ECL-EMC Test Report No.: 06-006

Equipment under test:	**COGNEX DataMan 7550** **FCC ID: TXH-DM7550** **IC: 6315A-DM7550**
Type of test:	**FCC Part 15.247 for FHSS systems and Canada RSS-210**
Measurement Procedures:	**ANSI C63.4 (2001)**
Test result:	**Passed**

Date of issue:	03.02.06			Signature:
Issue-No.:	01	Author:	**J.Steinbinder** Test engineer	
Date of delivery:	5.01.06	Checked:	**W.Zapf** Operational manager	
Testdates:	10.01. – 03.02.06			
Pages:	61			

Client:	**COGNEX Ltd.** Vaalser Strasse 259 52074 Aachen **Germany**
Manufacturer:	**Hand Held Products, Inc.** 700 Visions Drive Skaneateles Falls, NY 13153 **USA**
Testhouse:	HERBERG Service Plus GmbH European Compliance Laboratory (ECL) Nordostpark 51 D-90411 Nürnberg Tel.: +49 0911 59835 91 Fax: +49 0911 59835 90

General:
The purpose of the performed inspections and tests was to demonstrate that an equipment under defined environmental conditions can survive without irreversible failures and perform according to requirements. This report informs about the results of the EMC tests, it only refers to the equipment under test. No part of this report may be reproduced in any form, without written permission.

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1 Introduction

1.1 Purpose

This report documents the qualification testing for the COGNEX DataMan 7550 system to FCC 47CFR Part 15.247 for FHSS systems (released by the Commission as of April 5, 2005.) and the Canadian RSS-210 Issue 6 September 2005
The system is referred to as the EUT from here on for the purpose of this report. All emission testing was performed per ANSI C63.4-2001 (methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz).

1.2 Test Results Summary

Requirement	CFR Section	Report Section	Test Result
Carrier Frequency Separation	§15.247(a)	5.1	**Passed**
Number of hopping channels	§15.247(a)	5.2	**Passed**
Time of occupancy (Dwell time)	§15.247(a)	5.3	**Passed**
Spectrum Bandwidth of FHSS System	§15.247(a)	5.4	**Passed**
Maximum Peak output power	§15.247(b)(1)	5.5 / 5.6	**Passed**
Band edge compliance	§15.247(c)	5.7 / 5.8	**Passed**
Emission Limitations	§15.247(c) (1)	5.9 / 5.10	**Passed**
Conducted emission	§15.107/207	**n/a**	**n/a**
Receiver spurious radiation	§15.209	5.11	**Passed**

n/a: because EUT is powered by a rechargeable battery pack

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

.
The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units, and meet the requirements of the specifications referenced herein.
Consistent with industry practice, measurement and test equipment not directly involved in obtaining measurement results but having an impact on measurements (such as cable loss, antenna factors, etc.) are factored into the “Correction Factor” documented in certain test results. Instrumentation employed for testing meets tolerances consistent with known Industry Standards and Regulations.

The measurements contained in this report were made in accordance with the procedure ANSI C63.4 (2001) and all applicable Public Notices received prior to the date of testing. All emissions from the device were found to be within the limits outlined in this report.
The test results in this report apply only to the particular Equipment Under Test (EUT) as declared in this report.

2 Equipment under test

2.1 EUT designation

DataMan 7550 Ser. No.:15353-00011

FCC ID: TXH-DM7550
IC: 6315A-DM7550

2.2 Description

The DataMan 7550 is a generally released handheld ID reader. It is intended to read codes (primarily Data Matrix) directly marked on variety of parts using a variety of methods (e.g. dot peen, laser etch, chemical etch, ink jet, etc.), with the focus being on reading “hard to read” marks. Data communication is done wireless via Bluetooth.

2.3 Configuration

The DataMan 7550 can be used with a combination of battery charger and communication receiver but can also communicate with a Bluetooth adapter on a PC.

2.3.1 Connections

Wireless via Bluetooth

2.3.2 Additional information

Internal:	500MHz
Bluetooth:	2,402 GHz - 2,480 GHz
Type of modulation:	GFSK
Number of channels:	79
Antenna:	internal
Power supply:	Rechargeable battery pack
Output power :	-1.0 dBm (0.79 mW) max cond. peak power

2.3.3 Used Software

Version: V2.0

EUT

3 Normative references

FCC Part 15 §15.247	47 CFR FCC PART 15 - RADIO FREQUENCY DEVICES April 5, 2005.
RSS-210	Industry Canada RSS-210 Issue 6 September 2005
ANSI C63.4-2001	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz ANSI C63.4-2001 (Revision of ANSI C63.4-1992)

4 Description of the EMC test centre

4.1 Registrations

Industry Canada OATS No.: 3475

Registration No. (DATech): TTI-P-G 004/92-03

Registration No. (Kraftfahrt-Bundesamt): KBA-P 00053-03

Registration No.: 96997

Registration No.
for conducted emission: C-2169
for radiated emission: R-2016
for conducted emission on telecommunication ports: T-140

Registered within Verizons ITL program.

4.2 Semi anechoic chamber (SAC) with maximum 10m measurement distance

Dimensions (LxWxH):	22.28 m x 15.98 m x 9.00 m with ground plane
Shielding:	Chrome steel frame with steel panels in modular design, screwed, insulated design
Shielding attenuation:	> 85 dB at 10 kHz > 100 dB at 156 kHz > 120 dB at 1 MHz > 100 dB at 100 MHz up to 1 GHz > 80 dB at 10 GHz > 80 dB at 18 GHz
Absorber:	$Franko_{Sorb}$ P2400; length 2.4m; on sidewalls, endwalls and ceiling
Turntable:	5 m diameter; 3 t load-bearing capacity
EMC test system:	Rohde & Schwarz; ESH3; ESVS30; ESAI; ESI40
Antennas:	Loop antenna; biconical antennas, log. periodic antennas, horn antennas Emission frequency range: 10 kHz - 40 GHz Immunity frequency range: 10 kHz - 18 GHz
Chamber filters:	AC chamber filter max. 100A / 3 phase system DC chamber filter max. 100V / 100A 32 filters with 2 Mbit/s 20 filters with 64 kBit/s 20 filters with 3.4 kHz
Video:	Pontis
Power supplies:	DC: 100V / 100A (with chamber filter) or 70V / 500A (without chamber filter)

4.3 Fully anechoic chamber (FAC) with maximum 5m measurement distance

Dimensions (LxWxH):	12.01 m x 8.03 m x 6.00 m
Shielding:	Chrome steel frame with steel panels in modular design, screwed, insulated design
Shielding attenuation:	> 85 dB at 10 kHz > 100 dB at 156 kHz > 120 dB at 1 MHz > 100 dB at 100 MHz up to 1 GHz > 80 dB at 10 GHz > 80 dB at 18 GHz
Absorber:	$Franko_{Sorb}$ H600; length 0.6 m; on sidewalls, endwalls, ceiling and bottom
Turntable:	3 m diameter; 1 t load-bearing capacity
EMC test system:	Rohde & Schwarz; ESH3; ESVS30; ESAI; ESI40
Antennas:	Loop antenna; biconical antennas, log. periodic antennas, horn antennas Emission frequency range: 10 kHz - 40 GHz Immunity frequency range: 10 kHz - 18 GHz
Chamber filters:	AC chamber filter max. 100A / 3 phase system DC chamber filter max. 100V / 100 A 32 filters with 2 Mbit/s 20 filters with 64 kBit/s 20 filters with 3.4 kHz
Video:	Pontis
Power supply:	DC: 100V / 100A

4.4 Fully anechoic chamber (FAC2) with maximum 3m measurement distance

Dimensions (LxWxH):	6.7 m x 3.1 m x 3.00 m
Shielding:	Chrome steel frame with steel panels in modular design, screwed, insulated design
Shielding attenuation:	> 85 dB at 10 kHz > 100 dB at 156 kHz > 100 dB at 1 MHz > 120 dB at 100 MHz up to 1 GHz > 80 dB at 10 GHz > 80 dB at 18 GHz
Absorber:	Ferrite Absorber 600mm * 600mm * 6 mm on sidewalls, endwalls, ceiling and bottom and Pyramid Absorber length 0.2 m;
Turntable:	1 m diameter;
EMC test system:	Rohde & Schwarz; ESH3; ESVS30; ESVS10
Antennas:	Loop antenna; biconical antennas, log. periodic antennas, horn antennas Open Stripline (EN 55020) Emission frequency range: 10 kHz – 18 GHz Immunity frequency range: 20MHz – 4 GHz
Chamber filters:	AC chamber filter max. 30A / 2 phase system

4.5 Fully anechoic chamber (Stripline)

Dimensions (LxWxH):	4,5 m x 2,5 m x 2.55
Shielding:	Chrome steel frame with steel panels in modular design, screwed, insulated design
Shielding attenuation:	> 85 dB at 10 kHz > 100 dB at 156 kHz > 100 dB at 1 MHz > 120 dB at 100 MHz up to 1 GHz > 80 dB at 10 GHz > 80 dB at 18 GHz
Absorber:	Ferrite Absorber 600mm * 600mm * 6 mm on sidewalls, endwalls, ceiling and bottom and Pyramid Absorber length 0.2 m;
EMC test system:	Rohde & Schwarz; ESH3; ESVS30; ESVS10
Antennas:	Stripline
Chamber filters:	AC chamber filter max. 30A / 2 phase system

4.6 Shielded test cabins

Measurementroom for SAC (MRS):

Dimensions (LxWxH):	2.5 m x 2.4 m x 2.5 m
Use:	Isolation of auxiliary equipment from the equipment under test inside SAC

Measurementroom for FAC (MRF):

Dimensions (LxWxH):	3.5 m x 1.7 m x 2.5 m
Use:	Isolation of auxiliary equipment from the equipment under test inside FAC

Shielded cabin (EMI):

Dimensions (LxWxH):	4.31 m x 4.31 m x 2.8 m
Use:	ESD test cabin, RFI voltage measurement and conducted interference immunity tests.
Cabin filters:	AC chamber filter max. 25 A DC chamber filter max. 60 A 2 filters with cut-off frequency 3.4 kHz 5 filters (4-w) with cut-off frequency 500 kHz

Amplifier room (AR):

Dimensions (LxWxH):	3.5 m x 2.5 m x 2.5 m
Use:	Location for RF amplifiers

Shielded cabin (EMI2)

Dimensions (LxWxH):	3.5 m x 3.45.m x 2.5 m
Use:	Immunity Test for sound broadcast receivers and associated equipment
Cabin filters:	AC chamber filter max. 25 A

Shielded cabin (EMI3)

Dimensions (LxWxH):	3.5m x 2.9 m x 2.5 m
Use:	Immunity Test for television broadcast receivers and associated equipment
Cabin filters:	AC chamber filter max. 16 A

Shielded cabin (ACTS)

Dimensions (LxWxH):	3.5 m x 7.5 m x 2.5 m
Use:	Interference Power and Interference Voltage Test for Sound, television broadcast receivers and associated equipment
Cabin filters:	AC chamber filter max. 25 A

4.7 Instrument room

Dimensions (LxWxH):	12 m x 5.33 m x 3.3 m
Use:	Location for measurement equipment as like as spectrum analyzers, receivers and PCs with EMI software. There are also located: Control devices for antenna/turntable movement and audio/video.

4.8 Measurement Uncertainty

The table below shows the measurement uncertainties for each measurement method. The expanded uncertainty was calculated with worst case values over the complete frequency area.

Measurement method	Frequency area impulse duration time	Description	expanded Uncertainty (95% or k=2)
Radiated emission (EN 55022; ANSI C63.4 etc.)	30 MHz - 1 GHz	Semi anechoic chamber	± 4,7 dB
	1 GHz - 18 GHz	Fully anechoic chamber	± 3,9 dB
Conducted emission (EN 55022; ANSI C63.4 etc.)	9 kHz - 150 kHz 150 kHz - 30 MHz		± 4,0 dB ± 3,6 dB
Harmonics (EN 61000-3-2)	2 ... 40 x $f_{N;}$ f_N = 50 Hz	Voltage Current	± 1% ± 1%
Flicker (EN 61000-3-3)	f_N = 50 Hz	P_{st}	± 1,5%
ESD (EN 61000-4-2)	5/30ns	Rise time / half life Voltage amplitude	± 30% ± 10%
Radiated Immunity (EN 61000-4-3)	80 MHz - 1 GHz		± 42,7%
BURST (EN 61000-4-4)	5/50 ns	Rise time / half life Voltage amplitude	± 20% ± 4,1%
SURGE (EN 61000-4-5)	1,2/50 µs 8/20 µs	Voltage rise time / half life Current rise time / half life Charged voltage	± 30% / ±20% ± 20% / ±20% ± 4,1%
HF-Injection (EN 61000-4-6)	150 kHz - 80 MHz		± 9%
Voltage Dips, Interruptions (EN 61000-4-11)		Voltage level Time	± 1% ± 0,1%
Power induction	ITU-K.20	Frequency Amplitude	± 0,1Hz ± 1%

4.9 Ground plan

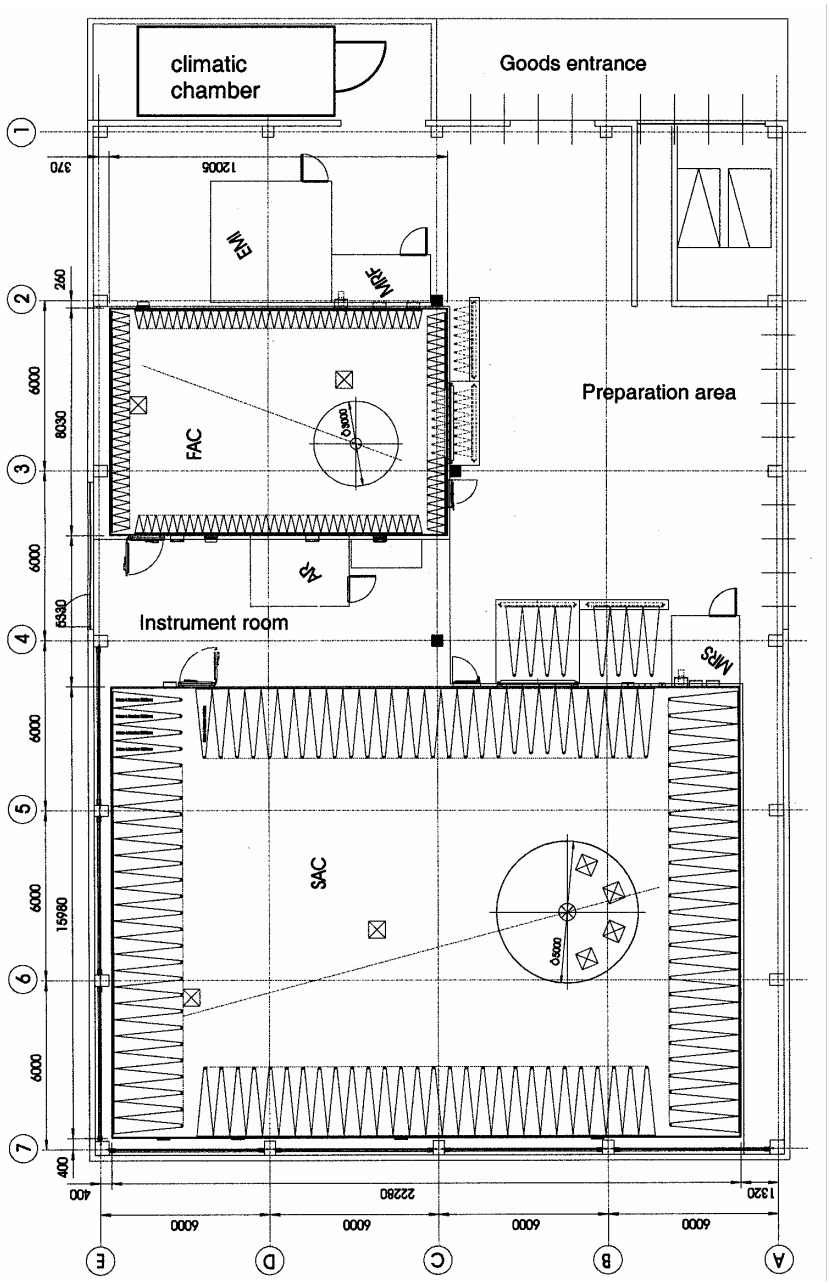


Abb. 4.9.1: Partition of the European Compliance Laboratory (Thurn-und-Taxis-Strasse 18)

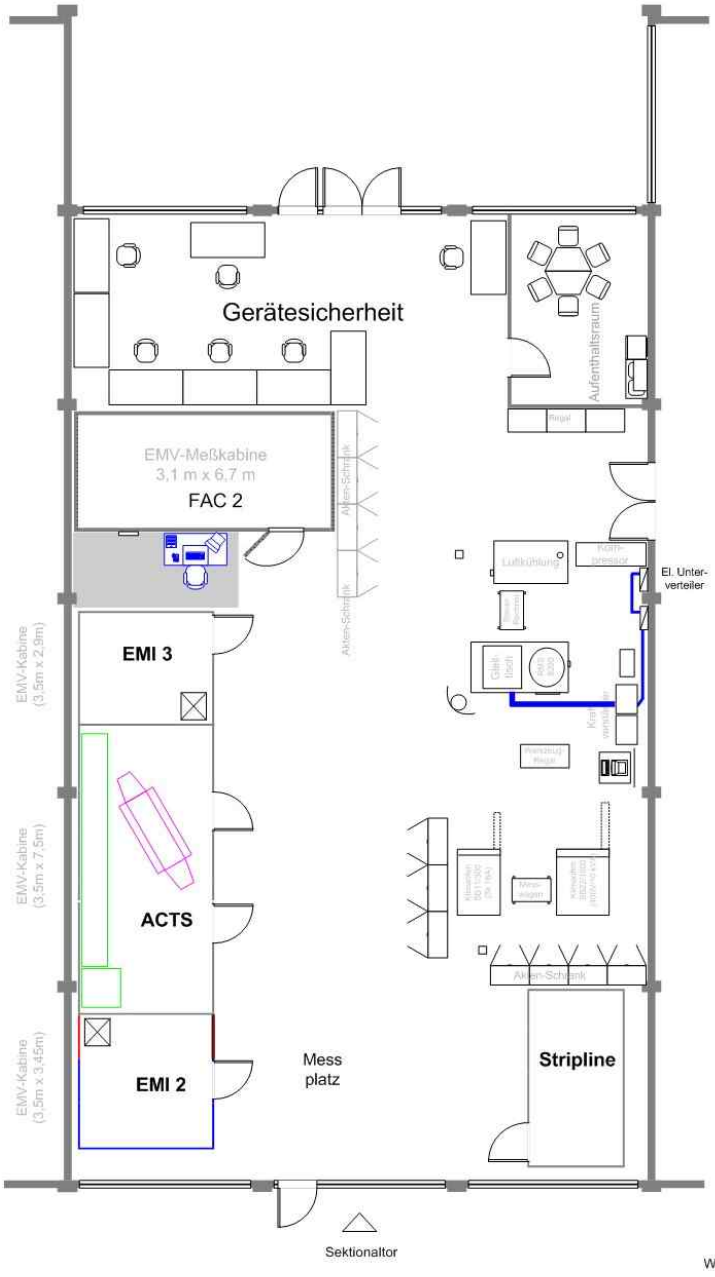
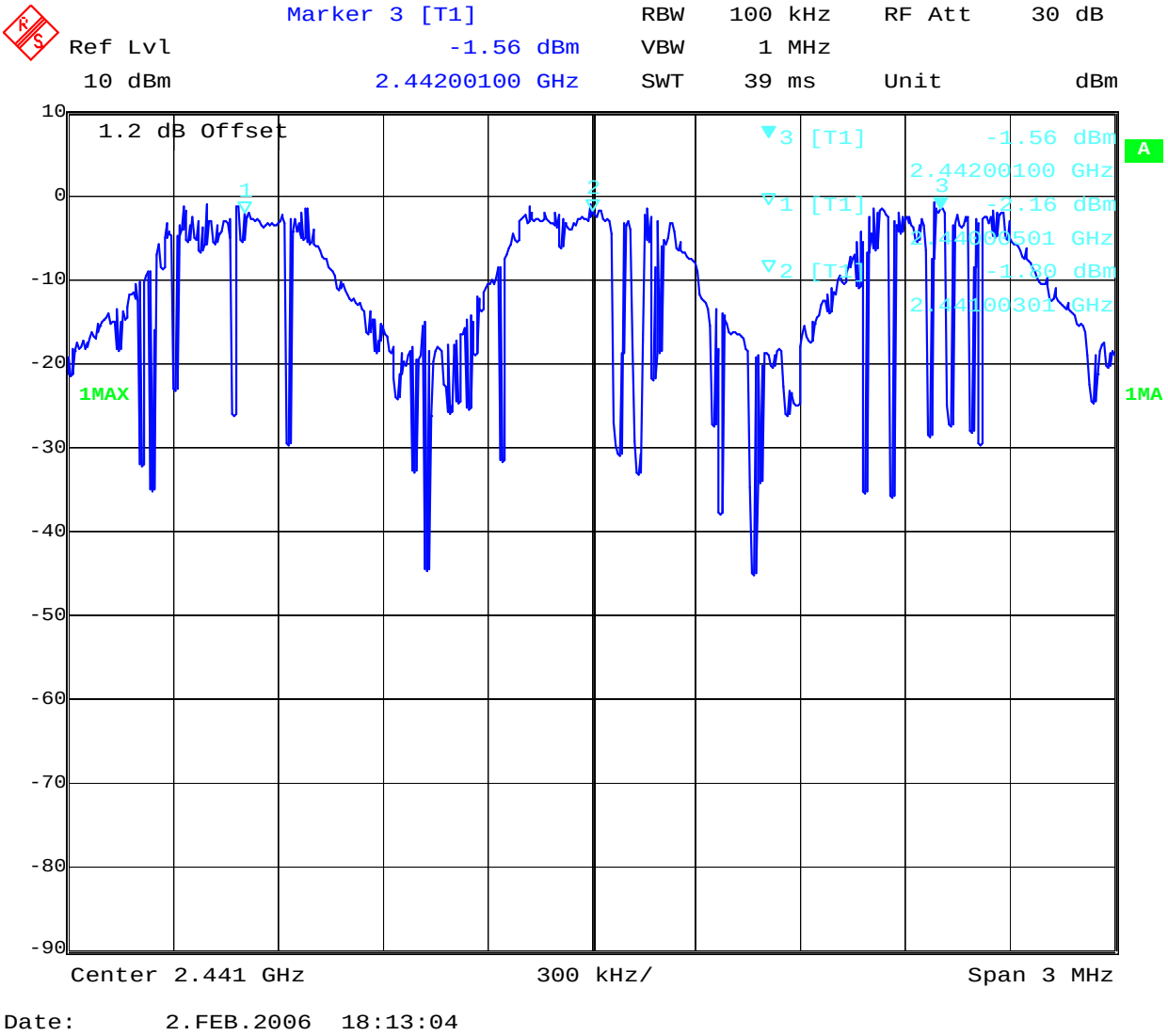


Abb. 4.9.2: Partition of the European Compliance Laboratory (Nordostpark 76)

5 Measurements

5.1 CARRIER FREQUENCY SEPARATION §15.247(a)

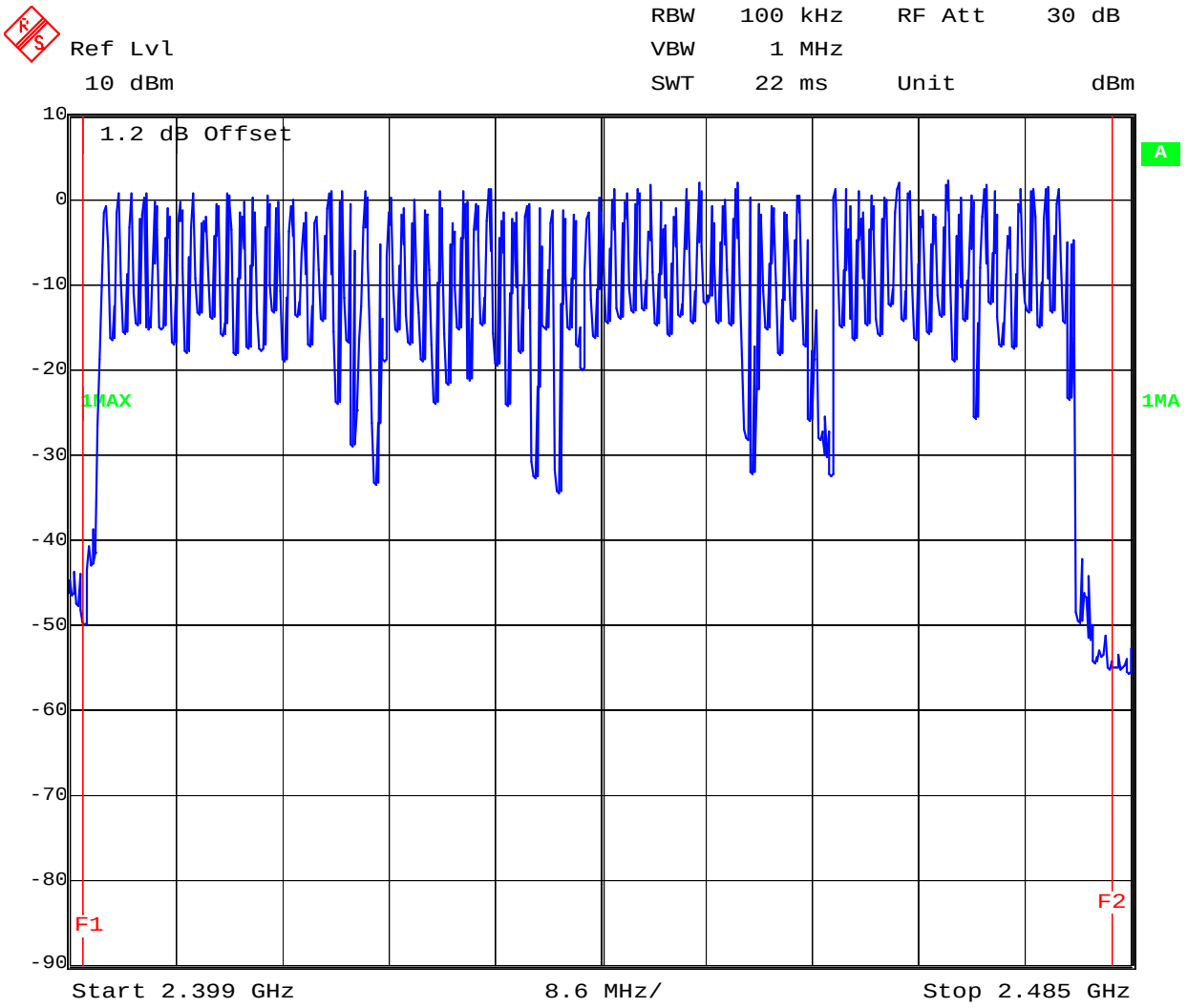
5.1.1 Results



5.2 NUMBER OF HOPPING CHANNELS §15.247(a)

5.2.1 Results

The number of hopping channels is 79

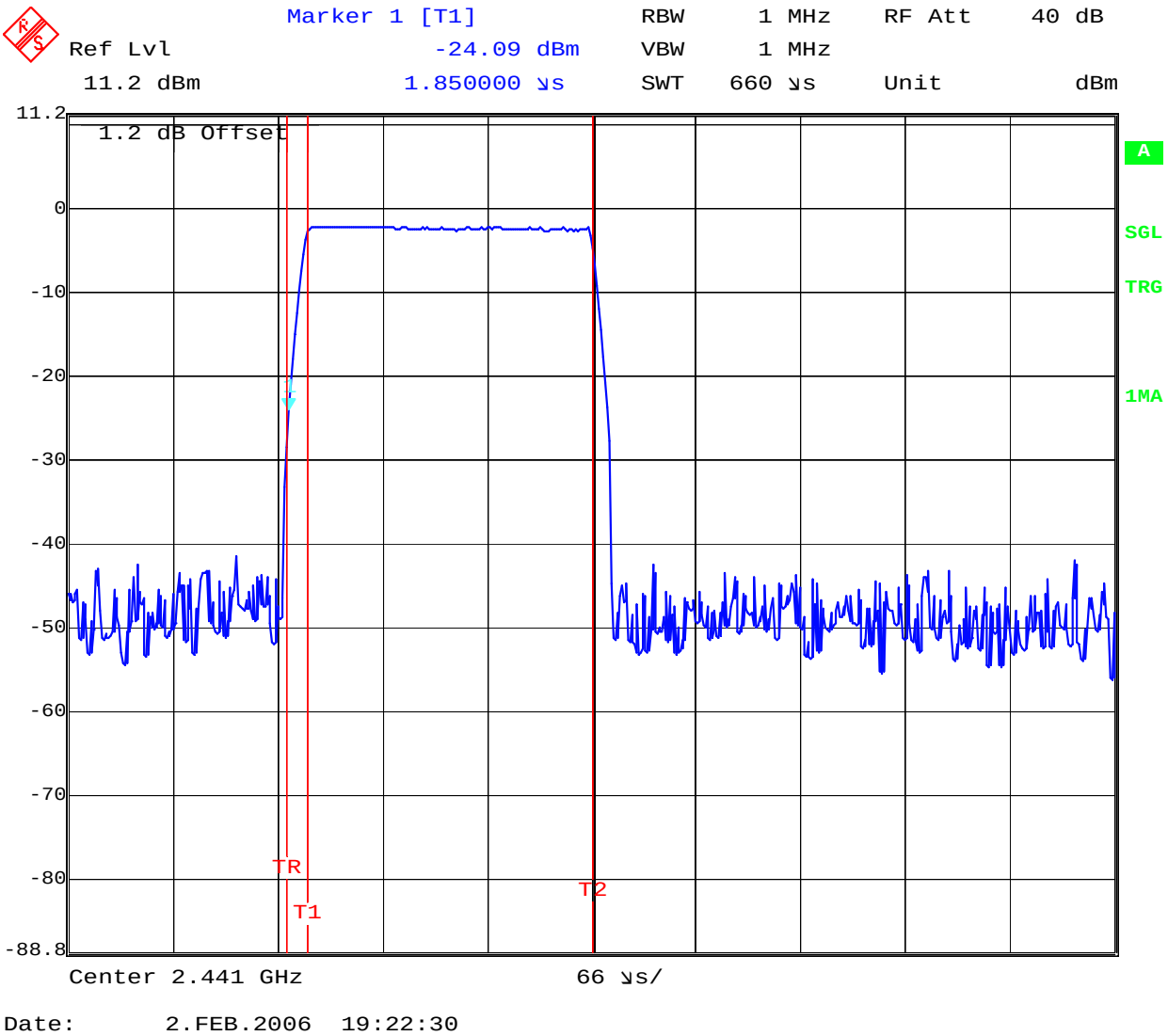


5.3 TIME OF OCCUPANCY (DWELL TIME) §15.247(a)

DH1- Packet
EUT support only 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 1.013 times per second and so for 31.6 seconds you have 320.108 times of appearance.
Each Tx time per appearance is 178µs.
So we have 320.108 * 178µs = 56.97ms per 31.6 seconds.

5.3.1 Results



5.4 SPECTRUM BANDWITH OF FHSS SYSTEM §15.247(a)

20 dB bandwidth

TEST CONDITIONS		20 db BANDWIDTH (kHz)		
Frequency (MHz)		2402	2441	2480
T_{nom} (23) C	V_{nom}	902	888	900

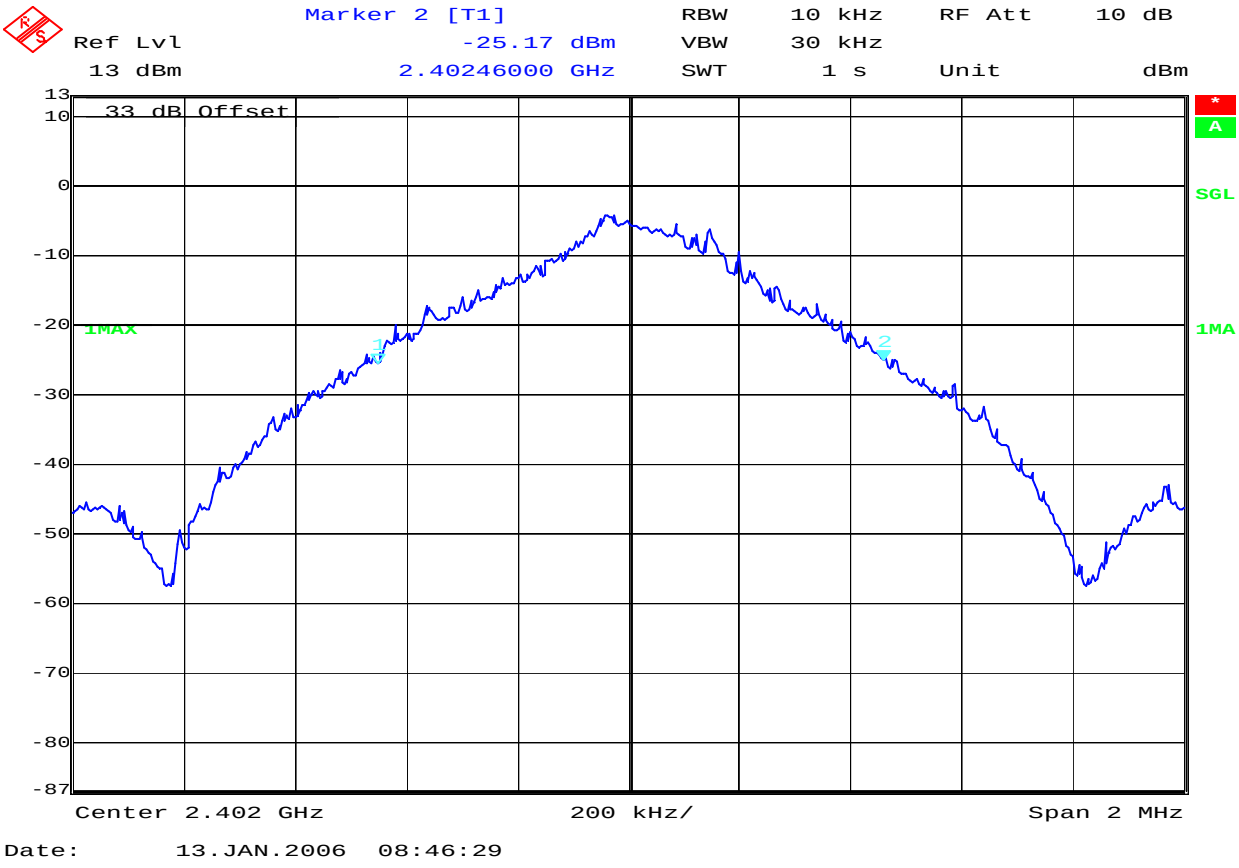
LIMIT **SUBCLAUSE §15.247(a) (1)**

The maximum 20dB bandwidth shall be at maximum 1000 KHz

5.4.1 Results

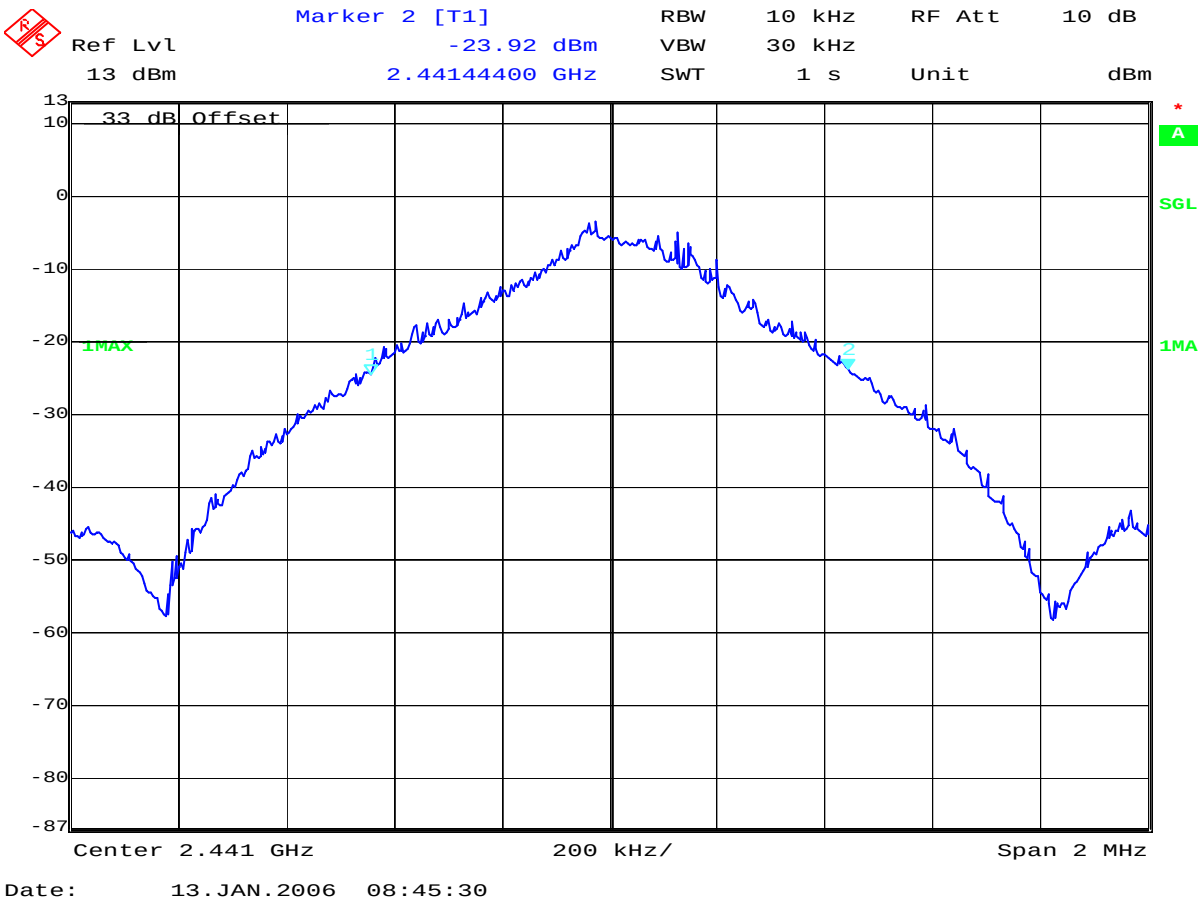
SPECTRUM BANDWITH OF FHSS SYSTEM **§15.247(a)**
20 dB bandwidth

Lowest Channel 2402 MHz



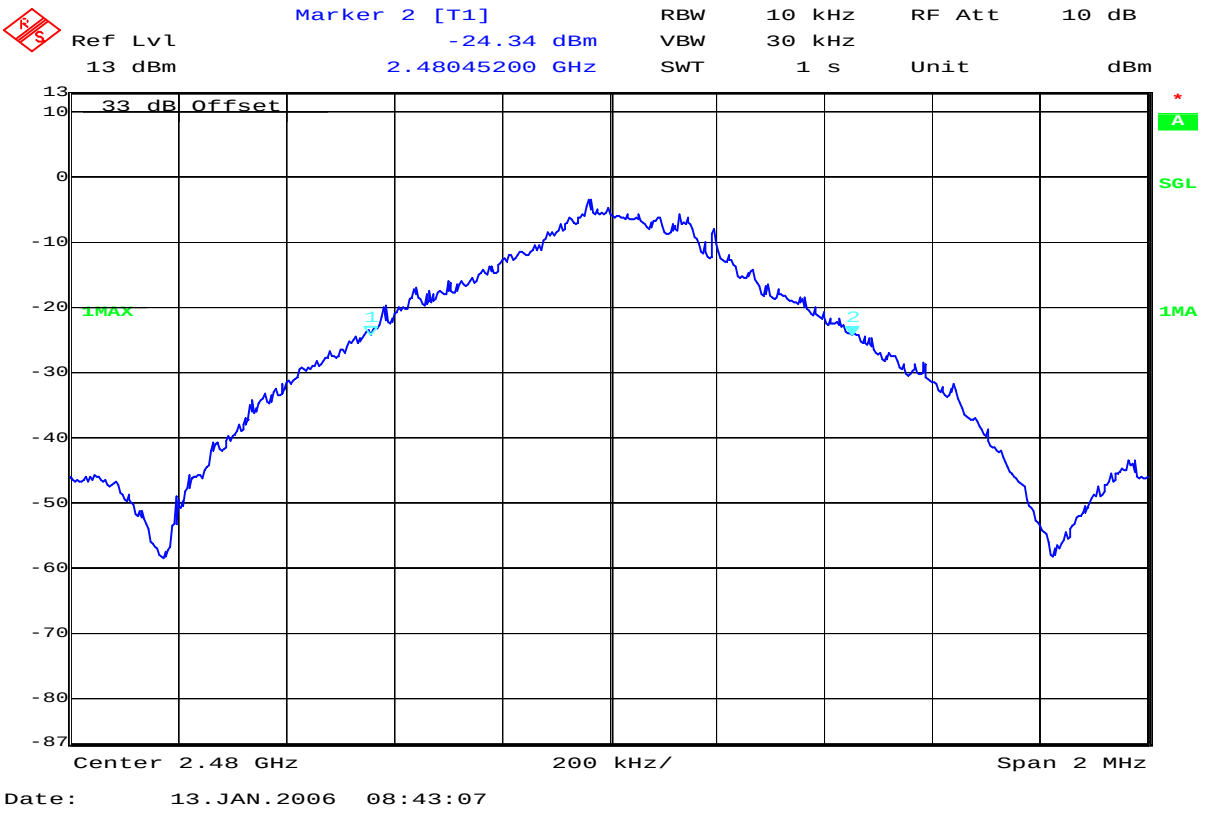
SPECTRUM BANDWITH OF FHSS SYSTEM **§15.247(a)**
20 dB bandwidth

Middle Channel 2441 MHz



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

Top Channel 2480 MHz



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

TEST CONDITIONS		Maximum Output Power (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom} (23) C	V_{nom}	-1.79	-1.66	-1.08
Measurment uncertainity		± 1dBm		

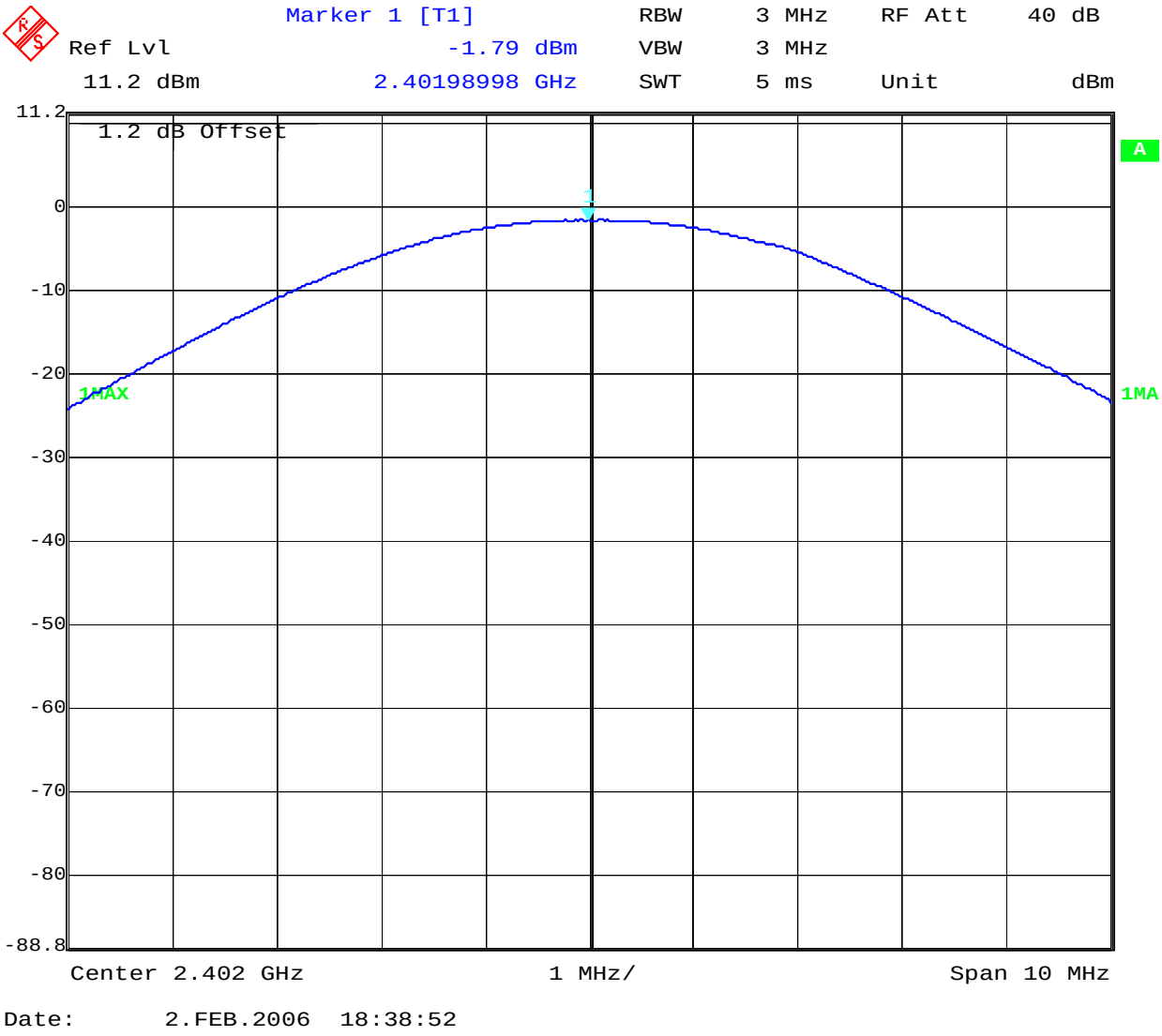
LIMIT **SUBCLAUSE §15.247(b) (1)**

Frequency Range	RF power output
2400-2483.5 MHz	1.0 Watt

5.5.1 Results

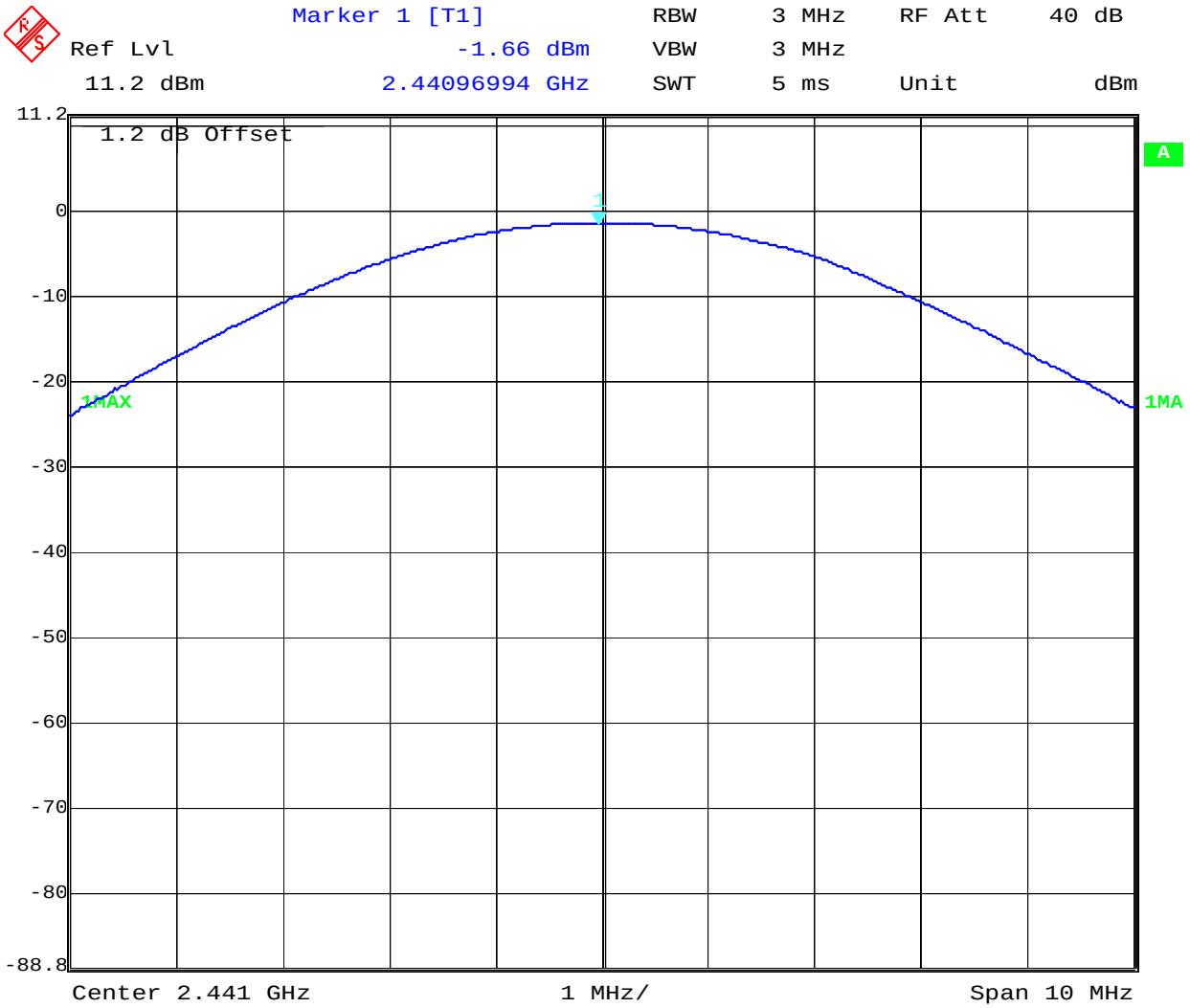
PEAK OUTPUT POWER (Conducted)

Lowest Channel: 2402 MHz



PEAK OUTPUT POWER (Conducted)

Middle Channel: 2441 MHz



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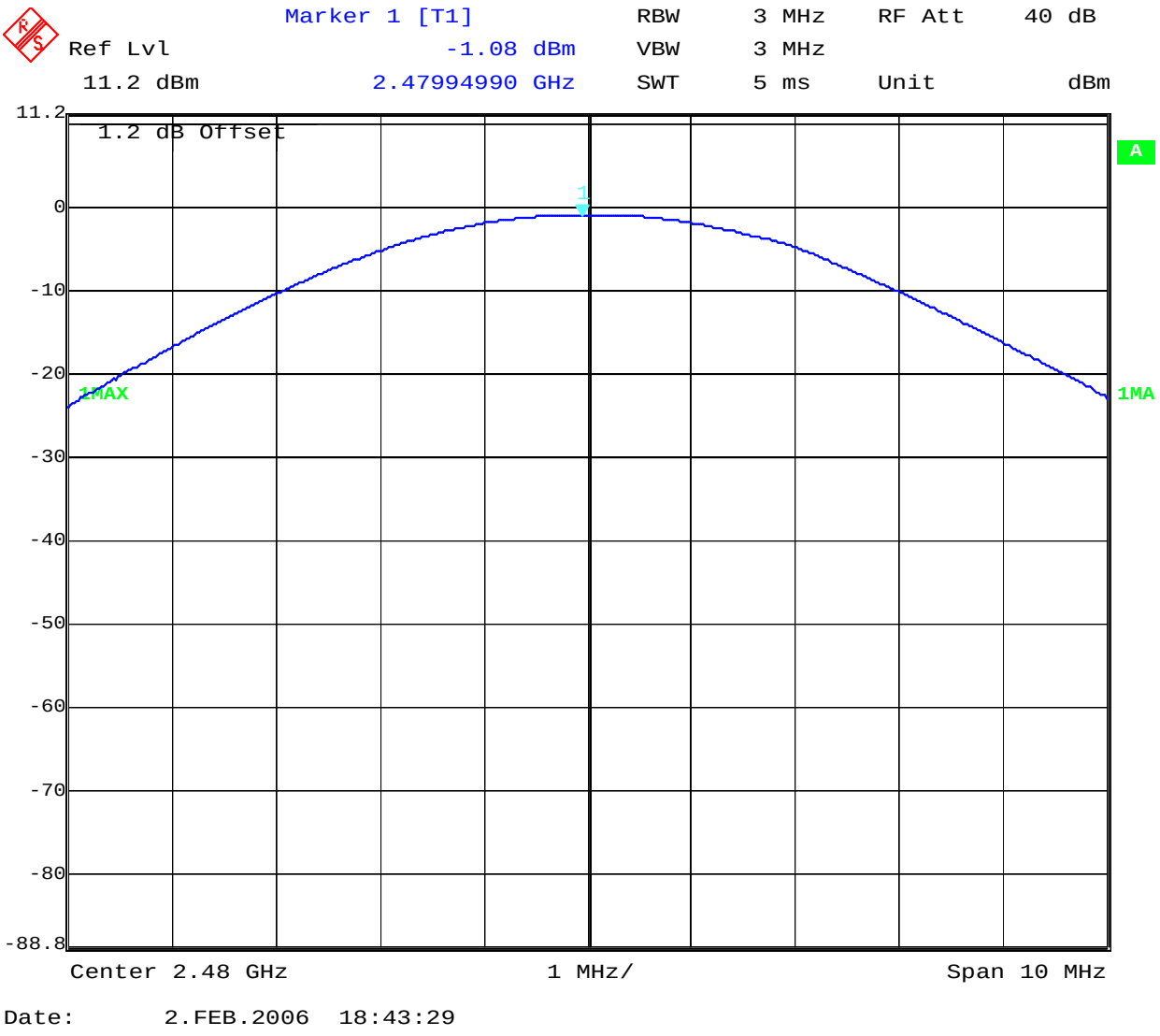
PEAK OUTPUT POWER (Conducted)

Top Channel: 2480 MHz



5.6 MXIMUM PEAK OUTPUT POWER (radiated) §15.247 (b)(1)

EIRP

TEST CONDITIONS		Maximum Output Power (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom} (23) C	V_{nom}	-0.69	-0.27	0.52
Measurment uncertainity		± 2dBm		

RBW/VBW:3 MHz

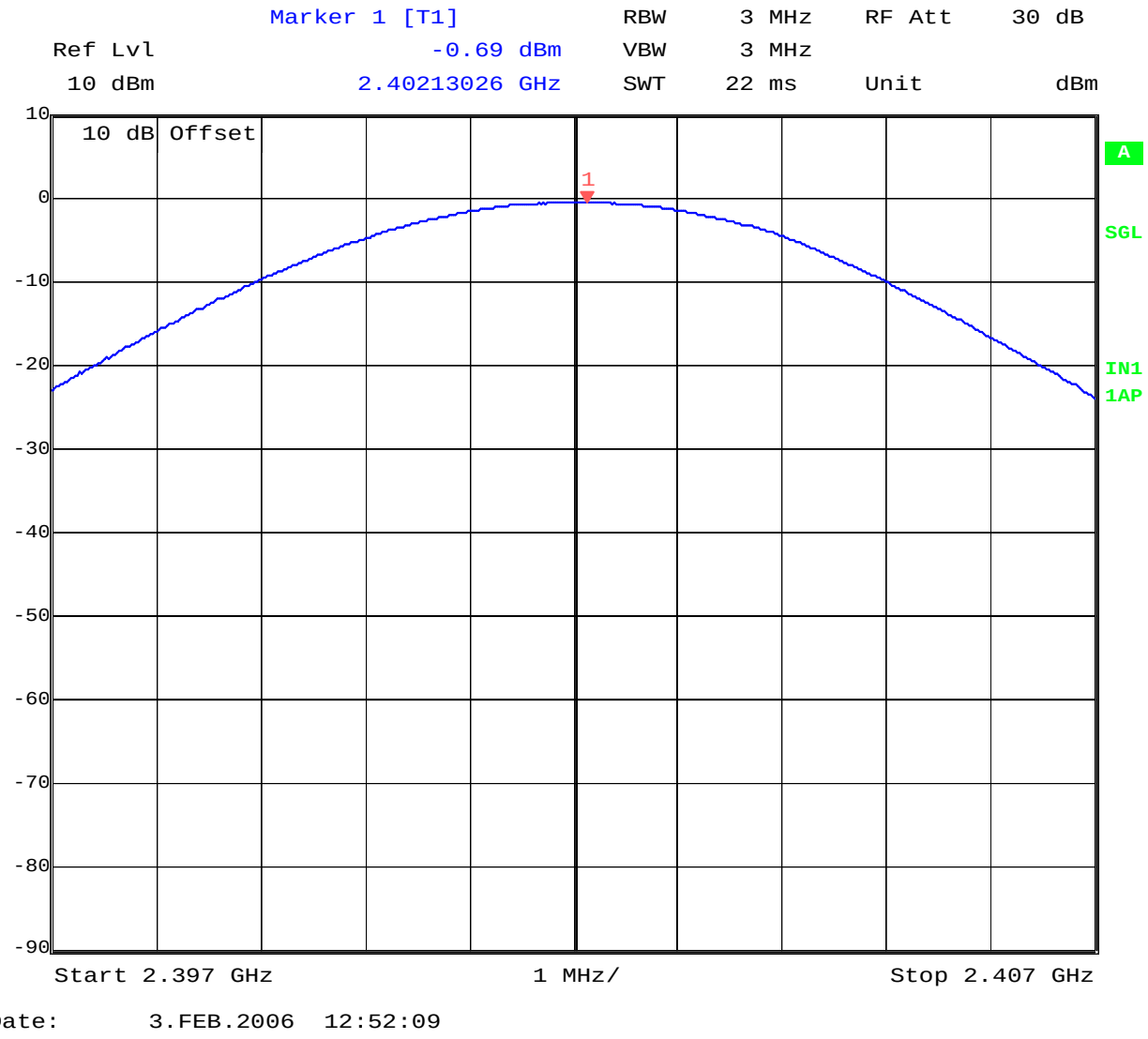
LIMIT **SUBCLAUSE §15.247(b) (1)**

Frequency Range	RF power output
2400-2483.5 MHz	1.0 Watt

5.6.1 Results

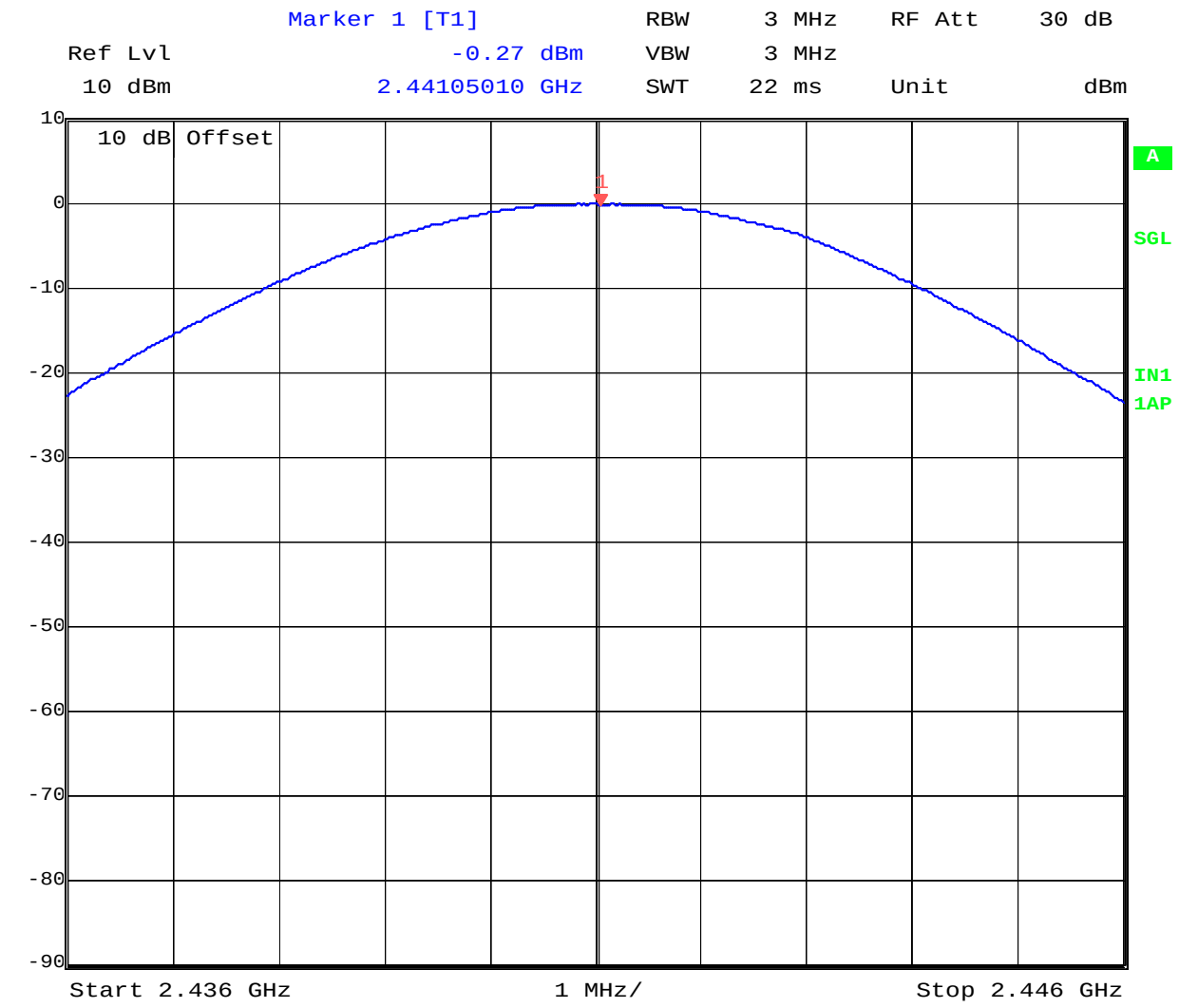
PEAK OUTPUT POWER (radiated)

Lowest Channel: 2402 MHz
Short Description: EIRP Bluetooth channel2402MHz
Start 2.397GHz Stop2.407GHz
Detector Meas. AV
Time BW Coupled 3 MHz



PEAK OUTPUT POWER (radiated)

Middle Channel: 2441 MHz
Short Description: EIRP Bluetooth channel2441MHz
Start 2.436GHz Stop2.446GHz
Detector Meas. AV
Time BW Coupled 3 MHz



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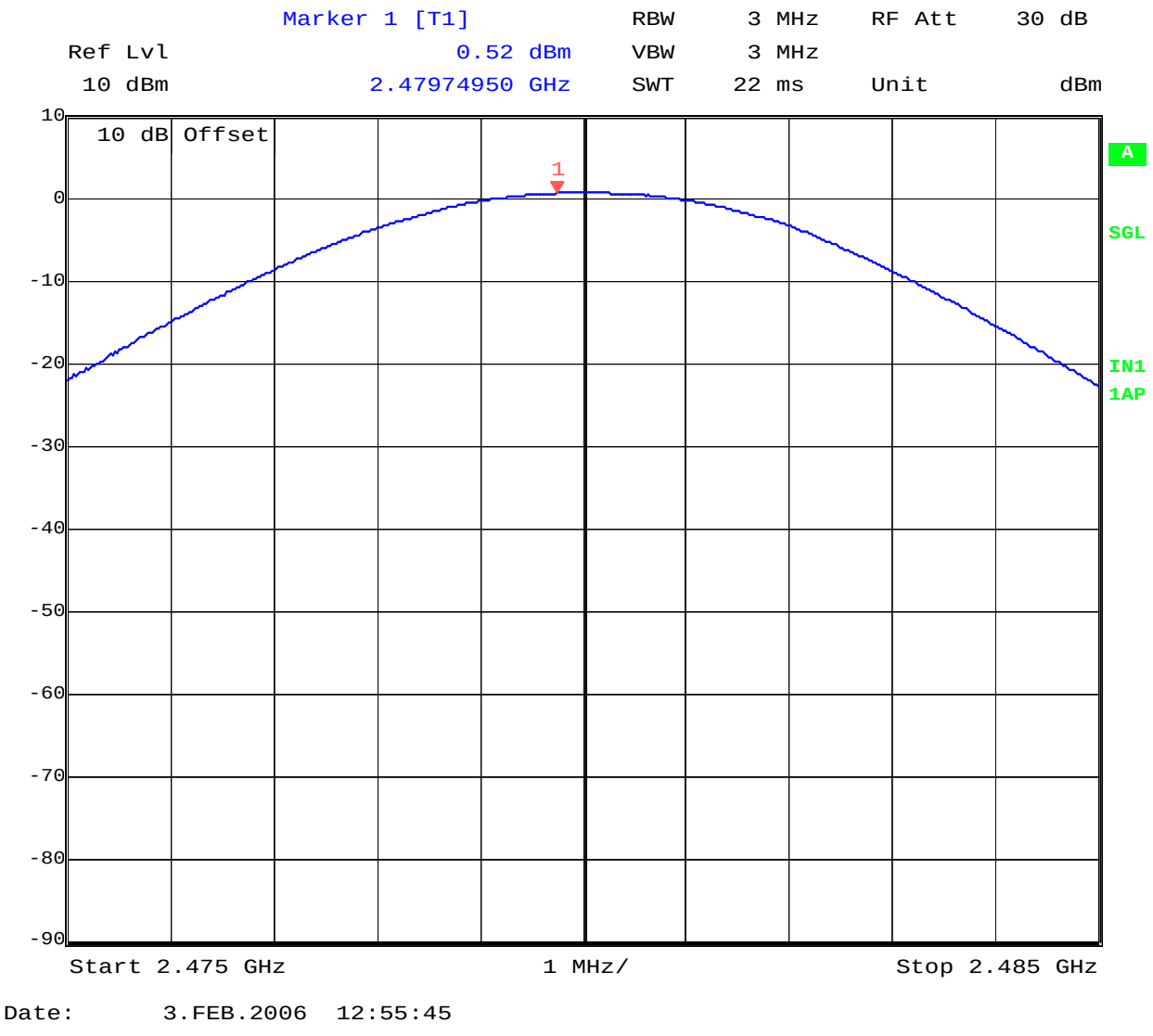
PEAK OUTPUT POWER (radiated)

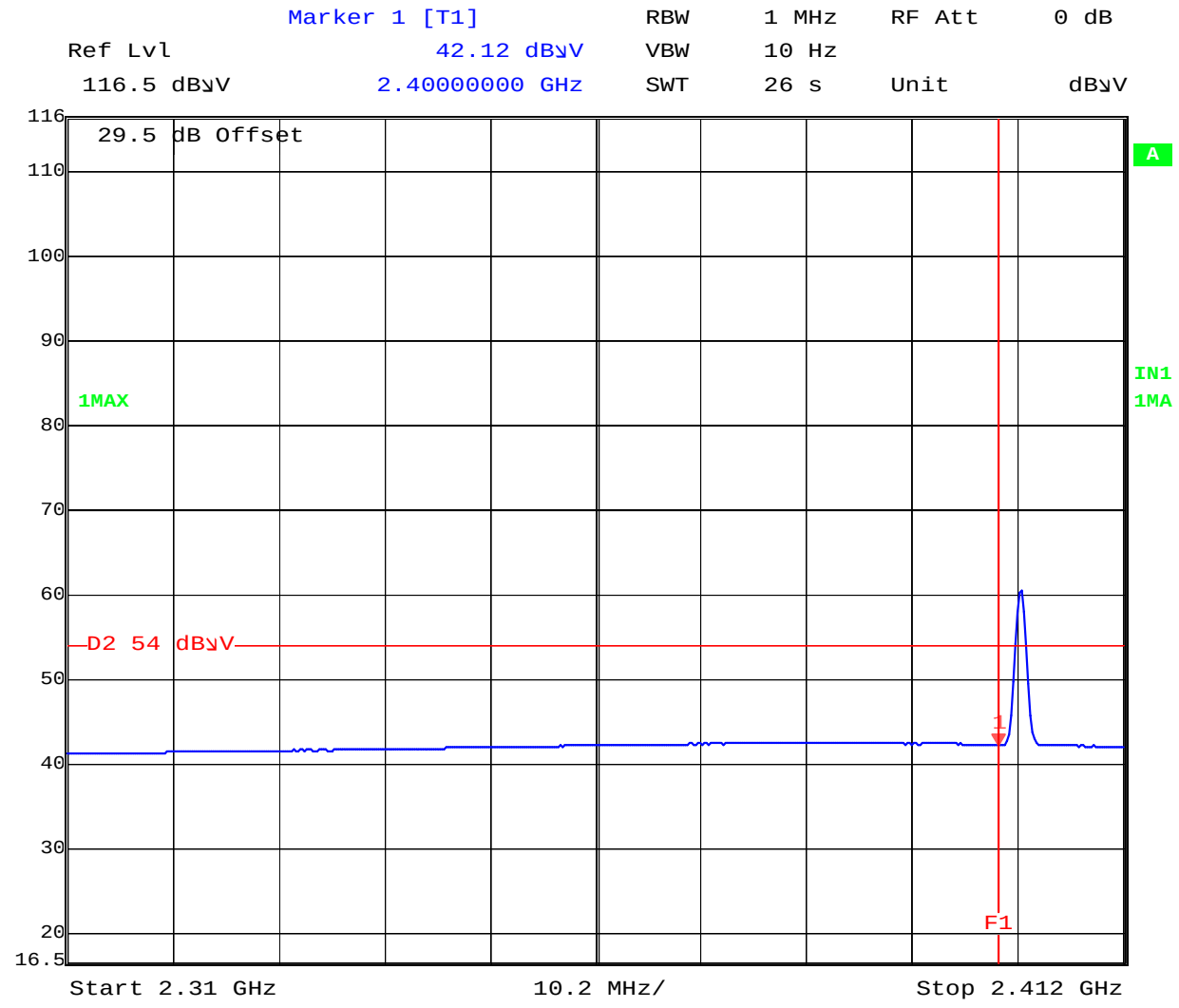
Top Channel: 2480 MHz
Short Description: EIRP Bluetooth channel2480MHz
Start 2.475GHz Stop2.485GHz
Detector Meas. AV
Time BW Coupled 3 MHz



5.7 BAND EDGE COMPLIANCE §15.247 (c)

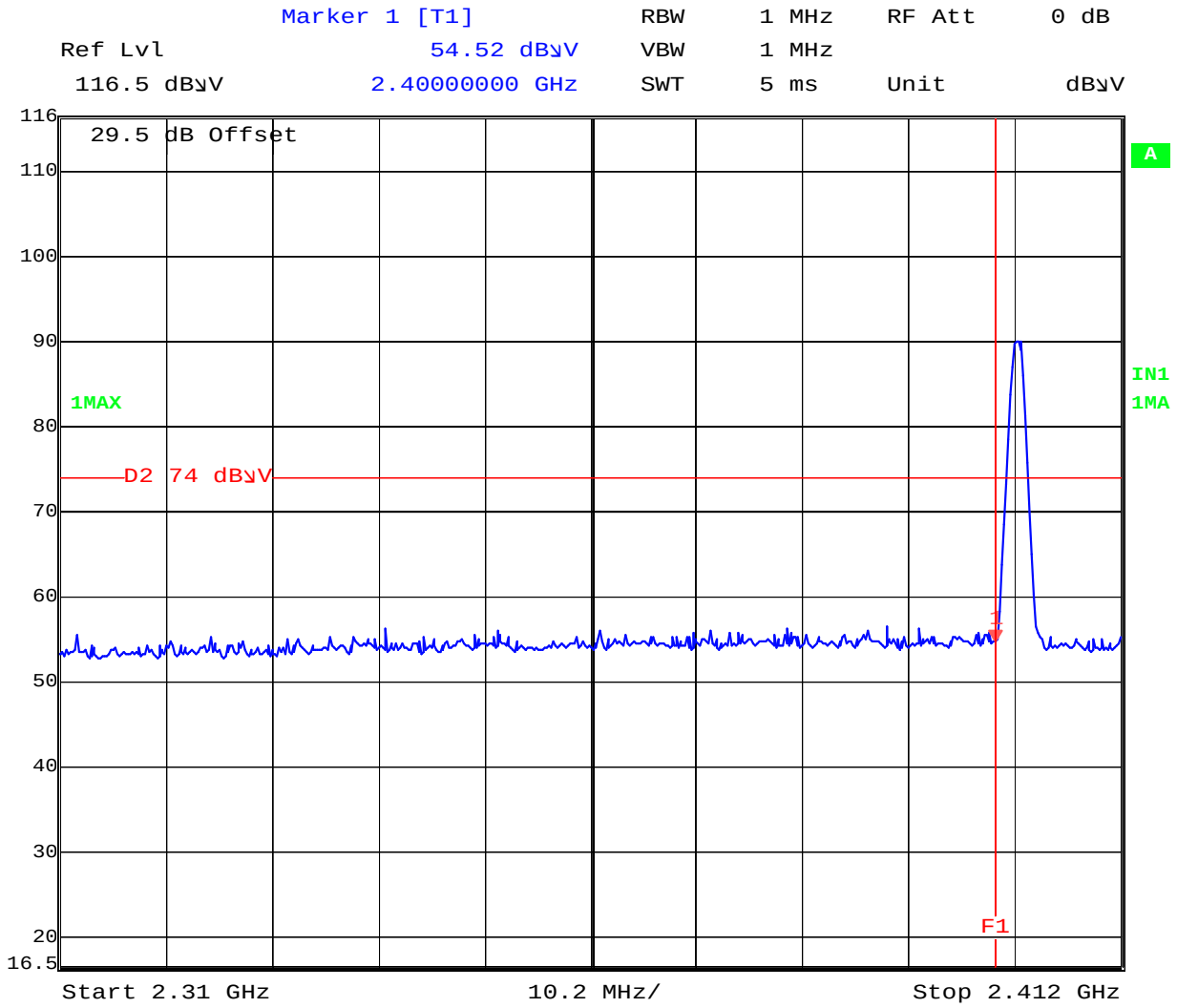
5.7.1 Results

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
Short Description :Low band edge
Limit Line : 54dBµV



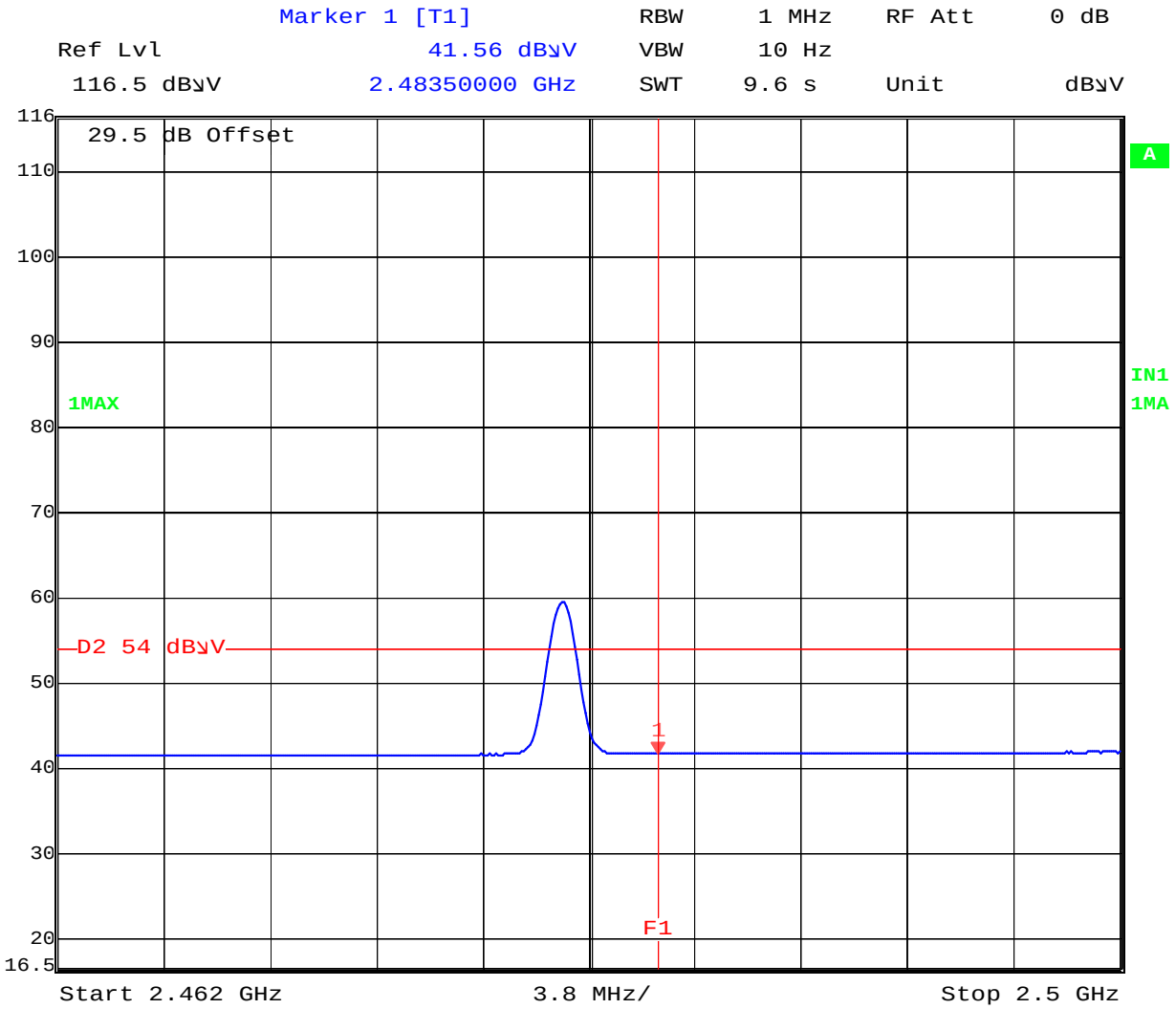
Date: 2.FEB.2006 14:58:20

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
Short Description :Lowbandedge
Limit Line : 74dBµV

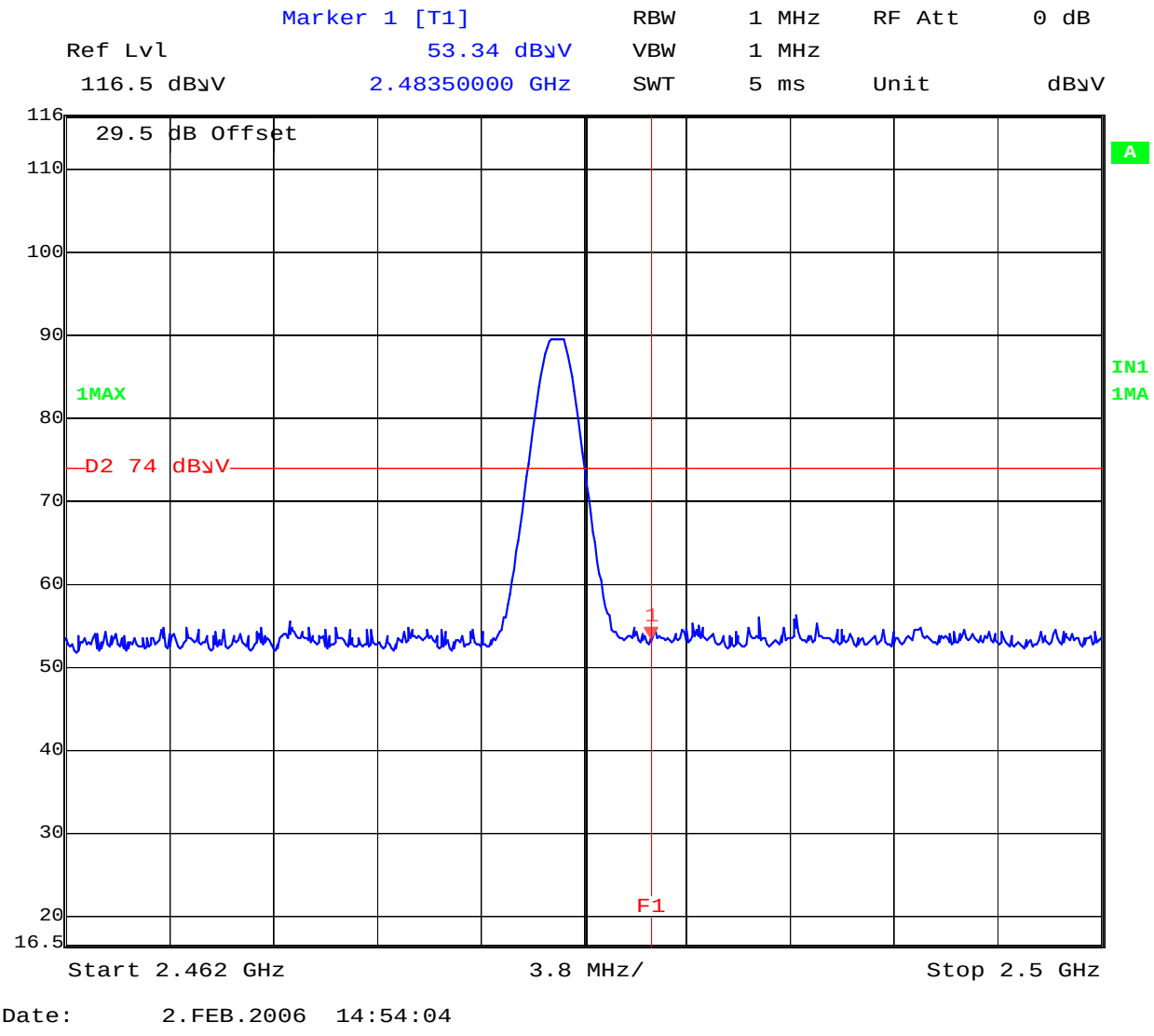


Date: 2.FEB.2006 14:50:40

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
Short Description :High band edge
Limit Line : 54dBµV



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
Short Description :High band edge
Limit Line : 74dBµV



5.8 EMISSION LIMITATIONS(conducted) §15.247 (c)(1)

Transmitter (Conducted)

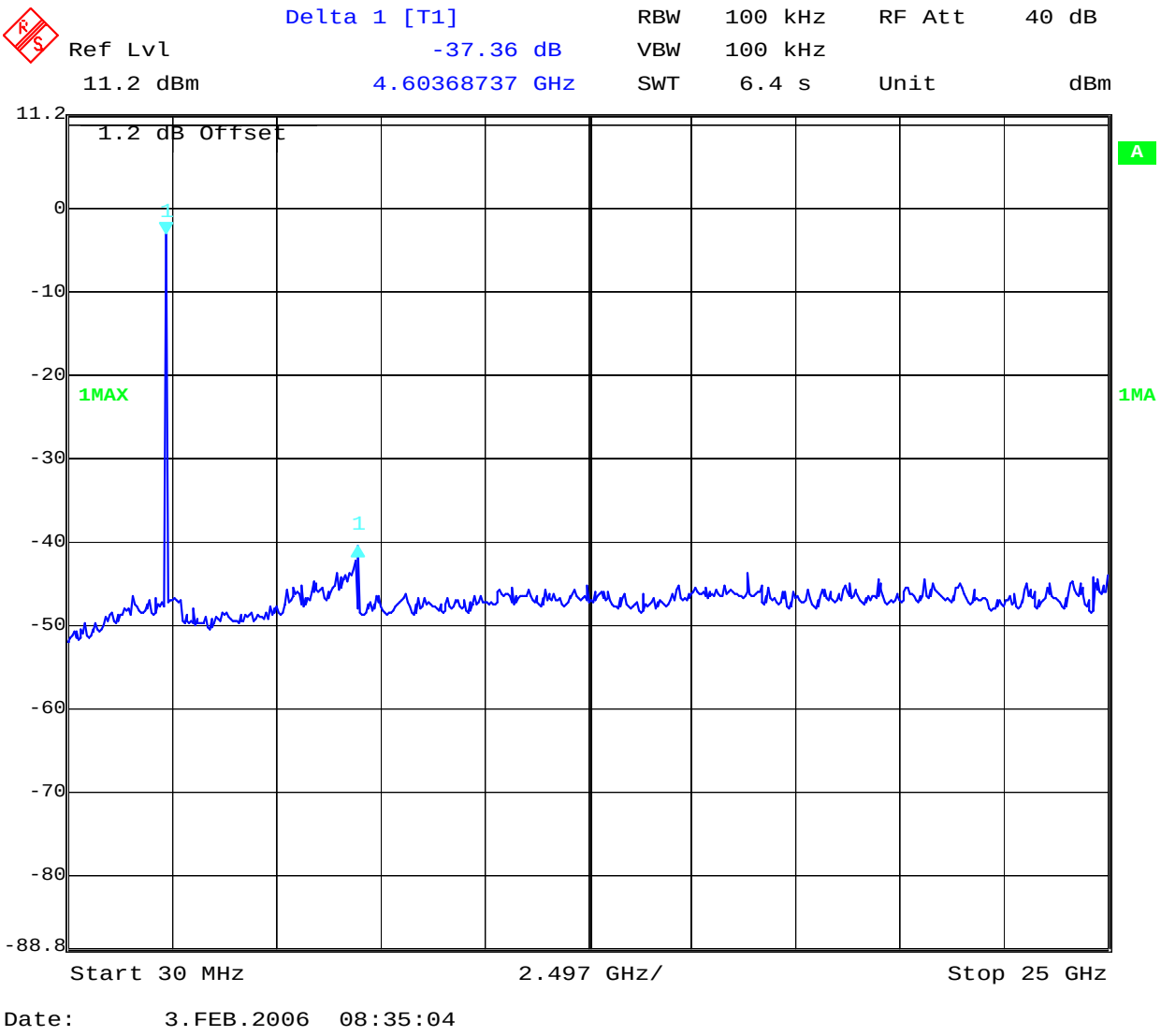
LIMITS :

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)).

5.8.1 Results

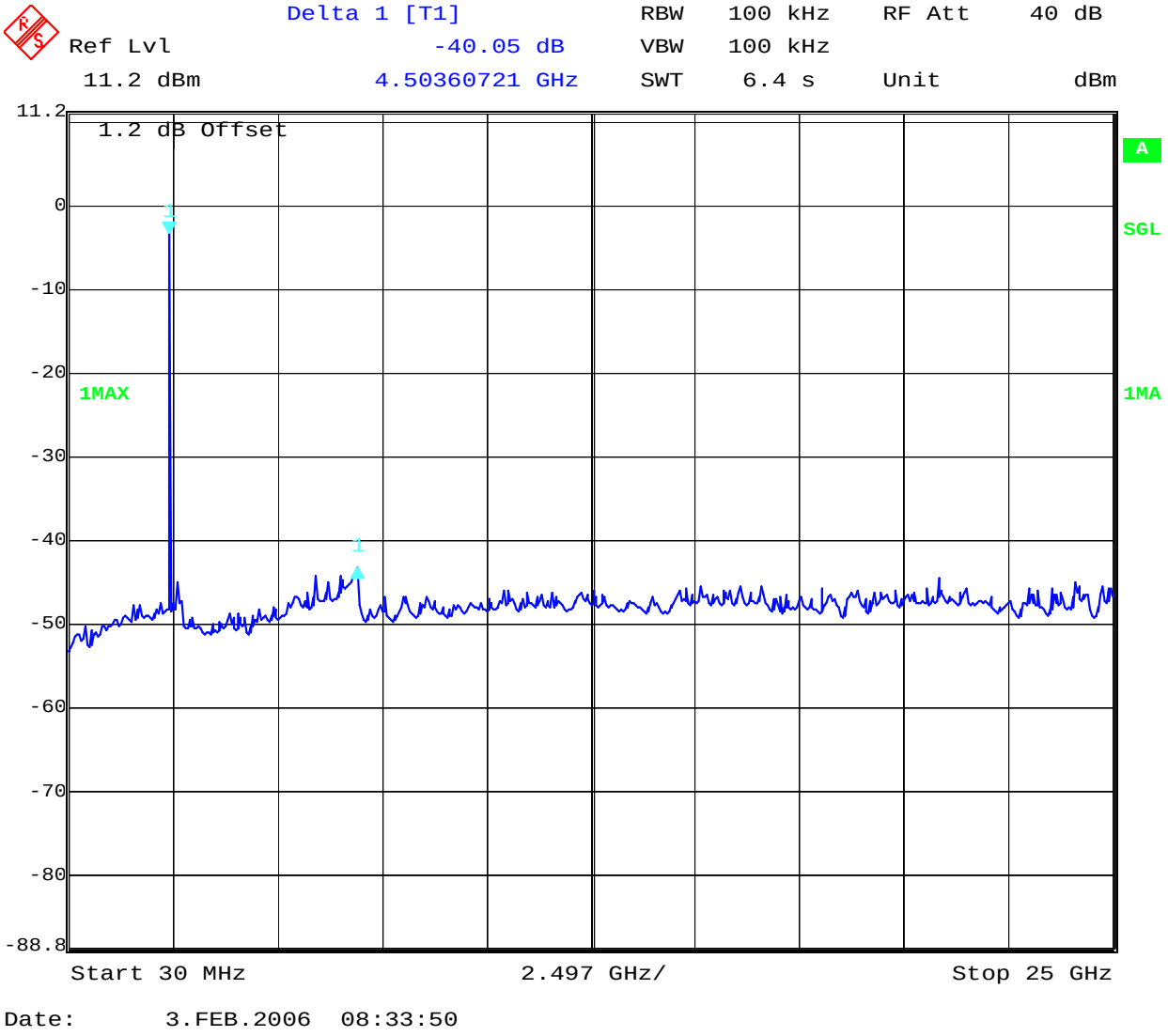
EMISSION LIMITATIONS Conducted (Transmitter) § 15.247 (c) (1)
Lowest Channel (2402MHz): 30MHz 25GHz
Detector : Peak

NOTE: The peak is the carrier frequency.



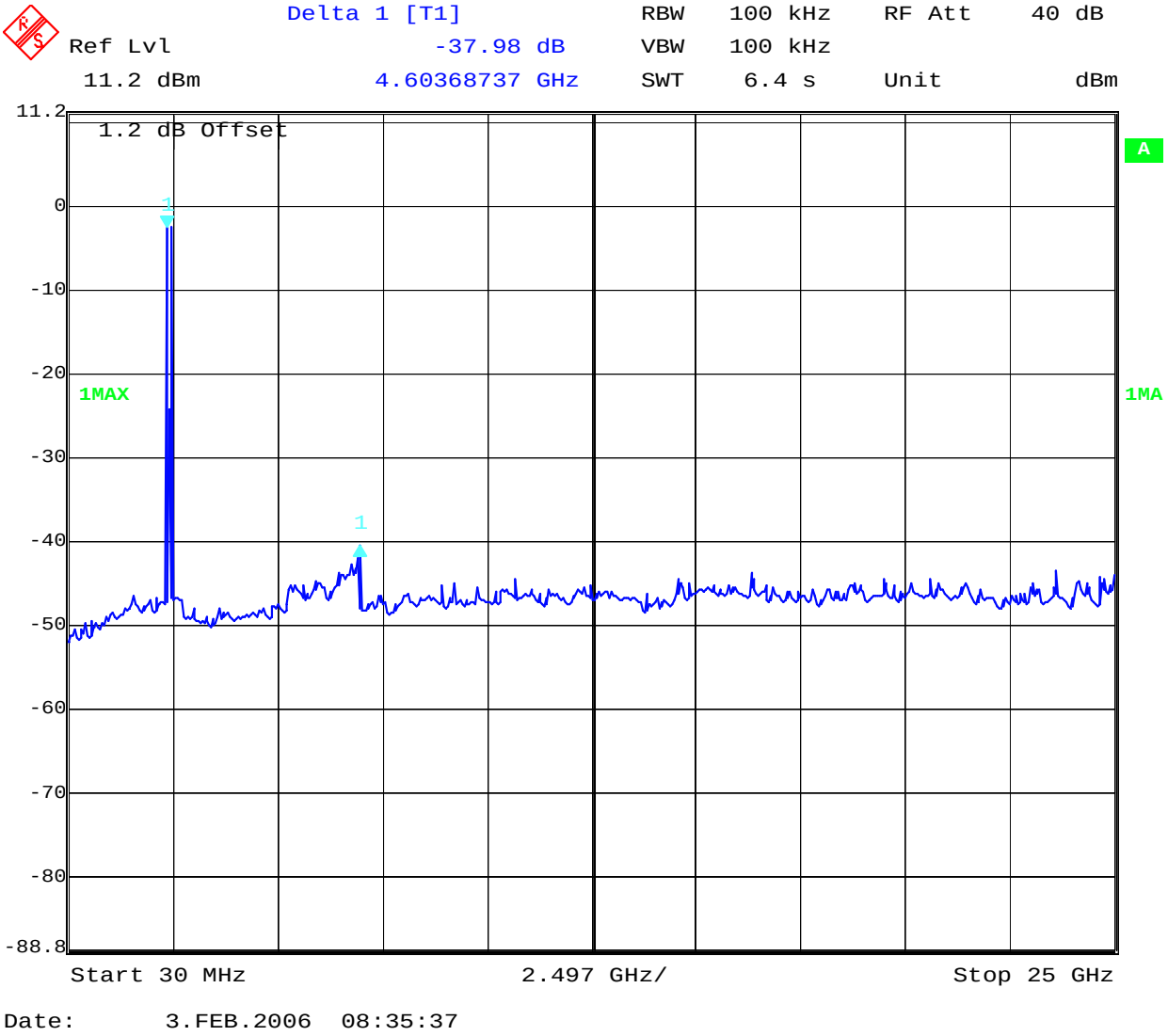
EMISSION LIMITATIONS Conducted(Transmitter) § 15.247 (c) (1)
Mid Channel (2441MHz): 30MHz 25GHz
Detector : Peak

NOTE: The peak is the carrier frequency.



EMISSION LIMITATIONS Conducted(Transmitter) § 15.247 (c) (1)
Highest Channel (2480MHz): 30MHz 25GHz
Detector : Peak

NOTE: The peak is the carrier frequency.



5.9 EMISSION LIMITATIONS (radiated) §15.247 (c)(1)

Transmitter (Radiated)

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 preamplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 26 GHz 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

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

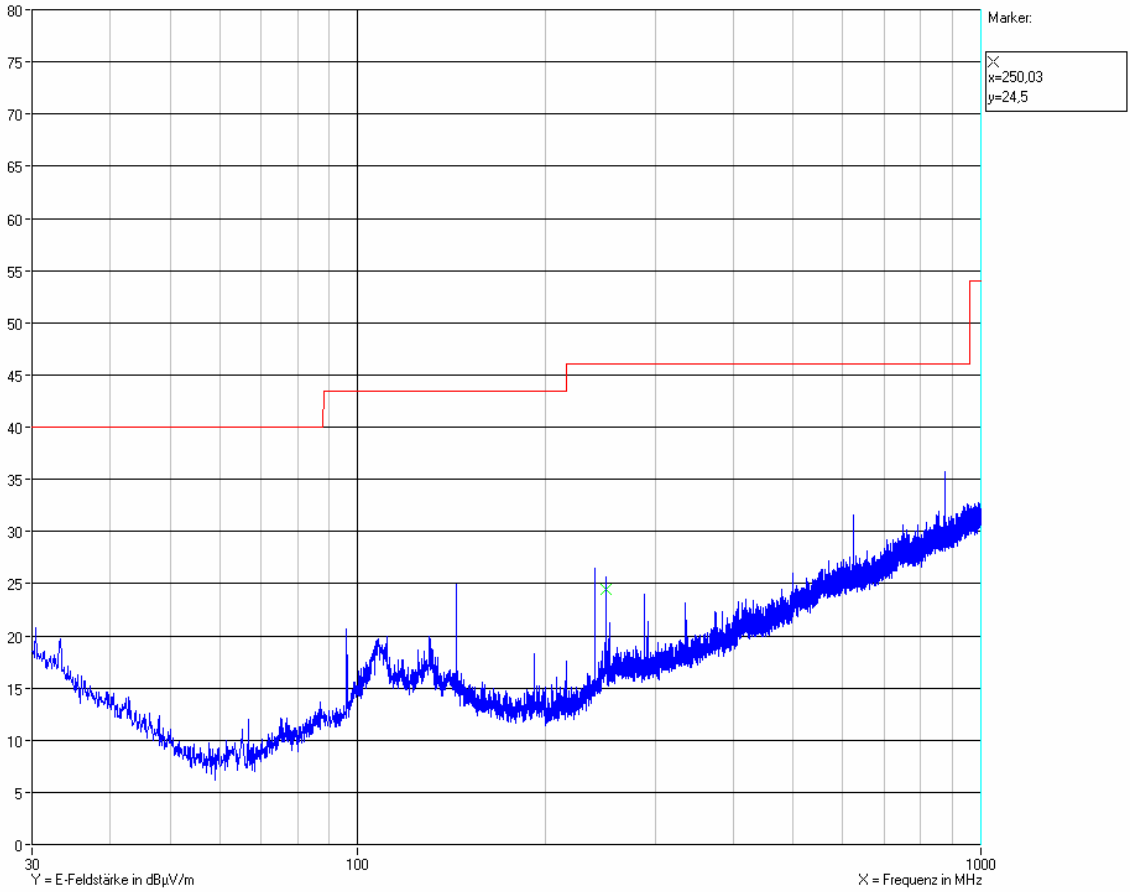
5.9.1 Results

EMISSION LIMITATIONS Radiated (Transmitter) **§ 15.247 (c) (1)**

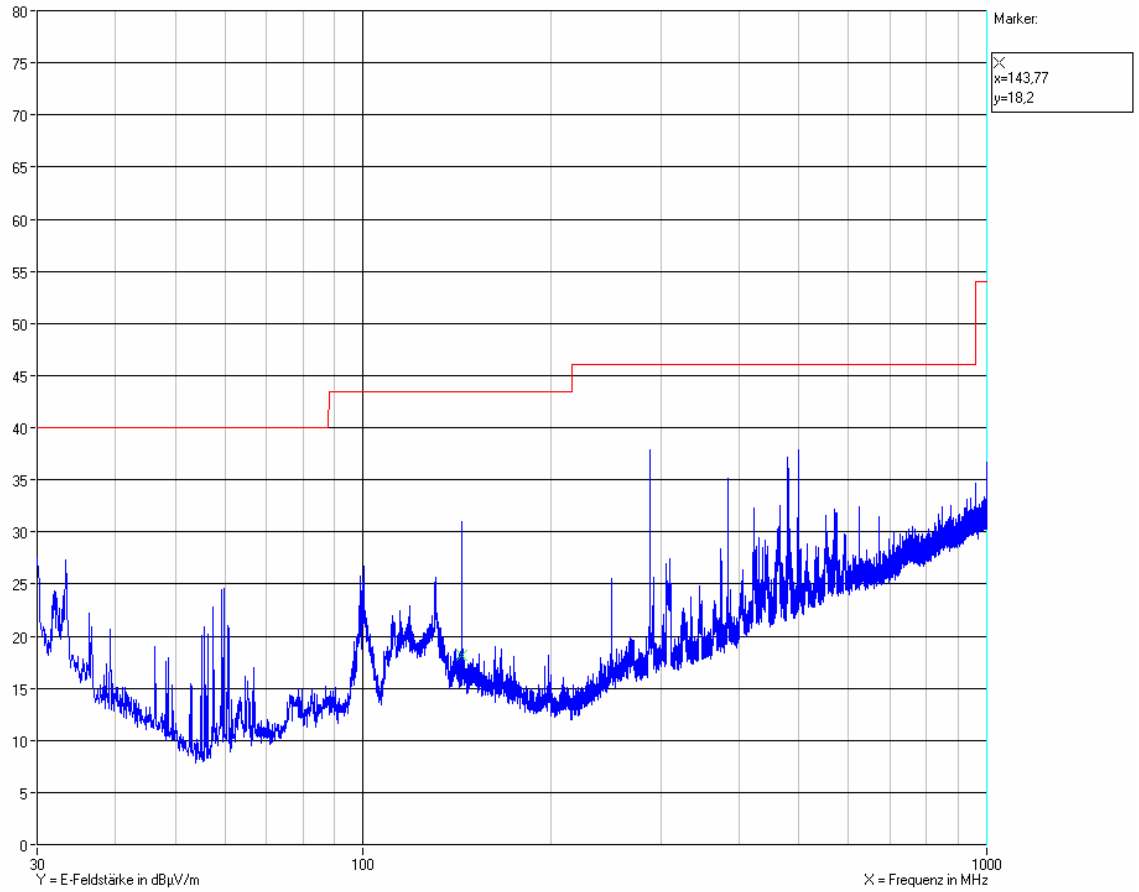
Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

Transmit channel Frequency (MHz)	Level (dBµV/m)
Lowest channel at 2402	see plot
Middle channel at 2441	see plot
Top channel at 2480	see plot

EMISSION LIMITATIONS Radiated (Transmitter) § 15.247 (c) (1)
30MHz – 1GHz
Antenna: horizontal
Note: This plot is valid for low, mid & high channels (worst case plot)
Short Description: Bluetooth 30MHz-1GHz
Start 30.0 MHz Stop 1.0 GHz; Detector: Peak; RBW: 120 kHz (EMI receiver)



EMISSION LIMITATIONS Radiated (Transmitter) § 15.247 (c) (1)
30MHz – 1GHz
Antenna: vertical
Note: This plot is valid for low, mid & high channels (worst case plot)
Short Description: Bluetooth 30MHz-1GHz
Start 30.0 MHz Stop 1.0 GHz; Detector: Peak; RBW: 120 kHz (EMI receiver)

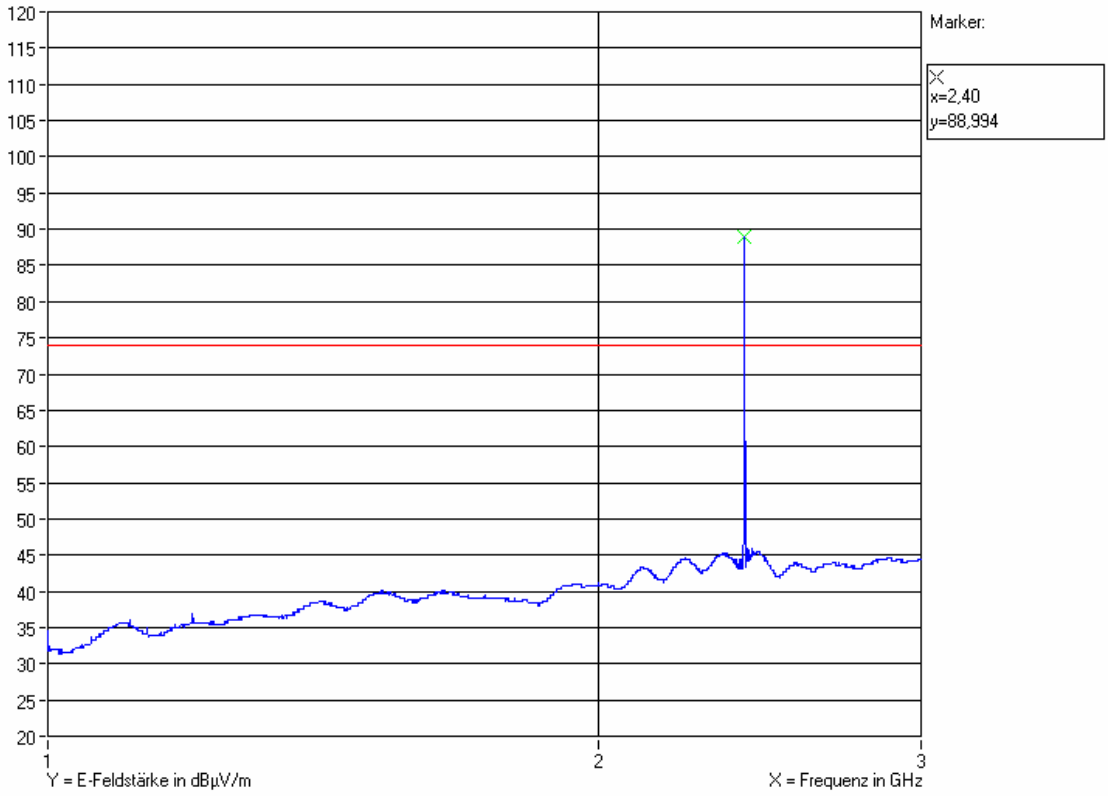


EMISSION LIMITATIONS –Radiated (Transmitter) **§15.247 (c)(1)**

Lowest Channel (2402MHz): 1GHz – 3GHz

NOTE: The peak is the carrier frequency.

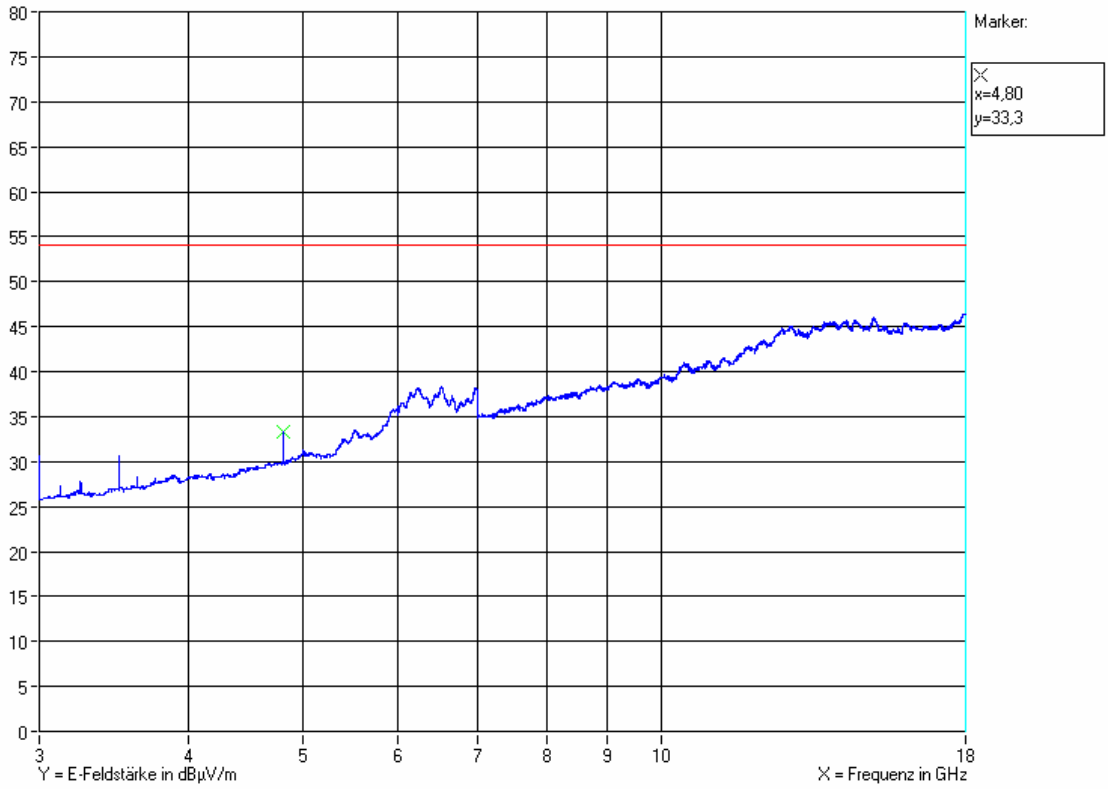
Short Description: Bluetooth Spurious 1GHz - 3GHz
Start 1.0 GHz Stop 3.0 GHz Detector AV RBW: 1MHz (EMI receiver)



EMISSION LIMITATIONS Radiated (Transmitter) § 15.247 (c) (1)

Lowest Channel (2402MHz): 3GHz – 18GHz

Short Description: Bluetooth Spurious 3GHz - 18GHz
Start 3.0 GHz Stop 18.0 GHz Detector AV RBW: 1MHZ (EMI receiver)

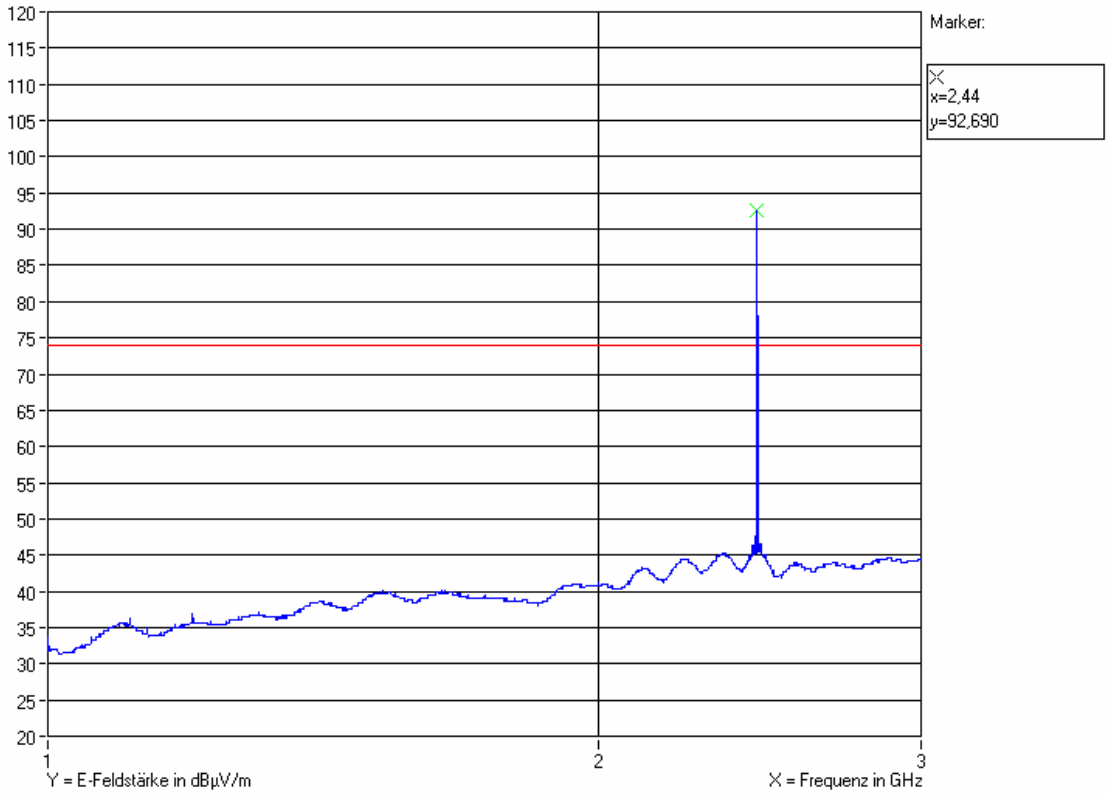


EMISSION LIMITATIONS Radiated (Transmitter) § 15.247 (c) (1)

Middle Channel (2441MHz): 1GHz – 3GHz

NOTE: The peak is the carrier frequency.

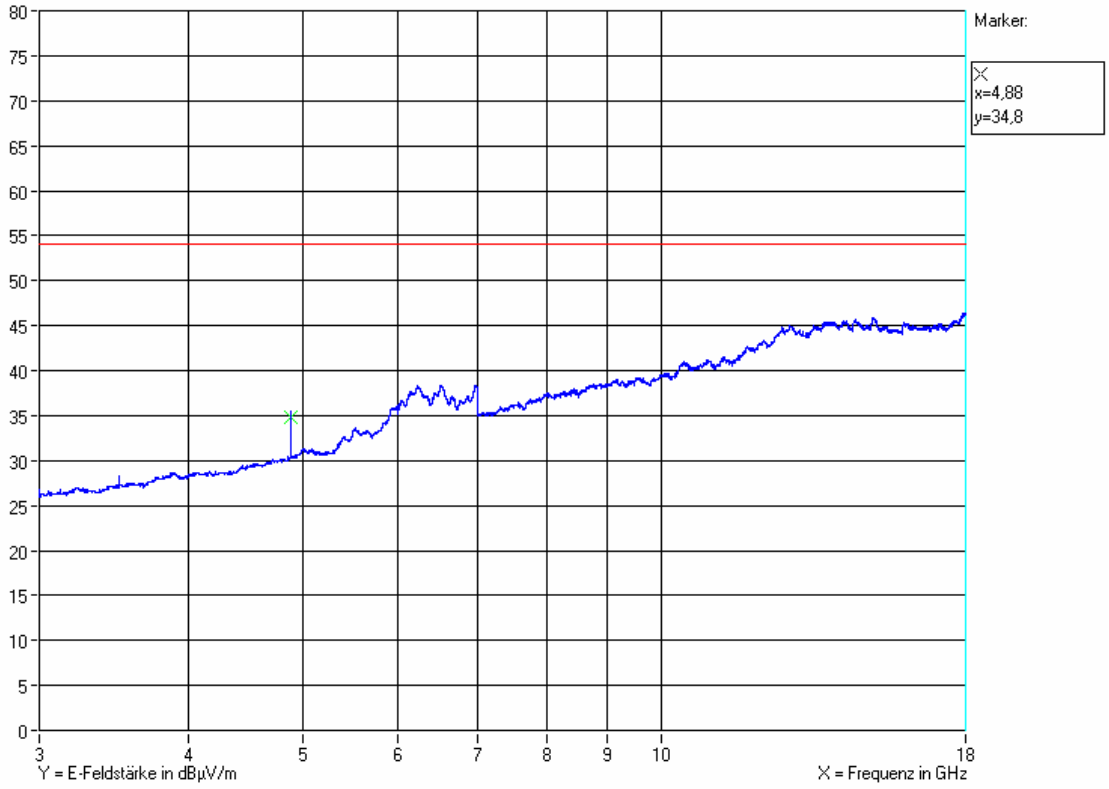
Short Description: Bluetooth Spurious 1GHz - 3GHz
Start 1.0 GHz Stop 3.0 GHz Detector AV RBW: 1MHZ (EMI receiver)



EMISSION LIMITATIONS Radiated (Transmitter) § 15.247 (c) (1)

Middle Channel (2441MHz): 3GHz – 18GHz

Short Description: Bluetooth Spurious 3GHz - 18GHz
Start 3.0 GHz Stop 18.0 GHz Detector AV ;RBW: 1MHZ (EMI receiver)

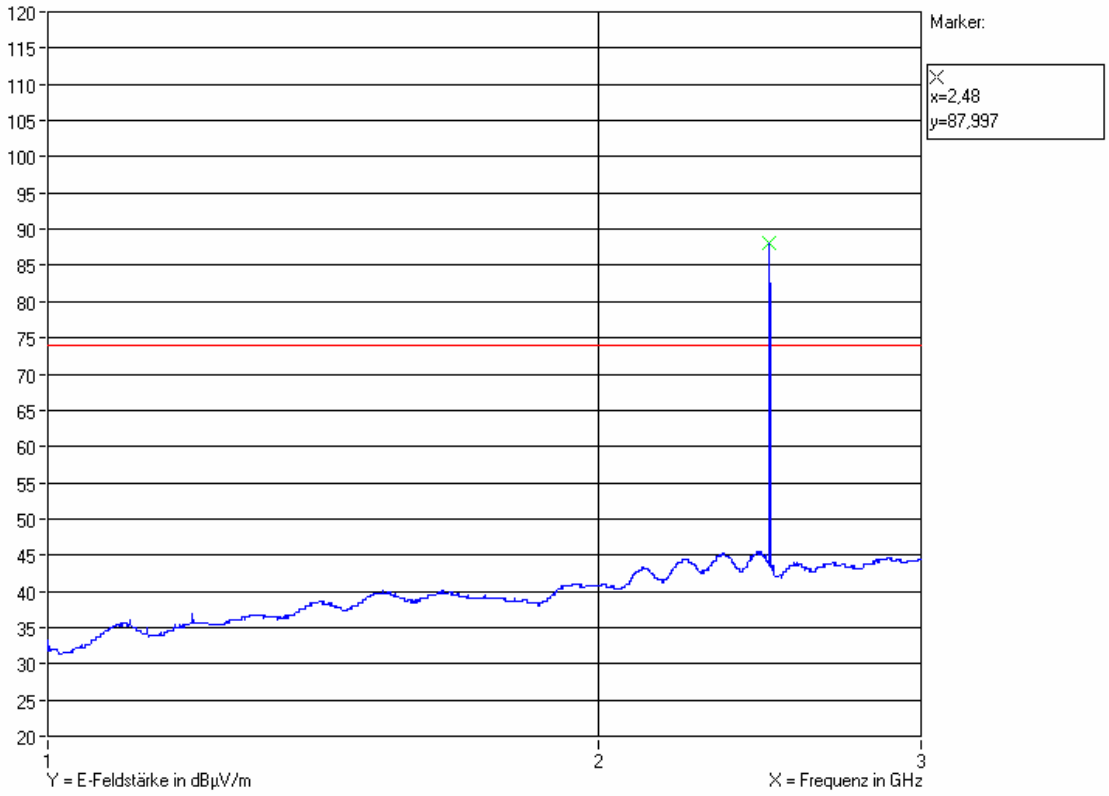


EMISSION LIMITATIONS Radiated (Transmitter) § 15.247 (c) (1)

Middle Channel (2480MHz): 1GHz – 3GHz

NOTE: The peak is the carrier frequency.

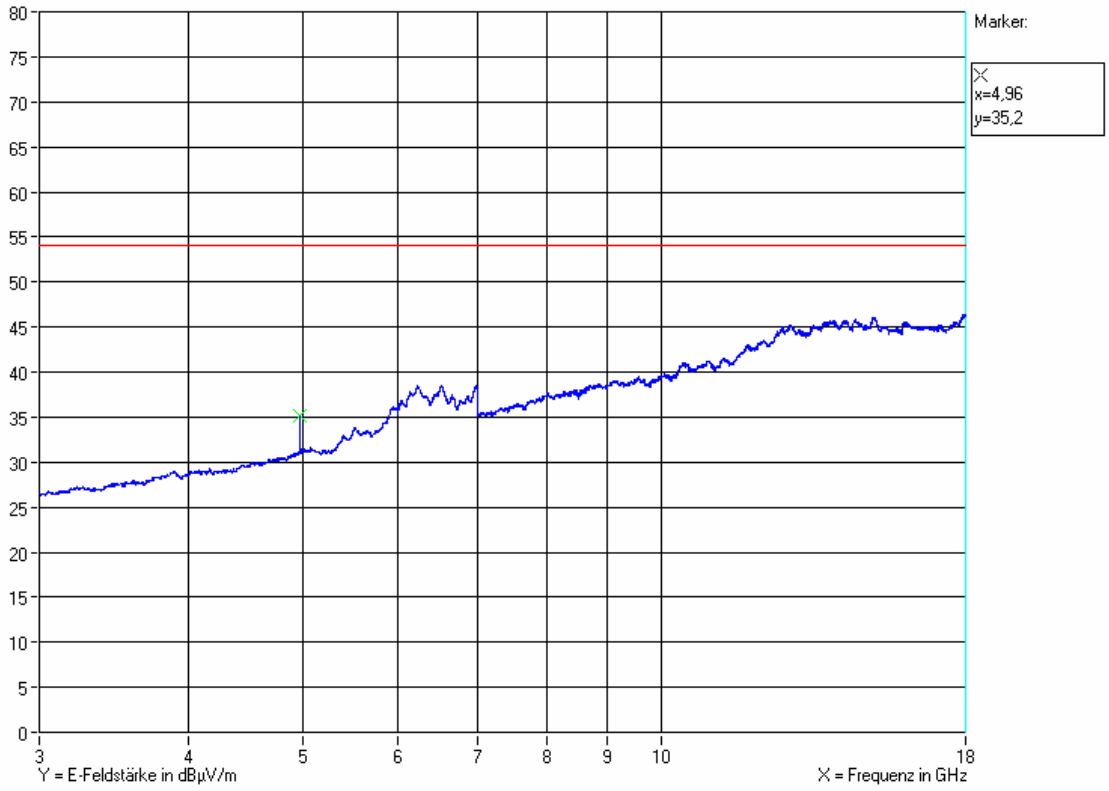
Short Description: Bluetooth Spurious 1GHz - 3GHz
Start 1.0 GHz Stop 3.0 GHz Detector AV RBW: 1MHZ (EMI receiver)



EMISSION LIMITATIONS Radiated (Transmitter) § 15.247 (c) (1)

Middle Channel (2480MHz): 3GHz – 18GHz

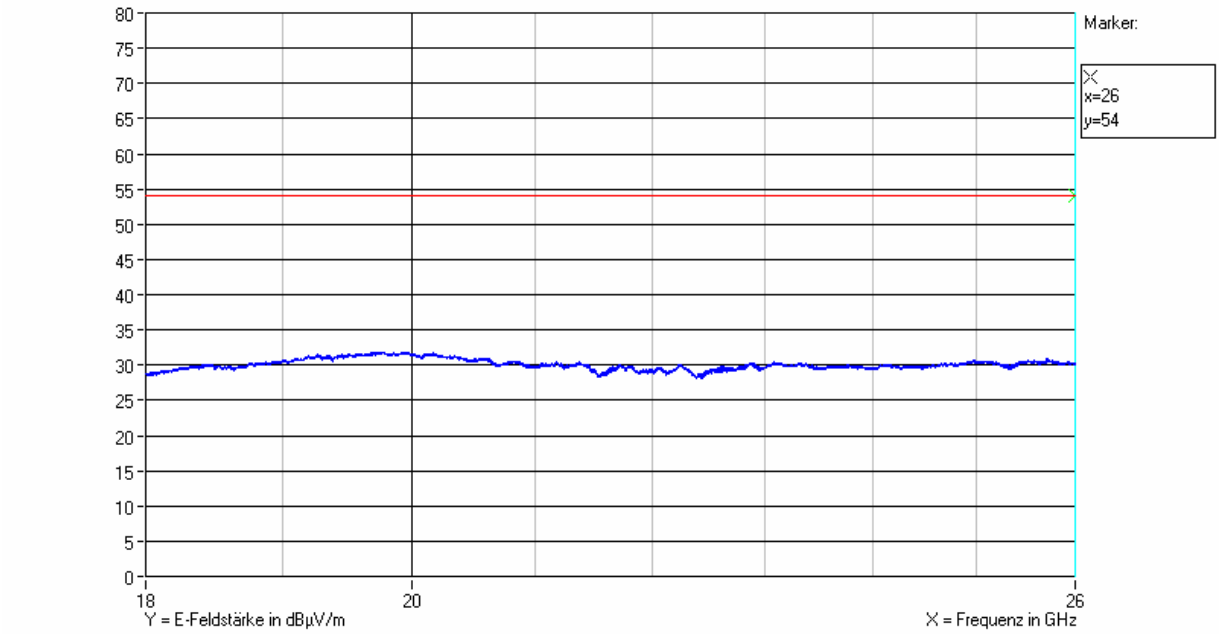
Short Description: Bluetooth Spurious 3GHz - 18GHz
Start 3.0 GHz Stop 18.0 GHz Detector AV ;RBW: 1MHZ (EMI receiver)



EMISSION LIMITATIONS Radiated(Transmitter) **§ 15.247 (c) (1)**

18GHz – 26GHz

Note: This plot is valid for low, mid & high channels (worst case plot)
Short Description: Bluetooth Spurious 18 – 26 GHz
Start 18.0 GHz ;Stop 26.0 GHz ;Detector AV ;RBW: 1MHZ ; (EMI receiver)



5.10 RECEIVER SPURIOUS RADIATION §15.209

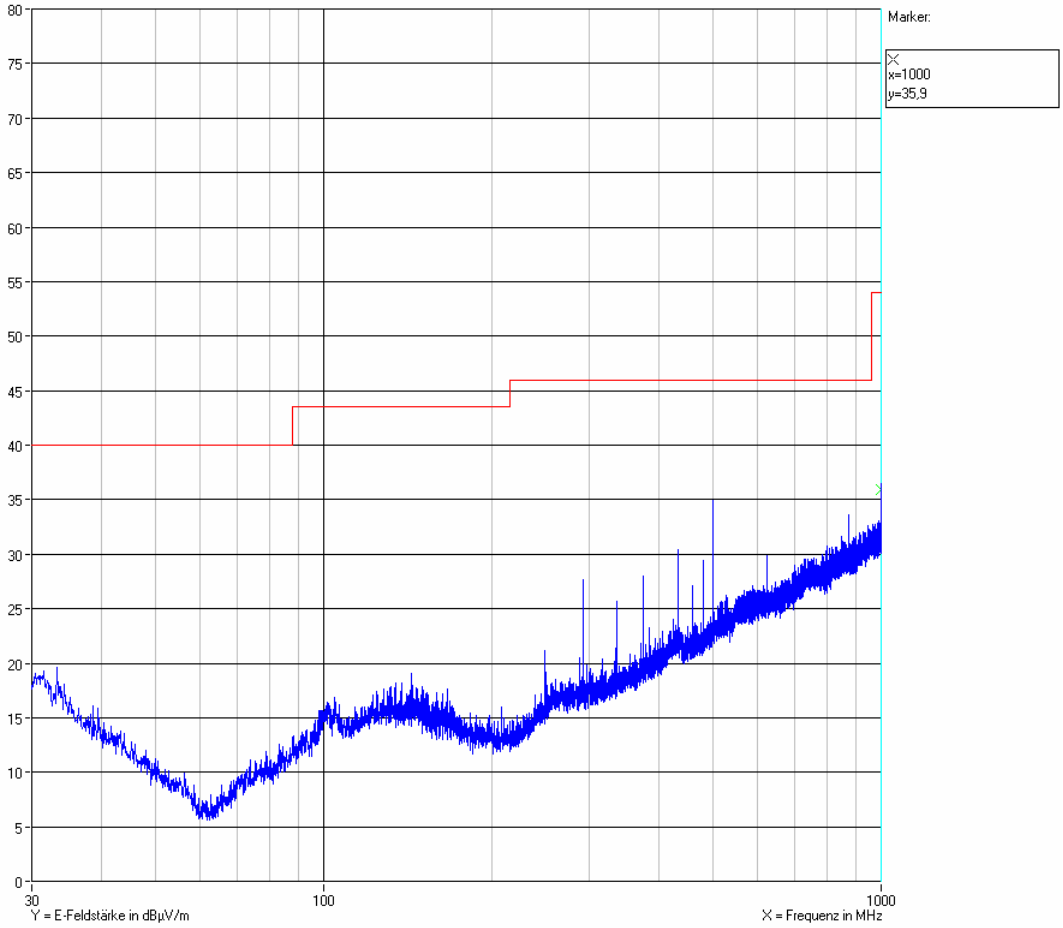
Limits

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

NOTE:
1. The radiated emissions were done with different settings, using the relevant preamplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 26. 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.

5.10.1 Results

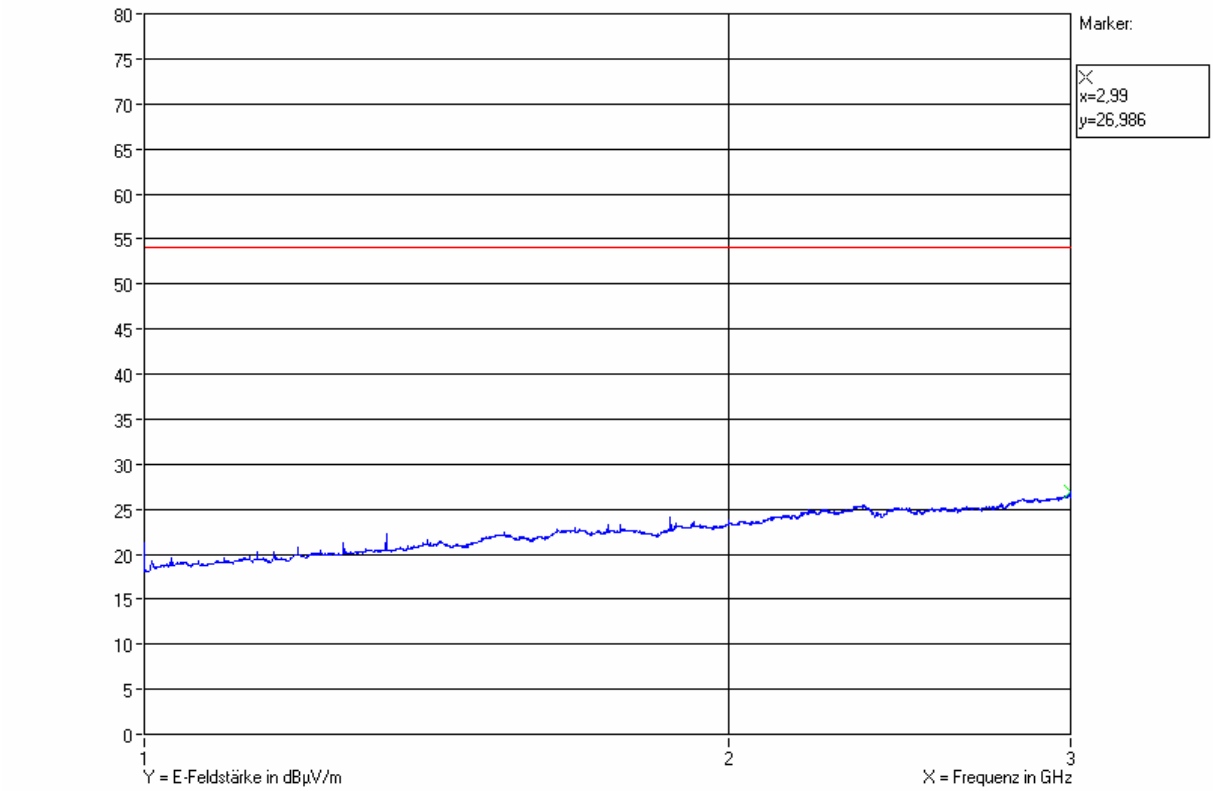
RECEIVER SPURIOUS RADIATION § 15.209
30MHz – 1GHz
Antenna: vertical (worst case plot)
Short Description: Bluetooth 30MHz - 1GHz
Start 30.0 MHz ;Stop 1.0 GHz; Detector :MaxPeak Coupled RBW:120 kHz (EMI receiver)



RECEIVER SPURIOUS RADIATION § 15.209

1GHz – 3GHz

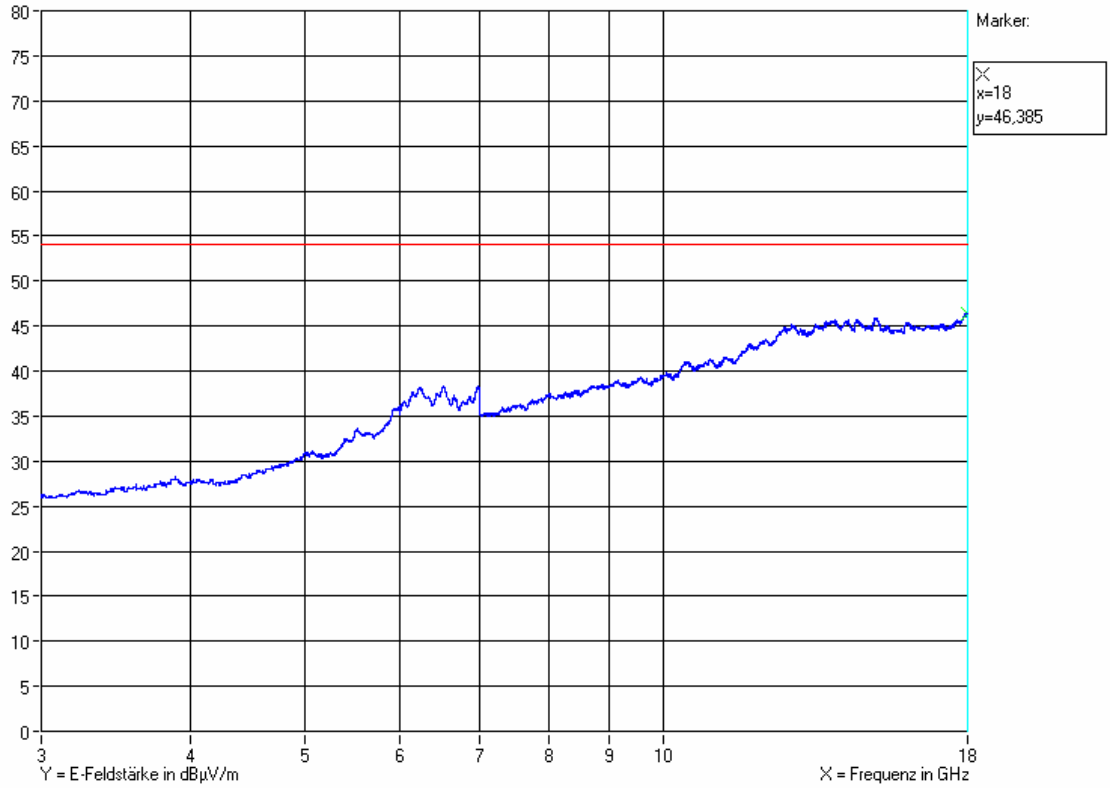
Short Description: Bluetooth 1GHz - 3GHz
Start 1GHz; Stop 3.0 GHz; Detector: AV Coupled RBW: 1MHz (EMI receiver)



RECEIVER SPURIOUS RADIATION§ §15.209

3GHz – 18GHz

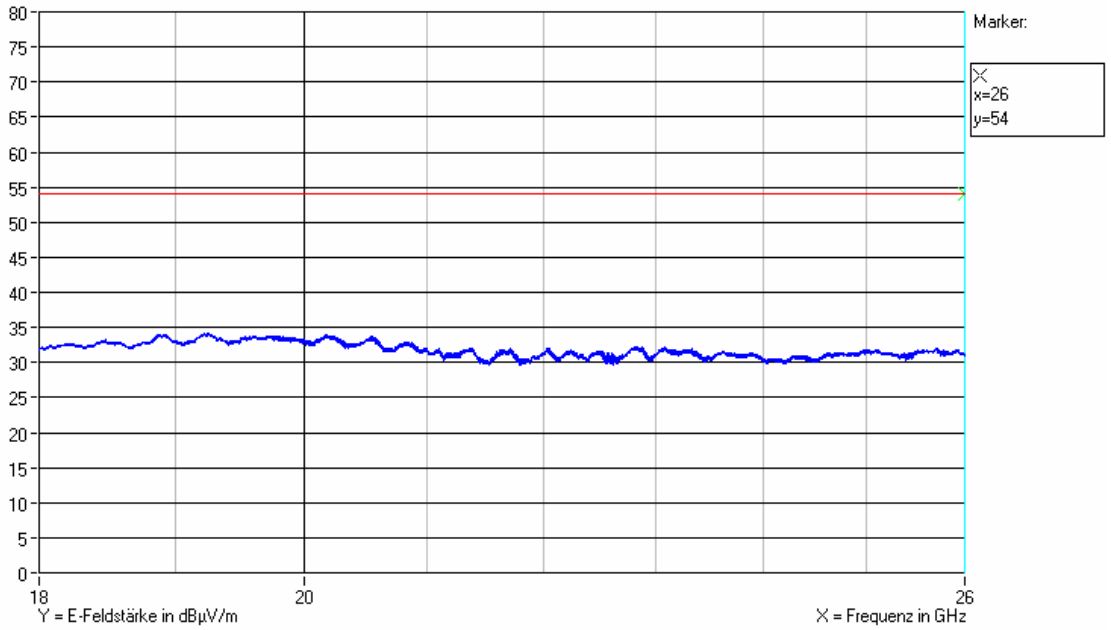
Short Description: Bluetooth 3GHz - 18GHz
Start 3GHz; Stop 18 GHz; Detector: AV Coupled RBW: 1MHz (EMI receiver)



RECEIVER SPURIOUS RADIATION § 15.209

18GHz – 26GHz

Short Description: Bluetooth 18GHz – 26GHz
Start 3GHz ;Stop 18 GHz; Detector :AV Coupled RBW:1MHz (EMI receiver)

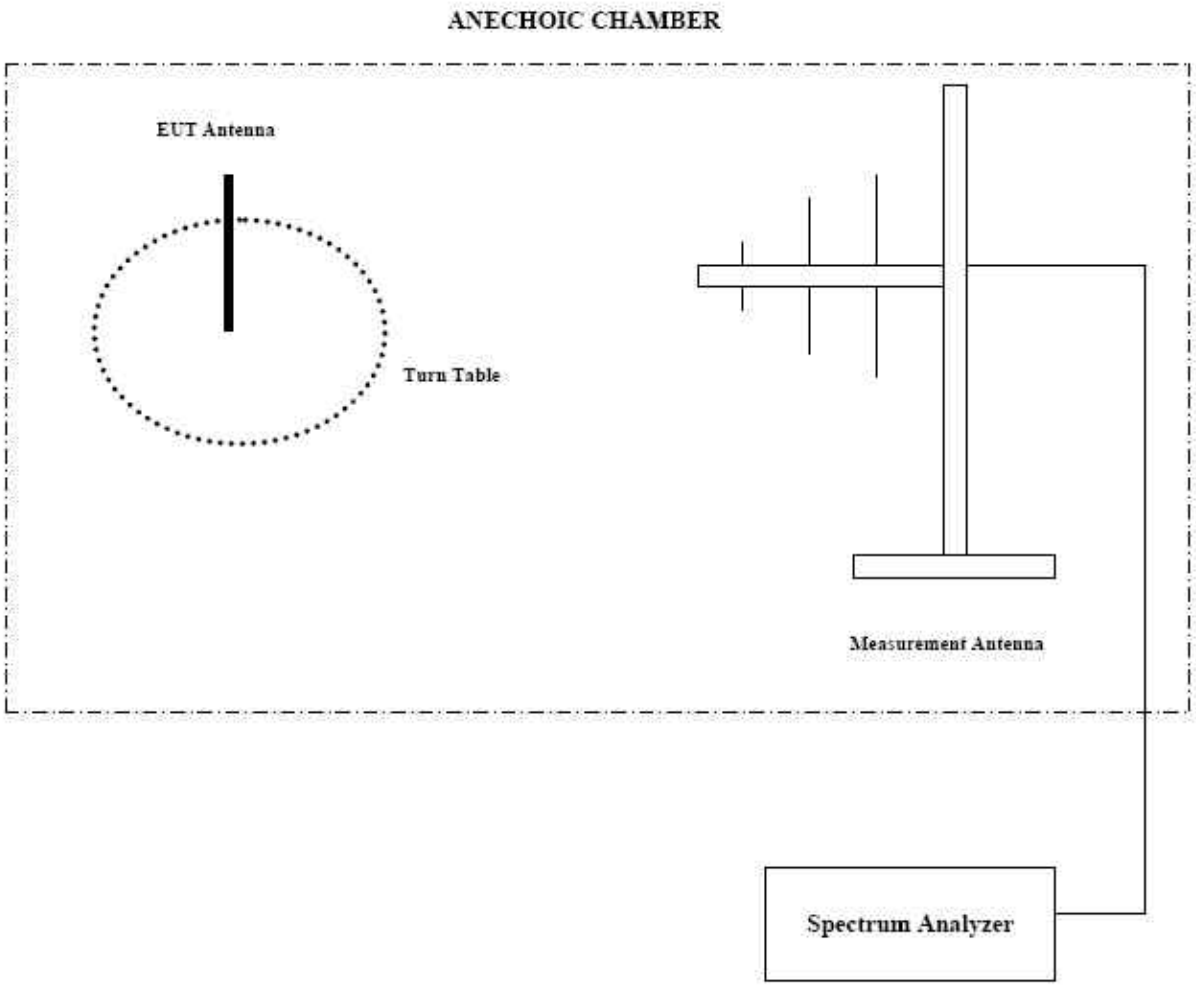


6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

Asset no.	Serial no.	Model	Manufacturer	Designation	Next Cal. date
E1723	1119.6001.27	SMIQ 26	Rohde&Schwarz	Spectrum Analyser	12/02/2006
E1687	837808/003	ESI-40	Rohde&Schwarz	Receiver	28/07/2006
K1042	1041	MWH-1826/B	ARA Inc.	Antenna (18-26 GHz)	20/12/2006
K1104	829141	JS43-18004000-30-5A	Parzich	Amplifier	06/05/2006
K1114	100109	HL 025	Rohde&Schwarz	Antenna (1-18GHz)	20/04/2006
K1149	1371	CBL 6111	Chase	Antenna(30MHz-1GHz)	21/02/2006
K1161	105232/4	Sucoflex	Suhner	HF cable	13/01/2006
K838	656297	Miteq	Parzich	Amplifier	26/04/2006
K759	8812-3085	3115	EMCO	Antenna(1-18GHz)	10/03/2006

7 RADIATED TESTING

Blockdiagram



8 Accreditation certificate

Deutsche Akkreditierungsstelle Technik (DATech) e.V.
Unterzeichner der Multilateralen Abkommen von EA und ILAC zur gegenseitigen Anerkennung

vertreten im

Deutschen AkkreditierungsRat

Akkreditierung

Die **Deutsche Akkreditierungsstelle Technik (DATech) e.V.** bestätigt hiermit, dass das Prüflaboratorium

HERBERG
Service Plus GmbH
European Compliance Laboratory (ECL)
Nordostpark 51

D-90411 Nürnberg

die Kompetenz nach DIN EN ISO/IEC 17025 besitzt, Prüfungen in den Bereichen

Elektromagnetische Verträglichkeit und Mobilfunk ,Sicherheit elektrischer Betriebsmittel, Umweltsimulation
Telekommunikationsschnittstelle

nach den in der Anlage aufgeführten Normen und Spezifikationen auszuführen.

Die Akkreditierung ist gültig bis: **07.02.2007**

Die Anlage ist Bestandteil der Urkunde und besteht aus **16** Seiten.

DAR-Registriernummer: **TTI-P-G004/92-03**

Frankfurt/Main, 28.03.2005

Dr.-Ing. Thomas Facklam
Leiter der Akkreditierungsstelle

Mitglied im EA, ILAC, IAF

Siehe Hinweise auf der Rückseite

****** End of test report *****