SPORTON International Inc.
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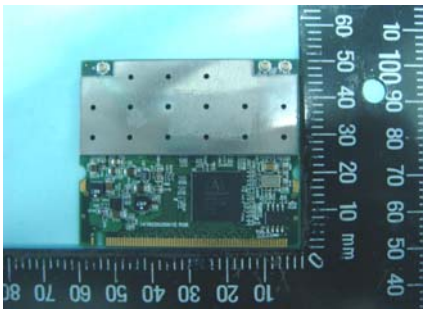
FCC RADIO TEST REPORT

Applicant's company	**Motorola, Inc.**
Applicant Address	One Motorola Plaza Holtsville, NY 11742 USA
FCC ID	**UZ7AP7131**
Manufacturer's company	**Joy Technology(ShenZhen) Corporation**
Manufacturer Address	Hengkeng Ind., Shanpai, shangwu, Aiqun Rd., Shiyan Town, Shenzhen, 518108 ,China

Product Name	11 a/b/g/n Access Point Module
Brand Name	Motorola
Model Name	AP-7131-MB82
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250MHz
Received Date	Feb. 15, 2008
Final Test Date	Apr. 2, 2008
Submission Type	Original Equipment
Operating Mode	Master



Statement

Test result included is only for the 802.11a (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

Table of Contents

History of This Test Report

Original Issue Date: May 22, 2008

Report No.: FR821502AA

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	11 a/b/g/n Access Point Module
Brand Name	:	Motorola
Model Name	:	AP-7131-MB82
Applicant	:	Motorola, 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 Feb. 15, 2008 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

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	13.00 dB
4.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.44 dB
4.4	15.407(a)	Power Spectral Density	Complies	2.15 dB
4.5	15.407(a)	Peak Excursion	Complies	6.10 dB
4.6	15.407(b)	Radiated Emissions	Complies	1.21 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.16 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

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

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5150 ~ 5250MHz
Channel Number	11a: 4
Channel Band Width (99%)	11a: 17.94MHz
Conducted Output Power	Band 1: 16.56 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Three (TX)	
Band width Mode	20 MHz	40 MHz
11a	V	X

3.2. Accessories

N/A

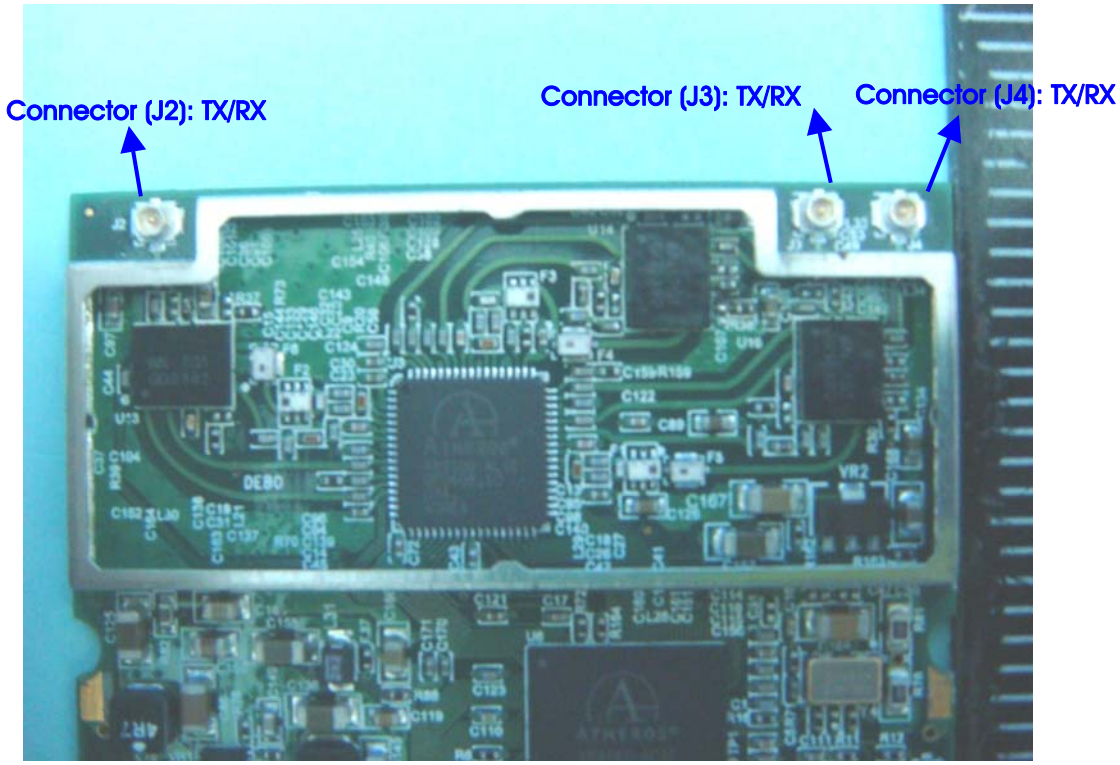
3.3. Table for Filed Antenna

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	SYMBOL	ML-2452-APA2-01R	Dipole Antenna	Reversed-SMA	4
5	SYMBOL	ML-2452-APA2-FAC	embedded Antenna	Reversed-SMA	4.5
6	SYMBOL	ML-5299-WPNA1-01	Patch Antenna	Reversed-SMA	13
7	SYMBOL	ML-5299-HPA1-01	Omni Antenna	Reversed-SMA	5

Note : The EUT has four antennas.

Connect (J2) & Connect (J3) & Connect (J4) could Receiver / Transmitter simultaneously.



3.4. Table for Carrier Frequencies

Frequency Allocation for 802.11a

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 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	-	1, 5, 6, 7
Max. Conducted Output Power	Band 1/BPSK	6Mbps	36/40/48	1, 5, 6, 7
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	Band 1/BPSK	6Mbps	36/40/48	1, 5, 6, 7
Radiated Emission Below 1GHz	Normal Link	Auto	-	1, 5, 6, 7
Radiated Emission Above 1GHz	Band 1/BPSK	6Mbps	36/40/48	1, 5, 6, 7
Band Edge Emission	Band 1/BPSK	6Mbps	36/40/48	1, 5, 6, 7
Frequency Stability	Un-modulation	-	40	1, 5, 6, 7

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
Notebook	DELL	D505	E2K24GBRL
Modem	ACEEX	DM1414	IFAXDM1414
Mouse	QSKY	Lx-619B	DOC
Printer	EPSON	LQ-300+	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.

For Antenna 1

Power Parameters of IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	11.5	11.5	12

For Antenna 5

Power Parameters of IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	11.5	11.5	12

For Antenna 6

Power Parameters of IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	4.5	4.5	5

For Antenna 7

Power Parameters of IEEE 802.11a

Test Software Version	ART		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	11.5	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 :

a. Turn on the power of all equipment.

b. The NB sends " H" messages to the panel, and the panel displays " H " patterns on the screen.

c. The NB sends " H " messages to the printer, then the printer prints them on the paper.

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

e. Repeat the steps from b to d.

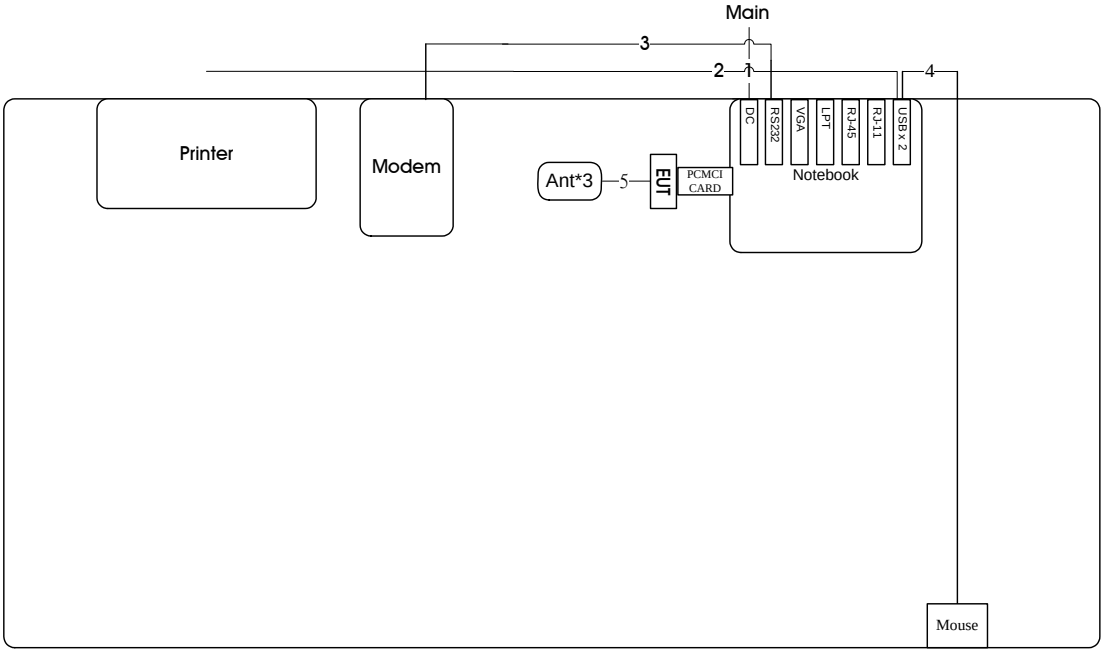
At the same time, "ART" was executed to control the EUT continuously transmit RF signal.

3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

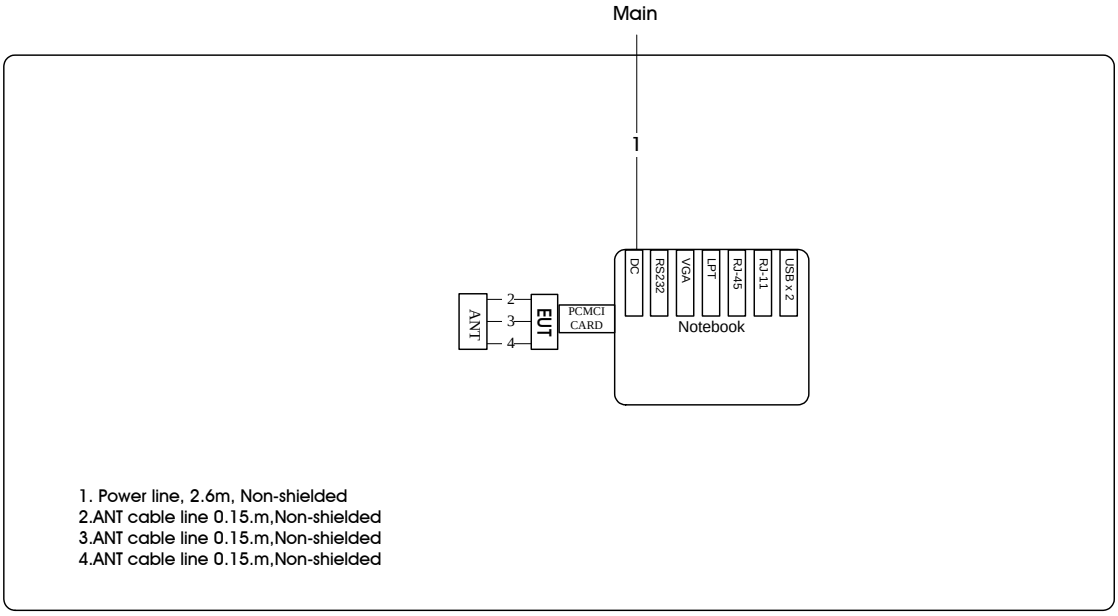
Antenna 1

Test configuration: 9kHz ~1GHz



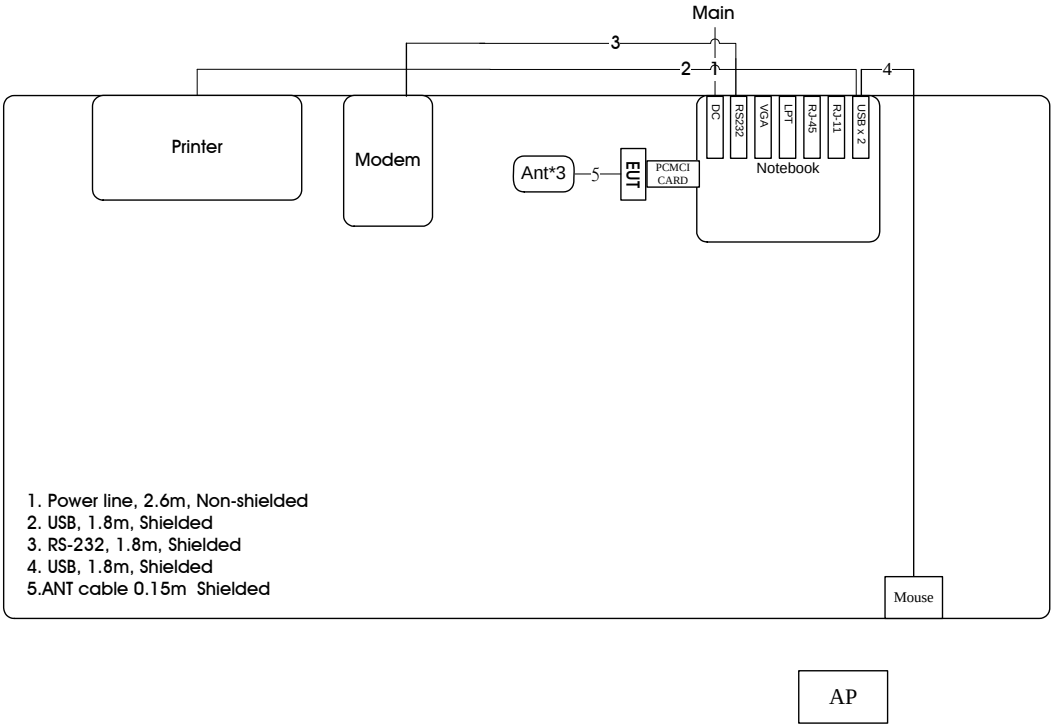
AP

Test configuration: Above 1GHz

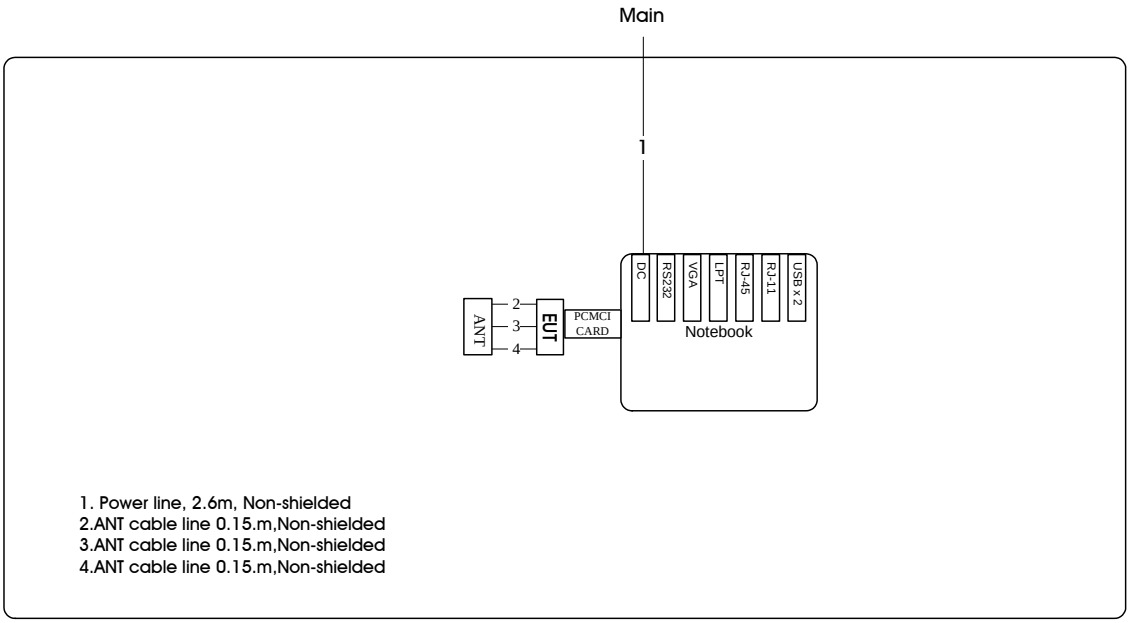


Antenna 5

Test configuration: 9kHz ~1GHz

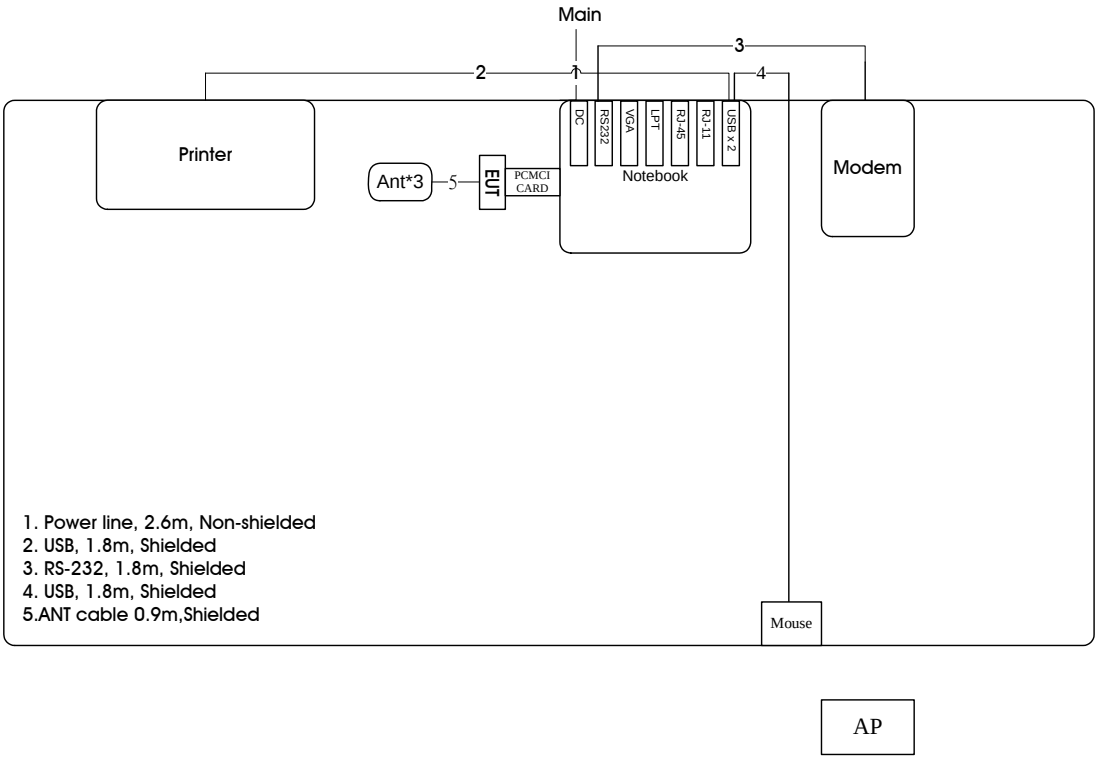


Test configuration: Above 1GHz

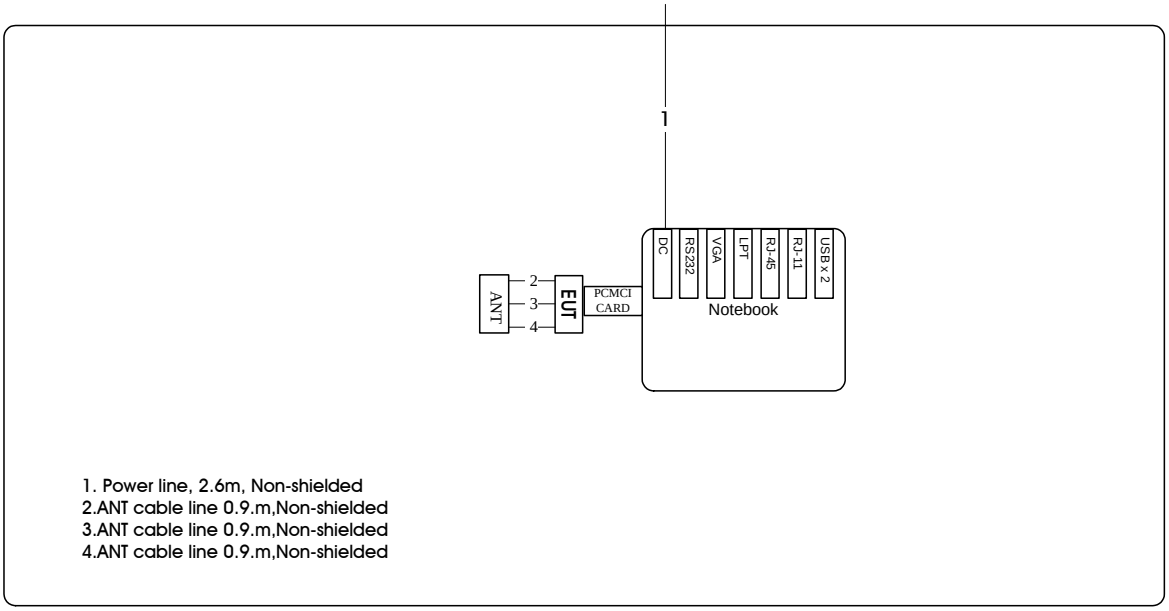


Antenna 6

Test configuration: 9kHz ~1GHz

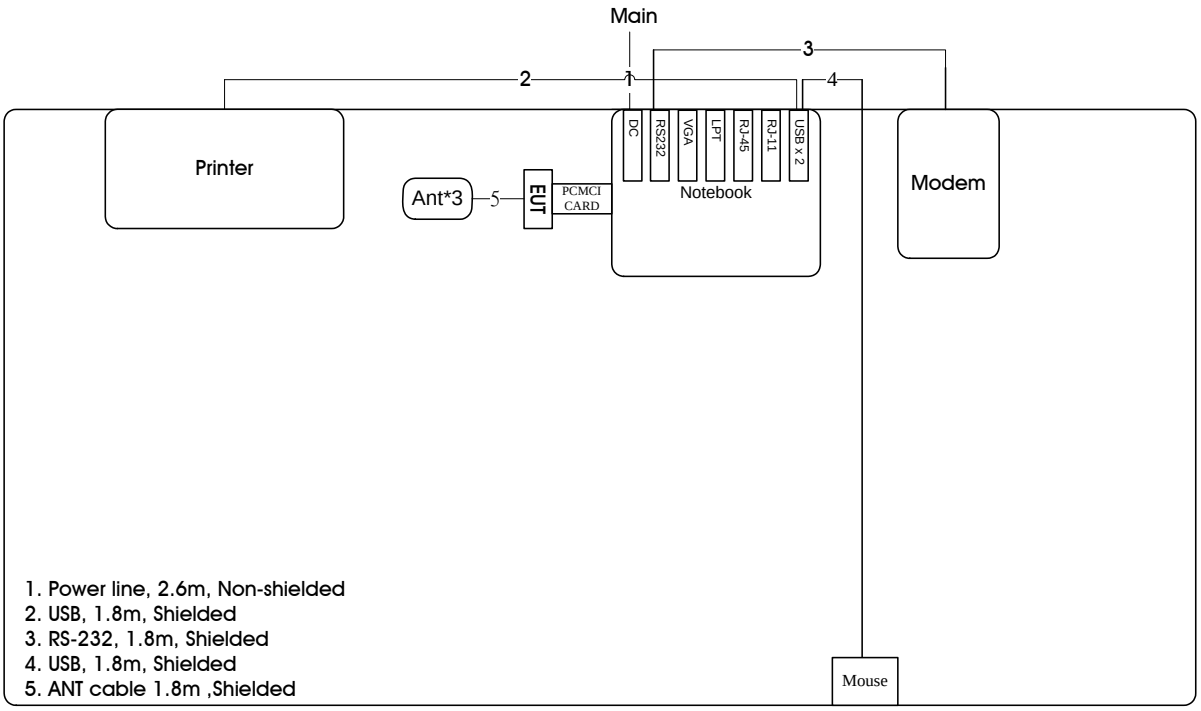


Test configuration: Above 1GHz



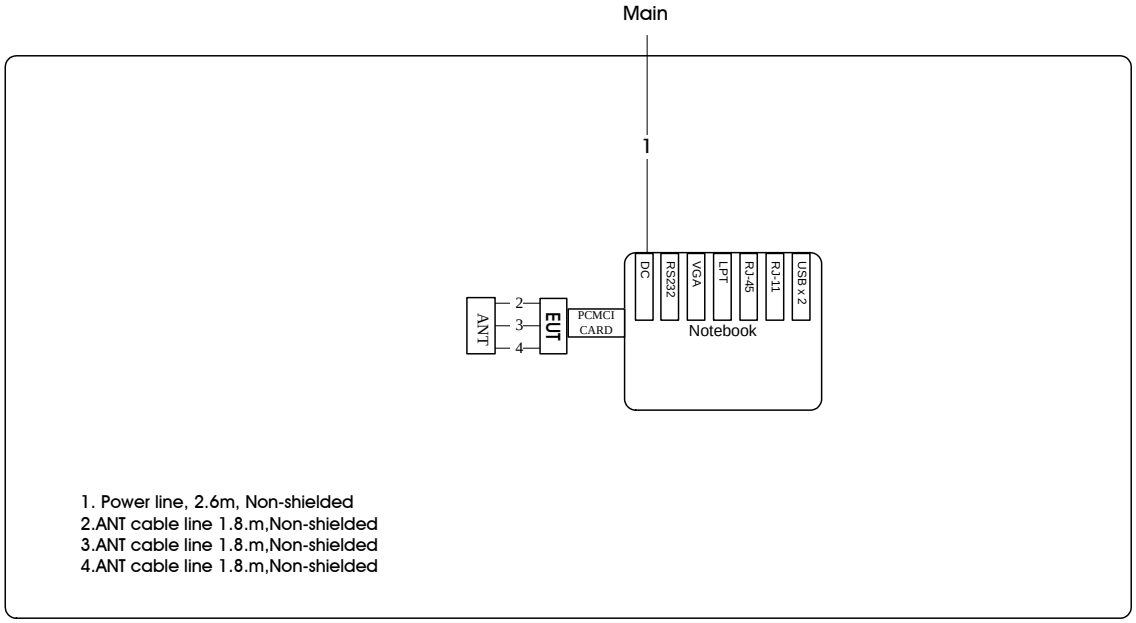
Antenna 7

Test configuration: 9kHz ~1GHz



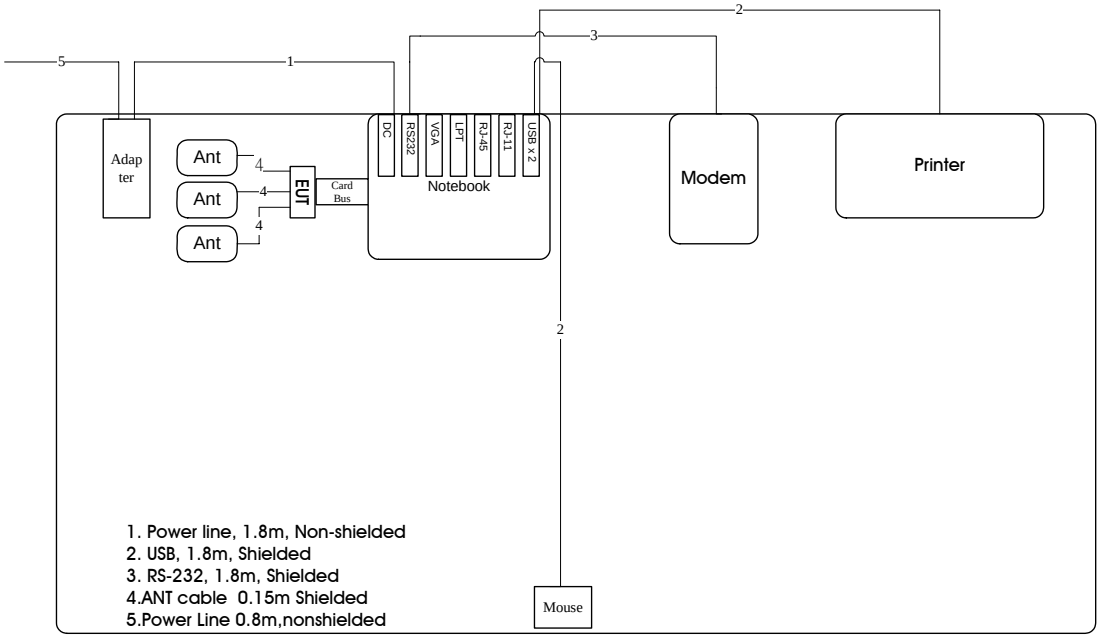
AP

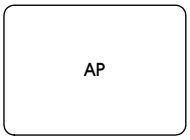
Test configuration: Above 1GHz



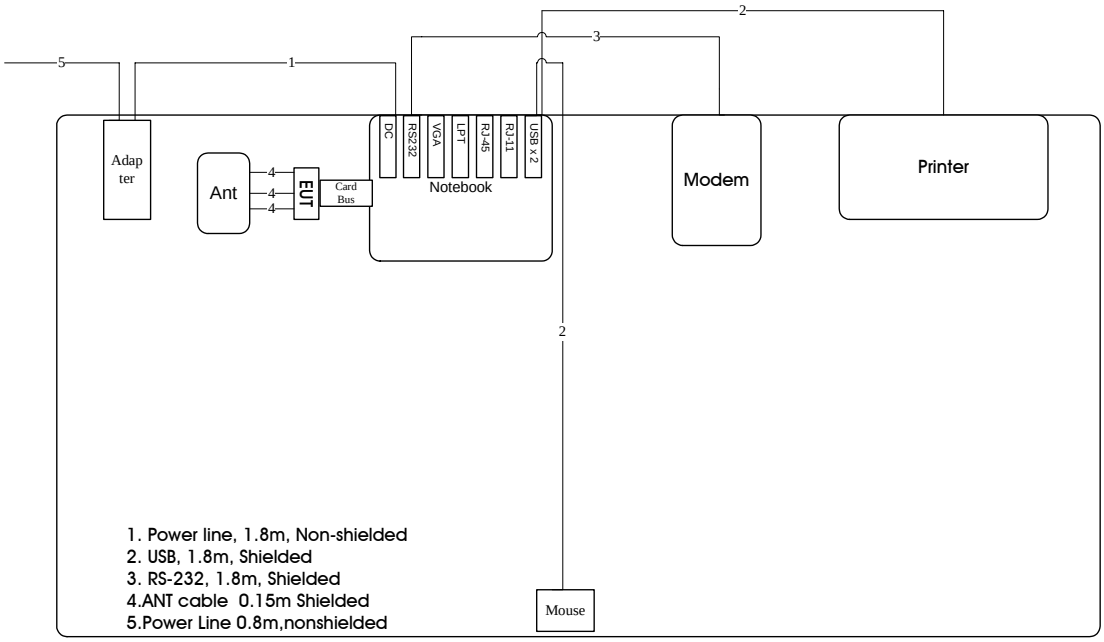
3.9.2. AC Power Line Conduction Emissions Test Configuration

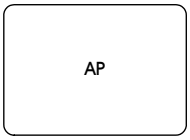
Antenna 1



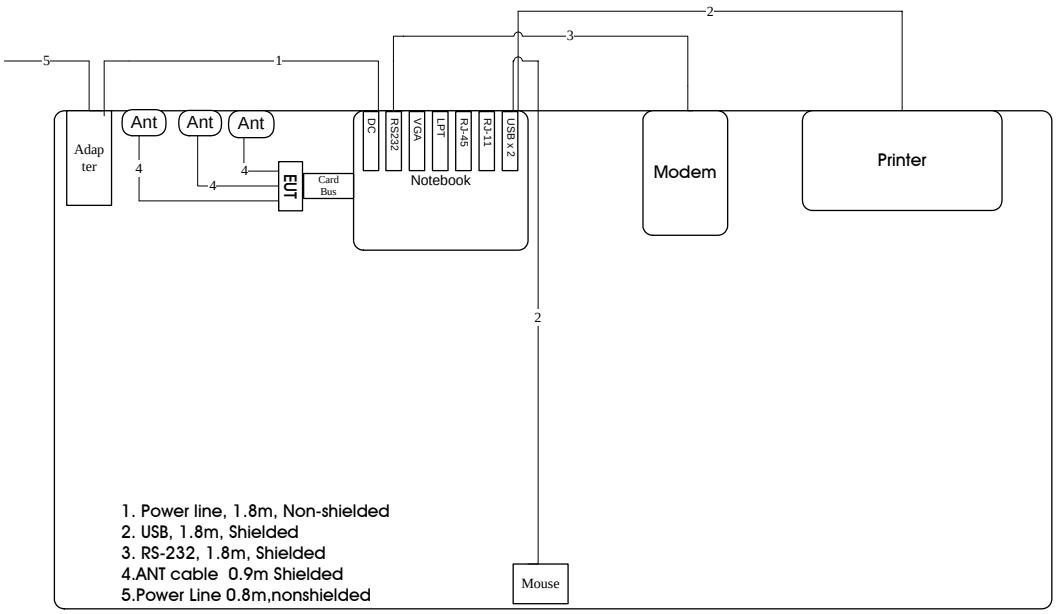


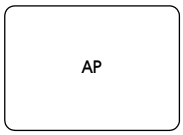
Antenna 5



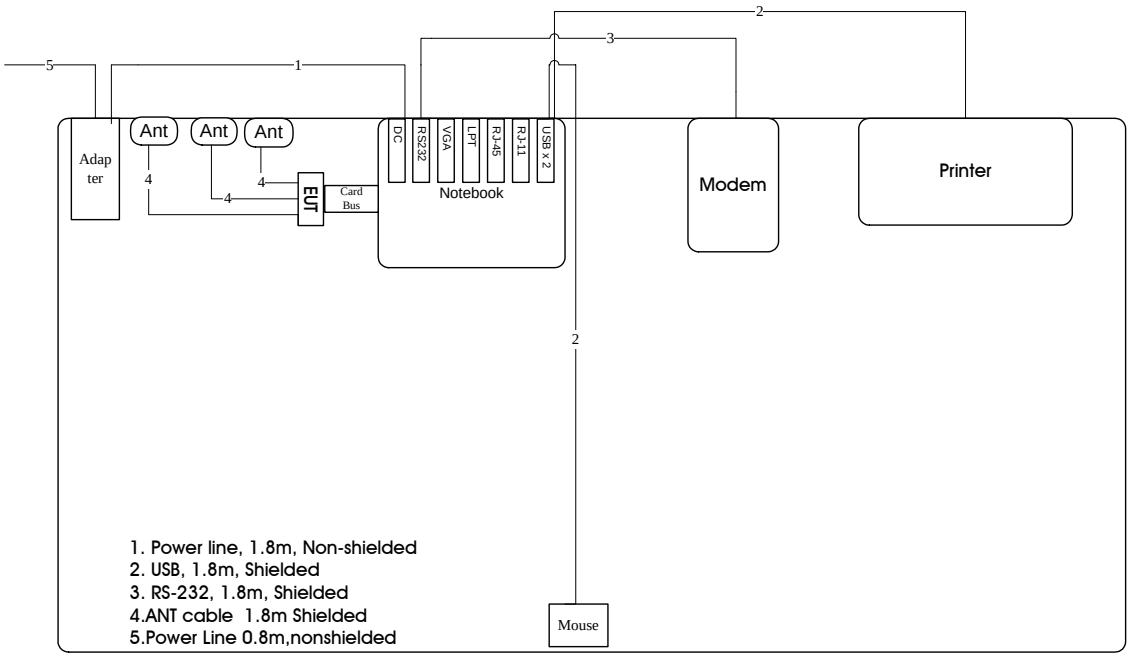


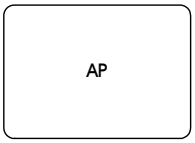
Antenna 6





Antenna 7





4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

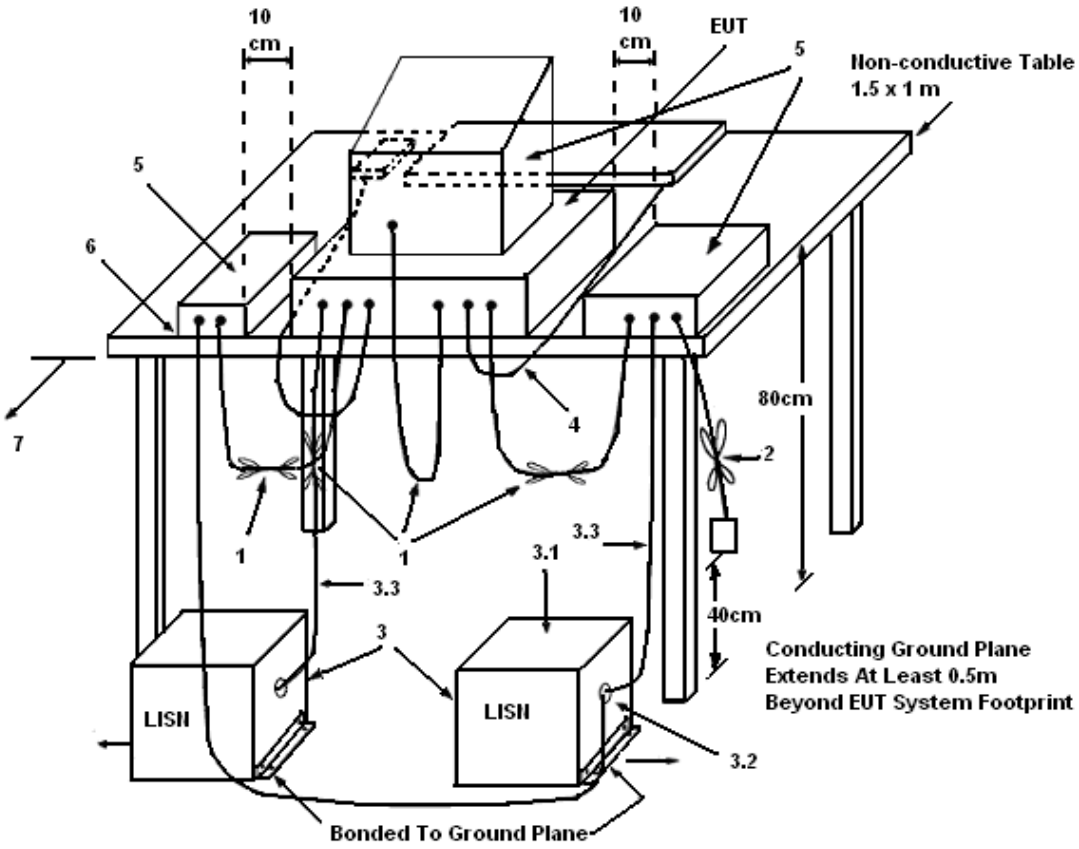
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

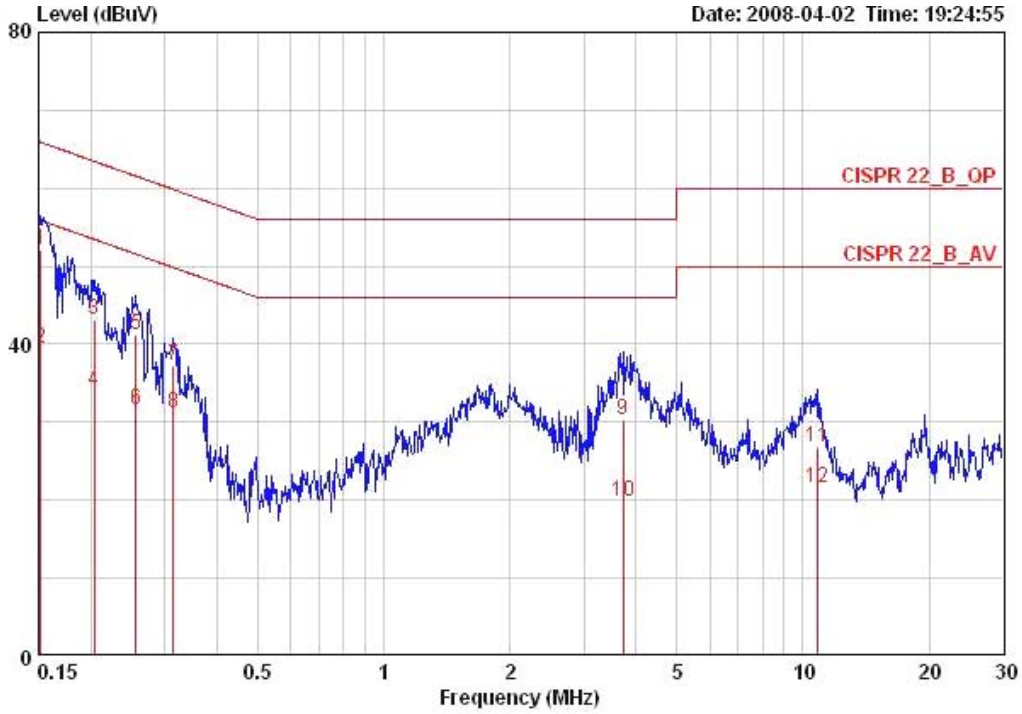
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

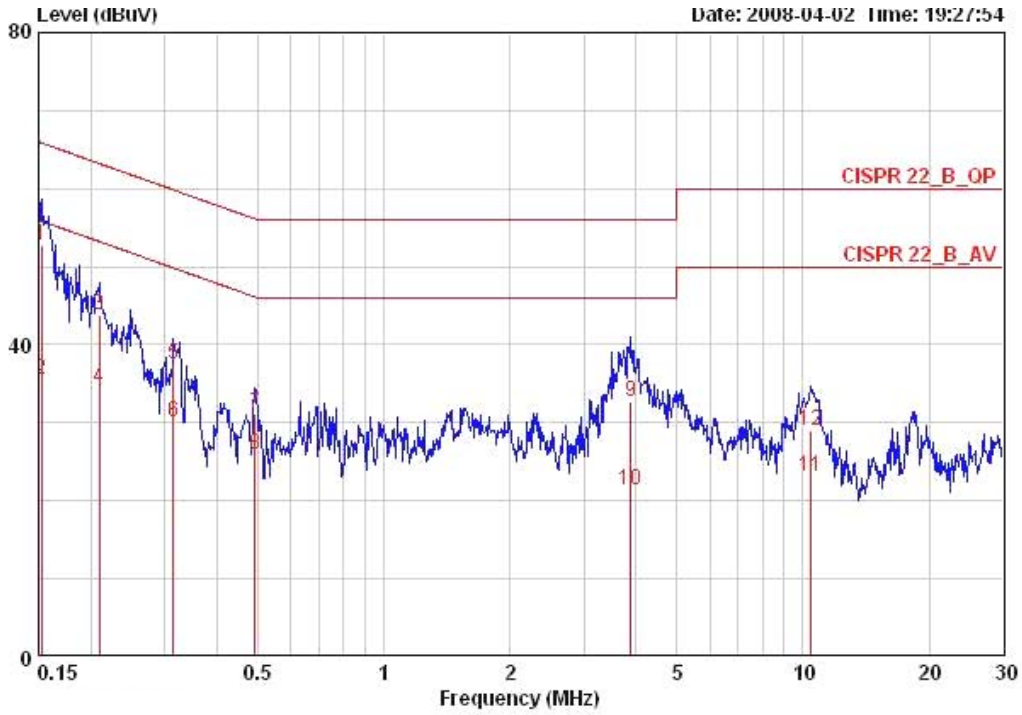
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Line
Configuration	Antenna 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15160	52.13	-13.78	65.91	51.73	0.20	0.20	QP
2	0.15160	39.50	-16.41	55.91	39.10	0.20	0.20	AVERAGE
3	0.20396	43.15	-20.30	63.45	42.85	0.10	0.20	QP
4	0.20396	33.91	-19.54	53.45	33.61	0.10	0.20	AVERAGE
5	0.25615	41.14	-20.42	61.56	40.84	0.10	0.20	QP
6	0.25615	31.69	-19.87	51.56	31.39	0.10	0.20	AVERAGE
7	0.31495	37.28	-22.56	59.84	36.98	0.10	0.20	QP
8	0.31495	31.09	-18.75	49.84	30.79	0.10	0.20	AVERAGE
9	3.720	30.26	-25.74	56.00	29.96	0.00	0.30	QP
10	3.720	19.94	-26.06	46.00	19.64	0.00	0.30	AVERAGE
11	10.847	26.82	-33.18	60.00	26.32	0.10	0.40	QP
12	10.847	21.61	-28.39	50.00	21.11	0.10	0.40	AVERAGE

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Neutral
Configuration	Antenna 1		

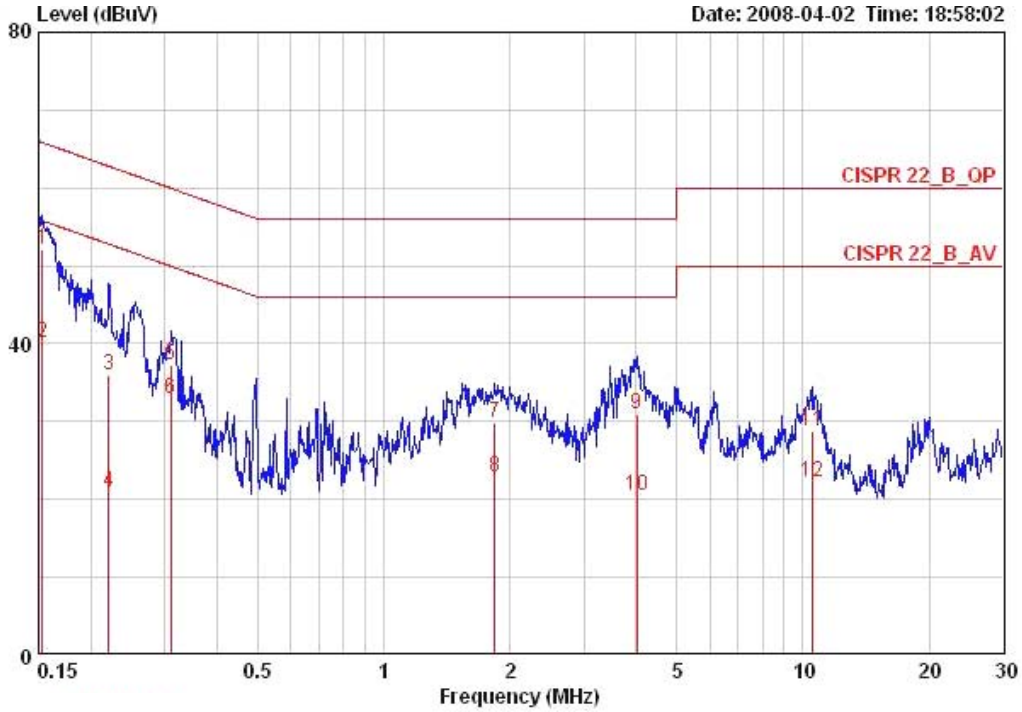


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.15240	52.77	-13.10	65.87	52.27	0.30	0.20	QP
2	0.15240	35.45	-20.42	55.87	34.95	0.30	0.20	AVERAGE
3	0.20944	43.71	-19.52	63.23	43.31	0.20	0.20	QP
4	0.20944	34.46	-18.77	53.23	34.06	0.20	0.20	AVERAGE
5	0.31495	37.45	-22.39	59.84	37.12	0.13	0.20	QP
6	0.31495	30.13	-19.71	49.84	29.80	0.13	0.20	AVERAGE
7	0.49150	31.09	-25.06	56.14	30.86	0.10	0.13	QP
8	0.49150	25.87	-20.28	46.14	25.64	0.10	0.13	AVERAGE
9	3.881	32.69	-23.31	56.00	32.29	0.10	0.30	QP
10	3.881	21.32	-24.68	46.00	20.92	0.10	0.30	AVERAGE
11	10.397	23.08	-26.92	50.00	22.60	0.10	0.38	AVERAGE
12	10.397	29.10	-30.90	60.00	28.62	0.10	0.38	QP

Note:

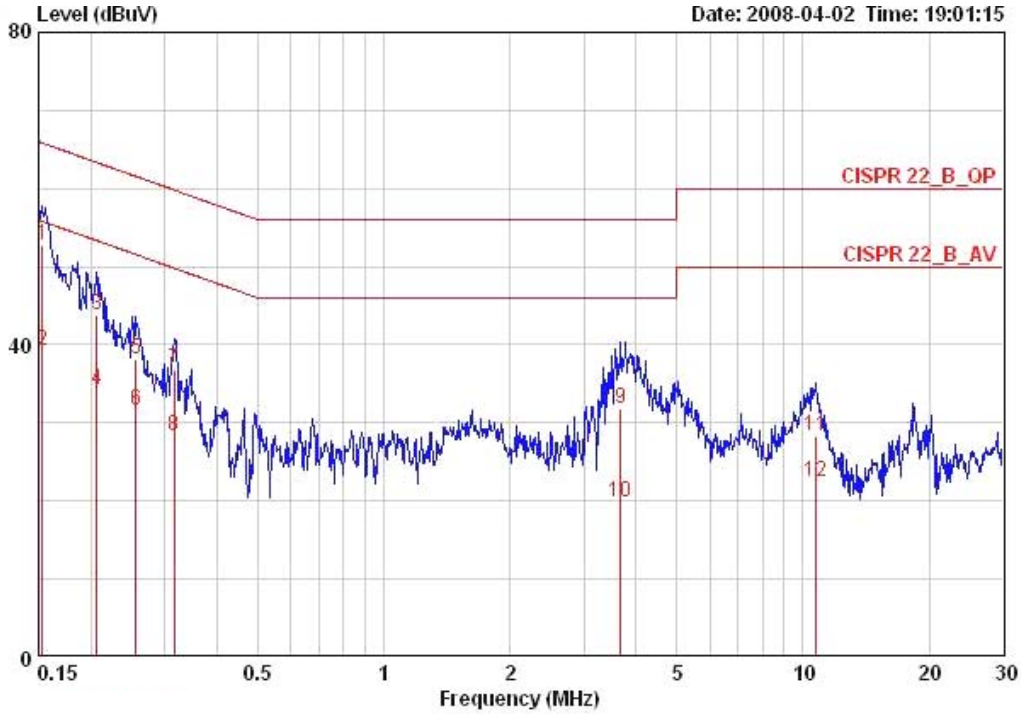
Level = Read Level + LISN Factor + Cable Loss.

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Line
Configuration	Antenna 5		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15321	52.12	-13.70	65.82	51.72	0.20	0.20	QP
2	0.15321	40.19	-15.63	55.82	39.79	0.20	0.20	AVERAGE
3	0.22083	36.04	-26.75	62.79	35.74	0.10	0.20	QP
4	0.22083	20.88	-31.91	52.79	20.58	0.10	0.20	AVERAGE
5	0.30998	37.25	-22.72	59.97	36.95	0.10	0.20	QP
6	0.30998	32.90	-17.07	49.97	32.60	0.10	0.20	AVERAGE
7	1.839	29.86	-26.14	56.00	29.69	0.00	0.17	QP
8	1.839	22.96	-23.04	46.00	22.79	0.00	0.17	AVERAGE
9	4.006	30.90	-25.10	56.00	30.60	0.00	0.30	QP
10	4.006	20.40	-25.60	46.00	20.10	0.00	0.30	AVERAGE
11	10.564	28.67	-31.33	60.00	28.17	0.10	0.40	QP
12	10.564	22.30	-27.70	50.00	21.80	0.10	0.40	AVERAGE

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Neutral
Configuration	Antenna 5		

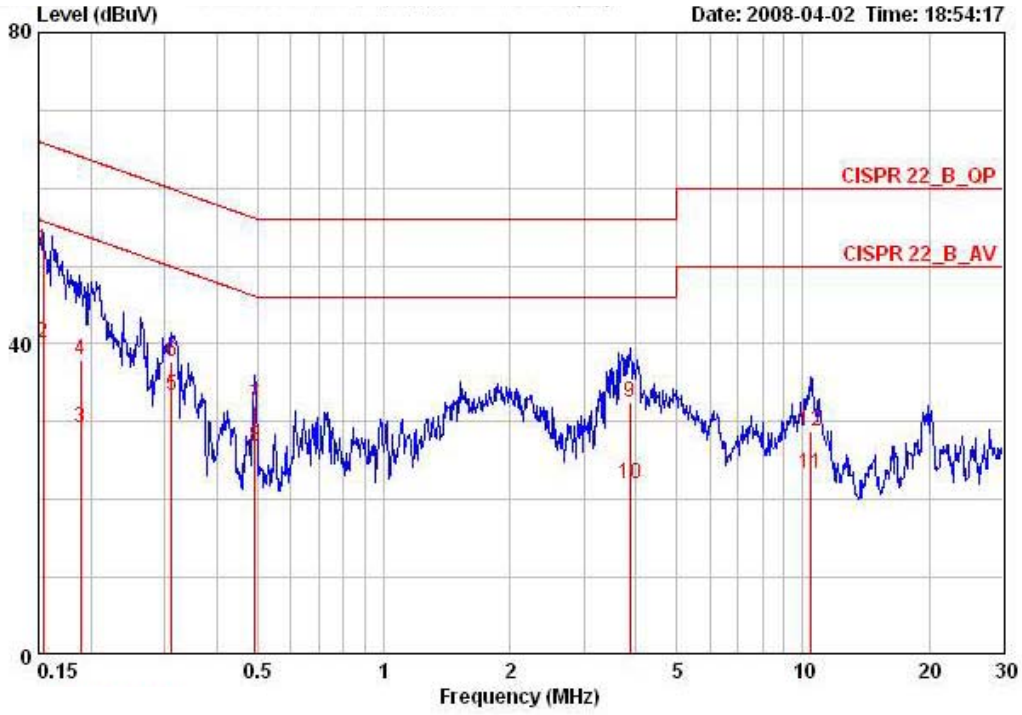


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.15321	52.82	-13.00	65.82	52.32	0.30	0.20	QP
2	0.15321	39.24	-16.58	55.82	38.74	0.30	0.20	AVERAGE
3	0.20614	43.81	-19.55	63.36	43.41	0.20	0.20	QP
4	0.20614	34.31	-19.05	53.36	33.91	0.20	0.20	AVERAGE
5	0.25615	38.12	-23.44	61.56	37.75	0.17	0.20	QP
6	0.25615	31.71	-19.85	51.56	31.34	0.17	0.20	AVERAGE
7	0.31662	36.74	-23.05	59.80	36.41	0.13	0.20	QP
8	0.31662	28.37	-21.42	49.80	28.04	0.13	0.20	AVERAGE
9	3.681	31.77	-24.23	56.00	31.37	0.10	0.30	QP
10	3.681	19.89	-26.11	46.00	19.49	0.10	0.30	AVERAGE
11	10.733	28.23	-31.77	60.00	27.73	0.10	0.40	QP
12	10.733	22.45	-27.55	50.00	21.95	0.10	0.40	AVERAGE

Note:

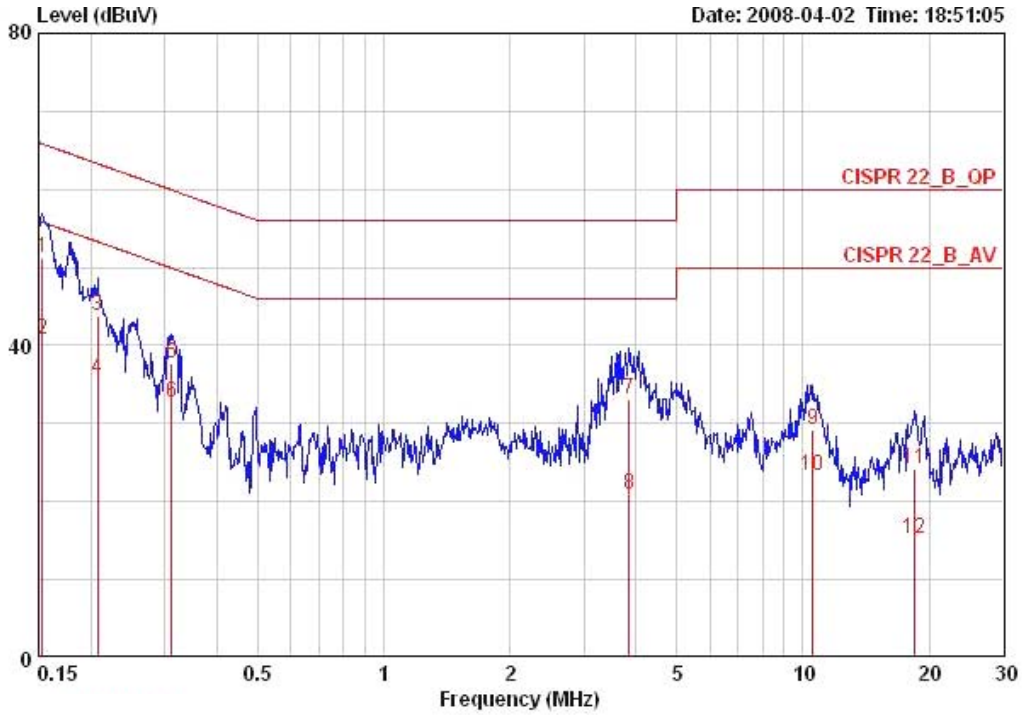
Level = Read Level + LISN Factor + Cable Loss.

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Line
Configuration	Antenna 6		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15403	52.10	-13.68	65.78	51.70	0.20	0.20	QP
2	0.15403	40.19	-15.59	55.78	39.79	0.20	0.20	AVERAGE
3	0.18938	29.12	-24.94	54.06	28.77	0.15	0.20	AVERAGE
4	0.18938	37.97	-26.09	64.06	37.62	0.15	0.20	QP
5	0.31163	33.42	-16.51	49.93	33.12	0.10	0.20	AVERAGE
6	0.31163	37.74	-22.19	59.93	37.44	0.10	0.20	QP
7	0.49150	31.94	-24.20	56.14	31.73	0.09	0.13	QP
8	0.49150	26.78	-19.36	46.14	26.57	0.09	0.13	AVERAGE
9	3.860	32.46	-23.54	56.00	32.16	0.00	0.30	QP
10	3.860	21.96	-24.04	46.00	21.66	0.00	0.30	AVERAGE
11	10.397	23.25	-26.75	50.00	22.77	0.10	0.38	AVERAGE
12	10.397	28.88	-31.12	60.00	28.40	0.10	0.38	QP

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Neutral
Configuration	Antenna 6		

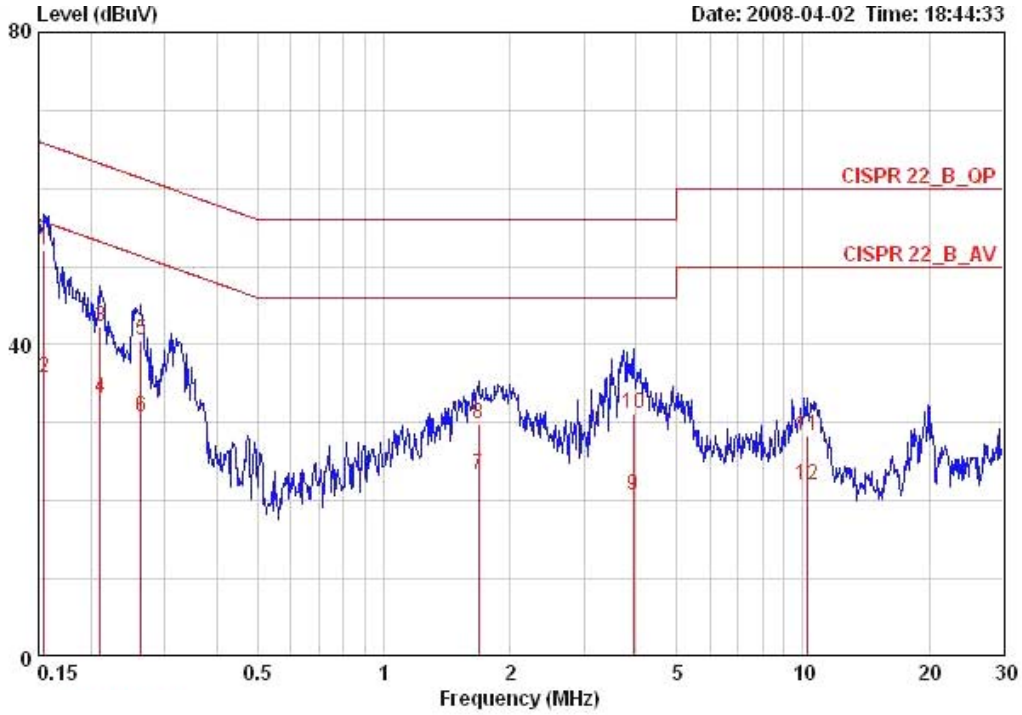


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15321	51.27	-14.55	65.82	50.77	0.30	0.20	QP
2	0.15321	40.82	-15.00	55.82	40.32	0.30	0.20	AVERAGE
3	0.20723	43.81	-19.51	63.32	43.41	0.20	0.20	QP
4	0.20723	35.82	-17.50	53.32	35.42	0.20	0.20	AVERAGE
5	0.31163	37.73	-22.20	59.93	37.38	0.15	0.20	QP
6	0.31163	32.77	-17.16	49.93	32.42	0.15	0.20	AVERAGE
7	3.840	33.09	-22.91	56.00	32.69	0.10	0.30	QP
8	3.840	20.99	-25.01	46.00	20.59	0.10	0.30	AVERAGE
9	10.564	29.27	-30.73	60.00	28.77	0.10	0.40	QP
10	10.564	23.28	-26.72	50.00	22.78	0.10	0.40	AVERAGE
11	18.524	24.20	-35.80	60.00	23.60	0.10	0.50	QP
12	18.524	15.31	-34.69	50.00	14.71	0.10	0.50	AVERAGE

Note:

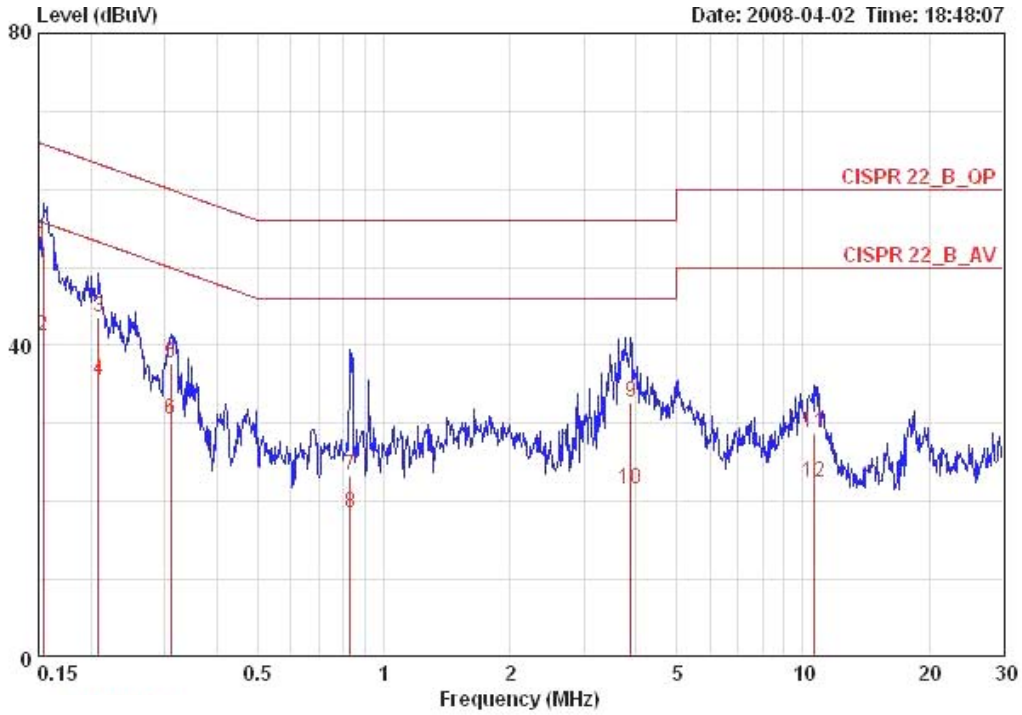
Level = Read Level + LISN Factor + Cable Loss.

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Line
Configuration	Antenna 7		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15485	52.18	-13.56	65.74	51.78	0.20	0.20	QP
2	0.15485	35.66	-20.08	55.74	35.26	0.20	0.20	AVERAGE
3	0.21055	42.30	-20.88	63.18	42.00	0.10	0.20	QP
4	0.21055	33.05	-20.13	53.18	32.75	0.10	0.20	AVERAGE
5	0.26303	40.46	-20.88	61.34	40.16	0.10	0.20	QP
6	0.26303	30.64	-20.70	51.34	30.34	0.10	0.20	AVERAGE
7	1.680	23.33	-22.67	46.00	23.19	0.00	0.14	AVERAGE
8	1.680	29.93	-26.07	56.00	29.79	0.00	0.14	QP
9	3.943	20.76	-25.24	46.00	20.46	0.00	0.30	AVERAGE
10	3.943	31.19	-24.81	56.00	30.89	0.00	0.30	QP
11	10.233	28.23	-31.77	60.00	27.79	0.10	0.34	QP
12	10.233	22.02	-27.98	50.00	21.58	0.10	0.34	AVERAGE

Temperature	25℃	Humidity	43%
Test Engineer	Cloud Peng	Phase	Neutral
Configuration	Antenna 7		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.15403	52.72	-13.06	65.78	52.22	0.30	0.20	QP
2	0.15403	41.17	-14.61	55.78	40.67	0.30	0.20	AVERAGE
3	0.20833	43.59	-19.68	63.27	43.19	0.20	0.20	QP
4	0.20833	35.61	-17.66	53.27	35.21	0.20	0.20	AVERAGE
5	0.30998	37.64	-22.33	59.97	37.29	0.15	0.20	QP
6	0.30998	30.54	-19.43	49.97	30.19	0.15	0.20	AVERAGE
7	0.83047	23.42	-32.58	56.00	23.12	0.10	0.20	QP
8	0.83047	18.61	-27.39	46.00	18.31	0.10	0.20	AVERAGE
9	3.881	32.63	-23.37	56.00	32.23	0.10	0.30	QP
10	3.881	21.58	-24.42	46.00	21.18	0.10	0.30	AVERAGE
11	10.676	28.88	-31.12	60.00	28.38	0.10	0.40	QP
12	10.676	22.49	-27.51	50.00	21.99	0.10	0.40	AVERAGE

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

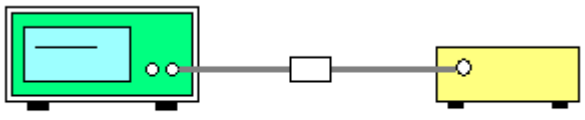
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RB	3000 kHz
VB	1000 kHz
Detector	RMS
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.
4. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 99% Occupied Bandwidth

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 1

Configuration IEEE 802.11a Ant. 1

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.94	17.94
40	5200 MHz	23.07	17.94
48	5240 MHz	22.56	17.94

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 5

Configuration IEEE 802.11a Ant. 5

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.94	17.94
40	5200 MHz	23.07	17.94
48	5240 MHz	22.56	17.94

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 6

Configuration IEEE 802.11a Ant. 6

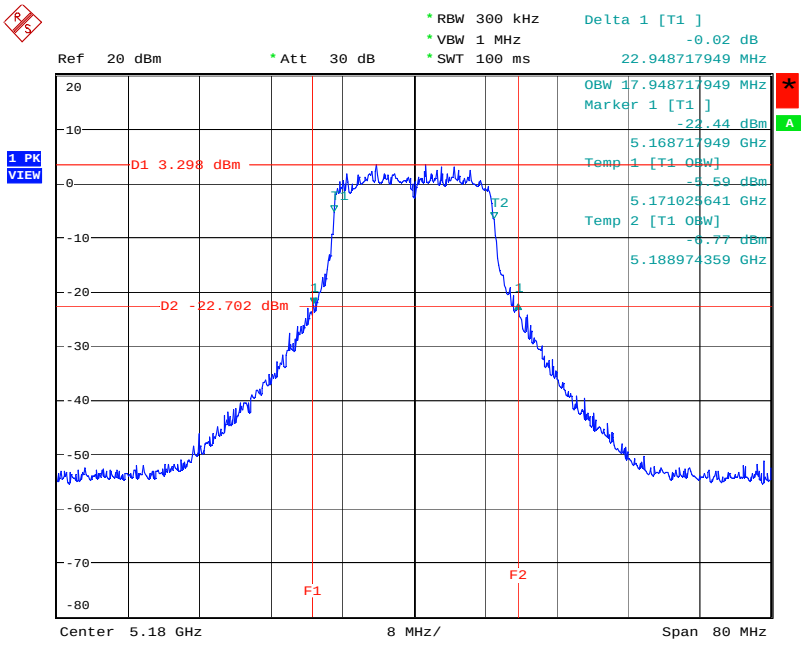
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.43	16.79
40	5200 MHz	21.66	16.66
48	5240 MHz	22.05	16.92

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 7

Configuration IEEE 802.11a Ant. 7

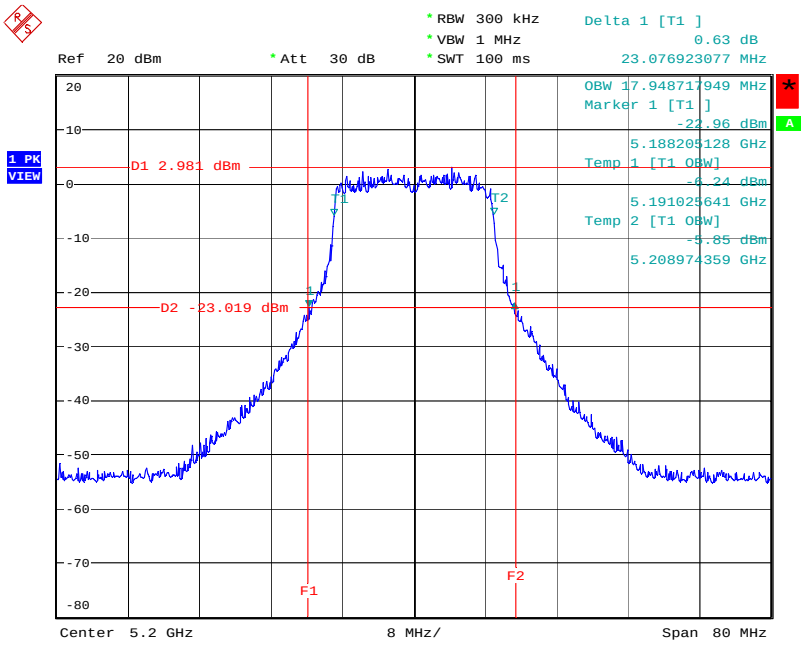
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.94	17.94
40	5200 MHz	23.07	17.94
48	5240 MHz	22.56	17.94

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



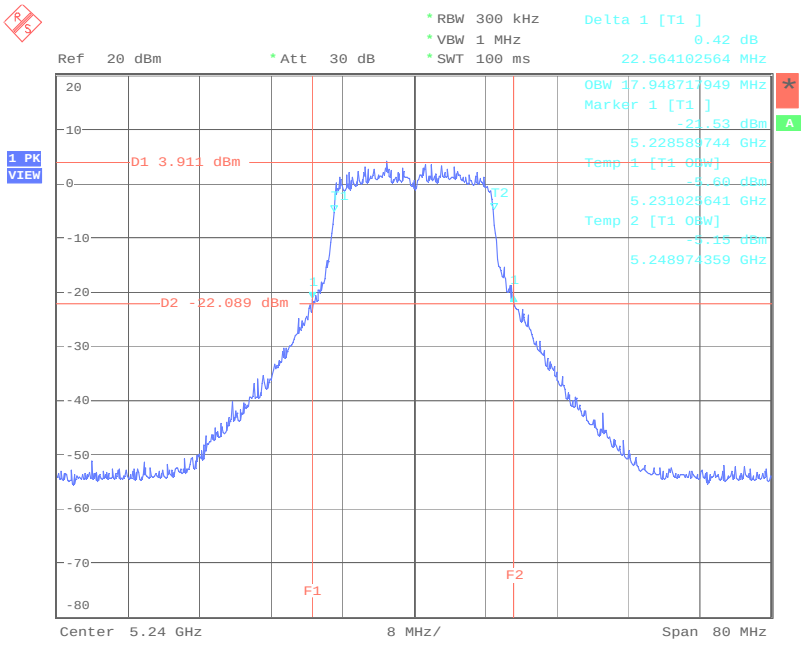
Date: 20.MAR.2008 20:02:36

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



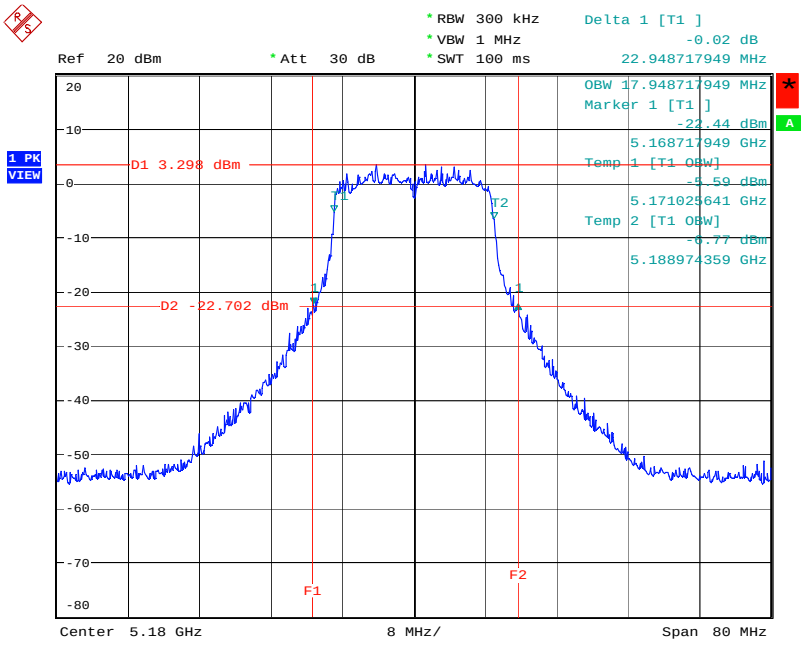
Date: 20.MAR.2008 20:01:01

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



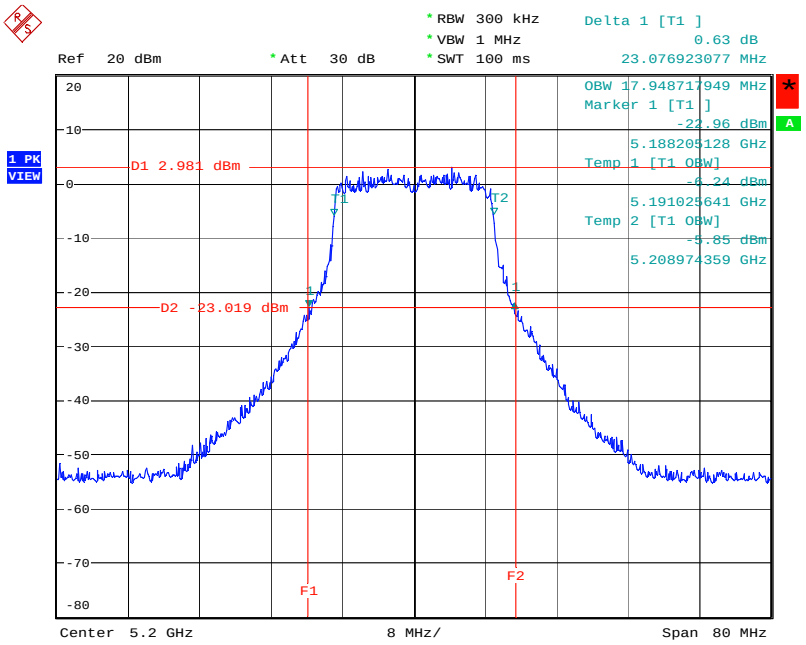
Date: 20.MAR.2008 19:58:48

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 5 / 5180 MHz



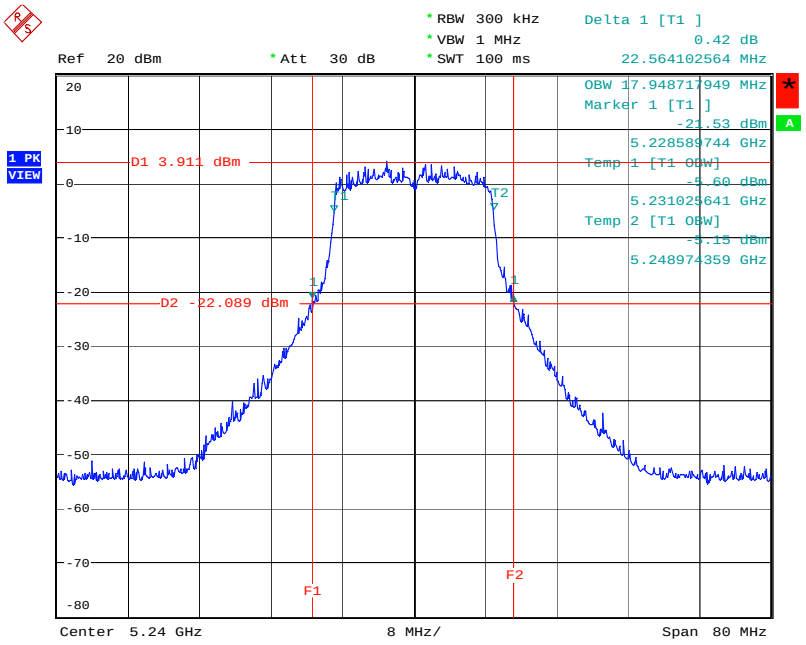
Date: 20.MAR.2008 20:02:36

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 5 / 5200 MHz



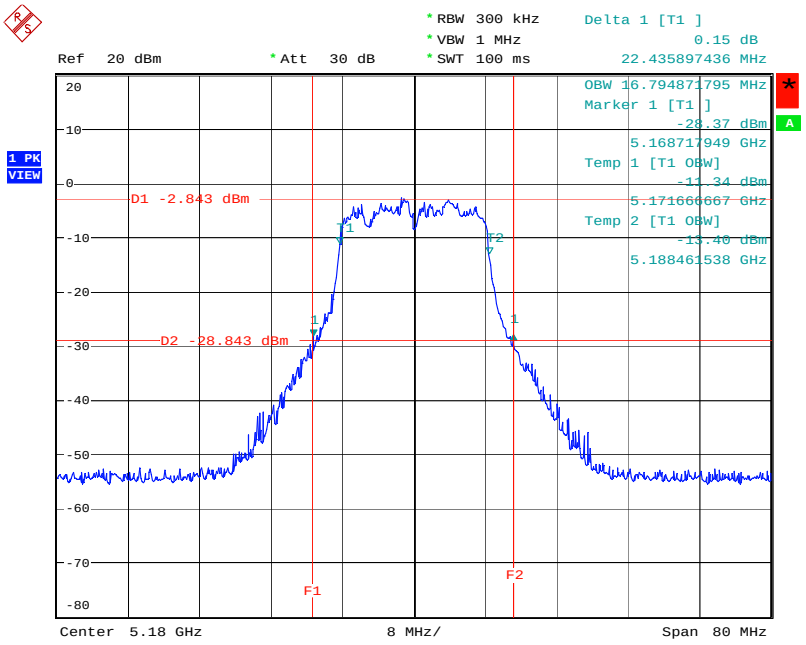
Date: 20.MAR.2008 20:01:01

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 5 / 5240 MHz



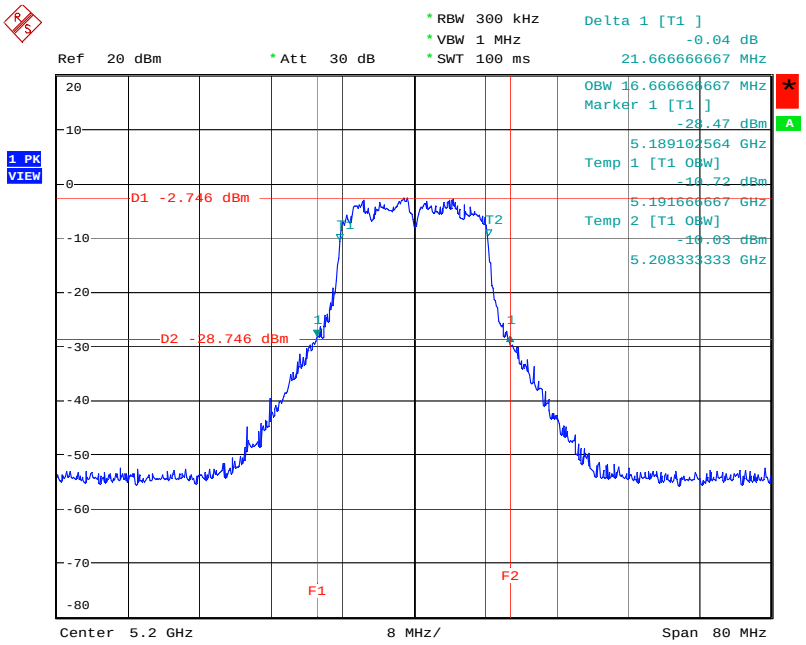
Date: 20.MAR.2008 19:58:48

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 6 / 5180 MHz



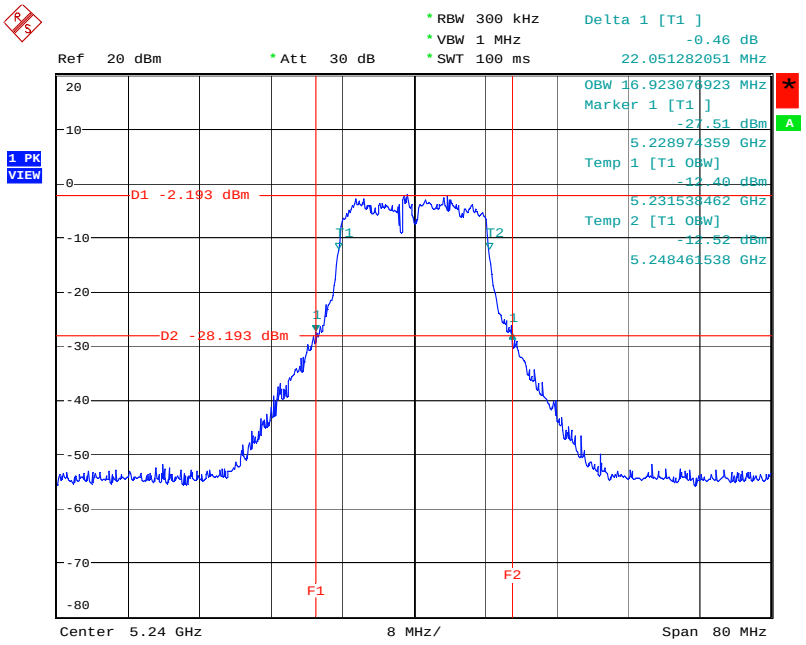
Date: 25.MAR.2008 14:25:10

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 6 / 5200 MHz



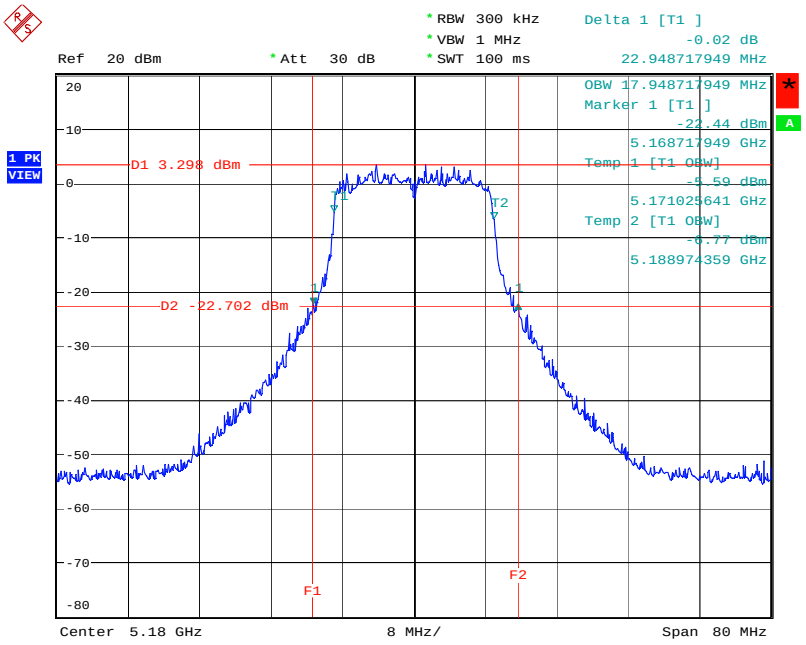
Date: 25.MAR.2008 14:26:12

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 6 / 5240 MHz



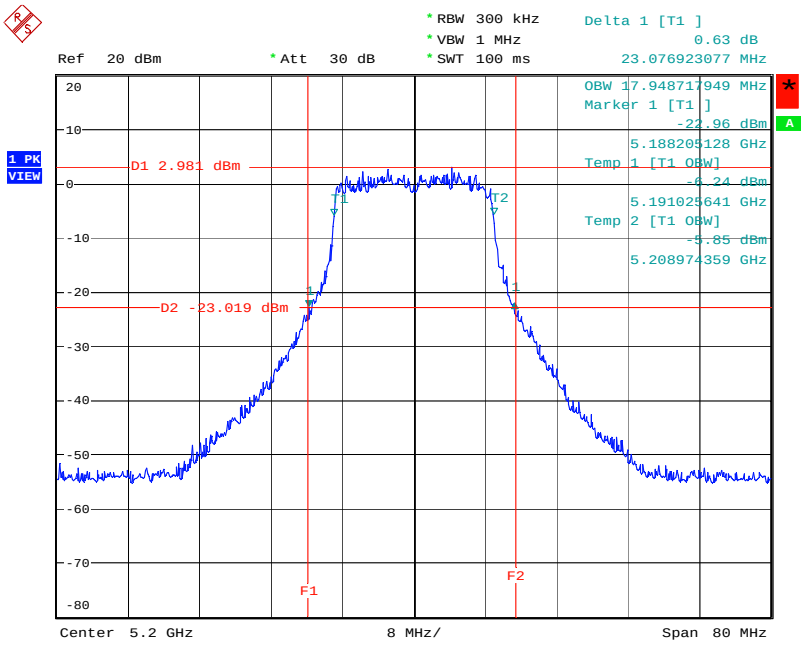
Date: 25.MAR.2008 14:27:05

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 7 / 5180 MHz



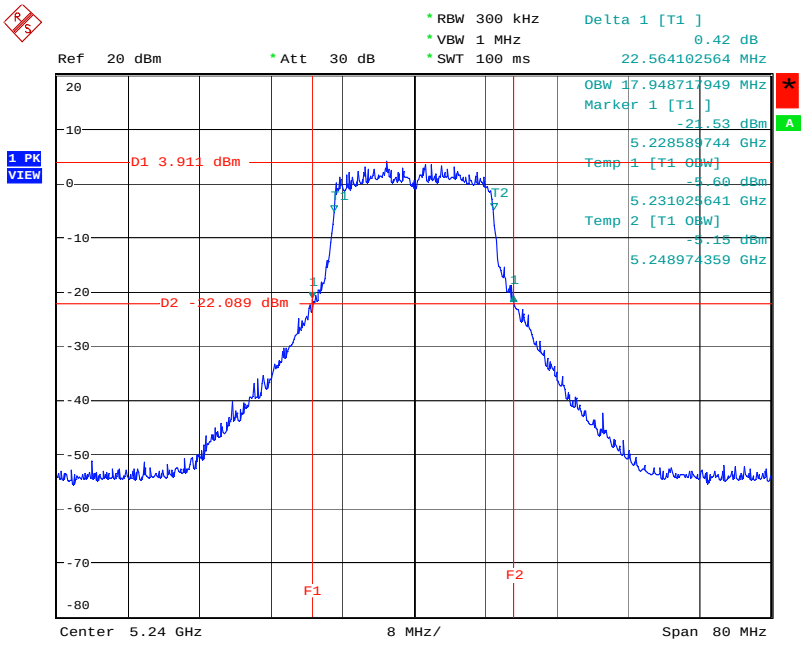
Date: 20.MAR.2008 20:02:36

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 7 / 5200 MHz



Date: 20.MAR.2008 20:01:01

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 7 / 5240 MHz



Date: 20.MAR.2008 19:58:48

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

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

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	300 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, 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	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 1

Configuration IEEE 802.11a Ant. 1-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.47	17.00	Complies
40	5200 MHz	12.13	17.00	Complies
48	5240 MHz	11.91	17.00	Complies

Configuration IEEE 802.11a Ant. 1-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.43	17.00	Complies
40	5200 MHz	10.97	17.00	Complies
48	5240 MHz	10.96	17.00	Complies

Configuration IEEE 802.11a Ant. 1-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.39	17.00	Complies
40	5200 MHz	11.36	17.00	Complies
48	5240 MHz	12.36	17.00	Complies

Configuration IEEE 802.11a Ant. 1-1 +Ant. 1-2 + Ant. 1-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.56	17.00	Complies
40	5200 MHz	16.28	17.00	Complies
48	5240 MHz	16.55	17.00	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 5

Configuration IEEE 802.11a Ant. 5-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.47	17.00	Complies
40	5200 MHz	12.13	17.00	Complies
48	5240 MHz	11.91	17.00	Complies

Configuration IEEE 802.11a Ant. 5-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.43	17.00	Complies
40	5200 MHz	10.97	17.00	Complies
48	5240 MHz	10.96	17.00	Complies

Configuration IEEE 802.11a Ant. 5-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.39	17.00	Complies
40	5200 MHz	11.36	17.00	Complies
48	5240 MHz	12.36	17.00	Complies

Configuration IEEE 802.11a Ant. 5-1 +Ant. 5-2 + Ant. 5-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.56	17.00	Complies
40	5200 MHz	16.28	17.00	Complies
48	5240 MHz	16.55	17.00	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 6

Configuration IEEE 802.11a Ant. 6-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	5.81	10.00	Complies
40	5200 MHz	5.51	10.00	Complies
48	5240 MHz	5.80	10.00	Complies

Configuration IEEE 802.11a Ant. 6-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	3.82	10.00	Complies
40	5200 MHz	3.69	10.00	Complies
48	5240 MHz	3.60	10.00	Complies

Configuration IEEE 802.11a Ant. 6-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	4.65	10.00	Complies
40	5200 MHz	4.52	10.00	Complies
48	5240 MHz	5.37	10.00	Complies

Configuration IEEE 802.11a Ant. 6-1 +Ant. 6-2 + Ant. 6-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	9.61	10.00	Complies
40	5200 MHz	9.41	10.00	Complies
48	5240 MHz	9.79	10.00	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 7

Configuration IEEE 802.11a Ant. 7-1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	12.47	17.00	Complies
40	5200 MHz	12.13	17.00	Complies
48	5240 MHz	11.91	17.00	Complies

Configuration IEEE 802.11a Ant. 7-2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.43	17.00	Complies
40	5200 MHz	10.97	17.00	Complies
48	5240 MHz	10.96	17.00	Complies

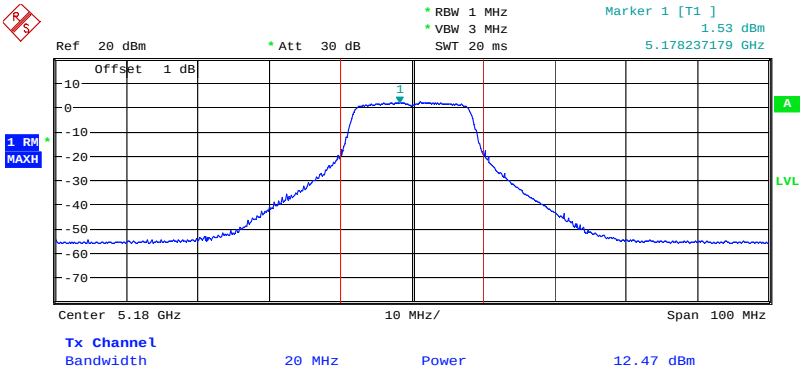
Configuration IEEE 802.11a Ant. 7-3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	11.39	17.00	Complies
40	5200 MHz	11.36	17.00	Complies
48	5240 MHz	12.36	17.00	Complies

Configuration IEEE 802.11a Ant. 7-1 +Ant. 7-2 + Ant. 7-3

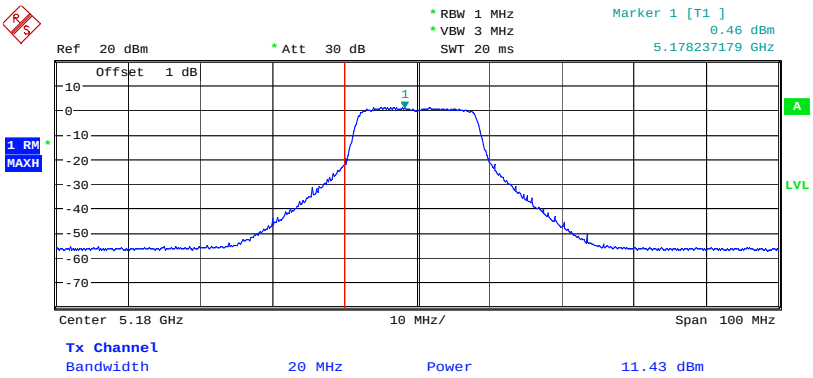
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.56	17.00	Complies
40	5200 MHz	16.28	17.00	Complies
48	5240 MHz	16.55	17.00	Complies

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



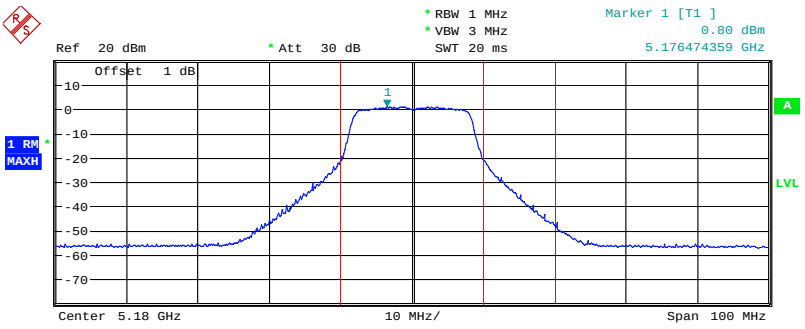
Date: 20.MAR.2008 18:35:55

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 1-2 / 5180 MHz



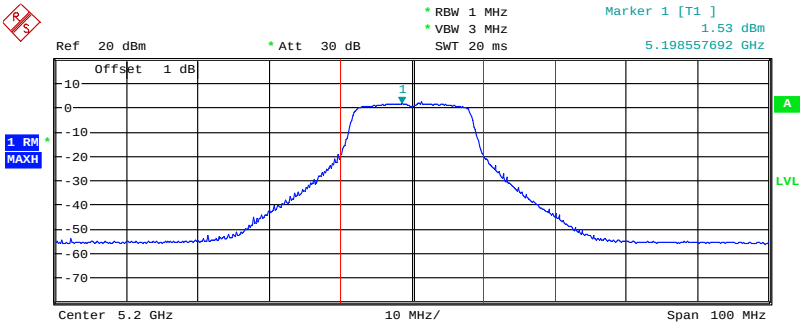
Date: 20.MAR.2008 18:36:32

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 1-3 / 5180 MHz



Date: 20.MAR.2008 18:37:06

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



Date: 20.MAR.2008 18:40:02

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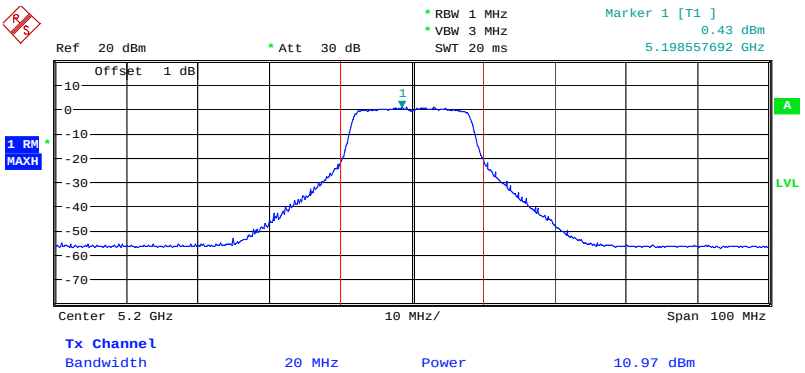
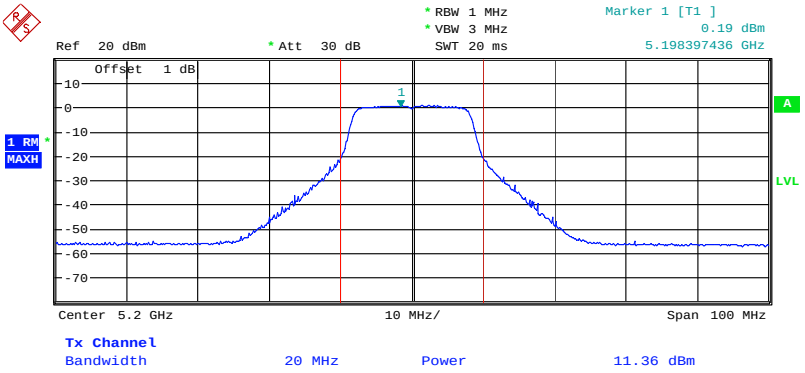


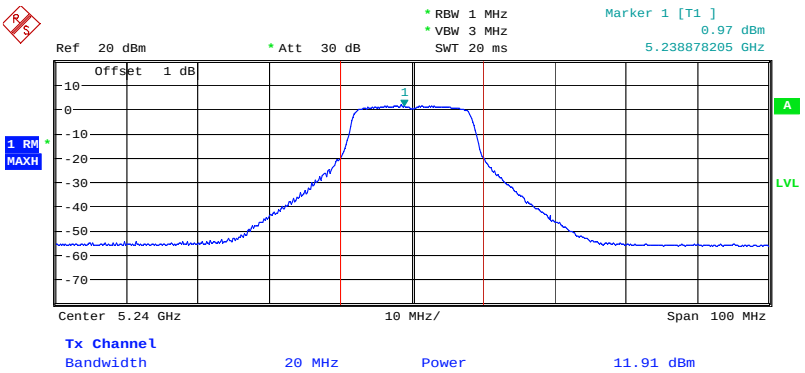
Date: 20.MAR.2008 18:38:52

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 1-3 / 5200 MHz



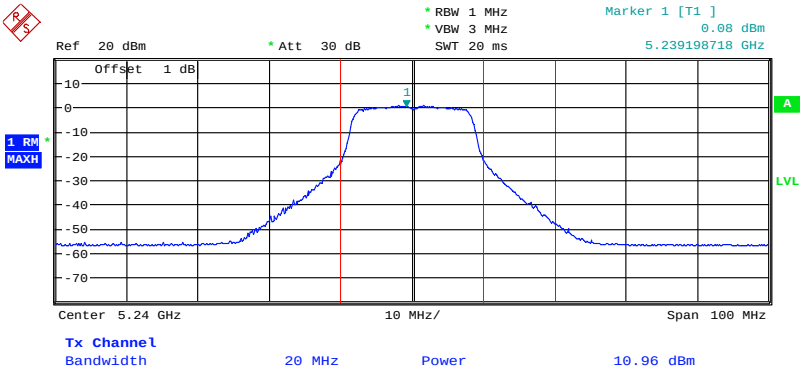
Date: 20.MAR.2008 18:37:59

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 1-1 / 5240 MHz



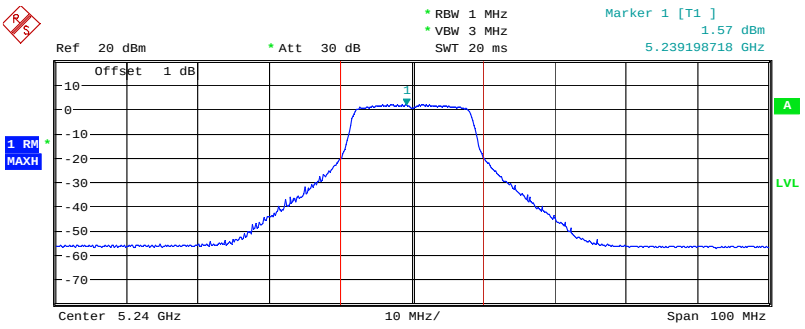
Date: 20.MAR.2008 18:44:25

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 1-2 / 5240 MHz



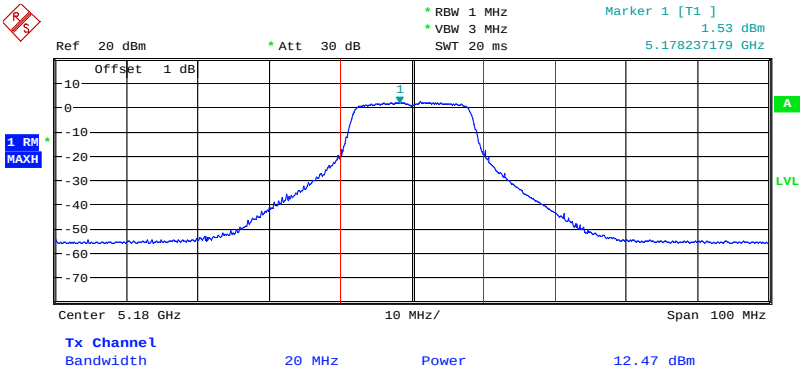
Date: 20.MAR.2008 18:43:44

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 1-3 / 5240 MHz



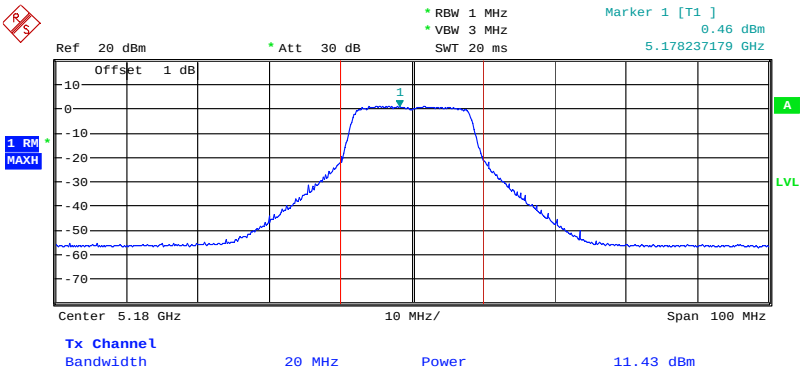
Date: 20.MAR.2008 18:43:10

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 5-1 / 5180 MHz



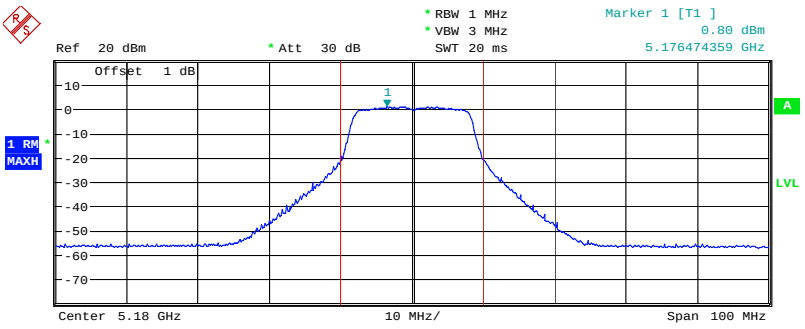
Date: 20.MAR.2008 18:35:55

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-2 / 5180 MHz



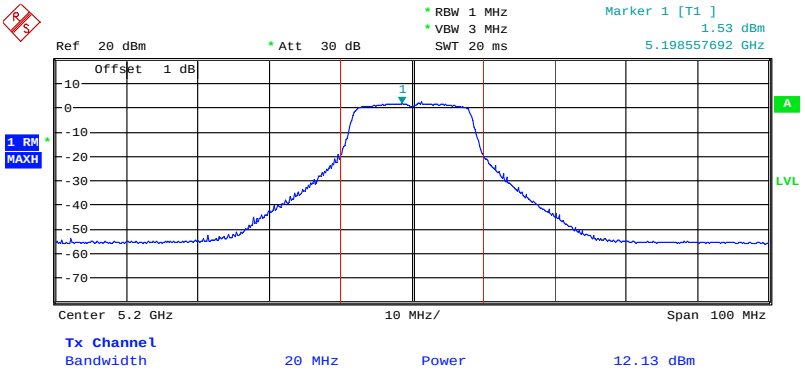
Date: 20.MAR.2008 18:36:32

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-3 / 5180 MHz



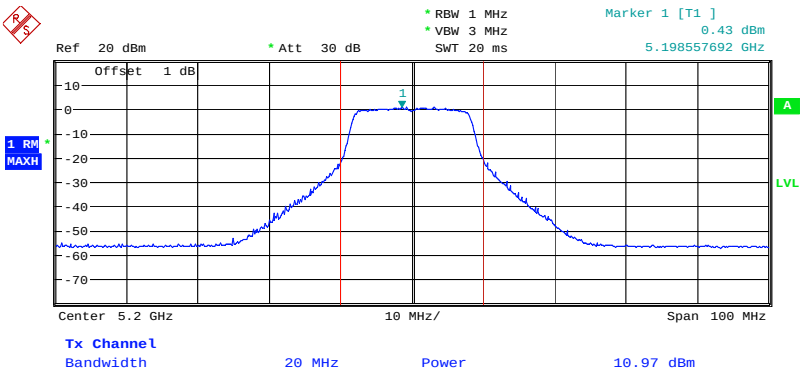
Date: 20.MAR.2008 18:37:06

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-1 / 5200 MHz



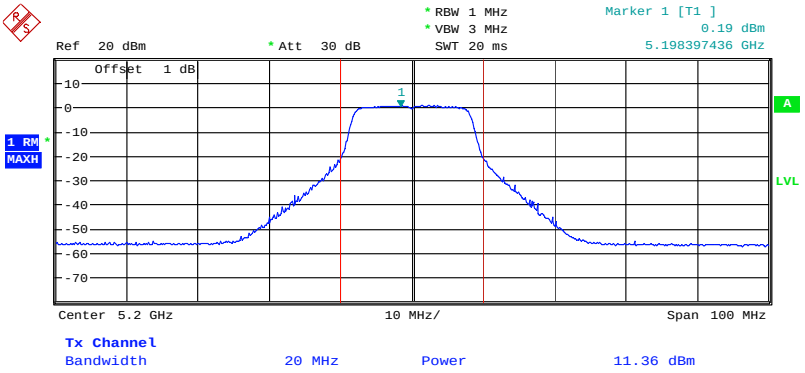
Date: 20.MAR.2008 18:40:02

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-2 / 5200 MHz



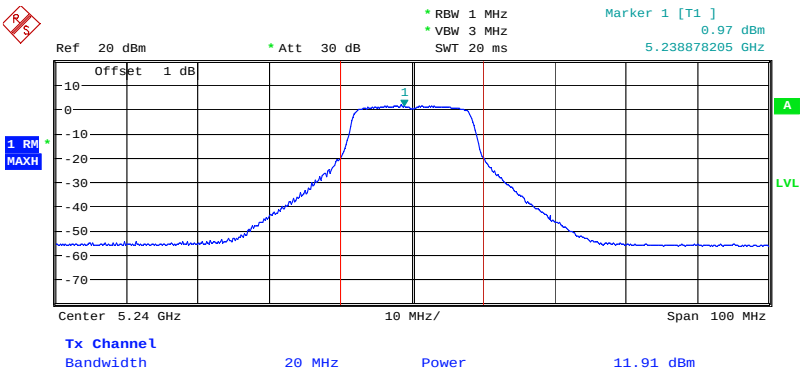
Date: 20.MAR.2008 18:38:52

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-3 / 5200 MHz



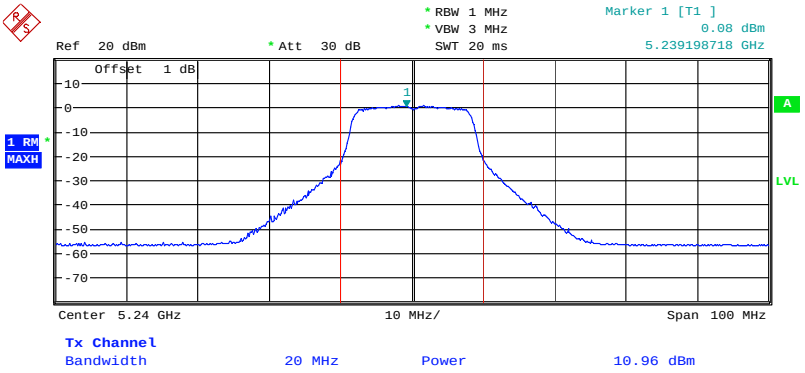
Date: 20.MAR.2008 18:37:59

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-1 / 5240 MHz



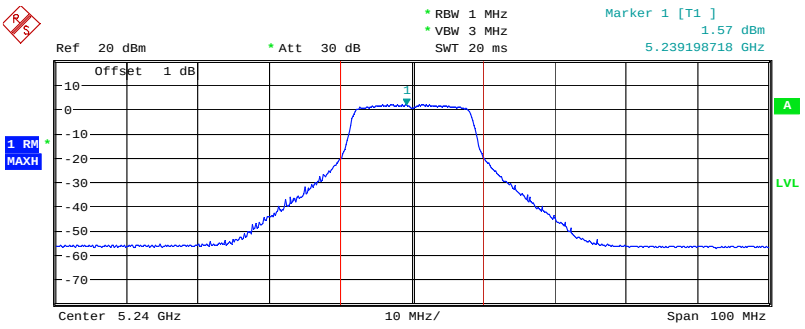
Date: 20.MAR.2008 18:44:25

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-2 / 5240 MHz



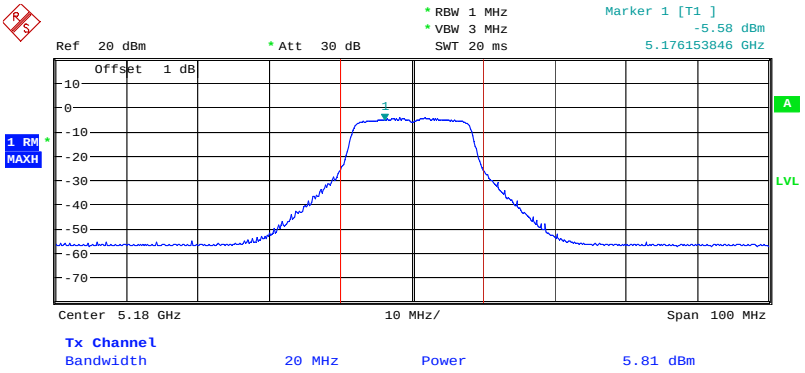
Date: 20.MAR.2008 18:43:44

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 5-3 / 5240 MHz



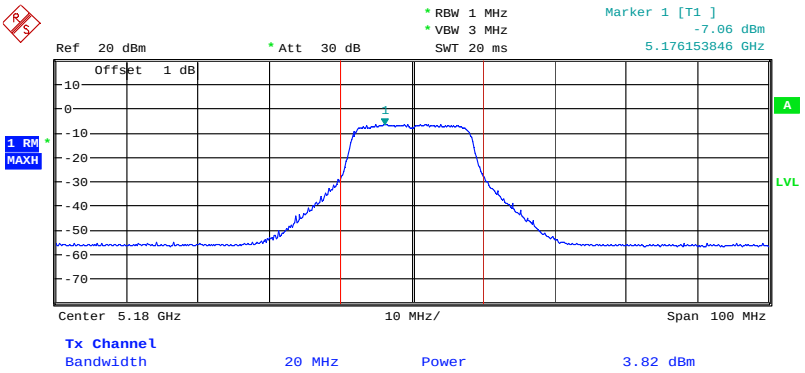
Date: 20.MAR.2008 18:43:10

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 6-1 / 5180 MHz



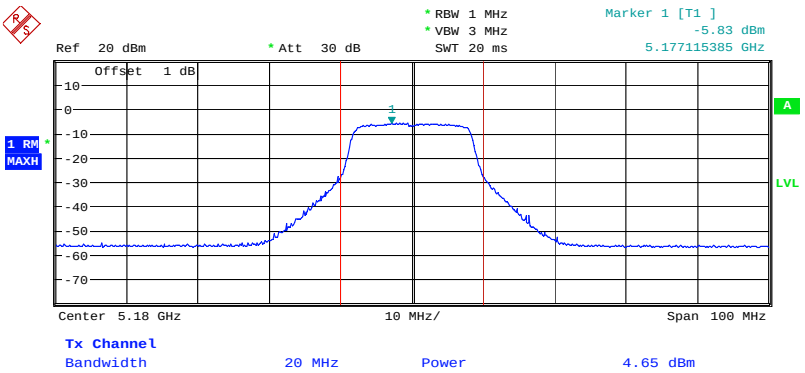
Date: 25.MAR.2008 08:56:43

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-2 / 5180 MHz



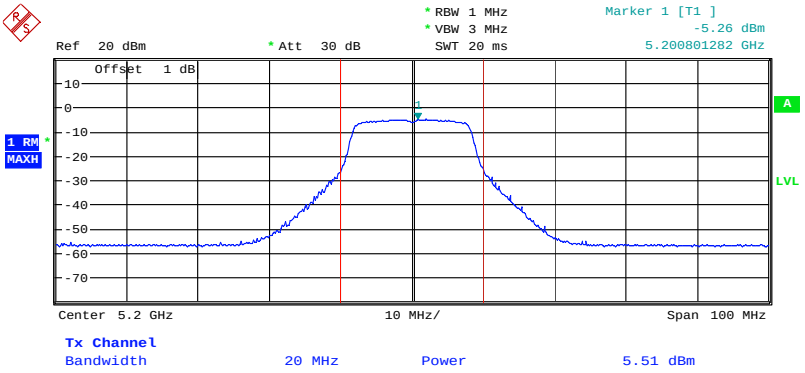
Date: 25.MAR.2008 08:56:10

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-3 / 5180 MHz



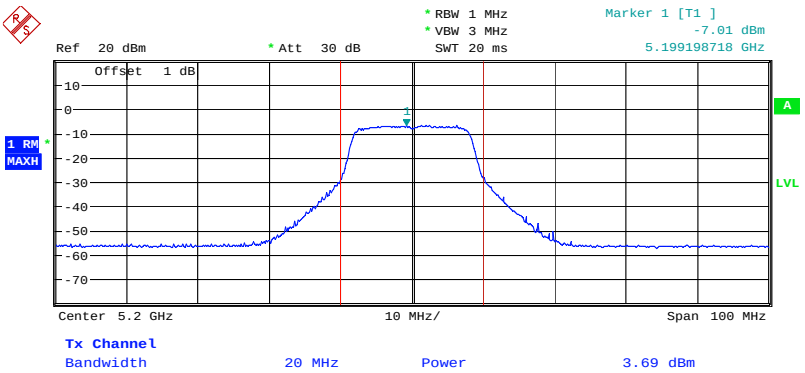
Date: 25.MAR.2008 08:55:06

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-1 / 5200 MHz



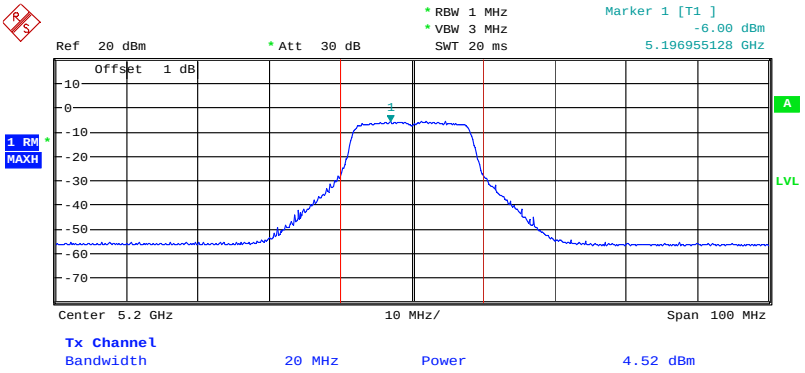
Date: 25.MAR.2008 08:57:27

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-2 / 5200 MHz



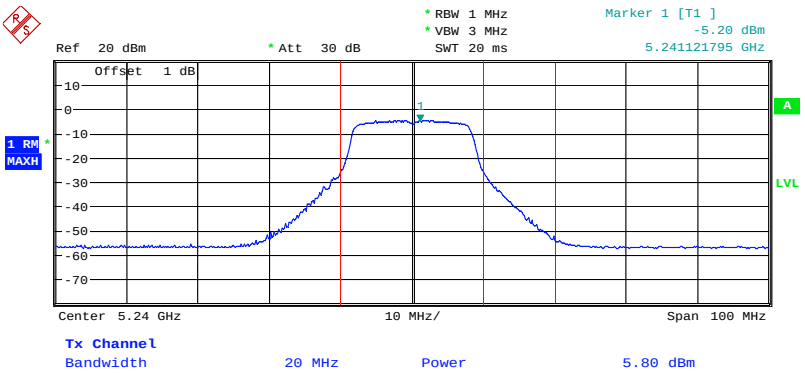
Date: 25.MAR.2008 08:58:06

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-3 / 5200 MHz



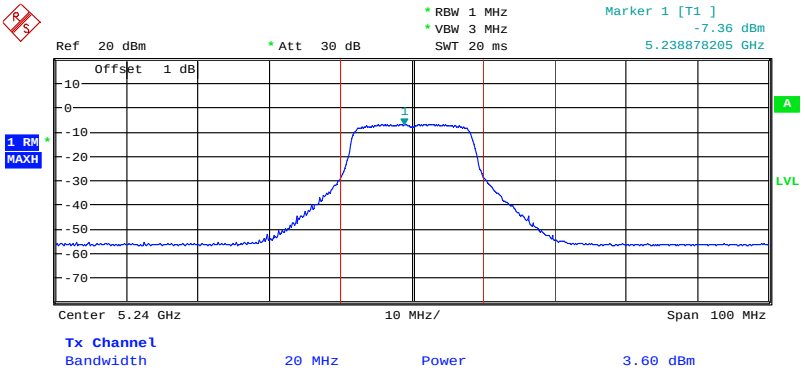
Date: 25.MAR.2008 08:59:02

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-1 / 5240 MHz



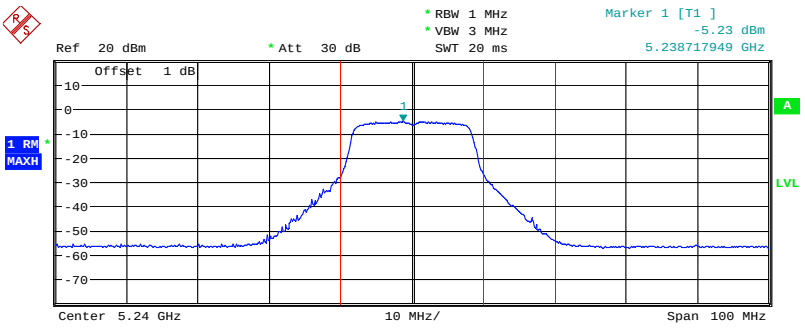
Date: 25.MAR.2008 09:00:57

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-2 / 5240 MHz



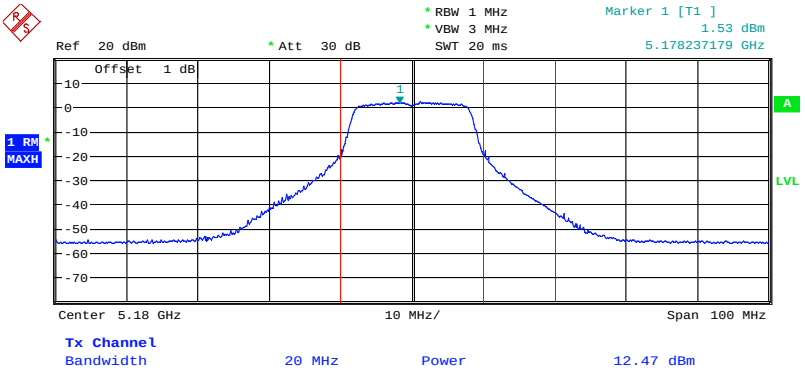
Date: 25.MAR.2008 09:01:34

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 6-3 / 5240 MHz



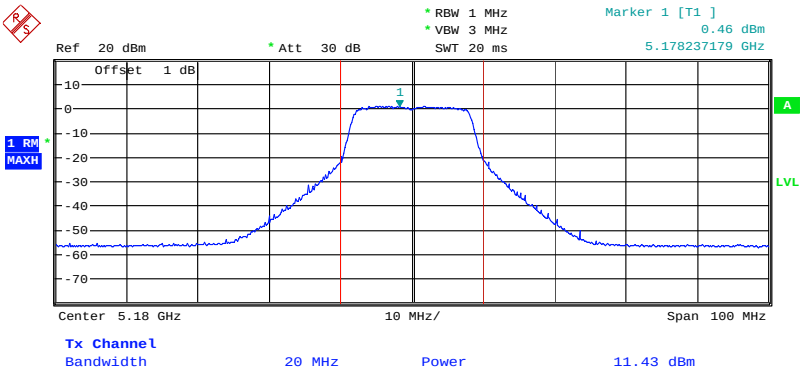
Date: 25.MAR.2008 09:02:01

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 7-1 / 5180 MHz



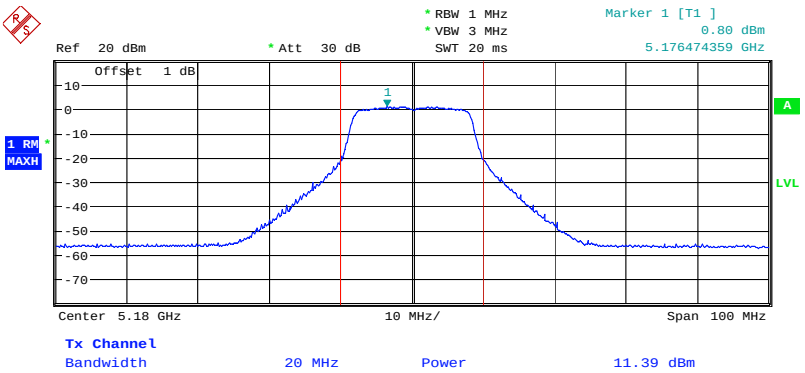
Date: 20.MAR.2008 18:35:55

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-2 / 5180 MHz



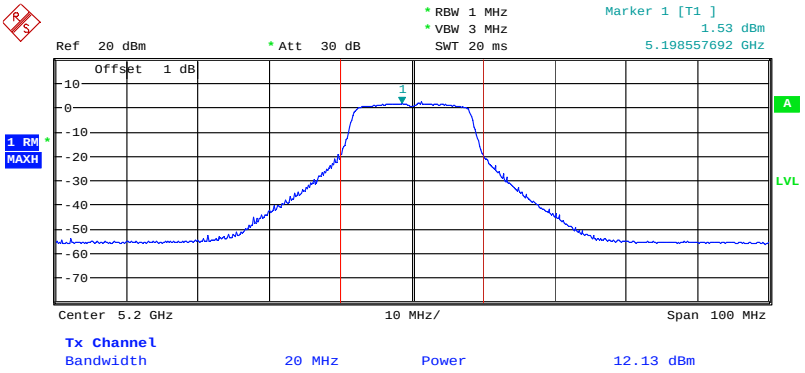
Date: 20.MAR.2008 18:36:32

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-3 / 5180 MHz



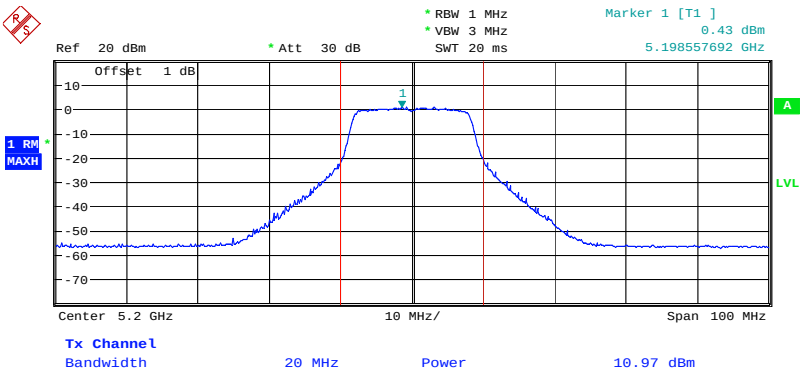
Date: 20.MAR.2008 18:37:06

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-1 / 5200 MHz



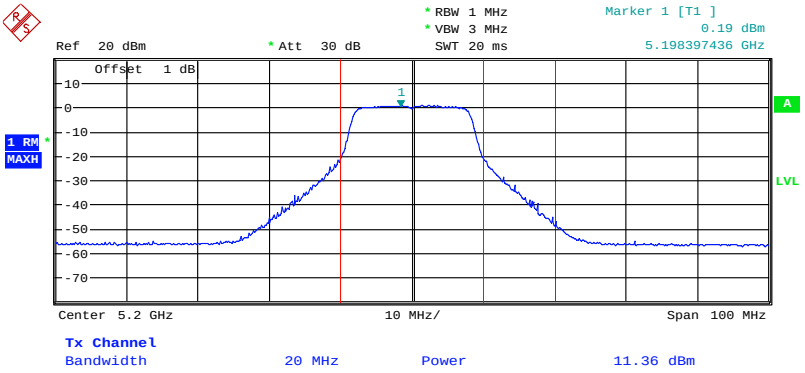
Date: 20.MAR.2008 18:40:02

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-2 / 5200 MHz



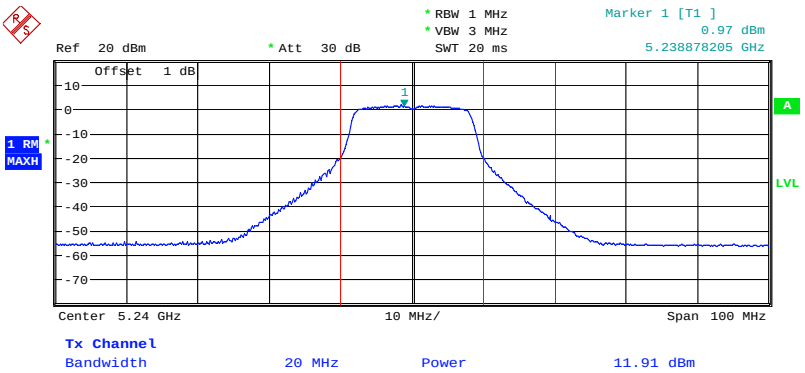
Date: 20.MAR.2008 18:38:52

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-3 / 5200 MHz



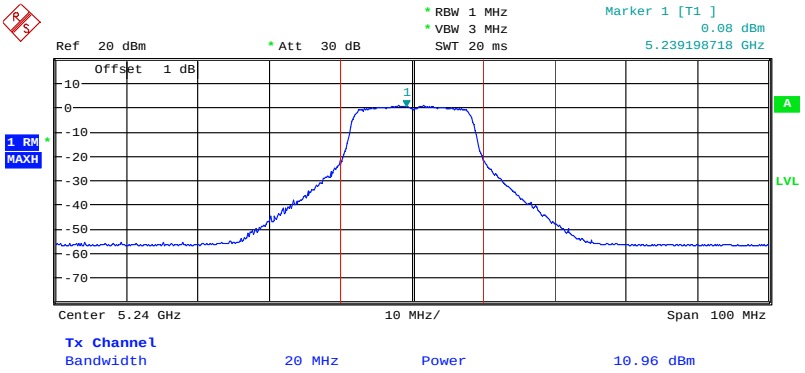
Date: 20.MAR.2008 18:37:59

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-1 / 5240 MHz



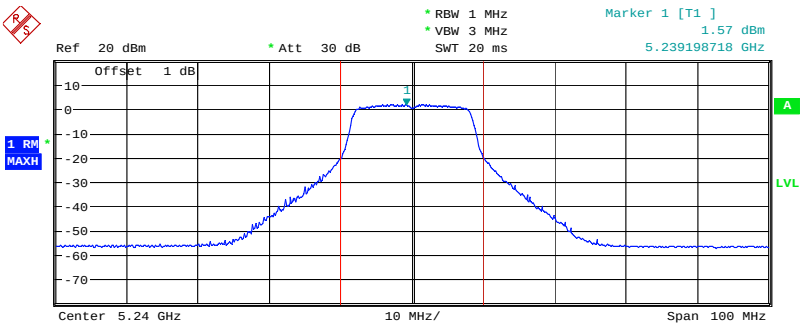
Date: 20.MAR.2008 18:44:25

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-2 / 5240 MHz



Date: 20.MAR.2008 18:43:44

Conducted Output Power Plot on Configuration IEEE 802.11 a Ant. 7-3 / 5240 MHz



Date: 20.MAR.2008 18:43:10

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

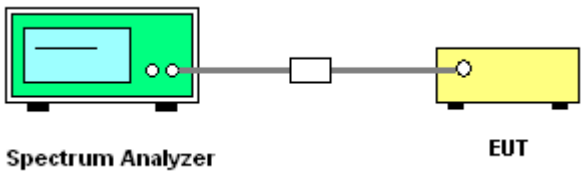
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 analyzer through a combiner.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 1

Configuration IEEE 802.11a Ant. 1

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	1.69	4.00	Complies
40	5200 MHz	1.24	4.00	Complies
48	5240 MHz	1.85	4.00	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 5

Configuration IEEE 802.11a Ant. 5

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	1.69	4.00	Complies
40	5200 MHz	1.24	4.00	Complies
48	5240 MHz	1.85	4.00	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 6

Configuration IEEE 802.11a Ant. 6

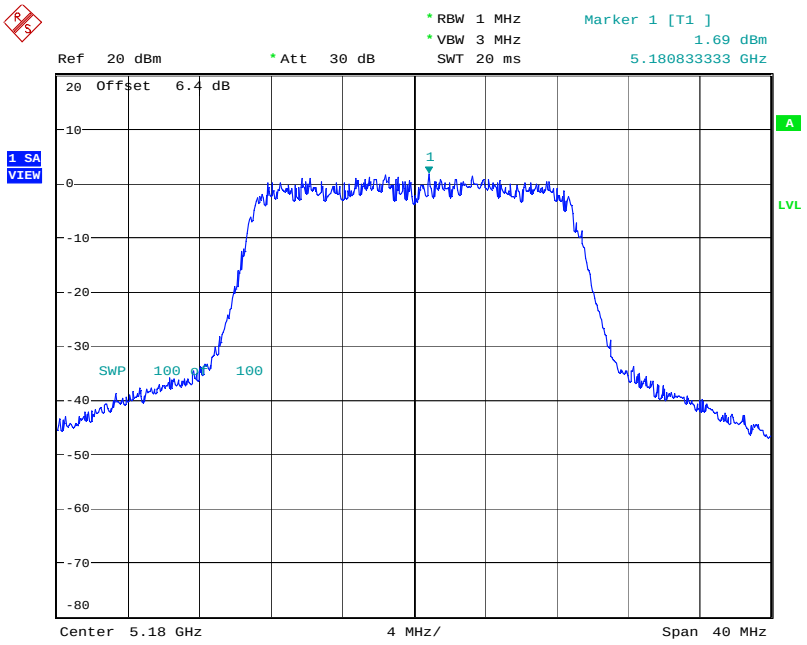
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	-4.92	-3.00	Complies
40	5200 MHz	-5.03	-3.00	Complies
48	5240 MHz	-5.01	-3.00	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 7

Configuration IEEE 802.11a Ant. 7

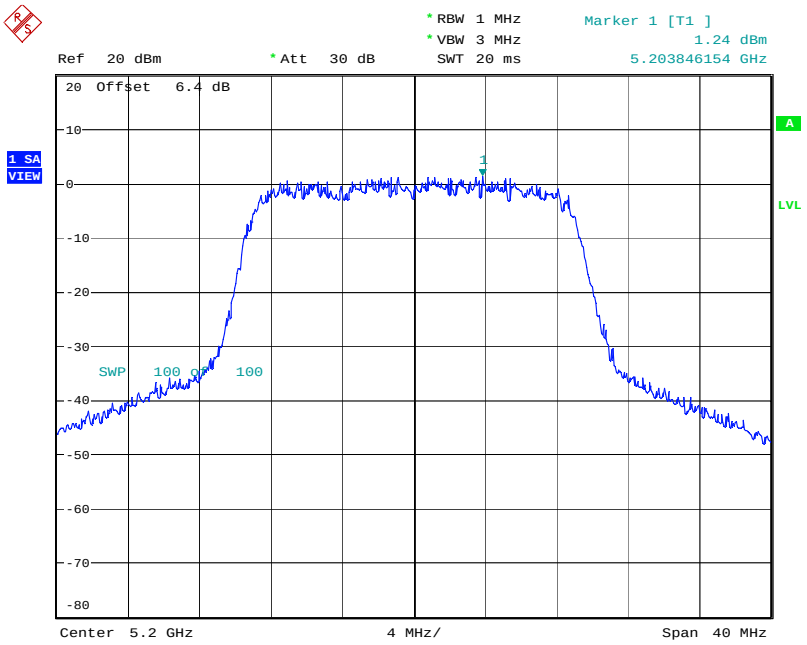
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	1.69	4.00	Complies
40	5200 MHz	1.24	4.00	Complies
48	5240 MHz	1.85	4.00	Complies

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



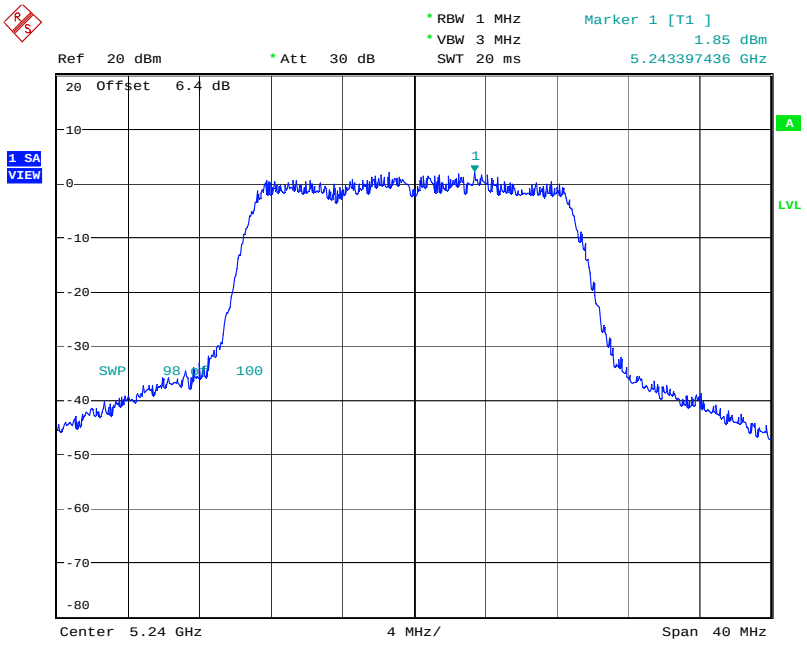
Date: 20.MAR.2008 20:02:43

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

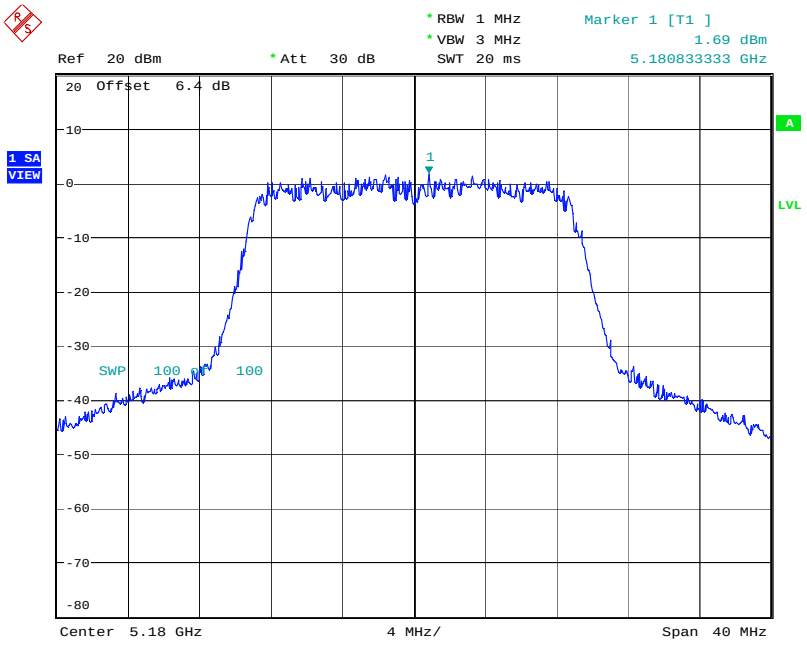


Date: 20.MAR.2008 20:01:09

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

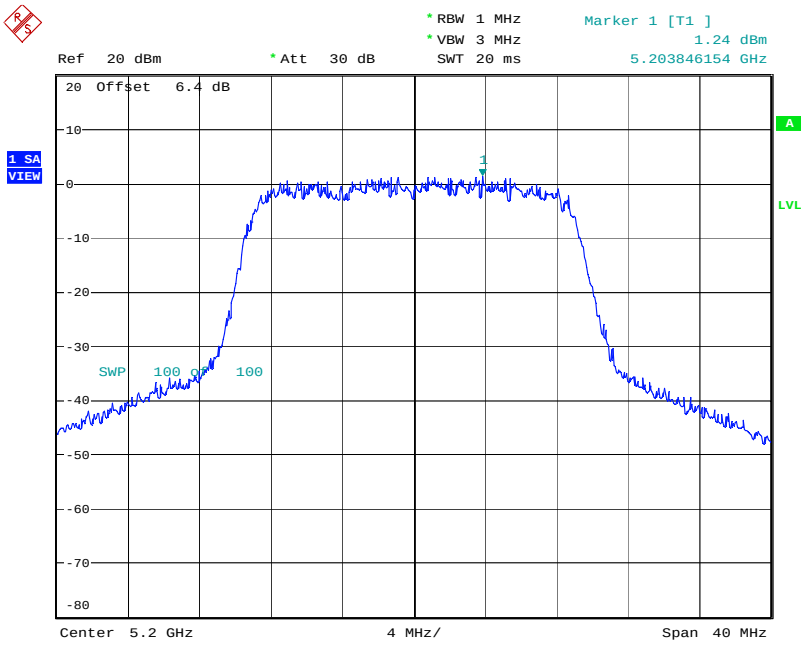


Power Density Plot on Configuration IEEE 802.11a Ant. 5 / 5180 MHz



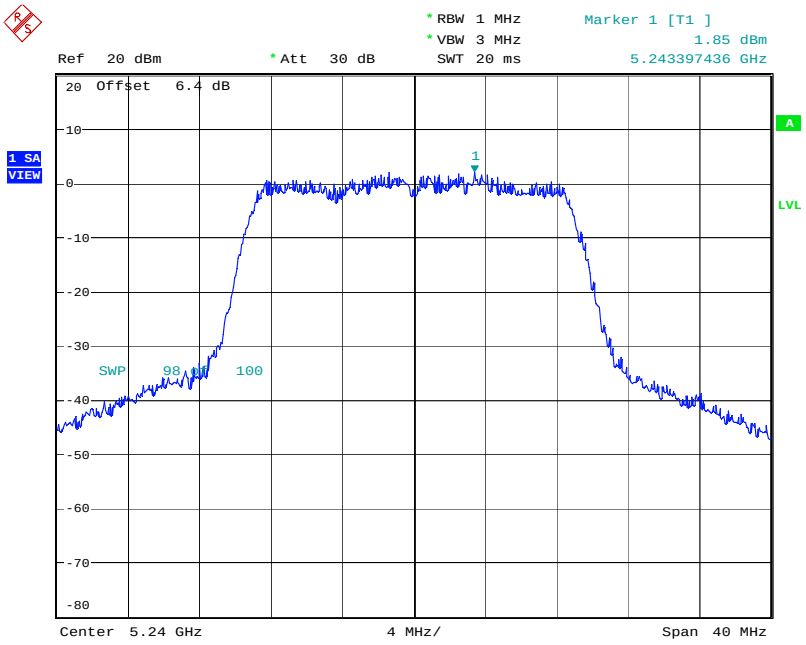
Date: 20.MAR.2008 20:02:43

Power Density Plot on Configuration IEEE 802.11a Ant. 5 / 5200 MHz

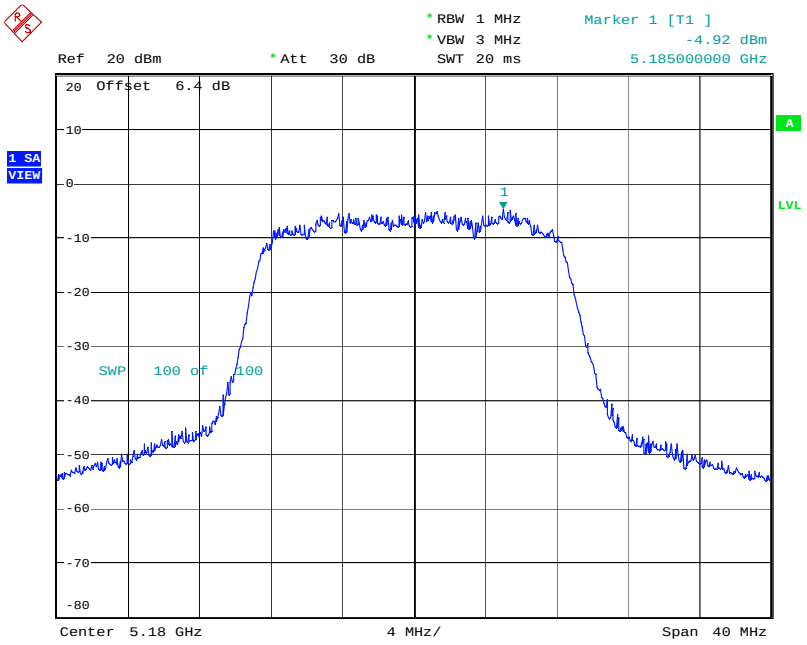


Date: 20.MAR.2008 20:01:09

Power Density Plot on Configuration IEEE 802.11a Ant. 5 / 5240 MHz

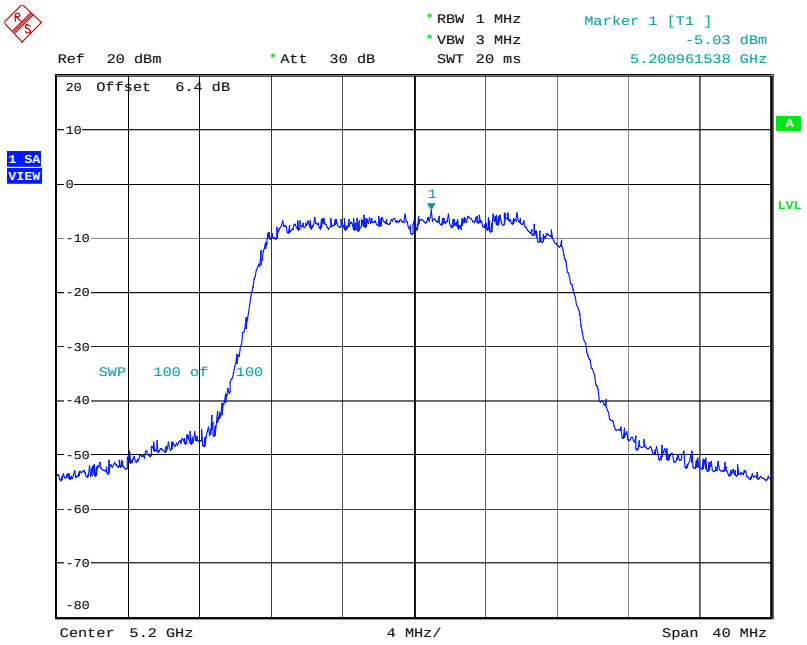


Power Density Plot on Configuration IEEE 802.11a Ant. 6 / 5180 MHz



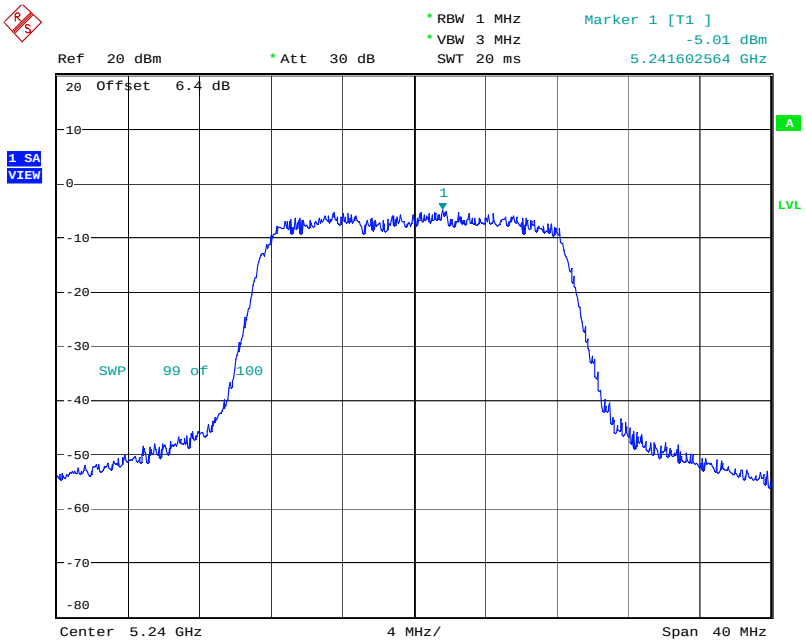
Date: 25.MAR.2008 14:25:17

Power Density Plot on Configuration IEEE 802.11a Ant. 6 / 5200 MHz



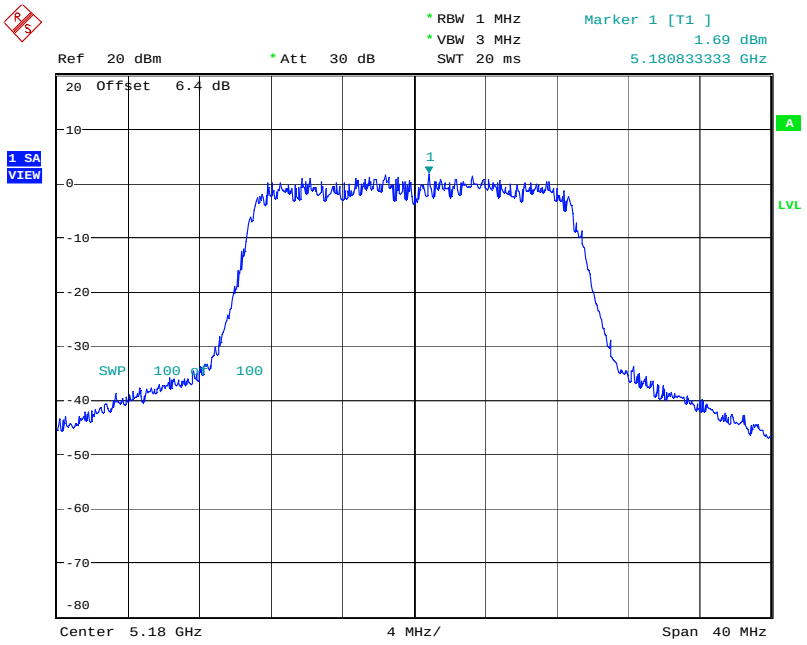
Date: 25.MAR.2008 14:26:19

Power Density Plot on Configuration IEEE 802.11a Ant. 6 / 5240 MHz



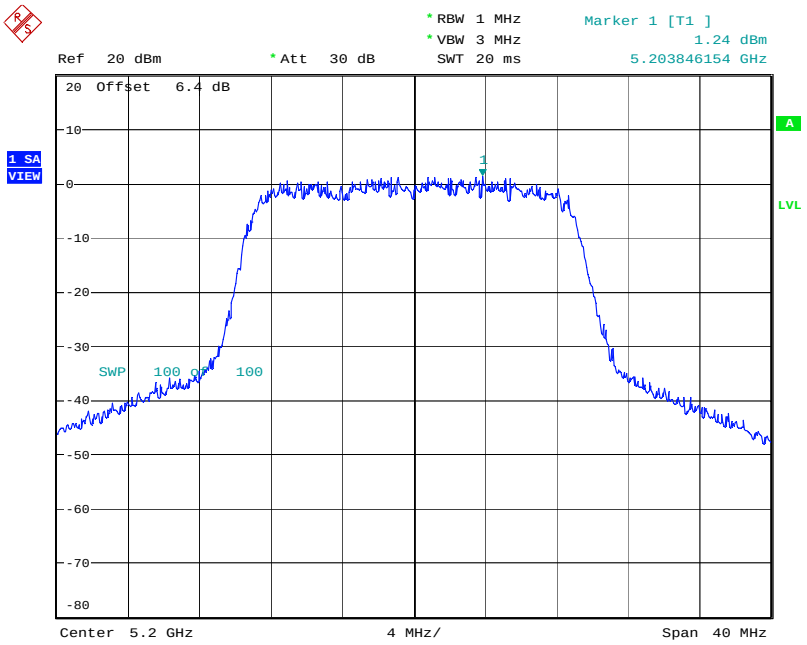
Date: 25.MAR.2008 14:27:13

Power Density Plot on Configuration IEEE 802.11a Ant. 7 / 5180 MHz



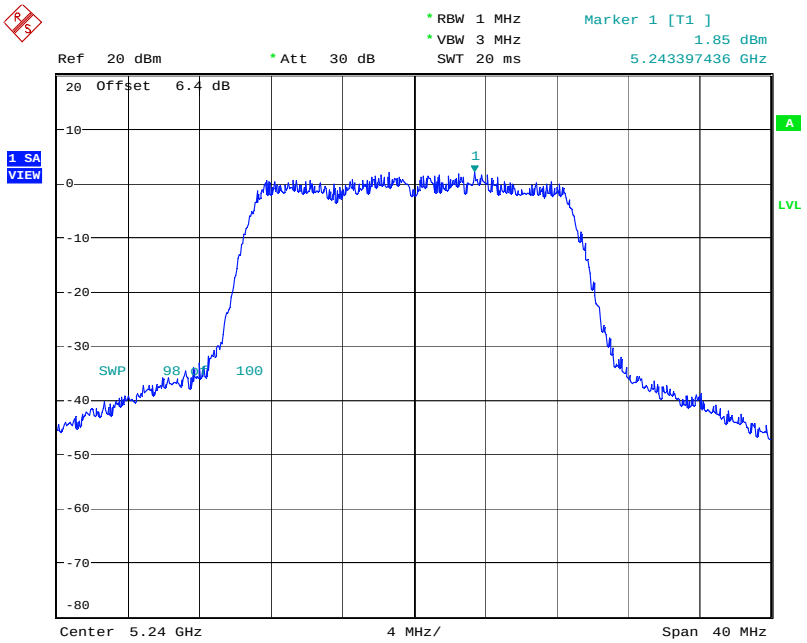
Date: 20.MAR.2008 20:02:43

Power Density Plot on Configuration IEEE 802.11a Ant. 7 / 5200 MHz



Date: 20.MAR.2008 20:01:09

Power Density Plot on Configuration IEEE 802.11a Ant. 7 / 5240 MHz



Date: 20.MAR.2008 19:58:55

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

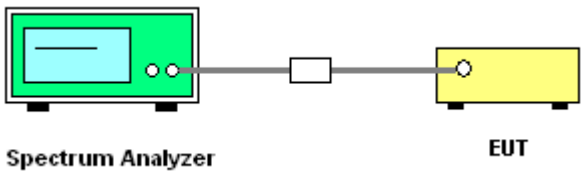
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 ≥ 1/T (IEEE 802.11a VBW = 300kHz ≥ 1/4 μs). Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode . Set max hold. Allow max hold to run for 60 seconds.
5. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Peak Excursion

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 1

Configuration IEEE 802.11a Ant. 1

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.37	13	Complies
40	5200 MHz	6.90	13	Complies
48	5240 MHz	5.41	13	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 5

Configuration IEEE 802.11a Ant. 5

Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.37	13	Complies
40	5200 MHz	6.90	13	Complies
48	5240 MHz	5.41	13	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 6

Configuration IEEE 802.11a Ant. 6

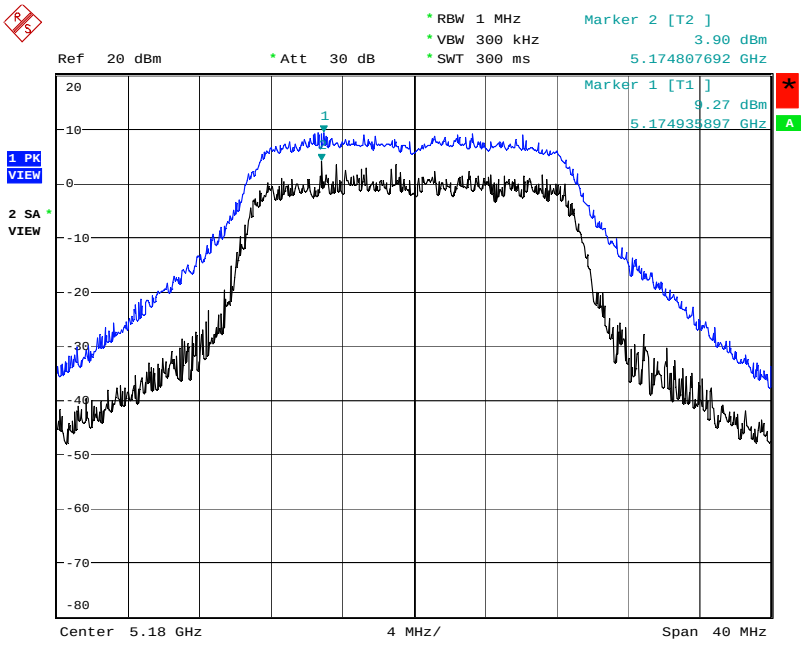
Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.69	13	Complies
40	5200 MHz	5.45	13	Complies
48	5240 MHz	5.46	13	Complies

Temperature	22℃	Humidity	61%
Test Engineer	Sam Chen	Configurations	802.11a / Antenna 7

Configuration IEEE 802.11a Ant. 7

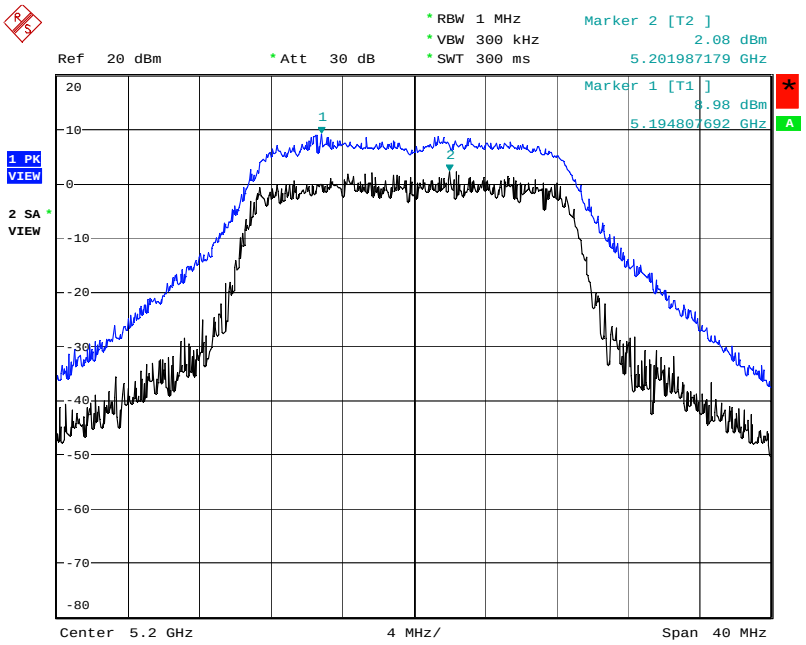
Channel	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
36	5180 MHz	5.37	13	Complies
40	5200 MHz	6.90	13	Complies
48	5240 MHz	5.41	13	Complies

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



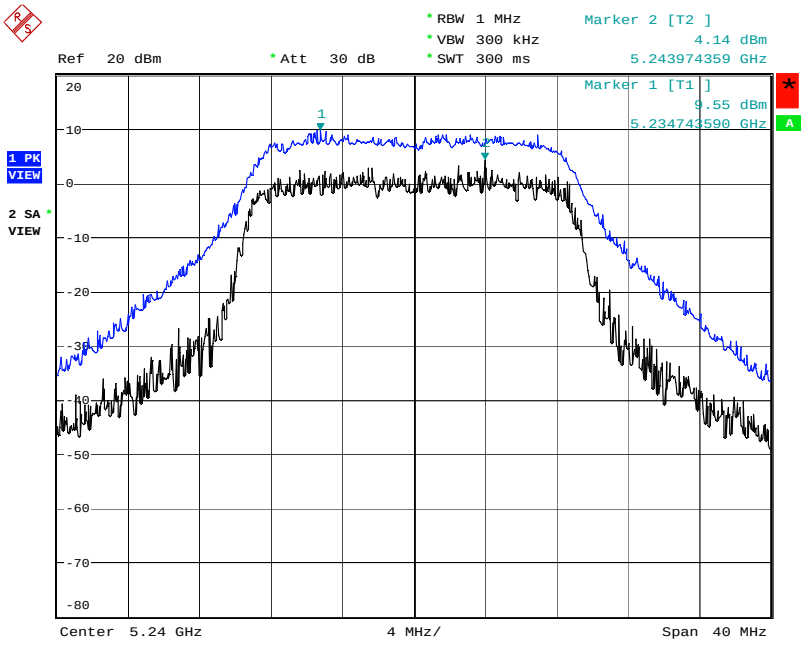
Date: 20.MAR.2008 20:02:55

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



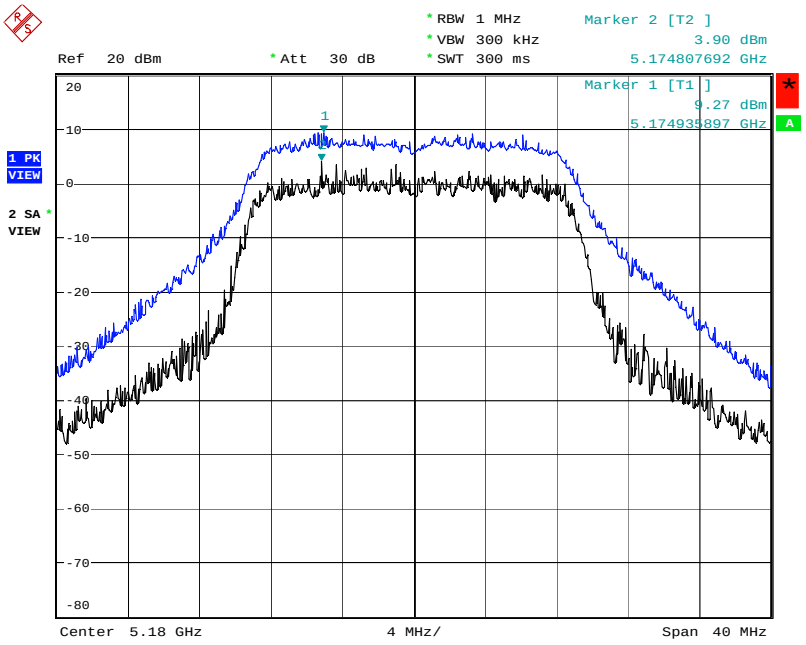
Date: 20.MAR.2008 20:01:21

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



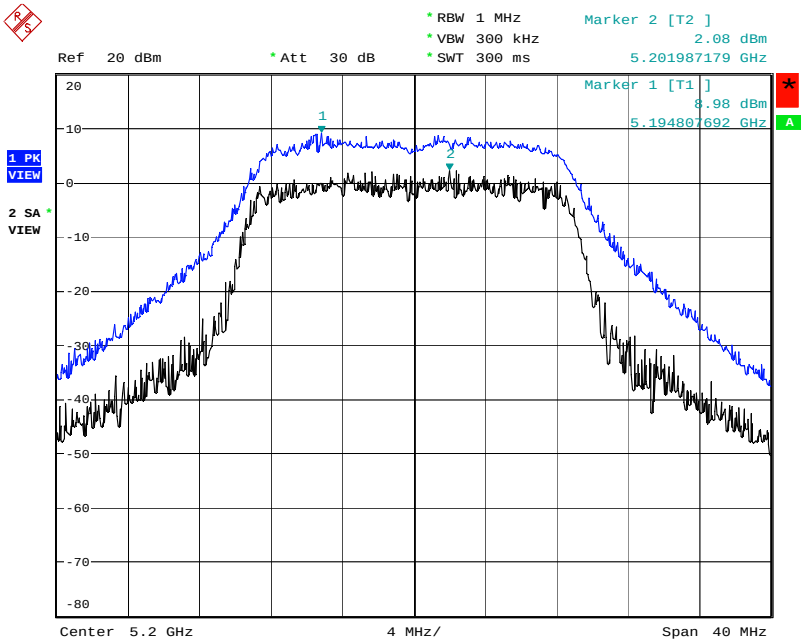
Date: 20.MAR.2008 19:59:07

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 5 / 5180 MHz



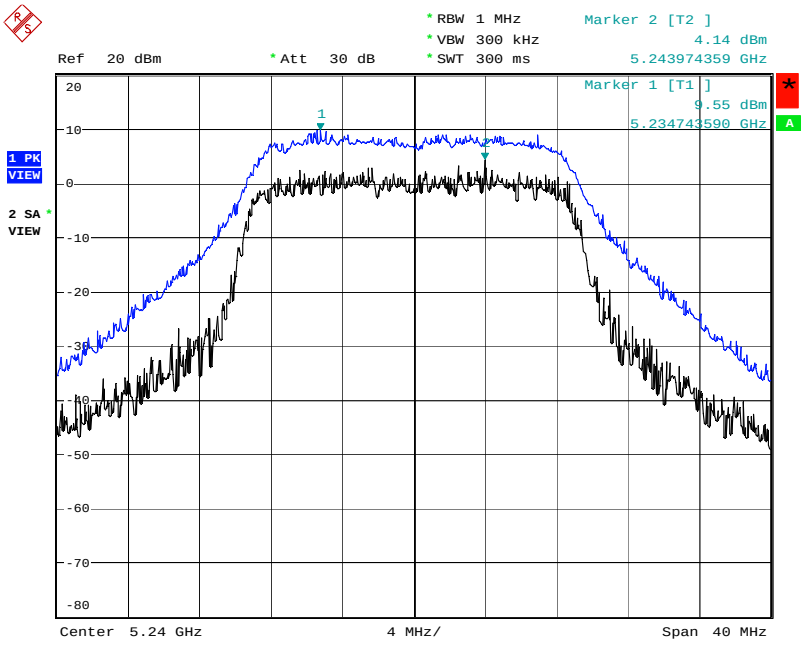
Date: 20.MAR.2008 20:02:55

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 5 / 5200 MHz



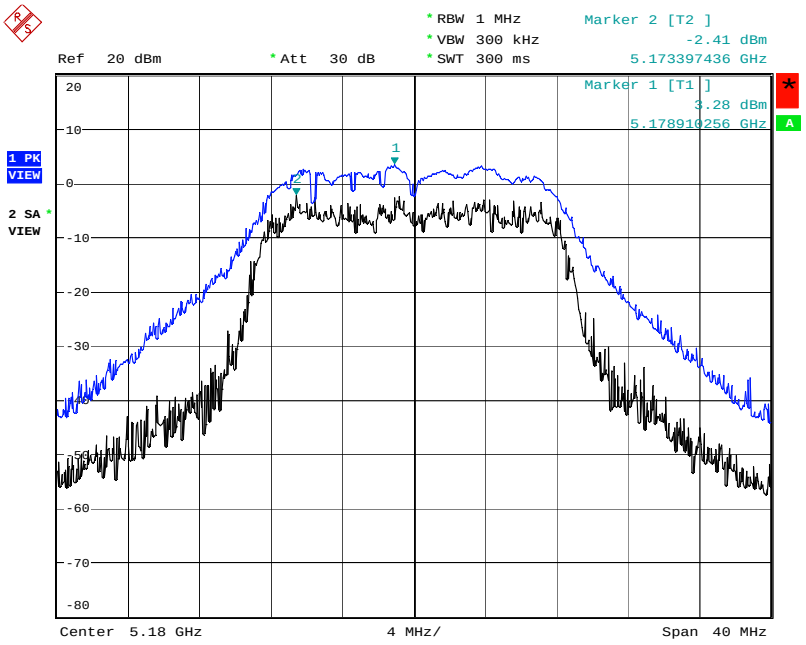
Date: 20.MAR.2008 20:01:21

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 5 / 5240 MHz



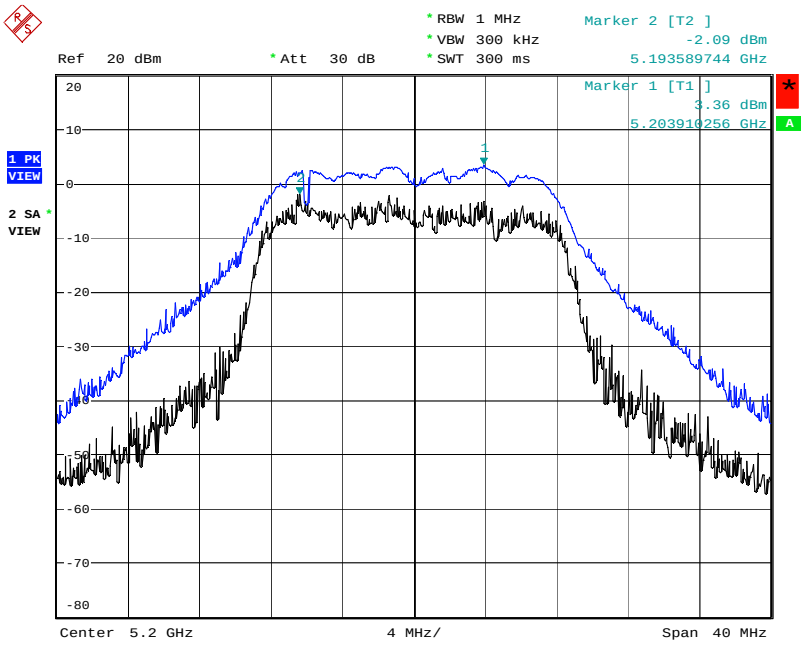
Date: 20.MAR.2008 19:59:07

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 6 / 5180 MHz



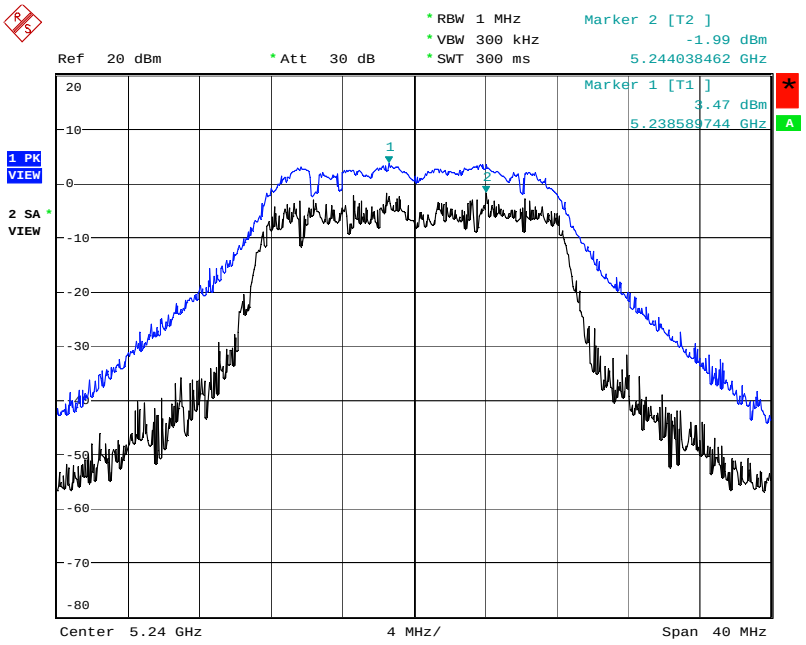
Date: 25.MAR.2008 14:25:30

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 6 / 5200 MHz



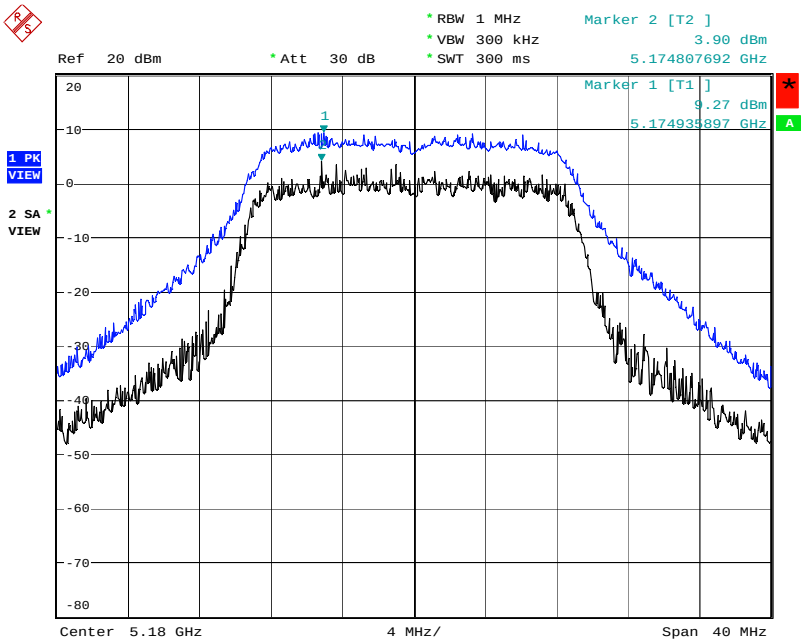
Date: 25.MAR.2008 14:26:31

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 6 / 5240 MHz



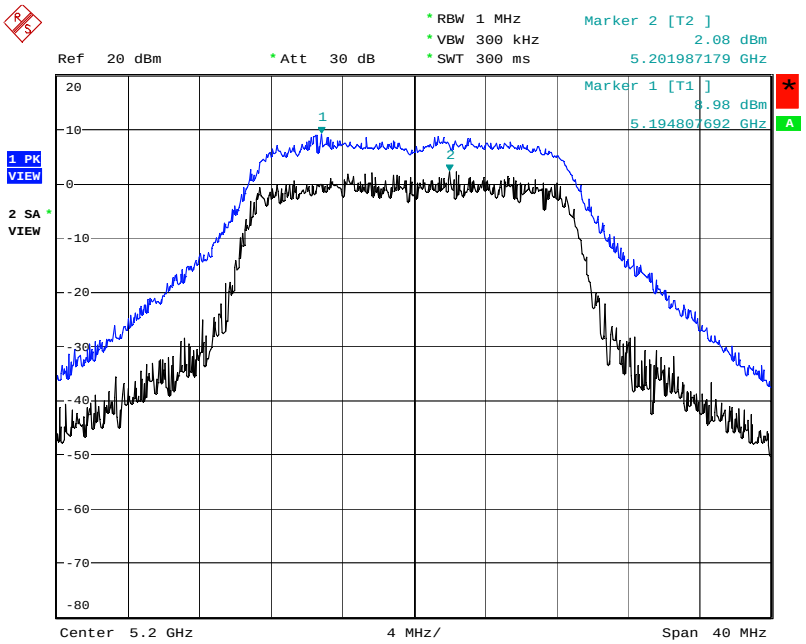
Date: 25.MAR.2008 14:27:25

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 7 / 5180 MHz



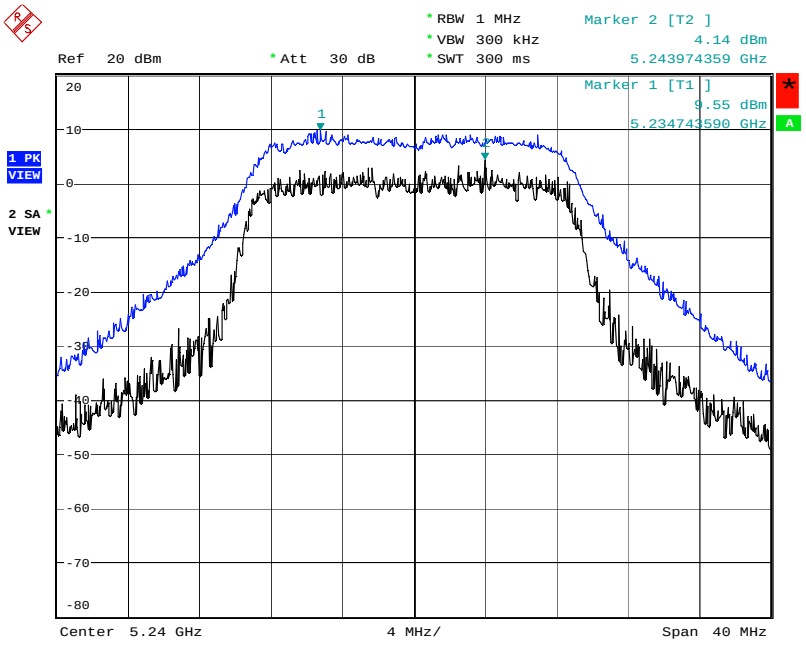
Date: 20.MAR.2008 20:02:55

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 7 / 5200 MHz



Date: 20.MAR.2008 20:01:21

Peak Excursion Plot on Configuration IEEE 802.11a Ant. 7 / 5240 MHz



Date: 20.MAR.2008 19:59:07

4.6. Radiated Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.15-5.25 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 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

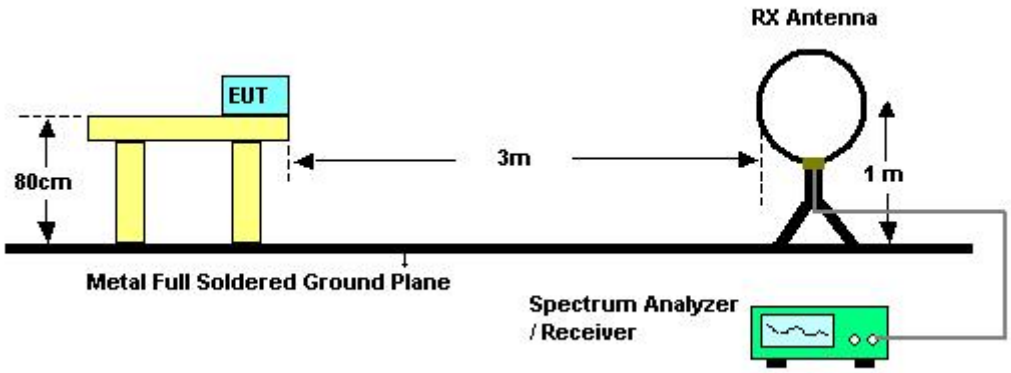
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

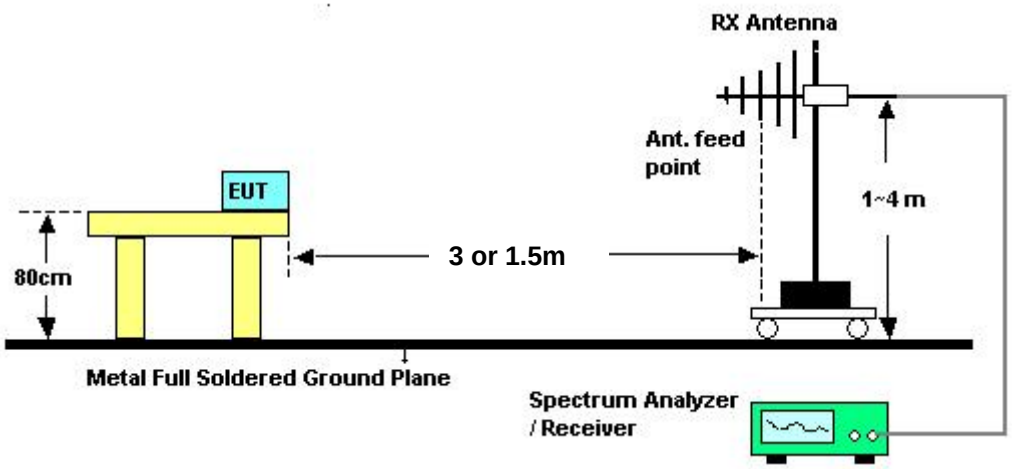
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

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	62%
Test Engineer	Jax Chen		

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.

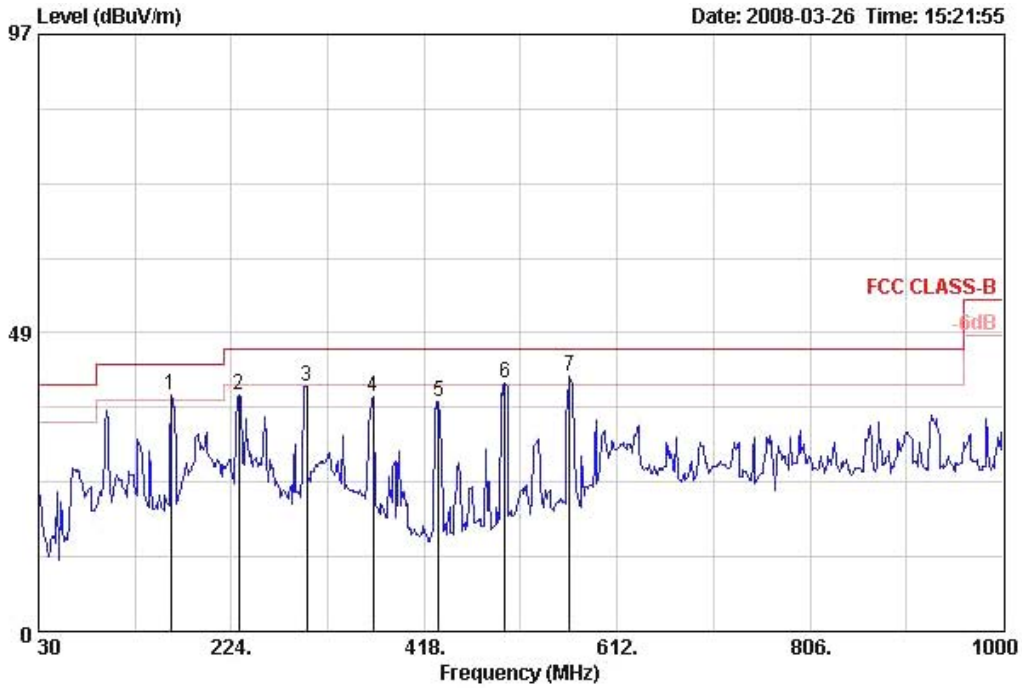
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

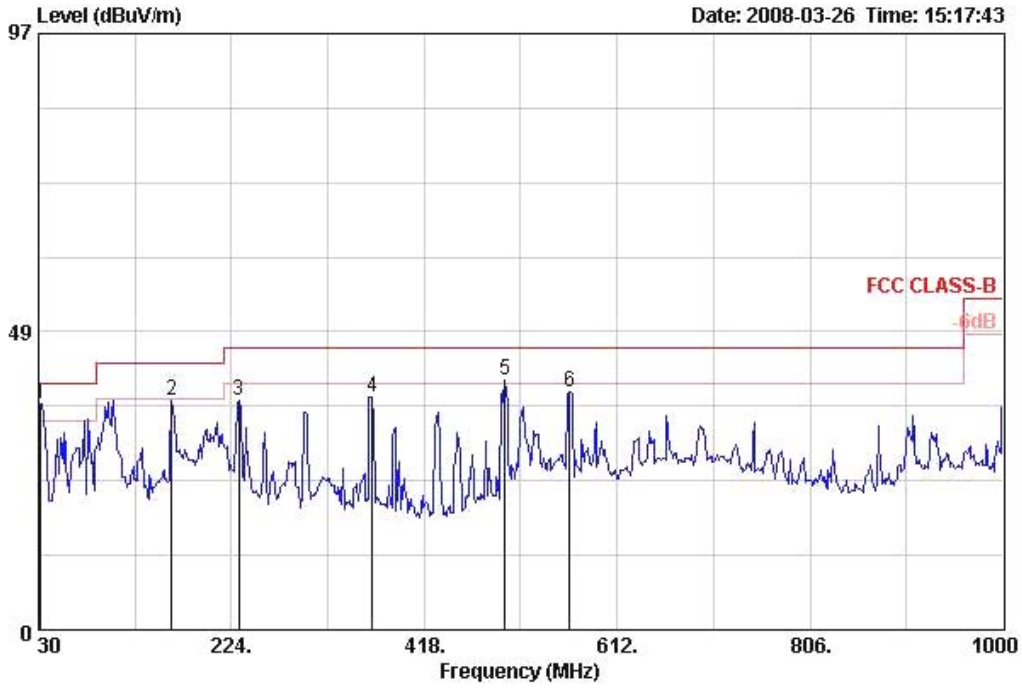
Temperature	23℃	Humidity	62%
Test Engineer	Jax Chen	Configurations	Normal Link / Ant. 1

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 !	162.890	38.33	-5.17	43.50	57.35	10.51	2.00	31.53	Peak	100	-1	HORIZONTAL
2	231.760	38.54	-7.46	46.00	56.41	11.30	2.21	31.38	Peak	100	-1	HORIZONTAL
3	299.660	39.92	-6.08	46.00	55.04	14.00	2.20	31.32	Peak	100	-1	HORIZONTAL
4	366.590	38.01	-7.99	46.00	50.88	15.80	2.50	31.17	Peak	100	-1	HORIZONTAL
5	432.550	37.21	-8.79	46.00	48.35	16.99	2.83	30.96	Peak	100	-1	HORIZONTAL
6 !	499.480	40.42	-5.58	46.00	50.19	17.89	3.28	30.94	Peak	100	-1	HORIZONTAL
7 @	564.470	41.45	-4.55	46.00	50.07	18.96	3.17	30.75	Peak	100	-1	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	31.940	36.76	-3.24	40.00	48.84	18.66	0.93	31.67	Peak	400	-1	VERTICAL
2	163.860	37.34	-6.16	43.50	56.39	10.48	2.00	31.53	Peak	400	-1	VERTICAL
3	231.760	37.18	-8.82	46.00	55.05	11.30	2.21	31.38	Peak	400	-1	VERTICAL
4	365.620	37.92	-8.08	46.00	50.83	15.78	2.49	31.17	Peak	400	-1	VERTICAL
5 !	499.480	40.52	-5.48	46.00	50.29	17.89	3.28	30.94	Peak	400	-1	VERTICAL
6	564.470	38.82	-7.18	46.00	47.44	18.96	3.17	30.75	Peak	400	-1	VERTICAL

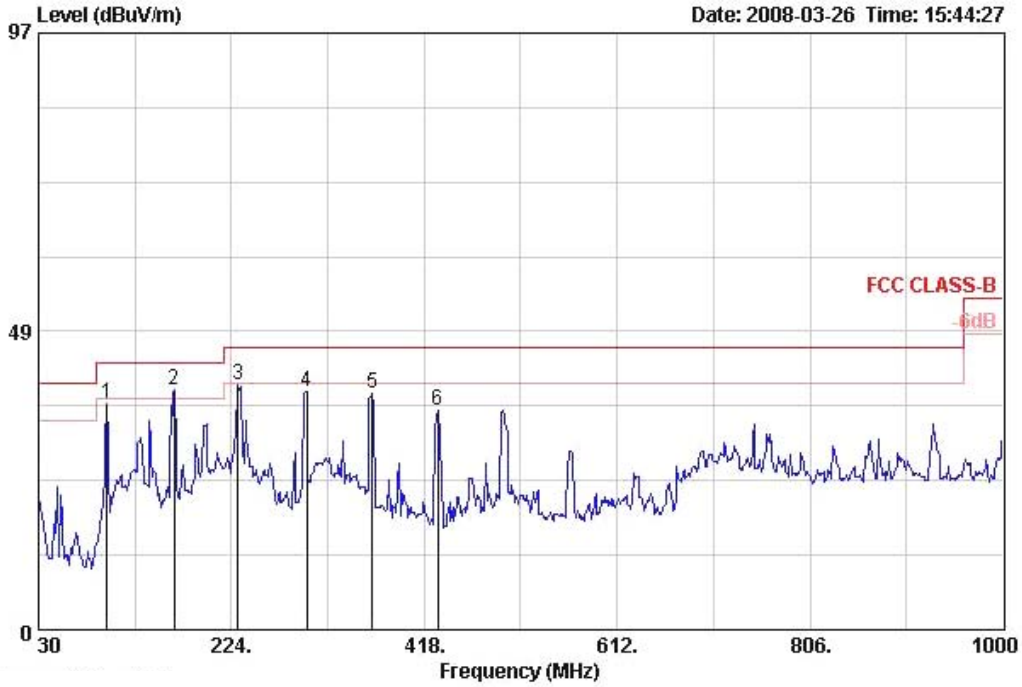
Note:

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

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

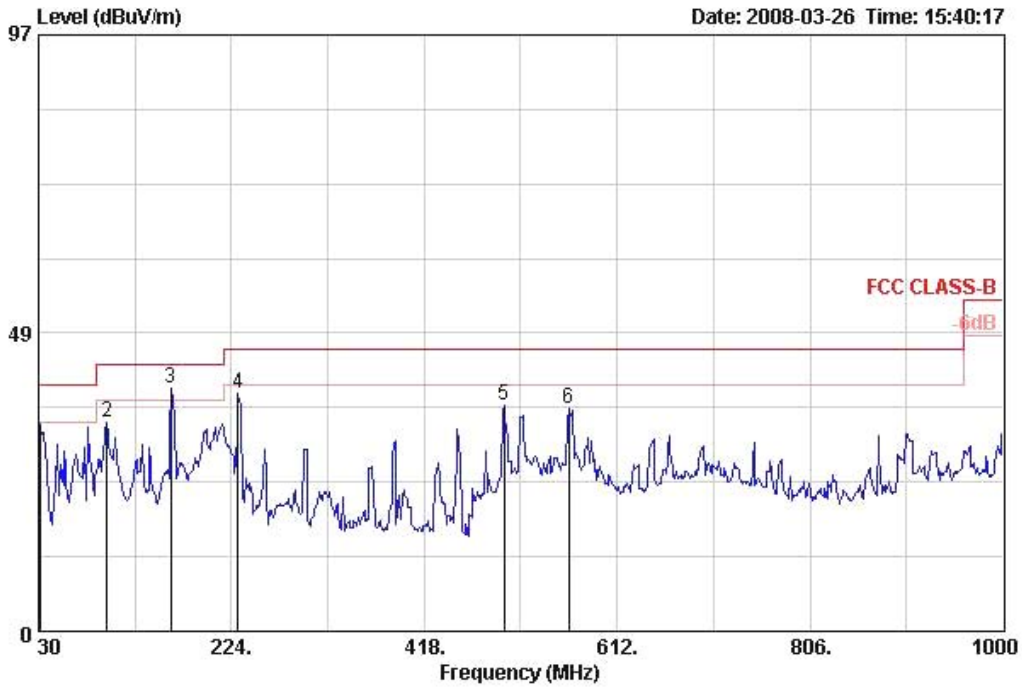
Temperature	23℃	Humidity	62%
Test Engineer	Jax Chen	Configurations	Normal Link / Ant. 2

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	98.870	36.73	-6.77	43.50	55.93	11.02	1.50	31.72	Peak	100	-4	HORIZONTAL
2 @	166.770	38.85	-4.65	43.50	58.01	10.39	2.00	31.55	Peak	100	-4	HORIZONTAL
3	230.790	39.68	-6.32	46.00	57.65	11.20	2.21	31.38	Peak	100	-4	HORIZONTAL
4	299.660	38.61	-7.39	46.00	53.73	14.00	2.20	31.32	Peak	100	-4	HORIZONTAL
5	365.620	38.37	-7.63	46.00	51.27	15.78	2.49	31.17	Peak	100	-4	HORIZONTAL
6	431.580	35.51	-10.49	46.00	46.66	16.98	2.83	30.96	Peak	100	-4	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	30.970	33.60	-6.40	40.00	45.09	19.38	0.80	31.67	Peak	400	-1	VERTICAL
2	98.870	34.12	-9.38	43.50	53.32	11.02	1.50	31.72	Peak	400	-1	VERTICAL
3 @	162.890	39.65	-3.85	43.50	58.67	10.51	2.00	31.53	Peak	400	-1	VERTICAL
4	230.790	38.62	-7.38	46.00	56.59	11.20	2.21	31.38	Peak	400	-1	VERTICAL
5	498.510	36.65	-9.35	46.00	46.43	17.87	3.28	30.94	Peak	400	-1	VERTICAL
6	563.500	36.22	-9.78	46.00	44.85	18.95	3.17	30.75	Peak	400	-1	VERTICAL

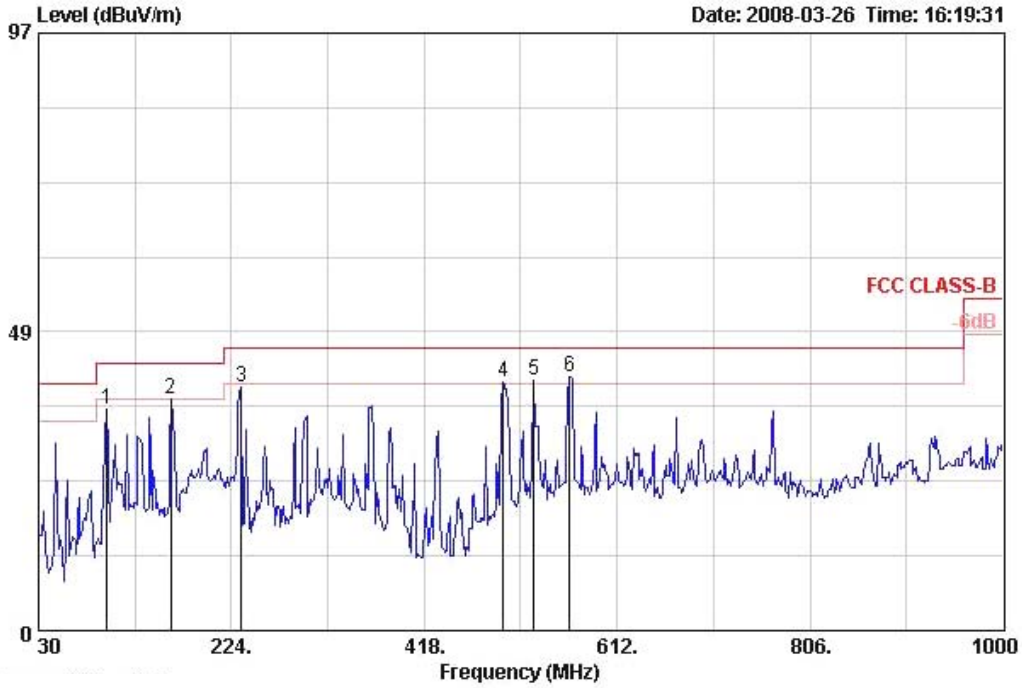
Note:

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

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

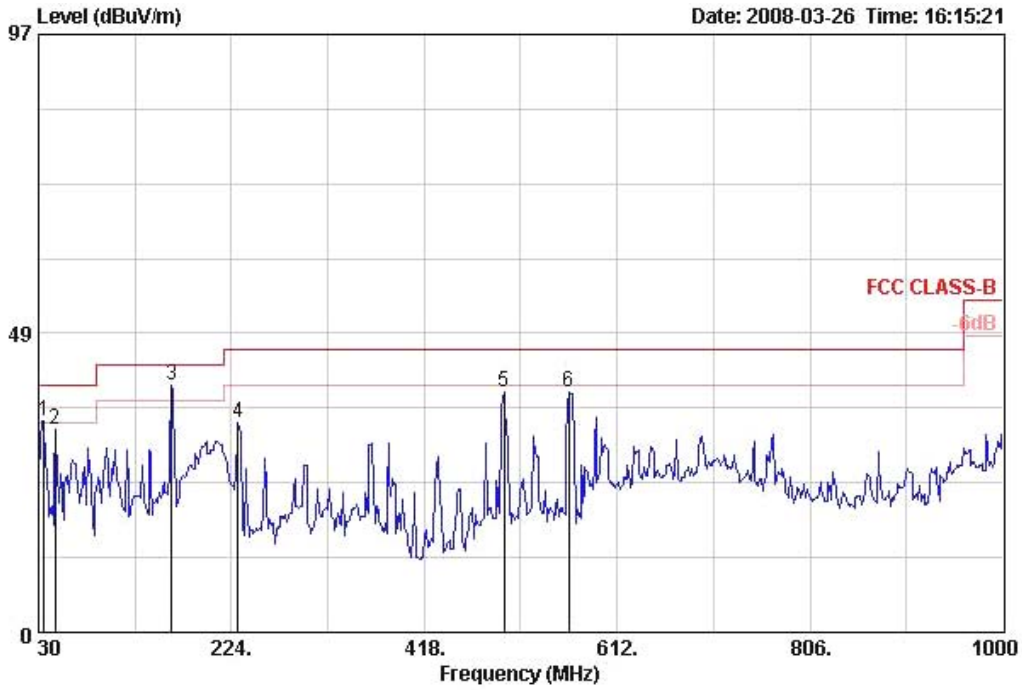
Temperature	23℃	Humidity	62%
Test Engineer	Jax Chen	Configurations	Normal Link / Ant. 3

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	98.870	36.00	-7.50	43.50	55.20	11.02	1.50	31.72	Peak	100	-1	HORIZONTAL
2 !	162.890	37.55	-5.95	43.50	56.57	10.51	2.00	31.53	Peak	100	-1	HORIZONTAL
3	233.700	39.50	-6.50	46.00	57.15	11.50	2.23	31.38	Peak	100	-1	HORIZONTAL
4 !	497.540	40.30	-5.70	46.00	50.11	17.86	3.27	30.94	Peak	100	-1	HORIZONTAL
5 !	528.580	40.74	-5.26	46.00	49.86	18.47	3.24	30.83	Peak	100	-1	HORIZONTAL
6 !	564.470	41.19	-4.81	46.00	49.81	18.96	3.17	30.75	Peak	100	-1	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 !	35.820	34.33	-5.67	40.00	48.85	15.98	1.20	31.70	Peak	400	-1	VERTICAL
2	46.490	32.86	-7.14	40.00	52.89	10.67	1.10	31.79	Peak	400	-1	VERTICAL
3 @	163.860	39.96	-3.54	43.50	59.01	10.48	2.00	31.53	Peak	400	-1	VERTICAL
4	230.790	33.89	-12.11	46.00	51.86	11.20	2.21	31.38	Peak	400	-1	VERTICAL
5	498.510	38.97	-7.03	46.00	48.75	17.87	3.28	30.94	Peak	400	-1	VERTICAL
6	563.500	38.86	-7.14	46.00	47.48	18.95	3.17	30.75	Peak	400	-1	VERTICAL

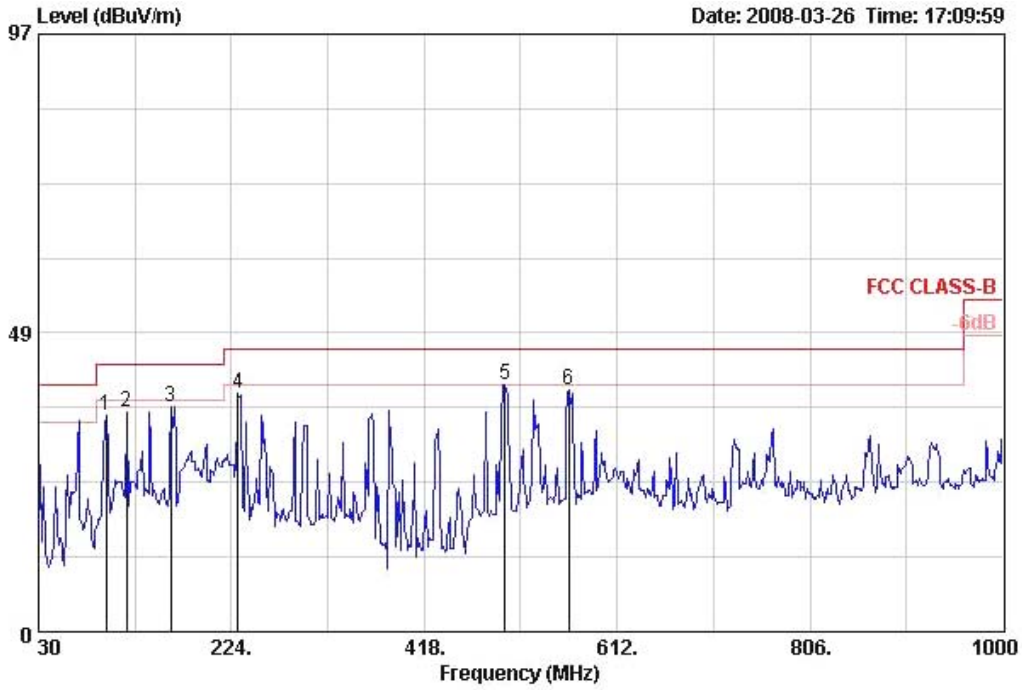
Note:

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

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

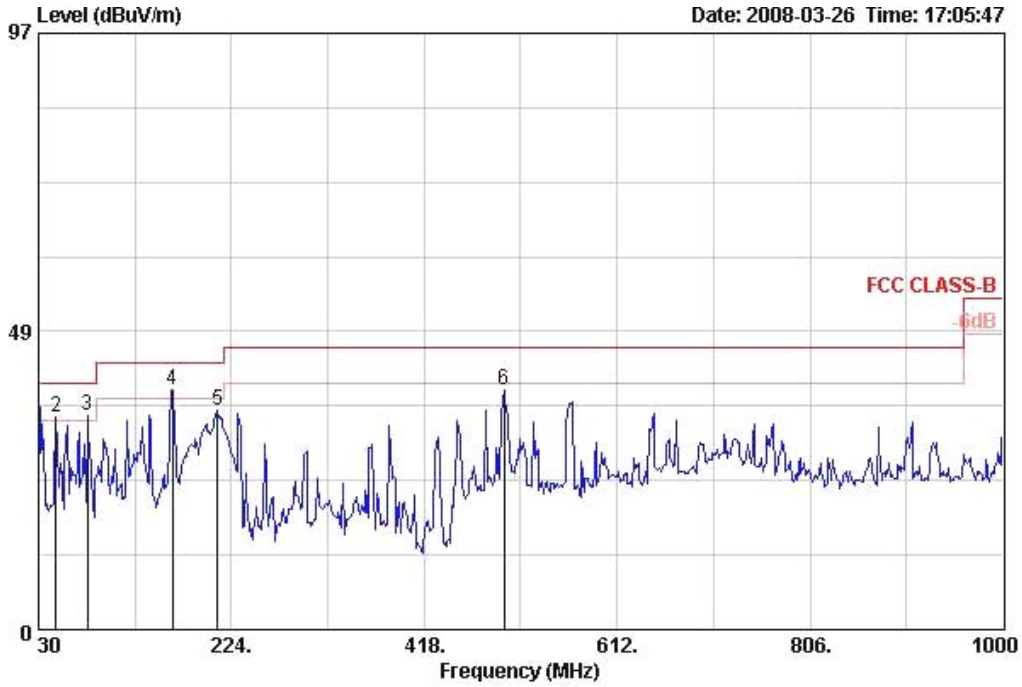
Temperature	23℃	Humidity	62%
Test Engineer	Jax Chen	Configurations	Normal Link / Ant. 4

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	97.900	35.03	-8.47	43.50	54.42	10.84	1.50	31.73	Peak	100	-4	HORIZONTAL
2	118.270	35.55	-7.95	43.50	52.86	12.88	1.57	31.76	Peak	100	-4	HORIZONTAL
3	162.890	36.55	-6.95	43.50	55.57	10.51	2.00	31.53	Peak	100	-4	HORIZONTAL
4	230.790	38.65	-7.35	46.00	56.62	11.20	2.21	31.38	Peak	100	-4	HORIZONTAL
5 !	499.480	40.14	-5.86	46.00	49.91	17.89	3.28	30.94	Peak	100	-4	HORIZONTAL
6	563.500	39.16	-6.84	46.00	47.78	18.95	3.17	30.75	Peak	100	-4	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	30.000	36.19	-3.81	40.00	46.96	20.10	0.80	31.67	Peak	400	-1	VERTICAL
2 !	47.460	34.56	-5.44	40.00	54.97	10.30	1.10	31.81	Peak	400	-1	VERTICAL
3 !	79.470	34.93	-5.07	40.00	57.87	7.51	1.30	31.75	Peak	400	-1	VERTICAL
4 !	164.830	39.06	-4.44	43.50	58.15	10.45	2.00	31.54	Peak	400	-1	VERTICAL
5	210.420	35.61	-7.89	43.50	54.37	10.60	2.06	31.42	Peak	400	-1	VERTICAL
6	498.510	38.86	-7.14	46.00	48.64	17.87	3.28	30.94	Peak	400	-1	VERTICAL

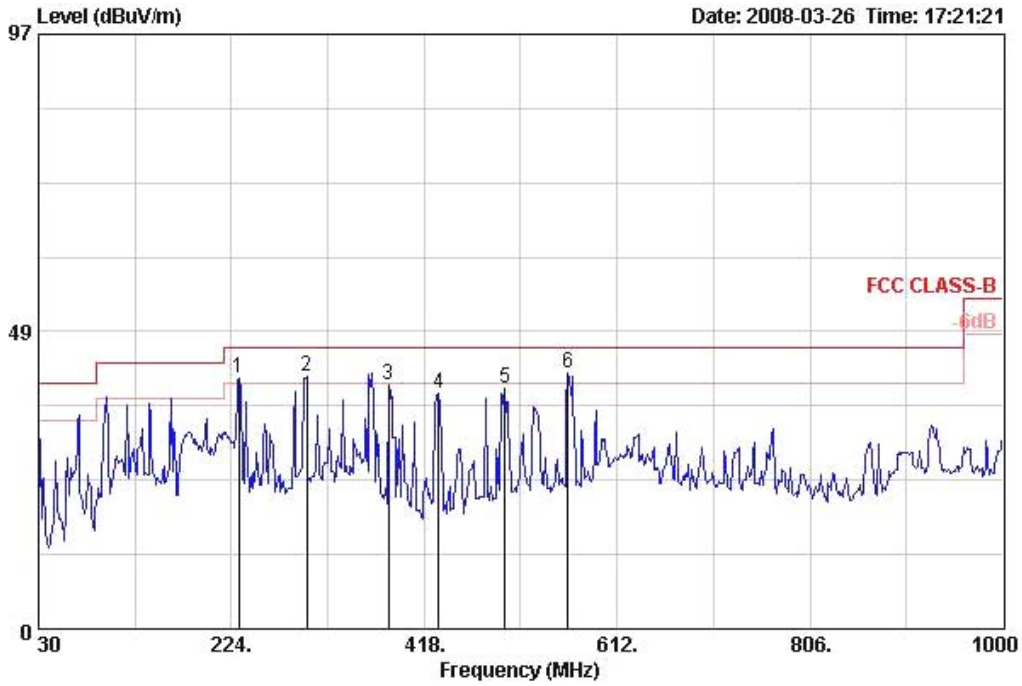
Note:

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

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

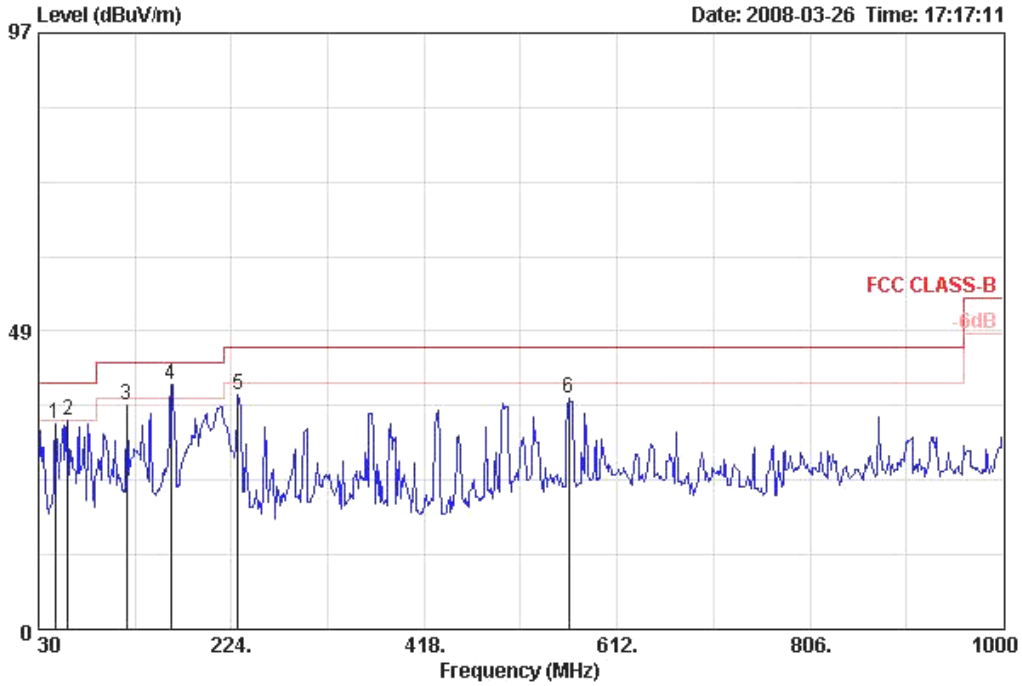
Temperature	23℃	Humidity	62%
Test Engineer	Jax Chen	Configurations	Normal Link / Ant. 5

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 !	231.760	40.85	-5.15	46.00	58.72	11.30	2.21	31.38	Peak	100	-5	HORIZONTAL
2 !	299.660	41.09	-4.91	46.00	56.21	14.00	2.20	31.32	Peak	100	-5	HORIZONTAL
3	382.110	39.90	-6.10	46.00	52.23	16.18	2.60	31.10	Peak	100	-5	HORIZONTAL
4	432.550	38.54	-7.46	46.00	49.68	16.99	2.83	30.96	Peak	100	-5	HORIZONTAL
5	499.480	39.35	-6.65	46.00	49.12	17.89	3.28	30.94	Peak	100	-5	HORIZONTAL
6 !	562.530	41.70	-4.30	46.00	50.32	18.95	3.18	30.75	Peak	100	-5	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	46.490	33.36	-6.64	40.00	53.38	10.67	1.10	31.79	Peak	400	-5	VERTICAL
2	59.100	34.00	-6.00	40.00	57.50	6.86	1.40	31.76	Peak	400	-5	VERTICAL
3	118.270	36.39	-7.11	43.50	53.69	12.88	1.57	31.76	Peak	400	-5	VERTICAL
4 @	162.890	39.87	-3.63	43.50	58.89	10.51	2.00	31.53	Peak	400	-5	VERTICAL
5	230.790	38.25	-7.75	46.00	56.22	11.20	2.21	31.38	Peak	400	-5	VERTICAL
6	563.500	37.47	-8.53	46.00	46.09	18.95	3.17	30.75	Peak	400	-5	VERTICAL

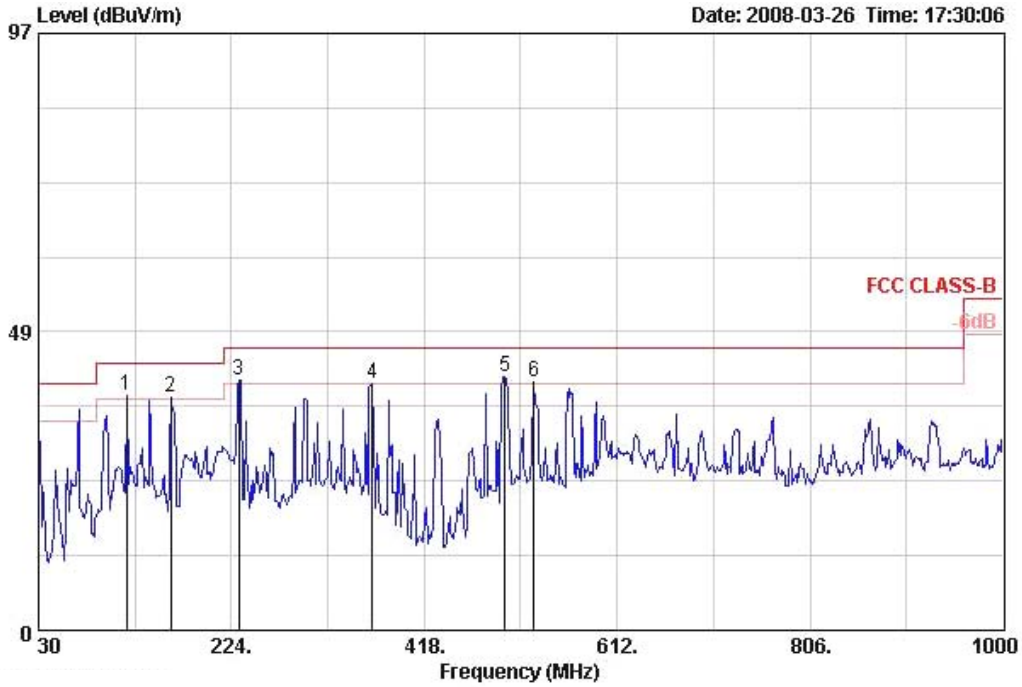
Note:

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

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

Temperature	23℃	Humidity	62%
Test Engineer	Jax Chen	Configurations	Normal Link / Ant. 6

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 !	118.270	38.16	-5.34	43.50	55.46	12.88	1.57	31.76	Peak	100	-1	HORIZONTAL
2 !	162.890	37.79	-5.71	43.50	56.81	10.51	2.00	31.53	Peak	100	-1	HORIZONTAL
3 !	231.760	40.66	-5.34	46.00	58.53	11.30	2.21	31.38	Peak	100	-1	HORIZONTAL
4	365.620	39.94	-6.06	46.00	52.85	15.78	2.49	31.17	Peak	100	-1	HORIZONTAL
5 @	499.480	41.31	-4.69	46.00	51.08	17.89	3.28	30.94	Peak	100	-1	HORIZONTAL
6 !	528.580	40.41	-5.59	46.00	49.53	18.47	3.24	30.83	Peak	100	-1	HORIZONTAL