



ECL-EMC Test Report No.: 06-030

Equipment under test: Hand Held Products 6320

FCC ID: HD5DPM01
IC: 1693B-DPM01

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 | | | |



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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.



Table of contents

| | | |
|-------|--|----|
| 1 | INTRODUCTION | 5 |
| 1.1 | PURPOSE | 5 |
| 1.2 | TEST RESULTS SUMMARY | 5 |
| 2 | EQUIPMENT UNDER TEST | 6 |
| 2.1 | EUT DESIGNATION | 6 |
| 2.2 | DESCRIPTION | 6 |
| 2.3 | CONFIGURATION | 6 |
| 2.3.1 | CONNECTIONS | 6 |
| 2.3.2 | ADDITIONAL INFORMATION | 6 |
| 2.3.3 | USED SOFTWARE | 6 |
| 3 | NORMATIVE REFERENCES | 8 |
| 4 | DESCRIPTION OF THE EMC TEST CENTRE | 9 |
| 4.1 | REGISTRATIONS | 9 |
| 4.2 | SEMI ANECHOIC CHAMBER (SAC) WITH MAXIMUM 10M MEASUREMENT DISTANCE | 10 |
| 4.3 | FULLY ANECHOIC CHAMBER (FAC) WITH MAXIMUM 5M MEASUREMENT DISTANCE | 11 |
| 4.4 | FULLY ANECHOIC CHAMBER (FAC2) WITH MAXIMUM 3M MEASUREMENT DISTANCE | 12 |
| 4.5 | FULLY ANECHOIC CHAMBER (STRIPLINE) | 13 |
| 4.6 | SHIELDED TEST CABINS | 14 |
| 4.7 | INSTRUMENT ROOM | 15 |
| 4.8 | MEASUREMENT UNCERTAINTY | 16 |
| 4.9 | GROUND PLAN | 17 |
| 5 | MEASUREMENTS | 19 |
| 5.1 | CARRIER FREQUENCY SEPARATION §15.247(A) | 19 |
| 5.1.1 | RESULTS | 19 |
| 5.2 | NUMBER OF HOPPING CHANNELS §15.247(A) | 20 |
| 5.2.1 | RESULTS | 20 |
| 5.3 | TIME OF OCCUPANCY (DWELL TIME) §15.247(A) | 21 |
| 5.3.1 | RESULTS | 21 |
| 5.4 | SPECTRUM BANDWIDTH OF FHSS SYSTEM §15.247(A) | 22 |
| 5.4.1 | RESULTS | 23 |
| 5.5 | MAXIMUM PEAK OUTPUT POWER (CONDUCTED) §15.247(B)(1) | 26 |
| 5.5.1 | RESULTS | 27 |
| 5.6 | MAXIMUM PEAK OUTPUT POWER (RADIATED) §15.247(B)(1) | 30 |
| 5.6.1 | RESULTS | 31 |
| 5.7 | BAND EDGE COMPLIANCE §15.247(C) | 34 |
| 5.7.1 | RESULTS | 34 |



| | |
|---|----|
| 5.8 EMISSION LIMITATIONS (CONDUCTED) §15.247 (c)(1) | 38 |
| 5.8.1 RESULTS..... | 39 |
| 5.9 EMISSION LIMITATIONS (RADIATED) §15.247 (c)(1)..... | 42 |
| 5.9.1 RESULTS..... | 43 |
| 5.10 RECEIVER SPURIOUS RADIATION §15.209..... | 53 |
| 5.10.1 RESULTS..... | 54 |
| 6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS..... | 58 |
| 7 RADIATED TESTING | 59 |
| 8 ACCREDITATION CERTIFICATE..... | 60 |



1 Introduction

1.1 Purpose

This report documents the qualification testing for the Hand Held Products 6320 (or 6320abcdefg where a to g represent alphanumeric characters to represent configuration options within 6320 product) 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

Hand Held Products 6320 (or 6320abcdefg where a to g represent alphanumeric characters to represent configuration options within 6320 product)

FCC ID: HD5DPM01

IC: 1693B-DPM01

2.2 Description

The 6320 (or 6320abcdefg where a to g represent alphanumeric characters to represent configuration options within 6320 product) 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 6320 (or 6320abcdefg where a to g represent alphanumeric characters to represent configuration options within 6320 product) 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: | <ul style="list-style-type: none"> > 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: | <ul style="list-style-type: none"> 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: | FrankoSorb 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 | | ± 4,0 dB |
| | 150 kHz - 30 MHz | | ± 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

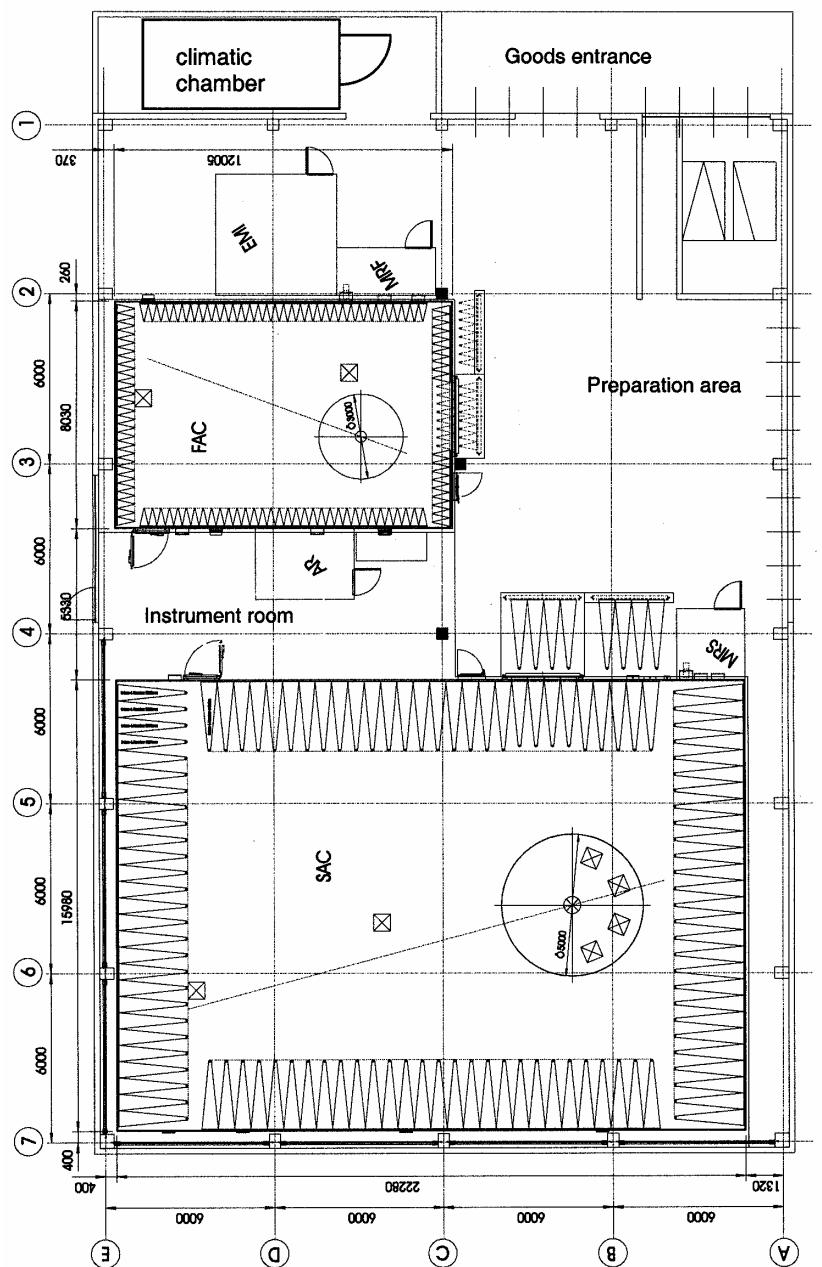


Abb. 4.9.1: Partition of the European Compliance Laboratory (Thurn-und-Taxis-Strasse 18)

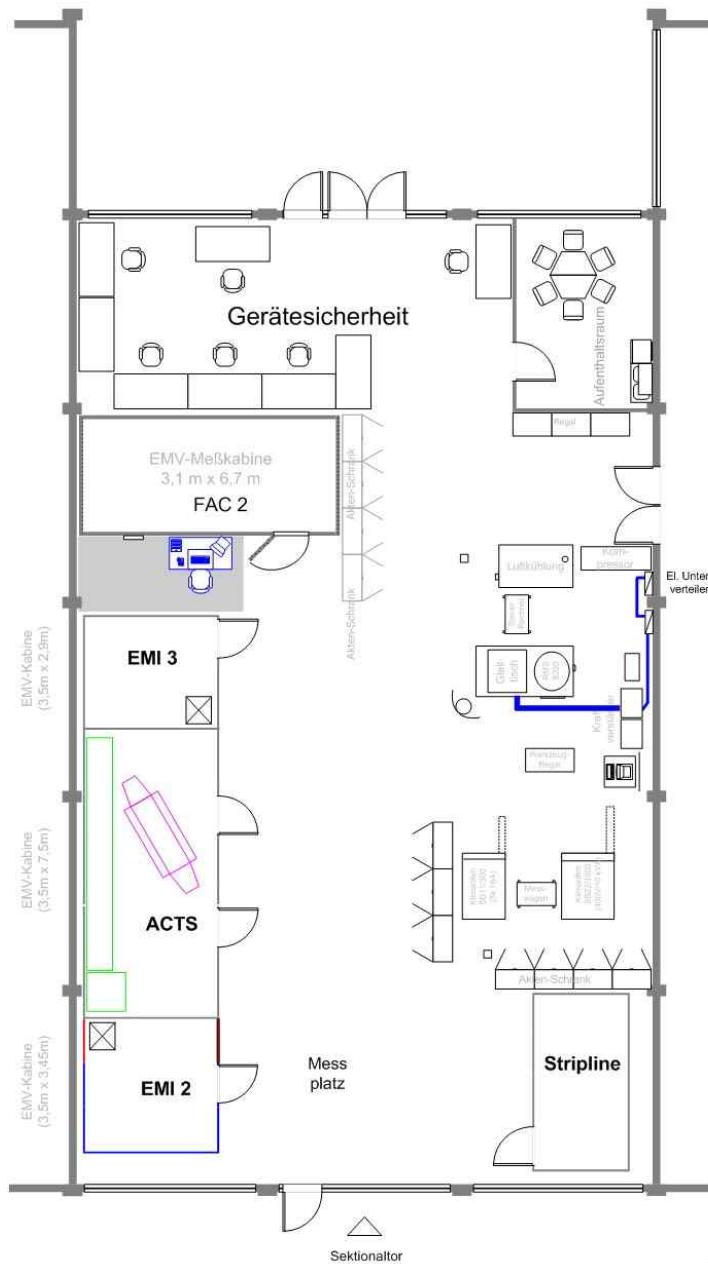


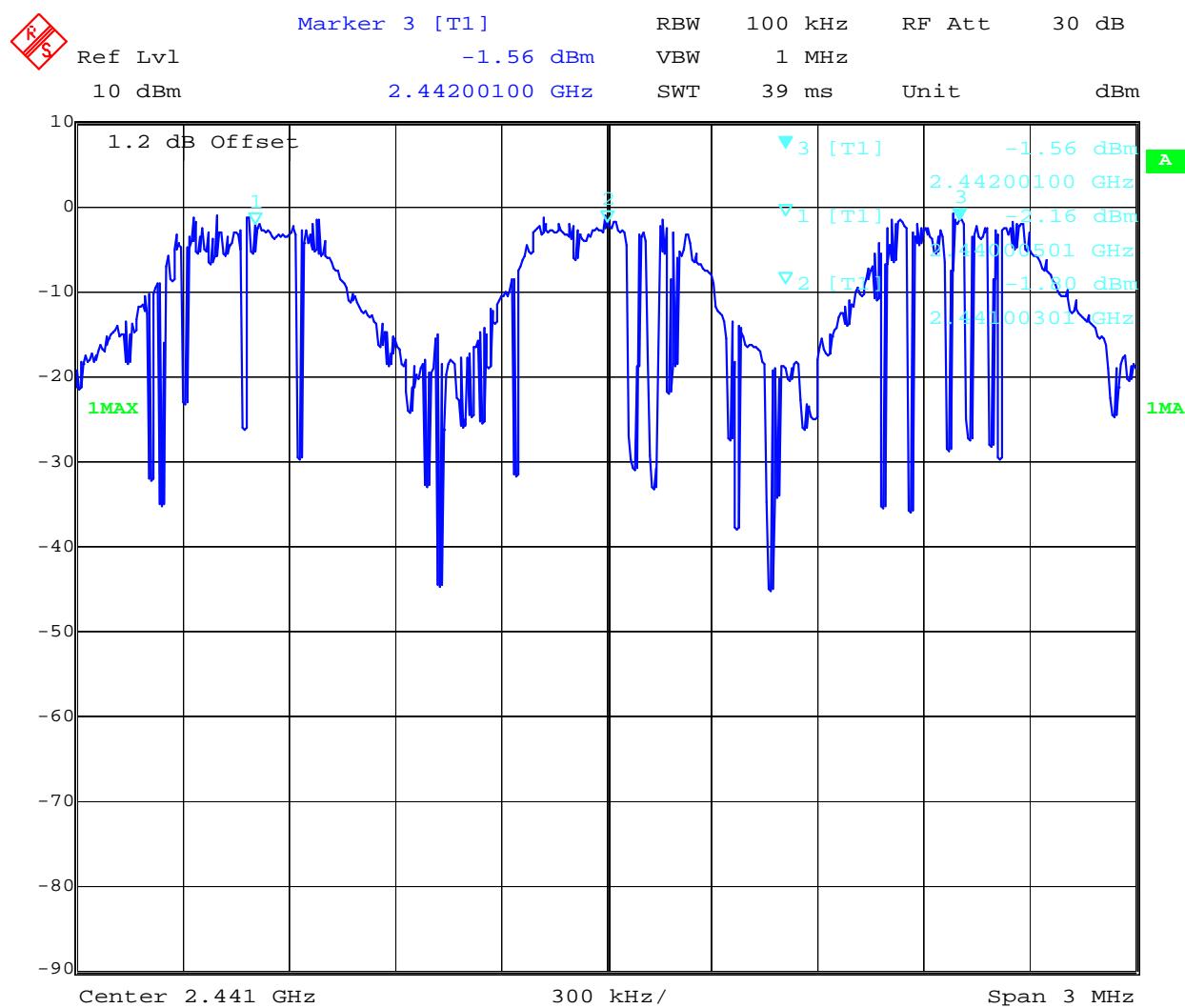
Abb. 4.9.2: Partition of the European Compliance Laboratory (Nordostpark 76)

5 Measurements

5.1 CARRIER FREQUENCY SEPARATION

§15.247(a)

5.1.1 Results

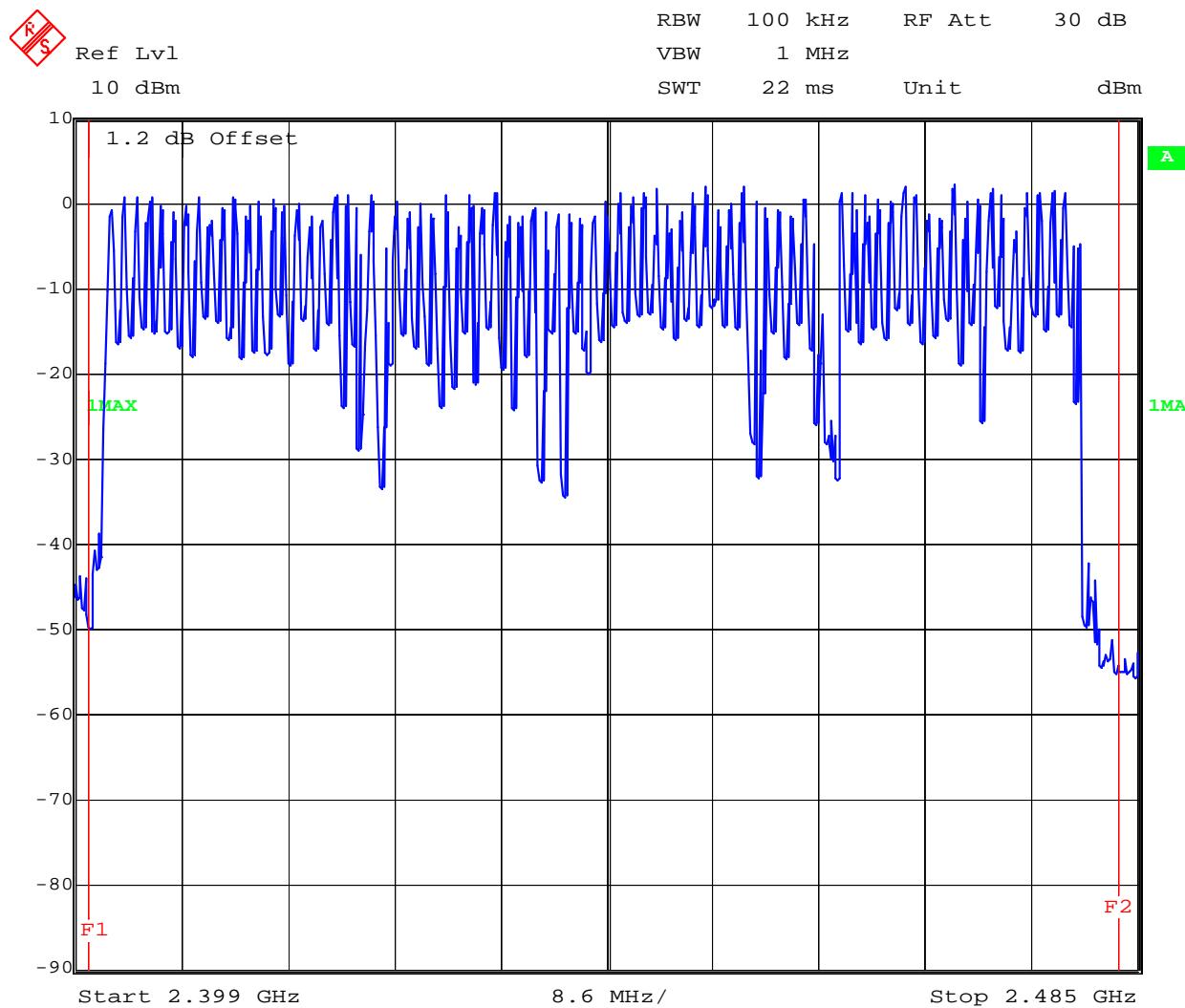


5.2 NUMBER OF HOPPING CHANNELS

§15.247(a)

5.2.1 Results

The number of hopping channels is 79



Date: 2.FEB.2006 18:24:46

5.3 TIME OF OCCUPANCY (DWELL TIME)

§15.247(a)

DH1- Packet

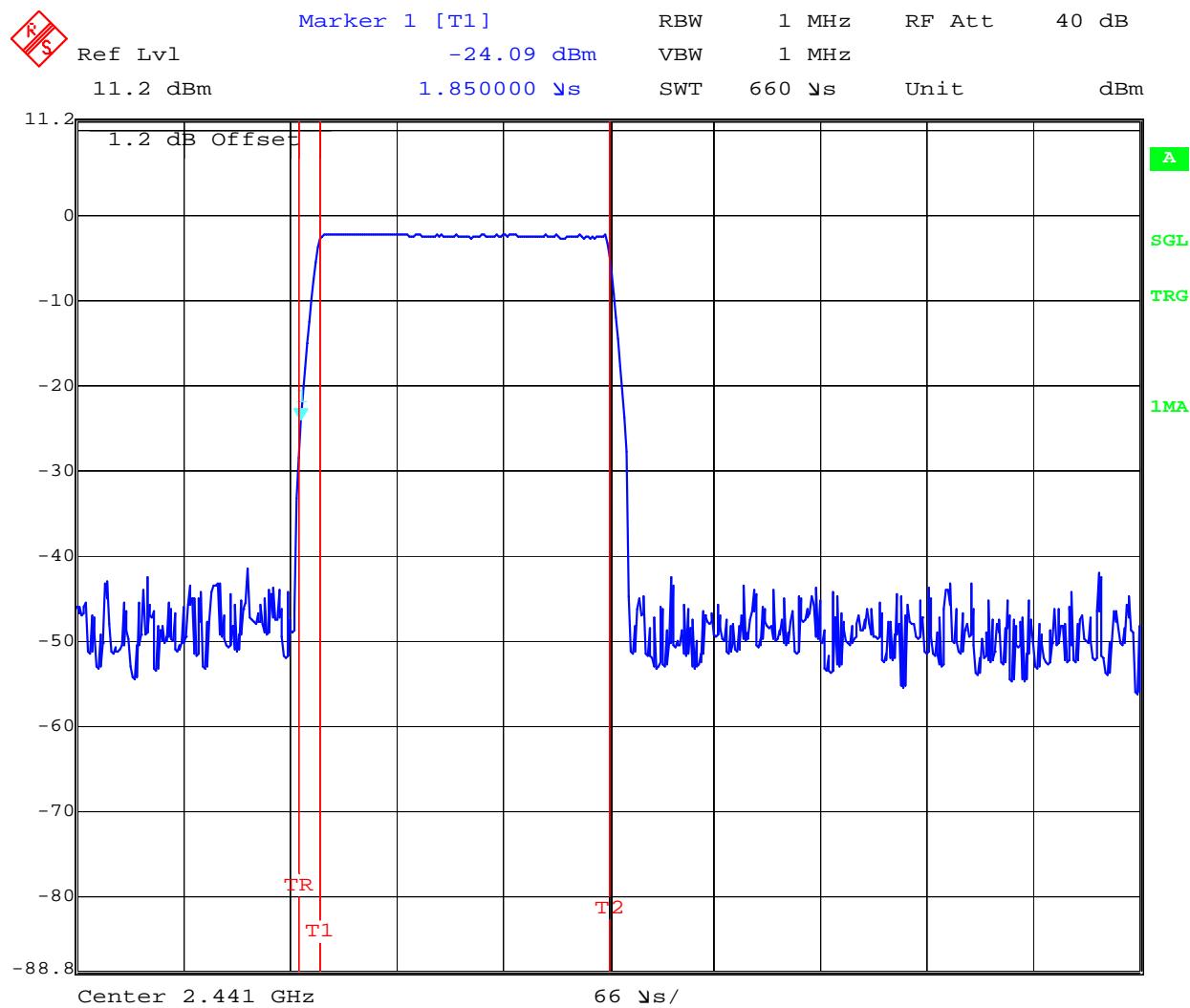
EUT support only DH1 Packet

The system makes worst case 1600 hops per second or 1 time slot has a length of 625 μ s 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 178 μ s.

So we have 320.108 * 178 μ s = 56.97ms per 31.6 seconds.

5.3.1 Results



**5.4 SPECTRUM BANDWIDTH 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 |

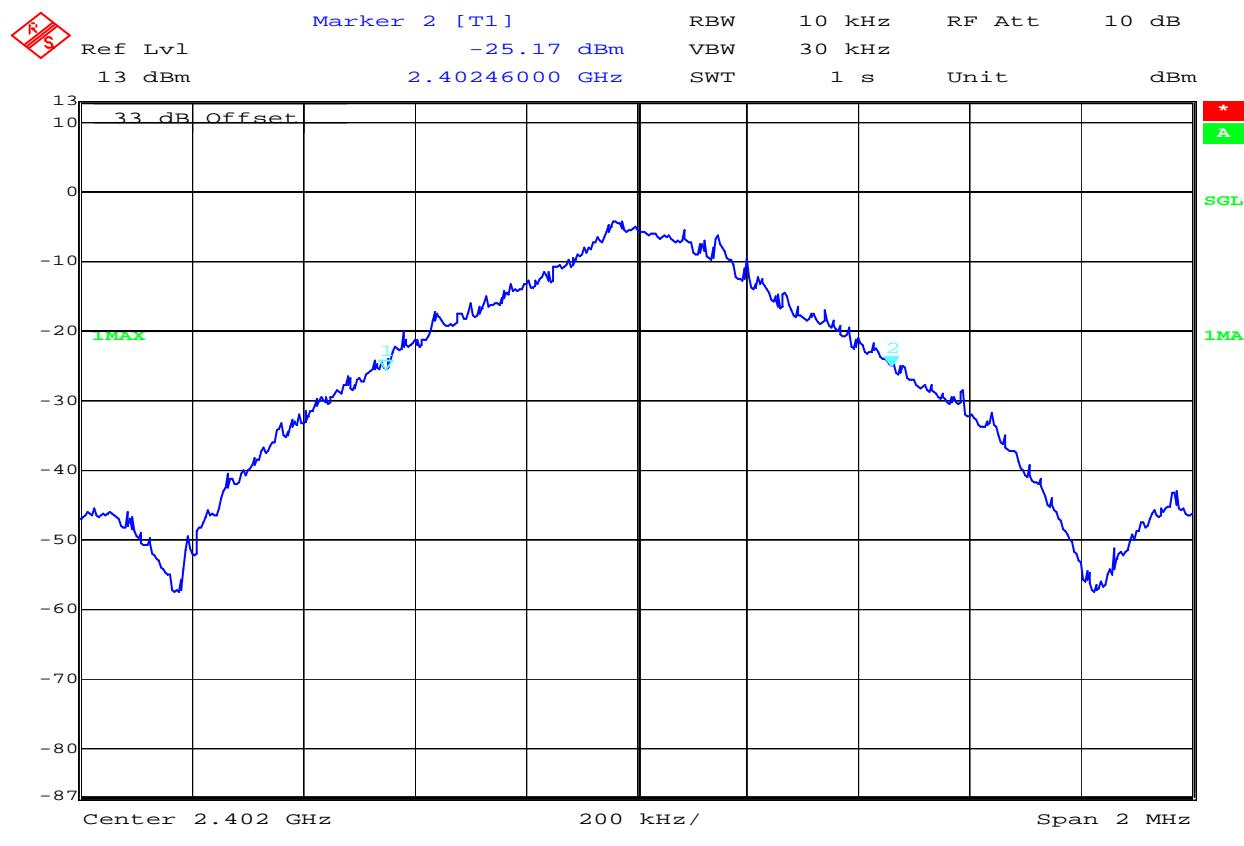
LIMIT**SUBCLAUSE §15.247(a) (1)****The maximum 20dB bandwidth shall be at maximum 1000 KHz**

5.4.1 Results

SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

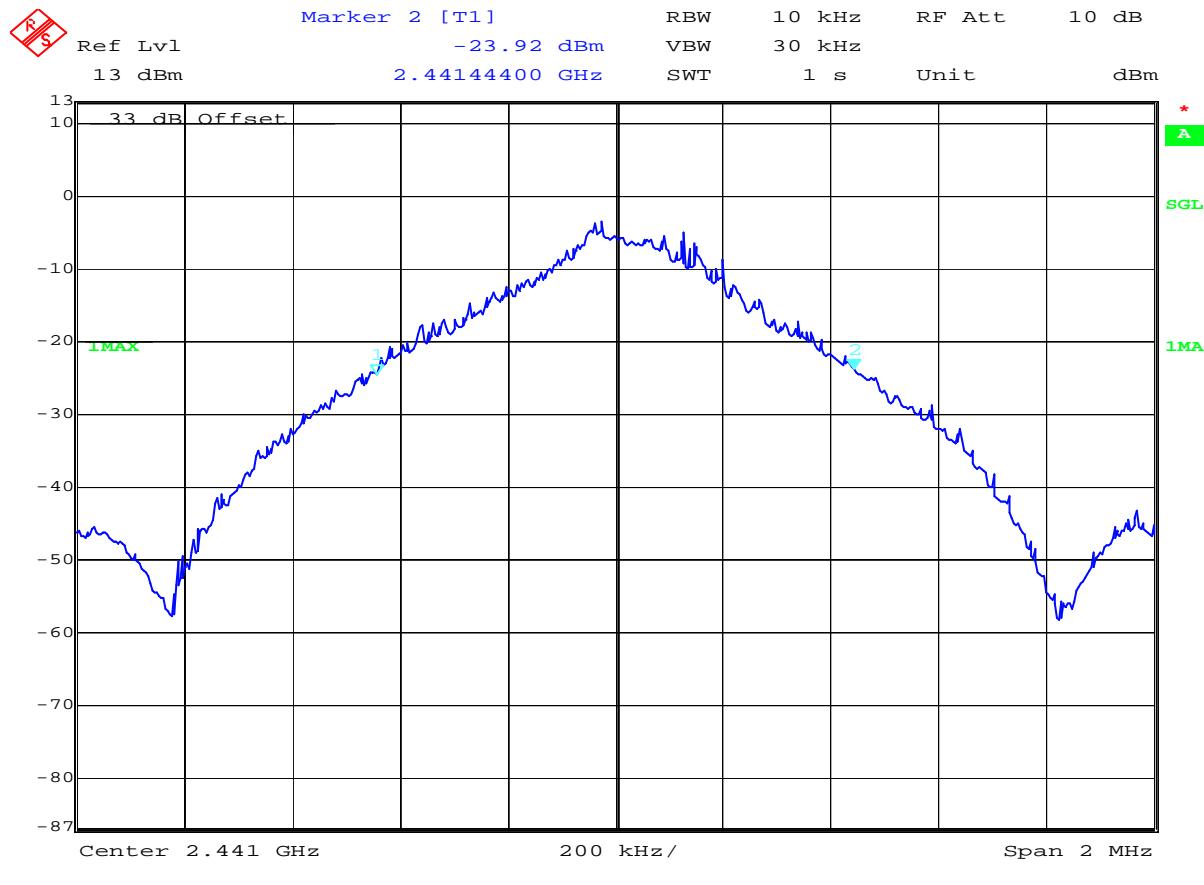
Lowest Channel 2402 MHz



SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

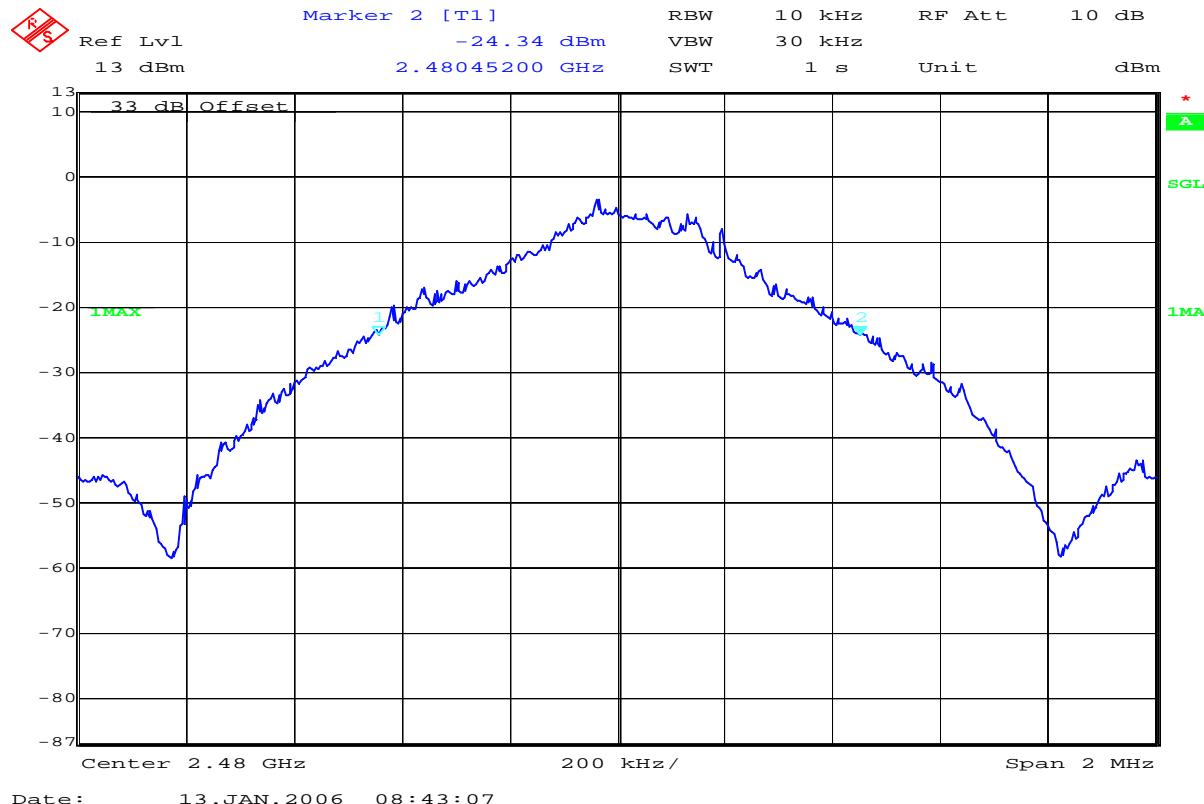
§15.247(a)

Middle Channel 2441 MHz



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

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 |
| Measurement uncertainty | | ± 1dBm | | |

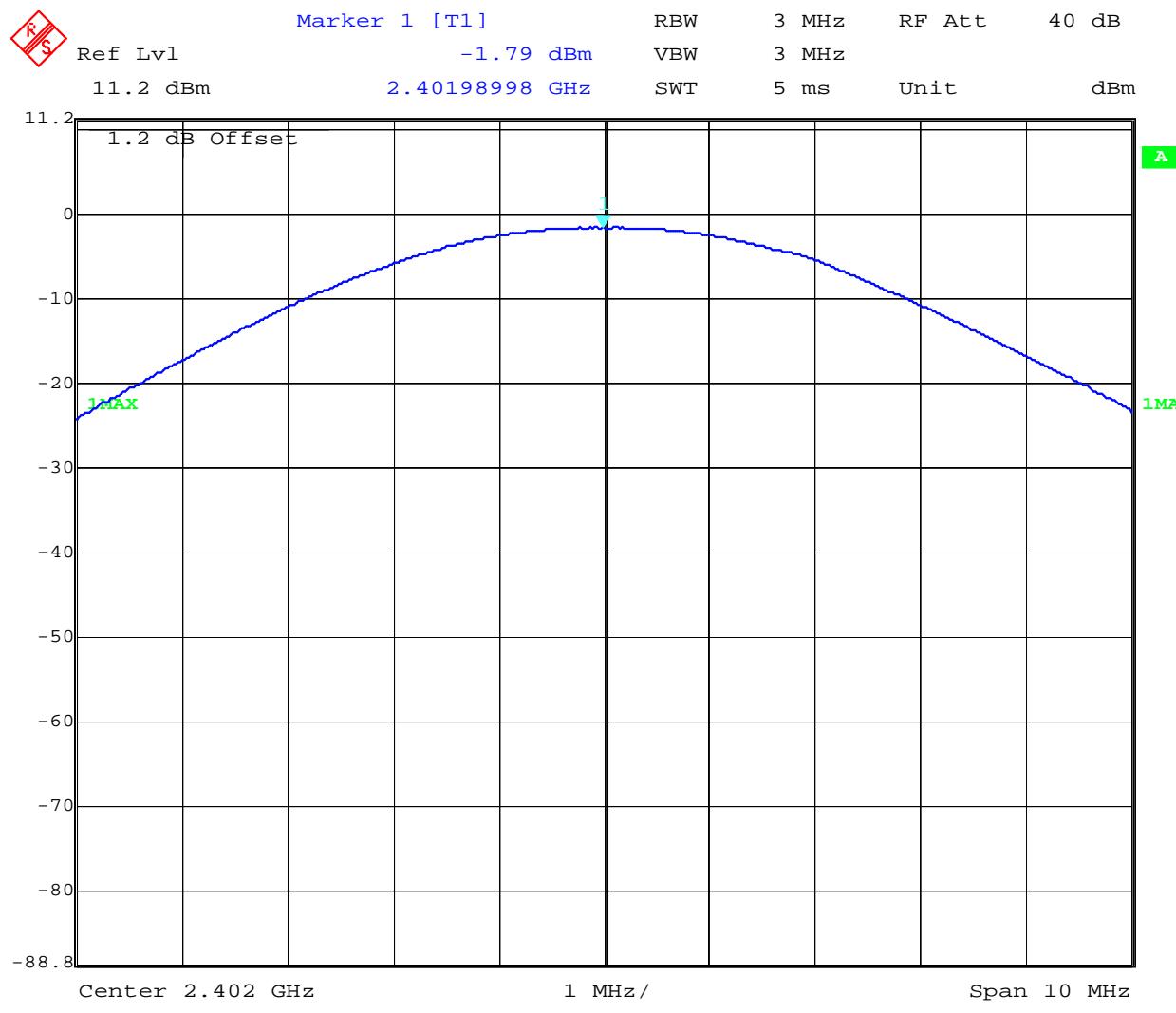
LIMIT **SUBCLAUSE §15.247(b) (1)**

| Frequency Range | RF power output |
|-----------------|-----------------|
| 2400-2483.5 MHz | 1.0 Watt |

5.5.1 Results

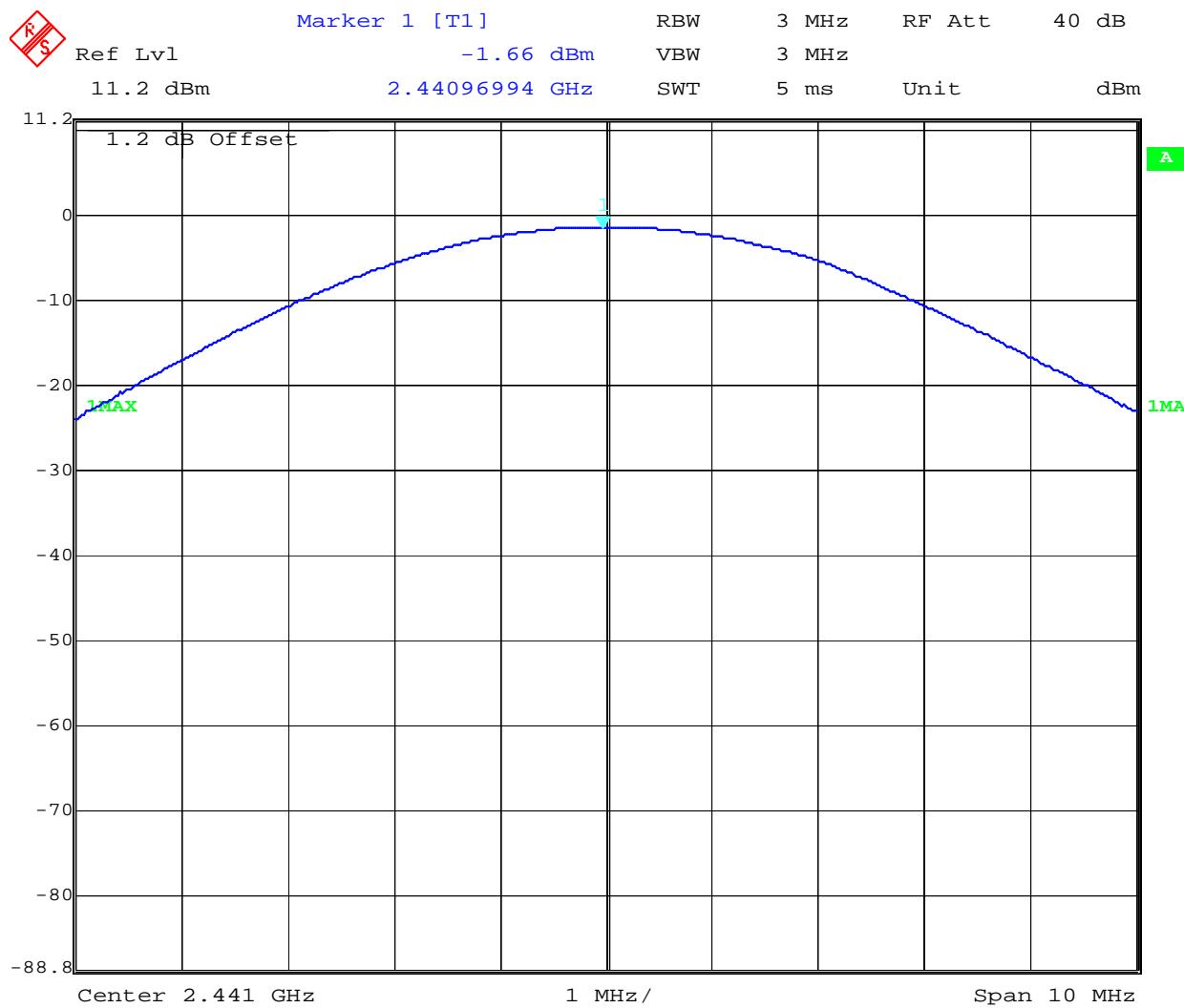
PEAK OUTPUT POWER (Conducted)

Lowest Channel: 2402 MHz



PEAK OUTPUT POWER (Conducted)

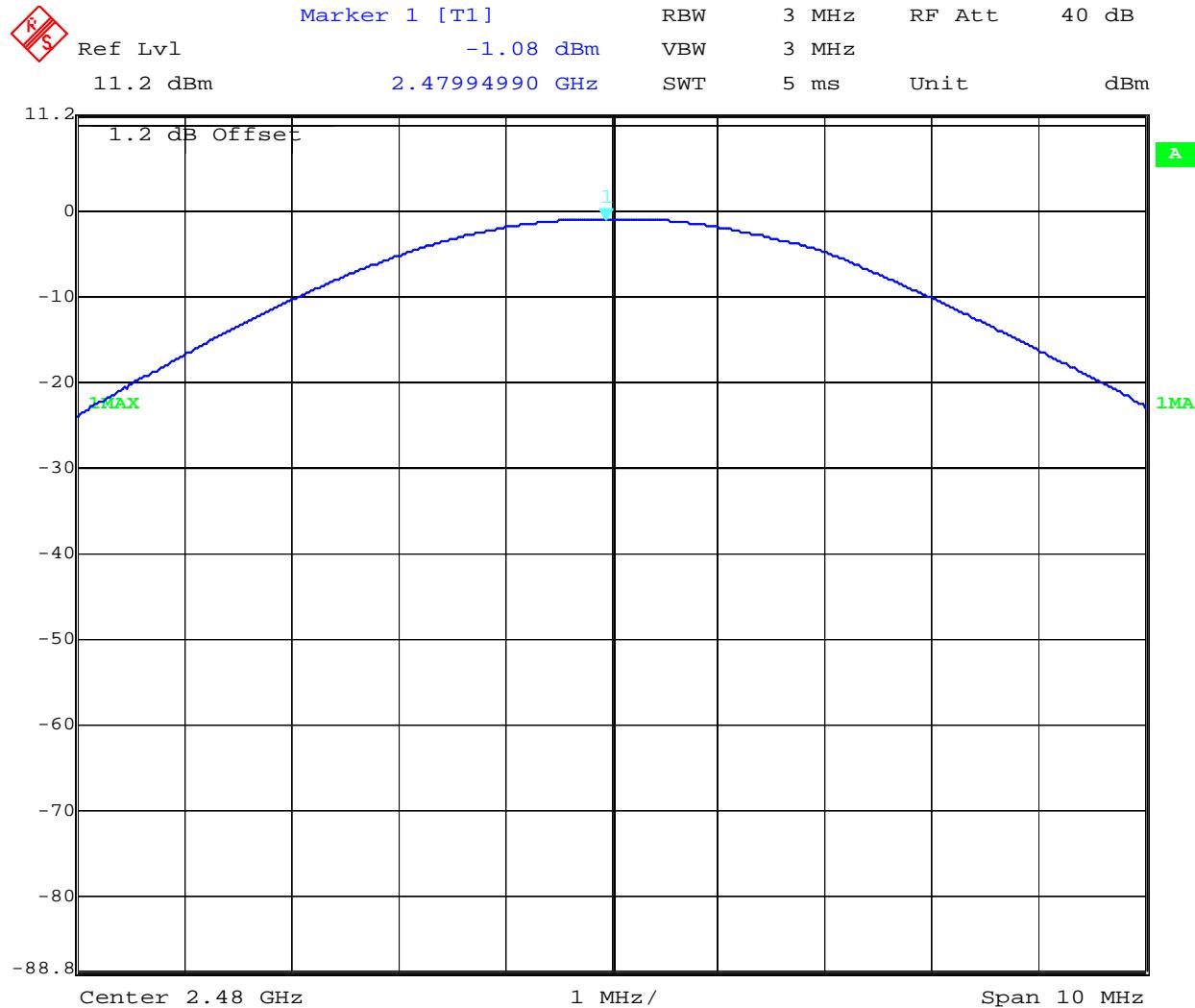
Middle Channel: 2441 MHz



Date: 2.FEB.2006 18:40:06

PEAK OUTPUT POWER (Conducted)

Top Channel: 2480 MHz



Date: 2.FEB.2006 18:43:29



5.6 MAXIMUM 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 |
| Measurement uncertainty | | ± 2dBm | | |

RBW/VBW:3 MHz

LIMIT

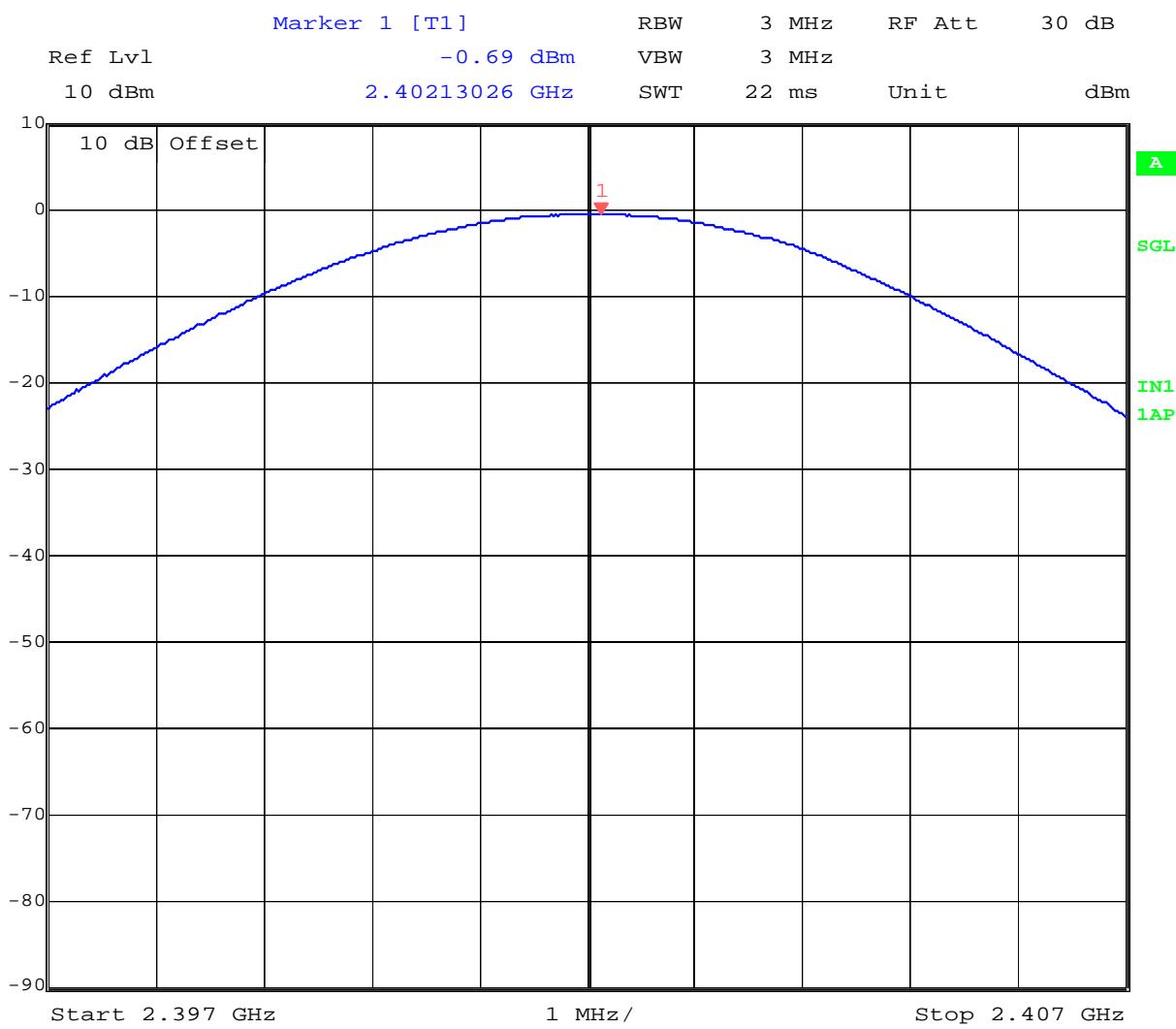
SUBCLAUSE §15.247(b) (1)

| 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 channel 2402MHz
 Start 2.397GHz Stop 2.407GHz
 Detector Meas. AV
 Time BW Coupled 3 MHz



Date: 3.FEB.2006 12:52:09



PEAK OUTPUT POWER (radiated)

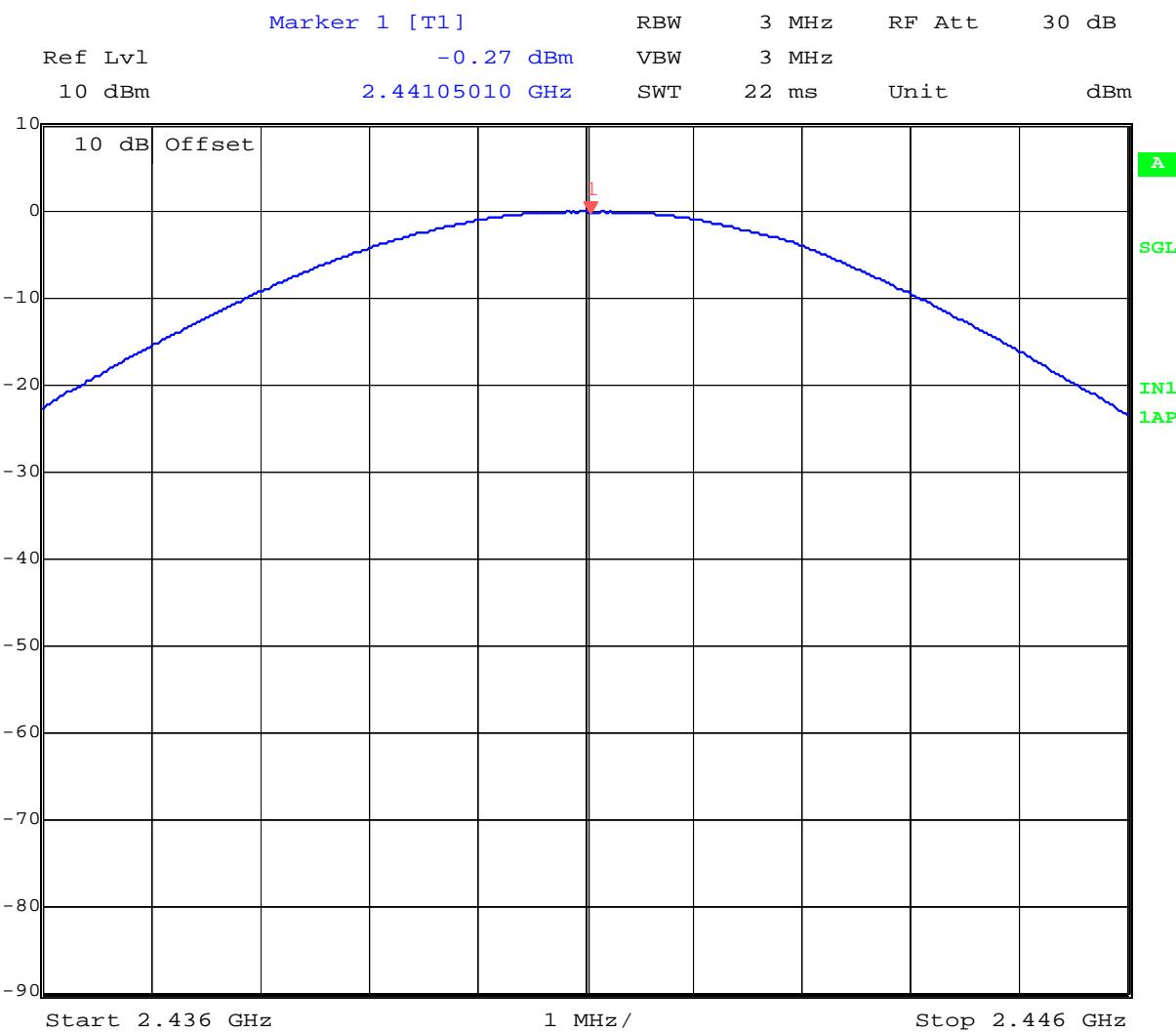
Middle Channel: 2441 MHz

Short Description: EIRP Bluetooth channel 2441 MHz

Start 2.436 GHz Stop 2.446 GHz

Detector Meas. AV

Time BW Coupled 3 MHz



Date: 3.FEB.2006 12:53:43

PEAK OUTPUT POWER (radiated)

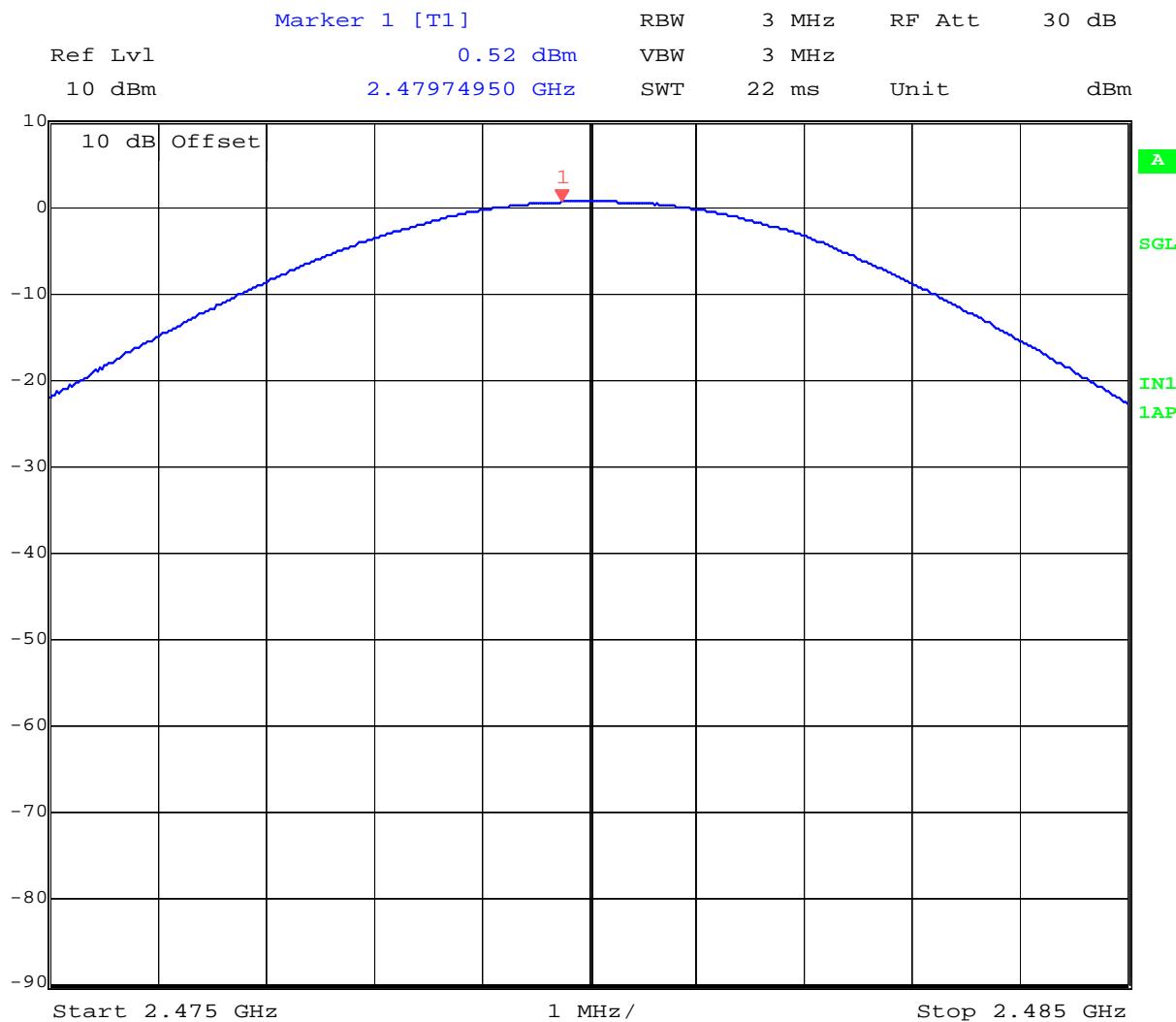
Top Channel: 2480 MHz

Short Description: EIRP Bluetooth channel 2480MHz

Start 2.475GHz Stop 2.485GHz

Detector Meas. AV

Time BW Coupled 3 MHz



Date: 3.FEB.2006 12:55:45

5.7 BAND EDGE COMPLIANCE

§15.247 (c)

5.7.1 Results

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

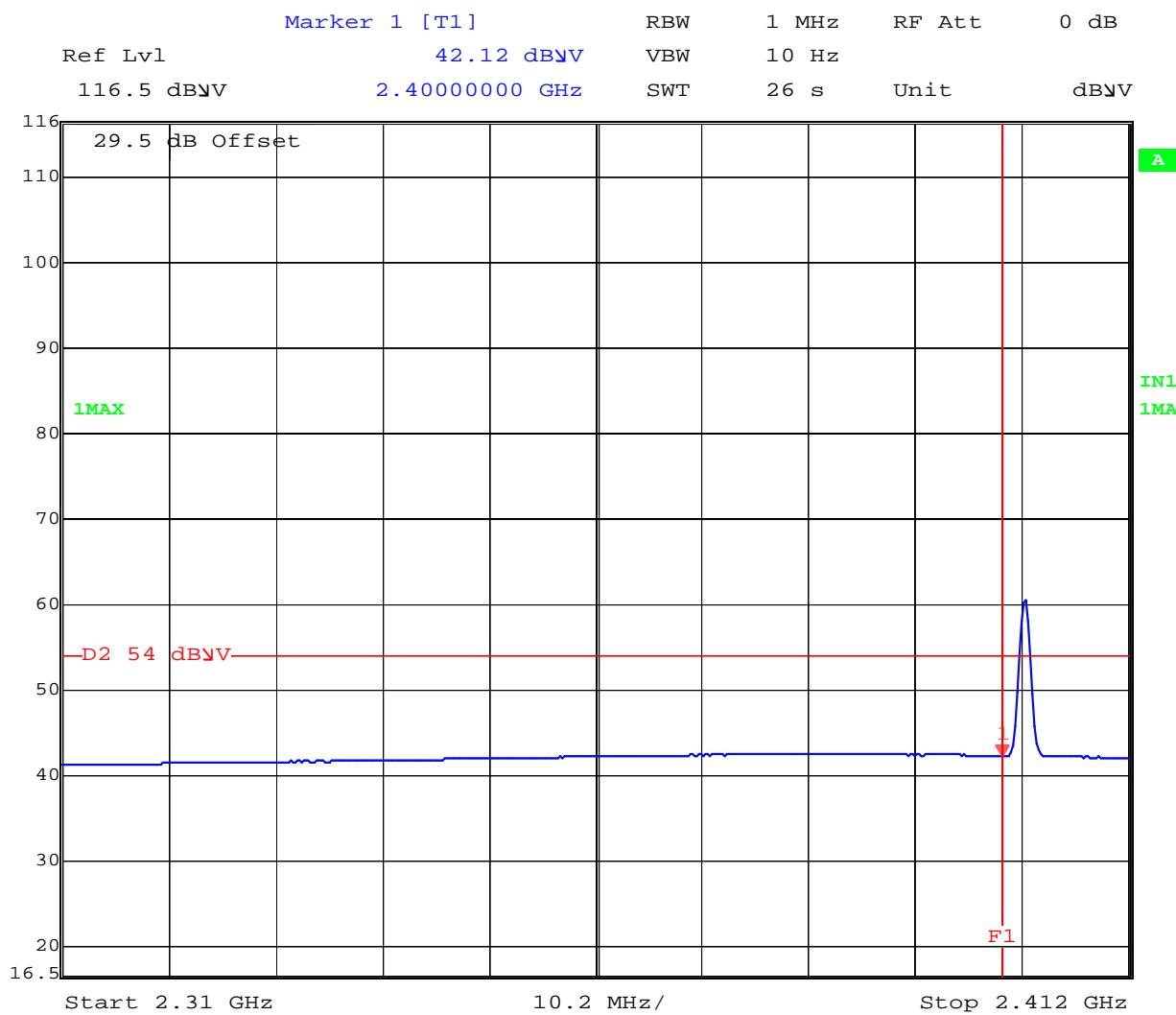
Average Measurement

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

Operating condition : Tx at 2402MHz

Short Description :Low band edge

Limit Line : 54dB μ V



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

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

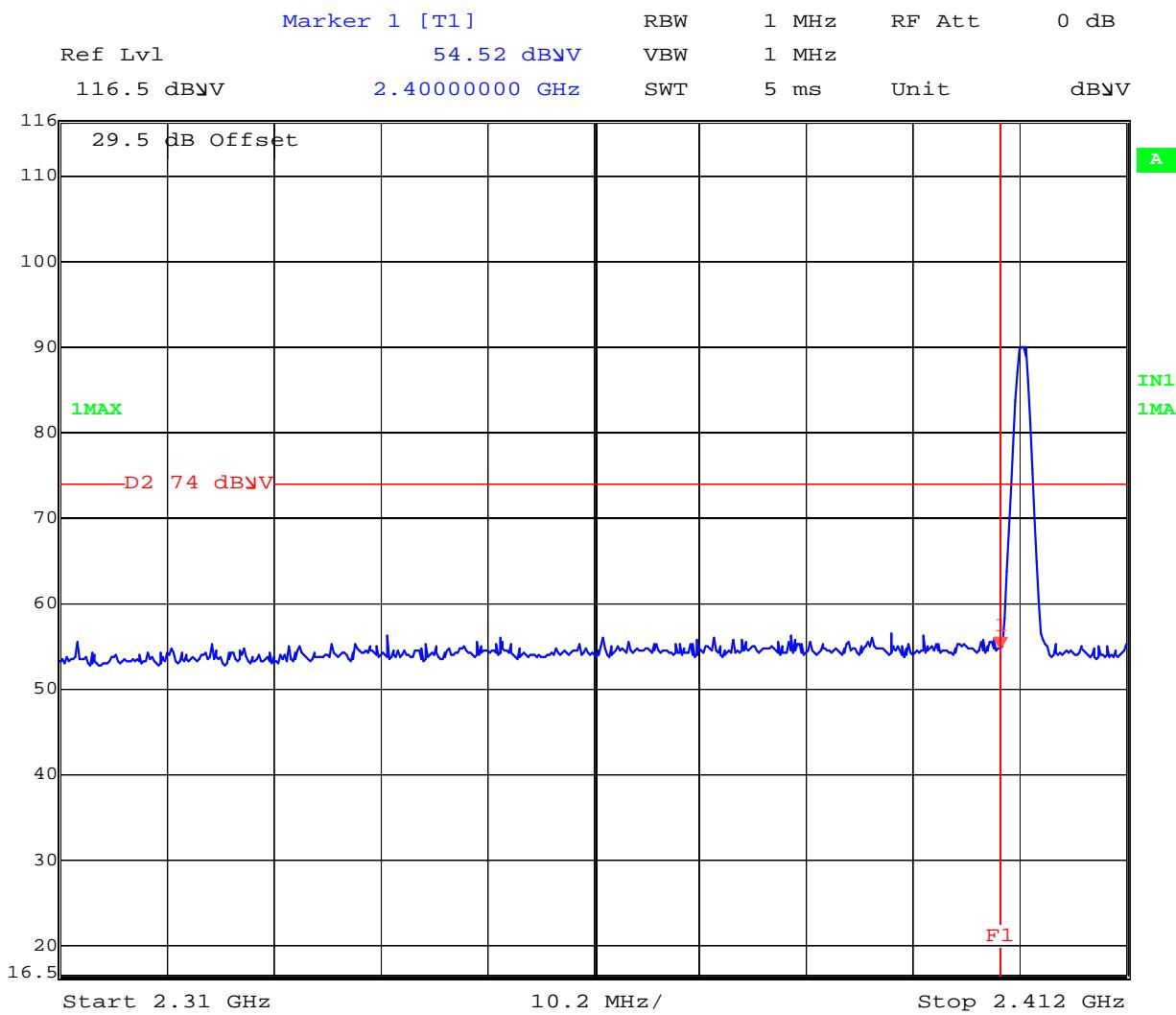
Peak Measurement

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

Operating condition : Tx at 2402MHz

Short Description :Lowbandedge

Limit Line : 74dB μ V



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

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

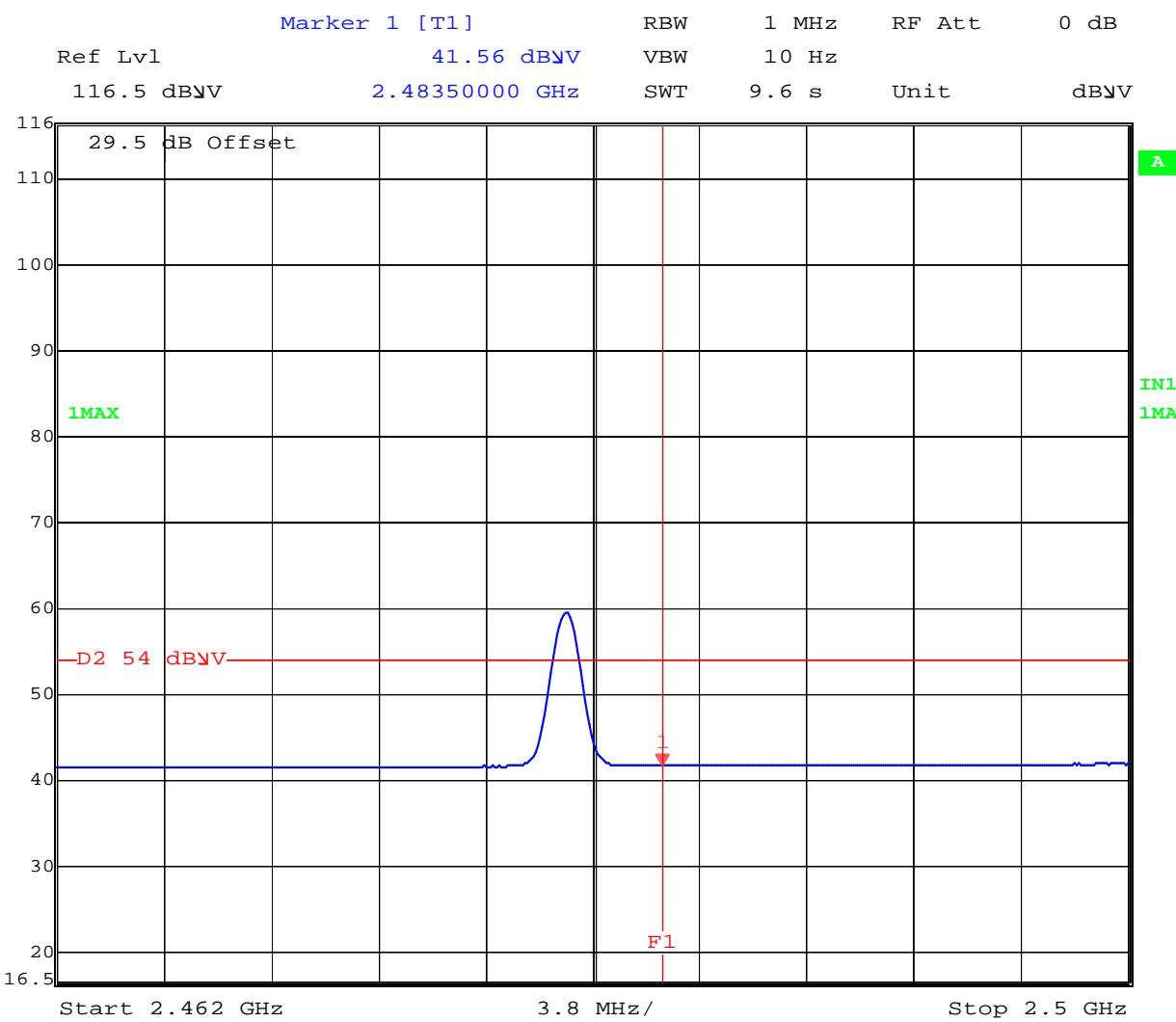
Average Measurement

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

Operating condition : Tx at 2480MHz

Short Description :High band edge

Limit Line : 54dB μ V



Date: 2.FEB.2006 14:56:19

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

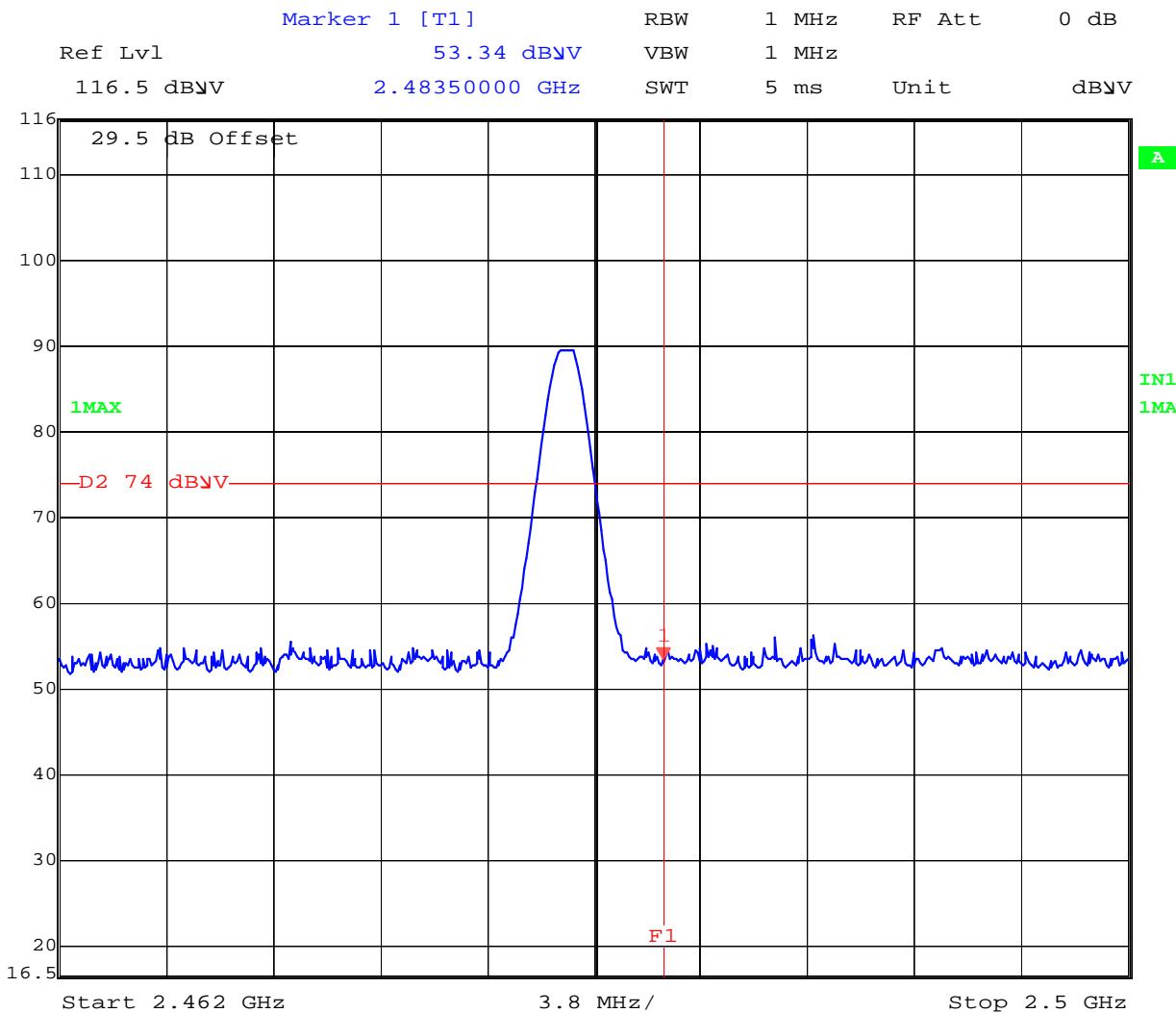
Peak Measurement

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

Operating condition : Tx at 2480MHz

Short Description :High band edge

Limit Line : 74dB μ V



Date: 2.FEB.2006 14:54:04



5.8 EMISSION LIMITATIONS(conducted)

§15.247 (c)(1)

Transmitter (Conducted)

LIMITS :

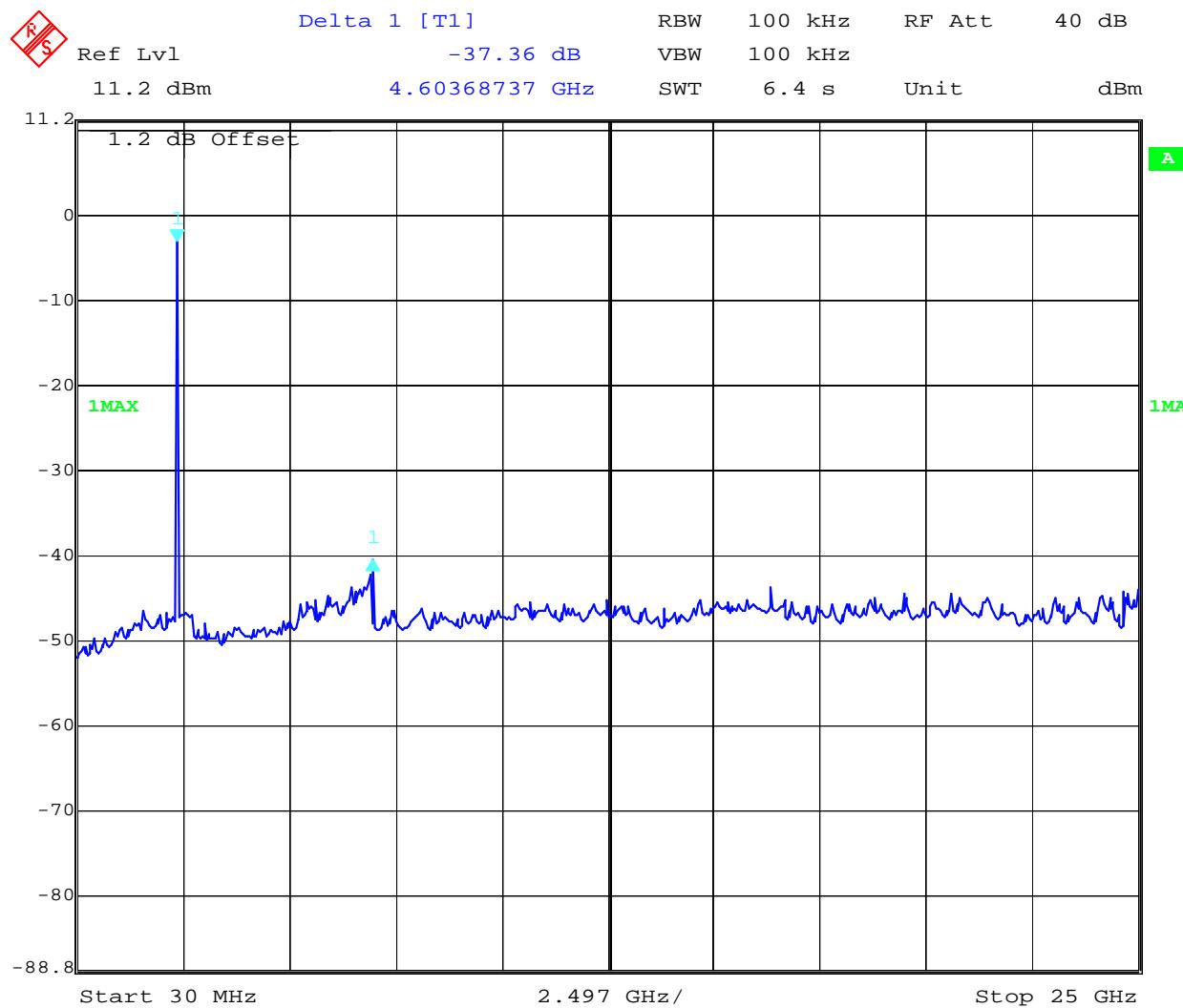
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions that fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.8.1 Results

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

§ 15.247 (c) (1)

NOTE: The peak is the carrier frequency.



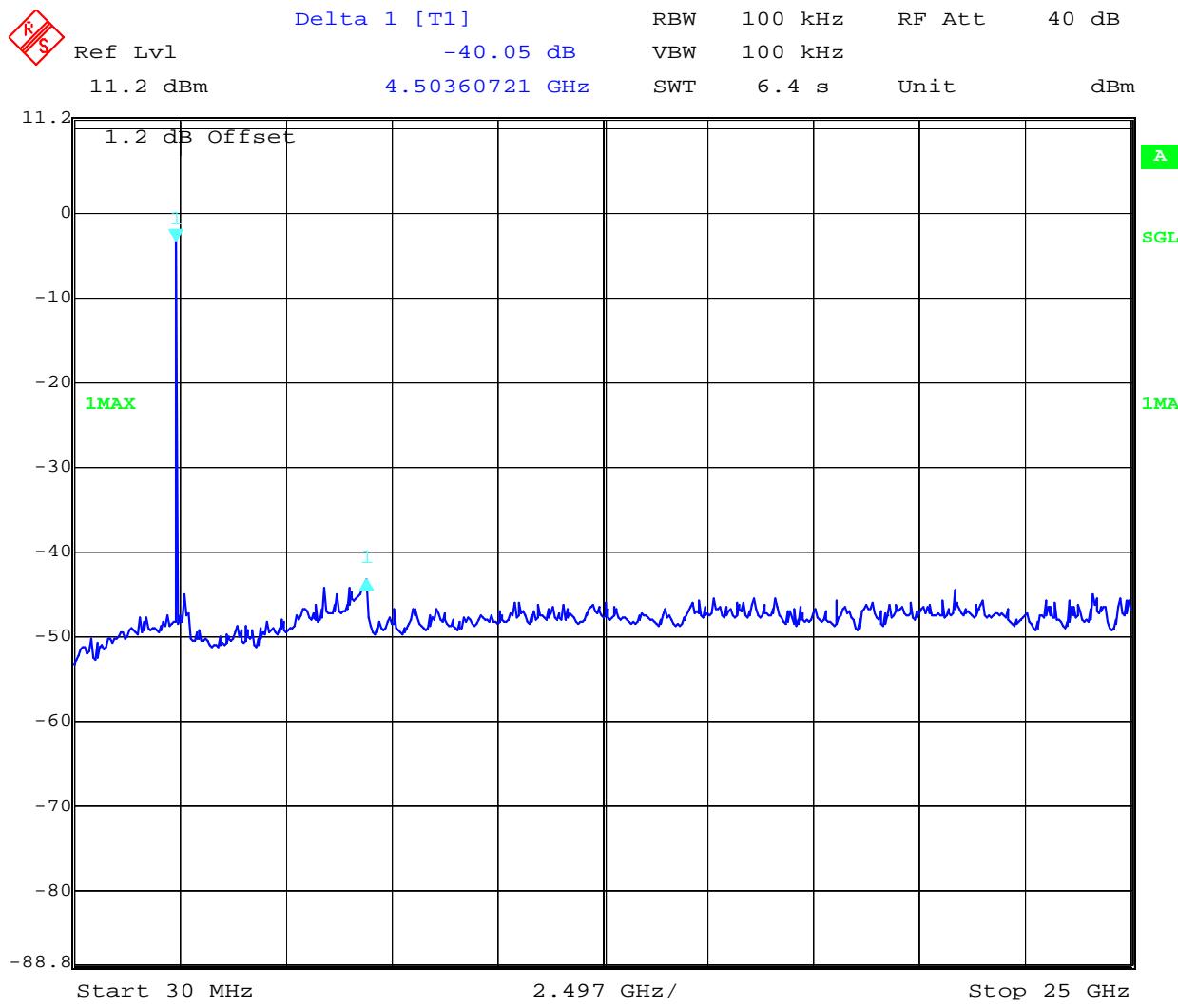
Date: 3.FEB.2006 08:35:04



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

§ 15.247 (c) (1)

NOTE: The peak is the carrier frequency.

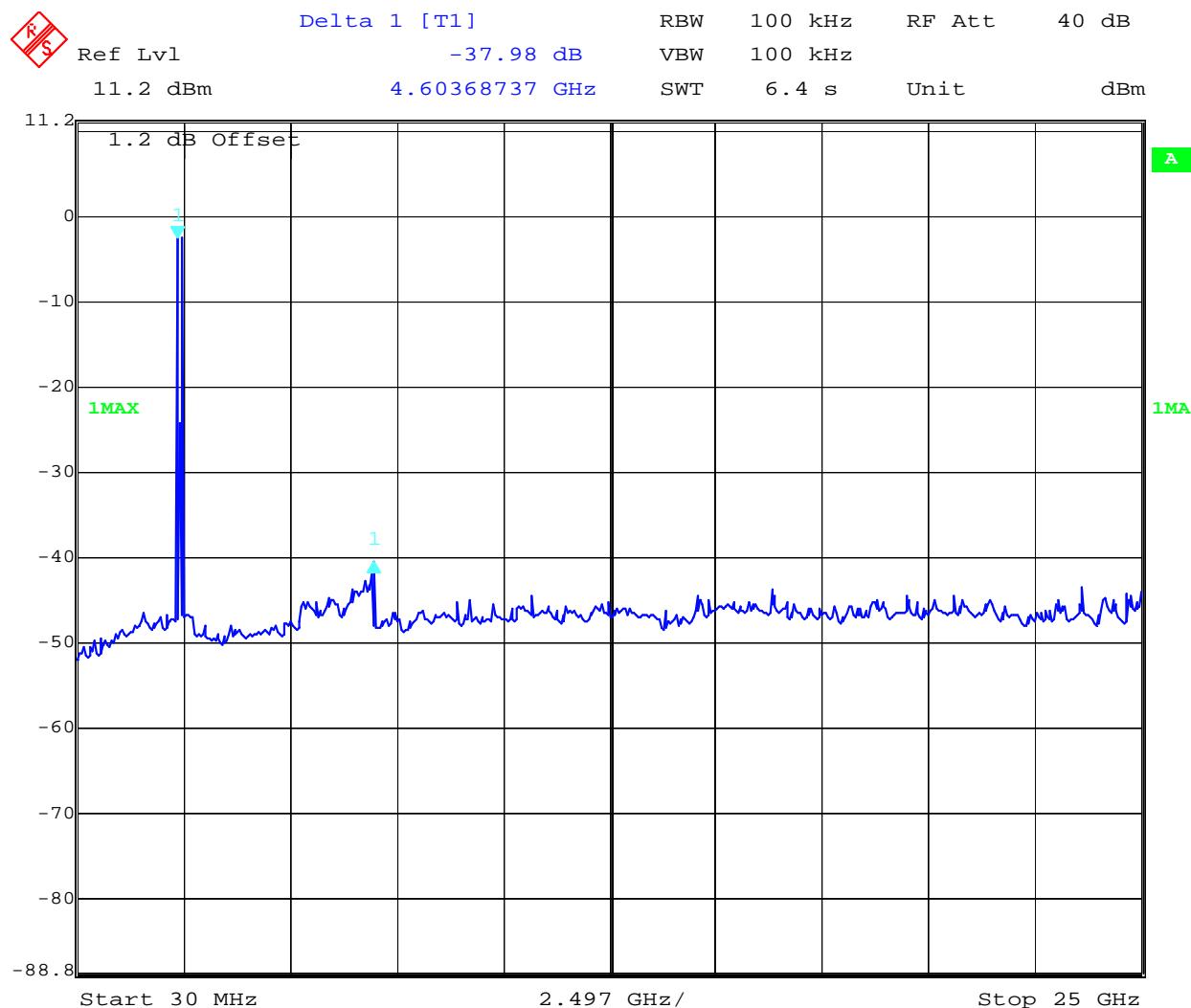


Date: 3.FEB.2006 08:33:50

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

§ 15.247 (c) (1)

NOTE: The peak is the carrier frequency.



Date: 3.FEB.2006 08:35:37



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 (dB μ V/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)

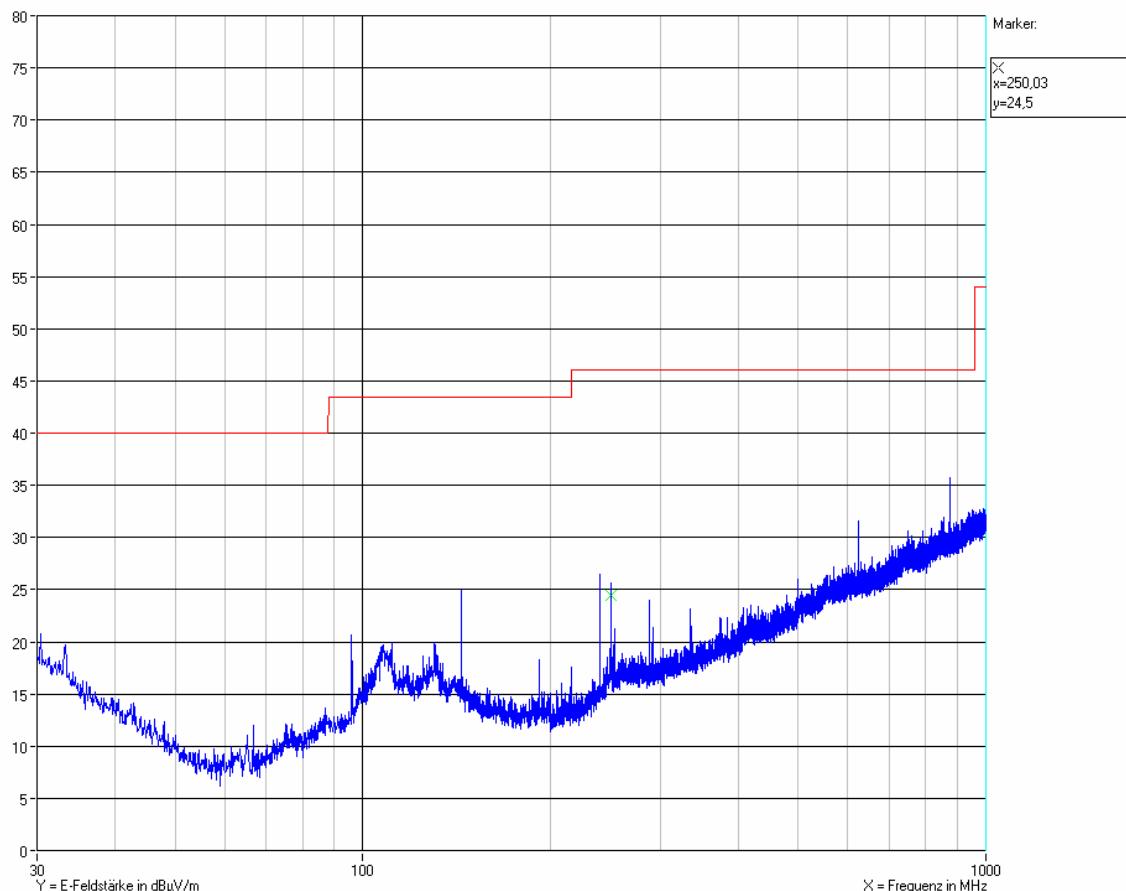
30MHz – 1GHz

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)

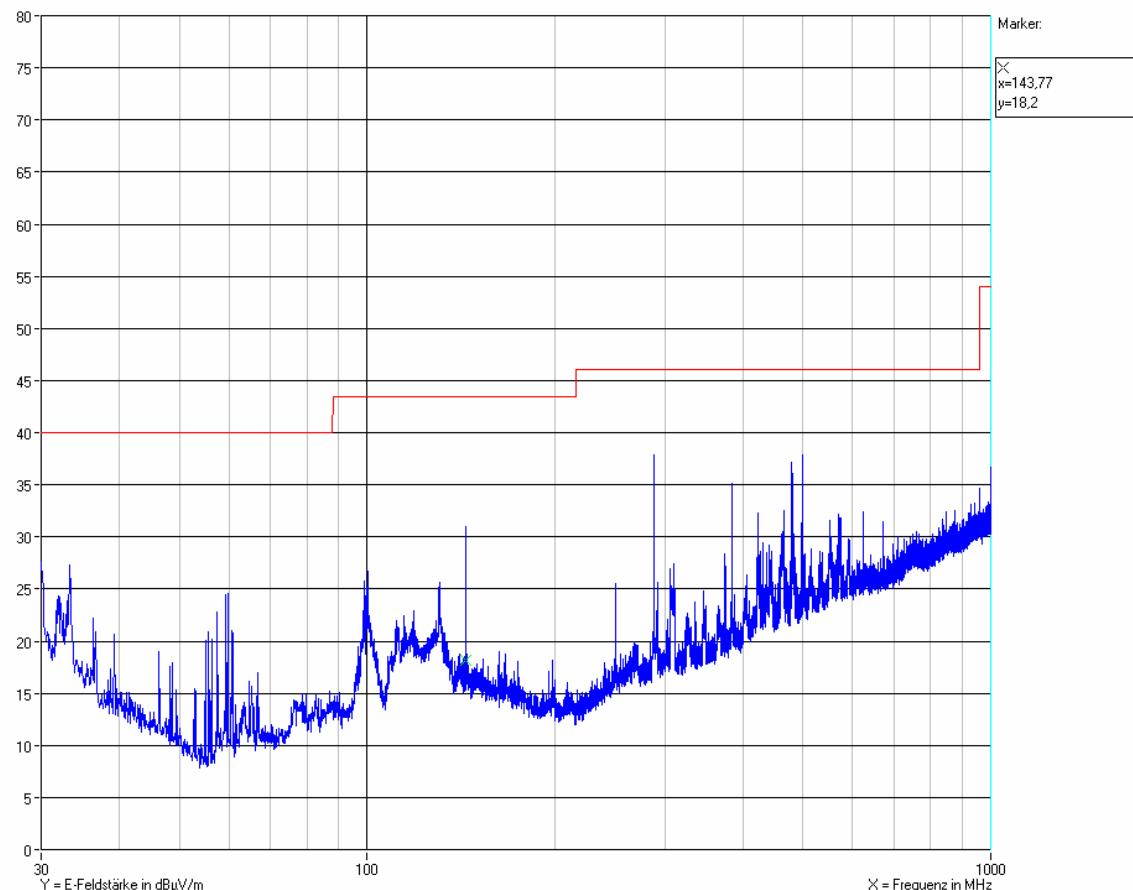
30MHz – 1GHz

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)



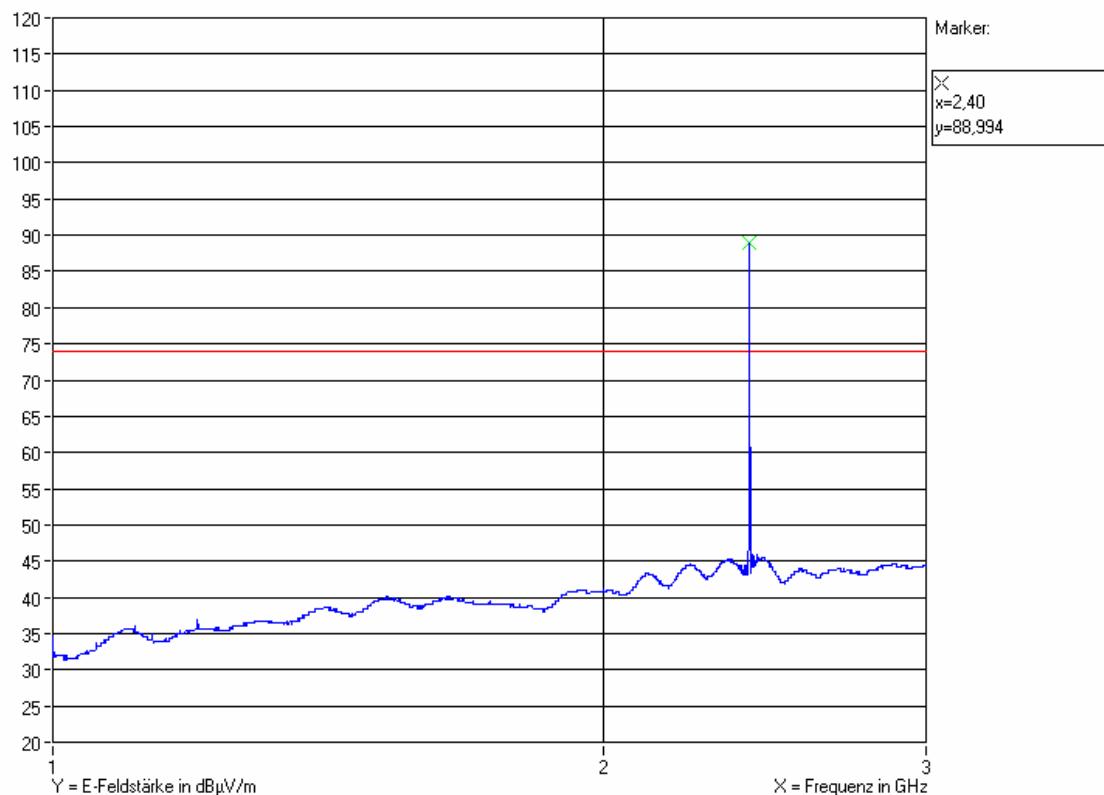
EMISSION LIMITATIONS –Radiated (Transmitter)

§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)

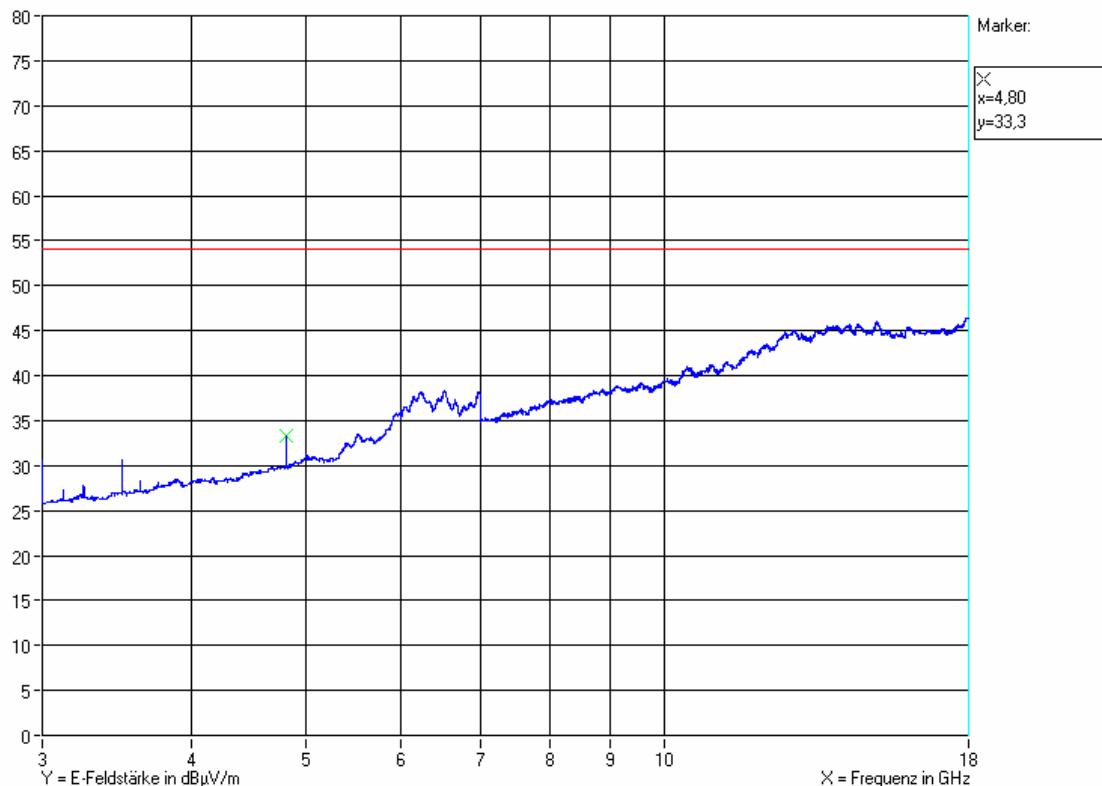


EMISSION LIMITATIONS Radiated (Transmitter)

§ 15.247 (c) (1)

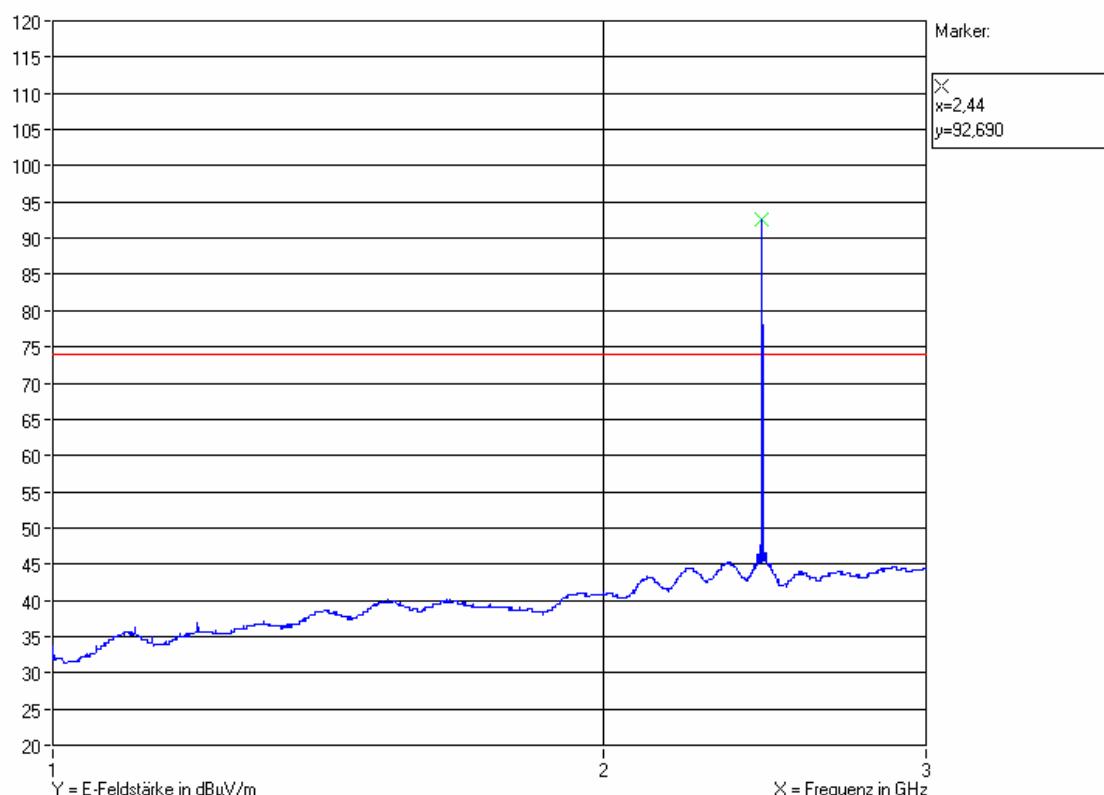
Lowest Channel (2402MHz): 3GHz – 18GHz

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)

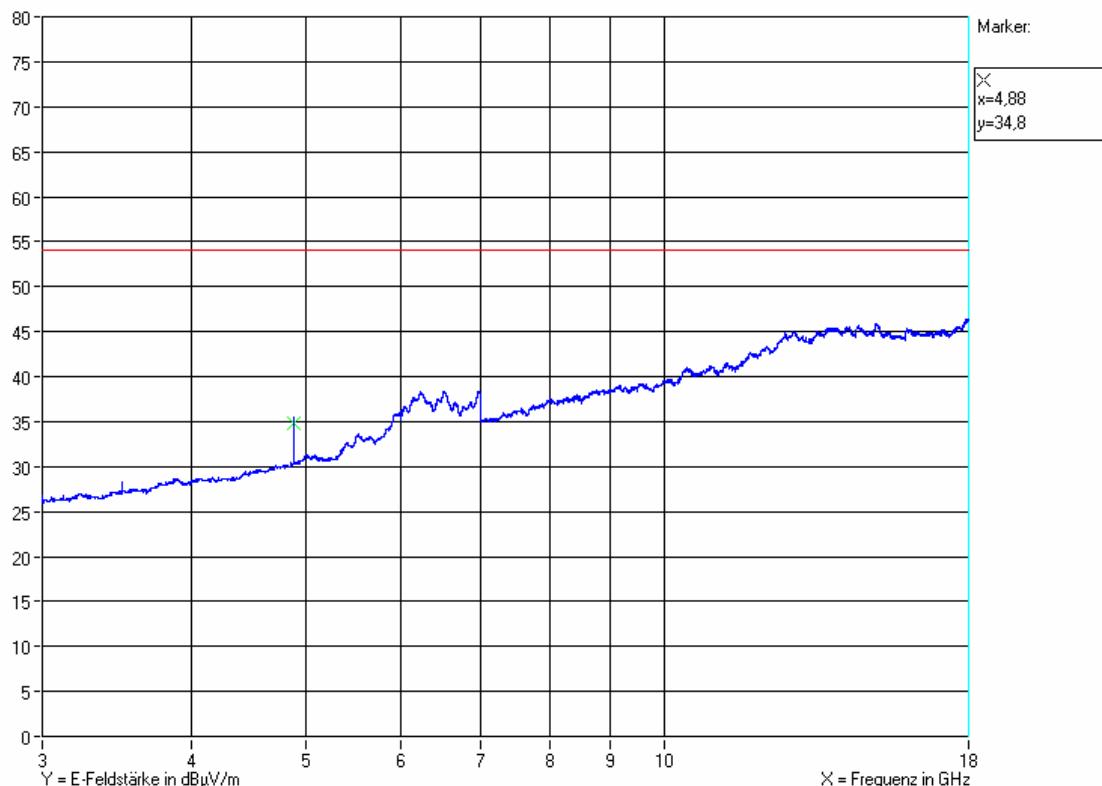


EMISSION LIMITATIONS Radiated (Transmitter)

§ 15.247 (c) (1)

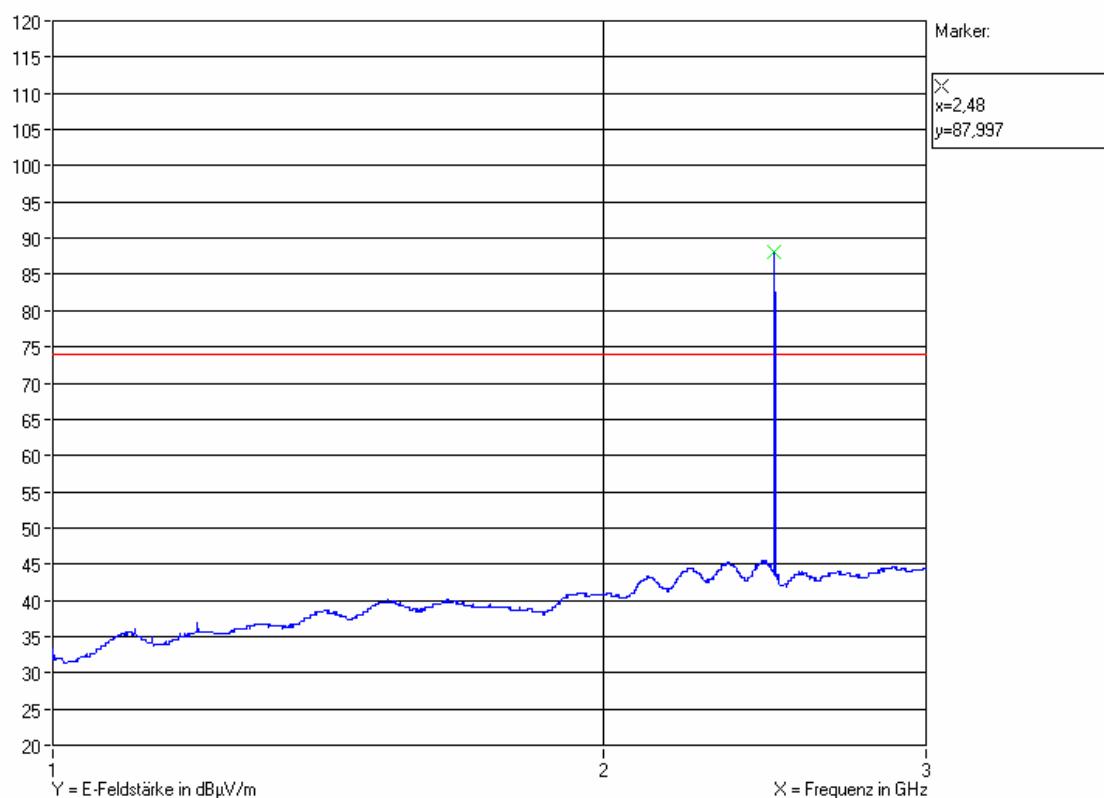
Middle Channel (2441MHz): 3GHz – 18GHz

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)

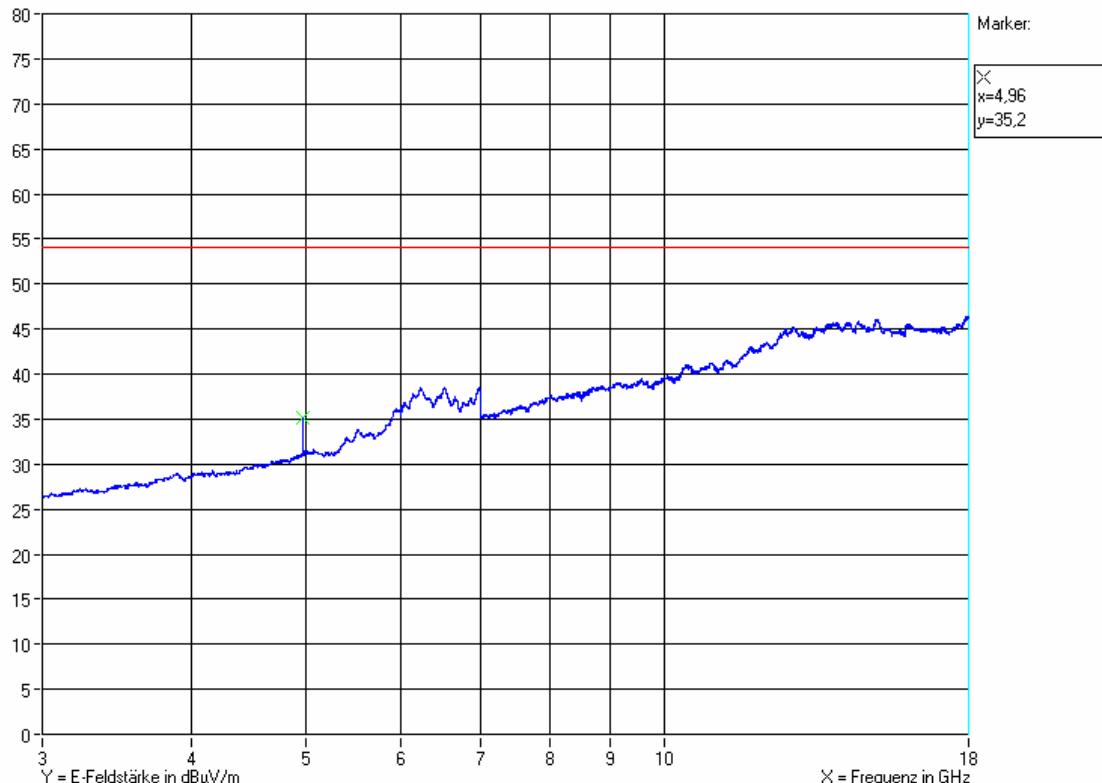


EMISSION LIMITATIONS Radiated (Transmitter)

§ 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)

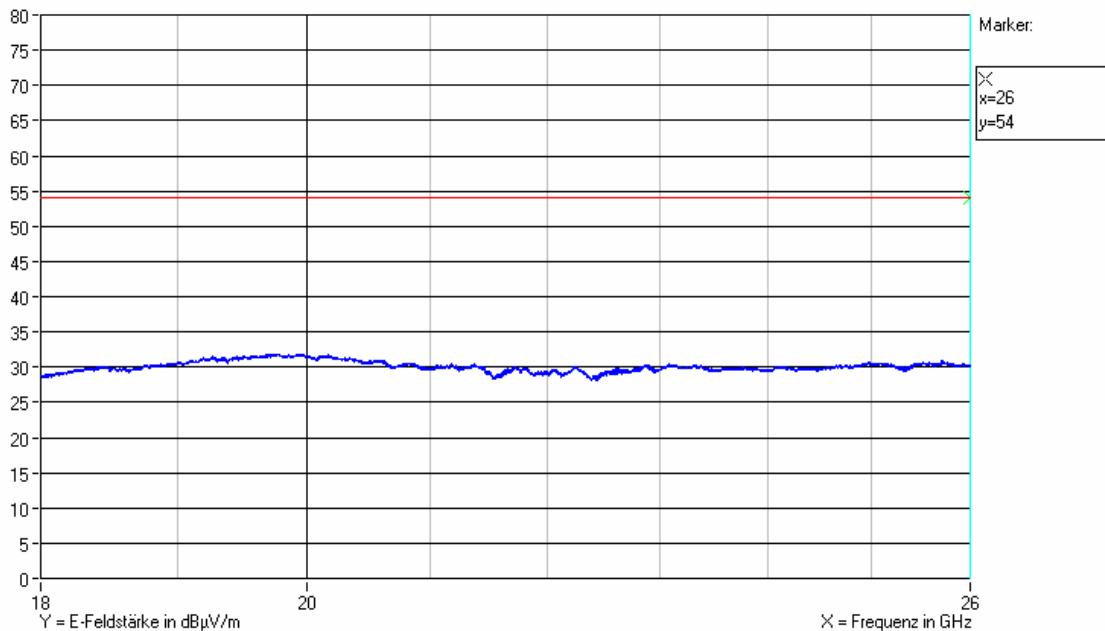
§ 15.247 (c) (1)

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 (μ V/m) | Measurement distance (m) |
|-----------------|-----------------------------|--------------------------|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| above 960 | 500 | 3 |

NOTE:

1. The radiated emissions were done with different settings, using the relevant 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

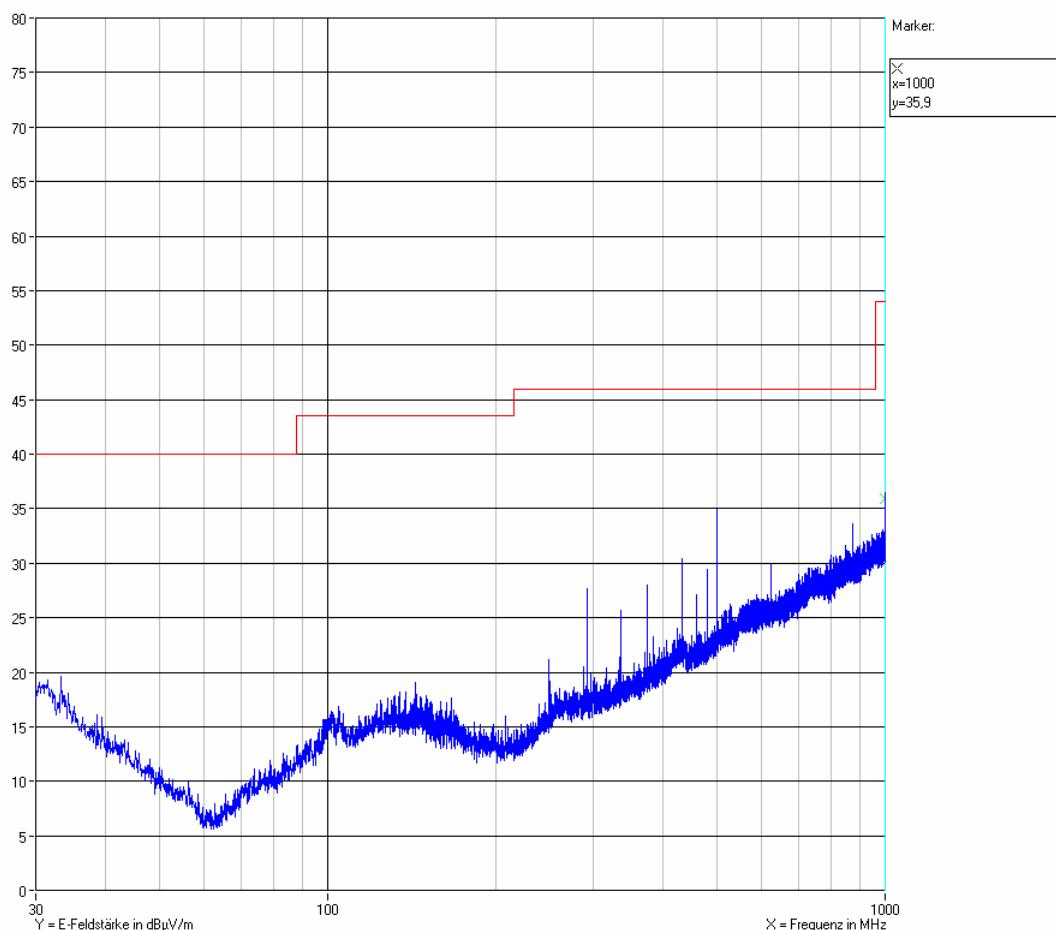
RECEIVER SPURIOUS RADIATION 30MHz – 1GHz

§ 15.209

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)



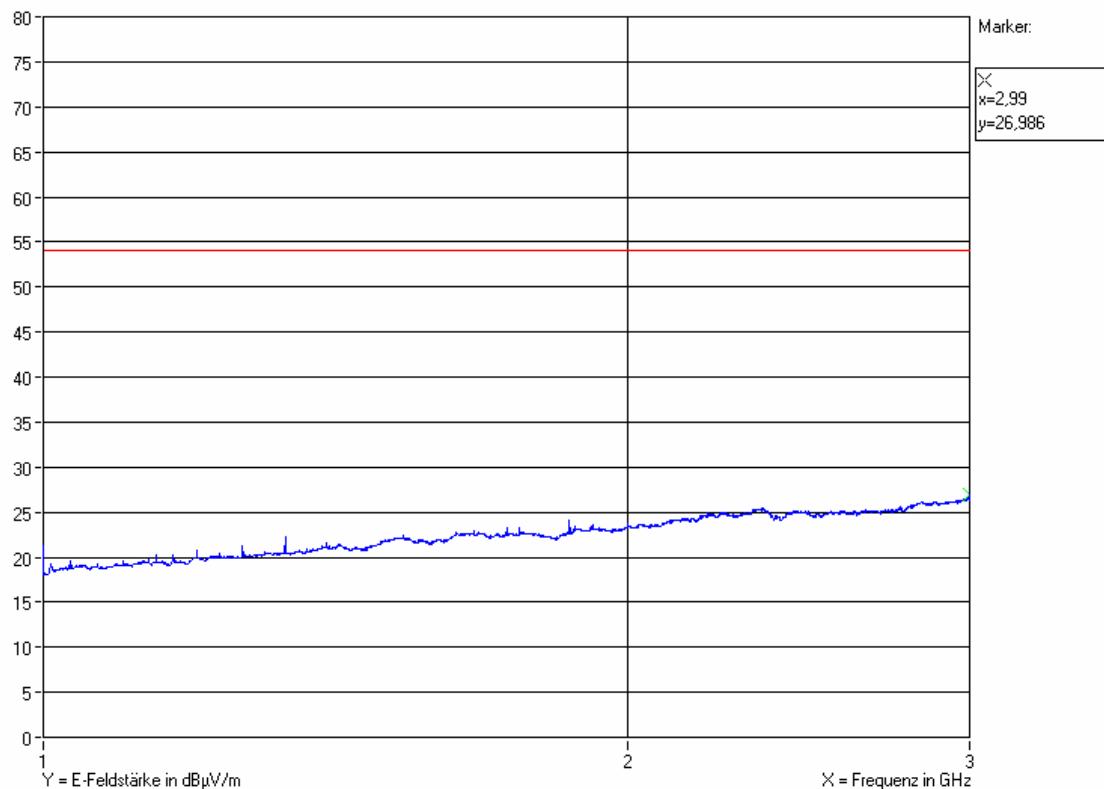
RECEIVER SPURIOUS RADIATION

§ 15.209

1GHz – 3GHz

Short Description: Bluetooth 1GHz - 3GHz

Start 1GHz; Stop 3.0 GHz; Detector: AV Coupled RBW: 1MHz (EMI receiver)



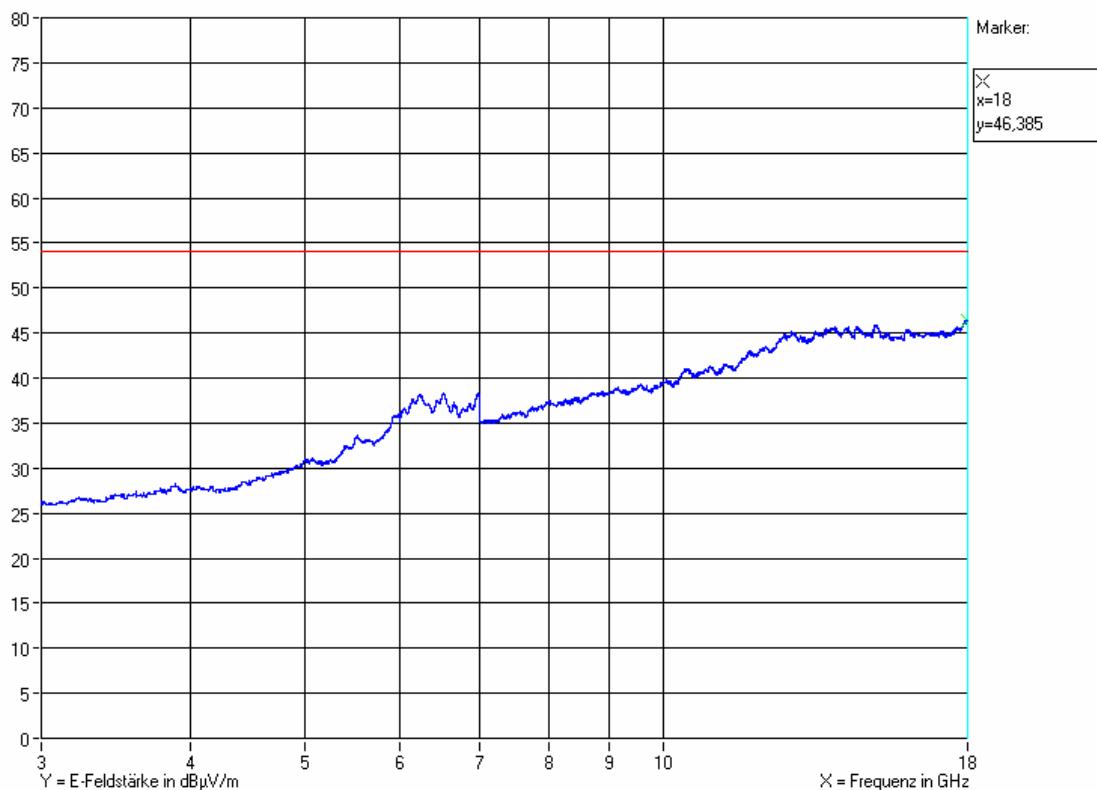
RECEIVER SPURIOUS RADIATIONS§

§15.209

3GHz – 18GHz

Short Description: Bluetooth 3GHz - 18GHz

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



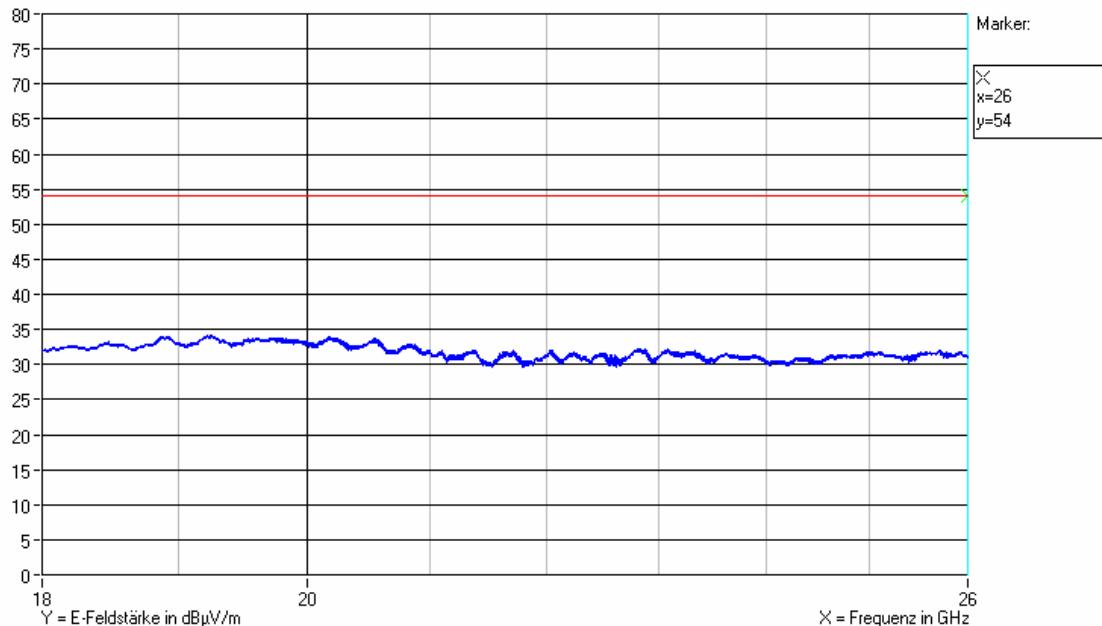
RECEIVER SPURIOUS RADIATION

§ 15.209

18GHz – 26GHz

Short Description: Bluetooth 18GHz – 26GHz

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



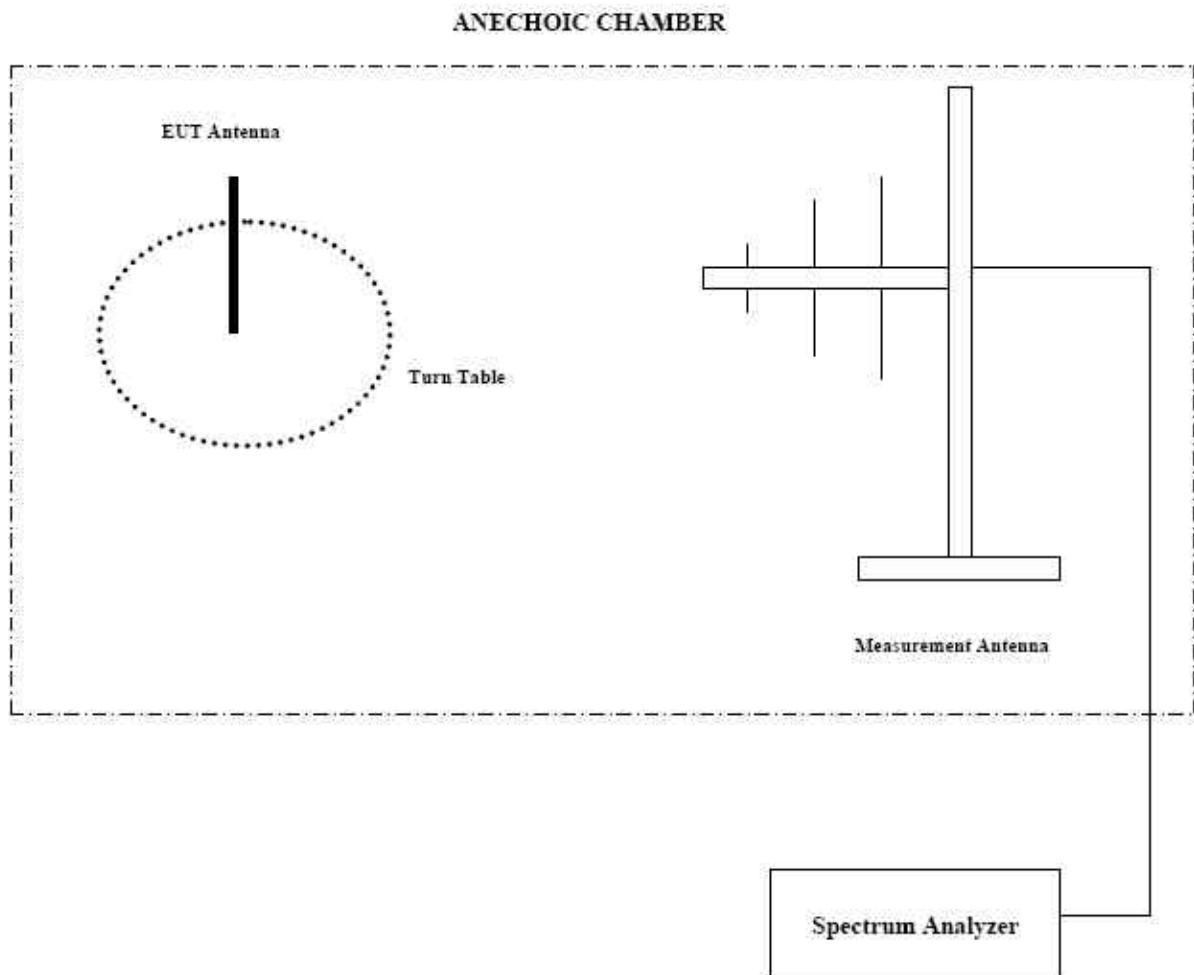


6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

| 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 |

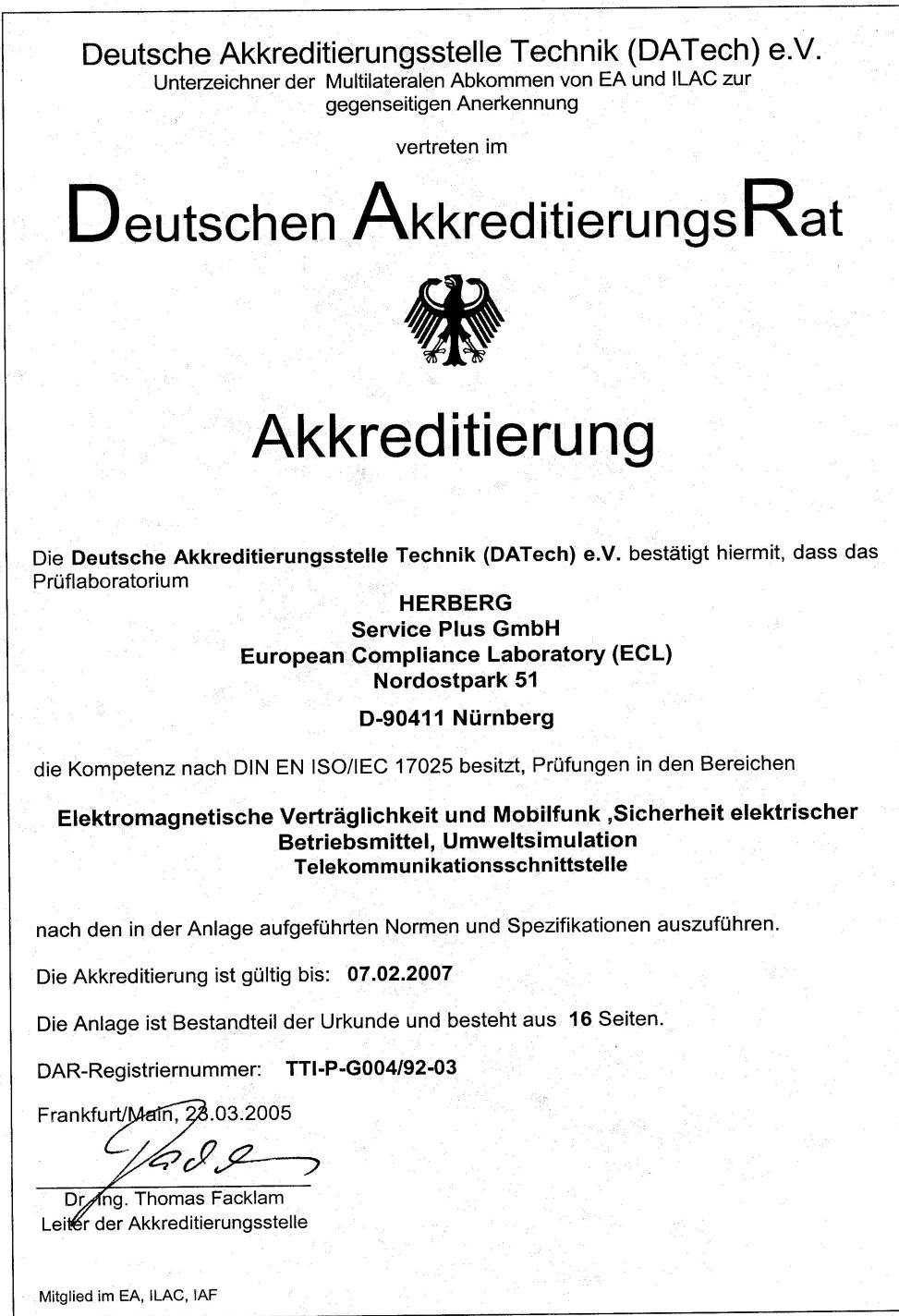
7 RADIATED TESTING

Blockdiagram





8 Accreditation certificate





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