

CETECOM ICT Services GmbH

Radio Satellite Communication

Untertürkheimer Straße 6-10 . D-66117 Saarbrücken

Telefon: +49 (0)681 598-9100

Telefax: -9075

RSC14

issue test report consist of 55 Pages

Page 1 (55)



TTI-P-G 166/98-30

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 2-2695-01-02/01
FCC Part 15.247 / CANADA RSS-210
M-RU77
FCC-ID: DZL201513

CETECOM – ICT Services GmbH
Untertürkheimerstr. 6-10
66117 Saarbrücken, Germany

Telephone: + 49 (0) 681 / 598-0
Fax: + 49 (0) 681 / 9075

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Telephone : + 49 681 598 - 9100

Telefax : + 49 681 598 - 9075

E-mail : Harro.Ames@ict.cetecom.de

Internet : www.cetecom.de

Accredited testing laboratory

DAR-registration number : TTI-P-G 166/98-30

Accredited Bluetooth™ Test Facility (BQTF)

BLUETOOTH is a trademark owned by Bluetooth SIG, Inc. and licensed to CETECOM

1.3 Details of applicant

Name : LOGITECH Europe SA
Street : ZI Moulin du Choc
City : 1122 Romanel / Morges
Country : Switzerland
Telephone : +41 21 863 51 11
Telefax : +41 21 863 53 11
Contact : Mr. Francesco Spina
Telephone : +41 21 863 52 23

1.4 Application details

Date of receipt of application : 21.12.01
Date of receipt of test item : 21.12.01
Date of test : 10.01.02

1.5 Test item

Type of equipment : **Cordless BT Presentation device**
Type designation : **M-RU77**
Manufacturer : applicant
Street :
City :
Country :
Serial number : See photographs

Additional informations: :

Frequency : 2402 – 2480 MHz
Type of modulation : 1M00FXD / 79M8FXD (FHSS)
Number of channels : 79
Antenna : integral antenna
Power supply : 3,0 V DC powered by battery
Output power : EIRP: 0.91 mW / -0.41 dBm
FCC ID : DZL201513
Type of equipment : cordless Bluetooth™ presentation device
Temperature range : -20°C - +55°C

1.6 Test standards: **FCC Part 15 §15.247**
CANADA RSS-210

2 Technical test

2.1 Summary of test results

The radiated measurements were performed vertical and horizontal over the whole frequency range. We start at 1 m high with vertical receiving antenna and rotate the dish continuously. During rotation we use the antenna lift system to vary the high from 1 to 4 m. So we find maximum radiation output. At this points we do manual remeasurements. After this we do the same measurements in horizontal position of the receiving antenna. This (horizontal and vertical) is made for all the three planes of the test sample. We use the maximum received results.

The detector function and selection of bandwidth are according ANSI C63.2-1996 item 8.2.1 and ANSI C63.4-1992 Item 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horns

The antenna gain is given by the applicant with -2 dBi.

All measurements were made radiated, as there is no coax adapter at the sample.

The correction factor for the standard gain horn at 0.5 m distance is 24.5 dB.

All measurement settings are according to FCC 15.35, 15.205, 15.209, 15.247 and the „Measurement guidelines for FHSS systems“, especially regarding the radiated measurements.

The product fullfills also the requirements for CANADA RSS-210

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

Final verdict : PASS

Technical responsibility for area of testing :

16.01.02

RSC 8414 Ames H.



Date

Section

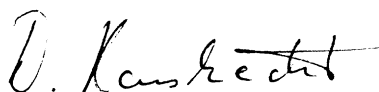
Name

Signature

Technical responsibility for area of testing :

16.01.02

RSC8412 Hausknecht D.



Date

Section

Name

Signature

2.2 Testreport

TEST REPORT

Testreport no. : 2-2695-01-02/01

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

Paragraph	PARAMETER TO BE MEASURED	PAGE
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Test report nr.: 2-2695-01-02/01

Issue Date: 01.03.02

Page 7 (55)

Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

Antenna Gain

SUBCLAUSE § 15.204

The gain is -2.0 dBi

- declared by the applicant -

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

-

Test report nr.: 2-2695-01-02/01 Issue Date: 01.03.02 Page 8 (55)

Carrier frequency separation

§15.247(a)



The carrier frequency separation is about 1 MHz.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

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Equipment under test : M-RU77

Ambient temperature : 22°C

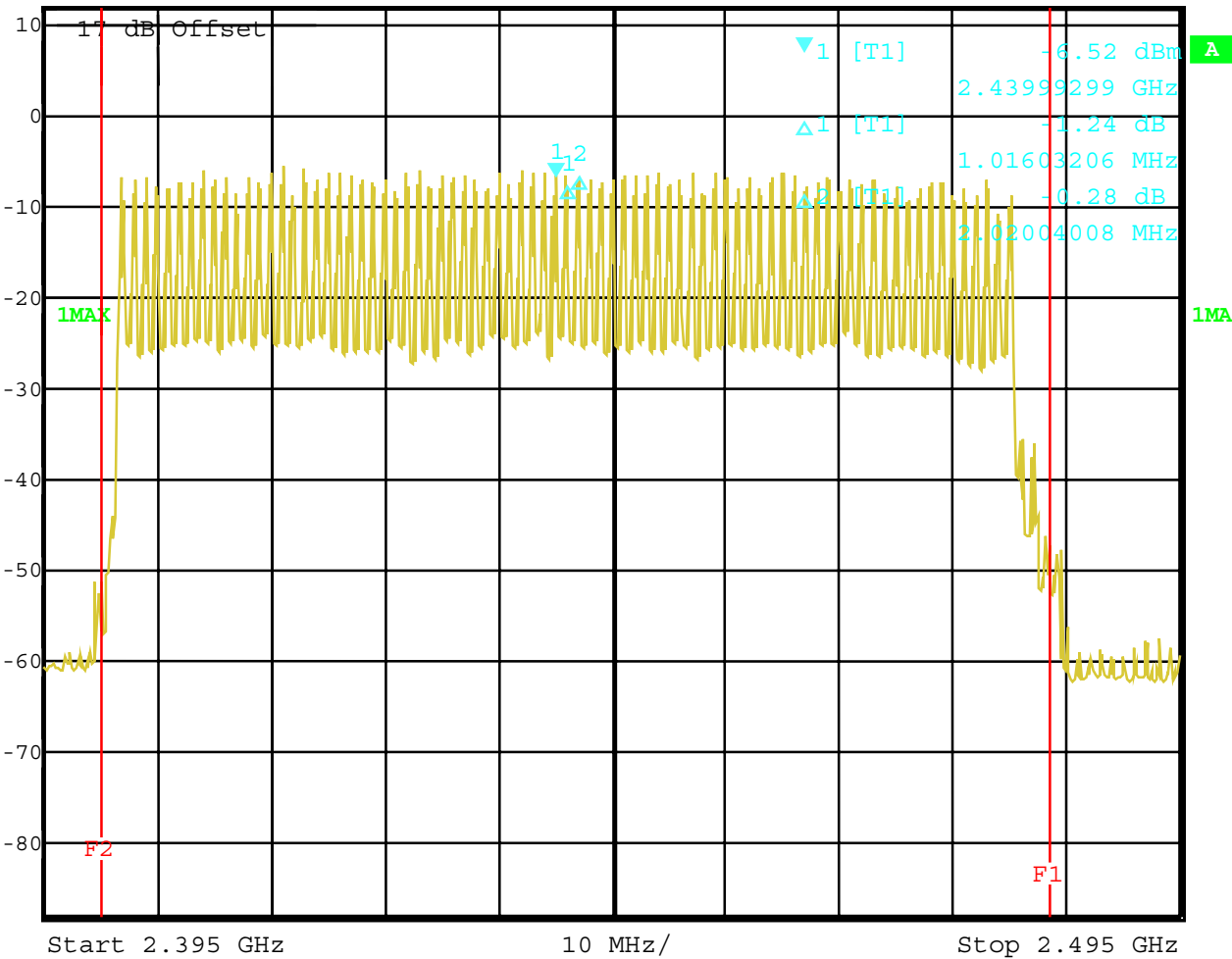
Relative humidity : 34%

Number of hopping channels

§15.247(a)



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
12 dBm	-6.52 dBm	VBW	1 MHz		
	2.43999299 GHz	SWT	20 ms	Unit	dBm



Date: 14.JAN.2002 15:39:10

The number of hopping channels is 79.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

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Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

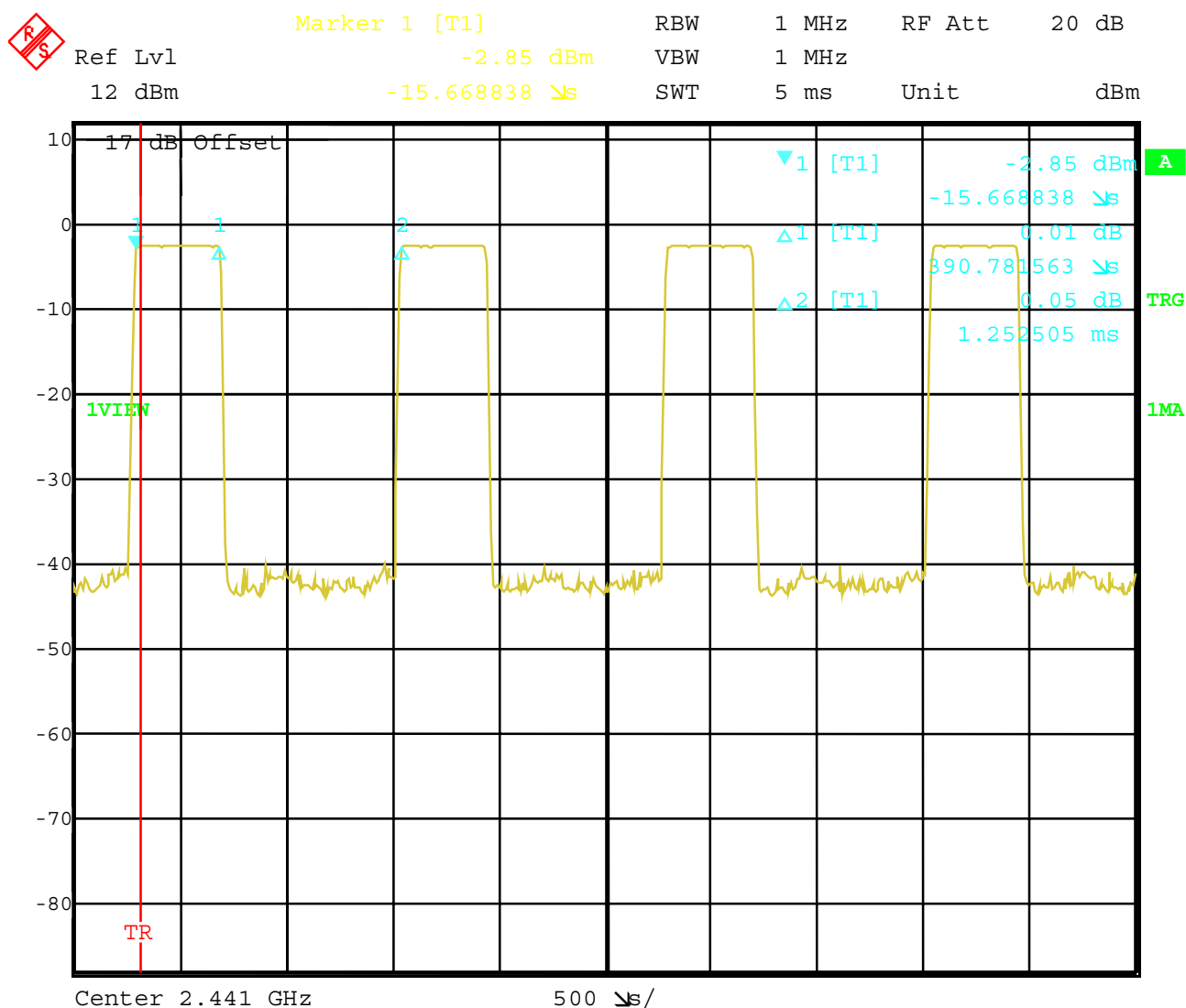
Time of occupancy (dwell time) for DH1

§15.247(a)

The system makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 times per second and for 30 seconds you have 303.9 times of appearance .

Each tx-time per appearance is 390 µs.

So we have $303.9 * 390 \mu s = 118.52 \text{ ms}$ per 30 seconds.



Date: 14.JAN.2002 15:46:11

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

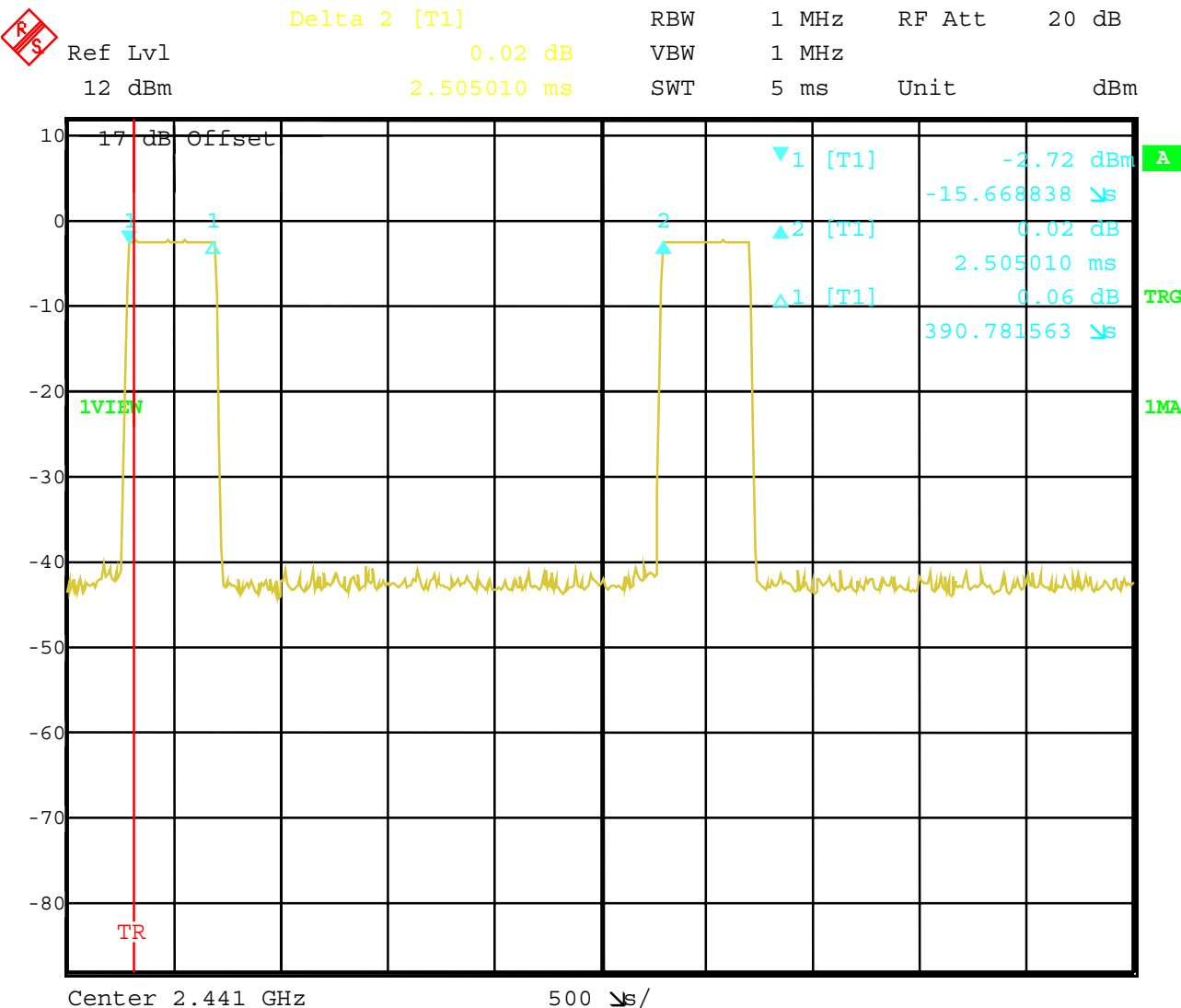
Time of occupancy (dwell time) for DH3

§15.247(a)

A DH3 Packets has max. 3 time slots for transmit (here 1) and 1 for receiving, then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 times per second and for 30 seconds you have 153 times of appearance .

Each tx-time per appearance is 0.39 ms.

So we have $153 * 0.39 \text{ ms} = 59.7 \text{ ms}$ per 30 seconds.



Date: 14.JAN.2002 15:48:39

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

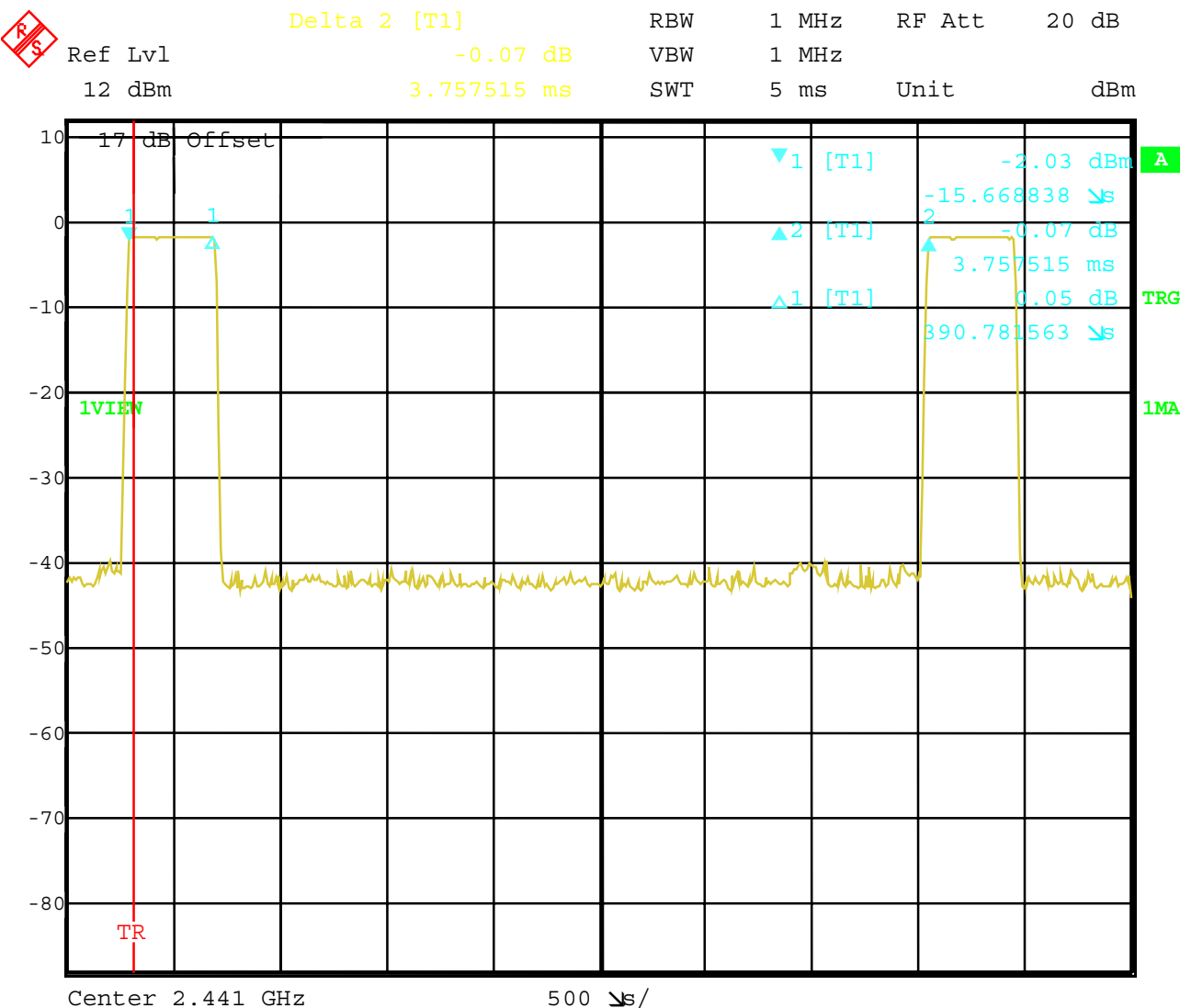
Time of occupancy (dwell time) for DH5

§15.247(a)

At DH5 Packets you have max. 5 time slots for transmit (here 1) and 1 for receiving, so the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.36 times per second and for 30 seconds you have 100.8 times of appearance .

Each tx-time per appearance is 0.39 ms.

So we have $100.8 * 0.39 \text{ ms} = 39.3 \text{ ms}$ per 30 seconds.



Date: 14.JAN.2002 15:51:01

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

CETECOM ICT Services GmbH

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Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

Time of occupancy (dwell time) for page mode /Inquiry mode (TX-on time) §15.247(a)

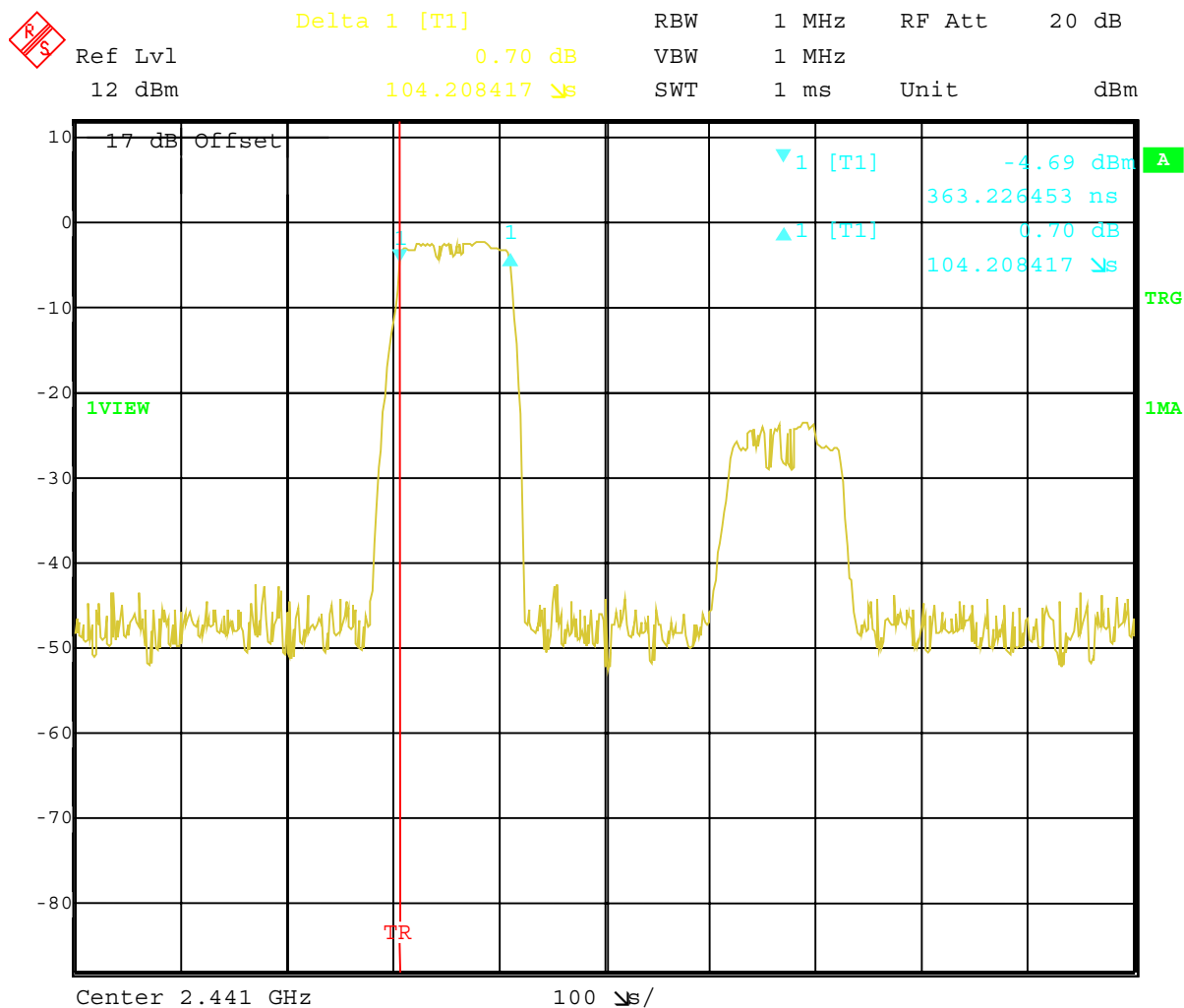
At paging mode the system makes first hopping with 16 channels. One sequence(called train A) lasts 10 ms. Every 1.28s frequencies change and a second train A starts with different frequencies. After max 7×1.28 s 16 new more distance frequencies (Train B) are used. So we have in the worst case (same frequency is in every train) the following time scedule. First: $7 \times 128 \times 10$ ms. For the next 7 seconds train B with other frequencies.

Then train A and B changes frequently.

⇒ so we have $7 \times 104 \times 176.784 \mu\text{s}$, then 8.96 s other frequencies, then again $7 \times 104 \times 176.784 \mu\text{s}$

⇒ together in 30 s maximal 2 sequences => maximal 0.257 s per 30 second period.

Page mode (TX-on time) / Inquiry mode (TX-on time)



Date: 14.JAN.2002 15:56:35

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

CETECOM ICT Services GmbH

Test report nr.: 2-2695-01-02/01

Issue Date: 01.03.02

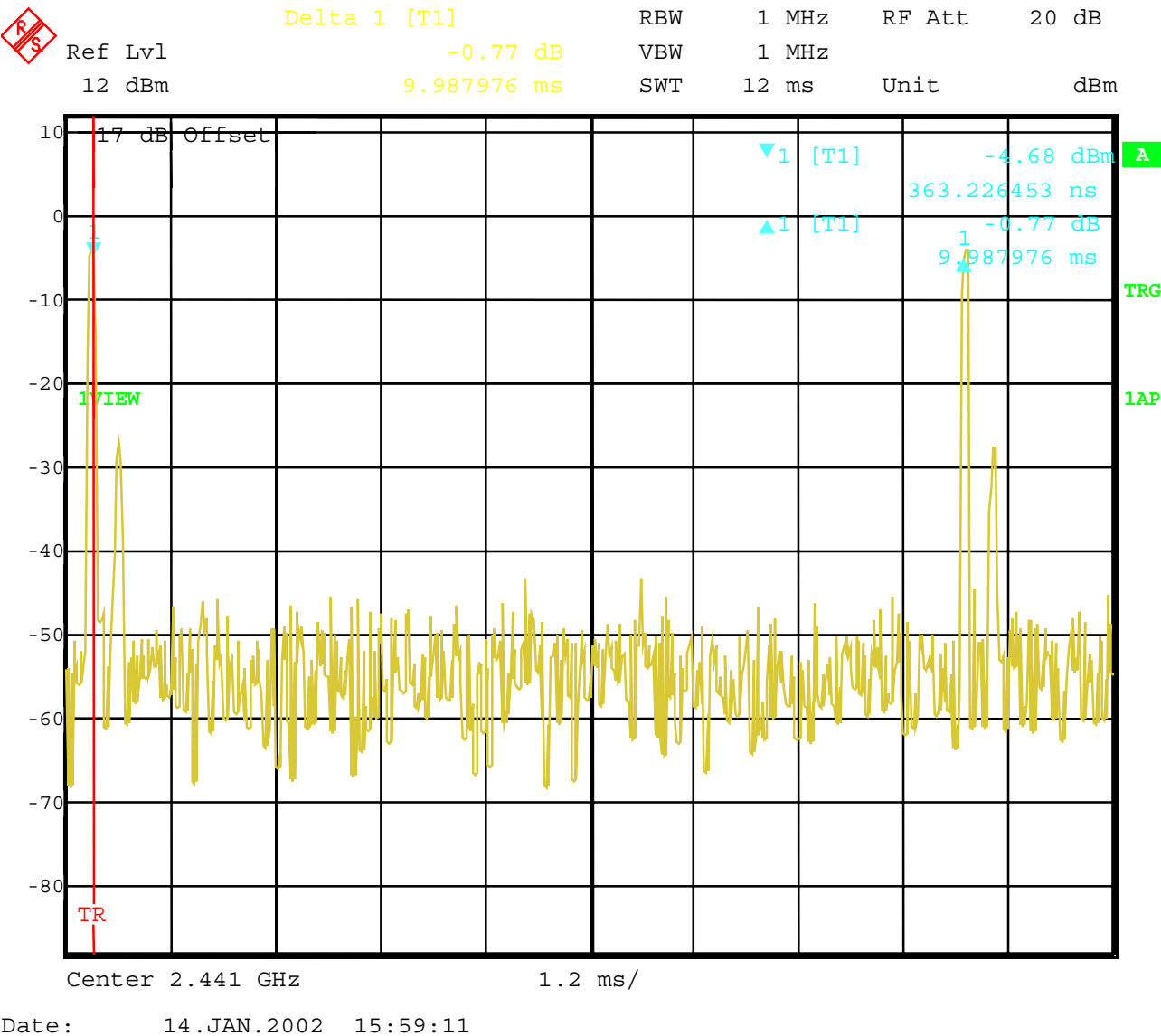
Page 14 (55)

Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

Page mode (complete sequence) / Inquiry mode (complete sequence)



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

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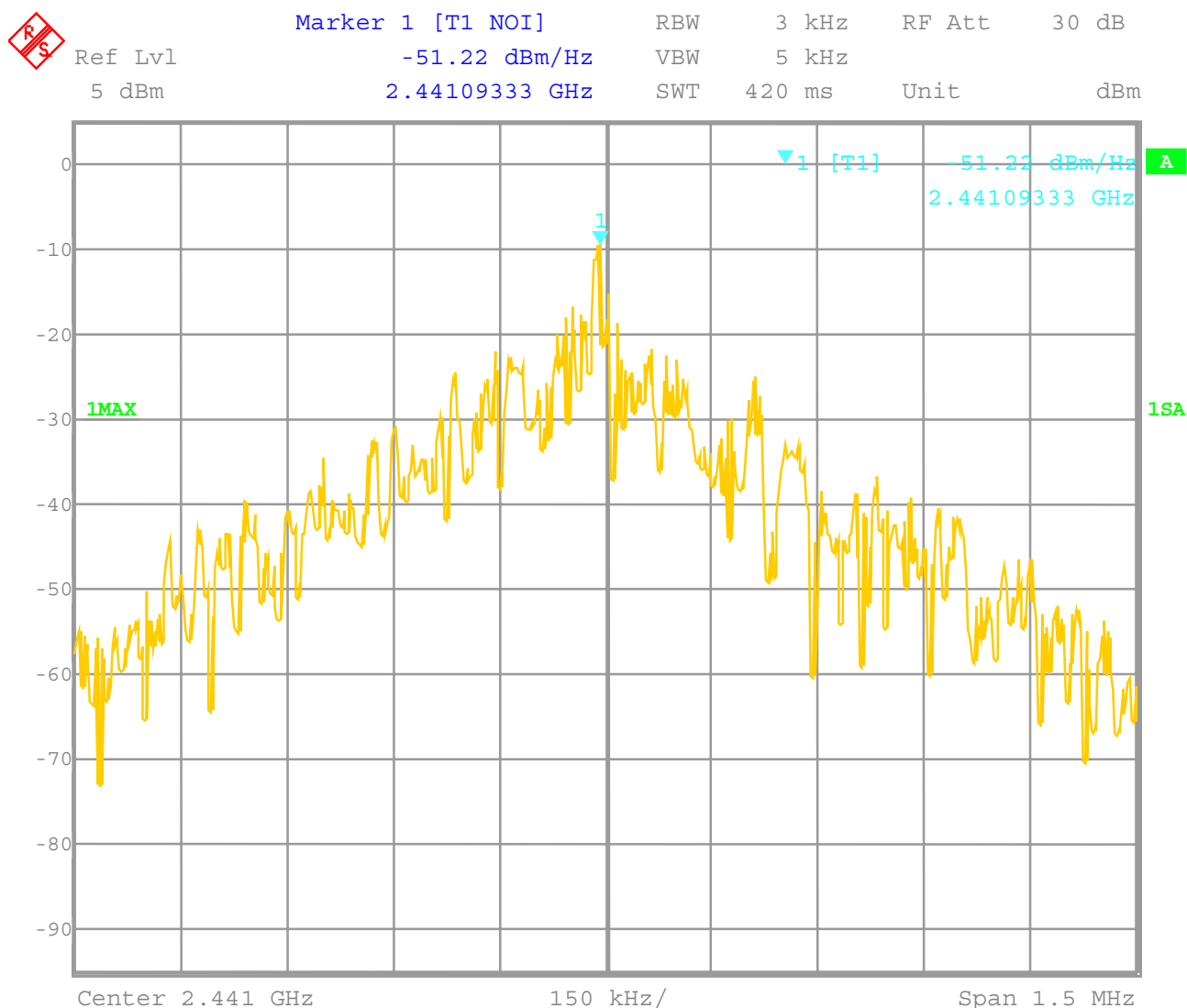
Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

Power Spectral density (Hybrid system in Inquiry mode / Page scan)

§15.247(d)



We use the noise density fuction of the analyzer. This results have to be corrected to the required bandwidth. The correction factor from dBm/Hz to dBm/3KHz is +34,8 dB.

=> Power density : $-51.22 \text{ dBm/Hz} = -16.42 \text{ dBm} / 3 \text{ KHz}$

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

CETECOM ICT Services GmbH

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Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

Spectrum Bandwith of a FHSS System

§15.247(a)

20 dB bandwidth

TEST CONDITIONS		20 dB BANDWIDTH (kHz)		
Frequency (MHz)		2402	2441	2480
T _{nom} (22)°C	V _{nom} (3.0)V	889.779	883.767	853.707
Measurement uncertainty		±1kHz		

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

LIMIT

SUBCLAUSE §15.247(a) (1)

The maximum 20dB bandwith shall be at maximum 1000 KHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Equipment under test : M-RU77

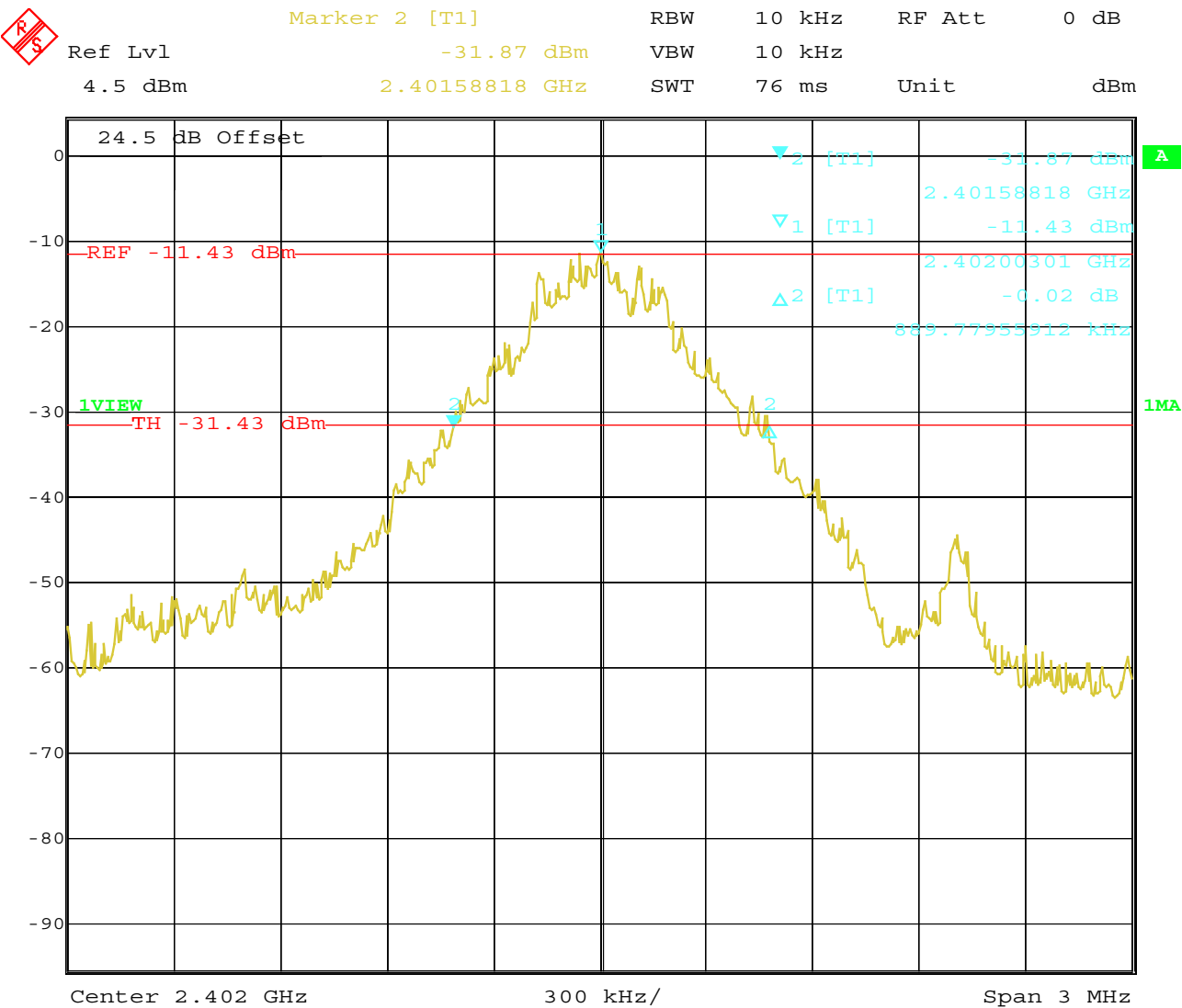
Ambient temperature : 22°C

Relative humidity : 34%

Spectrum Bandwidth of a FHSS System
20 dB bandwidth

§15.247(a)

Channel 1



Date: 15.JAN.2002 07:40:41

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

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Equipment under test : M-RU77

Ambient temperature : 22°C

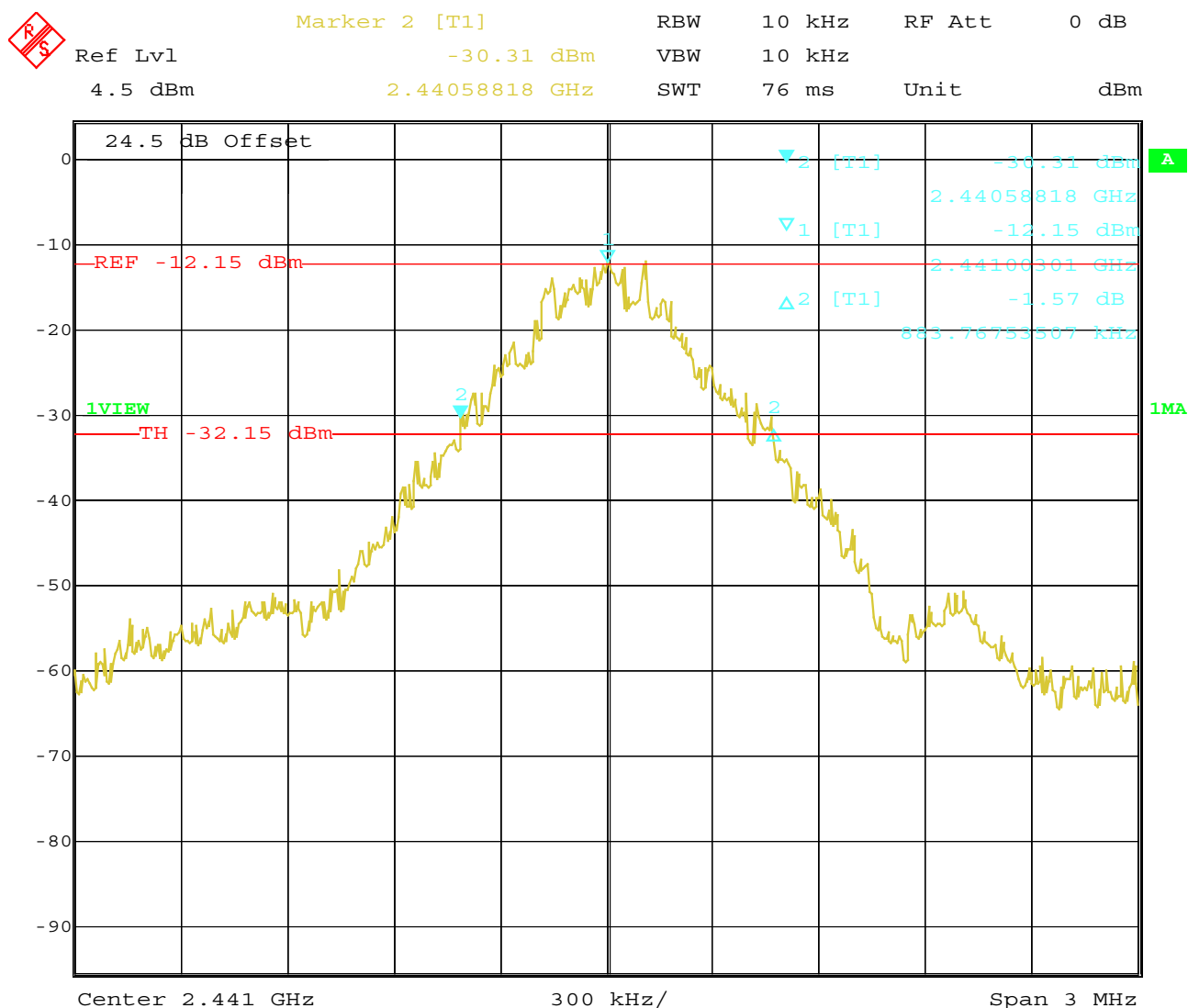
Relative humidity : 34%

Spectrum Bandwidth of a FHSS System

§15.247(a)

20 dB bandwidth

Channel 2



Date: 15.JAN.2002 08:14:10

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Equipment under test : M-RU77

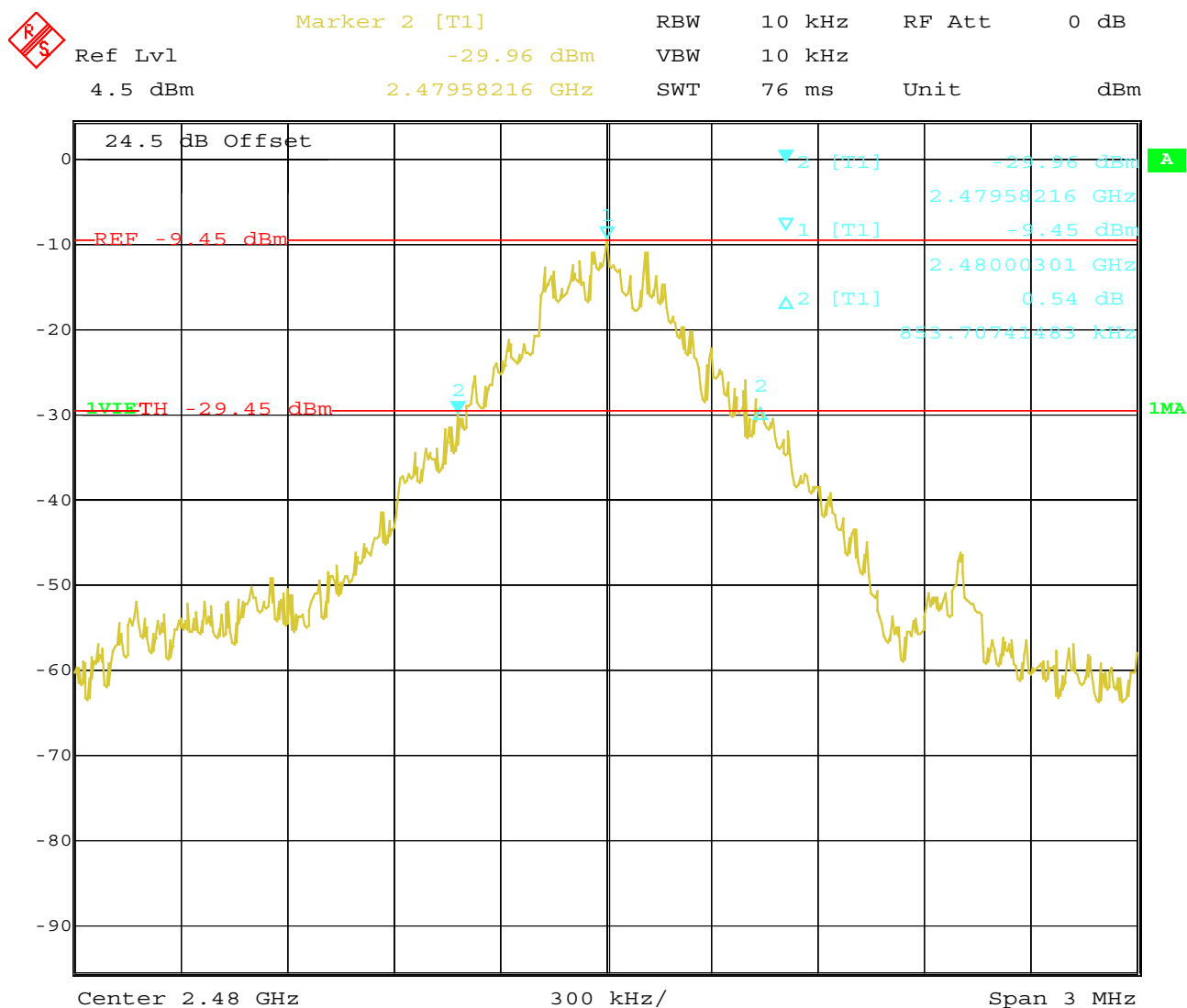
Ambient temperature : 22°C

Relative humidity : 34%

Spectrum Bandwidth of a FHSS System
20 dB bandwidth

§15.247(a)

Channel 3:



Date: 15.JAN.2002 07:46:20

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

CETECOM ICT Services GmbH

Test report nr.: 2-2695-01-02/01

Issue Date: 01.03.02

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Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

**MAXIMUM PEAK OUTPUT POWER
(RADIATED)**

SUBCLAUSE § 15.247 (b) (1)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)		2402	2441	2480
T _{nom} (22)°C	V _{nom} (3,0)V	0.74	0.87	0.91
Maximum deviation from output power under extreme test conditions (dBc)		not applicable	not applicable	not applicable
Measurement uncertainty		±3dB		

RBW/VBW : 3 MHz

Measured at a distance of 3m

LIMIT

SUBCLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
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Issue Date: 01.03.02

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Equipment under test : M-RU77

Ambient temperature : 22°C

Relative humidity : 34%

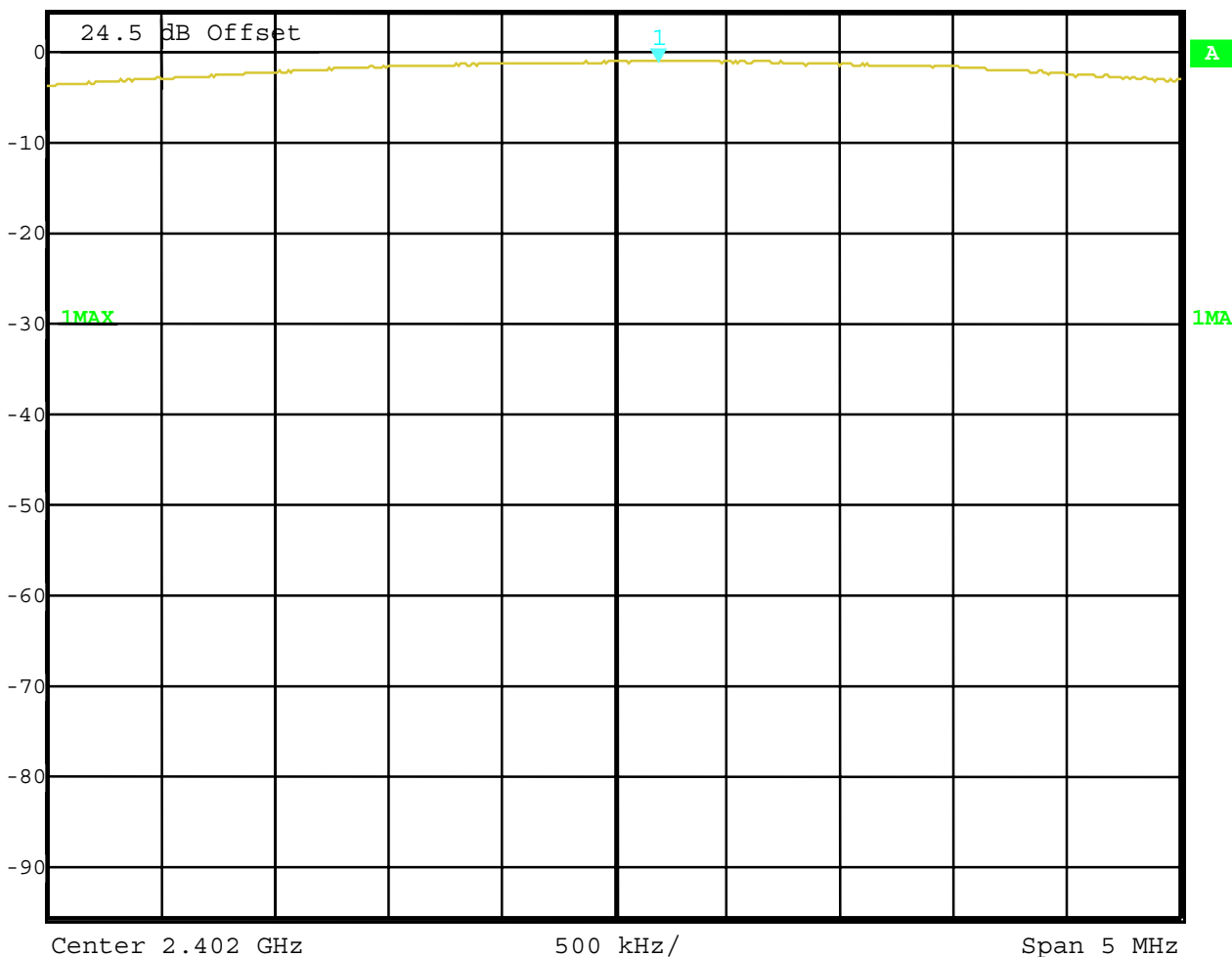
Peak output power (radiated) , measured with standard gain horn

§15.247 (b)

Channel 1: -1.21 dBm at 2402 MHz



Marker 1 [T1] RBW 3 MHz RF Att 0 dB
Ref Lvl -1.21 dBm VBW 3 MHz
4.5 dBm 2.40211723 GHz SWT 5 ms Unit dBm



Date: 15.JAN.2002 08:51:51

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
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Issue Date: 01.03.02

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Equipment under test : M-RU77

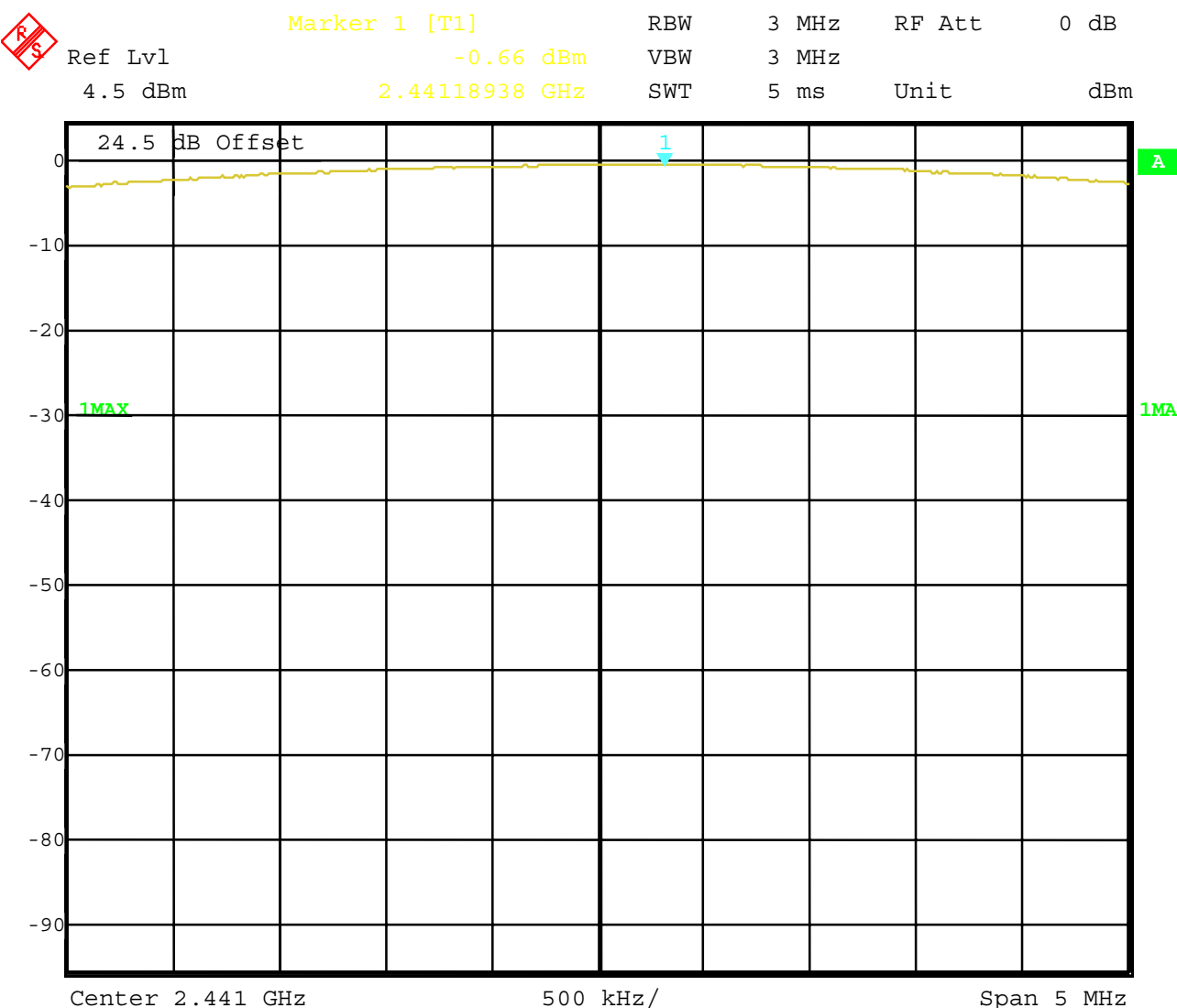
Ambient temperature : 22°C

Relative humidity : 34%

Peak output power (radiated) , measured with standard gain horn

§15.247 (b)

Channel 2: -0.66 dBm at 2441 MHz



Date: 15.JAN.2002 08:54:32

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

CETECOM ICT Services GmbH

Test report nr.: 2-2695-01-02/01

Issue Date: 01.03.02

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Equipment under test : M-RU77

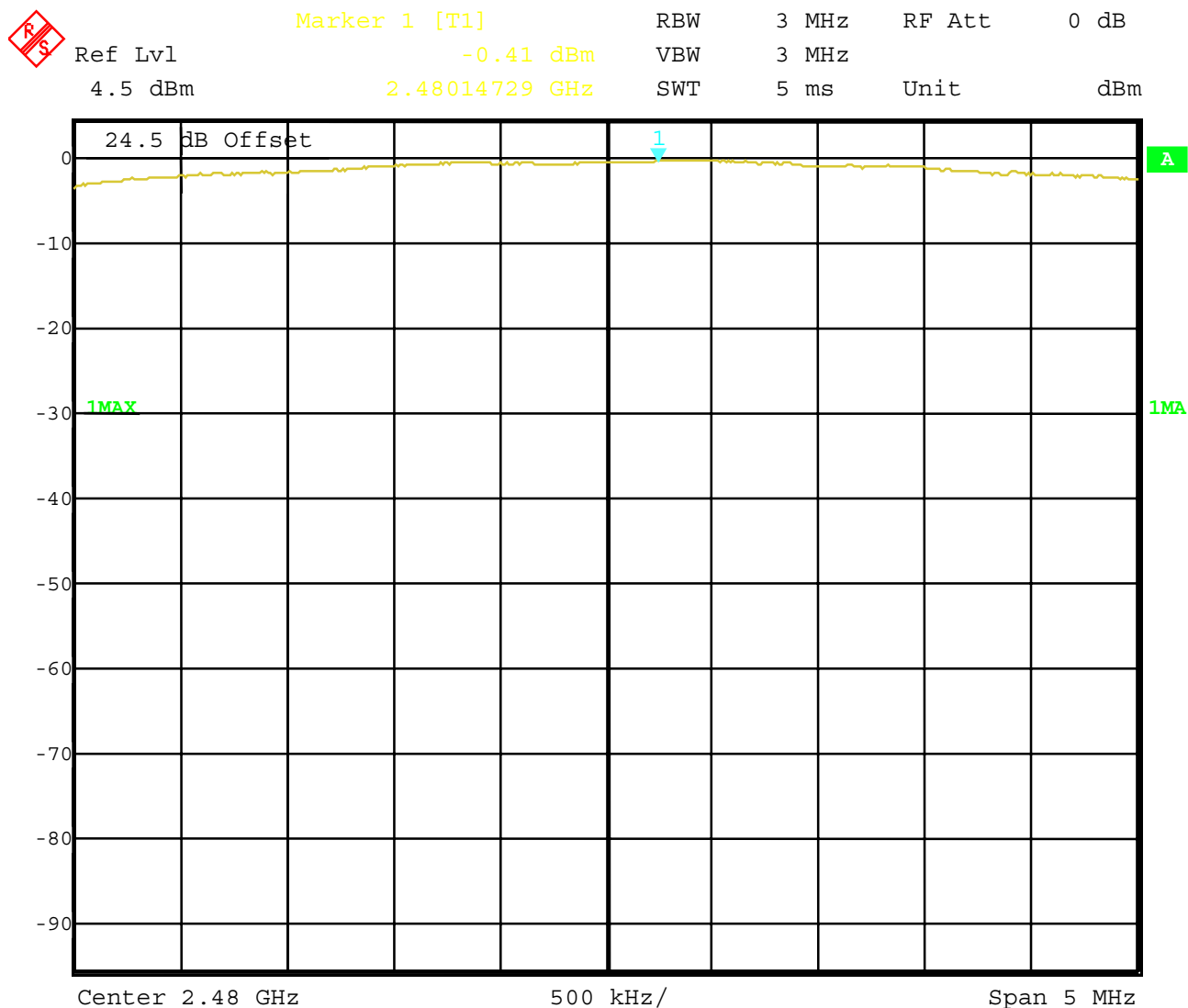
Ambient temperature : 22°C

Relative humidity : 34%

Peak output power (radiated) , measured with standard gain horn

§15.247 (b)

Channel 3: -0.41 dBm at 2480 MHz

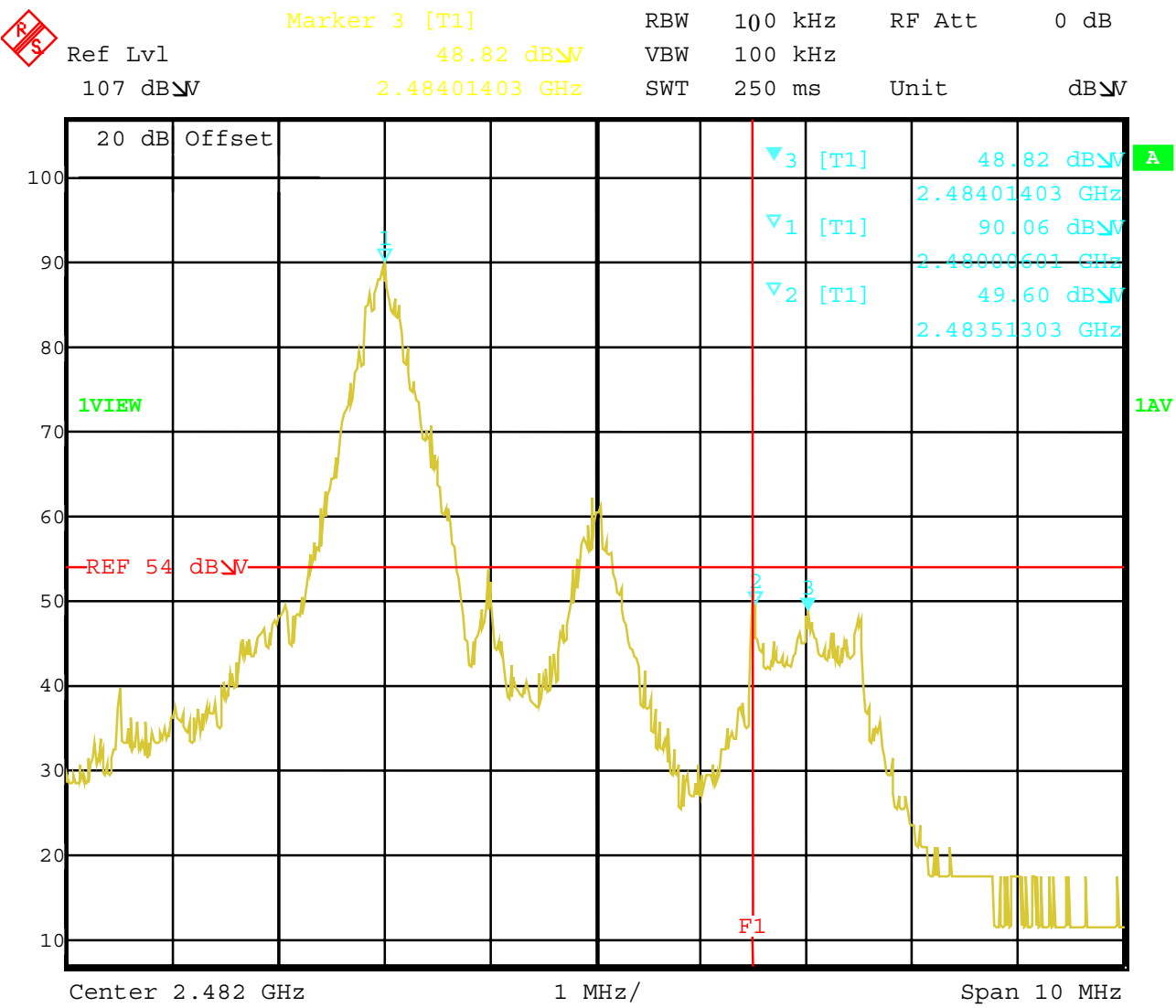


Date: 15.JAN.2002 08:55:48

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Band-edge compliance of radiated emissions §15.247 (c)

high frequency section (hopping off), Ref level is related to the effective radiated power.



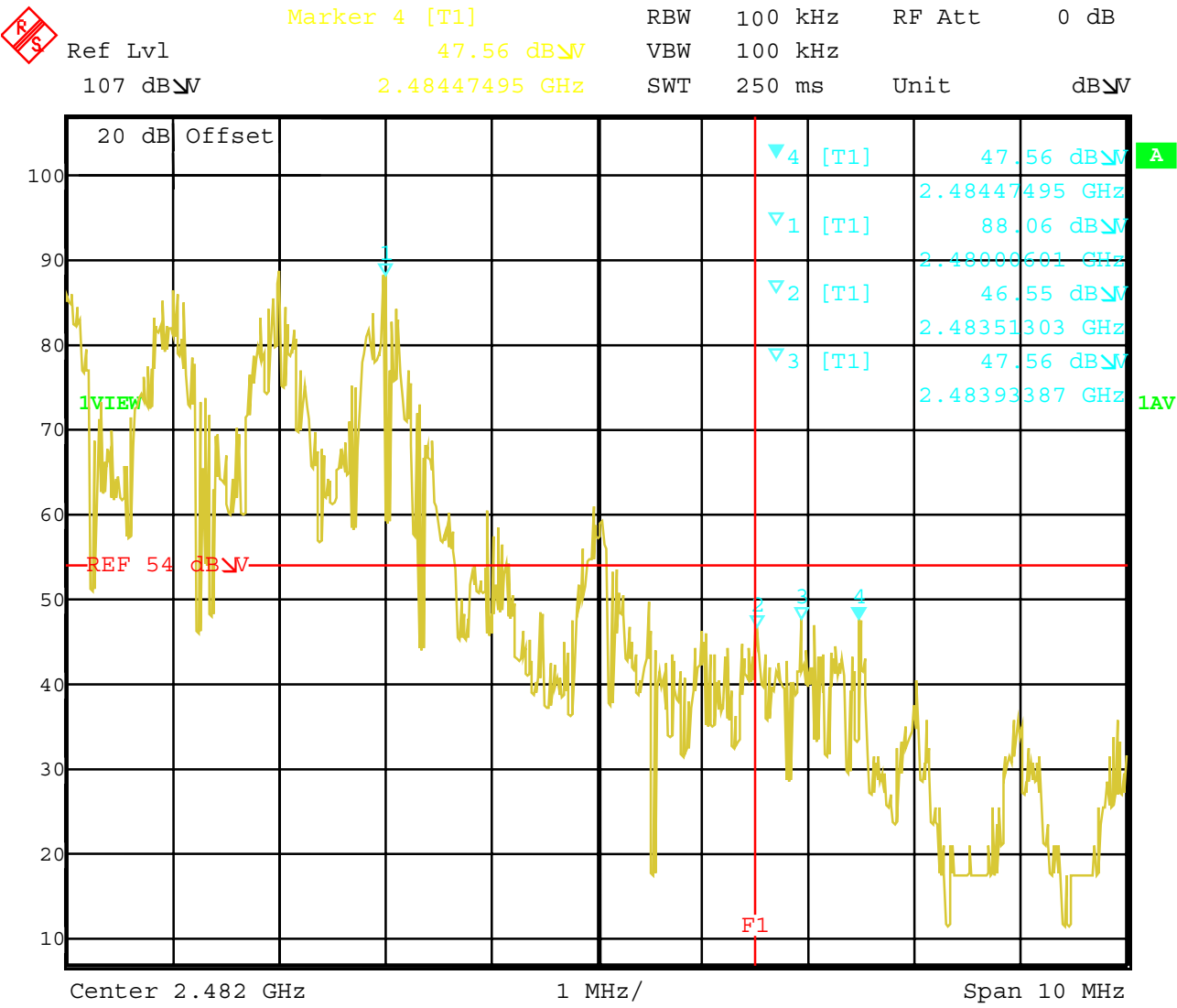
Date: 15.JAN.2002 09:06:39

This measurement was made to show that the behavior of the system is conform to

FCC 15.205 (restricted bands)

Band-edge compliance of radiated emissions §15.247 (c)

high frequency section (hopping on) , Ref level is related to the effective radiated power.



Date: 15.JAN.2002 09:10:13

This measurement was made to show that the behavior of the system is conform to
FCC 15.205 (restricted bands)

SPURIOUS RADIATED EMISSION

§ 15.247 (c) (1)

EMISSION LIMITATIONS					
f (MHz)	polarization	amplitude of emission (dBμV/m) QUASIPeAK	amplitude of emission (dBμV/m) average	limit max. allowed emmission power (dBμV/m)	results
CH 1					
4804	vertical		16.2	54.0	complies
no other peak found					
CH 2					
no peaks found					
CH 3					
no peaks found					
Measurement uncertainty		± 3dB			

LIMITS

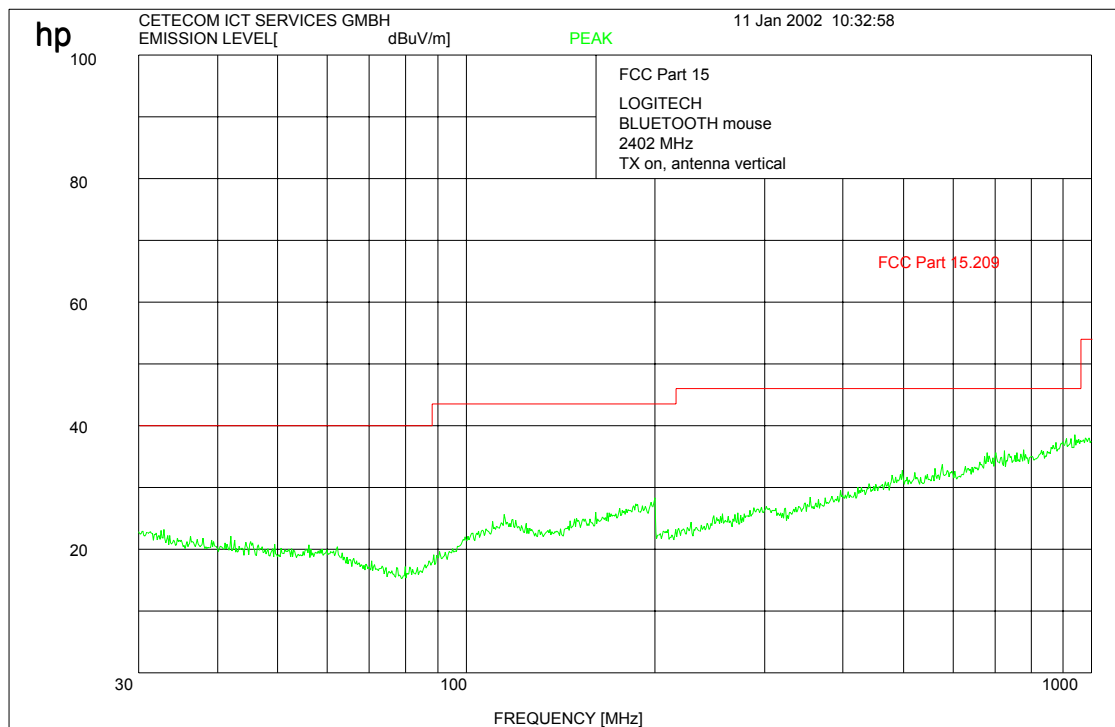
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

2402 MHz (30 MHz – 1 GHz)



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

LIMITS

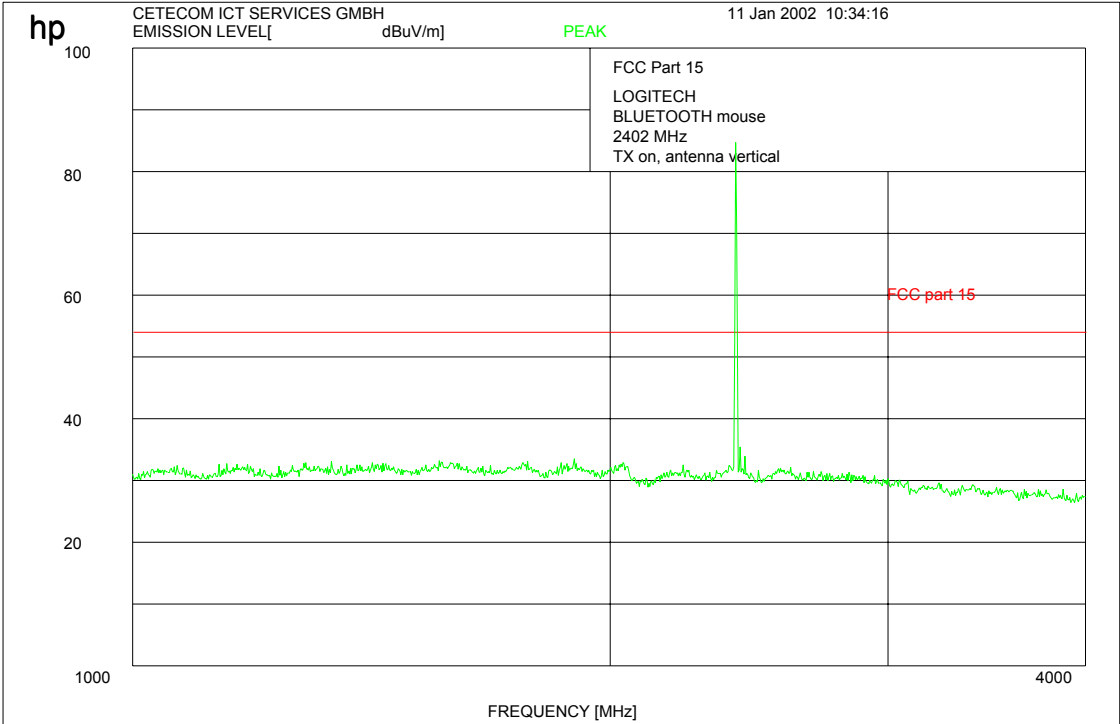
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

2402 MHz (1 – 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

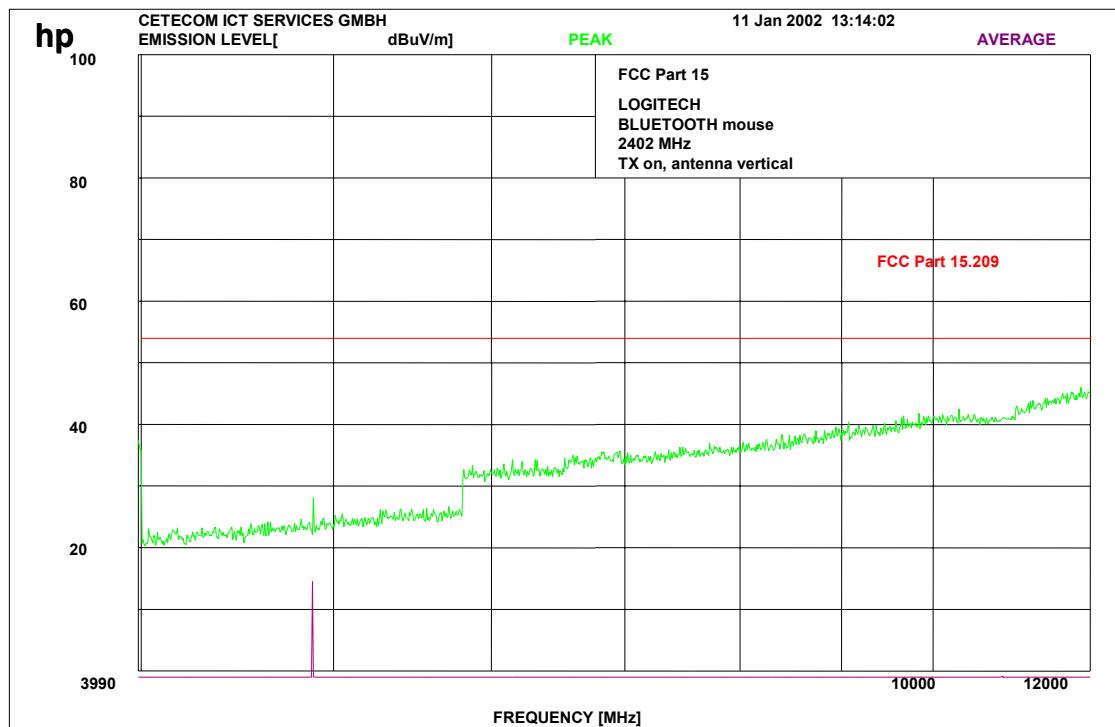
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

2402 MHz (4 – 12 GHz)



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

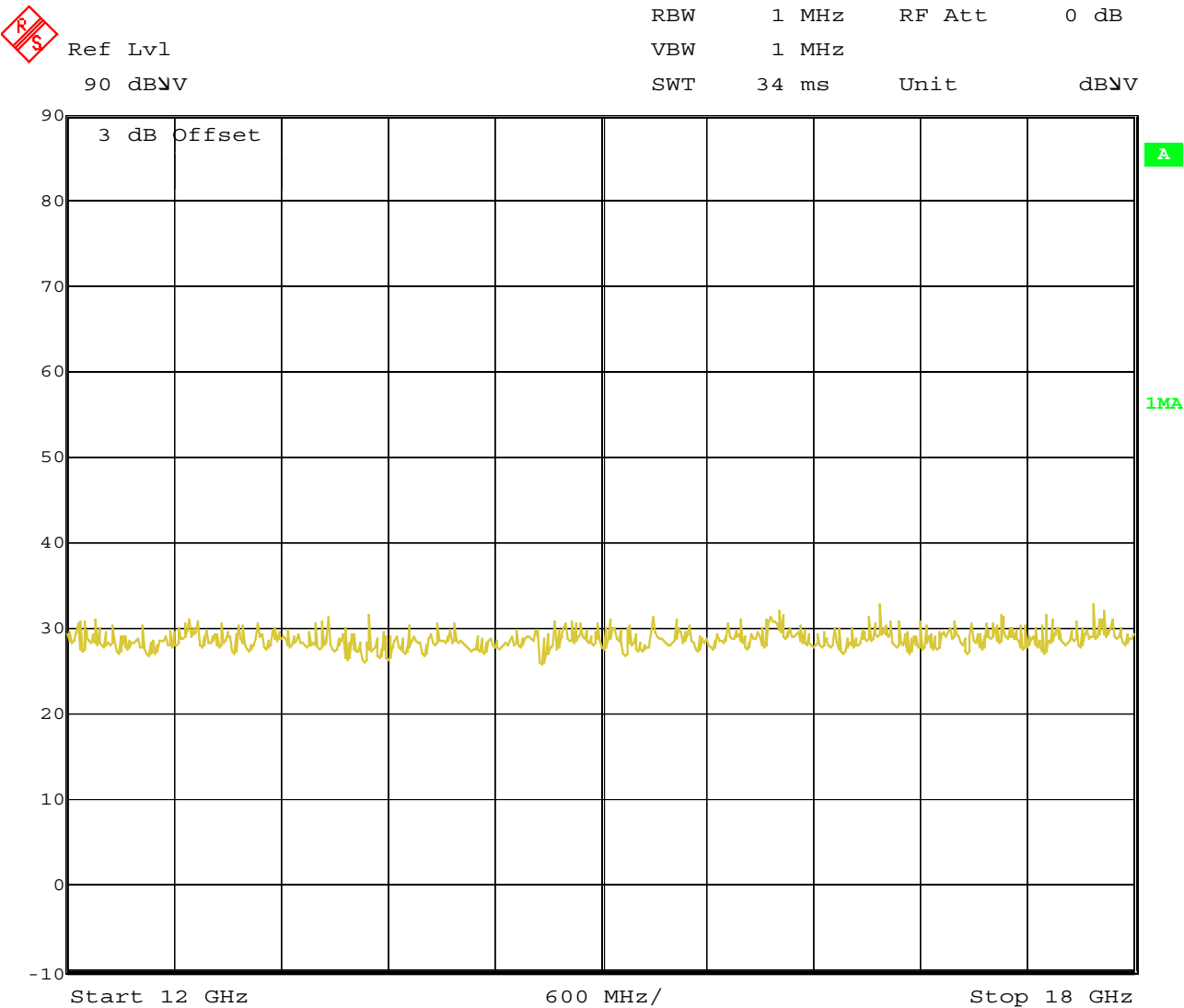
LIMITS

SUBCLAUSE § 15.247 (c)

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

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

12 GHz – 18 GHz peak (valid for all three frequencies)

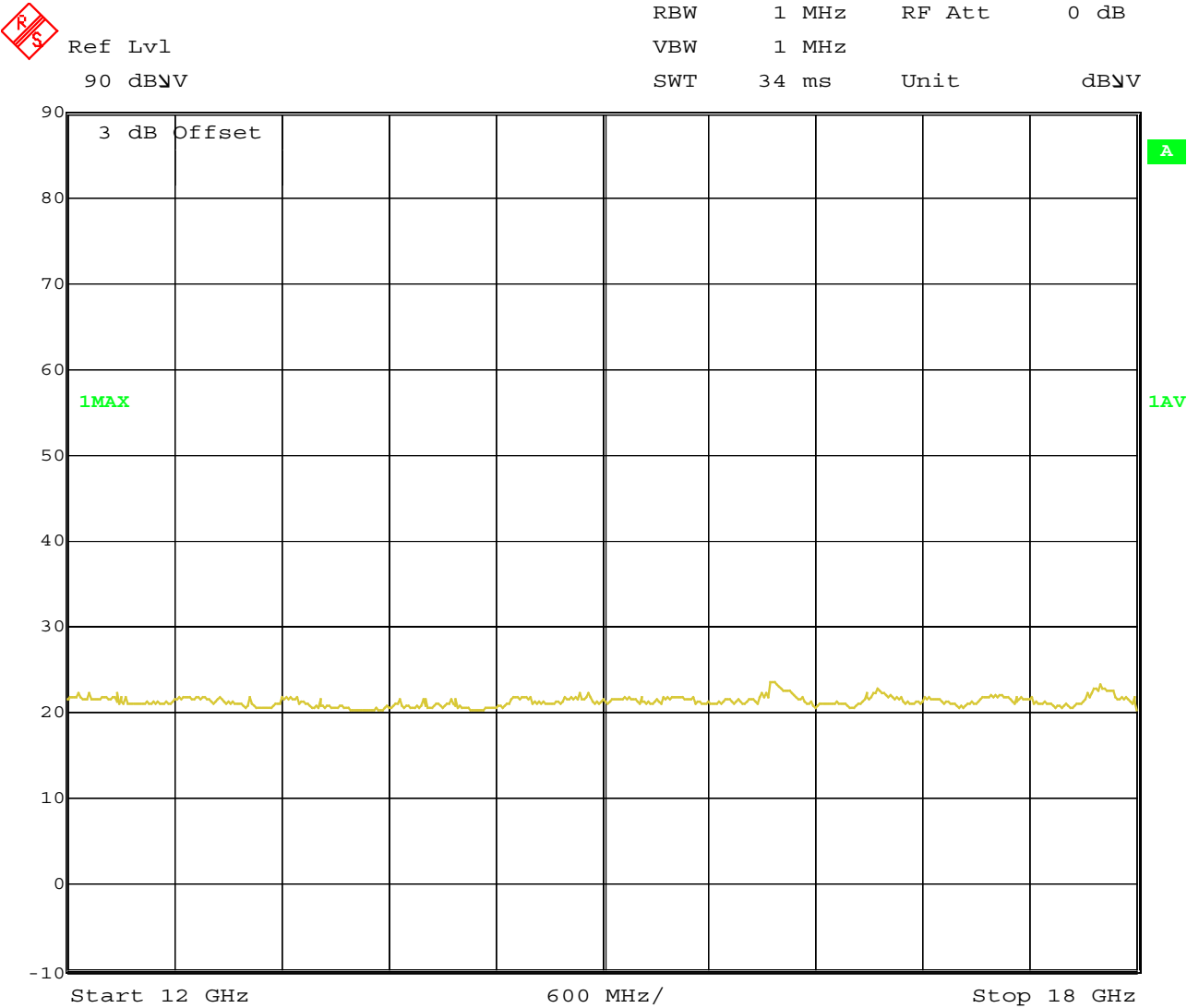


Date: 15.JAN.2002 09:19:35
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)
12 GHz – 18 GHz average (valid for all three frequencies)



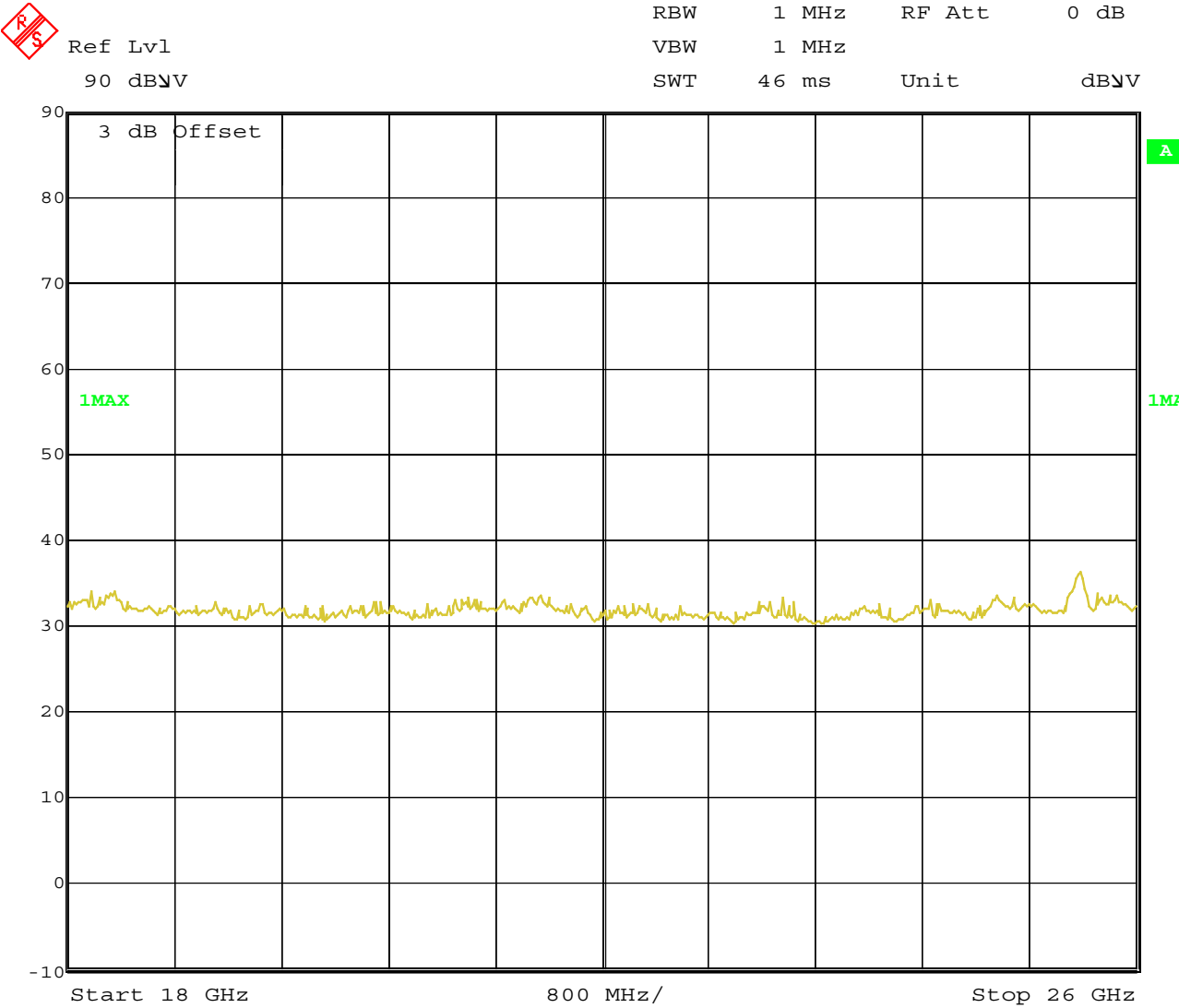
Date: 15.JAN.2002 09:20:04
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS SUBCLAUSE § 15.247 (c)

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

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

18 GHz – 25 GHz peak (valid for all three frequencies)



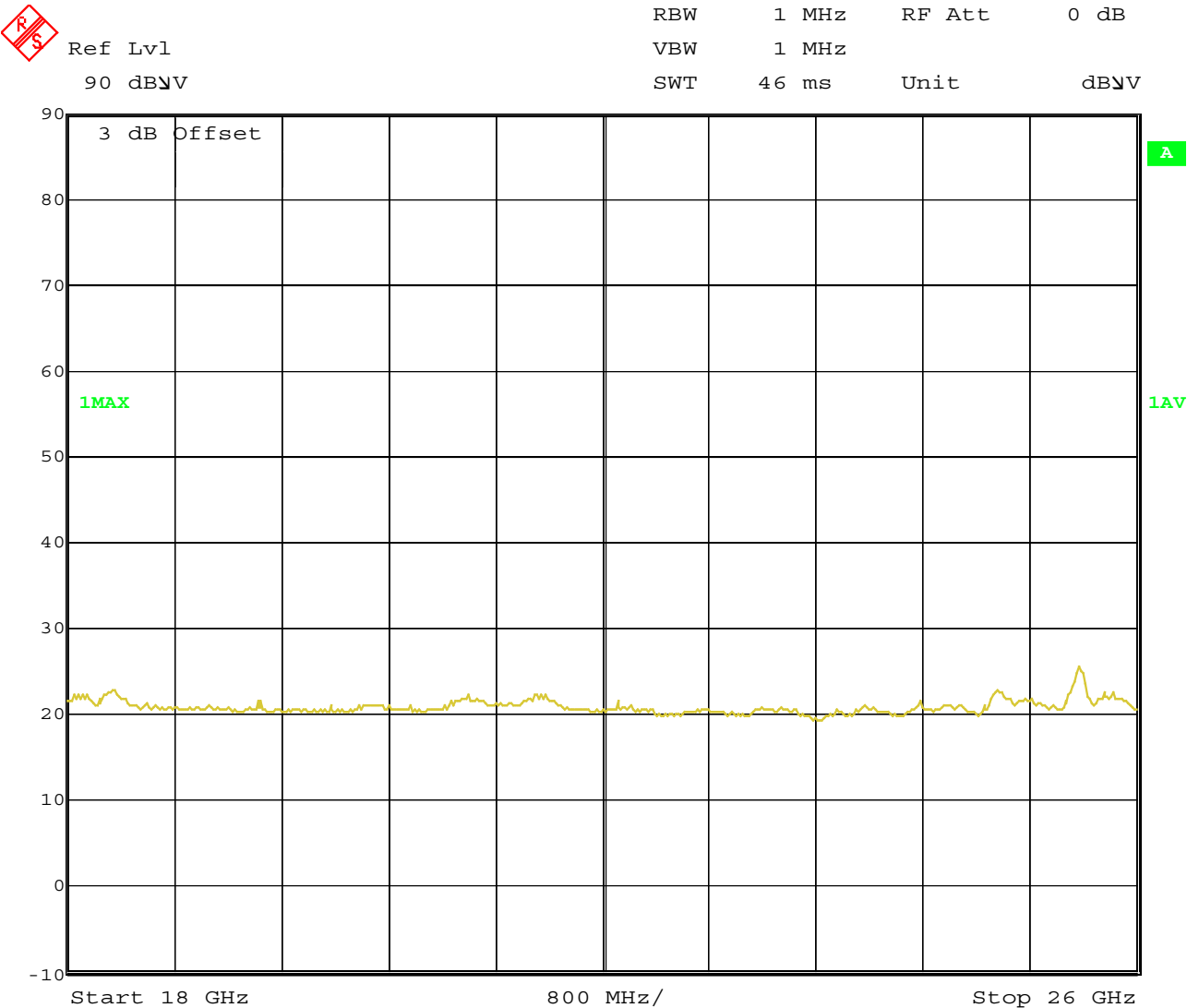
Date: 15.JAN.2002 09:22:58
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS SUBCLAUSE § 15.247 (c)

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

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

18 GHz – 25GHz average (valid for all three frequencies)



Date: 15.JAN.2002 09:21:38
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

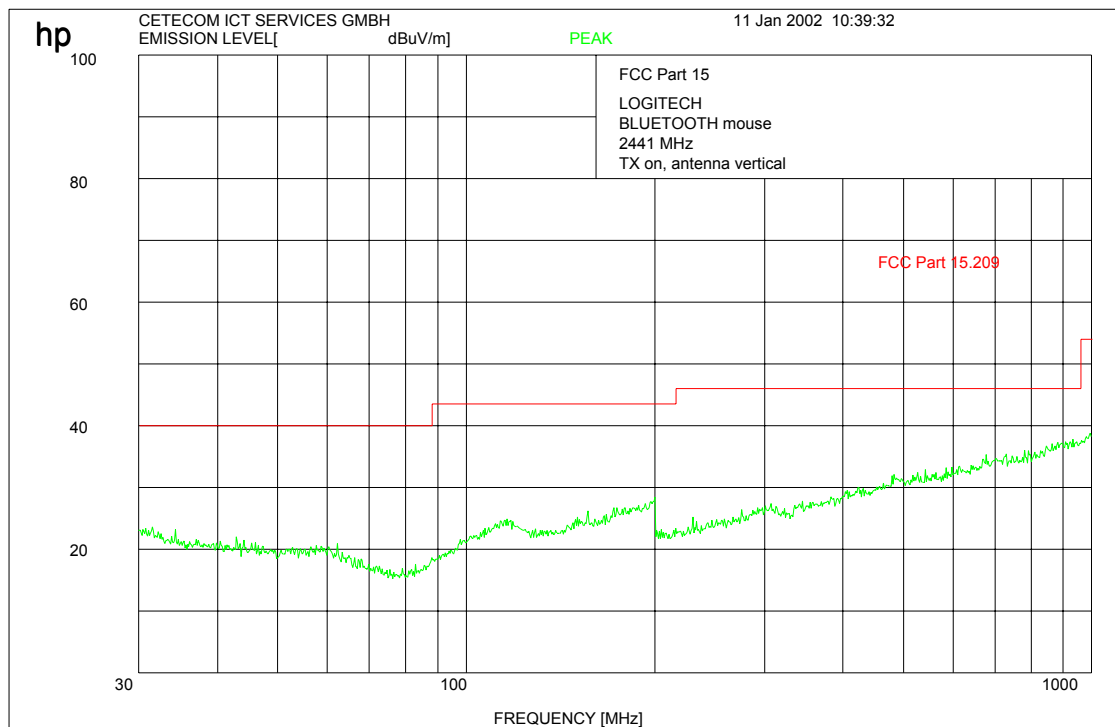
LIMITS SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

2441 MHz (30 MHz – 1 GHz)



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

LIMITS

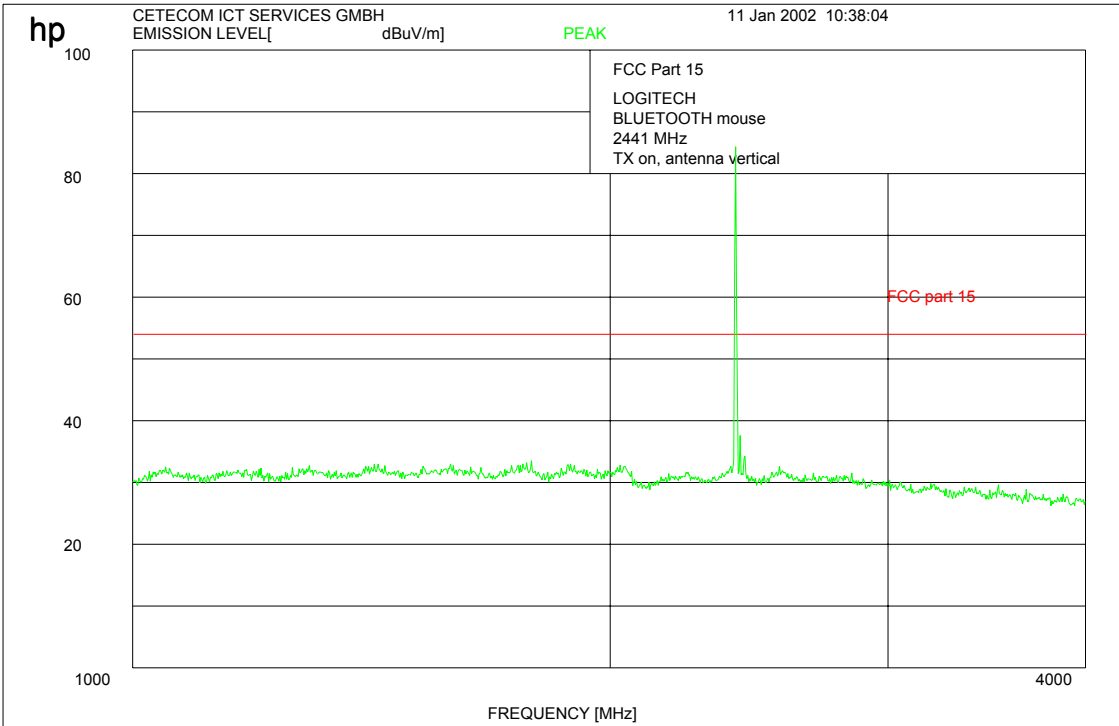
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

2441 MHz (1 GHz – 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

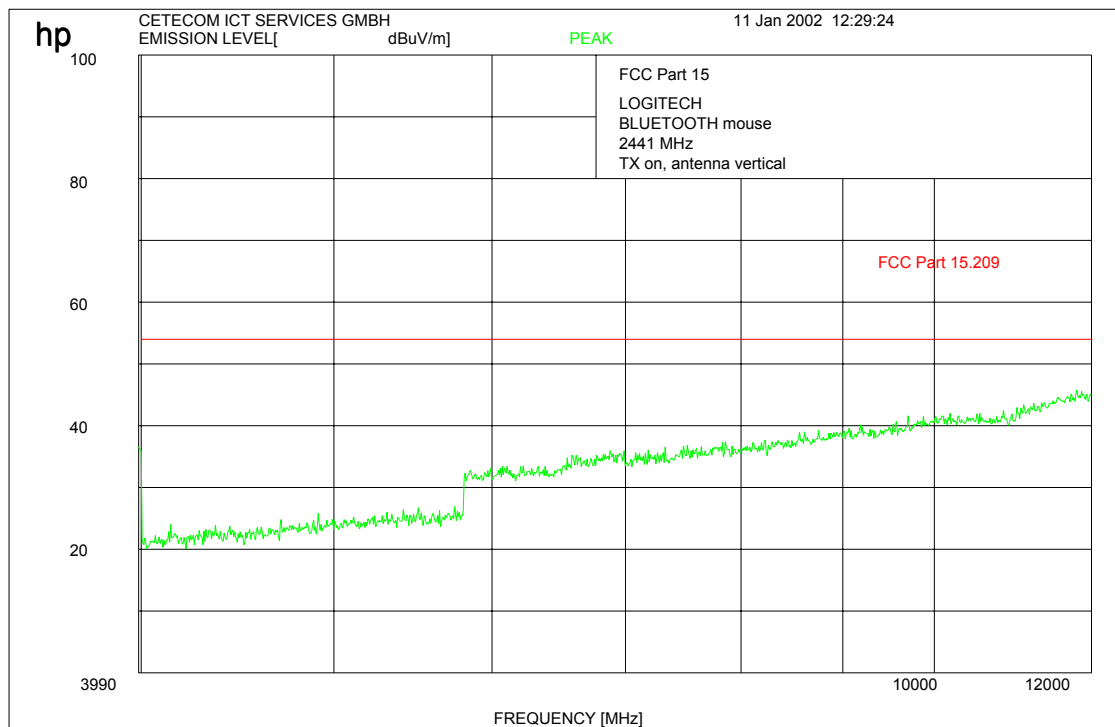
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

2441 MHz (4 GHz – 12 GHz)



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

LIMITS

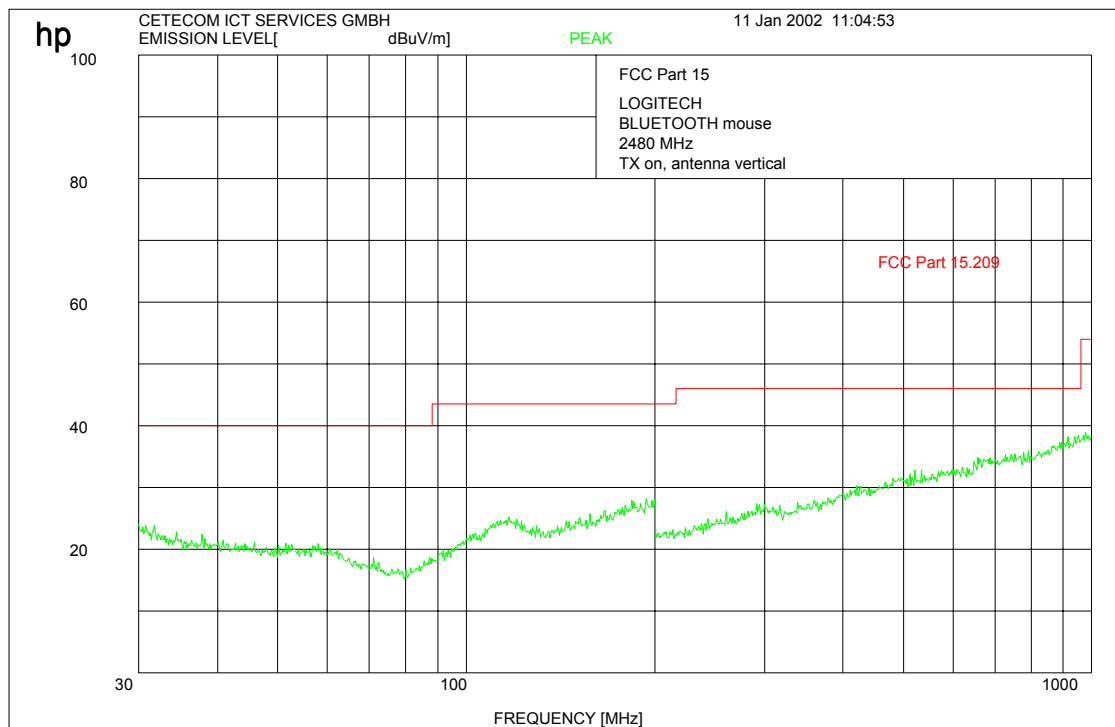
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

2480 MHz (30 MHz – 1 GHz)



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

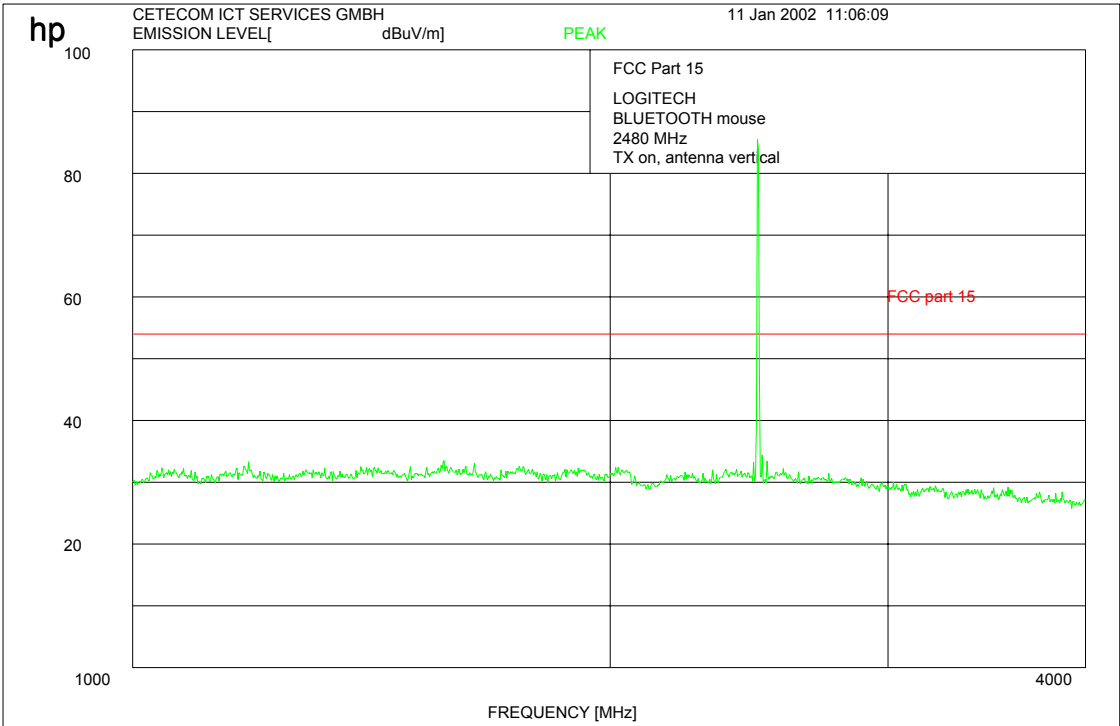
LIMITS

SUBCLAUSE § 15.247 (c)

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

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

2480 MHz (1 GHz – 4 GHz)



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

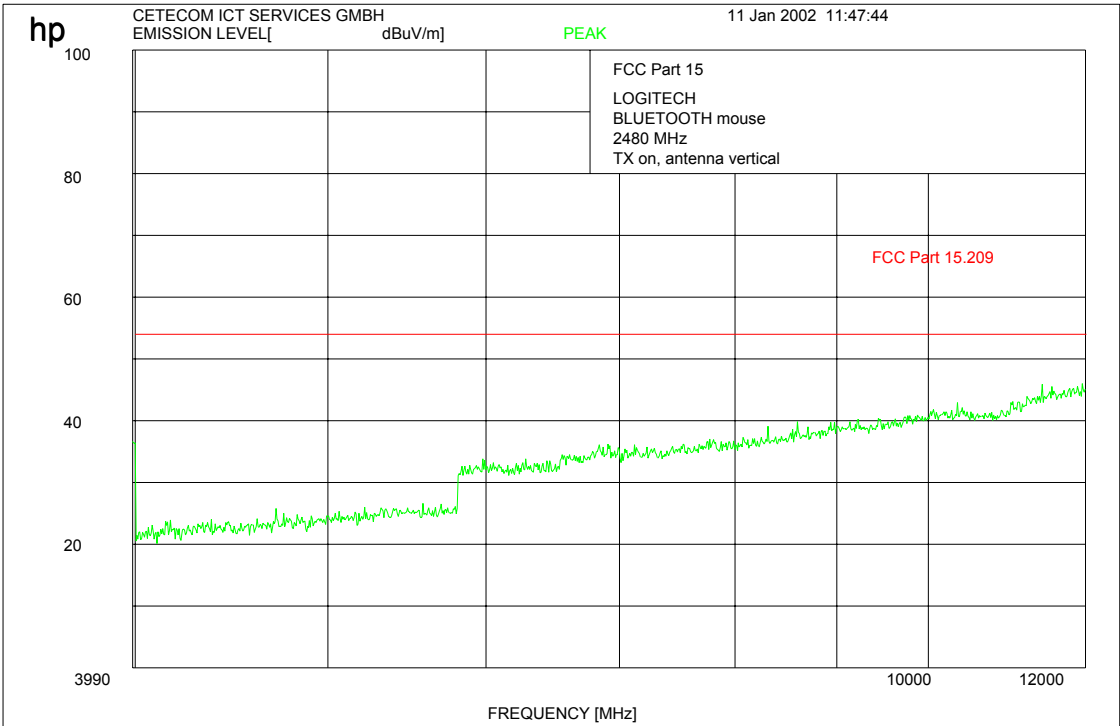
LIMITS **SUBCLAUSE § 15.247 (c)**

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

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

2480 MHz (4 GHz – 12 GHz)



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

LIMITS

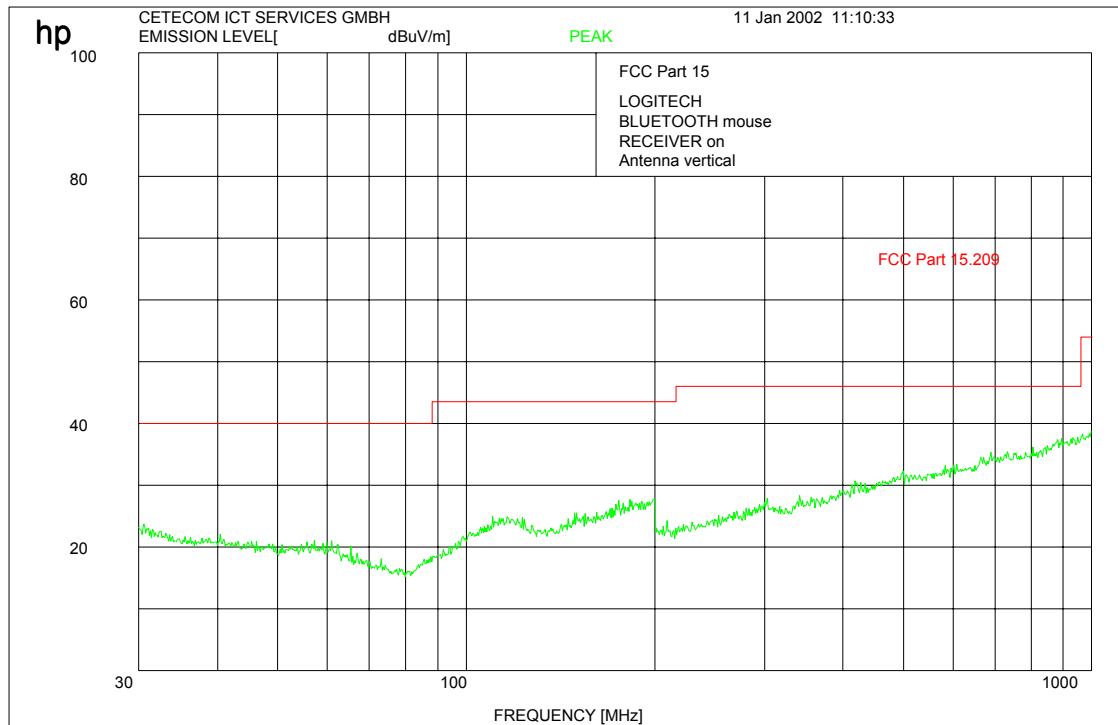
SUBCLAUSE § 15.247 (c)

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

RECEIVER SPURIOUS RADIATION

§ 15.209

30 MHz – 1 GHz



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

Limits

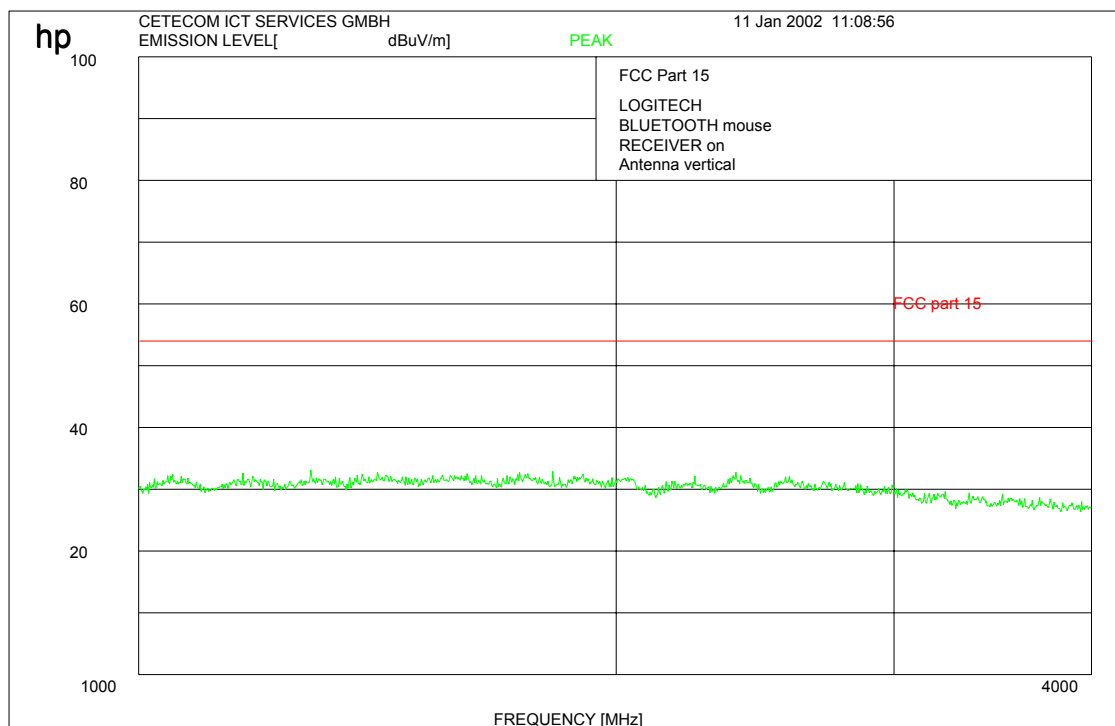
SUBCLAUSE § 15.209

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

RECEIVER SPURIOUS RADIATION

§ 15.209

1 GHz – 4 GHz



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

Limits

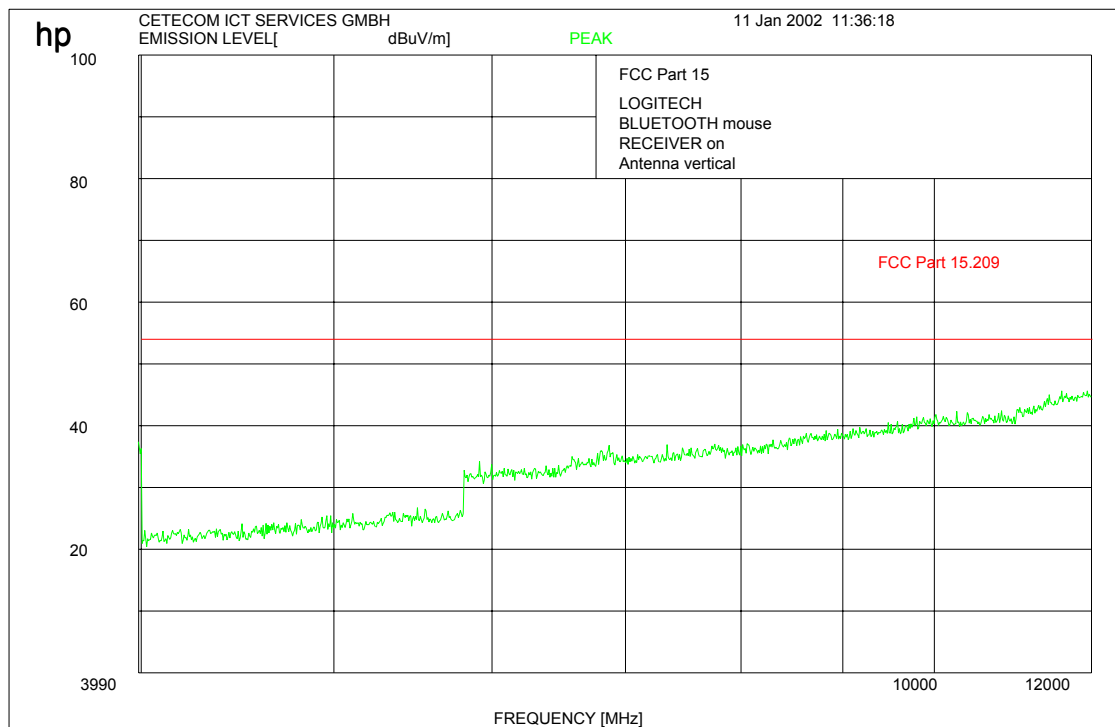
SUBCLAUSE § 15.209

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

RECEIVER SPURIOUS RADIATION

§ 15.209

4 GHz – 12 GHz



$f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

The measurements were performed up to 25 GHz. There were no spurious found.

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erfi	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Reciever	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

CETECOM ICT Services GmbH

Test report nr.: 2-2695-01-02/01

Issue Date: 01.03.02

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TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Meßempfänger	ESH 3	Rohde & Schwarz	890 174/002
43	Meßempfänger	ESVP	Rohde & Schwarz	891 752/005
44	Biconi Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisationsnetzwerk	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenne 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
52	Steuerrechner	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	861 406/005
54	Standard gain horn	Model 643	NARDA	8112
55	Standard gain horn	Model 640	NARDA	8406
56	Standard gain horn	1824-20	FMI	286
57	AC 2 Phasen V- Netzwerk	ESH3-Z5	Rohde & Schwarz	894 981/019
58	AC-3 Phasen V- Netzwerk	ESH2-Z5	Rohde & Schwarz	882 394/007
59	Stromversorgung	6032A	Rohde & Schwarz	2933A05441
60	HF-Test Empfänger	ESVP.52	Rohde & Schwarz	881 487/021
61	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
62	HF-Test Empfänger	ESH3	Rohde & Schwarz	881 515/002
63	Relais Matrix	PSU	Rohde & Schwarz	882 943/029
64	Relais Matrix	PSU	Rohde & Schwarz	828 628/007
65	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
66	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773
67	Standard gain horn	Model 638	NARDA	1006

Test site



Testsite



Photographs of the equipment

Photo 1: M-RU77



Photographs of the equipment

Photo 2: M-RU77



Photographs of the equipment

Photo 3: M-RU77



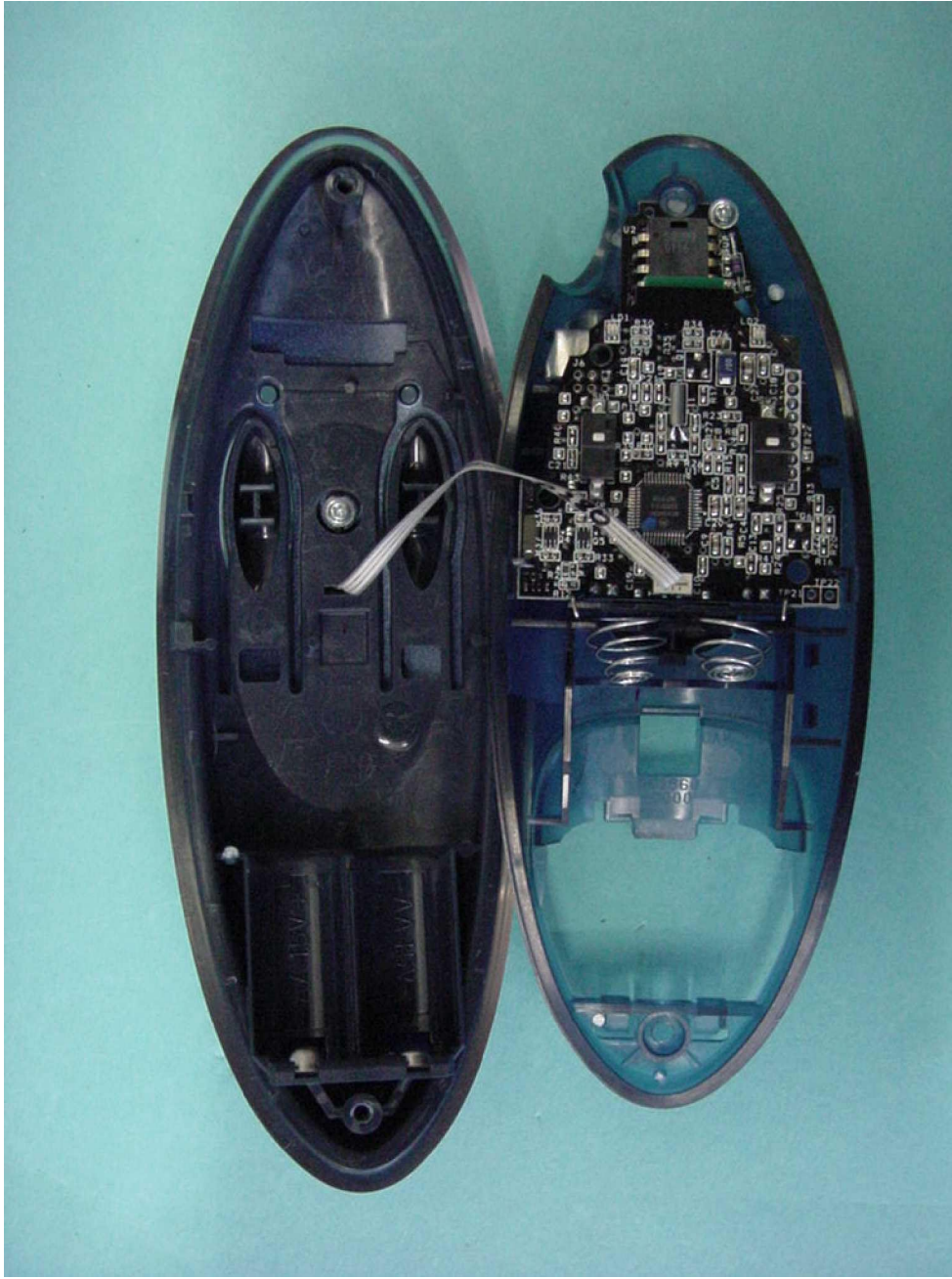
Photographs of the equipment

Photo 4: M-RU77



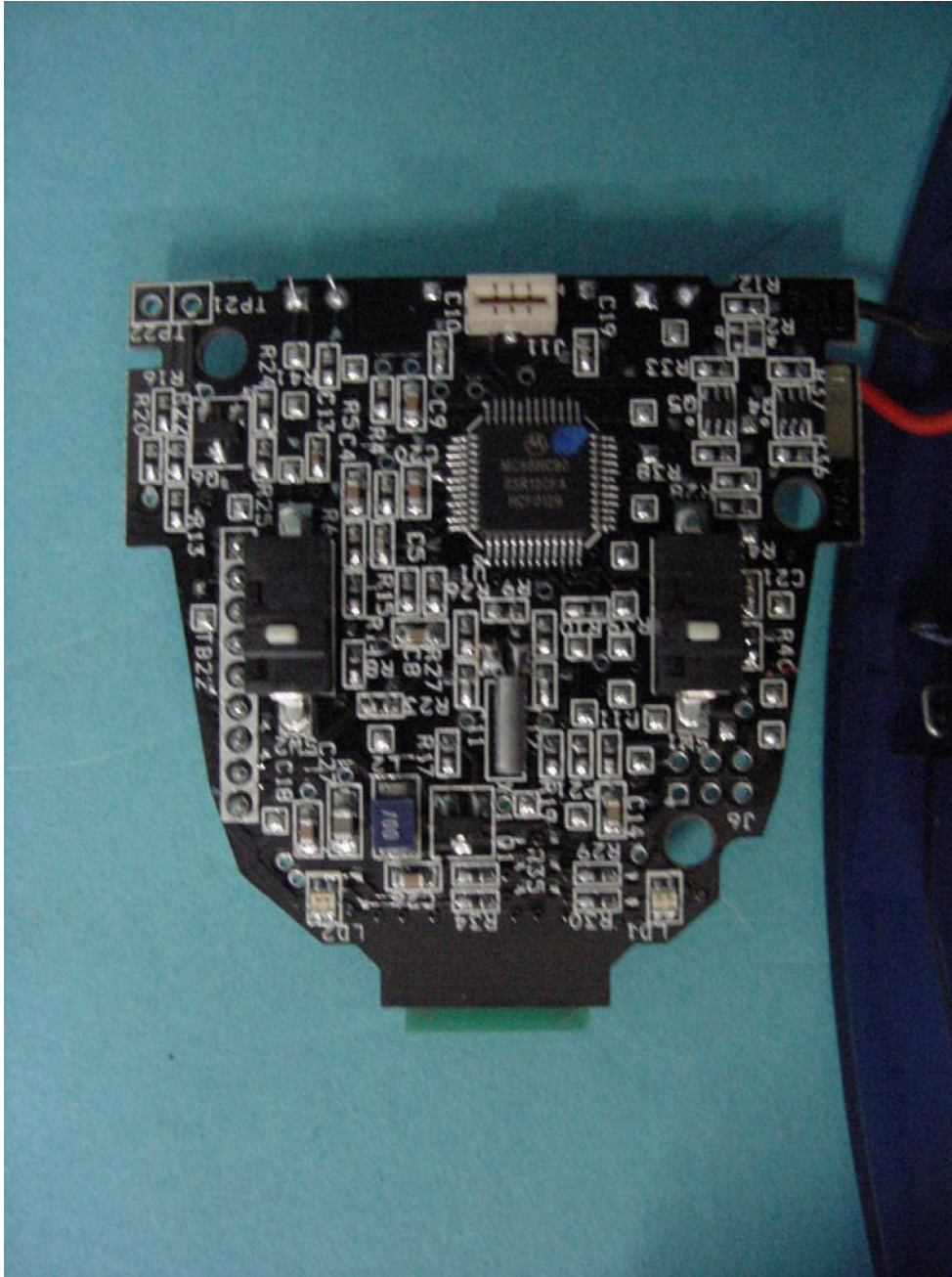
Photographs of the equipment

Photo 5: M-RU77



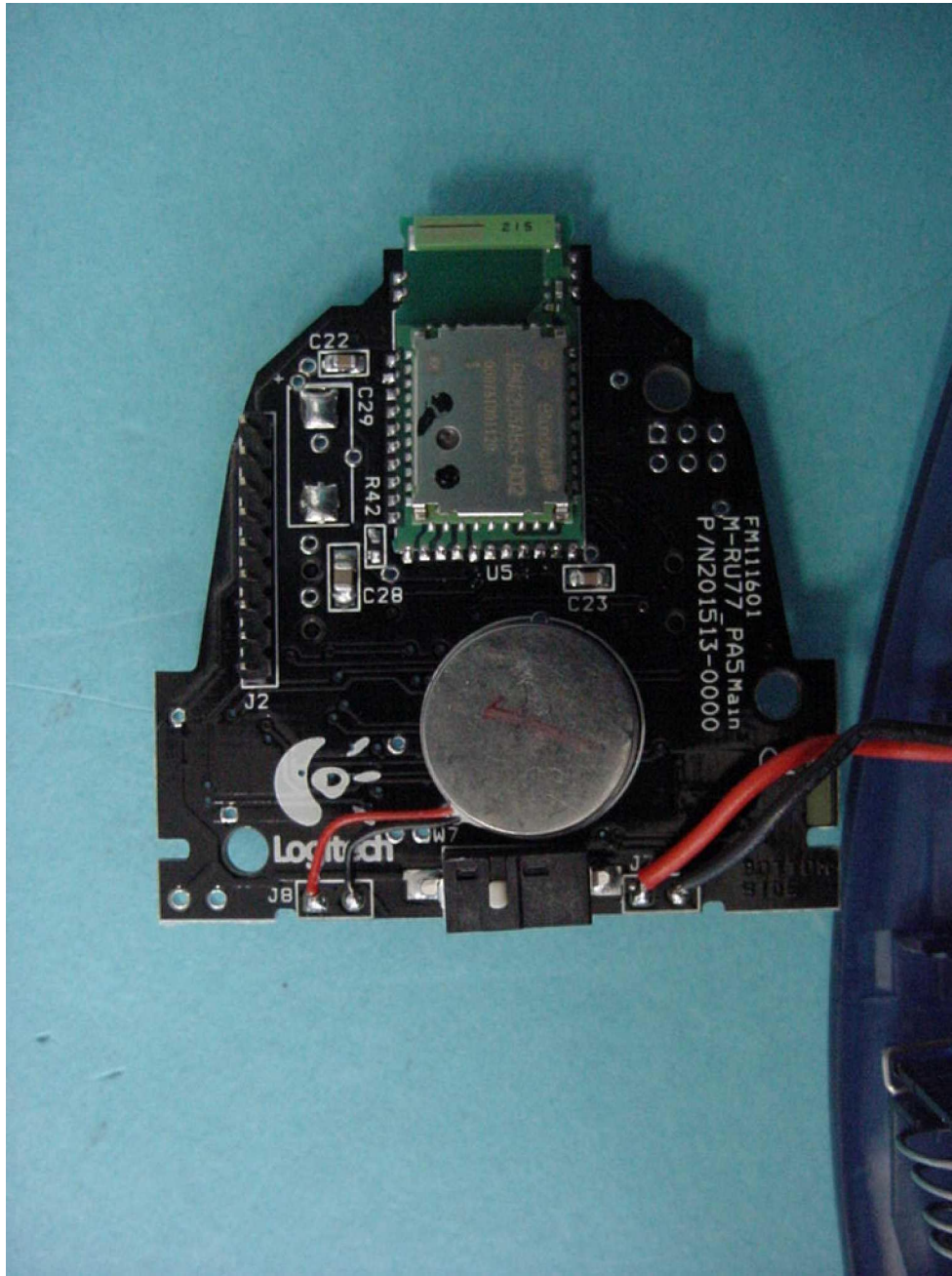
Photographs of the equipment

Photo 6: M-RU77



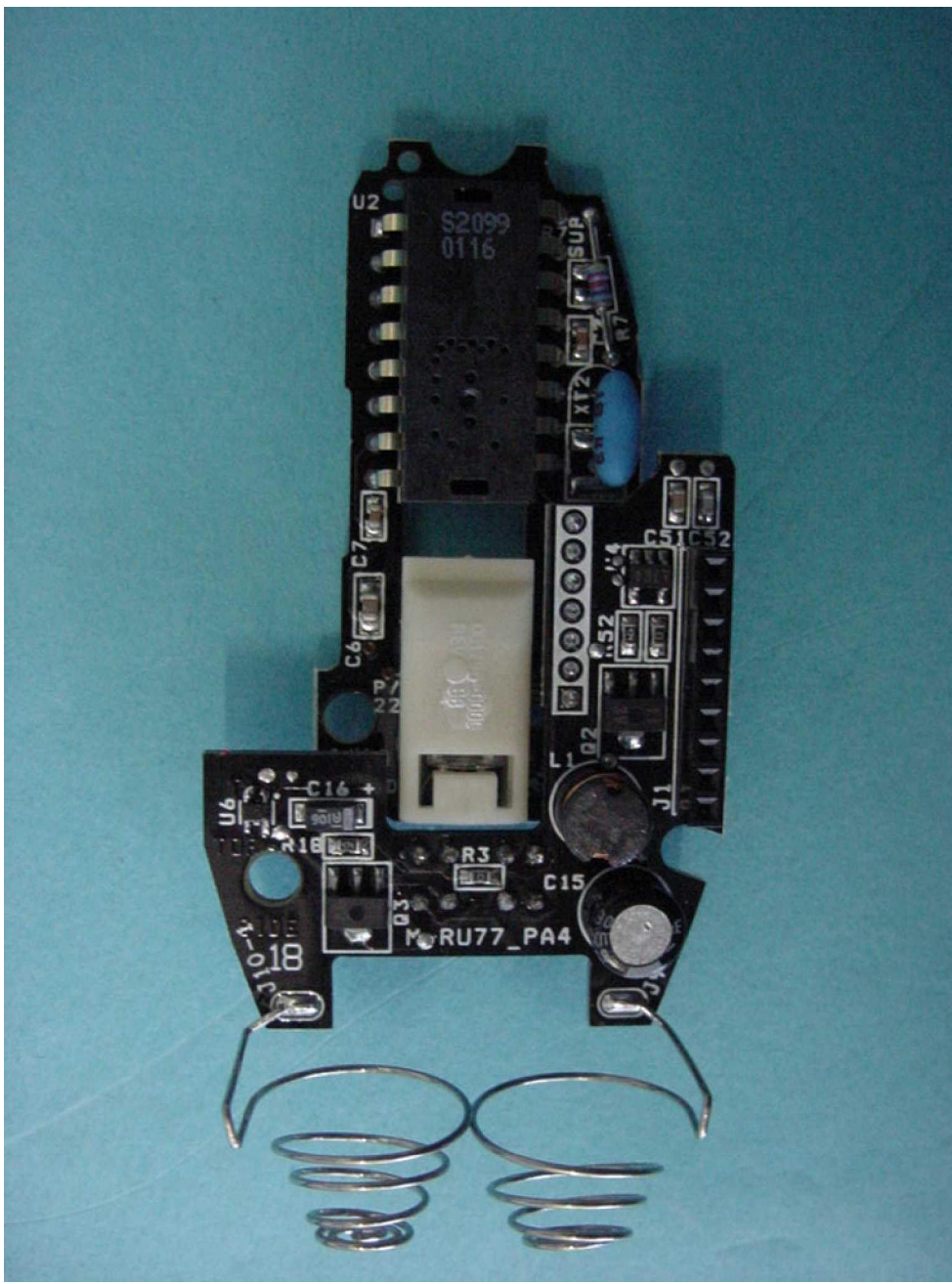
Photographs of the equipment

Photo 7: M-RU77



Photographs of the equipment

Photo 8: M-RU77



Photographs of the equipment

Photo 9: M-RU77

