

EMC TEST REPORT

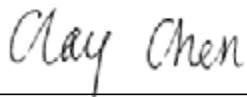
Report No. : EME-031201
Model No. : DWL-2100AP
Issued Date : Dec. 4, 2003

Applicant : D-Link Corporation
No. 8, Li-shing Road VII, Science-based Industrial Park,
Hsinchu, Taiwan

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
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Project Engineer

A handwritten signature in cursive script, appearing to read "Clay Chen".

Clay Chen

Reviewed By

A handwritten signature in cursive script, appearing to read "Elton Chen".

Elton Chen

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Summary of Tests**IEEE 802.11g Wireless Access Point -Model: DWL-2100AP
FCC ID: KA220030603014-1**

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	: D-Link Corporation
Product	: IEEE 802.11g Wireless Access Point
Model No.	: DWL-2100AP
FCC ID.	: KA220030603014-1
Frequency Range	: 2412~2462MHz
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	: 100-120Vac, 60Hz with Adapter (SMP-T1378, JTA0302A, TC10A-050)
Power Cord	: N/A
Sample Received	: Oct. 1, 2003
Test Date(s)	: Oct. 3, 2003 ~ Dec. 4, 2003

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is an IEEE 802.11g Wireless Access Point, and was defined as information technology equipment.

The 11g WIRELESS LAN ACCESS POINT provides the most expanded user bandwidth available in an AP. Wireless clients can connect to this AP using any of its channels to transfer data at speeds never achievable before in a wireless device. The 11g WIRELESS LAN ACCESS POINT operates seamlessly and simultaneously in the 2.4GHz frequency spectrums supporting the 802.11b and the newer, faster 802.11g wireless standards.

We verified that WAP-G02, C54APT and C108AP are series model to DWL-2100AP, and the different are listed below:

	Main model	Series model	Series model
Trade	D-Link	Alpha Networks	Conceptronics
Model Name	DWL-2100AP	WAP-G02	C54APT, C108AP
Product Name	IEEE 802.11g Wireless Access Point	High-Speed 2.4GHz Wireless Access Point	Wireless 54Mbps Access Point
Adapter	1. SMP-T1378 (D-Link) 2. JTA0302A (D-Link)	TC10A-050 (Fairway)	TC10A-050 (Fairway)
PCB layout	Original PCB	1. Change the spec MAC/BBP AR2312 2. Change the manufacturer 802.3FHY chip	The same as WAP-G02
Antenna type	External dipole antenna× 1 Internal dipole antenna× 1	External dipole antenna× 2	The same as WAP-G02
Remark	1. The internal antenna is permanently 2. The external antenna has two colors could be optioned by user. That are black and gray.	The external antenna can be replaced	C54APT and C108AP are identical and the difference is model number only.

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

1.3 Antenna description

The EUT has two types of antenna, one of which is permanently connected antenna, and the other can be replaced.

For permanently connected antenna:

The EUT uses a permanently connected antenna.

Antenna Gain : 1.8dBi

Antenna Type : Dipole

Connector Type : N/A

For replaceable antenna:

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 : 2.0dBi

Antenna Type : Dipole

Connector Type : SMA Reverse

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook	DELL	PP01L	CN-06P83-48643-33V-0112	FCC DoC Approved

Cable: RJ-45 cable 10meter length

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 C63.4/2001.

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

According to the difference between the main model and series model, the test items that may cause EMI influence should be performed and listed as below.

Adapter 1: SMP-T1378 (D-Link)

Adapter 2: JTA0302A (D-Link)

Adapter 3: TC10A-050 (Fairway)

Model Test item	DWL-2100AP		WAP-G02	C54APT, C108AP
	Adapter 1	Adapter 2	Adapter 3	Adapter 3
Radiation	ü			
Conduction	ü	ü		ü
Band-edge (conducted)	ü			
Band-edge (radiated)	ü			ü
Radiated Spurious	ü			ü
Conducted measurement	ü			

Remark:

1. The EUT(DWL-2100AP) has two types of antenna, one of which is permanently connected antenna, and the other can be replaced.
The replaceable antenna has two colors, black and gray. We choose the antenna in black as main model to perform all test items and record in this report.
2. When the EUT is operated at 802.11g (turbo mode), it only has the middle channel (2437MHz).
3. The EUT was transmitted continuously during the test.
4. After verifying the maximum output power, we found the maximum output power was of 802.11b was occurred at 11Mbps data rate and 802.11g was occurred at 54Mbps data rate. The final test was executed under this condition and recorded in this report individually.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	Feb. 18, 2003
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	825428/005	June 10, 2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2003
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100186	Oct. 9, 2003
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5890	Sep. 19, 2003
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	159	June 21, 2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3133	Feb. 21, 2003
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A
Microwave Amplifier	Agilent	2GHz~26.5GHz	8348A	3111A00567	Dec. 20, 2002
Crystal Detector	Agilent	10MHz~18GHz	8472B	MY42240243	N/A
Signal Generator	Rohde & Schwarz	20MHz~27GHz	SMR27	100036	Aug. 15, 2003
Two Channel Digital Storage Oscilloscope	Tektronix	N/A	TDS1012	C031679	Aug. 16, 2003

Note:

1. The calibration interval of the above instruments is 12 months.

3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 24 °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 Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	12.58517	> 500kHz
Middle	2437	12.46493	> 500kHz
High	2462	12.14429	> 500kHz

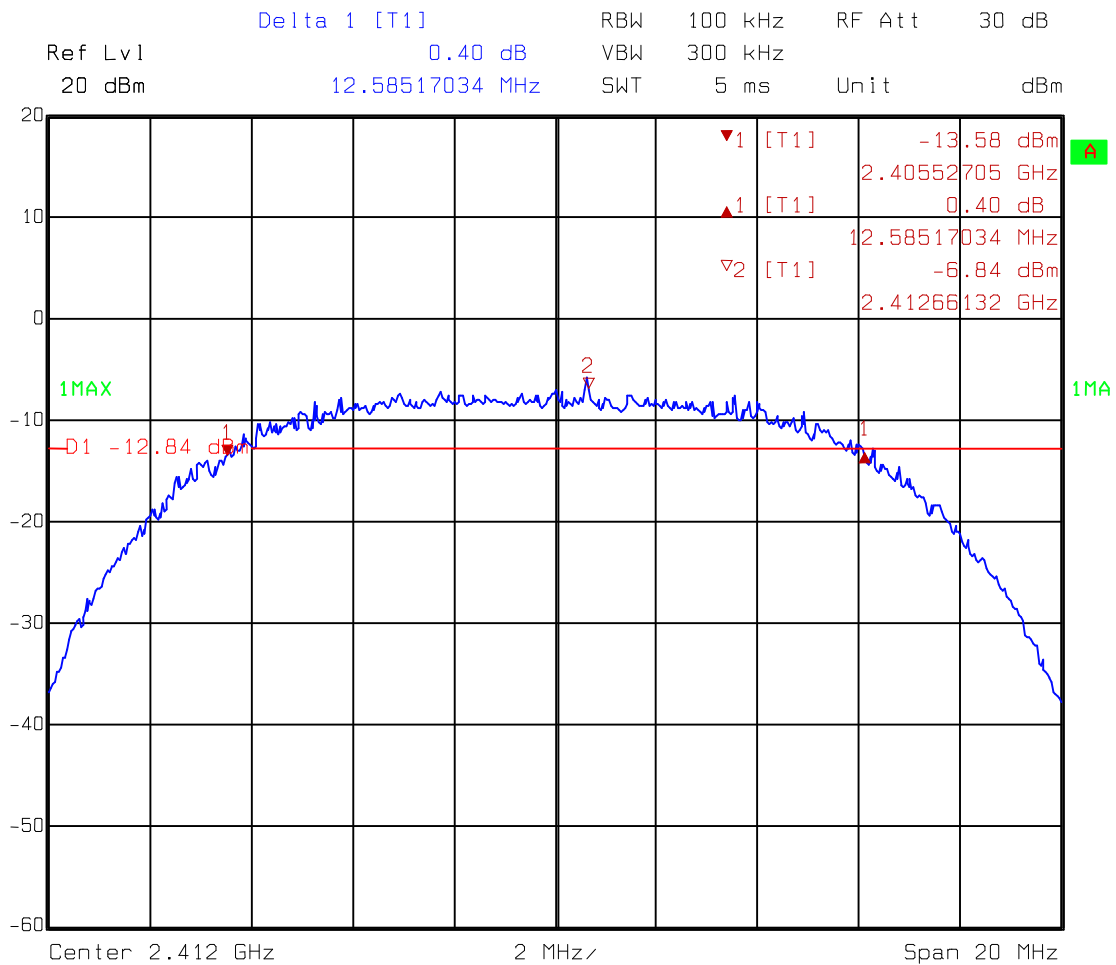
Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	16.63327	> 500kHz
Middle	2437	16.59319	> 500kHz
High	2462	16.63327	> 500kHz

Test Condition: 802.11g operation (OFDM modulation) turbo mode

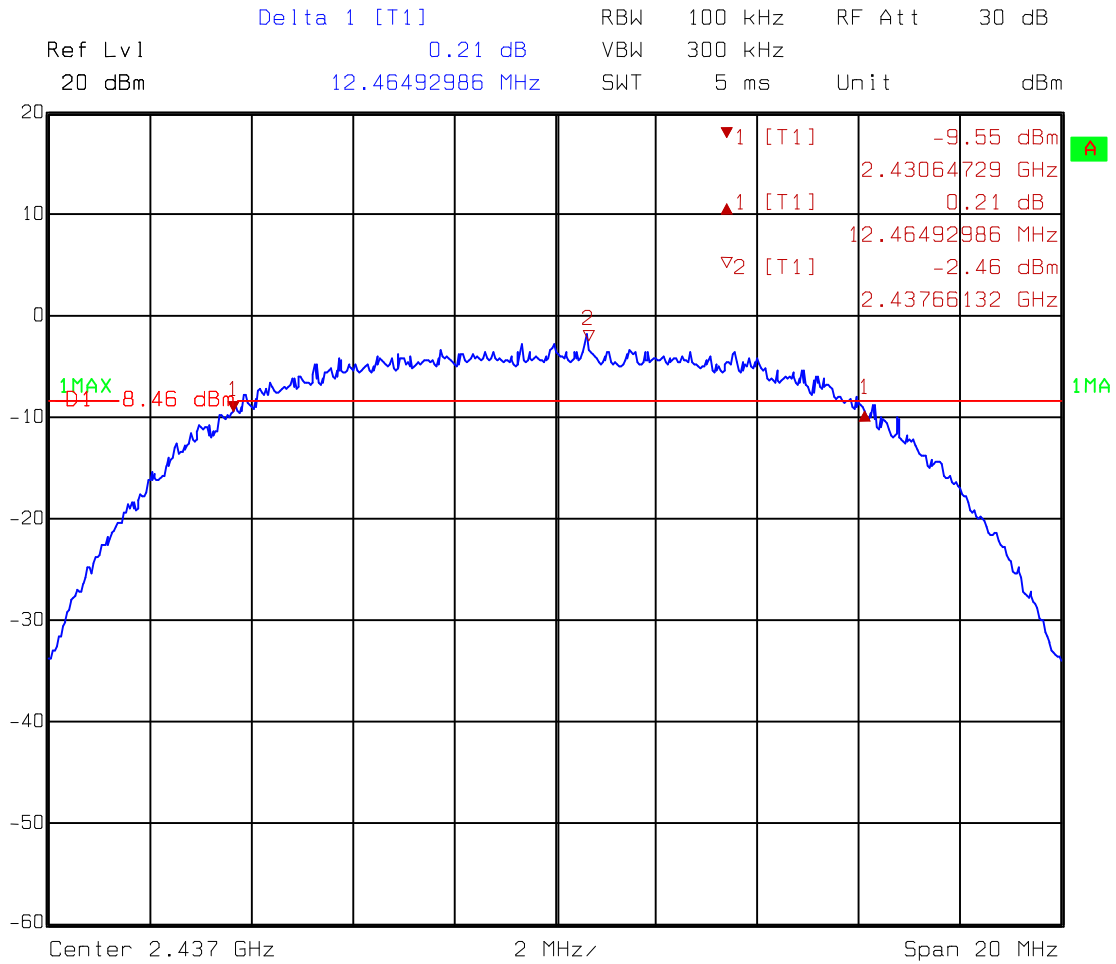
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Middle	2437	33.02605	> 500kHz

Please see the plot below.



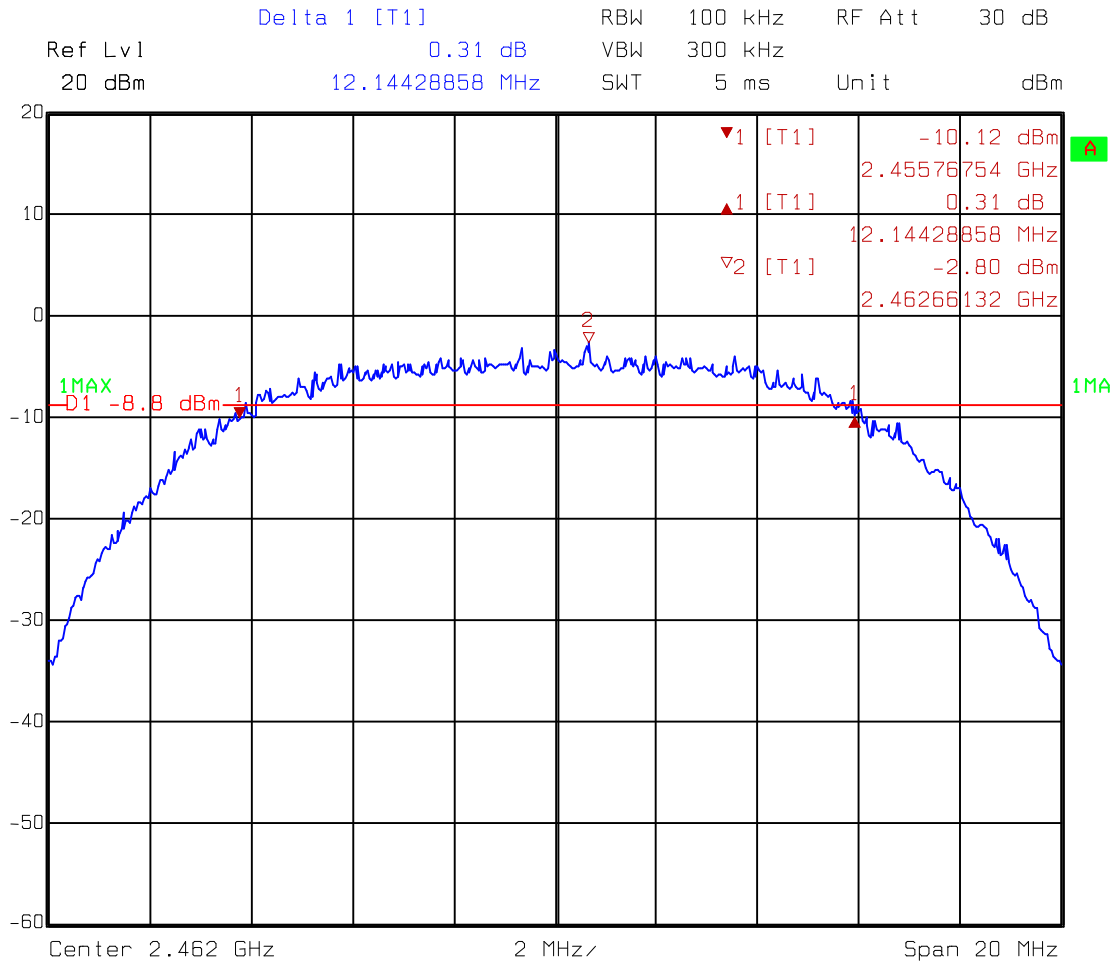
Comment A: 6dB bandwidth at low channel (EC365) 802.11b Att=6dB CB=3.13 dB

Date: 24.OCT.2003 13:27:55



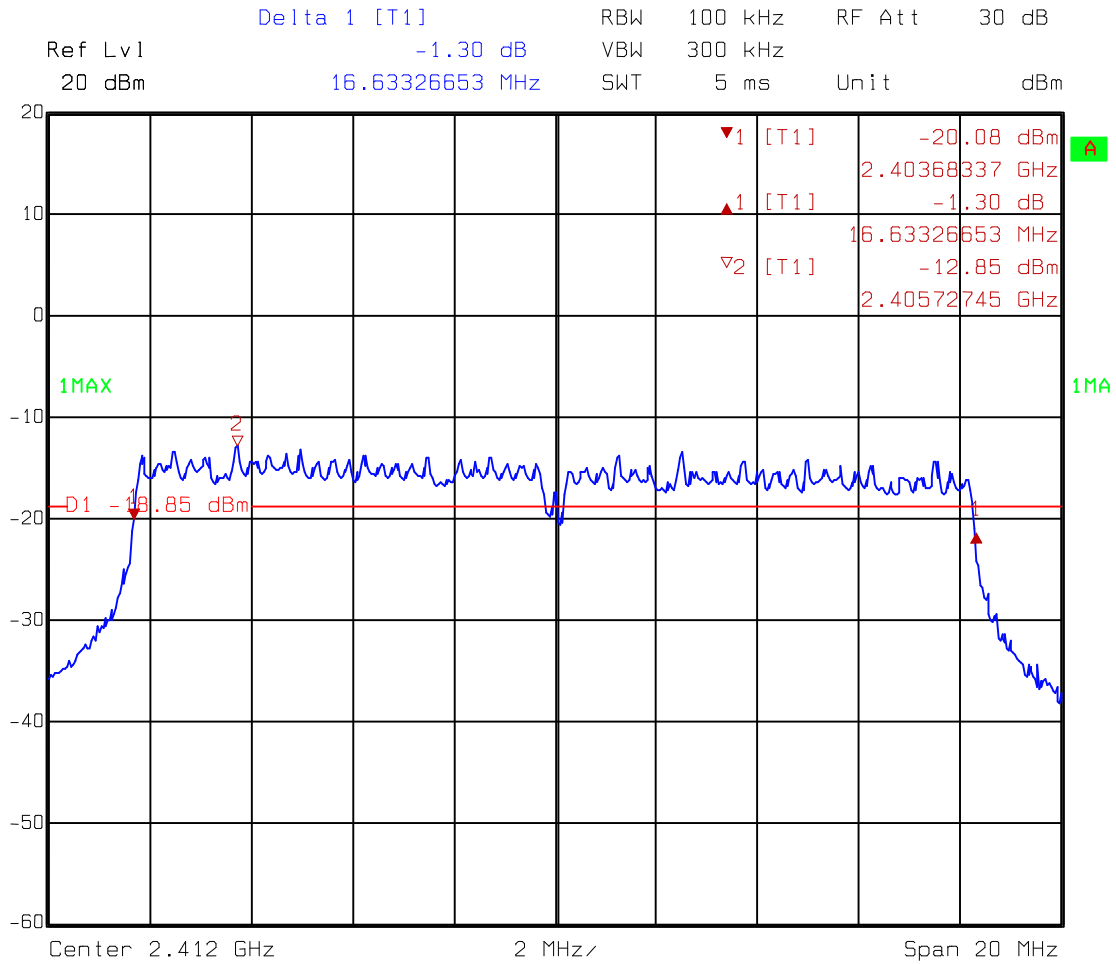
Comment A: 6dB bandwidth at middle channel (EC365) 802.11b Att=6dB CB=3
 .13dB

Date: 24.OCT.2003 13:33:58



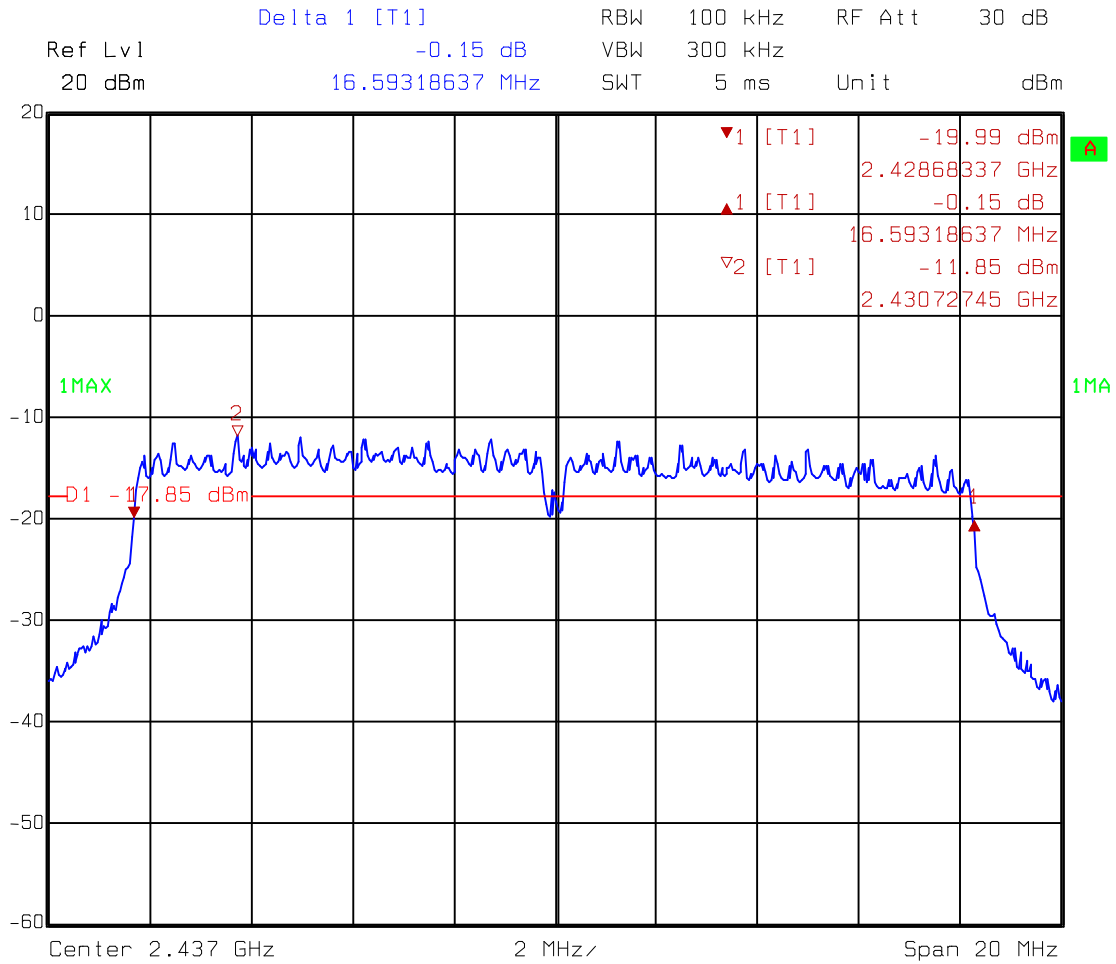
Comment A: 6dB bandwidth at high channel (EC365) 802.11b Att=6dB CB=3.1
 3dB

Date: 24.OCT.2003 13:37:25



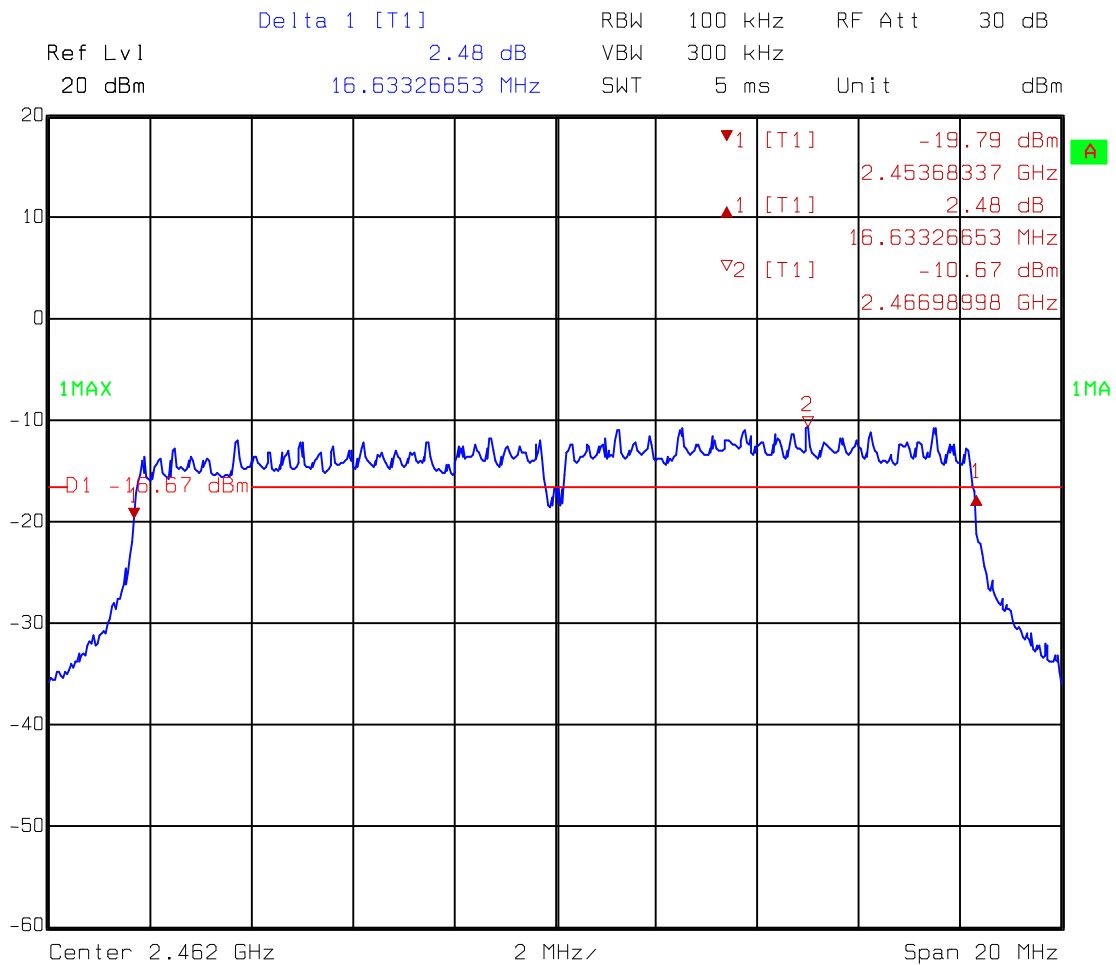
Comment A: 6dB bandwidth at low channel (EC365) 802.11g Att=6dB CB=3.13 dB

Date: 24.OCT.2003 13:46:07



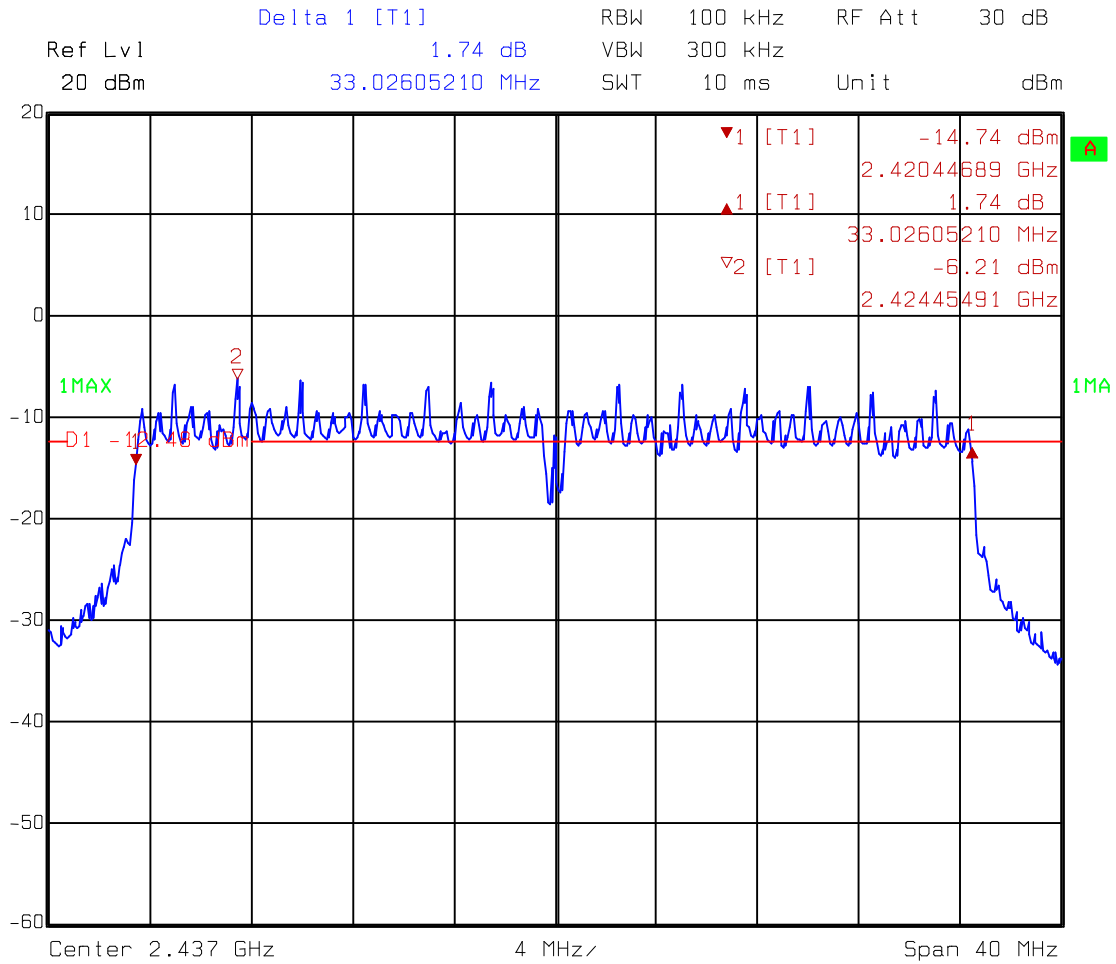
Comment A: 6dB bandwidth at middle channel (EC365) 802.11g Att=6dB CB=3
 .13dB

Date: 24.OCT.2003 13:43:36



Comment A: 6dB bandwidth at high channel (EC365) 802.11g Att=6dB CB=3.1
 3dB

Date: 24.OCT.2003 13:40:50



Comment A: 6dB bandwidth at middle channel (EC365)802.11g(turbo mode) A

tt=6dB CB=3.13dB

Date: 31.OCT.2003 20:06:08

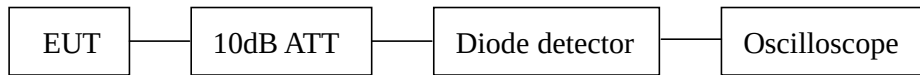
4. Maximum Output Power test

4.1 Operating environment

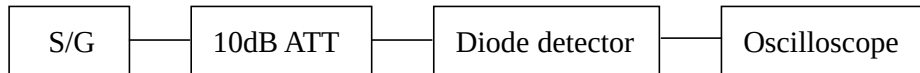
Temperature: 24 °C
 Relative Humidity: 55 %
 Atmospheric Pressure 1023 hPa

4.2 Test setup & procedure

A:



B:



1. The output of the transmitter via a 10 dB attenuator and coupled to a diode detector.
2. The output of the diode detector connected to the vertical channel of an oscilloscope. The observed trace of the oscilloscope shall be recorded as “A”.
3. The transmitter replaced by a signal generator. The output frequency of the signal made equal to the center of the frequency range occupied by the transmitter and unmodulated.
4. The output of the signal generator raised to reach the peak of trace “A” named X.
5. The signal generator output level X (dBm) is the transmitter peak output power.

4.3 Measured data of Maximum Output Power test results

Test Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	Reading (dBm)	Output Power		Limit (dBm)
			(dBm)	(mW)	
Lowest	2412	18.83	18.83	76.38	30
Middle	2437	19.03	19.03	79.98	30
Highest	2462	19.23	19.23	83.75	30

Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	Reading (dBm)	Output Power		Limit (dBm)
			(dBm)	(mW)	
Lowest	2412	22.63	22.63	183.23	30
Middle	2437	22.43	22.43	174.98	30
Highest	2462	22.83	22.83	191.87	30

Test Condition: 802.11g operation (OFDM modulation) turbo mode

Channel	Frequency (MHz)	Reading (dBm)	Output Power		Limit (dBm)
			(dBm)	(mW)	
Middle	2437	24.73	24.73	297.167	30

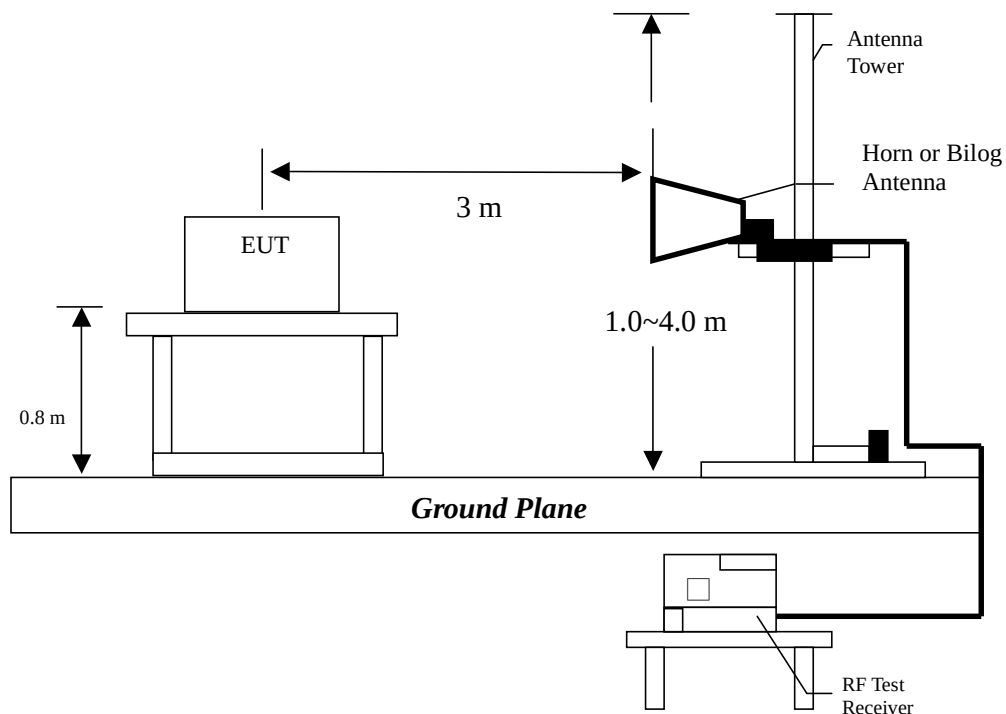
5. Radiated Emission test

5.1 Operating environment

Temperature:	25	°C	(10-40°C)
Relative Humidity:	52	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1060hPa)

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.

Expanded uncertainty (k=2) of conducted emission measurement is ± 2.02 dB.

5.4 Radiated spurious emission test data

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

EUT : DWL-2100AP

Worst Case Condition : 802.11b (DSSS modulation) Tx at low channel

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)
89.95000	QP	V	9.41	23.26	32.67	43.50	-10.83	100	261
199.98000	QP	V	12.03	16.22	28.25	43.50	-15.25	100	235
449.98000	QP	V	17.86	14.60	32.46	46.00	-13.54	129	259
499.97000	QP	V	18.61	14.01	32.62	46.00	-13.38	103	238
629.98000	QP	V	21.32	16.45	37.77	46.00	-8.23	100	238
759.97000	QP	V	23.40	6.39	29.79	46.00	-16.21	172	319
89.97000	QP	H	9.41	24.17	33.58	43.50	-9.92	235	124
120.00000	QP	H	12.89	21.94	34.83	43.50	-8.67	276	129
124.96000	QP	H	12.89	17.87	30.76	43.50	-12.74	277	131
199.98000	QP	H	12.03	24.30	36.33	43.50	-7.17	141	141
359.98000	QP	H	15.56	15.84	31.40	46.00	-14.60	100	123
759.98000	QP	H	23.40	6.50	29.90	46.00	-16.10	233	301

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

EUT : DWL-2100AP

Worst Case Condition : 802.11g (OFDM modulation) Tx at low channel

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)
40.01000	QP	V	12.96	21.83	34.79	40.00	-5.21	100	42
89.99000	QP	V	9.41	27.37	36.78	43.50	-6.72	100	82
374.98000	QP	V	15.81	15.99	31.80	46.00	-14.20	100	32
449.98000	QP	V	17.86	14.50	32.36	46.00	-13.64	100	66
629.98000	QP	V	21.32	12.26	33.58	46.00	-12.42	100	57
719.99000	QP	V	22.22	8.43	30.65	46.00	-15.35	158	255
119.98000	QP	H	11.80	23.15	34.95	43.50	-8.55	273	116
179.99000	QP	H	14.29	16.53	30.82	43.50	-12.68	141	126
269.98000	QP	H	13.38	22.42	35.80	46.00	-10.20	100	147
359.97000	QP	H	15.56	14.85	30.41	46.00	-15.59	100	130
499.96000	QP	H	18.61	15.50	34.11	46.00	-11.89	100	140
719.97000	QP	H	22.22	7.44	29.66	46.00	-16.34	147	270

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

EUT : DWL-2100AP

Worst Case Condition : 802.11g operation (OFDM modulation) turbo mode

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)
39.70000	QP	V	12.81	25.10	37.91	40.00	-2.09	100	360
89.99000	QP	V	9.41	26.24	35.65	43.50	-7.85	100	320
179.98000	QP	V	14.29	19.81	34.10	43.50	-9.40	100	279
199.98000	QP	V	12.03	21.54	33.57	43.50	-9.93	100	332
269.99000	QP	V	13.38	16.08	29.46	46.00	-16.54	208	309
374.99000	QP	V	15.81	12.98	28.79	46.00	-17.21	156	301
89.98000	QP	H	9.41	26.31	35.72	43.50	-7.78	233	272
124.98000	QP	H	12.89	21.05	33.94	43.50	-9.56	259	268
179.99000	QP	H	14.29	22.86	37.15	43.50	-6.35	147	265
199.98000	QP	H	12.03	26.24	38.27	43.50	-5.23	113	239
359.97000	QP	H	15.56	20.12	35.68	46.00	-10.32	100	230
374.98000	QP	H	15.81	12.75	28.56	46.00	-17.44	223	223

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

5.4.2 Measurement results: frequency above 1GHz

EUT : DWL-2100AP

Test Condition : 802.11b Tx at low channel

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)
4824.68	PK	V	32.265	35.742	52.053	55.53	74	-18.47	200	355
4824.68	AV	V	32.265	35.742	37.003	40.48	54	-13.52	200	355
9648.01	PK	V	35.753	43.384	47.4685	55.1	74	-18.9	147	221
9648.01	AV	V	35.753	43.384	36.5685	44.2	54	-9.8	147	221
4823.5	PK	H	32.265	35.742	48.733	52.21	74	-21.79	135	41
4823.5	AV	H	32.265	35.742	33.663	37.14	54	-16.86	135	41

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.

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 : DWL-2100AP

Test Condition : 802.11b Tx at middle channel

Test Result :

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

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 : DWL-2100AP

Test Condition : 802.11b Tx at high channel

Test Result :

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

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 : DWL-2100AP

Test Condition : 802.11g Tx at low channel

Test Result :

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

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 : DWL-2100AP

Test Condition : 802.11g Tx at middle channel

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)
7313.5	PK	V	34.17	39.966	52.884	58.68	74	-15.32	166	237
7313.5	AV	V	34.17	39.966	36.664	42.46	54	-11.54	166	237

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.

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 : DWL-2100AP

Test Condition : 802.11g Tx at high channel

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)
7385.82	PK	V	34.17	39.966	53.994	59.79	74	-14.21	163	161
7385.82	AV	V	34.17	39.966	37.344	43.14	54	-10.86	163	161

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.

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 : DWL-2100AP
Test Condition : 802.11g (turbo mode)

Test Result :

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

Serial model : C54APT

Test Condition : 802.11b Tx at low channel

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)
4822.46	PK	V	32.265	35.742	54.993	58.47	74	-15.53	160	183
4822.46	AV	V	32.265	35.742	40.083	43.56	54	-10.44	160	183
9647.88	PK	V	35.753	43.384	50.5085	58.14	74	-15.86	109	0
9647.88	AV	V	35.753	43.384	43.4085	51.04	54	-2.96	109	0
4824	PK	H	32.265	35.742	48.873	52.35	74	-21.65	141	280
4824	AV	H	32.265	35.742	34.343	37.82	54	-16.18	141	280

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.

For PK:

1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

Serial model : C54APT

Test Condition : 802.11b Tx at middle channel

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)
4873.8	PK	V	32.265	35.742	55.783	59.26	74	-14.74	124	160
4873.8	AV	V	32.265	35.742	38.943	42.42	54	-11.58	124	160
7311.9	PK	V	34.17	39.966	51.824	57.62	74	-16.38	163	229
7311.9	AV	V	34.17	39.966	40.304	46.1	54	-7.9	163	229
4874.68	PK	H	32.265	35.742	50.023	53.5	74	-20.5	183	123
4874.68	AV	H	32.265	35.742	35.323	38.8	54	-15.2	183	123
7313.6	PK	H	34.17	39.966	46.974	52.77	74	-21.23	154	201
7313.6	AV	H	34.17	39.966	35.734	41.53	54	-12.47	154	201

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.

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

Serial model : C54APT

Test Condition : 802.11b Tx at high channel

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)
4924.71	PK	V	32.265	35.742	54.213	57.69	74	-16.31	133	50
4924.71	AV	V	32.265	35.742	39.463	42.94	54	-11.06	133	50
7387	PK	V	34.17	39.966	56.364	62.16	74	-11.84	177	84
7387	AV	V	34.17	39.966	45.674	51.47	54	-2.53	177	84
4924.61	PK	H	32.265	35.742	55.833	59.31	74	-14.69	128	203
4924.61	AV	H	32.265	35.742	40.493	43.97	54	-10.03	128	203
7386.1	PK	H	34.17	39.966	54.544	60.34	74	-13.66	124	175
7386.1	AV	H	34.17	39.966	42.854	48.65	54	-5.35	124	175

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.

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

Serial model : C54APT

Test Condition : 802.11g Tx at low channel

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)
4821.9	PK	V	32.265	35.742	48.893	52.37	74	-21.63	170	195
4821.9	AV	V	32.265	35.742	34.643	38.12	54	-15.88	170	195

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.

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

Serial model : C54APT

Test Condition : 802.11g Tx at middle channel

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)
4874	PK	V	32.265	35.742	50.493	53.97	74	-20.03	121	296
4874	AV	V	32.265	35.742	35.803	39.28	54	-14.72	121	296
4872.8	PK	H	32.265	35.742	47.893	51.37	74	-22.63	107	221
4872.8	AV	H	32.265	35.742	33.983	37.46	54	-16.54	107	221

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.

For PK:

1GHz-3GHz: 20dBuV
3GHz-14GHz: 27dBuV
14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV
3GHz-14GHz: 16dBuV
14GHz-26.5GHz: 28dBuV

Serial model : C54APT

Test Condition : 802.11g Tx at high channel

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)
4922.5	PK	V	32.265	35.742	51.133	54.61	74	-19.39	188	140
4922.5	AV	V	32.265	35.742	37.423	40.9	54	-13.1	188	140
7386.1	PK	V	34.17	39.966	47.214	53.01	74	-20.99	107	142
7386.1	AV	V	34.17	39.966	32.464	38.26	54	-15.74	107	142
4922	PK	H	32.265	35.742	49.583	53.06	74	-20.94	160	136
4922	AV	H	32.265	35.742	35.183	38.66	54	-15.34	160	136

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.

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

Serial model : C54APT

Test Condition : 802.11g (turbo mode)

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)
7318.4	PK	60.42	34.17	39.966	54.624	60.42	74	-13.58	131	276
7318.4	AV	45.33	34.17	39.966	39.534	45.33	54	-8.67	131	276

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.

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: 25 °C
 Relative Humidity: 52 %
 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 (6dB)/external attenuator (3.13dB) 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 Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2.41198	-12.00	8
Middle	2.43698	-10.34	8
High	2.46198	-6.34	8

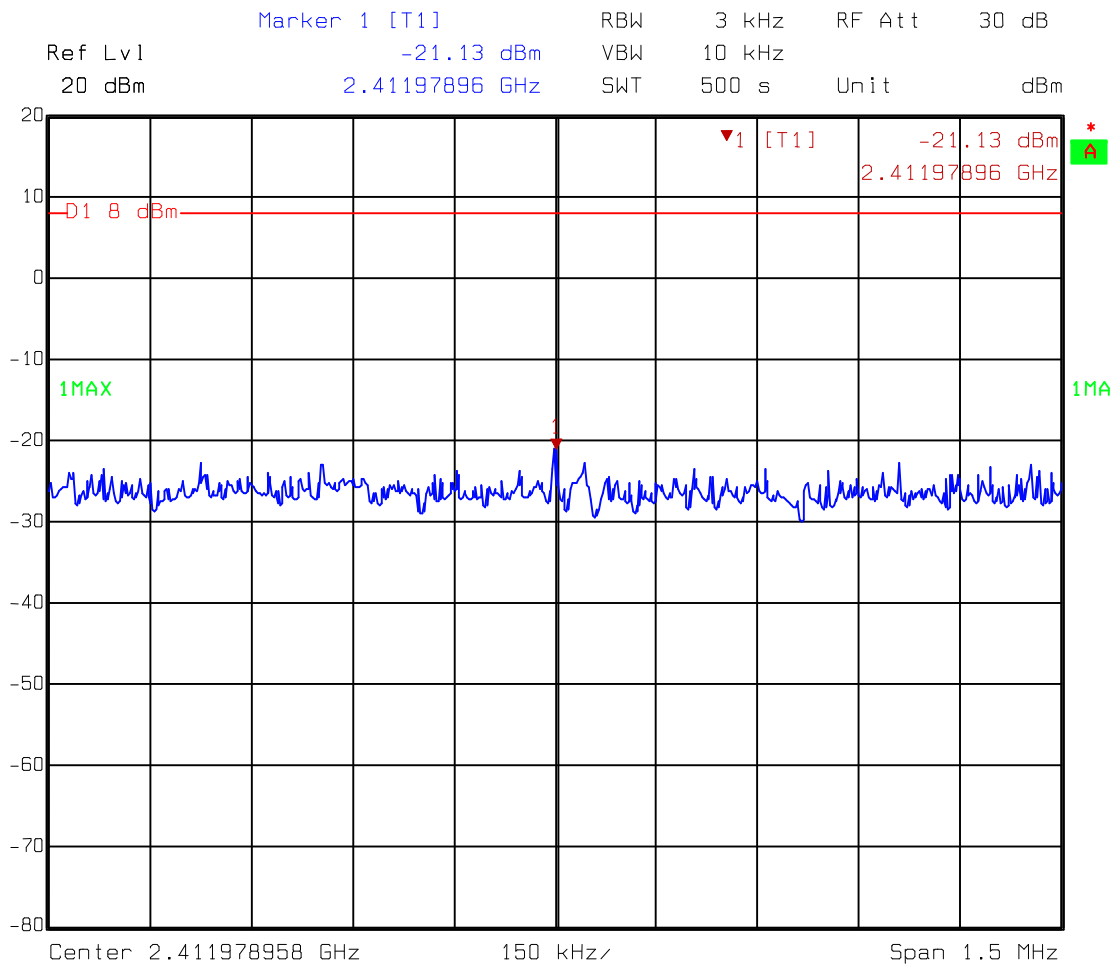
Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2.41198	-14.41	8
Middle	2.43698	-11.93	8
High	2.46198	-11.28	8

Test Condition: 802.11g operation (OFDM modulation) turbo mode

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Middle	2.43698	-6.65	8

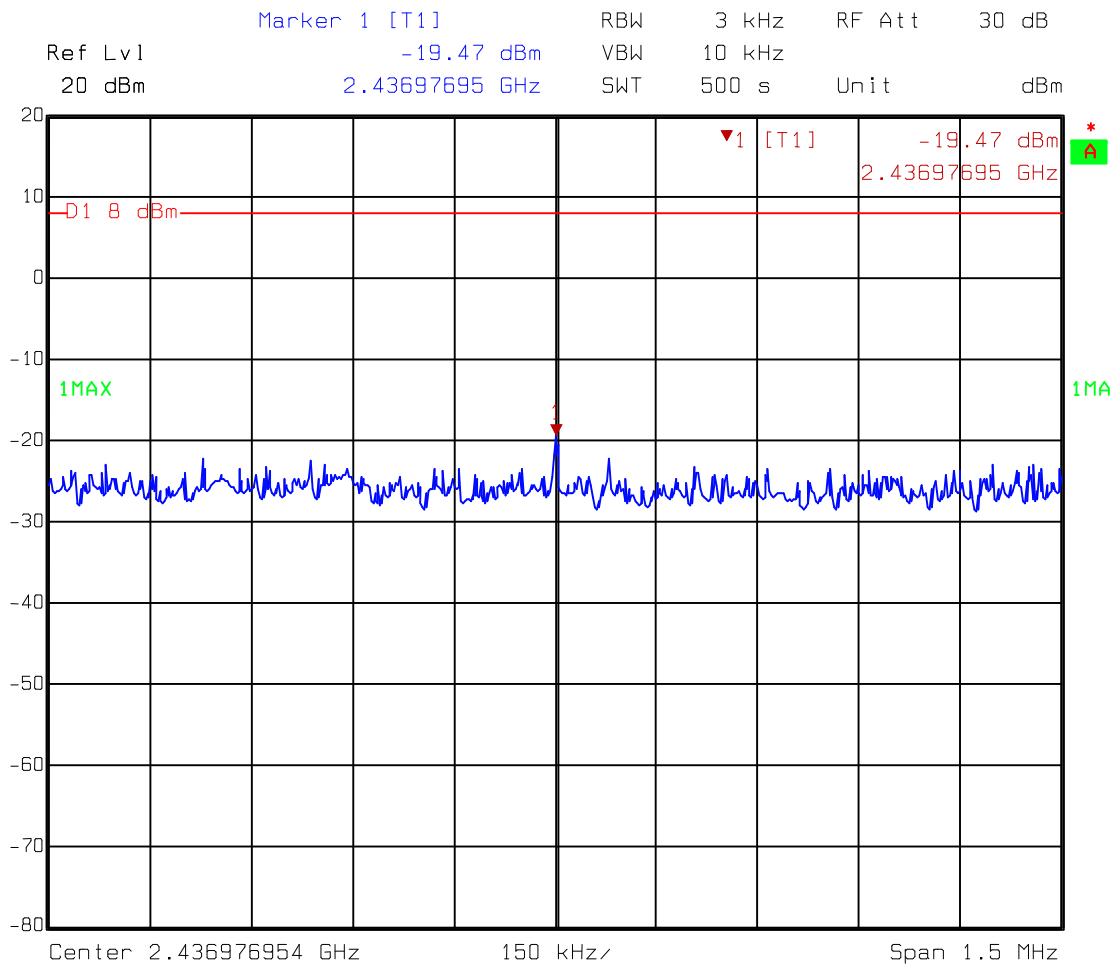
Please see the plot below.



Comment A: Power spectrum density at low channel

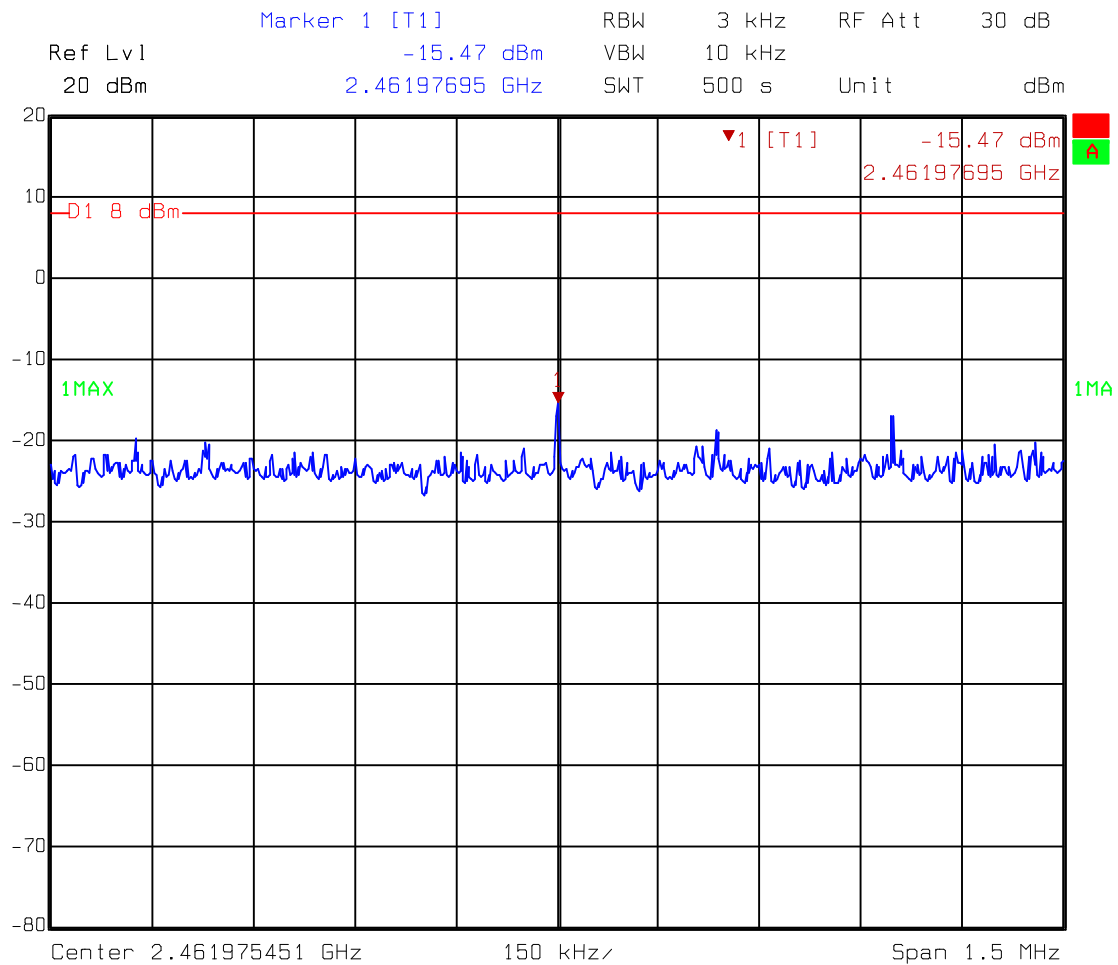
ATT=6dB CL=3.13dB 802.11b

Date: 24.OCT.2003 14:00:22



Comment A: Power spectrum density at middle channel
 ATT=6dB CL=3.13dB 802.11b

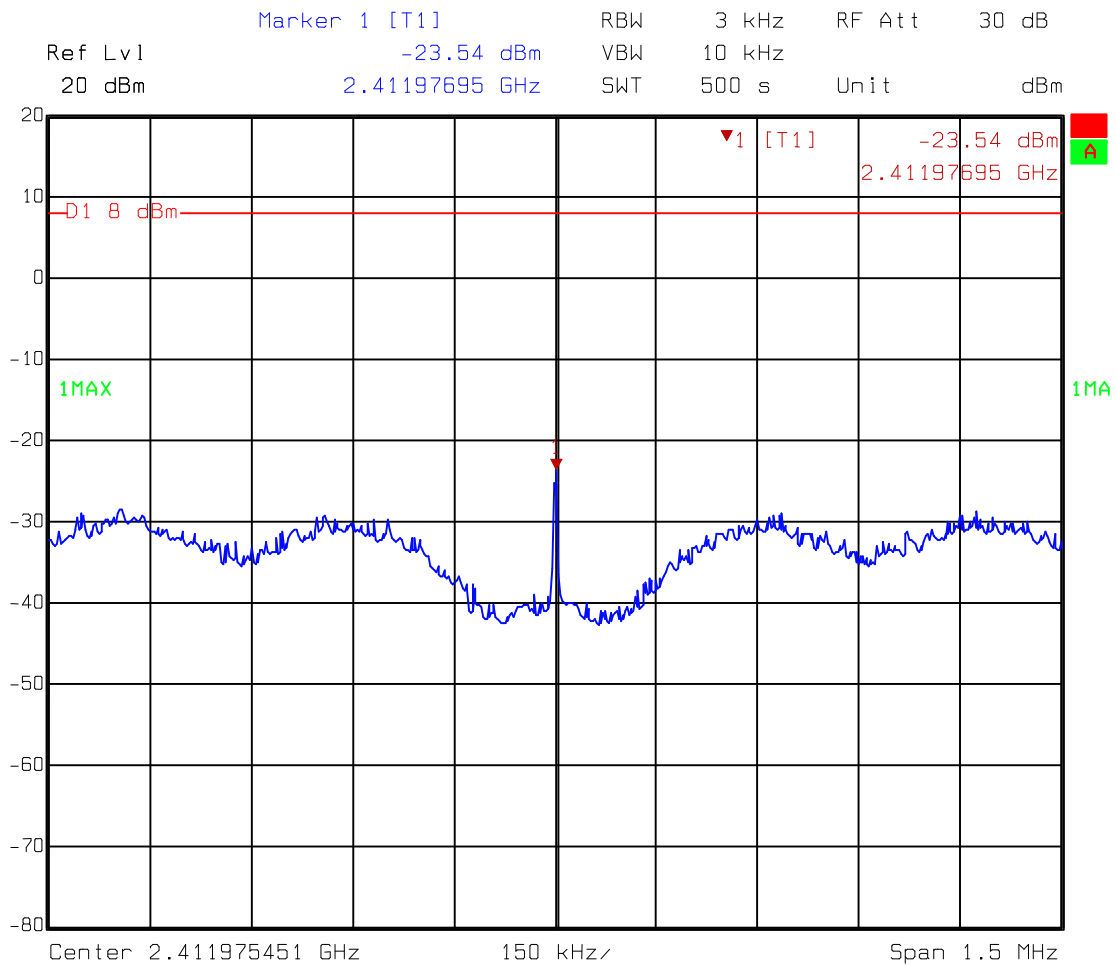
Date: 24.OCT.2003 13:59:08



Comment A: Power spectrum density at high channel

ATT=6dB CL=3.13dB 802.11b

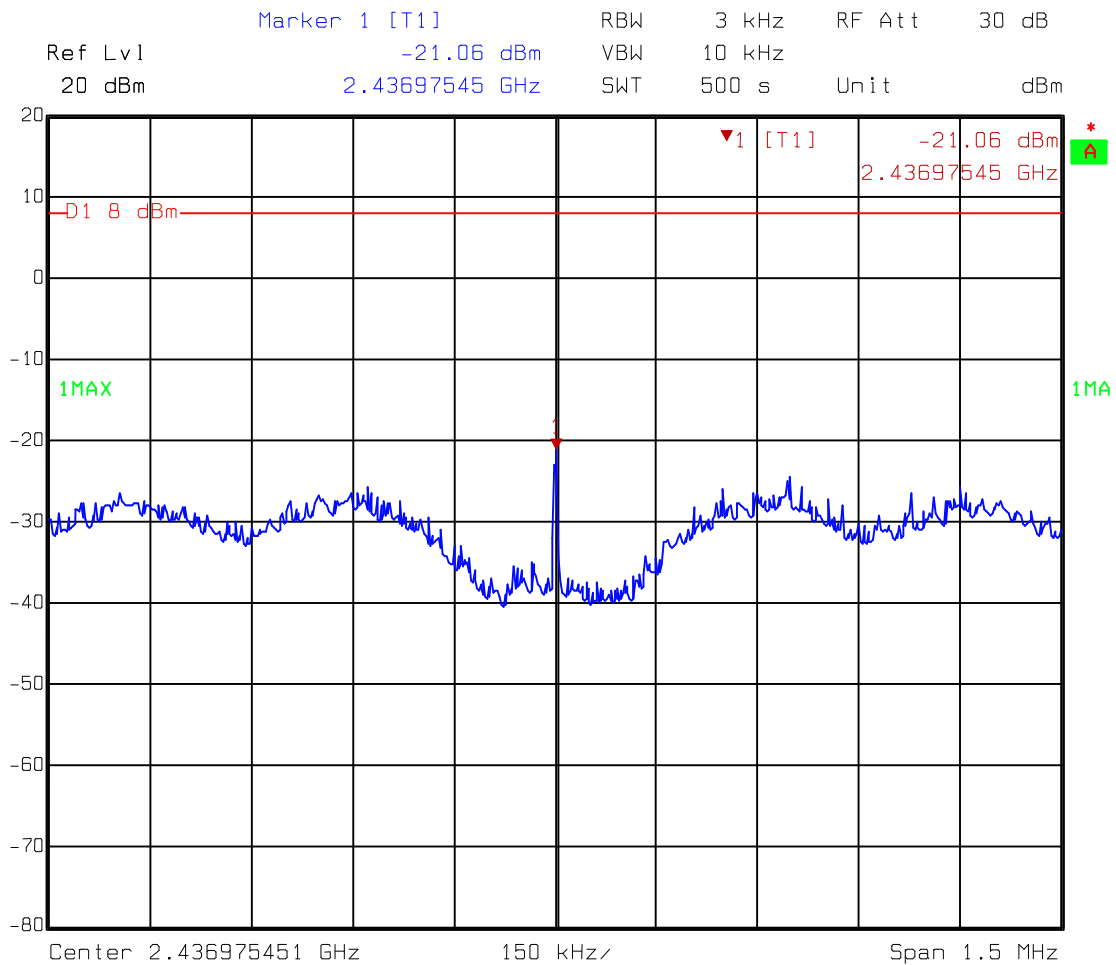
Date: 24.OCT.2003 13:56:27



Comment A: Power spectrum density at low channel

ATT=6dB CL=3.13dB 802.11g

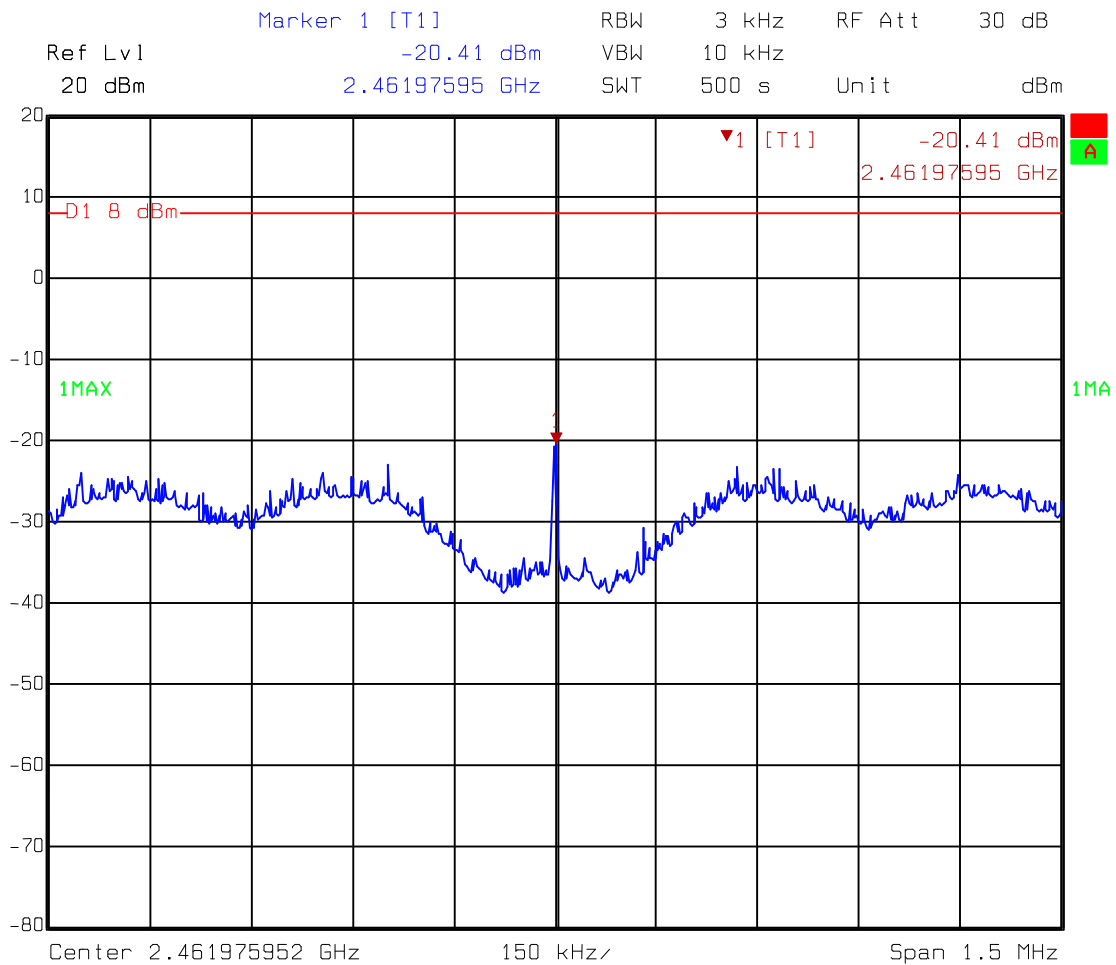
Date: 24.OCT.2003 13:50:30



Comment A: Power spectrum density at middle channel

ATT=6dB CL=3.13dB 802.11g

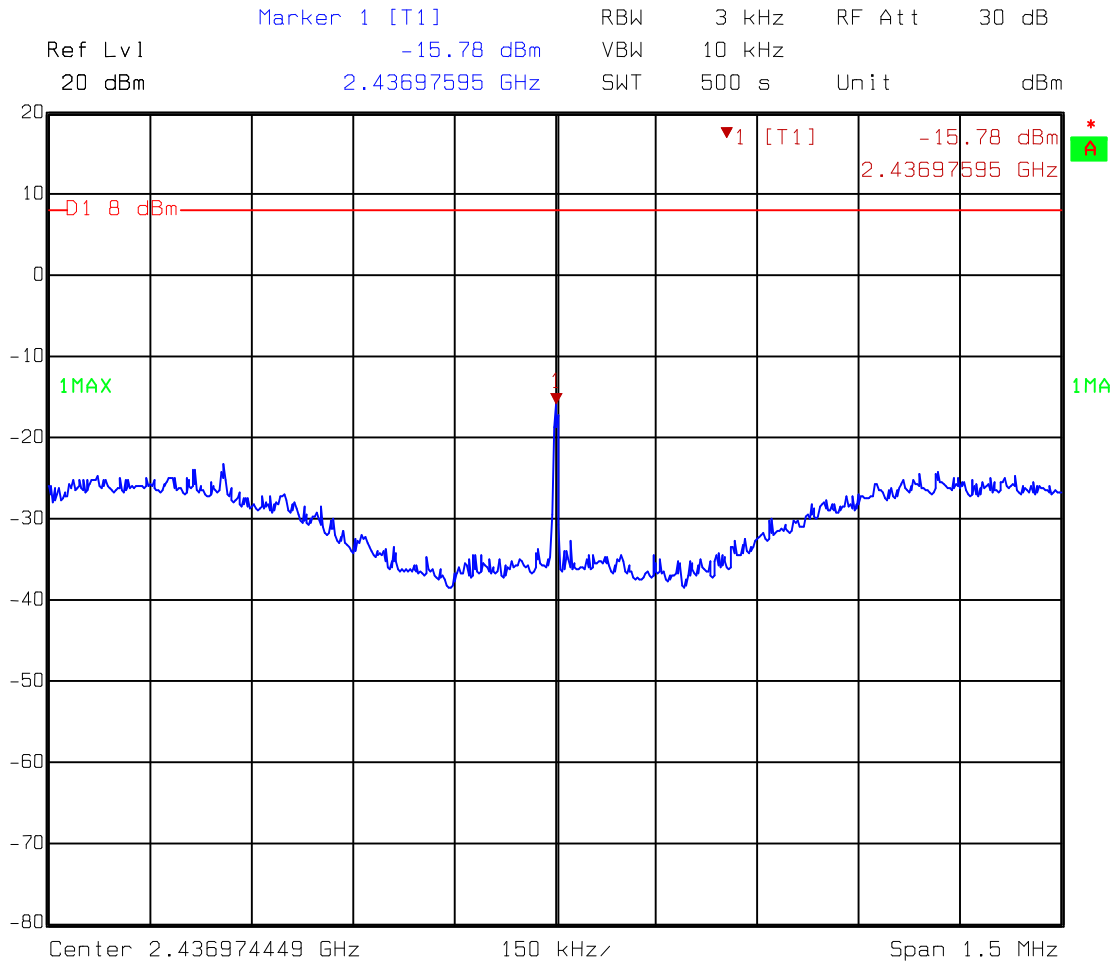
Date: 24.OCT.2003 13:52:35



Comment A: Power spectrum density at high channel

ATT=6dB CL=3.13dB 802.11g

Date: 24.OCT.2003 13:54:31



Comment A: Power spectrum density at middle channel
 ATT=6dB CL=3.13dB 802.11g(turbo mode)

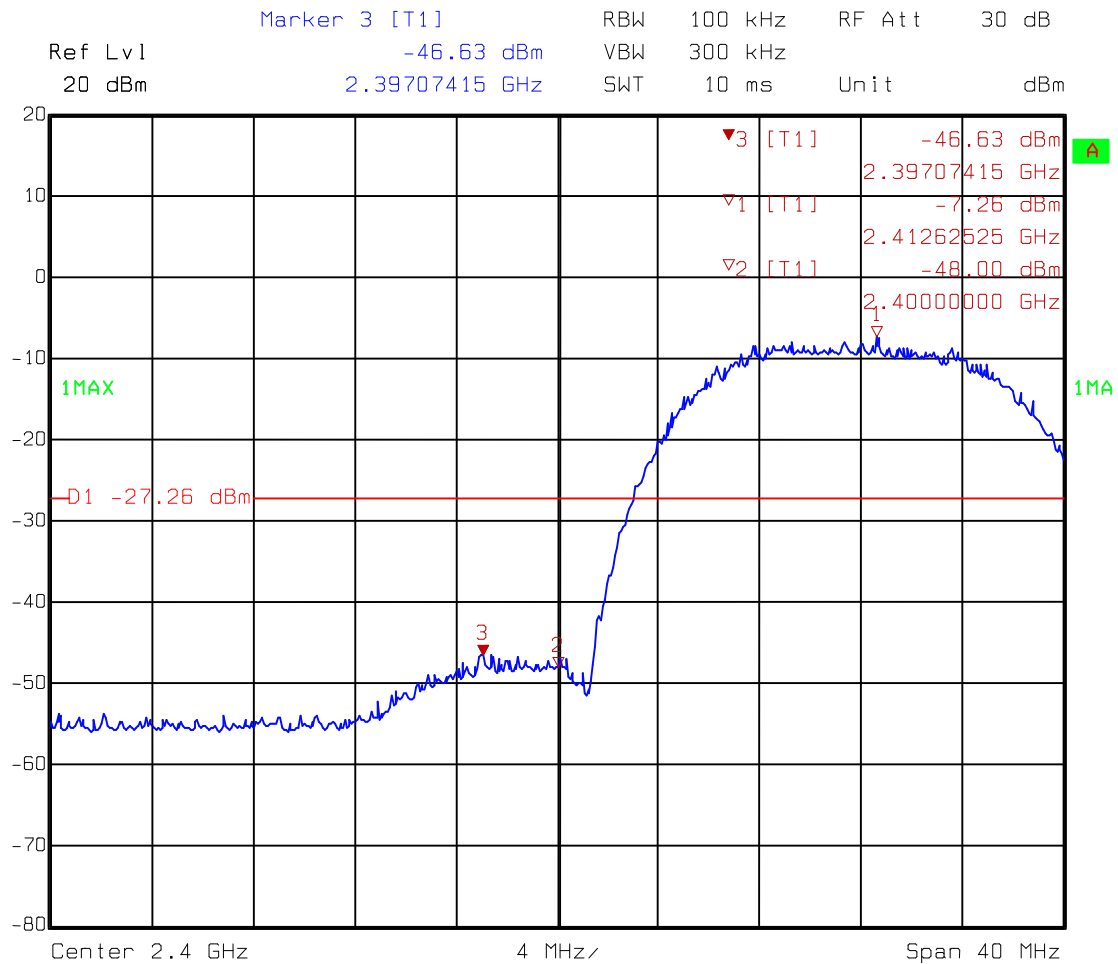
Date: 31.OCT.2003 20:11:06

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.

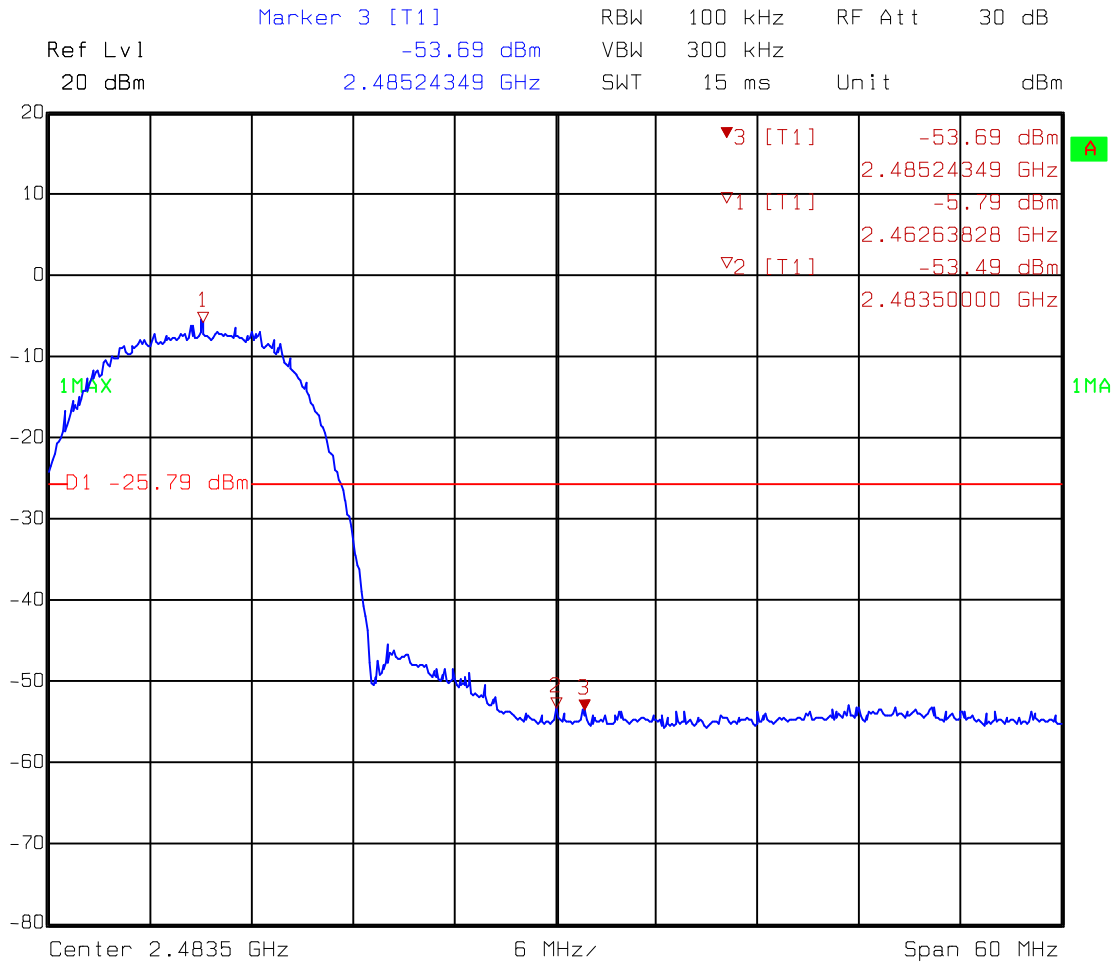
Please see the plot below.

7.1 Band-edge (Conducted method)



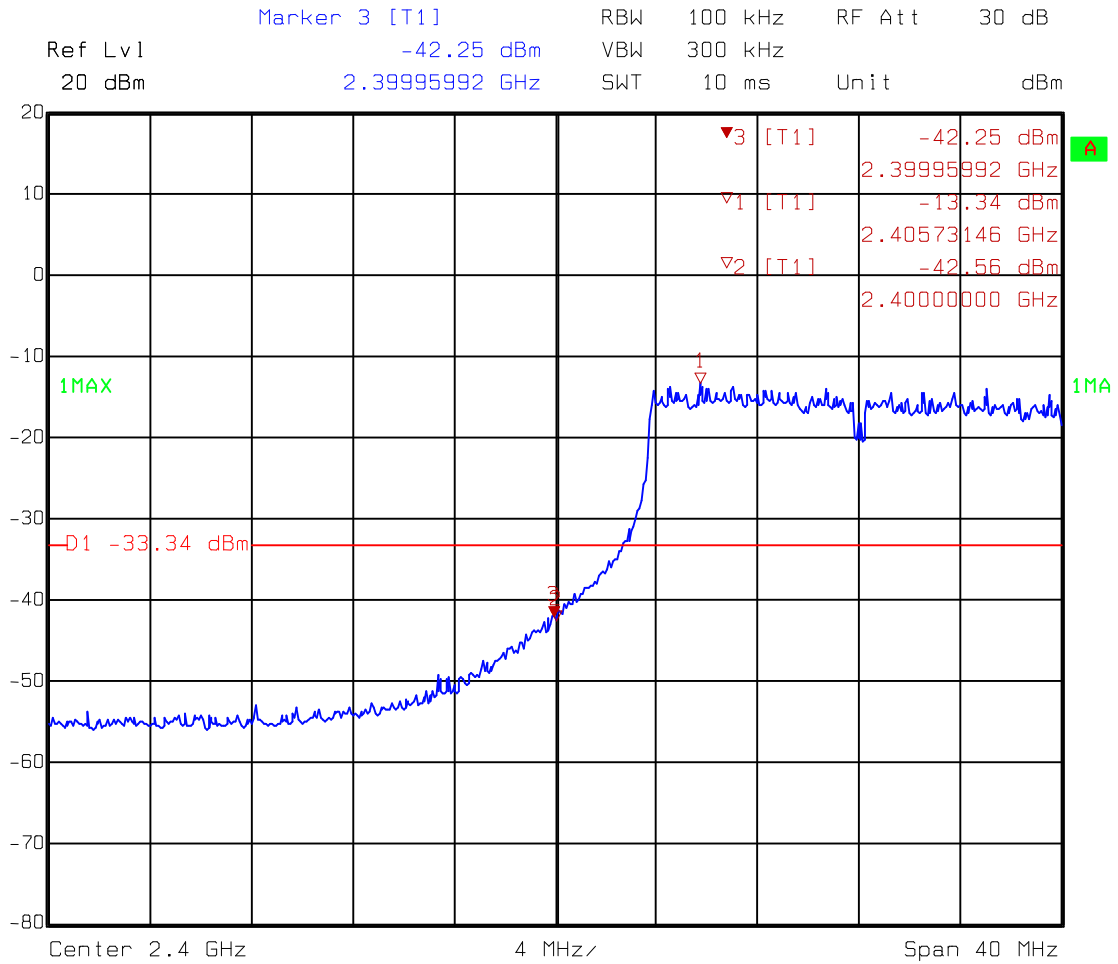
Comment A: Band-edge at low channel 802.11b Att=6dB CB=3.13dB

Date: 24.OCT.2003 14:03:02



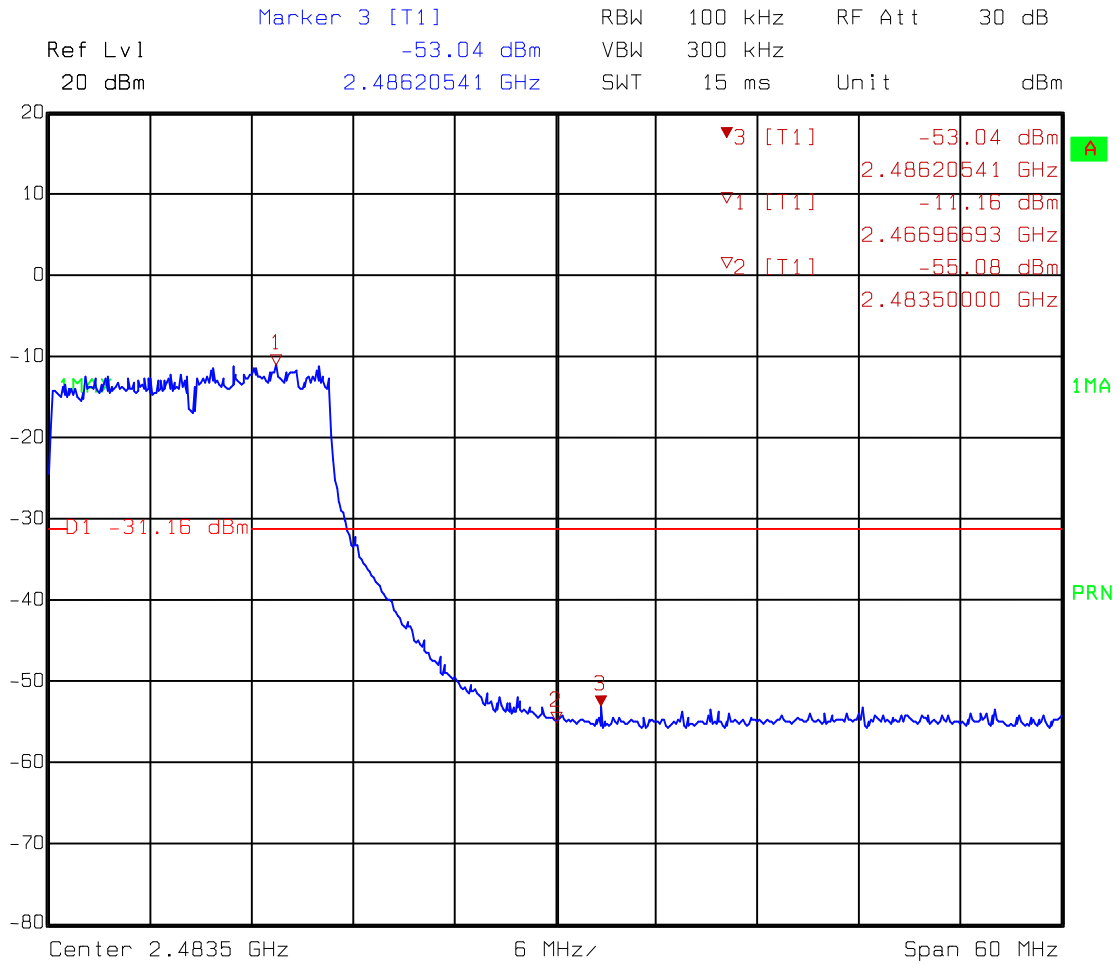
Comment A: Band-edge at high channel 802.11b Att=6dB CB=3.13dB

Date: 24.OCT.2003 14:06:25



Comment A: Band-edge at low channel 802.11g Att=6dB CB=3.13dB

Date: 24.OCT.2003 14:12:17

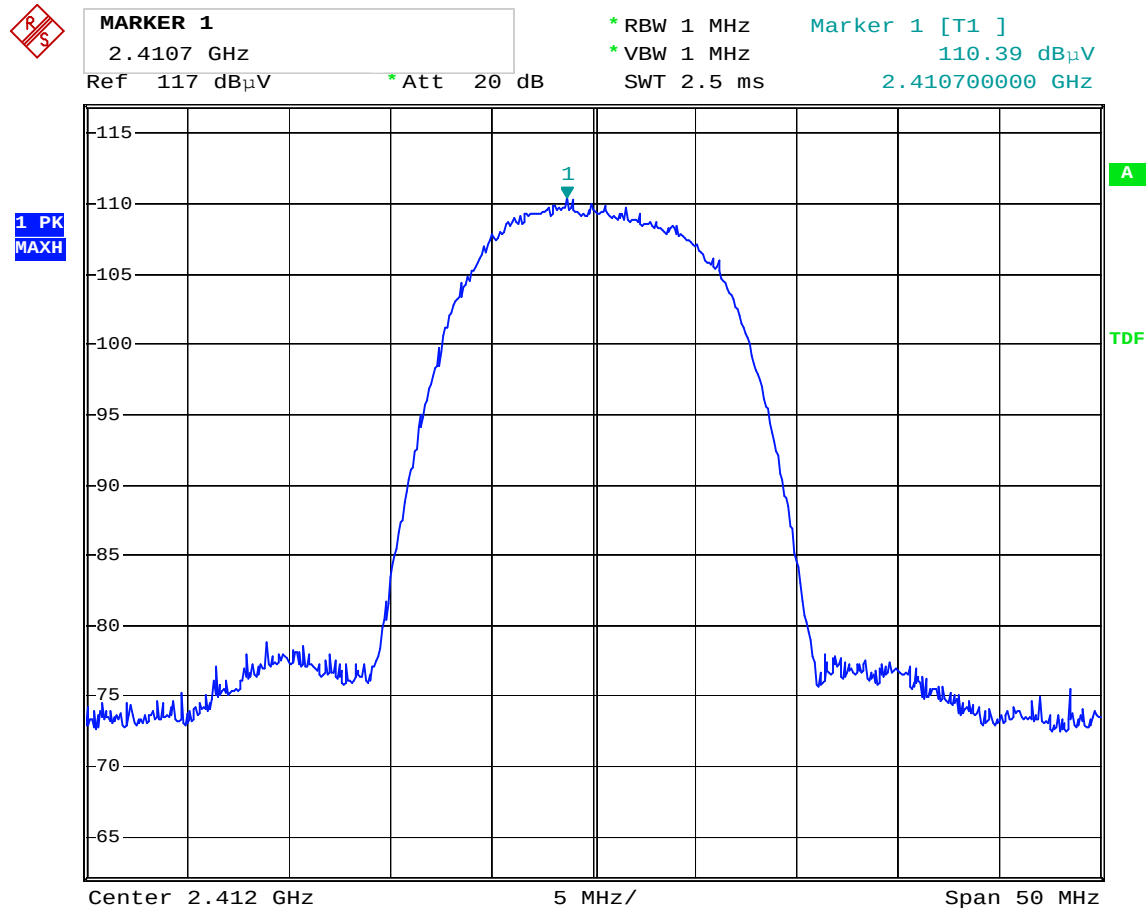


Comment A: Band-edge at high channel 802.11g Att=6dB CB=3.13dB

Date: 24.OCT.2003 14:09:32

7.2 Band-edge (Radiated method)

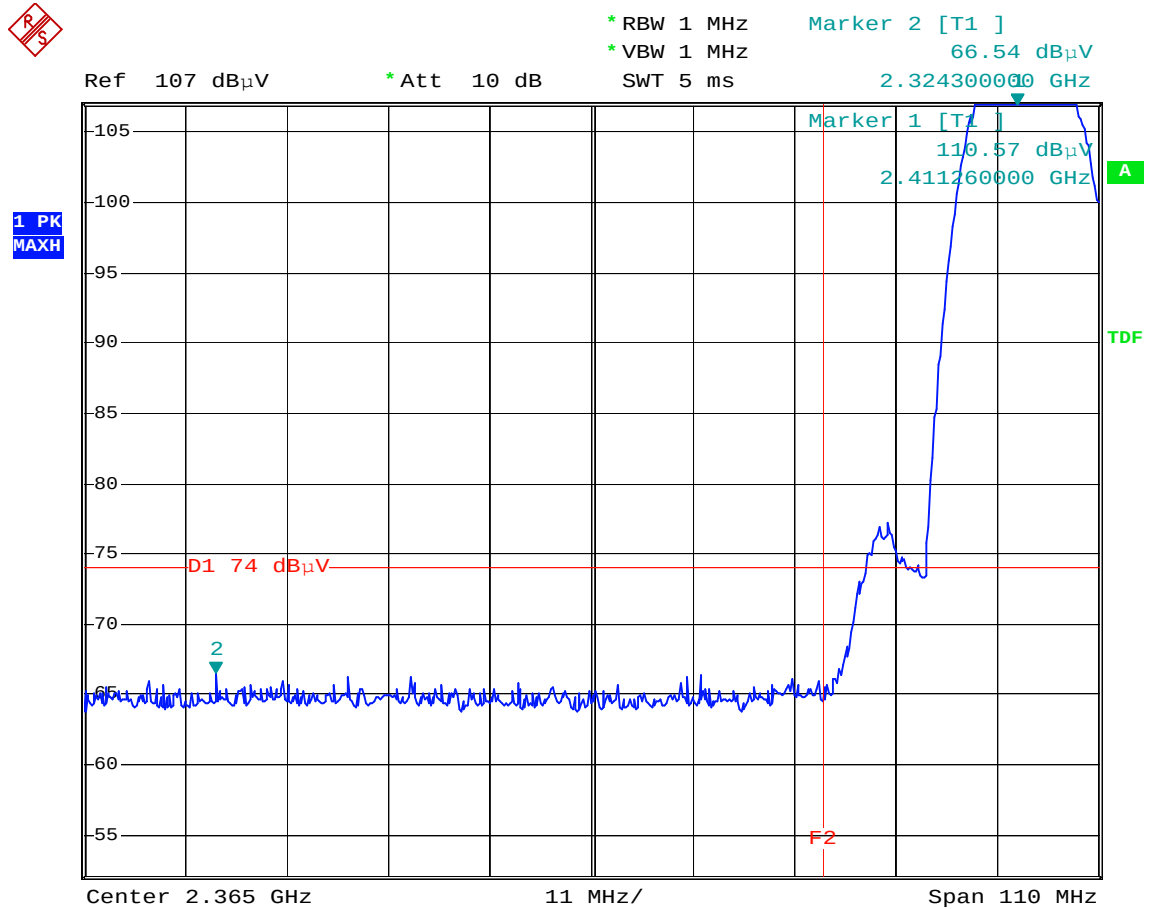
Model Number: DWL-2100AP



Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11b

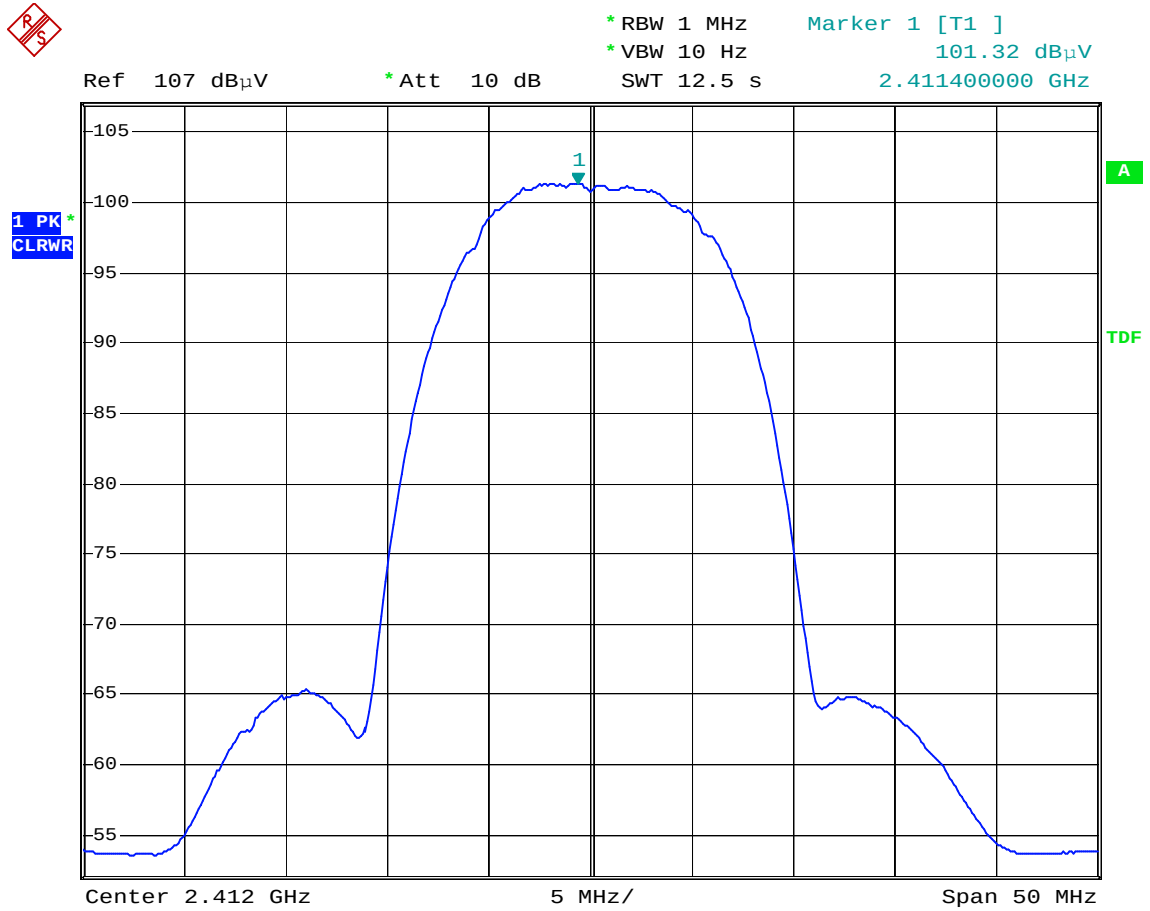
Date: 4.DEC.2003 13:20:00



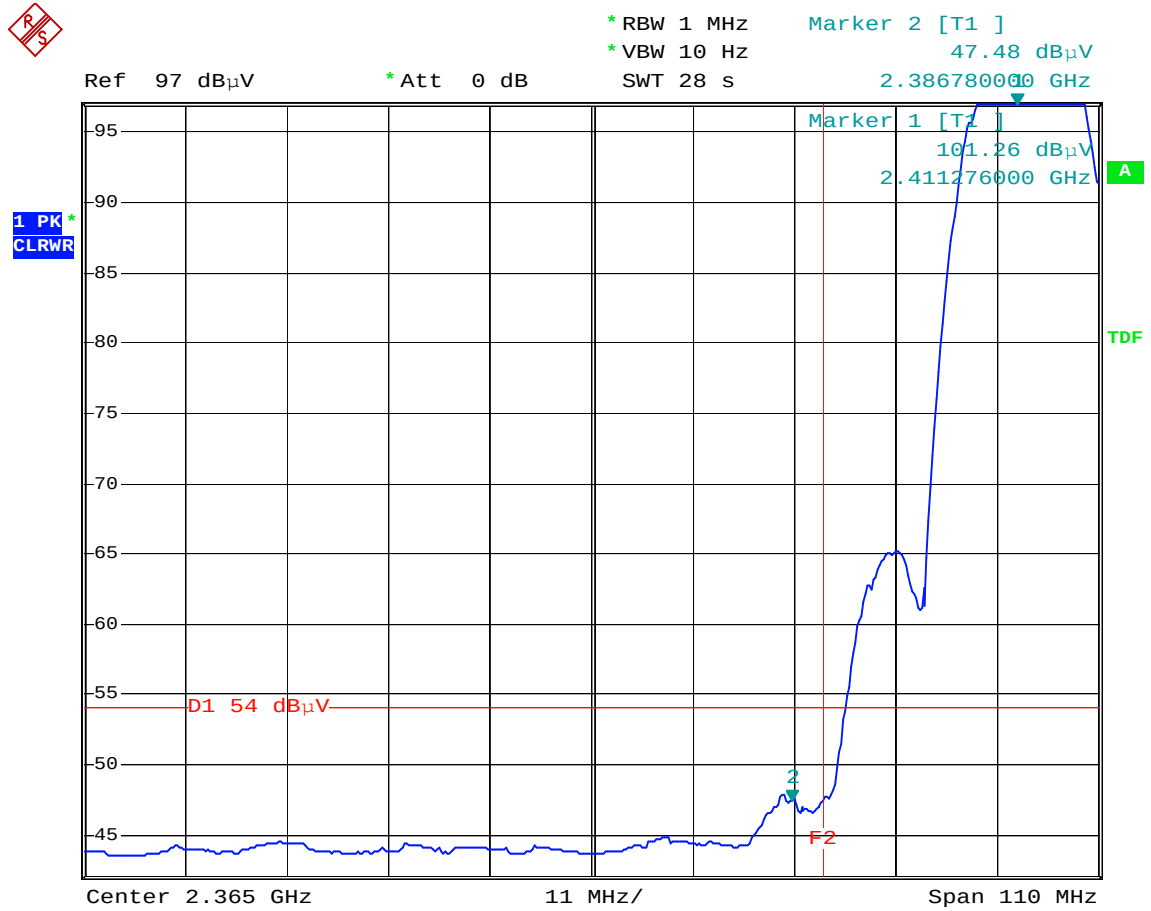
Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11b

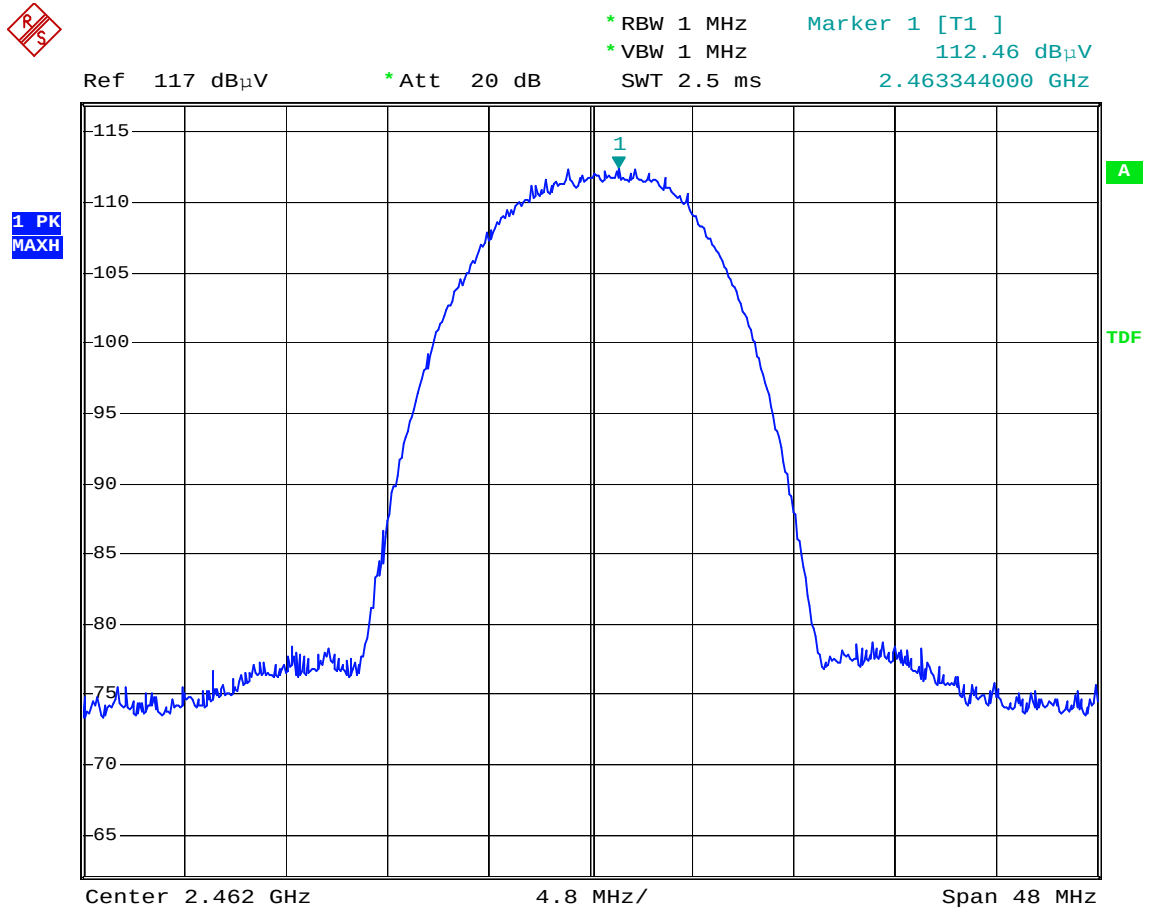
Date: 4.DEC.2003 13:18:33



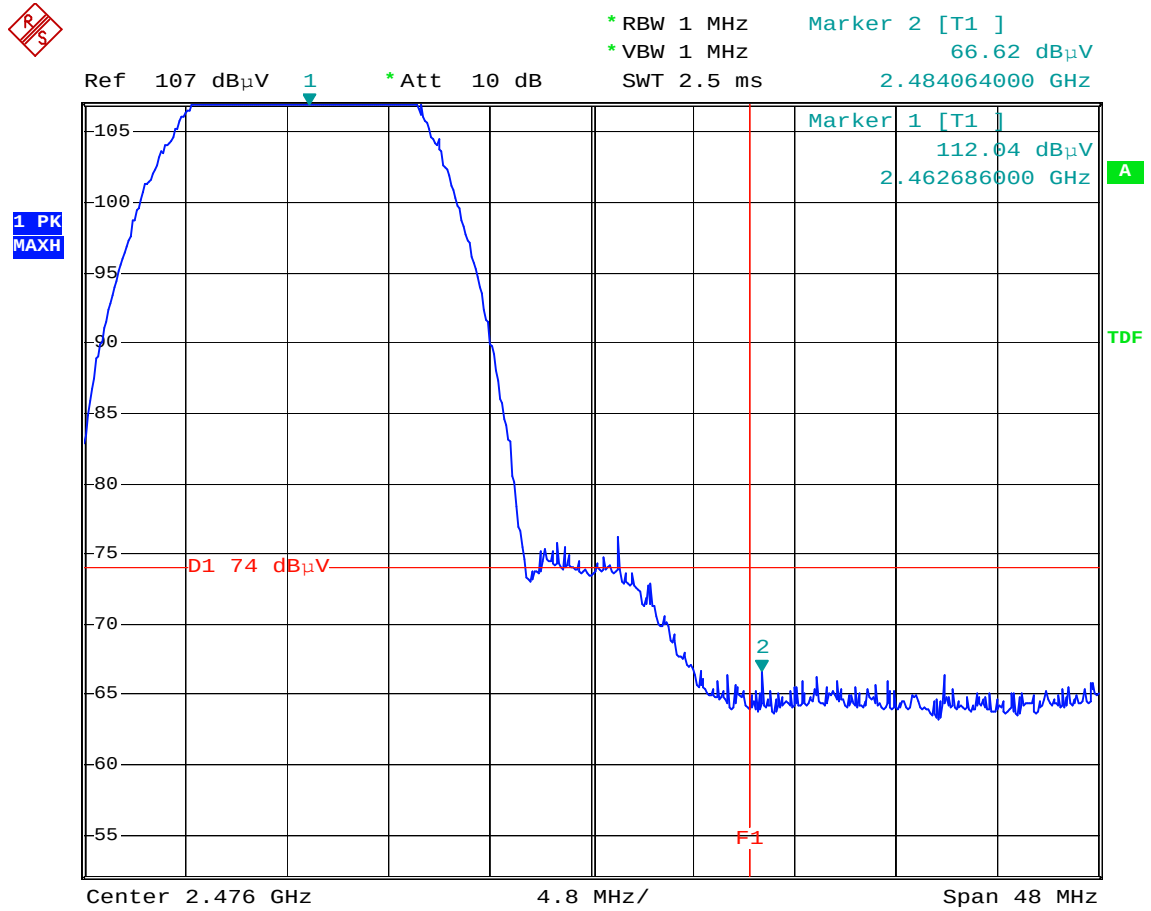
Comment A: Band-edge test at low channel E B
 Average detector F2=2390MHz 802.11b
 Date: 4.DEC.2003 13:25:11



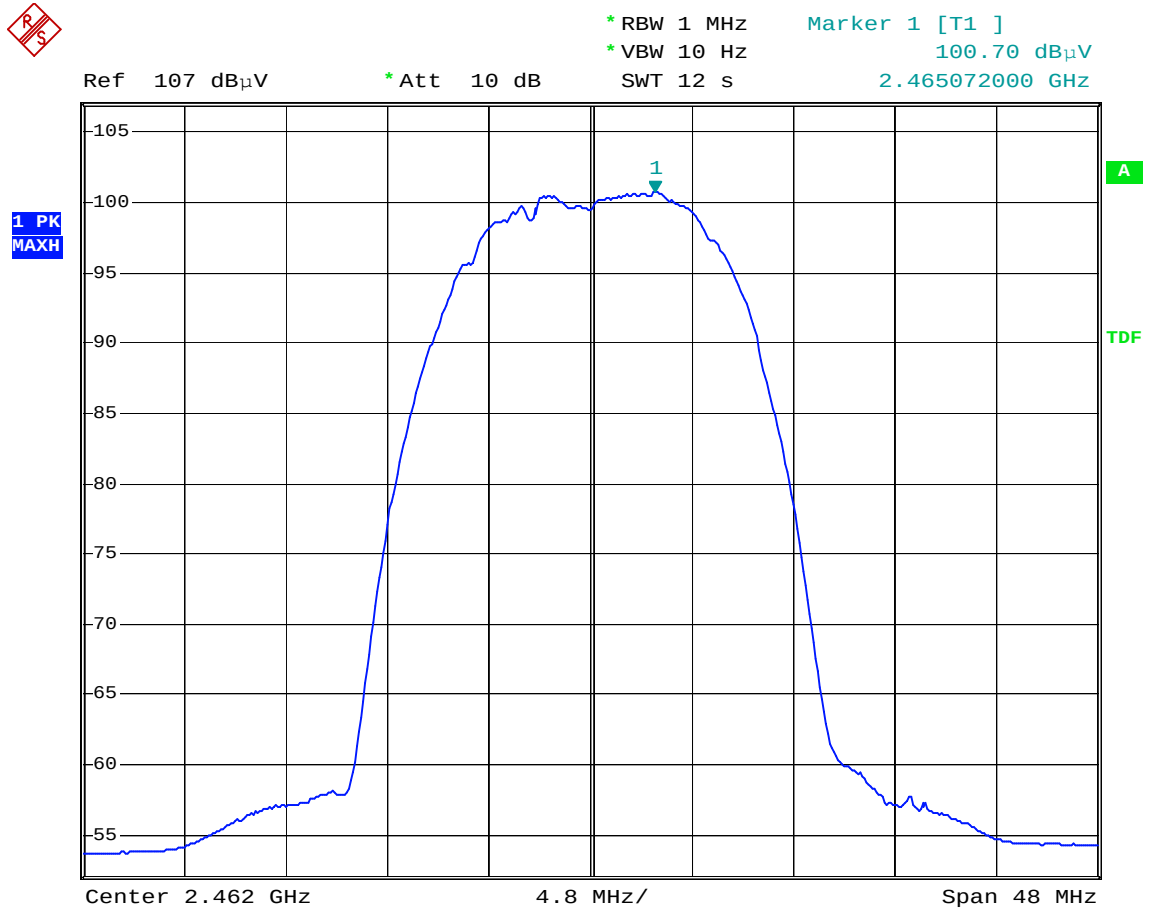
Comment A: Band-edge test at low channel EN B
 Average detector F2=2390MHz 802.11b
 Date: 4.DEC.2003 13:24:20



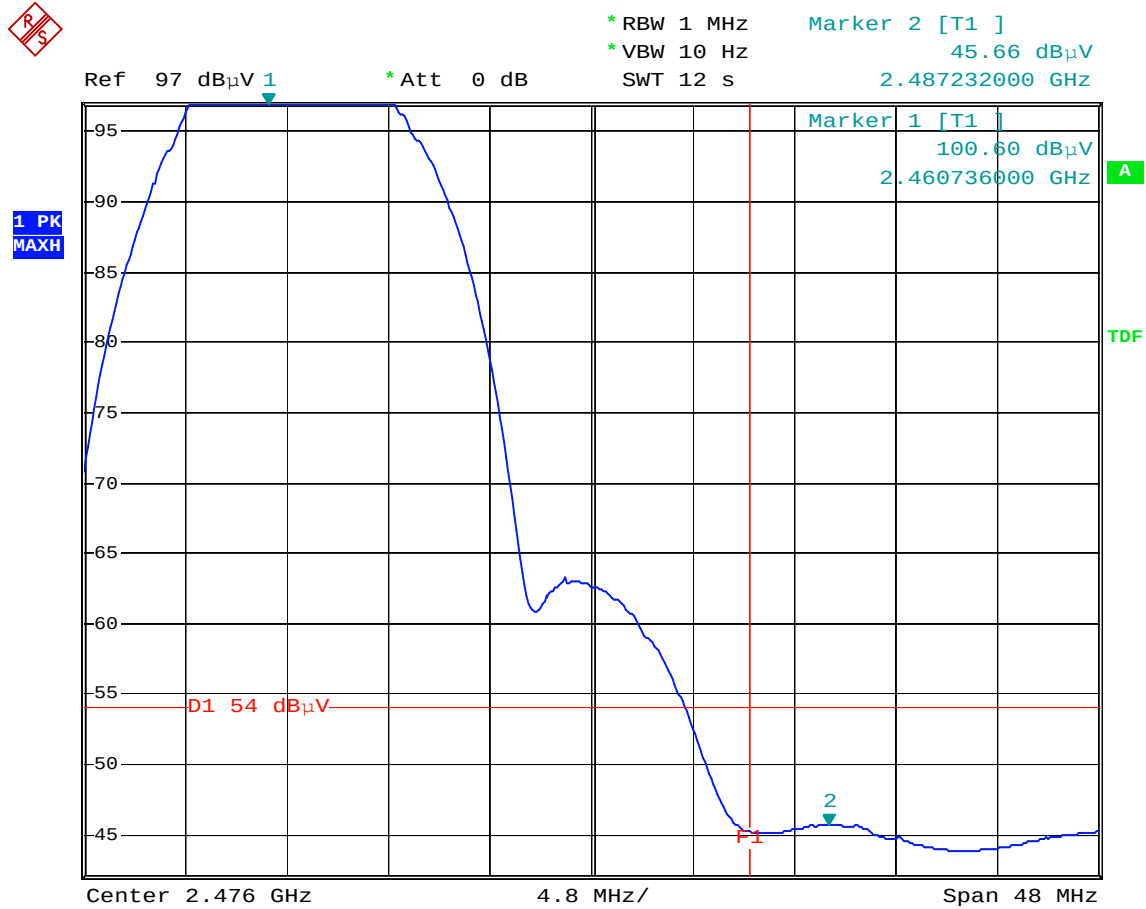
Comment A: Band-edge test at high channel N B
 Peak detector F1=2483.5MHz 802.11b
 Date: 4.DEC.2003 13:33:10



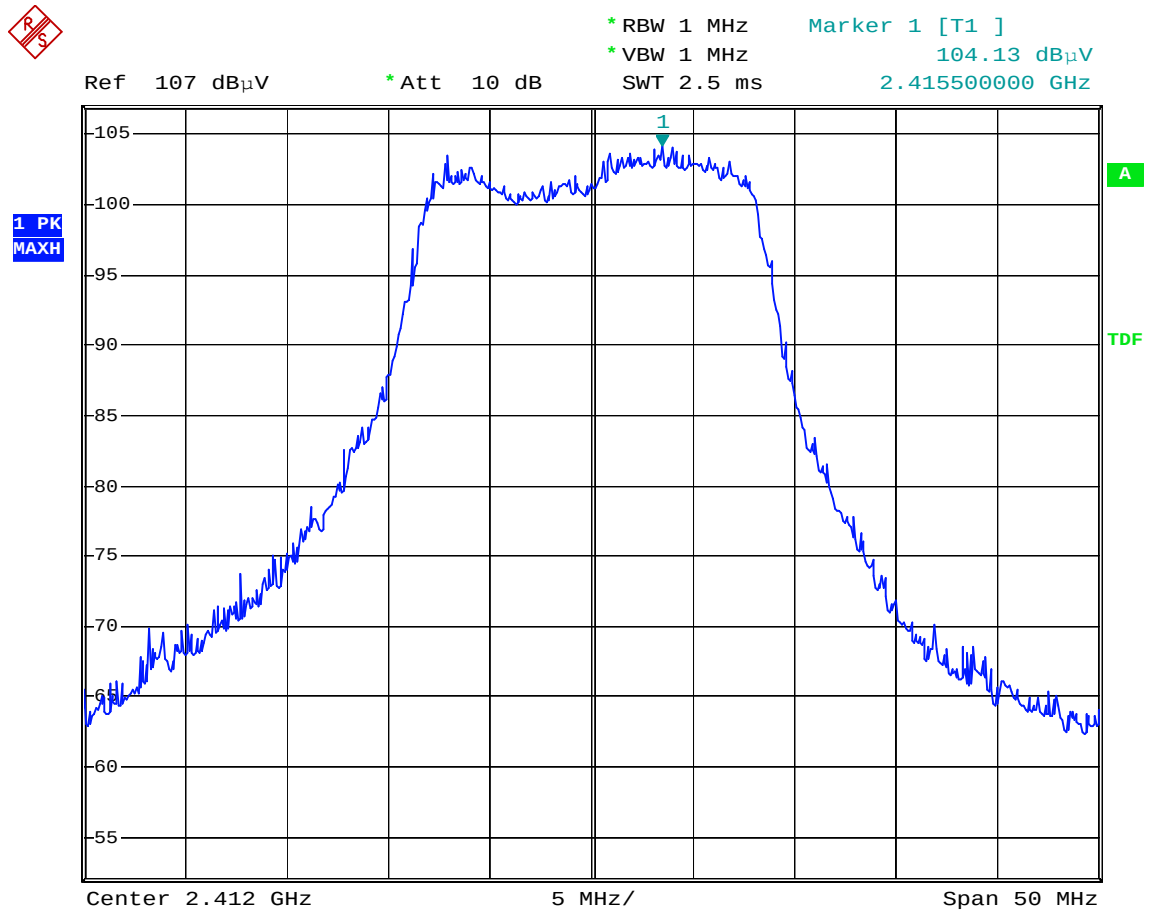
Comment A: Band-edge test at high channel N B
 Peak detector F1=2483.5MHz 802.11b
 Date: 4.DEC.2003 13:28:43



Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11b
 Date: 5.DEC.2003 08:30:31



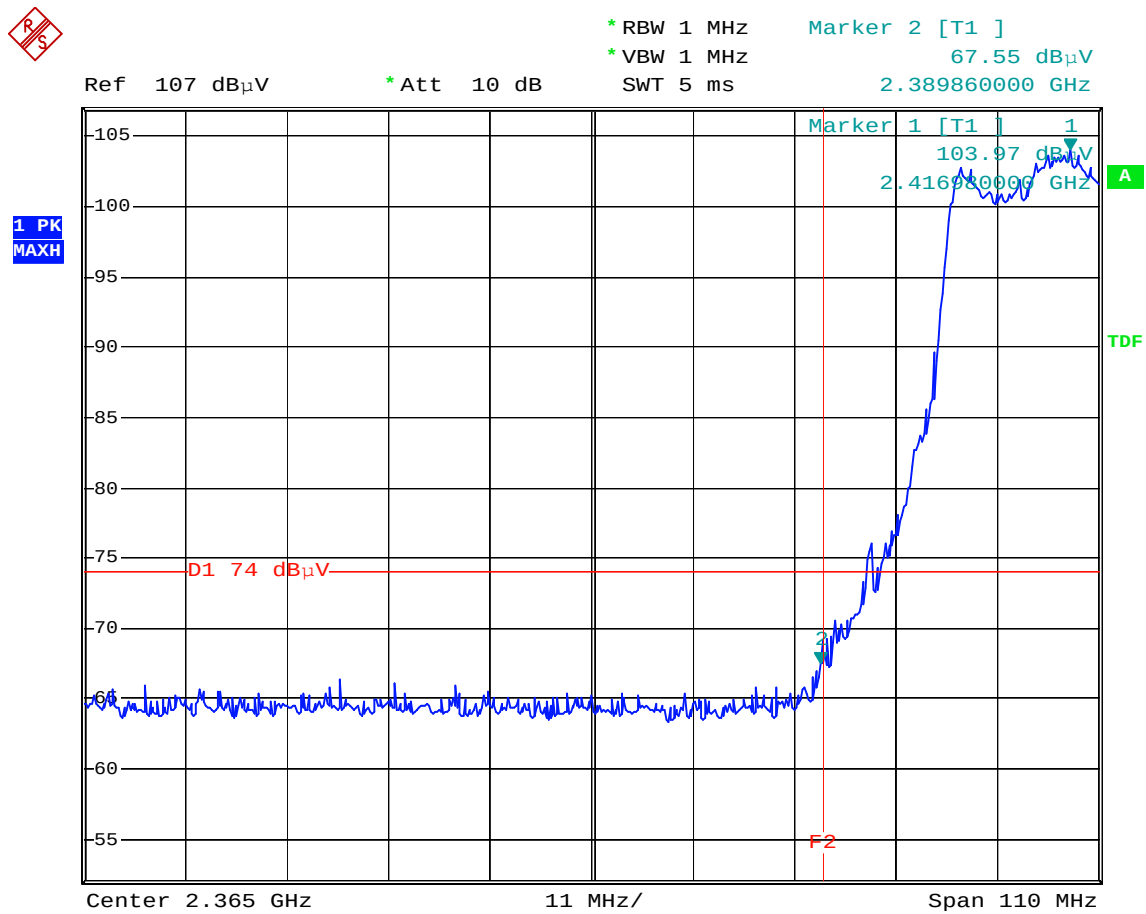
Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11b
 Date: 4.DEC.2003 13:36:57



Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11g

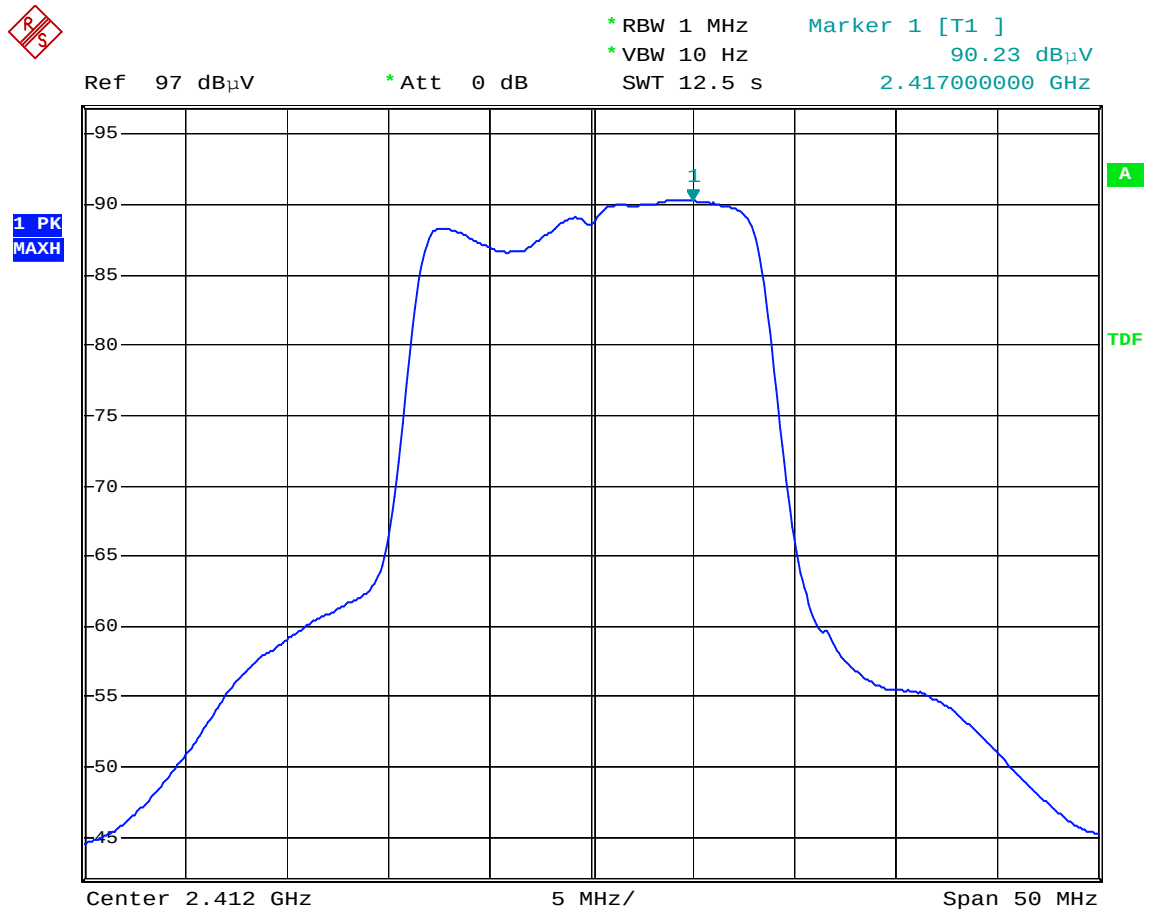
Date: 4.DEC.2003 13:49:39



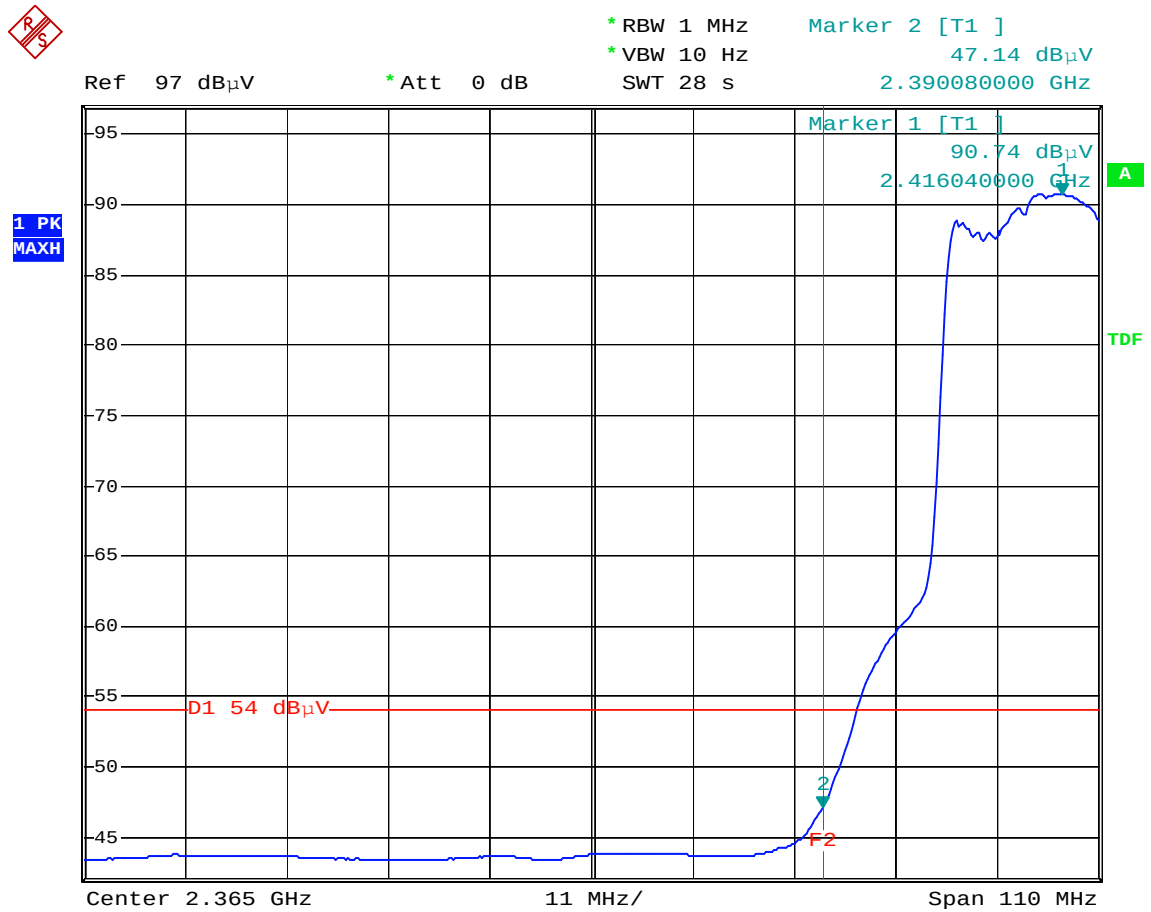
Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11g

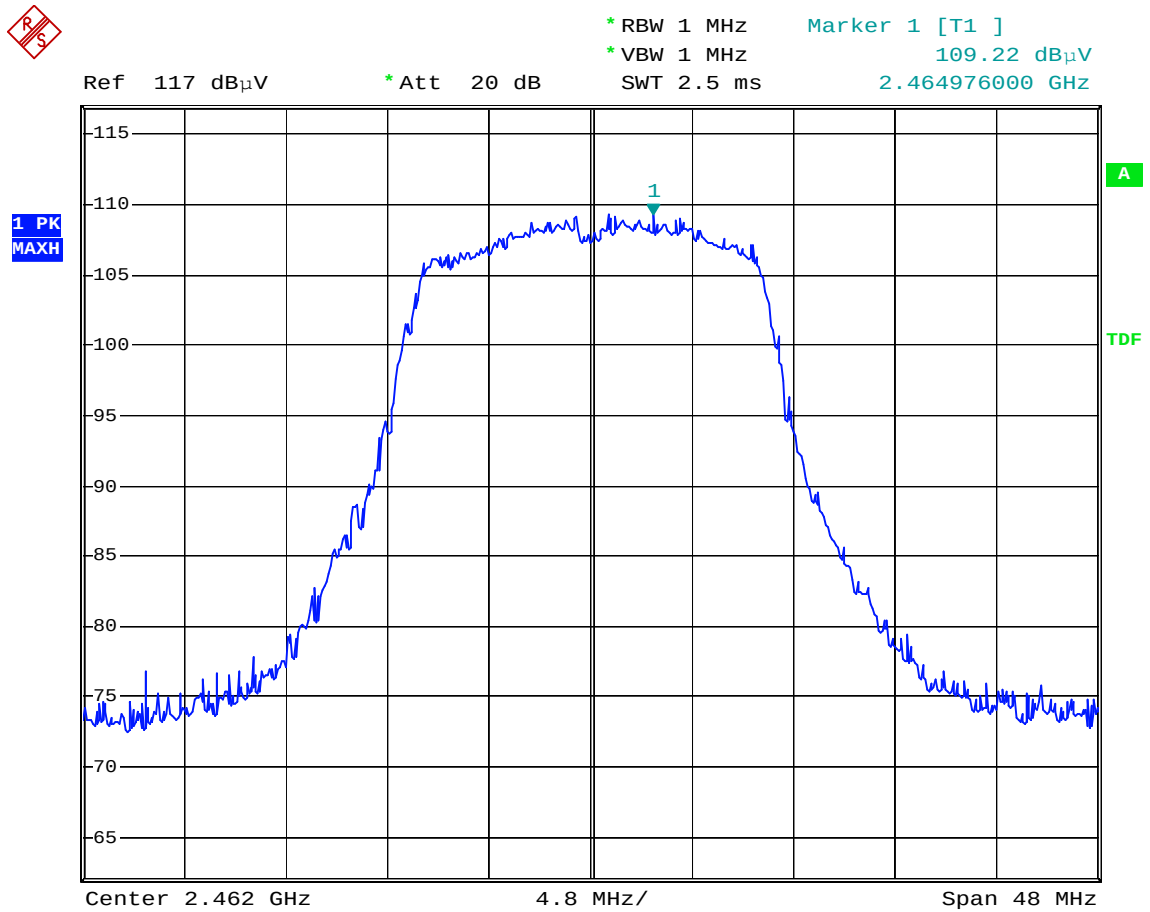
Date: 4.DEC.2003 13:48:58



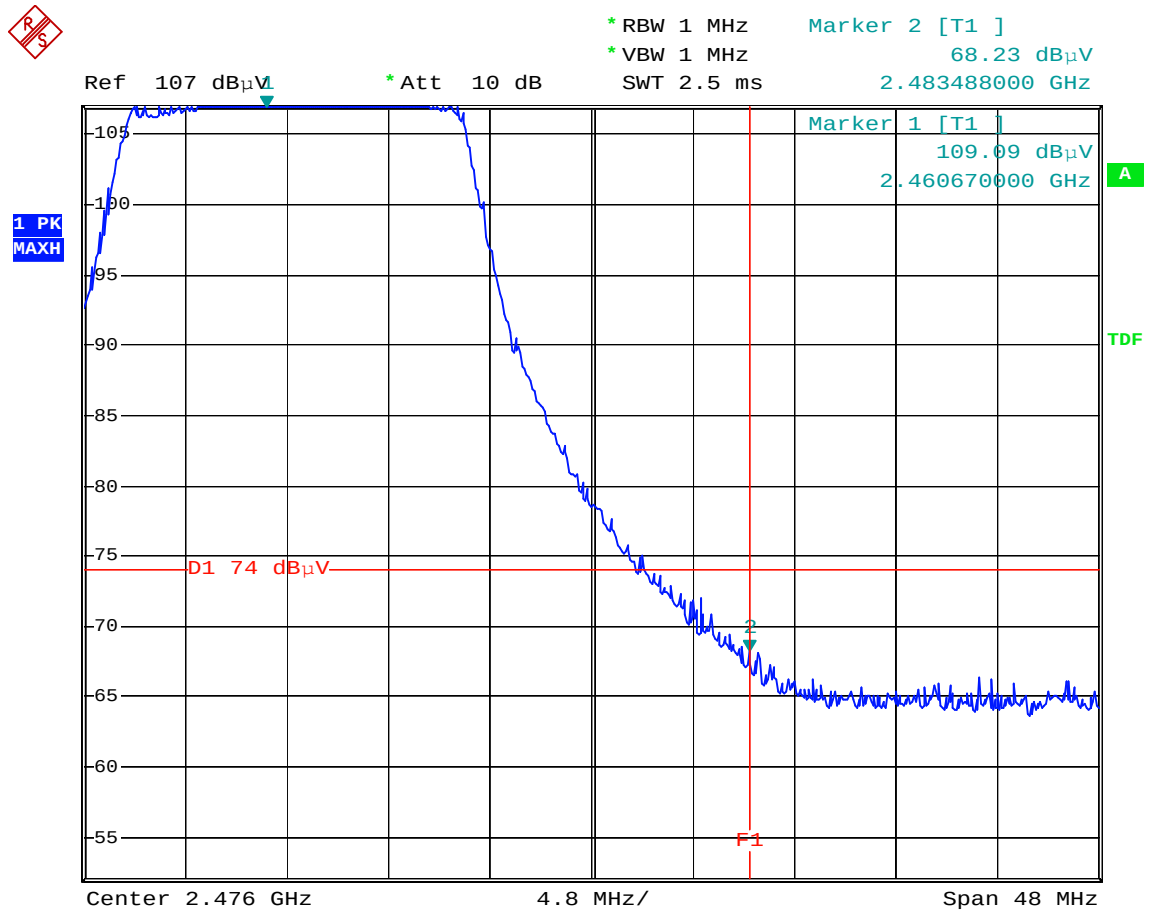
Comment A: Band-edge test at low channel EN B
 Average detector F2=2390MHz 802.11g
 Date: 4.DEC.2003 13:57:47



Comment A: Band-edge test at low channel EN B
 Average detector F2=2390MHz 802.11g
 Date: 4.DEC.2003 13:55:51



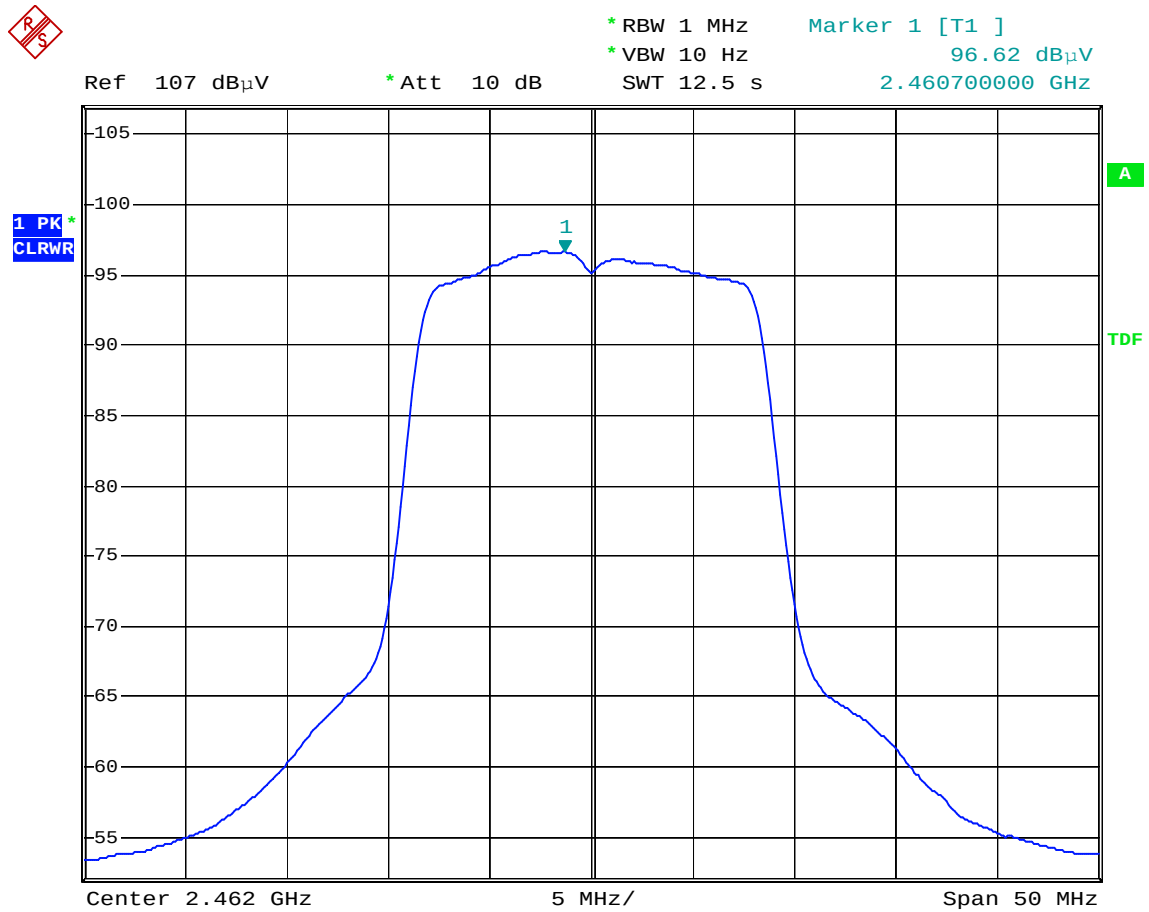
Comment A: Band-edge test at high channelN B
 Peak detector F1=2483.5MHz 802.11g
 Date: 4.DEC.2003 13:41:35



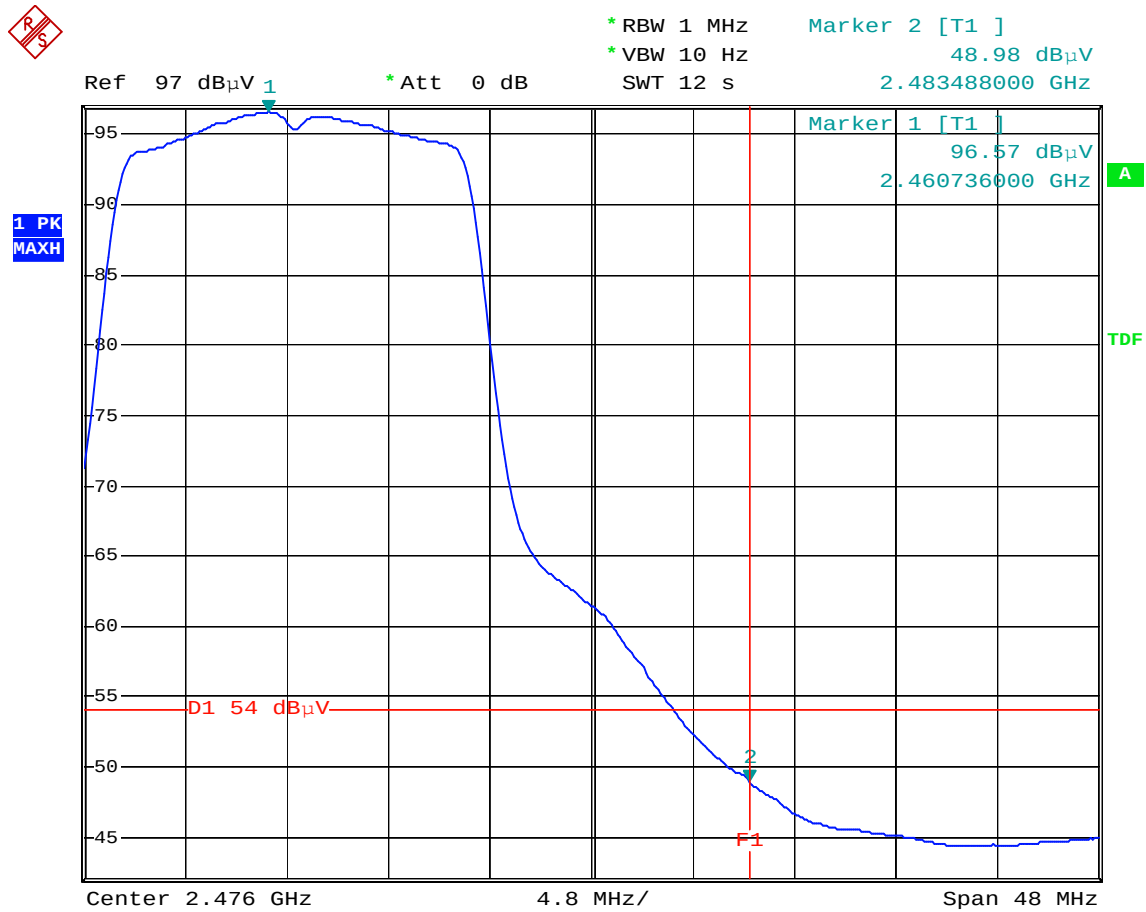
Comment A: Band-edge test at high channel B

Peak detector F1=2483.5MHz 802.11g

Date: 4.DEC.2003 13:40:45

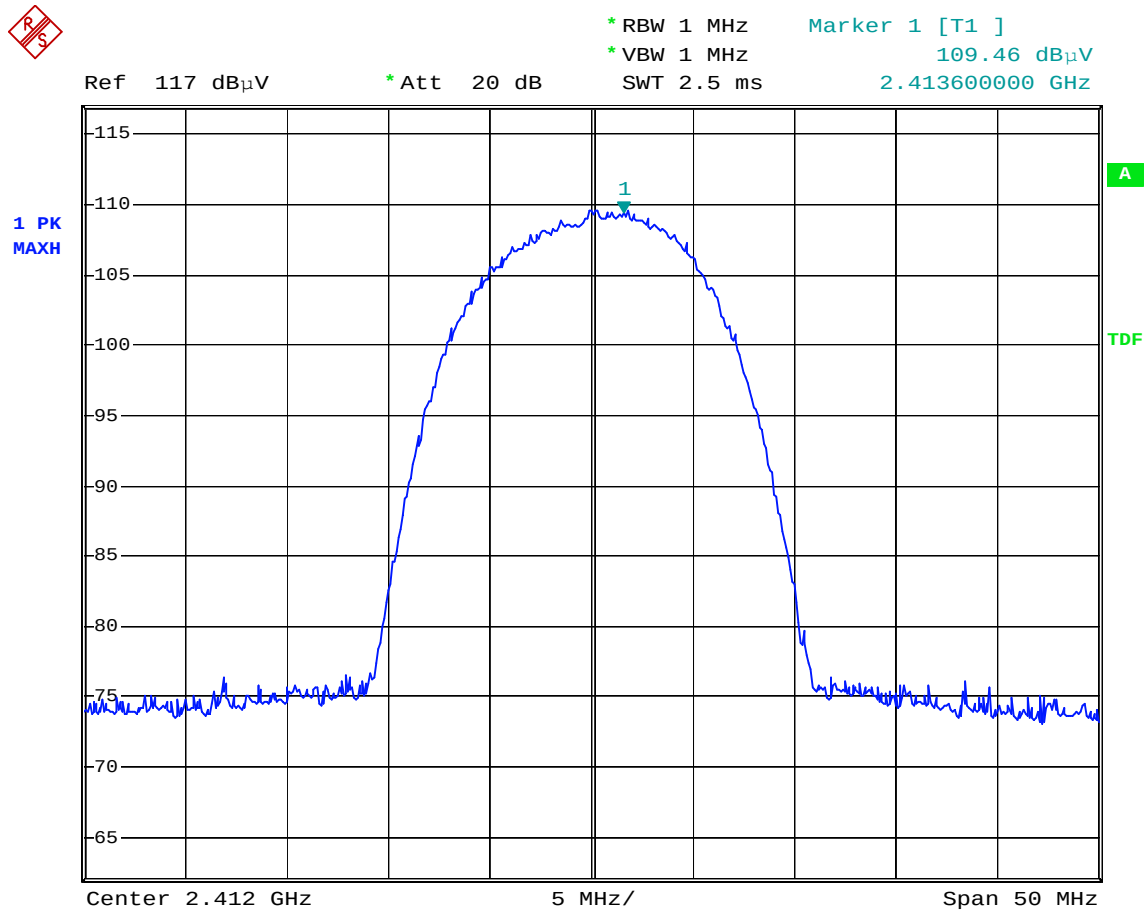


Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11g
 Date: 4.DEC.2003 13:46:06



Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11g
 Date: 4.DEC.2003 13:44:06

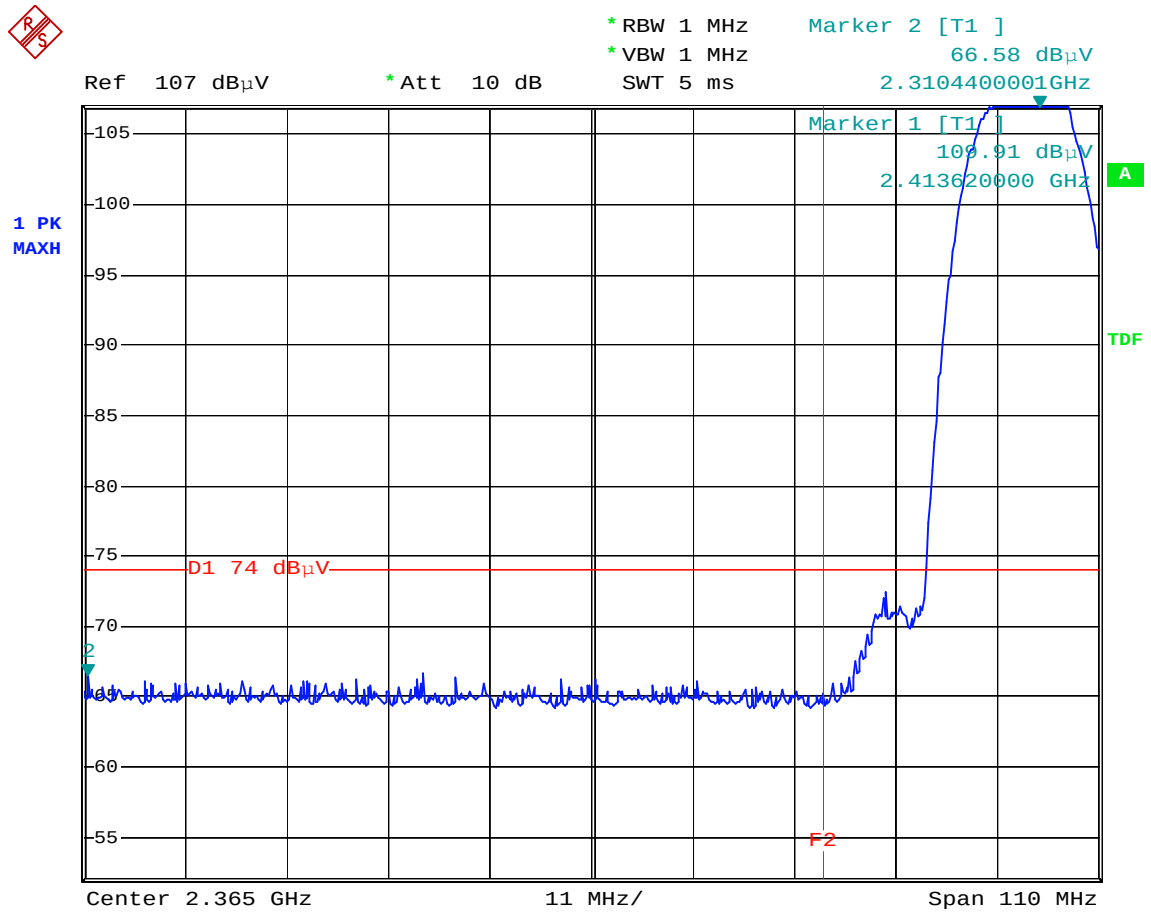
Model Number: C54APT



Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11b

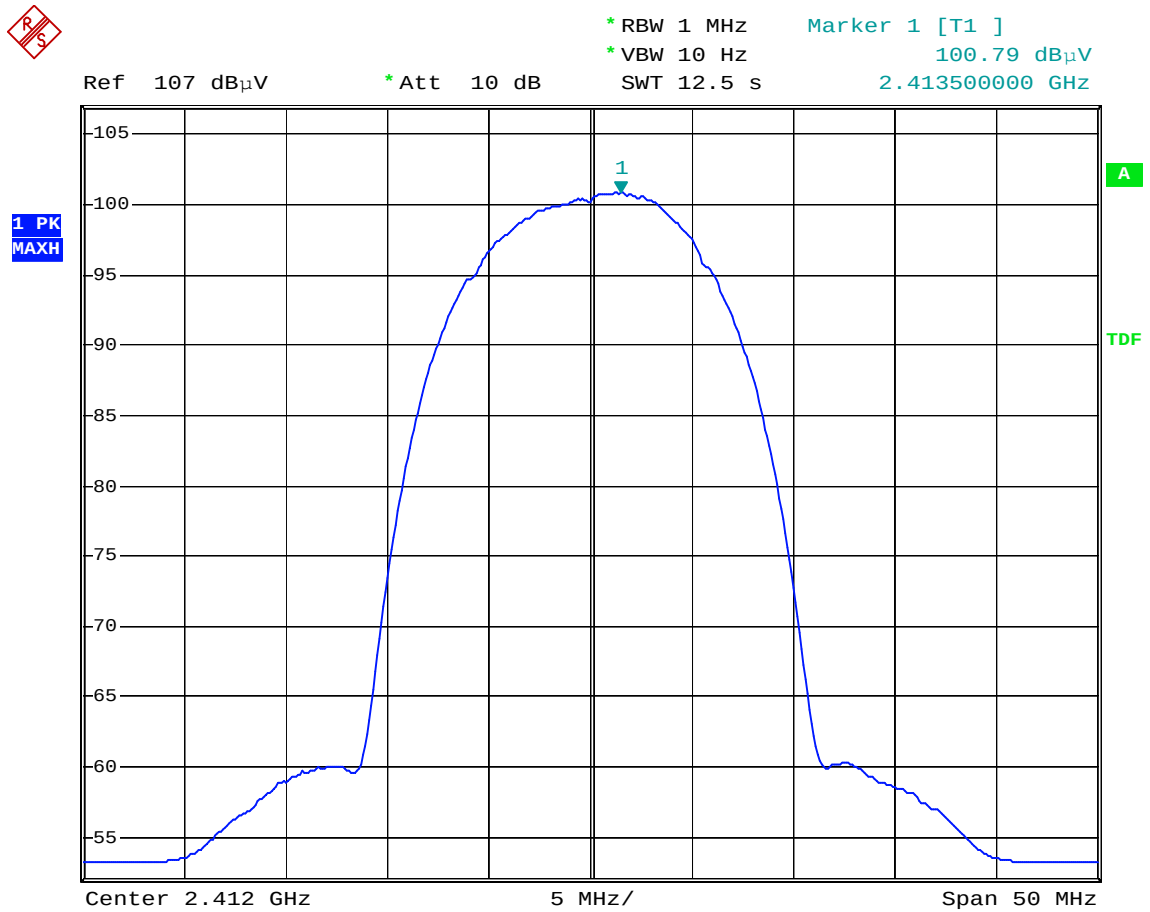
Date: 14.NOV.2003 15:04:48



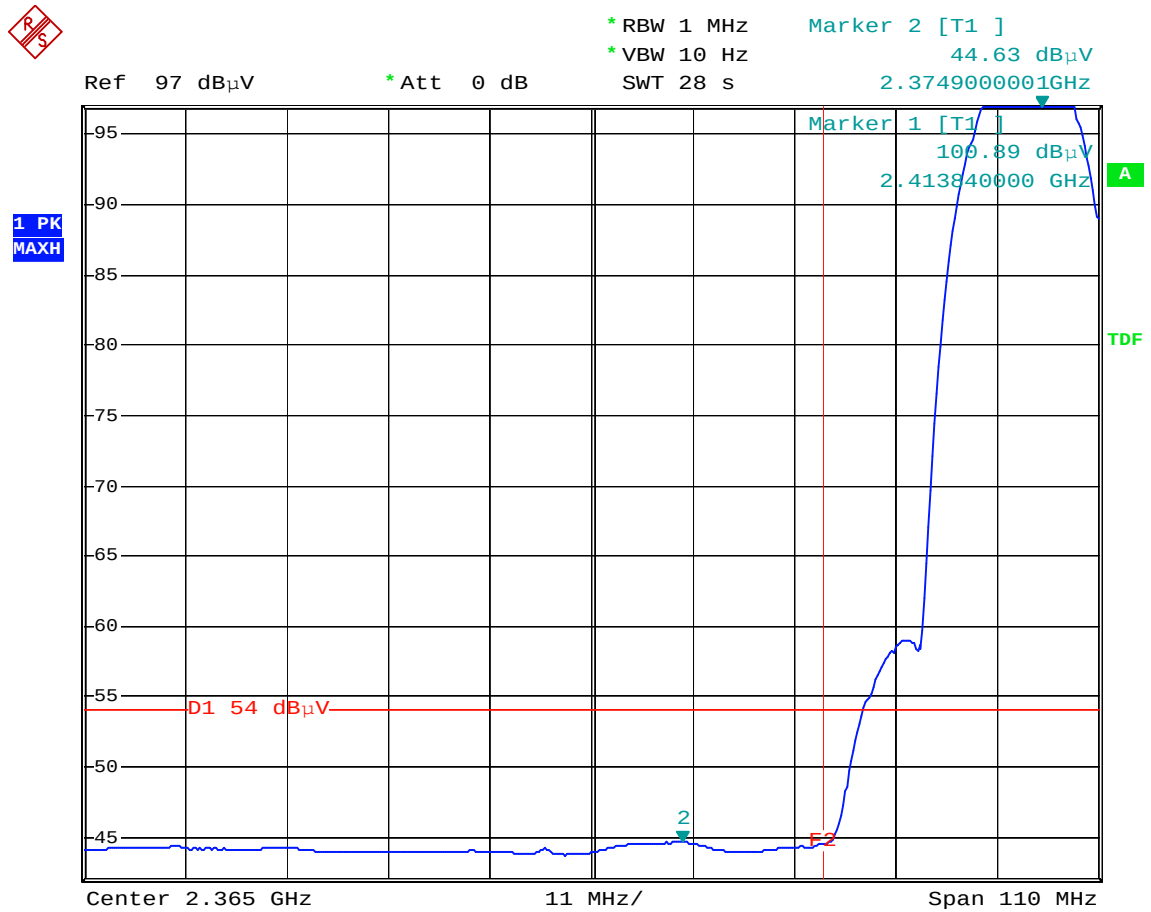
Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11b

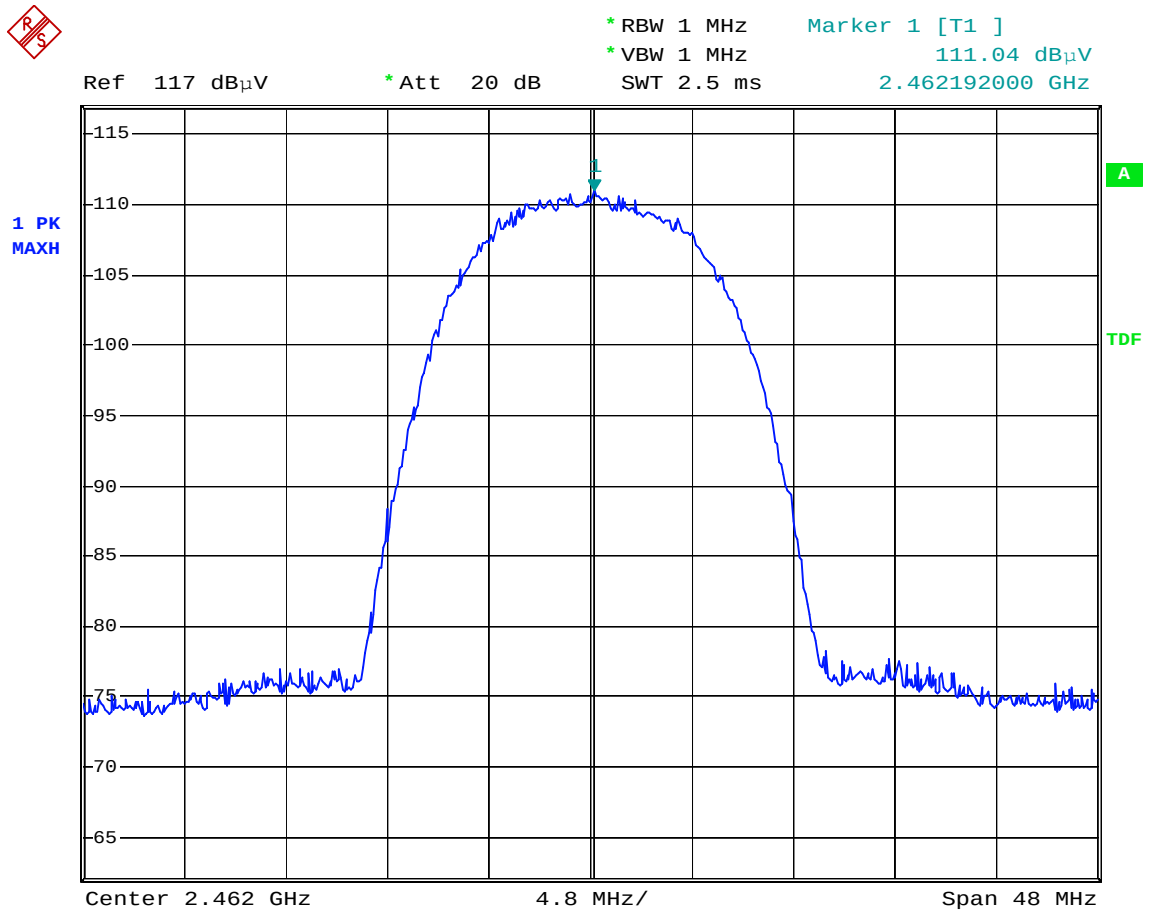
Date: 14.NOV.2003 15:01:33



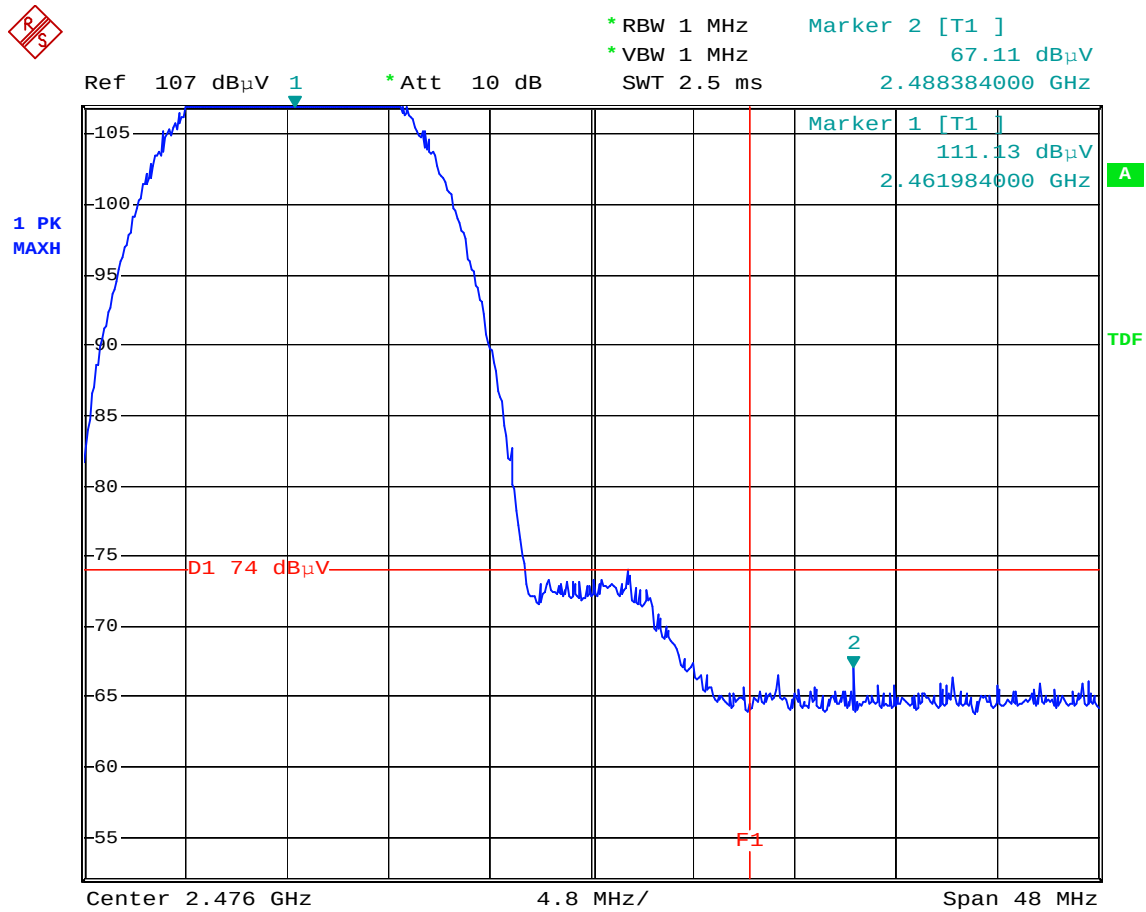
Comment A: Band-edge test at low channel0
 Average detector F2=2390MHz 802.11b
 Date: 14.NOV.2003 15:11:09



Comment A: Band-edge test at low channel0
 Average detector F2=2390MHz 802.11b
 Date: 14.NOV.2003 15:08:27



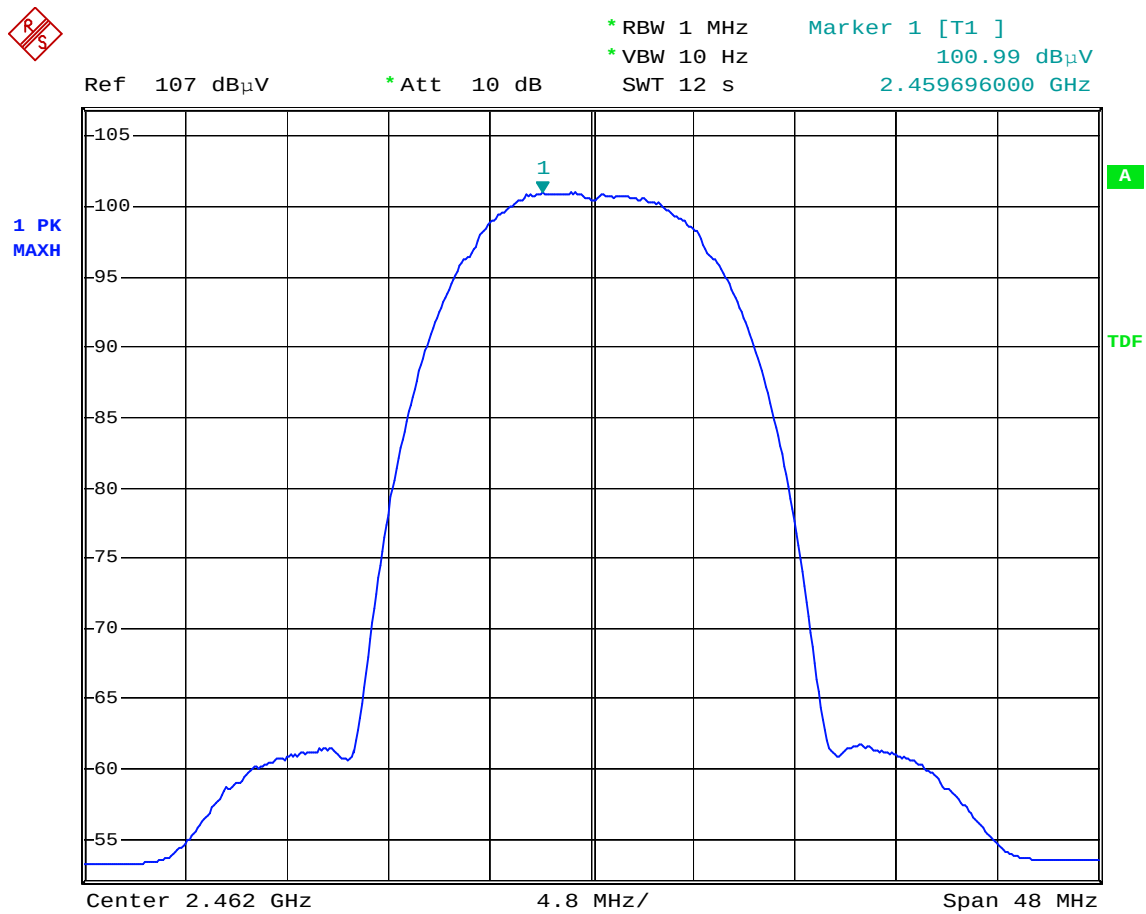
Comment A: Band-edge test at high channel
 Peak detector F1=2483.5MHz 802.11b
 Date: 14.NOV.2003 14:54:41



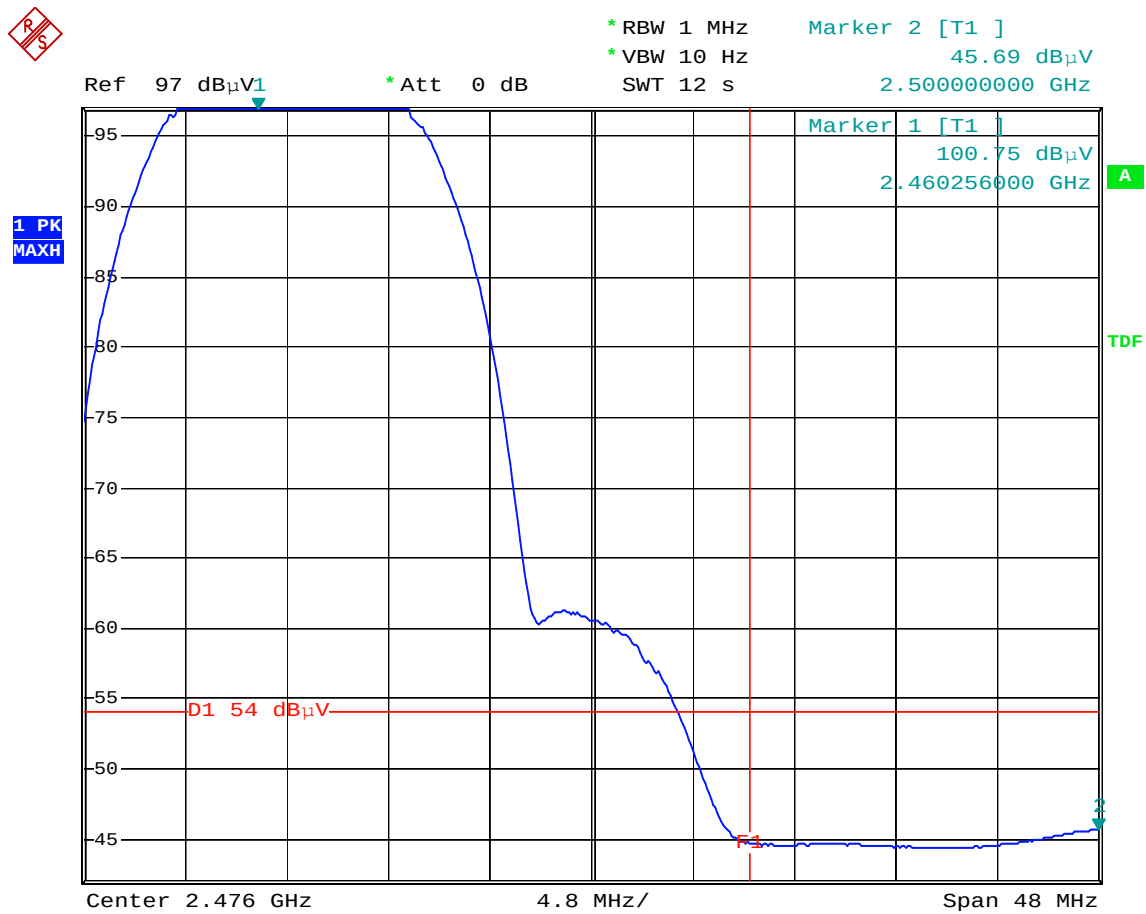
Comment A: Band-edge test at high channel N B

Peak detector F1=2483.5MHz 802.11b

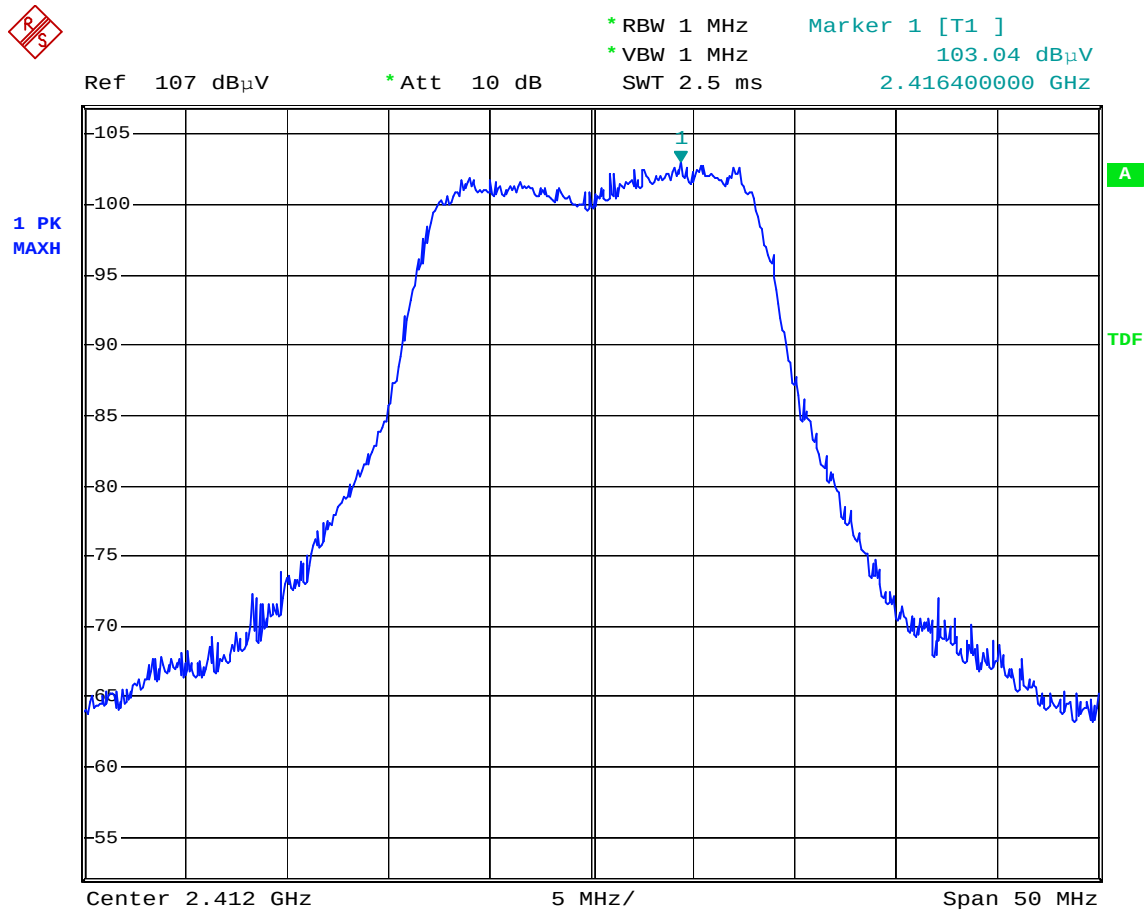
Date: 14.NOV.2003 14:51:17



Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11b
 Date: 14.NOV.2003 14:46:13



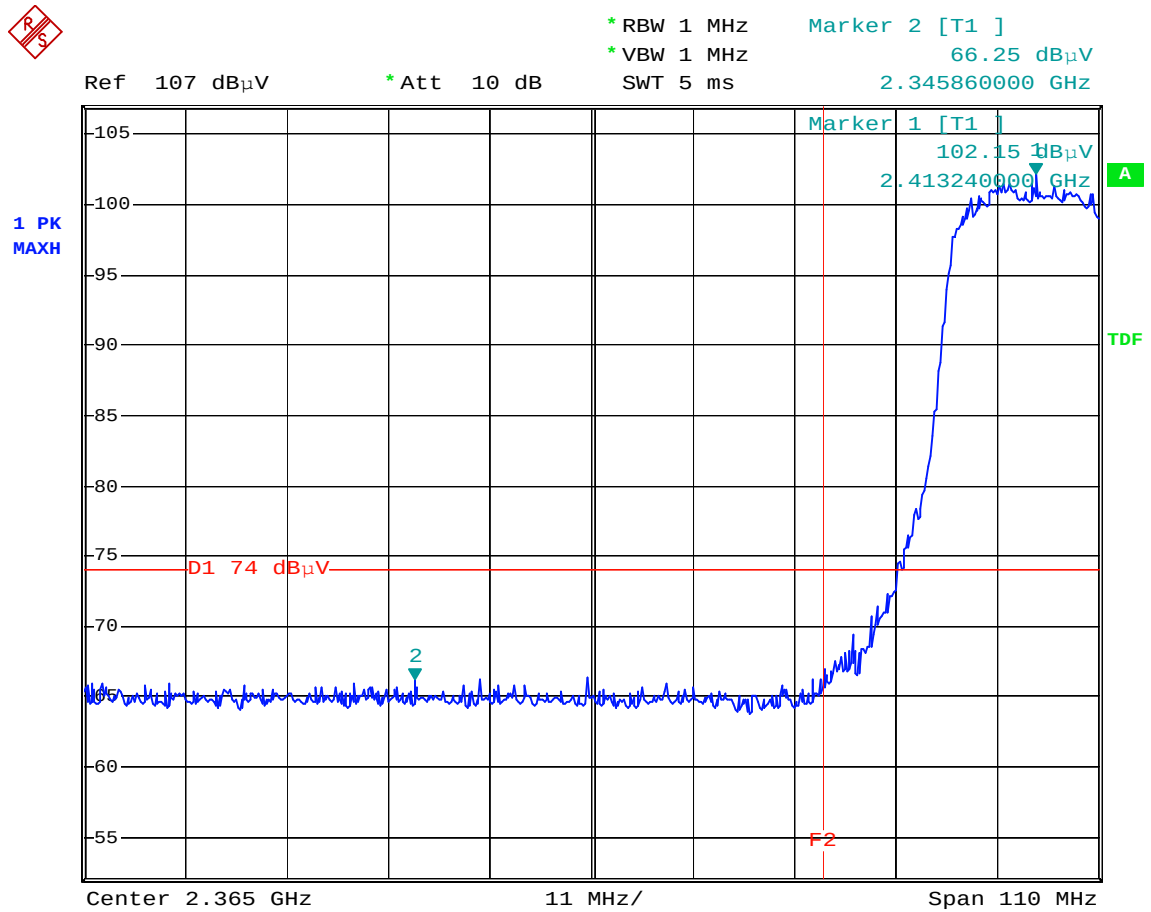
Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11b
 Date: 14.NOV.2003 14:48:16



Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11g

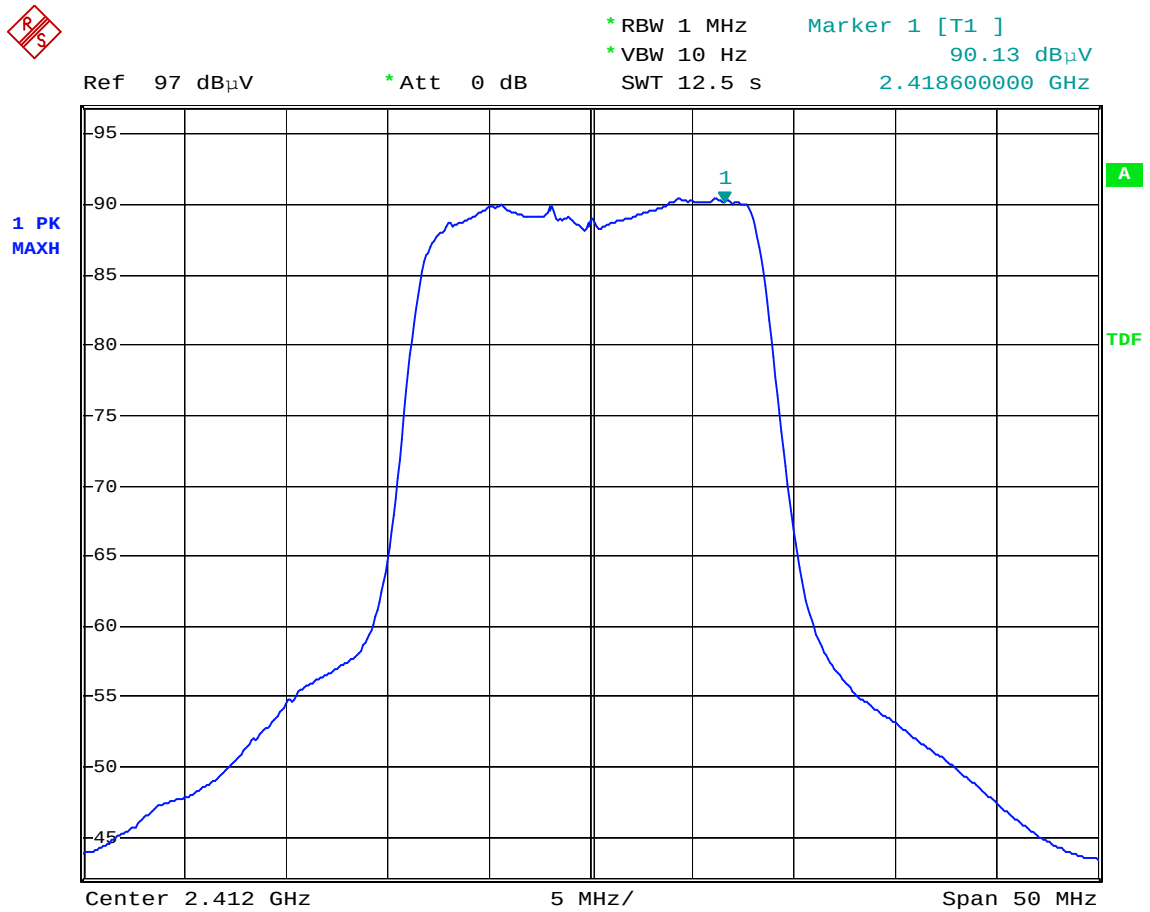
Date: 14.NOV.2003 13:32:53



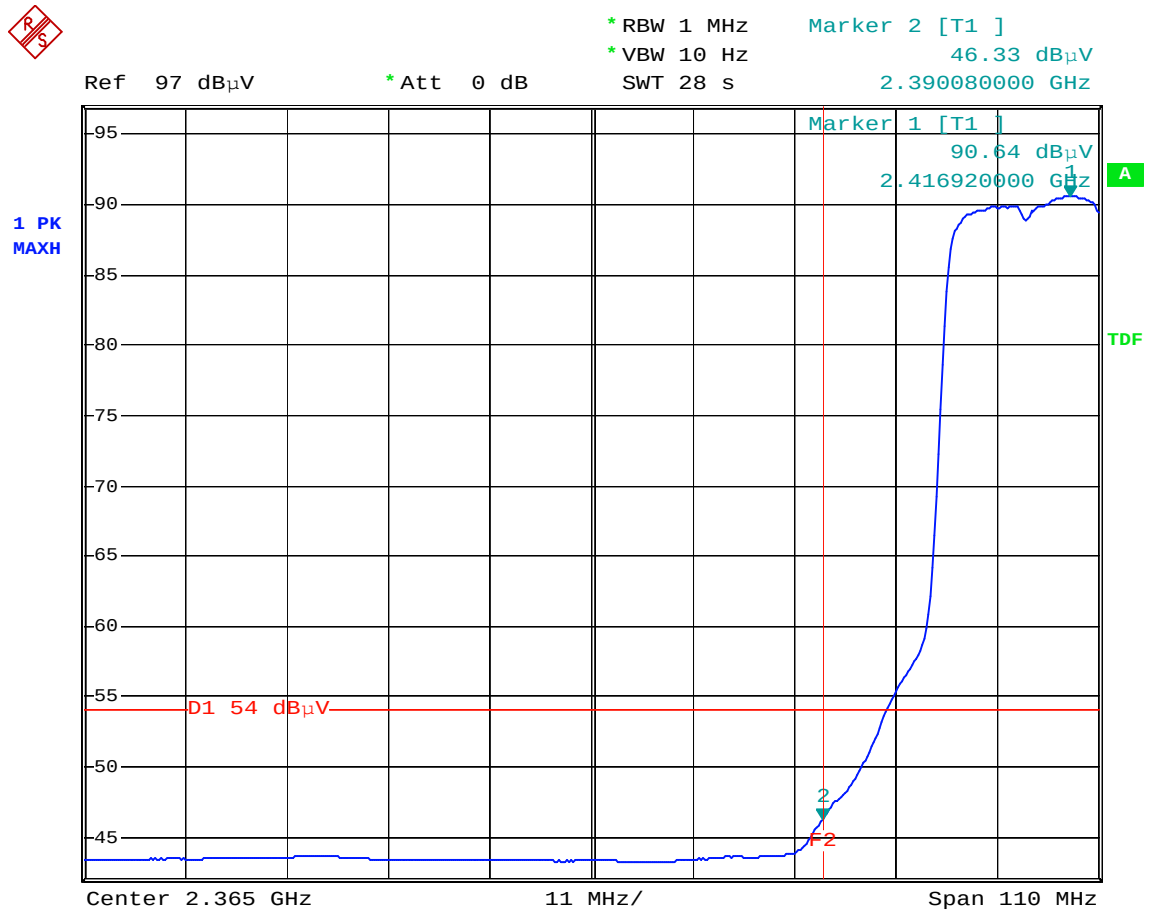
Comment A: Band-edge test at low channel EN B

Peak detector F2=2390MHz 802.11g

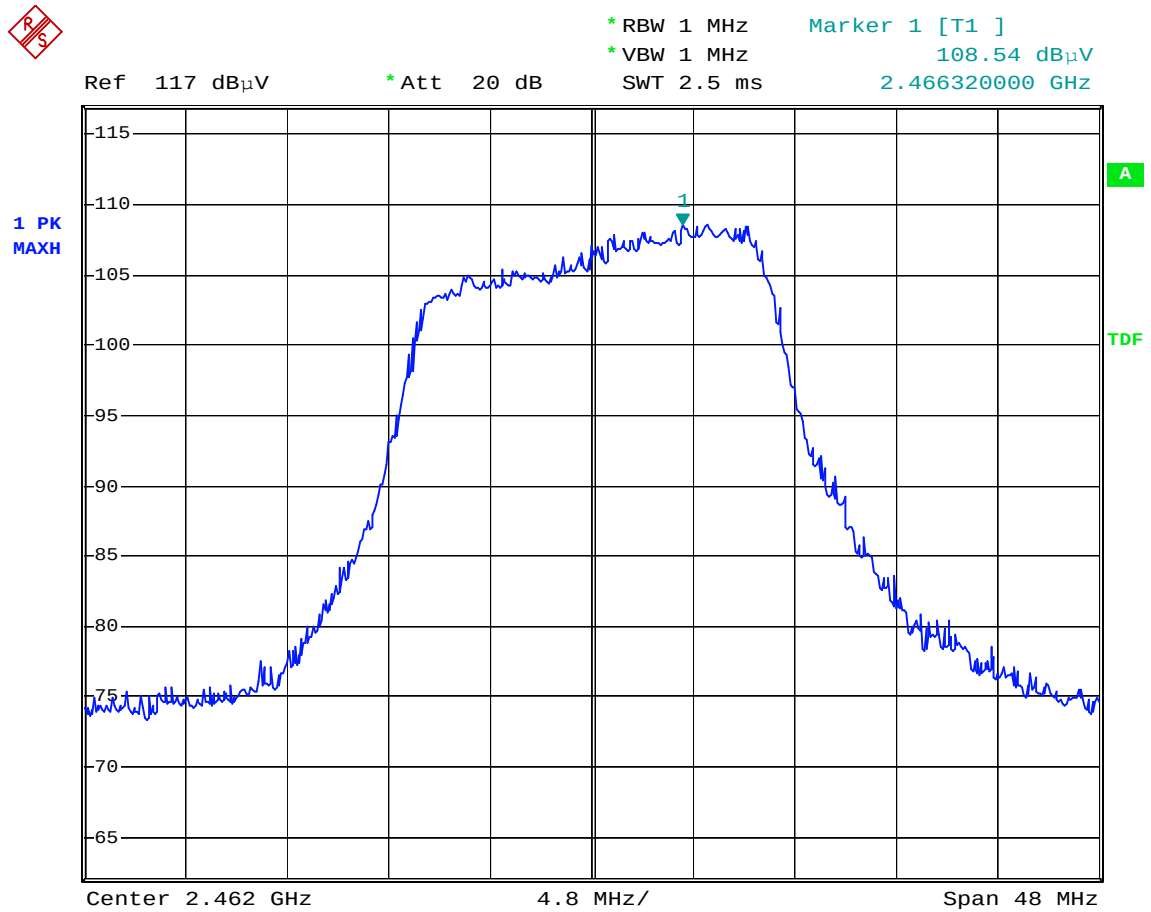
Date: 14.NOV.2003 13:27:31



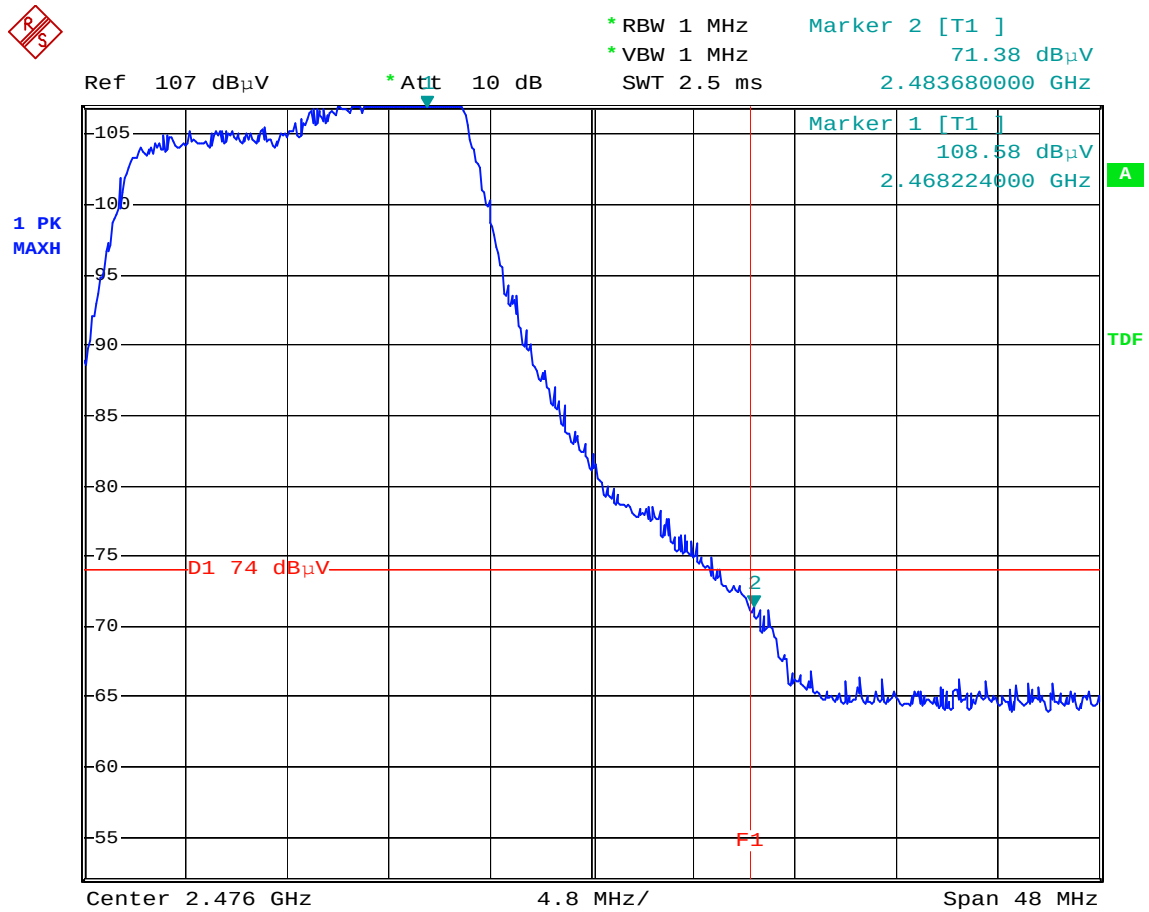
Comment A: Band-edge test at low channel1
Average detector F2=2390MHz 802.11g
Date: 14.NOV.2003 13:42:29



Comment A: Band-edge test at low channel EN B
 Average detector F2=2390MHz 802.11g
 Date: 14.NOV.2003 13:38:37



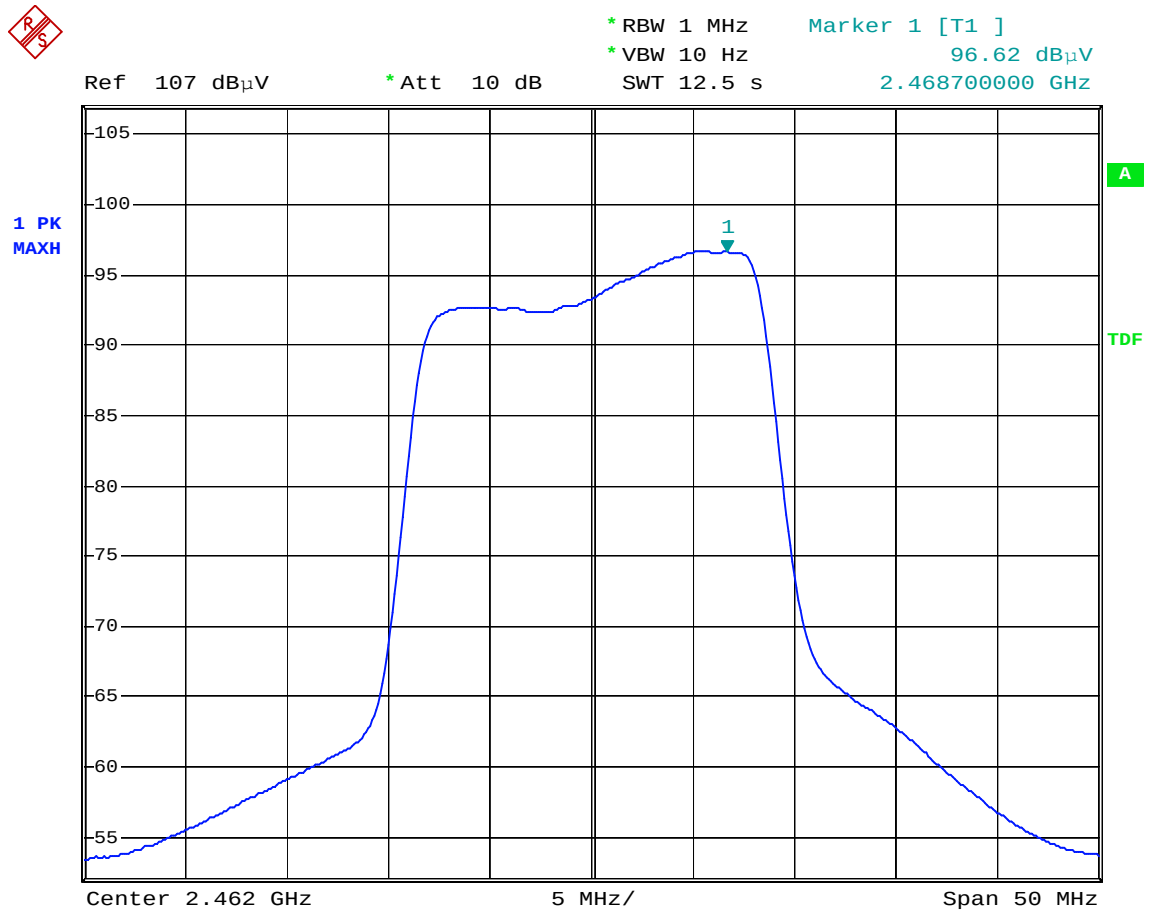
Comment A: Band-edge test at high channel
 Peak detector F1=2483.5MHz 802.11g
 Date: 14.NOV.2003 13:56:47



Comment A: Band-edge test at high channel N B

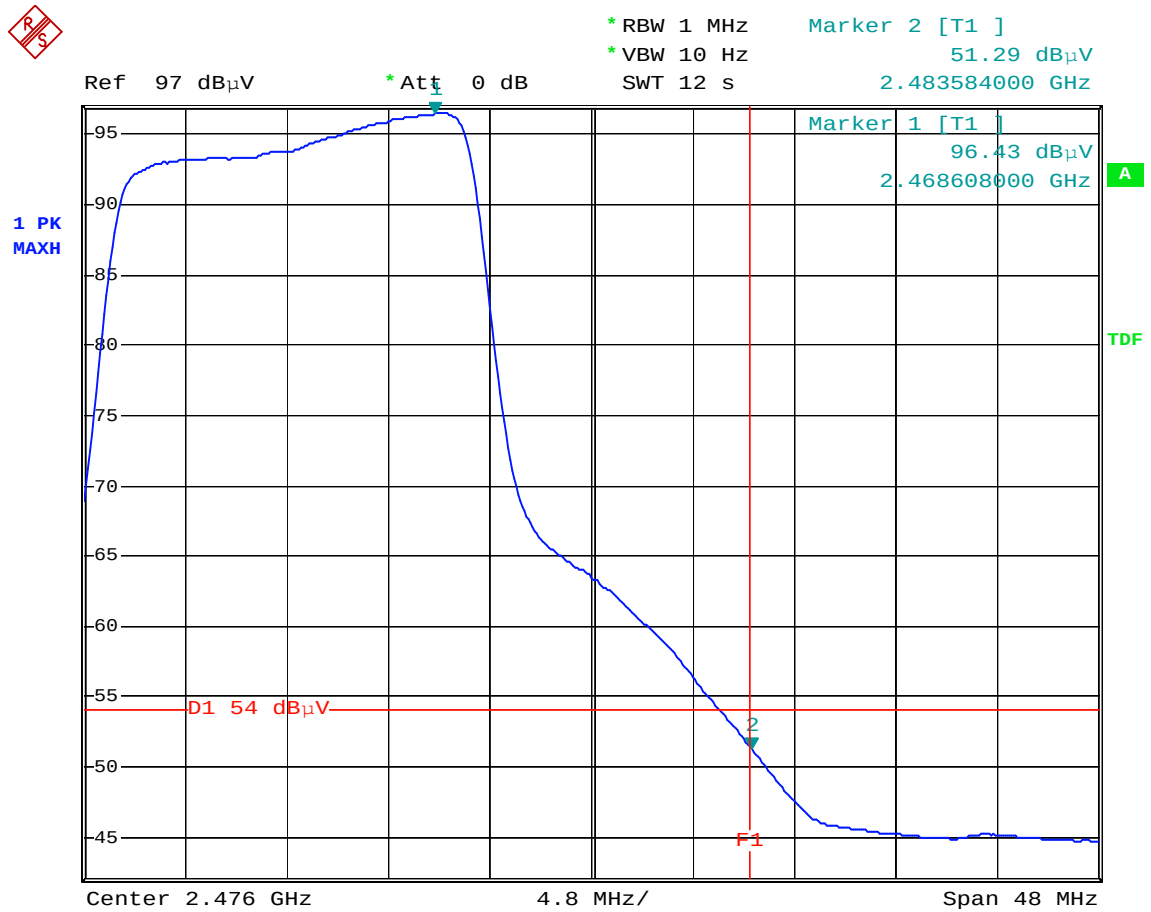
Peak detector F1=2483.5MHz 802.11g

Date: 14.NOV.2003 13:53:58



Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11g

Date: 14.NOV.2003 14:30:51



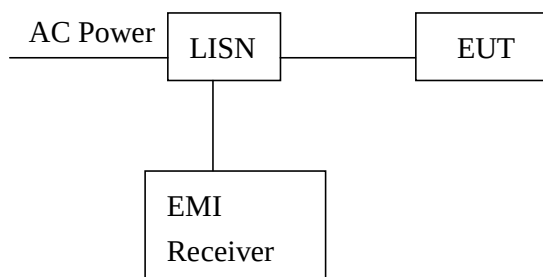
Comment A: Band-edge test at high channel N B
 Average detector F1=2483.5MHz 802.11g
 Date: 14.NOV.2003 14:27:42

8. Power Line Conducted Emission test §FCC 15.207

8.1 Operating environment

Temperature:	24	°C	(10-40°C)
Relative Humidity:	55	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1061hPa)

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 C63.4/1992 on conducted measurement. The AC power conducted emissions was measured over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz. (15.207 paragraph)

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

Please see the plot below.

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.

8.3 Power Line Conducted Emission test data

(1) Line

EUT : DWL-2100AP

Worst Case Condition : 802.11 b Tx at low channel with adapter 1

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.19000	55.4	64.04	44.0	54.04	-8.64	-10.04
0.28600	52.4	60.64	41.3	50.64	-8.24	-9.34
0.33400	46.9	59.35	38.5	49.35	-12.45	-10.85
0.38200	48.7	58.24	37.1	48.24	-9.54	-11.14
0.43000	43.1	57.26	35.3	47.26	-14.16	-11.96
0.47800	46.3	56.38	34.1	46.38	-10.08	-12.28

(2) Neutral

EUT : DWL-2100AP

Worst Case Condition : 802.11 b Tx at low channel with adapter 1

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.19000	55.6	64.04	43.8	54.04	-8.44	-10.24
0.28600	49.5	60.64	36.7	50.64	-11.14	-13.94
0.38200	47.4	58.24	36.6	48.24	-10.84	-11.64
0.43000	41.0	57.26	29.5	47.26	-16.26	-17.76
0.47800	44.8	56.38	34.6	46.38	-11.58	-11.78
0.57400	39.3	56.00	26.5	46.00	-16.70	-19.50

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

EUT : DWL-2100AP

Worst Case Condition : 802.11g Tx at low channel with adapter 1

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.19000	54.9	64.04	42.2	54.04	-9.14	-11.84
0.28600	51.0	60.64	38.1	50.64	-9.64	-12.54
0.38200	48.1	58.24	34.1	48.24	-10.14	-14.14
0.43000	41.3	57.26	34.0	47.26	-15.96	-13.26
0.47800	41.8	56.38	34.4	46.38	-14.58	-11.98
0.57400	40.7	56.00	27.0	46.00	-15.30	-19.00

(2) Neutral

EUT : DWL-2100AP

Worst Case Condition : 802.11g Tx at low channel with adapter 1

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.19000	54.7	64.04	44.9	54.04	-9.34	-9.14
0.28600	50.0	60.64	36.0	50.64	-10.64	-14.64
0.38200	48.0	58.24	35.2	48.24	-10.24	-13.04
0.47800	45.0	56.38	34.7	46.38	-11.38	-11.68
0.57400	40.4	56.00	25.8	46.00	-15.60	-20.20
0.67000	38.7	56.00	26.3	46.00	-17.30	-19.70

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

EUT : DWL-2100AP

Worst Case Condition : 802.11g turbo mode with adapter 1

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.19000	51.6	64.04	45.3	54.04	-12.44	-8.74
0.23800	43.6	62.17	35.1	52.17	-18.57	-17.07
0.28600	40.9	60.64	35.6	50.64	-19.74	-15.04
0.33400	42.2	59.35	36.7	49.35	-17.15	-12.65
0.38200	41.7	58.24	34.1	48.24	-16.54	-14.14
0.43000	41.9	57.26	36.1	47.26	-15.36	-11.16

(2) Neutral

EUT : DWL-2100AP

Worst Case Condition : 802.11g turbo mode with adapter 2

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.19000	47.4	64.04	43.0	54.04	-16.64	-11.04
0.23800	42.3	62.17	33.0	52.17	-19.87	-19.17
0.28600	38.3	60.64	32.9	50.64	-22.34	-17.74
0.33400	36.7	59.35	33.3	49.35	-22.65	-16.05
0.38200	38.2	58.24	32.3	48.24	-20.04	-15.94
0.43000	36.3	57.26	32.5	47.26	-20.96	-14.76

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

EUT : DWL-2100AP

Worst Case Condition : 802.11b Tx at low channel with adapter 2

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.17400	45.1	64.77	38.3	54.77	-19.67	-16.47
0.41400	36.0	57.57	34.8	47.57	-21.57	-12.77
0.88600	34.1	56.00	30.3	46.00	-21.90	-15.70
1.89400	36.8	56.00	32.4	46.00	-19.20	-13.60
2.12600	38.6	56.00	33.7	46.00	-17.40	-12.30
2.19000	37.6	56.00	33.1	46.00	-18.40	-12.90

(2) Neutral

EUT : DWL-2100AP

Worst Case Condition : 802.11b Tx at low channel with adapter 2

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.16600	34.5	65.16	17.4	55.16	-30.66	-37.76
0.22200	27.1	62.75	8.2	52.75	-35.65	-44.55
0.27800	21.6	60.88	6.3	50.88	-39.28	-44.58
1.97400	28.8	56.00	21.7	46.00	-27.20	-24.30
2.15000	29.7	56.00	24.1	46.00	-26.30	-21.90
2.37400	21.5	56.00	10.1	46.00	-34.50	-35.90

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

EUT : DWL-2100AP

Worst Case Condition : 802.11g Tx at low channel with adapter 2

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.17400	46.8	64.77	40.1	54.77	-17.97	-14.67
0.35000	33.9	58.96	32.0	48.96	-25.06	-16.96
0.41400	34.2	57.57	32.9	47.57	-23.37	-14.67
2.06200	35.6	56.00	30.3	46.00	-20.40	-15.70
2.11800	38.4	56.00	34.5	46.00	-17.60	-11.50
2.64600	38.7	56.00	32.9	46.00	-17.30	-13.10

(2) Neutral

EUT : DWL-2100AP

Worst Case Condition : 802.11g Tx at low channel with adapter 2

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.17400	42.7	64.77	34.7	54.77	-22.07	-20.07
0.23000	27.6	62.45	17.9	52.45	-34.85	-34.55
2.03800	25.8	56.00	21.9	46.00	-30.20	-24.10
2.21400	24.7	56.00	20.2	46.00	-31.30	-25.80
2.27000	26.8	56.00	22.8	46.00	-29.20	-23.20
2.62200	23.7	56.00	18.3	46.00	-32.30	-27.70

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

EUT : DWL-2100AP

Worst Case Condition : 802.11g turbo mode with adapter 2

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.17400	48.3	64.77	41.7	54.77	-16.47	-13.07
0.35000	36.4	58.96	33.5	48.96	-22.56	-15.46
0.40600	35.0	57.73	31.7	47.73	-22.73	-16.03
0.63800	25.0	56.00	20.0	46.00	-31.00	-26.00
0.81400	24.0	56.00	17.8	46.00	-32.00	-28.20
0.93400	34.3	56.00	30.0	46.00	-21.70	-16.00

(2) Neutral

EUT : DWL-2100AP

Worst Case Condition : 802.11g turbo mode with adapter 2

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.17400	45.7	64.77	37.3	54.77	-19.07	-17.47
0.23000	37.3	62.45	27.1	52.45	-25.15	-25.35
0.34200	29.1	59.16	22.5	49.16	-30.06	-26.66
0.39800	24.6	57.90	17.1	47.90	-33.30	-30.80
2.07000	21.3	56.00	13.0	46.00	-34.70	-33.00
2.27800	18.0	56.00	10.3	46.00	-38.00	-35.70

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

Serial model : C54APT

Worst Case Condition : 802.11b Tx at low channel (with adapter 3)

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.35000	35.0	58.96	27.8	48.96	-23.96	-21.16
0.52600	32.2	56.00	21.5	46.00	-23.80	-24.50
0.61400	34.9	56.00	22.7	46.00	-21.10	-23.30
0.86200	36.3	56.00	26.0	46.00	-19.70	-20.00
1.02200	37.8	56.00	23.0	46.00	-18.20	-23.00
1.80600	35.1	56.00	20.8	46.00	-20.90	-25.20

(2) Neutral

Serial model : C54APT

Worst Case Condition : 802.11b Tx at low channel (with adapter 3)

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.78200	33.1	56.00	23.5	46.00	-22.90	-22.50
0.88600	34.0	56.00	21.0	46.00	-22.00	-25.00
1.04600	38.8	56.00	27.9	46.00	-17.20	-18.10
1.12600	37.0	56.00	25.2	46.00	-19.00	-20.80
1.81400	33.6	56.00	22.9	46.00	-22.40	-23.10
1.83000	36.5	56.00	22.2	46.00	-19.50	-23.80

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

Serial model : C54APT

Worst Case Condition : 802.11g Tx at low channel (with adapter 3)

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.17400	38.6	64.77	30.4	54.77	-26.17	-24.37
0.35800	37.4	58.78	30.2	48.78	-21.38	-18.58
0.63000	37.7	56.00	25.8	46.00	-18.30	-20.20
0.90200	38.7	56.00	24.6	46.00	-17.30	-21.40
1.08600	37.0	56.00	22.8	46.00	-19.00	-23.20
11.12600	12.8	60.00	7.5	50.00	-47.20	-42.50

(2) Neutral

Serial model : C54APT

Worst Case Condition : 802.11g Tx at low channel (with adapter 3)

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.18200	39.9	64.40	33.9	54.40	-24.50	-20.50
0.26200	34.2	61.37	25.1	51.37	-27.17	-26.27
0.35800	33.9	58.78	28.6	48.78	-24.88	-20.18
0.63000	34.8	56.00	22.8	46.00	-21.20	-23.17
0.90200	36.9	56.00	22.4	46.00	-19.10	-23.60
1.07000	36.7	56.00	22.1	46.00	-19.30	-23.90

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

(1) Line

Serial model : C54APT

Worst Case Condition : 802.11g turbo mode (with adapter 3)

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.18200	38.6	64.40	30.2	54.40	-25.80	-24.20
0.35000	36.7	58.96	29.0	48.96	-22.26	-19.96
0.63000	36.5	56.00	26.5	46.00	-19.50	-19.50
0.78200	32.4	56.00	20.3	46.00	-23.60	-25.70
0.89400	36.3	56.00	25.0	46.00	-19.70	-21.00
1.07000	36.2	56.00	24.4	46.00	-19.80	-21.60

(2) Neutral

Serial model : C54APT

Worst Case Condition : 802.11g turbo mode (with adapter 3)

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.18200	39.6	64.40	34.1	54.40	-24.80	-20.30
0.26200	33.4	61.37	24.2	51.37	-27.97	-27.17
0.35000	33.4	58.96	26.7	48.96	-25.56	-22.26
0.63000	34.5	56.00	23.9	46.00	-21.50	-22.10
0.89400	35.3	56.00	23.6	46.00	-20.70	-22.40
1.05400	37.0	56.00	25.3	46.00	-19.00	-20.70

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.

Intertek Testing Services

RF VOLTAGE

EUT: DWL-2100AP

Manuf: D-Link

Op Cond: LISN-L

Operator: Clay

Test Spec: FCC P15 Class B

Comment: RCV:EC303 LISN:EC320

120V 60Hz 24'c 56%RH Adapter_1 ;802.11b Tx at low channel

Date: 22. Oct 03 14:26

Scan Settings (1 Range)

----- Frequencies -----

Start Stop Step

150k 30M 8k

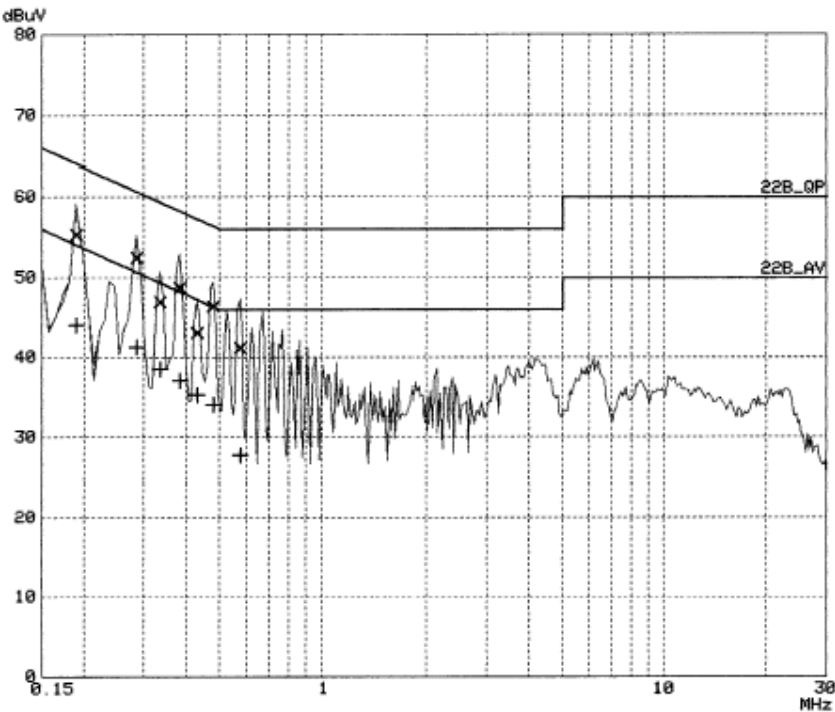
----- Receiver Settings -----

IF BW Detector M-Time Atten Preamp

9k PK 20ms AUTO LN OFF

Final Measurement: x QP / + AV

Meas Time: 1 s



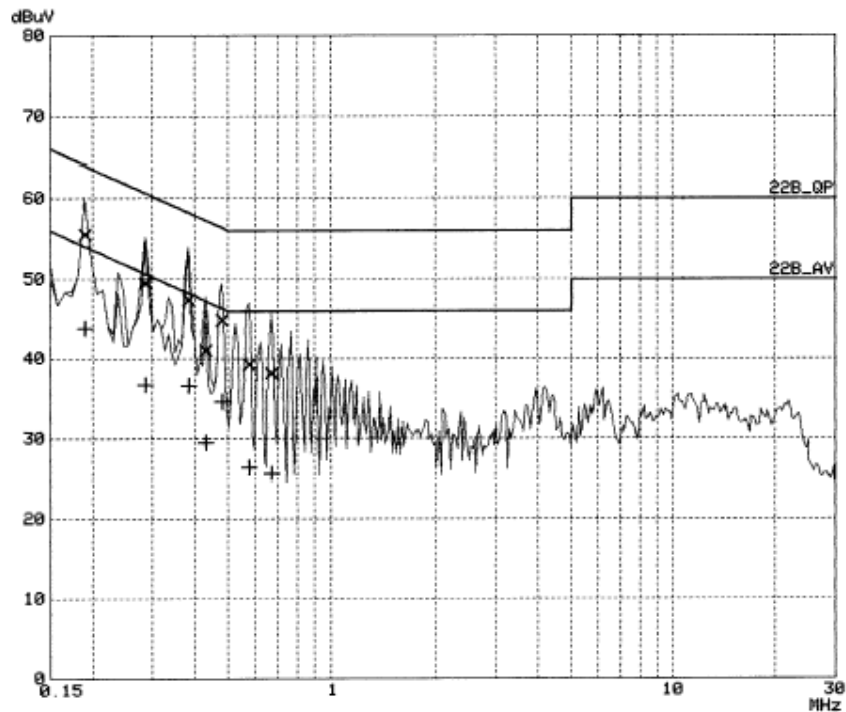
Intertek Testing Services RF VOLTAGE

EUT: DWL-2100AP
Manuf: D-Link
Op Cond: LISN-N
Operator: Clay
Test Spec: FCC P15 Class B
Comment: RCV:EC303 LISN:EC320
120V 60Hz 24°C 56%RH Adapter_1 ;802.11b Tx at low channel
Date: 22. Oct 03 14:51

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s

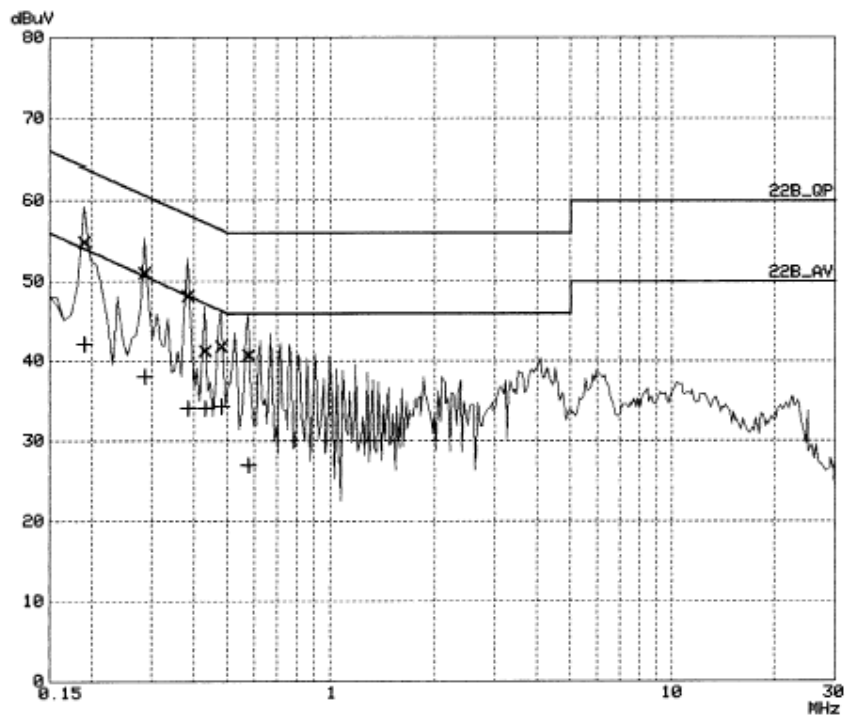


Intertek Testing Services RF VOLTAGE

EUT: DWL-2100AP
 Manuf: D-Link
 Op Cond: LISN-L
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC303 LISN:EC320
 120V 60Hz 24'c 56%RH Adapter_1 ;802.11g Tx at low channel
 Date: 22. Oct 03 14:38

Scan Settings (1 Range)			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

EUT: DWL-2100AP

Manuf: D-Link

Op Cond: LISN-N

Operator: Clay

Test Spec: FCC P15 Class B

Comment: RCV:EC303 LISN:EC320

120V 60Hz 24'c 56%RH Adapter_1 ;802.11g Tx at low channel

Date: 22. Oct 03 14:45

Scan Settings (1 Range)

----- Frequencies -----

Start Stop Step

150k 30M 8k

----- Receiver Settings -----

IF BW Detector M-Time Atten Preamp

9k PK 20ms AUTO LN OFF

Final Measurement: x QP / + AV

Meas Time: 1 s

The figure is a spectral plot with the following characteristics:

- Y-axis:** Labeled 'dBuV', ranging from 0 to 80 in increments of 10.
- X-axis:** Labeled 'MHz', ranging from 0.15 to 30 on a logarithmic scale.
- Signal:** A noisy signal is plotted, showing a peak around 0.5 MHz. There are several '+' markers on the signal line at various frequencies.
- Reference Lines:**
 - A diagonal line with 'x' markers starts at approximately 60 dBuV at 0.15 MHz and decreases to about 40 dBuV at 1 MHz.
 - Two horizontal lines are drawn at approximately 58 dBuV and 50 dBuV, labeled '22B_QP' and '22B_AV' respectively.

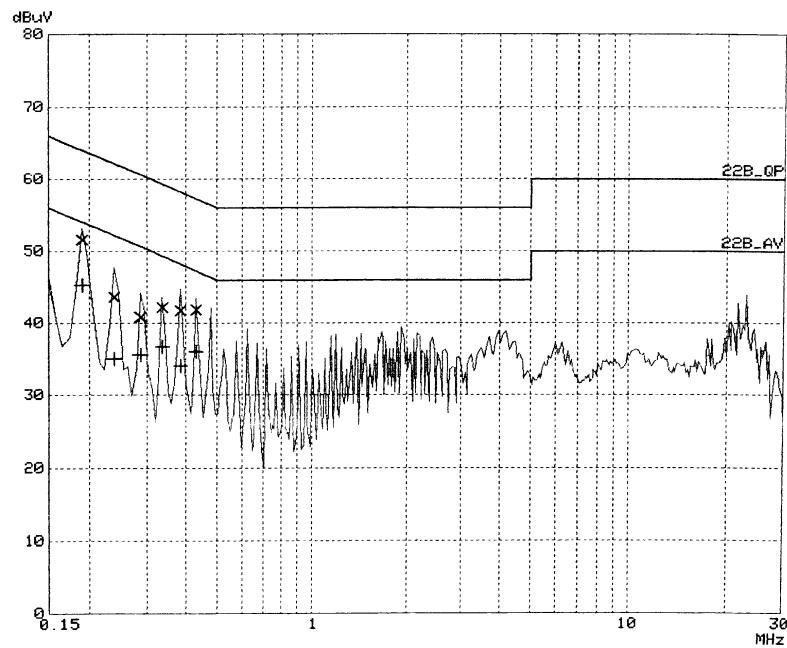
Intertek Testing Services RF VOLTAGE

EUT: DWL-2100AP
 Manuf: D-Link
 Op Cond: LISN-L
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC303 LISN:EC320
 120V 60Hz 24'c 56%RH Adapter_1;802.11g(turbo mode)
 Date: 31. Oct 03 18:46

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	8k	9k	PK	20ms AUTO LN	OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

EUT:

DWL-2100AP

Manuf:

D-Link

Op Cond:

LISN-N

Operator:

Clay

Test Spec:

FCC P15 Class B

Comment:

RCV:EC303 LISN:EC320

120V 60Hz 24'c 56%RH Adapter_1;802.11g(turbo mode)

Date:

31. Oct 03 18:53

Scan Settings (1 Range)

----- Frequencies -----

Start

Stop

Step

150k

30M

8k

----- Receiver Settings -----

IF BW

Detector

M-Time

Atten

Pream

9k

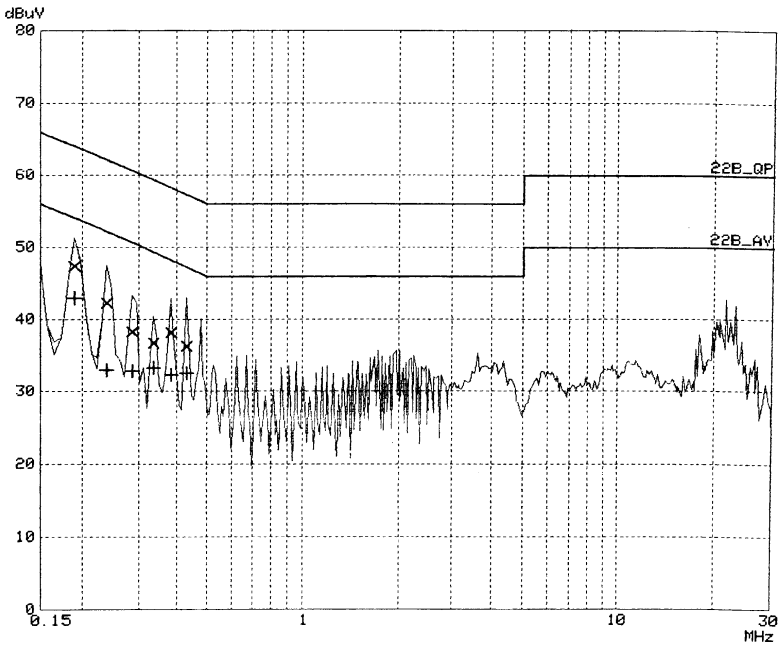
PK

20ms AUTO LN

OFF

Final Measurement: x QP / + AV

Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

EUT:

DWL-2100AP

Manuf:

D-Link

Op Cond:

LISN-L

Operator:

Clay

Test Spec:

FCC P15 Class B

Comment:

RCV:EC303 LISN:EC320

120V 60Hz 24'c 56%RH Adapter_2 ;802.11b Tx at low channel

Date:

22. Oct 03 16:05

Scan Settings (1 Range)

----- Frequencies -----

Start

Stop

Step

150k

30M

8k

----- Receiver Settings -----

IF BW

Detector

M-Time

Atten

Preamp

9k

PK

20ms

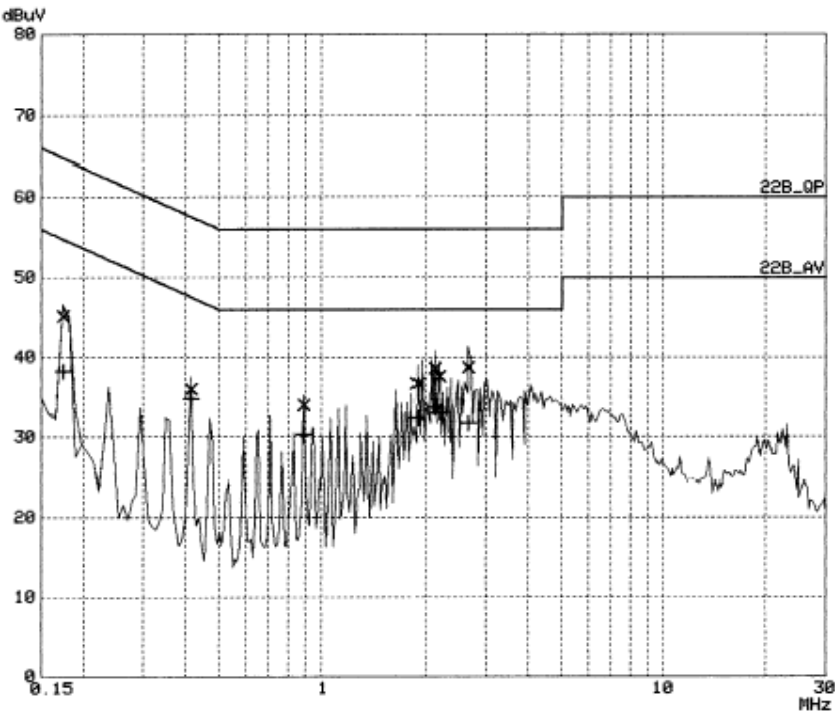
AUTO

LN

OFF

Final Measurement: x QP / + AV

Meas Time: 1 s



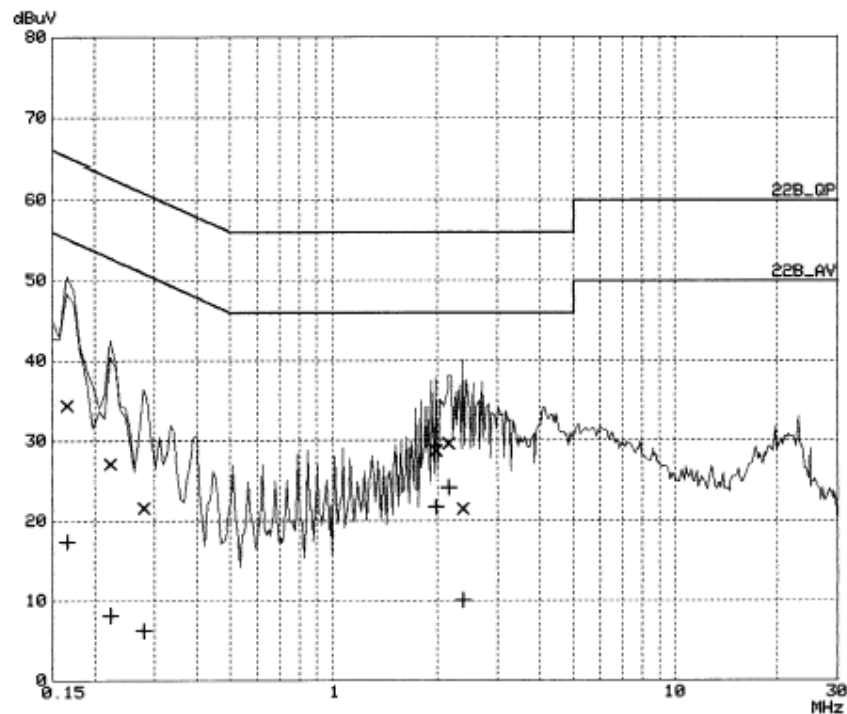
Intertek Testing Services RF VOLTAGE

EUT: DWL-2100AP
 Manuf: D-Link
 Op Cond: LISN-N
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC303 LISN:EC320
 120V 60Hz 24'c 56%RH Adapter_2 ;802.11b Tx at low channel
 Date: 22. Oct 03 15:09

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

EUT: DWL-2100AP

Manuf: D-Link

Op Cond: LISN-L

Operator: Clay

Test Spec: FCC P15 Class B

Comment: RCV:EC303 LISN:EC320

120V 60Hz 24'c 56%RH Adapter_2 ;802.11g Tx at low channel

Date: 22. Oct 03 15:40

Scan Settings (1 Range)

----- Frequencies -----

Start Stop Step

150k 30M 8k

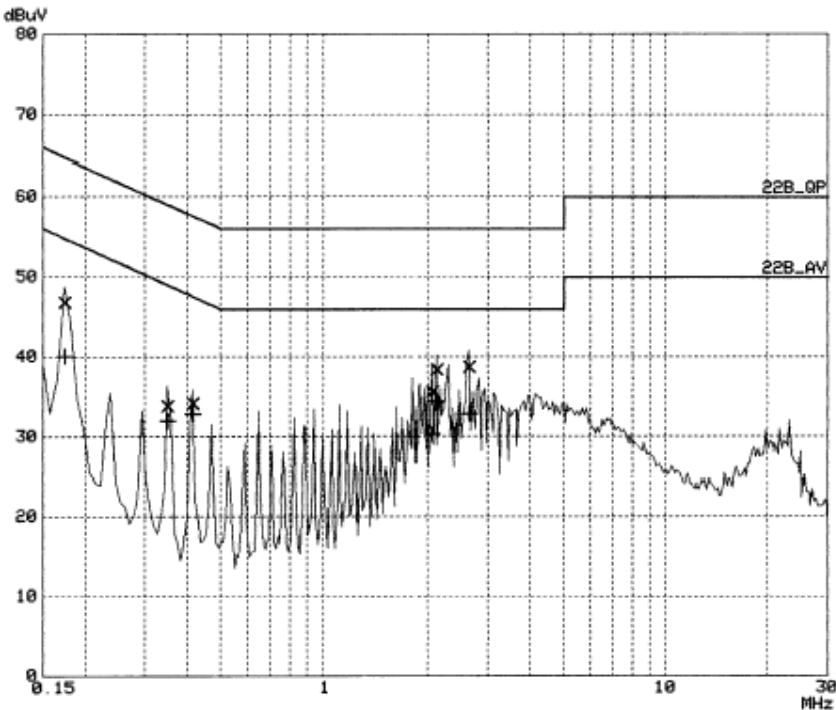
----- Receiver Settings -----

IF BW Detector M-Time Atten Preamp

9k PK 20ms AUTO LN OFF

Final Measurement: x QP / + AV

Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

EUT: DWL-2100AP

Manuf: D-Link

Op Cond: LISN-N

Operator: Clay

Test Spec: FCC P15 Class B

Comment: RCV:EC303 LISN:EC320

120V 60Hz 24'c 56%RH Adapter_2 ;802.11g Tx at low channel

Date: 22. Oct 03 15:33

Scan Settings (1 Range)

----- Frequencies -----

Start Stop Step

150k 30M 8k

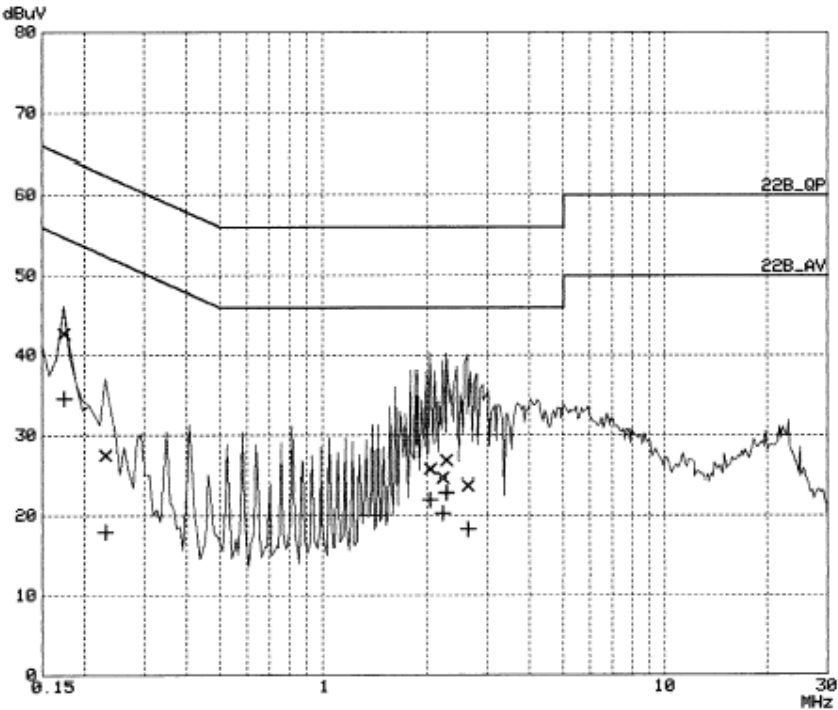
----- Receiver Settings -----

IF BW Detector M-Time Atten Preamp

9k PK 20ms AUTO LN OFF

Final Measurement: x QP / + AV

Meas Time: 1 s



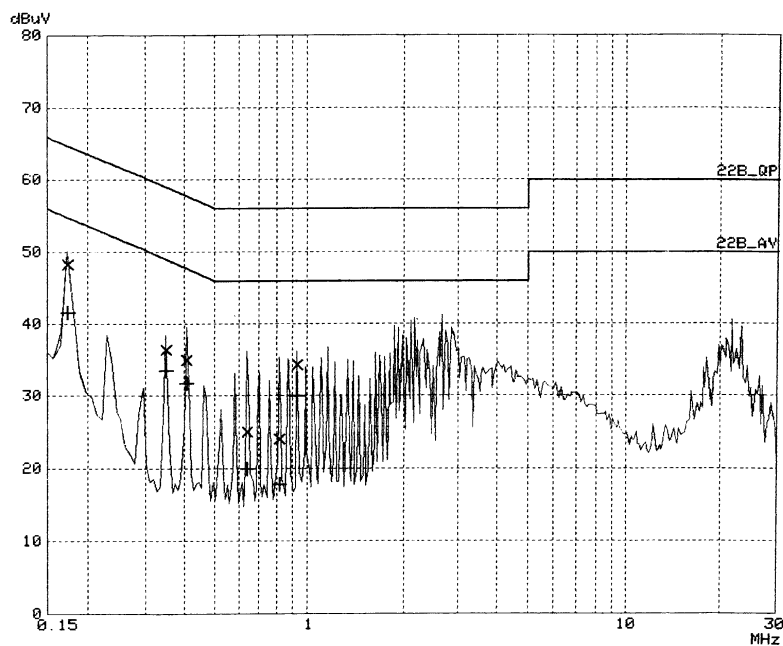
Intertek Testing Services RF VOLTAGE

EUT: DWL-2100AP
 Manuf: D-Link
 Op Cond: LISN-L
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC303 LISN:EC320
 120V 60Hz 24'c 56%RH Adapter_2;802.11g(turbo mode)
 Date: 31. Oct 03 19:08

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	8k	9k	PK	20ms AUTO LN	OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s



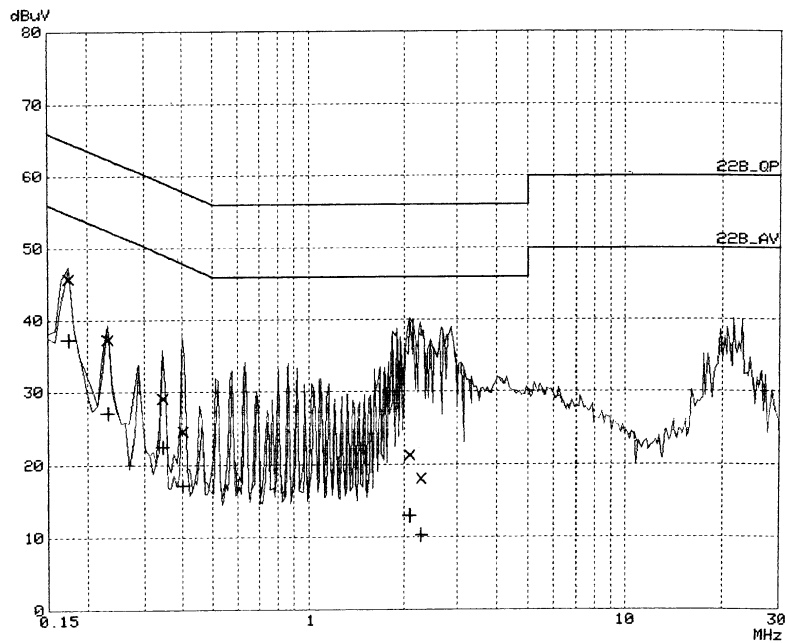
Intertek Testing Services RF VOLTAGE

EUT: DWL-2100AP
 Manuf: D-Link
 Op Cond: LISN-N
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC303 LISN:EC320
 120V 60Hz 24'c 56%RH Adapter_2;802.11g(turbo mode)
 Date: 31. Oct 03 19:01

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	8k	9k	PK	20ms AUTO LN	OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s



Intertek Testing Services

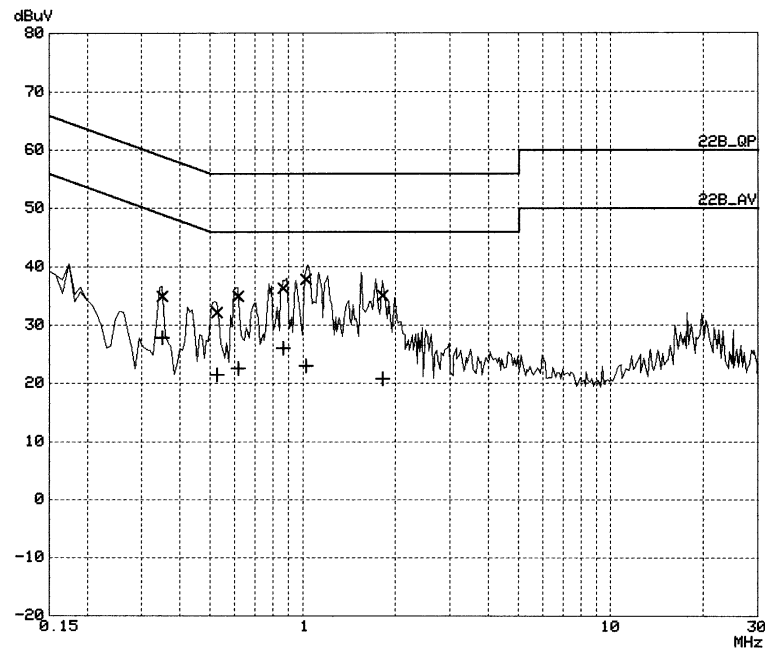
RF VOLTAGE

EUT: C54APT/C108AP
 Manuf: D-Link
 Op Cond: LISN-L
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC318 LISN:EC344
 120V 60Hz 25°C 58%RH 802.11b at low channel
 Date: 21. Nov 03 11:50

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	8k	9k	PK	20ms AUTO LN	OFF

Final Measurement: x QP / + AV
 Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

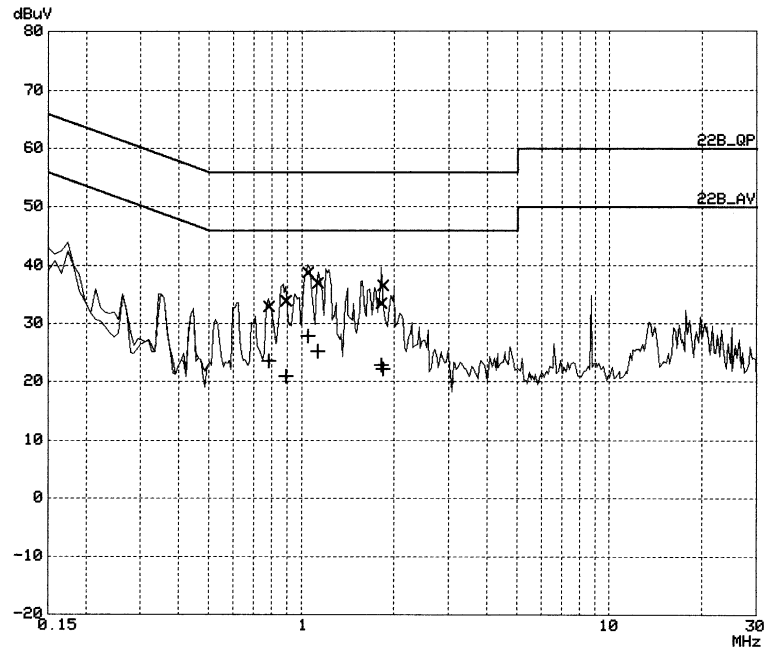
EUT: C54APT/C108AP
 Manuf: D-Link
 Op Cond: LISN-N
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC318 LISN:EC344
 120V 60Hz 25°C 58%RH 802.11b at low channel
 Date: 21. Nov 03 12:17

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	8k	9k	PK	20ms AUTO LN	OFF

Final Measurement: x QP / + AV

Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

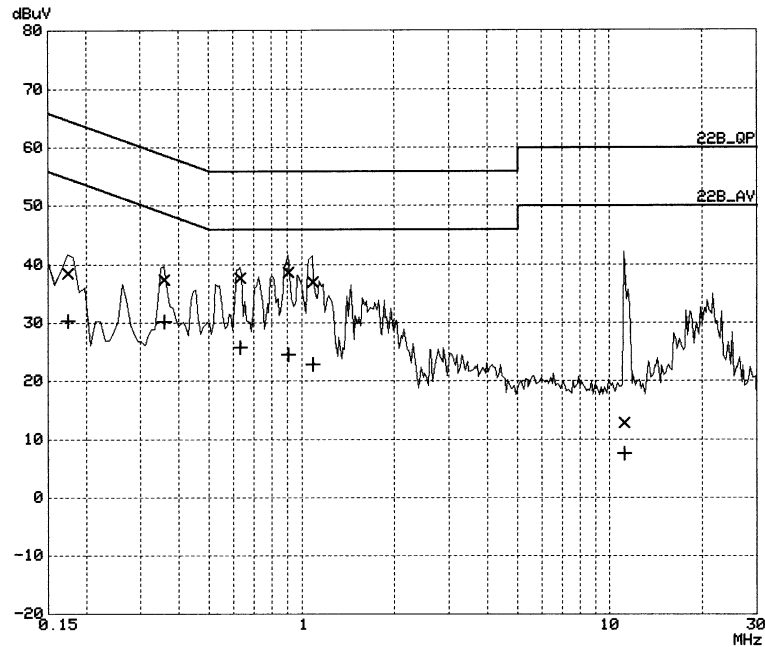
EUT: C54APT/C108AP
 Manuf: D-Link
 Op Cond: LISN-L
 Operator: Clay
 Test Spec: FCC P15 Class B
 Comment: RCV:EC318 LISN:EC344
 120V 60Hz 25°C 58%RH 802.11g at low channel
 Date: 21. Nov 03 15:01

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten
150k	30M	8k	9k	PK	20ms	AUTO LN

Final Measurement: x QP / + AV

Meas Time: 1 s



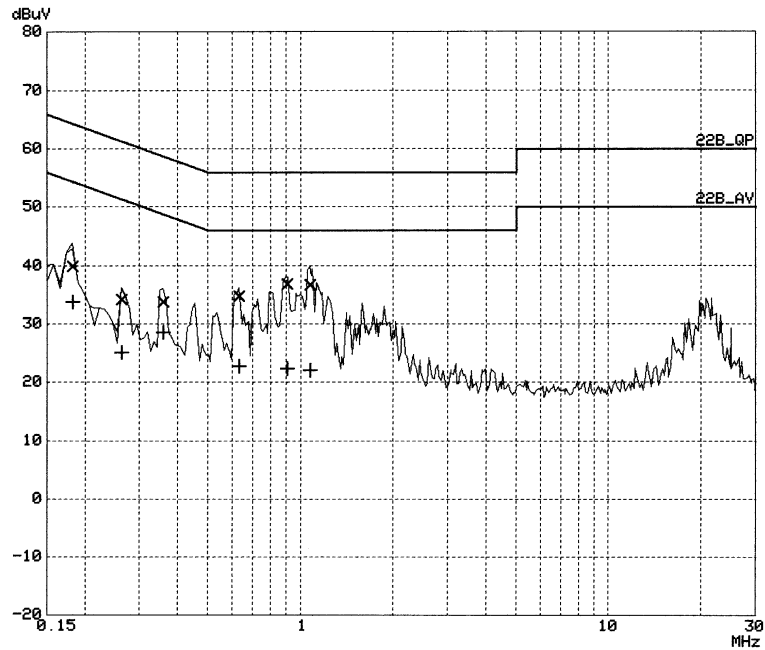
Intertek Testing Services
RF VOLTAGE

EUT: C54APT/C108AP
Manuf: D-Link
Op Cond: LISN-N
Operator: Clay
Test Spec: FCC P15 Class B
Comment: RCV:EC318 LISN:EC344
120V 60Hz 25'C 58%RH 802.11g at low channel
Date: 21. Nov 03 14:54

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s



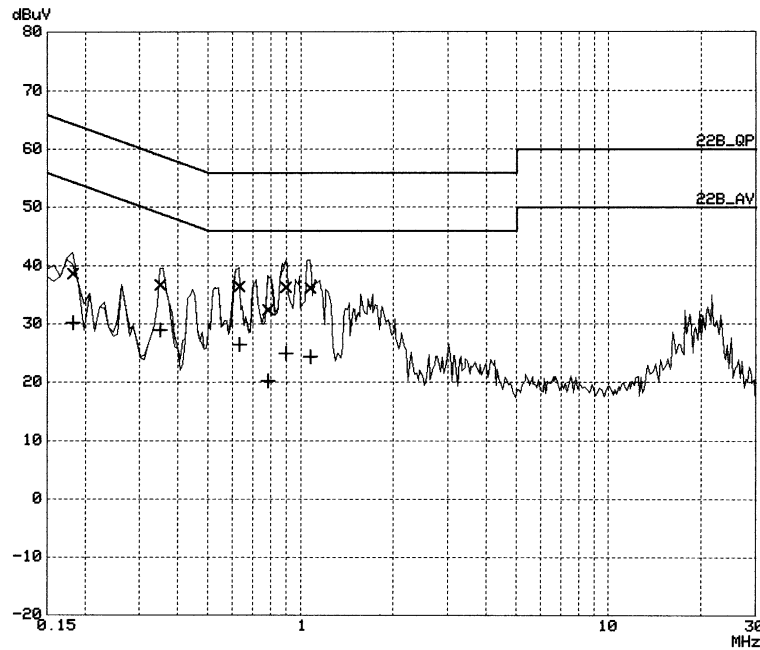
Intertek Testing Services RF VOLTAGE

EUT: C54APT/C108AP
Manuf: D-Link
Op Cond: LISN-L
Operator: Clay
Test Spec: FCC P15 Class B
Comment: RCV:EC318 LISN:EC344
120V 60Hz 25°C 58%RH 802.11g(turbo mode)
Date: 21. Nov 03 15:11

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s



Intertek Testing Services

RF VOLTAGE

EUT: C54APT/C108AP

Manuf: D-Link

Op Cond: LISN-N

Operator: Clay

Test Spec: FCC P15 Class B

Comment: RCV:EC318 LISN:EC344

120V 60Hz 25'C 58%RH 802.11g(turbo mode)

Date: 21. Nov 03 15:17

Scan Settings (1 Range)

----- Frequencies -----

Start 150k

Stop 30M

Step 8k

----- Receiver Settings -----

IF BW 9k

Detector PK

M-Time 20ms

Atten AUTO

Preamp LN

OFF

Final Measurement: x QP / + AV

Meas Time: 1 s

The figure is a spectral plot with the following characteristics:

- Y-axis:** Labeled 'dBuV', ranging from -20 to 80 in increments of 10.
- X-axis:** Labeled 'MHz', with major ticks at 0.15, 1, 10, and 30.
- Limit Lines:**
 - 22B_QP:** A solid line starting at ~65 dBuV at 0.15 MHz, sloping down to ~55 dBuV at 1 MHz, then stepping up to ~60 dBuV for frequencies above 1 MHz.
 - 22B_AV:** A solid line starting at ~55 dBuV at 0.15 MHz, sloping down to ~45 dBuV at 1 MHz, then stepping up to ~50 dBuV for frequencies above 1 MHz.
- Measured Signal:** A noisy trace marked with '+' symbols. It starts around 40 dBuV at 0.15 MHz, fluctuates between 20 and 40 dBuV up to 1 MHz, and then generally stays below 20 dBuV for higher frequencies, with some peaks reaching up to 30 dBuV.

0.15

1

10

30

MHz