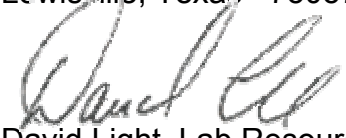
Nemko Test Report:	4L0166RUS1REV1
Applicant:	Navini Networks
Equipment Under Test: (E.U.T.)	2.4 GHz LCD Modem, Release 1
In Accordance With:	**FCC Part 15, Subpart C, 15.247** Direct Sequence Spread Spectrum Transmitters
Tested By:	Nemko Dallas Inc. 802 N. Kealy Lewisville, Texas 75057-3136
Authorized By:	 David Light, Lab Resource Manager
Date:	9/15/2004
Total Number of Pages:	58

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Section 1. Summary of Test Results

Manufacturer: Navini Networks

Model No.: 2.4GHz LCD Modem, Release 1

Serial No.: 01

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.247 for Direct Sequence Spread Spectrum devices. Radiated tests were conducted is accordance with ANSI C63.4-2001. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE
See " Summary of Test Data".

NVLAP LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
Powerline Conducted Emissions	15.207(a)	0.15-0.5 66 to 56* QP 56 to 46* ave *Decreases with Log(f) 0.5-5 56 QP 46 Ave 5-30 60 QP 50 Ave	Complies
Minimum 6 dB Bandwidth	15.247(a)(2)	>500 kHz	Complies
Maximum Peak Power Output	15.247(b)(1)	<1 Watt	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	-20 dBc/100kHz	Complies
Spurious Emissions (Restricted Bands)	15.247(c)	< 74 dBuV/m Peak < 54 dBuV/m Avg	Complies
Peak Power Spectral Density	15.247(d)	+8 dBm/3kHz	Complies

Footnotes:

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Band:

☐ 902 – 928 MHz
☒ 2400 – 2483.5 MHz
☐ 5725 – 5850 MHz

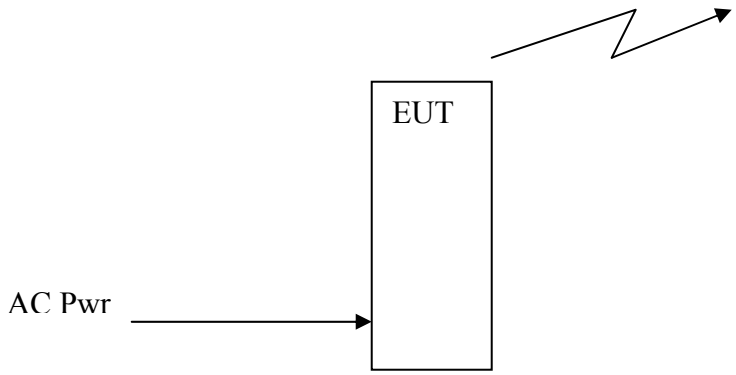
Frequency Band of operation: 2401.35MHz to 2478.9MHz

User Frequency Adjustment: Software controlled

Description of EUT

Navini's Wireless Modem is a sleek end-user wireless terminal device used to give the user access to Navini's wireless broadband network

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
TESTED BY: Dustin Oaks	DATE: June 28, 2004

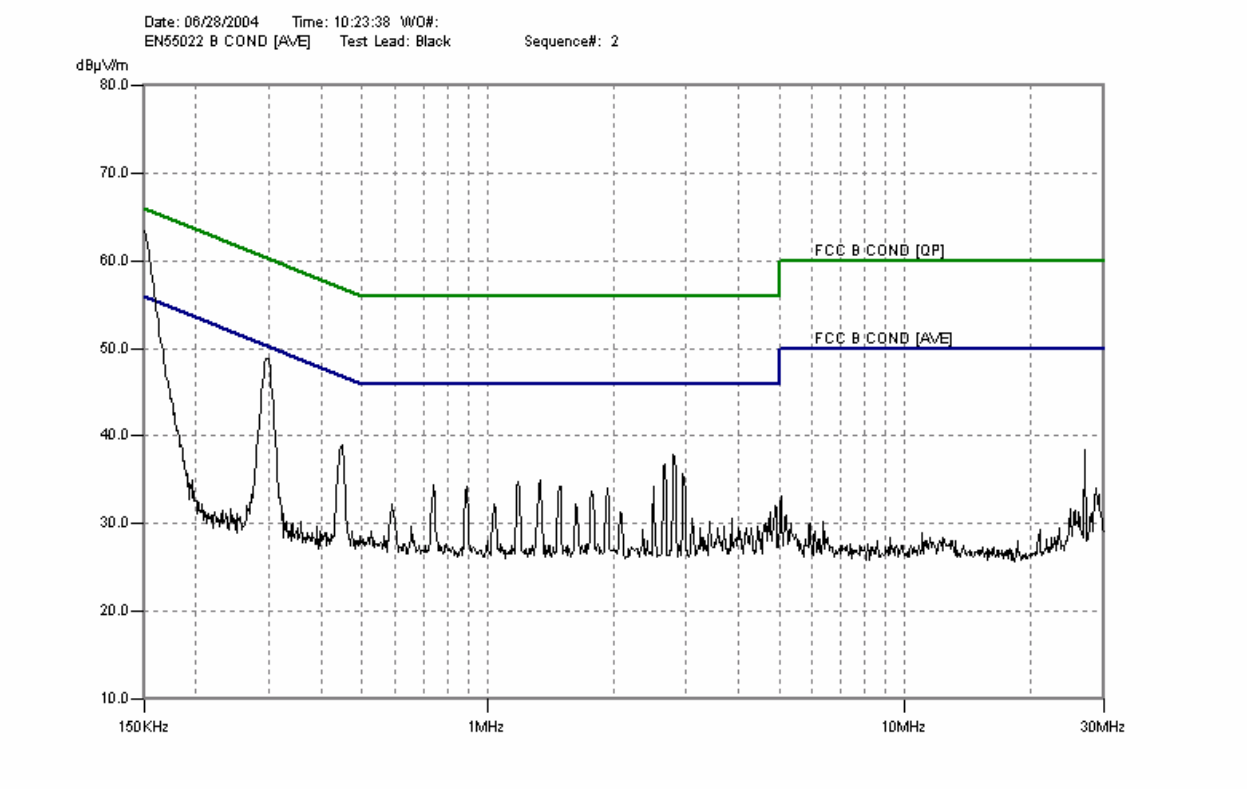
Test Results: Pass

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Test Data – Powerline Conducted Emissions

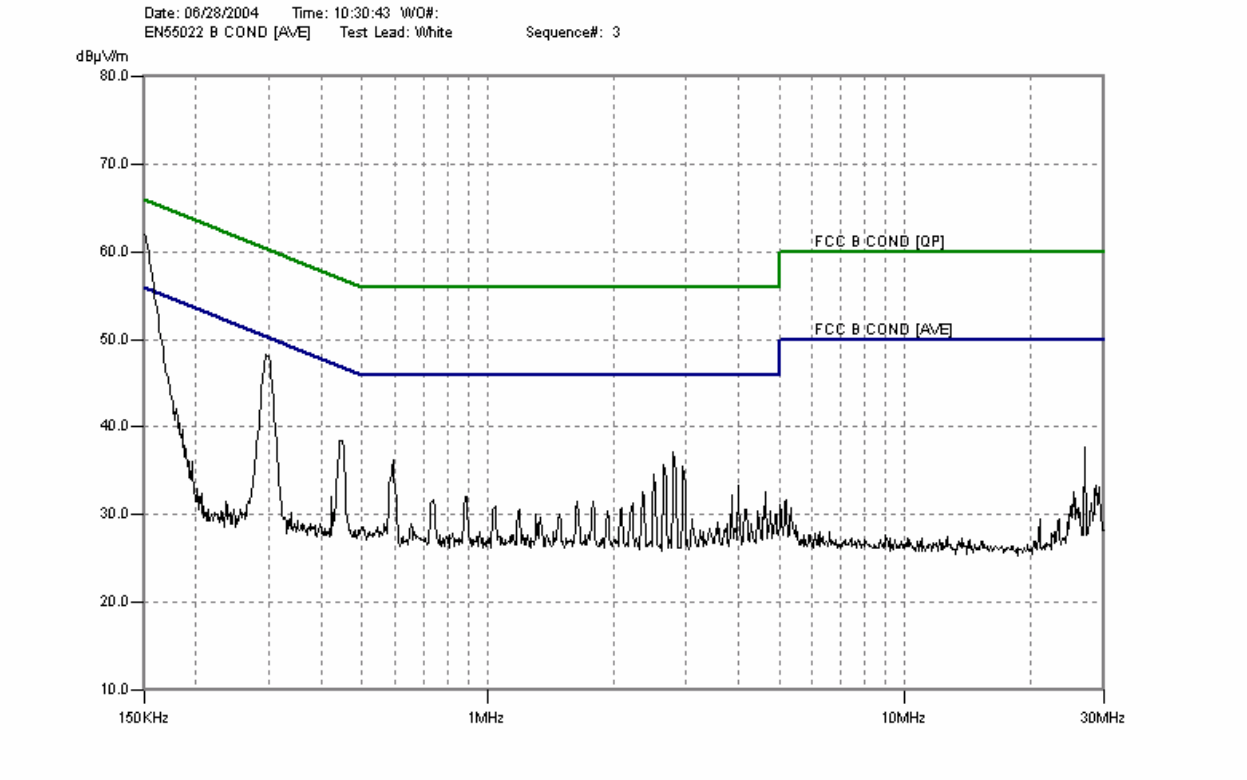
BLACK LEAD



Freq in MHz	Meter dBµV/m	Factors	Corr	Spec	Margin	RType
0.150100	49.6	2.2	51.8	56	-4.2	**Ave**
0.448152	38.4	0.6	39	46.9	-7.9	Peak
2.794000	37.6	0.3	37.9	46	-8.1	Peak
2.663000	36.5	0.3	36.8	46	-9.2	Peak
0.297000	39.4	0.8	40.2	50.3	-10.1	**Ave**

Test Data – Powerline Conducted Emissions

WHITE LEAD



Freq in MHz	Meter dBµV/m	Factors	Corr	Spec	Margin	RType
0.150500	48.1	1.9	50	56	-6.0	**Ave**
0.444011	37.7	0.8	38.5	47	-8.5	Peak
2.794000	36.8	0.3	37.1	46	-8.9	Peak
0.595140	35.7	0.6	36.3	46	-9.7	Peak
0.295900	39.2	0.9	40.1	50.4	-10.3	**Ave**

Photos – Powerline Conducted Emissions

Section 4. Minimum 6 dB Bandwidth

NAME OF TEST: Minimum 6 dB Bandwidth	PARA. NO.: 15.247(a)(2)
TESTED BY: Dustin Oaks	DATE: 4/6/2004

Test Results: Complies.

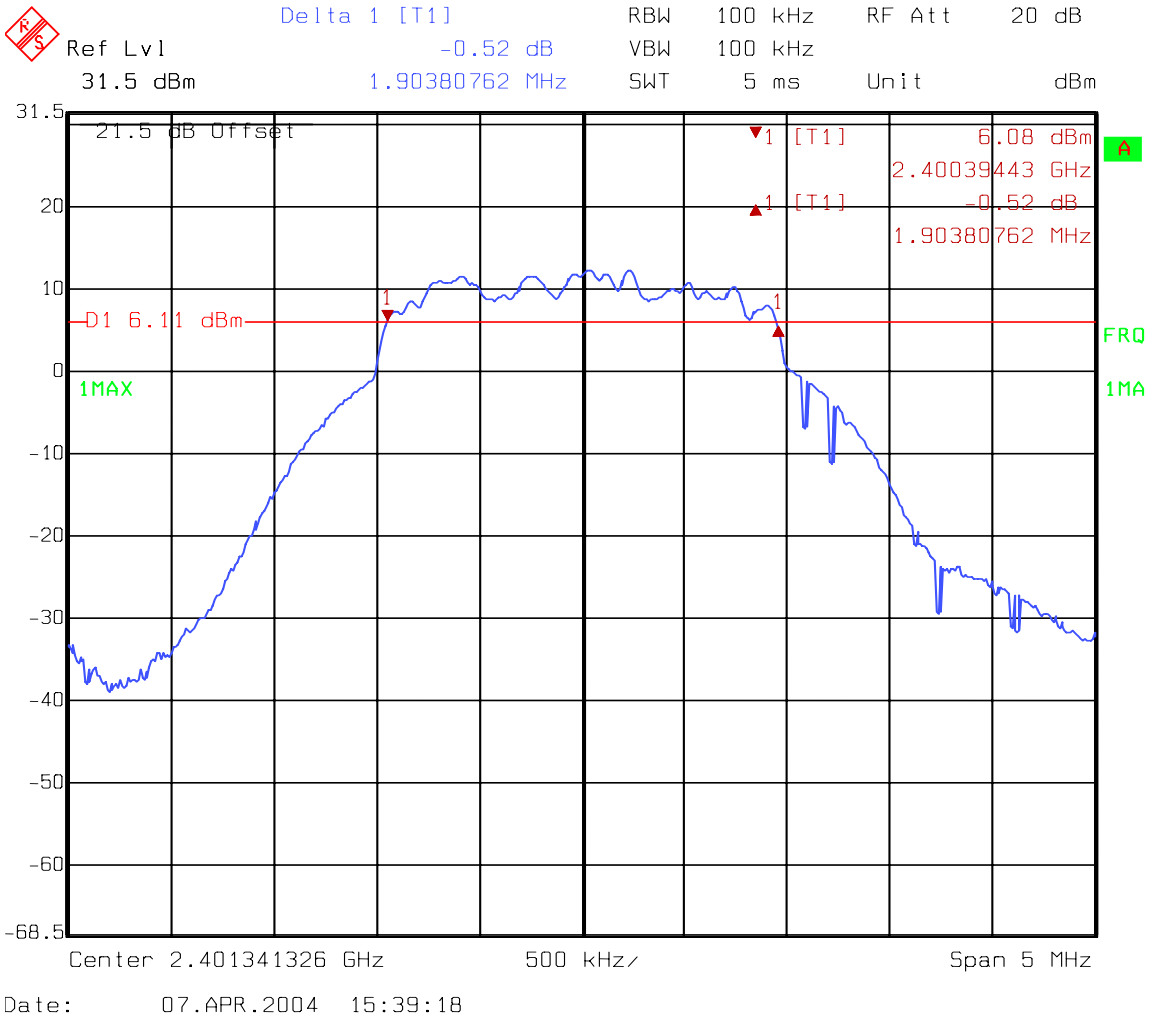
Measurement Data: See 6 dB BW plot
Measured 6 dB bandwidth: 1.90MHz
Channel Separation:

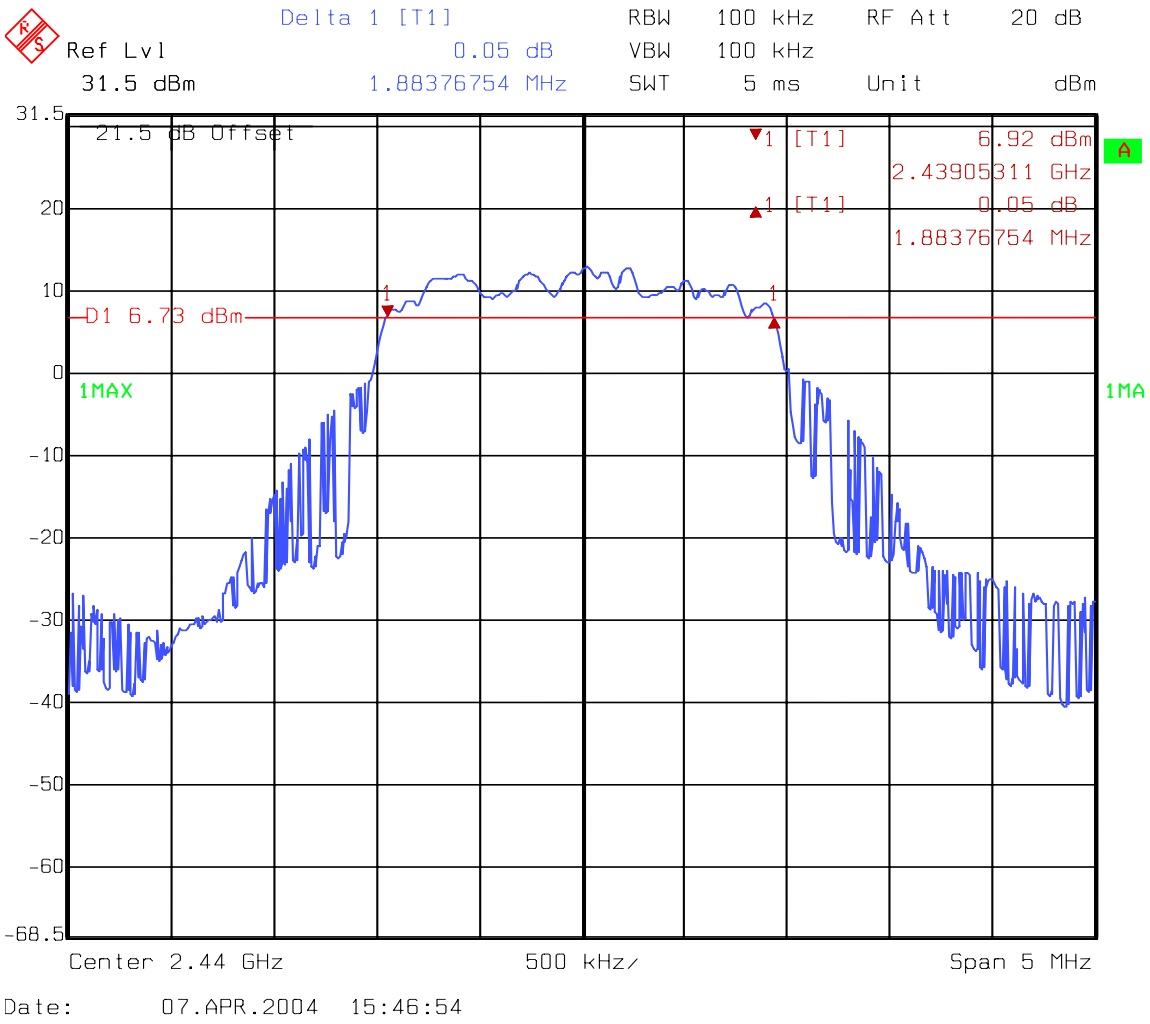
Equipment Used: 1036, 1044

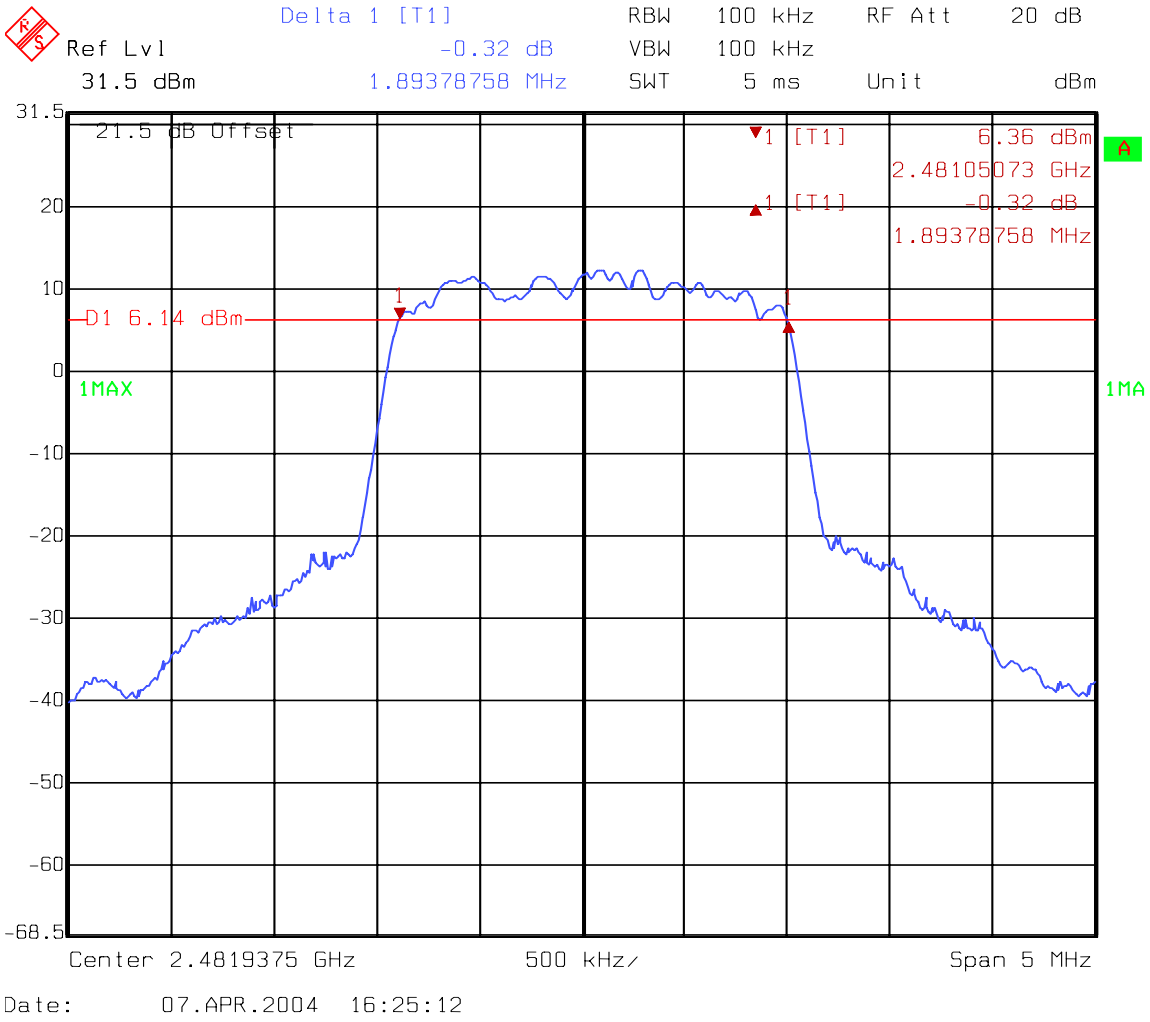
Measurement Uncertainty: +/- 0.7 dB

Temperature: 21°C

Relative Humidity: 40%


Delta 1 [T1]
RBW 100 kHz
RF Att 20 dB
Ref Lvl
-0.52 dB
VBW 100 kHz
31.5 dBm
1.90380762 MHz
SWT 5 ms
Unit dBm
31.5
21.5 dB Offset
1 [T1] 6.08 dBm
2.40039443 GHz
1 [T1] -0.52 dB
1.90380762 MHz
A
20
10
D1 6.11 dBm
FRQ
0
1MAX
1MA
-10
-20
-30
-40
-50
-60
-68.5
Center 2.401341326 GHz
500 kHz/
Span 5 MHz
Date: 07.APR.2004 15:39:18


Delta 1 [T1]
RBW 100 kHz
RF Att 20 dB
Ref Lvl
0.05 dB
VBW 100 kHz
31.5 dBm
1.88376754 MHz
SWT 5 ms
Unit dBm
31.5
21.5 dB Offset
1 [T1]
6.92 dBm
2.43905311 GHz
1 [T1]
0.05 dB
1.88376754 MHz
20
10
D1 6.73 dBm
0
1MAX
1MA
-10
-20
-30
-40
-50
-60
-68.5
Center 2.44 GHz
500 kHz/
Span 5 MHz
Date: 07.APR.2004 15:46:54


Delta 1 [T1]
-0.32 dB
1.89378758 MHz
RBW 100 kHz
VBW 100 kHz
SWT 5 ms
RF Att 20 dB
Unit dBm
Ref Lvl
31.5 dBm
21.5 dB Offset
1 [T1] 6.36 dBm
2.48105073 GHz
1 [T1] -0.32 dB
1.89378758 MHz
D1 6.14 dBm
1MAX
1MA
A
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Center 2.4819375 GHz
500 kHz/
Span 5 MHz
Date: 07.APR.2004 16:25:12

Section 5. Maximum Peak Output Power

NAME OF TEST: Maximum Peak Output power	PARA. NO.: 15.247(b)(1)
TESTED BY: Dustin Oaks	DATE: 04/08/2004

Test Results: Complies.

Measurement Data:

Antenna Terminal Measurements

Channel	Conducted Power (dBm)	Conducted Power (Watts)
Low	25.13	0.326
Mid	25.13	0.326
High	25.13	0.326

EIRP (Substitution)

Antenna	EIRP	EIRP (W)
Omni	30.98	1.253
Patch	31.18	1.312

Note: Substitution Method used to obtain EIRP values. Highest value for each antenna shown.

Equipment Used: 1036, 1044, 1016, 1484, 1485, 1304, 1033

Measurement Uncertainty: +/- 0.7 dB

Temperature: 21°C

Relative Humidity: 42%

Section 6. RF Exposure

NAME OF TEST: RF Exposure	PARA. NO.: 15.247(b)(4)
TESTED BY: Dustin Oaks	DATE: 4/6/2004

Test Results: Complies.

Measurement Data:

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power (EIRP): 31.18 (dBm)
Maximum peak output power (EIRP): 1312.2 (mW)
Prediction distance: 20 (cm)
Prediction frequency: 2400 (MHz)
MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm^2)

Power density at prediction frequency: 0.261054 (mW/cm^2)

Section 7. Spurious Emissions (conducted)

NAME OF TEST: Spurious Emissions (conducted)	PARA. NO.: 15.247(c)
TESTED BY: Dustin Oaks	DATE: 4/6/2004

Test Results: Complies.

Measurement Data: See attached plots.

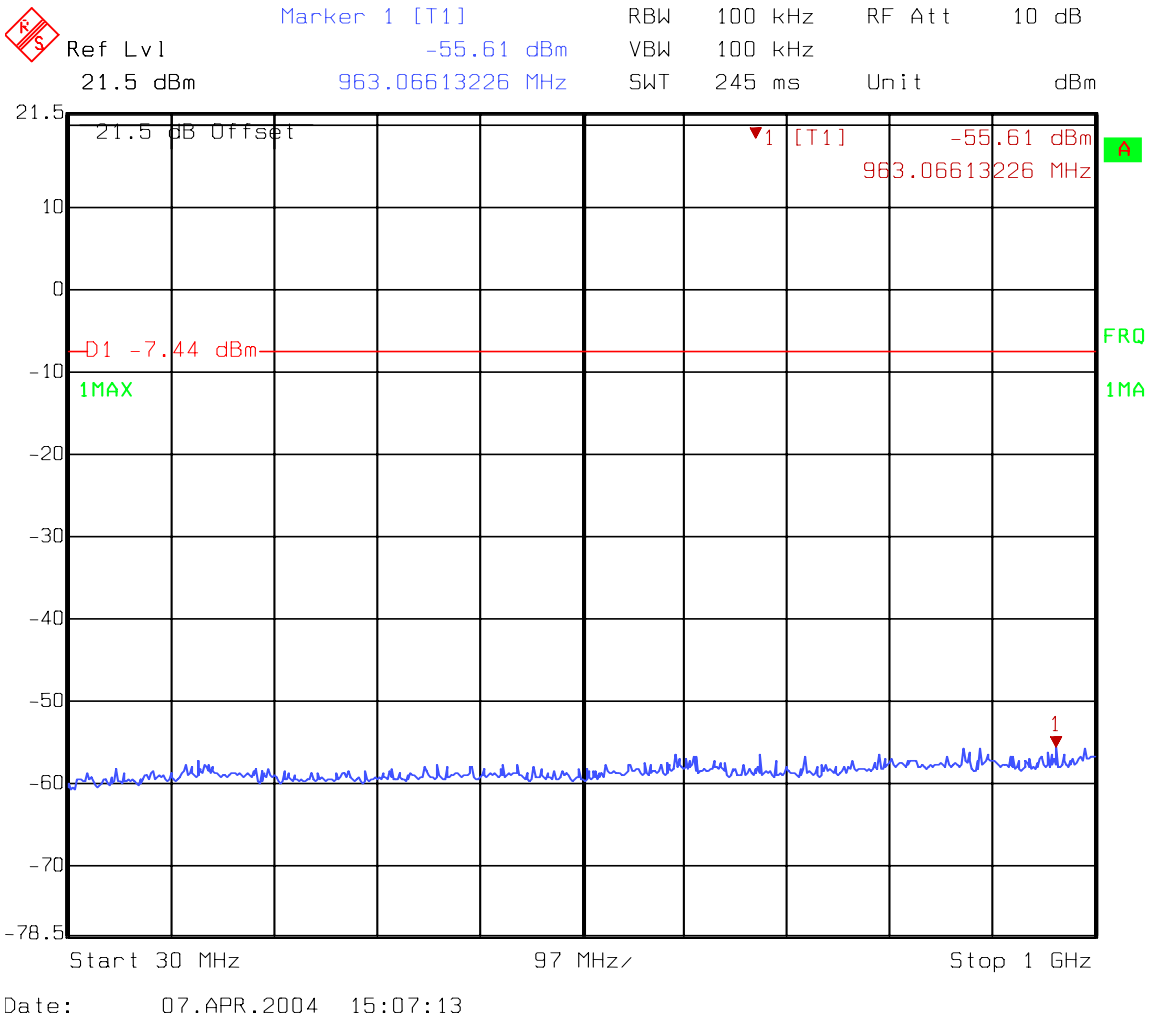
Equipment Used: 1036, 1044

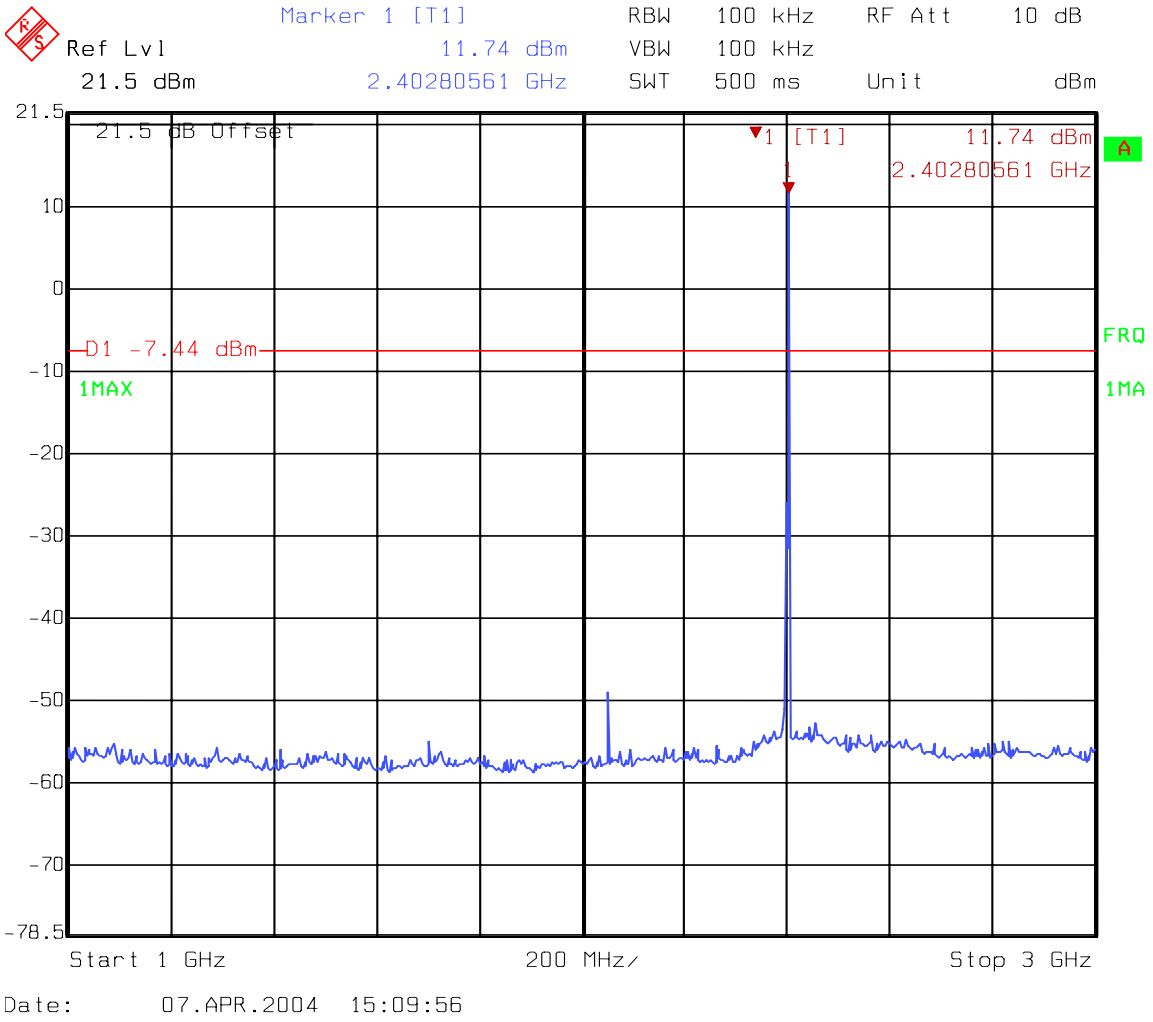
Measurement Uncertainty: +/- 0.7 dB

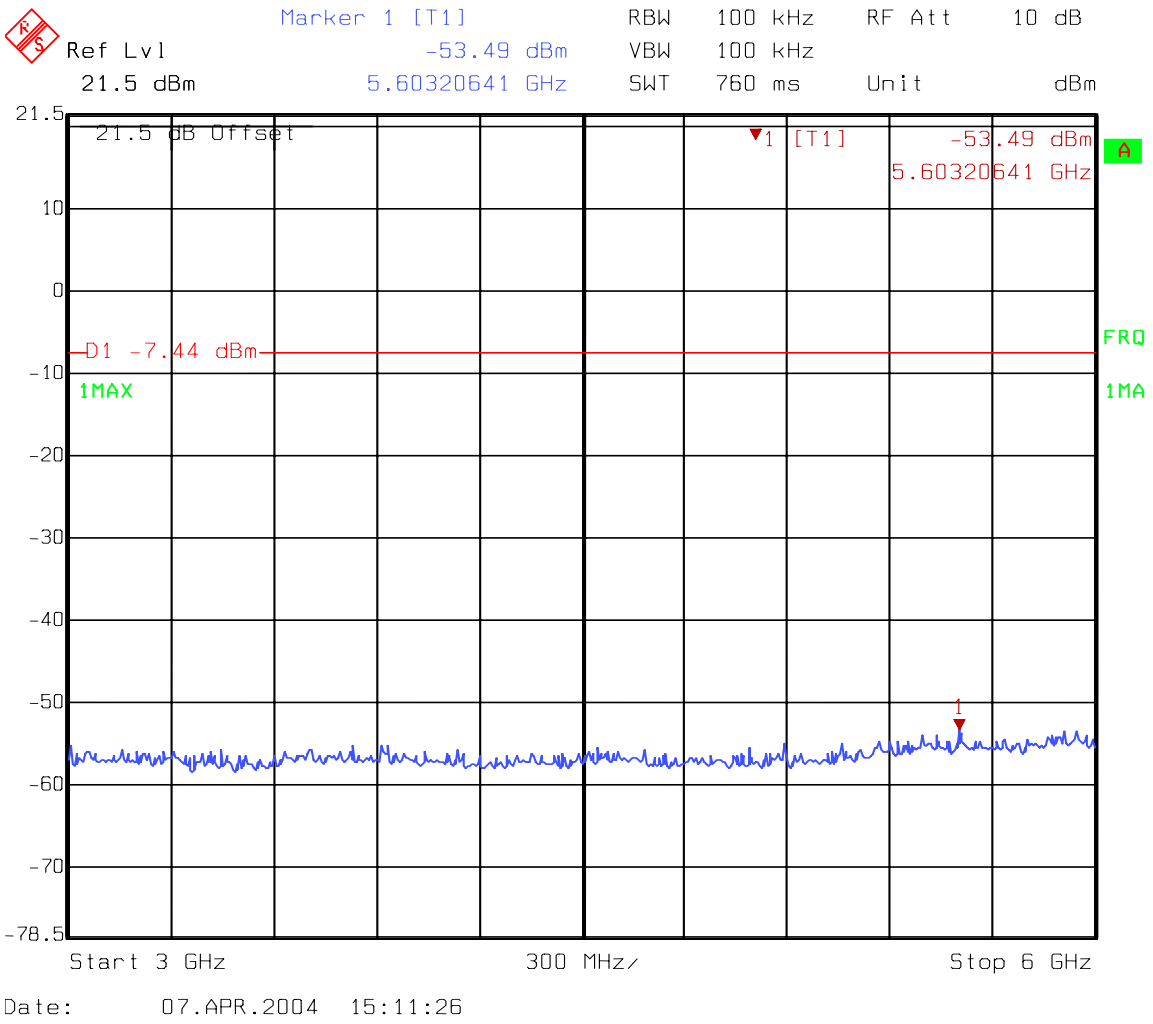
Temperature: 21°C

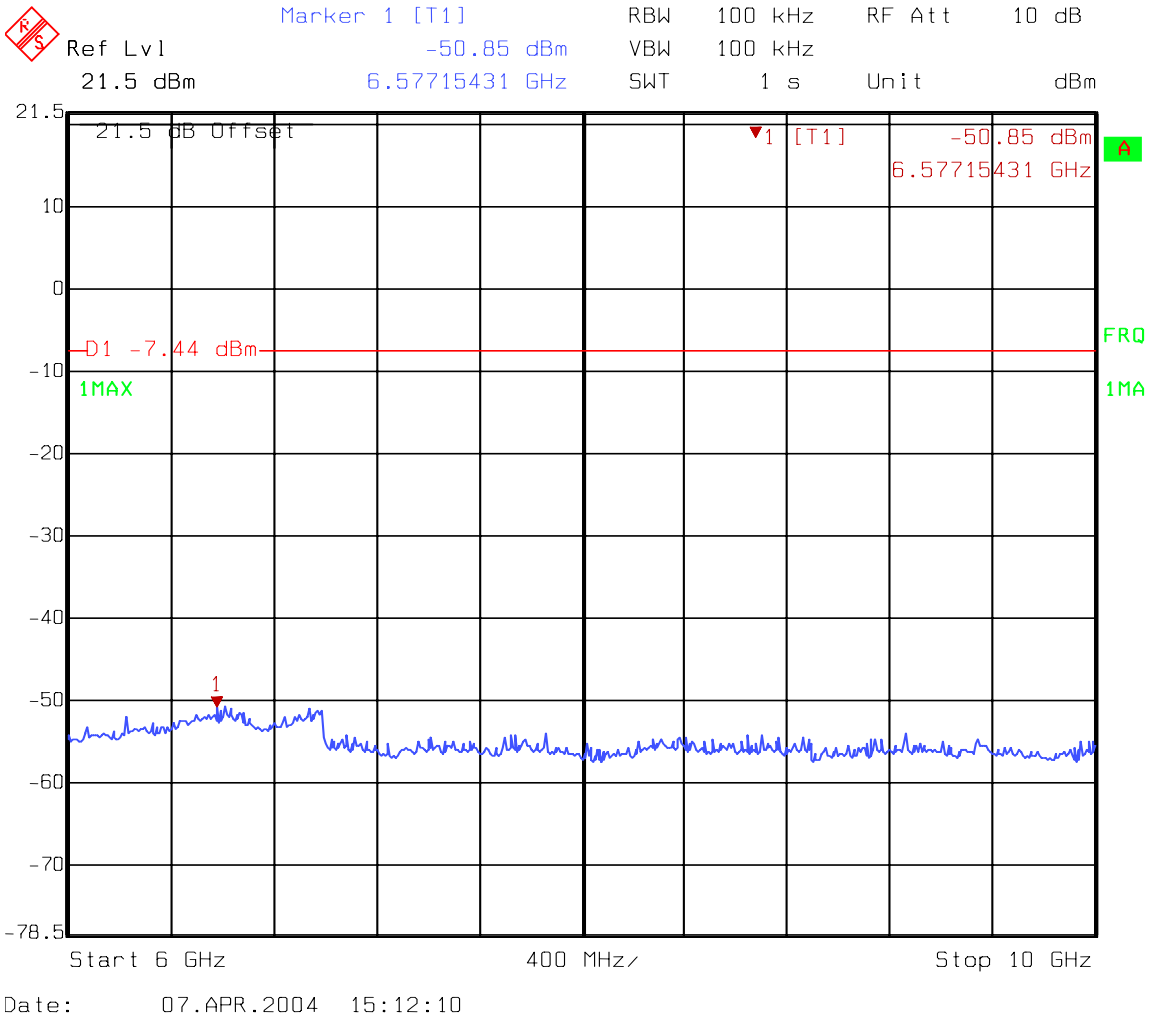
Relative Humidity: 46%

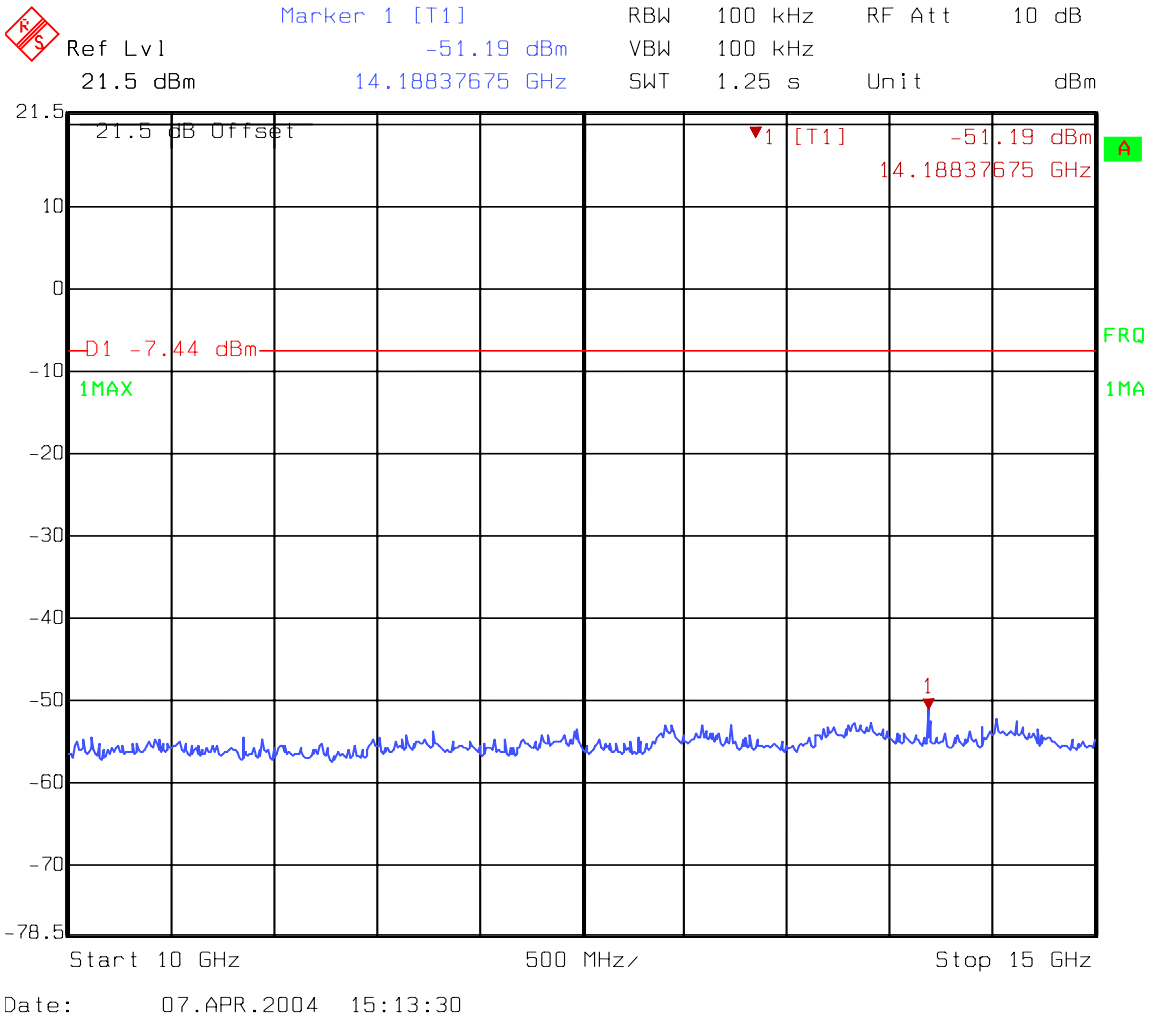
Antenna Spurs: Low channel

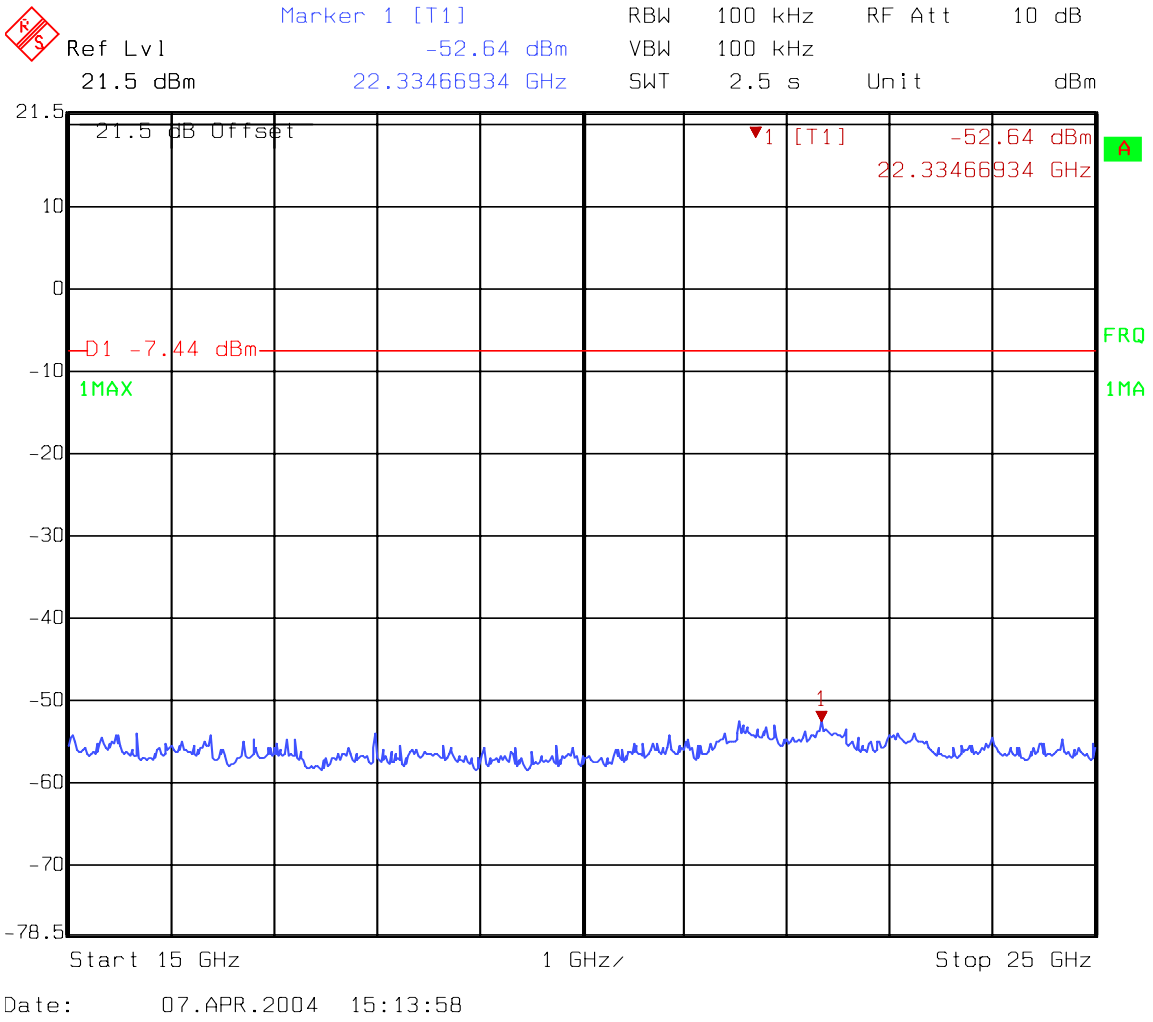



Marker 1 [T1]
RBW 100 kHz
RF Att 10 dB
Ref Lvl
11.74 dBm
VBW 100 kHz
21.5 dBm
2.40280561 GHz
SWT 500 ms
Unit dBm
21.5
21.5 dB Offset
1 [T1]
11.74 dBm
2.40280561 GHz
A
10
0
D1 -7.44 dBm
FRQ
-10
1MAX
1MA
-20
-30
-40
-50
-60
-70
-78.5
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 07.APR.2004 15:09:56

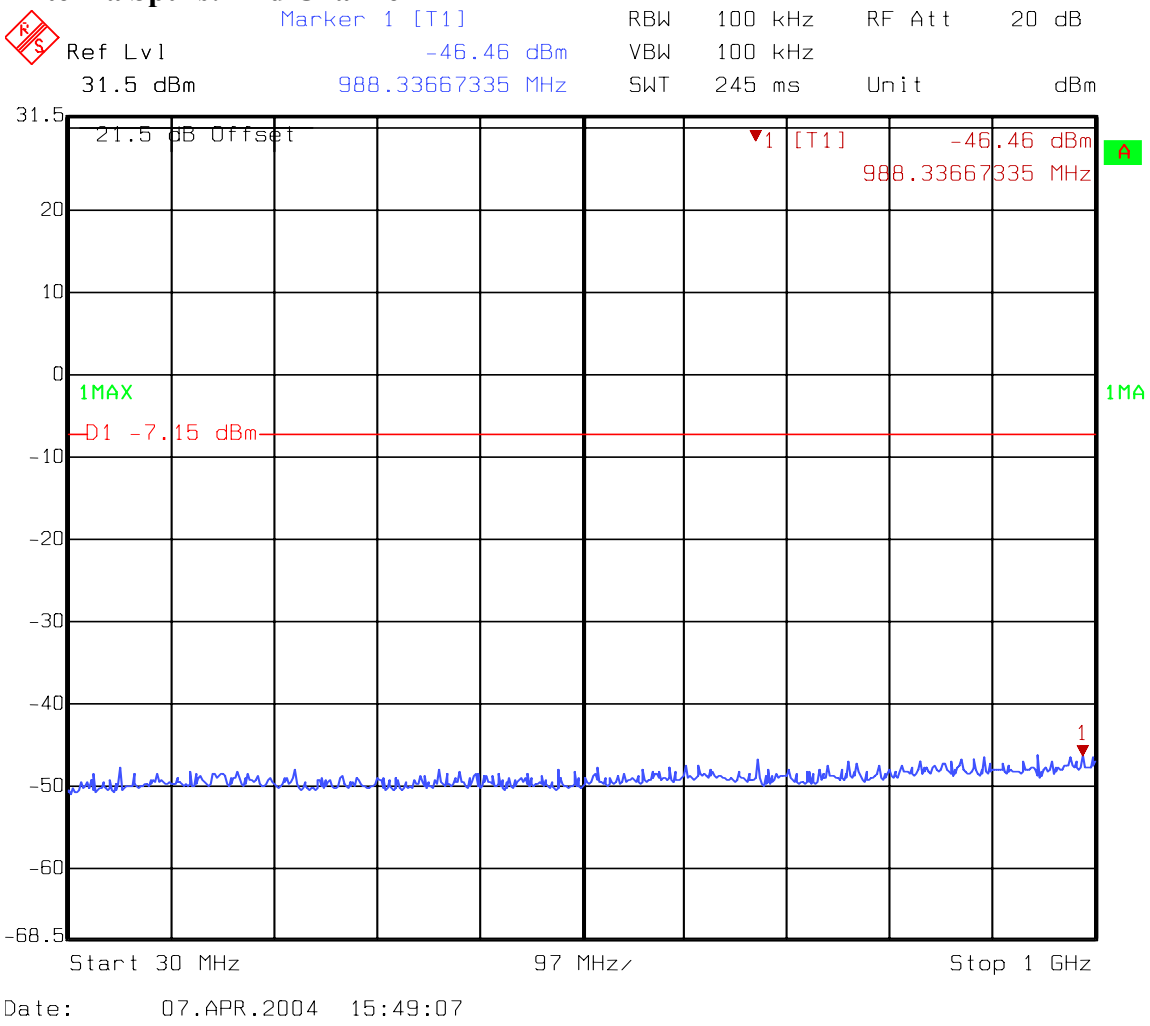

Marker 1 [T1]
Ref Lvl
21.5 dBm
-53.49 dBm
5.60320641 GHz
RBW 100 kHz
VBW 100 kHz
SWT 760 ms
RF Att 10 dB
Unit dBm
21.5 dB Offset
1 [T1]
-53.49 dBm
5.60320641 GHz
A
D1 -7.44 dBm
FRQ
1MAX
1MA
21.5
10
0
-10
-20
-30
-40
-50
-60
-70
-78.5
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 07.APR.2004 15:11:26

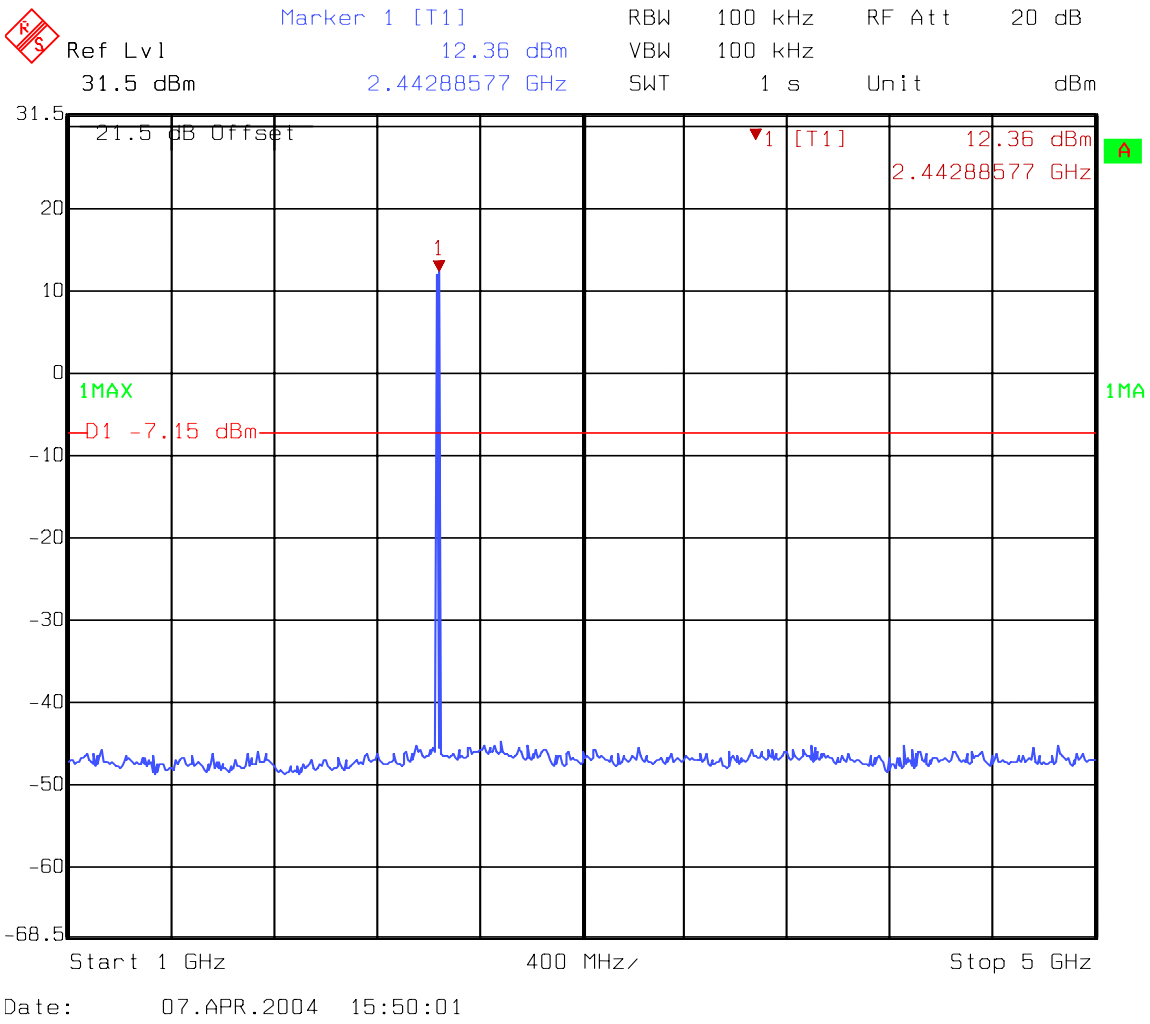

Marker 1 [T1]
Ref Lvl
21.5 dBm
-50.85 dBm
6.57715431 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1 s
RF Att 10 dB
Unit dBm
21.5 dB Offset
1 [T1]
-50.85 dBm
6.57715431 GHz
A
D1 -7.44 dBm
FRQ
1MAX
1MA
21.5
10
0
-10
-20
-30
-40
-50
-60
-70
-78.5
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 07.APR.2004 15:12:10

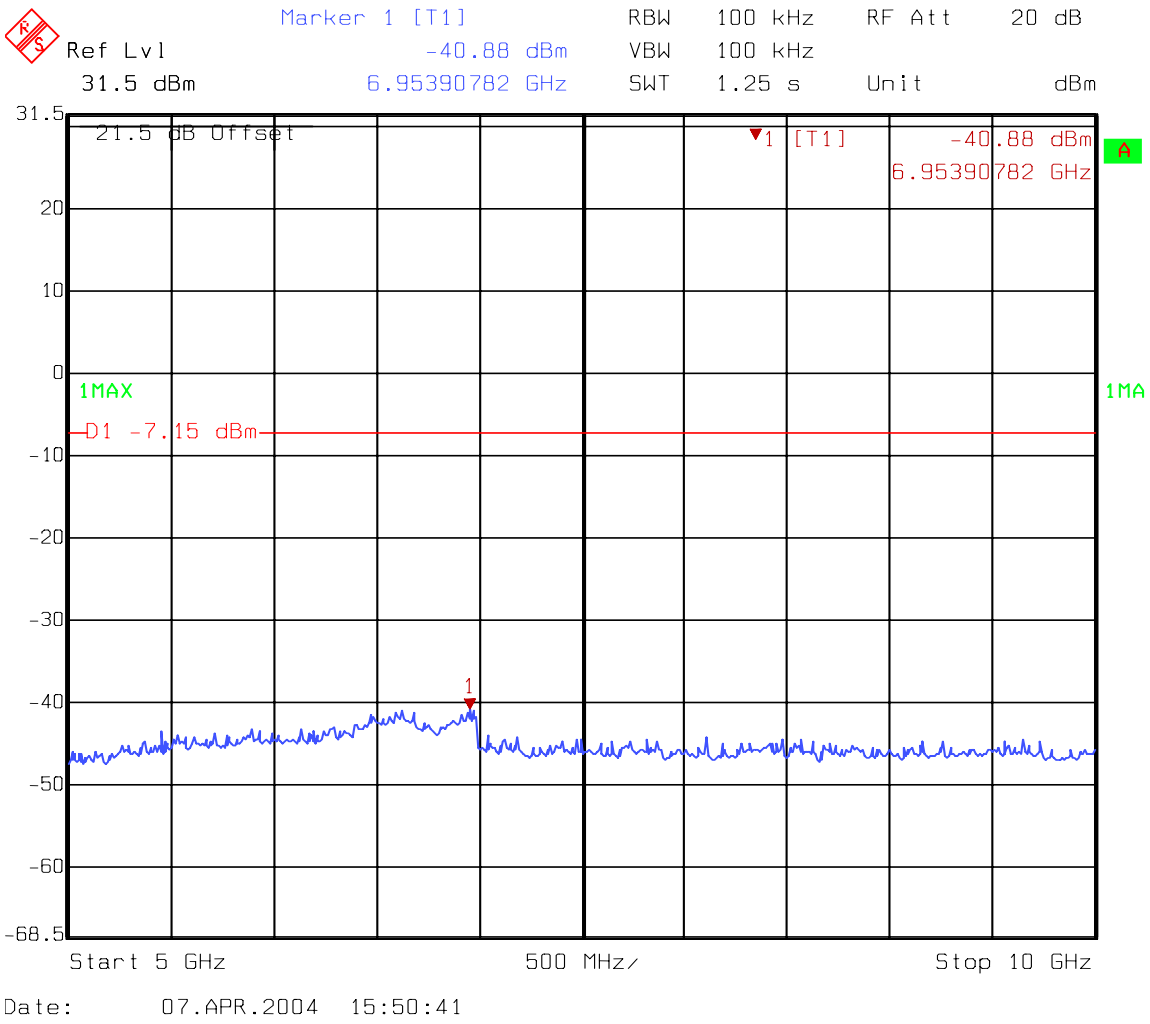

Marker 1 [T1]
Ref Lvl
21.5 dBm
-51.19 dBm
14.18837675 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1.25 s
RF Att 10 dB
Unit dBm
21.5 dB Offset
1 [T1] -51.19 dBm
14.18837675 GHz
A
D1 -7.44 dBm
FRQ
1MAX
1MA
21.5
10
0
-10
-20
-30
-40
-50
-60
-70
-78.5
Start 10 GHz
500 MHz/
Stop 15 GHz
Date: 07.APR.2004 15:13:30

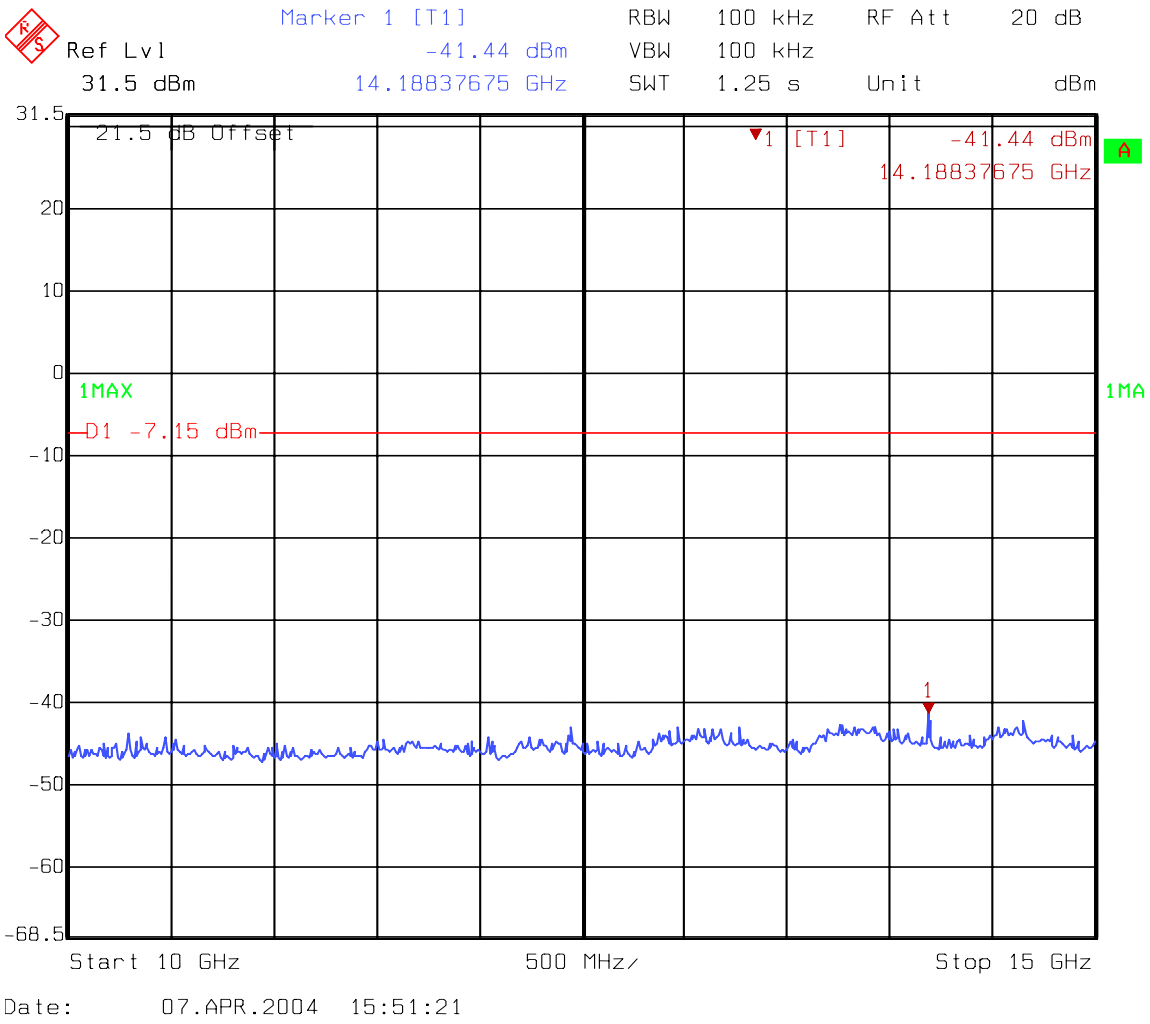

Marker 1 [T1]
Ref Lvl
21.5 dBm
-52.64 dBm
22.33466934 GHz
RBW 100 kHz
VBW 100 kHz
SWT 2.5 s
RF Att 10 dB
Unit dBm
21.5 dB Offset
1 [T1]
-52.64 dBm
22.33466934 GHz
A
D1 -7.44 dBm
FRQ
1MAX
1MA
21.5
10
0
-10
-20
-30
-40
-50
-60
-70
-78.5
Start 15 GHz
1 GHz/
Stop 25 GHz
Date: 07.APR.2004 15:13:58

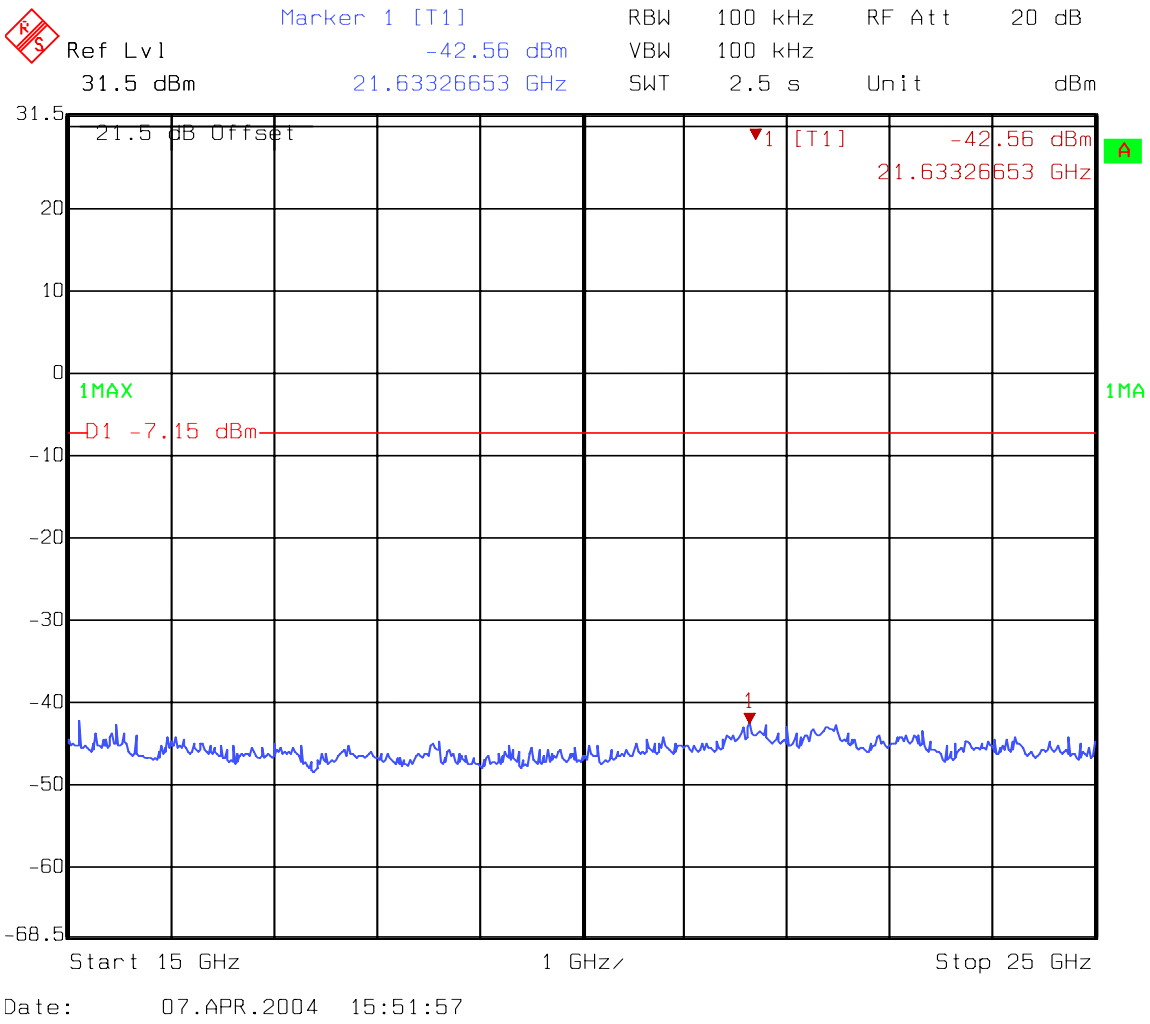
Antenna Spurs: Mid Channel



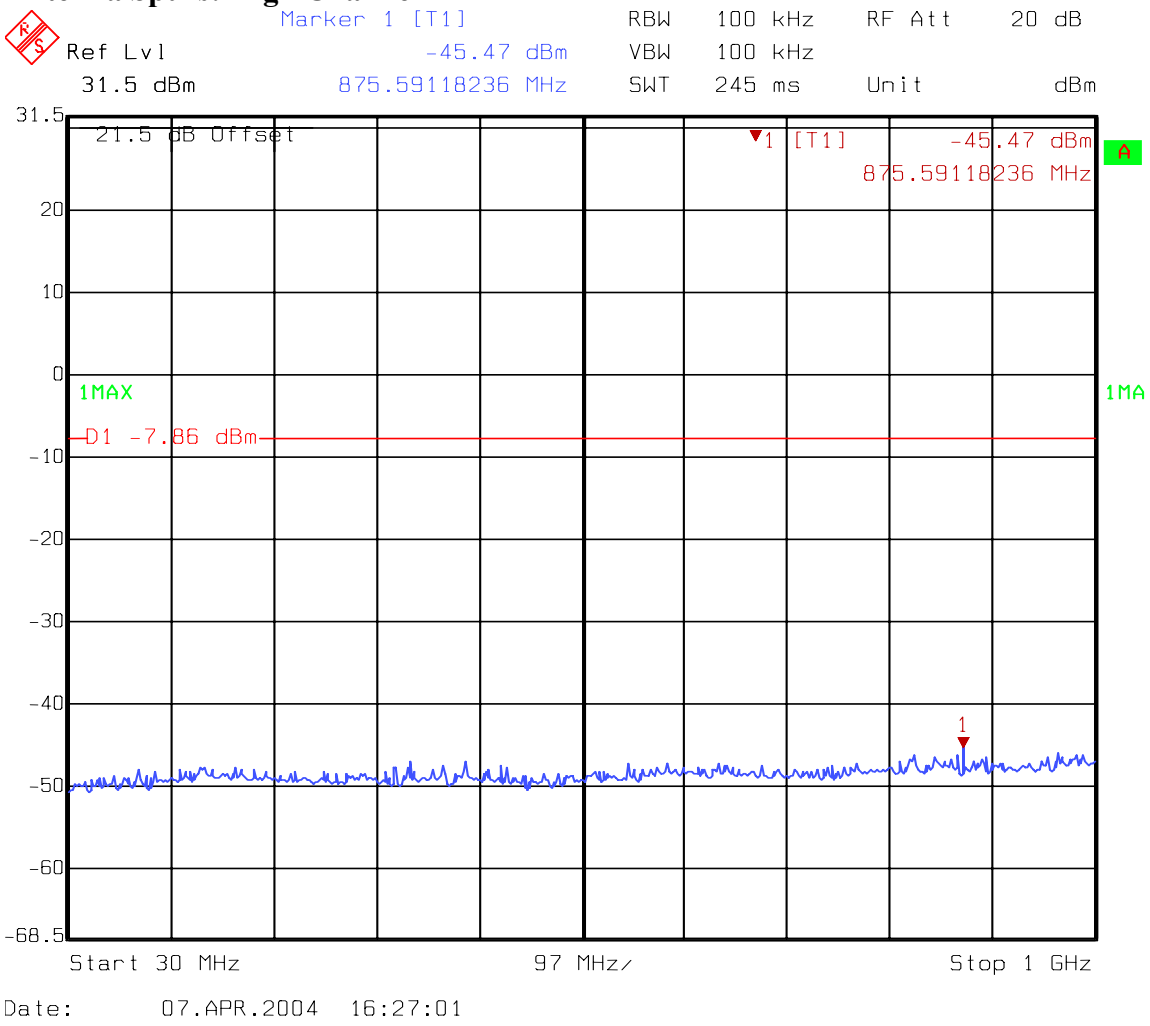

Marker 1 [T1]
Ref Lvl
31.5 dBm
12.36 dBm
2.44288577 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
12.36 dBm
2.44288577 GHz
A
1MAX
D1 -7.15 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 1 GHz
400 MHz/
Stop 5 GHz
Date: 07.APR.2004 15:50:01

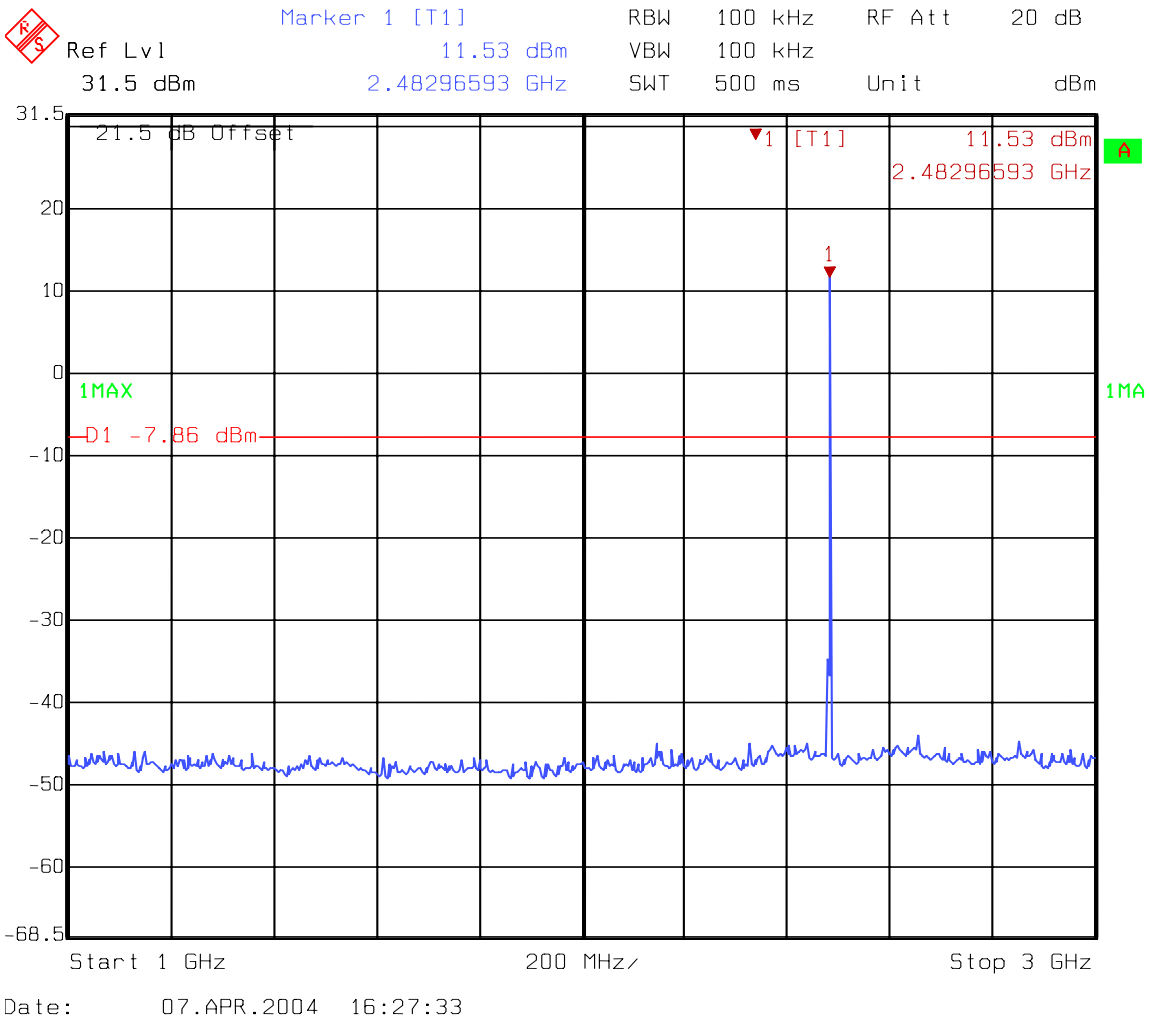

Marker 1 [T1]
Ref Lvl
31.5 dBm
-40.88 dBm
6.95390782 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1.25 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-40.88 dBm
6.95390782 GHz
A
1MAX
D1 -7.15 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 5 GHz
500 MHz/
Stop 10 GHz
Date: 07.APR.2004 15:50:41

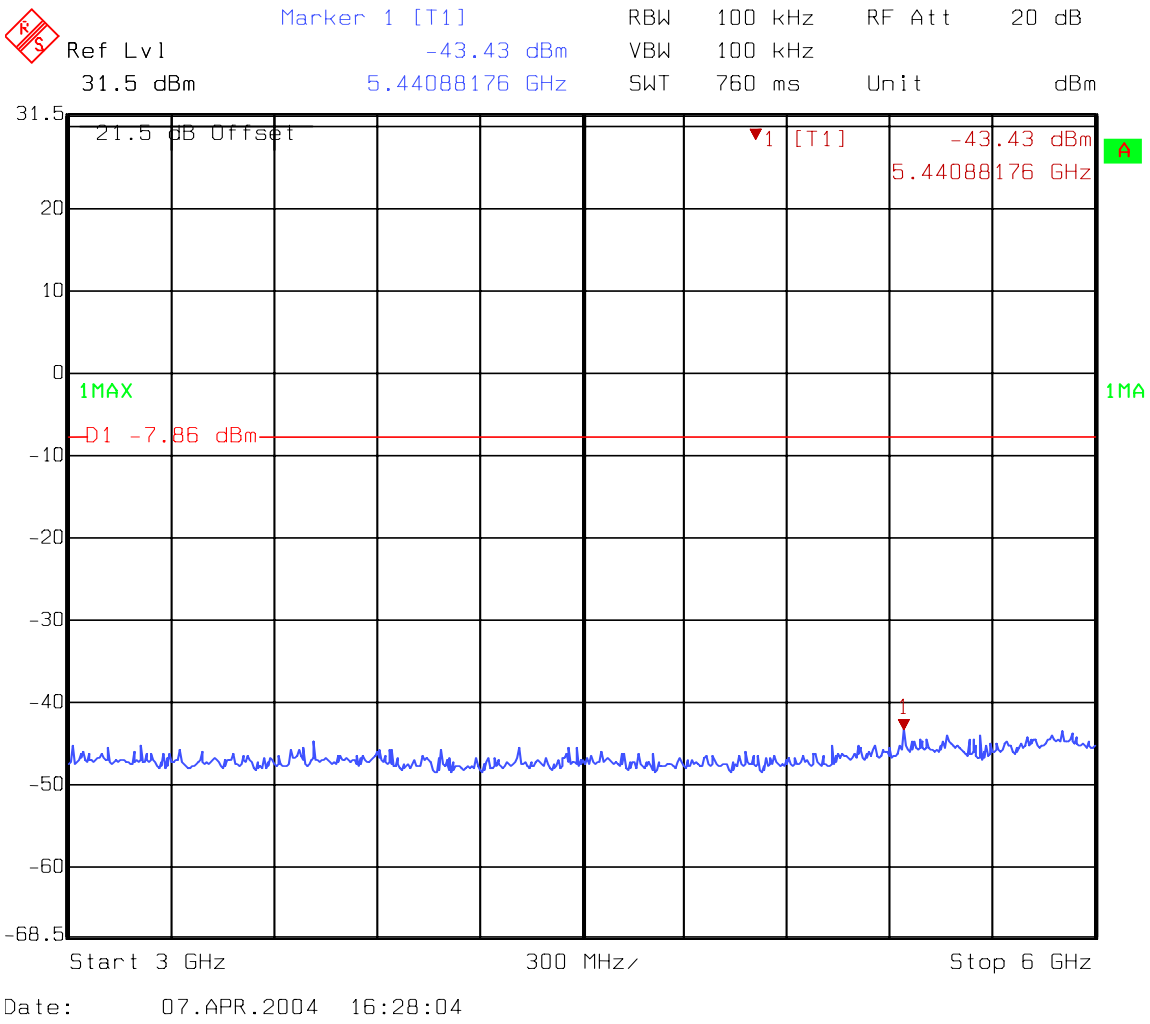

Marker 1 [T1]
Ref Lvl
31.5 dBm
-41.44 dBm
14.18837675 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1.25 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-41.44 dBm
14.18837675 GHz
A
1MAX
D1 -7.15 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 10 GHz
500 MHz/
Stop 15 GHz
Date: 07.APR.2004 15:51:21

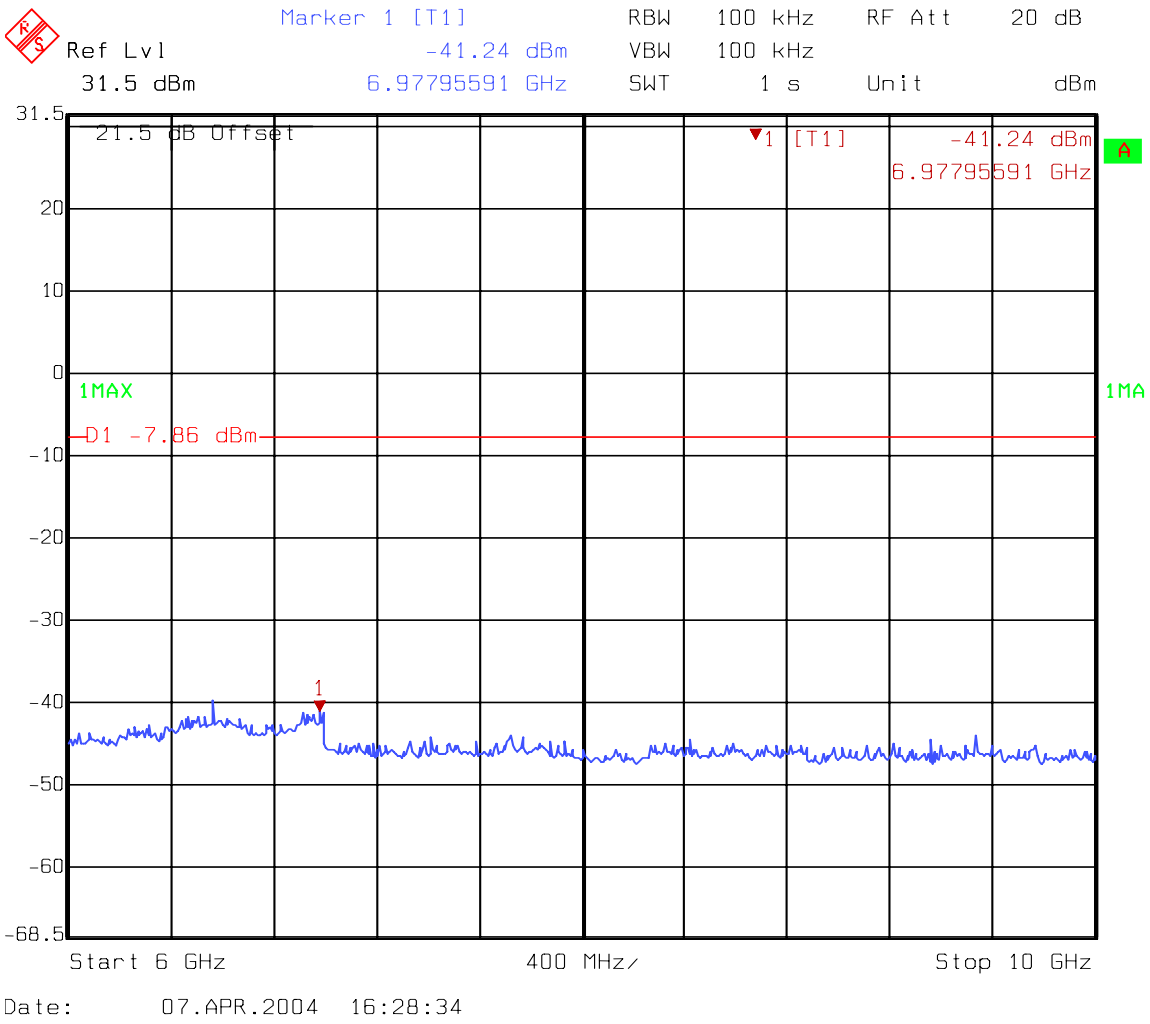

Marker 1 [T1]
RBW 100 kHz
RF Att 20 dB
Ref Lvl
-42.56 dBm
VBW 100 kHz
31.5 dBm
21.63326653 GHz
SWT 2.5 s
Unit dBm
21.5 dB Offset
1 [T1]
-42.56 dBm
21.63326653 GHz
A
1MAX
D1 -7.15 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 15 GHz
1 GHz/
Stop 25 GHz
Date: 07.APR.2004 15:51:57

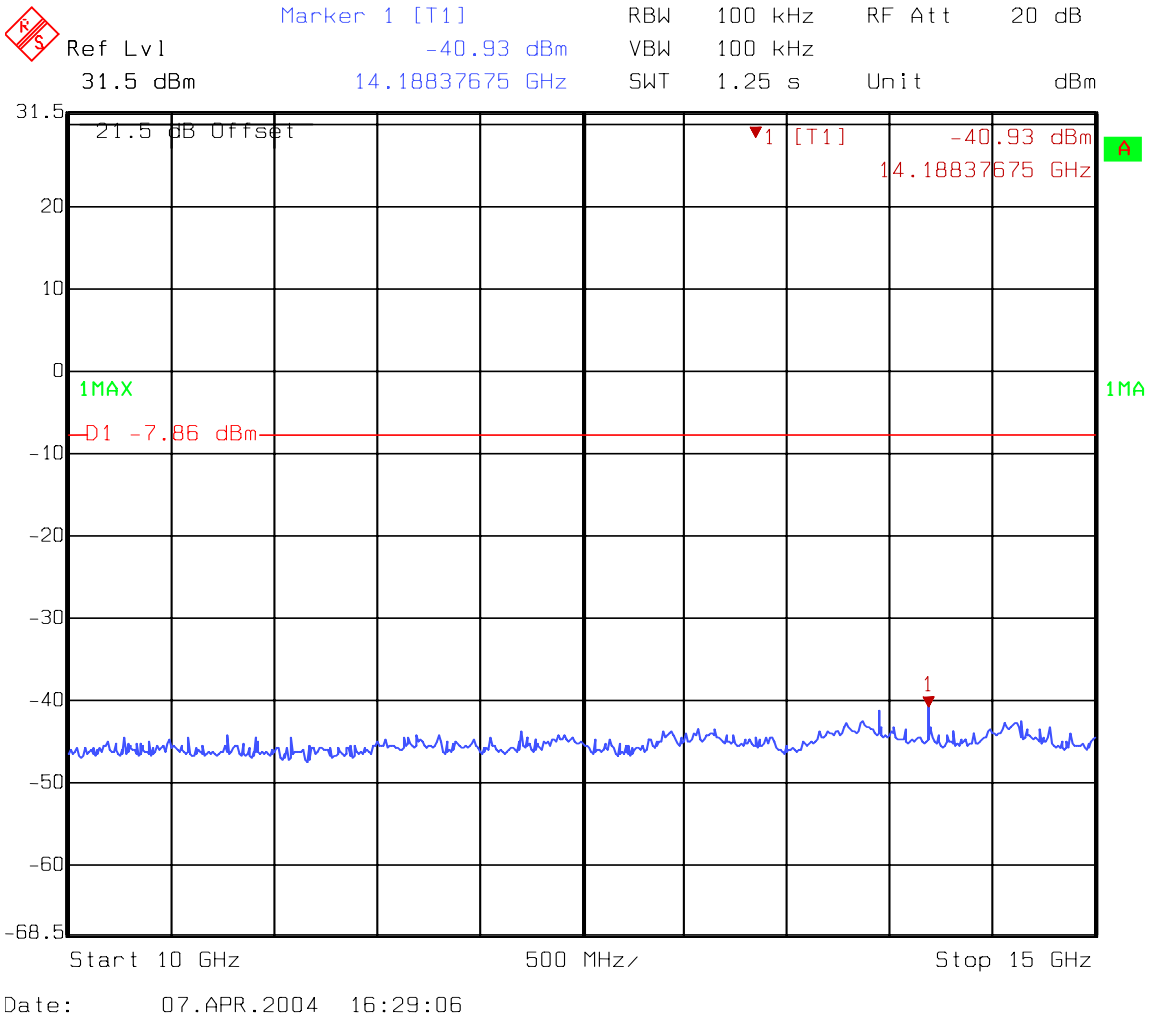
Antenna Spurs: High Channel

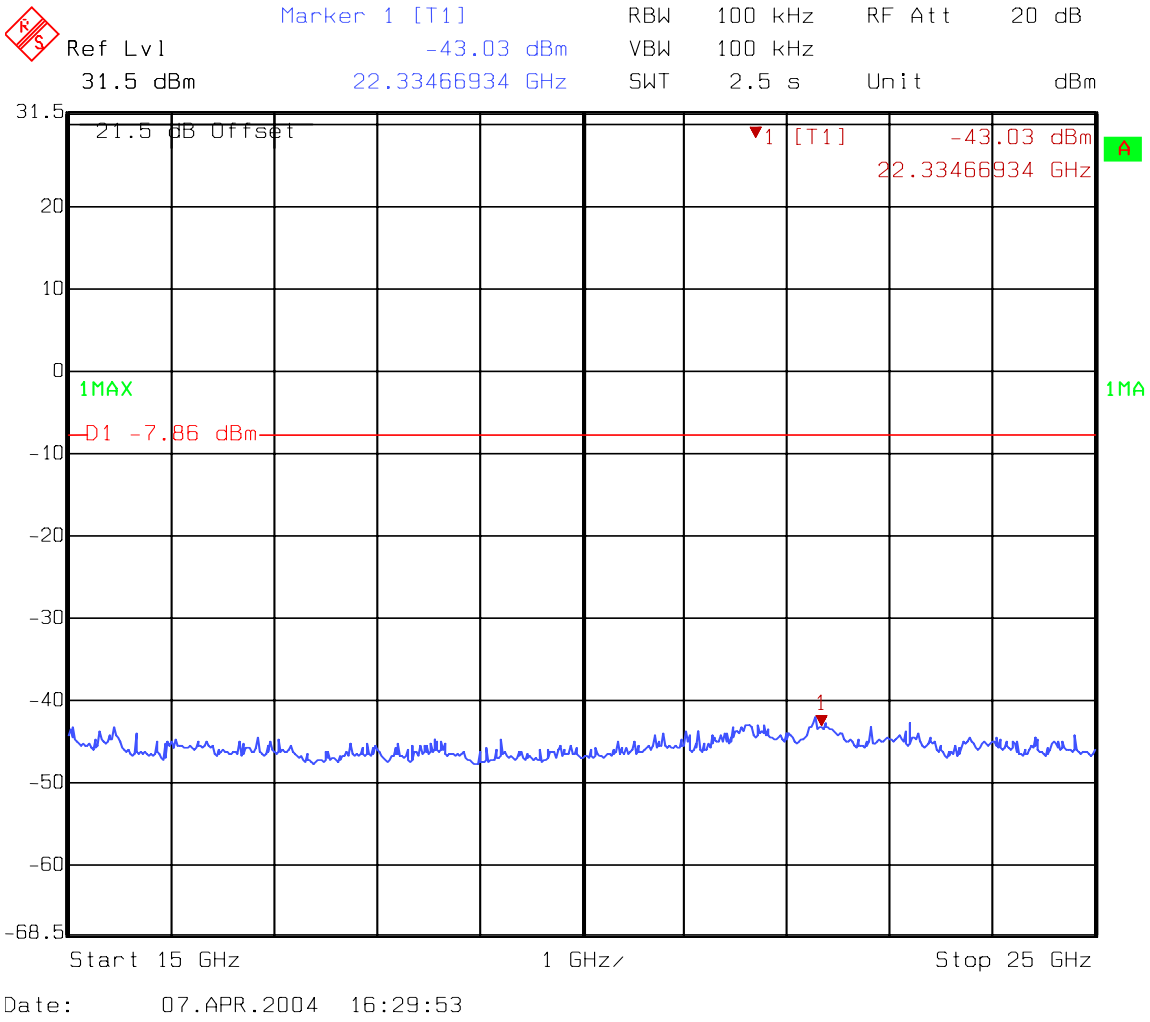



Marker 1 [T1]
Ref Lvl
31.5 dBm
11.53 dBm
2.48296593 GHz
RBW 100 kHz
VBW 100 kHz
SWT 500 ms
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
11.53 dBm
2.48296593 GHz
A
1MAX
D1 -7.86 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 07.APR.2004 16:27:33


Marker 1 [T1]
Ref Lvl
31.5 dBm
-43.43 dBm
5.44088176 GHz
RBW 100 kHz
VBW 100 kHz
SWT 760 ms
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-43.43 dBm
5.44088176 GHz
A
1MAX
D1 -7.86 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 07.APR.2004 16:28:04


Marker 1 [T1]
Ref Lvl
31.5 dBm
-41.24 dBm
6.97795591 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-41.24 dBm
6.97795591 GHz
A
1MAX
D1 -7.86 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 07.APR.2004 16:28:34


Marker 1 [T1]
Ref Lvl
31.5 dBm
-40.93 dBm
14.18837675 GHz
RBW 100 kHz
VBW 100 kHz
SWT 1.25 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-40.93 dBm
14.18837675 GHz
A
1MAX
D1 -7.86 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 10 GHz
500 MHz/
Stop 15 GHz
Date: 07.APR.2004 16:29:06


Marker 1 [T1]
Ref Lvl
31.5 dBm
-43.03 dBm
22.33466934 GHz
RBW 100 kHz
VBW 100 kHz
SWT 2.5 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-43.03 dBm
22.33466934 GHz
A
1MAX
D1 -7.86 dBm
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Start 15 GHz
1 GHz/
Stop 25 GHz
Date: 07.APR.2004 16:29:53

Section 8. Spurious Emissions (radiated)

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247 (c)
TESTED BY: Dustin Oaks	DATE: 4/6/2004

Test Results: Complies.

Measurement Data: See attached table.

Duty Cycle Calculation:

Duty Cycle correction factor(dB) = 20 log (rf_{ON} in ms/100ms)

Equipment Used: 1036, 1044, 1016, 1484, 1485, 1304

Measurement Uncertainty: +/- 0.7 dB

Temperature: 21°C

Relative Humidity: 48%

Frequency Range Tested: 30MHz to 25GHz

Radiated Data

Above 1GHz - Patch Antenna								
4,802.00	51.6	-1.8	49.8	54	-4.2	Ave	Vert	Low Channel
4,802.00	47.8	-1.8	46	54	-8	Ave	Horiz	Low Channel
4,880.00	48.1	-1.2	46.9	54	-7.1	Ave	Horiz	Mid Channel
4,880.00	47.9	-1.2	46.7	54	-7.3	Peak	Vert	Mid Channel
4,964.00	44.5	-0.6	43.9	54	-10.1	Ave	Vert	Upper Channel
4,964.00	44.2	-0.6	43.6	54	-10.4	Ave	Horiz	Upper Channel
Above 1GHz - Omni Antenna								
4,792.00	51.5	-1.9	49.6	54	-4.4	Ave	Vert	Low Channel (2401.350)
9,604.00	49.3	0.2	49.5	54	-4.6	Ave	Vert	Low Channel (2401.350)
9,760.00	48.1	0.8	48.9	54	-5.1	Ave	Horiz	Mid Channel (2440)
4,880.00	49.5	-1.2	48.3	54	-5.7	Ave	Horiz	Mid Channel (2440)
4,792.00	49.8	-1.9	47.9	54	-6.1	Ave	Horiz	Low Channel (2401.350)
4,880.00	48.9	-1.2	47.7	54	-6.3	Peak	Vert	Mid Channel (2440)
4,964.00	45.7	-0.6	45.1	54	-8.9	Ave	Horiz	Upper Channel (2482)
4,964.00	45	-0.6	44.4	54	-9.6	Peak	Vert	Upper Channel (2482)
9,604.00	42.1	0.2	42.3	54	-11.7	Ave	Horiz	Low Channel (2401.350)

Testing was performed from 30MHz to 25GHz. No signals within 20dB of limit found below 1GHz.

Radiated Photographs (Worst Case Configuration)

Section 9. Peak Power Spectral Density

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: 15.247(d)
TESTED BY: Dustin Oaks	DATE: 4/6/2004

Test Results: Complies.

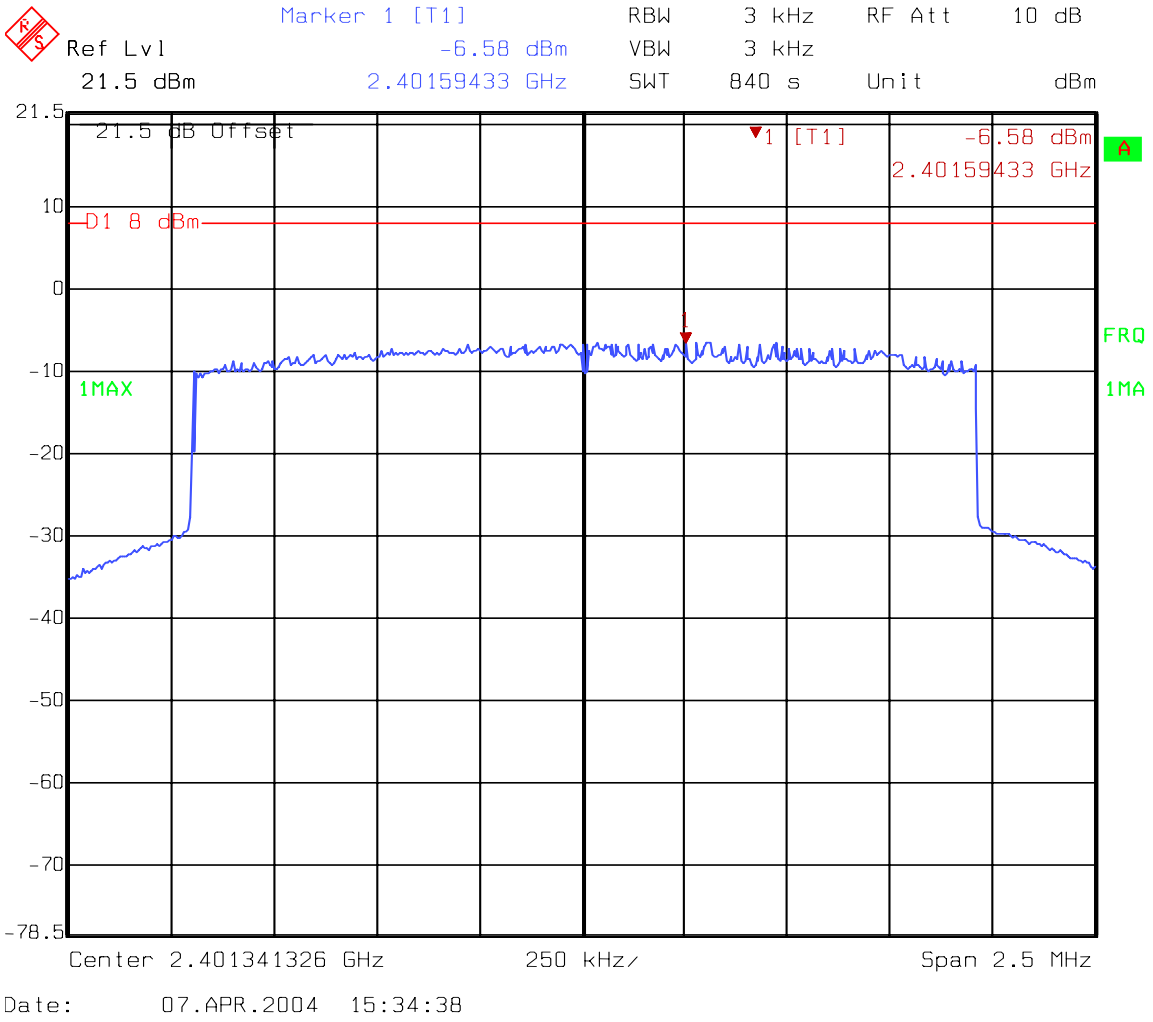
Measurement Data: See attached plots.

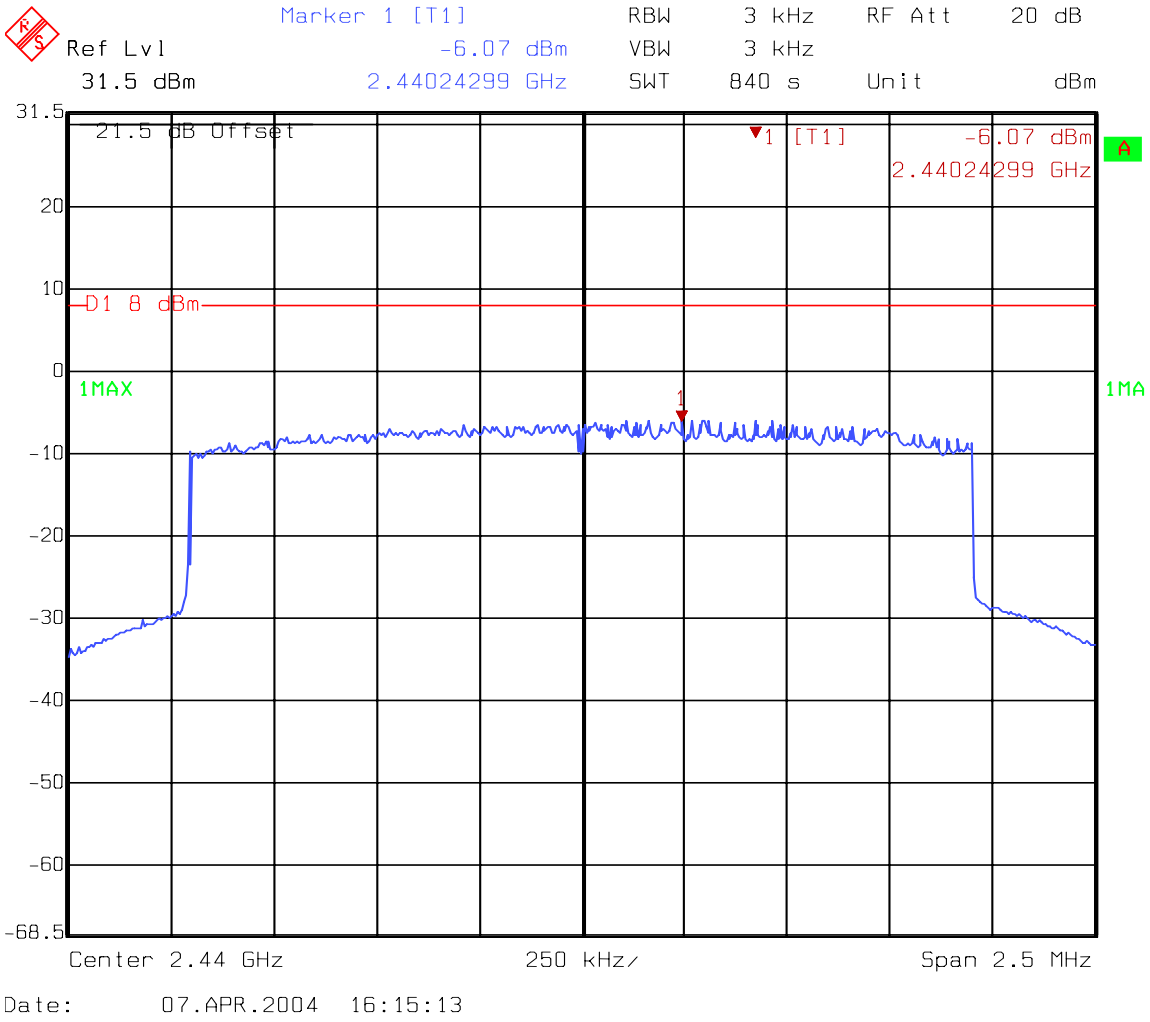
Equipment Used: 1036, 1044

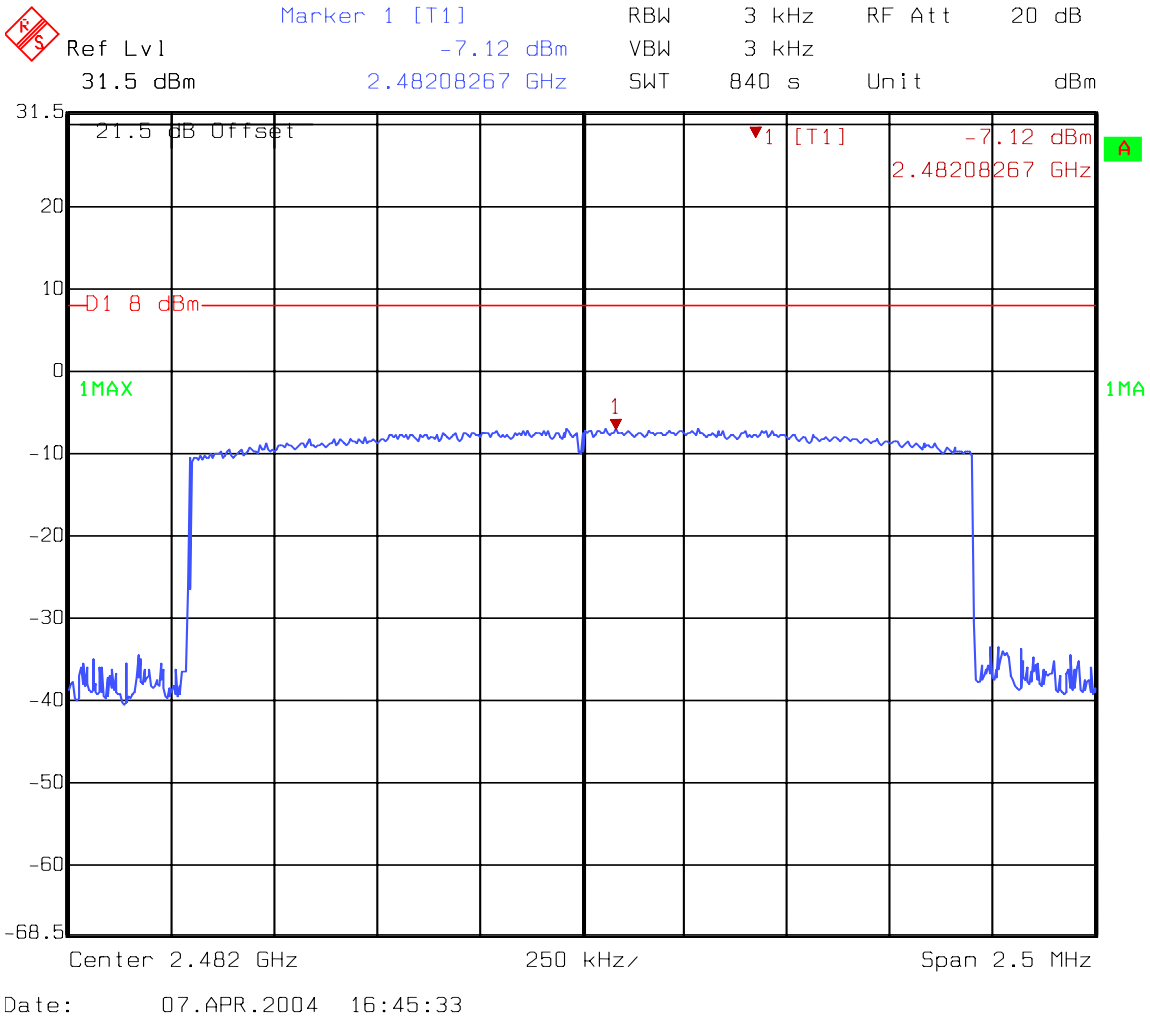
Measurement Uncertainty: +/- 0.7 dB

Temperature: 21°C

Relative Humidity: 48%

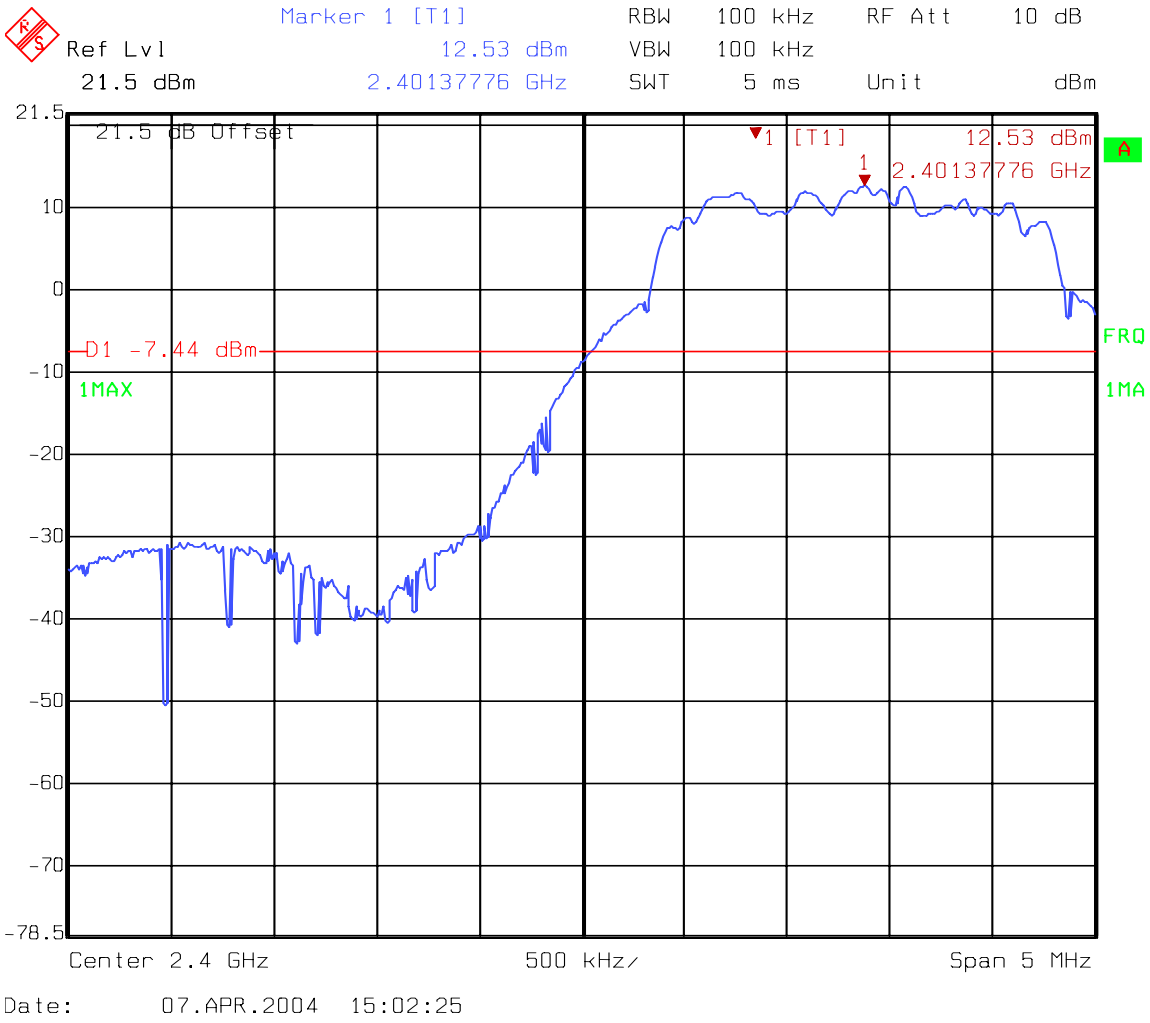

Marker 1 [T1]
Ref Lvl
21.5 dBm
-6.58 dBm
2.40159433 GHz
RBW 3 kHz
VBW 3 kHz
SWT 840 s
RF Att 10 dB
Unit dBm
21.5 dB Offset
1 [T1]
-6.58 dBm
2.40159433 GHz
D1 8 dBm
1MAX
FRQ
1MA
21.5
10
0
-10
-20
-30
-40
-50
-60
-70
-78.5
Center 2.401341326 GHz
250 kHz/
Span 2.5 MHz
Date: 07.APR.2004 15:34:38


Marker 1 [T1]
Ref Lvl
31.5 dBm
-6.07 dBm
2.44024299 GHz
RBW 3 kHz
VBW 3 kHz
SWT 840 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-6.07 dBm
2.44024299 GHz
A
D1 8 dBm
1MAX
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Center 2.44 GHz
250 kHz/
Span 2.5 MHz
Date: 07.APR.2004 16:15:13

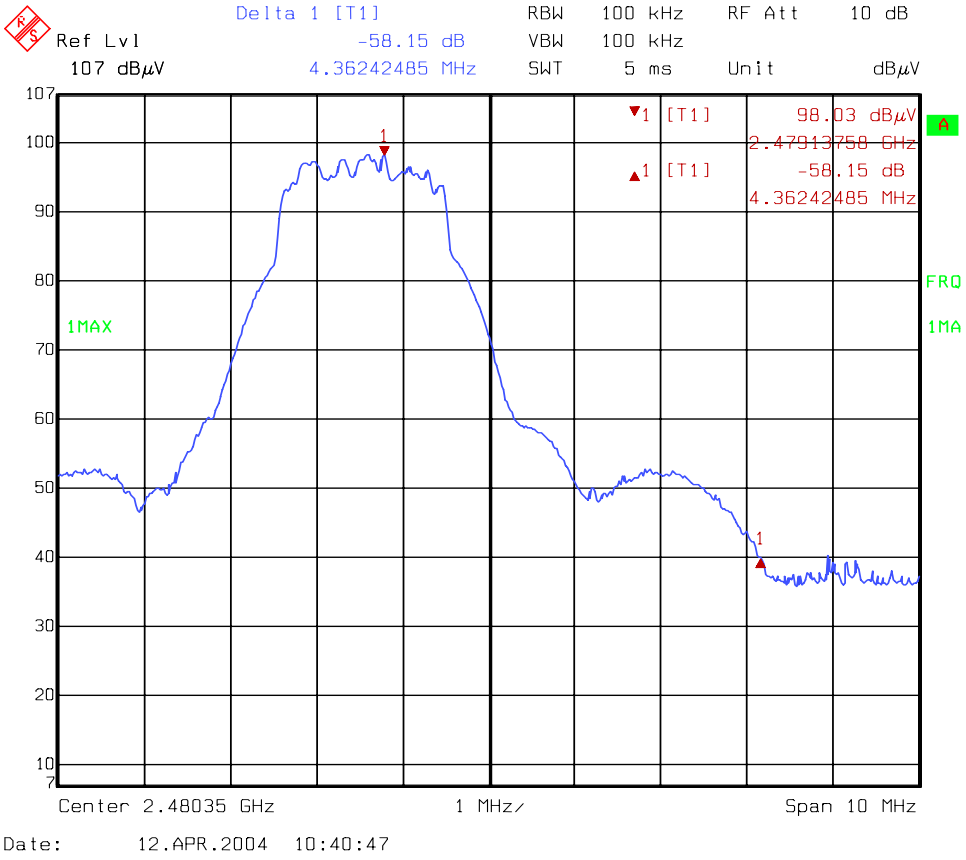

Marker 1 [T1]
Ref Lvl
31.5 dBm
-7.12 dBm
2.48208267 GHz
RBW 3 kHz
VBW 3 kHz
SWT 840 s
RF Att 20 dB
Unit dBm
21.5 dB Offset
1 [T1]
-7.12 dBm
2.48208267 GHz
A
D1 8 dBm
1MAX
1MA
31.5
20
10
0
-10
-20
-30
-40
-50
-60
-68.5
Center 2.482 GHz
250 kHz/
Span 2.5 MHz
Date: 07.APR.2004 16:45:33

Section 10. Band Edge

Band Edge, Lower Channel 2401.35MHz



Upper Band Edge, Fc=2478.9MHz.
This plot is showing the "DELTA" portion of the "Marker Delta Method" procedure for determining band-edge compliance.



Marker Delta Data:

Step 1: Record Fundamental reading

Fundamental Frequency	Patch Antenna	AVE = 109.58dBuV
	Upright Antenna	AVE = 109.72dBuV

Step 2: Set RBW=VBW=1% SPAN and record delta from Peak to Band Edge

Patch Delta = 60.67dB
Upright Delta = 58.15dB

Step 3: Subtract Delta from Step 1 to obtain Band Edge reading

Patch Antenna	109.58-60.67 =	**48.91dBuV/m @ 3 meters**
Upright Antenna	109.72-58.57 =	**51.57dBuV/m @ 3 meters**

Limit = 54dBuV/m @ 3 meters, Therefore this device complies with the upper band edge requirements.

Section 11. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/01/04	03/01/05
1044	Blue flex cable .6m	0 0	0	09/02/03	09/01/04
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/24/03	07/23/04
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/24/03	07/23/04
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	CalNotReq	N/A
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
545	LISN	Schwarz Beck 8120	8120350	08/01/03	07/31/04
1115	CABLE, 4.5m	KTL RG223	N/A	03/08/04	03/08/05
1033	Horn antenna	EMCO 3115	8812-3035	09/22/03	09/22/05

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)

Minimum Standard: The R.F. that is conducted back onto the AC power line on any frequency within the band 0.45 to 30 MHz shall not exceed 250µV (48 dBµV) across 50 ohms.

NAME OF TEST: Minimum 6 dB bandwidth	PARA. NO.: 15.247(a)(2)

Minimum Standard: The minimum 6 dB bandwidth shall be at least 500 kHz

NAME OF TEST: Maximum Peak Output Power	PARA. NO.: 15.247(b)(1)

Minimum Standard: The maximum peak output power shall not exceed 1 watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Direct Measurement Method For Detachable Antennas:
If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

Calculation Of EIRP For Integral Antenna:
If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts
E = the maximum measured field strength in V/m
R = the measurement range (3 meters)
G = the numeric gain of the transmit antenna in relation to an isotropic radiator

The RBW of the spectrum analyzer shall be set to a value greater than the measured 6 dB occupied bandwidth of the E.U.T.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: RF Exposure	PARA. NO.: 15.247(b)(4)

Minimum Standard: Systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines stipulated in 1.1307(b)(1) of CFR 47.

NAME OF TEST: Spurious Emissions(conducted) PARA. NO.: 15.247(c)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM IS SEARCHED TO THE 10th HARMONIC OF THE HIGHEST FREQUENCY GENERATED IN THE EUT.

Method Of Measurement:

30 MHz - 10th harmonic plot
RBW: 100 kHz
VBW: 300 kHz
Sweep: Auto
Display line: -20 dBc

Lower Band Edge
RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level below center frequency.

Upper Band Edge
RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level above center frequency.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Radiated Spurious Emissions PARA. NO.: 15.247(c)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Transmitter Power Density	PARA. NO.: 15.247(d)

Minimum Standard: The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

Method Of Measurement: The spectrum analyzer is set as follows:

RBW: 3 kHz
VBW: >3 kHz
Span: => measured 6 dB bandwidth
Sweep: Span(kHz)/3 (i.e. for a span of 1.5 MHz the sweep rate is 1500/3 = 500 sec.
LOG dB/div.: 2 dB

Note: For devices with spectrum line spacing =< 3 kHz, the RBW of the analyzer is reduced until the spectral lines are resolved. The measurement data is normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band in linear power units.

For Devices With Integral Antenna:

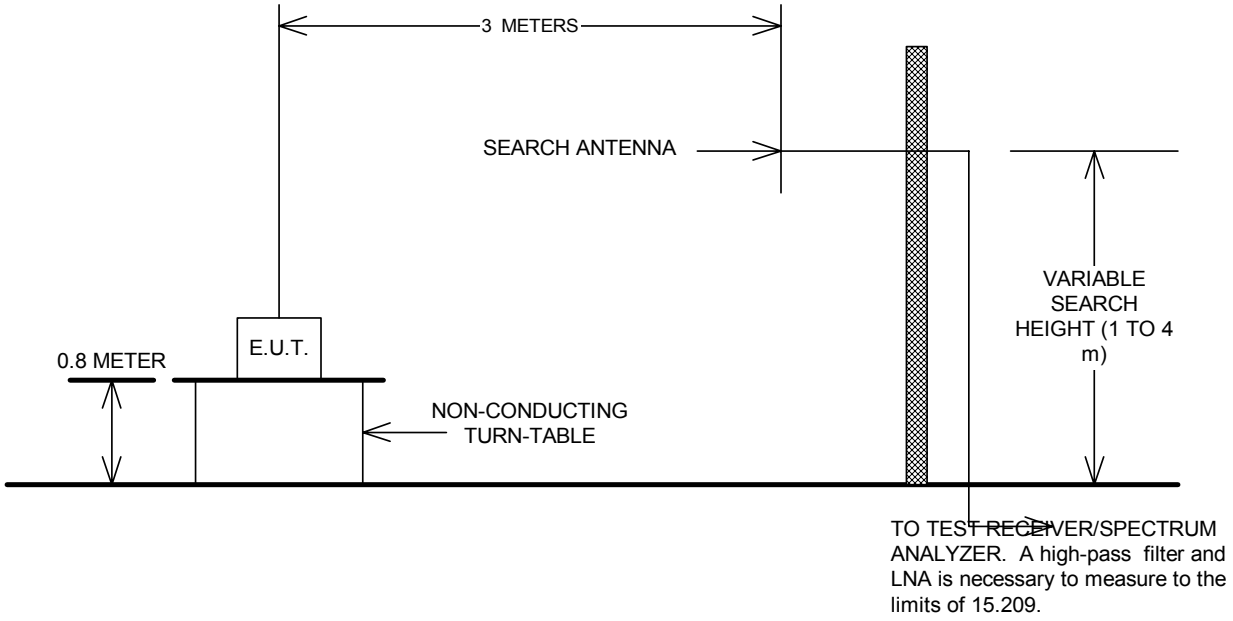
For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent isotropic radiated power using the same method as described for Peak Power output.

Number of channels tested:

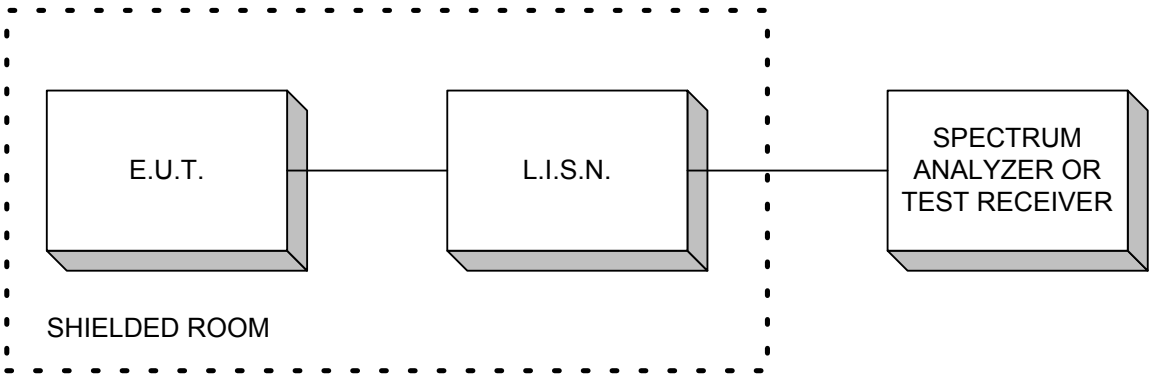
Tuning Range	Number Of Channels Tested	Channel Location In Band
1 MHz or Less	1	Middle
1 to 10 MHz	2	Top And Bottom
More Than 10 MHz	3	Top, Middle, Bottom

ANNEX B - TEST DIAGRAMS

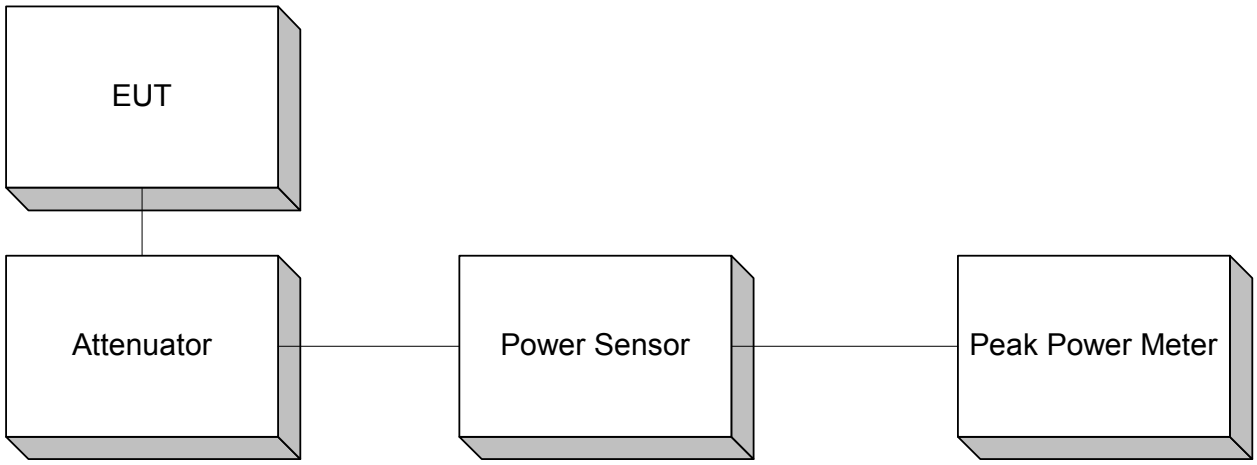
Test Site For Radiated Emissions



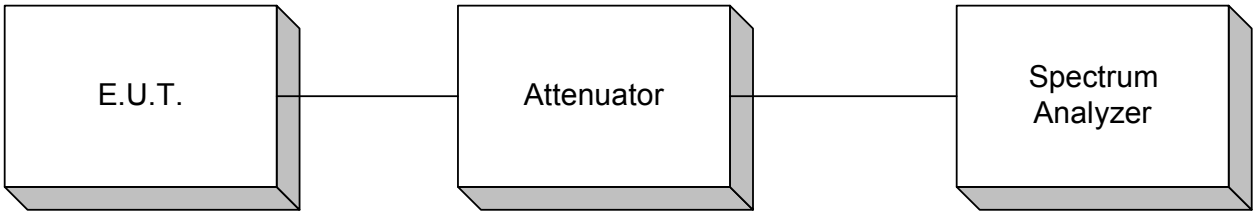
Conducted Emissions



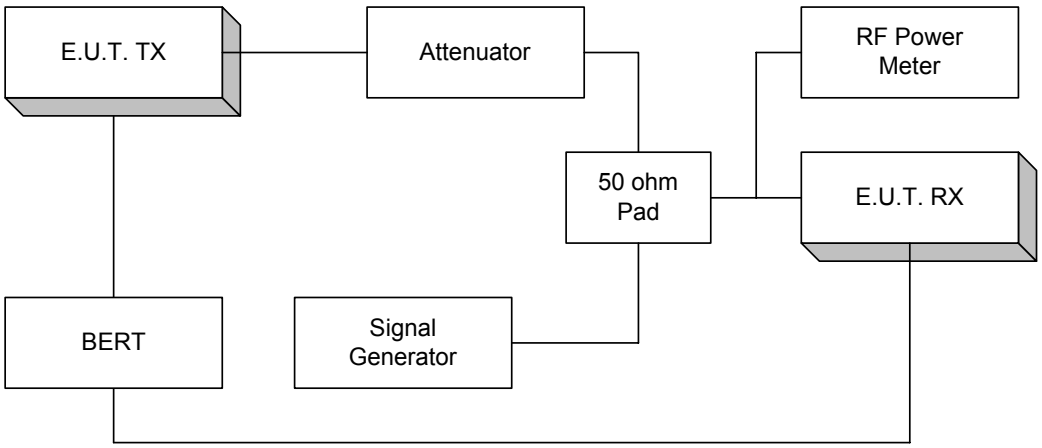
Peak Power At Antenna Terminals



Minimum 6 dB Bandwidth
Peak Power Spectral Density
Spurious Emissions (conducted)



Processing Gain



NOTE: This is a typical setup. The setup may vary slightly since many devices have BER test functions built into the device.