TEST REPORT

Report Number: 30548021
Project Number: 3054802
April 27, 2004

Testing performed on the

Runic (802.11b/g ADSL Routers)
Model Numbers: 3347WG & 3357WG
FCC ID: GZ53347WG
IC ID: 2525A-3347WG

to
FCC Part 15 Subpart C (15.247)

for
Netopia

A2LA Certificate Number: 1755-01

Test Performed by:	**Test Authorized by:**
Intertek Testing Services	Netopia
1365 Adams Court	46653 Fremont Blvd.
Menlo Park, CA 94025	Fremont, CA 94538 USA

Prepared by: David Chernomordik **Date:** 4/27/04
David Chernomordik, EMC Technical Manager

Reviewed by: **Date:** 4/27/04
Ollie Moyrong, EMC Manager

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1.0 Summary of Tests

FCC ID: GZ53347WG

TEST	REFERENCE	RESULTS
RF output power	15.247(b)	Complies
6 dB Bandwidth	15.247(a)(2)	Complies
Power Density	15.247(d)	Complies
Out of Band Antenna Conducted Emission	15.247(c)	Complies
Out of Band Radiated Emission (except emissions in restricted bands)	15.247(c)	Not performed. The EUT passed out-of-band antenna conducted emission
Radiated Emission in Restricted Bands	15.247(c), 15.209, 15.205	Complies
AC Conducted Emission	15.207	Complies
Radiated Emission from Digital Part and Receiver	15.109	Complies. A separate DOC report is issued
Antenna Requirement	15.203	Complies. Antenna is integral part of the EUT

2.0 General Description

2.1 Product Description

The model 3347WG is an ADSL Annex A Router. It provides the ADSL Wide Area Network Interface, as well as four 10/100BASE-T Ethernet interfaces and an IEEE 802.11b/g wireless interface operating at 2.4 GHz.

The model 3357WG is the same as the model 3347WG, except the ADSL bin usage is adjusted according to ITU G.992.1 Annex B. The PCB, all other components and software remain the same for both models.

Overview of the Equipment under Test:

Applicant	Netopia
Model No.	3347WG and 3357WG
FCC Identifier	GZ53347WG
Use of Product	The 3347W is a ADSL data router which is ITU compliant. It has an integrated 802.11b wireless LAN interface.
Manufacturer & Model of Spread Spectrum Module	Netopia
Type of Transmission	Direct Sequence Spread Spectrum
Rated RF Output	100 mW
Frequency Range	2412 - 2462
Type of modulation	DBPSK, DQPSK, CCK, PBCC, OFDM
Number of Channel(s)	11
Antenna(s) & Gain,	SkyCross SMT-2TO6-M Tri-Band Omni-directional Antenna mounted directly onto the PCB. gain of 3.75dBi. Nearson S131CL-L-RMM-2450S Half Wave Dipole Omni-directional Antenna, with a right angle male MMCX connector. gain of 2dBi.
Antenna Requirement	The EUT does not have an external antenna connector
Manufacturer Name & Address	Netopia, 46653 Fremont Blvd. Fremont, CA 94538 USA

EUT receive date: February 25, 2004

EUT receive condition: The EUT was received in good condition with no apparent damage.

Test start date: February 26, 2004

Test completion date: April 27, 2004

The test results in this report pertain only to the item tested.

2.2 Related Submittal(s) Grants

Declaration of Conformity (DoC) for FCC Part 15 Subpart B

2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

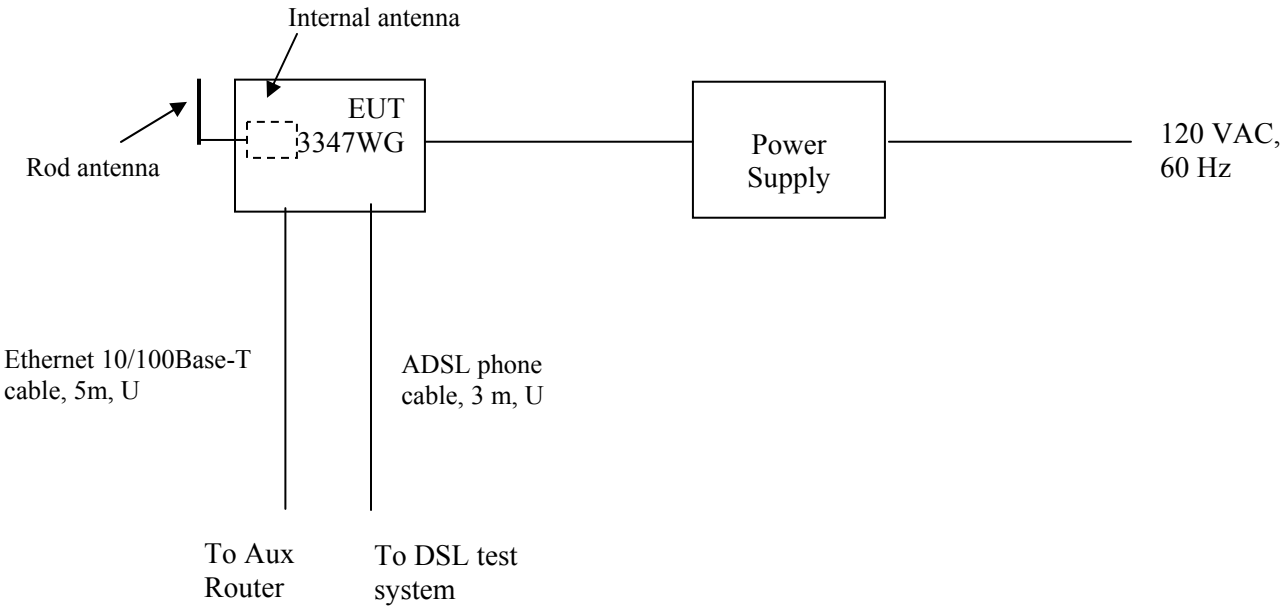
The open area test site and conducted measurement facility used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.

3.0 System Test Configuration

3.1 Support Equipment

Item #	Description	Model No.	Serial No.
1	Netopia R-Series Ethernet router	Not Labeled	Not Labeled
2	Dell Laptop Computer	Latitude 475MC	95000894
3	DSL Test System	Veritas 2000	Not Labeled

3.2 Block Diagram of Test Setup



Power Supply: model: DSA-0151D-12, p/n: DTS120150U-P5

S = Shielded **U** = Unshielded	**F** = With Ferrite **m** = Length in Meters

3.3 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible).

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

3.5 Mode of Operation During Test

During testing, the transmitter was setup to transmit continuously at maximum RF power on low, middle and high channels with five types of modulation: DBPSK, DQPSK, CCK, PBCC, OFDM. The transmitter was controlled by the Laptop, which was disconnected after setup. Care was taken to ensure proper power supply voltages during testing.

3.6 Modifications Required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by Netopia prior to compliance testing)

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusions from the standard were made.

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals,
FCC Rule 15.247(b)

Requirement

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm).
For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6) dBm.

Procedure

The antenna port of the EUT was connected to the input of a peak power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

Test Result

Frequency (MHz)	Modulation	Output in mWatt
2412 (channel 1)	DBPSK	84.9
	DQPSK	85.1
	CCK	84.9
	PBCC	98.3
	OFDM	82.1
2437 (channel 6)	DBPSK	75.9
	DQPSK	76.7
	CCK	76.5
	PBCC	87.8
	OFDM	76.7
2462 (channel 11)	DBPSK	67.5
	DQPSK	69.0
	CCK	68.7
	PBCC	79.2
	OFDM	67.3

4.2 6 dB RF Bandwidth,
FCC Rule 15.247(a)(2)

Requirement

The minimum 6-dB bandwidth shall be at least 500 kHz

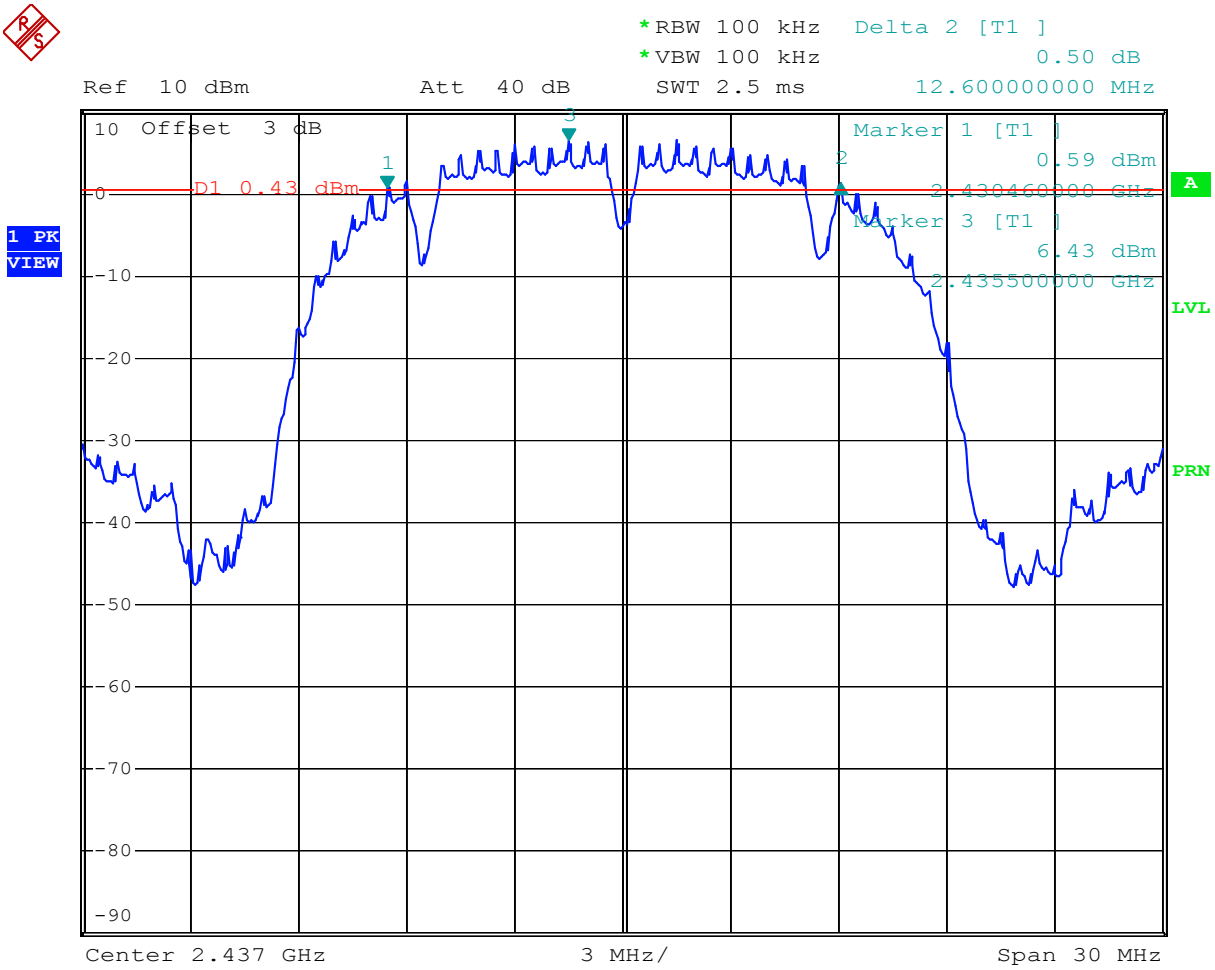
Procedure

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6-dB bandwidth was determined from where the channel output spectrum intersected the display line.

Test Result

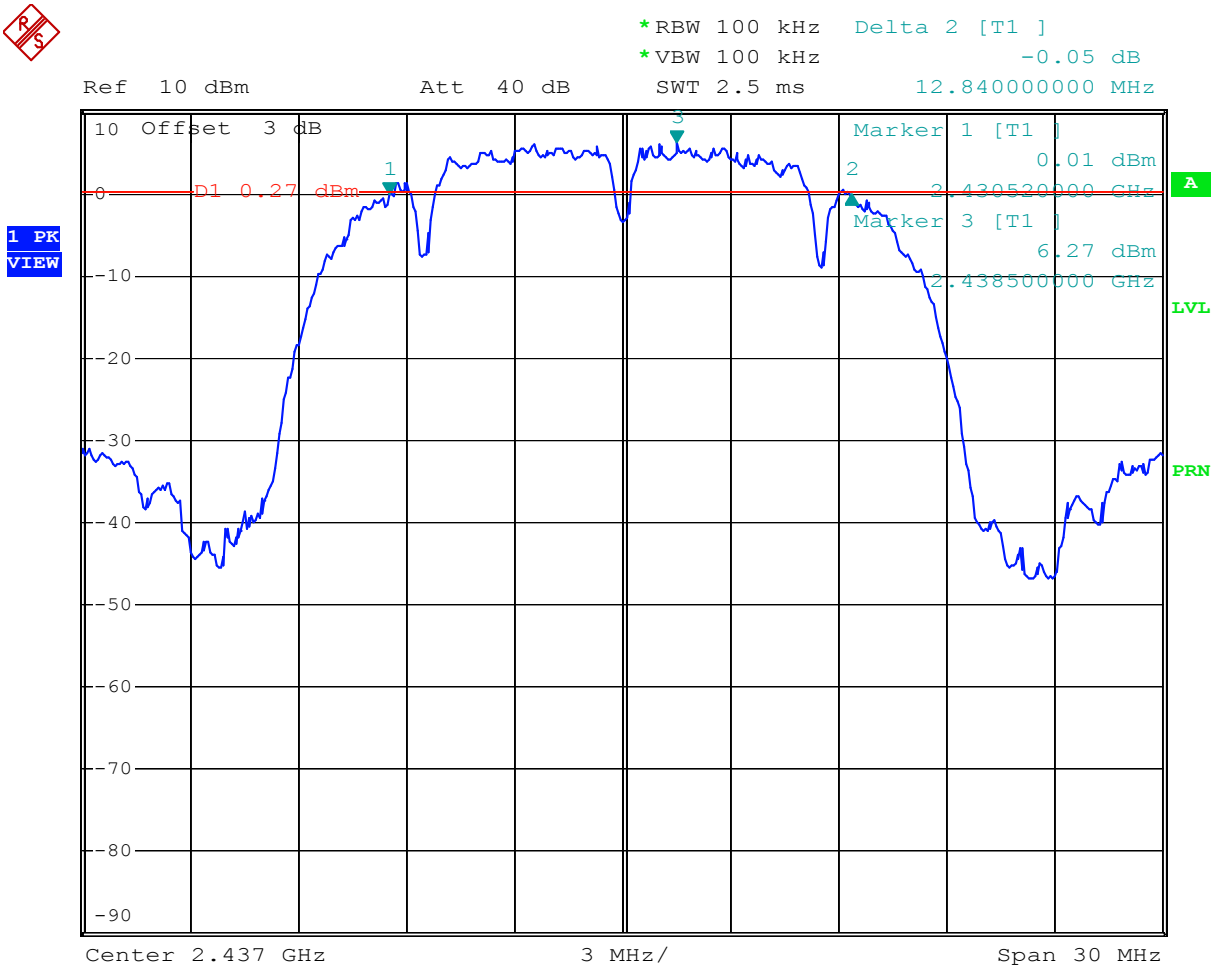
Frequency (MHz)	Modulation	6 dB Bandwidth (MHz)	Plot
2437	DBPSK	12.6	2.1
	DQPSK	12.8	2.2
	CCK	12.5	2.3
	PBCC	13.1	2.4
	OFDM	16.6	2.5
2412	PBCC	12.7	2.6
	OFDM	16.6	2.7
2462	PBCC	12.4	2.8
	OFDM	16.5	2.9

Plot 2.1



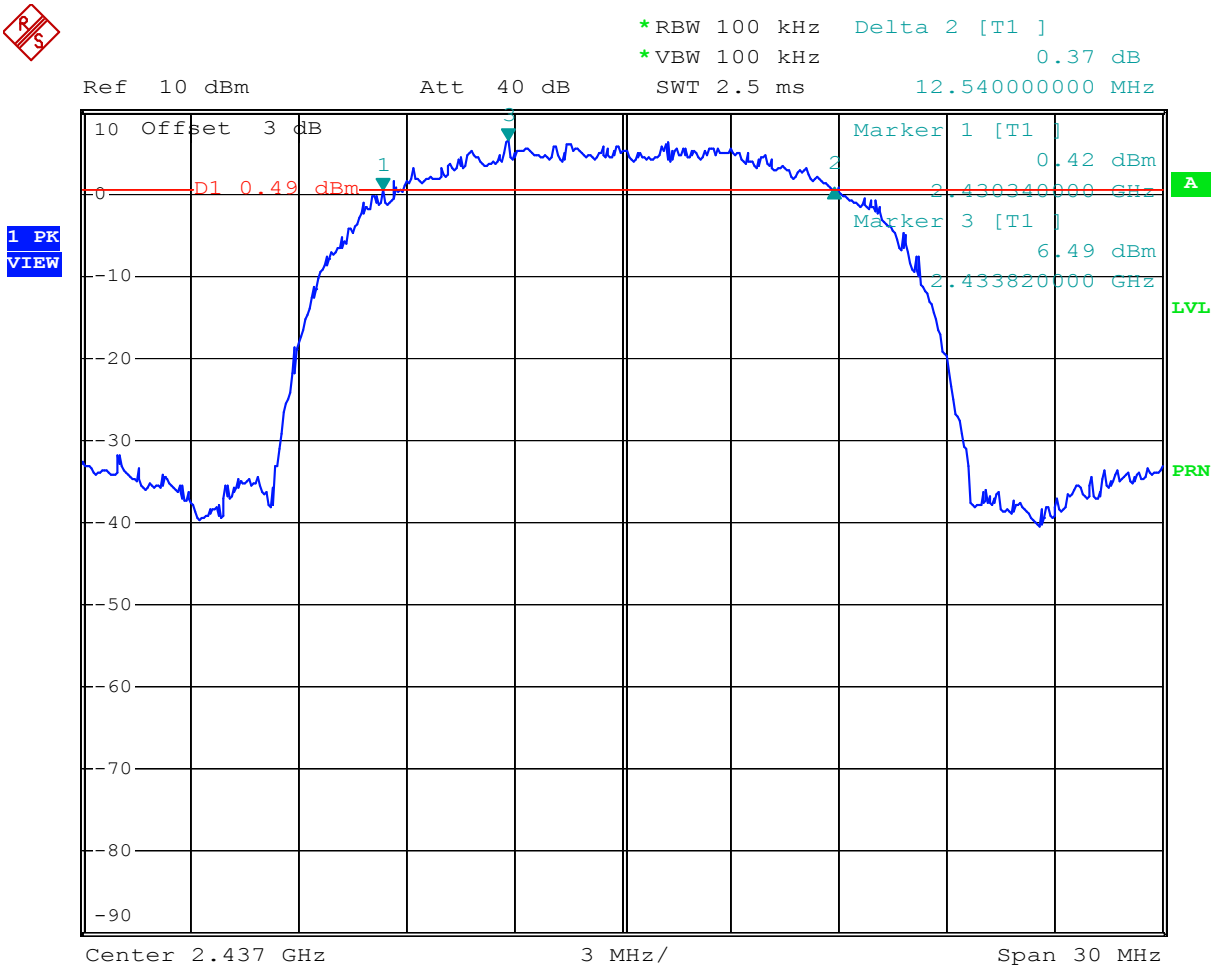
Comment: Channel 6, 6-dB Bandwidth, DBPSK mod.
Date: 24.APR.2004 04:52:06

Plot 2.2



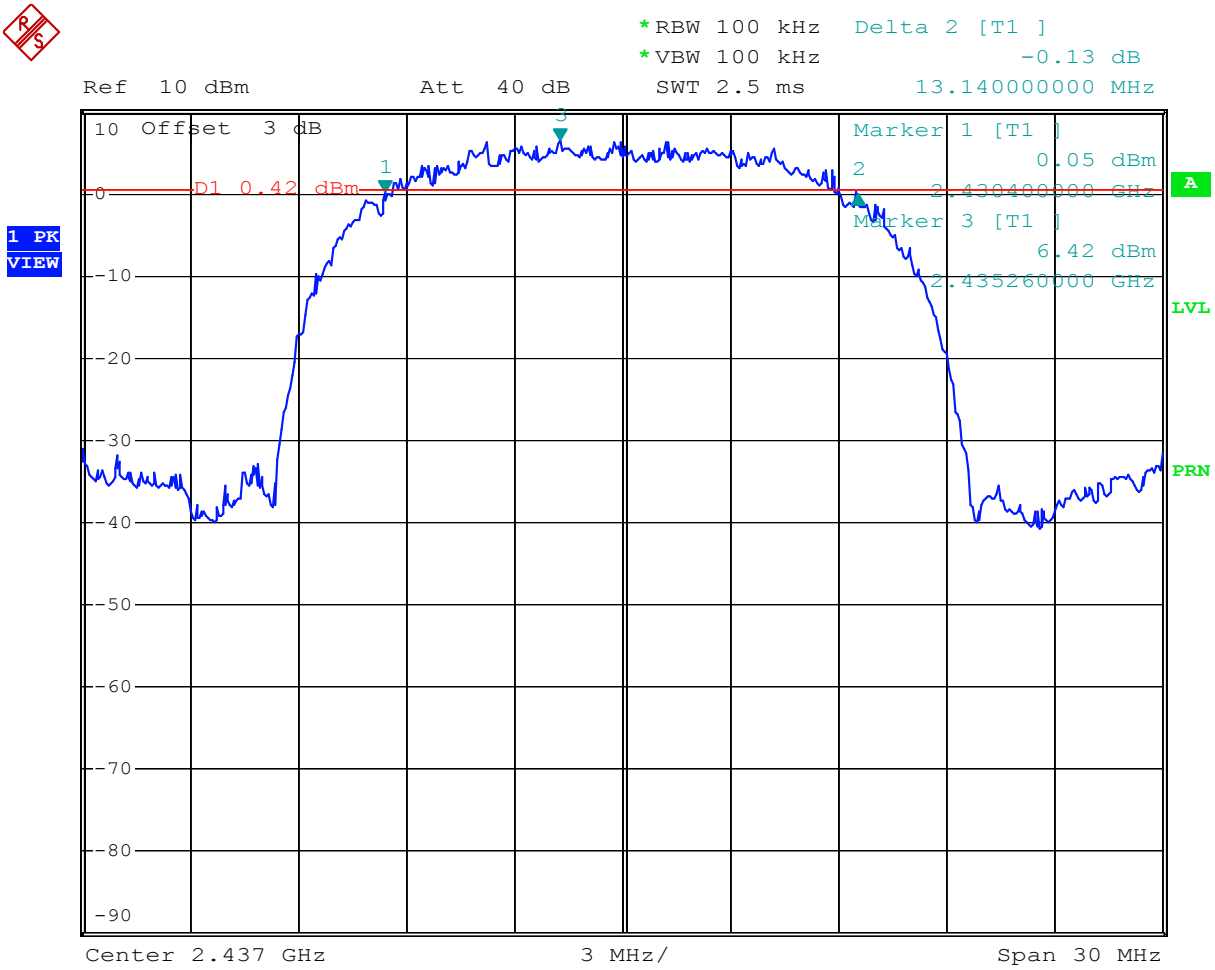
Comment: Channel 6, 6-dB Bandwidth, DQPSK mod.
Date: 24.APR.2004 04:57:35

Plot 2.3



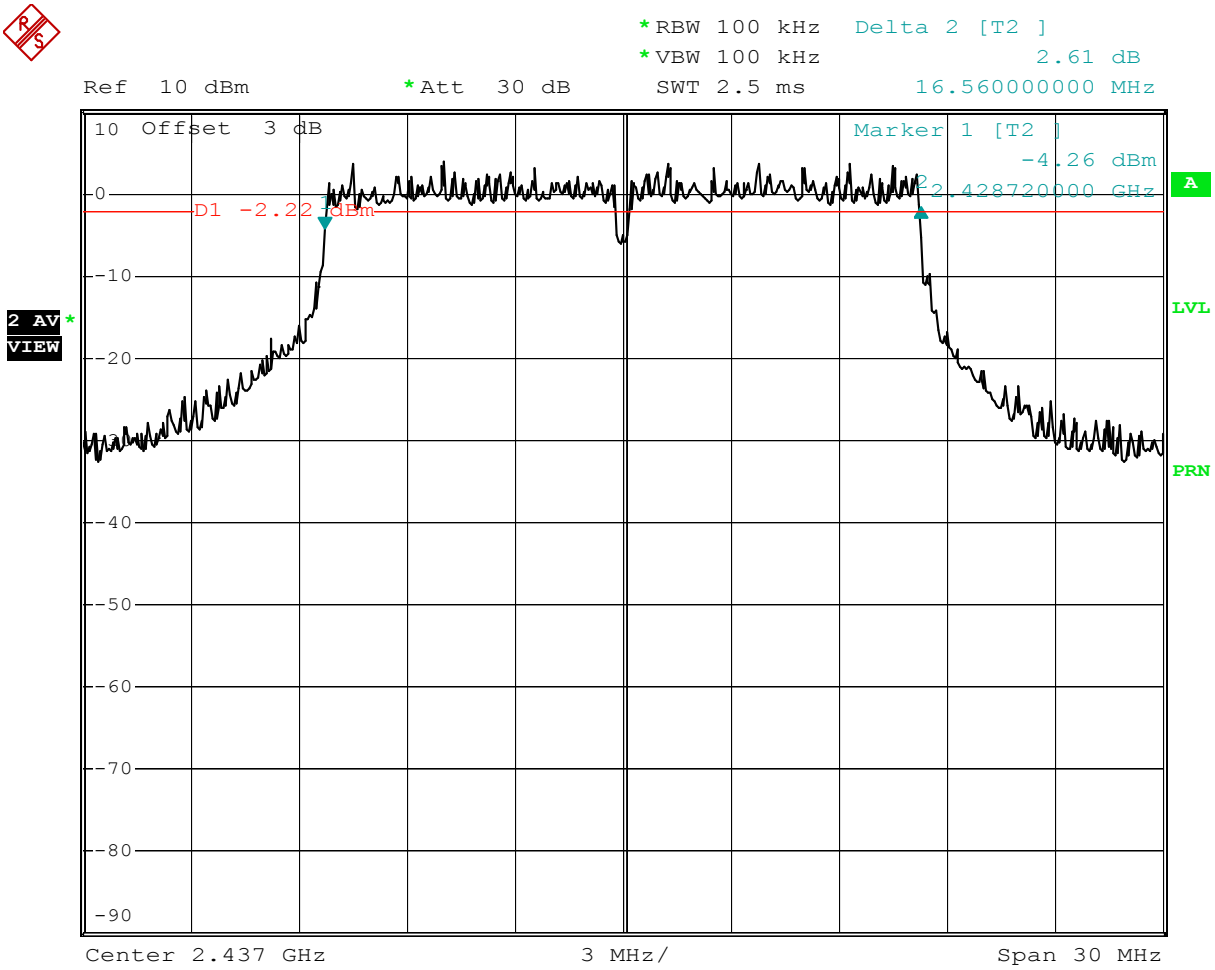
Comment: Channel 6, 6-dB Bandwidth, CCK mod.
Date: 24.APR.2004 05:01:52

Plot 2.4



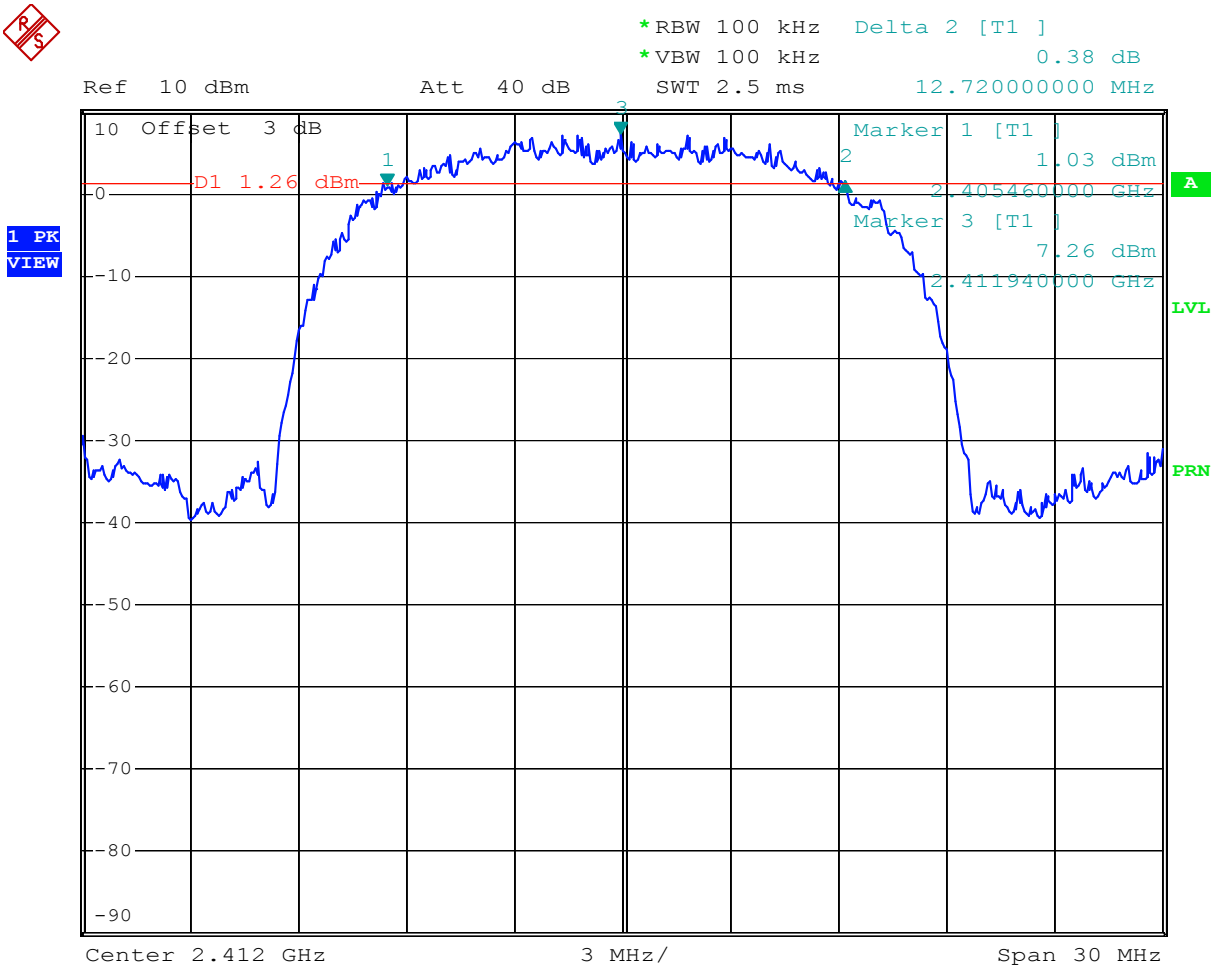
Comment: Channel 6, 6-dB Bandwidth, PBCC mod.
Date: 24.APR.2004 05:15:36

Plot 2.5



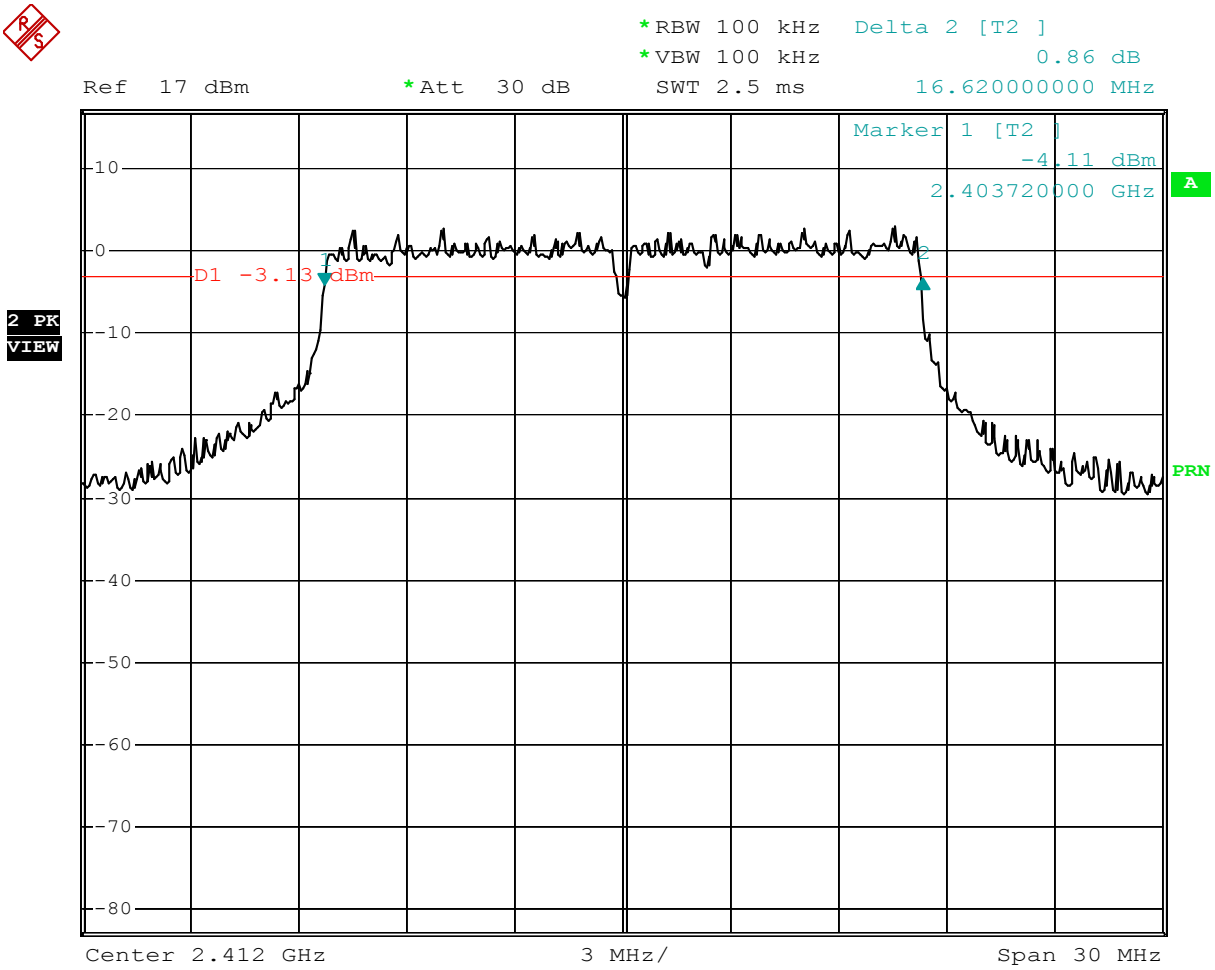
Comment: Channel 6, 6-dBbandwidth, OFDM mod.
Date: 28.APR.2004 01:05:44

Plot 2.6



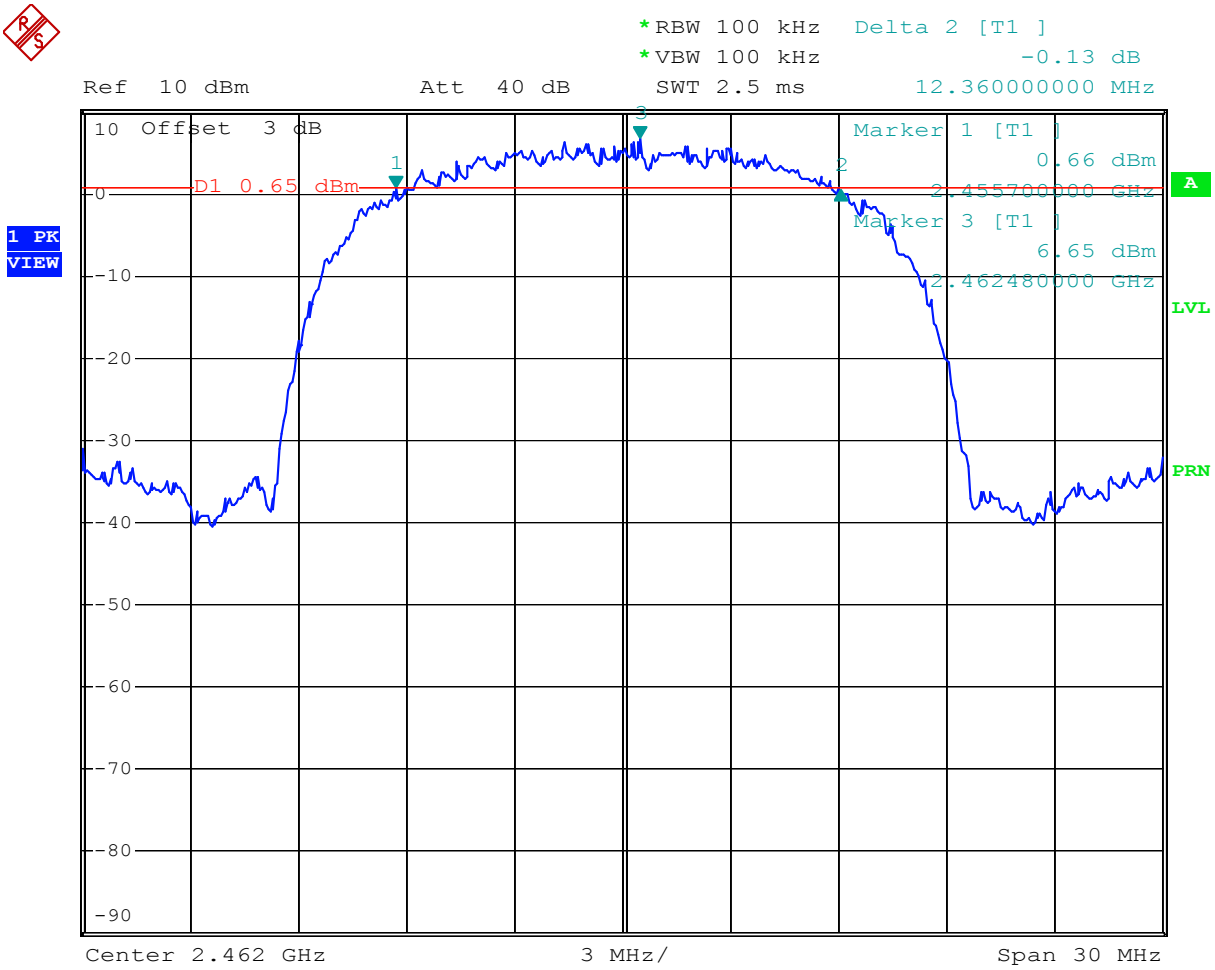
Comment: Channel 1, 6-dB Bandwidth, PBCC mod.
Date: 24.APR.2004 05:21:22

Plot 2.7



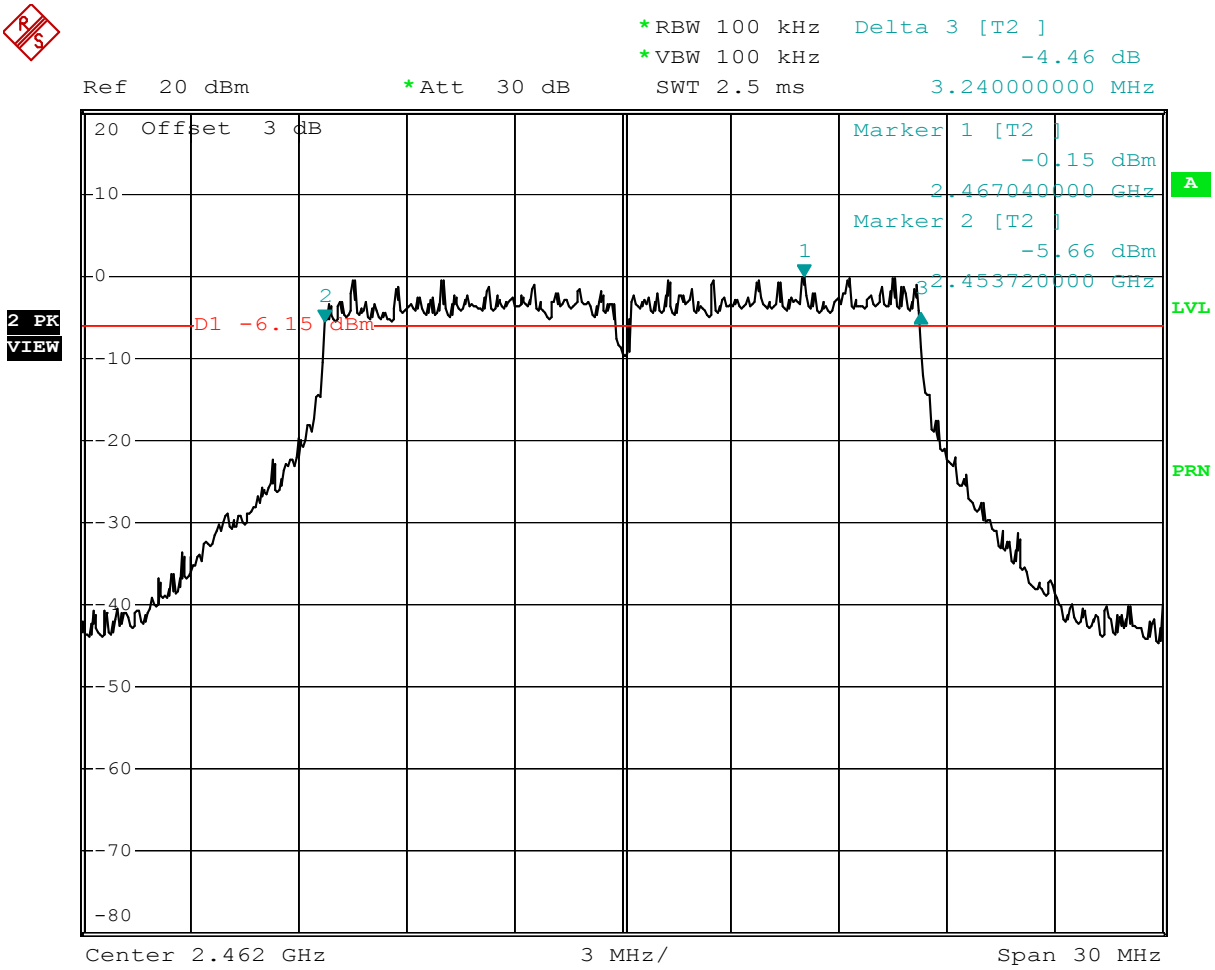
Comment: Channel 1, 6-dB bandwidth, OFDM mod.
Date: 27.APR.2004 19:26:34

Plot 2.8



Comment: Channel 11, 6-dB Bandwidth, PBCC mod.
Date: 24.APR.2004 05:25:26

Plot 2.9



Comment: Channel 11, 6-dB bandwidth, OFDM mod.
Date: 27.APR.2004 03:29:04

4.3 Power Density
FCC Rule 15.247(d)

Requirement

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Procedure

The spectrum analyzer RES BW was set to 3 kHz. The START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs. Total SWEEP TIME is calculated as follows:

SWEEP TIME (SEC) = (Fstop, kHz - Fstart, kHz)/3 kHz

Frequency Span= 1200 kHz

Sweep Time = Frequency Span/3 kHz = 400 seconds

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable is used, those losses are compensated for with the analyzer OFFSET function.

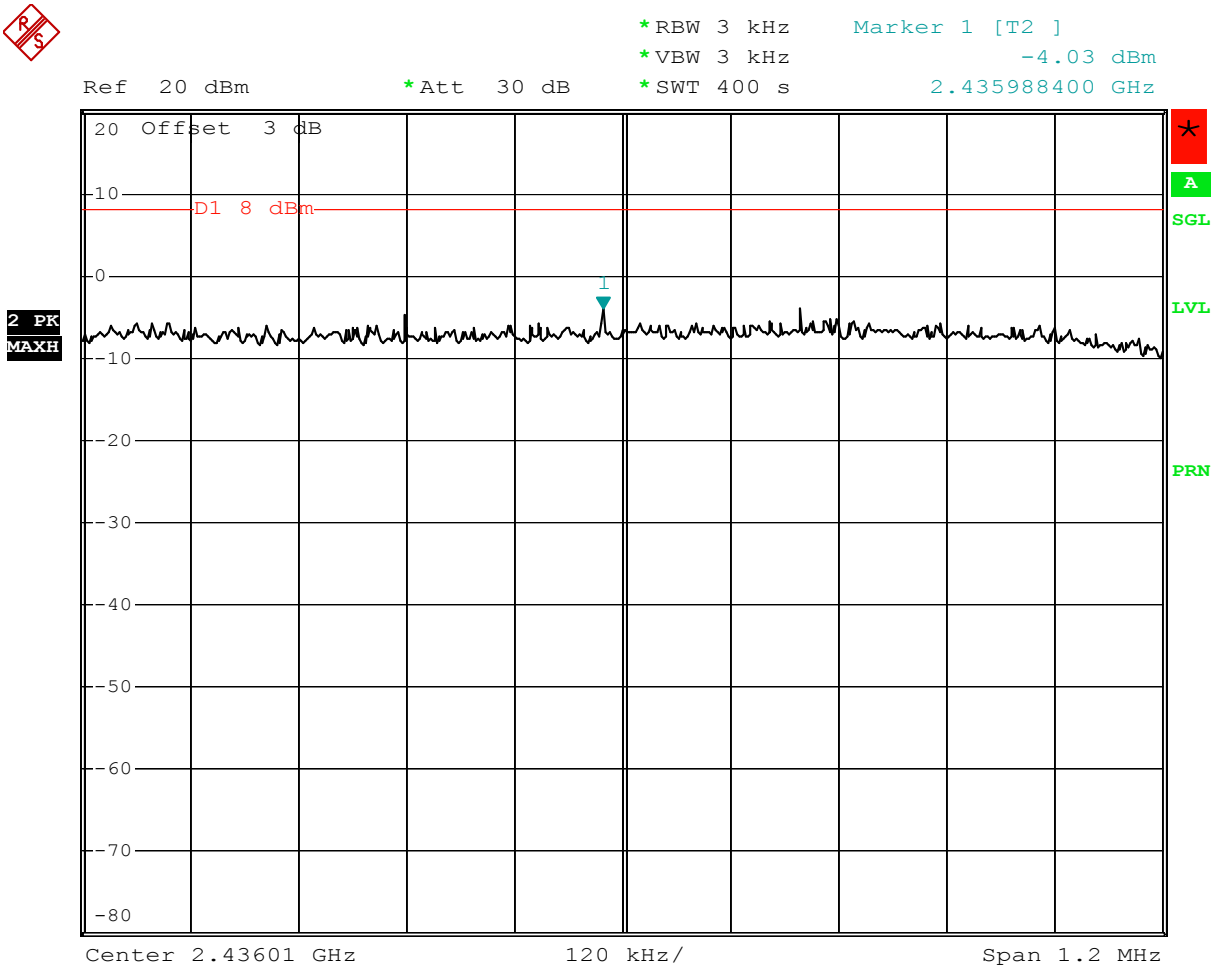
Test Result

Refer to the table below and plots.

Frequency (MHz)	Modulation	Power Density (dBm)	Plot
2437	DBPSK	-4.0	3.1
	DQPSK	-5.3	3.2
	CCK	-5.4	3.3
	PBCC	-2.1	3.4
	OFDM	-9.4	3.5
2412	PBCC	-1.6	3.6
	OFDM	-8.3	3.7
2462	PBCC	-2.7	3.8
	OFDM	-8.2	3.9

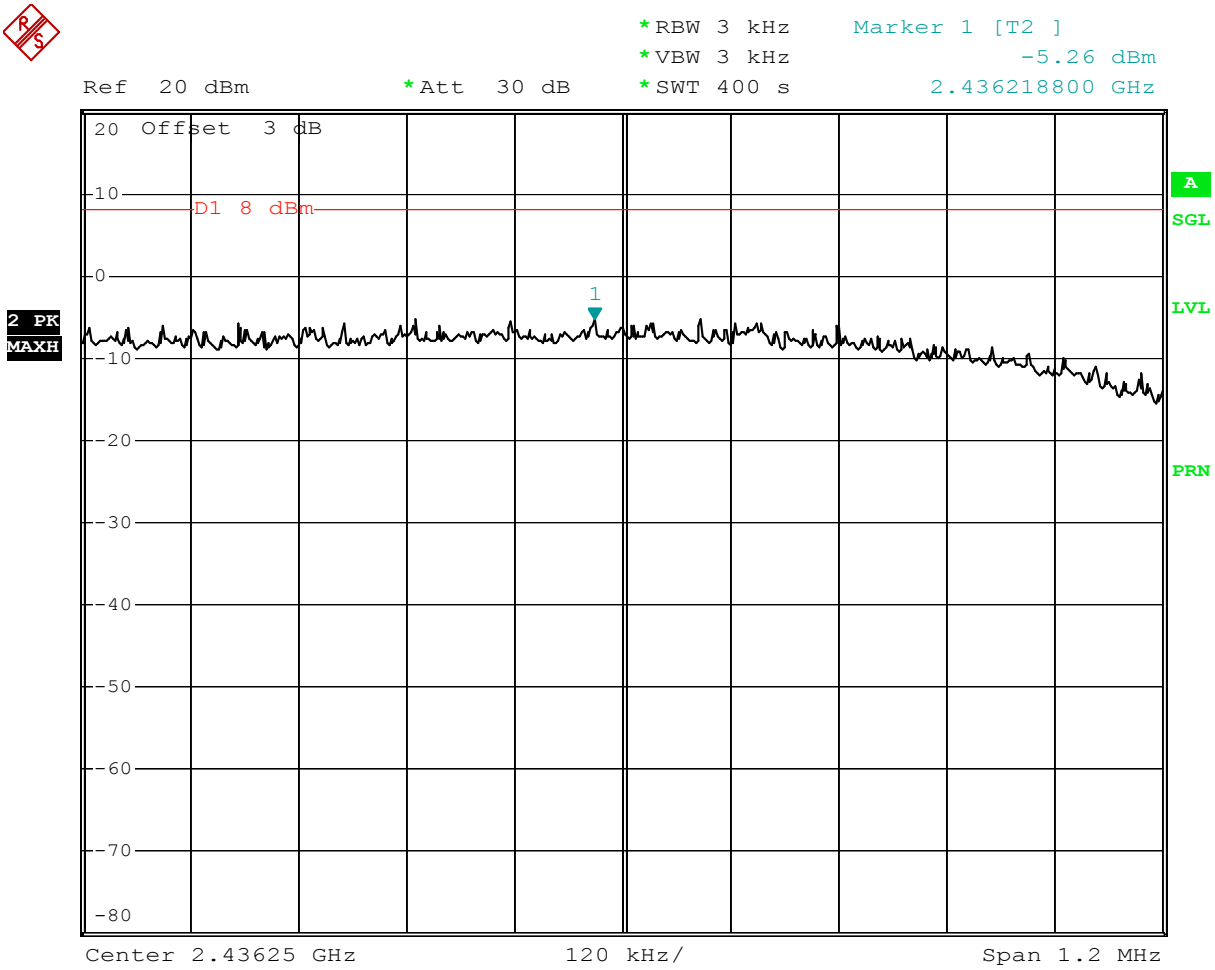
The EUT passed by 10.1 dB

Plot 3.1



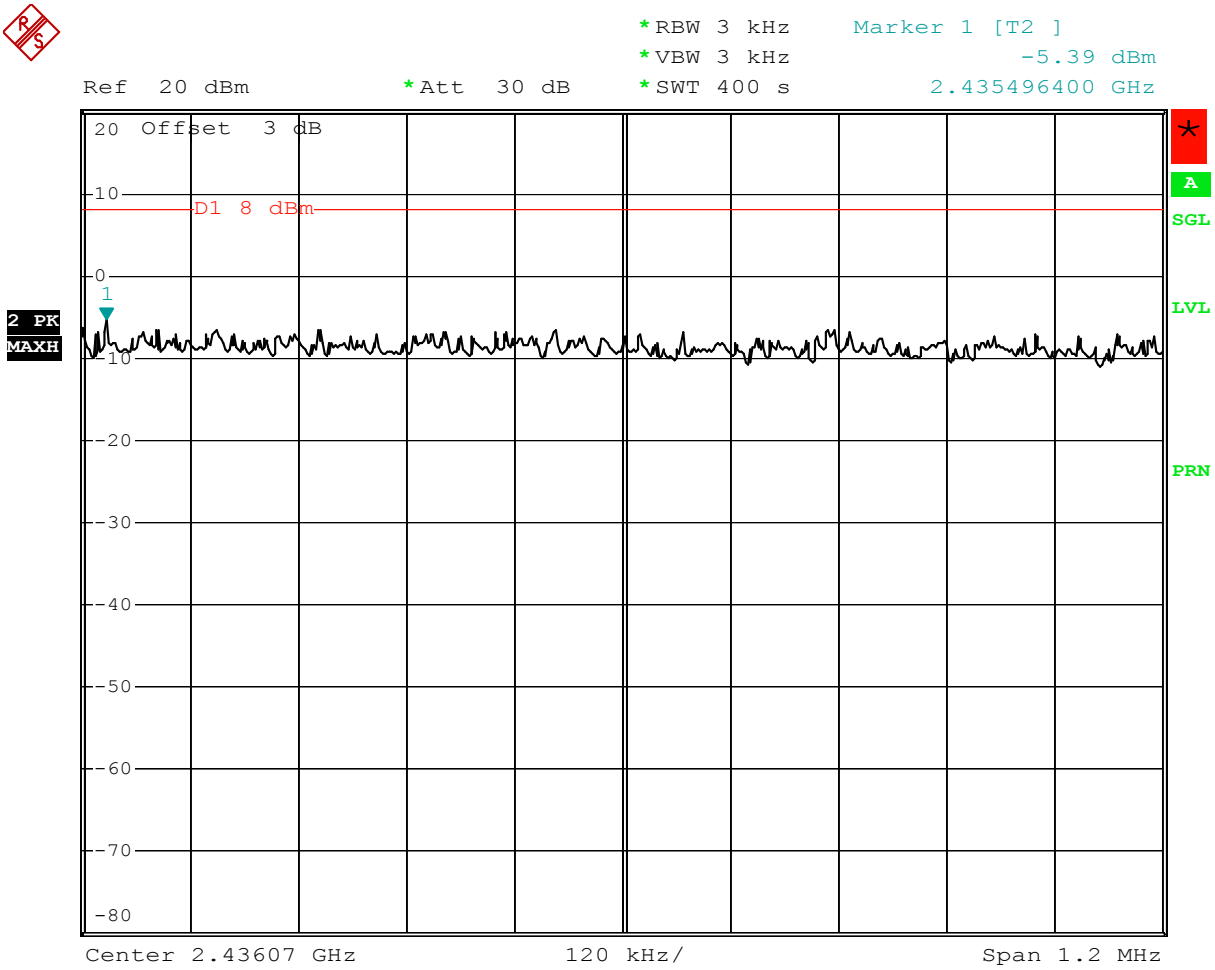
Comment: Channel 6, Power Density, DBPSK mod.
Date: 26.APR.2004 20:07:21

Plot 3.2



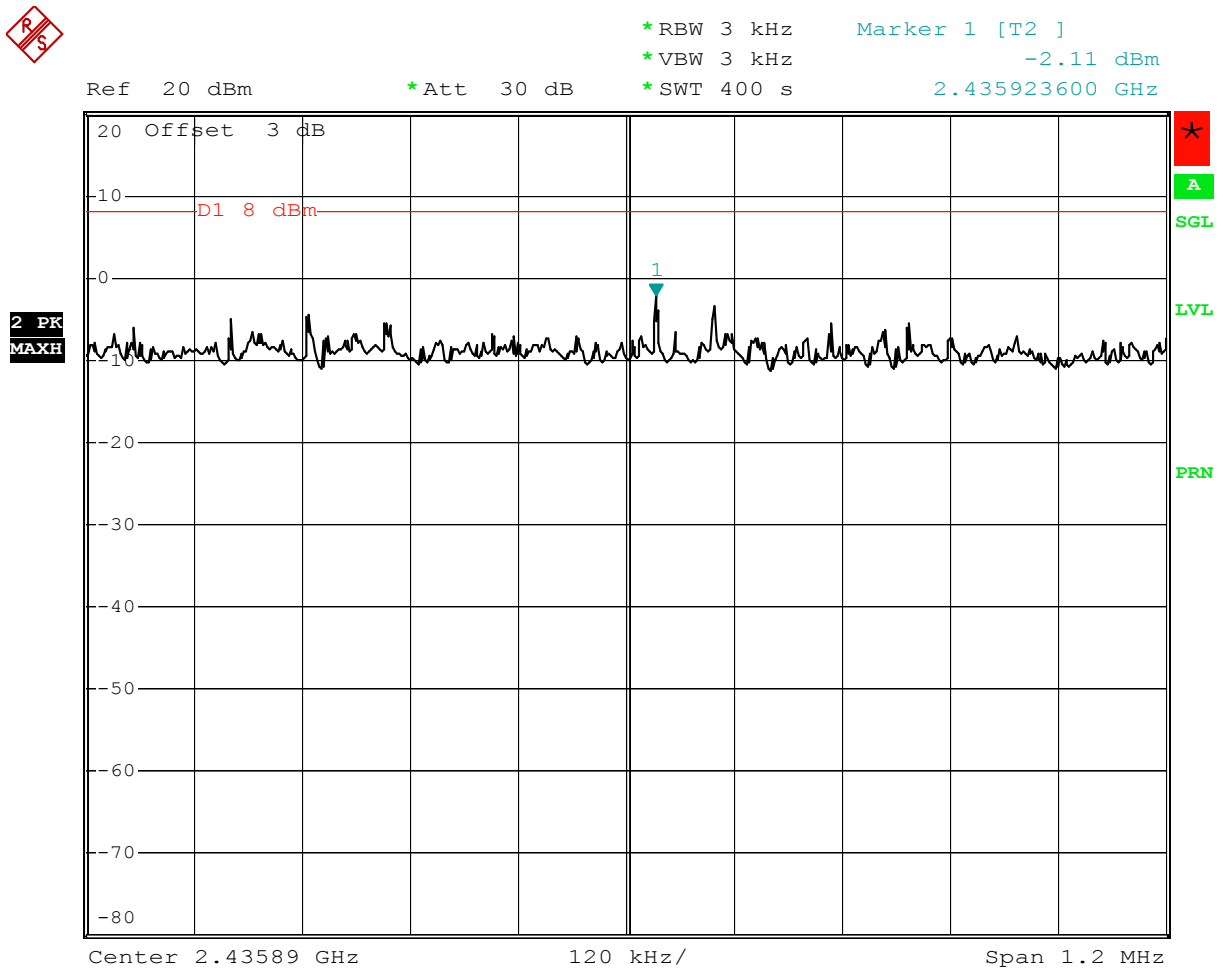
Comment: Channel 6, Power Density, DQPSK mod.
Date: 26.APR.2004 20:20:54

Plot 3.3



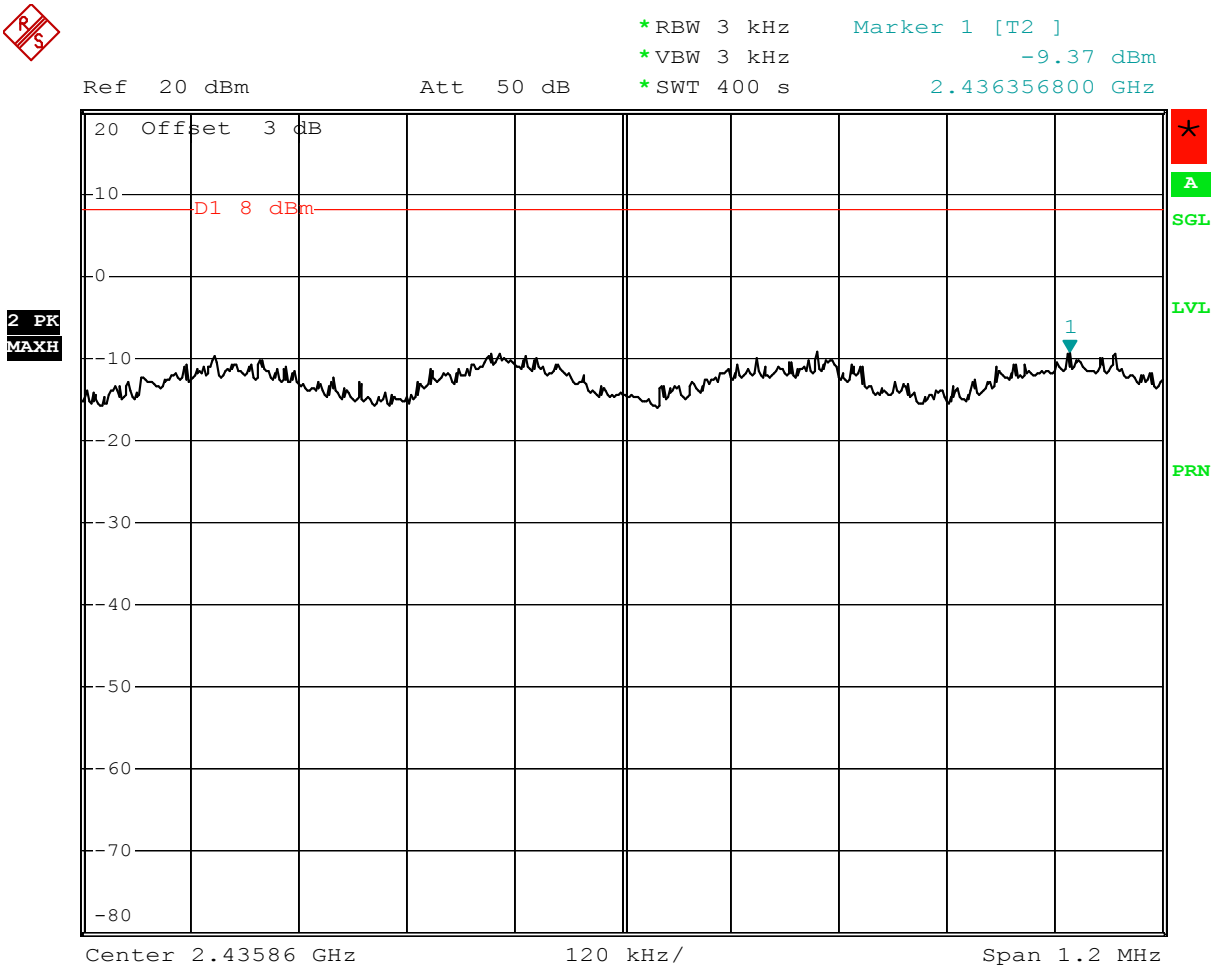
Comment: Channel 6, Power Density, CCK mod.
Date: 26.APR.2004 20:33:55

Plot 3.4



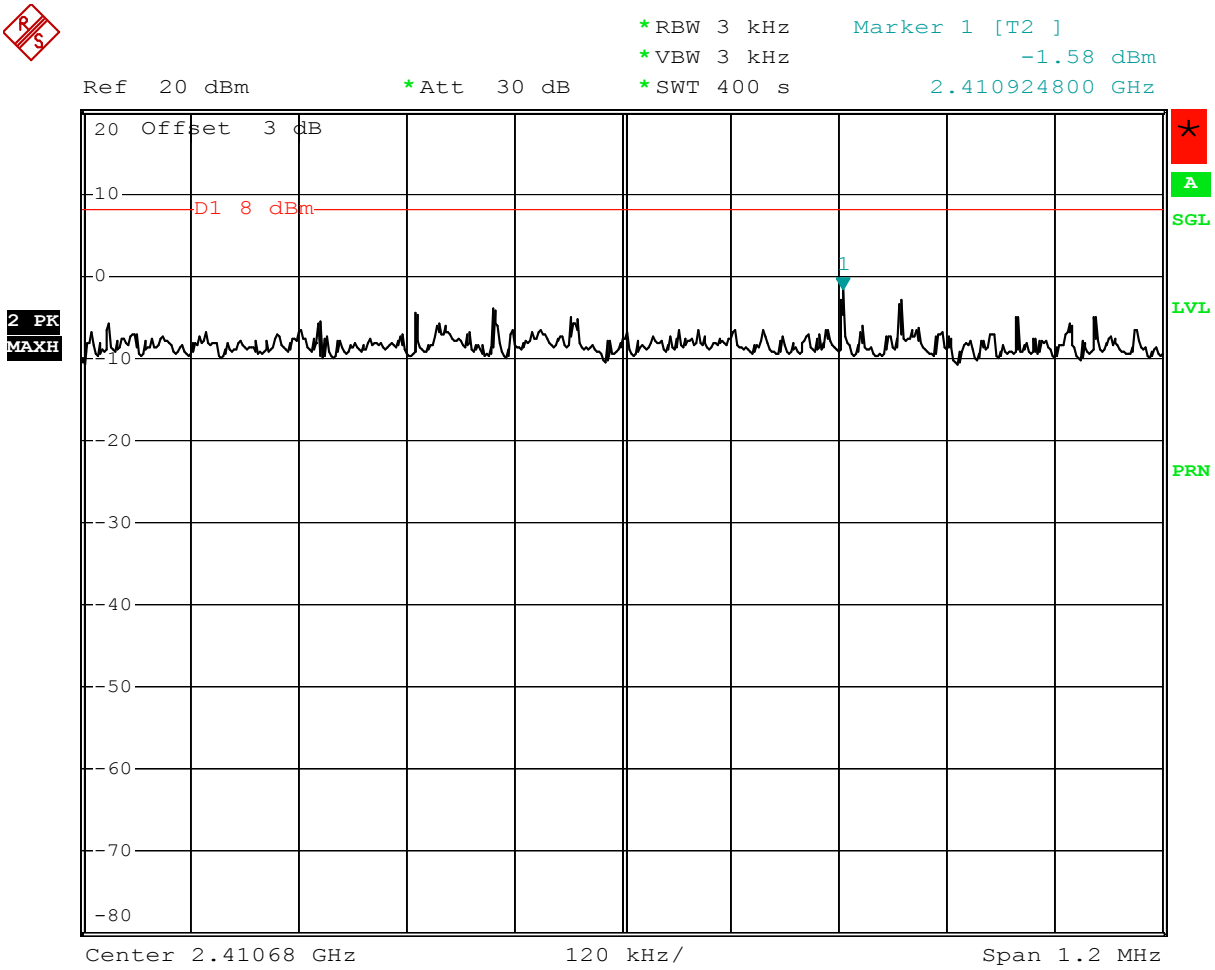
Comment: Channel 6, Power Density, PBCC mod.
Date: 26.APR.2004 22:33:56

Plot 3.5



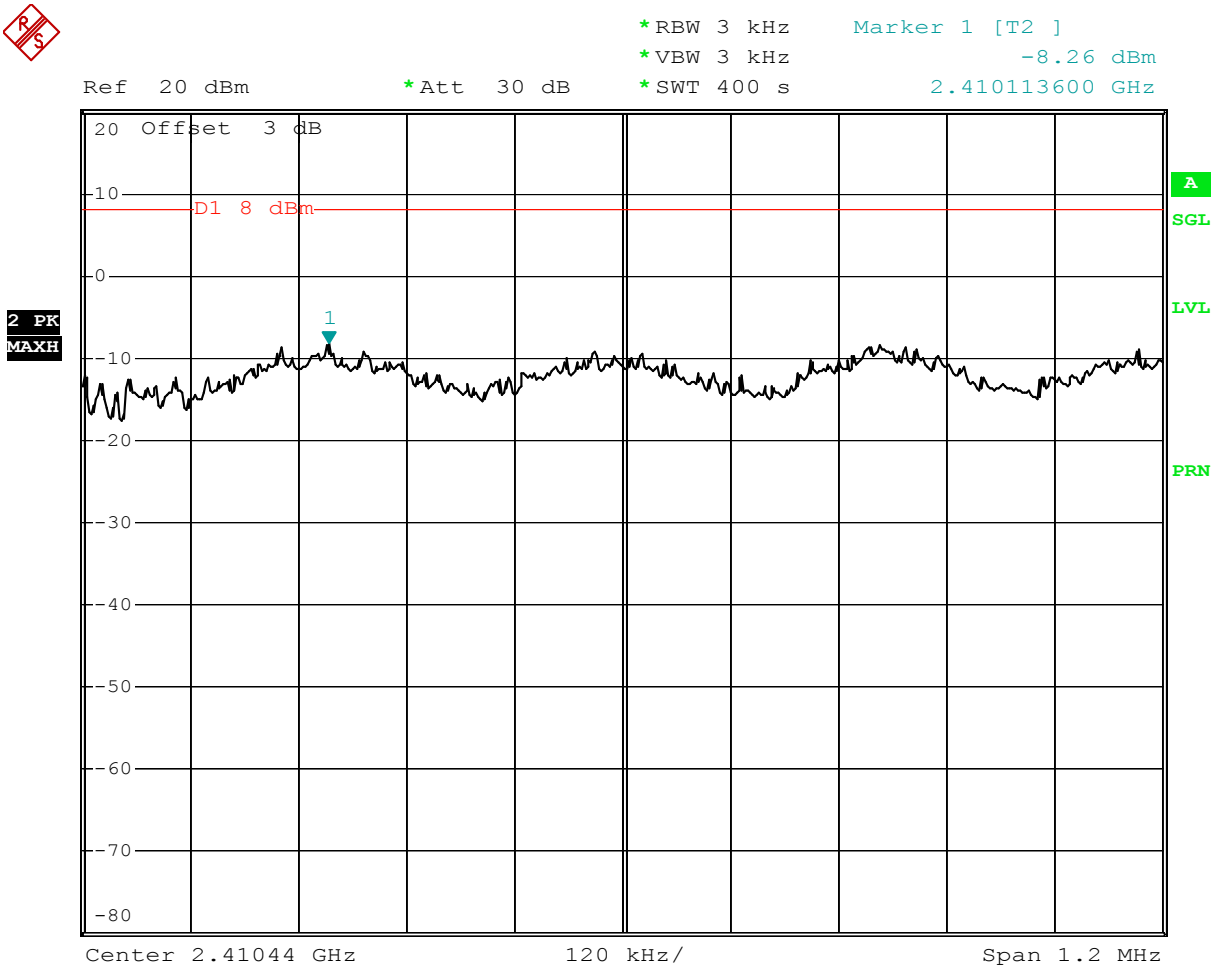
Comment: Channel 6, Power density, OFDM mod.
Date: 28.APR.2004 02:49:54

Plot 3.6



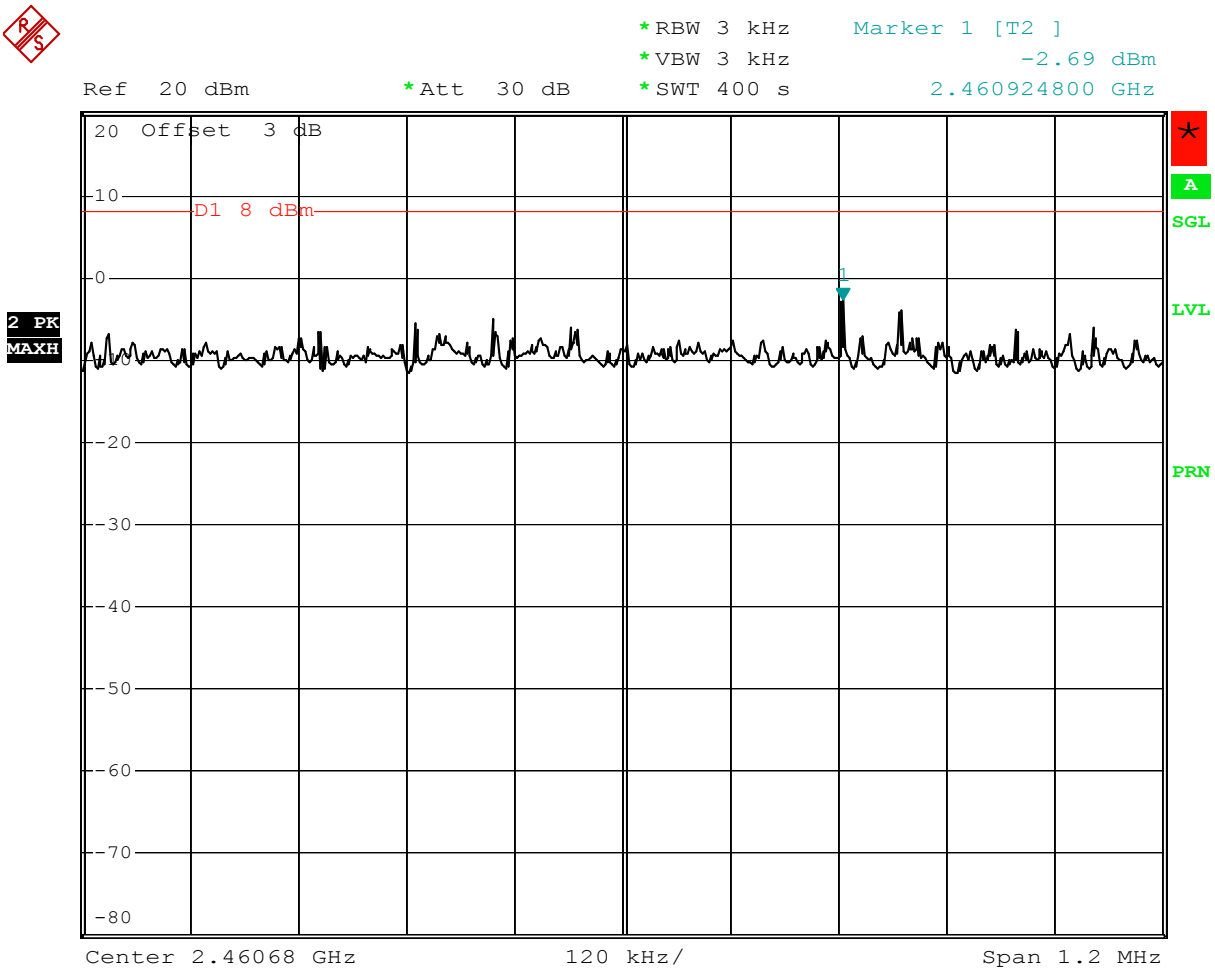
Comment: Channel 1, Power Density, PBCC mod.
Date: 26.APR.2004 22:45:15

Plot 3.7



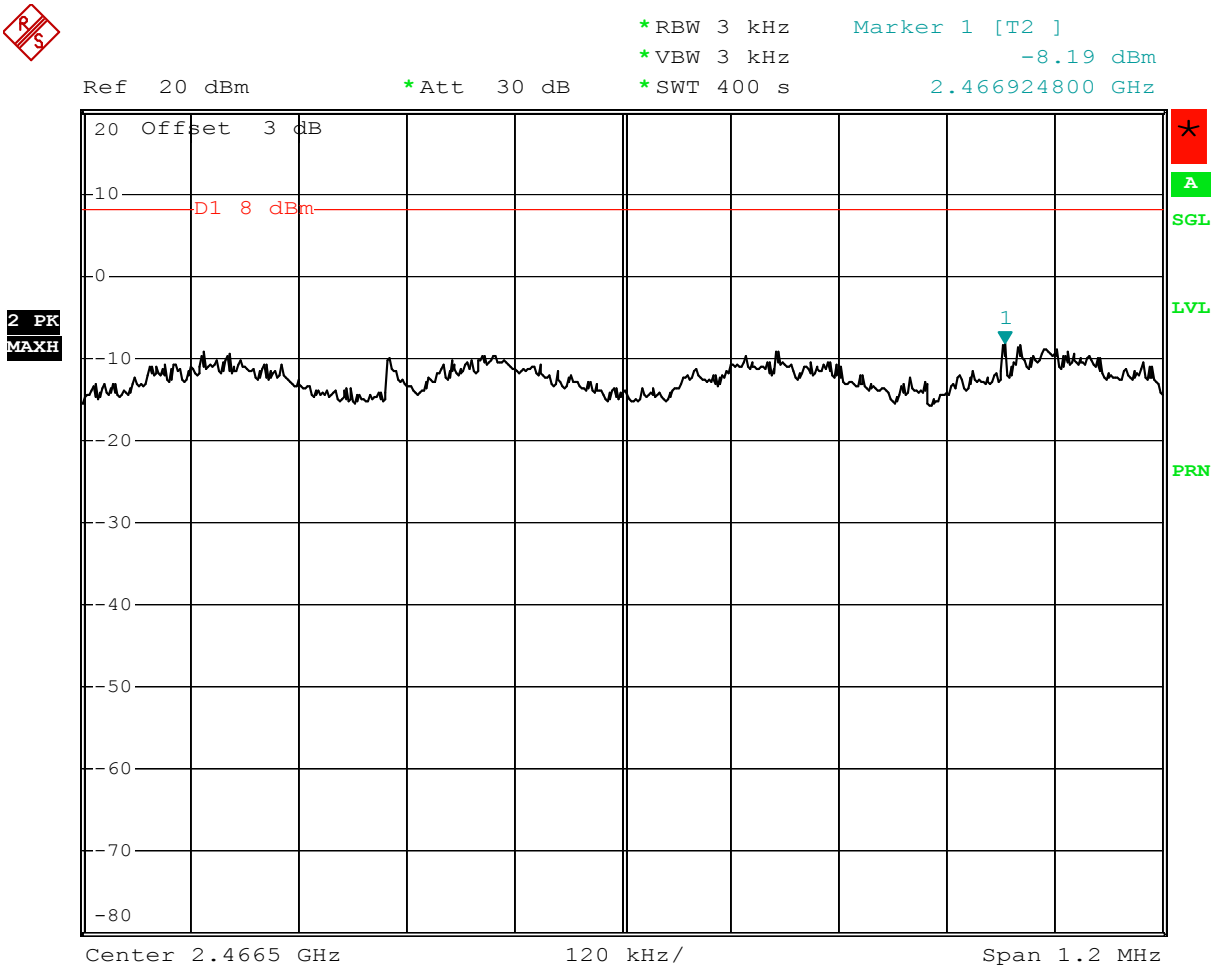
Comment: Channel 1, power density, OFDM mod.
Date: 27.APR.2004 21:06:02

Plot 3.8



Comment: Channel 11, Power Density, PBCC mod.
Date: 26.APR.2004 22:56:31

Plot 3.9



Comment: Channel 11, power density, OFDM mod.
Date: 27.APR.2004 20:50:32

4.4 Out-of-Band Conducted Emissions,
FCC Rule 15.247(c)

Requirement

In any 100 kHz bandwidths outside the EUT pass-band, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emissions.

Procedure

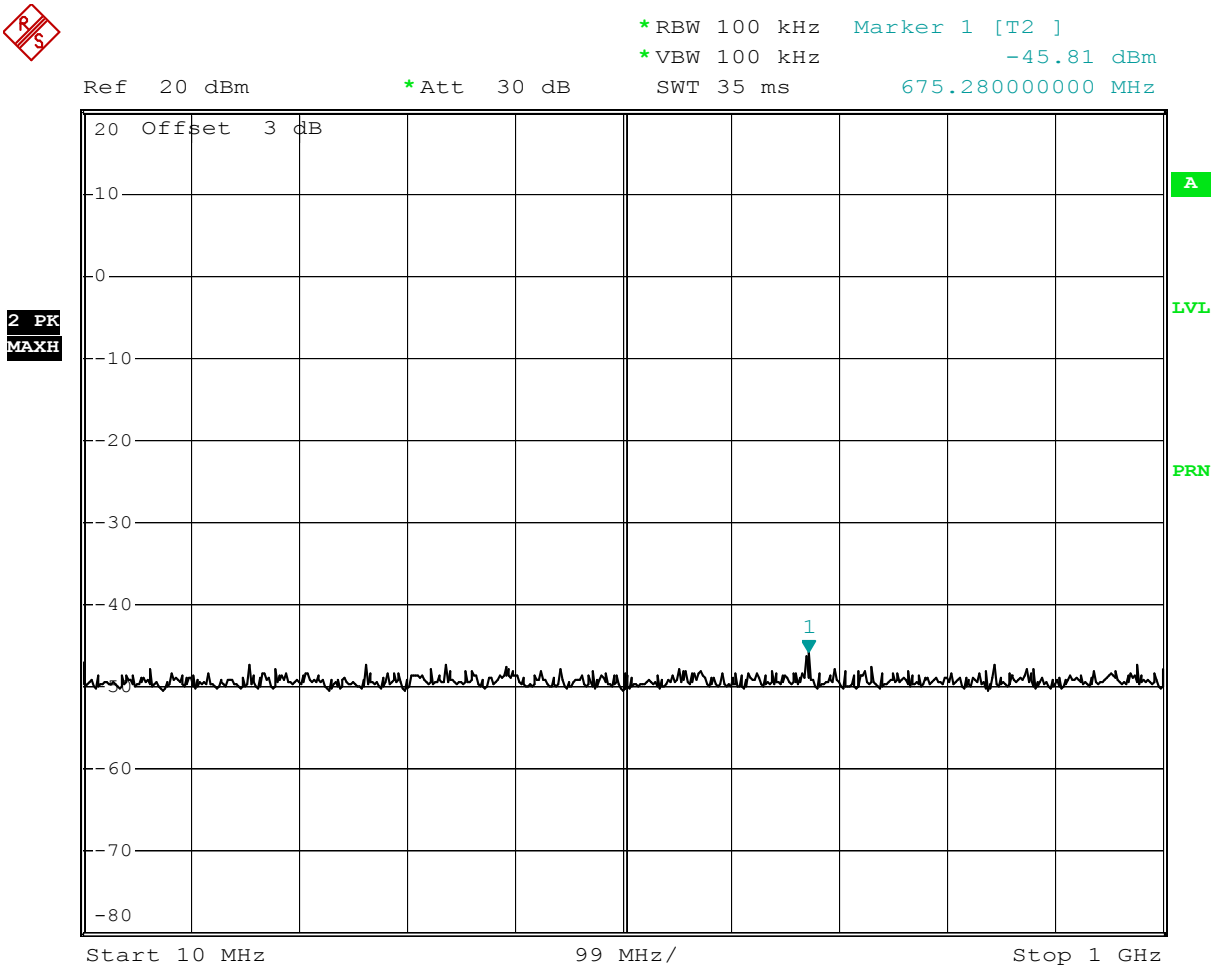
A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 10 MHz to 25 GHz.

Test Result

Refer to the table below and plots.

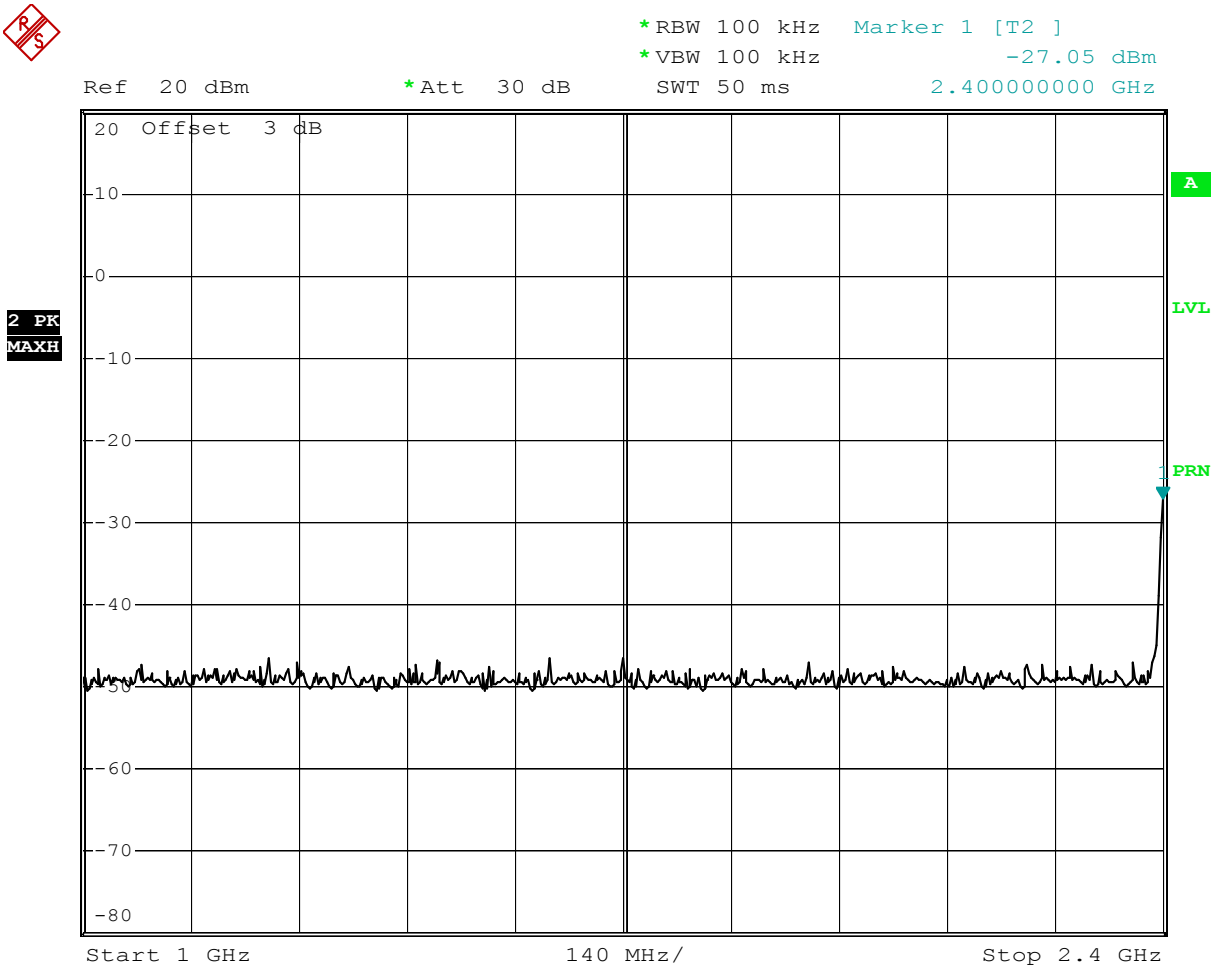
Frequency (MHz)	Modulation	Description	Plot
2412	PBCC	Scan 10 MHz – 1 GHz	4.1
	PBCC	Scan 1 GHz – 2.4 GHz	4.2
	OFDM	Scan 1 GHz – 2.4 GHz	4.3
	PBCC	Scan 2.4 GHz – 2.4835 GHz	4.4
	OFDM	Scan 2.4 GHz – 2.4835 GHz	4.5
	PBCC	Scan 2.4835 GHz – 25 GHz	4.6
	DQPSK	Scan 2.4 GHz – 2.4835 GHz	4.7
	DBPSK	Scan 2.4 GHz – 2.4835 GHz	4.8
	CCK	Scan 2.4 GHz – 2.4835 GHz	4.9
2437	PBCC	Scan 10 MHz – 1 GHz	4.10
	PBCC	Scan 1 GHz – 2.4 GHz	4.11
	PBCC	Scan 2.4 GHz – 2.4835 GHz	4.12
	PBCC	Scan 2.4835 GHz – 25 GHz	4.13
2462	PBCC	Scan 10 MHz – 1 GHz	4.14
	PBCC	Scan 1 GHz – 2.4 GHz	4.15
	PBCC	Scan 2.4 GHz – 2.4835 GHz	4.16
	OFDM	Scan 2.4 GHz – 2.4835 GHz	4.17
	PBCC	Scan 2.4835 GHz – 25 GHz	4.18
	OFDM	Scan 2.4835 GHz – 25 GHz	4.19
	DQPSK	Scan 2.4 GHz – 2.4835 GHz	4.20
	DBPSK	Scan 2.4 GHz – 2.4835 GHz	4.21
	CCK	Scan 2.4 GHz – 2.4835 GHz	4.22

Plot 4.1



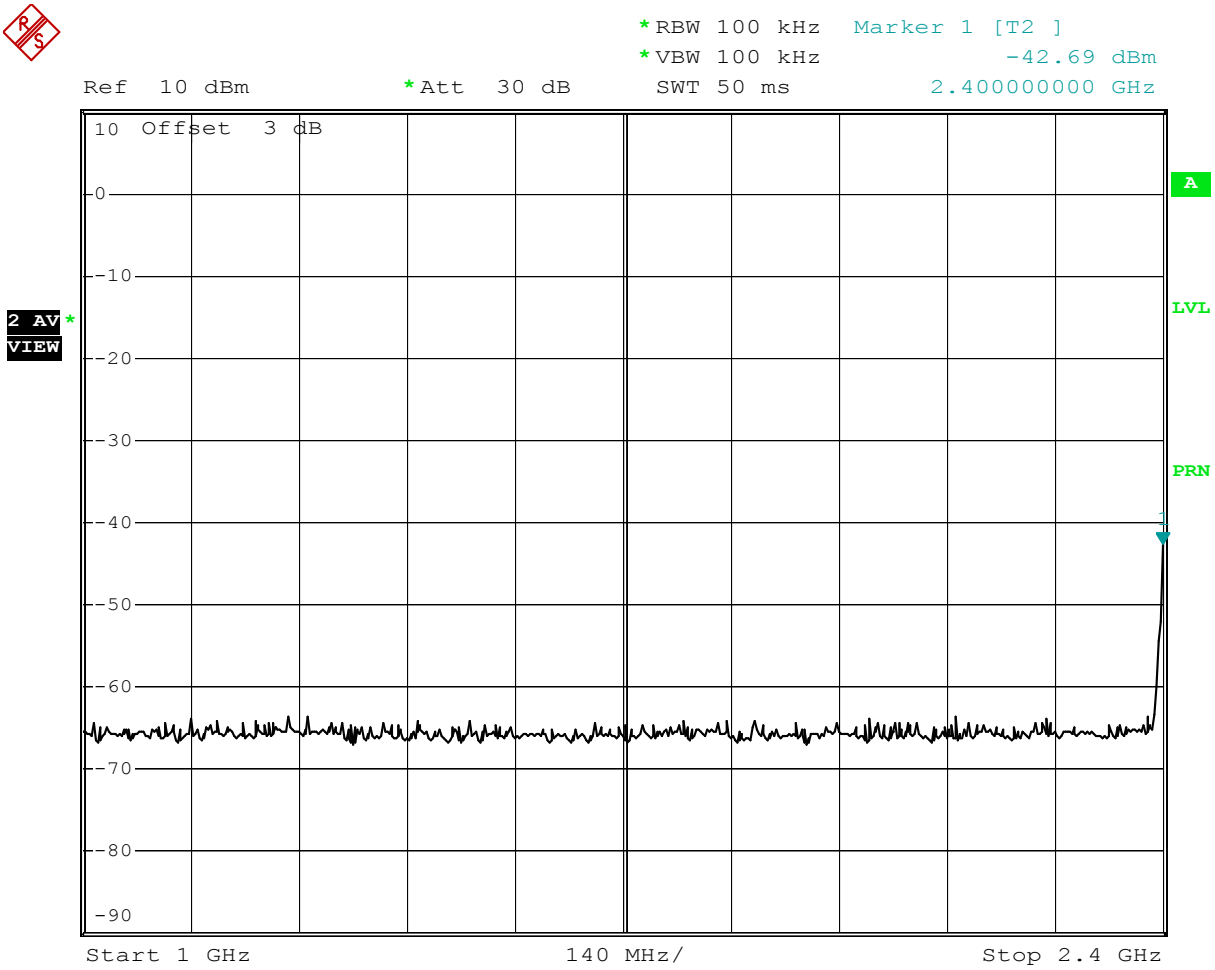
Comment: Channel 1, out-of-band, PBCC mod.
Date: 27.APR.2004 00:17:52

Plot 4.2



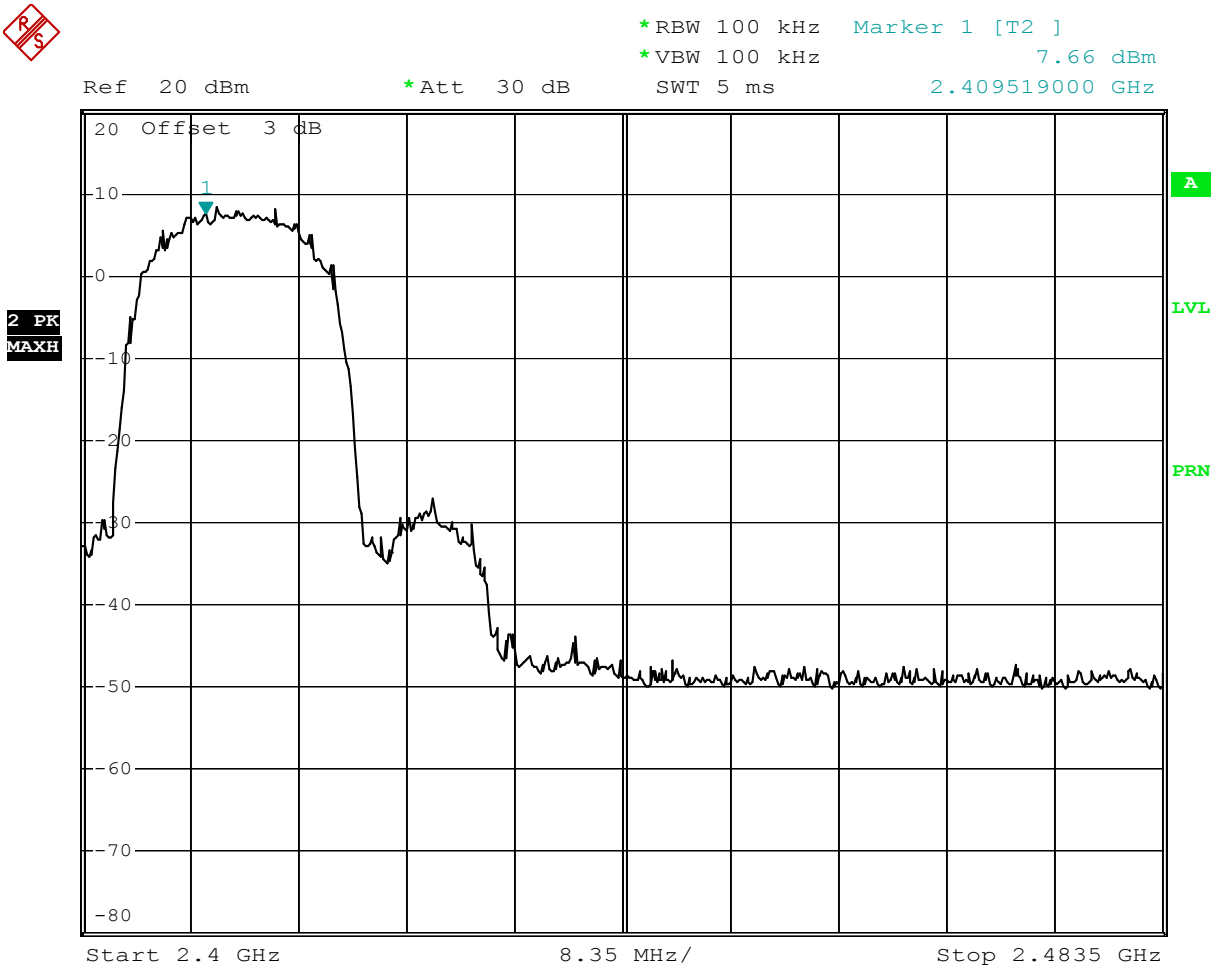
Comment: Channel 1, out-of-band, PBCC mod.
Date: 27.APR.2004 00:20:38

Plot 4.3



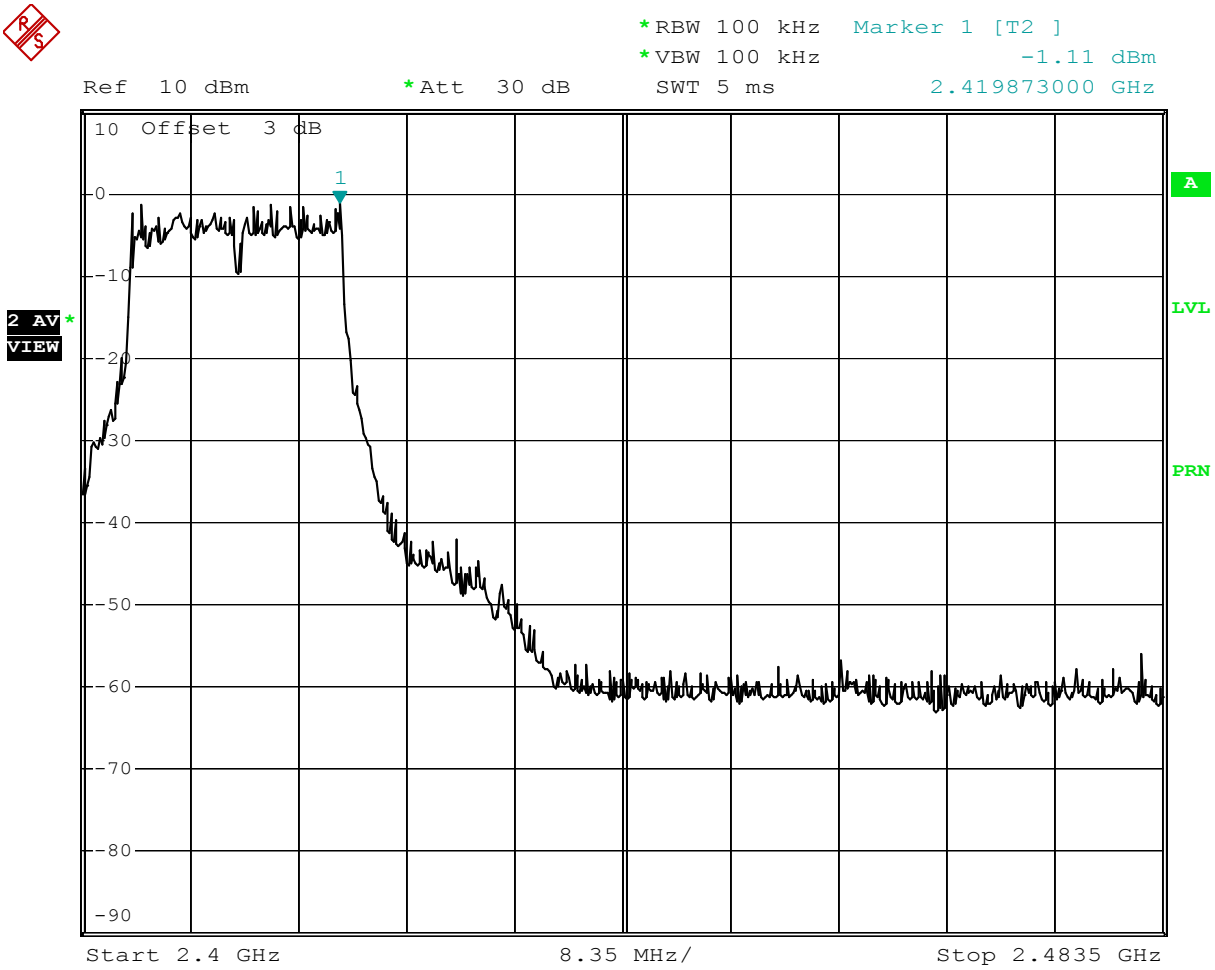
Comment: Channel 1, out-of-band, OFDM mod.
Date: 27.APR.2004 23:00:37

Plot 4.4



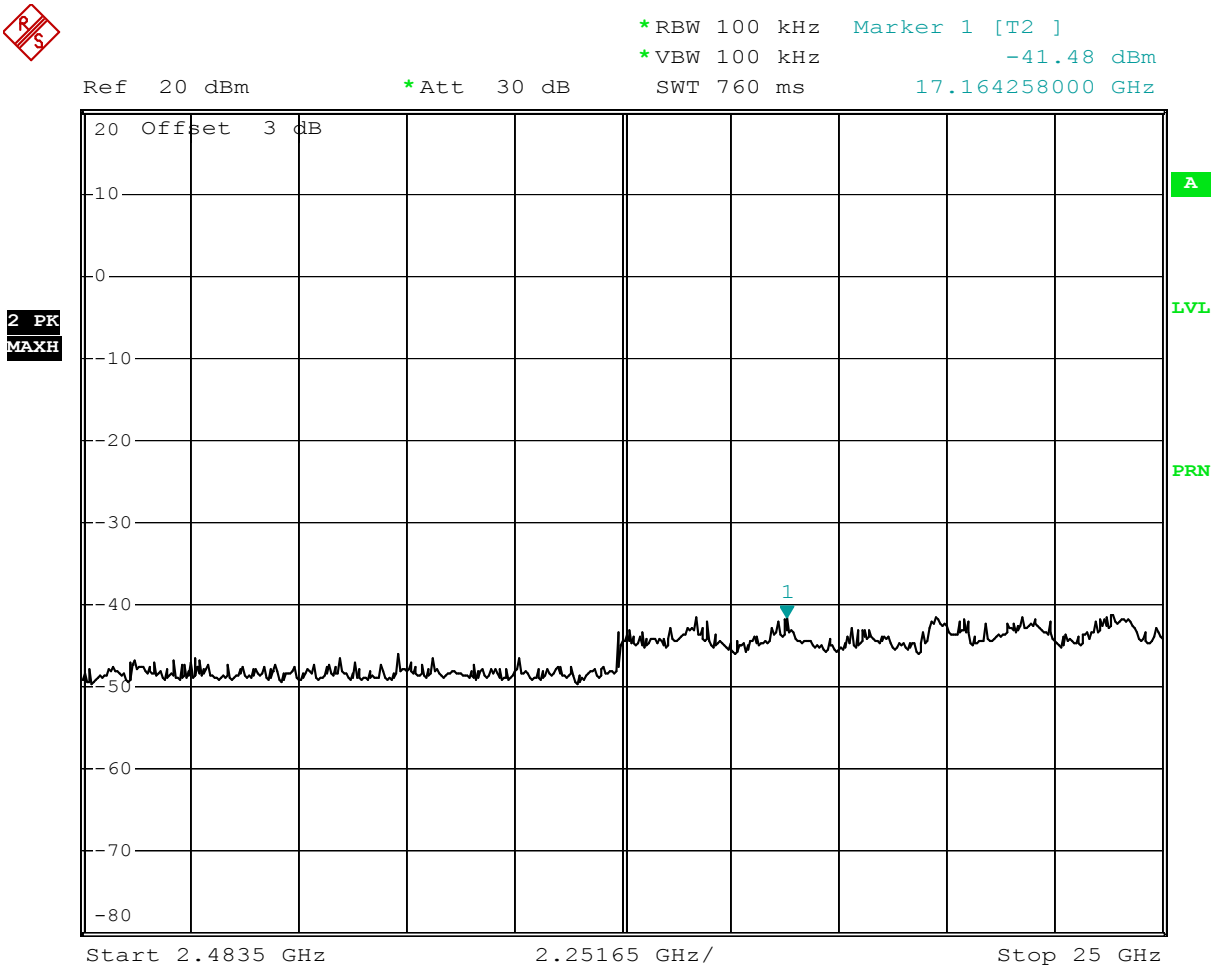
Comment: Channel 1, out-of-band, PBCC mod.
Date: 27.APR.2004 00:15:44

Plot 4.5



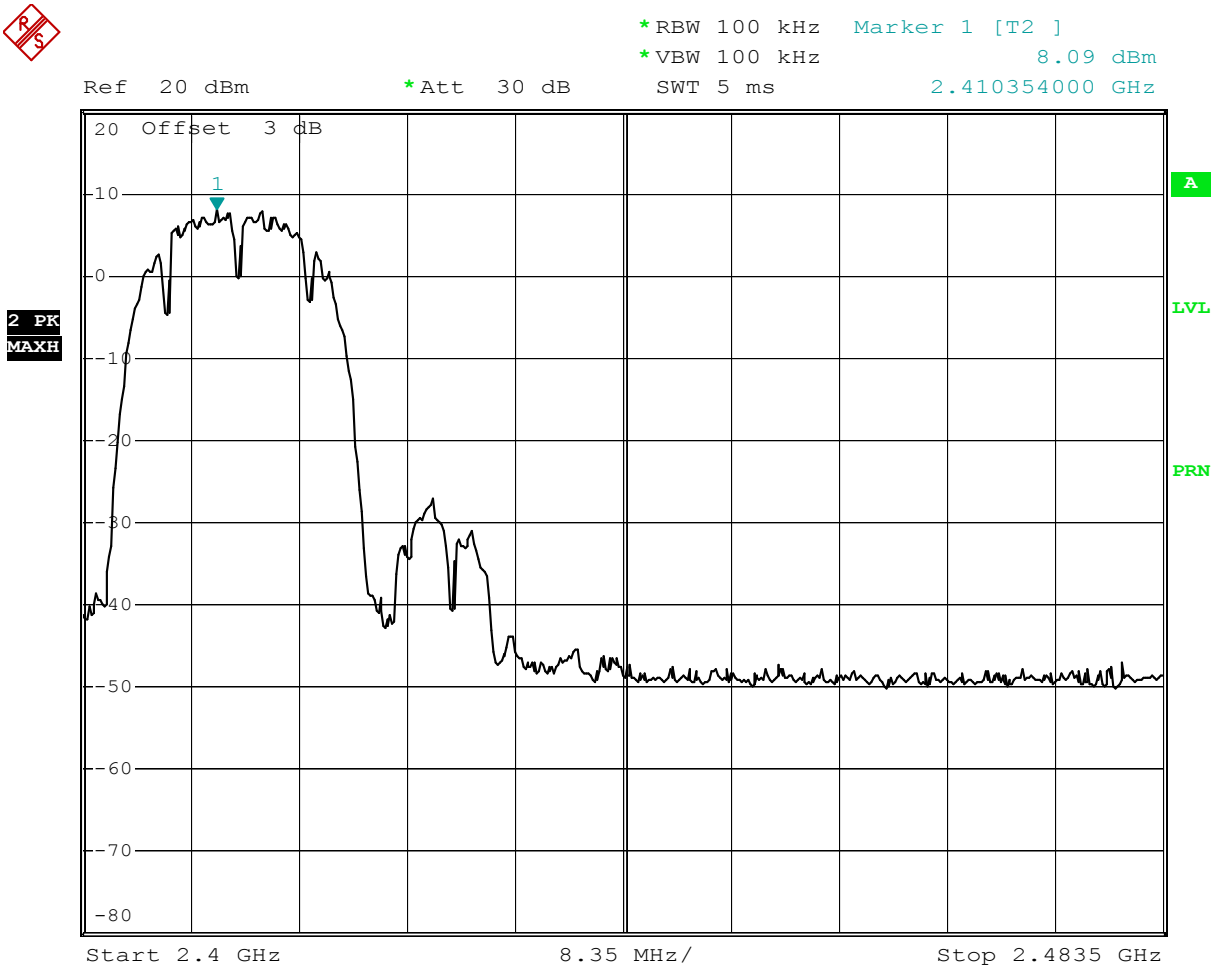
Comment: Channel 1, out-of-band, OFDM mod.
Date: 27.APR.2004 22:58:51

Plot 4.6



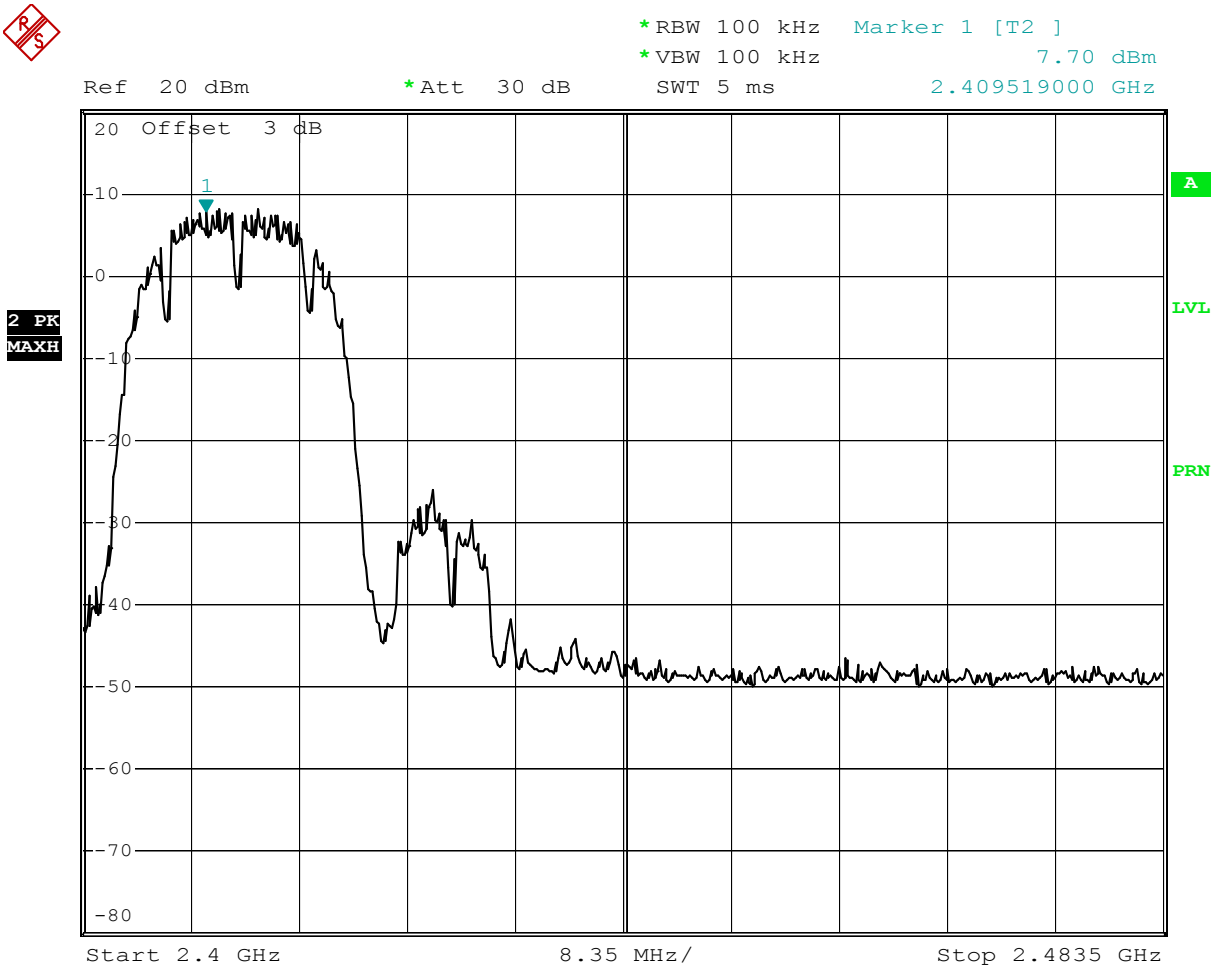
Comment: Channel 1, out-of-band, PBCC mod.
Date: 27.APR.2004 00:21:57

Plot 4.7



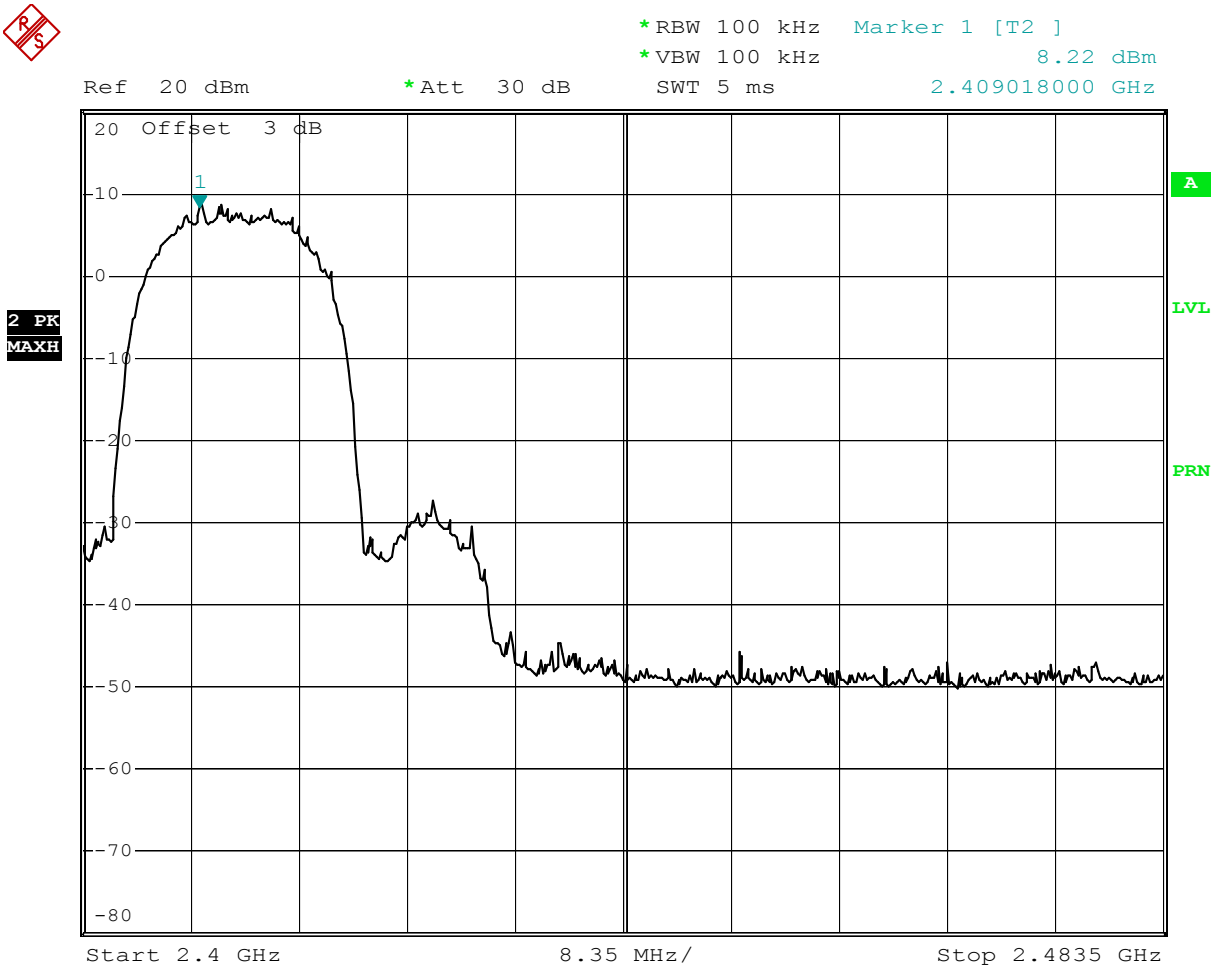
Comment: Channel 1, out-of-band, DQPSK mod.
Date: 27.APR.2004 00:31:21

Plot 4.8



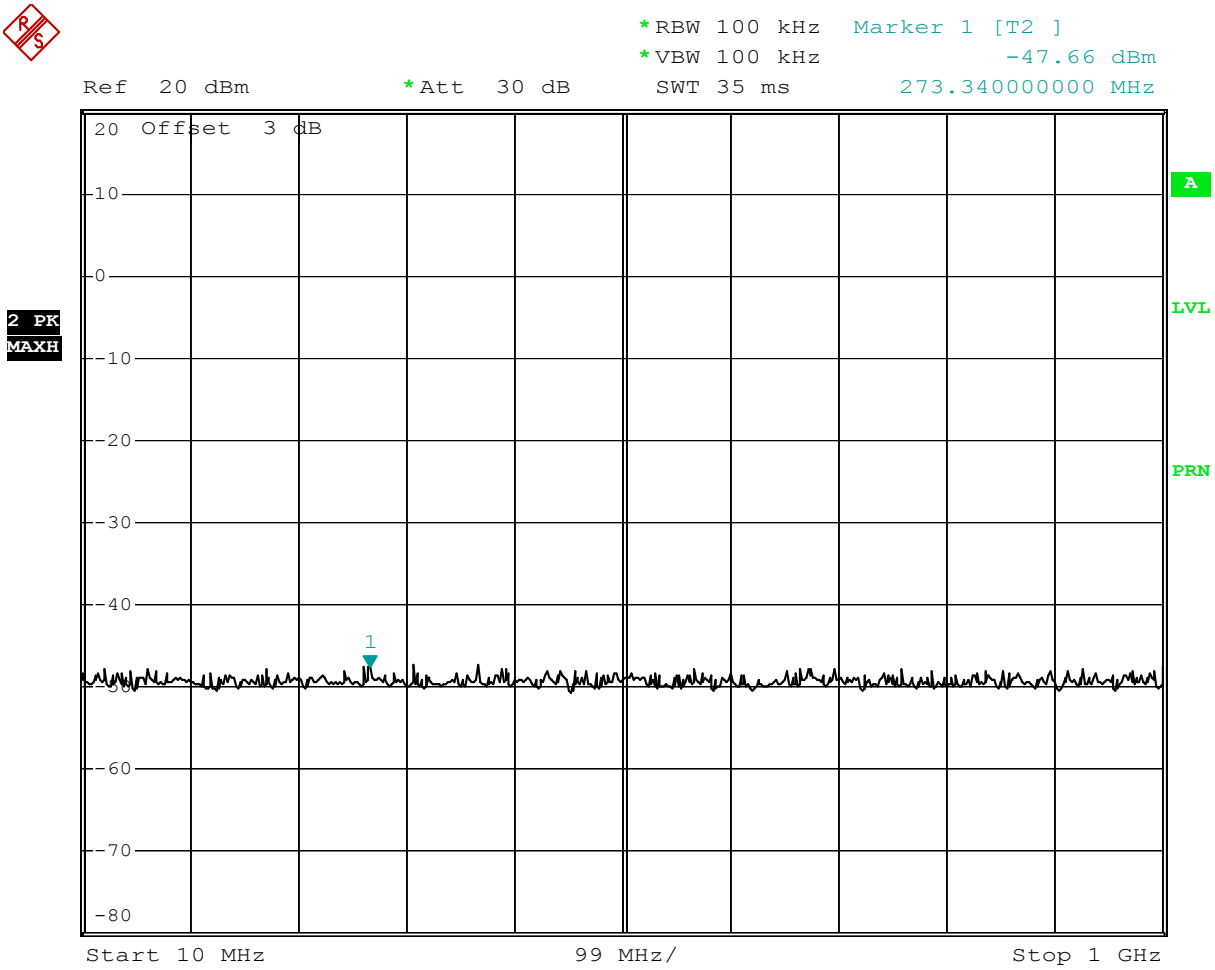
Comment: Channel 1, out-of-band, DBPSK mod.
Date: 27.APR.2004 00:29:00

Plot 4.9



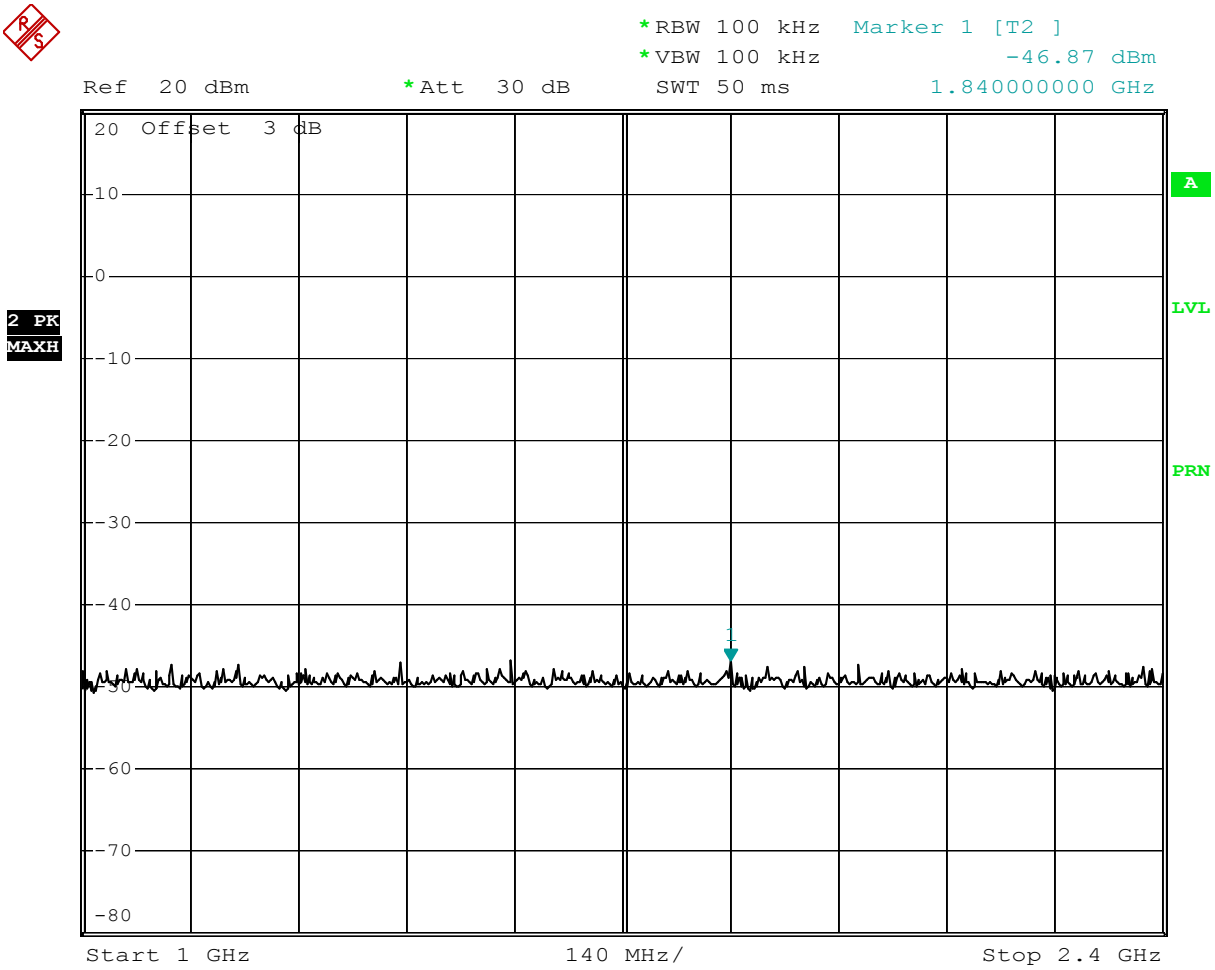
Comment: Channel 1, out-of-band, CCK mod.
Date: 27.APR.2004 00:34:12

Plot 4.10



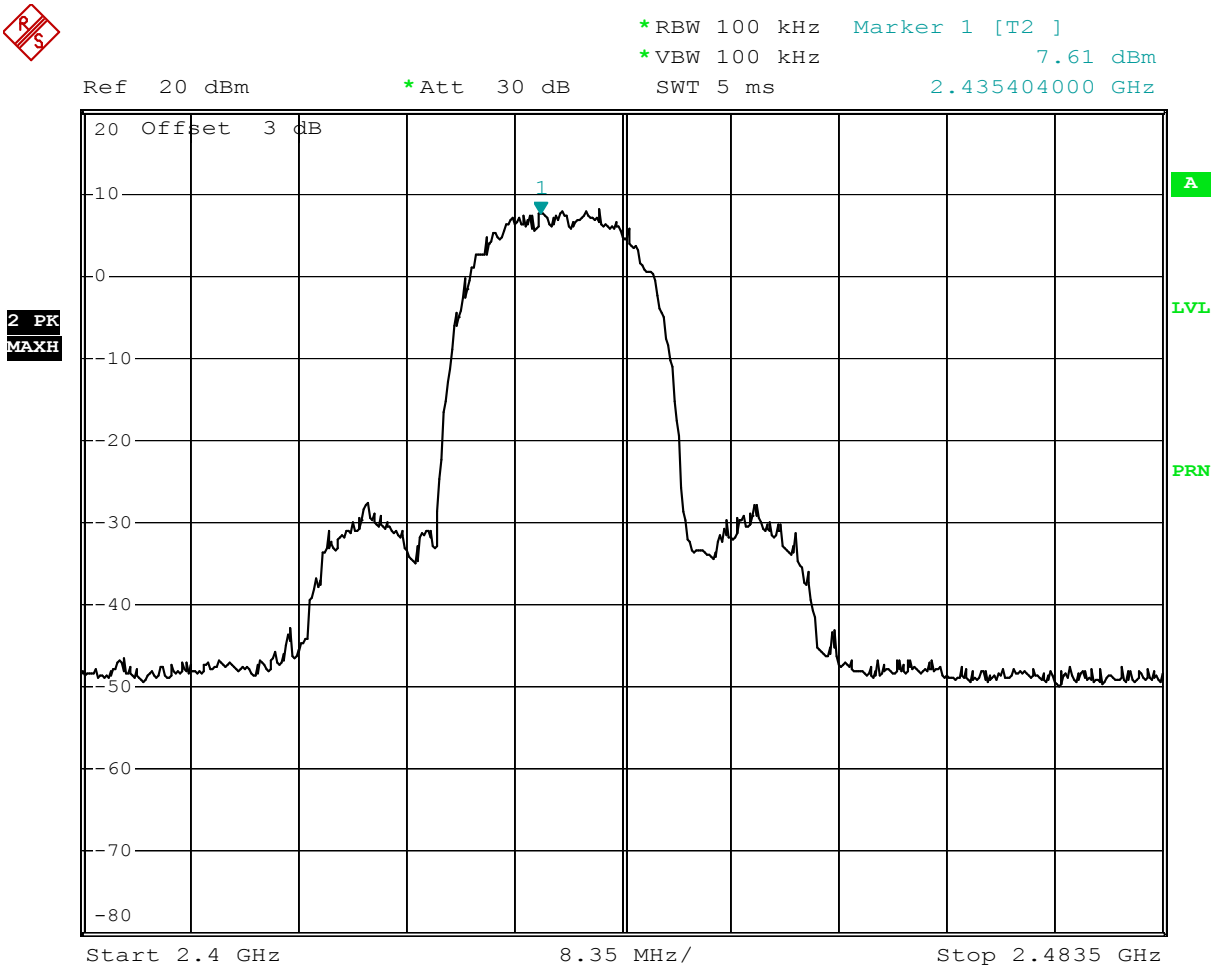
Comment: Channel 6, out-of-band, PBCC mod.
Date: 27.APR.2004 00:10:22

Plot 4.11



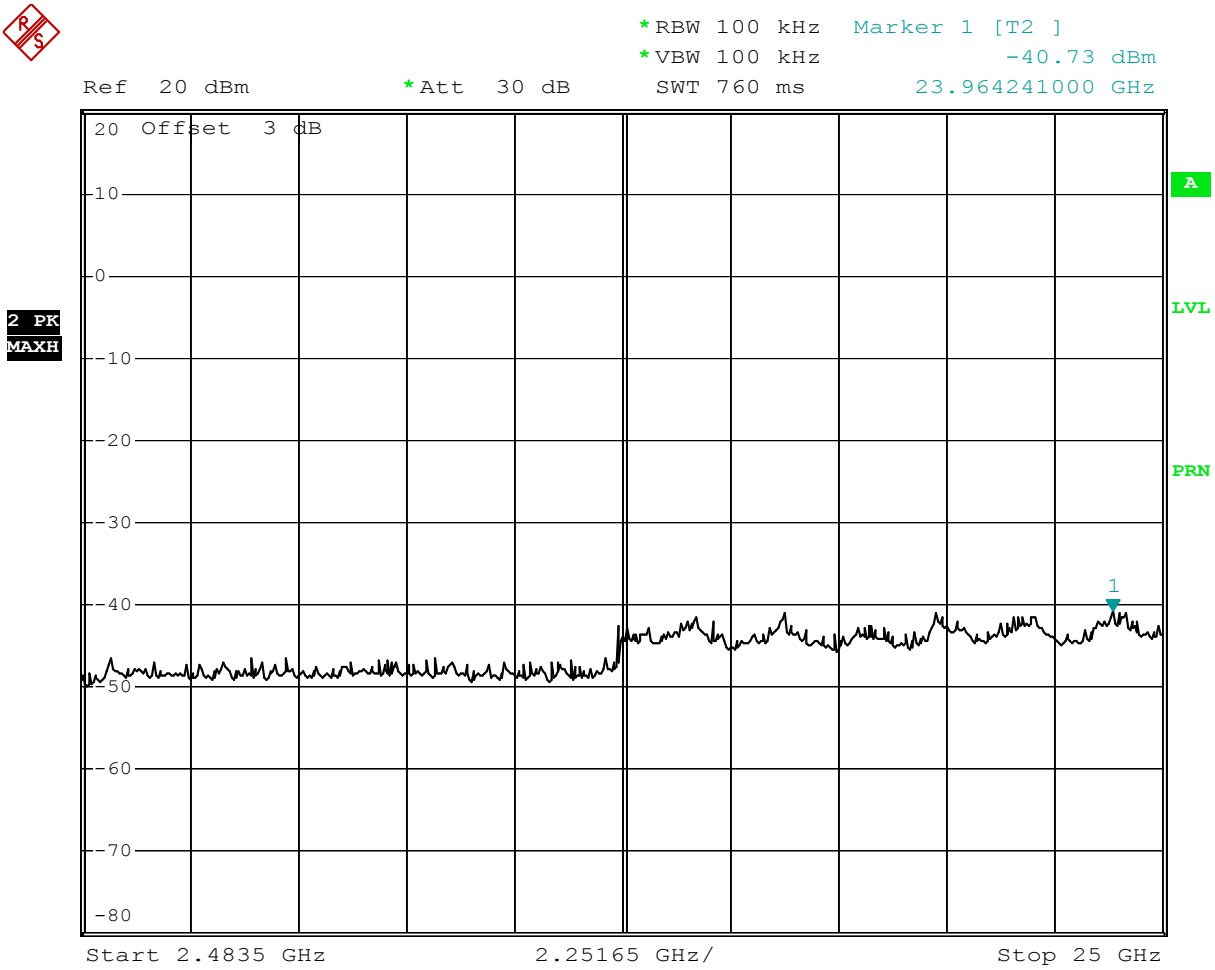
Comment: Channel 6, out-of-band, PBCC mod.
Date: 27.APR.2004 00:11:55

Plot 4.12



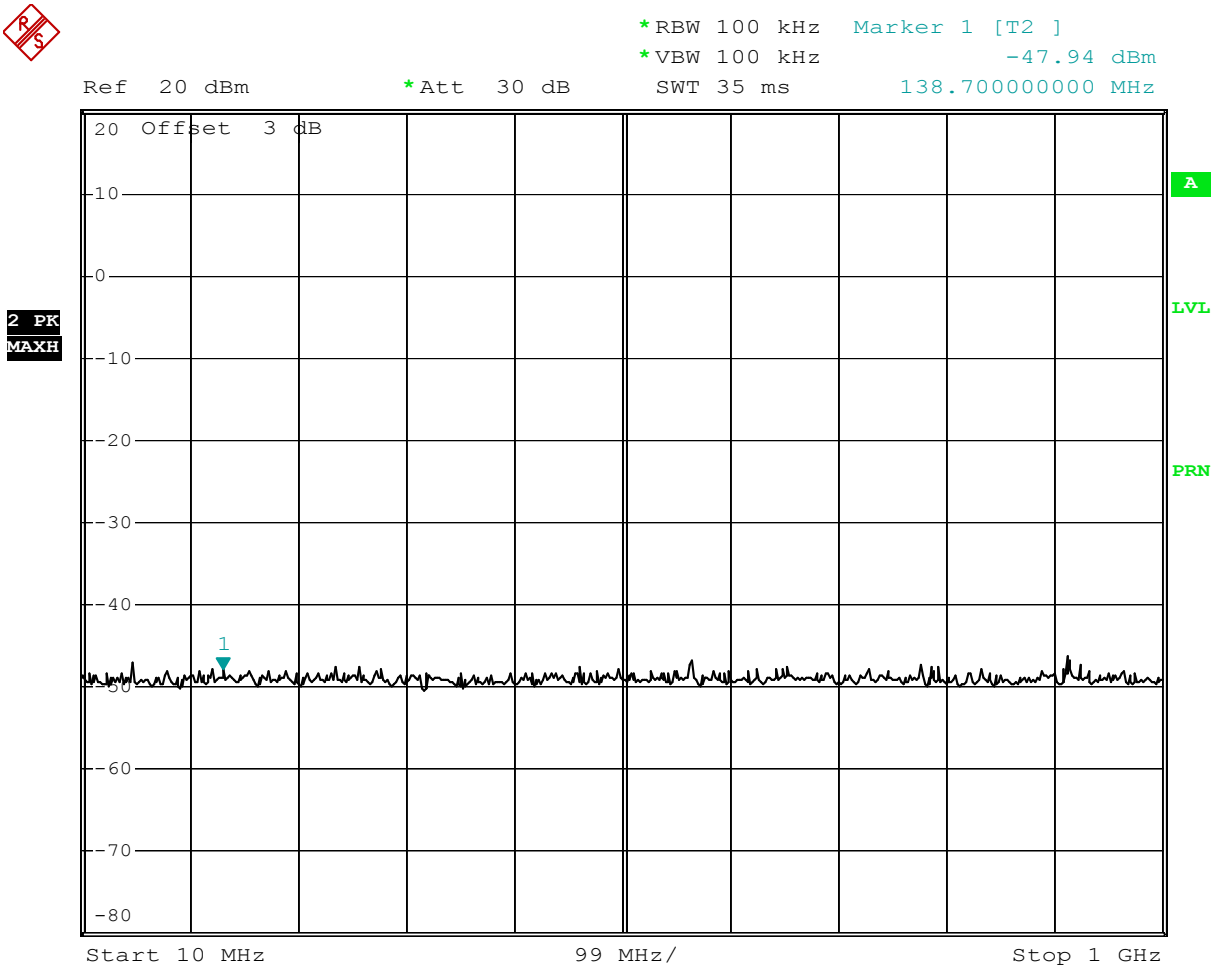
Comment: Channel 6, out-of-band, PBCC mod.
Date: 27.APR.2004 00:08:47

Plot 4.13



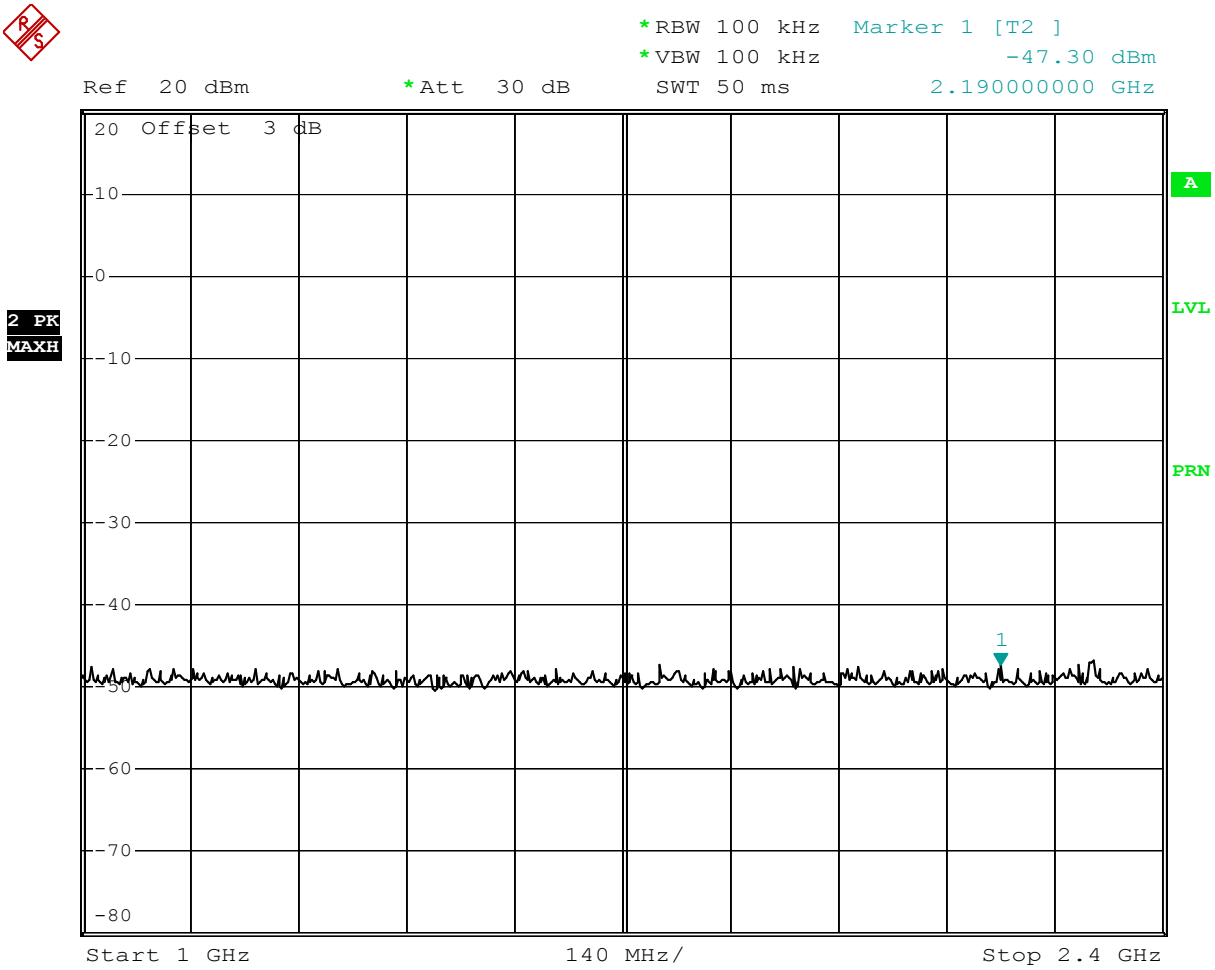
Comment: Channel 6, out-of-band, PBCC mod.
Date: 27.APR.2004 00:13:32

Plot 4.14



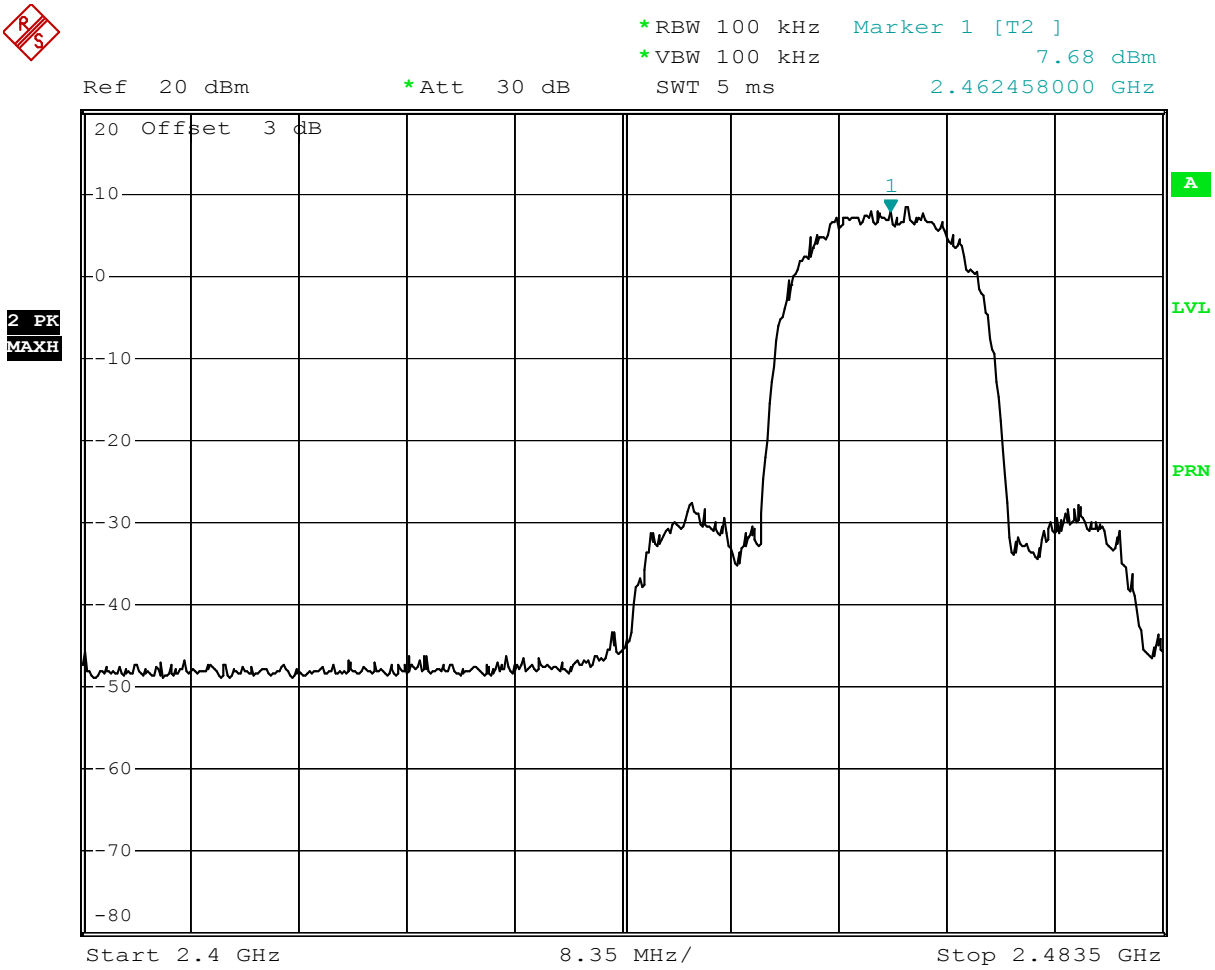
Comment: Channel 11, out-of-band, PBCC mod.
Date: 26.APR.2004 23:08:11

Plot 4.15



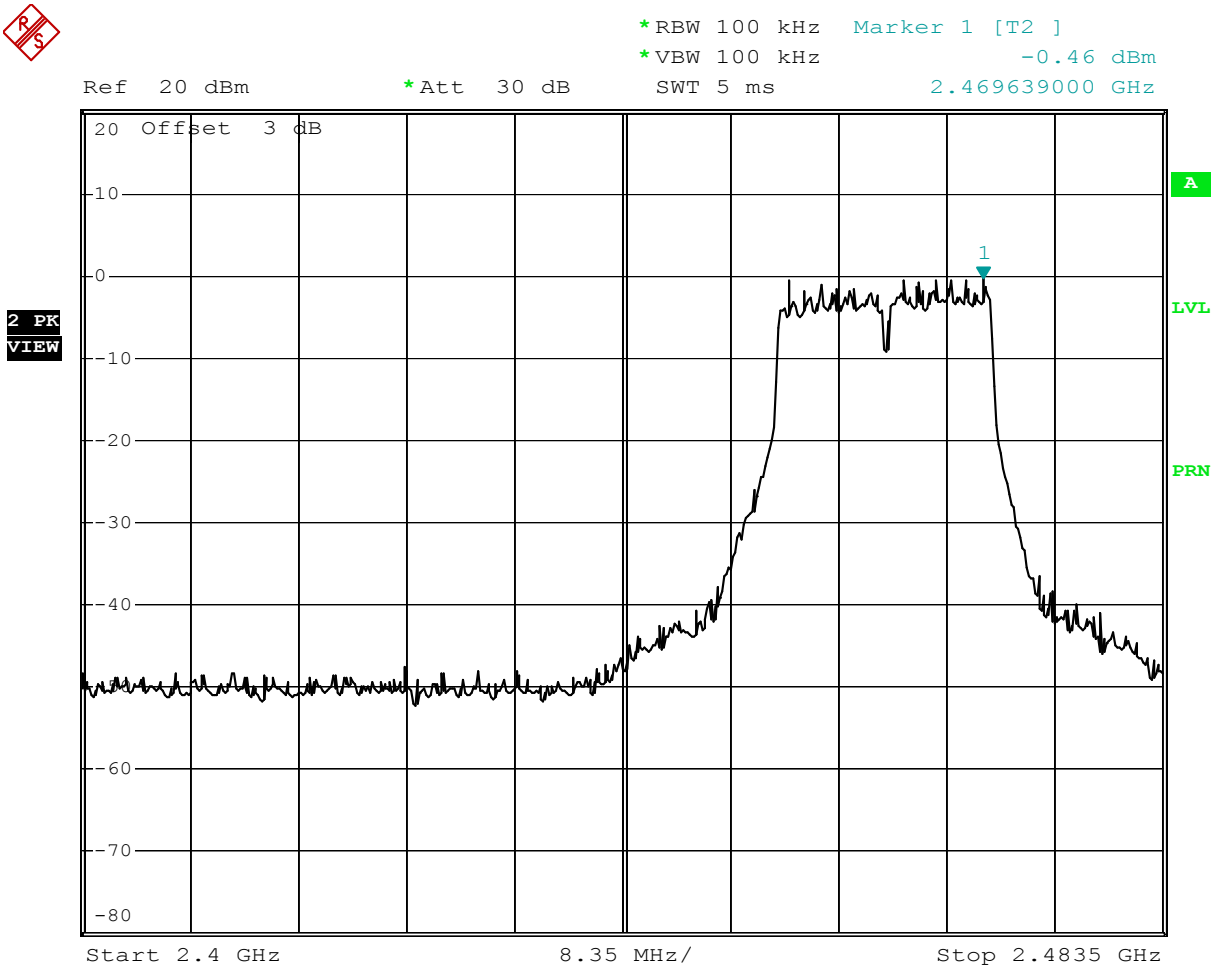
Comment: Channel 11, out-of-band, PBCC mod.
Date: 26.APR.2004 23:09:48

Plot 4.16



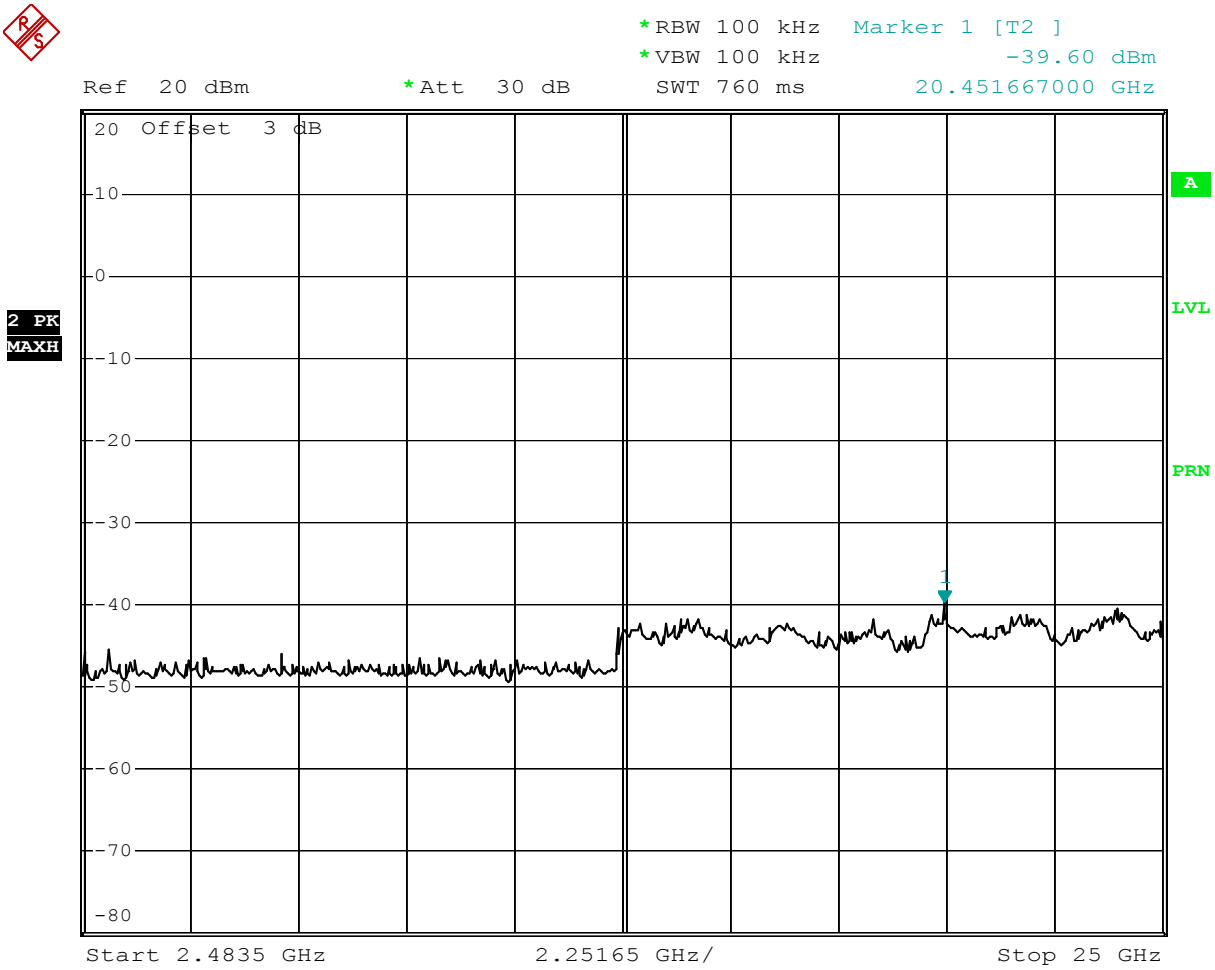
Comment: Channel 11, out-of-band, PBCC mod.
Date: 26.APR.2004 23:04:47

Plot 4.17



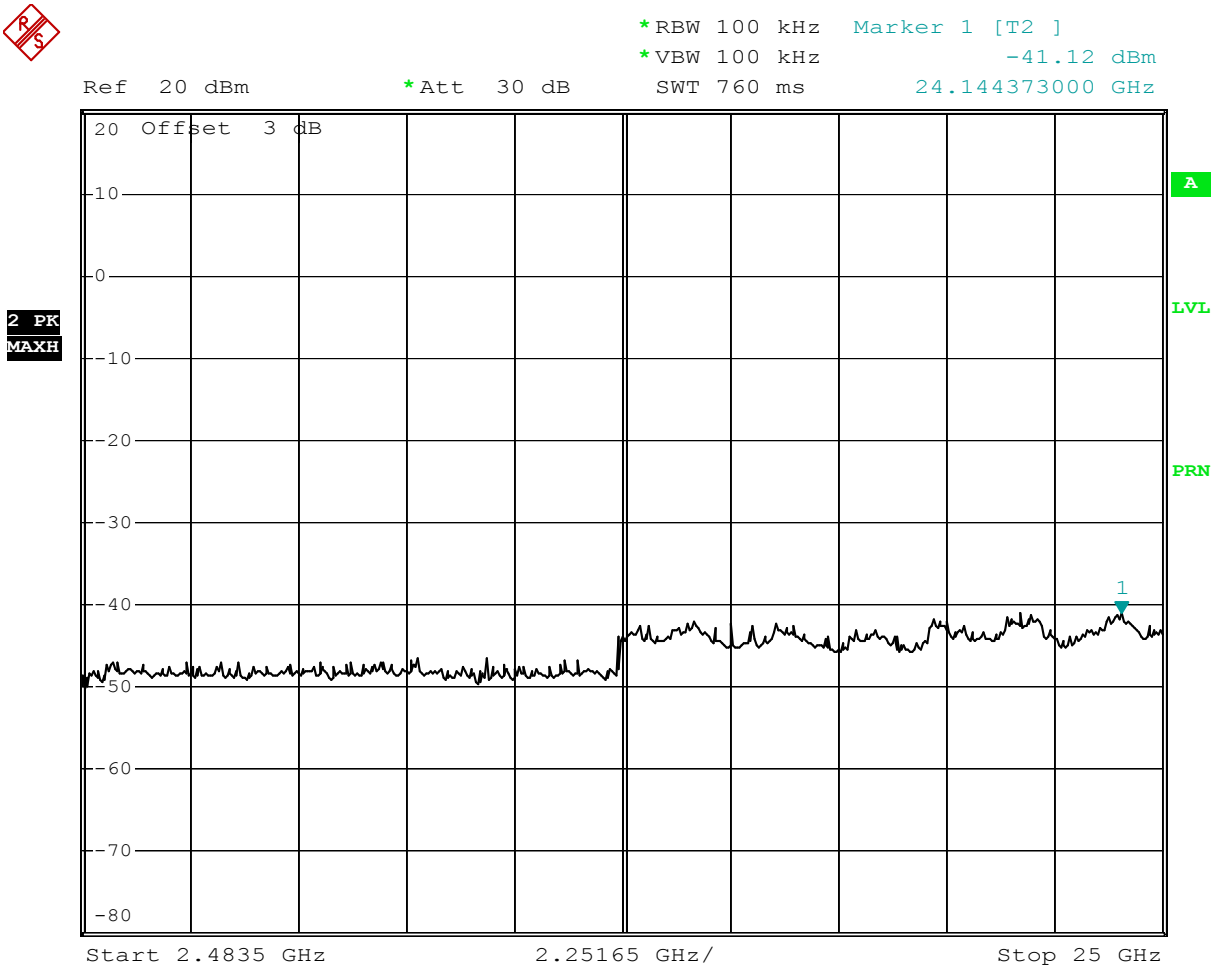
Comment: Channel 11, out-of-band, OFDM mod.
Date: 27.APR.2004 03:17:40

Plot 4.18



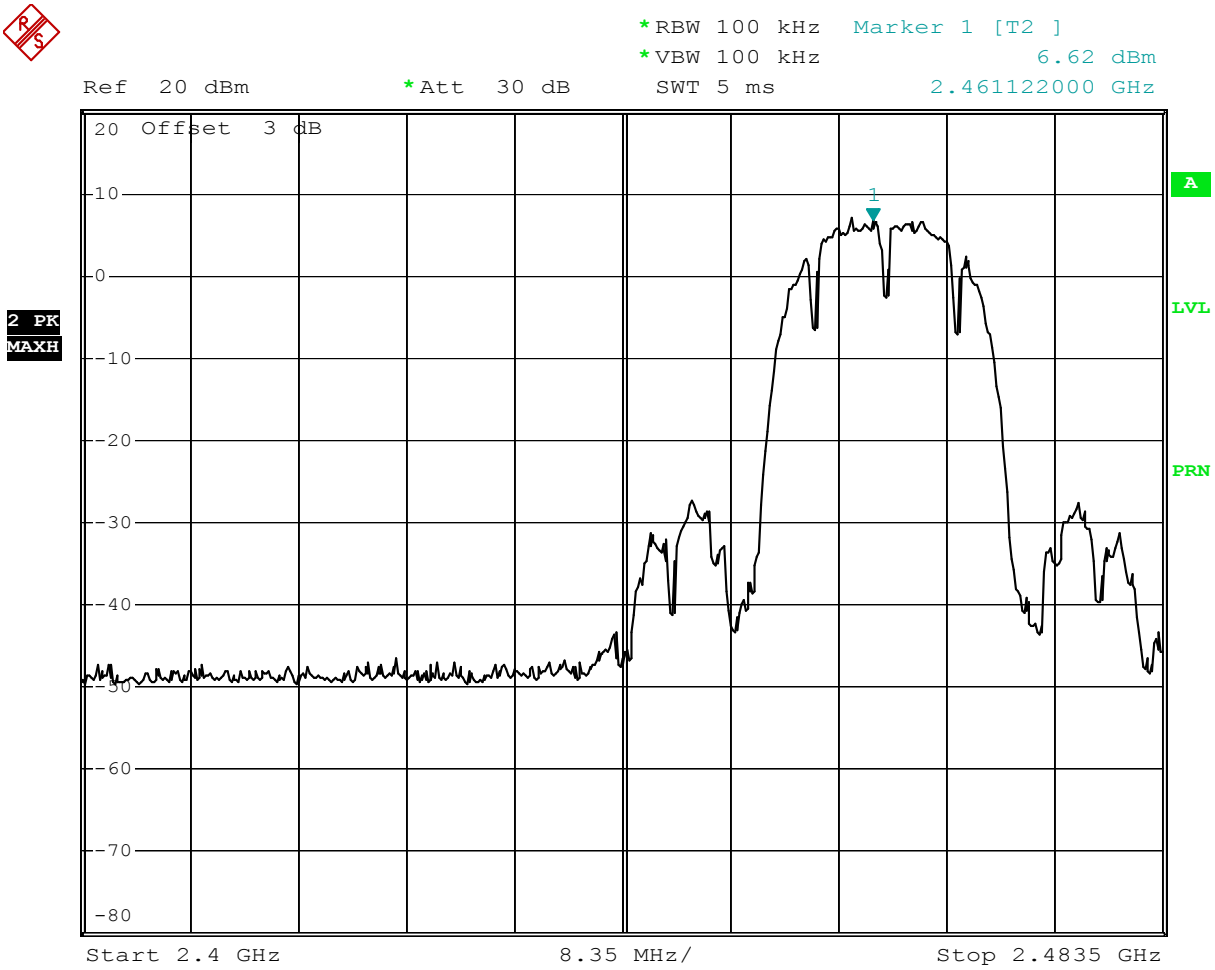
Comment: Channel 11, out-of-band, PBCC mod.
Date: 26.APR.2004 23:12:35

Plot 4.19



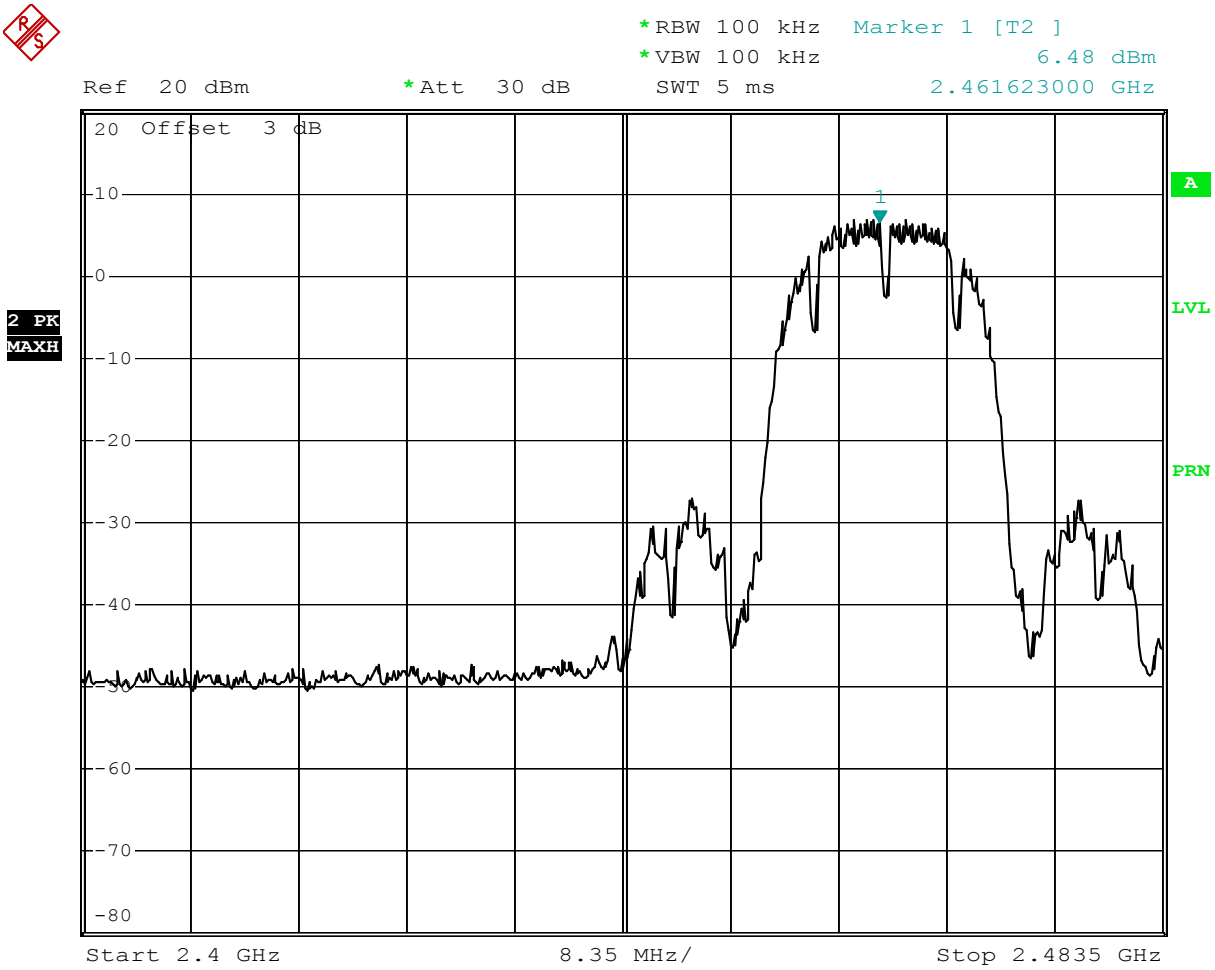
Comment: Channel 11, out-of-band, OFDM mod.
Date: 27.APR.2004 03:20:18

Plot 4.20



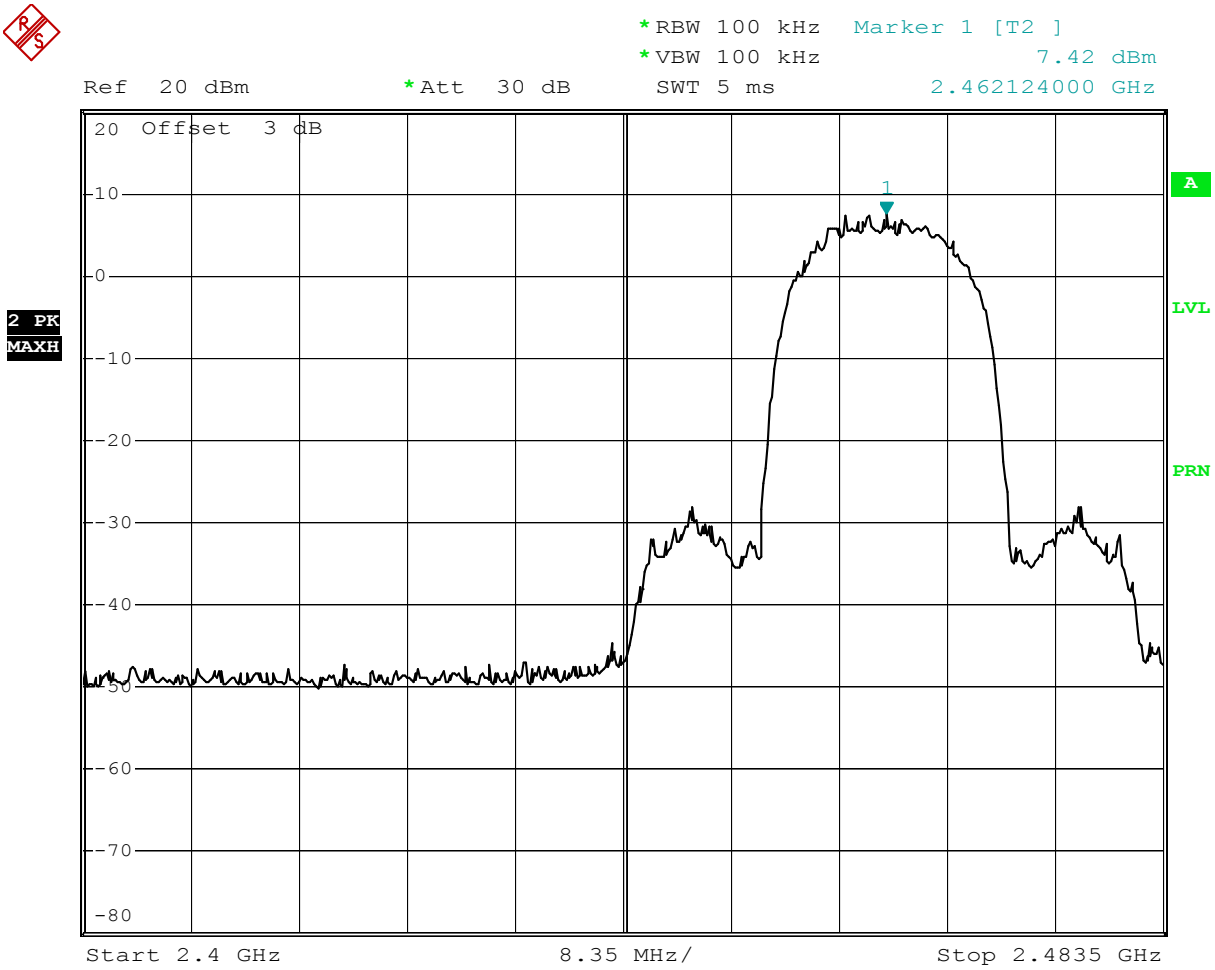
Comment: Channel 11, out-of-band, DQPSK mod.
Date: 27.APR.2004 00:39:13

Plot 4.21



Comment: Channel 11, out-of-band, DBPSK mod.
Date: 27.APR.2004 00:41:13

Plot 4.22



Comment: Channel 11, out-of-band, CCK mod.
Date: 27.APR.2004 00:36:33

4.5 Out of Band Radiated Emissions (except emissions in restricted bands)
FCC Rule 15.247(c)

Procedure

For out of band radiated emissions (except for frequencies in restricted bands) that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

Test Result

Test was not performed, the EUT passed out-of-band antenna conducted emission test.

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.247(c), 15.209, 15.205

Procedure

Radiated emission measurements were performed from 30 MHz to 25,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz - for frequencies above 1000 MHz.

The EUT is placed on a plastic turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels).

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(μV/m)
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

The Field Strength at the band-edge frequency in the restricted band, adjacent to the operating band, was calculated as $E_f = E_0 - \Delta$

Where:

E_f = Field Strength of Band-edge Frequency

E_0 = Field Strength of Fundamental Frequency
Δ = Delta between the levels of emissions at Fundamental Frequency and at Band-edge Frequency

Test Result

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance for the worst-case configuration.

The EUT passed the test by 1.3 dB.

Temperature: 21.0 C						Netopia				
Humidity: 39.8 %						Model: 3347WG				
Measured at 1 m										
Frequency MHz	Polarity	Detector	SA reading dB(uV)	Cable loss dB	Pre- amp gain dB	Ant. factor dB(1/m)	D.C.F dB	Field Strength dB(uV/m)	Limit dB(uV/m)	Margin dB
Tx, @ 2412 MHz										
2390	V	Peak	39.8	3.2	-	28.7	-9.5	62.2	74	-11.8
2390	V	Aver	29.5	3.2	-	28.7	-9.5	51.9	54	-2.1
4824	V	Peak	50.2	8.5	35.8	34.9	-9.5	48.3	74	-25.7
4824	V	Aver	39.1	8.5	35.8	34.9	-9.5	37.2	54	-16.8
7236	H	Peak	54.9	9.2	35.4	37.7	-9.5	56.9	74	-17.1
7236	H	Aver	44.7	9.2	35.4	37.7	-9.5	46.7	54	-7.3
12060	V/H	Peak	38.5*	6.5	37.1	41.2	-9.5	39.6	74	-34.4
12060	V/H	Aver	28.4*	6.5	37.1	41.2	-9.5	29.5	54	-24.5
14472	V/H	Peak	39.8*	7.3	37.1	41.2	-9.5	41.7	74	-32.3
14472	V/H	Aver	29.6*	7.3	37.1	41.2	-9.5	31.5	54	-22.5
19296	V/H	Peak	39.3*	9.7	24.0	40.2	-9.5	55.7	74	-18.3
19296	V/H	Aver	28.8*	9.7	24.0	40.2	-9.5	45.2	54	-8.8
Tx, @ 2437 MHz										
4874	V	Peak	47.2	8.5	35.8	34.9	-9.5	45.3	74	-28.7
4874	V	Aver.	37.6	8.5	35.8	34.9	-9.5	35.7	54	-18.3
7311	H	Peak	54.5	9.2	35.4	37.7	-9.5	56.5	74	-17.5
7311	H	Aver	45.1	9.2	35.4	37.7	-9.5	47.1	54	-6.9
12185	V/H	Peak	38.2*	6.5	37.1	41.2	-9.5	39.3	74	-34.7
12185	V/H	Aver	27.6*	6.5	37.1	41.2	-9.5	28.7	54	-25.3
19496	V/H	Peak	40.3*	9.7	24.0	40.2	-9.5	56.7	74	-17.3
19496	V/H	Aver	29.7*	9.7	24.0	40.2	-9.5	46.1	54	-7.9
Tx, @ 2462 MHz										
4924	H	Peak	51.8	8.5	35.8	34.9	-9.5	49.9	74	-24.1
4924	H	Aver	42.3	8.5	35.8	34.9	-9.5	40.4	54	-13.6
7386	V	Peak	53.2	9.2	35.4	37.7	-9.5	55.2	74	-18.8
7386	V	Aver	43.6	9.2	35.4	37.7	-9.5	45.6	54	-8.4
12310	V/H	Peak	39.2*	6.5	37.1	41.2	-9.5	40.3	74.0	-33.7
12310	V/H	Aver	28.7*	6.5	37.1	41.2	-9.5	29.8	54.0	-14.2
19696	V/H	Peak	40.7*	9.7	24.0	40.2	-9.5	57.1	74.0	-16.9
19696	V/H	Aver	30.5*	9.7	24.0	40.2	-9.5	46.9	54.0	-7.1
22158	V/H	Peak	41.0*	11.5	24.0	40.3	-9.5	59.3	74.0	-14.7
22158	V/H	Aver	30.4*	11.5	24.0	40.3	-9.5	49.8	54.0	-5.3

* Noise floor

Radiated Emission in Restricted Bands at the band-edge frequencies
(measured using the "delta" method)

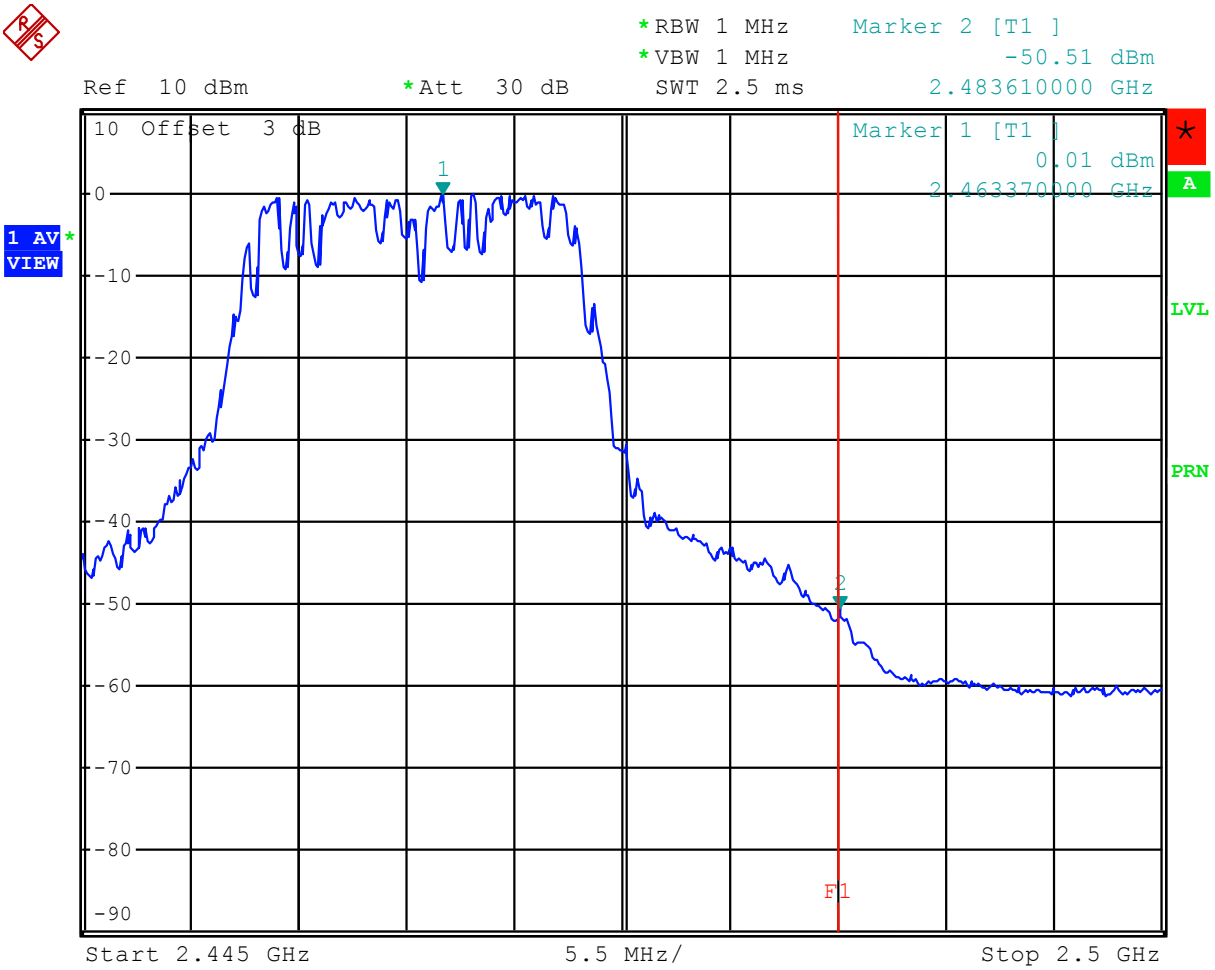
Frequency GHz	Polarity	Detector	SA reading dB(uV)	Cable loss dB	Ant. factor dB(1/m)	Field Strength at 3 m dB(uV/m)	Limit at 3 m dB(uV/m)	Margin dB
2.462	V	Peak	75.9	5.4	30.5	113.6	-	-
2.462	V	Aver.	65.8	5.4	30.5	103.2	-	-
2.4835 –2.5	V	Peak	-	-	-	113.6 – 50.5=63.1*	74.0	-10.9
2.4835 –2.5	V	Aver.	-	-	-	103.2 – 50.5=52.7*	54.0	-1.3

* delta = 50.5 dB obtained from plot 6.2

Refer to the following plots

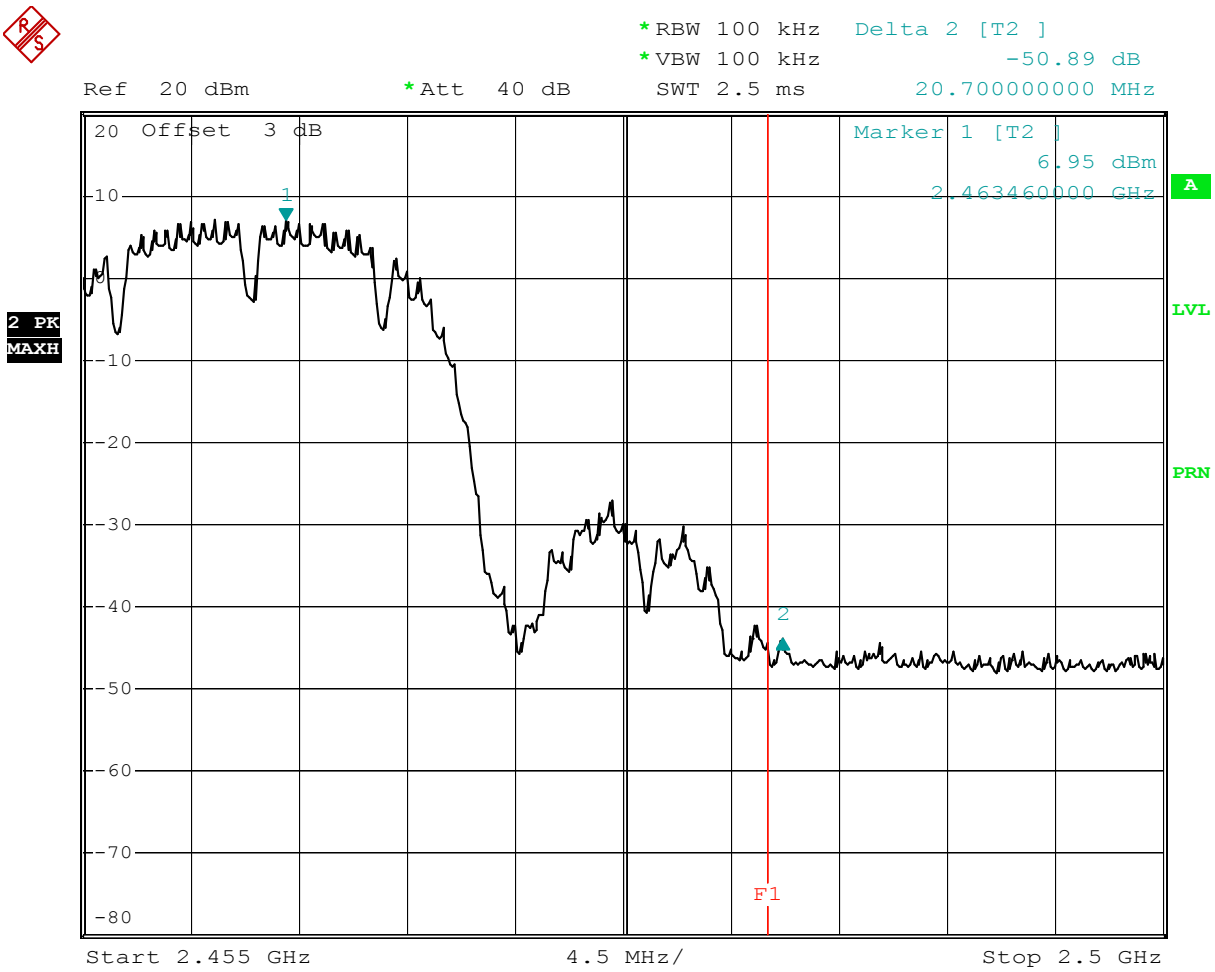
Band-edge frequency	Modulation	Delta, dB	Plot
2483.5 MHz	PBCC	-50.9	6.1
	OFDM	-50.5	6.2

Plot 6.1



Comment: Channel 11, band-edge delta, OFDM mod.
Date: 29.APR.2004 23:41:03

Plot 6.2



Comment: Channel 11, band-edge delta, DBPSK mod.
Date: 27.APR.2004 00:59:19

4.7 AC Line Conducted Emission, FCC Rule 15.207:

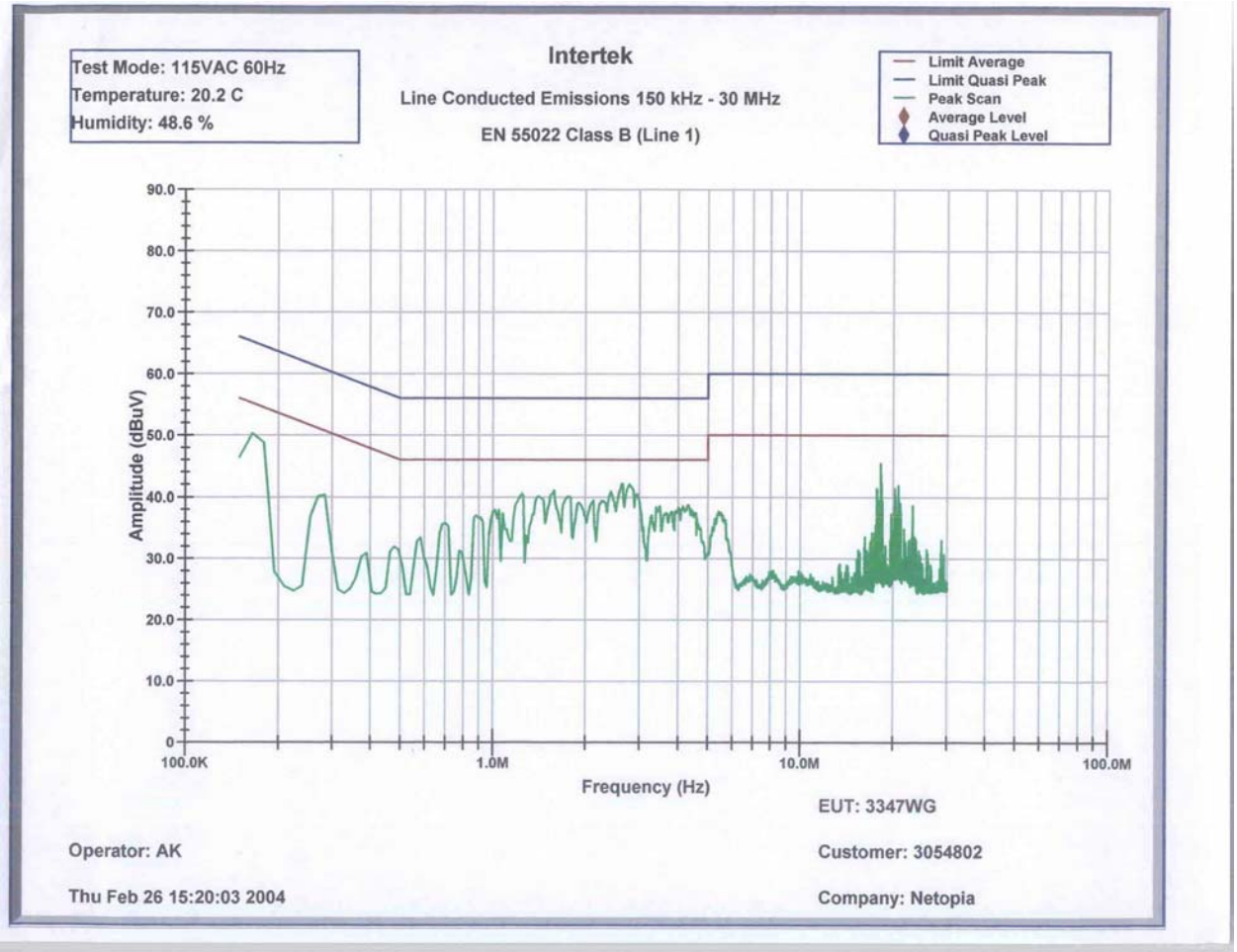
Procedure

AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to AC Line through the LISN.

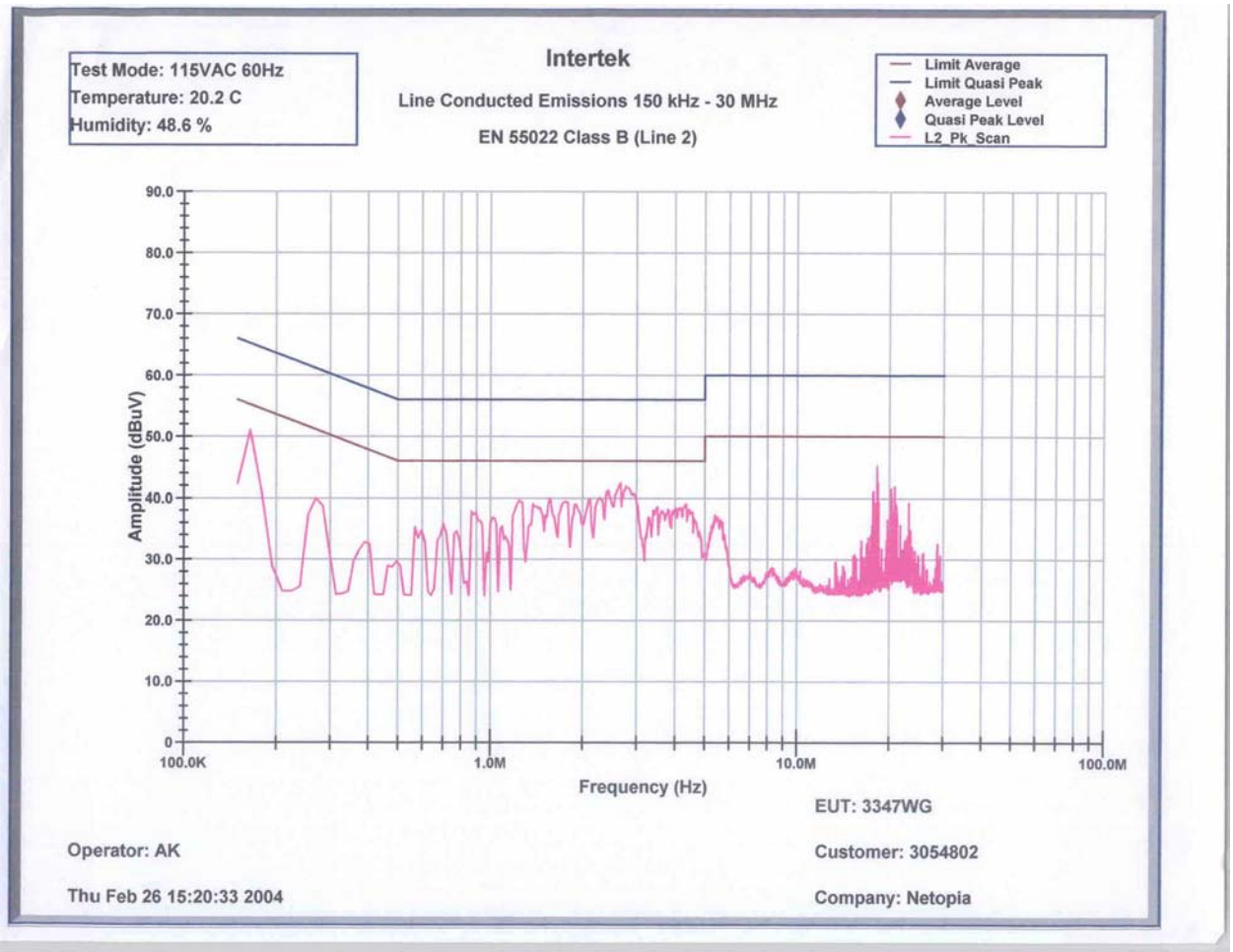
Test Result

For the test result, see attached plots 7.1, 7.2.
The EUT passed by 5 dB.

Plot 7.1


Test Mode: 115VAC 60Hz
Temperature: 20.2 C
Humidity: 48.6 %
Intertek
Line Conducted Emissions 150 kHz - 30 MHz
EN 55022 Class B (Line 1)
Limit Average
Limit Quasi Peak
Peak Scan
Average Level
Quasi Peak Level
Amplitude (dBuV)
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
100.0K
1.0M
10.0M
100.0M
Frequency (Hz)
EUT: 3347WG
Operator: AK
Customer: 3054802
Thu Feb 26 15:20:03 2004
Company: Netopia

Plot 7.2


Test Mode: 115VAC 60Hz
Temperature: 20.2 C
Humidity: 48.6 %
Intertek
Line Conducted Emissions 150 kHz - 30 MHz
EN 55022 Class B (Line 2)
Limit Average
Limit Quasi Peak
Average Level
Quasi Peak Level
L2_Pk_Scan
Amplitude (dBuV)
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
100.0K
1.0M
10.0M
100.0M
Frequency (Hz)
EUT: 3347WG
Operator: AK
Customer: 3054802
Thu Feb 26 15:20:33 2004
Company: Netopia

4.8 Radiation exposure evaluation

The 3347W is a Wireless ADSL Router. It is desktop or wall-mounted device used with AC power adapter in mobile application, at least 20 cm from any body part of the user or nearby persons.

The maximum conducted power is 20.0 dBm, antenna is fix-mounted, 3.75 dBi gain (maximum). Therefore, to comply with RF Exposure Requirement, the MPE is calculated.

The maximum Peak EIRP calculated is 0.24 W. The Power Density can be calculated using the formula

$$S = EIRP/ 4\pi D^2$$

Where: S is Power Density in W/m^2
D is the distance from the antenna.

In the table below, the calculated Power Density at different distances and MPE Limit for general population/uncontrolled exposure are presented.

Distance, m	Power Density, W/m^2	MPE, W/m^2
0.05	7.6	10.0
0.10	1.9	10.0
0.15	0.85	10.0
0.20	0.45	10.0

As can be seen from the data, the MPE is well below the limit at 10 cm and more.

5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	10/28/04
Spectrum Analyzer	Hewlett Packard	8565E	AE9674	12	5/27/04
BI-Log Antenna	EMCO	3143	9509-1160	12	4/24/04
Horn Antenna	EMCO	3115	8812-3049	12	4/08/04
Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	4/06/04
Pre-Amplifier	Avantek	AFT-18855	8723H705	12	4/10/04
Pre-amplifier	CTT	ACO/400	47526	12	4/10/04
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	9/9/04
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	9/8/04
LISN	FCC	FCC-LISN-50-50-M-H	2012	12	1/23/05

No calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3054802	DC	April 27, 2004	Original document