



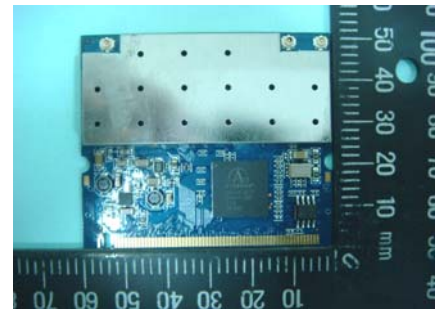
SPORTON International Inc.

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FCC RADIO TEST REPORT

Applicant's company	Wistron NeWeb Corporation
Applicant Address	No.10-1,Li-hsin Road I,Hsinchu Science Park,Hsinchu 300,Taiwan, R.O.C.
FCC ID	NKR-DNMA83
Manufacturer's company	Wistron NeWeb Corporation
Manufacturer Address	No.10-1,Li-hsin Road I,Hsinchu Science Park,Hsinchu 300,Taiwan, R.O.C.

Product Name	WLAN a/b/g/n mini-PCI Module
Brand Name	WNC
Model Name	DNMA-83
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250MHz
Received Date	Nov. 29, 2007
Final Test Date	Feb. 29, 2008
Submission Type	Original Equipment
Operating Mode	Master



Statement

Test result included is only for the Draft n (5150 ~ 5250MHz) 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

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History of This Test Report

Original Issue Date: Feb. 28, 2008

Report No.: FR7D1412AB

No additional attachment.

Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



1. CERTIFICATE OF COMPLIANCE

Product Name : WLAN a/b/g/n mini-PCI Module
Brand Name : WNC
Model Name : DNMA-83
Applicant : Wistron NeWeb Corporation
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 29, 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 that reads 'Wayne Hsu 29.2.08'.

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	13.16 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.22 dB
4.4	15.407(a)	Power Spectral Density	Complies	2.19 dB
4.5	15.407(a)	Peak Excursion	Complies	6.28 dB
4.6	15.407(b)	Radiated Emissions	Complies	4.31 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.08 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 (3TX, 3RX)
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 ~ 5250MHz
Channel Number	4 for 20MHz bandwidth ; 2 for 40MHz bandwidth
Channel Band Width (99%)	MCS16 (20MHz) : 18.08 MHz MCS16 (40MHz) : 36.48 MHz
Conducted Output Power	MCS16 (20MHz) : 16.78 dBm MCS16 (40MHz) : 16.54 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)		Three (TX)	
	20 MHz	40 MHz	20 MHz	40 MHz
802.11a	X	X	V	X
802.11b	X	X	V	X
802.11g	X	X	V	X
Draft n	X	X	V	V

Draft n spec

MCS Index	Nss	Modulation	R	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
16	3	BPSK	1/2	1	156	324	78	162	19.5	40.5
17	3	QPSK	1/2	2	312	648	156	324	39	81
18	3	QPSK	3/4	2	312	648	234	486	58.5	121.5
19	3	16-QAM	1/2	4	624	1296	312	648	78	162
20	3	16-QAM	3/4	4	624	1296	468	972	117	243
21	3	64-QAM	2/3	6	936	1944	624	1296	156	324
22	3	64-QAM	3/4	6	936	1944	702	1458	175.5	364.5
23	3	64-QAM	5/6	6	936	1944	780	1620	195	405.5

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

N/A

3.3. Table for Filed Antenna

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A-1	Colubris Networks	XS7-RU	Dipole Antenna	Reversed-SMA	1.23	TX / RX Ant.
A-2	Colubris Networks	XS7-RU	Dipole Antenna	Reversed-SMA	1.23	TX / RX Ant.
A-3	Colubris Networks	XS7-RU	Dipole Antenna	Reversed-SMA	1.23	TX / RX Ant.
B-1	LCU	F1B-294405-32	Dipole Antenna	Reversed-SMA	4.28	TX / RX Ant.
B-2	LCU	F1B-294405-32	Dipole Antenna	Reversed-SMA	4.28	TX / RX Ant.
B-3	LCU	F1B-294405-32	Dipole Antenna	Reversed-SMA	4.28	TX / RX Ant.
C-1	Centurion	WTS2450-RPSMA	Dipole Antenna	Reversed-SMA	3.4	TX / RX Ant.
C-2	Centurion	WTS2450-RPSMA	Dipole Antenna	Reversed-SMA	3.4	TX / RX Ant.
C-3	Centurion	WTS2450-RPSMA	Dipole Antenna	Reversed-SMA	3.4	TX / RX Ant.
D-1	Centurion	NanoBlade	Emdeded Antenna	Reversed-SMA	5.1	TX / RX Ant.
D-2	Centurion	NanoBlade	Emdeded Antenna	Reversed-SMA	5.1	TX / RX Ant.
D-3	Centurion	NanoBlade	Emdeded Antenna	Reversed-SMA	5.1	TX / RX Ant.

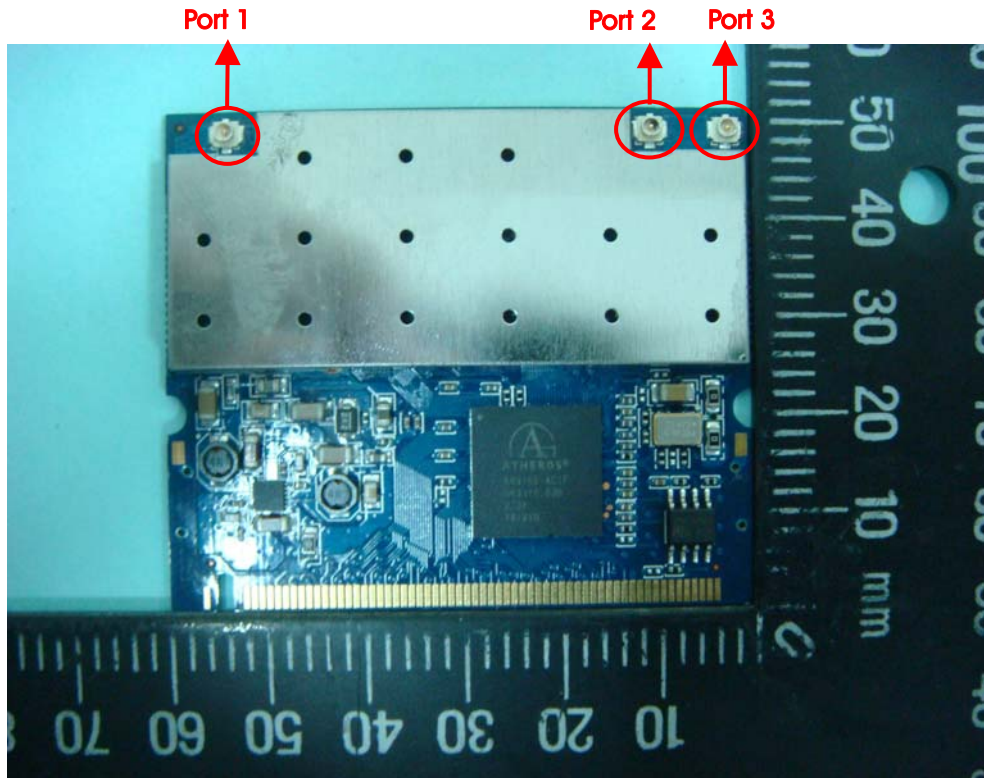
Note: The EUT has 12 antennas.

Due to Ant. A ~ Ant. C is the same type antenna, only the higher gain antenna “Ant. B” was tested.
Both Ant. B and Ant. D were tested and recorded in the report.

Port 1: Ant. B-1 / Ant. D-1

Port 2: Ant. B-2 / Ant. D-2

Port 3: Ant. B-3 / Ant. D-3



3.4. Table for Carrier Frequencies

There are two bandwidth systems for draft n.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48.

For 40MHz bandwidth systems, use Channel 38, 46.

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

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Antenna
AC Power Conducted Emission	Normal Link		Auto	-	-
Max. Conducted Output Power	MCS16/20MHz	Band 1	13Mbps	36/40/48	B-1/B-2/B-3/ B-1+B-2+B-3/ D-1/D-2/D-3/ D-1+D-2+D-3
	MCS16/40MHz	Band 1	27Mbps	38/46	N/A
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	MCS16/20MHz	Band 1	13Mbps	36/40/48	N/A
	MCS16/40MHz	Band 1	27Mbps	38/46	N/A
Radiated Emission Below 1GHz	Normal Link		Auto	-	B/D
Radiated Emission Above 1GHz	MCS16/20MHz	Band 1	13Mbps	36/40/48	B/D
	MCS16/40MHz	Band 1	27Mbps	38/46	B/D
Band Edge Emission	MCS16/20MHz	Band 1	13Mbps	36/48	B/D
	MCS16/40MHz	Band 1	27Mbps	38/46	B/D
Frequency Stability	Un-modulation		-	40	N/A

3.6. Table for Testing Locations

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

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

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL
Modem	ACEEX	DM1414	IFAXDM1414
Mouse	QSKY	Lx-619B	DoC
Printer	EPSON	LQ-300+	DOC
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 MCS16 20MHz

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
Draft n Ant. B	11	11.5	12
Draft n Ant. D	11.5	11.5	12.5

Power Parameters of Draft n MCS16 40MHz

Test Software Version	ART	
Frequency	5190 MHz	5230 MHz
Draft n Ant. B	11.5	12
Draft n Ant. D	11..5	12

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:

- Turn on the power of all equipment.
- The NB sends " H " messages to the panel, and the panel displays " H " patterns on the screen.
- The NB sends " H " messages to the printer, then the printer prints them on the paper.
- The NB sends " H " messages to the modem.
- Repeat the steps from b to d.

At the same time, the following programs were executed:

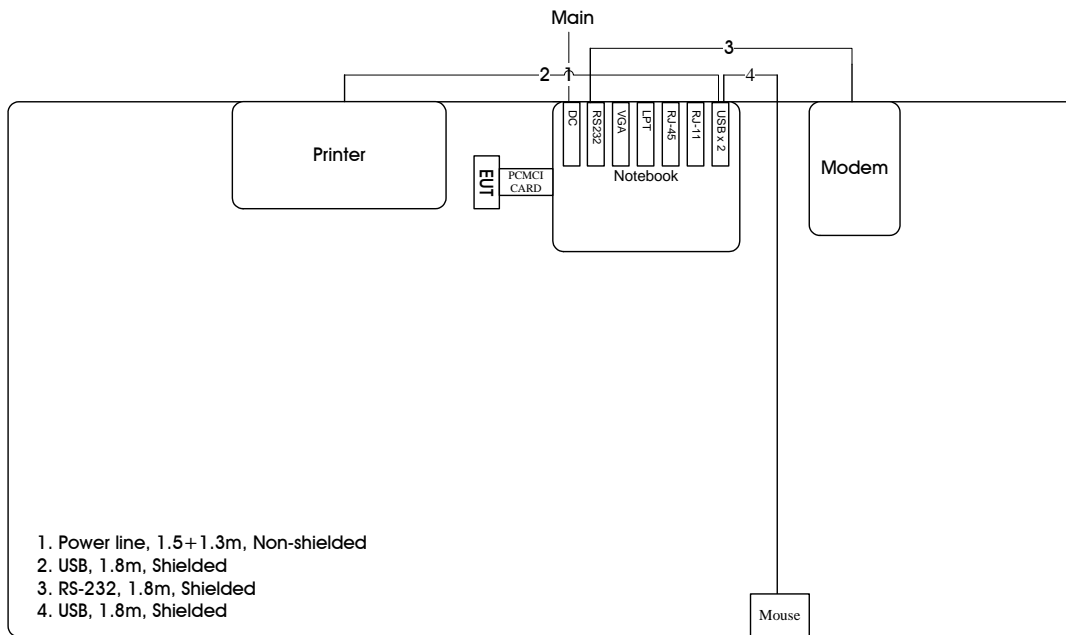
Executed "ping.exe" to link with the remote workstation to receive and transmit signal by LAN and WLAN.

3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

Test Configuration: 9KHz~1GHz

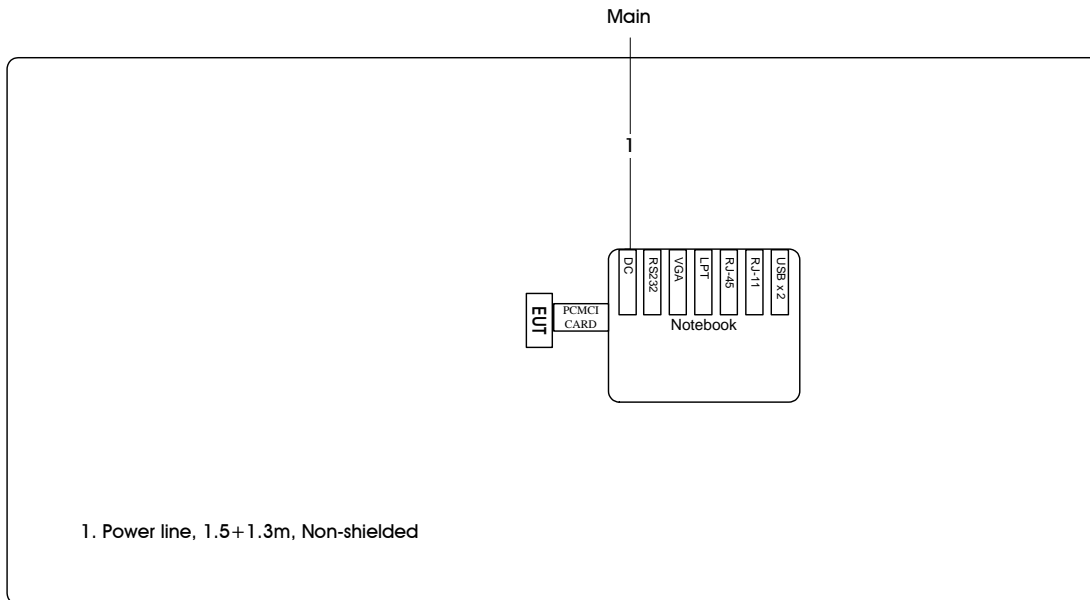
Test Mode: Ant. B / Ant. D



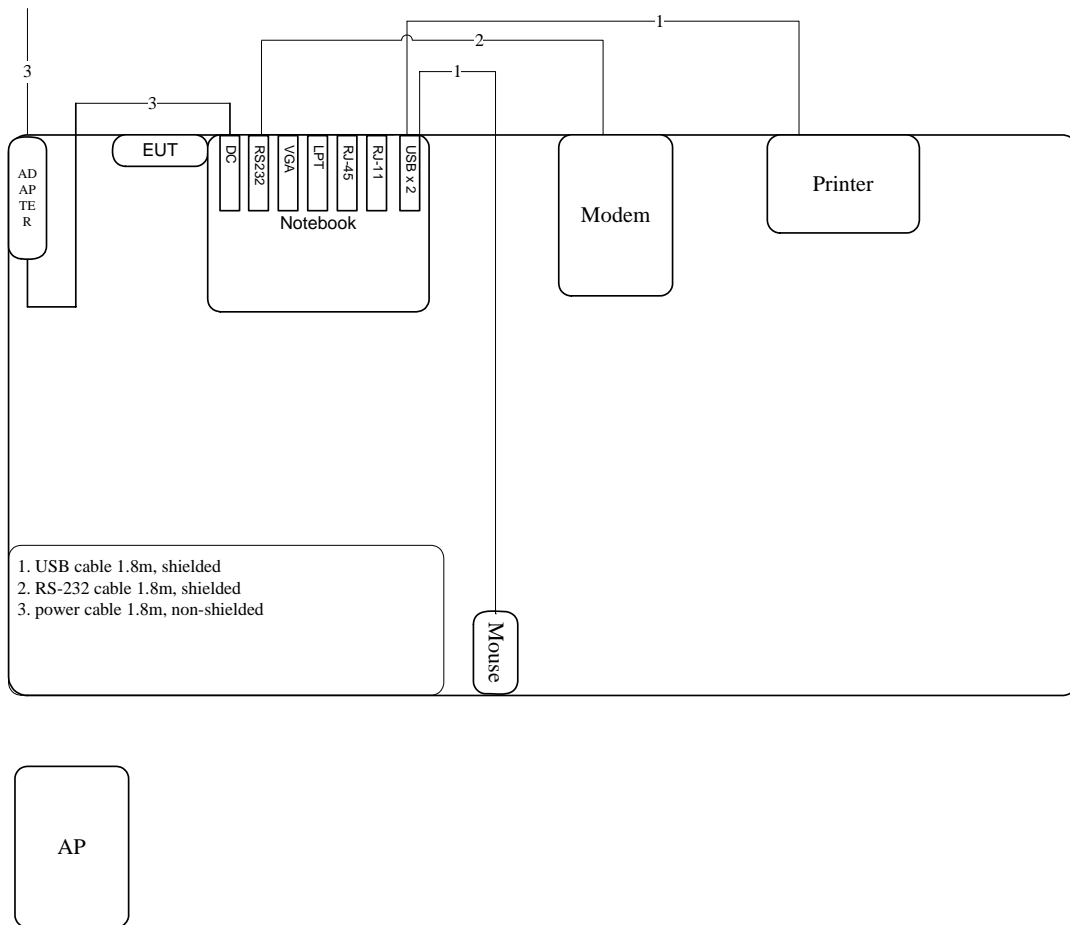
AP

Test Configuration: above 1GHz

Test Mode: Ant. B / Ant. D



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

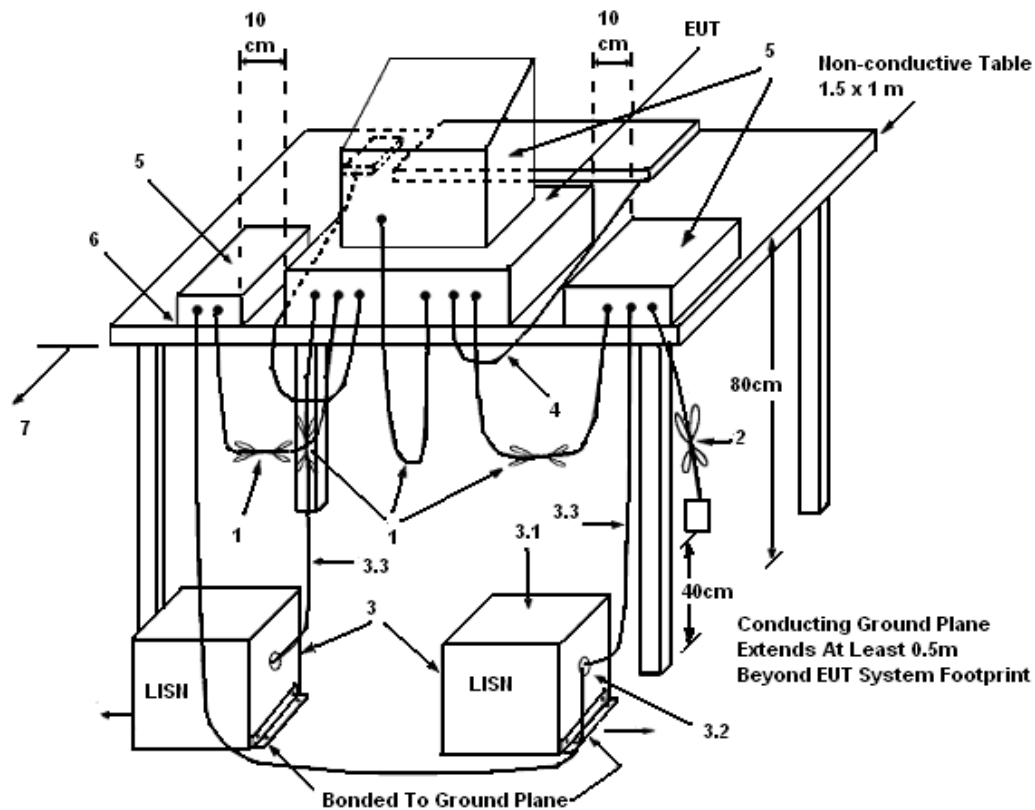
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

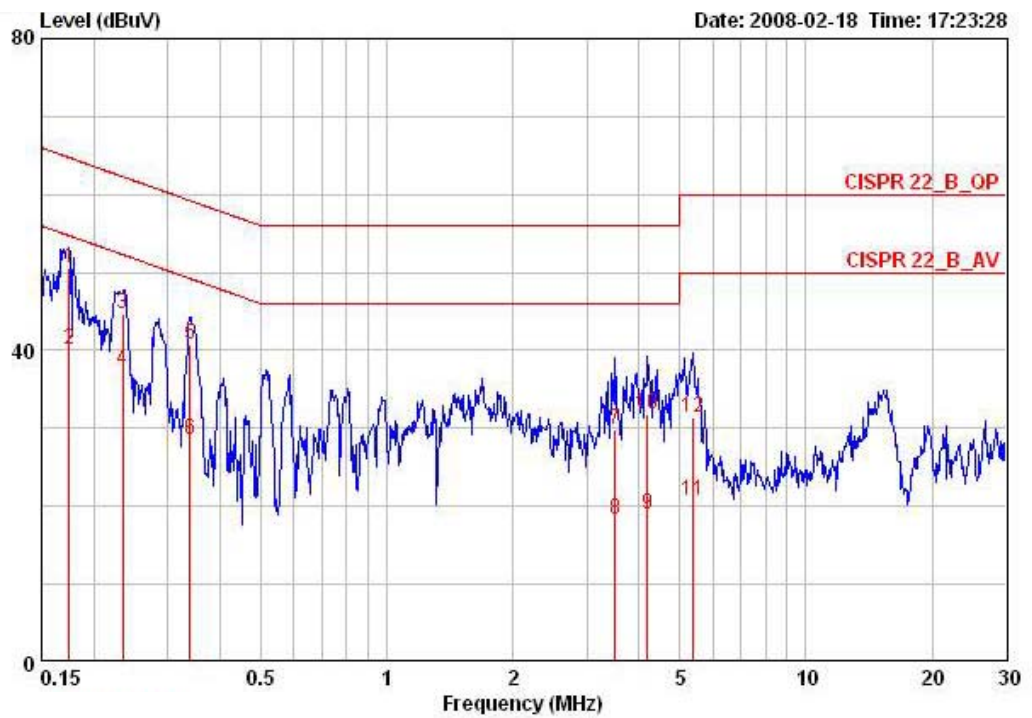
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

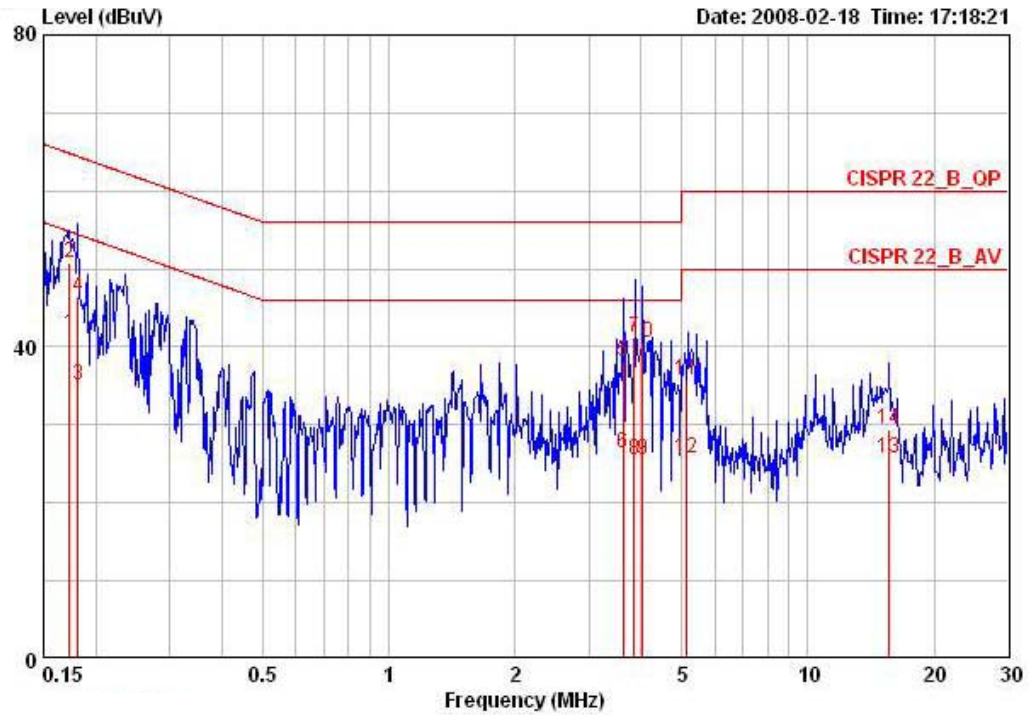
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	20°C	Humidity	61%
Test Engineer	Andy Tsai	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	0.17491	50.53	-14.19	64.72	50.18	0.15	0.20	QP	LINE
2	0.17491	40.11	-14.61	54.72	39.76	0.15	0.20	AVERAGE	LINE
3	0.23409	44.71	-17.59	62.30	44.41	0.10	0.20	QP	LINE
4	0.23409	37.49	-14.81	52.30	37.19	0.10	0.20	AVERAGE	LINE
5	0.33920	40.71	-18.51	59.22	40.41	0.10	0.20	QP	LINE
6	0.33920	28.64	-20.58	49.22	28.34	0.10	0.20	AVERAGE	LINE
7	3.509	29.77	-26.23	56.00	29.47	0.00	0.30	QP	LINE
8	3.509	18.21	-27.79	46.00	17.91	0.00	0.30	AVERAGE	LINE
9	4.180	18.93	-27.07	46.00	18.63	0.00	0.30	AVERAGE	LINE
10	4.180	31.72	-24.28	56.00	31.42	0.00	0.30	QP	LINE
11	5.390	20.71	-29.29	50.00	20.39	0.02	0.30	AVERAGE	LINE
12	5.390	31.43	-28.57	60.00	31.11	0.02	0.30	QP	LINE

Temperature	20°C	Humidity	61%
Test Engineer	Andy Tsai	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.17307	41.65	-13.16	54.81	41.20	0.25	0.20	AVERAGE	NEUTRAL
2	0.17307	50.83	-13.98	64.81	50.38	0.25	0.20	QP	NEUTRAL
3	0.18152	35.08	-19.34	54.42	34.63	0.25	0.20	AVERAGE	NEUTRAL
4	0.18152	46.39	-18.03	64.42	45.94	0.25	0.20	QP	NEUTRAL
5	3.615	38.23	-17.77	56.00	37.83	0.10	0.30	QP	NEUTRAL
6	3.615	26.47	-19.53	46.00	26.07	0.10	0.30	AVERAGE	NEUTRAL
7	3.854	41.18	-14.82	56.00	40.78	0.10	0.30	QP	NEUTRAL
8	3.854	25.51	-20.49	46.00	25.11	0.10	0.30	AVERAGE	NEUTRAL
9	4.027	25.40	-20.60	46.00	25.00	0.10	0.30	AVERAGE	NEUTRAL
10	4.027	40.51	-15.49	56.00	40.11	0.10	0.30	QP	NEUTRAL
11	5.153	35.68	-24.32	60.00	35.28	0.10	0.30	QP	NEUTRAL
12	5.153	25.79	-24.21	50.00	25.39	0.10	0.30	AVERAGE	NEUTRAL
13	15.639	25.69	-24.31	50.00	25.19	0.10	0.40	AVERAGE	NEUTRAL
14	15.639	29.51	-30.49	60.00	29.01	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

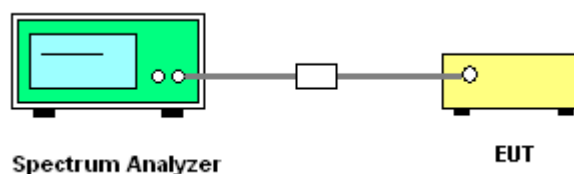
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 spectrum analyse 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	61%
Test Engineer	Sam Lee	Configurations	Draft n

Configuration Draft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.72	17.92
40	5200 MHz	22.72	18.08
48	5240 MHz	23.68	18.08

Configuration Draft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.00	17.92
40	5200 MHz	22.88	18.08
48	5240 MHz	22.56	17.92

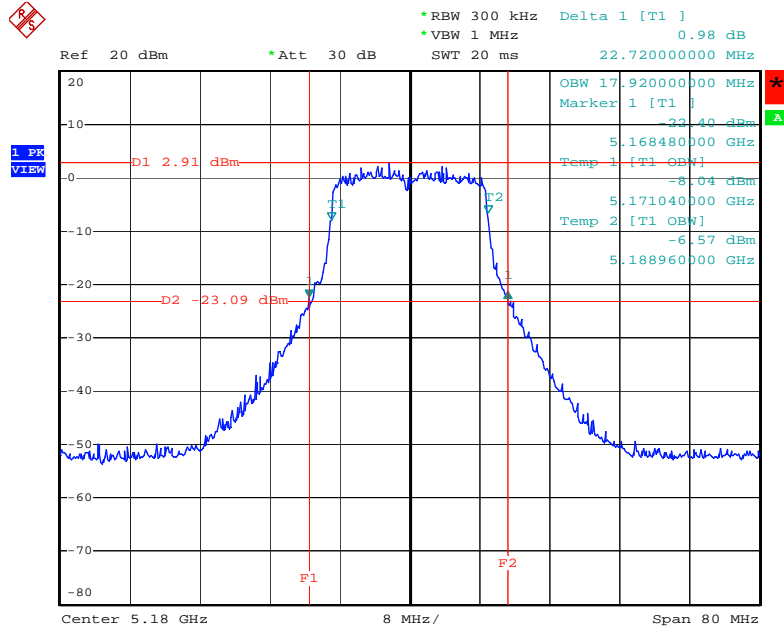
Configuration Draft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	42.56	36.48
46	5230 MHz	44.00	36.48

Configuration Draft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3

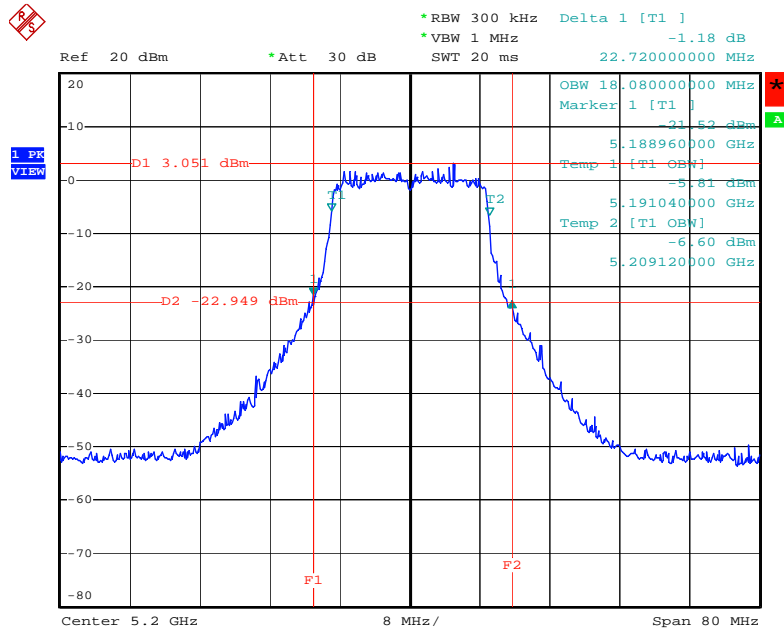
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	44.00	36.48
46	5230 MHz	42.56	36.48

26 dB Bandwidth Plot on Configuration Drafft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5180 MHz



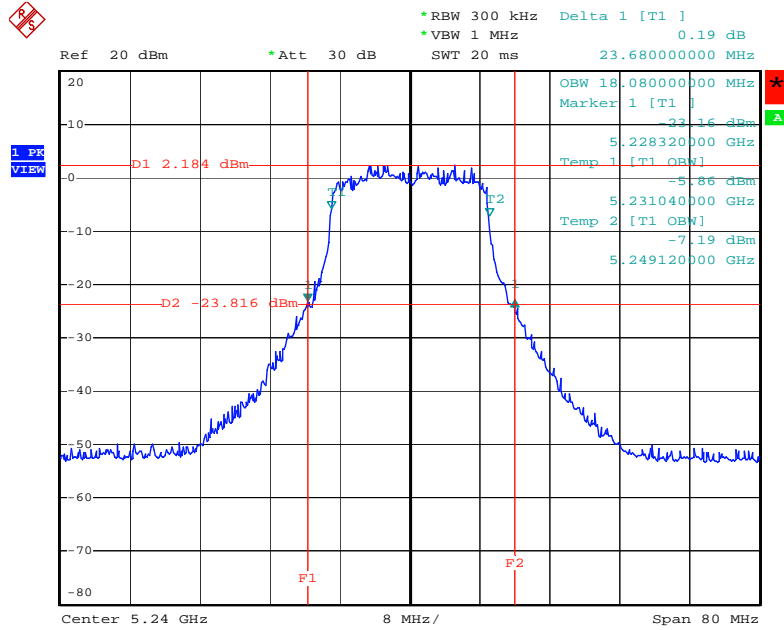
Date: 15.FEB.2008 12:59:52

26 dB Bandwidth Plot on Configuration Drafft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5200 MHz



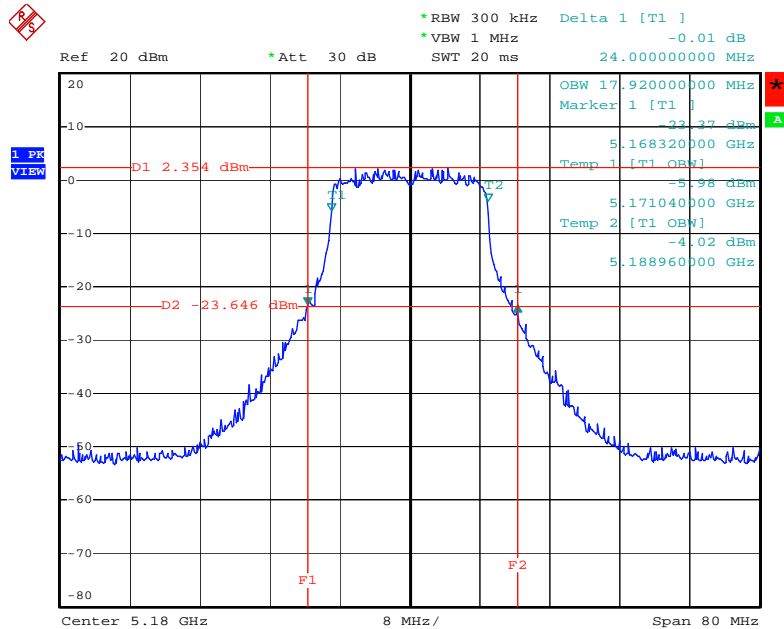
Date: 15.FEB.2008 12:57:30

26 dB Bandwidth Plot on Configuration Drafft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5240 MHz



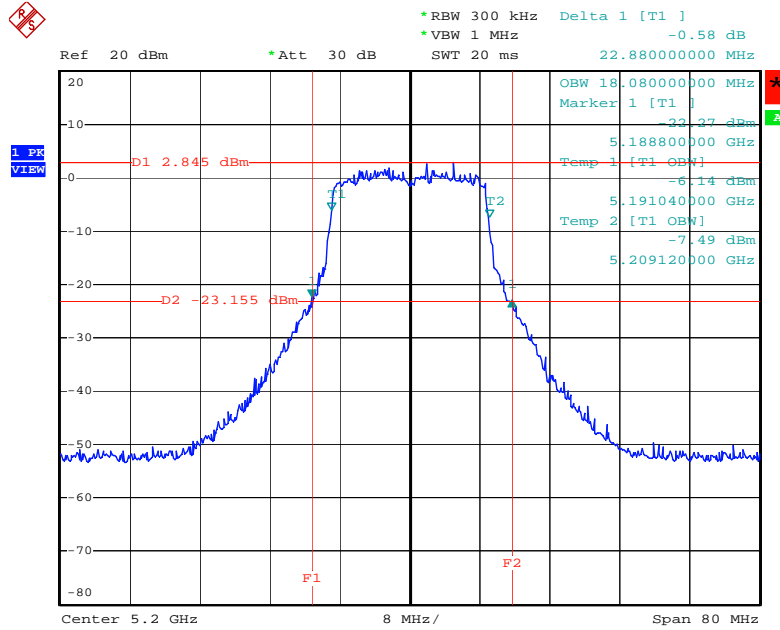
Date: 15.FEB.2008 12:56:35

26 dB Bandwidth Plot on Configuration Drafft n MCS16 20MHz Ant. D-1+Ant. D-2+Ant. D-3 / 5180 MHz



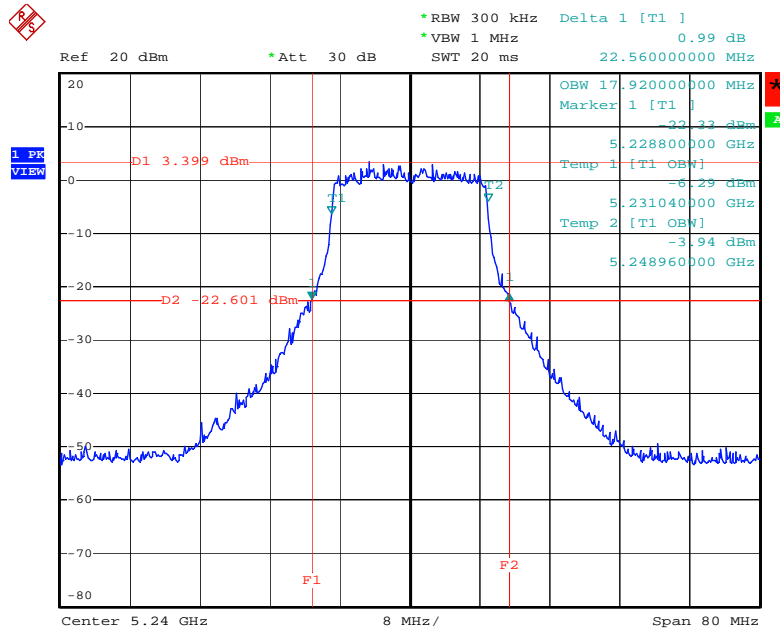
Date: 15.FEB.2008 11:55:41

26 dB Bandwidth Plot on Configuration Drafft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5200 MHz



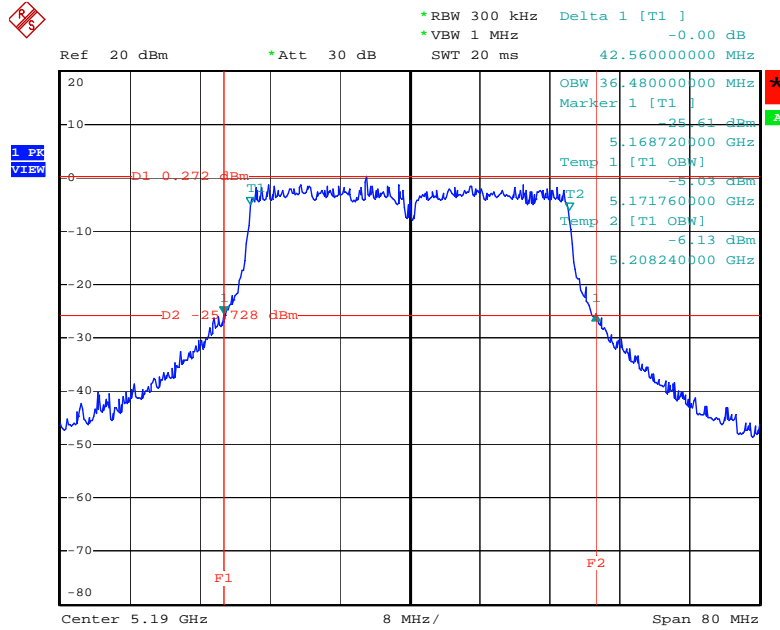
Date: 15.FEB.2008 11:54:25

26 dB Bandwidth Plot on Configuration Drafft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5240 MHz



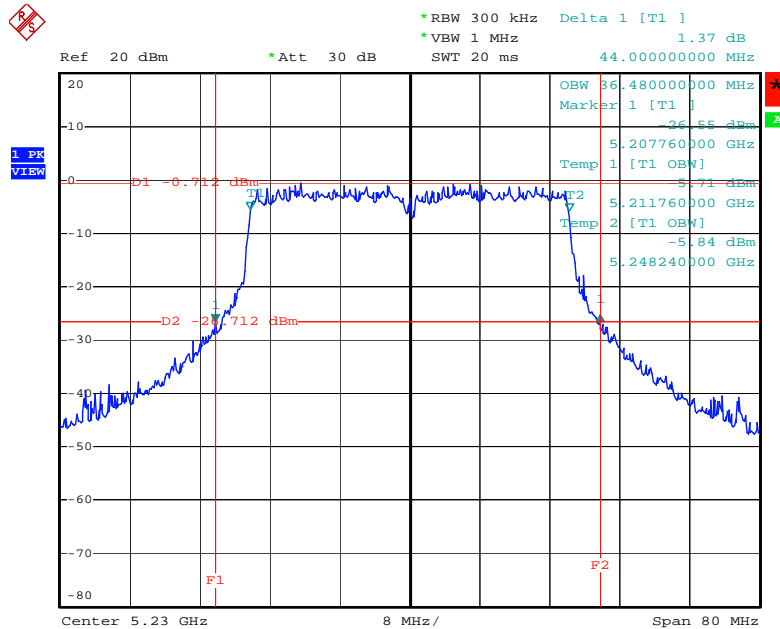
Date: 15.FEB.2008 11:53:43

26 dB Bandwidth Plot on Configuration Drafft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5190 MHz



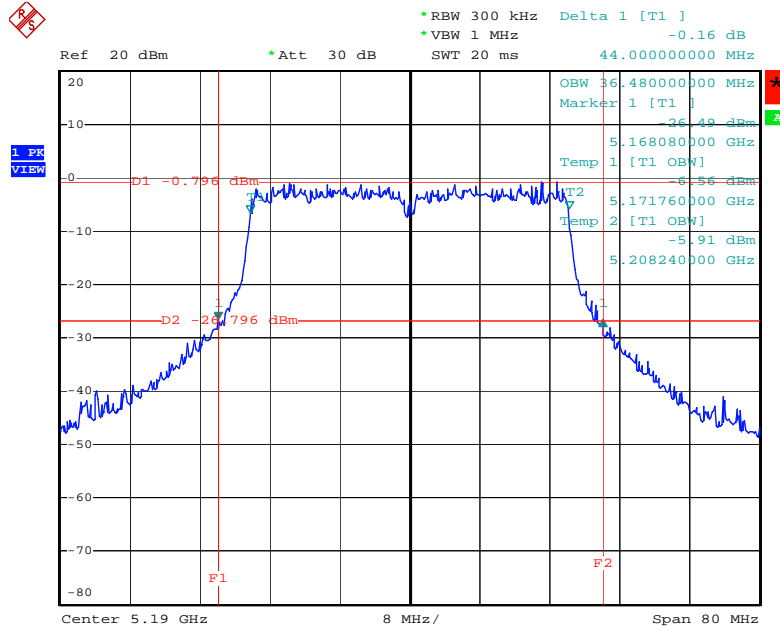
Date: 15.FEB.2008 12:30:08

26 dB Bandwidth Plot on Configuration Drafft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5230 MHz



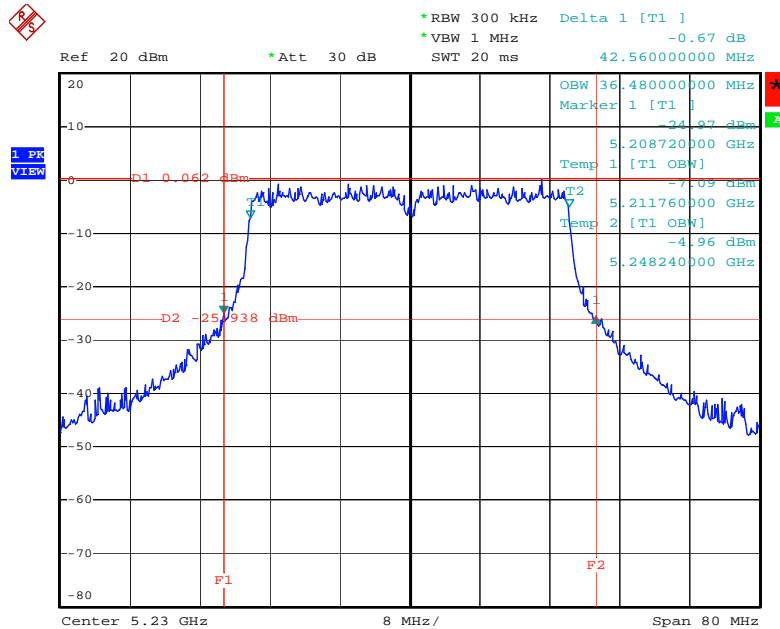
Date: 15.FEB.2008 12:31:05

26 dB Bandwidth Plot on Configuration Drafft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5190 MHz



Date: 15.FEB.2008 12:09:11

26 dB Bandwidth Plot on Configuration Drafft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5230 MHz



Date: 15.FEB.2008 12:08:05

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or $4 \text{ dBm} + 10\log B$, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.3.2. Measuring Instruments and Setting

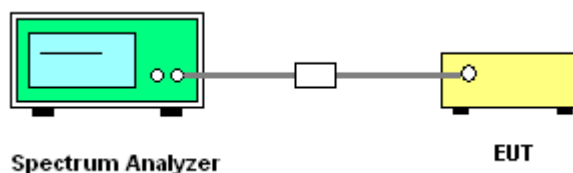
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with FCC Public Notice DA 02-2138.
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	61%
Test Engineer	Sam Lee	Configurations	Draft n

Configuration Draft n MCS16 20MHz Ant. B-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.49	17.00	Complies
40	5200 MHz	11.10	17.00	Complies
48	5240 MHz	11.22	17.00	Complies

Configuration Draft n MCS16 20MHz Ant. B-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.79	17.00	Complies
40	5200 MHz	12.39	17.00	Complies
48	5240 MHz	11.87	17.00	Complies

Configuration Draft n MCS16 20MHz Ant. B-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.24	17.00	Complies
40	5200 MHz	11.41	17.00	Complies
48	5240 MHz	11.62	17.00	Complies

Configuration Draft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.28	17.00	Complies
40	5200 MHz	16.44	17.00	Complies
48	5240 MHz	16.35	17.00	Complies

Configuration Draft n MCS16 20MHz Ant. D-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.73	17.00	Complies
40	5200 MHz	11.32	17.00	Complies
48	5240 MHz	11.62	17.00	Complies

Configuration Draft n MCS16 20MHz Ant. D-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.26	17.00	Complies
40	5200 MHz	12.07	17.00	Complies
48	5240 MHz	12.44	17.00	Complies

Configuration Draft n MCS16 20MHz Ant. D-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.80	17.00	Complies
40	5200 MHz	11.31	17.00	Complies
48	5240 MHz	11.92	17.00	Complies

Configuration Draft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.71	17.00	Complies
40	5200 MHz	16.35	17.00	Complies
48	5240 MHz	16.78	17.00	Complies

Configuration Draft n MCS16 40MHz Ant. B-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	10.97	17.00	Complies
46	5230 MHz	11.52	17.00	Complies

Configuration Draft n MCS16 40MHz Ant. B-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.98	17.00	Complies
46	5230 MHz	12.50	17.00	Complies

Configuration Draft n MCS16 40MHz Ant. B-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.26	17.00	Complies
46	5230 MHz	11.12	17.00	Complies

Configuration Draft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	16.20	17.00	Complies
46	5230 MHz	16.52	17.00	Complies

Configuration Draft n MCS16 40MHz Ant. D-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.03	17.00	Complies
46	5230 MHz	11.47	17.00	Complies

Configuration Draft n MCS16 40MHz Ant. D-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.93	17.00	Complies
46	5230 MHz	12.56	17.00	Complies

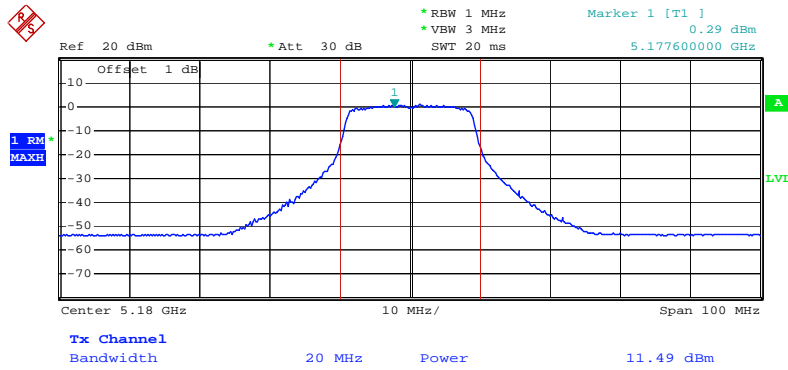
Configuration Draft n MCS16 40MHz Ant. D-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	11.39	17.00	Complies
46	5230 MHz	11.13	17.00	Complies

Configuration Draft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3

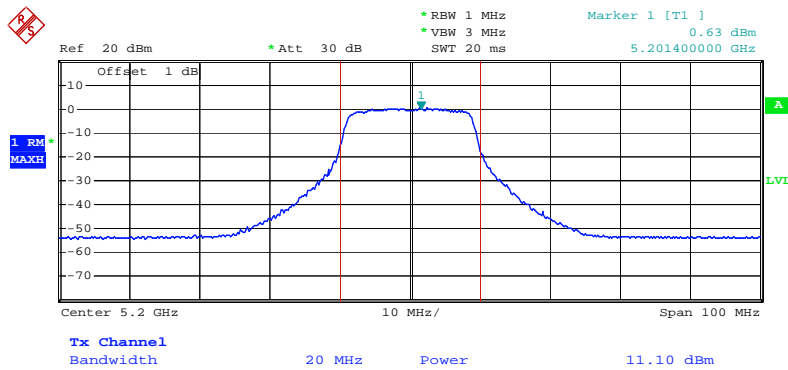
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	16.24	17.00	Complies
46	5230 MHz	16.54	17.00	Complies

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-1 / 5180 MHz



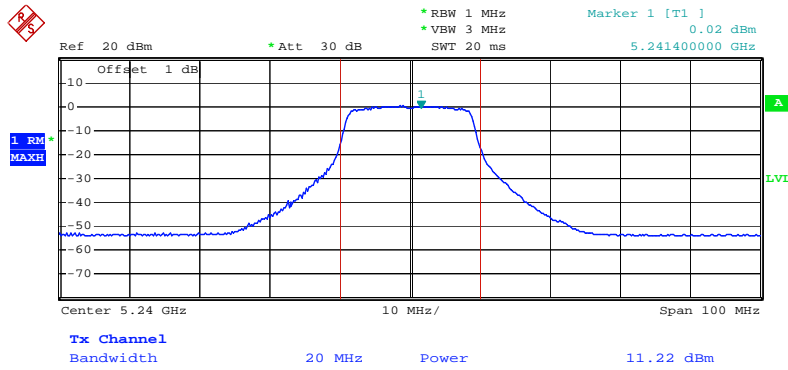
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Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-1 / 5200 MHz



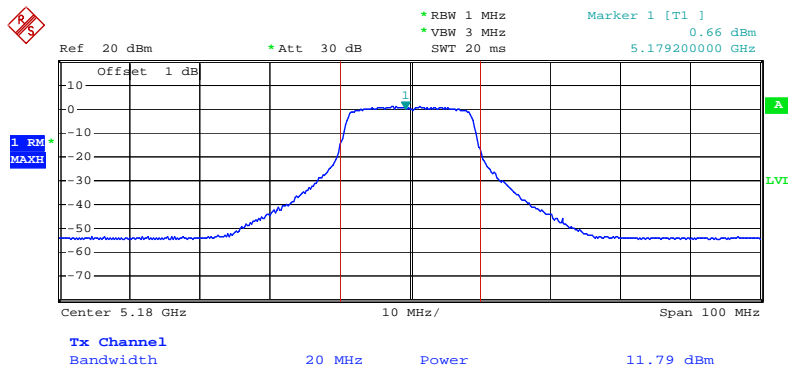
Date: 15.FEB.2008 07:44:07

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-1 / 5240 MHz



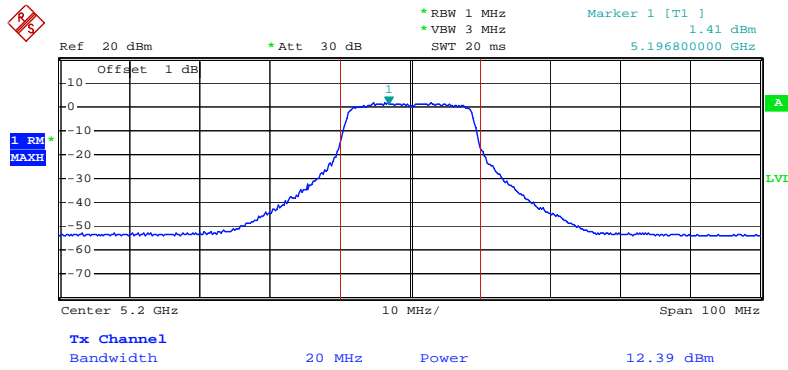
Date: 15.FEB.2008 07:42:37

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-2 / 5180 MHz



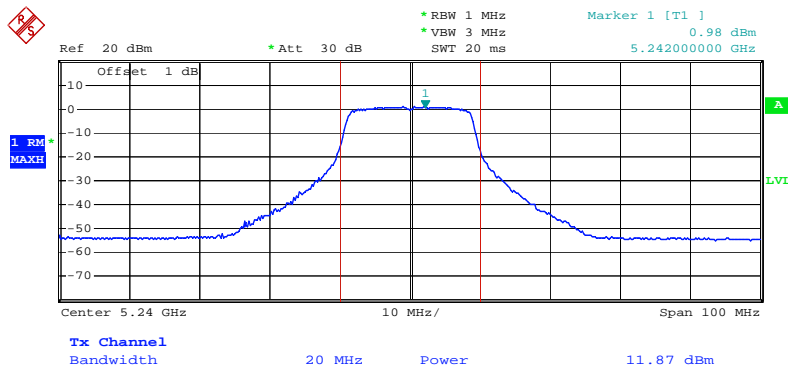
Date: 15.FEB.2008 07:47:40

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-2 / 5200 MHz



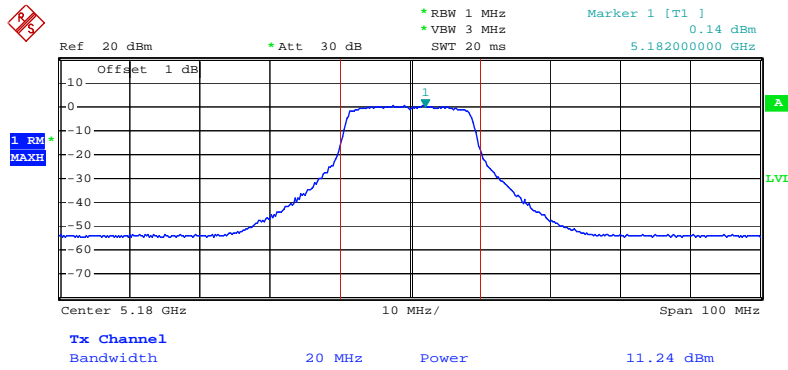
Date: 15.FEB.2008 07:44:38

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-2 / 5240 MHz



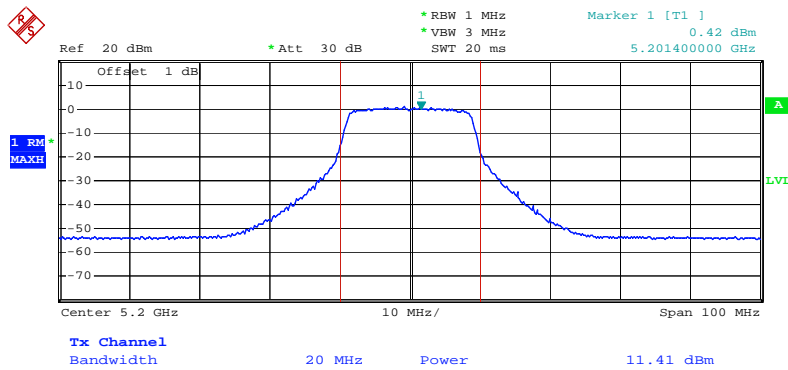
Date: 15.FEB.2008 07:41:54

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-3 / 5180 MHz



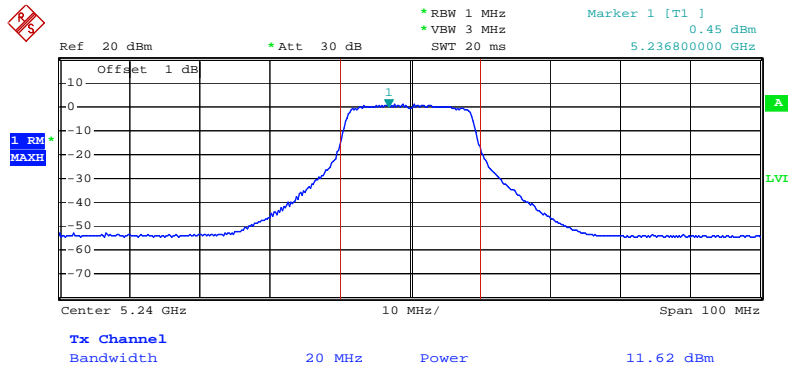
Date: 15.FEB.2008 07:47:01

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-3 / 5200 MHz



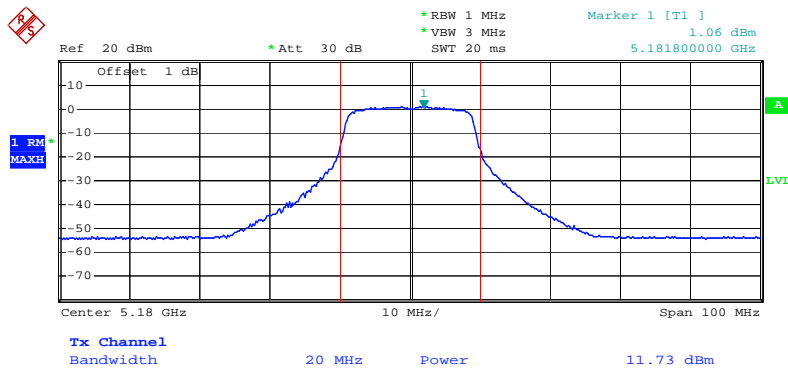
Date: 15.FEB.2008 07:45:30

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. B-3 / 5240 MHz



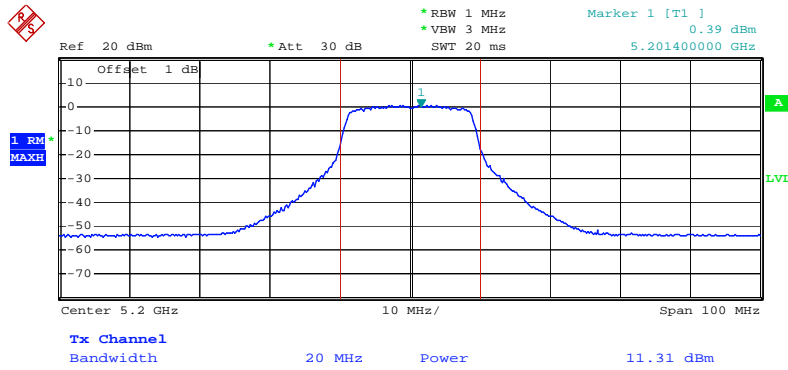
Date: 15.FEB.2008 07:41:23

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. D-1 / 5180 MHz



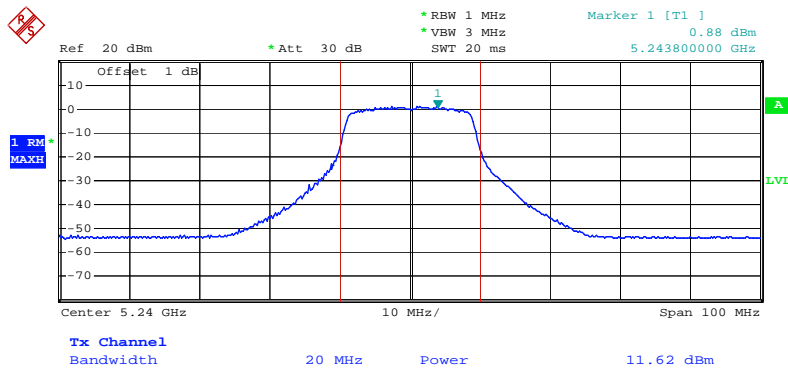
Date: 15.FEB.2008 09:53:49

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. D-1 / 5200 MHz



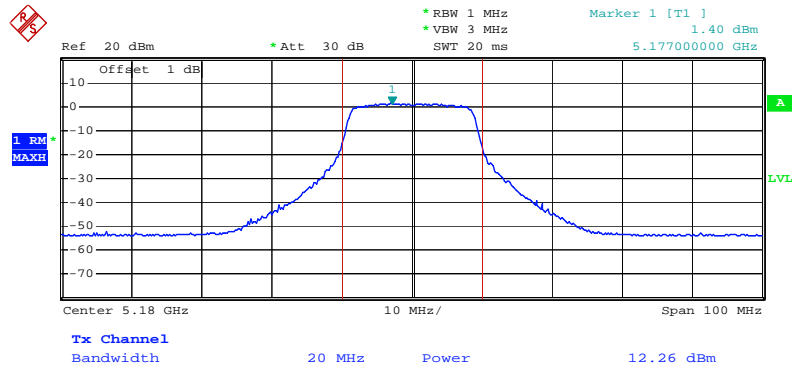
Date: 15.FEB.2008 09:54:39

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. D-1 / 5240 MHz



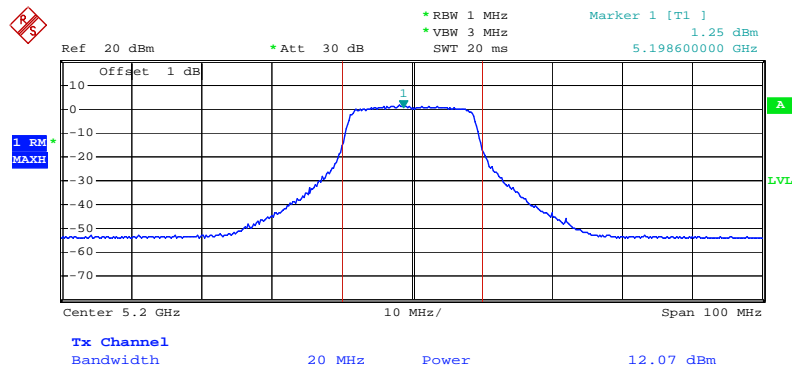
Date: 15.FEB.2008 09:58:08

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. D-2 / 5180 MHz



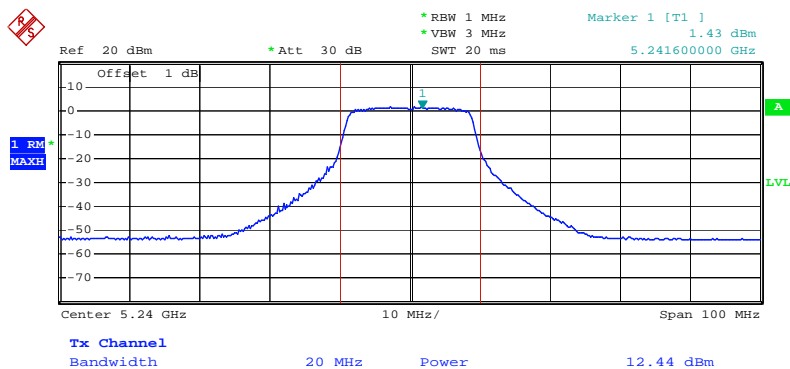
Date: 15.FEB.2008 09:53:31

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. D-2 / 5200 MHz



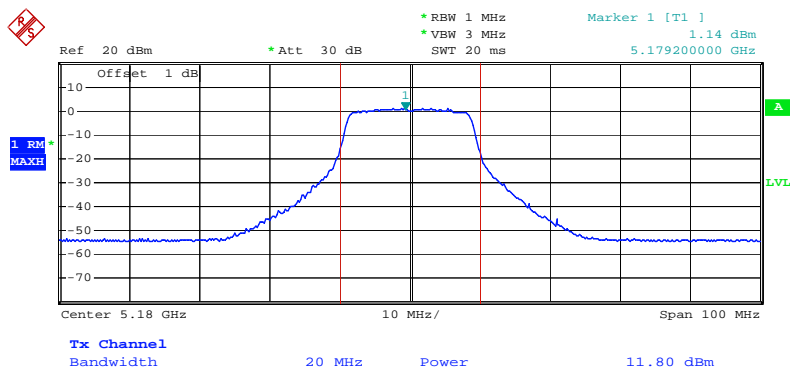
Date: 15.FEB.2008 09:55:01

Channel Output Power Plot on Configuration Drafft n MCS16 20MHz Ant. D-2 / 5240 MHz



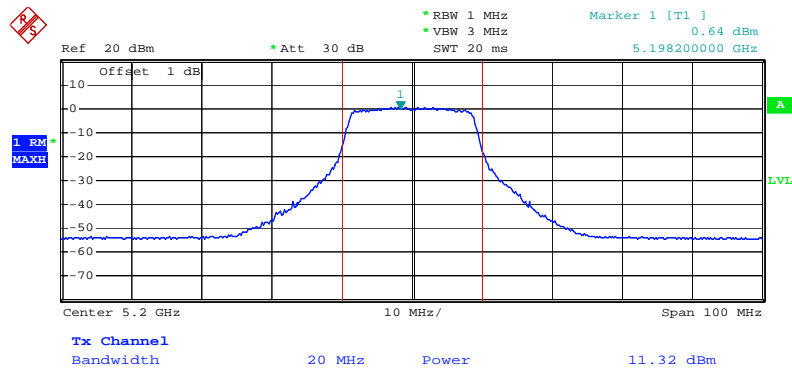
Date: 15.FEB.2008 09:58:31

Channel Output Power Plot on Configuration Drafft n MCS16 20MHz Ant. D-3 / 5180 MHz



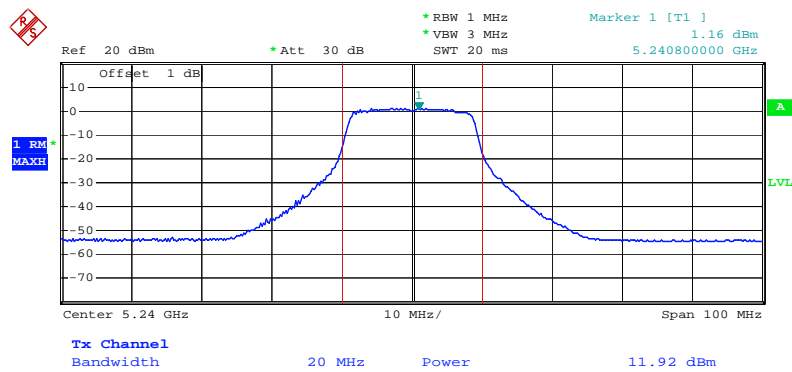
Date: 15.FEB.2008 09:53:11

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. D-3 / 5200 MHz



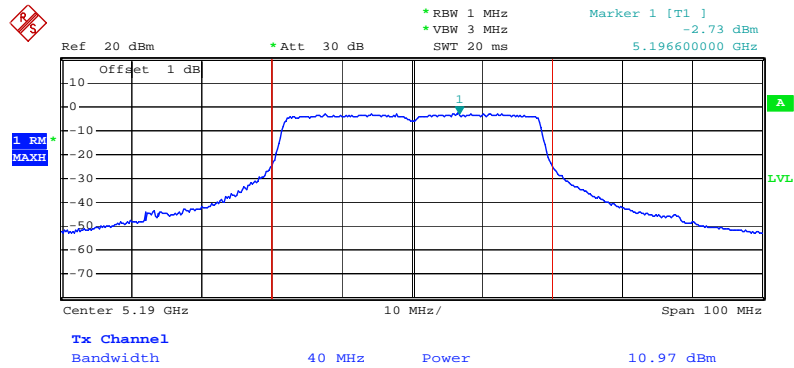
Date: 15.FEB.2008 09:55:22

Channel Output Power Plot on Configuration Draft n MCS16 20MHz Ant. D-3 / 5240 MHz



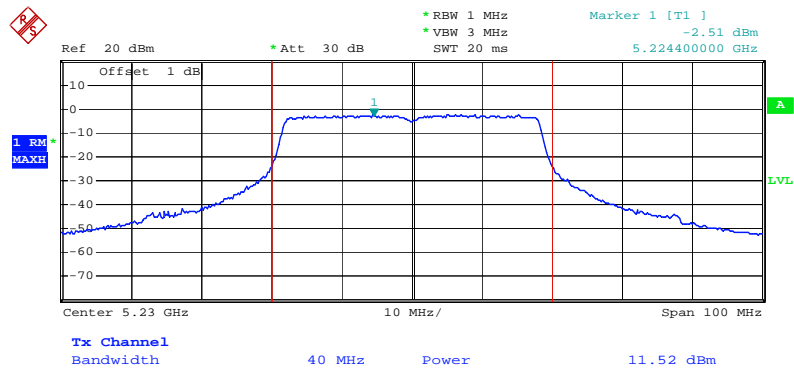
Date: 15.FEB.2008 09:58:56

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. B-1 / 5190 MHz



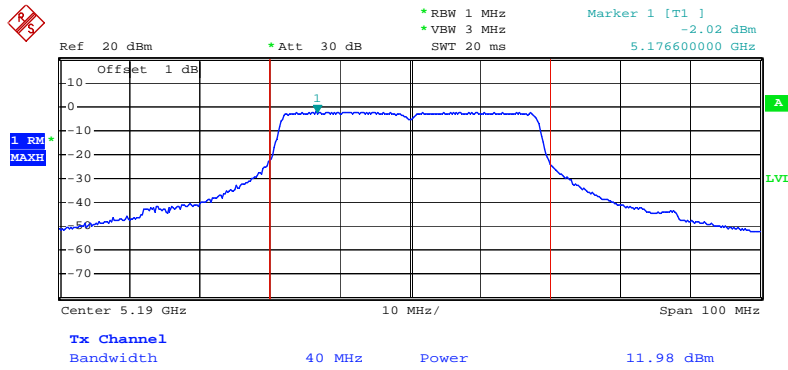
Date: 15.FEB.2008 08:05:48

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. B-1 / 5230 MHz



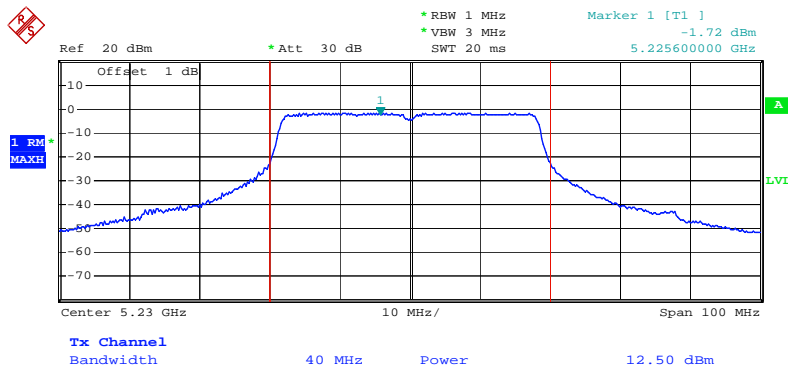
Date: 15.FEB.2008 08:06:45

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. B-2 / 5190 MHz



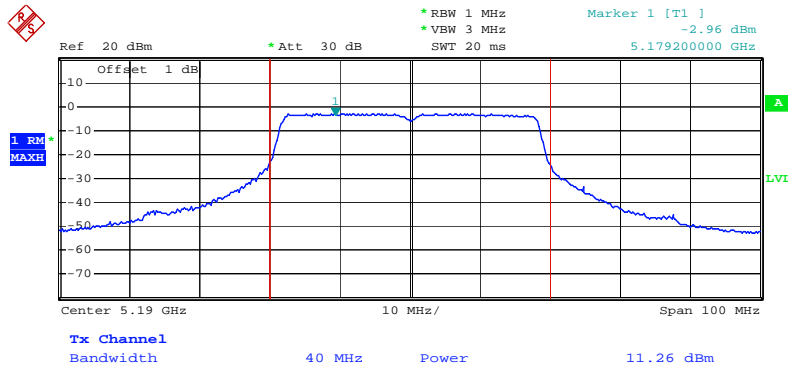
Date: 15.FEB.2008 08:05:27

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. B-2 / 5230 MHz



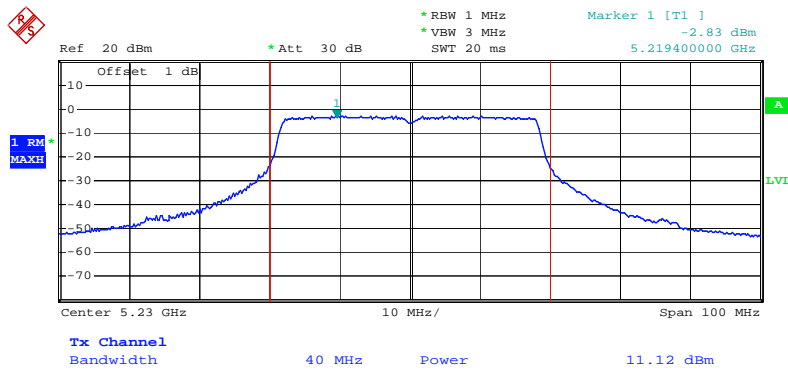
Date: 15.FEB.2008 08:07:03

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. B-3 / 5190 MHz



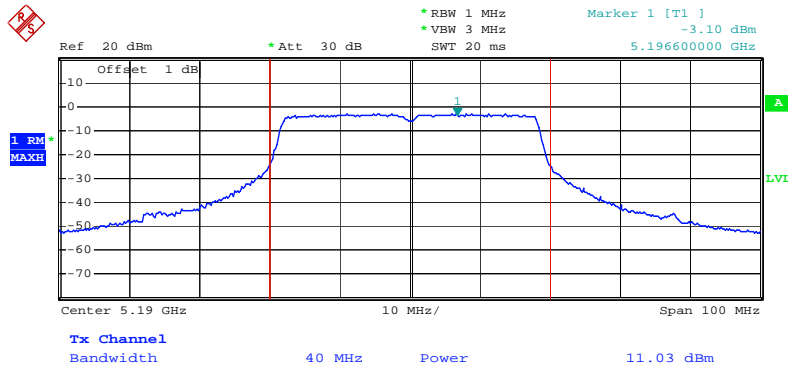
Date: 15.FEB.2008 08:05:01

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. B-3 / 5230 MHz



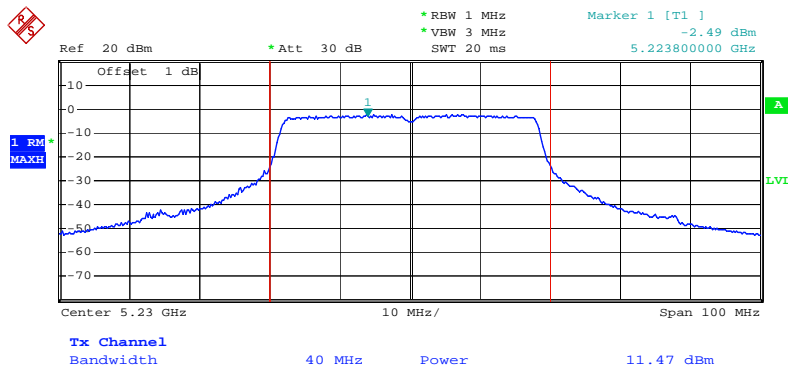
Date: 15.FEB.2008 08:07:24

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. D-1 / 5190 MHz



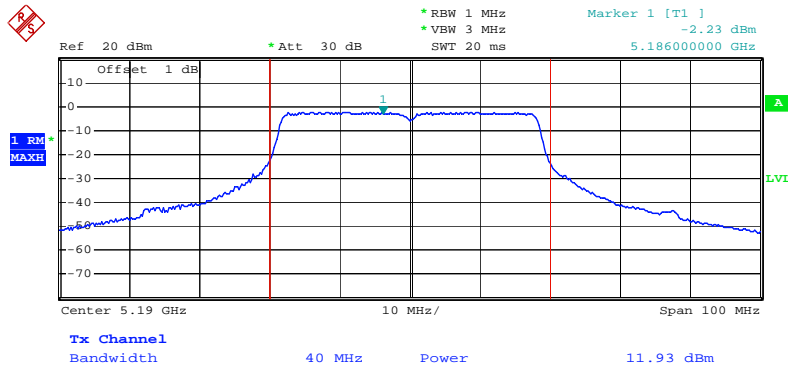
Date: 15.FEB.2008 10:15:31

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. D-1 / 5230 MHz



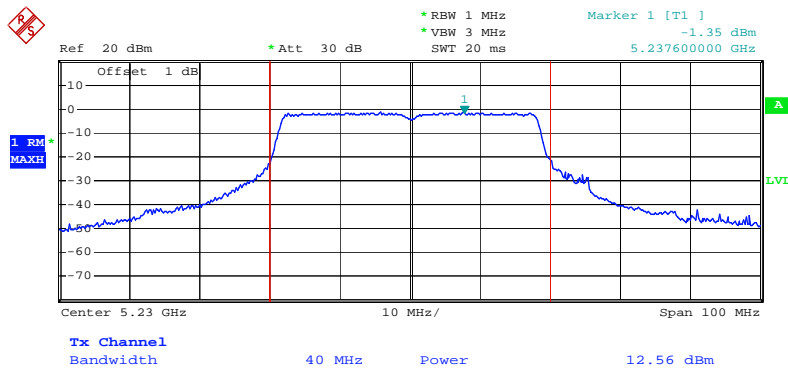
Date: 15.FEB.2008 10:16:19

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. D-2 / 5190 MHz



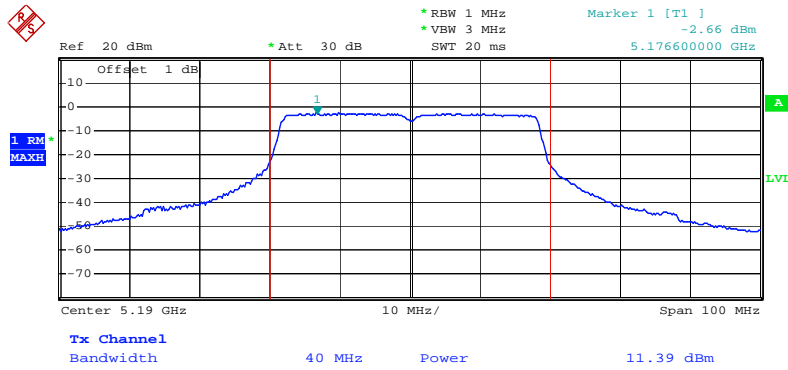
Date: 15.FEB.2008 10:15:01

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. D-2 / 5230 MHz



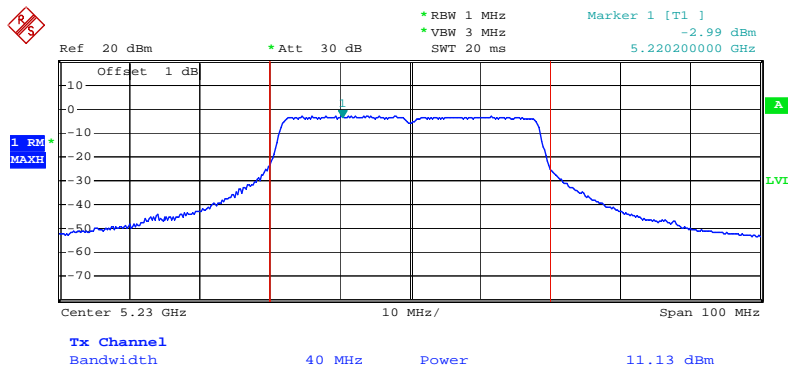
Date: 15.FEB.2008 10:16:37

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. D-3 / 5190 MHz



Date: 15.FEB.2008 10:14:38

Channel Output Power Plot on Configuration Draft n MCS16 40MHz Ant. D-3 / 5230 MHz



Date: 15.FEB.2008 10:16:56

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

4.4.2. Measuring Instruments and Setting

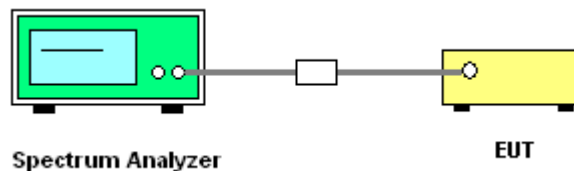
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 analyse 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	61%
Test Engineer	Sam Lee	Configurations	Draft n

Configuration Draft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	1.05	4.00	Complies
40	5200 MHz	1.18	4.00	Complies
48	5240 MHz	1.12	4.00	Complies

Configuration Draft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	0.98	4.00	Complies
40	5200 MHz	0.99	4.00	Complies
48	5240 MHz	1.81	4.00	Complies

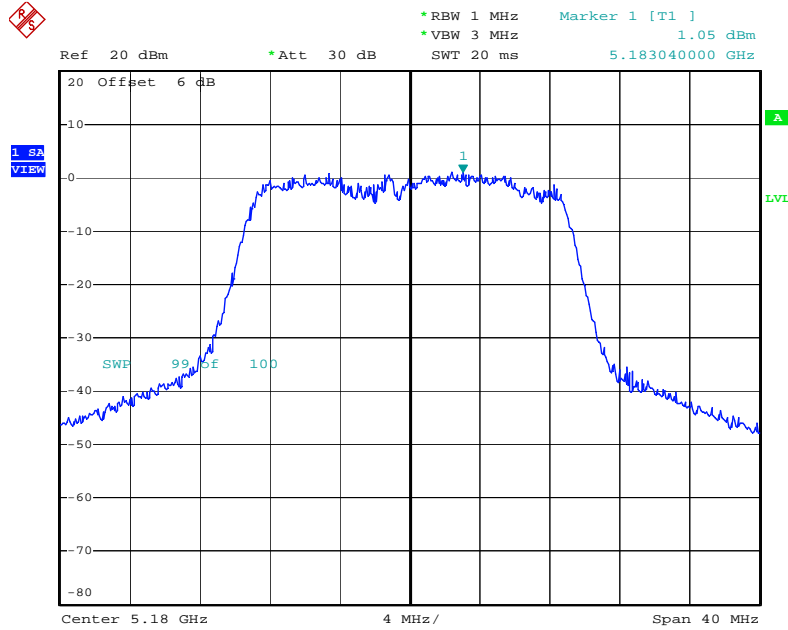
Configuration Draft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	-2.35	4.00	Complies
46	5230 MHz	-2.03	4.00	Complies

Configuration Draft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3

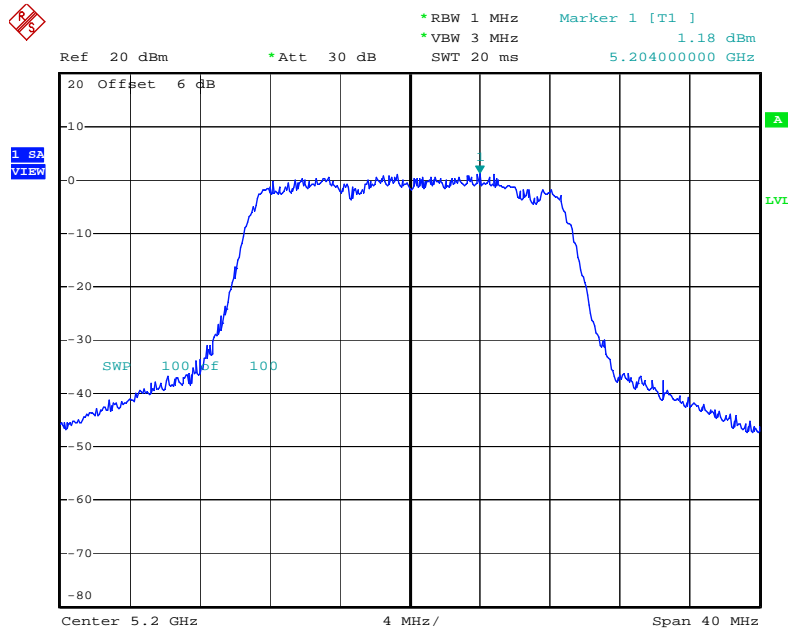
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	-1.89	4.00	Complies
46	5230 MHz	-1.69	4.00	Complies

Power Density Plot on Configuration Drafft n MCS16 20MHz Ant. A-1+Ant. A-2+Ant. A-3 / 5180 MHz



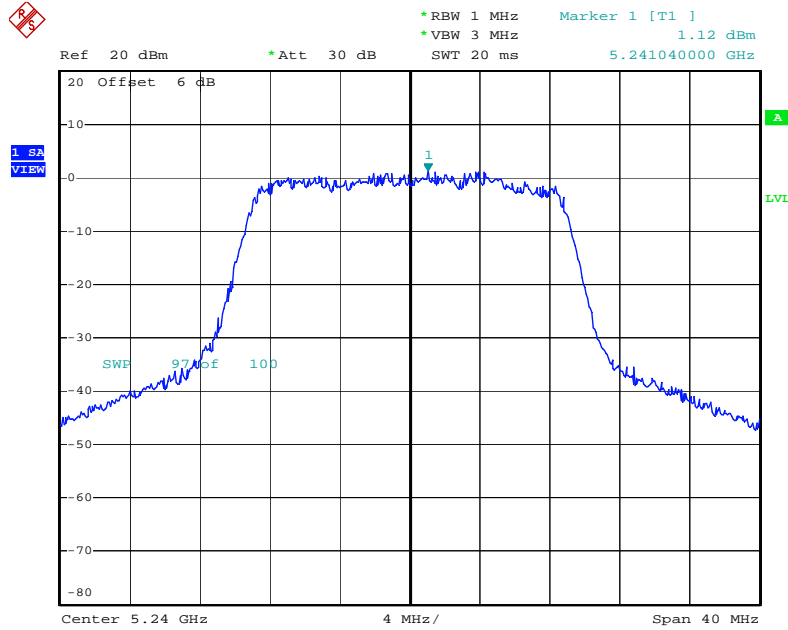
Date: 15.FEB.2008 12:59:59

Power Density Plot on Configuration Drafft n MCS16 20MHz Ant. A-1+Ant. A-2+Ant. A-3 / 5200 MHz



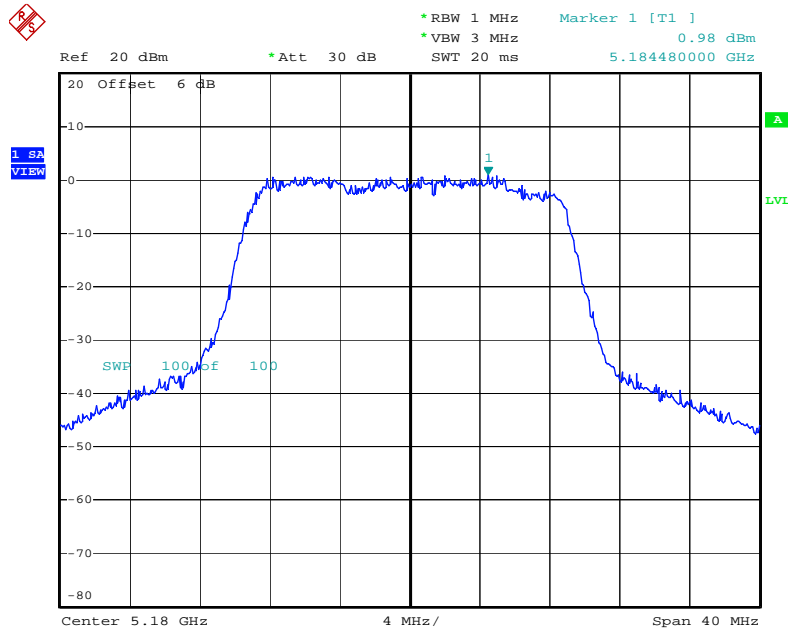
Date: 15.FEB.2008 12:57:37

Power Density Plot on Configuration Drafft n MCS16 20MHz Ant. A-1+Ant. A-2+Ant. A-3 / 5240 MHz



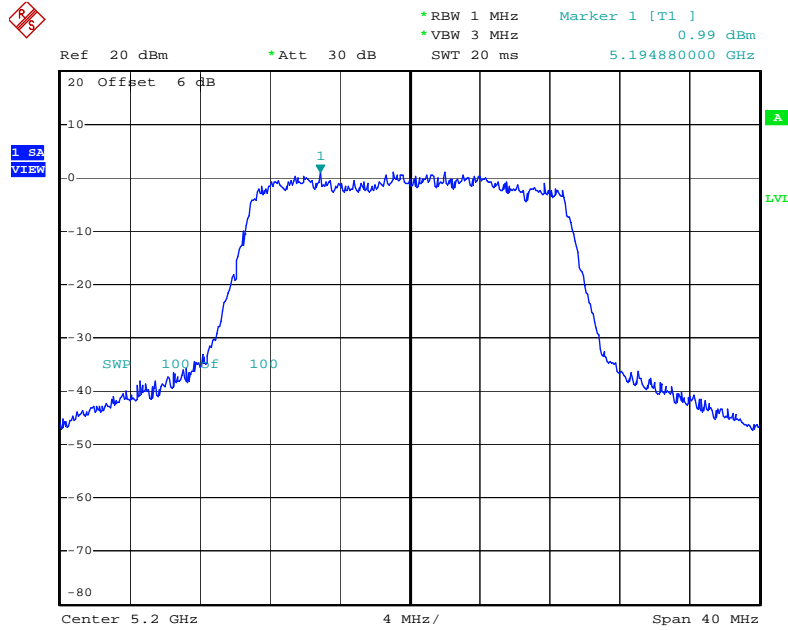
Date: 15.FEB.2008 12:56:42

Power Density Plot on Configuration Drafft n MCS16 20MHz Ant. D-1+Ant. D-2+Ant. D-3 / 5180 MHz



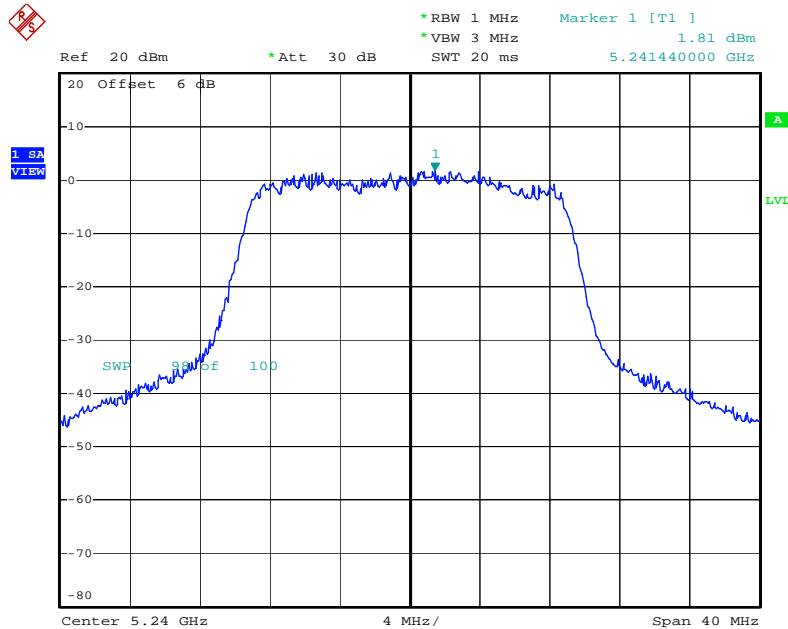
Date: 15.FEB.2008 11:55:48

Power Density Plot on Configuration Drafft n MCS16 20MHz Ant. D-1+Ant. D-2+Ant. D-3 / 5200 MHz



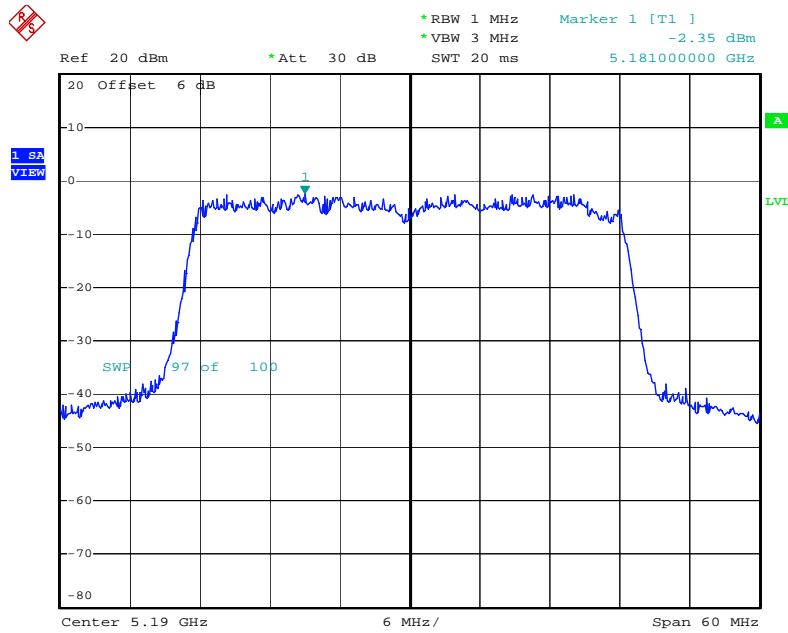
Date: 15.FEB.2008 11:54:32

Power Density Plot on Configuration Drafft n MCS16 20MHz Ant. D-1+Ant. D-2+Ant. D-3 / 5240 MHz



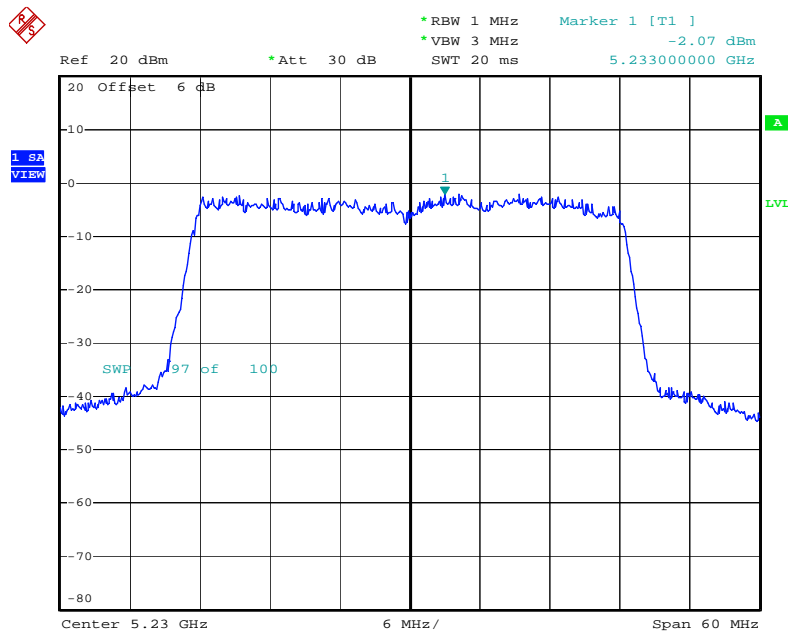
Date: 15.FEB.2008 11:53:51

Power Density Plot on Configuration Drafft n MCS16 40MHz Ant. A-1+Ant. A-2+Ant. A-3 / 5190 MHz



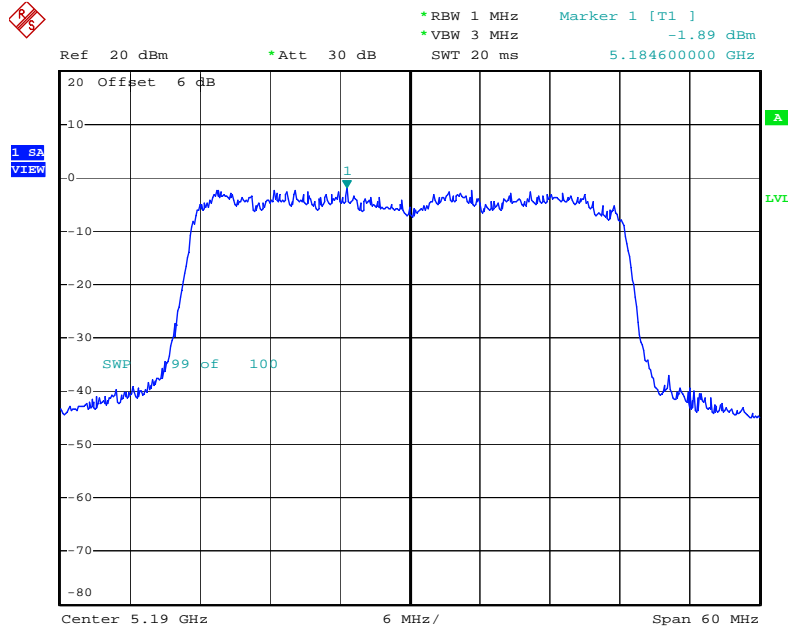
Date: 15.FEB.2008 12:30:15

Power Density Plot on Configuration Drafft n MCS16 40MHz Ant. A-1+Ant. A-2+Ant. A-3 / 5230 MHz



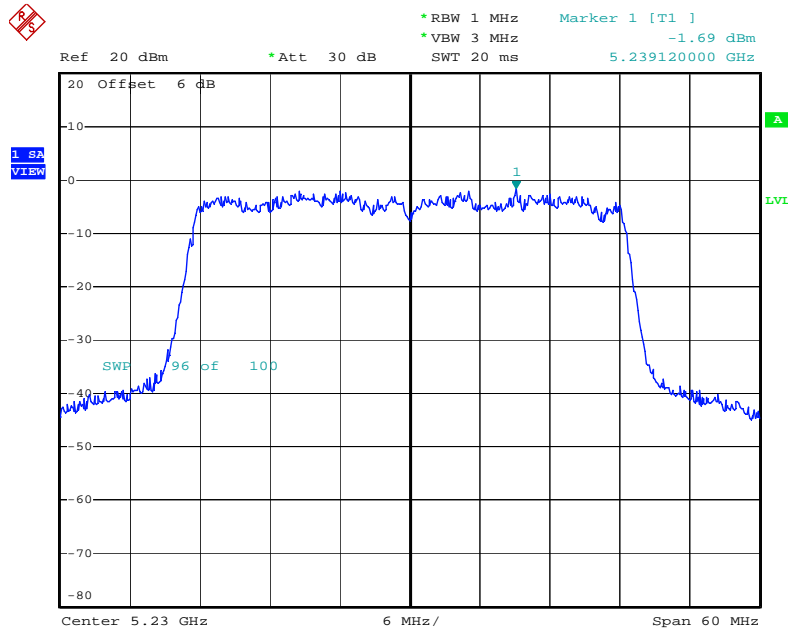
Date: 15.FEB.2008 12:31:13

Power Density Plot on Configuration Drafft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5190 MHz



Date: 15.FEB.2008 12:09:18

Power Density Plot on Configuration Drafft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5230 MHz



Date: 15.FEB.2008 12:08:12

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

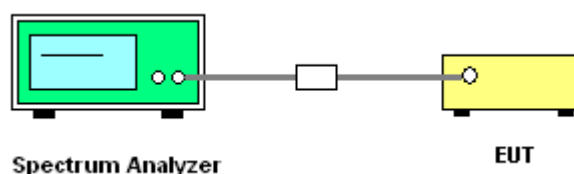
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 spectrum analyse 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	61%
Test Engineer	Sam Lee	Configurations	Draft n

Configuration Draft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.31	13	Complies
40	5200 MHz	6.62	13	Complies
48	5240 MHz	5.99	13	Complies

Configuration Draft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.58	13	Complies
40	5200 MHz	6.72	13	Complies
48	5240 MHz	6.33	13	Complies

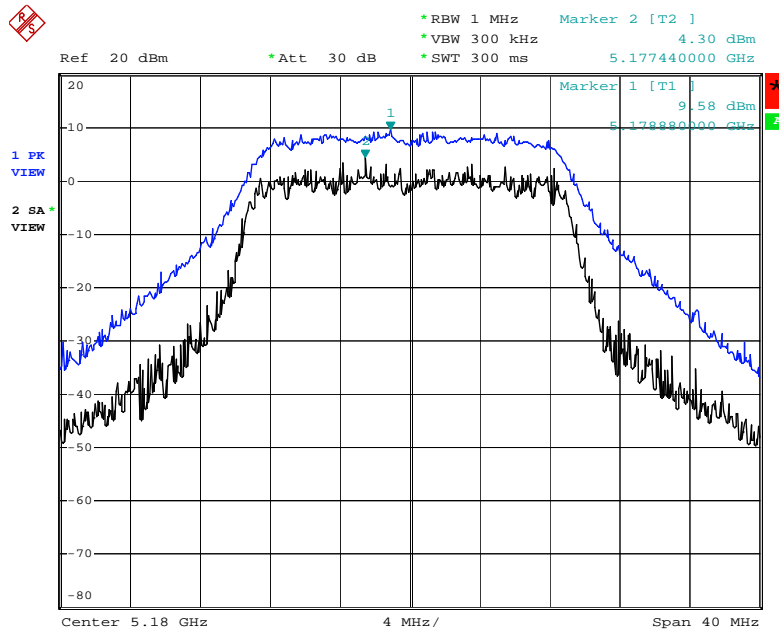
Configuration Draft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	5.83	13	Complies
46	5230 MHz	6.42	13	Complies

Configuration Draft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3

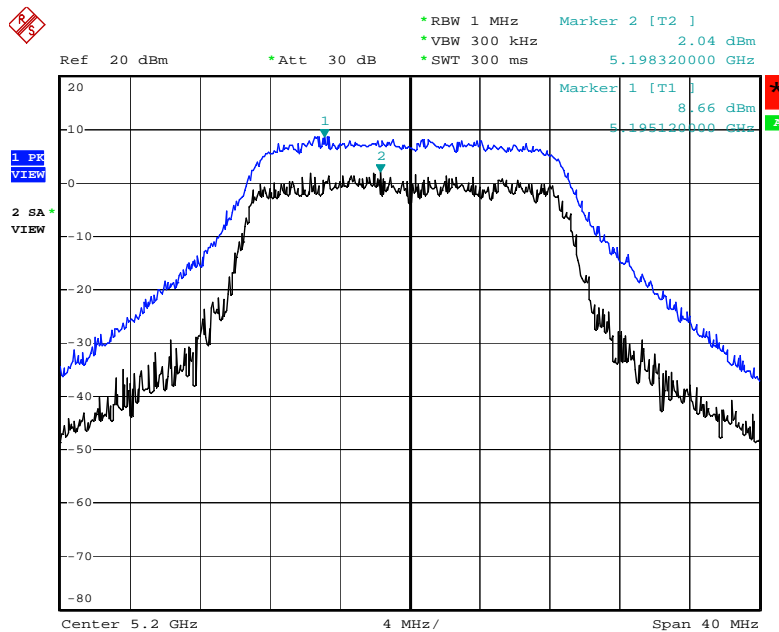
Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
38	5190 MHz	6.40	13	Complies
46	5230 MHz	5.77	13	Complies

Peak Excursion Plot on Configuration Drafft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5180 MHz



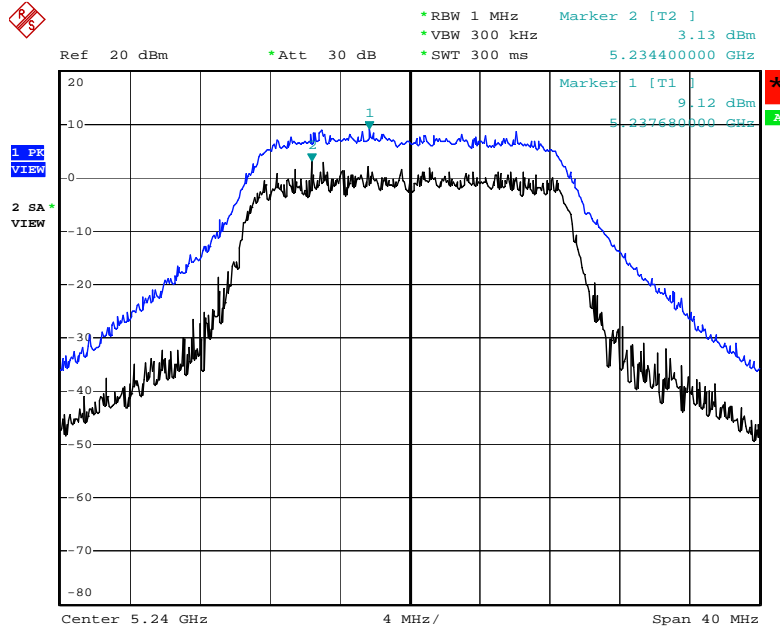
Date: 29.FEB.2008 09:19:45

Peak Excursion Plot on Configuration Drafft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5200 MHz



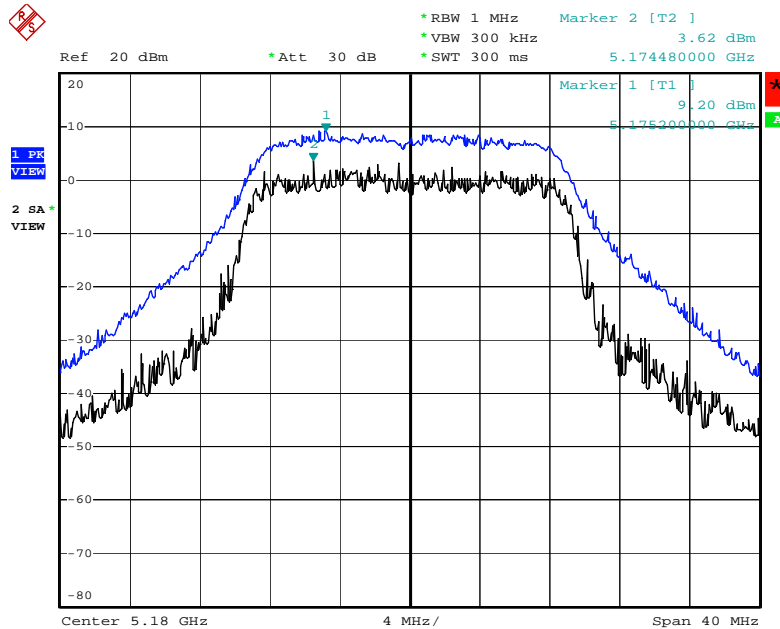
Date: 15.FEB.2008 12:57:50

Peak Excursion Plot on Configuration Drafft n MCS16 20MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5240 MHz



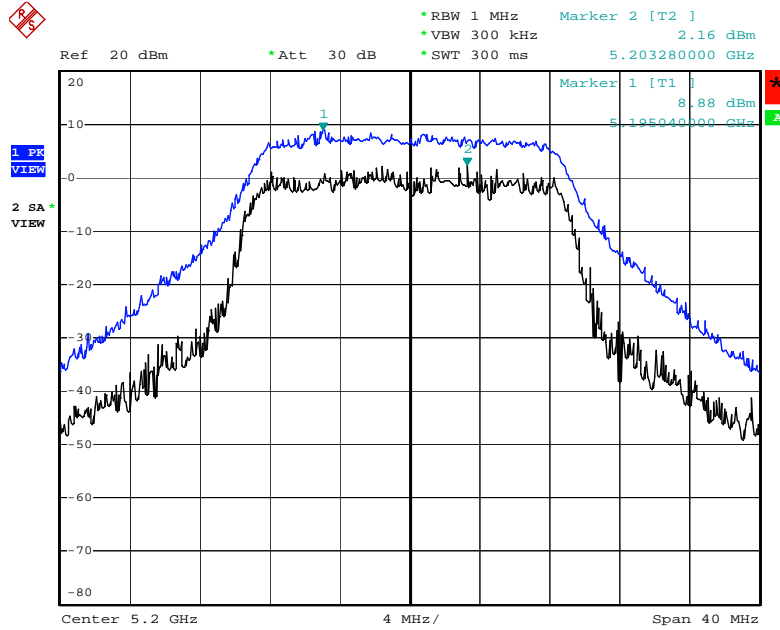
Date: 15.FEB.2008 12:56:54

Peak Excursion Plot on Configuration Drafft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5180 MHz



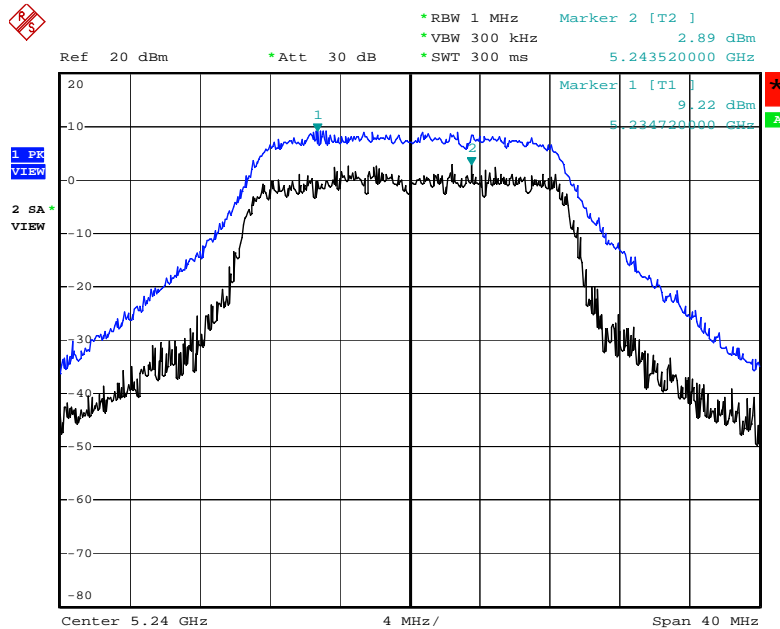
Date: 15.FEB.2008 11:56:01

Peak Excursion Plot on Configuration Drafft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5200 MHz



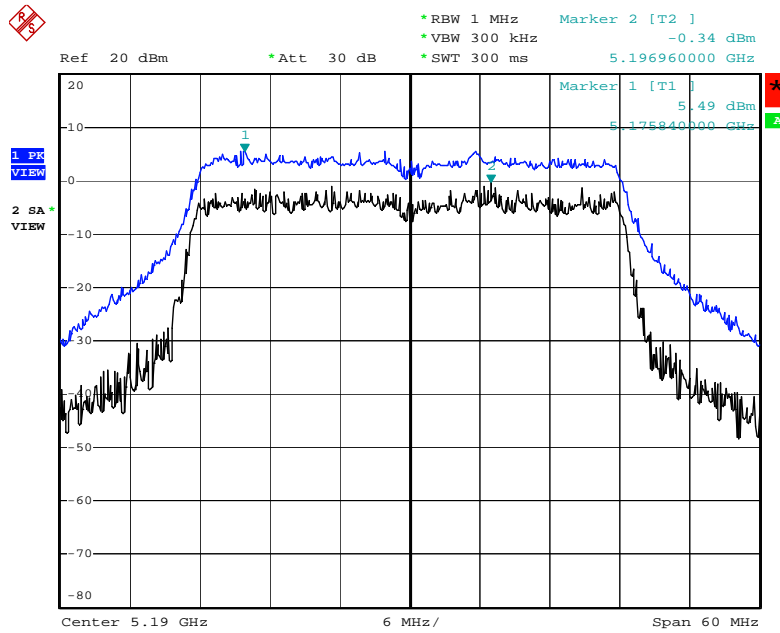
Date: 15.FEB.2008 11:54:44

Peak Excursion Plot on Configuration Drafft n MCS16 20MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5240 MHz



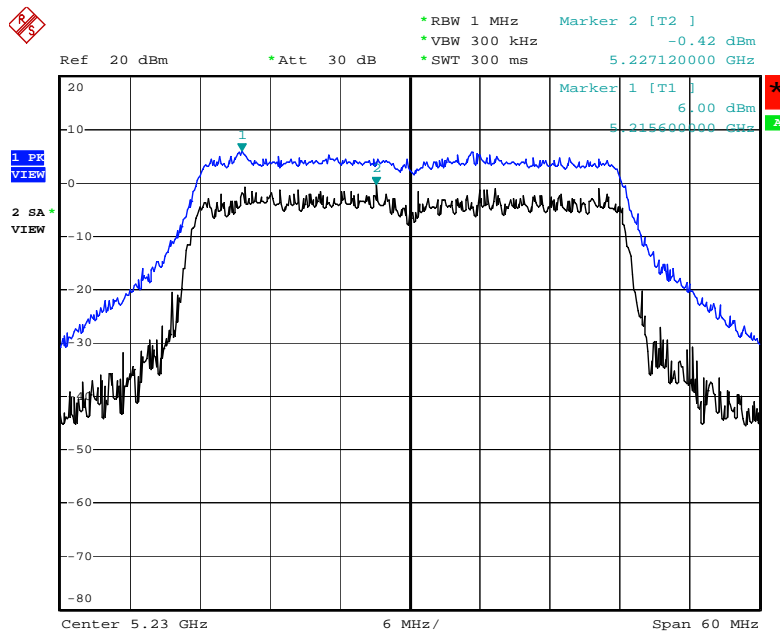
Date: 15.FEB.2008 11:54:04

Peak Excursion Plot on Configuration Drafft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5190 MHz



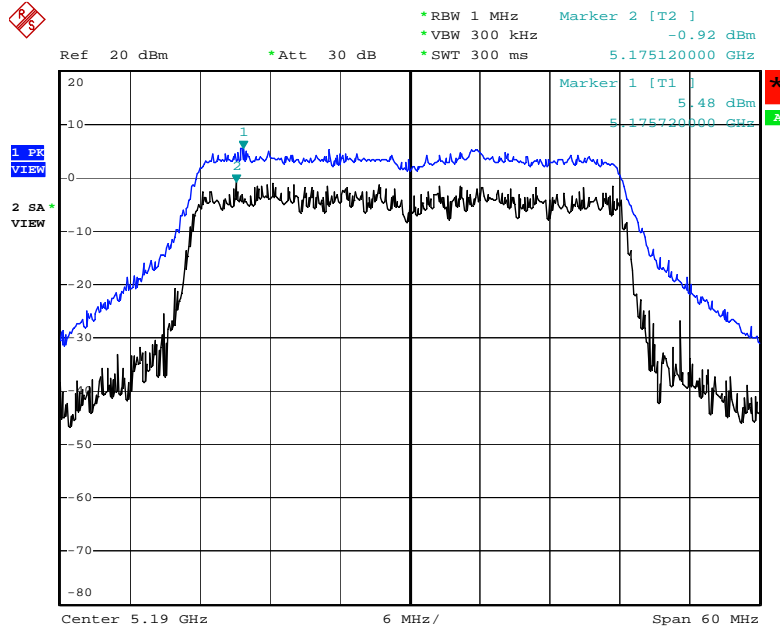
Date: 15.FEB.2008 12:30:28

Peak Excursion Plot on Configuration Drafft n MCS16 40MHz Ant. A-1 +Ant. A-2+Ant. A-3 / 5230 MHz



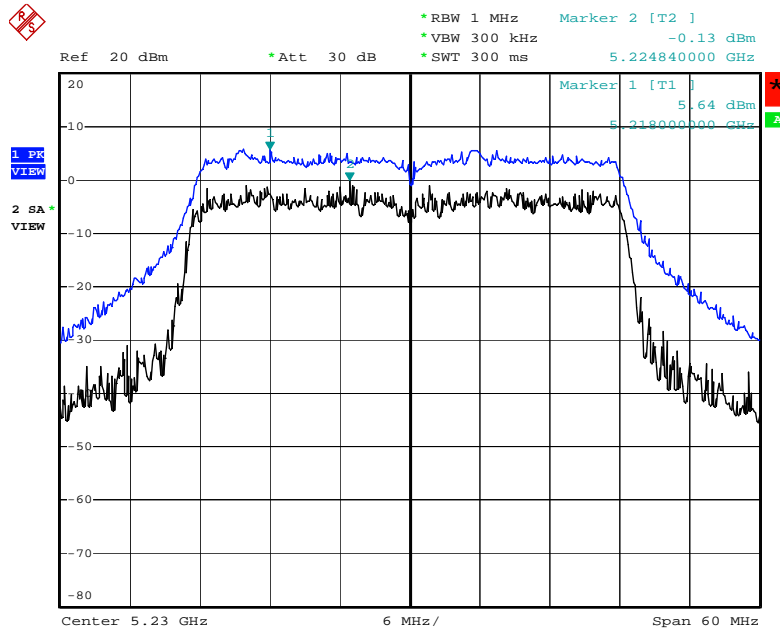
Date: 15.FEB.2008 12:31:26

Peak Excursion Plot on Configuration Drafft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5190 MHz



Date: 15.FEB.2008 12:09:30

Peak Excursion Plot on Configuration Drafft n MCS16 40MHz Ant. D-1 +Ant. D-2+Ant. D-3 / 5230 MHz



Date: 15.FEB.2008 12:08:24

4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.25 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, in case the emission falls within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microrvolts/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

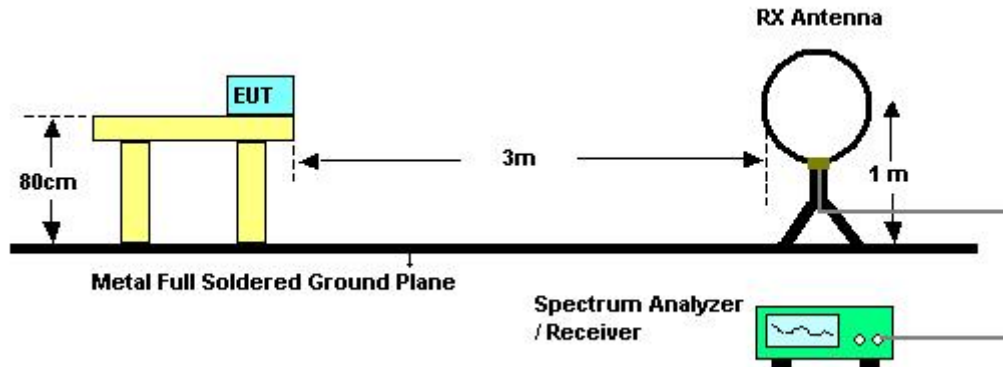
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

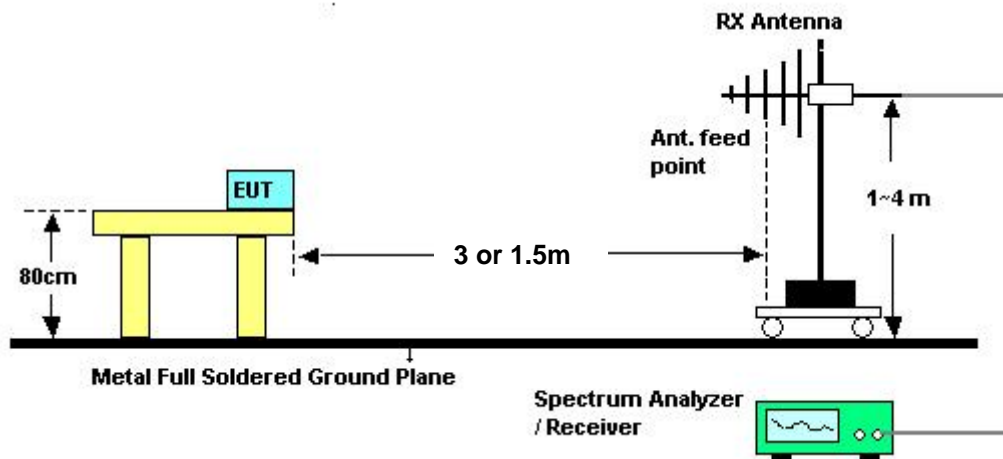
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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	26°C	Humidity	56%
Test Engineer	Roy Huang		

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.

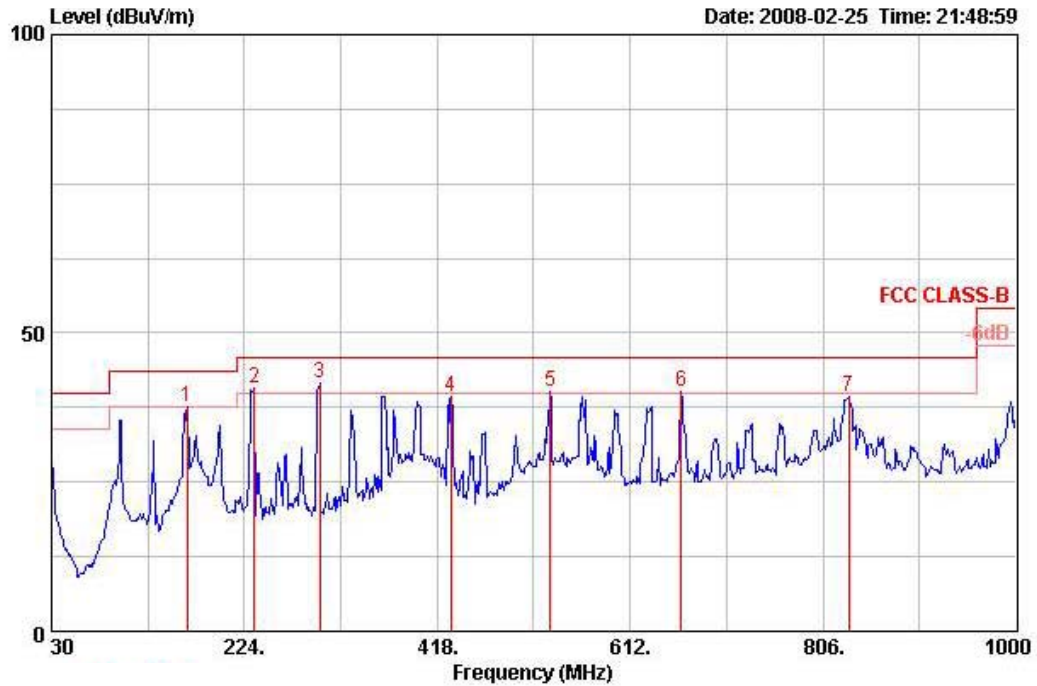
Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

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

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

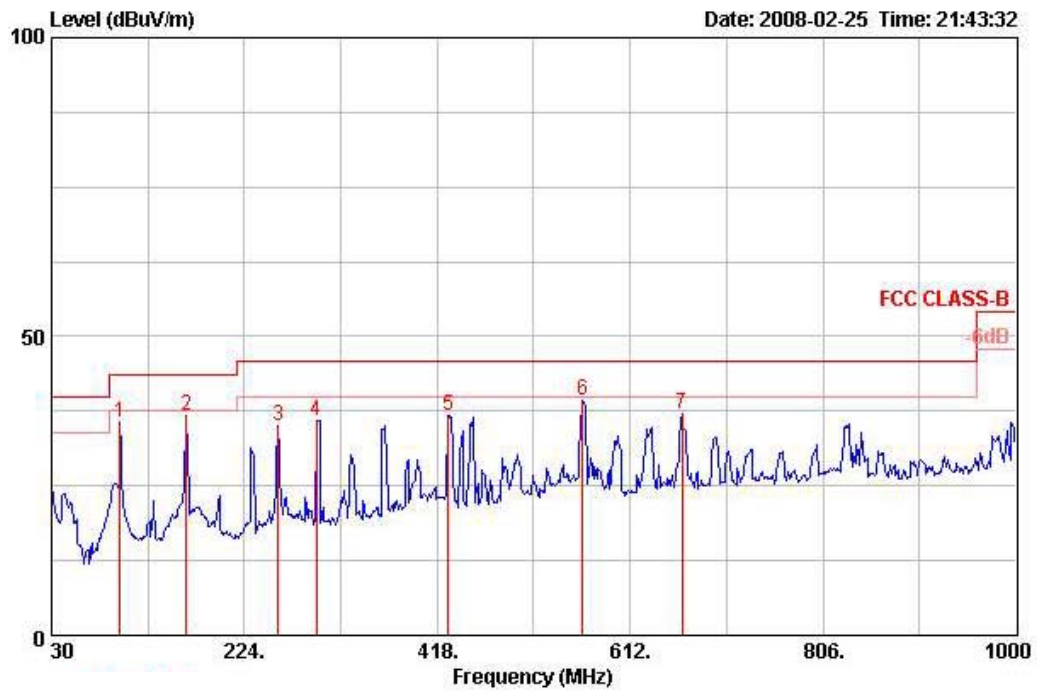
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Ant. B

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	166.770	37.61	-5.89	43.50	54.55	8.79	27.27	1.53	Peak	0	100	HORIZONTAL
2	233.700	40.69	-5.31	46.00	55.85	10.04	27.03	1.83	Peak	0	100	HORIZONTAL
3	299.660	41.55	-4.45	46.00	53.45	12.90	26.90	2.10	Peak	152	255	HORIZONTAL
4	431.580	39.35	-6.65	46.00	48.24	16.38	27.76	2.49	Peak	0	100	HORIZONTAL
5	531.490	40.13	-5.87	46.00	47.60	17.87	28.10	2.76	Peak	0	100	HORIZONTAL
6	663.410	40.06	-5.94	46.00	45.75	18.90	28.04	3.45	Peak	0	100	HORIZONTAL
7	832.190	39.45	-6.55	46.00	43.02	20.60	27.54	3.36	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	98.870	35.66	-7.84	43.50	51.98	10.10	27.61	1.18	Peak	0	400	VERTICAL
2	165.800	36.84	-6.66	43.50	53.76	8.82	27.27	1.53	Peak	0	400	VERTICAL
3	257.950	34.94	-11.06	46.00	47.51	12.48	26.98	1.93	Peak	0	400	VERTICAL
4	296.750	35.89	-10.11	46.00	47.87	12.84	26.91	2.09	Peak	0	400	VERTICAL
5	428.670	36.88	-9.12	46.00	45.73	16.42	27.75	2.47	Peak	0	400	VERTICAL
6	564.470	39.30	-6.70	46.00	45.97	18.60	28.10	2.83	Peak	0	400	VERTICAL
7	664.380	36.90	-9.10	46.00	42.61	18.89	28.04	3.44	Peak	0	400	VERTICAL

Note:

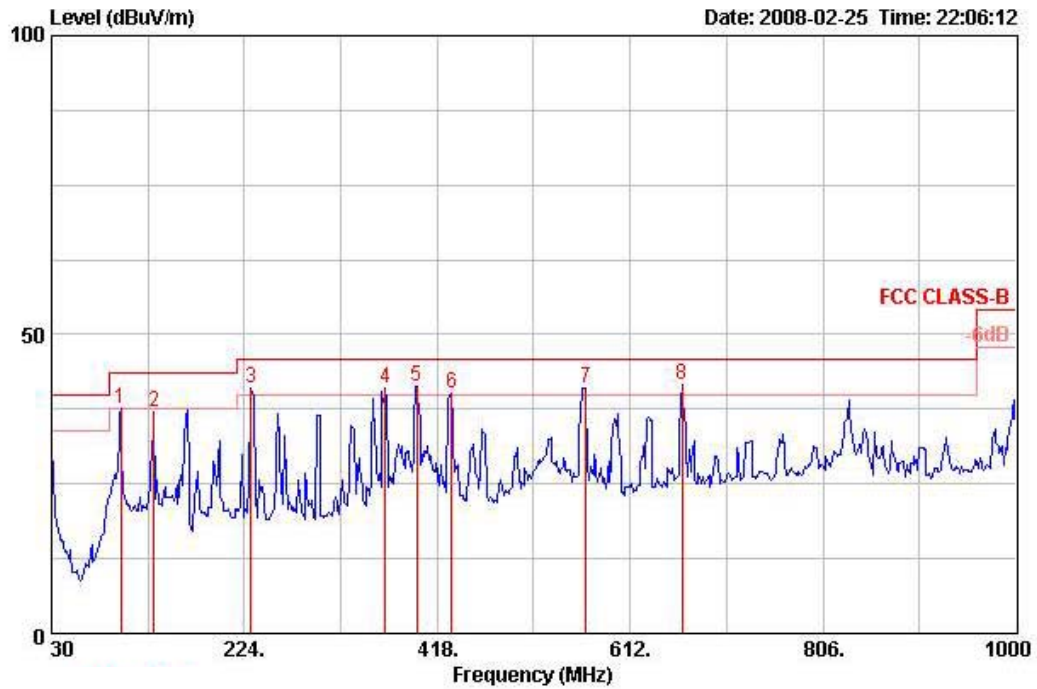
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

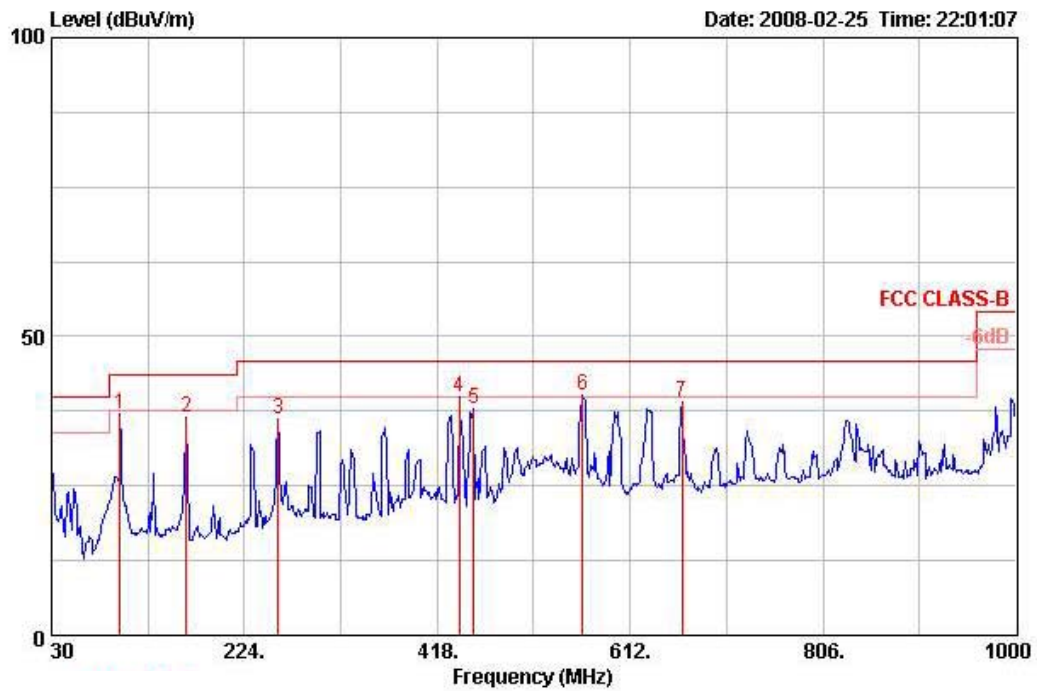
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Ant. D

Horizontal



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Table	Ant	
	MHz	dBUV/m	Limit	Line	Level	Factor	Factor	Loss	Pos	Pos	Pol/Phase
			dB	dBUV/m	dBuV	dB/m	dB	dB	deg	cm	
1	99.840	37.65	-5.85	43.50	53.80	10.25	27.60	1.20	0	100	HORIZONTAL
2	132.820	37.17	-6.33	43.50	51.91	11.37	27.43	1.33	0	100	HORIZONTAL
3	230.790	40.93	-5.07	46.00	56.43	9.71	27.04	1.82	0	100	HORIZONTAL
4	365.620	41.04	-4.96	46.00	51.59	14.58	27.36	2.23	0	100	HORIZONTAL
5	397.630	41.28	-4.72	46.00	50.78	15.79	27.58	2.30	0	100	HORIZONTAL
6	432.550	40.05	-5.95	46.00	48.94	16.37	27.76	2.50	0	100	HORIZONTAL
7	567.380	41.16	-4.84	46.00	47.80	18.62	28.10	2.83	0	100	HORIZONTAL
8	664.380	41.69	-4.31	46.00	47.39	18.89	28.04	3.44	339	158	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	98.870	37.05	-6.45	43.50	53.37	10.10	27.61	1.18	Peak	0	400	VERTICAL
2	165.800	36.55	-6.95	43.50	53.47	8.82	27.27	1.53	Peak	0	400	VERTICAL
3	257.950	36.23	-9.77	46.00	48.80	12.48	26.98	1.93	Peak	0	400	VERTICAL
4	440.310	40.03	-5.97	46.00	48.99	16.30	27.80	2.54	Peak	0	400	VERTICAL
5	454.860	37.80	-8.20	46.00	46.76	16.30	27.87	2.61	Peak	0	400	VERTICAL
6	564.470	40.05	-5.95	46.00	46.73	18.60	28.10	2.83	Peak	0	400	VERTICAL
7	664.380	39.00	-7.00	46.00	44.71	18.89	28.04	3.44	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.

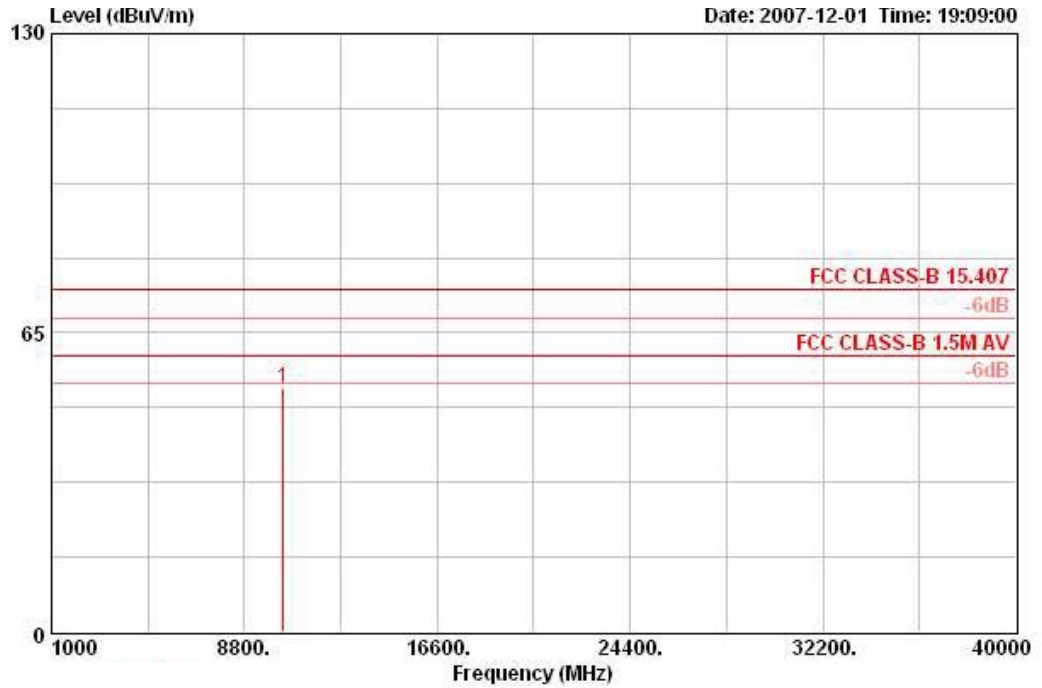
Emission level (dBUV/m) = 20 log Emission level (uV/m).

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

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

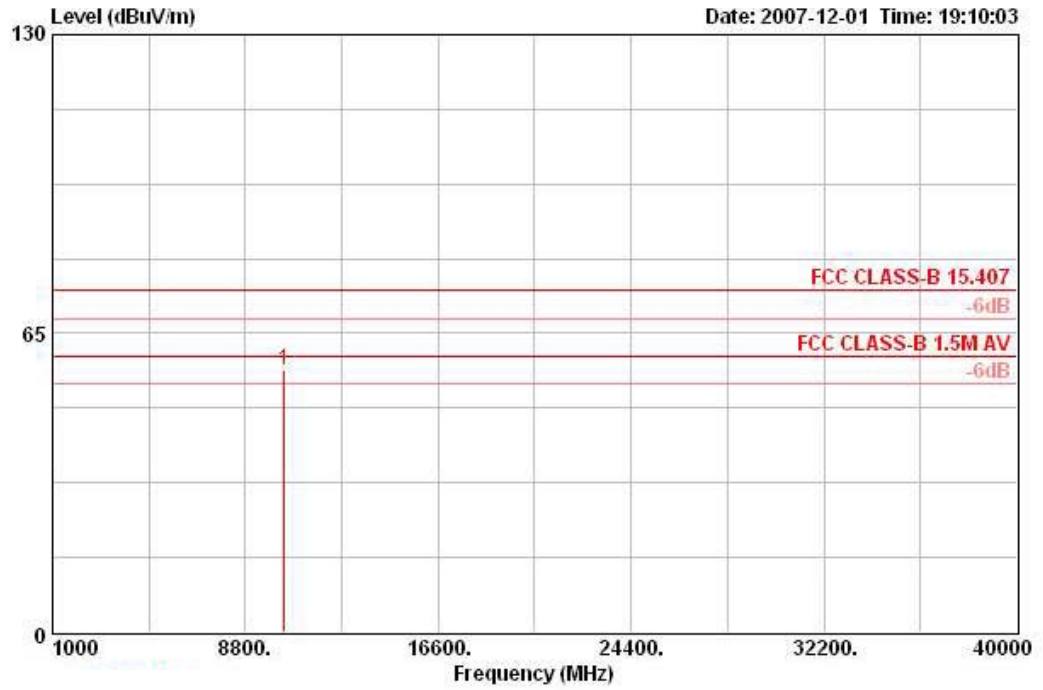
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 20MHz Ch 36 / Ant. B

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	10363.540	52.86	-21.44	74.30	39.51	38.49	35.36	10.22	PEAK	0	100	HORIZONTAL

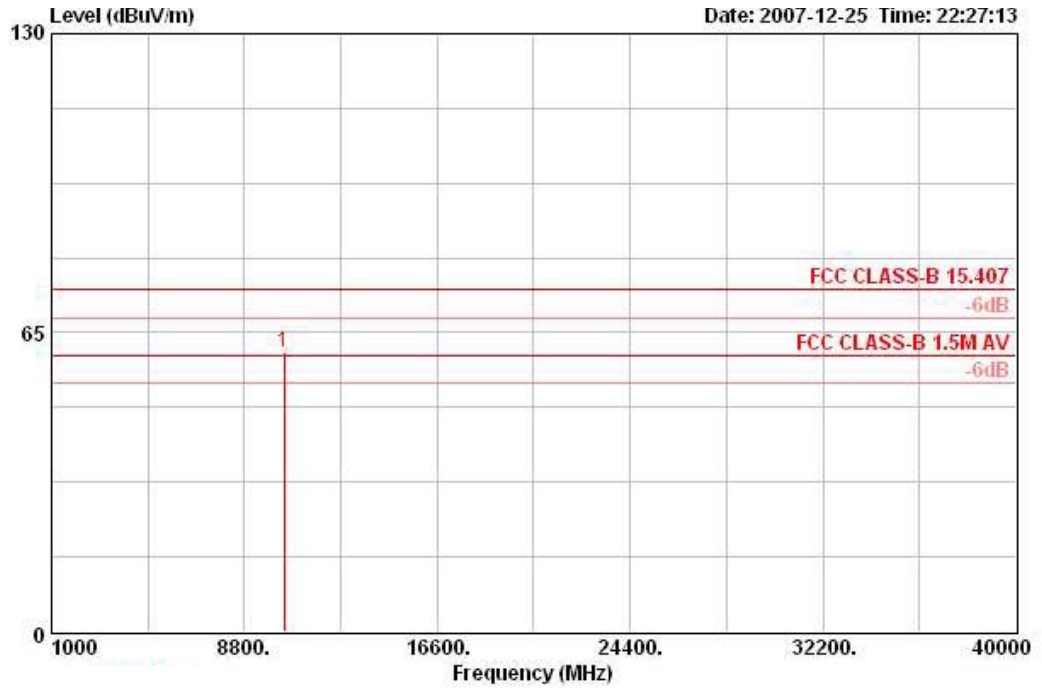
Vertical



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Table	Ant
	MHz	dBuV/m	dB	dBuV/m	Level	Factor	Factor	Loss	Pos	Pos
					dBuV	dB/m	dB	dB	deg	cm
1	10356.140	57.02	-17.28	74.30	43.68	38.48	35.36	10.22	360	100
										VERTICAL

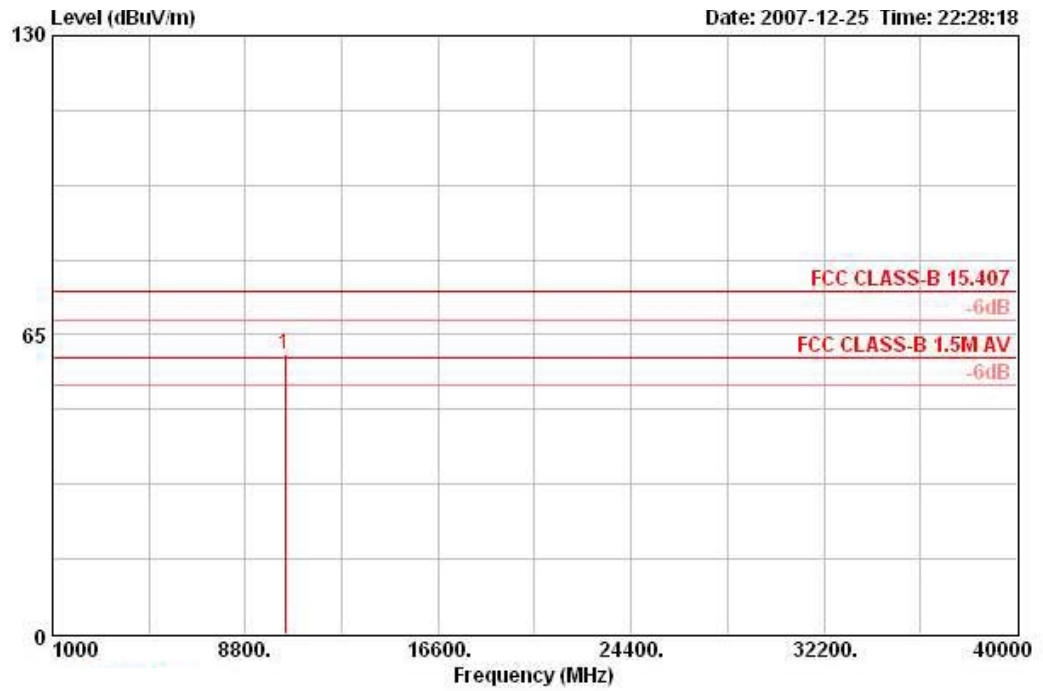
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 20MHz Ch 40 / Ant. B

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	10397.900	60.67	-13.63	74.30	47.18	38.52	35.30	10.27	PEAK	294	113	HORIZONTAL

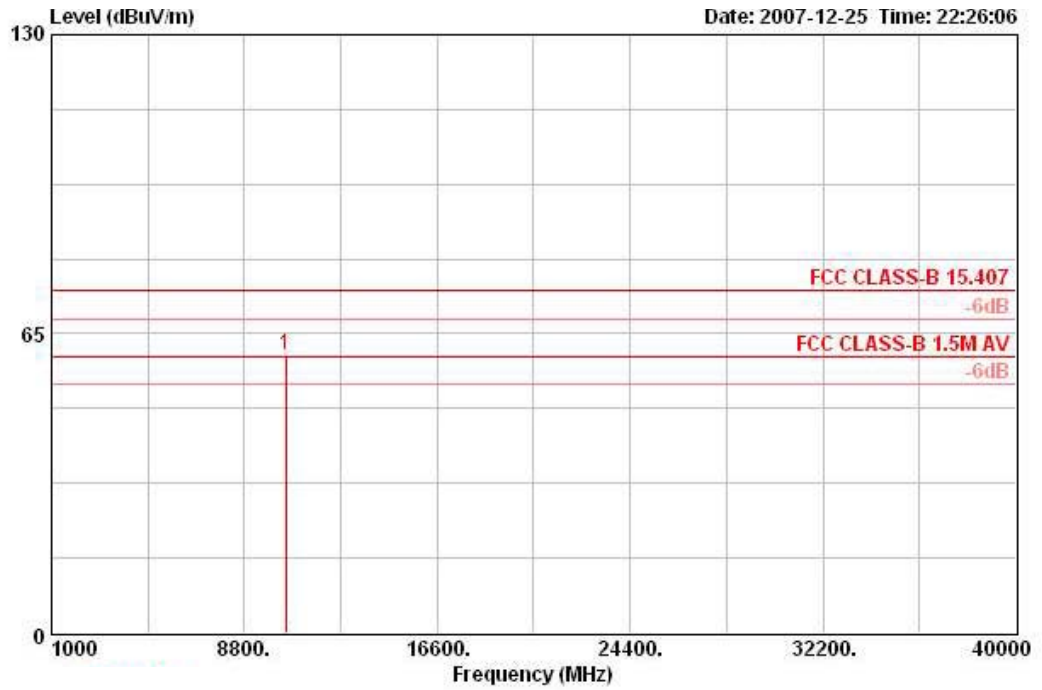
Vertical



1	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	
	10400.720	60.66	-13.64	74.30	47.17	38.52	35.30	10.27	PERK	312	105	VERTICAL

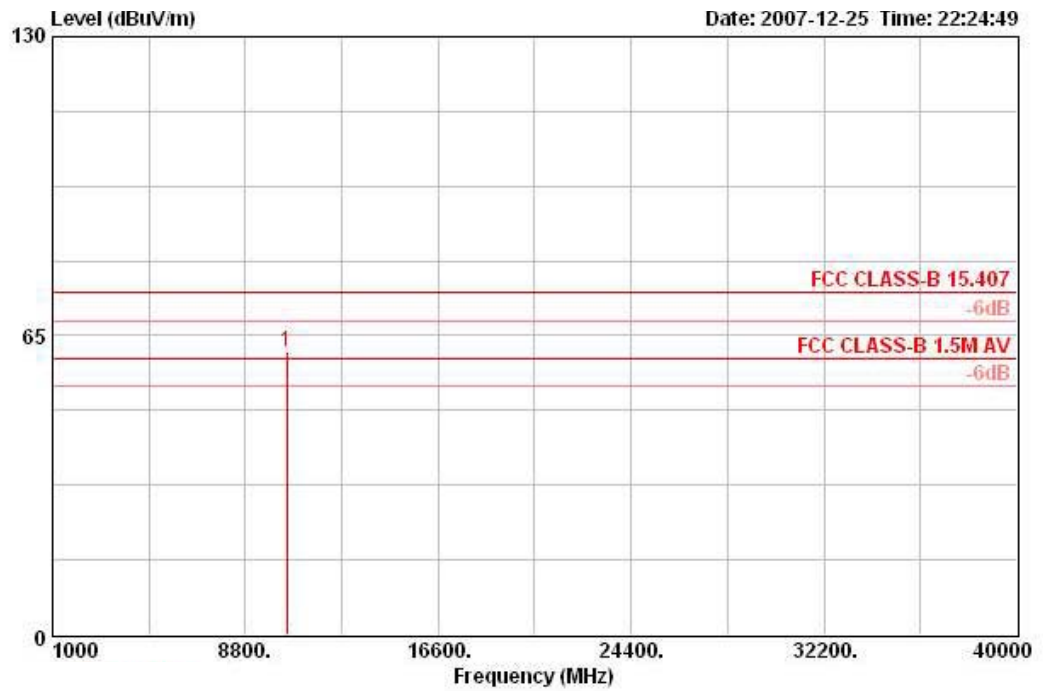
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 20MHz Ch 48 / Ant. B

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	10478.740	60.42	-13.88	74.30	46.70	38.59	35.21	10.35	PEAK	300	112	HORIZONTAL

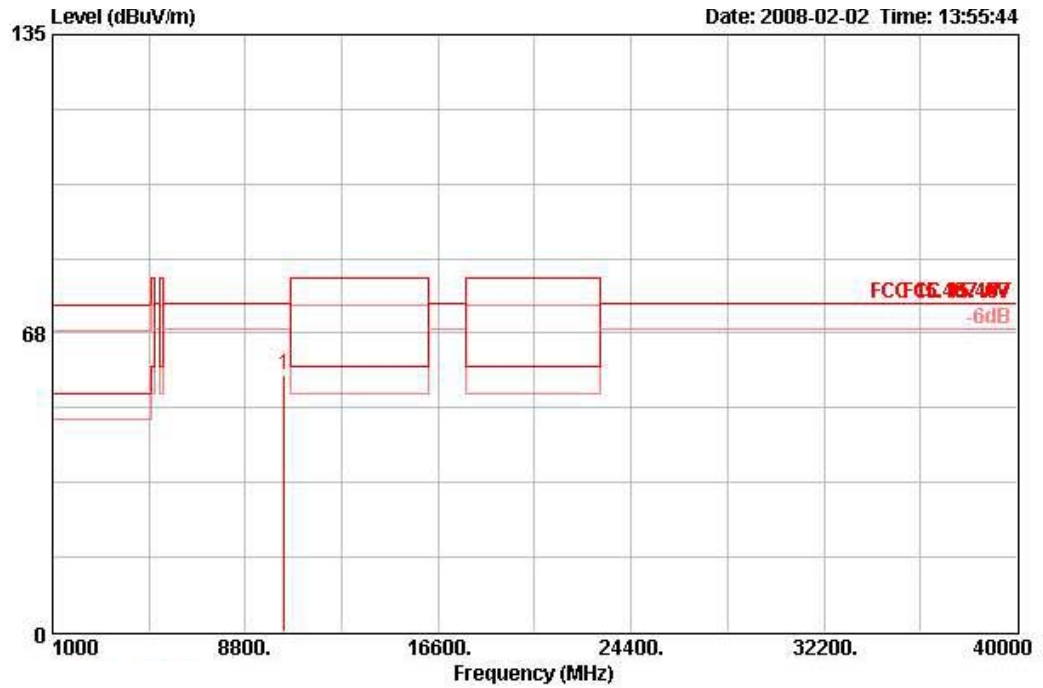
Vertical



1	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	
	10478.000	61.44	-12.86	74.30	47.72	38.59	35.21	10.35	PEAK	274	100	VERTICAL

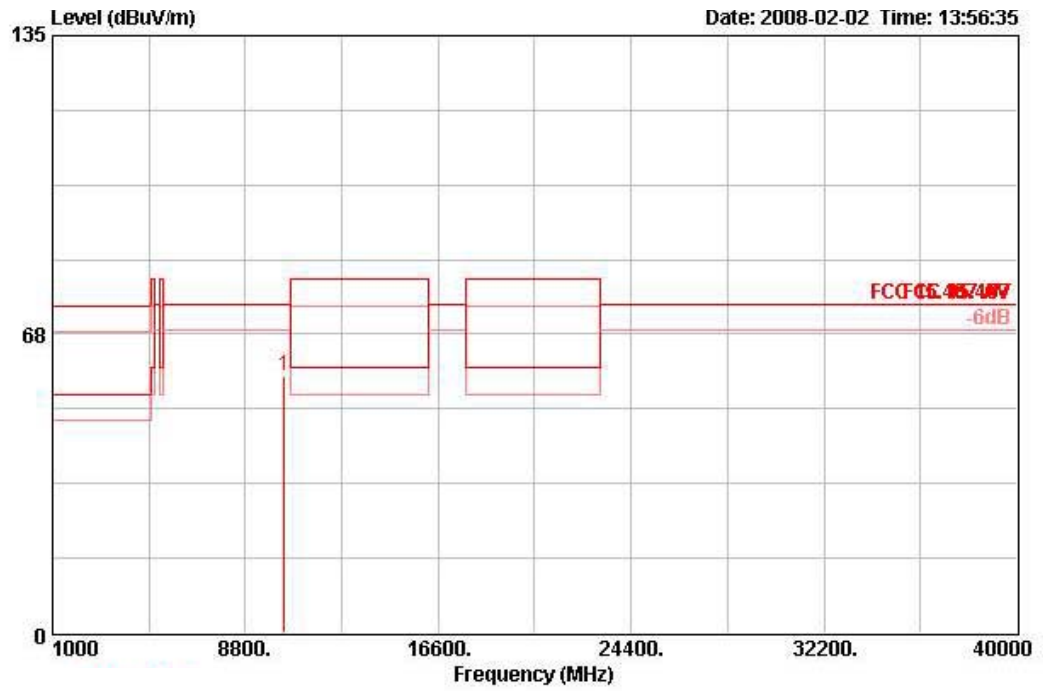
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 20MHz Ch 36 / Ant. D

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	10358.410	58.25	-16.05	74.30	44.92	38.48	35.36	10.22	PEAK	0	100	HORIZONTAL

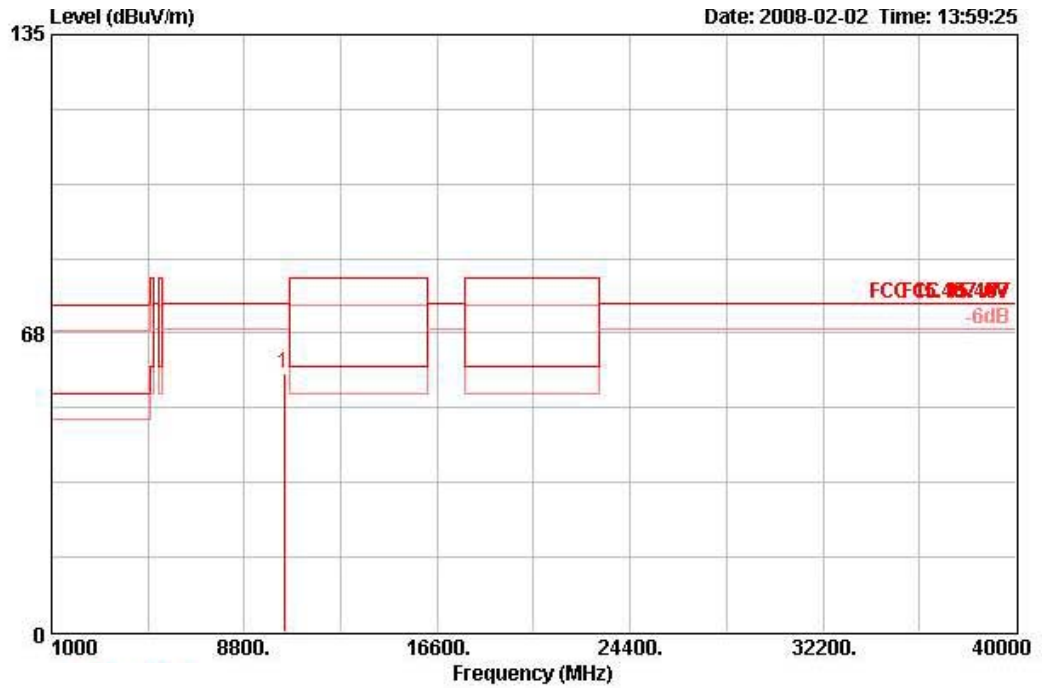
Vertical



	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	10359.000	58.18	-16.12	74.30	44.83	38.49	35.36	10.22	PEAK	360	100	VERTICAL

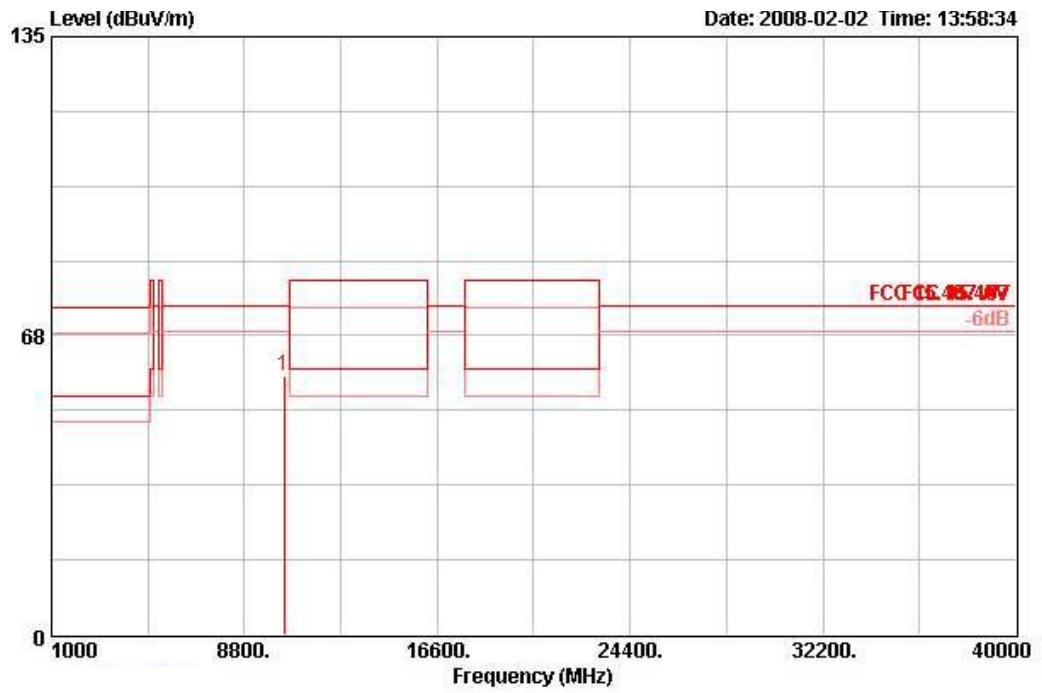
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 20MHz Ch 40 / Ant. D

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	10400.150	58.53	-15.77	74.30	45.04	38.52	35.30	10.27	PEAK	360	100	HORIZONTAL

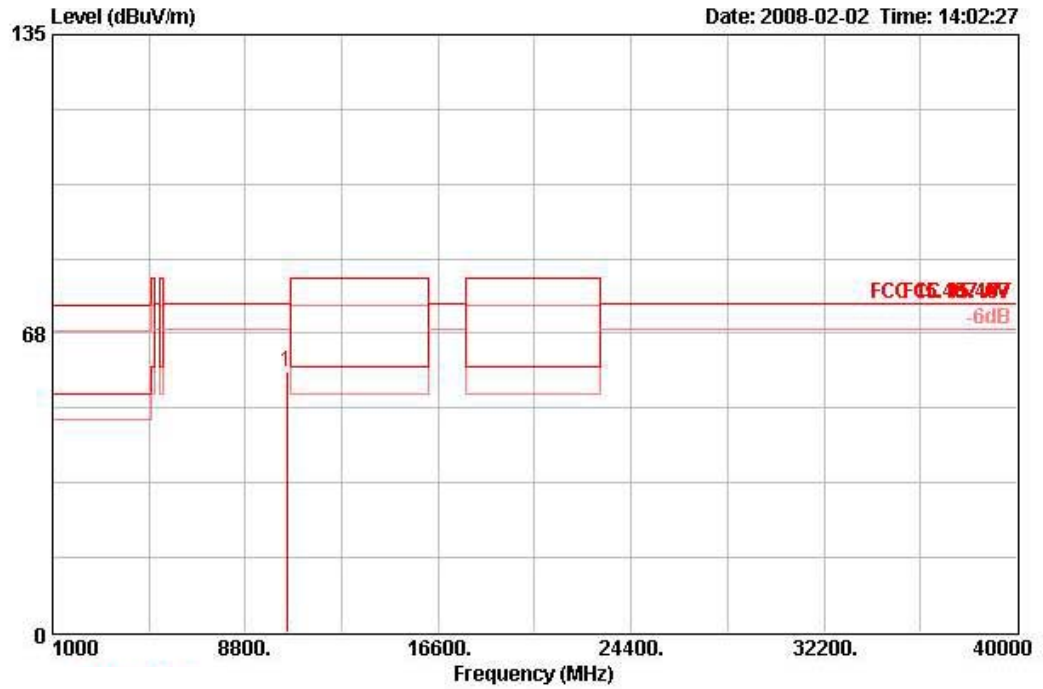
Vertical



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Table	Ant
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		Pos	Pos
										deg	cm
1	10399.590	58.31	-15.99	74.30	44.83	38.52	35.30	10.27	PEAK	0	100 VERTICAL

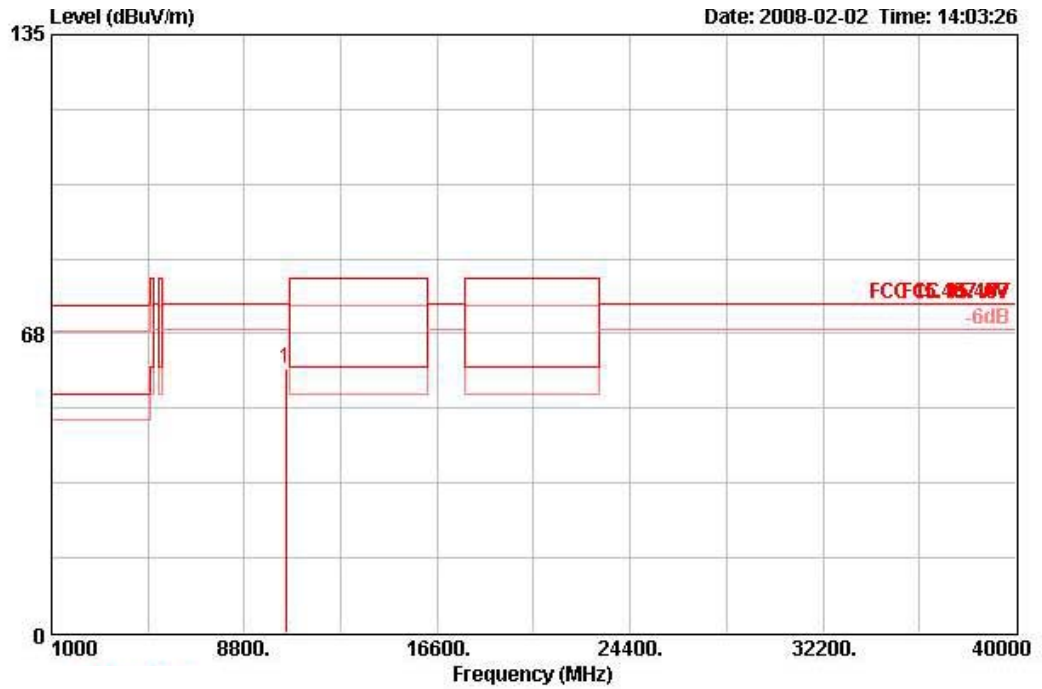
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draff n MCS16 20MHz Ch 48 / Ant. D

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	10481.910	58.91	-15.39	74.30	45.19	38.59	35.21	10.35	PEAK	0	100	HORIZONTAL

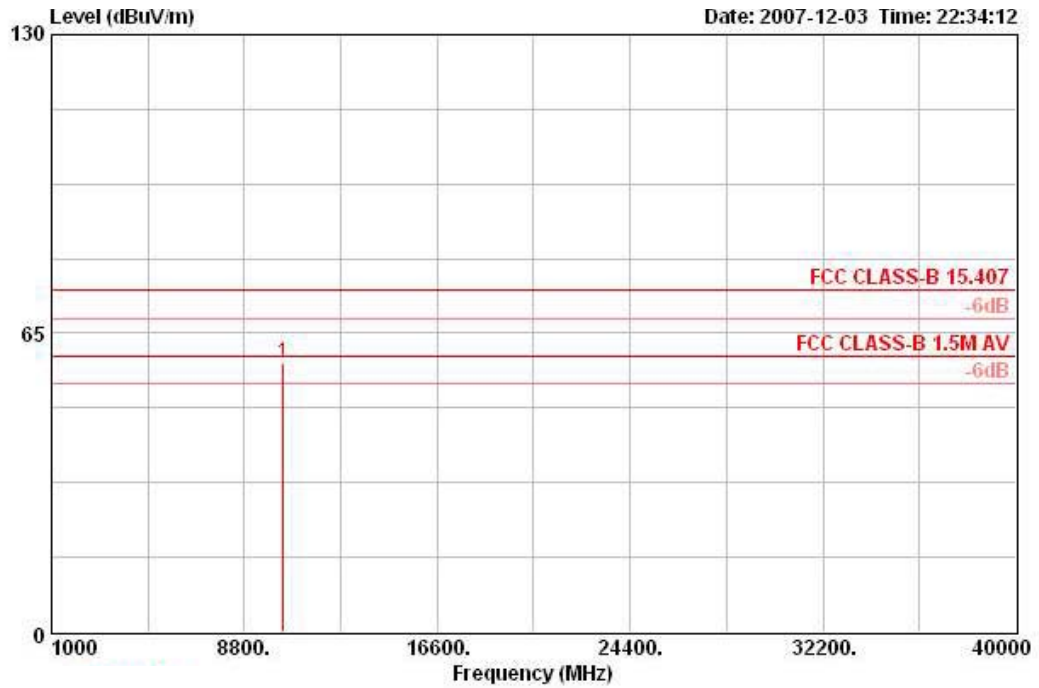
Vertical



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Table	Ant
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		Pos	Pos
										deg	cm
1	10481.100	59.77	-14.53	74.30	46.05	38.59	35.21	10.35	PEAK	360	100 VERTICAL

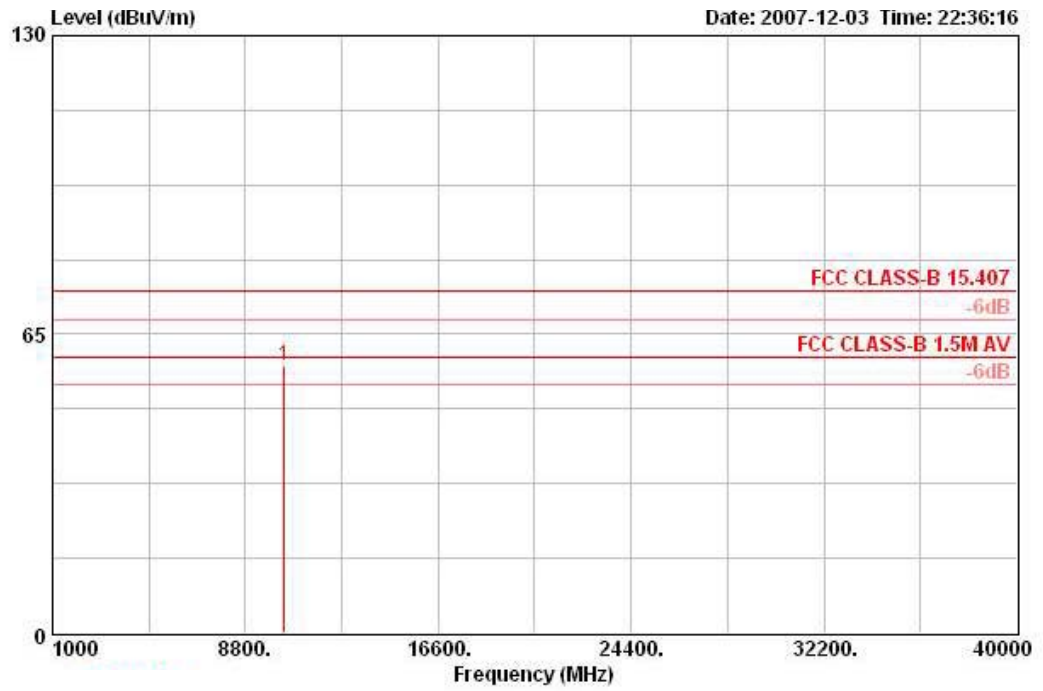
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 40MHz Ch 38 / Ant. B

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	10381.280	58.70	-15.60	74.30	45.28	38.51	35.33	10.25	PEAK	0	100	HORIZONTAL

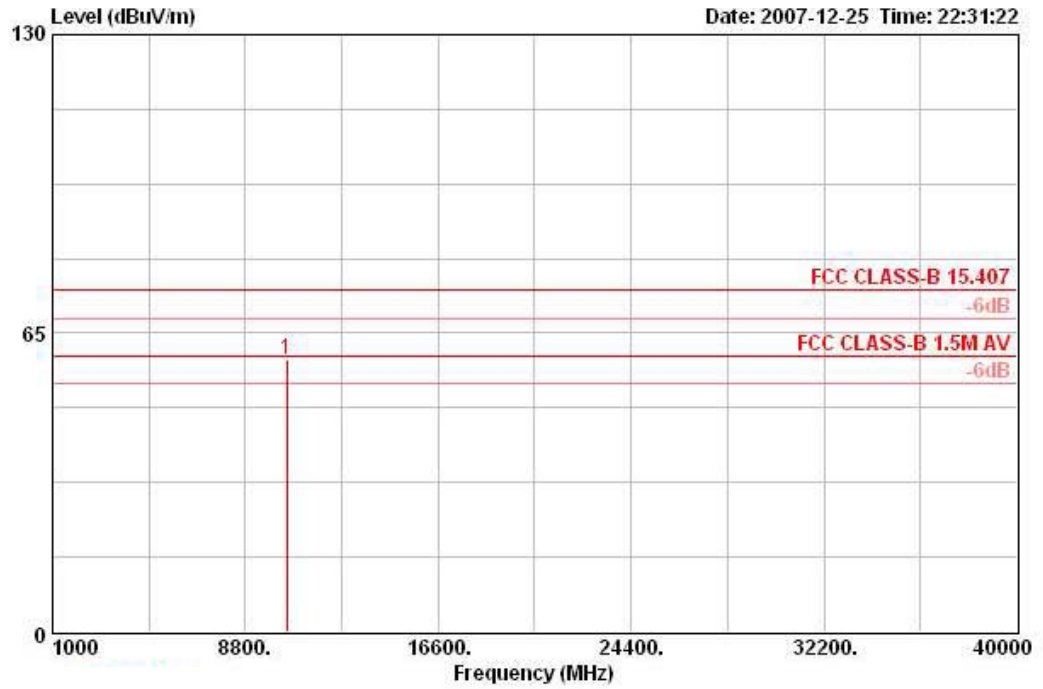
Vertical



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Table	Ant
	MHz	dBuV/m	dB	dBuV/m	Level	Factor	Factor	Loss	Pos	Pos
					dBuV	dB/m	dB	dB	deg	cm
1	10384.980	58.21	-16.09	74.30	44.79	38.51	35.33	10.25	266	100
										VERTICAL

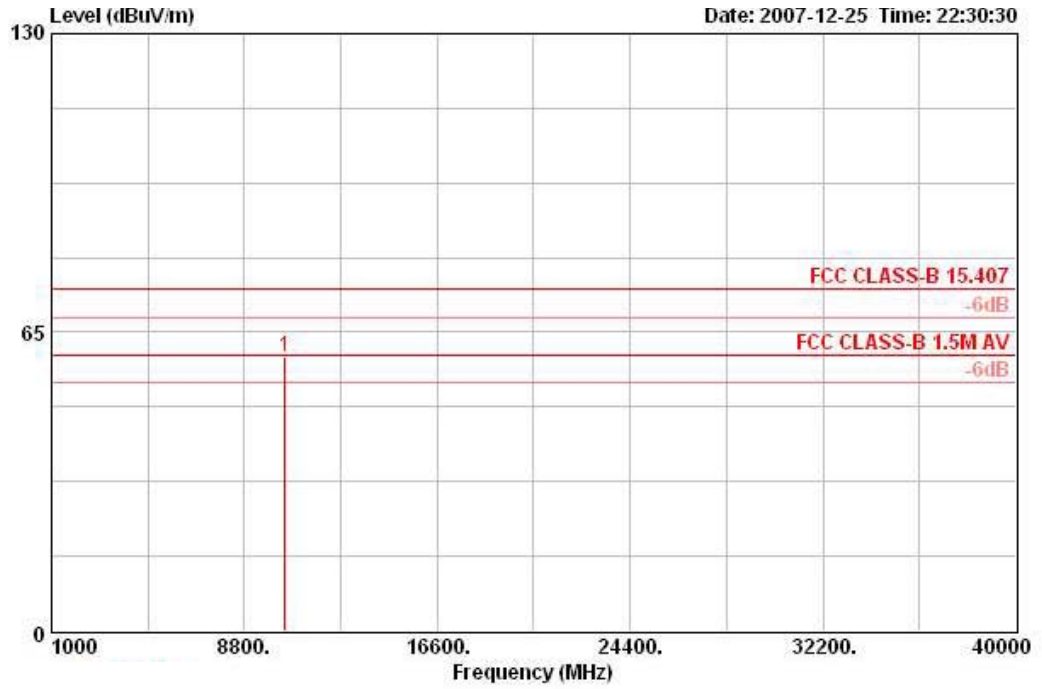
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 40MHz Ch 46 / Ant. B

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	10460.220	59.23	-15.07	74.30	45.59	38.56	35.24	10.32	PEAK	300	100	HORIZONTAL

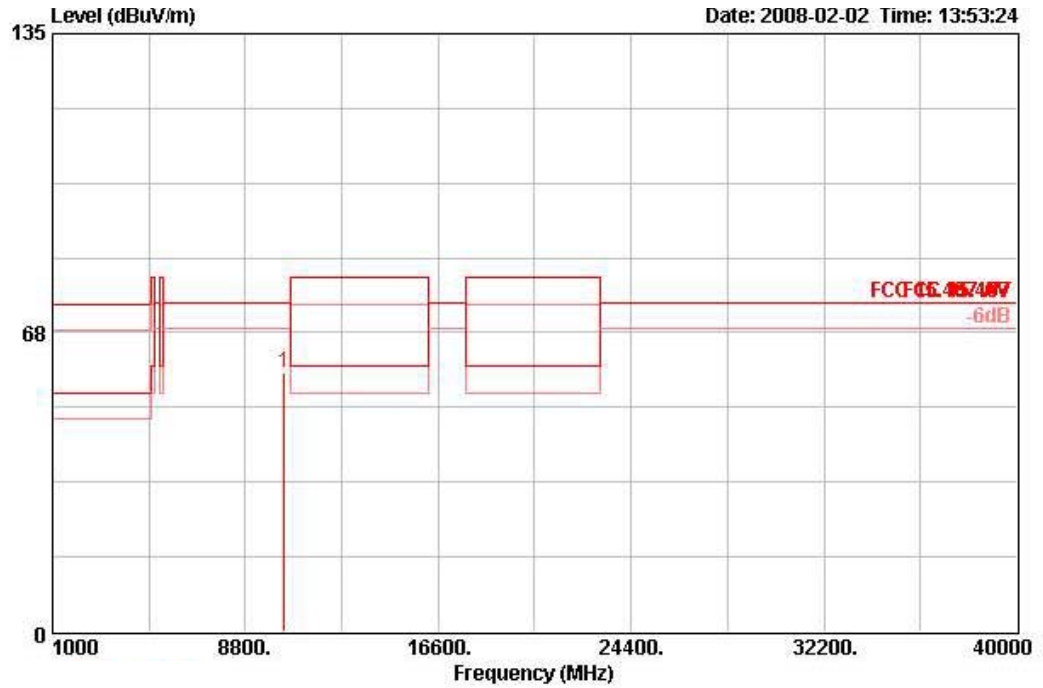
Vertical



1	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	10456.280	59.70	-14.60	74.30	46.06	38.56	35.24	10.32	PEAK	272	100	VERTICAL

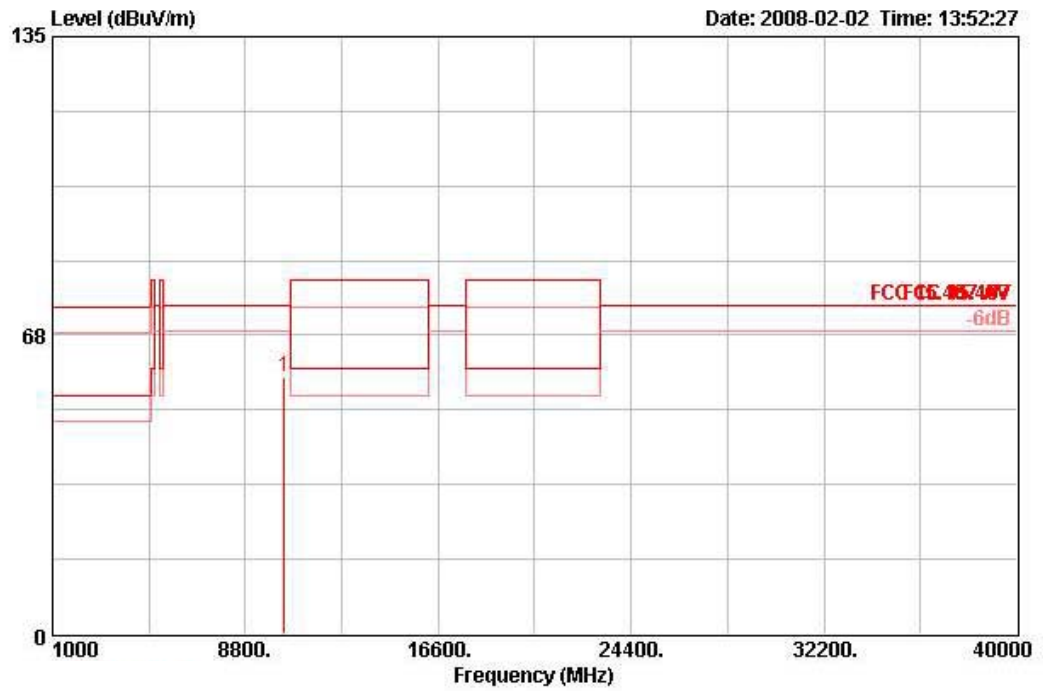
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 40MHz Ch 38 / Ant. D

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	10382.140	58.65	-15.65	74.30	45.23	38.51	35.33	10.25	PEAK	360	100	HORIZONTAL

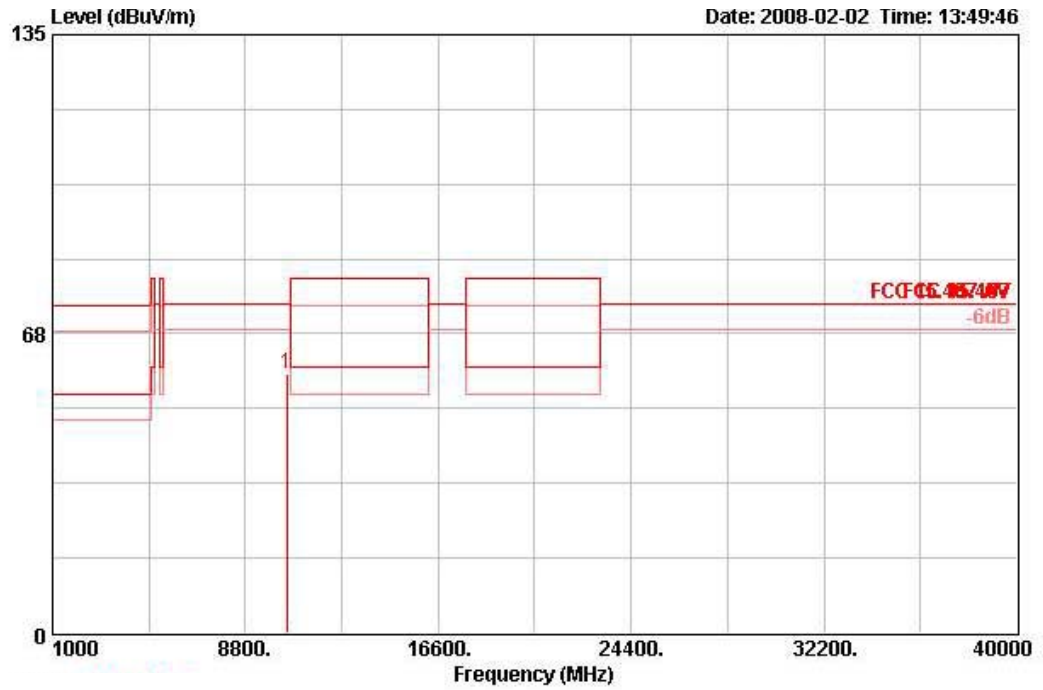
Vertical



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Table	Ant
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		Pos	Pos
										deg	cm
1	10378.540	57.90	-16.40	74.30	44.48	38.51	35.33	10.25	PERK	0	100 VERTICAL

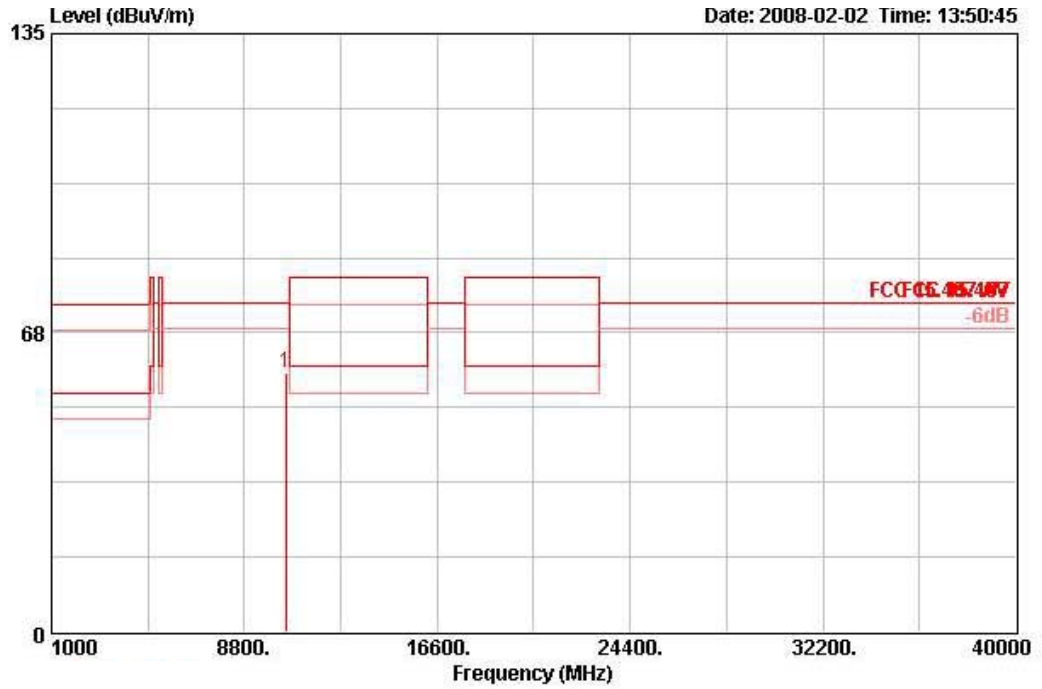
Temperature	26°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Draft n MCS16 40MHz Ch 46 / Ant. D

Horizontal



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Table	Ant
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		deg	cm
1	10459.150	58.46	-15.84	74.30	44.83	38.56	35.24	10.32	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	10462.460	58.50	-15.80	74.30	44.84	38.57	35.24	10.32	PERK	360	100	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.

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

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