

CETECOM Inc.



CETECOM Inc.

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Issued test report consists of 62 Pages

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<p>FCC LISTED, REG. NO.: 101450 & RECOGNIZED BY INDUSTRY CANADA IC – 3925</p>

Test report no.: 361FCC15.247/2002
FCC Part 15.247 for FHSS systems / CANADA RSS-210
(MT0760-UDIP Bluetooth USB Dongle Class 1)

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1	General information
1.1	Notes

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 generalisations 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: Mark Sechrist****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****Internet: www.cetecom.com**

1.3 Details of applicant

Name : **Microtune Inc.**
Street : **6440 Lusk Blvd., Suite D-205**
City / Zip Code : **San Diego, CA 92121**
Country : **U.S.A.**
Contact : **Kevin Lynaugh**
Telephone : **(858) 558-6088 ext. 197**
Tele-fax : **(858) 558-6598**
e-mail : **Kevin.lynaugh@microtune.com**

1.4 Application details

Date of receipt of application : 10/16/02
Date of receipt test item : 10/16/02
Date of test : 10/22/02, 10/23/02, 12/19/02, 12/20/02

1.5 Test item

Manufacturer : Microtune Inc.
Street Address : 6440 Lusk Blvd., Suite D-205
City / Zip Code : San Diego, CA 92121
Country : U.S.A.
Marketing Name : Bluetooth USB Dongle Class 1
Model No. : MT0760-UD1P
Description : [Wireless USB connectivity between Window's based hosts and common peripheral devices.](#)
FCC-ID : QR8-MT0760UD1P

Additional information

Frequency : 2402-2480 MHz
Type of modulation : GFSK
Number of channels : 79
Antenna : Internal
Power supply : 3.7 volt
Output power : Class 1
Extreme vol. Limits : 3.1 volt to 3.7 volt
Extreme temp. Tolerance : 0 to 55 degrees celsius

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

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:

2002-xx-xx EMC & Radio Lothar Schmidt (Manager)



Date

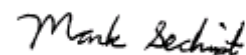
Section

Name

Signature

Responsible for test report and project leader:

2002-12-20 EMC & Radio Mark Sechrist (EMC Engineer)



Date

Section

Name

Signature

2.2 Test report

TEST REPORT

**Test report no. : EMC361FCC15.247/2002
(MT0760-UD1P Bluetooth USB Dongle Class 1)**

TEST REPORT REFERENCE

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ANTENNA GAIN**§ 15.204**

The antenna gain of the complete system is calculated by the difference of conducted power of the module and the radiated power in EIRP.

	Low channel	Mid channel	High channel
Conducted Power	11.81 dBm	12.02 dBm	12.24dBm
Raidated Power (EIRP)	10.53 dBm	10.26 dBm	9.87 dBm
Antenna Gain	-1.28 dBi	-1.76 dBi	-2.37 dBi

The calculated antenna gain is between –1.28 dBi and –2.37 dBi.

CARRIER FREQUENCY SEPERATION

§15.247(a)

Cfs.wmf



Delta 1 [T1]

RBW 30 kHz RF Att 40 dB

Ref Lvl

-0.47 dB

VBW 100 kHz

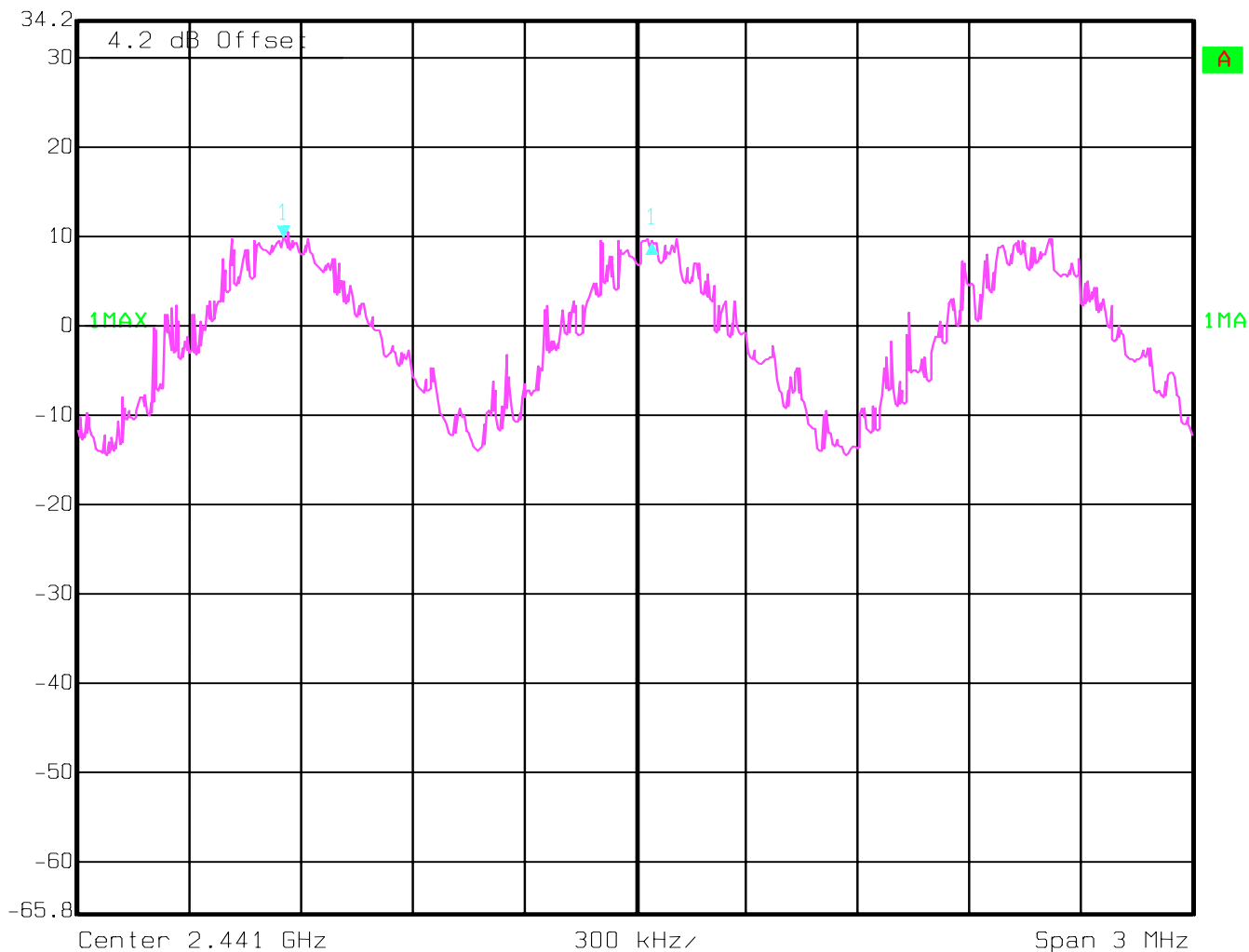
34.2 dBm

991.98396794 kHz

SWT 8.5 ms

Unit

dBm



Date: 19.DEC.2002 08:03:34

NUMBER OF HOPPING CHANNELS

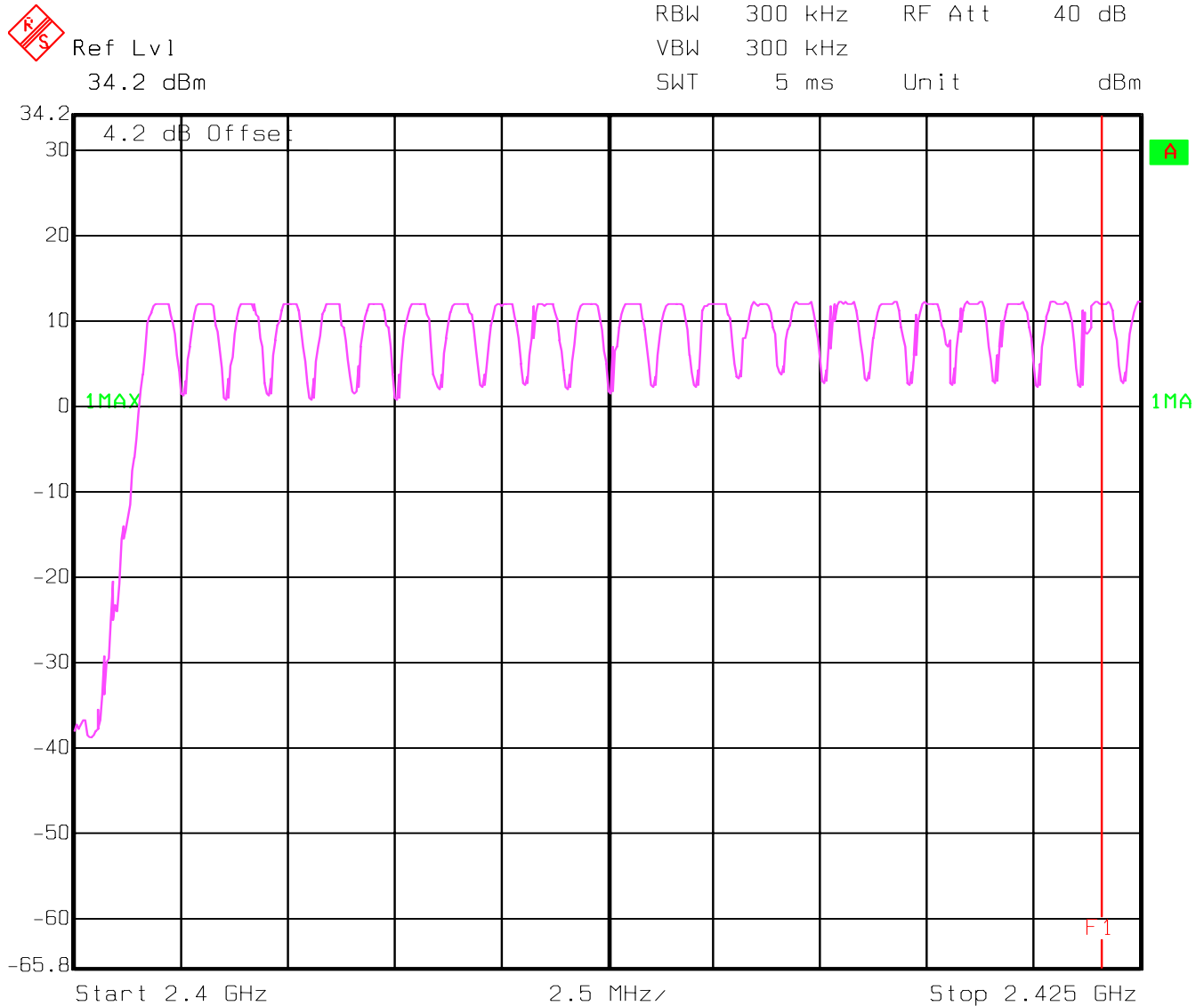
§15.247(a)

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 23

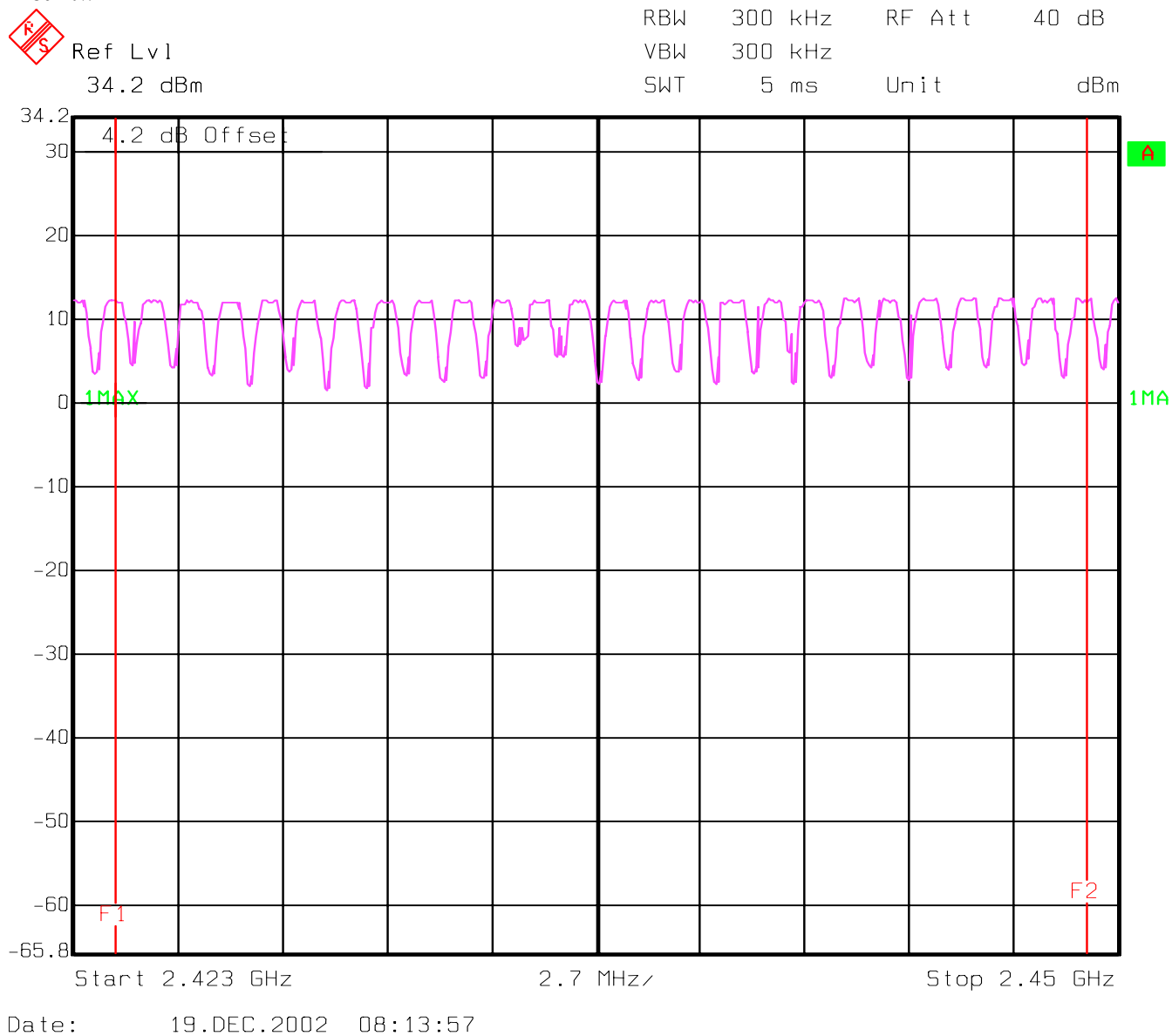
Plot-1.wmf



Date: 19.DEC.2002 08:12:12

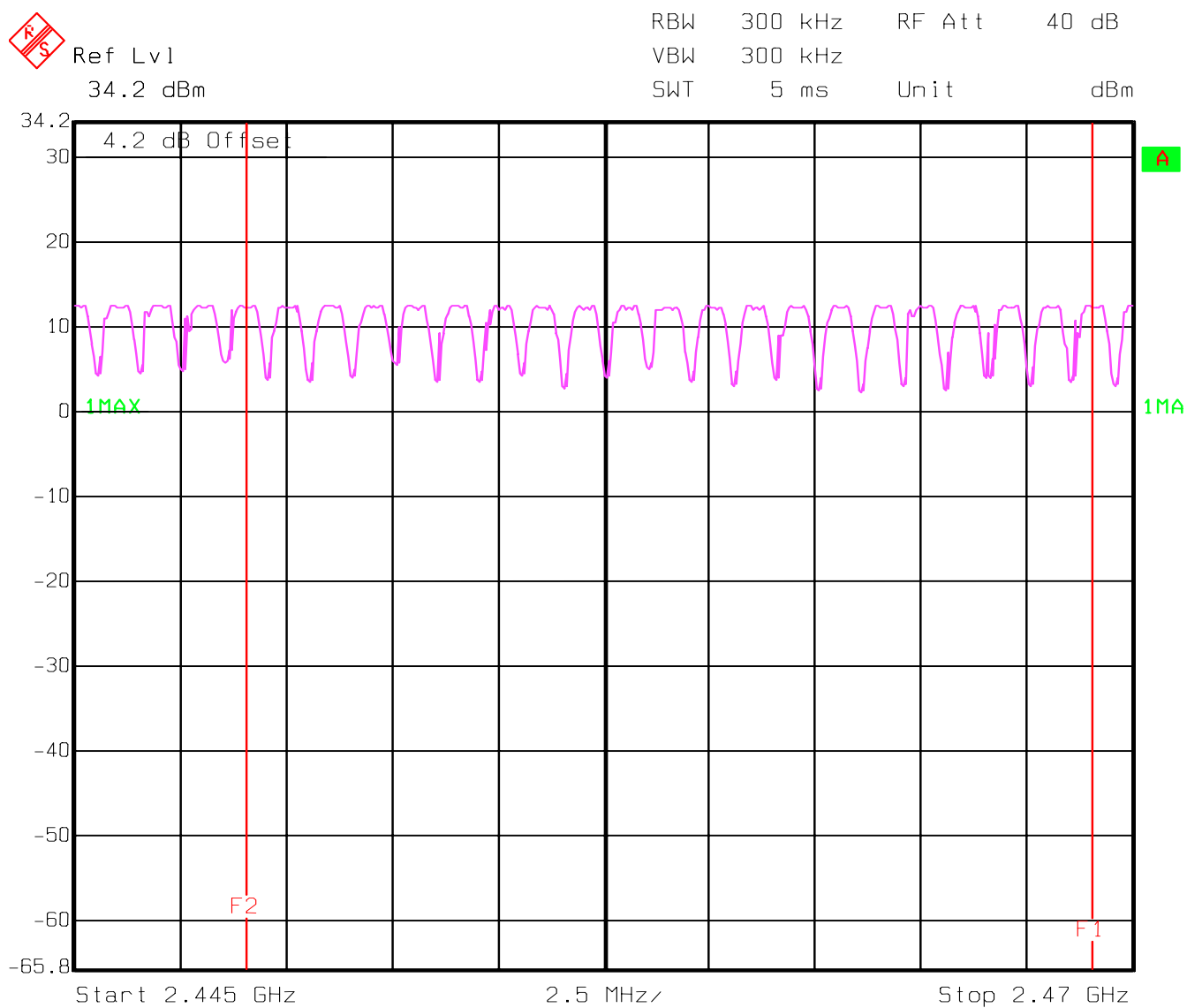
Plot 2: Total 25

Plot-2.wmf



Plot 3: Total 20

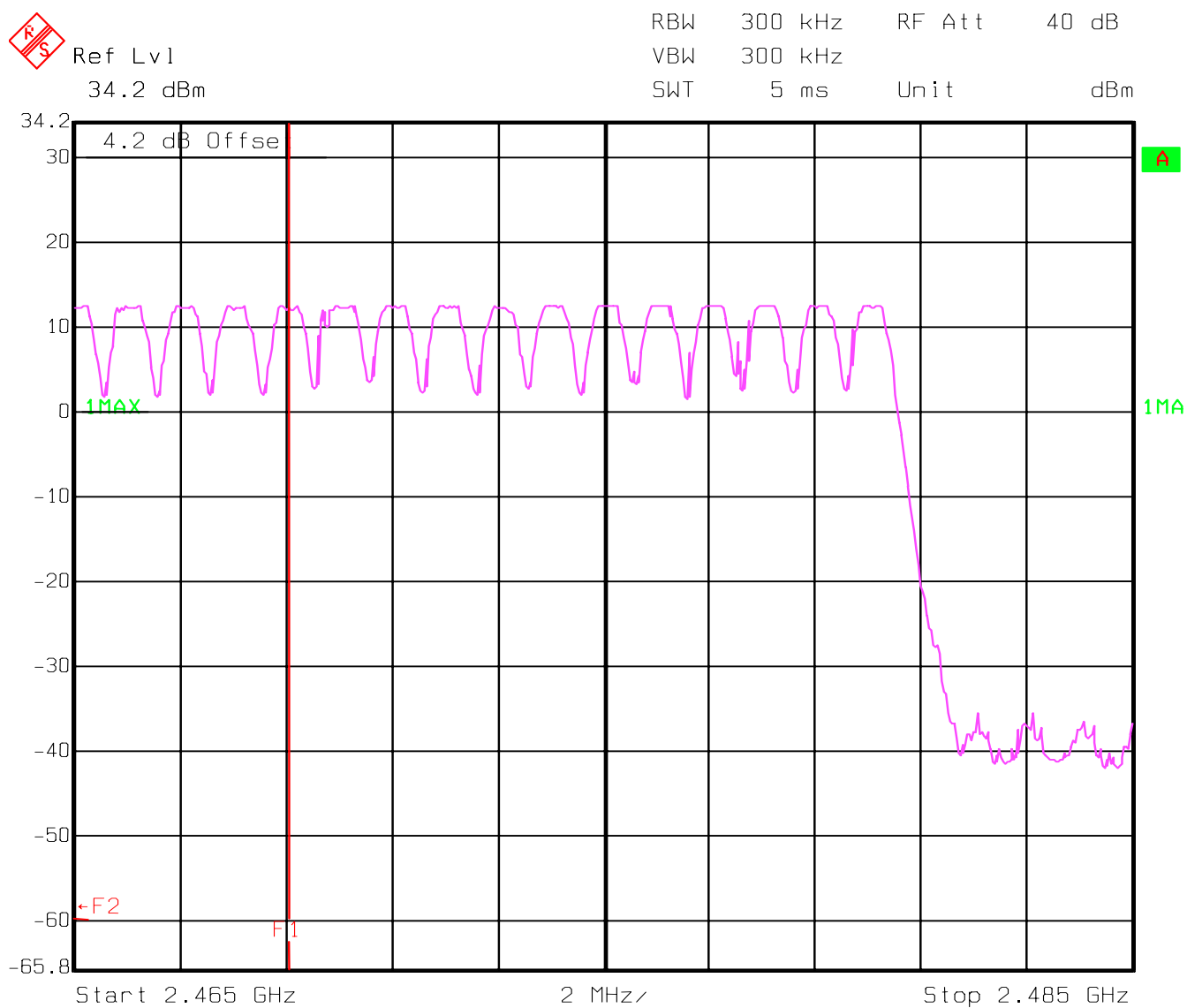
Plot-3.wmf



Date: 19.DEC.2002 08:16:38

Plot 4: Total 11

Plot-4.wmf



Date: 19.DEC.2002 08:18:10

TIME OF OCCUPANCY (DWEELL TIME)

§15.247(a)

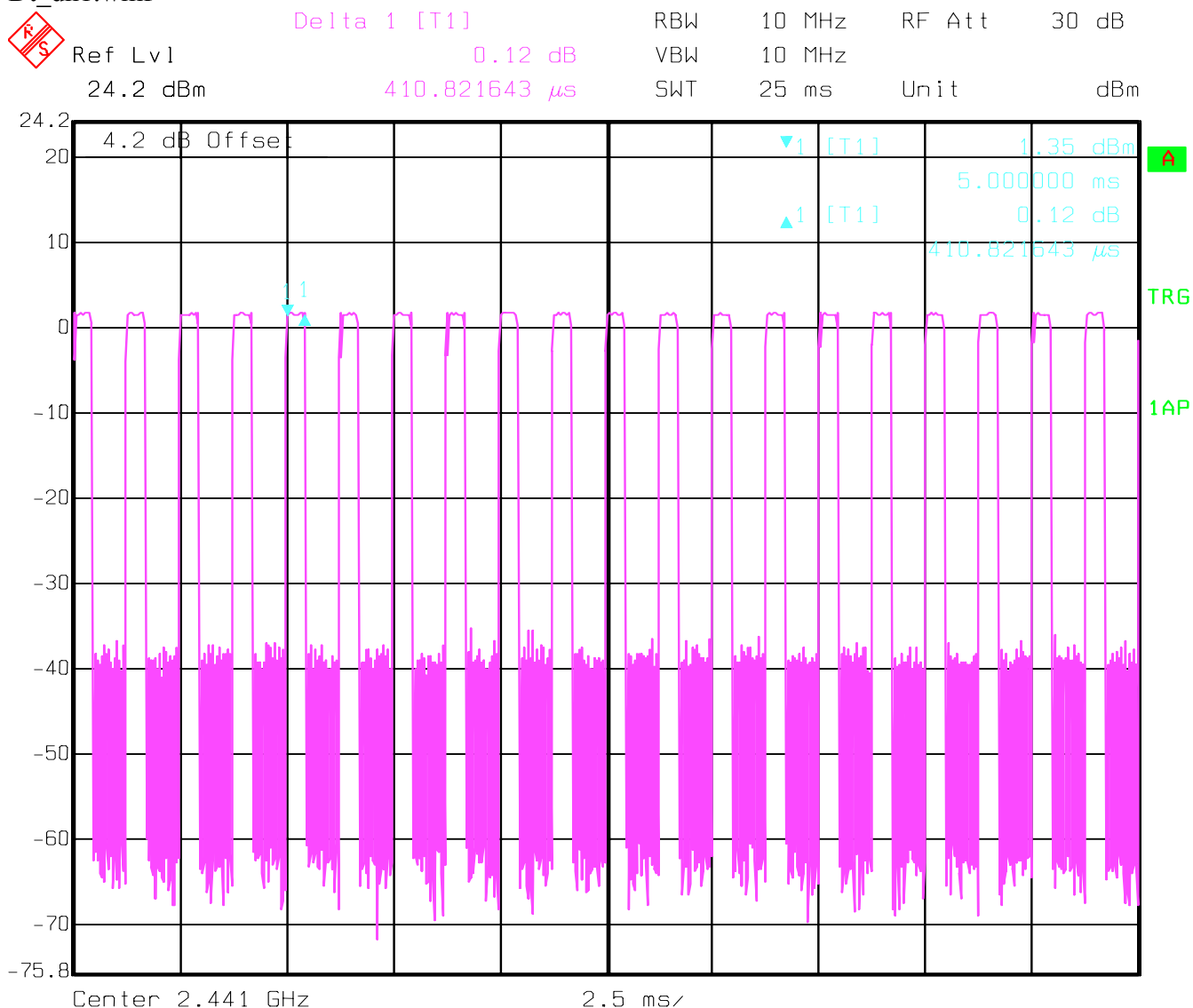
DH1 – Packet

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 30 seconds you have 303.9 times of appearance .

Each Tx-time per appearance is xxxx µs.

So we have $303.9 * 410.82 \mu s = 124.85 \text{ ms}$ per 30 seconds.

Dt_dh1.wmf



Date: 20.DEC.2002 04:59:01

TIME OF OCCUPANCY (DWELL TIME)

§15.247(a)

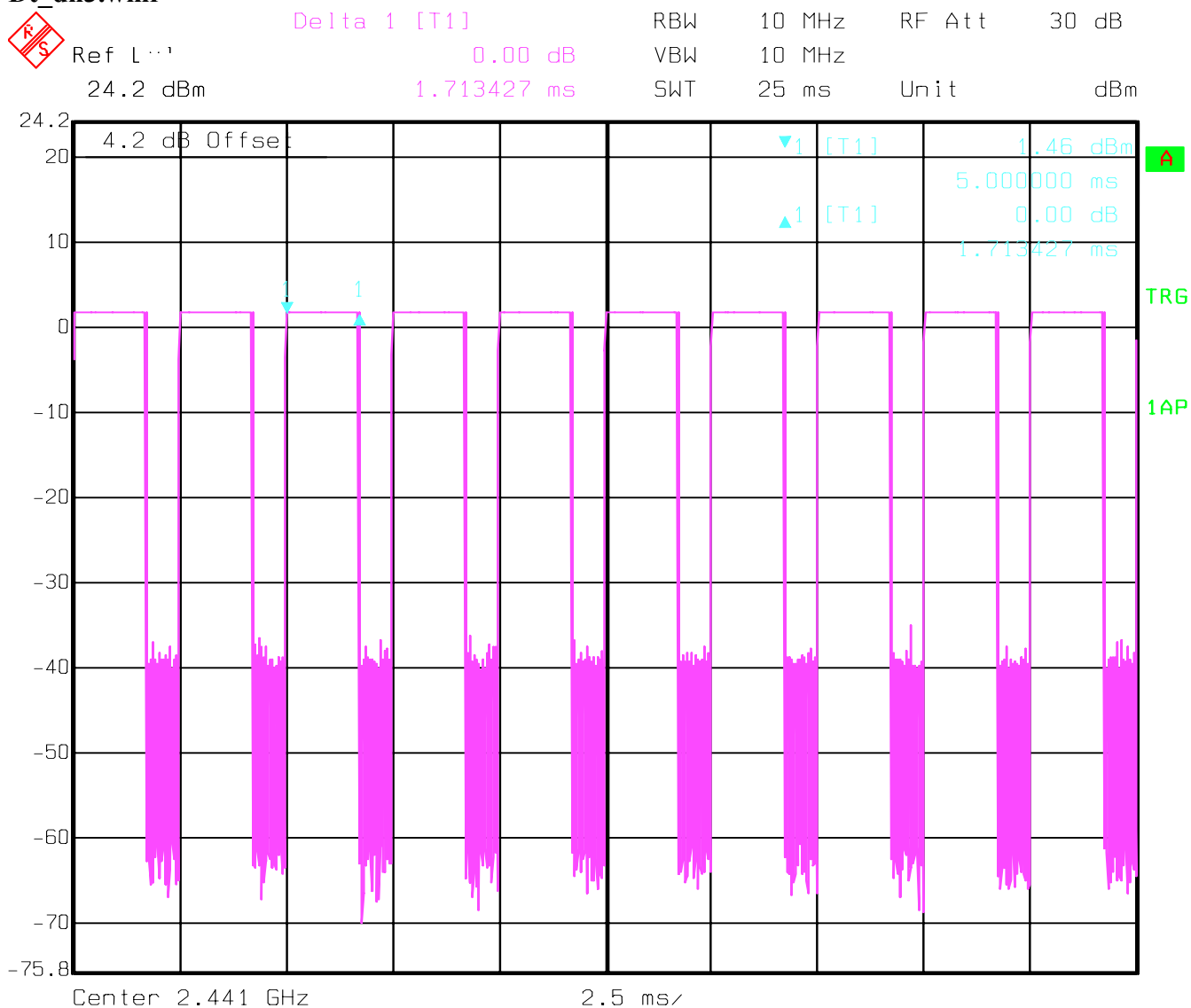
DH3 – Packet

A DH3 Packets need 3 time slots for transmit and 1 for receicing, 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 30 seconds you have 153 times of appearance .

Each Tx-time per appearance is xxxx ms.

So we have $153 * 1.713 \text{ ms} = 262.09 \text{ ms}$ per 30 seconds.

Dt_dh3.wmf



Date: 20.DEC.2002 04:57:03

TIME OF OCCUPANCY (DWELL TIME)

§15.247(a)

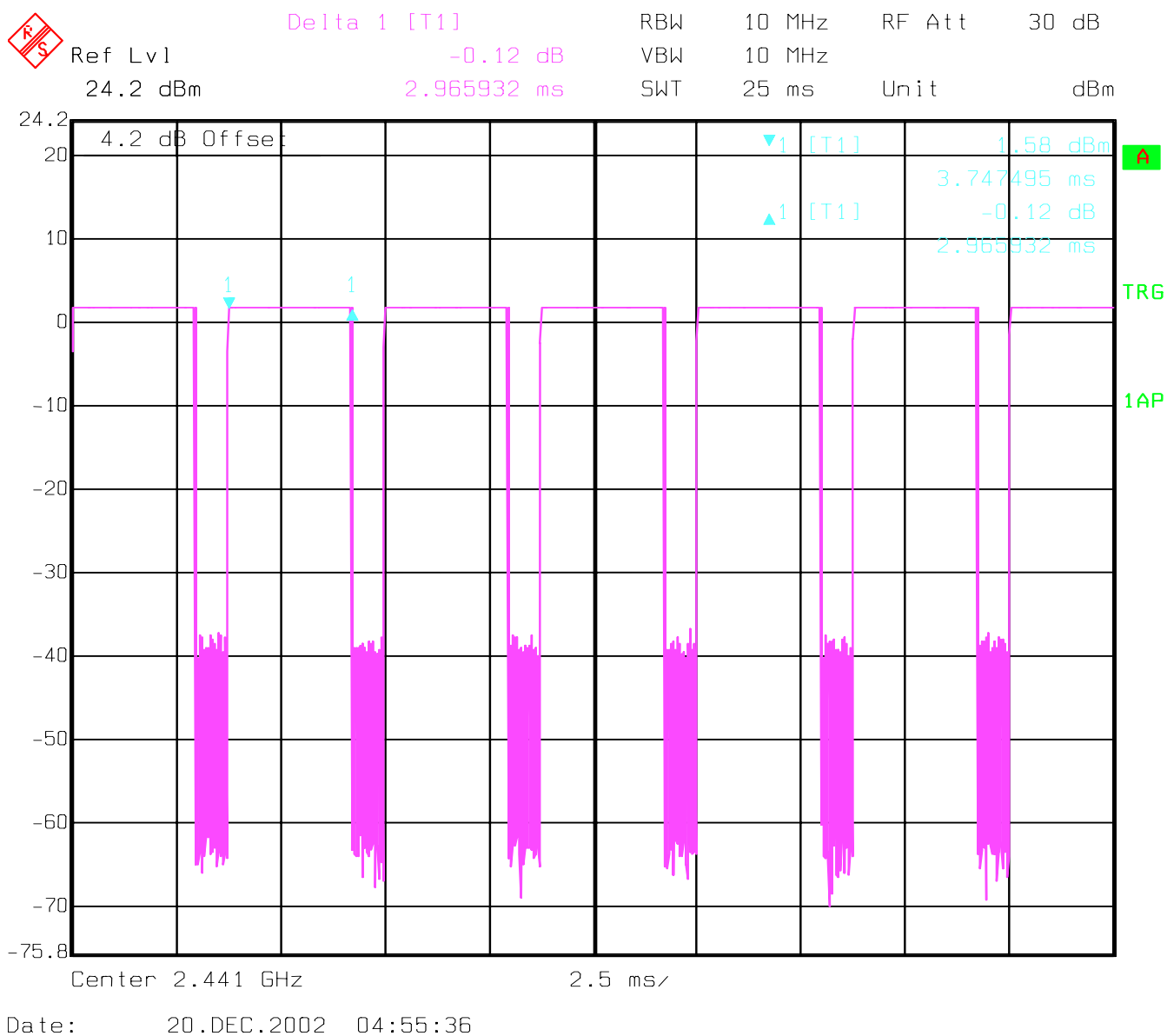
DH5 – Packet

At DH5 Packets you need 5 time slots for transmit and 1 for receicing,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 100.8 times of appearance .

Each tx-time per appearance is xxxx ms.

So we have $100.8 * 2.966\text{ms} = 298.97\text{ ms}$ per 30 seconds.

Dt_dh5.wmf



SPECTRUM BANDWIDTH OF FHSS SYSTEM**§15.247(a)****20 dB bandwidth**

TEST CONDITIONS		20 dB BANDWIDTH (kHz)		
Frequency (MHz)		2402	2440	2480
T _{nom} (23)°C	V _{nom} 3.7)VDC	729.46 kHz	817.63 kHz	905.81 kHz

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

LIMIT**SUBCLAUSE §15.247(a) (1)****The maximum 20dB bandwith shall be at maximum 1000 KHz**

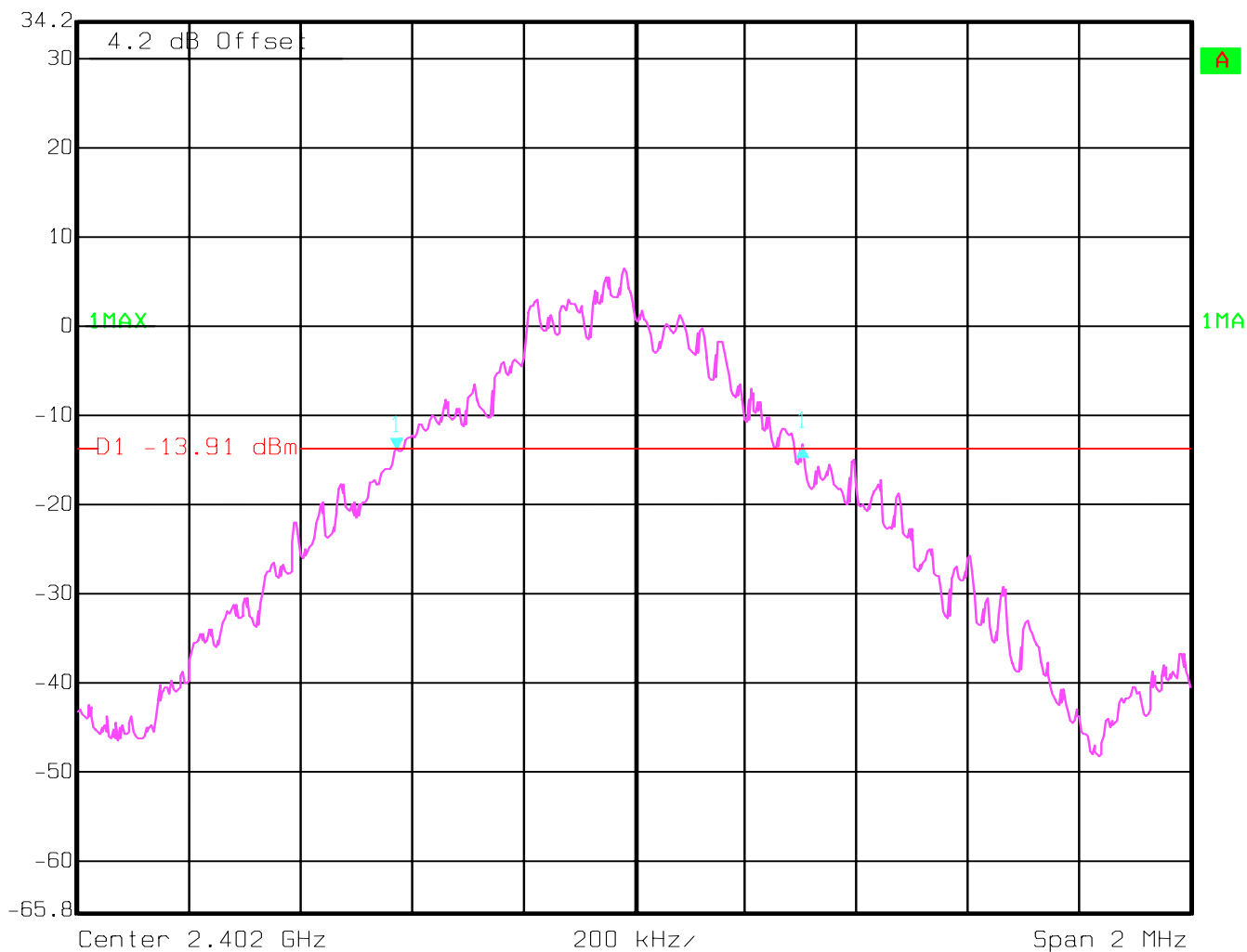
SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

Lowest Channel: 2402MHz

Sbw-1.wmf

	Delta 1 [T1]	RBW	10 kHz	RF Att	40 dB
	Ref Lvl	0.51 dB	VBW	10 kHz	
	34.2 dBm	729.45891783 kHz	SWT	50 ms	Unit dBm



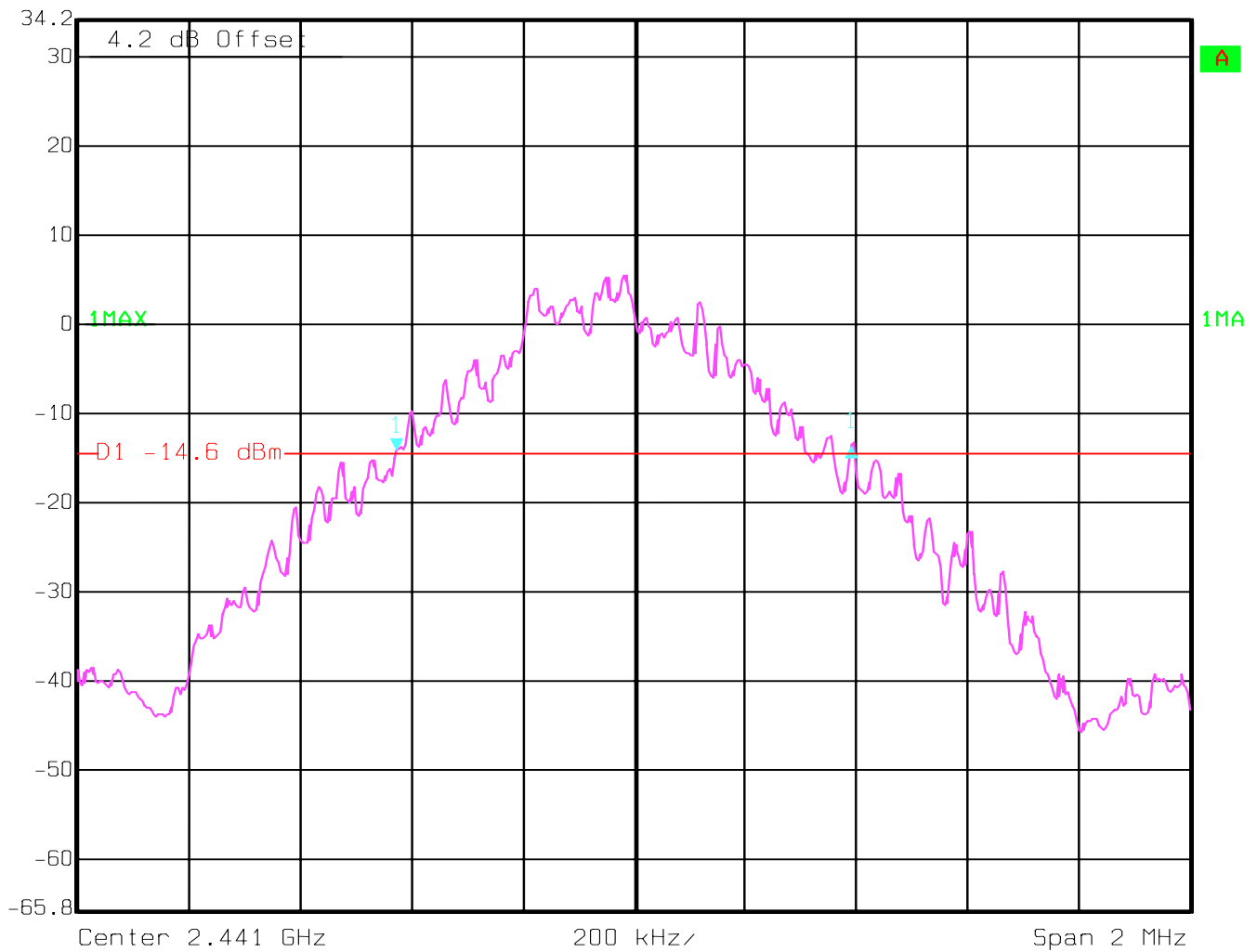
Date: 19.DEC.2002 06:52:39

SPECTRUM BANDWIDTH OF FHSS SYSTEM §15.247(a) 20 dB bandwidth

Mid Channel: 2440MHz

Sbw-2.wmf

	Delta 1 [T1]	RBW	10 kHz	RF Att	40 dB
	Ref Lvl	0.52 dB	VBW	10 kHz	
	34.2 dBm	817.63527054 kHz	SWT	50 ms	Unit dBm



Date: 19.DEC.2002 06:55:08

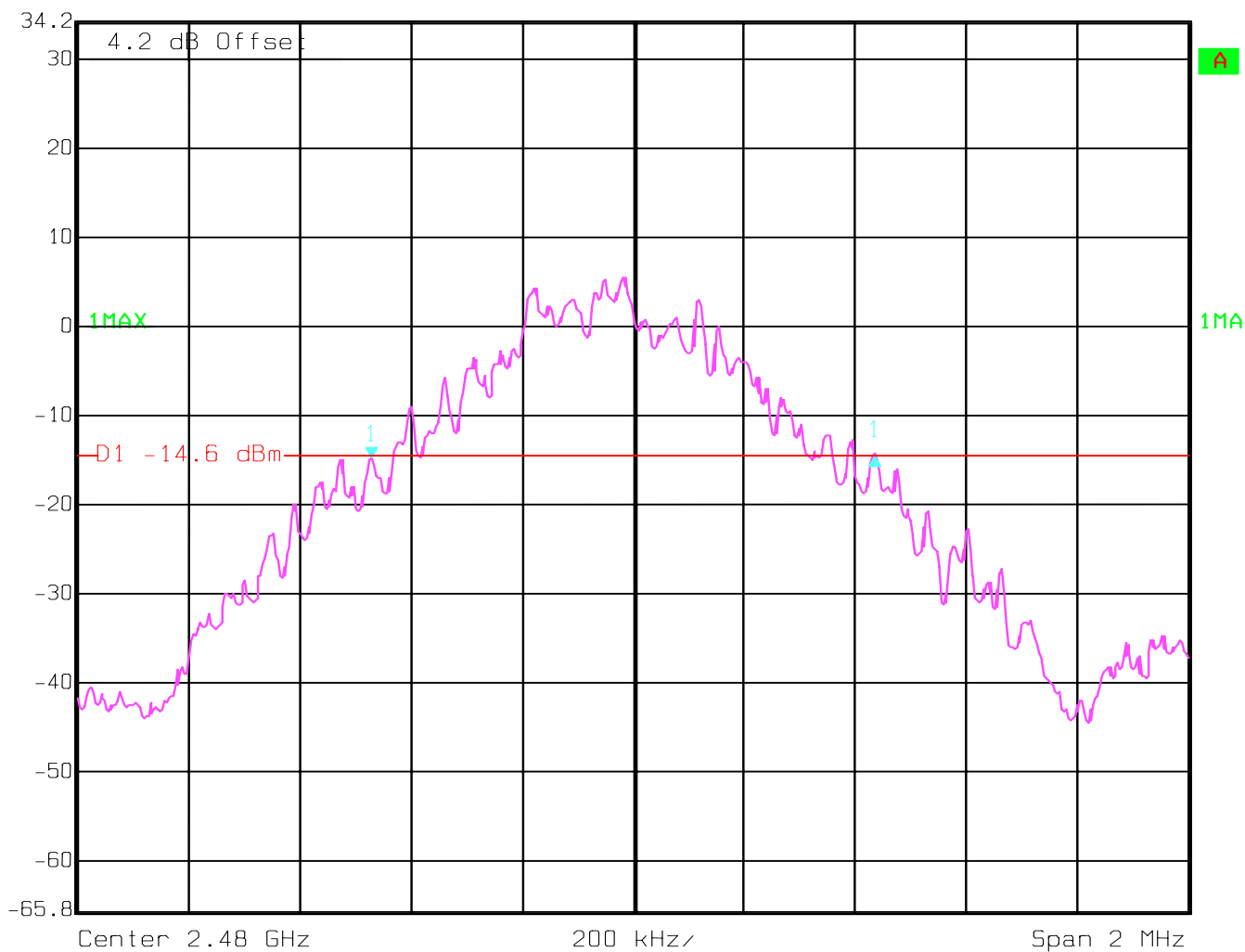
SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

Highest Channel: 2480MHz

Sbw-3.wmf

	Delta 1 [T1]	RBW	10 kHz	RF Att	40 dB
Ref Lvl	0.35 dB	VBW	10 kHz		
34.2 dBm	905.81162325 kHz	SWT	50 ms	Unit	dBm



Date: 19.DEC.2002 06:57:16

POWER SPECTRAL DENSITY**§15.247 (d)**

TEST CONDITIONS		POWER SPECTRAL DENSITY (dBm)		
Frequency (MHz)		2402	2440	2480
T _{nom} (23)°C	V _{nom} (3.7)VDC	-0.22 dBm	-0.34 dBm	0.07 dBm

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

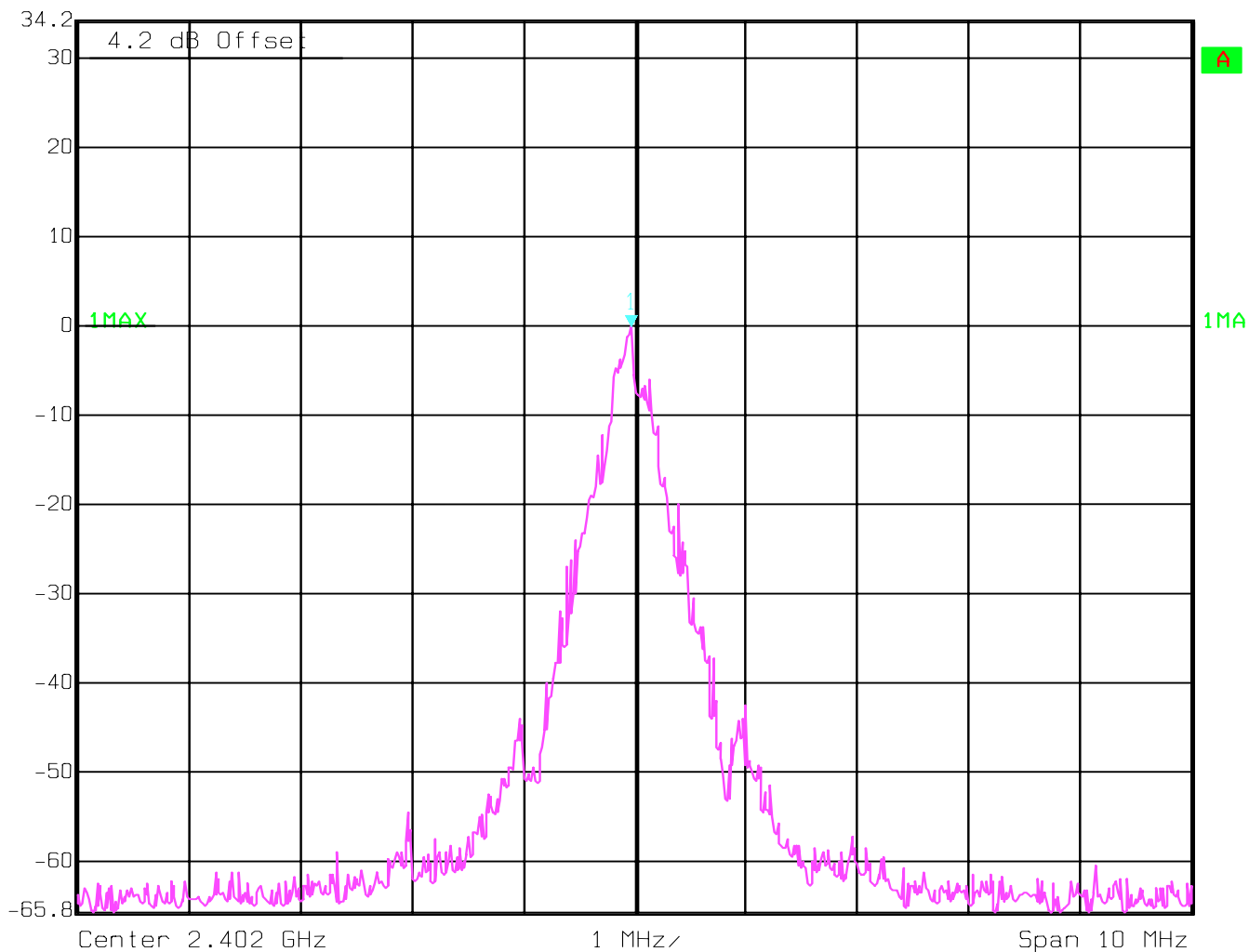
POWER SPECTRAL DENSITY

§15.247(d)

Lowest Channel: 2402MHz

Psd-1.wmf

	Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	40 dB
	34.2 dBm	-0.22 dBm	VBW	3 kHz		
		2.40196994 GHz	SWT	2.8 s	Unit	dBm



Date: 19.DEC.2002 07:30:16

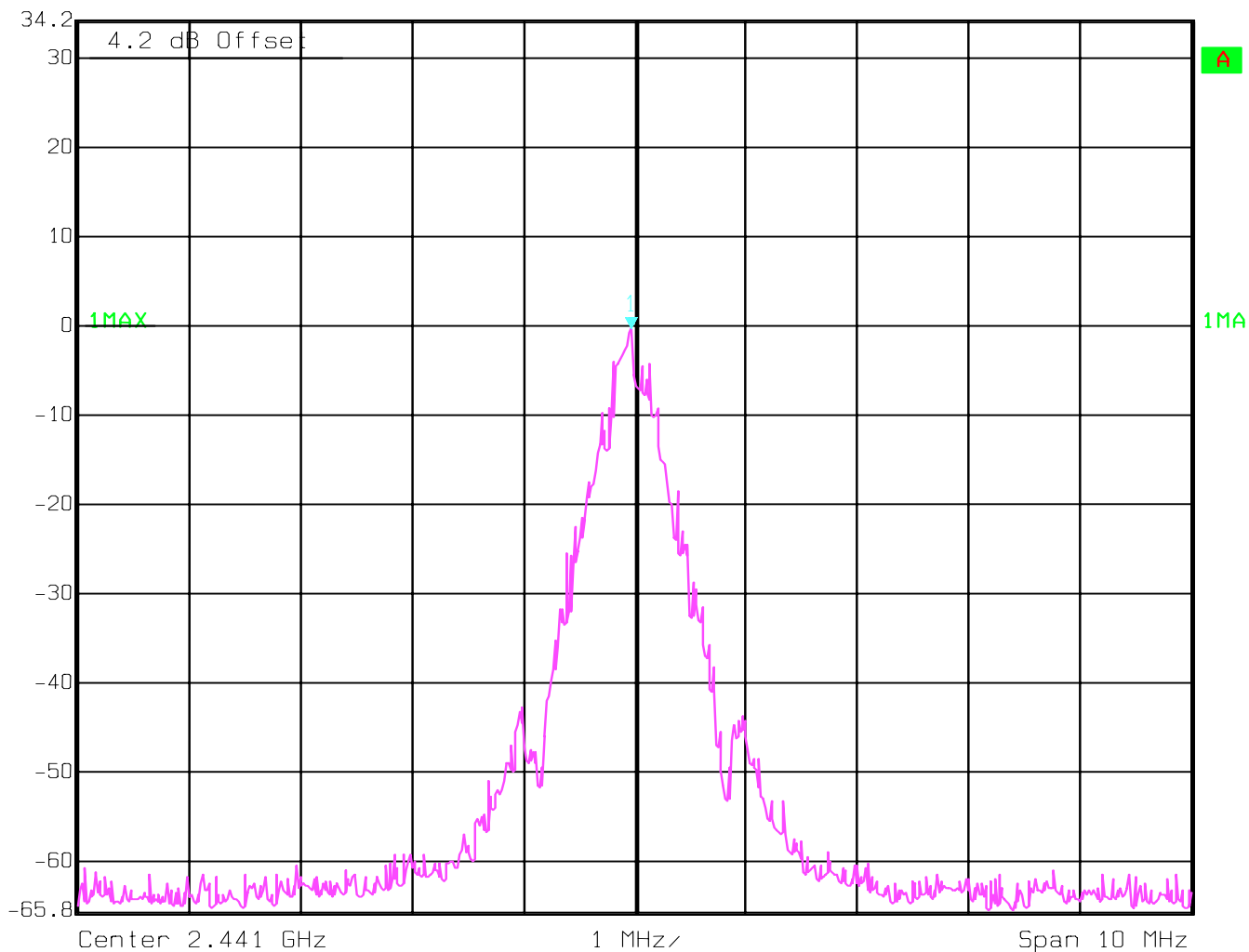
POWER SPECTRAL DENSITY

§15.247(d)

Middle Channel: 2440MHz

Psd-2.wmf

	Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	40 dB
	34.2 dBm	-0.34 dBm	VBW	3 kHz		
		2.44096994 GHz	SWT	2.8 s	Unit	dBm



Date: 19.DEC.2002 07:32:03

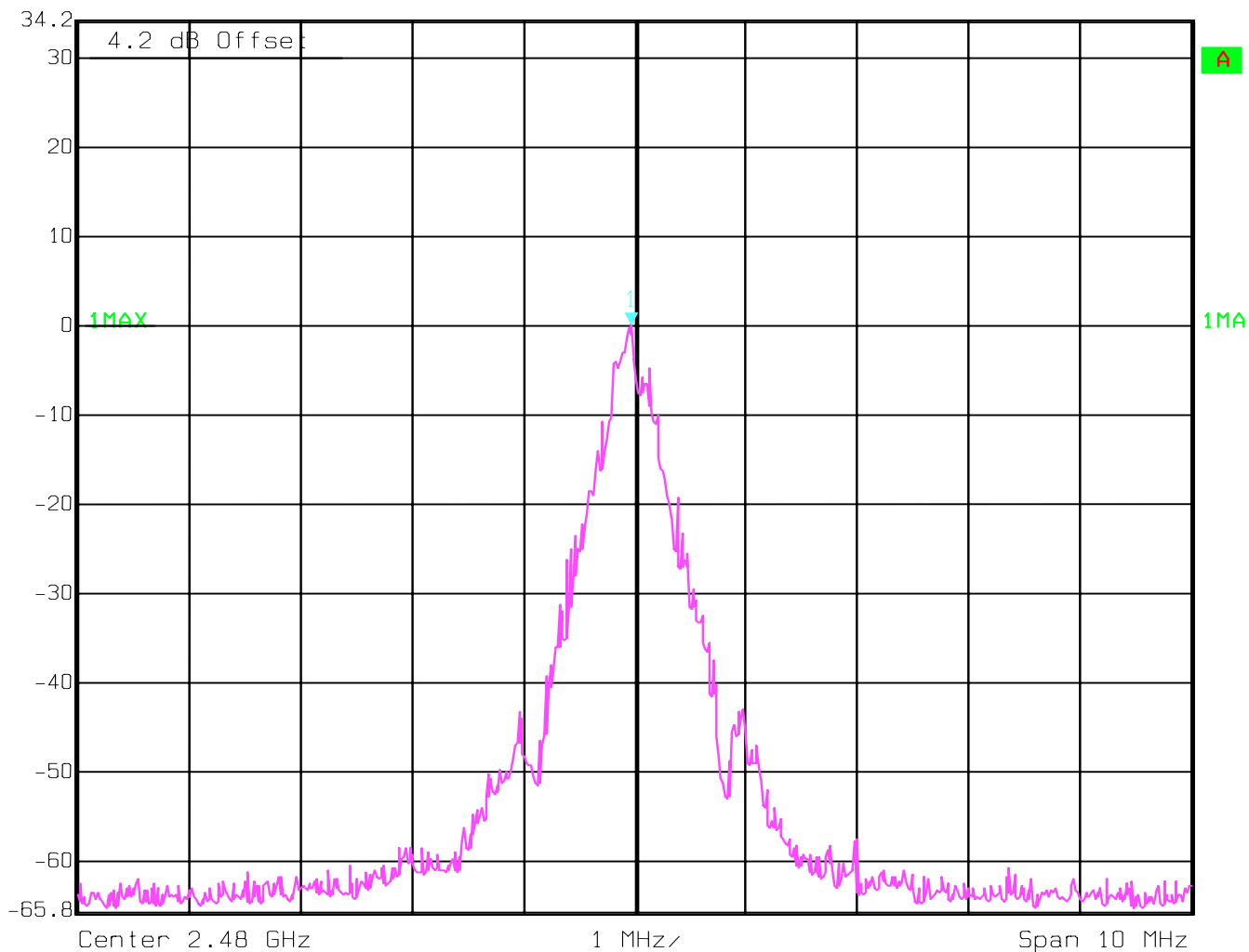
POWER SPECTRAL DENSITY

§15.247(d)

Highest Channel: 2480MHz

Psd-3.wmf

	Marker 1 [T1]	RBW	3 kHz	RF Att	40 dB
Ref Lvl	0.07 dBm	VBW	3 kHz		
34.2 dBm	2.47996994 GHz	SWT	2.8 s	Unit	dBm



Date: 19.DEC.2002 07:33:48

MAXIMUM PEAK OUTPUT POWER (conducted)**§ 15.247 (b) (1)**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2440	2480
T _{nom} (23)°C	V _{nom} (3.7)VDC	11.81 dBm	12.02 dBm	12.24 dBm
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

Conpp-1.wmf



Ref Lvl

34.2 dBm

Marker 1 [T1]

11.81 dBm

2.40182966 GHz

RBW

3 MHz

RF Att

40 dB

VBW

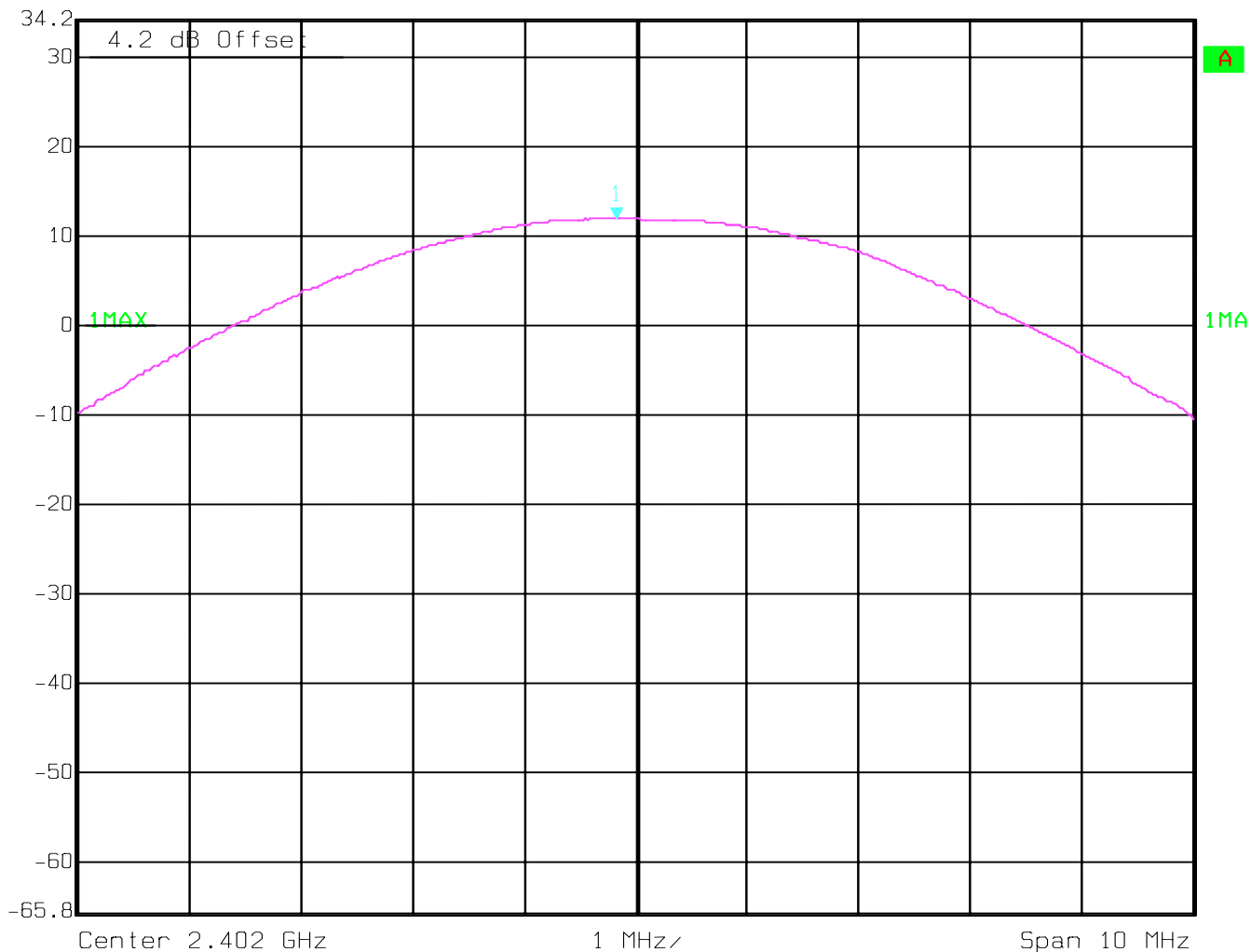
3 MHz

SWT

5 ms

Unit

dBm



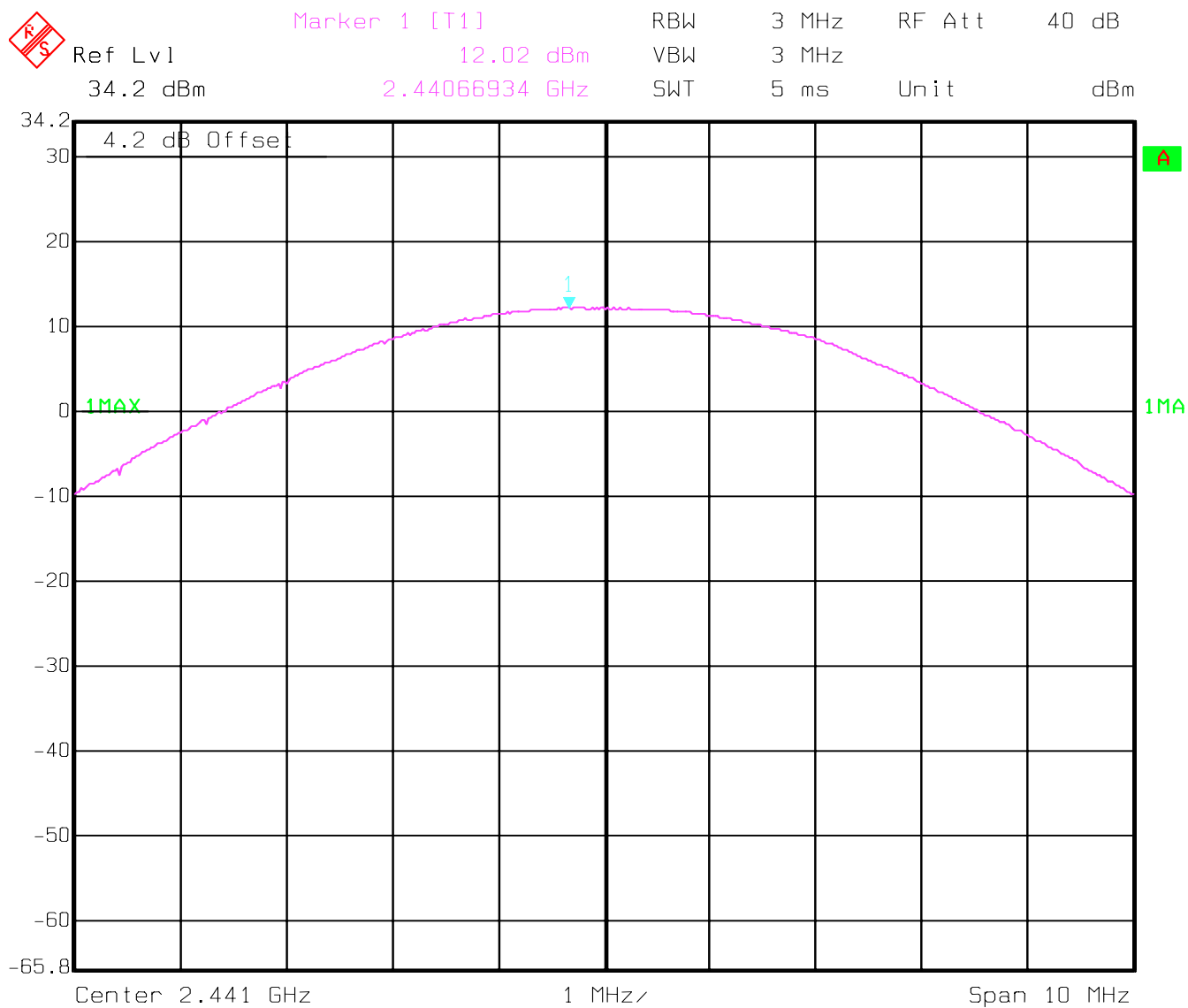
Date: 19.DEC.2002 07:00:33

PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Mid Channel: 2441MHz

Conpp-2.wmf



Date: 19.DEC.2002 07:01:50

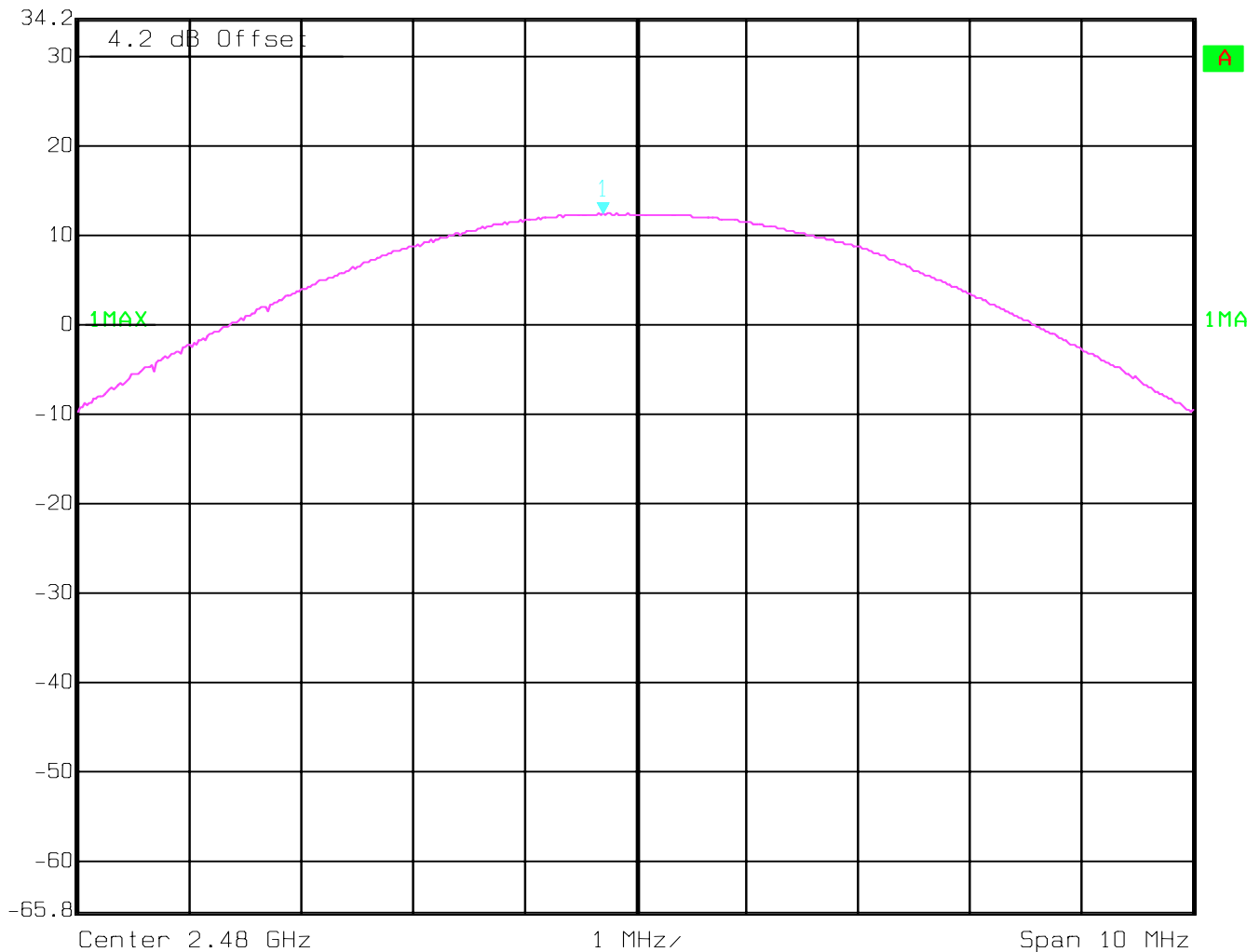
PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Highest Channel: 2480MHz

Conpp-3.wmf

	Marker 1 [T1]	RBW	3 MHz	RF Att	40 dB
Ref Lvl	12.24 dBm	VBW	3 MHz		
34.2 dBm	2.47970942 GHz	SWT	5 ms	Unit	dBm



Date: 19.DEC.2002 07:03:06

MAXIMUM PEAK OUTPUT POWER (Radiated) § 15.247 (b) (1)**EIRP:**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2440	2480
T _{nom} (23)°C	V _{nom} (xx)VDC	10.53 dBm	10.26 dBm	9.87 dBm
Measurement uncertainty		±0.5dBm		

RBW/VBW : 3 MHz

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

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

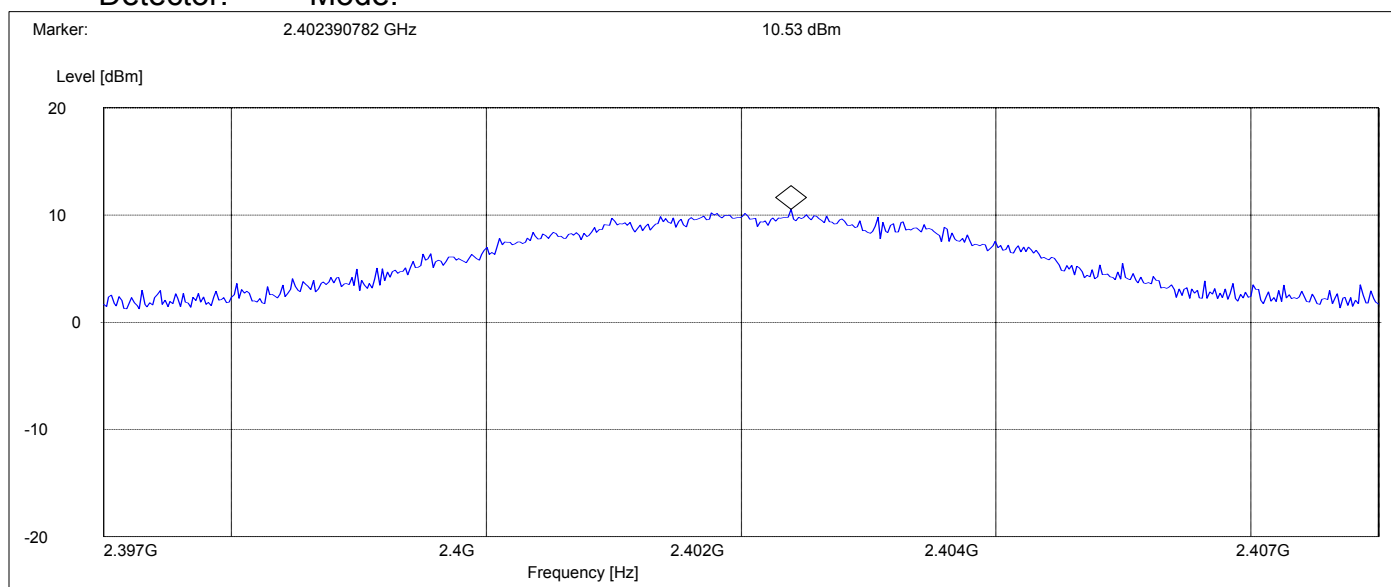
SWEEP TABLE: "EIRP BT low channel"

Short Description: EIRP Bluetooth channel-2402MHz

Start	Stop	Detector	Meas.	IF
Frequency	Frequency		Time	BW
2.397GHz	2.407GHz	MaxPeak	Coupled	3 MHz

eirp-1.rtf

Detector: Mode:



PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

Mid Channel: 2441MHz

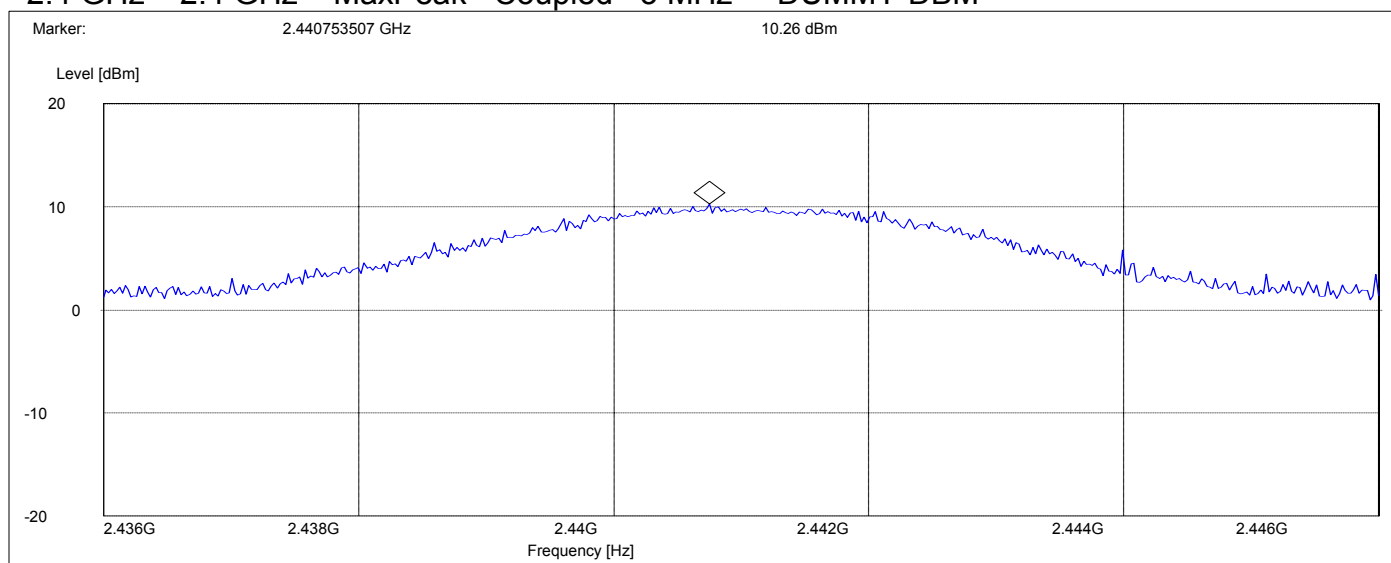
SWEEP TABLE: "EIRP BT Mid channel"

Short Description: EIRP Bluetooth channel-2441MHz

Start	Stop	Detector	Meas.	IF
Frequency	Frequency		Time	BW
2.435GHz	2.445GHz	MaxPeak	Coupled	3 MHz

eirp-2.rtf

2.4 GHz 2.4 GHz MaxPeak Coupled 3 MHz DUMMY-DBM



PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

Highest Channel: 2480MHz

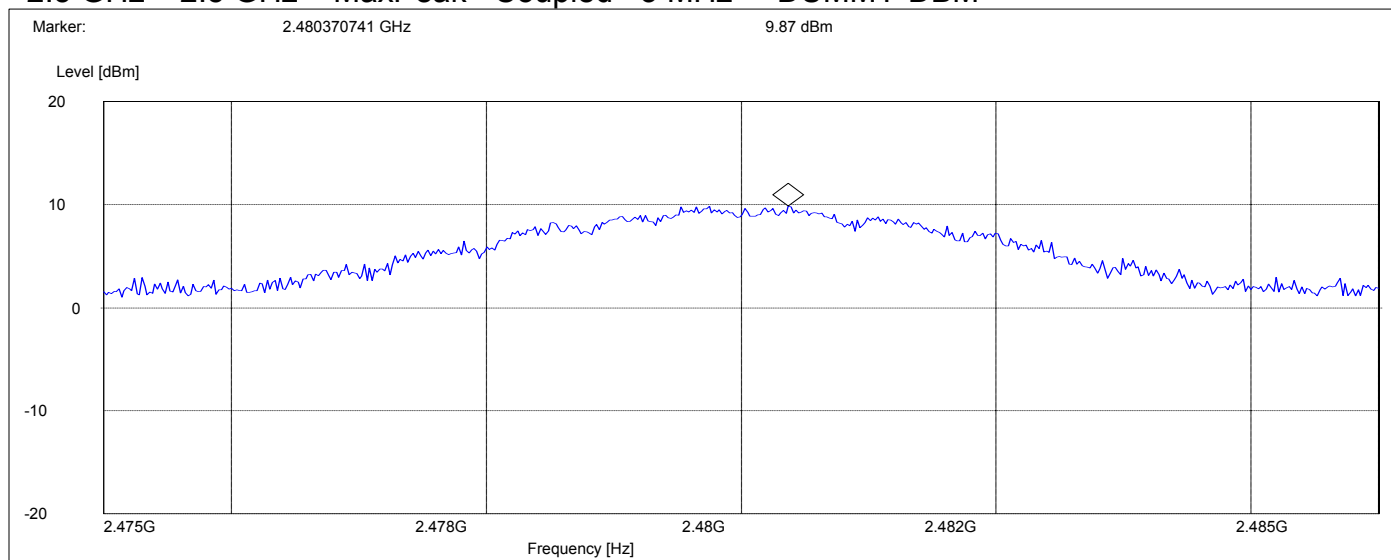
SWEEP TABLE: "EIRP BT High channel"

Short Description: EIRP Bluetooth channel-2480MHz

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

eirp-3.rtf

2.5 GHz 2.5 GHz MaxPeak Coupled 3 MHz DUMMY-DBM



BAND EDGE COMPLIANCE

§15.247 (c)

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

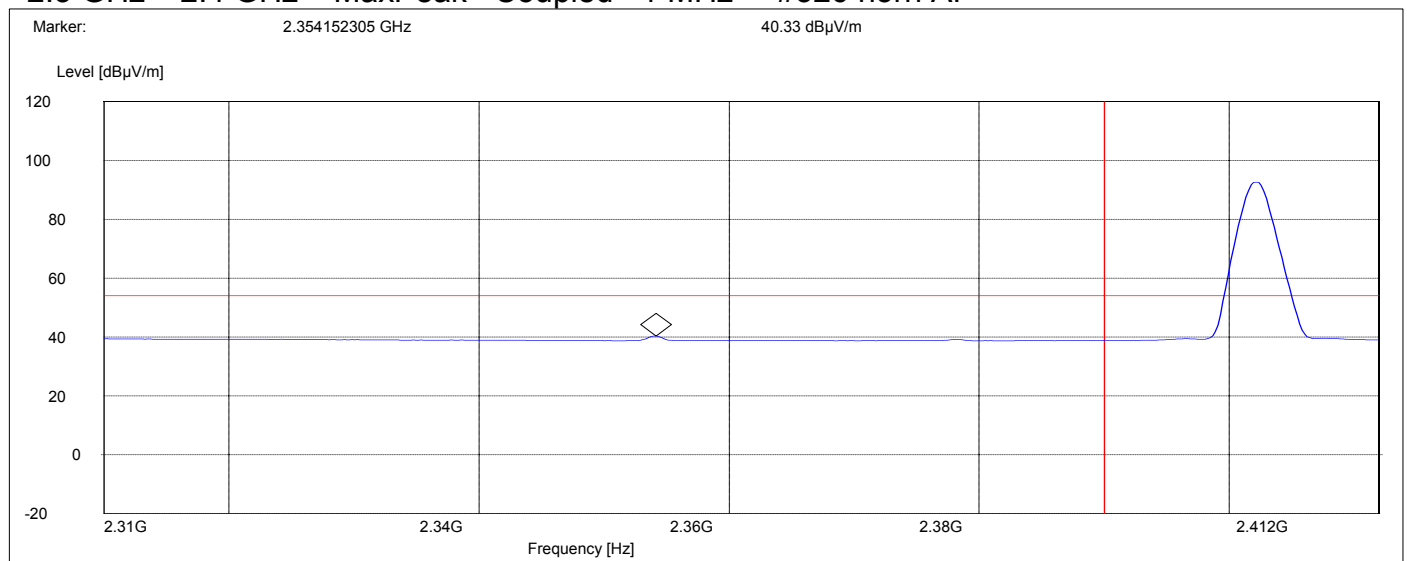
(Hopping – OFF, Average measurement)

Operating condition : Tx at 2402MHz
 SWEEP TABLE : "FCC15.247 LBE_AVG"
 Short Description : FCC15.247 BT Low-band-edge
 Limit Line : 54dBμV

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

lbe_avnh.rtf

2.3 GHz 2.4 GHz MaxPeak Coupled 1 MHz #326 horn AF



BAND EDGE COMPLIANCE

§15.247 (c)

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

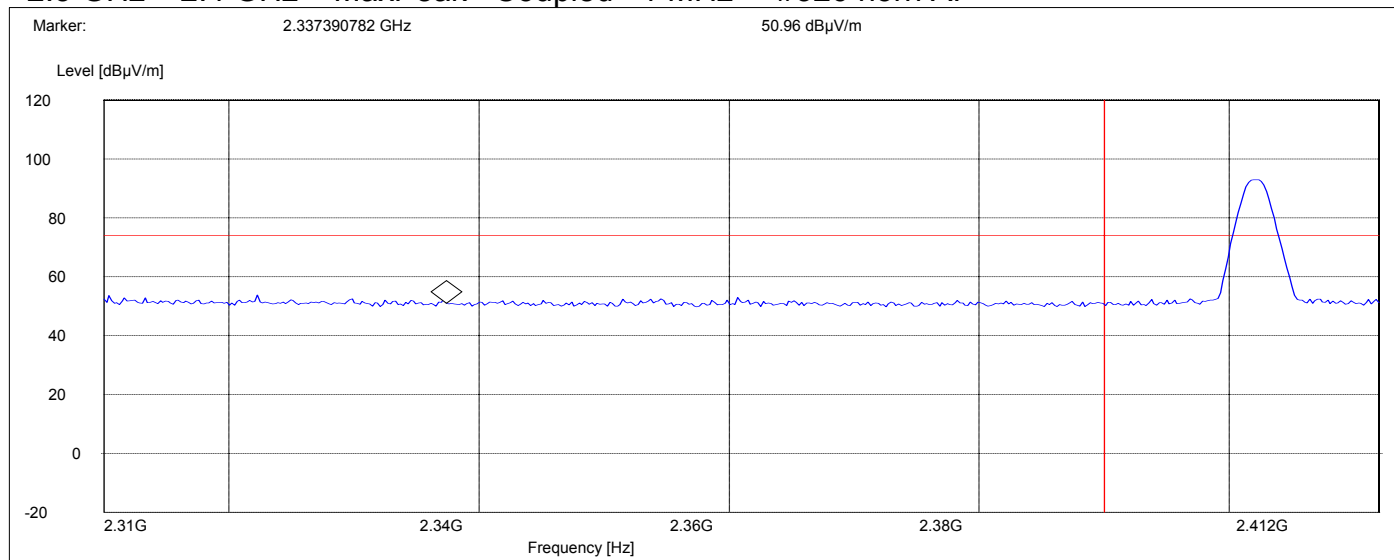
(Hopping – OFF, Peak measurement)

Operating condition : Tx at 2402MHz
 SWEEP TABLE : "FCC15.247 LBE_Pk"
 Short Description : FCC15.247 BT Low-band-edge
 Limit Line : 74dBμV

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

lbe_pknh.rtf

2.3 GHz 2.4 GHz MaxPeak Coupled 1 MHz #326 horn AF



BAND EDGE COMPLIANCE

§15.247 (c)

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

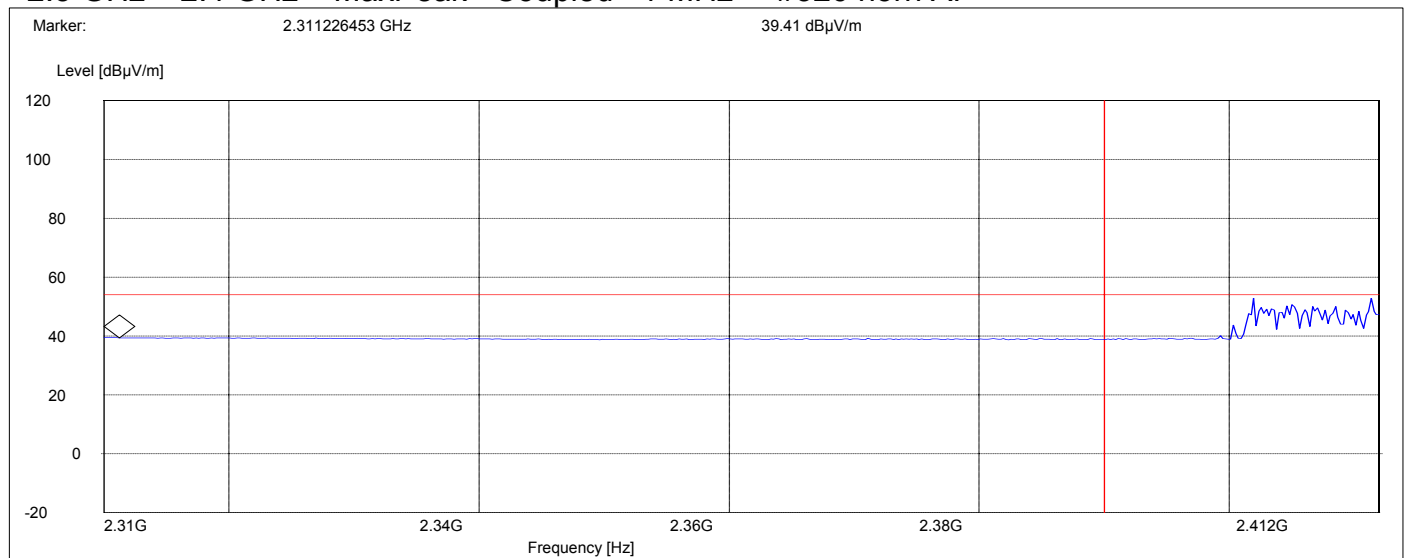
(Hopping – ON, Average measurement)

Operating condition : Tx at 2402MHz
 SWEEP TABLE : "FCC15.247 LBE_AVG"
 Short Description : FCC15.247 BT Low-band-edge
 Limit Line : 54dBμV

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

lbe_avh.rtf

2.3 GHz 2.4 GHz MaxPeak Coupled 1 MHz #326 horn AF



BAND EDGE COMPLIANCE

§15.247 (c)

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

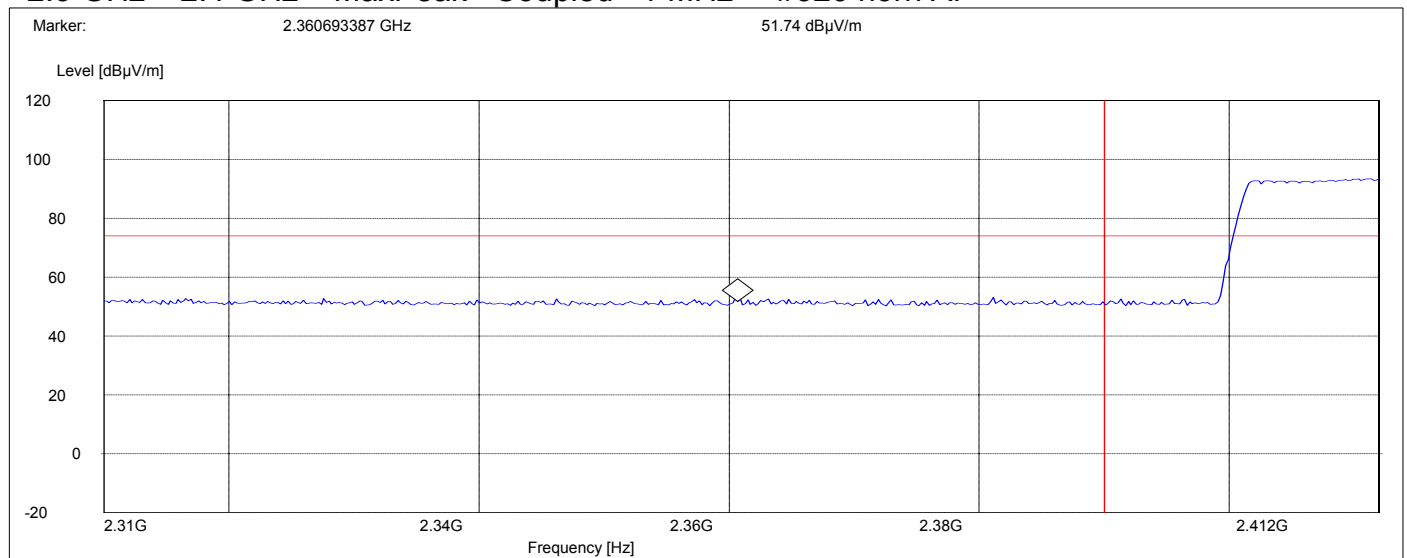
(Hopping – ON, Peak measurement)

Operating condition : Tx at 2402MHz
 SWEEP TABLE : "FCC15.247 LBE_Pk"
 Short Description : FCC15.247 BT Low-band-edge
 Limit Line : 74dBμV

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

lbe_pkh.rtf

2.3 GHz 2.4 GHz MaxPeak Coupled 1 MHz #326 horn AF



BAND EDGE COMPLIANCE

§15.247 (c)

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

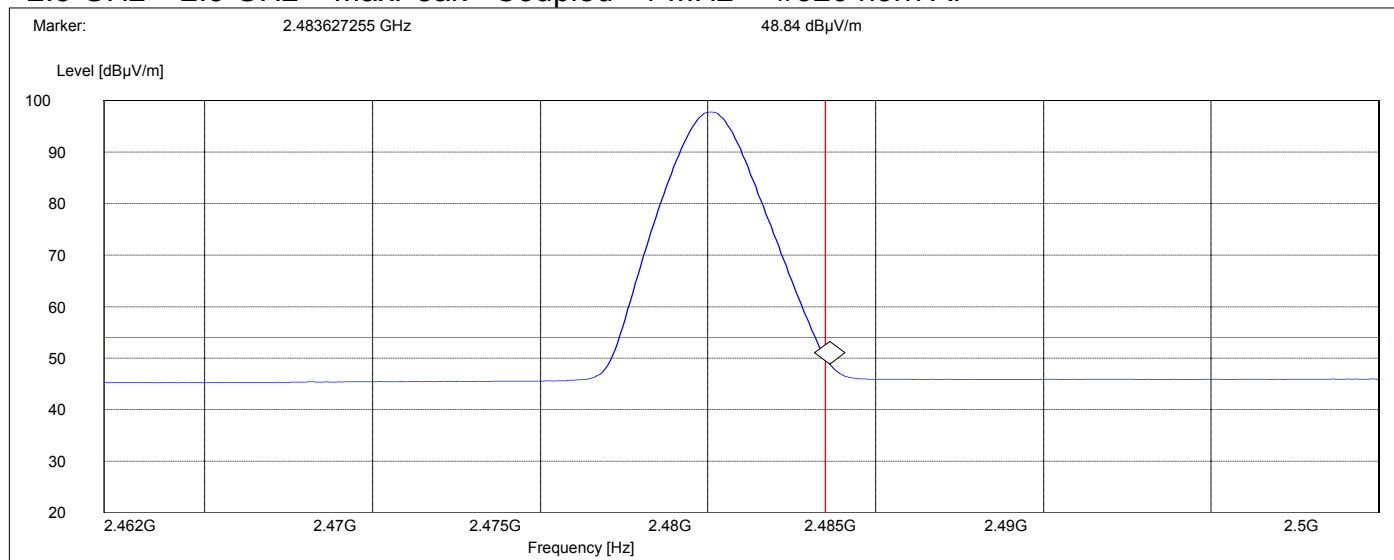
(Hopping – OFF, Average measurement)

Operating condition : Tx at 2480MHz
 SWEEP TABLE : "FCC15.247 HBE_AVG"
 Short Description : FCC15.247 BT High-band-edge
 Limit Line : 54dBμV

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

hbe_avnh.rtf

2.5 GHz 2.5 GHz MaxPeak Coupled 1 MHz #326 horn AF



BAND EDGE COMPLIANCE

§15.247 (c)

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

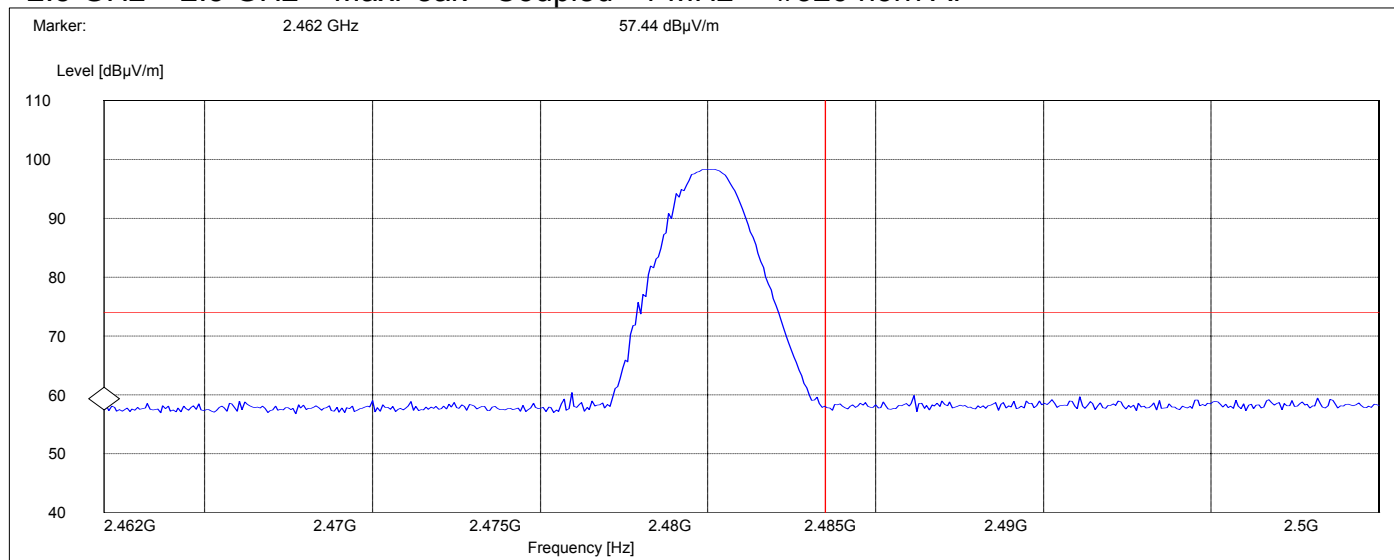
(Hopping – OFF, Peak measurement)

Operating condition : Tx at 2480MHz
 SWEEP TABLE : "FCC15.247 HBE_PK"
 Short Description : FCC15.247 BT High-band-edge
 Limit Line : 74dBμV

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

hbe_pknh.rtf

2.5 GHz 2.5 GHz MaxPeak Coupled 1 MHz #326 horn AF



BAND EDGE COMPLIANCE

§15.247 (c)

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

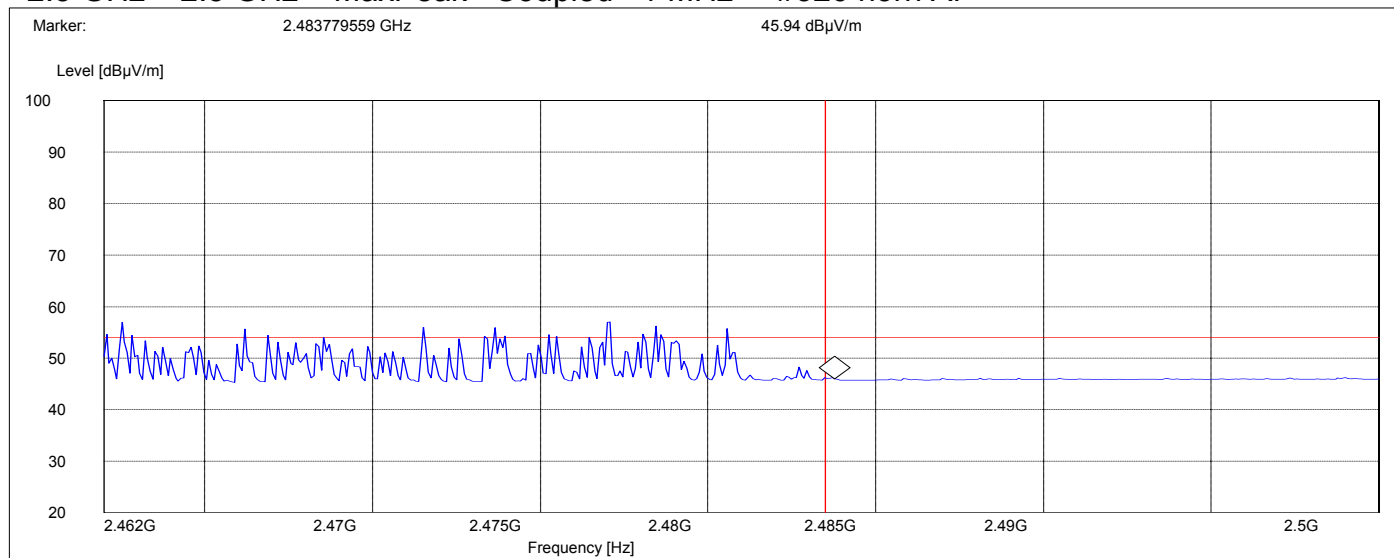
(Hopping – ON, Average measurement)

Operating condition : Tx at 2480MHz
 SWEEP TABLE : "FCC15.247 HBE_AVG"
 Short Description : FCC15.247 BT High-band-edge
 Limit Line : 54dBμV

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

hbe_avh.rtf

2.5 GHz 2.5 GHz MaxPeak Coupled 1 MHz #326 horn AF



BAND EDGE COMPLIANCE

§15.247 (c)

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

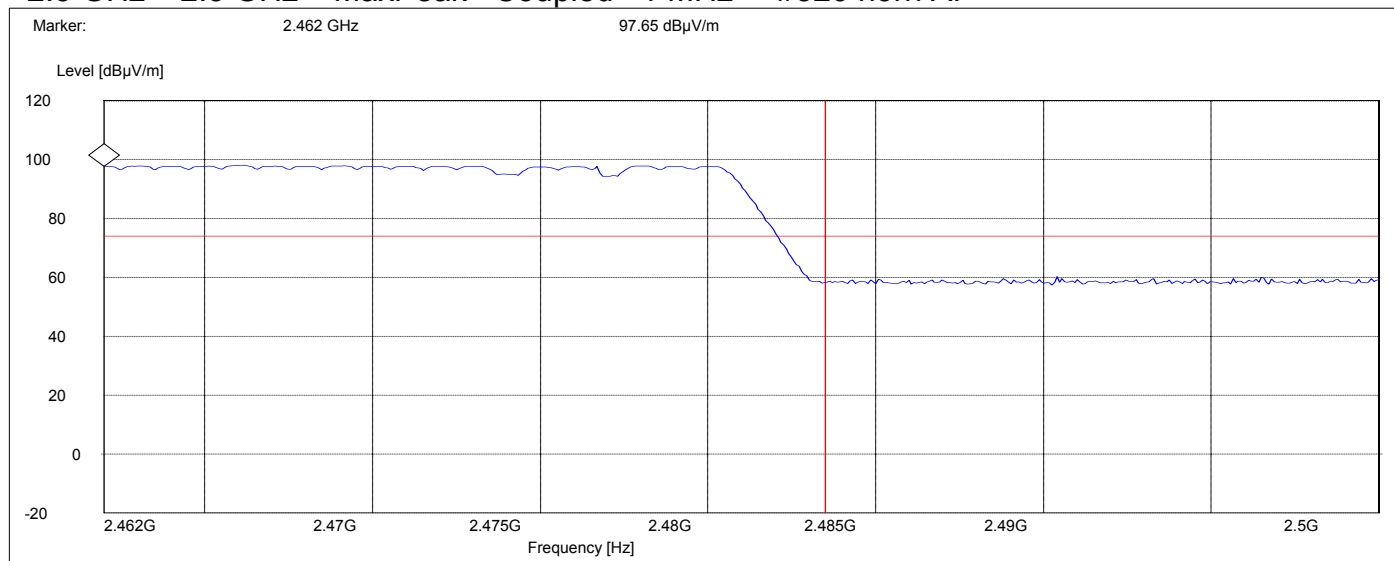
(Hopping – ON, Peak measurement)

Operating condition : Tx at 2480MHz
 SWEEP TABLE : "FCC15.247 HBE_PK"
 Short Description : FCC15.247 BT High-band-edge
 Limit Line : 74dBμV

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

hbe_pkh.rtf

2.5 GHz 2.5 GHz MaxPeak Coupled 1 MHz #326 horn AF



EMISSION LIMITATIONS (Transmitter conducted)**§ 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 which 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.

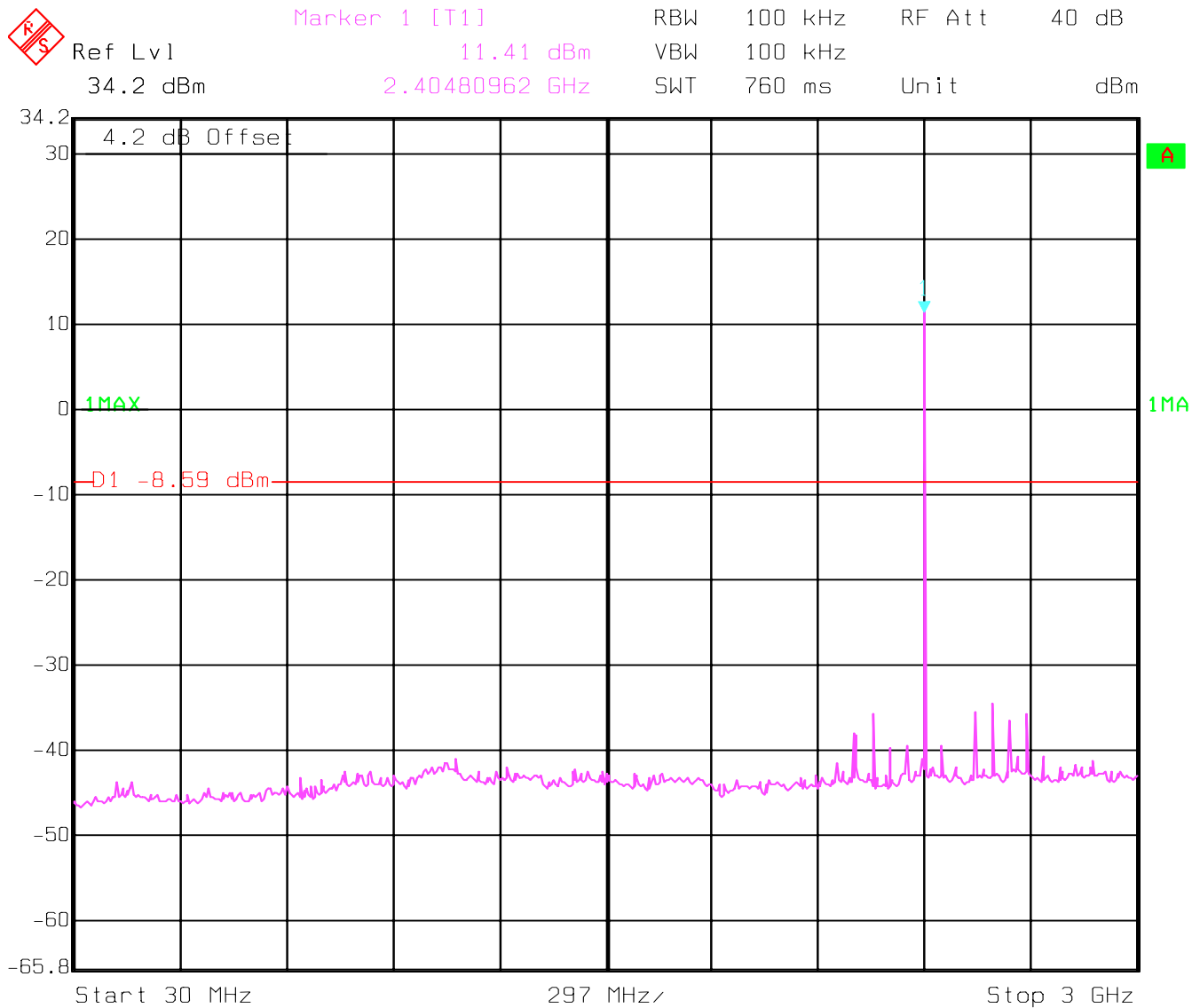
EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Lowest Channel(2402MHz): 30MHz - 3GHz

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

C30-3ch1.wmf



Date: 19.DEC.2002 07:14:58

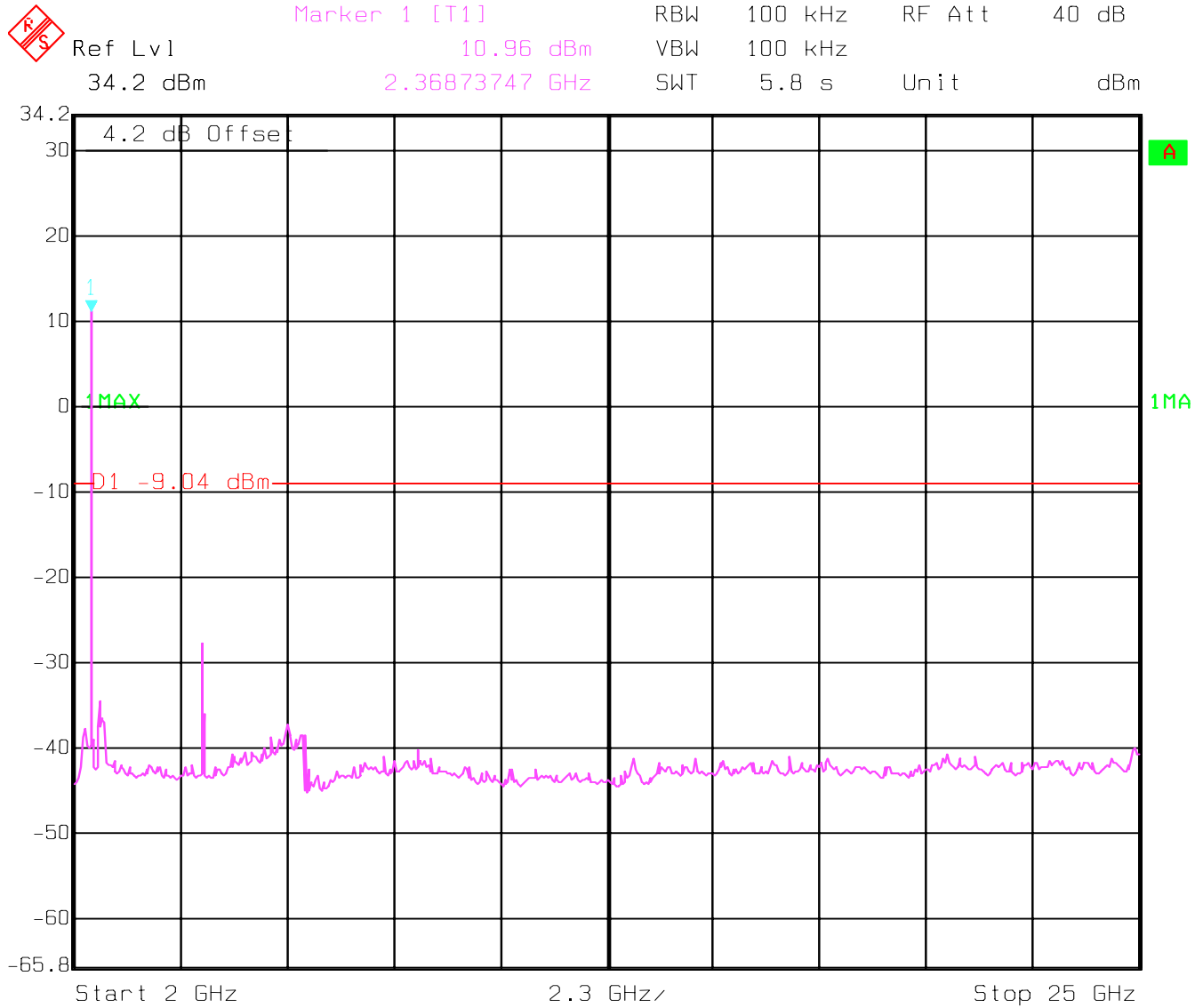
EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Lowest Channel(2402MHz): 2GHz - 25GHz

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

C2-25ch1.wmf



Date: 19.DEC.2002 07:22:12

EMISSION LIMITATIONS - Conducted (Transmitter)

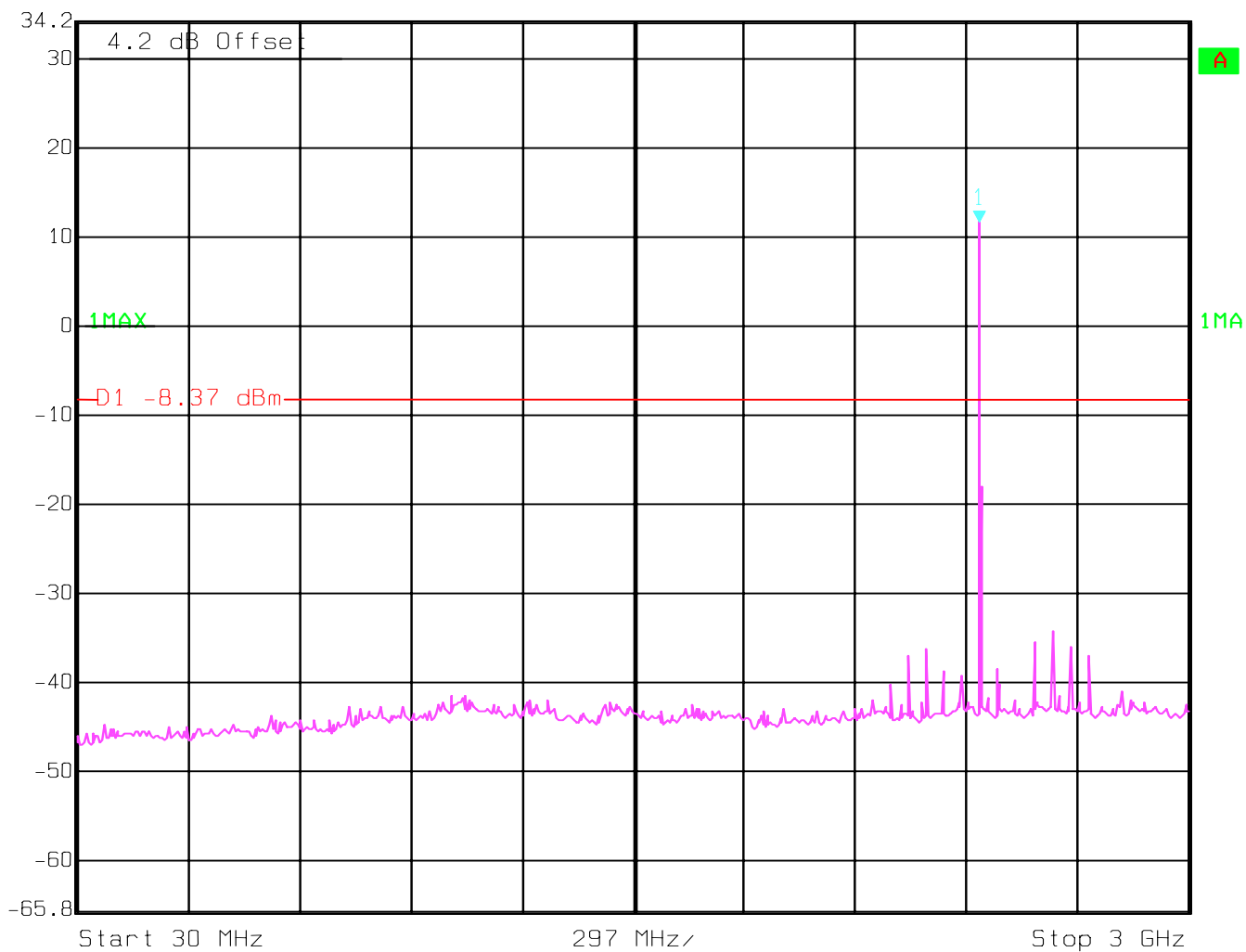
§ 15.247 (c) (1)

Mid Channel(2440MHz): 30MHz - 3GHz

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

C30-3ch2.wmf

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
	Ref Lvl	11.63 dBm	VBW	100 kHz	
	34.2 dBm	2.44052104 GHz	SWT	760 ms	Unit dBm



Date: 19.DEC.2002 07:16:42

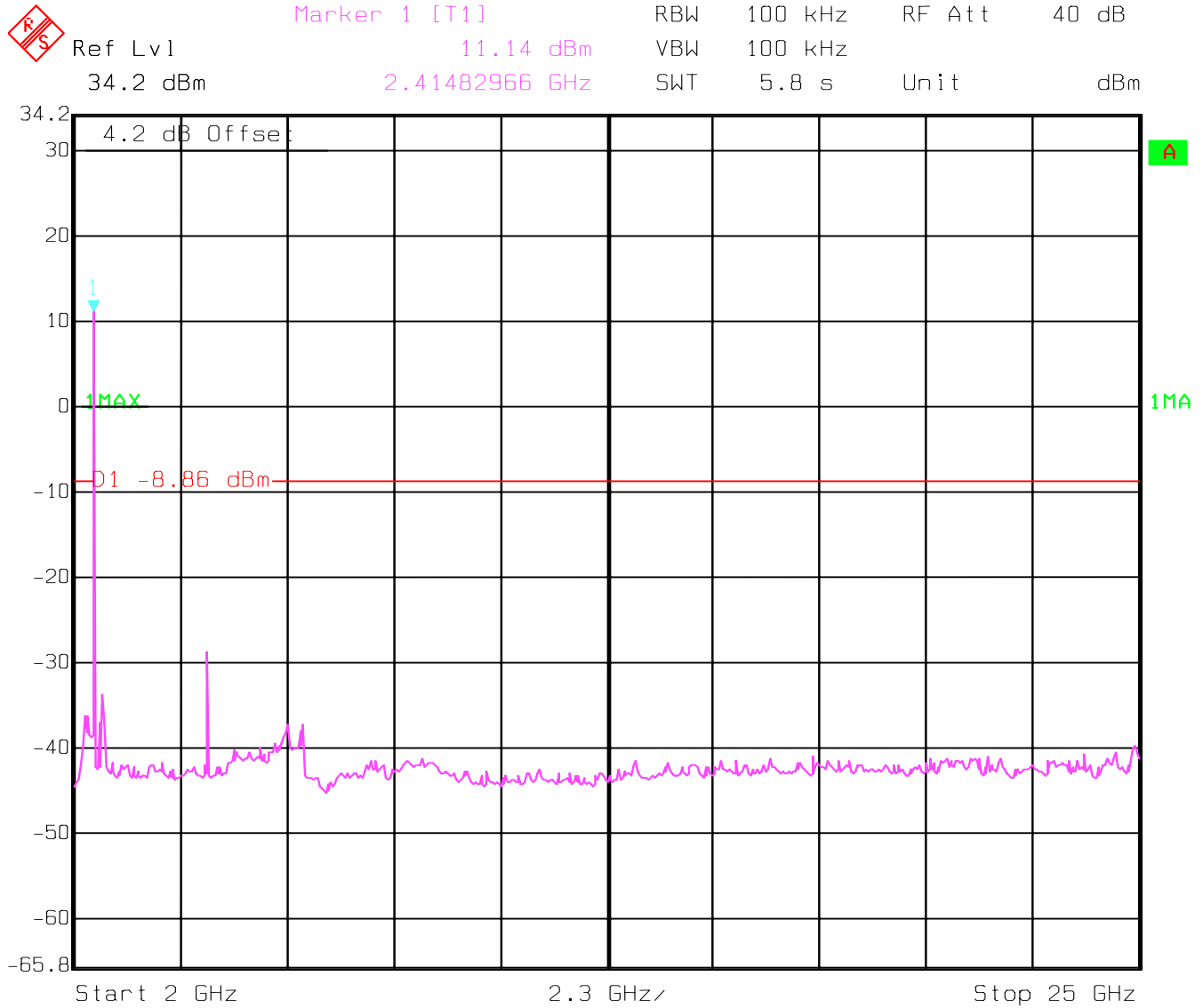
EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Mid Channel(2440MHz): 2GHz - 25GHz

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

C2-25ch2.wmf



Date: 19.DEC.2002 07:24:47

EMISSION LIMITATIONS - Conducted (Transmitter)

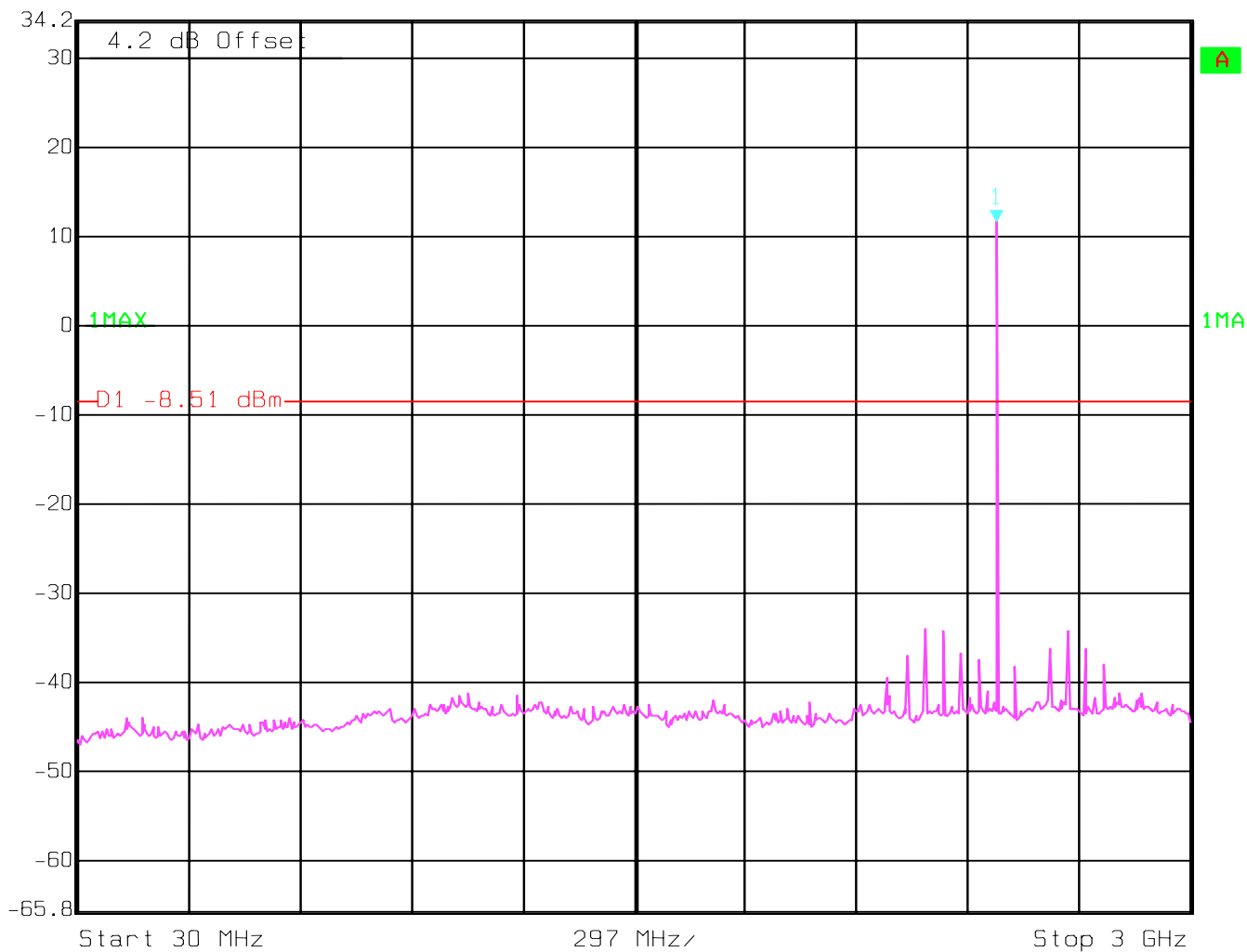
§ 15.247 (c) (1)

Highest Channel(2480MHz): 30MHz - 3GHz

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

C30-3ch3.wmf

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
	Ref Lvl	11.49 dBm	VBW	100 kHz	
	34.2 dBm	2.48218437 GHz	SWT	760 ms	Unit dBm



Date: 19.DEC.2002 07:18:38

EMISSION LIMITATIONS - Conducted (Transmitter)

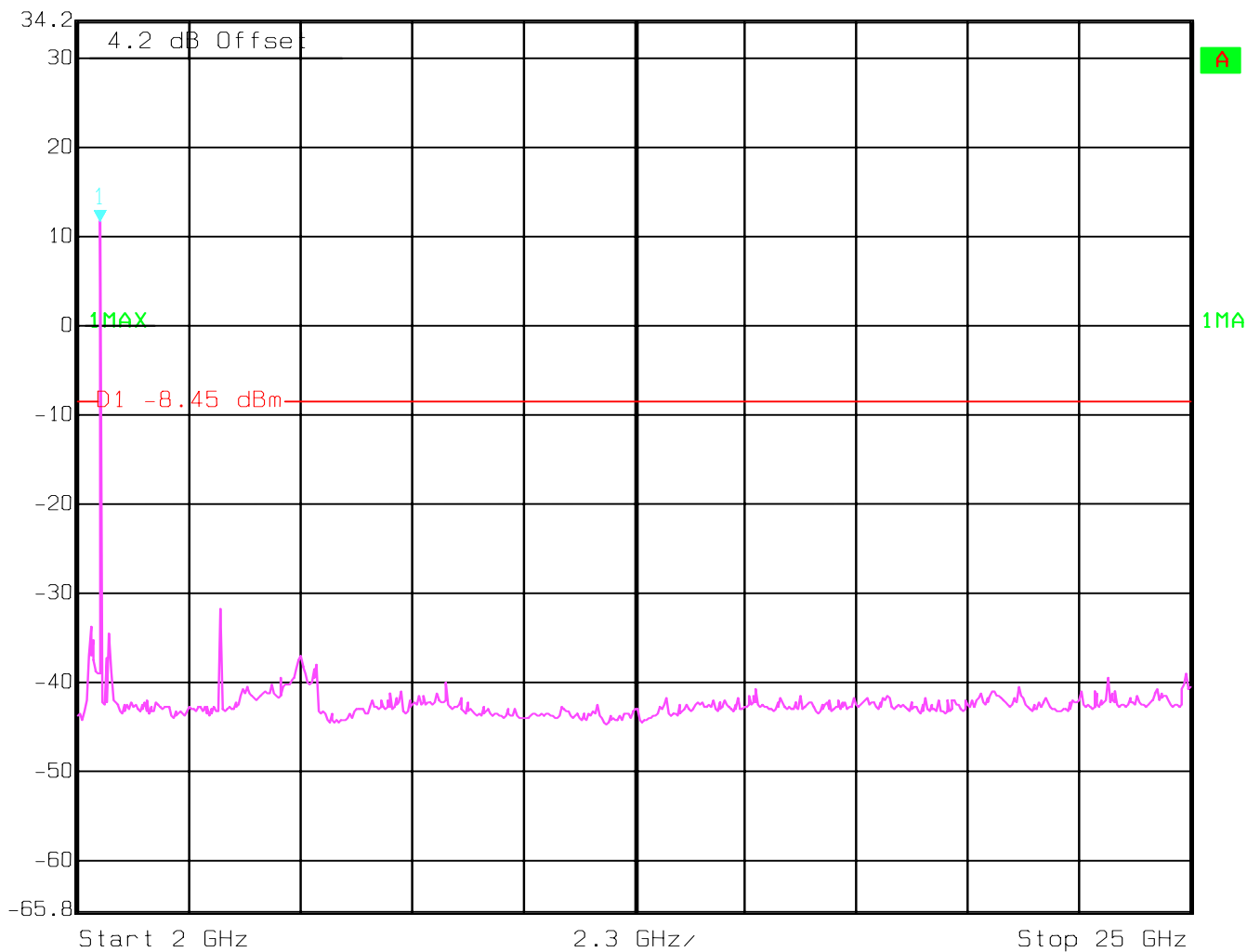
§ 15.247 (c) (1)

Highest Channel(2480MHz): 2GHz - 25GHz

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

C2-25ch3.wmf

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	11.55 dBm	VBW	100 kHz		
34.2 dBm	2.46092184 GHz	SWT	5.8 s	Unit	dBm



Date: 19.DEC.2002 07:27:31

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 which 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 18 and 25 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.

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

§ 15.247 (c) (1)

[illegible]

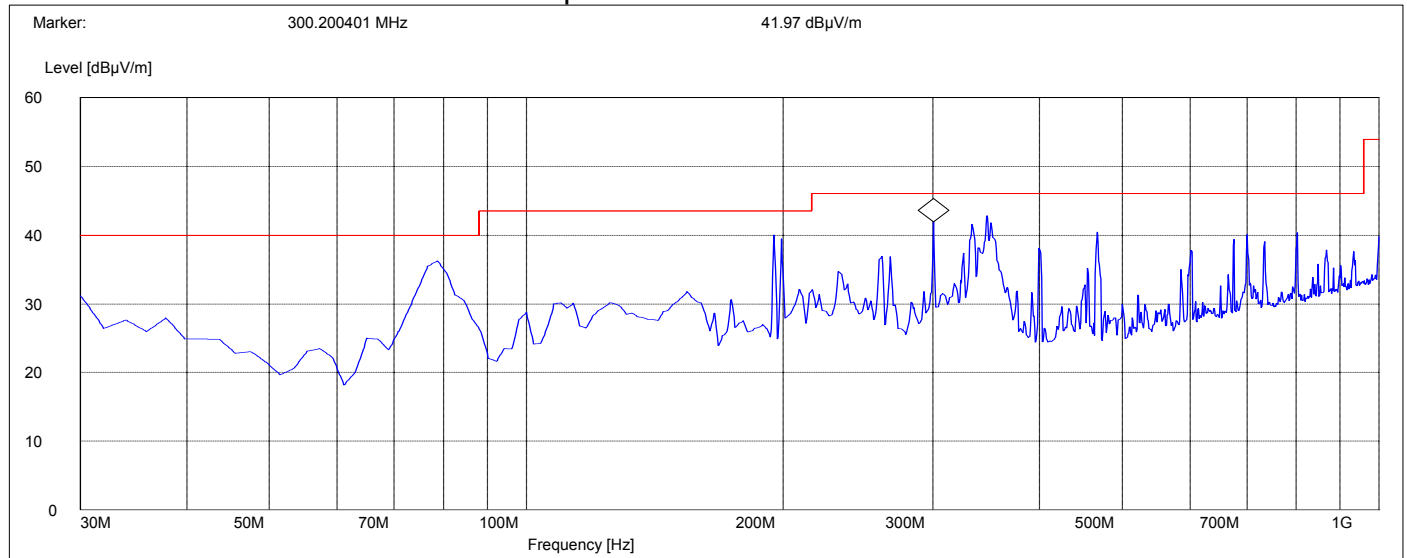
EMISSION LIMITATIONS - Radiated (Transmitter) Lowest Channel(2402MHz): 30MHz – 1GHz

§ 15.247 (c) (1)

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

T30-1ch1.rtf

30.0 MHz 1.0 GHz MaxPeak Coupled 100 kHz 3141-#1186



EMISSION LIMITATIONS - Radiated (Transmitter) Lowest Channel(2402MHz): 1GHz – 18GHz

§ 15.247 (c) (1)

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

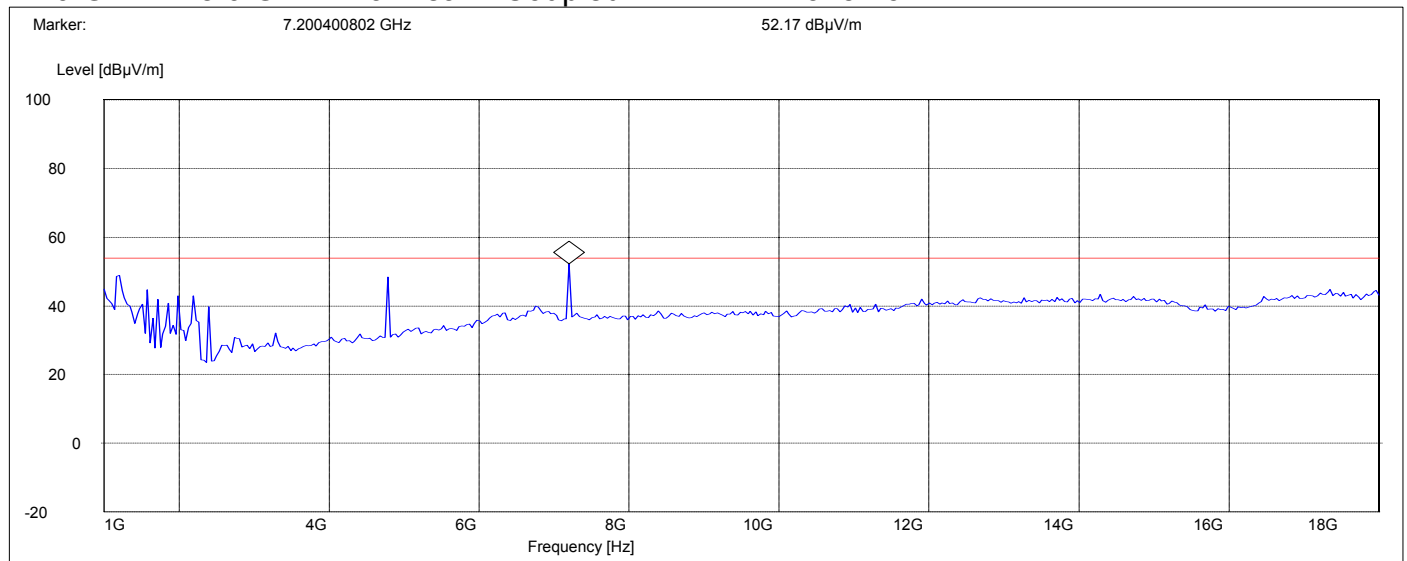
SWEEP TABLE: "BT Spuri hi 1-18G"

Short Description: Bluetooth Spurious 1-18 GHz

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)

T1-18ch1.rtf

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #325 horn AF



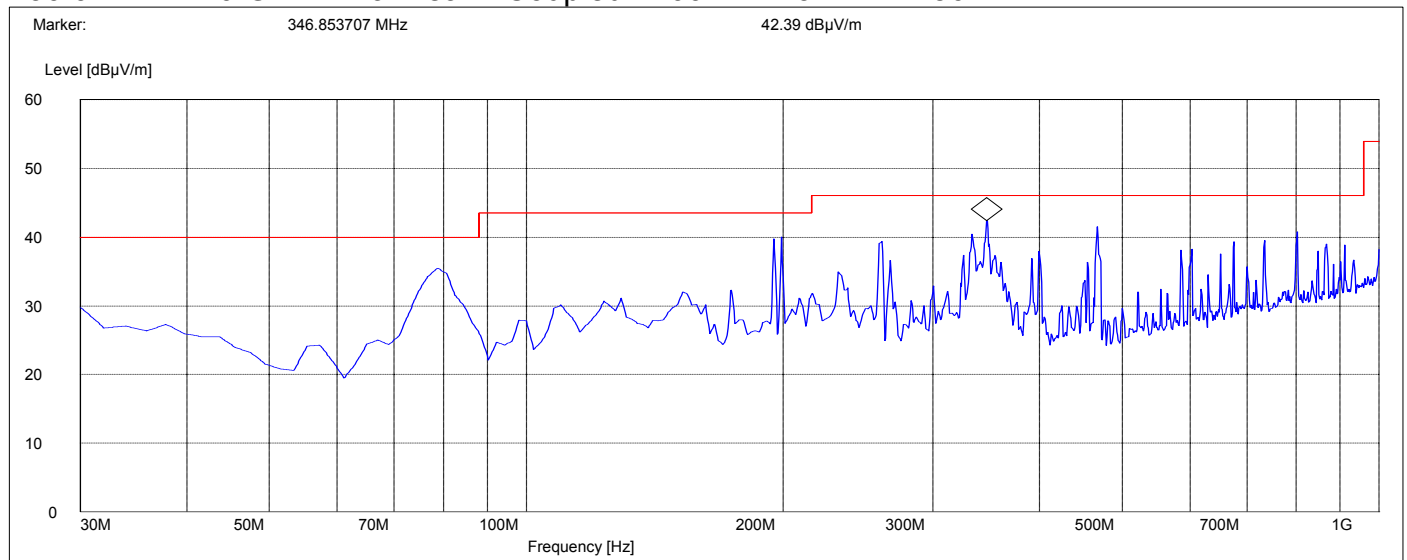
EMISSION LIMITATIONS - Radiated (Transmitter) Middle Channel(2441MHz): 30MHz – 1GHz

§ 15.247 (c) (1)

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

T30-1ch2.rtf

30.0 MHz 1.0 GHz MaxPeak Coupled 100 kHz 3141-#1186



EMISSION LIMITATIONS - Radiated (Transmitter) Middle Channel(2441MHz): 1GHz – 18GHz

§ 15.247 (c) (1)

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

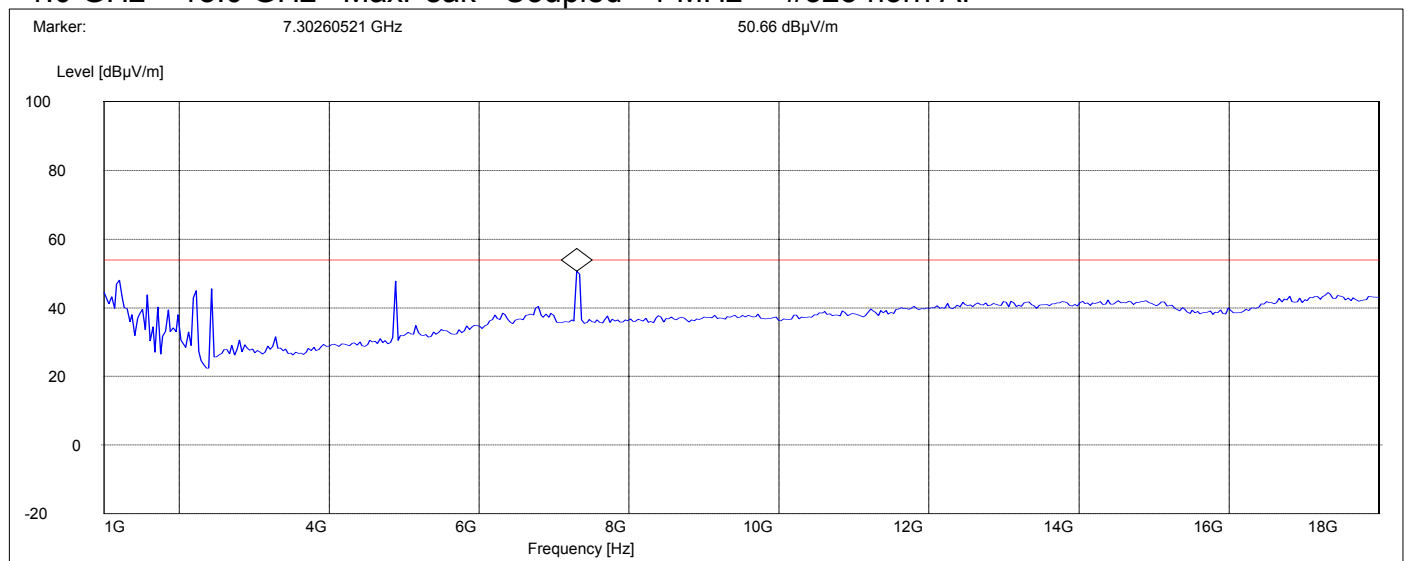
SWEEP TABLE: "BT Spuri hi 1-18G"

Short Description: Bluetooth Spurious 1-18GHz

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)

T1-18ch2.rtf

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #325 horn AF



EMISSION LIMITATIONS - Radiated (Transmitter)

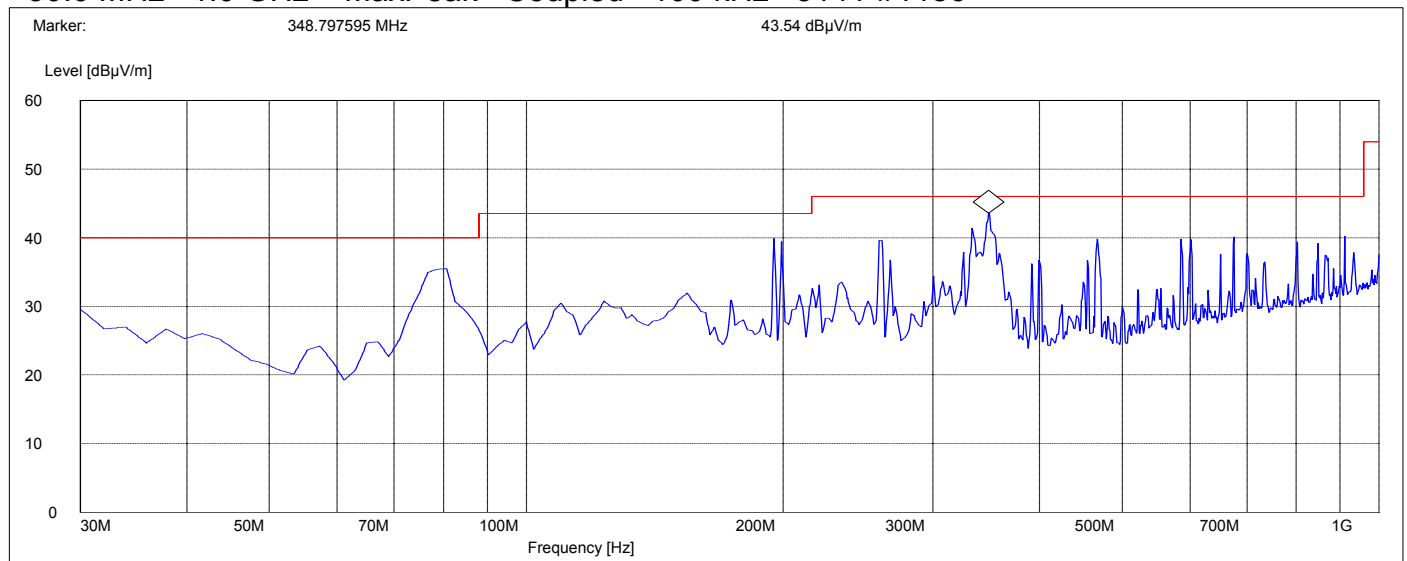
§ 15.247 (c) (1)

Highest Channel(2480MHz): 30MHz – 1GHz

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

T30-1ch3.rtf

30.0 MHz 1.0 GHz MaxPeak Coupled 100 kHz 3141-#1186



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Highest Channel(2480MHz): 1GHz – 18GHz

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

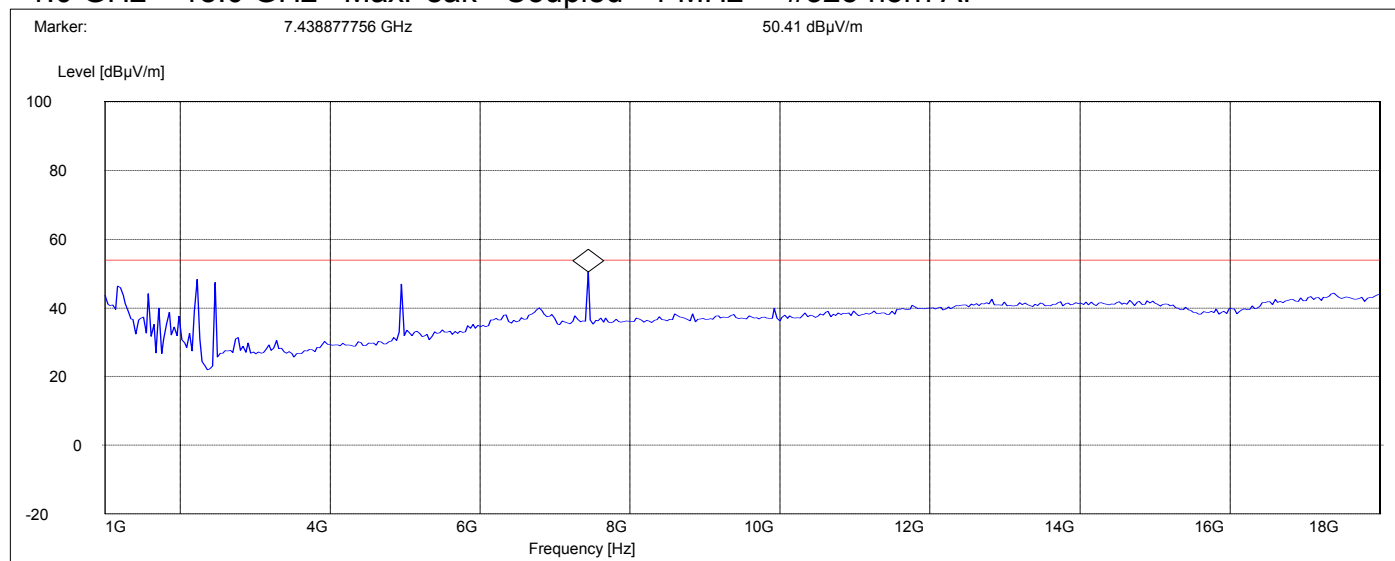
SWEEP TABLE: "BT Spuri hi 1-18G"

Short Description: Bluetooth Spurious 1-18GHz

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	8.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)

T1-18ch3.rtf

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #325 horn AF



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

18GHz – 25GHz

(This plot is valid for all three channels)

SWEEP TABLE:

"BT Spuri hi 18-25G"

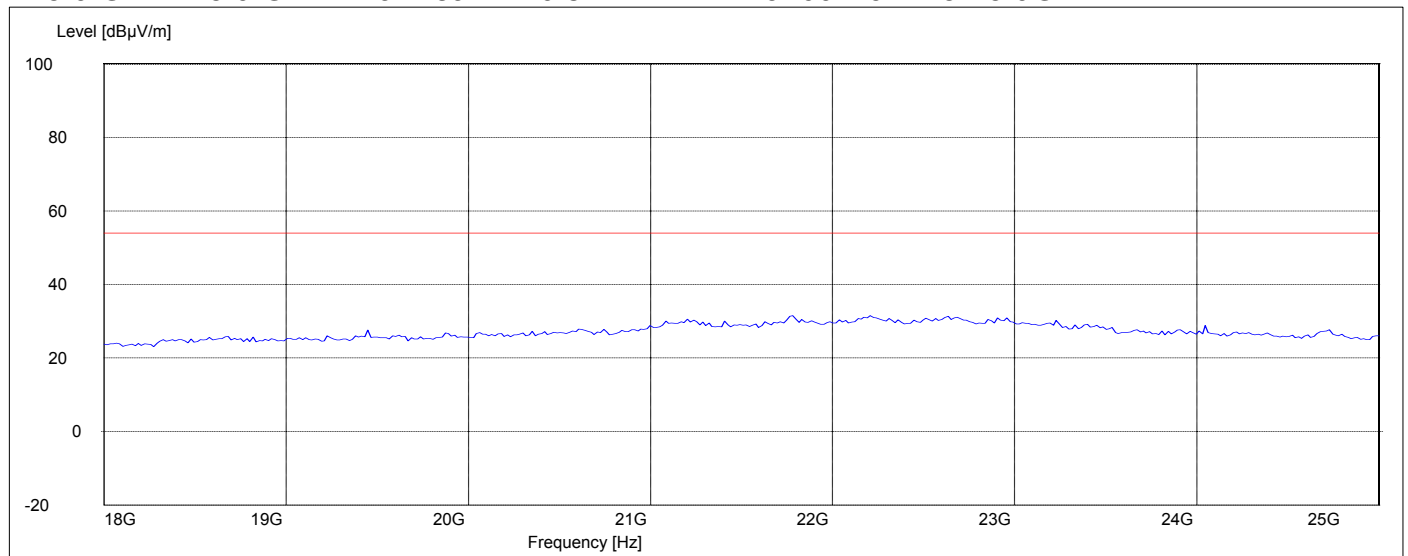
Short Description:

Bluetooth Spurious 18-25GHz

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18 GHz	25 GHz	MaxPeak	Coupled	1 MHz	#141 horn (dBi)

T25ch1.rtf

18.0 GHz 25.0 GHz MaxPeak 2.0 s 1 MHz 3160 Horn 18-25.0G



RECEIVER SPURIOUS RADIATION**§ 15.209****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:

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 18 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

RECEIVER SPURIOUS RADIATION

§ 15.209

30MHz – 1GHz

SWEEP TABLE:

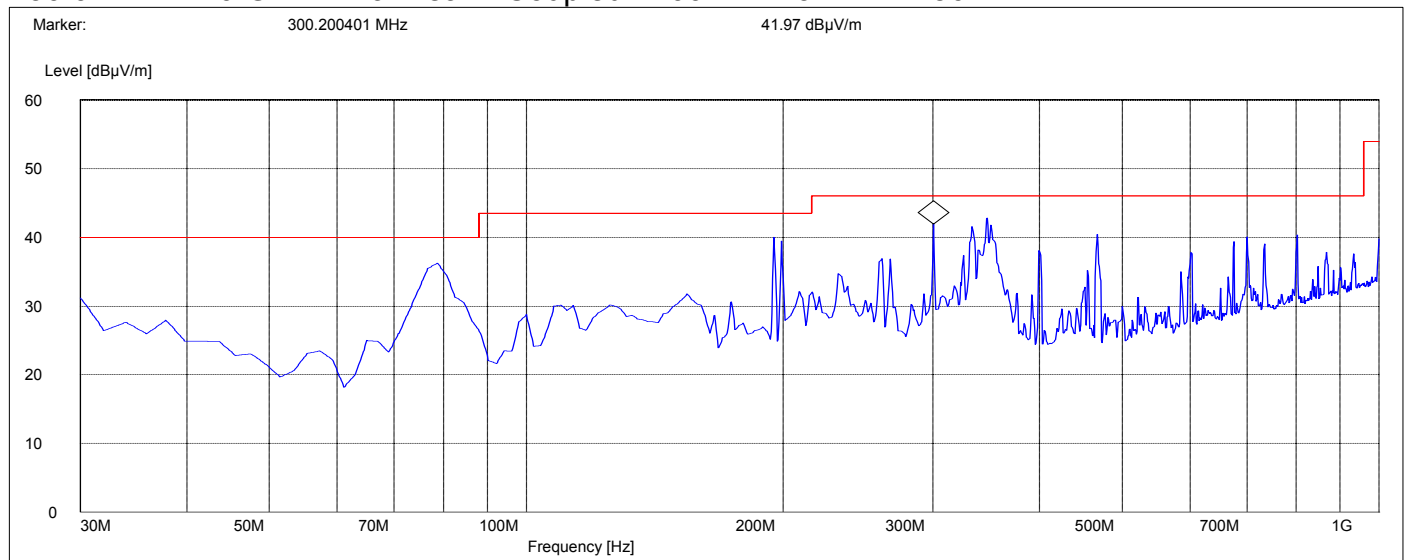
"BT Spuri hi 30-1G"

Short Description: Bluetooth 30MHz-1GHz

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

r30-1ch1.rtf

30.0 MHz 1.0 GHz MaxPeak Coupled 100 kHz 3141-#1186



RECEIVER SPURIOUS RADIATION

§ 15.209

1GHz – 18GHz

SWEEP TABLE:

"BT Spuri hi 1-18G"

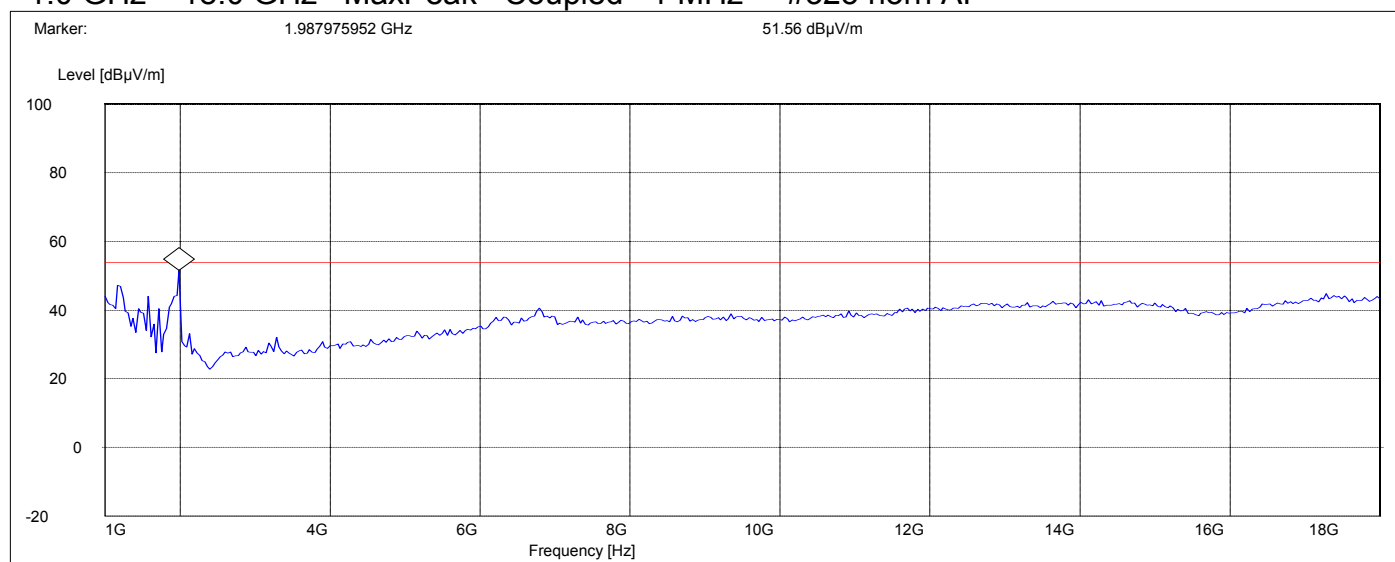
Short Description:

Bluetooth Spurious 1-18 GHz

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
1.0 GHz	8.0 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)

r1-18ch1.rtf

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #325 horn AF



RECEIVER SPURIOUS RADIATION

§ 15.209

18GHz – 25GHz

SWEEP TABLE:

"BT Spuri hi 18-25G"

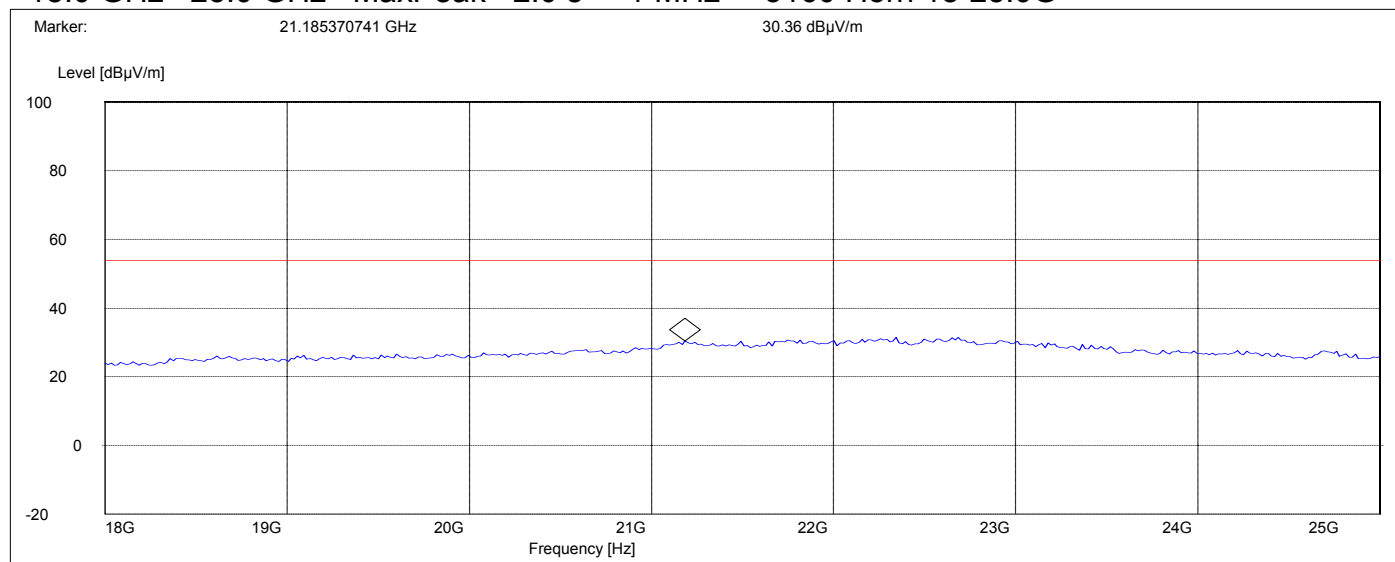
Short Description:

Bluetooth Spurious 18-25GHz

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18 GHz	25 GHz	MaxPeak	Coupled	1 MHz	#141 horn (dBi)

r25ch1.rtf

18.0 GHz 25.0 GHz MaxPeak 2.0 s 1 MHz 3160 Horn 18-25.0G

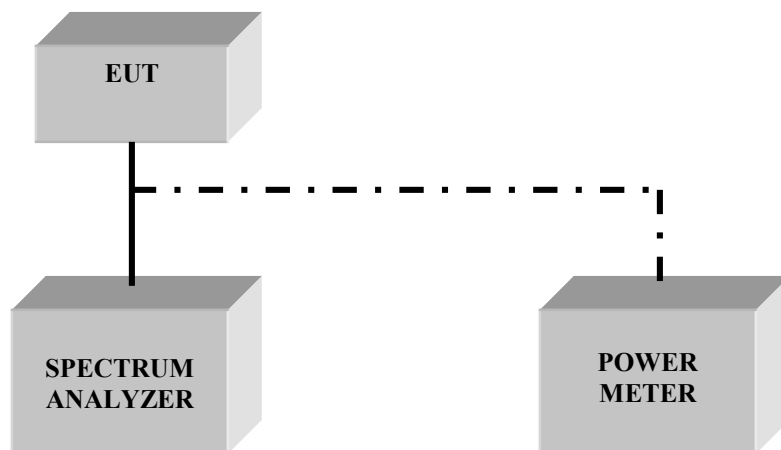


TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02
05	Power Amplifier	250W1000	Amplifier Research	300031
06	Biconilog Antenna	3141	EMCO	0005-1186
07	Horn Antenna	SAS-200/571	AH Systems	325
08	Power Splitter	11667B	Hewlett Packard	645348
09	Climatic Chamber	VT4004	Votch	G1115
10	Pre-Amplifier	JS4-00102600	Miteq	00616
11	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807
12	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008

BLOCK DIAGRAMS

Conducted Testing



Radiated Testing

ANECHOIC CHAMBER

