FCC Test Report

FCC Part 15.247 for DSSS systems/ CANADA RSS-210

FOR:

GSM/UMTS/HSDPA Mobile Phone

MODEL #: RG4-E02, RG4-J01
Toshiba Information Systems (UK) Ltd., Mobile Communications Division

Riverside Way
Camberley, Surrey, GU15 3YA UK

FCC ID: SP2-RG4-E02, SP2-RG4-J01

TEST REPORT #: EMC_CETEC_0010_06502_15.247WLAN
DATE: 2007-4-11

ilac-MRA ACCREDITED Certificate # 2135.01

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Testing Laboratory

FCC listed# 101450

IC recognized # 3925

***CETECOM* Inc.**
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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS210.

Company	Description	Model #
Toshiba Information Systems (UK) Ltd., MobileCommunications Division	**GSM/UMTS/HSDPA Mobile Phone**	**RG4-E02, RG4-J01**

Technical responsibility for area of testing:

Date	Section	Name	Signature
2007-4-11	EMC & Radio	Lothar Schmidt (Test Lab Manager)	Lothar Schmidt I am approving this document

This report is prepared by:

Date	Section	Name	Signature
2007-4-11	EMC & Radio	Peter Mu (EMC Project Engineer)	Peter Mu I am the author of this document

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	**CETECOM Inc.**
Department:	**EMC**
Address:	**411 Dixon Landing Road Milpitas, CA 95035 U.S.A.**
Telephone:	**+1 (408) 586 6200**
Fax:	**+1 (408) 586 6299**
Responsible Test Lab Manager:	**Lothar Schmidt**
Responsible Project Leader:	**Peter Mu**
Date of test:	**2007-2-21 to 2007-4-11**

2.2 Identification of the Client

APPLICANT	
Applicant (Company Name)	**Toshiba Information Systems (UK) Ltd., MobileCommunications Division**
Street Address	**Riverside Way**
City/Zip Code	**Camberley, Surrey, GU15 3YA**
Country	**UK**
Contact Person	**Adrian Coyle**
Telephone	**+44 1276 405100**
Fax	**+44 1276 405111**
e-mail	**adrian.coyle@toshiba.co.uk**

2.3 Identification of the Manufacturer

MANUFACTURER	
Manufacturer	**Toshiba Corporation**
Street Address	**1-1, Shibaura 1-Chome, Minato-ku**
City/Zip Code	**Tokyo, 105-8001**
Country	**Japan**

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

EUT	
Marketing Name of EUT (if not same as Model No.)	**RG4-E02, RG4-J01**
Description	**GSM/UMTS/HSDPA Mobile Phone**
Model No.	**RG4-E02, RG4-J01**
Serial No.	
H/W & S/W	**HW version: SP-1, SP** **SW version: TF_WM6_ORCA_VER_02.01_R0702060857**
FCC-ID	**SP2-RG4-E02, SP2-RG4-J01**
IC-ID (Industry Canada)	**N/A**

Frequency Range:	**2400-2483.5MHz**
Type(s) of Modulation:	**CCK , OFDM**
Number of Channels:	**11**
Antenna Type:	**PIFA/average Gain is about -5dBi**
Output Power:	**802.11 (b) mode: 0.00710 W EIRP @ 2462 MHz** **802.11 (g) mode: 0.00895 W EIRP @ 2462 MHz**

3.2 Identification of the Equipment Under Test (EUT)

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	EUT	Toshiba Corporation	RG4-E02	004401120327032

3.3 Identification of Accessory equipment

AE #	TYPE	MANF.	MODEL	SERIAL #
1	AC/DC ADAPTER	Toshiba	TS-ADP001	0648

4 Subject Of Investigation

During the testing process the EUT was tested in b mode with 11Mbps data rate and in g mode with 54Mbps data rate which yielded the worst case results. All data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS210.

5 Measurements (Radiated)

5.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)

5.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1) (2) (3) (4)

Frequency range	RF power output
2400-2483.5 MHz	36dBm EIRP

***limit is based upon antenna gain of less than or equal to 6dBi.**

5.1.2 EIRP

TEST CONDITIONS	MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)	2412	2437	2462
802.11b	7.07	8.15	8.51
802.11g	7.75*	9.17*	9.52*
802.11g (corrected)	8.55	9.84	10.25
Measurement uncertainty	±0.5dBm		

* Since 6dB bandwidth for 802.11g is greater than analyzer maximum resolution bandwidth of 10MHz correction factors apply. See section 6.3 for calculations.

EIRP 802.11 b Mode (2412MHz)

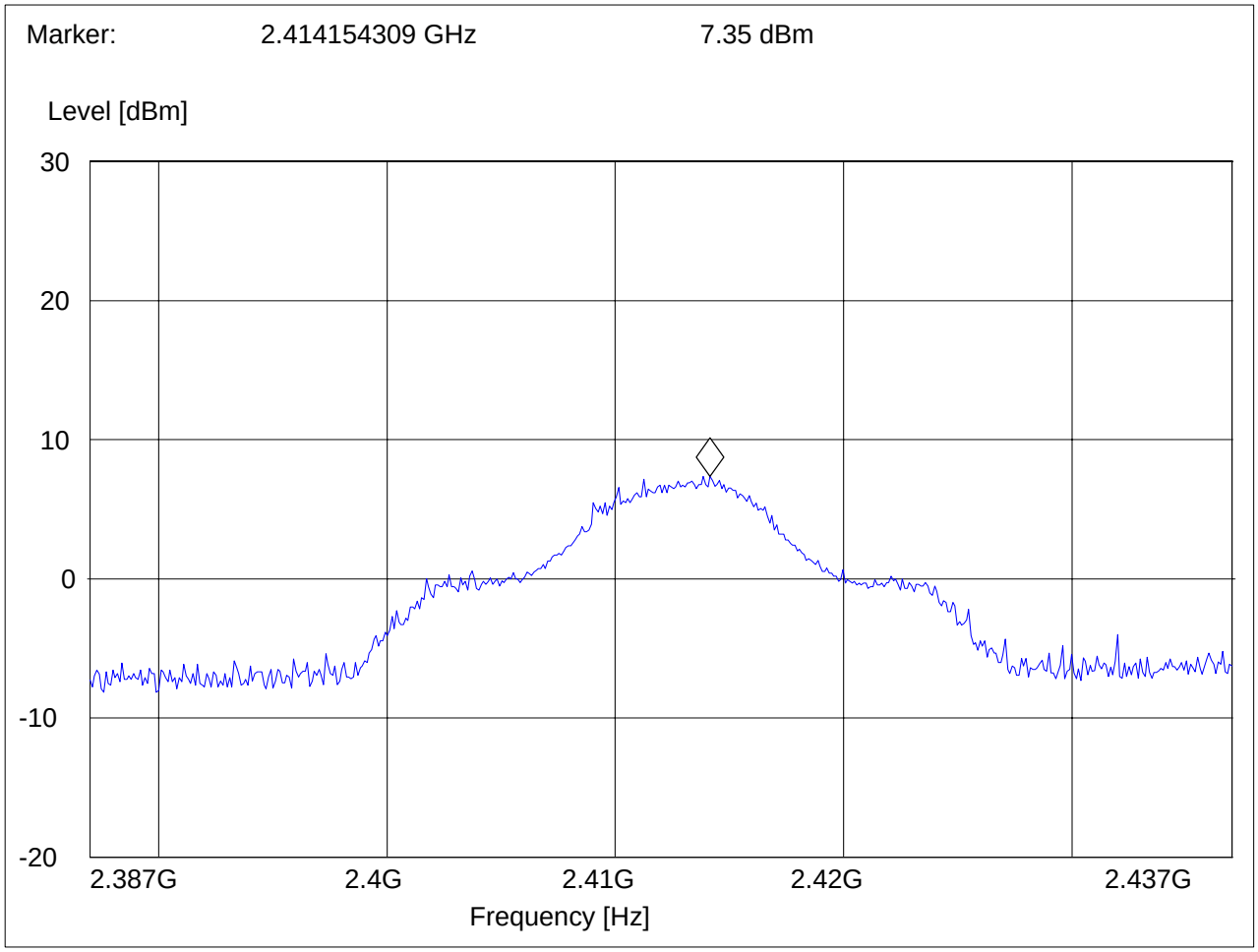
CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        TOSHIBA
Test Mode:       802.11b
ANT Orientation: H
EUT Orientation: H, TT 230°
Test Engineer:   PETER MU
Voltage:         BATTERY
Comments:        SP SAMPLES APR 2ND, 2007
```

SWEEP TABLE: "EIRP RLAN CH1"

Short Description: EIRP RLAN channel-2412 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



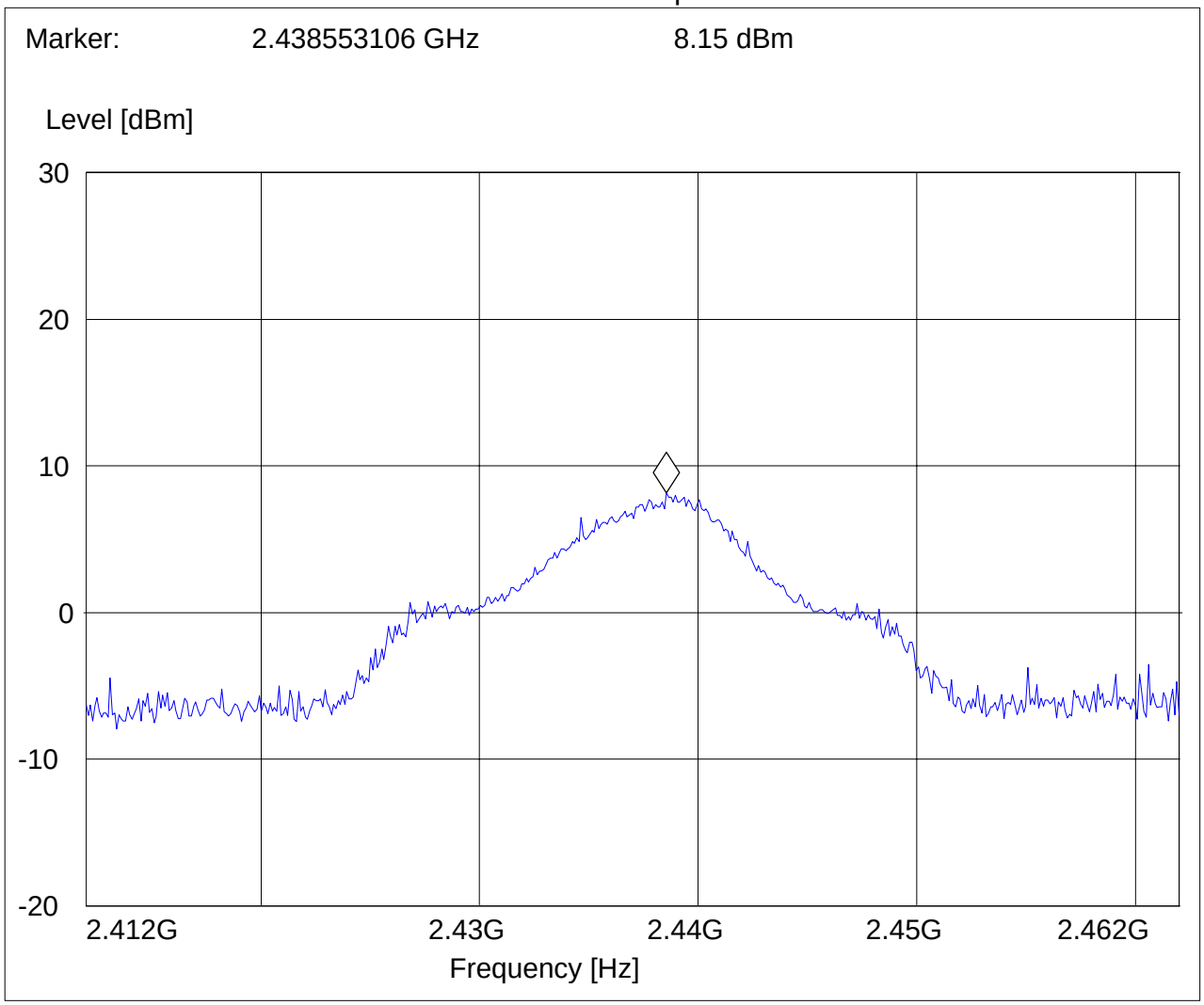
EIRP 802.11 b Mode (2437MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        TOSHIBA
Test Mode:       802.11b
ANT Orientation: H
EUT Orientation: H, TT 230°
Test Engineer:   PETER MU
Voltage:         BATTERY
Comments:        SP SAMPLES APR 2ND, 2007
```

SWEEP TABLE: "EIRP RLAN CH6"

Short Description:		EIRP RLAN channel-2437 MHz			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM



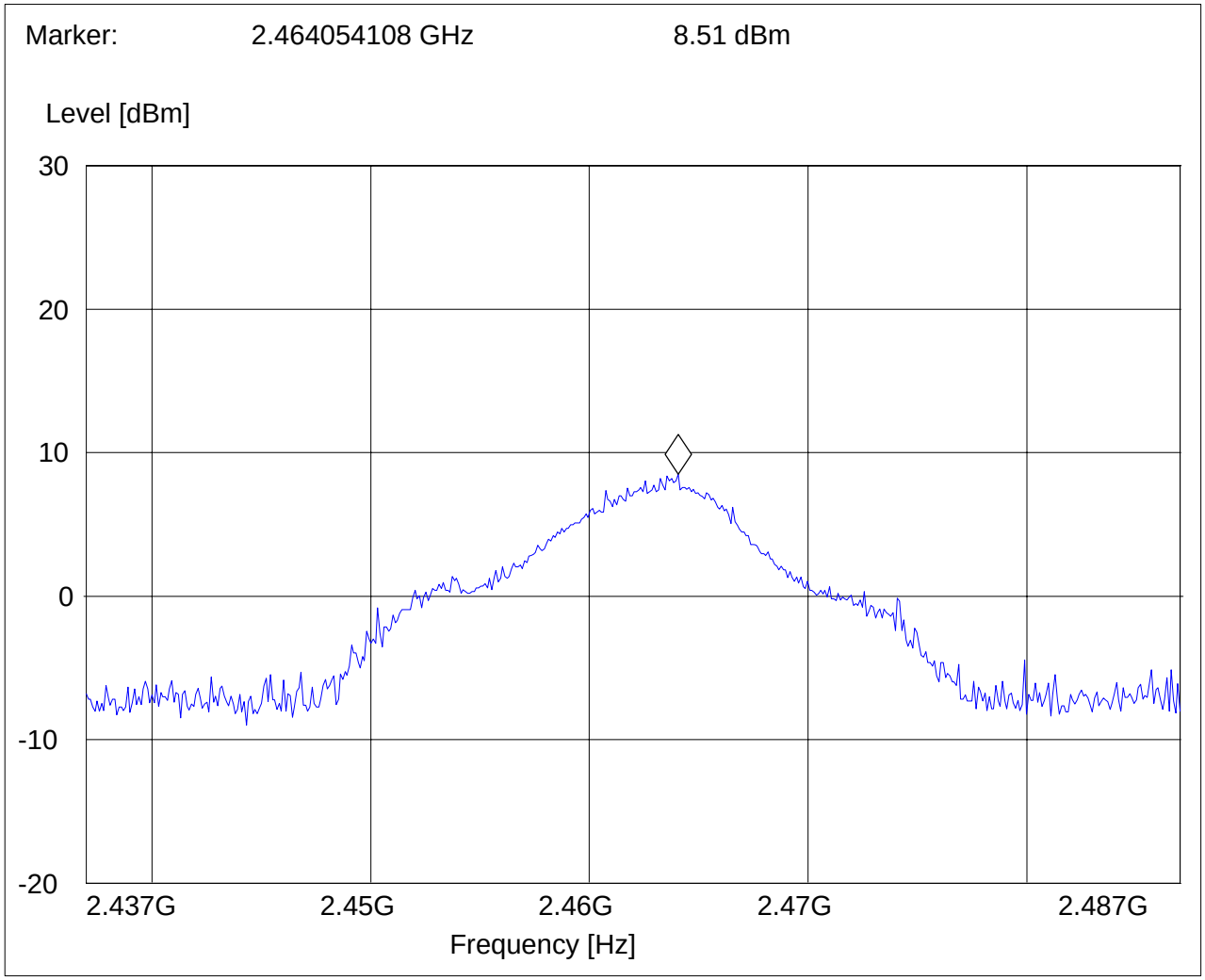
EIRP 802.11 b Mode (2462MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        TOSHIBA
Test Mode:       802.11b
ANT Orientation: H
EUT Orientation: H, TT 295°
Test Engineer:   PETER MU
Voltage:         BATTERY
Comments:        SP SAMPLES APR 2ND, 2007
```

SWEEP TABLE: "EIRP RLAN CH11"

Short Description:		EIRP RLAN channel-2462 MHz			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



EIRP 802.11 g Mode (2412MHz)

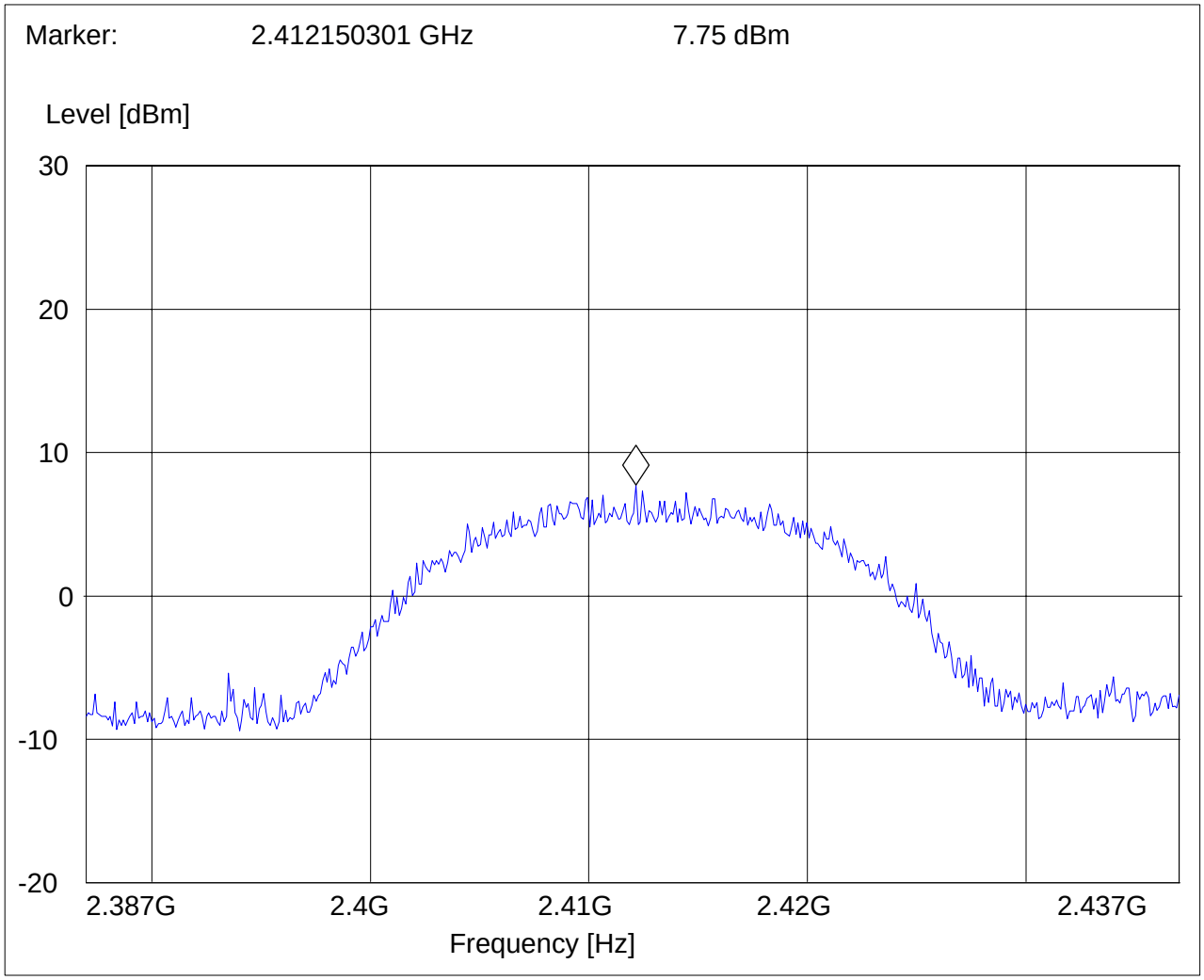
CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        TOSHIBA
Test Mode:       802.11g
ANT Orientation: H
EUT Orientation: H, TT 230°
Test Engineer:   PETER MU
Voltage:         BATTERY
Comments:        SP SAMPLES APR 2ND, 2007
```

SWEEP TABLE: "EIRP RLAN CH1"

Short Description: EIRP RLAN channel-2412 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM MaxPeak



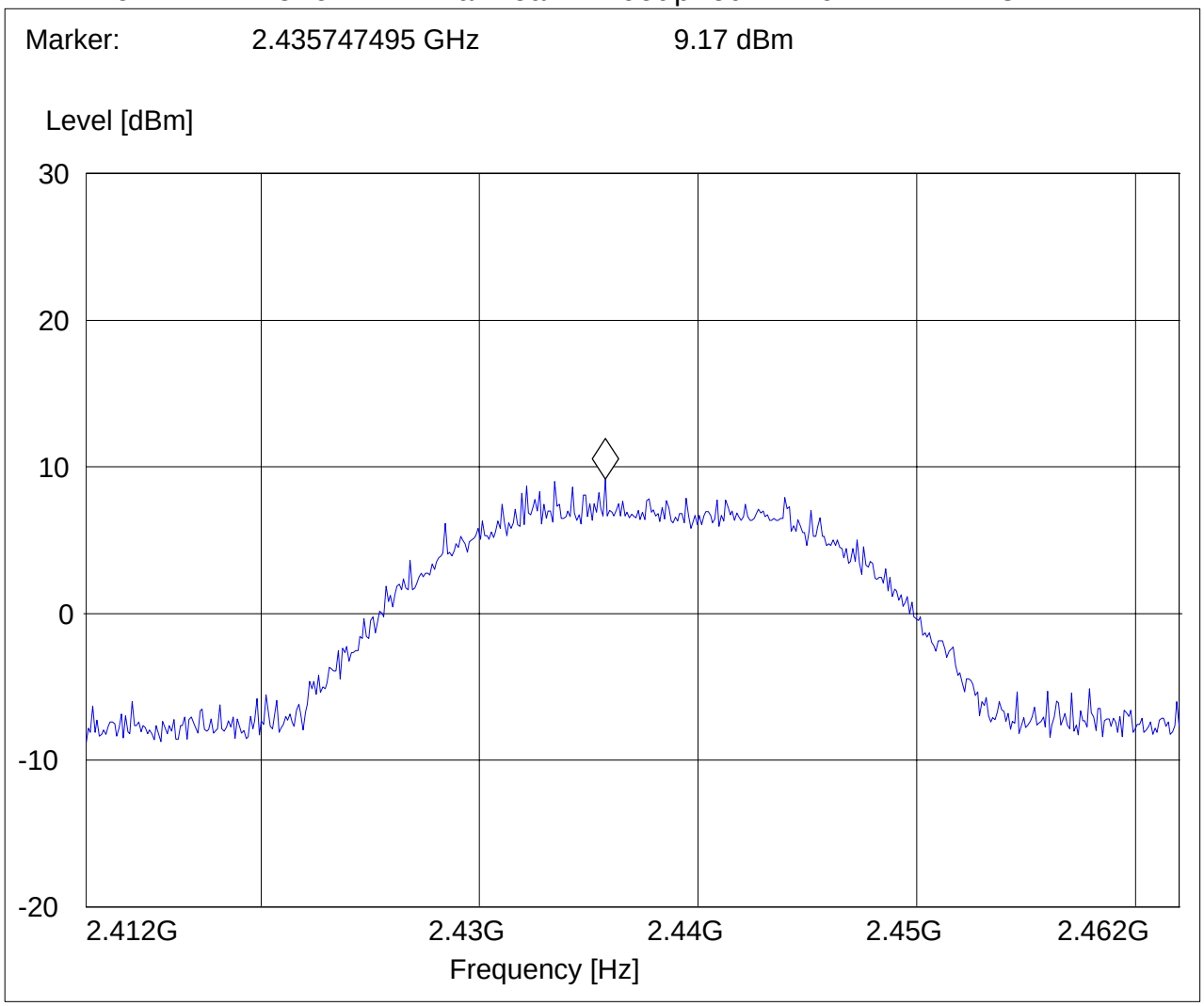
EIRP 802.11 g Mode (2437MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        TOSHIBA
Test Mode:       802.11g
ANT Orientation: H
EUT Orientation: H, TT 295°
Test Engineer:   PETER MU
Voltage:         BATTERY
Comments:        SP SAMPLES APR 2ND, 2007
```

SWEEP TABLE: "EIRP RLAN CH6"

Short Description:		EIRP RLAN channel-2437 MHz			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM



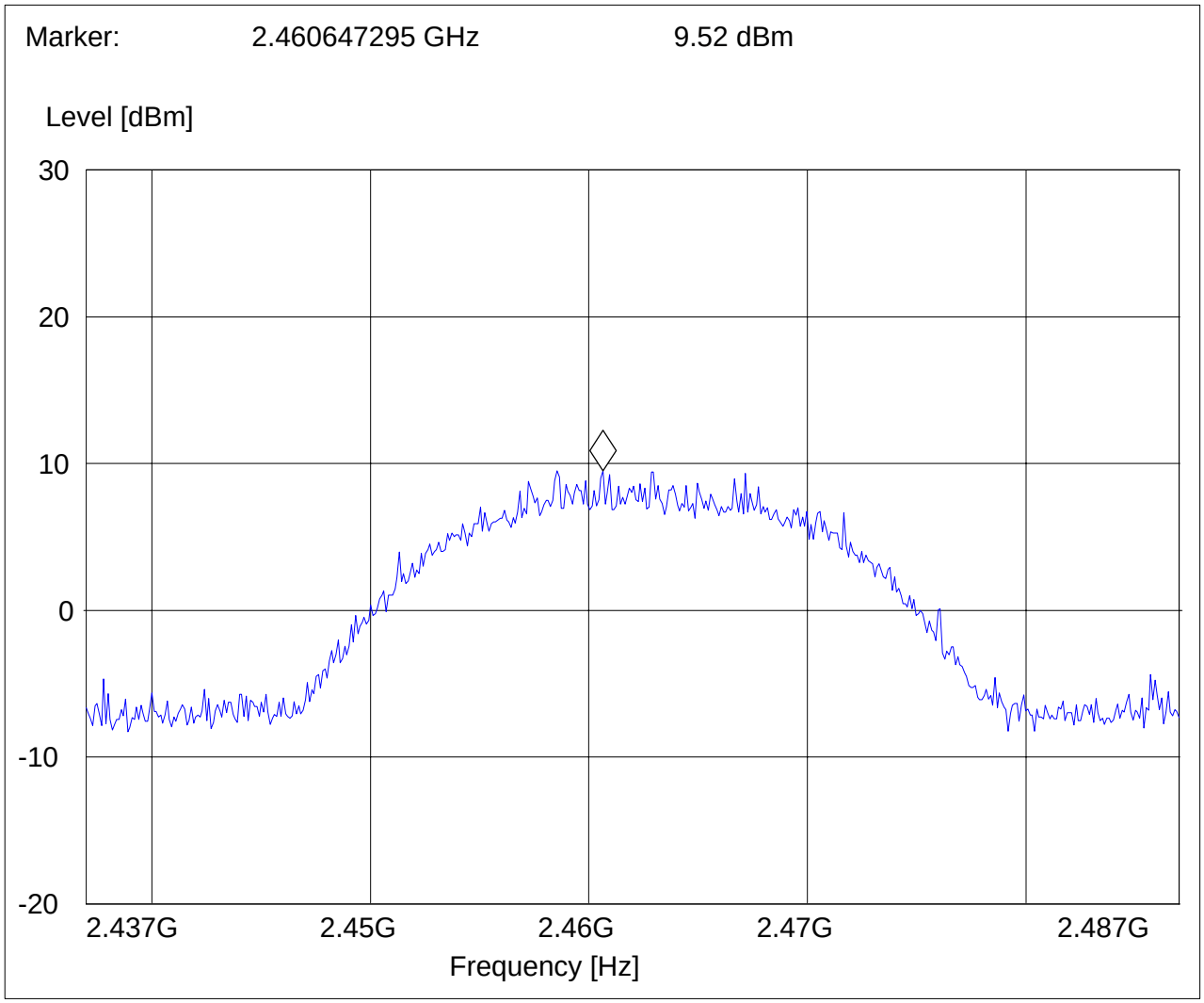
EIRP 802.11 g Mode (2462MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        TOSHIBA
Test Mode:       802.11g
ANT Orientation: H
EUT Orientation: H, TT 295°
Test Engineer:   PETER MU
Voltage:         BATTERY
Comments:        SP SAMPLES APR 2ND, 2007
```

SWEEP TABLE: "EIRP RLAN CH11"

Short Description:		EIRP RLAN channel-2462 MHz			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



5.2 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205

5.2.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]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
6.215 - 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	2690 - 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	([2])
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m**
***AVG. LIMIT= 54dBuV/m**

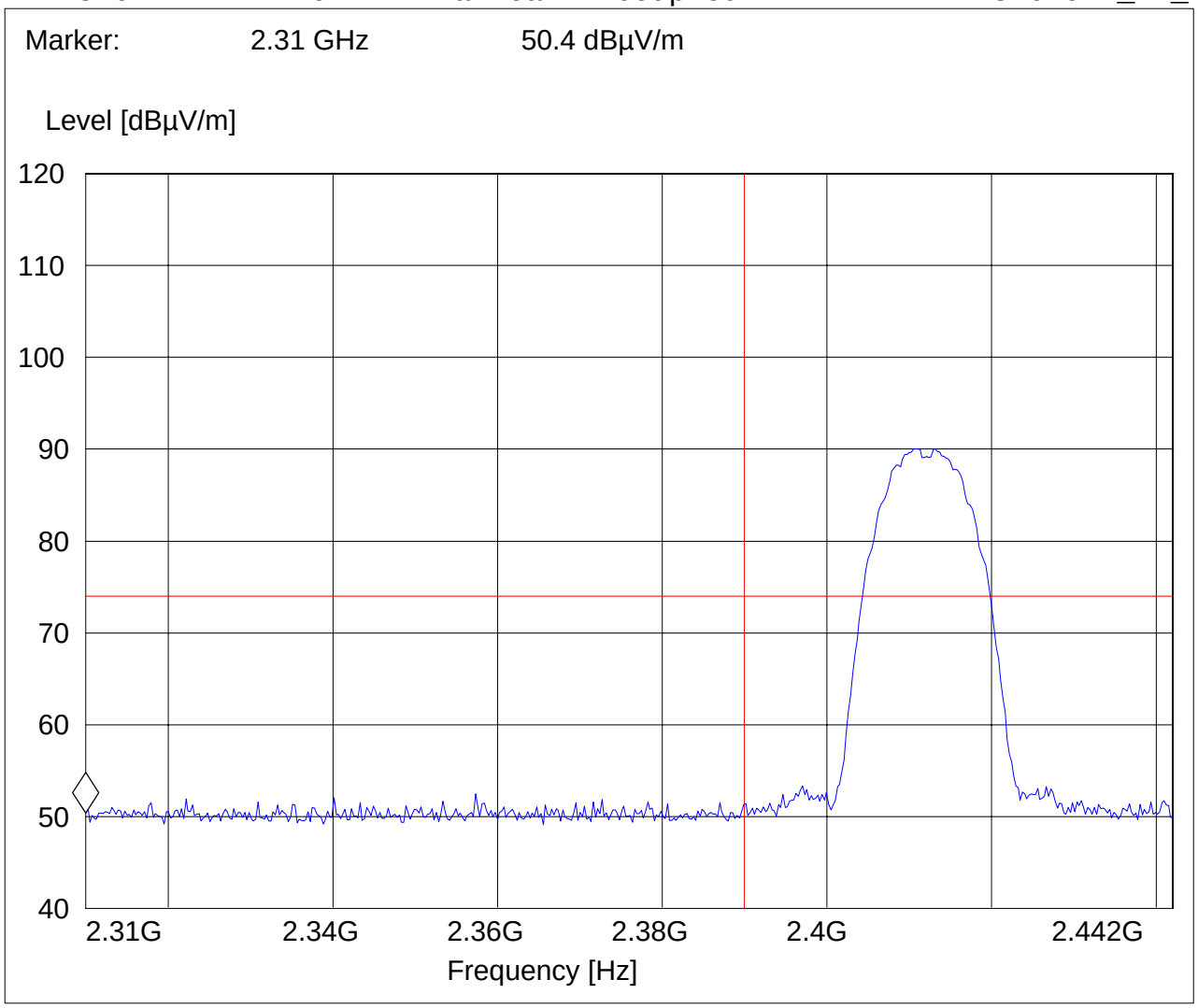
PEAK, 802.11 b MODE (2412MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        Toshiba
Test Mode:       802.11b
ANT Orientation: V
EUT Orientation: H
Test Engineer:   PETER MU
Power Supply::   Battery
Comments:
```

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



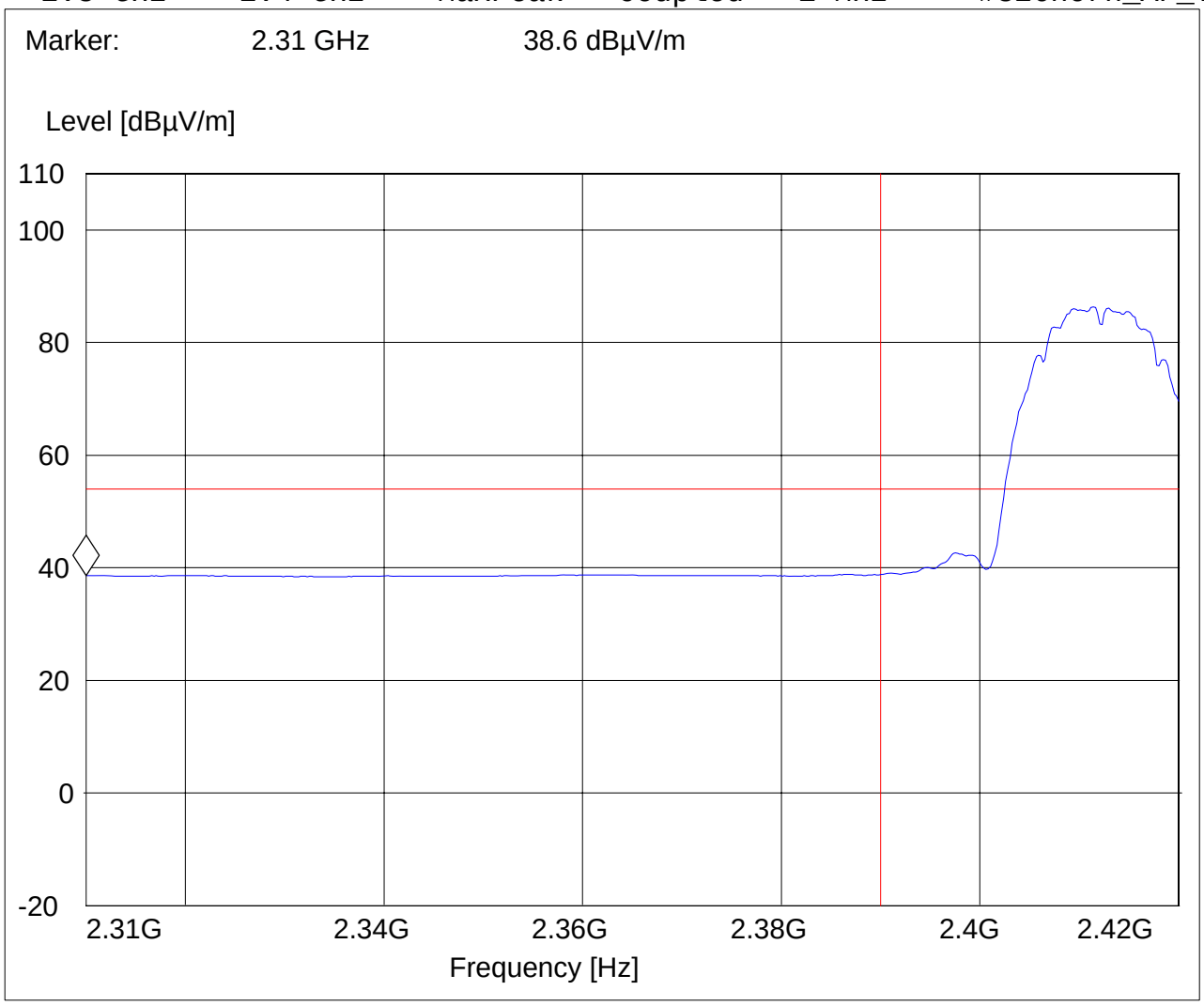
AVG, 802.11 b MODE (2412MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        Toshiba
Test Mode:       802.11b
ANT Orientation: V
EUT Orientation: H
Test Engineer:   PETER MU
Power Supply::   Battery
Comments:
```

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



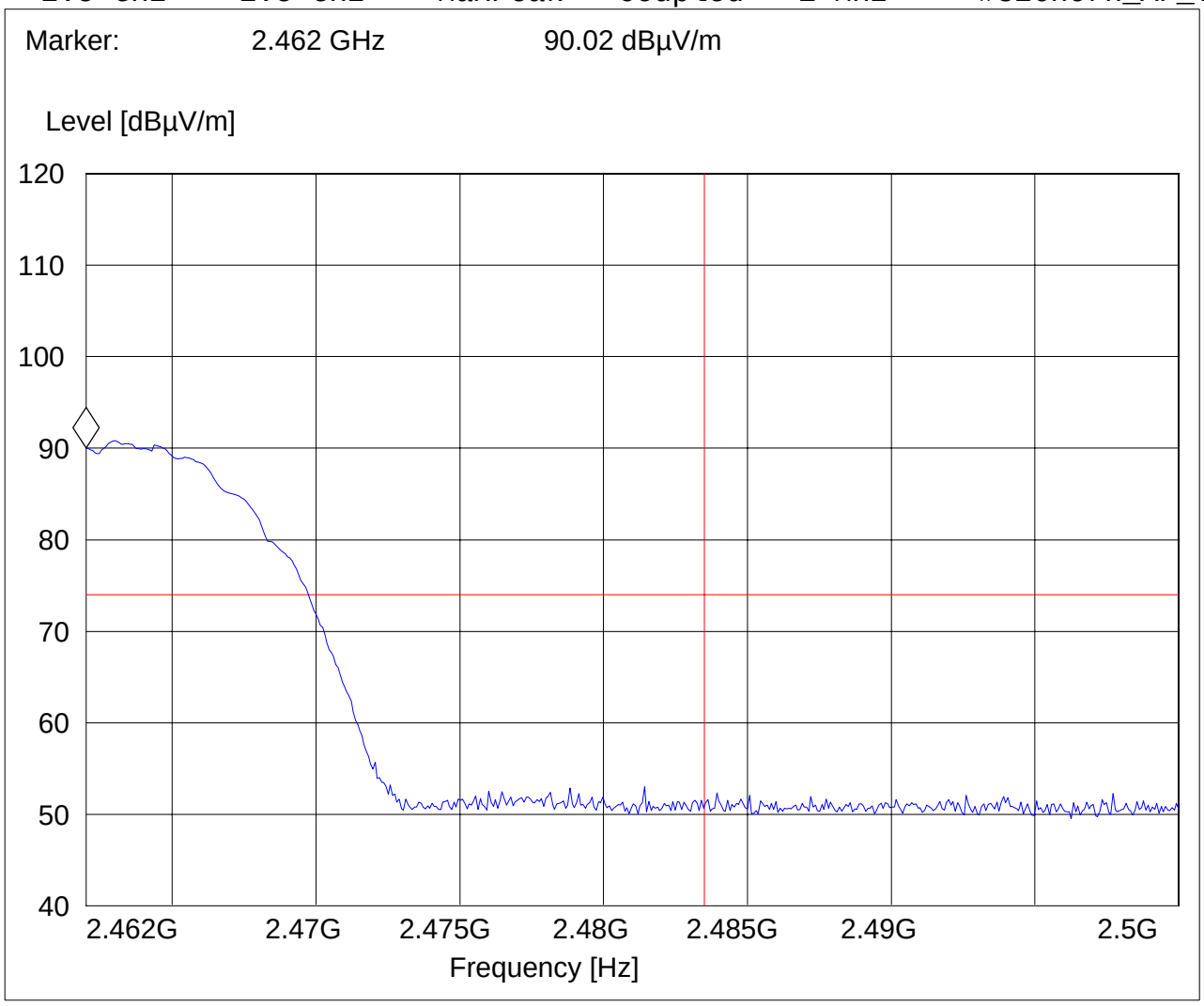
PEAK, 802.11 b MODE (2462MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        Toshiba
Test Mode:       802.11b
ANT Orientation: V
EUT Orientation: H
Test Engineer:   PETER MU
Power Supply::   Battery
Comments:
```

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



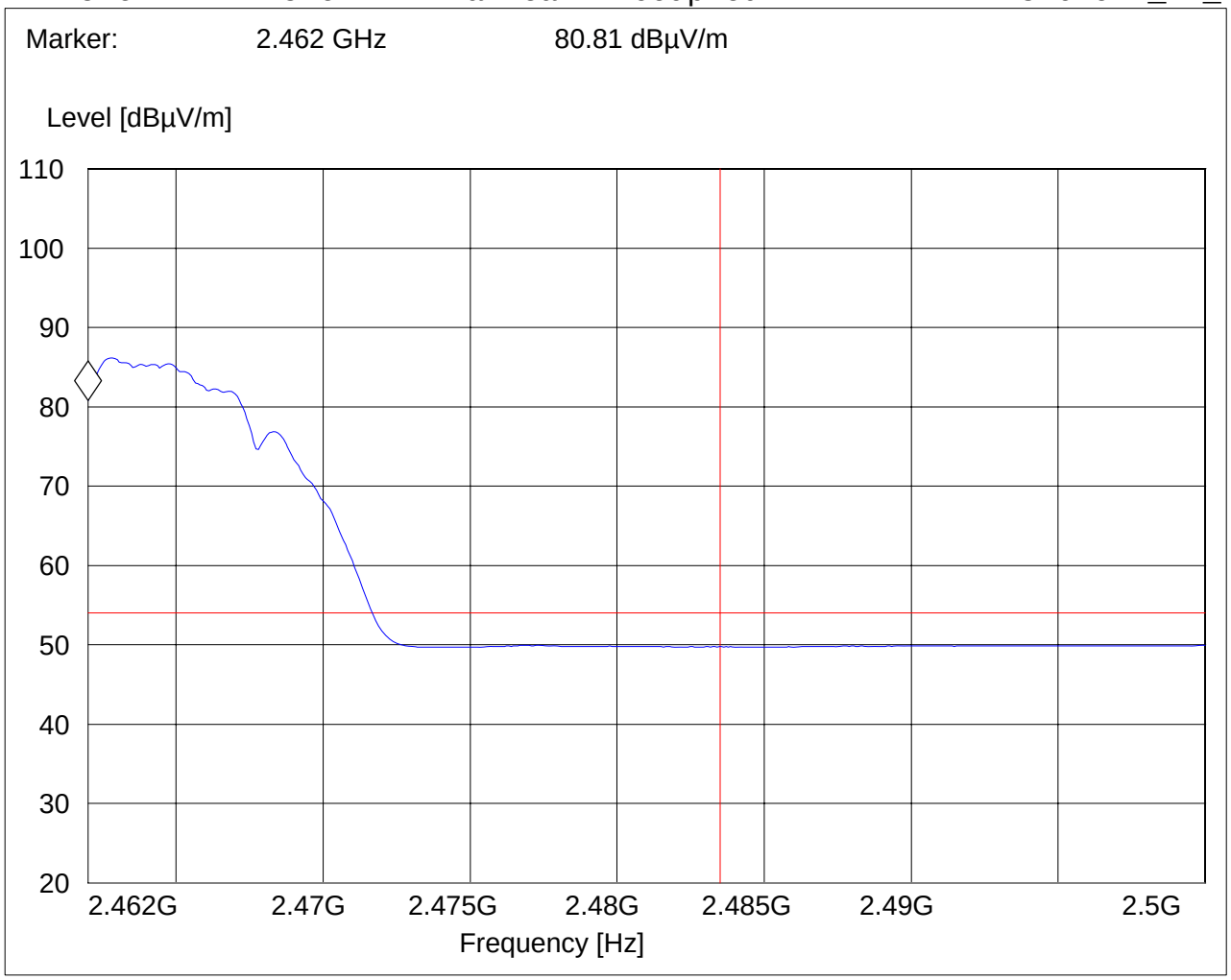
AVG, , 802.11 b MODE (2462MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT:             RSE SAMPLE, 004401120327032
Customer:        Toshiba
Test Mode:       802.11b
ANT Orientation: V
EUT Orientation: H
Test Engineer:   PETER MU
Power Supply::   Battery
Comments:
```

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



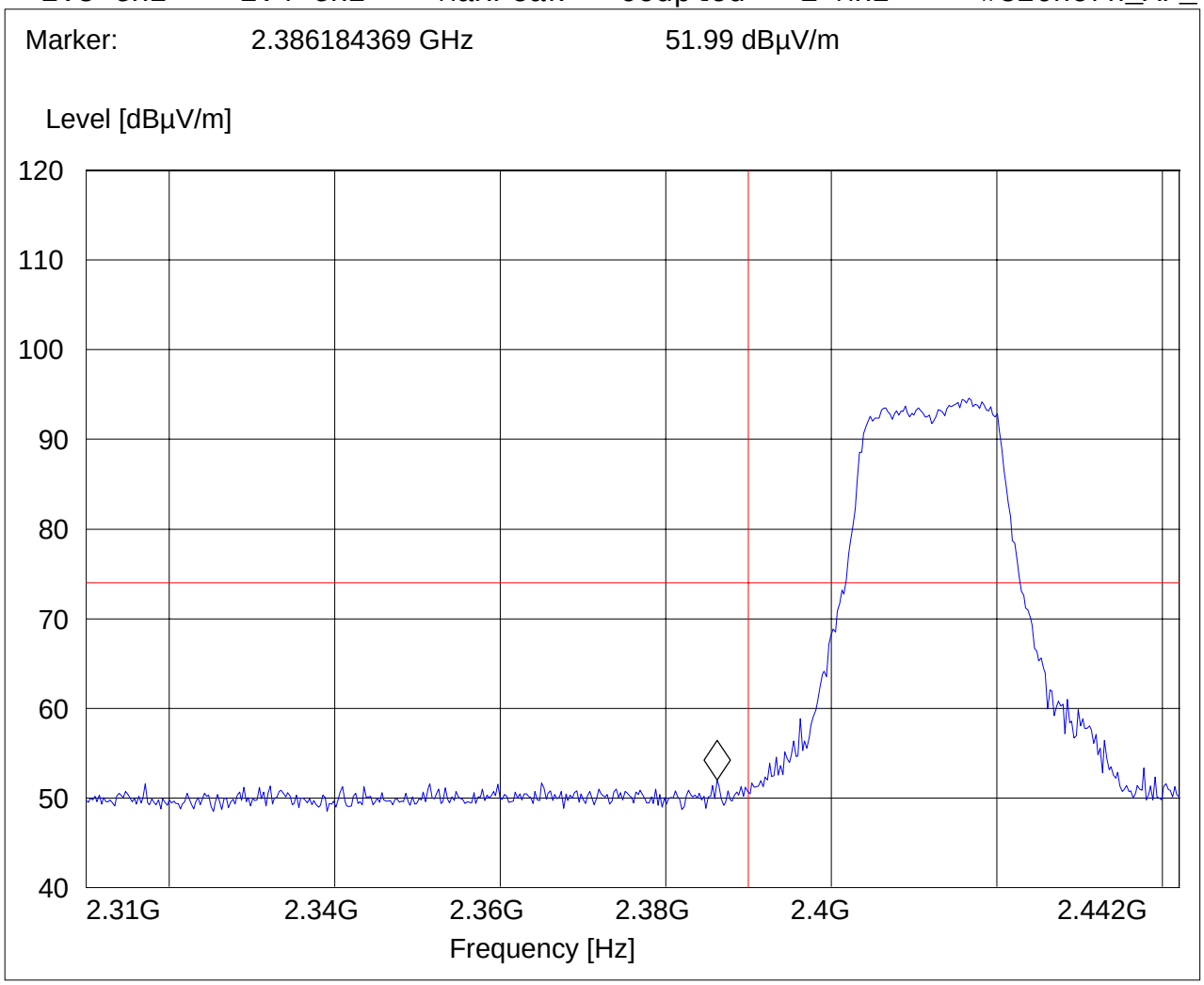
PEAK, 802.11g MODE (2412MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



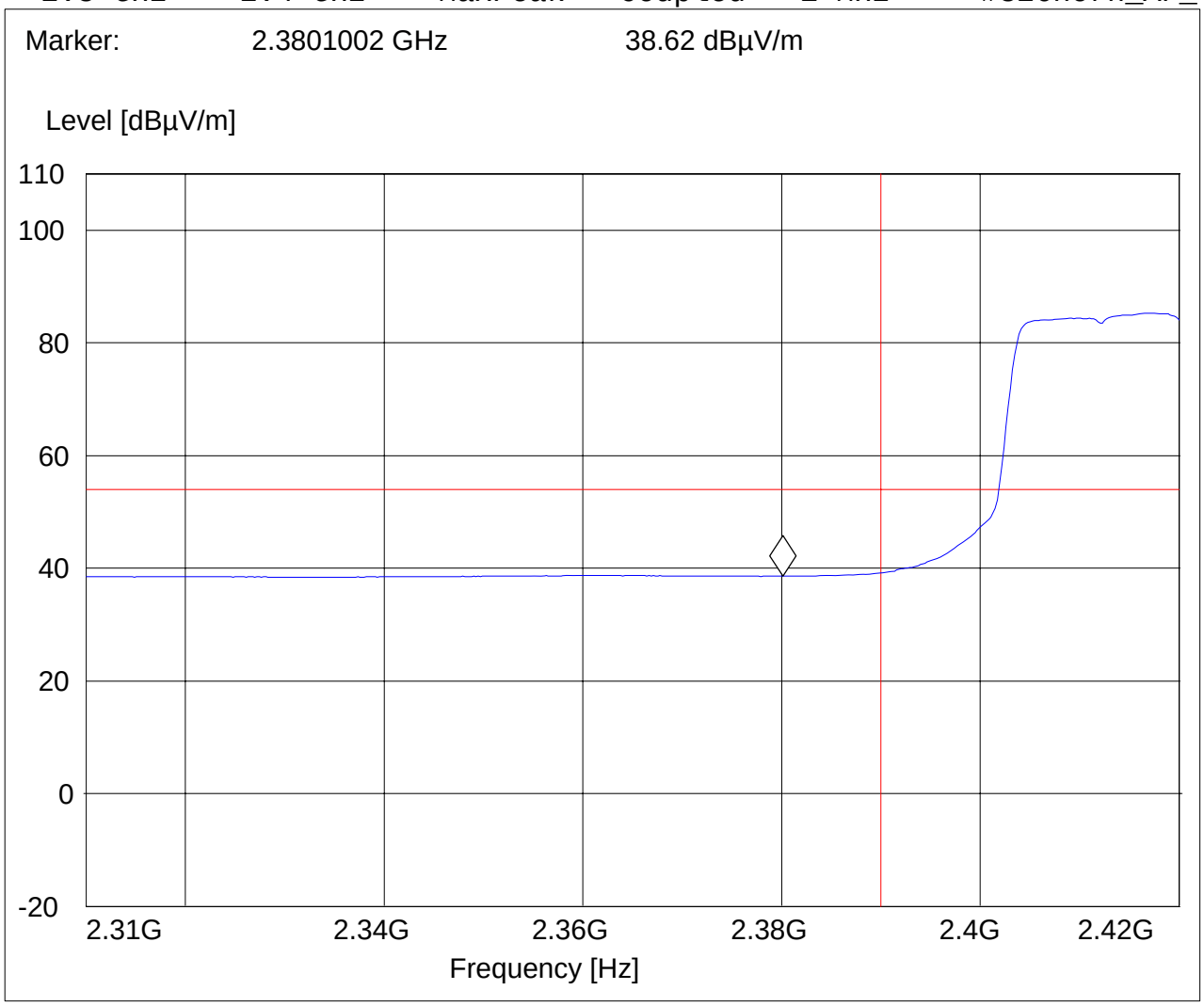
AVG, 802.11g MODE (2412MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



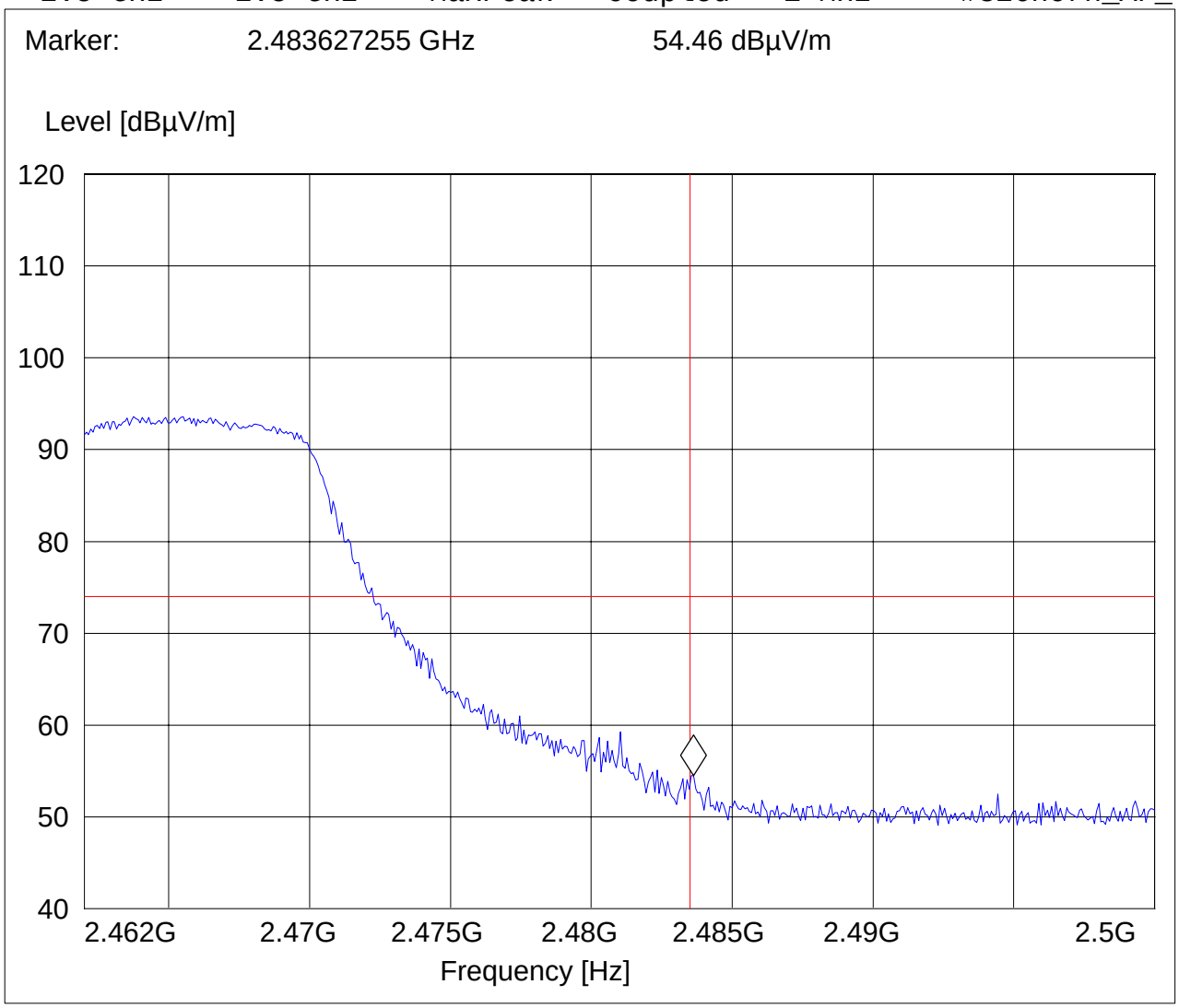
PEAK, 802.11g MODE (2462MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



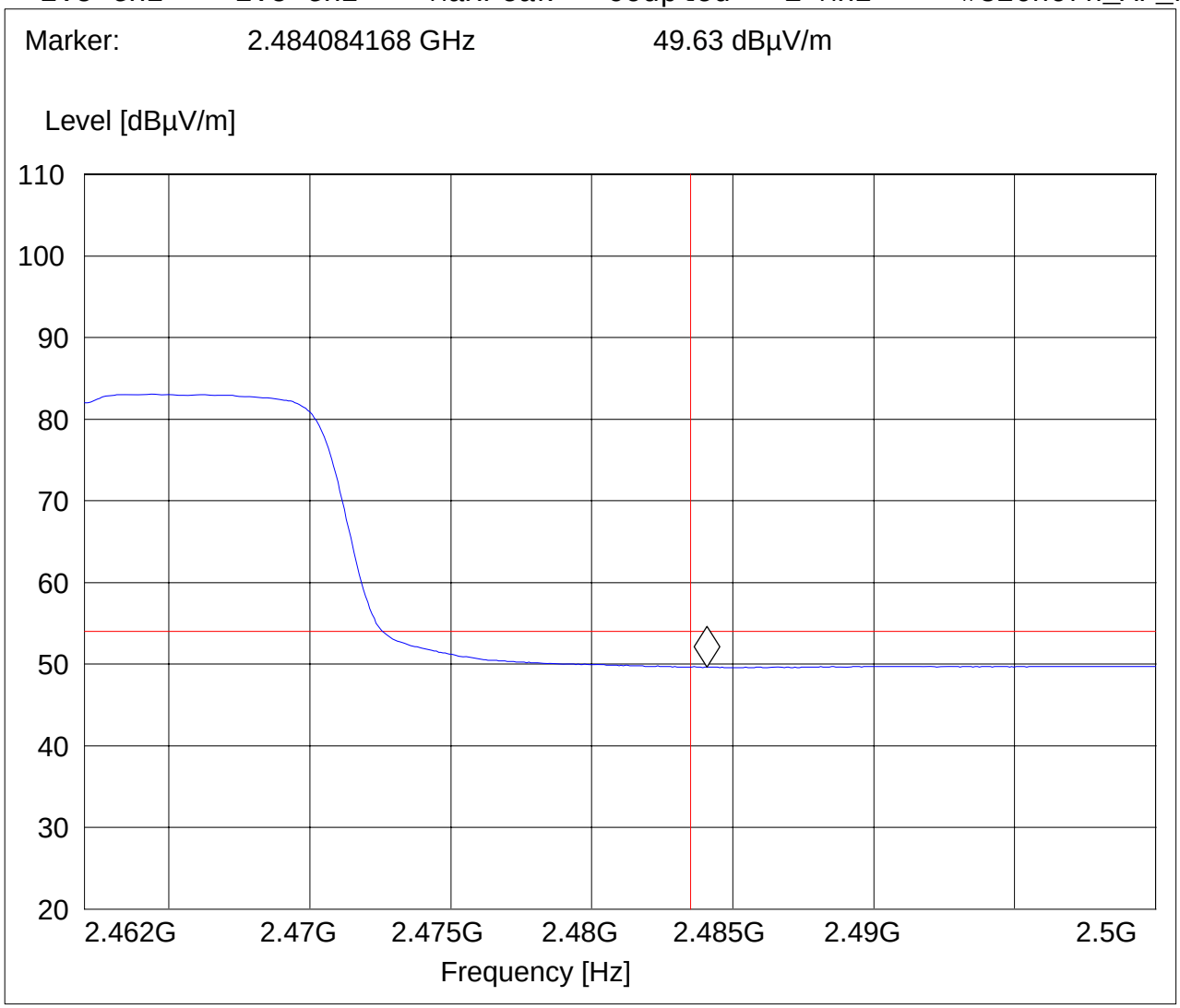
AVG, 802.11g MODE (2462MHz)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209

5.3.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]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
6.215 - 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	2690 - 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	([2])
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m**
***AVG. LIMIT= 54dBuV/m**

NOTE:
1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels

5.3.2 RESULTS 802.11 (worst case)

30MHz – 1GHz

Antenna: vertical

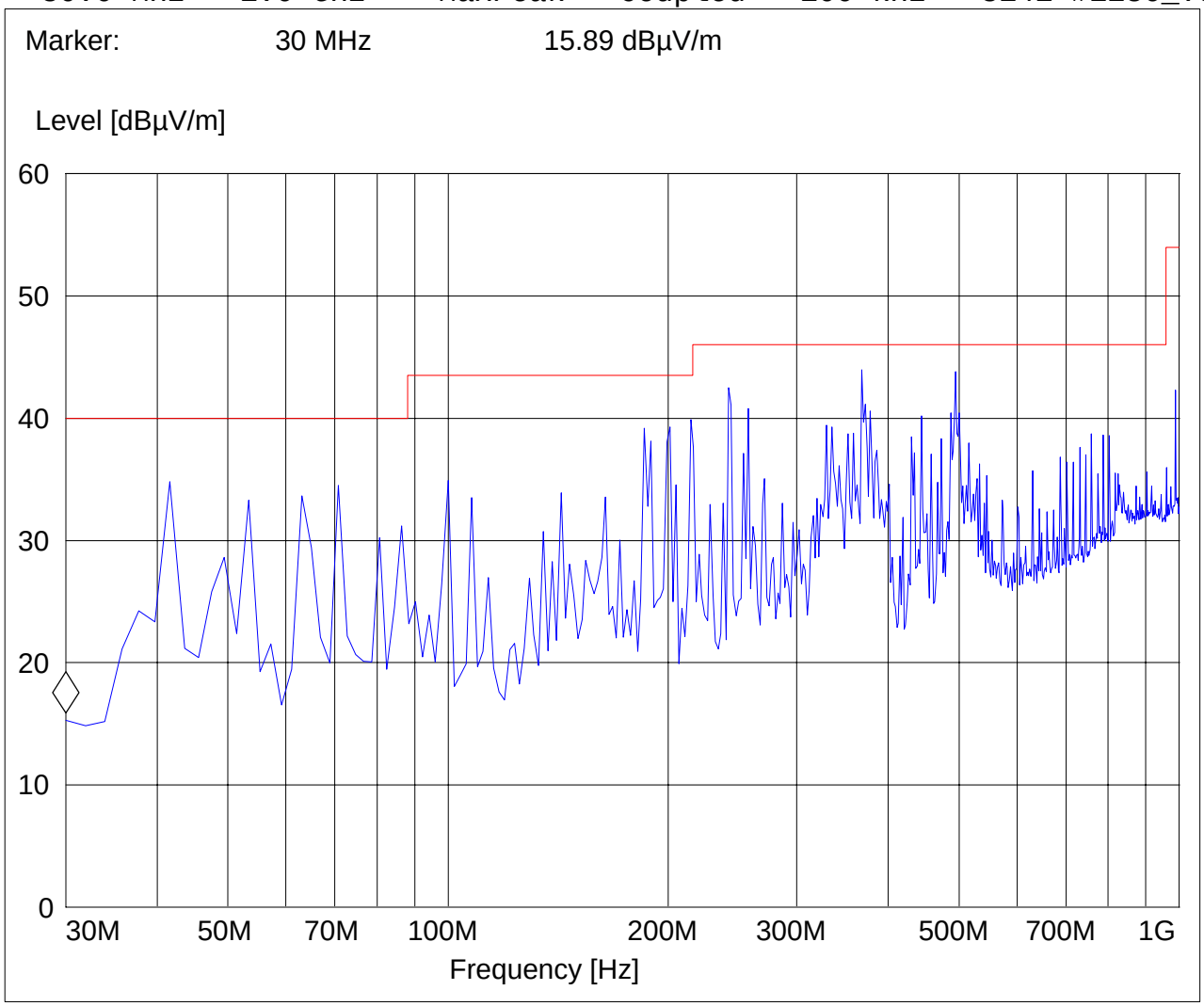
Note: This plot is valid for low, mid, high channels and both polarizations (worst-case plot)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: V
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



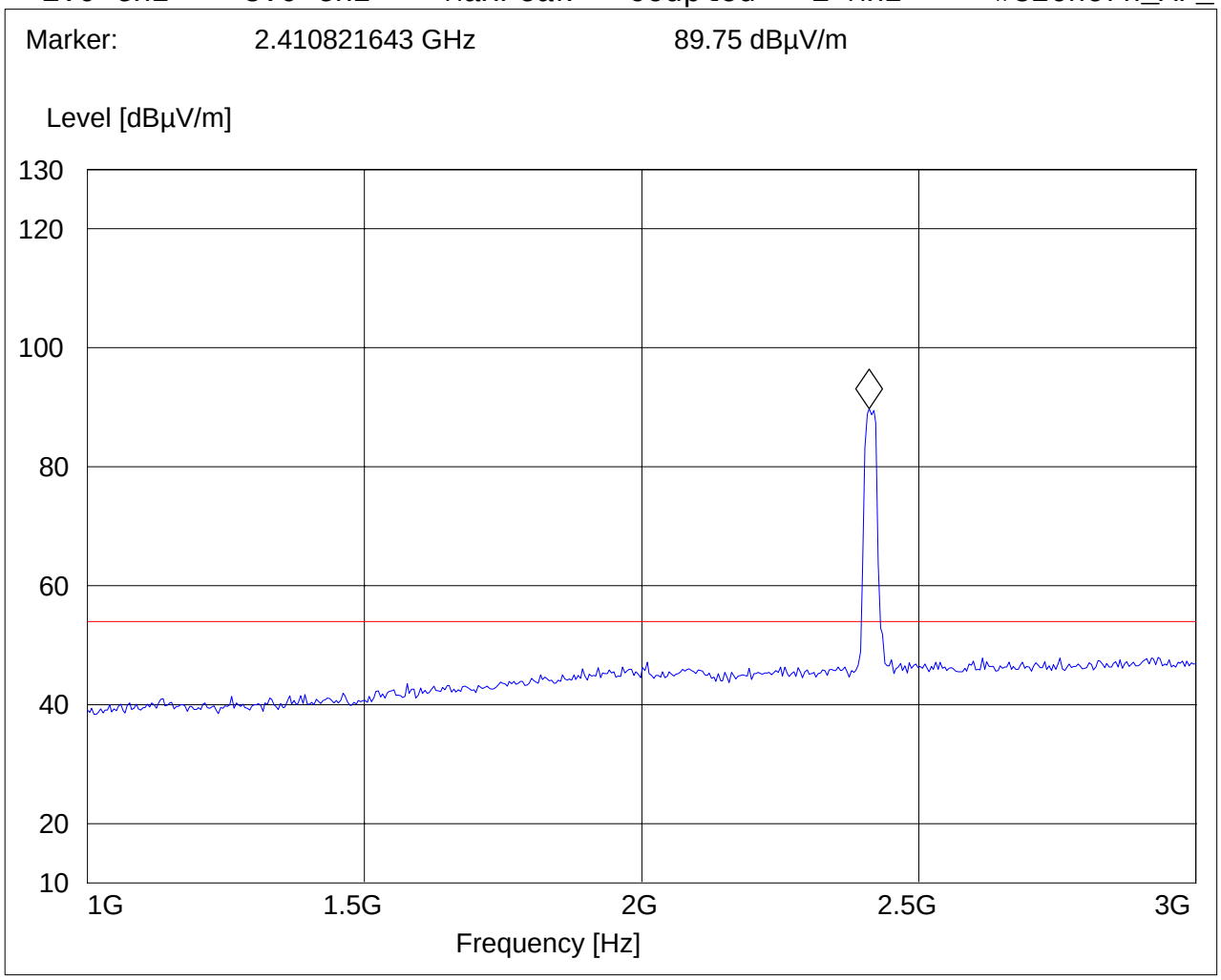
1-3GHz (2412MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       TT230°,  54Mbps
```

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



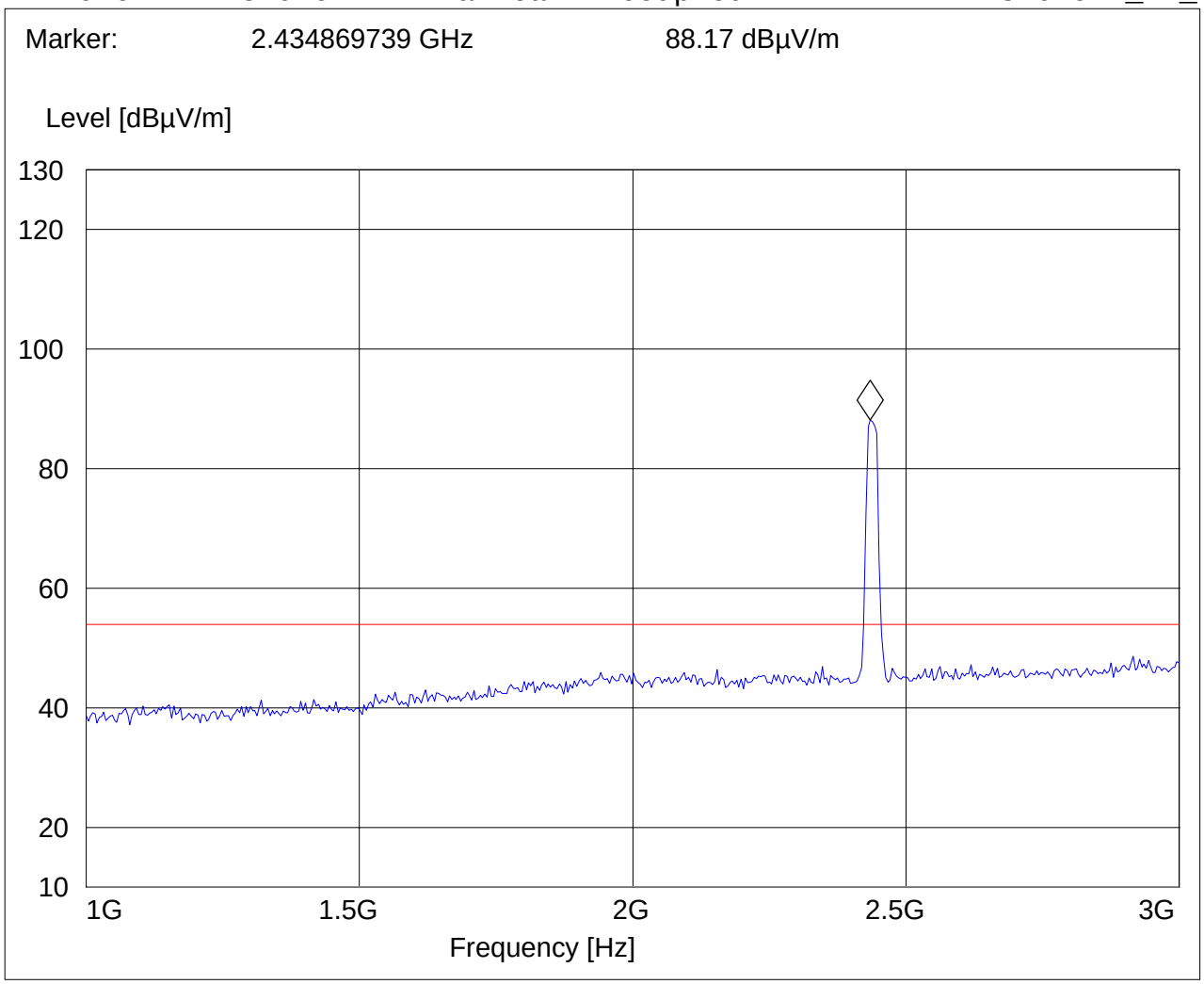
1-3GHz (2437MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



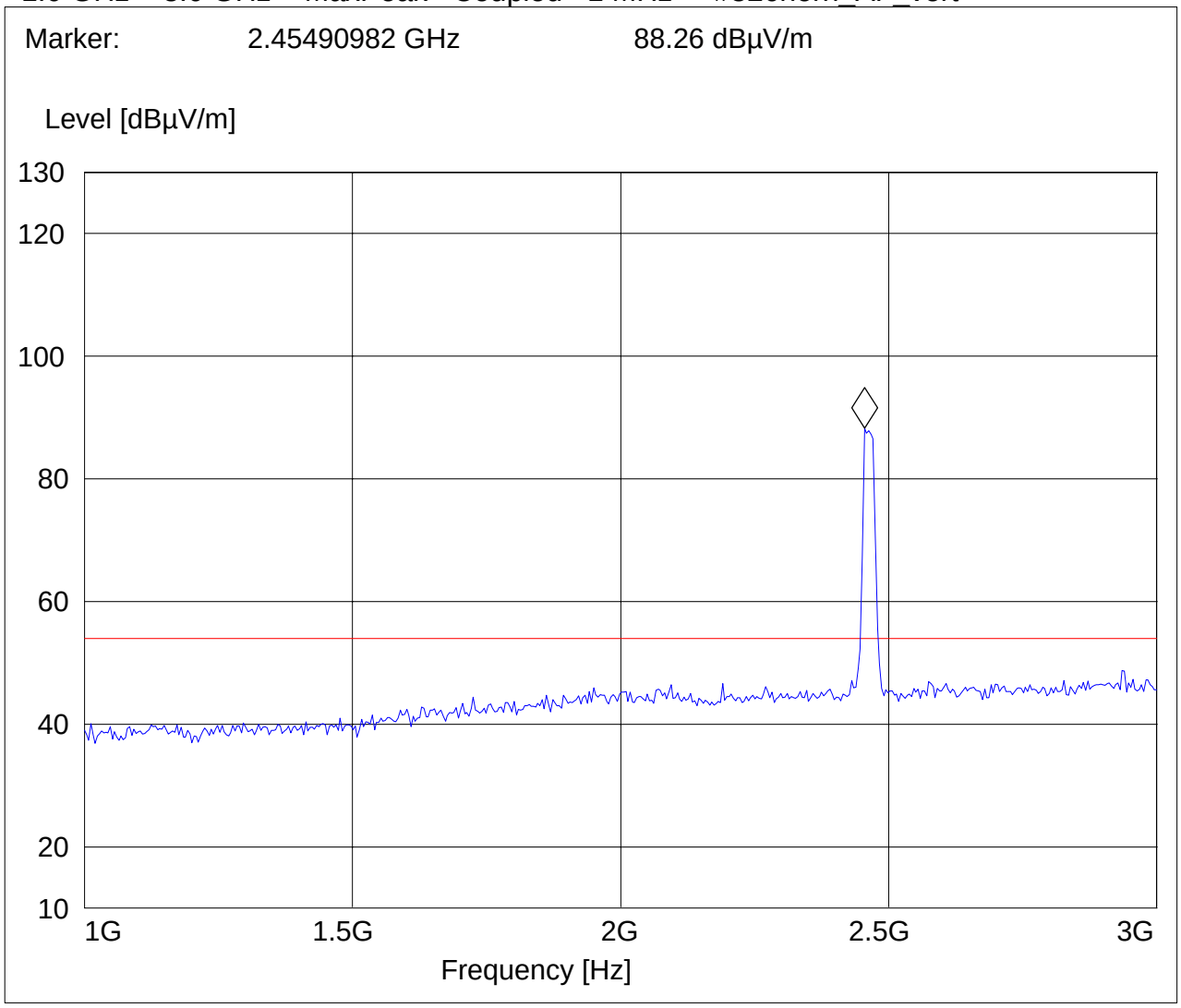
1-3GHz (2462MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



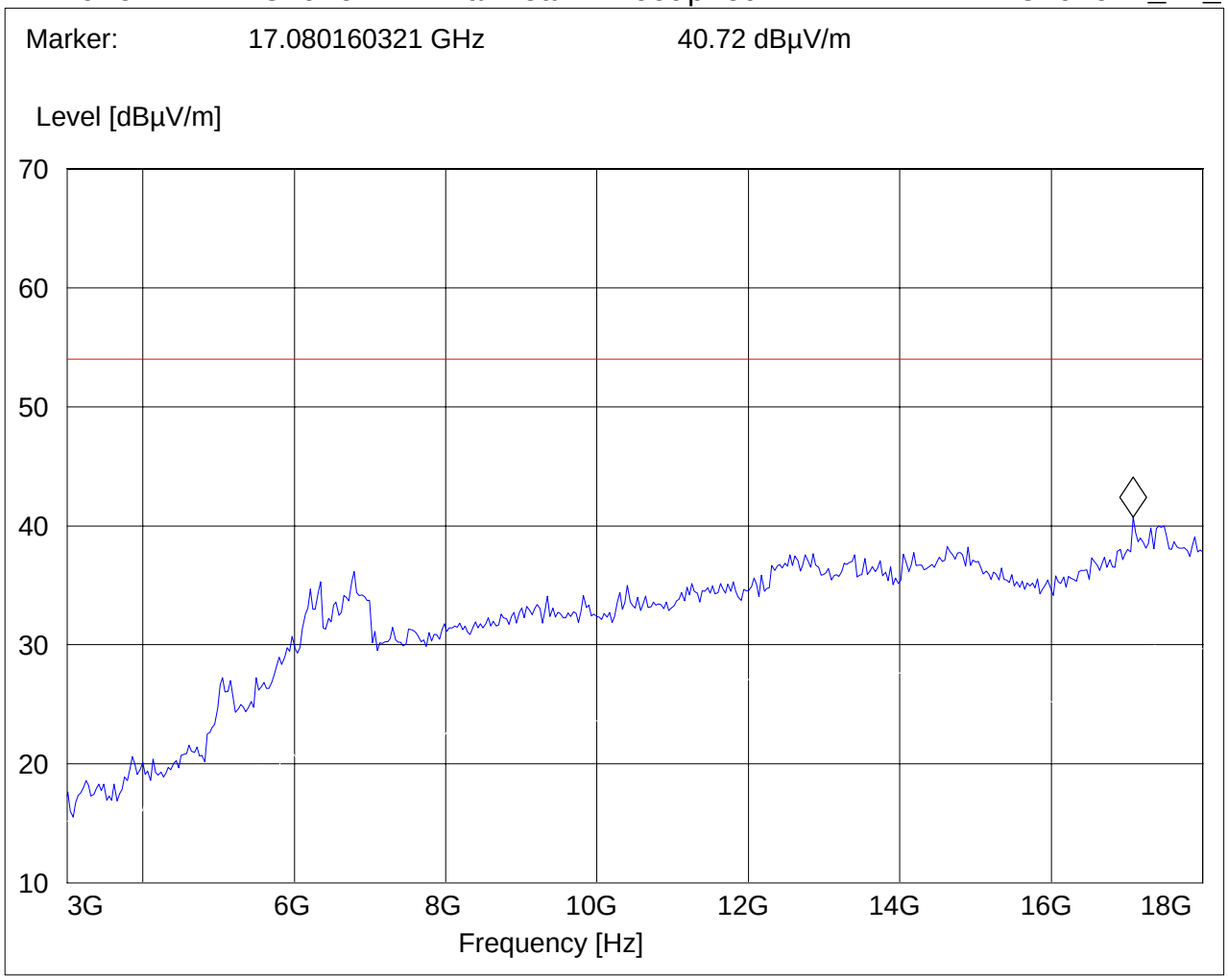
3-18GHz (2412MHz)
Note: Peak Reading vs. Average limit

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



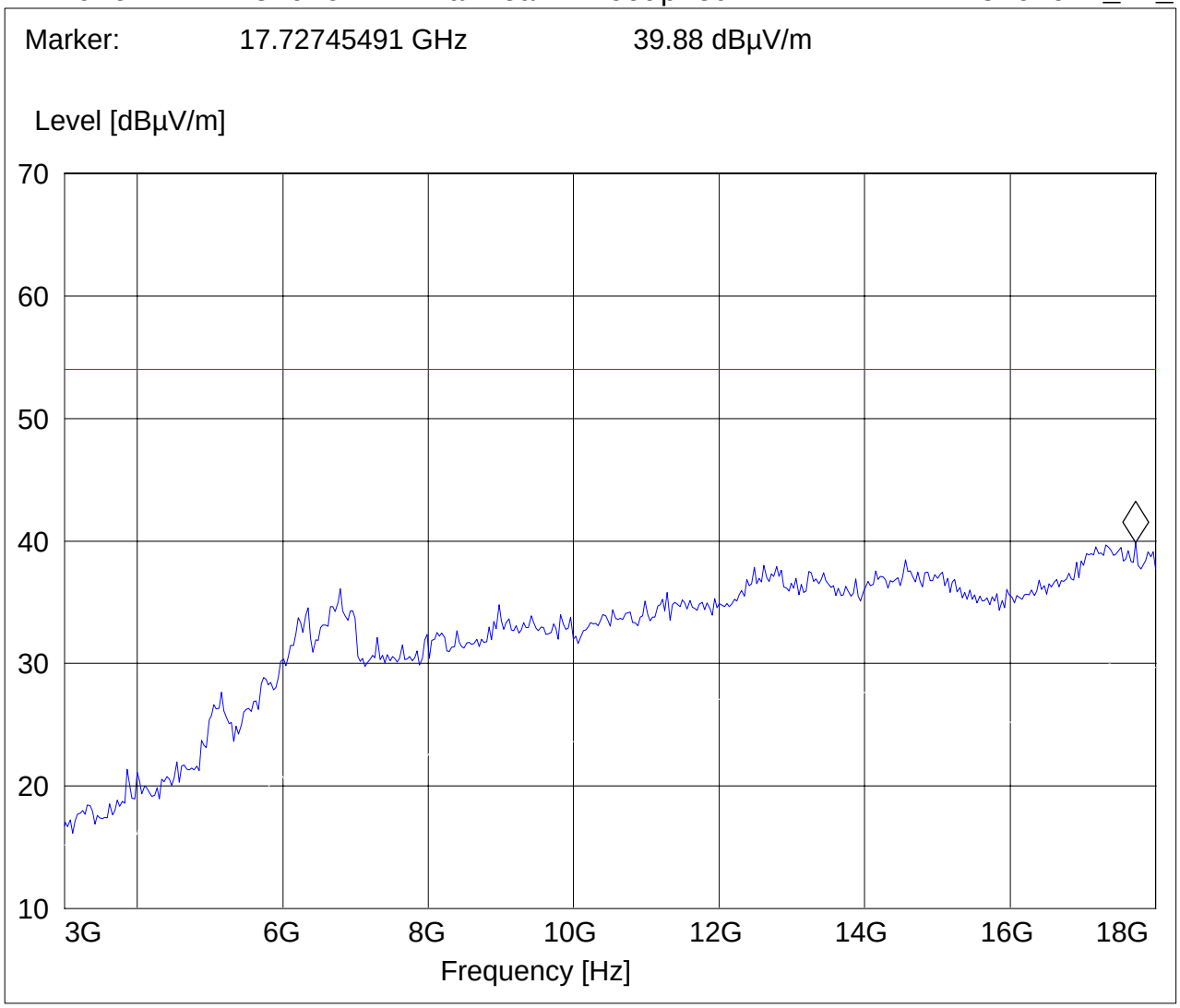
3-18GHz (2437MHz)
Note: Peak Reading vs. Average limit

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



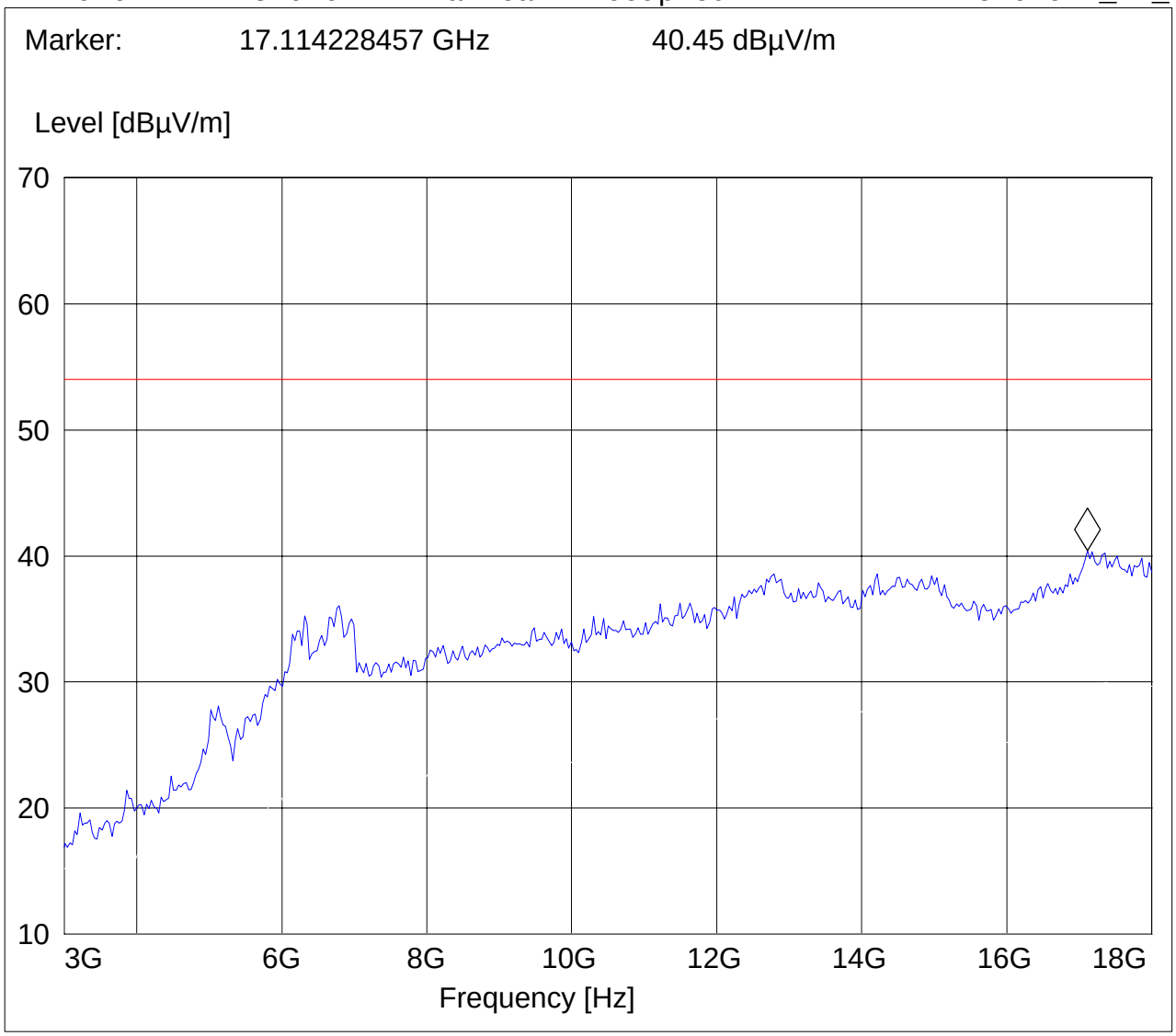
3-18GHz (2462MHz)
Note: Peak Reading vs. Average limit

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



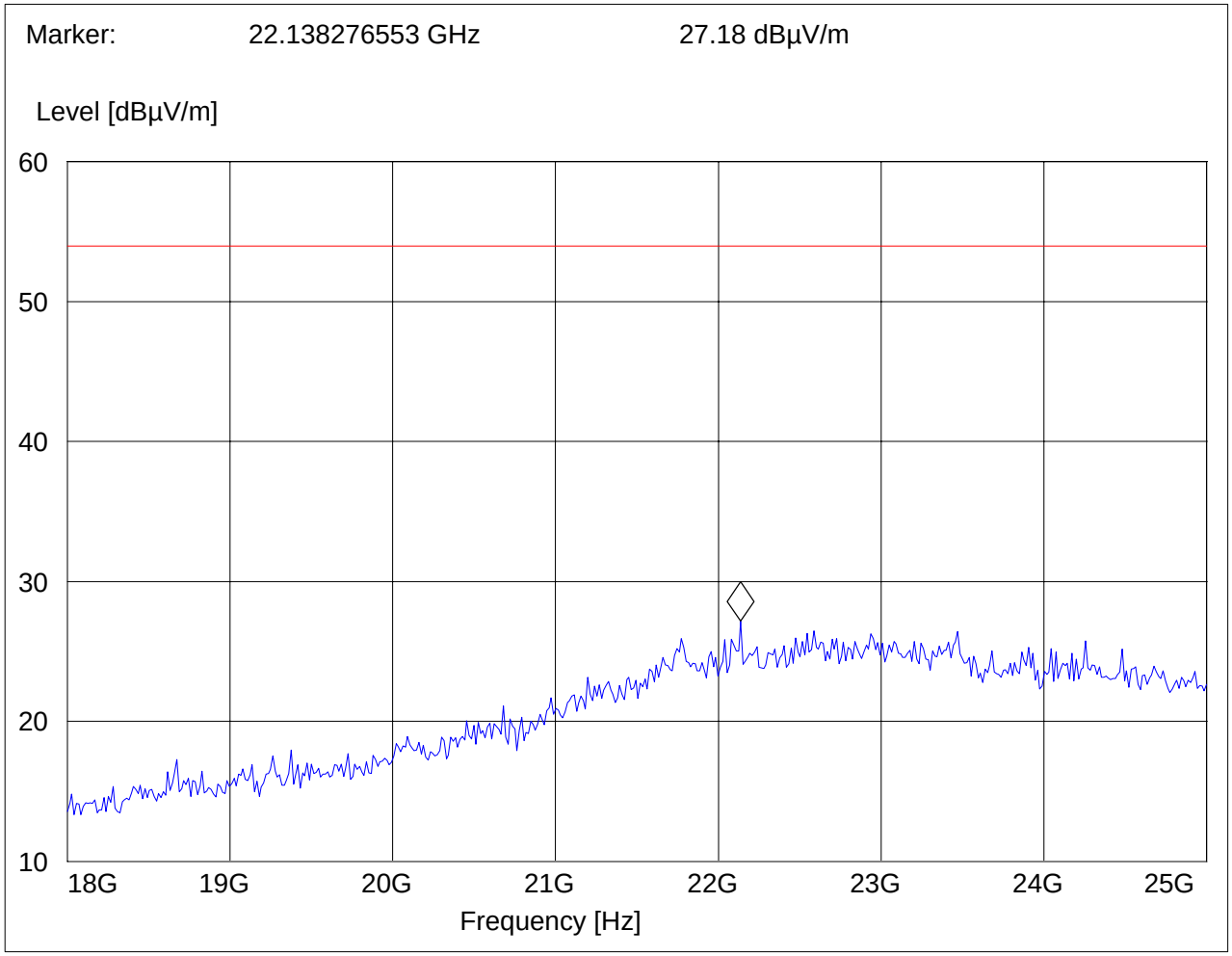
18-25GHz
Note: This plot is valid for low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Average limit

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT::            #19
Customer::       Toshiba
Test Mode:       WLAN, 802.11g
Ant Orientation: H
EUT Orientation: H
Test Engineer:   Peter Mu
Voltage::        Battery
Comments::       54Mbps
```

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	25.0 GHz	MaxPeak	Coupled	1 MHz	3160 Horn 18-26.5G



5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

5.4.1 LIMITS

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

NOTE:
1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.

Test Not Conducted.

6 Measurements (CONDUCTED)

6.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (CONDUCTED)

6.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	30dBm

***limit is based upon antenna gain of less than or equal to 6dBi.**

6.1.2 RESULTS:

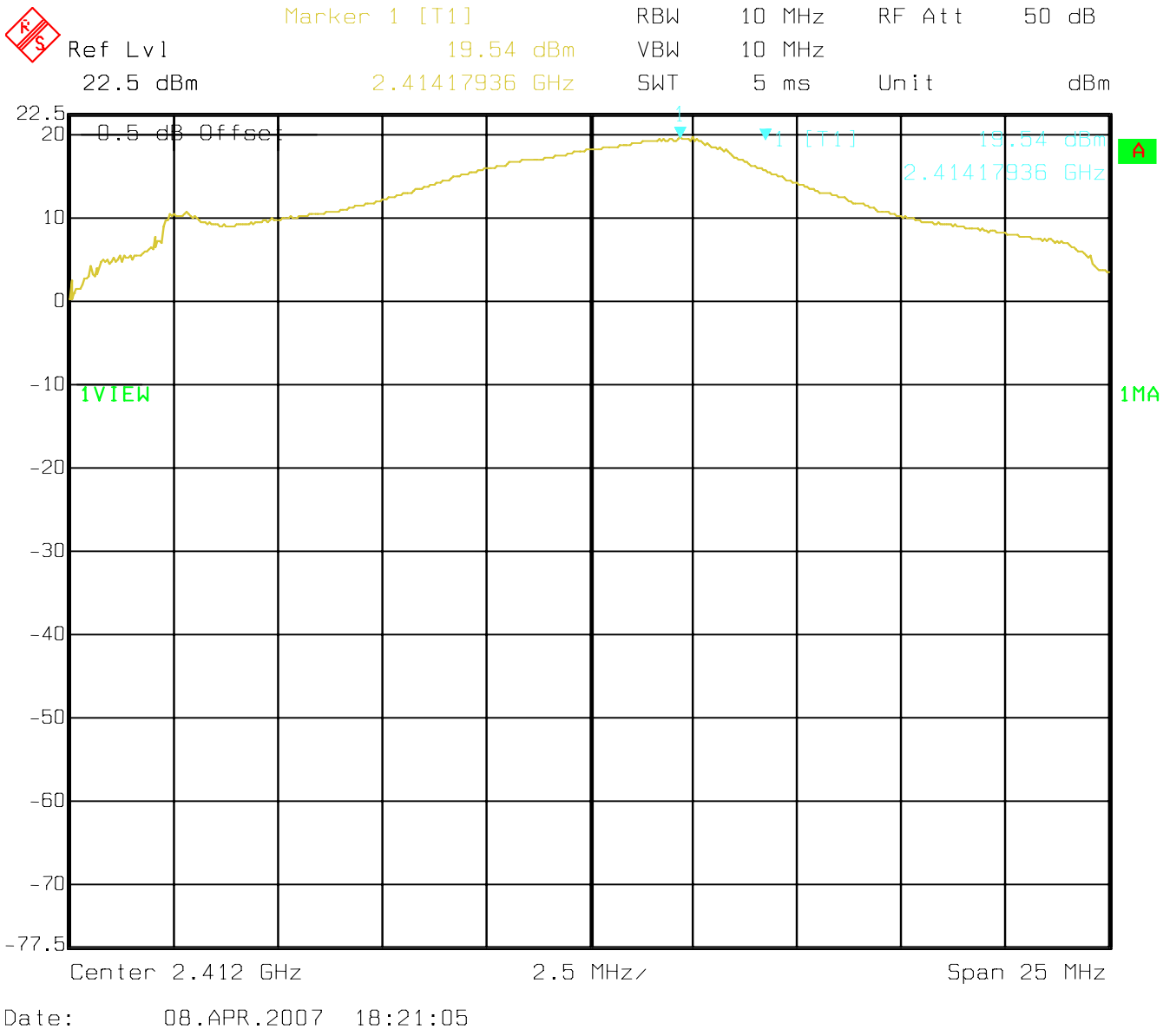
TEST CONDITIONS	MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)	2412 MHz	2437 MHz	2462 MHz
802.11b	19.54	19.11	18.84
802.11g	21.18	20.04	20.25
802.11g (corrected)	21.98	20.71	20.98

* Since 6dB bandwidth for 802.11g is greater than analyzer maximum resolution bandwidth of 10MHz correction factors apply. See section 6.3 for calculations.

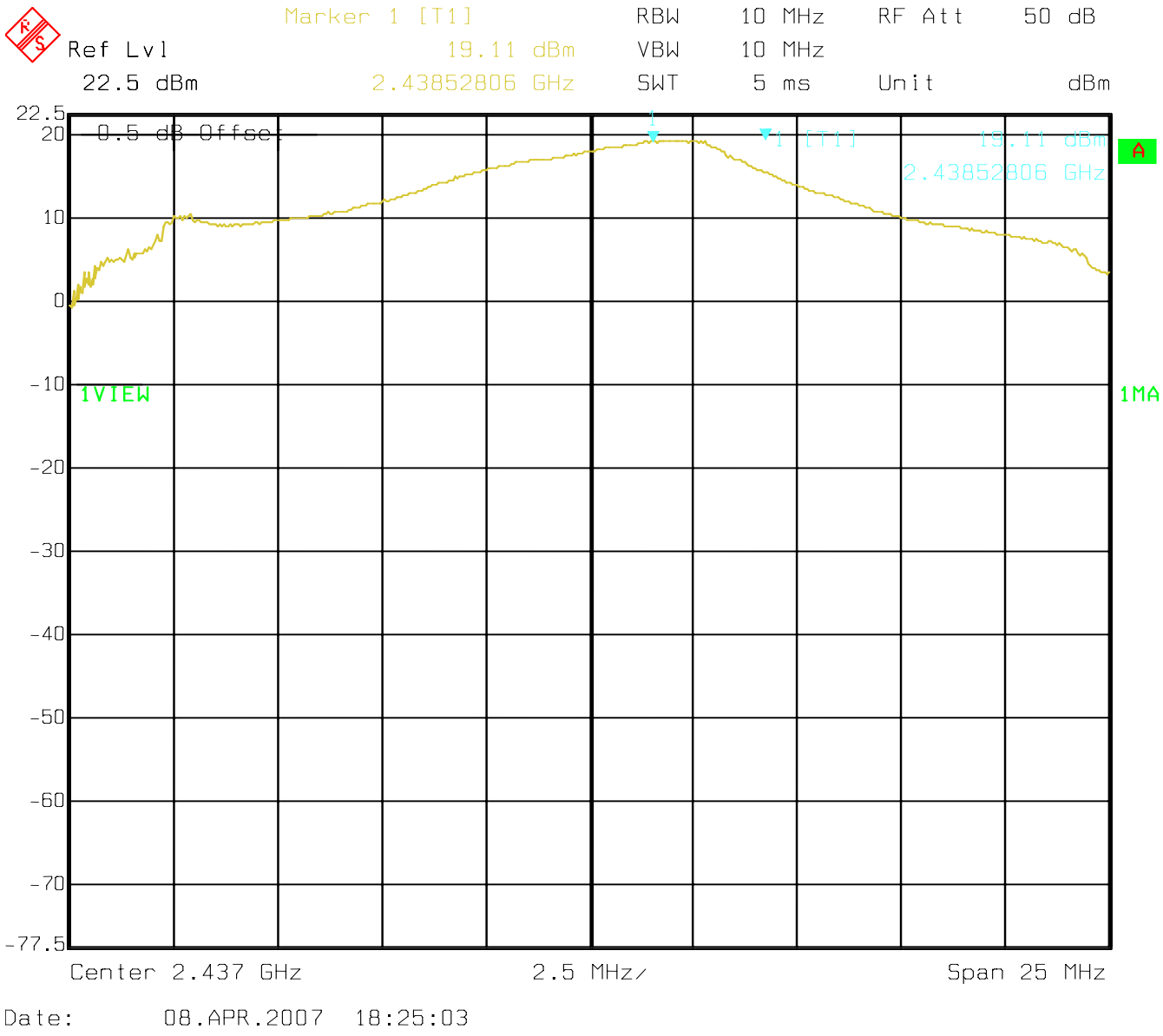
6.2 6dB BANDWIDTH

TEST CONDITIONS	6dB BANDWIDTH (kHz)		
Frequency (MHz)	2412 MHz	2437 MHz	2462 MHz
802.11b	6764	6814	7014
802.11g	12024	11673	11824

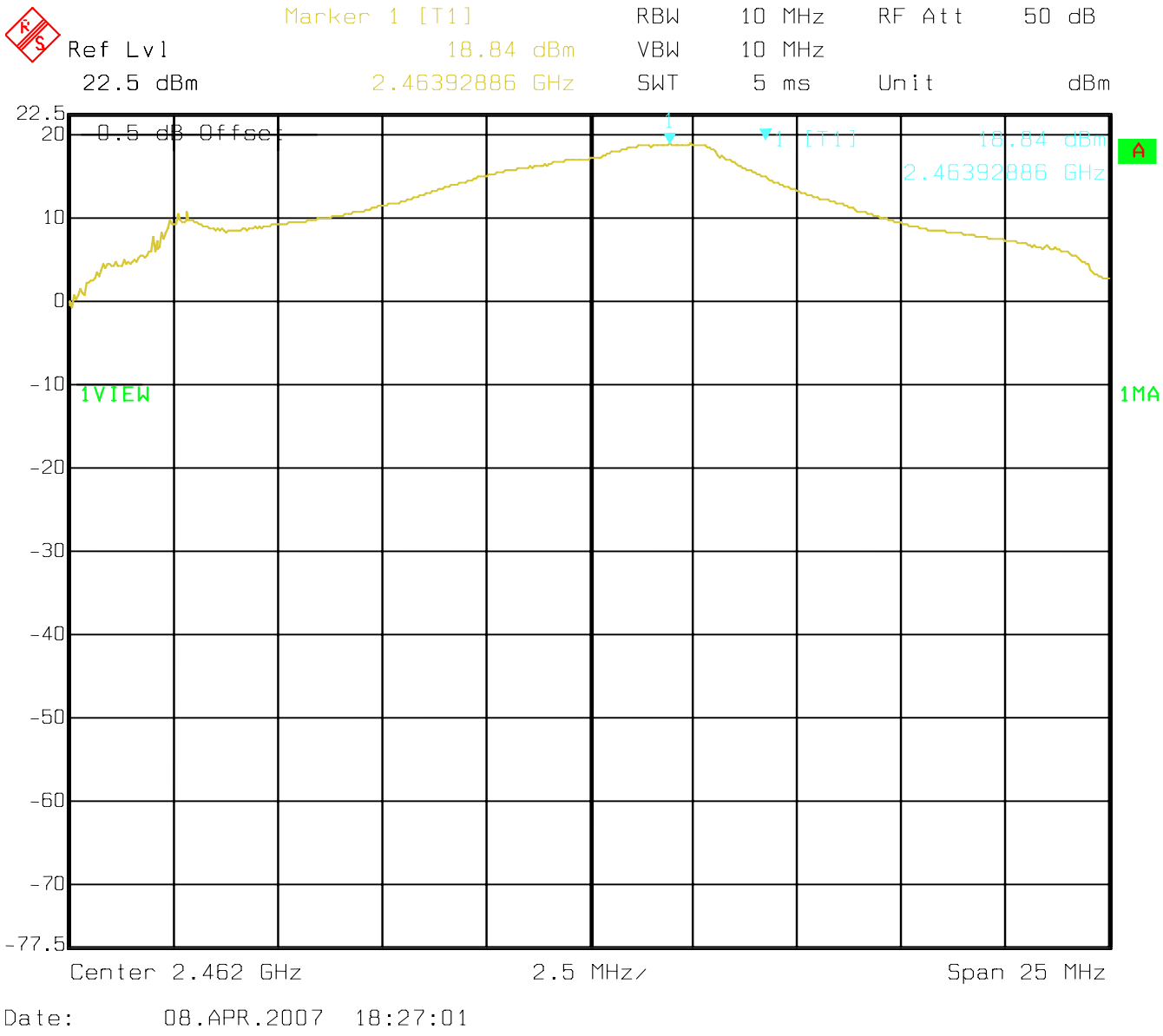
(2412 MHz) 802.11b CONDUCTED PEAK POWER



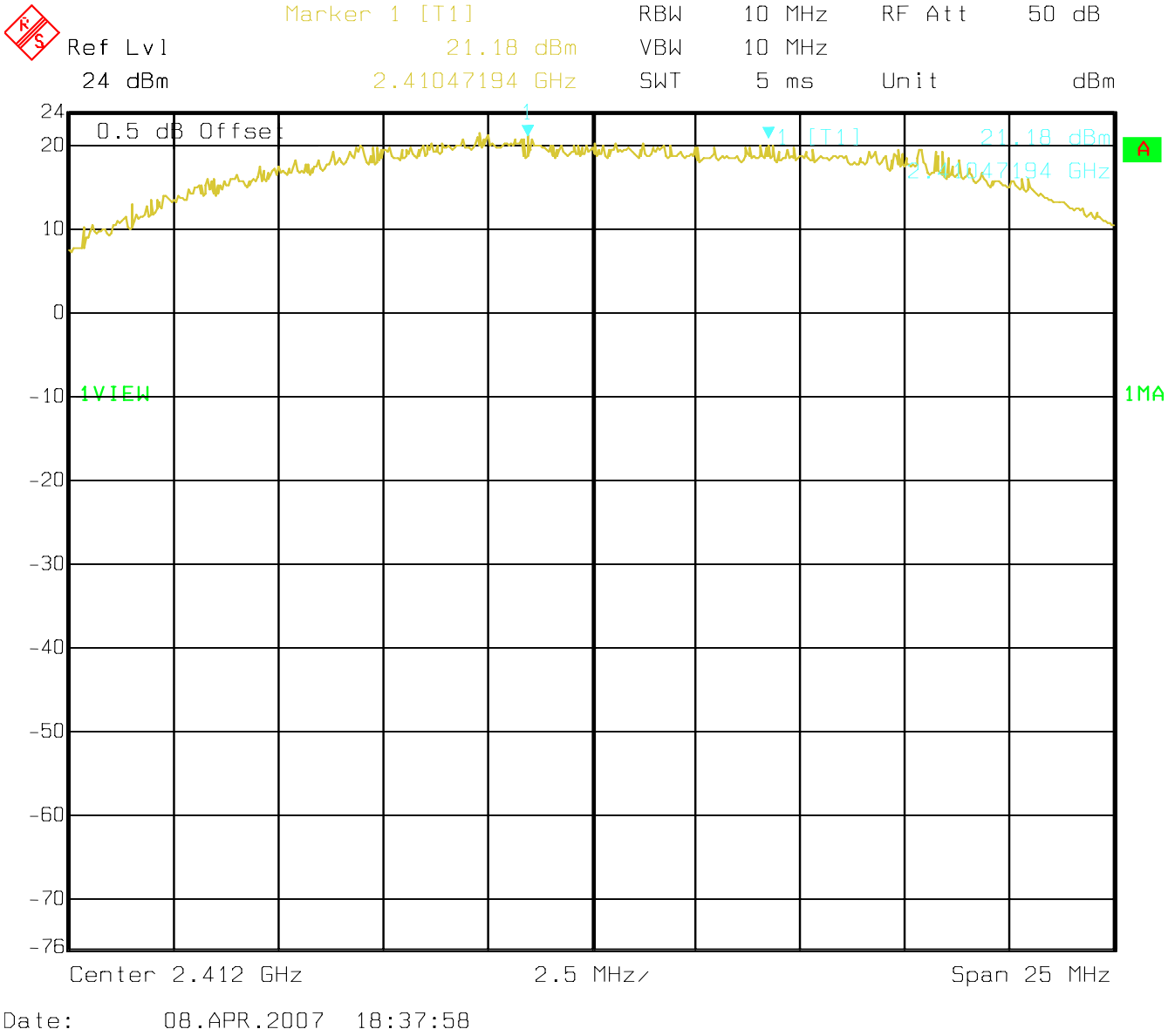
(2437 MHz) 802.11b CONDUCTED PEAK POWER



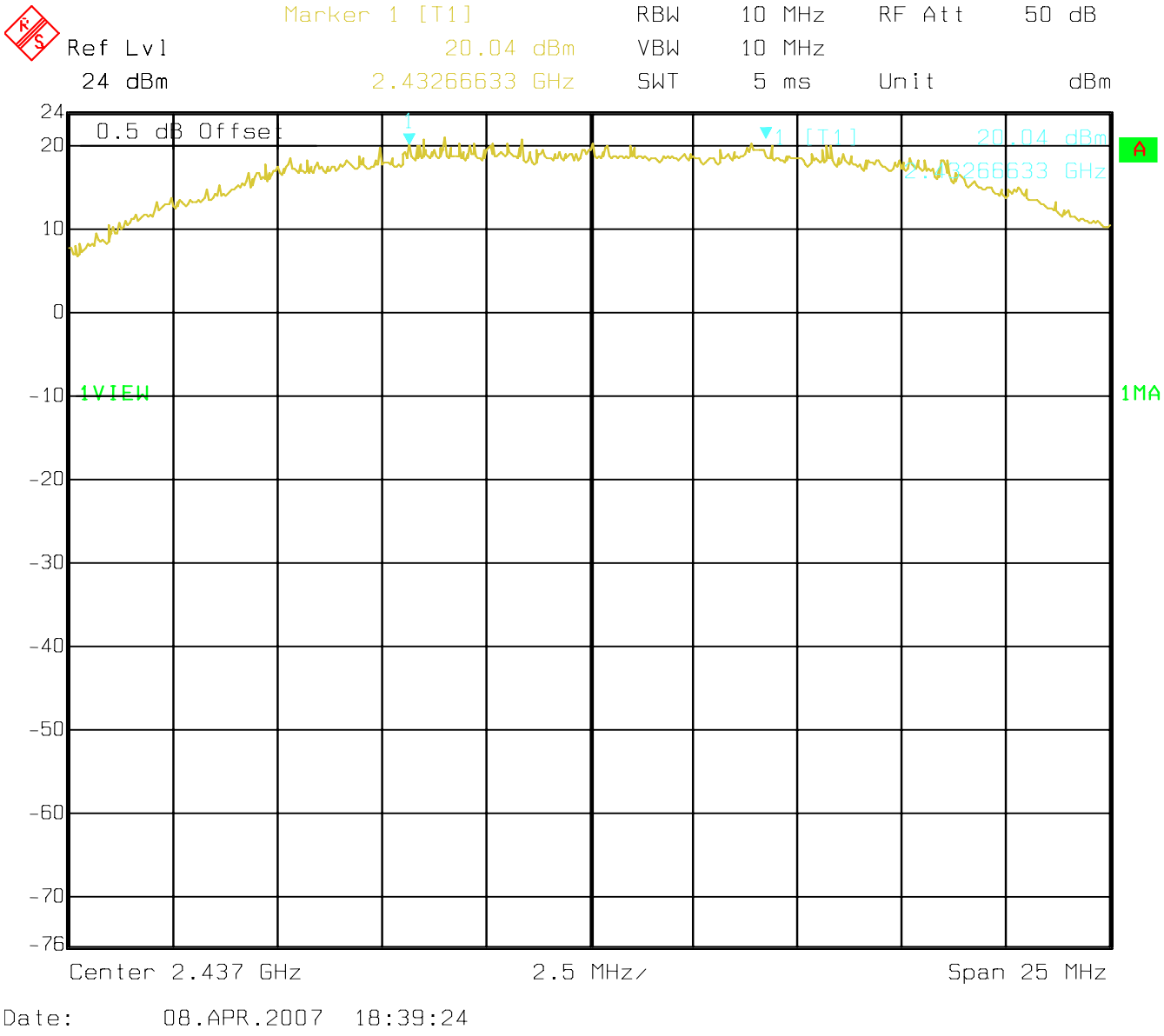
(2462 MHz) 802.11b CONDUCTED PEAK POWER



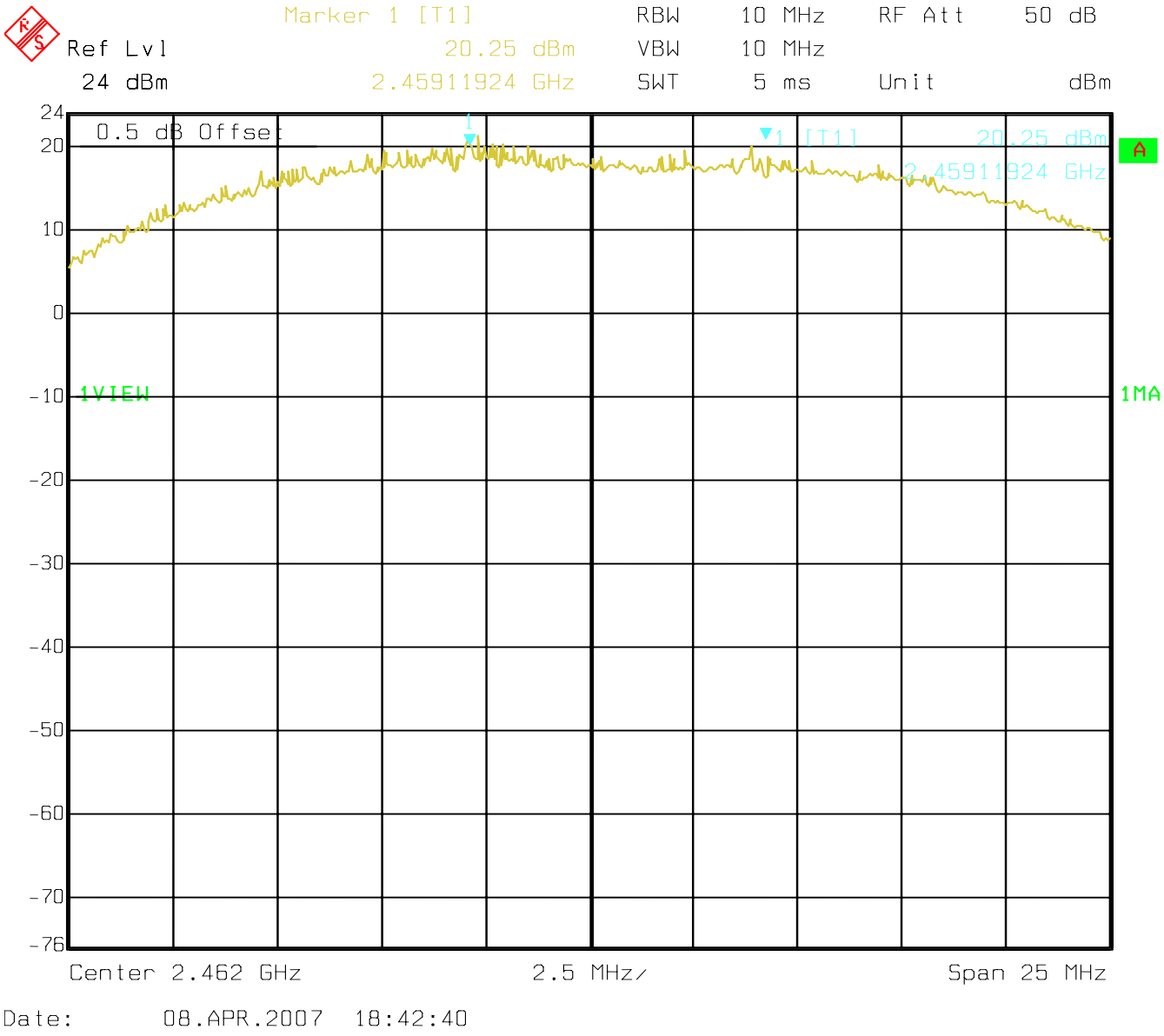
(2412 MHz) 802.11g CONDUCTED PEAK POWER



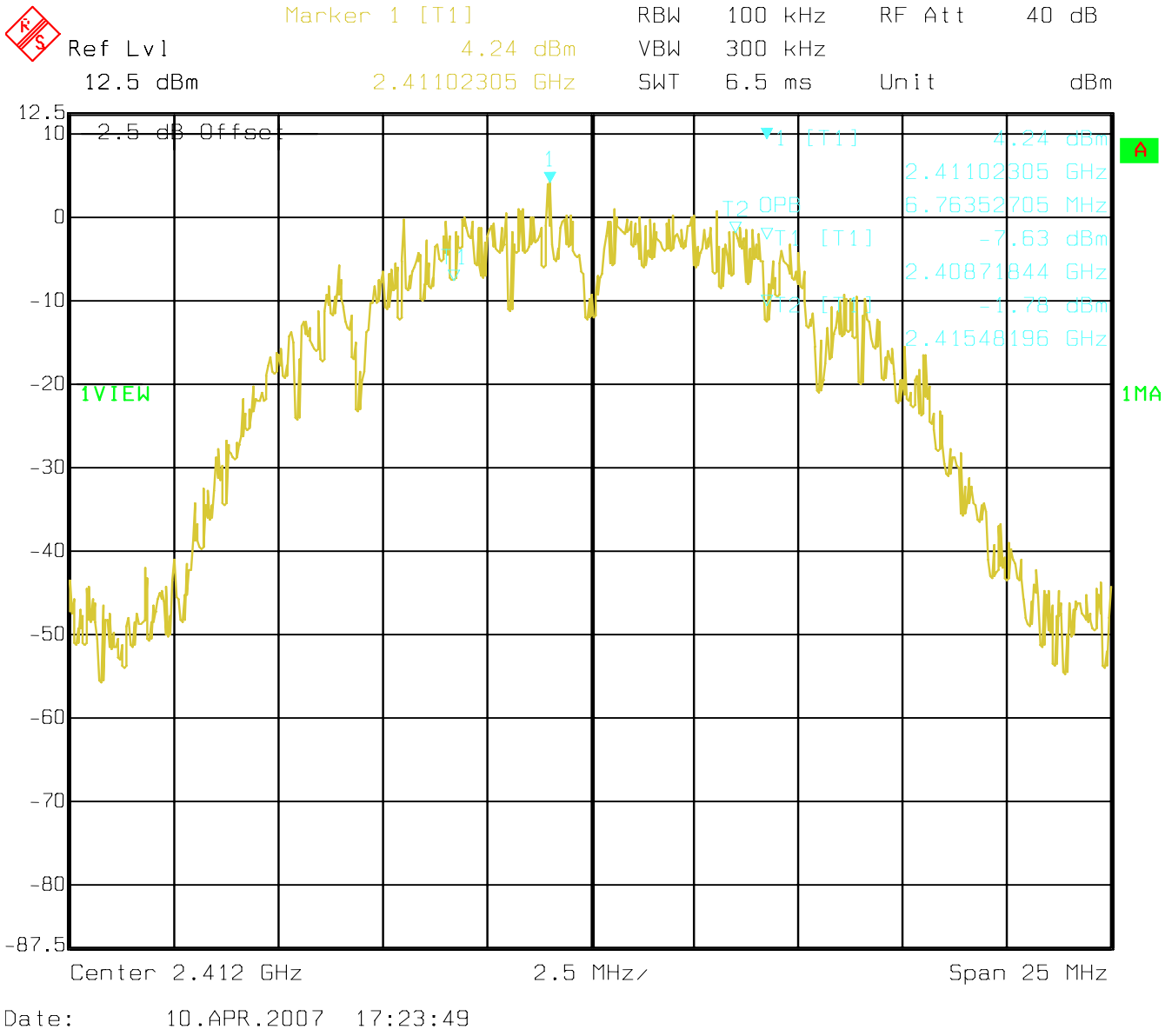
(2437 MHz) 802.11g CONDUCTED PEAK POWER



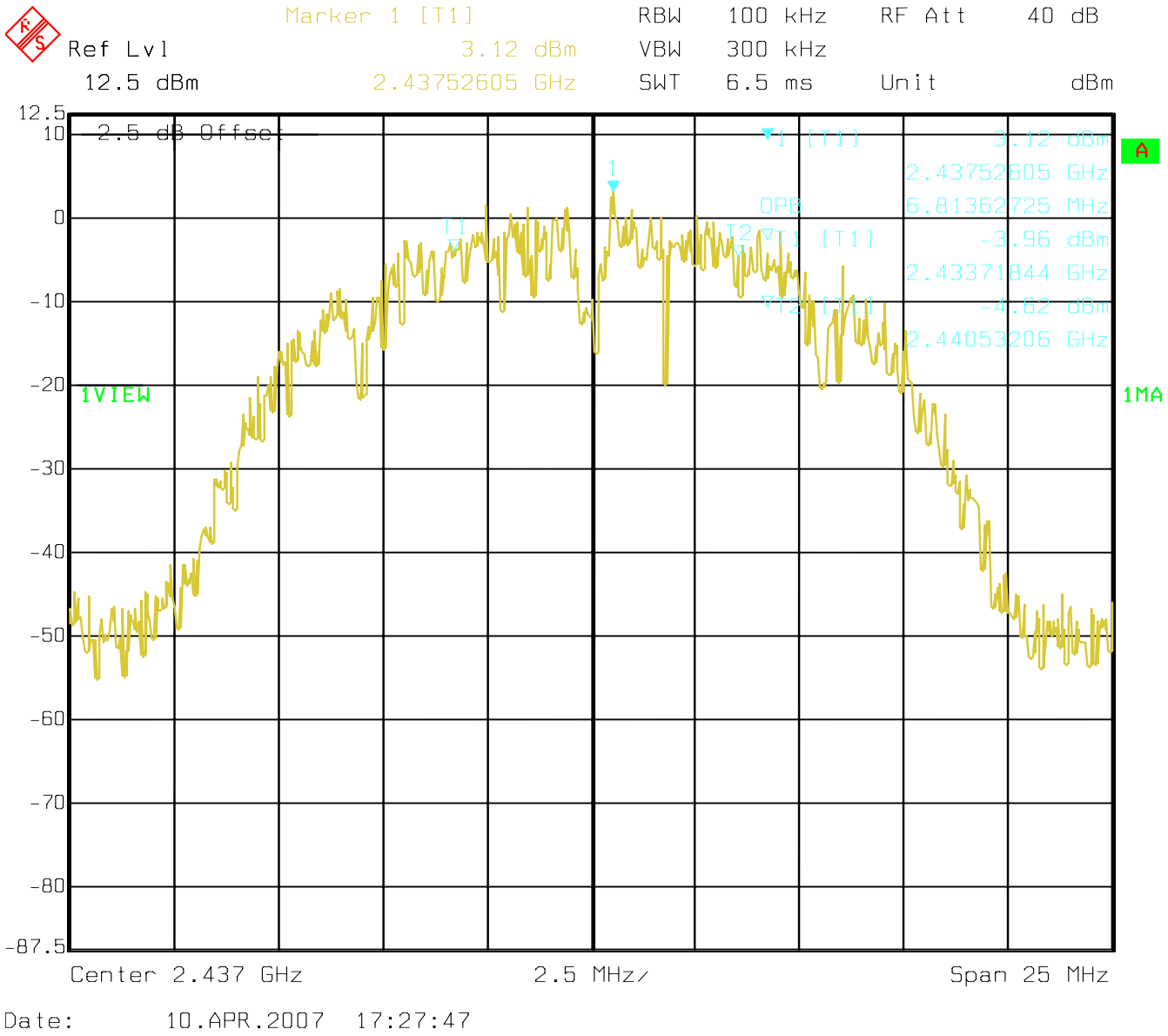
(2462 MHz) 802.11g CONDUCTED PEAK POWER



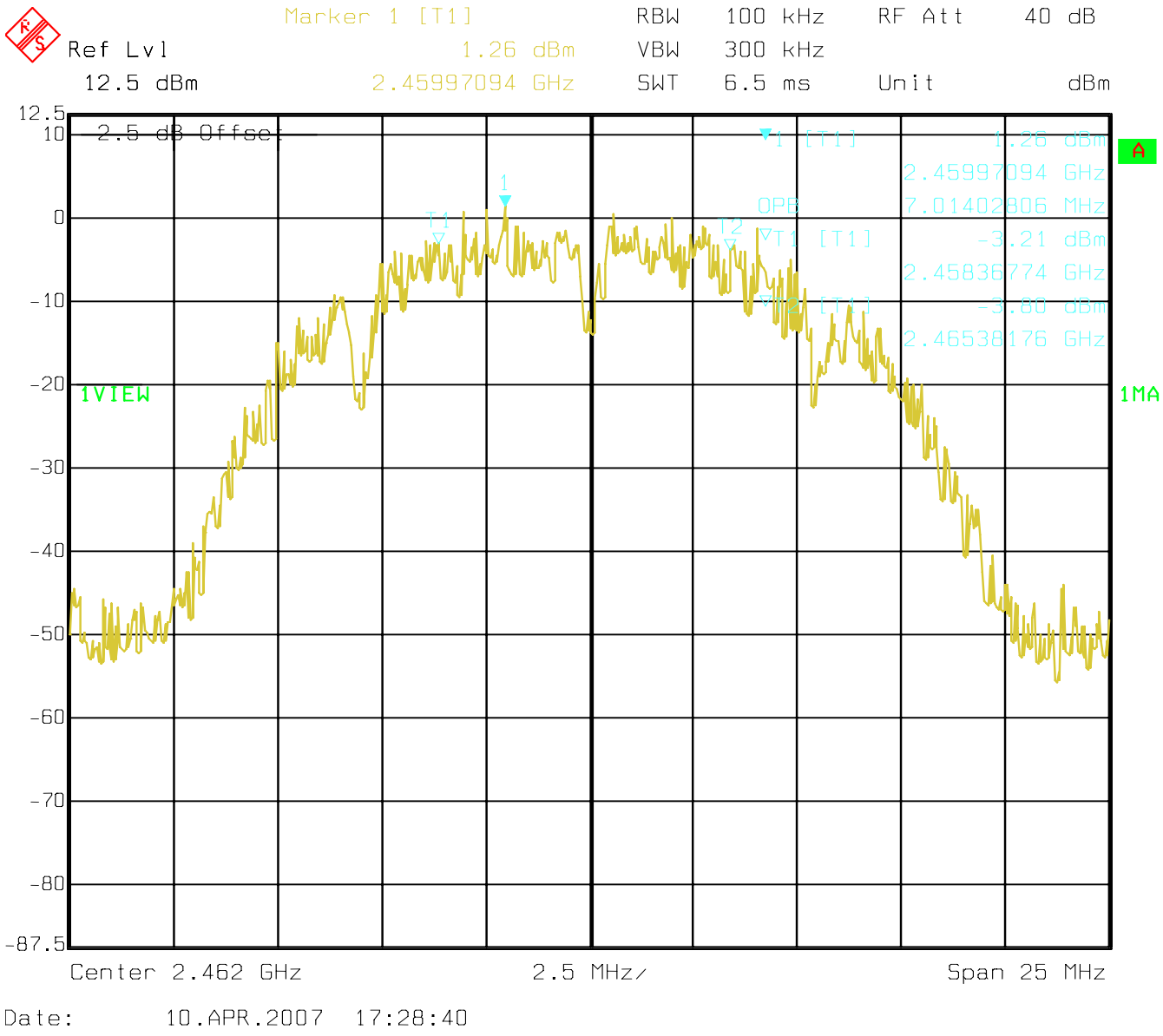
(2412 MHz) 802.11b 6dB BW



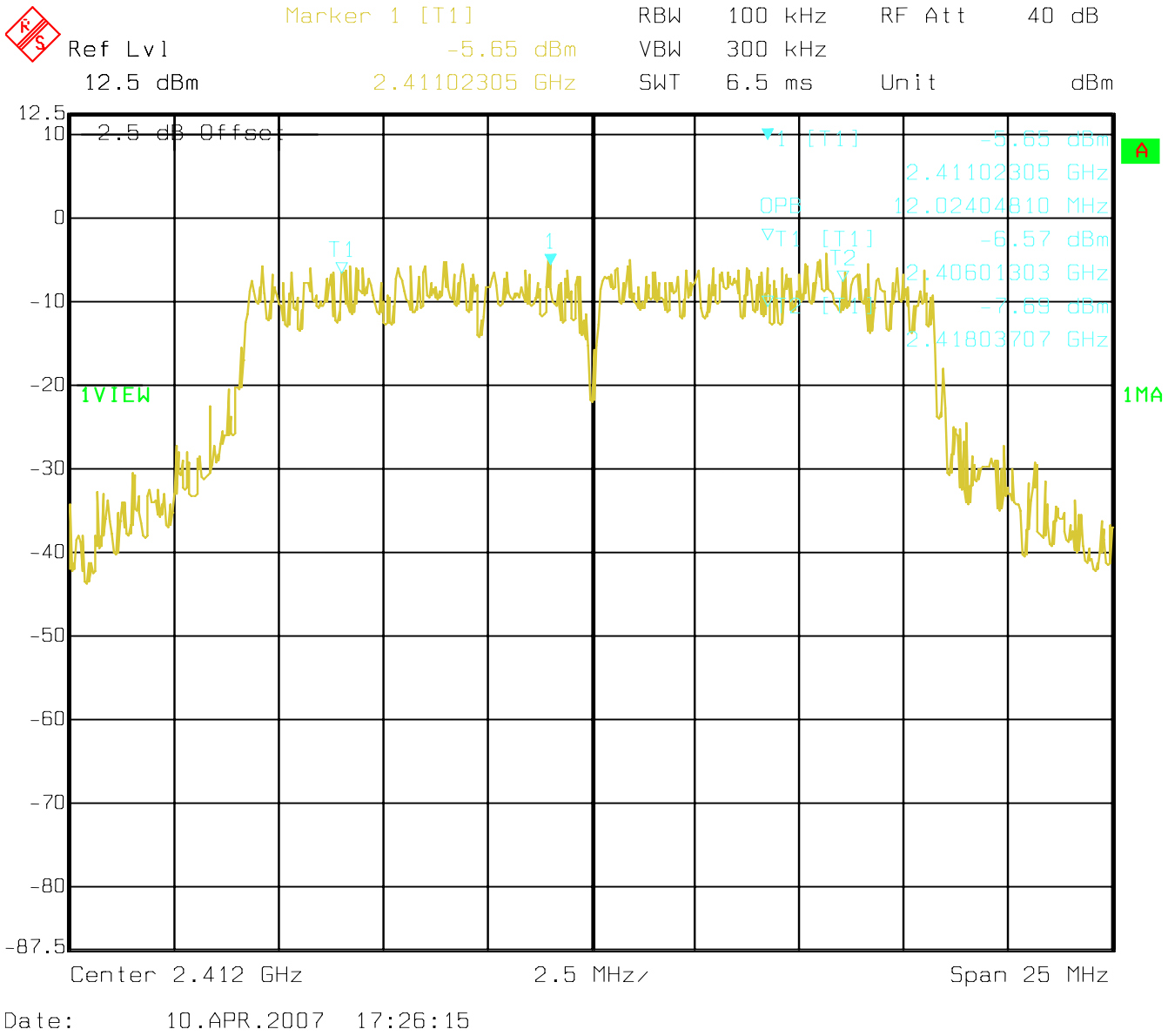
(2437 MHz) 802.11b 6dB BW



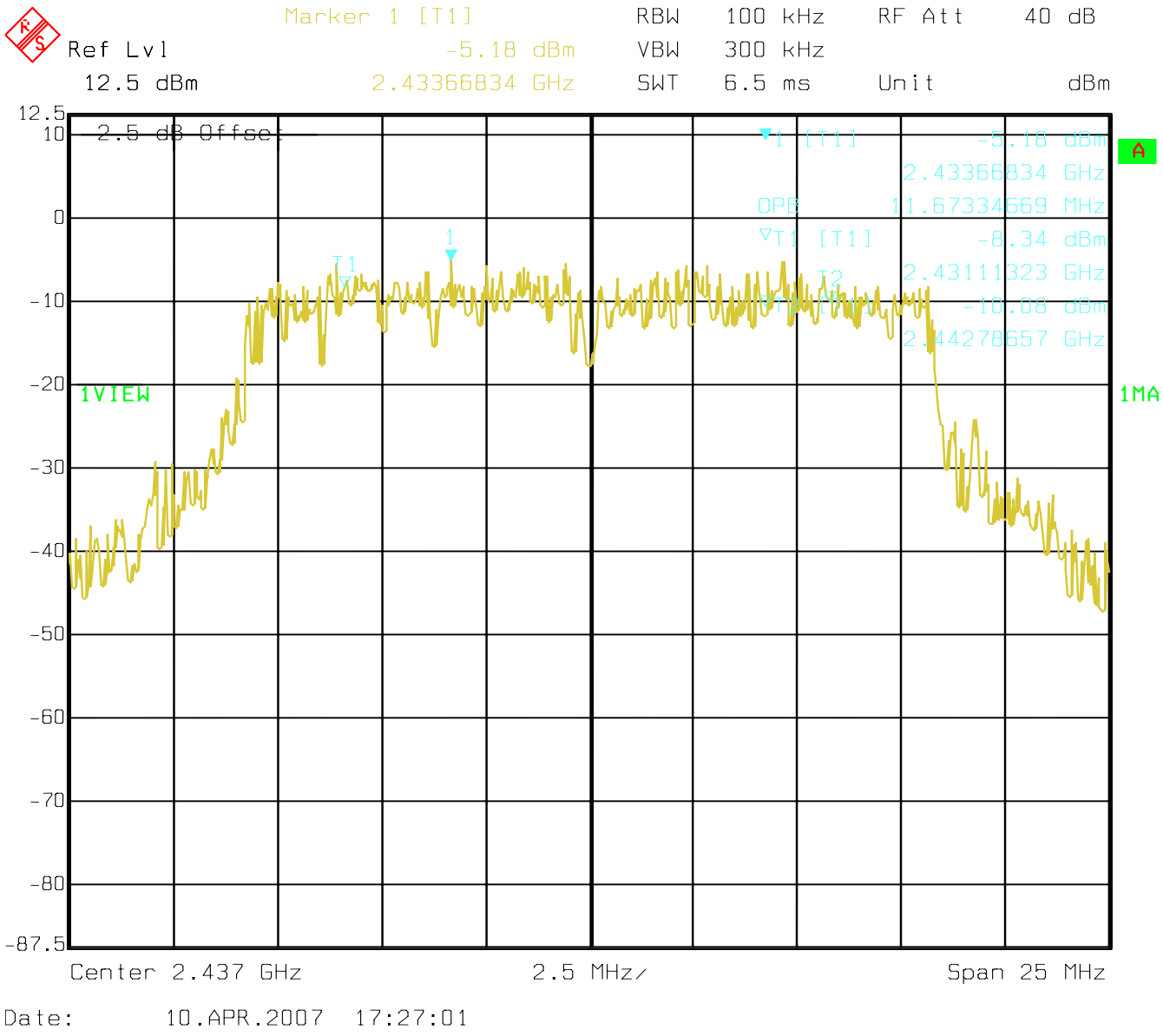
(2462 MHz) 802.11b 6dB BW



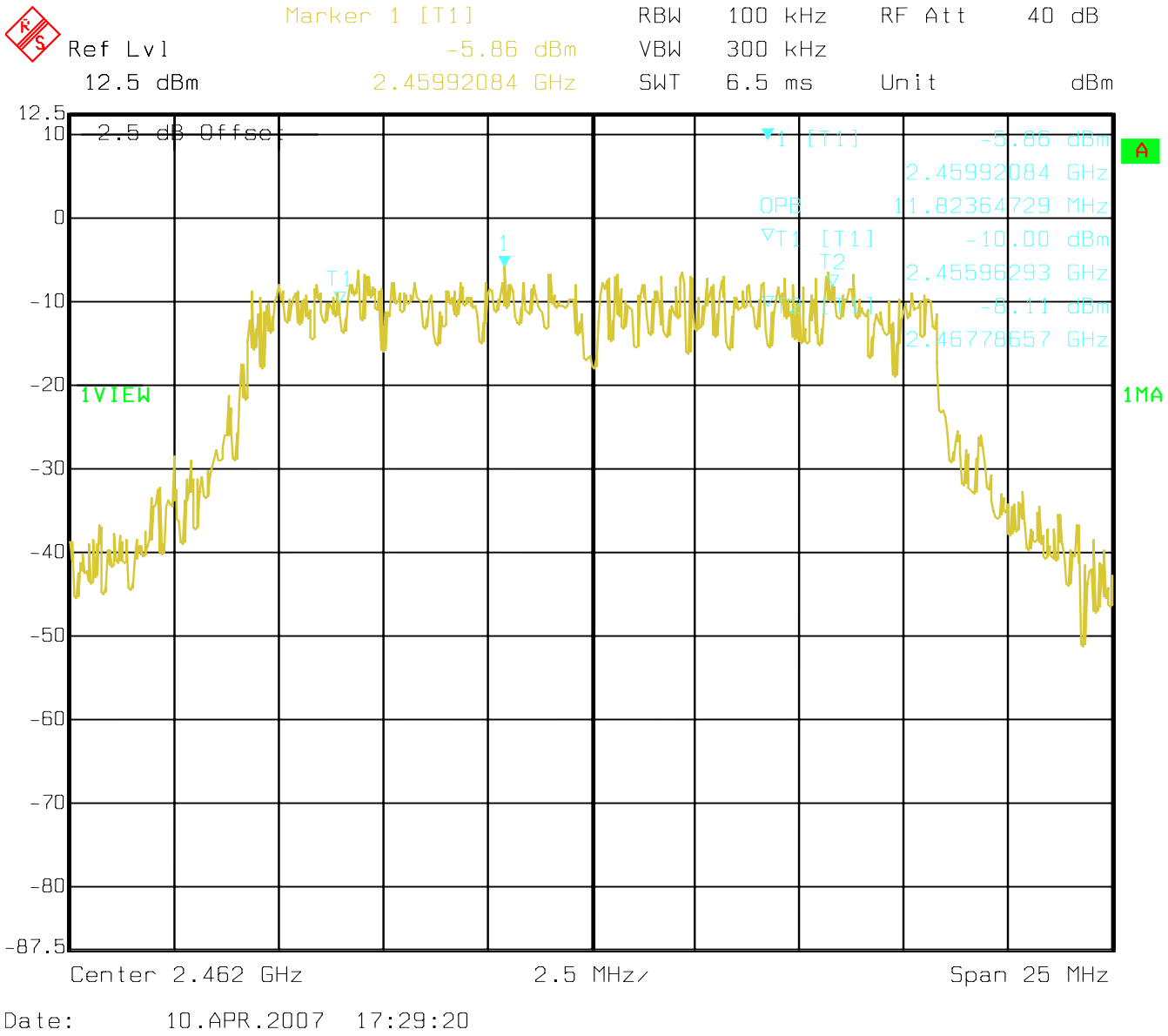
(2412 MHz) 802.11g 6dB BW



(2437 MHz) 802.11g 6dB BW



(2462 MHz) 802.11g 6dB BW



6.3 CORRECTED OUTPUT POWER

6.3.1 LIMIT SUB CLAUSE § FCC97-114

RBW for measuring output power should be greater than 6dB BW. Since maximum available BW on spectrum analyzer is 10MHz, if 6dB BW >10MHz, correct the measured output power as following:

Correction factor: 10 log (6dB BW / Measurement RBW)

6.3.2 Result

Channel No.	Frequency (MHz)	Correction Factor (dBm)	Corrected EIRP: 802.11g (dBm)	Corrected Cond. Out put power (dBm)
1	**2412**	**0.80049**	**8.55**	**21.98**
6	**2437**	**0.67182**	**9.84**	**20.71**
11	**2462**	**0.72764**	**10.25**	**20.98**

6.4 POWER SPECTRAL DENSITY

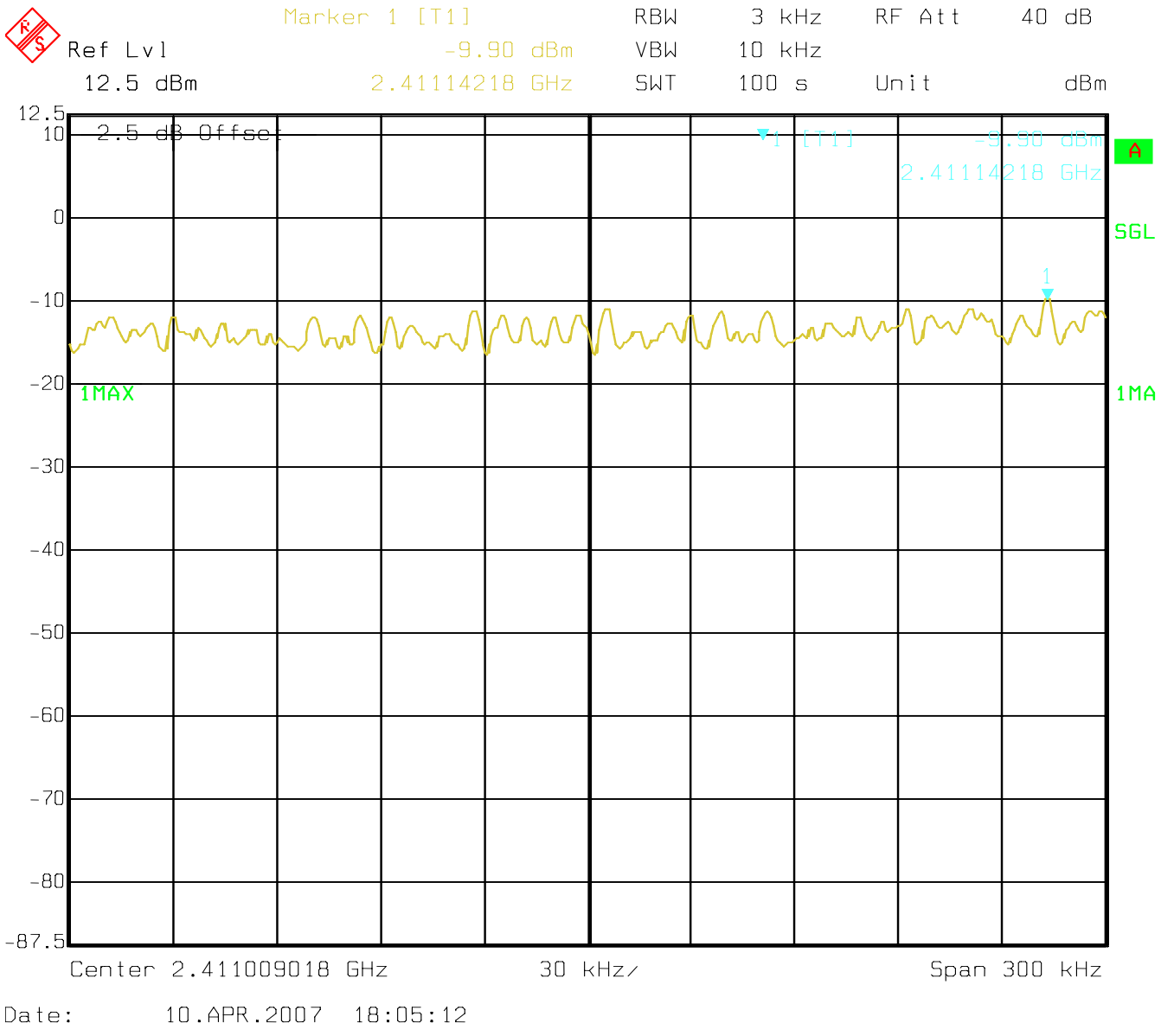
6.4.1 LIMIT SUB CLAUSE § 15.247 5 (d)

FREQUENCY RANGE	limit
2400-2483.5	**8dBm (in 3kHz BW)**

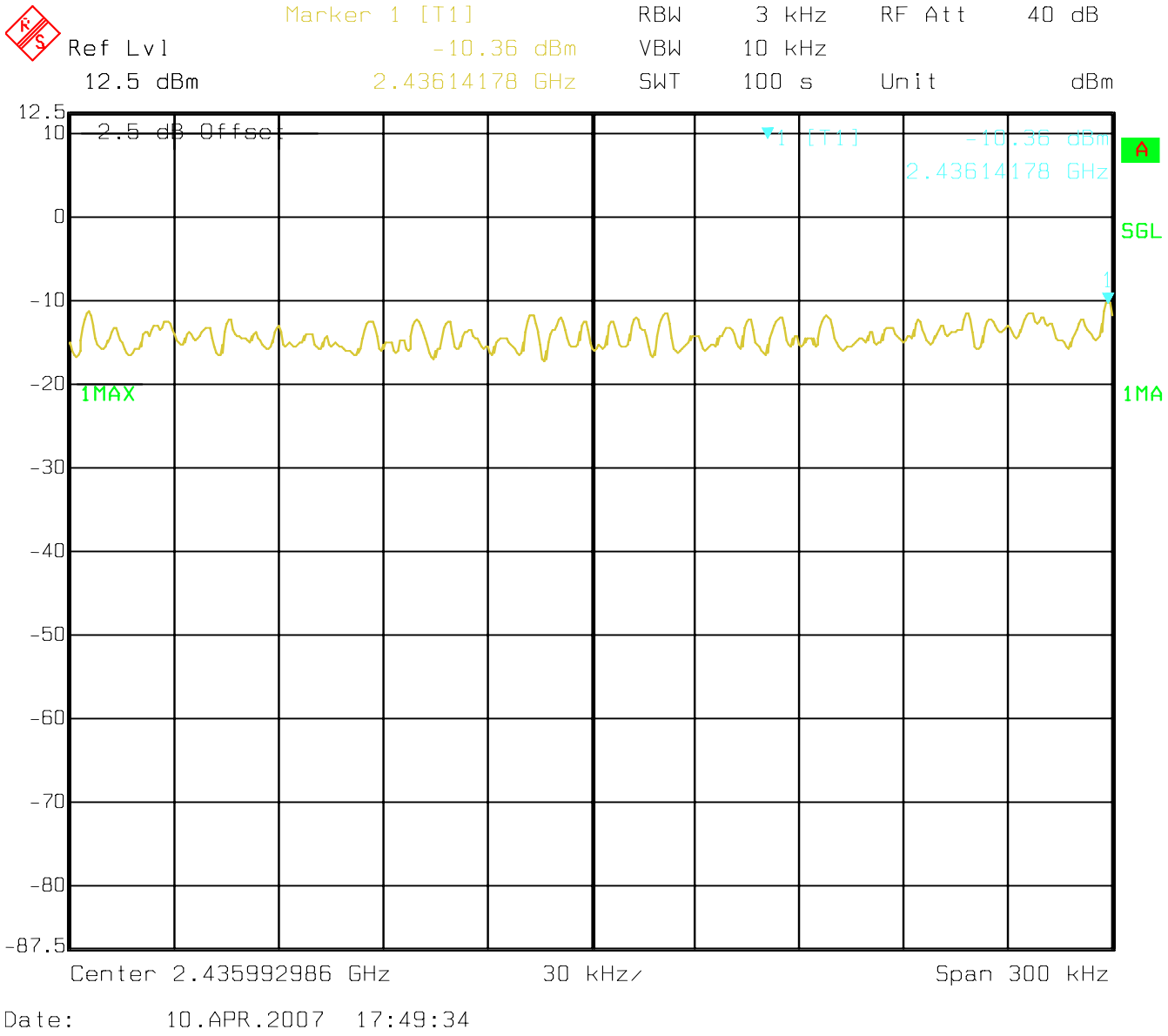
6.4.2 RESULTS:

TEST CONDITIONS	POWER SPECTRAL DENSITY (dBm)		
Frequency (MHz)	**2412 MHz**	**2437 MHz**	**2462 MHz**
802.11b	**--9.90**	**-10.36**	**-11.61**
802.11g	**-17.36**	**-18.28**	**-19.35**

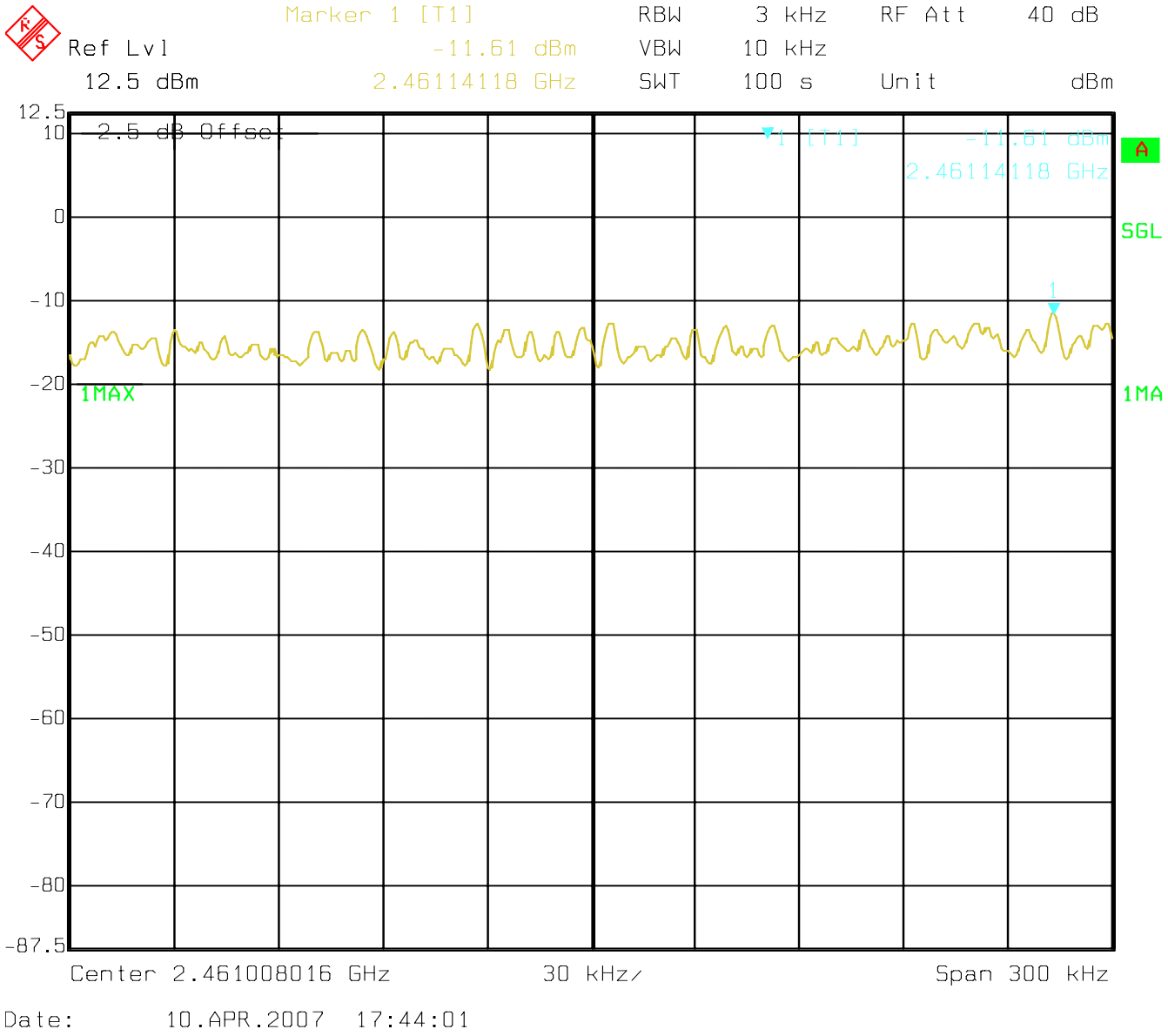
(2412 MHz) 802.11b POWER SPECTRAL DENSITY



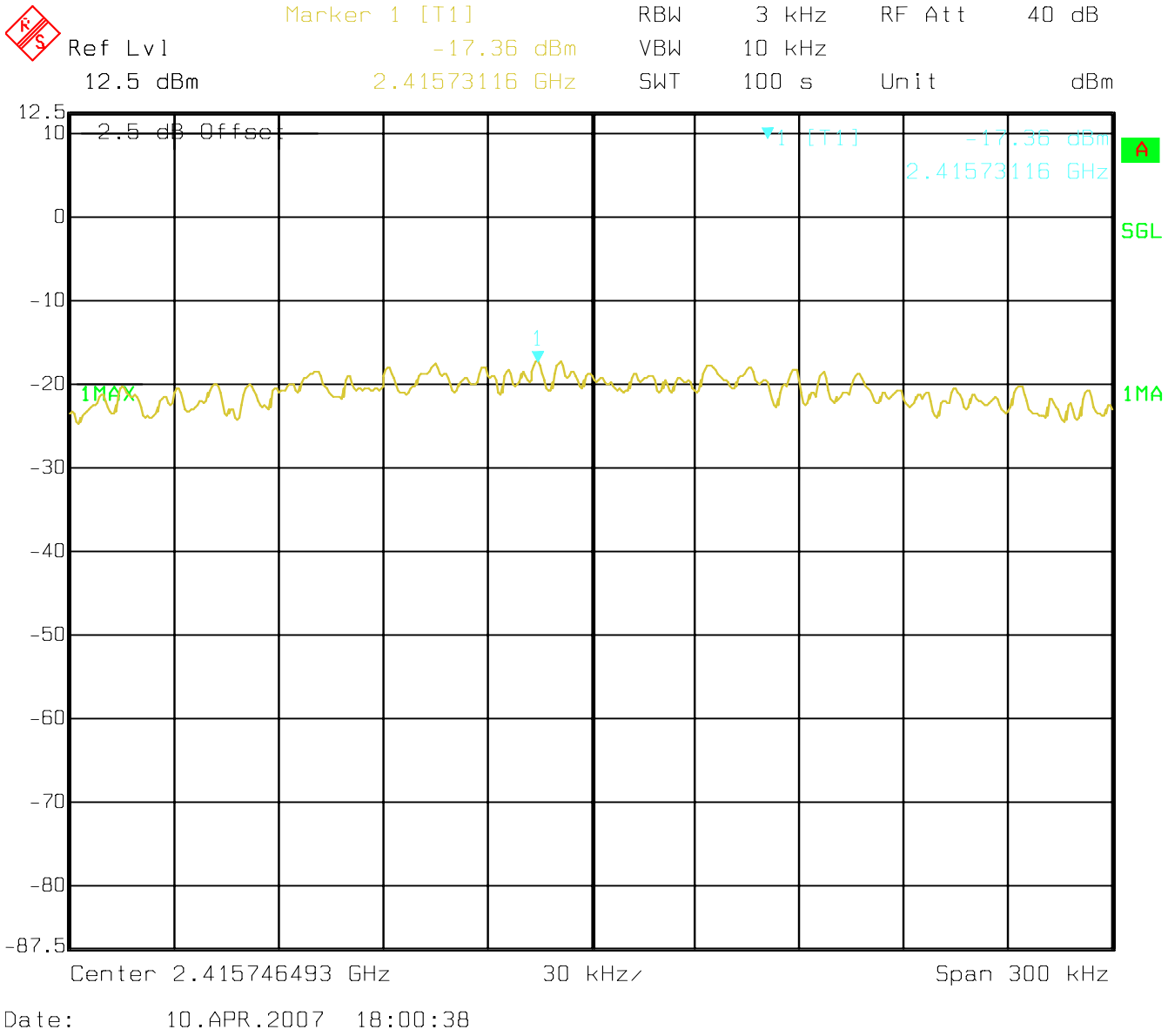
(2437 MHz) 802.11b POWER SPECTRAL DENSITY



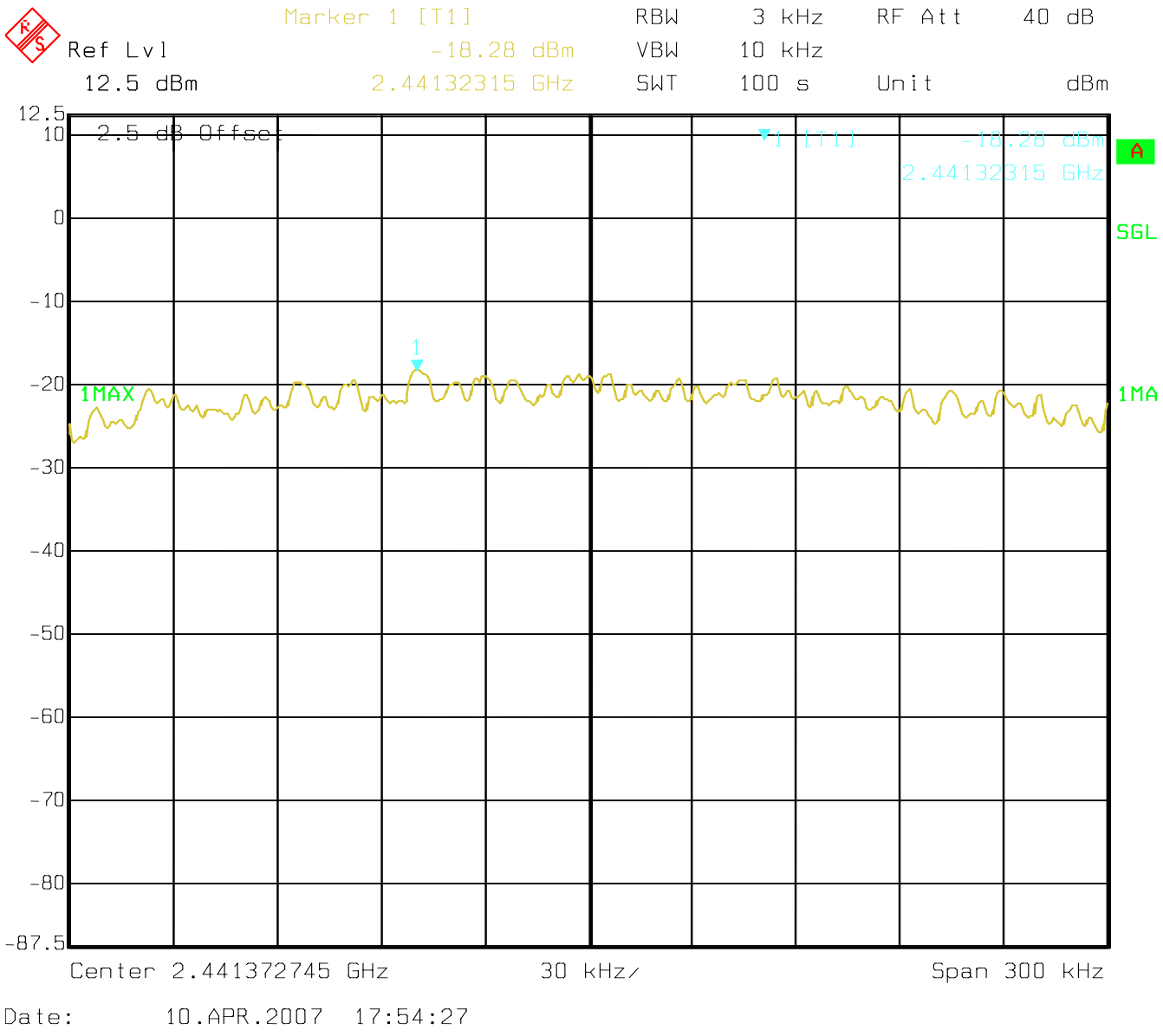
(2462 MHz) 802.11b POWER SPECTRAL DENSITY



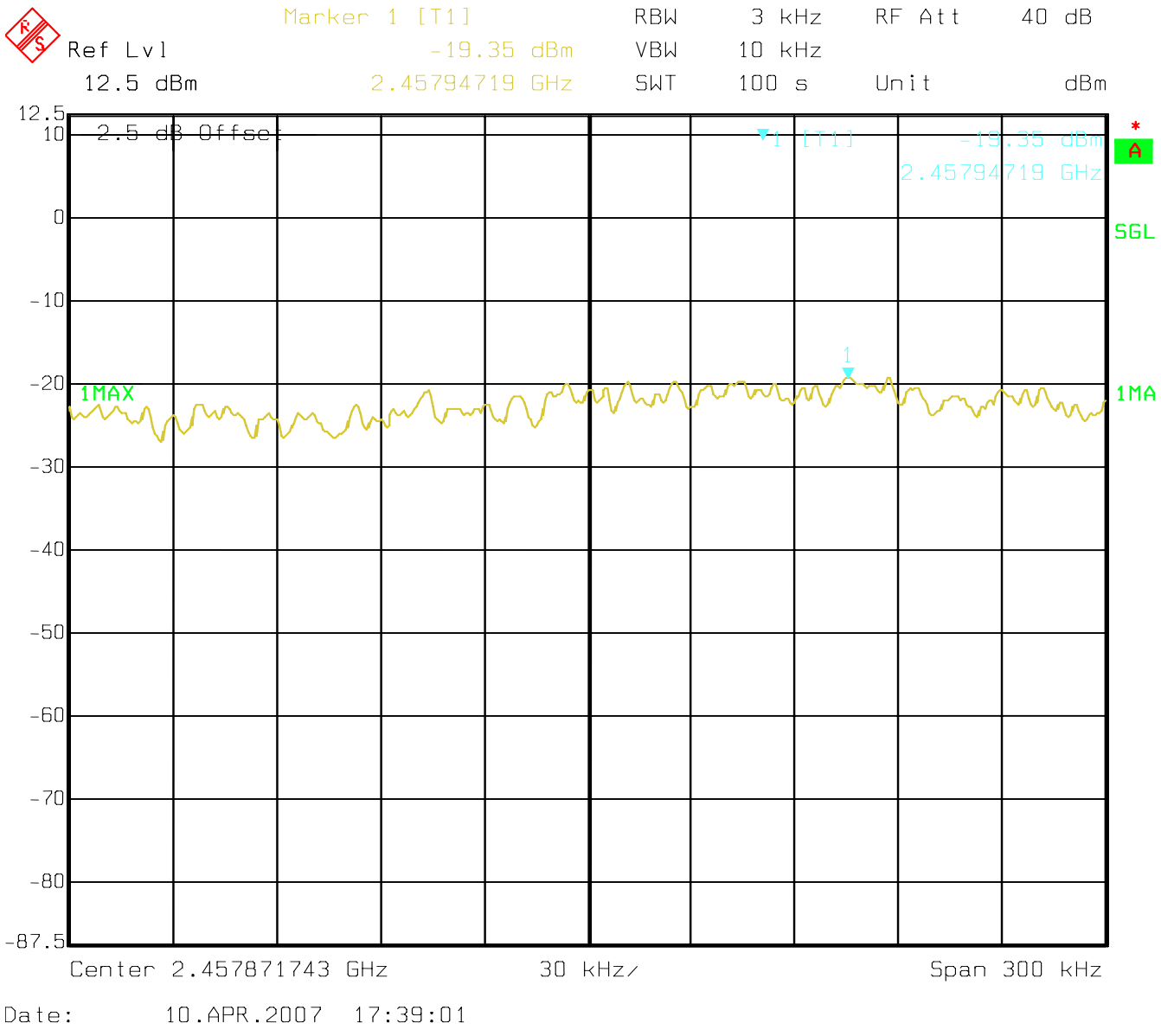
(2412 MHz) 802.11g POWER SPECTRAL DENSITY



(2437 MHz) 802.11g POWER SPECTRAL DENSITY



(2462 MHz) 802.11g POWER SPECTRAL DENSITY



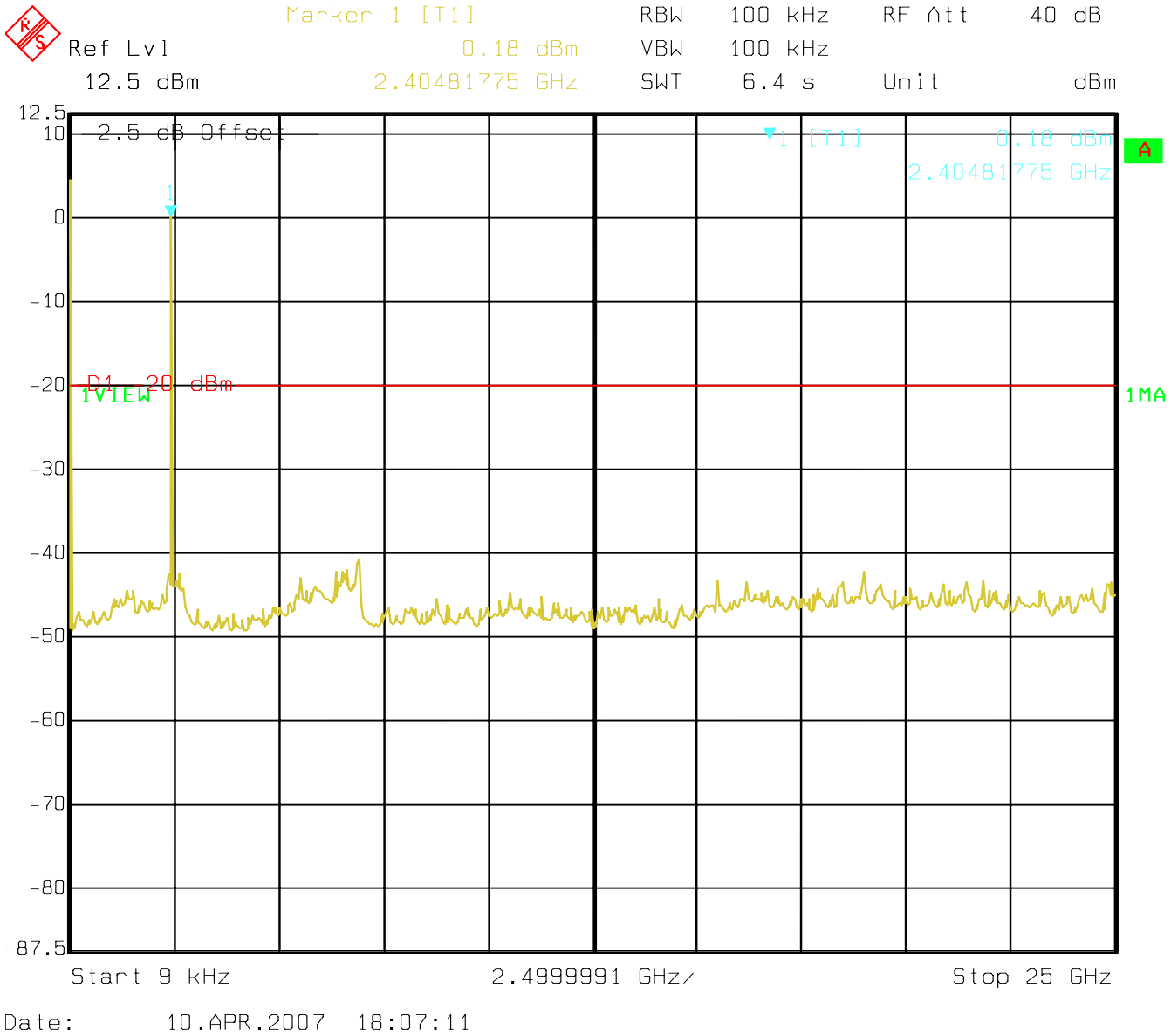
6.5 CONDUCTED SPURIOUS EMISSION

6.5.1 LIMIT SUB CLAUSE § 15.247 (d)

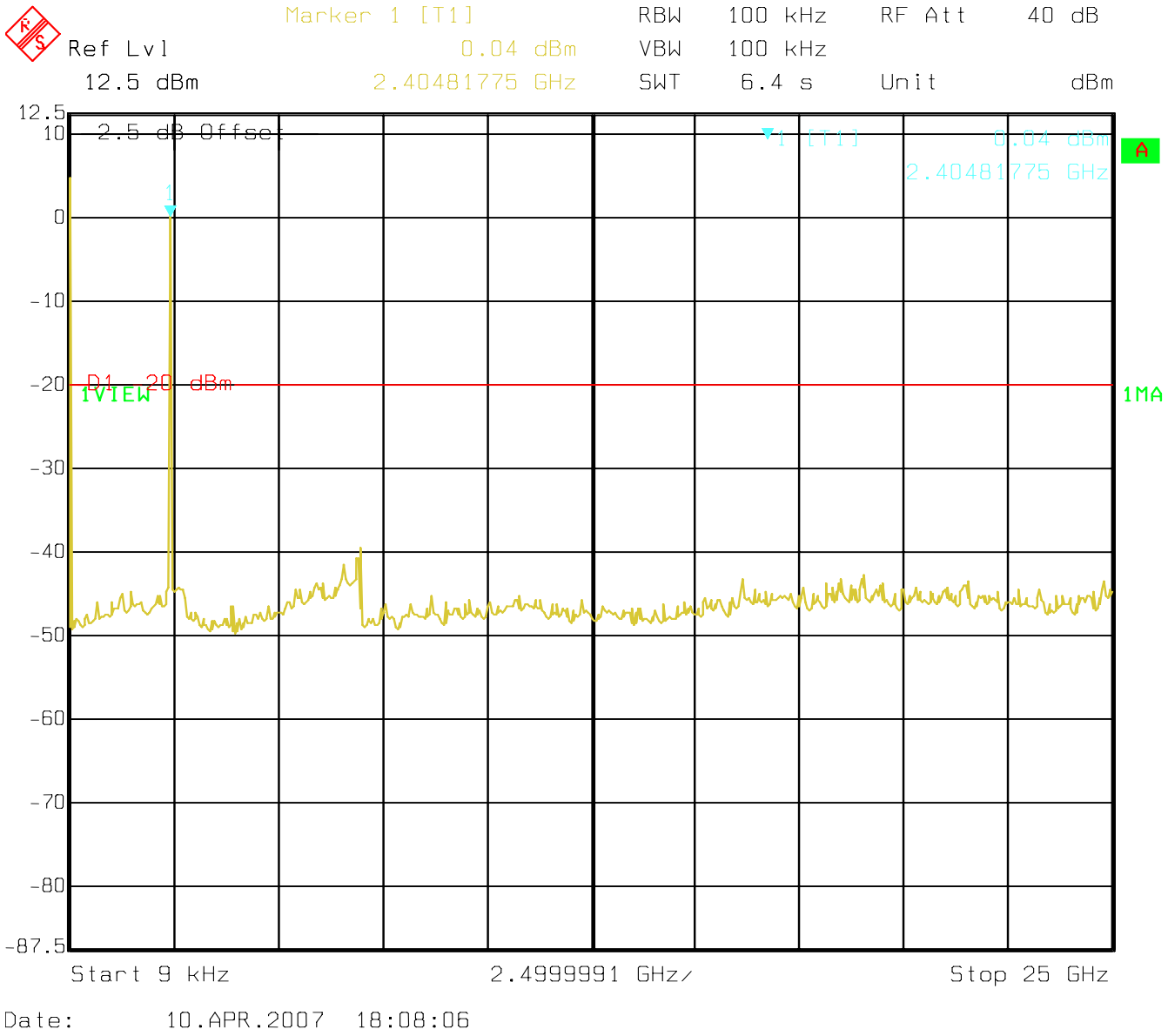
FREQUENCY RANGE	limit
30M-25GHz	-20dBc

6.5.2 RESULTS: Tnom(23)°C VnomVDC

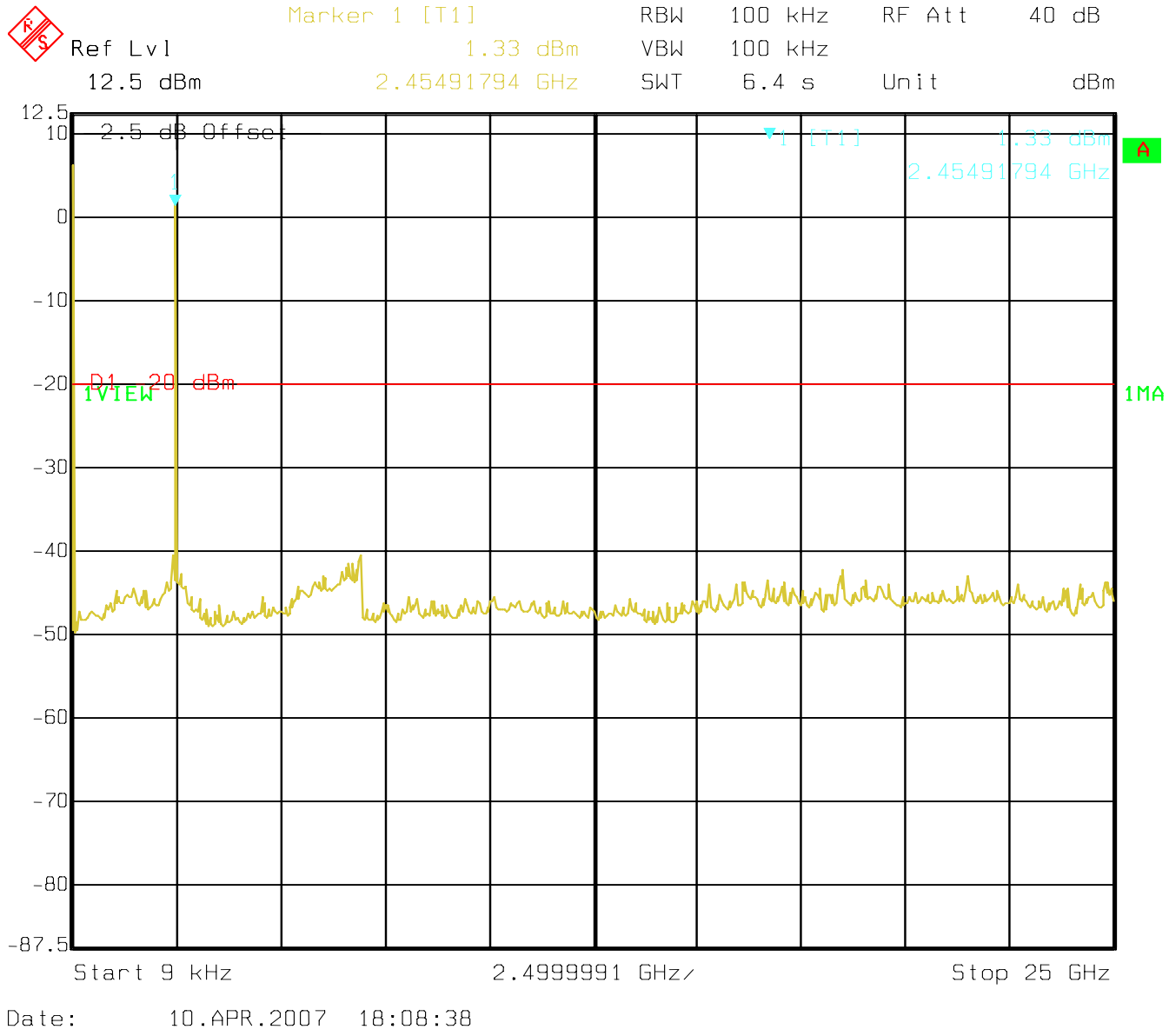
(2412MHz)



(2437MHz)


Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
0.04 dBm
VBW 100 kHz
12.5 dBm
2.40481775 GHz
SWT 6.4 s
Unit dBm
12.5
10
2.5 dB Offset
T1 [T1]
0.04 dBm
2.40481775 GHz
A
0
-10
-20
D1 -20 dBm
1VIEW
1MA
-30
-40
-50
-60
-70
-80
-87.5
Start 9 kHz
2.4999991 GHz/
Stop 25 GHz
Date: 10.APR.2007 18:08:06

(2462MHz)


Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
1.33 dBm
VBW 100 kHz
12.5 dBm
2.45491794 GHz
SWT 6.4 s
Unit dBm
12.5
10
2.5 dB Offset
1 [T1]
1.33 dBm
2.45491794 GHz
A
1
0
-10
-20
D1 -20 dBm
1VIEW
1MA
-30
-40
-50
-60
-70
-80
-87.5
Start 9 kHz
2.4999991 GHz/
Stop 25 GHz
Date: 10.APR.2007 18:08:38

6.6 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

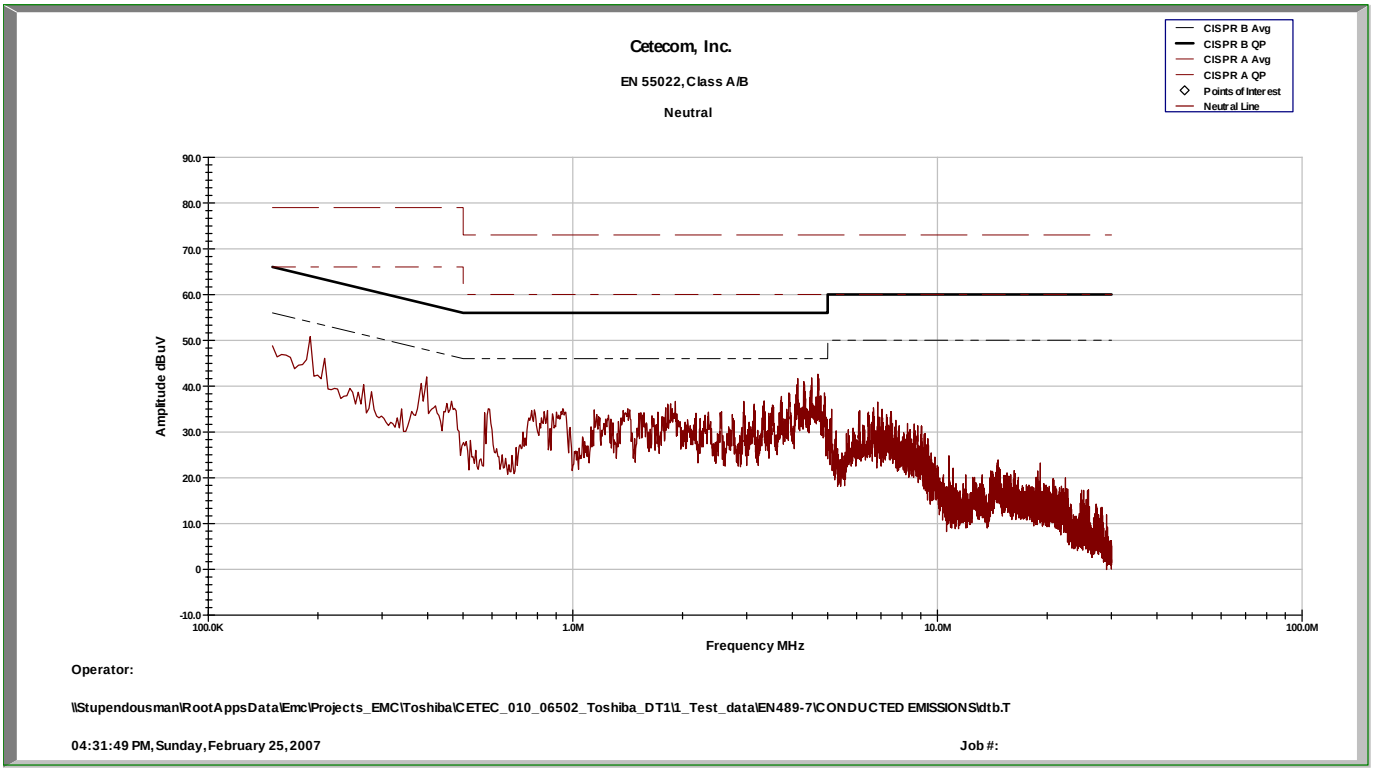
6.6.1 LIMITS

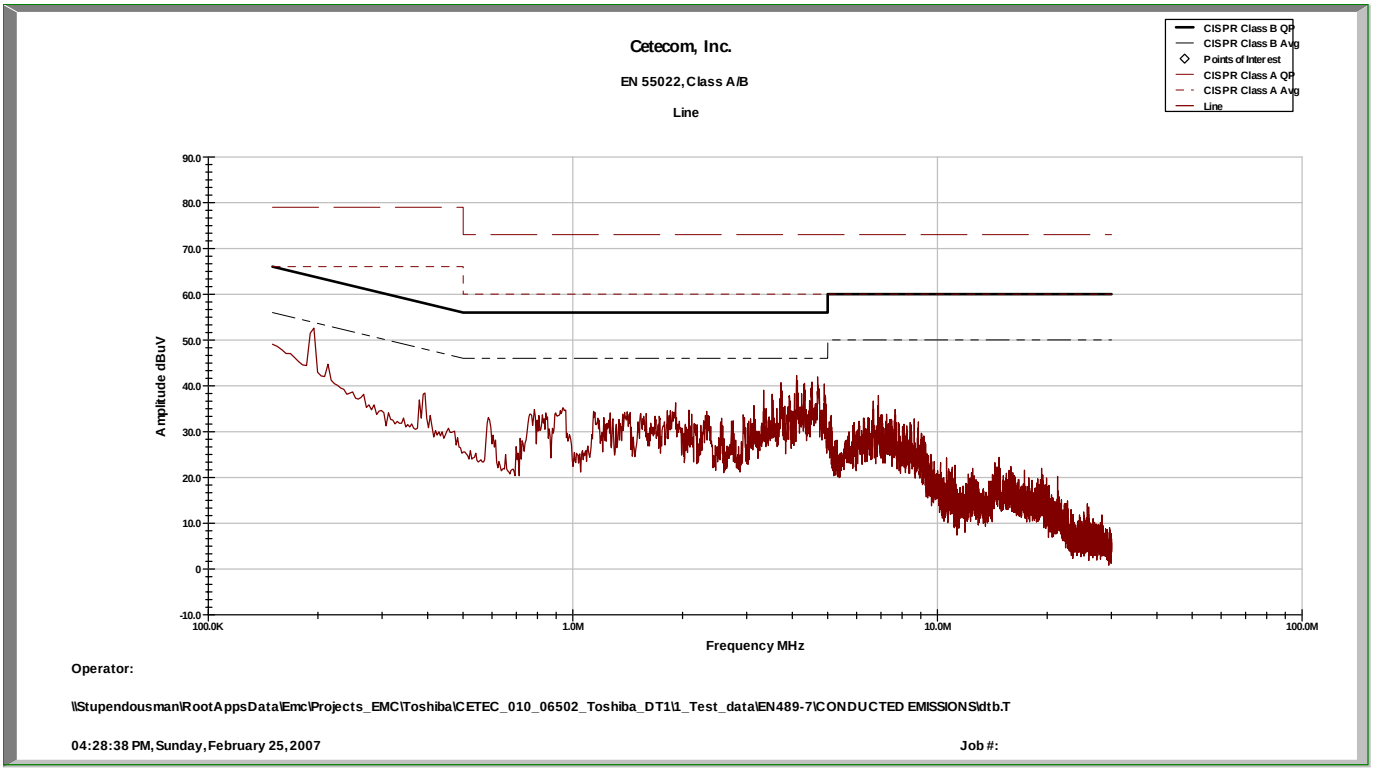
Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)
Limit

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz

6.6.2 RESULTS


Cetecom, Inc.
EN 55022, Class A/B
Neutral
CISPR B Avg
CISPR B QP
CISPR A Avg
CISPR A QP
Points of Interest
Neutral Line
Amplitude dBuV
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
100.0K
1.0M
10.0M
100.0M
Frequency MHz
Operator:
\\Stupendousman\RootAppsData\Emc\Projects_EMC\Toshiba\CETEC_010_06502_Toshiba_DT1\1_Test_data\EN489-7\CONDUCTED EMISSIONS\dtb.T
04:31:49 PM, Sunday, February 25, 2007
Job #:


Cetecom, Inc.
EN 55022, Class A/B
Line
CISPR Class B QP
CISPR Class B Avg
Points of Interest
CISPR Class A QP
CISPR Class A Avg
Line
Amplitude dBuV
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
100.0K
1.0M
10.0M
100.0M
Frequency MHz
Operator:
\\Stupendousman\RootAppsData\Emc\Projects_EMC\Toshiba\CETEC_010_06502_Toshiba_DT1\1_Test_data\EN489-7\CONDUCTED EMISSIONS\dtb.T
04:28:38 PM, Sunday, February 25, 2007
Job #:

7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2007	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2007	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2007	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2007	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2007	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2007	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2007	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2007	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2007	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2007	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2007	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2007	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2007	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2007	2 years

8 BLOCK DIAGRAMS

Radiated Testing