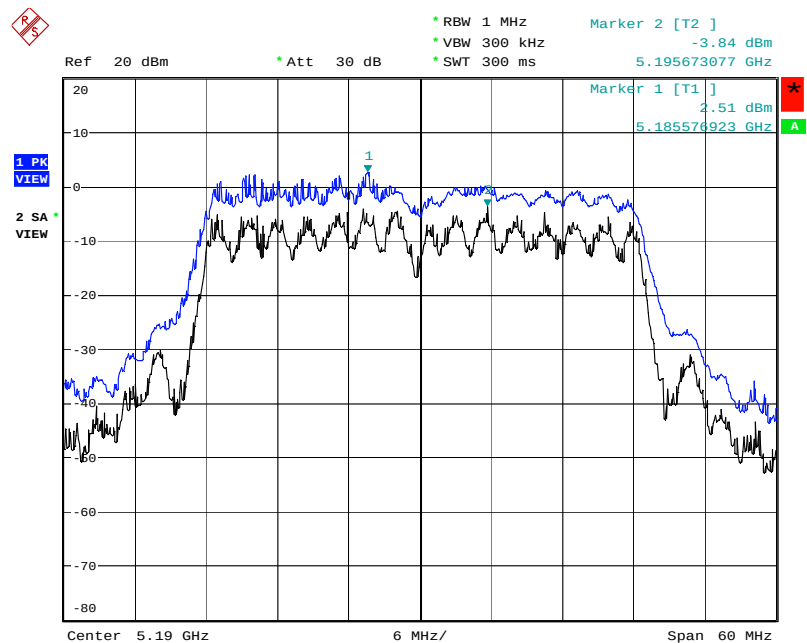
Date: 20.JAN.2008 00:30:30

Peak Excursion Plot on Configuration Draft n MCS8 20MHz Ant. 3 + Ant. 5 / 5700 MHz



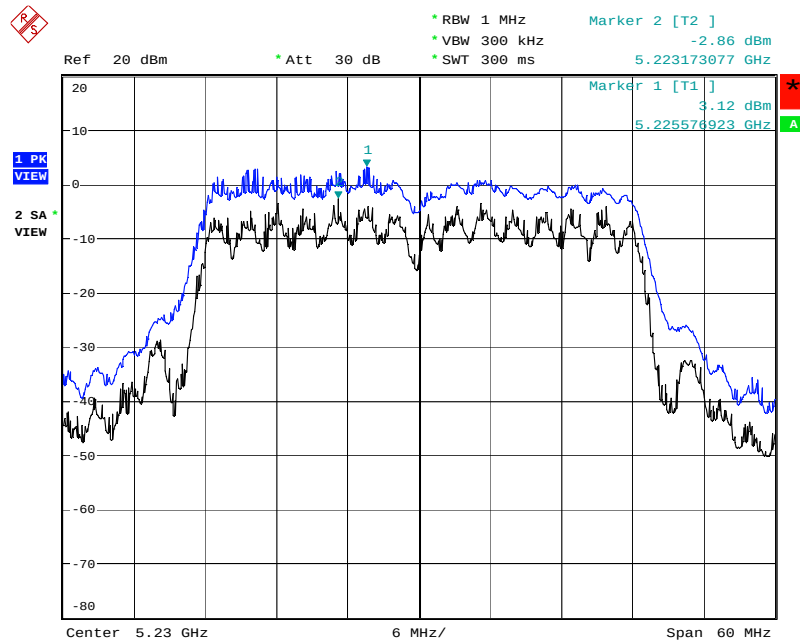
Date: 20.JAN.2008 00:35:00

Peak Excursion Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5190 MHz



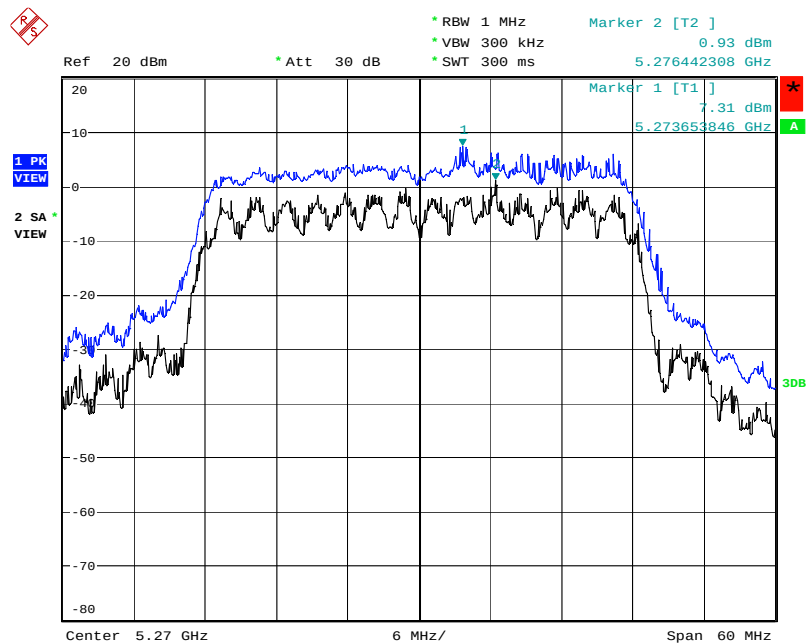
Date: 11.DEC.2007 14:35:07

Peak Excursion Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5230 MHz



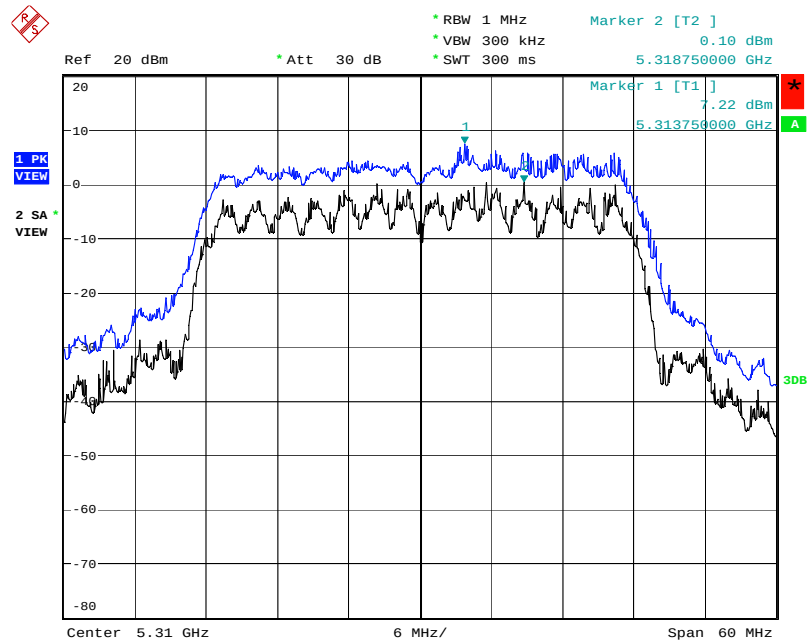
Date: 11.DEC.2007 14:32:20

Peak Excursion Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5270 MHz



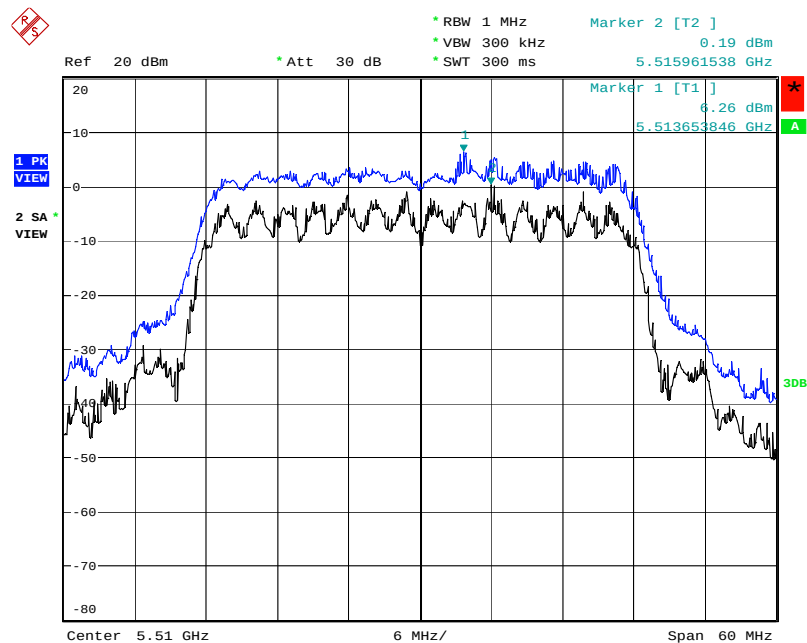
Date: 20.JAN.2008 00:13:50

Peak Excursion Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5310 MHz



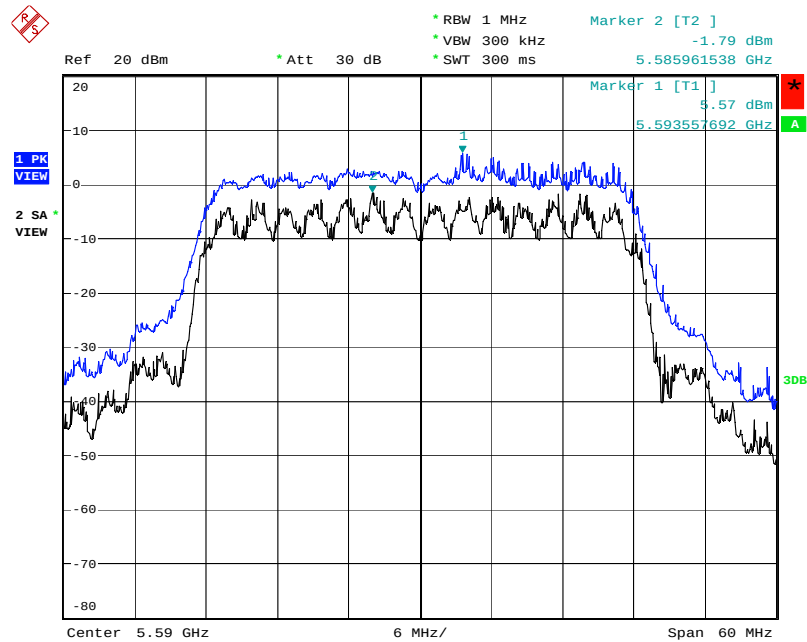
Date: 20.JAN.2008 00:11:48

Peak Excursion Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5510 MHz



Date: 20.JAN.2008 00:00:53

Peak Excursion Plot on Configuration Draft n MCS8 40MHz Ant. 3 + Ant. 5 / 5590 MHz



Date: 19.JAN.2008 23:58:19

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 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 fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

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

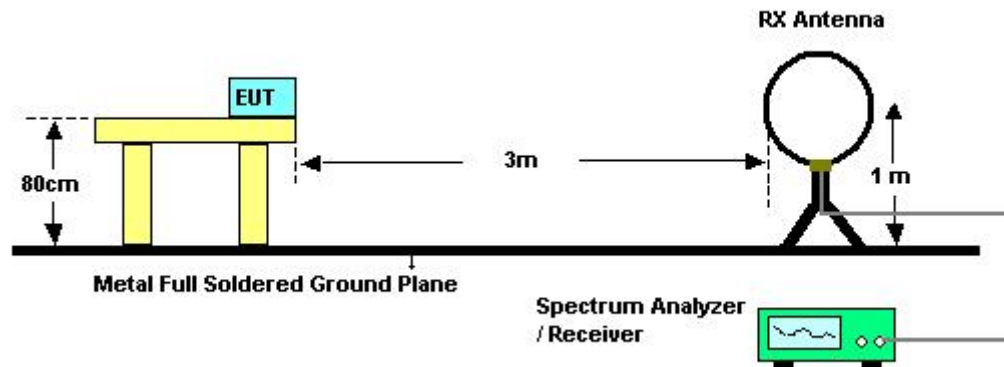
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

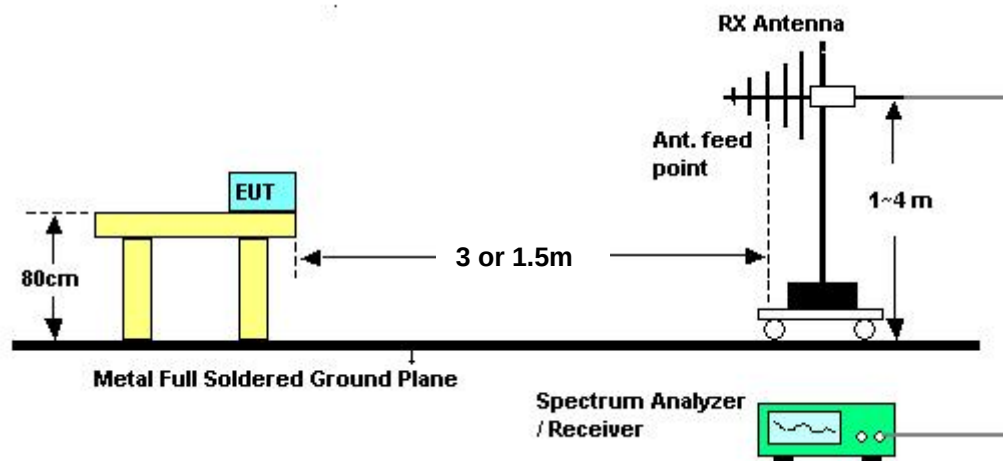
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

Temperature	23℃	Humidity	54%
Test Engineer	Barry Chen	Configurations	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.

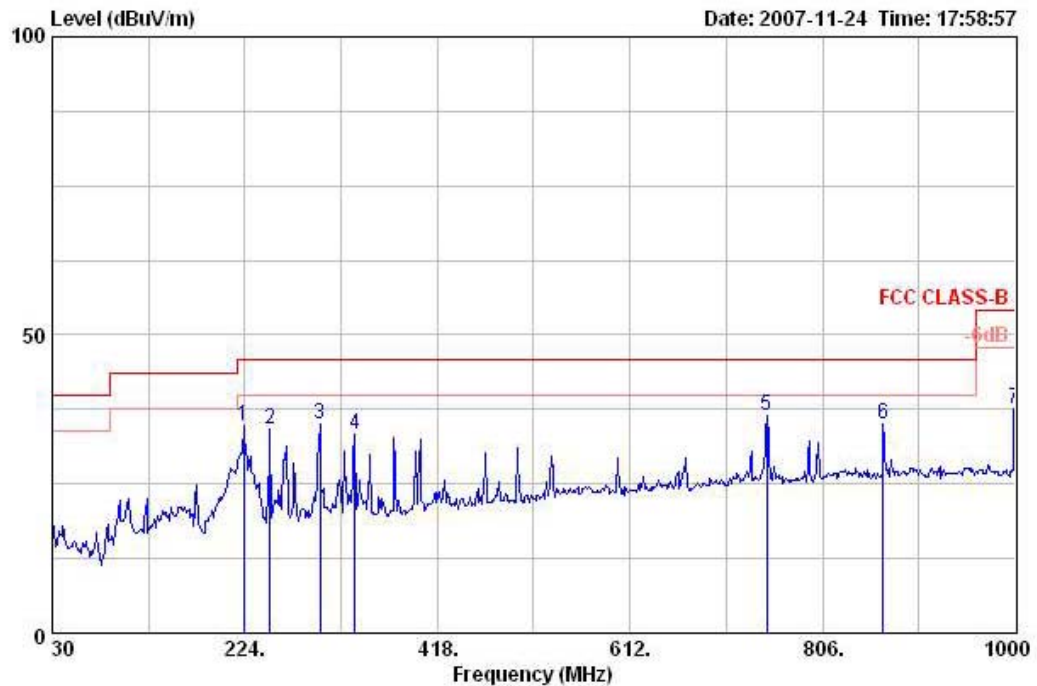
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

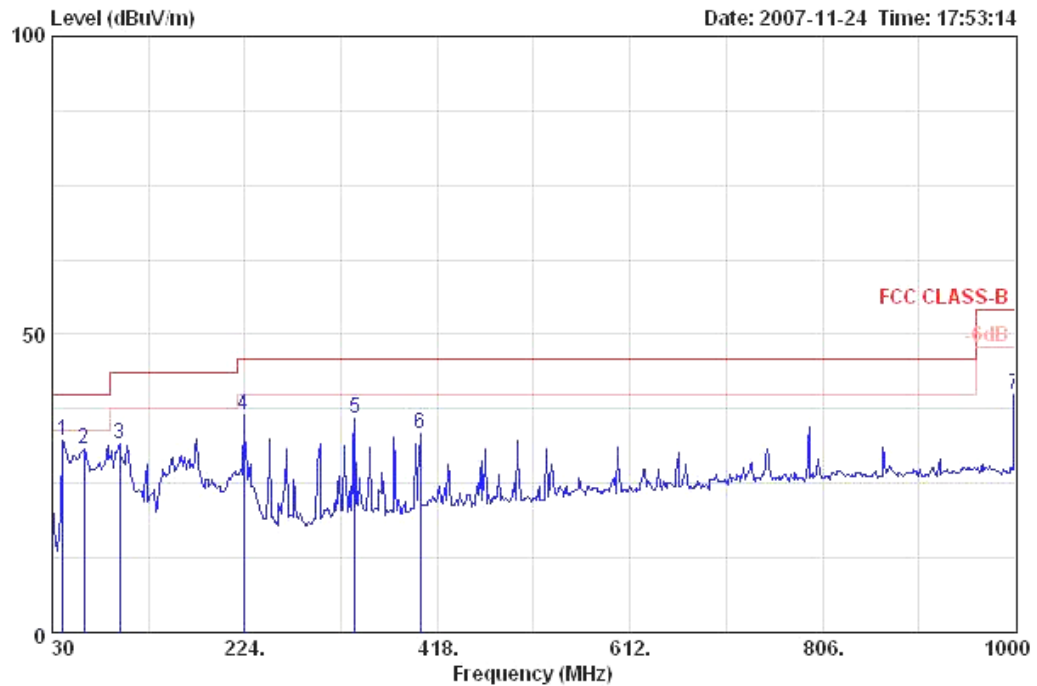
Temperature	23℃	Humidity	54%
Test Engineer	Barry Chen	Configurations	Normal Link

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Table Pos	Ant Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		deg	cm	
1	223.030	34.71	-11.29	46.00	51.06	8.91	27.05	1.79	Peak	0	100	HORIZONTAL
2	249.220	34.07	-11.93	46.00	47.61	11.56	27.00	1.90	Peak	0	100	HORIZONTAL
3	299.660	35.16	-10.84	46.00	47.06	12.90	26.90	2.10	Peak	0	100	HORIZONTAL
4	334.580	33.41	-12.59	46.00	44.42	13.97	27.14	2.17	Peak	0	100	HORIZONTAL
5	749.740	36.59	-9.41	46.00	40.82	20.07	27.80	3.50	Peak	0	100	HORIZONTAL
6	867.110	34.93	-11.07	46.00	38.51	20.43	27.47	3.47	Peak	0	100	HORIZONTAL
7	1000.000	37.69	-16.31	54.00	40.69	20.30	27.00	3.70	Peak	0	100	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Table Pos	Ant Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		deg	cm	
1	40.670	32.06	-7.94	40.00	47.71	11.45	27.80	0.70	Peak	236	100	VERTICAL
2	62.010	30.68	-9.32	40.00	52.64	4.95	27.75	0.84	Peak	0	400	VERTICAL
3	97.900	31.70	-11.80	43.50	48.20	9.95	27.61	1.16	Peak	0	400	VERTICAL
4	223.030	36.59	-9.41	46.00	52.94	8.91	27.05	1.79	Peak	0	400	VERTICAL
5	334.580	35.79	-10.21	46.00	46.80	13.97	27.14	2.17	Peak	0	400	VERTICAL
6	400.540	33.46	-12.54	46.00	42.81	15.95	27.61	2.31	Peak	0	400	VERTICAL
7	1000.000	39.85	-14.15	54.00	42.85	20.30	27.00	3.70	Peak	0	400	VERTICAL

Note:

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

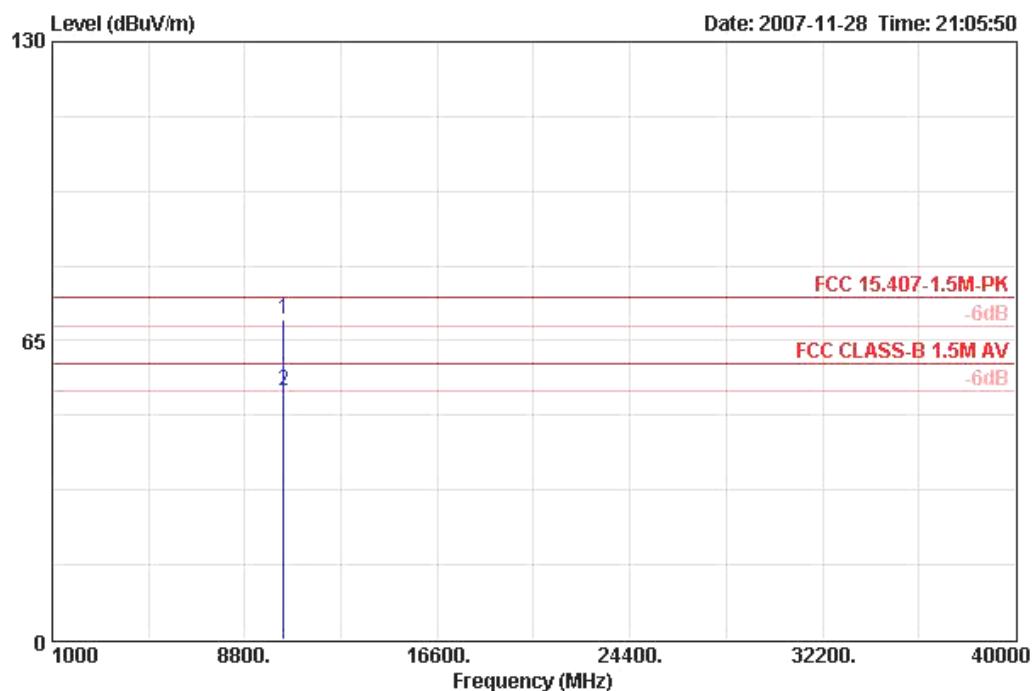
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

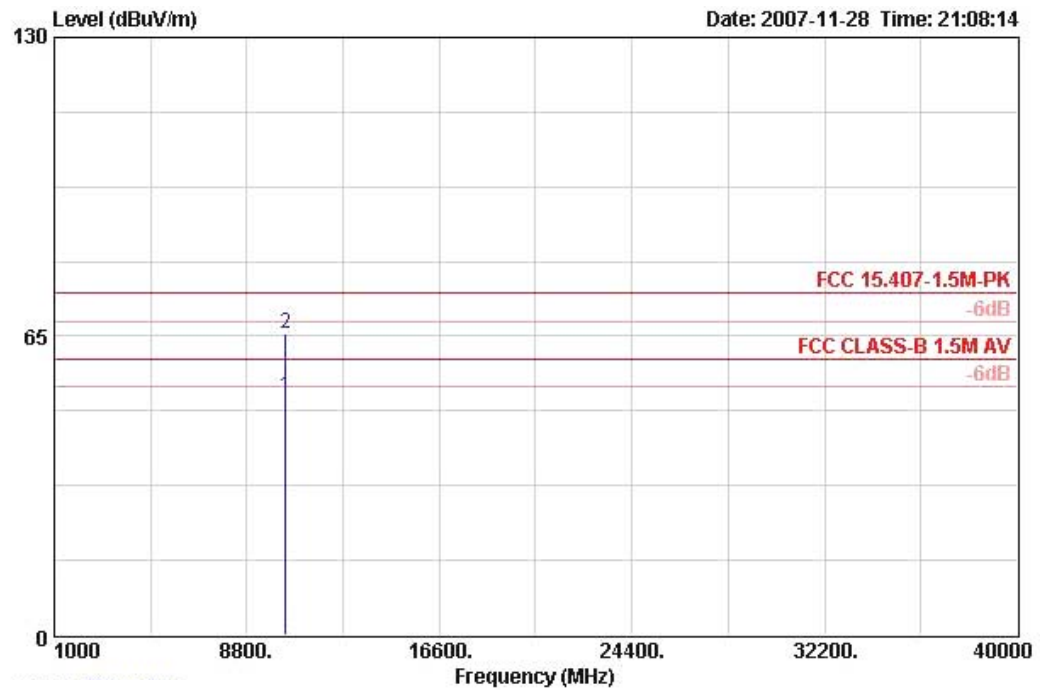
Temperature	23°C	Humidity	54%
Test Engineer	Barry Chen	Configurations	Draft n MCS8 20MHz Ch 36 Ant. 3 + Ant. 5

Horizontal



	Freq	Level	Over Limit	Limit Line	Remark	Pol/Phase	Distance	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor
	MHz	dBuV/m	dB	dBuV/m			m	dBuV	dB/m	dB	dB
1 !	10358.200	69.63	-4.67	74.30	PEAK	HORIZONTAL	3	57.05	38.37	9.32	35.12

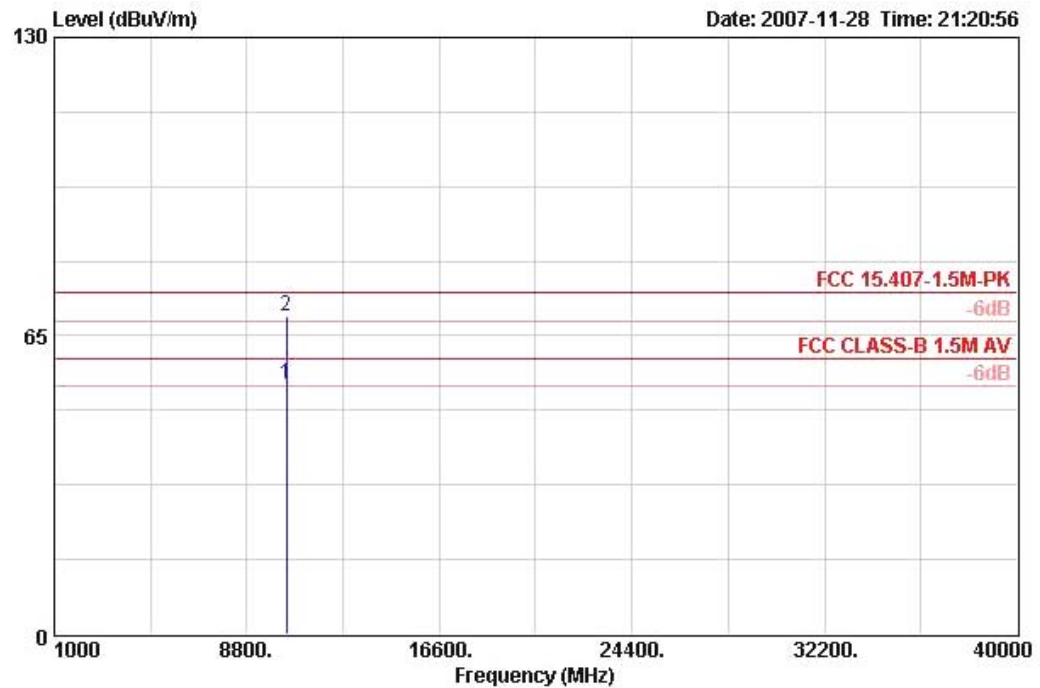
Vertical



	Freq	Level	Over	Limit				ReadAntenna	Cable	Preamp
	MHz	dBuV/m	Limit	Line	Remark	Pol/Phase	Distance	Level	Factor	Loss
			dB	dBuV/m			m	dBuV	dB/m	dB
2	10362.600	65.72	-8.58	74.30	PEAK	VERTICAL	3	53.15	38.37	9.32
										35.12

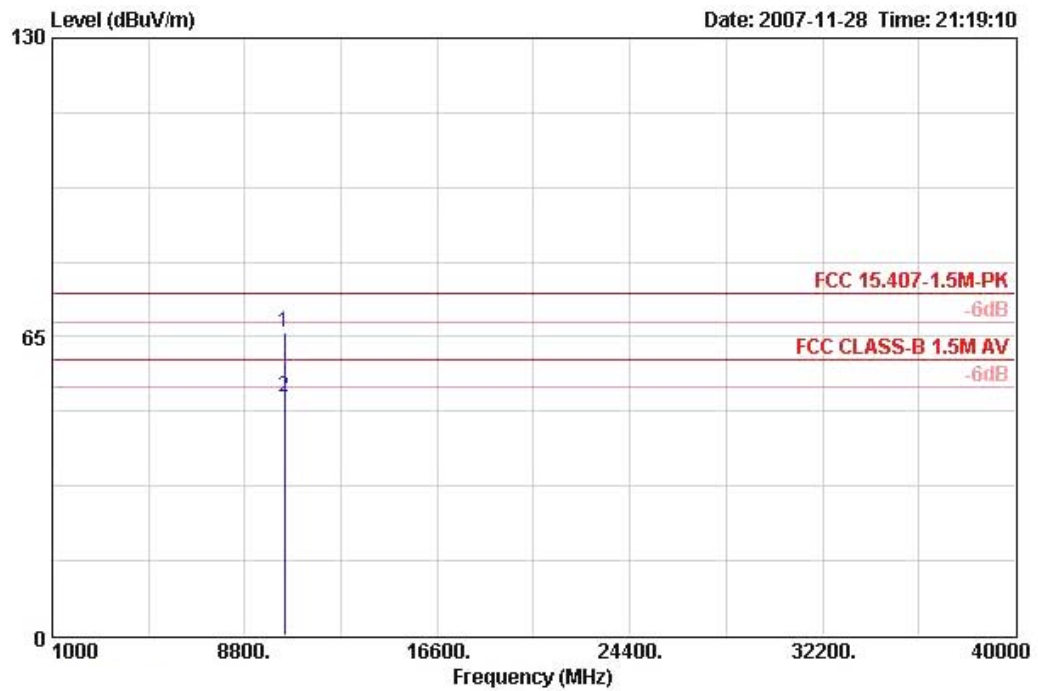
Temperature	23°C	Humidity	54%
Test Engineer	Barry Chen	Configurations	Draft n MCS8 20MHz Ch 40 Ant. 3 + Ant. 5

Horizontal



	Freq	Level	Over Limit	Limit Line	Remark	Pol/Phase	Distance	Read Level	Antenna Factor	Cable Loss	Preamp Factor
	MHz	dBuV/m	dB	dBuV/m			m	dBuV	dB/m	dB	dB
2 !	10400.600	69.27	-5.03	74.30	PEAK	HORIZONTAL	3	56.58	38.38	9.36	35.05

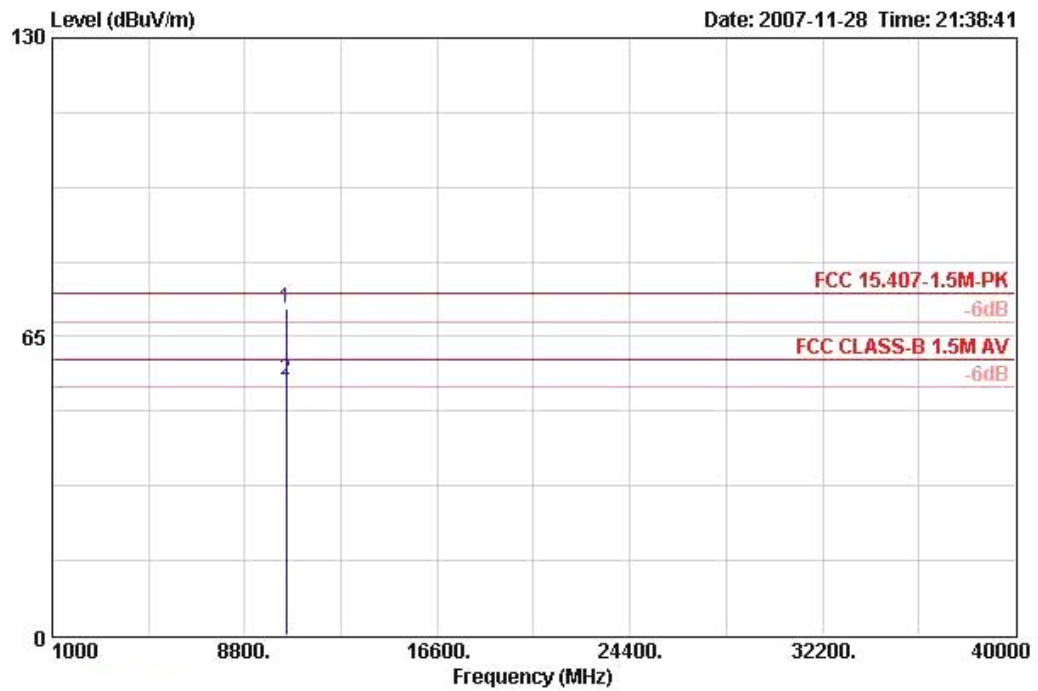
Vertical



	Freq	Level	Over	Limit				ReadAntenna	Cable	Preamp
	MHz	dBuV/m	Limit	Line	Remark	Pol/Phase	Distance	Level	Factor	Loss
			dB	dBuV/m			m	dBuV	dB/m	dB
1	10397.320	65.97	-8.33	74.30	PEAK	VERTICAL	3	53.29	38.38	9.36 35.05

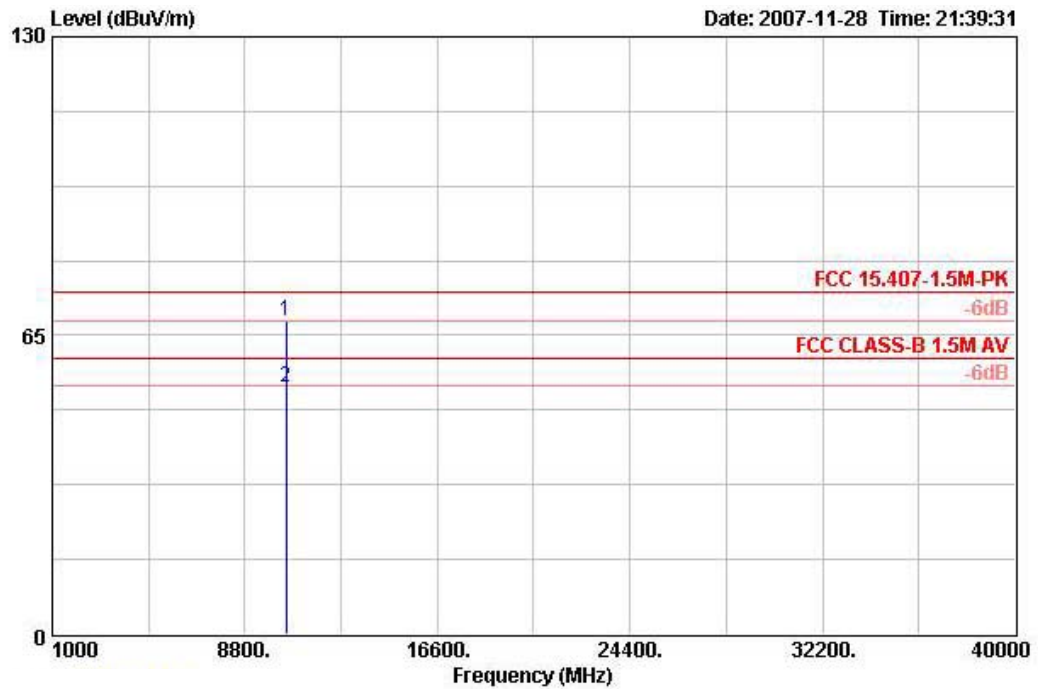
Temperature	23°C	Humidity	54%
Test Engineer	Barry Chen	Configurations	Draft n MCS8 20MHz Ch 48 Ant. 3 + Ant. 5

Horizontal



	Freq	Level	Over	Limit				ReadAntenna	Cable	Preamp
	MHz	dBuV/m	Limit	Line	Remark	Pol/Phase	Distance	Level Factor	Loss	Factor
	MHz	dBuV/m	dB	dBuV/m			m	dBuV	dB/m	dB
1 !	10477.920	71.19	-3.11	74.30	PEAK	HORIZONTAL	3	58.34	38.40	9.41
										34.96

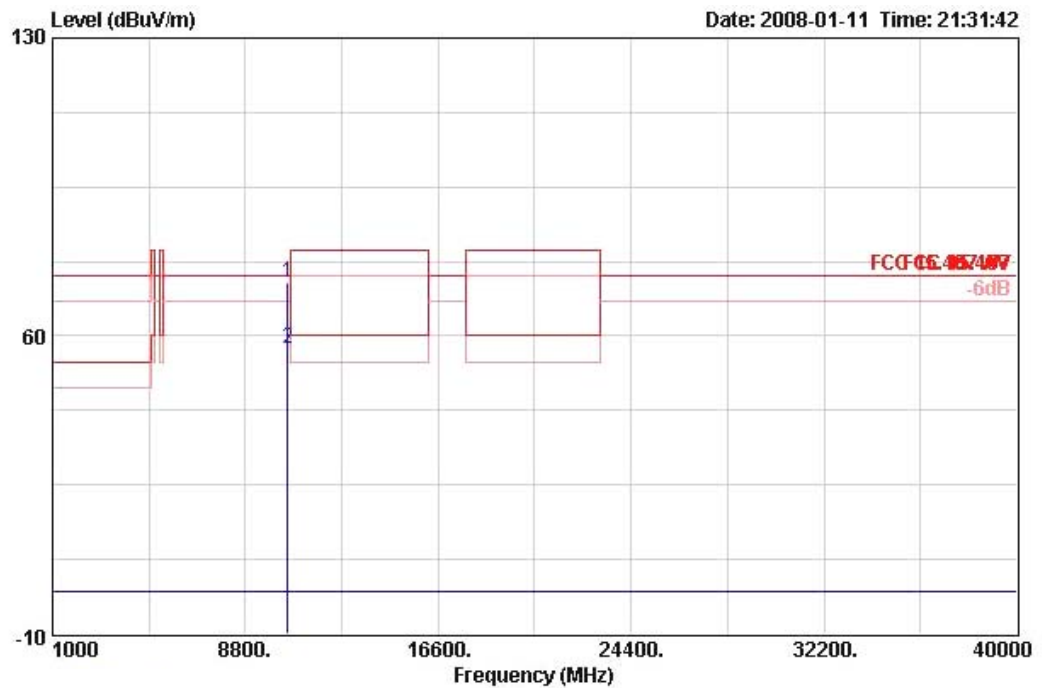
Vertical



	Freq	Level	Over	Limit				ReadAntenna	Cable Preamp		
	MHz	dBuV/m	Limit	Line	Remark	Pol/Phase	Distance	Level	Factor	Loss	Factor
	MHz	dBuV/m	dB	dBuV/m			m	dBuV	dB/m	dB	dB
1	10479.960	68.24	-6.06	74.30	PEAK	VERTICAL	3	55.39	38.40	9.41	34.96

Temperature	23°C	Humidity	54%
Test Engineer	Barry Chen	Configurations	Draft n MCS8 20MHz Ch 52 Ant. 3 + Ant. 5

Horizontal



	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 @	10518.040	72.51	-1.79	74.30	59.61	38.40	9.43	34.93	PEAK	112	320	HORIZONTAL
2	10520.660	57.15	-17.15	74.30	44.26	38.40	9.43	34.93	AVERAGE	112	320	HORIZONTAL



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level 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	10520.200	53.54	-20.76	74.30	40.64	38.40	9.43	34.93	AVERAGE	108	30	VERTICAL
2 @	10522.300	68.37	-5.93	74.30	55.47	38.40	9.43	34.93	PEAK	108	30	VERTICAL