

EMC TEST REPORT

Report No. : EME-050383

Model No. : F5D7230-4

Issued Date : Apr. 28, 2005

Applicant : Arcadyan Technology Corporation
4F, No. 9, Park Avenue II, Science-based Industrial Park,
Hsinchu 300, Taiwan

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

This test report consists of 51 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Intertek Laboratory. The test result(s) in this report only applies to the tested sample(s).

Project Engineer

Jackey Chiu

Jackey Chiu

Reviewed By

Jerry Liu

Jerry Liu

Table of Contents

Summary of Tests	3
1. General information	4
1.1 Identification of the EUT	4
1.2 Additional information about the EUT	4
1.3 Antenna description	5
1.4 Peripherals equipment	5
2. Test specifications	6
2.1 Test standard	6
2.2 Operation mode	6
2.3 Test equipment	7
3. Minimum 6dB Bandwidth test	8
3.1 Operating environment	8
3.2 Test setup & procedure	8
3.3 Measured data of Minimum 6dB Bandwidth test results	8
4. Maximum Output Power test	15
4.1 Operating environment	15
4.2 Test setup & procedure	15
4.3 Measured data of Maximum Output Power test results	15
5. Radiated Emission test	16
5.1 Operating environment	16
5.2 Test setup & procedure	16
5.3 Emission limits	17
5.4 Radiated spurious emission test data	18
5.4.1 Measurement results: frequencies equal to or less than 1 GHz	18
5.4.2 Measurement results: frequency above 1GHz	20
6. Power Spectrum Density test	26
6.1 Operating environment	26
6.2 Test setup & procedure	26
6.3 Measured data of Power Spectrum Density test results	26
7. Emission on the band edge §FCC 15.247(C)	33
7.1 Band-edge (Conducted method)	34
7.2 Band-edge (Radiated method)	38
8. Power Line Conducted Emission test §FCC 15.207	46
8.1 Operating environment	46
8.2 Test setup & procedure	46
8.3 Emission limit	47
8.4 Uncertainty of Conducted Emission	47
8.5 Power Line Conducted Emission test data	48

Summary of Tests**802.11g Wireless DSL/Cable Gateway Router-Model: F5D7230-4
FCC ID: RAXWG4005FB**

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(d)	Complies
Power Line Conducted Emission test	15.207	Complies

1. General information

1.1 Identification of the EUT

Applicant	: Arcadyan Technology Corporation
Product	: 802.11g Wireless DSL/Cable Gateway Router
Model No.	: F5D7230-4
FCC ID.	: RAXWG4005FB
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	: 1. 120Vac, 60Hz with adapter (Model: DV-91A) 2. 120Vac, 60Hz with adapter (Model: 480910003CT)
Power Cord	: N/A
Data Cable:	: 1. RJ-45 UTP Cat.5 1.8meter × 4 2. RJ-45 UTP Cat.5 3meter × 1
Sample Received	: Apr. 25, 2005
Test Date(s)	: Apr. 26, 2005 ~ Apr. 27, 2005

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is an 802.11g Wireless DSL/Cable Gateway Router, and was defined as radio and telecommunications terminal equipment.

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

1.3 Antenna description

Main:

The EUT uses a permanently connected antenna.

Antenna Gain : 2dBi max

Antenna Type : Dipole antenna

Connector Type : N/A

AUX:

The EUT uses a permanently connected antenna.

Antenna Gain : 2dBi max

Antenna Type : PCB Printed

Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.
Notebook PC	IBM	R51	99XML12
Notebook PC	DELL	PP05L	CN-0G5152-48643-498-6810

Dummy Load: 100

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

Plug the EUT was supplied with adapter and run the test program “art.exe” under windows OS, which provide by manufacturer.

During conducted emission test, the EUT was in normal mode communicating with IBM Notebook PC. While in other test, it worked in the status of continuously transmitting.

With individual verifying, the maximum output power were found at 11Mbps data rate for 802.11b mode and 6Mbps data rate for 802.11g mode. The final tests were executed under these conditions recorded in this report individually.

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	04/13/2006
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	07/14/2005
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/13/2005
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	10/18/2005
Horn Antenna	EMCO	1GHz~18GHz	3115	EC338	08/16/2005
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC351	07/08/2005
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	05/20/2005
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	4/13/2006
Pre-Amplifier	MITEQ	26GHz~40GHz	828825	EC374	1/28/2006
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/ MA2491A	EC396	10/18/2005
Controller	HDGmbH	N/A	HD 100	EP317-1	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP317-2	N/A
Turn Table	HDGmbH	N/A	DS 420S	EP317-3	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	01/14/2006

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

3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 20
 Relative Humidity: 65 %
 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

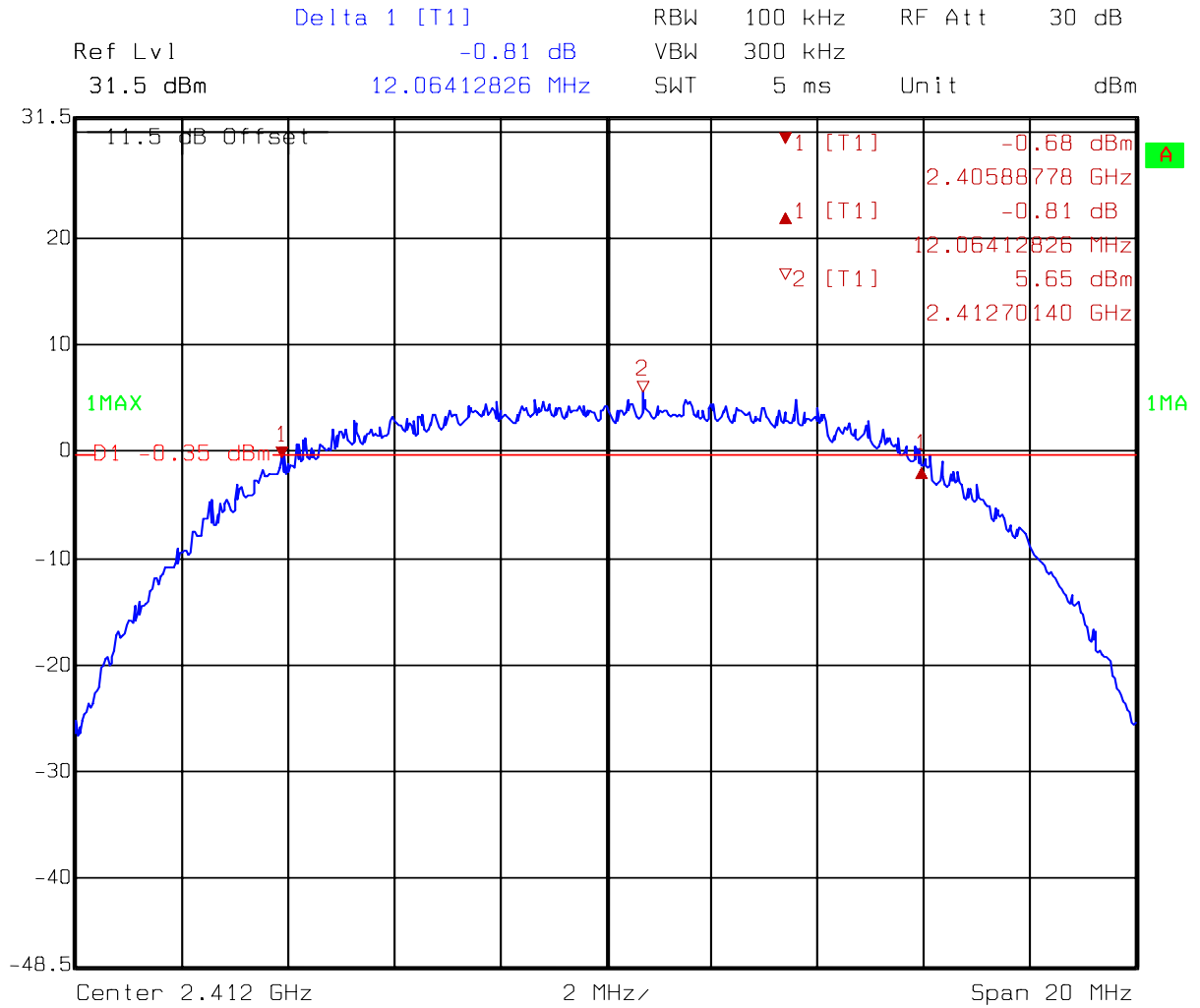
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	12.06	> 500kHz
6 (middle)	2437	11.82	> 500kHz
11 (highest)	2462	12.26	> 500kHz

Test Mode: 802.11g (OFDM Modulation) operating mode

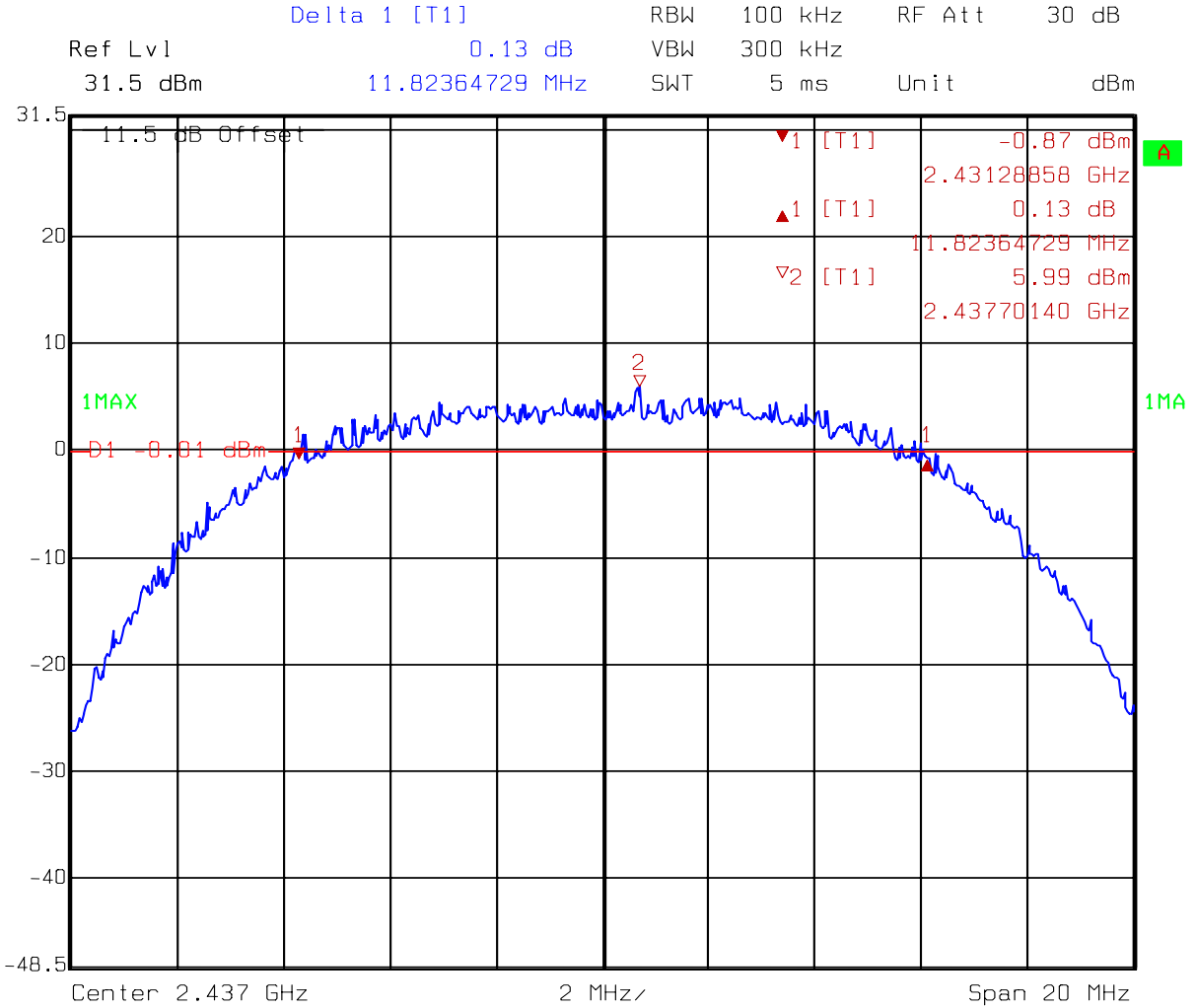
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	16.59	> 500kHz
6 (middle)	2437	16.59	> 500kHz
11 (highest)	2462	16.63	> 500kHz

Please see the plot below.

Test Mode: 802.11b(DSSS Modulation) operating mode

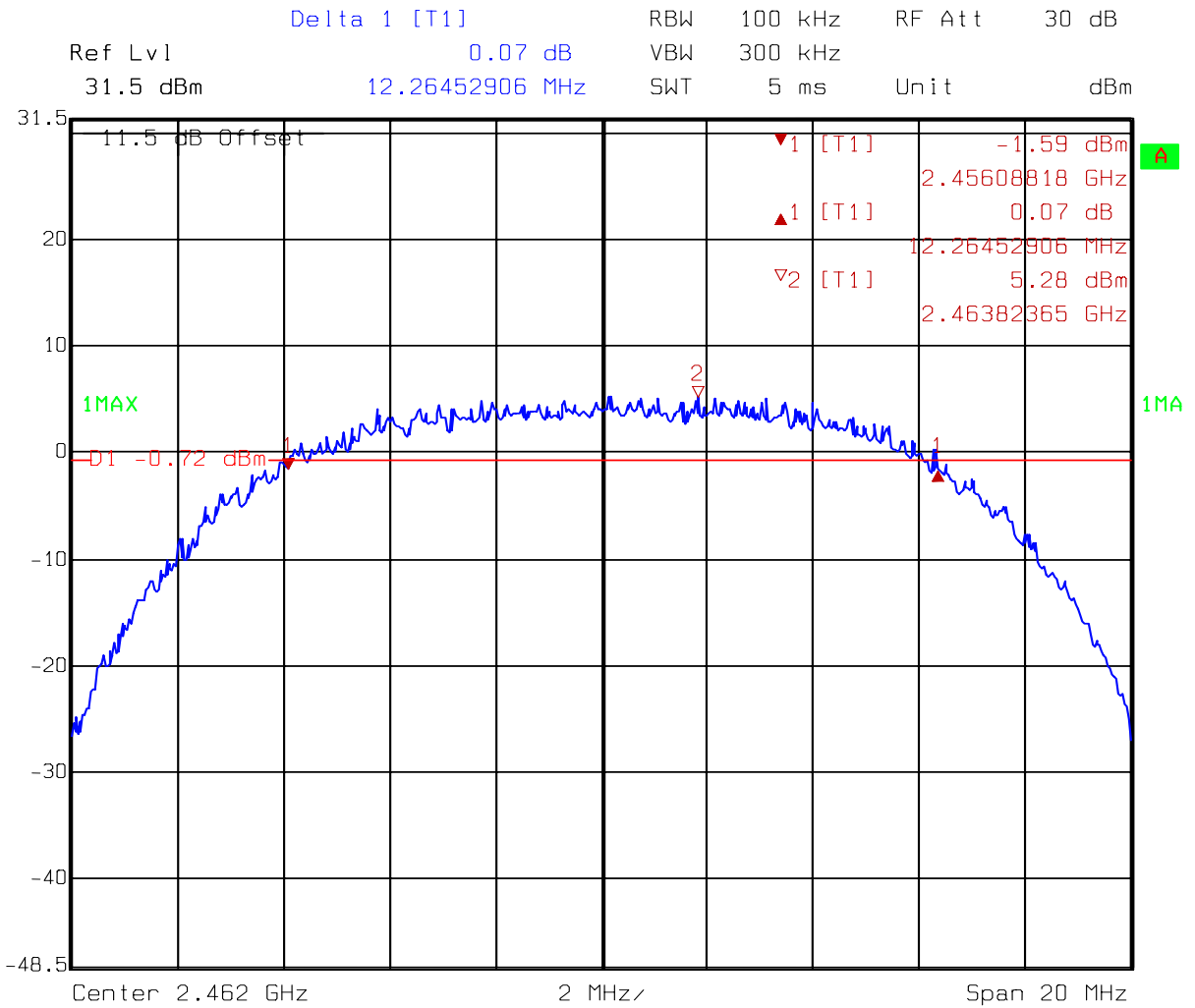


Comment A: 6dB bandwidth at ch 1 (EC365) 802.11b
 Date: 27.APR.2005 13:59:55



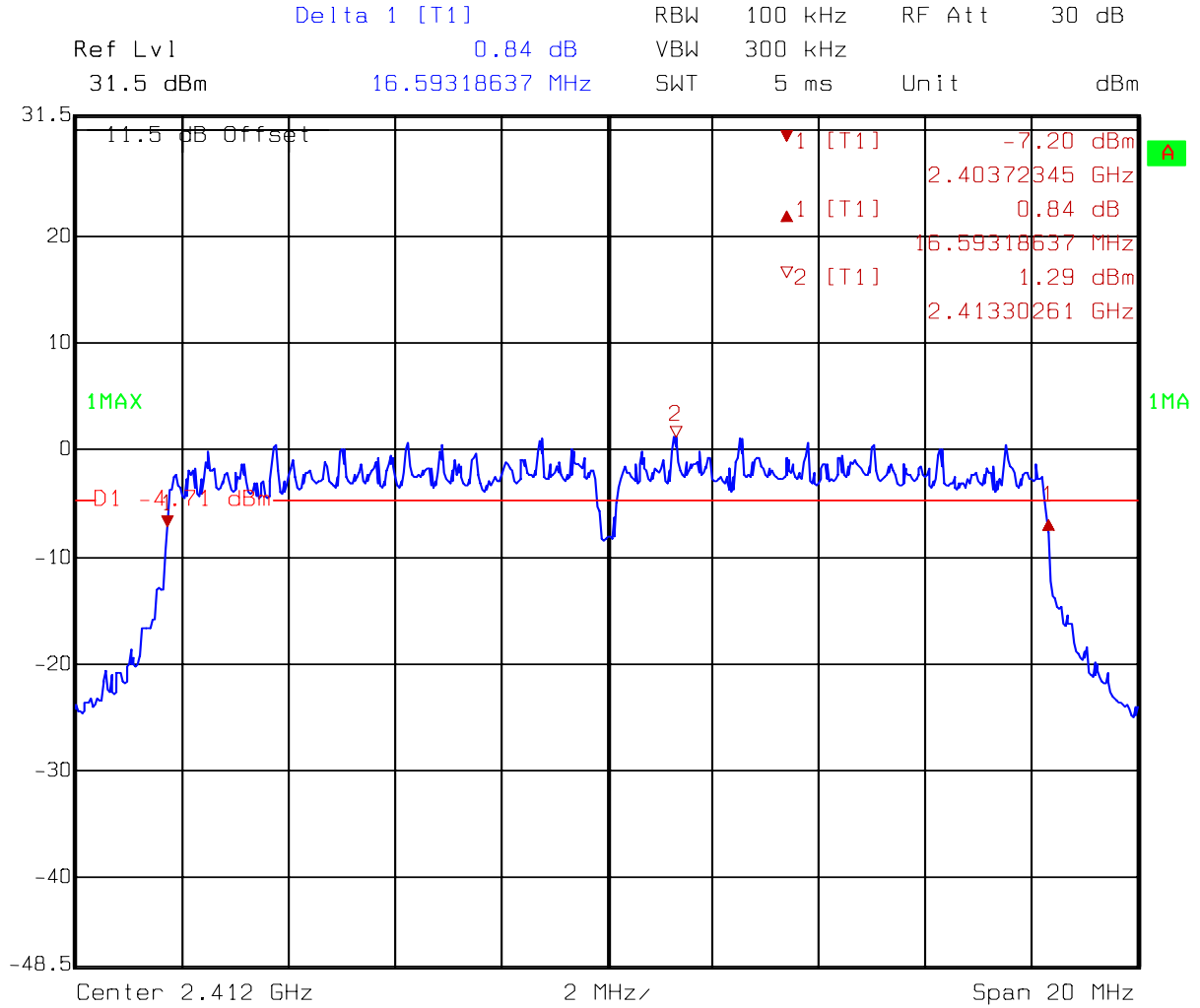
Comment A: 6dB bandwidth at ch 6 (EC365) 802.11b

Date: 27.APR.2005 13:57:32

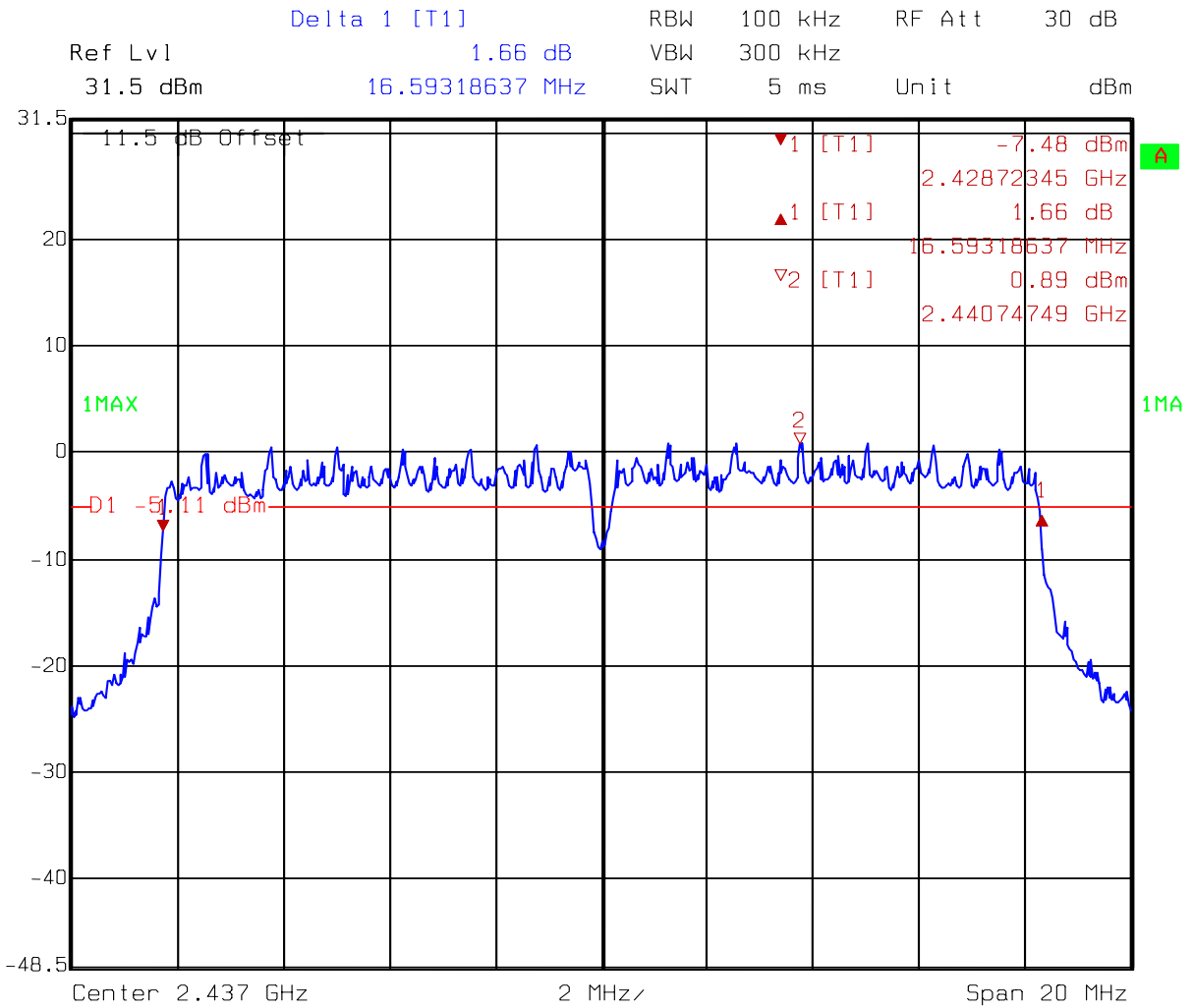


Comment A: 6dB bandwidth at ch 11 (EC365) 802.11b
 Date: 27.APR.2005 13:58:55

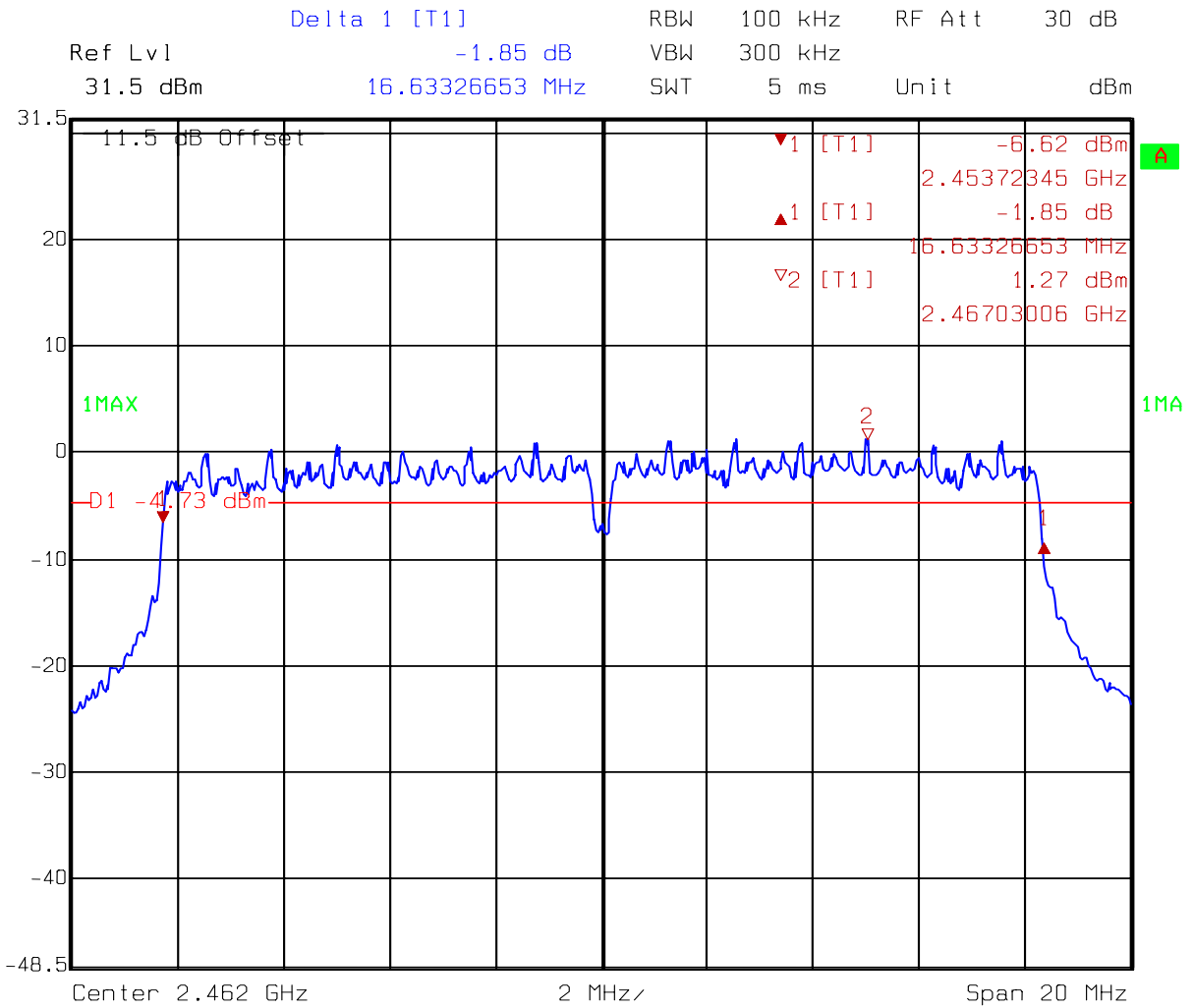
Test Mode: 802.11g(OFDM Modulation) operating mode



Comment A: 6dB bandwidth at ch 1 (EC365) 802.11g
Date: 27.APR.2005 14:01:22



Comment A: 6dB bandwidth at ch 6 (EC365) 802.11g
 Date: 27.APR.2005 14:02:22



4. Maximum Output Power test

4.1 Operating environment

Temperature: 20
 Relative Humidity: 65 %
 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 (1.5dB) 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

Test Mode: 802.11b (DSSS Modulation) operating mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (dBm)
				(dBm)	(mW)	
1 (lowest)	2412	1.5	19.89	21.39	137.72	30
6 (middle)	2437	1.5	20.34	21.84	152.76	30
11 (highest)	2462	1.5	20.08	21.58	143.88	30

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 (dBm)
				(dBm)	(mW)	
1 (lowest)	2412	1.5	20.32	21.82	152.05	30
6 (middle)	2437	1.5	20.59	22.09	161.81	30
11 (highest)	2462	1.5	20.65	22.15	164.06	30

Remark:

Conducted Peak Output Power = Reading + C.L.

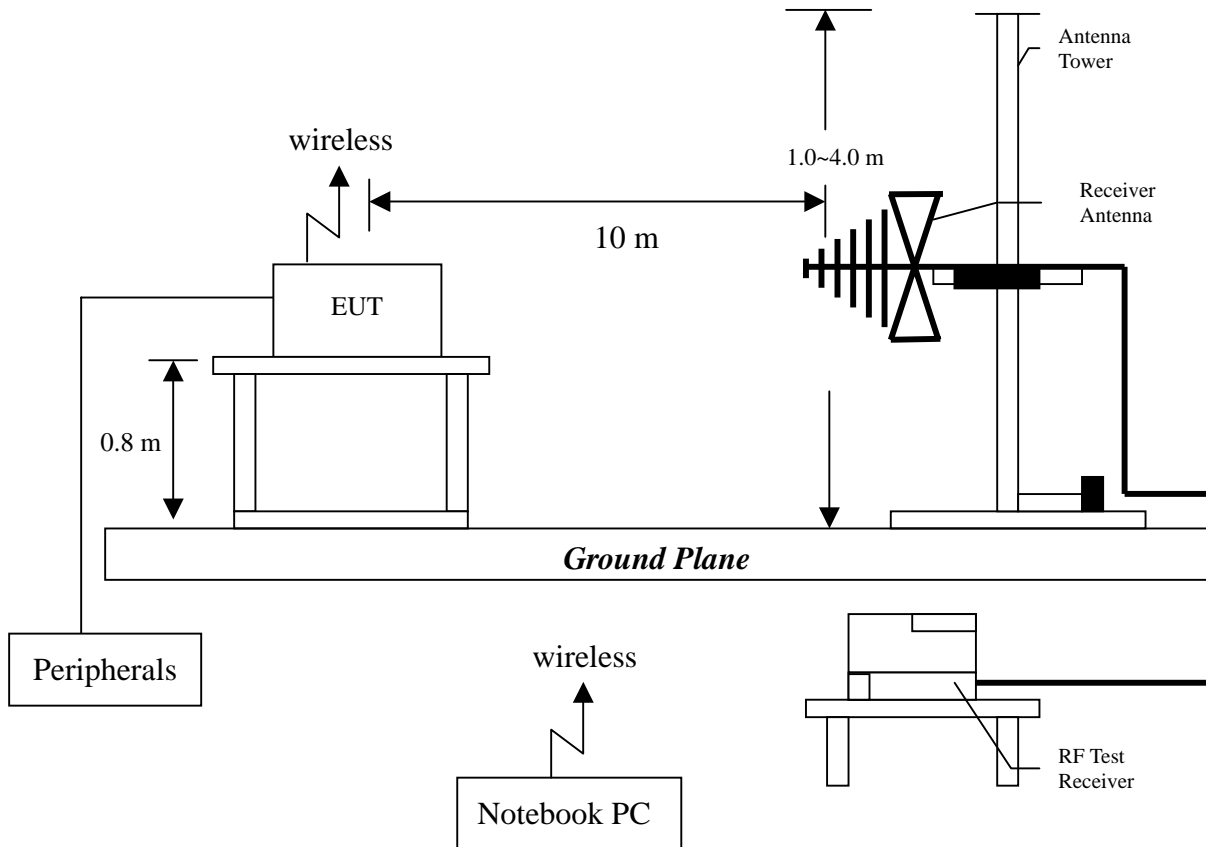
5. Radiated Emission test

5.1 Operating environment

Temperature: 20
Relative Humidity: 65 %
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 three 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

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

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

EUT : F5D7230-4
 Worst Case : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBUV)	Corrected Level (dBUV)	Limit @ 3 m (dBUV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
47.500	QP	V	13.05	21.80	34.85	40.00	-5.15	100	270
59.100	QP	V	12.90	19.50	32.40	40.00	-7.60	100	250
68.800	QP	V	12.94	19.60	32.54	40.00	-7.46	100	220
183.300	QP	V	13.55	19.60	33.15	43.50	-10.35	100	310
276.400	QP	V	13.38	21.10	34.48	46.00	-11.52	100	330
499.500	QP	V	18.61	11.70	30.31	46.00	-15.69	100	240
183.300	QP	H	13.55	17.70	31.25	43.50	-12.25	175	240
257.000	QP	H	12.85	19.80	32.65	46.00	-13.35	150	273
276.400	QP	H	13.38	23.20	36.58	46.00	-9.42	163	235
499.500	QP	H	18.61	11.10	29.71	46.00	-16.29	135	300
625.500	QP	H	21.32	9.40	30.72	46.00	-15.28	220	297
802.100	QP	H	23.89	6.40	30.29	46.00	-15.71	205	210

Remark:

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

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

EUT : F5D7230-4
 Worst Case : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBUV)	Corrected Level (dBUV)	Limit @ 3 m (dBUV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
47.500	QP	V	13.05	20.70	33.75	40.00	-6.25	100	165
59.100	QP	V	12.90	19.60	32.50	40.00	-7.50	100	230
138.600	QP	V	13.34	19.70	33.04	43.50	-10.46	100	220
183.300	QP	V	13.55	20.90	34.45	43.50	-9.05	100	170
276.400	QP	V	13.38	19.70	33.08	46.00	-12.92	100	195
625.500	QP	V	21.32	10.60	31.92	46.00	-14.08	150	183
165.800	QP	H	14.92	13.30	28.22	43.50	-15.28	220	120
183.300	QP	H	13.55	17.70	31.25	43.50	-12.25	180	300
276.400	QP	H	13.38	21.20	34.58	46.00	-11.42	165	220
375.300	QP	H	15.81	12.50	28.31	46.00	-17.69	200	80
499.500	QP	H	18.61	11.90	30.51	46.00	-15.49	210	160
625.500	QP	H	21.32	11.10	32.42	46.00	-13.58	180	120

Remark:

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

5.4.2 Measurement results: frequency above 1GHz

EUT : F5D7230-4

Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
3196.00	PK	V	35.54	38.78	47.97	51.21	54	-2.79	100.00	181.00
4824.00	PK	V	36.07	41.64	53.16	58.73	74	-15.27	100.00	173.00
4824.00	AV	V	36.07	41.64	39.17	44.74	54	-9.26	100.00	173.00
9636.00	PK	V	34.28	48.44	38.94	53.1	54	-0.9	100.00	165.00
3200.00	PK	H	35.54	38.78	41.83	45.07	54	-8.93	100.00	154.00
4824.00	PK	H	36.07	41.64	46.98	52.55	54	-1.45	100.00	158.00
9636.00	PK	H	34.28	48.44	37.62	51.78	74	-22.22	100.00	155.00

Remark:

1. Corrected Level = Reading + Correction Factor - Preamp
2. Correction Factor = Antenna Factor + Cable Loss
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 : F5D7230-4
Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2437.00	PK	V	0	30.31	74.93	105.24	-	-	-	-
2437.00	AV	V	0	30.31	68.97	99.28	-	-	-	-
3222.10	PK	V	35.54	38.78	48.82	52.06	79.28	-27.22	102.00	168.00
4874.00	PK	V	36.07	41.64	53.62	59.19	74.00	-14.81	111.00	143.00
4874.00	AV	V	36.07	41.64	39.98	45.55	54.00	-8.45	111.00	143.00
9748.06	PK	V	34.28	48.44	44.11	58.27	99.28	-41.01	156.00	194.00
9748.06	AV	V	34.28	48.44	40.19	54.35	79.28	-24.93	156.00	194.00
3228.00	PK	H	35.54	38.78	43.58	46.82	79.28	-32.46	121.00	175.00
4874.00	PK	H	36.07	41.64	52.68	58.25	74.00	-15.75	101.00	211.00
4874.00	AV	H	36.07	41.64	39.03	44.6	54.00	-9.40	101.00	211.00
9748.00	PK	H	34.28	48.44	36.21	50.37	79.28	-28.91	105.00	188.00

Remark:

1. Corrected Level = Reading Level + Correction Factor - Preamp
2. Correction Factor = Antenna Factor + Cable Loss
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 : F5D7230-4

Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
3282.52	PK	V	35.54	38.78	52.1	55.34	74	-18.66	100.00	145.00
3282.52	AV	V	35.54	38.78	50.33	53.57	54	-0.43	100.00	145.00
4924.00	PK	V	36.07	41.64	54.43	60.00	74	-14.00	100.00	264.00
4924.00	AV	V	36.07	41.64	40.99	46.56	54	-7.44	100.00	264.00
9848.00	PK	V	34.28	48.44	38.96	53.12	54	-0.88	100.00	235.00
3272.00	PK	H	35.54	38.78	45.01	48.25	54	-5.75	102.00	221.00
9848.00	PK	H	34.28	48.44	38.52	52.68	54	-1.32	101.00	219.00

Remark:

1. Corrected Level = Reading Level + Correction Factor - Preamp
2. Correction Factor = Antenna Factor + Cable Loss
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 : F5D7230-4

Test Condition : 802.11g Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
3188.00	PK	V	35.54	38.78	47.37	50.61	54	-3.39	100.00	174.00
4824.00	PK	V	36.07	41.64	46.34	51.91	54	-2.09	100.00	154.00
9636.00	PK	V	34.28	48.44	37.30	51.46	54	-2.54	102.00	166.00
3188.00	PK	H	35.54	38.78	41.97	45.21	54	-8.79	100.00	189.00

Remark:

1. Corrected Level = Reading + Correction Factor - Preamp
2. Correction Factor = Antenna Factor + Cable Loss
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 : F5D7230-4

Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
3216.00	PK	V	35.54	38.78	49.84	53.08	54	-0.92	105.00	145.00
4876.00	PK	V	36.07	41.64	47.97	53.54	54	-0.46	107.00	168.00
9748.00	PK	V	34.28	48.44	36.3	50.46	54	-3.54	105.00	179.00
1624.40	PK	H	35.59	28.76	64.39	57.56	74	-16.44	100.00	55.00
1624.40	AV	H	35.59	28.76	58.86	52.03	54	-1.97	100.00	55.00
3216.00	PK	H	35.54	38.78	44.22	47.46	54	-6.54	120.00	154.00
4876.00	PK	H	36.07	41.64	47.45	53.02	54	-0.98	100.00	68.00

Remark:

1. Corrected Level = Reading Level + Correction Factor - Preamp
2. Correction Factor = Antenna Factor + Cable Loss
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 : F5D7230-4

Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
2462.00	PK	V	0	30.31	76.4	106.71	-	-	-	-
2462.00	AV	V	0	30.31	65.01	95.32	-	-	-	-
3282.74	PK	V	35.54	38.78	52.80	56.04	95.32	-39.28	100.00	147.00
3282.74	AV	V	35.54	38.78	51.30	54.54	75.32	-20.78	100.00	147.00
4924.00	PK	V	36.07	41.64	47.93	53.5	54.00	-0.5	100.00	142.00
1641.36	PK	H	35.59	28.76	63.89	57.06	95.32	-38.26	100.00	64.00
1641.36	AV	H	35.59	28.76	57.92	51.09	75.32	-24.23	100.00	64.00
3282.74	PK	H	35.54	38.78	46.85	50.09	75.32	-25.23	101.00	211.00
4924.00	PK	H	36.07	41.64	47.38	52.95	54.00	-1.05	100.00	241.00

Remark:

1. Corrected Level = Reading Level + Correction Factor - Preamp
2. Correction Factor = Antenna Factor + Cable Loss
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: 20
 Relative Humidity: 55 %
 Atmospheric Pressure 1023 hPa

6.2 Test setup & procedure

The power spectrum density per FCC §15.247(d) 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 and cable loss (1.5dB)/external attenuator (3dB) 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

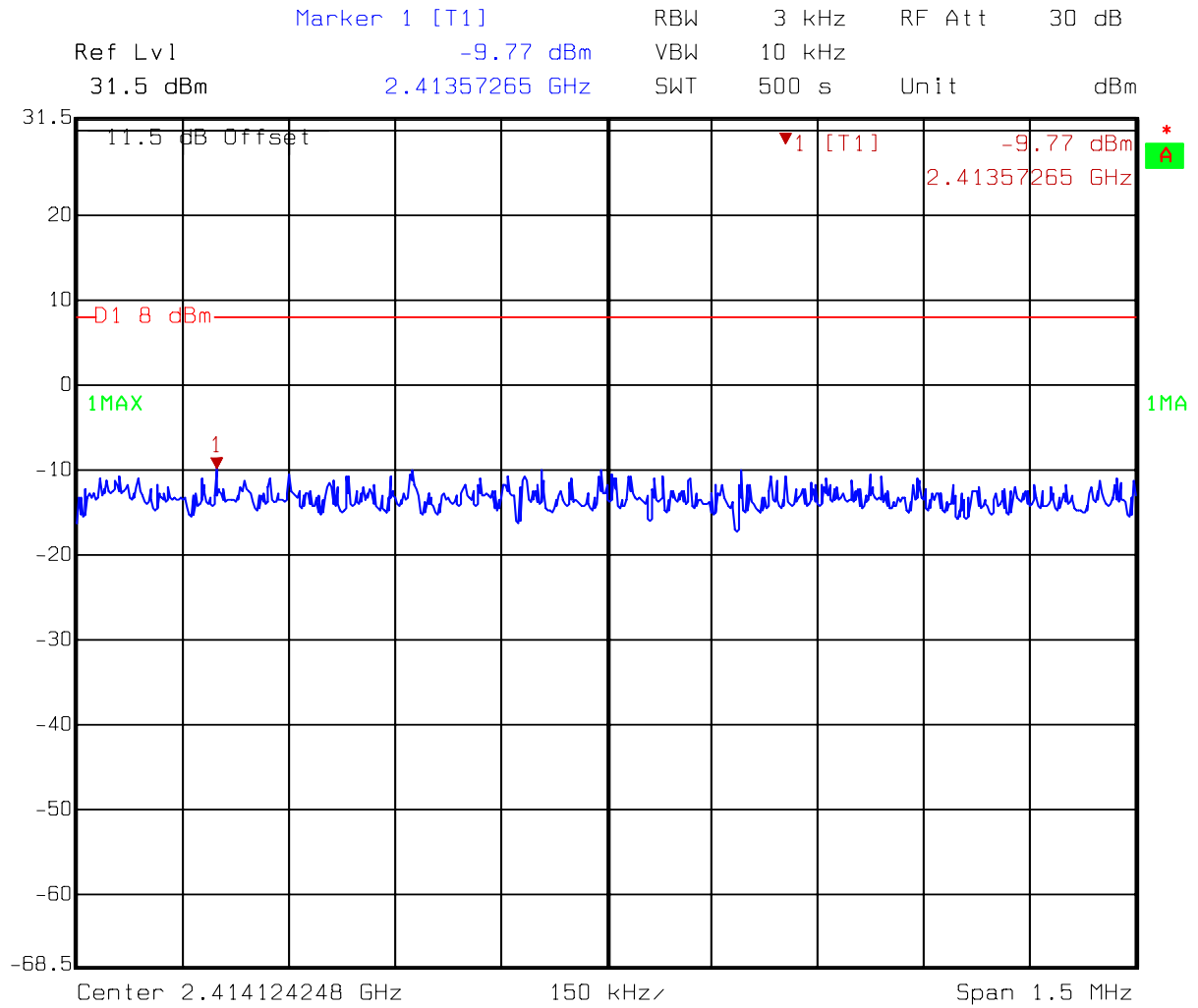
Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	-9.77	8
6 (middle)	2437	-8.85	8
11 (highest)	2462	-5.76	8

Test Mode: 802.11b (DSSS Modulation) operating mode

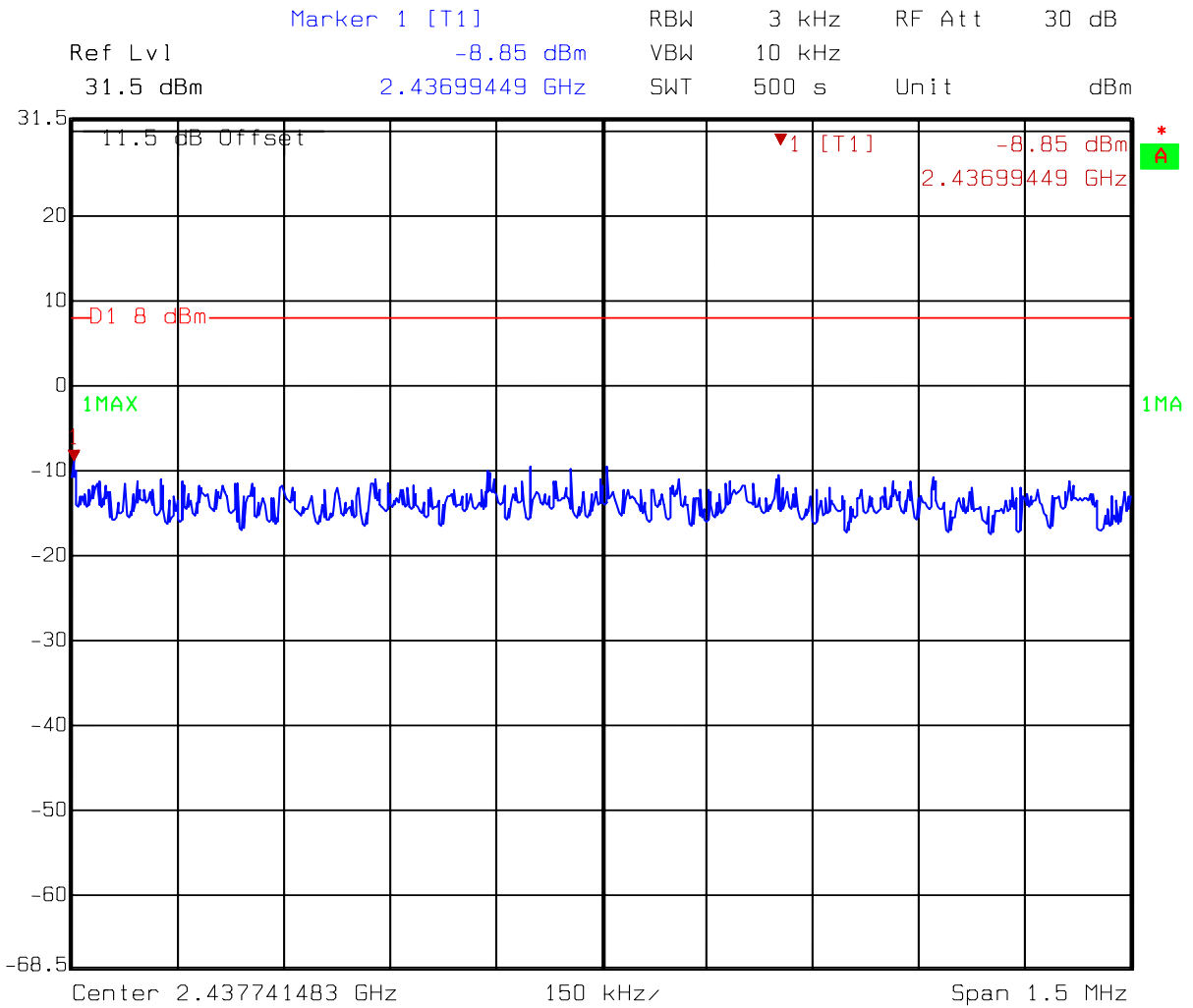
Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	-28.42	8
6 (middle)	2437	-14.28	8
11 (highest)	2462	-11.73	8

Please see the plot below.

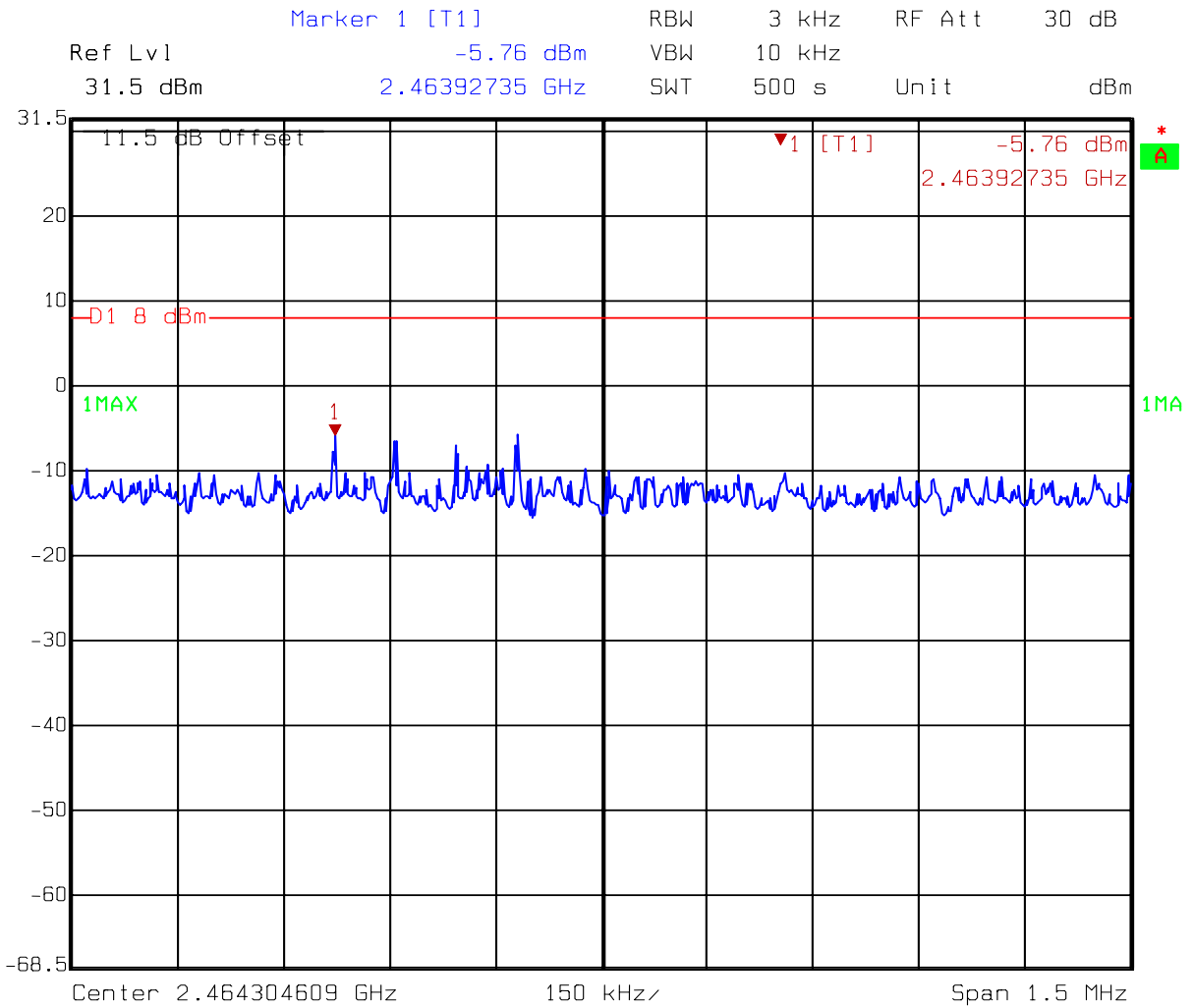
Test Mode: 802.11b (DSSS Modulation) operating mode



Comment A: Power spectrum density at ch1
ATT=3dB CL=1.5dB (EC365) 802.11b
Date: 27.APR.2005 14:09:30

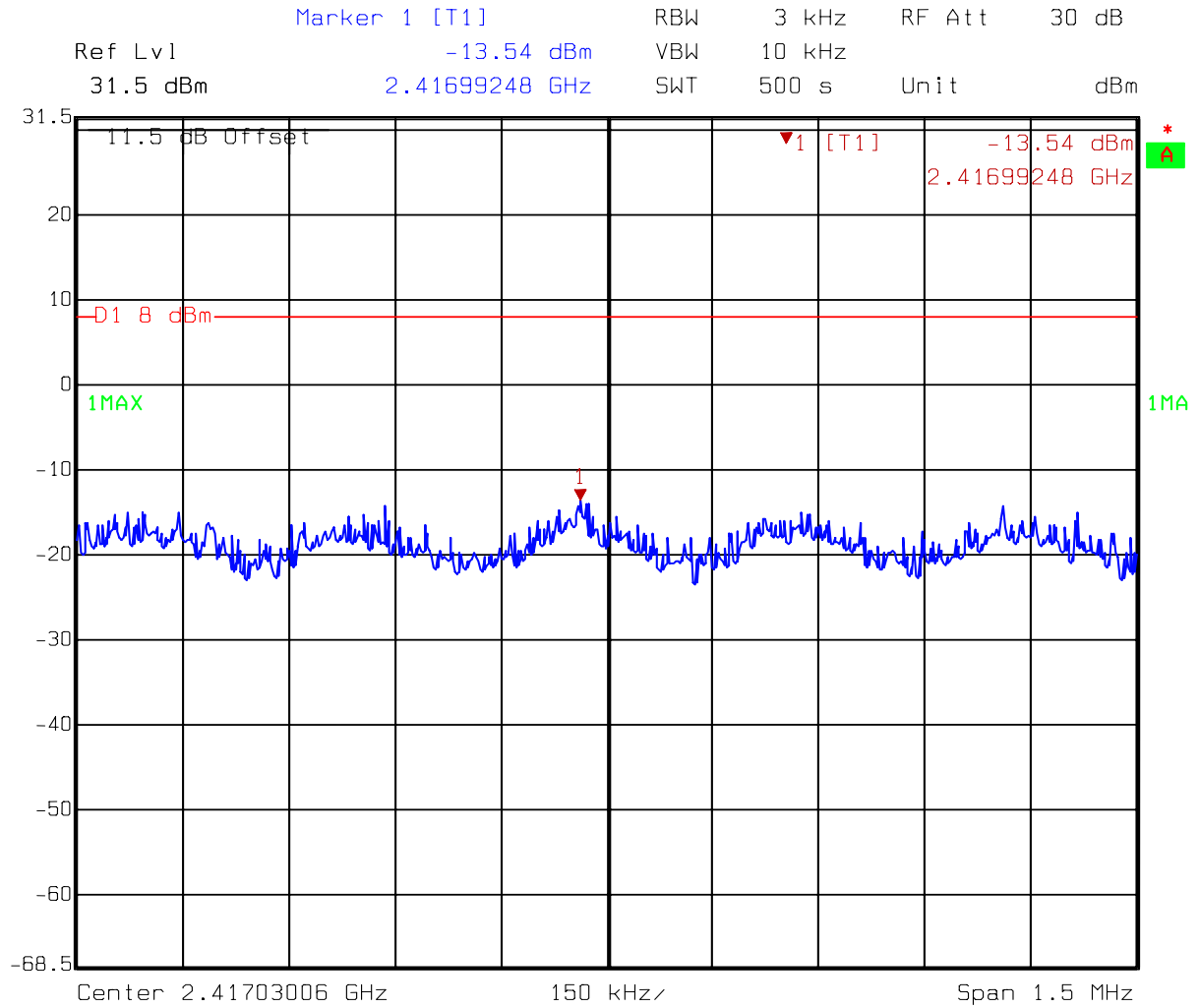


Comment A: Power spectrum density at ch6
 ATT=3dB CL=1.5dB (EC365) 802.11b
 Date: 27.APR.2005 14:10:38



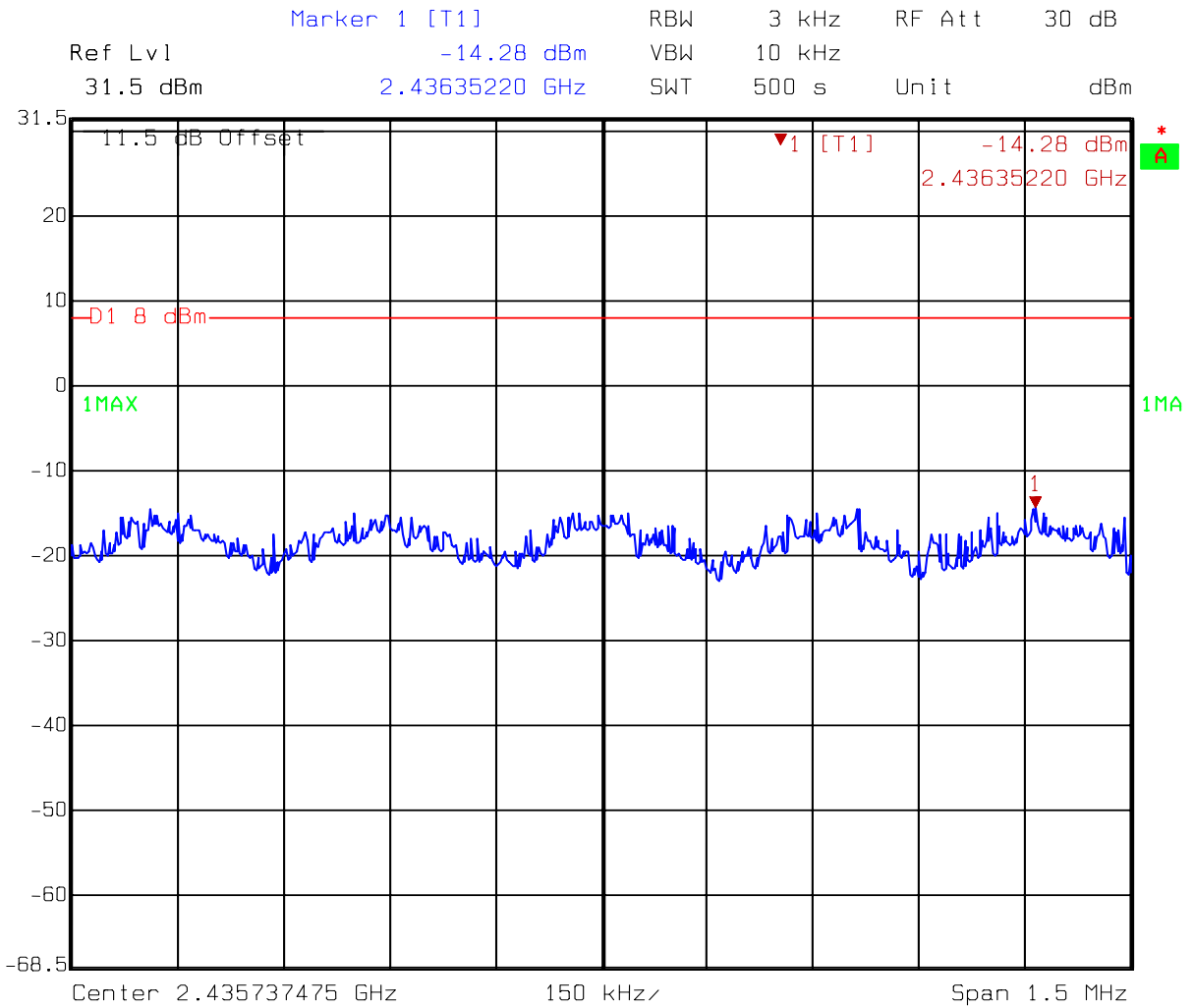
Comment A: Power spectrum density at ch11
 ATT=3dB CL=1.5dB (EC365) 802.11b
 Date: 27.APR.2005 14:11:56

Test Mode: 802.11g (OFDM Modulation) operating mode

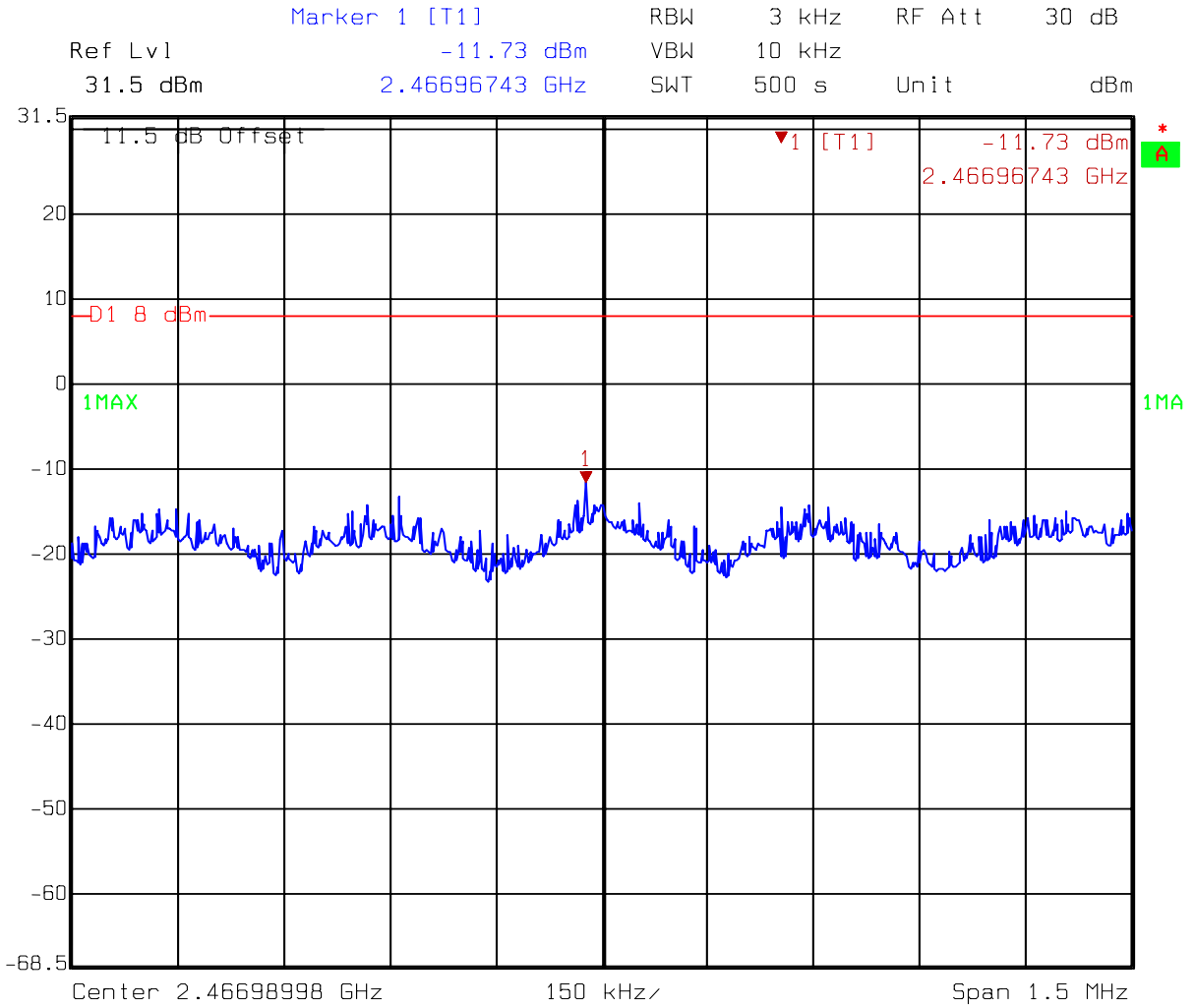


Comment A: Power spectrum density at ch1
ATT=3dB CL=1.5dB (EC365) 802.11g

Date: 27.APR.2005 14:16:53



Comment A: Power spectrum density at ch6
 ATT=3dB CL=1.5dB (EC365) 802.11g
 Date: 27.APR.2005 14:13:26



Comment A: Power spectrum density at ch11
 ATT=3dB CL=1.5dB (EC365) 802.11g
 Date: 27.APR.2005 14:15:39

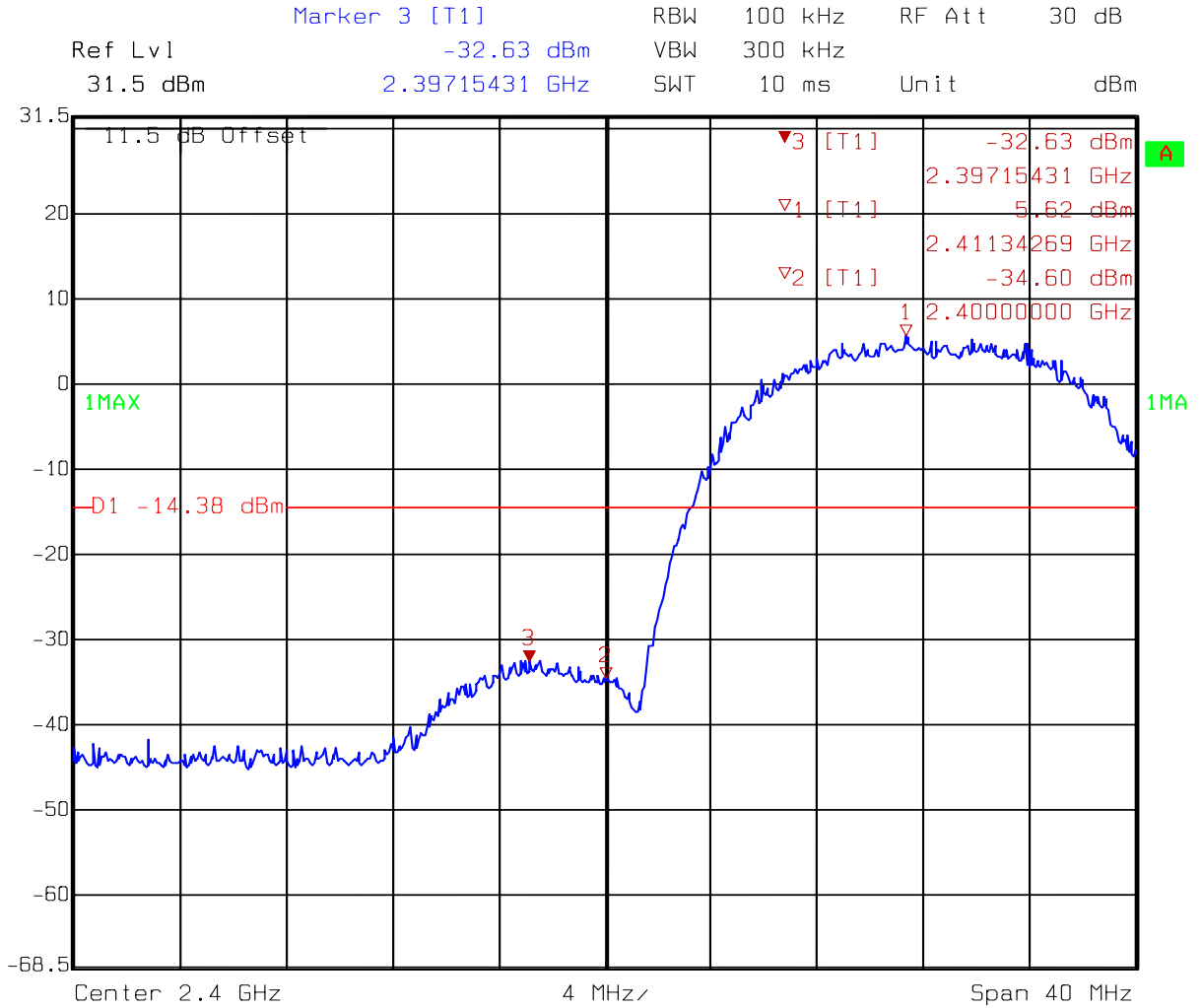
7. Emission on the band edge §FCC 15.247(C)

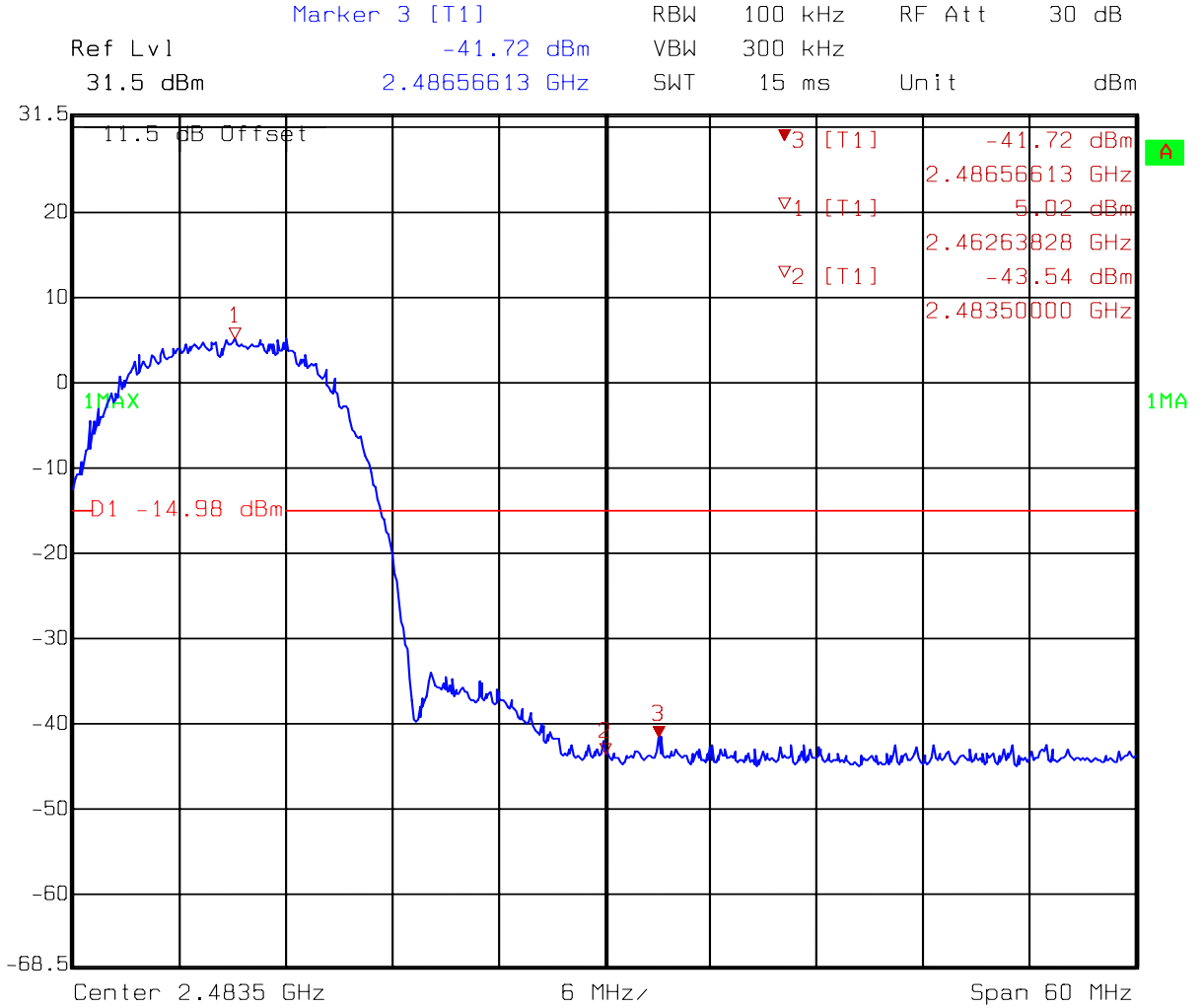
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Please see the plot below.

7.1 Band-edge (Conducted method)

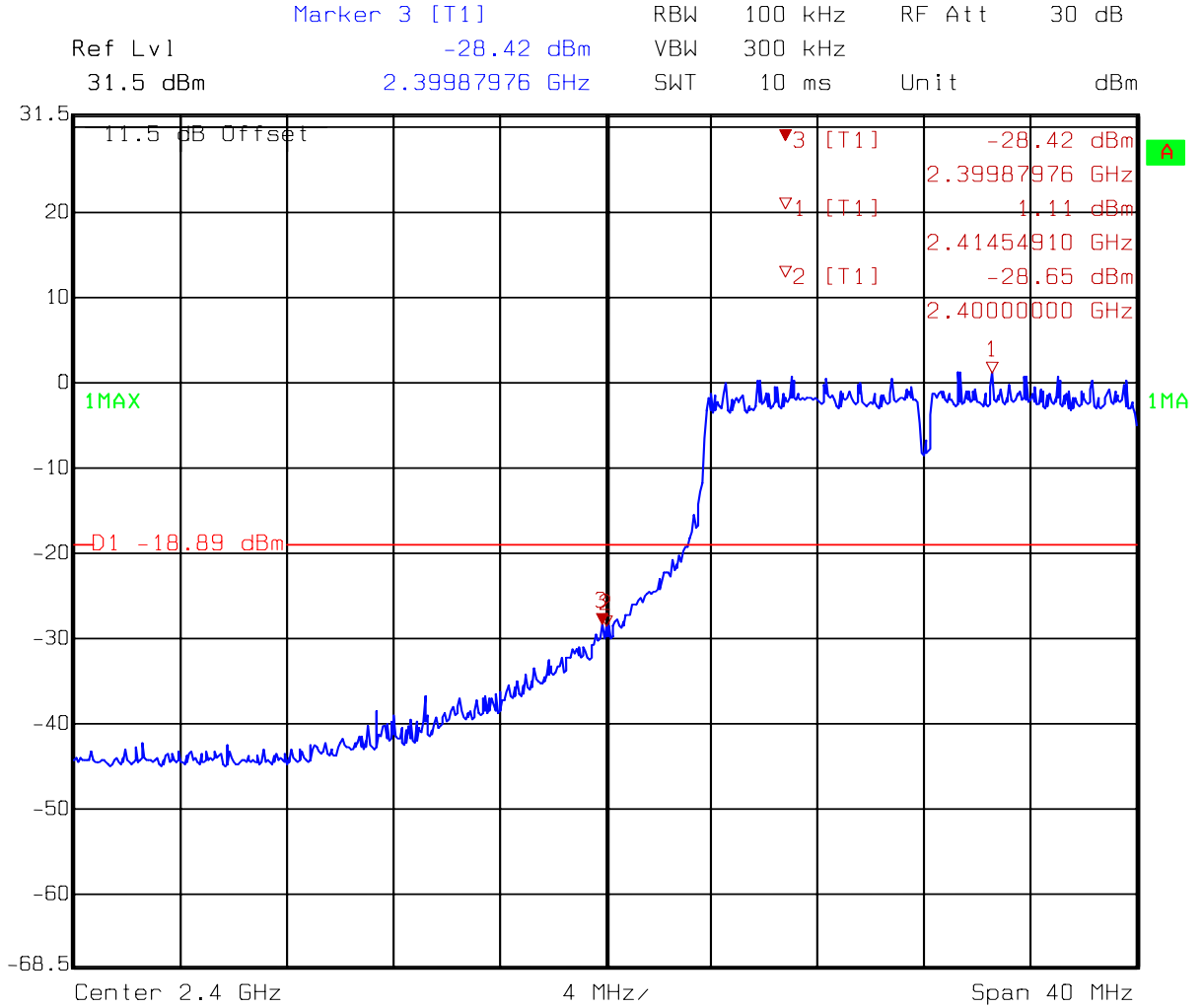
Test Mode: 802.11b (DSSS Modulation) operating mode



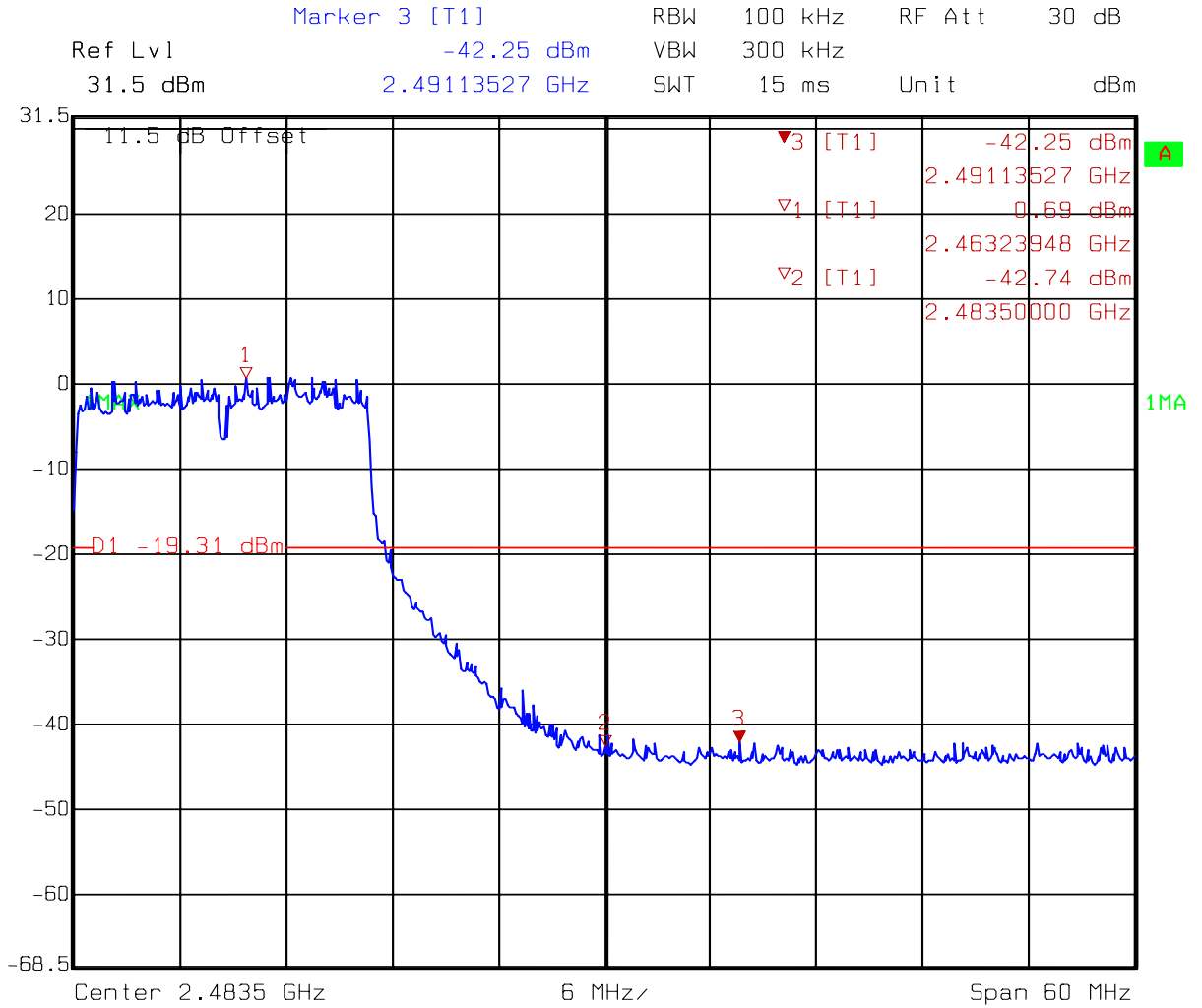


Comment A: Band-edge at ch11 (EC365) 802.11b
Date: 27.APR.2005 14:07:21

Test Mode: 802.11g (OFDM Modulation) operating mode



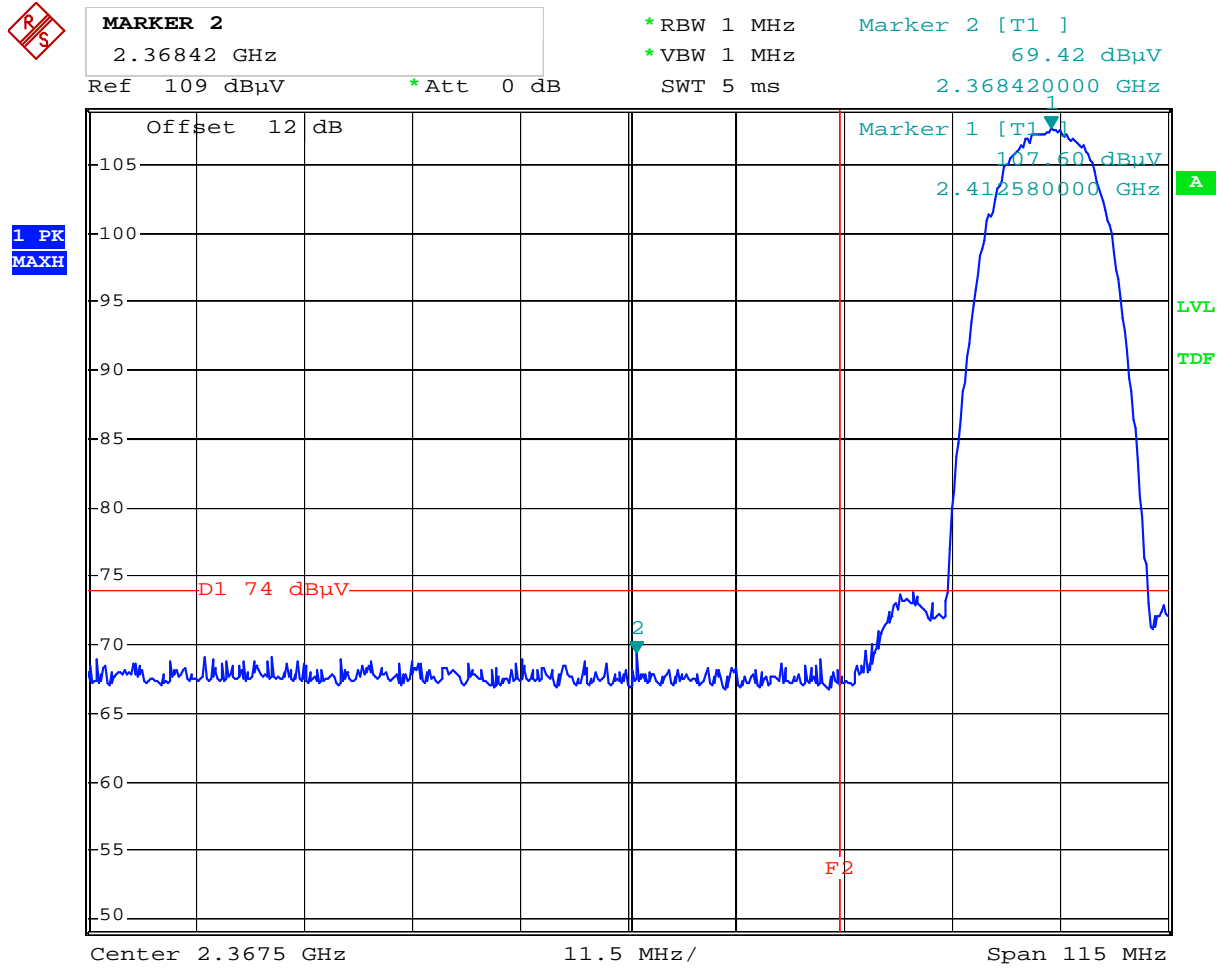
Comment A: Band-edge at ch1 (EC365) 802.11g
Date: 27.APR.2005 14:05:42



Comment A: Band-edge at ch11 (EC365) 802.11g
 Date: 27.APR.2005 14:04:51

7.2 Band-edge (Radiated method)

Test Mode: 802.11b (DSSS Modulation) operating mode



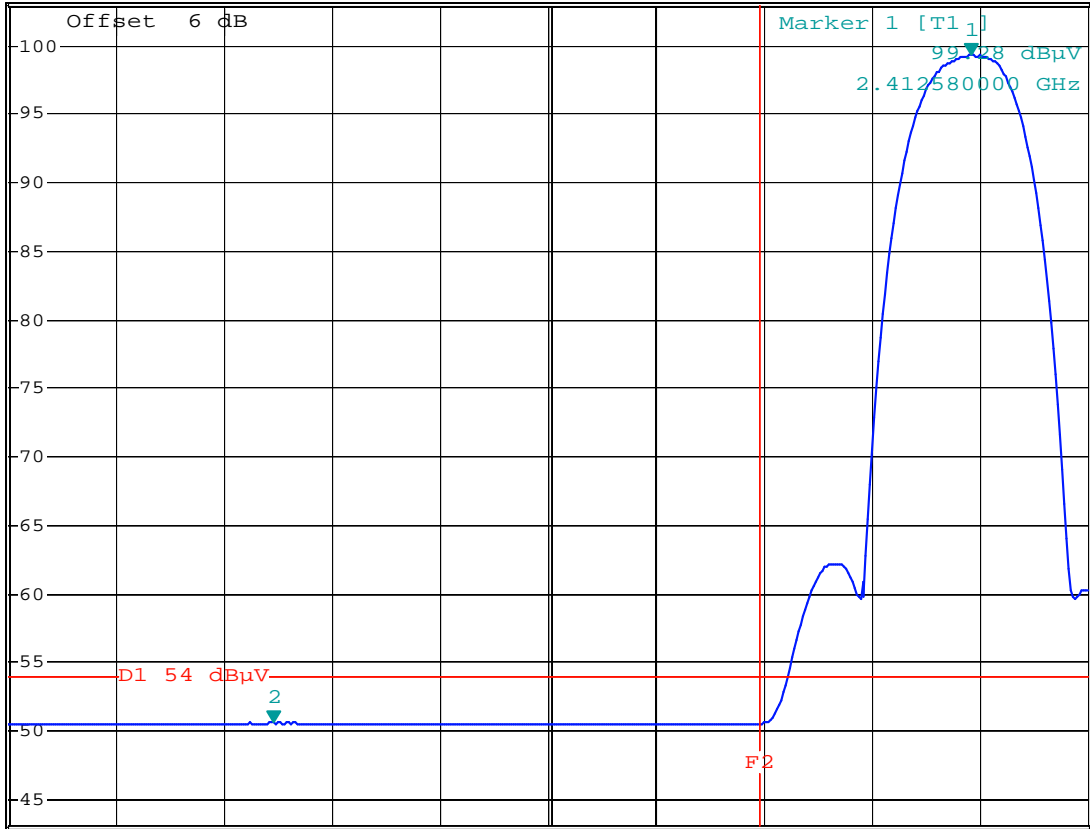
Comment: Band-Edge at 11b-ch1 F2=2390MHz
 Comment: PK external ATT=12dB (EC371/EC353)
 Date: 26.APR.2005 19:50:14



MARKER 2
 2.33829 GHz
 Ref 103 dBµV *Att 0 dB

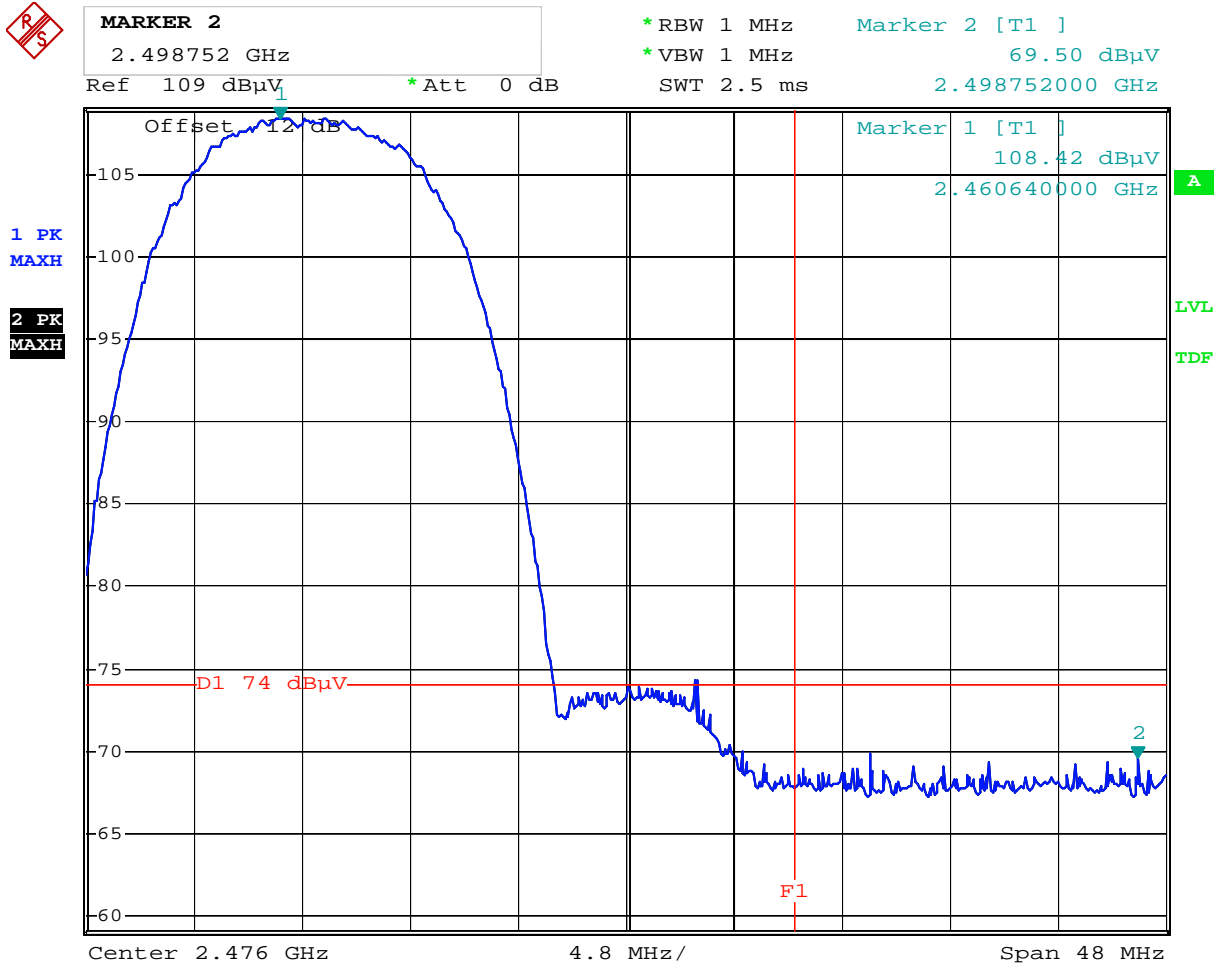
*RBW 1 MHz Marker 2 [T1]
 *VBW 10 Hz 50.58 dBµV
 SWT 29 s 2.338290000 GHz

1 PK
 MAXH



*
 A
 LVL
 TDF

Comment: Band-Edge at 11b-ch1 F2=2390MHz
 Comment: AV external ATT=12dB (EC371/EC353)
 Date: 26.APR.2005 19:52:36

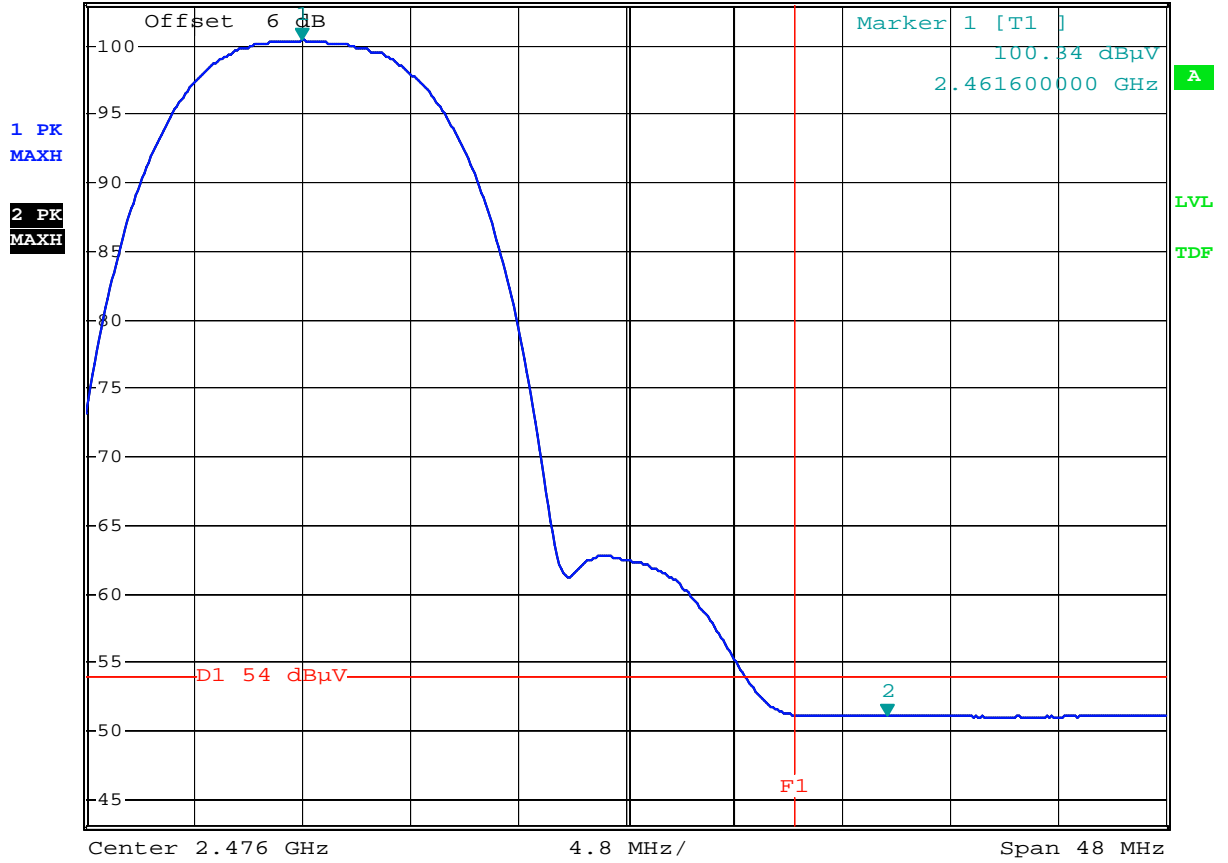


Comment: Band-Edge at 11b-ch11 F1=2483.5MHz
 Comment: PK external ATT=12dB (EC371/EC353)
 Date: 26.APR.2005 20:01:16



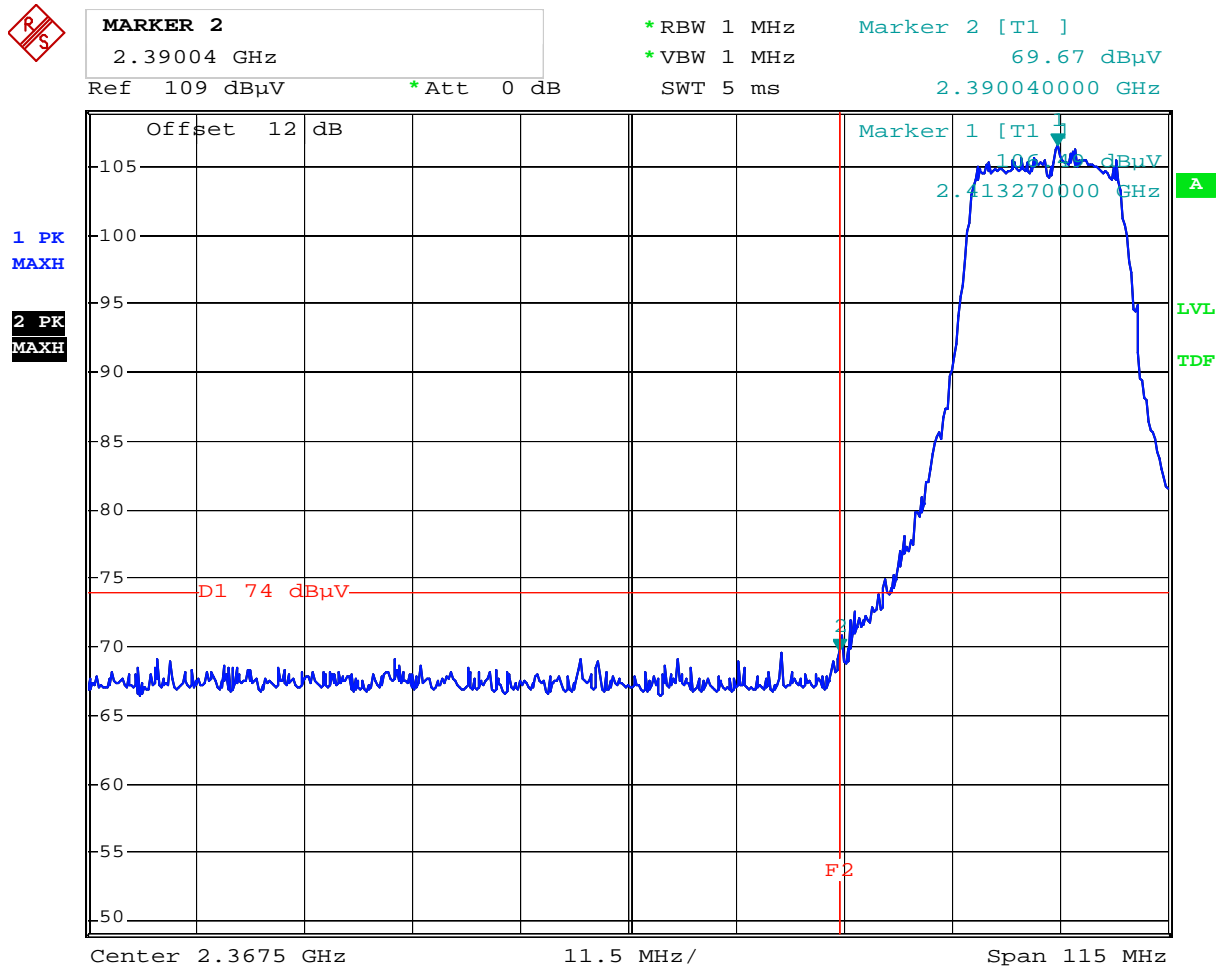
MARKER 2
 2.487616 GHz
 Ref 103 dBμV *Att 0 dB

*RBW 1 MHz Marker 2 [T1]
 *VBW 10 Hz 51.19 dBμV
 SWT 12 s 2.487616000 GHz

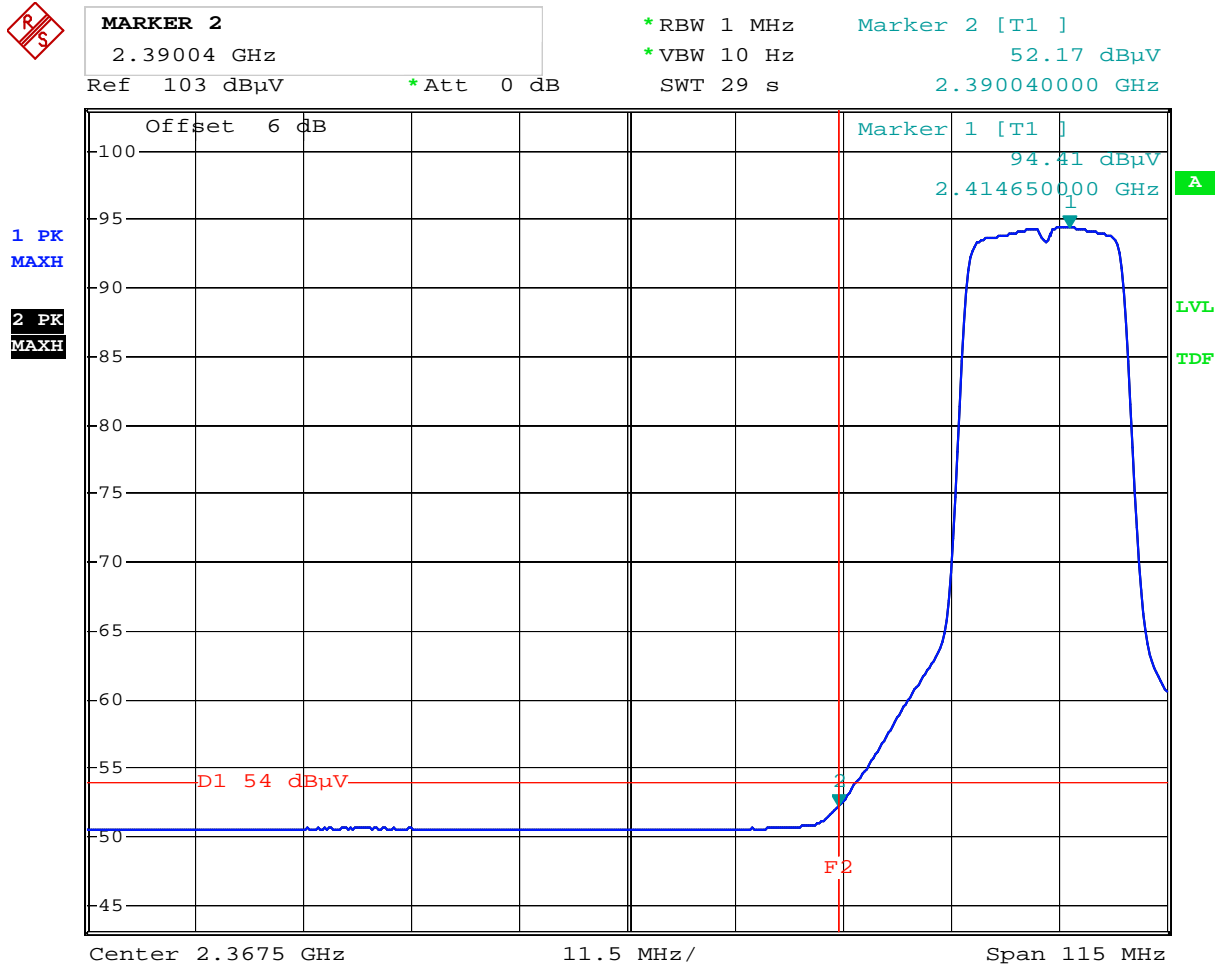


Comment: Band-Edge at 11b-ch11 F1=2483.5MHz
 Comment: AV external ATT=6dB (EC371/EC353)
 Date: 26.APR.2005 20:04:42

Test Mode: 802.11g (OFDM Modulation) operating mode



Comment: Band-Edge at 11g-ch1 F2=2390MHz
 Comment: PK external ATT=12dB (EC371/EC353)
 Date: 26.APR.2005 20:12:05

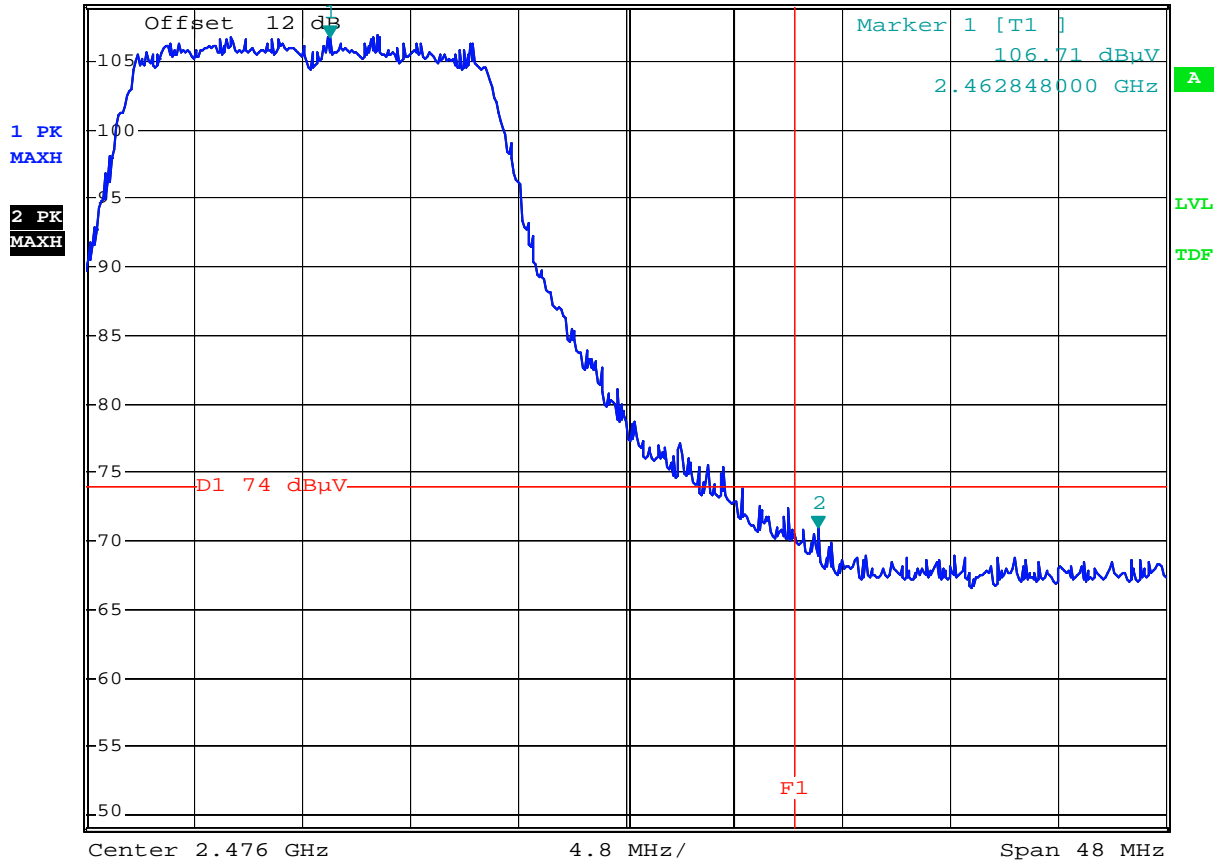


Comment: Band-Edge at 11g-ch1 F2=2390MHz
 Comment: AV external ATT=6dB (EC371/EC353)
 Date: 26.APR.2005 20:14:48



MARKER 2
 2.484544 GHz
 Ref 109 dBμV *Att 0 dB

*RBW 1 MHz Marker 2 [T1]
 *VBW 1 MHz 71.03 dBμV
 SWT 2.5 ms 2.484544000 GHz

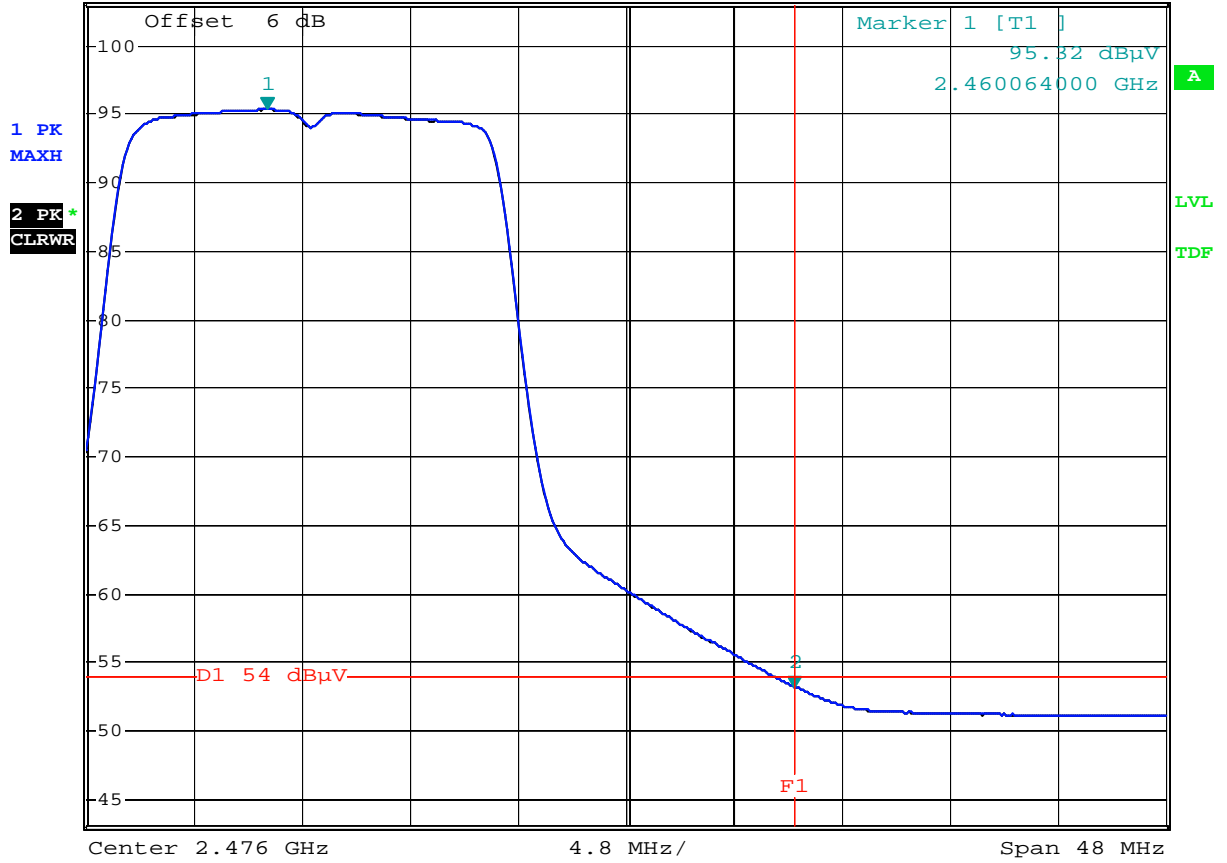


Comment: Band-Edge at 11g-ch11 F1=2483.5MHz
 Comment: PK external ATT=12dB (EC371/EC353)
 Date: 26.APR.2005 20:22:15



MARKER 2
 2.483488 GHz
 Ref 103 dBμV *Att 0 dB

*RBW 1 MHz Marker 2 [T1]
 *VBW 10 Hz 53.22 dBμV
 SWT 12 s 2.483488000 GHz



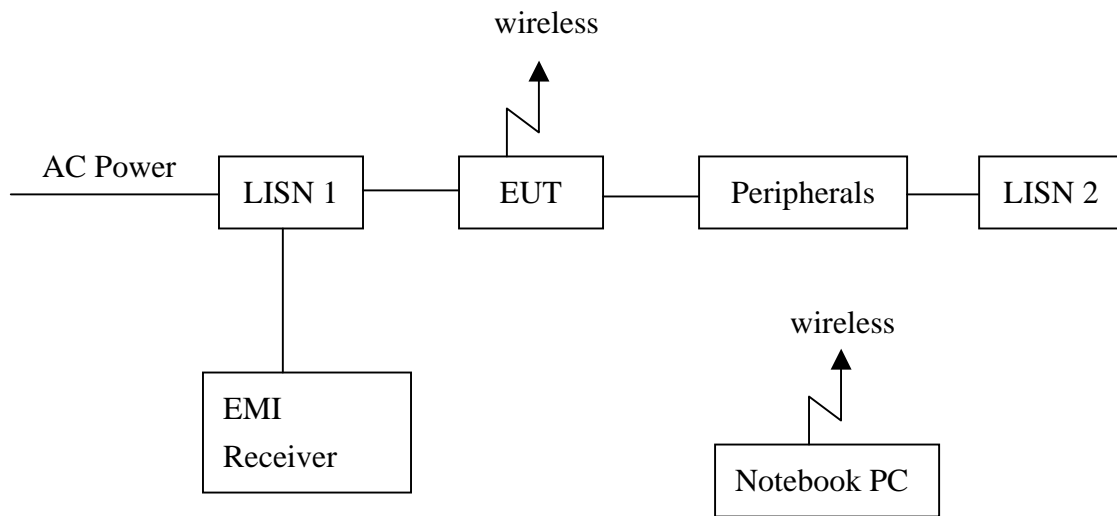
Comment: Band-Edge at 11g-ch11 F1=2483.5MHz
 Comment: AV external ATT=6dB (EC371/EC353)
 Date: 26.APR.2005 20:19:58

8. Power Line Conducted Emission test §FCC 15.207

8.1 Operating environment

Temperature: 23
Relative Humidity: 55 %
Atmospheric Pressure 1023 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

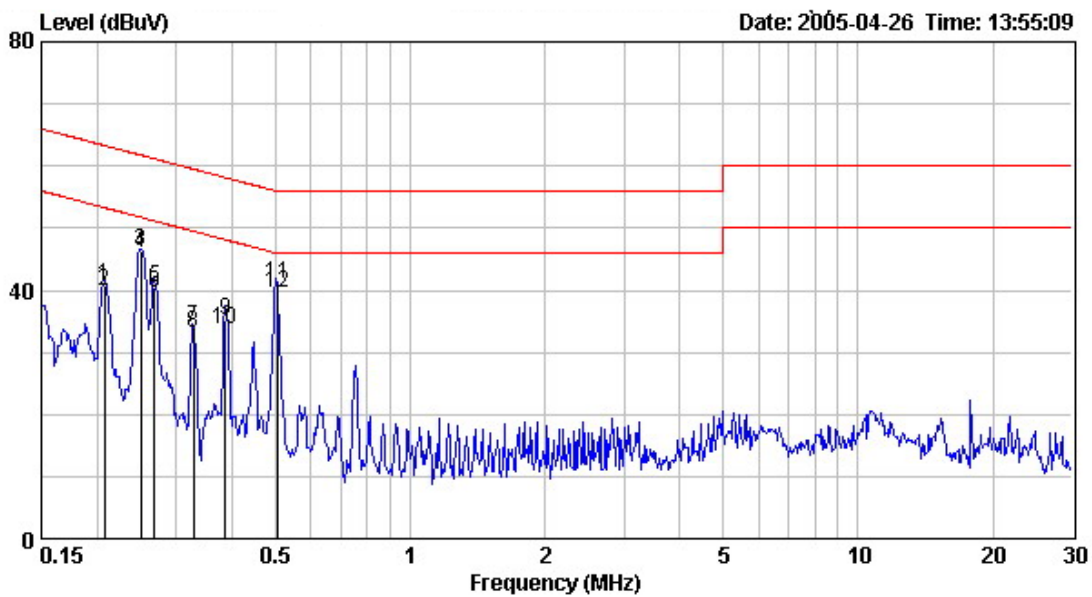
The test was performed the 802.11b and 802.11g normal operating modes, the worst case was occurred at 802.11g normal operating mode.

Phase: Line
 Model No.: F5D7230-4
 Worst Case: 802.11g Normal operating mode
 With Adapter: DV-91A (DVE)

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.208	0.10	40.74	63.29	40.00	53.29	-22.55	-13.29
0.250	0.10	46.18	61.76	46.11	51.76	-15.58	-5.65
0.268	0.10	40.48	61.17	39.53	51.17	-20.69	-11.64
0.328	0.10	33.92	59.51	32.97	49.51	-25.59	-16.54
0.387	0.10	35.08	58.12	33.80	48.12	-23.04	-14.32
0.504	0.10	41.08	56.00	39.53	46.00	-14.92	-6.47

Remark:

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

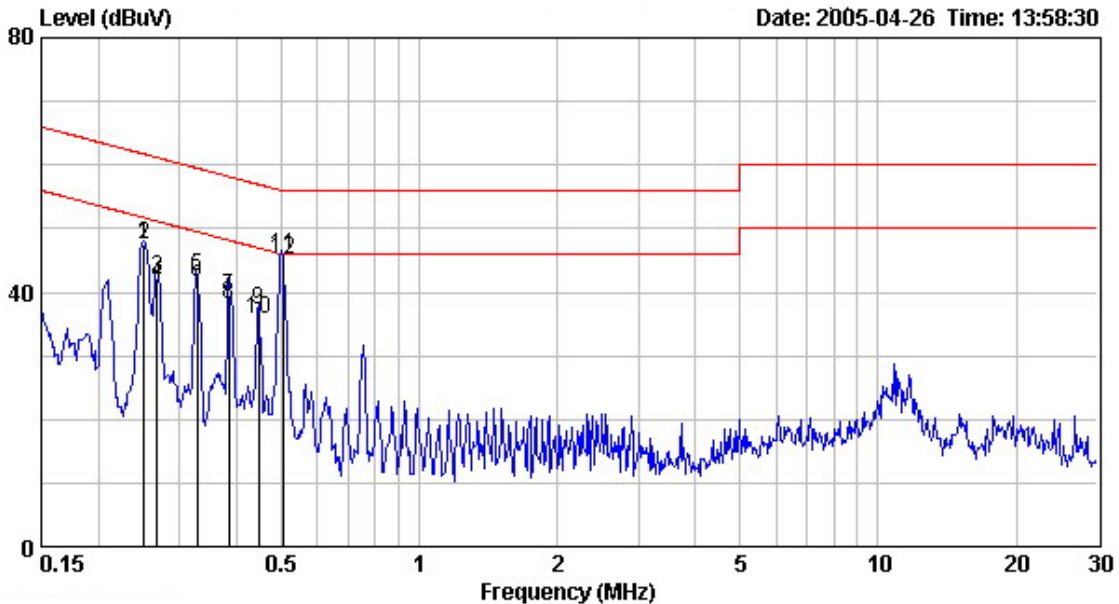


Phase: Neutral
 Model No.: F5D7230-4
 Worst Case: 802.11g Normal operating mode
 With Adapter: DV-91A (DVE)

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.252	0.10	47.48	61.70	47.40	51.70	-14.22	-4.30
0.268	0.10	42.10	61.17	41.31	51.17	-19.07	-9.86
0.328	0.10	42.54	59.51	41.61	49.51	-16.97	-7.90
0.384	0.10	39.40	58.19	38.13	48.19	-18.79	-10.06
0.447	0.10	37.22	56.93	35.67	46.93	-19.71	-11.26
0.504	0.10	45.84	56.00	45.11	46.00	-10.16	-0.89

Remark:

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

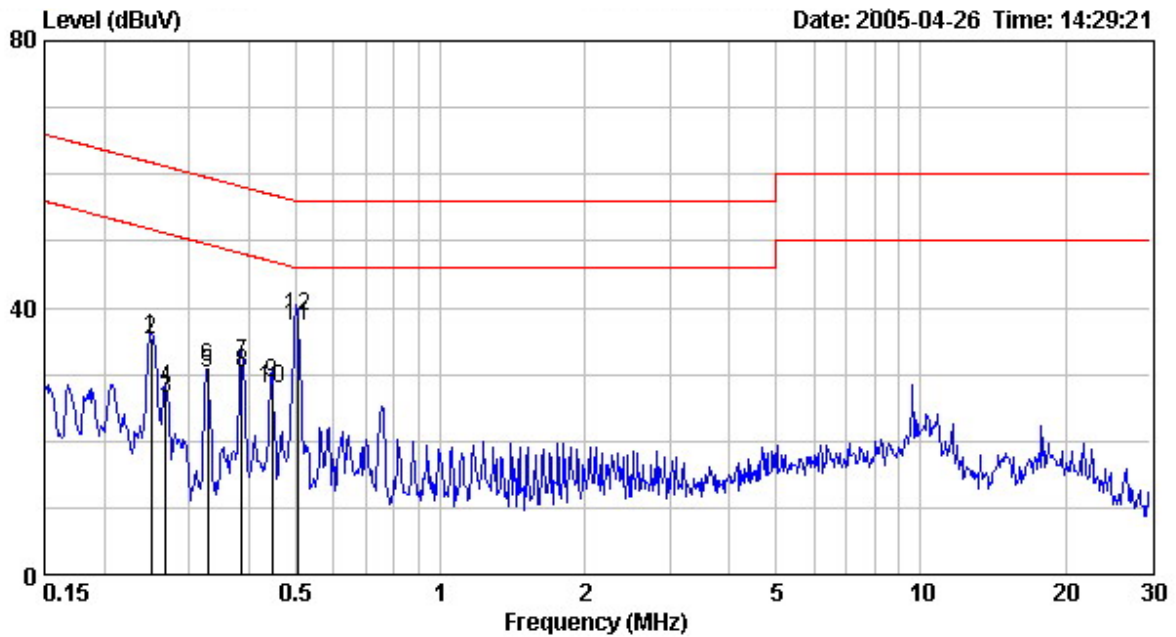


Phase: Line
 Model No.: F5D7230-4
 Worst Case: 802.11g Normal operating mode
 With Adapter: 480910003CT (Leader)

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.250	0.10	35.54	61.76	35.29	51.76	-26.22	-16.47
0.268	0.10	27.84	61.17	26.42	51.17	-33.33	-24.75
0.328	0.10	31.00	59.51	30.09	49.51	-28.51	-19.42
0.387	0.10	31.54	58.12	30.16	48.12	-26.58	-17.96
0.447	0.10	28.80	56.93	27.92	46.93	-28.13	-19.01
0.504	0.10	38.66	56.00	37.30	46.00	-17.34	-8.70

Remark:

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



Phase: Neutral
 Model No.: F5D7230-4
 Worst Case: 802.11g Normal operating mode
 With Adapter: 480910003CT (Leader)

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.250	0.10	35.48	61.76	34.80	51.76	-26.28	-16.96
0.266	0.10	27.96	61.23	27.20	51.23	-33.27	-24.03
0.328	0.10	30.76	59.51	29.72	49.51	-28.75	-19.79
0.387	0.10	31.84	58.12	30.50	48.12	-26.28	-17.62
0.447	0.10	28.66	56.93	27.30	46.93	-28.27	-19.63
0.504	0.10	38.64	56.00	37.90	46.00	-17.36	-8.10

Remark:

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

