CETECOM ICT Services GmbH

Radio Satellite Communication
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TTI-P-G166/98

Accredited Bluetooth Test Facility (BQTF)

Test report no.:5-3724-B/01
FCC Part 15.247/CANADA RSS-210
SIEMENS WDCT-PHONE
GIGASET 8800

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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
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66117 Saarbrücken
Germany
Telefone : + 49 681 598 - 0
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 166/98-20

1.3 Details of applicant

Name : SIEMENS AG
Street : Frankenstrasse 2
City : D-46395 Bocholt
Country : Germany
Telephone : +49 2871 91 0
Telefax : +49 2871 91 2495
Contact : Mr. Uwe Alt
Telephone: +49 2871 91 2948

1.4 Application details

Date of receipt of application : 14.05.01
Date of receipt of test item : 14.05.01
Date of test : 14./15.05.01

1.5 Test item

Type of equipment	:	**WDCT - Phone , Mobile part**
Type designation	:	**GIGASET 8800**
Manufacturer	:	applicant
Street	:	
City	:	
Country	:	
Serial number	:	
Additional informations:	**:**	
Frequency	:	2400 – 2483.5 MHz
Type of modulation	:	800KFXD / 79M8FXD (FHSS)
Number of channels	:	95
Antenna	:	integral antenna
Power supply	:	3V DC / Charger station 9.5VAC via Adapter
Output power rad.	:	max 195 mW EIRP
Type of equipment	:	

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, horizontal results were more then 7 dB lower over the whole frequency range.
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“.
Measurements below 1 GHz were performed with a CISPR Quasi Peak Adapter, over 1 GHz we used peak measurements. At peaks we did an second, average measurement.
ResBW and VBW were according FCC requirements.

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

FINAL VERDICT: PASS

The product fullfills also the requirements of CANADA RSS-210

Technical responsibility for area of testing :

Date	Section	Name	Signature
24.09.01	RSC 8414	Ames H.	

Technical responsibility for area of testing :

Date	Section	Name	Signature
24.09.01	RSC8411	Berg M.	

2.2 Testreport

TEST REPORT

Testreport no. : 5-3724-B/01

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

Paragraph	PARAMETER TO BE MEASURED	PAGE
	Transmitter parameters	
§ 15.204	Antenna gain	7
§ 15.247 (a)	Carrier frequency separation	8
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§ 15.247 (a)	Time of occupancy (dwell time)	10
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Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

Antenna Gain **SUBCLAUSE § 15.204**

The gain is for 2401 MHz –1.90 dBi, for 2442 MHz –1.58 dBi and for 2482 MHz –1.64 dBi.

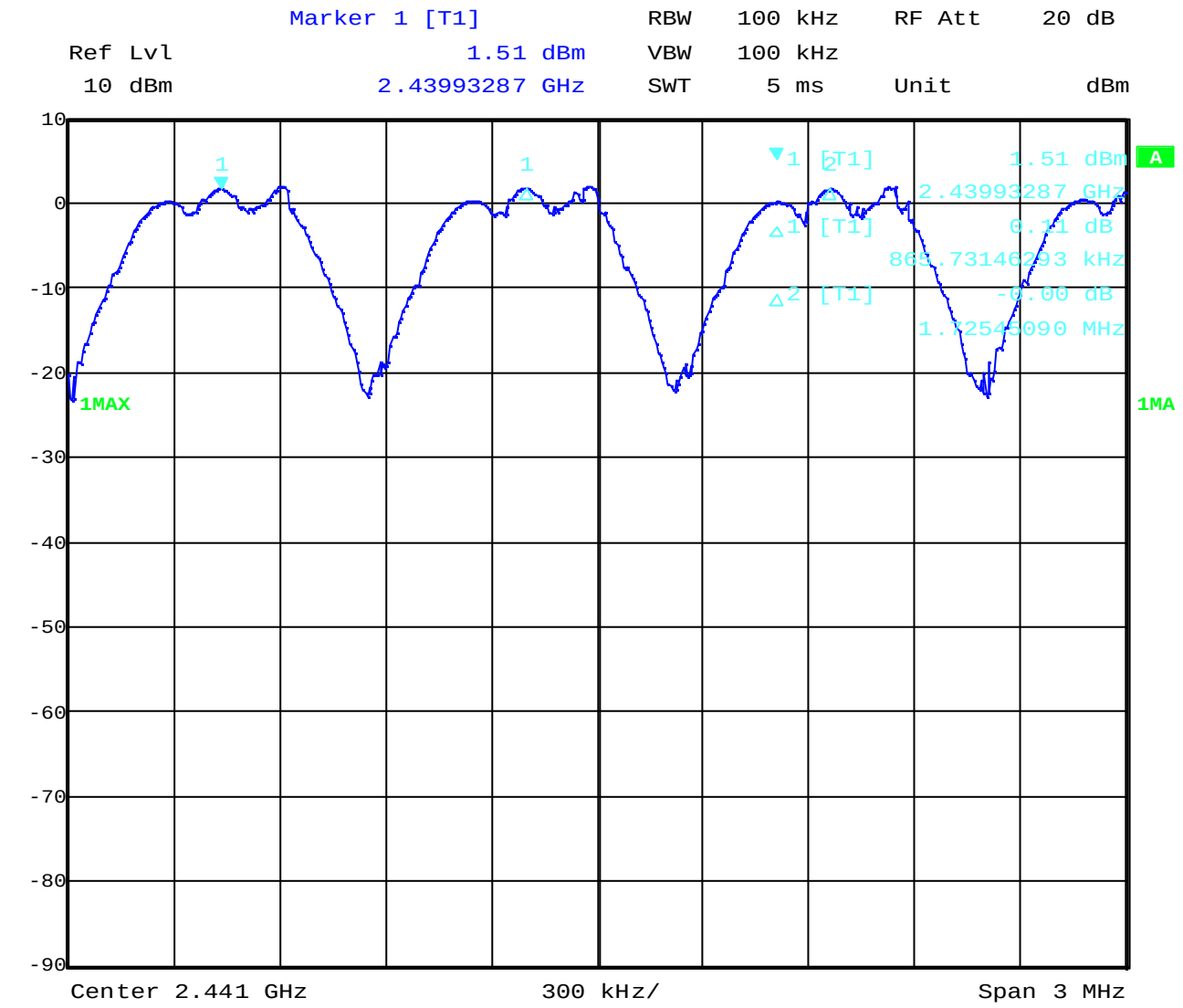
(measured effectiv radiated power over isotropical radiator – measured conducted power with a temporary RF-connector)

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

Equipment under test : **GIGASET 8800**
Ambient temperature : **22° C**
Relative humidity : **40%**

Carrier frequency separation §15.247(a)

Cursor 1 to cursor 2 ~ 865 kHz; cursor 2 to cursor 3 ~ 860 kHz



Date: 10.SEP.2001 15:29:33

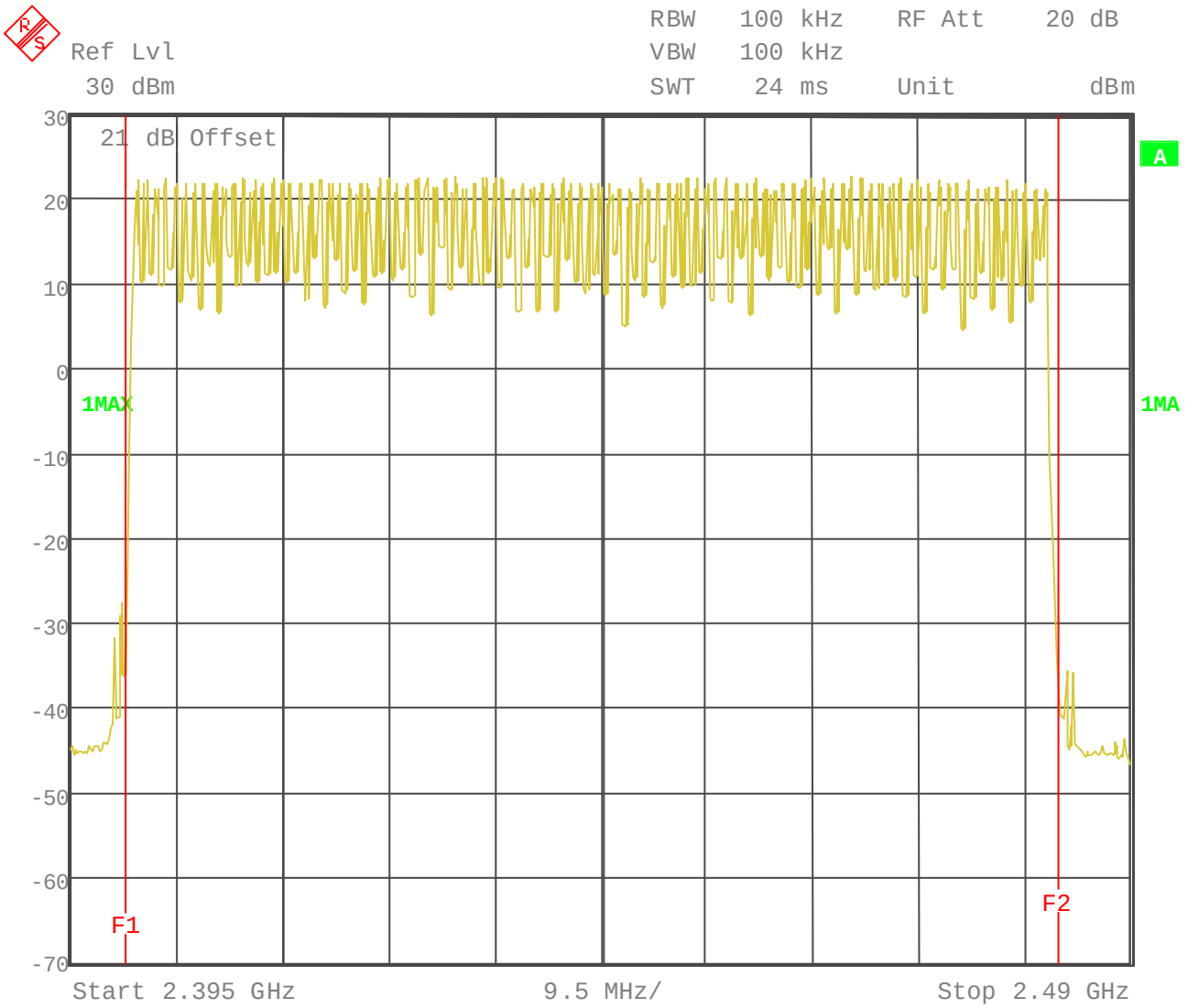
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

Number of hopping channels **§15.247(a)**

The number of hopping channels is 95.

The red frequency lines show the limit of the band.
According to the wdct requirements, the sample fullfills the requirement of min 75 hopping channels at every time. The minimum number of used channels is 80.



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

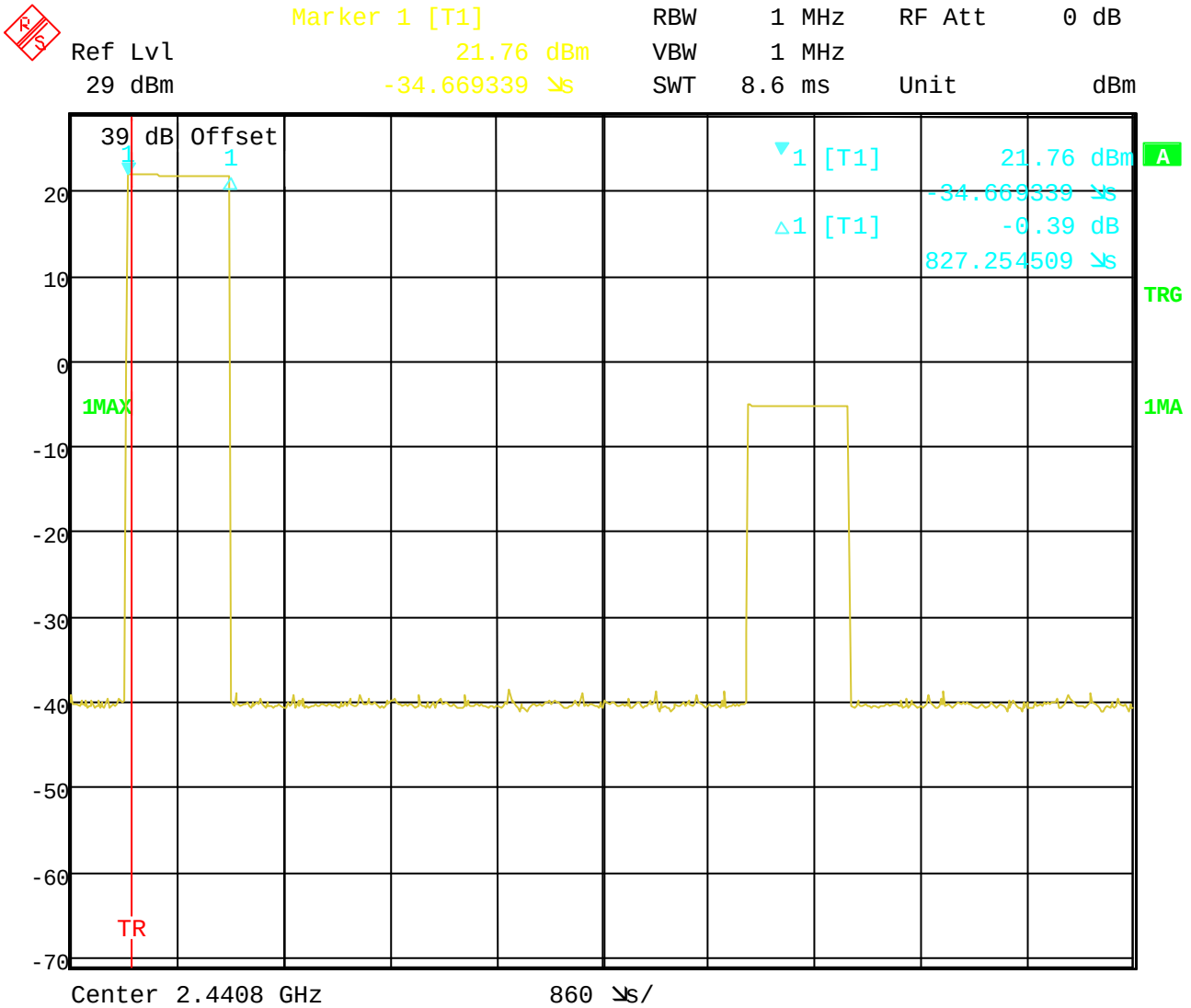
Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

Time of occupancy (dwell time) §15.247(a)

The max. duration of signal is 0.827 ms. the worst case (shortest) period for repetition of signals on one channel is 800 ms. This period equates to approximately 38 pulses within 30 seconds. based on this rate and a signal duration of 0.827 ms, the longest duration would be 38 X 0.827 ms = 31.43 ms. Based on this criteria, the SIEMENS GIGASET 8800 meets the average time of occupancy requirements of FCC15.247. Even in the case of connections to 4 mobile parts (4 X 31.43 ms = 125.7 ms), the limit requirements are fullfilled.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : **GIGASET 8800**
Ambient temperature : **22° C**
Relative humidity : **40%**

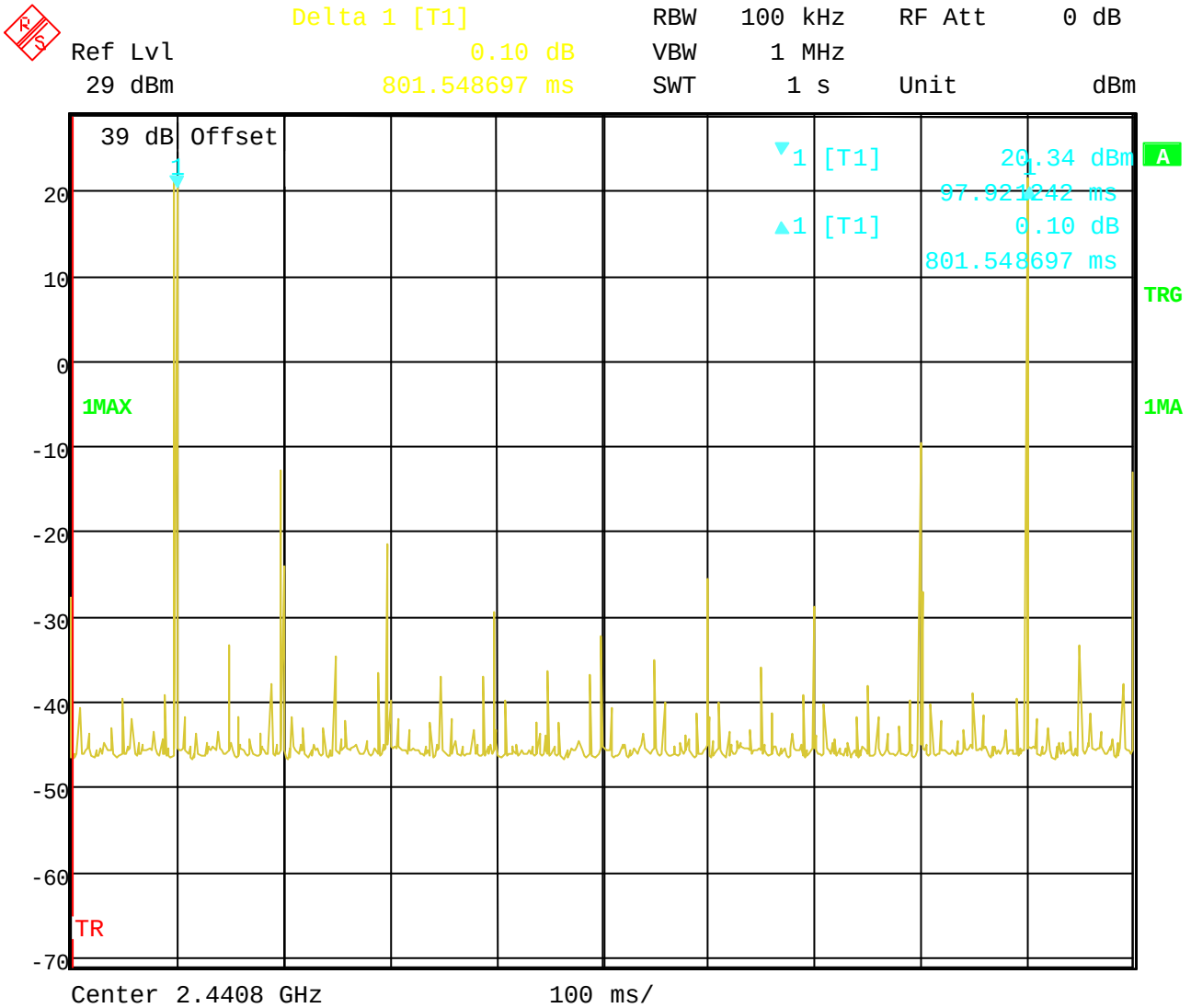


Time of occupancy (dwell time) **§15.247(a)**

Time between two pulses is 800 ms.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : **GIGASET 8800**
Ambient temperature : **22° C**
Relative humidity : **40%**



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

Spectrum Bandwidth of a FHSS System

§15.247(a)

20 dB + 10 dB bandwidth

TEST CONDITIONS		10 dB BANDWIDTH (kHz)		
Frequency (MHz)		2401.06	2441.66	2482.28
T_{nom}(22)° C	V_{nom}(3.0)V	535	535	537
Measurement uncertainty		±1kHz		

TEST CONDITIONS		20 dB BANDWIDTH (kHz)		
Frequency (MHz)		2401.06	2441.66	2482.28
T_{nom}(22)° C	V_{nom}(3.0)V	619	613	613
Measurement uncertainty		±1kHz		

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

LIMIT **SUBCLAUSE §15.247(a) (1)**

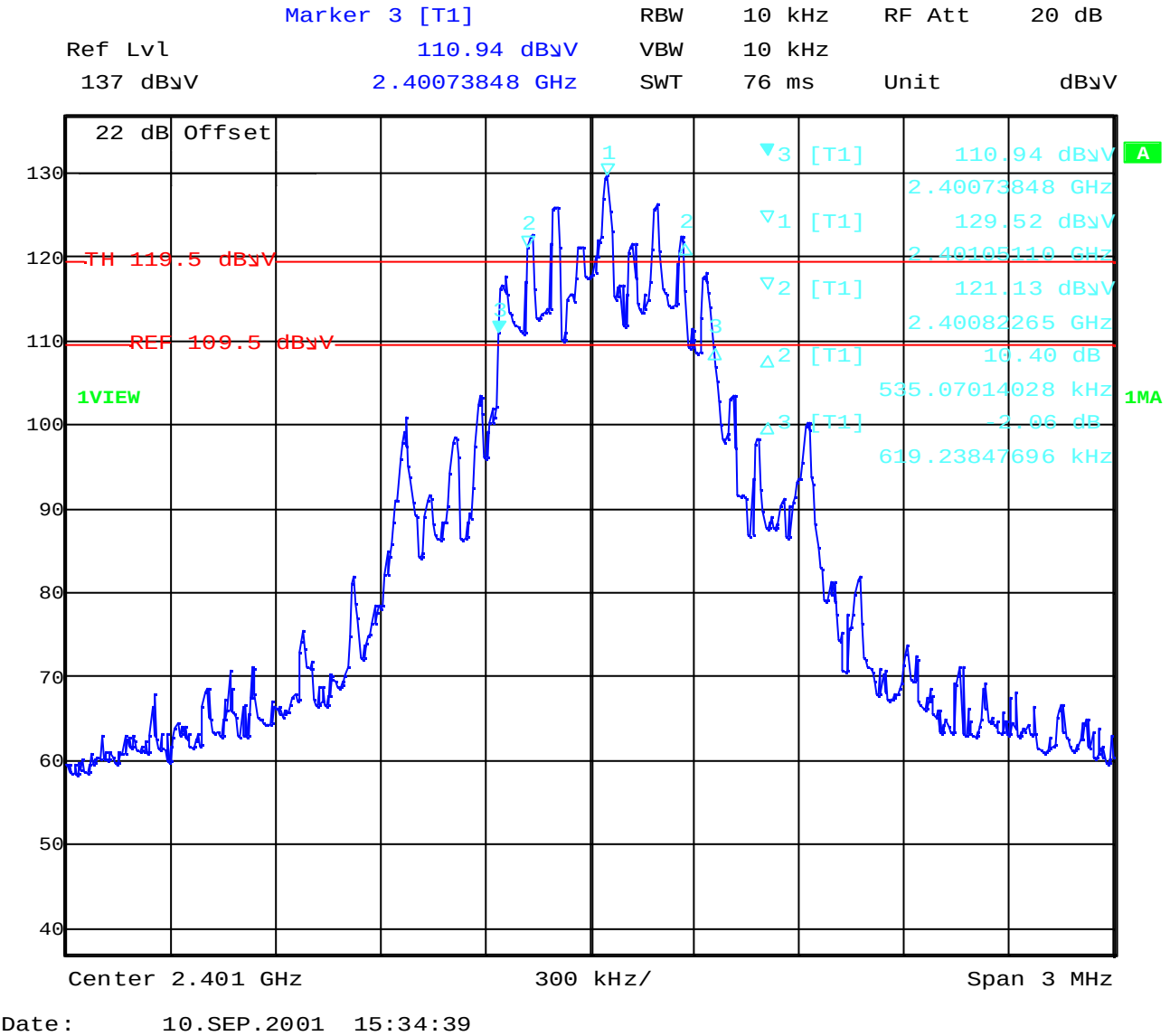
The maximum 20dB bandwith shall be at maximum 1000 KHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : **GIGASET 8800**
Ambient temperature : **22° C**
Relative humidity : **40%**

Spectrum Bandwidth of a FHSS System **§15.247(a)**
10 dB + 20 dB bandwidth

Channel 1 (lowest Channel)



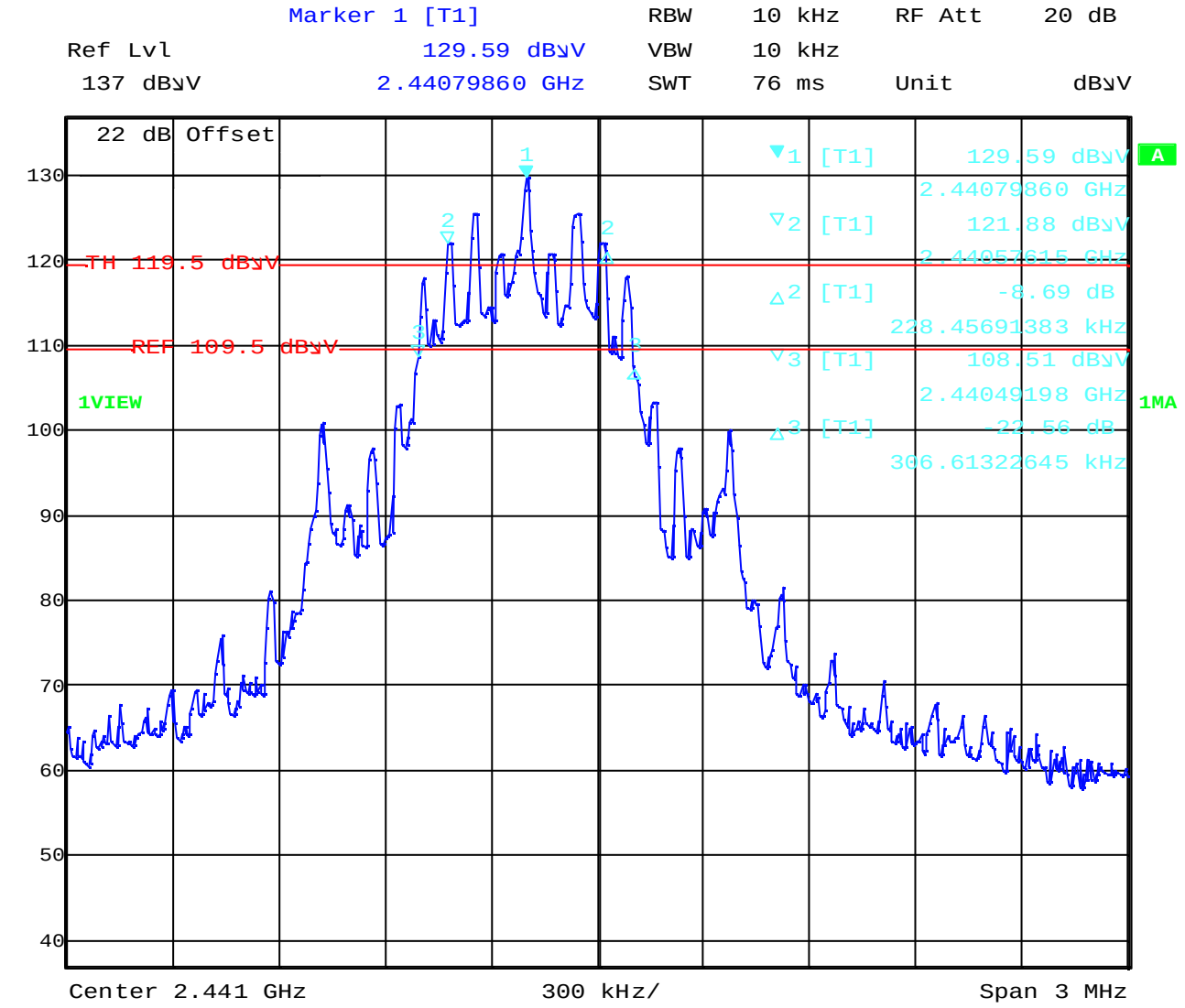
Date: 10.SEP.2001 15:34:39

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : **GIGASET 8800**
Ambient temperature : **22° C**
Relative humidity : **40%**

Spectrum Bandwidth of a FHSS System **§15.247(a)**
10 dB + 20 dB bandwidth

Channel 2 (middle Channel)



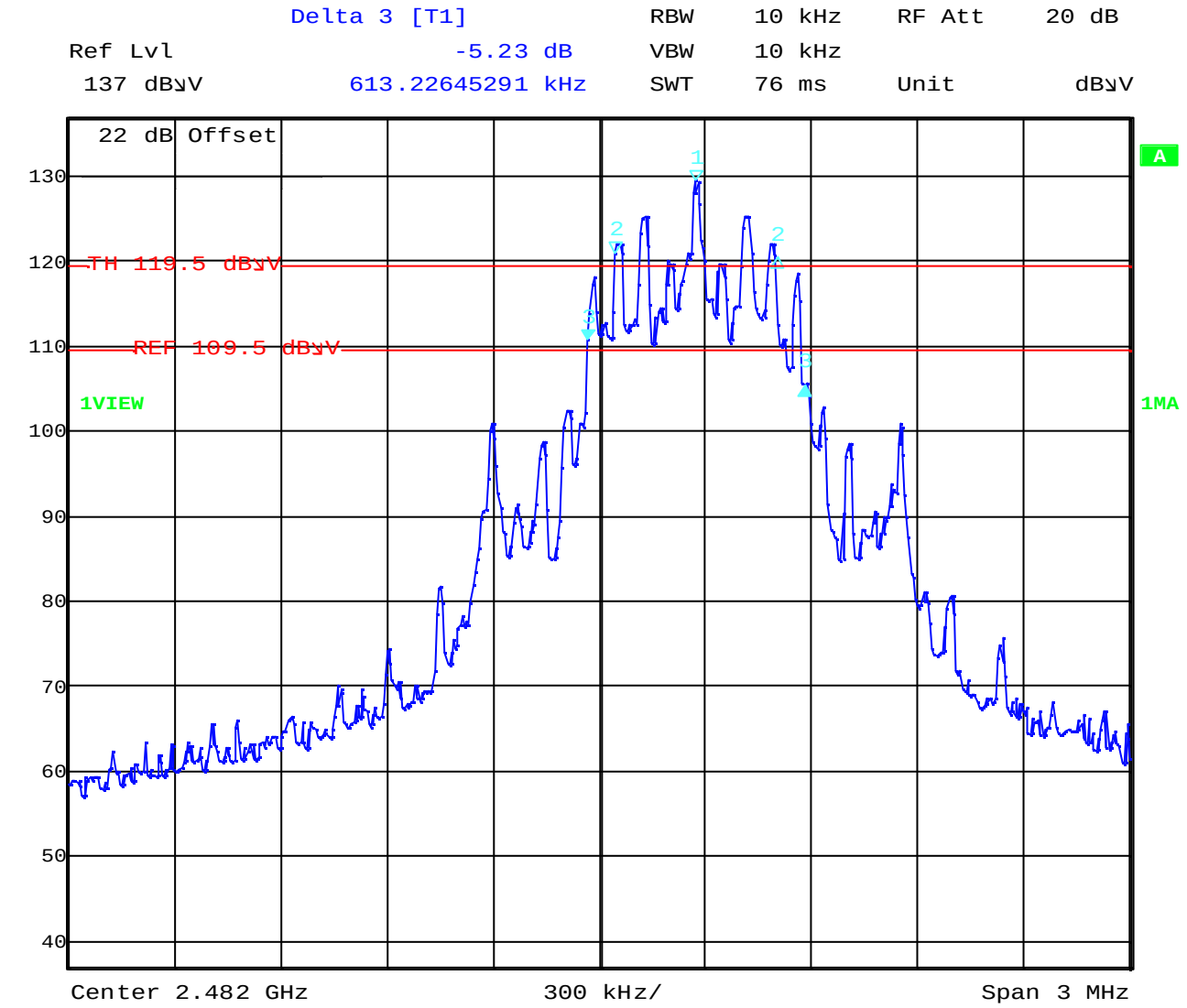
Date: 10.SEP.2001 15:42:08

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : **GIGASET 8800**
Ambient temperature : **22° C**
Relative humidity : **40%**

Spectrum Bandwidth of a FHSS System **§15.247(a)**
10 dB + 20 dB bandwidth

Channel 3 (highest Channel)



Date: 10.SEP.2001 15:39:02

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

MAXIMUM PEAK OUTPUT POWER (conducted) **SUBCLAUSE § 15.247 (b) (1)**

The conducted measurements were performed with a temporary coax connector.

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)			
Frequency (MHz)			2401.06	2441.66	2482.28
T_{nom}(22)° C	V_{nom}(3.0)V	PK	302.0	263.0	269.2
		AV	38.1	33.1	33.9
Measurement uncertainty		±3dB			

RBW / VBW : 3 MHz

LIMIT **SUBCLAUSE § 15.247 (b) (1)**

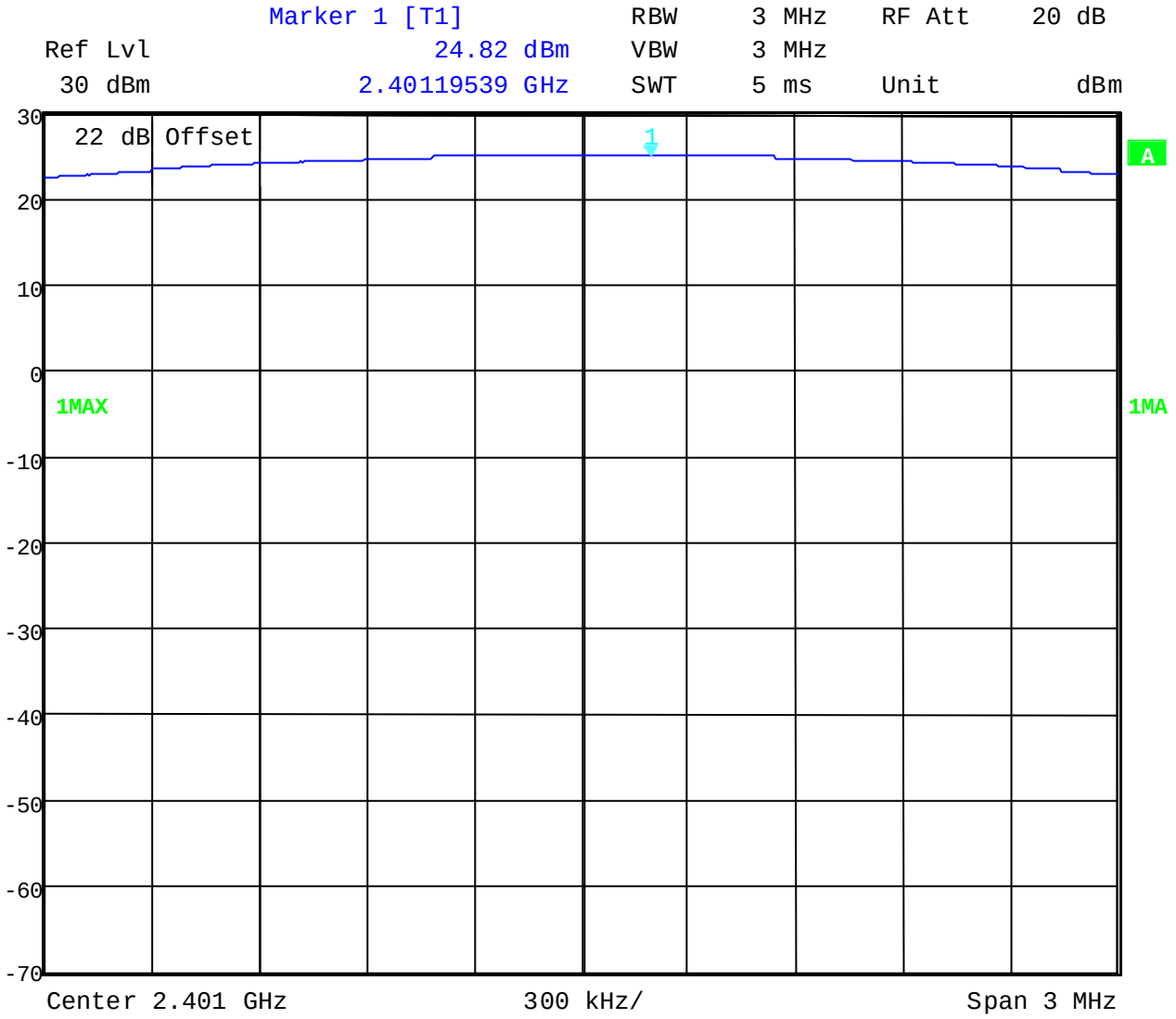
Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

Peak output power (conducted) §15.247 (b)

Channel 1 (lowest Channel): 24.8 dBm at 2401 MHz
De facto EIRP with -1.90db max. antenna gain is +22.9dBm



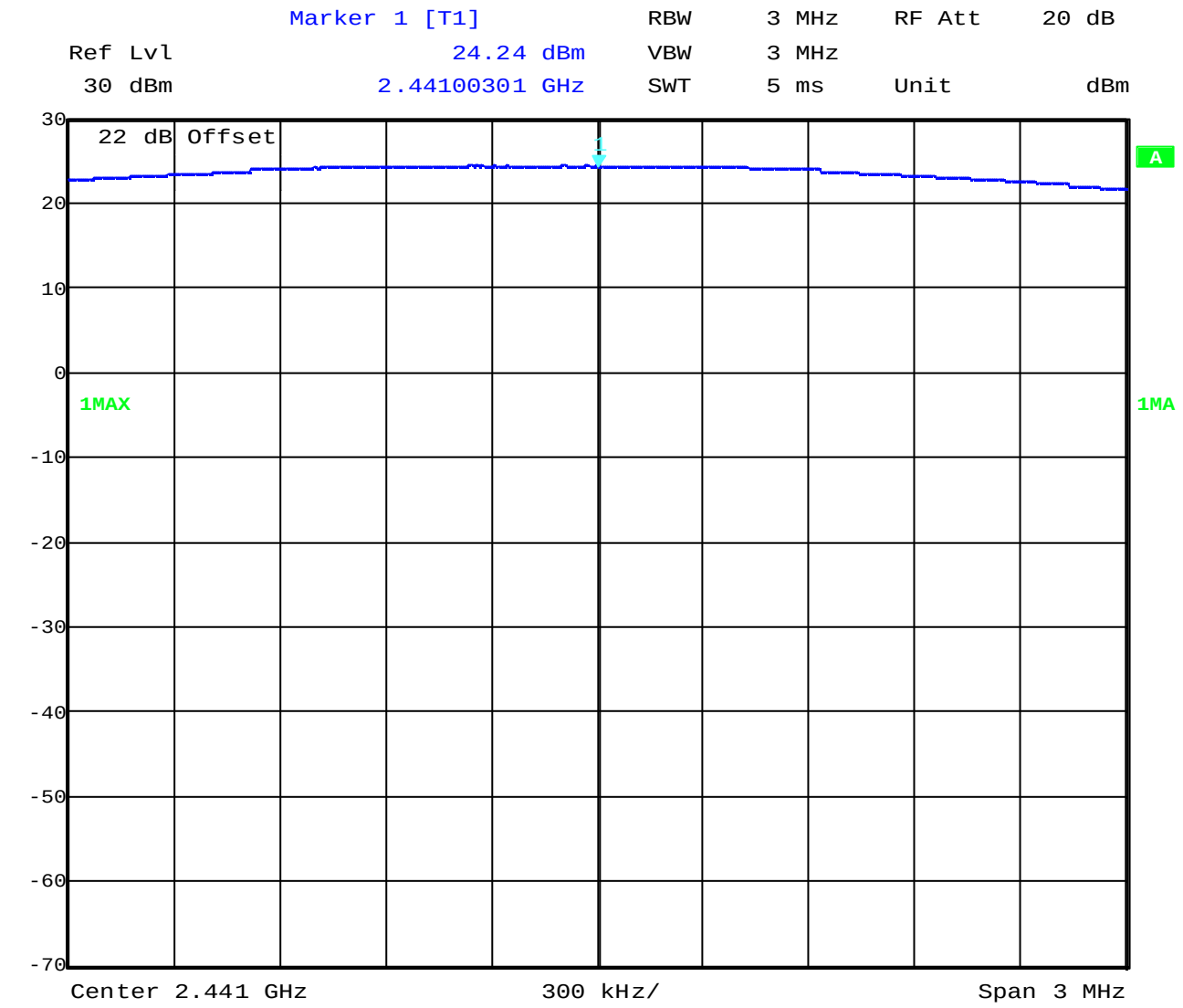
Date: 10.SEP.2001 15:45:10

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

Peak output power (conducted) §15.247 (b)

Channel 2 (middle Channel): +24.2 dBm at 2441 MHz
De facto EIRP with –1.58 dbI max. antenna gain is +22.62dBm



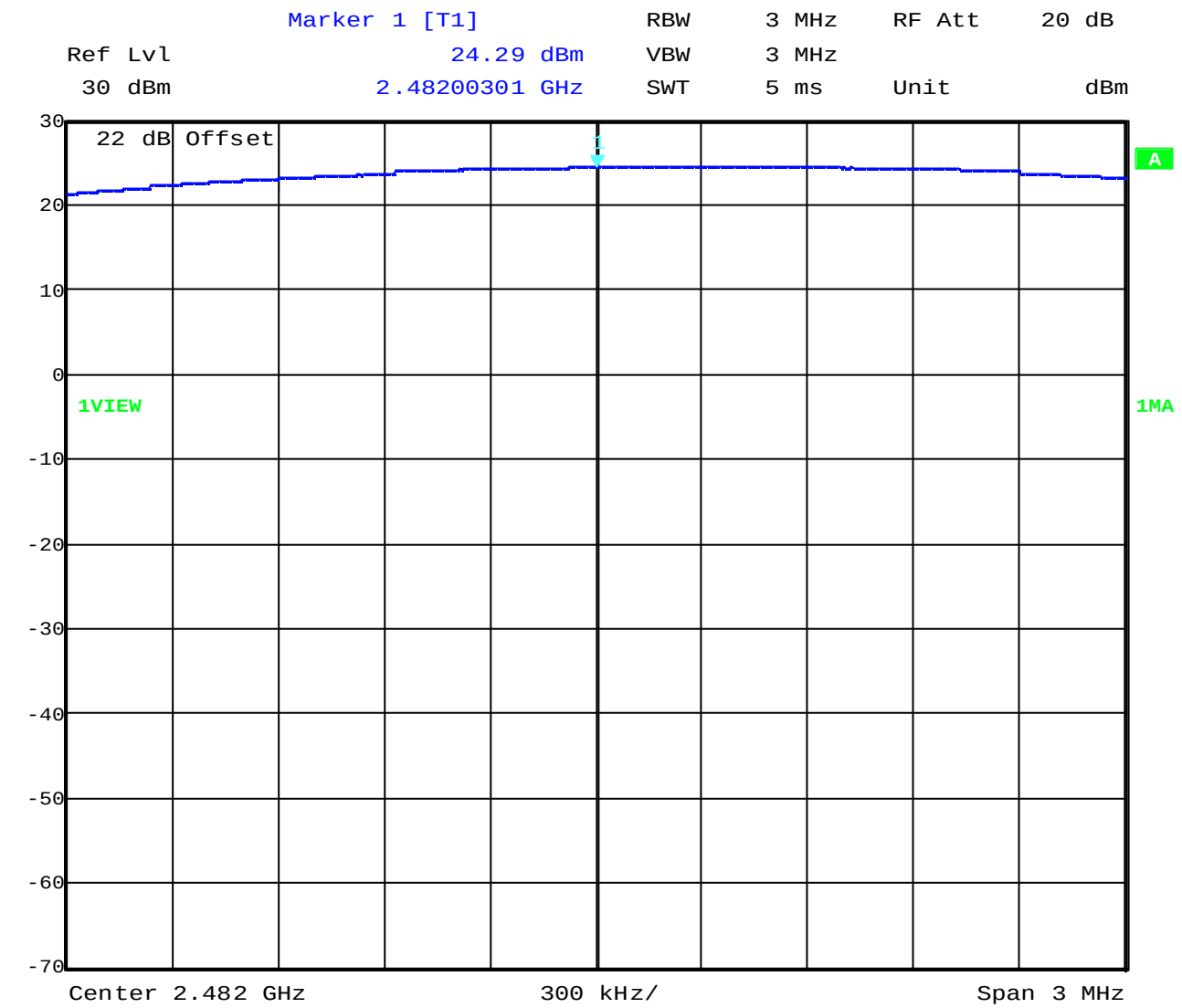
Date: 10.SEP.2001 15:44:11

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

Peak output power (conducted) §15.247 (b)

Channel 3 (highest Channel): +24.3 dBm at 2482 MHz
De facto EIRP with –1.64 dbI max. antenna gain is +22.66 dBm



Date: 11.SEP.2001 06:34:01

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Equipment under test : GIGASET 8800
Ambient temperature : 22° C
Relative humidity : 40%

MAXIMUM PEAK OUTPUT POWER (RADIATED) **SUBCLAUSE § 15.247 (b) (1)**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)		2401	2441	2482
T_{nom}(22)° C	V_{nom}(12.0)V	195.0	182.8	184.5
Measurement uncertainty		±3dB		

RBW/VBW : 3 MHz

Measured at a distance of 3m

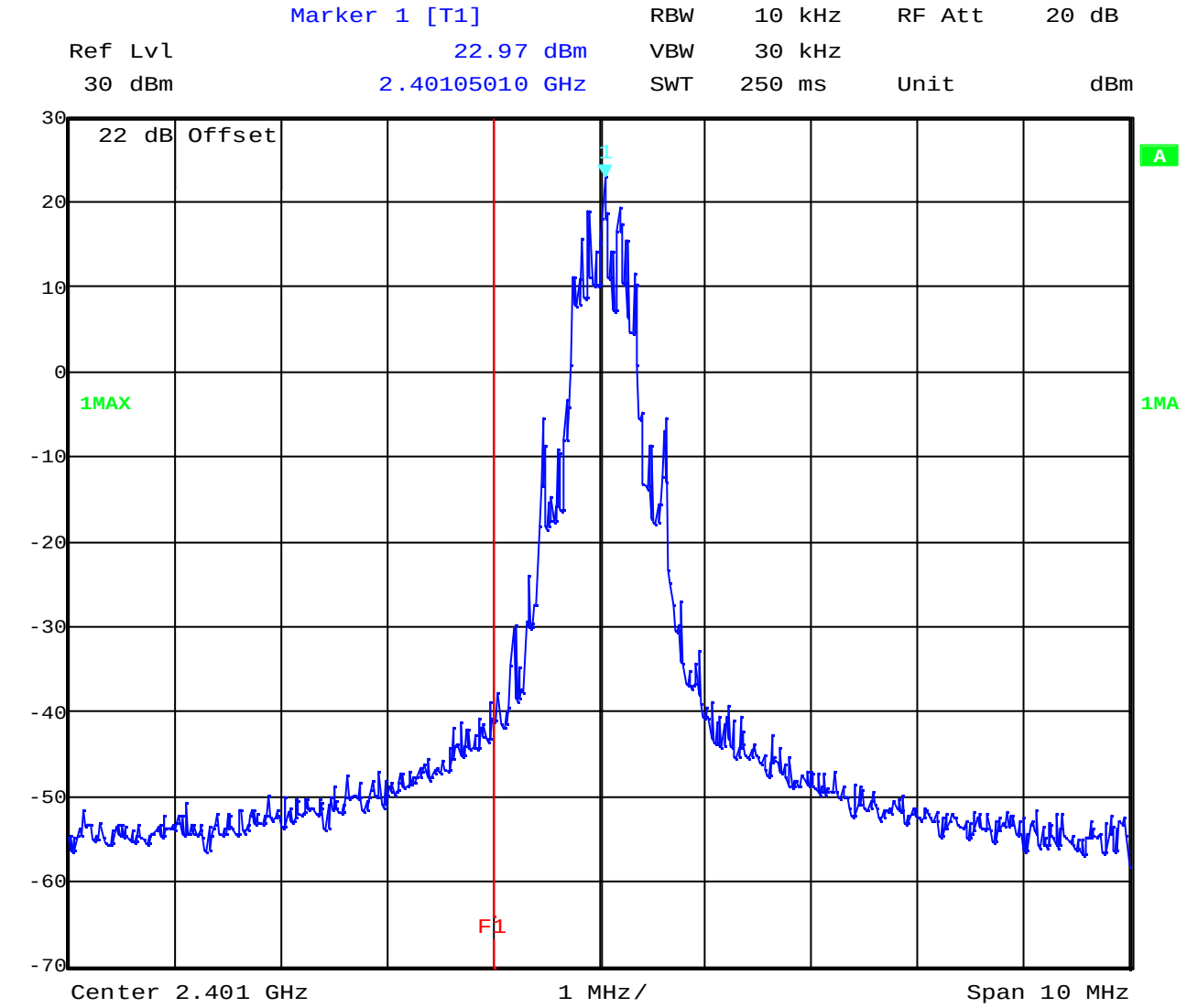
LIMIT **SUBCLAUSE § 15.247 (b) (1)**

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)
17 - 24

Band-edge compliance of conducted emissions **§15.247 (c)**

Low frequency section (hopping off) : more than 20 dBc

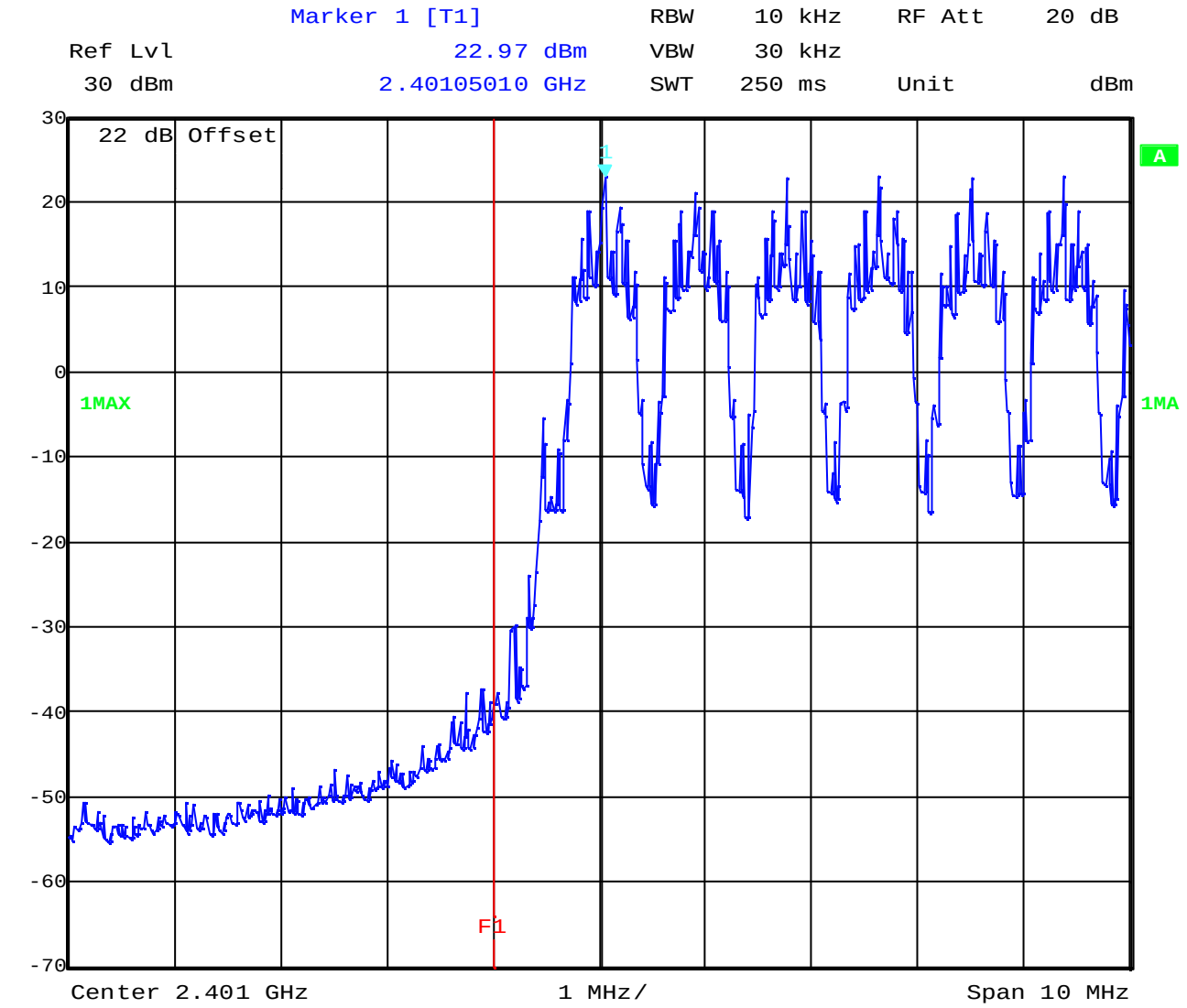


Date: 10.SEP.2001 15:49:25

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Band-edge compliance of conducted emissions **§15.247 (c)**

Low frequency section (hopping on): more than 20 dBc

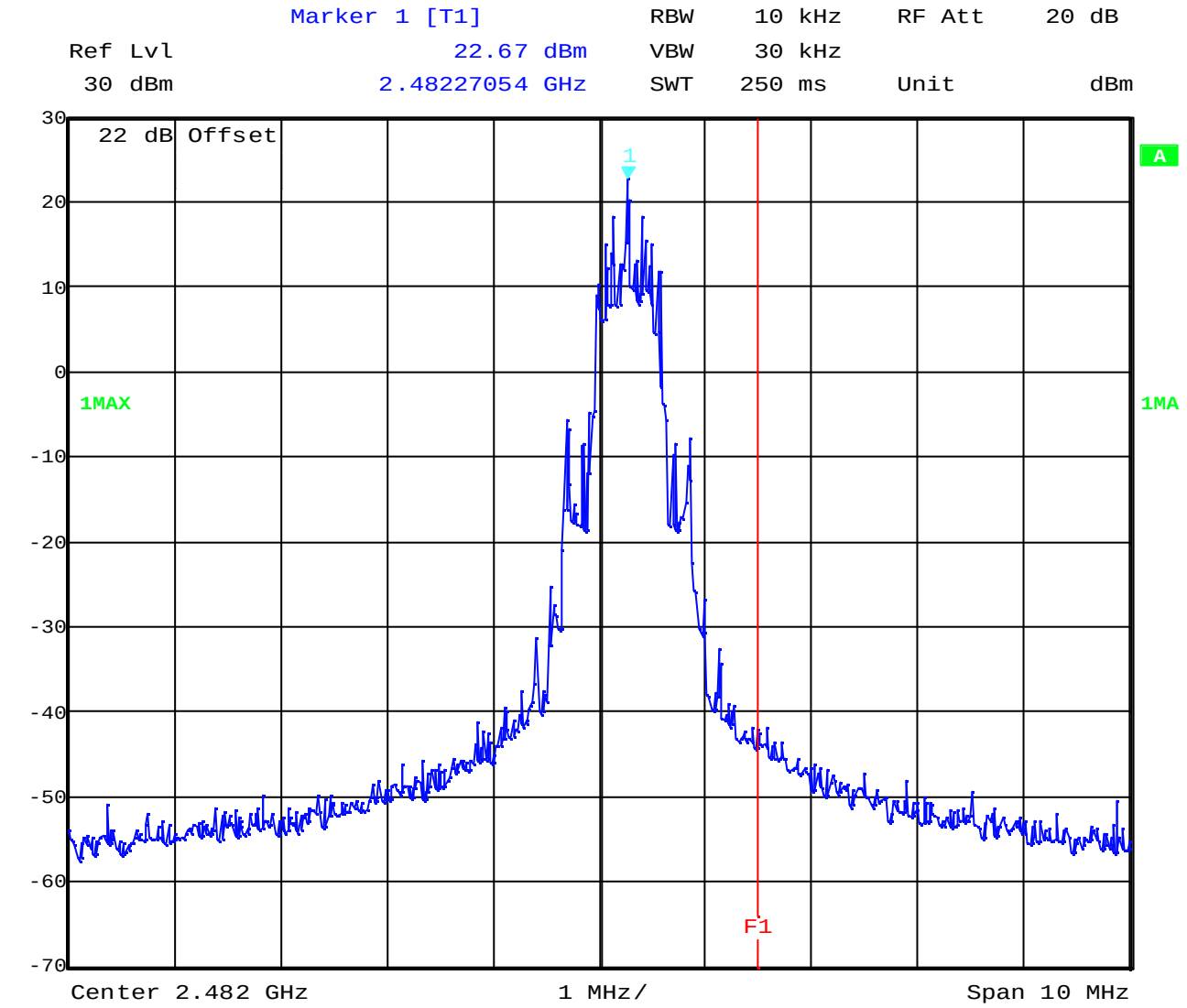


Date: 10.SEP.2001 15:52:17

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Band-edge compliance of conducted emissions **§15.247 (c)**

high frequency section (hopping off): more than 20 dBc

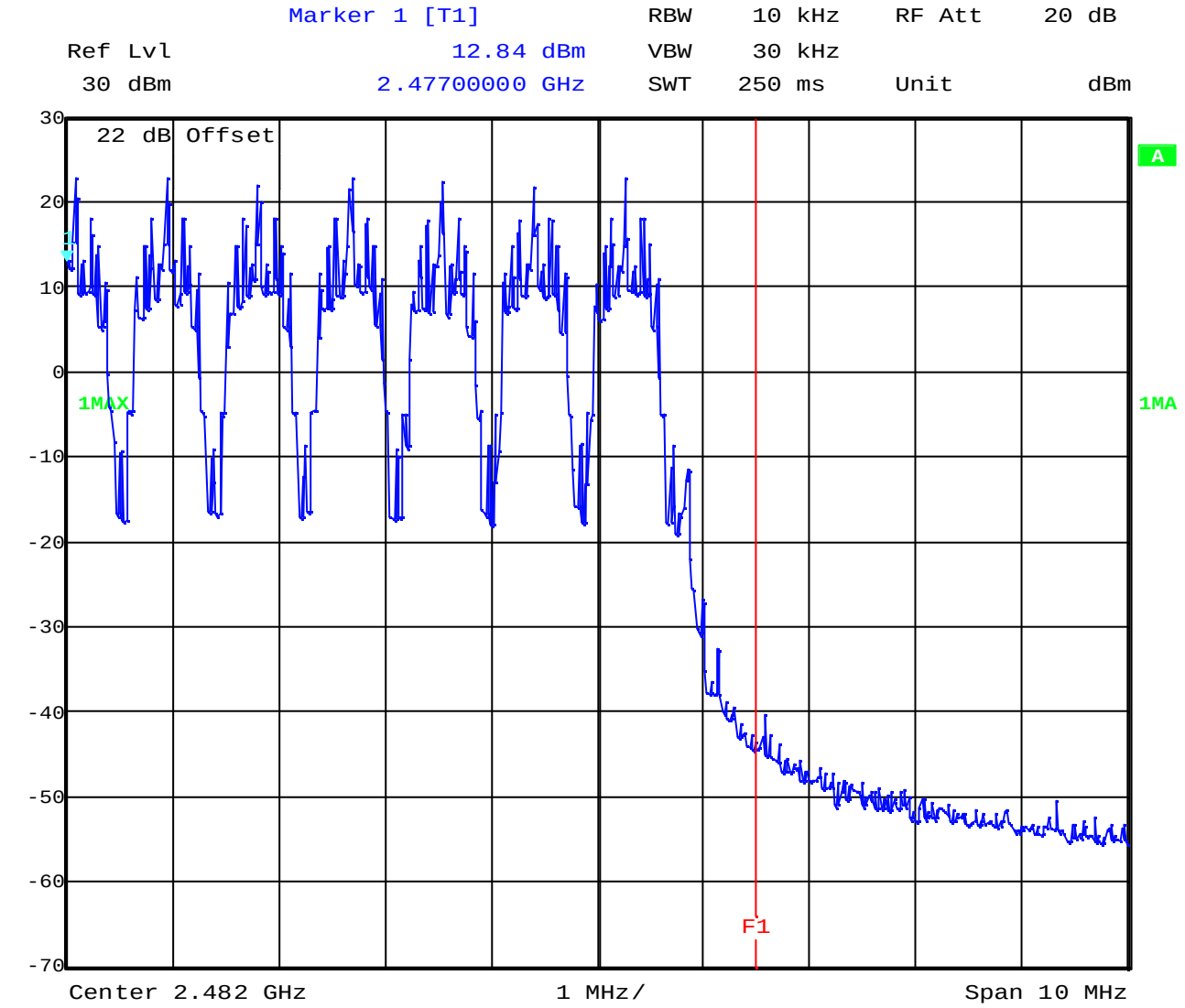


Date: 10.SEP.2001 15:48:13

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

Band-edge compliance of conducted emissions **§15.247 (c)**

high frequency section (hopping on): more than 20 dBc

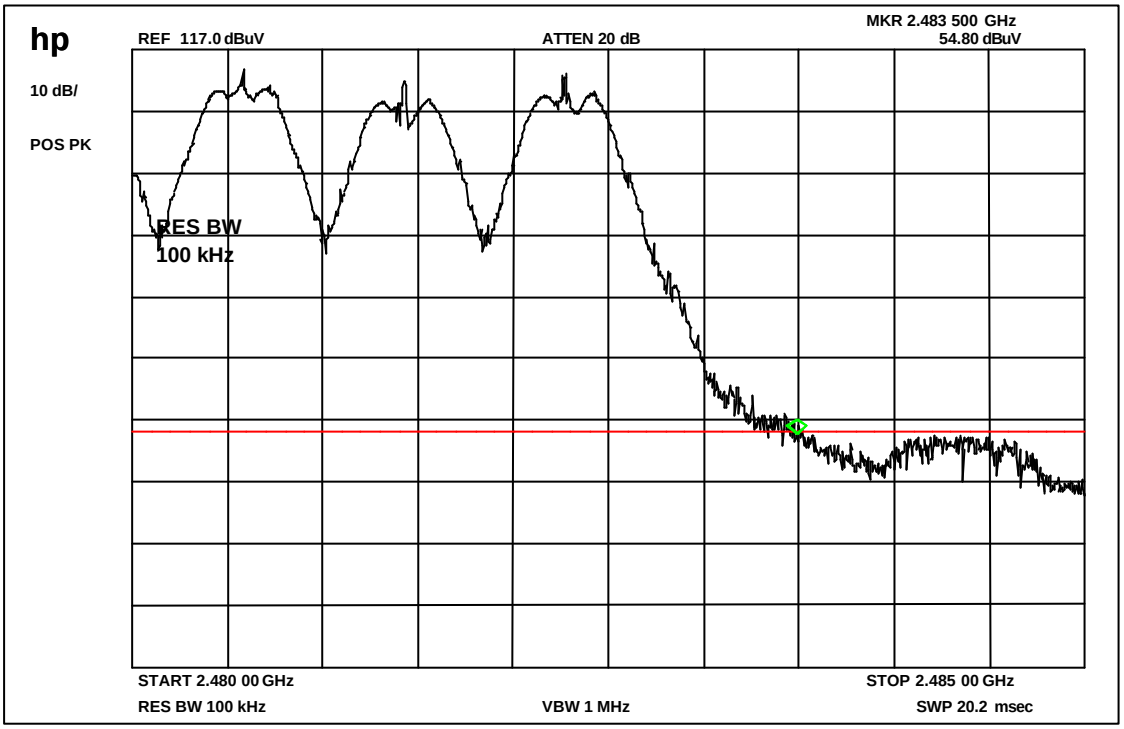


Date: 10.SEP.2001 15:57:08

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

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

This measurement was made to show, that the radiated emissions complies to the rules. The peak at 2484.1 MHz is peak 54.2 dBµV/m and average 46.4 dBµV/m.



The marker shows the lower frequency of the restricted band

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17-24

EMISSION LIMITATIONS- Conducted (Transmitter) § 15.247 (c) (1)

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBm)	limit max. allowed emmision power	actual attenuation below frequency of operation (dB)	results
2401		+22.90	30 dBm	-	Operating frequency
all peaks <<limit			-20 dBc	see plots	complies
2441		+22.62	30 dBm	-	Operating frequency
all peaks <<limit			-20 dBc	see plots	complies
2482		+22.66	30 dBm		Operating frequency
all peaks <<limit			-20 dBc	see plot	complies
Measurement uncertainty		± 3dB			

RBW : 100 kHz VBW: 1 MHz

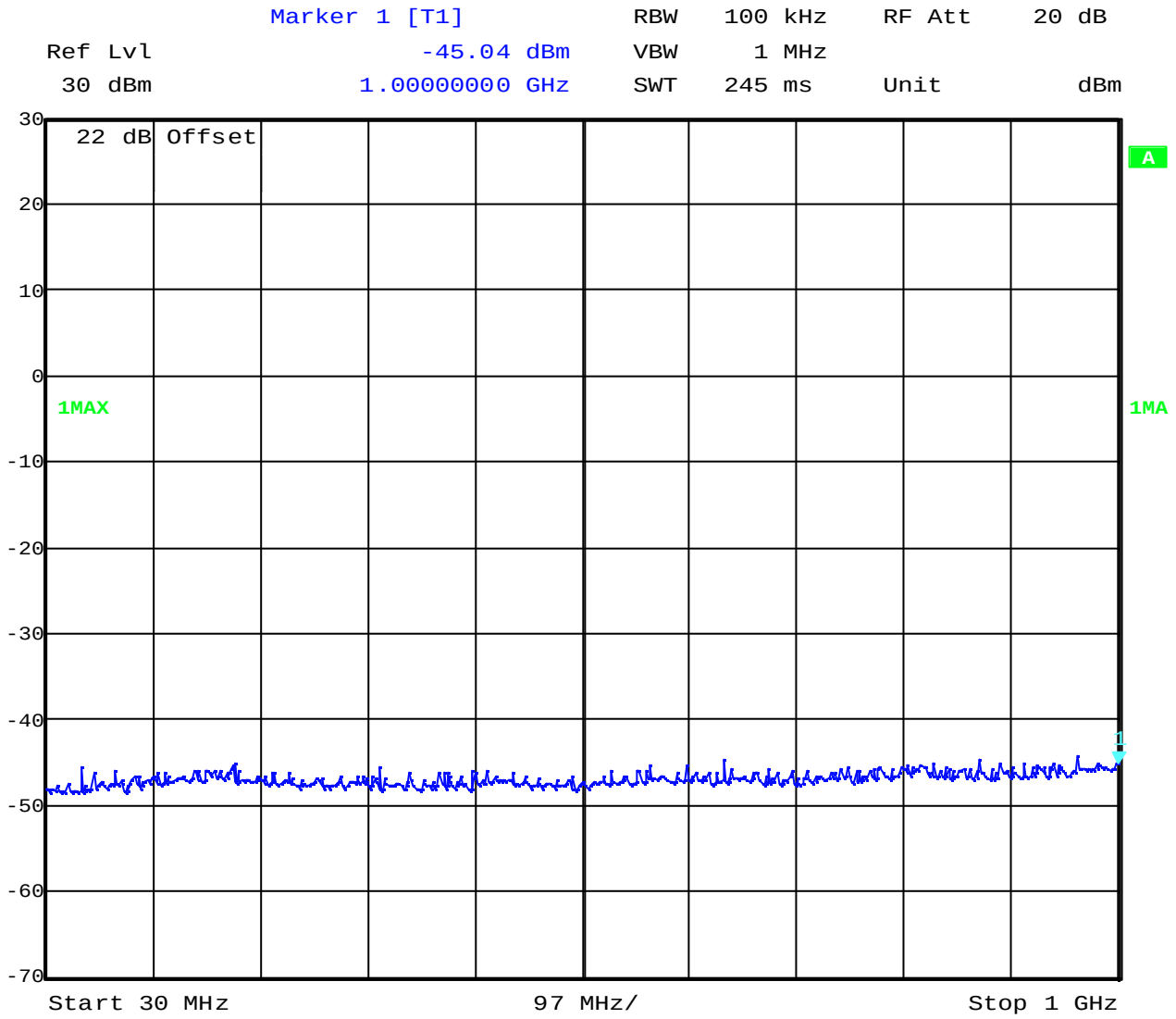
For emissions that fall into restricted bands you find the radiated emissions later in the report.

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)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 1 (lowest Channel): 30 MHz - 1 GHz



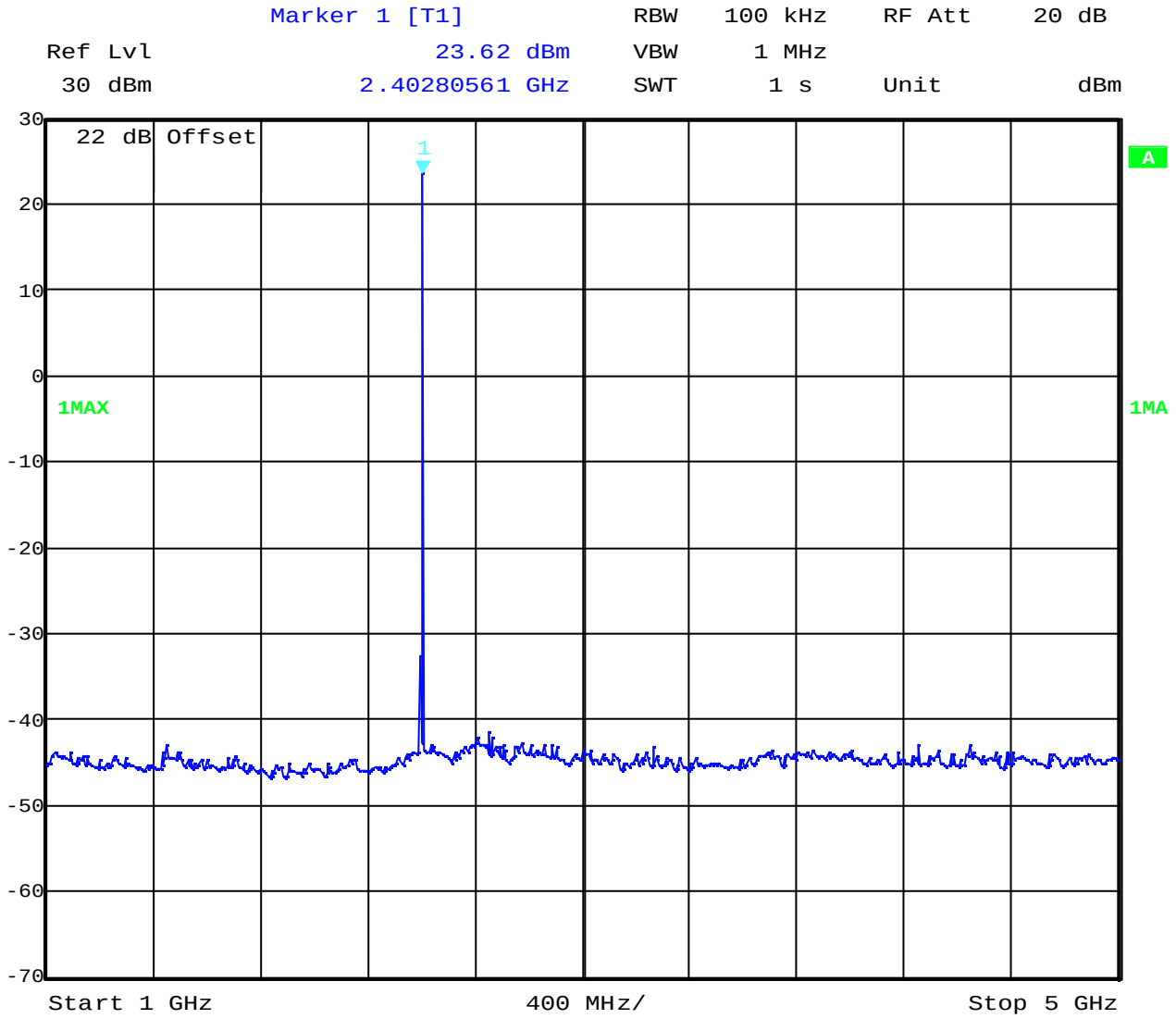
Date: 11.SEP.2001 06:53:04

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 1 (lowest Channel): 1 – 5 GHz peak



Date: 11.SEP.2001 06:53:31

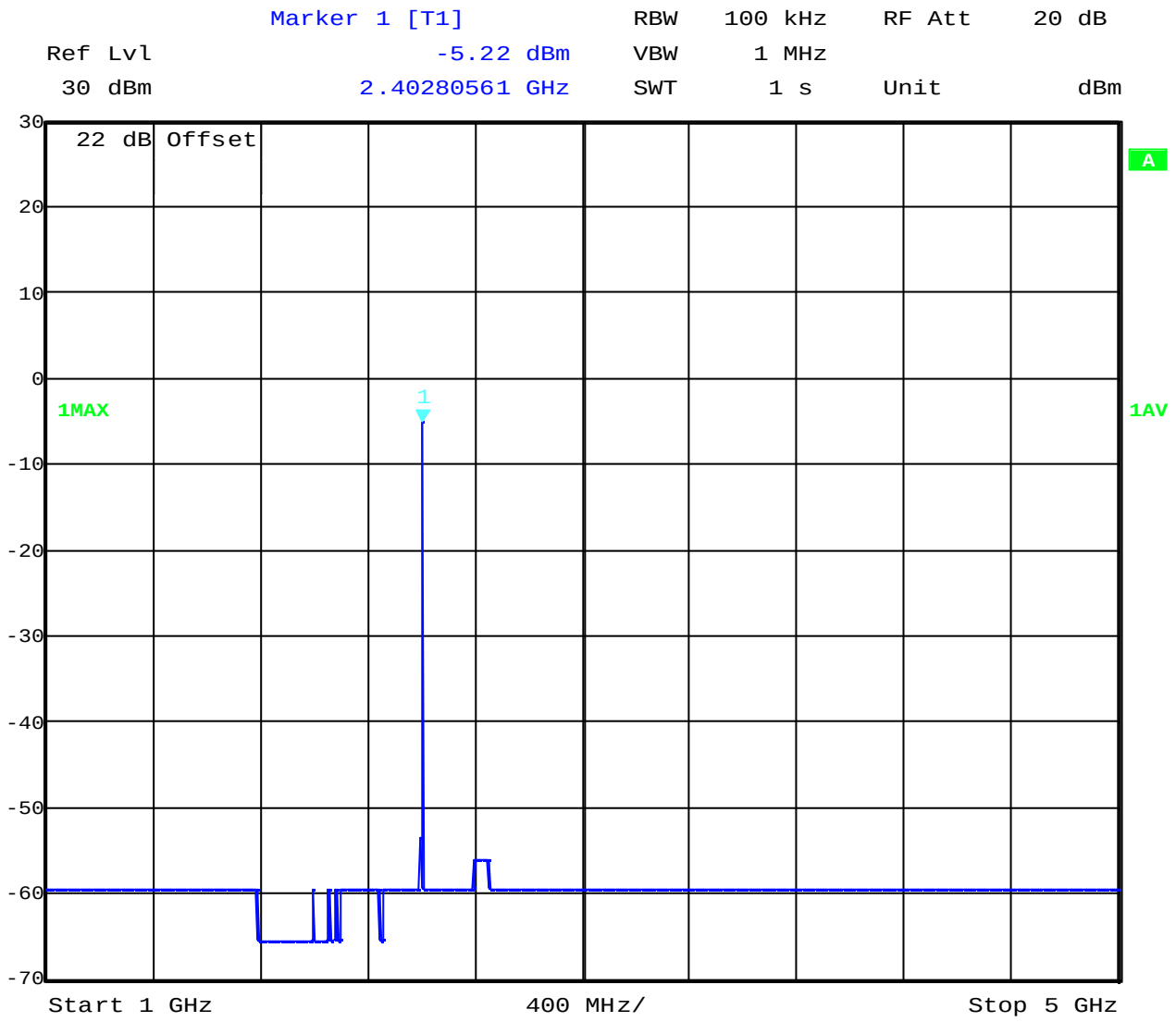
This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**

Channel 1 (lowest Channel): 1 – 5 GHz average

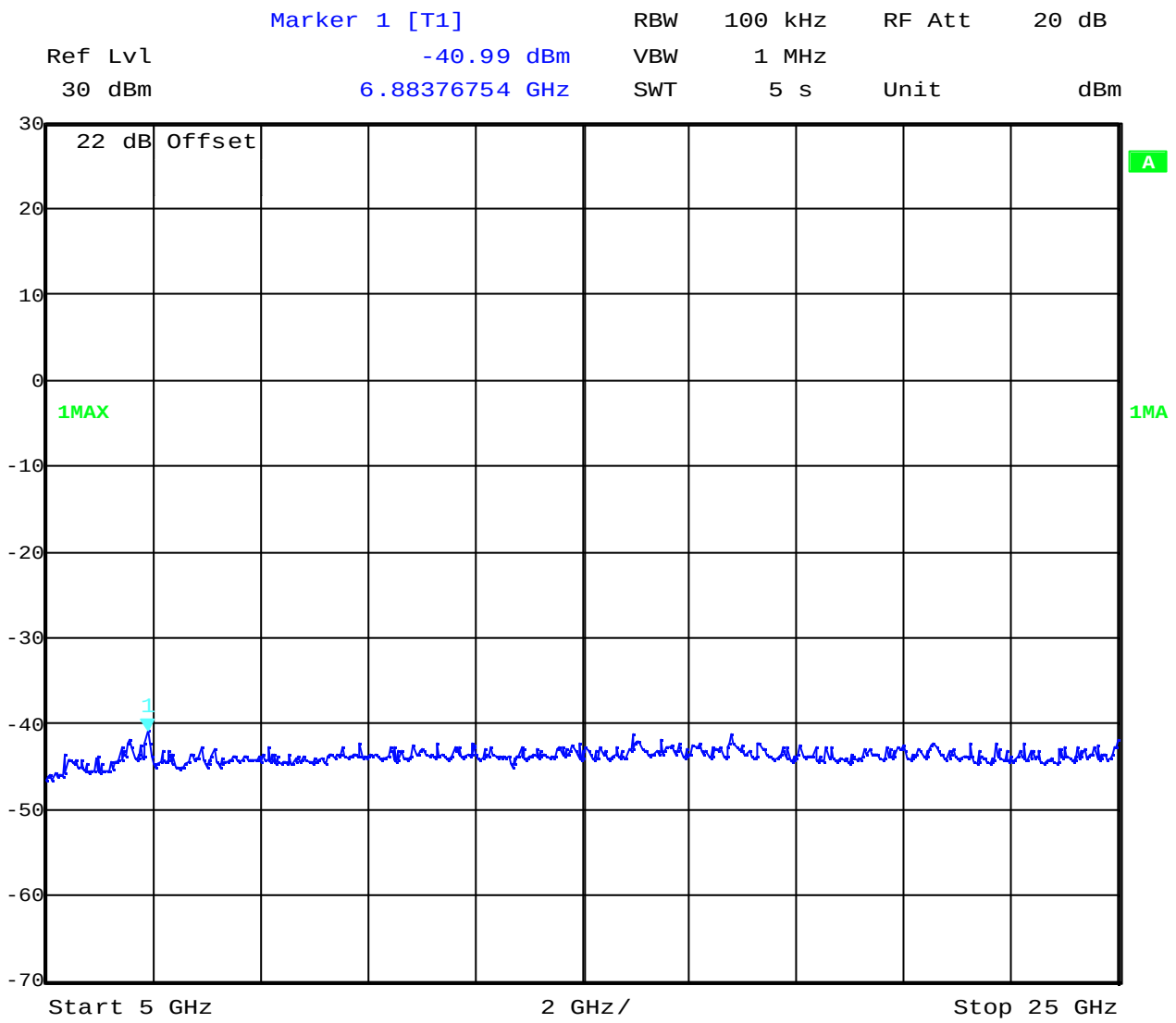


Date: 11.SEP.2001 06:54:08

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 1 (lowest Channel): 5 - 25 GHz peak



Date: 11.SEP.2001 06:55:25

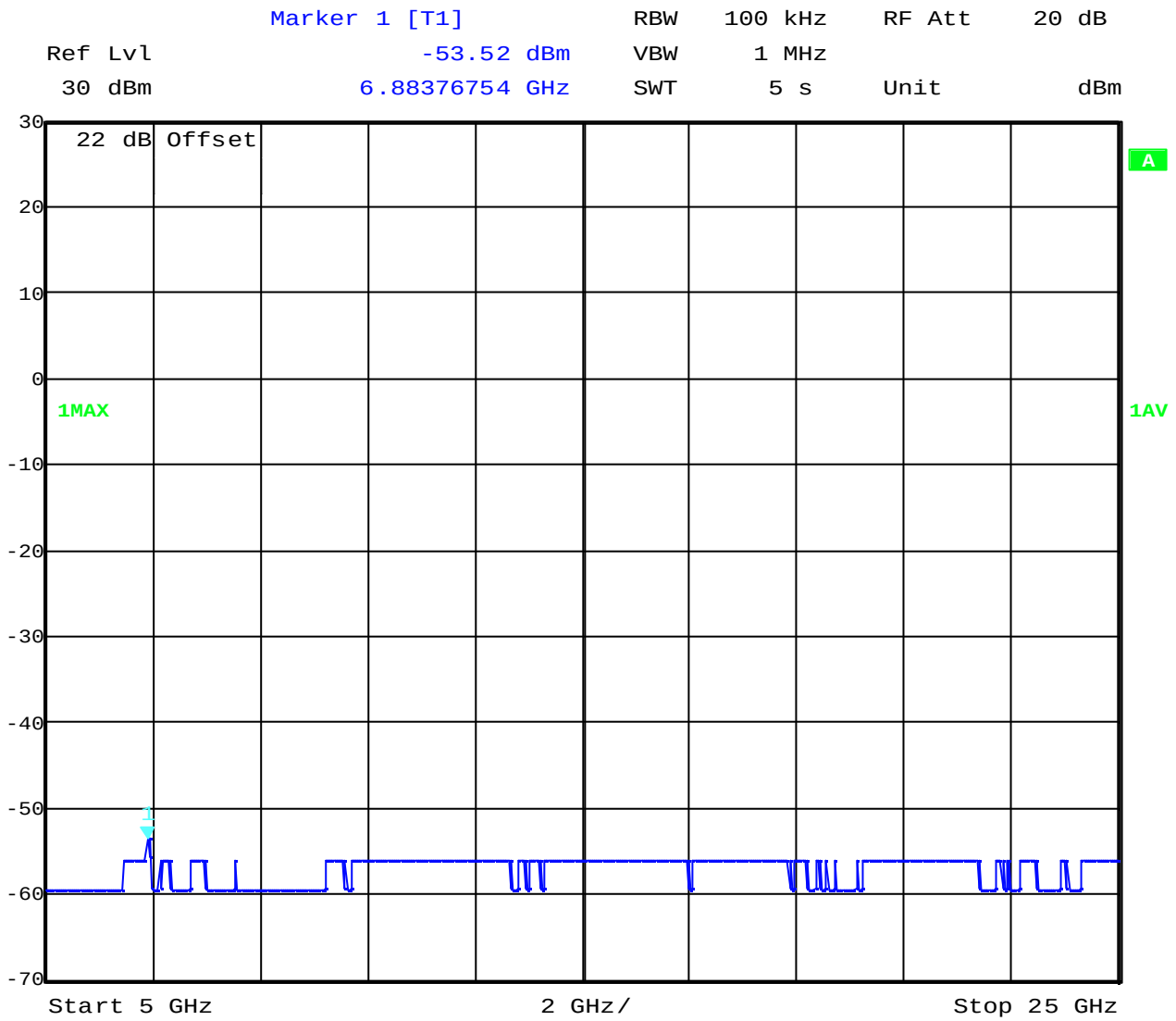
This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**

Channel 1 (lowest Channel): 5 – 25 GHz average



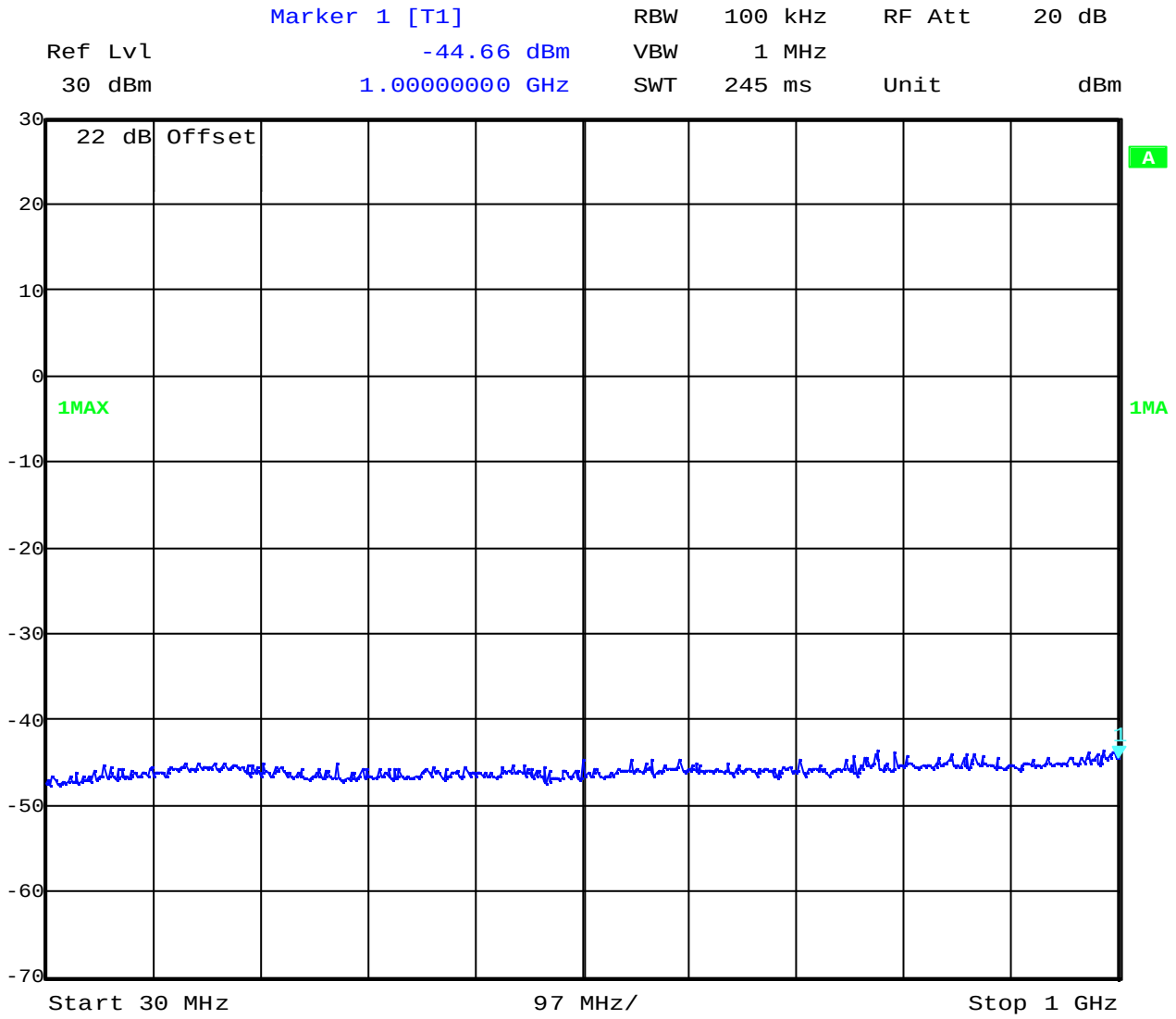
Date: 11.SEP.2001 06:54:52

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 2 (middle Channel): 30 MHz - 1GHz

The upper line is referenced to the max. output at 2441 MHz in the next plot.



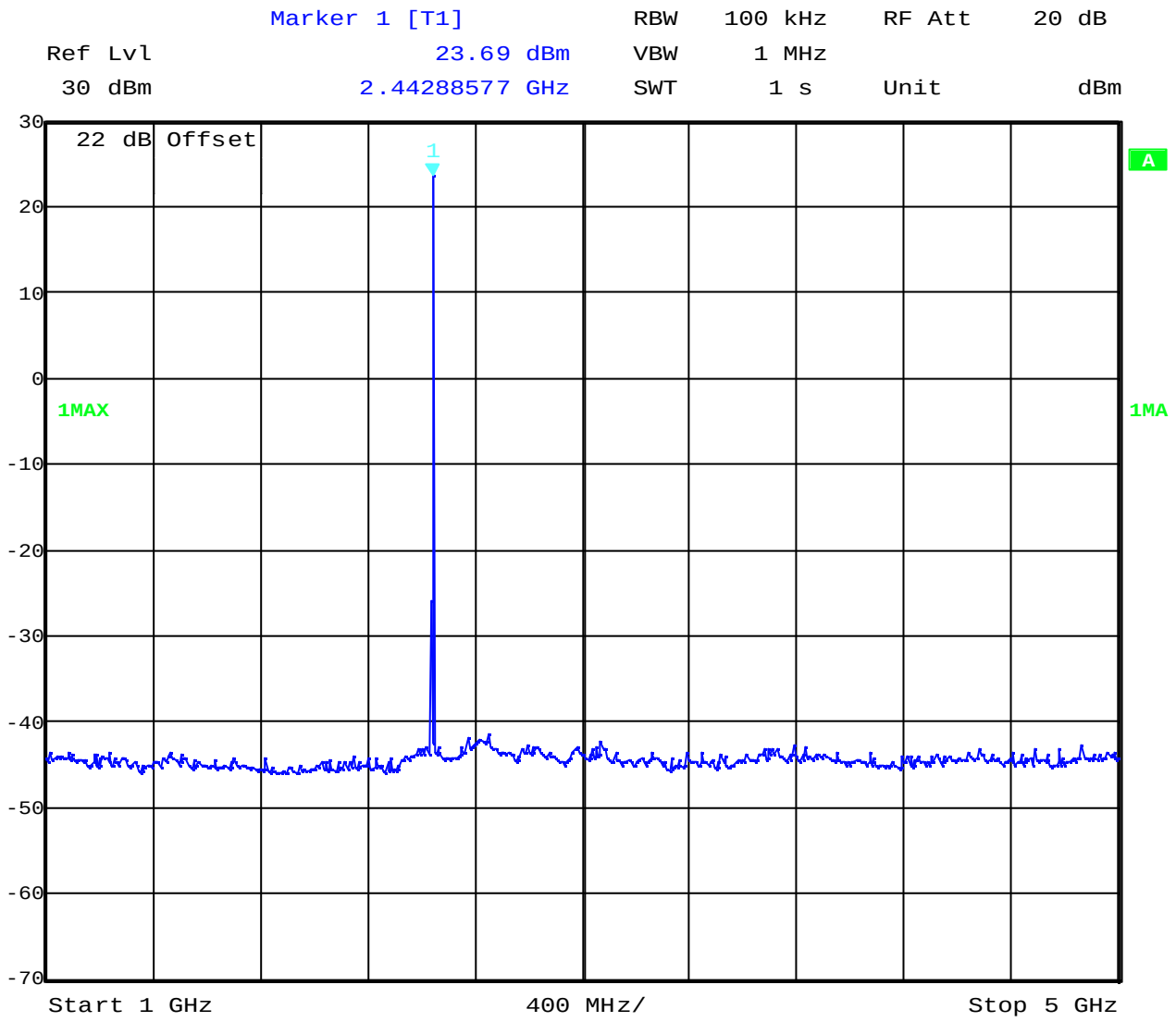
Date: 11.SEP.2001 06:37:54

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 2 (middle Channel): 1 –5 GHz peak



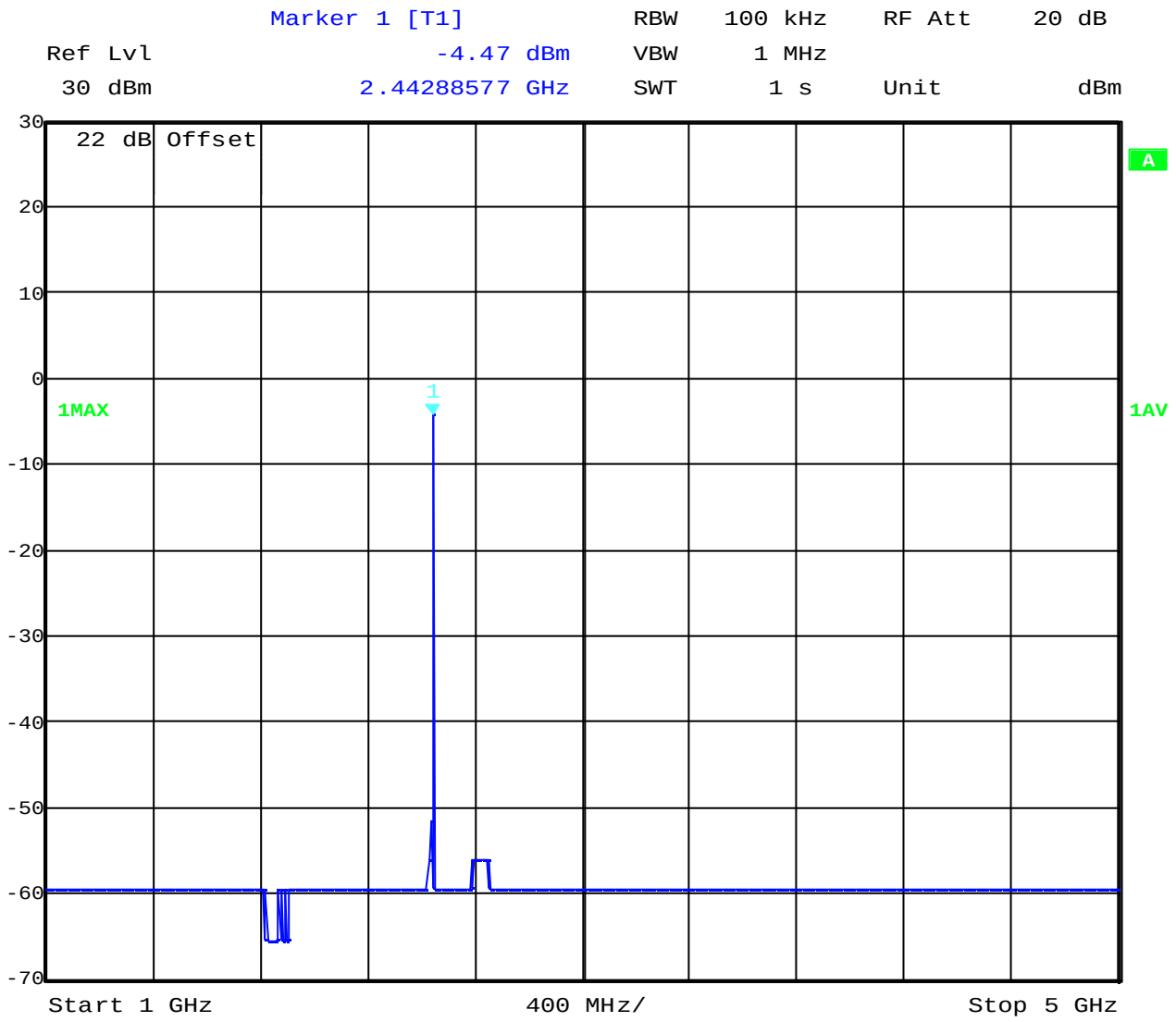
Date: 11.SEP.2001 06:39:05

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 2 (middle Channel): 1 –5 GHz average



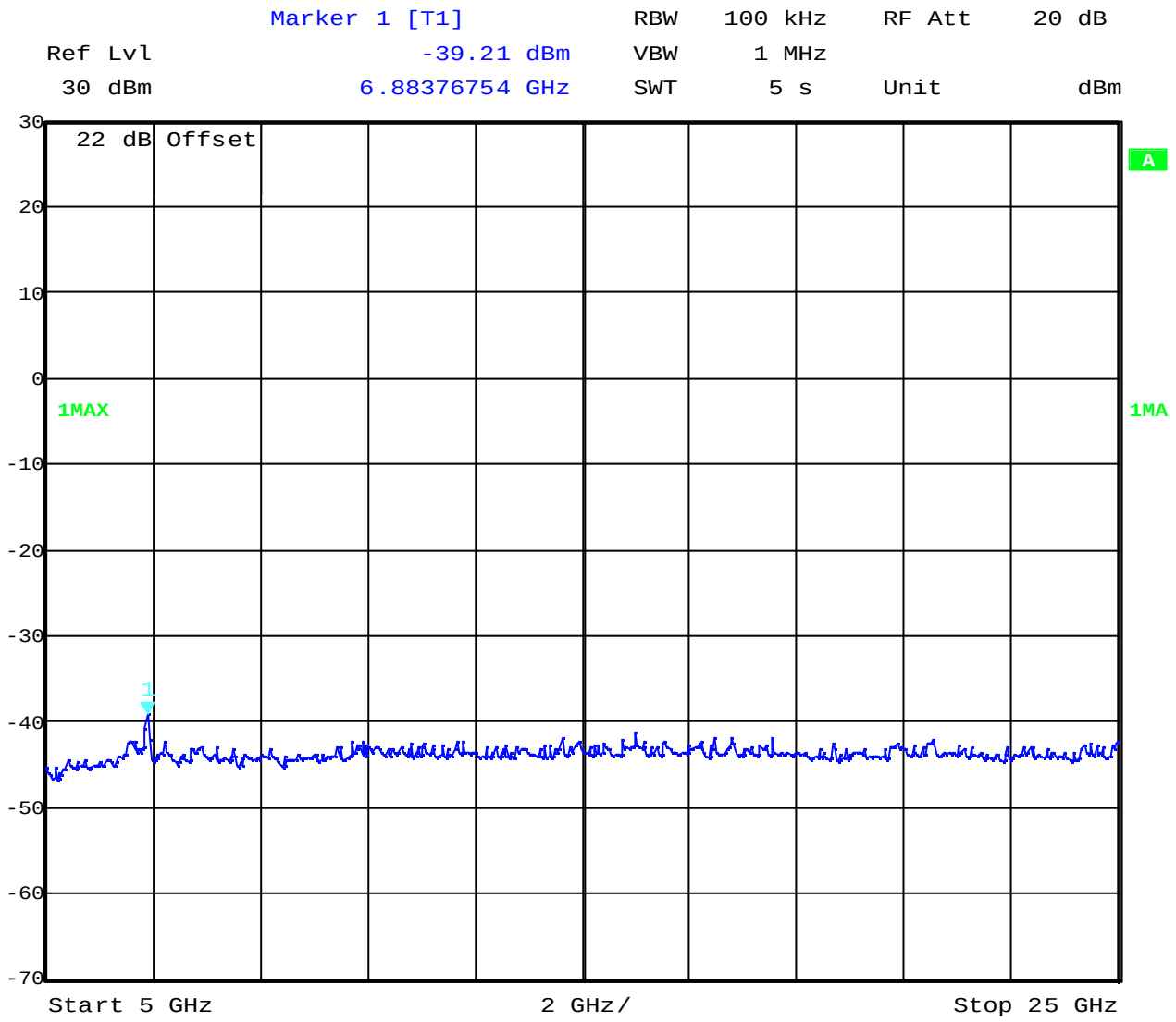
Date: 11.SEP.2001 06:51:13

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 2 (middle Channel): 5 – 25 GHz peak



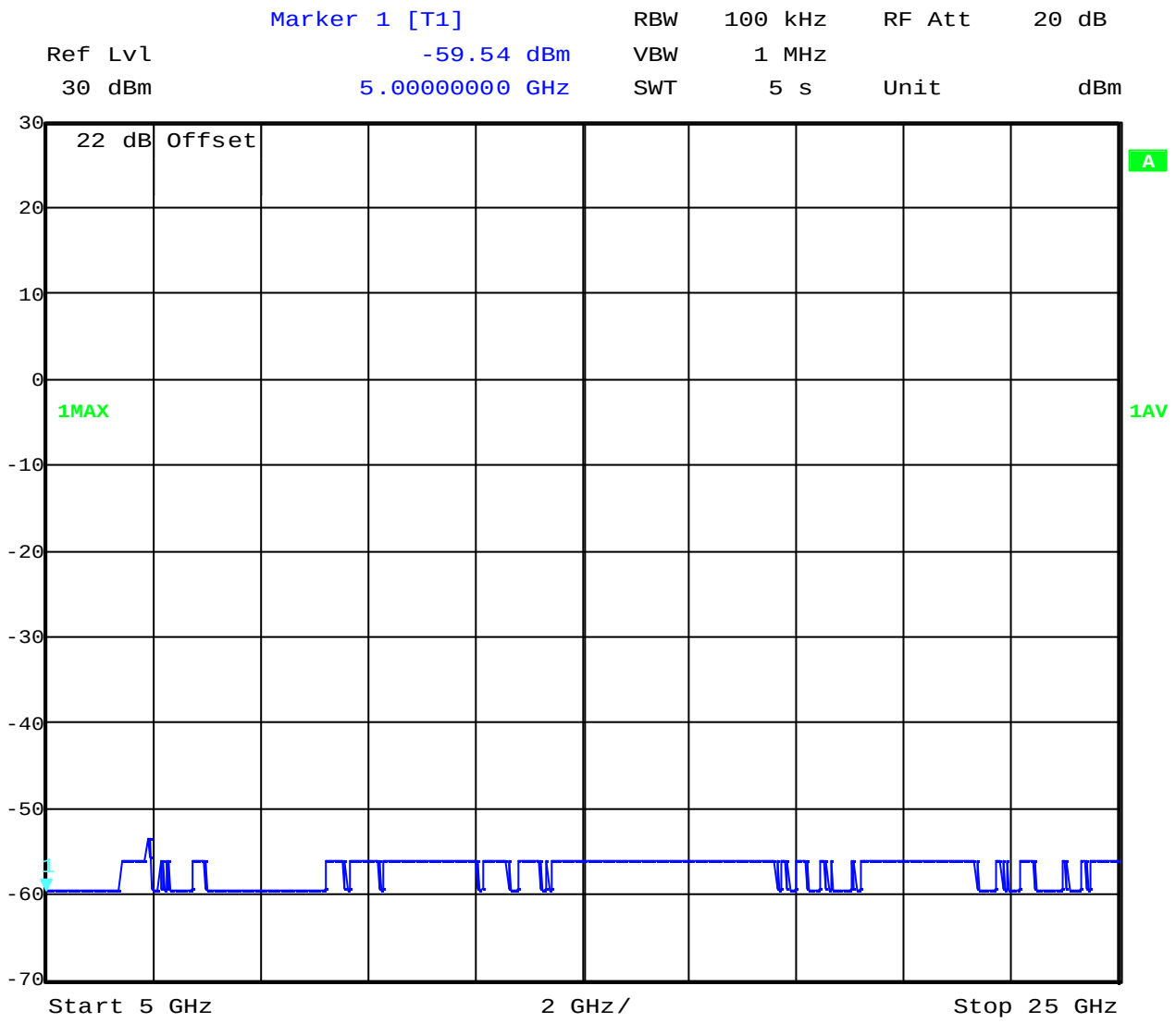
Date: 11.SEP.2001 06:52:04

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**

Channel 2 (middle Channel): 5 – 25 GHz average



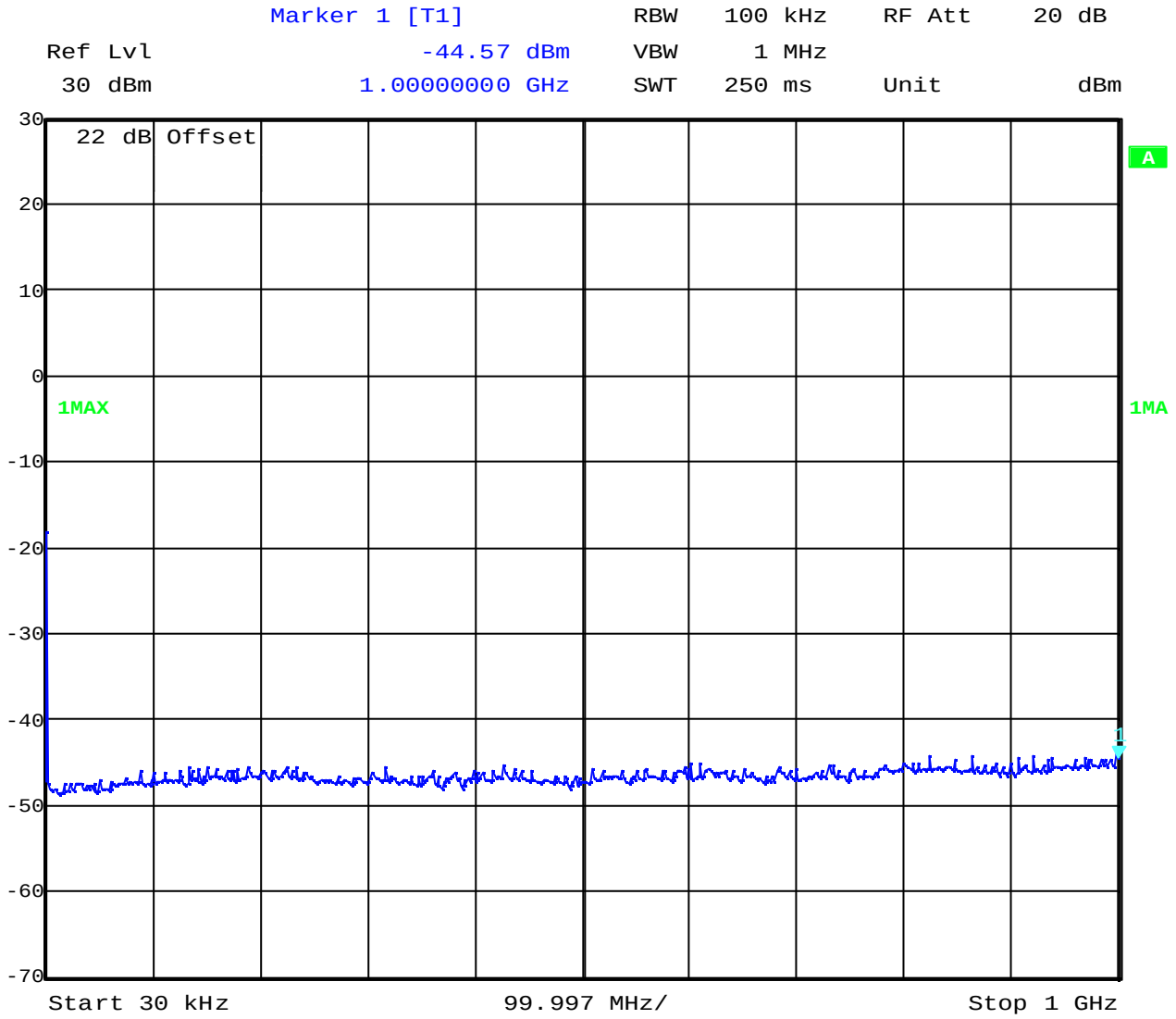
Date: 11.SEP.2001 06:51:37

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the lots later in the report.

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 3 (highest Channel): 30 MHz - 1 GHz

The upper line is referenced to the max. output at 2482 MHz in the next plot.



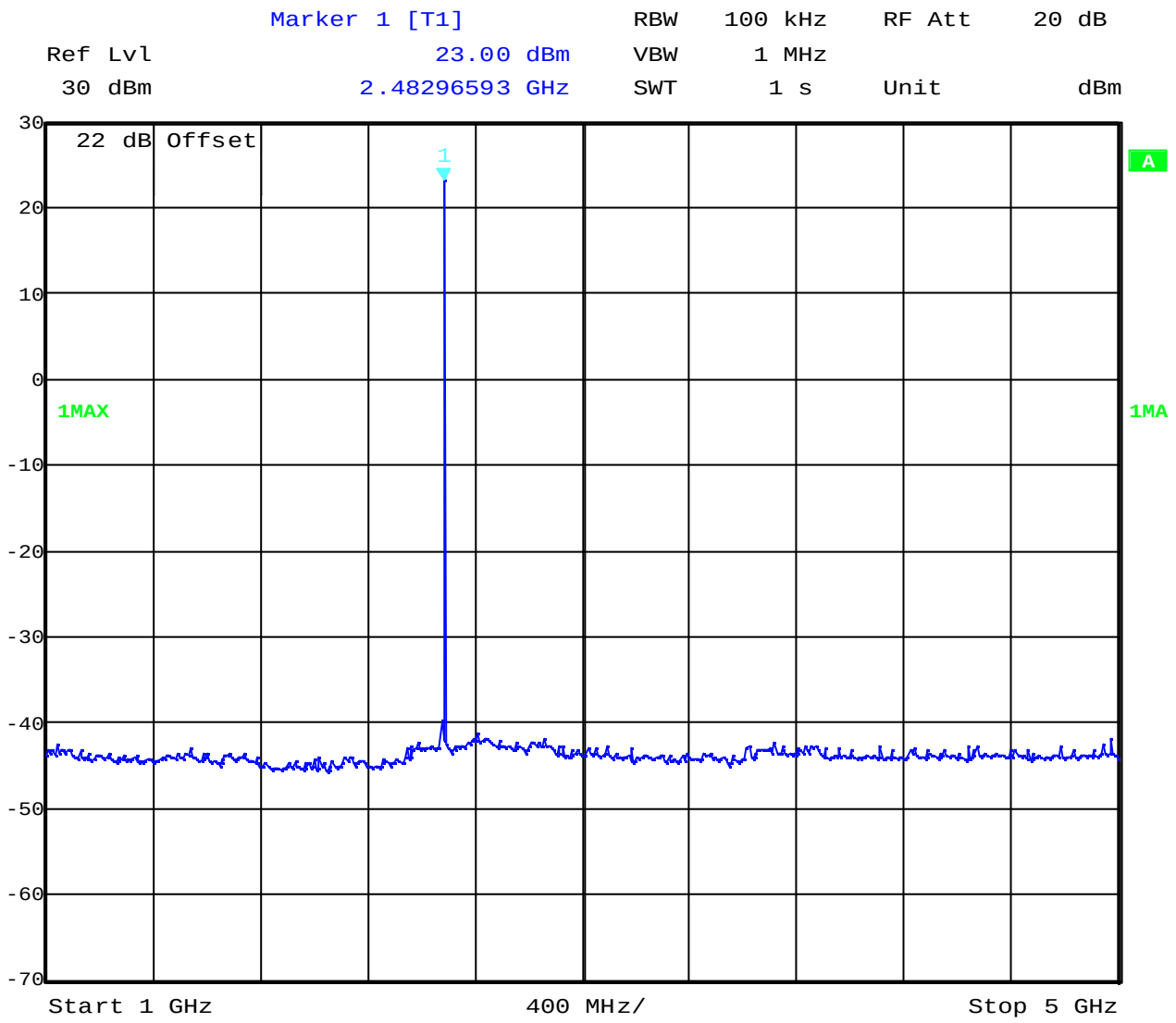
Date: 10.SEP.2001 15:59:10

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**

Channel 3 (highest Channel):: 1 - 5 GHz peak



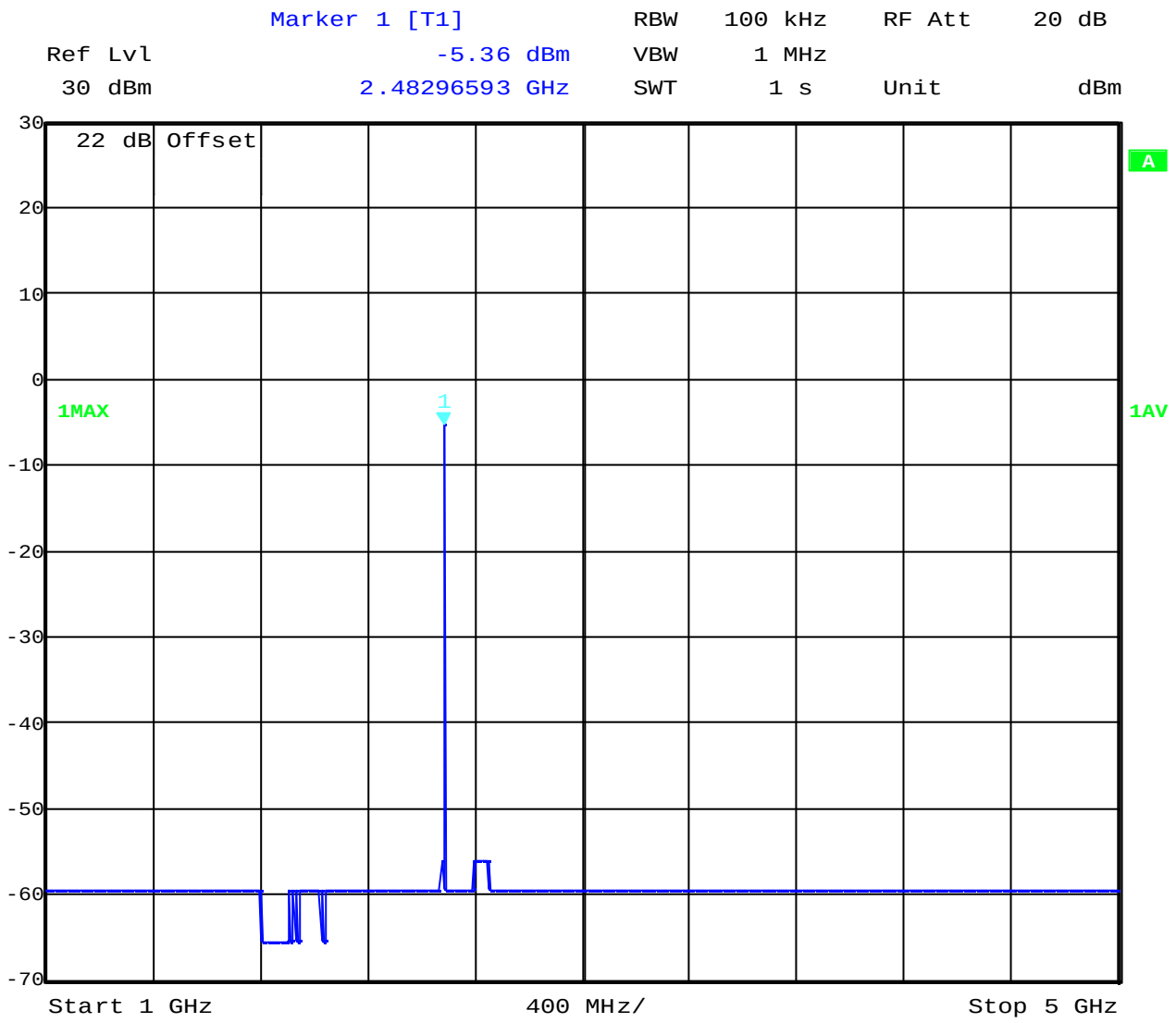
Date: 10.SEP.2001 16:02:04

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**

Channel 3 (highest Channel):: 1 - 5 GHz average



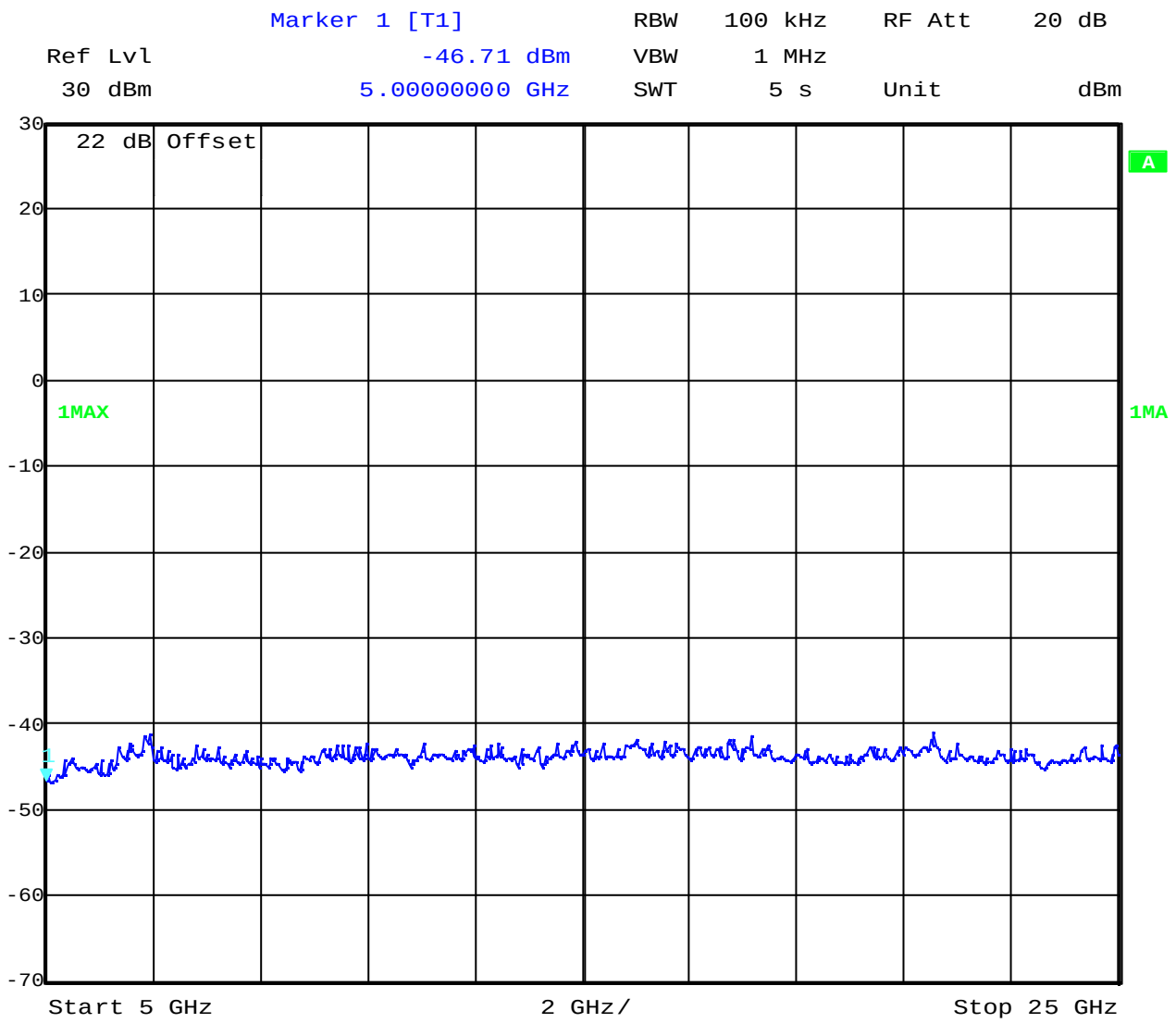
Date: 10.SEP.2001 16:04:34

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 3 (highest Channel): 5 - 25 GHz peak



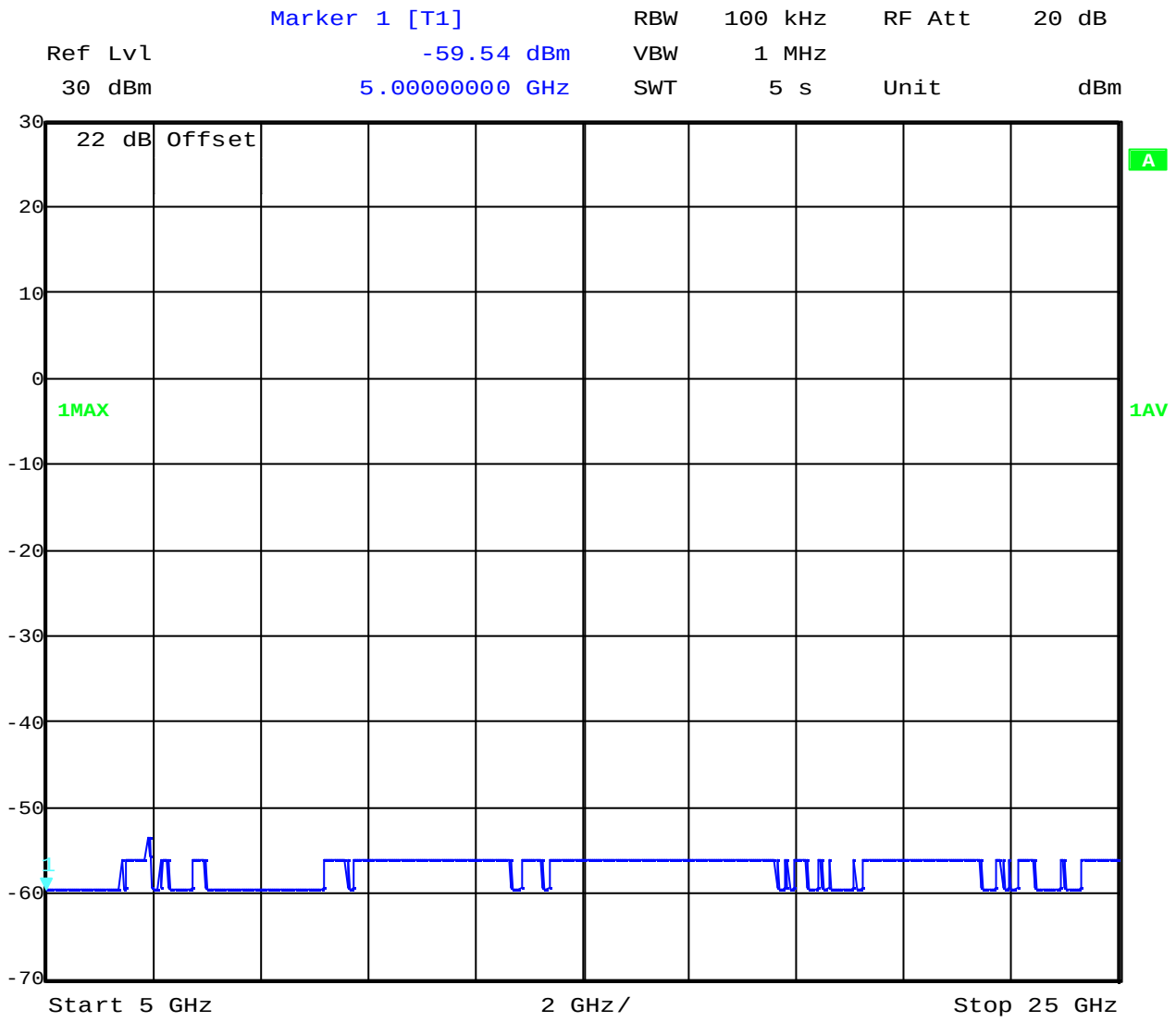
Date: 10.SEP.2001 16:05:15

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSION LIMITATIONS- Conducted (Transmitter) **§ 15.247 (c) (1)**
Channel 3 (highest Channel): 5 - 25 GHz average



Date: 10.SEP.2001 16:04:56

This is only a scan. Final measurements were made below 1 GHz with 100 kHz RBW/VBW and a CISPR Quasi peak adapter , higher frequencies with 1 MHz RBW/VBW

The peaks in restricted bands are remeasured radiated. You can find the plots later in the report.

SPURIOUS RADIATED EMISSION **§ 15.247 (c) (1)**

The measurements below 1 GHz were performed with an CISPR Quasi Peak Adapter.

EMISSION LIMITATIONS					
f (MHz)	polari-zation	amplitude of emission (dBµV/m) QP/Peak	amplitude of emission (dBµV/m) average	limit max. allowed emmision power (dBµV/m)	results
2402 MHz					
No	peaks	found			complies
2441 MHz					
No	peaks	found			complies
2482 MHz					
No	peaks	found			complies
Measurement uncertainty		± 3dB			

<u>Horizontal measurements were more then 5 dB lower</u>

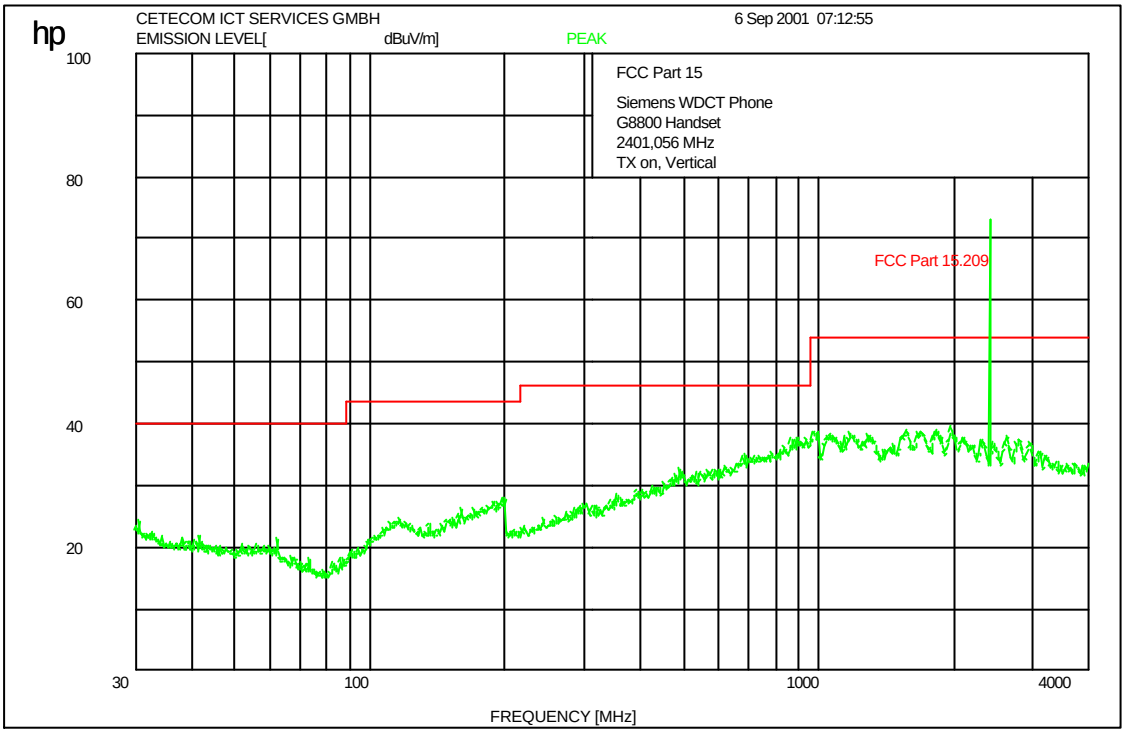
LIMITS **SUBCLAUSE § 15.247 (c)**

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)
17-24

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

30-4000 MHz, vertical, 2401 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

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

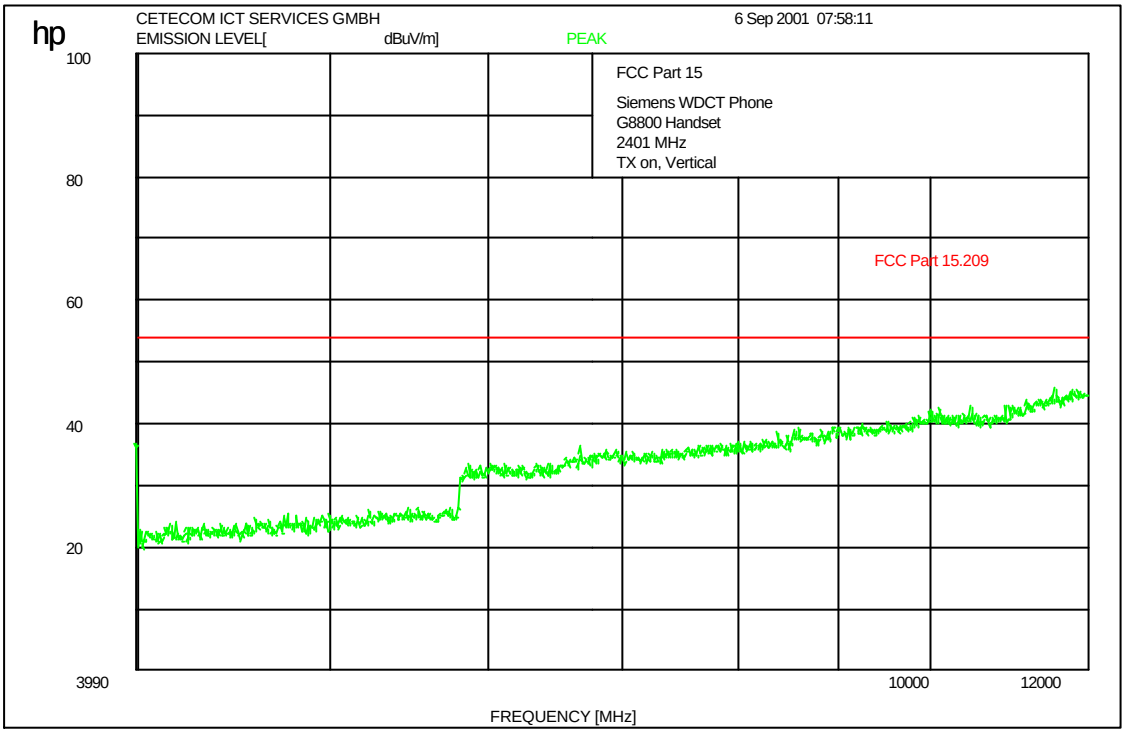
LIMITS **SUBCLAUSE § 15.247 (c)**

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)
17-24

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

4000 - 12000 MHz, vertical, 2401 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

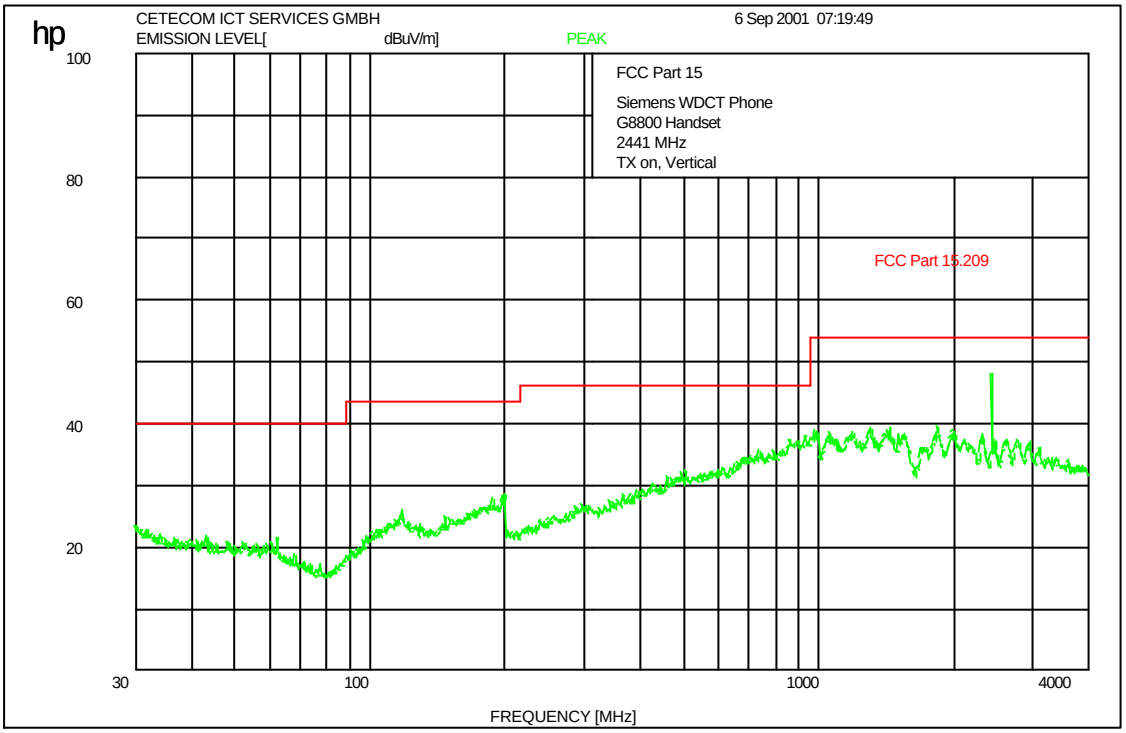
LIMITS **SUBCLAUSE § 15.247 (c)**

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17-24

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

30-4000 MHz, vertical, 2441 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

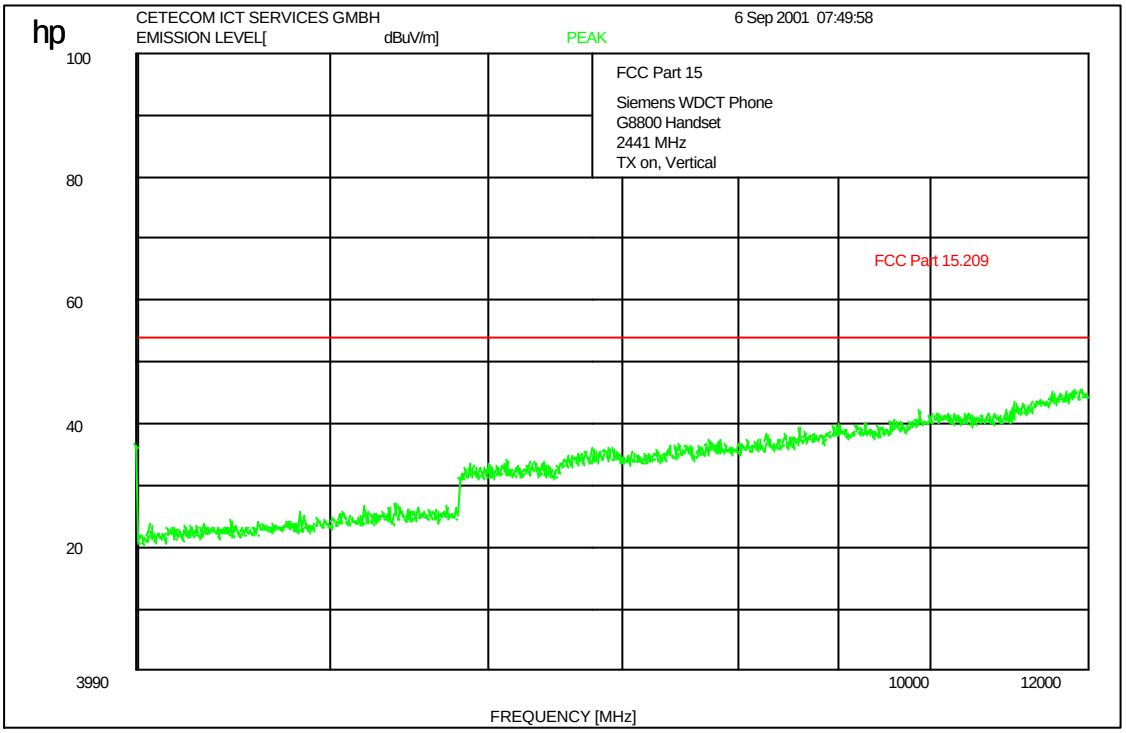
LIMITS **SUBCLAUSE § 15.247 (c)**

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17-24

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

4000 - 12000 MHz, vertical, 2441 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

LIMITS **SUBCLAUSE § 15.247 (c)**

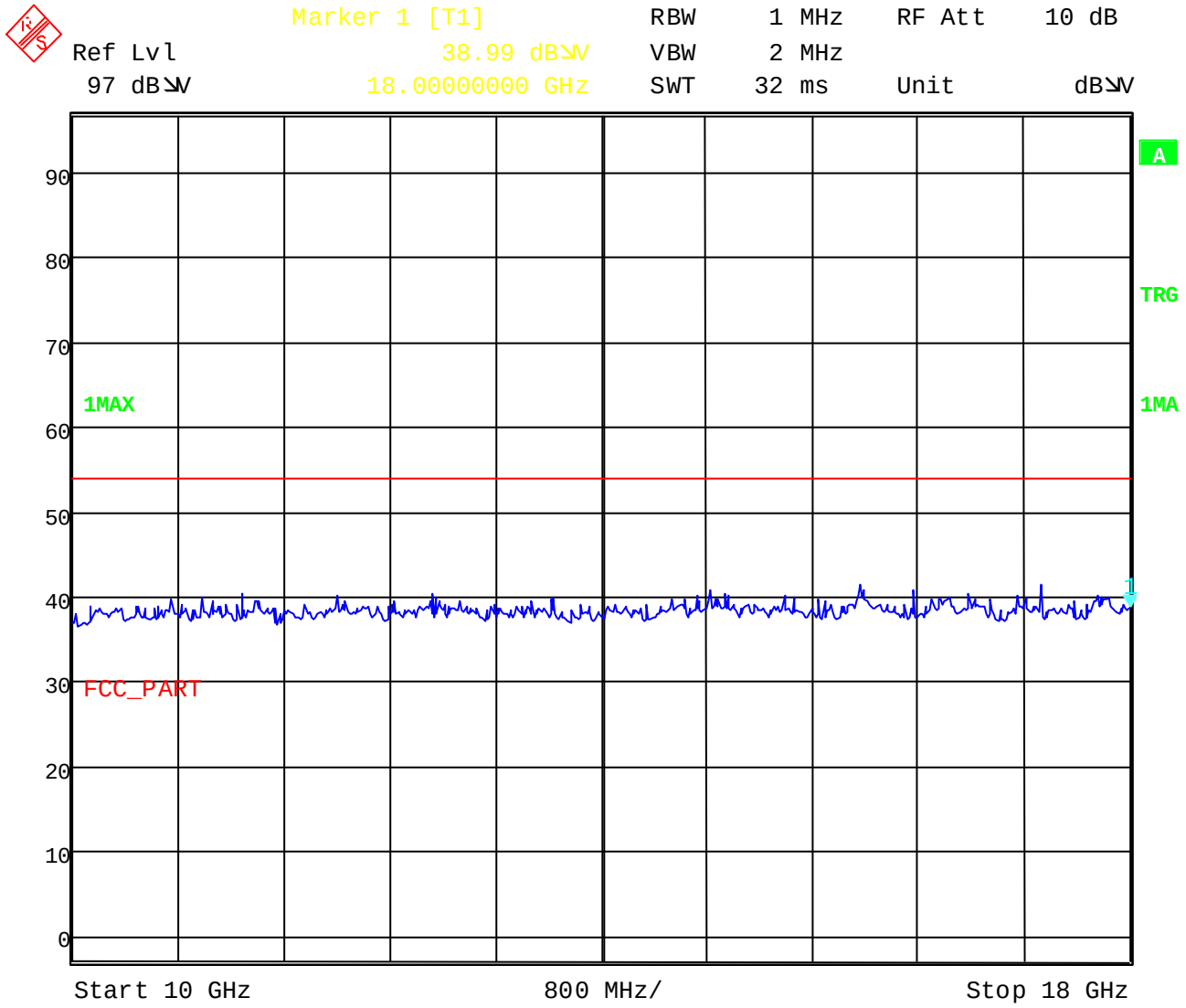
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17-24

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

<u>The next 4 plots are valid for all channels. There were no peaks found.</u>

12000 – 18000 MHz, vertical, 2441 MHz, peak



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

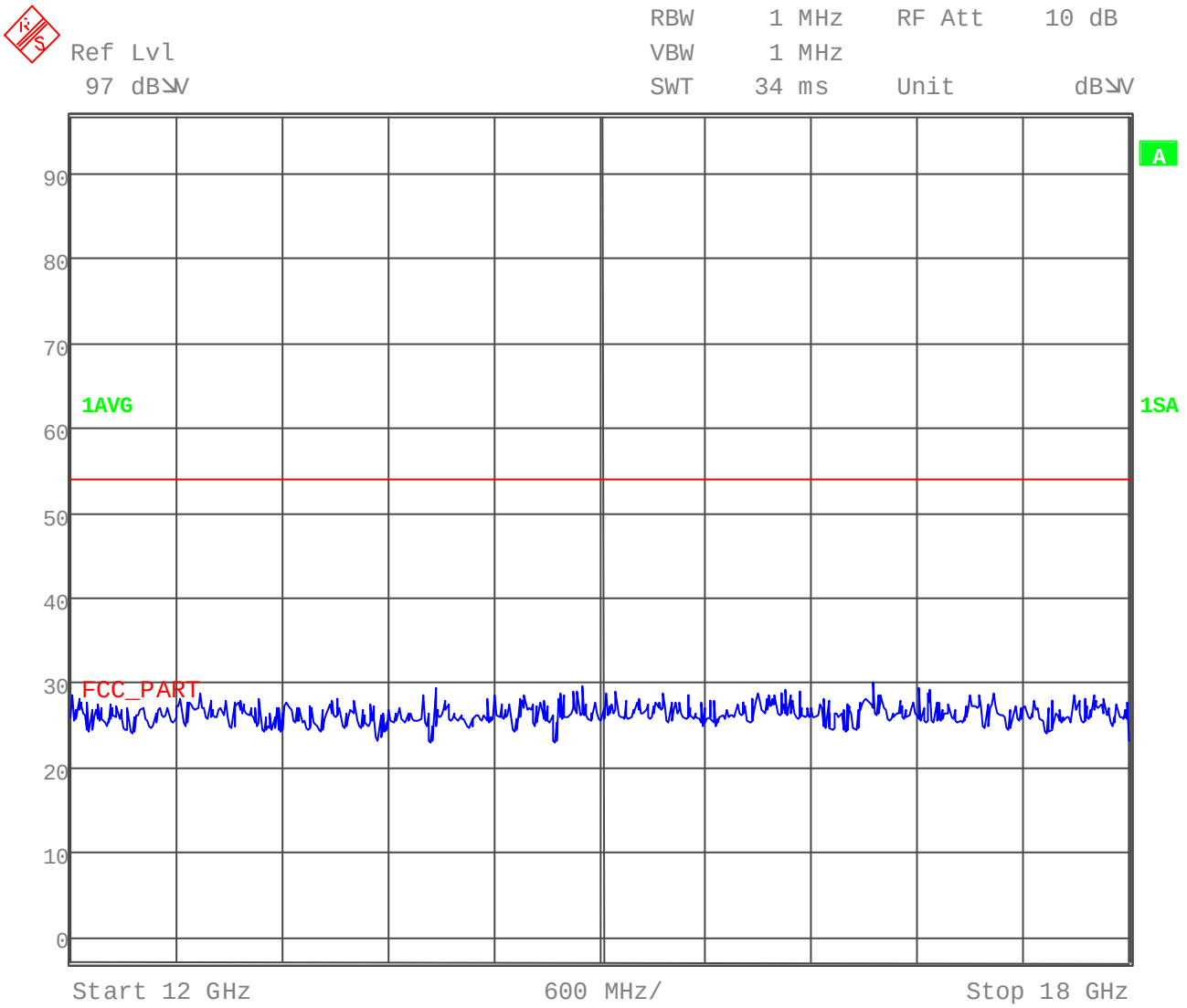
LIMITS **SUBCLAUSE § 15.247 (c)**

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

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

12000 – 18000 MHz, vertical, 2441 MHz, average



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

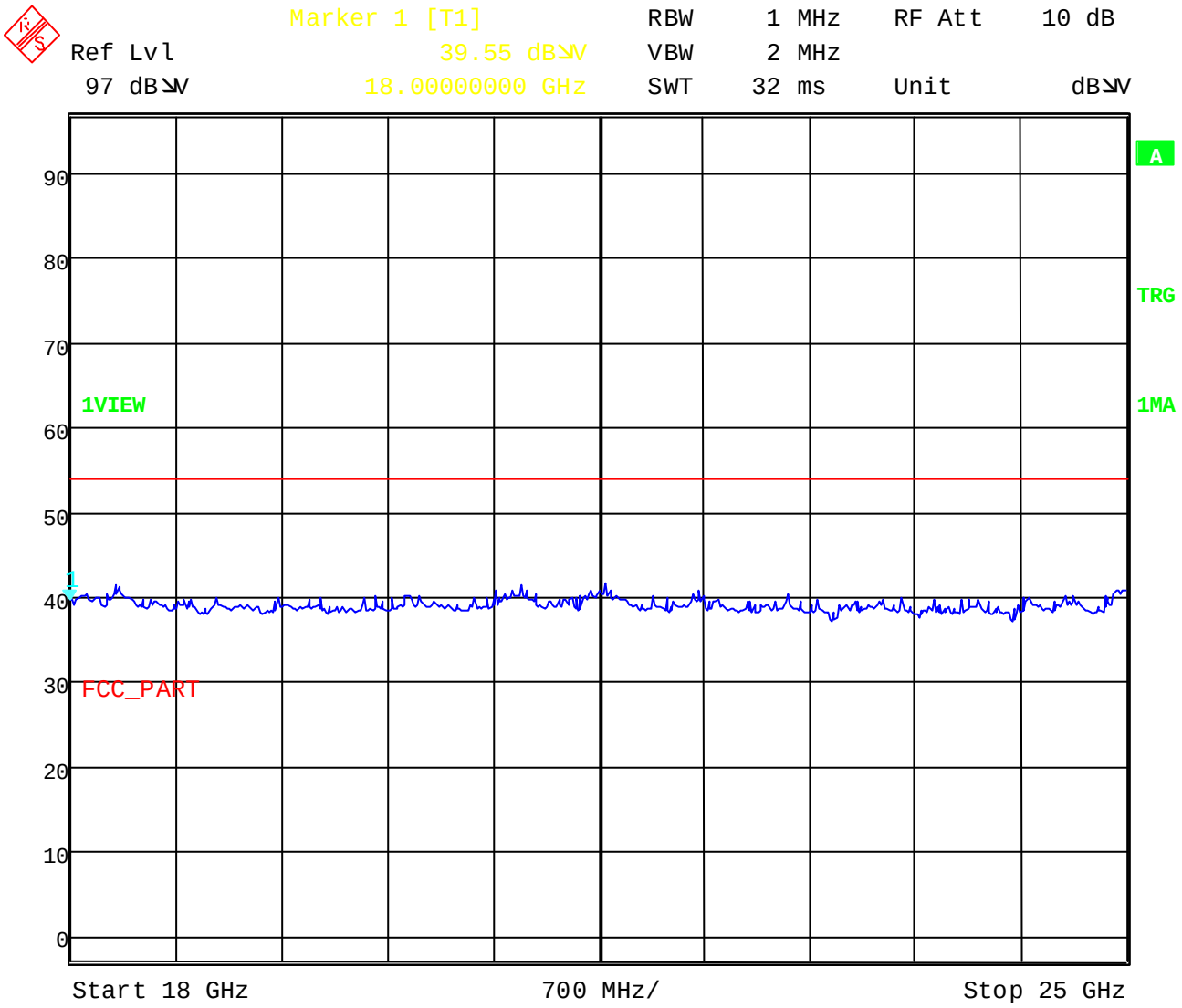
LIMITS **SUBCLAUSE § 15.247 (c)**

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

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

18000 – 25000 MHz, vertical, 2441 MHz, peak



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

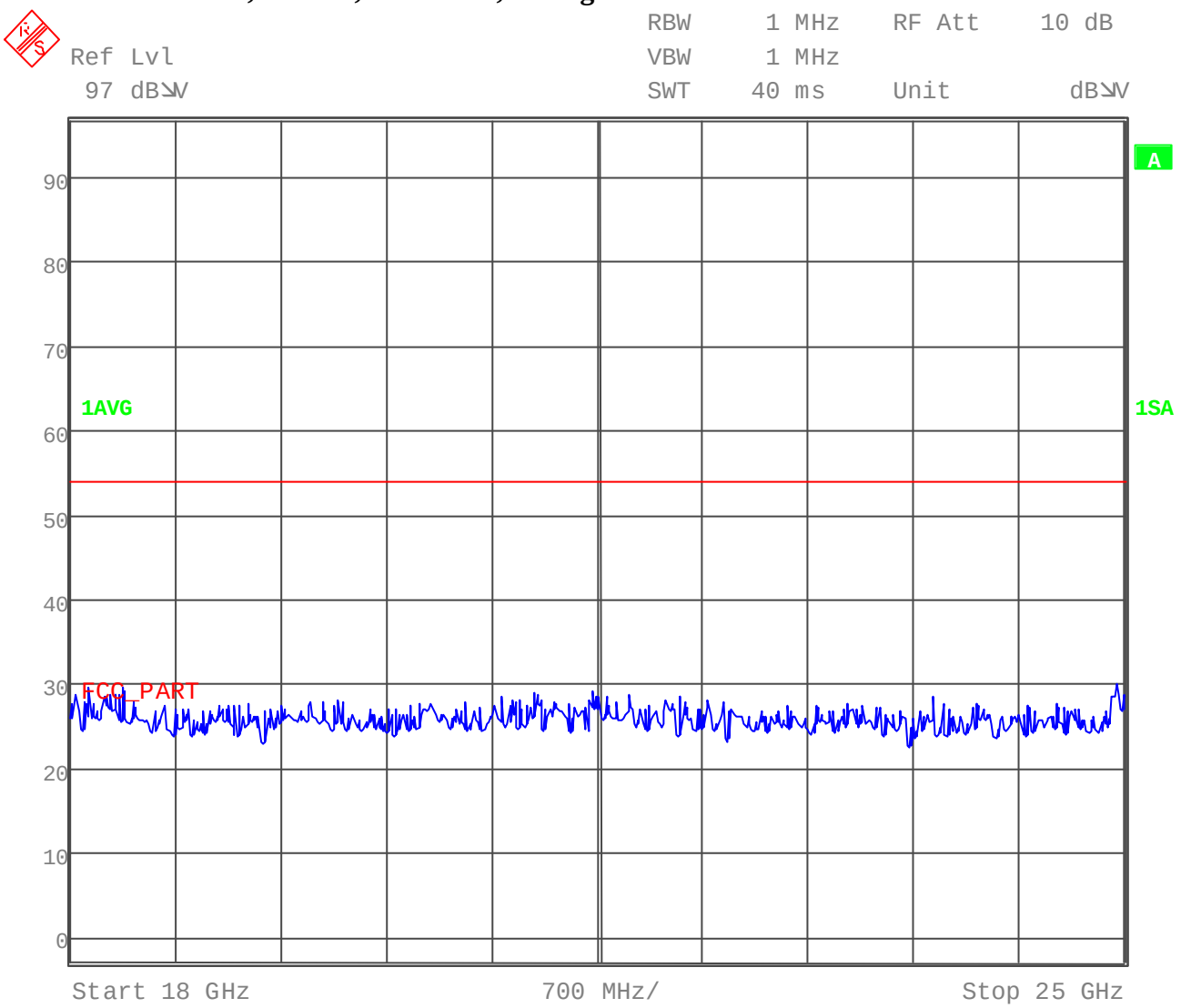
LIMITS **SUBCLAUSE § 15.247 (c)**

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

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

18000 – 25000 MHz, vertical, 2441 MHz, average



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

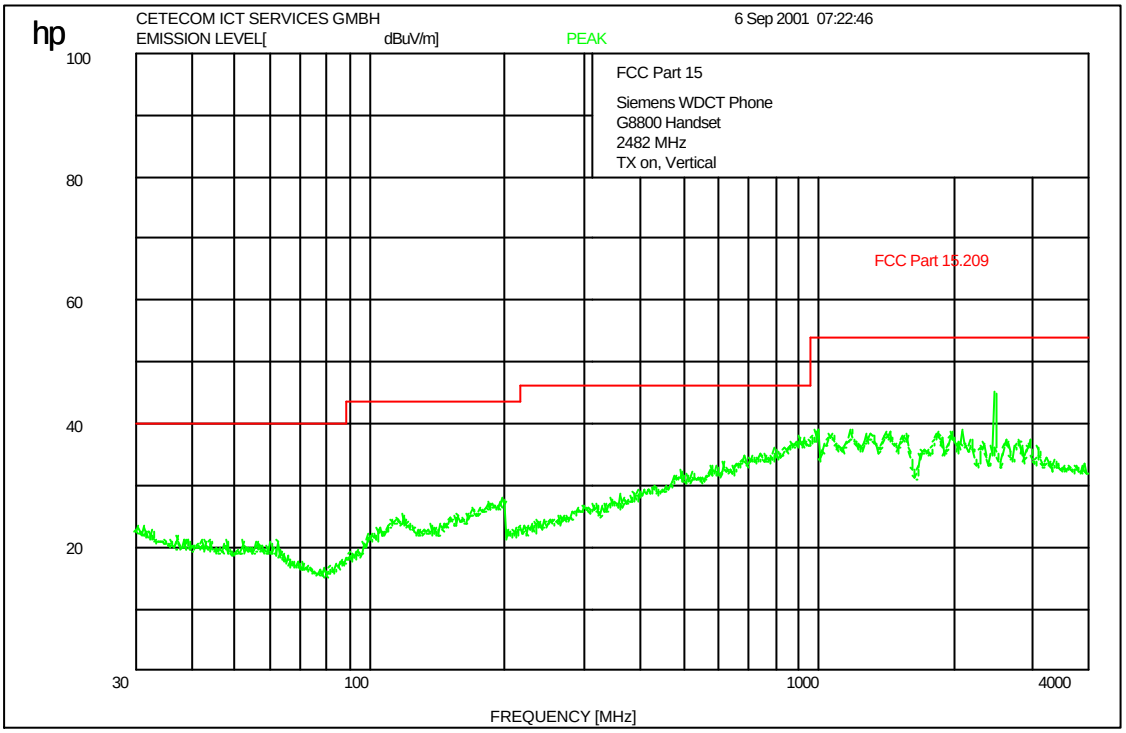
LIMITS **SUBCLAUSE § 15.247 (c)**

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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

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

30-4000 MHz, vertical, 2482 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

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

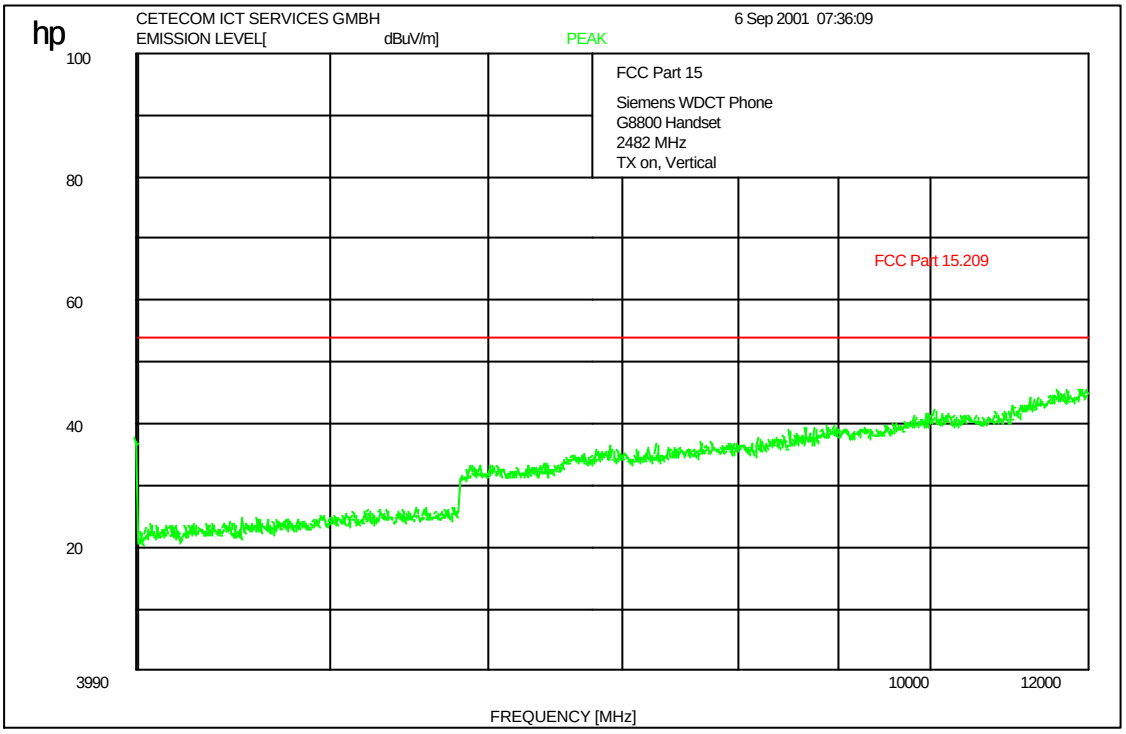
LIMITS **SUBCLAUSE § 15.247 (c)**

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)
17-24

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

4000 - 12000 MHz, vertical, 2482 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 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)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17-24

Low frequency emissions (conducted) **§ 15.107/207**

Not performed

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17-24

RECEIVER SPURIOUS RADIATION **§ 15.209**

Radiated

SPURIOUS EMISSIONS LEVEL (µV/m)								
f (MHz)	Detector	Level (dBµV/m)	f (MHz)	Detector	Level (dBµV/m)	f (MHz)	Detector	Level (dBµV/m)
No	peaks	found						
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ³ 1GHz : RBW/VBW: 1 MHz

Measurement distance see table

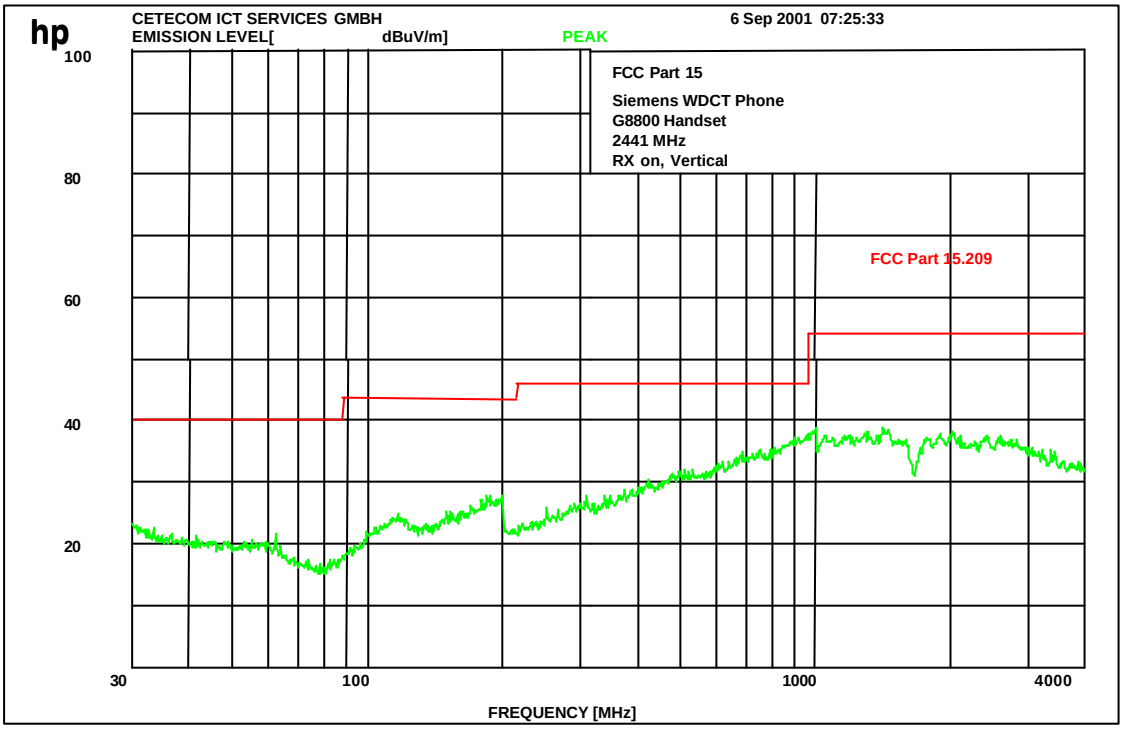
Limits **SUBCLAUSE § 15.209**

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)
17-24

RECEIVER SPURIOUS RADIATION § 15.209

radiated: 30 – 4000 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

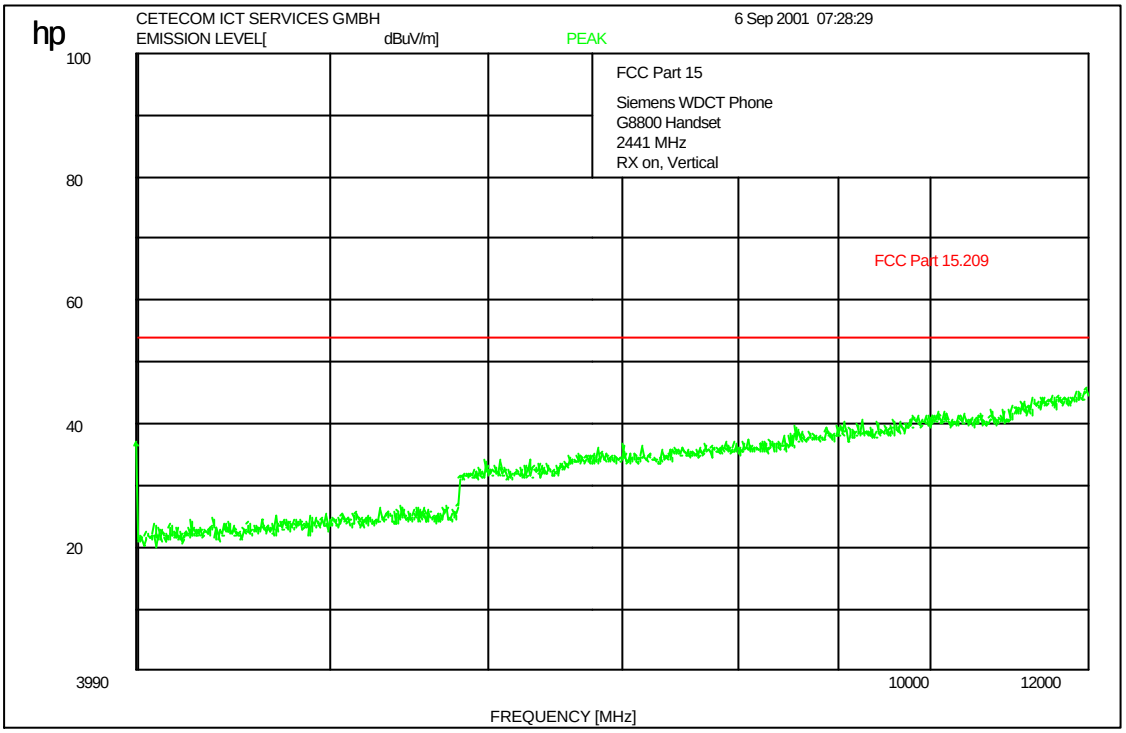
Limits **SUBCLAUSE § 15.209**

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)
17-24

RECEIVER SPURIOUS RADIATION § 15.209

Radiated 4000 – 12000 MHz



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : RBW/VBW: 1 MHz**

Limits **SUBCLAUSE § 15.209**

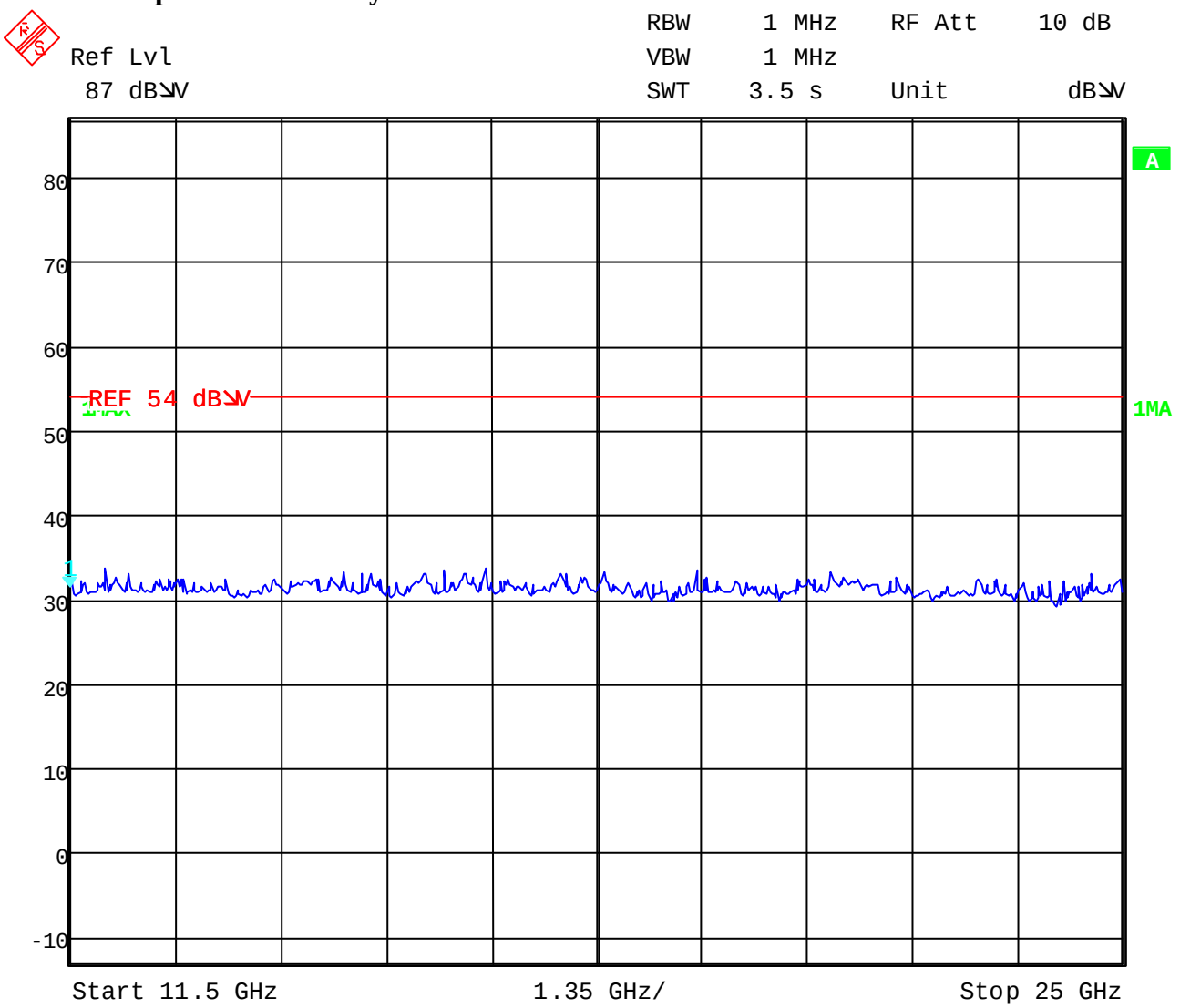
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17-24

RECEIVER SPURIOUS RADIATION § 15.209

peak:

This measurement was made with a low noise analyzer FSIQ from R&S with an additional lownoise amplifier to reduce system noise.



f < 1 GHz : RBW/VBW: 100 kHz f ³ 1GHz : RBW/VBW: 1 MHz

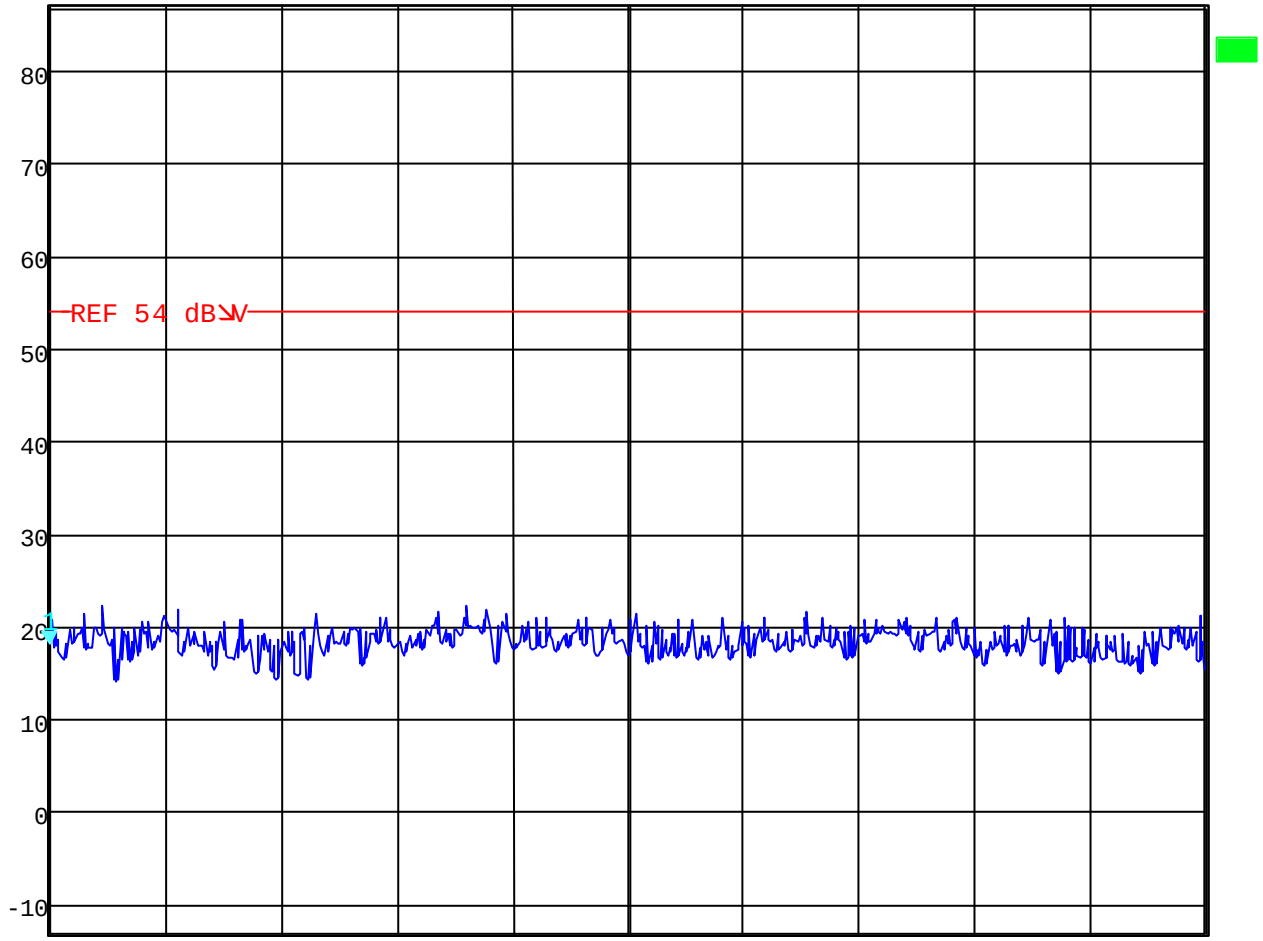
Limits **SUBCLAUSE § 15.209**

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)
64

RECEIVER SPURIOUS RADIATION **§ 15.209**

average:
This measurement was made with a low noise analyzer FSIQ from R&S with an additional lownoise amplifier to reduce system noise.



f < 1 GHz : RBW/VBW: 100 kHz **f ³ 1GHz : 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)
64

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.

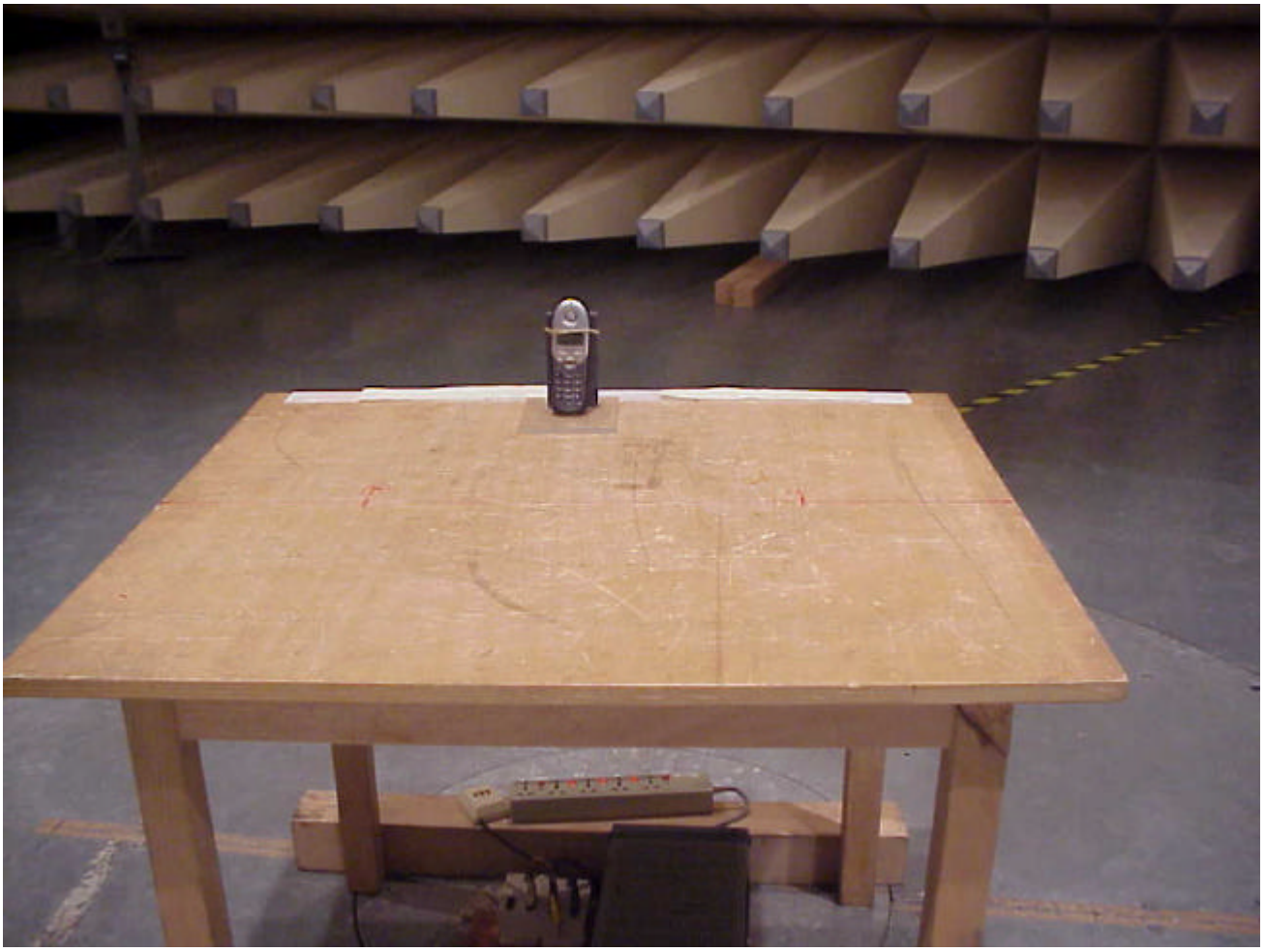
No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Signal Generator	AFGU	Rohde & Schwarz	862 480/032
09	Transformer	MPL	Erfi	91350
10	AC-Line Simulator	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	Deviation meter	9008	Racal-Dana	2647
16	Frequency counter	5340 A	Hewlett-Packard	1532A03899
17	Anechoic chamber	---	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	Anechoic chamber		Frankonia	
33	Controler	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

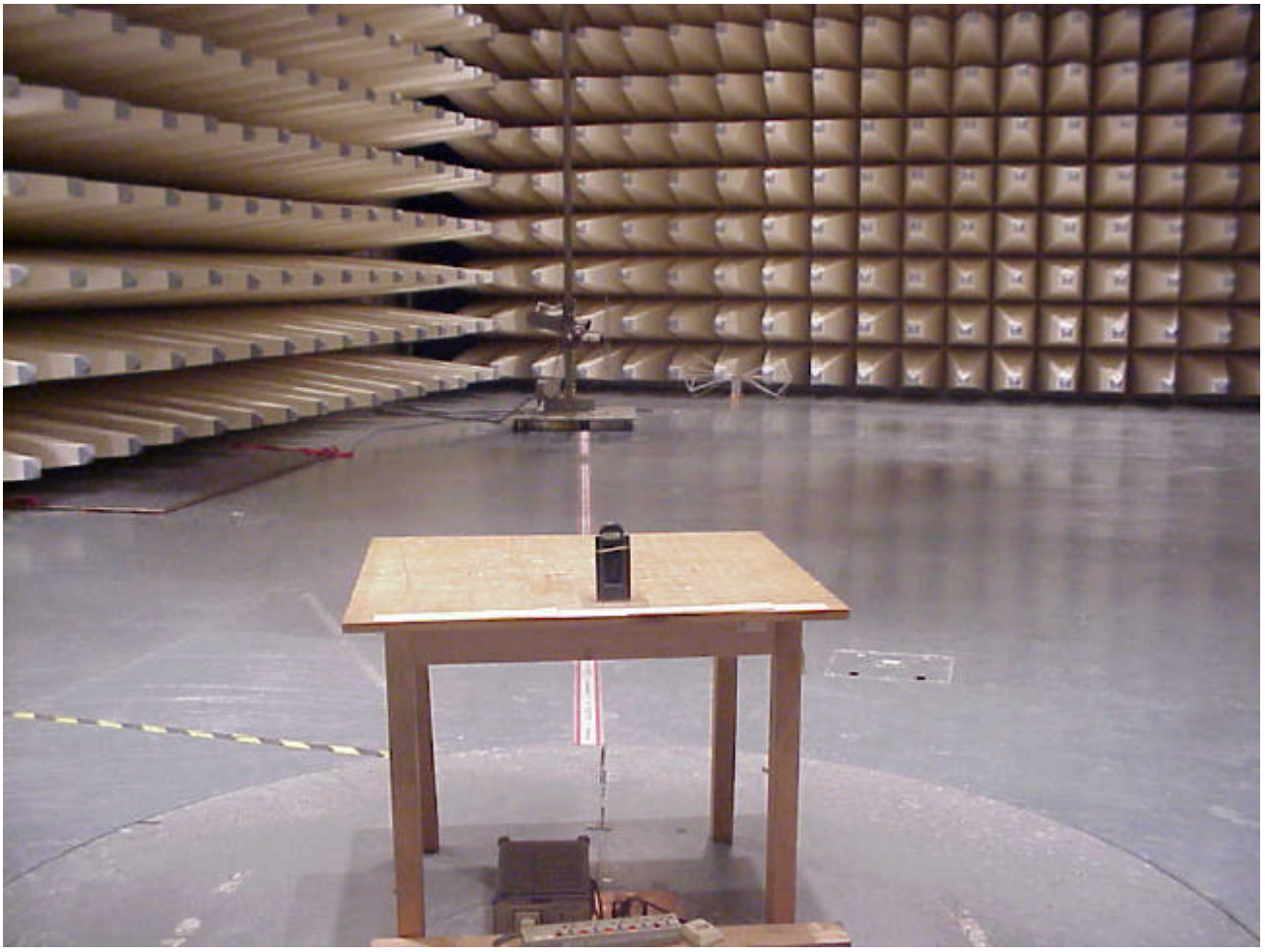
To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

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	Spectrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Receiver	ESH 3	Rohde & Schwarz	890 174/002
43	Reiciver	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	Polarisationsnetwork	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenn0 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	Controler	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Network	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Network	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phasen V-Network	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phasen V-Network	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phasen V-Network	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Power supply	6032A	Rohde & Schwarz	2933A05441
59	Receiver	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	Receiver	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



Test site
RADIATED EMISSIONS



Photographs of the equipment

Photograph no.: 1

Photographs of the equipment

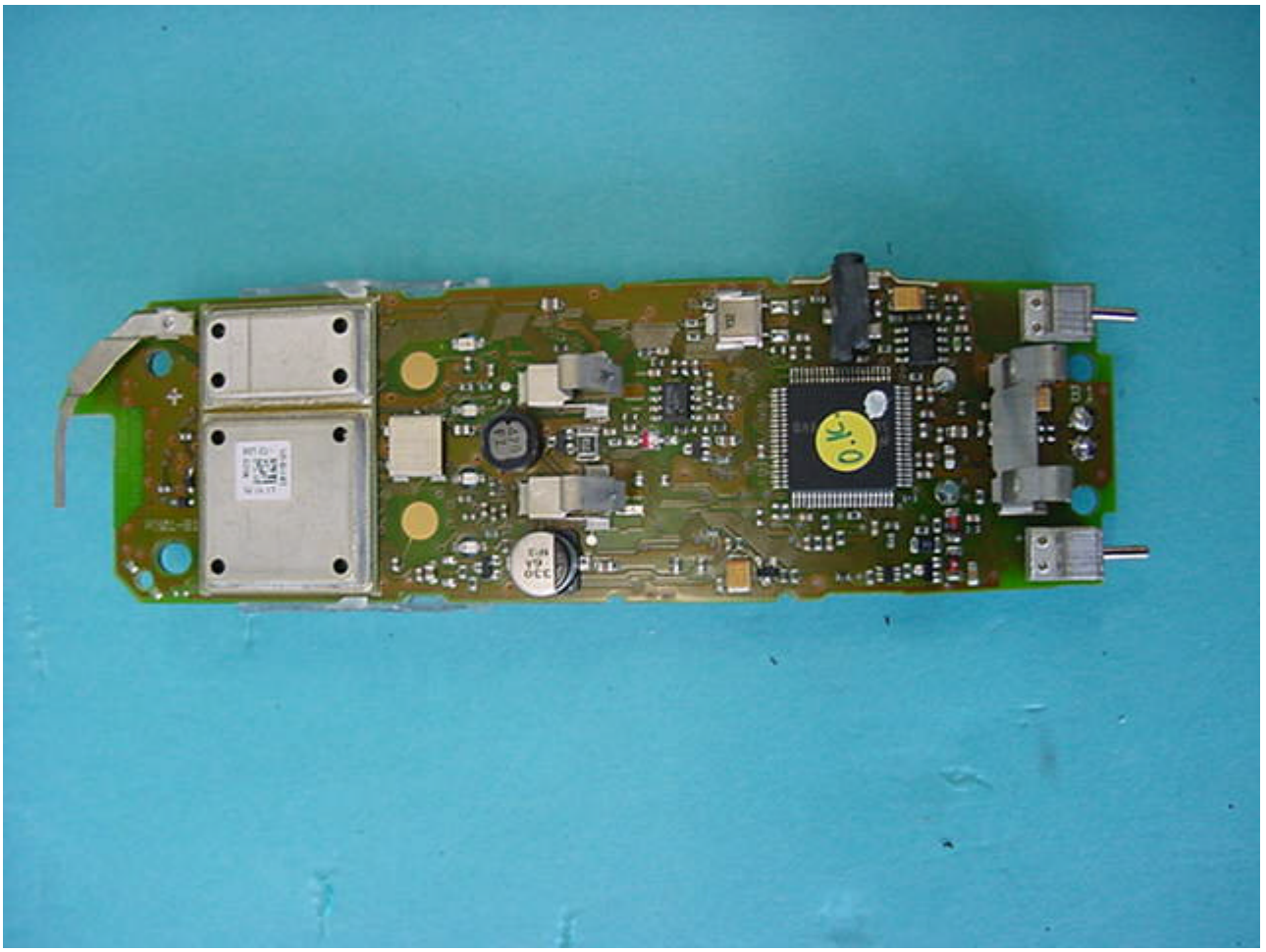
Photograph no.: 2

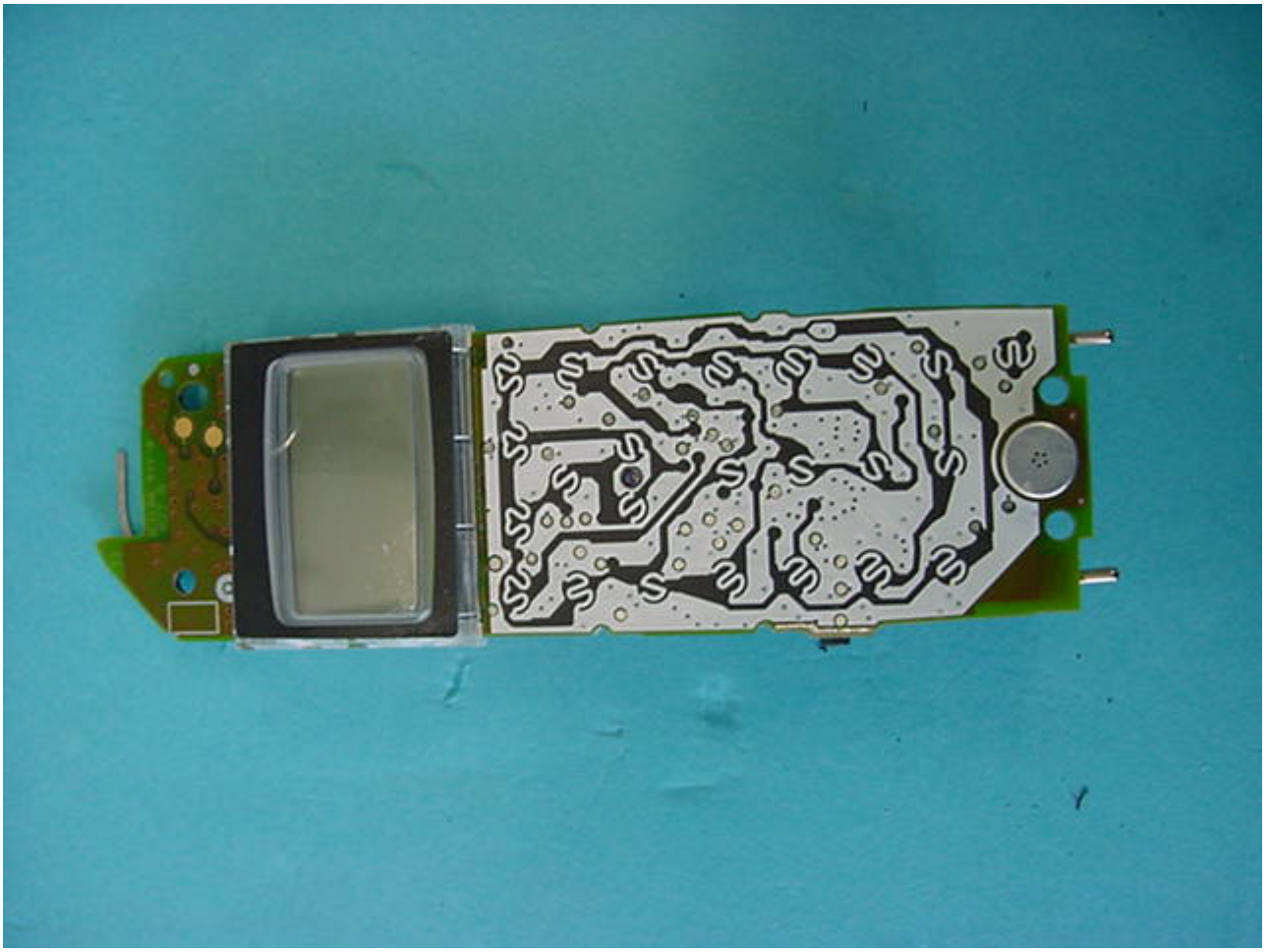
Photographs of the equipment

Photograph no.: 3

Photographs of the equipment

Photograph no.: 4



Photographs of the equipment

Photograph no.: 5