



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Tablet PC built in 5GHz Wireless LAN module

Model: ZE1, TravelMate C200

Trade Name: acer

Issued to

Acer Inc.

**8F, 88, Sec.1, Hsin Tai Wu Rd., Hsichih,
Taipei Hsien 221,
Taiwan, R.O.C.**

Issued by

Compliance Certification Services Inc.

**No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.**

TEL: 886-3-324-0332

FAX: 886-3-324-5235



***Note:** This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document*



TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION.....	3
2. EUT DESCRIPTION	4
3. TEST METHODOLOGY	5
3.1 EUT CONFIGURATION	5
3.2 EUT EXERCISE	5
3.3 GENERAL TEST PROCEDURES	5
3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS	6
3.5 DESCRIPTION OF TEST MODES	6
4. INSTRUMENT CALIBRATION.....	7
4.1 MEASUREMENT EQUIPMENT USED	7
5. FACILITIES AND ACCREDITATIONS	8
5.1 FACILITIES	8
5.2 EQUIPMENT	8
5.3 LABORATORY ACCREDITATIONS AND LISTING	8
5.4 TABLE OF ACCREDITATIONS AND LISTINGS	9
6. SETUP OF EQUIPMENT UNDER TEST	10
6.1 SETUP CONFIGURATION OF EUT	10
6.2 SUPPORT EQUIPMENT	10
7. FCC PART 15.247 REQUIREMENTS.....	11
CONDITION A: WLAN OPERATION.....	11
7.1 6DB BANDWIDTH	11
7.2 PEAK POWER	18
7.3 AVERAGE POWER.....	25
7.4 BAND EDGES MEASUREMENT	32
7.5 PEAK POWER SPECTRAL DENSITY	41
7.6 RADIO FREQUENCY EXPOSURE	48
7.7 SPURIOUS EMISSIONS.....	50
CONDITION B: BLUETOOTH OPERATION.....	68
7.8 BAND EDGES MEASUREMENT	68
7.9 RADIATED EMISSIONS	73
CONDITION C: WLAN + BLUETOOTH OPERATION.....	80
7.10 POWER LINE CONDUCTED EMISSIONS	80
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP.....	83



1. TEST RESULT CERTIFICATION

Applicant: Acer Inc.
8F, 88, Sec.1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221,
Taiwan, R.O.C.

Equipment Under Test: Tablet PC built in 5GHz Wireless LAN module

Trade Name: acer

Model Number: ZE1, TravelMate C200

Date of Test: September 15 ~ October 4, 2005

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Reviewed by:

Gavin Lim
Section Manager
Compliance Certification Services Inc.

Amanda Wu
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Tablet PC built in 5GHz Wireless LAN module
Trade Name	acer
Model Number	ZE1, TravelMate C200
Model Name Discrepancy	All the above models are identical except the model designation.
Power Supply	Model Number: PA-1650-02 I/P: AC 100-240V, 1.6A, 50-60Hz O/P: DC 19V, 3.42A, 65W
Frequency Range	IEEE 802.11a: DTS: 5.745~5.825 GHz IEEE 802.11b/g: 2.412~2.462 GHz Bluetooth: 2.402~2.480 GHz
Transmit Power	IEEE 802.11a: 15.61 dBm IEEE 802.11b: 16.45 dBm IEEE 802.11g: 16.06 dBm Bluetooth: 1.19 dBm
Modulation Technique	IEEE 802.11a: OFDM (QPSK, BPSK, 16-QAM, 64-QAM) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: DSSS (CCK, DQPSK, DBPSK) + OFDM (QPSK, BPSK, 16-QAM, 64-QAM) Bluetooth: FHSS (GFSK)
Number of Channels	IEEE 802.11a: 5 Channels IEEE 802.11b/g: 11 Channels Bluetooth: 79 Channels
Antenna Specification	WLAN: IEEE 802.11a: 5.745~5.825 GHz : 2.35 dBi IEEE 802.11b/g: 1.94dBi Bluetooth: 1.97 dBi
Antenna Designation	WLAN: PIFA Antenna Bluetooth: Printed Antenna

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **HLZZE1ABG** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4. Radiated testing was performed at an antenna to EUT distance 3 meters.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT (model: ZE1) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests carried out are with the worst-case test modes as shown below except radiated spurious emissions below 1GHz's worst case was in normal link mode.

IEEE802.11a / (DTS):

Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6Mbps data rate were chosen for full testing.

IEEE802.11b:

Channel Low(2412MHz), Channel Mid(2437MHz) and Channel High(2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE802.11g:

Channel Low(2412MHz), Channel Mid(2437MHz) and Channel High(2462MHz) with 6Mbps data rate were chosen for full testing.

Bluetooth:

The bluetooth module used in this EUT had been certified with FCC ID: **MCLT60H928**, please refer to the separated certificate for further details. Except radiated measurements were performed and reported, all other conducted tests, please refer to the granted bluetooth module report.

Channel Low(2402MHz), Channel Mid(2441MHz) and Channel High(2480MHz) were chosen for radiated testing.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis) and laptop mode. The worst emission was found in laptop position and the worst case was recorded



4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.1 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

Open Area Test Site # 3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESVS20	838804/004	01/08/2006
Spectrum Analyzer	R&S	FSP30	100112	09/23/2006
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006
Pre-Amplifier	MITEC	AFS42-00102650	924206	N.C.R.
Pre-Amplifier	MITEC	AMF-6F-260400	945377	N.C.R.
Bilog Antenna	SCHWAZBECK	VULB9163	145	07/05/2006
Horn Antenna	EMCO	3115	00022250	04/18/2006
Horn Antenna	EMCO	3116	2487	12/08/2005
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R.
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R.
Controller	EMCO	2090	9709-1256	N.C.R.
RF Switch	ANRITSU	MP59B	M53867	N.C.R.
Site NSA	C&C	N/A	N/A	09/06/2006

Remark: The measurement uncertainty is less than +/- 2.16dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER 9kHz-30MHz	ROHDE & SCHWARZ	ESHS30	828144/003	09/24/2006
TWO-LINE V-NETWORK 9kHz-30MHz	SCHAFFNER	NNB41	03/10013	06/11/2006
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	02/17/2006
Test S/W	LABVIEW (V 6.1)			

Remark: The measurement uncertainty is less than +/- 2.81dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang, Taoyuan Hsien, Taiwan, R.O.C.

☐ No. 199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

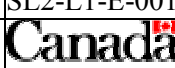
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200600-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 93105 and 90471).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	EN 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS CISPR 22, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	 200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 93105, 90471
Japan	VCCI	4 3/10 meter Open Area Test Sites to perform conducted/radiated measurements	 R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1/2, EN 300 220-1/2/3, EN 300 440-1/2, EN 61000-3-2, EN 61000-3-3, 47 CFR FCC Part 15 Subpart C/D/E, EN 55013, CNS 13439, EN 55014-1, CNS 13783-1, EN 55022, CNS 13438, CISPR 22, AS/NZS 3548, EN 61000-4-2/3/4/5/6/8/11, ENV 50204, IEEE Std 1528, FCC OET Bulletin, 65+Supplement C, EN50360, EN50361, EN50371, RSS102	 0363 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	 IC 3991-3 IC 3991-4

* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

* Australia: MRA of NVLAP AS/NZS 4771 & AS/NZS 4268.



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Wireless Router (remote)	PLANEX	BLW-045AG	40DDA0421	N/A	N/A	Unshielded, 1.8m

Remark:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



7. FCC PART 15.247 REQUIREMENTS

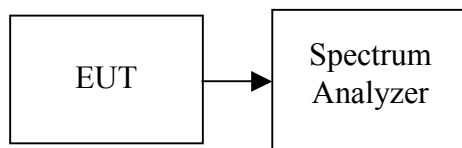
CONDITION A: WLAN OPERATION

7.16dB BANDWIDTH

LIMIT

According to §15.247(a)(2), 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 Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Span = 50MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

**Test Data*****IEEE 802.11a***

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	5745	16420	>500	PASS
Mid	5785	16420		PASS
High	5825	16250		PASS

IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	9080	>500	PASS
Mid	2437	8920		PASS
High	2462	8750		PASS

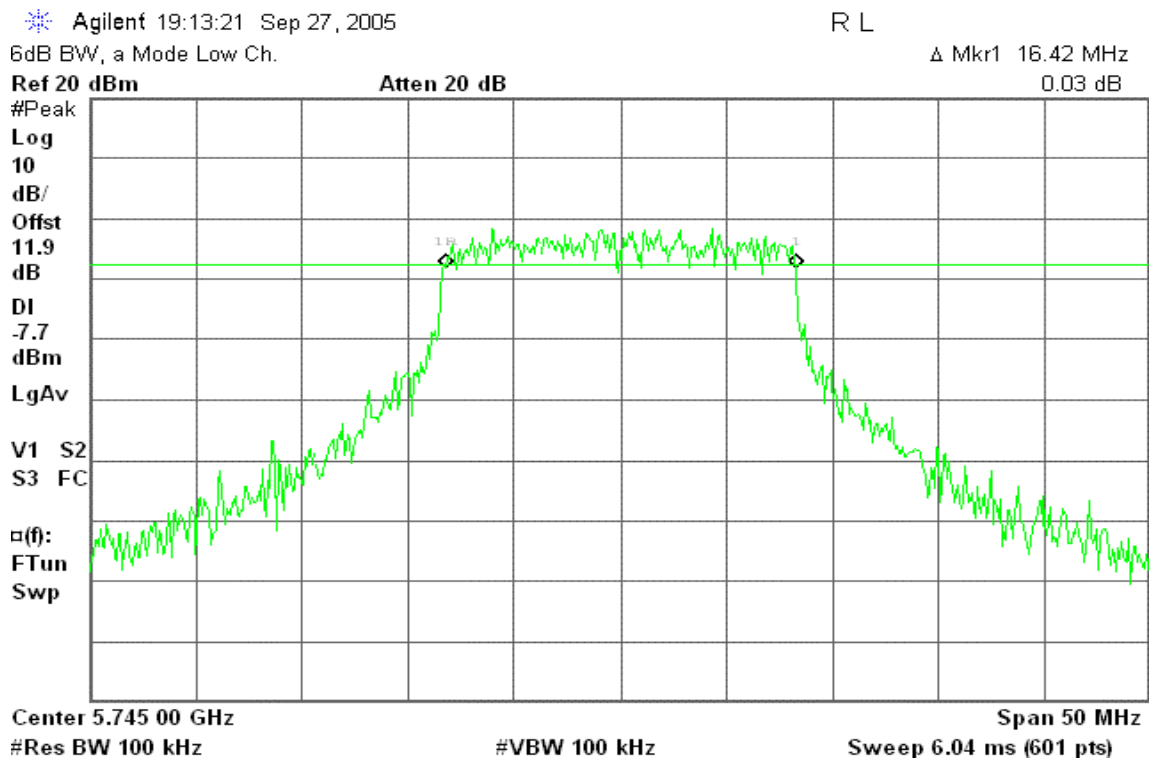
IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16250	>500	PASS
Mid	2437	15170		PASS
High	2462	15250		PASS

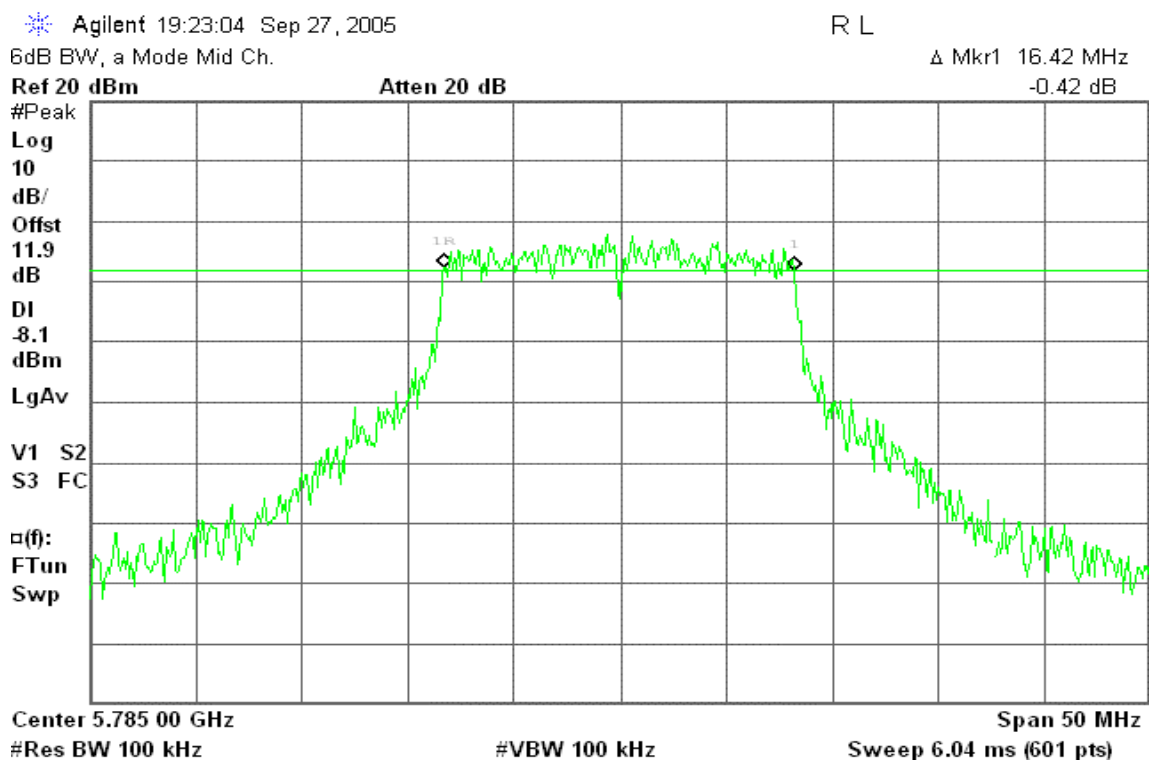


Test Plot

6dB Bandwidth (IEEE 802.11a / CH Low)



6dB Bandwidth (IEEE 802.11a / CH Mid)





6dB Bandwidth (IEEE 802.11a / CH High)

Agilent 23:18:53 Sep 27, 2005

R L

6dB BW, a Mode High Ch.

Δ Mkr1 16.25 MHz

Ref 20 dBm

Atten 20 dB

-3.23 dB

#Peak

Log

10

dB/

Offst

11.9

dB

DI

-8.8

dBm

LgAv

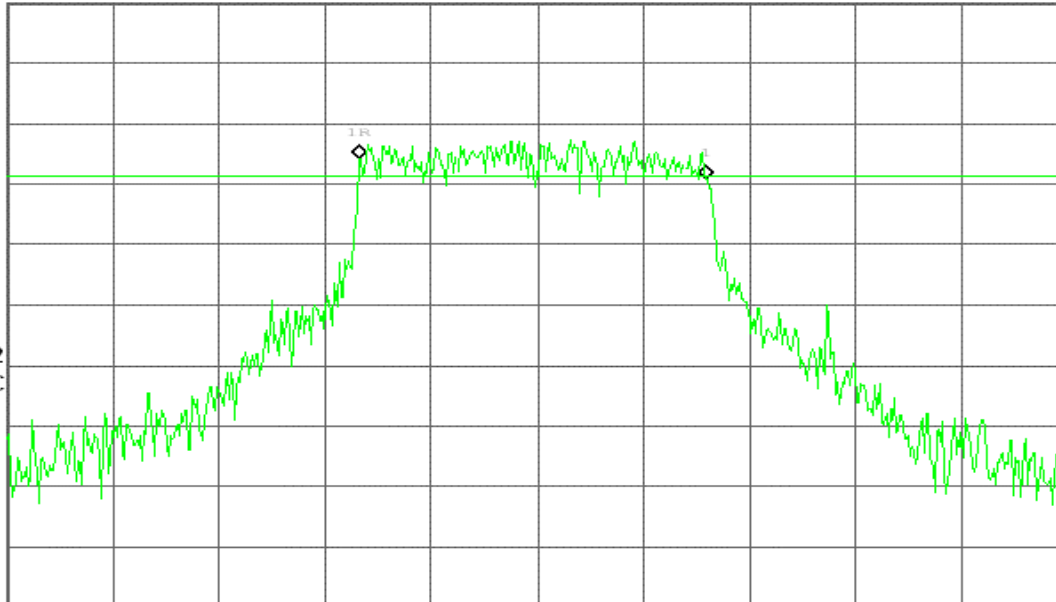
V1 S2

S3 FC

□(f):

FTun

Swp



Center 5.825 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

6dB Bandwidth (IEEE 802.11b / CH Low)

Agilent 22:28:29 Sep 20, 2005

R T

Δ Mkr1 9.08 MHz

Ref 21.93 dBm

#Atten 20 dB

0.71 dB

#Peak

Log

10

dB/

Offst

11.9

dB

DI

-0.3

dBm

LgAv

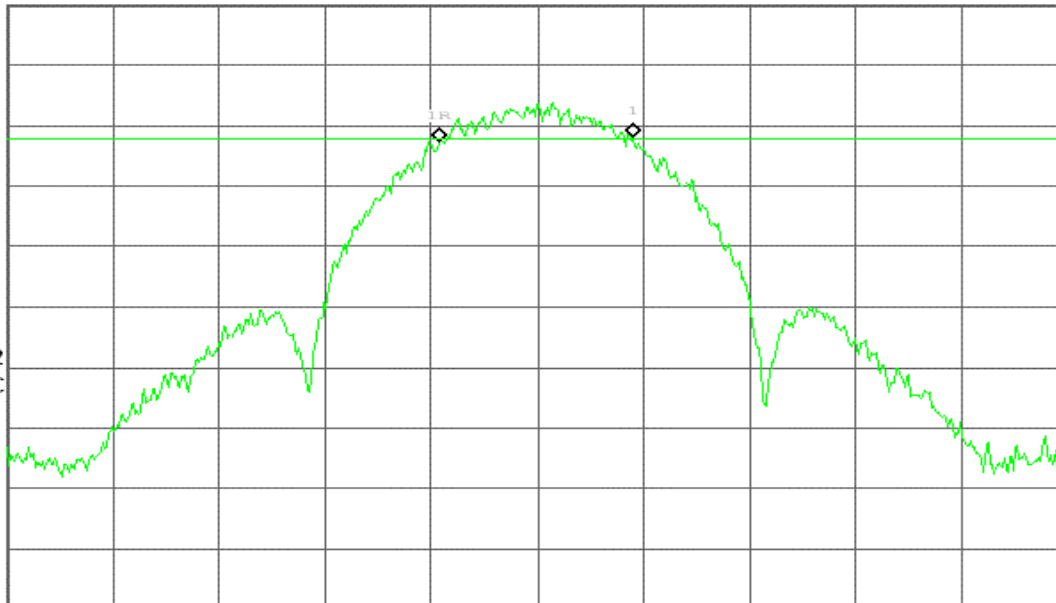
V1 S2

S3 FC

□(f):

FTun

Swp



Center 2.412 00 GHz

Span 50 MHz

#Res BW 100 kHz

VBW 100 kHz

Sweep 6.04 ms (601 pts)



6dB Bandwidth (IEEE 802.11b / CH Mid)

Agilent 22:30:51 Sep 20, 2005

T

Δ Mkr1 8.92 MHz

-0.46 dB

Ref 21.93 dBm

#Atten 20 dB

#Peak

Log

10

dB/

Offst

11.9

dB

DI

0.9

dBm

LgAv

V1 S2

S3 FC

α(f):

FTun

Swp

Center 2.437 00 GHz

#Res BW 100 kHz

VBW 100 kHz

Span 50 MHz

Sweep 6.04 ms (601 pts)

6dB Bandwidth (IEEE 802.11b / CH High)

Agilent 22:36:29 Sep 20, 2005

T

Δ Mkr1 8.75 MHz

0.90 dB

Ref 21.93 dBm

#Atten 20 dB

#Peak

Log

10

dB/

Offst

11.9

dB

DI

0.7

dBm

LgAv

V1 S2

S3 FC

α(f):

FTun

Swp

Center 2.462 00 GHz

#Res BW 100 kHz

VBW 100 kHz

Span 50 MHz

Sweep 6.04 ms (601 pts)



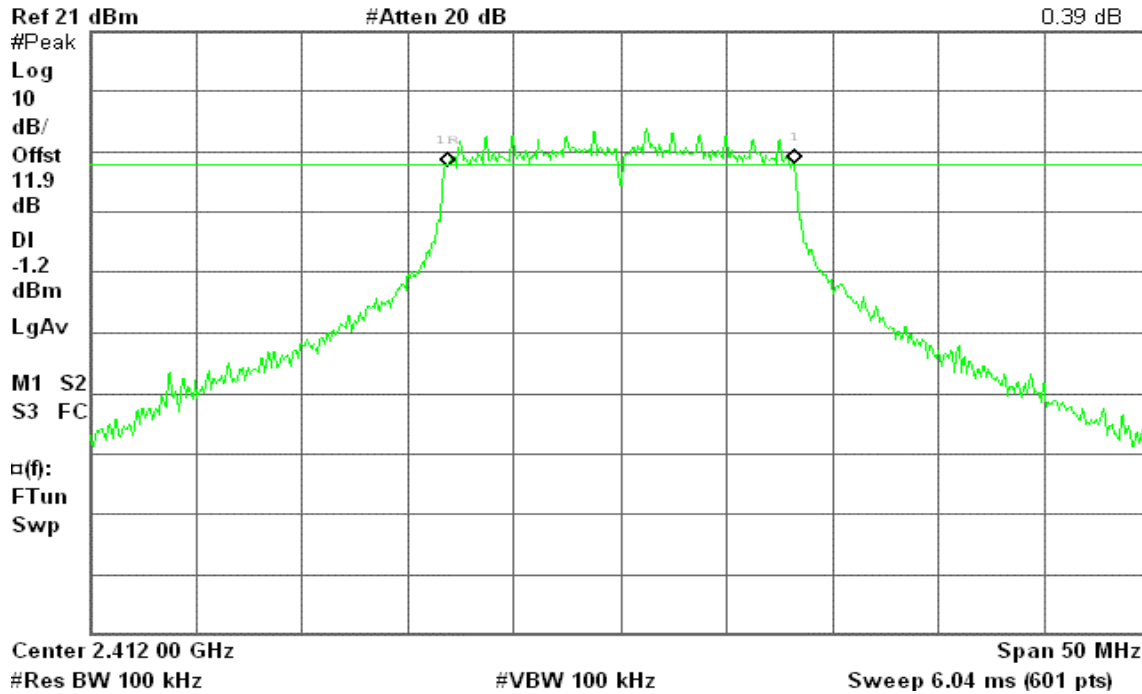
6dB Bandwidth (IEEE 802.11g / CH Low)

Agilent 23:55:20 Sep 20, 2005

T

Δ Mkr1 16.25 MHz

0.39 dB



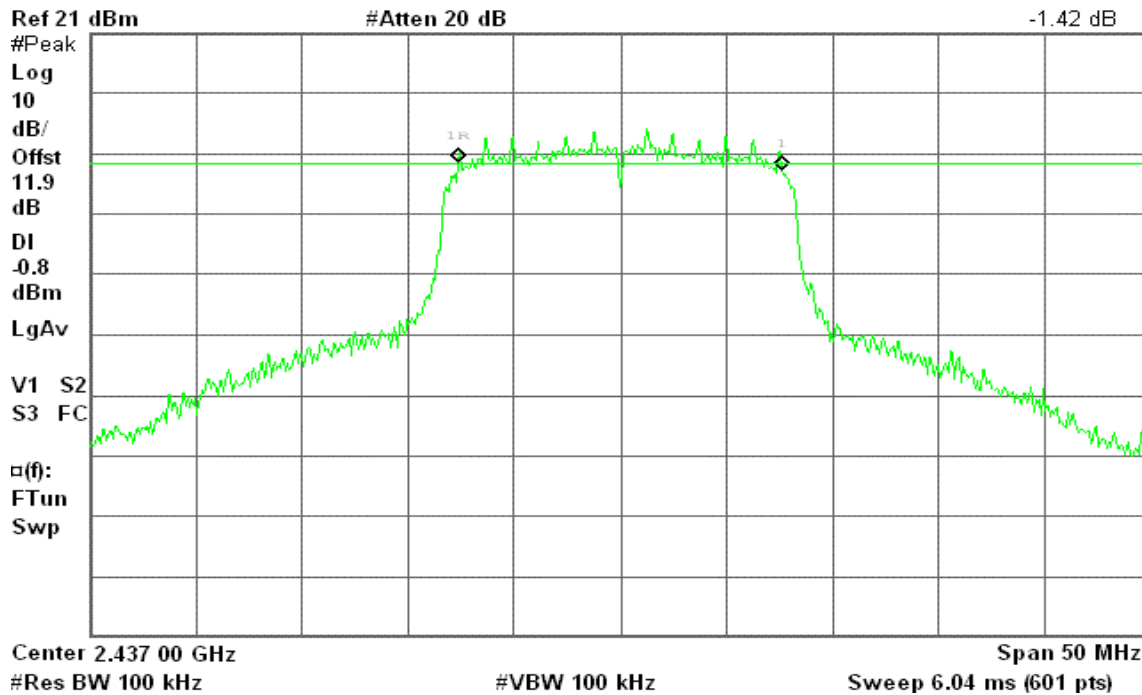
6dB Bandwidth (IEEE 802.11g / CH Mid)

Agilent 00:00:30 Sep 21, 2005

T

Δ Mkr1 15.17 MHz

-1.42 dB





6dB Bandwidth (IEEE 802.11g / CH High)

Agilent 23:59:01 Sep 20, 2005

T

Δ Mkr1 15.25 MHz

1.05 dB

Ref 21 dBm

#Atten 20 dB

#Peak

Log

10

dB/

Offset

11.9

dB

DI

-1.3

dBm

LgAv

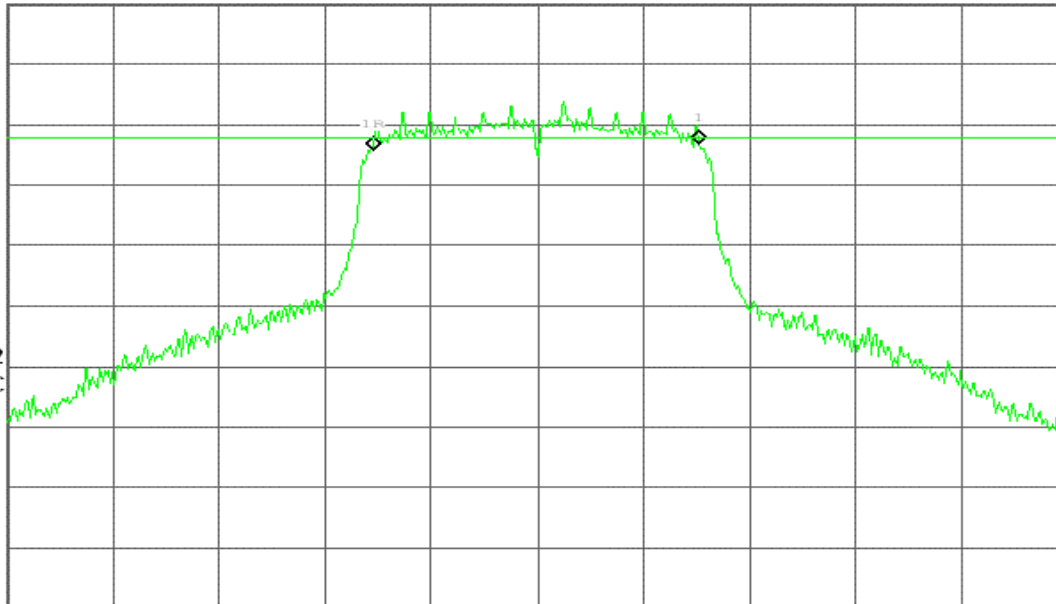
M1 S2

S3 FC

α(f):

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



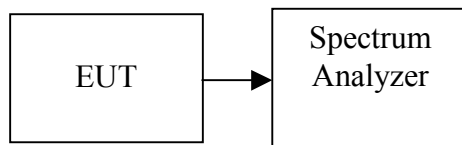
7.2 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

TEST RESULTS

No non-compliance noted

**Test Data*****IEEE 802.11a***

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	5745	15.56	0.03597	1	PASS
Mid	5785	15.61	0.03639		PASS
High	5825	14.86	0.03062		PASS

IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	16.45	0.04416	1	PASS
Mid	2437	15.69	0.03707		PASS
High	2462	15.46	0.03516		PASS

IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	16.04	0.04018	1	PASS
Mid	2437	15.76	0.03767		PASS
High	2462	15.16	0.03281		PASS



Test Plot

Peak Power (IEEE 802.11a / CH Low)

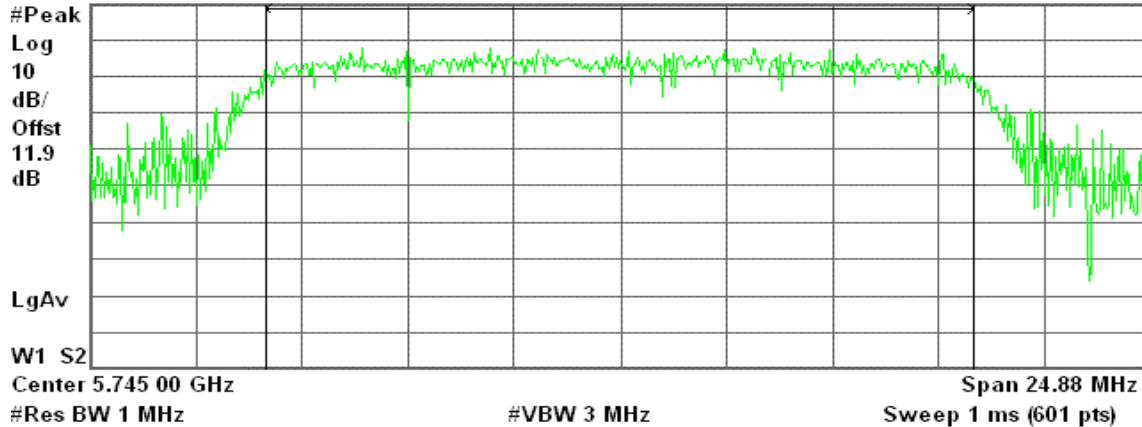
Agilent 19:15:07 Sep 27, 2005

R L

Peak Output Power (DTS), a Mode Low Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

Power Spectral Density

15.56 dBm / 16.5860 MHz

-56.64 dBm/Hz

Peak Power (IEEE 802.11a / CH Mid)

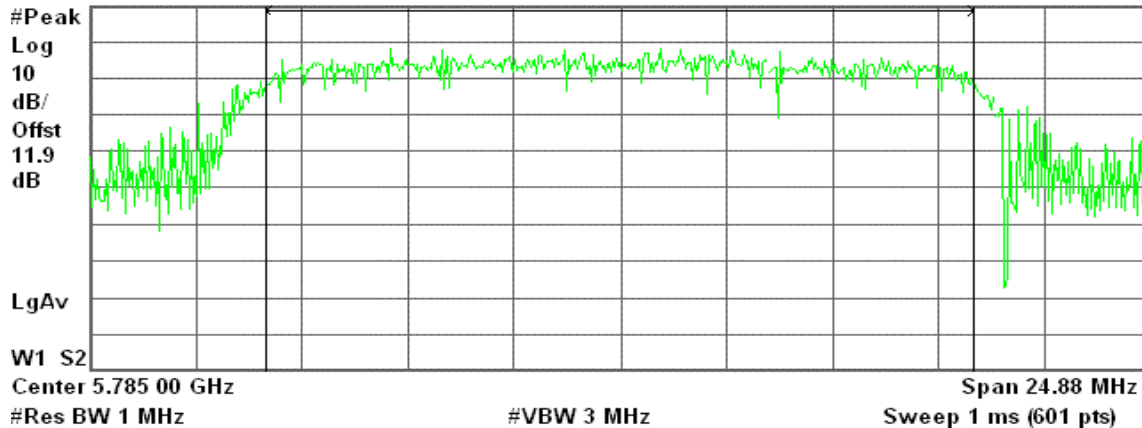
Agilent 19:24:17 Sep 27, 2005

R L

Peak Output Power (DTS), a Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

Power Spectral Density

15.61 dBm / 16.5890 MHz

-56.59 dBm/Hz



Peak Power (IEEE 802.11a / CH High)

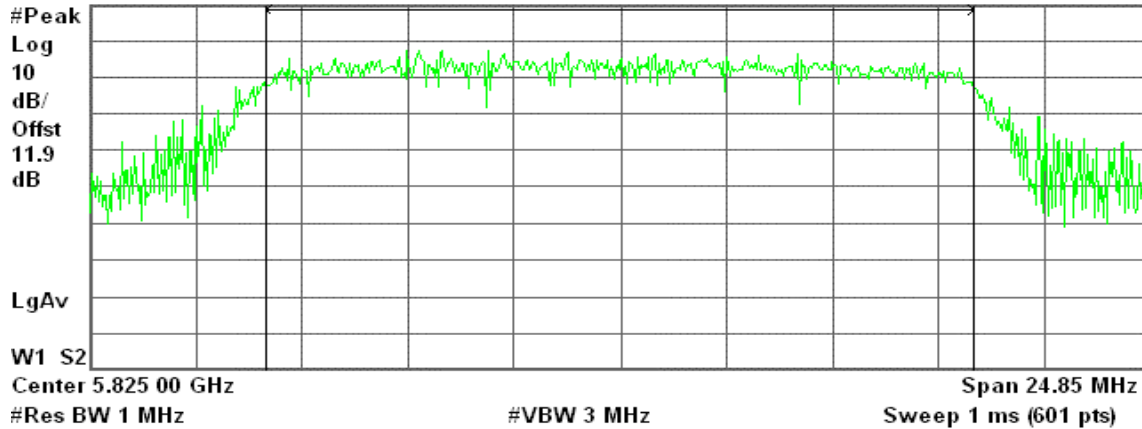
Agilent 23:20:35 Sep 27, 2005

R L

Peak Output Power (DTS), a Mode High Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

Power Spectral Density

14.86 dBm / 16.5670 MHz

-57.33 dBm/Hz

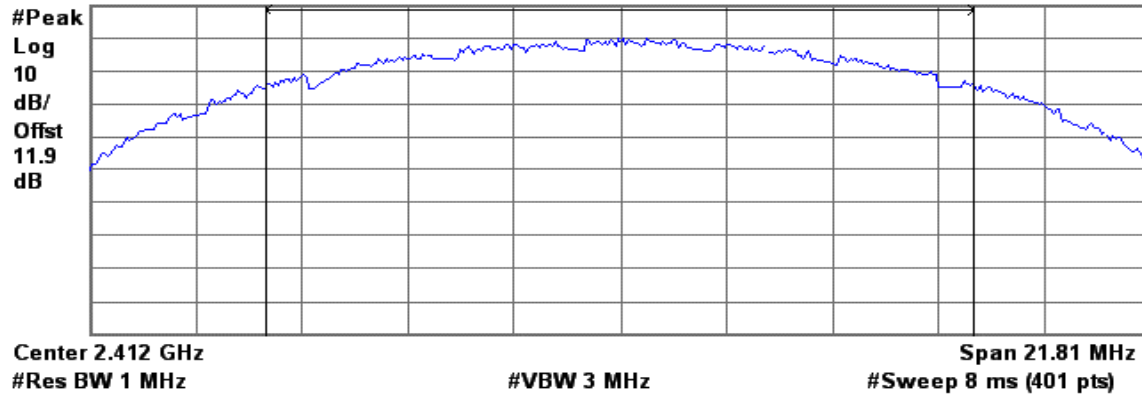
Peak Power (IEEE 802.11b / CH Low)

Agilent 22:15:17 Sep 26, 2005

R T

Ref 20 dBm

#Atten 20 dB



Channel Power

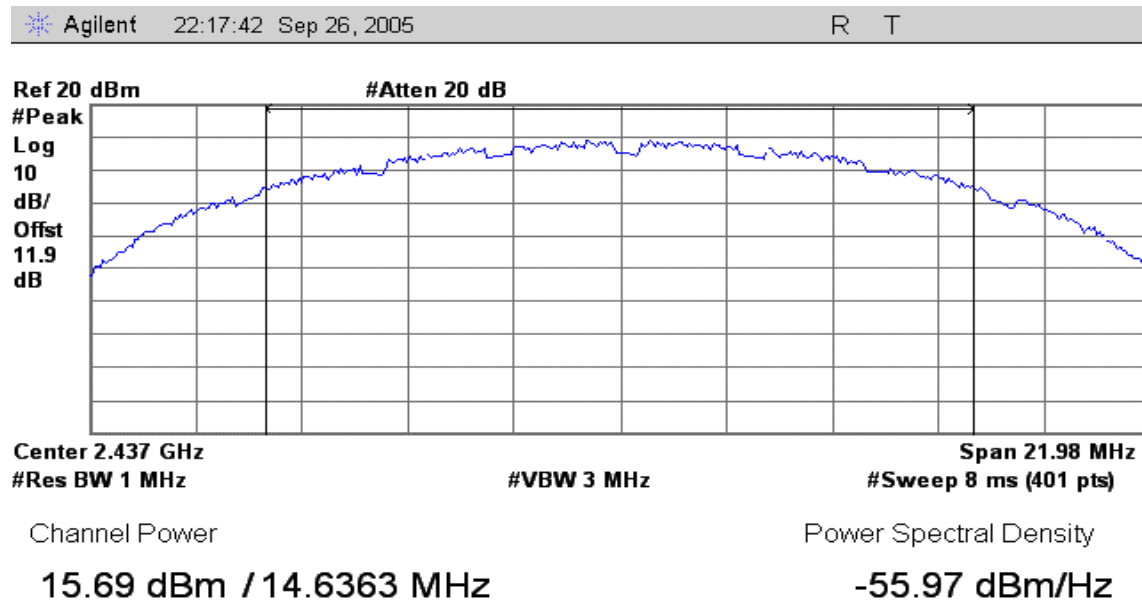
Power Spectral Density

16.45 dBm / 14.5241 MHz

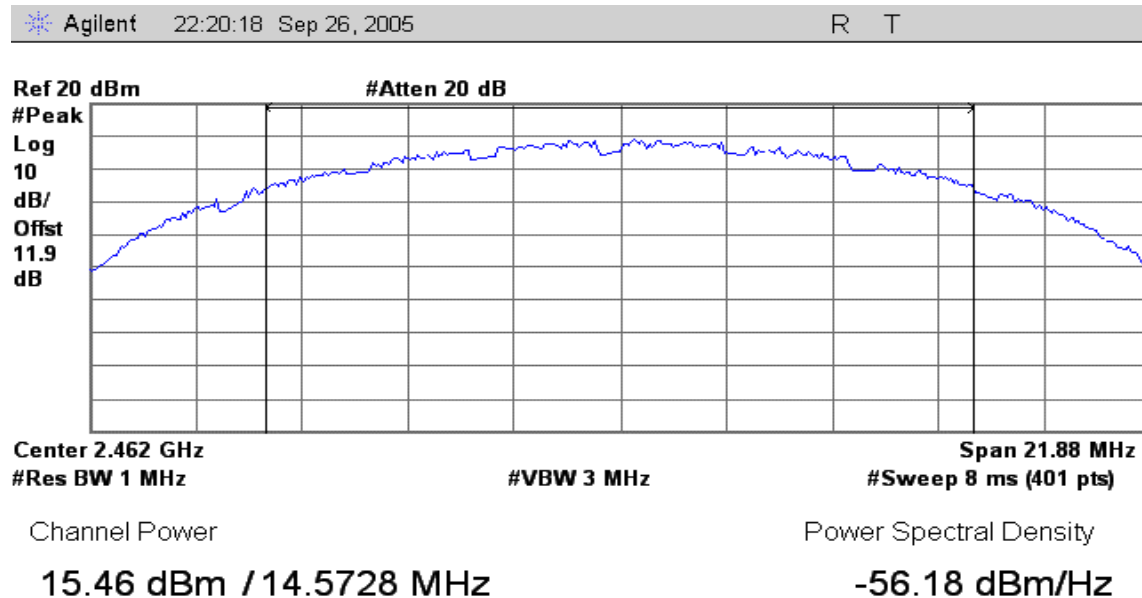
-55.17 dBm/Hz



Peak Power (IEEE 802.11b / CH Mid)



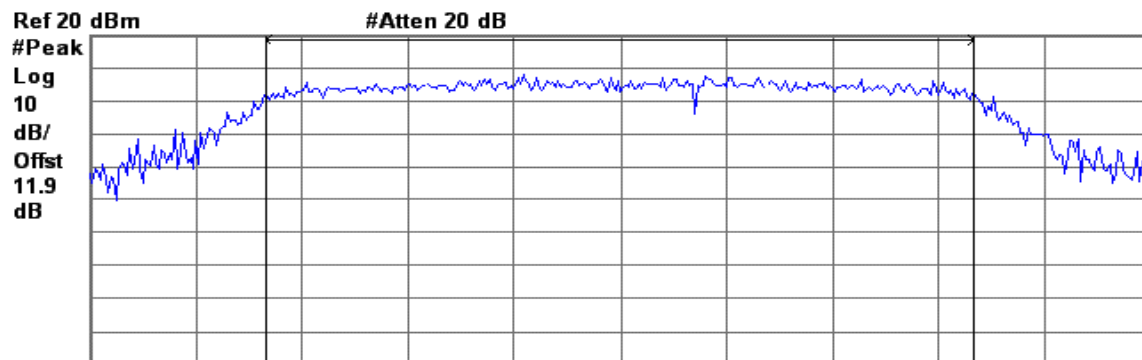
Peak Power (IEEE 802.11b / CH High)





Peak Power (IEEE 802.11g / CH Low)

Agilent 22:32:48 Sep 26, 2005 R T



Center 2.412 GHz Span 24.65 MHz
#Res BW 1 MHz #VBW 3 MHz Sweep 4 ms (401 pts)

Channel Power

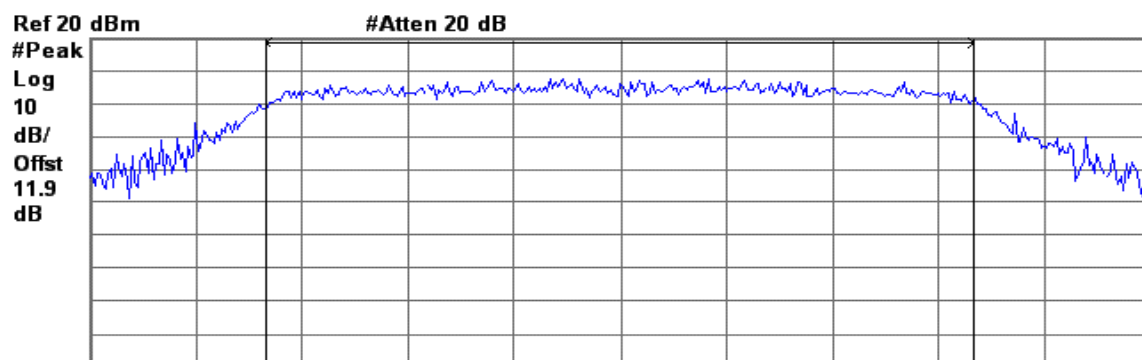
16.04 dBm / 16.4378 MHz

Power Spectral Density

-56.12 dBm/Hz

Peak Power (IEEE 802.11g / CH Mid)

Agilent 22:27:13 Sep 26, 2005 R T



Center 2.437 GHz Span 24.66 MHz
#Res BW 1 MHz #VBW 3 MHz Sweep 4 ms (401 pts)

Channel Power

15.76 dBm / 16.4421 MHz

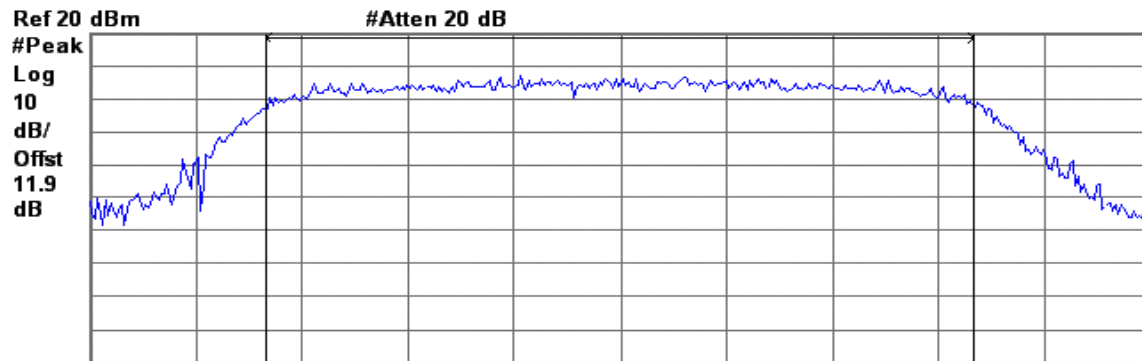
Power Spectral Density

-56.40 dBm/Hz



Peak Power (IEEE 802.11g / CH High)

Agilent 22:24:58 Sep 26, 2005 R T



Center 2.462 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 24.16 MHz

Sweep 4 ms (401 pts)

Channel Power

15.16 dBm / 16.1081 MHz

Power Spectral Density

-56.91 dBm/Hz



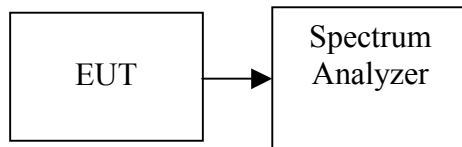


7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

**TEST RESULTS***No non-compliance noted***Test Data****Test mode: IEEE 802.11a**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	5745	11.98	0.01578
Mid	5785	11.56	0.01432
High	5825	11.37	0.01371

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	10.54	0.01132
Mid	2437	10.22	0.01052
High	2462	10.00	0.01000

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	9.83	0.00962
Mid	2437	9.54	0.00899
High	2462	9.05	0.00804



Test Plot

IEEE 802.11a

CH Low

Agilent 19:15:56 Sep 27, 2005

R L

AVG Output Power , a Mode Low Ch.

Ref 30 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

11.9

dB

#PAvg

100

V1 S2

Center 5.745 00 GHz

Span 24.88 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.98 dBm / 16.5860 MHz

-60.22 dBm/Hz

CH Mid

Agilent 19:24:59 Sep 27, 2005

R L

AVG Output Power , a Mode Mid Ch.

Ref 30 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

11.9

dB

#PAvg

100

V1 S2

Center 5.785 00 GHz

Span 24.88 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.56 dBm / 16.5890 MHz

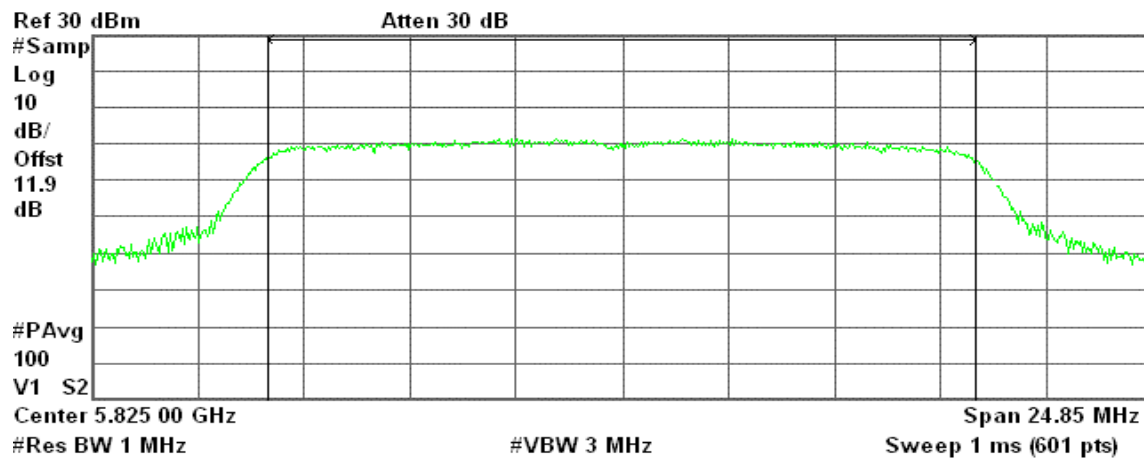
-60.64 dBm/Hz



CH High

Agilent 23:21:29 Sep 27, 2005

R L



Channel Power

11.37 dBm / 16.5670 MHz

Power Spectral Density

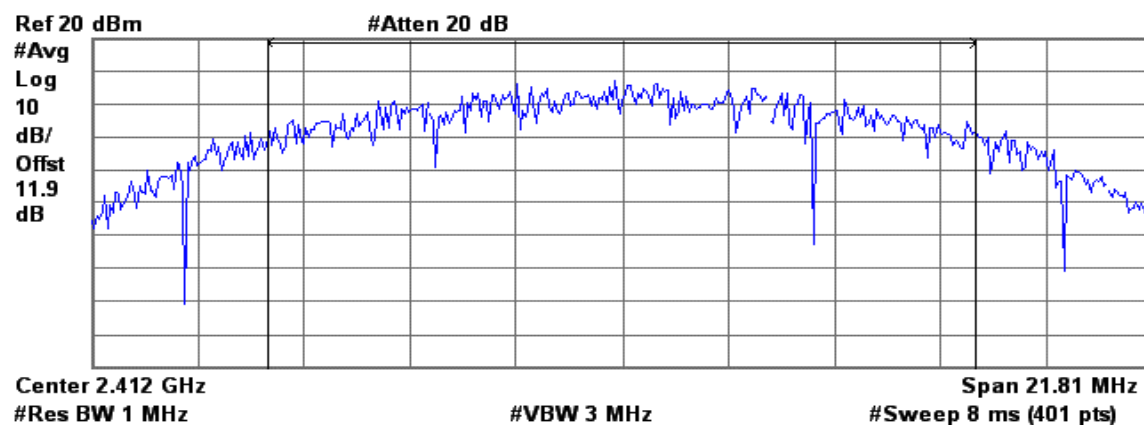
-60.82 dBm/Hz

IEEE 802.11b

Peak Power (CH Low)

Agilent 22:15:52 Sep 26, 2005

R T



Channel Power

10.54 dBm / 14.5241 MHz

Power Spectral Density

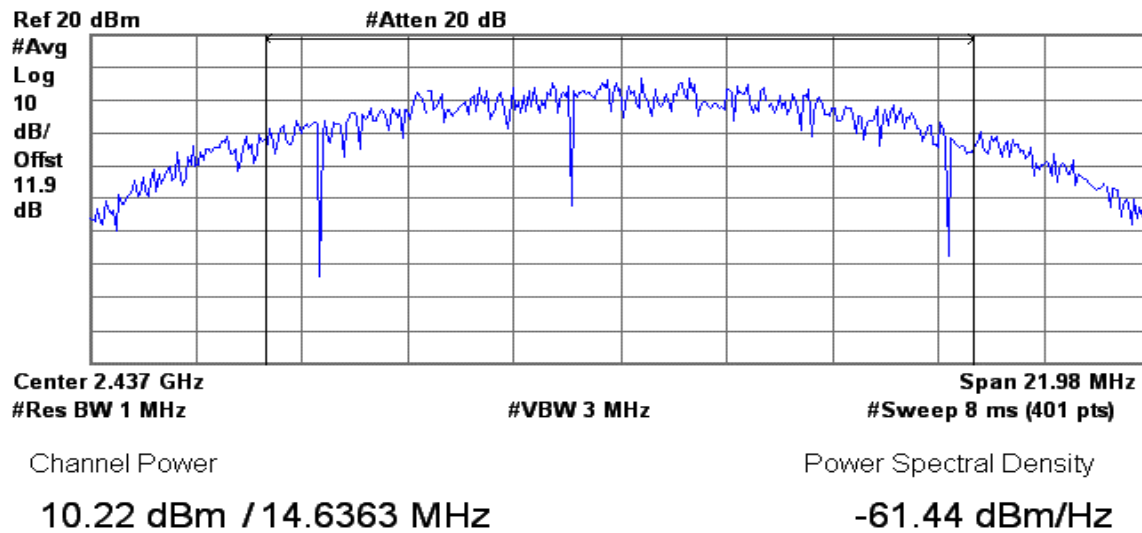
-61.08 dBm/Hz



Peak Power (CH Mid)

Agilent 22:18:19 Sep 26, 2005

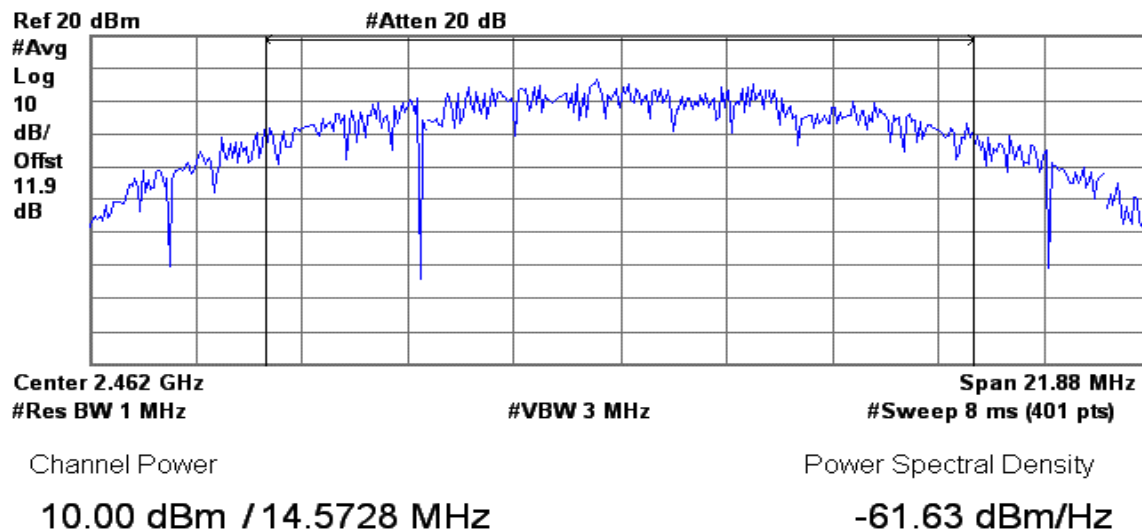
R T



Peak Power (CH High)

Agilent 22:21:14 Sep 26, 2005

R T

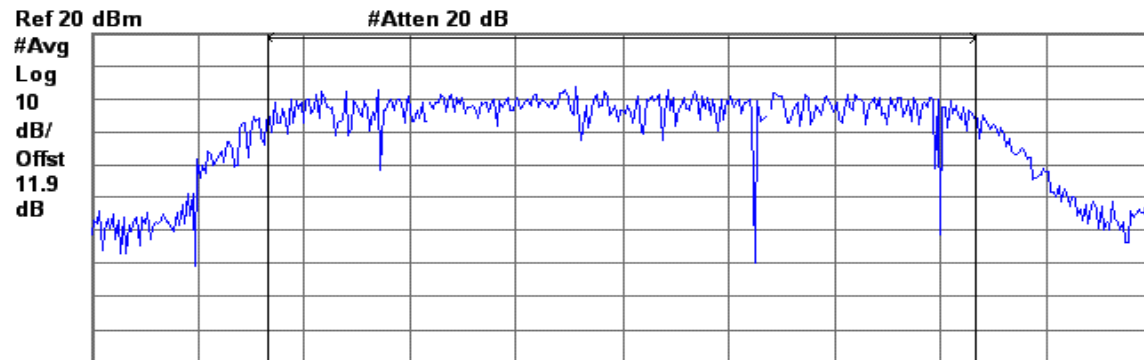




IEEE 802.11g

Peak Power (CH Low)

Agilent 22:33:23 Sep 26, 2005 R T



Center 2.412 GHz Span 24.65 MHz
#Res BW 1 MHz #VBW 3 MHz Sweep 8 ms (401 pts)

Channel Power

9.83 dBm / 16.4378 MHz

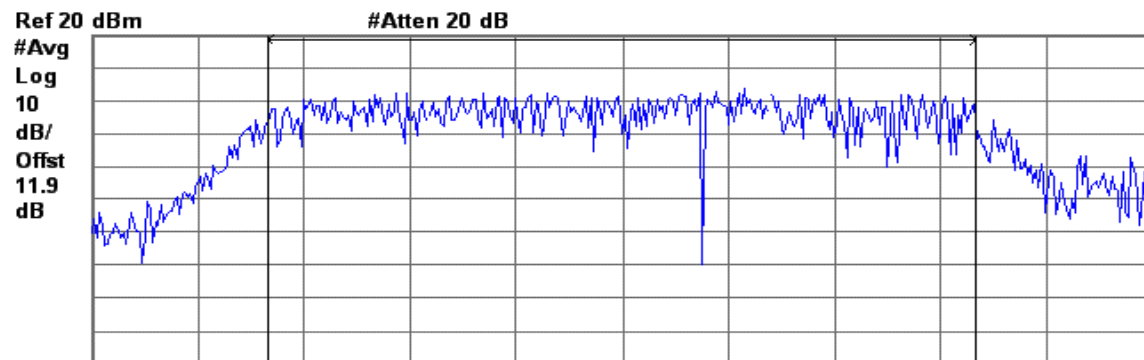
Power Spectral Density

-62.33 dBm/Hz



Peak Power (CH Mid)

Agilent 22:27:51 Sep 26, 2005 R T



Center 2.437 GHz Span 24.66 MHz
#Res BW 1 MHz #VBW 3 MHz Sweep 8 ms (401 pts)

Channel Power

9.54 dBm / 16.4421 MHz

Power Spectral Density

-62.62 dBm/Hz

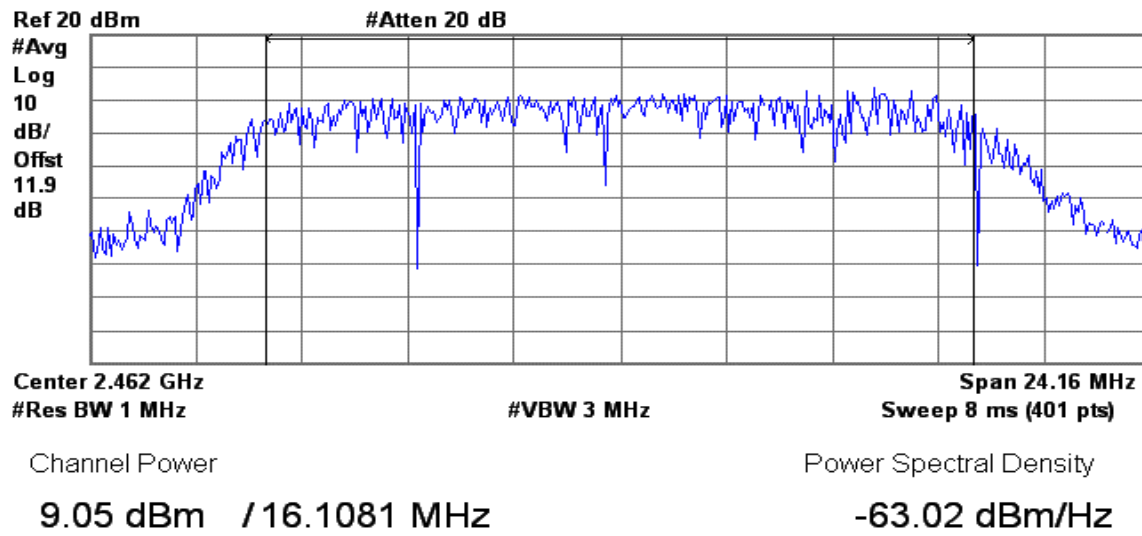




Peak Power (CH High)

Agilent 22:25:47 Sep 26, 2005

R T

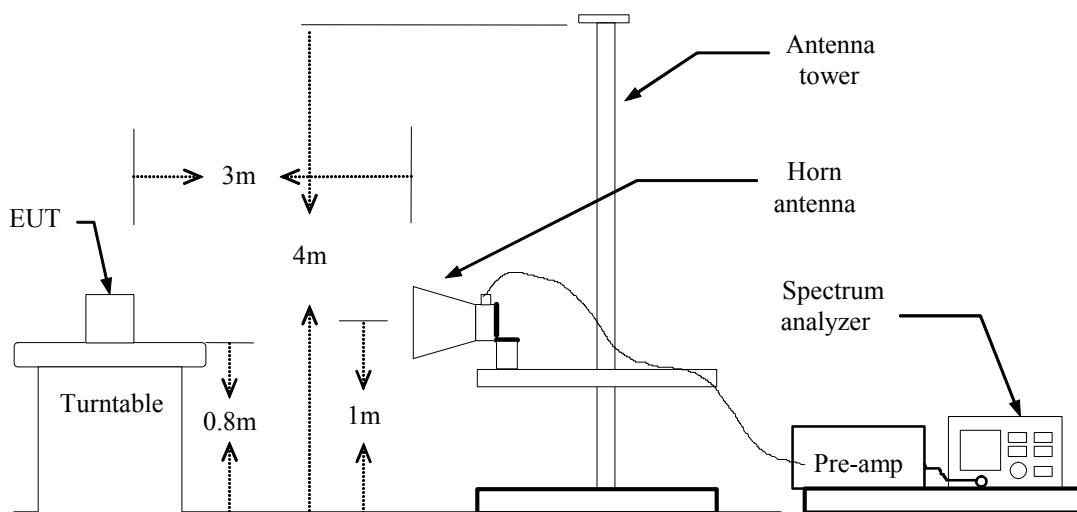


7.4 BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. 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 Section 15.205(c)).

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

Refer to attach spectrum analyzer data chart.



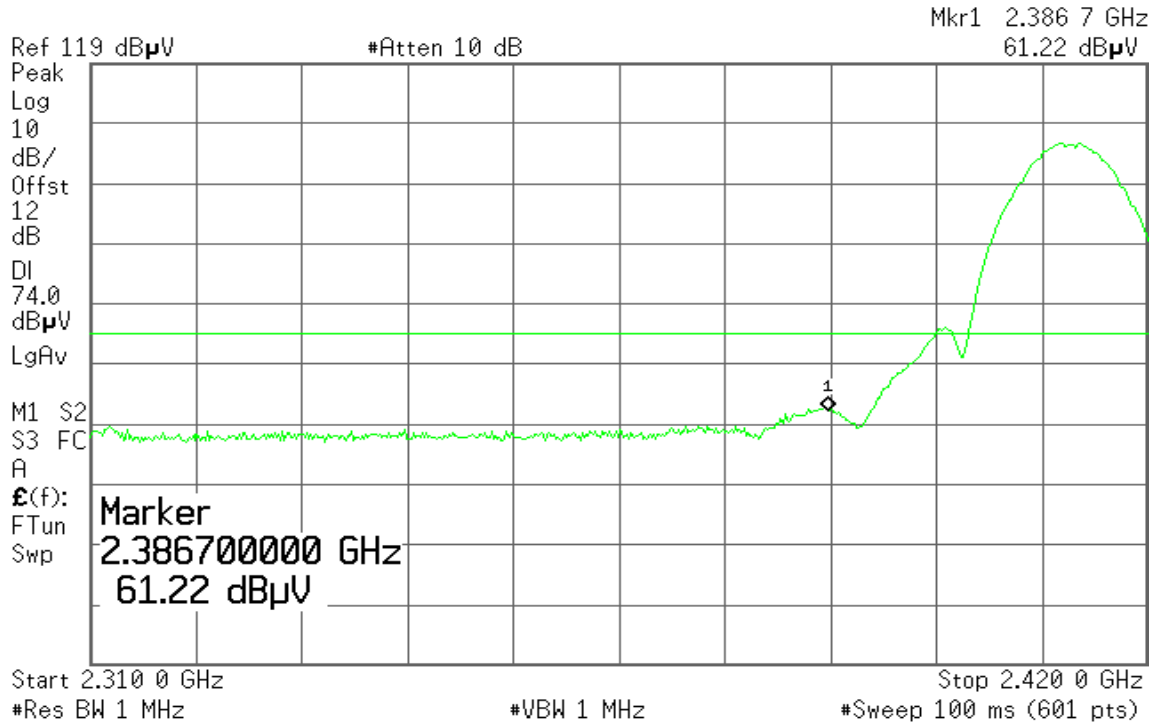
Band Edges (IEEE 802.11b / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 15:02:22 Sep 15, 2005

T

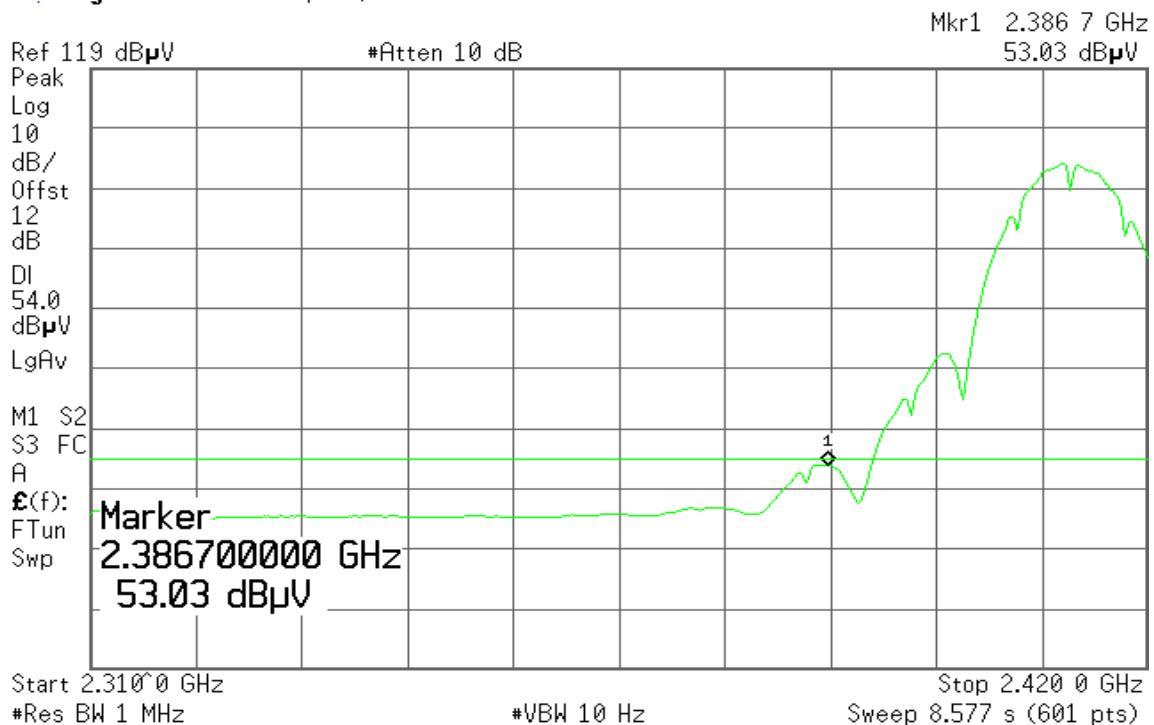


Detector mode: Average

Polarity: Vertical

Agilent 15:03:21 Sep 15, 2005

T





Detector mode: Peak

Polarity: Horizontal

Agilent 15:10:23 Sep 15, 2005

R T

Mkr1 2.385 4 GHz
60.76 dB μ V

Ref 119 dB μ V

#Atten 10 dB

Peak
Log
10
dB/
Offst
12
dB
DI
74.0
dB μ V
LgAv

M1 S2
S3 FC
A

f(f):
FTun
Swp

Marker
2.385400000 GHz
60.76 dB μ V

Start 2.310 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.420 0 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent 15:08:27 Sep 15, 2005

T

Mkr1 2.385 4 GHz
52.75 dB μ V

Ref 119 dB μ V

#Atten 10 dB

Peak
Log
10
dB/
Offst
12
dB
DI
54.0
dB μ V
LgAv

M1 S2
S3 FC
A

f(f):
FTun
Swp

Marker
2.385400000 GHz
52.75 dB μ V

Start 2.310 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.420 0 GHz

Sweep 8.577 s (601 pts)



Band Edges (IEEE 802.11b / CH High)

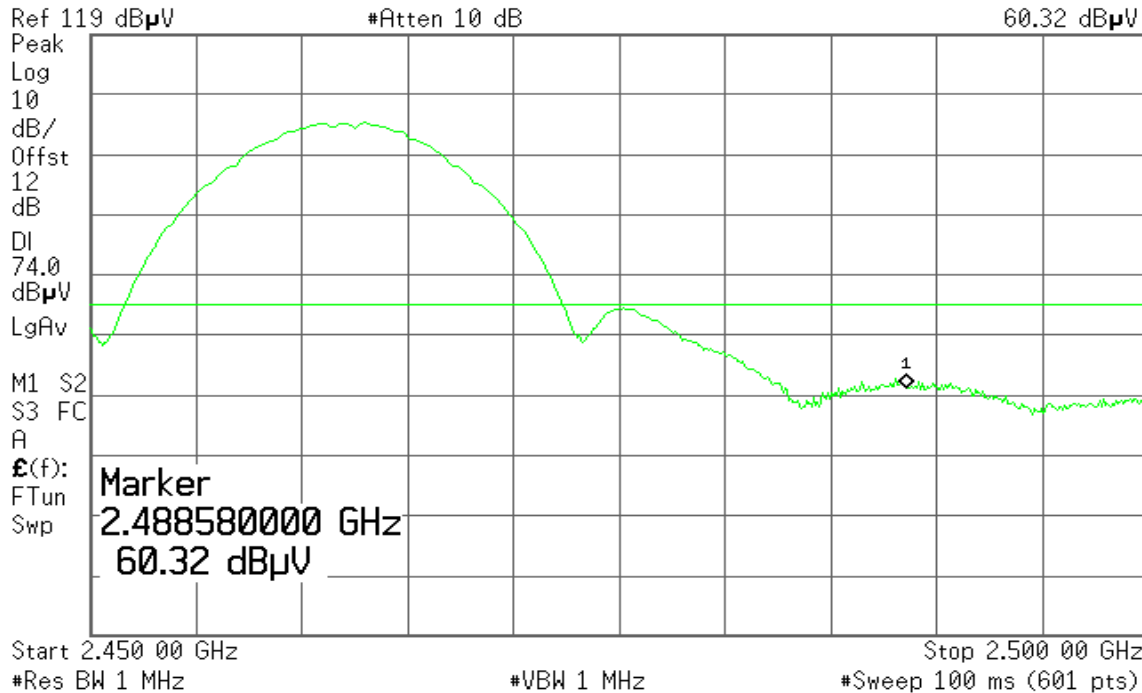
Detector mode: Peak

Polarity: Vertical

Agilent 14:35:04 Sep 15, 2005

T

Mkr1 2.488 58 GHz
60.32 dB μ V



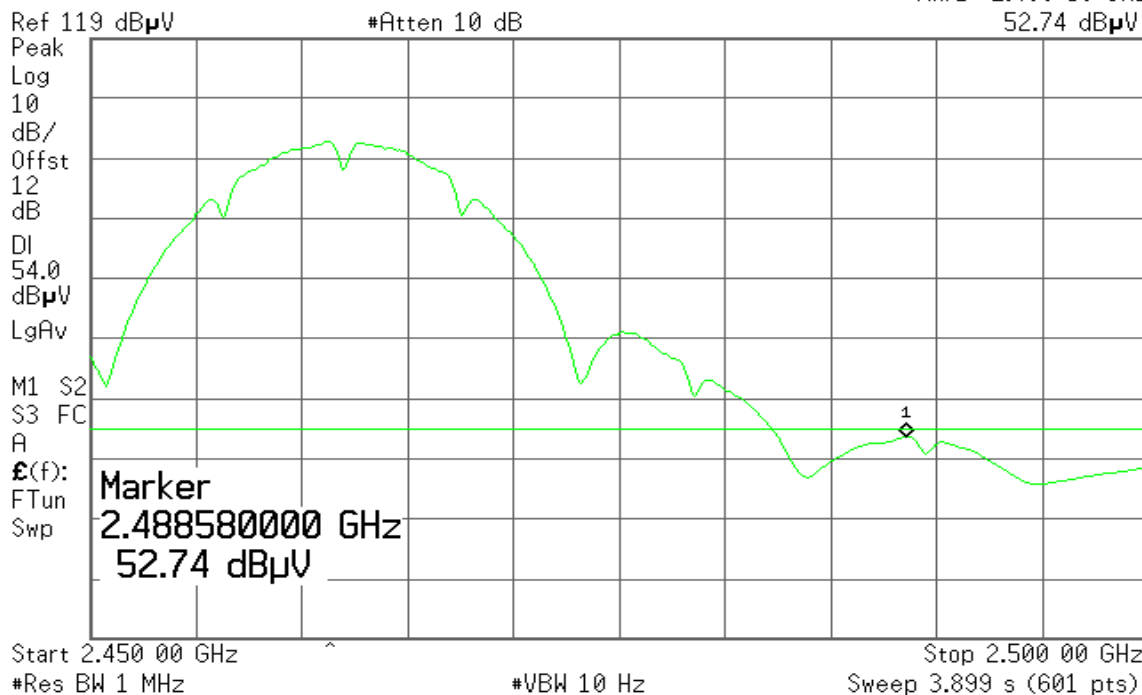
Detector mode: Average

Polarity: Vertical

Agilent 14:34:34 Sep 15, 2005

T

Mkr1 2.488 58 GHz
52.74 dB μ V





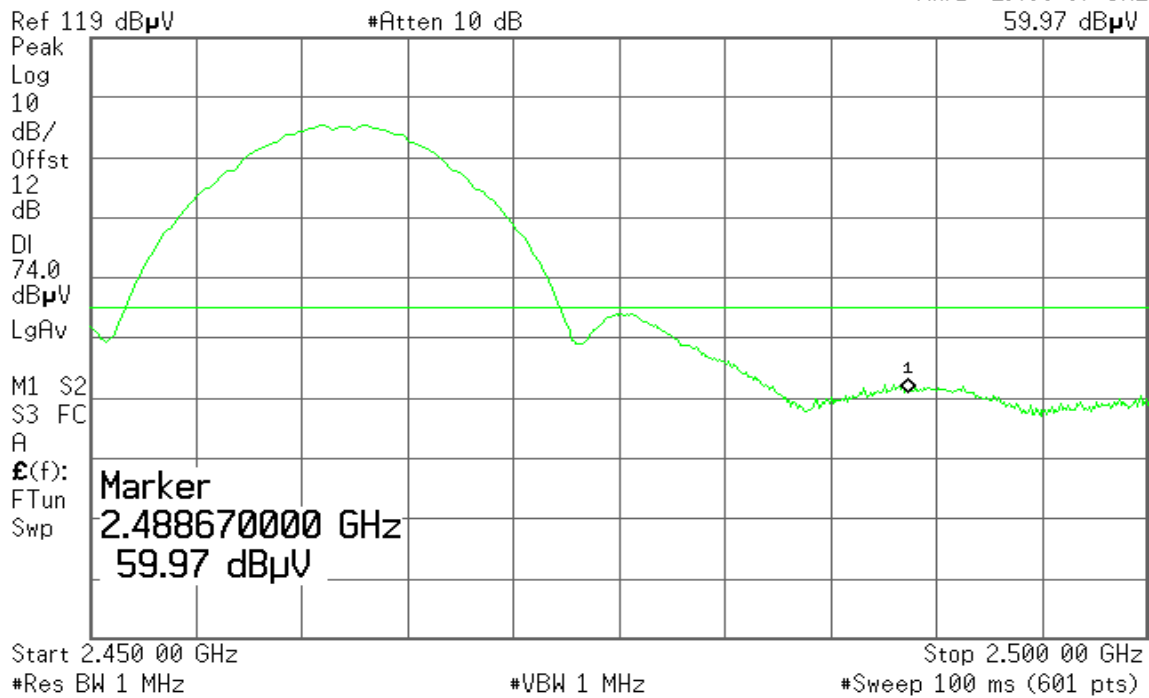
Detector mode: Peak

Polarity: Horizontal

Agilent 14:41:47 Sep 15, 2005

T

Mkr1 2.488 67 GHz
59.97 dB μ V



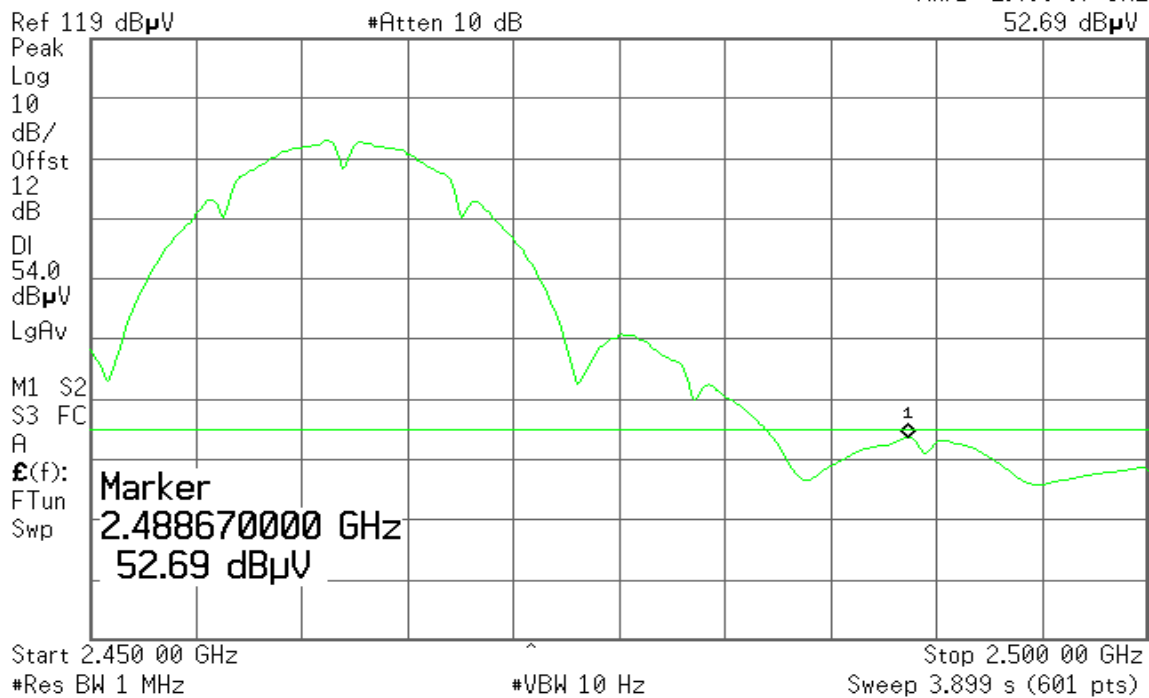
Detector mode: Average

Polarity: Horizontal

Agilent 14:41:16 Sep 15, 2005

T

Mkr1 2.488 67 GHz
52.69 dB μ V



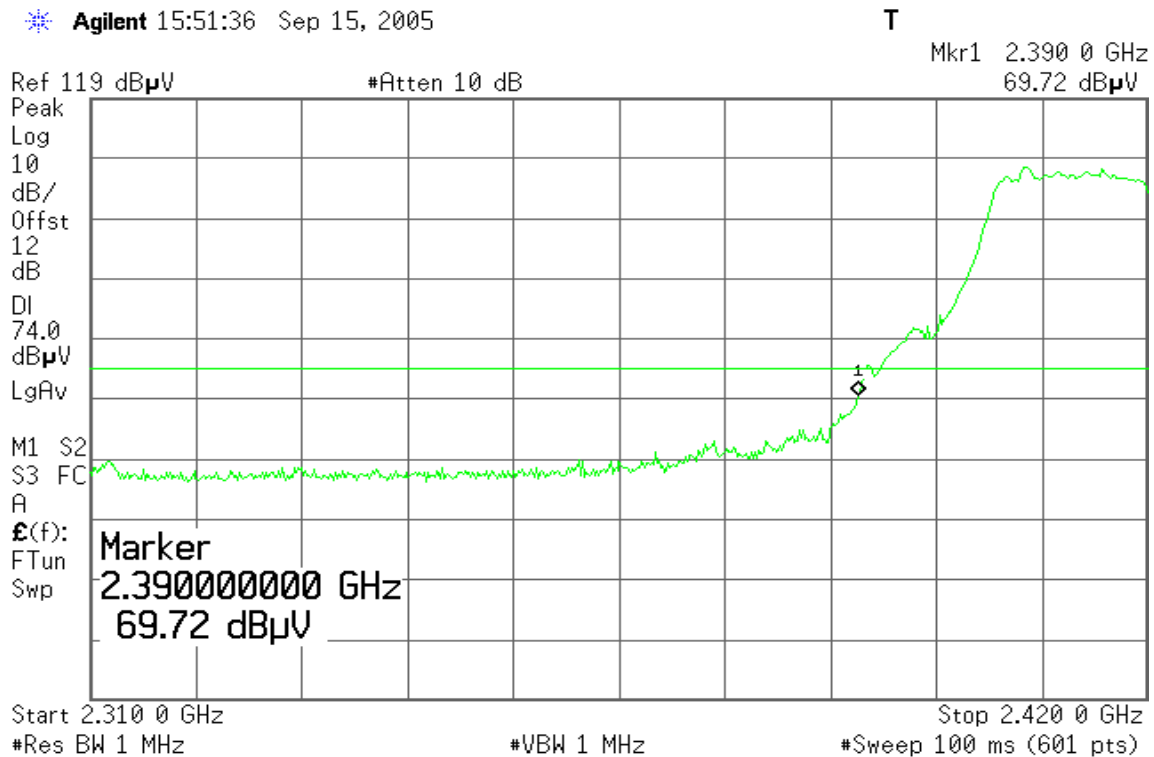


Band Edges (IEEE 802.11g / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 15:51:36 Sep 15, 2005



Detector mode: Average

Polarity: Vertical

Agilent 15:51:02 Sep 15, 2005



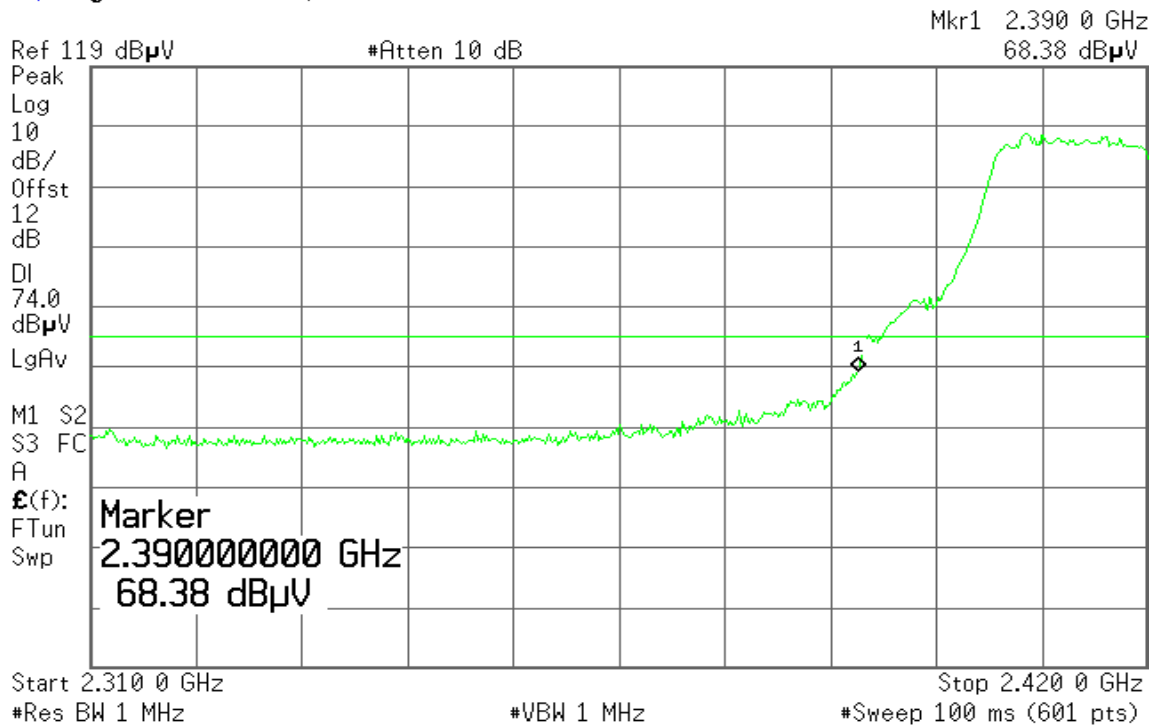


Detector mode: Peak

Polarity: Horizontal

Agilent 15:57:11 Sep 15, 2005

T

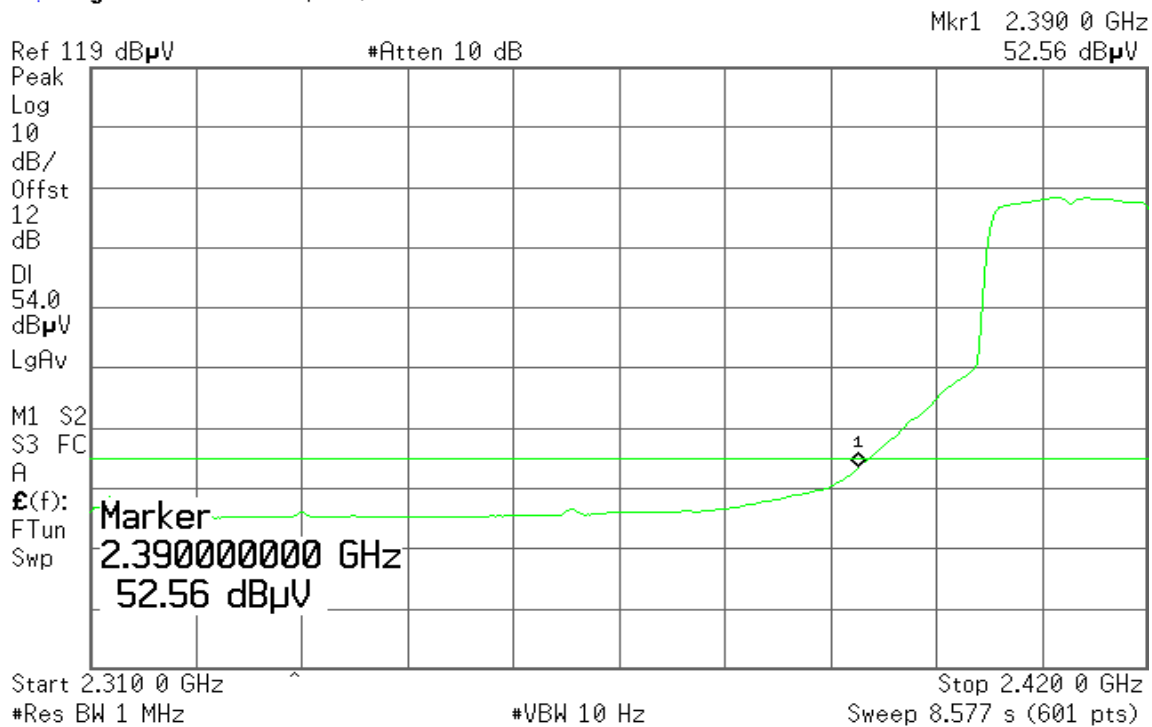


Detector mode: Average

Polarity: Horizontal

Agilent 15:55:58 Sep 15, 2005

T





Band Edges (IEEE 802.11g / CH High)

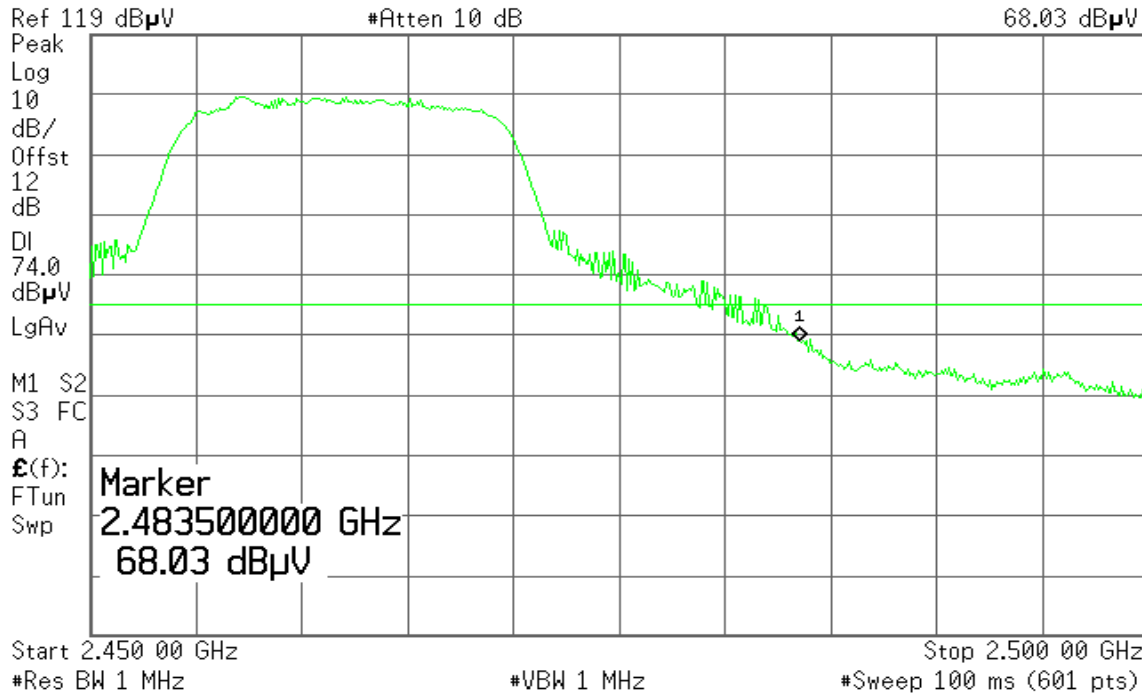
Detector mode: Peak

Polarity: Vertical

Agilent 16:10:57 Sep 15, 2005

T

Mkr1 2.483 50 GHz
68.03 dB μ V



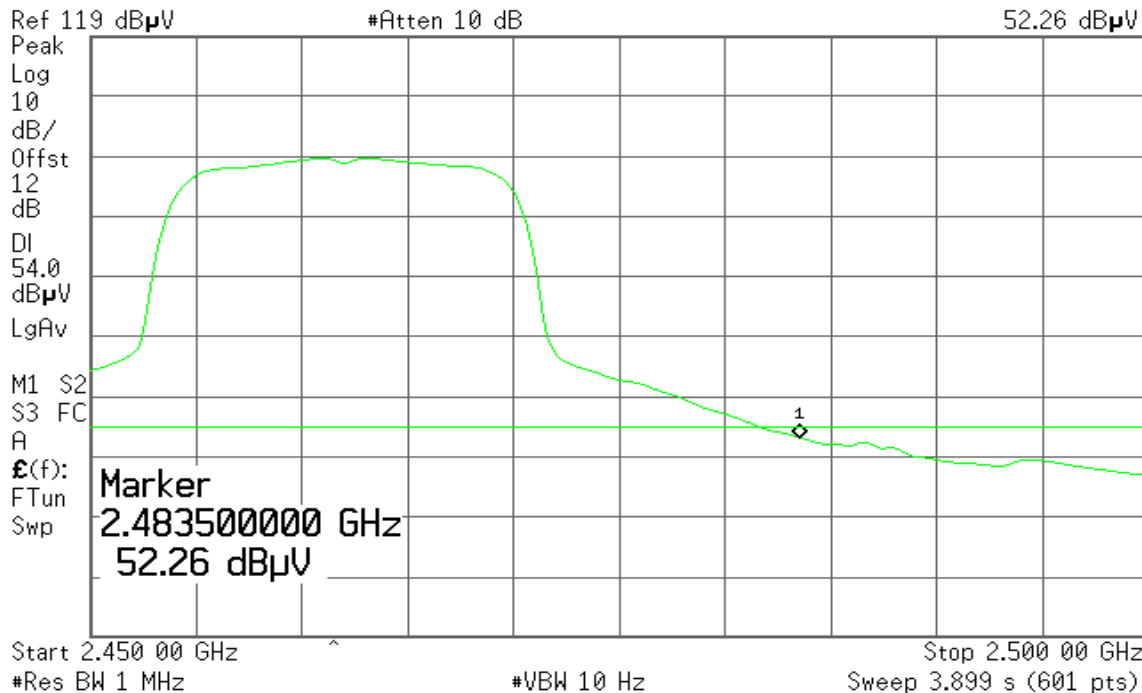
Detector mode: Average

Polarity: Vertical

Agilent 16:09:29 Sep 15, 2005

T

Mkr1 2.483 50 GHz
52.26 dB μ V





Detector mode: Peak

Polarity: Horizontal

Agilent 16:03:22 Sep 15, 2005

T

Mkr1 2.483 50 GHz
62.80 dB μ V

Ref 119 dB μ V

#Atten 10 dB

Peak
Log
10
dB/
Offst
12
dB
DI
74.0
dB μ V
LgAv

M1 S2
S3 FC
A
£(f):
FTun
Swp

Marker
2.483500000 GHz
62.80 dB μ V

Start 2.450 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent 16:02:35 Sep 15, 2005

T

Mkr1 2.483 50 GHz
48.37 dB μ V

Ref 119 dB μ V

#Atten 10 dB

Peak
Log
10
dB/
Offst
12
dB
DI
54.0
dB μ V
LgAv

M1 S2
S3 FC
A
£(f):
FTun
Swp

Marker
2.483500000 GHz
48.37 dB μ V

Start 2.450 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 3.899 s (601 pts)

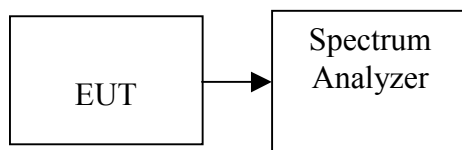


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), 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.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

**Test Data*****IEEE 802.11a***

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	5745	-10.56	8.00	PASS
Mid	5785	-11.39		PASS
High	5825	-11.90		PASS

IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-6.90	8.00	PASS
Mid	2437	-5.93		PASS
High	2462	-6.16		PASS

IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-9.16	8.00	PASS
Mid	2437	-9.20		PASS
High	2462	-8.54		PASS



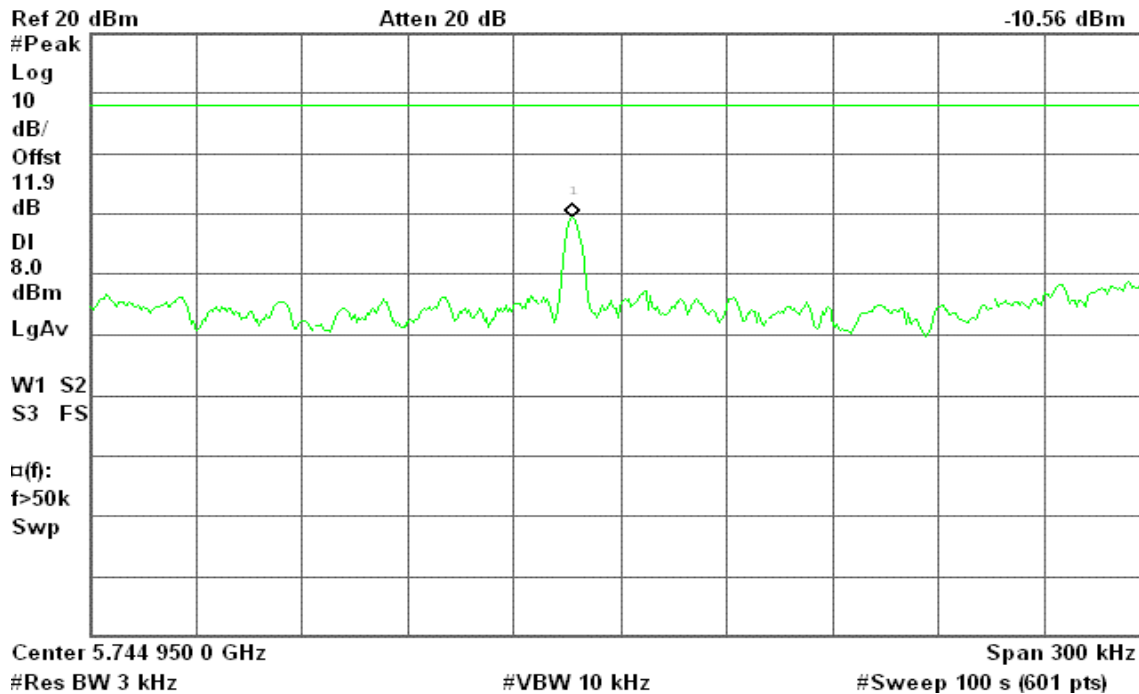
Test Plot

PPSD (IEEE 802.11a / CH Low)

Agilent 19:18:38 Sep 27, 2005

R L

Mkr1 5.744 936 4 GHz
-10.56 dBm



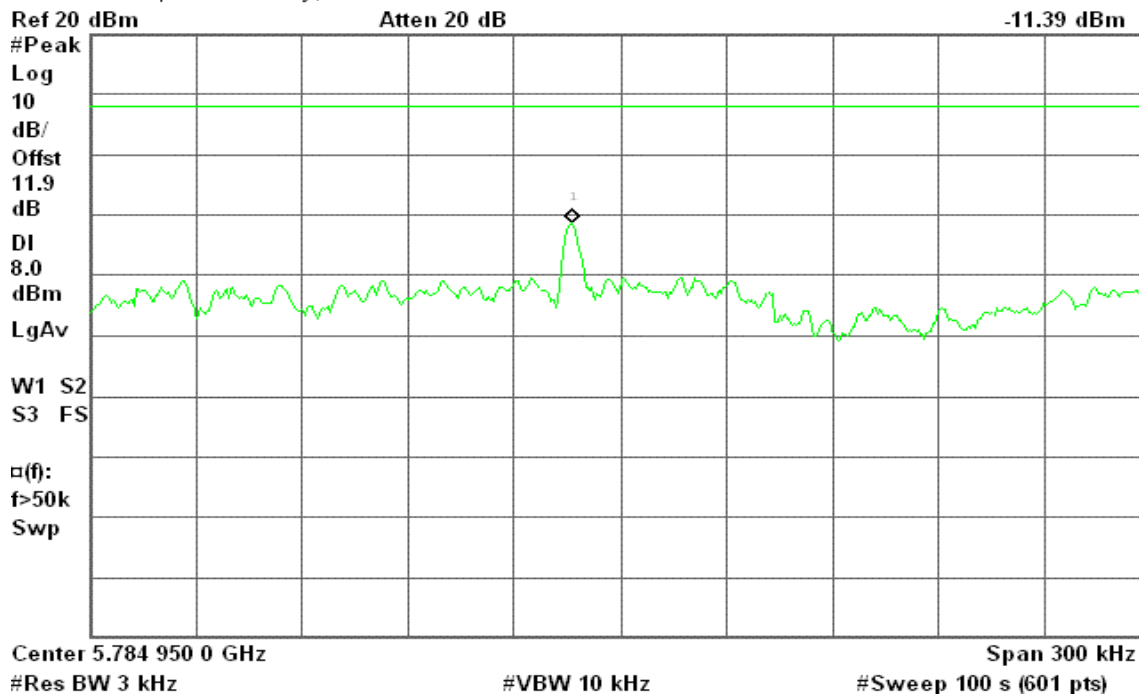
PPSD (IEEE 802.11a / CH Mid)

Agilent 19:27:32 Sep 27, 2005

R L

Mkr1 5.784 936 4 GHz
-11.39 dBm

Peak Power Spectral Density, a Mode Mid Ch.





PPSD (IEEE 802.11a / CH High)

Agilent 23:26:20 Sep 27, 2005

R L

Peak Power Spectral Density, a Mode High Ch.

Mkr1 5.824 936 4 GHz

Ref 20 dBm

Atten 20 dB

-11.90 dBm

#Peak

Log

10

dB/

Offst

11.9

dB

DI

8.0

dBm

LgAv

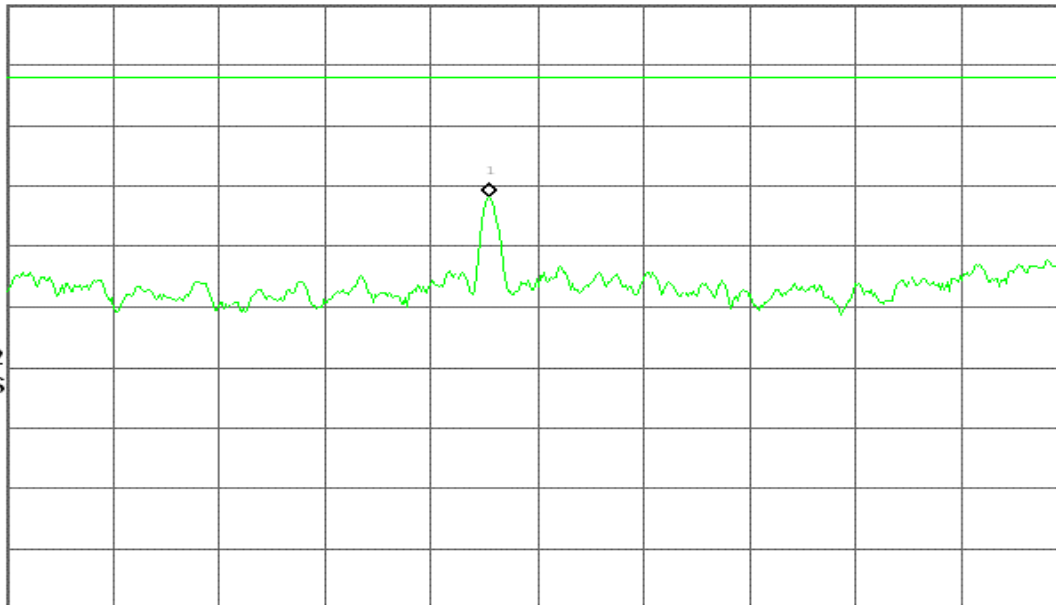
W1 S2

S3 FS

□(f):

f>50k

Swp



Center 5.824 950 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

PPSD (IEEE 802.11b / CH Low)

Agilent 23:23:25 Sep 20, 2005

T

Mkr1 2.412 635 7 GHz

Ref 21.93 dBm

#Atten 20 dB

-6.90 dBm

#Peak

Log

10

dB/

Offst

11.9

dB

DI

8.0

dBm

LgAv

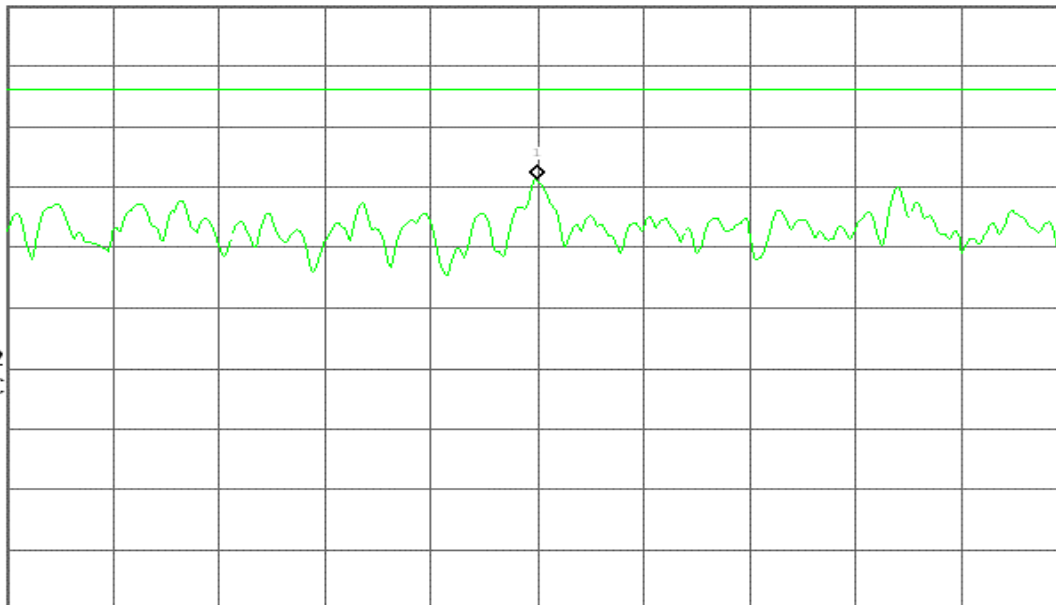
V1 S2

S3 FC

□(f):

f>50k

Swp



Center 2.412 636 2 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

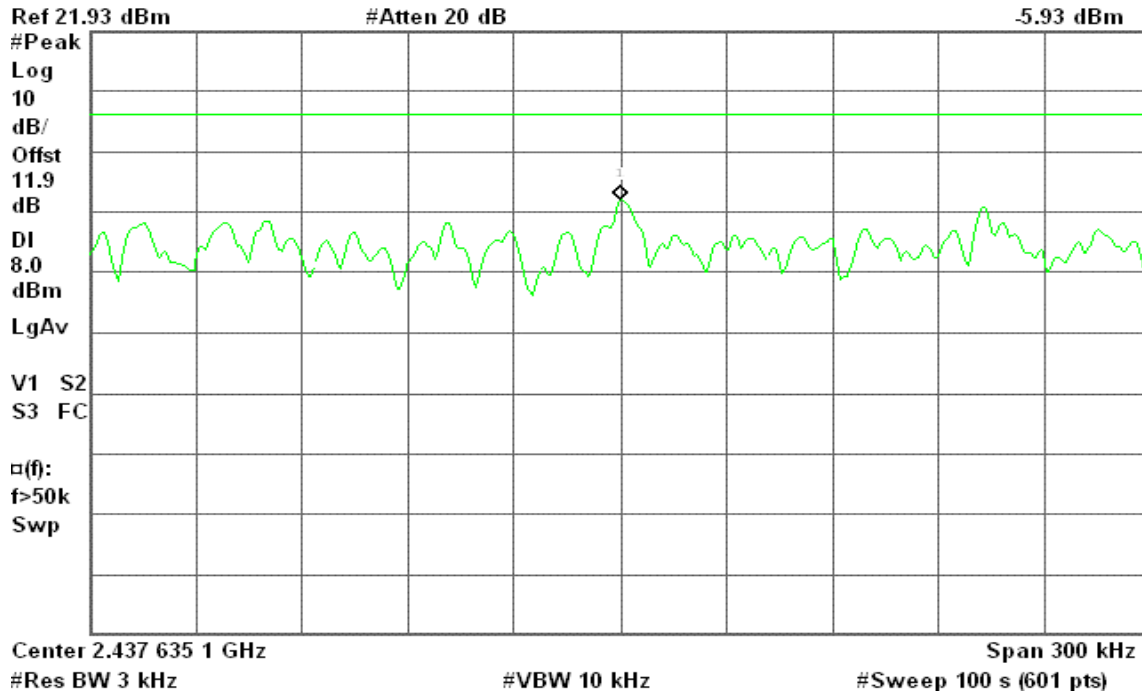
#Sweep 100 s (601 pts)



PPSD (IEEE 802.11b / CH Mid)

Agilent 23:18:19 Sep 20, 2005

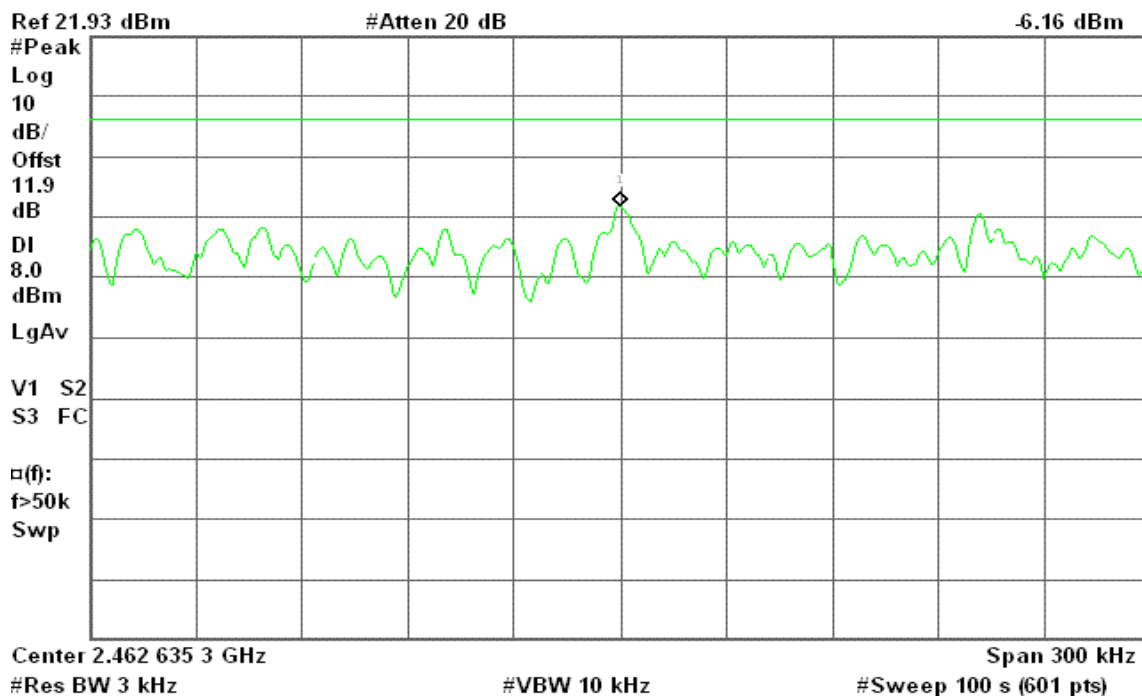
T
Mkr1 2.437 635 1 GHz
-5.93 dBm



PPSD (IEEE 802.11b / CH High)

Agilent 23:11:25 Sep 20, 2005

T
Mkr1 2.462 634 8 GHz
-6.16 dBm





PPSD (IEEE 802.11g / CH Low)

Agilent 20:29:21 Sep 29, 2005

R T

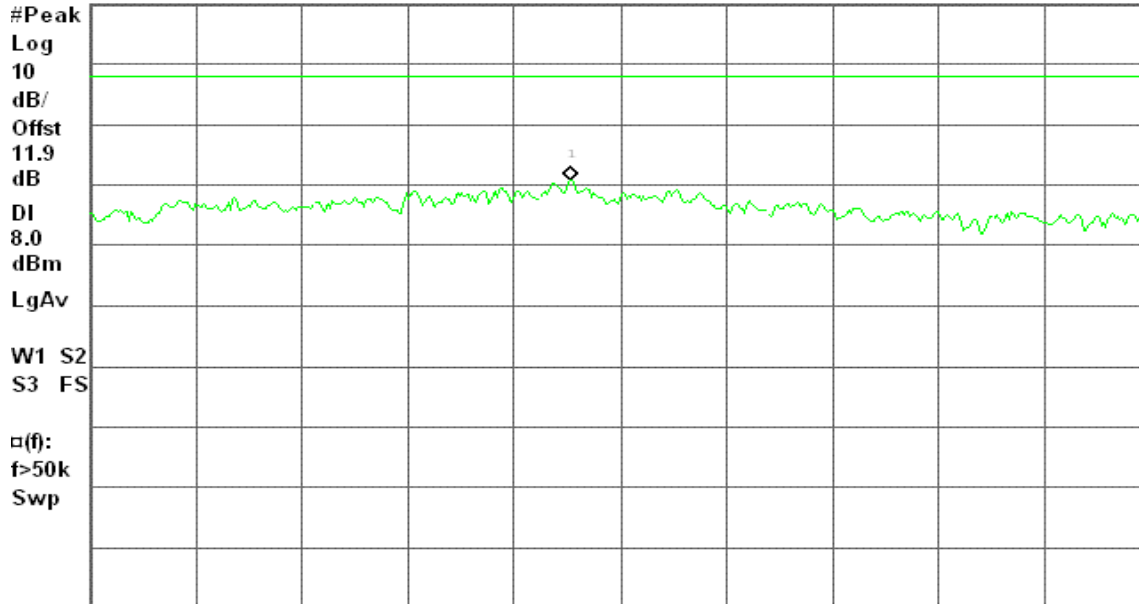
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.407 935 9 GHz

Ref 20 dBm

Atten 20 dB

-9.16 dBm



Center 2.407 950 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

PPSD (IEEE 802.11g / CH Mid)

Agilent 20:32:22 Sep 29, 2005

R L

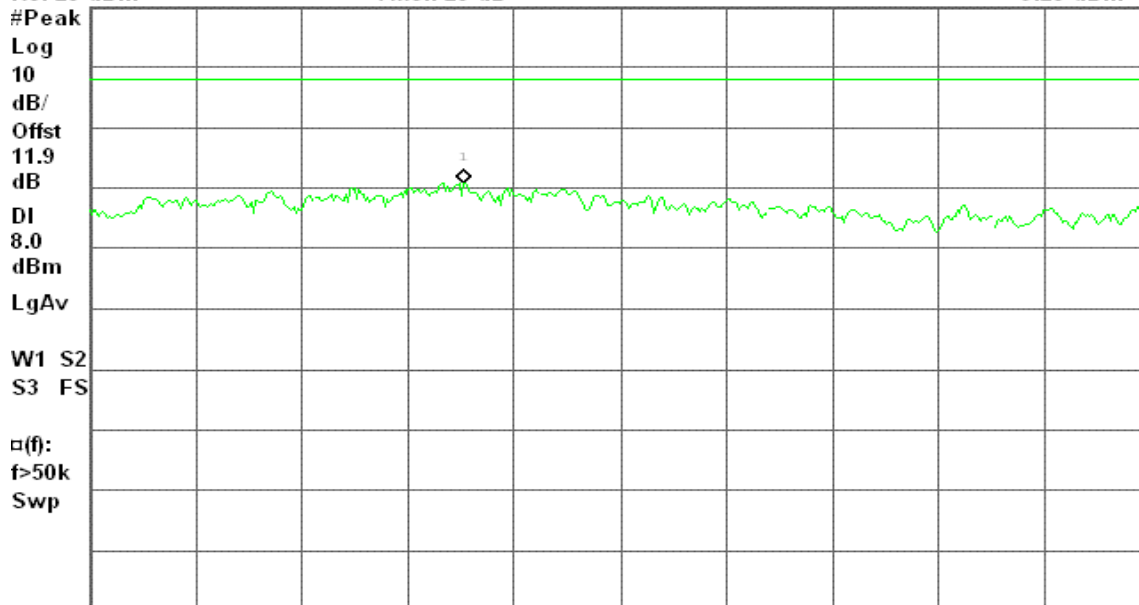
Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.440 105 9 GHz

Ref 20 dBm

Atten 20 dB

-9.20 dBm



Center 2.440 150 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



PPSD (IEEE 802.11g / CH High)

Agilent 20:35:23 Sep 29, 2005

R L

Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.463 523 4 GHz

Ref 20 dBm

Atten 20 dB

-8.54 dBm

#Peak

Log

10

dB/

Offst

11.9

dB

DI

8.0

dBm

LgAv

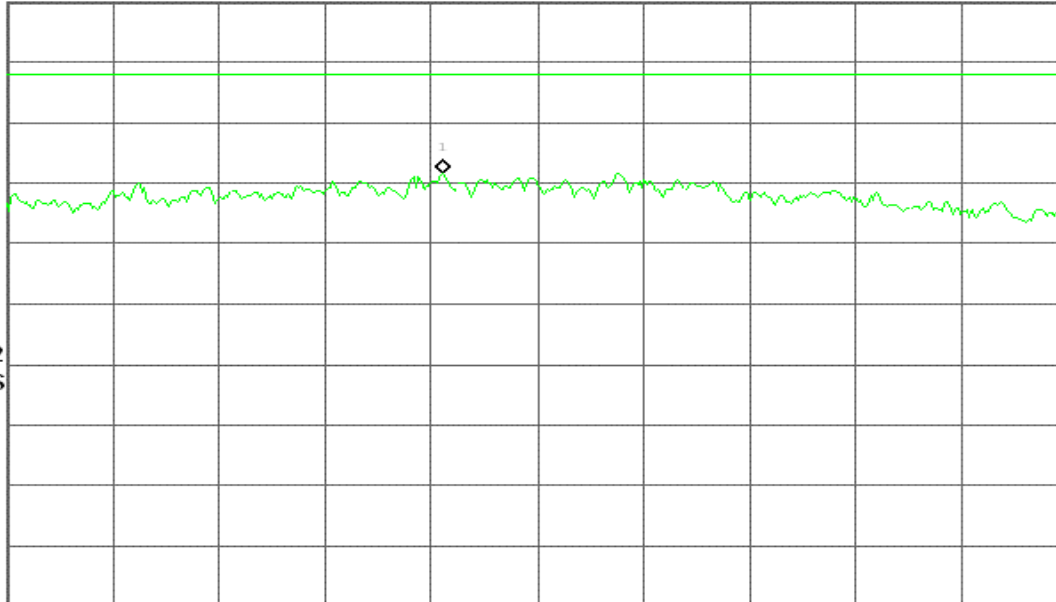
W1 S2

S3 FS

α(f):

f>50k

Swp



Center 2.463 550 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



7.6 RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i), 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 levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter

EUT Specification

EUT	Tablet PC built in 5GHz Wireless LAN module
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☒ WLAN: 5.745GHz ~ 5.825GHz
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation)
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	IEEE 802.11a: 15.61 dBm (36.39mW)
Antenna gain (Max)	2.35 dBi (Numeric gain: 1.72)
Evaluation applied	☐ MPE Evaluation ☒ SAR Evaluation* ☐ N/A

Remark:

- The maximum output power is 15.61dBm (36.39mW) at 5785MHz (with 1.72 numeric antenna gain.)*
- DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.*
- For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.*

TEST RESULTS

No non-compliance noted.

Remark: *Please refer to the separated SAR report.*

MPE EVALUATION

Not applicable.

**EUT Specification**

EUT	Tablet PC built in 5GHz Wireless LAN module
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	IEEE 802.11b: 16.45 dBm (44.15mW) IEEE 802.11g: 16.04 dBm (40.18mW)
Antenna gain (Max)	1.94 dBi (Numeric gain: 1.56)
Evaluation applied	☐ MPE Evaluation ☒ SAR Evaluation* ☐ N/A

Remark:

1. The maximum output power is 16.45dBm (44.15mW) at 2412MHz (with 1.56 numeric antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.

TEST RESULTS

No non-compliance noted.

Remark: Please refer to the separated SAR report.

MPE EVALUATION

Not applicable.



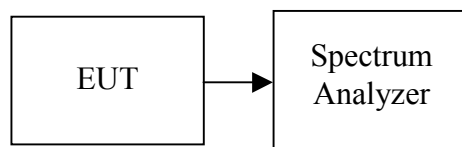
7.7 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. 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 Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

Measurements are made over the 30MHz to 25GHz range for IEEE802.11b/g, 30MHz to 40GHz range for IEEE802.11a with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted.

**Test Plot****IEEE 802.11a / CH Low****30MHz ~ 40GHz**

Agilent 19:40:21 Sep 27, 2005

R T

Spurious, a Mode Low Ch.

Mkr1 5.75 GHz

Ref 20 dBm

Atten 20 dB

1.24 dBm

#Peak

Log

10

dB/

Offst

11.9

dB

DI

-18.8

dBm

LgAv

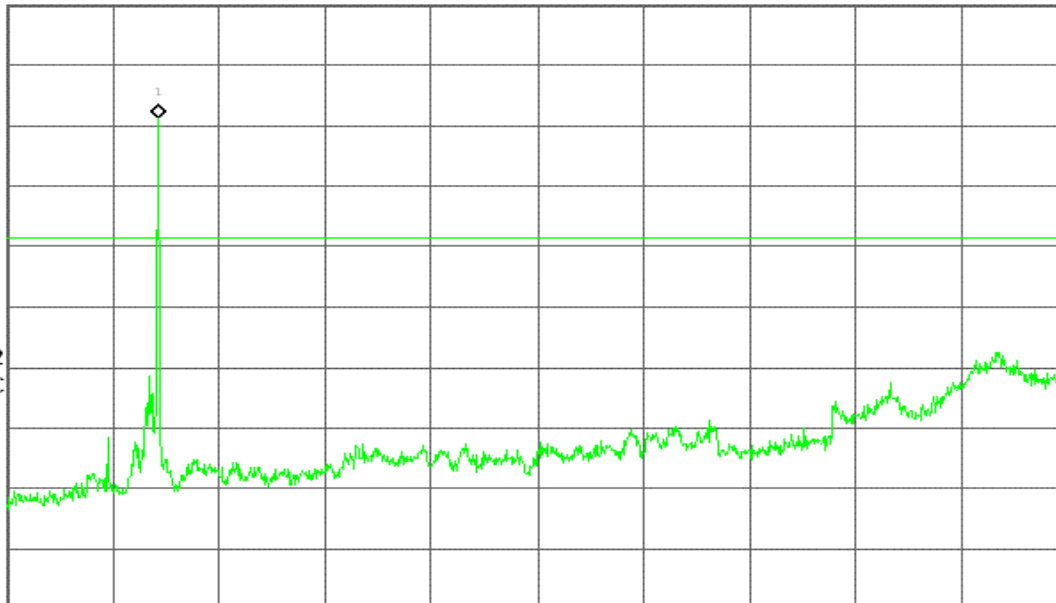
V1 S2

S3 FC

□(f):

FTun

Swp



Center 20.02 GHz

Span 39.97 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 3.82 s (1001 pts)

IEEE 802.11a / CH Mid**30MHz ~ 40GHz**

Agilent 19:44:00 Sep 27, 2005

L

Spurious, a Mode Mid Ch.

Mkr1 5.79 GHz

Ref 20 dBm

Atten 20 dB

-1.98 dBm

#Peak

Log

10

dB/

Offst

11.9

dB

DI

-22.0

dBm

LgAv

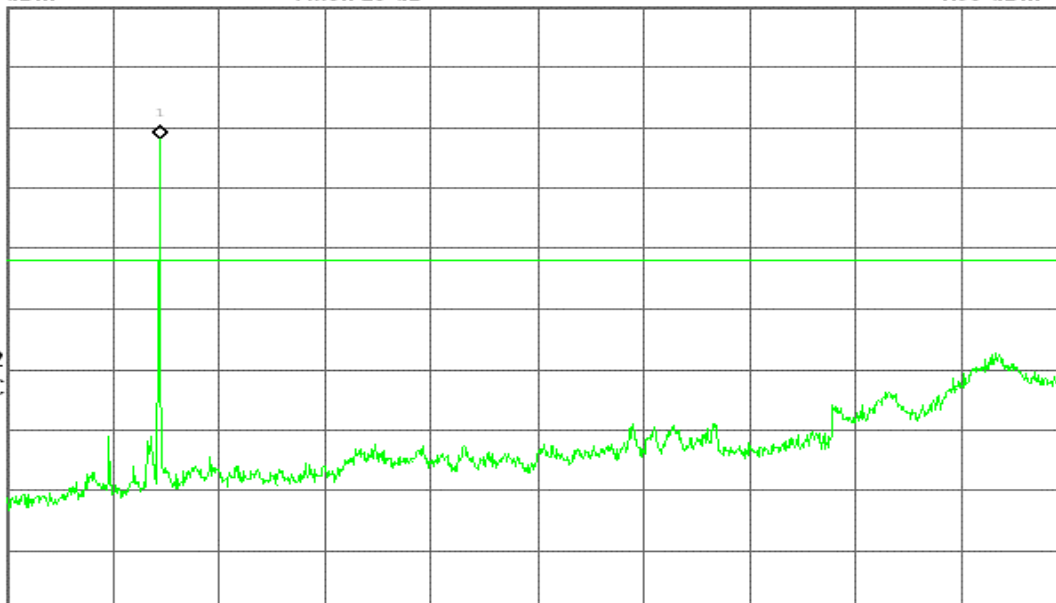
V1 S2

S3 FC

□(f):

FTun

Swp



Center 20.02 GHz

Span 39.97 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 3.82 s (1001 pts)



IEEE 802.11a / CH High

30MHz ~ 40GHz

Agilent 19:46:15 Sep 27, 2005

L

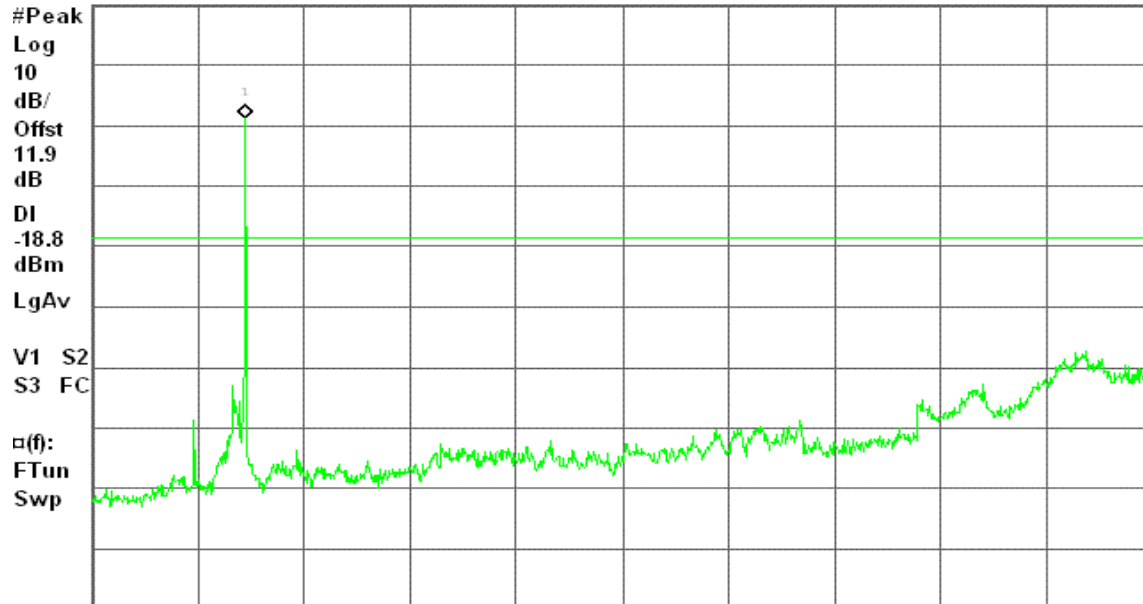
Spurious, a Mode High Ch.

Mkr1 5.83 GHz

Ref 20 dBm

Atten 20 dB

1.24 dBm



Center 20.02 GHz

Span 39.97 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 3.82 s (1001 pts)

IEEE 802.11b / CH Low

30MHz ~ 25GHz

Agilent 23:25:56 Sep 20, 2005

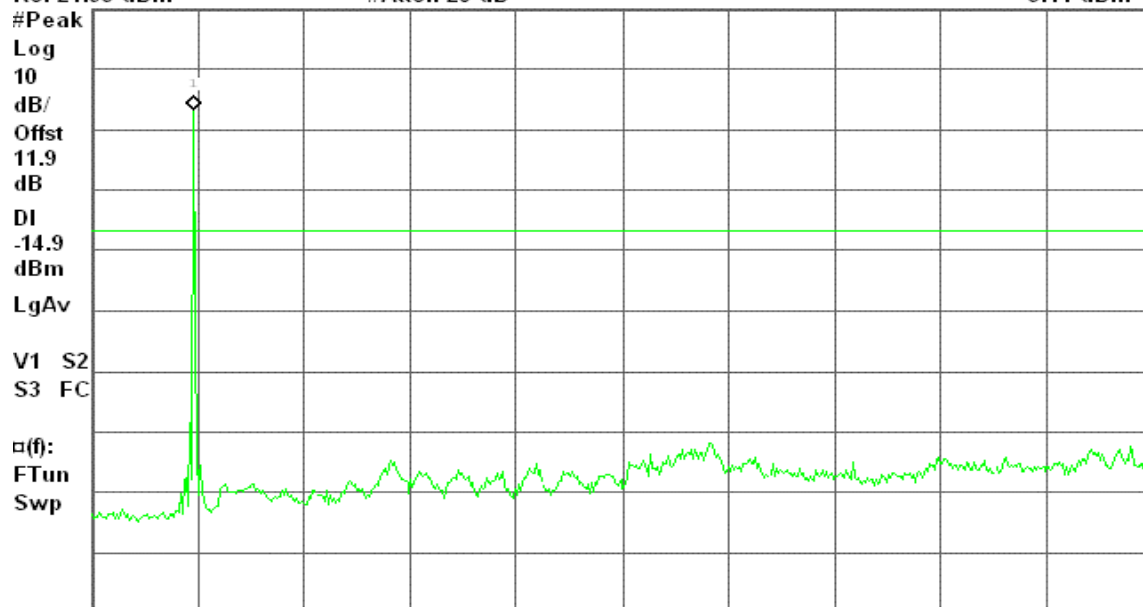
T

Mkr1 2.40 GHz

Ref 21.93 dBm

#Atten 20 dB

5.14 dBm



Start 30 MHz

Stop 25.00 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 3.011 s (601 pts)

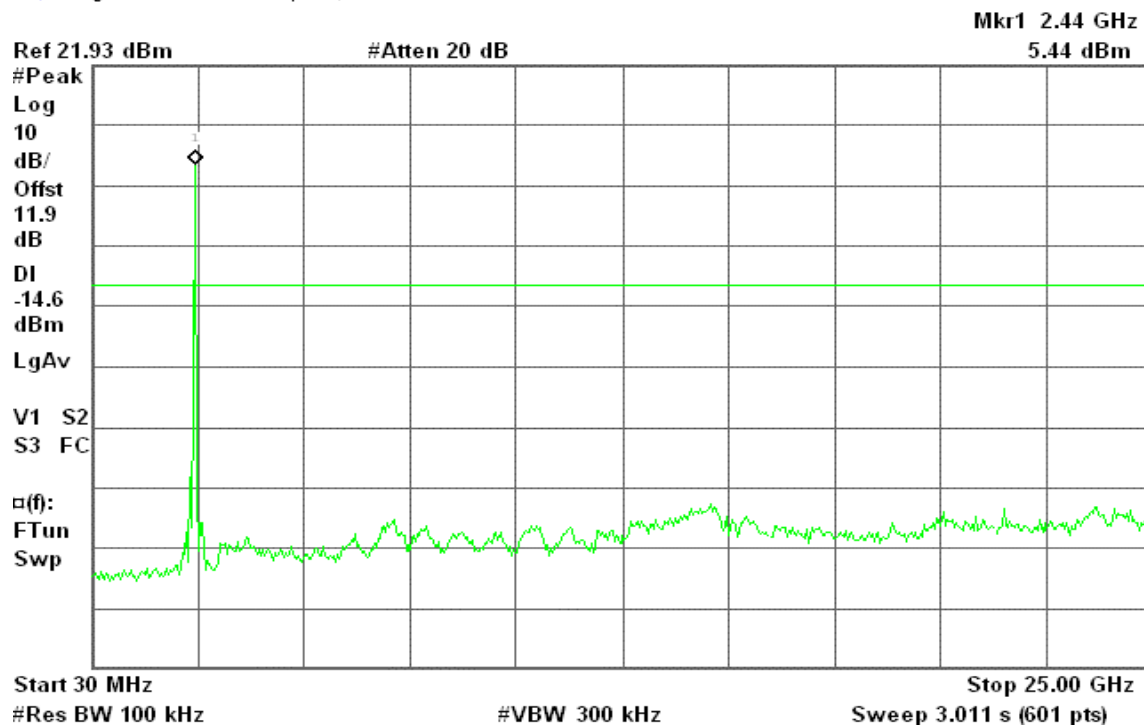


IEEE 802.11b / CH Mid

30MHz ~ 25GHz

Agilent 23:29:51 Sep 20, 2005

T

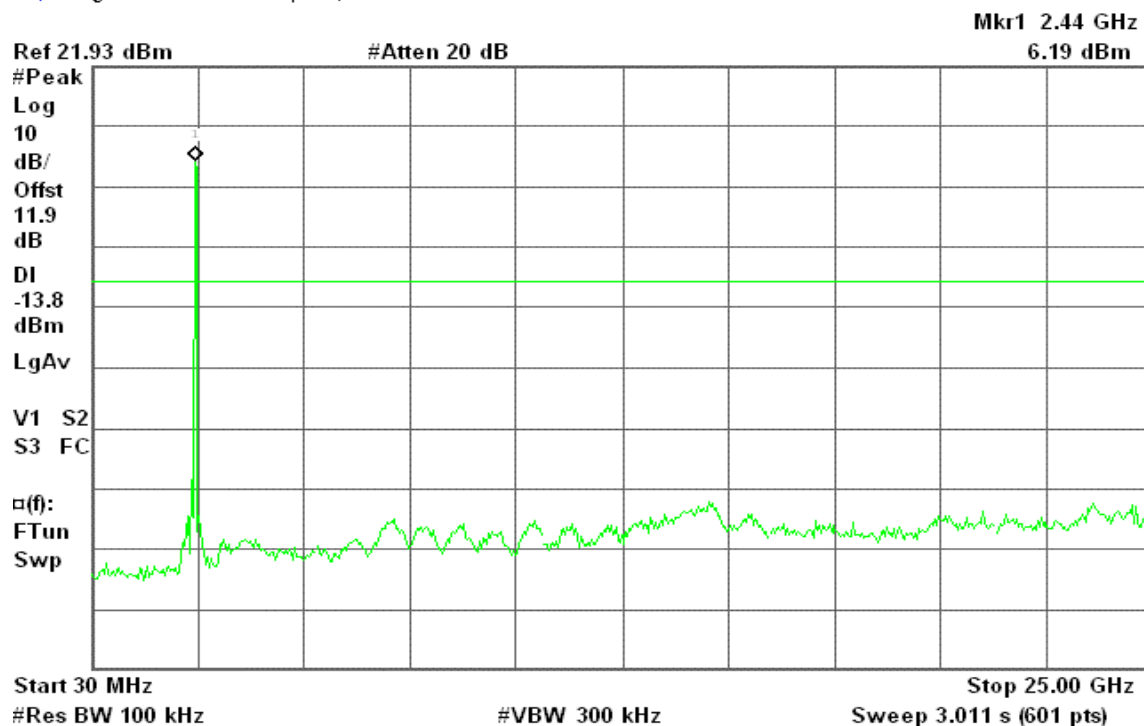


IEEE 802.11b / CH High

30MHz ~ 25GHz

Agilent 23:32:37 Sep 20, 2005

T



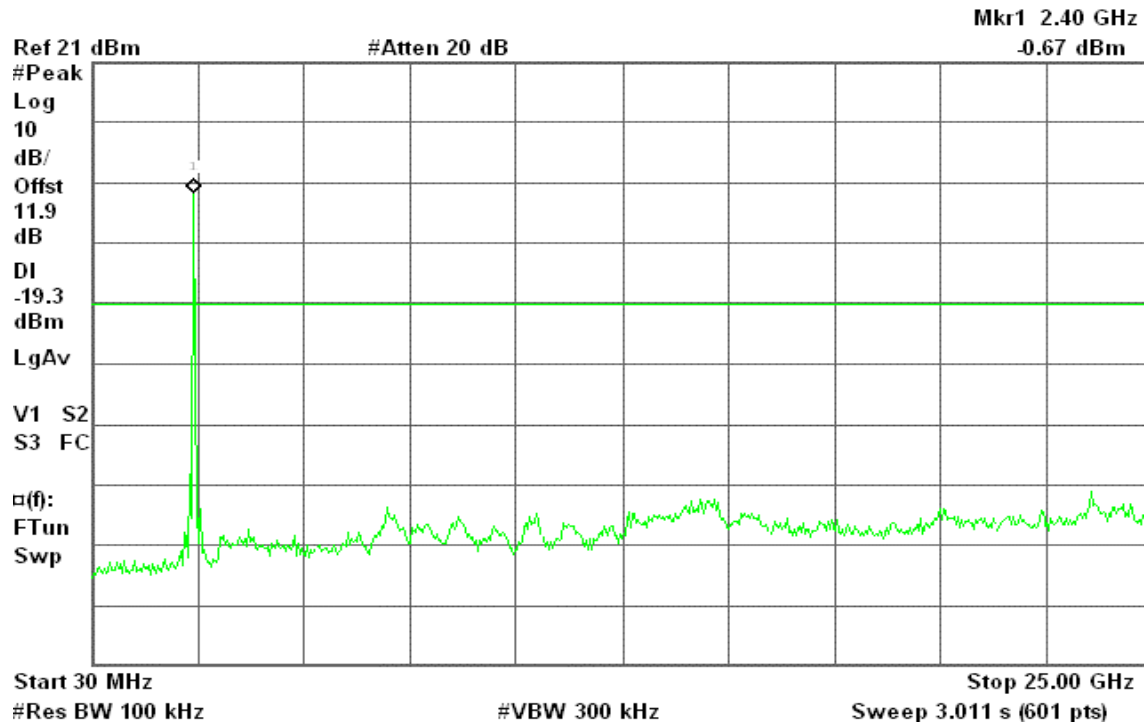


IEEE 802.11g / CH Low

30MHz ~ 25GHz

Agilent 00:38:06 Sep 21, 2005

T

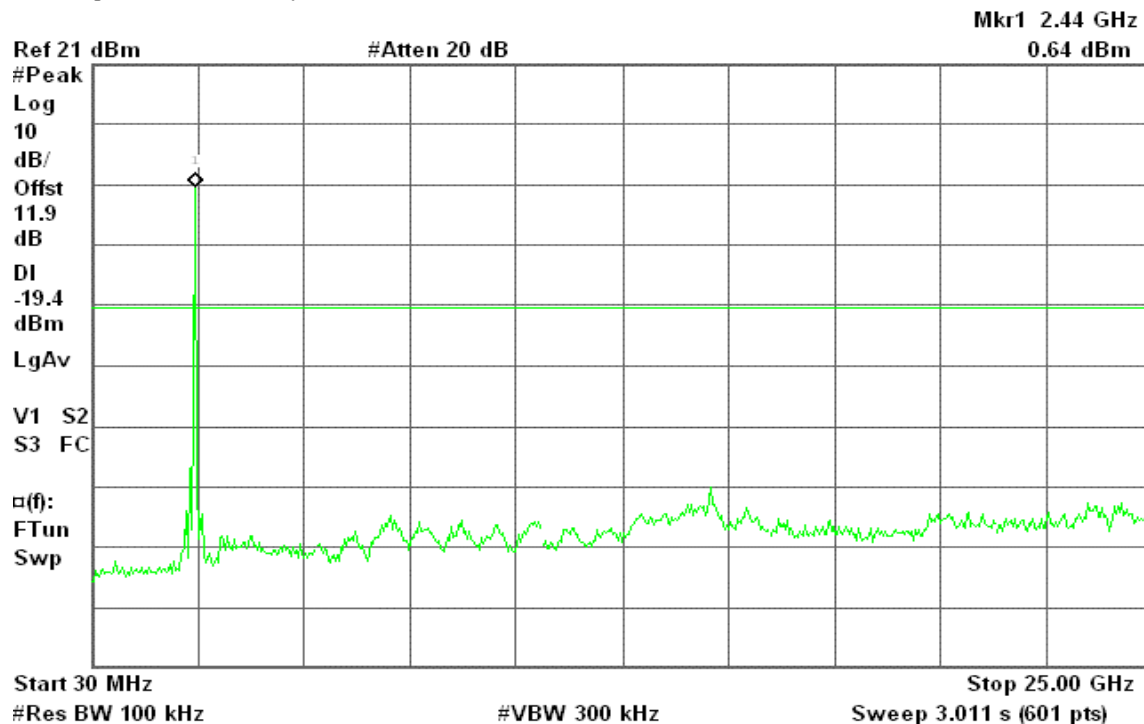


IEEE 802.11g / CH Mid

30MHz ~ 25GHz

Agilent 00:39:03 Sep 21, 2005

T



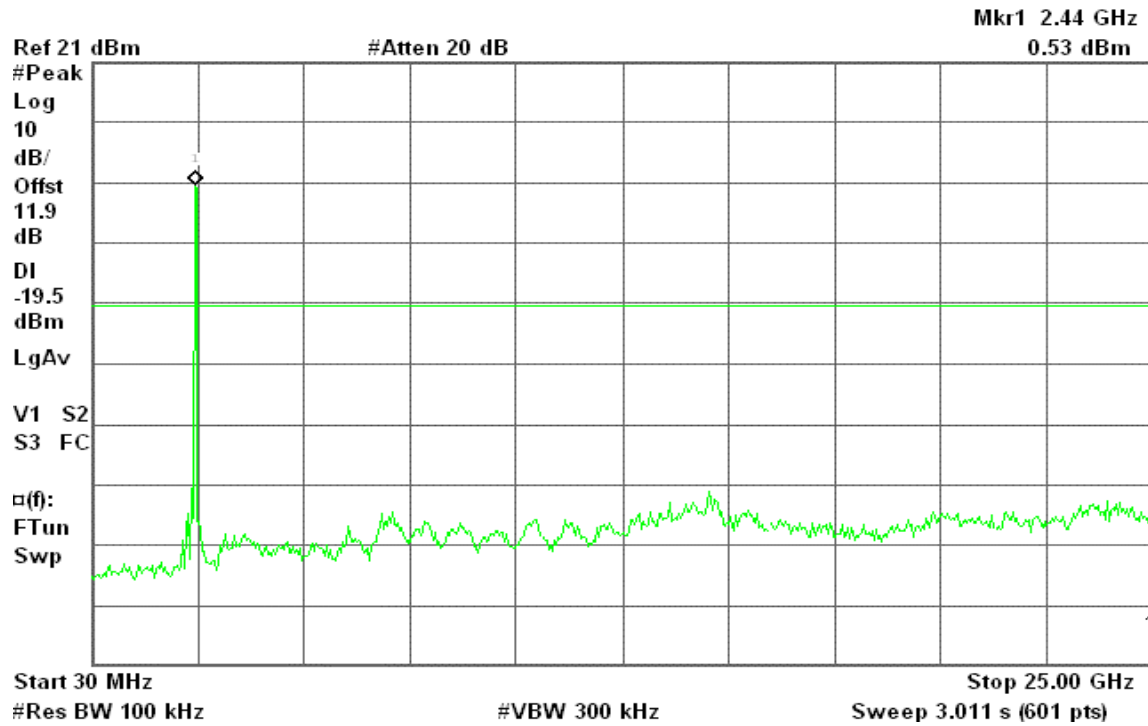


IEEE 802.11g / CH High

30MHz ~ 25GHz

Agilent 00:40:11 Sep 21, 2005

T



7.6.2 Radiated Emissions

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

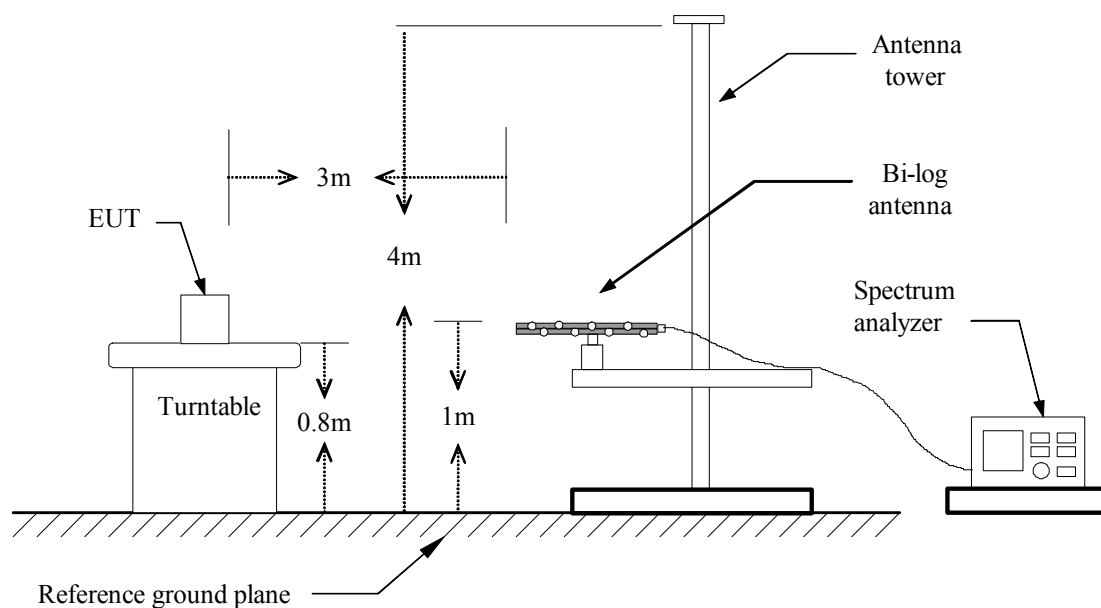
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the emission table above, the tighter limit applies at the band edges.

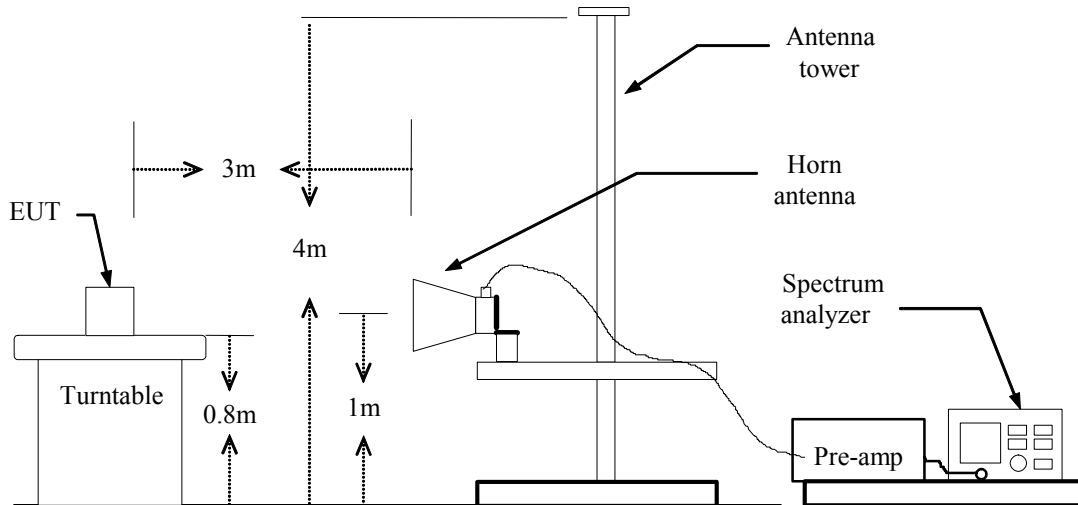
Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

Below 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

**TEST RESULTS****WLAN OPERATION****Below 1 GHz****Operation Mode:** Normal Link**Test Date:** September 6, 2005**Temperature:** 25°C**Tested by:** Ryan Chen**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. (H/V)	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
47.69	V	Peak	15.20	12.90	28.10	40.00	-11.90
250.05	V	Peak	18.80	14.90	33.70	46.00	-12.30
280.50	V	Peak	17.60	14.70	32.30	46.00	-13.70
330.00	V	Peak	14.20	16.10	30.30	46.00	-15.70
500.10	V	Peak	13.50	21.20	34.70	46.00	-11.30
560.00	V	Peak	12.50	22.20	34.70	46.00	-11.30
48.00	H	Peak	19.20	12.90	32.10	40.00	-7.90
200.10	H	Peak	17.70	11.70	29.40	43.50	-14.10
250.05	H	Peak	17.60	14.90	32.50	46.00	-13.50
283.35	H	Peak	18.50	14.90	33.40	46.00	-12.60
336.10	H	Peak	16.80	16.10	32.90	46.00	-13.10
565.00	H	Peak	15.30	22.30	37.60	46.00	-8.40

Remark:

- 1. Measuring frequencies from 30 MHz to the 1GHz.*
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
- 3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
- 4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
- 5. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

**Above 1 GHz****Operation Mode:** TX / IEEE 802.11a / CH Low**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
5291.00	V	50.97	1.96	49.01	54.00	-4.99	Peak
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / IEEE 802.11a / CH Mid**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
1854.00	V	50.03	-6.28	43.75	54.00	-10.25	Peak
5305.00	V	53.63	1.99	55.62	54.00	1.62	Peak
5305.00	V	48.88	1.99	50.87	54.00	-3.13	Average
N/A							
1595.00	H	47.24	-6.76	40.48	54.00	-13.52	Peak
5305.00	H	59.33	1.99	61.32	54.00	7.32	Peak
5305.00	H	50.55	1.99	52.54	54.00	-1.46	Average
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: $\text{margin} > 20\text{dB}$ from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / IEEE 802.11a / CH High**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
5347.00	V	53.99	2.08	56.07	54.00	2.07	Peak
5347.00	V	49.84	2.08	51.92	54.00	-2.08	Average
N/A							
5347.00	H	55.75	2.08	57.83	54.00	3.83	Peak
5347.00	H	50.12	2.08	52.20	54.00	-1.80	Average
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: $\text{margin} > 20\text{dB}$ from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
1562.00	V	56.10	-6.82	49.28	54.00	-4.72	Peak
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
Peak limit (74dBuV/m) = Average Limit (54dBuV/m)+20dB
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. Margin (dB) = Result (Remark) – Limit (Average) (dBuV/m)

**Operation Mode:** TX / IEEE 802.11b / CH Mid**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / IEEE 802.11b / CH High**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
1600.00	V	59.81	-6.75	53.06	54.00	-0.94	Peak
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / IEEE 802.11g / CH Low**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
1598.00	V	62.79	-6.75	56.04	54.00	2.04	Peak
1598.00	V	47.31	-6.75	40.56	54.00	-13.44	Average
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: $\text{margin} > 20\text{dB}$ from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** September 22, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
1598.00	V	60.53	-6.75	53.78	54.00	-0.22	Peak
2360.00	V	62.53	-5.10	57.43	54.00	3.43	Peak
2360.00	V	51.71	-5.10	46.61	54.00	-7.39	Average
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.

$$\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

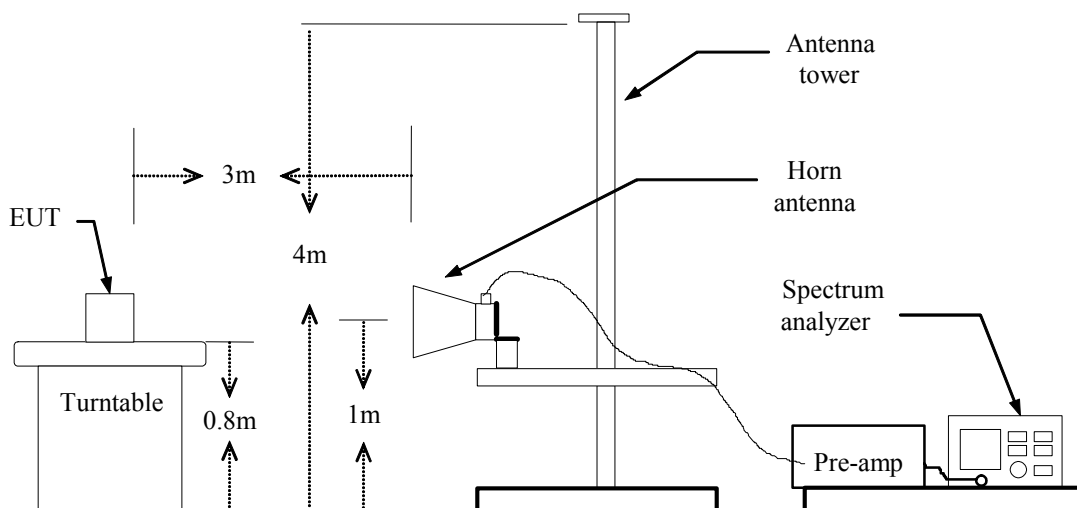
CONDITION B: BLUETOOTH OPERATION

7.8 BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. 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 Section 15.205(c)).

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (c) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (d) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

Refer to attach spectrum analyzer data chart.



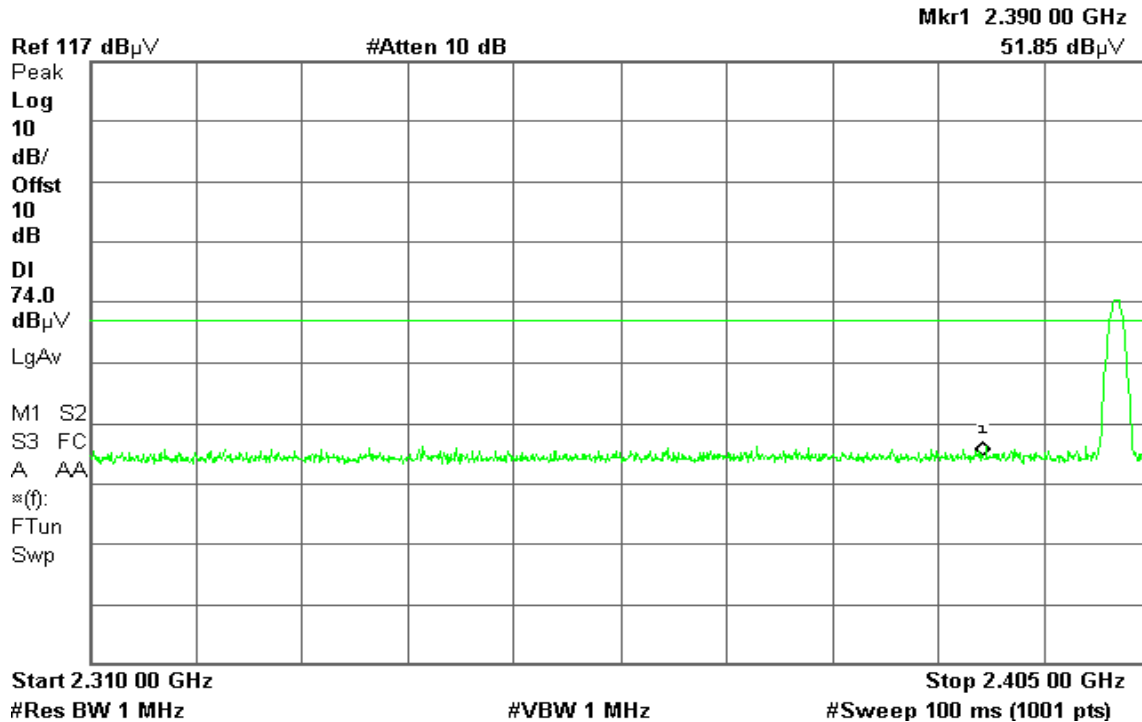
Band Edges (Bluetooth mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 11:24:19 Oct 4, 2005

T

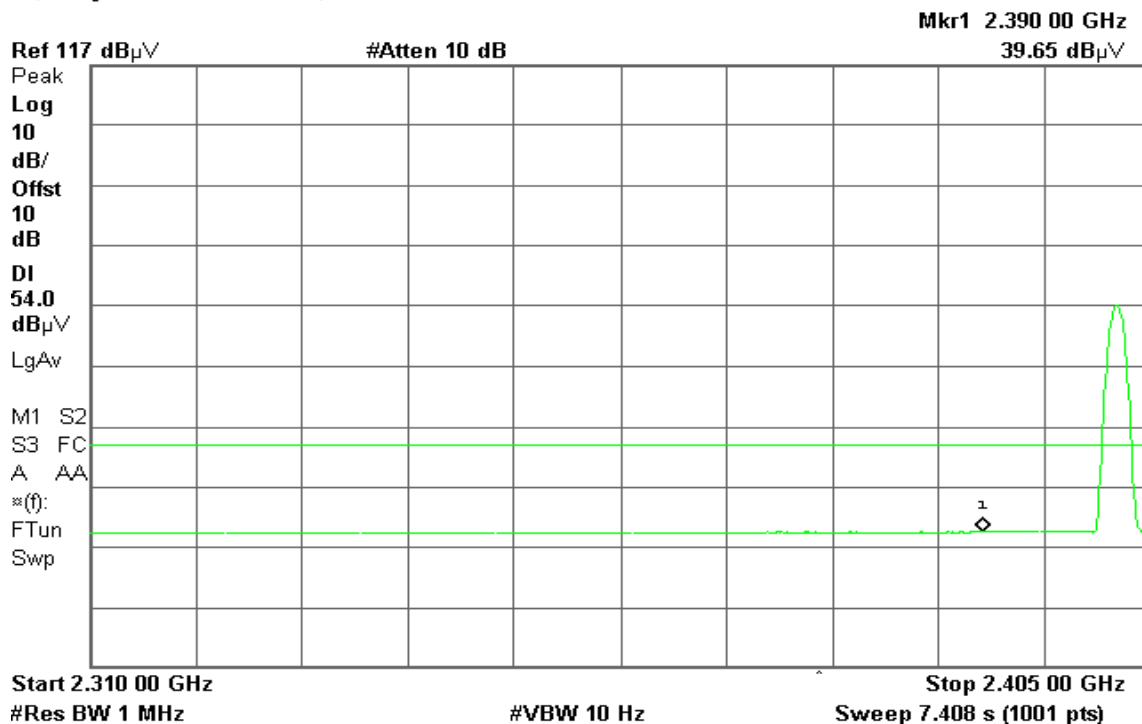


Detector mode: Average

Polarity: Vertical

Agilent 11:23:46 Oct 4, 2005

T





Detector mode: Peak

Polarity: Horizontal

Agilent 11:20:41 Oct 4, 2005

T

Ref 117 dB μ V

#Atten 10 dB

Mkr1 2.390 00 GHz

52.02 dB μ V

Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V

LgAv

M1 S2

S3 FC

A AA

*(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.405 00 GHz

#Sweep 100 ms (1001 pts)

Detector mode: Average

Polarity: Horizontal

Agilent 11:21:21 Oct 4, 2005

T

Ref 117 dB μ V

#Atten 10 dB

Mkr1 2.390 00 GHz

39.59 dB μ V

Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V

LgAv

M1 S2

S3 FC

A AA

*(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.405 00 GHz

Sweep 7.408 s (1001 pts)



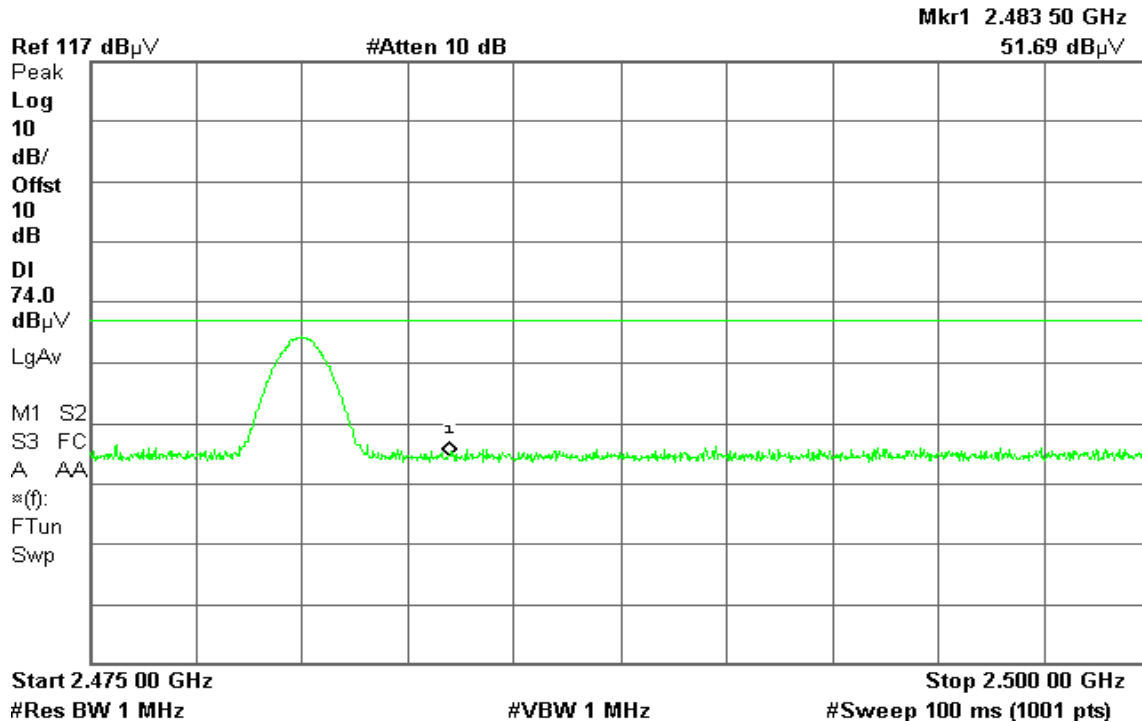
Band Edges (Bluetooth mode / CH High)

Detector mode: Peak

Polarity: Vertical

Agilent 11:32:06 Oct 4, 2005

T

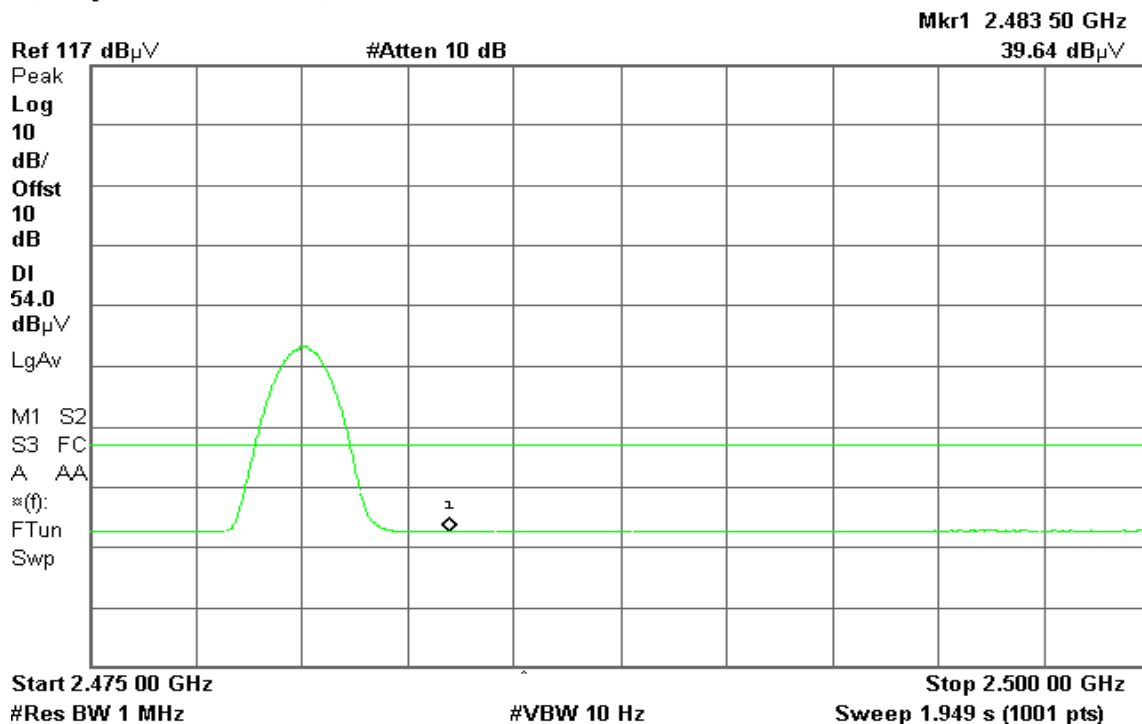


Detector mode: Average

Polarity: Vertical

Agilent 11:31:33 Oct 4, 2005

T





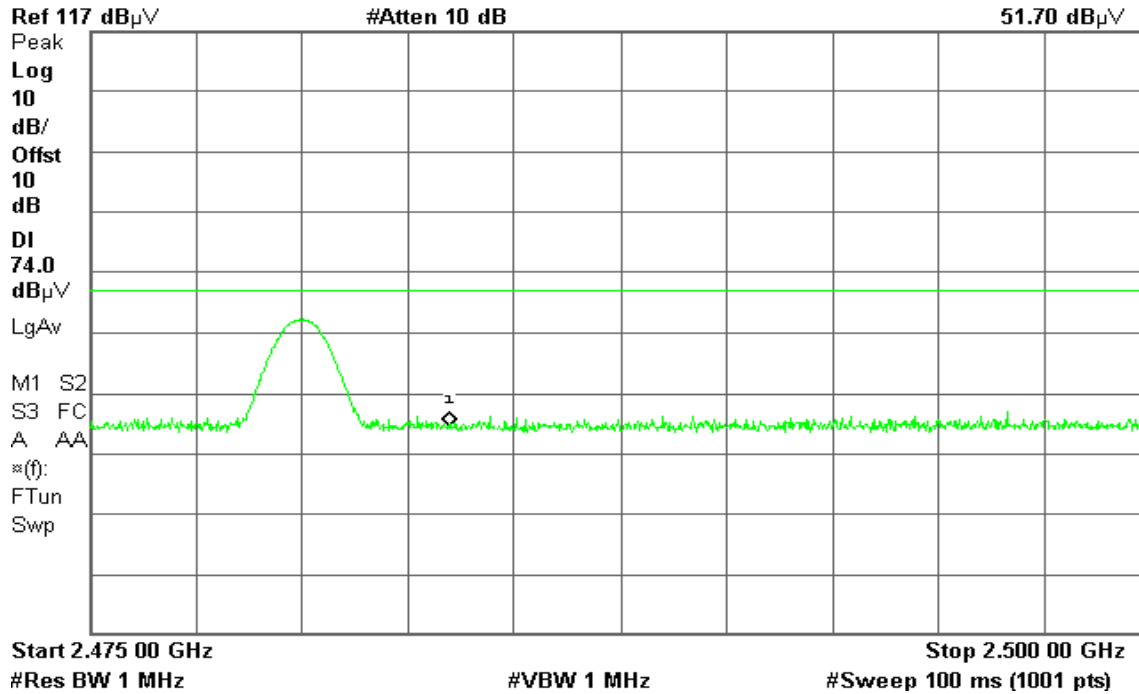
Detector mode: Peak

Polarity: Horizontal

Agilent 11:41:55 Oct 4, 2005

T

Mkr1 2.483 50 GHz
51.70 dB μ V



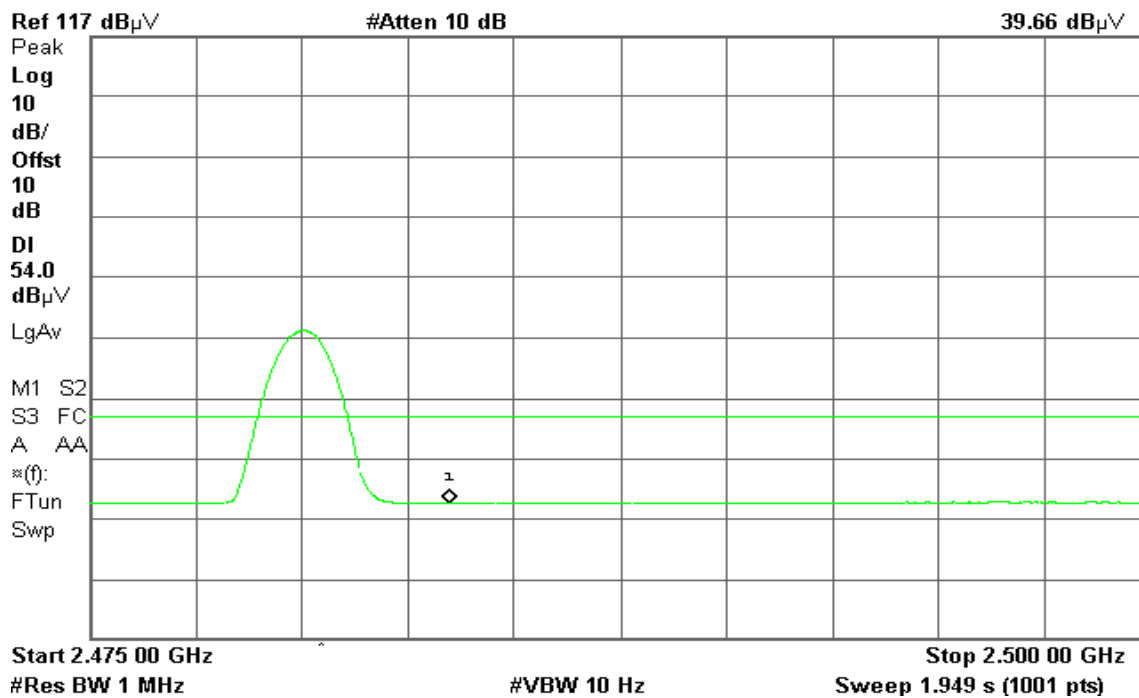
Detector mode: Average

Polarity: Horizontal

Agilent 11:40:51 Oct 4, 2005

T

Mkr1 2.483 50 GHz
39.66 dB μ V





7.9 RADIATED EMISSIONS

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

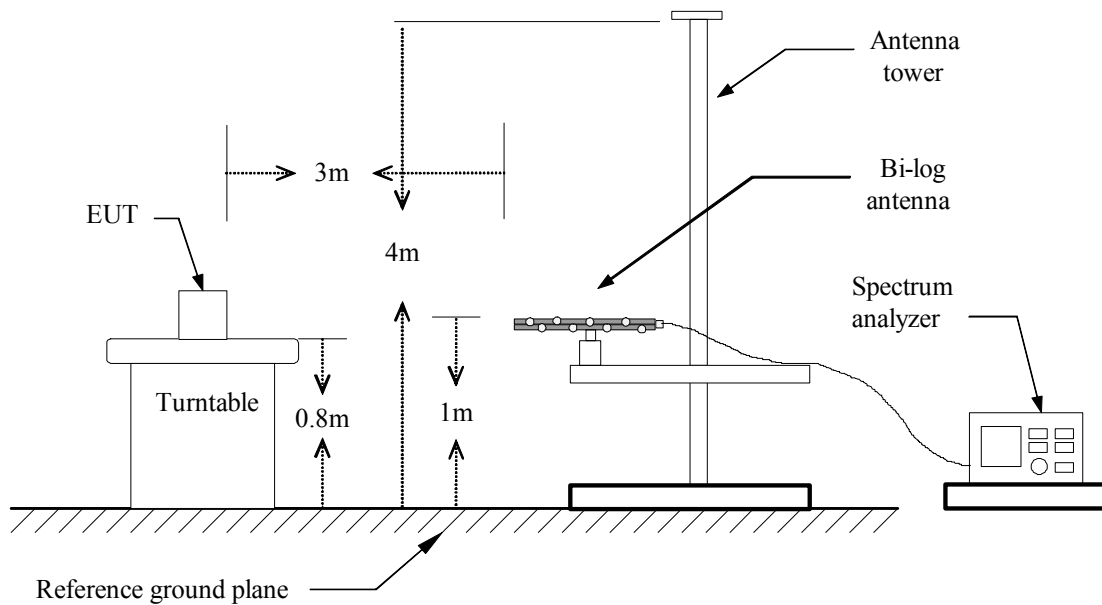
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the emission table above, the tighter limit applies at the band edges.

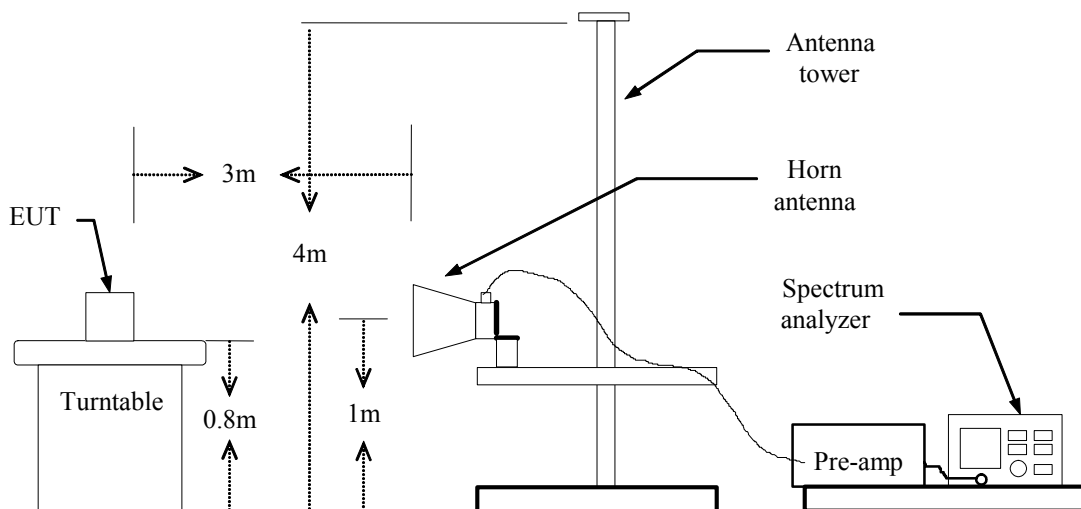
Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

Below 1 GHz



Above 1 GHz





TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(e) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(f) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**TEST RESULTS****BLUETOOTH OPERATION****Below 1 GHz****Operation Mode:** Normal Link**Test Date:** September 6, 2005**Temperature:** 25°C**Tested by:** Ryan Chen**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB/m)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
47.69	V	Peak	15.20	12.90	28.10	40.00	-11.90
250.05	V	Peak	18.80	14.90	33.70	46.00	-12.30
280.50	V	Peak	17.60	14.70	32.30	46.00	-13.70
330.00	V	Peak	14.20	16.10	30.30	46.00	-15.70
500.10	V	Peak	13.50	21.20	34.70	46.00	-11.30
560.00	V	Peak	12.50	22.20	34.70	46.00	-11.30
48.00	H	Peak	19.20	12.90	32.10	40.00	-7.90
200.10	H	Peak	17.70	11.70	29.40	43.50	-14.10
250.05	H	Peak	17.60	14.90	32.50	46.00	-13.50
283.35	H	Peak	18.50	14.90	33.40	46.00	-12.60
336.10	H	Peak	16.80	16.10	32.90	46.00	-13.10
565.00	H	Peak	15.30	22.30	37.60	46.00	-8.40

Remark:

- 1. Measuring frequencies from 30 MHz to the 1GHz.*
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
- 3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
- 4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
- 5. The IF bandwidth of SPA between 30MHz and 1GHz was 100kHz.*

**Above 1GHz****Operation Mode:** TX / Bluetooth / CH Low**Test Date:** October 4, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
1562.00	V	53.25	-6.82	46.43	54.00	-7.57	Peak
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / Bluetooth / CH Mid**Test Date:** October 4, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**Operation Mode:** TX / Bluetooth / CH High**Test Date:** October 4, 2005**Temperature:** 25°C**Tested by:** Eric Cheng**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. H/V	Reading (dBuV)	Corr. (dB/m)	Result (Peak/ Average) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark (Peak/ Average)
1600.00	V	55.27	-6.75	48.52	54.00	-5.48	Peak
N/A							
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit, but not more than 20dB.
 $\text{Peak limit (74dBuV/m)} = \text{Average Limit (54dBuV/m)} + 20\text{dB}$
3. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: $\text{margin} > 20\text{dB}$ from the applicable limit) and considered that's already beyond the background noise floor.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak/Average detector mode of the emission shown in Remark column.
5. $\text{Margin (dB)} = \text{Result (Remark)} - \text{Limit (Average) (dBuV/m)}$

**CONDITION C: WLAN + BLUETOOTH OPERATION****7.10 POWER LINE CONDUCTED EMISSIONS****LIMIT**

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (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 the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.



TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Operation Mode: Normal Link **Test Date:** September 22, 2005
Temperature: 25°C **Tested by:** Steven Yang
Humidity: 55% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.275	37.900	35.710	0.100	38.000	35.810	60.966	50.966	-22.966	-15.156	L1
0.488	35.270	35.230	0.100	35.370	35.330	56.202	46.202	-20.832	-10.872	L1
1.040	33.920	33.890	0.100	34.020	33.990	56.000	46.000	-21.980	-12.010	L1
1.524	36.090	35.650	0.100	36.190	35.750	56.000	46.000	-19.810	-10.250	L1
4.095	32.150	28.370	0.109	32.259	28.479	56.000	46.000	-23.741	-17.521	L1
12.296	26.680	24.720	0.746	27.426	25.466	60.000	50.000	-32.574	-24.534	L1
0.208	45.960	40.940	0.100	46.060	41.040	63.285	53.285	-17.225	-12.245	L2
0.346	38.930	39.070	0.100	39.030	39.170	59.058	49.058	-20.028	-9.888	L2
0.693	30.020	29.010	0.100	30.120	29.110	56.000	46.000	-25.880	-16.890	L2
1.249	33.180	32.710	0.100	33.280	32.810	56.000	46.000	-22.720	-13.190	L2
1.802	33.700	32.500	0.100	33.800	32.600	56.000	46.000	-22.200	-13.400	L2
4.030	29.400	24.550	0.103	29.503	24.653	56.000	46.000	-26.497	-21.347	L2

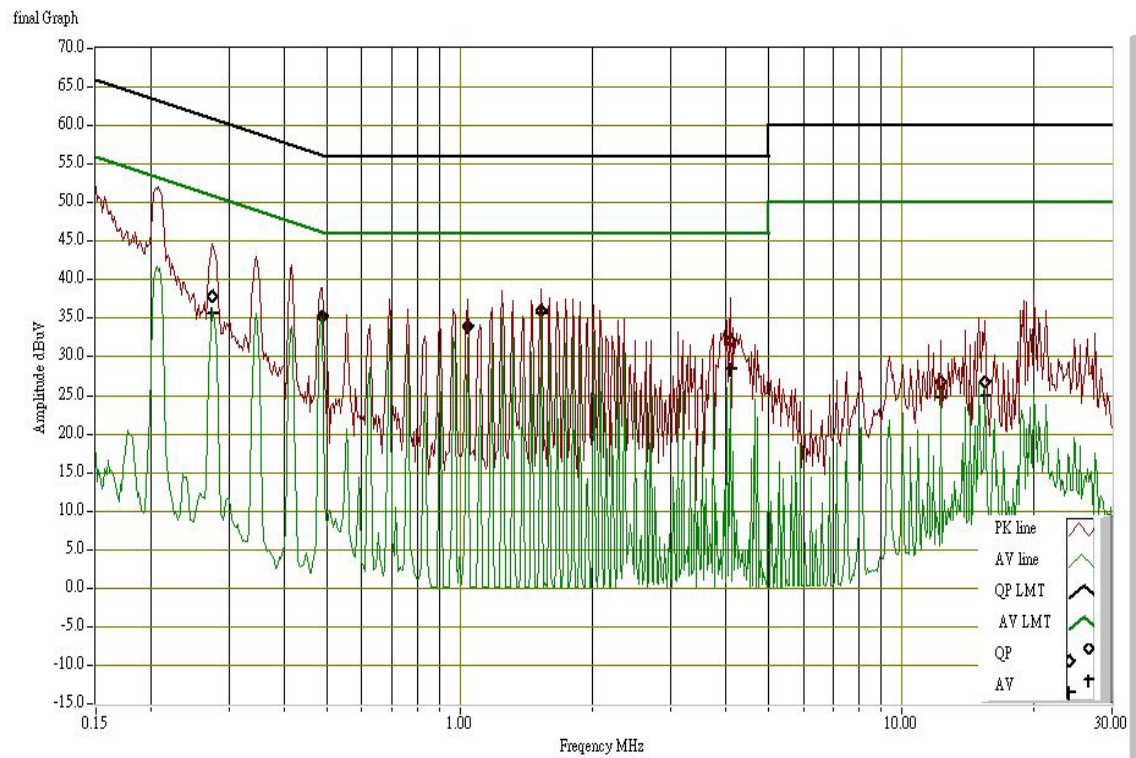
Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



Test Data Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

