



Test Report

FCC Part 15.247 for DSSS systems

Model #: A1303
FCC ID: BCGA1303B

Apple Inc.
1 Infinite Loop Mail Stop26A
Cupertino, California 95014
U.S.A

TEST REPORT #: EMC_APPLE_047_09001_15.247_BCGA1303B
DATE: 2009-5-27



FCC listed#
A2LA Accredited
IC recognized #
3462B

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.

Company	Description	Model #
Apple Inc.	This device is a GSM and WCDMA smart handset with WiFi, Bluetooth +EDR, and iPod and application functions.	A1303

Technical responsibility for area of testing:

Heiko Strehlow
(Director Regulatory and
Antenna Services)

2009-5-27 EMC & Radio

Date Section Name Signature

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

This report is prepared by:

Marc Douat
(Test Lab Manager)

2009-5-27 EMC & Radio

Date Section Name Signature



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:	Heiko Strehlow
Responsible Project Leader:	Marc Douat

2.2 Identification of the Client

APPLICANT	
Applicant (Company Name)	Apple Inc.
Street Address	1 Infinite Loop Mail Stop26A
City/Zip Code	Cupertino, California 95014
Country	USA
Contact Person	Robert Steinfeld
Telephone	408-974-2618
Fax	408-862-5061
e-mail	steinfe1@apple.com

2.3 Identification of the Manufacturer

Same as above applicant.



3 Equipment Under Test (EUT)

3.1 Specification of the Equipment under Test

EUT	
Marketing Name of EUT (if not same as Model No.)	iPhone 3G
Description	This device is a GSM and WCDMA smart handset with WiFi, Bluetooth +EDR, and iPod and application functions.
Model No.	A1303
H/W	REV4-16GB
	04.24.02 (7A290)
FCC-ID:	BCGA1303B

Frequency Range:	2400MHz – 2483.5MHz
Type(s) of Modulation:	CCK, OFDM
Number of Channels:	11
Antenna Type:	IFA - inverted F Antenna 1.2dBi gain
Output Power:	Conducted 802.11b: 19.49 dBm, 88.9 mW Conducted 802.11g: 25.49 dBm, 354.0 mW Radiated 802.11b: 20.69 dBm, 117.2 mW Radiated 802.11g: 26.69 dBm, 466.7 mW

3.2 Identification of the Equipment under Test (EUT)

EUT #	TYPE	MANF.	MODEL
1	EUT	Apple Inc	A1303

3.3 Identification of Accessory equipment

AE #	TYPE	MANF.	MODEL
1	AC/DC ADAPTER	Flextronics	A1265



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.



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

EIRP = Conducted Output Power + Antenna Gain (1.2dBi)

TEST CONDITIONS	MAXIMUM PEAK OUTPUT POWER (dBm)		
	2412	2437	2462
Frequency (MHz)			
802.11b	20.53	20.57	20.69
802.11g	26.59	26.69	26.58
Measurement uncertainty	±0.5dBm		



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**

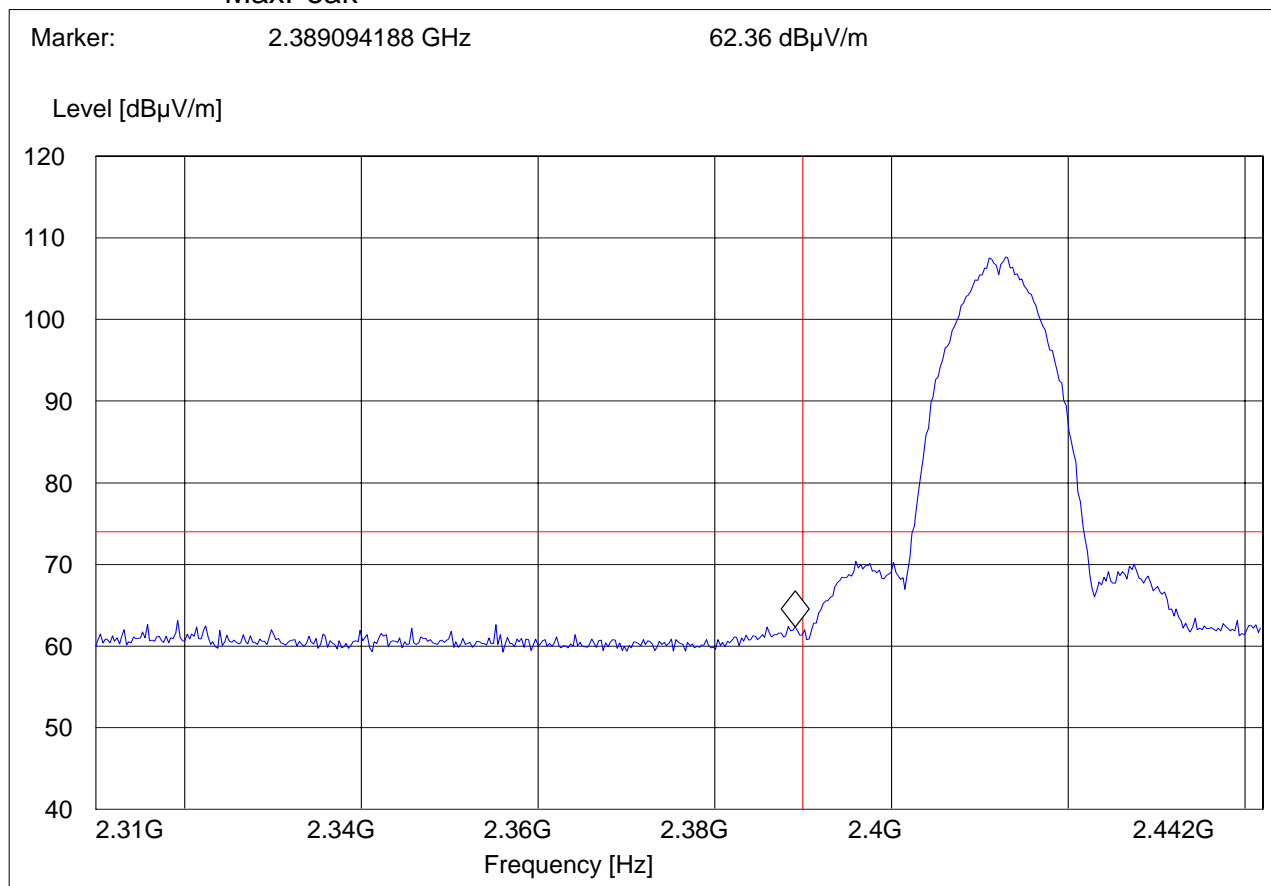


PEAK, 802.11 b MODE (2412MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11b
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 LBE_PK 3m"

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



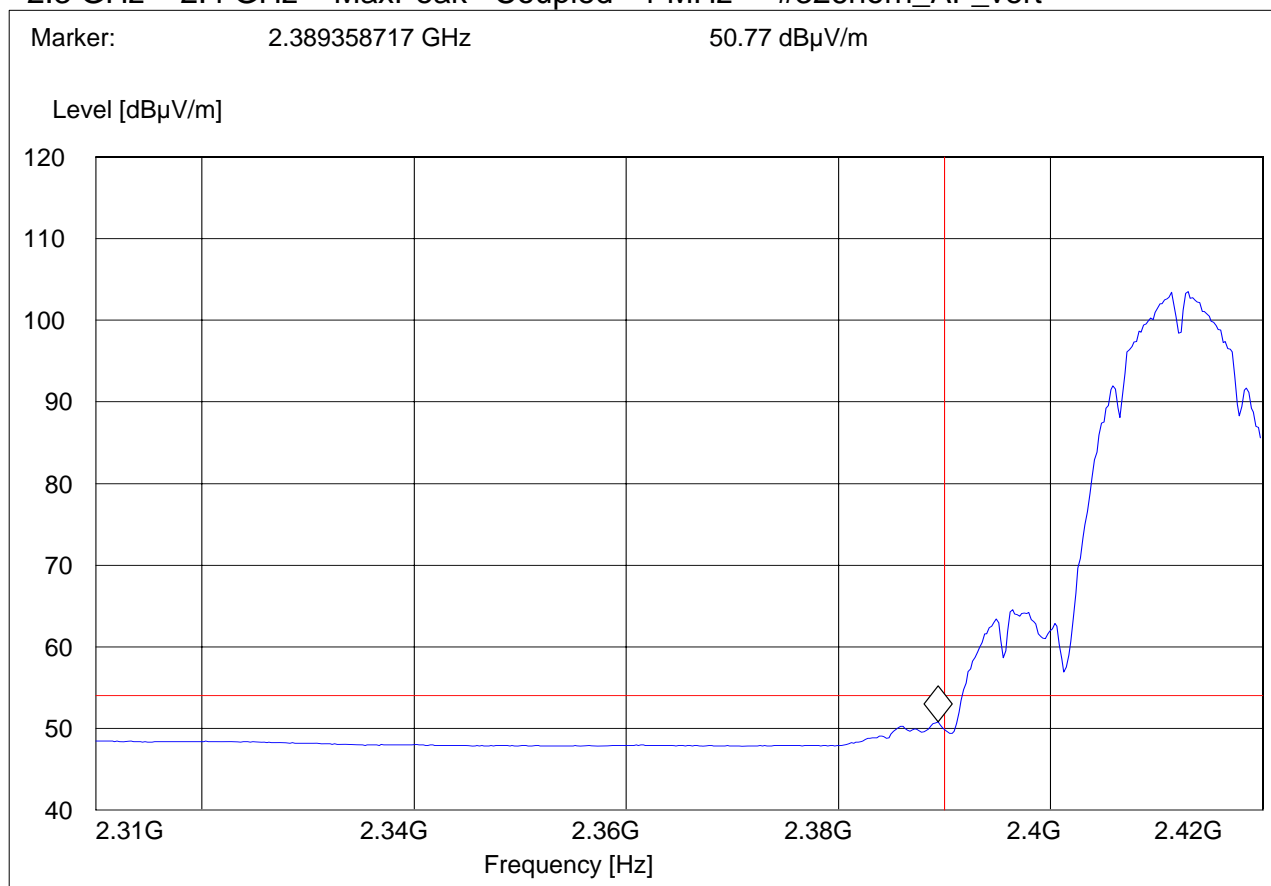


AVG, 802.11 b MODE (2412MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11b
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 LBE_AVG 3m"

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



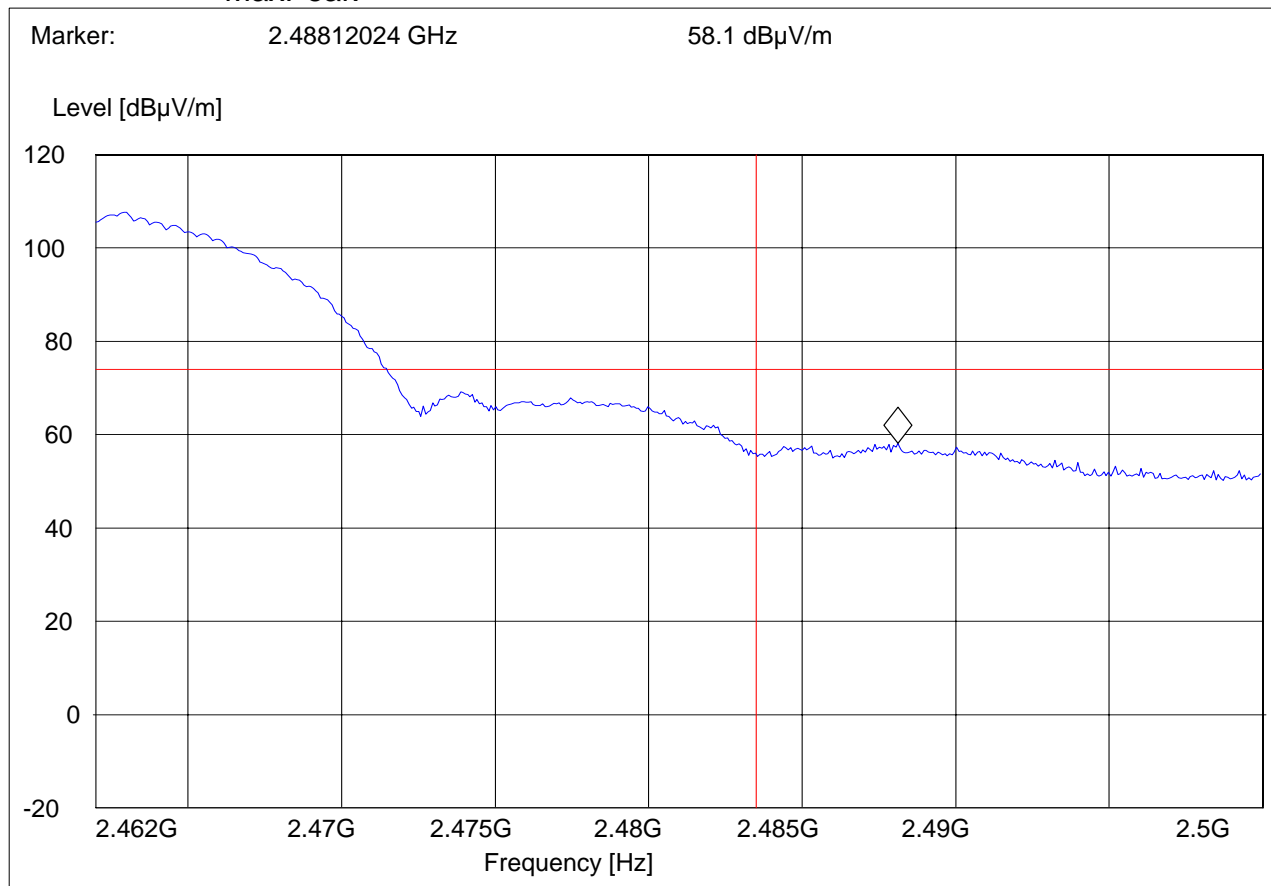


PEAK, 802.11 b MODE (2462MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11b
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 HBE_PK 3m"

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



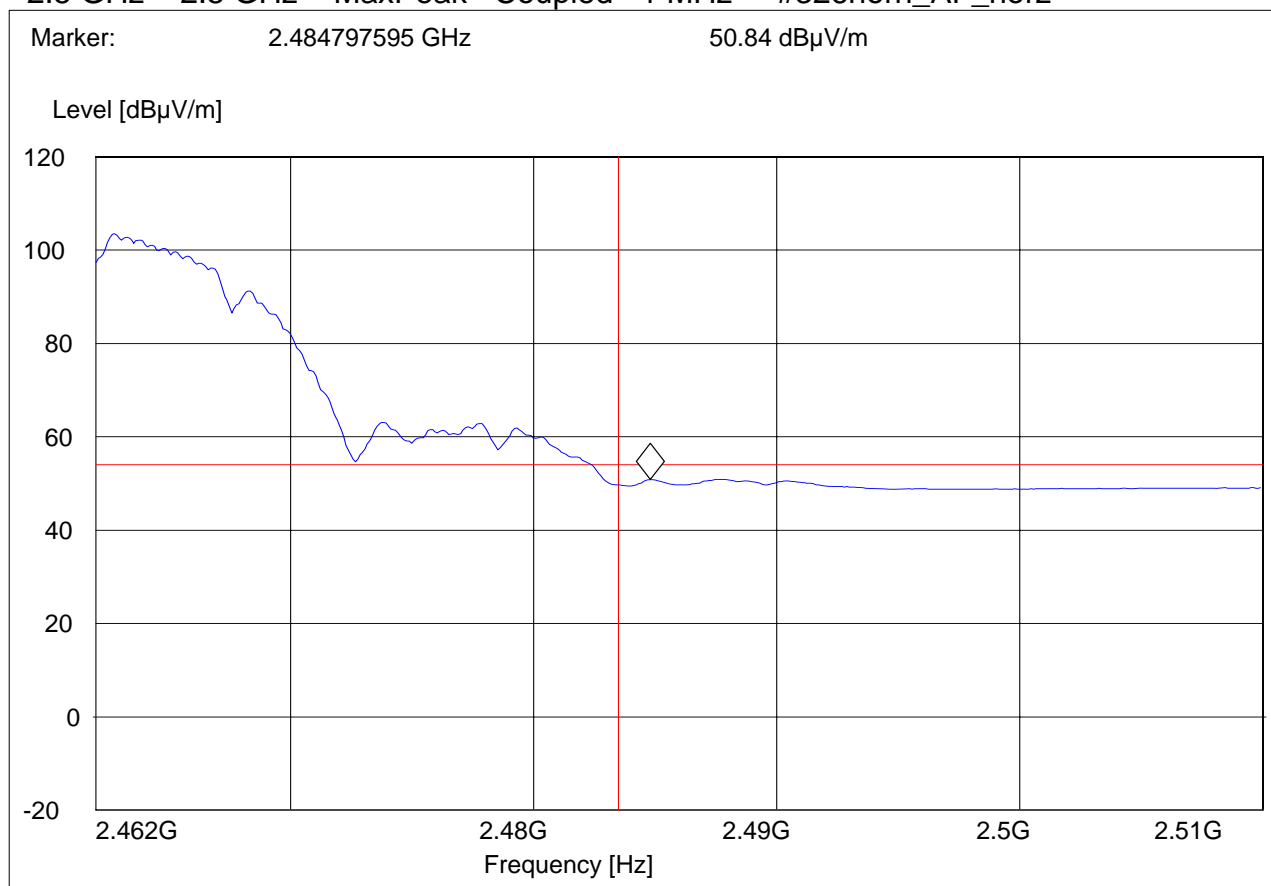


AVG, 802.11 b MODE (2462MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11b
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 HBE_AVG 3m"

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



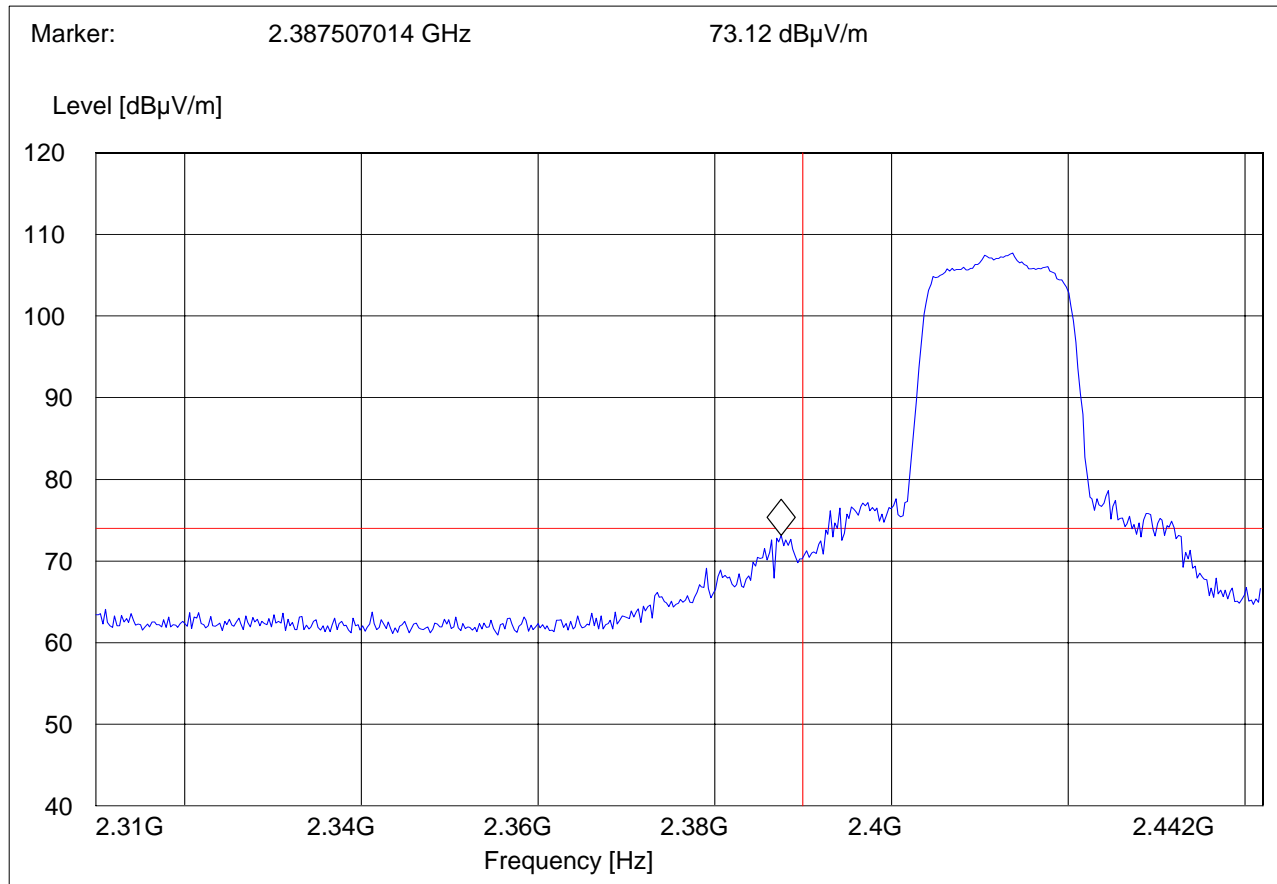


PEAK, 802.11g MODE (2412MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11g
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 LBE_PK 3m"

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



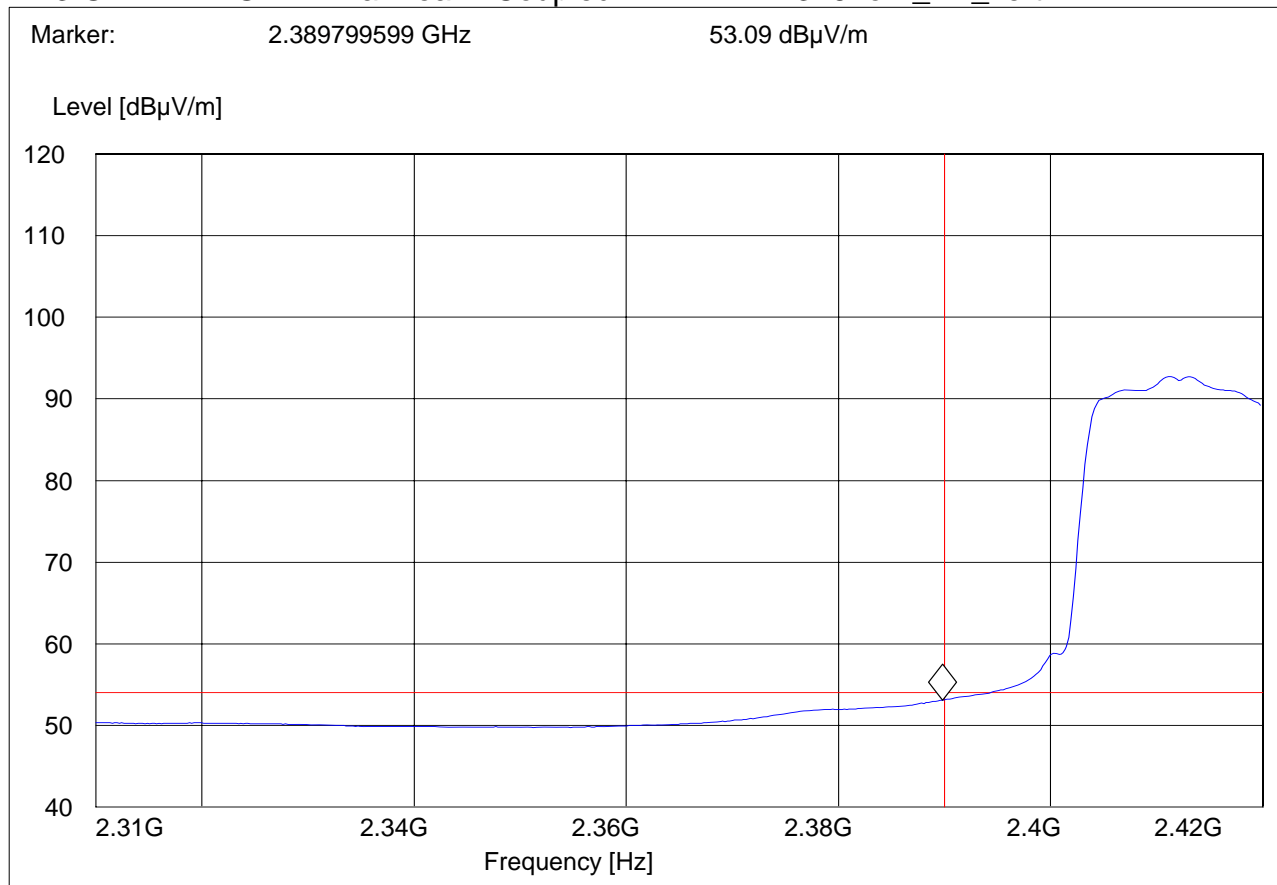


AVG, 802.11g MODE (2412MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11g
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 LBE_AVG 3m"

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



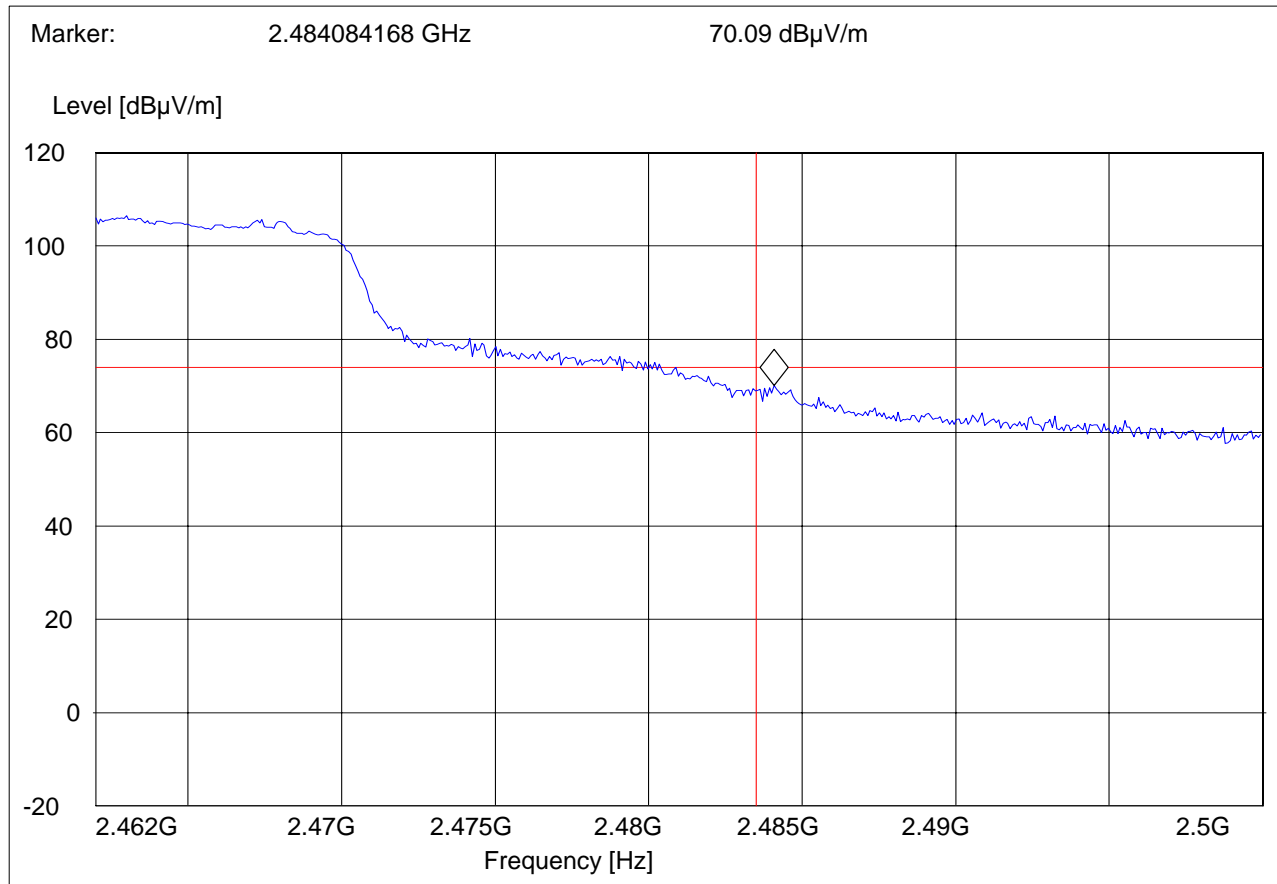


PEAK, 802.11g MODE (2462MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11g
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 HBE_PK 3m"

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



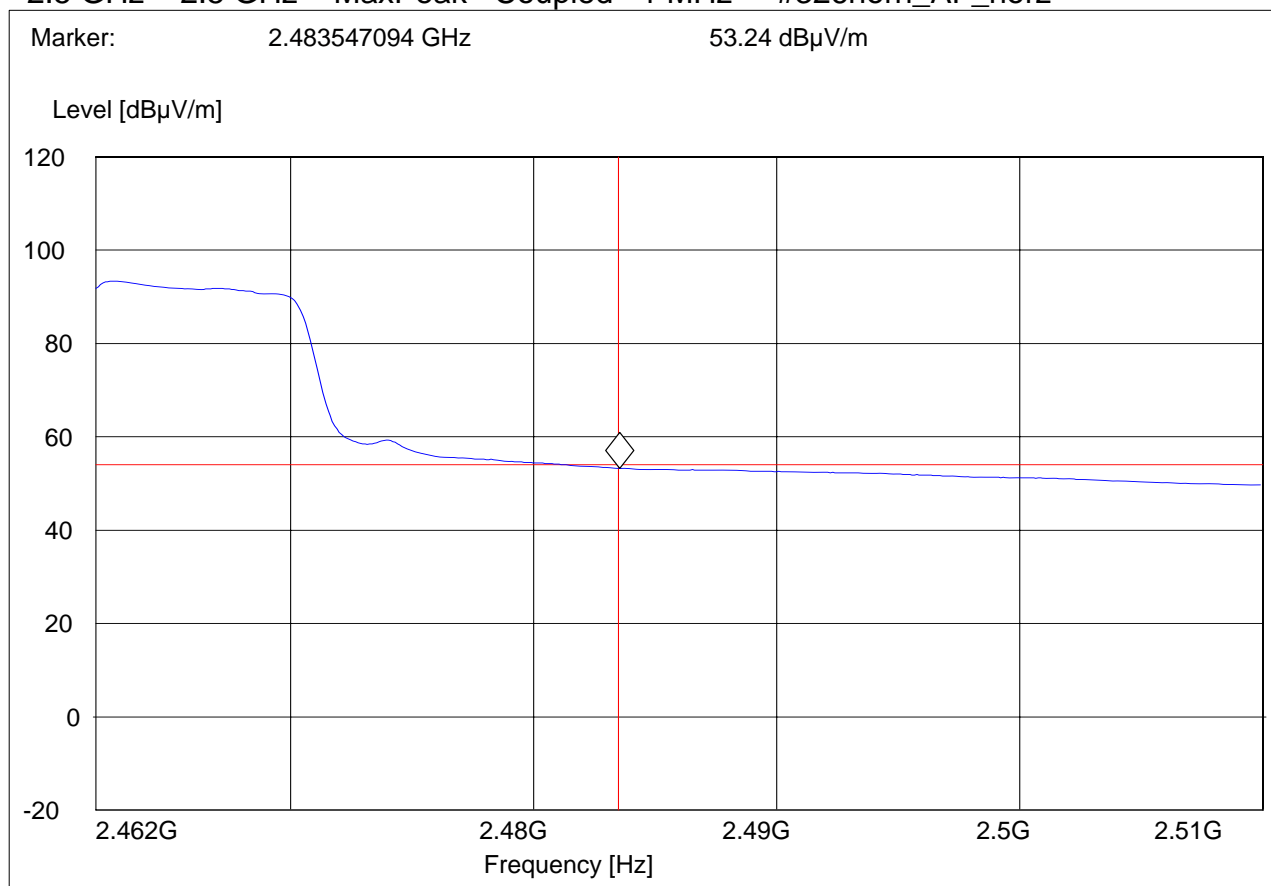


AVG, 802.11g MODE (2462MHz)

EUT: A1303
Customer:: APPLE
Test Mode: 802.11g
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: BATTERY
Comments:

SWEEP TABLE: "FCC15.247 HBE_AVG 3m"

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 802.11g (worst case)

30MHz – 1GHz

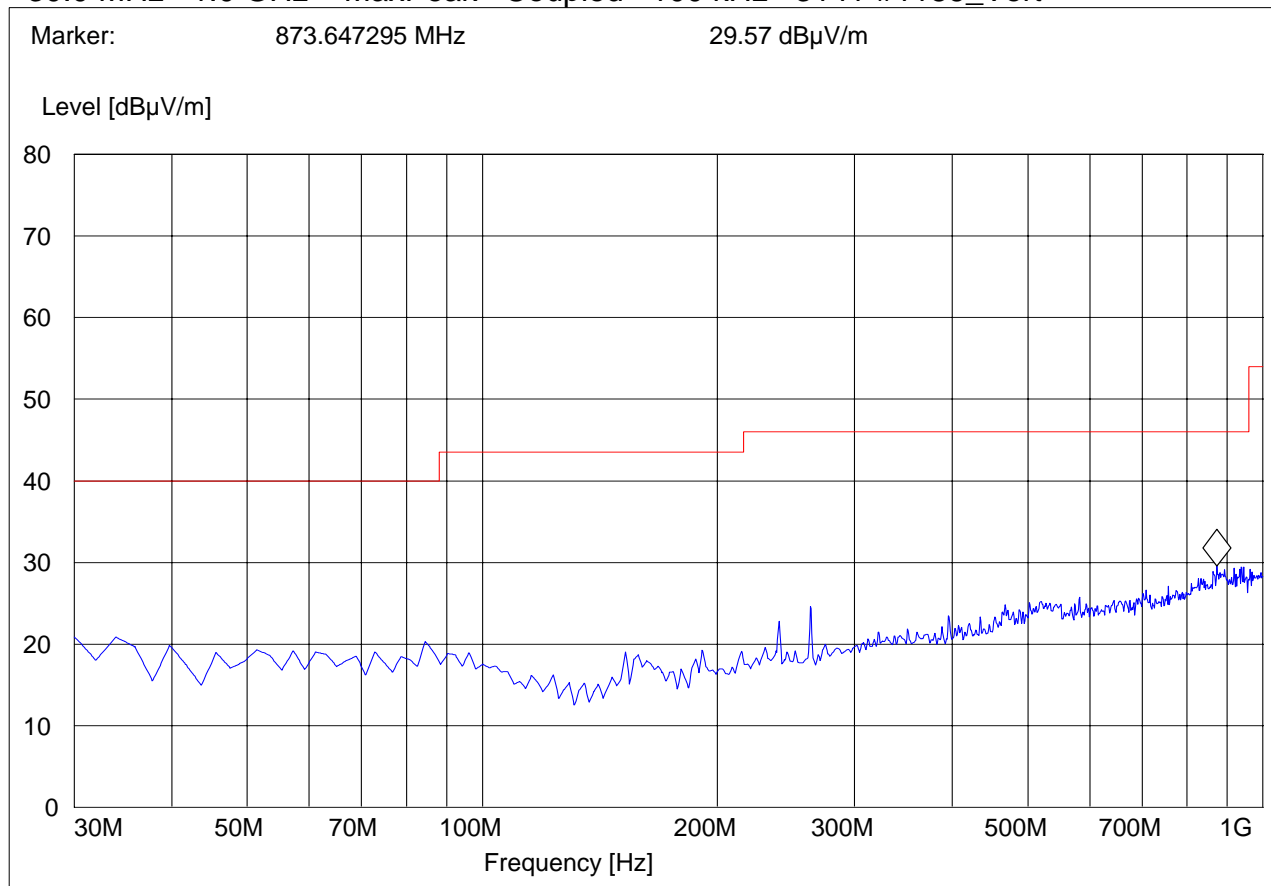
Antenna: vertical

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

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: V
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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





30MHz – 1GHz

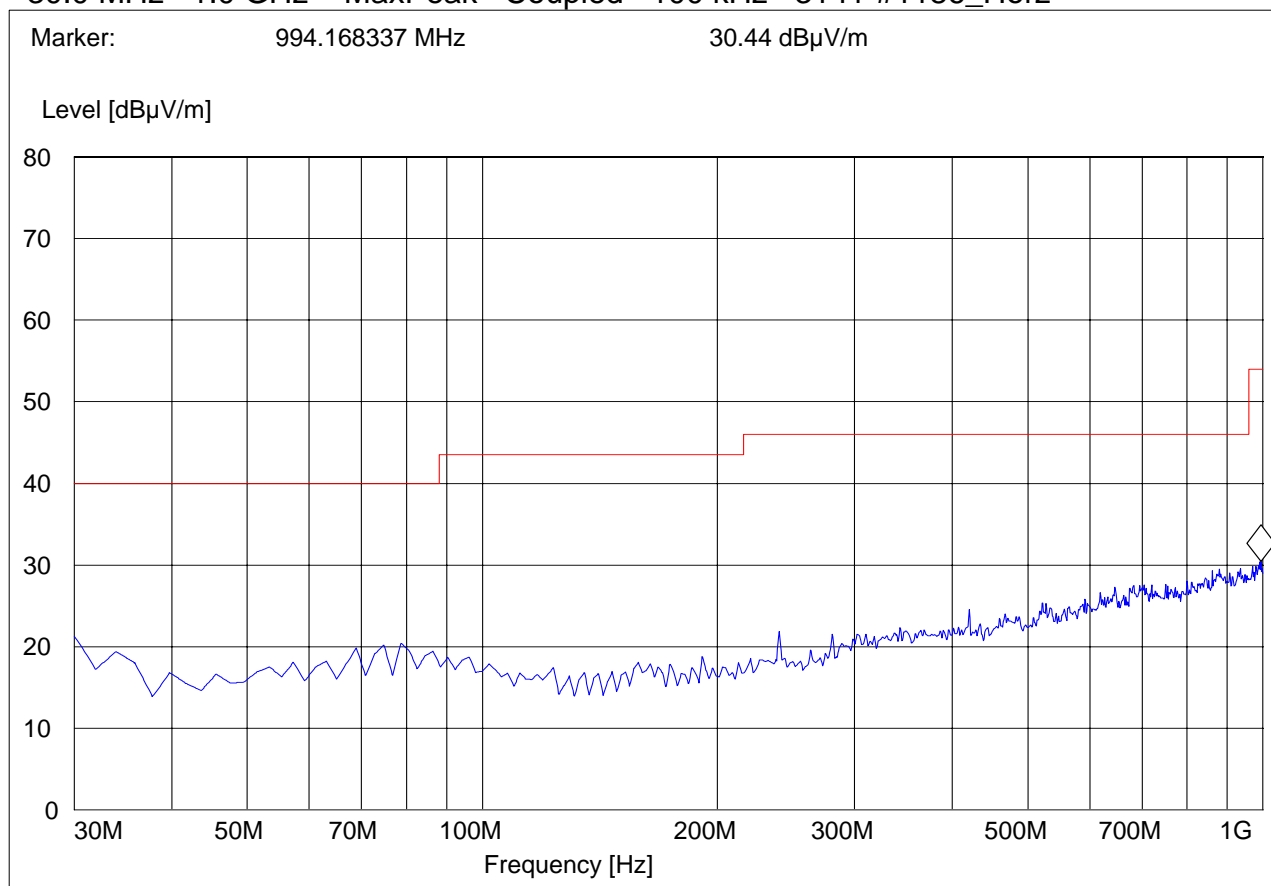
Antenna: Horizontal

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

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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

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





1-3GHz (2412MHz)

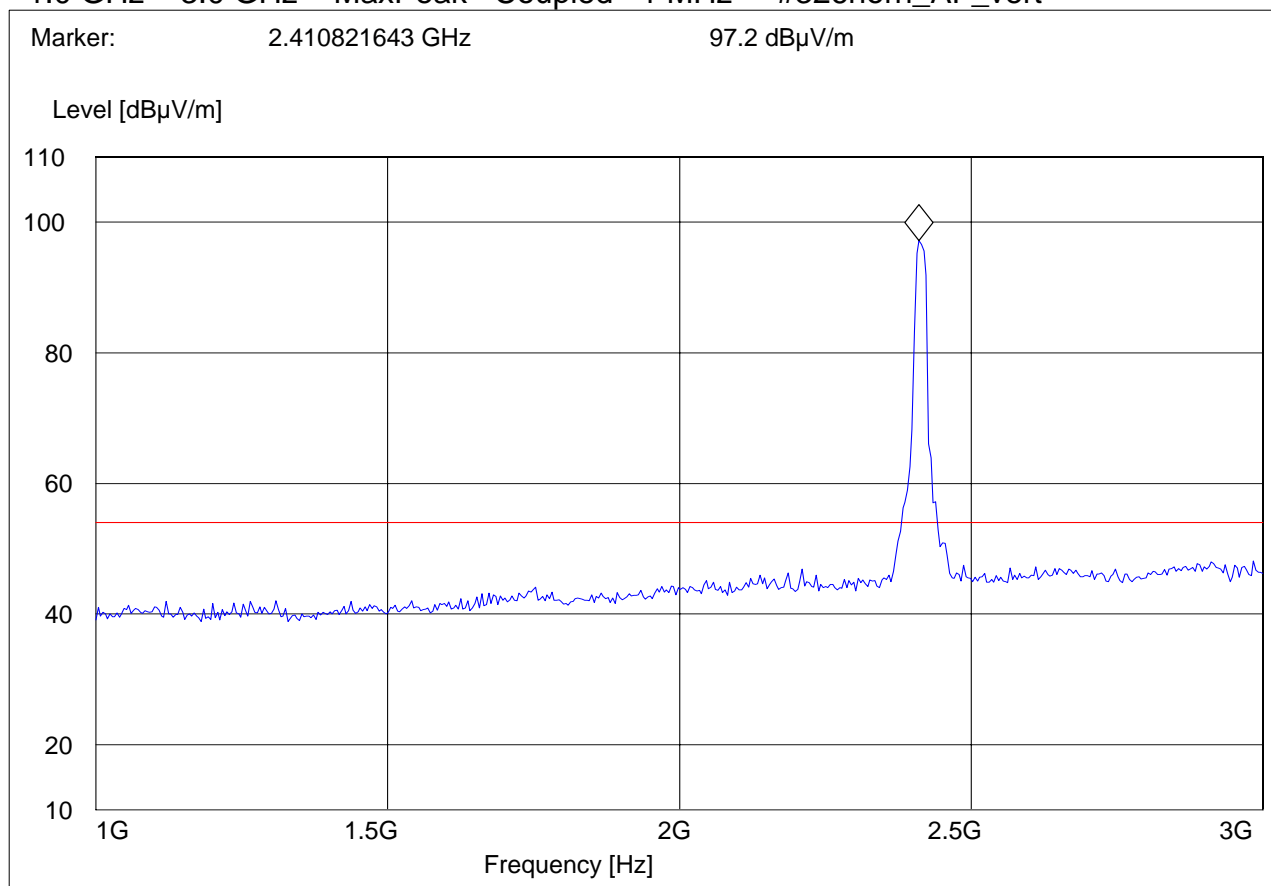
Note: The peaks above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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)

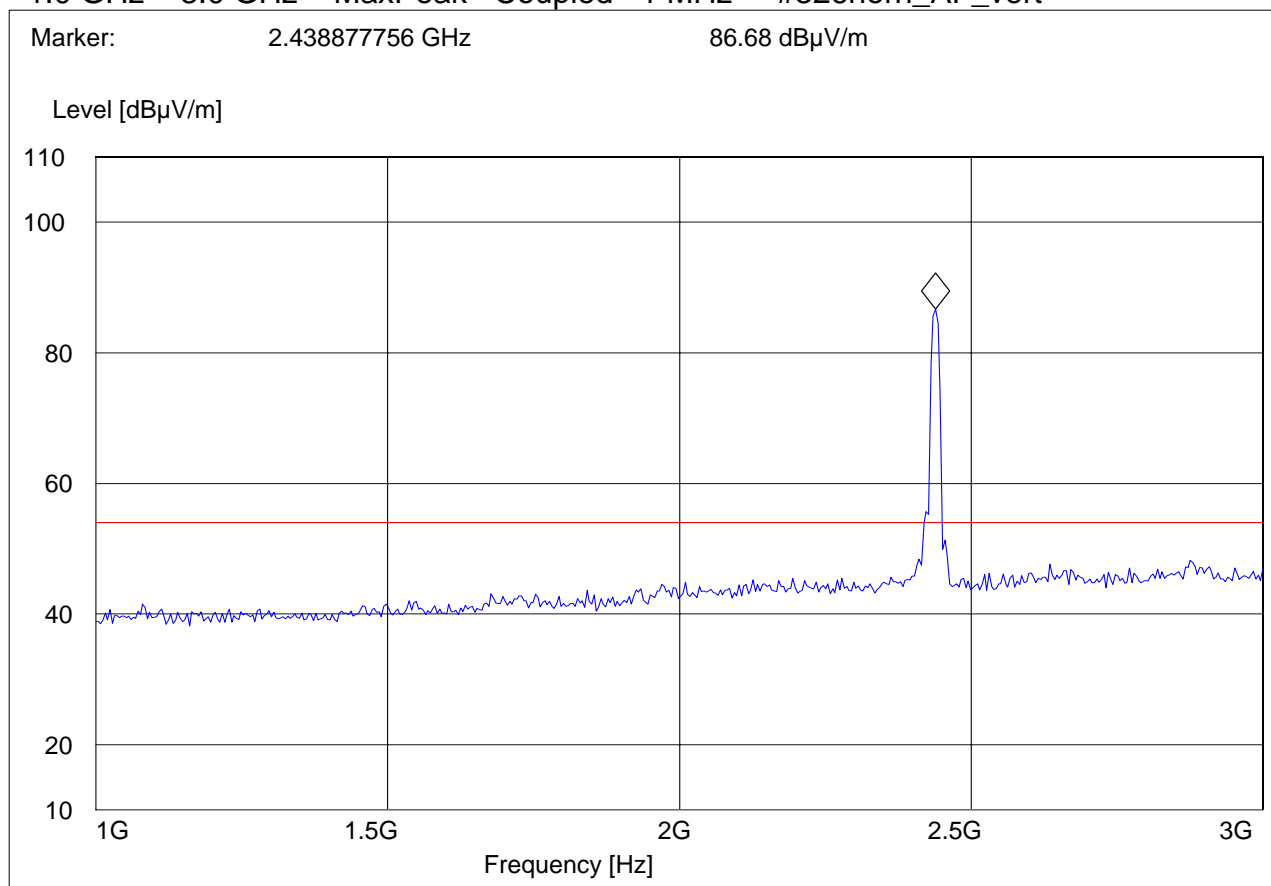
Note: The peaks above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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)

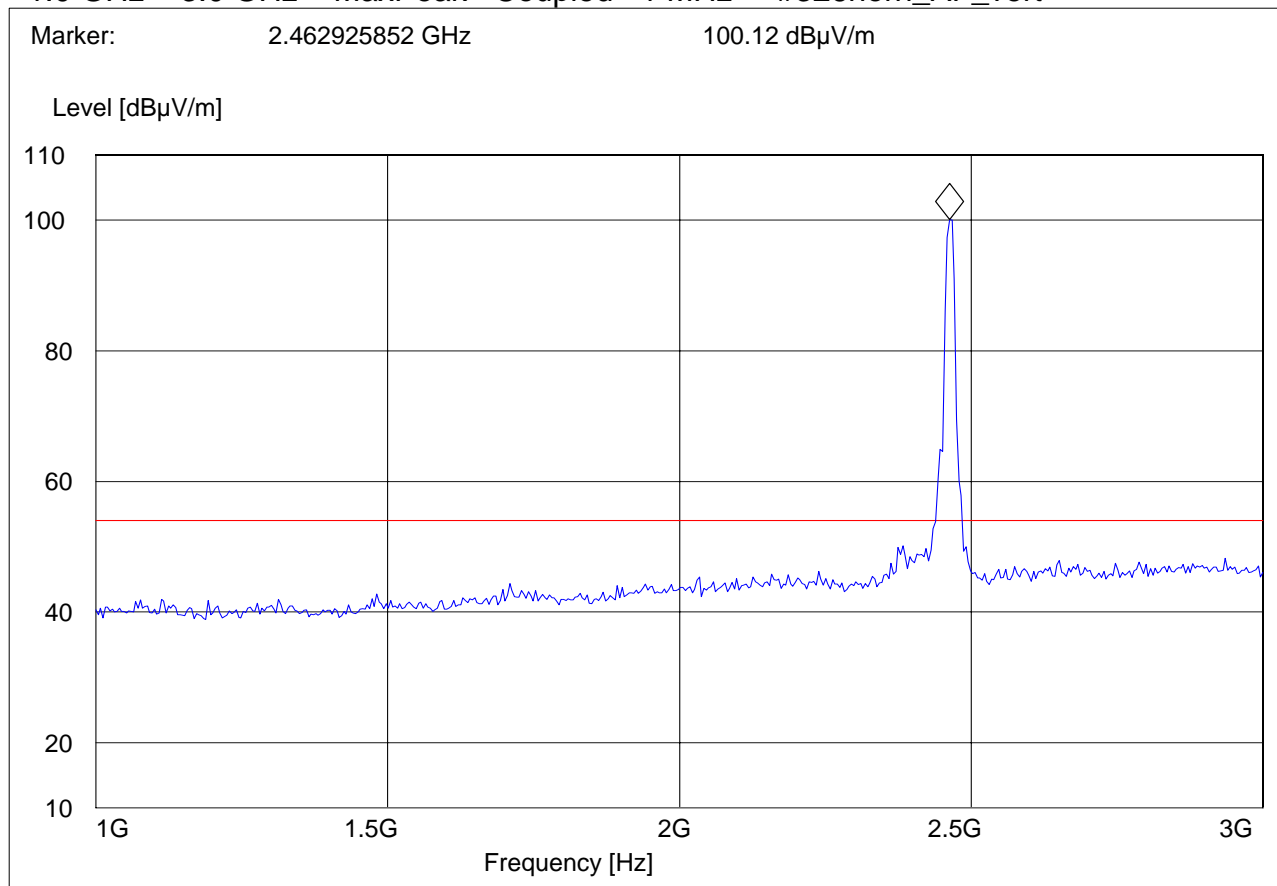
Note: The peaks above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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





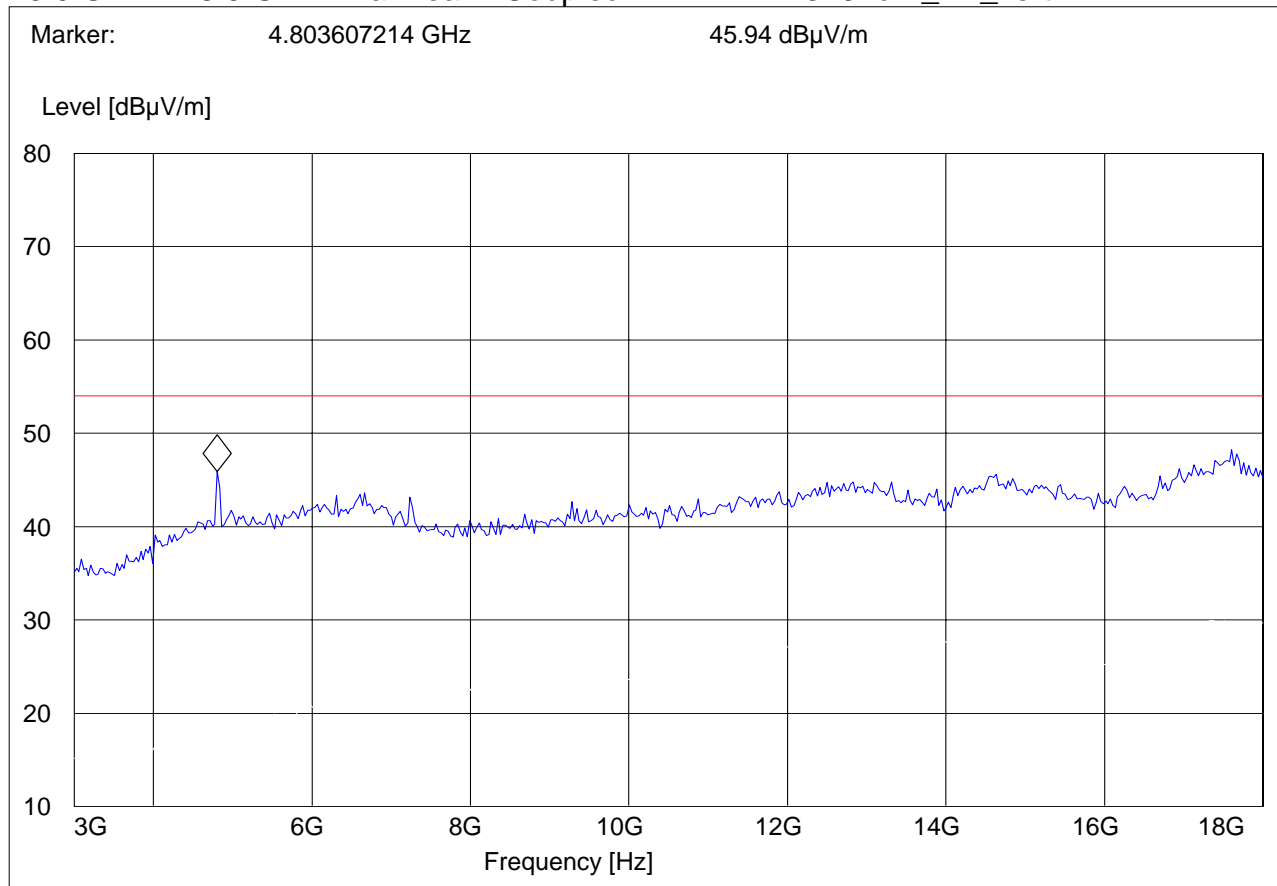
3-18GHz (2412MHz)

Note: Peak Reading vs. Average limit

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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

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





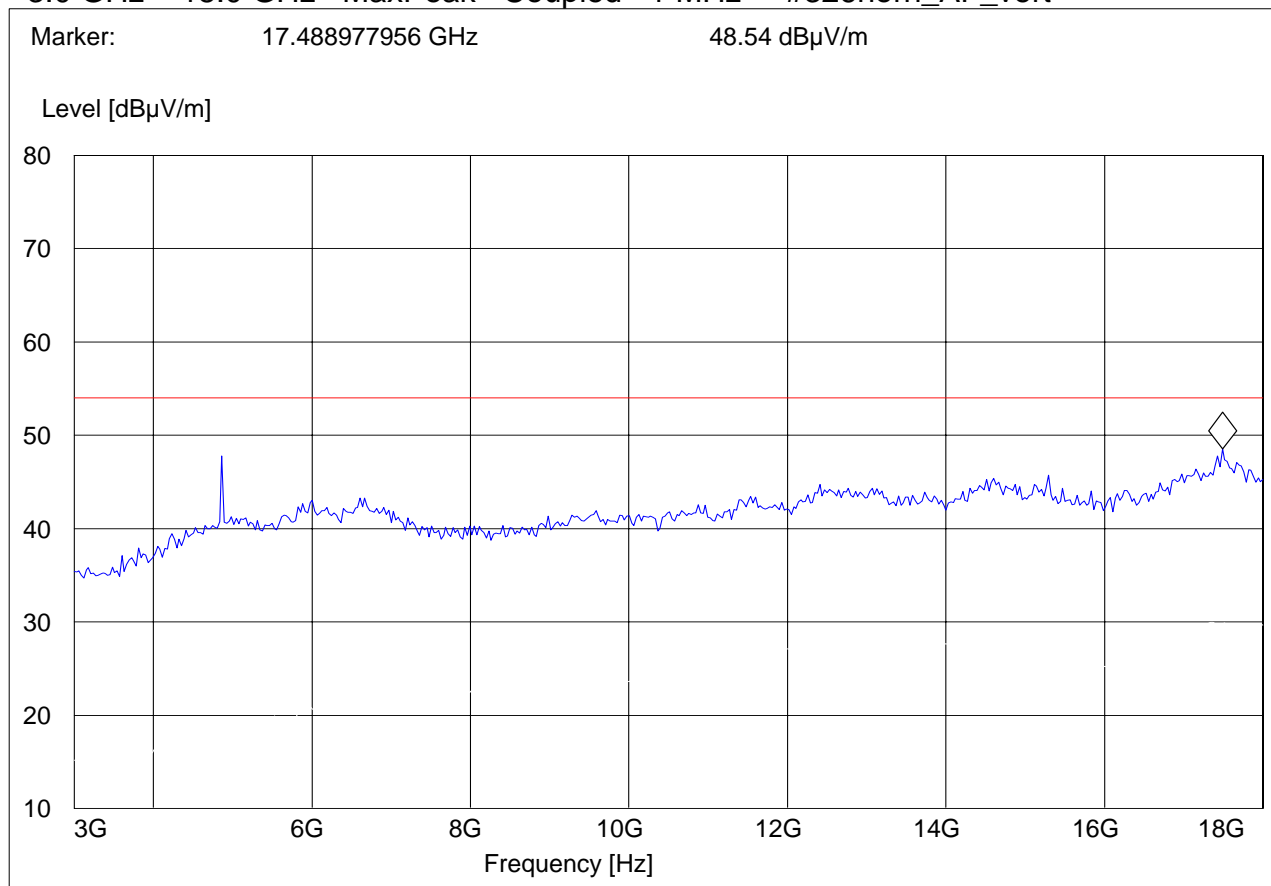
3-18GHz (2437MHz)

Note: Peak Reading vs. Average limit

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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

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





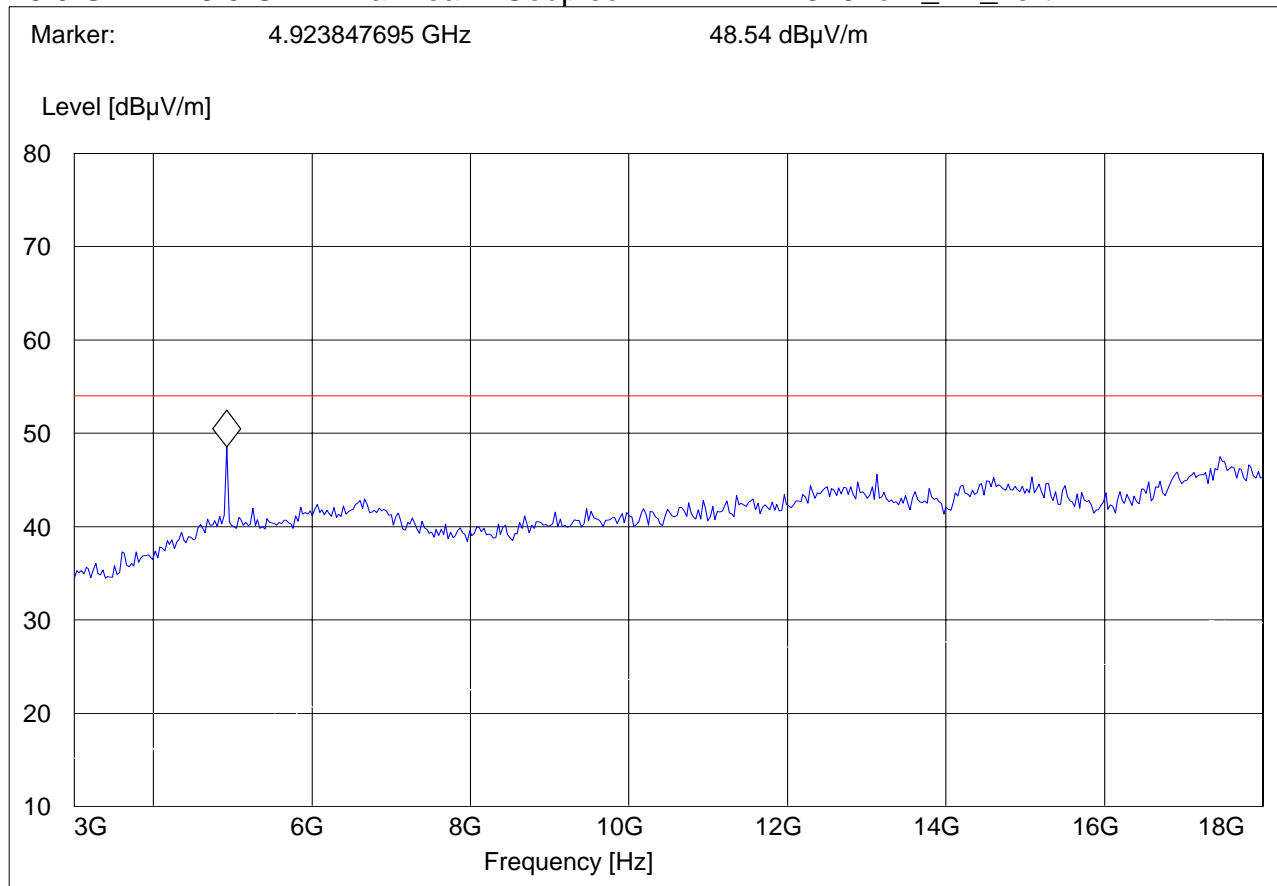
3-18GHz (2462MHz)

Note: Peak Reading vs. Average limit

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 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)

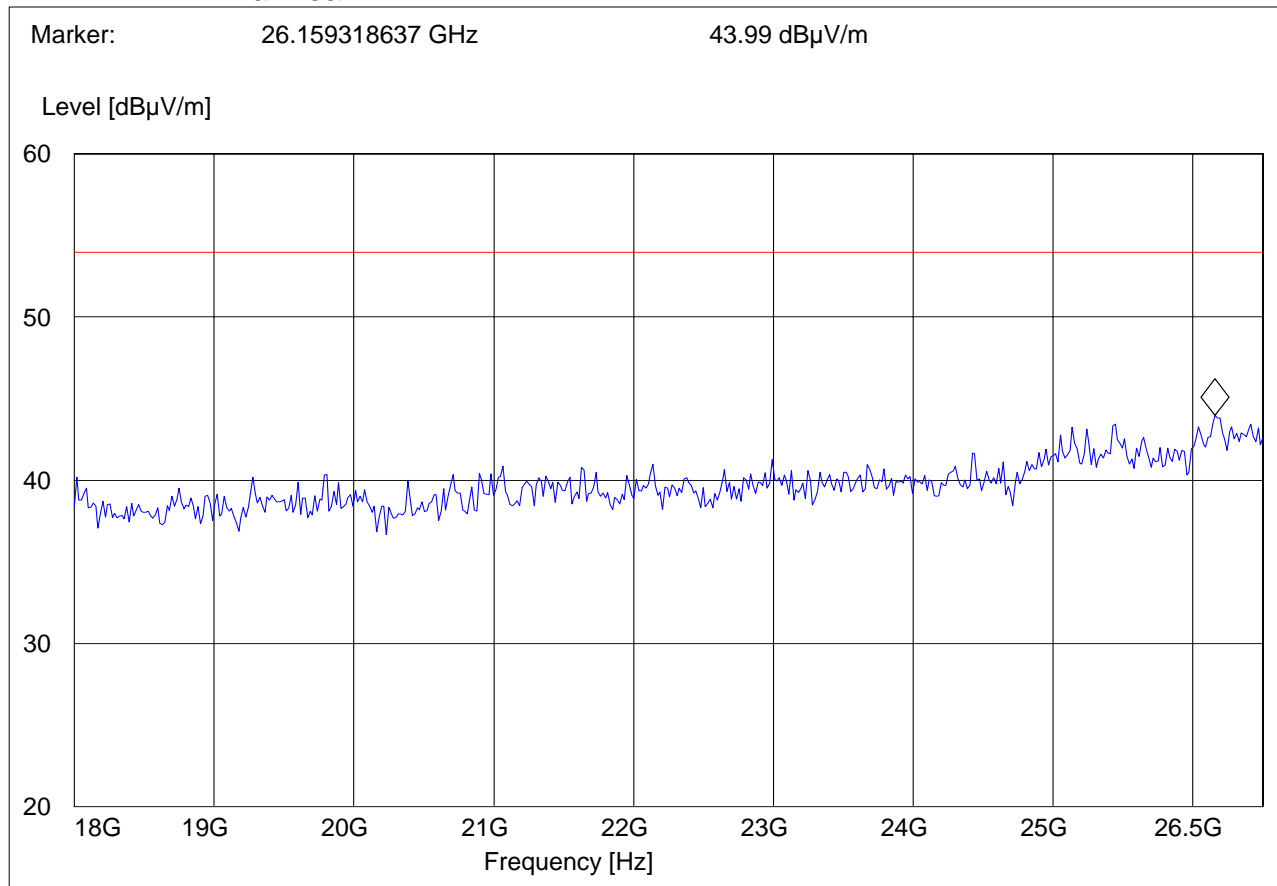
Note: Peak Reading vs. Average limit

EUT: A1303
Customer:: Apple
Test Mode: 802.11
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC Adapter
Comments:

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

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	100 kHz	Horn # 3116_18-40G

MaxPeak





5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

5.4.1 LIMITS

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	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.



30MHz – 1GHz

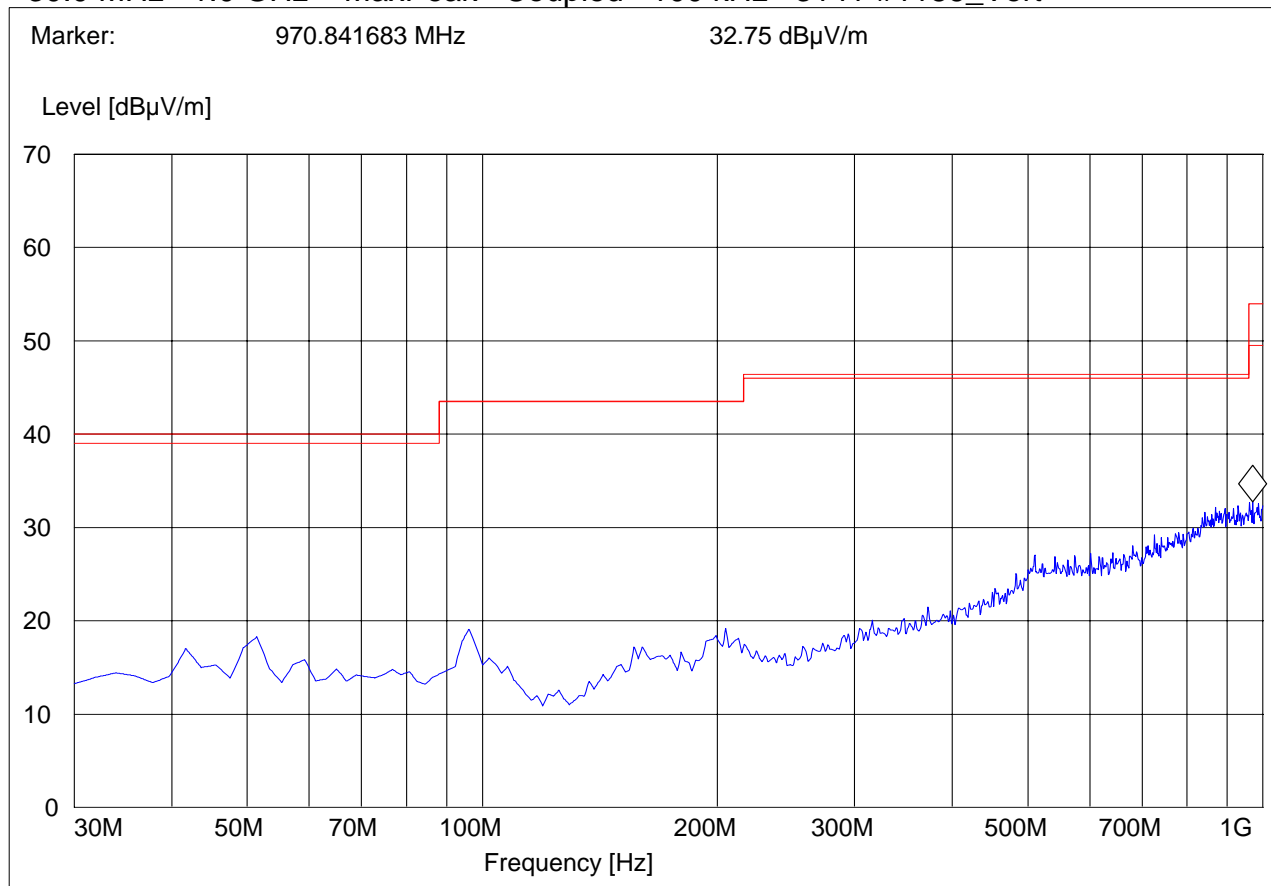
Antenna: vertical

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

EUT: A1303
Customer:: Apple
Test Mode: RX
ANT Orientation: V
EUT Orientation: V
Test Engineer: SAM
Voltage: AC
Comments: FCC Adapter

SWEEP TABLE: "CANADA RE_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





30MHz – 1GHz

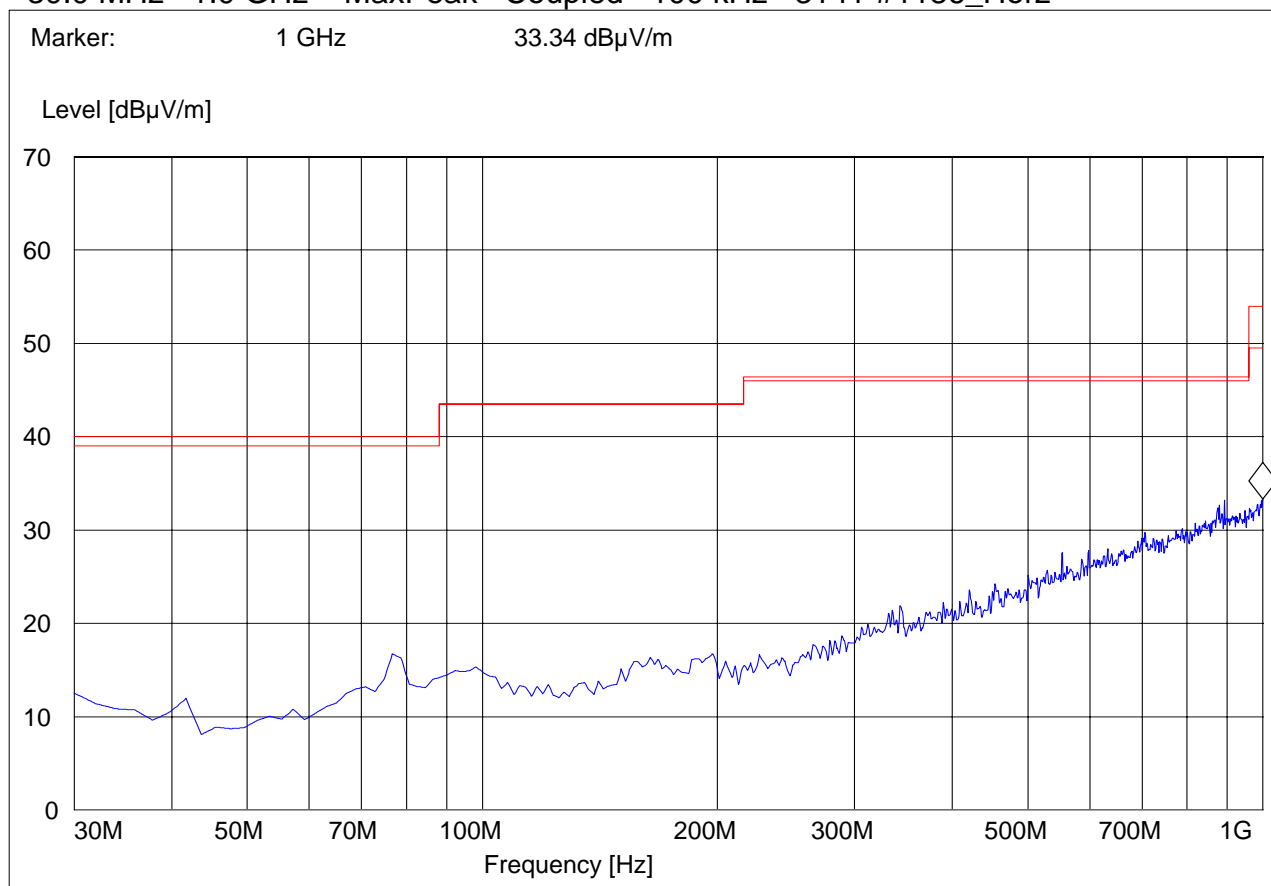
Antenna: Horizontal

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

EUT: A1303
Customer:: Apple
Test Mode: RX
ANT Orientation: H
EUT Orientation: V
Test Engineer: SAM
Voltage: AC
Comments: FCC Adapter

SWEEP TABLE: "CANDA RE_30M-1G_Hor"

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





1-18GHz

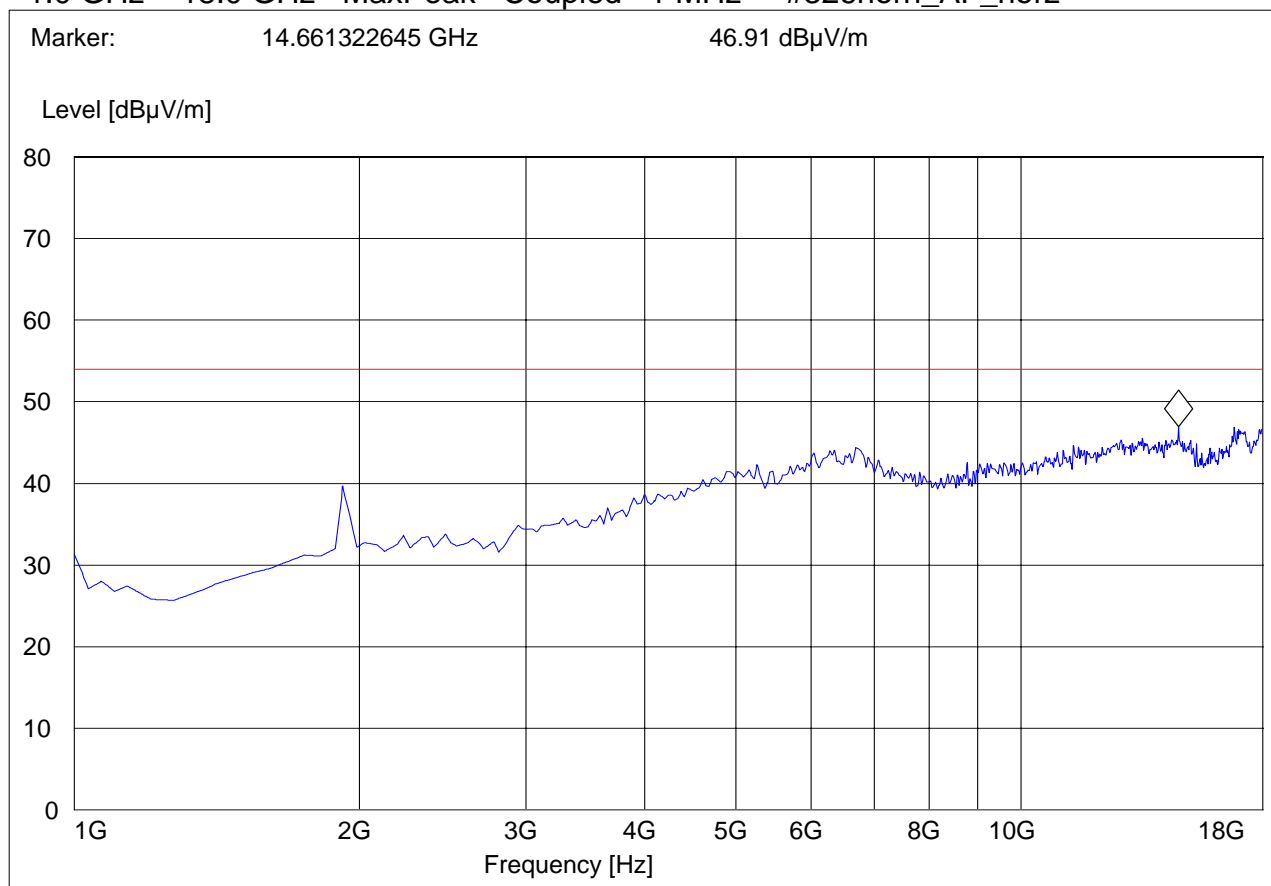
Note: Peak Reading vs. Average limit

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

EUT / Description: A1303
 Customer: Apple
 Operation Mode: Rx
 ANT Orientation: : H
 EUT Orientation:: V
 Test Engineer: Chris
 Voltage: FCC AC Adapter
 Comments::

SWEEP TABLE: "CANADA RE_1-18G"

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





6 Measurements (CONDUCTED)

6.1 MAXIMUM 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:

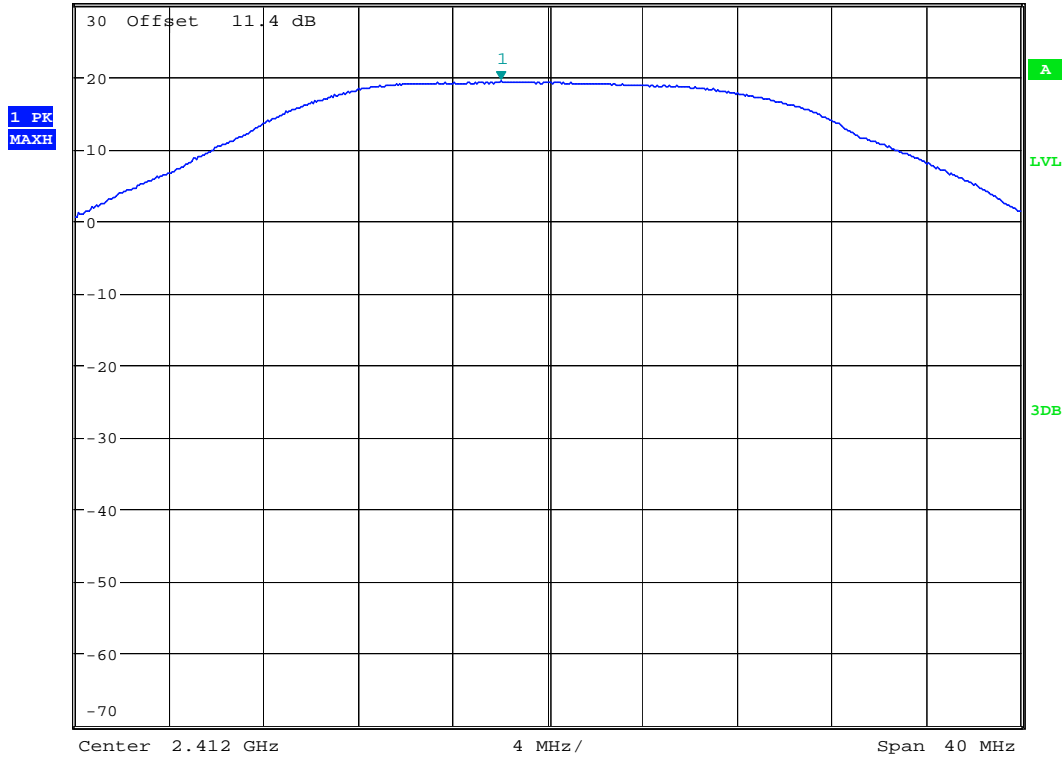
TEST CONDITIONS Frequency (MHz)	MAXIMUM OUTPUT POWER (dBm)		
	2412 MHz	2437 MHz	2462 MHz
802.11b	19.33	19.37	19.49
802.11g	25.39	25.49	25.38



(2412 MHz) 802.11b Conducted Peak Power



Ref 30 dBm Att 45 dB *RBW 20 MHz Marker 1 [T1]
VBW 30 MHz 19.33 dBm
SWT 2.5 ms 2.410012821 GHz

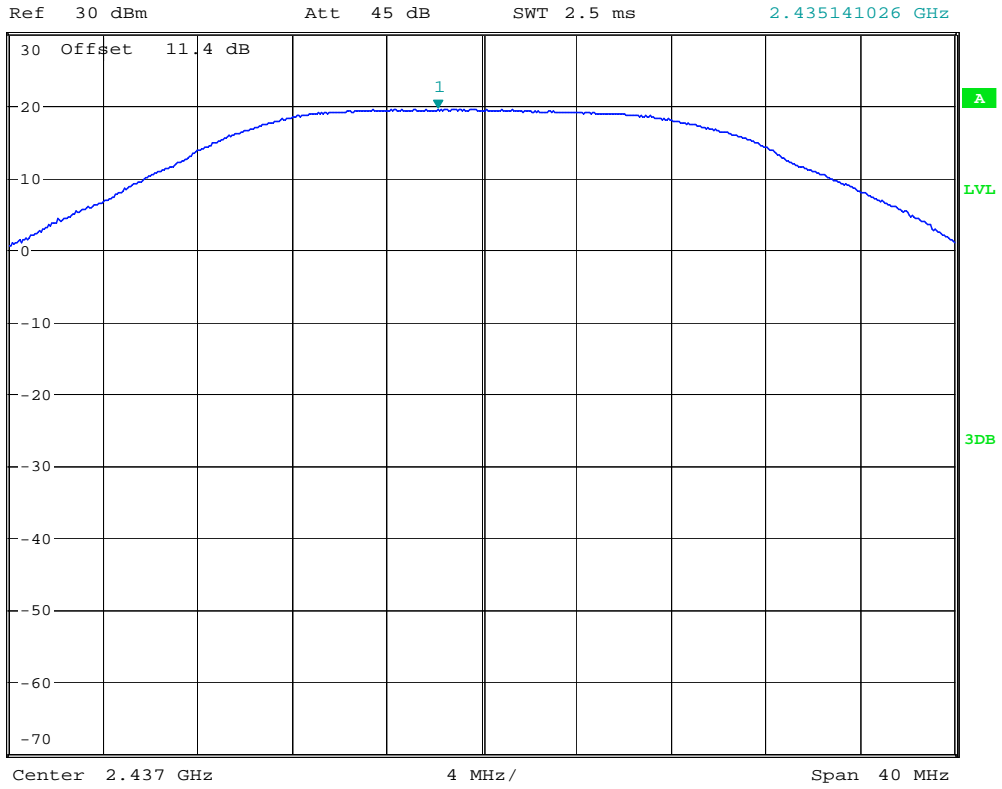




(2437 MHz) 802.11b Conducted Peak Power



*RBW 20 MHz Marker 1 [T1]
VBW 30 MHz 19.37 dBm
SWT 2.5 ms 2.435141026 GHz

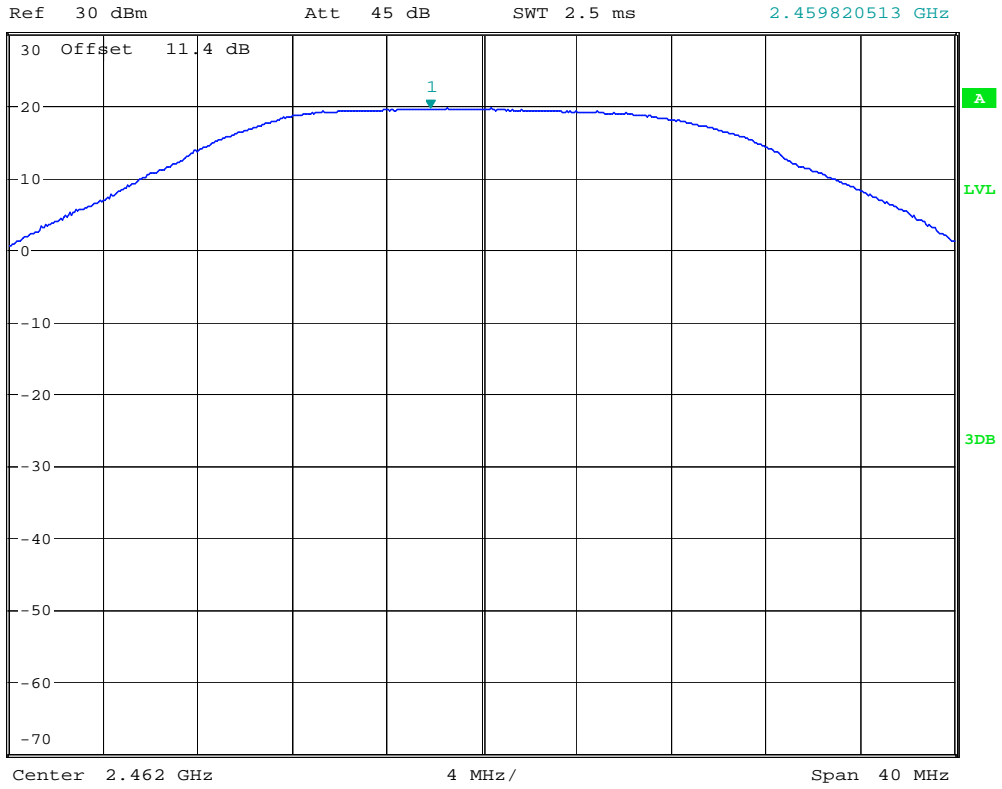




(2462 MHz) 802.11b Conducted Peak Power



* RBW 20 MHz Marker 1 [T1]
VBW 30 MHz 19.49 dBm
SWT 2.5 ms 2.459820513 GHz

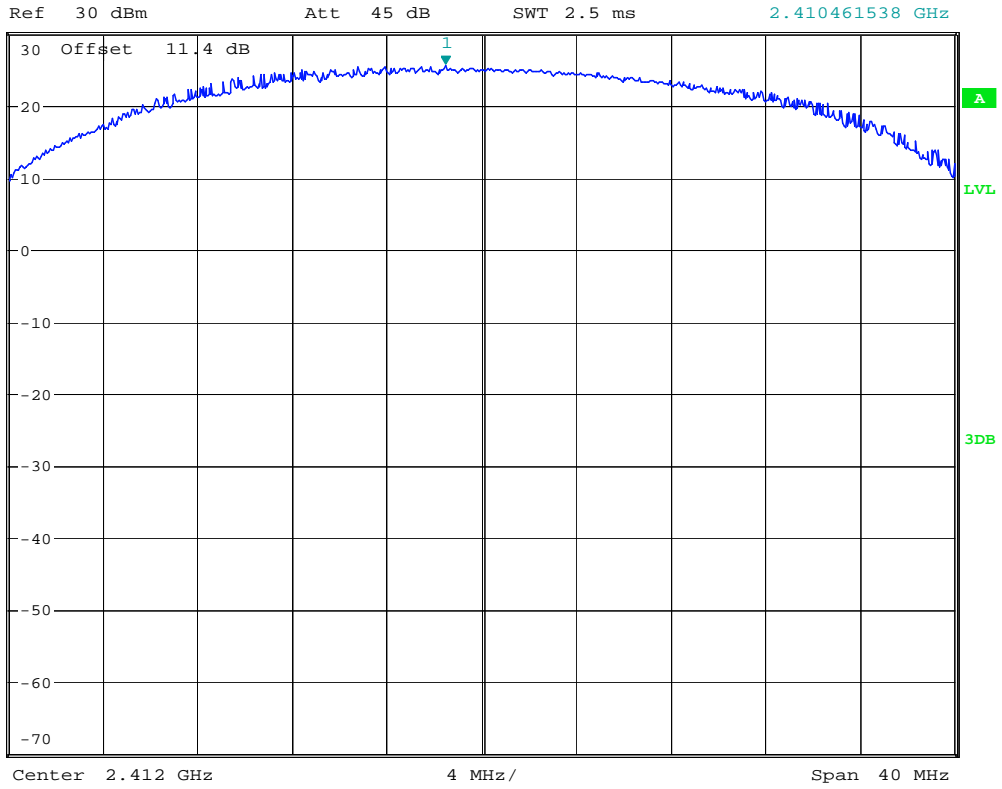




(2412 MHz) 802.11g Conducted Peak Power



* RBW 20 MHz Marker 1 [T1]
VBW 30 MHz 25.39 dBm
SWT 2.5 ms 2.410461538 GHz

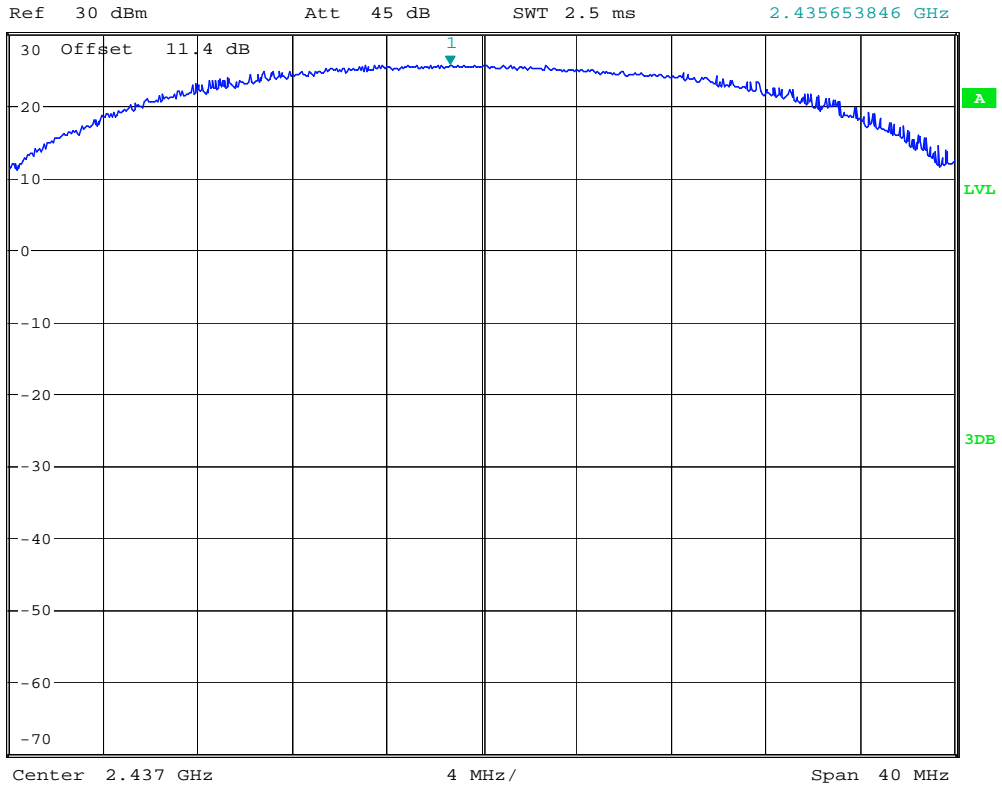




(2437 MHz) 802.11g Conducted Peak Power



*RBW 20 MHz Marker 1 [T1]
VBW 30 MHz 25.49 dBm
SWT 2.5 ms 2.435653846 GHz

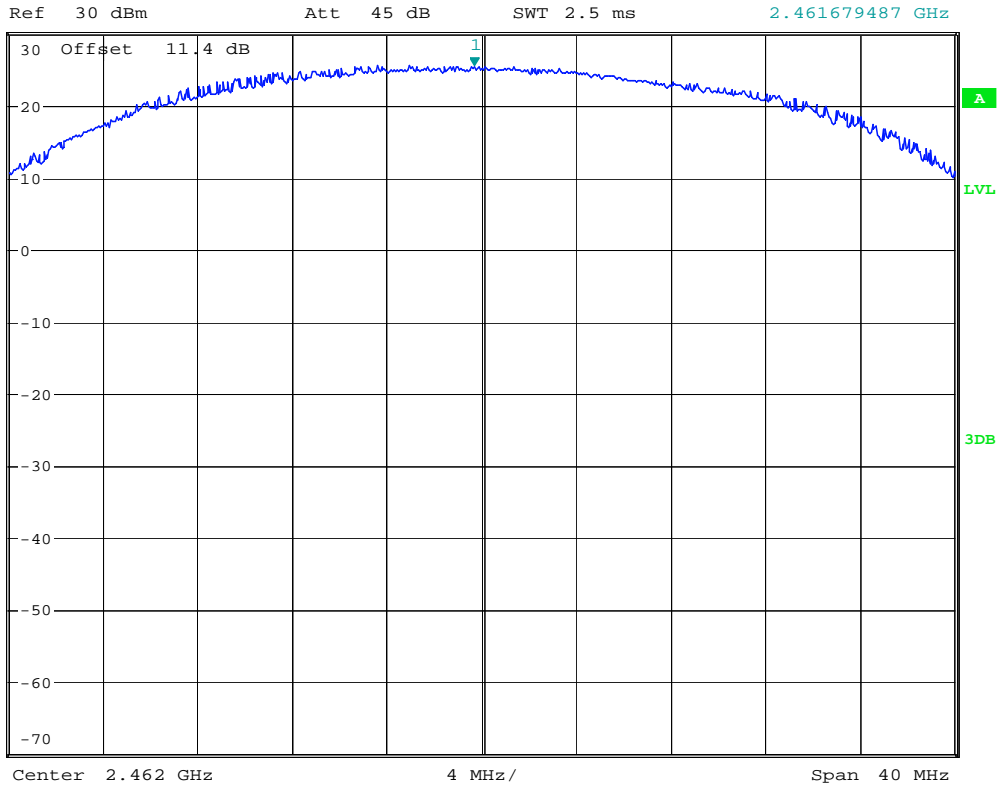




(2462 MHz) 802.11g Conducted Peak Power



* RBW 20 MHz Marker 1 [T1]
VBW 30 MHz 25.38 dBm
SWT 2.5 ms 2.461679487 GHz





6.2 6dB BANDWIDTH

6.2.1 LIMIT SUB CLAUSE § 15.247 (a) (2)

(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

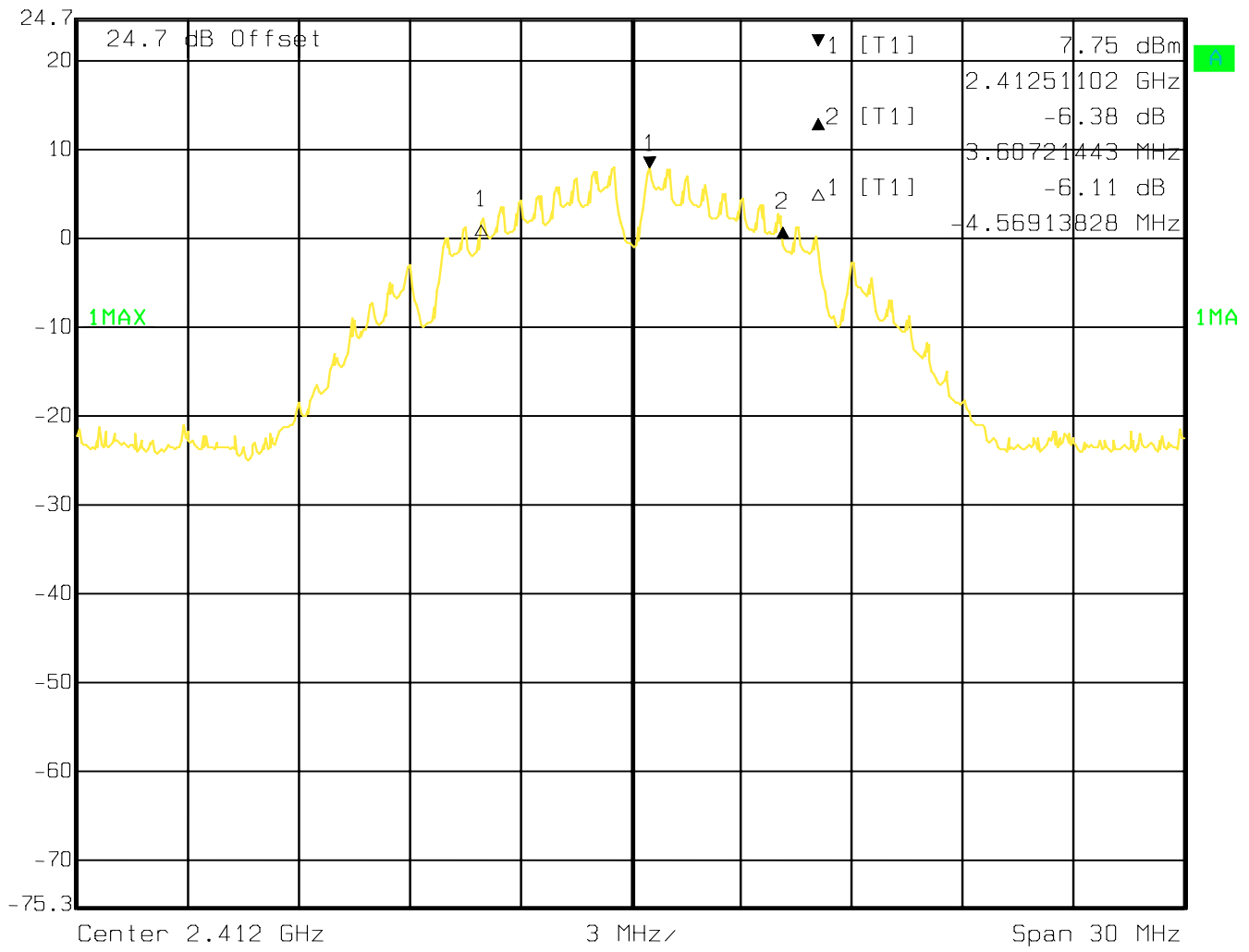
Frequency range	6dB Band width
2400-2483.5 MHz	500kHz

TEST CONDITIONS Frequency (MHz)	6dB BANDWIDTH (MHz)		
	2412 MHz	2437 MHz	2462 MHz
802.11b	8.176	8.176	8.176
802.11g	16.172	16.052	16.052



(2412 MHz) 802.11b 6dB BW


Delta 2 [T1]
RBW 200 kHz
RF Att 40 dB
Ref Lvl -6.38 dB
VBW 200 kHz
24.7 dBm
3.60721443 MHz
SWT 5 ms
Unit dBm

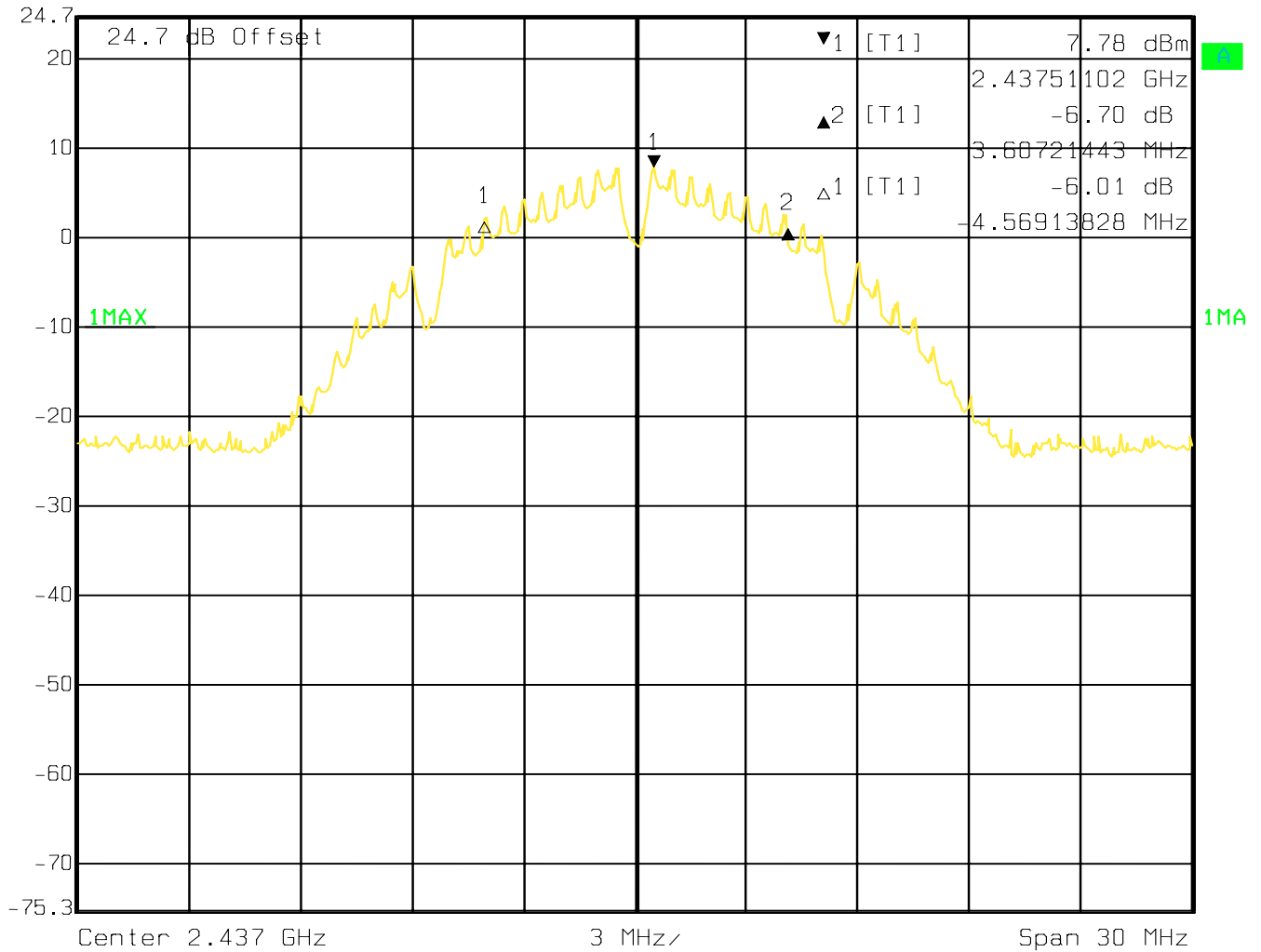


Date: 11.MAY 2009 16:03:35



(2437 MHz) 802.11b 6dB BW

FS Delta 2 [T1] RBW 200 kHz RF Att 40 dB
 Ref Lvl -6.70 dB VBW 200 kHz
 24.7 dBm 3.60721443 MHz SWT 5 ms Unit dBm

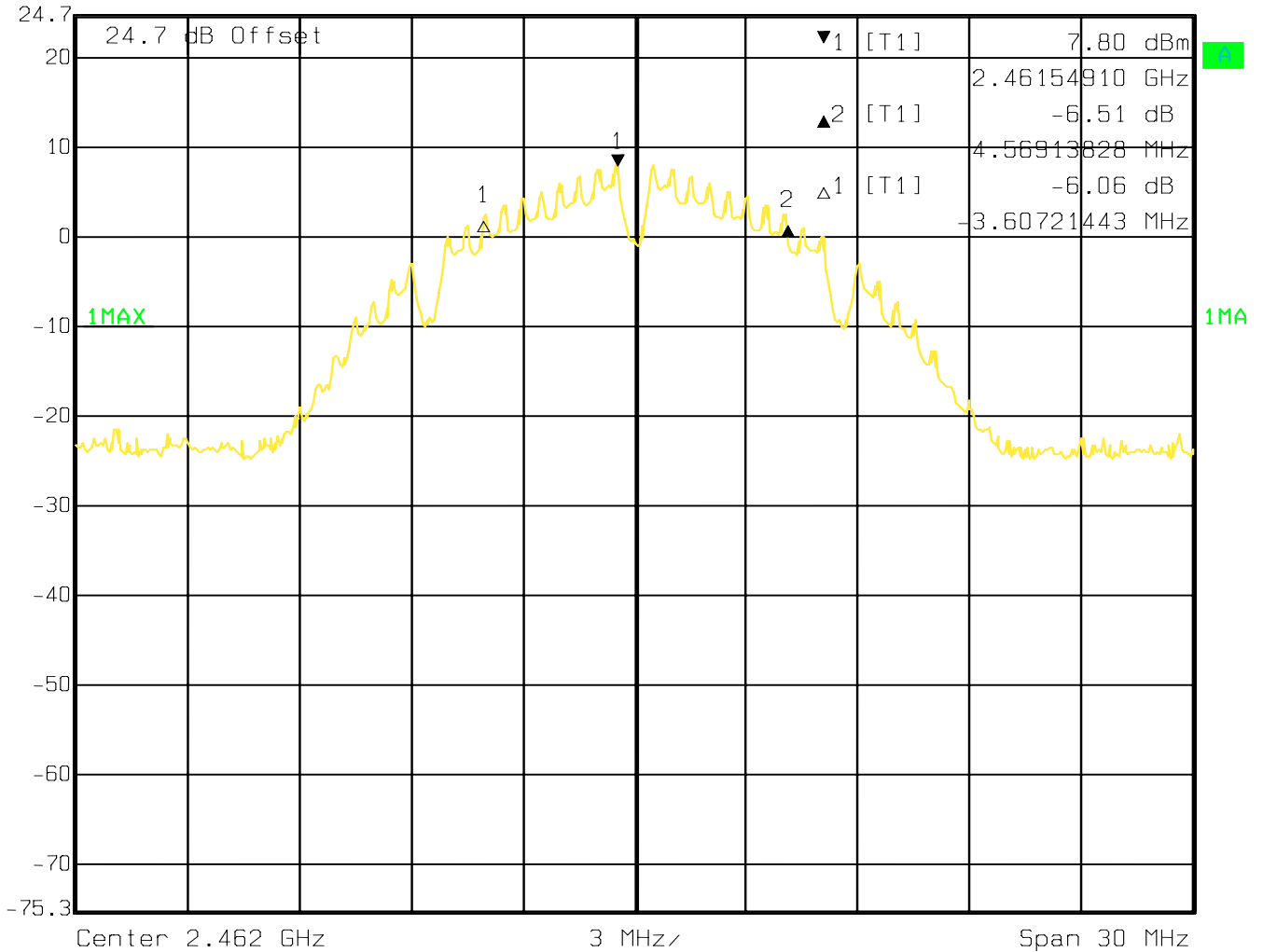


Date: 11.MAY 2009 16:06:58



(2462 MHz) 802.11b 6dB BW


Delta 2 [T1]
RBW 200 kHz
RF Att 40 dB
Ref Lvl 24.7 dBm
-6.51 dB
VBW 200 kHz
4.56913828 MHz
SWT 5 ms
Unit dBm

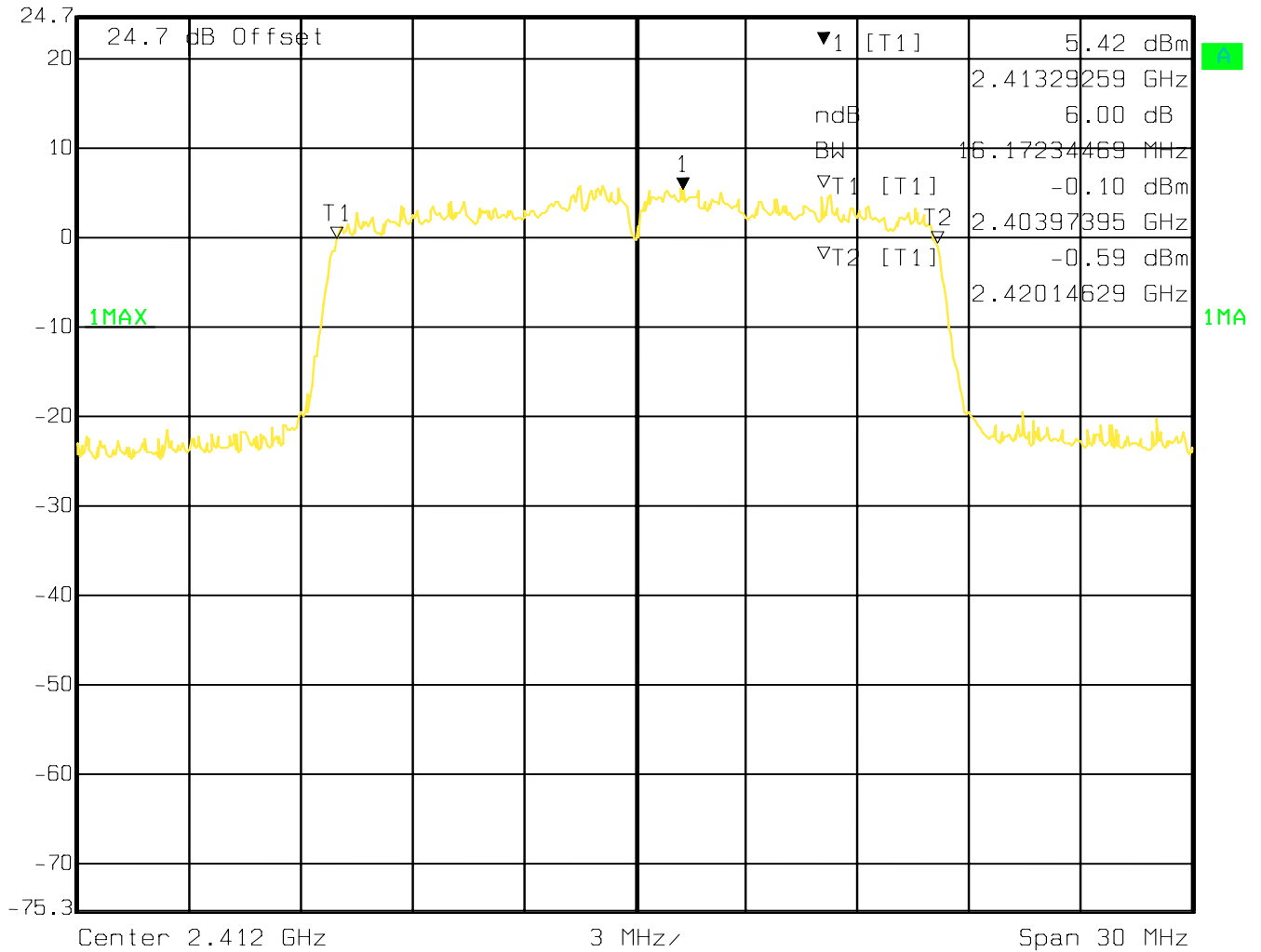


Date: 11.MAY 2009 16:08:00



(2412 MHz) 802.11g 6dB BW

FS Marker 1 [T1 ndB] RBW 200 kHz RF Att 40 dB
 Ref Lvl ndB 6.00 dB VBW 200 kHz
 24.7 dBm BW 16.17234469 MHz SWT 5 ms Unit dBm

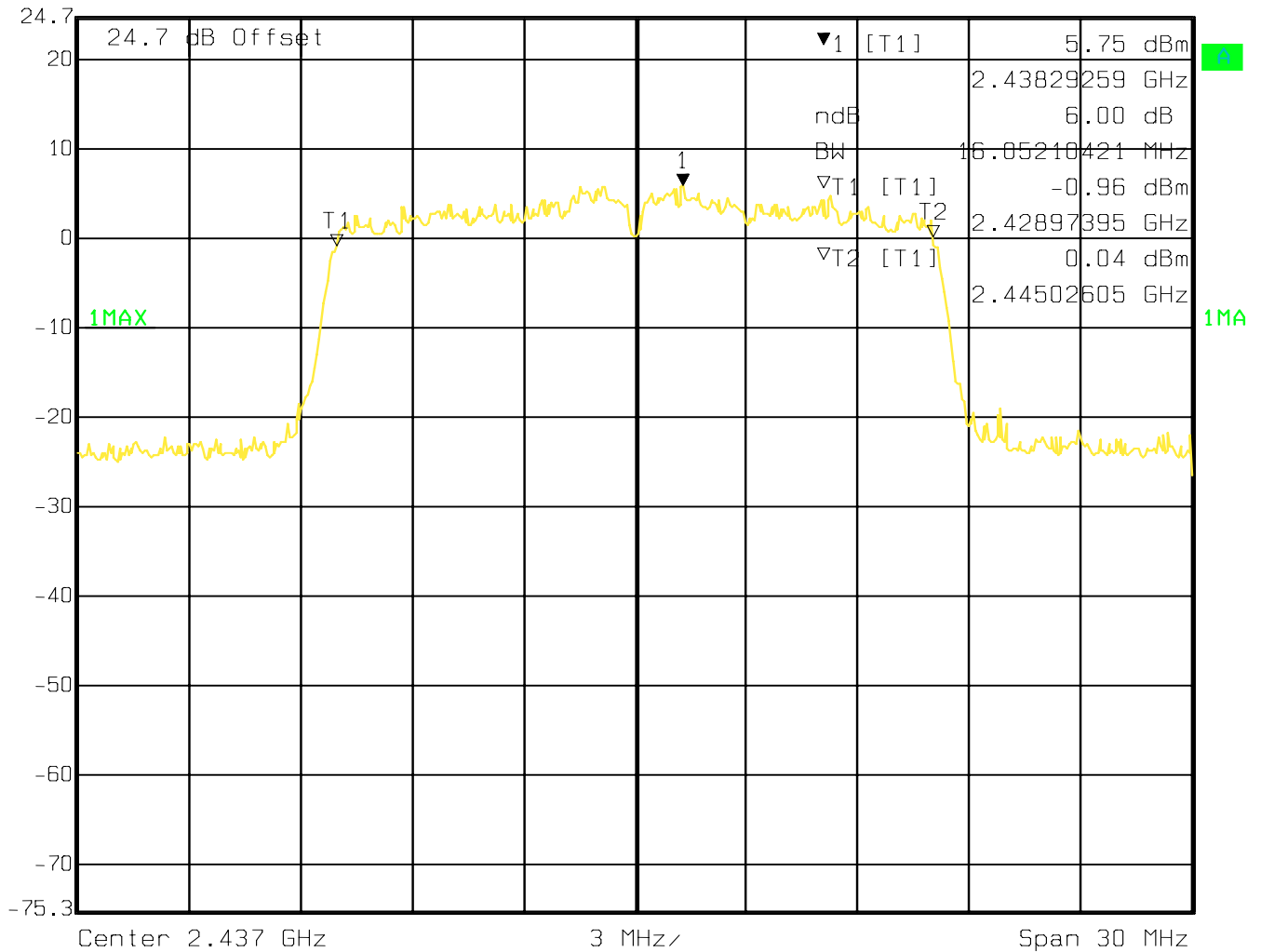


Date: 11.MAY 2009 16:01:52



(2437 MHz) 802.11g 6dB BW


 Ref Lvl 24.7 dBm
 Marker 1 [T1 ndB] 6.00 dB
 RBW 200 kHz
 VBW 200 kHz
 RF Att 40 dB
 BW 16.05210421 MHz
 SWT 5 ms
 Unit dBm

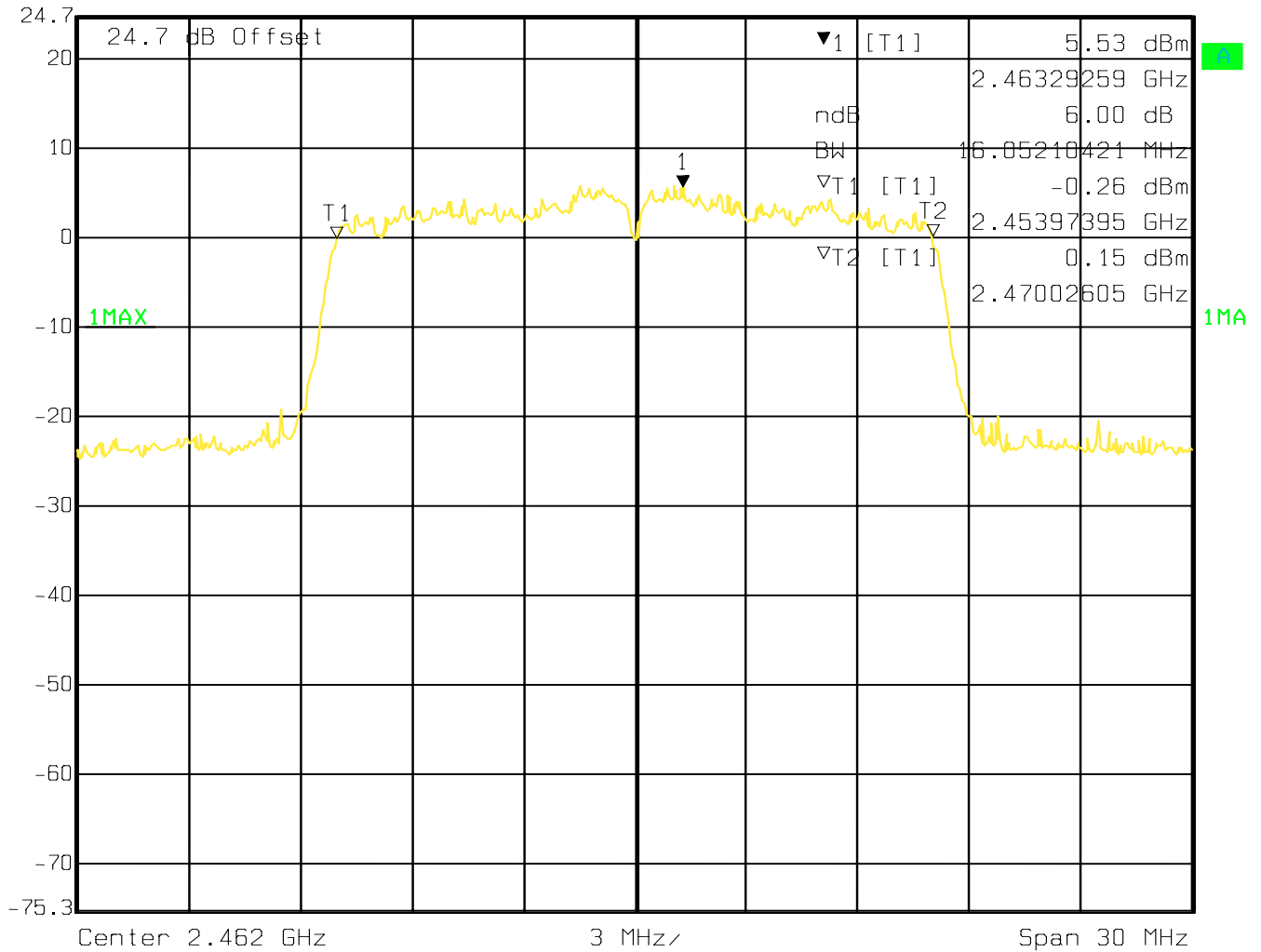


Date: 11.MAY 2009 15:59:11



(2462 MHz) 802.11g 6dB BW

FS Marker 1 [T1 ndB] RBW 200 kHz RF Att 40 dB
 Ref Lvl 24.7 dBm ndB 6.00 dB VBW 200 kHz
 24.7 dBm BW 16.05210421 MHz SWT 5 ms Unit dBm



Date: 11.MAY 2009 15:53:28



6.3 99% BANDWIDTH

6.3.1 LIMIT SUB CLAUSE § RSS-210 (A8.2)(a)

99% BW shall be at least 500kHz

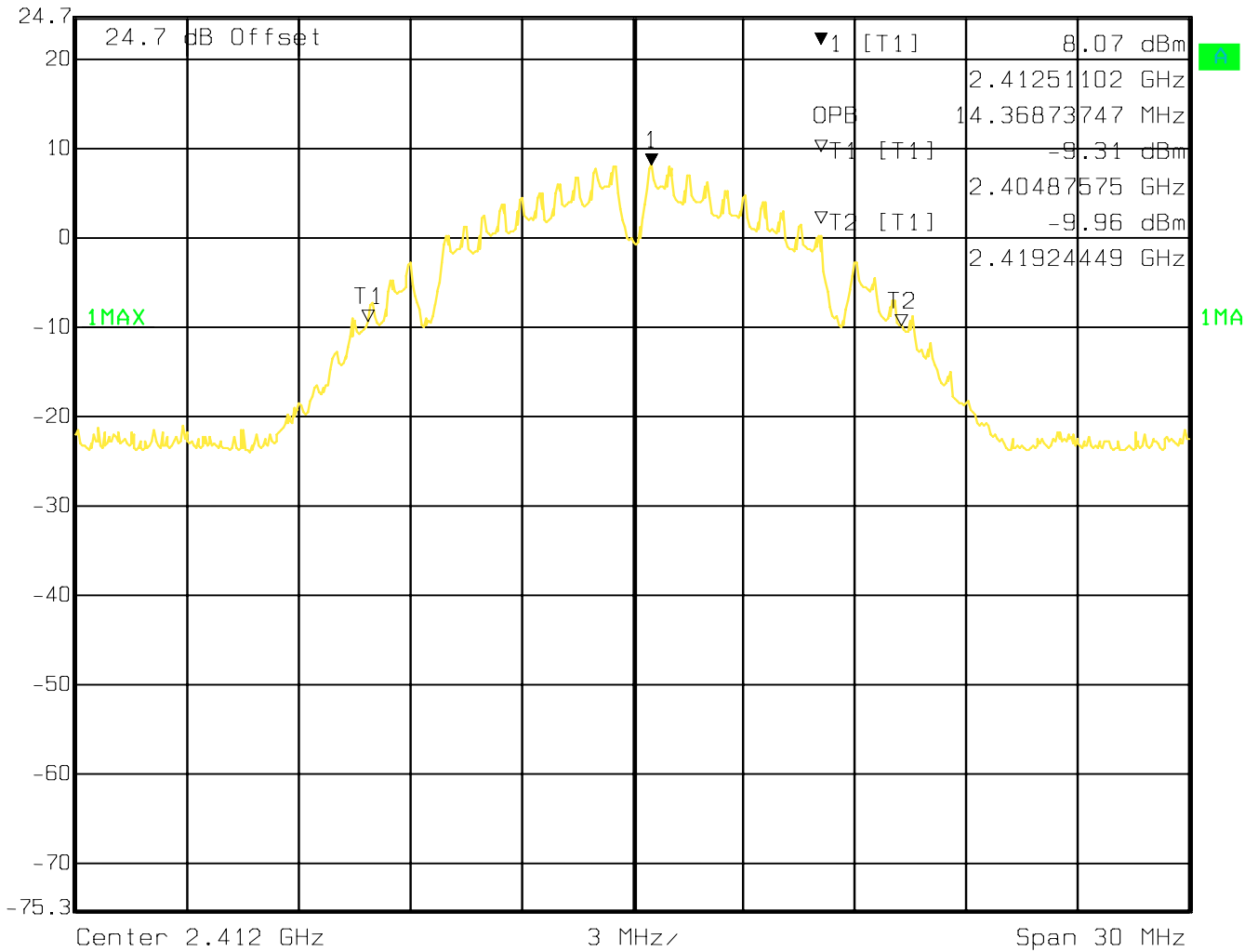
Frequency range	99% Band width
2400-2483.5 MHz	500kHz

TEST CONDITIONS Frequency (MHz)	99% BANDWIDTH (MHz)		
	2412 MHz	2437 MHz	2462 MHz
802.11b	14.369	14.068	14.248
802.11g	16.293	16.353	16.293



(2412 MHz) 802.11b 99% BW


Marker 1 [T1]
RBW 200 kHz
RF Att 40 dB
Ref Lvl 24.7 dBm
8.07 dBm
VBW 200 kHz
2.41251102 GHz
SWT 5 ms
Unit dBm

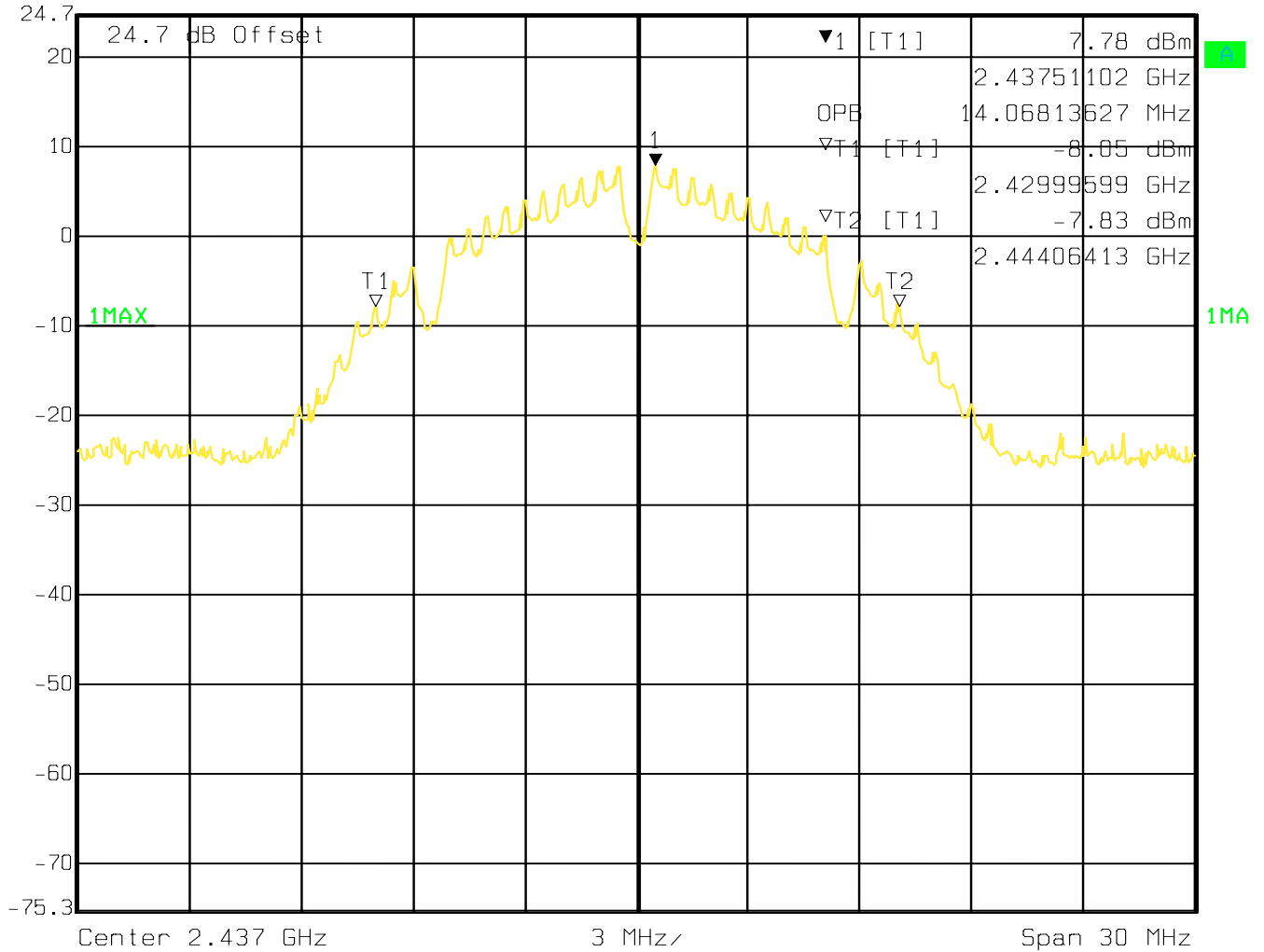


Date: 11.MAY 2009 16:04:16



(2437 MHz) 802.11b 99% BW

Ref Lvl 24.7 dBm
Marker 1 [T1] 7.78 dBm
RBW 200 kHz RF Att 40 dB
VBW 200 kHz
SWT 5 ms Unit dBm

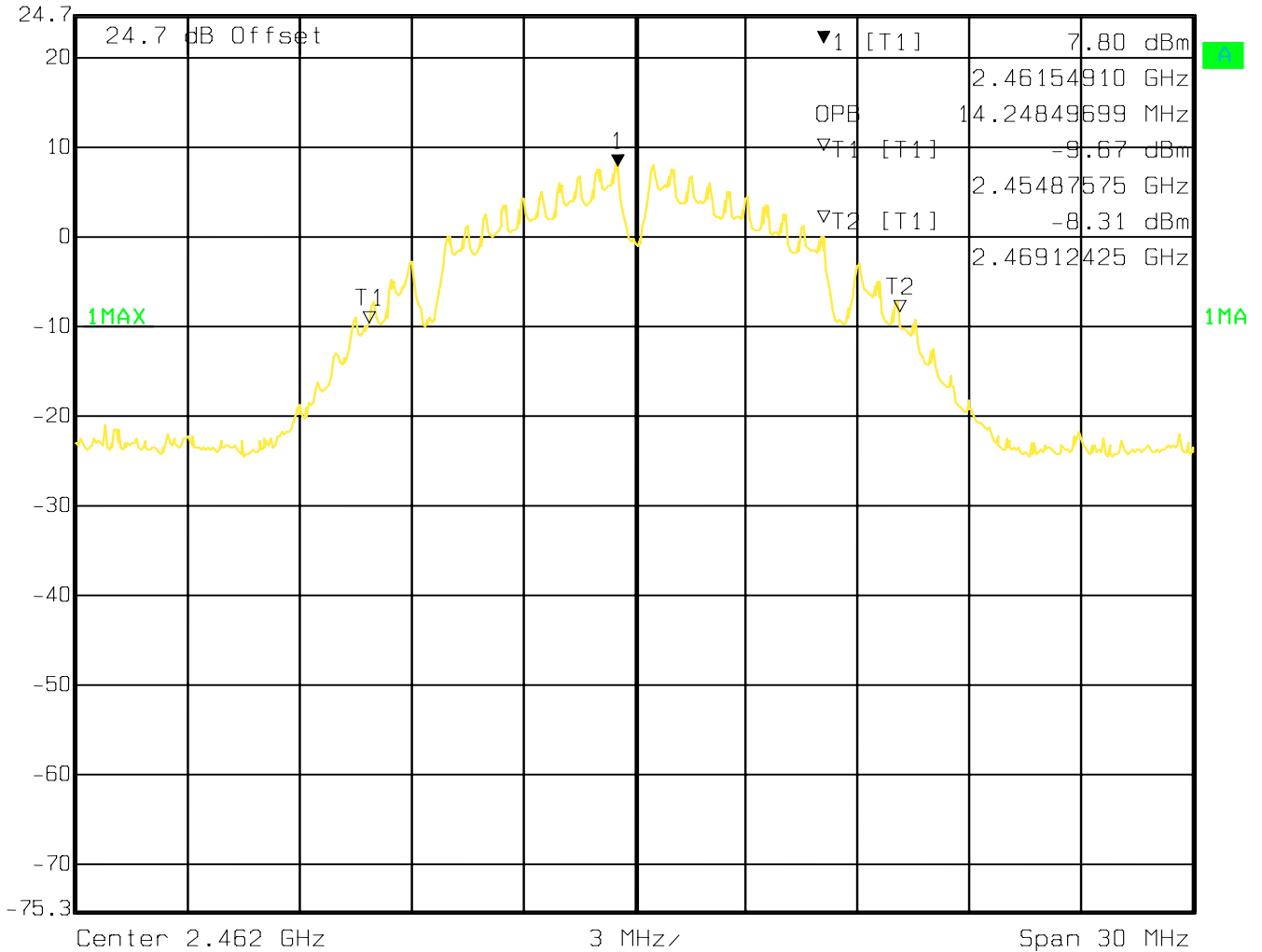


Date: 11.MAY 2009 16:06:01



(2462 MHz) 802.11b 99% BW


Marker 1 [T1]
RBW 200 kHz
RF Att 40 dB
Ref Lvl 24.7 dBm
7.80 dBm
VBW 200 kHz
2.46154910 GHz
SWT 5 ms
Unit dBm

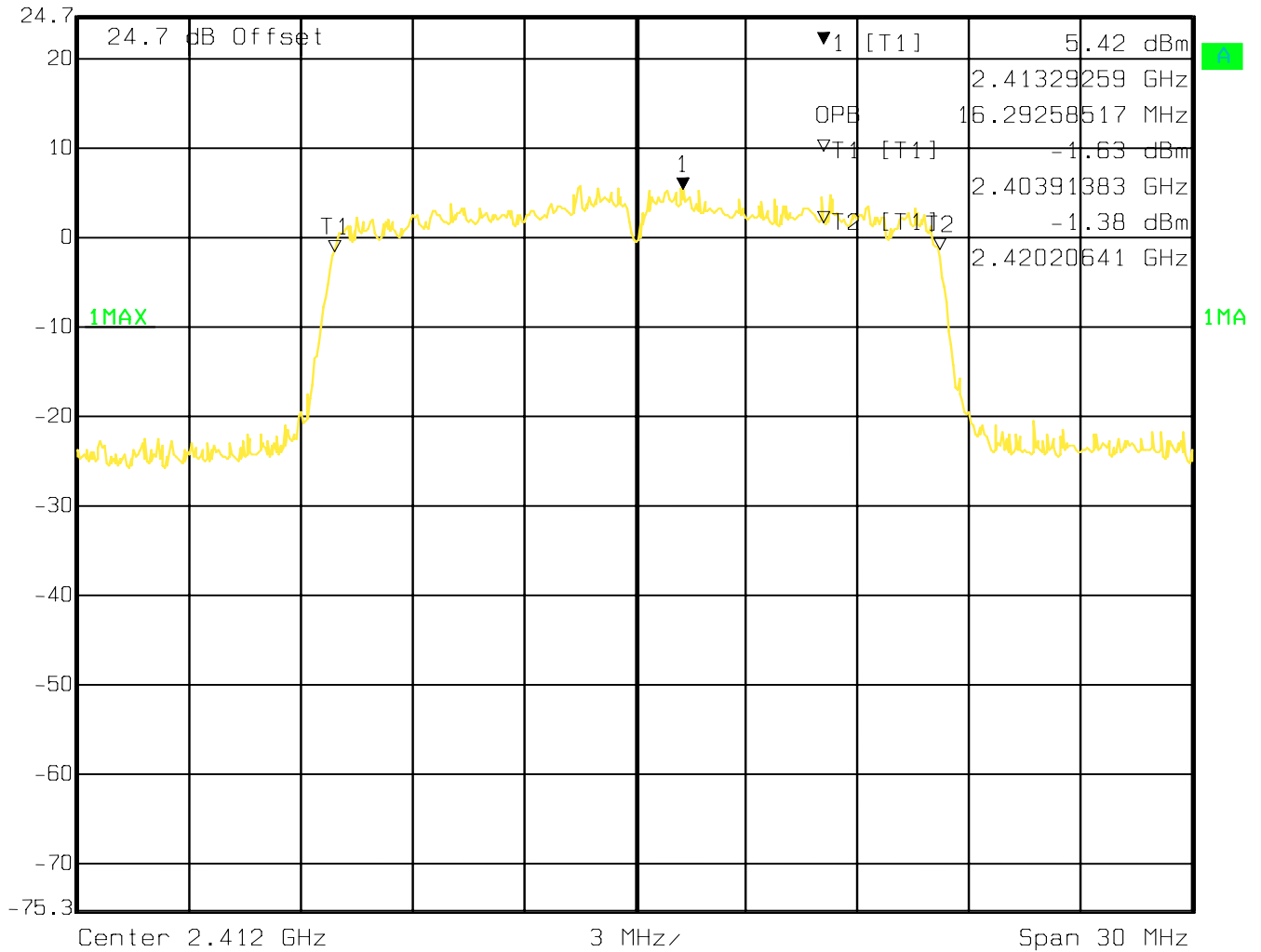


Date: 11.MAY 2009 16:08:28



(2412 MHz) 802.11g 99% BW

FS Marker 1 [T1] RBW 200 kHz RF Att 40 dB
 Ref Lvl 24.7 dBm 5.42 dBm VBW 200 kHz
 24.7 dBm 2.41329259 GHz SWT 5 ms Unit dBm

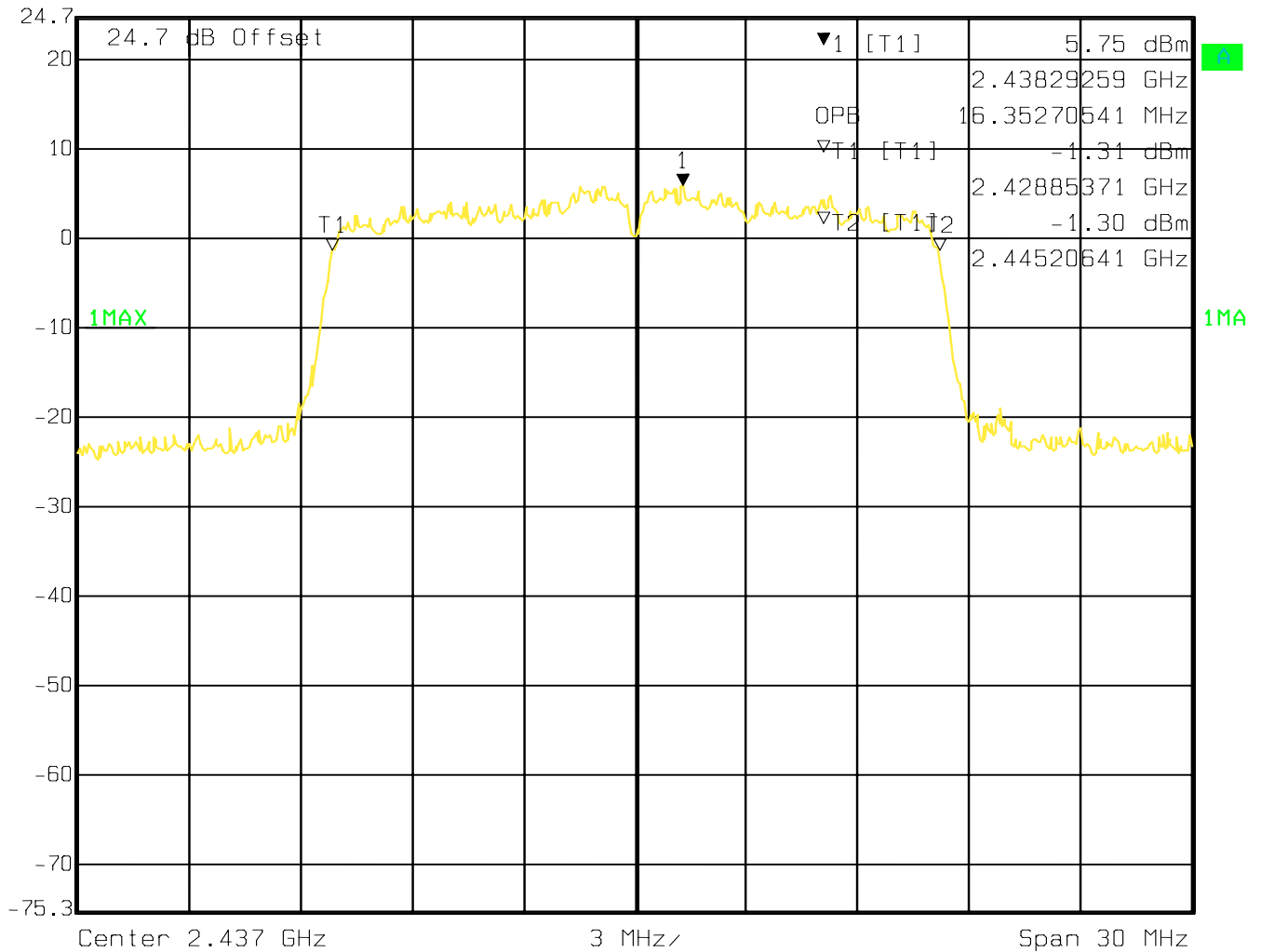


Date: 11.MAY 2009 16:01:21



(2437 MHz) 802.11g 99% BW


Marker 1 [T1]
RBW 200 kHz
RF Att 40 dB
Ref Lvl 24.7 dBm
5.75 dBm
VBW 200 kHz
2.43829259 GHz
SWT 5 ms
Unit dBm

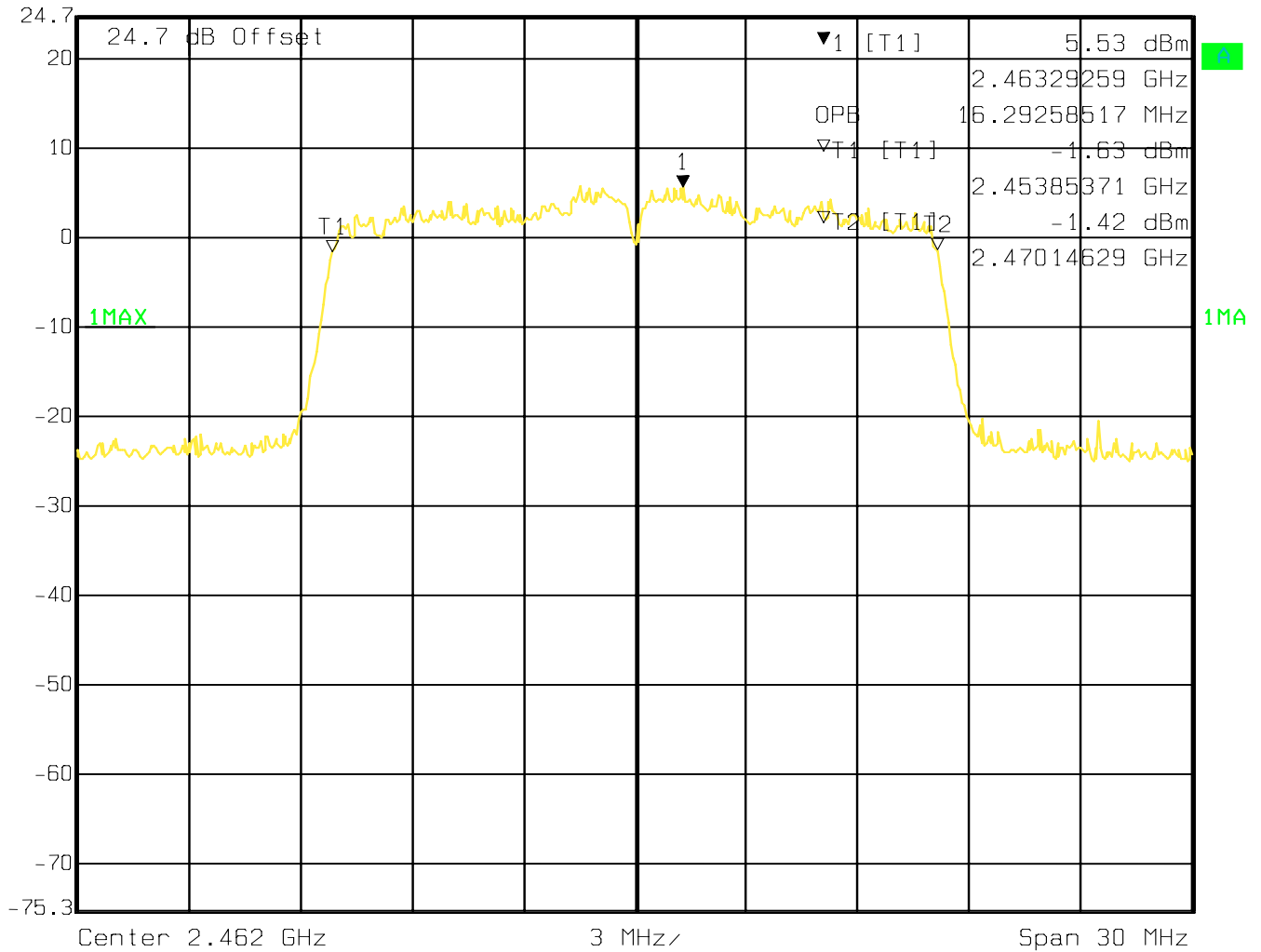


Date: 11.MAY 2009 15:59:43



(2462 MHz) 802.11g 99% BW

FS Marker 1 [T1] RBW 200 kHz RF Att 40 dB
 Ref Lvl 24.7 dBm 5.53 dBm VBW 200 kHz
 24.7 dBm 2.46329259 GHz SWT 5 ms Unit dBm



Date: 11.MAY 2009 15:52:45



6.4 POWER SPECTRAL DENSITY

6.4.1 LIMIT SUB CLAUSE § 15.247 5 (d)

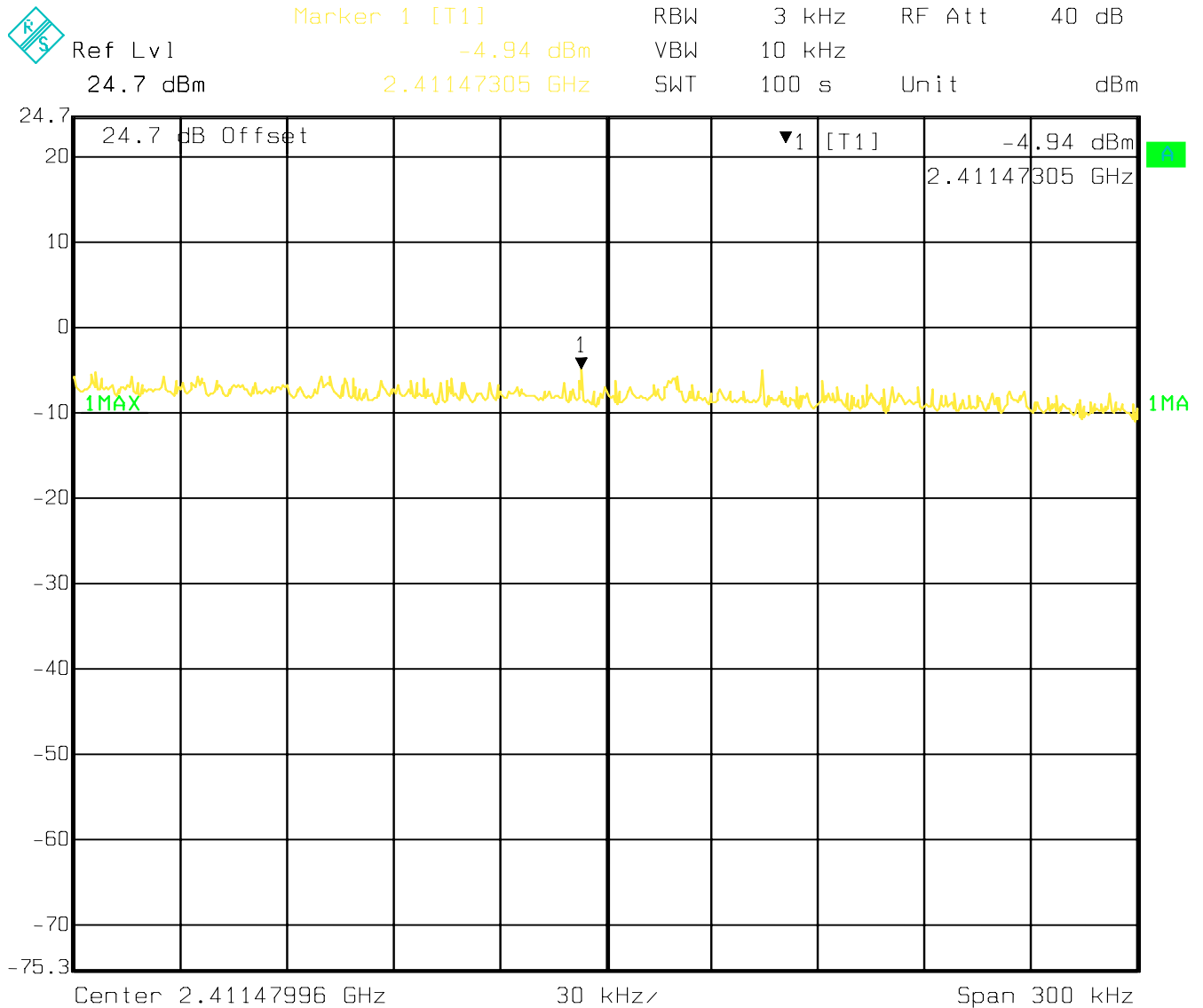
FREQUENCY RANGE	limit
2400-2483.5	8dBm (in 3kHz BW)

6.4.2 RESULTS:

TEST CONDITIONS Frequency (MHz)	POWER SPECTRAL DENSITY (dBm)		
	2412 MHz	2437 MHz	2462 MHz
802.11b	-4.94	-5.44	-4.74
802.11g	-7.91	-7.99	-9.78



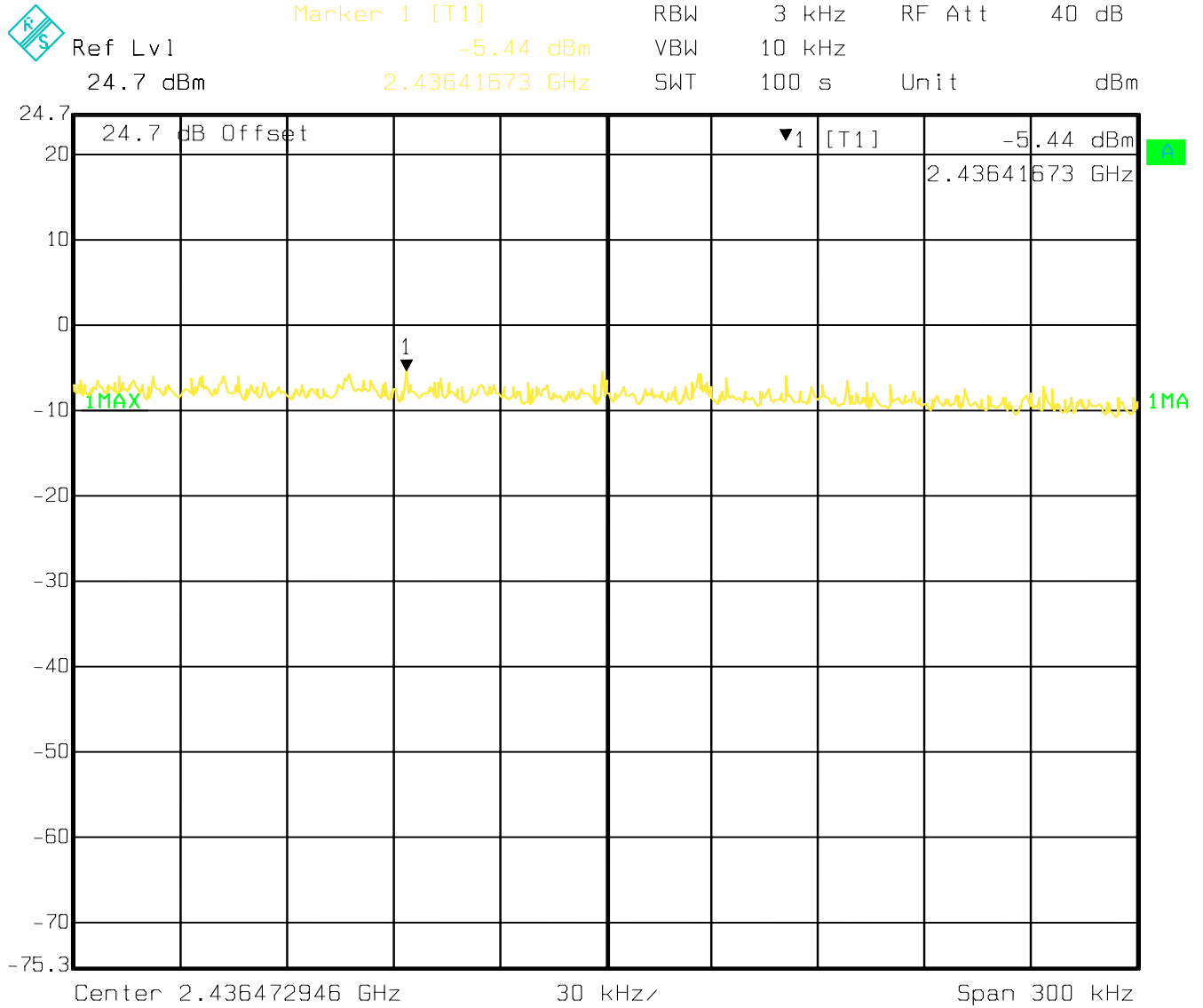
(2412 MHz) 802.11b POWER SPECTRAL DENSITY



Date: 11.MAY 2009 15:32:12



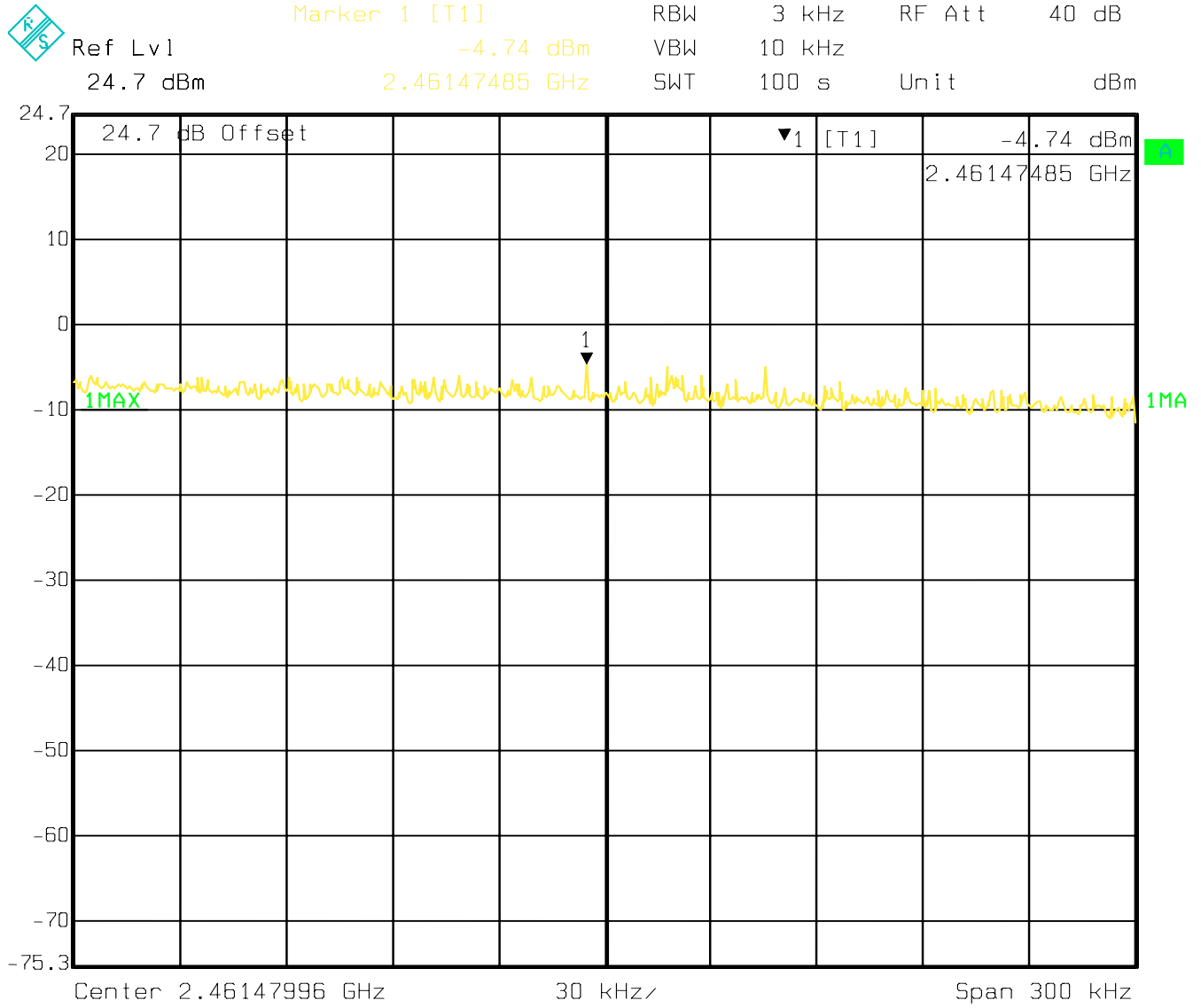
(2437 MHz) 802.11b POWER SPECTRAL DENSITY



Date: 11.MAY 2009 15:27:21



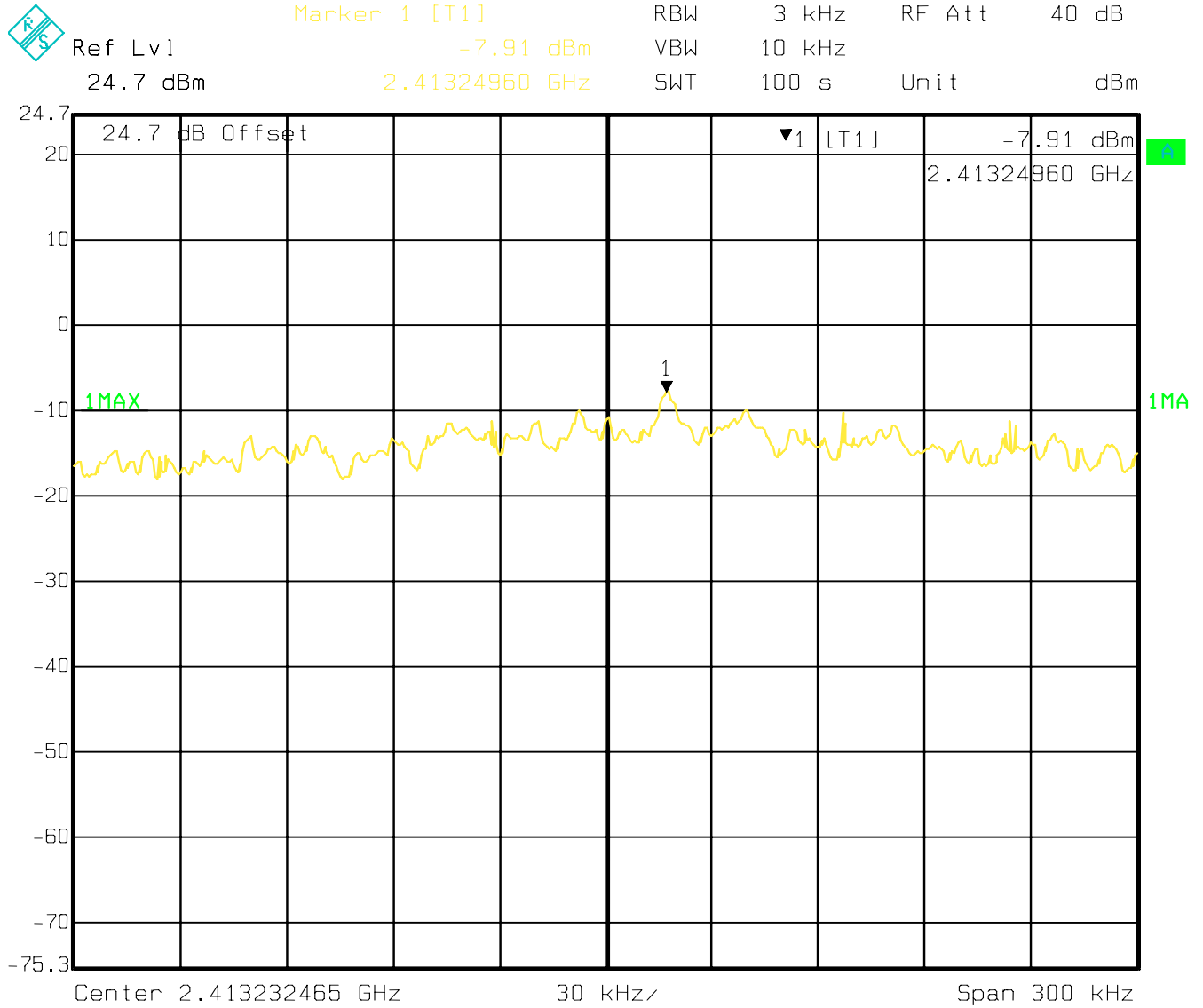
(2462 MHz) 802.11b POWER SPECTRAL DENSITY



Date: 11.MAY 2009 15:14:42



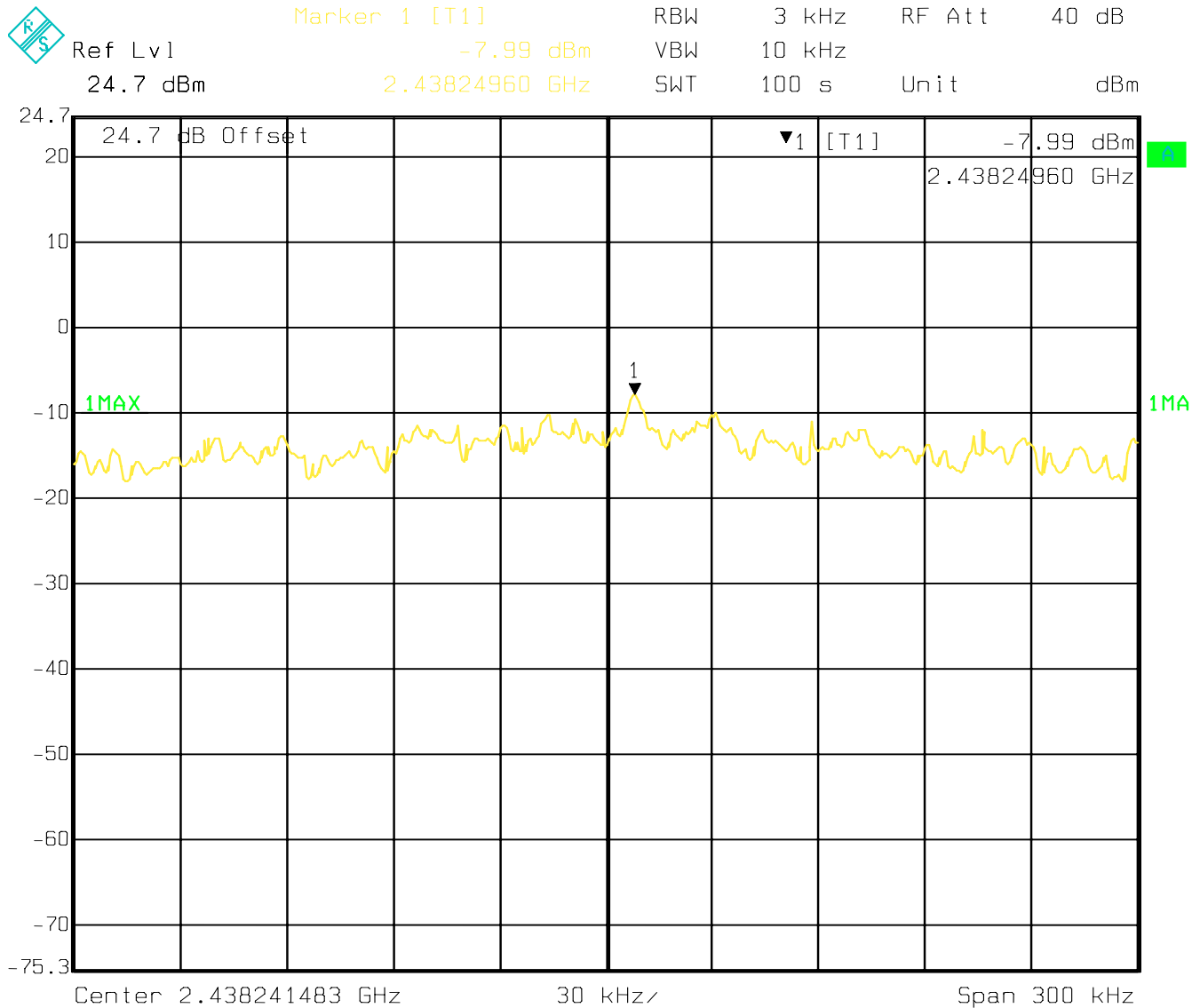
(2412 MHz) 802.11g POWER SPECTRAL DENSITY



Date: 11.MAY 2009 15:37:38



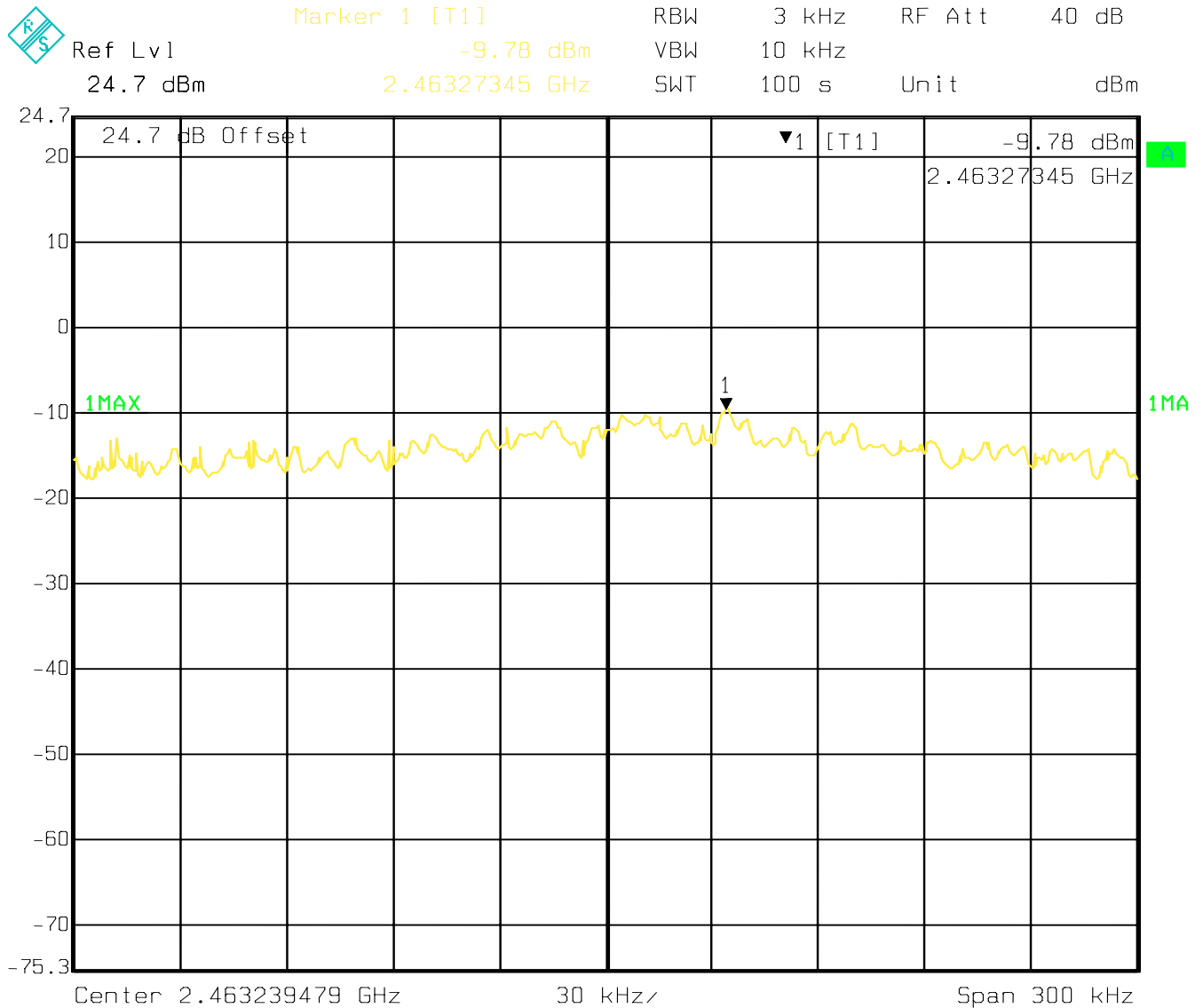
(2437 MHz) 802.11g POWER SPECTRAL DENSITY



Date: 11.MAY 2009 15:41:19



(2462 MHz) 802.11g POWER SPECTRAL DENSITY



Date: 11.MAY 2009 15:50:52



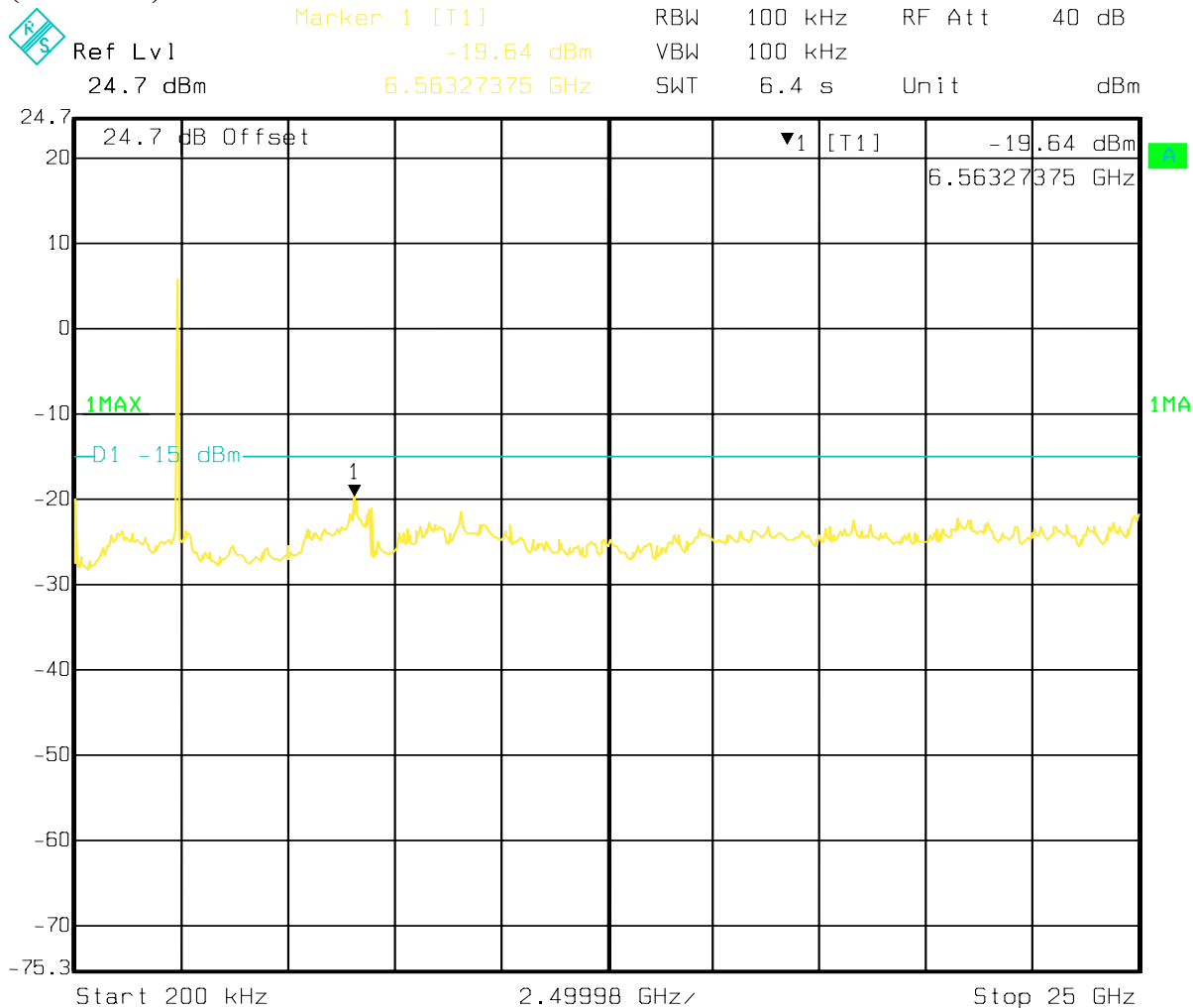
6.5 CONDUCTED SPURIOUS EMISSION

6.5.1 LIMIT SUB CLAUSE § 15.247 (d)

FREQUENCY RANGE	limit
30M-25GHz	-20dBc

6.5.2 RESULTS: Tnom(23)°C VnomVDC Worst case for all modes. Emission above limit is transmission frequency.

(2412MHz) 802.11

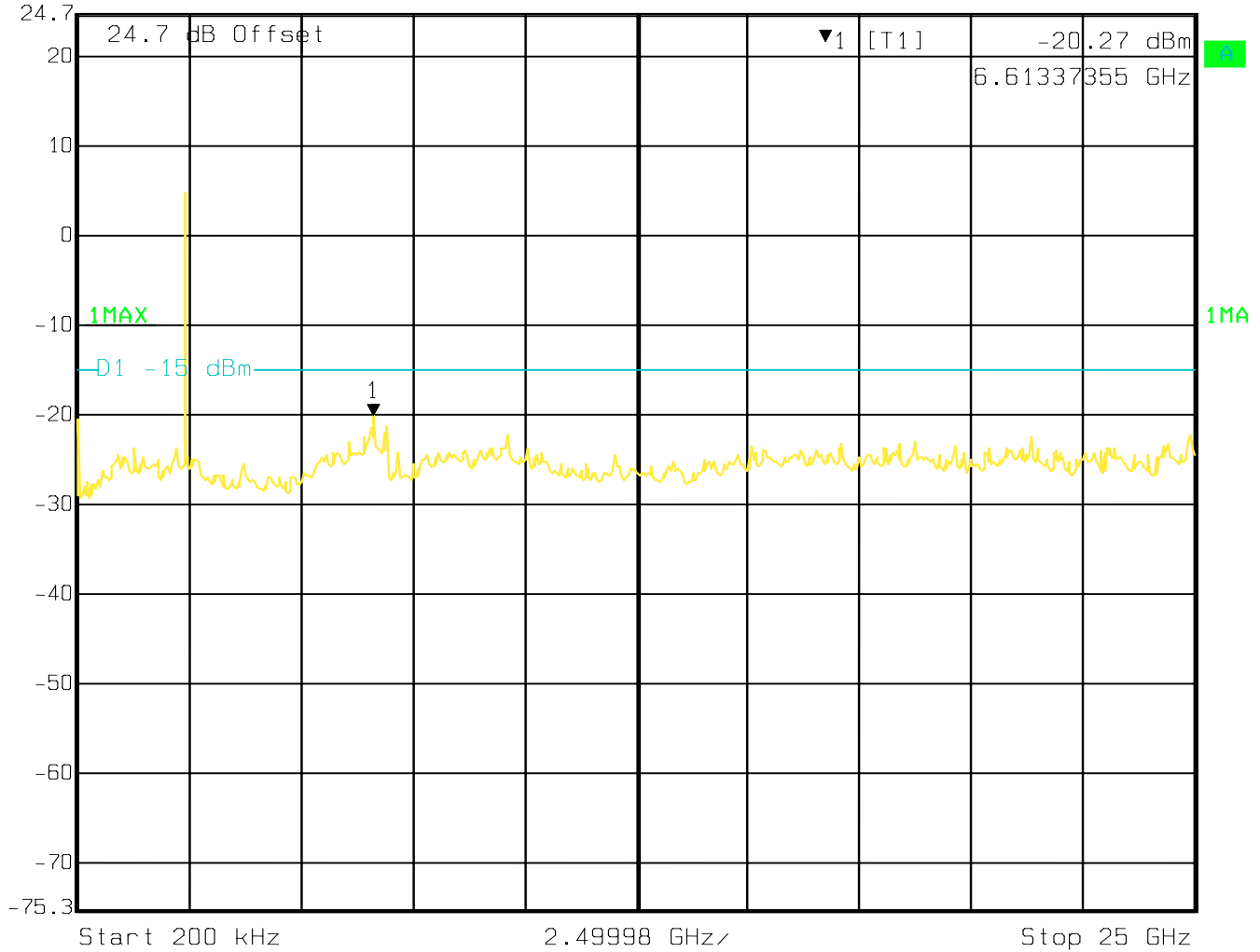


Date: 11.MAY 2009 15:08:53



(2437MHz) 802.11

 Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl 24.7 dBm Offset -20.27 dBm VBW 100 kHz
24.7 dBm 6.61337355 GHz SWT 6.4 s Unit dBm

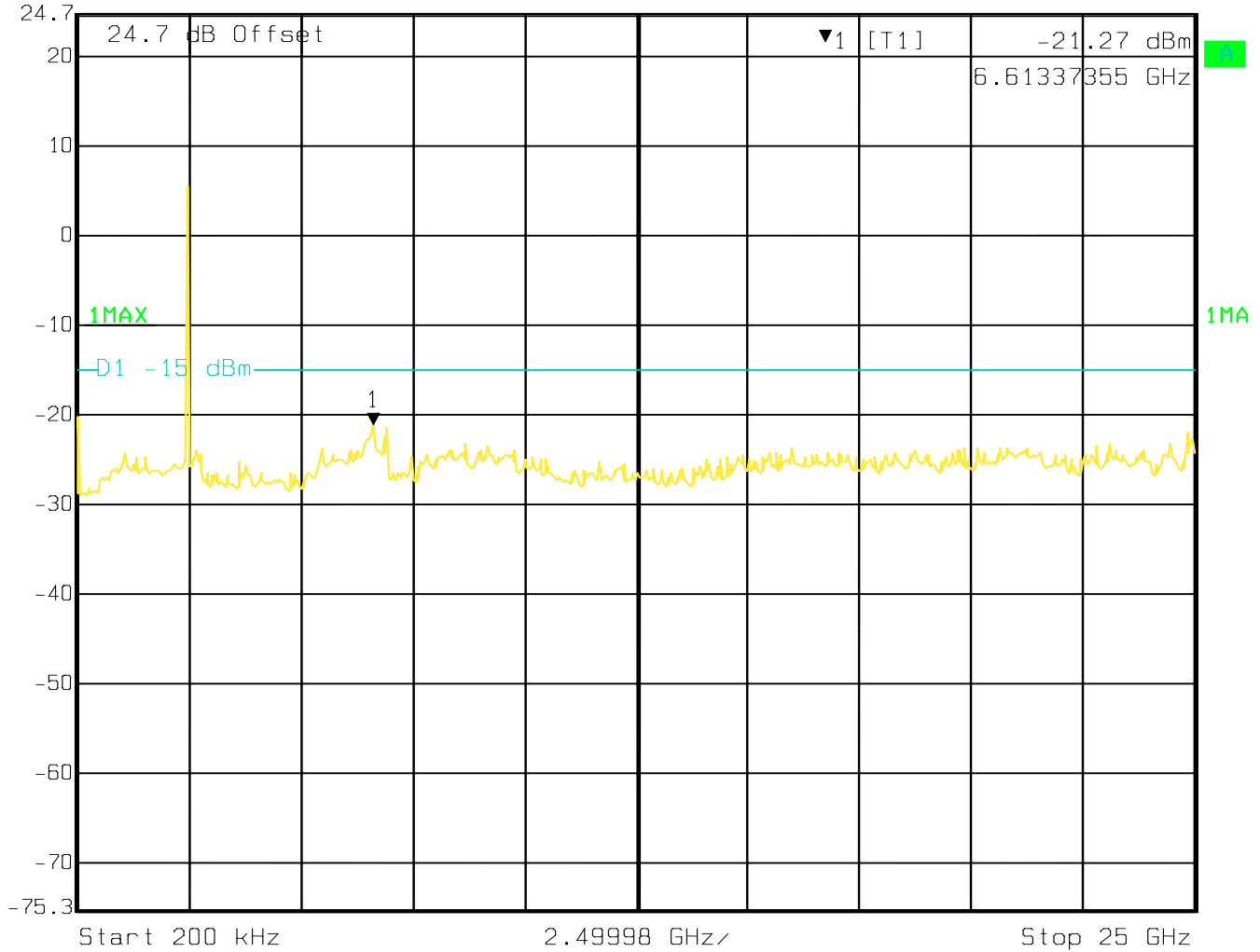


Date: 11.MAY 2009 15:09:43



(2462MHz) 802.11

 Ref Lvl 24.7 dBm Marker 1 [T1] -21.27 dBm RBW 100 kHz RF Att 40 dB
24.7 dBm 6.61337355 GHz VBW 100 kHz Unit dBm
SWT 6.4 s

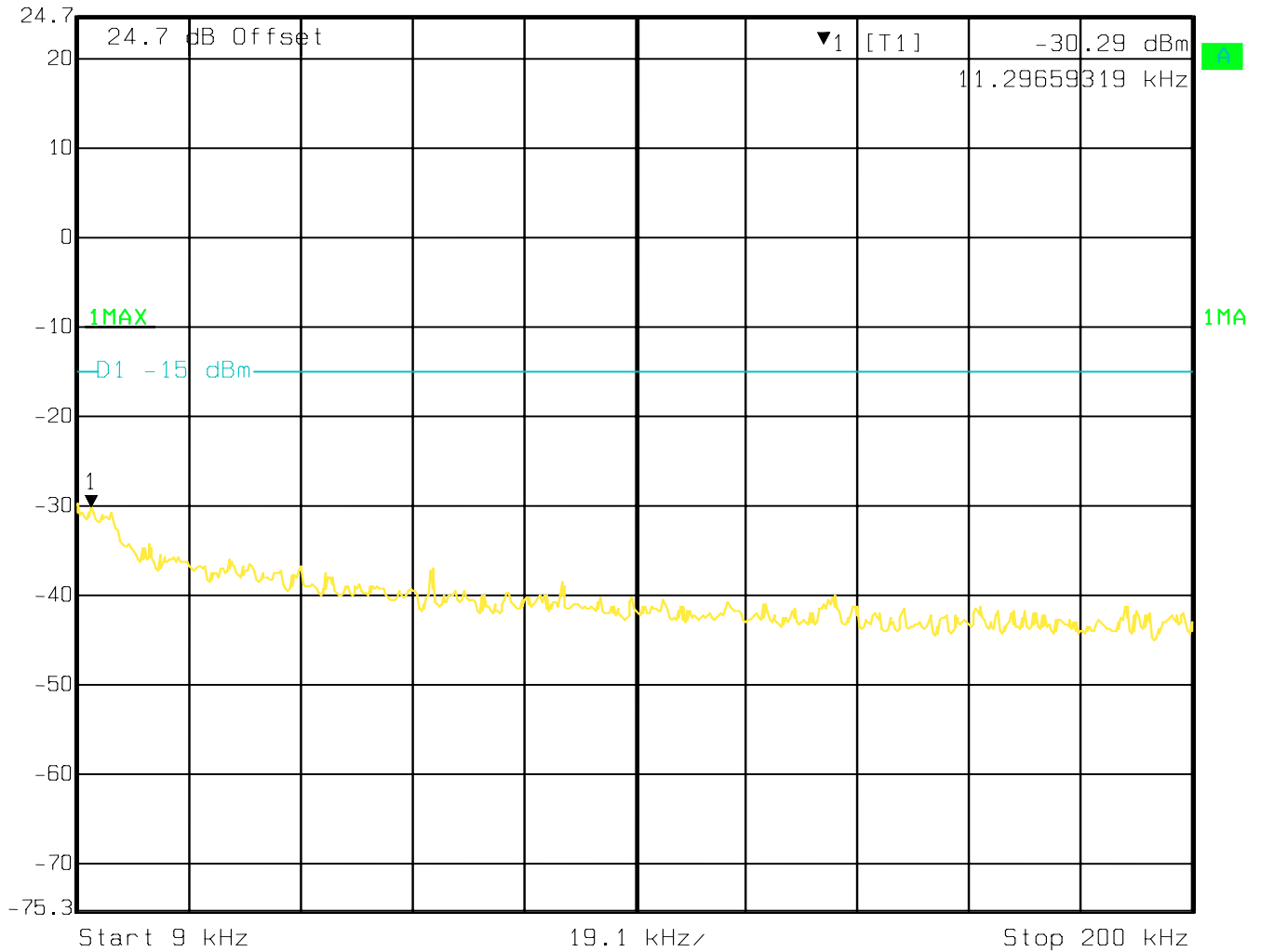


Date: 11.MAY 2009 15:10:24



9 kHz - 200 kHz
Worst case for all modes and channels

FS
Marker 1 [T1]
RBW 3 kHz
RF Att 40 dB
Ref Lvl 24.7 dBm
-30.29 dBm
VBW 3 kHz
11.29659319 kHz
SWT 54 ms
Unit dBm



Date: 11.MAY 2009 15:06:52



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)

§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

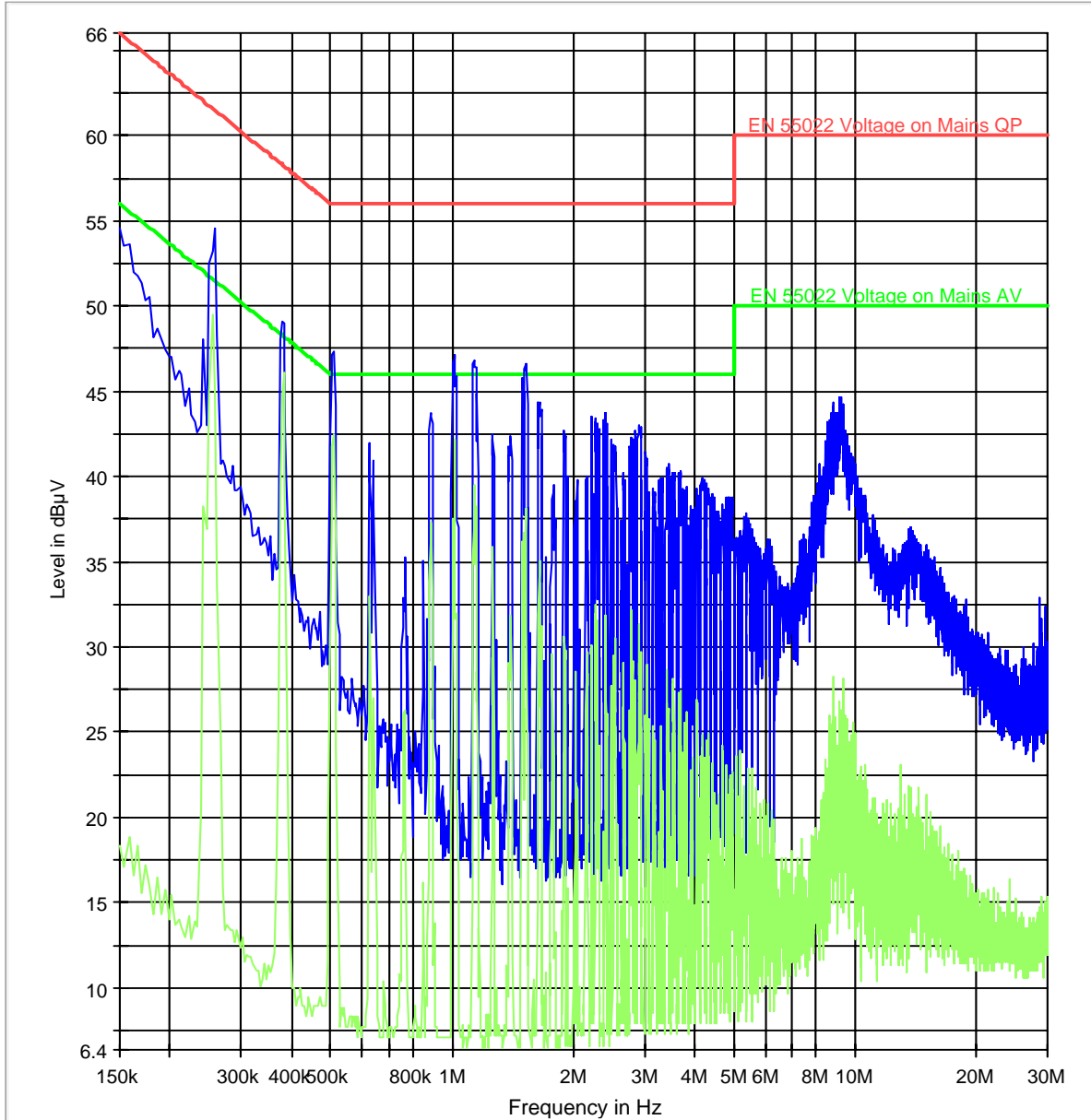
ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz

Results reports here represents the worse case emission in all operating modes.



6.6.2 RESULTS Line:

CISPR 22 Mains Conducted - L



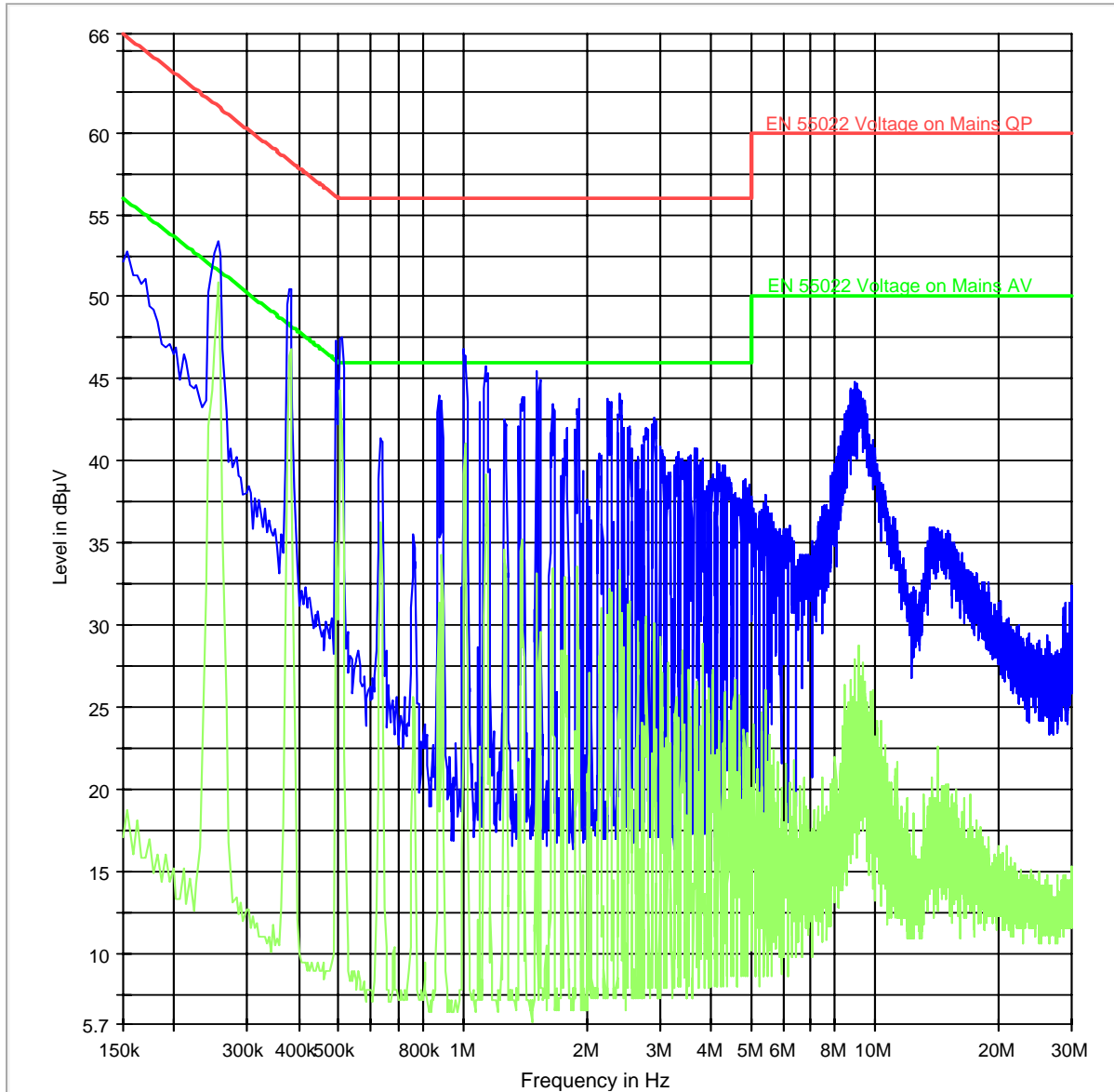
EN 55022 Voltage on Mains QP.LimitLine
Preview Result 1

EN 55022 Voltage on Mains AV.LimitLine
Preview Result 2



Neutral:

CISPR 22 Mains Conducted - N



EN 55022 Voltage on Mains QP.LimitLine
Preview Result 1

EN 55022 Voltage on Mains AV.LimitLine
Preview Result 2



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 2010	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	May 2010	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2010	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2010	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	March 2010	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	February 2010	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	February 2010	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2010	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 2010	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2010	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2010	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2010	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2010	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2009	2 years

8 BLOCK DIAGRAMS

Radiated Testing

ANECHOIC CHAMBER

