

EMC TEST REPORT

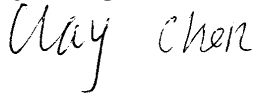
Report No. : EME-040166
Model No. : S30853-S1016-R107
Issued Date : Mar. 8, 2004

Applicant : Arcadyan Technology Corporation
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Project Engineer



Clay Chen

Reviewed By



Elton Chen

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Summary of Tests

Siemens Gigaset USB Adapter 54-Model: S30853-S1016-R107
FCC ID: RAXWN4501DARC

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 : Siemens Gigaset USB Adapter 54
Model No. : S30853-S1016-R107
FCC ID. : RAXWN4501DARC
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 : 5Vdc
Power Cord : N/A
Sample Received : Feb. 26, 2004
Test Date(s) : Feb. 29, 2004 ~ Mar. 3, 2004

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The Gigaset USB Adapter 54 is a 54 Mbps network adapter that is connected to user's PC or Notebook via the USB (Universal Serial Bus). User's can use Gigaset data products to set up a wireless local network (WLAN=Wireless Local Area Network) without having to lay cables.

The EUT has brand name for Siemens and two types of antenna collocation listed below:

Type	Antenna's collocation	Model No.
Type 1 antenna	Dipole, Chip	S30853-S1016-R107
Type 2 antenna	Chip, Chip	ST120g

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

1.3 Antenna description

The EUT uses a permanently connected antenna.

Type	Antenna Gain	Antenna collocation	Connector Type
Type 1 antenna	2.0 dBi max	Dipole antenna & Chip antenna	N/A
Type 2 antenna	2.0 dBi max	Both are Chip antenna	N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook	Dell	PP01L	CN-06P83-48643-33V-0112	FCC DoC Approved
Notebook	Dell	PP01L	CN-03P83-48643-33O-3930	FCC DoC Approved
54M Wireless LAN CardBus	BUFFALO	WLI-CB-G54A	0007407964D4	FCC DoC Approved

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.205 、 §15.207 、 §15.209 、 §15.247 and ANSI C63.4/2001.

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

For type 2 antenna, we only tested radiated emission and band edge and recorded in this report.

During the conducted emission test, the EUT was linked with the other wireless LAN Card.

During the other tests, the EUT was transmitted continuously.

After verifying the maximum output power, we found the maximum output power was occurred at 11Mbps data rate in 802.11b and at 54Mbps data rate in 802.11g. The final test was executed under this condition and recorded in this report individually.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Last Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC303	6/16/2003
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	6/24/2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	7/19/2003
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	10/20/2003
Horn Antenna	EMCO	1GHz~18GHz	3115	EC332	10/15/2003
Horn Antenna	SCHWARZBECK	15GHz~40GHz	BBHA 9170	EC351	6/21/2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC350	6/21/2003
Turn Table	HDGmbH	N/A	DS 420S	EP317-3	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP317-2	N/A
Pre-Amplifier	MITER	100MHz~26.5GHz	919981	EC373	5/13/2003
Pre-Amplifier	MITER	26GHz~40GHz	828825	EC374	5/13/2003
Crystal Detector	Agilent	10MHz~18GHz	8472B		N/A
Signal Generator	Rohde & Schwarz	20MHz~27GHz	SMR27	EC354	8/16/2003
Two Channel Digital Storage Oscilloscope	Tektronix	N/A	TDS1012		8/16/2003
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	1/20/2004

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

3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 19 °C
 Relative Humidity: 68 %
 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 function (DSSS Modulation)

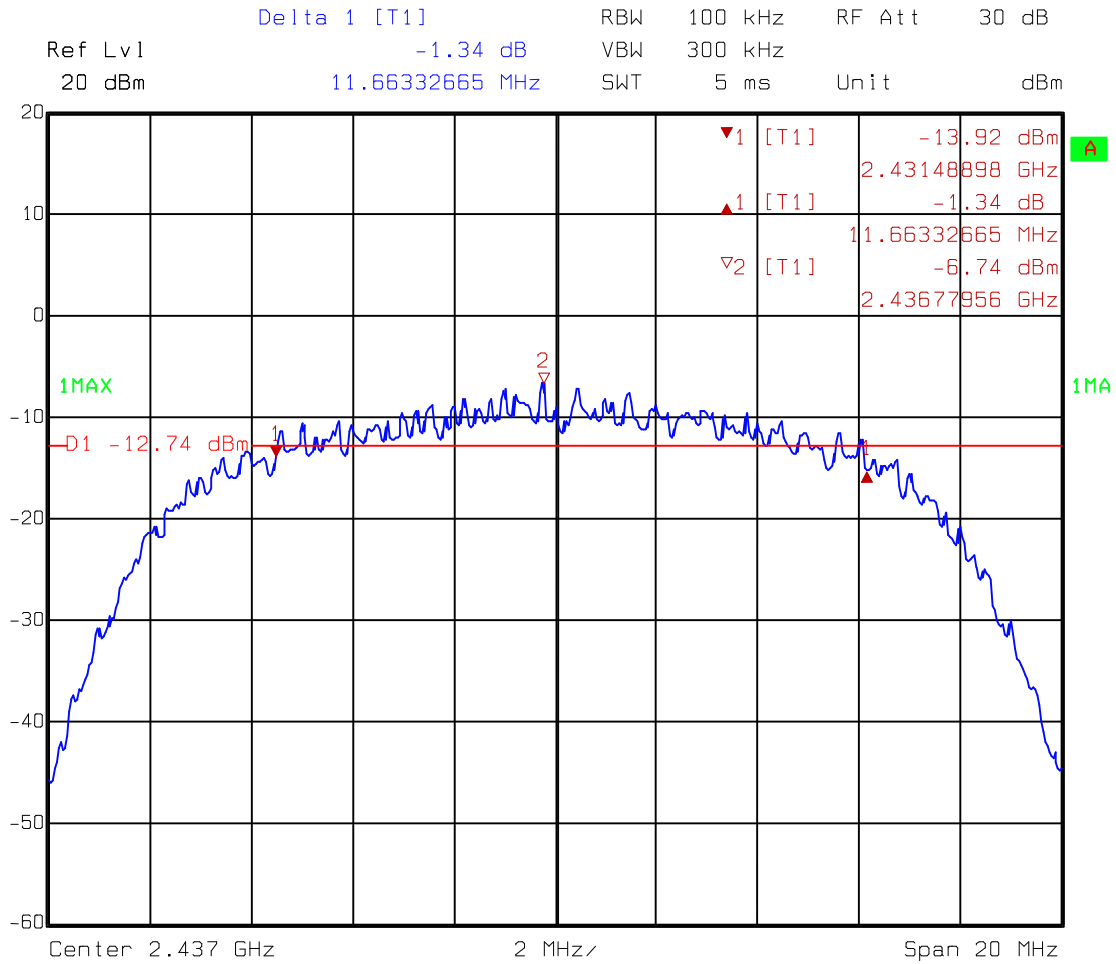
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	11.66333	> 500kHz
Middle	2437	11.66333	> 500kHz
High	2462	11.66333	> 500kHz

Test Condition: 802.11g function (OFDM Modulation)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	16.55311	> 500kHz
Middle	2437	16.55311	> 500kHz
High	2462	16.55311	> 500kHz

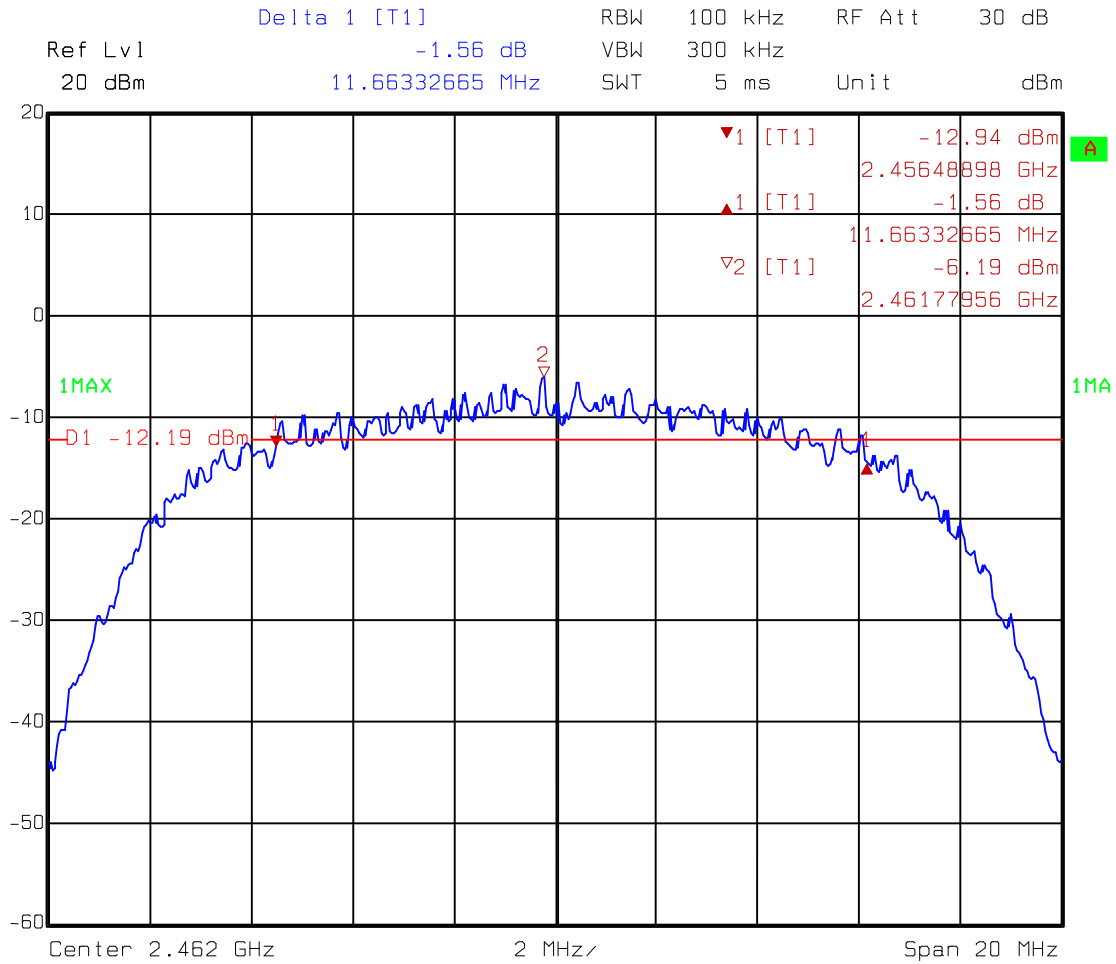
Please see the plot below.

Comment A: 6dB bandwidth at low channel (EC365) 802.11b
Date: 27.FEB.2004 10:39:56



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

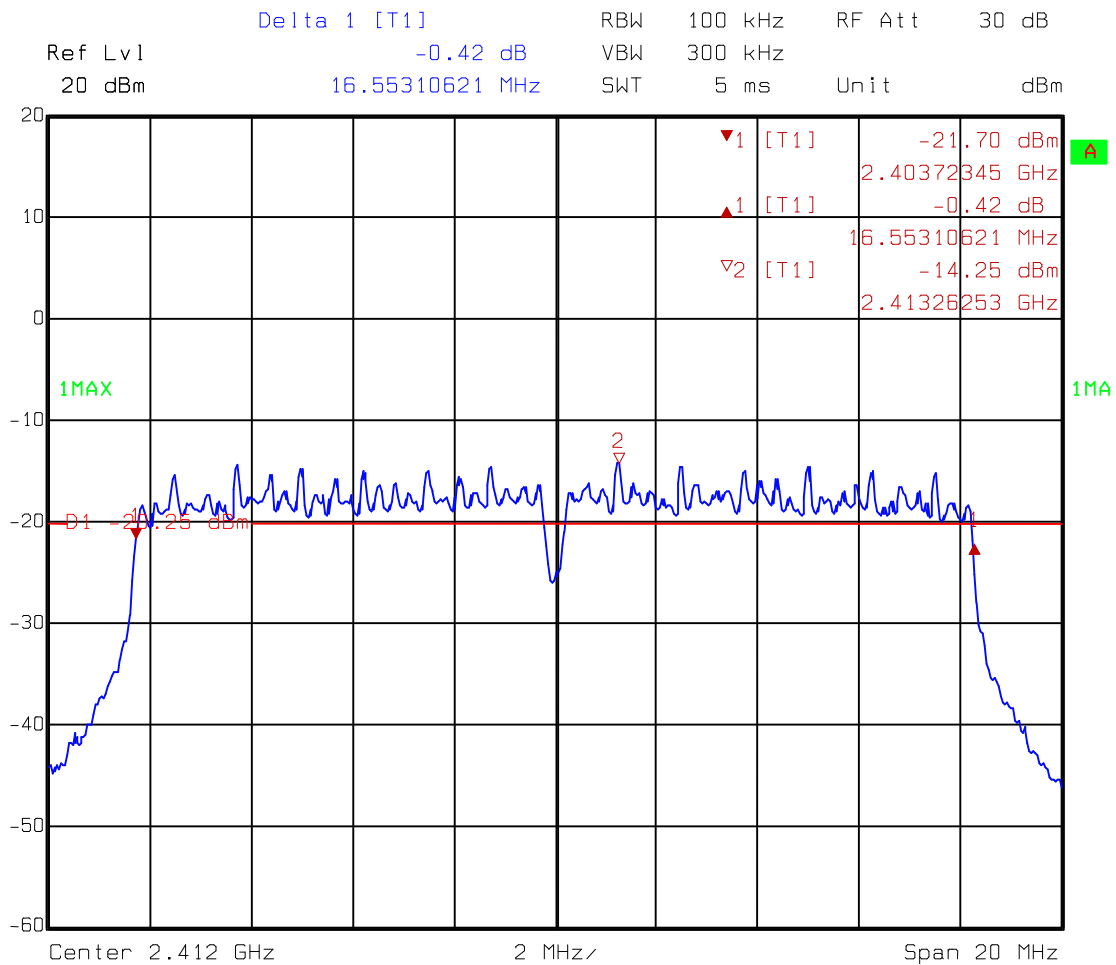
Date: 27.FEB.2004 10:38:06



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

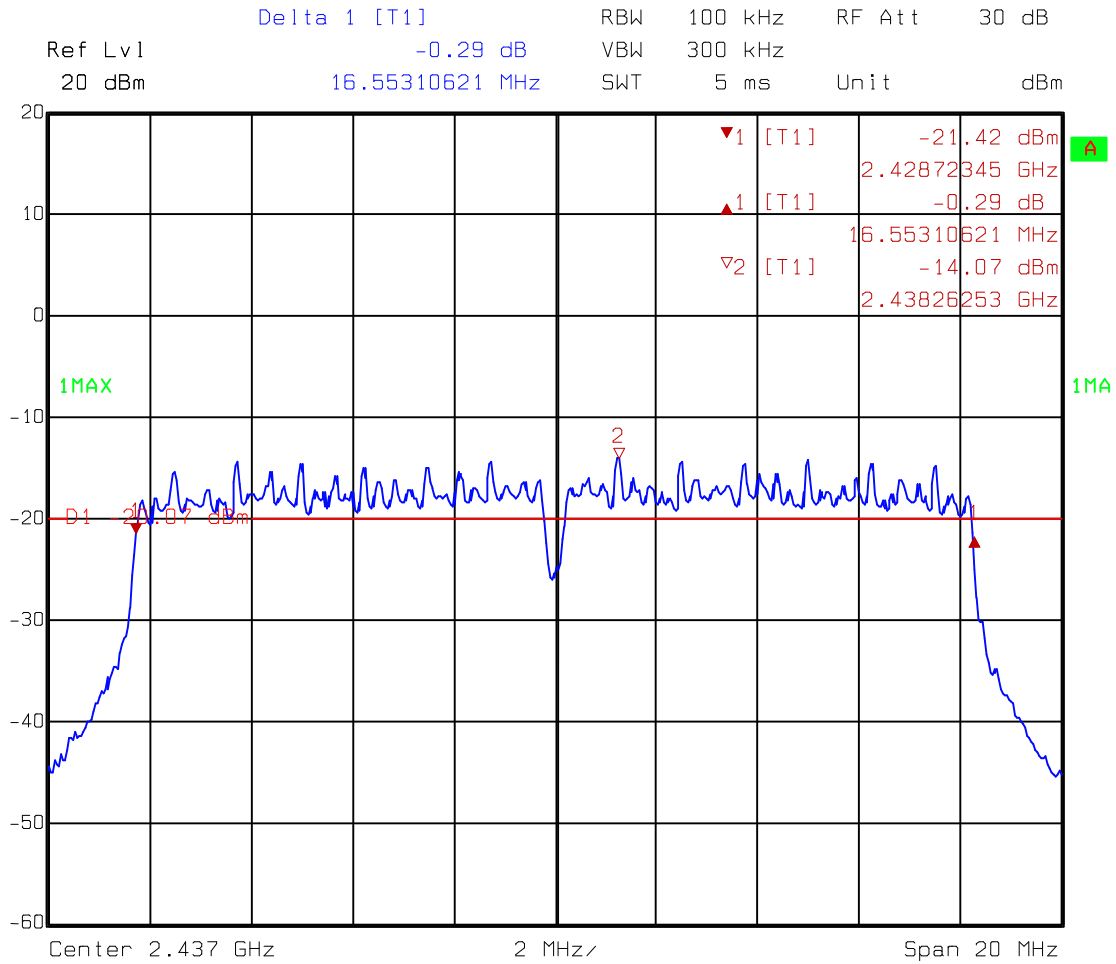
Date: 27.FEB.2004 10:36:01

Test Condition: 802.11g function (OFDM Modulation)



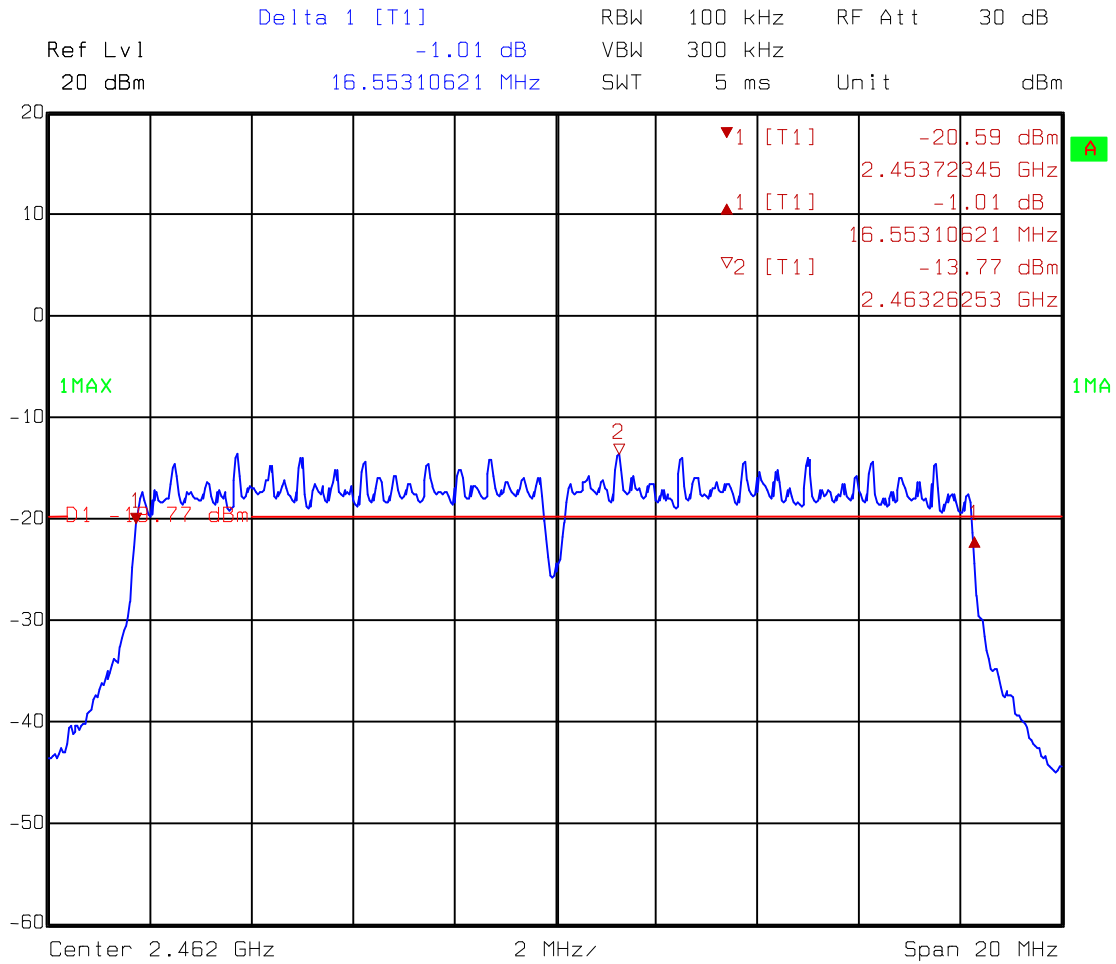
Comment A: 6dB bandwidth at low channel (EC365) 802.11g

Date: 27.FEB.2004 10:42:18



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

Date: 27.FEB.2004 10:44:06



Comment A: 6dB bandwidth at high channel (EC365) 802.11g

Date: 27.FEB.2004 10:45:58

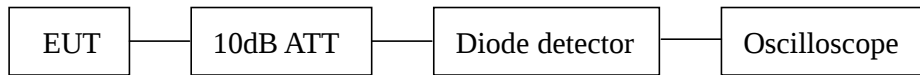
4. Maximum Output Power test

4.1 Operating environment

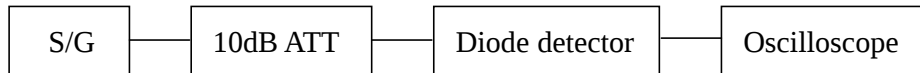
Temperature: 19 °C
 Relative Humidity: 68 %
 Atmospheric Pressure 1023 hPa

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 function (DSSS Modulation)

Channel	Frequency (MHz)	Reading (dBm)	Output Power		Limit (dBm)
			(dBm)	(mW)	
Lowest	2412	22.00	22.00	158.48	30
Middle	2437	22.30	22.30	169.82	30
Highest	2462	22.45	22.45	175.79	30

Test Condition: 802.11g function (OFDM Modulation)

Channel	Frequency (MHz)	Reading (dBm)	Output Power		Limit (dBm)
			(dBm)	(mW)	
Lowest	2412	22.30	22.30	169.82	30
Middle	2437	22.46	22.46	176.19	30
Highest	2462	22.85	22.85	192.75	30

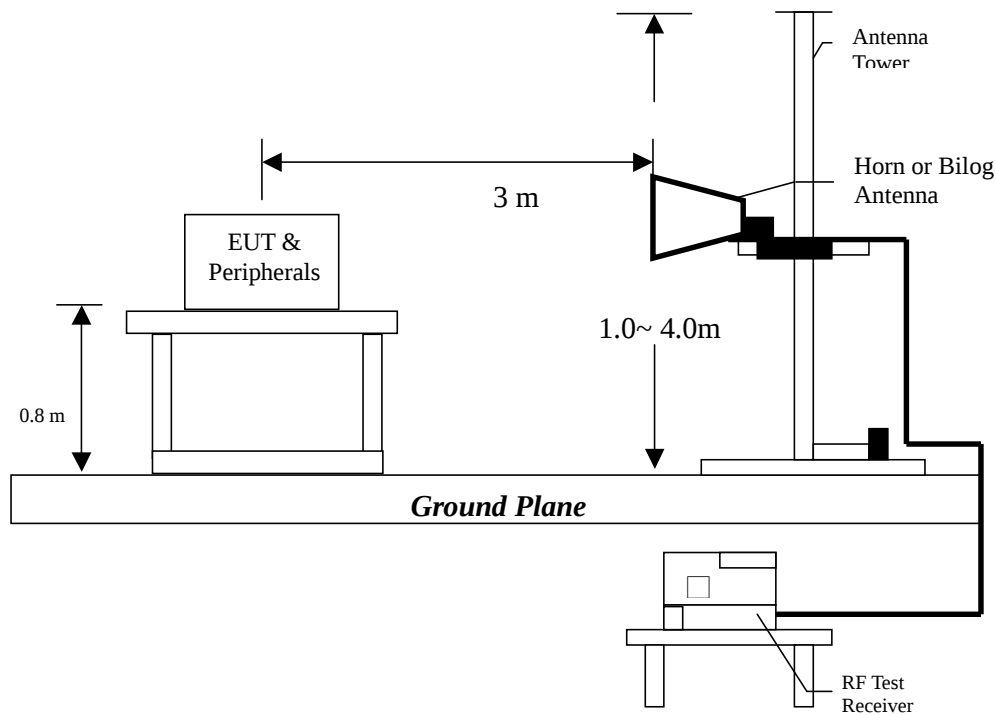
5. Radiated Emission test

5.1 Operating environment

Temperature:	18	°C	(10-40°C)
Relative Humidity:	65	%	(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

Antenna : Type 1 antenna

Worst Case Condition : 802.11b function (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)
65.620	QP	V	12.94	21.63	34.57	40.00	-5.43	257	359
328.800	QP	V	14.99	17.50	32.49	46.00	-13.51	244	111
398.600	QP	V	16.40	19.20	35.60	46.00	-10.40	197	168
530.500	QP	V	19.15	12.40	31.55	46.00	-14.45	154	178
930.200	QP	V	25.46	11.60	37.06	46.00	-8.94	188	203
980.600	QP	V	25.84	11.00	36.84	54.00	-17.16	165	244
66.200	QP	H	12.94	23.05	35.99	40.00	-4.01	133	105
132.810	QP	H	13.34	23.70	37.04	43.50	-6.46	117	152
199.970	QP	H	12.03	13.30	25.33	43.50	-18.17	100	72
240.210	QP	H	12.85	24.20	37.05	46.00	-8.95	214	175
330.200	QP	H	14.99	26.30	41.29	46.00	-4.71	114	98
665.250	QP	H	21.72	14.40	36.12	46.00	-9.88	178	55

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

Antenna : Type 1 antenna

Worst Case Condition : 802.11g function (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)
66.280	QP	V	12.94	18.96	31.90	40.00	-8.10	276	360
330.170	QP	V	14.99	17.00	31.99	46.00	-14.01	244	145
398.600	QP	V	16.40	18.90	35.30	46.00	-10.70	155	352
629.500	QP	V	21.32	10.70	32.02	46.00	-13.98	102	78
665.210	QP	V	21.72	11.10	32.82	46.00	-13.18	187	159
930.200	QP	V	25.46	10.60	36.06	46.00	-9.94	169	128
66.320	QP	H	12.94	22.16	35.10	40.00	-4.90	147	119
132.800	QP	H	13.34	23.40	36.74	43.50	-6.76	157	98
240.210	QP	H	12.85	23.50	36.35	46.00	-9.65	58	231
330.010	QP	H	14.99	24.40	39.39	46.00	-6.61	100	32
398.780	QP	H	16.40	13.38	29.78	46.00	-16.22	100	267
665.140	QP	H	21.72	11.80	33.52	46.00	-12.48	157	213

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

Antenna : Type 2 antenna

Worst Case Condition : 802.11b function (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)
66.230	QP	V	12.94	22.67	35.61	40.00	-4.39	100	179
332.600	QP	V	14.99	15.70	30.69	46.00	-15.31	112	147
398.600	QP	V	16.40	19.60	36.00	46.00	-10.00	158	224
449.000	QP	V	17.86	15.80	33.66	46.00	-12.34	178	321
480.100	QP	V	18.61	14.30	32.91	46.00	-13.09	124	29
664.400	QP	V	21.72	12.60	34.32	46.00	-11.68	265	64
239.500	QP	H	11.82	20.20	32.02	46.00	-13.98	175	55
332.600	QP	H	14.99	21.40	36.39	46.00	-9.61	198	230
388.900	QP	H	16.40	20.40	36.80	46.00	-9.20	235	157
398.600	QP	H	16.40	19.70	36.10	46.00	-9.90	145	196
664.400	QP	H	21.72	13.50	35.22	46.00	-10.78	167	158
796.300	QP	H	23.49	12.60	36.09	46.00	-9.91	104	232

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

Antenna : Type 2 antenna

Worst Case Condition : 802.11g function (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)
69.560	QP	V	12.94	21.20	34.14	40.00	-5.86	102	193
388.900	QP	V	16.40	16.00	32.40	46.00	-13.60	124	273
398.600	QP	V	16.40	17.70	34.10	46.00	-11.90	120	255
449.000	QP	V	17.86	15.00	32.86	46.00	-13.14	157	102
480.100	QP	V	18.61	14.40	33.01	46.00	-12.99	144	111
629.500	QP	V	21.32	12.50	33.82	46.00	-12.18	175	67
332.600	QP	H	14.99	21.50	36.49	46.00	-9.51	100	55
388.900	QP	H	16.40	20.30	36.70	46.00	-9.30	114	178
398.600	QP	H	16.40	21.30	37.70	46.00	-8.30	174	299
664.400	QP	H	21.72	13.90	35.62	46.00	-10.38	250	101
796.300	QP	H	23.49	12.10	35.59	46.00	-10.41	247	74
930.200	QP	H	25.46	9.20	34.66	46.00	-11.34	169	25

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

5.4.2 Measurement results: frequency above 1GHz

Antenna : Type 1 antenna

Test Condition : 802.11b (DSSS Modulation) 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)
4823.93	PK	V	32.265	35.742	46.193	49.67	74	-24.33	147	44
4823.93	AV	V	32.265	35.742	43.473	46.95	54	-7.05	147	44
9647.88	PK	V	35.753	43.384	44.9385	52.57	74	-21.43	131	158
9647.88	AV	V	35.753	43.384	41.1485	48.78	54	-5.22	131	158
4823.96	PK	H	32.265	35.742	43.843	47.32	74	-26.68	178	169
4823.96	AV	H	32.265	35.742	40.823	44.30	54	-9.70	178	169
9647.90	PK	H	35.753	43.384	42.5285	50.16	74	-23.84	199	120
9647.90	AV	H	35.753	43.384	37.7785	45.41	54	-8.59	199	120

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.

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

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

Antenna : Type 1 antenna

Test Condition : 802.11b (DSSS Modulation) 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)
4973.84	PK	V	32.265	35.742	46.793	50.27	74	-23.73	157	38
4973.84	AV	V	32.265	35.742	43.743	47.22	54	-6.78	157	38
9747.81	PK	V	35.753	43.384	44.3085	51.94	74	-22.06	167	102
9747.81	AV	V	35.753	43.384	40.3485	47.98	54	-6.02	167	102
4873.95	PK	H	32.265	35.742	44.263	47.74	74	-26.26	187	360
4873.95	AV	H	32.265	35.742	41.053	44.53	54	-9.47	187	360
9747.85	PK	H	35.753	43.384	43.1285	50.76	74	-23.24	176	125
9747.85	AV	H	35.753	43.384	38.2885	45.92	54	-8.08	176	125

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

Antenna : Type 1 antenna

Test Condition : 802.11b (DSSS Modulation) 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)
4823.95	PK	V	32.265	35.742	47.163	50.64	74	-23.36	199	72
4823.95	AV	V	32.265	35.742	44.463	47.94	54	-6.06	199	72
9847.88	PK	V	35.753	43.384	43.1085	50.74	74	-23.26	148	103
9847.88	AV	V	35.753	43.384	38.5785	46.21	54	-7.79	148	103
4923.85	PK	H	32.265	35.742	44.113	47.59	74	-26.41	197	0
4923.85	AV	H	32.265	35.742	40.743	44.22	54	-9.78	197	0
9847.88	PK	H	35.753	43.384	42.9785	50.61	74	-23.39	172	118
9847.88	AV	H	35.753	43.384	38.2085	45.84	54	-8.16	172	118

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

The radiated spurious emissions at

Frequency(MHz)	Margin
9647.86	-2.13

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

Antenna : Type 1 antenna

Test Condition : 802.11g (OFDM Modulation) 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)
4823.93	PK	V	32.265	35.742	46.153	49.63	74	-24.37	140	111
4823.93	AV	V	35.753	43.384	39.9485	47.58	54	-6.42	140	111
9647.86	PK	V	35.753	43.384	46.8185	54.45	74	-19.55	163	110
9647.86	AV	V	35.753	43.384	44.2385	51.87	54	-2.13	163	110
4823.93	PK	H	32.265	35.742	44.683	48.16	74	-25.84	179	2
4823.93	AV	H	32.265	35.742	41.873	45.35	54	-8.65	179	2
9647.88	PK	H	35.753	43.384	44.0585	51.69	74	-22.31	150	122
9647.88	AV	H	35.753	43.384	40.3485	47.98	54	-6.02	150	122

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.

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

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

Antenna : Type 1 antenna

Test Condition : 802.11g (OFDM Modulation) 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)
4873.95	PK	V	32.265	35.742	45.973	49.45	74	-24.55	140	30
4873.95	AV	V	32.265	35.742	43.663	47.14	54	-6.86	140	30
9747.87	PK	V	35.753	43.384	43.5185	51.15	74	-22.85	131	167
9747.87	AV	V	35.753	43.384	39.0585	46.69	54	-7.31	131	167
4873.96	PK	H	32.265	35.742	42.293	45.77	74	-28.23	192	24
4873.96	AV	H	32.265	35.742	38.523	42.00	54	-12.00	192	24
9747.88	PK	H	35.753	43.384	43.3485	50.98	74	-23.02	175	124
9747.88	AV	H	35.753	43.384	38.2185	45.85	54	-8.15	175	124

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

Antenna : Type 1 antenna

Test Condition : 802.11g (OFDM Modulation) 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)
4923.93	PK	V	32.265	35.742	43.343	46.82	74	-27.18	135	25
4923.93	AV	V	32.265	35.742	40.303	43.78	54	-10.22	135	25
9847.87	PK	V	35.753	43.384	42.5185	50.15	74	-23.85	140	187
9847.87	AV	V	35.753	43.384	37.8785	45.51	54	-8.49	140	187
4923.96	PK	H	32.265	35.742	42.493	45.97	74	-28.03	197	0
4923.96	AV	H	32.265	35.742	39.473	42.95	54	-11.05	197	0
9847.87	PK	H	35.753	43.384	42.6685	50.30	74	-23.7	182	124
9847.87	AV	H	35.753	43.384	37.9485	45.58	54	-8.42	182	124

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

Antenna : Type 2 antenna

Test Condition : 802.11b (DSSS Modulation) 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)
4823.95	PK	V	32.265	35.742	46.153	49.63	74	-24.37	162	0
4823.95	AV	V	32.265	35.742	40.363	43.84	54	-10.16	162	0
4823.95	PK	H	32.265	35.742	46.743	50.22	74	-23.78	200	210
4823.95	AV	H	32.265	35.742	41.103	44.58	54	-9.42	200	210

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.

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

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

Antenna : Type 2 antenna

Test Condition : 802.11b (DSSS Modulation) 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)
4873.93	PK	V	32.265	35.742	46.333	49.81	74	-24.19	175	0
4873.93	AV	V	32.265	35.742	39.333	42.81	54	-11.19	175	0
4873.95	PK	H	32.265	35.742	45.603	49.08	74	-24.92	179	221
4873.95	AV	H	32.265	35.742	38.883	42.36	54	-11.64	179	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

Antenna : Type 2 antenna

Test Condition : 802.11b (DSSS Modulation) 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)
4923.9	PK	V	32.265	35.742	44.953	48.43	74	-25.57	128	210
4923.9	AV	V	32.265	35.742	37.283	40.76	54	-13.24	128	210
4923.9	PK	H	32.265	35.742	46.283	49.76	74	-24.24	186	221
4923.9	AV	H	32.265	35.742	39.663	43.14	54	-10.86	186	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

Antenna : Type 2 antenna

Test Condition : 802.11g (OFDM Modulation) 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)
4823.95	PK	V	32.265	35.742	45.353	48.83	74	-25.17	153	128
4823.95	AV	V	32.265	35.742	39.193	42.67	54	-11.33	153	128
9647.89	PK	V	35.753	43.384	46.6985	54.33	74	-19.67	177	115
9647.89	AV	V	35.753	43.384	42.6785	50.31	54	-3.69	177	115
4823.95	PK	H	32.265	35.742	46.473	49.95	74	-24.05	186	222
4823.95	AV	H	32.265	35.742	39.723	43.2	54	-10.80	186	222
9647.91	PK	H	35.753	43.384	44.0785	51.71	74	-22.29	187	47
9647.91	AV	H	35.753	43.384	37.9885	45.62	54	-8.38	187	47

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.

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

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

Antenna : Type 2 antenna

Test Condition : 802.11g (OFDM Modulation) 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)
4873.94	PK	V	32.265	35.742	45.613	49.09	74	-24.91	175	230
4873.94	AV	V	32.265	35.742	39.713	43.19	54	-10.81	175	230
4873.94	PK	H	32.265	35.742	46.443	49.92	74	-24.08	188	150
4873.94	AV	H	32.265	35.742	40.393	43.87	54	-10.13	188	150

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

Antenna : Type 2 antenna

Test Condition : 802.11g (OFDM Modulation) 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)
4923.93	PK	V	32.265	35.742	45.873	49.35	74	-24.65	179	117
4923.93	AV	V	32.265	35.742	39.063	42.54	54	-11.46	179	117
4923.91	PK	H	32.265	35.742	45.053	48.53	74	-25.47	123	151
4923.91	AV	H	32.265	35.742	38.303	41.78	54	-12.22	123	151

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: 23 °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 (3.13dB)/external attenuator (10dB) 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)

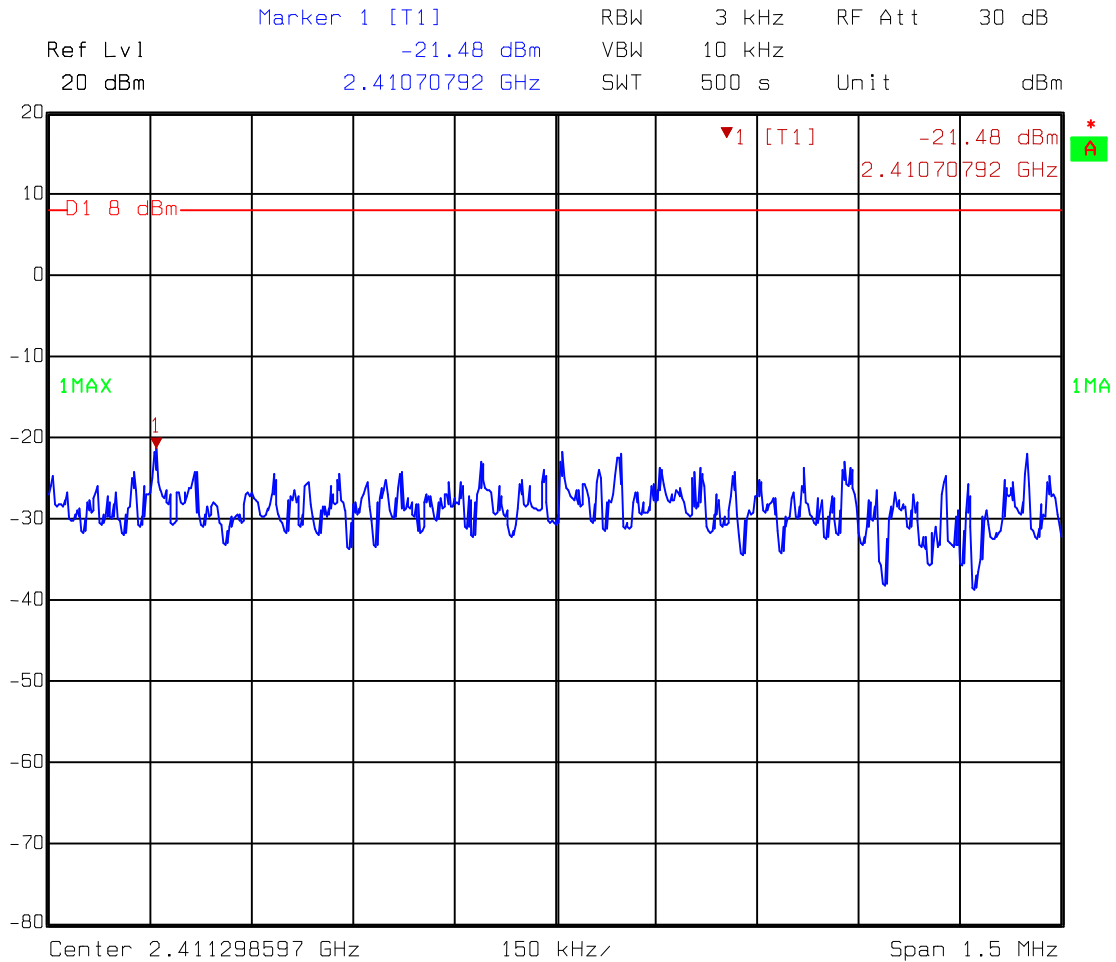
Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2410.71	-8.35	8
Middle	2435.71	-7.78	8
High	2462.00	-8.18	8

Test Mode: 802.11g (OFDM Modulation)

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2416.99	-15.62	8
Middle	2441.97	-15.25	8
High	2466.97	-15.33	8

Please see the plot below.

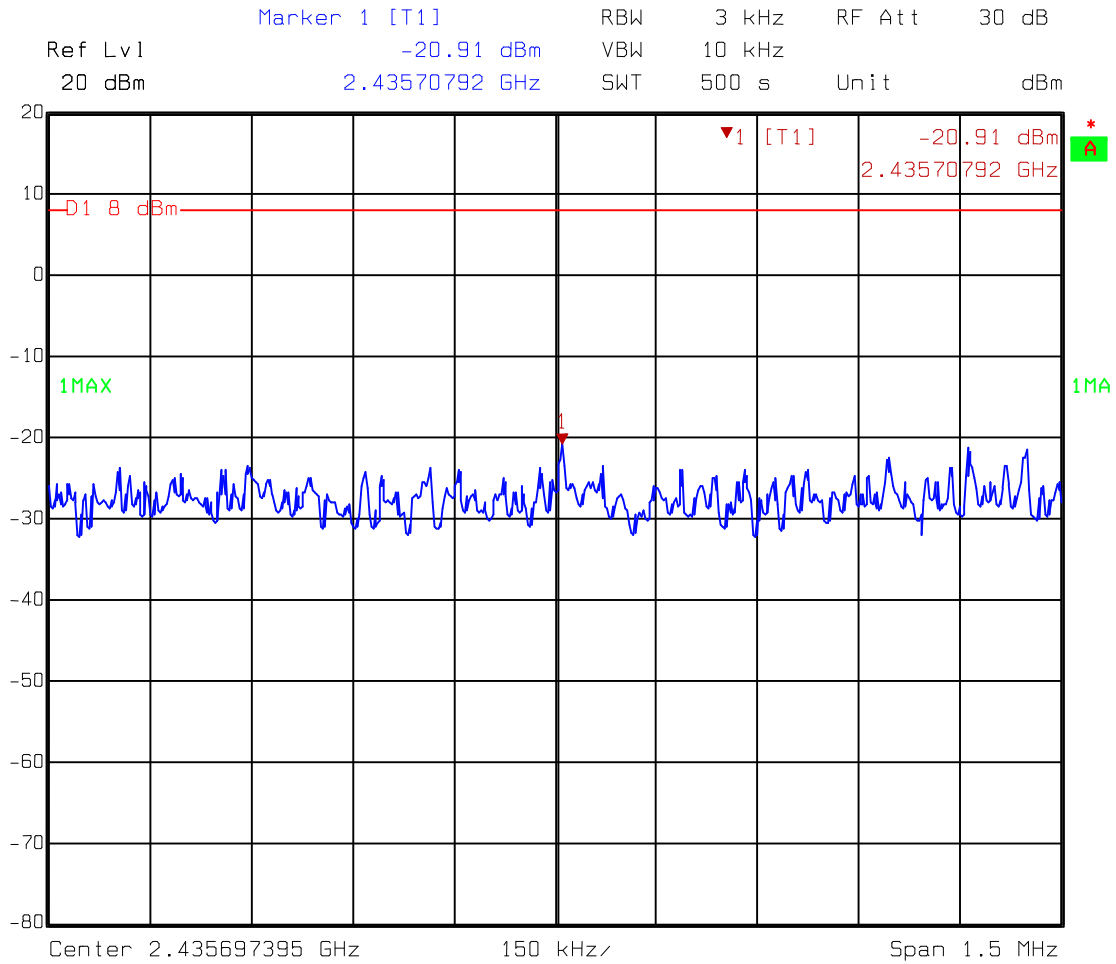
Test Mode: 802.11b (DSSS Modulation)



Comment A: Power spectrum density at low channel

ATT=10dB CL=3.13dB 802.11b

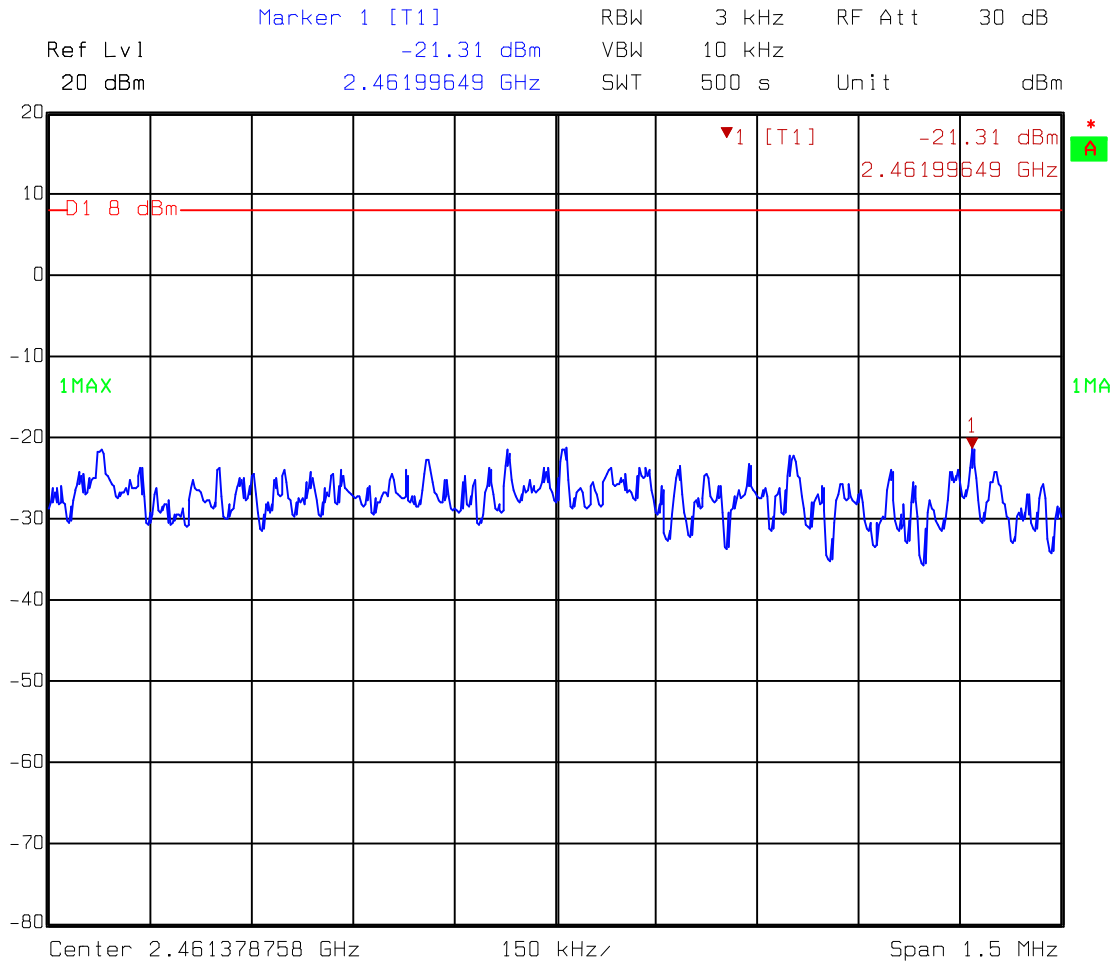
Date: 27.FEB.2004 10:55:29



Comment A: Power spectrum density at middle channel

ATT=10dB CL=3.13dB 802.11b

Date: 27.FEB.2004 10:57:29

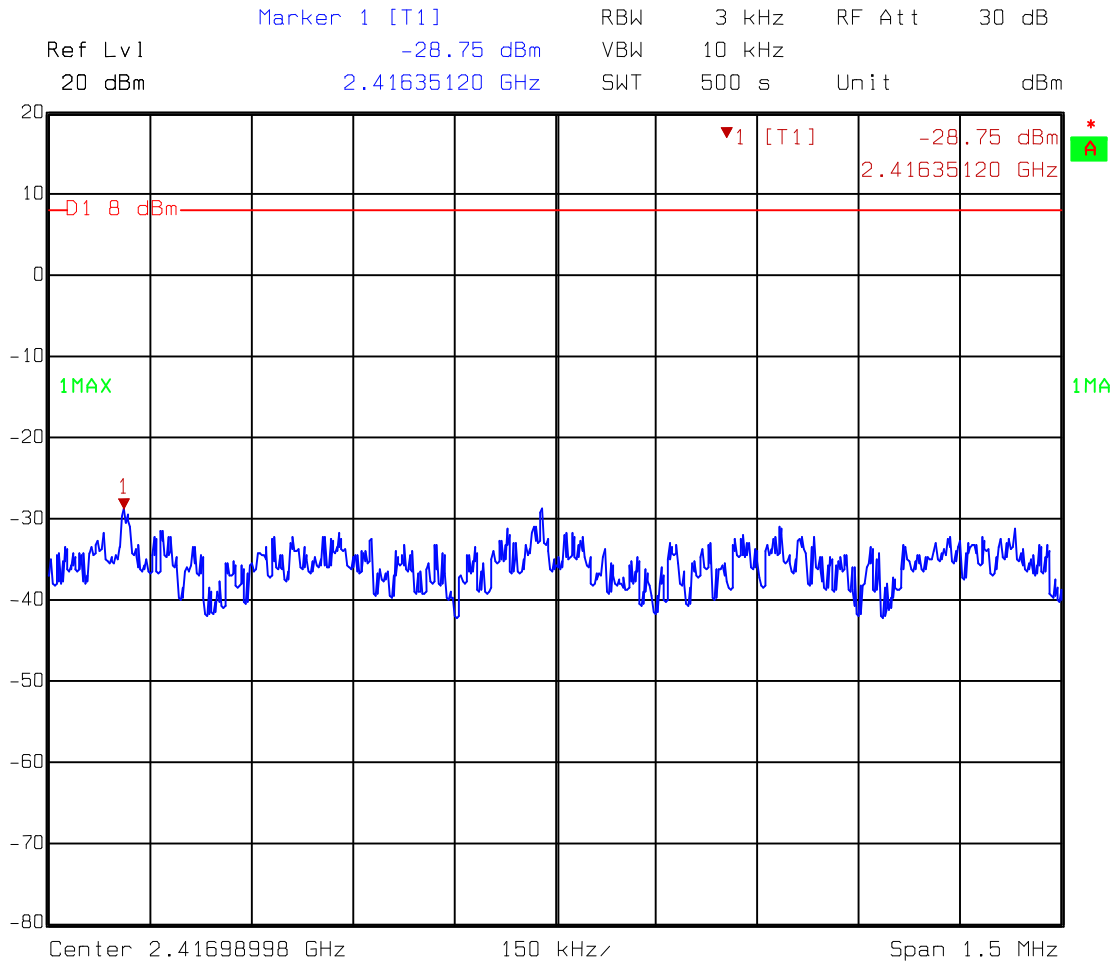


Comment A: Power spectrum density at high channel

ATT=10dB CL=3.13dB 802.11b

Date: 27.FEB.2004 10:59:00

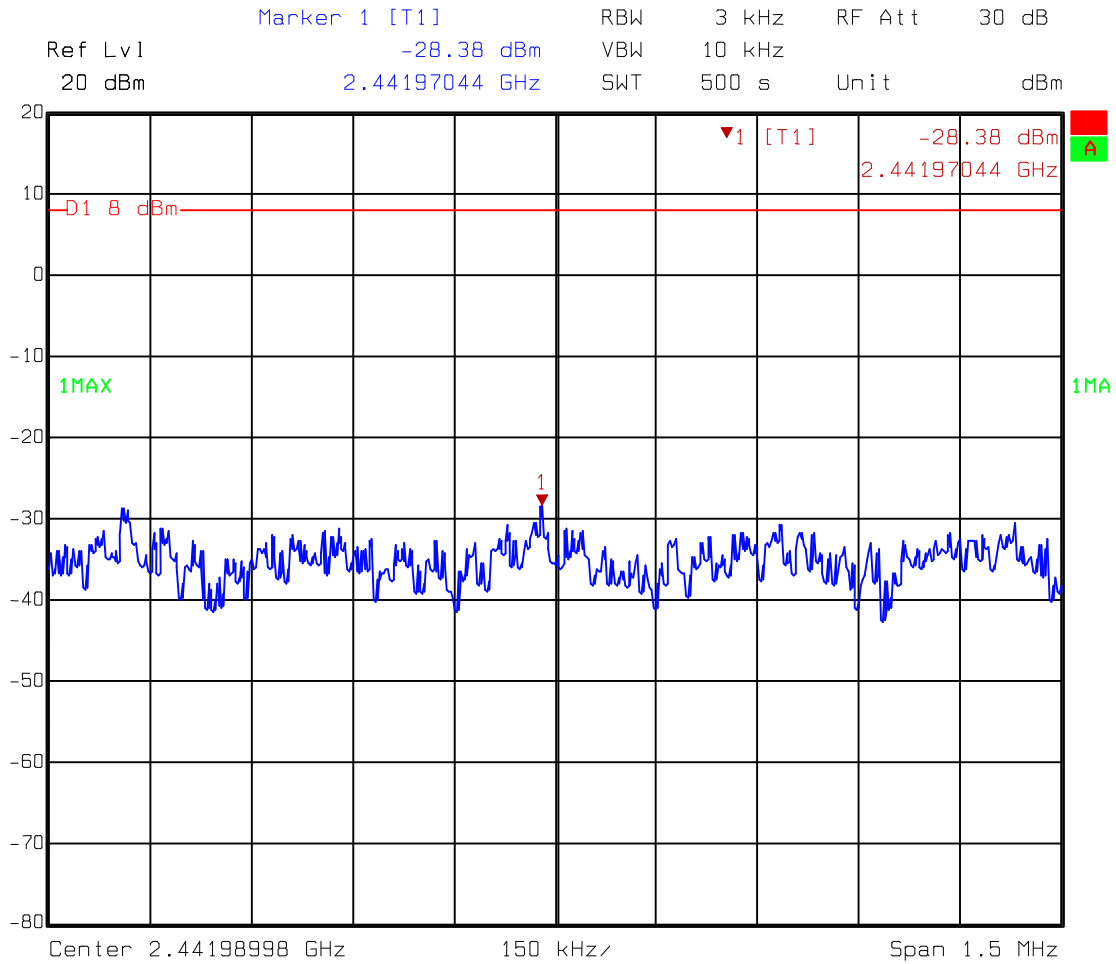
Test Mode: 802.11g (OFDM Modulation)



Comment A: Power spectrum density at low channel

ATT=10dB CL=3.13dB 802.11g

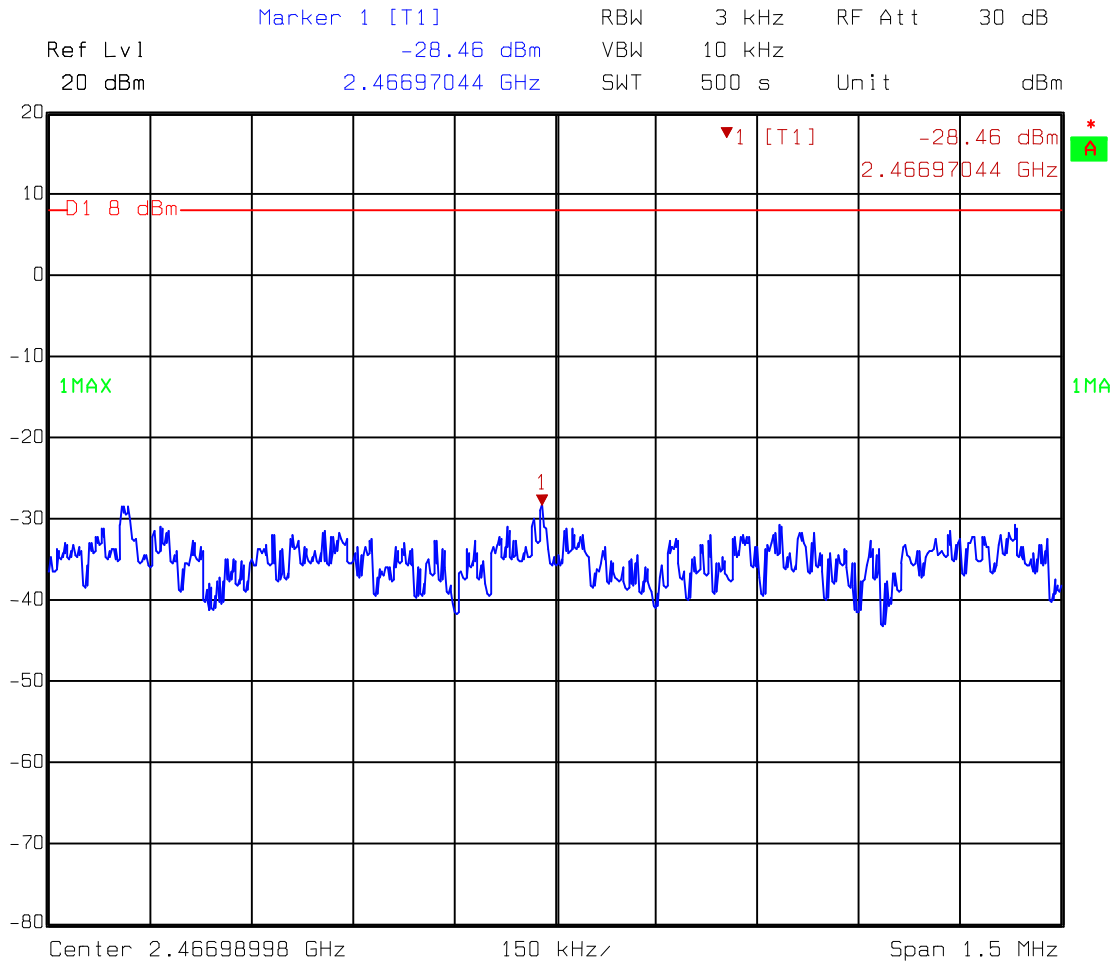
Date: 27.FEB.2004 10:54:05



Comment A: Power spectrum density at middle channel

ATT=10dB CL=3.13dB 802.11g

Date: 27.FEB.2004 10:50:57



Comment A: Power spectrum density at high channel

ATT=10dB CL=3.13dB 802.11g

Date: 27.FEB.2004 10:49:07

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

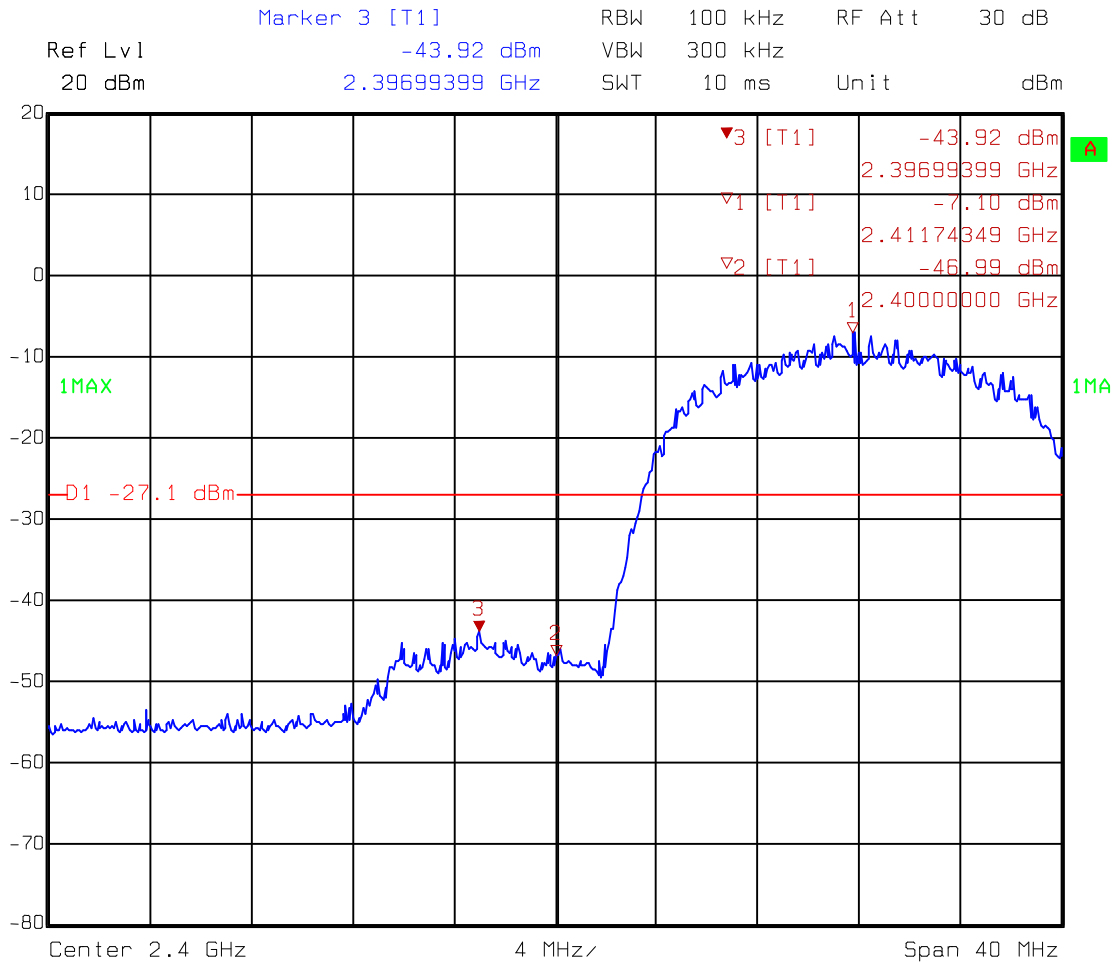
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the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

Please see the plot below.

7.1 Band-edge (Conducted method)

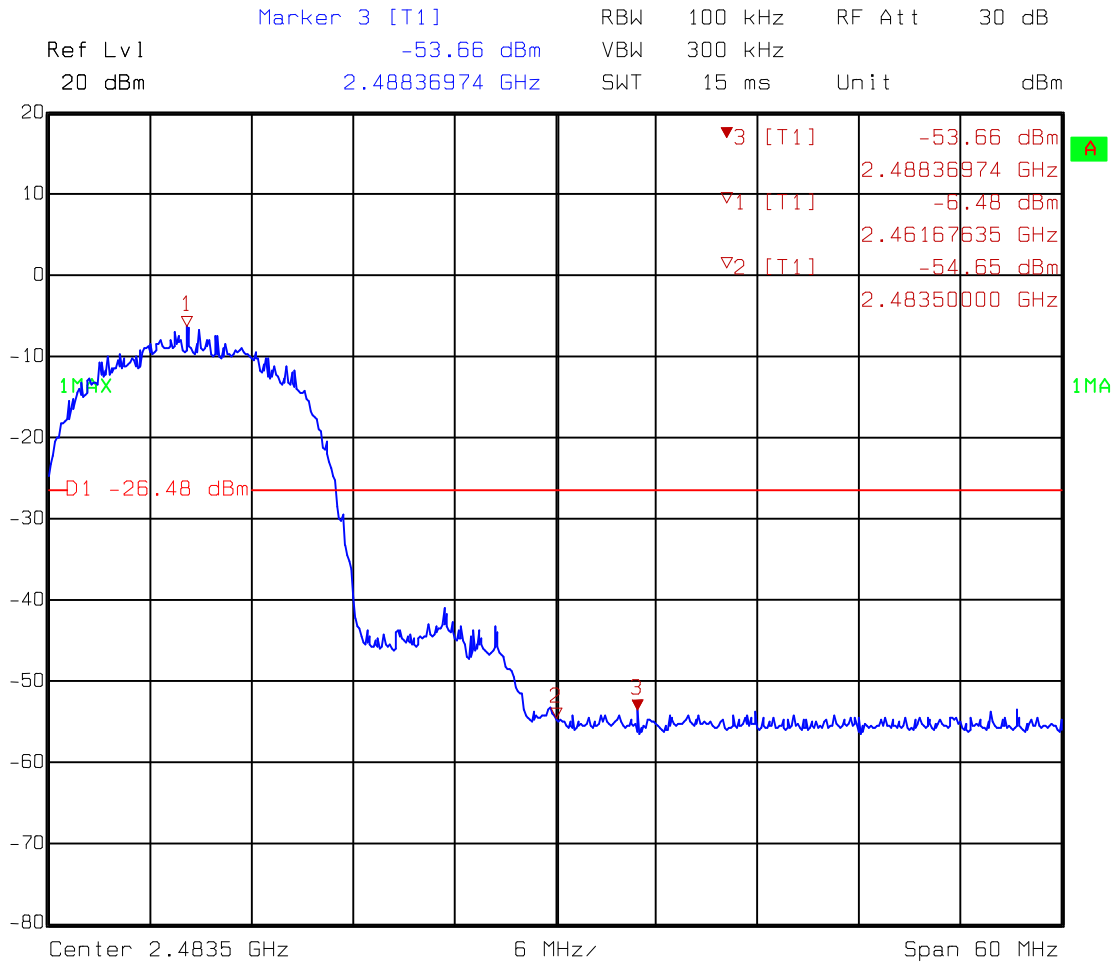
Type 1 antenna

Test Mode: 802.11b (DSSS Modulation)



Comment A: Band-edge at low channel 802.11b

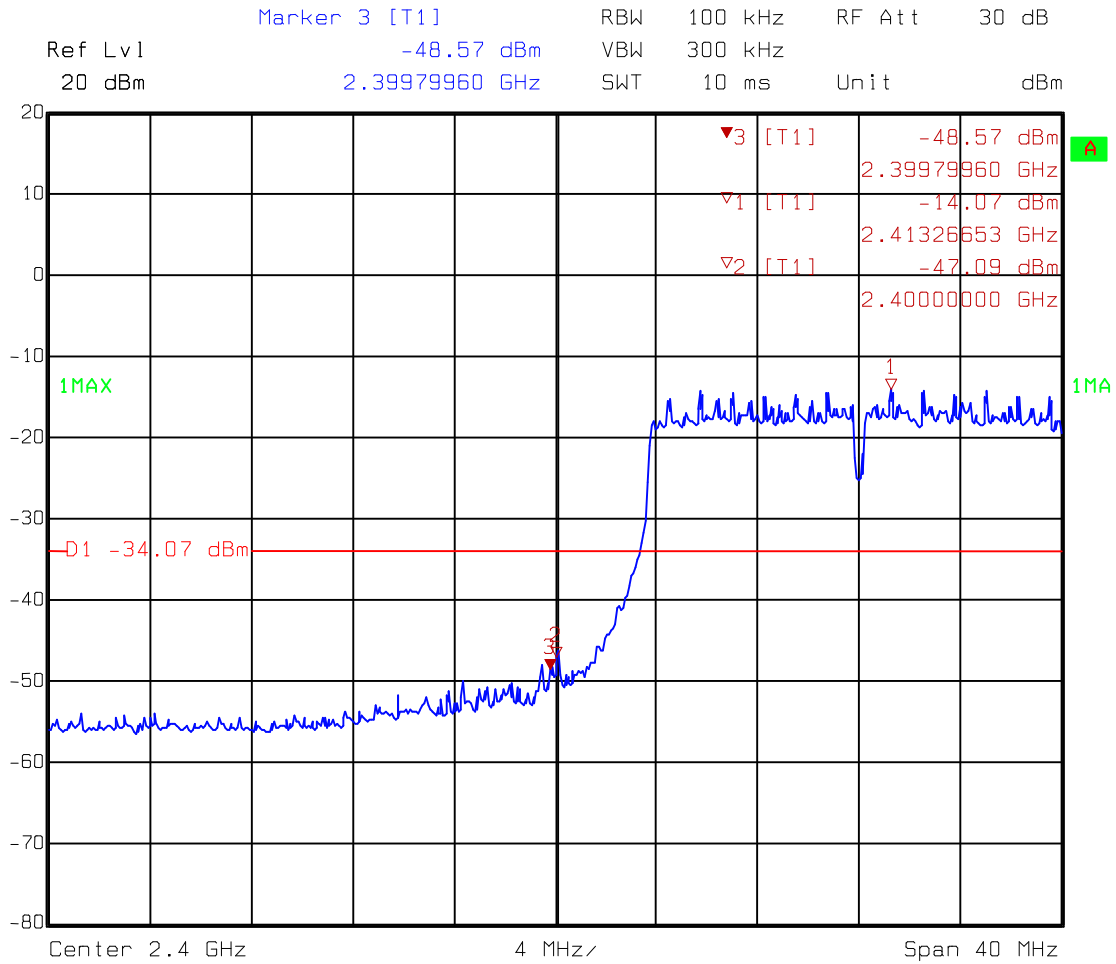
Date: 27.FEB.2004 11:02:27



Comment A: Band-edge at high channel 802.11b

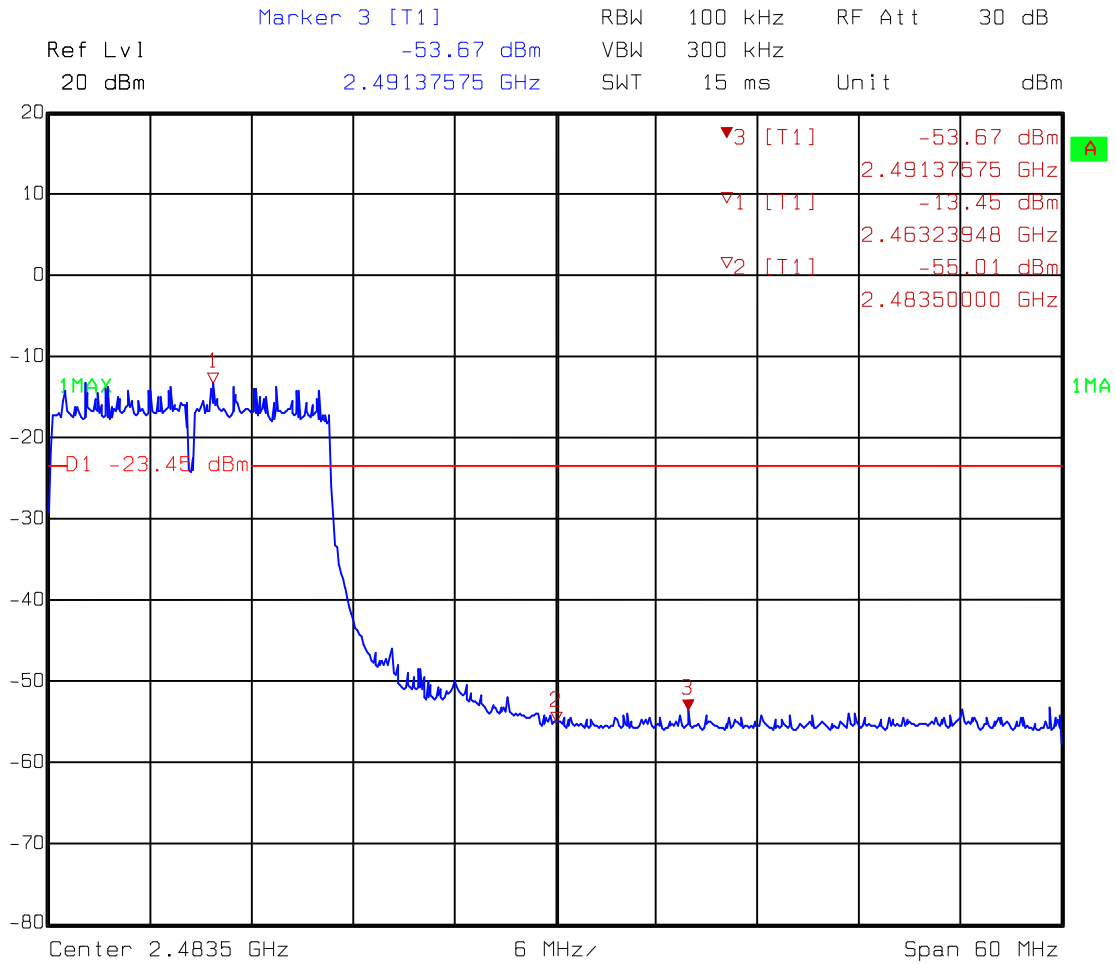
Date: 27.FEB.2004 11:00:44

Test Mode: 802.11g (OFDM Modulation)



Comment A: Band-edge at low channel 802.11g

Date: 27.FEB.2004 11:04:13



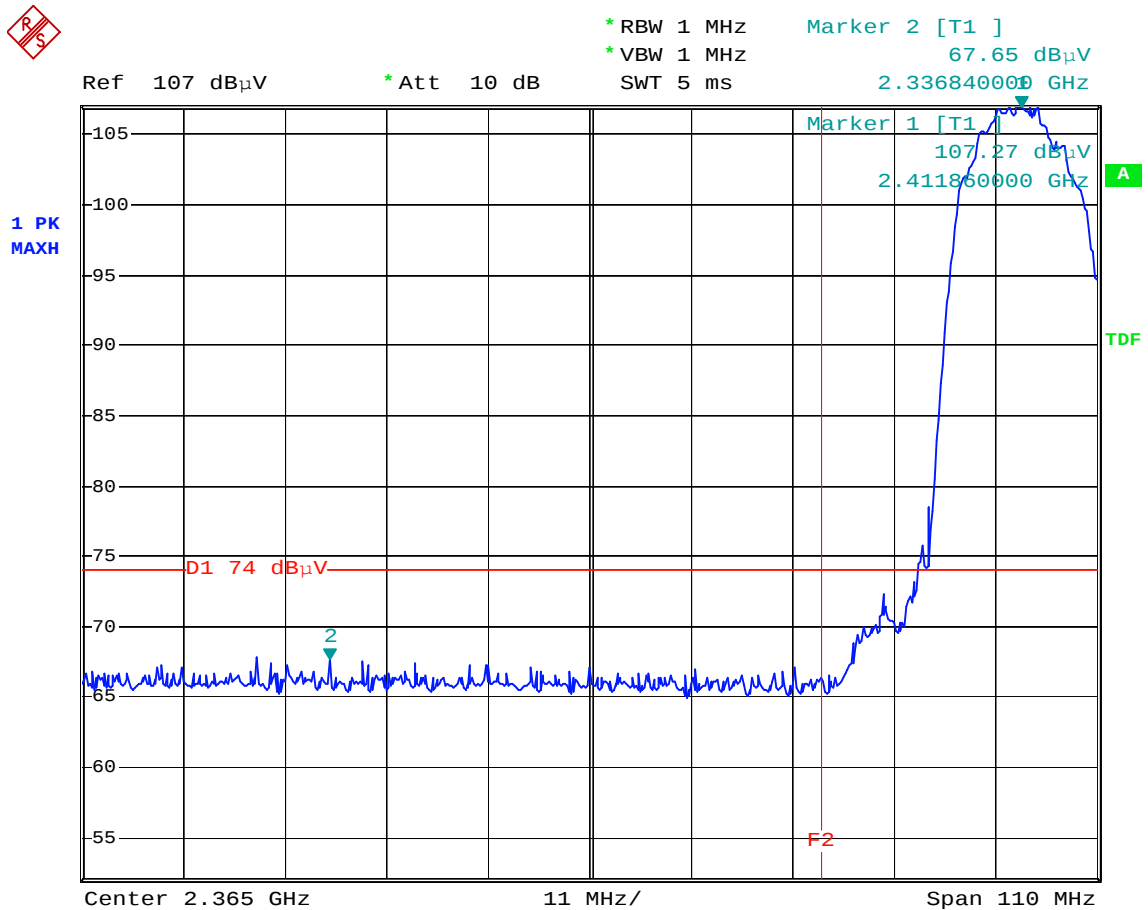
Comment A: Band-edge at high channel 802.11g

Date: 27.FEB.2004 11:07:20

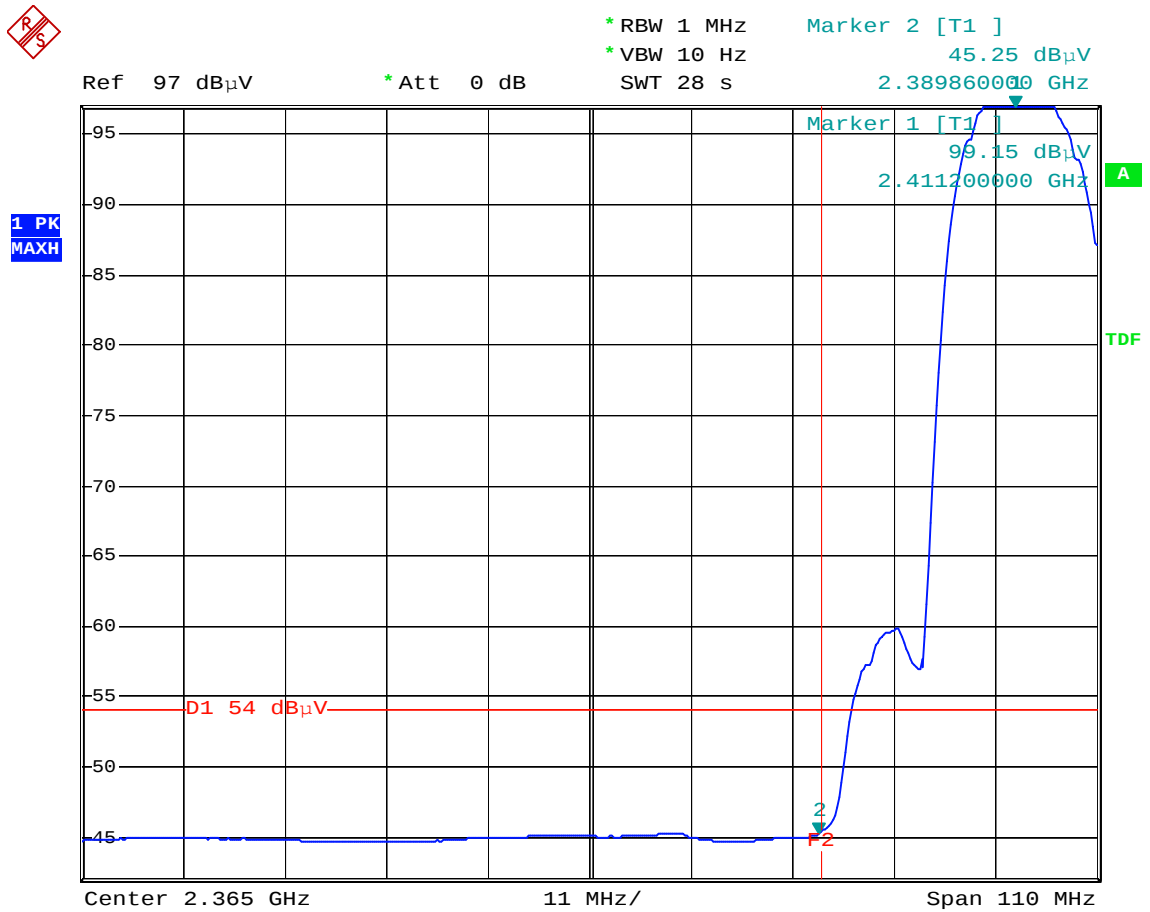
7.2 Band-edge (Radiated method)

Type 1 antenna

Test Mode: 802.11b (DSSS Modulation)



Comment: Band-edge test at low channel
 Comment: Peak detector F2=2390MHz 802.11b
 Date: 3.MAR.2004 09:02:59



Comment: Band-edge test at low channel
 Comment: Average detector F2=2390MHz 802.11b
 Date: 3.MAR.2004 09:05:31



* RBW 1 MHz

Marker 1 [T1]

* VBW 10 Hz

99.27 dB μ V

SWT 12.5 s

2.411200000 GHz

Ref 107 dB μ V

* Att 10 dB

1 PK
MAXH



Center 2.412 GHz

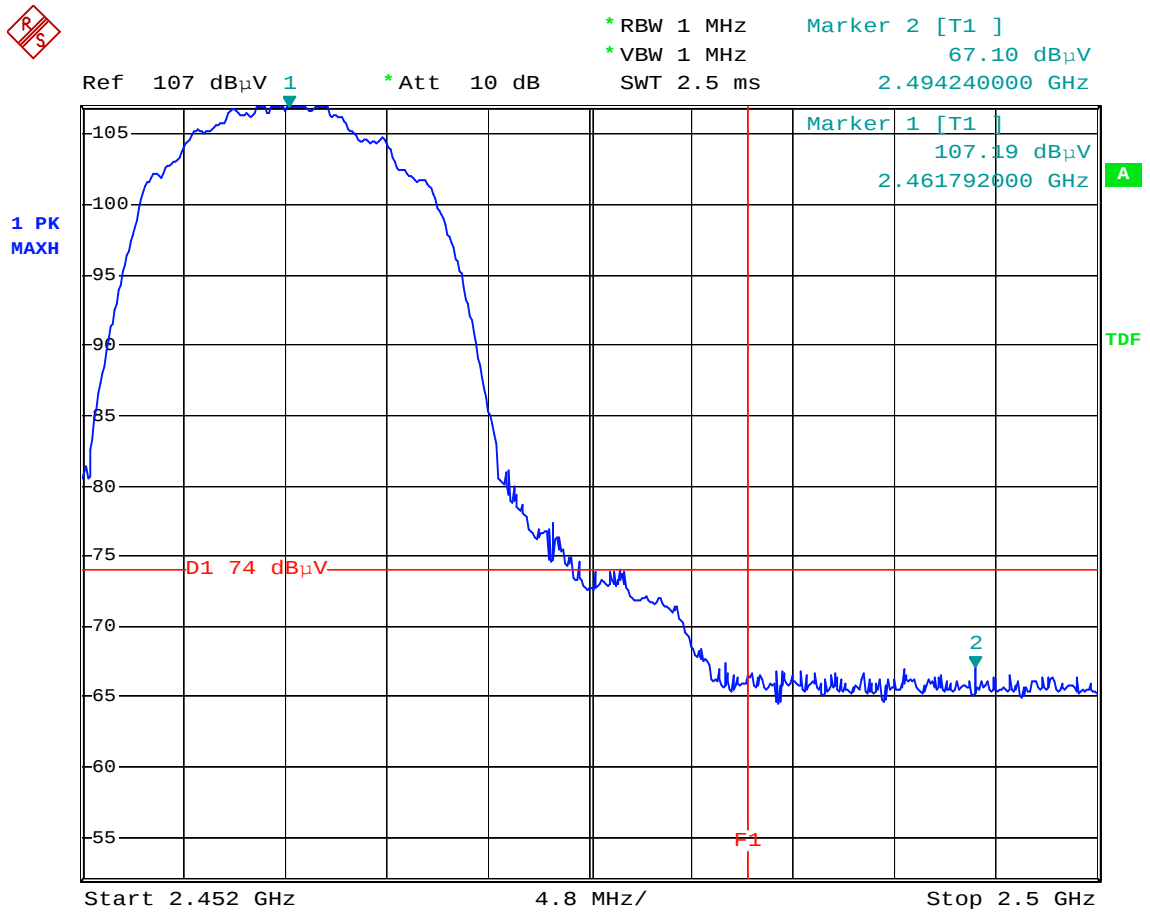
5 MHz/

Span 50 MHz

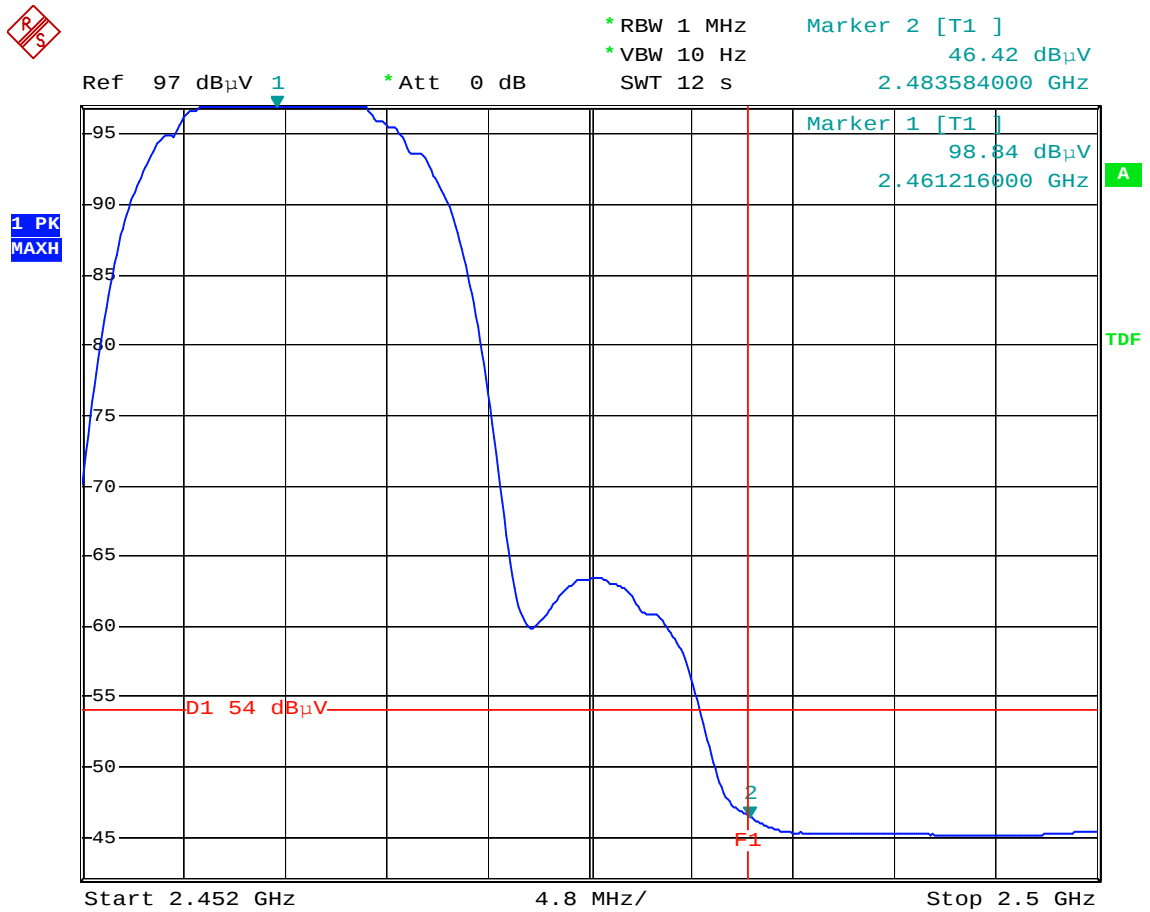
Comment: Band-edge test at low channel

Comment: Average detector F2=2390MHz 802.11b

Date: 3.MAR.2004 09:06:49



Comment: Band-edge test at high channel
 Comment: Peak detector F1=2483.5MHz 802.11b
 Date: 3.MAR.2004 08:55:15



Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz 802.11b
 Date: 3.MAR.2004 08:57:51



* RBW 1 MHz

Marker 1 [T1]

* VBW 10 Hz

99.17 dB μ V

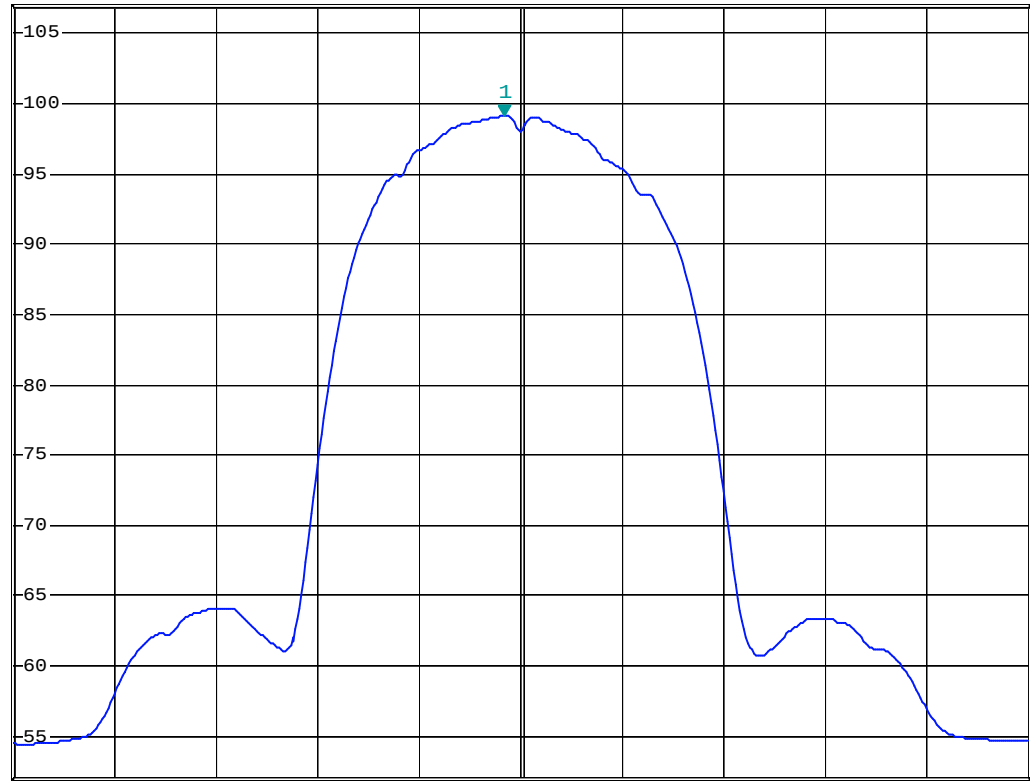
SWT 12 s

2.461232000 GHz

Ref 107 dB μ V

* Att 10 dB

1 PK
MAXH

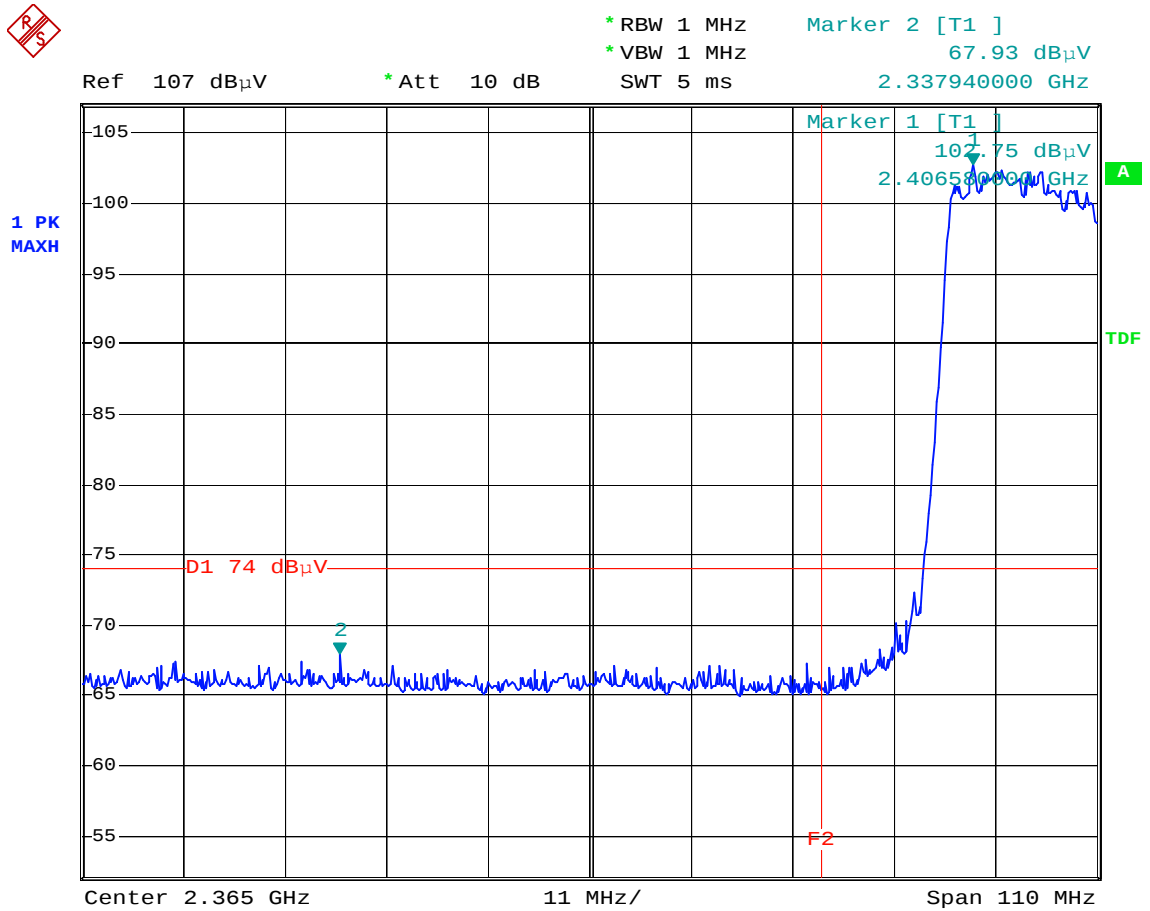


Comment: Band-edge test at high channel

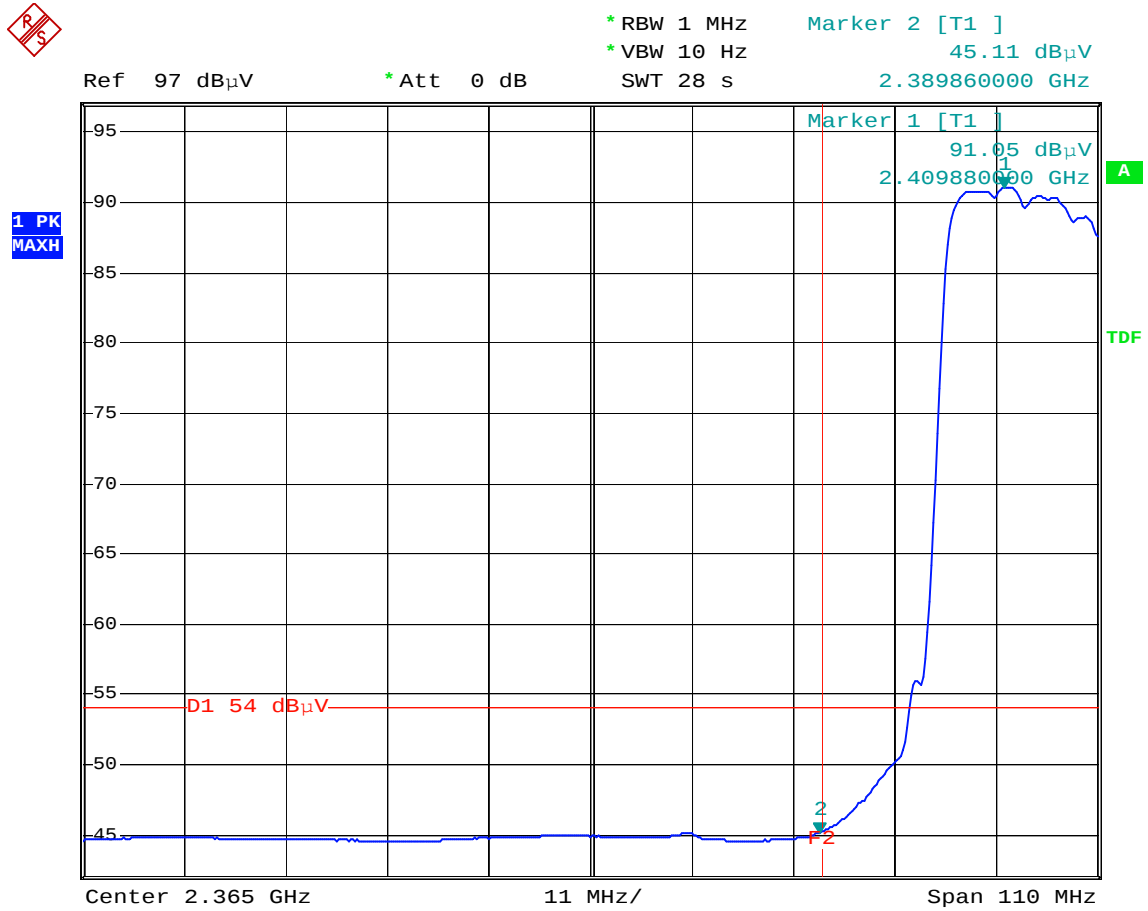
Comment: Average detector F1=2483.5MHz 802.11b

Date: 3.MAR.2004 08:59:12

Test Mode: 802.11g (OFDM Modulation)



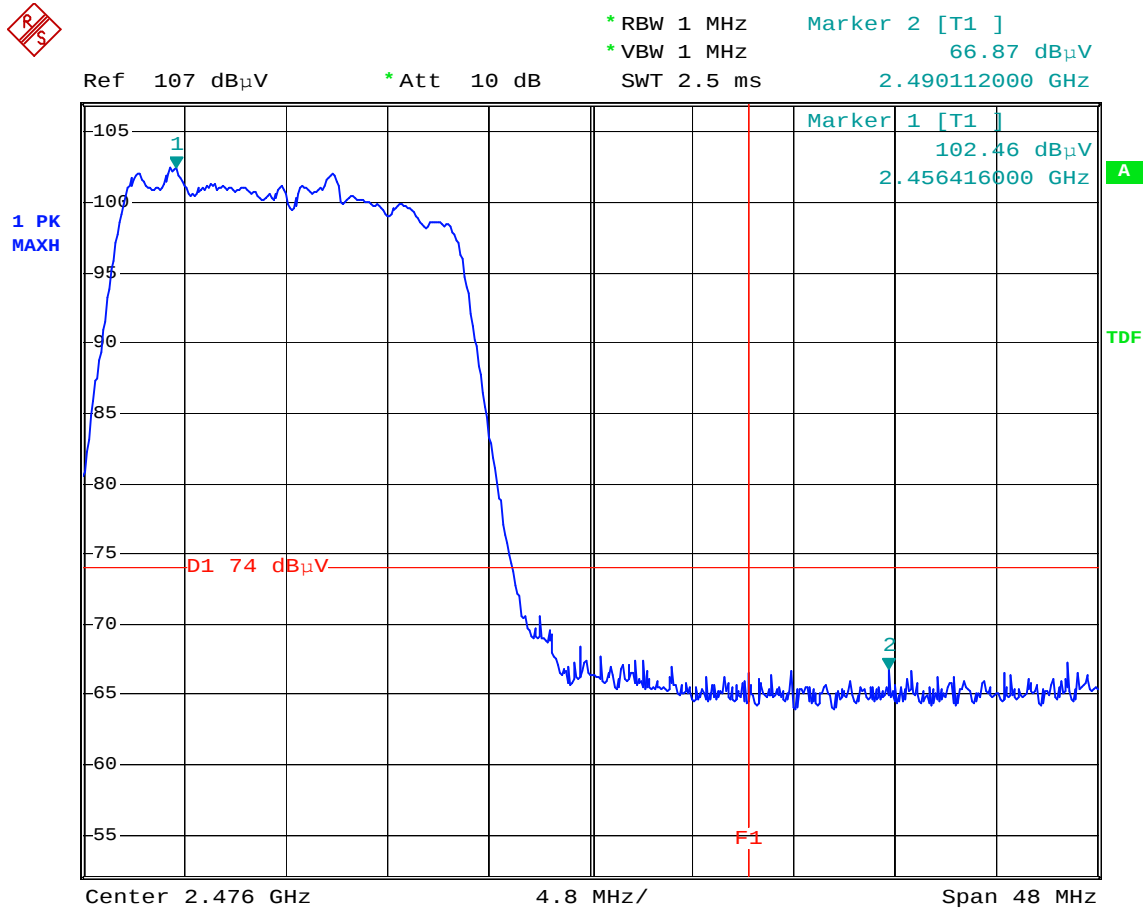
Comment: Band-edge test at low channel
 Comment: Peak detector F2=2390MHz 802.11g
 Date: 3.MAR.2004 09:10:07



Comment: Band-edge test at low channel

Comment: Average detector F2=2390MHz 802.11g

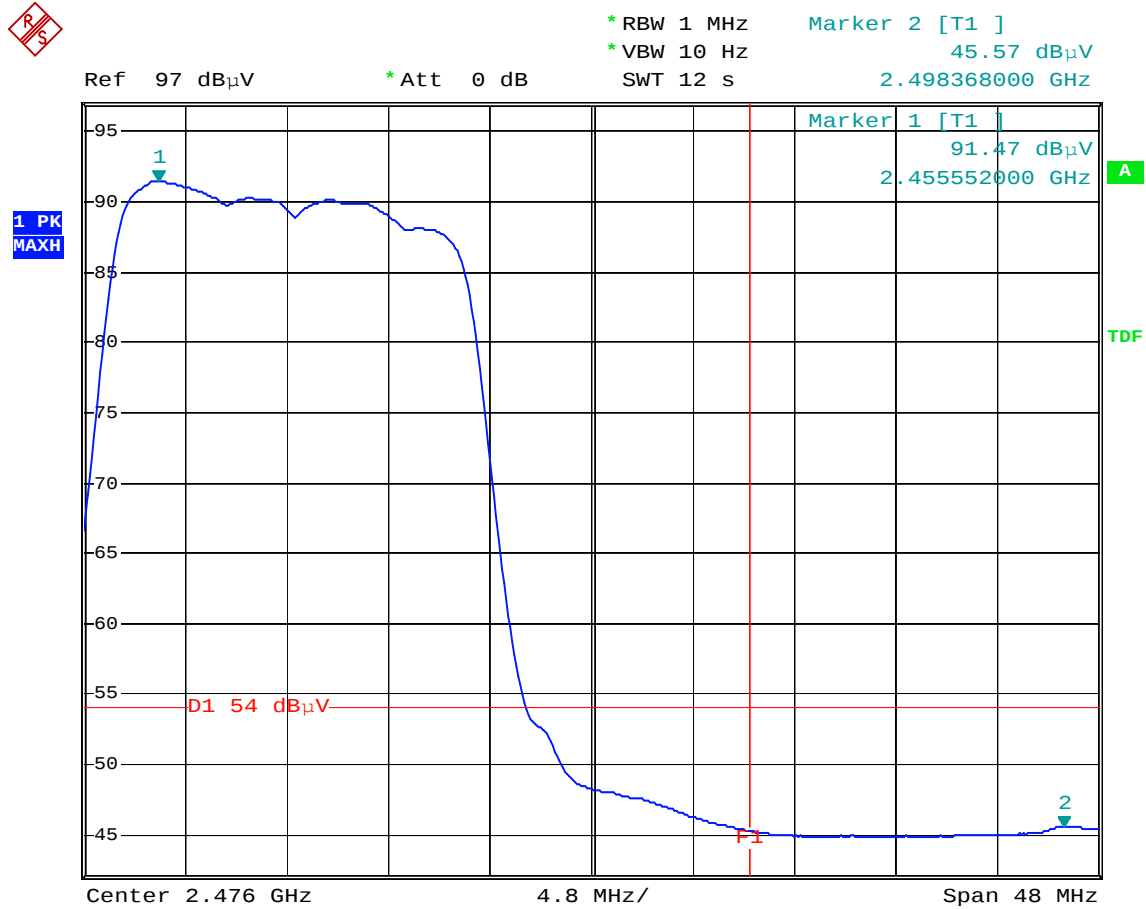
Date: 3.MAR.2004 09:11:31



Comment: Band-edge test at high channel

Comment: Peak detector F1=2483.5MHz 802.11g

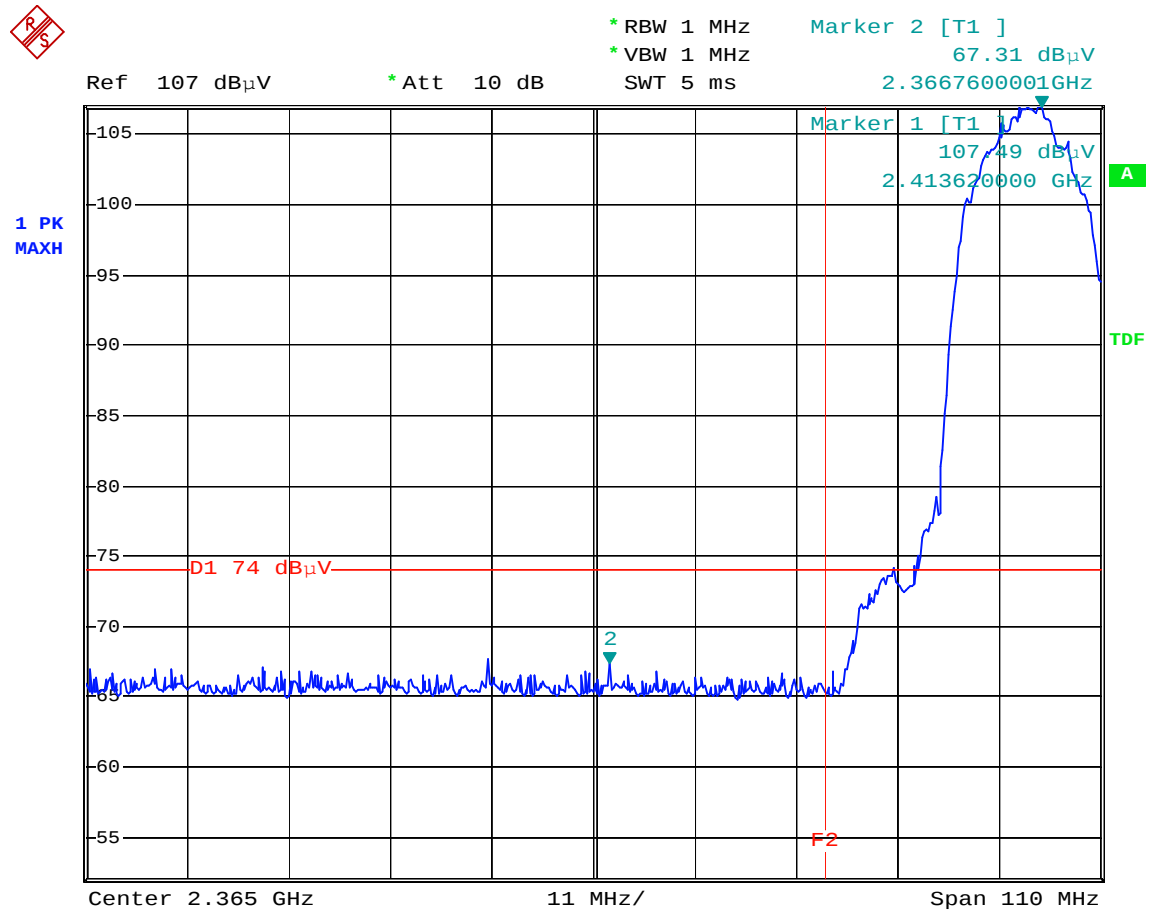
Date: 3.MAR.2004 09:15:02



Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz 802.11g
 Date: 3.MAR.2004 09:16:02

Type 2 antenna

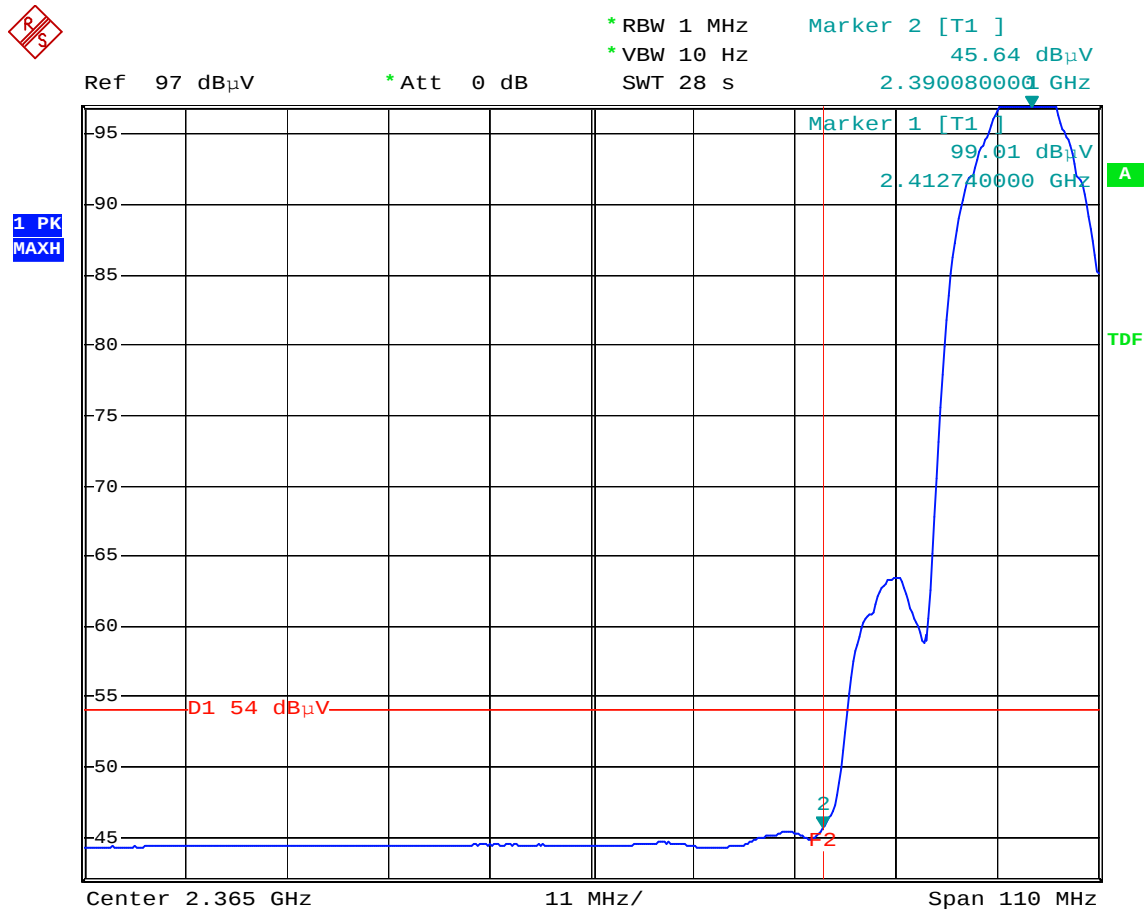
Test Mode: 802.11b (DSSS Modulation)



Comment: Band-edge test at low channel

Comment: Peak detector F2=2390MHz 802.11b

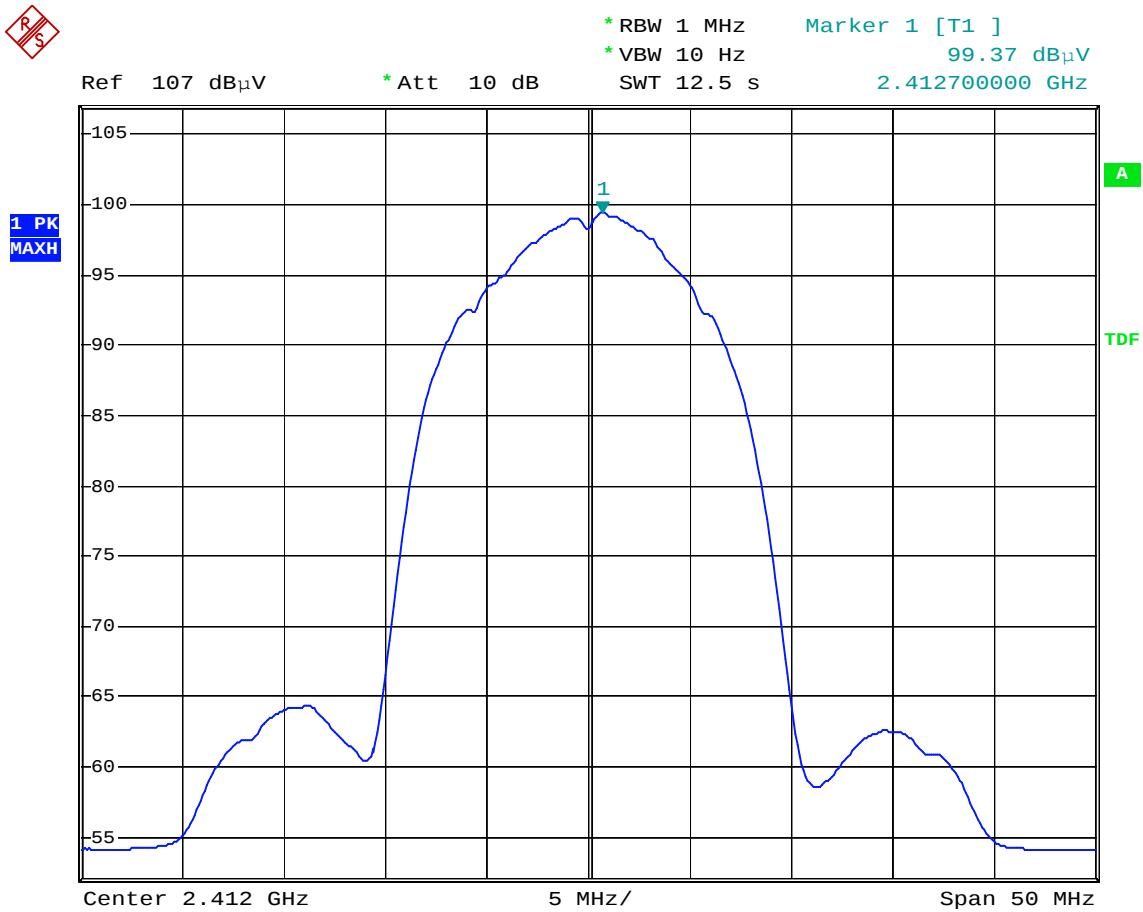
Date: 27.FEB.2004 15:51:53



Comment: Band-edge test at low channel

Comment: Average detector F2=2390MHz

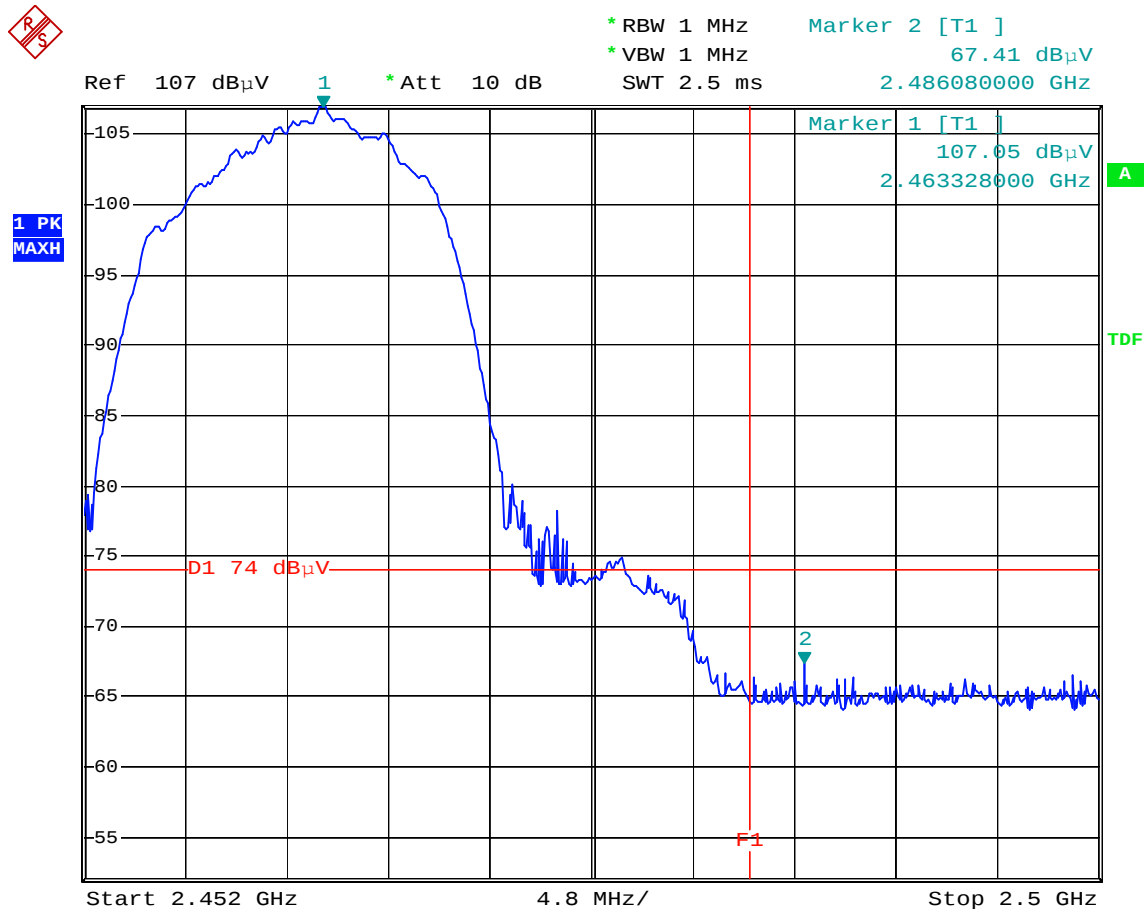
Date: 27.FEB.2004 15:54:24



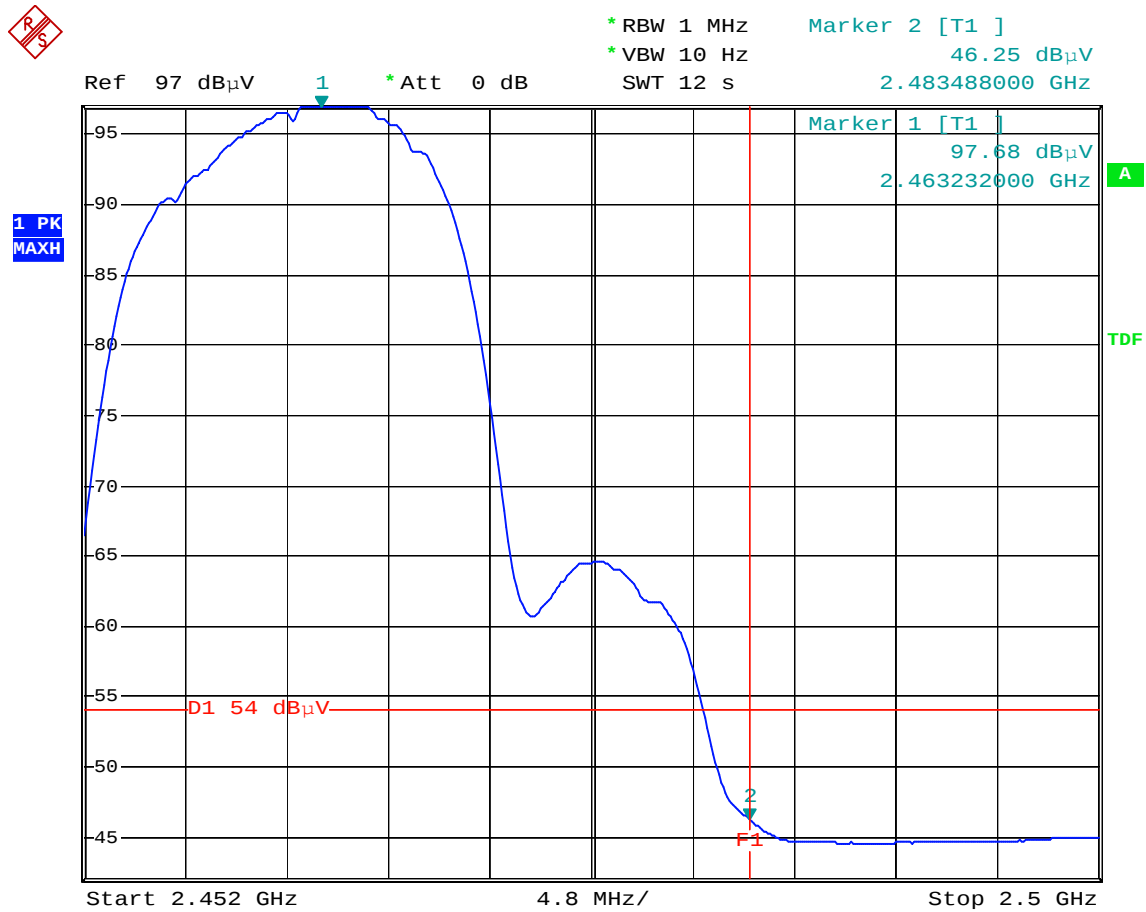
Comment: Band-edge test at low channel

Comment: Average detector F2=2390MHz

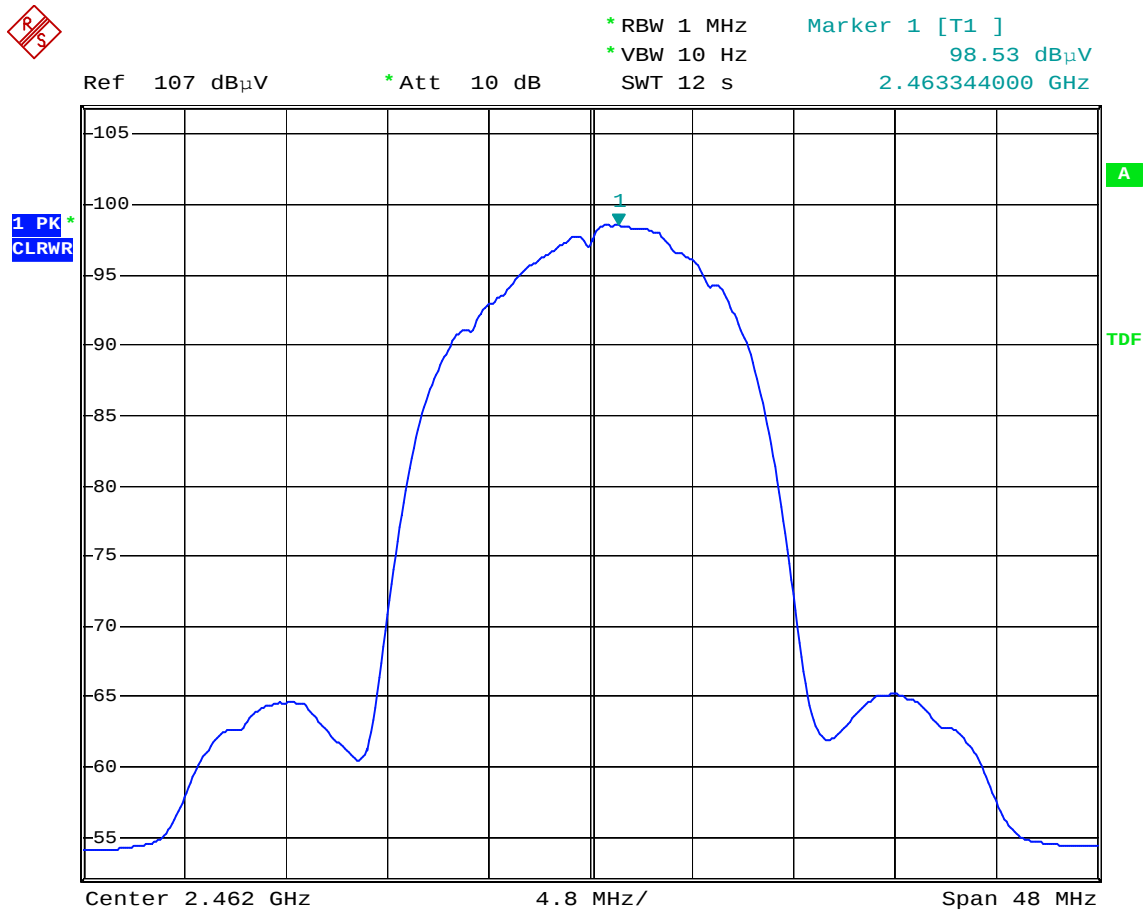
Date: 27.FEB.2004 16:08:36



Comment: Band-edge test at high channel
 Comment: Peak detector F1=2483.5MHz 802.11b
 Date: 27.FEB.2004 15:29:58

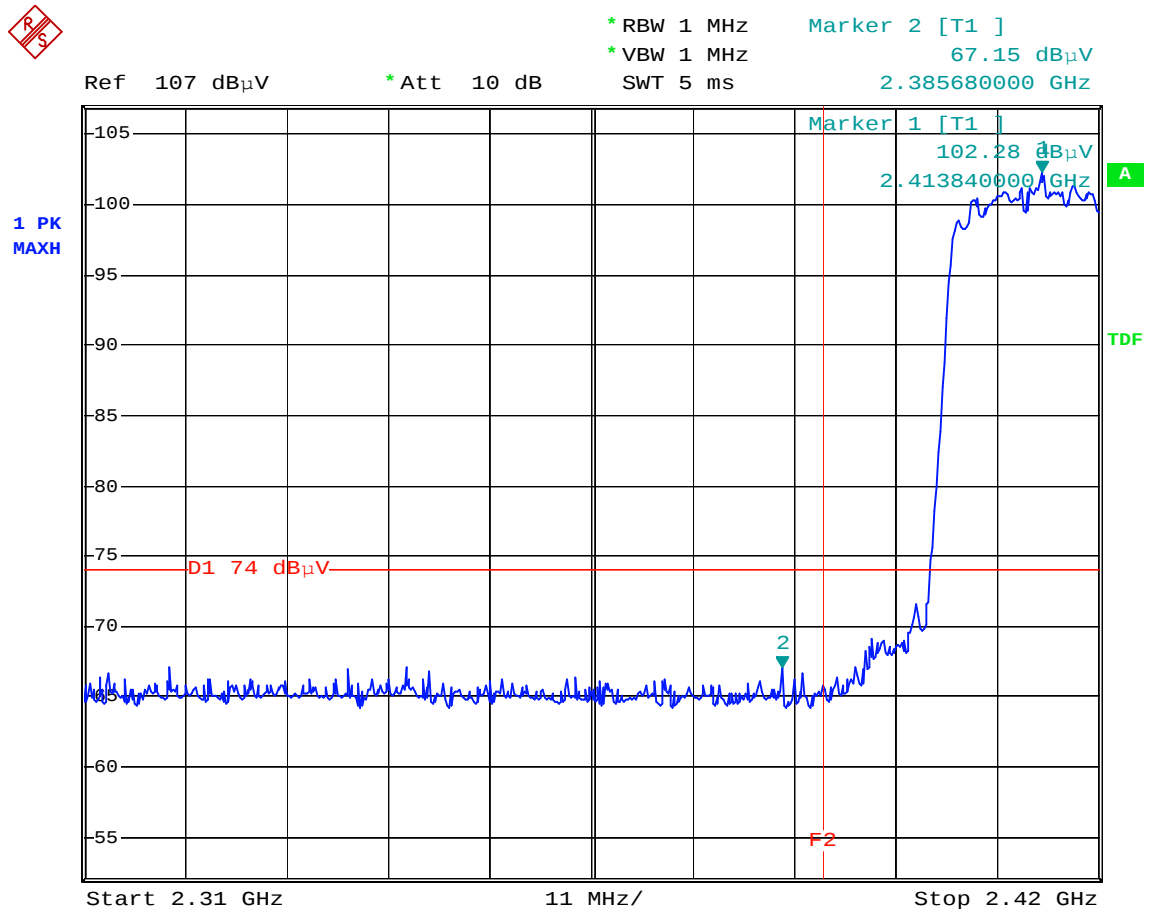


Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz 802.11b
 Date: 27.FEB.2004 15:31:26

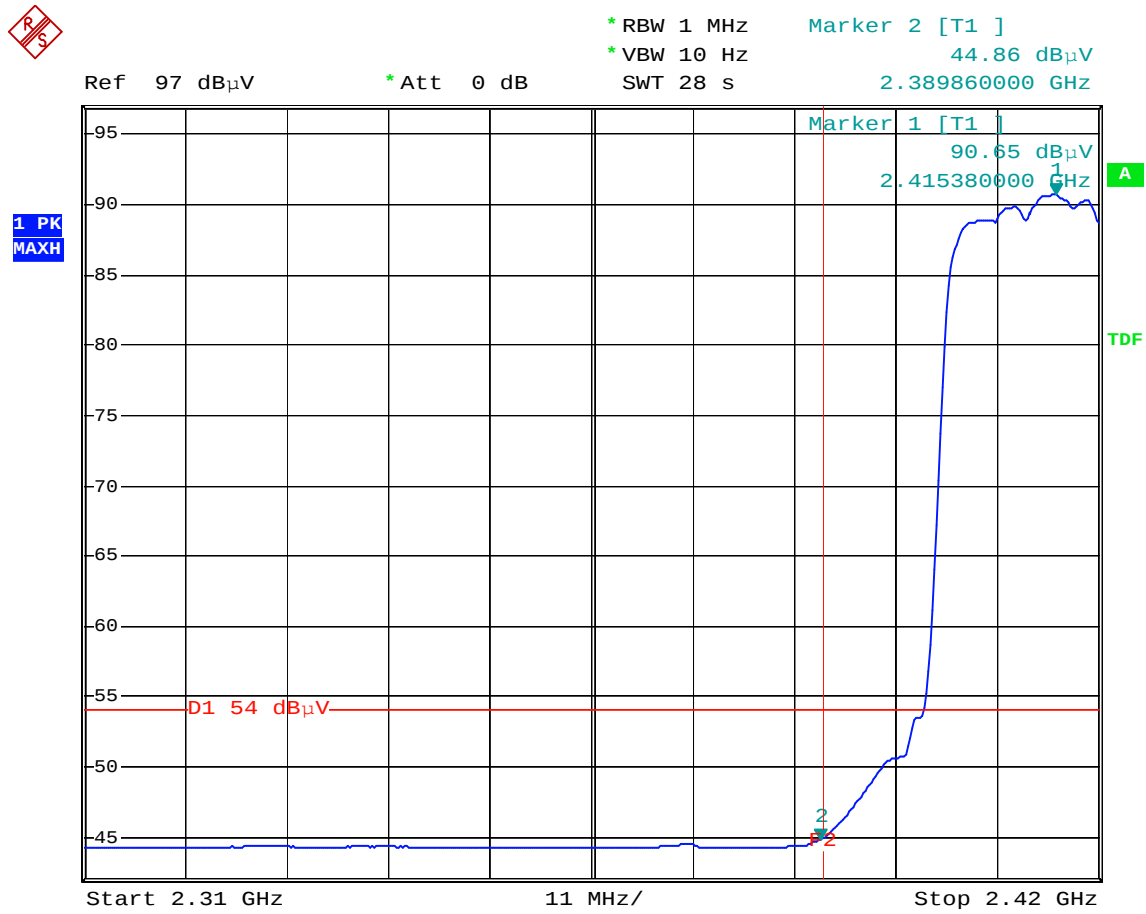


Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz 802.11b
 Date: 27.FEB.2004 15:32:49

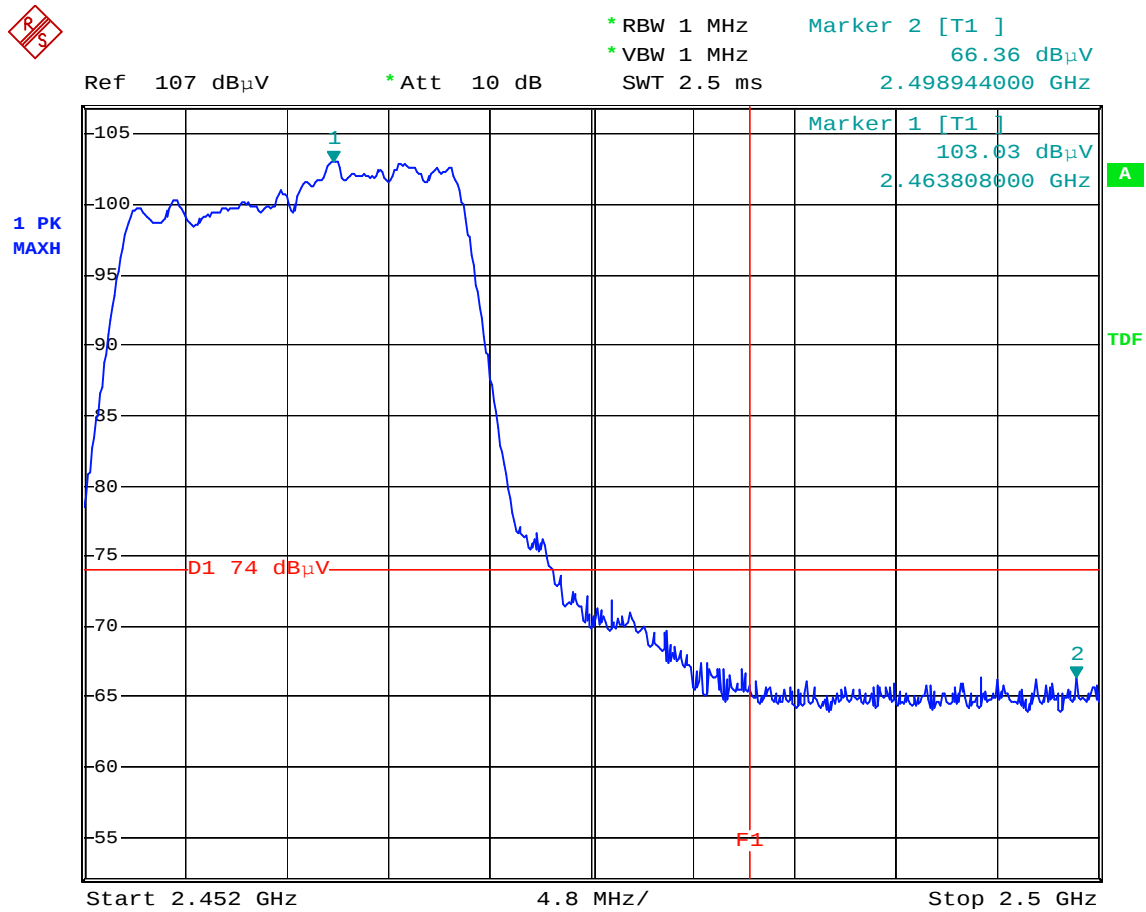
Test Mode: 802.11g (OFDM Modulation)



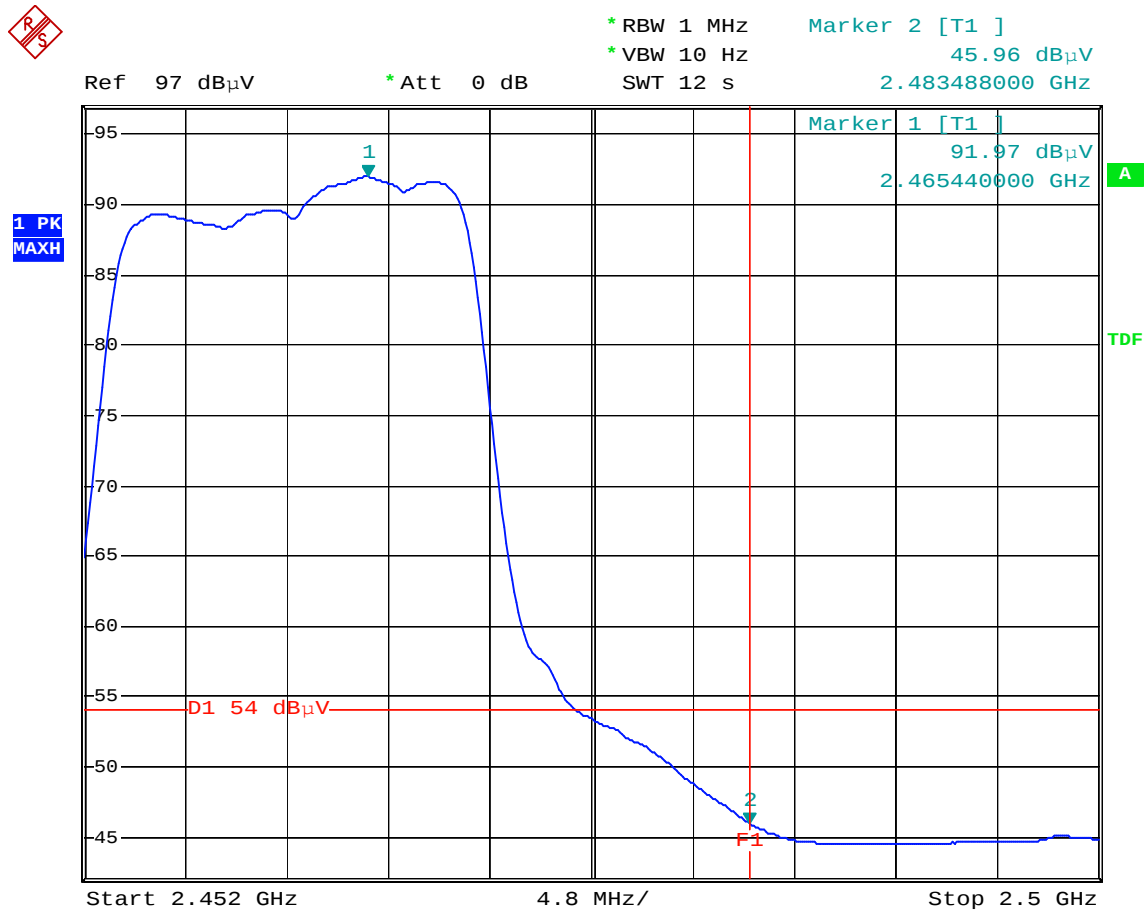
Comment: Band-edge test at low channel
 Comment: Peak detector F2=2390MHz 802.11g
 Date: 27.FEB.2004 16:37:09



Comment: Band-edge test at low channel
 Comment: Average detector F2=2390MHz 802.11g
 Date: 27.FEB.2004 16:39:06



Comment: Band-edge test at high channel
 Comment: Peak detector F1=2483.5MHz 802.11g
 Date: 27.FEB.2004 16:31:53



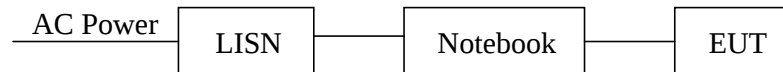
Comment: Band-edge test at high channel
 Comment: Average detector F1=2483.5MHz 802.11g
 Date: 27.FEB.2004 16:31:01

8. Power Line Conducted Emission test §FCC 15.207

8.1 Operating environment

Temperature:	19	°C	(10-40°C)
Relative Humidity:	68	%	(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 invested 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 : S30853-S1016-R107

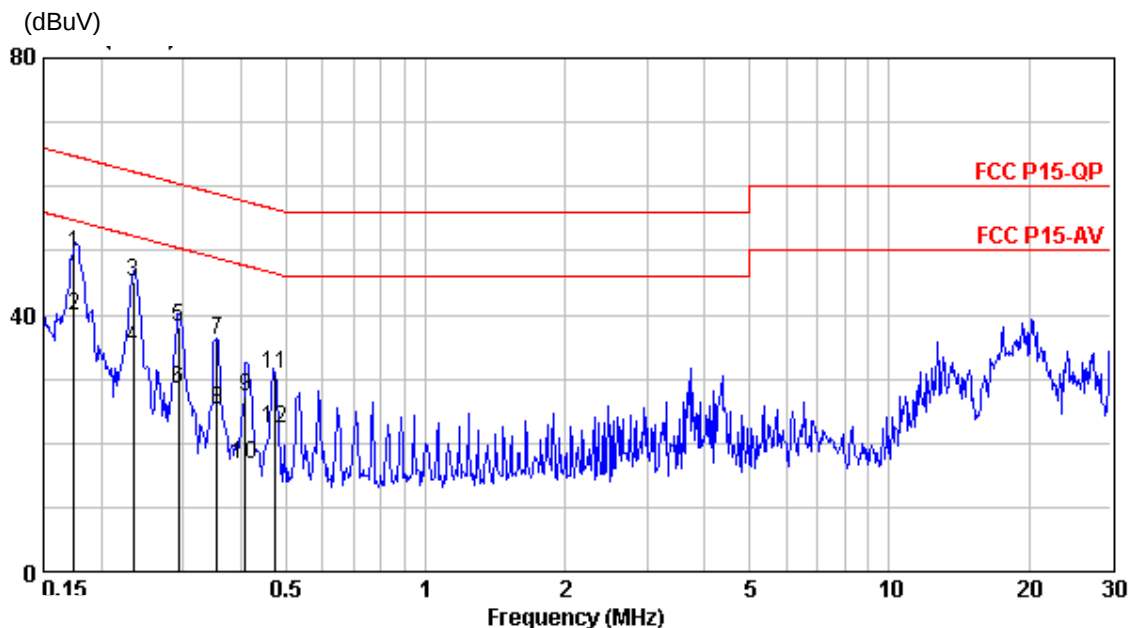
Test Condition : Normal operation mode

Freq. (MHz)	Correction Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.175	0.10	49.46	64.74	-15.28	QP
0.175	0.10	40.00	54.74	-14.74	AVERAGE
0.234	0.10	45.00	62.29	-17.29	QP
0.234	0.10	34.85	52.29	-17.44	AVERAGE
0.293	0.10	37.98	60.44	-22.46	QP
0.293	0.10	28.48	50.44	-21.96	AVERAGE
0.355	0.10	36.17	58.85	-22.68	QP
0.355	0.10	25.14	48.85	-23.71	AVERAGE
0.409	0.10	27.27	57.66	-30.39	QP
0.409	0.10	16.81	47.66	-30.85	AVERAGE
0.473	0.10	30.75	56.47	-25.72	QP
0.473	0.10	22.39	46.47	-24.08	AVERAGE

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) = Level (dBuV) – Limit (dBuV)



(2) Neutral

EUT : S30853-S1016-R107

Test Condition : Normal operation mode

Freq. (MHz)	Correction Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.175	0.10	49.90	64.74	-14.84	QP
0.175	0.10	42.52	54.74	-12.22	AVERAGE
0.234	0.10	45.27	62.29	-17.02	QP
0.234	0.10	37.48	52.29	-14.81	AVERAGE
0.293	0.10	38.54	60.44	-21.90	QP
0.293	0.10	29.54	50.44	-20.90	AVERAGE
0.355	0.10	35.86	58.85	-22.99	QP
0.355	0.10	29.61	48.85	-19.24	AVERAGE
0.409	0.10	29.91	57.66	-27.75	QP
0.409	0.10	22.92	47.66	-24.74	AVERAGE
0.473	0.10	31.54	56.47	-24.93	QP
0.473	0.10	24.73	46.47	-21.74	AVERAGE

Remark:

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

