EMC-ECL-EMC Test Report No.: 08-185

Equipment under test: **Digta CordEx Microphone**

Type of test: **FCC 47 CFR Part 15 Subpart B, C**

Measurement Procedures: **ANSI C63.4 (2003), ICES003 (2004), RSS210 Issue7**

Test result: **Passed**

Date of issue:	28.08.08			Signature:
Issue-No.:	01	Author:	**M. Lehmann** Test engineer	
Date of delivery:	21.07.08	Checked:	**W. Zapf** Operational manager	
Test dates:	22.07. – 13.11.08			
Pages:	39			

Manufacturer: Grundig Business Systems GmbH

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General:
The purpose of this report is to show compliance to the FCC regulations for unlicensed devices operating under section 15.249 of the Code of Federal Regulations title 47.
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 Test Results Summery

Summary of Test Results
Digta CordEx Microphone

Requirement	CFR/IC Section	Report Section	Test Result
Antenna requirement	15.203 RSS-GEN 7.1.4	4	Pass
Radiated Spurious Emissions (Receiver + Transmitter)	15.109, 15.209, 15.249 RSS210 2.6 RSS-Gen7.3.2	5	Pass
Conducted emissions (Receiver + Transmitter)	15.107, 15.207		n.a.*
Field Strength Limits (Fundamental and Harmonics) Band edges measurement	15.249 RSS210 Annex A2.9	6	Pass
99% Bandwidth	RSS-GEN	7	Pass
20dB Bandwidth	15.215	8	Pass

* Not required, the EUT is battery powered and there is no provision for connection to the mains.
The Connections to the mains is made by **Digta CordEx Station**.

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 C63.4-1992 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

Digta CordEx Microphone
FCC ID: WPCGXR2100
IC Company Number: 7943A-GXR2100

2.2 Description

Digta CordEx Microphone is a wireless profi-handheld-dictation-microphone, operated in a world-wide 2,4 – 2,5 GHz ISM-band to the Digta CordEx Station for home or office use. (see detailed in external Operational describtion)

2.3 Configuration

Fig. 2.3.1: EUT: Digta CordEx Microphone

2.3.1 Internal Rack wiring

Digta CordEx Microphone	six so often PCB

2.3.2 Connections

Digta CordEx Microphone	wireless

2.3.3 Frequencies

Digta CordEx Microphone	CPU-taktrate in stopp 12 MHz
	CPU-taktrate in play 27 MHz
	CPU-taktrate in record 75 MHz
Timer Clock	taktrate 32 KHz
Wireless-Modul	taktrate 16 MHz
I/O Circuit	taktrate 3,072 MHz

The operational frequency band is 2.402 to 2.479 GHz (78 Channels)

2.3.4 Used Software

Digta CordEx	FW-MO:	0000 00047
Wireless Modul	FW-RF:	0007
Display	FW-DI:	0020

2.4 Operating states

The EUT was tested in receive and transmit mode with full power.

2.5 Used Equipment to work with EUT (not EMC specific)

designation	instrument	manufact.	asset-no.	invent.-no.	calib.-date
Evo N610c	notebook	COMPAQ	470037-533		17.06.2008

2.6 Technical Data Overview

Frequency Range :	2402 – 2481 MHz
Tunable Bands :	1
Number of Channels:	79 in use
Operating Mode:	TX & RX mit 2 Mbps
Type of Modulation:	GFSK
Emissions Designator:	3M30G1D
User Frequency Adjustment :	None, Software controlled
Rated Output Power	0 dBm
Type of Power Supply :	USB & Battery
Antenna Connector:	Integral antenna only
Antenna Diversity Supported :	None

3 Description of the EMC test centre

3.1 Registrations

Registration No. (DATech): DAT-P-231/92-04

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

Registration No.: 96997

Registration No.
for radiated emission: IC 3475

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

Registered within Verizons ITL program.

3.2 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 Antenna Requirement

Test requirement: FCC CFR47, Part 15C

4.1 Regulation

15.203 An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

4.2 Result

EUT: **Digta CordEx Microphone**

Antenna is directly soldered on the PCB.
The EUT meets the requirements of this section.

5 Radiated Emissions Test

Test requirement: FCC CFR47, Part 15C
Test procedure: ANSI C63.4: 2003

5.1 Regulation

15.249(a) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (milli volts/meter)	Field strength of harmonics (micro volts/meter)
902 – 928 MHz	50	500
2400 – 2483.5 MHz	50	500
5725 – 5875 MHz	50	500
24.0 – 24.25 GHz	250	2500

(b) Field strength limits are specified at a distance of 3 meters.

(c) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or the general radiated emission limits in §15.209, whichever is the lesser attenuations.

(d) As shown in §15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Section 15.33 Frequency range of radiated measurements:
(a) Unless otherwise noted in the specific rule section under which the equipment operates for an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:
(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

5.2 Radiated Emissions Test, 30 MHz to 26 GHz

5.2.1 Test equipment used:

Designation	Equipment	Manufacturer	Cal	Due Cal	used
EMI test receiver	ESI40	Rohde & Schwarz	03.09.2008	03.09.2009	X
Amplifier	AFS4-00102000	Miteq	11.11.2008	11.11.2009	X
Amplifier	JS43-18004000-30-5A	Miteq	25.07.2008	25.07.2009	X
Amplifier	AM-1431-N	Miteq	17.10.2008	17.10.2009	X
Antenna	CBL 6111	Chase	09.07.2008	09.07.2009	X
Antenna	HL025	Rohde & Schwarz	05.12.2007	05.12.2008	X
Antenna	MWH-1826/B	ARA Inc.	01.10.2008	01.10.2009	X

5.2.2 Test Procedures

For tabletop equipment, the EUT is placed on a 0.8 meter high nonconductive table that sits on a flush mounted metal turntable. Floor standing equipment is placed directly on the flush mounted metal turntable. The EUT is connected to its associated peripherals with any excess I/O cabling bundled to approximately 1 meter.
Preview tests are performed. Emissions from the unit are maximized by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable. Manipulating the system cables also maximizes EUT emissions. All tests performed with the antenna placed in two polarizations: horizontal and vertical.

Radiated Emissions Test Characteristics	
Frequency range	30 MHz – 26 GHz
Test distance	3 m *
Test instrumentation resolution bandwidth	120 kHz (30 MHz – 1 GHz) 1 MHz (1 GHz – 26 GHz)
Receive antenna scan height	1 m – 4 m
Receive antenna polarization	Vertical/Horizontal

* According to Section 15.31 (f)(1): At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. (...) When performing measurements at a distance other than specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

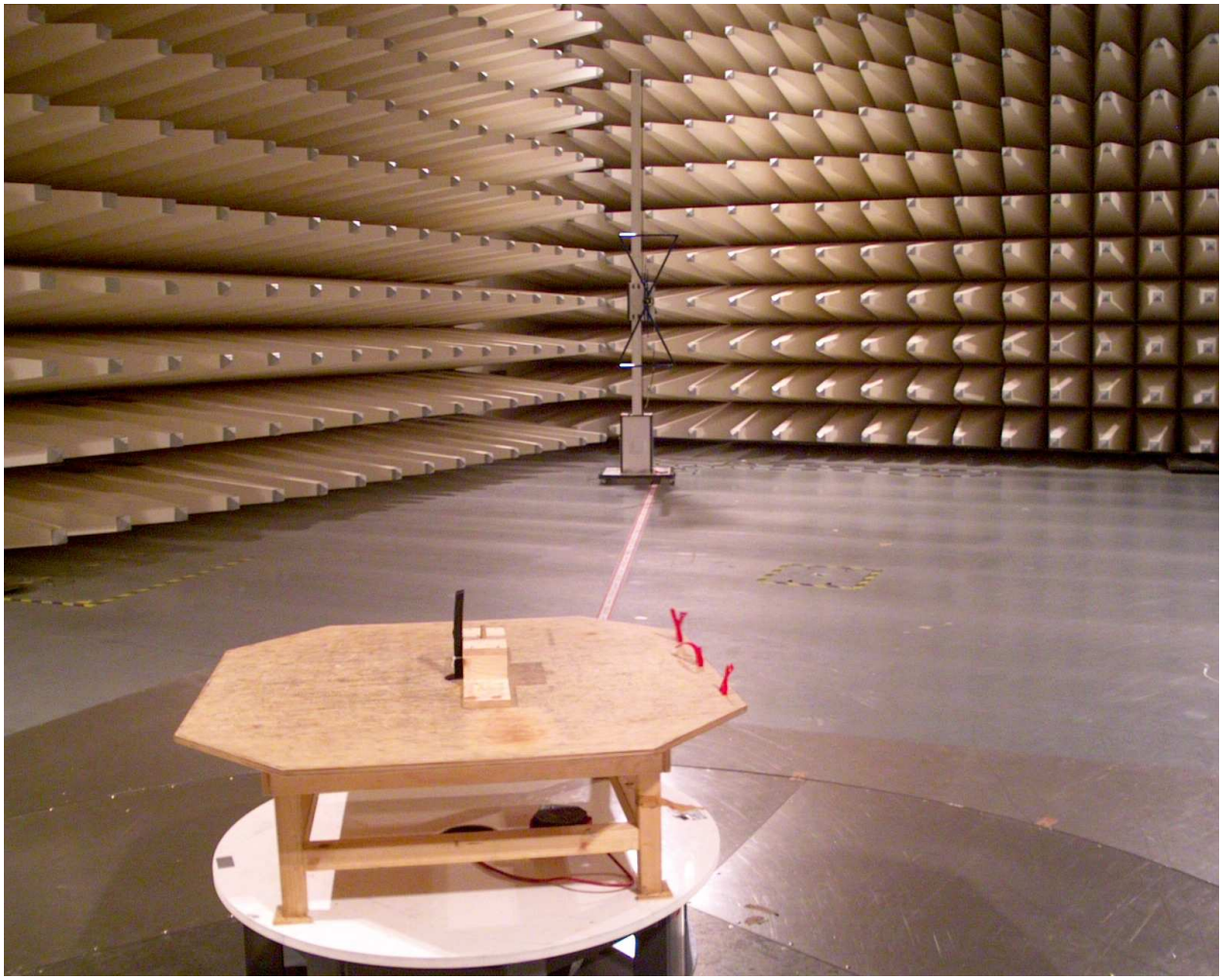


Fig. 5.2.1: Basic set-up for radiated emission; 30 MHz - 1 GHz distance 10m

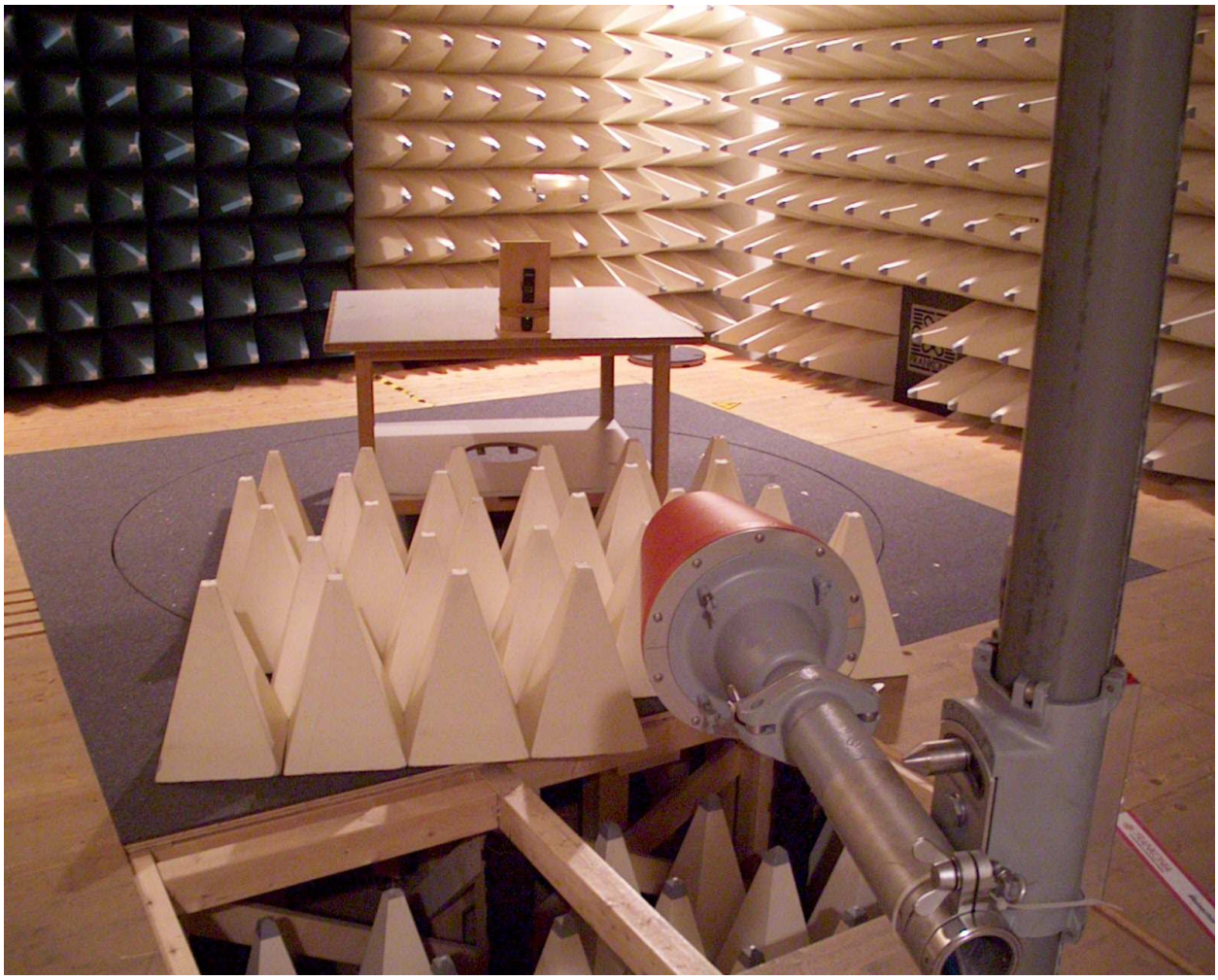


Fig. 5.2.2: Basic set-up for radiated emission test above 1 GHz distance 3m

5.2.3 Calculation of Field Strength Limits

Fundamental field strength limit for the band 2400 – 2483,5 MHz:
50 mV/m at 3 meters; 50 mV/m corresponds with 94.0 dB(µV/m).

Harmonics field strength limit for the band 2400 – 2483,5 MHz:
500 µV/m at 3 meters; 500 µV/m corresponds with 54.0 dB(µV/m).

The above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Emissions radiated outside the frequency band 2400 – 2483,5 MHz, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Calculation: microvolts/meter to dB(µV/m)

Frequency	Field Strength Limits according to §15.209		Measurement distance
[MHz]	[µV/m]	[dB(µV/m)]	[m]
30 - 88	100	40.0	3
88 - 216	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3

The emission limits shown in the above table are based on measurements employing a CISPR quasipeak detector except for frequencies above 1000 MHz. Radiated emission limits above 1000 MHz are based on measurements employing an average detector.

5.2.4 Calculation of Average Correction Factor

The average correction factor is computed by analyzing the “worst case” on time in any 100 ms time period and using the formula:

Correction Factor (dB) = 20*log (worst case on time/100 ms)

The peak to average ratio has been measured by using the right detectors of the ESI40. Therefore the correction factor was zero.

5.2.5 Field Strength Calculation

The field Strength is calculated by adding the Antenna Factor and the Cable Factor. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF
where
FS = Field Strength in dB((µV/m)
RA = Receiver Amplitude in dB(µV)
AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB

Assume a receiver reading of 23.5 dB(µV) is obtained. The Antenna Factor of 7.4 dB(1/m) and a Cable Factor of 1.1 dB are added, giving a field strength of 32 dB(µV/m). The 32 dB(µV/m) value can be mathematically converted to its corresponding level in µV/m.

FS = 23.5 dB(µV) + 7.4 dB (1/m) + 1.1 dB = 32 dB(µ/m)

$FS = 10^{(32/20)}$ µV/m = 39.8 µV/m

For test distances other than what is specified, but fufilling the requirements of Section 15.31 (f)(1) the field strength is calculated by adding additionally an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements). The basic equation with a sample calculation is as follows:

FS = RA + AF + CF + DF
where
FS = Field Strength in dB(µV/m)
RA = Receiver Amplitude in dB(µV)
AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB
DF = Distance Extrapolation Factor in dB
where DF = $20\log(D_{test}/D_{spec})$ where D_{test} = test distance and D_{spec} = specified distance

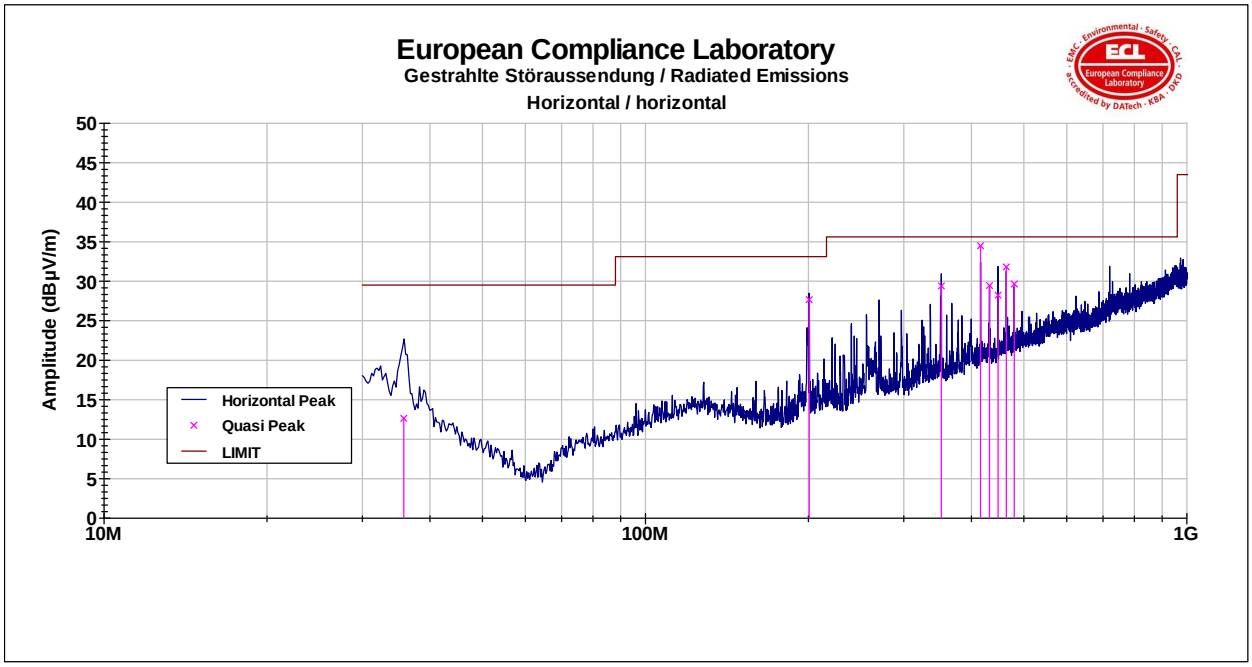
Assume the test performed at a reduced test distance of 1.5 m instead of the specified distance of 3 m giving a Distance Extrapolation of DF = 20log(1.5m/3m) = - 6 dB.
Assuming a receiver reading of 23.5 dB(µV) is obtained. The Antenna Factor of 7.4 dB(1/m), the Cable Factor of 1.1 dB and the Distance Factor of –6 dB are added, giving a field strength of 26 dB(µV/m). The 26 dB(µV/m) value can be mathematically converted to its corresponding level in µV/m.

FS = 23.5 dB(µV) + 7.4 dB(1/m) + 1.1 dB – 6 dB = 26 dB(µV/m)

$FS = 10^{(26/20)}$ µV/m = 20.0 µV/m

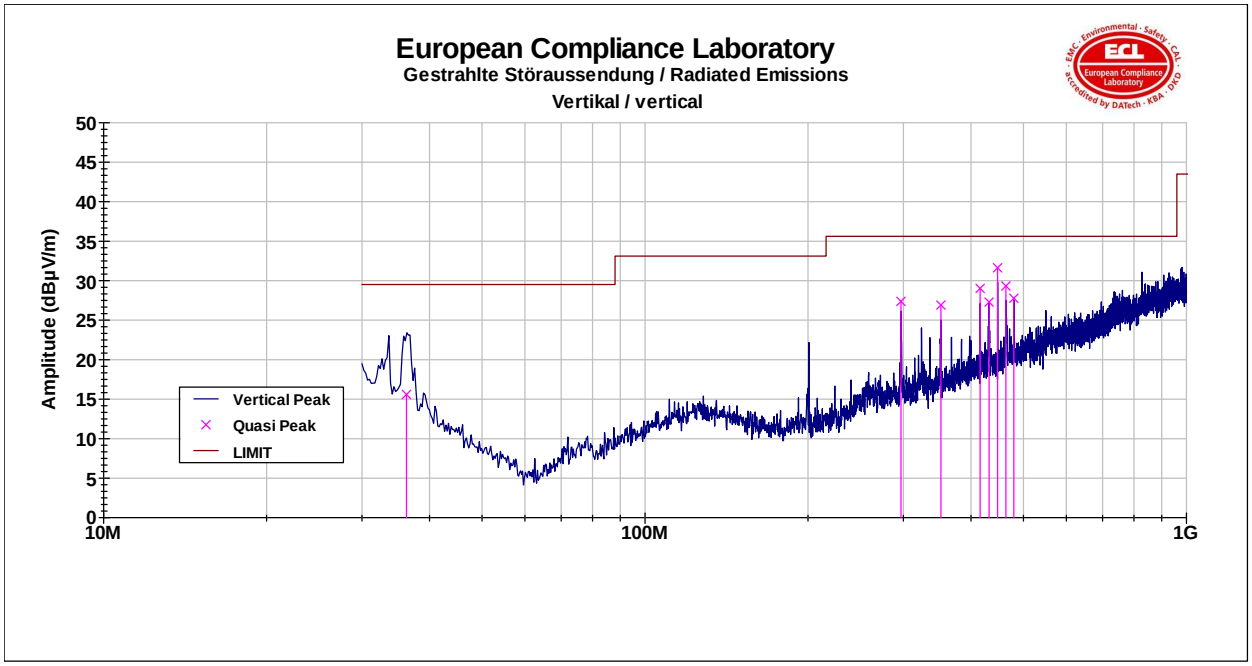
5.3 Test Results spurious emission 30 MHz to 1 GHz at 10m

All 10m measurements have to be corrected by 20log(10/3) =10,45 dB for the 3m specified limits.



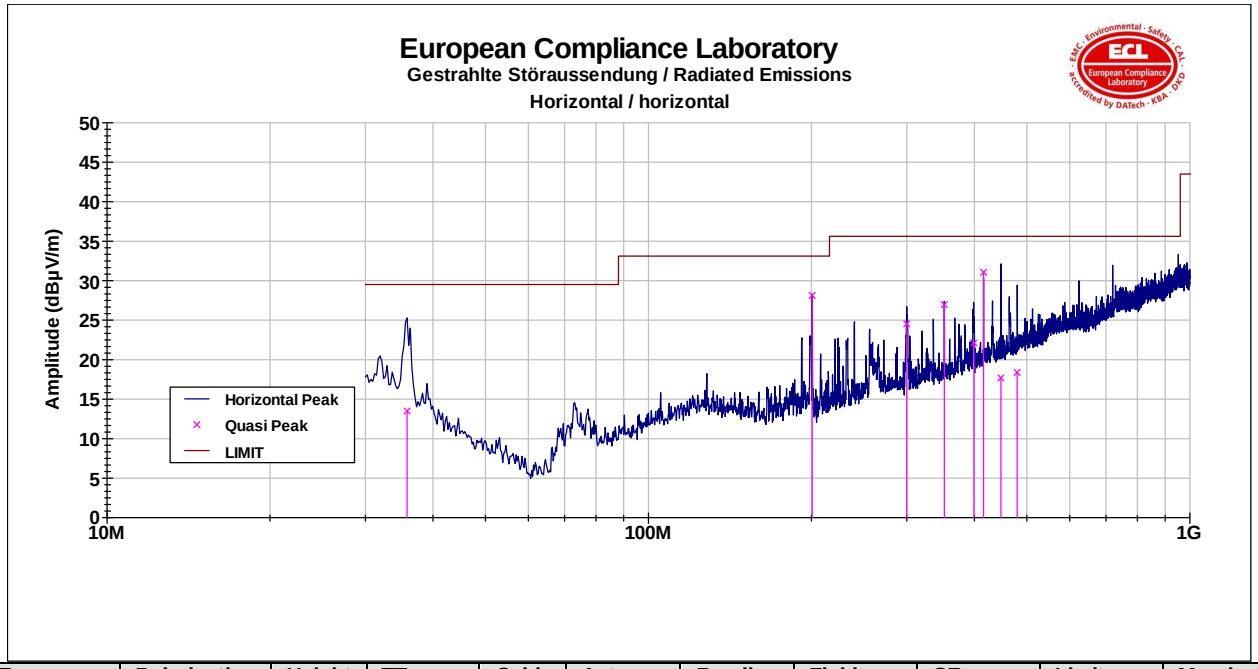
Frequency	Polari-sation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	CF Distance 10→3m	Limit	Margin FCC A
[MHz]	H/V	[cm]	[°]	[dB]	[dB]	[dB]	[dBµV/m]	dB	[dBµV/m]	[dB]
35.7717	H	380	25	0.8	14.5	-2.6	12.6	10.45	40	16.95
200.696	H	399	-83	1.8	9.8	16.0	27.7	10.45	43.5	5.35
352.016	H	226	-129	2.4	14.7	12.3	29.4	10.45	46	6.15
415.982	H	183	132	2.6	16.8	15.1	34.5	10.45	46	1.05
431.959	H	187	-109	2.6	16.9	9.9	29.4	10.45	46	6.15
448.056	H	219	132	2.7	16.9	8.6	28.2	10.45	46	7.35
463.973	H	204	146	2.7	17.2	11.9	31.8	10.45	46	3.75
480.01	H	210	-126	2.8	17.5	9.4	29.7	10.45	46	5.85

Measurement report 1: horizontal; transmit mode measured at 10m
30 MHz – 1 GHz



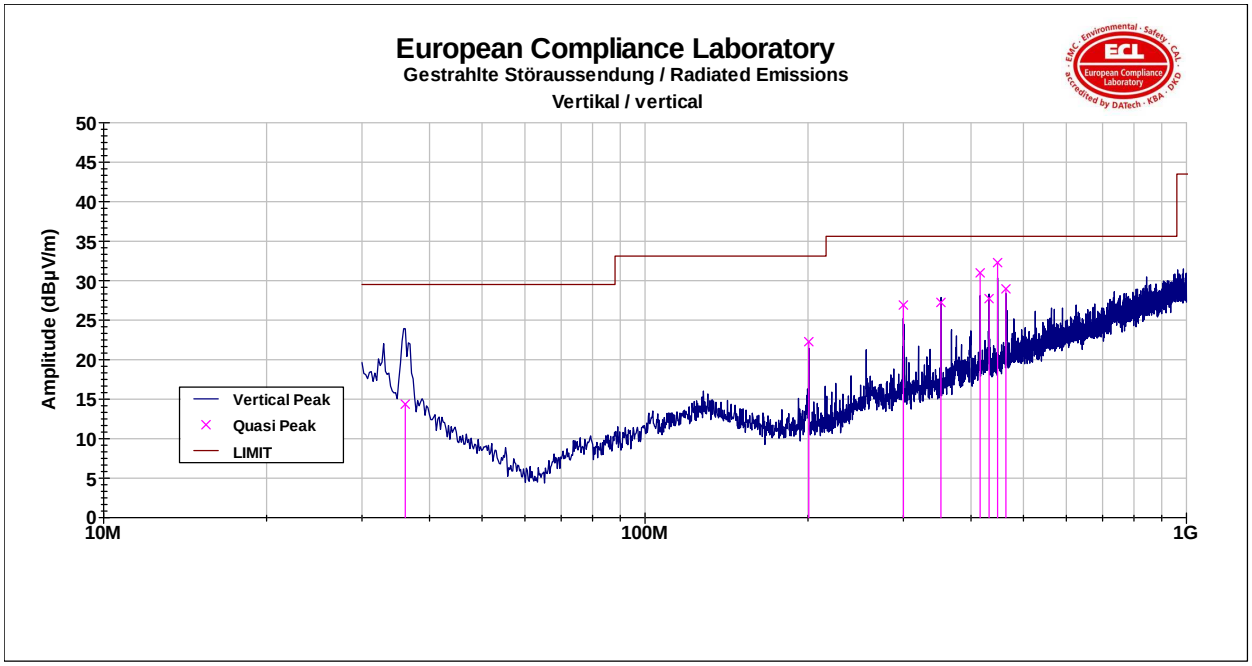
Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	CF Distance 10→3m	Limit	Margin FCC A
[MHz]	H/V	[cm]	[°]	[dB]	[dB]	[dB]	[dBµV/m]	dB	[dBµV/m]	[dB]
36.2636	V	148	-114	0.8	14.2	0.6	15.6	10.45	40	13.95
297.042	V	132	115	2.2	13.4	11.8	27.4	10.45	46	8.15
351.956	V	107	163	2.4	14.7	9.8	26.9	10.45	46	8.65
415.982	V	114	156	2.6	16.8	9.6	29.0	10.45	46	6.55
432.019	V	106	24	2.6	16.9	7.8	27.3	10.45	46	8.25
447.996	V	357	132	2.7	16.9	12.0	31.6	10.45	46	3.95
463.973	V	350	116	2.7	17.2	9.4	29.3	10.45	46	6.25
480.01	V	107	36	2.8	17.5	7.5	27.8	10.45	46	7.75

Measurement report 2: vertical; transmit mode at 10
30 MHz – 1 GHz



Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	CF Distance 10→3m	Limit	Margin FCC A
[MHz]	H/V	[cm]	[°]	[dB]	[dB]	[dB]	[dBµV/m]	dB	[dBµV/m]	[dB]
35.8317	H	240	174	0.8	14.5	-1.8	13.5	10.45	40	16.05
200.696	H	398	-114	1.8	9.8	16.5	28.1	10.45	43.5	4.95
300.077	H	396	144	2.2	13.4	8.9	24.5	10.45	46	11.05
352.016	H	280	84	2.4	14.7	9.9	27.0	10.45	46	8.55
399.15	H	235	70	2.5	15.9	3.7	22.1	10.45	46	13.45
415.982	H	245	144	2.6	16.8	11.7	31.0	10.45	46	4.55
447.816	H	180	84	2.7	16.9	-1.9	17.7	10.45	46	17.85
479.83	H	113	71	2.8	17.5	-1.9	18.4	10.45	46	17.15

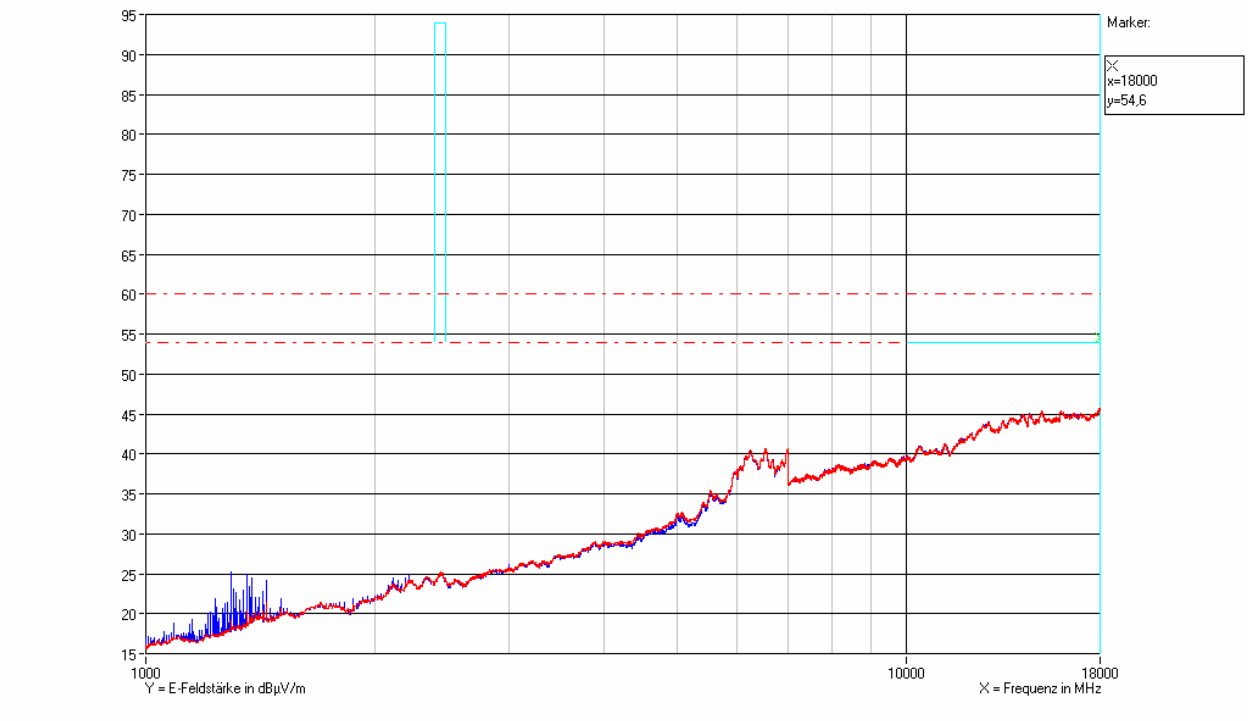
Measurement report 3: horizontal; receive mode at 10m
30 MHz – 1 GHz



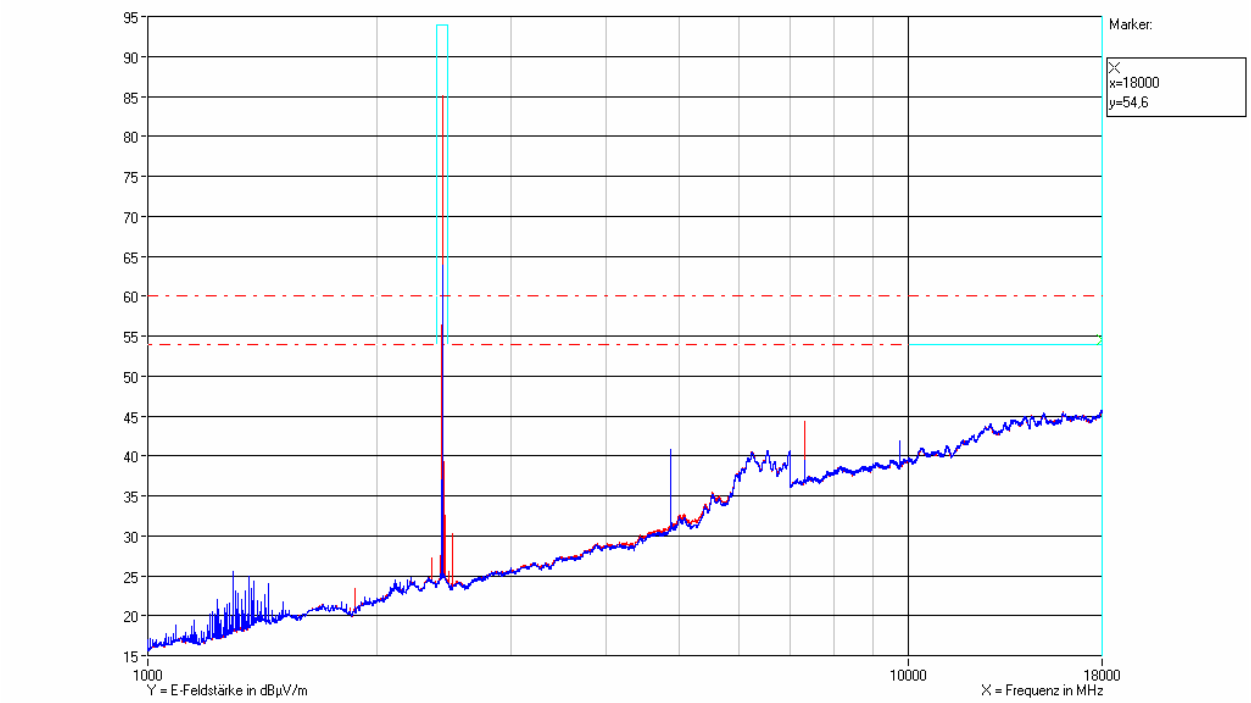
Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	CF Distance 10→3m	Limit	Margin
[MHz]	H/V	[cm]	[°]	[dB]	[dB]	[dB]	[dBµV/m]	[dB]	[dBµV/m]	[dB]
36.0746	V	253	-68	0.8	14.4	-0.8	14.40	10.45	40.00	15.15
200.699	V	106	-129	1.8	9.8	10.6	22.30	10.45	43.50	10.75
300.017	V	107	97	2.2	13.4	11.3	26.90	10.45	46.00	8.65
351.959	V	102	155	2.4	14.7	10.1	27.20	10.45	46.00	8.35
415.982	V	103	37	2.6	16.8	11.6	31.00	10.45	46.00	4.55
432.019	V	104	39	2.6	16.9	8.2	27.70	10.45	46.00	7.85
447.996	V	103	-35	2.7	16.9	12.7	32.30	10.45	46.00	3.25
463.973	V	375	180	2.7	17.2	9.0	29.00	10.45	46.00	6.55

Measurement report 4: vertical; receive mode at 10m
30 MHz – 1 GHz

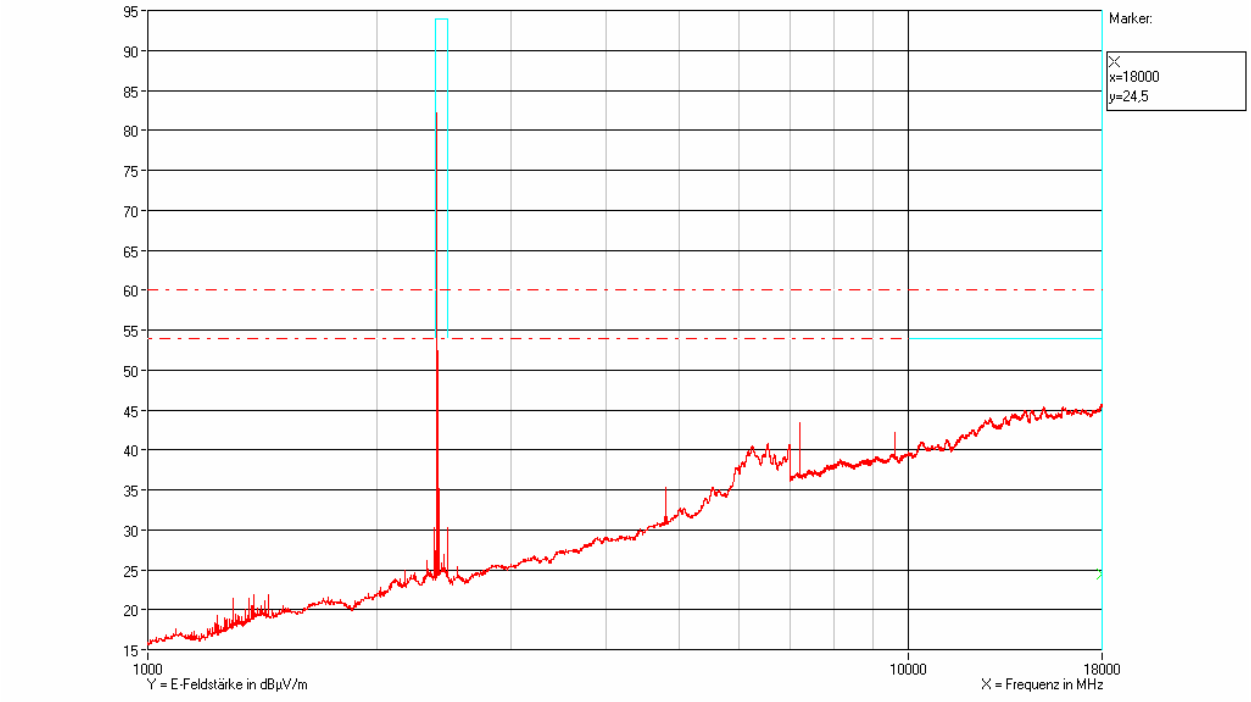
5.4 Test Results spurious emission 1 GHz to 18 GHz at 3m



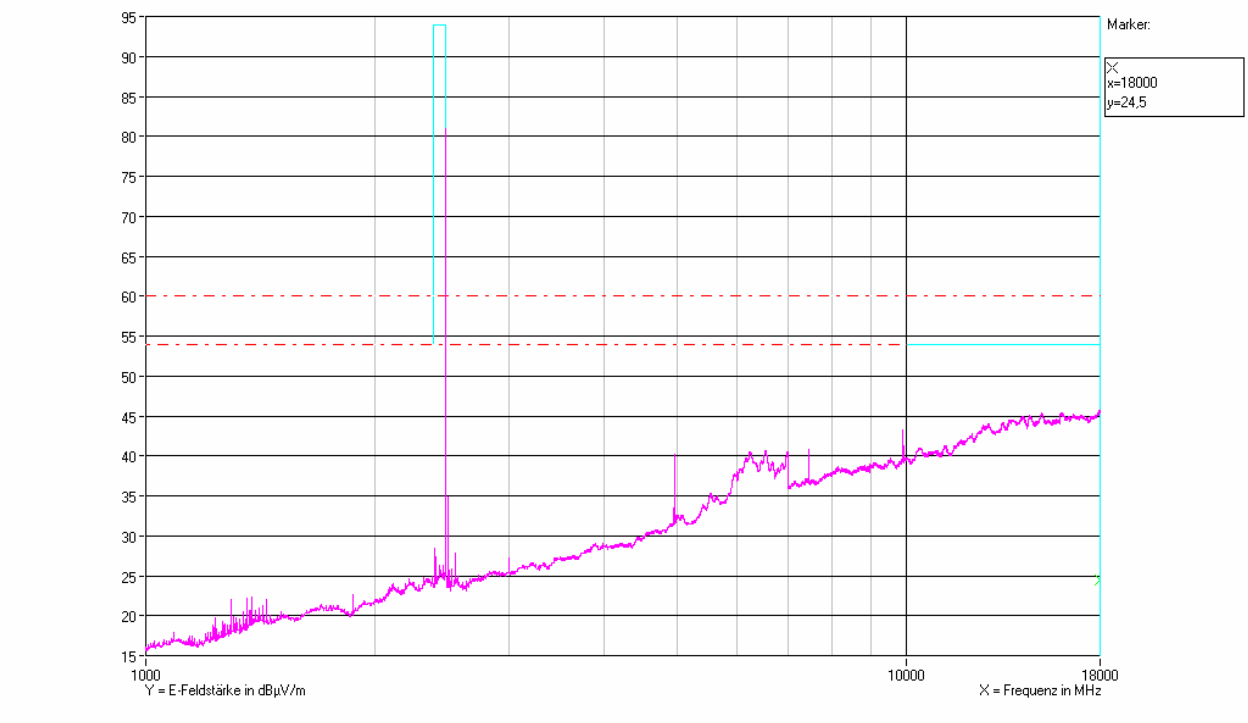
Measurement report 5: Horizontal + vertical (max.hold,all positions); receive mode at CH40
1 GHz – 18 GHz



Measurement report 6: Horizontal + vertical (max.hold,all positions);; transmit mode at CH40
1 GHz – 18 GHz

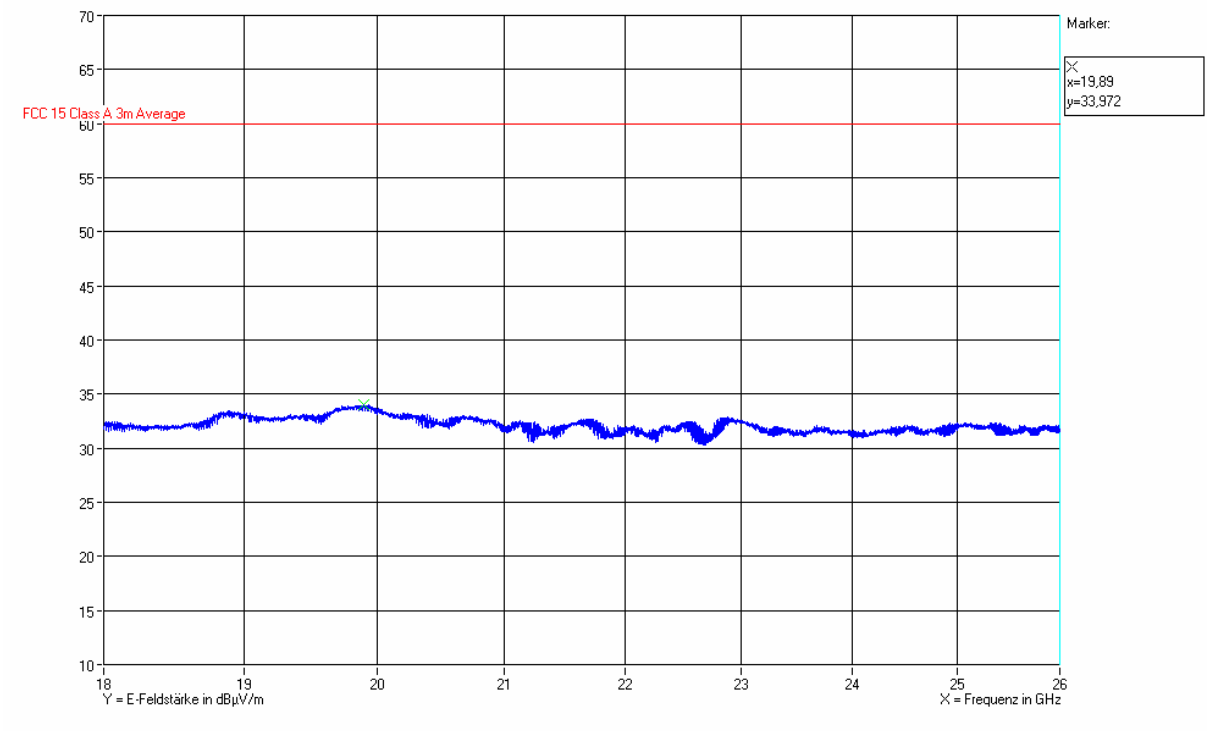


Measurement report 7: Horizontal + vertical (max.hold,all positions);; transmit mode at CH02
1 GHz – 18 GHz

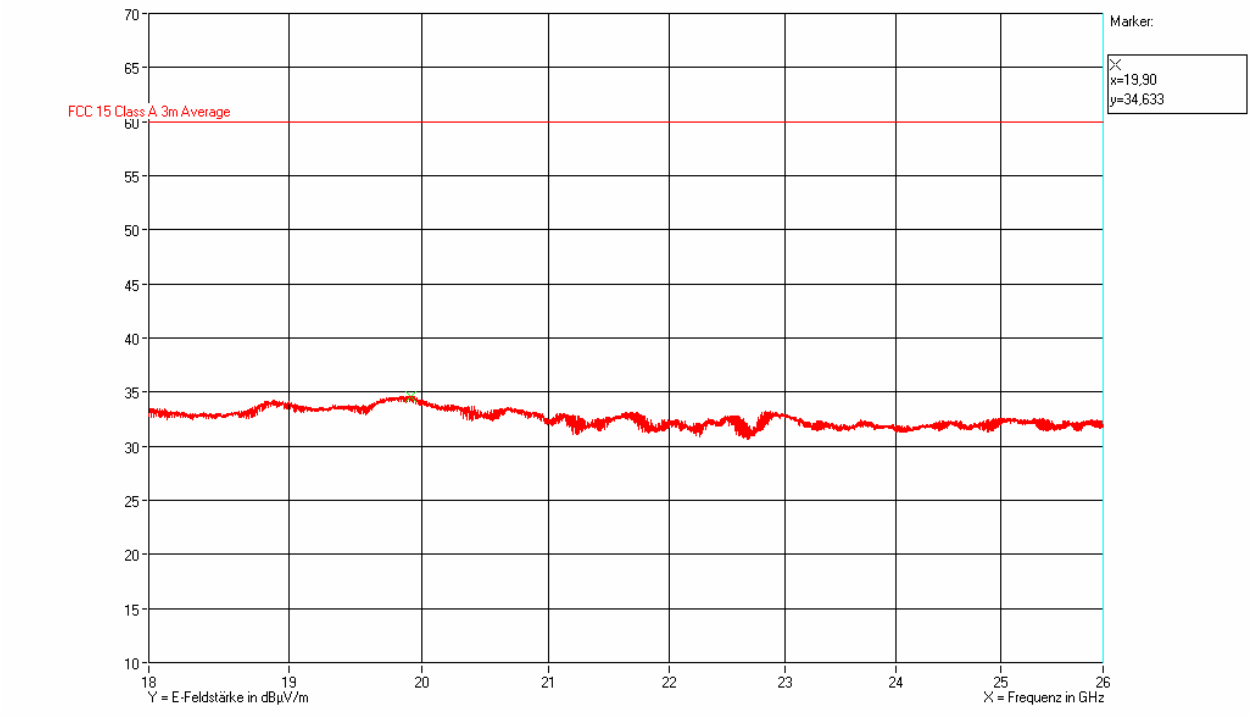


Measurement report 8: Horizontal + vertical (max.hold,all positions);; transmit mode at CH81
1 GHz – 18 GHz

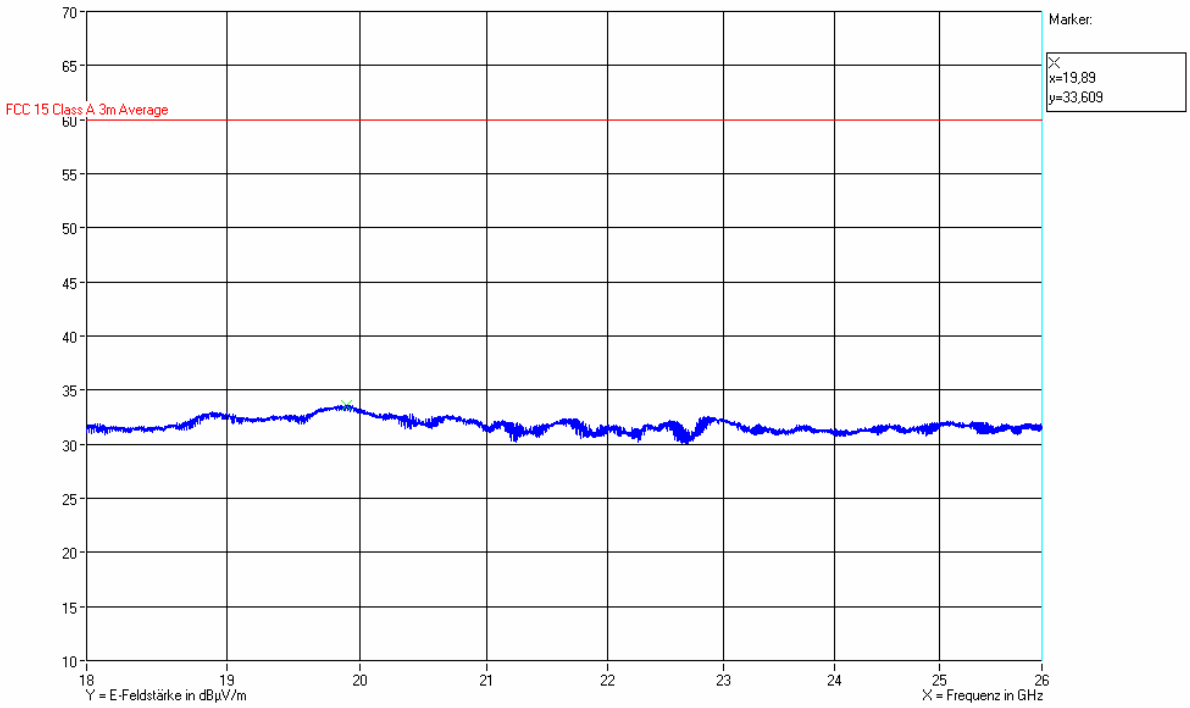
5.5 Test Results spurious emission 18 GHz to 26 GHz at 3m



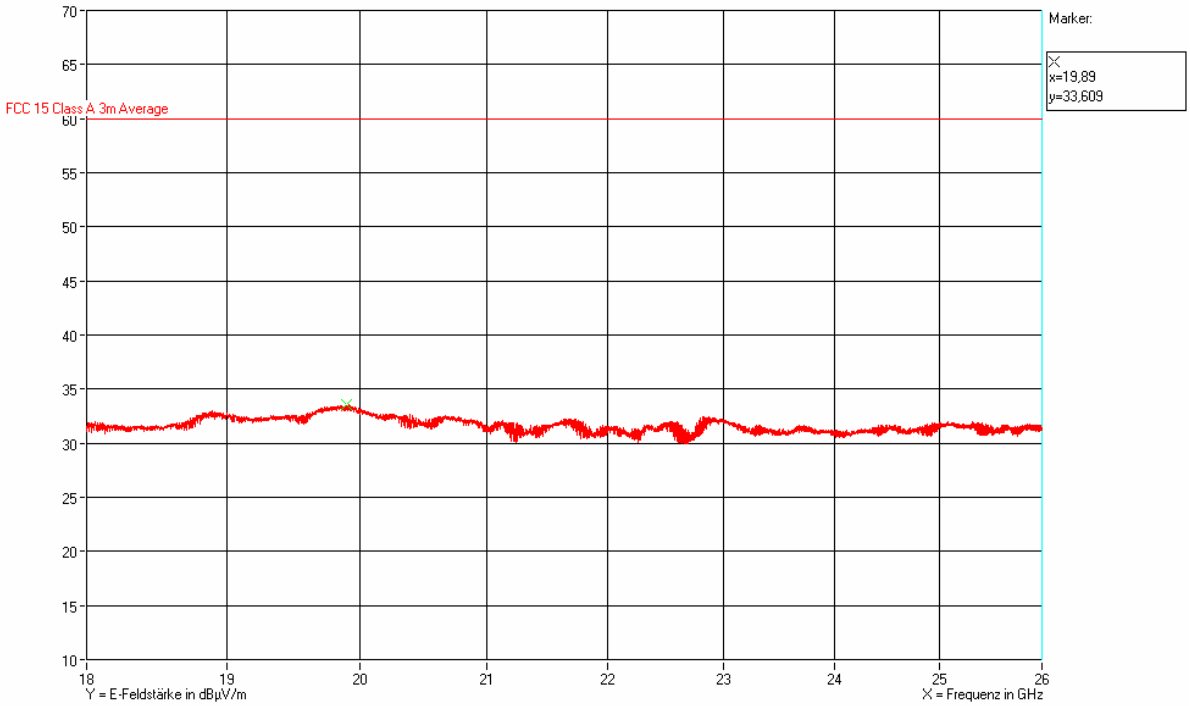
Measurement report 11: horizontal; receive mode at CH40
18 GHz – 26 GHz



Measurement report 12: vertical; receive mode at CH40
18 GHz – 26 GHz



Measurement report 13: horizontal; transmit mode at CH40
18 GHz – 26 GHz



Measurement report 14: vertical; transmit mode at CH40
18 GHz – 26 GHz

The peaks at 2.4 GHz are the working frequencies.

EUT: **Digta CordEx Microphone**

The EUT meets the requirements of this section.

6 Field strength limits (Fundamental + Harmonics) §15.249

FCC Part 15.247 “Digital Transmission System” and
RSS-210, Issue 7 “Low Power Licence-Exempt Radio communication Devices”

6.1 Regulation

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

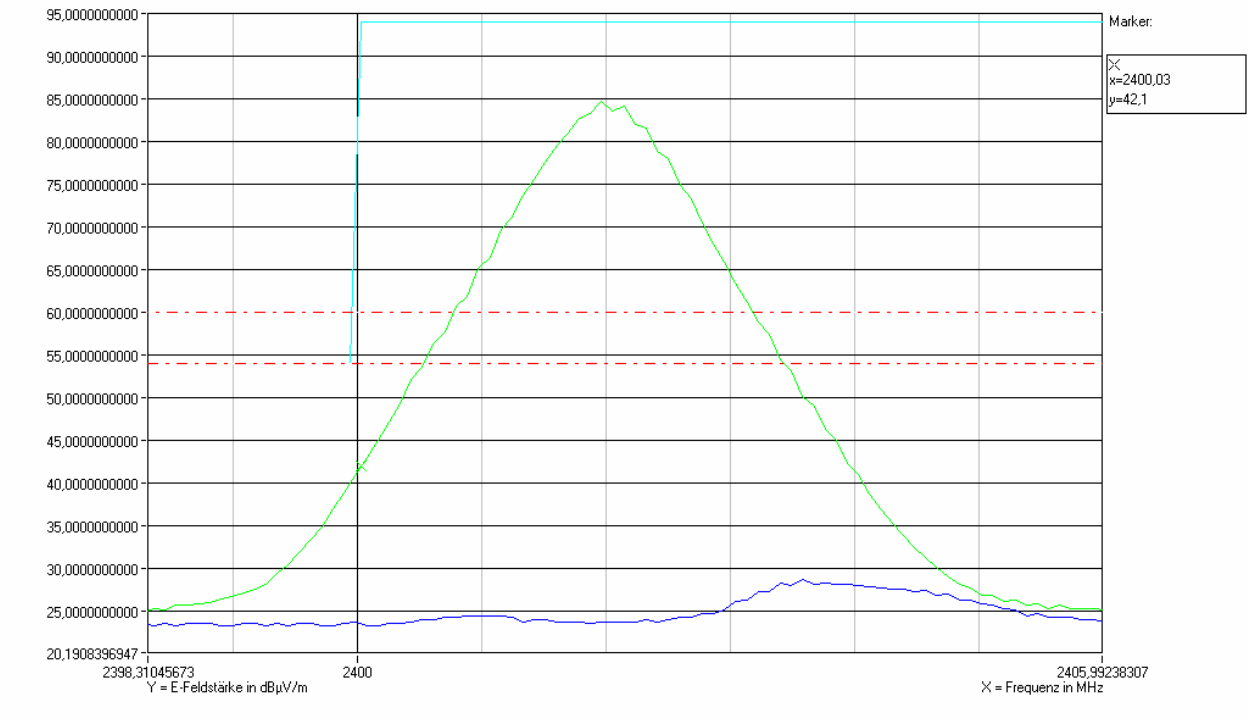
Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

(c) Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

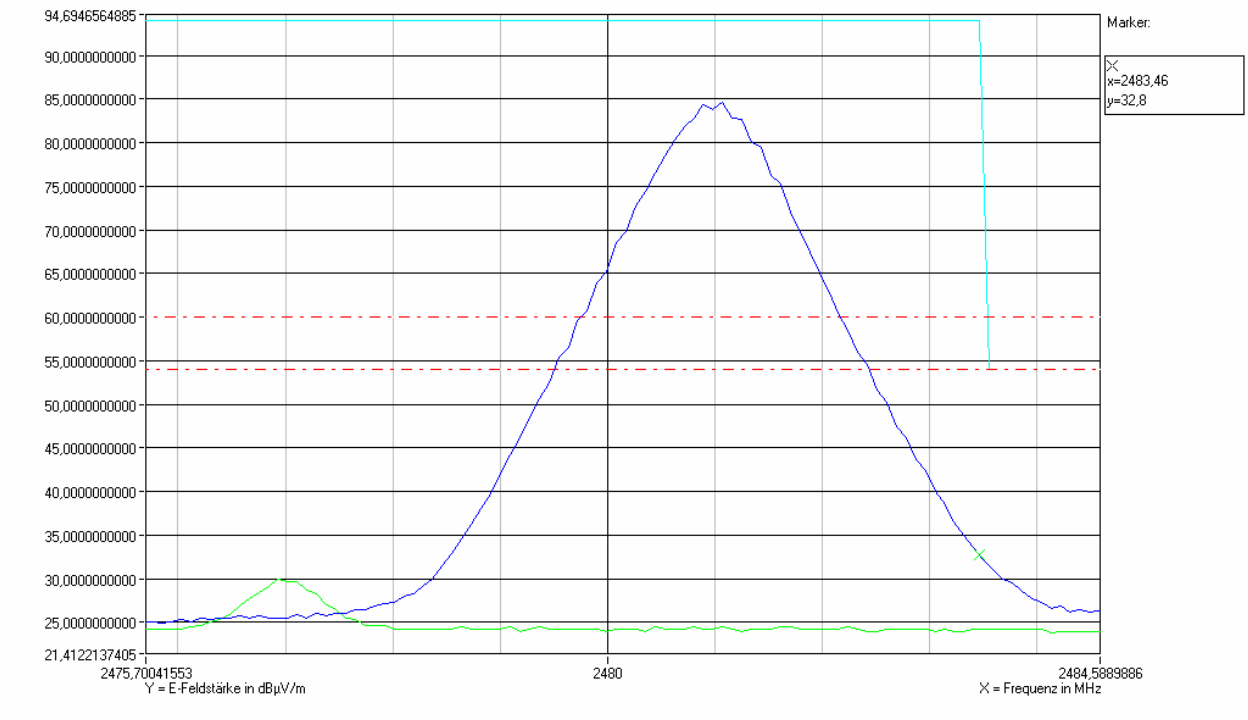
(e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

6.2 Band edge emissions & Field strength emissions (Fundamental & Harmonics) §15.249



f MHz	Polar V/H	Heigth cm	Azimuth Deg	Receiver Reading	AF dB	Cabel loss dB	Amplifier Gain dB	Field strength dBuV/m	Limit dBmV/m	Margin dB
2400	V	100	180	32,3	29,4	2,0	22,8	42	54	12
2401,96	V	100	180	76,1	29,4	2,0	22,8	84,7	94,0	9,3
2418,07	V	100	180	32,4	29,4	2,0	22,8	41,0	54,0	13,0

CH02



f MHz	Polar V/H	Heigth cm	Azimuth Deg	Receiver Reading	AF dB	Cabel loss dB	Amplifier Gain dB	Field strength dBuV/m	Limit dBmV/m	Margin dB
2481,07	V	102	180	75,8	29,5	2,1	22,8	84,6	94	9,4
2483,5	V	102	180	23,4	29,5	2,1	22,8	32,2	54	21,8

CH 81

7 99% Bandwidth RSS-Gen Section 4.6.1

7.1 Rule

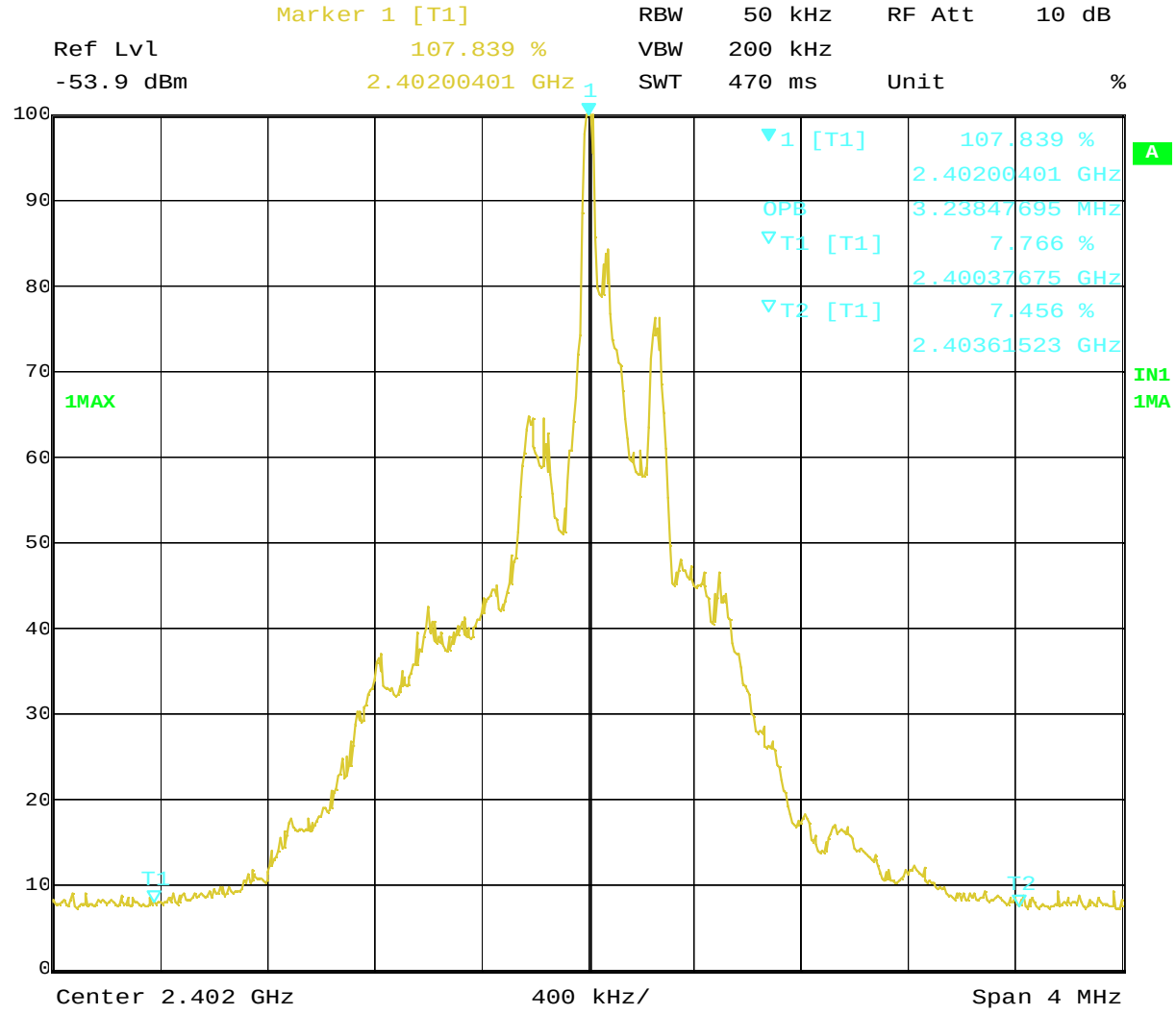
When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.
The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

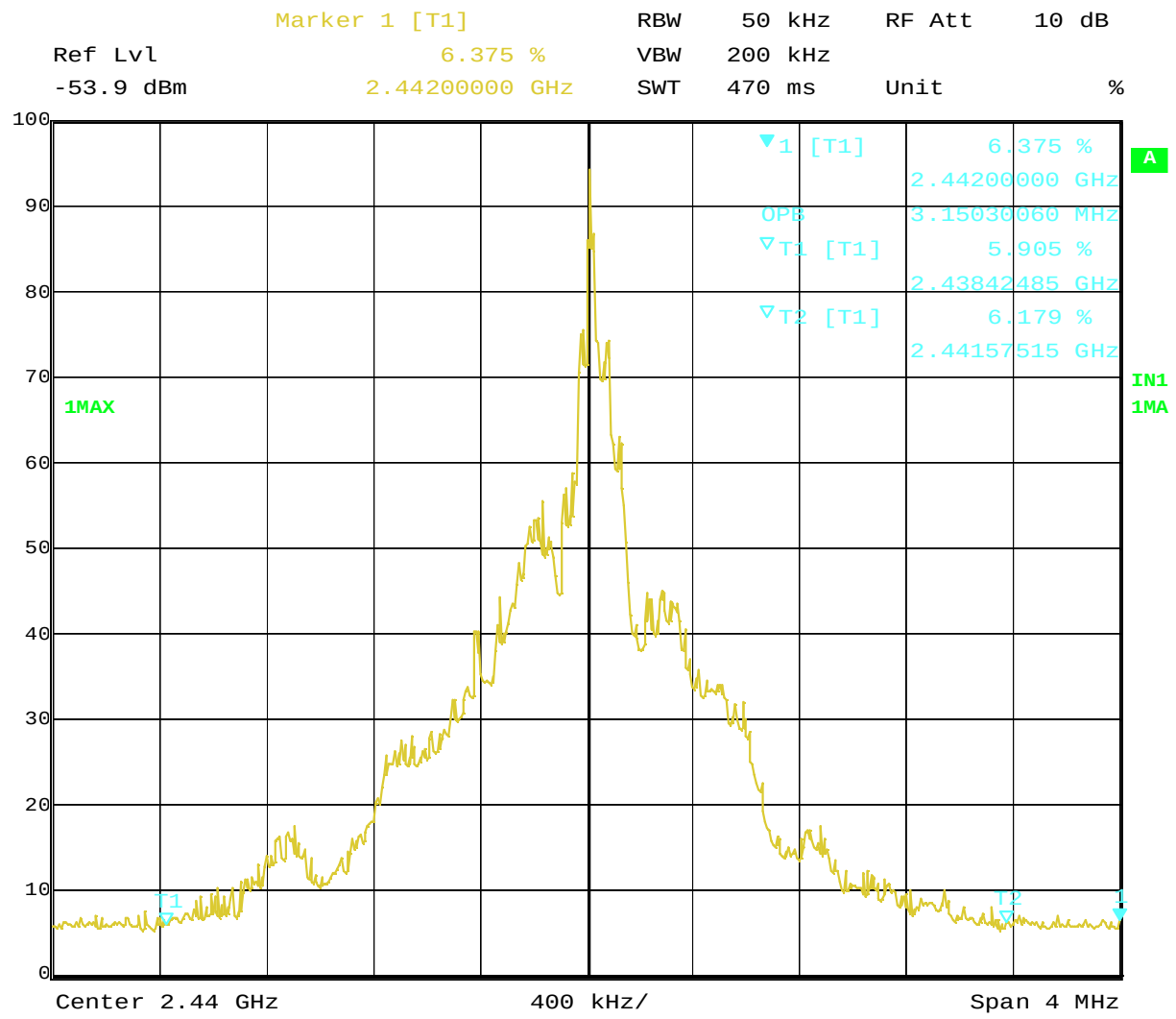
The span between the two recorded frequencies is the occupied bandwidth.

7.2 Measurements



Date: 24.NOV.2008 18:35:46

CH02: 3,22 MHz



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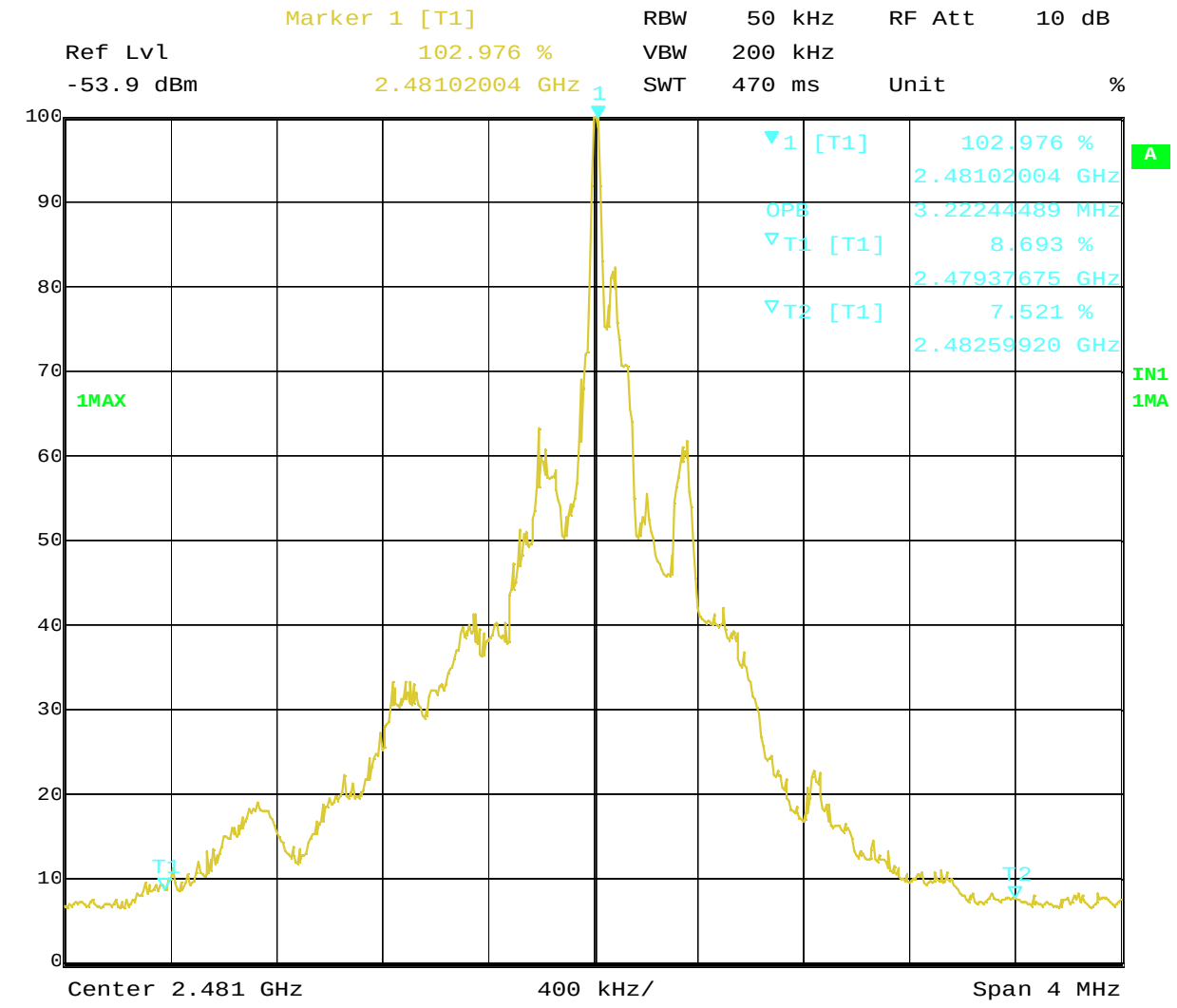
CH40: 3,15 MHz


Marker 1 [T1]
Ref Lvl
-53.9 dBm
102.976 %
2.48102004 GHz
RBW 50 kHz
VBW 200 kHz
SWT 470 ms
RF Att 10 dB
Unit %
1 [T1] 102.976 %
2.48102004 GHz
OPB 3.22244489 MHz
T1 [T1] 8.693 %
2.47937675 GHz
T2 [T1] 7.521 %
2.48259920 GHz
A
IN1
1MA
1MAX
100
90
80
70
60
50
40
30
20
10
0
T1
T2
Center 2.481 GHz
400 kHz/
Span 4 MHz
Date: 24.NOV.2008 18:26:12

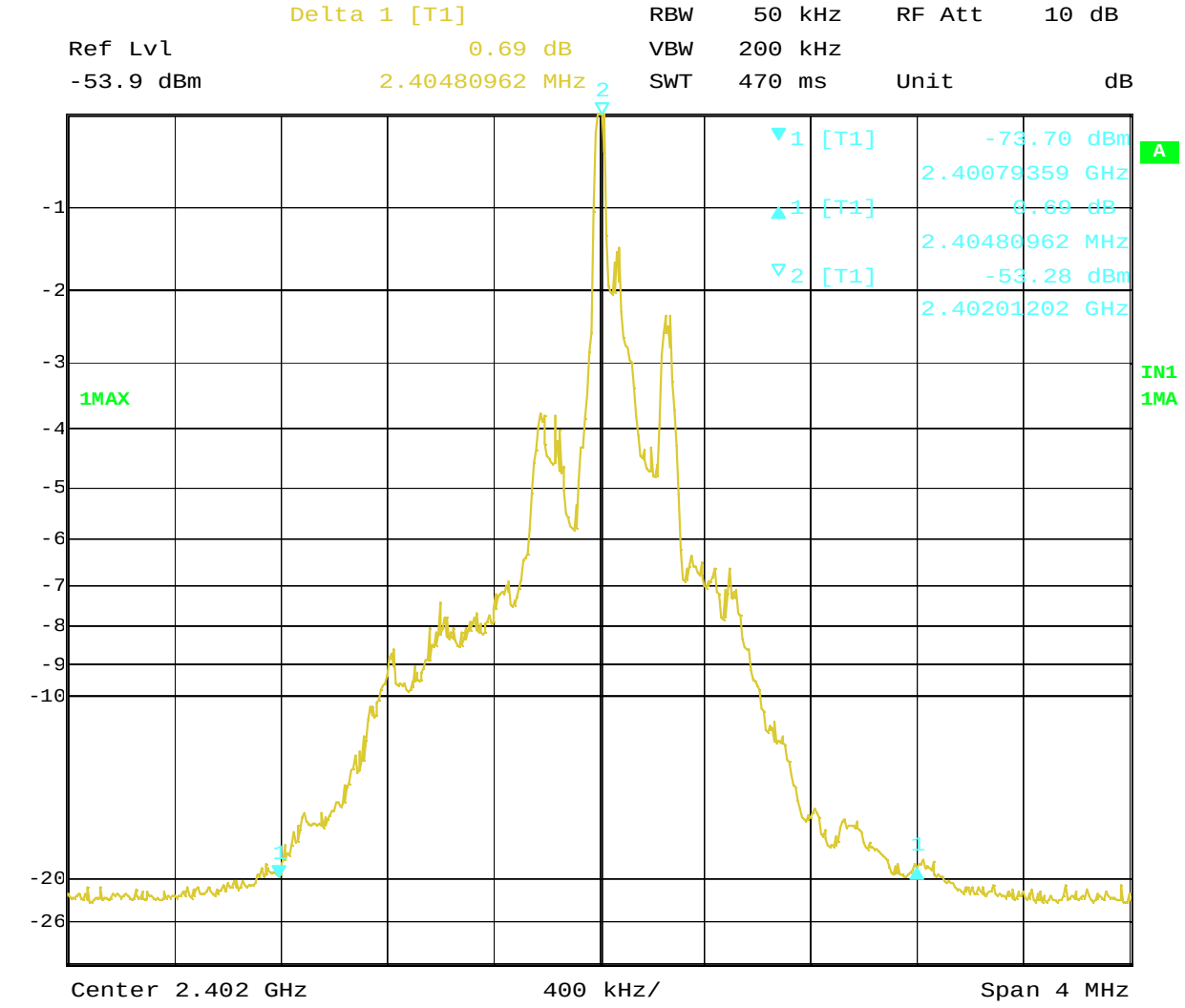
CH81: 3,22 MHz

8 20 dB Bandwidth §15.215 (c)

8.1 Rule

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

8.2 Measurements



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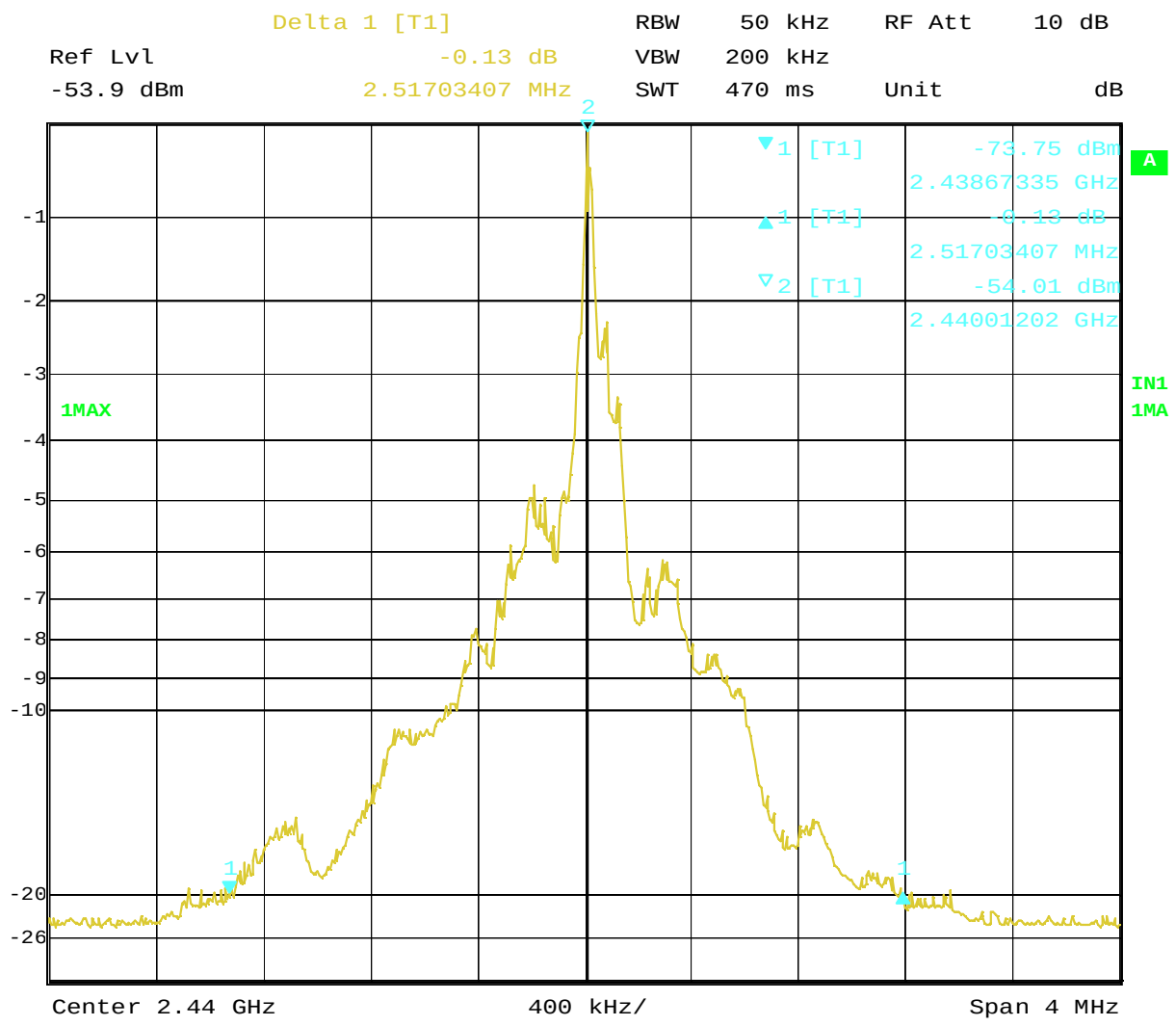
CH02: 2,4 MHz



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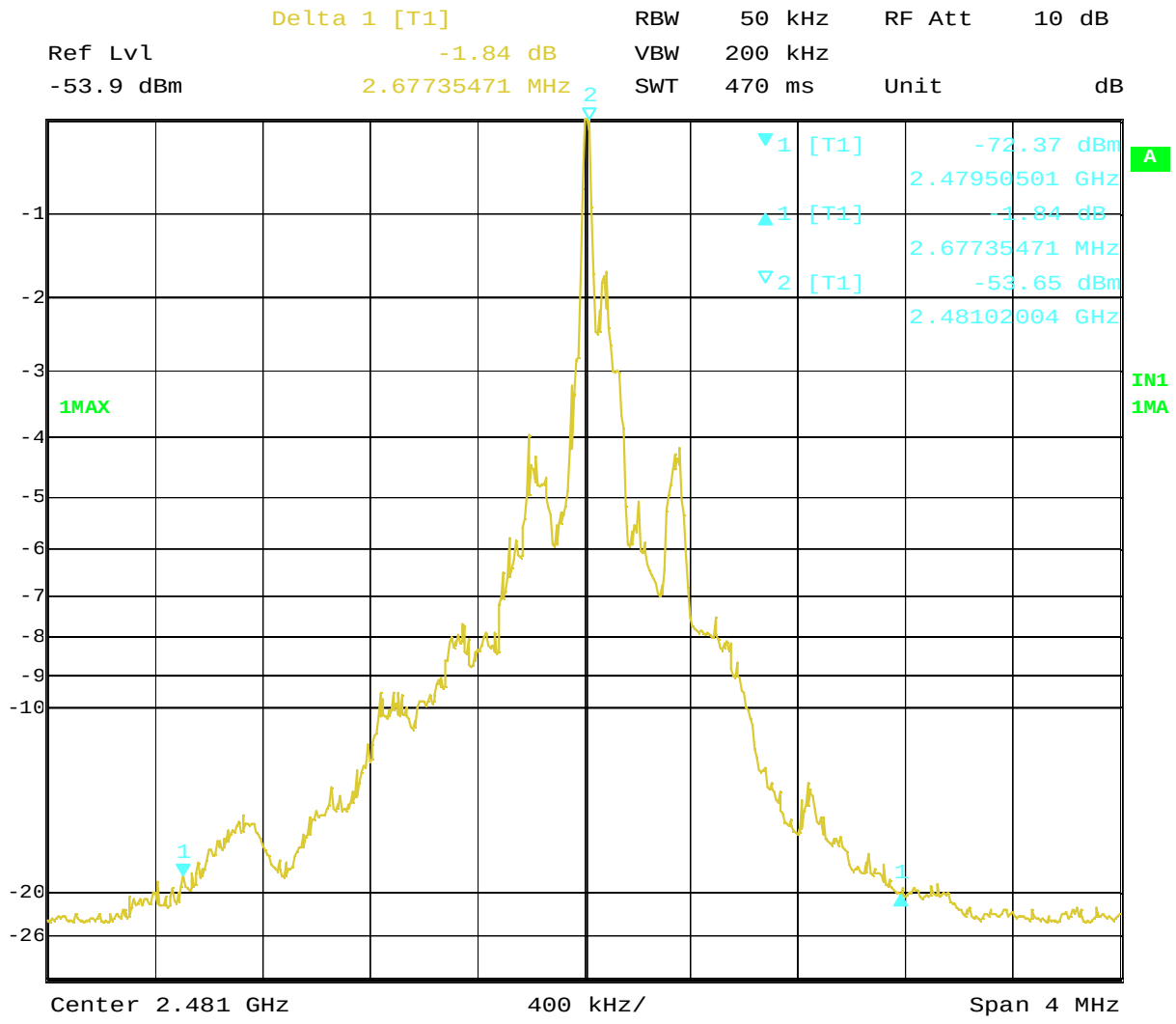
CH40: 2,51 MHz



Date: 24.NOV.2008 18:25:35

CH81: 2,68 dB

9 Accreditation certificate

DATech Deutsche Akkreditierungsstelle Technik GmbH
Unterzeichner der Multilateralen Abkommen von EA und ILAC zur gegenseitigen Anerkennung

vertreten im

Deutschen AkkreditierungsRat

Akkreditierung

Die **DATech Deutsche Akkreditierungsstelle Technik GmbH** 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: **07.02.2012**

Die Anlage ist Bestandteil der Urkunde und besteht aus **18** Seiten.

DAR-Registriernummer: **DAT-P-231/92-04**

Frankfurt/Main, 08.02.2007

i.V. Dipl.-Ing.(FH) R. Egner
Leiter der Akkreditierungsstelle

Mitglied in EA, ILAC, IAF

Siehe Hinweise auf der Rückseite

End of Testreport