

EMC TEST REPORT

Report No. : EME-051087
Model No. : WPG2500, WPG2501
Issued Date : Oct. 24, 2005

Applicant : AboCom Systems, Inc.
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Taiwan

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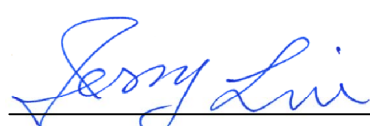
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Project Engineer



Kevin Chen

Reviewed By



Jerry Liu

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Summary of Tests**Wireless 802.11g PCI Card-Model: WPG2500, WPG2501
FCC ID: MQ4WPG2500**

Test	Reference	Results
Minimum 6dB Bandwidth test	15.247(a)(2)	Complies
Maximum Output Power test	15.247(b)	Complies
Radiated Spurious Emission test	15.205, 15.209	Complies
Power Spectrum Density test	15.247(e)	Complies
Emission on the Band Edge test	15.247(d)	Complies
AC Power Line Conducted Emission test	15.207	Complies

1. General information**1.1 Identification of the EUT**

Applicant	: AboCom Systems, Inc.
Product	: Wireless 802.11g PCI Card
Model No.	: WPG2500
FCC ID.	: MQ4WPG2500
Frequency Range	: 2412MHz ~ 2462MHz
Channel Number	: 11 channels
Frequency of Each Channel	: 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Type of Modulation	: DSSS, OFDM
Rated Power	: 3.3V from PC
Power Cord	: N/A
Sample Received	: Sep. 28, 2005
Test Date(s)	: Sep. 28, 2005 ~ Oct. 28, 2005

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is a Wireless 802.11g PCI Card, and was defined as information technology equipment.

Intertek verified that WPG2501 is series model to WPG2500 (EUT), for these models are identical in hardware aspect, and the difference is in antenna connector type. Please refer to the following table:

Model No.	Antenna connector type
WPG2500	Reverse SMA
WPG2501	N/A (Antenna with coaxial cable is soldered in the PCB Antenna)

For more detail features, please refer to User's manual as file name "Installation guide.pdf"

1.3 Antenna description

For replaceable antenna (Mode No.: WPG2500):

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain : 2.5dBi max

Antenna Type : External antenna

Connector Type : Reverse SMA

For permanently connected antenna (Mode No.: WPG2501):

The EUT uses a permanently connected antenna.

Antenna Gain : 2.5dBi max

Antenna Type : PCB antenna

Connector Type : N/A (Antenna with coaxial cable is soldered in the PCB Antenna)

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
PC	HP	DTPC-16	SG20400787	FCC DoC Approved
Key Board	IBM	KB-9910	0008623	FCC DoC Approved
Monitor	Benq	FP557	99L63726A132600064TAA6A1	FCC DoC Approved
Mouse	LOGITECH	M-BE58	LZE14373751	FCC DoC Approved
Printer	HP	DeskJet 400	TH86I1K30S	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved
AP	SMC	SMC2655W	S25028NU05021	FCC DoC Approved

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.205 、 §15.207 、 §15.209 、 §15.247 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

Verifying two models (models: WPG2500 and WPG2501). The worst case was found in WPG2500).

Plug the EUT into desktop PC, than turn on the PC power, card run the test program” REALTEX TRL 8185 WLAN NIC Massproduction kit” under windows OS, which provide by manufacturer.

While in other test, it worked in the status of continuously transmitting.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC303	04/17/2006
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	08/07/2006
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/24/2006
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	10/17/2006
Horn Antenna	SCHWARZBECK	1GHz~18GHz	BBHA 9120 D	EC371	12/22/2007
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC351	07/08/2007
Bilog Antenna	SCHWARZBECK	25MHz~2GHz	VULB 9168	EC347	12/22/2007
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	12/30/2005
Pre-Amplifier	MITEQ	26GHz~40GHz	828825	EC374	01/28/2006
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/MA2491A	EC396	10/17/2006
Controller	HDGmbH	N/A	CM 100	EP346	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP347	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	01/13/2006

Note: 1. The above equipments are within the valid calibration period.

2. The test antennas (receiving antenna) are calibration per 3 years.

3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 25 °C
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

3.2 Test setup & procedure

The minimum 6dB bandwidth per FCC §15.247(a)(2) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel). The minimum 6-dB modulation bandwidth is in the following Table.

3.3 Measured data of Minimum 6dB Bandwidth test results

Test Mode: 802.11b(DSSS Modulation) operating mode

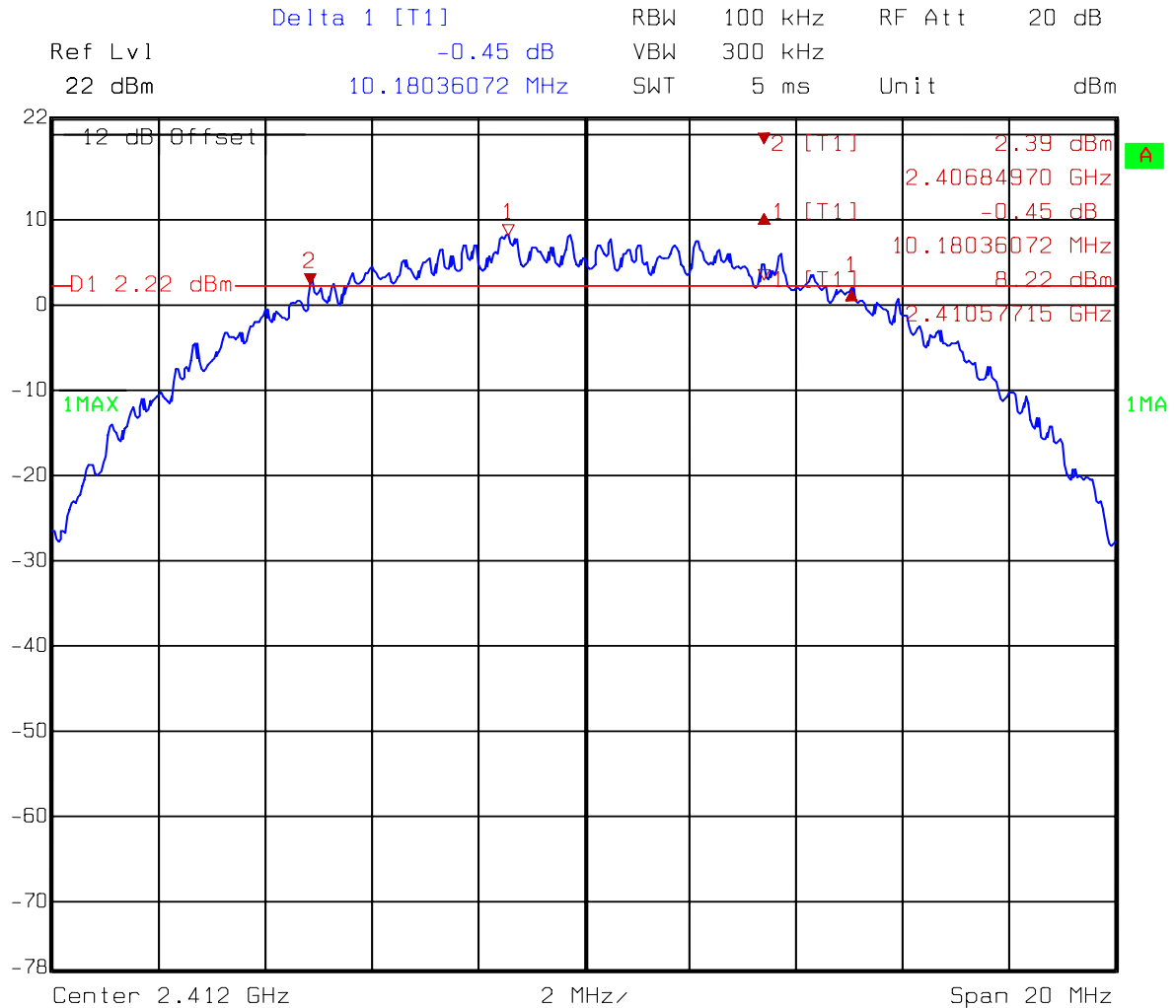
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412.00	10.180	> 500kHz
6 (middle)	2437.00	9.699	> 500kHz
11 (highest)	2462.00	9.699	> 500kHz

Test Mode: 802.11g(OFDM Modulation) operating mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412.00	16.272	> 500kHz
6 (middle)	2437.00	16.242	> 500kHz
11 (highest)	2462.00	16.112	> 500kHz

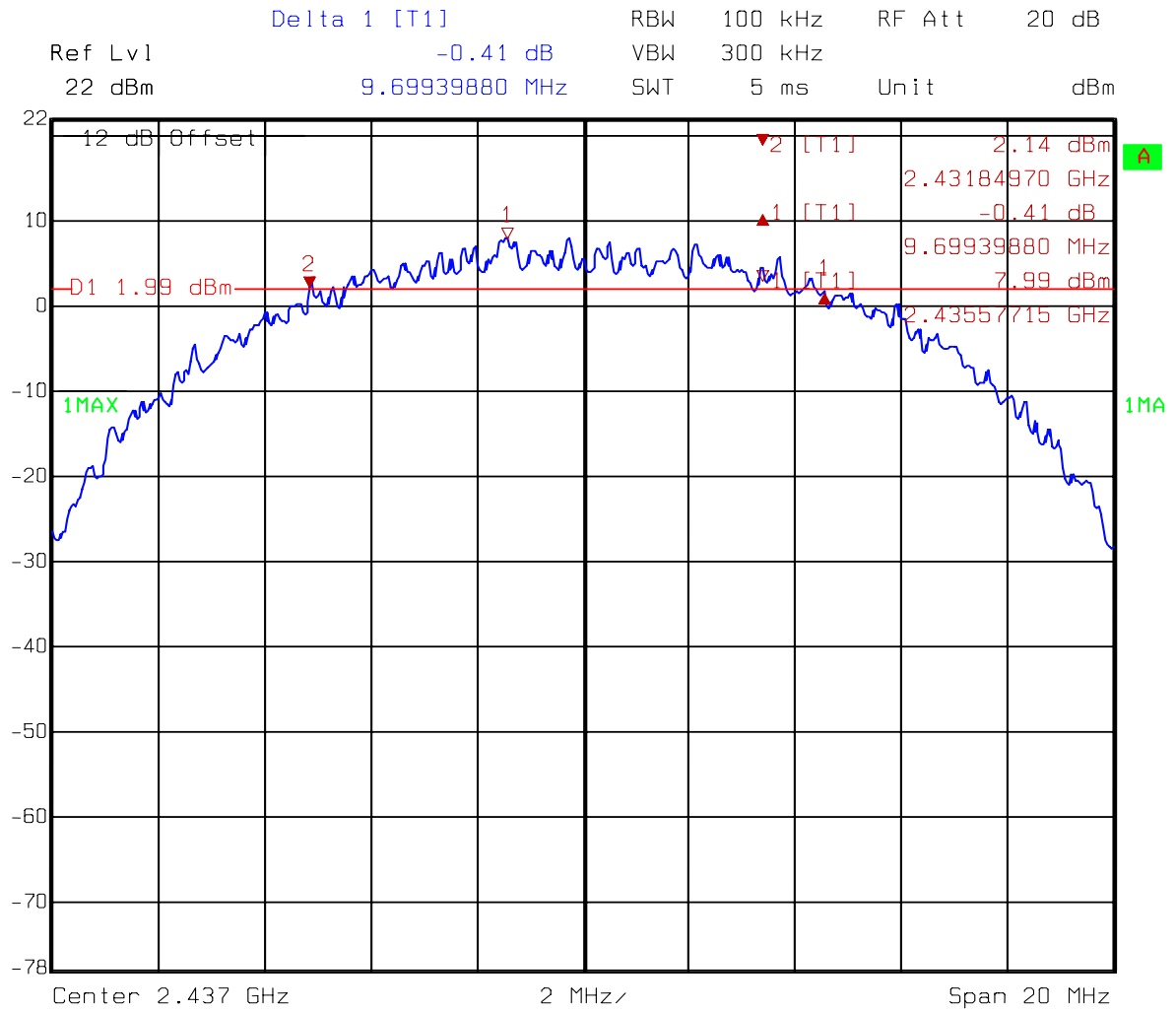
Please see the plot below.

Test Mode: 802.11b(DSSS Modulation) operating mode



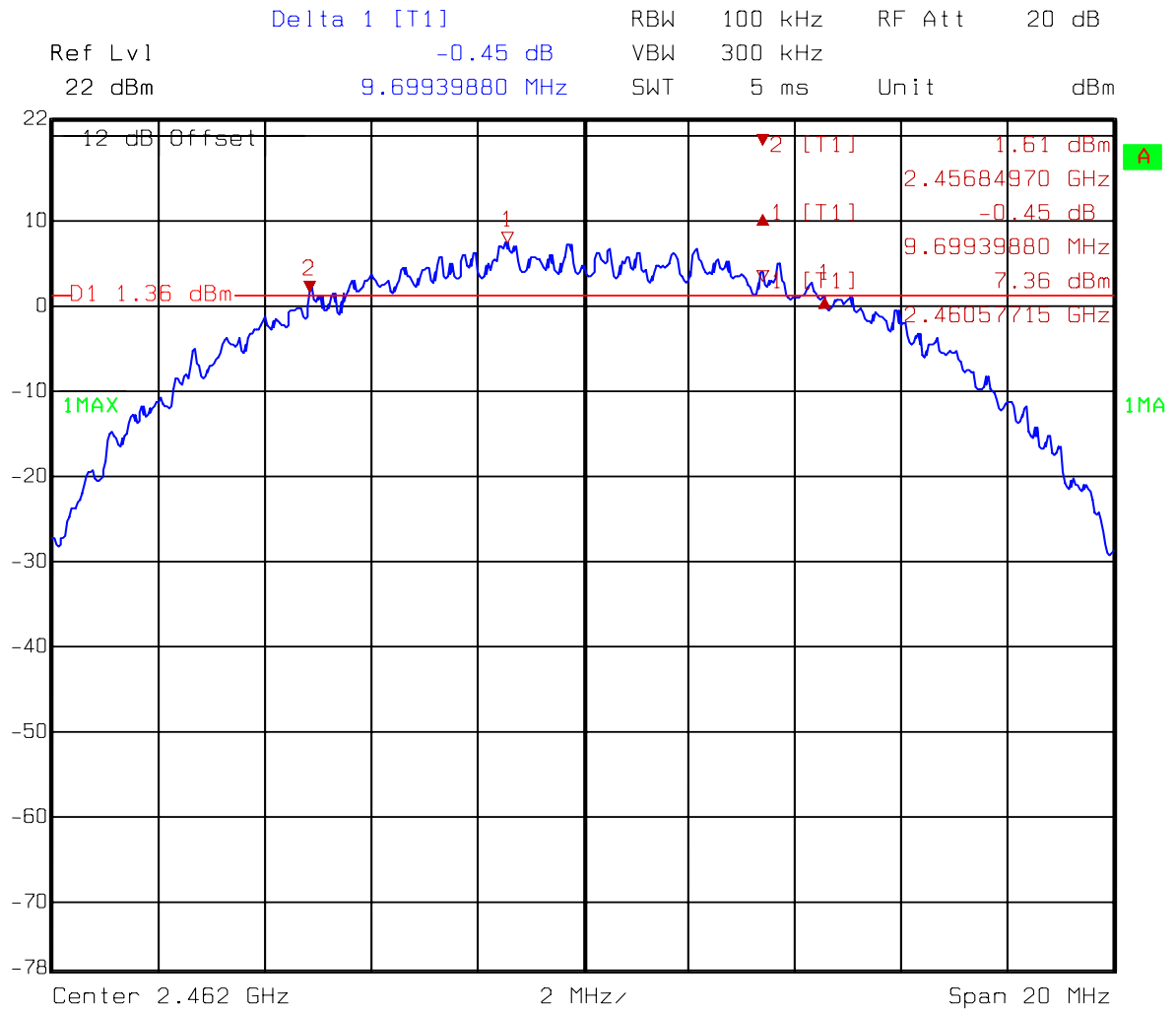
Comment A: 6dB BW at 11b_low
 (EC365)

Date: 03.OCT.2005 16:29:14



Comment A: 6dB BW at 11b_mid
(EC365)

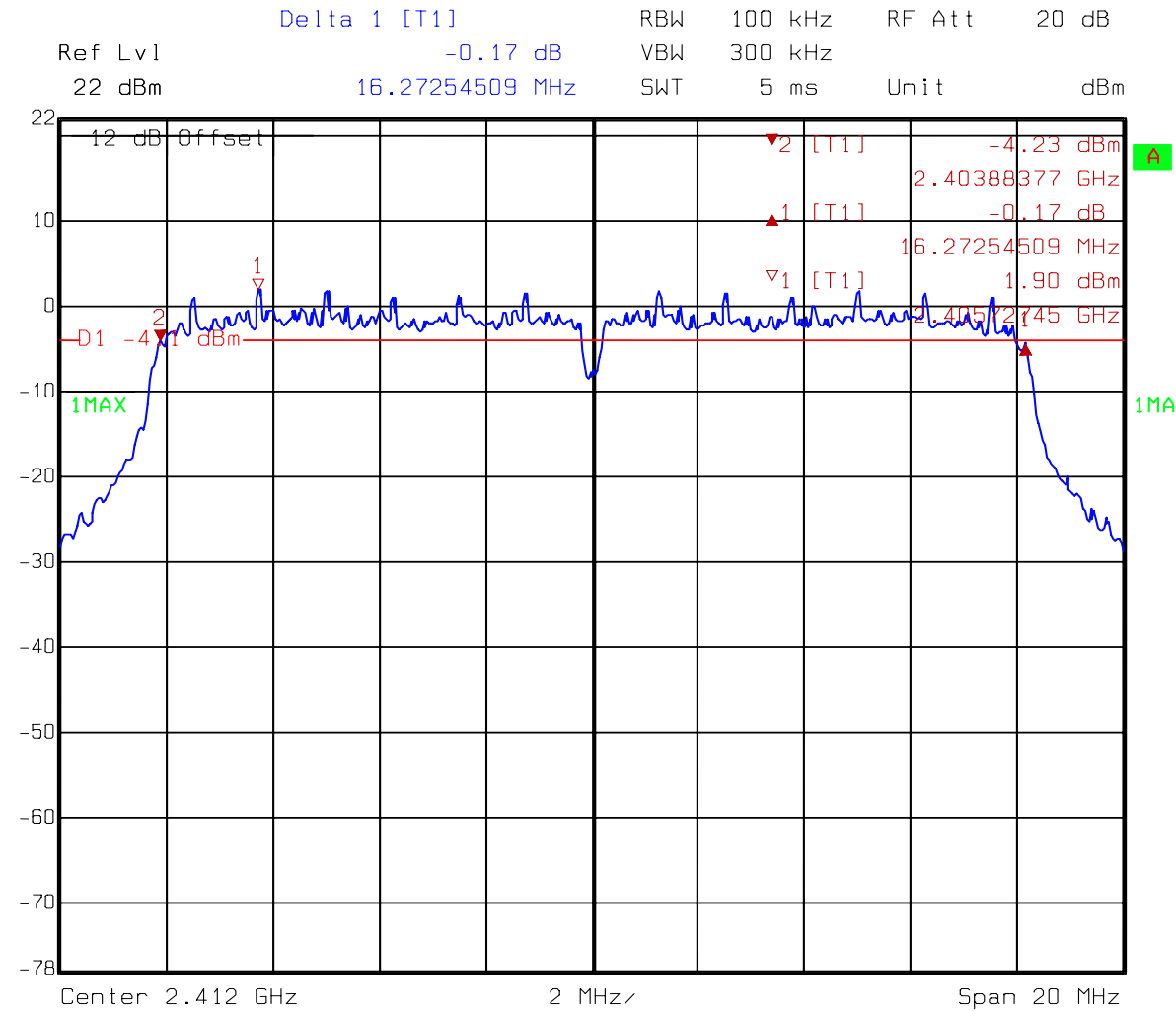
Date: 03.OCT.2005 16:33:44



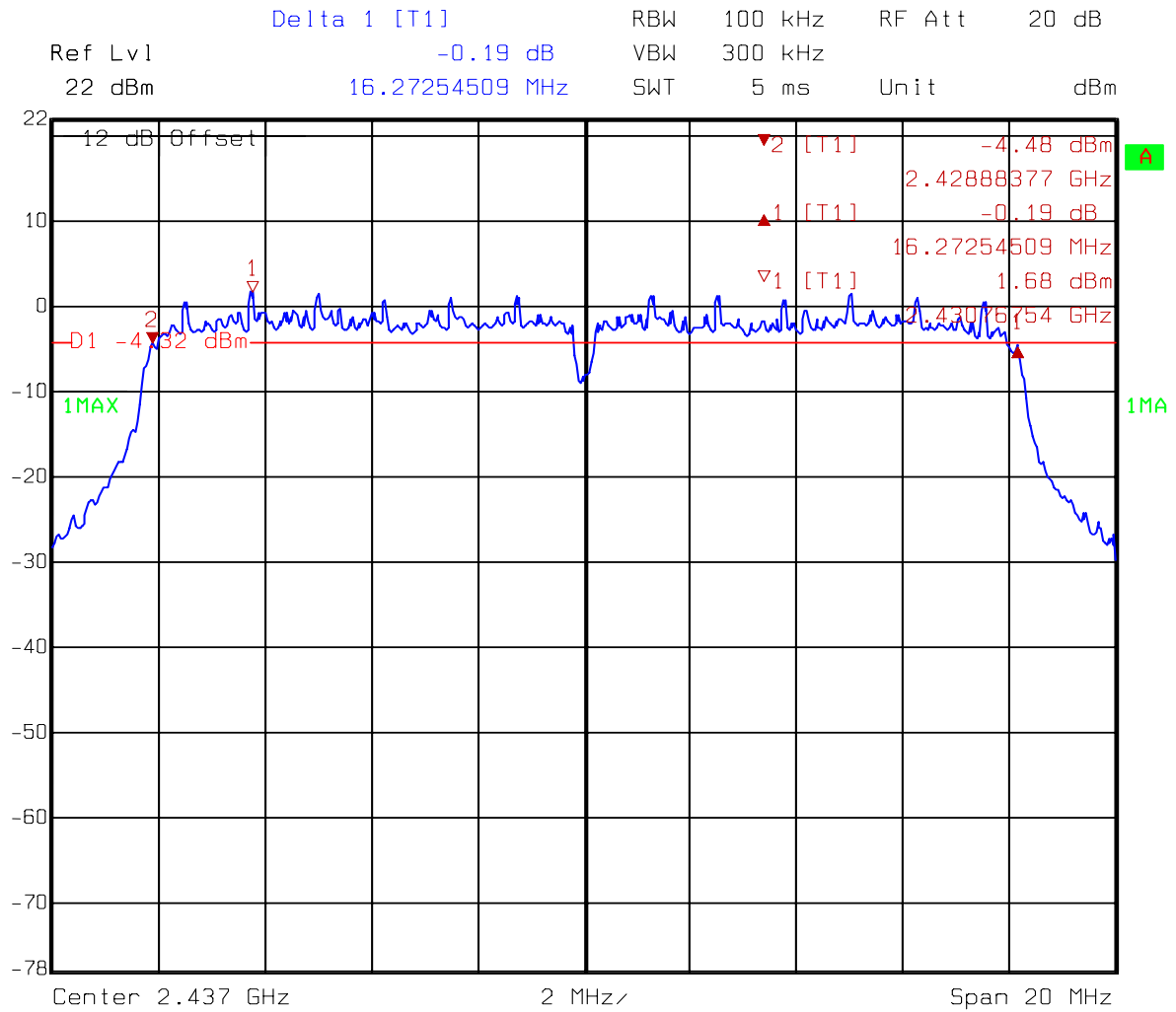
Comment A: 6dB BW at 11b_high
 (EC365)

Date: 03.OCT.2005 16:39:34

Test Mode: 802.11g(OFDM Modulation) operating mode

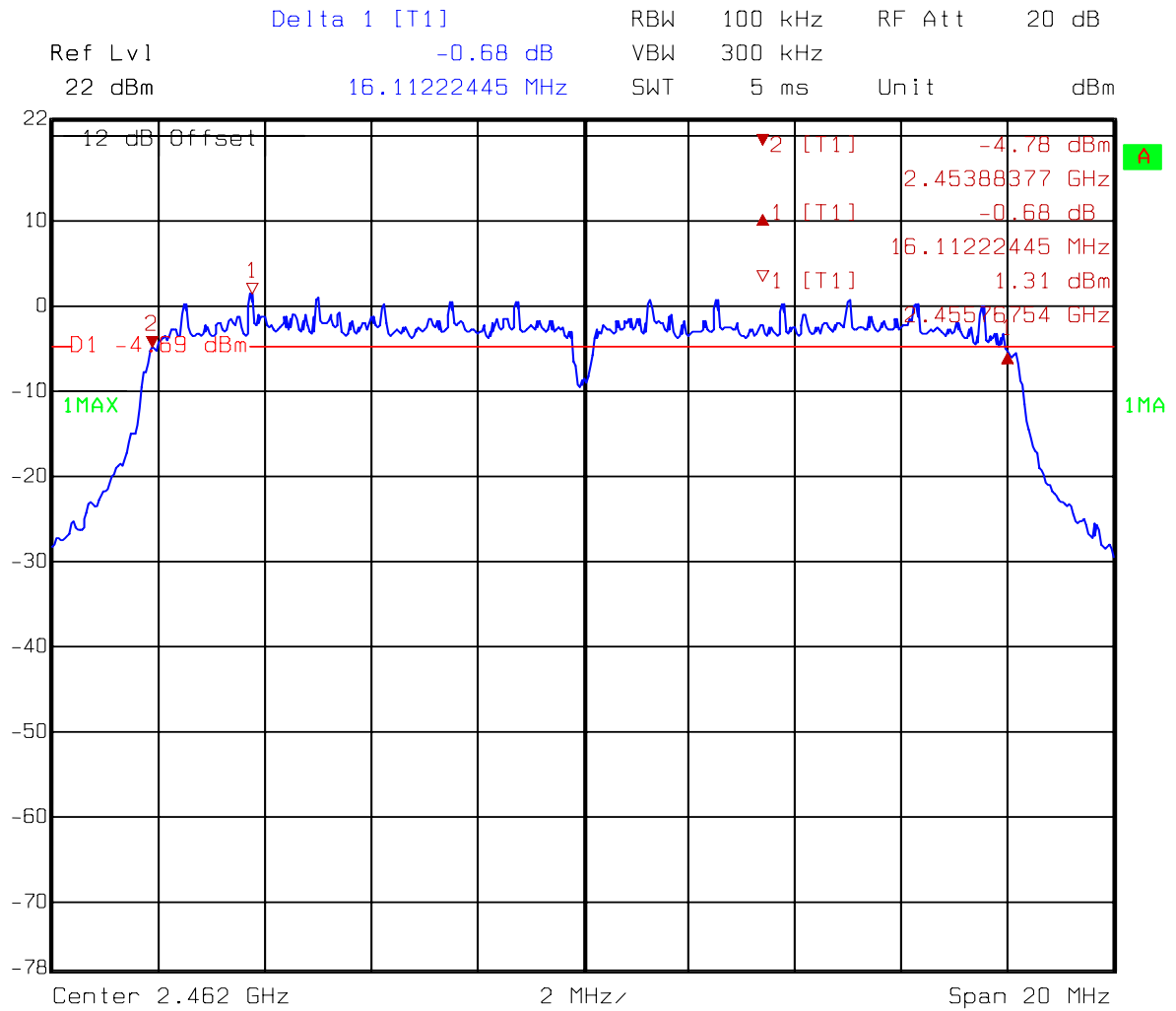


Comment A: 6dB BW at 11g_low
 (EC365)
 Date: 03.OCT.2005 16:58:27



Comment A: 6dB BW at 11g_mid
 (EC365)

Date: 03.OCT.2005 16:54:54



Comment A: 6dB BW at 11g_high
 (EC365)

Date: 03.OCT.2005 16:52:13

4. Maximum Output Power test

4.1 Operating environment

Temperature: 22 °C
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

4.2 Test setup & procedure

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (2 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

4.3 Measured data of Maximum Output Power test results

For Mode No.: WPG2500 (Replaceable antenna, Connector Type: Reverse SMA):

Test Mode: 802.11b(DSSS Modulation) operating mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412.00	2.00	18.21	20.21	104.95	1.00
6 (middle)	2437.00	2.00	18.06	20.06	101.39	1.00
11 (highest)	2462.00	2.00	17.60	19.60	91.20	1.00

Remark:

Conducted Peak Output Power = Reading + C.L.

Test Mode: 802.11g(OFDM Modulation) operating mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412.00	2.00	18.67	20.67	116.68	1.00
6 (middle)	2437.00	2.00	18.33	20.33	107.89	1.00
11 (highest)	2462.00	2.00	17.98	19.98	99.54	1.00

Remark:

Conducted Peak Output Power = Reading + C.L.

***For Mode No.: WPG2501 (Permanently connected antenna, Connector Type: N/A
(Antenna with coaxial cable is soldered in the PCB Antenna):***

Test Mode: 802.11b(DSSS Modulation) operating mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412.00	2.00	18.31	20.31	107.40	1.00
6 (middle)	2437.00	2.00	18.11	20.11	102.57	1.00
11 (highest)	2462.00	2.00	17.76	19.76	94.62	1.00

Remark:

Conducted Peak Output Power = Reading + C.L.

Test Mode: 802.11g(OFDM Modulation) operating mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412.00	2.00	18.86	20.86	121.90	1.00
6 (middle)	2437.00	2.00	18.34	20.34	108.14	1.00
11 (highest)	2462.00	2.00	18.03	20.03	100.69	1.00

Remark:

Conducted Peak Output Power = Reading + C.L.

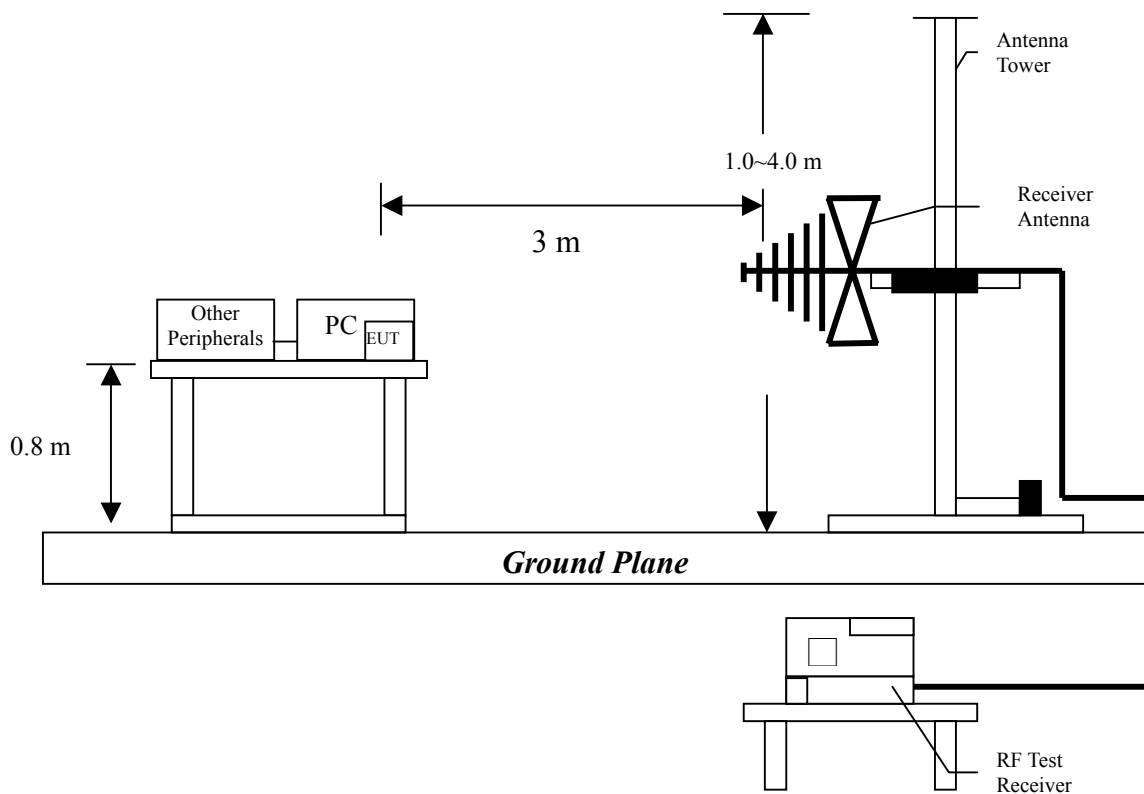
5. Radiated Emission test

5.1 Operating environment

Temperature: 23 °C
Relative Humidity: 53 %
Atmospheric Pressure: 1023 hPa

5.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent 3 meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

5.3 Emission limits

The spurious Emission shall test through the 10th harmonic. 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).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is 4.98 dB.

5.4 Radiated spurious emission test data

The radiated spurious emissions at

Frequency(MHz)	Margin
70.740	-2.24
4260.000	-0.32
7236.000	-2.64
9648.000	-1.20
4824.000	-2.50
12060.000	-1.37
4200.000	-0.65
4824.000	-2.24
7320.000	-1.75
9750.000	-1.38
12180.000	-1.03
4860.000	-4.27
9750.000	-2.81
12180.000	-1.92
4170.000	-2.54
4924.000	-4.51
7386.000	-1.26
9848.000	-1.12
12330.000	-0.31
4170.000	-4.59
4140.000	-2.57
4140.000	-3.02

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

5.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 802.11b and 802.11g continuously transmitting mode. Channel 1, 6, 11 were verified. The worst case occurred at 802.11b Tx channel 1.

EUT : WPG2500
Worst Case : 802.11b Tx at channel 1

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
V	43.580	QP	12.38	22.05	34.43	40.00	-5.58	100.00	96.00
V	59.100	QP	12.90	21.97	34.87	40.00	-5.14	110.00	187.00
V	70.740	QP	10.39	27.37	37.76	40.00	-2.24	121.00	122.00
V	119.240	QP	8.19	19.84	28.03	43.50	-15.47	105.00	48.00
V	220.120	QP	12.08	15.90	27.98	46.00	-18.02	141.00	65.00
V	796.300	QP	23.19	6.75	29.94	46.00	-16.06	113.00	57.00
H	43.580	QP	14.20	15.12	29.32	40.00	-10.68	101.00	155.00
H	119.240	QP	10.54	22.27	32.81	43.50	-10.70	100.00	241.00
H	198.780	QP	11.27	18.18	29.45	43.50	-14.06	132.00	76.00
H	264.740	QP	12.88	17.35	30.23	46.00	-15.77	114.00	223.00
H	398.600	QP	16.74	13.02	29.76	46.00	-16.24	129.00	98.00
H	530.520	QP	19.65	8.58	28.23	46.00	-17.77	143.00	135.00

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

5.4.2 Measurement results: frequency above 1GHz

EUT : WPG2500

Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preampl. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4260.000	PK	V	35.69	36.24	53.13	53.68	54.00	-0.32	100.00	89.00
4824.000	PK	V	36.07	37.77	47.28	48.98	54.00	-5.02	101.00	67.00
7236.000	PK	V	36.18	43.97	43.57	51.36	54.00	-2.64	100.00	155.00
9648.000	PK	V	34.28	48.31	45.40	59.43	74.00	-14.57	105.00	47.00
9648.000	AV	V	34.28	48.31	38.77	52.80	54.00	-1.20	105.00	47.00
12060.000	PK	V	36.09	49.60	44.25	57.76	74.00	-16.24	100.00	98.00
12060.000	AV	V	36.09	49.60	33.22	46.73	54.00	-7.27	100.00	98.00
4230.000	PK	H	35.69	36.24	46.11	46.66	54.00	-7.34	110.00	124.00
4824.000	AV	H	36.07	37.77	49.80	51.50	54.00	-2.50	103.00	35.00
12060.000	PK	H	36.09	49.60	39.12	52.63	54.00	-1.37	100.00	76.00

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preampl. Gain
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is :

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WPG2500
Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4200.000	PK	V	35.69	36.24	52.80	53.35	54.00	-0.65	100.00	54.00
4824.000	PK	V	36.07	37.77	50.06	51.76	54.00	-2.24	100.00	33.00
7320.000	PK	V	36.18	43.97	44.46	52.25	54.00	-1.75	100.00	97.00
9750.000	PK	V	34.28	48.31	38.59	52.62	54.00	-1.38	100.00	166.00
12180.000	PK	V	36.09	49.60	39.46	52.97	54.00	-1.03	101.00	241.00
4200.000	PK	H	35.69	36.24	48.14	48.69	54.00	-5.31	105.00	195.00
4860.000	PK	H	36.07	37.77	48.03	49.73	54.00	-4.27	100.00	78.00
9750.000	PK	H	34.28	48.31	37.16	51.19	54.00	-2.81	100.00	63.00
12180.000	PK	H	36.09	49.60	38.57	52.08	54.00	-1.92	100.00	66.00

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WPG2500

Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4170.000	PK	V	35.69	36.24	50.91	51.46	54.00	-2.54	100.00	87.00
4924.000	PK	V	36.07	37.77	47.79	49.49	54.00	-4.51	106.00	233.00
7386.000	PK	V	36.18	43.97	44.95	52.74	54.00	-1.26	102.00	321.00
9848.000	PK	V	34.28	48.31	38.85	52.88	54.00	-1.12	100.00	49.00
4170.000	PK	H	35.69	36.24	47.39	47.94	54.00	-6.06	105.00	98.00
4924.000	PK	H	36.07	37.77	46.30	48.00	54.00	-6.00	100.00	331.00
12330.000	PK	H	36.09	49.60	40.18	53.69	54.00	-0.31	100.00	61.00

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WPG2500
Test Condition : 802.11g Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4170.000	PK	V	35.69	36.24	48.86	49.41	54.00	-4.59	102.00	86.00
4824.000	PK	V	36.07	37.77	-	-	54.00	-	-	-
7236.000	PK	V	36.18	43.97	-	-	54.00	-	-	-
4170.000	PK	H	35.69	36.24	46.37	46.92	54.00	-7.08	100.00	81.00
4824.000	AV	H	36.07	37.77	-	-	54.00	-	-	-
7236.000	PK	H	36.18	43.97	-	-	54.00	-	-	-

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is :

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WPG2500
Test Condition : 802.11g Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4140.000	PK	V	35.69	36.24	50.88	51.43	54.00	-2.57	100.00	122.00
4874.000	PK	V	36.07	37.77	-	-	54.00	-	-	-
7311.000	PK	V	36.18	43.97	-	-	54.00	-	-	-
4140.000	PK	H	35.69	36.24	46.78	47.33	54.00	-6.67	100.00	146.00
4874.000	PK	H	36.07	37.77	-	-	54.00	-	-	-
7311.000	PK	H	36.18	43.97	-	-	54.00	-	-	-

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WPG2500

Test Condition : 802.11g Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4140.000	PK	V	35.69	36.24	50.43	50.98	54.00	-3.02	104.00	147.00
4924.000	PK	V	36.07	37.77	-	-	54.00	-	-	-
7386.000	PK	V	36.18	43.97	-	-	54.00	-	-	-
4140.000	PK	H	35.69	36.24	46.60	47.15	54.00	-6.85	101.00	125.00
4924.000	PK	H	36.07	37.77	-	-	54.00	-	-	-
7386.000	PK	H	36.18	43.97	-	-	54.00	-	-	-

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

6. Power Spectrum Density test

6.1 Operating environment

Temperature: 23 °C
Relative Humidity: 52 %
Atmospheric Pressure 1023 hPa

6.2 Test setup & procedure

The power spectrum density per FCC §15.247(e) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 3kHz, the video bandwidth set at 10kHz, a span of 1.5 MHz, and the sweep time set at 500 seconds. Power Density was read directly correction was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel). The Power Spectral Density measured result is in the following table.

6.3 Measured data of Power Spectrum Density test results

Test Mode: 802.11b(DSSS Modulation) operating mode

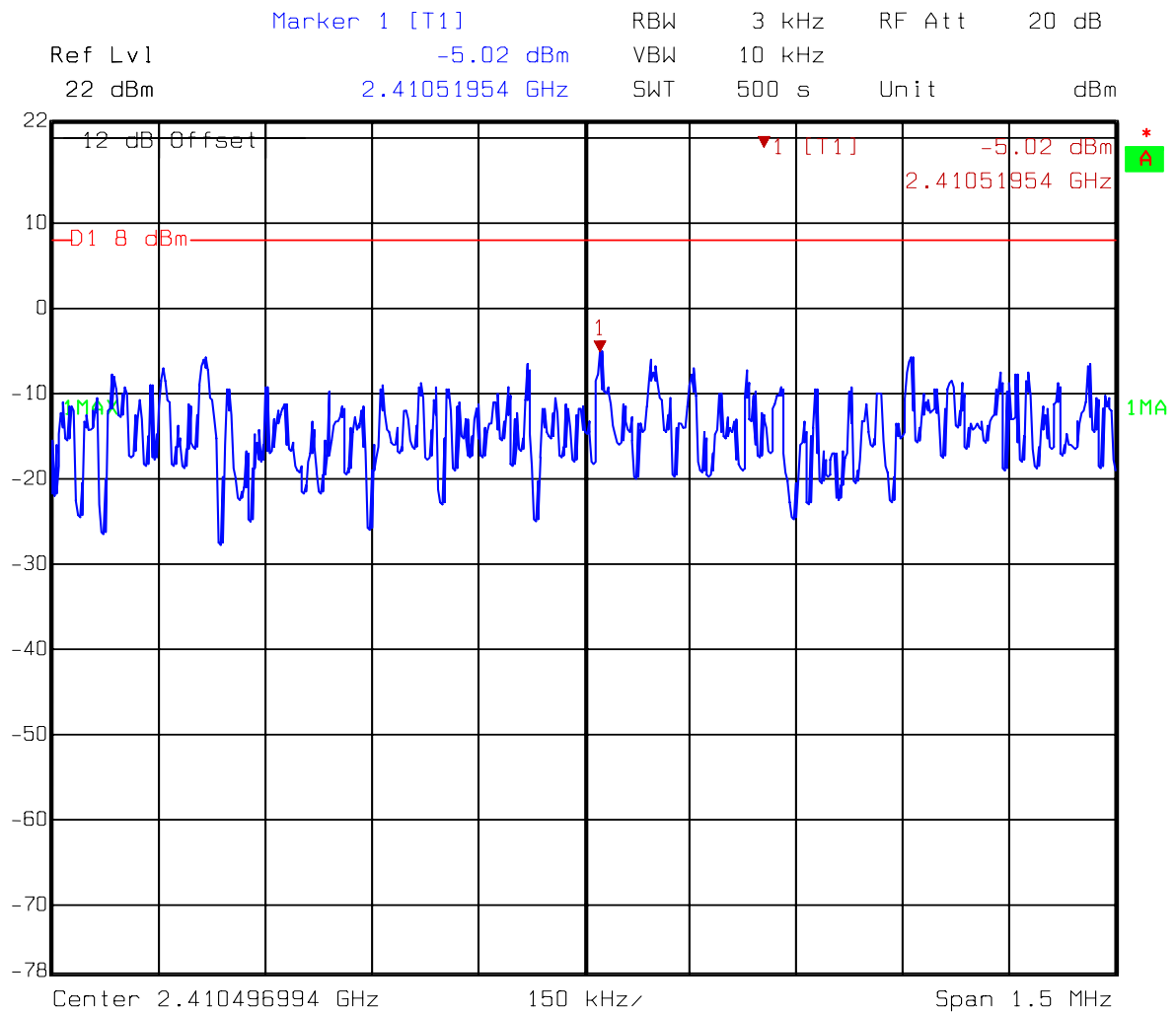
Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412.00	-5.02	8.00
6 (middle)	2437.00	-5.49	8.00
11 (highest)	2462.00	-5.89	8.00

Test Mode: 802.11g(OFDM Modulation) operating mode

Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412.00	-13.16	8.00
6 (middle)	2437.00	-13.71	8.00
11 (highest)	2462.00	-14.13	8.00

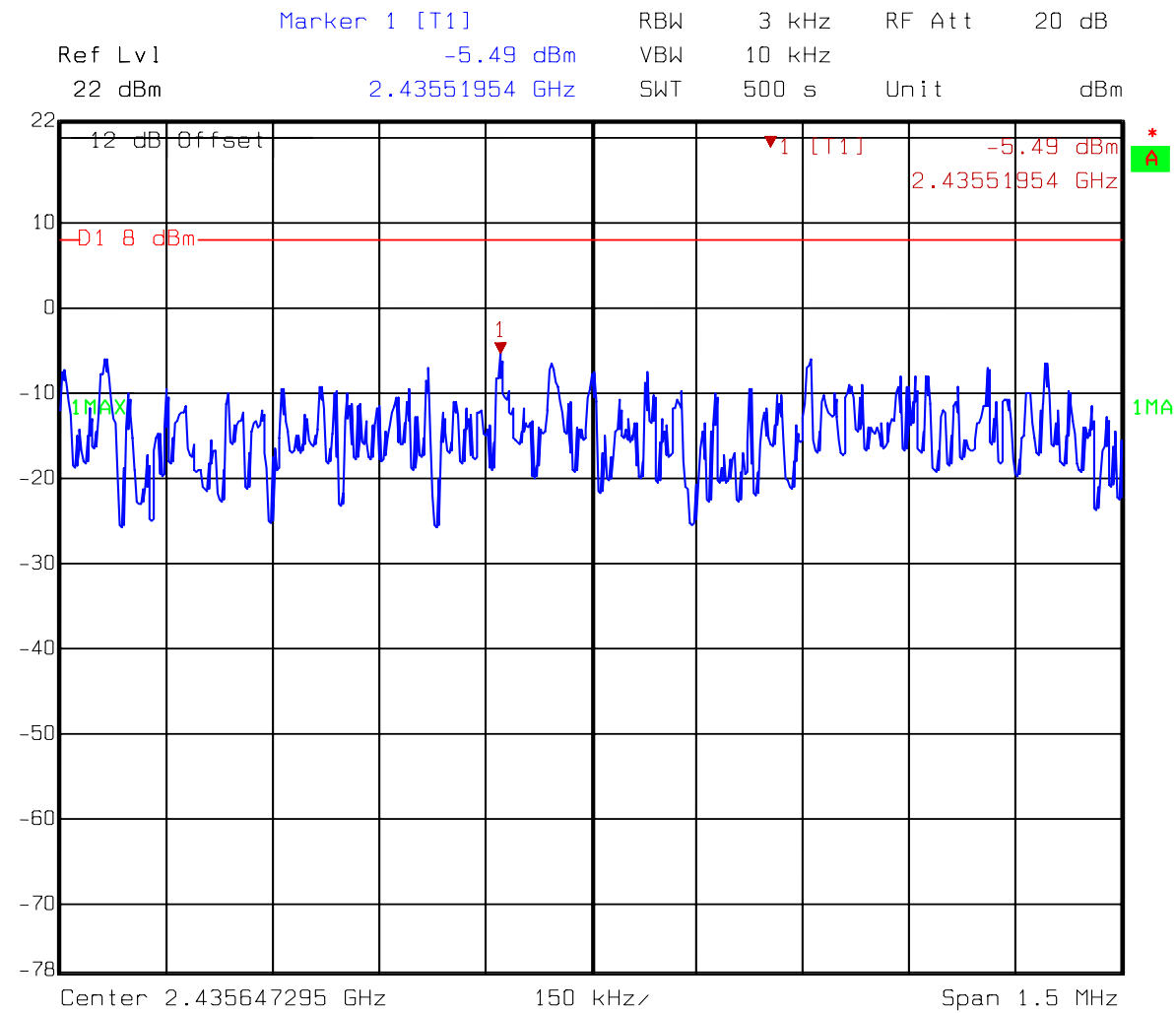
Please see the plot below.

Test Mode: 802.11b(DSSS Modulation) operating mode



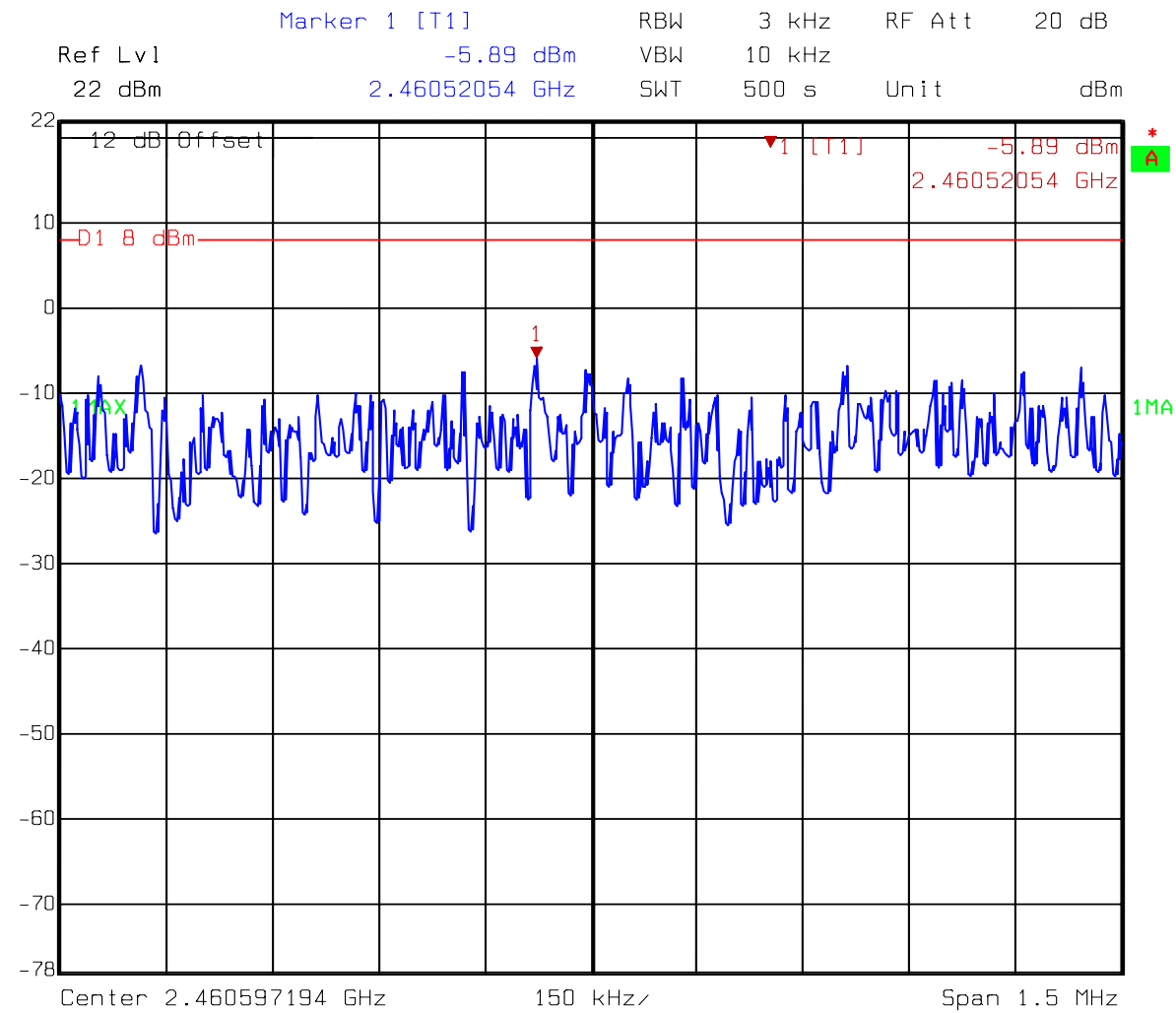
Comment A: Power Density at 11b_low
(EC365)

Date: 03.OCT.2005 17:36:07



Comment A: Power Density at 11b_mid
 (EC365)

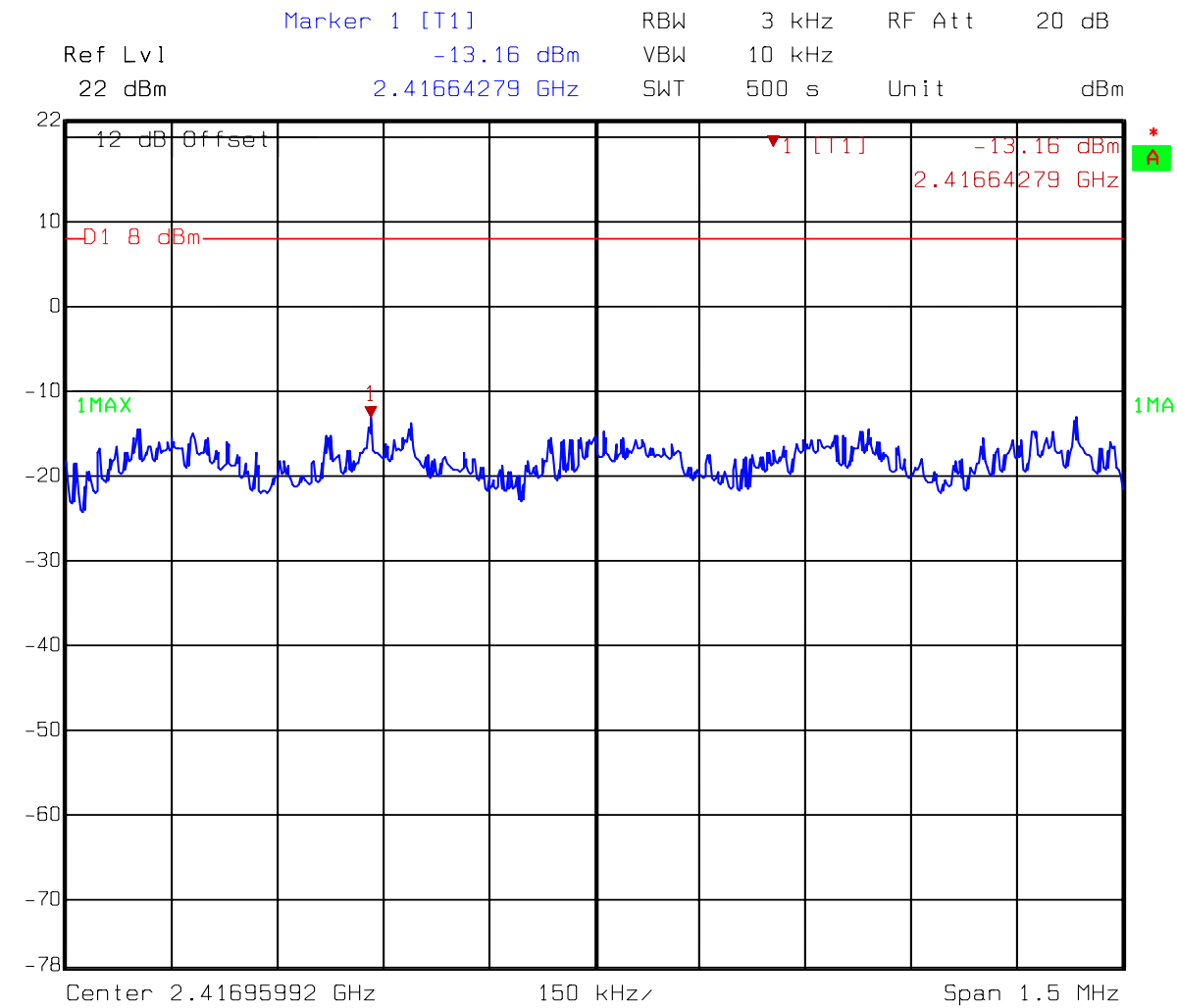
Date: 03.OCT.2005 17:37:47



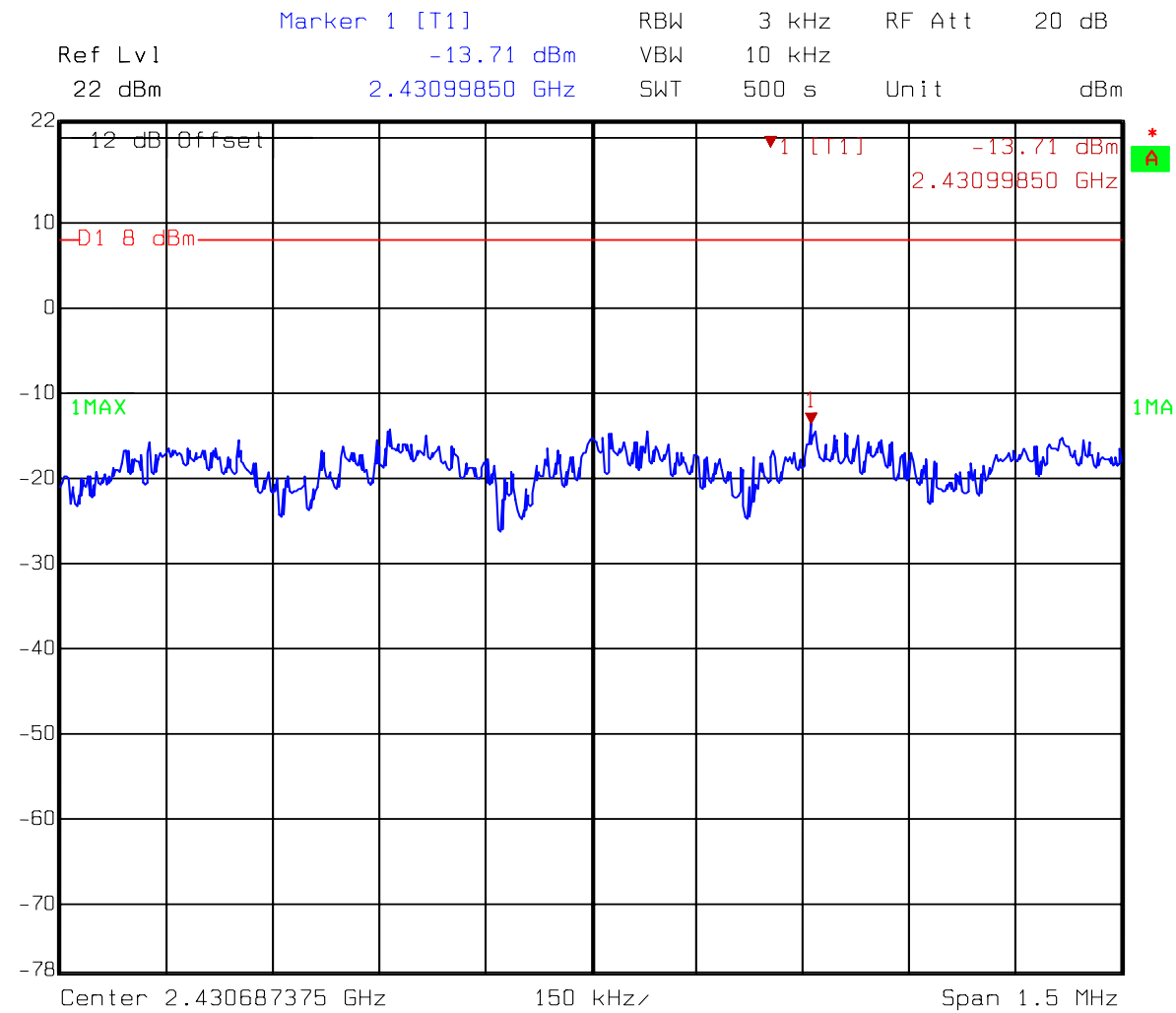
Comment A: Power Density at 11b_high
 (EC365)

Date: 03.OCT.2005 17:39:12

Test Mode: 802.11G(OFDM Modulation) operating mode

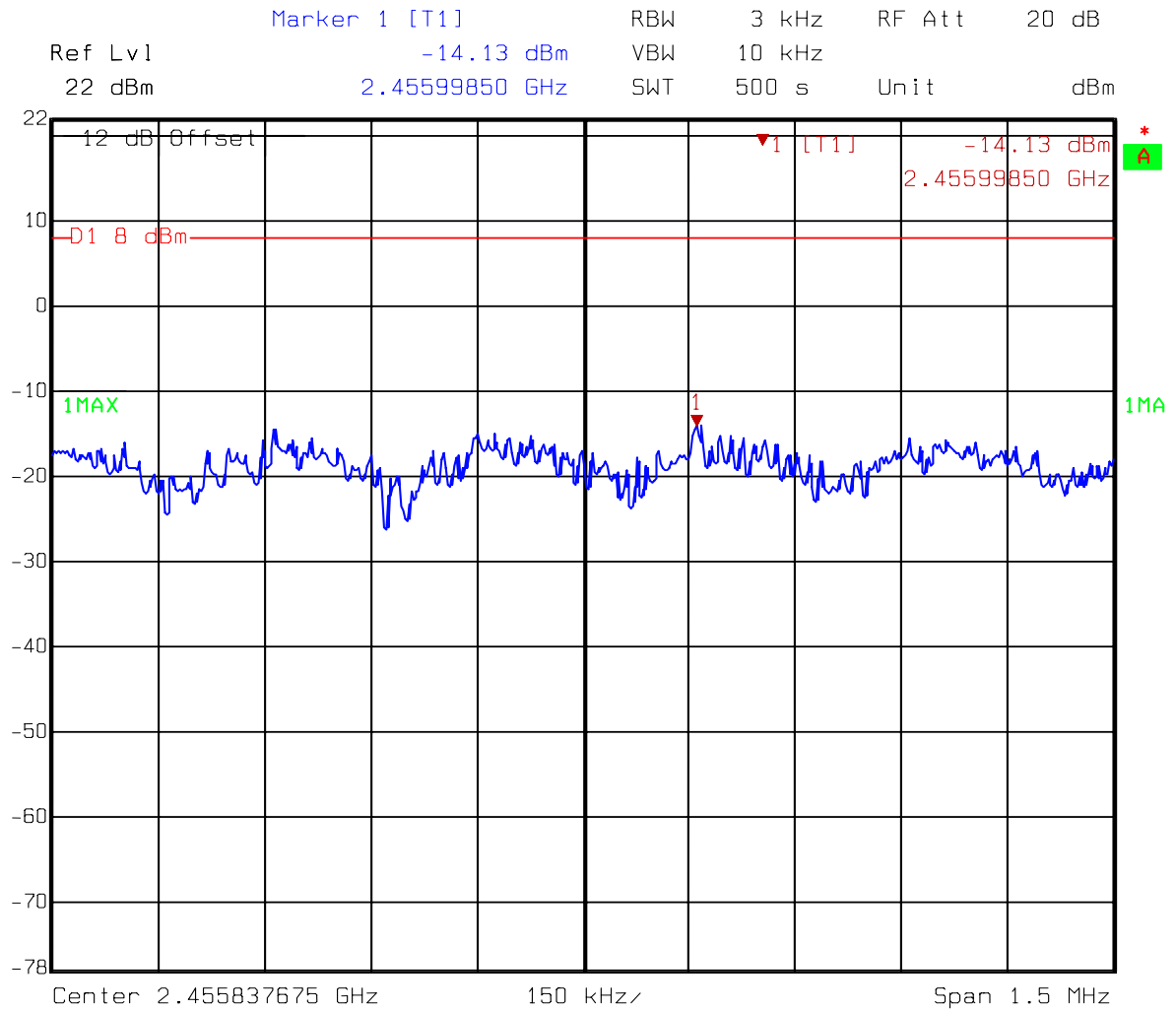


Comment A: Power Density at 11g_low
 (EC365)
 Date: 03.OCT.2005 17:11:45



Comment A: Power Density at 11g_mid
 (EC365)

Date: 03.OCT.2005 17:09:53



Comment A: Power Density at 11g_high
 (EC365)

Date: 03.OCT.2005 17:07:42

7. Emission on the band edge

In any 100kHz bandwidth outside the frequency band 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.

7.1 Operating environment

Temperature:	23	°C
Relative Humidity:	50	%
Atmospheric Pressure	1023	hPa

7.2 Test setup & procedure

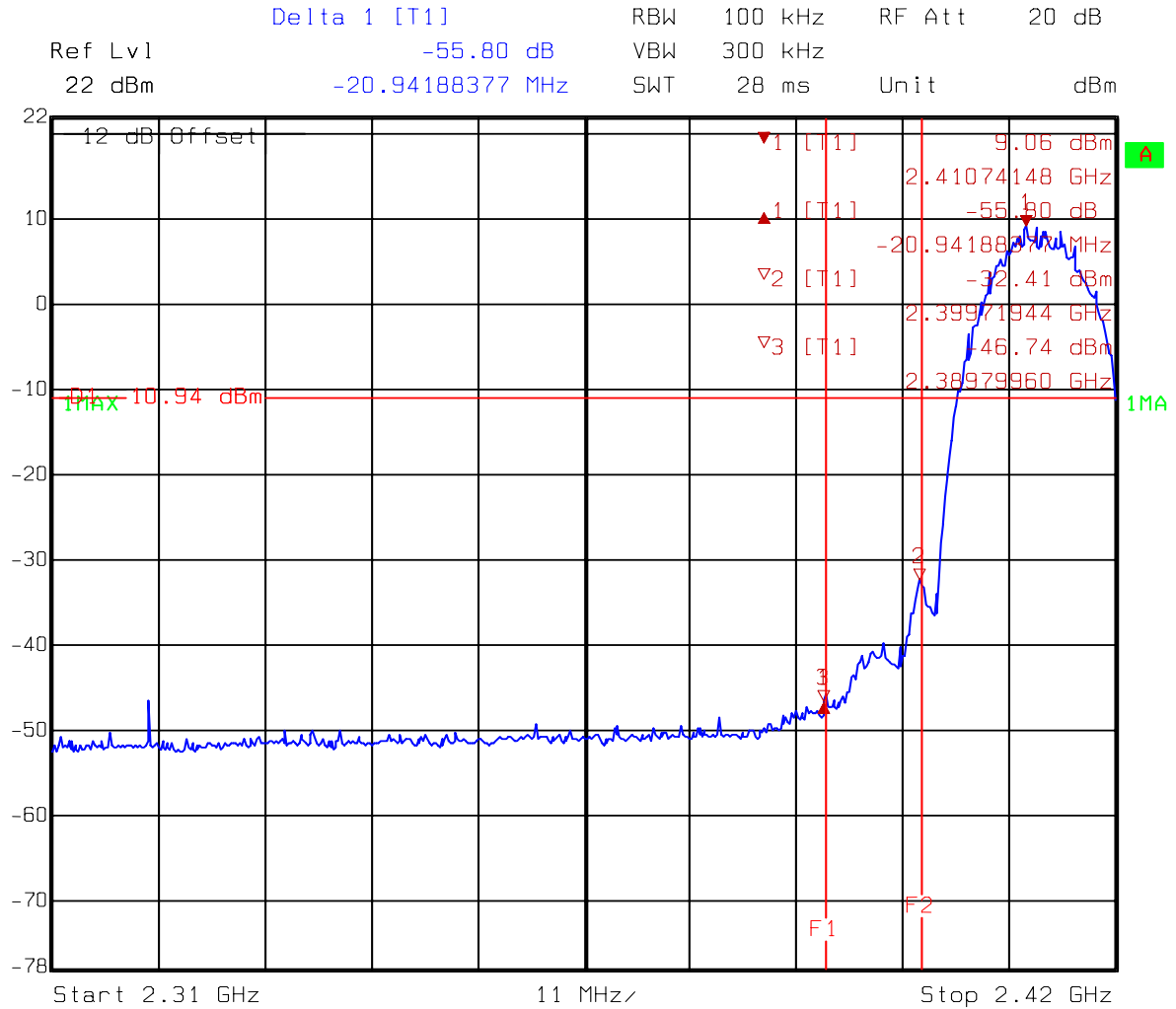
The output of EUT was connected to spectrum analyzer via a 50ohm cable.

The setting of spectrum analyzer is:

Peak:	RBW = 100kHz ;	VBW = 100kHz
Average:	RBW = 1MHz ;	VBW = 10Hz

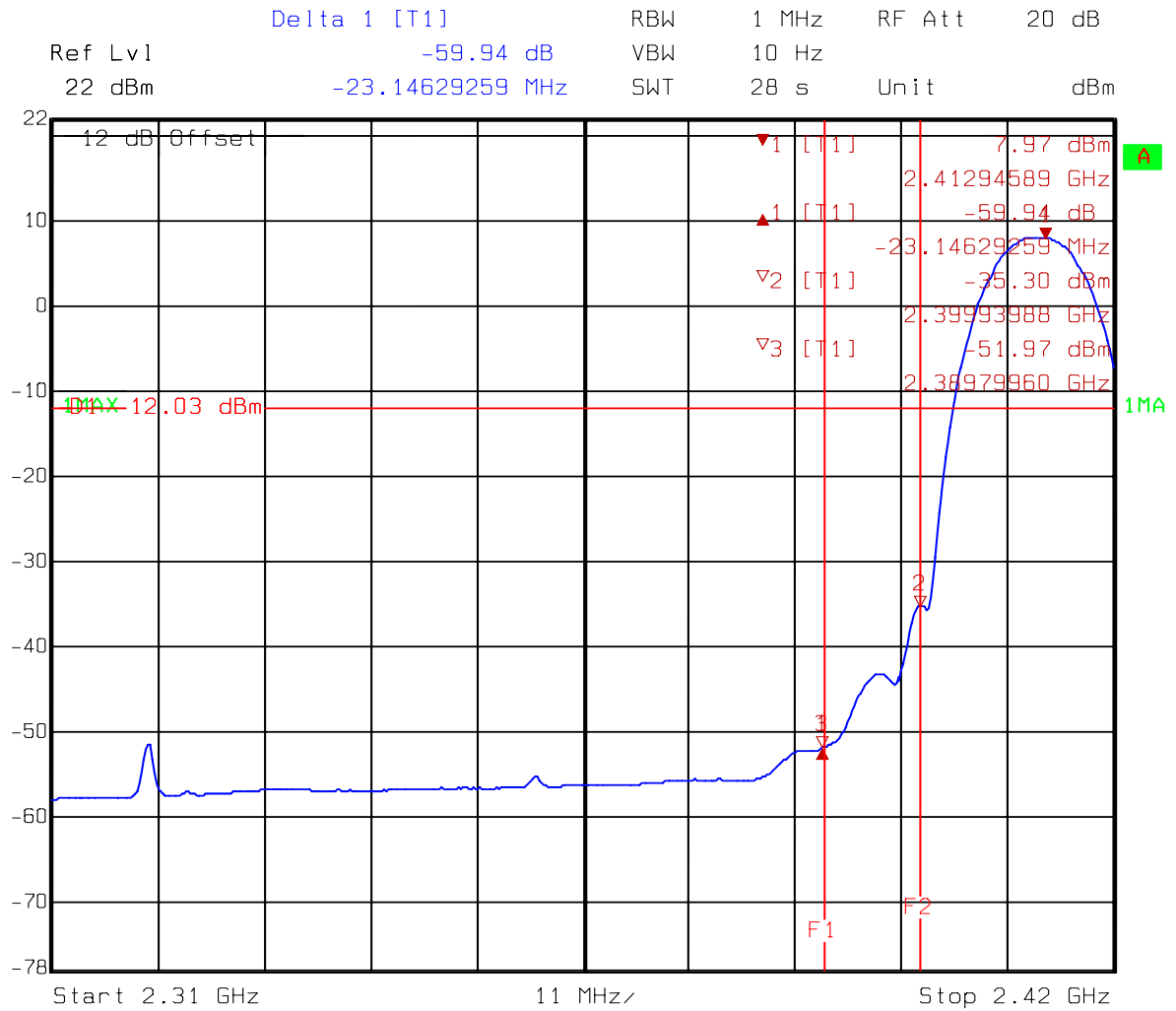
Please see the test plot below.

Test Mode: 802.11b(DSSS Modulation) operating mode



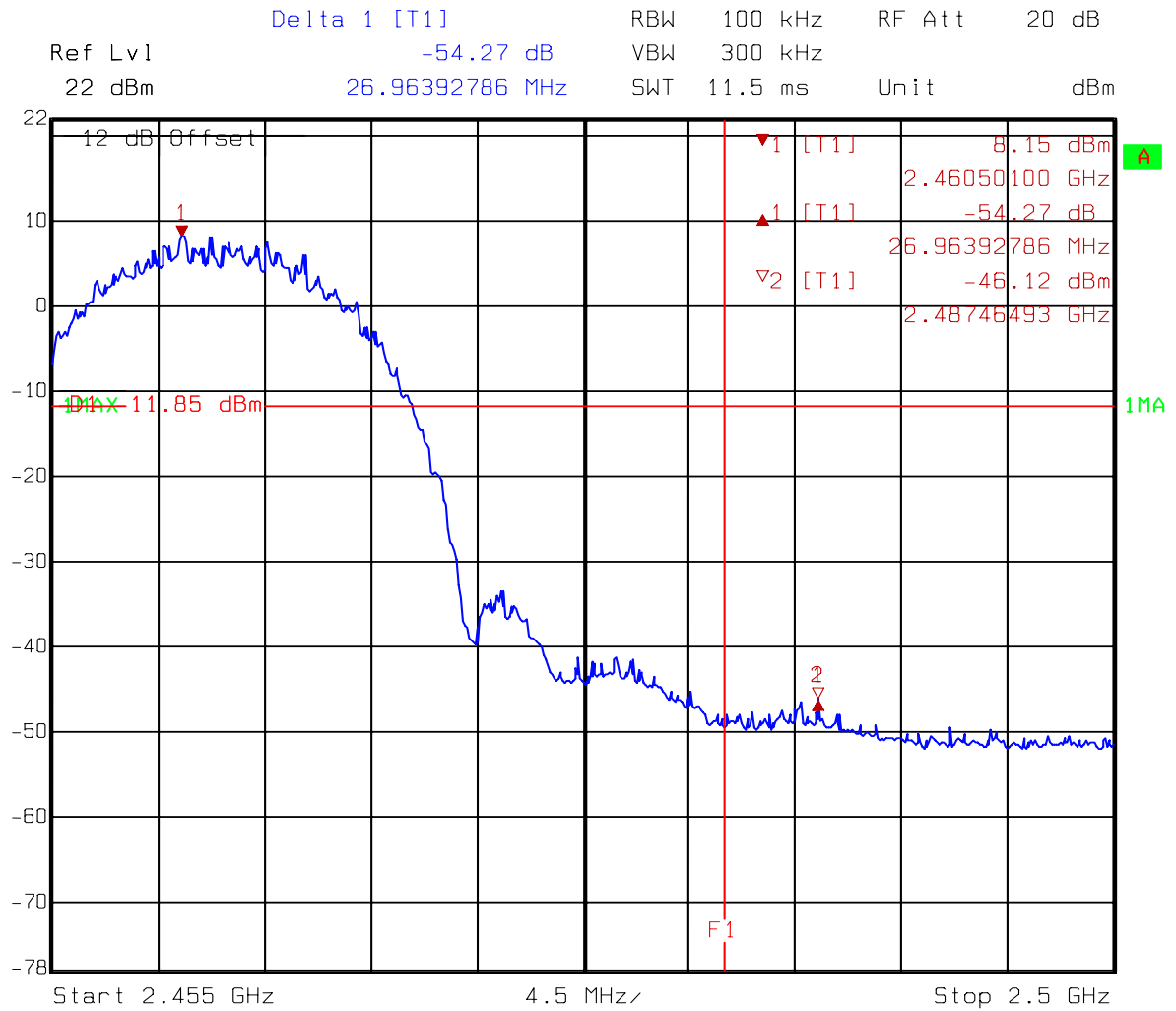
Comment A: Band-edge at 11b_low
PK F1=2390MHz F2=2400MHz (EC365)

Date: 03.OCT.2005 17:59:25



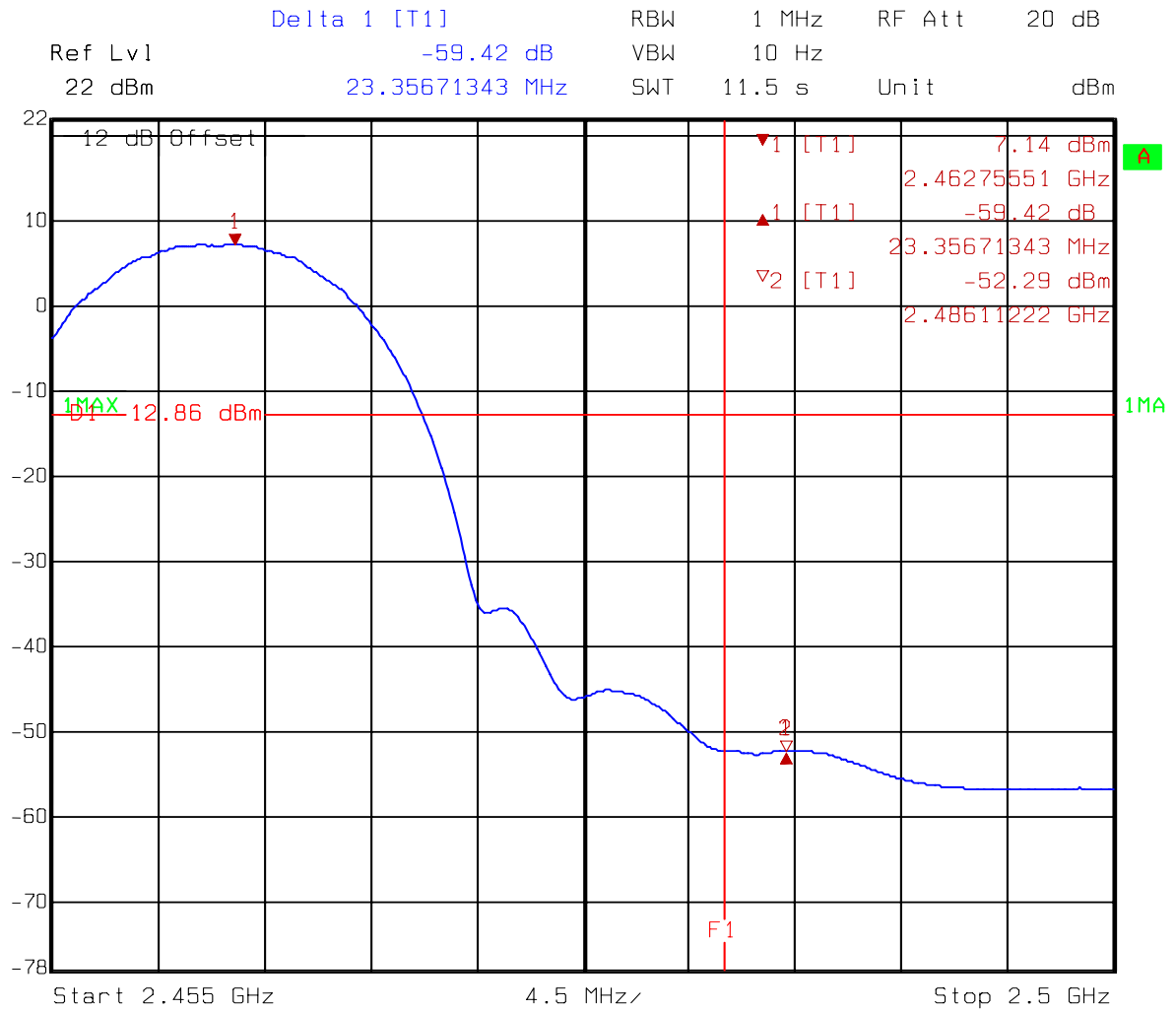
Comment A: Band-edge at 11b_low
 AV F1=2390MHz F2=2400MHz(EC365)

Date: 03.OCT.2005 18:03:15



Comment A: Band-edge at 11b_high
 PK F1=2483.5MHz(EC365)

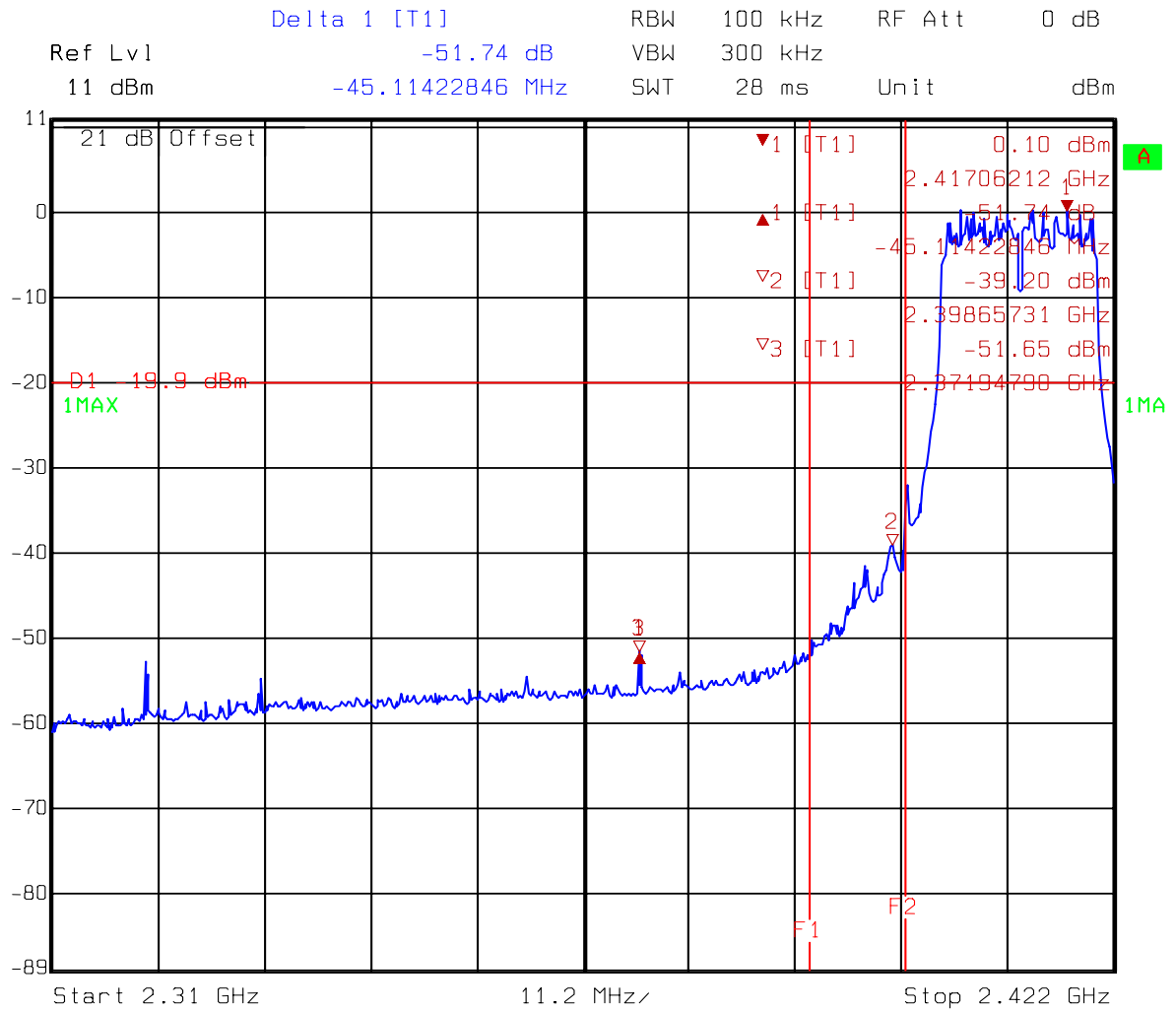
Date: 03.OCT.2005 17:45:45



Comment A: Band-edge at 11b_high
 AV F1=2483.5MHz(EC365)

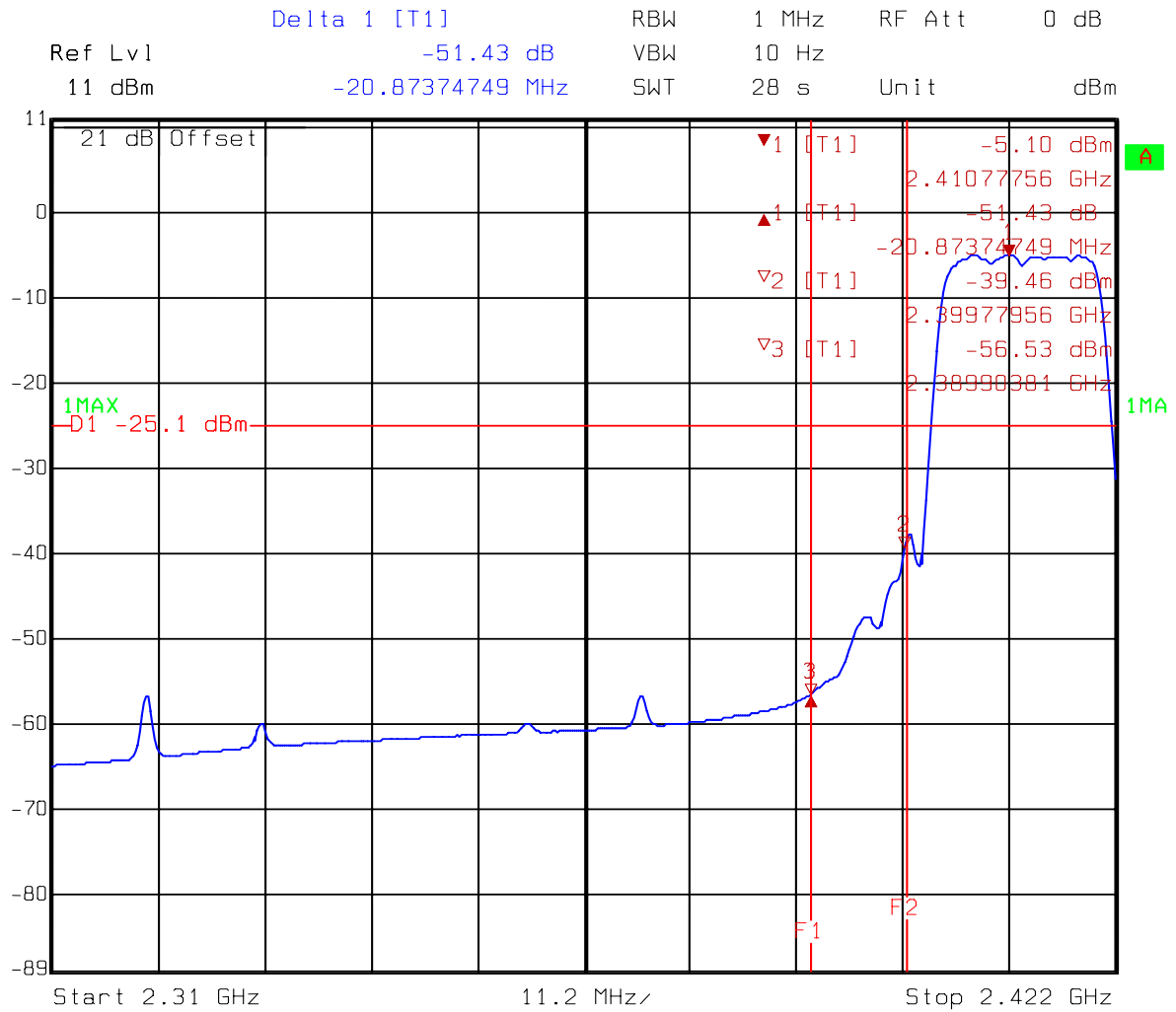
Date: 03.OCT.2005 17:53:19

Test Mode: 802.11g(OFDM Modulation) operating mode



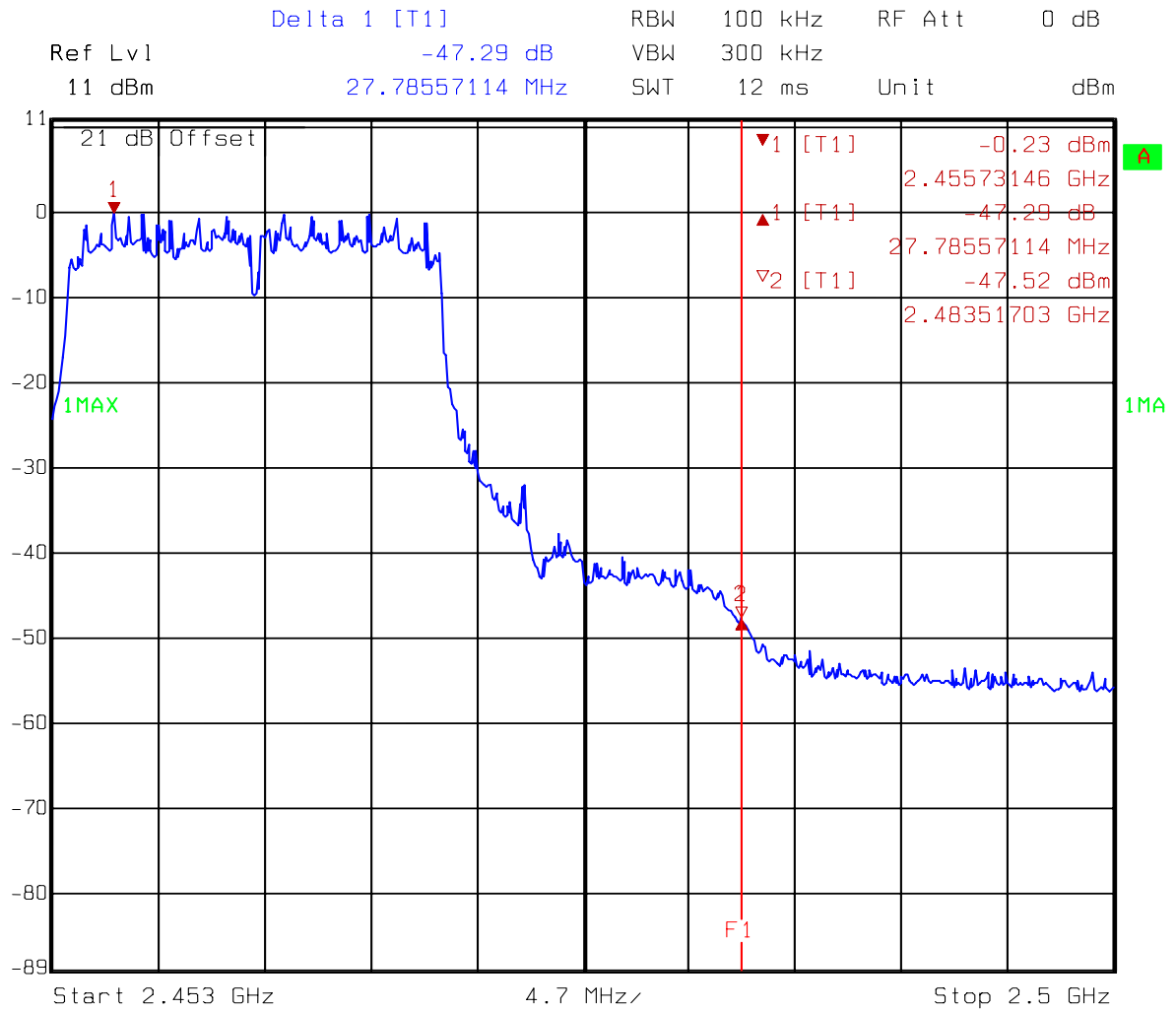
Comment A: Band-edge at 11g_high
 PK F1=2390MHz, F2=2400MHz(EC365)

Date: 21.OCT.2005 10:03:44



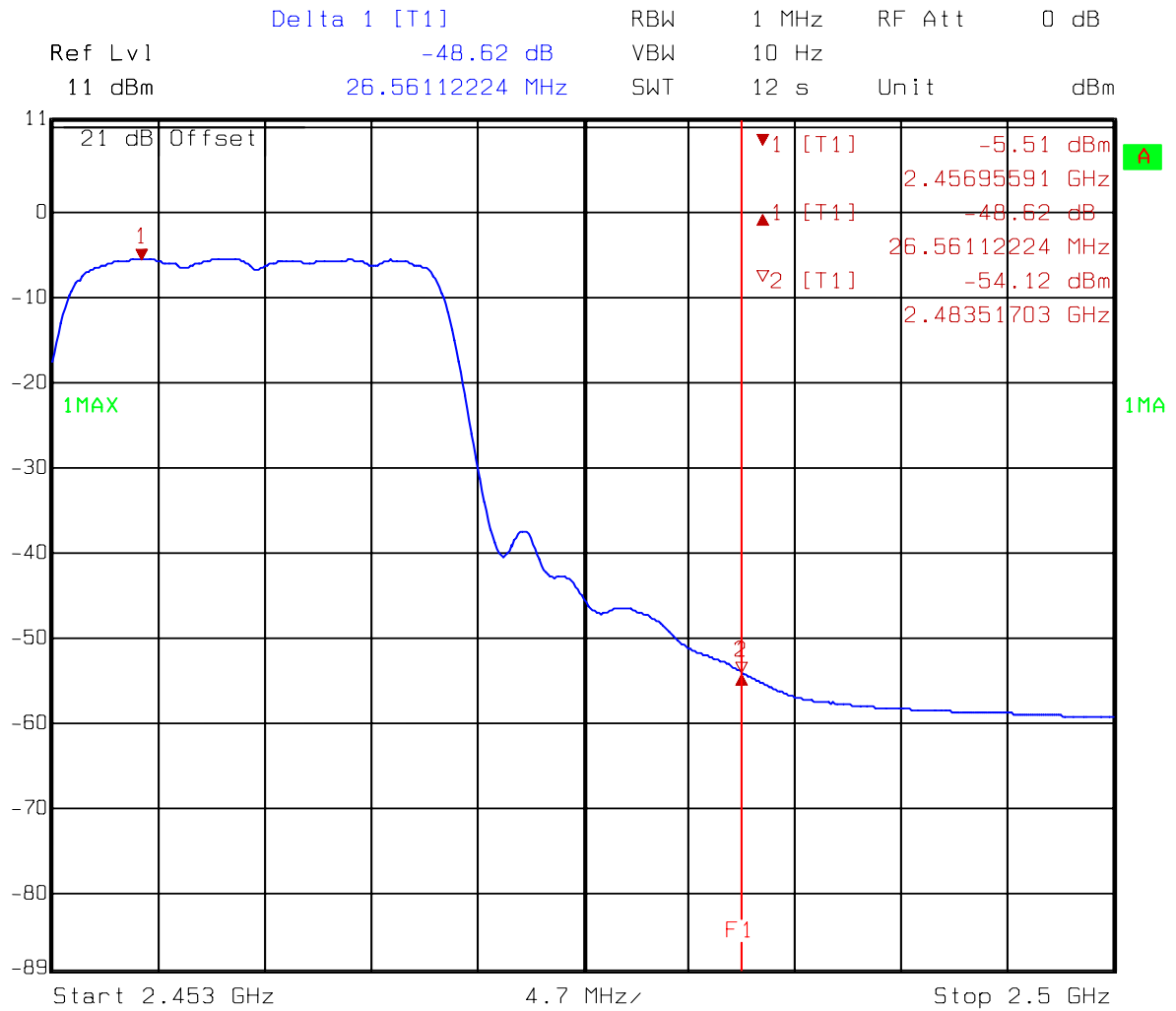
Comment A: Band-edge at 11g_low
 AV F1=2390MHz, F2=2400MHz(EC365)

Date: 21.OCT.2005 09:58:05



Comment A: Band-edge at 11g_high
 PK F1=2483.5MHz(EC365)

Date: 21.OCT.2005 10:57:24



Comment A: Band-edge at 11g_high
 AV F1=2483.5MHz(EC365)

Date: 21.OCT.2005 10:20:45

7.3 Test Result

Test Mode: 802.11b(DSSS Modulation) operating mode

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental @3m (dBuV/m)	Between Carrier Max. Power and Local Max. Emission in Restrict Band (dBc)			
		A	B			
1 (lowest)	PK	121.400	55.80	65.60	74.00	-8.40
	AV	113.010	59.94	53.07	54.00	-0.93
11 (highest)	PK	120.810	54.27	66.54	74.00	-7.46
	AV	112.610	59.42	53.19	54.00	-0.81

Remark: 1. $C = A - B$

2. $E = C - D$

Test Mode: 802.11g(OFDM Modulation) operating mode

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental @3m (dBuV/m)	Between Carrier Max. Power and Local Max. Emission in Restrict Band (dBc)			
		A	B			
1 (lowest)	PK	112.390	51.74	60.65	74.00	-13.35
	AV	99.800	51.43	48.37	54.00	-5.63
11 (highest)	PK	114.580	47.29	67.29	74.00	-6.71
	AV	102.18	48.65	53.53	54.00	-0.47

Remark: 1. $C = A - B$

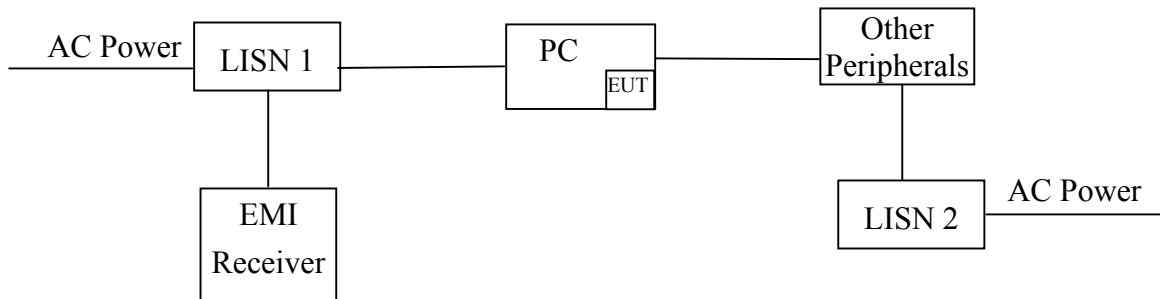
2. $E = C - D$

8. Power Line Conducted Emission test §FCC 15.207

8.1 Operating environment

Temperature: 25 °C
Relative Humidity: 59 %
Atmospheric Pressure 1022 hPa

8.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement. The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

8.3 Emission limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

8.4 Uncertainty of Conducted Emission

Expanded uncertainty (k=2) of conducted emission measurement is 2.6 dB.

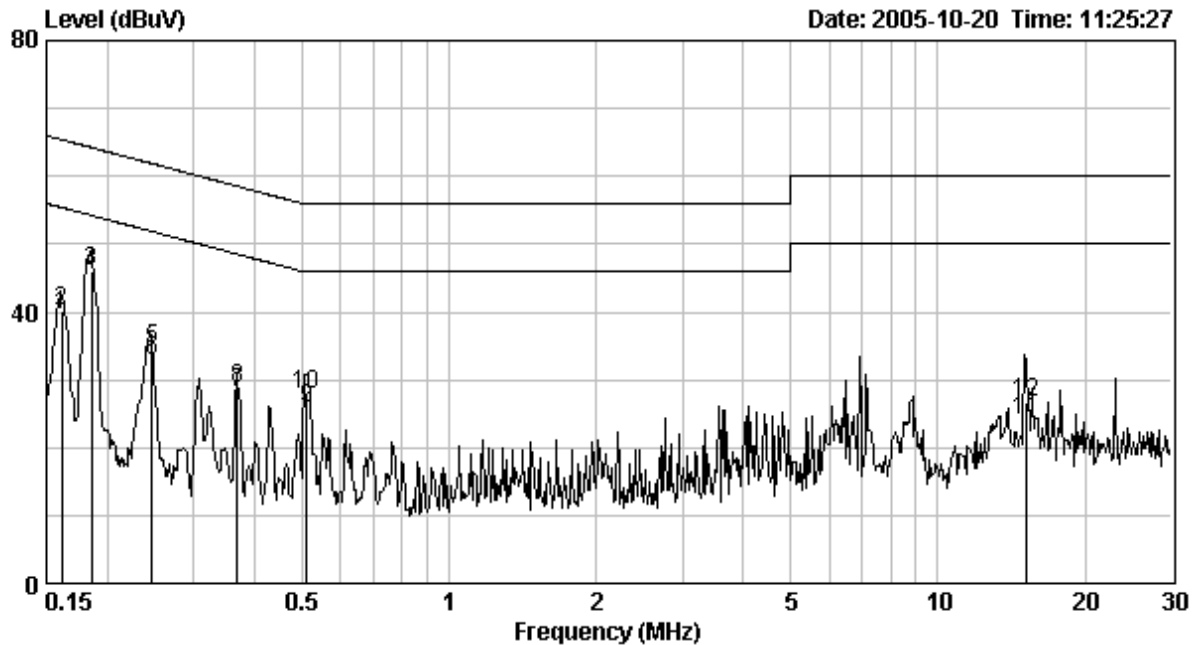
8.5 Power Line Conducted Emission test data

Phase : Line
 EUT : WPG2500
 Test Condition : Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.161	0.10	40.20	65.40	39.56	55.40	-25.20	-15.84
0.186	0.10	46.15	64.23	45.82	54.23	-18.08	-8.41
0.246	0.10	34.51	61.88	32.79	51.88	-27.37	-19.09
0.369	0.10	28.77	58.52	28.12	48.52	-29.75	-20.40
0.512	0.10	27.71	56.00	25.76	46.00	-28.29	-20.24
15.130	0.70	26.70	60.00	24.12	50.00	-33.30	-25.88

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase : Neutral
 EUT : WPG2500
 Test Condition : Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.185	0.10	50.06	64.28	48.87	54.28	-14.22	-5.41
0.247	0.10	32.75	61.85	32.08	51.85	-29.10	-19.77
0.309	0.10	30.83	60.01	30.25	50.01	-29.18	-19.76
0.369	0.10	29.85	58.52	29.75	48.52	-28.67	-18.77
0.510	0.10	27.29	56.00	17.84	46.00	-28.71	-28.16
17.809	0.51	37.13	60.00	28.13	50.00	-22.87	-21.87

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)

