



# FCC Test Report

Test report no.: EMC\_570FCC15.247\_2003\_M3500

FCC Part 15.247 for FHSS systems / CANADA RSS-210

Model: (M3500)

FCC ID: AL8-M3500

IC: 457A-M3500



**TTI-P-G 081/94-A0**

Accredited according to **ISO/IEC 17025**



**Bluetooth Qualification  
Test Facility  
(BQTF)**



FCC listed # 101450

IC recognized # 3925

## **CETECOM Inc.**

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CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686

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

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The test results of this test report relate exclusively to the test item specified in 1.5. 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.

**TEST REPORT PREPARED BY:****EMC Engineer: Harpreet Sidhu****1.2 Testing laboratory****CETECOM Inc.****411 Dixon Landing Road, Milpitas, CA-95035, USA****Phone: +1 408 586 6200 Fax: +1 408 586 6299****E-mail: [lothar.schmidt@cetecomusa.com](mailto:lothar.schmidt@cetecomusa.com)****Internet: [www.cetecom.com](http://www.cetecom.com)**

### 1.3 Details of applicant

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City / Zip Code : Santa Cruz, Ca 95060  
Country : USA  
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[Myhassan.bakrim@plantronics.com](mailto:Myhassan.bakrim@plantronics.com)

### 1.4 Application details

Date of receipt test item : 2003-10-27  
Date of test : 2003-10-28/29/30

### 1.5 Test item

Manufacturer : Applicant  
Marketing Name : M3500  
Model No. : M3500  
Description : [Bluetooth Headset with Digital Signal Processing](#)  
FCC-ID : AL8-M3500  
IC ID : 457A-M3500

#### Additional information

Frequency : 2402MHz – 2480MHz  
Type of modulation : GFSK  
Number of channels : 79  
Antenna : Integral  
Power supply : Battery  
Output power : 3.06dBm (2.02mW) conducted peak power  
Extreme vol. Limits : 2.2 – 2.9VDC (2.5VDC nominal)  
Extreme temp. Tolerance : 0°C-55°C

**1.6 Test standards: FCC Part 15 §15.247 (DA00-705) / RSS 210**

**Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.**

**2 Technical test****2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests  
Performed

Final Verdict:  
(only "passed" if all single measurements are "passed")

**Passed**

**Technical responsibility for area of testing:**

2003-11-04 EMC & Radio Siegfried Lehmann  
(Technical Manager)



Date

Section

Name

Signature

**Responsible for test report and project leader:**

2003-11-04 EMC & Radio Harpreet Sidhu (EMC Engineer)



Date

Section

Name

Signature

## **2.2 Test report**

**TEST REPORT**

**Test report no.: EMC\_570FCC15.247\_2003\_M3500  
(Model: M3500)**

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**TEST REPORT REFERENCE**

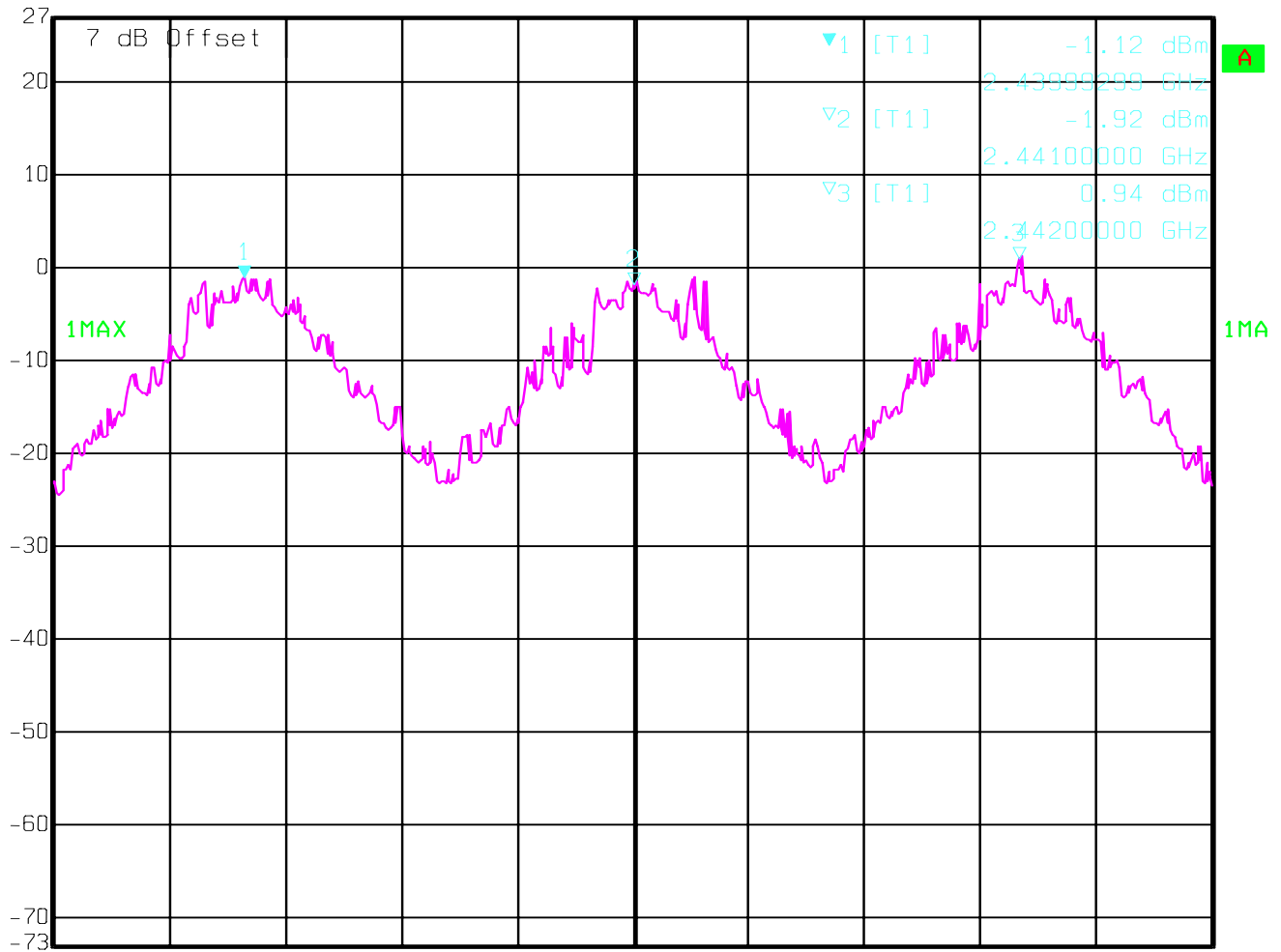
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## CARRIER FREQUENCY SEPERATION

§15.247(a)



Ref Lvl	Marker 1 [T1]	RBW	30 kHz	RF Att	30 dB
27 dBm	-1.12 dBm	VBW	100 kHz		
	2.43999299 GHz	SWT	8.5 ms	Unit	dBm



Center 2.441 GHz

300 kHz

Span 3 MHz

Date: 29.OCT.2003 14:26:36

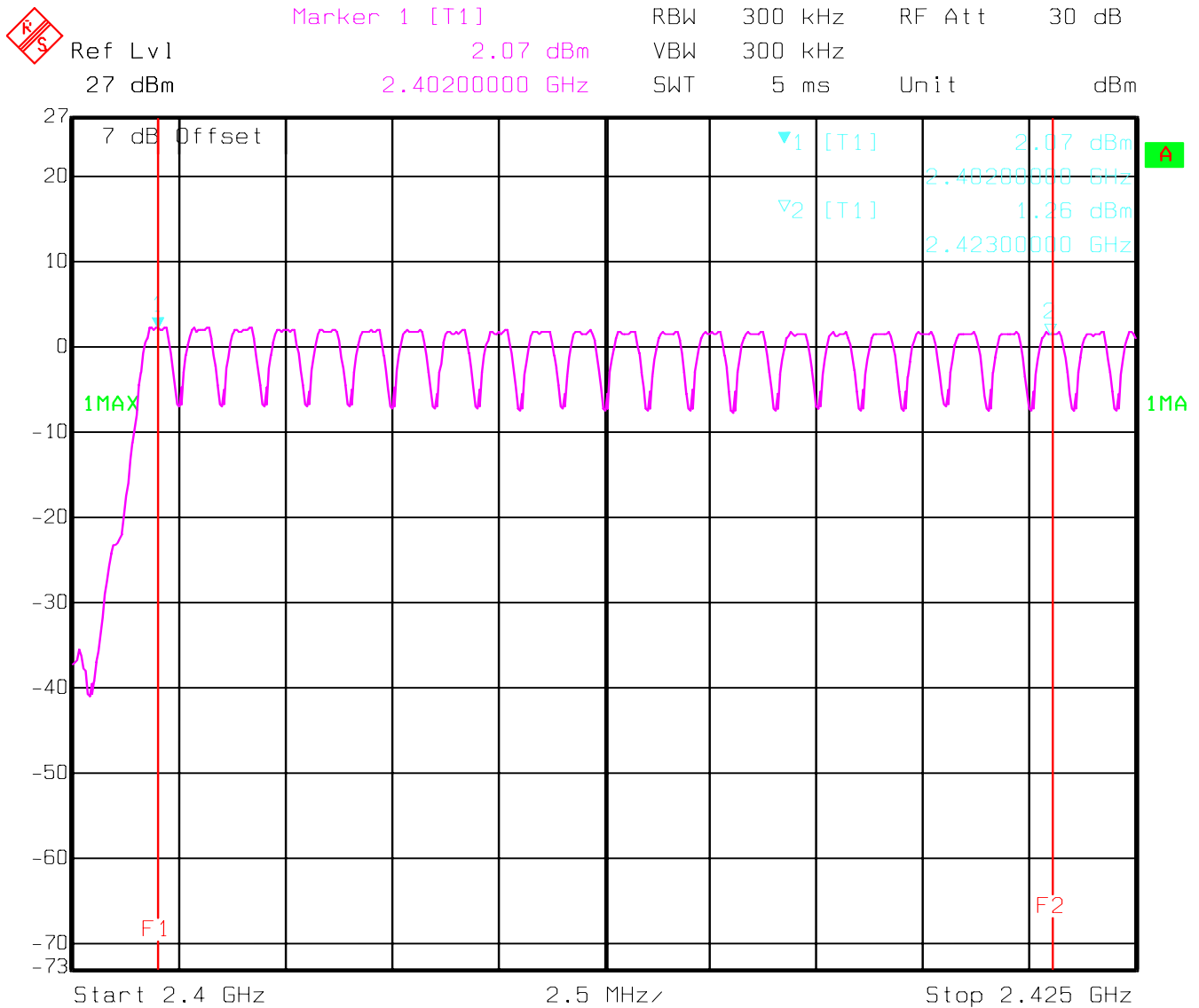
**NUMBER OF HOPPING CHANNELS**

**§15.247(a)**

**The number of hopping channels is 79 (see next 4 plots)**

**The right red line corresponds to the left red line from the next plot.**

**Plot 1: Total 22**



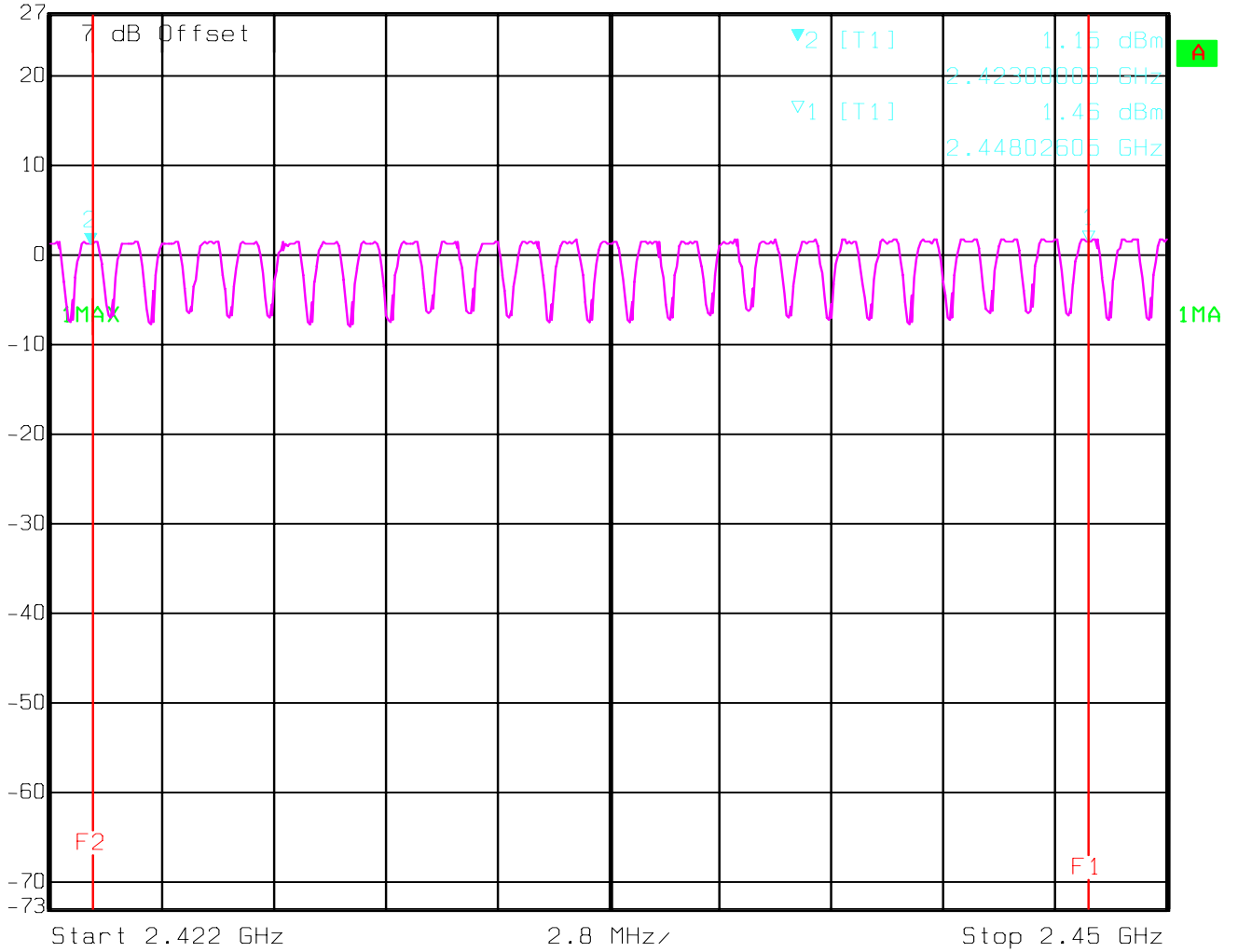
Date: 29.OCT.2003 14:18:29



**Plot 2: Total 25**

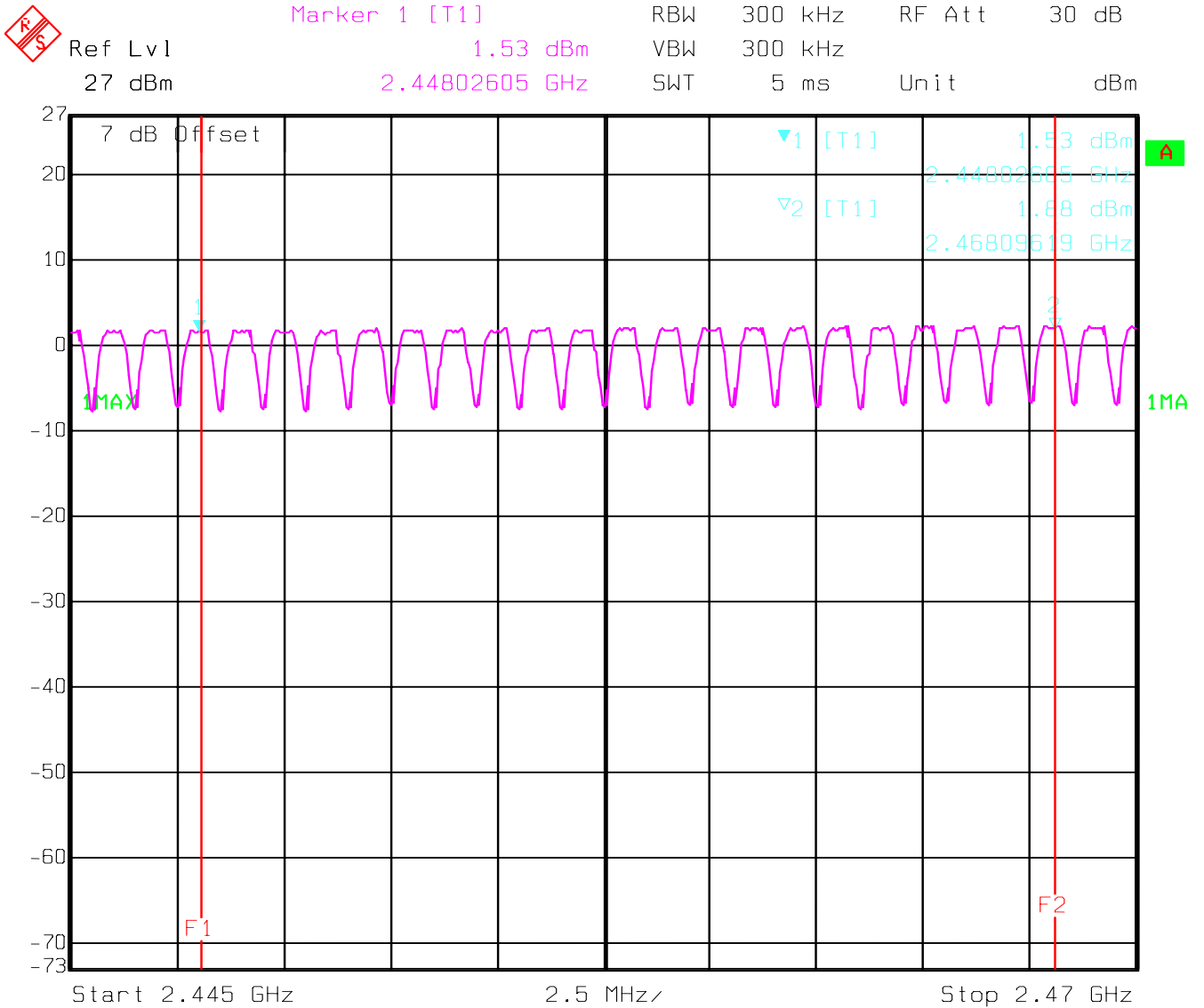


Ref Lvl 27 dBm  
Marker 2 [T1] 1.15 dBm  
2.42300000 GHz  
RBW 300 kHz RF Att 30 dB  
VBW 300 kHz  
SWT 5 ms Unit dBm



Date: 29.OCT.2003 14:20:39

**Plot 3: Total 20**

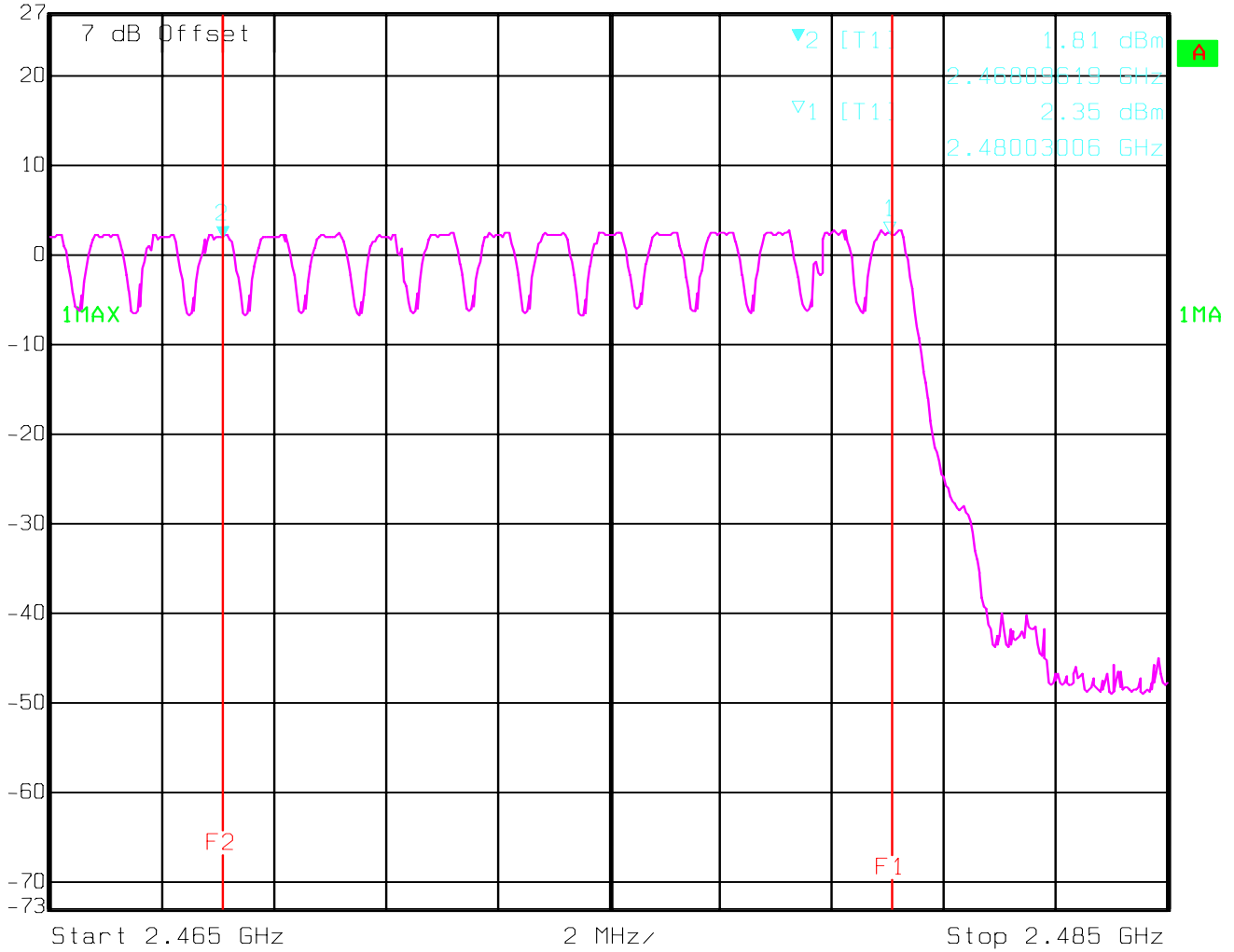


Date: 29.OCT.2003 14:22:10

**Plot 4: Total 12**



	Marker 2 [T1]	RBW	300 kHz	RF Att	30 dB
Ref Lvl	1.81 dBm	VBW	300 kHz		
27 dBm	2.46809619 GHz	SWT	5 ms	Unit	dBm



Date: 29.OCT.2003 14:23:53

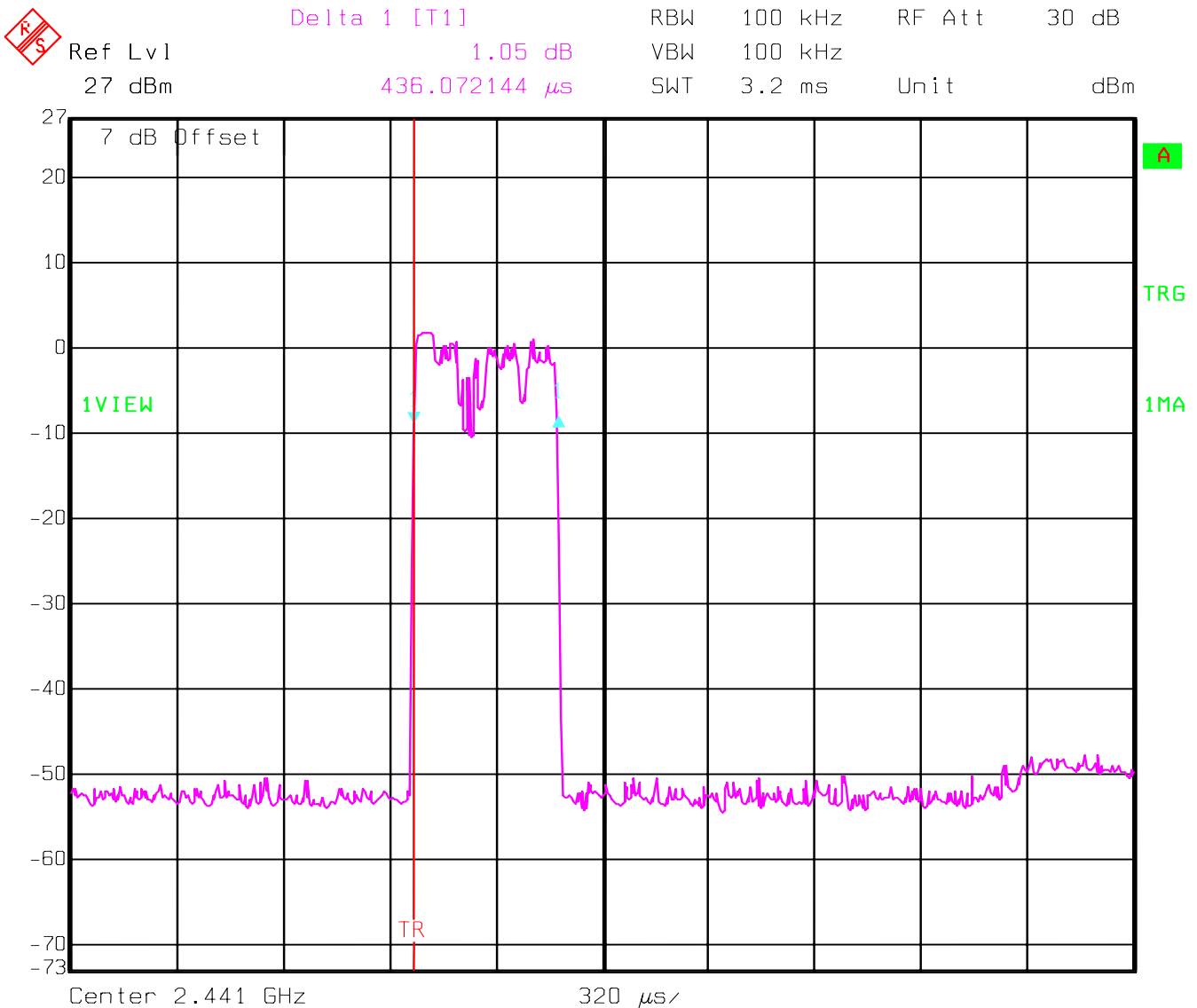
**TIME OF OCCUPANCY (DWELL TIME)**  
**DH1 – Packet**

§15.247(a)

The system makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 times per second and so for 31.6 seconds you have 320.108 times of appearance.

Each Tx-time per appearance is 436µs.

So we have 320.108 \* 436µs = 139.56ms per 31.6 seconds.

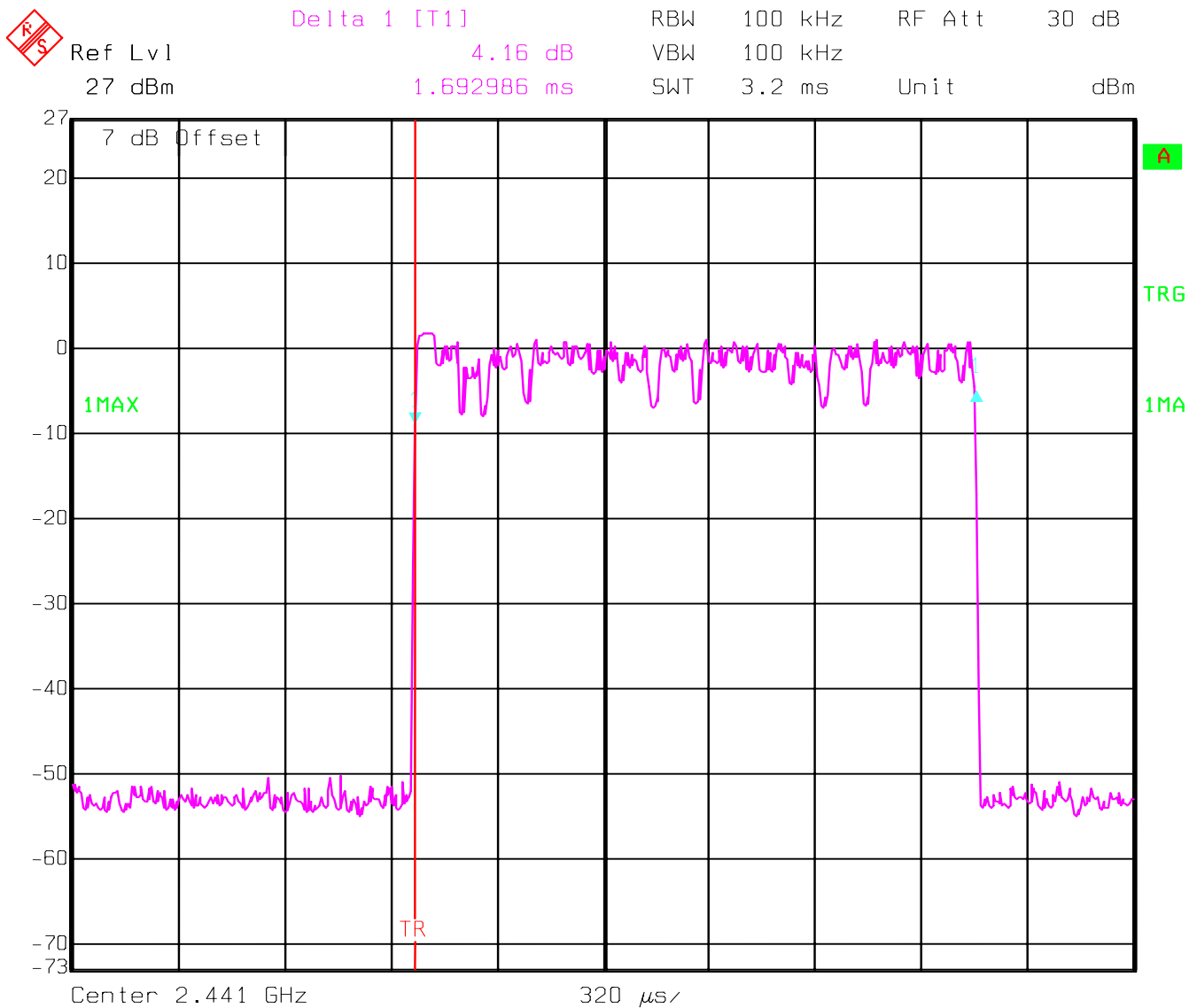


Date: 29.OCT.2003 14:31:01

**TIME OF OCCUPANCY (DWELL TIME)**  
**DH3 – Packet**

§15.247(a)

**A DH3 Packets need 3 time slots for transmit and 1 for receiving, then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 times per second and so for 31.6 seconds you have 161.16 times of appearance.  
 Each Tx-time per appearance is 1.69ms.  
So we have 161.16 \* 1.69ms = 272.36ms per 31.6 seconds.**



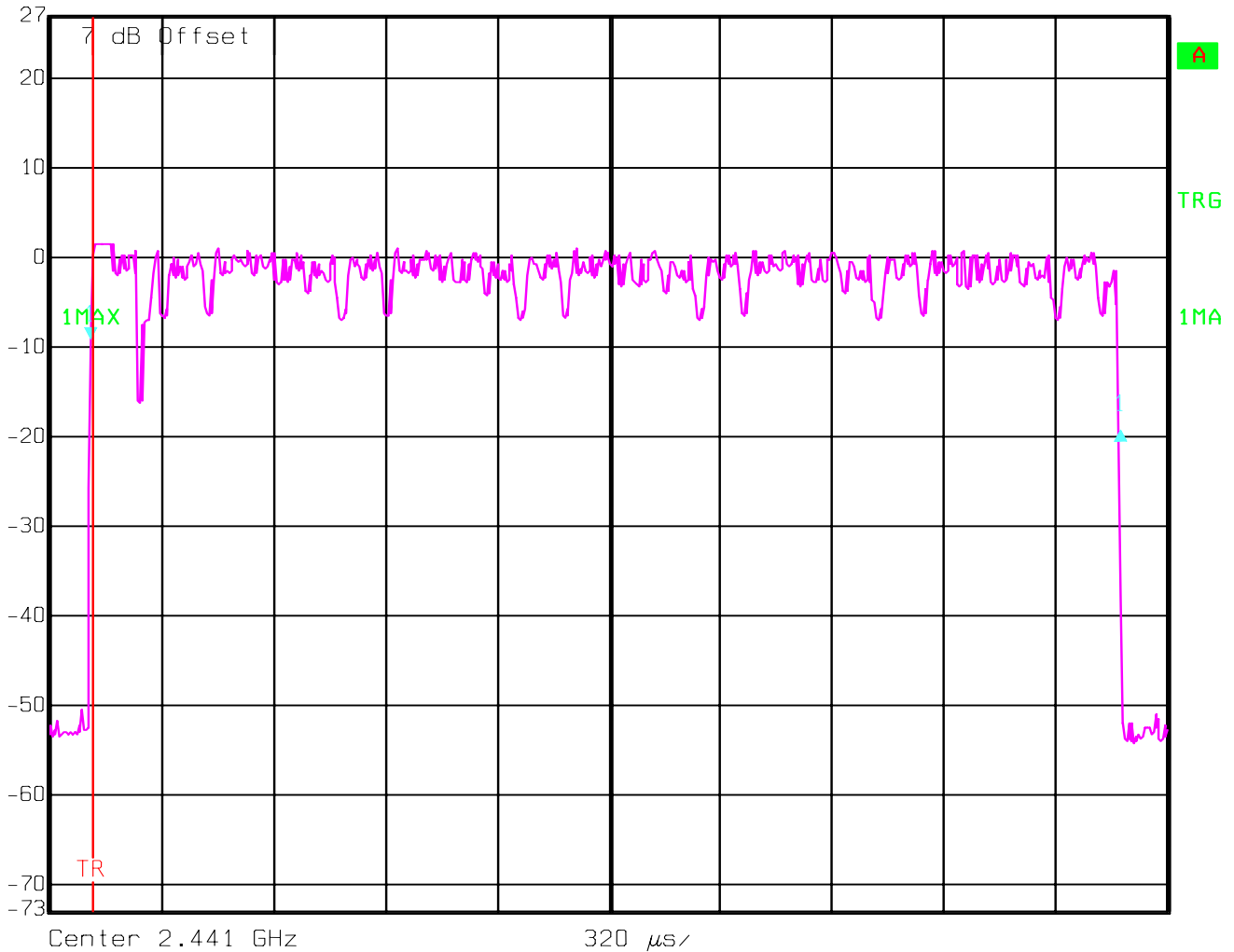
**TIME OF OCCUPANCY (DWELL TIME)**  
**DH5 – Packet**

§15.247(a)

**At DH5 Packets you need 5 time slots for transmit and 1 for receiving, then the system makes worst case 266,7 hops per second with 79 channels. So you have each channel 3.36 times per second and so for 30 seconds you have 106.176 times of appearance. Each Tx-time per appearance is 2.95ms. So we have  $106.176 * 2.95\text{ms} = 313.21\text{ms}$  per 31.6 seconds.**



Ref Lvl	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
27 dBm	-10.07 dB	VBW	100 kHz		
	2.949900 ms	SWT	3.2 ms	Unit	dBm



**SPECTRUM BANDWIDTH OF FHSS SYSTEM  
20 dB bandwidth**

§15.247(a)

<b>TEST CONDITIONS</b>		<b>20 dB BANDWIDTH (kHz)</b>		
<b>Frequency (MHz)</b>		<b>2402</b>	<b>2441</b>	<b>2480</b>
<b>T<sub>nom</sub>(23)°C</b>	<b>V<sub>nom</sub>(2.5)VDC</b>	<b>877.75</b>	<b>877.75</b>	<b>877.75</b>

RBW / VBW as provided in the "Measurement Guidelines" (DA 00-705, March 30, 2000)

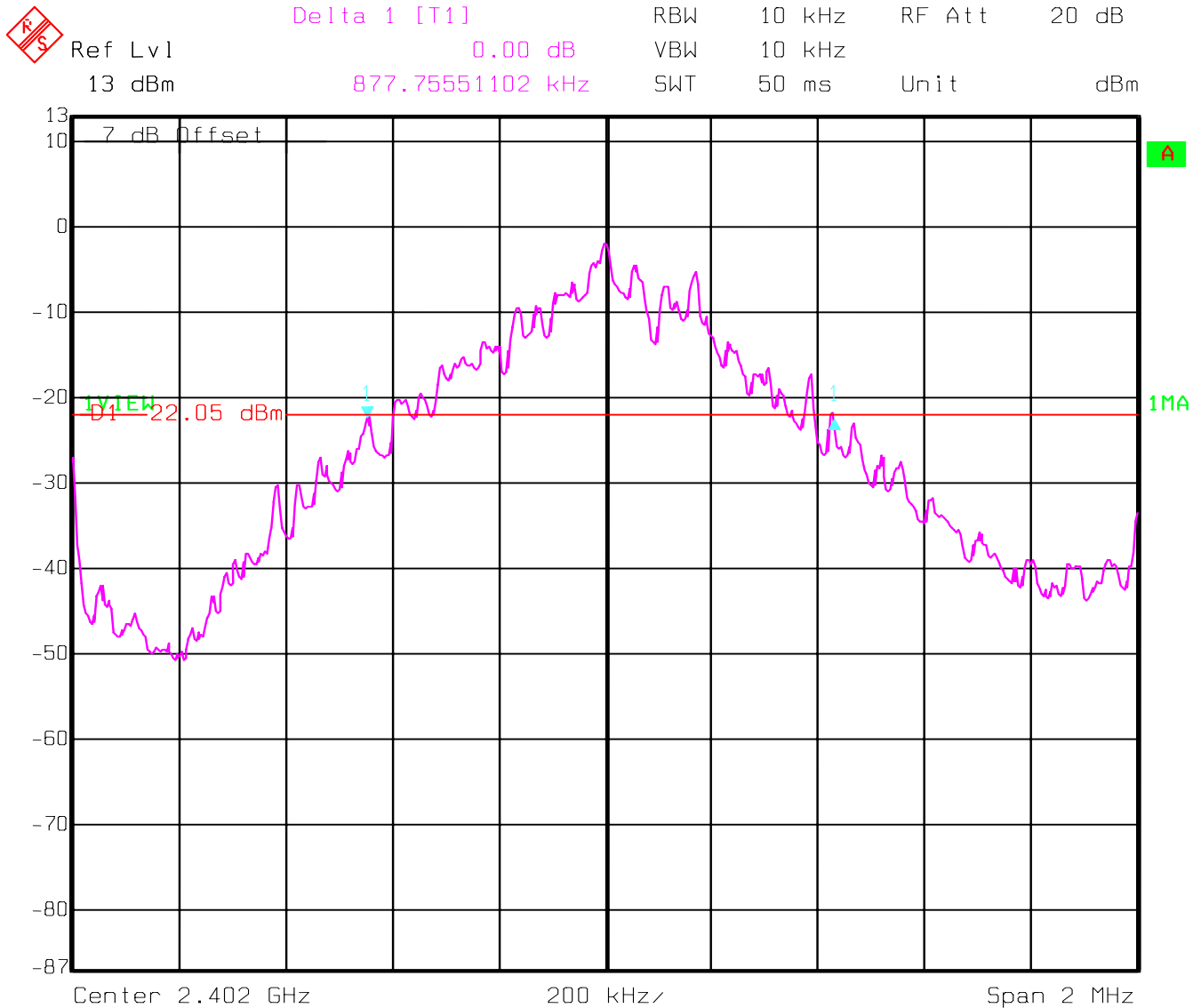
**LIMIT****SUBCLAUSE §15.247(a) (1)**

<b>The maximum 20dB bandwidth shall be at maximum 1000 KHz</b>
--

**SPECTRUM BANDWIDTH OF FHSS SYSTEM  
20 dB bandwidth**

§15.247(a)

**Lowest Channel: 2402MHz**



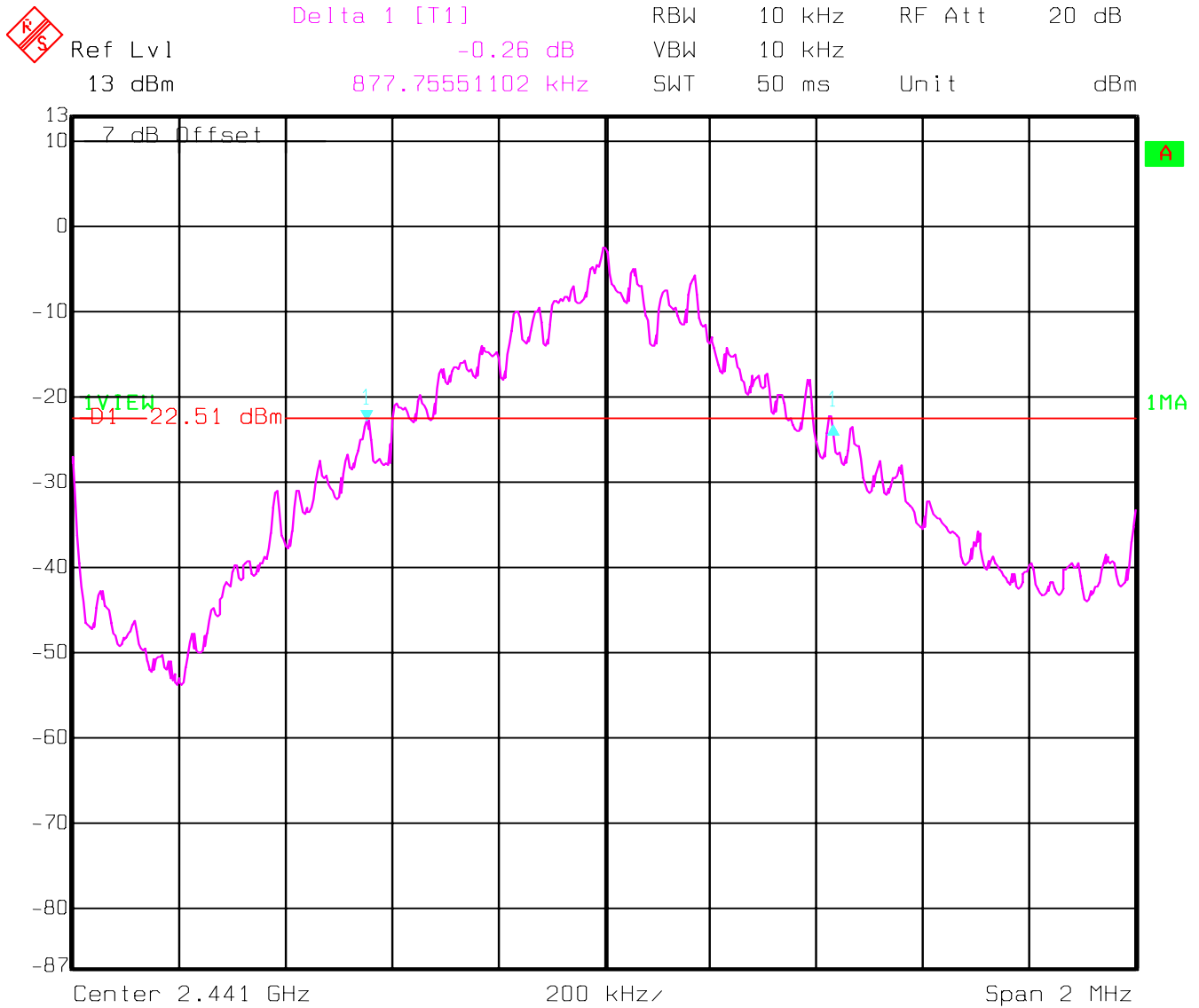
Date: 29.OCT.2003 13:19:41



## SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

Mid Channel: 2441MHz



Date: 29.OCT.2003 13:21:35

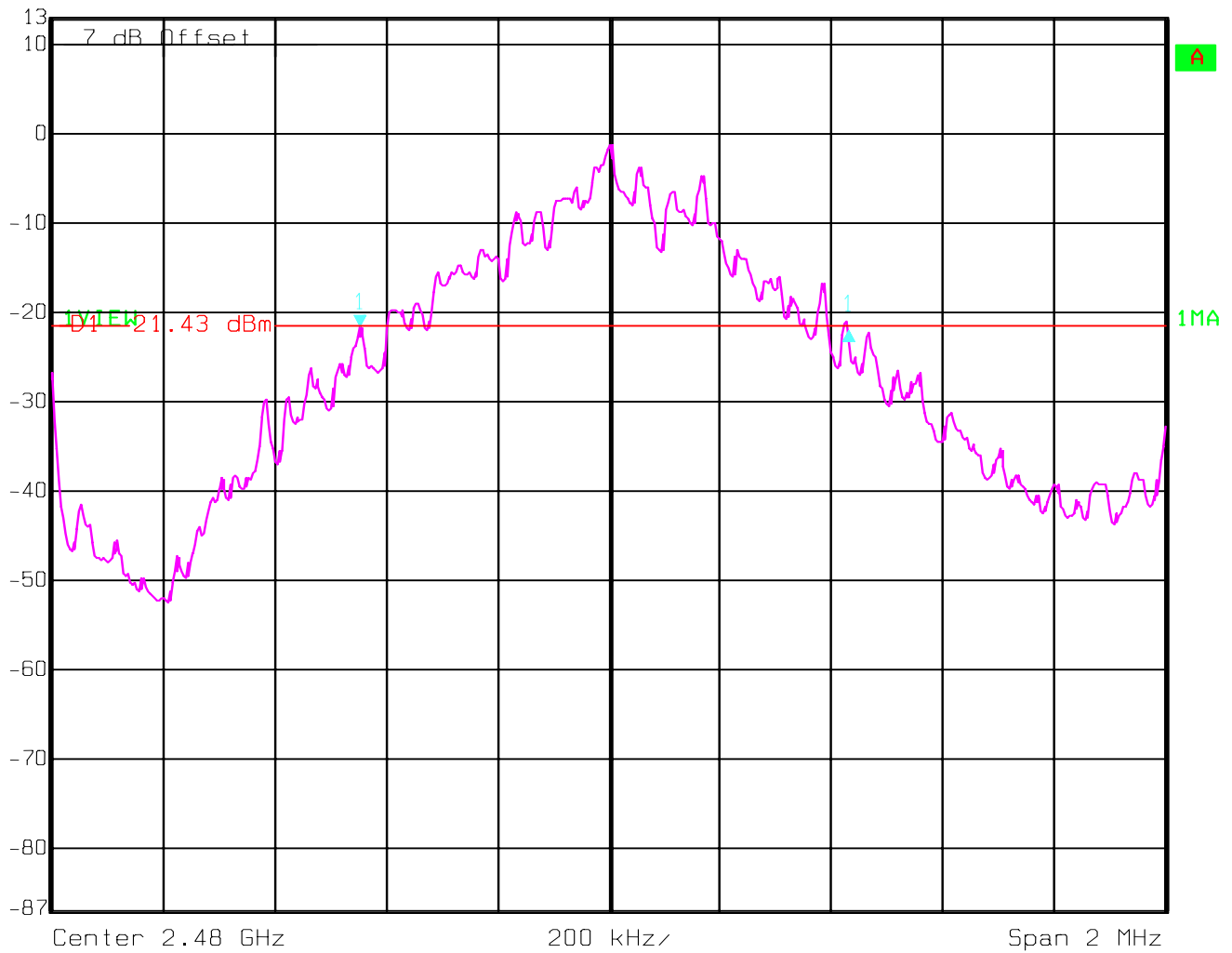
**SPECTRUM BANDWIDTH OF FHSS SYSTEM  
20 dB bandwidth**

§15.247(a)

**Highest Channel: 2480MHz**



Ref Lvl	Delta 1 [T1]	RBW	10 kHz	RF Att	20 dB
13 dBm	-0.16 dB	VBW	10 kHz		
	877.75551102 kHz	SWT	50 ms	Unit	dBm



Date: 29.OCT.2003 13:26:26

**POWER SPECTRAL DENSITY**

§15.247 (d)

TEST CONDITIONS		POWER SPECTRAL DENSITY (dBm)		
		2402	2441	2480
<b>T<sub>nom</sub>(23)°C</b>	<b>V<sub>nom</sub>(2.5)VDC</b>	<b>-9.51</b>	<b>-10.10</b>	<b>-9.07</b>

**LIMIT**

SUBCLAUSE §15.247(d)

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

ANALYZER SETTINGS: RBW=3KHz, VBW=3KHz

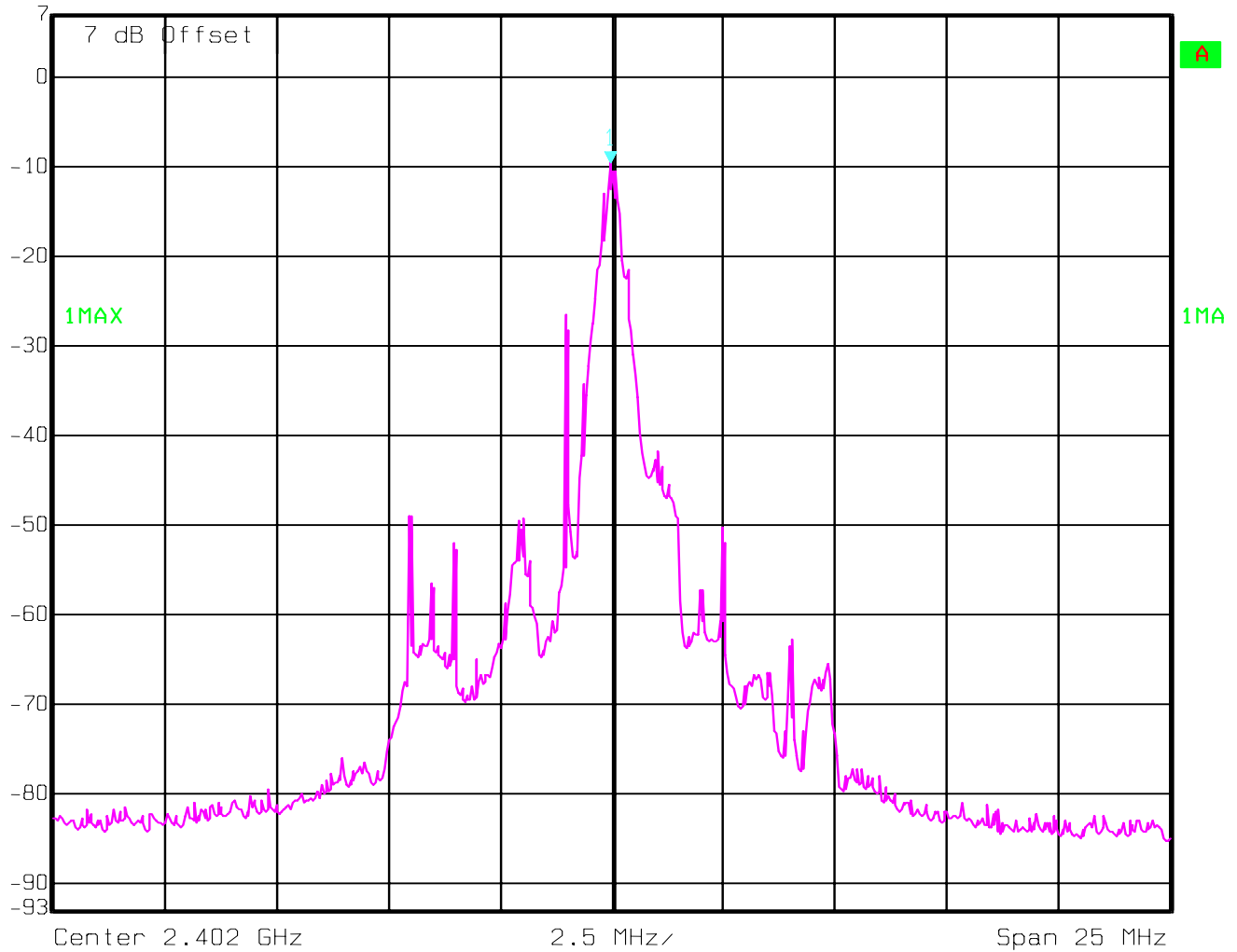
**POWER SPECTRAL DENSITY**

§15.247(d)

**Lowest Channel: 2402MHz**



Ref Lvl 7 dBm  
Marker 1 [T1] -9.51 dBm  
2.40197495 GHz  
RBW 3 kHz  
RF Att 10 dB  
VBW 3 kHz  
SWT 7 s  
Unit dBm



Date: 29.OCT.2003 13:30:09

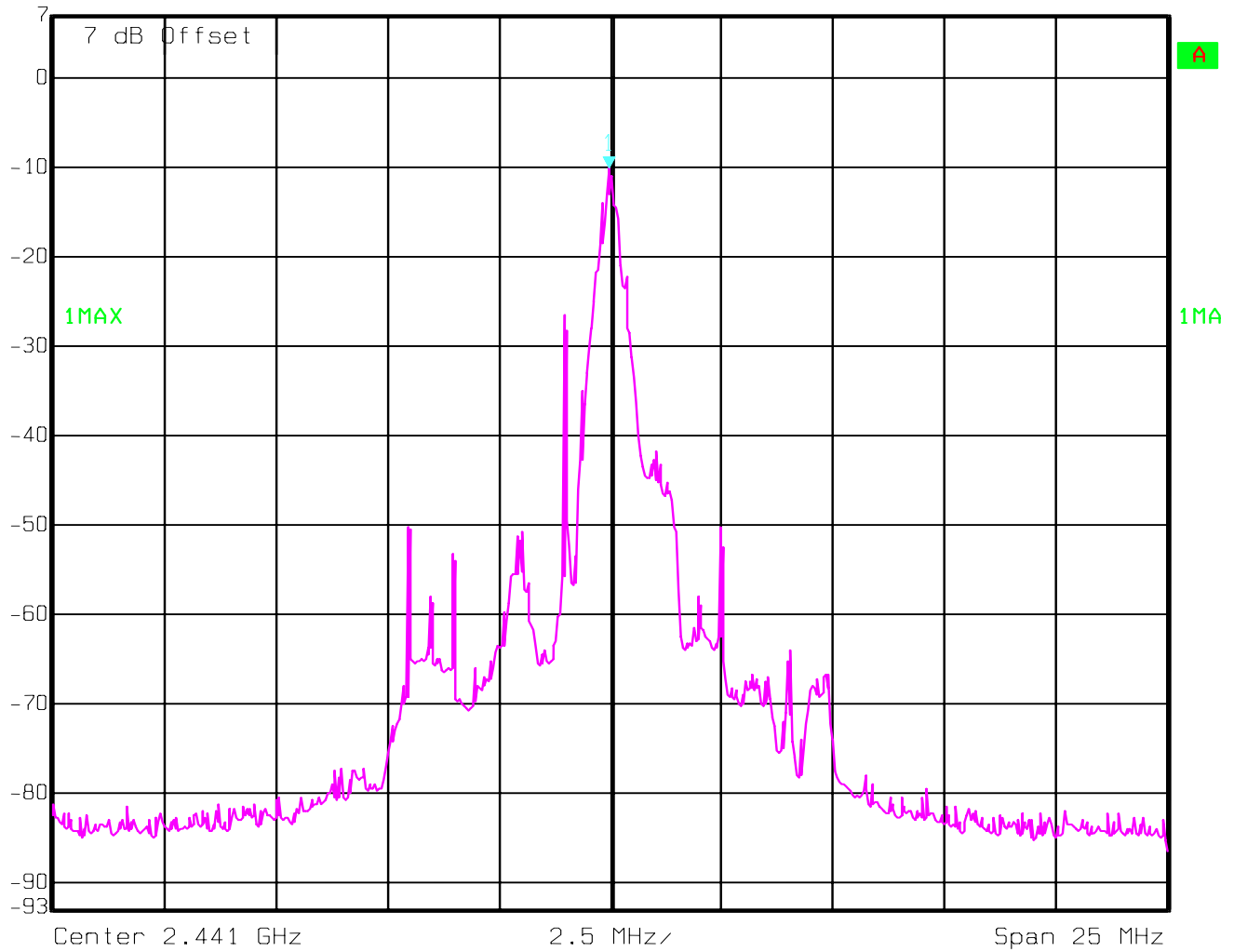
**POWER SPECTRAL DENSITY**

§15.247(d)

**Middle Channel: 2441MHz**



Marker 1 [T1] RBW 3 kHz RF Att 10 dB  
Ref Lvl -10.10 dBm VBW 3 kHz  
7 dBm 2.44097495 GHz SWT 7 s Unit dBm



Date: 29.OCT.2003 13:31:41

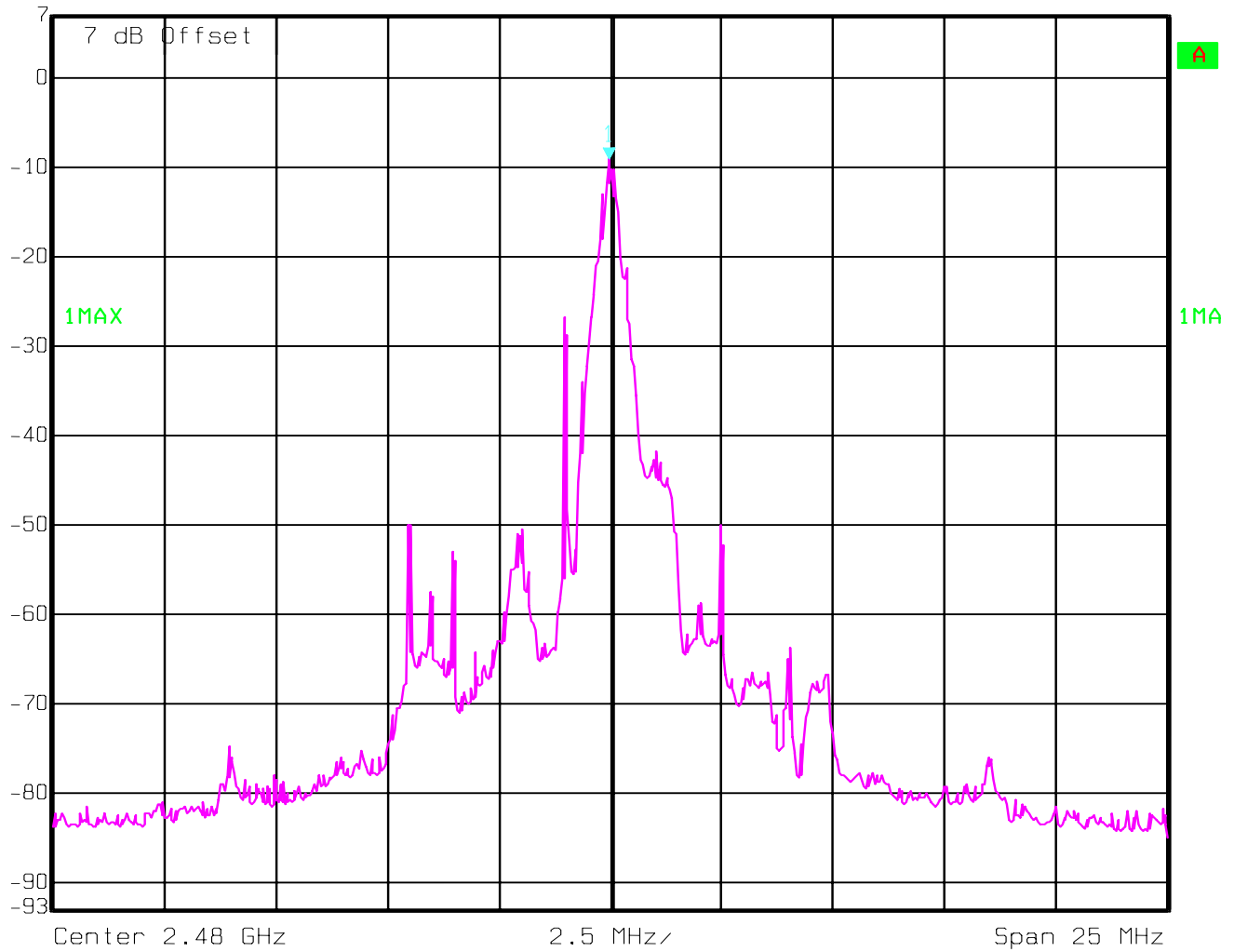
## POWER SPECTRAL DENSITY

§15.247(d)

Highest Channel: 2480MHz



Marker 1 [T1] RBW 3 kHz RF Att 10 dB  
Ref Lvl -9.07 dBm VBW 3 kHz  
7 dBm 2.47997495 GHz SWT 7 s Unit dBm



Date: 29.OCT.2003 13:34:27

**MAXIMUM PEAK OUTPUT POWER  
(conducted)**

§ 15.247 (b) (1)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T <sub>nom</sub> (23)°C	V <sub>nom</sub> (2.5)VDC	2.35	1.88	3.06
Measurement uncertainty		±0.5dBm		

RBW / VBW: 3 MHz

**LIMIT**

SUBCLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt

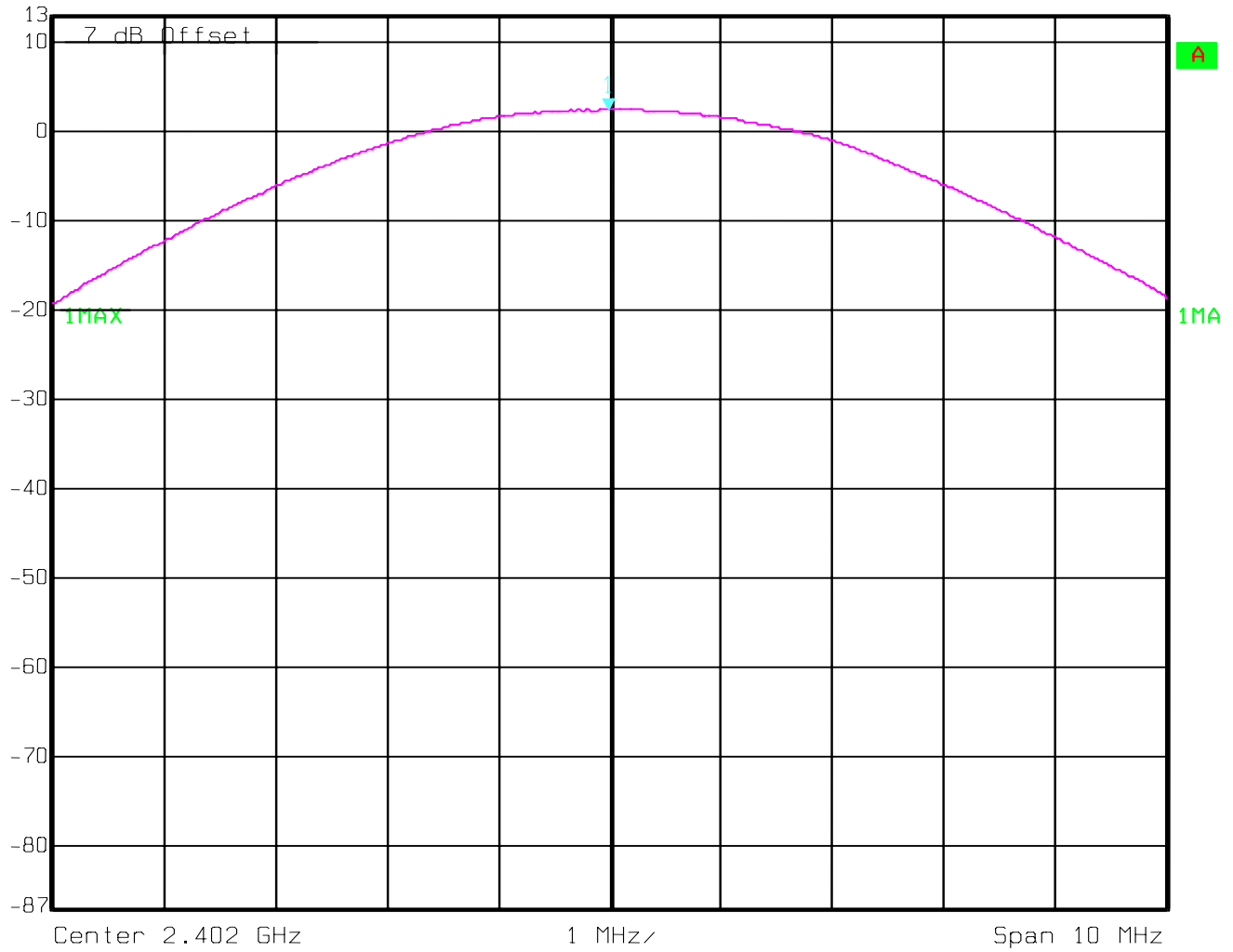
**PEAK OUTPUT POWER (CONDUCTED)**

**§15.247 (b)**

**Lowest Channel: 2402MHz**



Ref Lvl	Marker 1 [T1]	RBW	3 MHz	RF Att	20 dB
13 dBm	2.35 dBm	VBW	3 MHz		
	2.40198998 GHz	SWT	5 ms	Unit	dBm



Date: 29.OCT.2003 13:10:16



## PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Mid Channel: 2441MHz



Ref Lvl  
13 dBm

Marker 1 [T1]

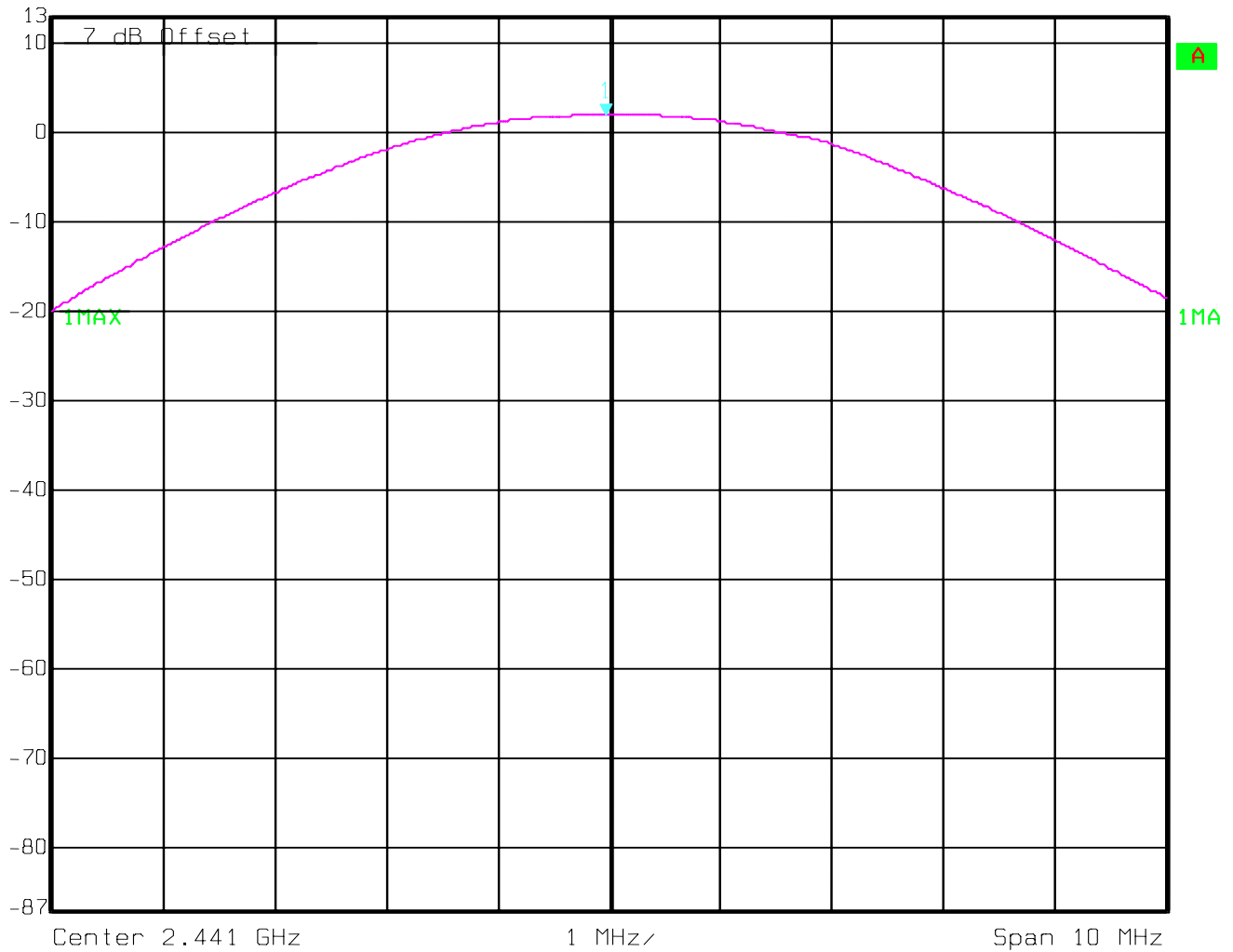
1.88 dBm

2.44096994 GHz

RBW 3 MHz RF Att 20 dB

VBW 3 MHz

SWT 5 ms Unit dBm



Date: 29.OCT.2003 13:11:16

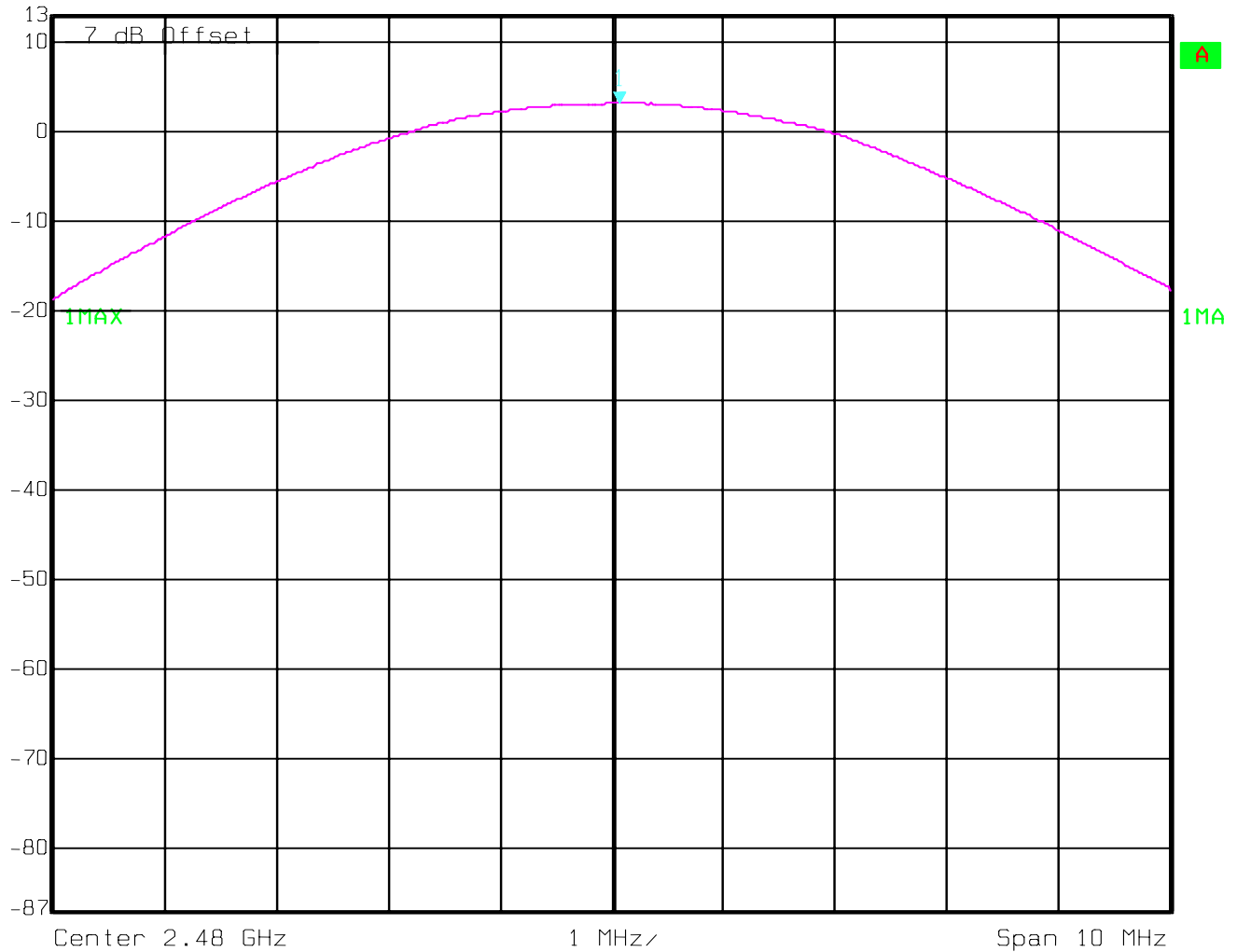
**PEAK OUTPUT POWER (CONDUCTED)**

**§15.247 (b)**

**Highest Channel: 2480MHz**



Ref Lvl	3.06 dBm	RBW	3 MHz	RF Att	20 dB
13 dBm	2.48007014 GHz	VBW	3 MHz	Unit	dBm
		SWT	5 ms		



Date: 29.OCT.2003 13:13:13

**MAXIMUM PEAK OUTPUT POWER  
(RADIATED)**

§ 15.247 (b) (1)

**EIRP:**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
		2402	2441	2480
$T_{nom}(23)^{\circ}C$	$V_{nom}(2.5)VDC$	3.01	2.63	2.54
Measurement uncertainty		±0.5dBm		

RBW/VBW: 3 MHz

**LIMIT**

SUBCLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt

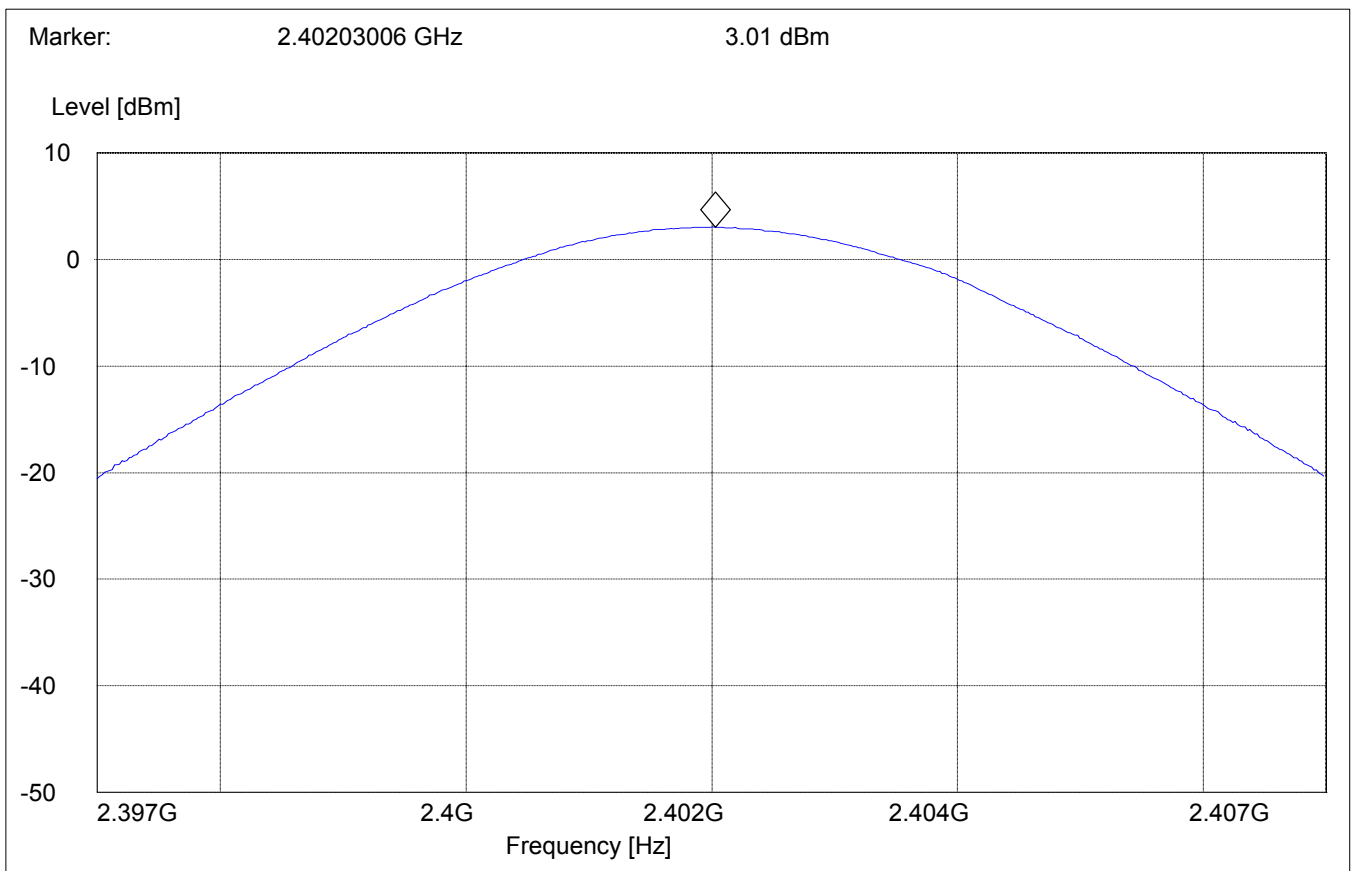
**PEAK OUTPUT POWER (RADIATED)**

**§15.247 (b) (1)**

**Lowest Channel: 2402MHz**

SWEEP TABLE: "EIRP BT low channel"

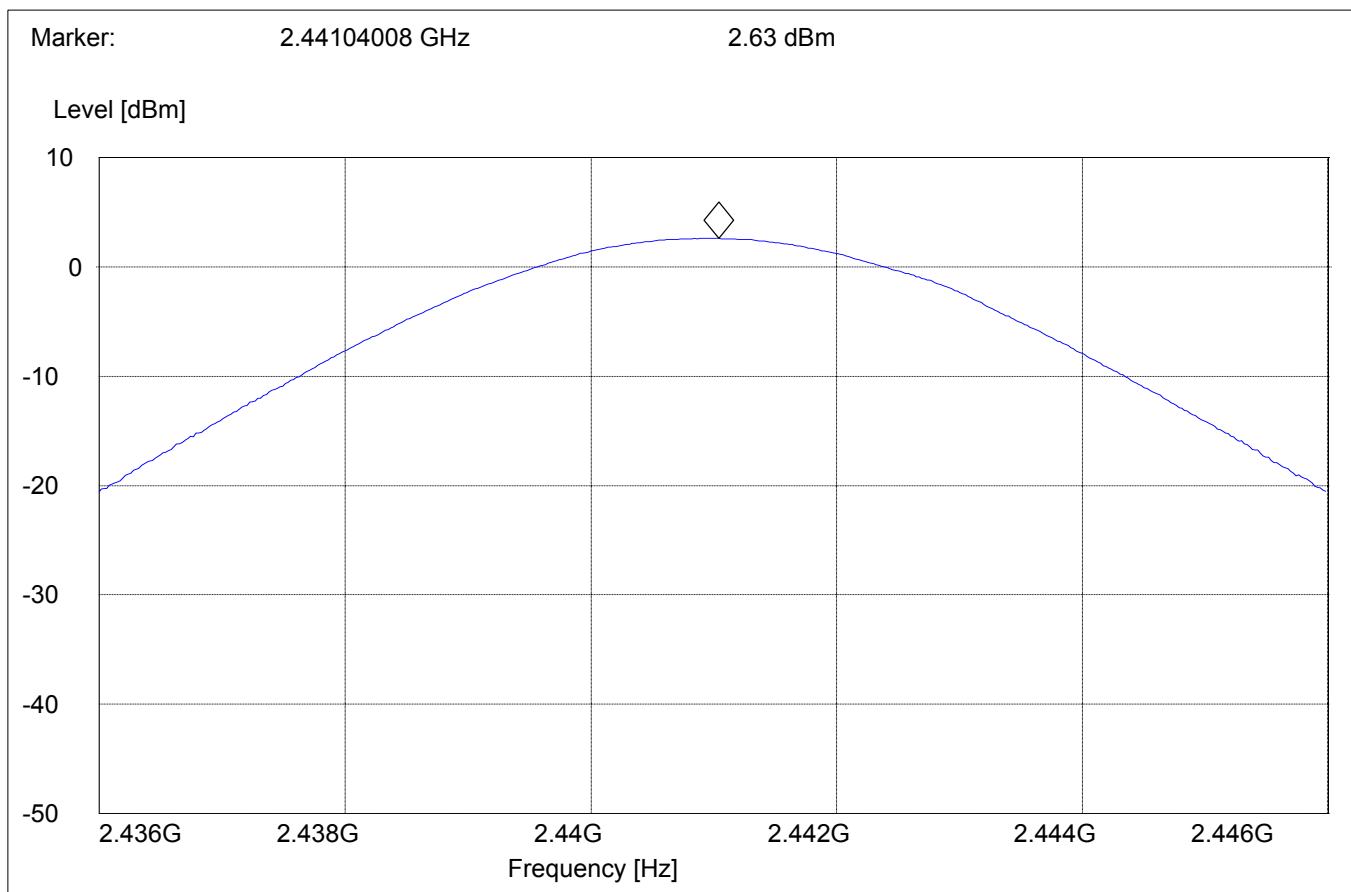
Short Description:		EIRP Bluetooth channel-2402MHz		
Start	Stop	Detector	Meas.	IF
Frequency	Frequency		Time	BW
2.397GHz	2.407GHz	MaxPeak	Coupled	3 MHz



**PEAK OUTPUT POWER (RADIATED)****§15.247 (b) (1)****Mid Channel: 2441MHz**

SWEEP TABLE: "EIRP BT Mid channel"

Short Description:	EIRP Bluetooth channel-2441MHz			
Start	Stop	Detector	Meas.	IF
Frequency	Frequency	Time	Time	BW
2.436GHz	2.446GHz	MaxPeak	Coupled	3 MHz

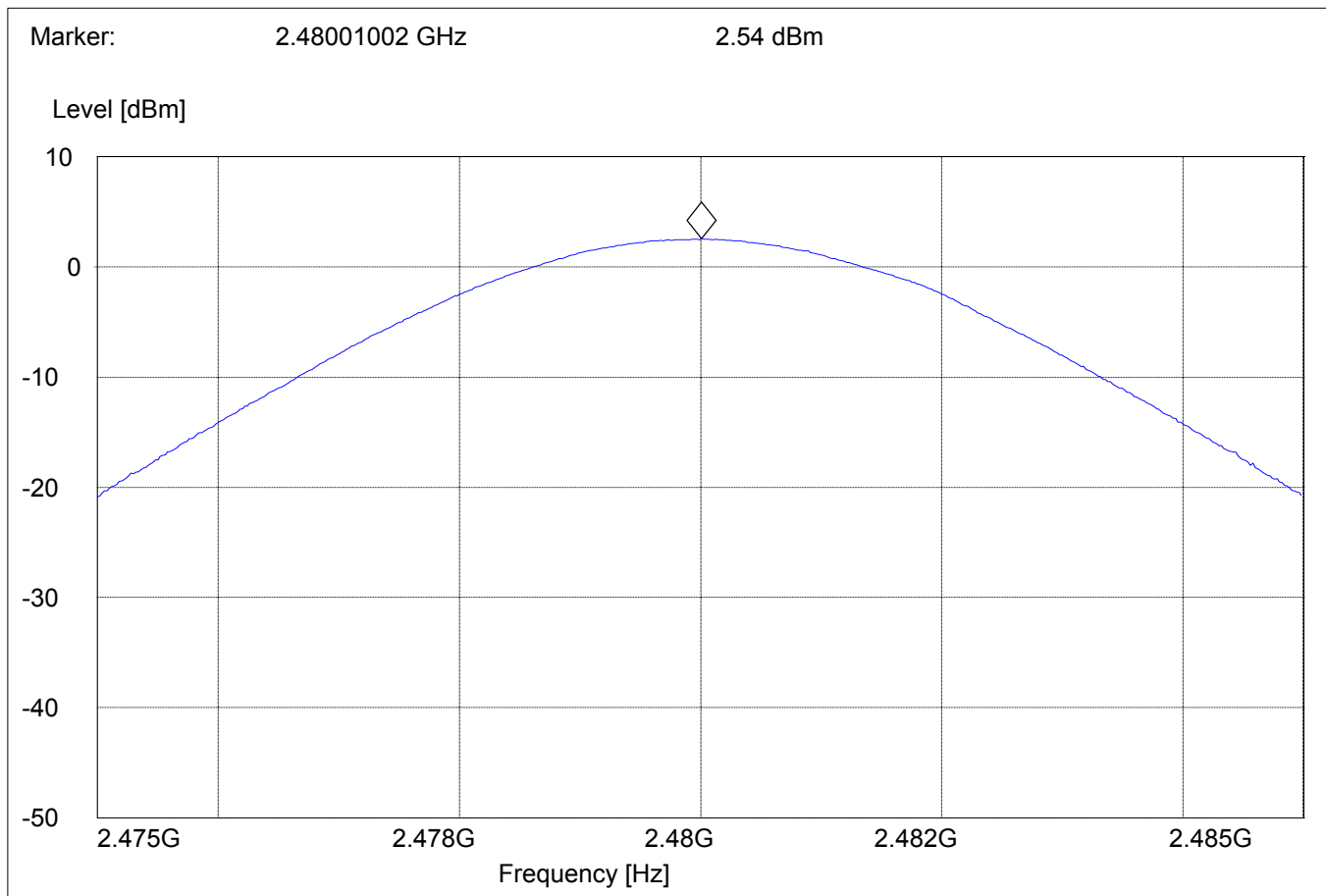


**PEAK OUTPUT POWER (RADIATED)****§15.247 (b) (1)****Highest Channel: 2480MHz**

SWEEP TABLE: "EIRP BT High channel"

Short Description: EIRP Bluetooth channel-2480MHz

Start	Stop	Detector	Meas.	IF
Frequency	Frequency		Time	BW
2.475GHz	2.485GHz	MaxPeak	Coupled	3 MHz



**BAND EDGE COMPLIANCE**

§15.247 (c)

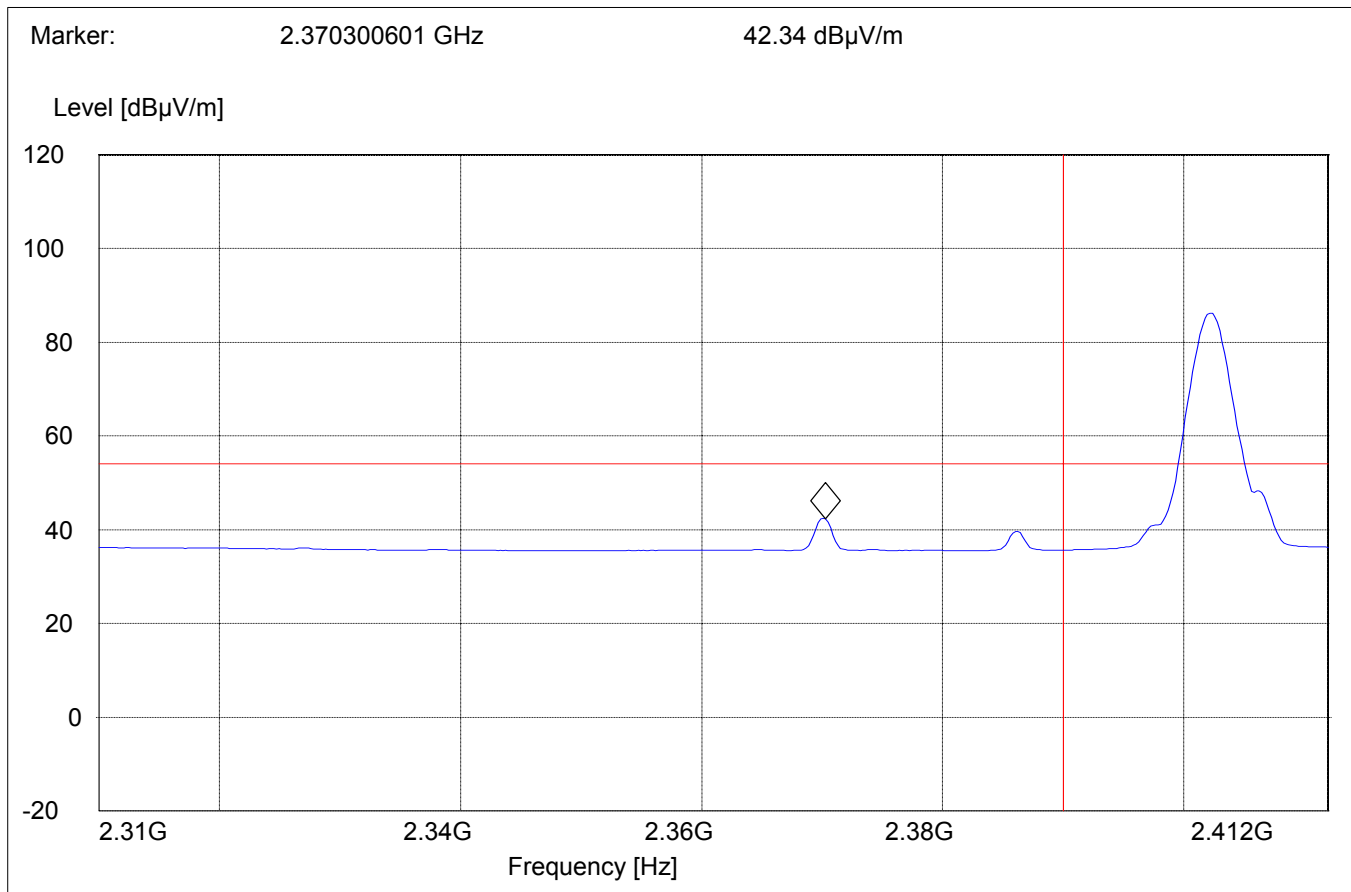
**Low frequency section (spurious in the restricted band 2310 – 2390 MHz)**

**Average Measurement**

**(This plot is valid for both Hopping ON & OFF)**

Operating condition : Tx at 2402MHz  
 SWEEP TABLE : "FCC15.247 LBE\_AVG"  
 Short Description : FCC15.247 BT Low-band-edge  
 Limit Line : 54dB $\mu$ V

Start Frequency	Stop Frequency	Detector	Meas. Bandw.	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)



**BAND EDGE COMPLIANCE**

§15.247 (c)

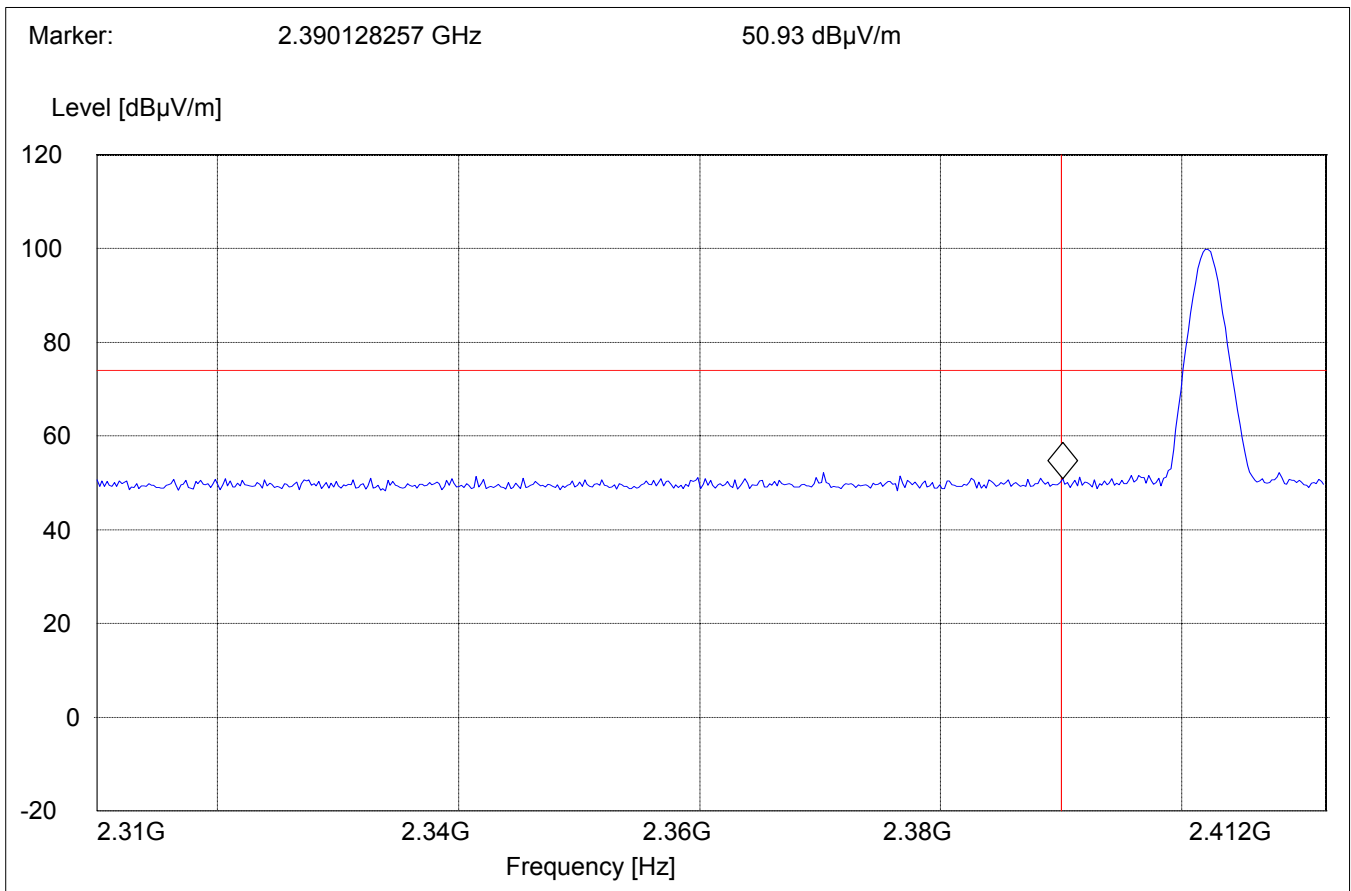
**Low frequency section (spurious in the restricted band 2310 – 2390 MHz)**

**Peak Measurement**

**(This plot is valid for both Hopping ON & OFF)**

Operating condition : Tx at 2402MHz  
 SWEEP TABLE : "FCC15.247 LBE\_Pk"  
 Short Description : FCC15.247 BT Low-band-edge  
 Limit Line : 74dB $\mu$ V

Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)





**BAND EDGE COMPLIANCE**

§15.247 (c)

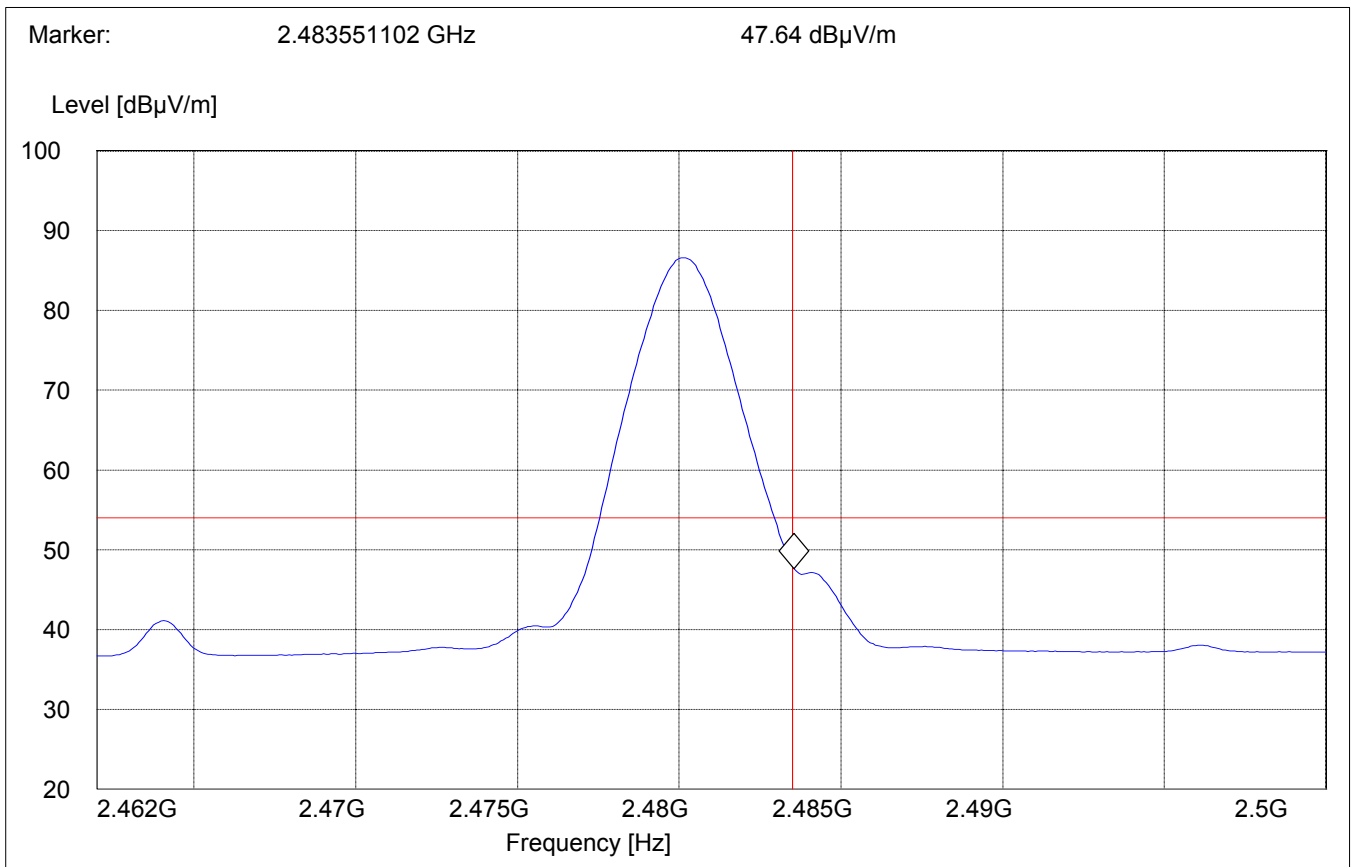
**High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)**

**Average Measurement**

**(This plot is valid for both Hopping ON & OFF)**

Operating condition : Tx at 2480MHz  
 SWEEP TABLE : "FCC15.247 HBE\_AVG"  
 Short Description : FCC15.247 BT High-band-edge  
 Limit Line : 54dB $\mu$ V

Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)



**BAND EDGE COMPLIANCE**

§15.247 (c)

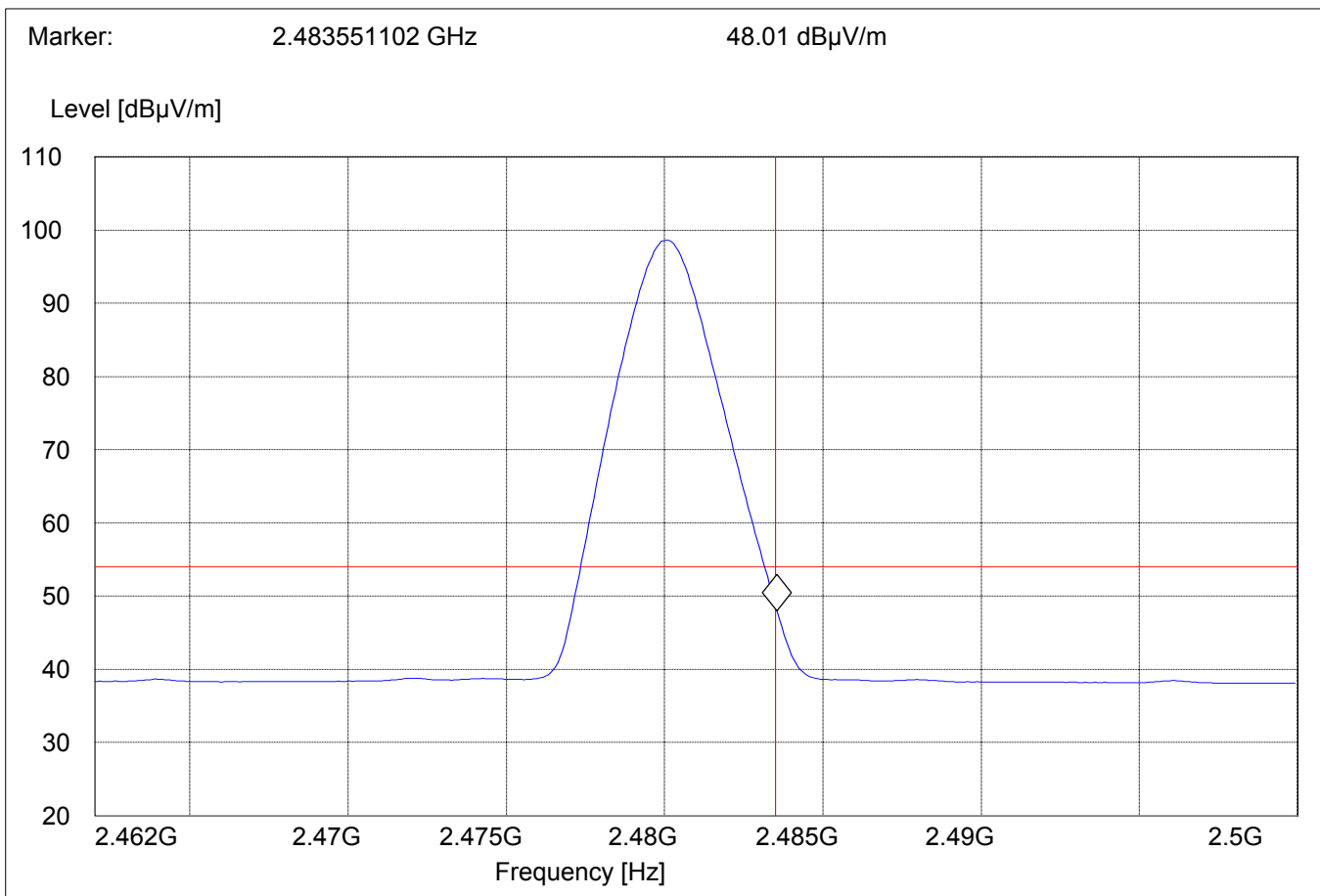
**High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)**

**Peak Measurement**

**(This plot is valid for both Hopping ON & OFF)**

Operating condition : Tx at 2480MHz  
 SWEEP TABLE : "FCC15.247 HBE\_PK"  
 Short Description : FCC15.247 BT High-band-edge  
 Limit Line : 74dB $\mu$ V

Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS  
Transmitter (Conducted)  
LIMITS****§ 15.247 (c) (1)**

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions that fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

**NOTE:** Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

**EMISSION LIMITATIONS - Conducted (Transmitter)**

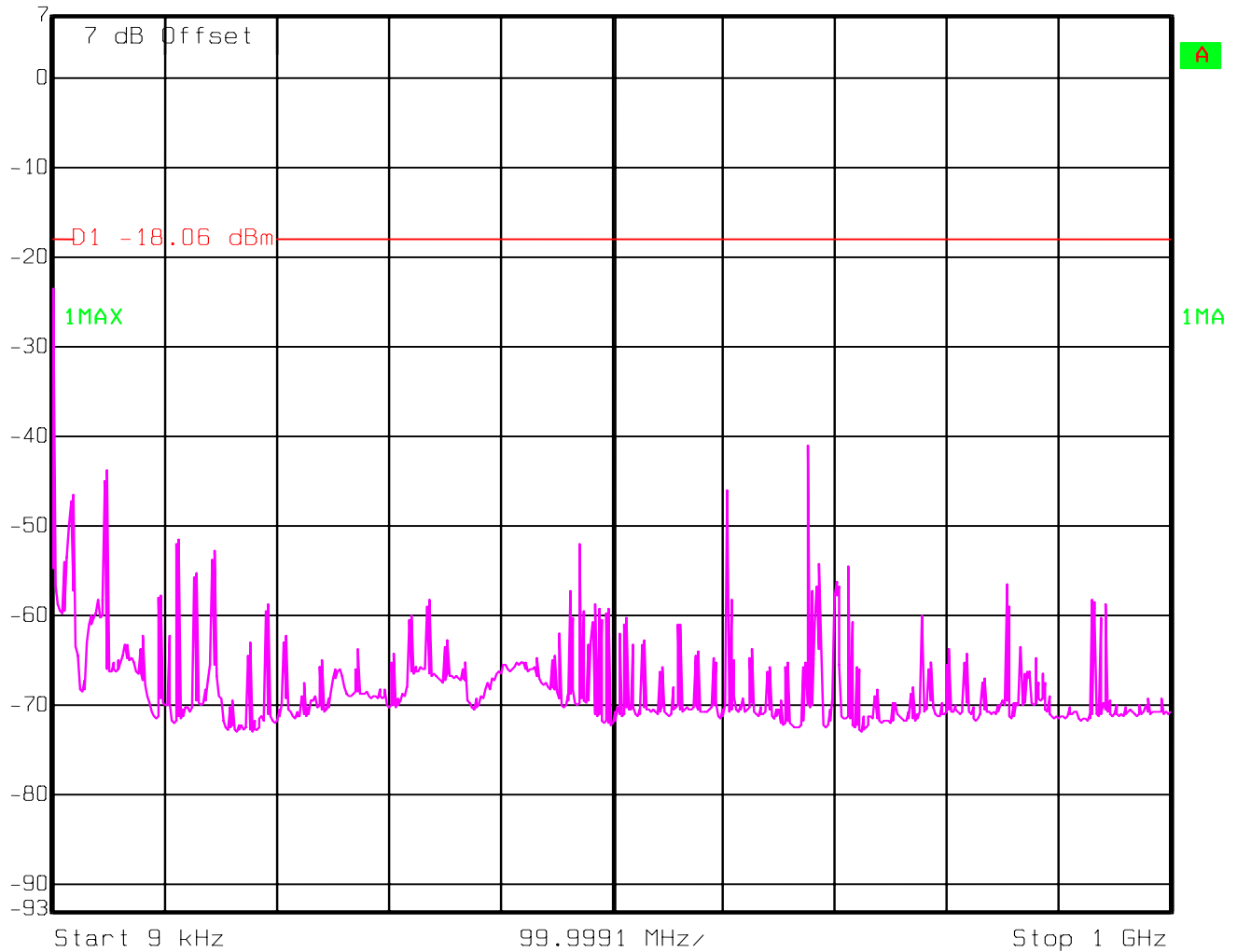
**§ 15.247 (c) (1)**

**Lowest Channel (2402MHz): 9KHz - 1GHz**



Ref Lvl  
7 dBm

RBW 100 kHz RF Att 10 dB  
VBW 100 kHz  
SWT 250 ms Unit dBm



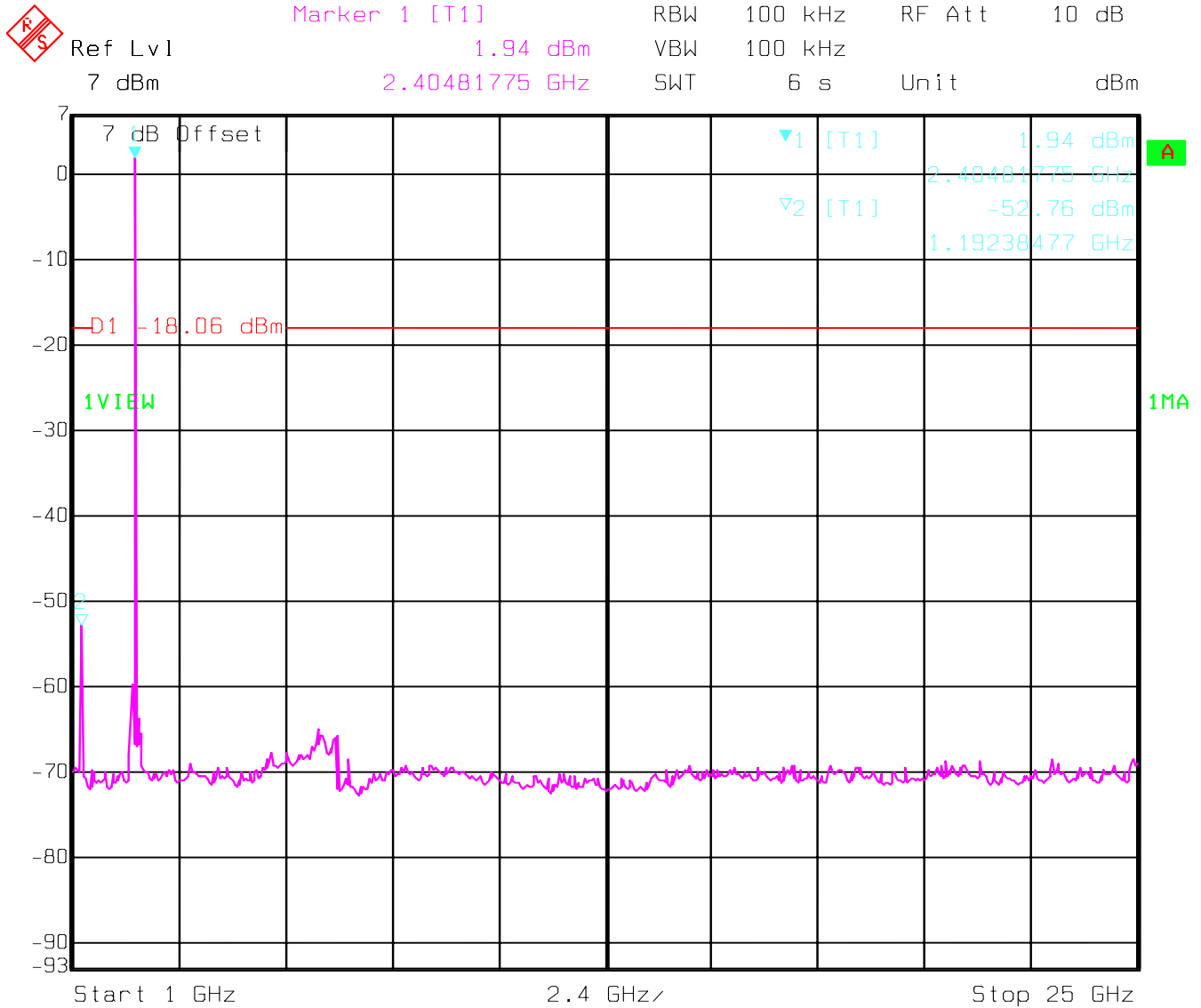
Date: 29.OCT.2003 13:47:00

**EMISSION LIMITATIONS - Conducted (Transmitter)**

**§ 15.247 (c) (1)**

**Lowest Channel (2402MHz): 1GHz - 25GHz**

**NOTE: The peak above the limit line is the carrier frequency.**



Date: 29.OCT.2003 13:45:23

**EMISSION LIMITATIONS - Conducted (Transmitter)**

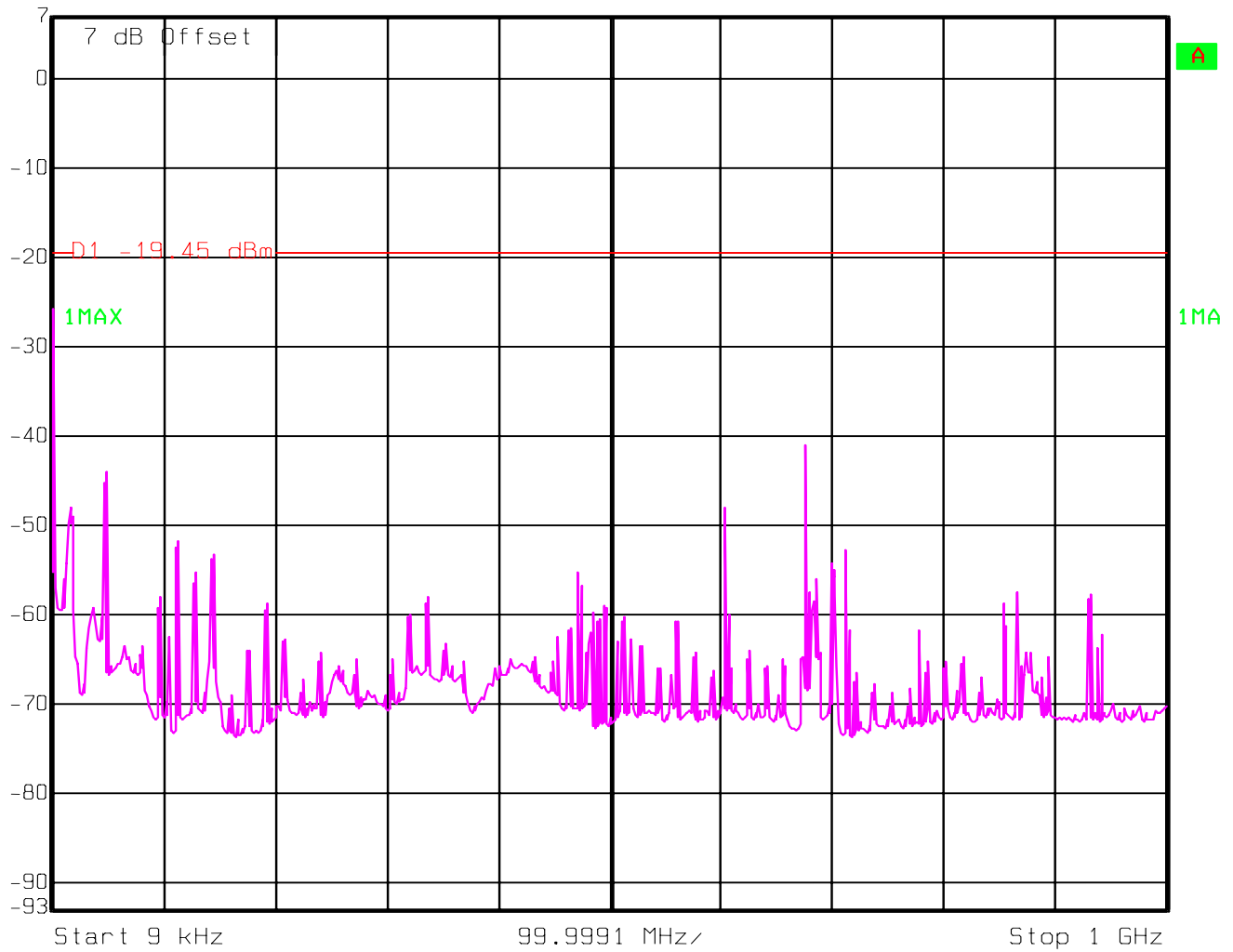
**§ 15.247 (c) (1)**

**Mid Channel (2441MHz): 9KHz - 1GHz**



Ref Lvl  
7 dBm

RBW 100 kHz RF Att 10 dB  
VBW 100 kHz  
SWT 250 ms Unit dBm



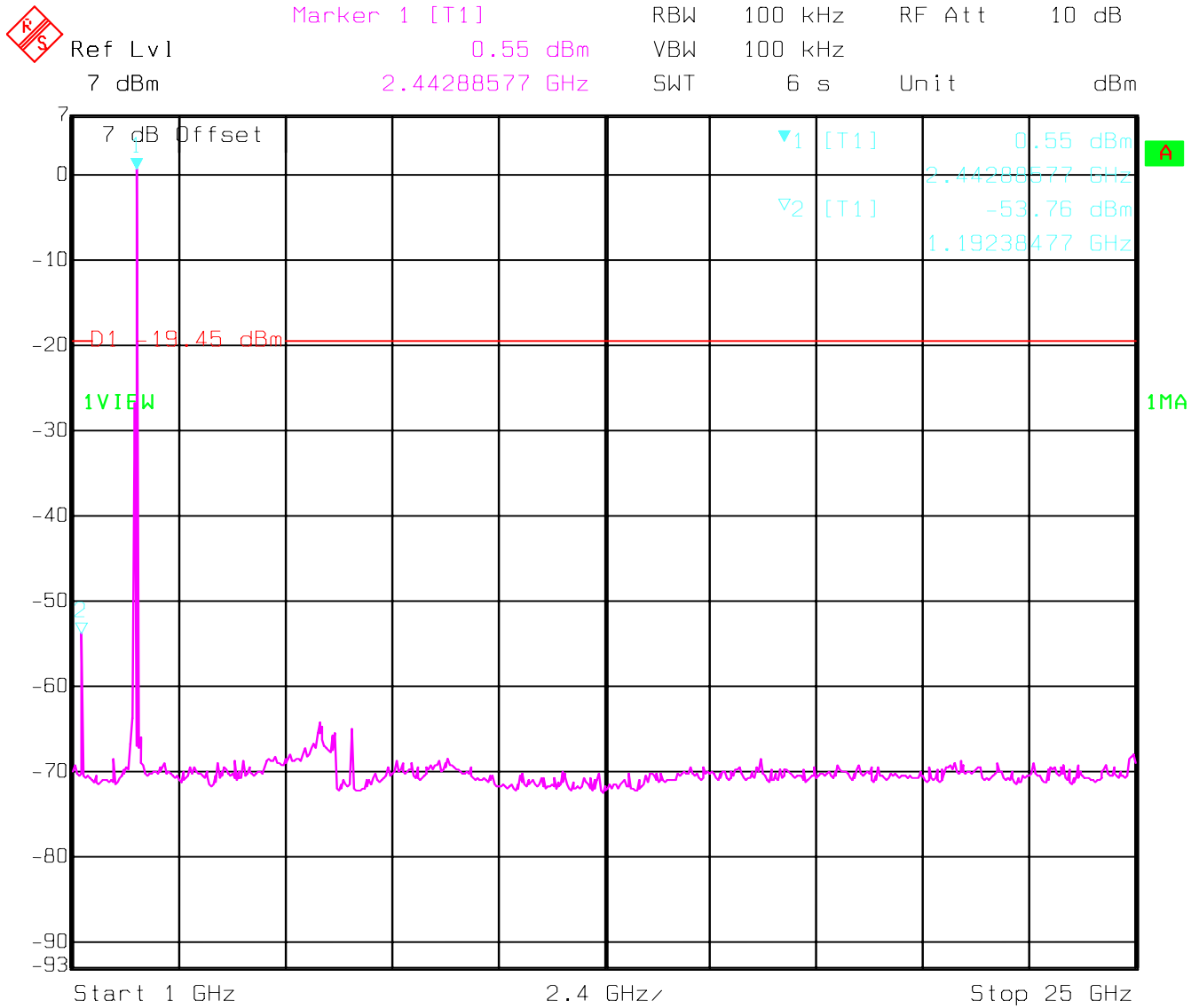
Date: 29.OCT.2003 13:50:59

## EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

### Mid Channel (2441MHz): 1GHz - 25GHz

NOTE: The peak above the limit line is the carrier frequency.



Date: 29.OCT.2003 13:49:40

## EMISSION LIMITATIONS - Conducted (Transmitter)

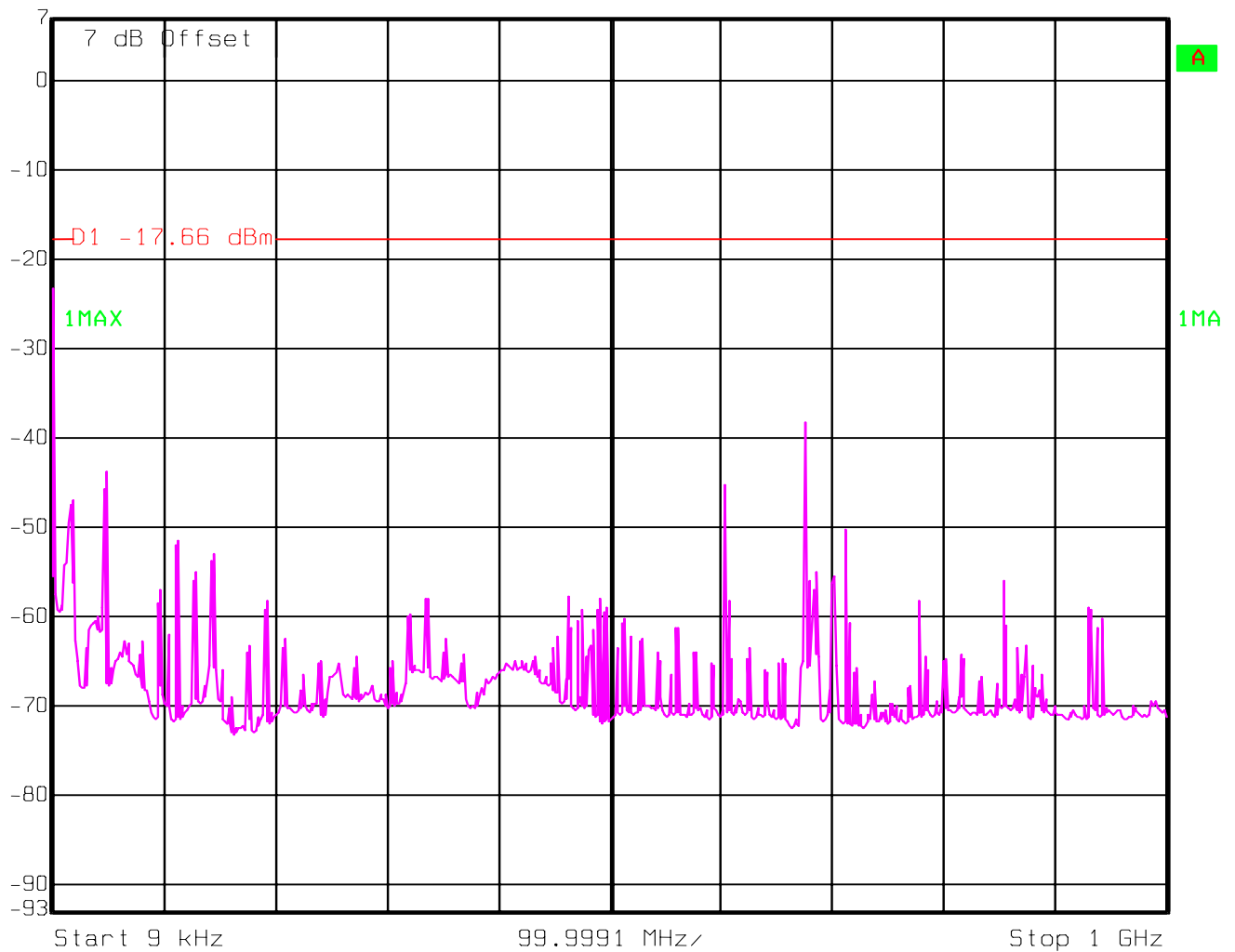
§ 15.247 (c) (1)

Highest Channel (2480MHz): 9KHz - 1GHz



Ref Lvl  
7 dBm

RBW 100 kHz RF Att 10 dB  
VBW 100 kHz  
SWT 250 ms Unit dBm



Date: 29.OCT.2003 13:54:47

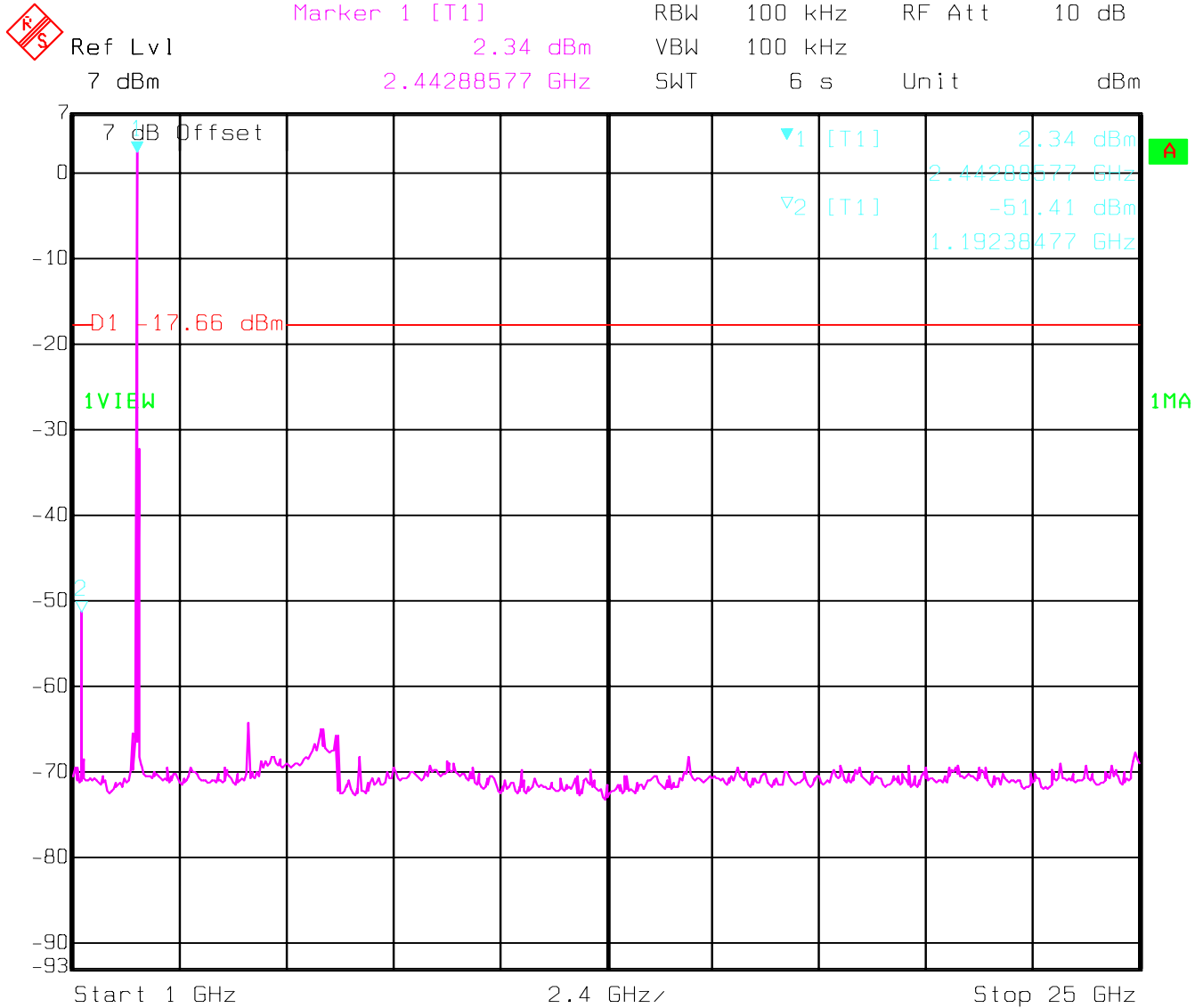


## EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

**Highest Channel (2480MHz): 1GHz - 25GHz**

**NOTE: The peak above the limit line is the carrier frequency.**



Date: 29.OCT.2003 13:53:17

**EMISSION LIMITATIONS**  
**Transmitter (Radiated)**

§ 15.247 (c) (1)

**LIMITS**

**In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions that fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).**

**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 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.
2. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.
3. All measurements are done in peak mode unless specified with plots.

**Results for the radiated measurements below 30MHz according § 15.33**

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

**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

**Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.**

<b>Transmit at Lowest channel Frequency 2402MHz</b>			
<b>Frequency (MHz)</b>	<b>Level (dBµV/m)</b>		
	<b>Peak</b>	<b>Quasi-Peak</b>	<b>Average</b>
SEE PLOTS			
<b>Transmit at Middle channel Frequency 2441MHz</b>			
<b>Frequency (MHz)</b>	<b>Level (dBµV/m)</b>		
	<b>Peak</b>	<b>Quasi-Peak</b>	<b>Average</b>
SEE PLOTS			
<b>Transmit at Highest channel Frequency 2480MHz</b>			
<b>Frequency (MHz)</b>	<b>Level (dBµV/m)</b>		
	<b>Peak</b>	<b>Quasi-Peak</b>	<b>Average</b>
SEE PLOTS			

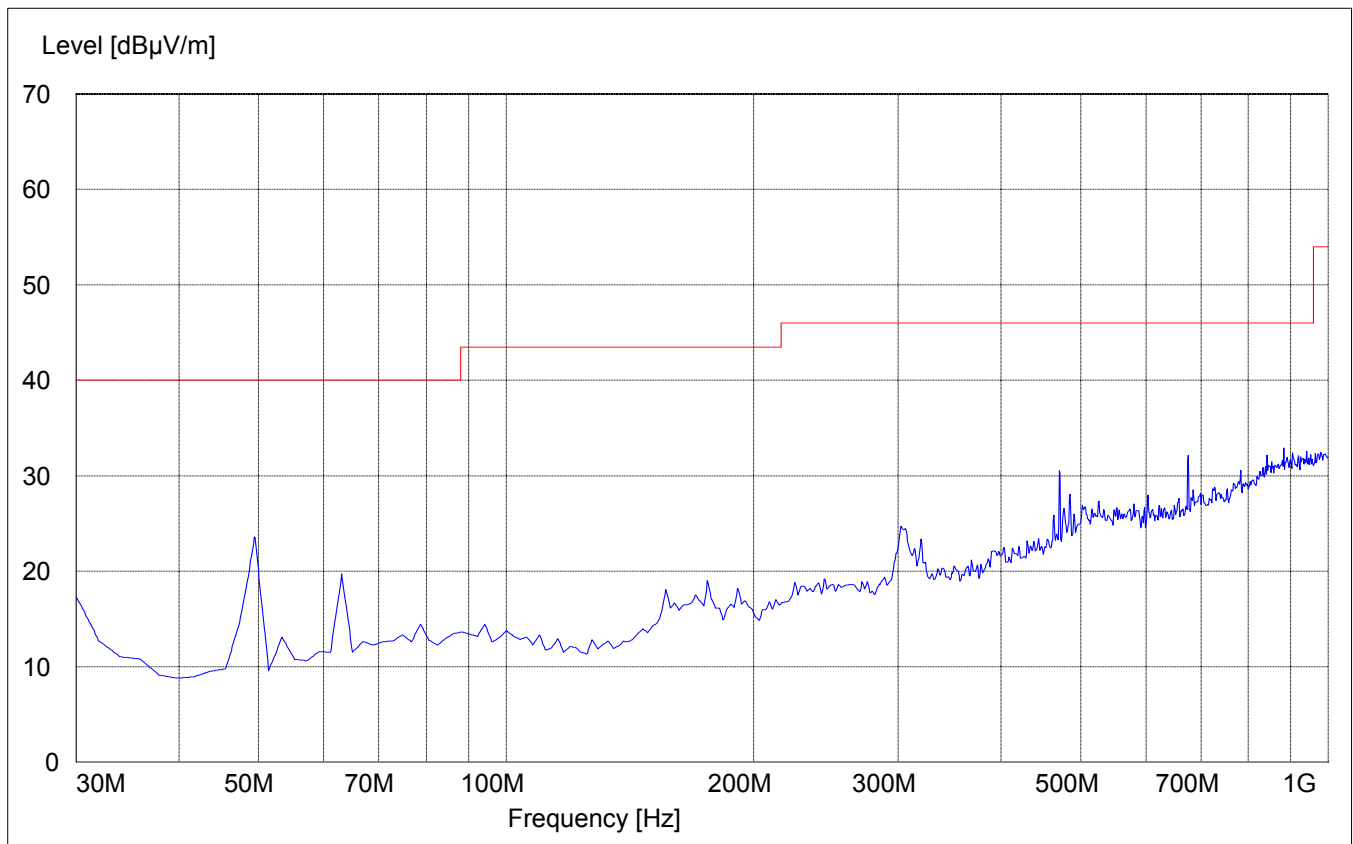
**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

**30MHz – 1GHz**

**Note: This plot is valid for low, mid & high channels (worst-case plot)**

SWEEP TABLE:		"BT Spuri hi 30-1G"			
Short Description:		Bluetooth 30MHz-1GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency		Time	VBW	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186

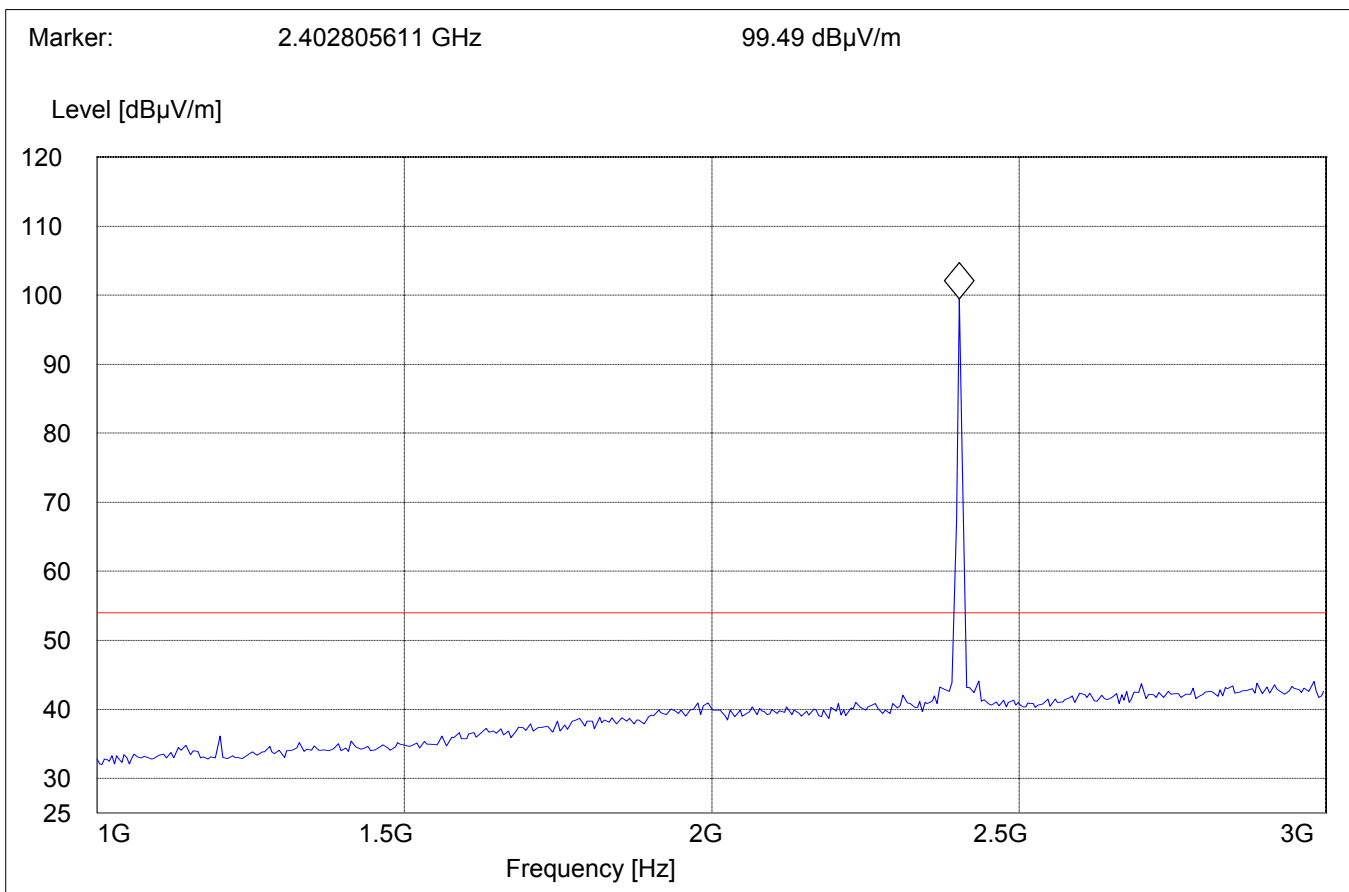


**EMISSION LIMITATIONS - Radiated (Transmitter)**  
**Lowest Channel (2402MHz): 1GHz – 3GHz**

§ 15.247 (c) (1)

**NOTE: The peak above the limit is the carrier frequency.**

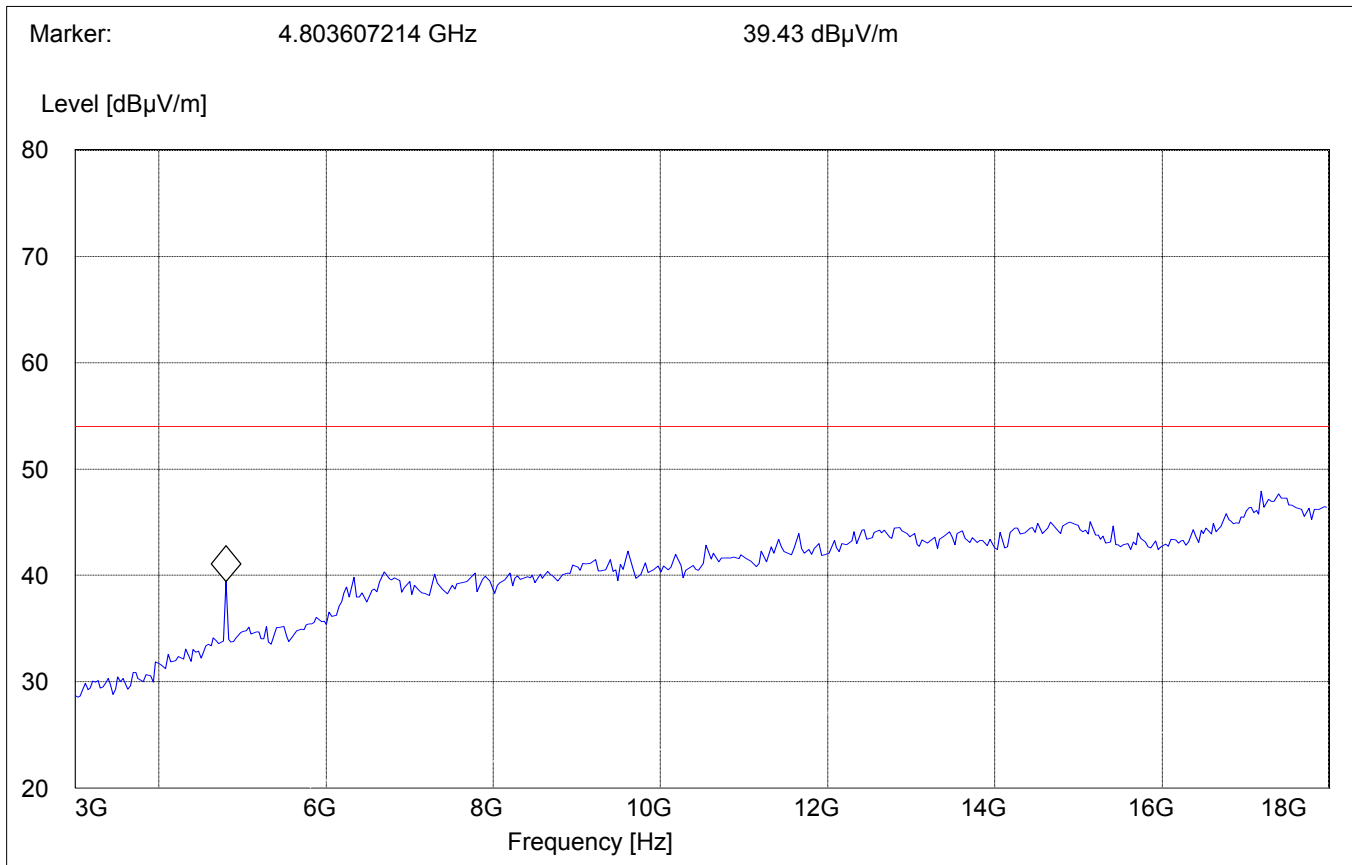
SWEEP TABLE:		"BT Spuri hi 1-3G"			
Short Description:		Bluetooth Spurious 1-3GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**  
**Lowest Channel (2402MHz): 3GHz – 18GHz**

§ 15.247 (c) (1)

SWEEP TABLE:		"BT Spuri hi 3-18G"			
Short Description:		Bluetooth Spurious 3-18 GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)

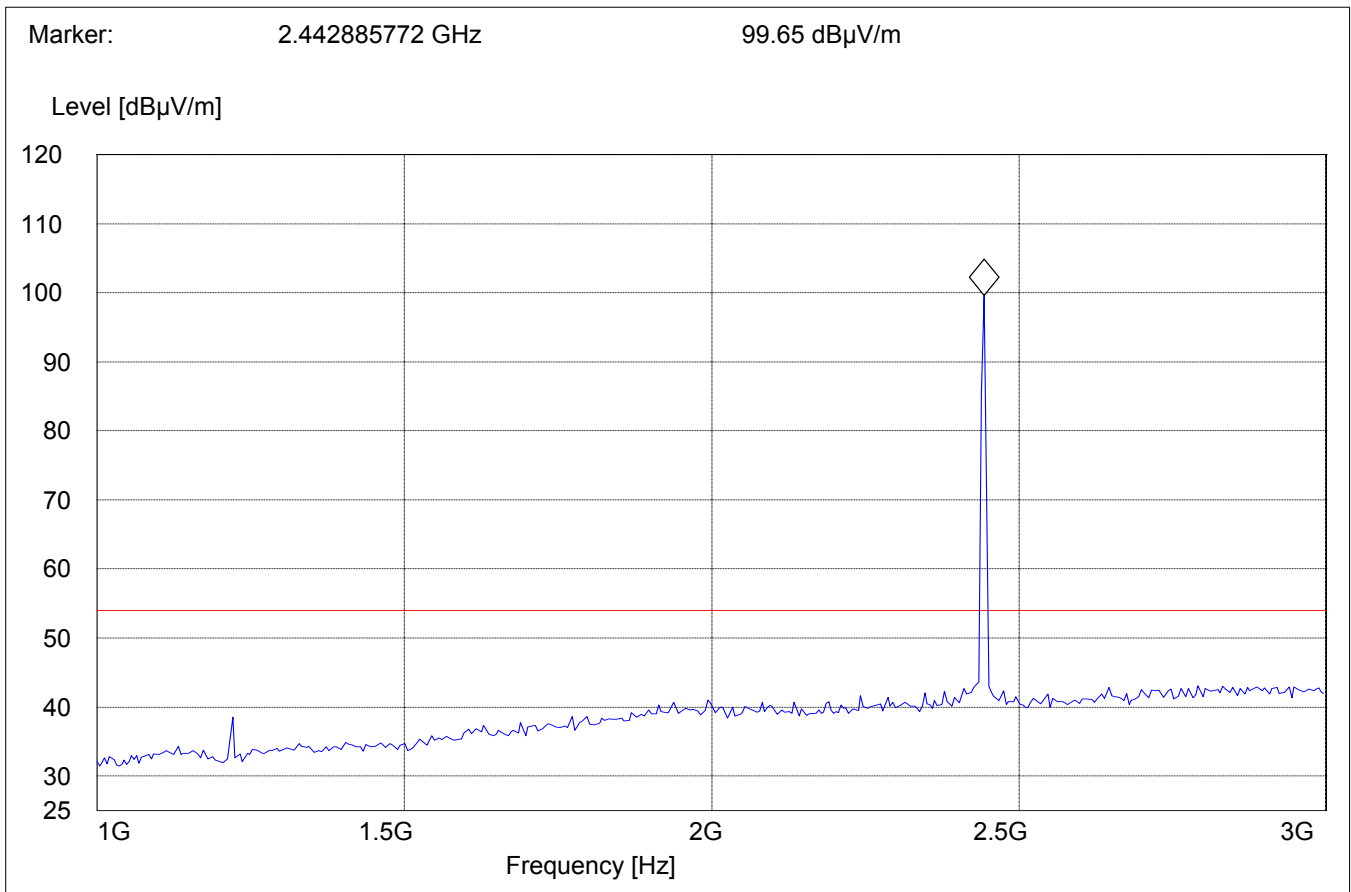


**EMISSION LIMITATIONS - Radiated (Transmitter)**  
**Middle Channel (2441MHz): 1GHz – 3GHz**

§ 15.247 (c) (1)

**NOTE: The peak above the limit is the carrier frequency.**

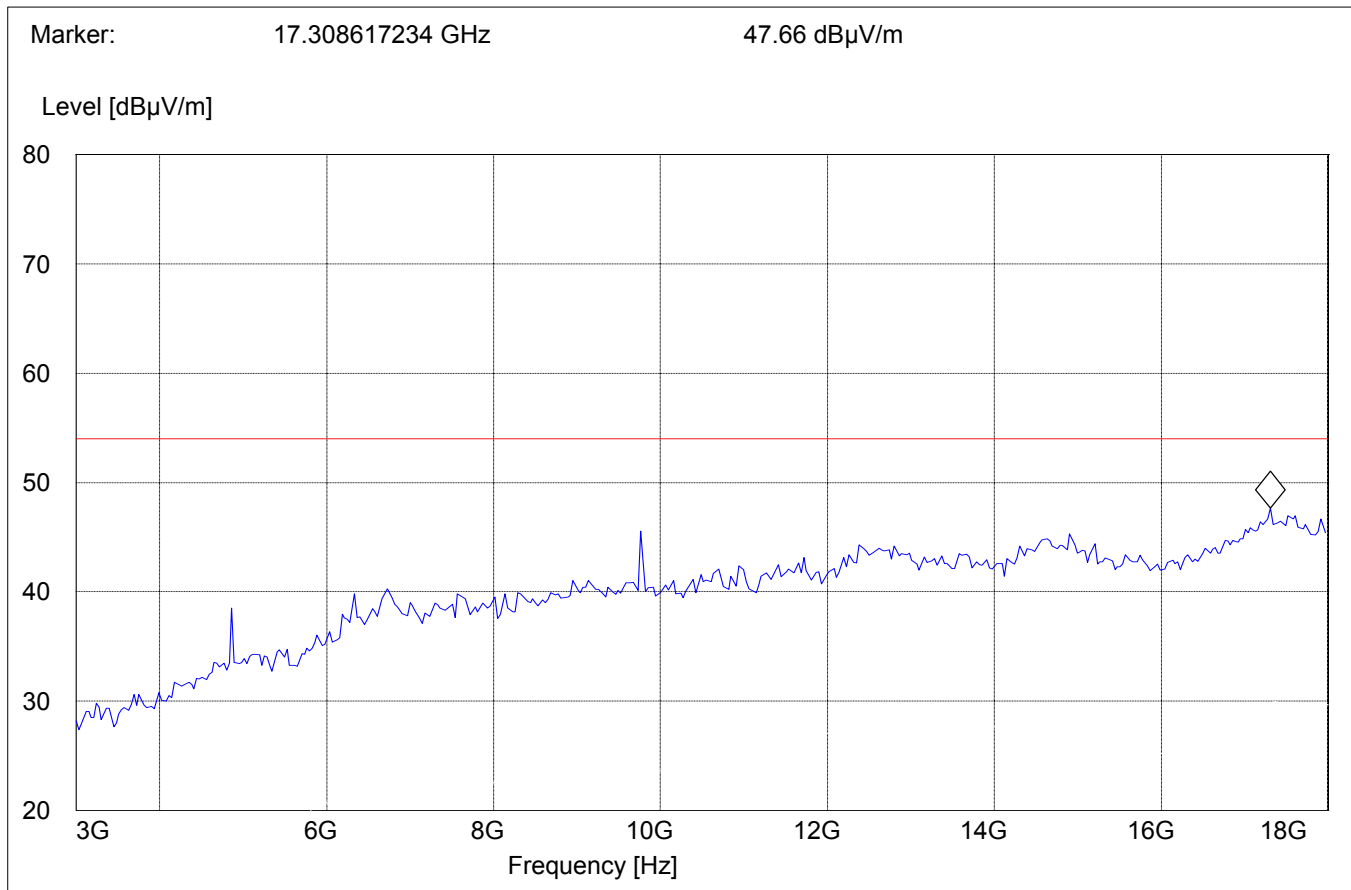
SWEEP TABLE:	"BT Spuri hi 1-3G"				
Short Description:	Bluetooth Spurious 1-3GHz				
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**  
**Middle Channel (2441MHz): 3GHz – 18GHz**

§ 15.247 (c) (1)

SWEEP TABLE:		"BT Spuri hi 3-18G"			
Short Description:		Bluetooth Spurious 3-18GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)





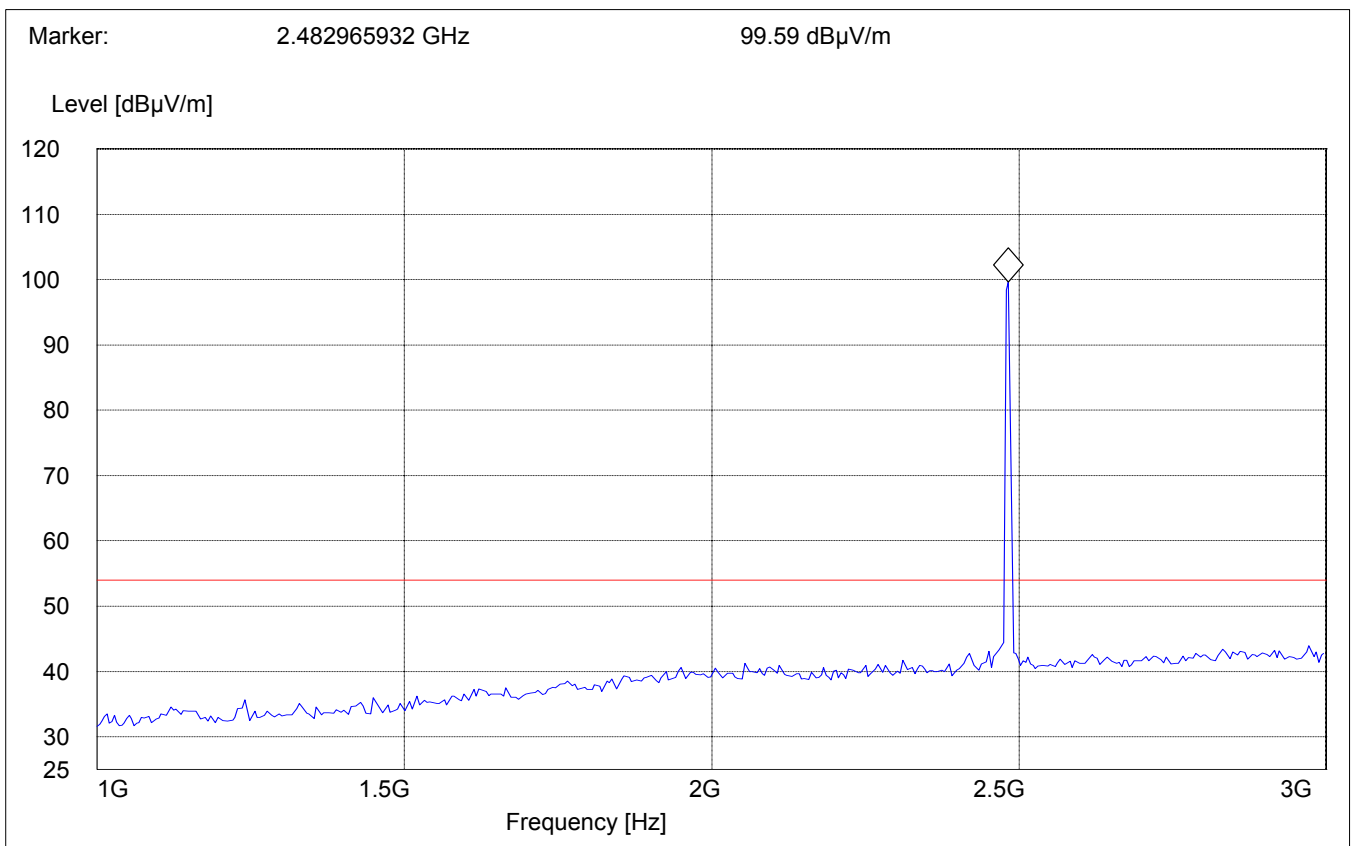
**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

**Highest Channel (2480MHz): 1GHz – 3GHz**

**NOTE: The peak above the limit is the carrier frequency.**

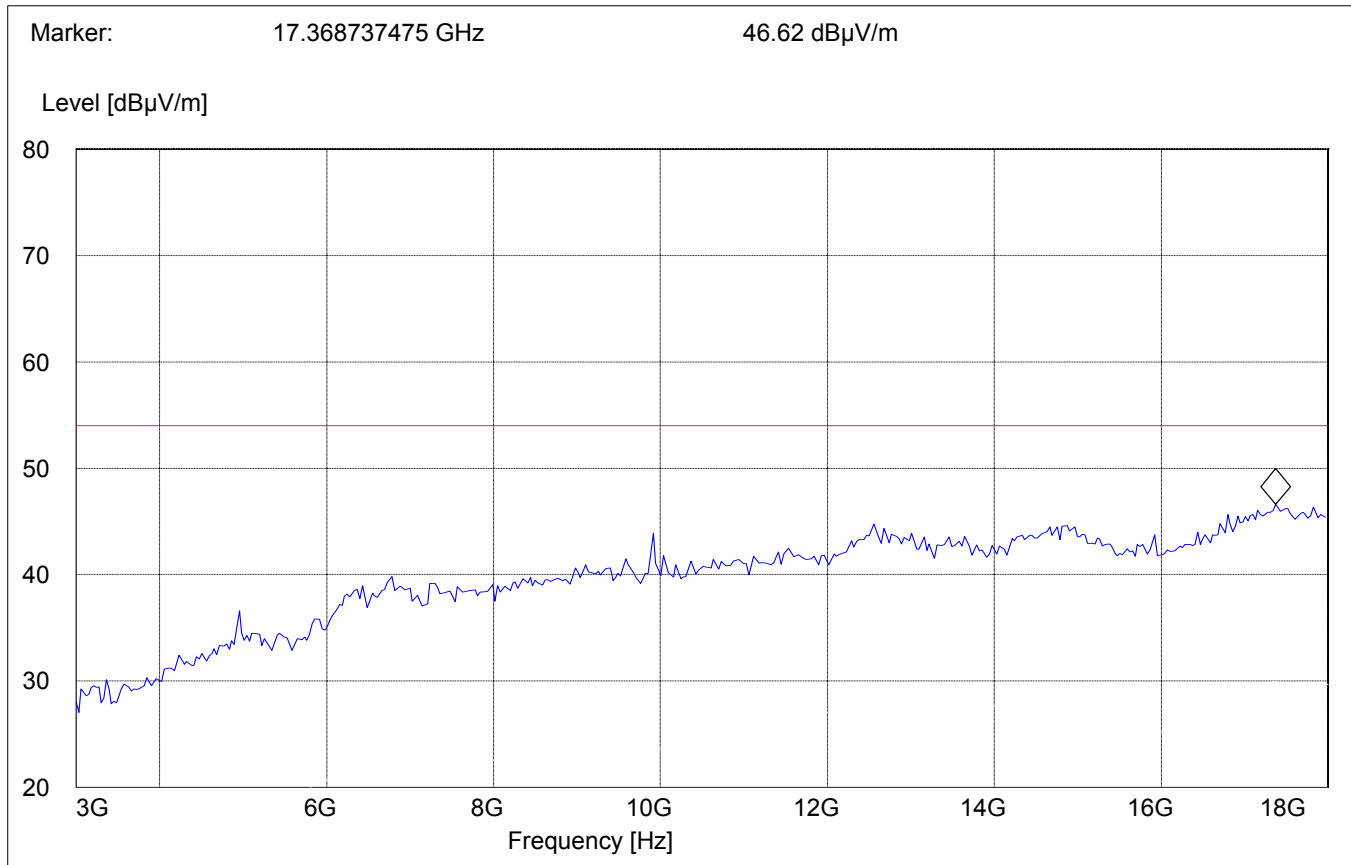
SWEEP TABLE:		"BT Spuri hi 1-3G"			
Short Description:		Bluetooth Spurious 1-3GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**  
**Highest Channel (2480MHz): 3GHz – 18GHz**

§ 15.247 (c) (1)

SWEEP TABLE:		"BT Spuri hi 3-18G"			
Short Description:		Bluetooth Spurious 3-18GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)



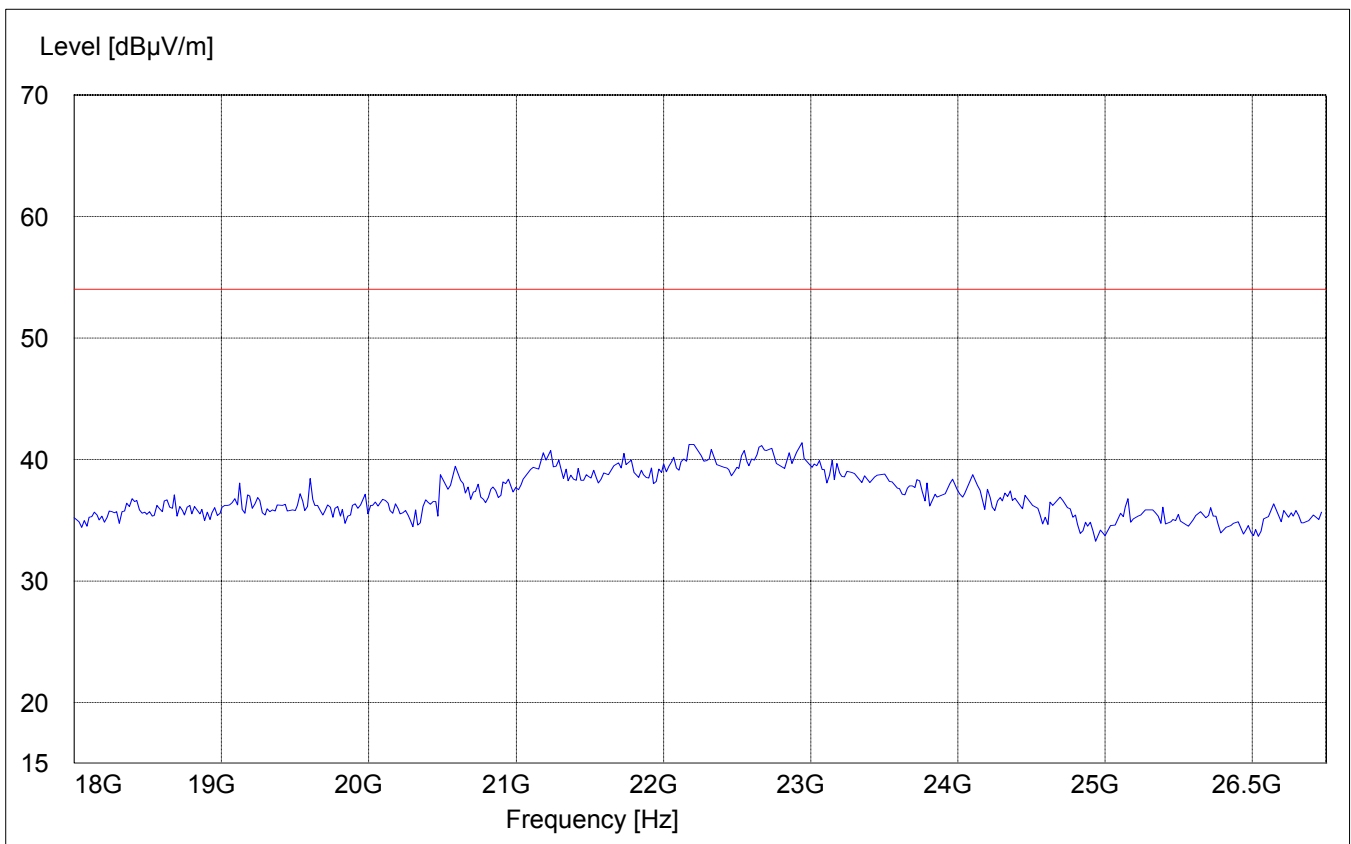
**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

**18GHz – 26.5GHz**

**Note: This plot is valid for low, mid & high channels (worst-case plot)**

SWEEP TABLE:		"BT Spuri hi 18-25G"			
Short Description:		Bluetooth Spurious 18-25GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#141 horn (dBi)



**CONDUCTED EMISSIONS**

§ 15.107/207

Measured with AC/DC power adapter

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

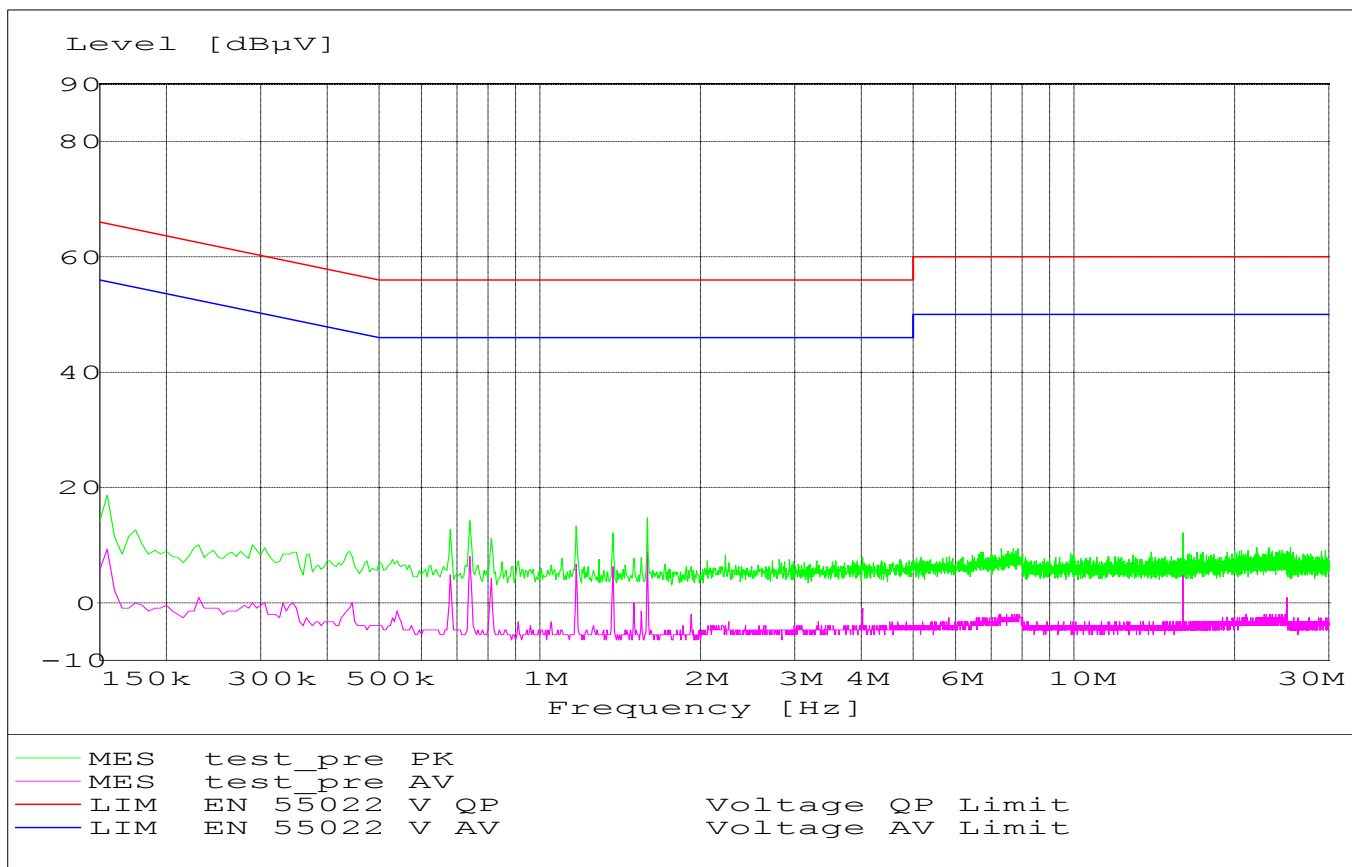
**Limit**

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



**RECEIVER SPURIOUS RADIATION****§ 15.209****Limits**

<b>Frequency (MHz)</b>	<b>Field strength (<math>\mu\text{V/m}</math>)</b>	<b>Measurement distance (m)</b>
<b>0.009 - 0.490</b>	<b>2400/F(kHz)</b>	<b>300</b>
<b>0.490 - 1.705</b>	<b>24000/F(kHz)</b>	<b>30</b>
<b>1.705 - 30.0</b>	<b>30</b>	<b>30</b>
<b>30 - 88</b>	<b>100</b>	<b>3</b>
<b>88 - 216</b>	<b>150</b>	<b>3</b>
<b>216 - 960</b>	<b>200</b>	<b>3</b>
<b>above 960</b>	<b>500</b>	<b>3</b>

**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 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode unless specified with the plots.

**RECEIVER SPURIOUS RADIATION**

§ 15.209

**30MHz – 1GHz**

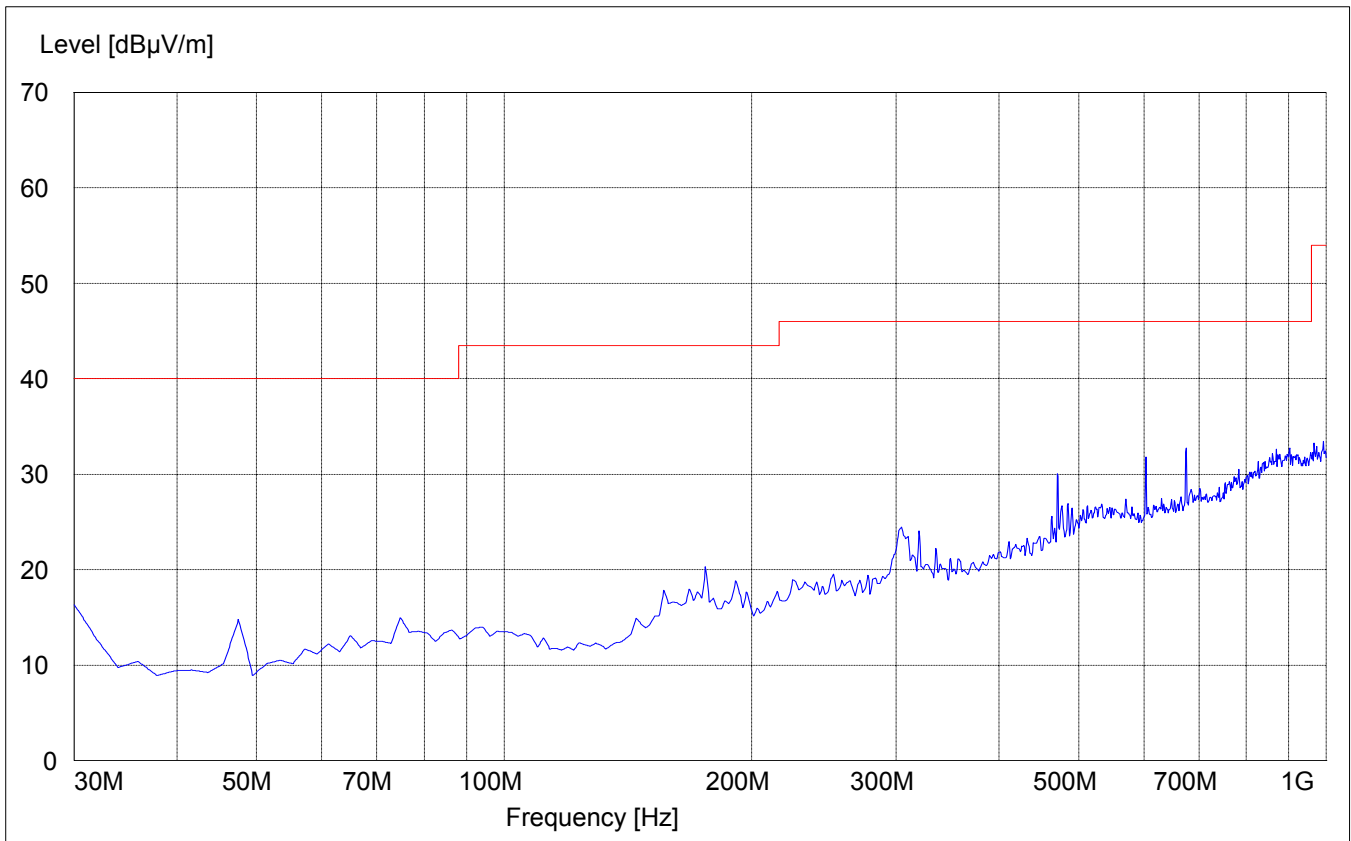
SWEEP TABLE:

"BT Spuri hi 30-1G"

Short Description:

Bluetooth 30MHz-1GHz

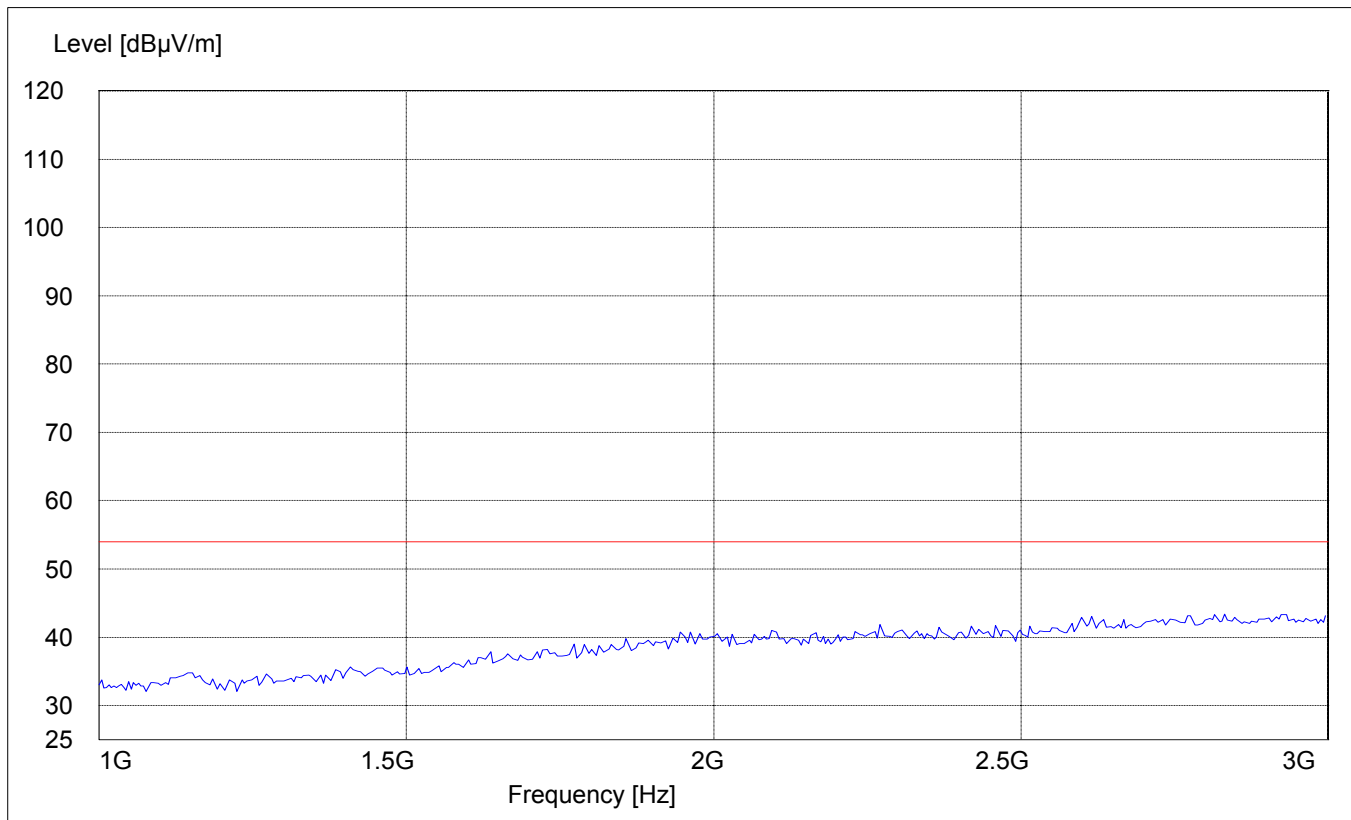
Start	Stop	Detector	Meas. Time	RBW	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186



**RECEIVER SPURIOUS RADIATION  
1GHz – 3GHz**

§ 15.209

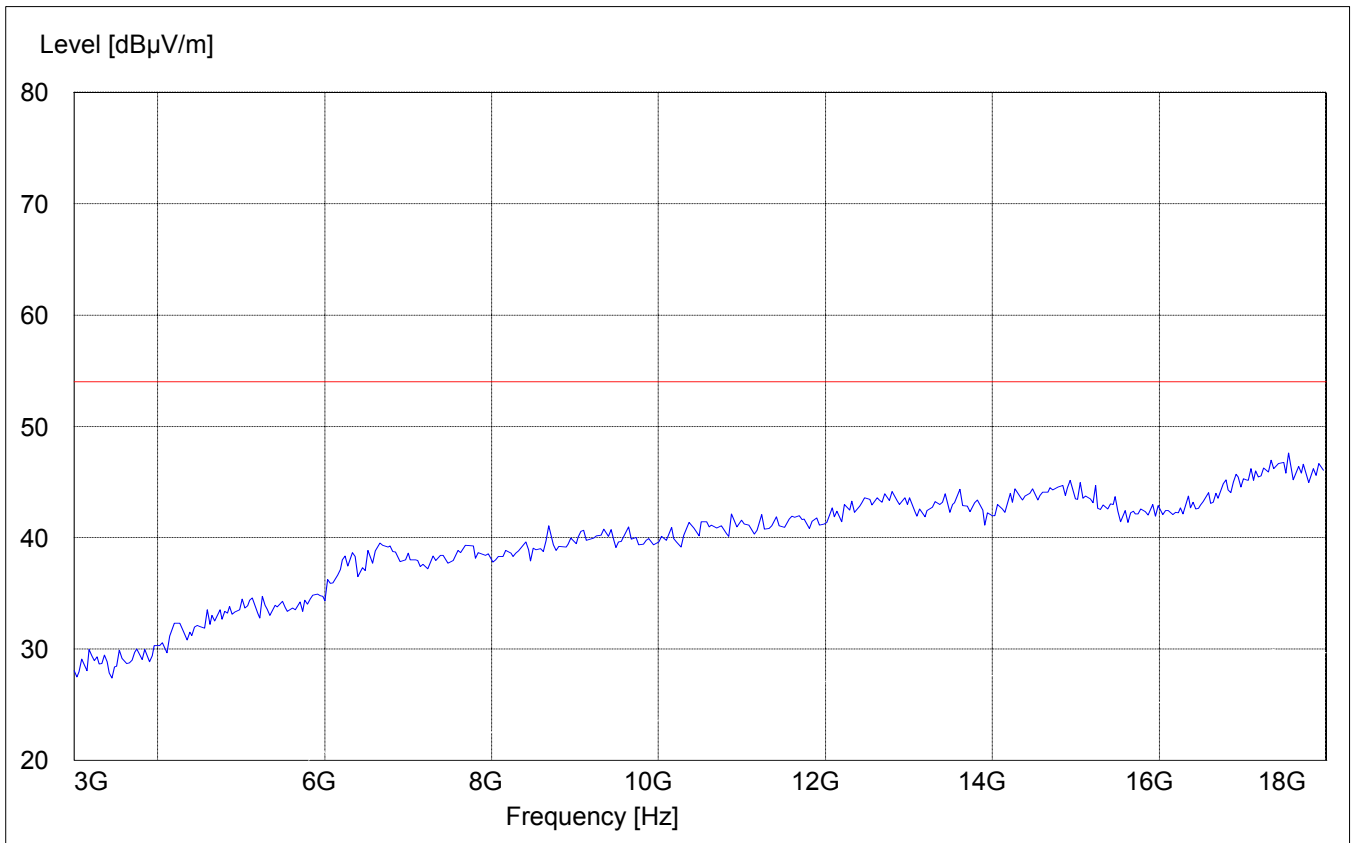
SWEEP TABLE:		"BT Spuri hi 1-3G"			
Short Description:		Bluetooth Spurious 1-3GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)



**RECEIVER SPURIOUS RADIATION**  
**3GHz – 18GHz**

§ 15.209

SWEEP TABLE:		"BT Spuri hi 3-18G"			
Short Description:		Bluetooth Spurious 3-18 GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)

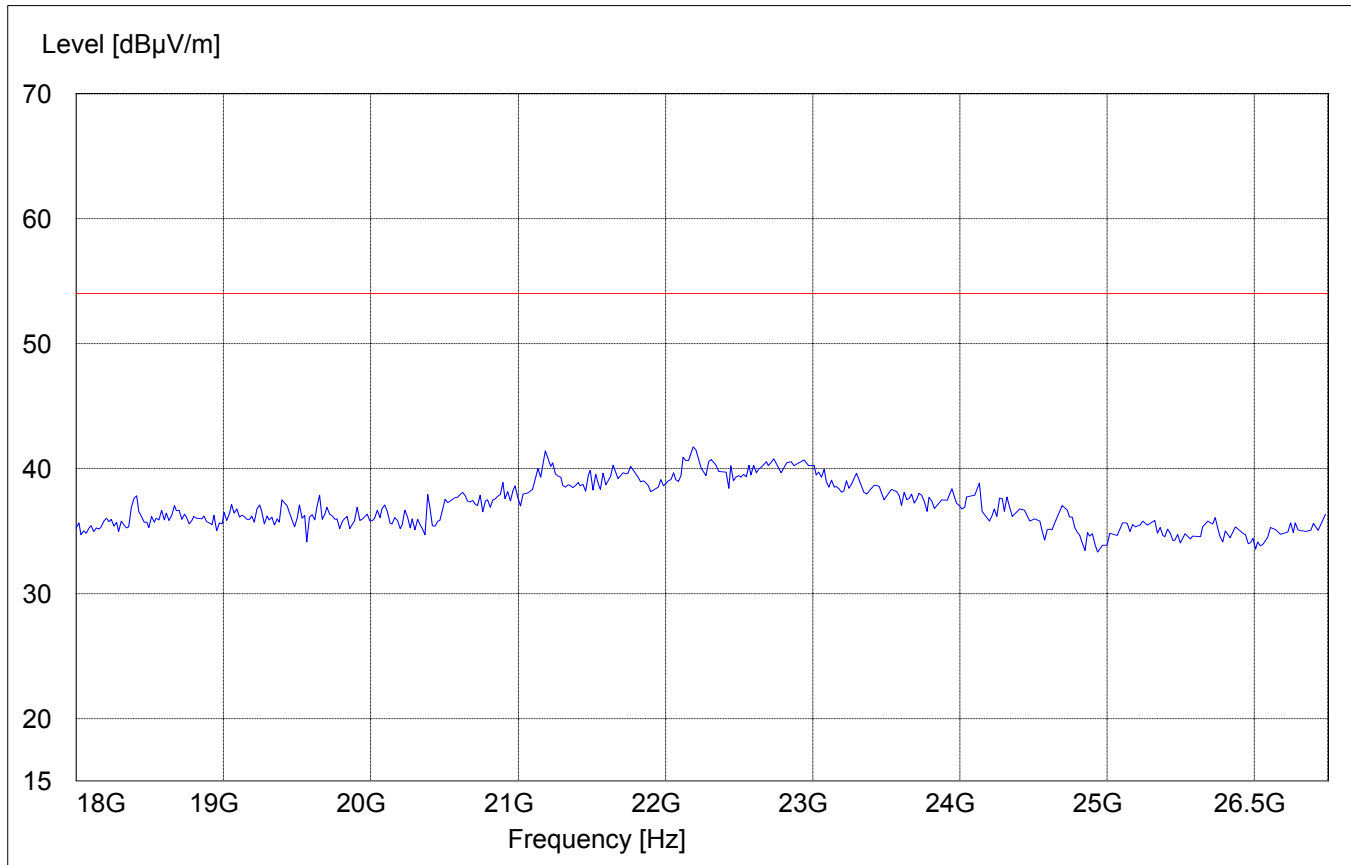




**RECEIVER SPURIOUS RADIATION  
18GHz – 25GHz**

§ 15.209

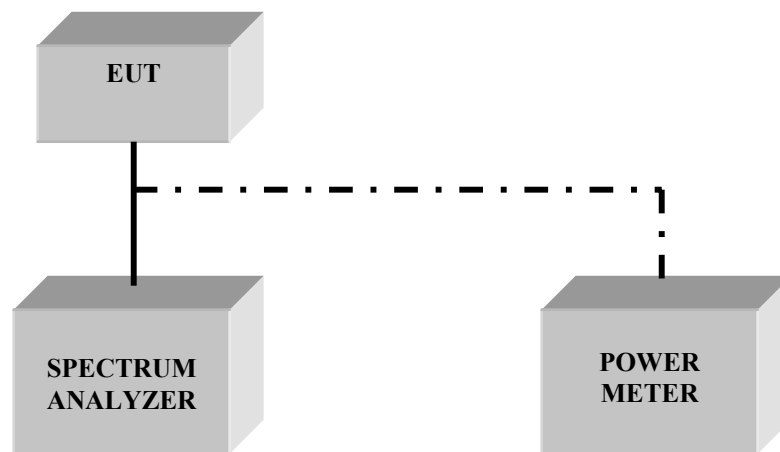
SWEEP TABLE:		"BT Spuri hi 18-25G"			
Short Description:		Bluetooth Spurious 18-25GHz			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)



**TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

<b>No</b>	<b>Instrument/Ancillary</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Serial No.</b>
<b>01</b>	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
<b>02</b>	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
<b>03</b>	Biconilog Antenna	3141	EMCO	0005-1186
<b>04</b>	Horn Antenna (700M-18GHz)	SAS-200/571	AH Systems	325
<b>05</b>	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
<b>06</b>	2-3GHz Band reject filter	BRM50701	Microtronics	6
<b>07</b>	Pre-Amplifier	TS-ANA	Rohde & Schwarz	--
<b>08</b>	Pre-Amplifier	JS4-00102600	Miteq	00616

**BLOCK DIAGRAMS**  
**Conducted Testing**



**Radiated Testing**

**ANECHOIC CHAMBER**

