

CETECOM ICT Services GmbH

Radio Satellite Communication

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RSC14

issue test report consist of 92 Pages

Page 1 (92)



TTI-P-G 166/98-30

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 2_2946-01-01/02
FCC Part 15.247 / CANADA RSS-210
HDW-1
FCC ID: PYAHDW1

CETECOM – ICT Services GmbH
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66117 Saarbrücken, Germany

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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 : Michael.Berg@ict.cetecom.de

Internet : www.cetecom-ict.de

Accredited testing laboratory

The Test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025.

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

Accredited Bluetooth™ Test Facility (BQTF)

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

1.3 Details of Applicant

Name : Nokia Mobile Phones / TCC Salo
Street : P.O. Box 86 (Joensuunkatu 7 E / Kiila 1 B)
City : FIN-24101 Salo
Country : Finland
Telephone : +358 (0) 7180 42913
Telefax : +358 (0) 7180 42920
Contact : Mr. Jarkko Luoma
Telephone : +358 (0) 7180 42913

1.4 Application Details

Date of receipt of application : 2002-06-28
Date of receipt of test item : 2002-07-12
Date of test : 2002-07-15/16

1.5 Test Item

Type of equipment : **Wireless Headset (bluetooth)**
Type designation : HDW-1
Manufacturer : Applicant
Street :
City :
Country :
S/N : 05837, 05838
Additional information :
Frequency : 2402 – 2480 MHz
Type of modulation : 1M00FXD / 79M0FXD
Number of channels : 79
Antenna : Integral antenna
Power supply : 1.2 VDC NiMH
Output power : Conducted: 0.69mW, Radiated: 0,56 mWEIRP
Type of equipment : Temperature range : -30°C - +60°C
FCC – ID : PYAHDW1
Hardware : 12.00
Software : 2.00, MV2.084

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 horn

The antenna gain measurement was performed by the difference between conducted and radiated output measurement.

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

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 performed.

Final verdict : PASS

Technical responsibility for area of testing :

2002-07-17 RSC 8411 Berg M.

Date

Section

Name

Signature



Technical responsibility for area of testing :

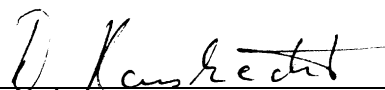
2002-07-17 RSC8412 Hausknecht D.

Date

Section

Name

Signature



2.2 Testreport

TEST REPORT

Test report no. : 2_2946-01-01/02

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

Paragraph	PARAMETER TO BE MEASURED	PAGE
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§ 15.247 (a)	Carrier frequency separation	8
§ 15.247 (a)	Number of hopping channels	9
§ 15.247 (a)	Time of occupancy (dwell time)	11
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Equipment under test : HDW-1**Ambient temperature : 24°C****Relative humidity : 38%**

Antenna Gain

SUBCLAUSE § 15.204

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

	low channel	mid channel	high channel
Conducted power	-1.63 dBm	-1.70 dBm	-3.34 dBm
Radiated power	-4.07dBm	-2.53dBm	-3.65dBm
Gain	-2.44 dBi	-0.83 dBi	-0.31 dBi

The calculated antenna gain is between -2.44 and -0.31 dB for the build-in antenna.
So we will calculate the Defacto EIRP with the middle value from: -1.2 dBi

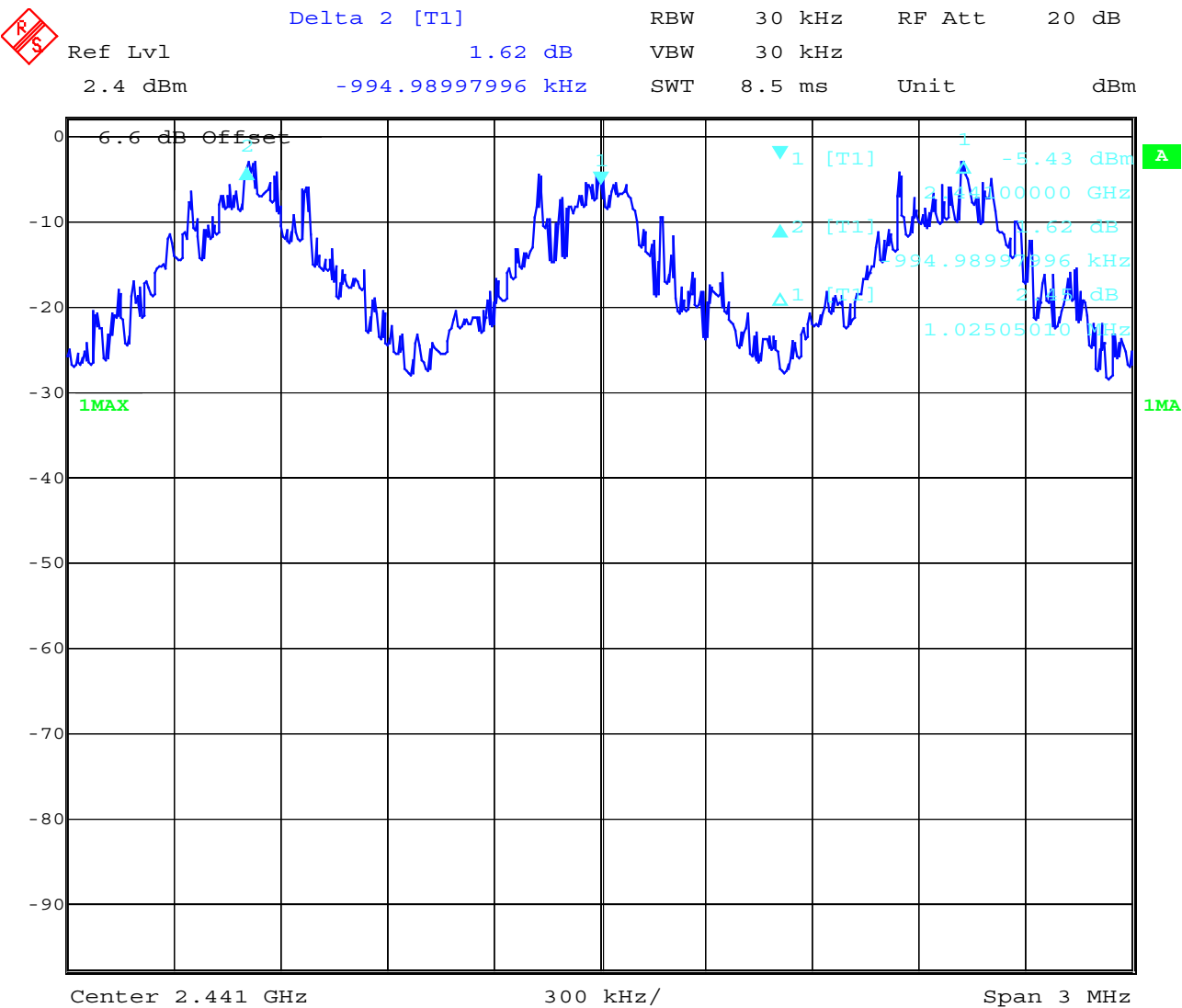
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

-

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 8 (92)

Equipment under test : HDW-1
Ambient temperature : 24°C
Relative humidity : 38%

Carrier frequency separation §15.247(a)

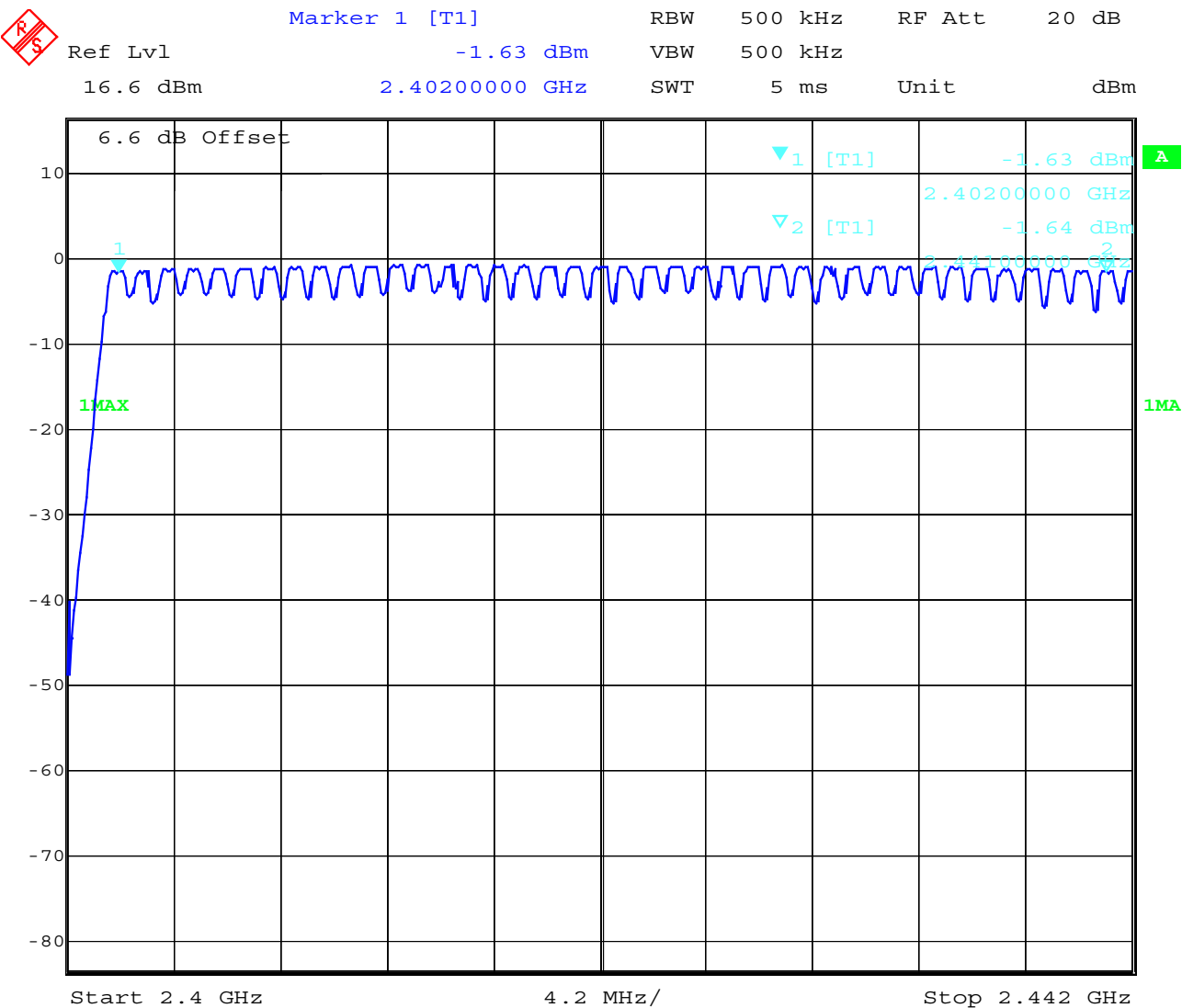


Date: 15.JUL.2002 13:43:10

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

Equipment under test : HDW-1
Ambient temperature : 24°C
Relative humidity : 38%

Number of hopping channels §15.247(a)
Channel 1 - 39



Date: 15.JUL.2002 13:50:48

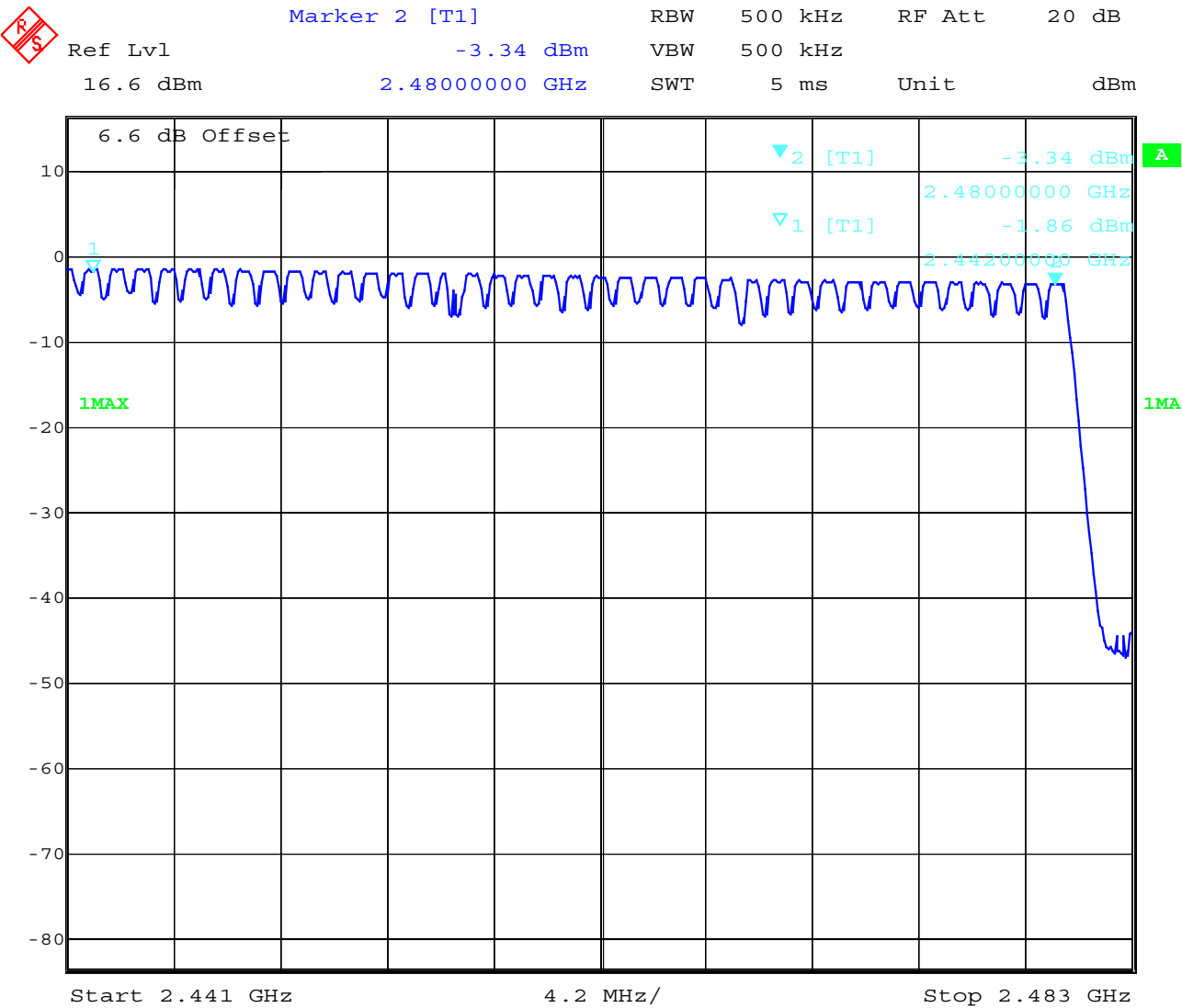
The number of hopping channels is 79.

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

Equipment under test : HDW-1
Ambient temperature : 24°C
Relative humidity : 38%

Number of hopping channels
Channel 40-79

§15.247(a)



Date: 15.JUL.2002 14:02:29

The number of hopping channels is 79.

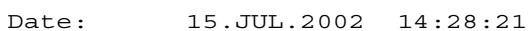
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Relative humidity : 38%

§15.247(a)

Each tx-time per appearance is 428.958 μ s.

	Delta 1 [T1]		RBW	3 MHz	RF Att	20 dB
	Ref Lvl	6.60 dB	VBW	3 MHz		
	16.6 dBm	428.957916 μ s	SWT	2 ms	Unit	dBm



64

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

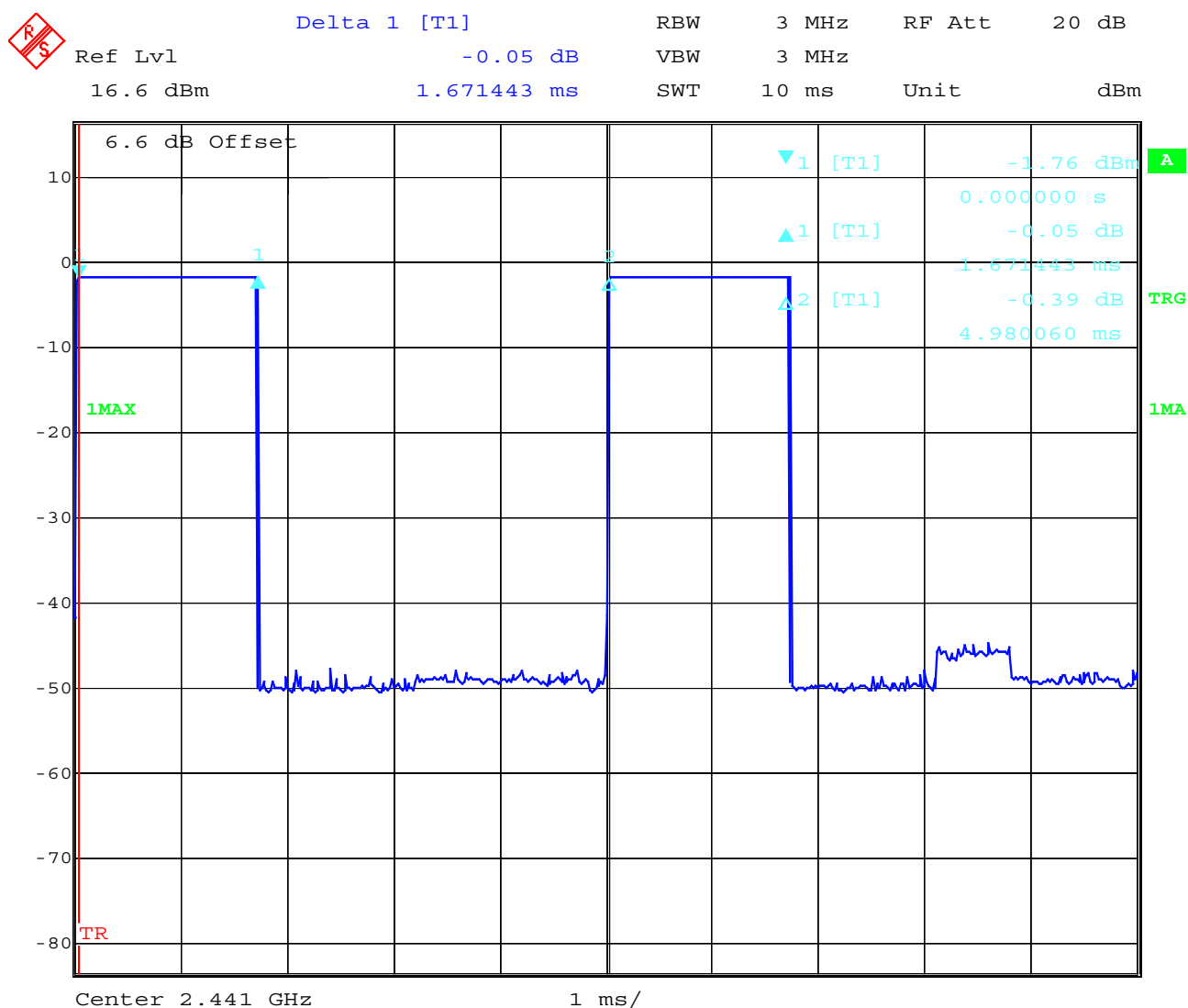
Time of occupancy (dwell time) for DH3

§15.247(a)

A DH3 Packets need 3 time slots for transmit 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 1.671 ms.

So we have $153 * 1.671 \text{ ms} = 255.663 \text{ ms}$ per 30 seconds.



Date: 15.JUL.2002 14:34:20

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

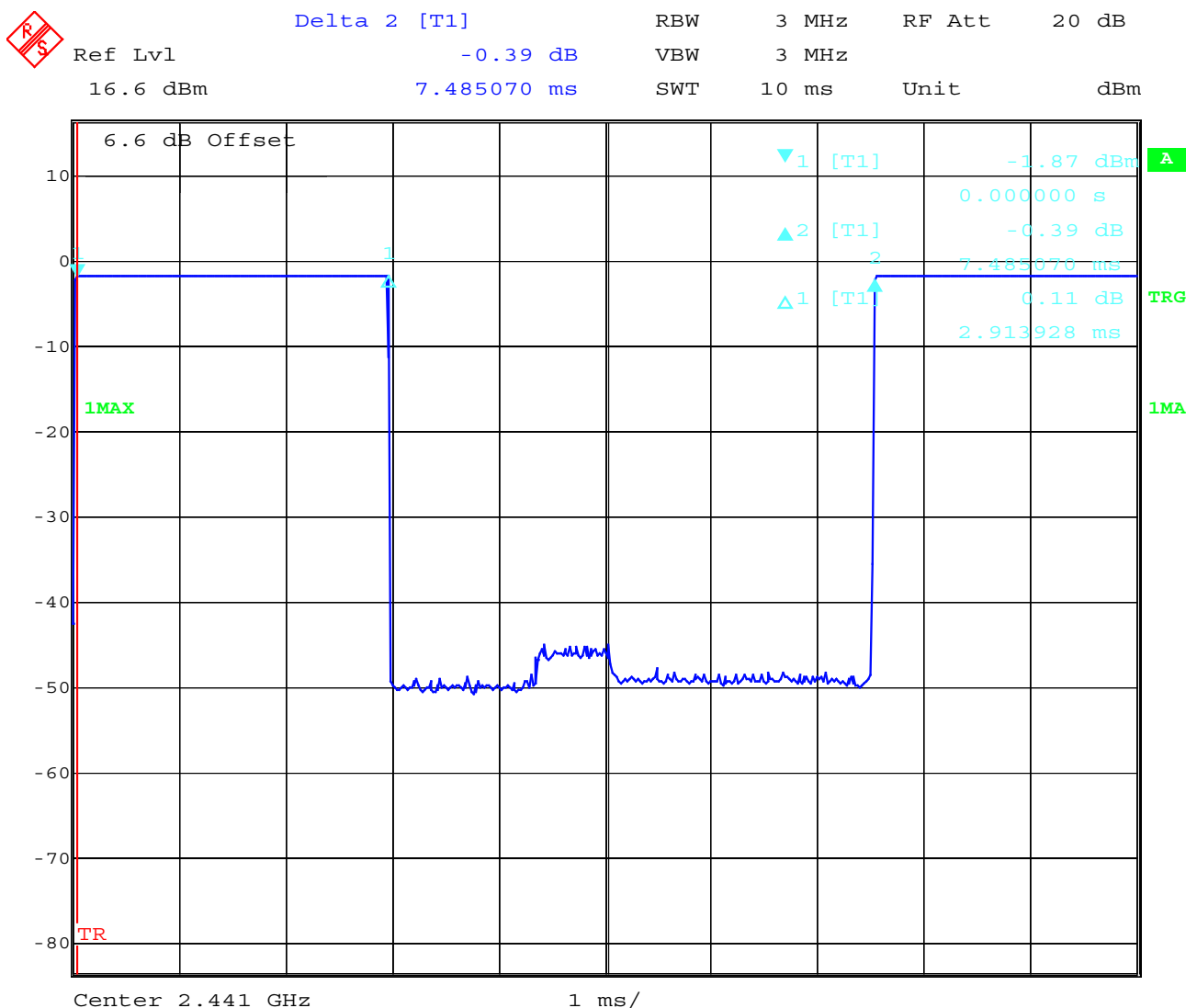
Time of occupancy (dwell time) for DH5

§15.247(a)

At DH5 Packets you need 5 time slots for transmit 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 2.913 ms.

So we have $100,8 * 2.913 \text{ ms} = 293.630 \text{ ms}$ per 30 seconds.



Date: 15.JUL.2002 14:36:53

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

⇒ **together in 30 s maximal 2 sequences => maximal 0.396 s per 30 second period.**

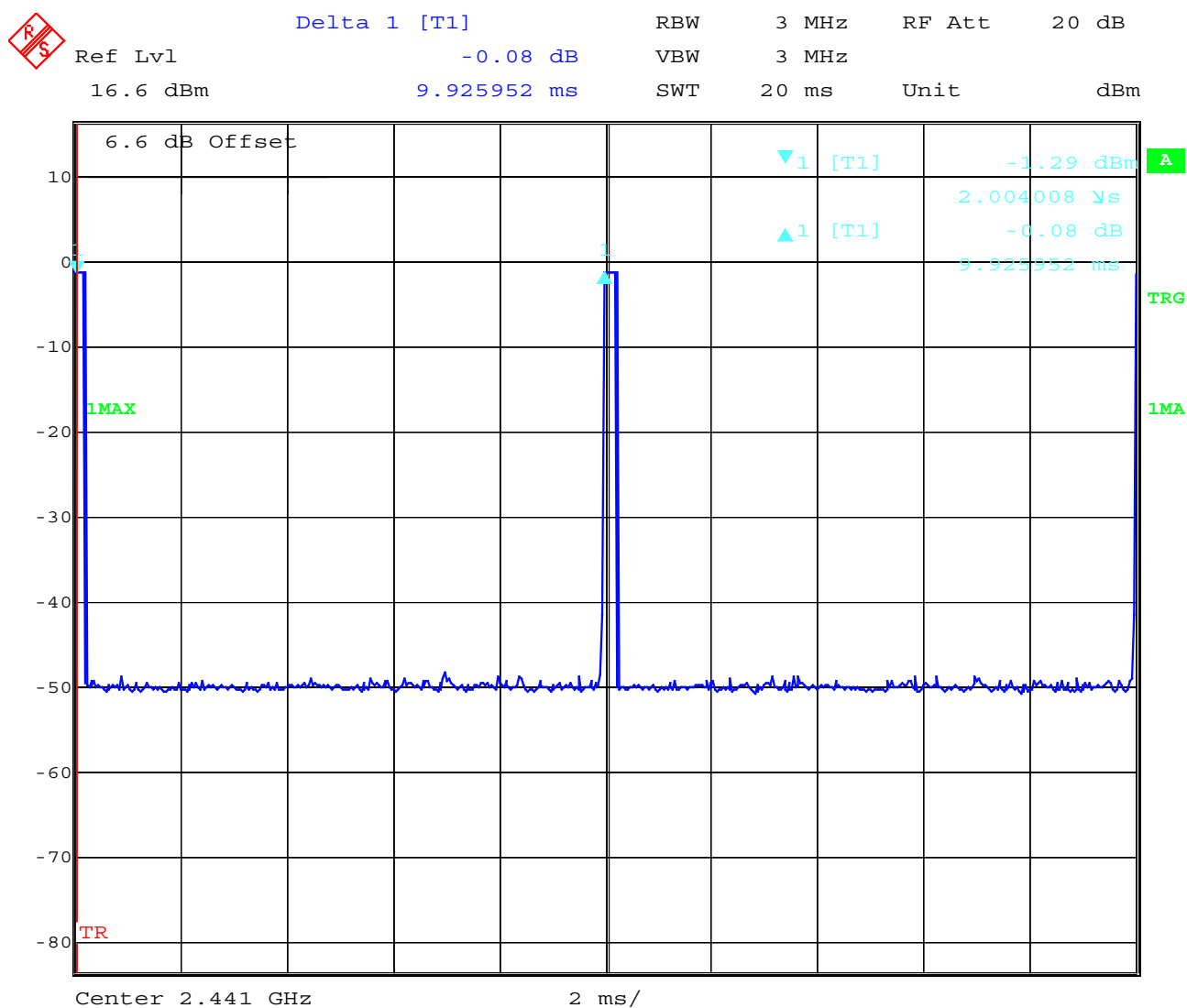
64

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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



Date: 15.JUL.2002 14:47:16

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

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 16 (92)

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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} (23)°C	V _{nom} (1.2)V	865.731	973.948	953.908
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)

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

Page 17 (92)

Equipment under test : HDW-1

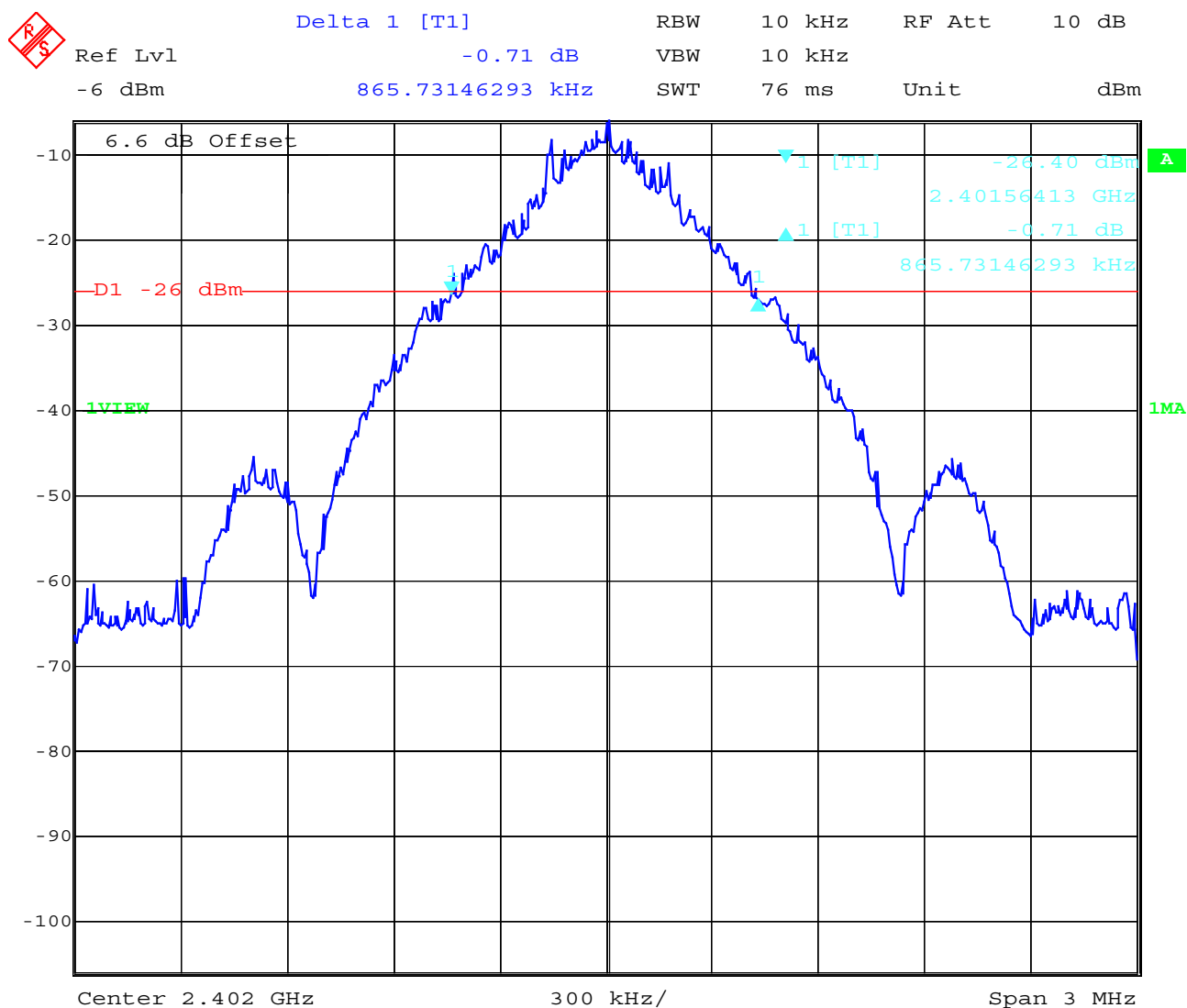
Ambient temperature : 24°C

Relative humidity : 38%

Spectrum Bandwidth of a FHSS System
20 dB bandwidth

§15.247(a)

Channel 1



Date: 15.JUL.2002 13:21:53

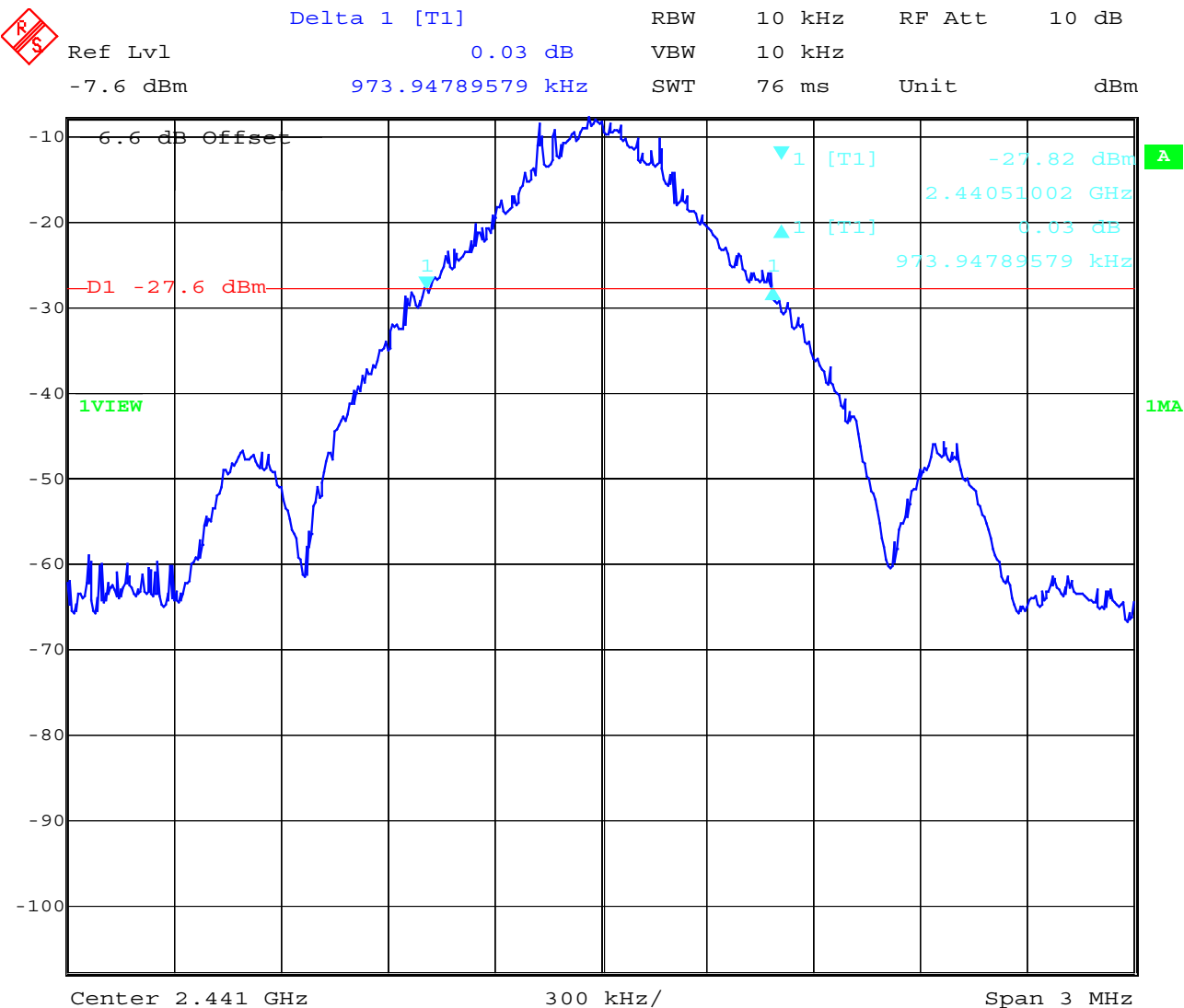
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Equipment under test : HDW-1
Ambient temperature : 24°C
Relative humidity : 38%

Spectrum Bandwidth of a FHSS System
20 dB bandwidth

§15.247(a)

Channel 2



Date: 15.JUL.2002 13:24:34

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

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

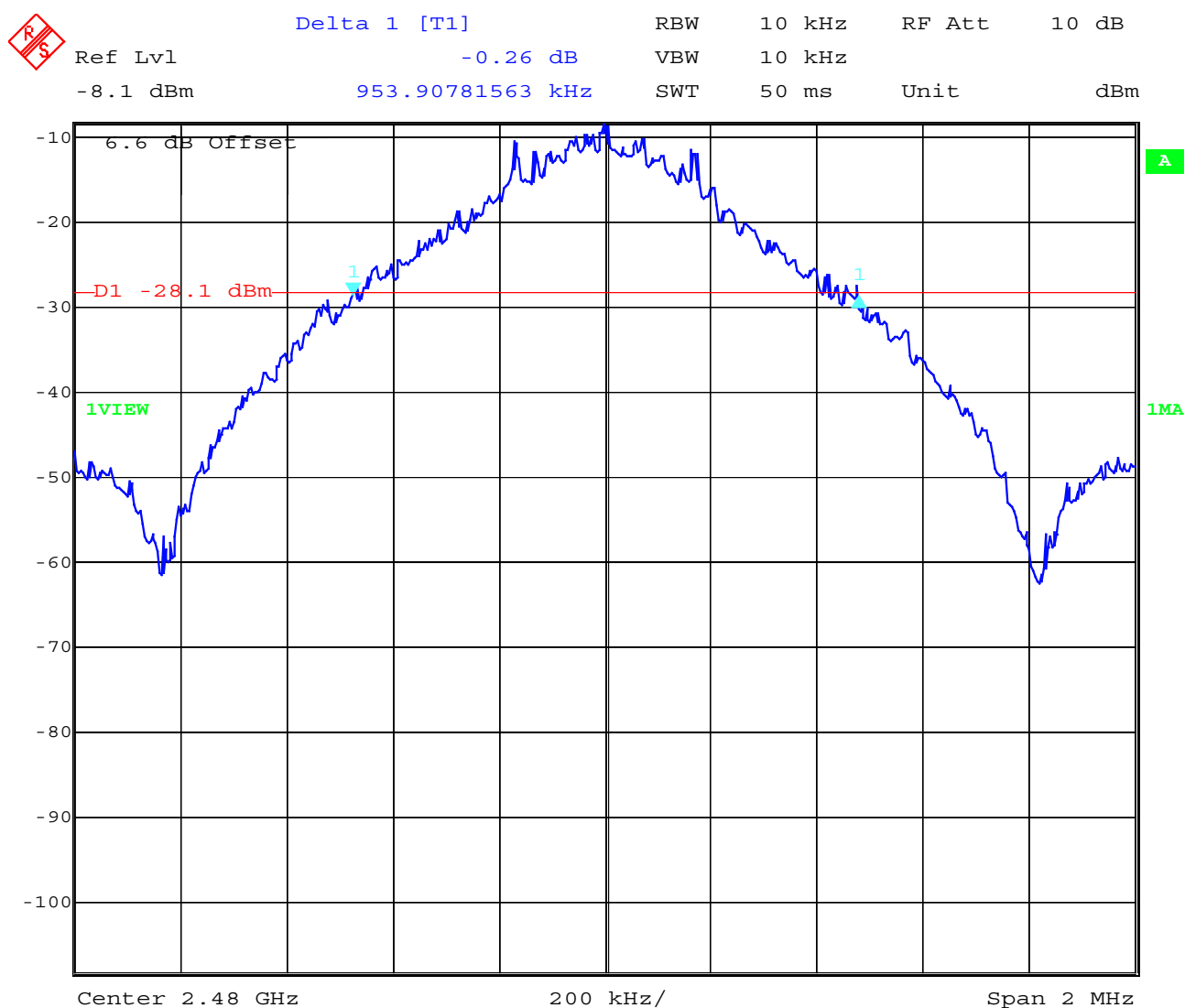
Ambient temperature : 24°C

Relative humidity : 38%

Spectrum Bandwidth of a FHSS System
20 dB bandwidth

§15.247(a)

Channel 3:



Date: 15.JUL.2002 12:54:28

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

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 20 (92)

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

MAXIMUM PEAK OUTPUT POWER (conducted)

SUBCLAUSE § 15.247 (b) (1)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)			
Frequency (MHz)		2402		2442	2480
T _{nom} (23)°C	V _{nom} (1.2)V	PK	0.69	0.68	0.46
		AV	0.56	0.55	0.36
Maximum deviation from output power under extreme test conditions (dBc)		not applicable		not applicable	not applicable
Measurement uncertainty		±3dB			

RBW / VBW : 3 MHz

LIMIT

SUBCLAUSE § 15.247 (b) (1)

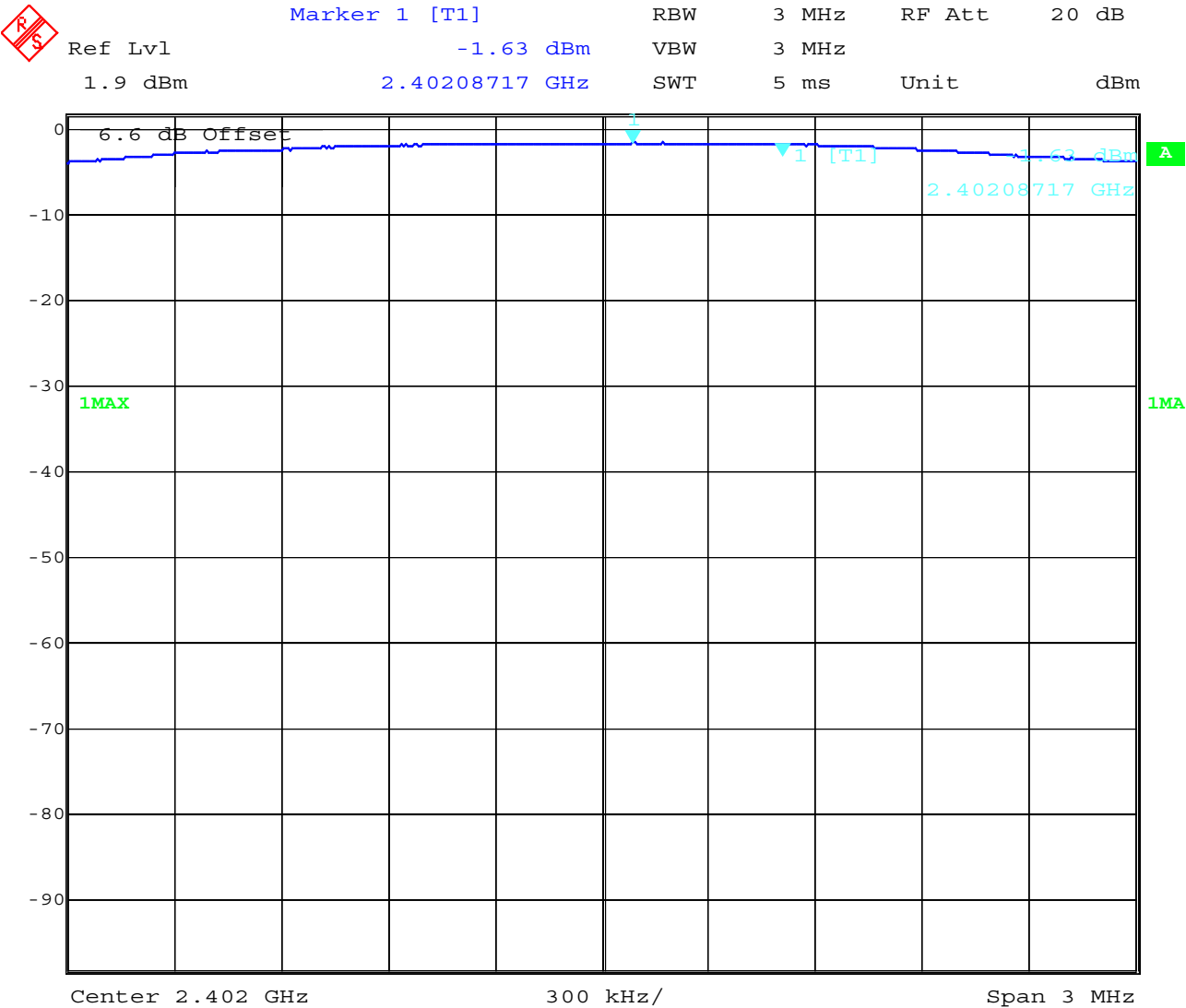
Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt

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

Equipment under test : HDW-1
Ambient temperature : 24°C
Relative humidity : 38%

Peak output power (conducted) §15.247 (b)

Channel 1: -1.63 dBm at 2402 MHz
De facto EIRP with -1.2 dBI antenna gain is -2.83 dBm / 0.52 mW



Date: 15.JUL.2002 13:17:31

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

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 22 (92)

Equipment under test : HDW-1

Ambient temperature : 24°C

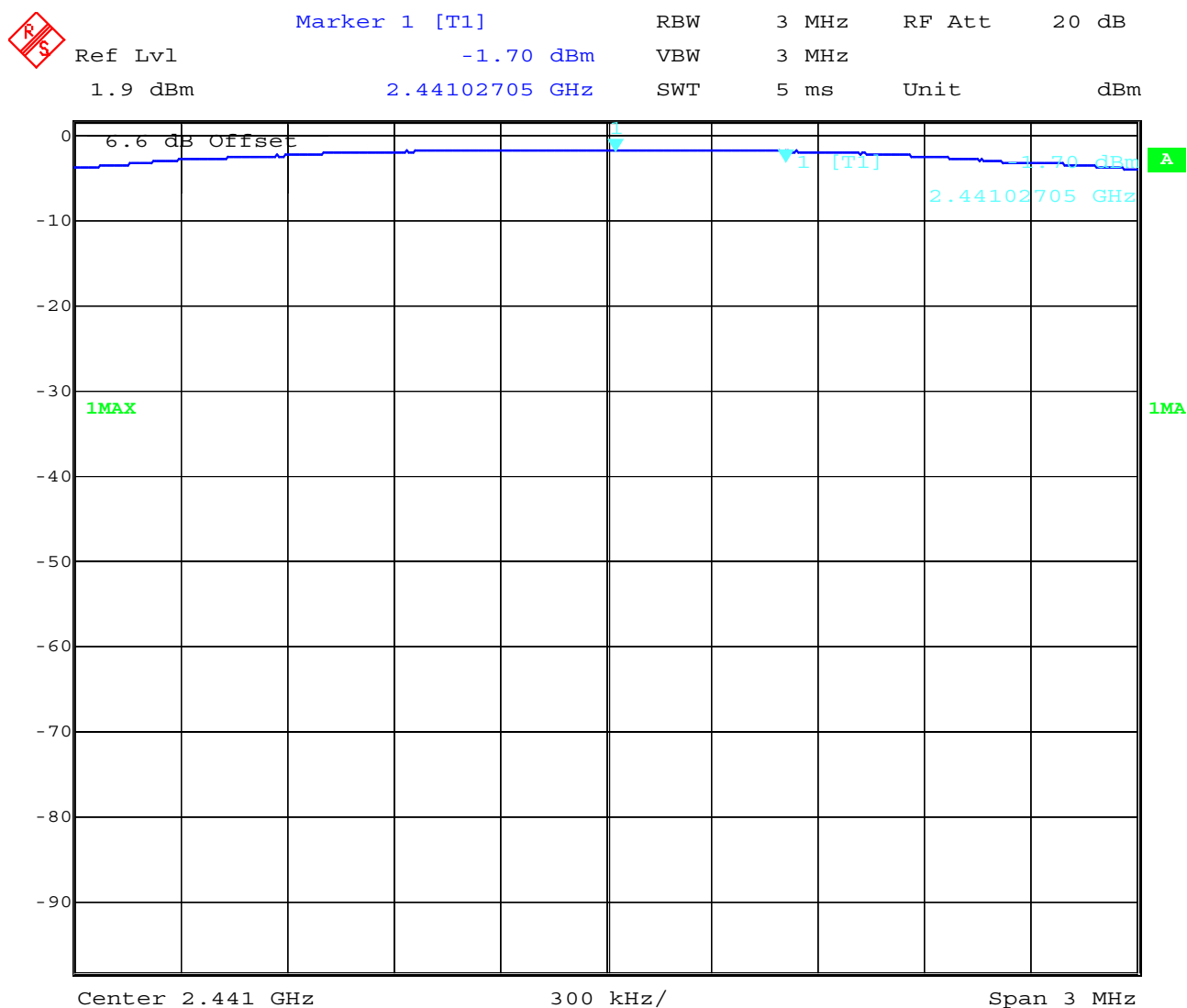
Relative humidity : 38%

Peak output power (conducted)

§15.247 (b)

Channel 2: -1.70 dBm at 2441 MHz

De facto EIRP with -1.2 dBI antenna gain is -2.90 dBm / 0.51 mW



Date: 15.JUL.2002 13:18:49

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

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

Ambient temperature : 24°C

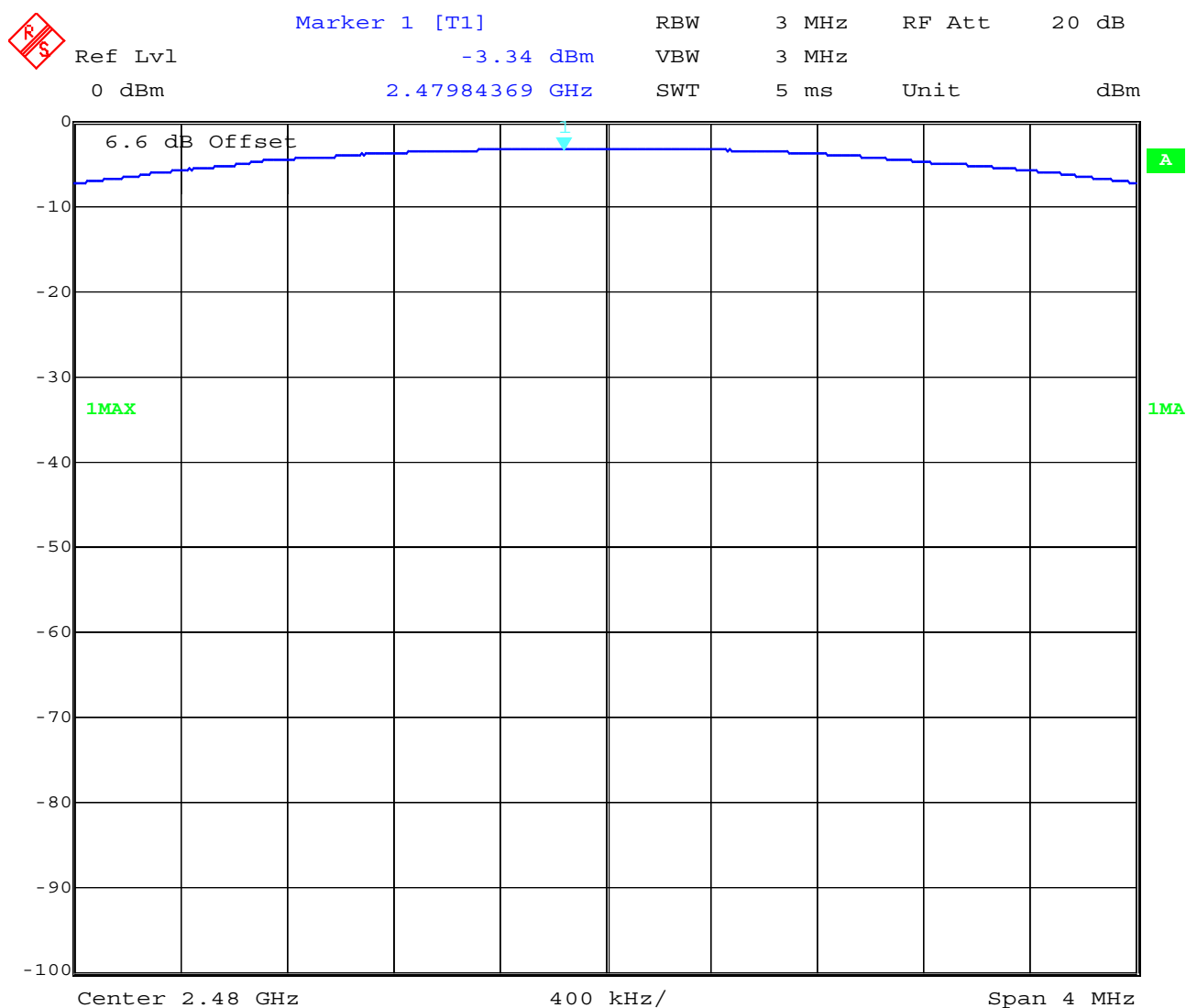
Relative humidity : 38%

Peak output power (conducted)

§15.247 (b)

Channel 3: -3.34 dBm at 2480 MHz

De facto EIRP with -1.2 dBI max. antenna gain is -4.54 dBm / 0.35 mW



Date: 15.JUL.2002 12:48:34

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

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

MAXIMUM PEAK OUTPUT POWER (RADIATED)

SUBCLAUSE § 15.247 (b) (1)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER EIRP (mW)		
Frequency (MHz)		2402	2441	2480
T _{nom} (20)°C	V _{nom} (1.2)V	0.39	0,56	0,43
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
(for reference numbers see test equipment listing)

Equipment under test : HDW-1

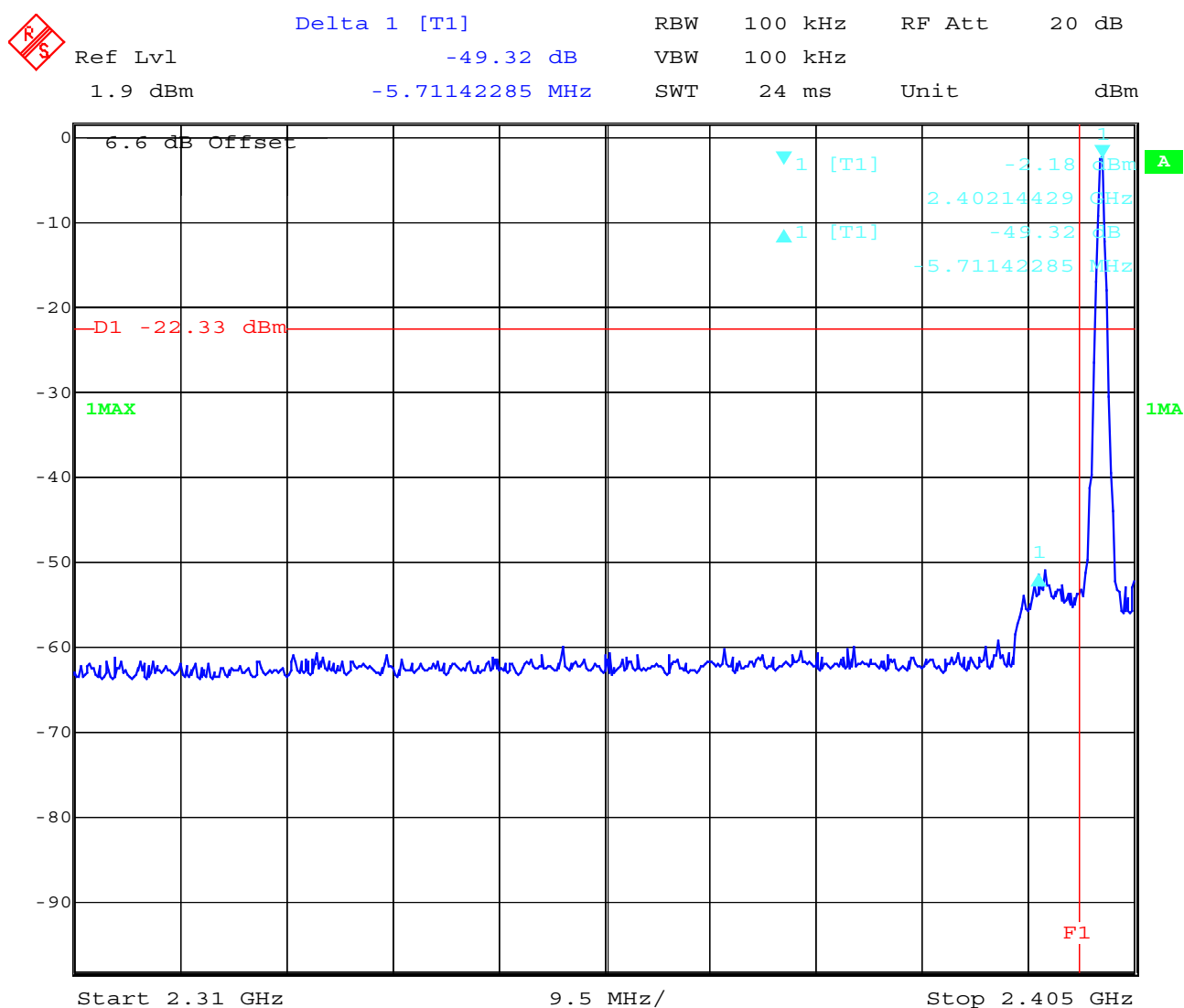
Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance of conducted emissions

§15.247 (c)

Low frequency section (hopping off)



Date: 15.JUL.2002 13:04:43

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

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

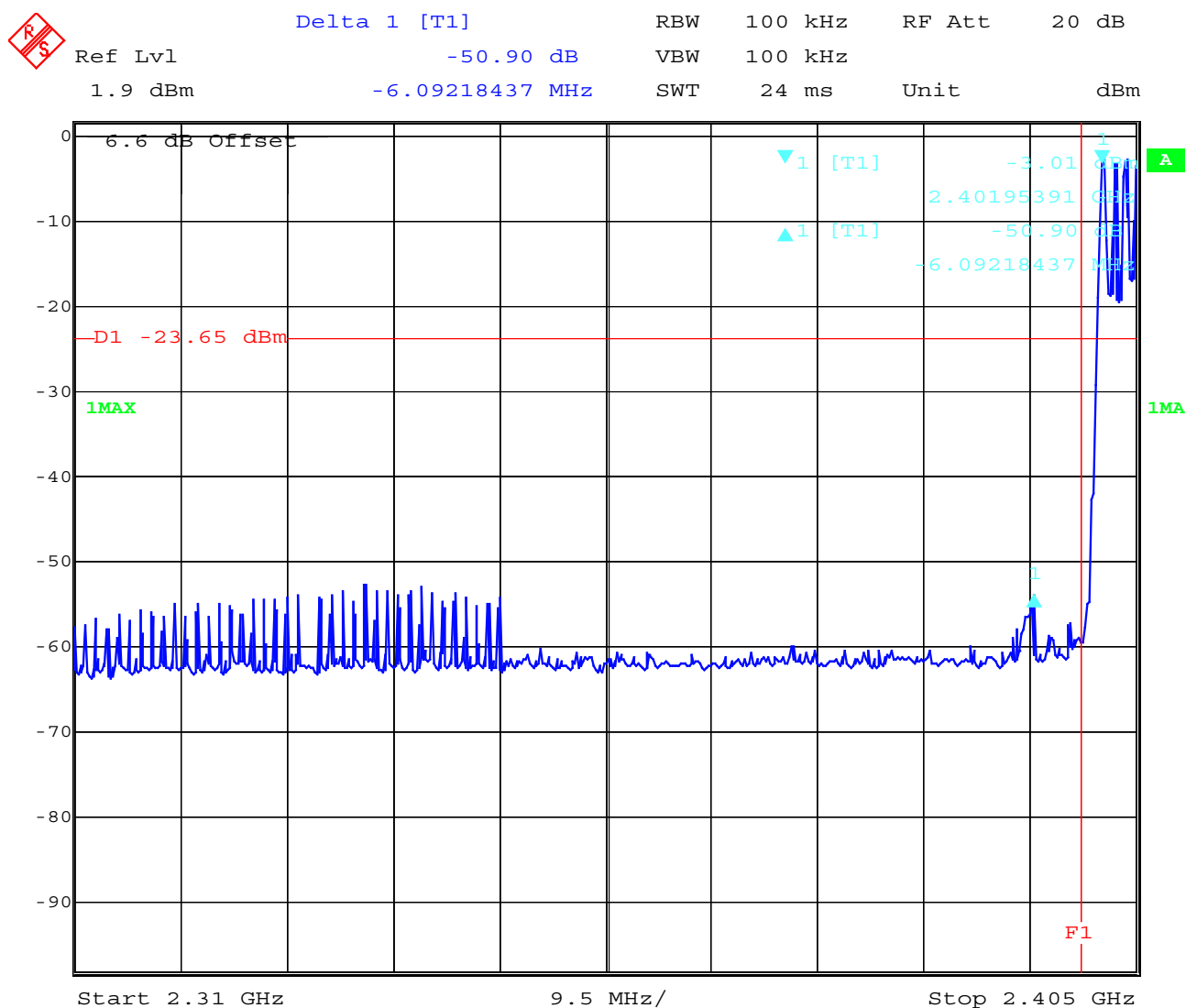
Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance of conducted emissions

§15.247 (c)

Low frequency section (hopping on)



Date: 15.JUL.2002 13:03:21

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

Equipment under test : HDW-1

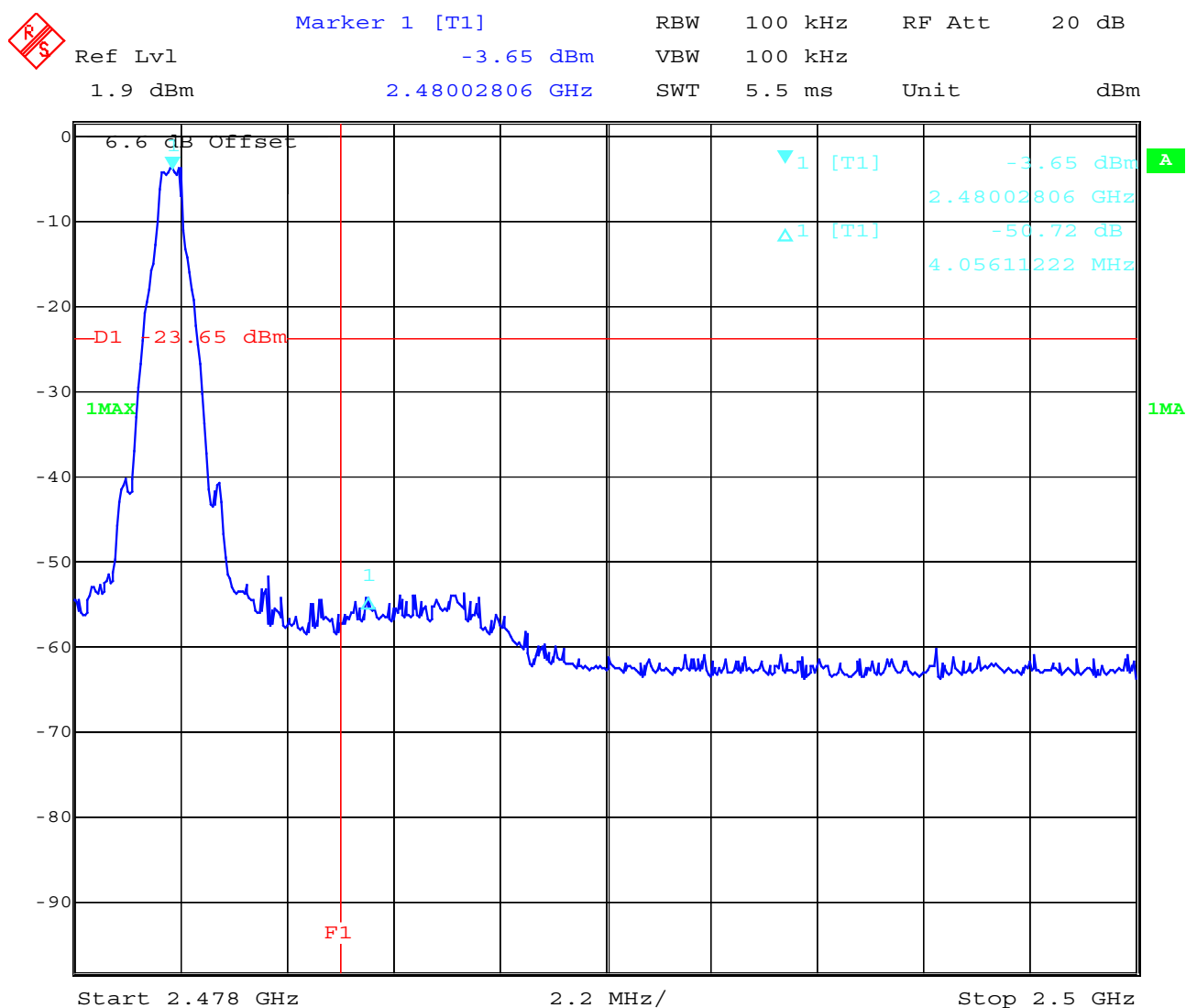
Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance of conducted emissions

§15.247 (c)

high frequency section (hopping off)



Date: 15.JUL.2002 12:59:37

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

Equipment under test : HDW-1

Ambient temperature : 24°C

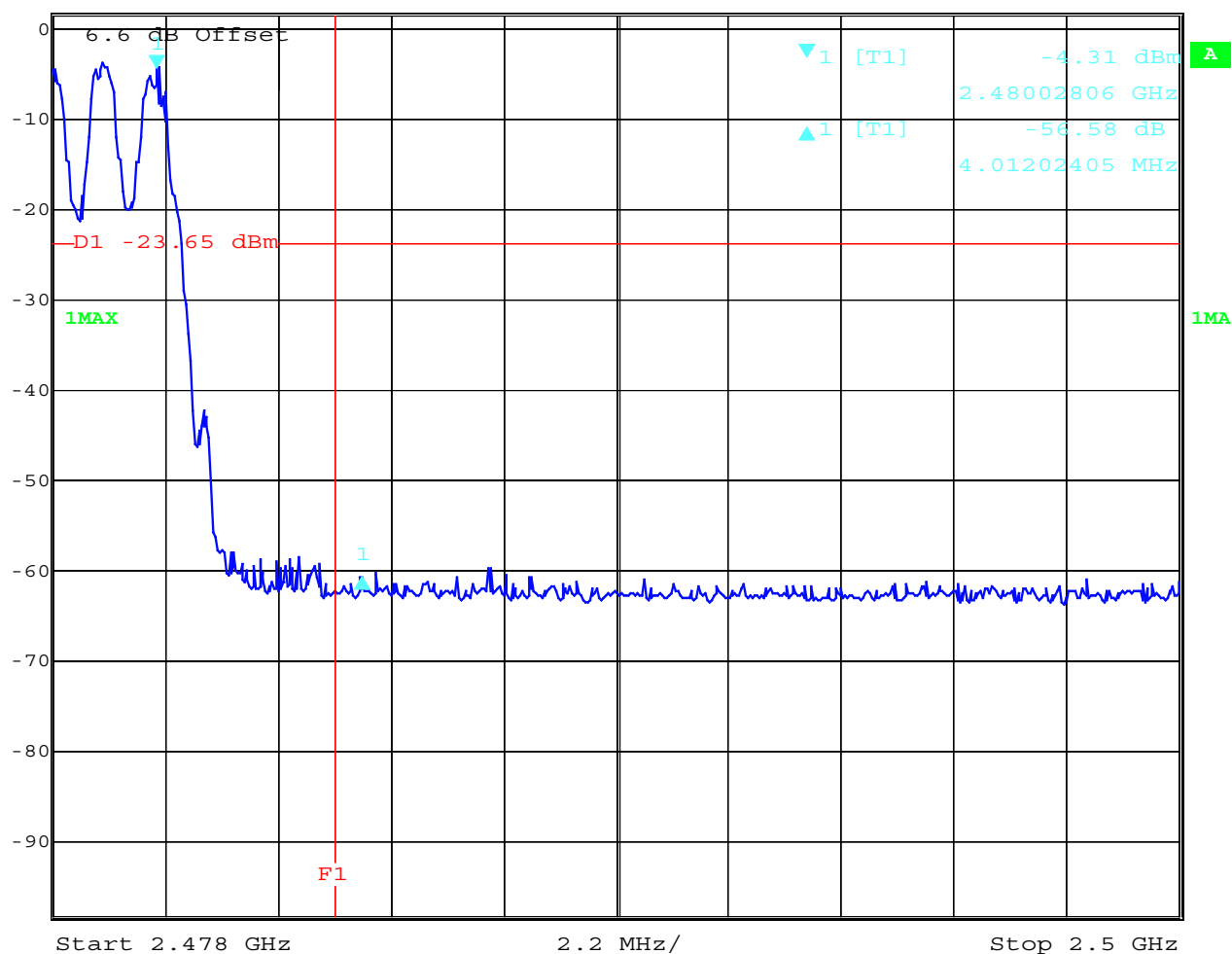
Relative humidity : 38%

Band-edge compliance of conducted emissions

§15.247 (c)

high frequency section (hopping on)


 Delta 1 [T1] RBW 100 kHz RF Att 20 dB
 Ref Lvl -56.58 dB VBW 100 kHz
 1.9 dBm 4.01202405 MHz SWT 5.5 ms Unit dBm



Date: 15.JUL.2002 13:02:16

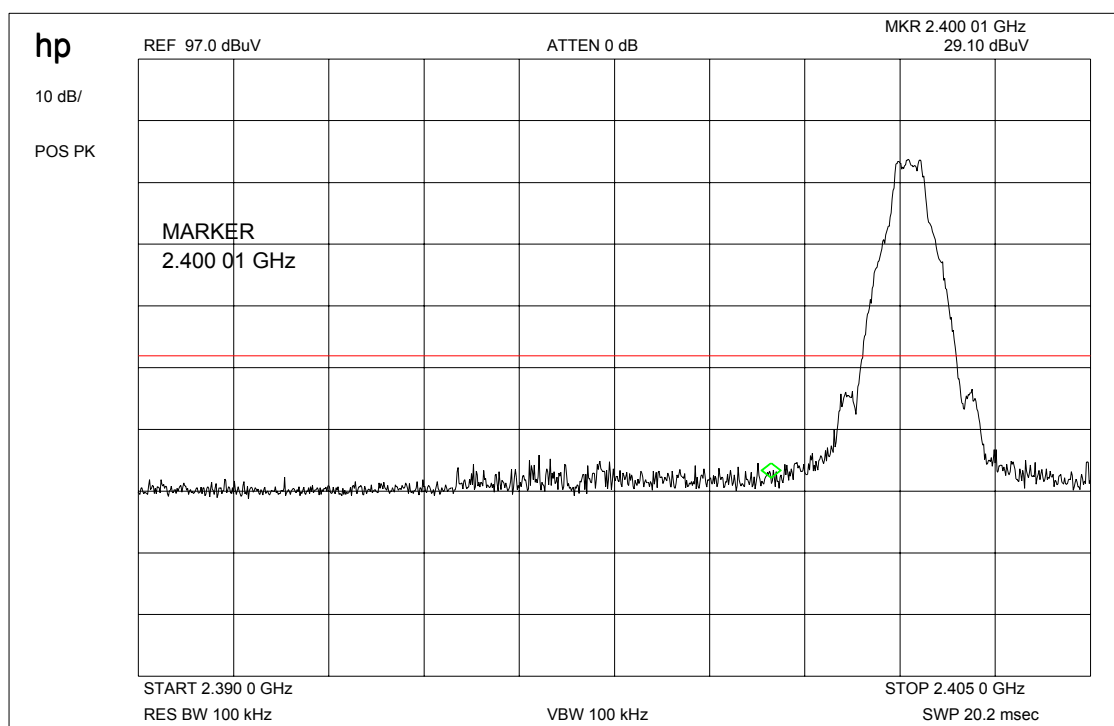
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
 (for reference numbers see test equipment listing)

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance radiated



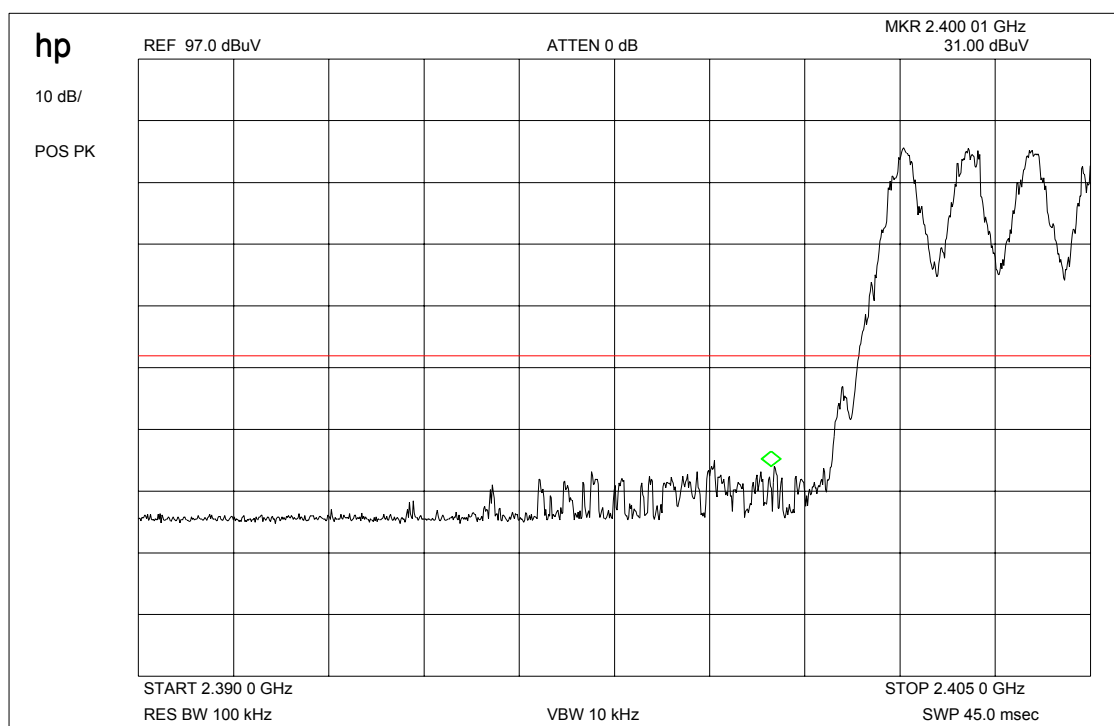
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance radiated



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

FCC 15.205 (restricted bands)

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

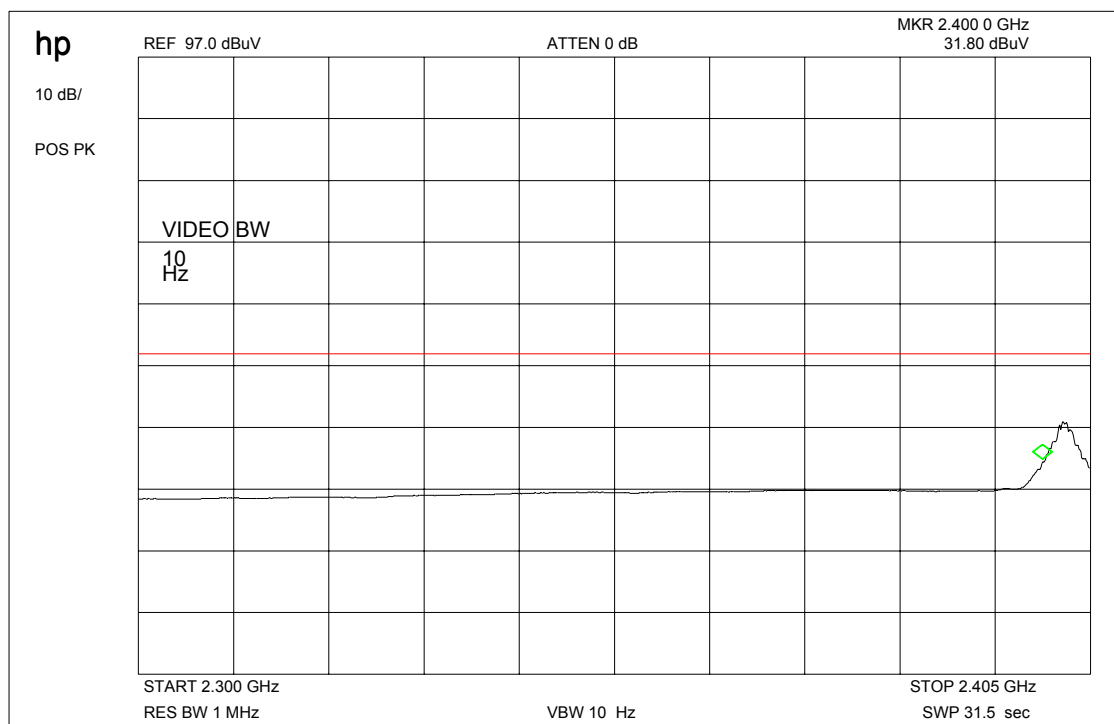
17-24

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance radiated Restricted Band Average



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

FCC 15.205 (restricted bands)

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

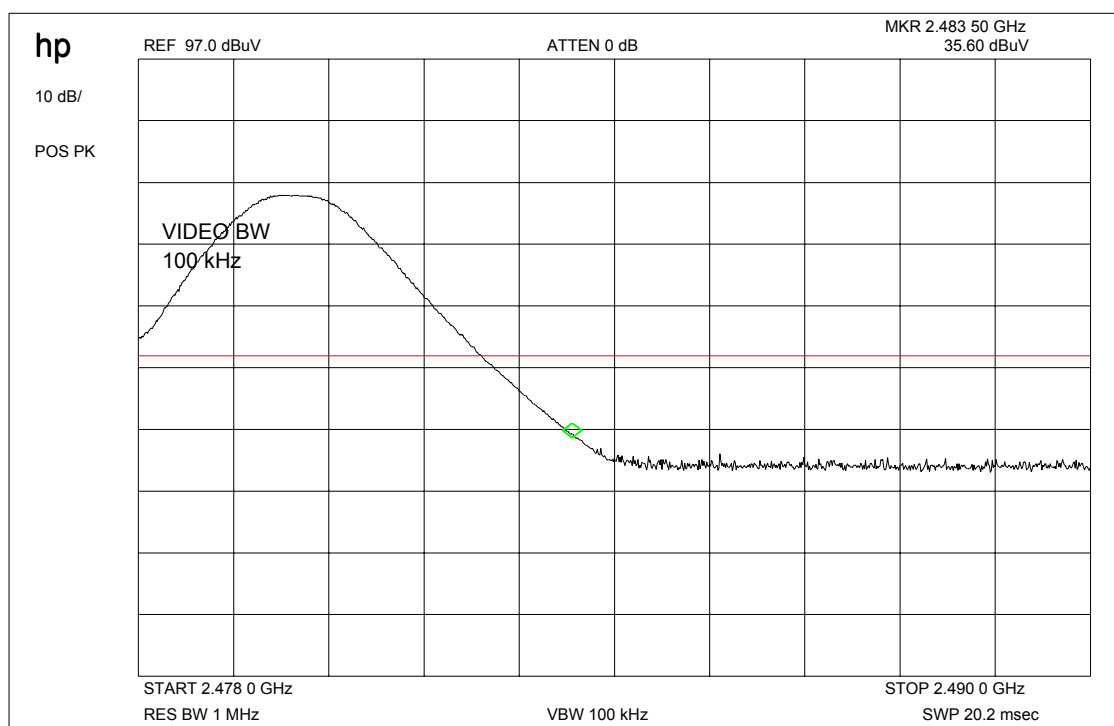
17-24

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance radiated



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

FCC 15.205 (restricted bands)

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

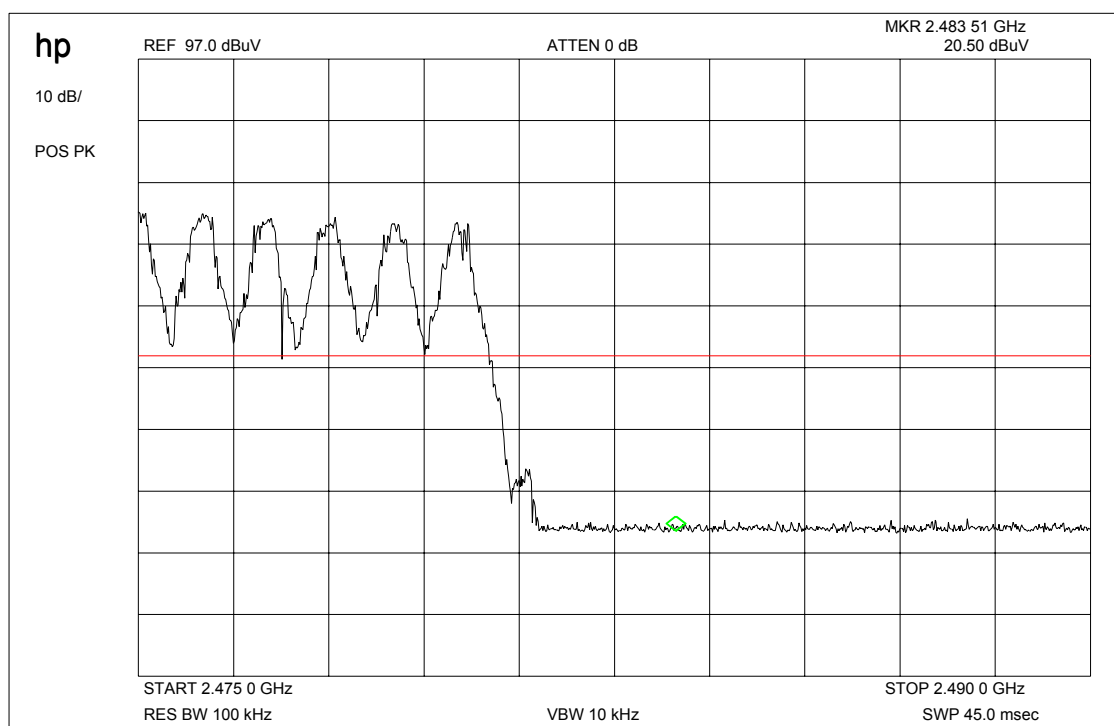
17-24

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance radiated



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

FCC 15.205 (restricted bands)

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

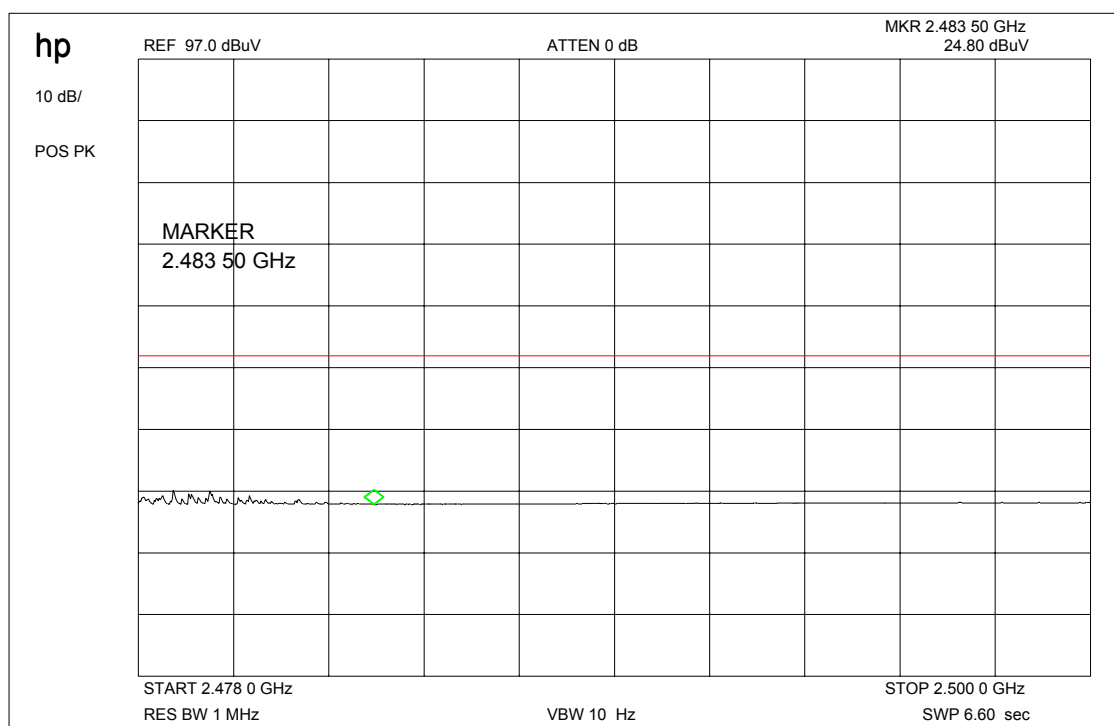
17-24

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

Band-edge compliance radiated Restricted Band Average



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

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17-24

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS- Conducted (Transmitter)

§ 15.247 (c) (1)

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBm)	limit max. allowed emmission power	actual attenuation below frequency of operation (dB)	results
2402		-1.63	30 dBm	-	Operating frequency
all peaks <<limit			-20 dBc	see plot	complies
2441		-1.70	30 dBm	-	Operating frequency
all peaks <<limit			-20 dBc	see plot	complies
2480		-3.65	30 dBm		Operating frequency
all peaks <<limit			-20 dBc	see plot	complies
Measurement uncertainty		± 3dB			

RBW : 100 kHz VBW: 1 MHz

For emissions that fall into restricted bands you find the radiated emissions later in the report.

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)).

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

Equipment under test : HDW-1

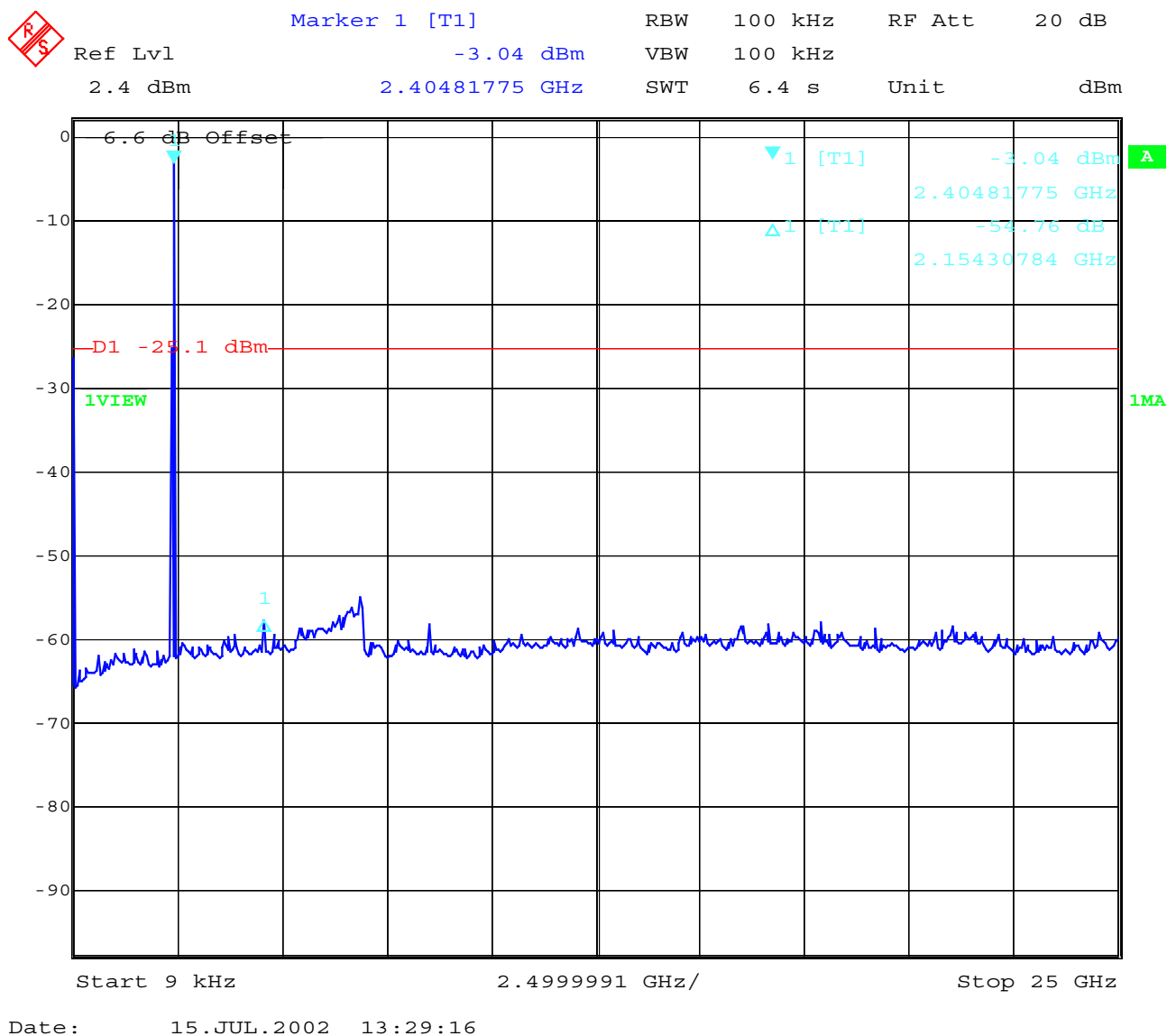
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS- Conducted (Transmitter)

§ 15.247 (c) (1)

Channel 1: 9 kHz - 25 GHz



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

Equipment under test : HDW-1

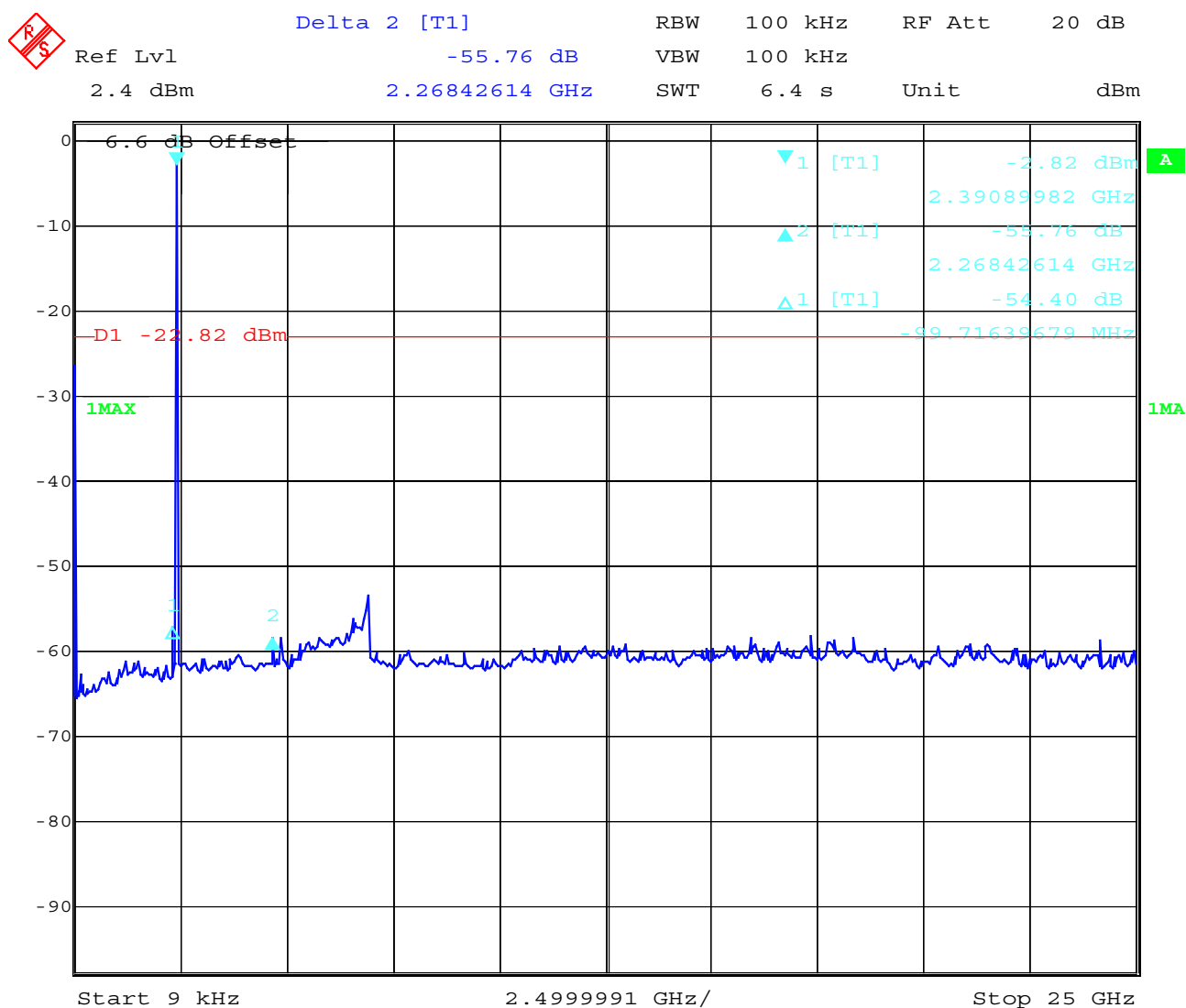
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS- Conducted (Transmitter)

§ 15.247 (c) (1)

Channel 2: 9 kHz – 25 GHz



Date: 15.JUL.2002 13:26:47

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

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

Page 38 (92)

Equipment under test : HDW-1

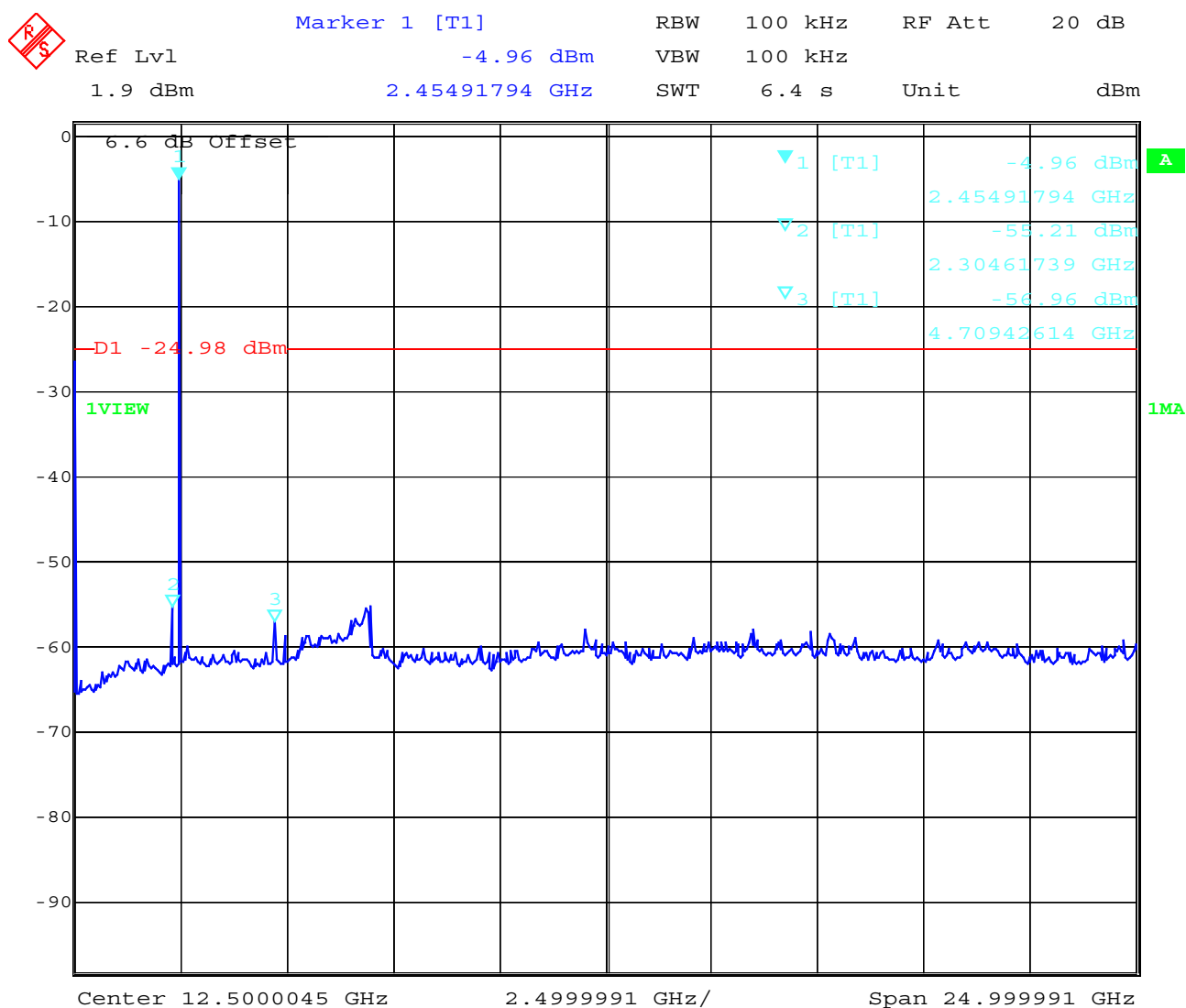
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS- Conducted (Transmitter)

§ 15.247 (c) (1)

Channel 3: 9 kHz – 25 GHz



Date: 15.JUL.2002 12:56:46

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

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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					
Results see plots					
1097.2	V		30.8	54	Complies
2273.3	H		22.2	54	complies
all	other	peaks	> 20 dB	below	limit
CH 2					
Results see plots					
1459.5	V		32.1		
2308.2	V		35.9		
all	other	peaks	> 20 dB	below	limit
CH 3					
Results see plots					
1463.5	H		29.6	54	Complies
2346.9	H		36.2	54	complies
all	other	peaks	> 20 dB	below	limit
Measurement uncertainty		± 3dB			

LIMITS

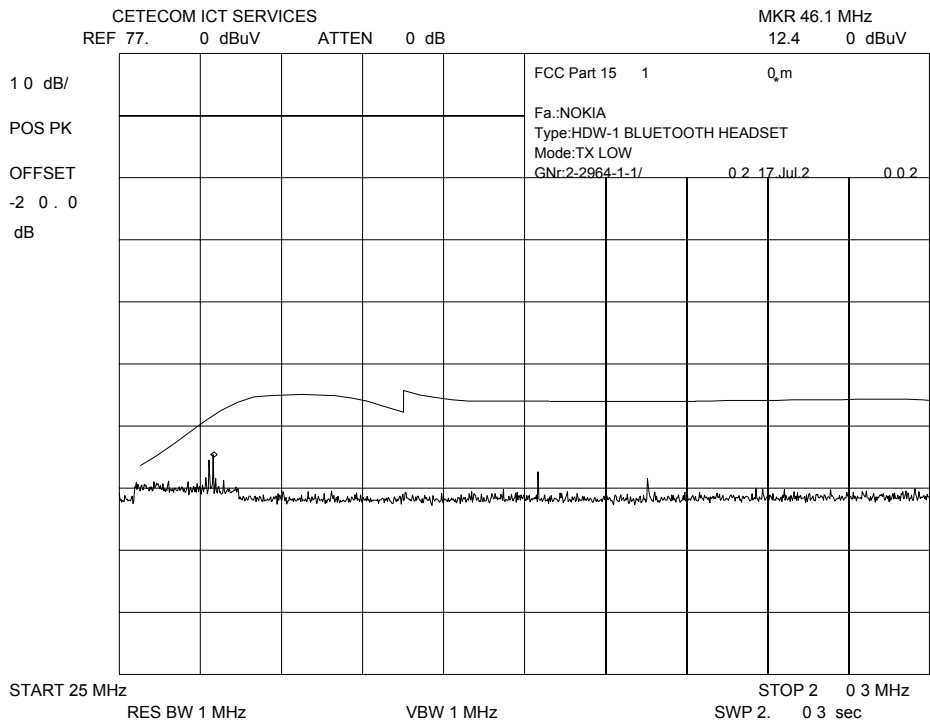
SUBCLAUSE § 15.247 (c)

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)).

Equipment under test : HDW-1
Ambient temperature : 24°C
Relative humidity : 38%

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

2402 MHz vertical 25 –200 MHz



$f < 1 \text{ GHz}$: 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)).

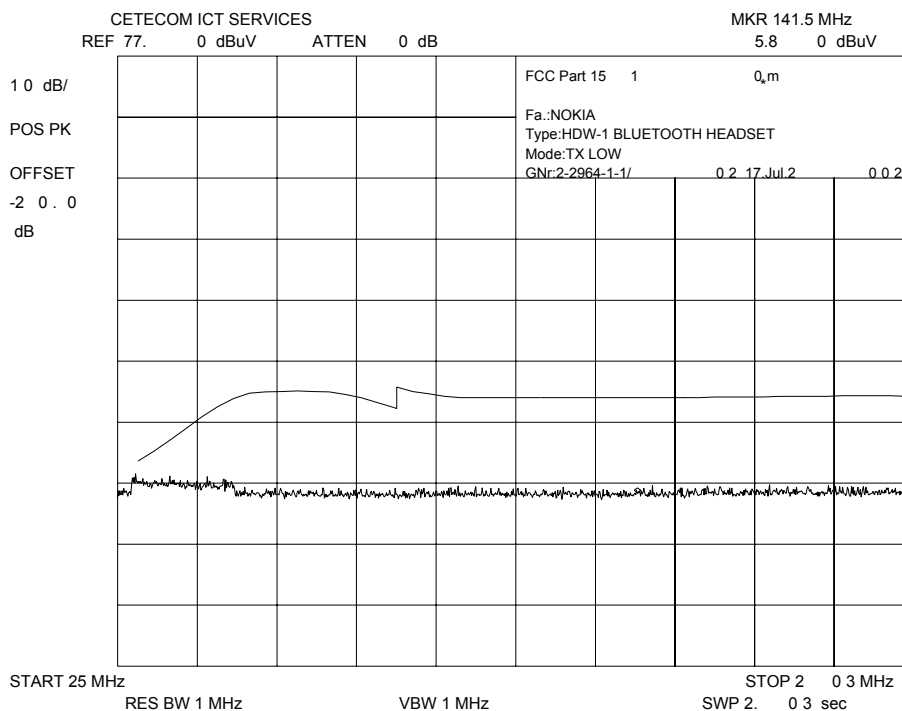
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2402 MHz horizontal 25 –200 MHz



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 42 (92)

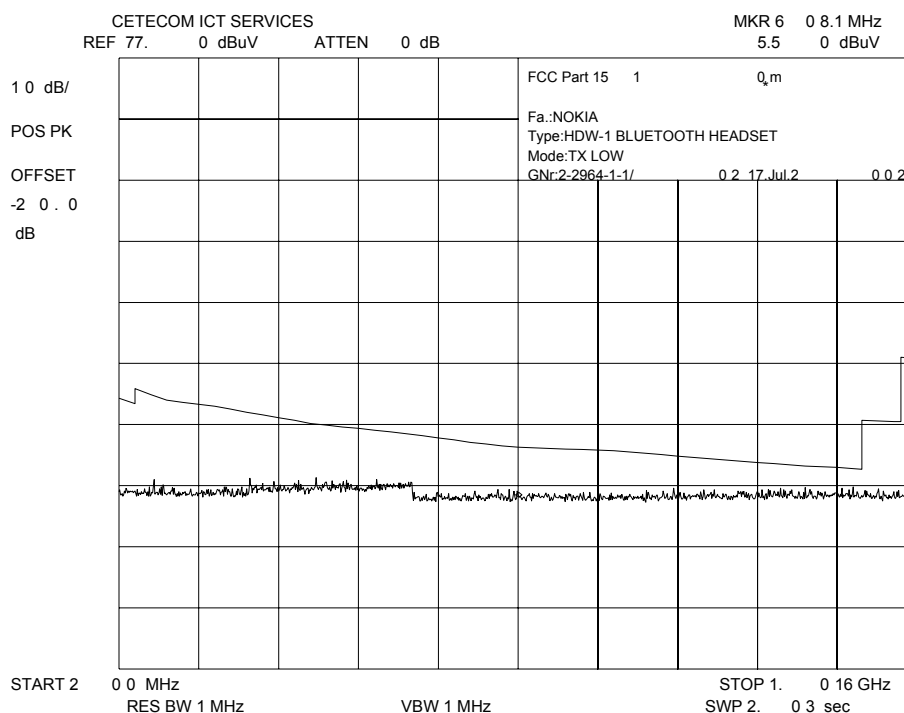
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2402 MHz vertical 200 – 1000 MHz



$f < 1 \text{ GHz}$: 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)).

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

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 43 (92)

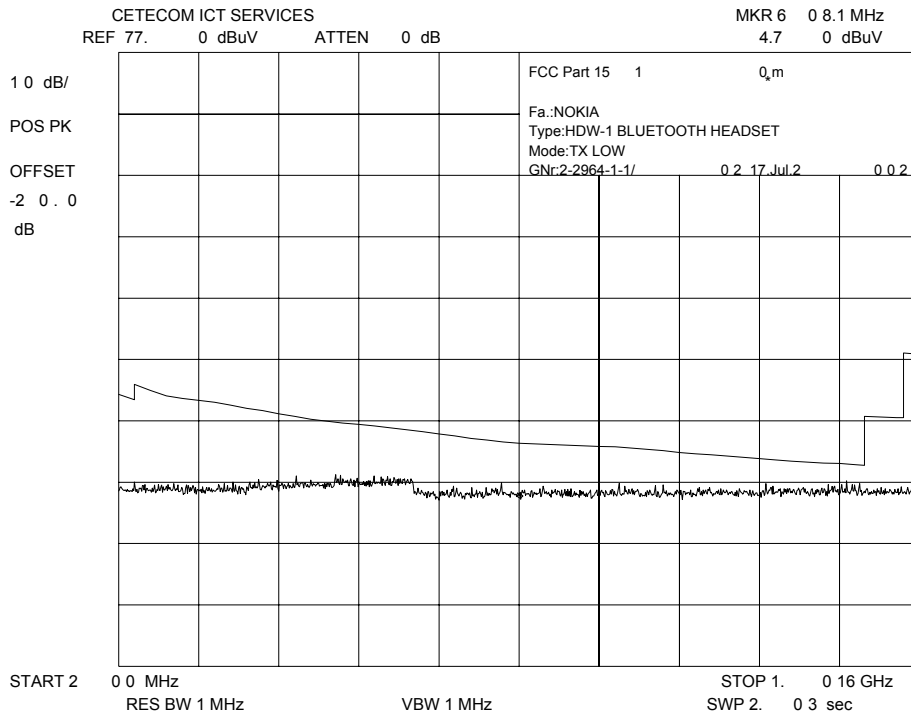
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2402 MHz horizontal 200 – 1000 MHz



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

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

Data File : /22964_05.DOC

17 Jul 1902 17:03:36

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS			SITE			CORR FACTOR dB	COMMENTS
			ABS	dLIM	MODE	POL	HGT	AZM		
			dBuV/m	dB			cm	deg		
1	45.2	29.5	22.7	-6.8	PK	V	100	0	N/T	
2	46.1	29.5	23.2	-6.3	PK	V	100	0	N/T	
3	117.5	33.0	21.6	-11.4	PK	V	100	0	N/T	
4	141.5	33.0	20.5	-12.5	PK	V	100	0	N/T	

N/T in CORR FACTOR column denotes a non-traceable signal.

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

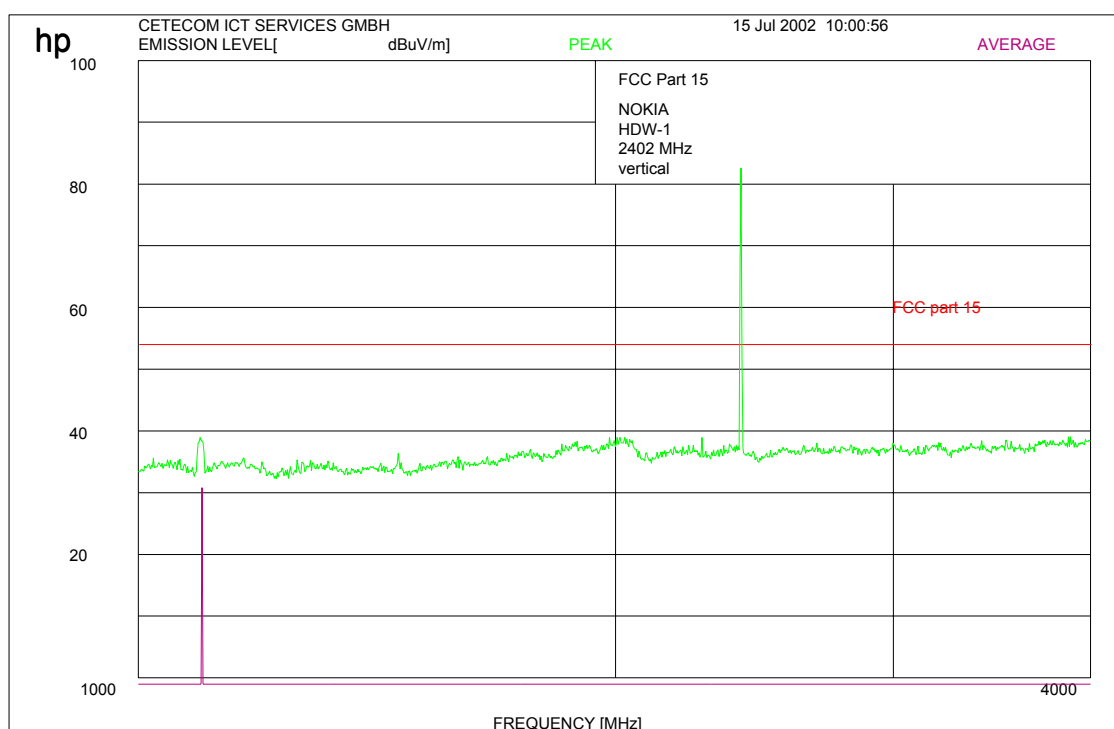
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2402 MHz vertical



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

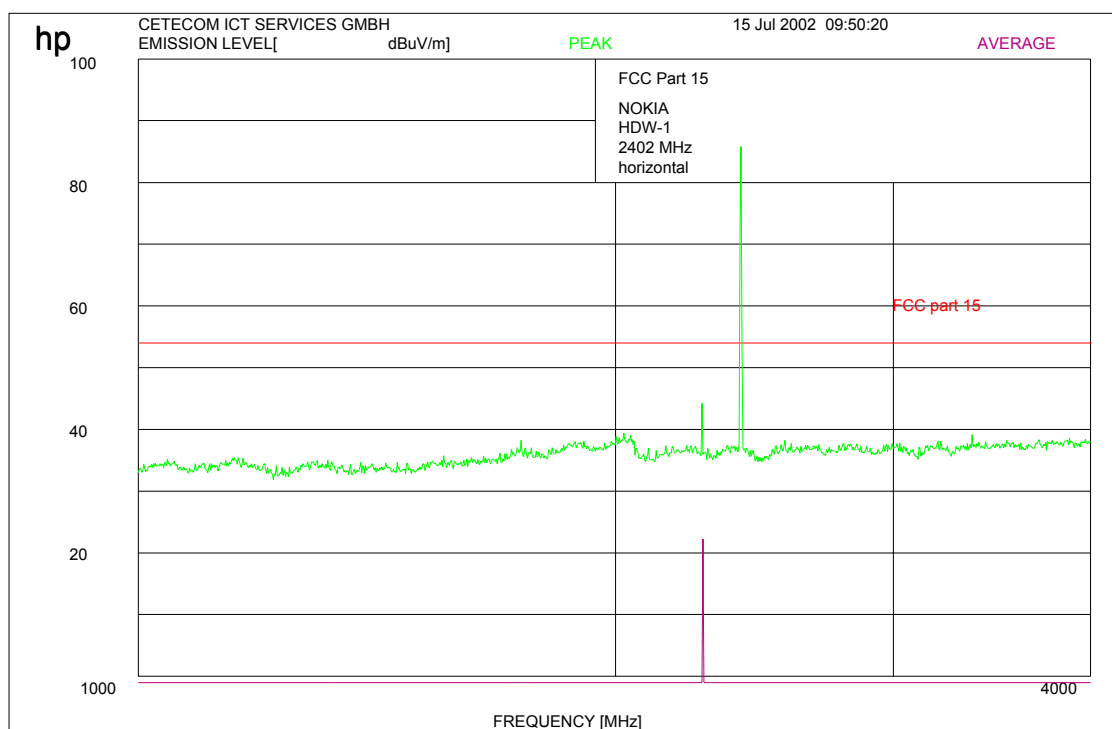
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2402 MHz horizontal



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

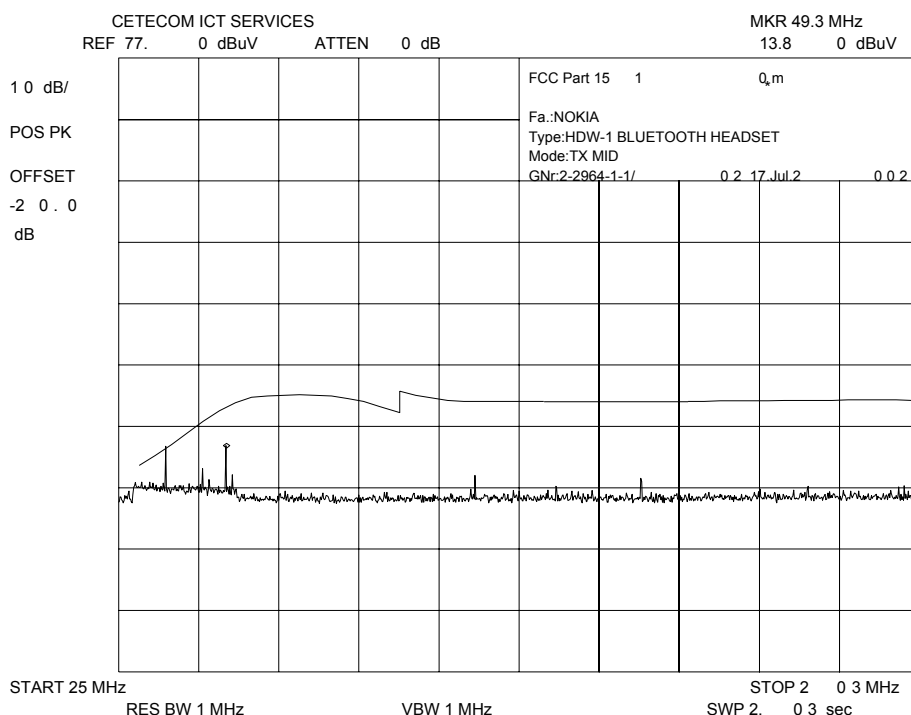
(for reference numbers see test equipment listing)

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 46 (92)

Equipment under test : HDW-1
Ambient temperature : 24°C
Relative humidity : 38%

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

2441 MHz vertical 25 –200 MHz



$f < 1 \text{ GHz}$: 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)).

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

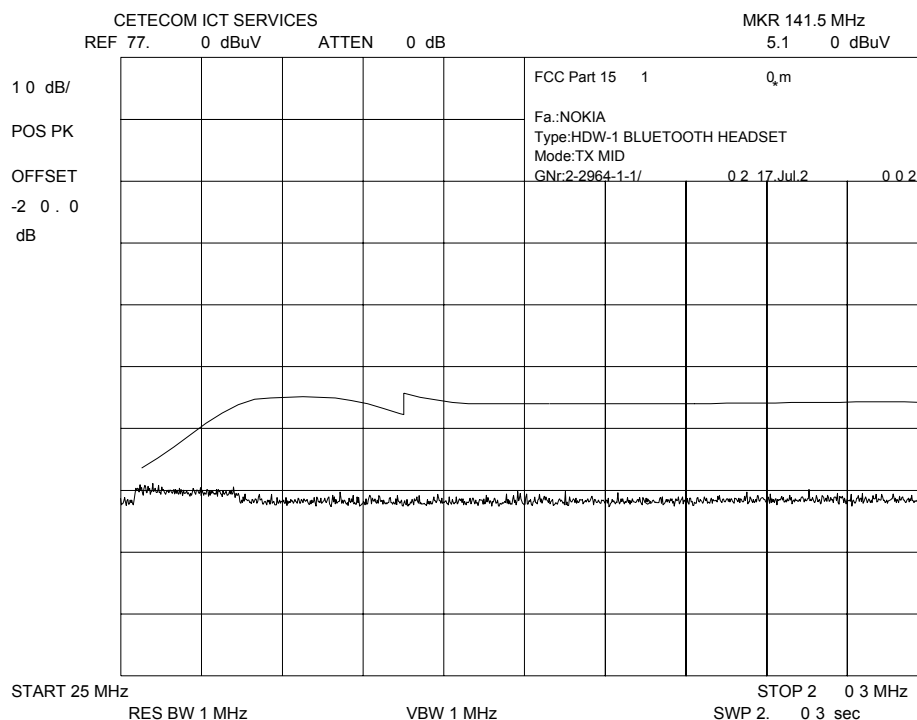
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2441 MHz horizontal 25 –200 MHz



$f < 1 \text{ GHz}$: 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)).

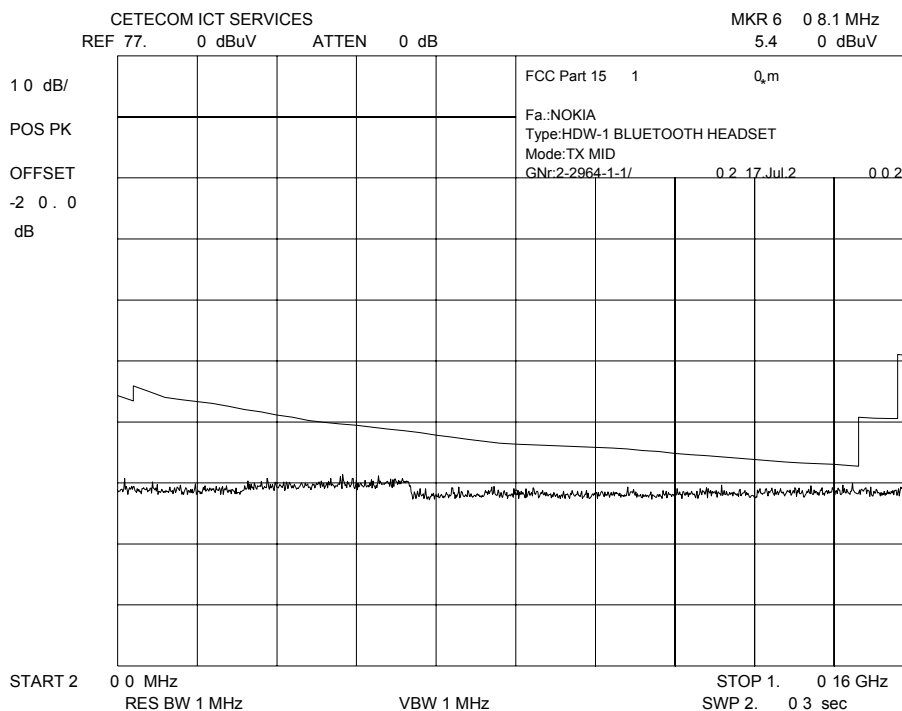
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2441 MHz vertical 200 – 1000 MHz



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 49 (92)

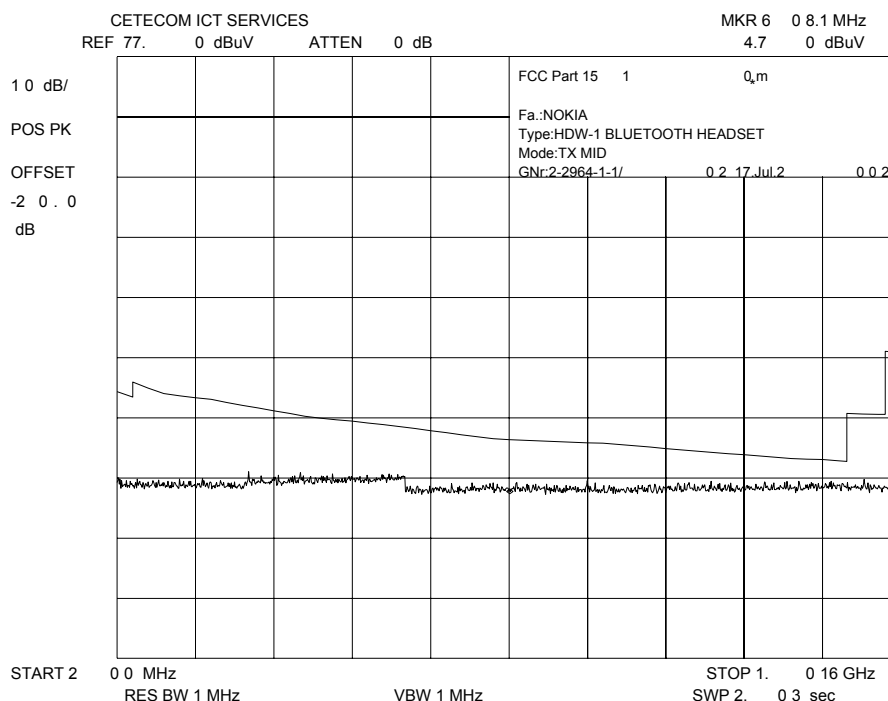
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2441 MHz horizontal 200 – 1000 MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Data File : /22964_10.DOC

17 Jul 1902 17:46:03

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS			SITE			CORR FACTOR dB	COMMENTS
			ABS	dLIM	MODE	POL	HGT	AZM		
			dBuV/m	dB			cm	deg		
1	36.000	29.5	16.1	-13.4	QP	V	102	7	16.1	
2	44.2	29.5	21.8	-7.7	PK	V	96	0	N/T	
3	49.3	29.5	23.2	-6.3	PK	V	96	0	N/T	
4	104.7	33.0	21.0	-12.0	PK	V	96	0	N/T	
5	122.8	33.0	19.0	-14.0	PK	V	96	0	N/T	
6	141.5	33.0	20.5	-12.5	PK	V	96	0	N/T	

N/T in CORR FACTOR column denotes a non-traceable signal.

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

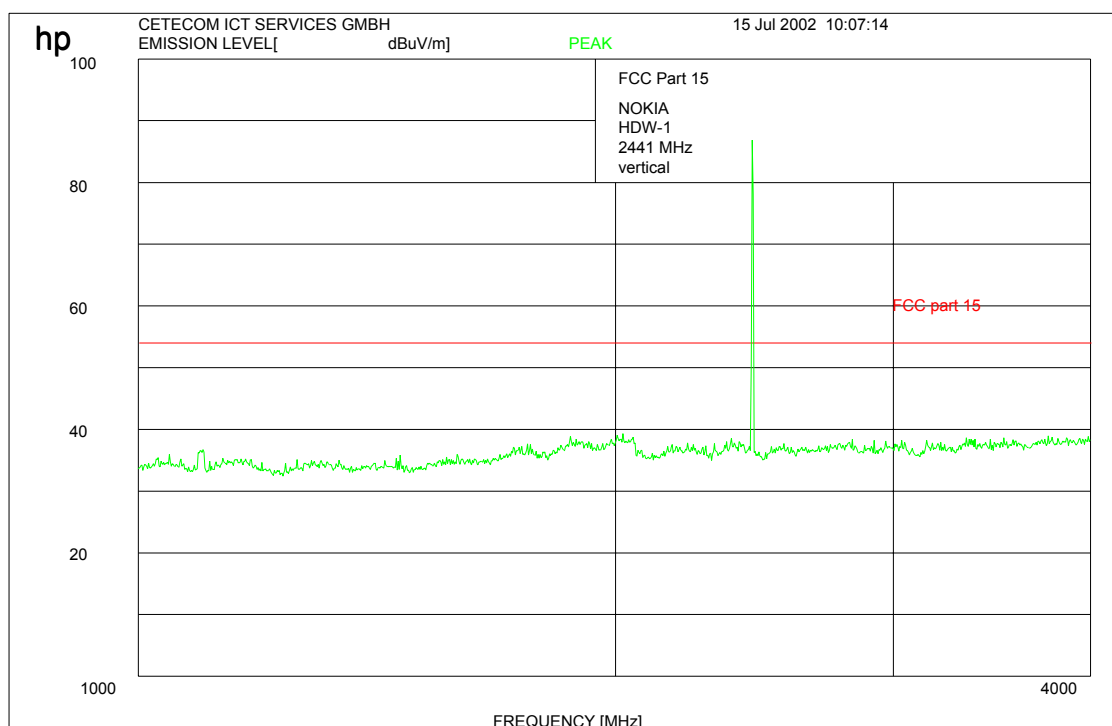
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2441 MHz vertical



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

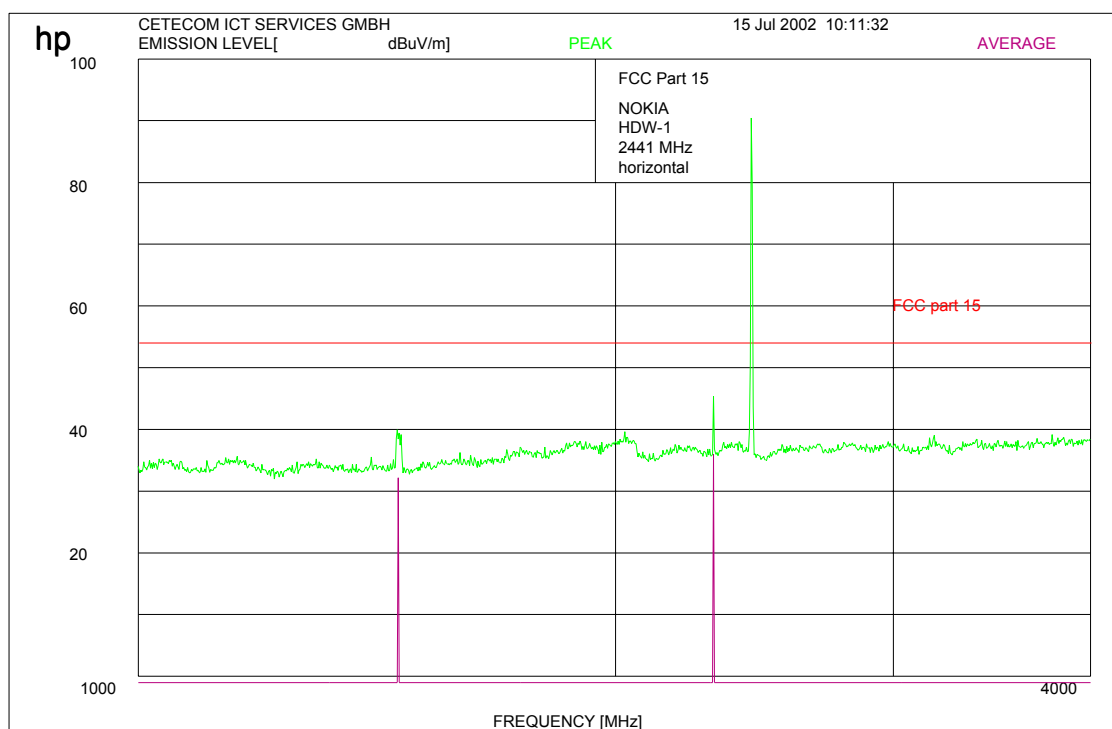
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2441 MHz horizontal



$f < 1 \text{ GHz}$: 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)).

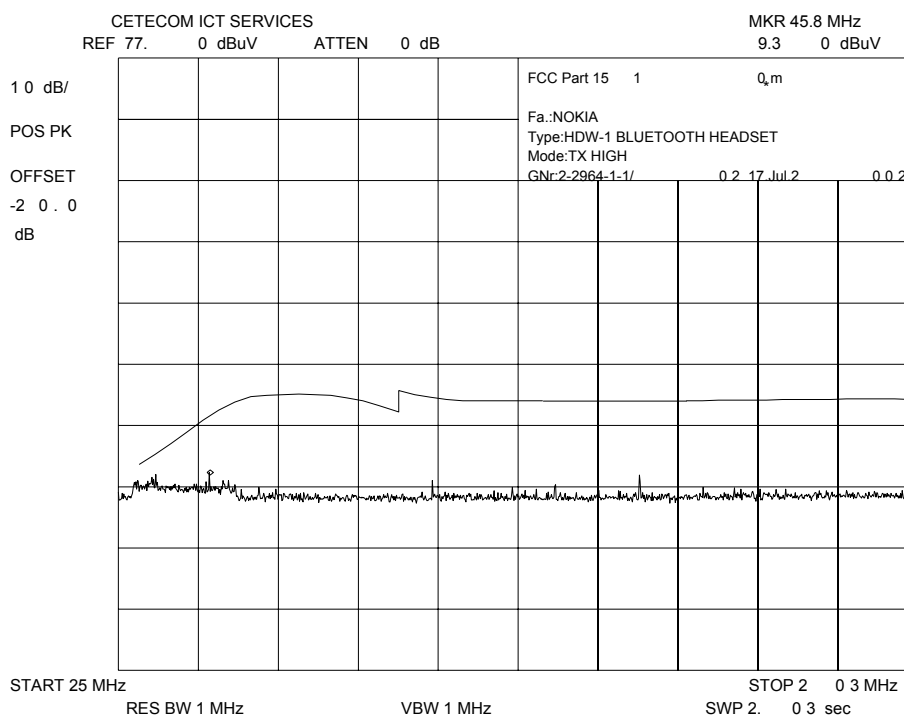
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : HDW-1
 Ambient temperature : 24°C
 Relative humidity : 38%

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

2480 MHz vertical 25 –200 MHz



$f < 1 \text{ GHz}$: 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)).

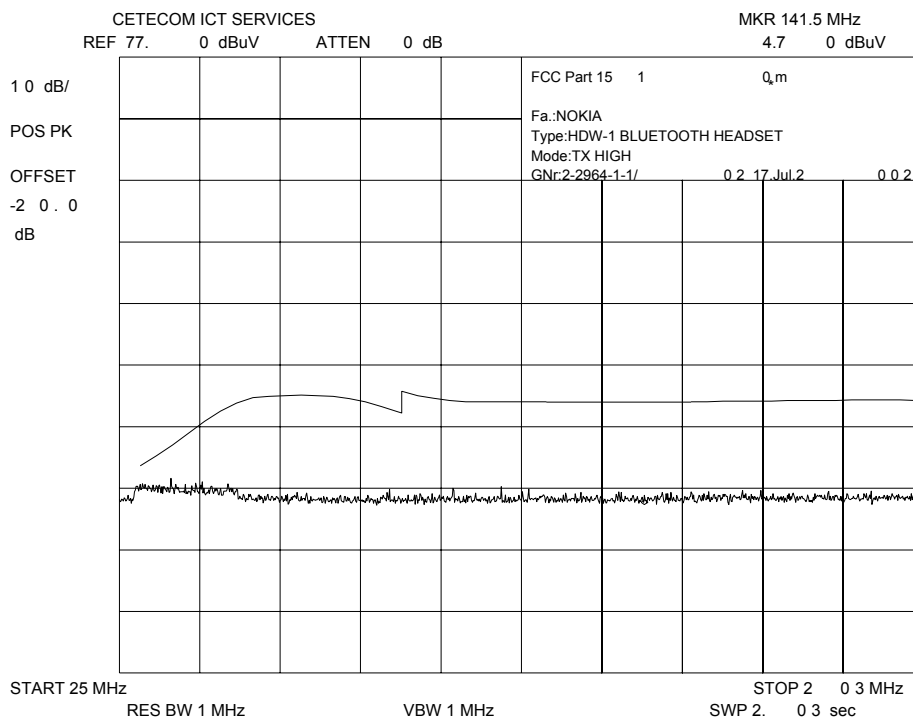
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2480 MHz horizontal 25 –200 MHz



$f < 1 \text{ GHz}$: 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)).

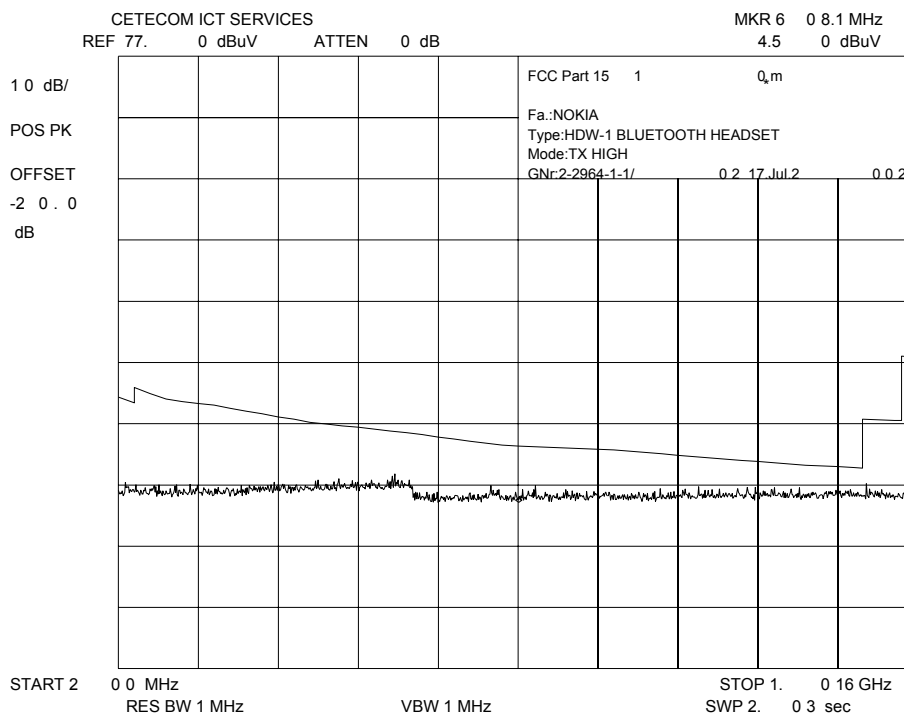
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2480 MHz vertical 200 – 1000 MHz



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 55 (92)

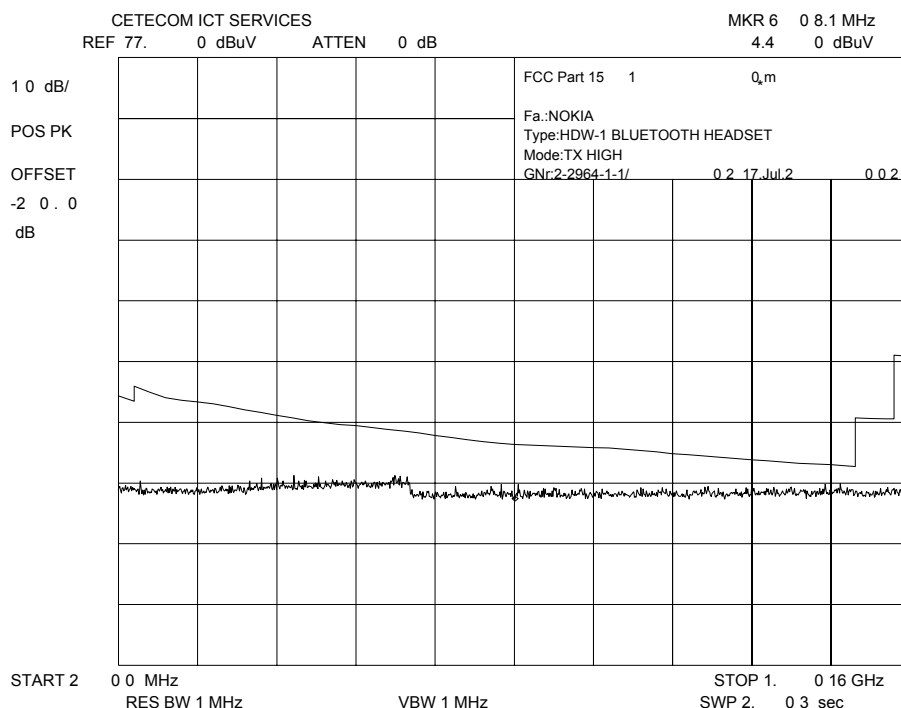
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2480 MHz horizontal 200 – 1000 MHz



f < 1 GHz :

RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Data File : /22964_15.DOC

17 Jul 1902 18:15:18

No	EMISSION	SPEC	MEASUREMENTS			SITE			CORR	COMMENTS
	FREQUENCY MHz	LIMIT dBuV/m	ABS	dLIM dB	MODE	POL	HGT cm	AZM deg	FACTOR dB	
1	33.800	29.5	17.4	-12.1	QP	V	102	6	17.2	
2	45.8	29.5	20.2	-9.3	PK	V	96	360	N/T	
3	95.4	33.0	19.4	-13.6	PK	V	96	360	N/T	
4	122.8	33.0	19.3	-13.7	PK	V	96	360	N/T	
5	141.5	33.0	20.9	-12.1	PK	V	96	360	N/T	

N/T in CORR FACTOR column denotes a non-traceable signal.

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

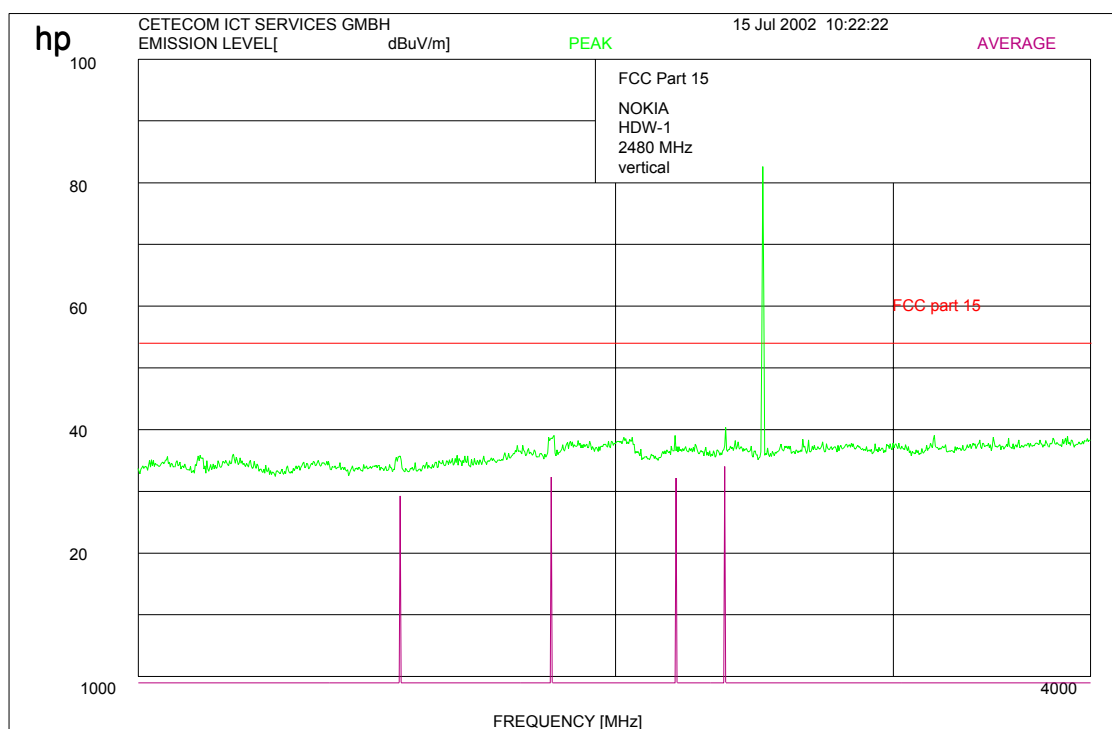
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2480 MHz vertical



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

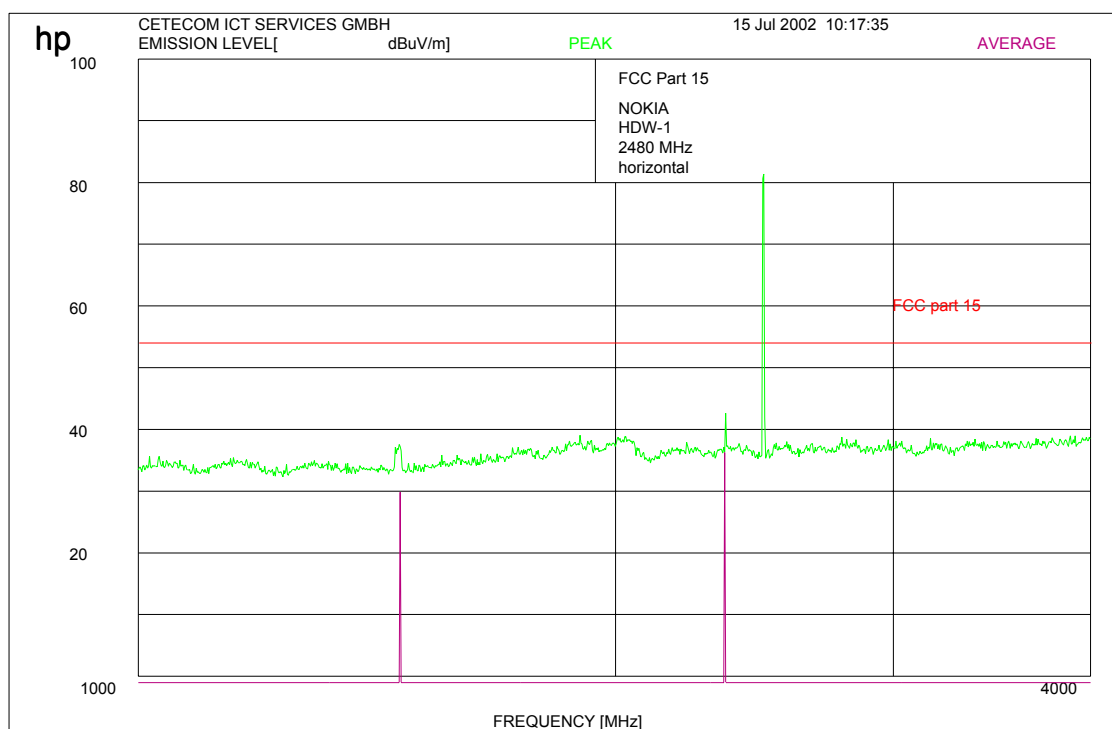
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

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

2480 MHz horizontal



$f < 1 \text{ GHz}$: 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : HDW-1

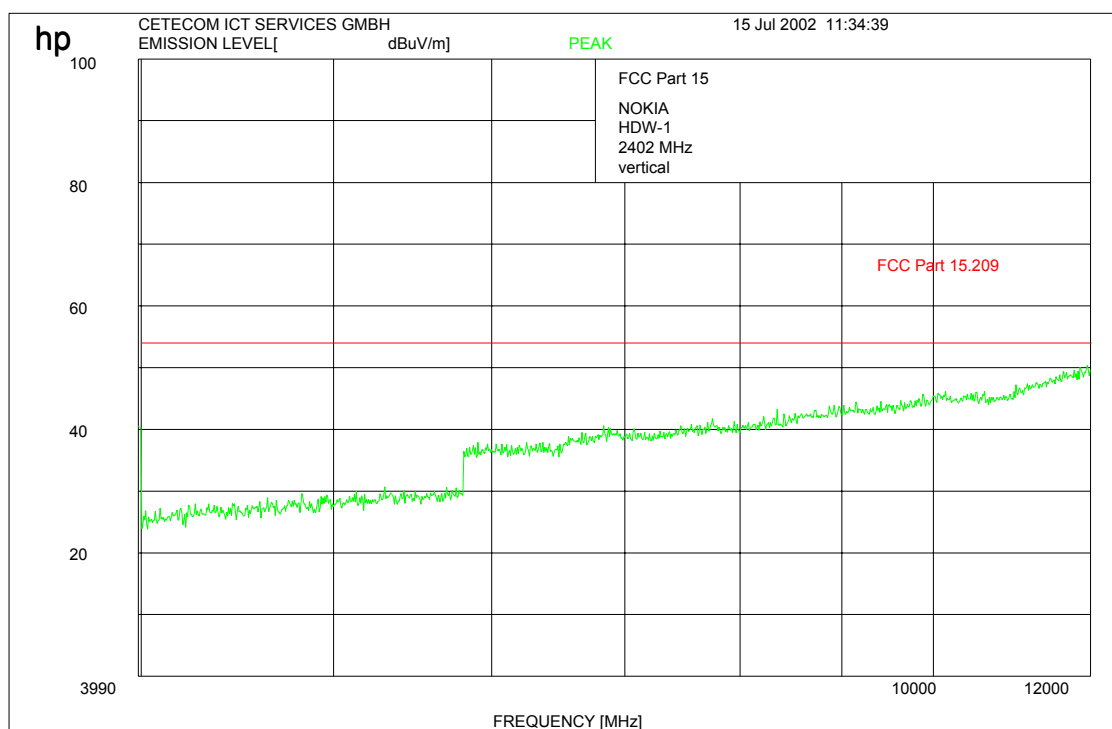
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 1 vertical 4 to 12 GHz



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

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

Carrier was suppressed by a stubb tuner to avoid overload of the system.

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)).

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

Equipment under test : HDW-1

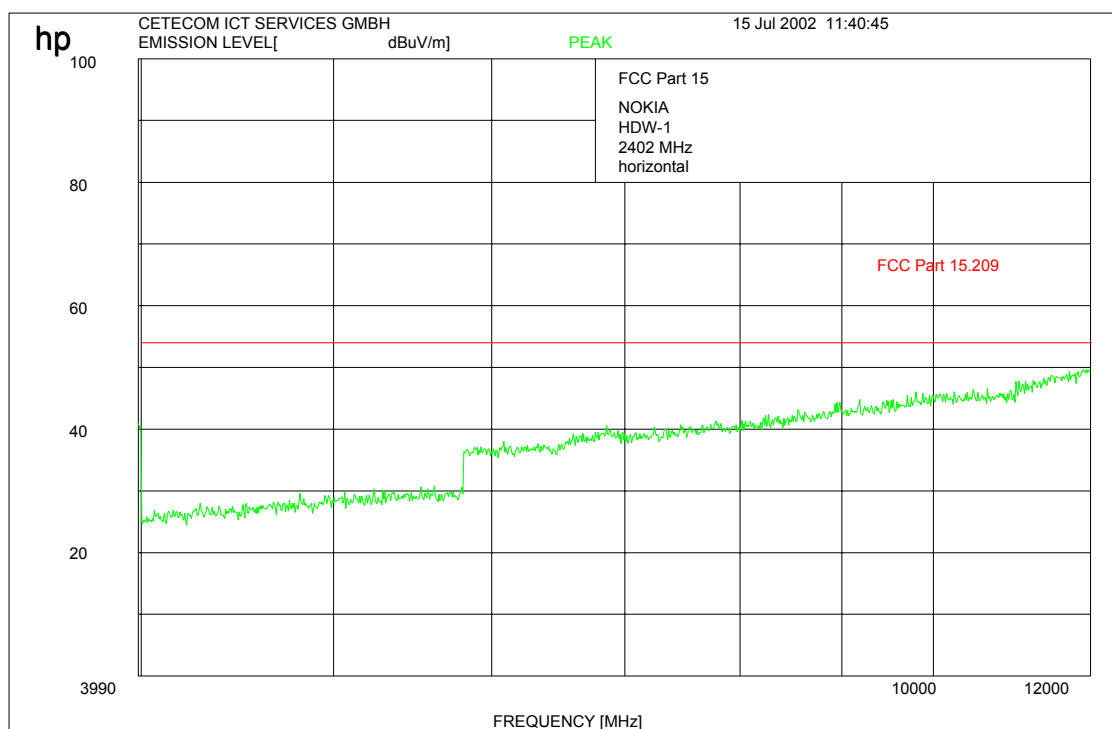
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 1 horizontal 4 to 12 GHz



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

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

Carrier was suppressed by a stubb tuner to avoid overload of the system.

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : HDW-1

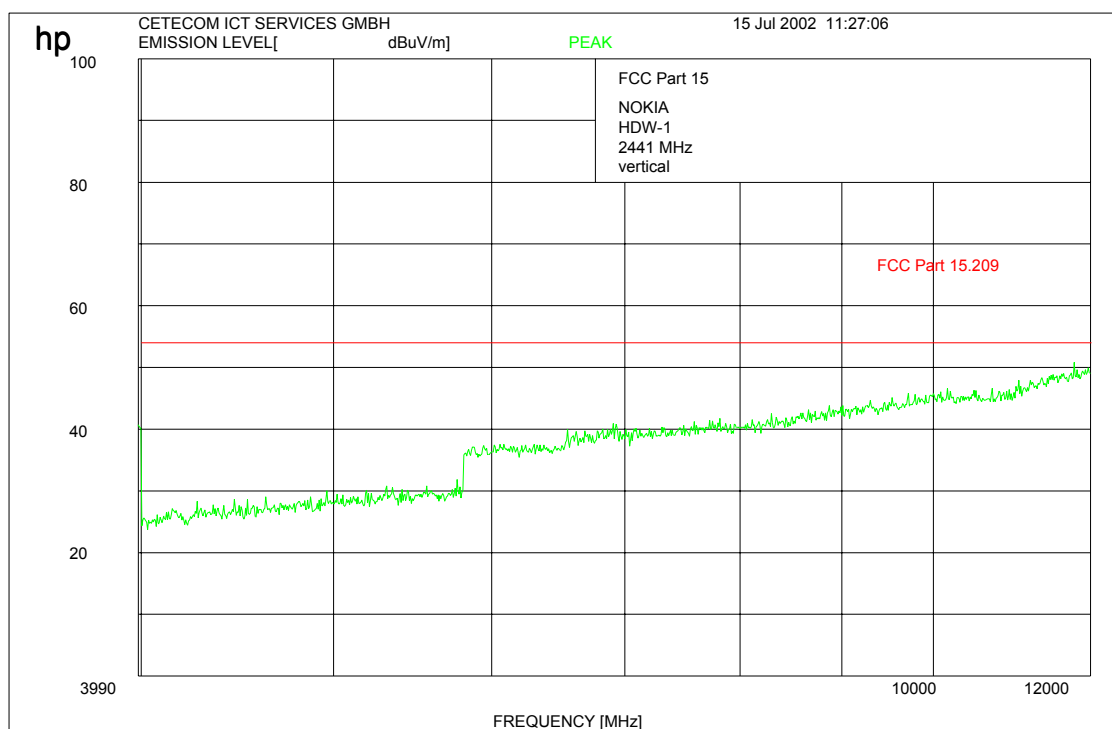
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 2 vertical 4 to 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : HDW-1

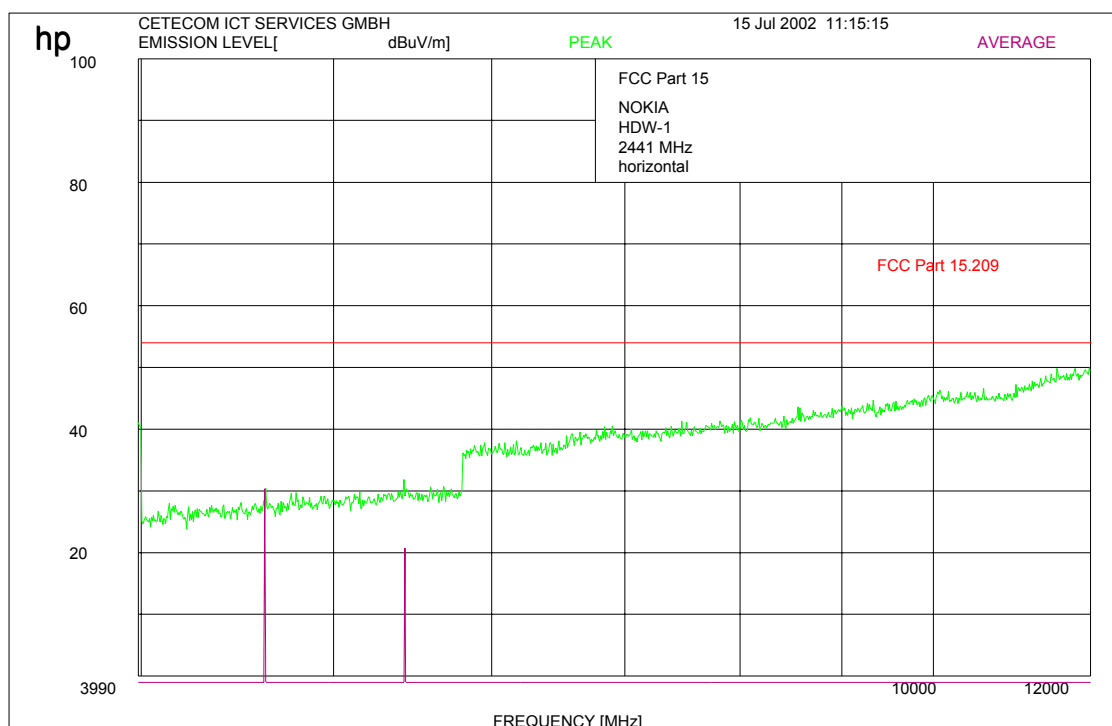
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 2 horizontal 4 to 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : HDW-1

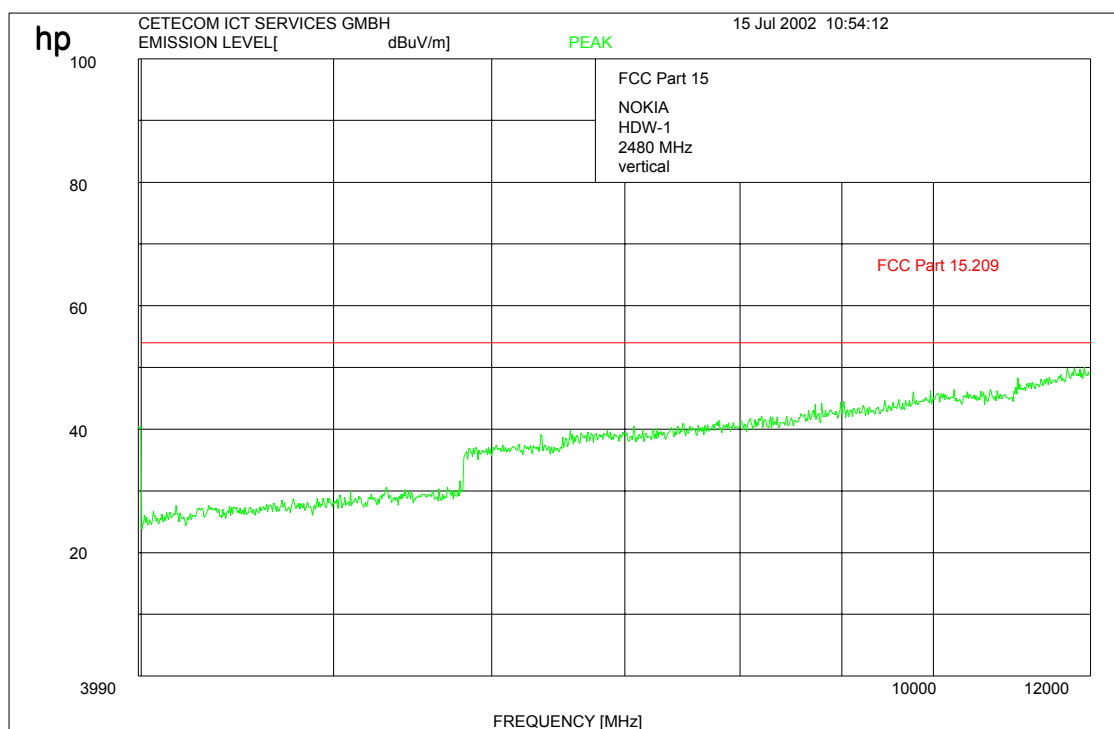
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 3 vertical 4 to 12 GHz



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

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

Carrier was suppressed by a stubb tuner to avoid overload of the system.

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : HDW-1

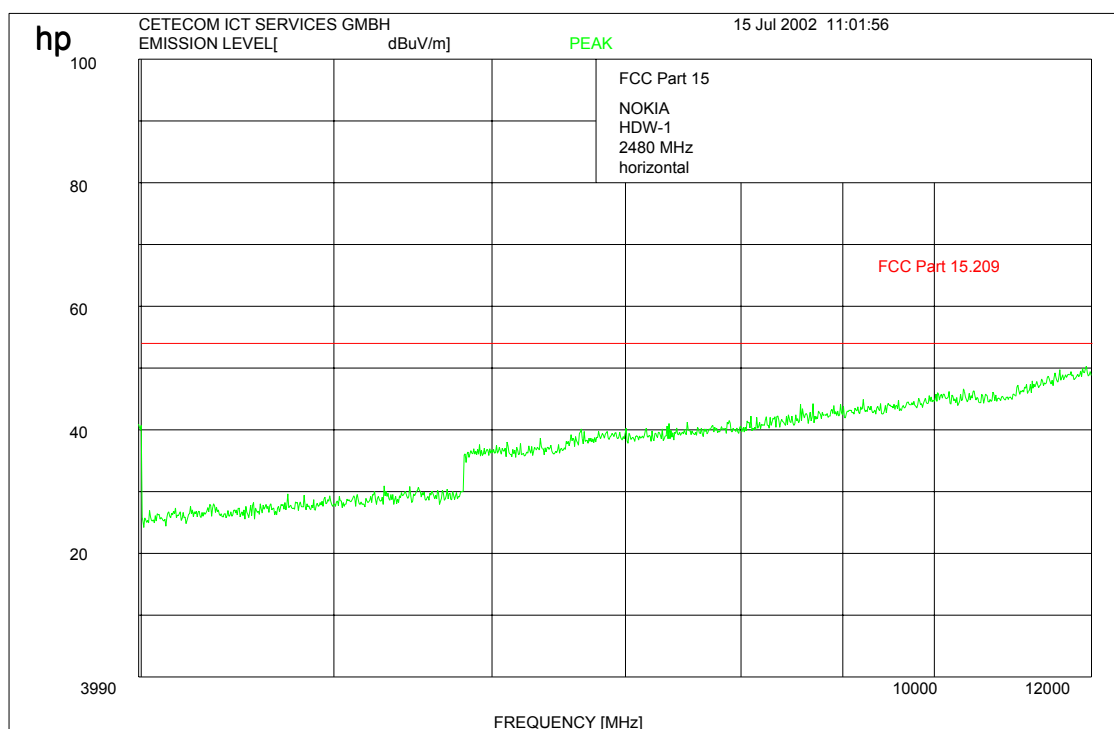
Ambient temperature : 24°C

Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 3 horizontal 4 to 12 GHz



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

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

Carrier was suppressed by a stubb tuner to avoid overload of the system.

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)).

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

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 64 (92)

Equipment under test : HDW-1

Ambient temperature : 24°C

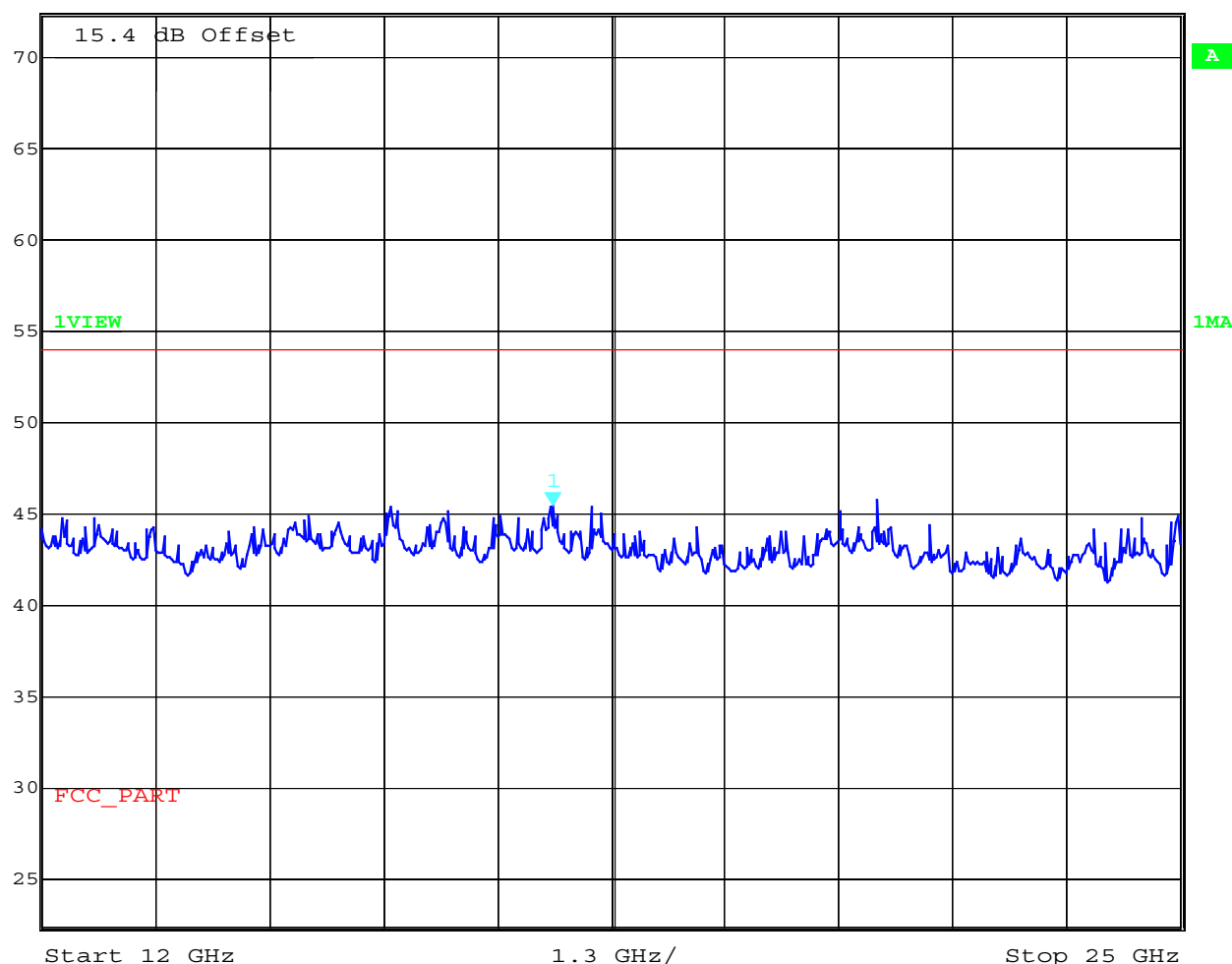
Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 1, 12 – 25 GHz


 Marker 1 [T1] RBW 1 MHz RF Att 0 dB
 Ref Lvl 45.46 dBμV VBW 1 MHz
 72.4 dBμV 17.83567134 GHz SWT 74 ms Unit dBμV



Date: 15.JUL.2002 12:37:56

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)).

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

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

Ambient temperature : 24°C

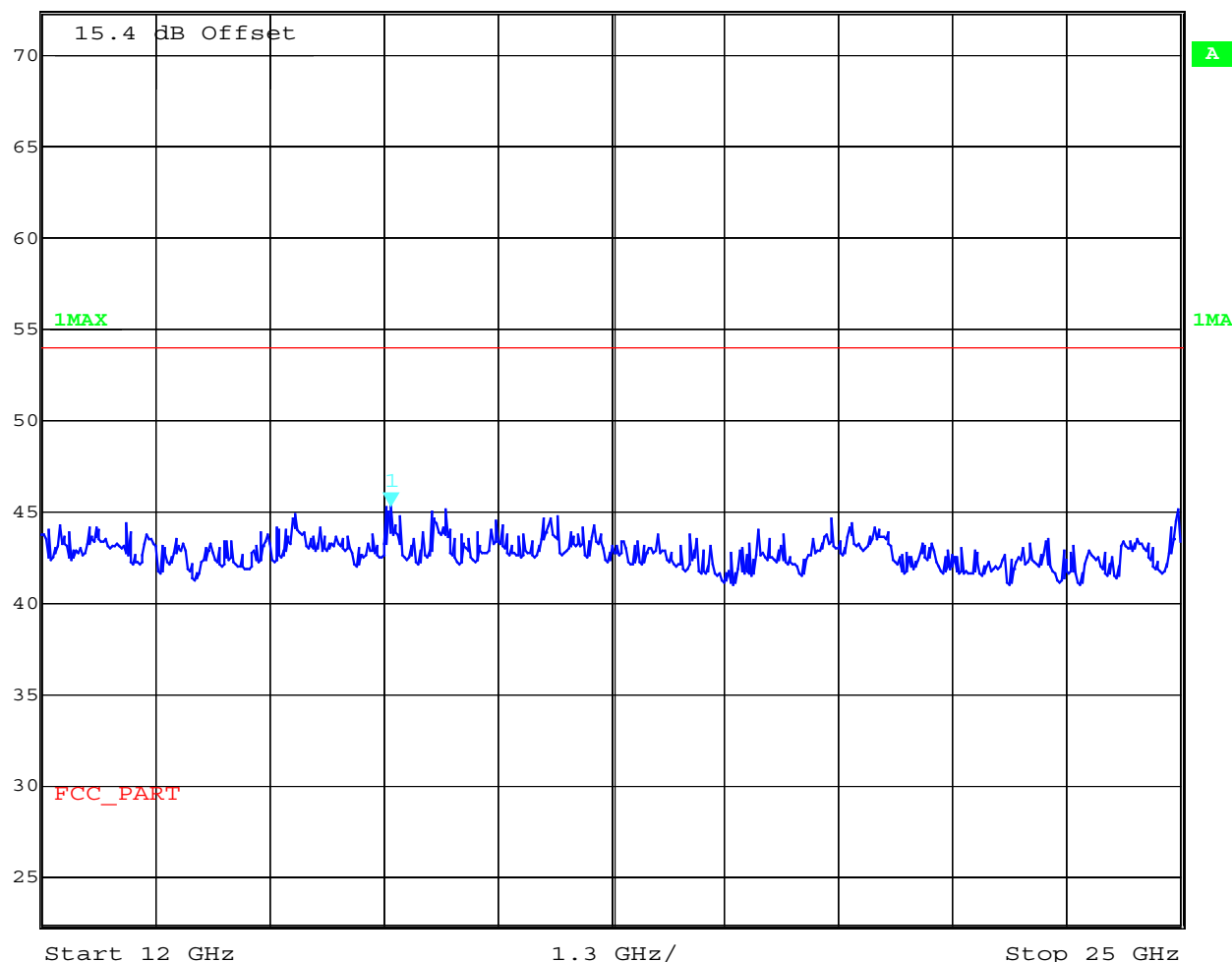
Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 2, 12 – 25 GHz


 Marker 1 [T1] RBW 1 MHz RF Att 0 dB
 Ref Lvl 45.38 dBμV VBW 1 MHz
 72.4 dBμV 15.98597194 GHz SWT 74 ms Unit dBμV



Date: 15.JUL.2002 12:39:05

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)).

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

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

Ambient temperature : 24°C

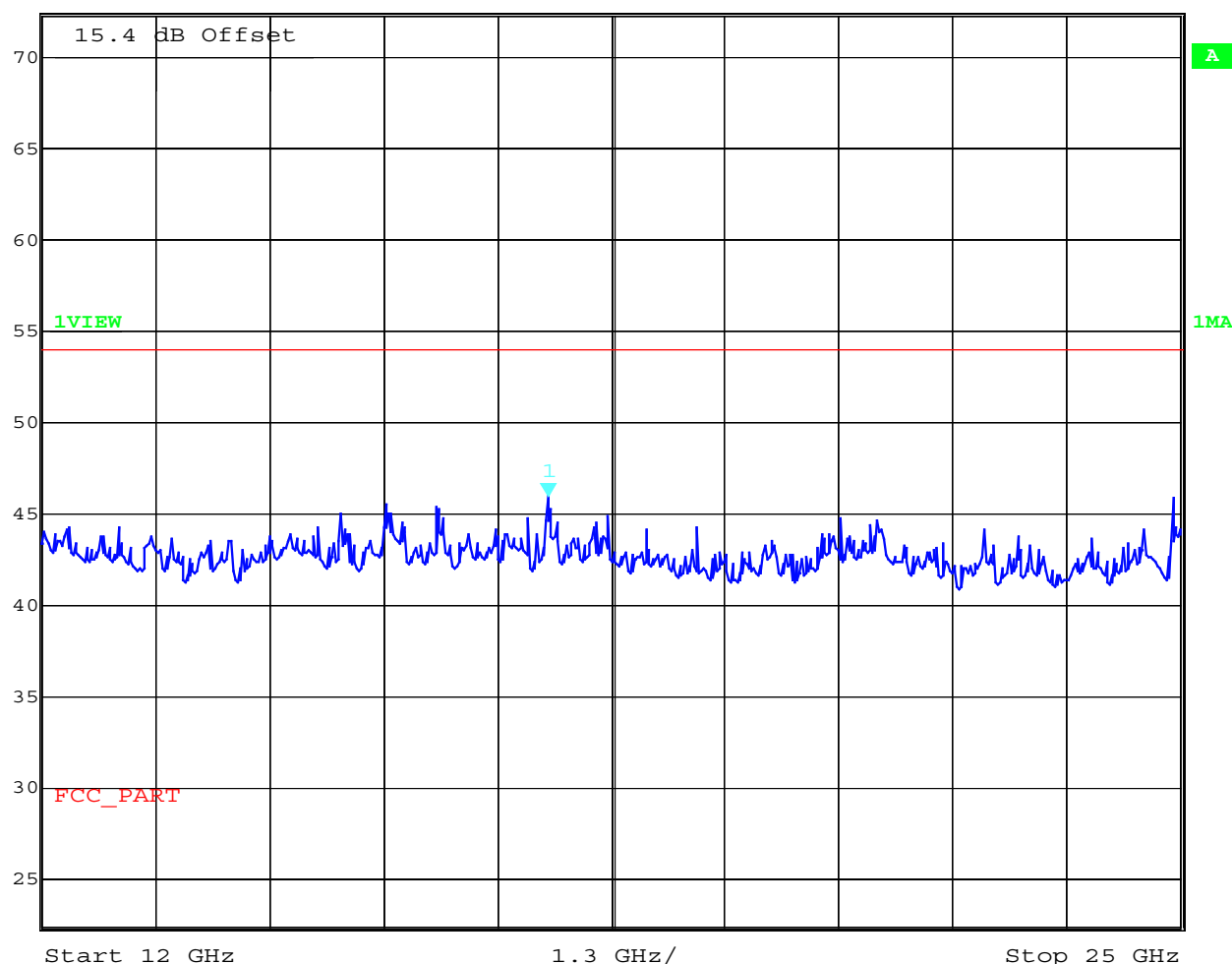
Relative humidity : 38%

EMISSION LIMITATIONS (Transmitter)

CLAUSE § 15.247 (c) (1)

Channel 3, 12 – 25 GHz


 Marker 1 [T1] RBW 1 MHz RF Att 0 dB
 Ref Lvl 46.02 dBμV VBW 1 MHz
 72.4 dBμV 17.78356713 GHz SWT 74 ms Unit dBμV



Date: 15.JUL.2002 12:40:19

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)).

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

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 67 (92)

Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION Radiated

§ 15.209

< 1 GHz

Data File : /22964_25.DOC

17 Jul 1902 18:49:09

No	EMISSION	SPEC LIMIT	MEASUREMENTS			POL	SITE		CORR FACTOR	COMMENTS
	FREQUENCY MHz		ABS	dLIM	MODE		HGT	AZM		
			dBuV/m	dB			cm	deg	dB	
1	32.200	29.5	18.1	-11.4	QP	V	104	6	17.9	
2	83.5	29.5	17.4	-12.1	PK	V	97	360	N/T	
3	109.9	33.0	19.8	-13.2	PK	H	332	0	N/T	
4	122.7	33.0	19.4	-13.6	PK	V	97	360	N/T	
5	126.6	33.0	19.1	-13.9	PK	H	332	0	N/T	
6	141.5	33.0	20.7	-12.3	PK	V	97	360	N/T	
7	223.7	35.5	22.8	-12.7	PK	H	329	0	N/T	
8	280.8	35.5	23.3	-12.2	PK	H	329	0	N/T	
9	755.8	35.5	30.7	-4.8	PK	V	96	360	N/T	
10	958.790	35.5	23.9	-11.6	QP	H	102	7	25.7	
11	967.1	43.5	32.8	-10.7	PK	H	329	0	N/T	

N/T in CORR FACTOR column denotes a non-traceable signal.

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

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

> 1 GHz

SPURIOUS EMISSIONS LEVEL (µV/m)								
Idle mode								
f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
1097.2	AV	29.5						
1821.5	AV	31.8						
1457.5	AV	29.7						
1463.5	AV	29.2						
4623.7	AV	34.0						
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Measurement distance see table

Limits

SUBCLAUSE § 15.209

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

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : HDW-1

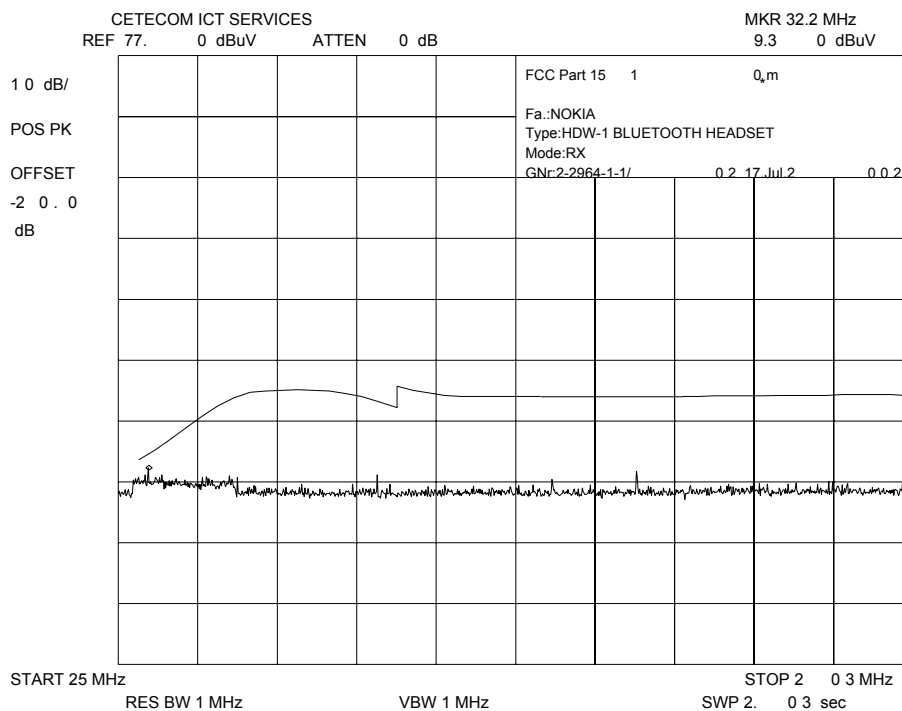
Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION

§ 15.209

25 –200 MHz vertical



Limits

SUBCLAUSE § 15.209

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

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

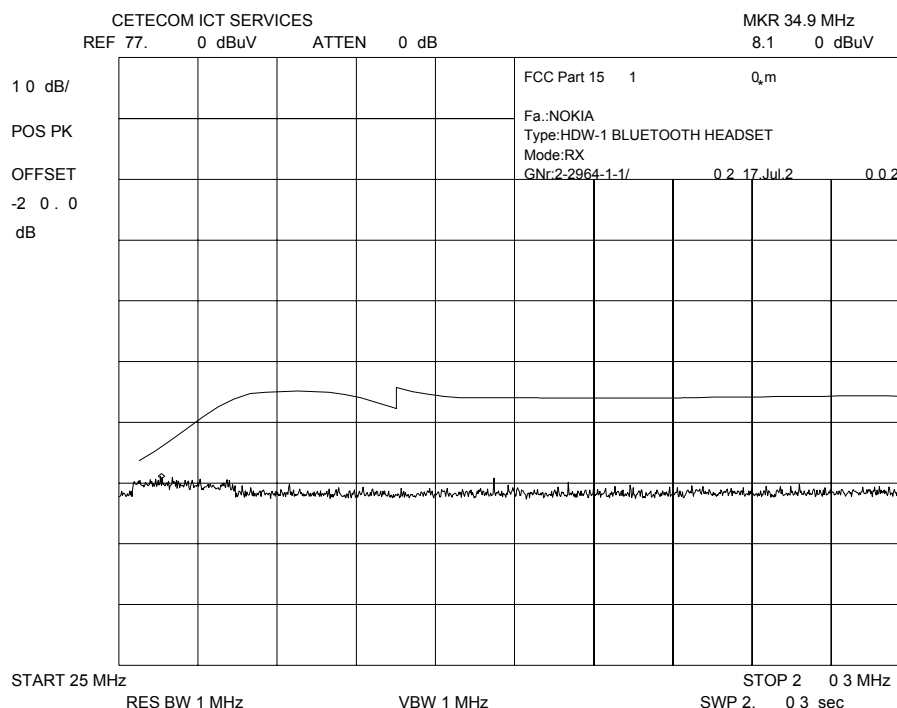
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION 25 –200 MHz horizontal

§ 15.209



Limits

SUBCLAUSE § 15.209

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

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

Equipment under test : HDW-1

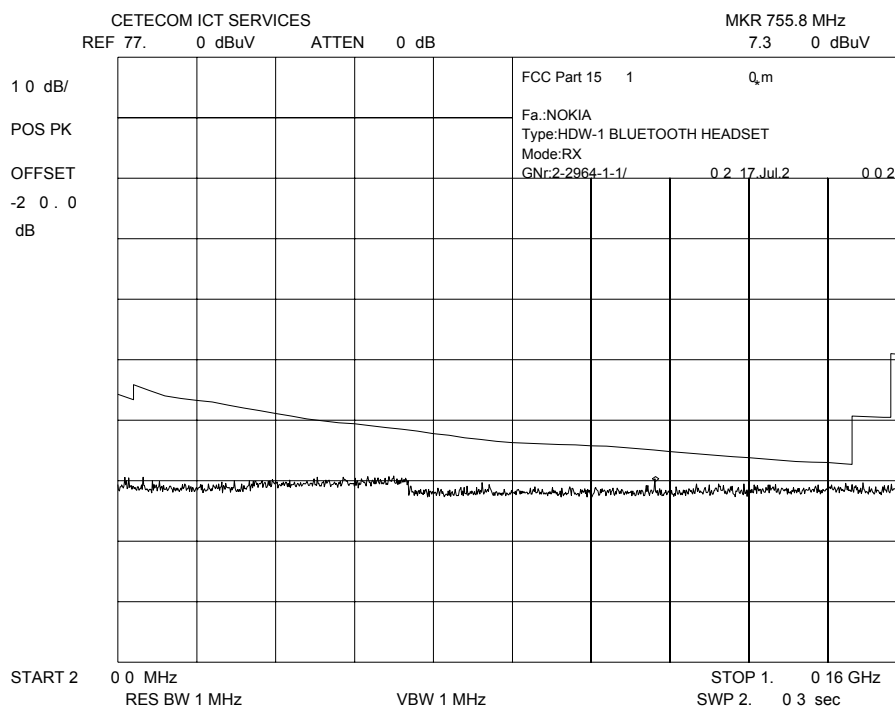
Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION

§ 15.209

200 - 1000 MHz vertical



Limits

SUBCLAUSE § 15.209

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

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

Equipment under test : HDW-1

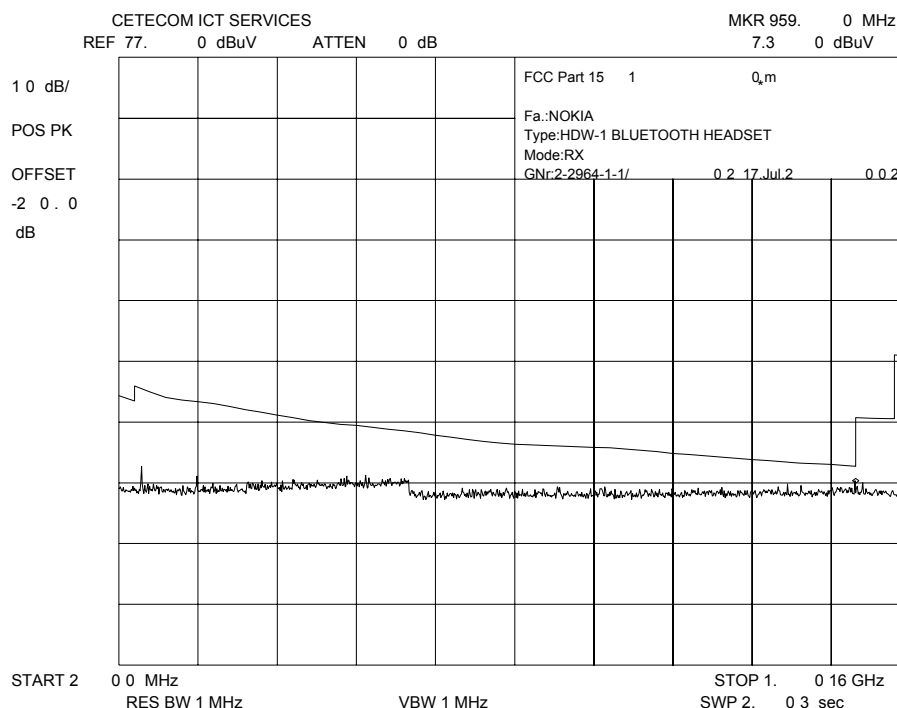
Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION

§ 15.209

200 - 1000 MHz horizontal



Limits

SUBCLAUSE § 15.209

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

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

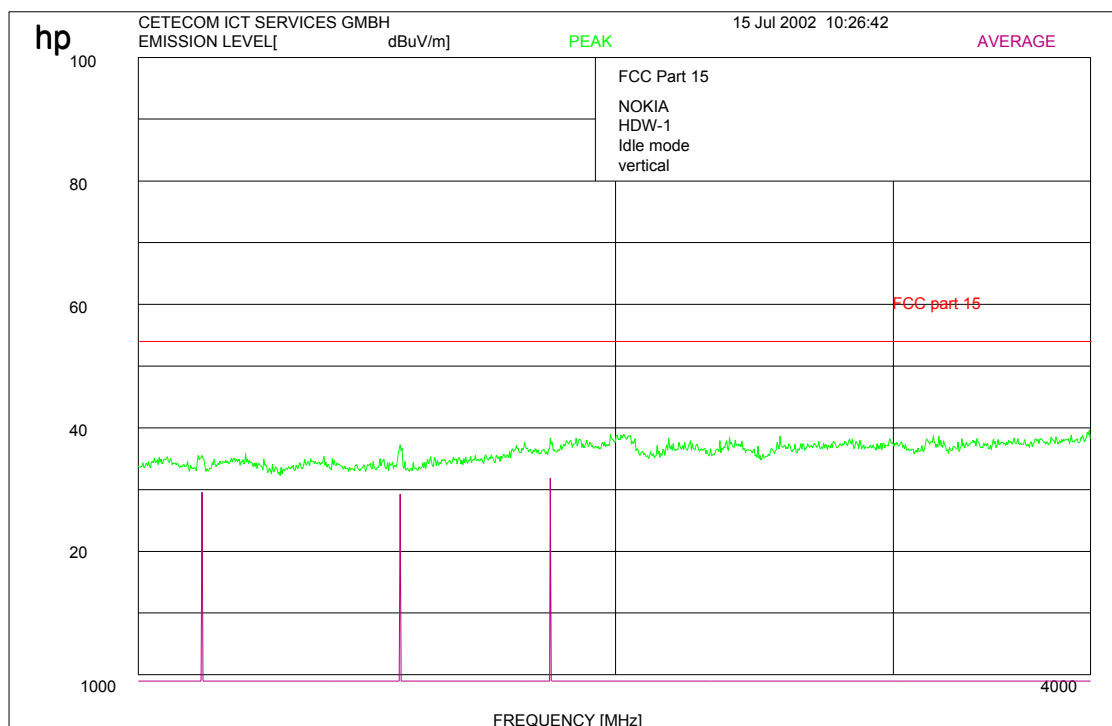
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION vertical

§ 15.209



$f < 1 \text{ GHz}$: 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

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

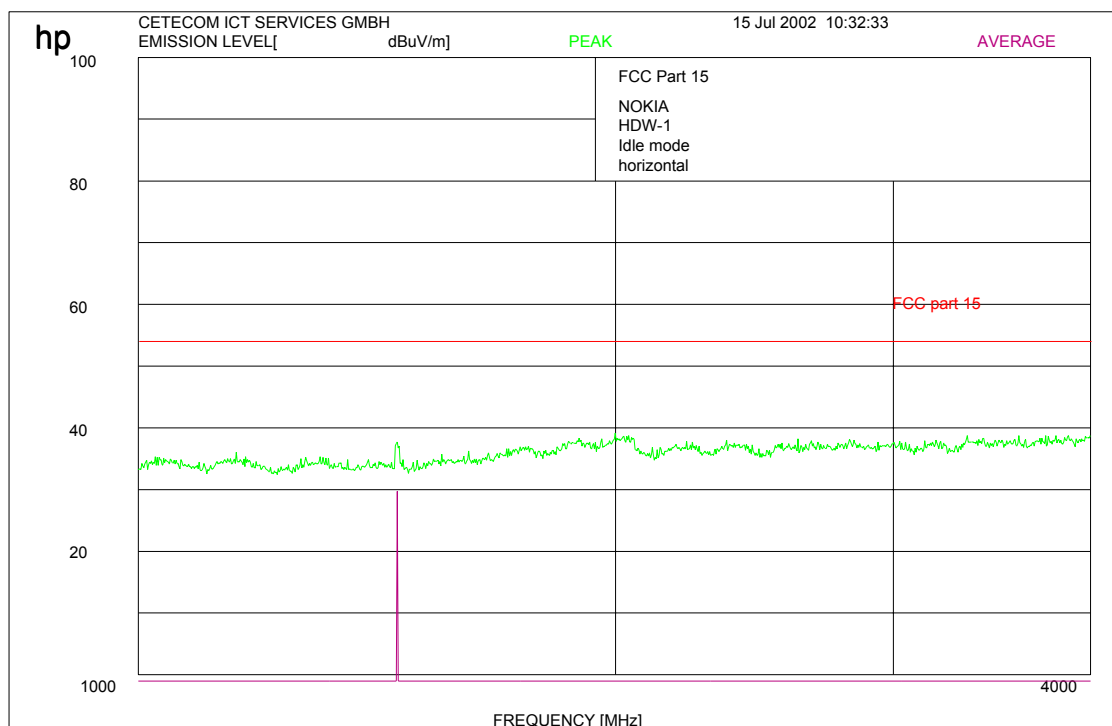
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION horizontal

§ 15.209



$f < 1 \text{ GHz}$: 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

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

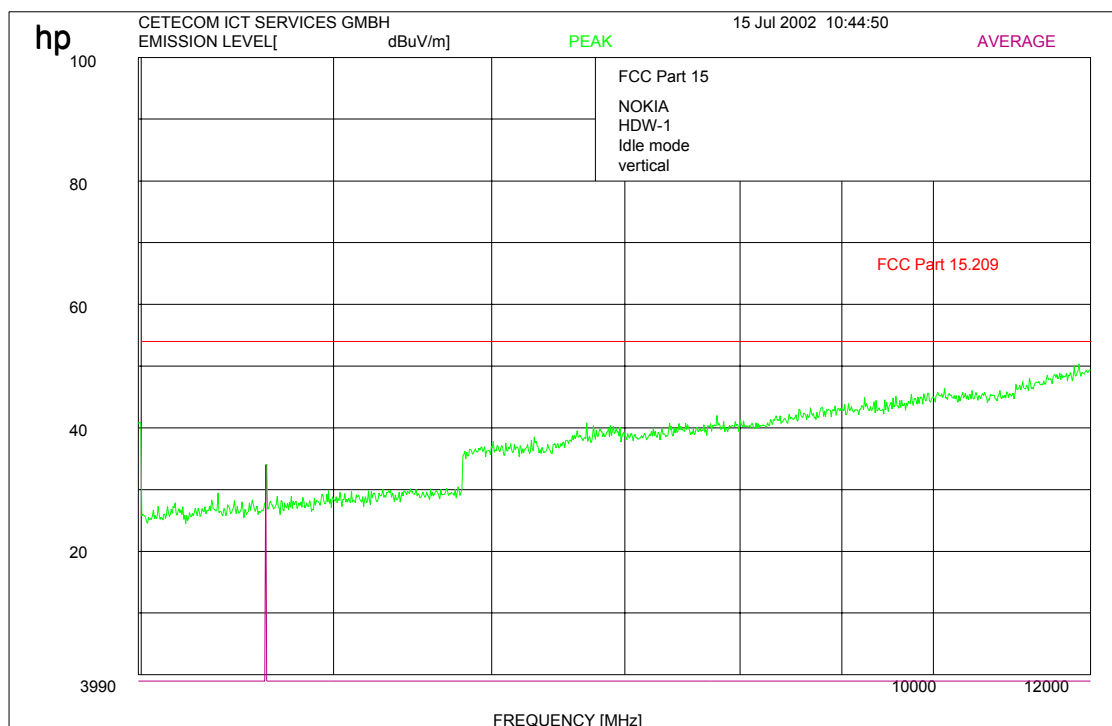
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION vertical

§ 15.209



$f < 1 \text{ GHz}$: 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)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

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

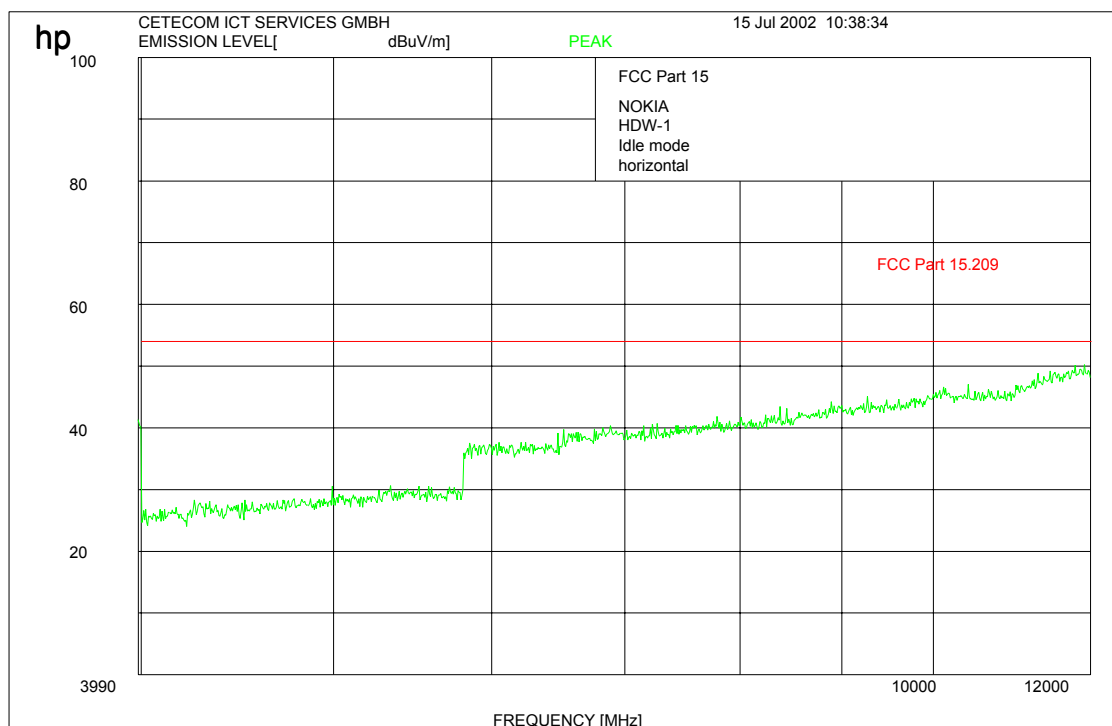
Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

RECEIVER SPURIOUS RADIATION horizontal

§ 15.209



$f < 1 \text{ GHz}$: 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)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

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

Test report nr.: 2_2946-01-01/02 Issue Date: 17.07.2002 Page 77 (92)

Equipment under test : HDW-1

Ambient temperature : 24°C

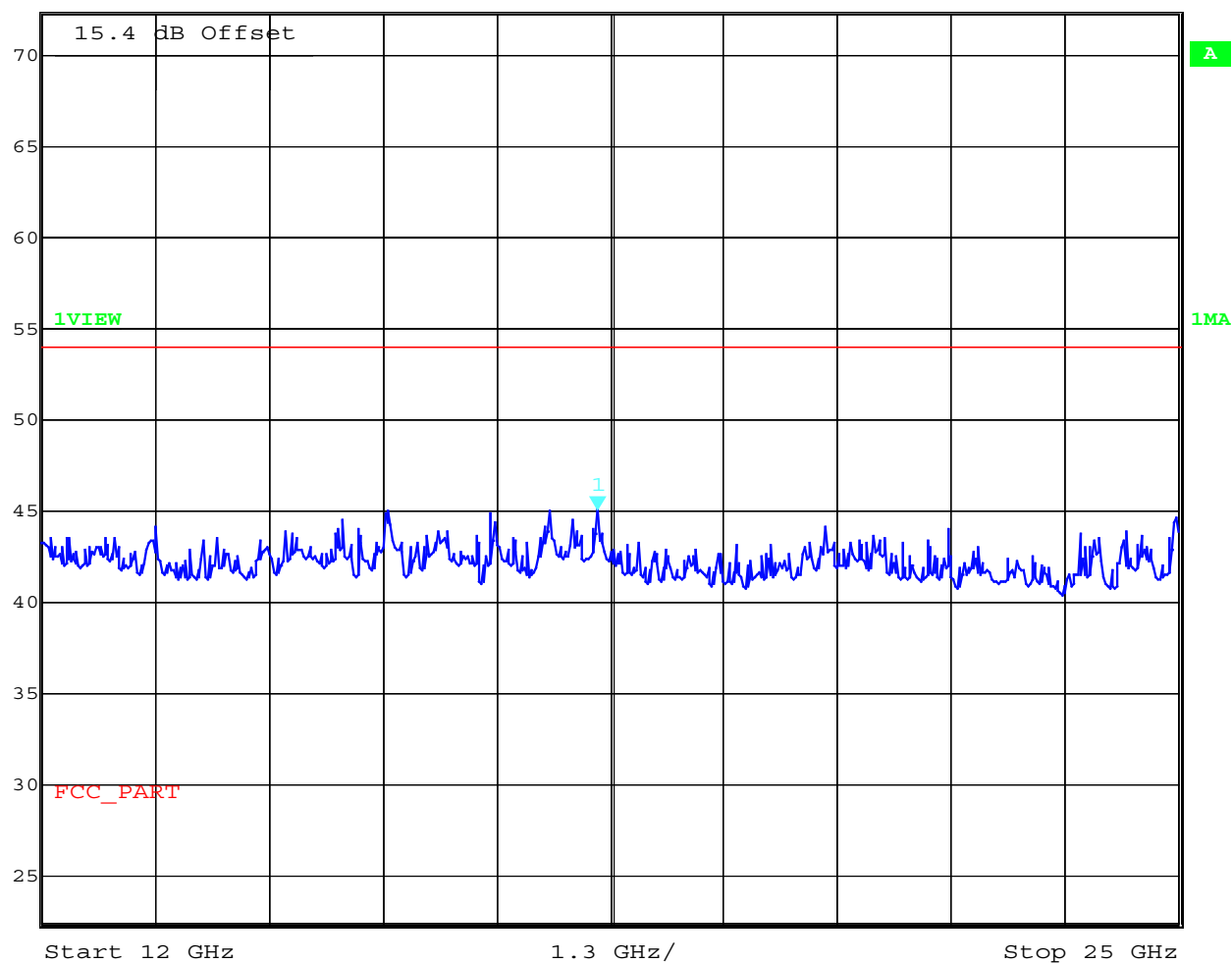
Relative humidity : 38%

RECEIVER SPURIOUS RADIATION

§ 15.209

Peak


 Marker 1 [T1] RBW 1 MHz RF Att 0 dB
 Ref Lvl 45.09 dBμV VBW 1 MHz
 72.4 dBμV 18.35671343 GHz SWT 74 ms Unit dBμV



Date: 15.JUL.2002 12:40:40

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

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

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Test report nr.: 2_2946-01-01/02

Issue Date: 17.07.2002

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Equipment under test : HDW-1

Ambient temperature : 24°C

Relative humidity : 38%

Conducted emissions

§ 15.107/207

EUT: HDW-1

Manufacturer: NOKIA Corporation

Operation condition: Tx/Rx mode

Test Site: CETECOM ICT Services, Room 006

Operator: Berg

Power supply: 110 V AC / 60 Hz

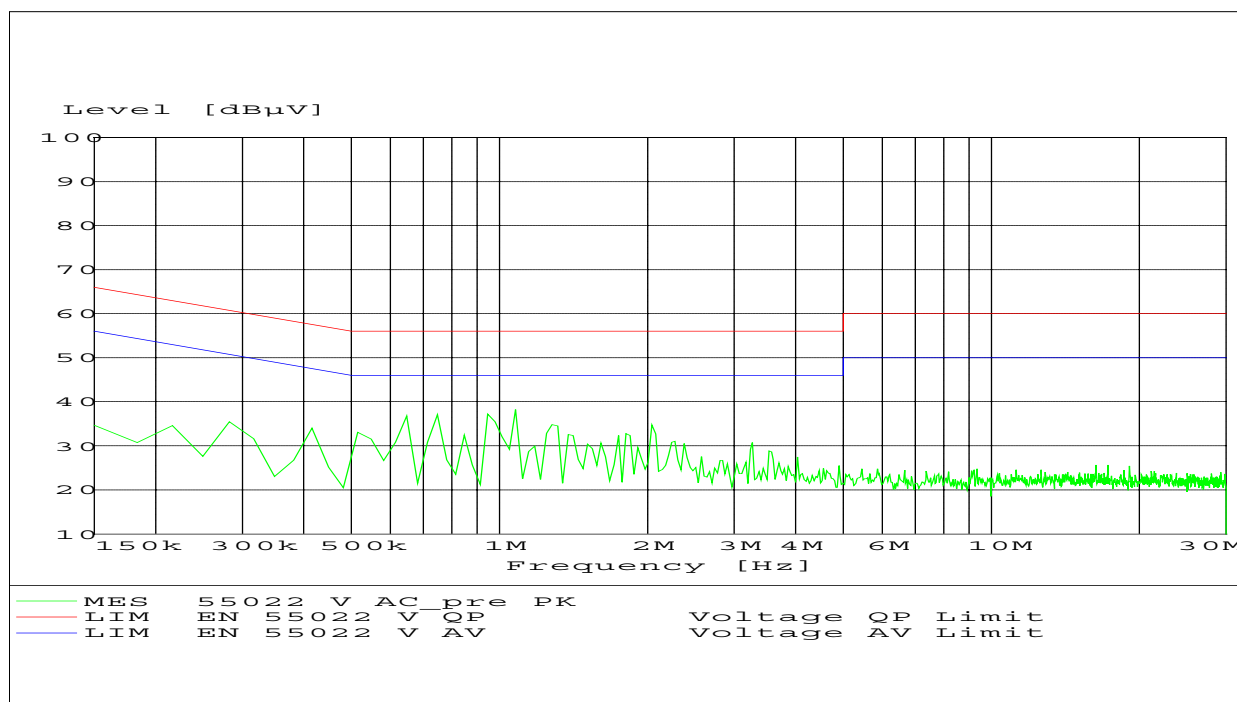
Comment: ACP-8

Start of Test: 17.07.02 / 09:34:16

SCANTABELLE: "EN 55022 V"

Kurzbeschreibung: Voltage Mains 1.60

Start-Frequenz	Stop-Frequenz	Schrittweite	Detektor	Meßzeit	ZF-Bandbr.	Transducer
150.0 kHz	30.0 MHz	7.5 kHz	MaxPeak Average	100.0 ms	10 kHz	ESH3-Z5 L1 1458



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

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

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	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phasen V-Netzwerk	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Stromversorgung	6032A	Rohde & Schwarz	2933A05441
59	HF-Test Empfänger	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	HF-Test Empfänger	ESH3	Rohde & Schwarz	881 515/002
62	Relais Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relais Matrix	PSU	Rohde & Schwarz	828 628/007
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773
66				

Test site

RADIATED EMISSIONS

WHD-1 (semi anechoic chamber)



Test site

RADIATED EMISSIONS

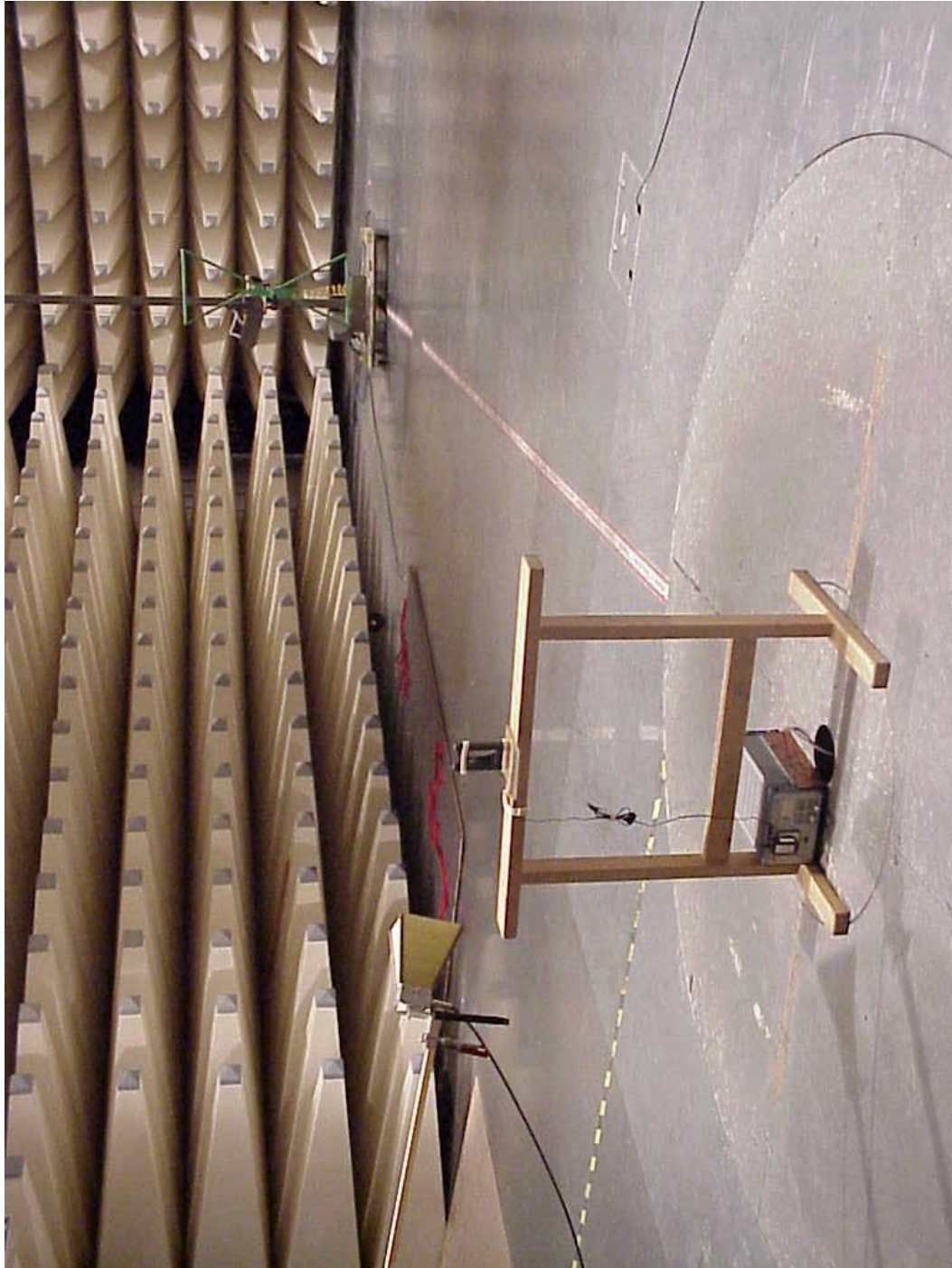
HDW-1 (semi anechoic chamber)



Test site

RADIATED EMISSIONS

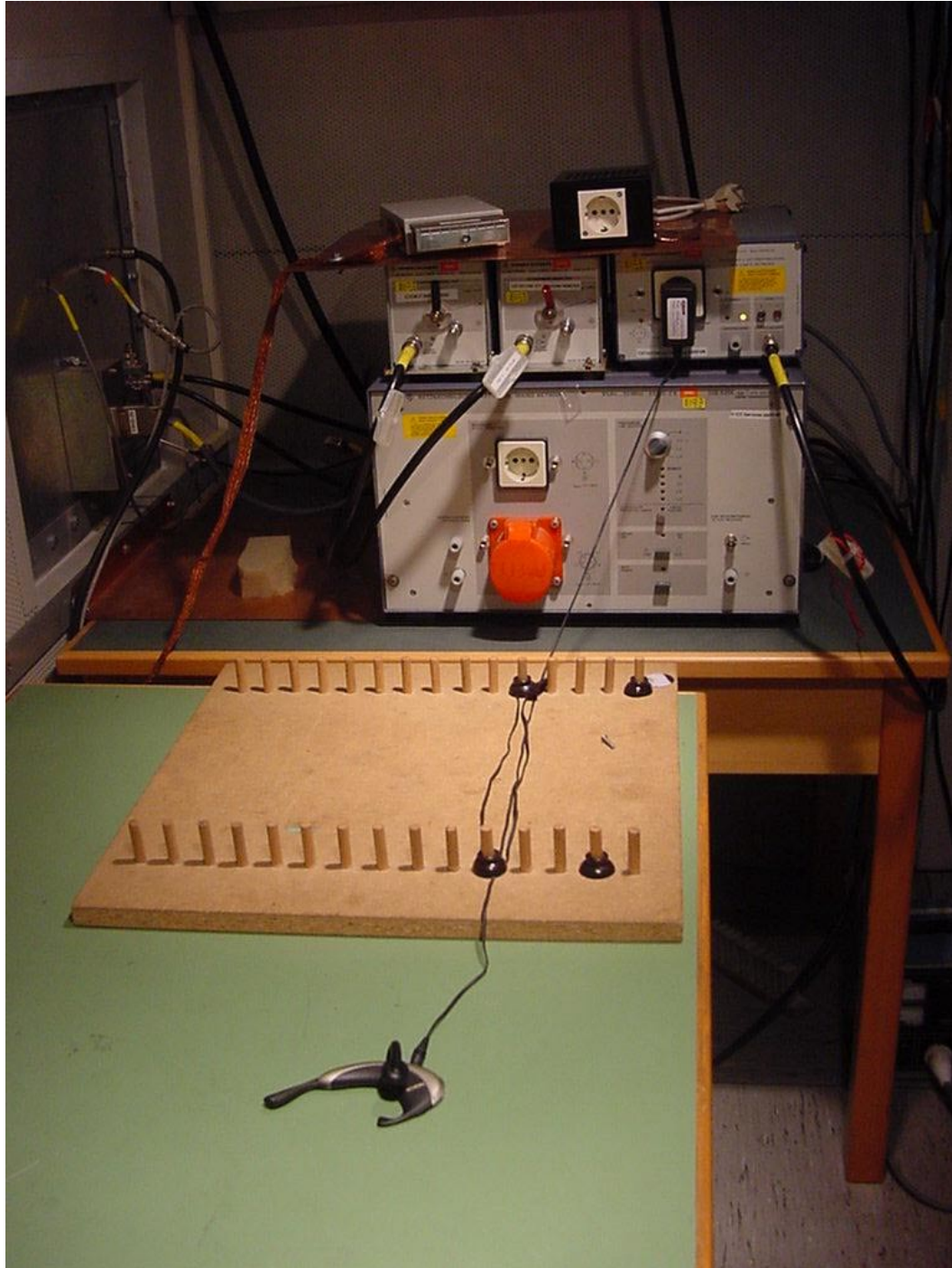
HDW-1 (semi anechoic chamber)



Test site

CONDUCTED EMISSIONS

HDW-1



Photographs of the equipment

Photograph no.: 1

HDW-1 (with charger ACP-8)



Photographs of the equipment

Photograph no.: 2

HDW-1 (Front site)



Photographs of the equipment

Photograph no.: 3

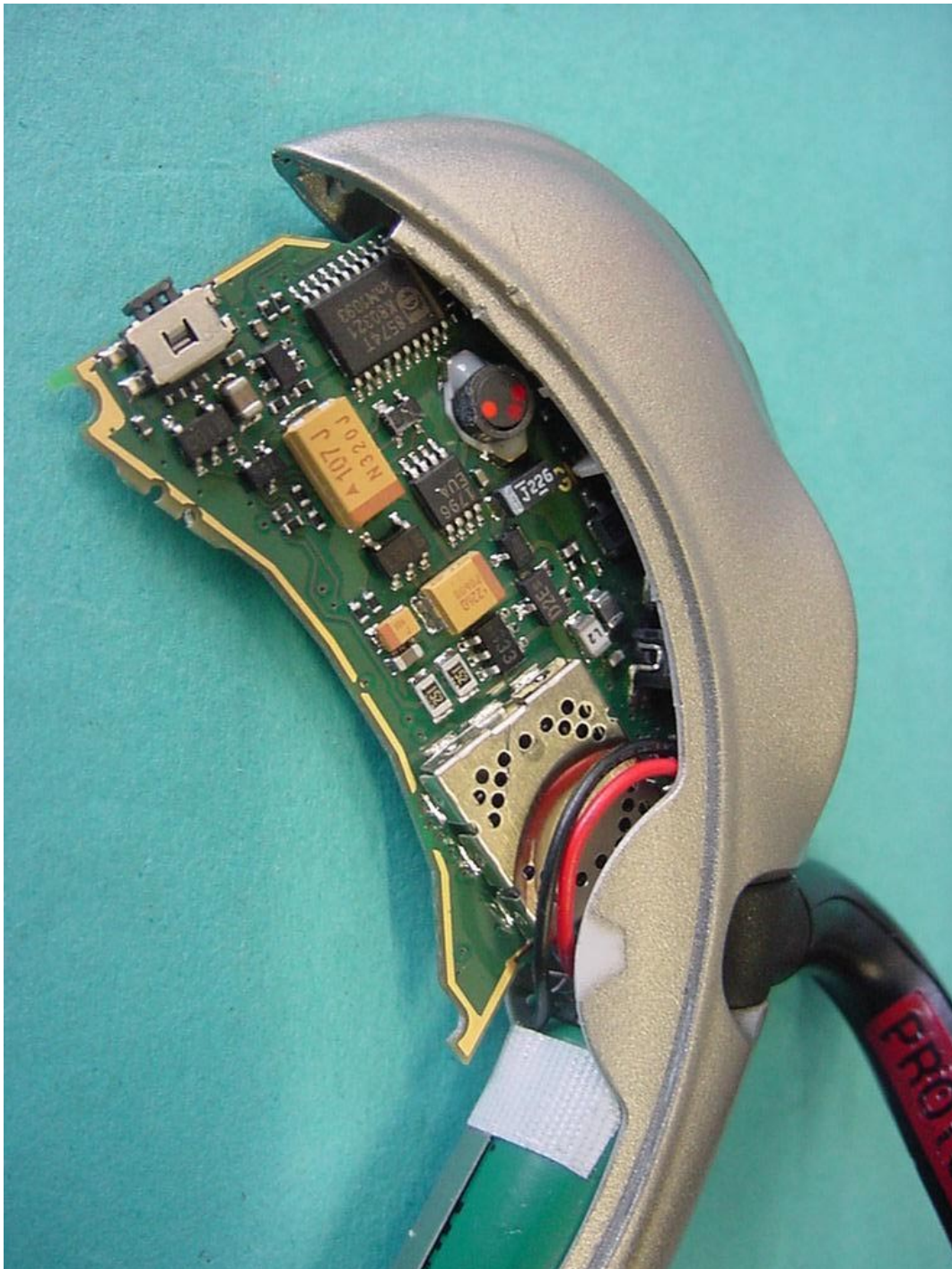
HDW-1 (Back site)



Photographs of the equipment

Photograph no.: 4

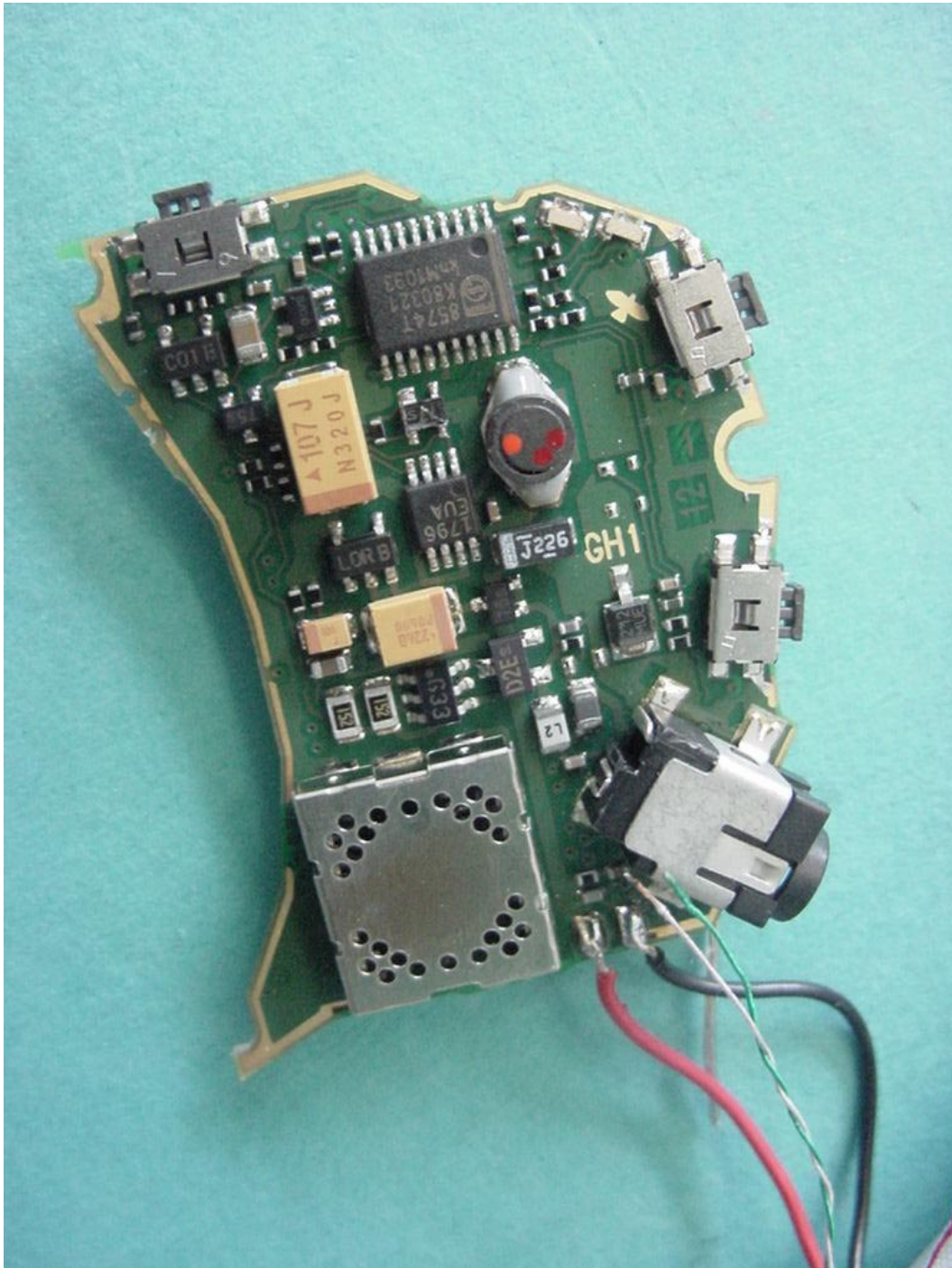
HDW-1 internal view



Photographs of the equipment

Photograph no.: 5

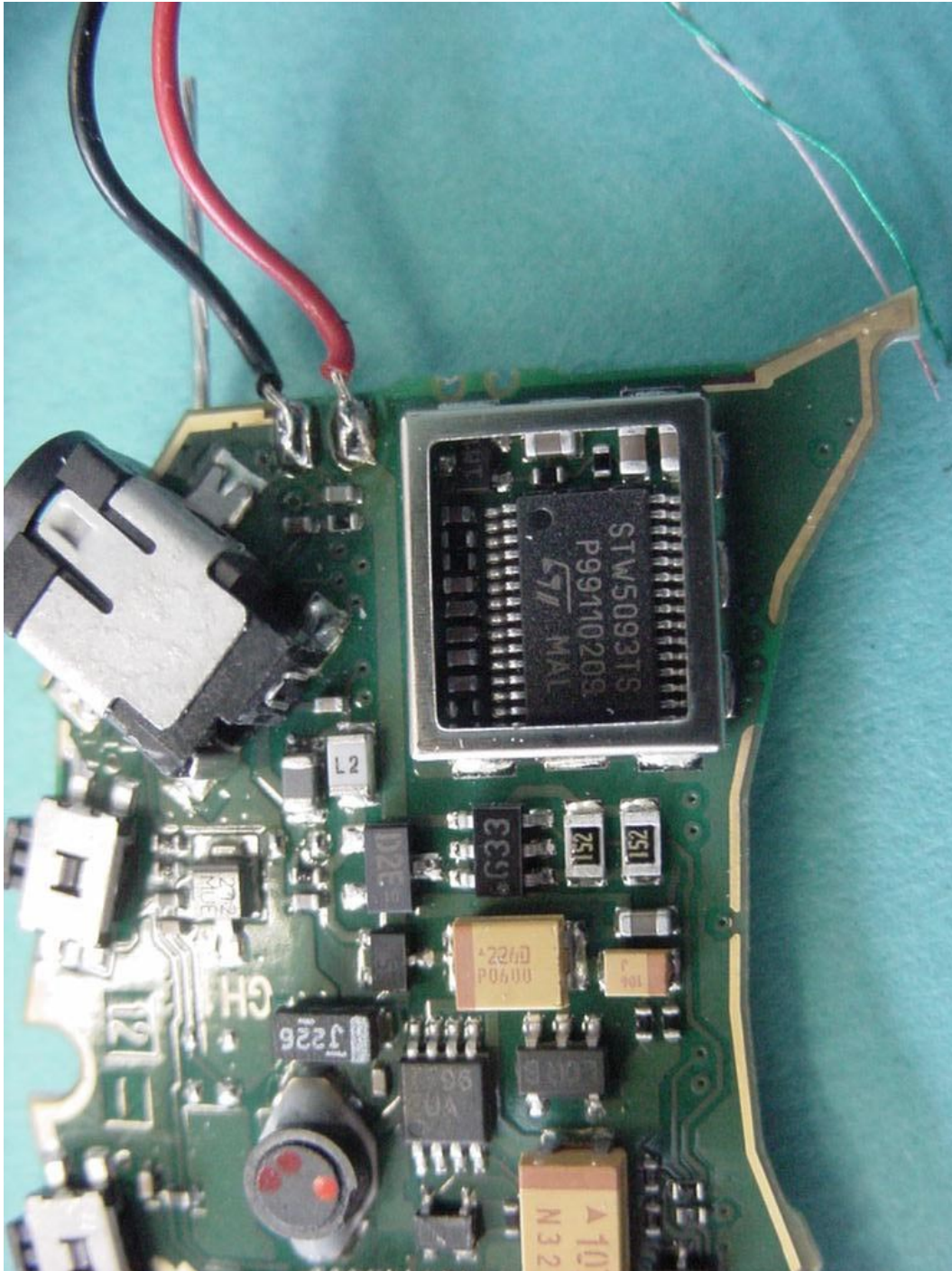
HDW-1 internal view



Photographs of the equipment

Photograph no.: 6

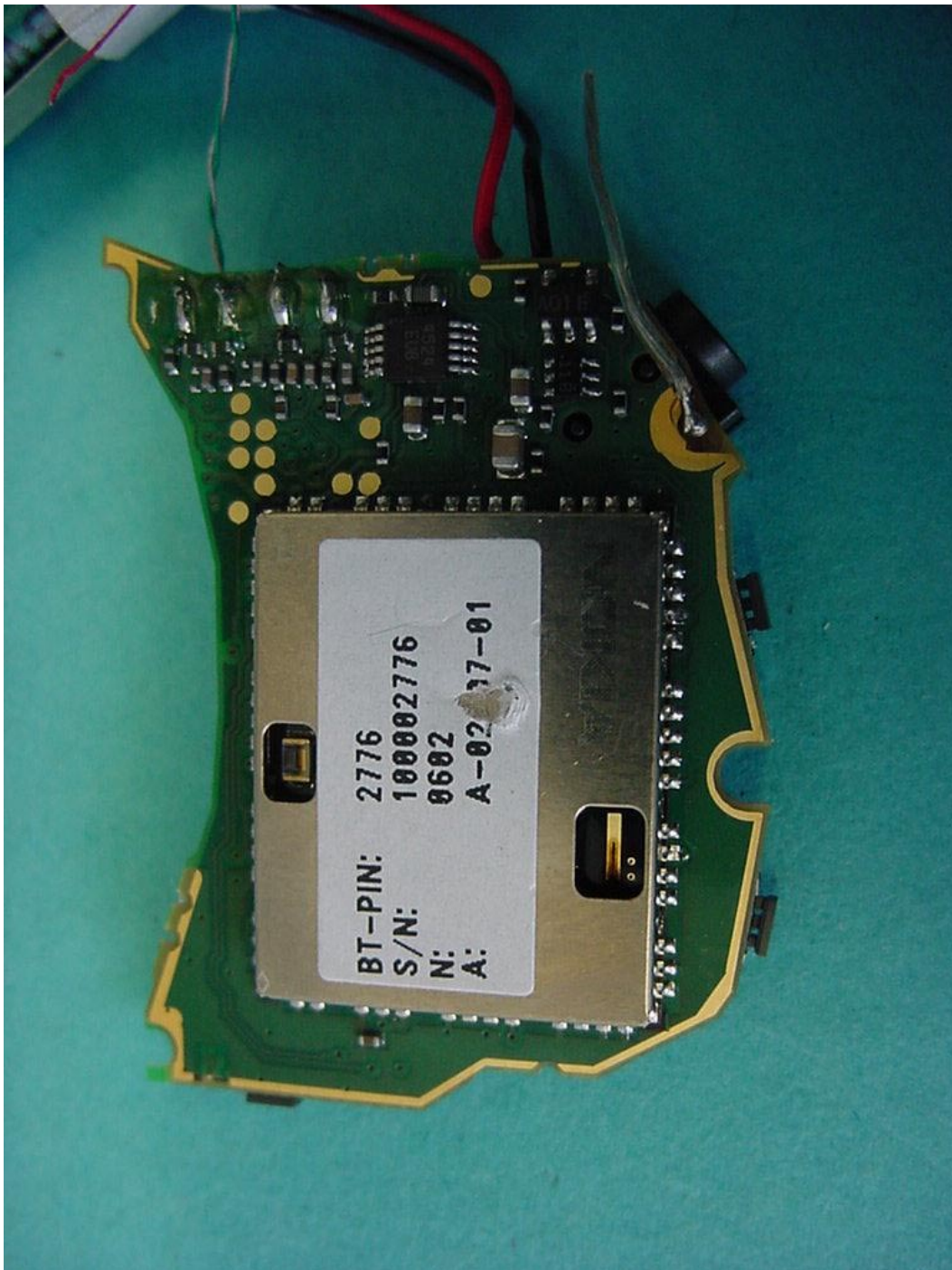
HDW-1 internal view



Photographs of the equipment

Photograph no.: 7

HDW-1 internal view



Photographs of the equipment

Photograph no.: 8

HDW-1

