

# CETECOM ICT Services GmbH

Radio Satellite Communication

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RSC11

issue test report consist of

68 Pages

Page 1 (68)

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## Accredited Bluetooth Test Facility (BQTF)

TTI-P-G166/98

**Test report no.: 2-2969-01-02/02**  
**FCC Part15.247/CANADA RSS-210**  
**MPCI3A-20/R**  
**FCC ID: HF5MKX**

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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

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Internet : [www.cetecom.de](http://www.cetecom.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)**

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# CETECOM ICT Services GmbH

Test report no.:2-2969-01-02/02

Issue date:2002-09-26

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## 1.3 Details of applicant

**Name :** Quanta Computer Inc.  
**Street :** No. 188, Wen Hwa 2<sup>nd</sup> Road, Kuei-Shan Hsiang  
**City :** Tao Yuan Shien  
**Country :** Taiwan, ROC  
**Telephone:** +886 3 327 2345 ext. 5714  
**Telefax :** +886 3 396 1334  
**Contact :** Mrs. Joyce Kuo  
**Telephone:** +886 3 327 2345 ext. 5714

## 1.4 Application details

Date of receipt of application : 2002-08-01  
Date of receipt of test item : 2002-08-01  
Date of test : 2002-08-03 - 2002-08-08

## 1.5 Test item

Type of equipment : **Wireless LAN mini-PCI Card**  
Type designation : **Model : MPC1 3A-20/R**  
Manufacturer : Agere Systems NL  
Street : Zadelstede 1-10  
City : 3431 JZ Nieuwegein  
Country : The Netherlands  
Serial number : MAC:00022D6B5BA2  
**Additional informations: :**  
Frequency : 2400 – 2483.5 MHz (2412 – 2472 MHz)  
Type of modulation : 22M0P7D (DSSS) Ch.Sep. : 5 MHz  
Number of channels : 13  
Antenna : Antenna name: MK2 , Typ: patch antenna on PCB, UFL-connector  
Power supply : 3,3 V DC from PC  
Output power cond. : 18.49 dBm / 70.6 mW  
Type of equipment : Class B  
Temperature range : 0°C - +35°C  
FCC ID : HFSMKX

## 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 made with a totally shielded PC board (Pentium 300 MHz) and the Mini-PCI-card on a passive extender board connected to the dedicated antenna to show only the spurious of the card.

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 re-measurements. 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.

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 DSSS systems“.

The product fulfills 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 :

2002-09-27

RSC 8414 Ames.H



Date

Section

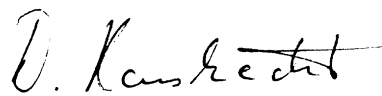
Name

Signature

Technical responsibility for area of testing :

2002-09-27

RSC8412 Hausknecht D.



Date

Section

Name

Signature

## 2.2 Test report

### TEST REPORT

Test report no. : 2-2969-01-02/02

## TEST REPORT REFERENCE

## LIST OF MEASUREMENTS

Paragraph	PARAMETER TO BE MEASURED	PAGE
	<b>Transmitter parameters</b>	
§ 15.247	Antenna gain	7
§ 15.247 (a)(2)	Spectrum bandwidth of a DSSS System	8
§ 15.247 (b)(1)	Maximum peak output power	12
§ 15.247 (b) (4)	RF Exposure calculation	19
§ 15.247 (d)	Power spectral density	20
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## Antenna Gain

## SUBCLAUSE § 15.247

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	18.36 dBm	18.49 dBm	17.99 dBm
Radiated power	18.32 dBm	17.95 dBm	17.90 dBm
Gain	-0.04 dBi	-0.54 dBi	-0.09 dBi

The calculated antenna gain is about 0 dBi dB for the used MK2 antenna.

## REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24, 64

## Spectrum Bandwidth of a DSSS System

§15.247(a)

### 6 dB bandwidth

TEST CONDITIONS		6 dB BANDWIDTH ( kHz )		
Frequency (MHz)		2412	2442	2472
T <sub>nom</sub> ( 23.4 )°C	V <sub>nom</sub> ( 3.3 )V	8968	8867	8917
Measurement uncertainty		±1kHz		

RBW / VBW 100 kHz

LIMIT

SUBCLAUSE §15.247(a) (2)

<p>The minimum 6dB bandwidth shall be at least 500 KHz</p>
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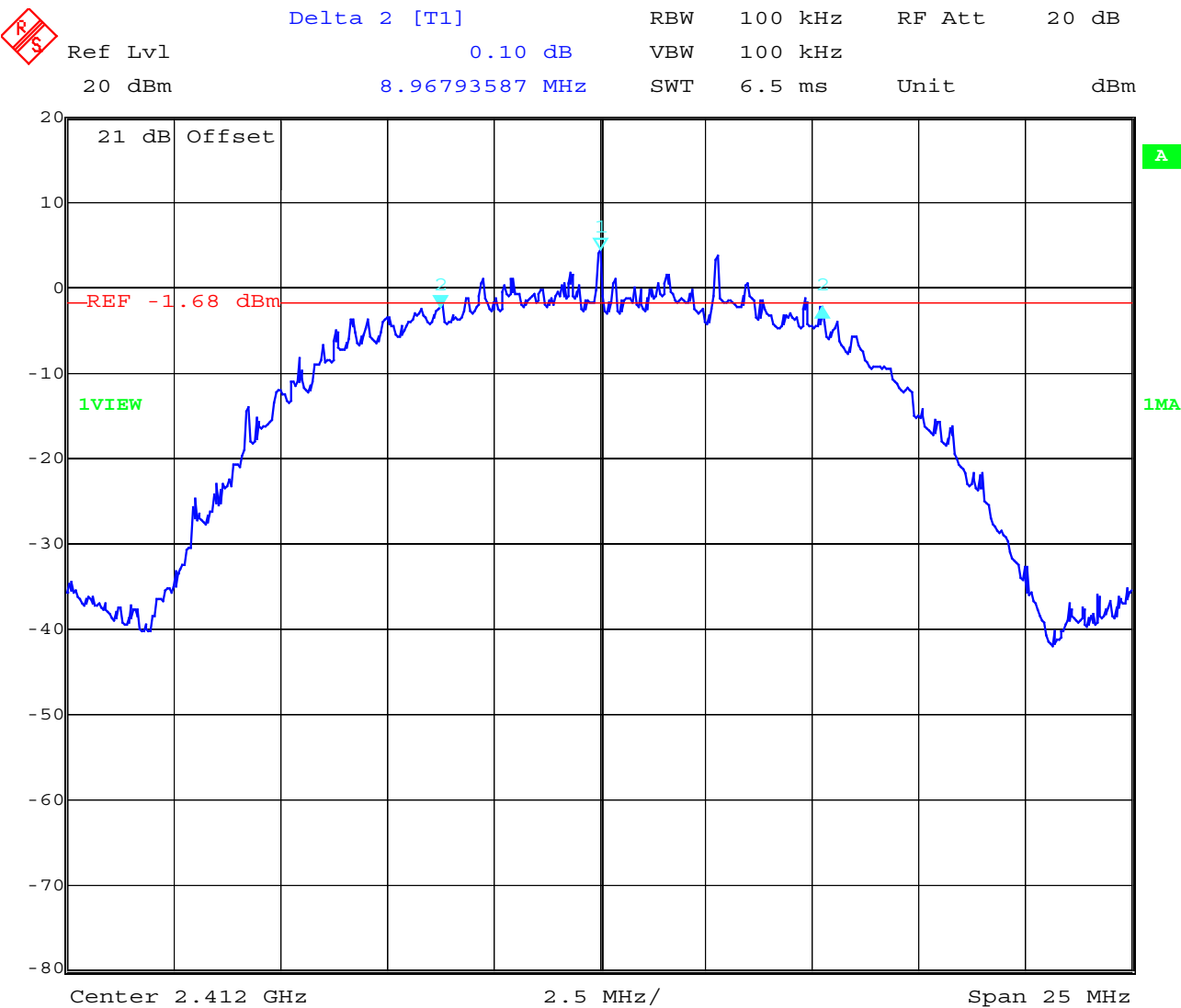
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
(for reference numbers see test equipment listing)



Spectrum Bandwith of a DSSS System §15.247(a)

6 dB bandwidth

Channel 1



Date: 7.AUG.2002 10:49:44

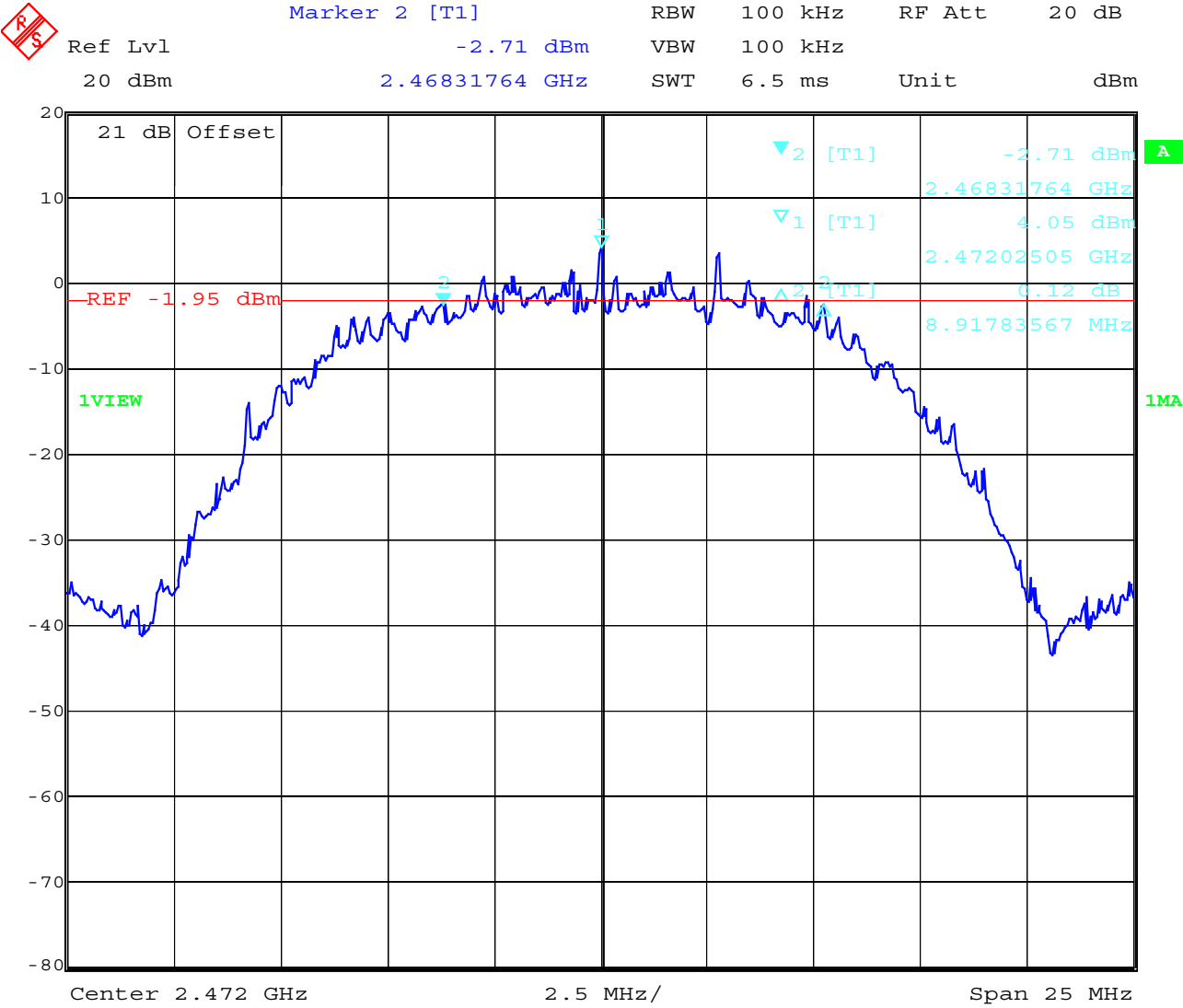
**§15.247(a)**

Date: 7.AUG.2002 10:59:53

Spectrum Bandwith of a DSSS System §15.247(a)

6 dB bandwidth

Channel 13:



Date:            7.AUG.2002    11:04:28

**MAXIMUM PEAK OUTPUT POWER  
(CONDUCTED)**

**SUBCLAUSE § 15.247 (b) (1)**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)		2412	2442	2472
T <sub>nom</sub> ( 23.4 )°C	V <sub>nom</sub> ( 3.3)V	Peak : 68.55	Peak : 70.63	Peak : 62.95
Maximum deviation from output power under extreme test conditions (dBc)		0.5	0.5	0.5
Measurement uncertainty		±0.5dB		

**RBW/VBW : 10 MHz**

**LIMIT**

**SUBCLAUSE § 15.247 (b) (1)**

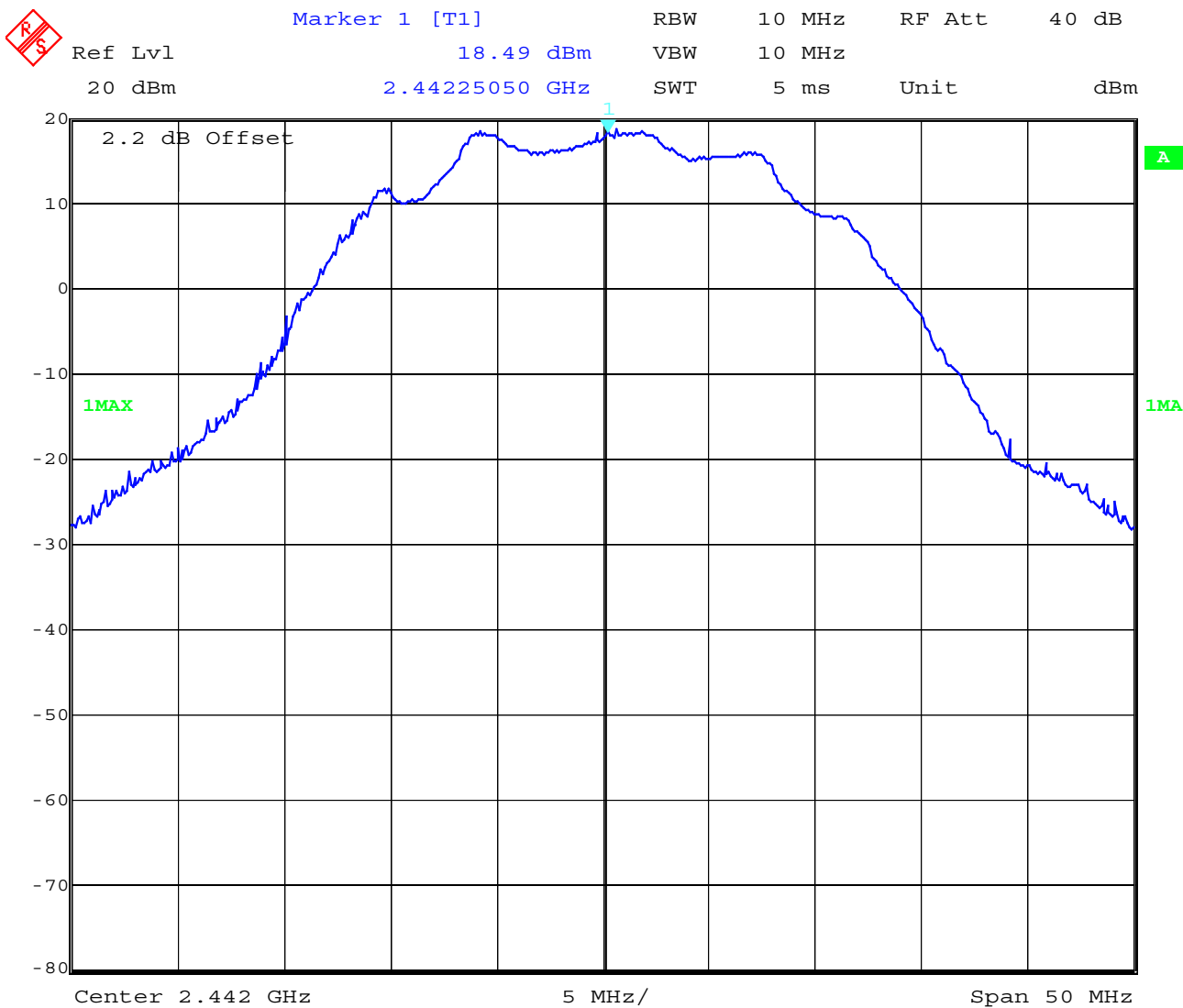
Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt/ 30dBm

Date: 6.AUG.2002 15:21:19

Date: 6.AUG.2002 15:21:54

MAXIMUM PEAK OUTPUT POWER  
(CONDUCTED)      SUBCLAUSE § 15.247 (b) (1)

mid channel peak

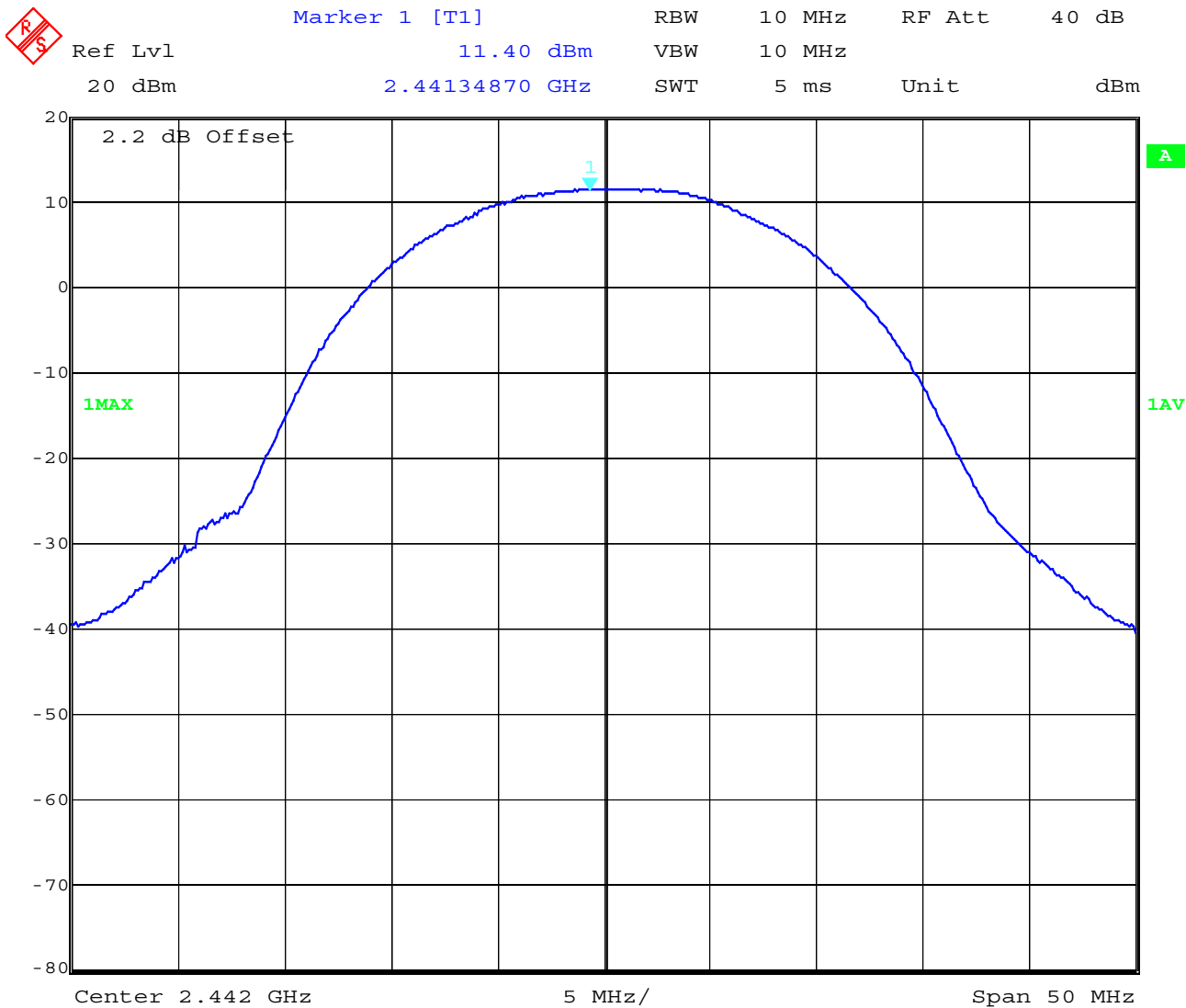


Date:      6.AUG.2002    15:22:54

MAXIMUM PEAK OUTPUT POWER  
(CONDUCTED)

SUBCLAUSE § 15.247 (b) (1)

mid channel average

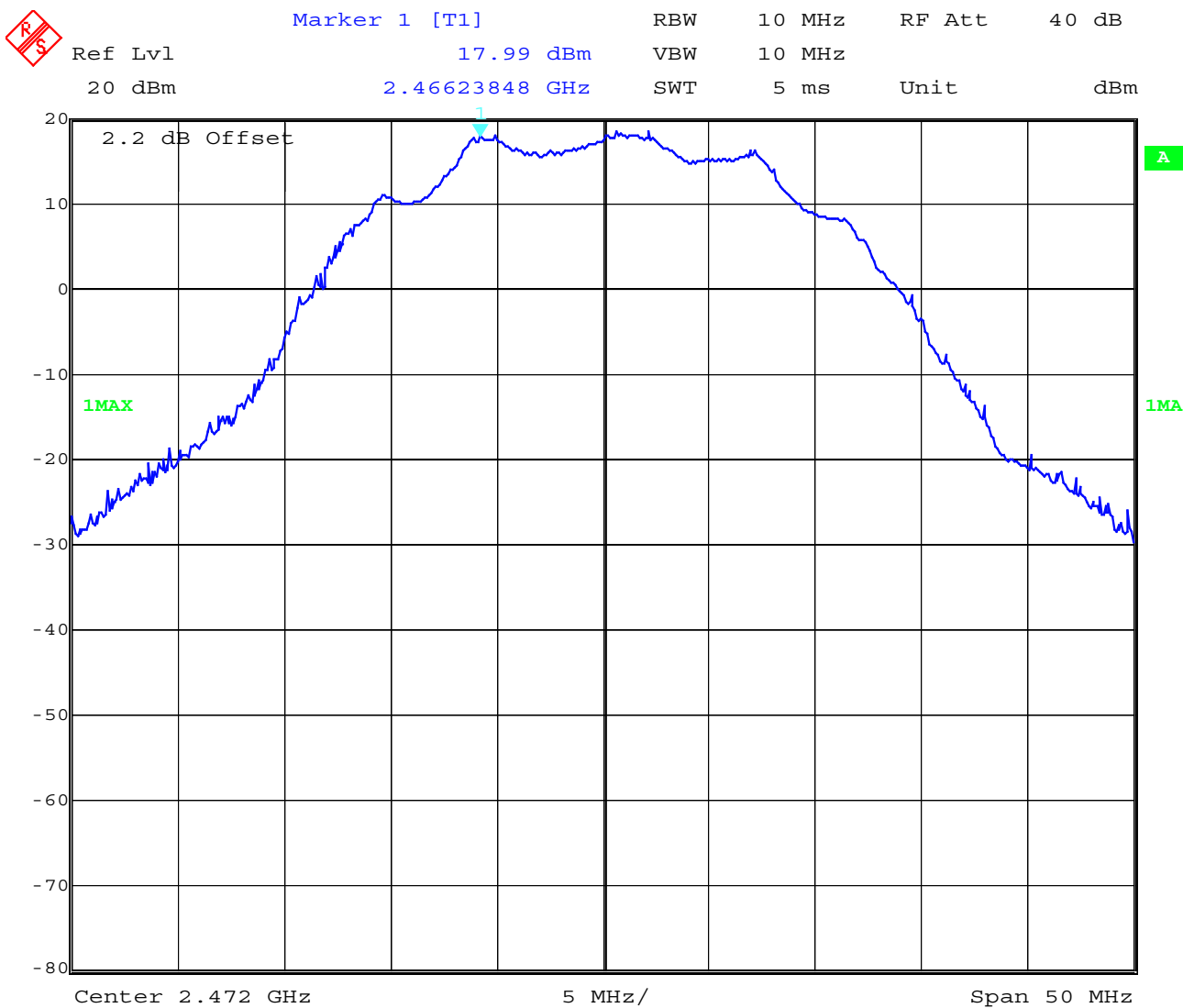


Date: 6.AUG.2002 15:22:20



MAXIMUM PEAK OUTPUT POWER (CONDUCTED)      SUBCLAUSE § 15.247 (b) (1)

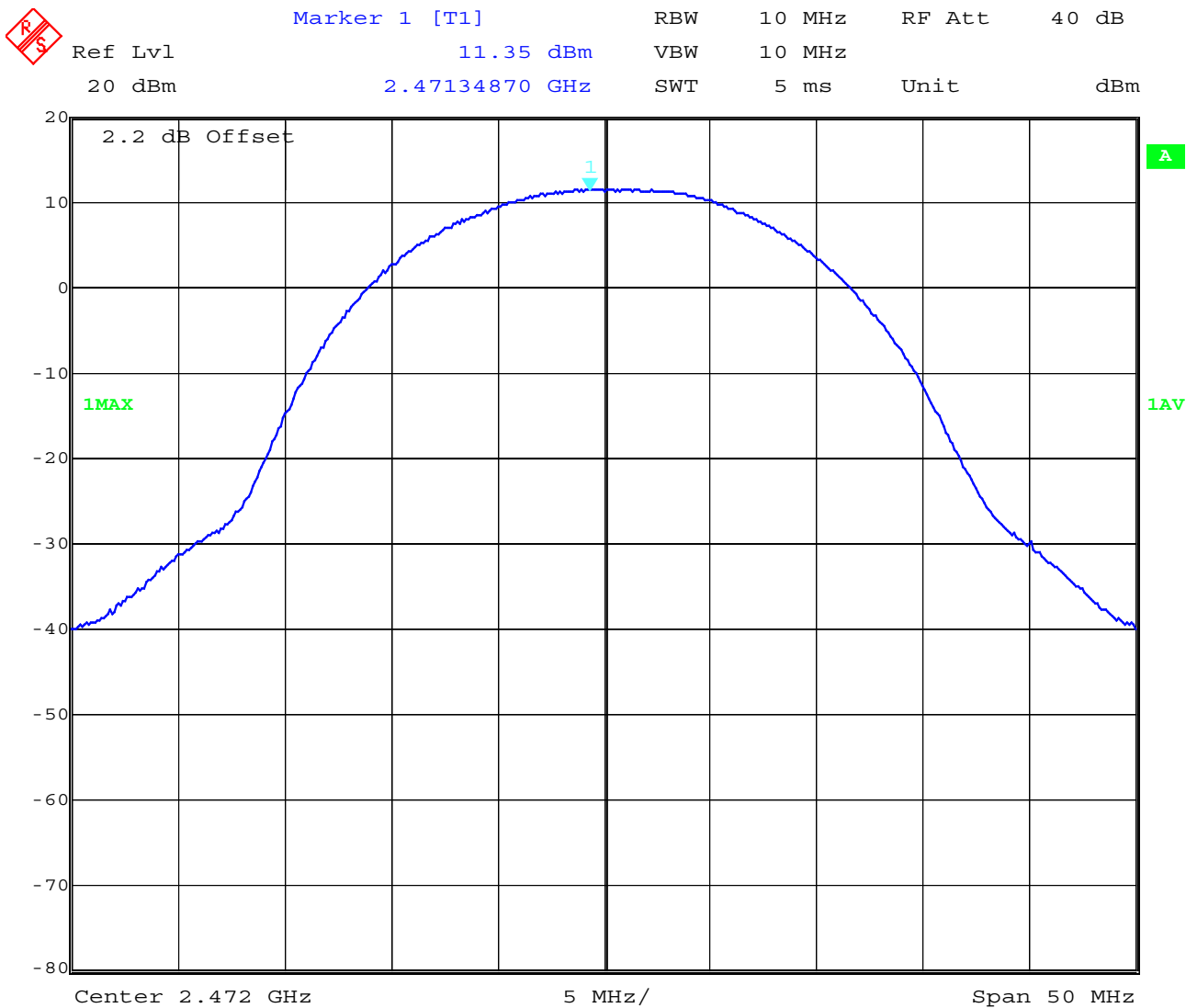
high channel peak



Date: 6.AUG.2002 15:23:23

MAXIMUM PEAK OUTPUT POWER (CONDUCTED)      SUBCLAUSE § 15.247 (b) (1)

high channel average



Date: 6.AUG.2002 15:23:41

## MAXIMUM PEAK OUTPUT POWER (EIRP)

SUBCLAUSE § 15.247 (b) (1)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER EIRP (mW)		
Frequency (MHz)		2412	2442	2472
T <sub>nom</sub> ( 23.4 )°C	V <sub>nom</sub> ( 3.3)V	18.32 dBm 67.9 mW	17.95 dBm 62.4 mW	17.90 dBm 61.7 mW
Maximum deviation from output power under extreme test conditions (dBc)		-	-	-
Measurement uncertainty		±3dB		

RBW/VBW : 10 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

## RF EXPOSURE CALCULATION

SUBCLAUSE § 15.247 (B) (4)

The maximal power density at 20cm distance is calculated as:  $P_d = (P_{out} * G)/(4\pi * r^2)$

$$67.9 \text{ mW} / 4\pi 400\text{cm}^2 = 0.01351 \text{ mW/cm}^2$$

## Limit

The Limit for general population/uncontrolled exposures according §1.1307(b) is 1mW/cm<sup>2</sup>

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

Power spectral density

§15.247 (d)

TEST CONDITIONS		RF POWER LEVEL IN 3 kHz BW		
Frequency (MHz)		2412	2442	2472
T <sub>nom</sub> ( 23.4 )°C	V <sub>nom</sub> (3.3)V	-11.41 dBm	-14.79 dBm	-12.65dBm
Measurement uncertainty		±3dB		

The measurement was performed with the power density funktion of the analyzer.  
The readout is related to 1 Hz BW. For 3 kHz BW we have to add 34.8 dB.

LIMIT

SUBCLAUSE §15.247(d)

<p>The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band</p>
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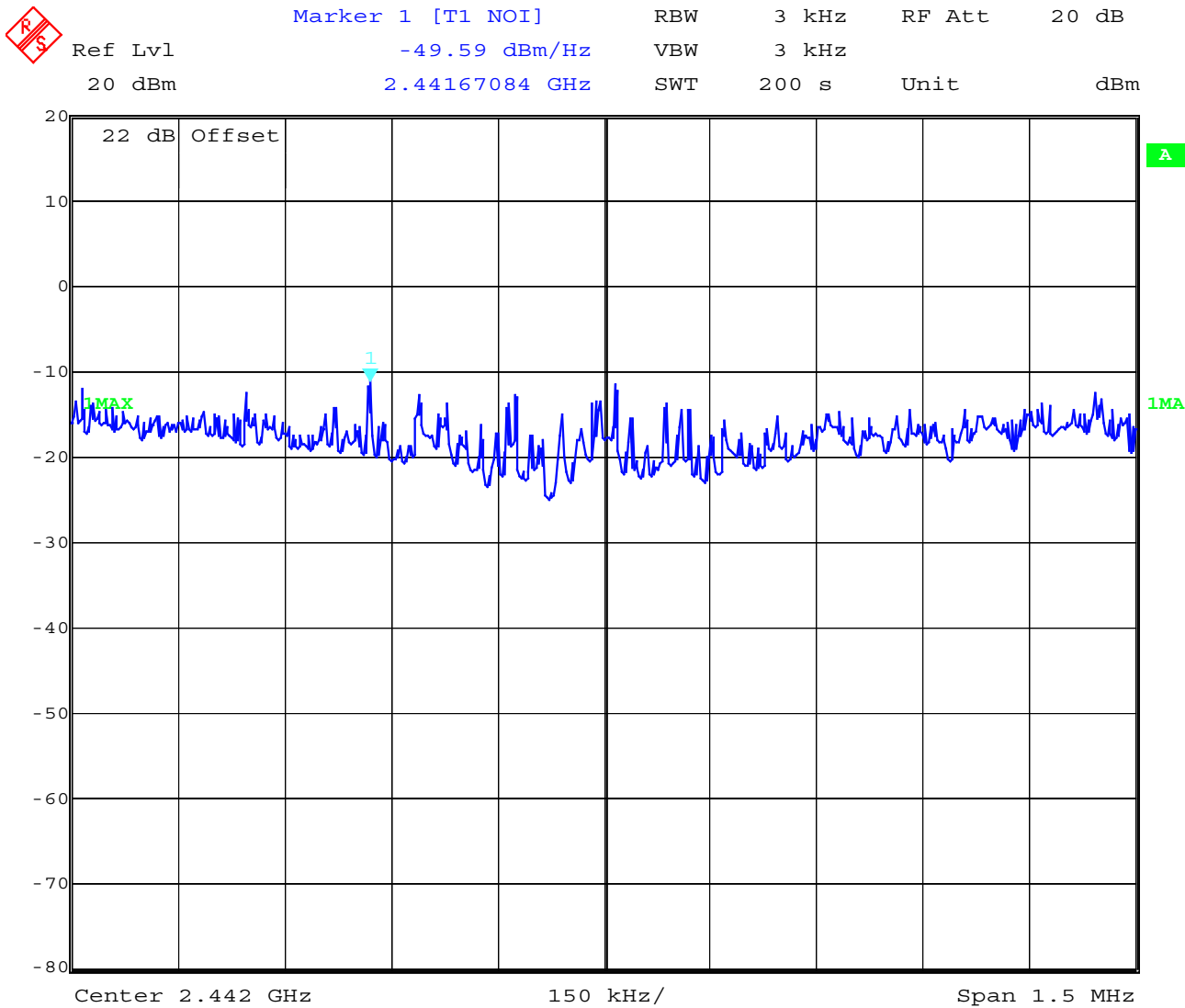
**SUBCLAUSE § 15.247 (d)**



**SUBCLAUSE §15.247(d)**

**The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band**

POWER SPECTRAL DENSITY      SUBCLAUSE § 15.247 (d)  
2442 MHz



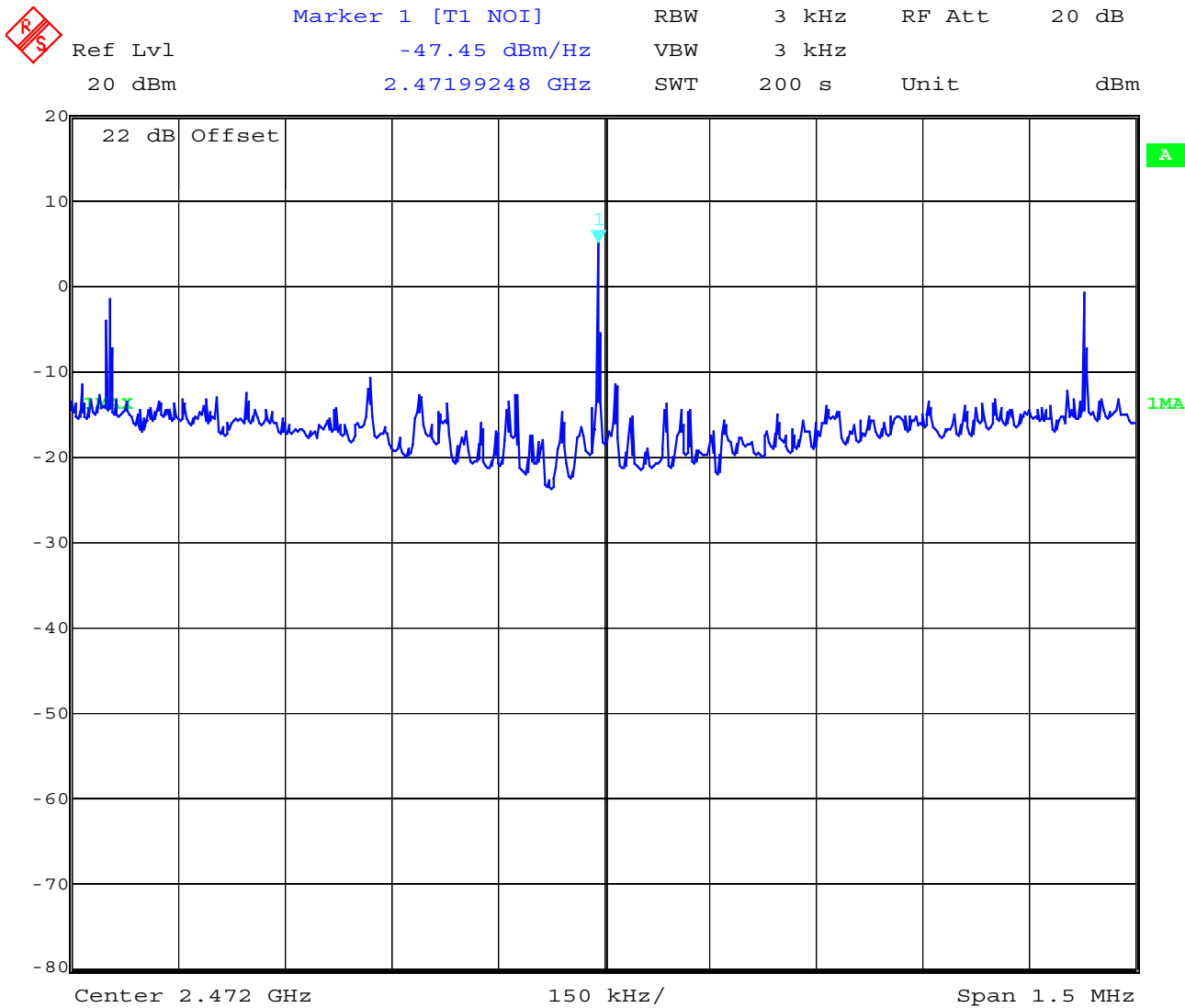
Date:      7.AUG.2002      12:26:51

LIMIT      SUBCLAUSE §15.247(d)

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

POWER SPECTRAL DENSITY      SUBCLAUSE § 15.247 (d)

2472 MHz



Date:      7.AUG.2002      13:39:06

LIMIT      SUBCLAUSE §15.247(d)

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

**We have a reduction  $> 20$  dB.**



**We have a reduction  $> 20$  dB in the restricted band.**

**Band-edge compliance of radiated emissions****§15.205****Radiated field strength**

The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1MHz RBW / 10Hz VBW for average at a distance of 3m.

The correction factor is the summation of path loss, cable loss, antenna gain and amplifier gain.

The value at 2472 MHz is +15.2 dB.

high channel 2472 MHz	setup	measured value (3m)	correction factor (3m)	calculated value (3m)
Peak value	1 MHz RBW 1 MHz VBW	97.9 dB $\mu$ V/m	15.2 dB	113.1 dB $\mu$ V/m
Average value	1 MHz RBW 10 Hz VBW	91.9 dB $\mu$ V/m	15.2 dB	107.1 dB $\mu$ V/m
Delta value	Peak 100 kHz RBW/VBW	55.4 dB	-	-
Value at band edge 100 kHz RBW	limit 54 dB $\mu$ V/m			51.7 dB $\mu$ V/m
Statement:				complies

**The product complies with the limit of the restricted bands.**

Delta marker plots see next page

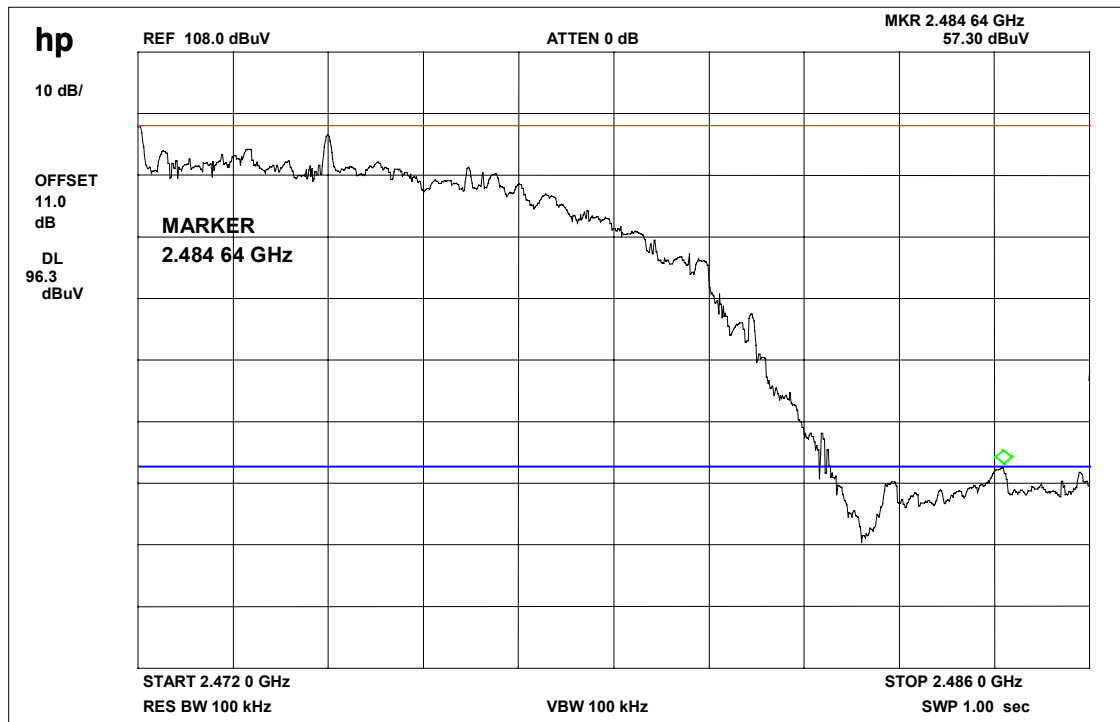
## Radiated field strength

## SUBCLAUSE § 15.205

### Plot of radiated band edge behavior. (Peak, max hold)

#### 100 kHz RBW

red line is at 96.3 dB $\mu$ V/m, marker and blue line at 40.9 dB $\mu$ V/m, delta dB is 55.4 dB



The range is from middle carrier highest frequency up to 2Mhz into restricted band. Span is 14 MHz, so we choose a RBW of 1% span, here 100 kHz.

## SPURIOUS EMISSION (conducted)

§ 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
2412		18.32	30 dBm	-	Operating frequency
all peaks <<limit			-20 dBc		complies
2442		17.95	30 dBm	-	Operating frequency
all peaks <<limit			-20 dBc		complies
2472		17.90	30 dBm		Operating frequency
all peaks <<limit §			-20 dBc		complies
Measurement uncertainty		± 3dB			

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

### LIMITS

SUBCLAUSE § 15.247 (c)

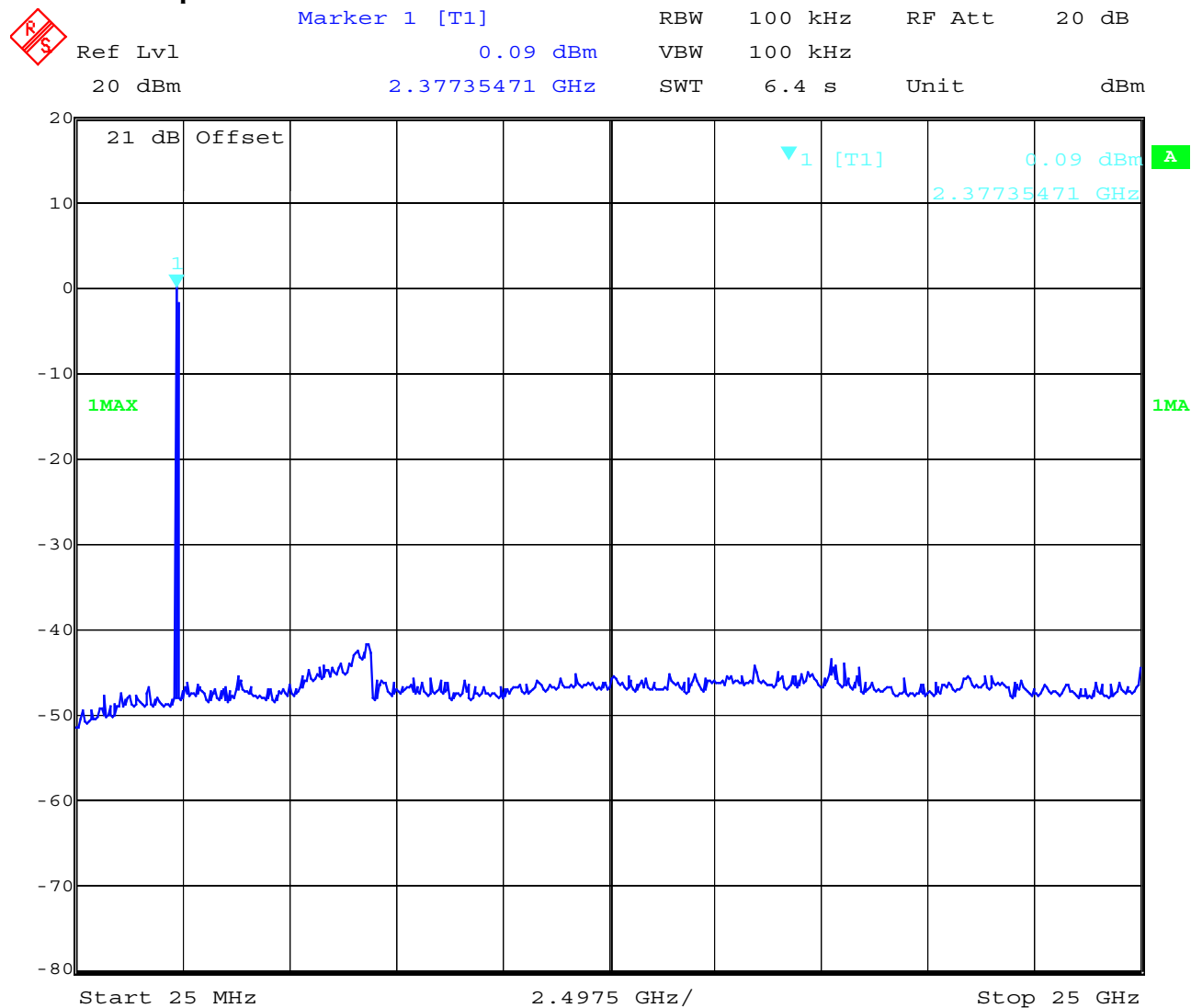
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

## SPURIOUS EMISSION LIMITATION CONDUCTED

§ 15.247 (c) (1)

No peak found < 20 dB below Limit (20dBc)

### Low channel peak

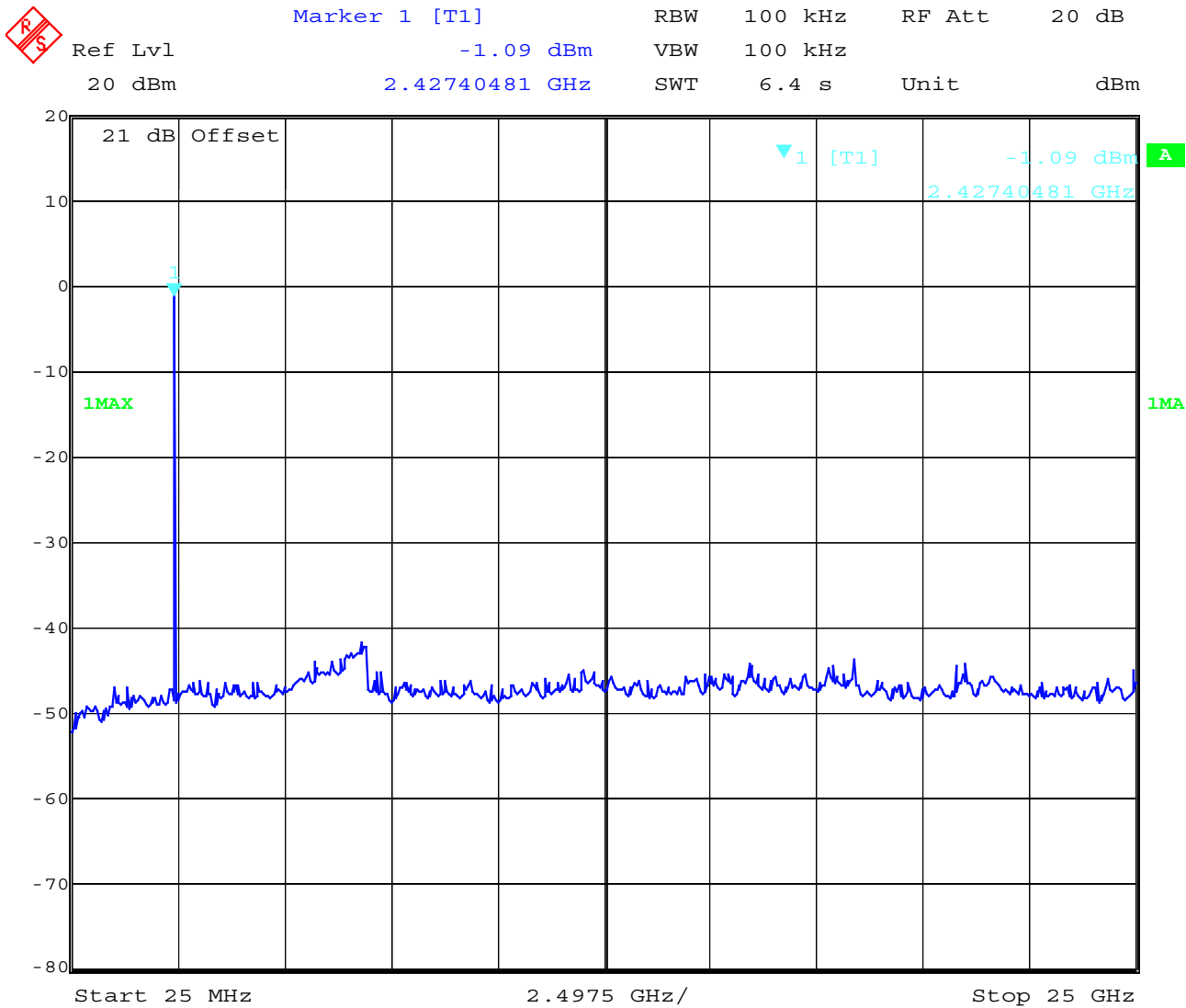


Date: 8.AUG.2002 14:58:31



SPURIOUS EMISSION  
CONDUCTED      § 15.247 (c) (1)

Mid channel (peak)



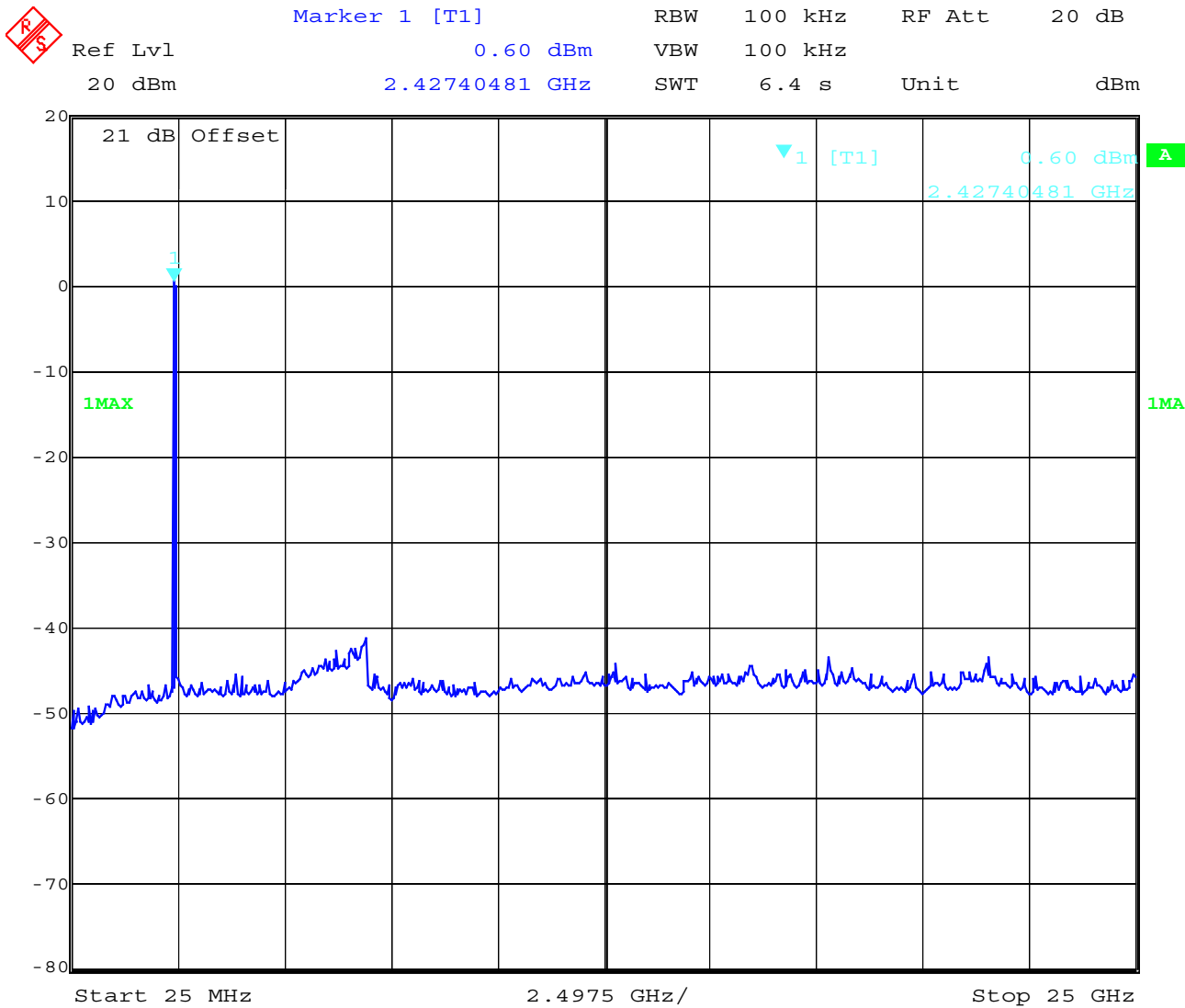
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SPURIOUS EMISSION  
CONDUCTED      § 15.247 (c) (1)

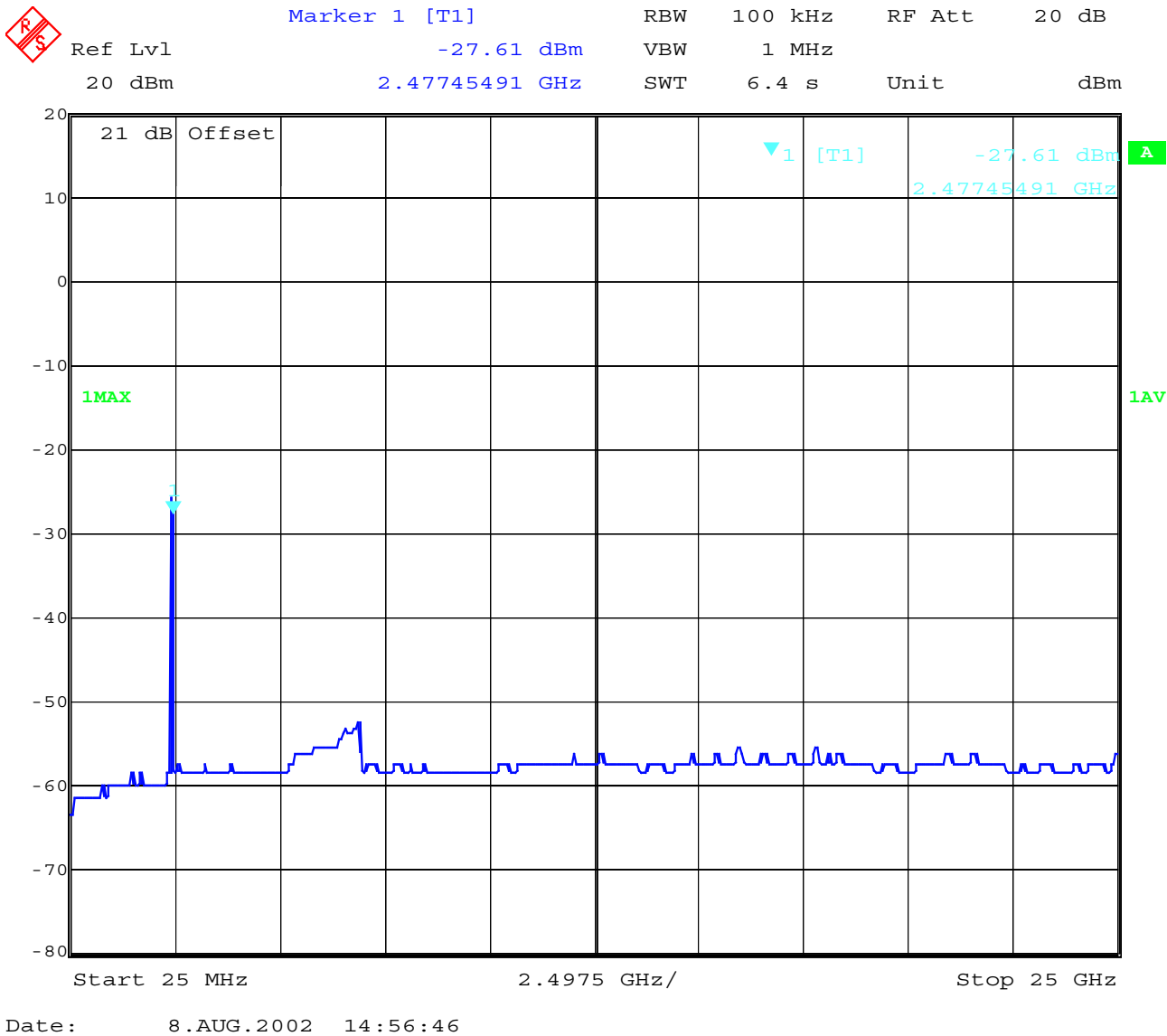
High channel peak



Date: 8.AUG.2002 14:55:55

SPURIOUS EMISSION  
CONDUCTED      § 15.247 (c) (1)

High channel average (with average detector)



# CETECOM ICT Services GmbH

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SPURIOUS EMISSION (radiated)

§ 15.247 (c) (1)

All peaks in the plot near the limit are peak values.

The peaks below 1 GHz are caused by the measuring PC, not by the test sample.

EMISSION LIMITATIONS					
f (MHz)	polarization	amplitude of emission (dBμV/m) QUASIPEA K	amplitude of emission (dBμV/m) average	limit max. allowed emmission power (dBμV/m)	results
CH 1					
195.4	vert	40.1		43.5	complies
228.0	vert	42.7		46.0	complies
749.2	vert	33.4		46.0	complies
1642.4	vert		38.4	54.0	complies
CH 7					
195.4	vert	40.3		43.5	complies
228.0	vert	43.4		46.0	complies
749.2	vert	32.5		46.0	complies
1642.4	vert		39.0	54.0	complies
CH 13					
195.4	vert	39.3		43.5	complies
228.0	vert	41.5		46.0	complies
749.2	vert	33.3		46.0	complies
1642.4	vert		38.2	54.0	complies
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)).

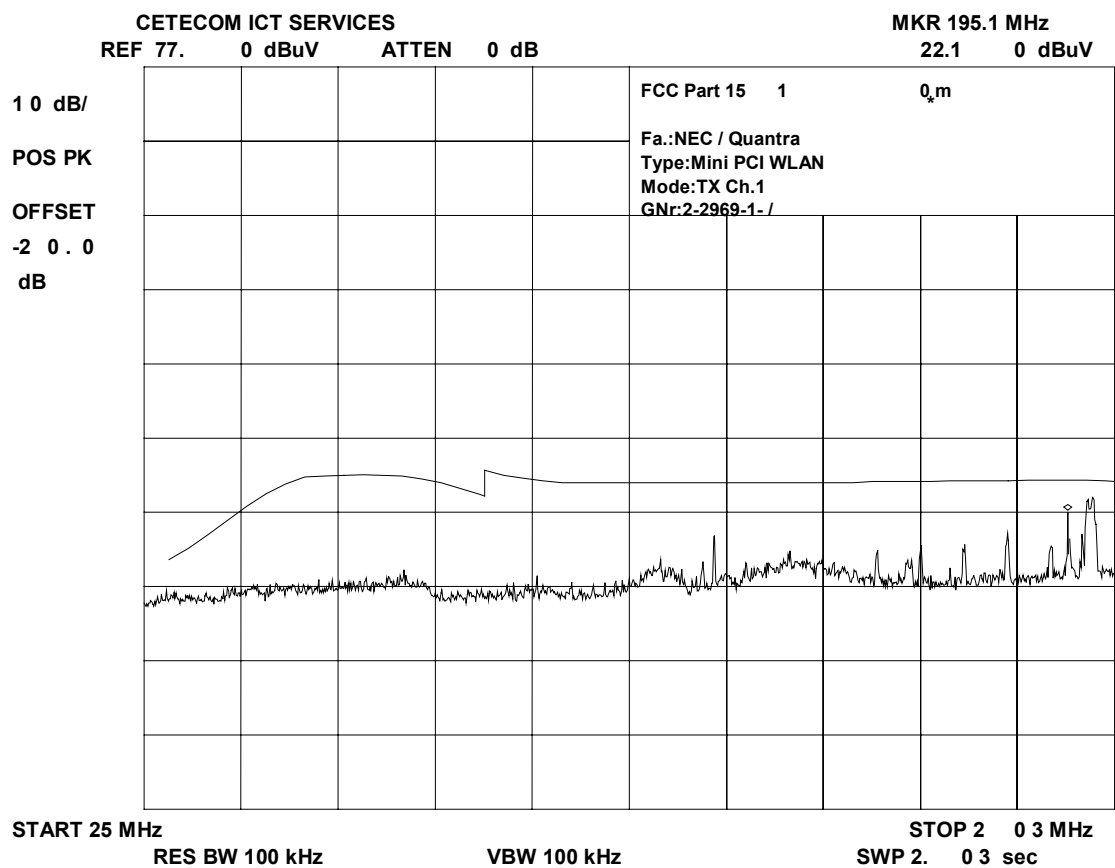
## REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

EMISSION LIMITATIONS- Radiated

low channel 30 – 200 MHz (vertical, worst case)

§ 15.247 (c) (1)

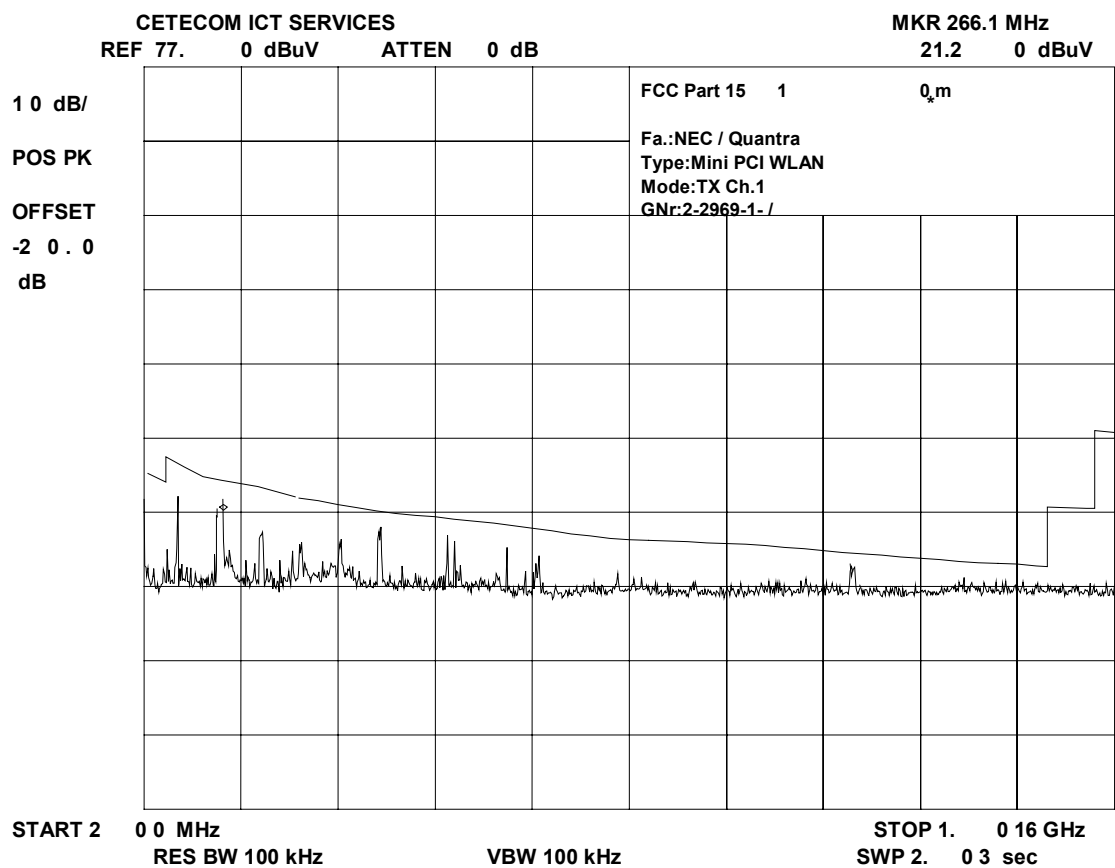


LIMITS

SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS- Radiated § 15.247 (c) (1)  
low channel 200 - 1000 MHz (vertical, worst case)



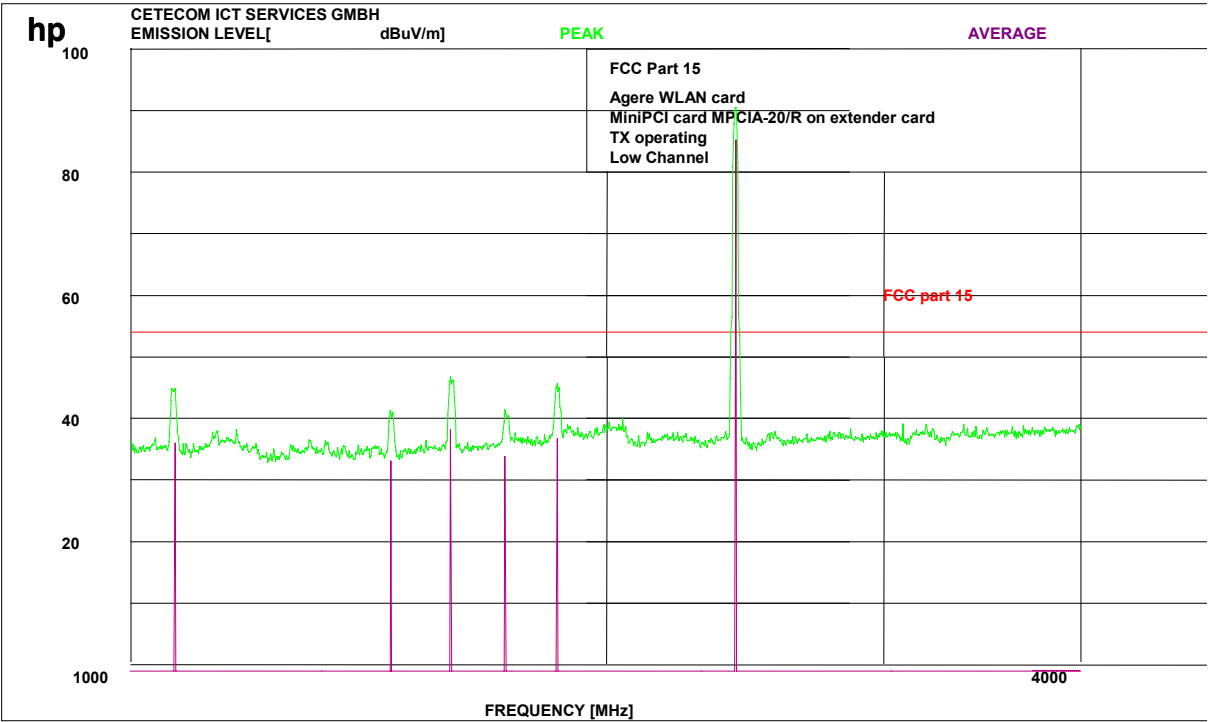
LIMITS SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS- Radiated

low channel 1000 - 4000 MHz (vertical, worst case)

§ 15.247 (c) (1)



RBW/VBW 1 MHz

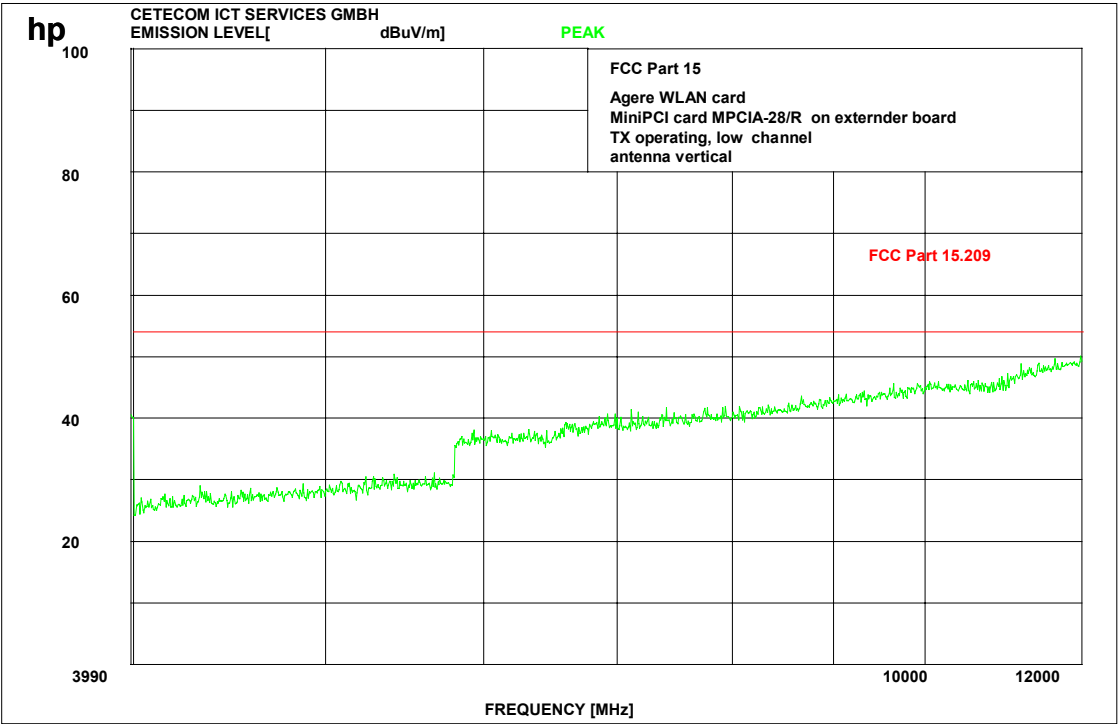
LIMITS

SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS- Radiated § 15.247 (c) (1)

low channel up to 12 GHz



RBW/VBW 1 MHz

LIMITS SUBCLAUSE § 15.247 (c)

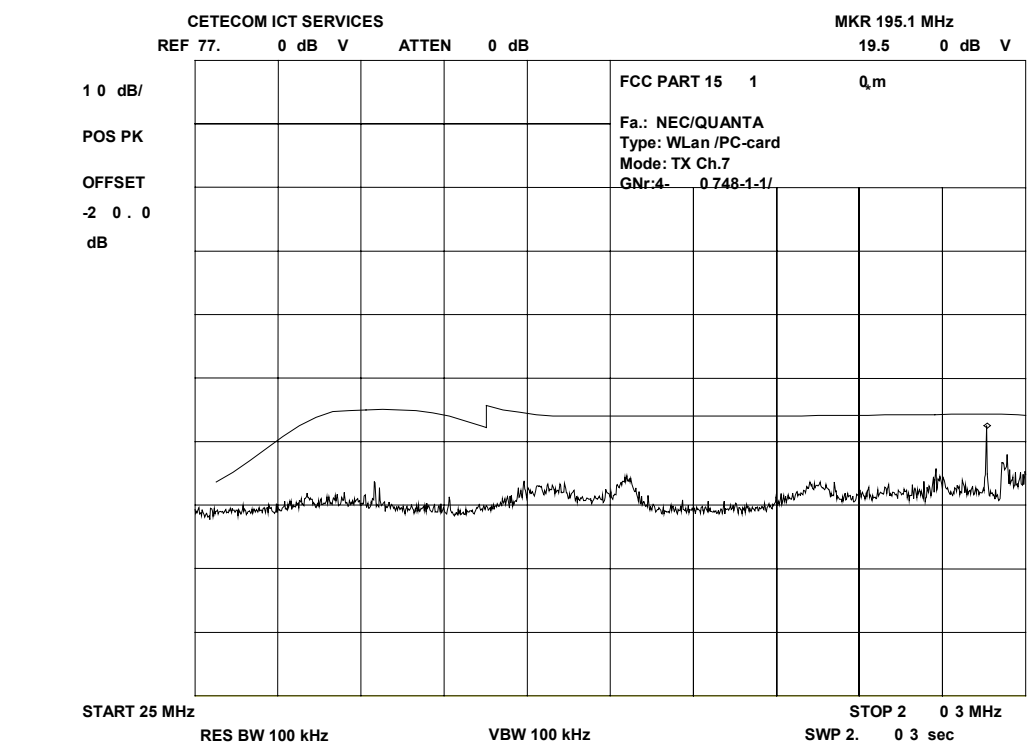
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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



EMISSION LIMITATIONS- Radiated  
mid channel 30 – 200 MHz (vertical, worst case)

§ 15.247 (c) (1)



LIMITS

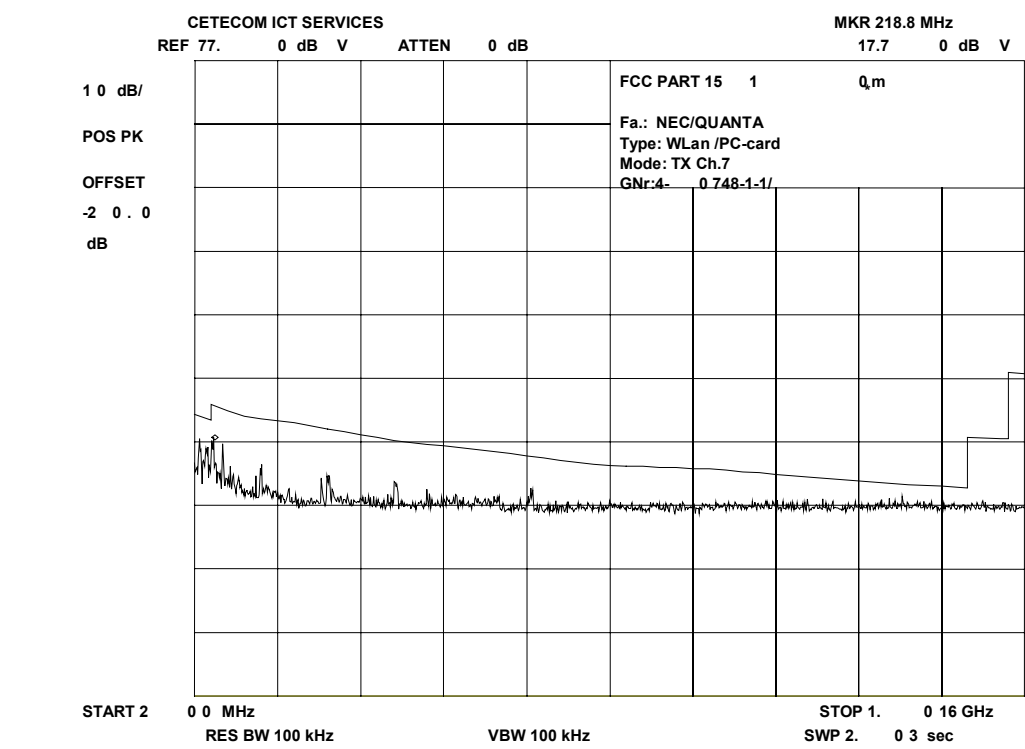
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS- Radiated

mid channel 200 - 1000 MHz (vertical, worst case)

§ 15.247 (c)



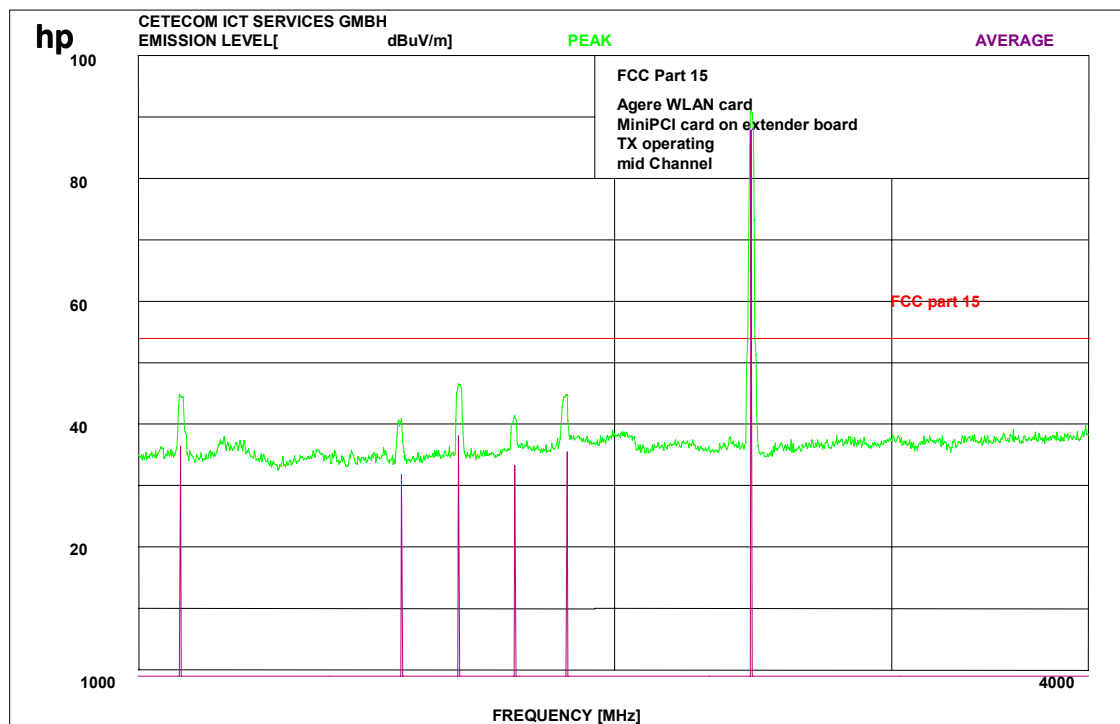
LIMITS

SUBCLAUSE § 15.247 (c)

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

## EMISSION LIMITATIONS- Radiated mid channel 1000 - 4000 MHz (vertical, worst case)

§ 15.247 (c)



RBW/VBW 1 MHz

### LIMITS

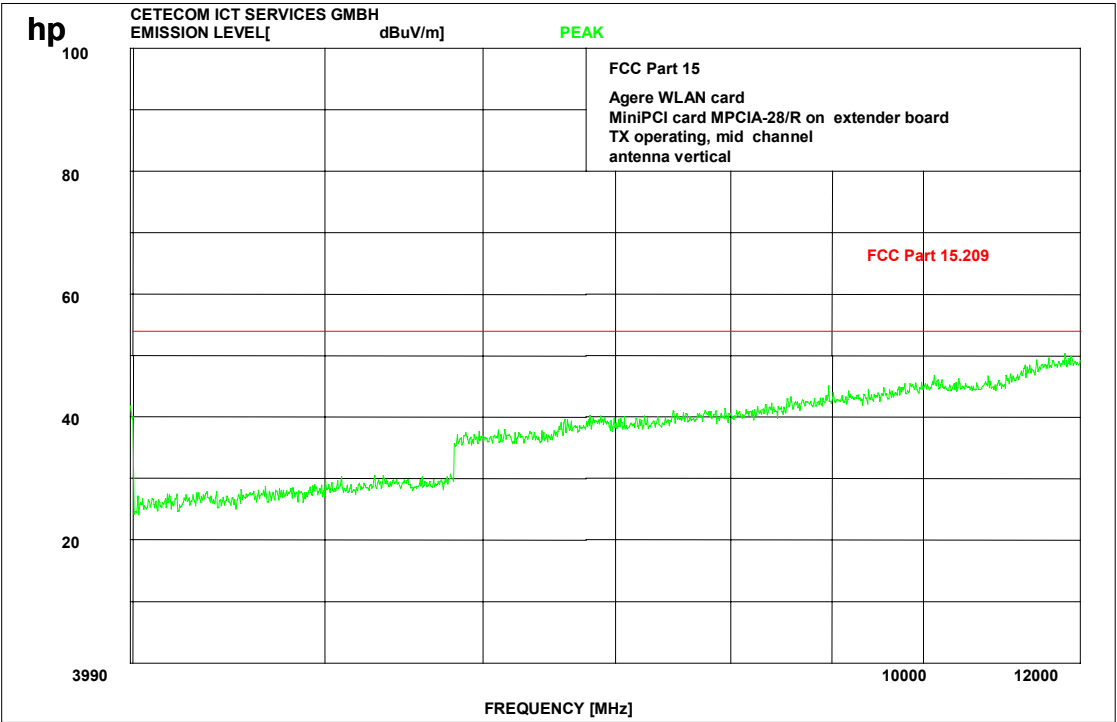
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS- Radiated

§ 15.247 (c) (1)

mid channel up to 12 GHz



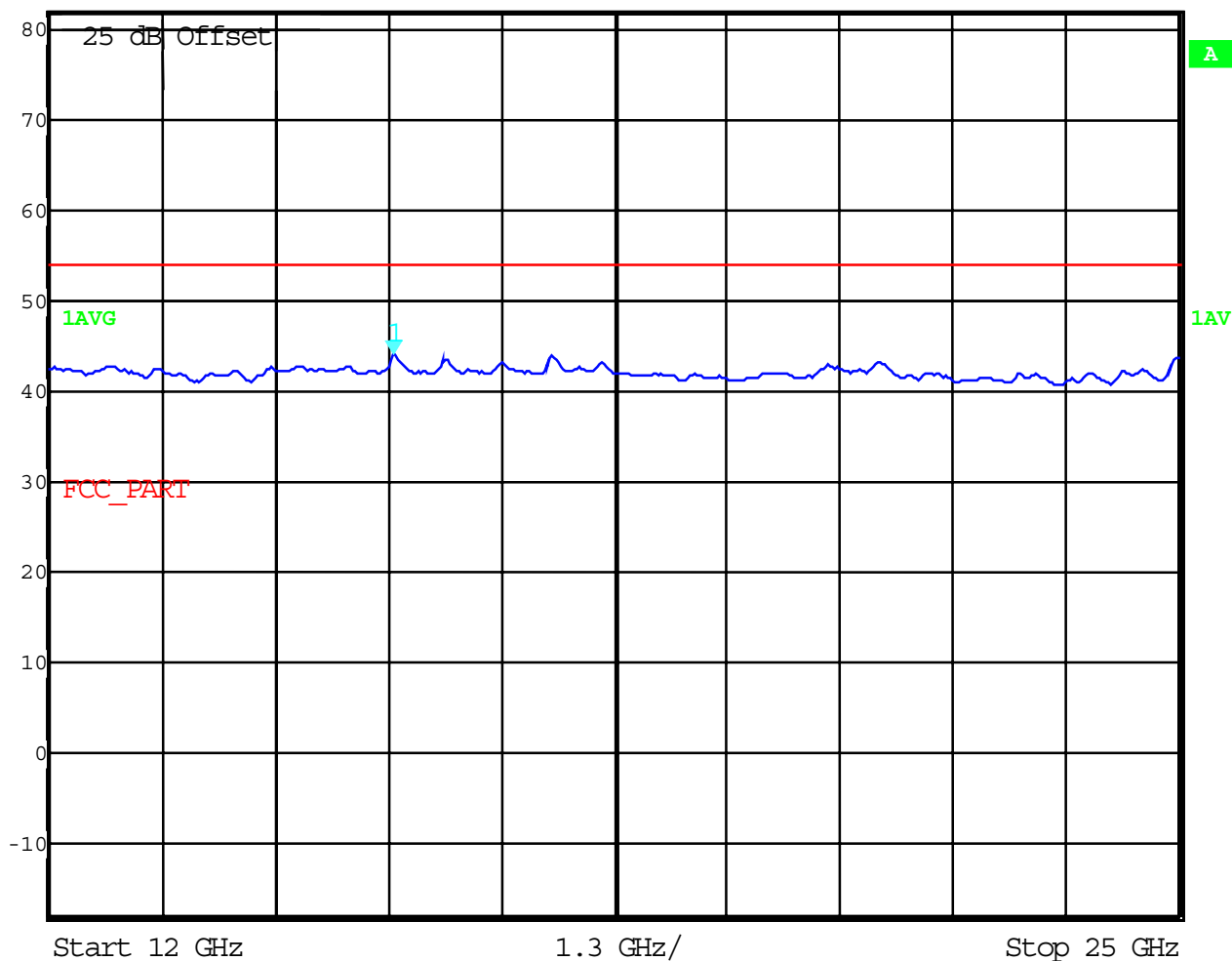
RBW/VBW 1 MHz

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)).

**§ 15.247 (c) (1)**



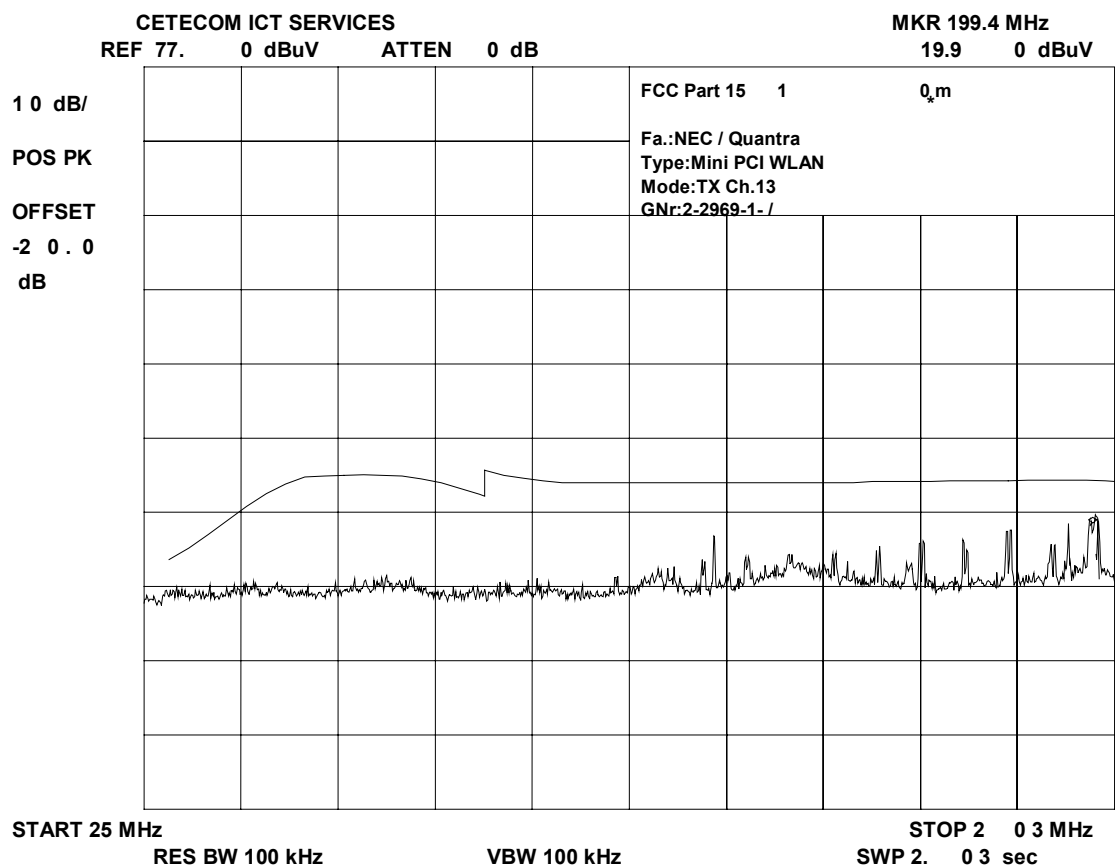
**SUBCLAUSE § 15.247 (c)**

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

EMISSION LIMITATIONS- Radiated

high channel 30 – 200 MHz (vertical, worst case)

§ 15.247 (c) (1)



LIMITS

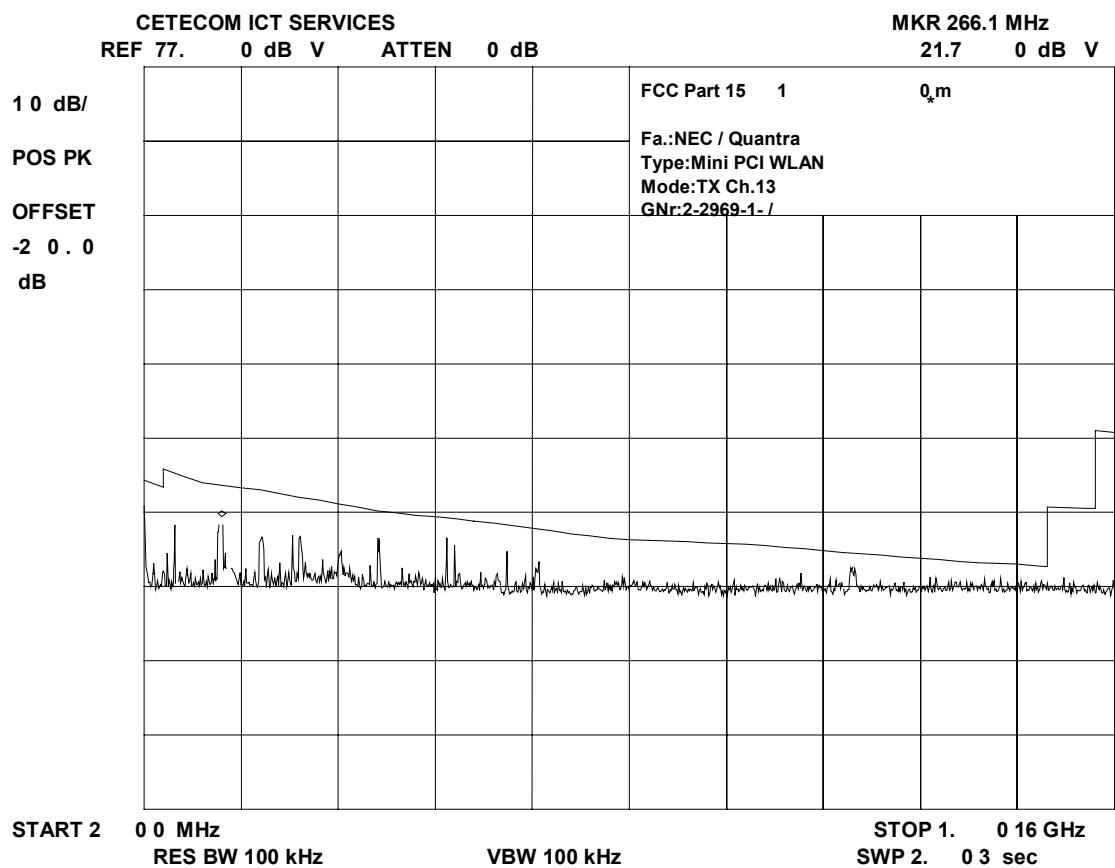
SUBCLAUSE § 15.247 (c)

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

EMISSION LIMITATIONS- Radiated

high channel 200 - 1000 MHz (vertical, worst case)

§ 15.247 (c) (1)



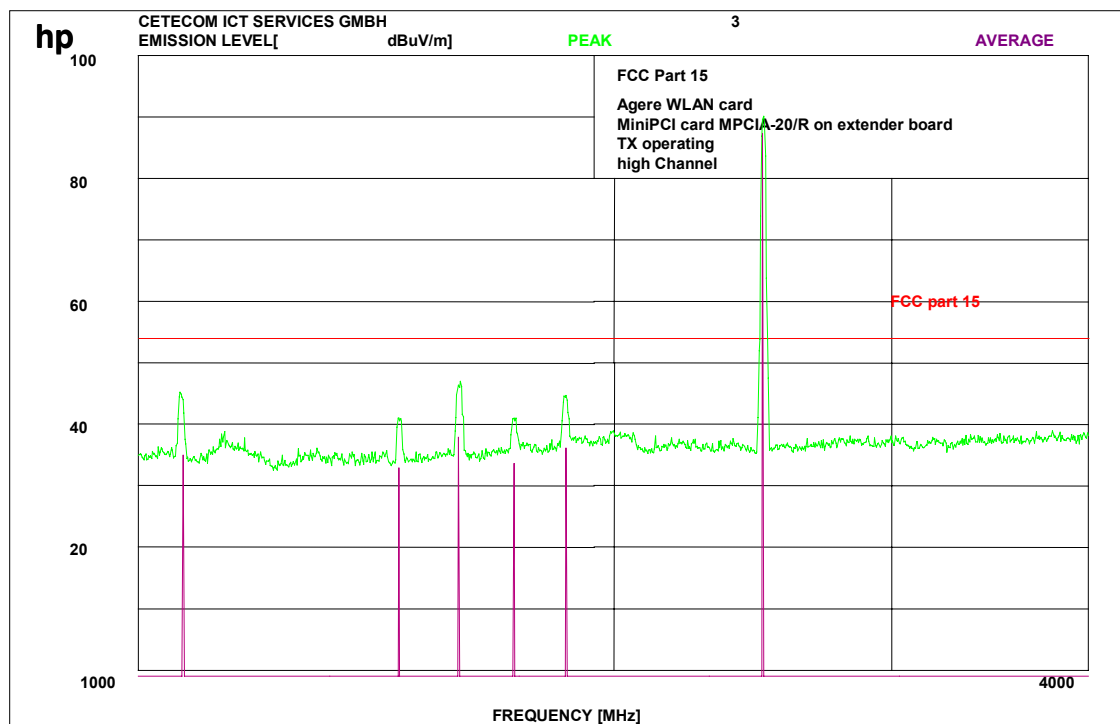
LIMITS

SUBCLAUSE § 15.247 (c)

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

## EMISSION LIMITATIONS- Radiated high channel 1000 - 4000 MHz (vertical, worst case)

§ 15.247 (c) (1)



RBW/VBW 1 MHz

### LIMITS

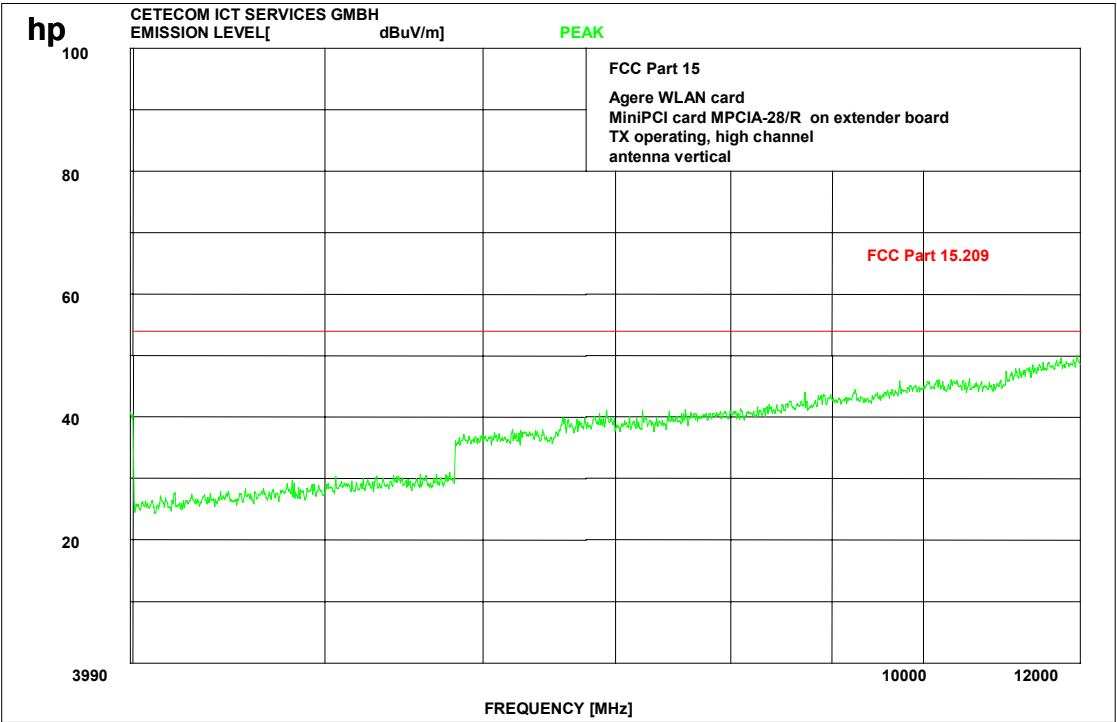
SUBCLAUSE § 15.247 (c)

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



EMISSION LIMITATIONS- Radiated § 15.247 (c) (1)

high channel up to 12 GHz



RBW/VBW 1 MHz

LIMITS SUBCLAUSE § 15.247 (c)

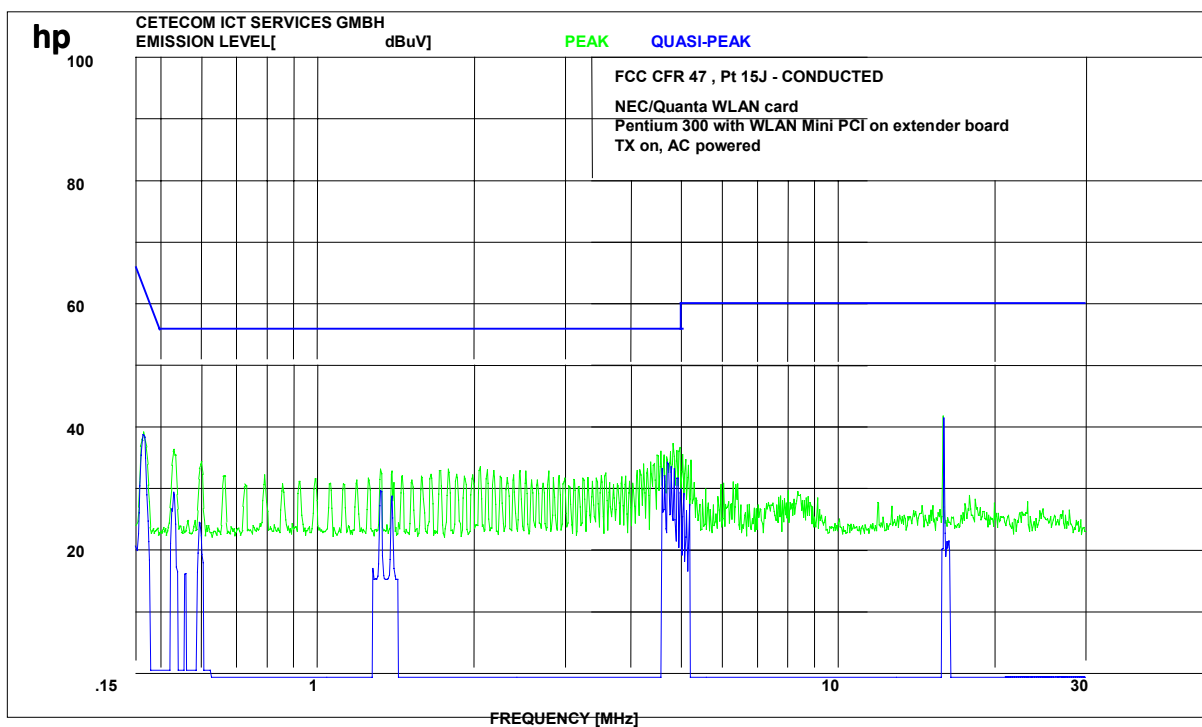
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

**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)).**

## Conducted emissions

FCC 15.207

L1-system and N-system (maximum value will be stored)



Limits:

	limit QP (dBμV)	limit AV (dBμV)
0.15 – 0.5 MHz	66 - 56	56 - 46
0.5 - 5.0 MHz	56	46
5.0 – 30.0 MHz	60	50

# CETECOM ICT Services GmbH

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Receiver

EMISSION LIMITATIONS- Radiated

§ 15.209

All spurious emissions below 1 GHz were caused by the measuring PC.

All peaks found were QP or Average >6 dB below limit of FCC15.209

EMISSION LIMITATIONS					
f (MHz)	polarization	amplitude of emission (dBµV/m) QUASIEPA K	amplitude of emission (dBµV/m) average	limit max. allowed emmission power (dBµV/m)	results
CH 1/2/3					
195.4	vert	40.1		43.5	complies
266.3	vert	37.8		46.0	complies
1642.4	vert		38.4	54.0	complies
Measurement uncertainty		± 3dB			

All peaks found in Receiving mode are < limit.

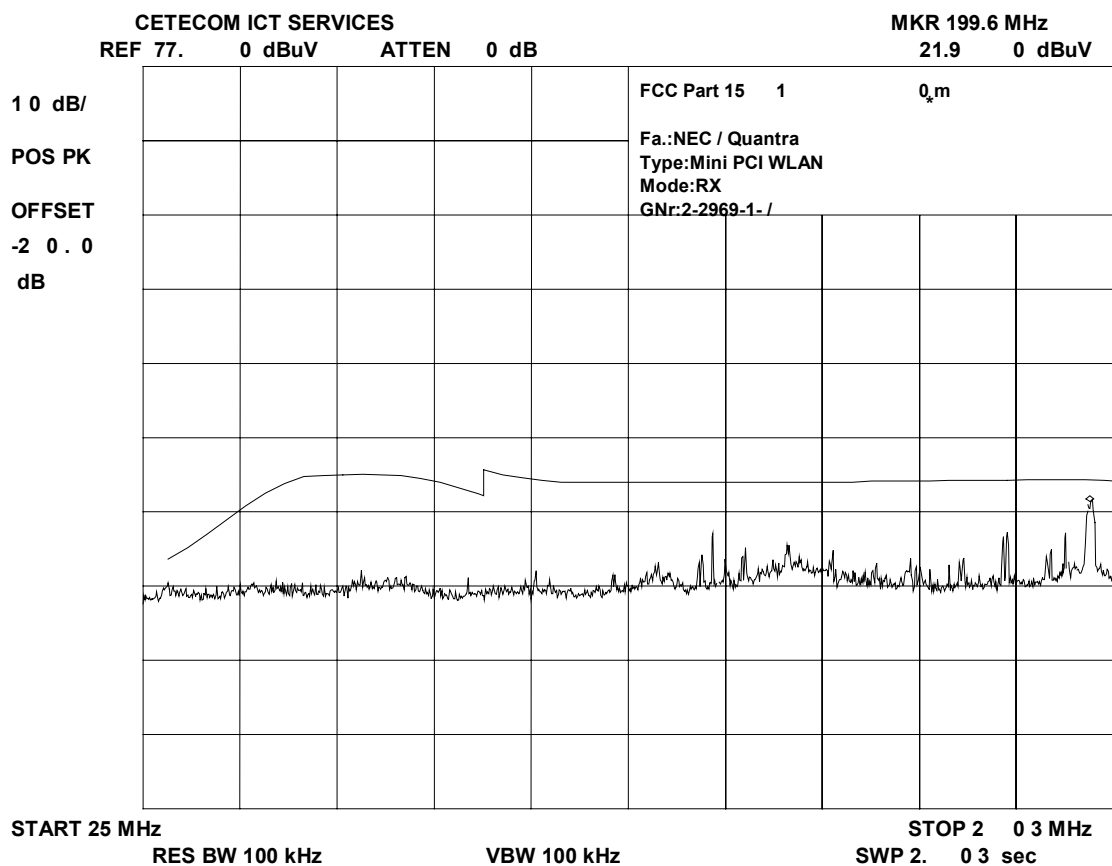
Limits

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

## EMISSION LIMITATIONS- Radiated Receiver 30 - 200 MHz (vertical, worst case)

§ 15.209



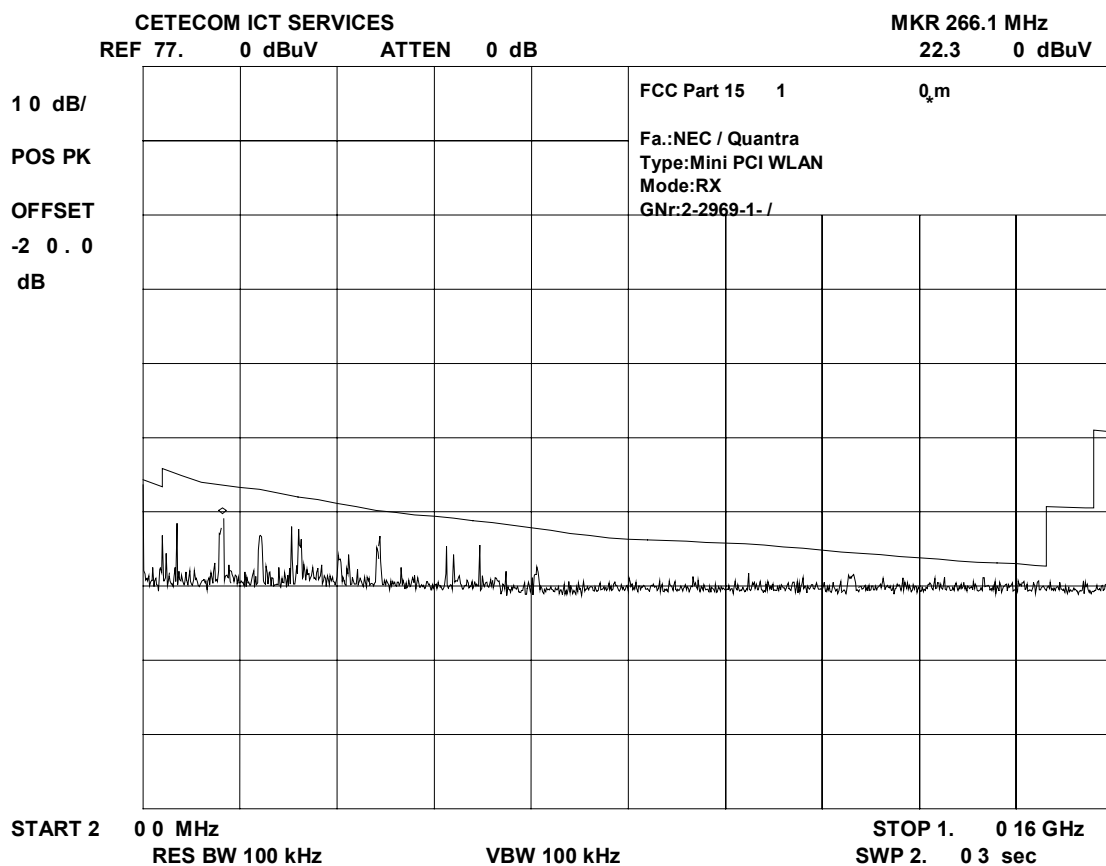
### Limits

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

## EMISSION LIMITATIONS- Radiated Receiver 200 – 1000 MHz (vertical, worst case)

§ 15.209



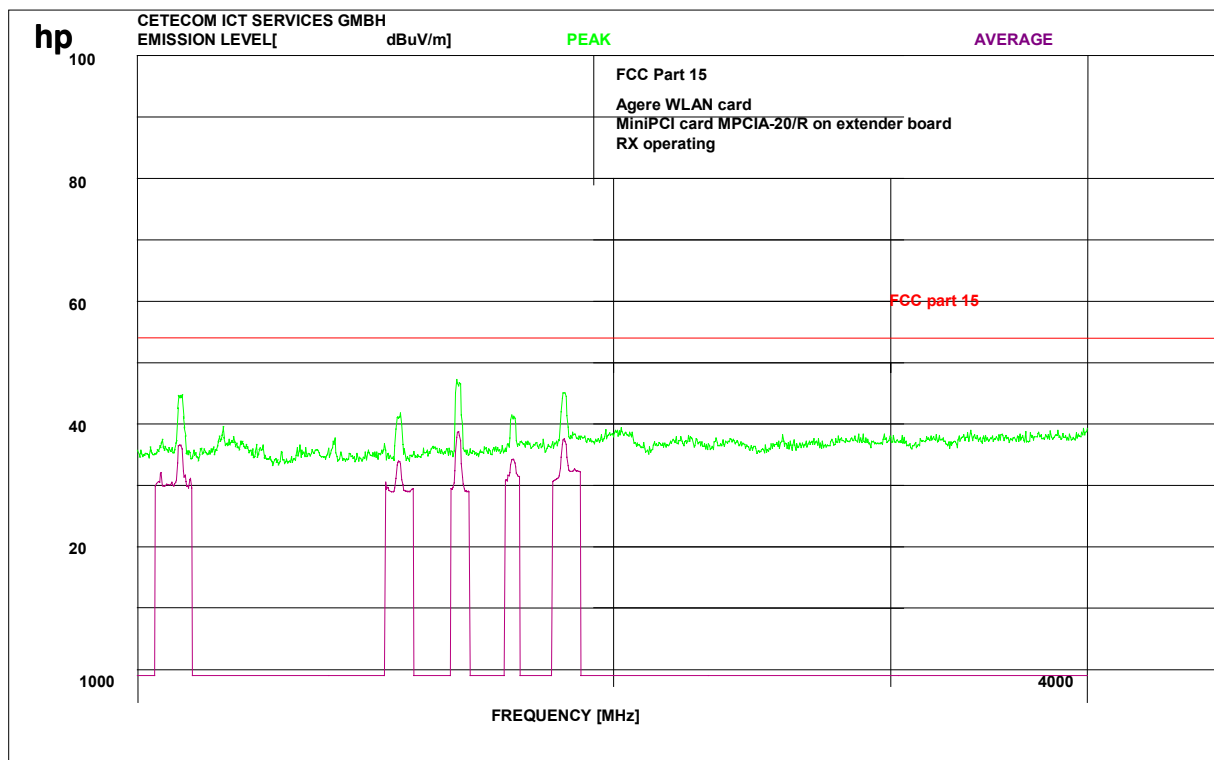
### Limits

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

## EMISSION LIMITATIONS- Radiated Receiver up to 4 GHz

§ 15.209



RBW/VBW 1 MHz

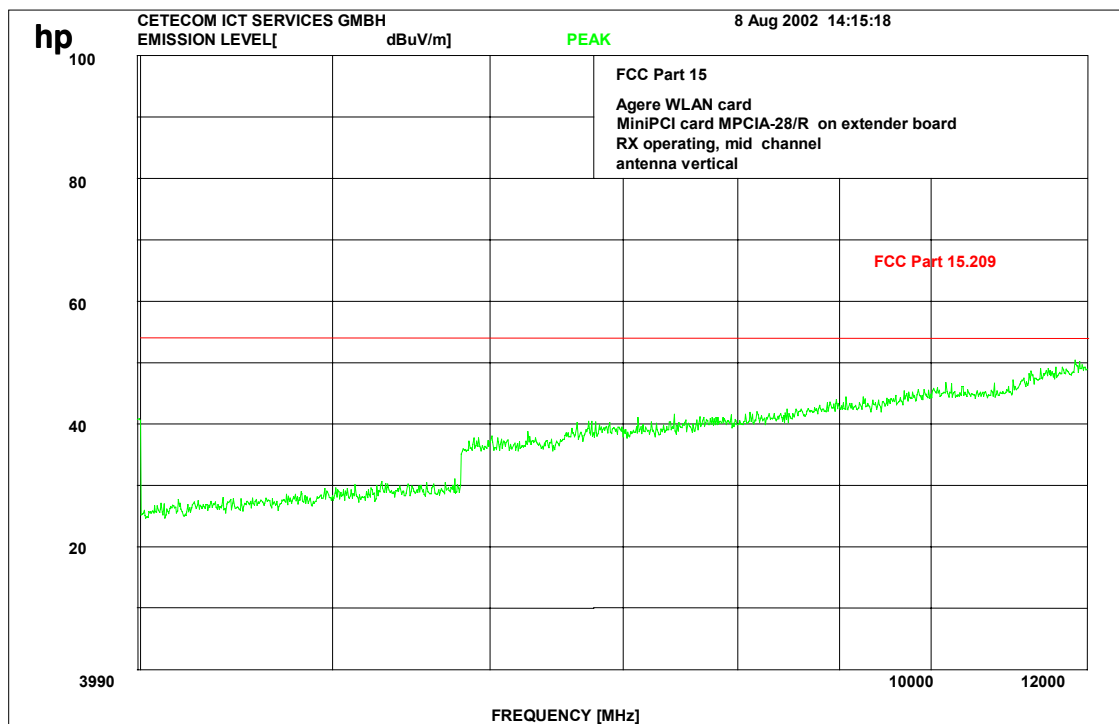
Limits

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

## EMISSION LIMITATIONS- Radiated Receiver up to 12 GHz

§ 15.209



RBW/VBW 1 MHz

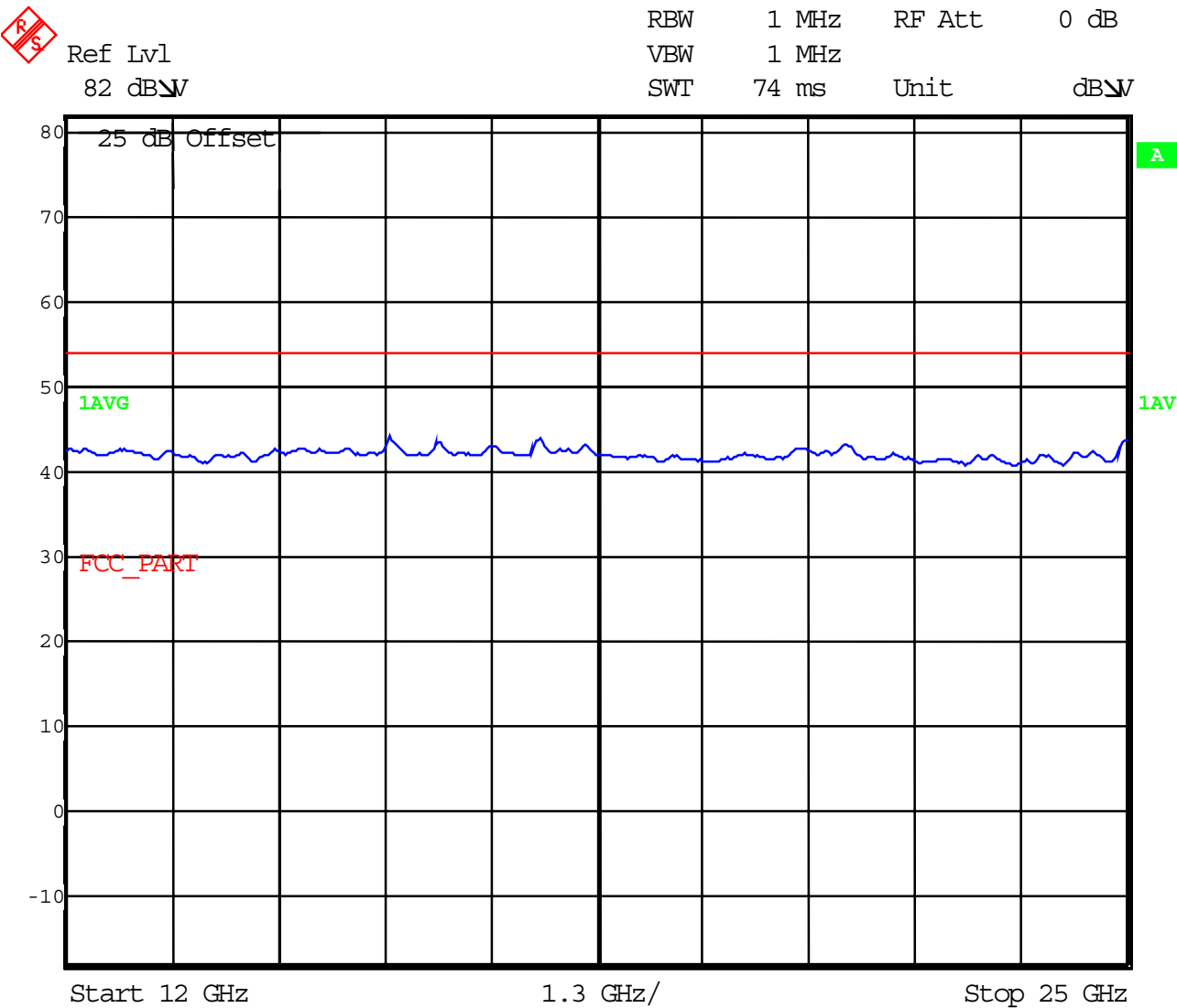
Limits

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



EMISSION LIMITATIONS- Radiated      § 15.209  
Receiver up to 25 GHz



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

## 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 Receiver	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

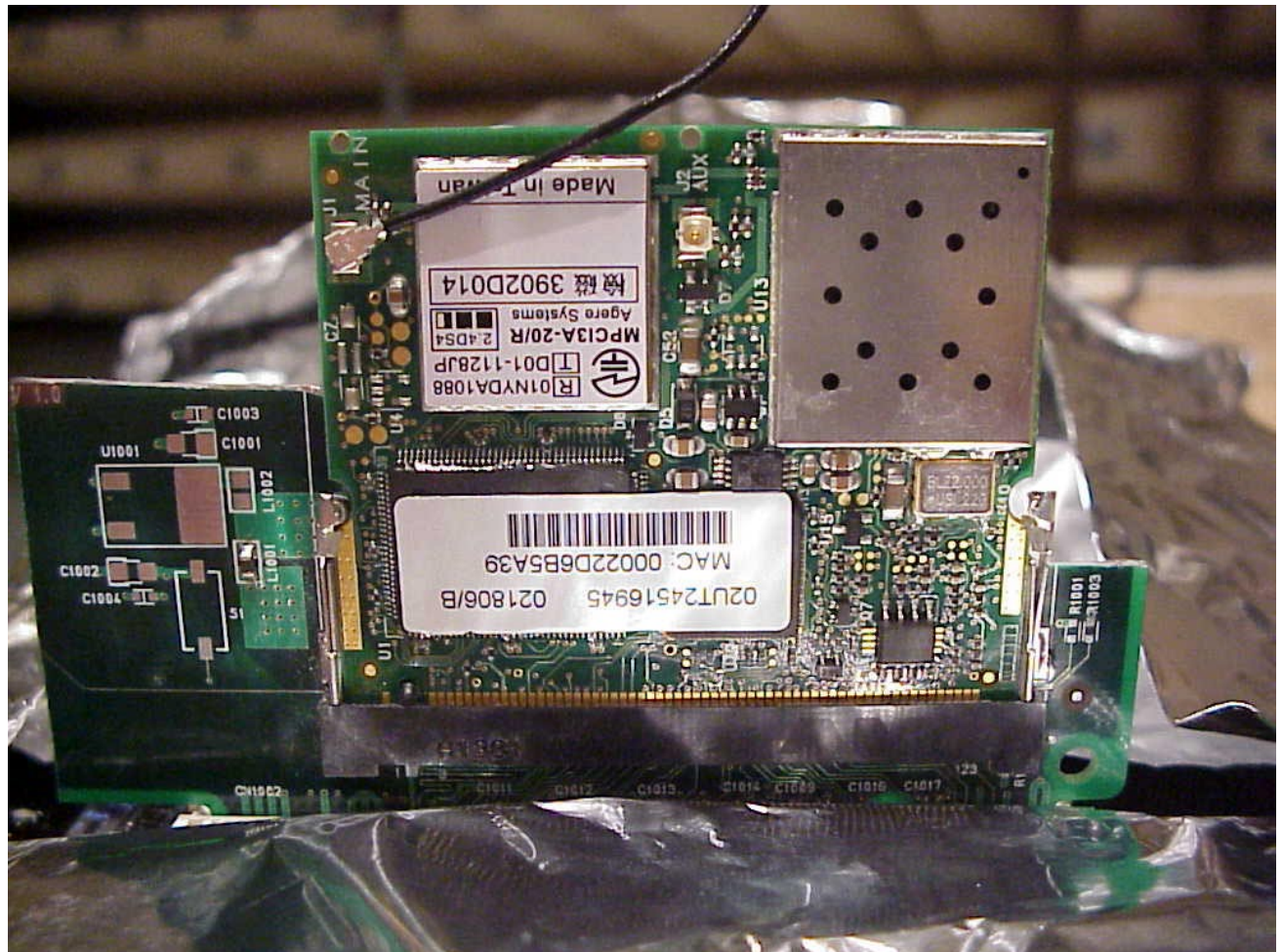
## TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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
67				

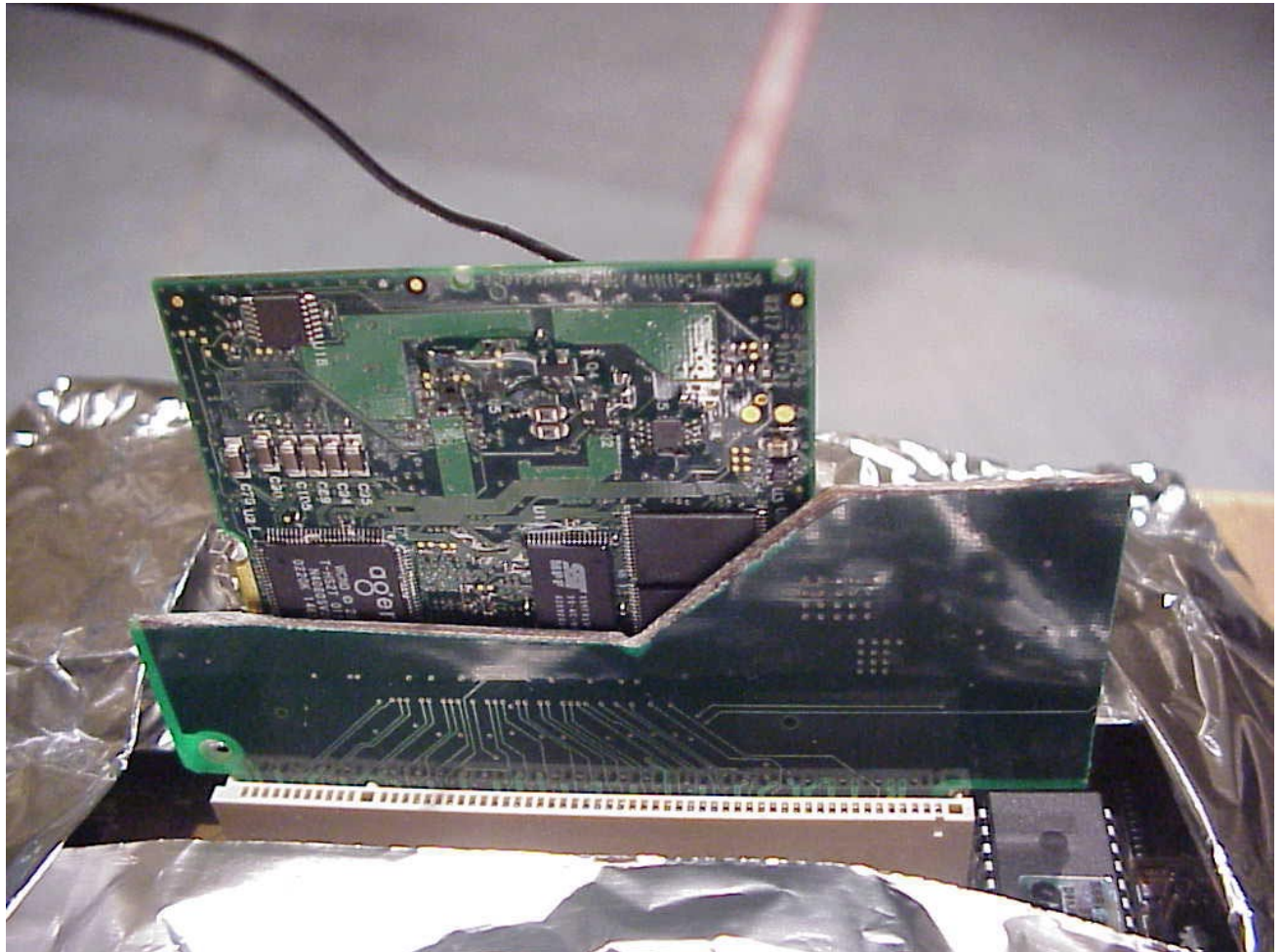
Test site

RADIATED EMISSIONS



Test site

RADIATED EMISSIONS





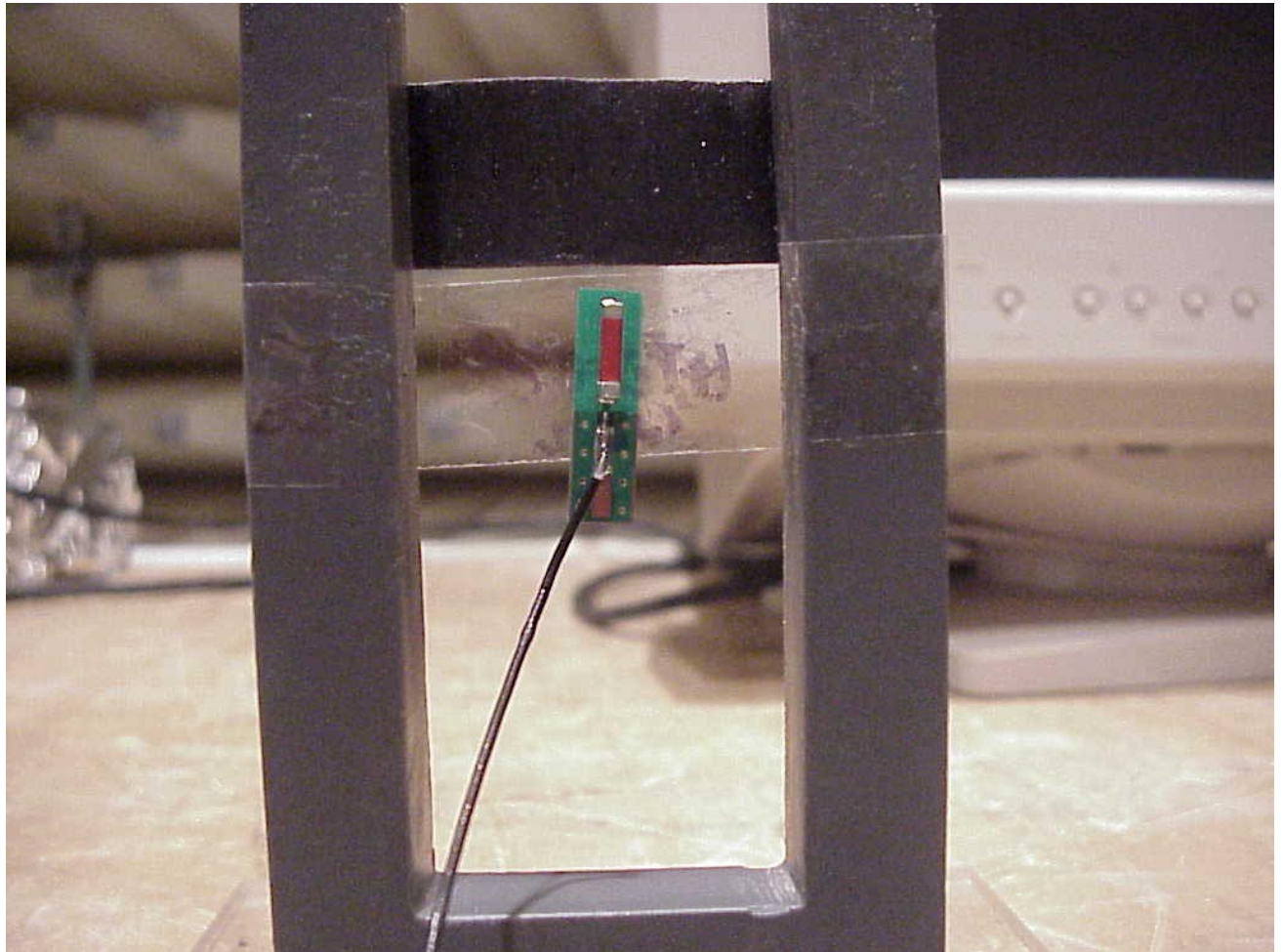
## Test site

### RADIATED EMISSIONS



## Test site

### RADIATED EMISSIONS



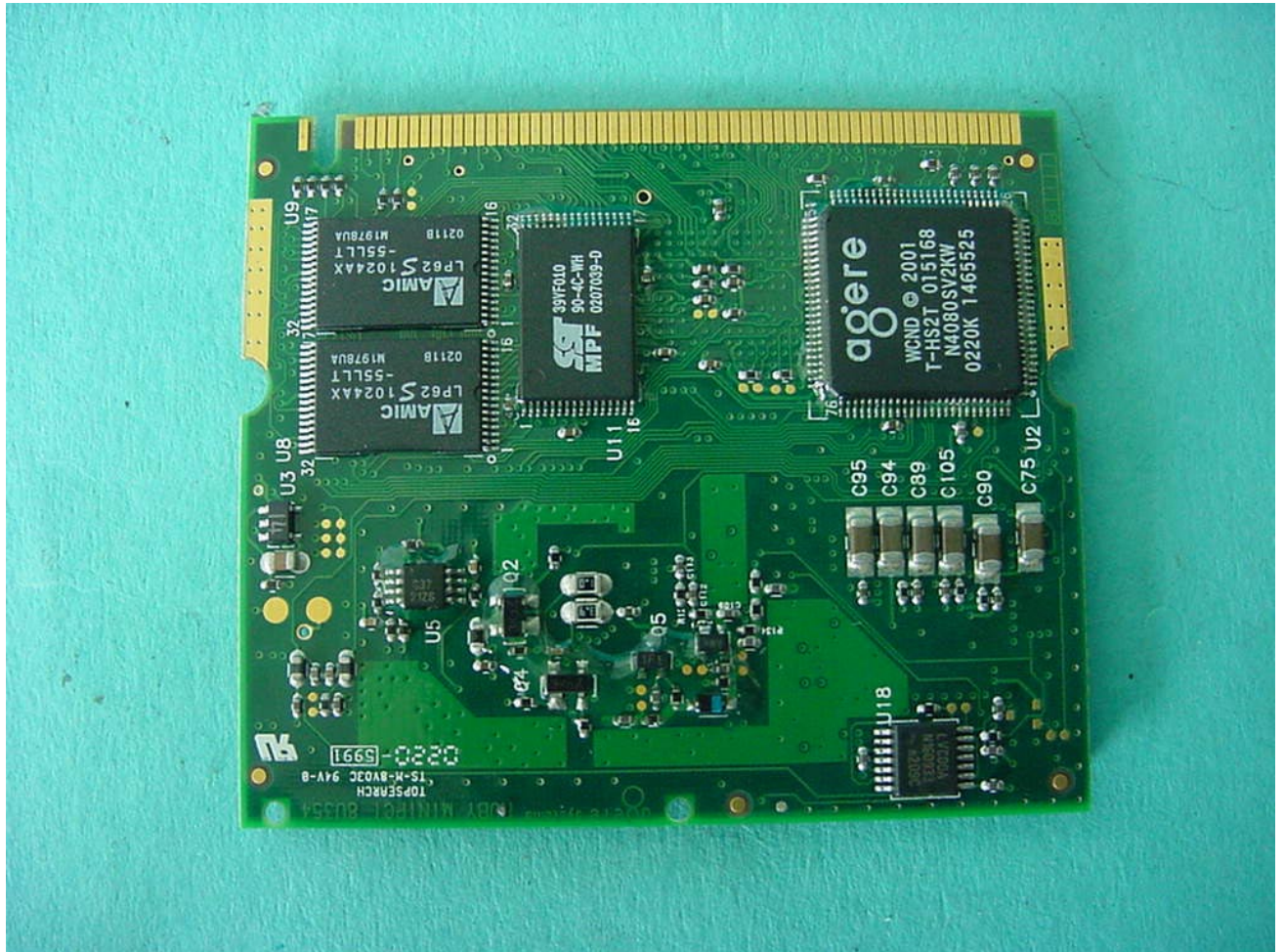


## Photographs of the equipment

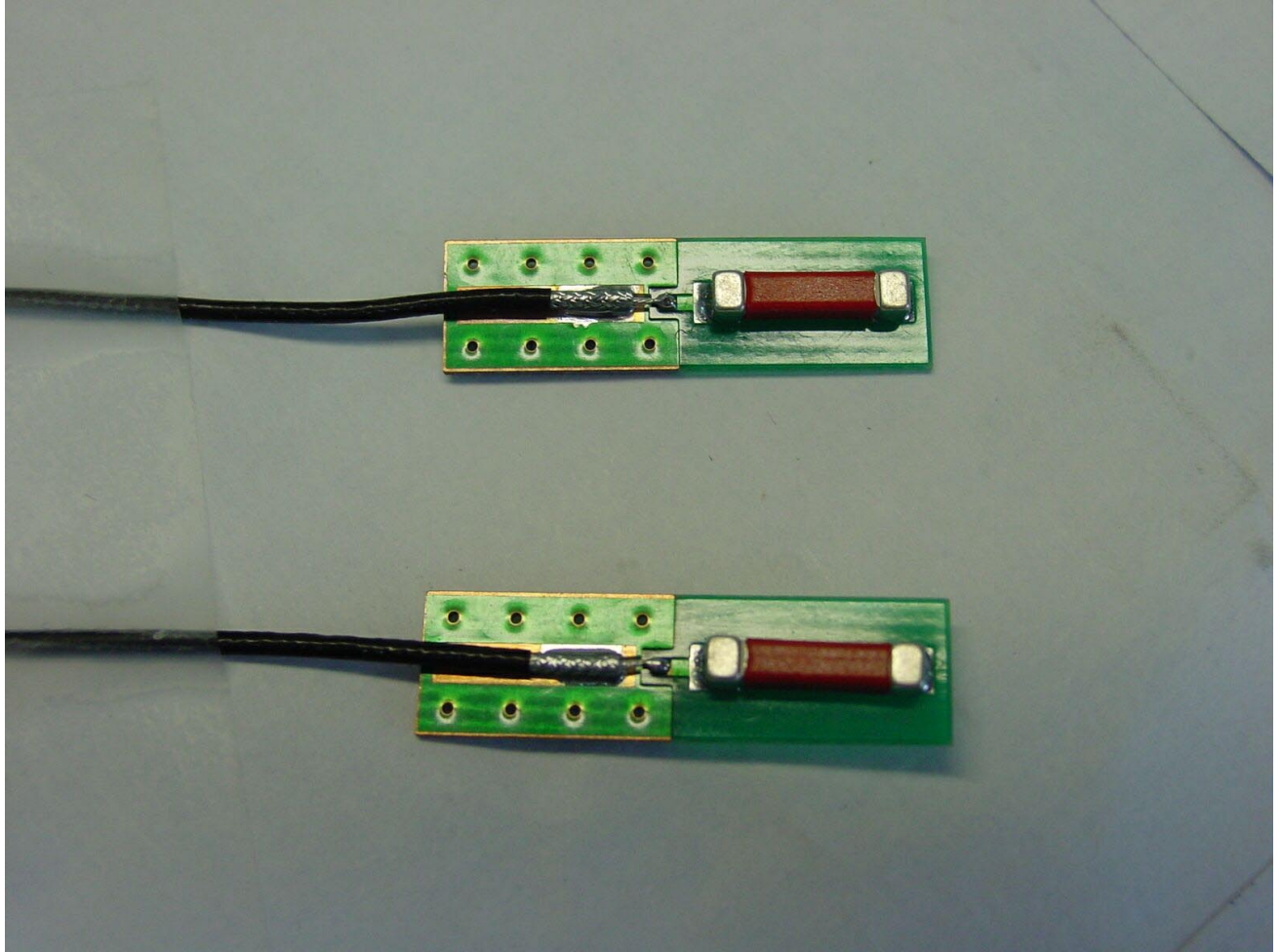




## Photographs of the equipment



## Photographs of the equipment





## Photographs of the equipment



## Photographs of the equipment

