NVLAP LAB CODE 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Azalea Networks U.S.A.

673 Smilpitas Blvd Suite 105 Milpitas, CA 95035, USA

FCC ID: URP-MSR2K24S

This Report Concerns:	Equipment Type:
☒ Original Report	Wireless Mesh Router

Test Engineer:	Green Xu
Report No.:	RSZ07062501
Test Date:	2007-07-19 to 2007-08-19
Report Date:	2007-08-20
Reviewed By:	EMC Manager: Boni Baniqued
Prepared By:	Bay Area Compliance Laboratory Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Azalea Networks U.S.A.* 's product, model number: *MSR2000 o*r the "EUT" as referred to in this report is a *Wireless Mesh Router,* which measures approximately: 26.0 cm L x 24.0 cm W x 10.5 cm H, rated input voltage: AC 120V/60Hz.

The series products, model name: MSR2000, DWR-500, WMS4500, Wawoola R1200 have the same circuit diagram, PCB layout, only model name is different. So, we select MSR2000 to test.

** The test data gathered are from production sample, serial number: 0706044 provided by the manufacturer, we receive the EUT on 2007-06-25.*

Objective

This Type approval report is prepared on behalf of *Azalea Networks U.S.A.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209and 15.247rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratory Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratory Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratory Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).

NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

The EUT is programmed with the modulation, frequency and power setting for the testing.

Special Accessories

The special accessories were provided by Bay Area Compliance Laboratory Corp. (Shenzhen).

Equipment Modifications

Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Intel	Motherboard	D865GKD	11S19R1949ZJ1WCB46J1J4	DoC
IBM	Power	HIPRO-A2307F3T	11S49P2191ZJ1TAR47D1PG	DoC
IBM	Hard Disk	IC35L090AW207-0	VNVC32G3GGS52T	DoC
ALPS	3.5' Floppy	06P5226	11S06P5226ZJ1W25328053	DoC
Hitachi-LG	DVD-Rom	LTN-489S	B4F511412	DoC
Intel	Ethernet	PRO 10/100 VE	N/A	DoC
IBM	PC	ThinkCentre A50	99Y5681	DoC
ProMOS	Memory	V826616J24SATG-C0	BD070964H	DoC
Intel	CPU	Pentium4 2800MHz	N/A	DoC

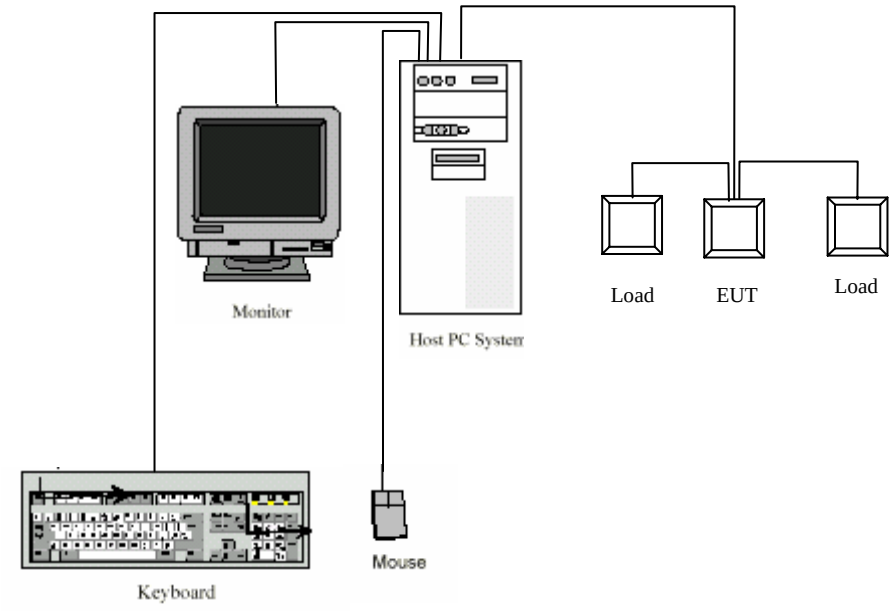
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Logitech	Keyboard	Y-SM48	SY513U68933	DoC
Logitech	Mouse	M-SAW83A	HCA31707689	DoC
IBM	CRT Monitor	6737-66W	23-P3242	BEJT17HD

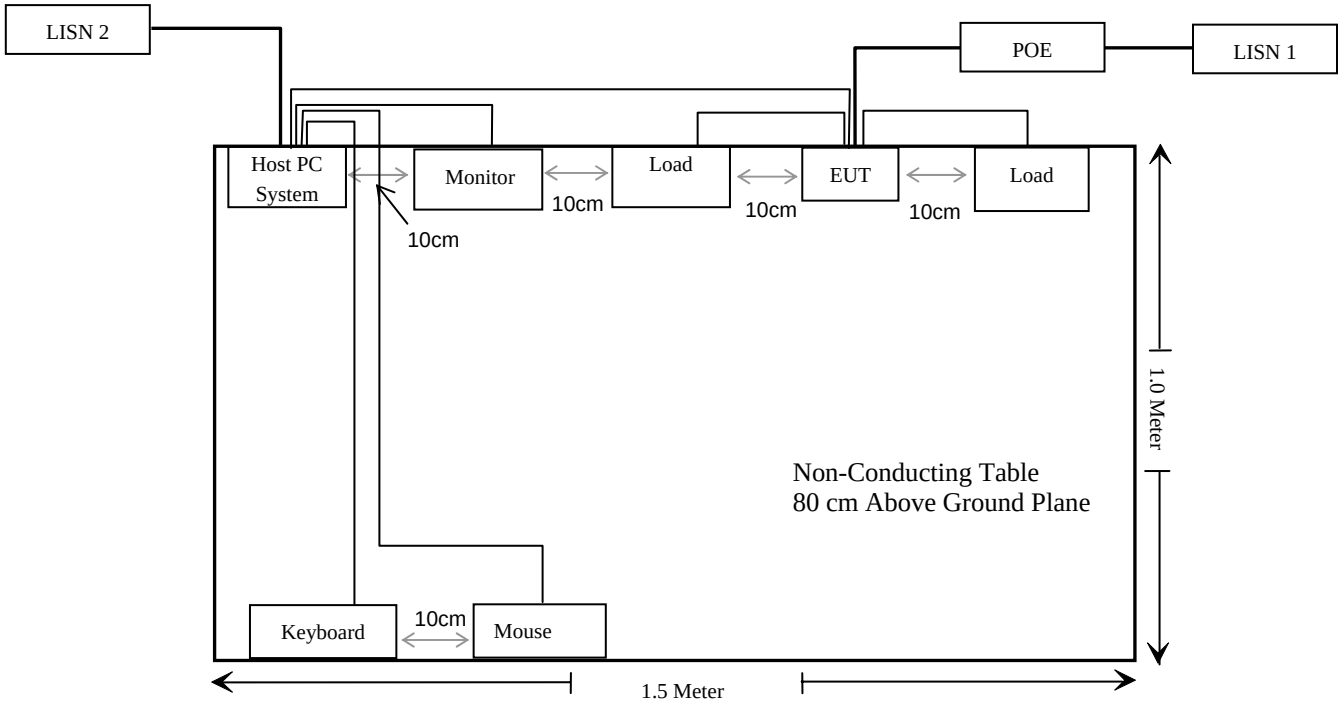
External I/O Cable

Cable Description	Length (M)	From/Port	To
Shielded Detachable Keyboard Cable	1.50	Keyboard Port / Host	Keyboard
Shielded Detachable Mouse Cable	1.50	Mouse Port / Host	Mouse
Shielded Detachable VGA Cable	1.50	VGA Port/Host	Monitor
RF Shield coaxial Cable 1	1.0	Radio port 0	Antenna
RF Shield coaxial Cable 2	1.0	Radio port 1	Antenna
Communication Cable 1	2.0	Console	Computer Com
Communication Cable 2	2.0	computer	Ethernet

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1310	Maximun Permissible Exposure (MPE)	Compliant
§ 15.203/15.247 (c)	Antenna Requirement	Compliant
§15.107, §15.207 (a)	Conducted Emissions	Compliant
§ 15.247 (d), §15.205, §15.109, §15.209	Radiated Emissions and Band edges	Compliant*
§ 15.247 (a) (2) and §15.403 (c)	6dB Bandwidth Testing	Compliant
§ 15.247 (b) (3)	Peak output Power Measurement	Compliant
§15.247(e)	Power Spectral Density	Compliant

* *Within the measurement uncertainty*

§15.247 (i), § 1.1310 - MAXIMUN PERMISSIBLE EXPOSURE (MPE)

Limit

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Radio frequency radiation exposure was calculated based on § 1.1310 limits.

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f\2\)	6
30-300.	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6

f = frequency in MHz
* = Plane-wave equivalent power density

Test Data

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna
R = distance to the center of radiation of the antenna

802.11a mode (Antenna model: TQWTD-1700-5.5V):

Maximum peak output power at antenna input terminal: 19.49 dBm
Maximum peak output power at antenna input terminal: 88.92 mW
Prediction distance: 20 cm
Prediction frequency: 5745 MHz
Antenna gain (actual): 17 dBi
Antenna gain (numeric): 50.12
Power density at the predication frequency at 20 cm: 0.89 mW/cm^2

802.11b mode (Antenna model: XPTX1412-QX):

Maximum peak output power at antenna input terminal: 20.09 dBm
Maximum peak output power at antenna input terminal: 102.09 mW
Prediction distance: 20 cm
Prediction frequency: 2437 MHz
Antenna gain (actual): 12 dBi
Antenna gain (numeric): 15.85
Power density at the predication frequency at 20 cm: 0.32 mW/ cm^2

802.11b mode (Antenna model: SPDG14T):

Maximum peak output power at antenna input terminal: 20.09 dBm
Maximum peak output power at antenna input terminal: 102.09 mW
Prediction distance: 20 cm
Prediction frequency: 2437MHz
Antenna gain (actual): 11 dBi
Antenna gain (numeric): 12.59
Power density at the predication frequency at 20 cm: 0.26 mW/ cm^2

802.11g mode (Antenna model: XPTX1412-QX):

Maximum peak output power at antenna input terminal: 19.69 dBm
Maximum peak output power at antenna input terminal: 93.11 mW
Prediction distance: 20 cm
Prediction frequency: 2437 MHz
Antenna gain (actual): 12 dBi
Antenna gain (numeric): 15.85
Power density at the predication frequency at 20 cm: 0.29 mW/ cm^2

802.11g mode (Antenna model: XPTX1412-QX):

Maximum peak output power at antenna input terminal: 19.69 dBm
Maximum peak output power at antenna input terminal: 93.11 mW
Prediction distance: 20 cm
Prediction frequency: 2437 MHz
Antenna gain (actual): 11 dBi
Antenna gain (numeric): 12.59
Power density at the predication frequency at 20 cm: 0.23 mW/ cm^2

Results: All of above results are compliance with the limit of 1.0 mW/ cm^2 at 20 cm distance.

§ 15.203/15.247 (c) - ANTENNA REQUIREMENT

Standard Applicable

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.

b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The three antennae used in this product are as follows:

1. Directional antenna:
   a. TQWTD-17030-5.5V for 802.11a with a maximum gain of 17 dBi
   b. SPDTG14T for 802.11b/g with a maximum gain of 11dBi

2. Omni-Directional Antenna:
   a. XPTX2412-QX for 802.11b/g with a maximum gain of 12dBi

The above antennae use N-K reverse connector and as per warning information in the User Manual “The installation should be done by experienced antenna installer”, which in accordance with the above sections are considered sufficient to comply with provision of these sections.

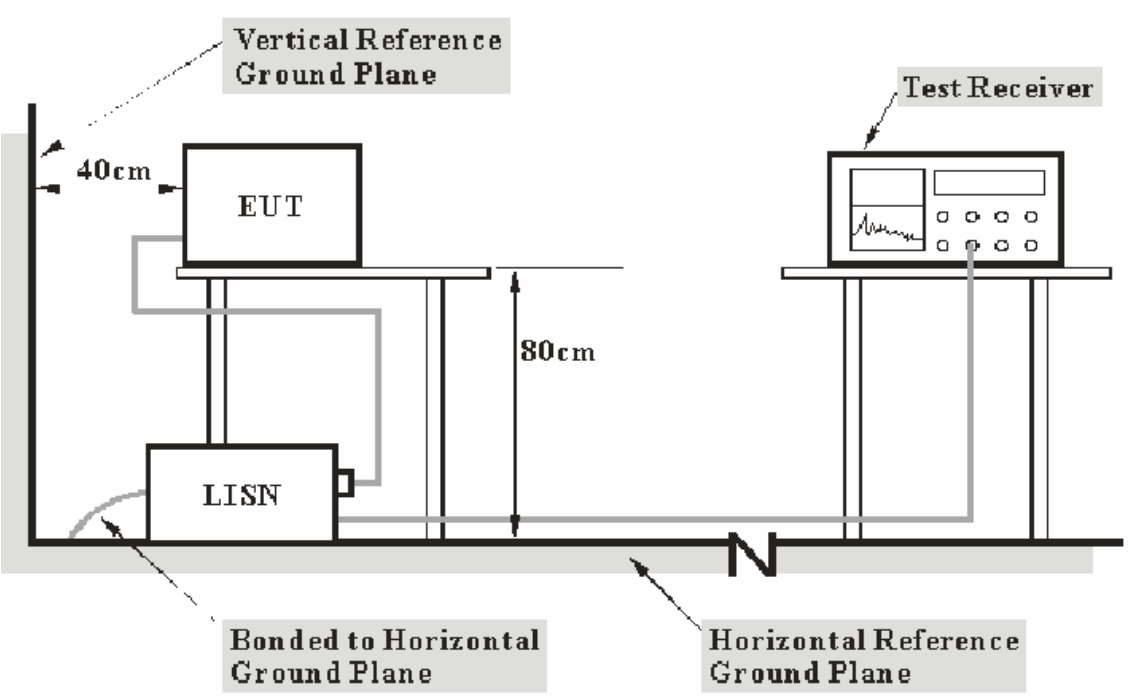
§15.107 (a) and §15.207 (a) - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ±2.4 dB.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	***IF B/W***
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12008	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-26	2008-03-26

***** Com-Power's LISN were used as the supporting equipment.
*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the host PC connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107 and FCC Part 15.207, with the worst margin reading of:

FCC Part 15.207:

2.20 dB at **1.100 MHz** in the **Live** conductor mode, 802.11a
4.30 dB at **0.700 MHz** in the **Live** conductor mode, 802.11b
4.60dB at **2.000 MHz** in the **Neutral** conductor mode, 802.11g

FCC Part 15.107:

17.8 dB at **2.090 MHz** in the **Neutral** conductor mode, Receiving

Test Data

Environmental Conditions

Temperature:	22 ° C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa

The testing was performed by Green Xu on 2007-07-18

FCC Part 15.207 (a) Conducted Emissions Limits

Test Mode: Transmitting

802.11a mode:

Line Conducted Emissions				FCC PART 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Phase (Live/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
1.100	53.80	QP	Live	56.00	2.20*
1.995	43.20	AV	Live	46.00	2.80
1.995	53.10	QP	Live	56.00	2.90
2.0	43.00	AV	Neutral	46.00	3.00
1.100	52.90	QP	Neutral	56.00	3.10
1.100	42.30	AV	Live	46.00	3.70
1.100	42.20	AV	Neutral	46.00	3.80
2.0	52.00	QP	Neutral	56.00	4.00
0.150	61.00	QP	Neutral	66.00	5.00
0.150	58.40	QP	Live	66.00	7.60
3.84	42.70	QP	Neutral	56.00	13.30
3.49	31.00	AV	Neutral	46.00	15.00
8.030	33.60	AV	Live	50.00	16.40
8.025	43.00	QP	Live	60.00	17.00
7.93	33.00	AV	Neutral	50.00	17.00
11.870	42.70	QP	Neutral	60.00	17.30
7.84	41.30	QP	Neutral	60.00	18.70
10.080	41.20	QP	Live	60.00	18.80
22.330	26.30	AV	Live	50.00	23.70
22.335	32.10	QP	Live	60.00	27.90
0.150	27.10	AV	Neutral	56.00	28.90
0.150	22.80	AV	Live	56.00	33.20
10.000	16.70	AV	Live	50.00	39.30
11.880	19.50	AV	Neutral	60.00	40.50

802.11b mode:

Line Conducted Emissions				FCC PART 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Frequency (MHz)**	**Amplitude (dBμV)**	**Frequency (MHz)**	**Amplitude (dBμV)**
0.700	41.70	AV	Live	46.00	4.30
2.000	51.30	QP	Live	56.00	4.70
2.000	41.20	AV	Neutral	46.00	4.80
0.150	61.10	QP	Live	66.00	4.90
2.000	51.10	QP	Neutral	56.00	4.90
1.100	41.00	AV	Neutral	46.00	5.00
0.150	60.90	QP	Neutral	66.00	5.10
1.100	50.80	QP	Neutral	56.00	5.20
1.100	50.30	QP	Live	56.00	5.70
1.100	40.10	AV	Live	46.00	5.90
3.320	50.00	QP	Live	56.00	6.00
2.000	39.50	AV	Live	46.00	6.50
0.700	47.70	QP	Live	56.00	8.30
3.300	46.80	QP	Neutral	56.00	9.20
29.880	48.20	QP	Live	60.00	11.80
11.640	43.60	QP	Neutral	60.00	16.40
3.300	26.40	AV	Neutral	46.00	19.60
3.360	22.60	AV	Live	46.00	23.40
15.780	34.10	QP	Neutral	60.00	25.90
11.691	19.70	AV	Neutral	50.00	30.30
15.780	18.60	AV	Neutral	50.00	31.40
0.150	24.50	AV	Live	56.00	31.50
0.150	24.20	AV	Neutral	56.00	31.80
29.960	17.80	AV	Live	50.00	32.20

802.11g mode:

Line Conducted Emissions				FCC PART 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Frequency (MHz)**	**Amplitude (dBμV)**	**Frequency (MHz)**	**Amplitude (dBμV)**
2.000	41.40	AV	Neutral	46.00	4.60
0.150	60.80	QP	Neutral	66.00	5.20
0.150	60.80	QP	Live	66.00	5.20
2.000	50.80	QP	Neutral	56.00	5.20
2.000	50.60	QP	Live	56.00	5.40
1.100	50.00	QP	Live	56.00	6.00
1.100	40.00	AV	Live	46.00	6.00
2.000	40.00	AV	Live	46.00	6.00
3.320	49.80	QP	Live	56.00	6.20
1.100	49.20	QP	Neutral	56.00	6.80
1.100	38.50	AV	Neutral	46.00	7.50
11.170	46.60	QP	Live	60.00	13.40
29.810	46.50	QP	Live	60.00	13.50
29.800	46.20	QP	Neutral	60.00	13.80
5.100	40.00	QP	Neutral	60.00	20.00
10.750	38.80	QP	Neutral	60.00	21.20
3.360	22.70	AV	Live	46.00	23.30
0.150	29.80	AV	Live	56.00	26.20
5.100	22.00	AV	Neutral	50.00	28.00
10.790	21.00	AV	Neutral	50.00	29.00
0.150	25.80	AV	Neutral	56.00	30.20
11.170	18.10	AV	Live	50.00	31.90
29.900	16.50	AV	Neutral	50.00	33.50
30.000	14.20	AV	Live	50.00	35.80

FCC Part 15.107 (a) Conducted Emissions Limits

Test Mode: Receiving

Line Conducted Emissions				FCC PART 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Frequency (MHz)**	**Amplitude (dBμV)**	**Frequency (MHz)**	**Amplitude (dBμV)**
2.090	42.20	AV	Neutral	60	17.8
0.150	60.80	QP	Live	79	18.2
2.090	41.50	AV	Live	60	18.5
0.150	60.00	QP	Neutral	79	19.0
0.600	40.20	AV	Live	60	19.8
2.090	51.40	QP	Neutral	73	21.6
2.090	50.50	QP	Live	73	22.5
28.530	50.50	QP	Live	73	22.5
3.620	48.40	QP	Live	73	24.6
29.710	48.10	QP	Neutral	73	24.9
0.600	47.80	QP	Live	73	25.2
3.230	46.80	QP	Neutral	73	26.2
29.770	31.00	AV	Neutral	60	29.0
0.150	25.8	AV	Live	66	30.2
11.260	42.60	QP	Neutral	73	30.4
3.240	28.8	AV	Live	60	31.2
29.530	28.50	AV	Live	60	31.5
12.88	39.50	QP	Live	73	33.5
5.080	39.50	QP	Neutral	73	33.5
3.240	25.90	AV	Neutral	60	34.1
0.150	29.50	AV	Neutral	66	36.5
11.060	21.00	AV	Live	60	39.0
11.260	18.50	AV	Neutral	60	41.5
5.080	27.60	AV	Neutral	73	45.4

** Within the measurement uncertainty*

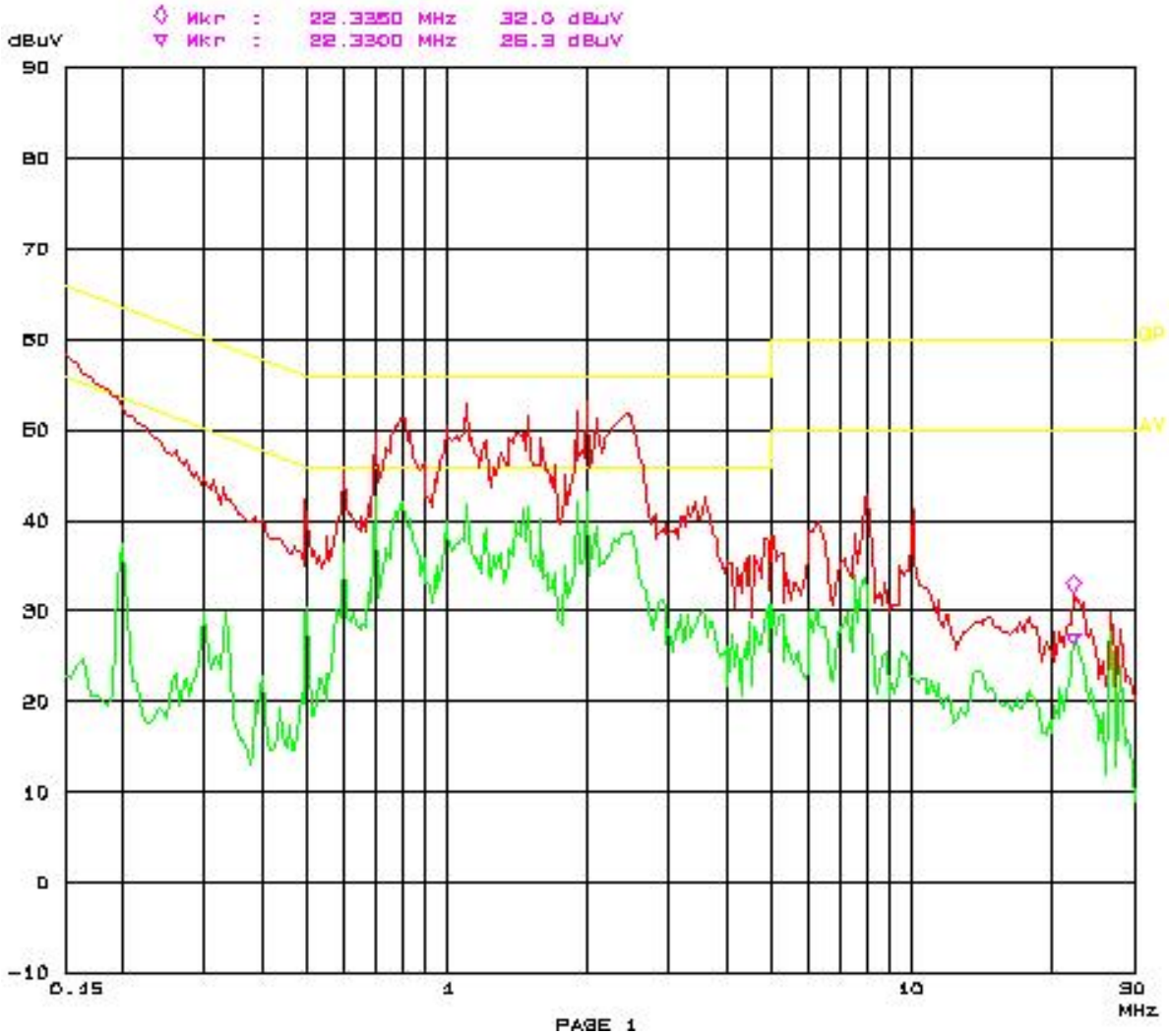
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

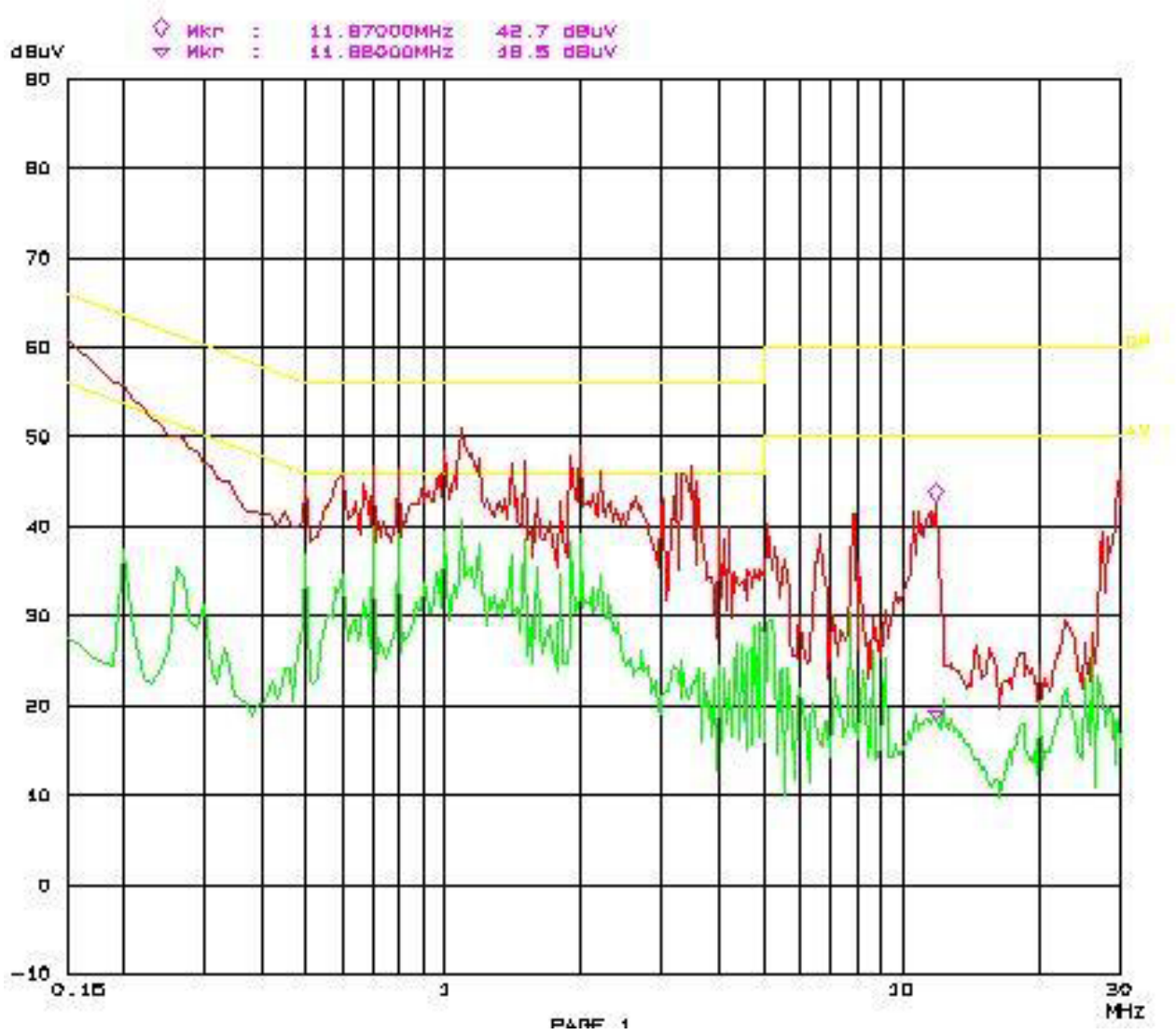
802.11a mode:

Conducted Emission Test
FCC15 ClassB

EUT:	Wireless Mesh RouterM/N: MSR2000
Manuf:	Azalea
Op Cond:	Transmitting (802.11a)
Operator:	Green.Xu
Test Spec:	AC 120V/60Hz LiveLine
Comment:	Temp: 26 Humi: 68%



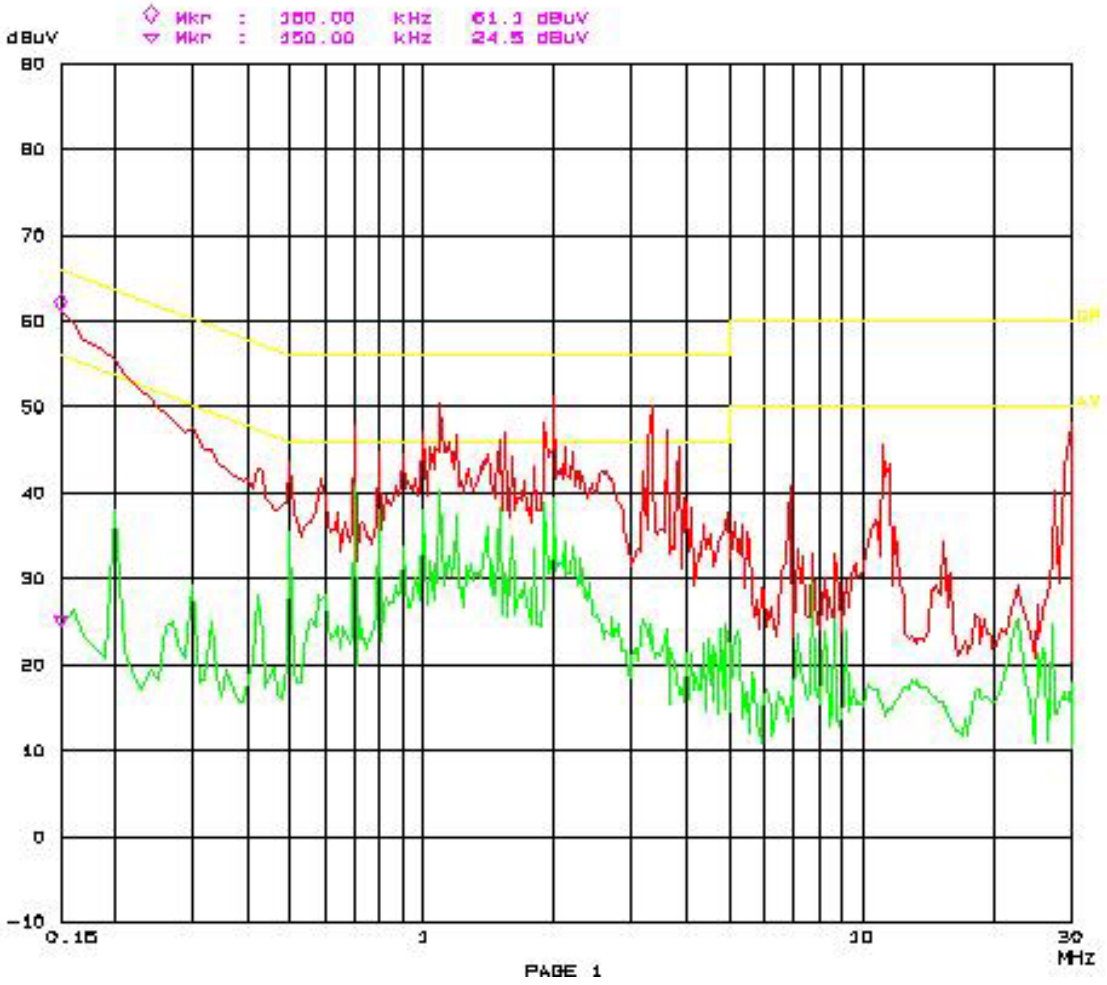
EUT:	Wireless Mesh Rotor M/N: MSR2000
Manuf:	Azalea
Op Cond:	Running
Operator:	Green
Test Spec:	AC 120V/60Hz N
Comment:	Temp: 25 Humi: 50%



802.11b mode:

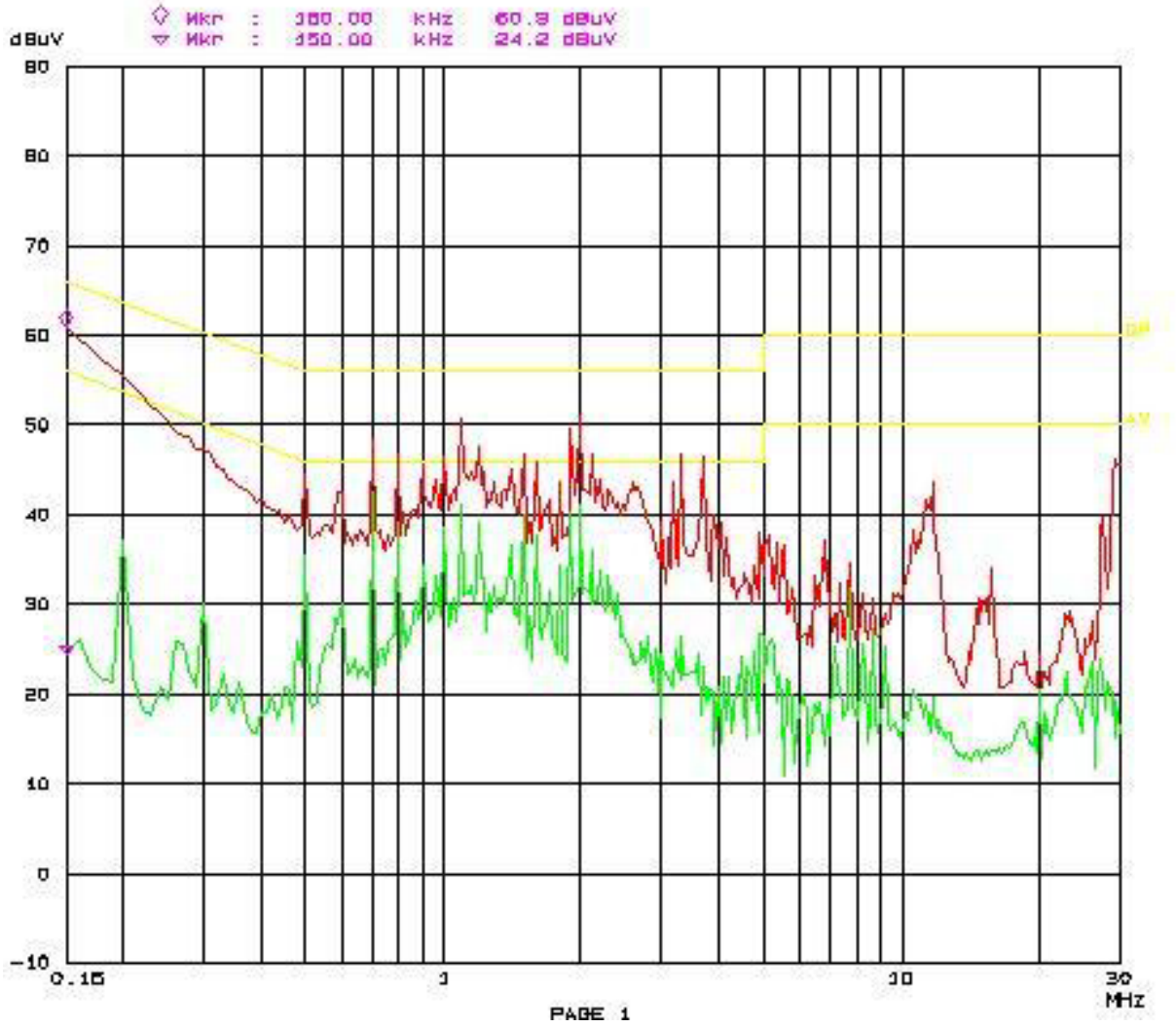
Conducted Emission Test
FCC15

EUT: Wireless Mesh Rotar M/N: MSR2000
Manuf: Azalea
Op Cond: Running
Operator: Green
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Humi: 50%



Conducted Emission Test
FCC15

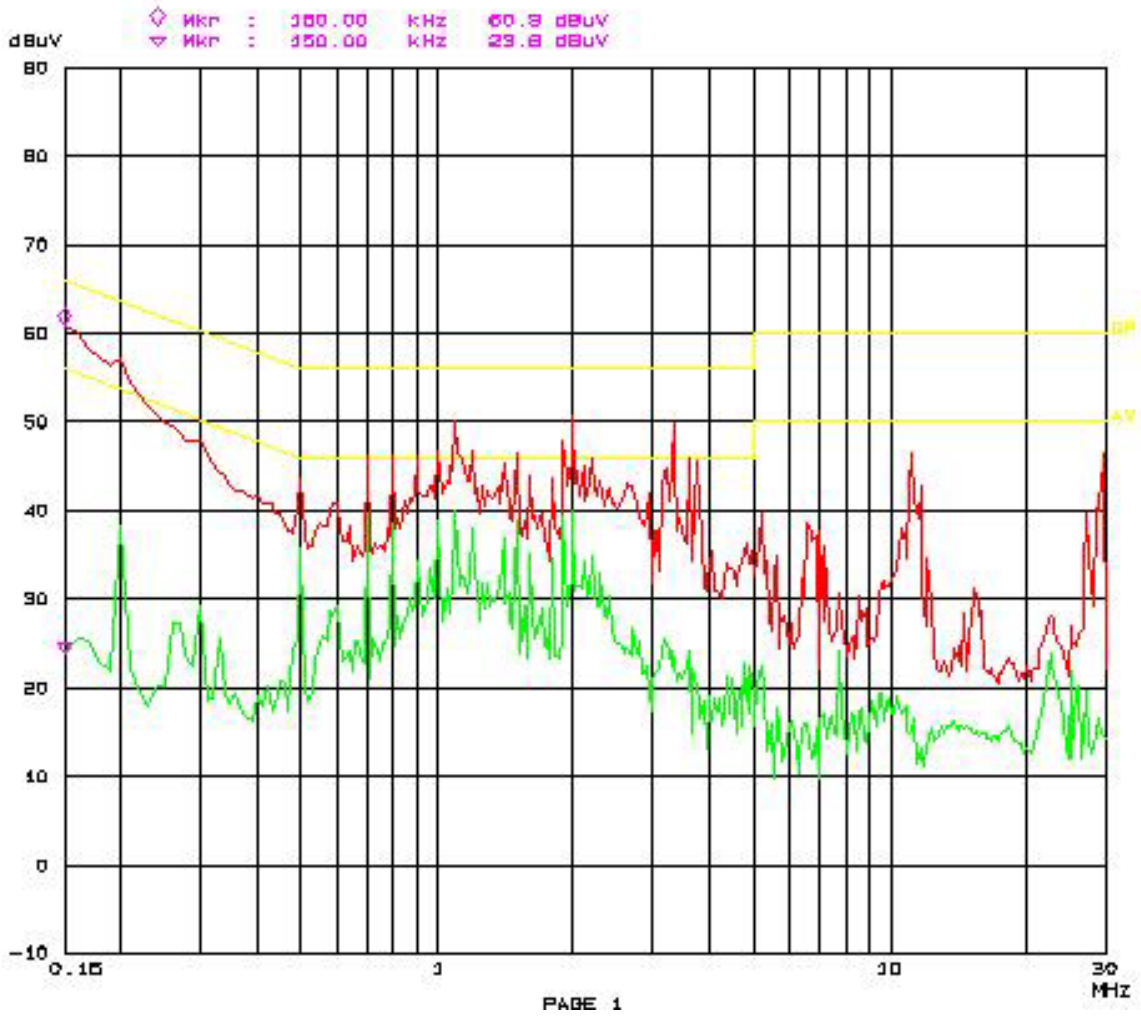
EUT: Wireless Mesh Roter M/N: MSR2000
Manuf: Azalea
Op Cond: Running
Operator: Green
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Humi: 60%



802.11g mode:

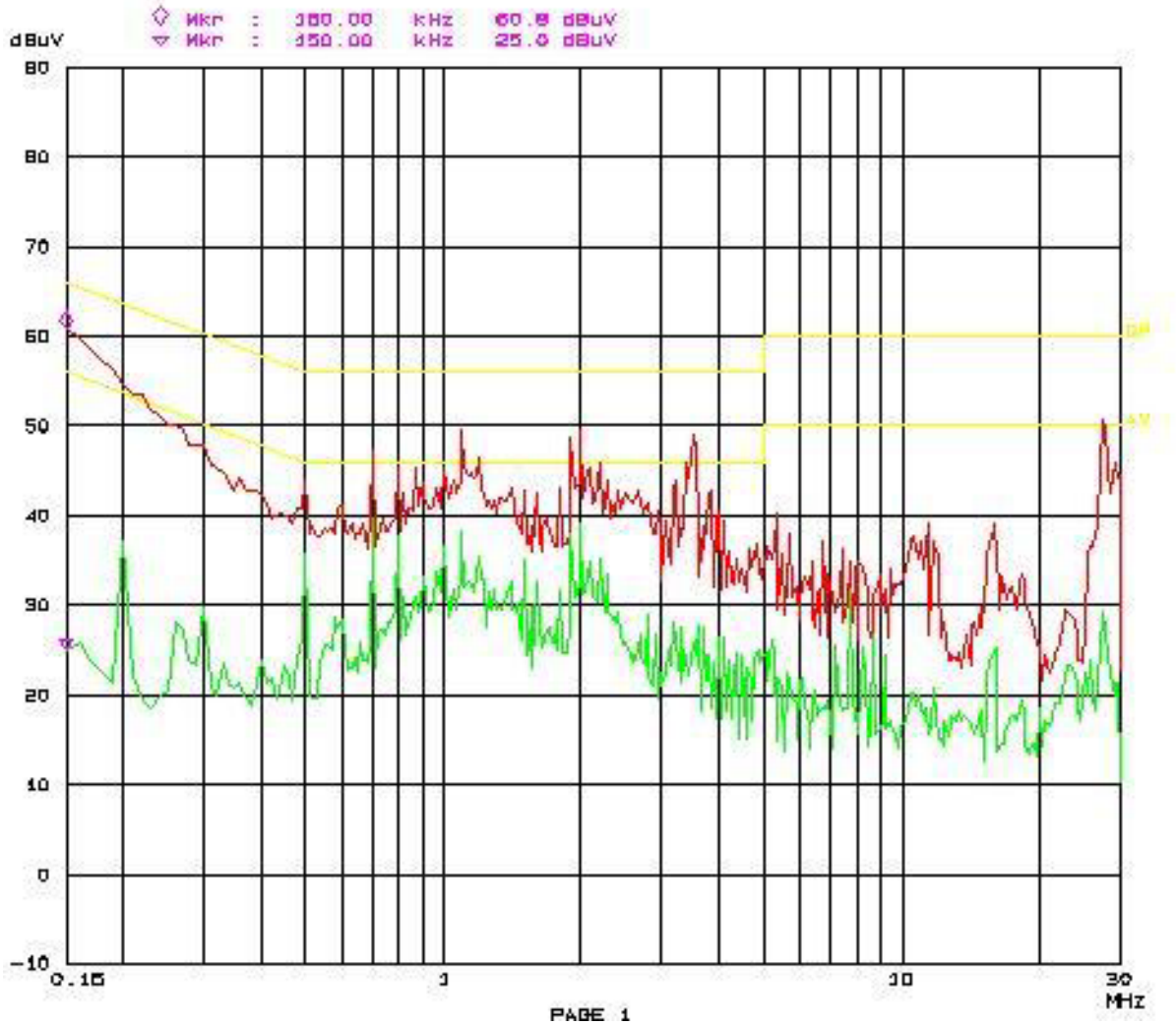
Conducted Emission Test
FCC15

EUT: Wireless Mesh Roter M/N: MSR2000
Manuf: Azalea
Op Cond: Running
Operator: Green
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Humi: 60%



Conducted Emission Test
FCC15

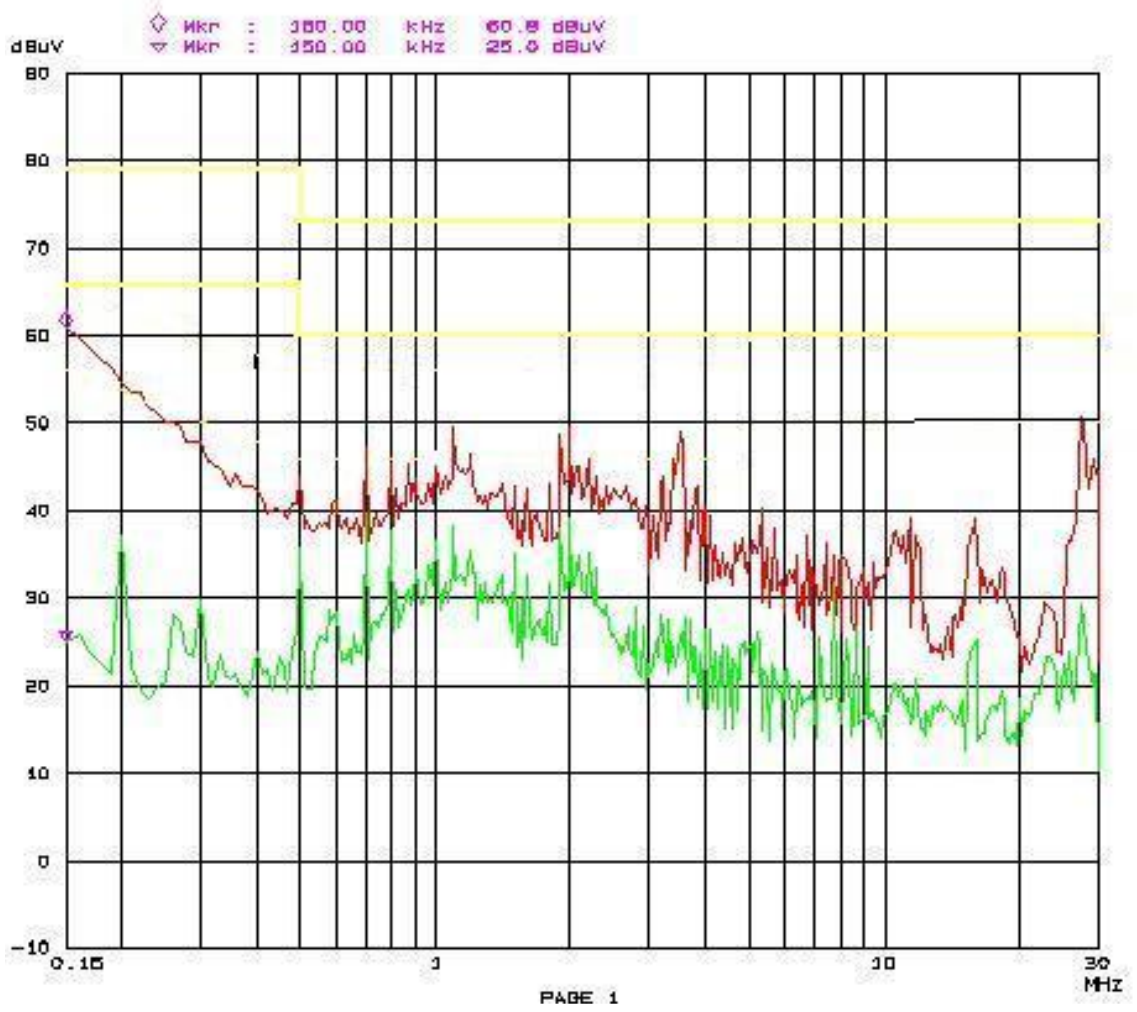
EUT: Wireless Mesh Rotor M/N: MSR2500
Manuf: Azalea
Op Cond: Running
Operator: Green
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Humi: 55%



Receiving mode:

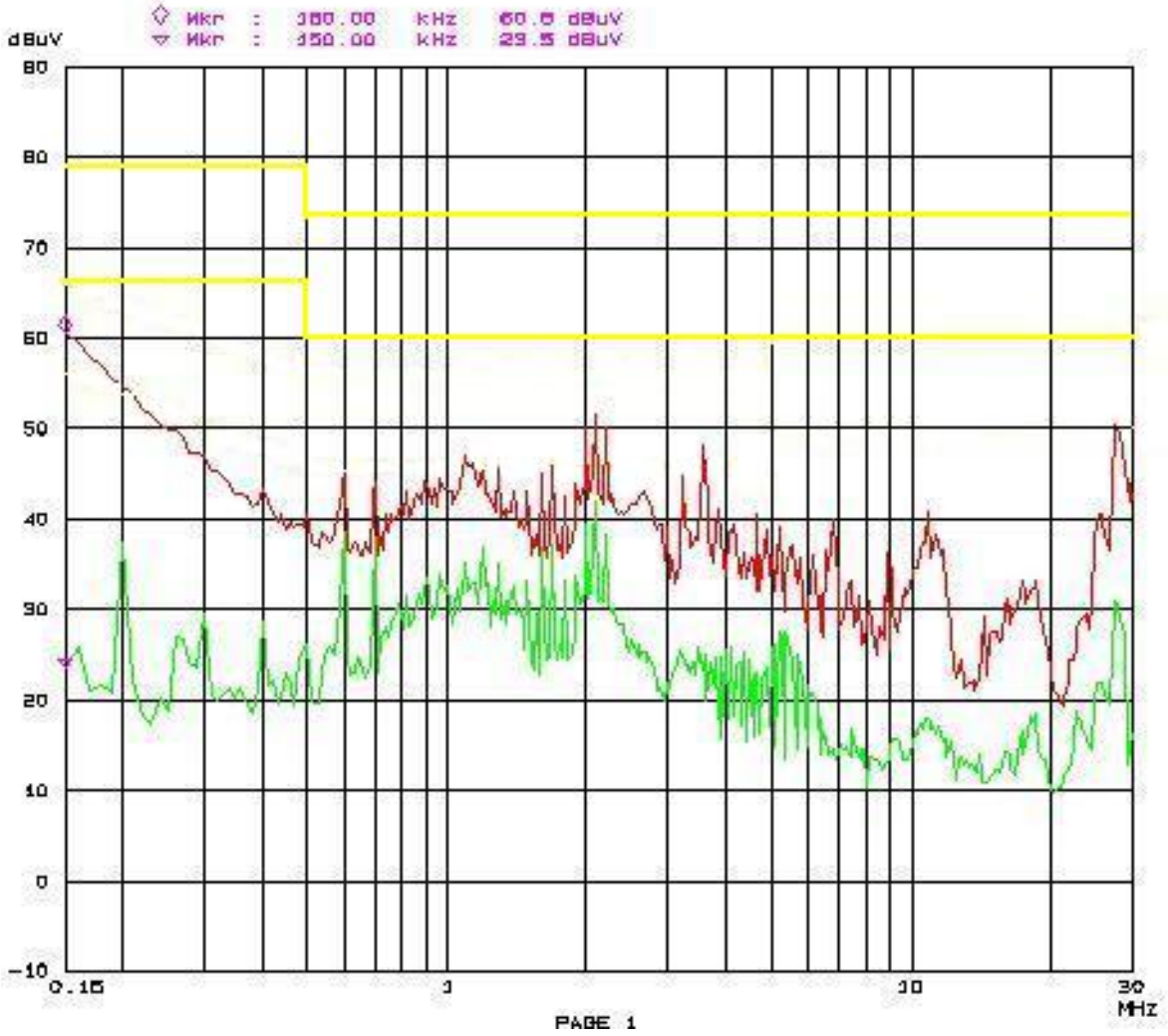
Conducted Emission Test
FCC15

EUT:	Wireless Mesh Roter M/N: MSR2000
Manuf:	Azalea
Op Cond:	Running
Operator:	Green
Test Spec:	AC 120V/60Hz L
Comment:	Temp: 25 Humi: 55%



Conducted Emission Test
FCC15

EUT:	Wireless Mesh Rotor M/N: MSR2000
Manuf:	Azalea
Op Cond:	Running
Operator:	Green
Test Spec:	AC 120V/60Hz N
Comment:	Temp: 25 Humi: 60%



§15.247 (d), §15.205, §15.109, §15.209 - RADIATED EMISSIONS AND BAND EDGES

Applicable Standard

According to FCC §15.247 (d)

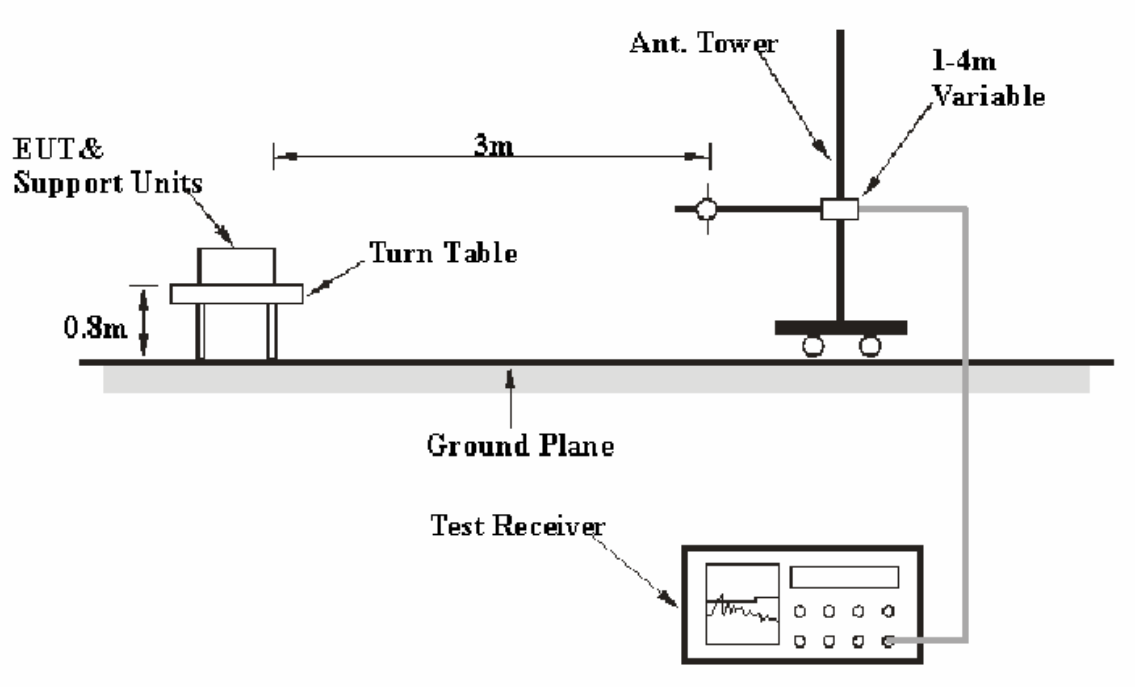
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ±4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.109, FCC 15.209 and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2006-11-15	2007-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-08-14	2007-08-14
HP	Amplifier	8449B	3008A00277	2006-09-29	2007-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2006-09-25	2007-09-25
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22

*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the host PC was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz and peak and Average detection modes for frequencies above 1GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corr. Amp. = Meter Reading + Antenna Loss + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit - Corr. Amp.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.109, 15.205, 15.209, and 15.247, with the worst margin reading of:

For 802.11a 17dBi directional Antenna, Antenna Mode: TQWTD-1700-5.5V:

30 -1000MHz: 3.0 dB at **666.654200MHz** in the **Vertical** polarization, **(802.11a)**

For 12 dBi Omni Antenna, Antenna model: XPTX2412-QX:

30 -1000MHz: 2.9 dB at **133.318650 MHz** in the **Vertical** polarization, **(802.11b)**
30 -1000MHz: 2.9 dB at **133.318650 MHz** in the **Vertical** polarization, **(802.11g)**

For 11 dBi Directional Antenna, Antenna model: SPDG14T:

30 -1000MHz: 0.7 dB at **146.191825 MHz** in the **Vertical** polarization, **(802.11b)**
30 -1000MHz: 0.7 dB at **146.191825 MHz** in the **Vertical** polarization, **(802.11g)**

For 802.11a 17dBi directional Antenna, Antenna Mode: TQWTD-1700-5.5V:

Above 1 GHz: 0.5 dB at **11490.0 MHz** in the **Vertical** polarization, **Low Channel (802.11a)**
Above 1 GHz: 0.2 dB at **17355.0 MHz** in the **Vertical** polarization, **Middle Channel (802.11a)**
Above 1 GHz: 0.4 dB at **11610.0MHz** in the **Vertical** polarization, **High Channel (802.11a)**

For 12 dBi Omni Antenna, Antenna model: XPTX2412-QX:

Above 1 GHz: 4.6 dB at **4824 MHz** in the **Vertical** polarization, **Low Channel (802.11b)**
Above 1 GHz: 7.6 dB at **4874 MHz** in the **Vertical** polarization, **Middle Channel (802.11b)**
Above 1 GHz: 1.4 dB at **7386 MHz** in the **Vertical** polarization, **high Channel (802.11b)**

Above 1 GHz: 4.6 dB at **4824 MHz** in the **Vertical** polarization, **Low Channel (802.11g)**
Above 1 GHz: 7.6 dB at **4874 MHz** in the **Vertical** polarization, **Middle Channel (802.11g)**
Above 1 GHz: 1.4 dB at **7386 MHz** in the **Vertical** polarization, **high Channel (802.11g)**

For 11 dBi Directional Antenna, Antenna model: SPDG14T:

Above 1 GHz: 12.4 dB at **7236 MHz** in the **Vertical** polarization, **Low Channel (802.11b)**
Above 1 GHz: 12.4 dB at **7311 MHz** in the **Vertical** polarization, **Middle Channel (802.11b)**
Above 1 GHz: 13.1 dB at **7386 MHz** in the **Vertical** polarization, **high Channel (802.11b)**

Above 1 GHz: 12.4 dB at **7236 MHz** in the **Vertical** polarization, **Low Channel (802.11g)**
Above 1 GHz: 12.4 dB at **7311 MHz** in the **Vertical** polarization, **Middle Channel (802.11g)**
Above 1 GHz: 13.1 dB at **7386 MHz** in the **Vertical** polarization, **high Channel (802.11g)**

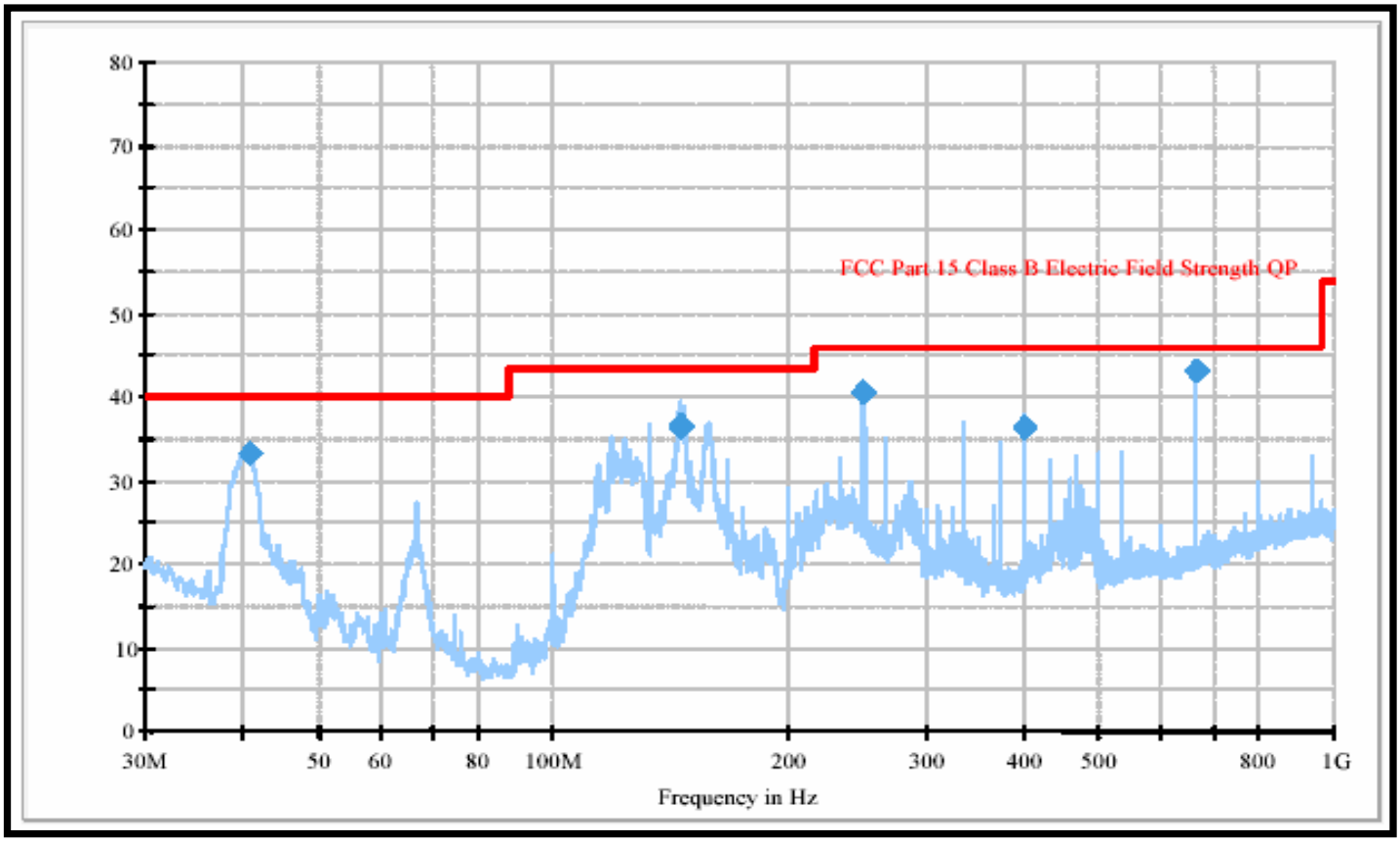
Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	52%
ATM Pressure:	1009mbar

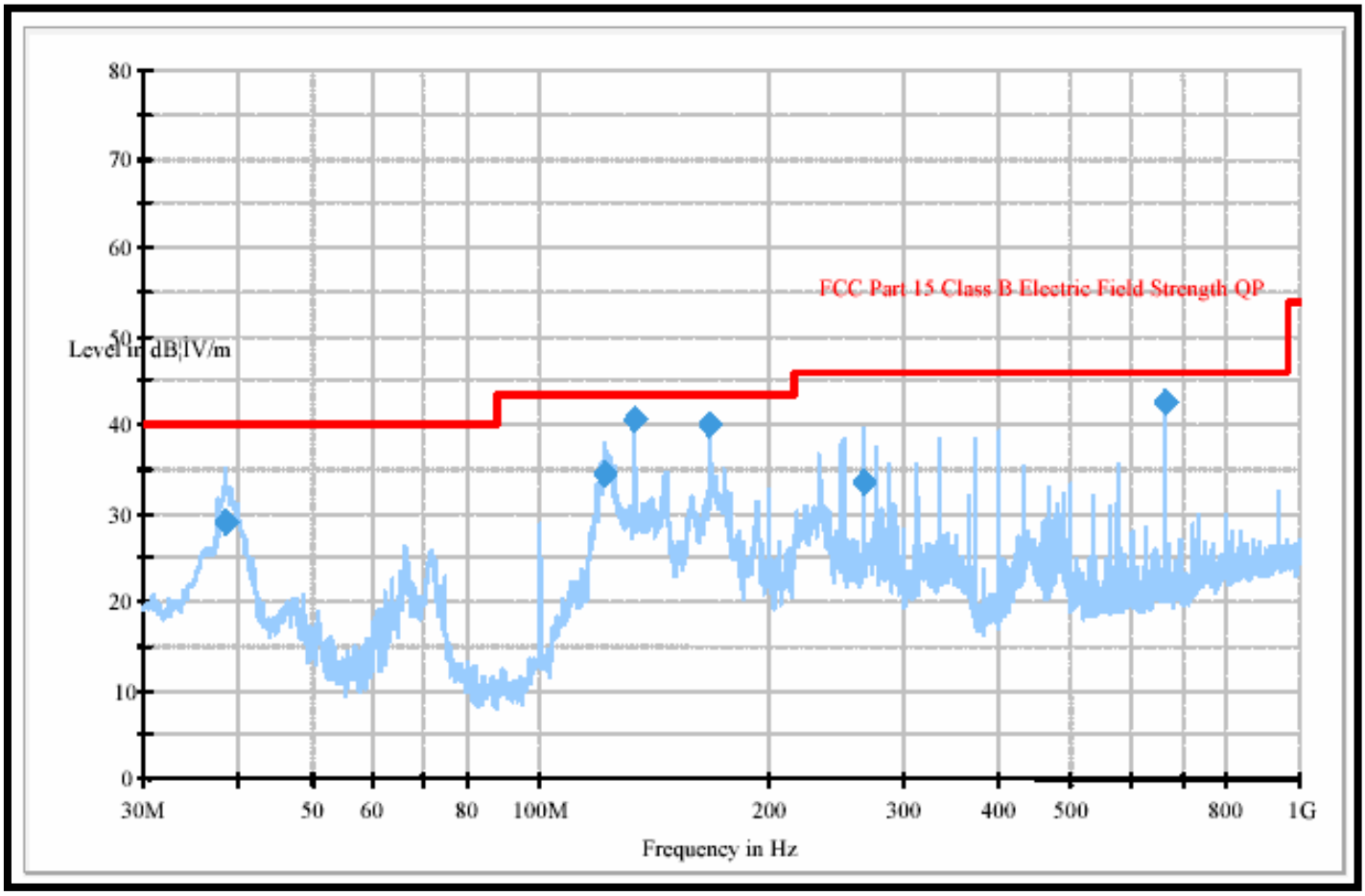
The testing was performed by Green Xu on 2007-07-29, 2007-08-1, 2007-08-17 and 2007-08-19.

802.11a mode 30-1000 MHz, 17dBi directional Antenna TQWTD-1700-5.5V



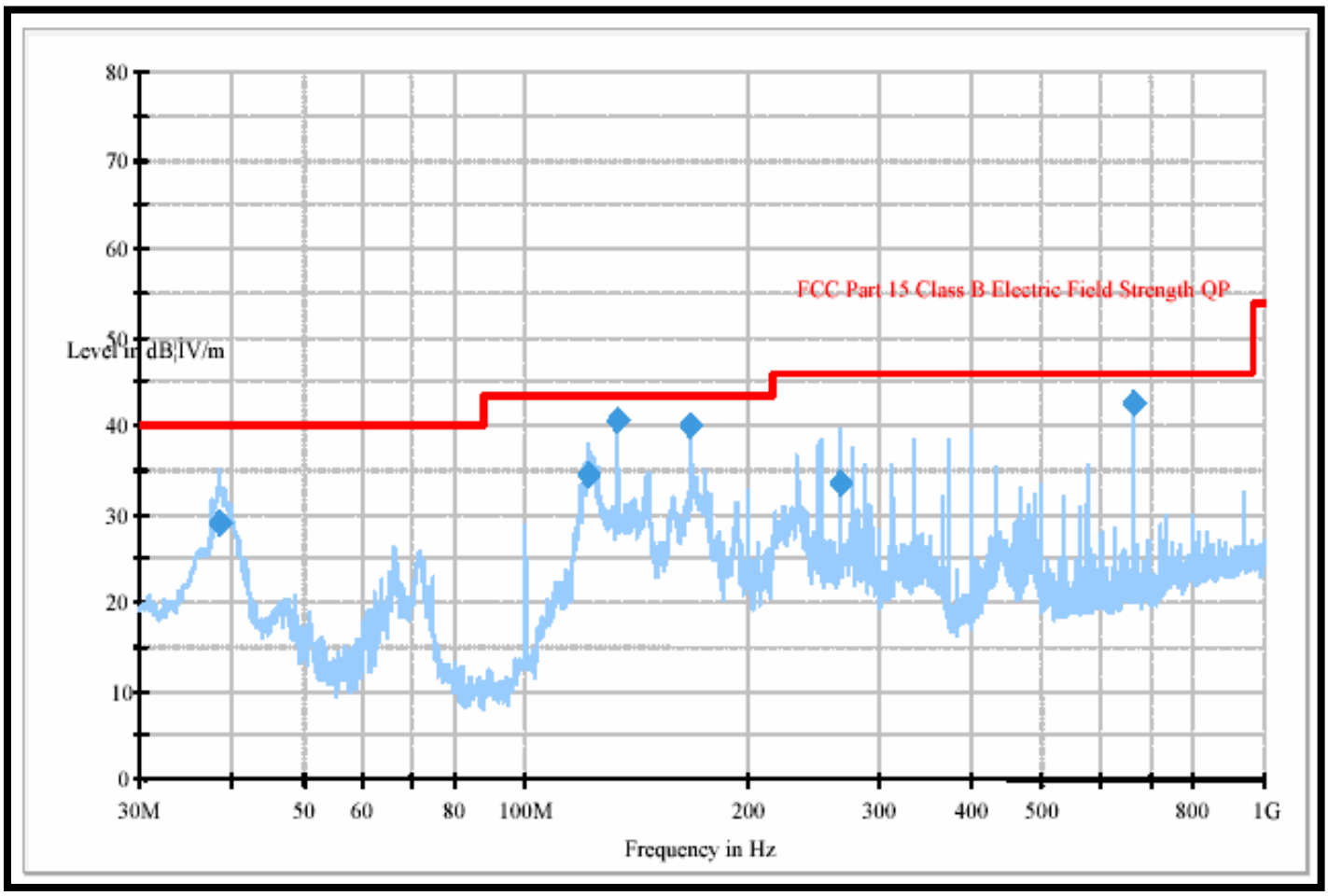
Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
666.654200	43.0	101.0	V	330.0	-3.6	46.0	3.0*
249.826250	40.4	136.0	V	38.0	-11.5	46.0	5.6
40.912500	33.3	140.0	V	0.0	-12.6	40.0	6.7
145.546000	36.5	115.0	V	229.0	-11.5	43.5	7.0
145.090300	36.2	101.0	V	218.0	-11.5	43.5	7.3
399.996600	36.4	102.0	V	45.0	-7.6	46.0	9.6

802.11b mode 30-1000 MHz, 12 dBi Omni Antenna XPTX2412-QX



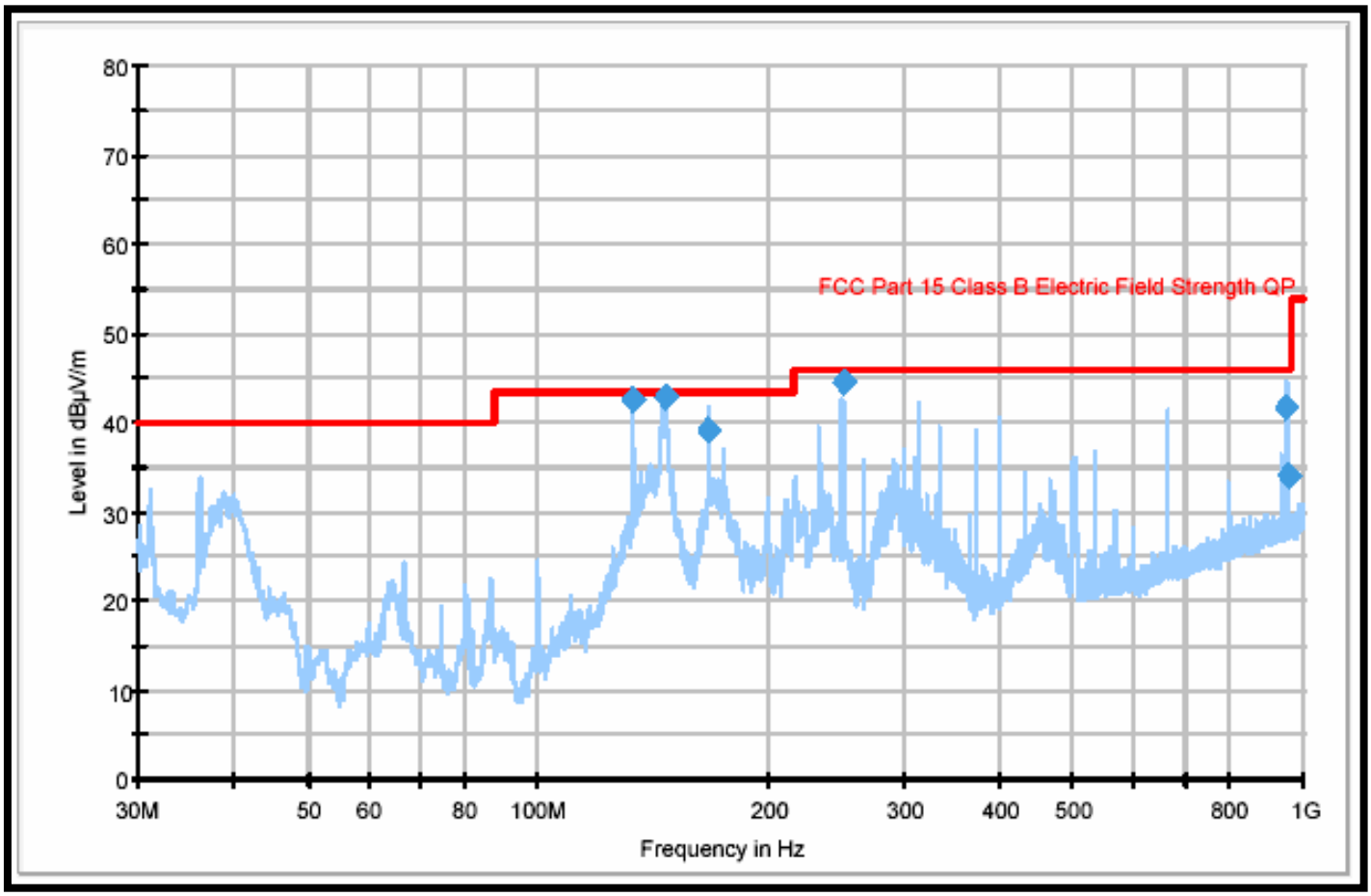
Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
133.318650	40.6	101.0	V	171.0	-10.6	43.5	2.9*
666.656375	42.6	101.0	V	346.0	-3.6	46.0	3.4*
166.668025	40.0	114.0	V	38.0	-12.4	43.5	3.5*
121.746800	34.3	101.0	V	89.0	-11.4	43.5	9.2
38.455100	28.9	101.0	V	232.0	-10.8	40.0	11.1
266.642125	33.5	156.0	V	33.0	-10.4	46.0	12.5

802.11g mode 30-1000 MHz, 12dBi Omni Antenna XPTX2412-QX



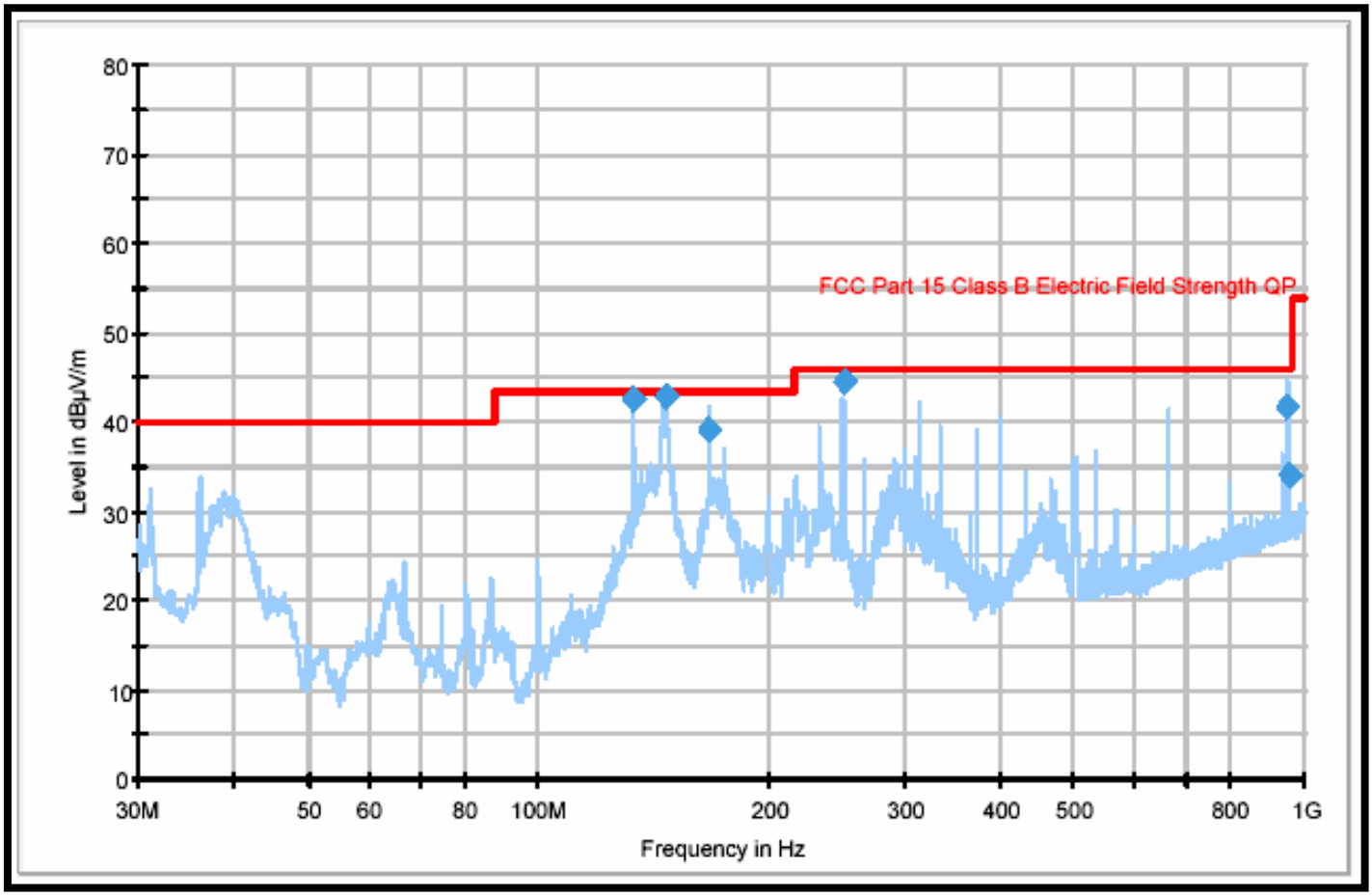
Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
133.318650	40.6	101.0	V	171.0	-10.6	43.5	2.9*
666.656375	42.6	101.0	V	346.0	-3.6	46.0	3.4*
166.668025	40.0	114.0	V	38.0	-12.4	43.5	3.5*
121.746800	34.3	101.0	V	89.0	-11.4	43.5	9.2
38.455100	28.9	101.0	V	232.0	-10.8	40.0	11.1
266.642125	33.5	156.0	V	33.0	-10.4	46.0	12.5

802.11b mode 30-1000 MHz, 11 dBi Directional Antenna SPDG14T



Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
146.191825	42.8	116.0	V	327.0	-10.4	43.5	0.7*
133.330725	42.6	101.0	V	336.0	-9.6	43.5	0.9*
249.927525	44.5	102.0	V	342.0	-10.1	46.0	1.5*
950.604075	41.8	126.0	V	327.0	4.0	46.0	4.2
166.657375	39.1	102.0	V	330.0	-11.0	43.5	4.4
956.629850	34.1	351.0	V	93.0	4.1	46.0	11.9

802.11g mode 30-1000 MHz, 11 dBi Directional Antenna SPDG14T



Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
146.191825	42.8	116.0	V	327.0	-10.4	43.5	0.7*
133.330725	42.6	101.0	V	336.0	-9.6	43.5	0.9*
249.927525	44.5	102.0	V	342.0	-10.1	46.0	1.5*
950.604075	41.8	126.0	V	327.0	4.0	46.0	4.2
166.657375	39.1	102.0	V	330.0	-11.0	43.5	4.4
956.629850	34.1	351.0	V	93.0	4.1	46.0	11.9

Radiated (802.11a mode), Antenna 17dBi directional: TQWTD-1700-5.5V

Lower channel (5745 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
11490.0	V	40.78	34.10	40.40	6.39	53.47	54.0	0.5*	AV
17235.0	V	33.00	34.10	45.00	9.00	52.90	54.0	1.1*	AV
17235.0	V	43.23	34.10	45.00	9.00	63.13	74.0	10.9	PK
11490.0	V	50.15	34.10	40.40	6.39	62.84	74.0	11.2	PK
Middle Channel (5785 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
17355.0	V	33.90	34.10	45.00	9.00	53.80	54.0	0.2*	AV
11570.0	V	40.24	34.10	40.40	6.45	52.99	54.0	1.0*	AV
17355.0	V	49.25	34.10	45.00	9.00	69.15	74.0	4.8	PK
11570.0	V	51.97	34.10	40.40	6.45	64.72	74.0	9.3	PK
Higher Channel (5805 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
11610.0	V	40.35	34.10	41.00	6.40	53.65	54.0	0.4*	AV
17415.0	V	32.43	34.10	46.30	8.90	53.53	54.0	0.5*	AV
17415.0	V	46.85	34.10	46.30	8.90	67.95	74.0	6.0	PK
11610.0	V	49.53	34.10	41.00	6.40	62.83	74.0	11.2	PK

Note: * *Within the measurement uncertainty*

All other emissions were measured at noise floor level.

Radiated (802.11b mode), Antenna 12dBi Omni-directional : XPTX2412-QX

Lower channel (2412 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
4824.0	V	42.75	33.40	35.40	4.64	49.39	54.0	4.6	AV
7236.0	V	39.29	33.70	37.80	4.51	47.90	54.0	6.1	AV
4824.0	V	45.41	33.40	35.40	4.64	52.05	74.0	22.0	PK
7236.0	V	41.55	33.70	37.80	4.51	50.16	74.0	23.8	PK
Middle Channel (2437 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
4874.0	V	59.81	33.40	35.40	4.60	66.41	74.0	7.6	PK
7311.0	V	37.33	33.70	37.80	4.60	46.03	54.0	8.0	AV
4874.0	V	34.99	33.40	35.40	4.60	41.59	54.0	12.4	AV
7311.0	V	40.09	33.70	37.80	4.60	48.79	74.0	25.2	PK
Higher Channel (2462MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7386.0	V	43.73	33.70	37.80	4.75	52.58	54.0	1.4*	AV
4924.0	V	39.30	33.40	35.40	4.55	45.85	54.0	8.2	AV
7386.0	V	48.86	33.70	37.80	4.75	57.71	74.0	16.3	PK
4924.0	V	44.60	33.40	35.40	4.55	51.15	74.0	22.9	PK

Note: * *Within the measurement uncertainty*

All other emissions were measured at noise floor level.

Radiated (802.11g mode), Antenna 12dBi Omni-directional : XPTX2412-QX

Lower channel (2412 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
4824.0	V	42.75	33.40	35.40	4.64	49.39	54.0	4.6	AV
7236.0	V	39.29	33.70	37.80	4.51	47.90	54.0	6.1	AV
4824.0	V	45.41	33.40	35.40	4.64	52.05	74.0	22.0	PK
7236.0	V	41.55	33.70	37.80	4.51	50.16	74.0	23.8	PK
Middle Channel (2437 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
4874.0	V	59.81	33.40	35.40	4.60	66.41	74.0	7.6	PK
7311.0	V	37.33	33.70	37.80	4.60	46.03	54.0	8.0	AV
4874.0	V	34.99	33.40	35.40	4.60	41.59	54.0	12.4	AV
7311.0	V	40.09	33.70	37.80	4.60	48.79	74.0	25.2	PK
Higher Channel (2462MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7386.0	V	43.73	33.70	37.80	4.75	52.58	54.0	1.4*	AV
4924.0	V	39.30	33.40	35.40	4.55	45.85	54.0	8.2	AV
7386.0	V	48.86	33.70	37.80	4.75	57.71	74.0	16.3	PK
4924.0	V	44.60	33.40	35.40	4.55	51.15	74.0	22.9	PK

Note: * *Within the measurement uncertainty*

All other emissions were measured at noise floor level.

Radiated (802.11b mode), Antenna 11dBi Directional : SPDG14T

Lower channel (2412 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7236	V	33.29	34.00	37.80	4.51	41.60	54.0	12.4	AV
4824	V	34.94	33.40	34.40	4.64	40.58	54.0	13.4	AV
7236	V	37.94	34.00	37.80	4.51	46.25	74.0	27.8	PK
4824	V	38.96	33.40	34.40	4.64	44.60	74.0	29.4	PK
Middle Channel (2437 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7311	V	33.26	34.00	37.80	4.51	41.57	54.00	12.4	AV
4874	V	34.94	33.14	34.40	4.64	40.84	54.00	13.2	AV
7311	V	37.94	34.00	37.80	4.51	46.25	74.00	27.8	PK
4874	V	38.96	33.14	34.40	4.64	44.86	74.00	29.1	PK
Higher Channel (2462MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7386	V	32.61	34.00	37.80	4.51	40.92	54.0	13.1	AV
4924	V	34.93	33.40	34.40	4.64	40.57	54.0	13.4	AV
7386	V	37.18	34.00	37.80	4.51	45.49	74.0	28.5	PK
4924	V	38.63	33.40	34.40	4.64	44.27	74.0	29.7	PK

Note: * *Within the measurement uncertainty*

All other emissions were measured at noise floor level.

Radiated (802.11g mode), Antenna 11dBi Directional : SPDG14T

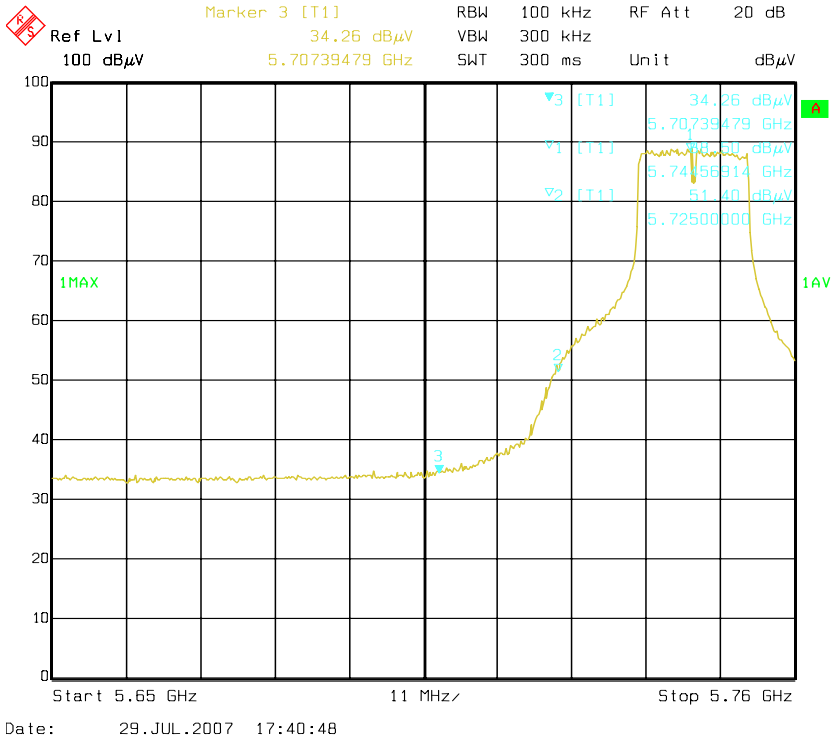
Lower channel (2412 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7236	V	33.29	34.00	37.80	4.51	41.60	54.0	12.4	AV
4824	V	34.94	33.40	34.40	4.64	40.58	54.0	13.4	AV
7236	V	37.94	34.00	37.80	4.51	46.25	74.0	27.8	PK
4824	V	39.58	33.40	34.40	4.64	45.22	74.0	28.8	PK
Middle Channel (2437 MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7311	V	33.26	34.00	37.80	4.51	41.57	54.00	12.4	AV
4874	V	34.94	33.14	34.40	4.64	40.84	54.00	13.2	AV
7311	V	37.18	34.00	37.80	4.51	45.49	74.00	28.5	PK
4874	V	38.96	33.14	34.40	4.64	44.86	74.00	29.1	PK
Higher Channel (2462MHz)									
Freq. (MHz)	**Receive Antenna Polarity (H/V)**	**Meter Reading (dBuV@3m)**	**Pre-amp. (dBi)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Corrected Field Strength (dBuV/m@3m)**	**Limits (dBuV/m@3m)**	**Margin (dB)**	**Meas. Type**
7386	V	32.61	34.00	37.80	4.51	40.92	54.0	13.1	AV
4924	V	34.93	33.40	34.40	4.64	40.57	54.0	13.4	AV
7386	V	37.18	34.00	37.80	4.51	45.49	74.0	28.5	PK
4924	V	38.29	33.40	34.40	4.64	43.93	74.0	30.1	PK

Note: * *Within the measurement uncertainty*

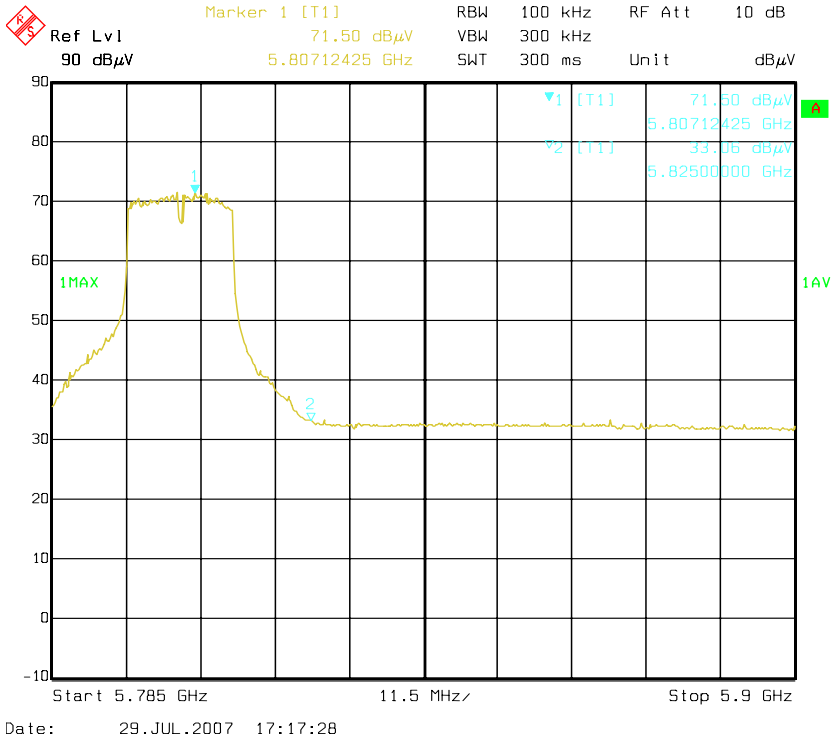
All other emissions were measured at noise floor level.

802.11a 100 kHz Outside-of-Band Edge for 17dBi directional Antenna: TQWTD-1700-5.5V

Low-Channel (5745 MHz)

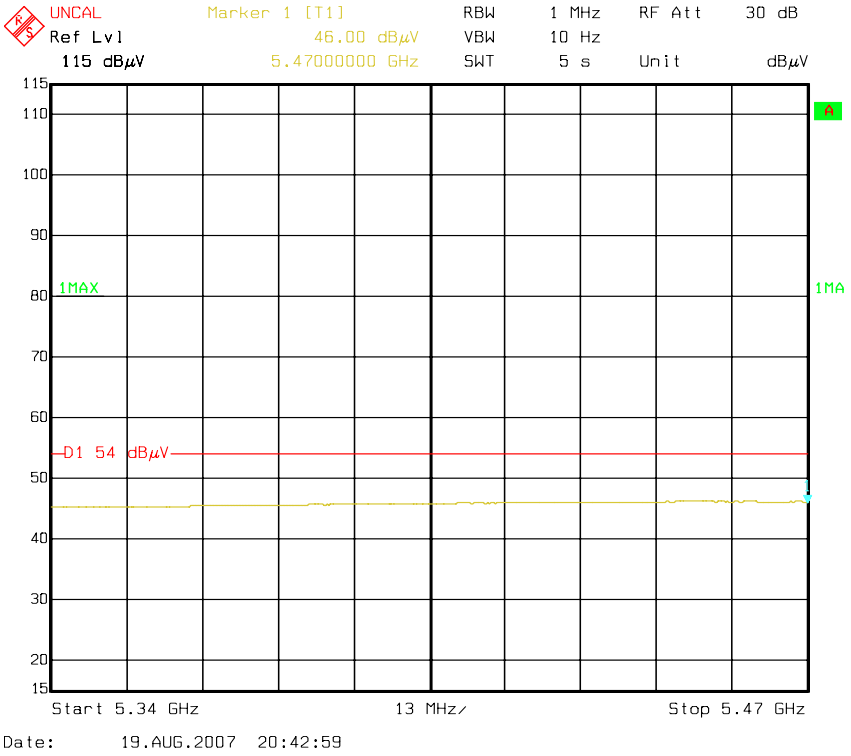


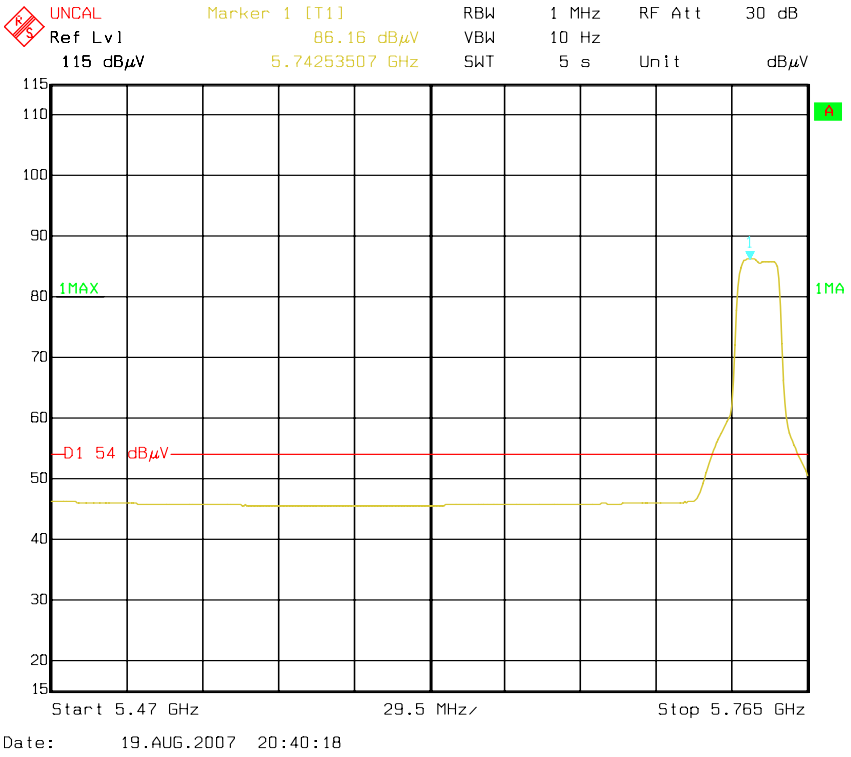
High-Channel (5805 MHz)



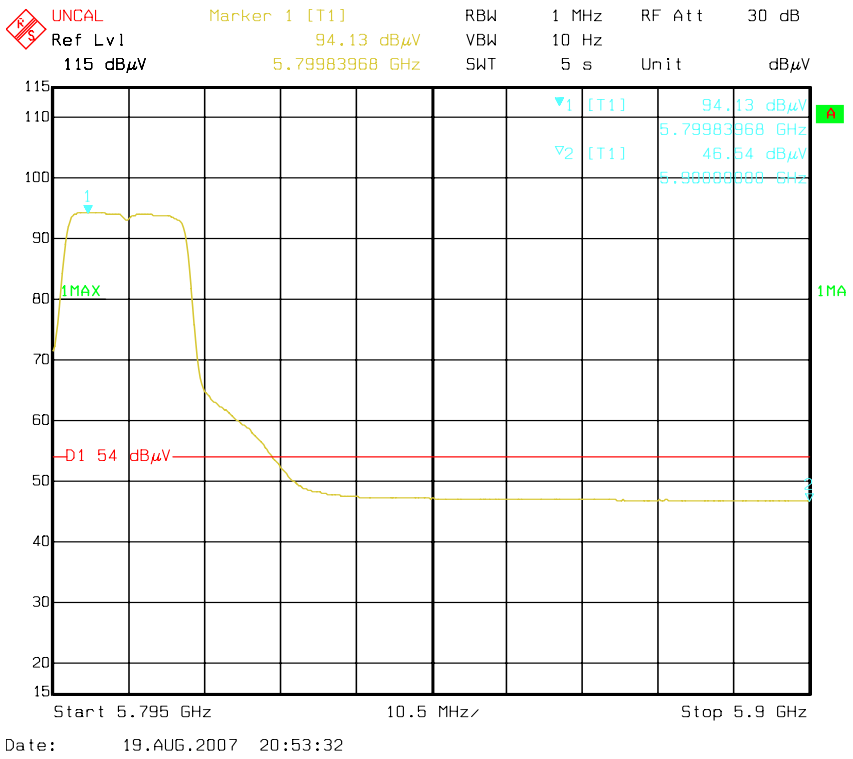
802.11a Restricted-Band for 17dBi directional Antenna TQWTD-1700-5.5V

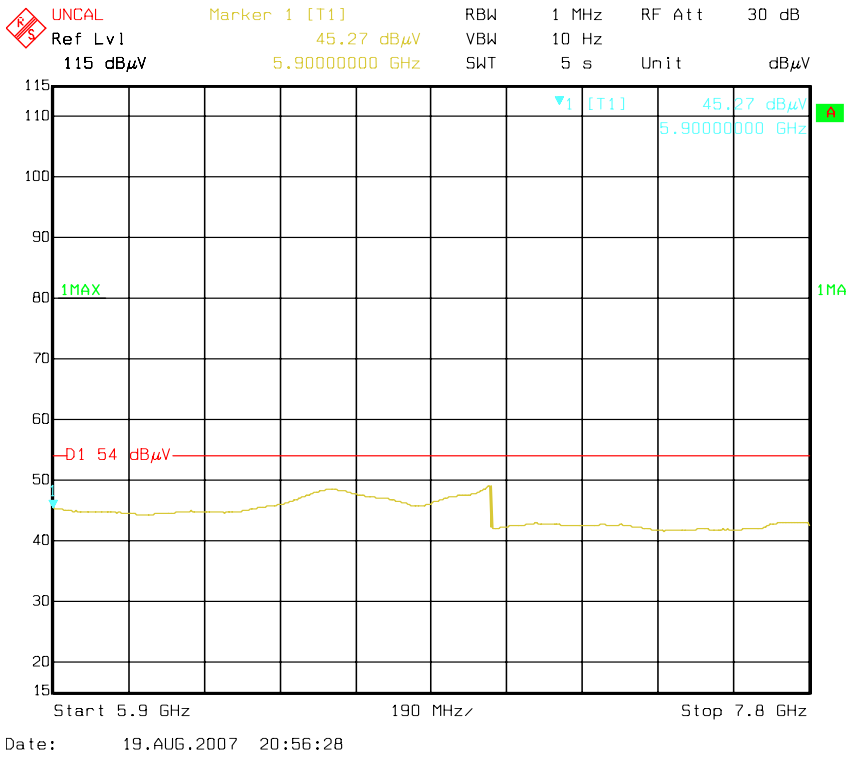
Low Channel Average





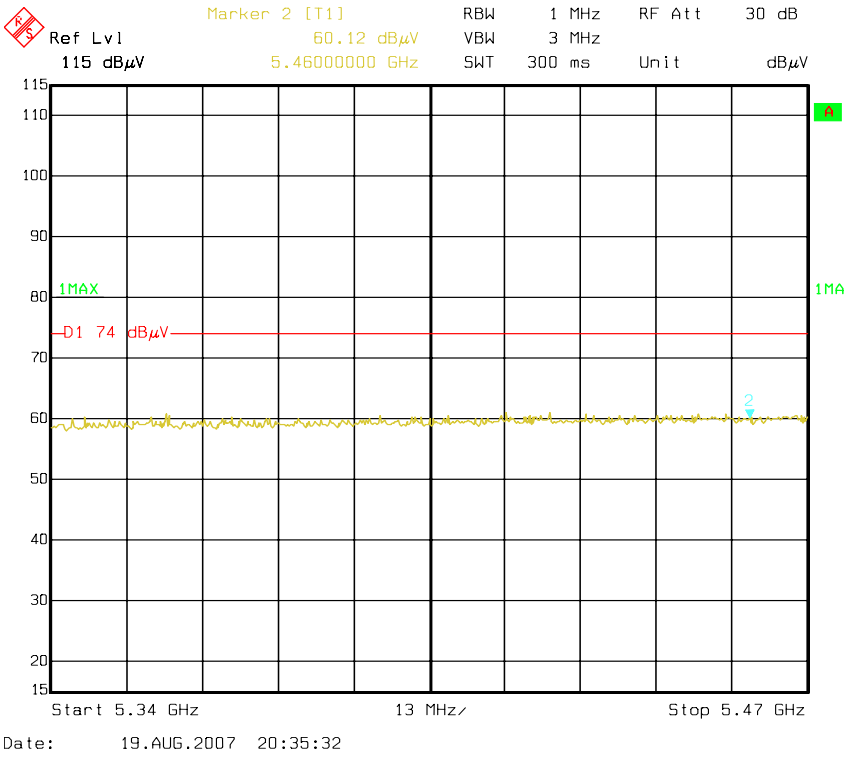
High Channel Average

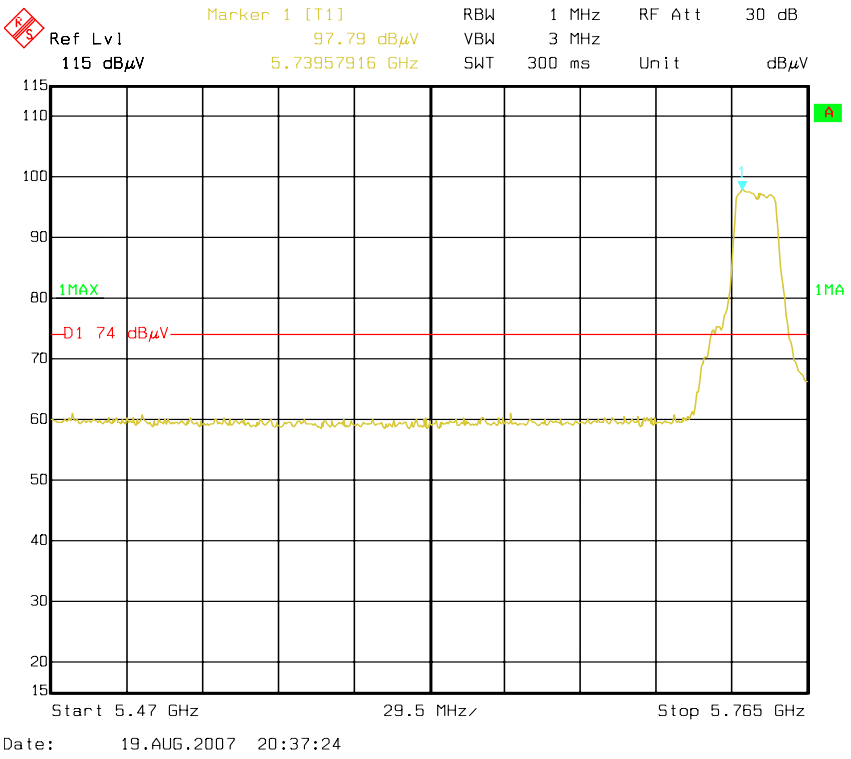




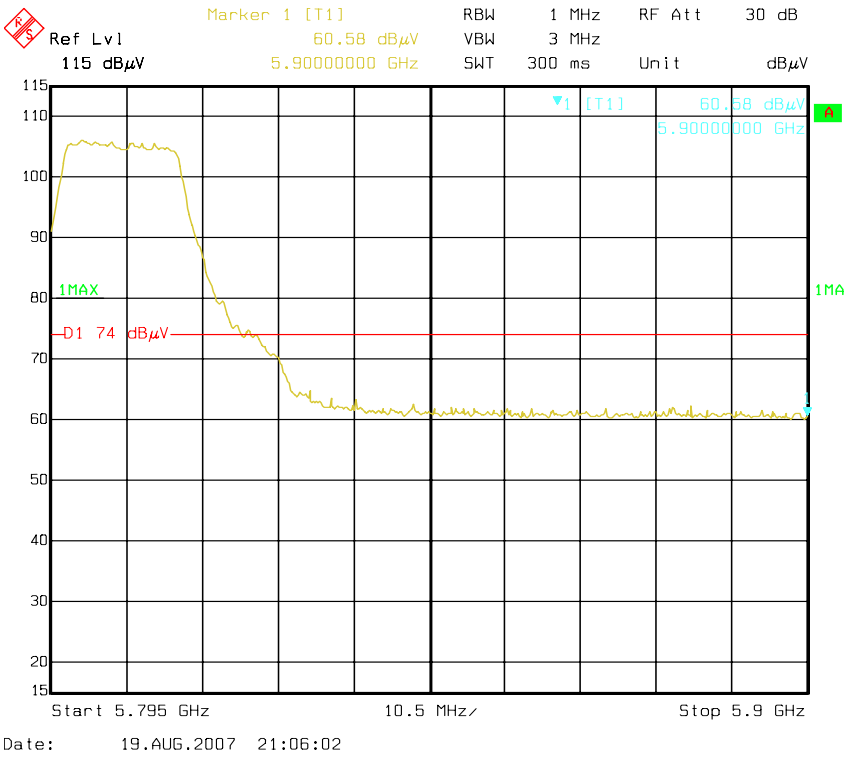
802.11a Restricted-Band for 17dBi directional Antenna TQWTD-1700-5.5V

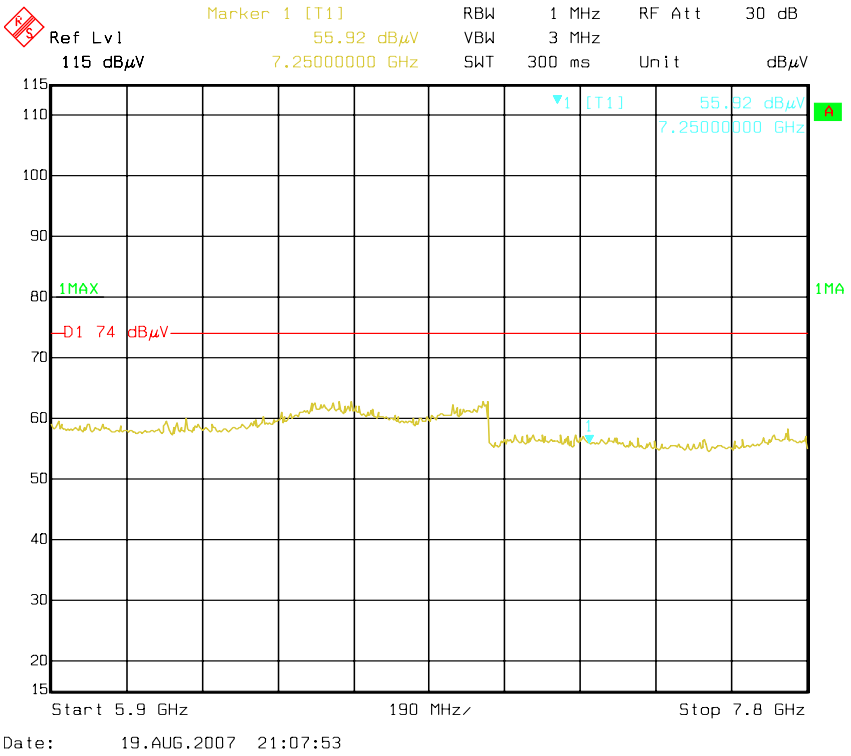
Low Channel Peak





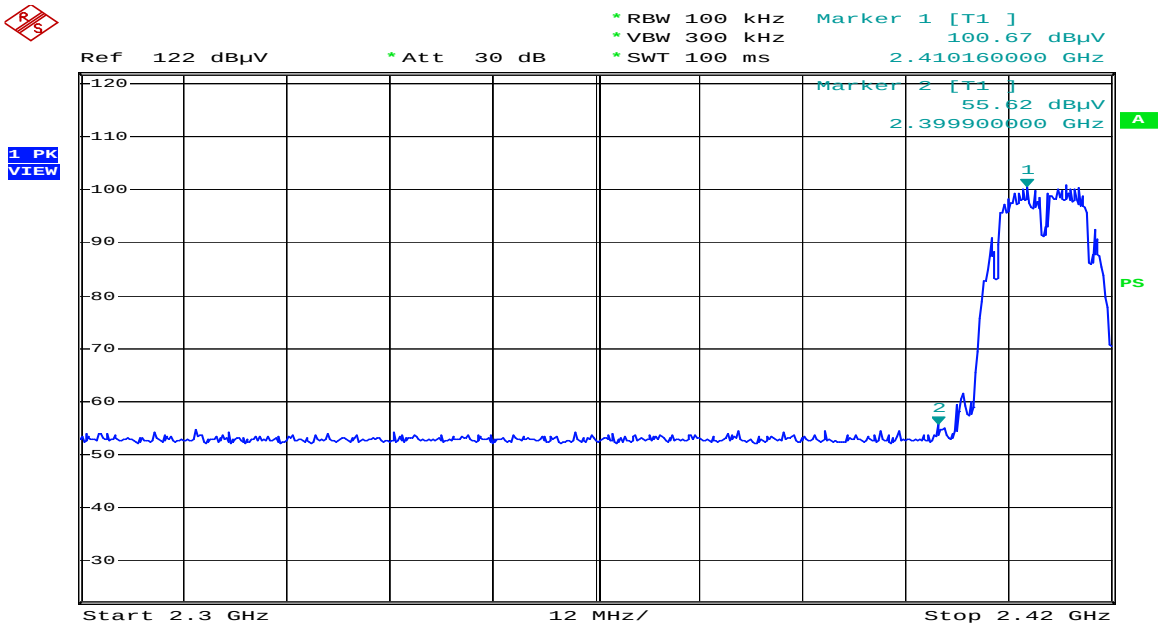
High Channel Peak





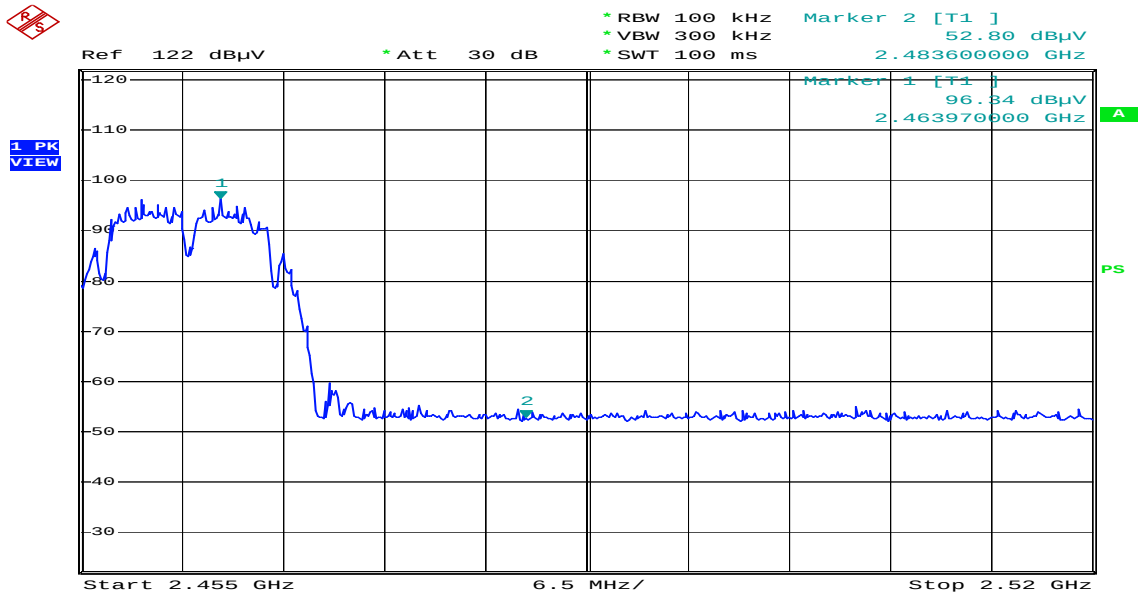
802.11b 100 kHz Outside-of-Band Edge for 12dBi Omni Antenna: XPTX2412-QX

Low-Channel (2412 MHz)



bandedge-802.11b low channel
Date: 1.AUG.2007 12:51:55

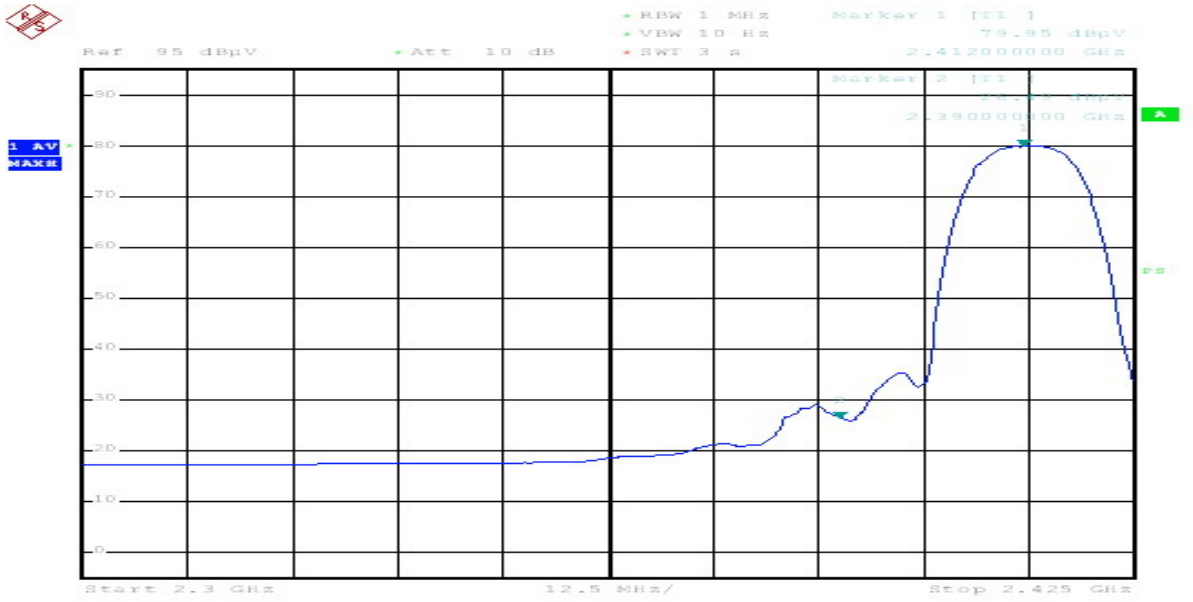
High-Channel (2462 MHz)



bandedge-802.11b high channel
Date: 1.AUG.2007 12:45:49

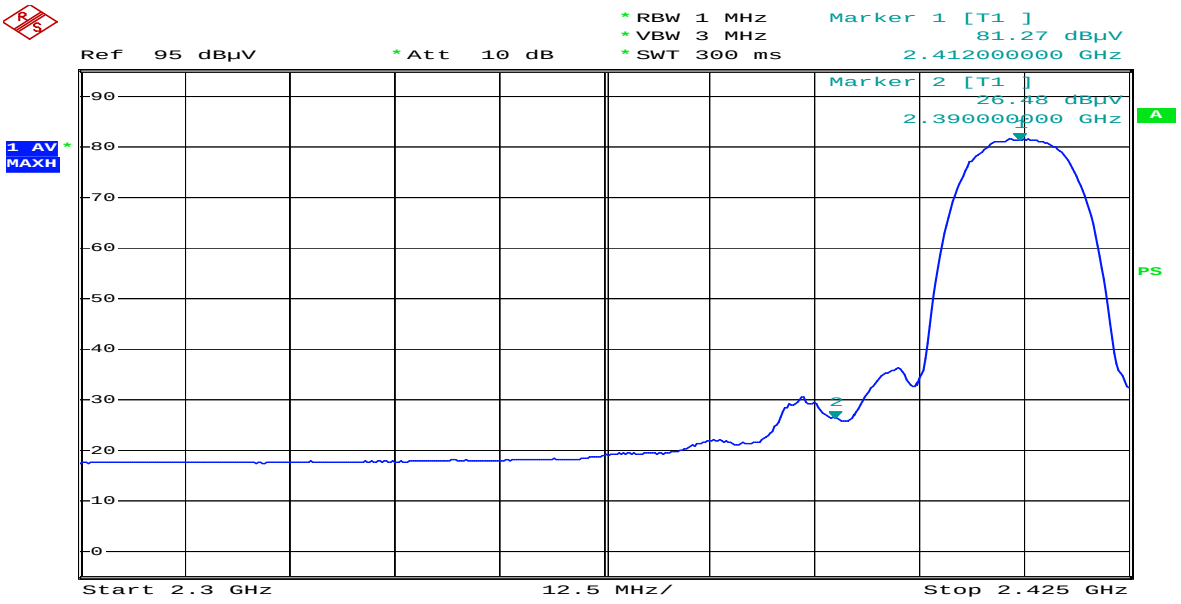
802.11b Restricted-Band for 12dBi Omni Antenna XPTX2412-QX

Low Channel Average



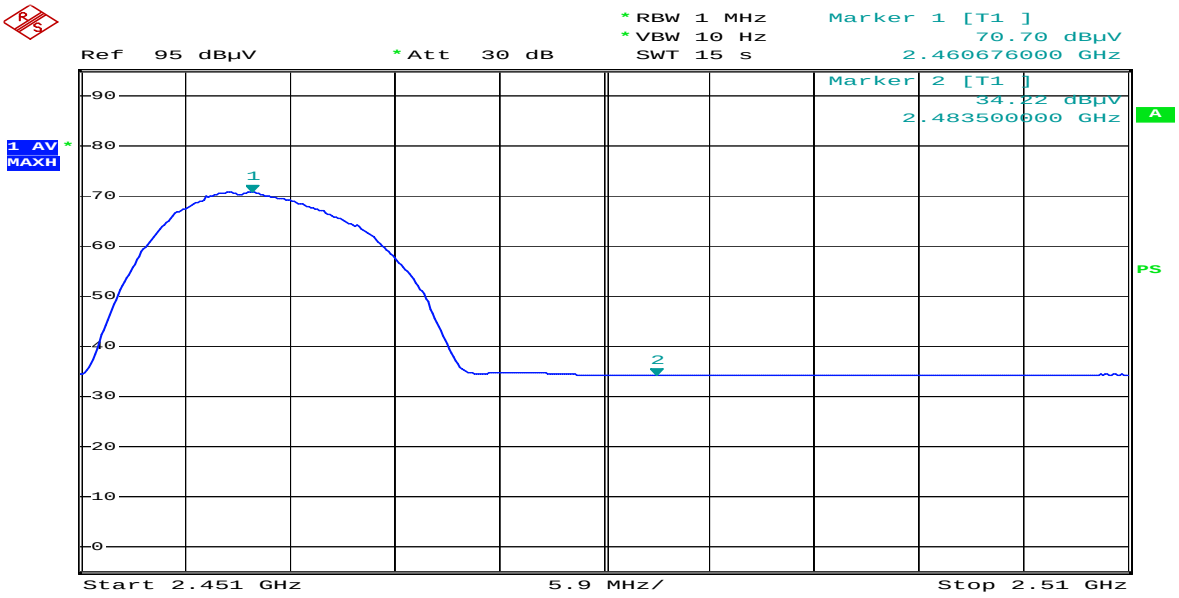
802.11b Restricted Band Edge (low-channel)-AV
Date: 17.AUG.2007 20:56:16

Low Channel Peak



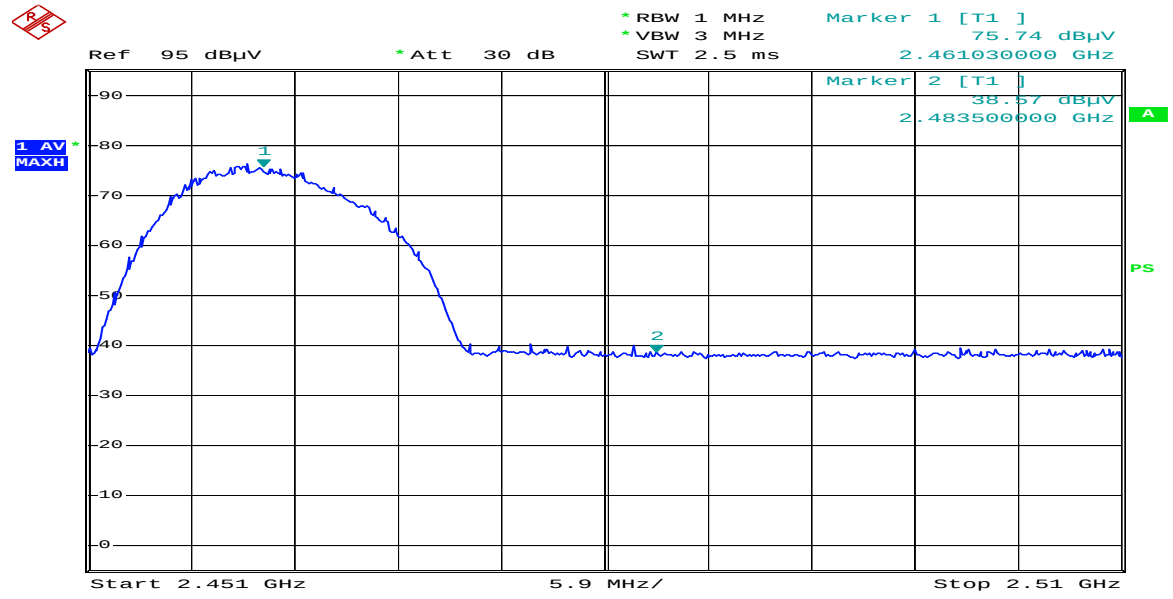
802.11b Restricted Band Edge (low-channel)-PK
Date: 17.AUG.2007 20:58:50

High Channel Average



802.11B Restricted-Band HigeChannel-AV(Antenna 12dBi)
Date: 25.AUG.2007 21:36:00

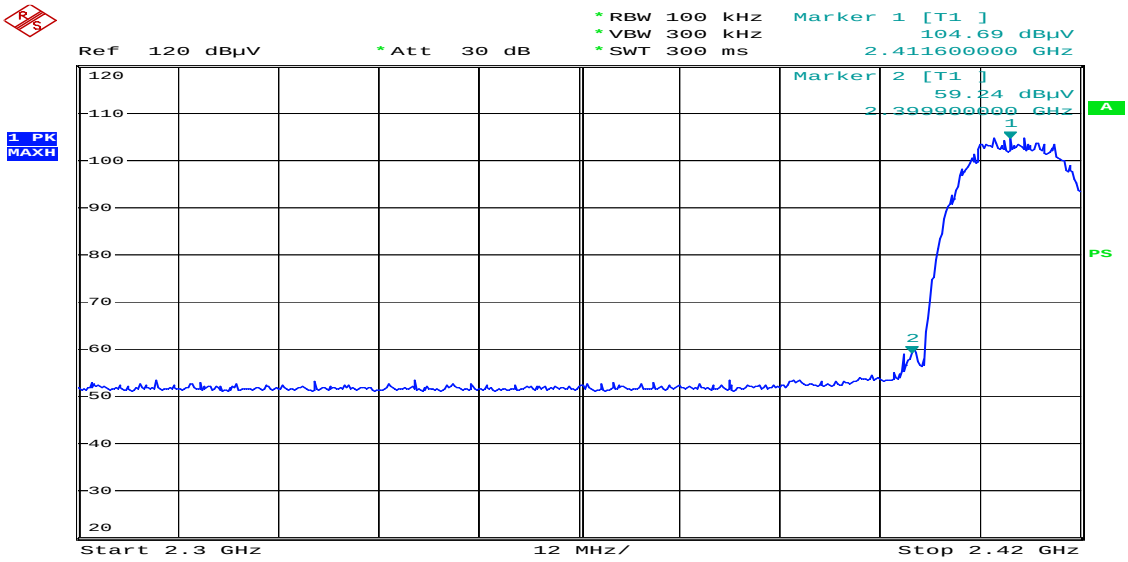
High Channel Peak



802.11B Restricted-Band HigeChannel-PK(Antenna 12dBi)
Date: 25.AUG.2007 21:32:02

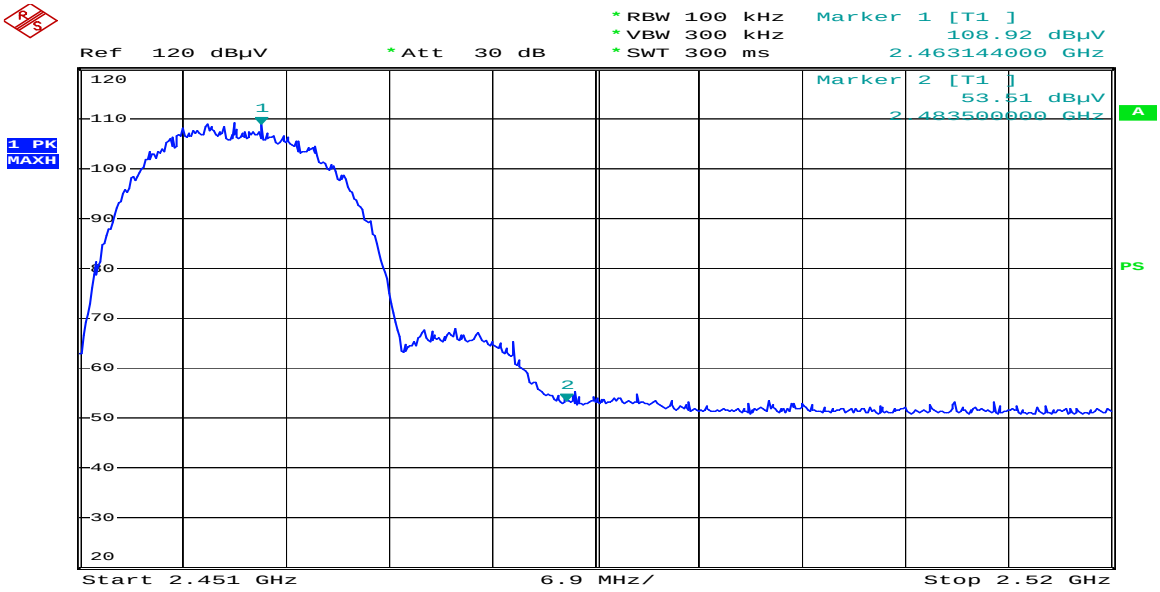
802.11b 100 kHz Outside-of-Band Edge for 11dBi Directional Antenna: SPDG14T

Low-Channel (2412 MHz)



802.11b 100KHz Outside-of-Band Edge LowChannel(Antenna 11dBi)
Date: 25.AUG.2007 19:49:37

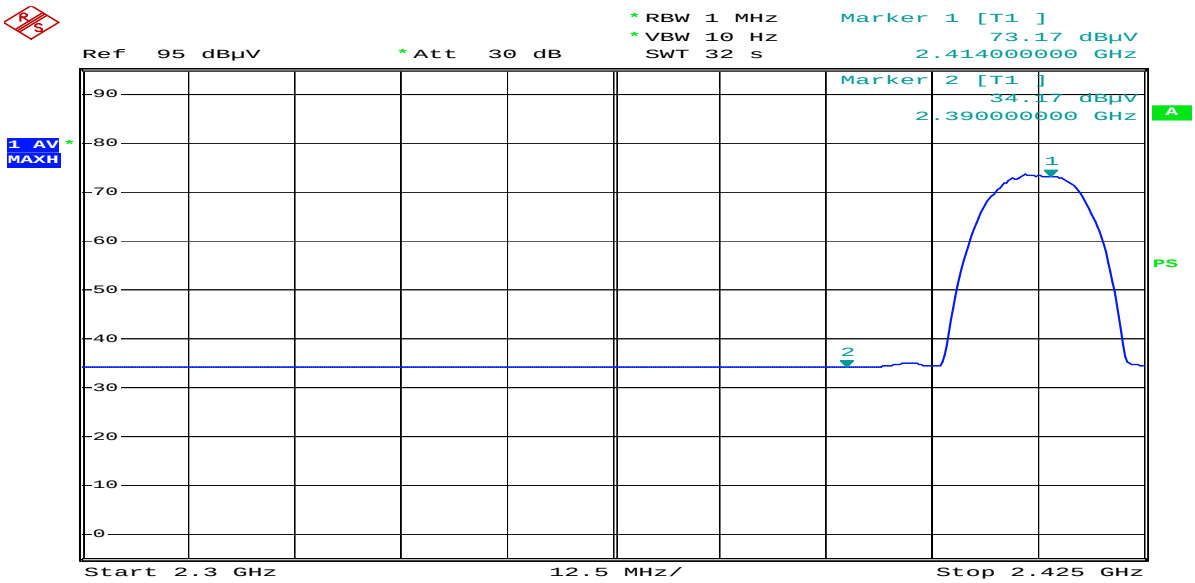
High-Channel (2462 MHz)



802.11b 100KHz Outside-of-Band Edge HighChannel(Antenna 11dBi)
Date: 25.AUG.2007 20:11:57

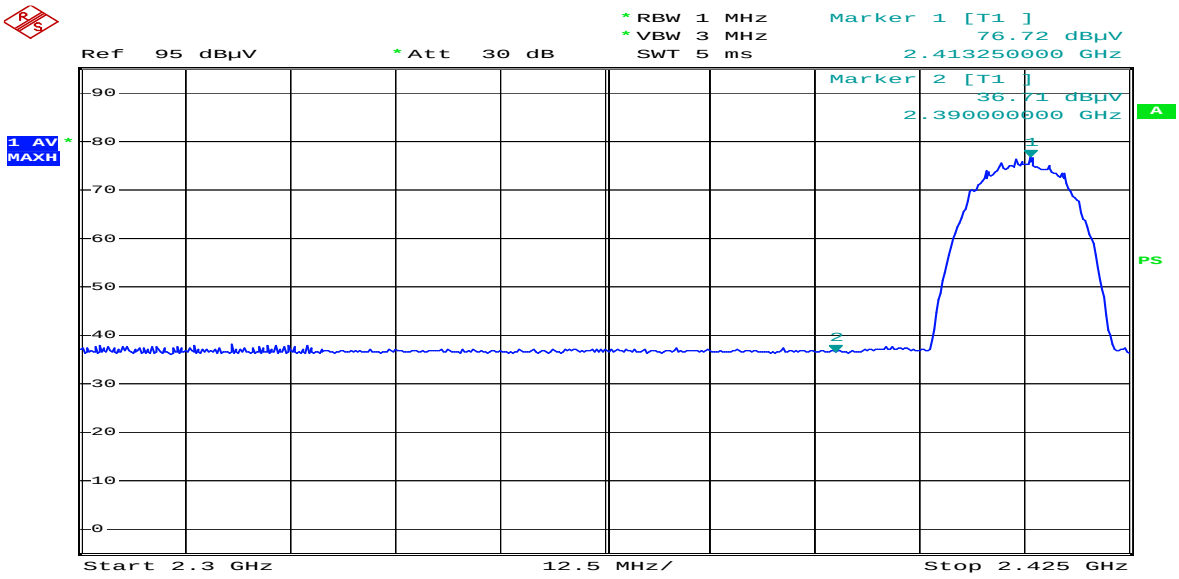
802.11b Restricted-Band for 11dBi Directional Antenna SPDG14T

Low Channel Average



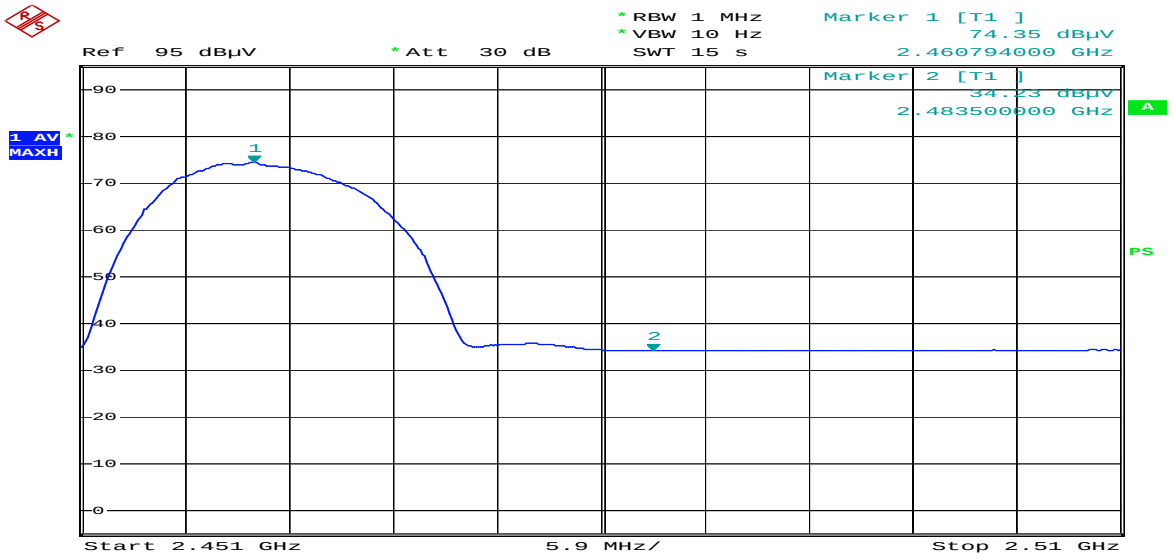
802.11B Restricted-Band LowChannel-AV(Antenna 11dBi)
Date: 25.AUG.2007 21:11:14

Low Channel Peak



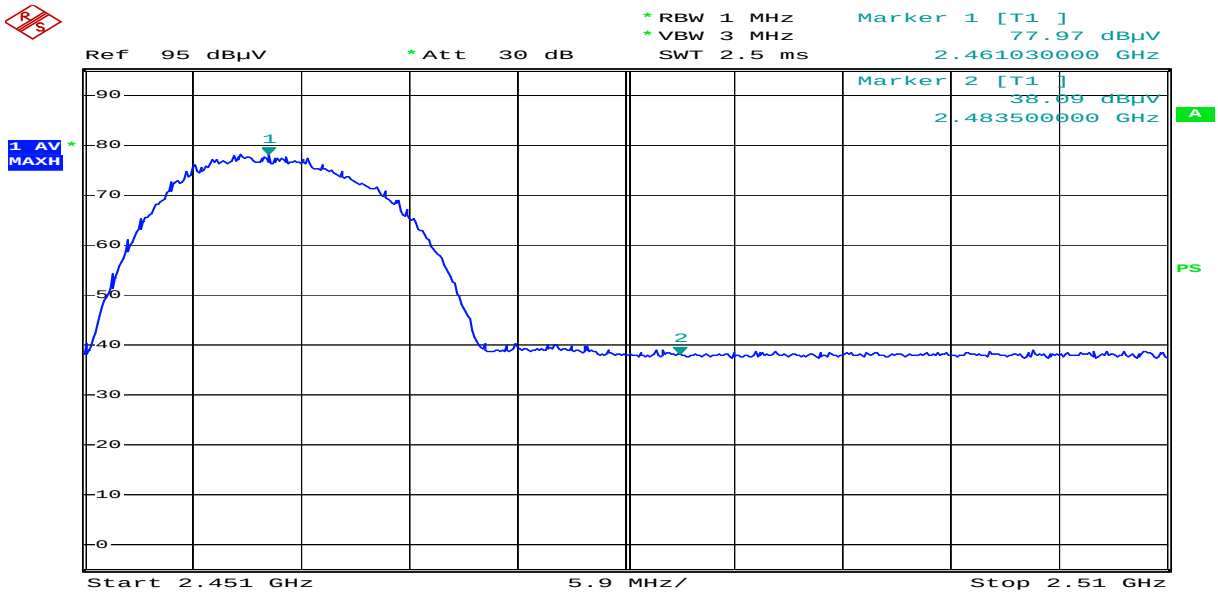
802.11B Restricted-Band LowChannel-PK(Antenna 11dBi)
Date: 25.AUG.2007 21:13:29

High Channel Average



802.11B Restricted-Band HigeChannel-AV(Antenna 11dBi)
Date: 25.AUG.2007 21:20:04

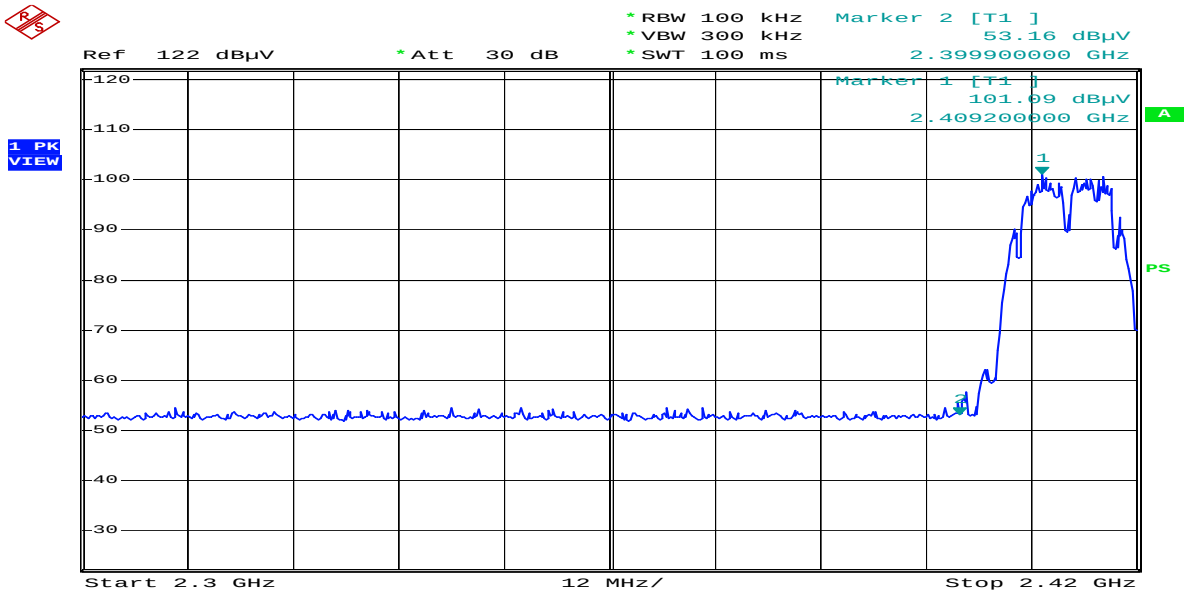
High Channel Peak



802.11B Restricted-Band HigeChannel-PK(Antenna 11dBi)
Date: 25.AUG.2007 21:18:33

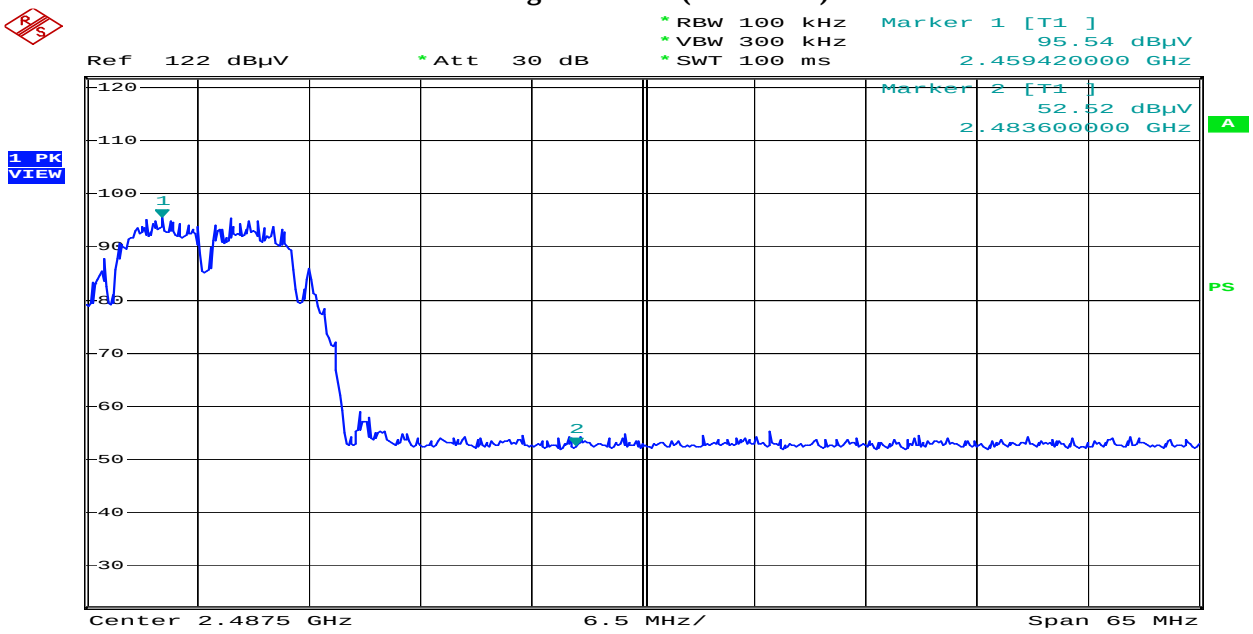
802.11g 100 kHz Outside-of-Band Edge for 12dBi Omni Antenna: XPTX2412-QX

Low-Channel (2412 MHz)



bandege low-802.11g
Date: 1.AUG.2007 12:35:18

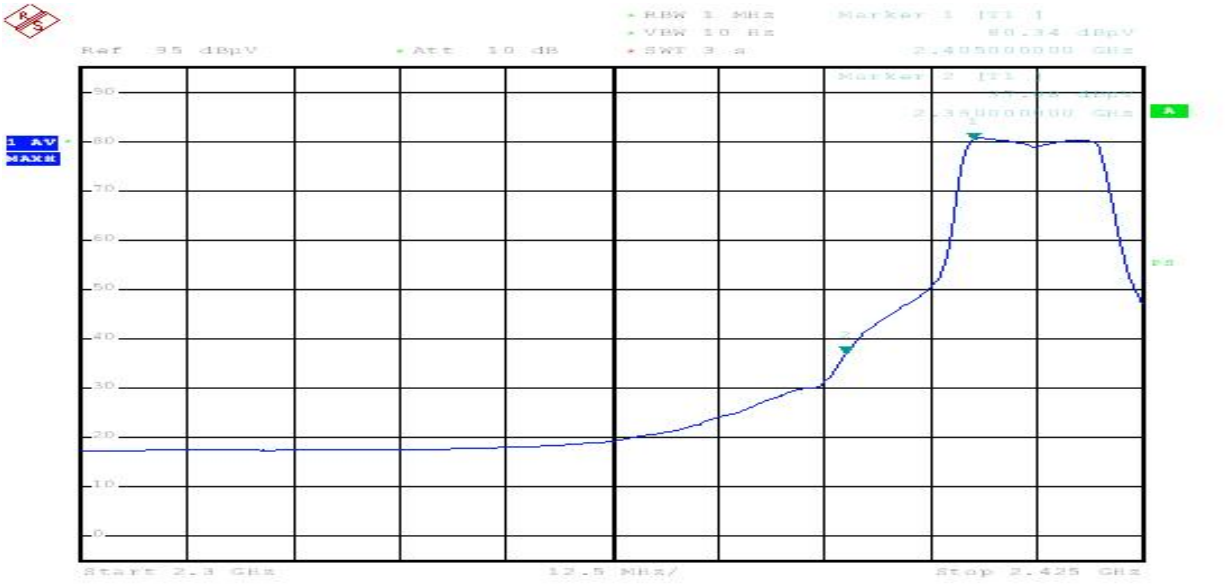
High-Channel (2462 MHz)



bandedge-802.11g high channel
Date: 1.AUG.2007 12:42:39

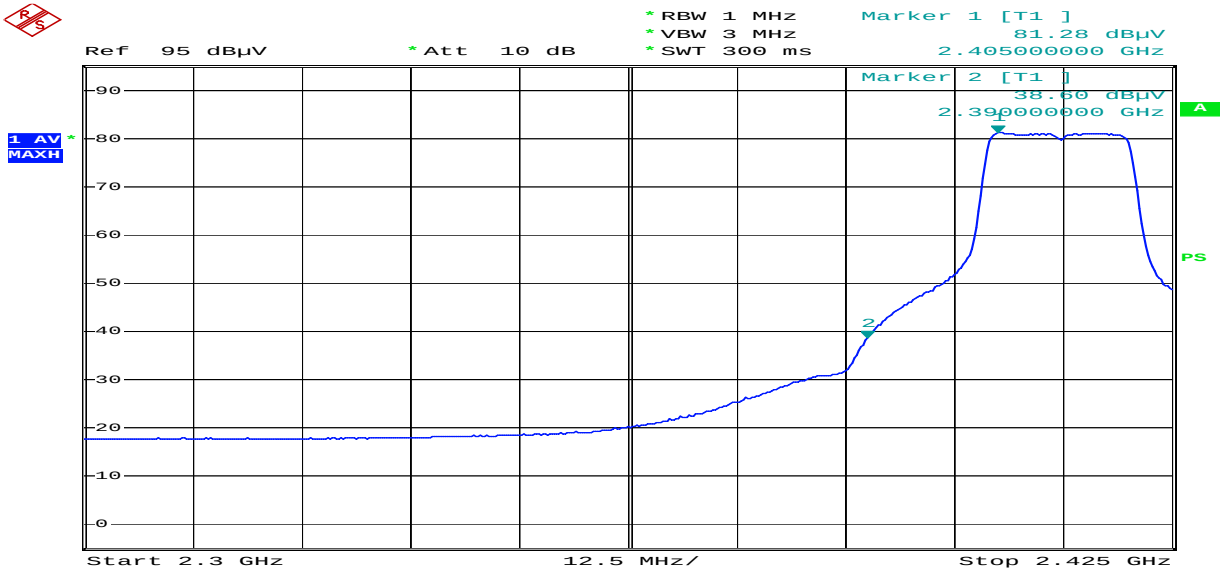
802.11g Restricted-Band for 12dBi Omni Antenna XPTX2412-QX

Low Channel Average



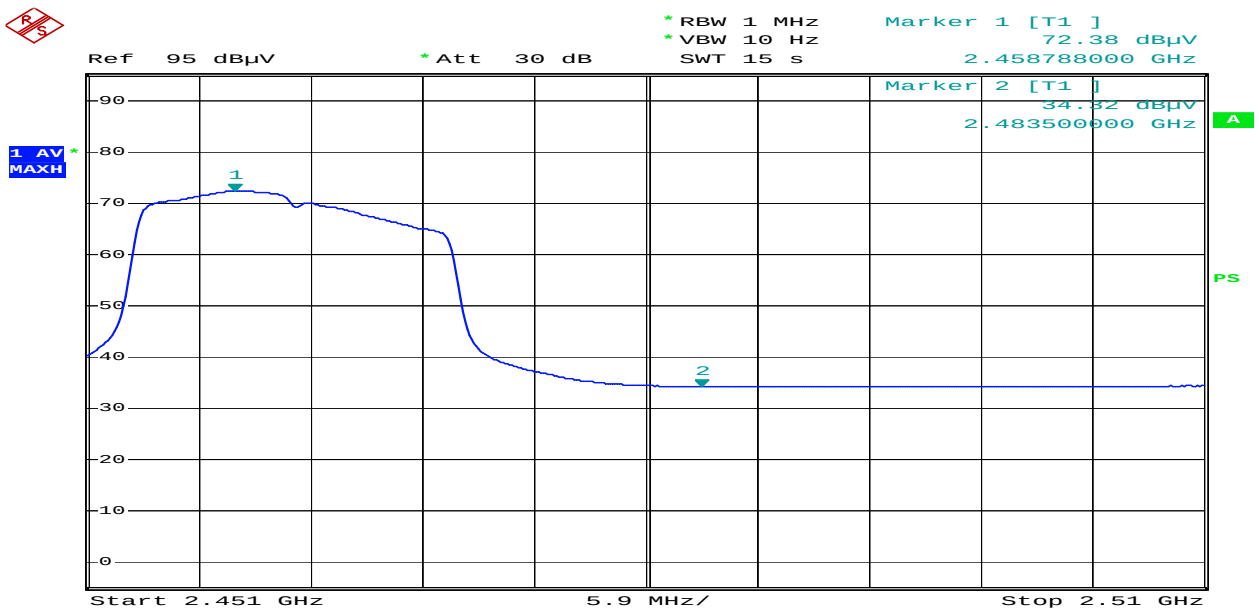
802.11g Restricted Band Edge (low-channel)-AV
Date: 17.AUG.2007 21:06:45

Low Channel Peak



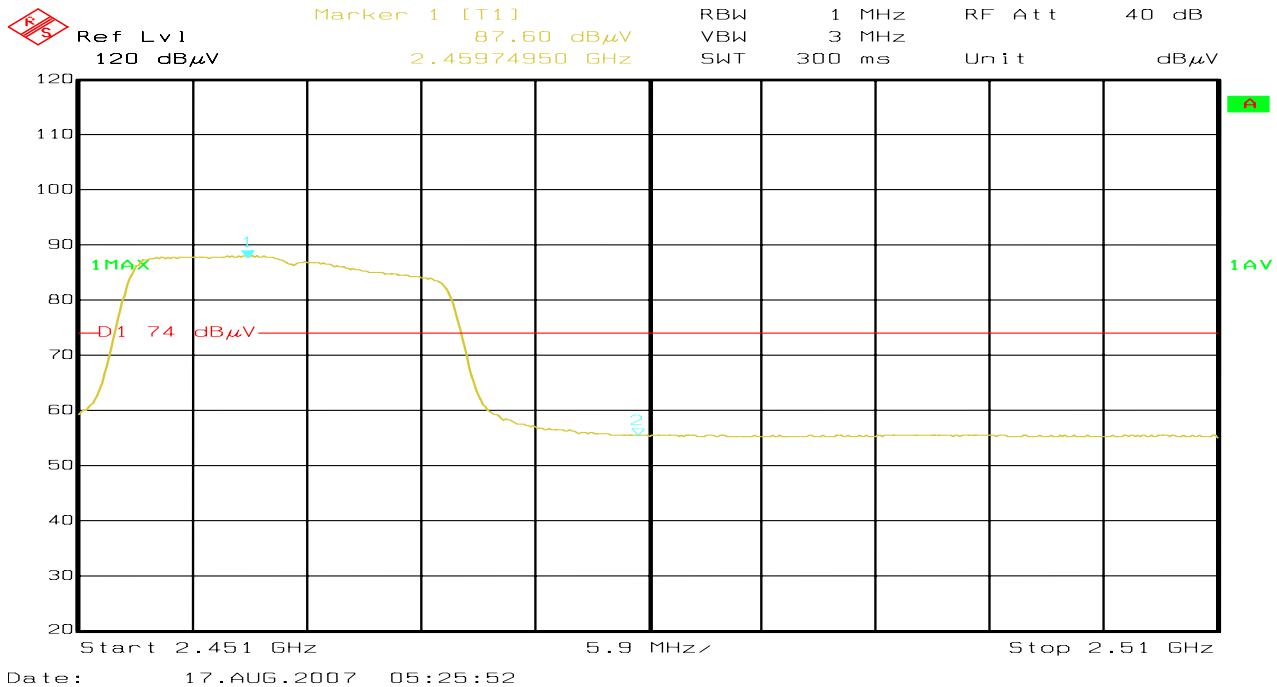
802.11g Restricted Band Edge (low-channel)-PK
Date: 17.AUG.2007 21:03:10

High Channel Average



802.11G Restricted-Band HigeChannel-AV(Antenna 12dBi)
Date: 25.AUG.2007 21:39:31

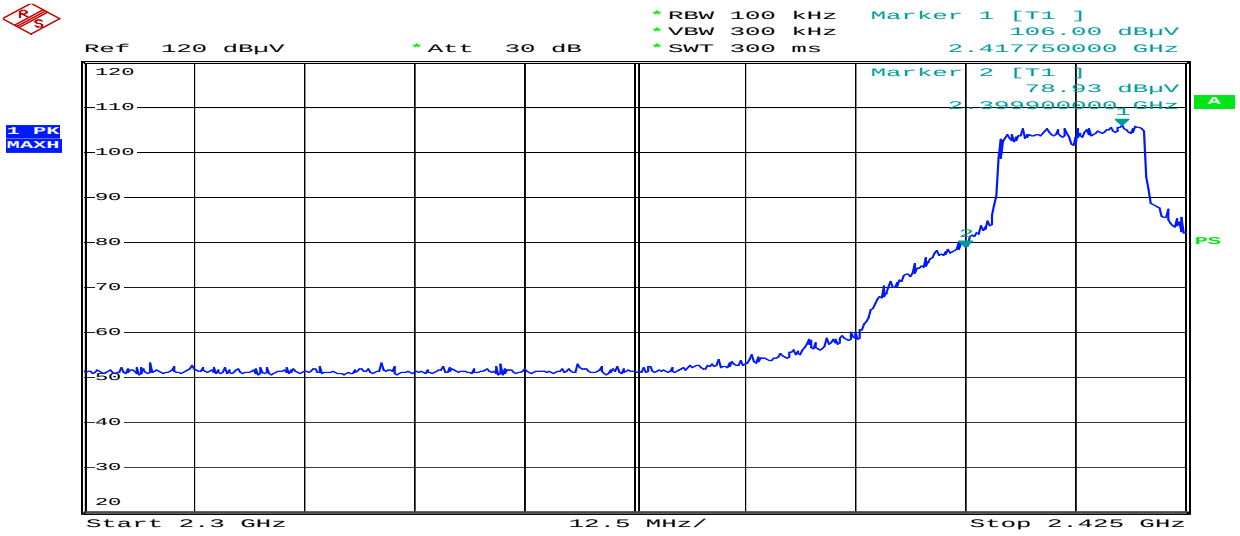
High Channel Peak



Date: 17.AUG.2007 05:25:52

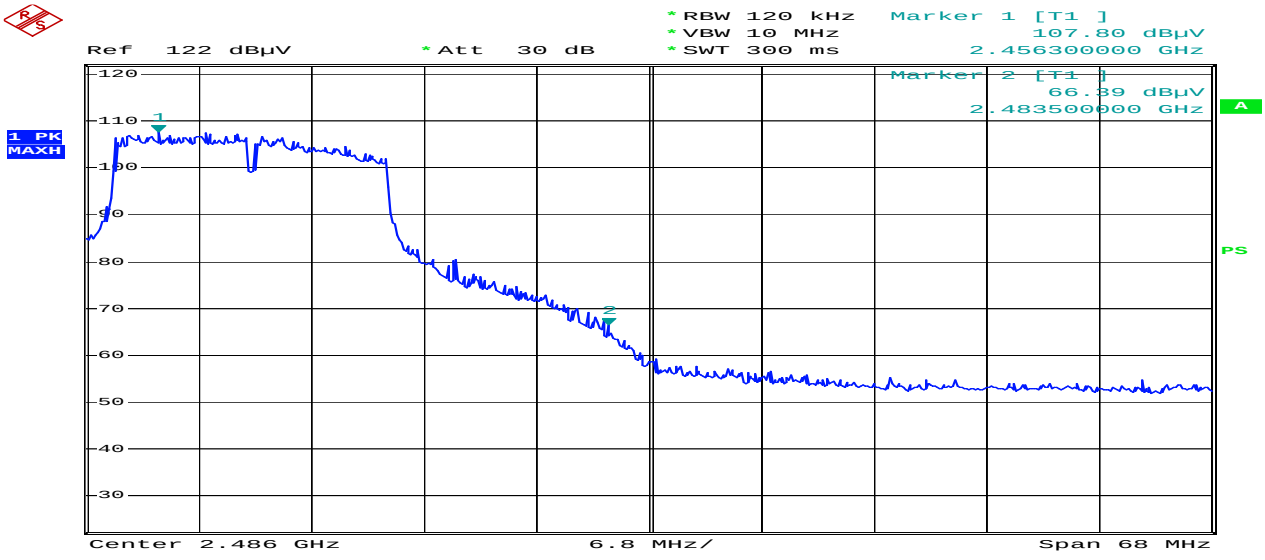
802.11g 100 kHz Outside-of-Band Edge for 11dBi Directional Antenna: SPDG14T

Low-Channel (2412 MHz)



802.11g 100KHz Outside-of-Band Edge LowChannel(Antenna 11dBi)
Date: 25.AUG.2007 19:54:39

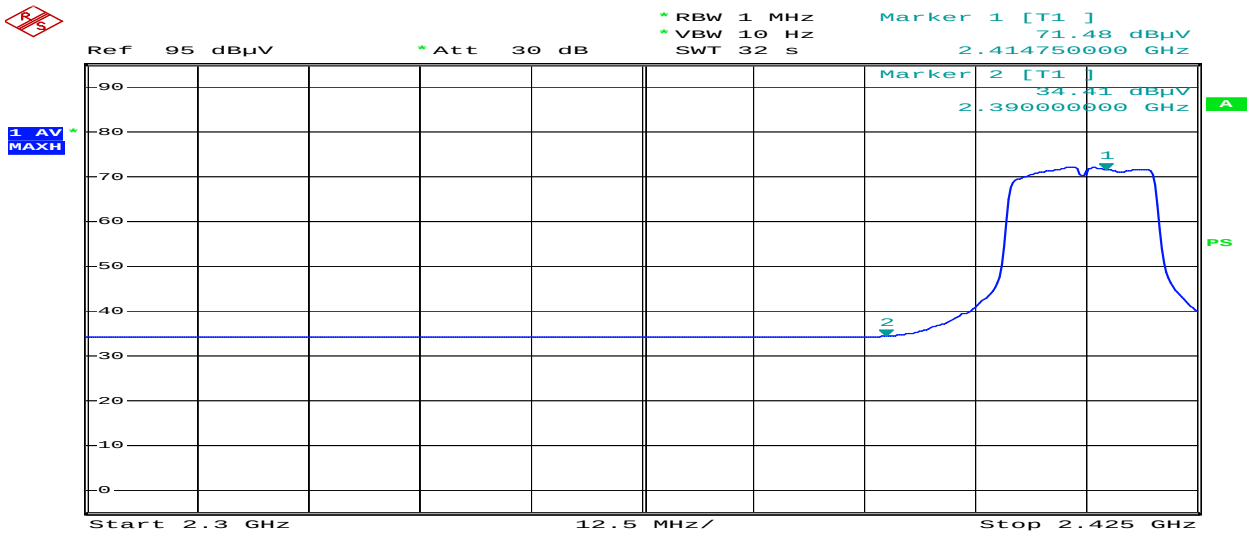
High-Channel (2462 MHz)



802.11g 100KHz Outside-of-Band Edge HighChannel(Antenna 11dBi)
Date: 25.AUG.2007 20:27:49

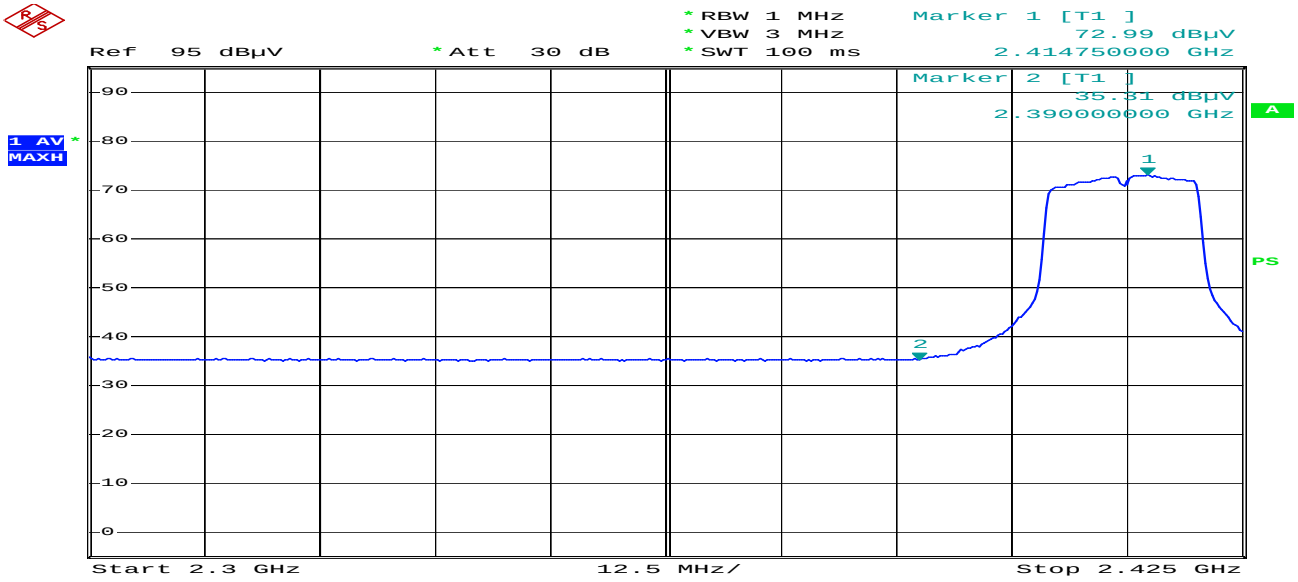
802.11g Restricted-Band for 11dBi Directional Antenna SPDG14T

Low Channel Average



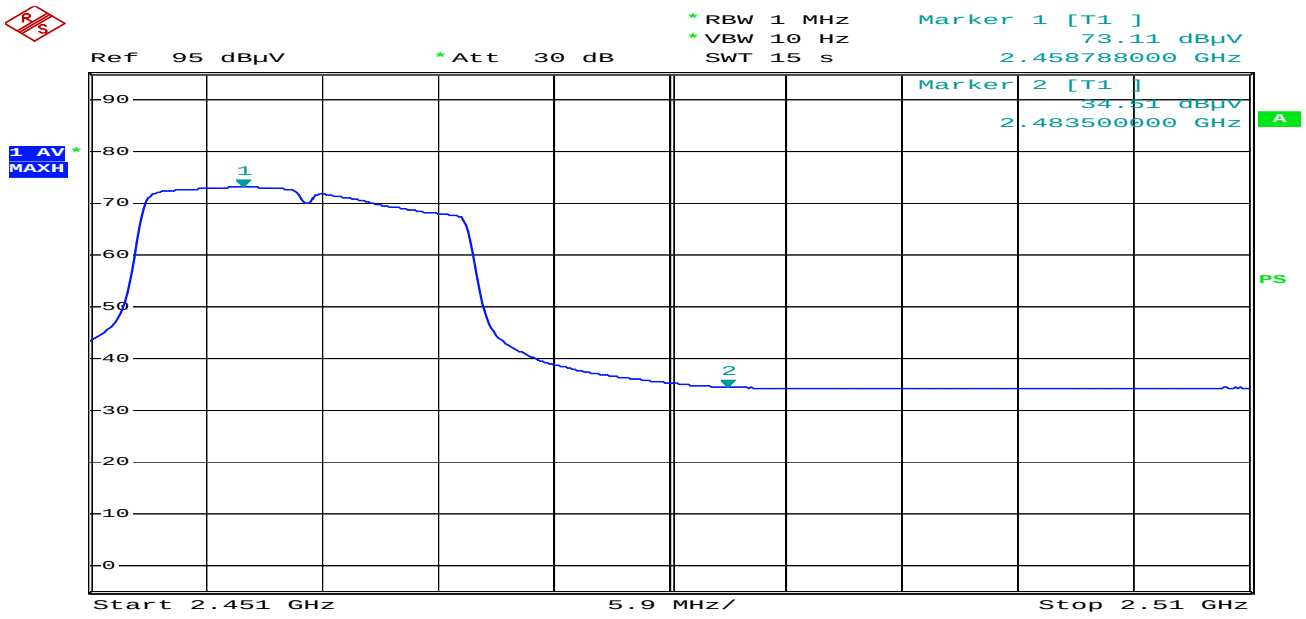
802.11G Restricted-Band LowChannel-AV(Antenna 11dBi)
Date: 25.AUG.2007 21:07:53

Low Channel Peak



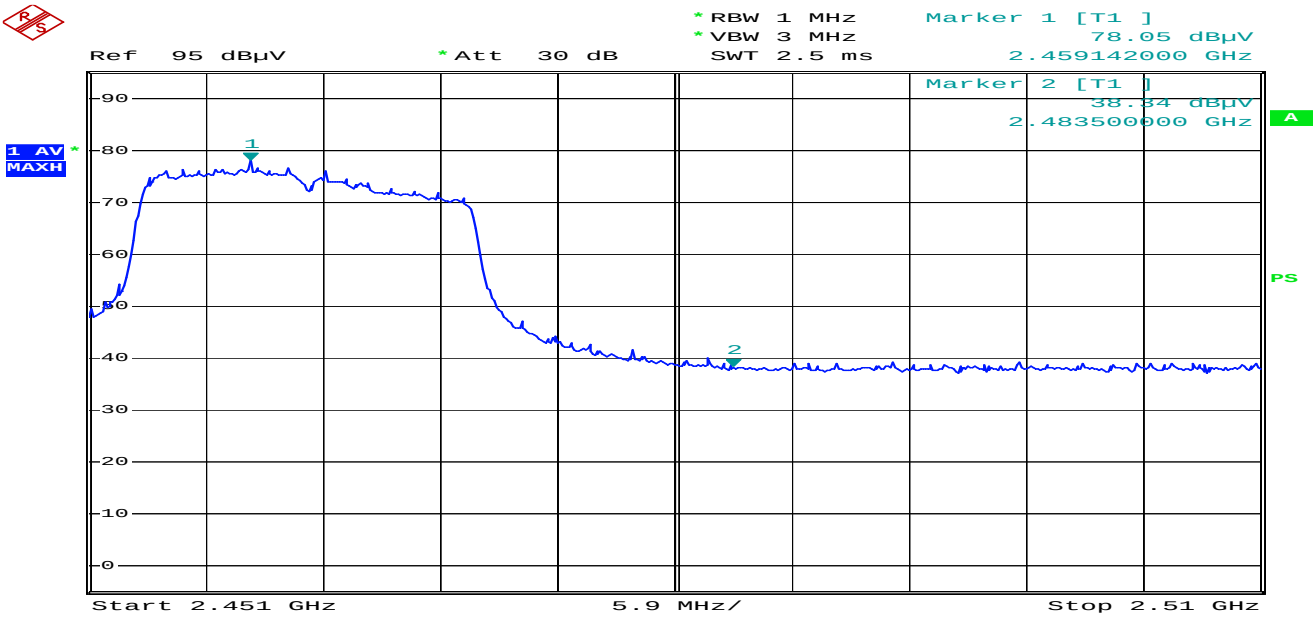
802.11G Restricted-Band LowChannel-PK(Antenna 11dBi)
Date: 25.AUG.2007 21:05:25

High Channel Average



802.11G Restricted-Band HigeChannel-AV(Antenna 11dBi)
Date: 25.AUG.2007 21:23:42

High Channel Peak



802.11G Restricted-Band HigeChannel-PK(Antenna 11dBi)
Date: 25.AUG.2007 21:25:50

§15.247(a) (2) – 6dB BANDWIDTH TESTING

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

The testing was performed by Green Xu on 2007-07-22, 2007-08-02 and 2007-08-09.

802.11a mode:

Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (MHz)	Result
5745	16.63	0.5	Pass
5785	16.63	0.5	Pass
5805	16.63	0.5	Pass

802.11b mode:

Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (MHz)	Result
2412	12.02	0.5	Pass
2437	11.86	0.5	Pass
2462	11.86	0.5	Pass

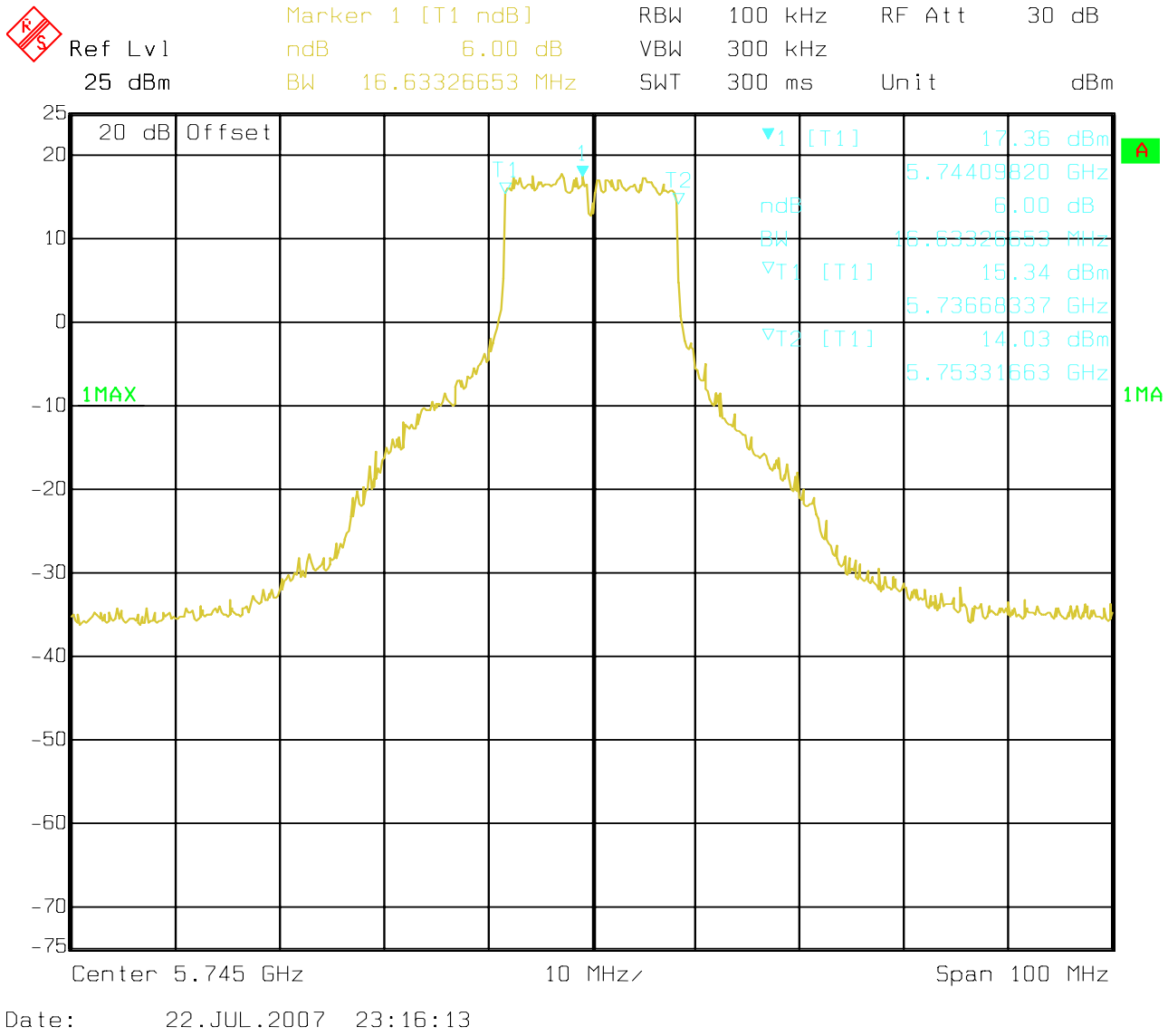
802.11g mode:

Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (MHz)	Result
2412	16.51	0.5	Pass
2437	16.67	0.5	Pass
2462	16.67	0.5	Pass

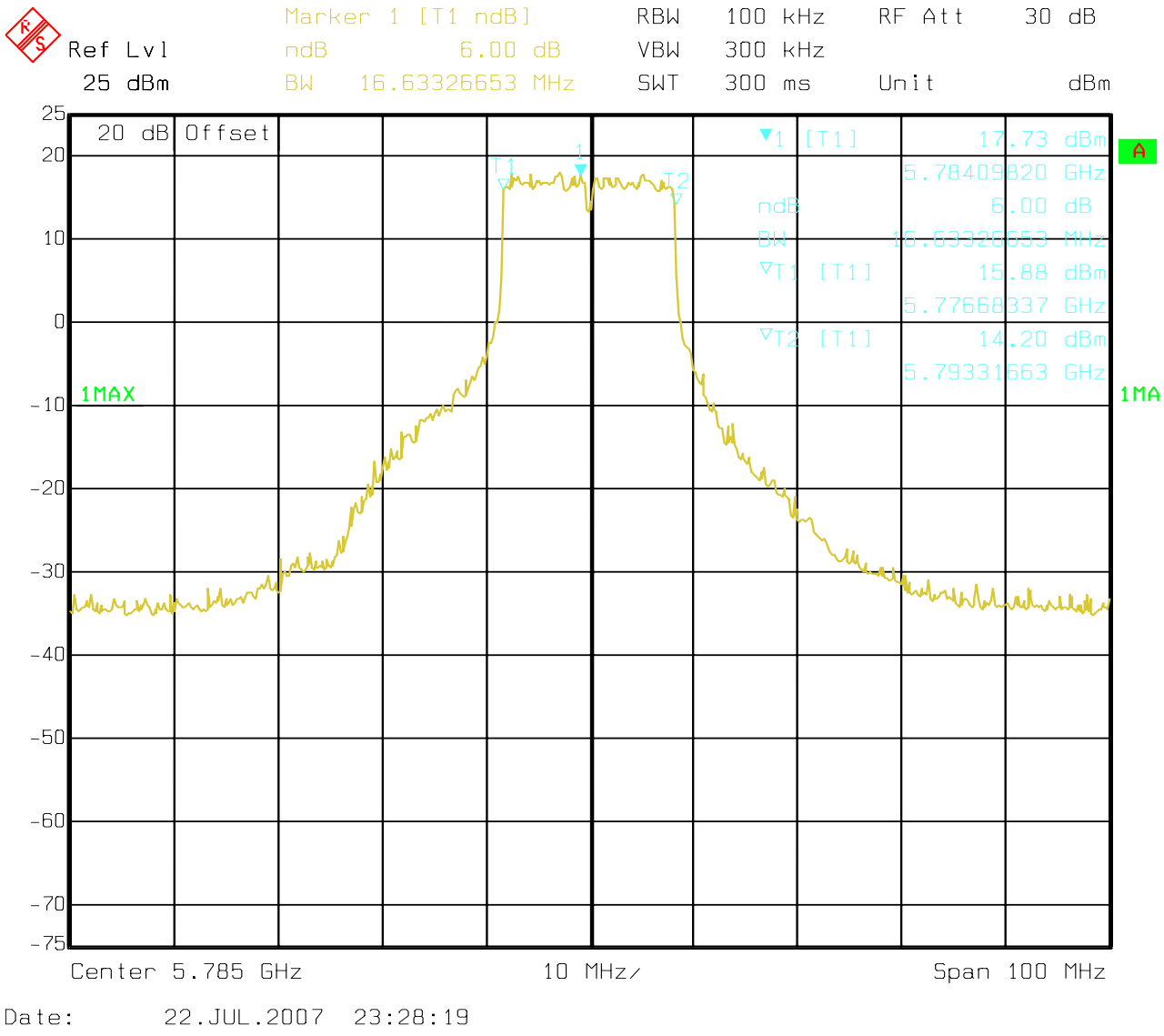
Test Result: Pass

Please refer to following plots

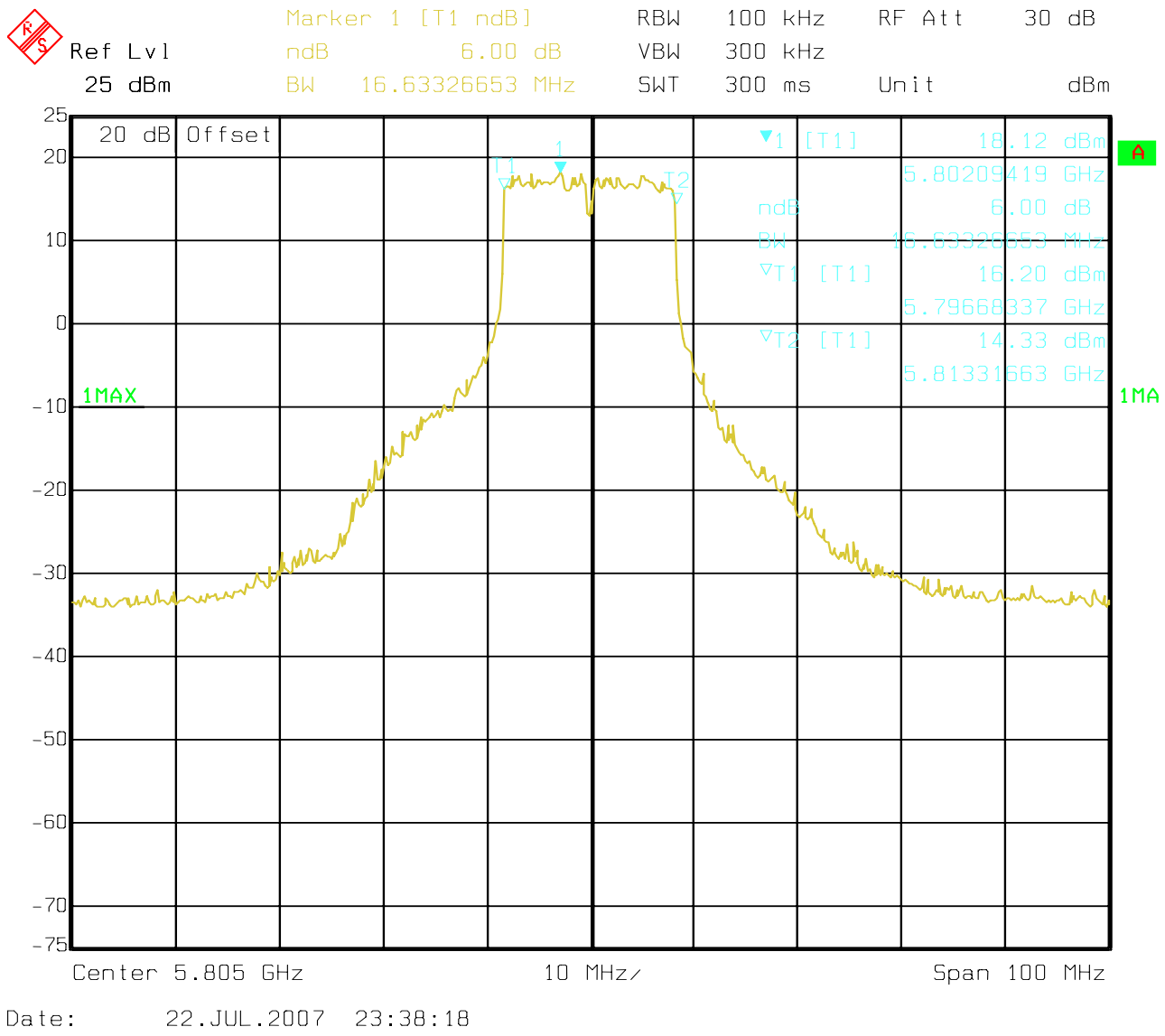
802.11a 6dB Band Width (Low Channel 5745MHz)



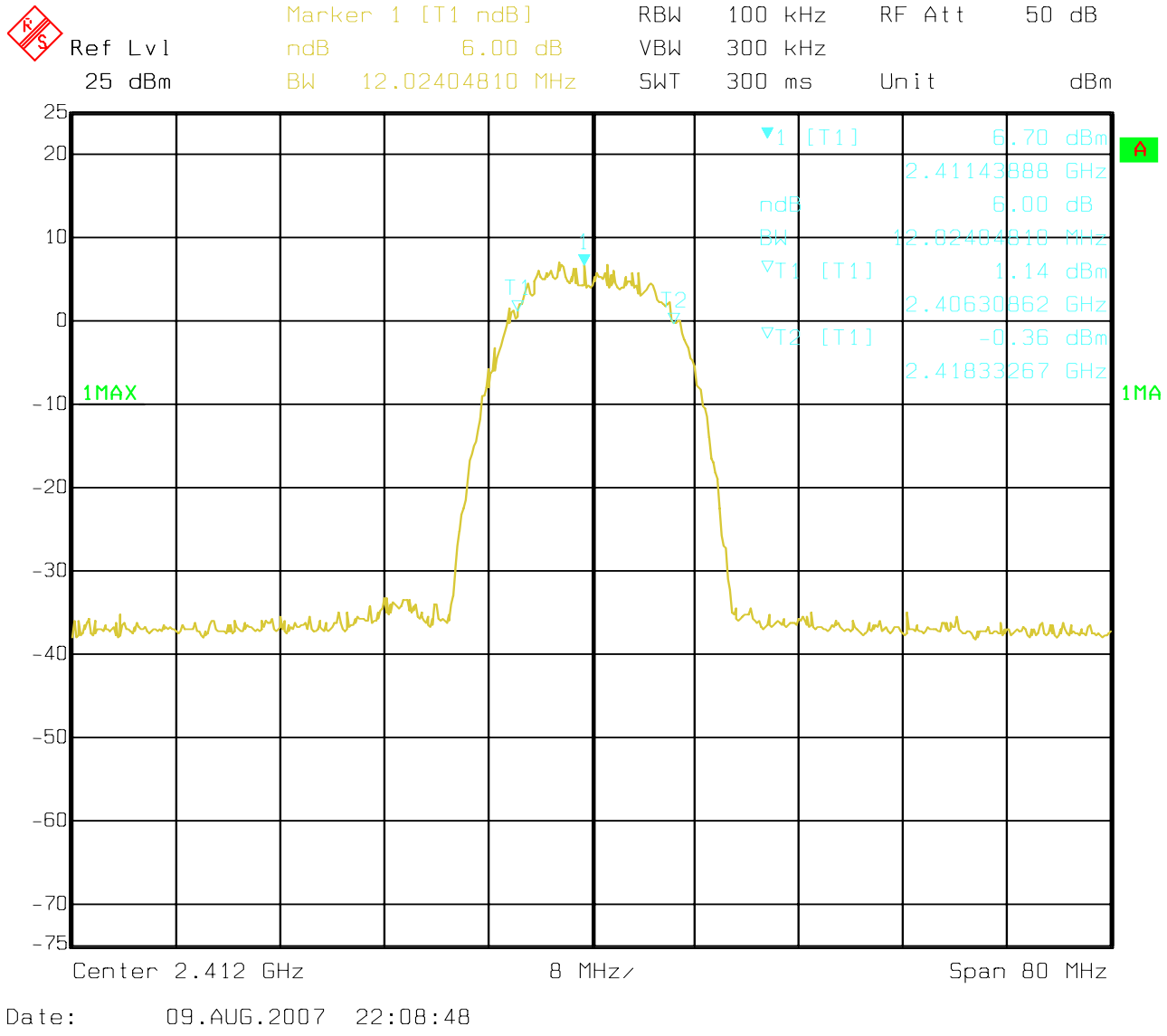
802.11a 6dB Band Width (Middle Channel 5785MHz)



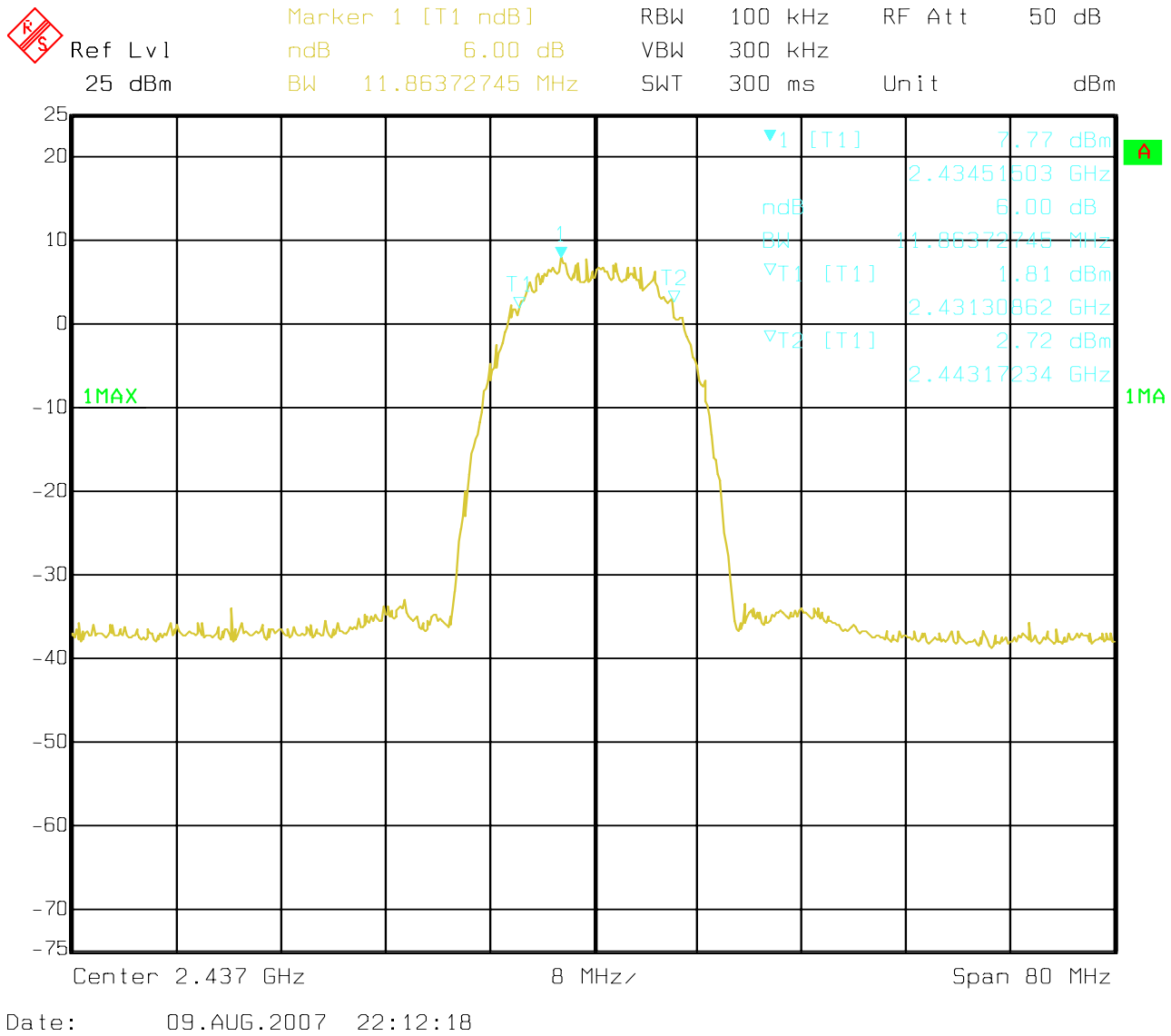
802.11a 6dB Band Width (High Channel 5805MHz)



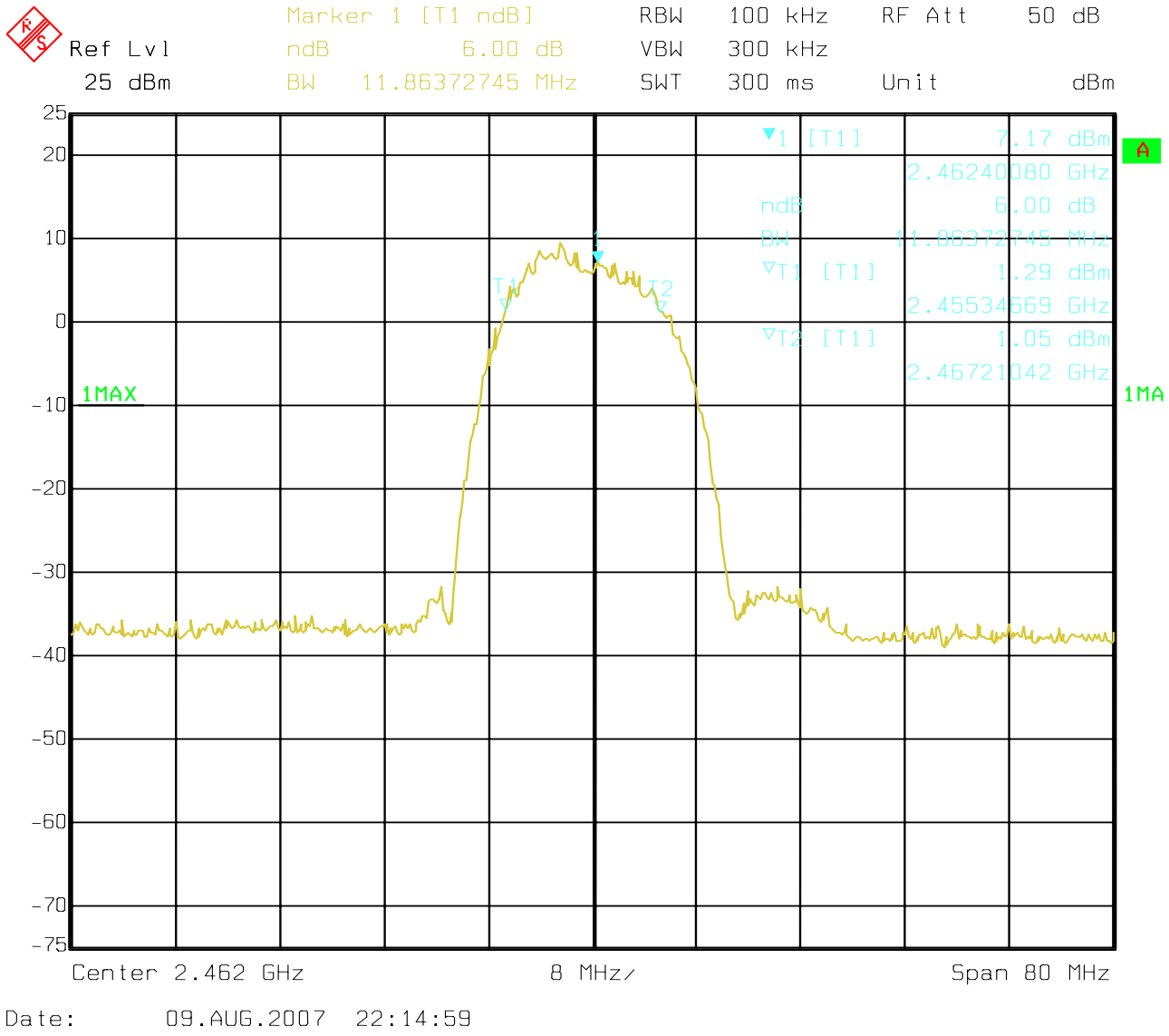
802.11b 6dB Band Width (Low Channel 2412MHz)



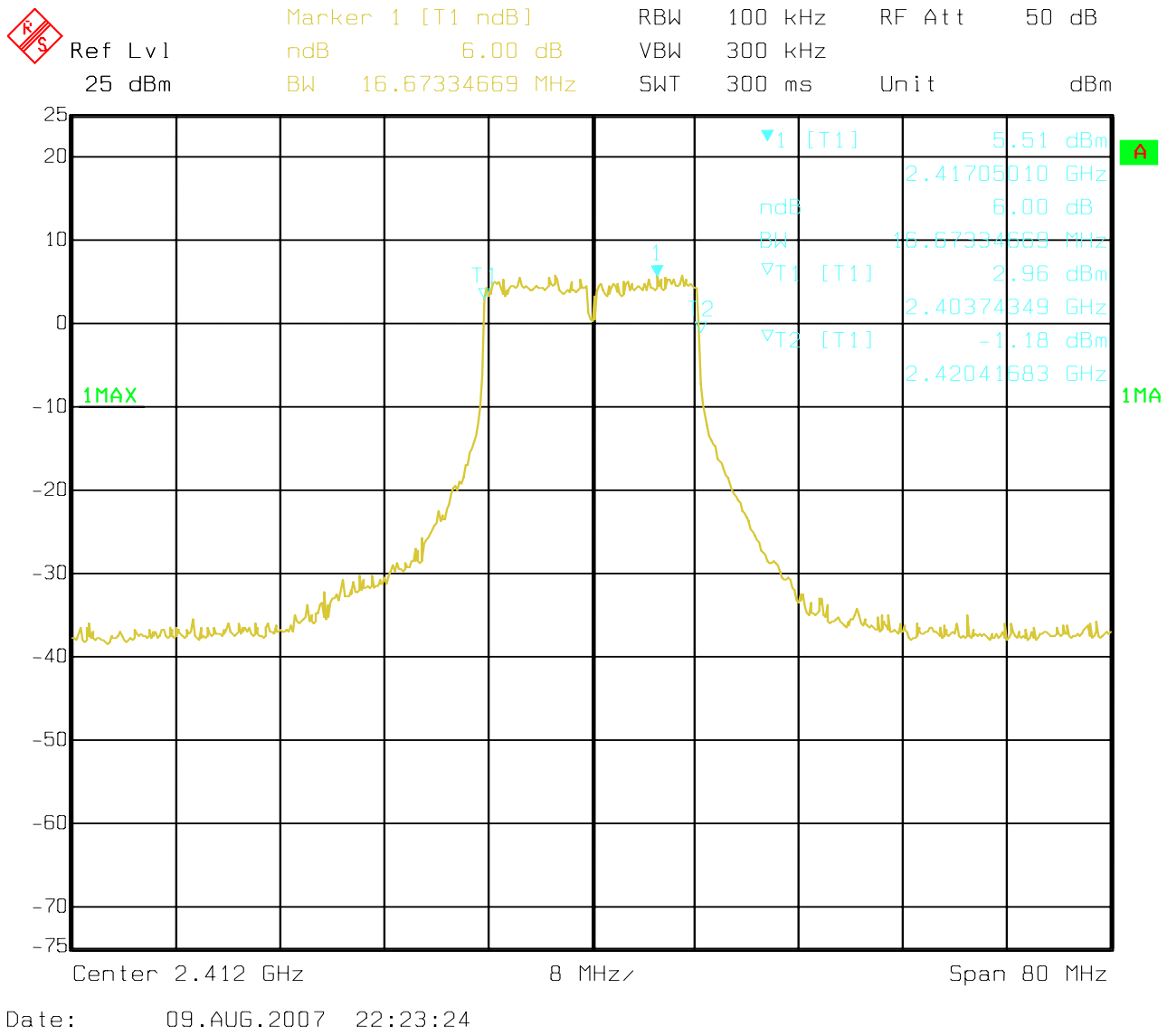
802.11b 6dB Band Width (Middle Channel 2437MHz)



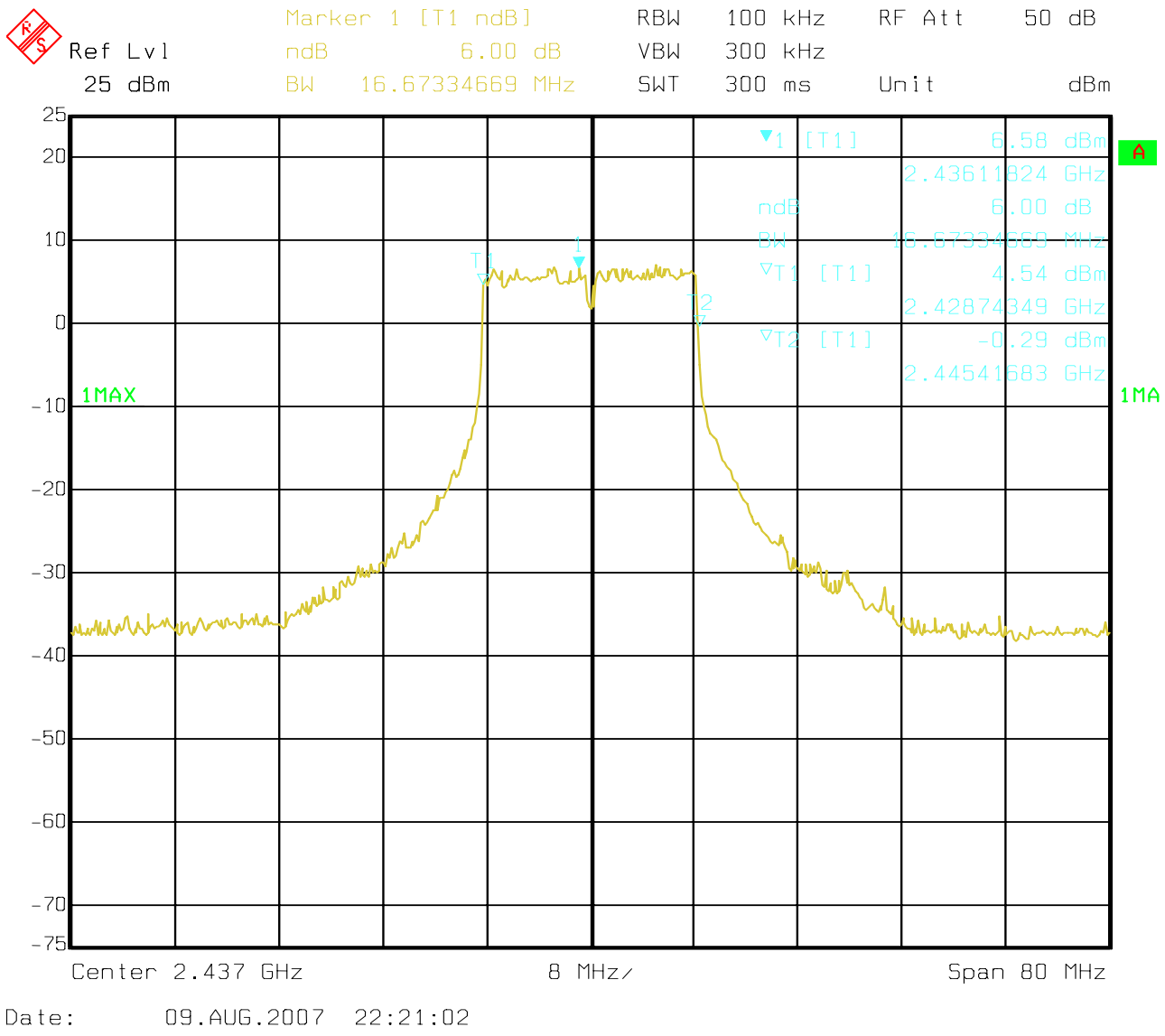
802.11b 6dB Band Width (High Channel 2462MHz)



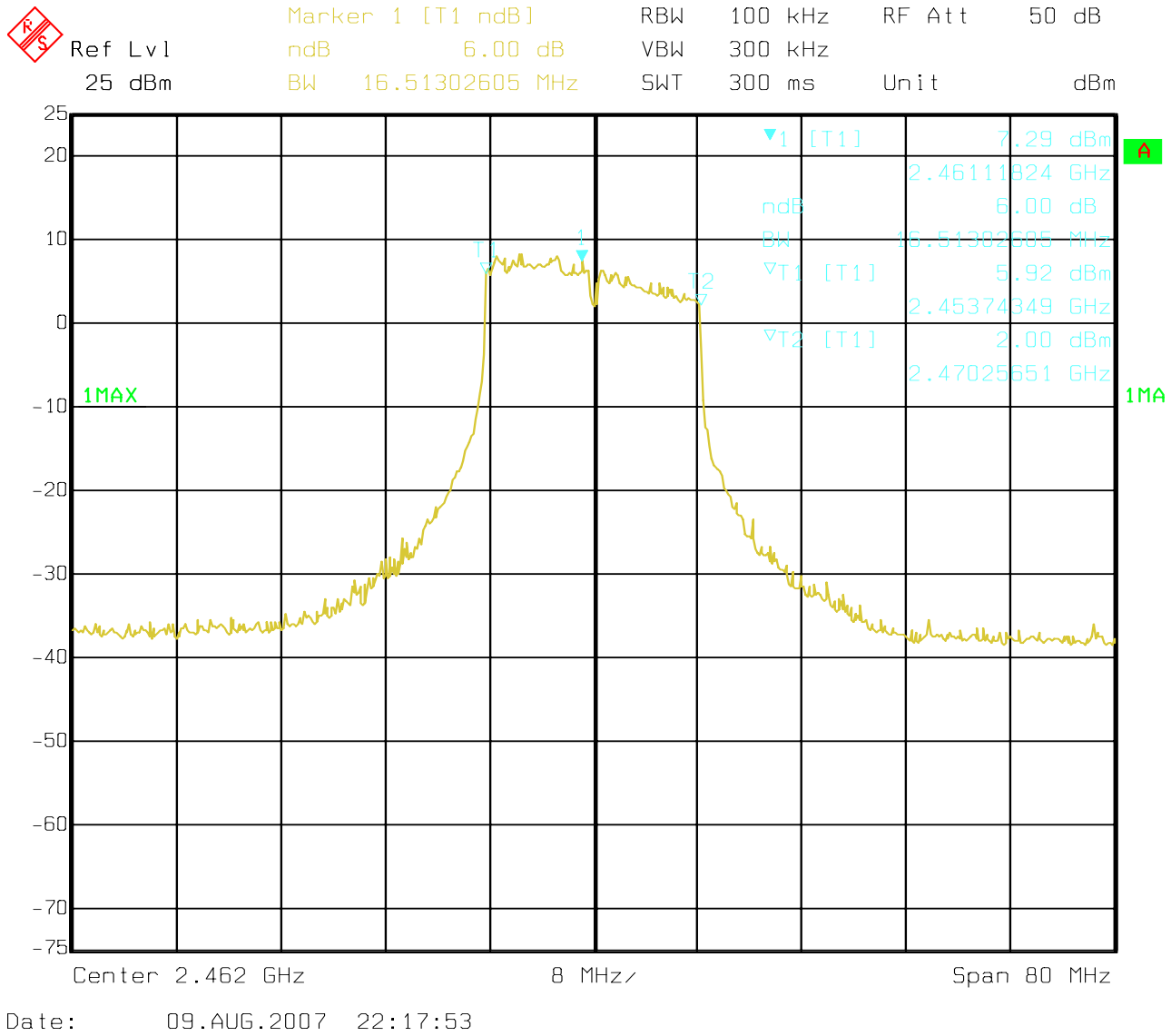
802.11g 6dB Band Width (Low Channel 2412MHz)



802.11g 6dB Band Width (Middle Channel 2437MHz)



802.11g 6dB Band Width (High Channel 2462MHz)



§15.247(b) (3) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

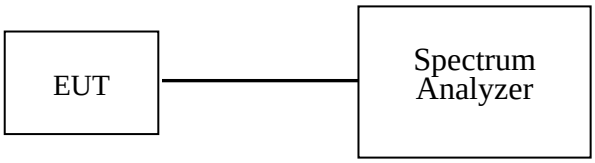
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.
4. Measure the Peak Output Power of the EUT at Low mid and high channels of each band at a data rate which gare the maximum power level.



Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

The testing was performed by Green Xu on 2007-07-19, 2007-07-23, 2007-07-26 and 2007-08-09.

Test Mode: Transmitting

802.11a mode:

Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Output Power (dBm)	Limits (dBm)	Result
5745	17.54	1.5	19.04	30	Pass
5765	17.99	1.5	19.49	30	Pass
5805	17.61	1.5	19.11	30	Pass

802.11b mode:

Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Output Power (dBm)	Limits (dBm)	Result
2412	18.59	1.0	19.59	28	Pass
2437	17.06	1.0	20.09	28	Pass
2462	17.75	1.0	18.75	28	Pass

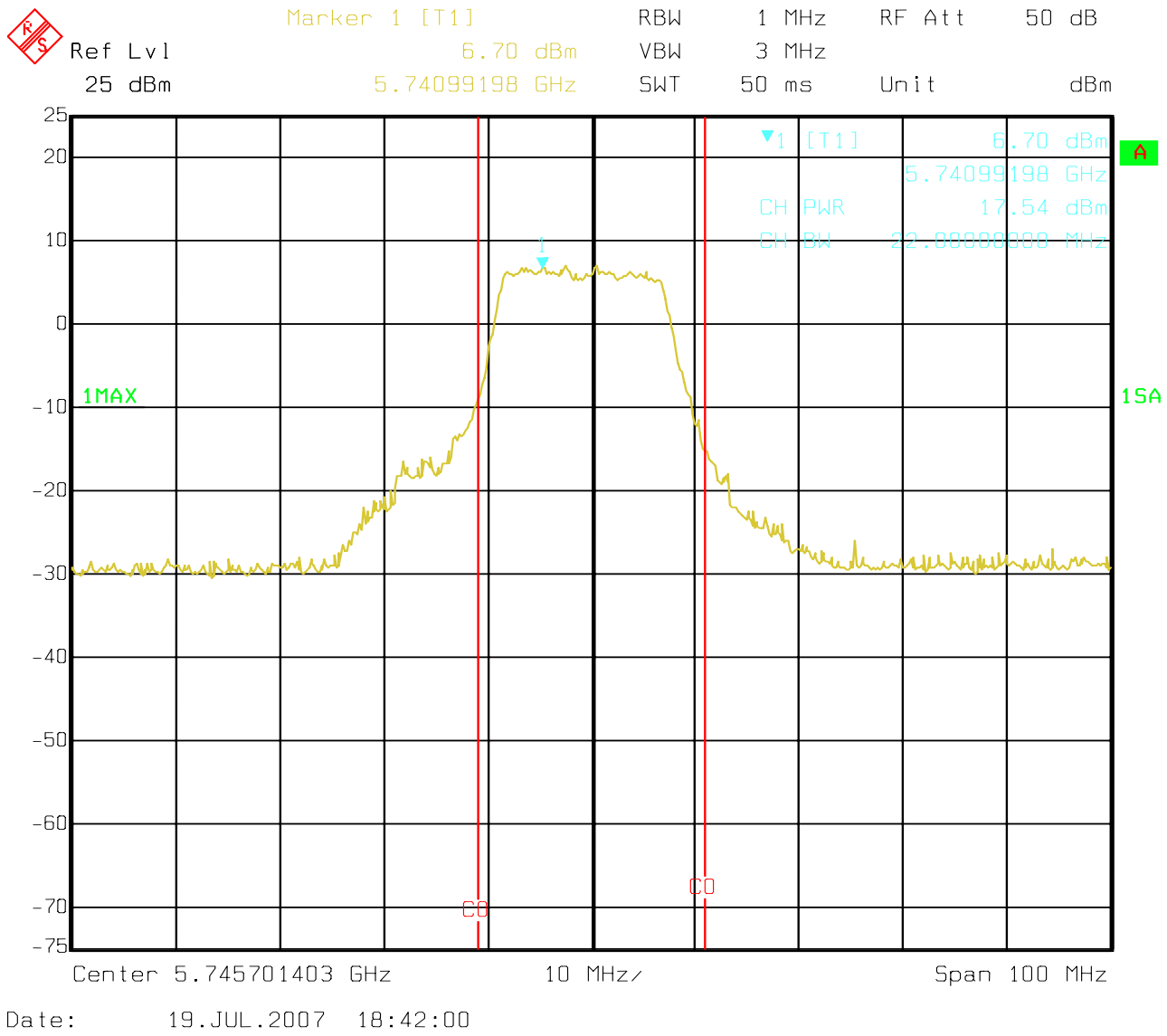
802.11g mode:

Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Output Power (dBm)	Limits (dBm)	Result
2412	17.23	1.0	18.23	28	Pass
2437	18.26	1.0	19.69	28	Pass
2462	18.17	1.0	19.17	28	Pass

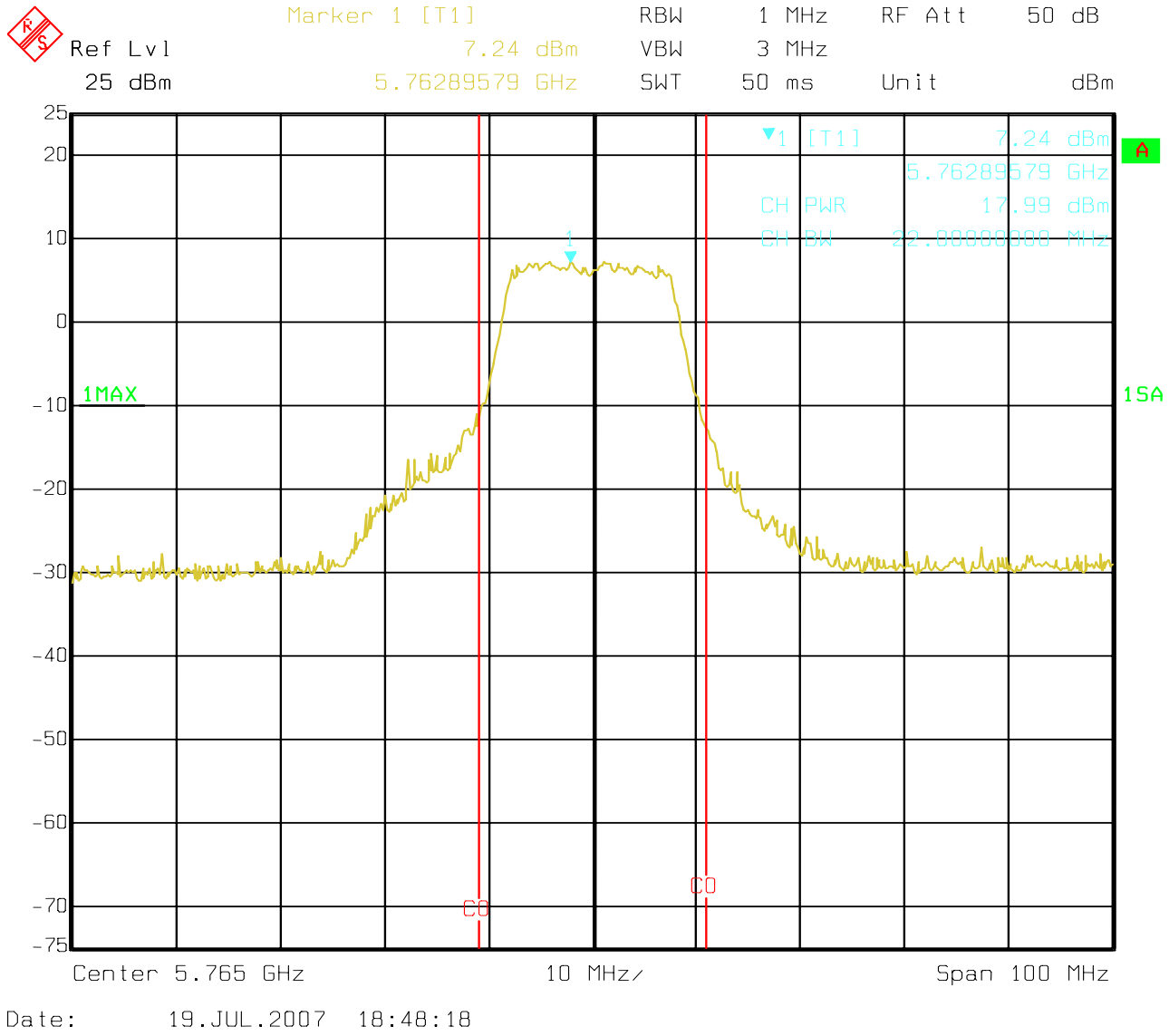
Test Result: Pass

Please refer to the following plots.

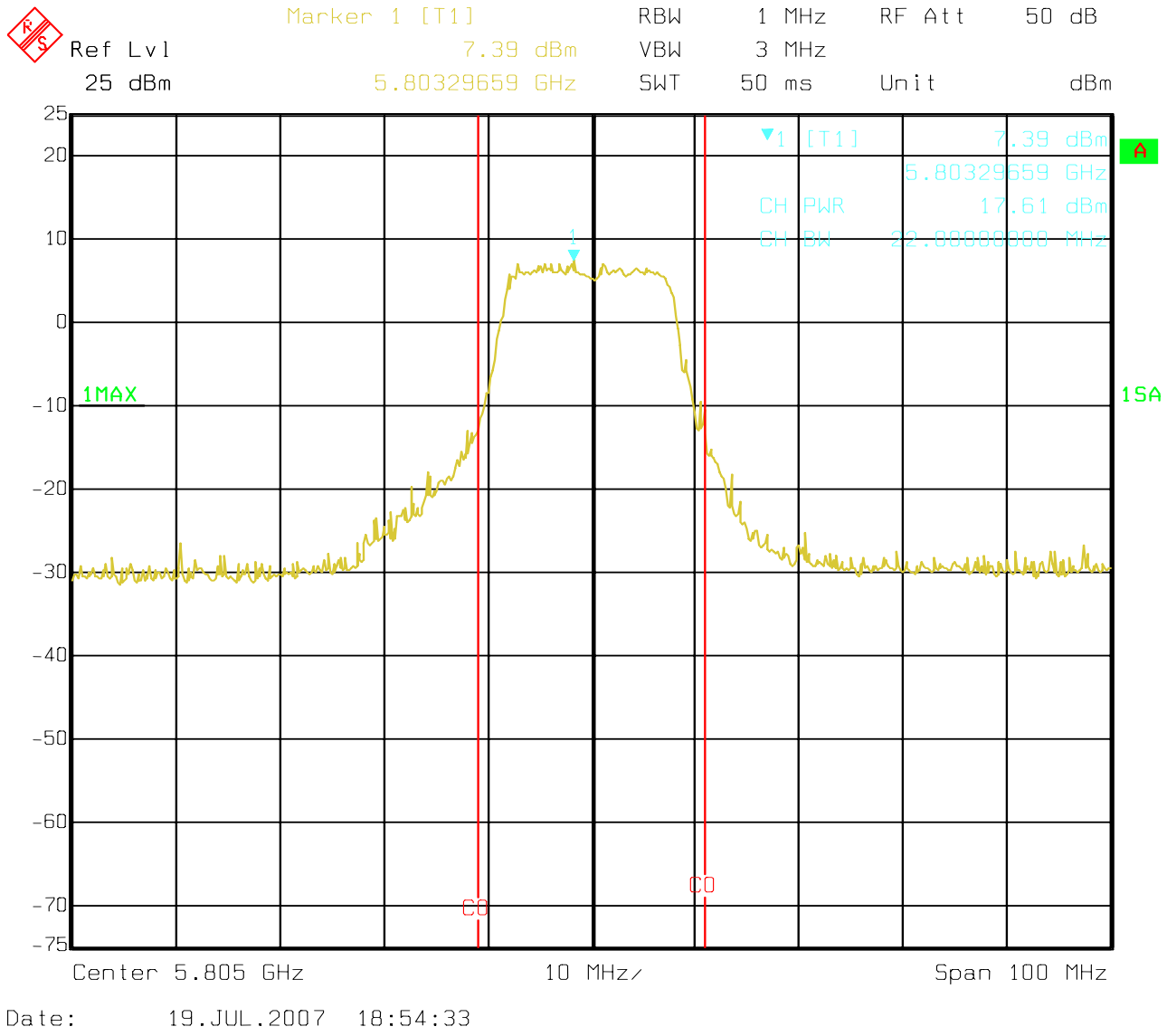
802.11a Peak-Output-Power (5745MHz)



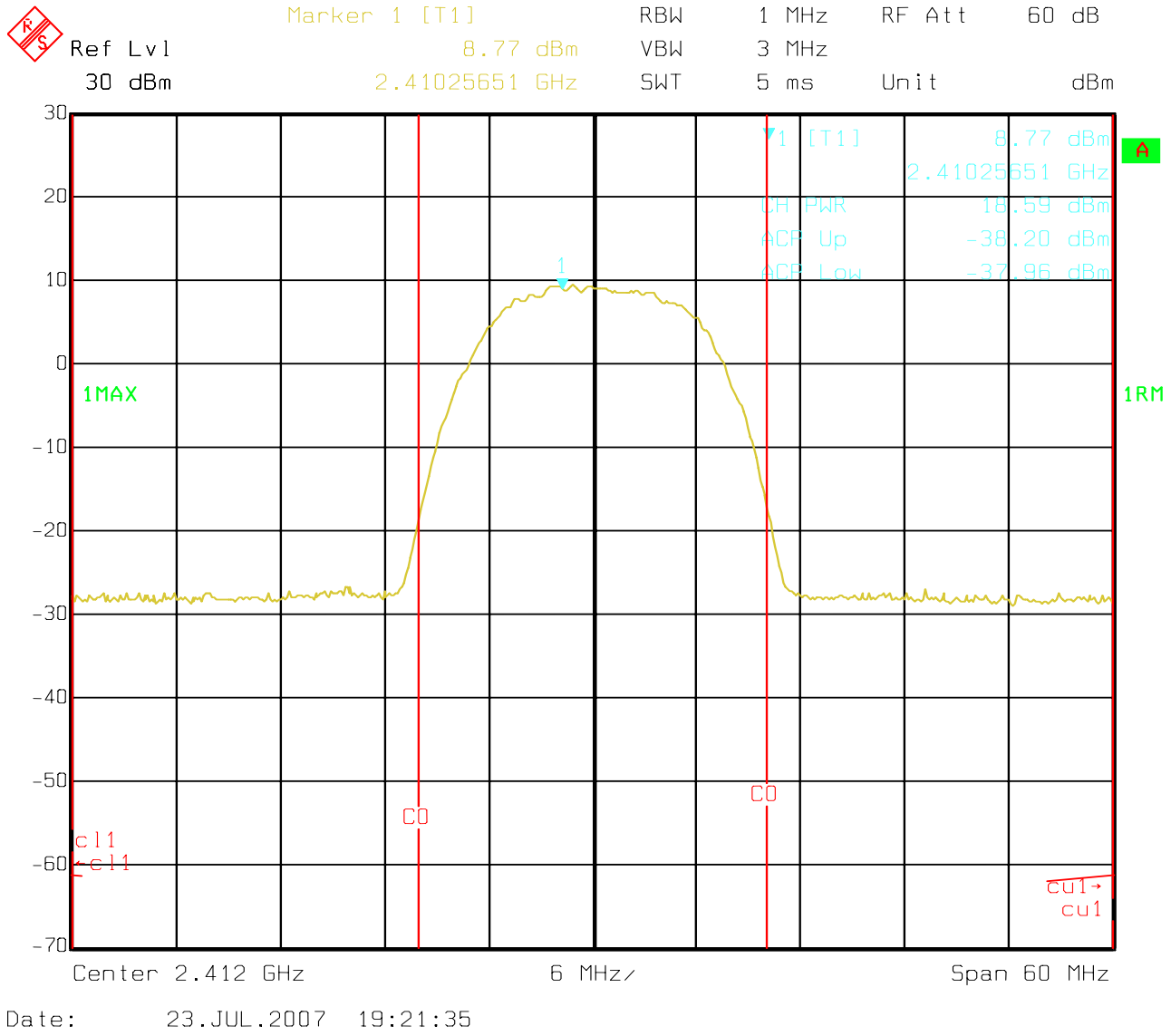
802.11a Peak-Output-Power (5765MHz)



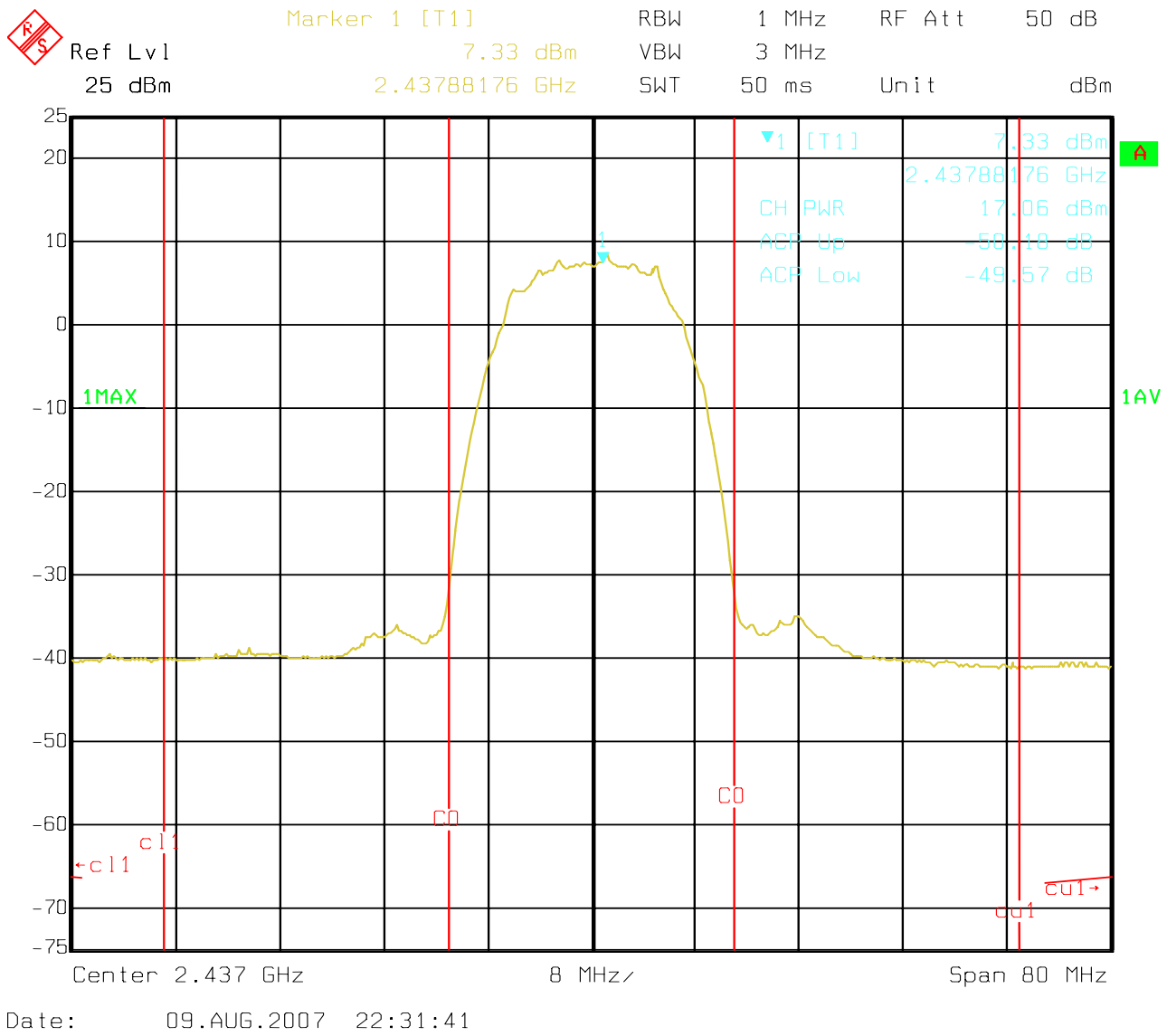
802.11a Peak-Output-Power (5805MHz)



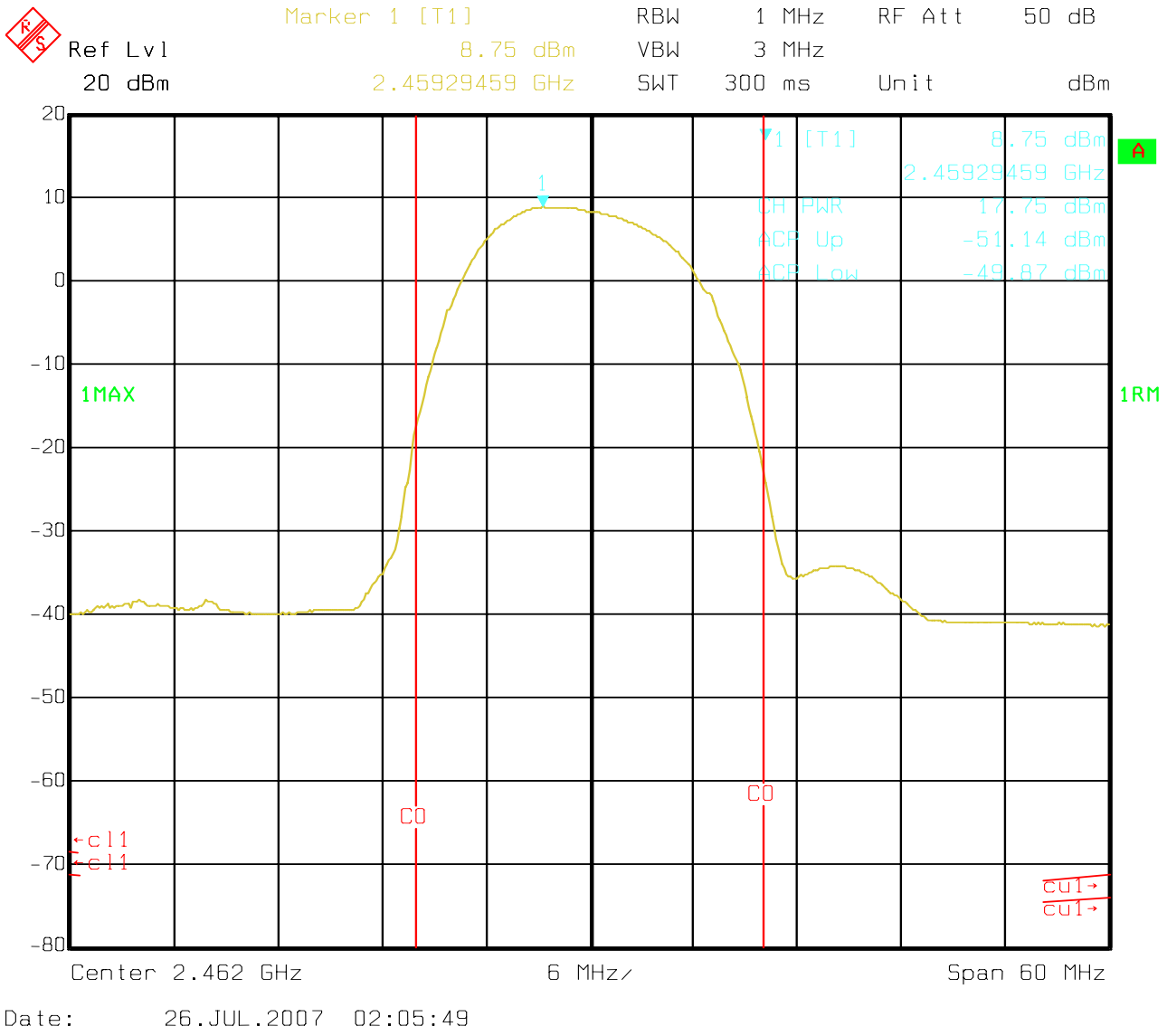
802.11b Peak-Output-Power (2412MHz)



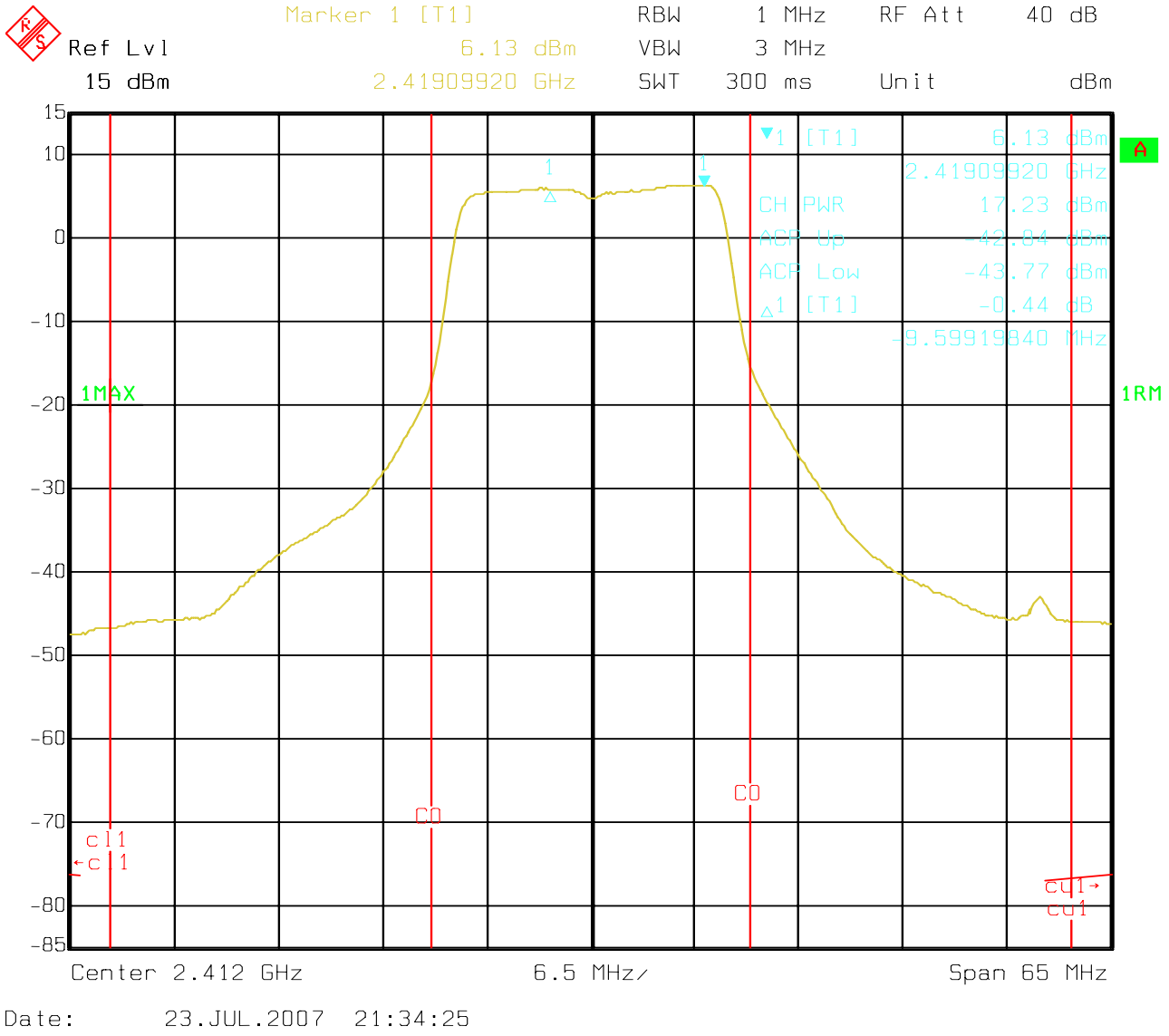
802.11b Peak-Output-Power (2437 MHz)



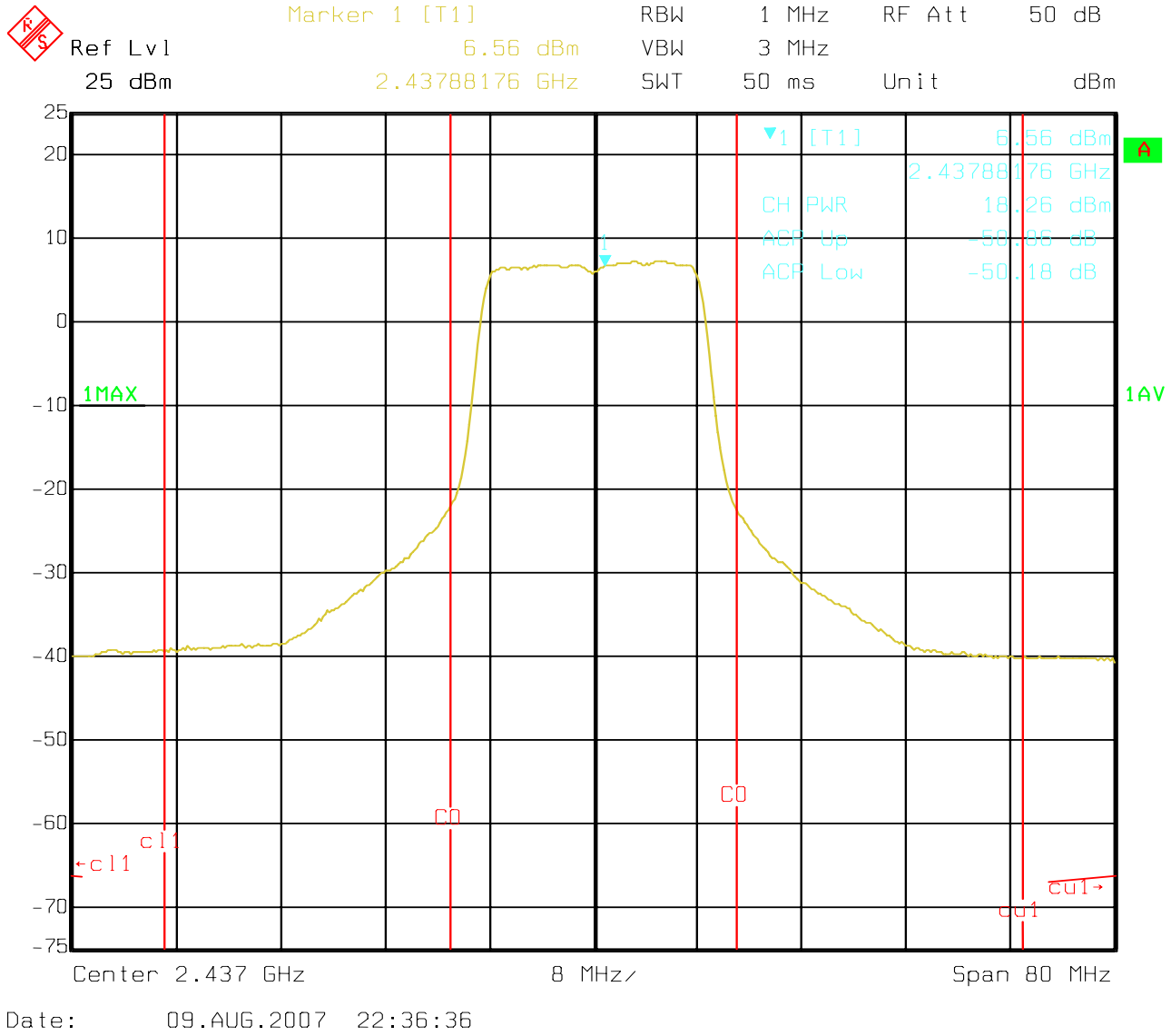
802.11b Peak-Output-Power (2462MHz)



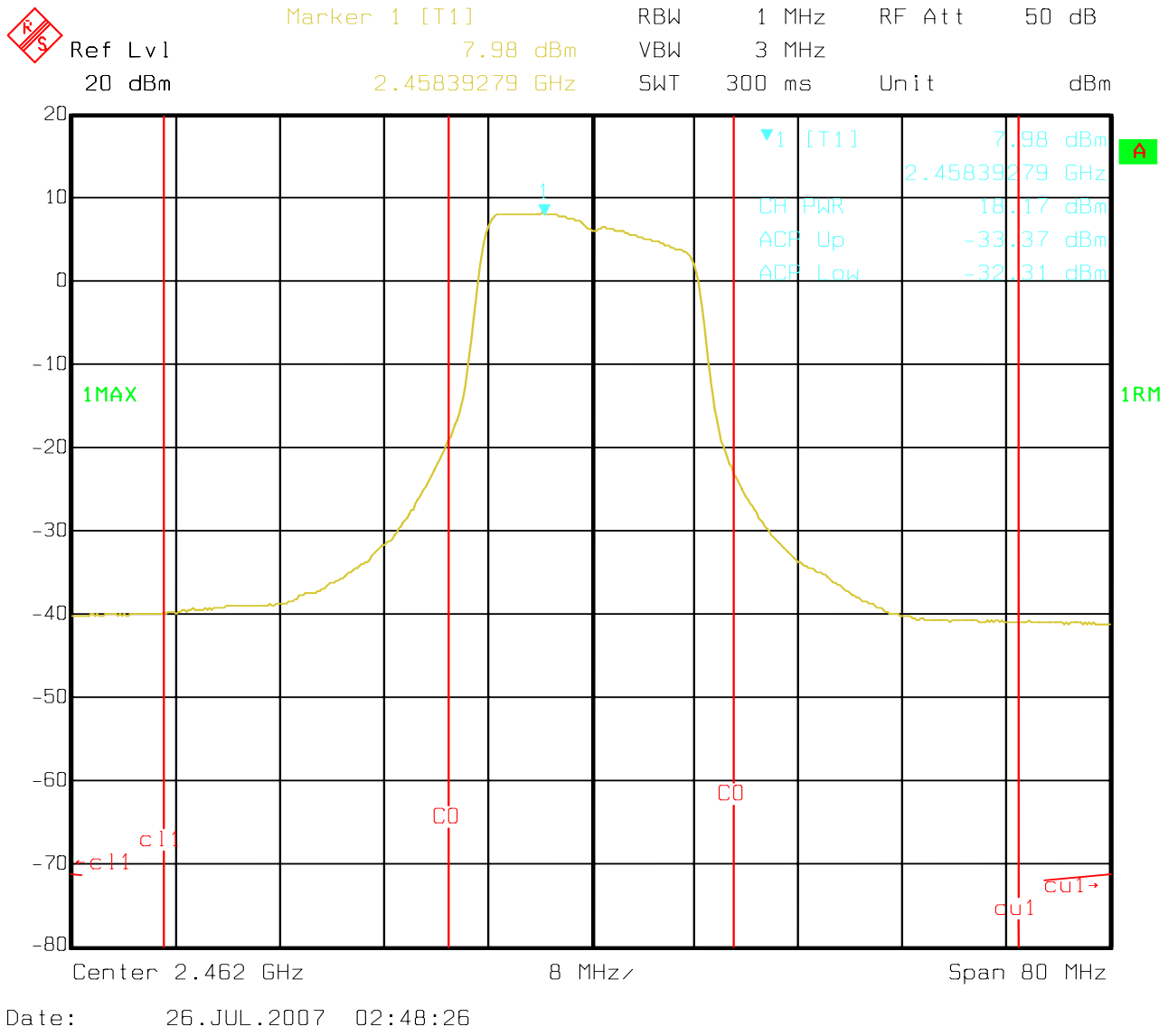
802.11g Peak-Output-Power (2412MHz)



802.11g Peak-Output-Power (2437 MHz)



802.11g Peak-Output-Power (2462MHz)



§15.247(e) – POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

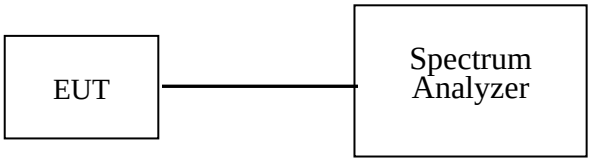
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	100.9 kPa

The testing was performed by Green Xu on 2007-07-19, 2007-08-02 and 2007-08-09.

Test Mode: Transmitting

802.11a mode:

Frequency (MHz)	Spectrum Reading (dBm/3kHz)	Cable Loss (dB)	Peak Output Power (dBm/3kHz)	Limits (dBm/3kHz)	Result
5745	-16.62	1.5	-15.12	8	Pass
5765	-16.31	1.5	-14.81	8	Pass
5805	-22.89	1.5	-21.39	8	Pass

802.11b mode:

Frequency (MHz)	Spectrum Reading (dBm/3kHz)	Cable Loss (dB)	Peak Output Power (dBm/3kHz)	Limits (dBm/3KHz)	Result
2412	-11.08	1.0	-10.08	8	Pass
2437	0.68	1.0	1.68	8	Pass
2462	-10.24	1.0	-9.24	8	Pass

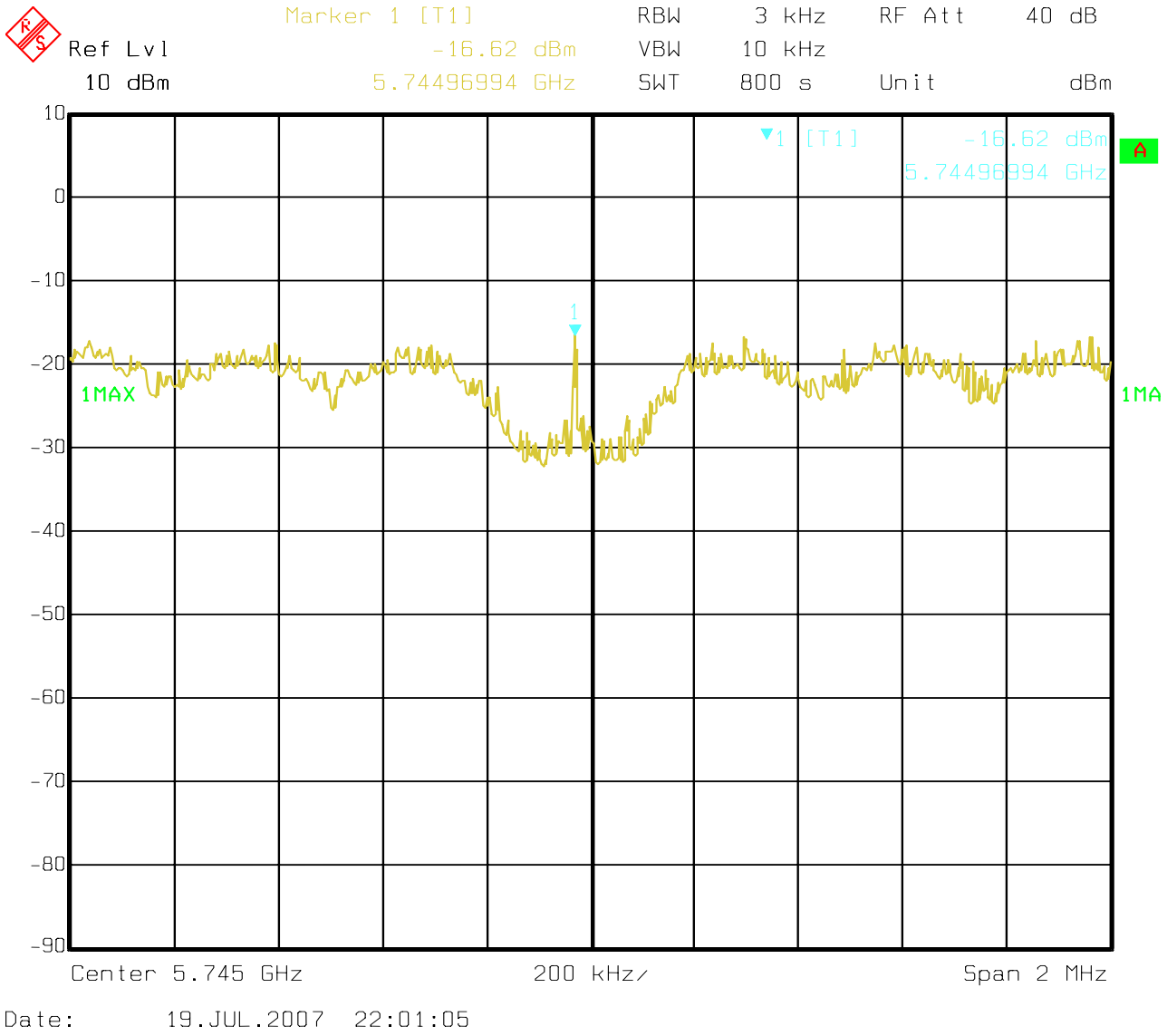
802.11g mode:

Frequency (MHz)	Spectrum Reading (dBm/3kHz)	Cable Loss (dB)	Peak Output Power (dBm/3kHz)	Limits (dBm/3kHz)	Result
2412	-9.63	1.0	-8.63	8	Pass
2437	-6.52	1.0	-5.52	8	Pass
2462	-8.43	1.0	-7.43	8	Pass

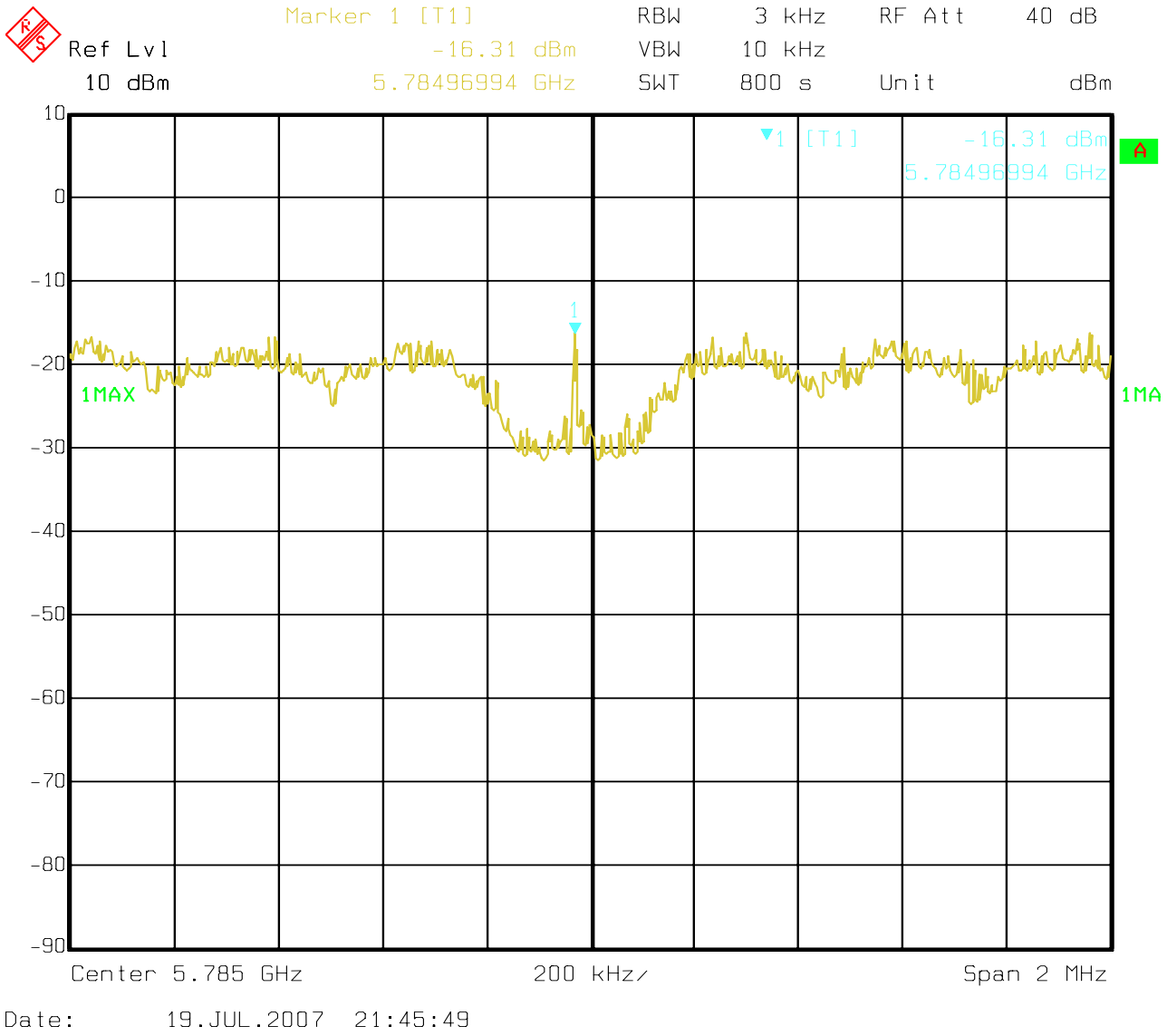
Test Result: Pass.

Please refer to the following plots.

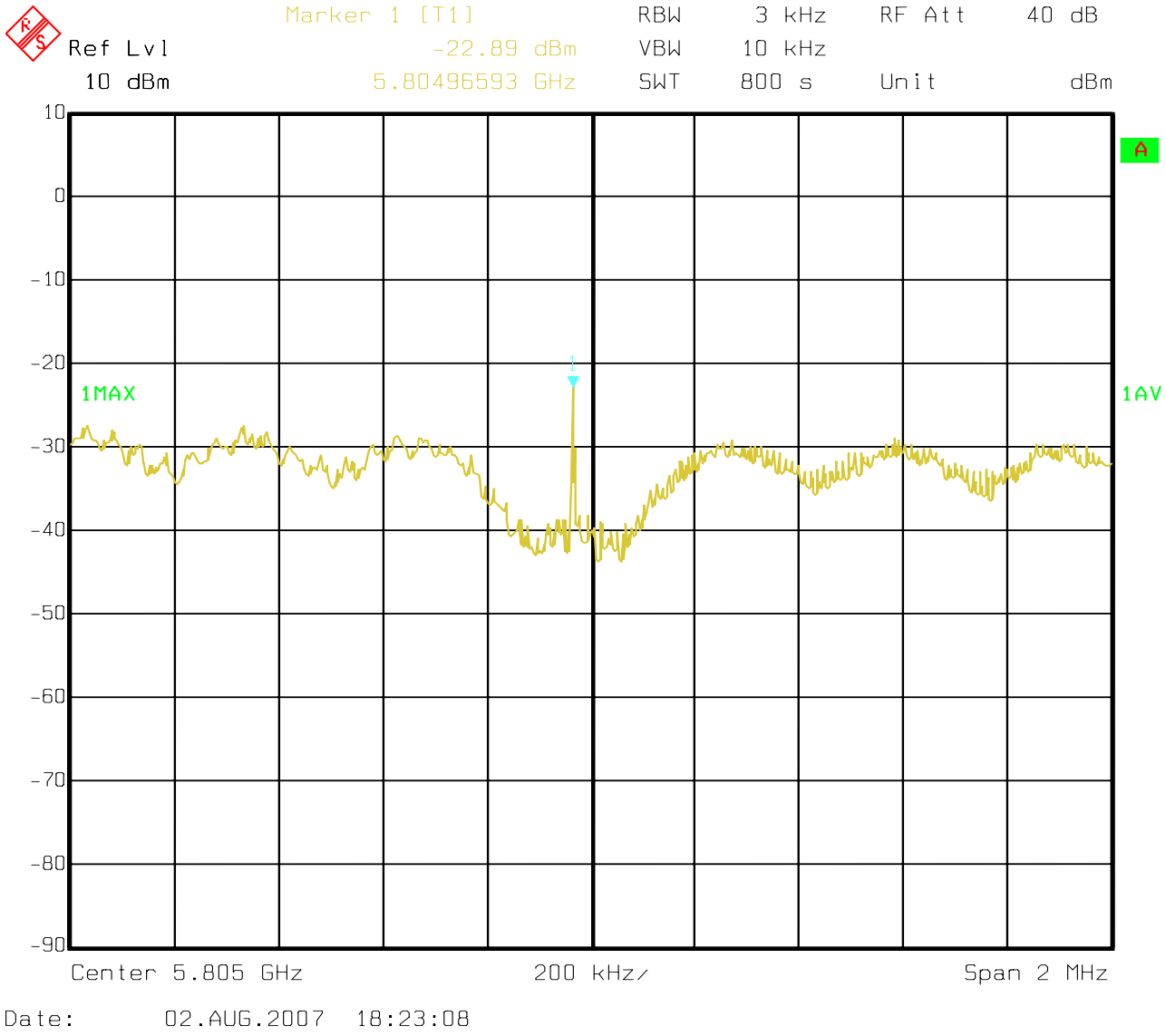
802.11a Lower-Channel (5745MHz) Peak Power Spectral Density



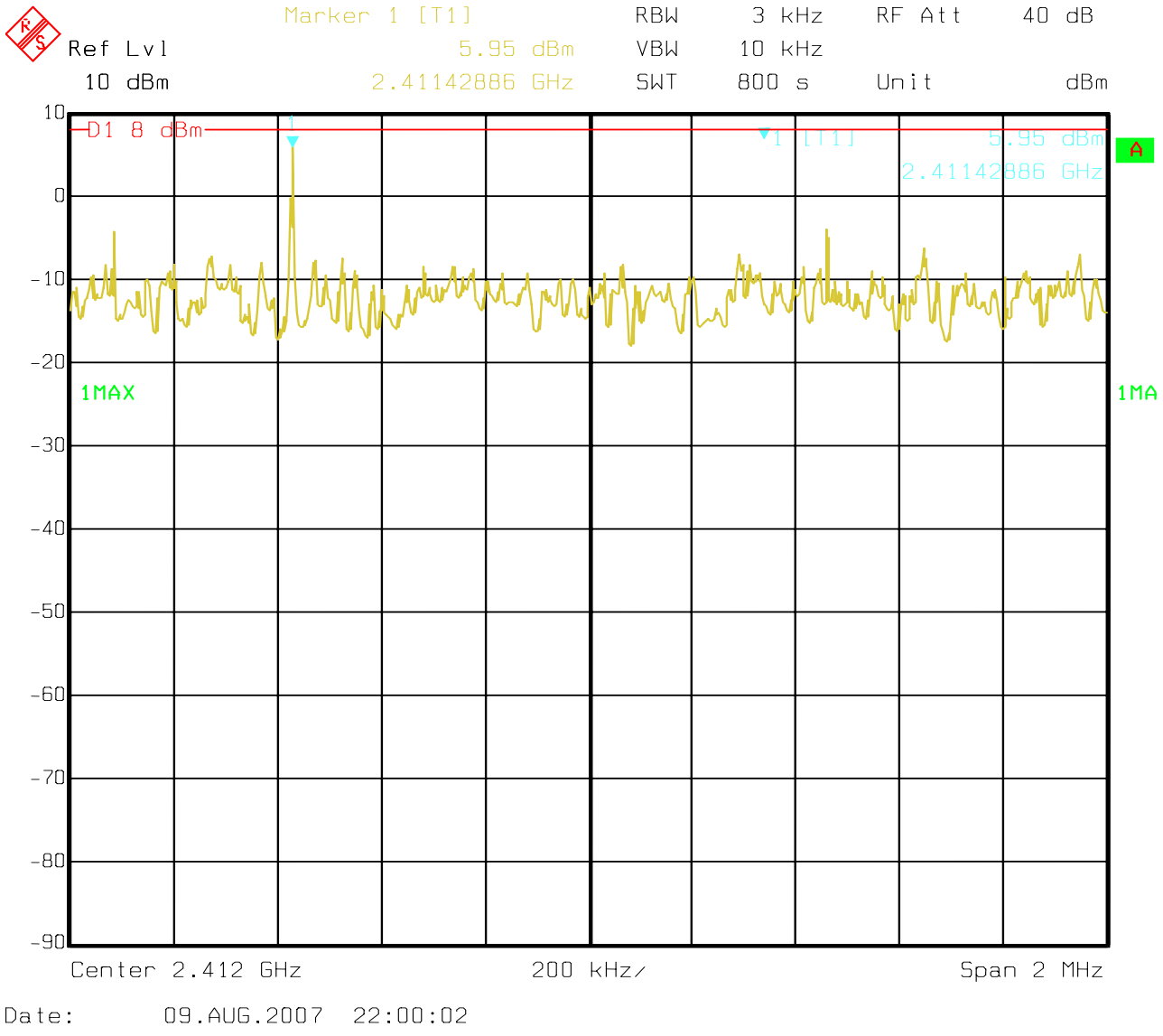
802.11a Middle-Channel (5785MHz) Peak Power Spectral Density



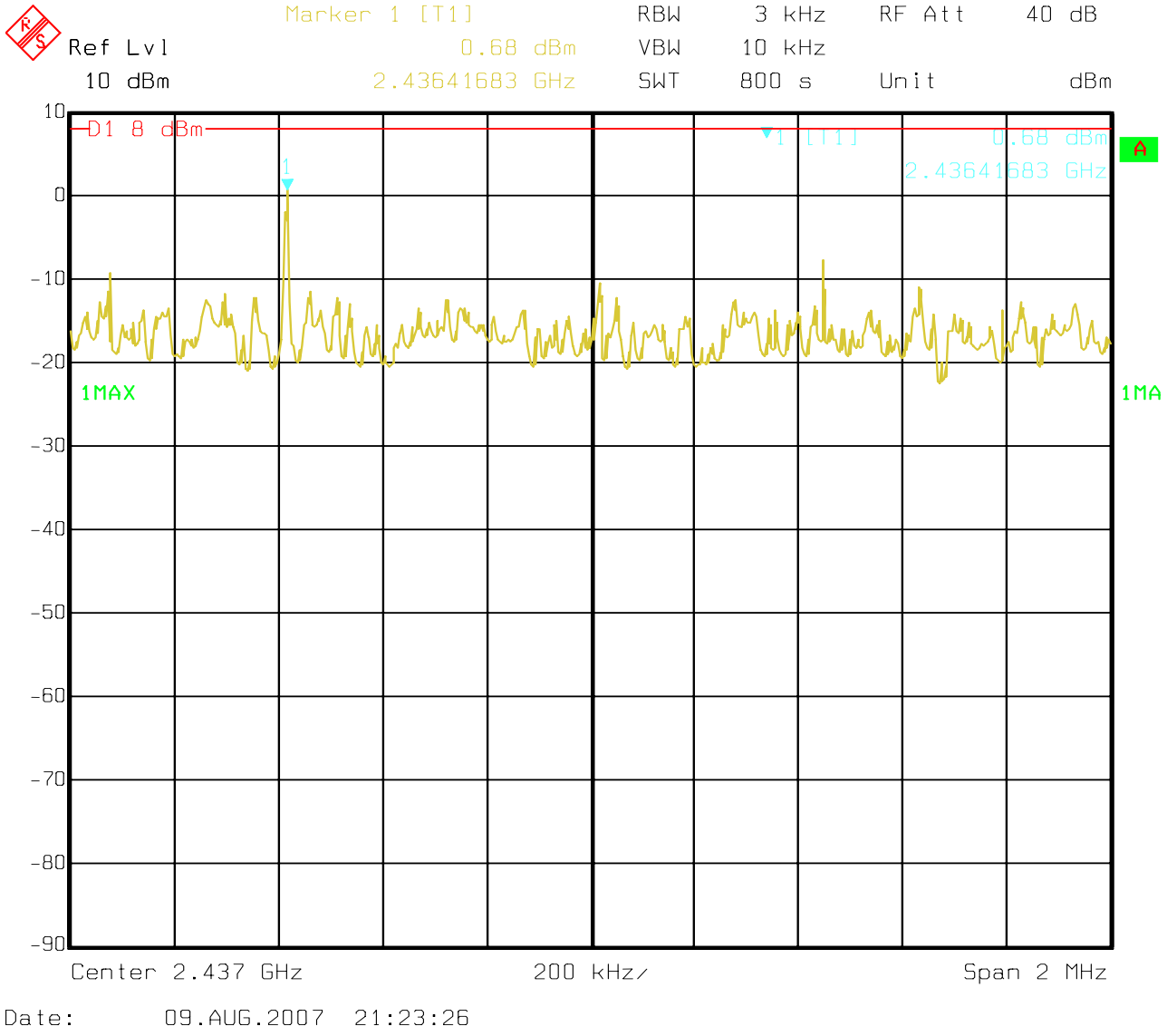
802.11a Higher-Channel (5805MHz) Peak Power Spectral Density



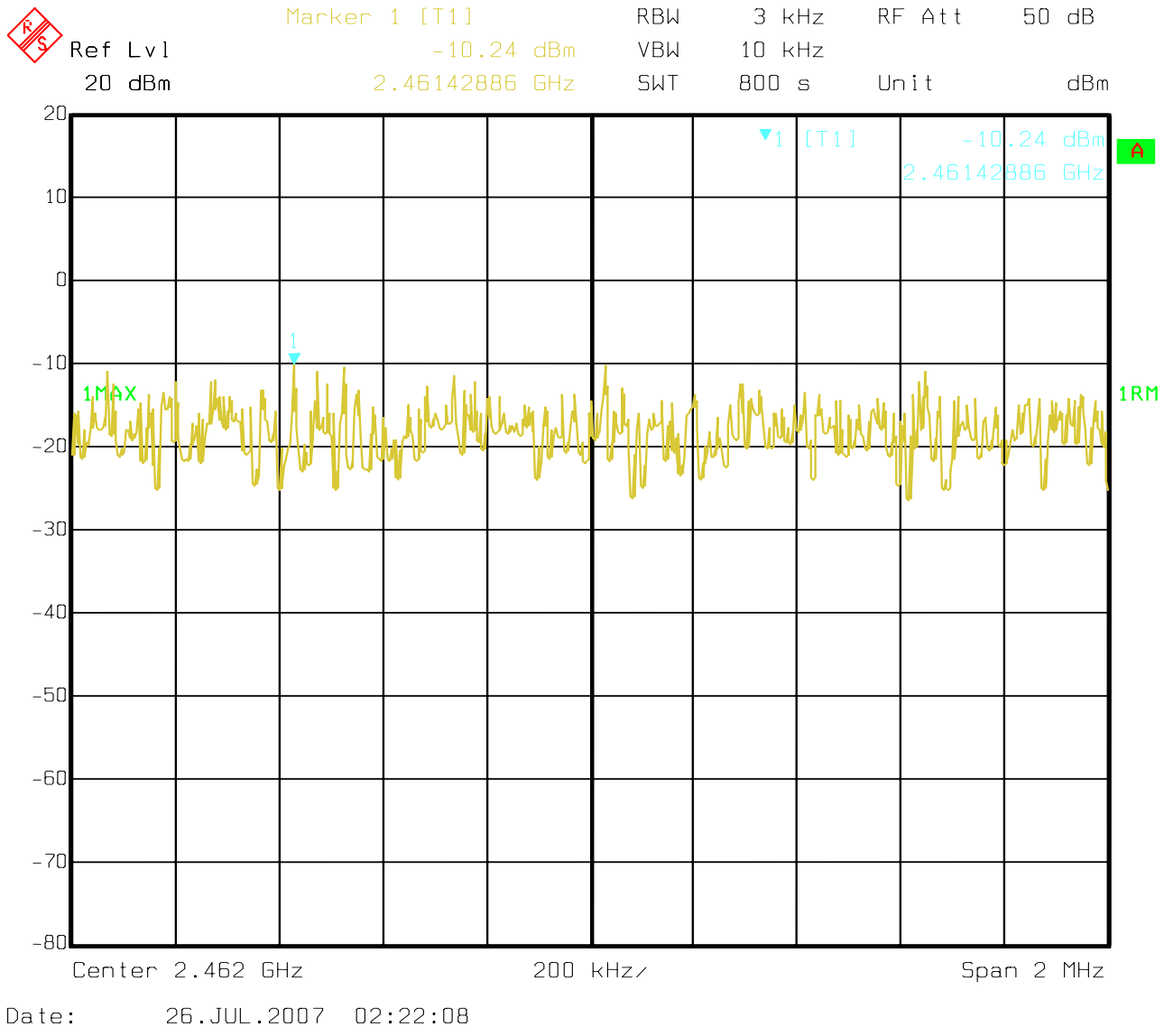
802.11b Lower-Channel (2412MHz) Peak Power Spectral Density



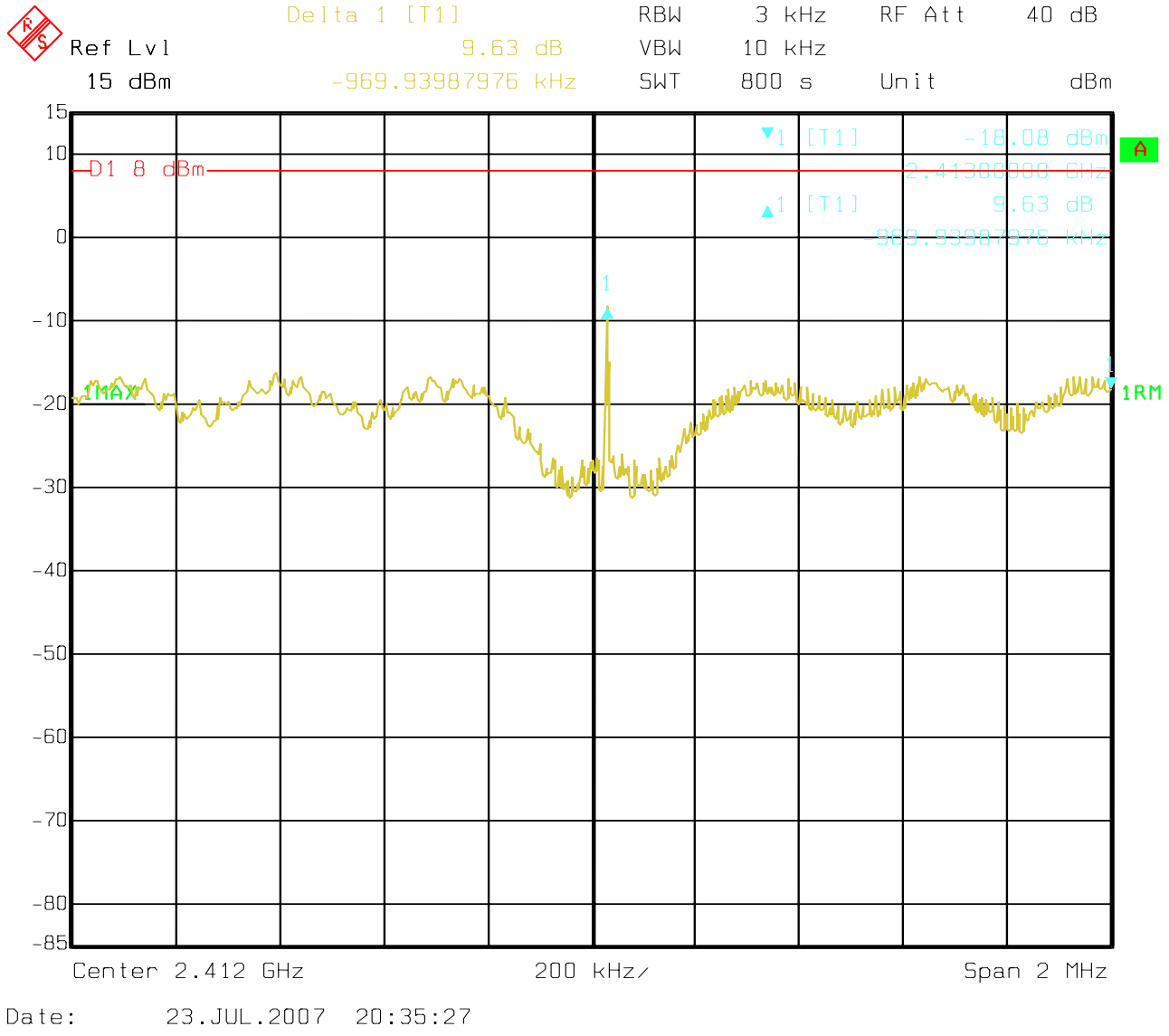
802.11b Middle-Channel (2437MHz) Peak Power Spectral Density



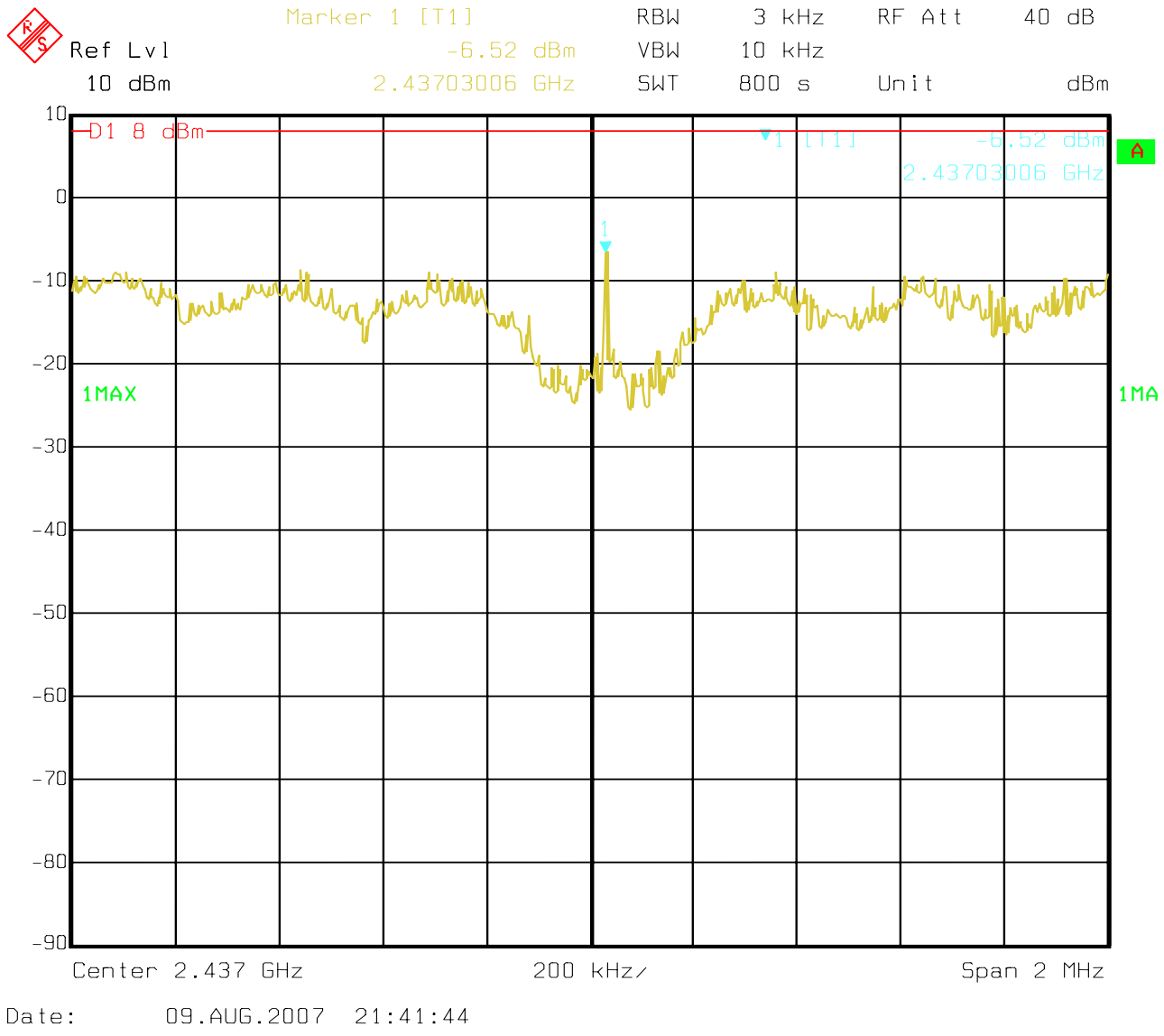
802.11b Higher-Channel (2462MHz) Peak Power Spectral Density



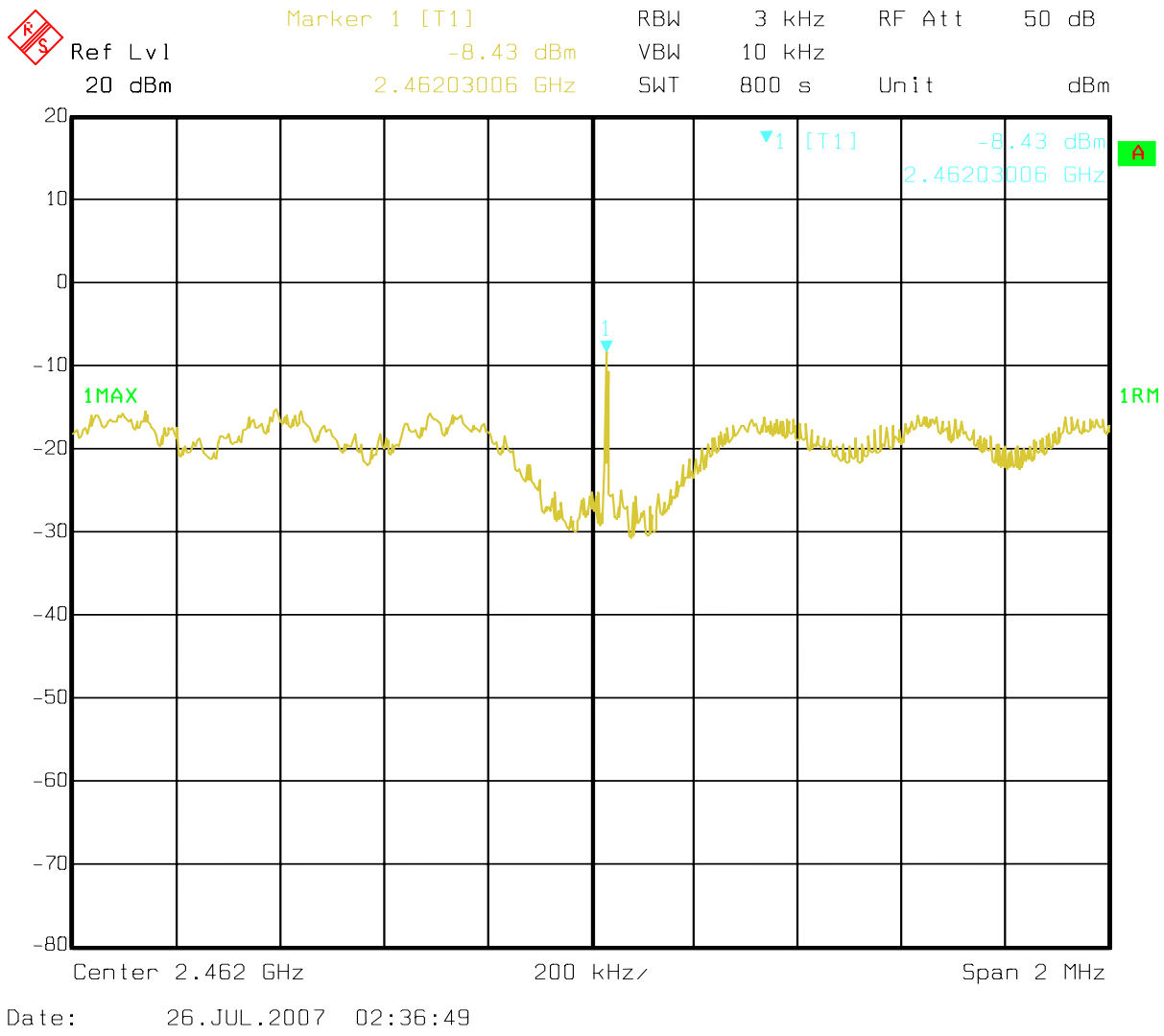
802.11g Lower-Channel (2412MHz) Peak Power Spectral Density



802.11g Middle-Channel (2437MHz) Peak Power Spectral Density



802.11g Higher-Channel (2462MHz) Peak Power Spectral Density



END OF REPORT