CETECOM ICT Services GmbH

Radio Satelite Communication
Untertürkheimer Straße 6-10 . D-66117 Saarbrücken Telefon: +49 (0)681 598-9100 Telefax: -9075

Akkreditiertes Prüflaboratorium

DAR-Registriernummer:
TTI-P-G 166/98-00 vom 18.09.98

Test report no.: 2_2100-D/00
FCC Part 15.247
8505001

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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
66117 Saarbrücken
Untertürkheimer Straße 6 - 10
Deutschland
Telefone: + 49 681 598 - 9100
Telefax : + 49 681 598 - 9075
E-mail : Michael.Berg@ict.cetecom.de
Internet : www.cetecom.de
Accredited testing laboratory
DAR-registration number : TTI-P-G 166/98-00

1.3 Details of applicant

Name : Ericsson Radio Systems BV
Street : Nieuw Amsterdamsestraat 40
City : 7801 CA Emmen
Country : The Netherlands
Telephone : +31 591 637 777
Telefax : +31 591 632 001
Contact : Mr. Ron Linde
Telephone : +31 591 637 777

1.4 Application details

Date of receipt of application : 06.05.00
Date of receipt of test item : 11.07.00
Date of test : 11.-12.07.00

1.5 Test item

Type of equipment	:	**RLAN**
Type designation	:	**8505001**
Manufacturer	:	applicant
Street	:	
City	:	
Country	:	
Serial number	:	HW# KRY 901 28/01 R1 ; S/N: 0080370F2580
Additional informations:	**:**	
Frequency	:	2402 – 2480 MHz
Type of modulation	:	24M0FXD (FHSS)
Number of channels	:	79
Antenna	:	integral antenna
Power supply	:	1.1 – 1.6 V DC NiMH accu
Output power	:	max. 1 mW
Type of equipment	:	Temperature range : -10°C - +55°C
Average time of occupancy within a 30 second period	:	< 0.4 second

1.6 Test standards: FCC Part 15 §15.247

2 Technical test

2.1 Summary of test results

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

Technical responsibility for area of testing :

18.07.00	**RSC 8411**	**Berg**	
Date	**Section**	**Name**	**Signature**

Technical responsibility for area of testing :

18.07.00	**RSC8414**	**Ames**	
Date	**Section**	**Name**	**Signature**

2.2 Testreport

TEST REPORT

Testreport no. : 2_2100-D/00

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

Paragraph	PARAMETER TO BE MEASURED	PAGE
	Transmitter parameters	
§ 15.247 (a)(1)	20 dB Bandwidth	7
§ 15.247 (b)(1)	Maximum peak output power	11
§ 15.247 (c)(1)	Emission limitations	12
§ 15.207	Conducted emissions	21
	Modulation spectrum	22
	Band edge limits	23
	Receiver parameters	
§ 15.209	Spurious radiations - Radiated	24
	Test equipment listing	27
	Photographs of the equipment	29

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

20 dB BANDWIDTH **SUBCLAUSE § 15.247 (a)(1)**

TEST CONDITIONS		20 dB BANDWIDTH (kHz)		
Frequency (MHz)		2402	2440	2480
T_{nom}(23) °C	V_{nom}(1.3)V	961.92	905.81	945.89
Measurement uncertainty		±3dB		

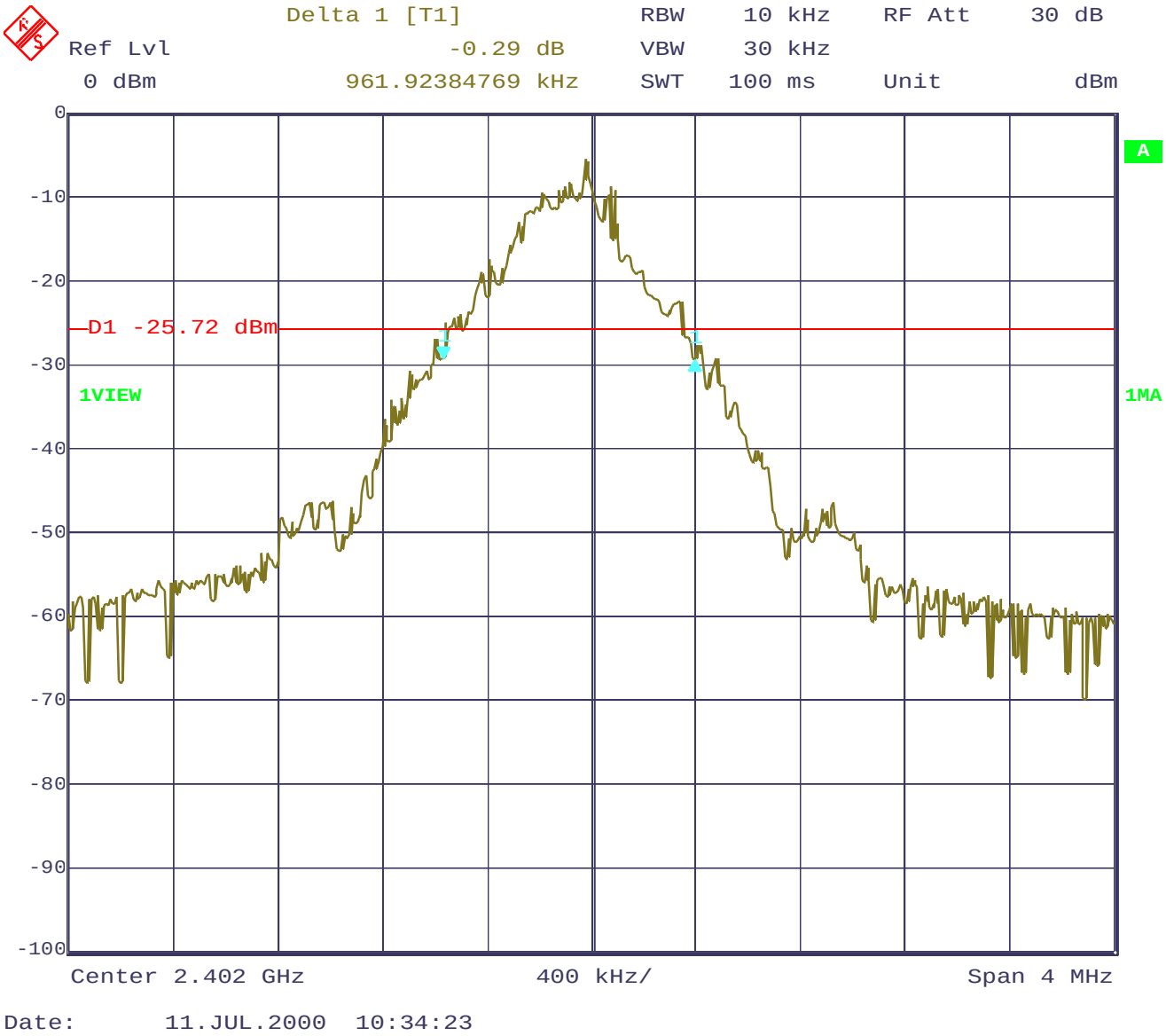
LIMIT **SUBCLAUSE §15.247(a) (1) (ii)**

Occupied bandwith shall not exceed 1000 kHz

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

20 dB BANDWIDTH **SUBCLAUSE § 15.247 (a)(1)**
2402 MHz



Date: 11.JUL.2000 10:34:23

LIMIT **SUBCLAUSE §15.247(a) (1) (ii)**

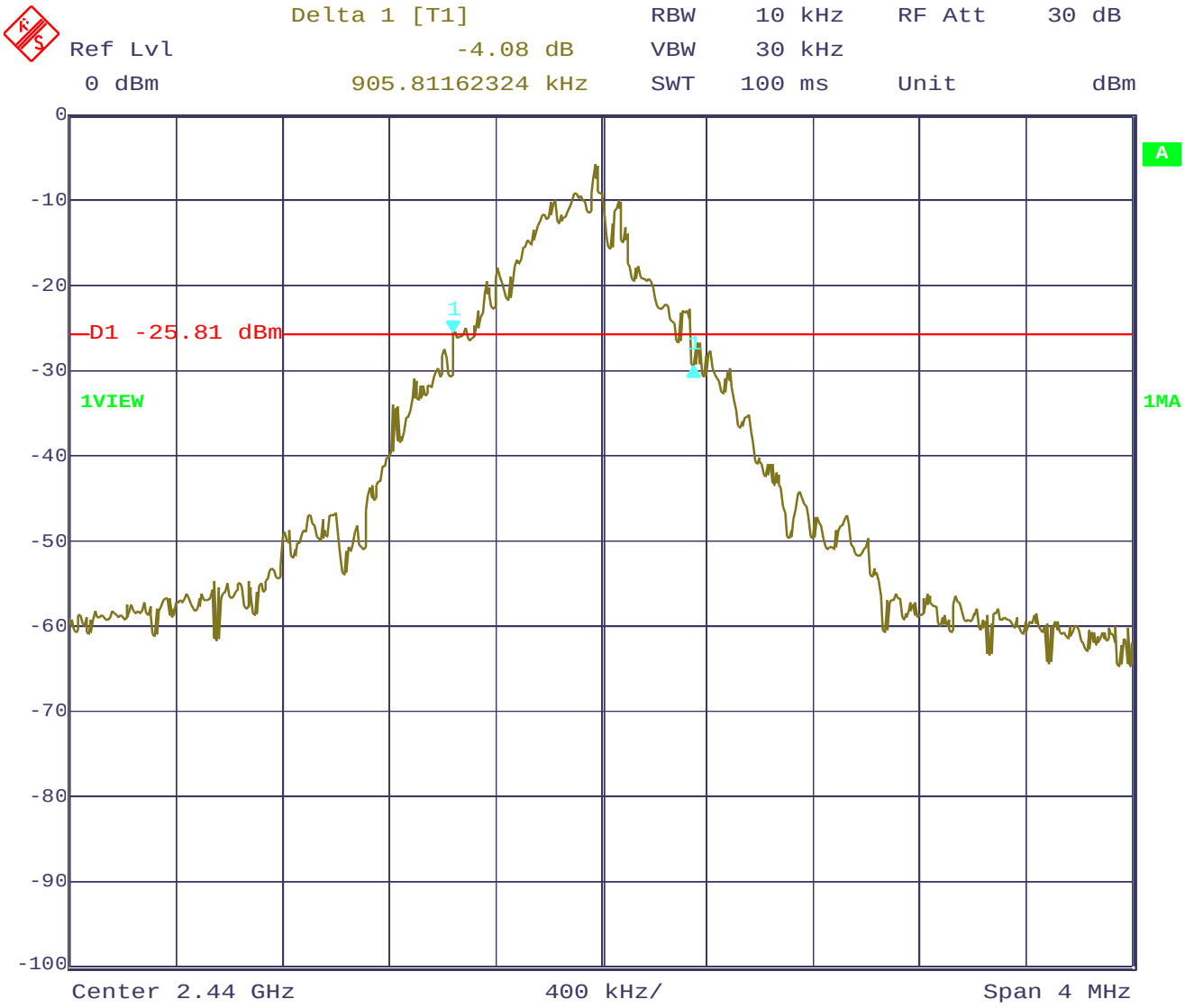
Occupied bandwith shall not exceed 1000 kHz

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

20 dB BANDWIDTH **SUBCLAUSE § 15.247 (a)(1)**

2440 MHz



Date: 11.JUL.2000 10:32:42

LIMIT **SUBCLAUSE §15.247(a) (1) (ii)**

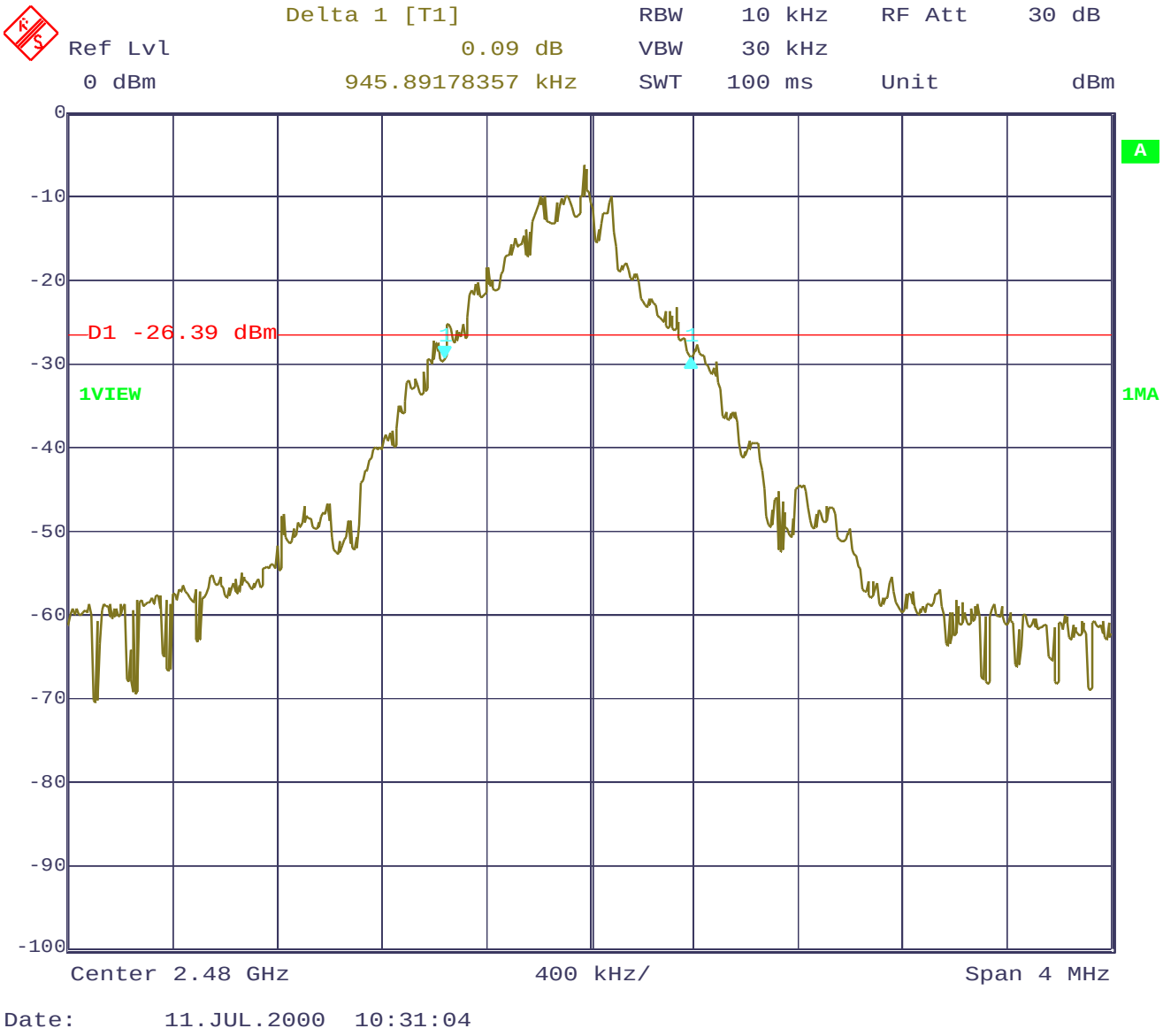
Occupied bandwith shall not exceed 1000 kHz

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

20 dB BANDWIDTH **SUBCLAUSE § 15.247 (a)(1)**

2480 MHz



Date: 11.JUL.2000 10:31:04

LIMIT **SUBCLAUSE §15.247(a) (1) (ii)**

Occupied bandwith shall not exceed 1000 kHz

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (W)		
Frequency (MHz)		2402	2440	2482
T_{nom}(23) °C	V_{nom}(1..6)V	0.00167 (AV:0.00092)	0.00085 (AV:0.00066)	0.00072 (AV:0.00055)
Maximum deviation from output power under extreme test conditions (dBc)		+0.60	+0.41	+0.20
Measurement uncertainty		±3dB		

LIMIT **SUBCLAUSE § 15.247 (b) (1)**

Frequency range	RF power output
2400-2483.5 MHz / 5725 – 5850 MHz	1.0 Watt

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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

EMISSION LIMITATIONS					
f (MHz)	polari-zation	amplitude of emission (dBm)	limit max. allowed emmision power	actual attenuation below frquency of operation (dB)	results
2402	vertical	+2.23	30.0 dBm	-	Operating frequency
4804	vertical	PK:-55.3 AV: -58.6	-20 dBc	57.53	complies
7206	vertical	PK:-64.6 AV:-66.8	-20 dBc	66.83	complies
2440	vertical	-0.70	30 dBm	-	Operating frequency
4880	vertical	PK:-57.2 AV:-59.9	-20 dBc	56.40	complies
					complies
2480	vertical	-1.33	30 dBm		Operating frequency
4960	vertical	PK:-54.7 AV:-57.3	-20 dBc	53.37	complies
7440	vertical	PK:-65.9 AV:-67.4	-20 dBc	64.57	complies
Measurement uncertainty		± 3dB			

RBW: 100 kHz VBW: 100 KHz
all measurements were done up to 25 GHz

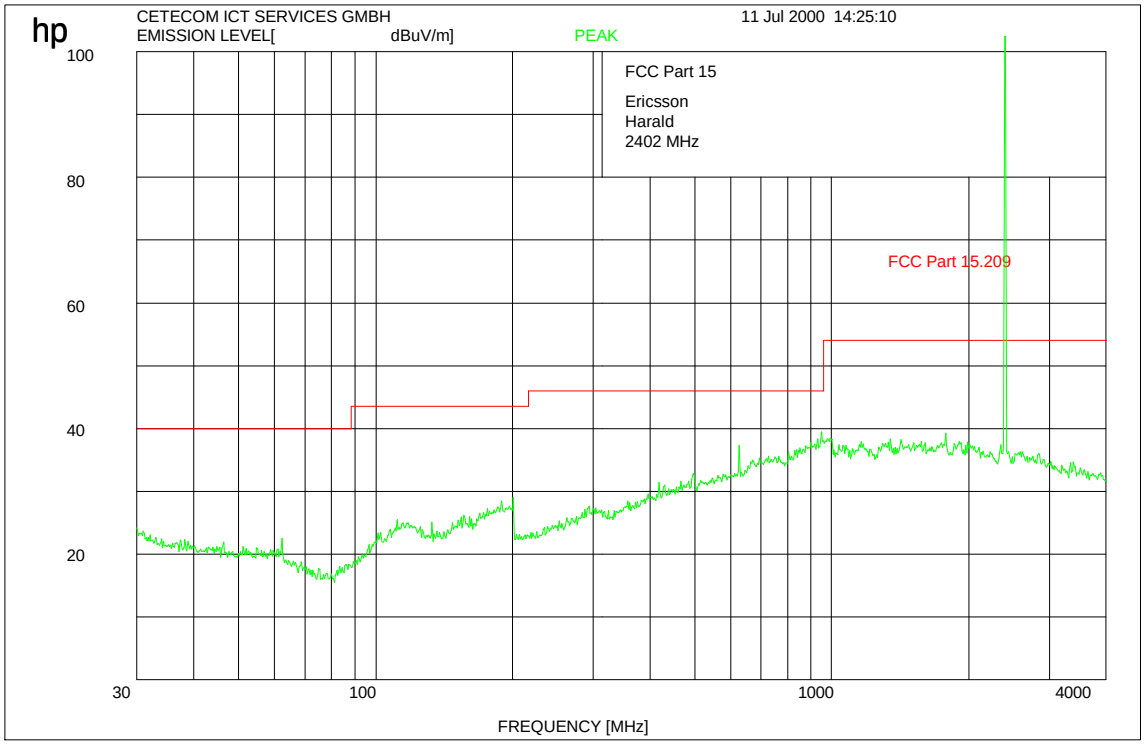
LIMITS SUBCLAUSE § 15.247 (c)

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

EMISSION LIMITATIONS (Transmitter) **SUBCLAUSE § 15.247 (c) (1)**
2402 MHz



Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

LIMITS **SUBCLAUSE § 15.247 (c)**

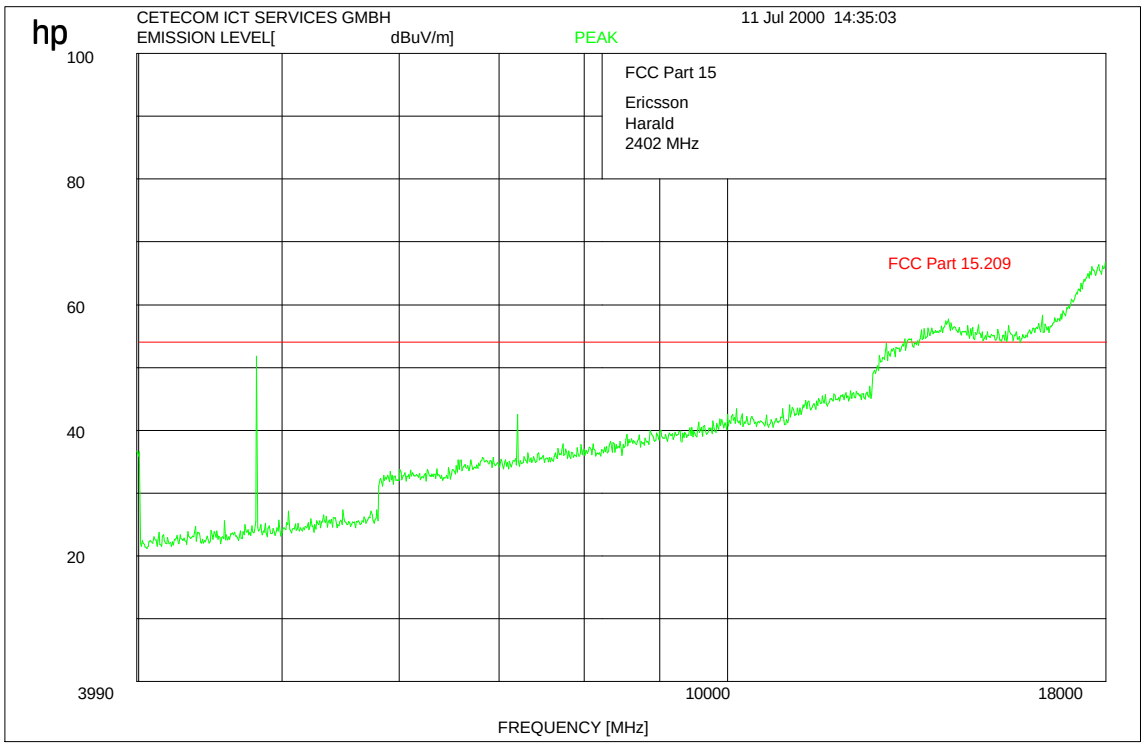
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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

2402 MHz



Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

LIMITS **SUBCLAUSE § 15.247 (c)**

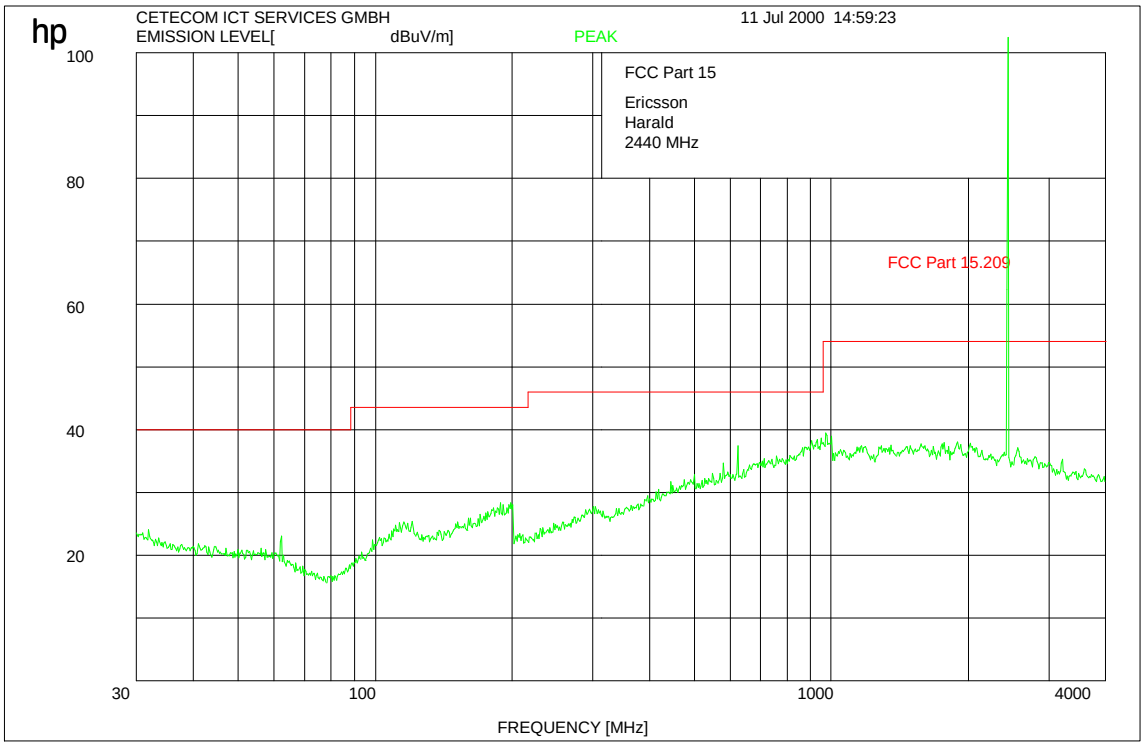
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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

2440 MHz



Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

LIMITS **SUBCLAUSE § 15.247 (c)**

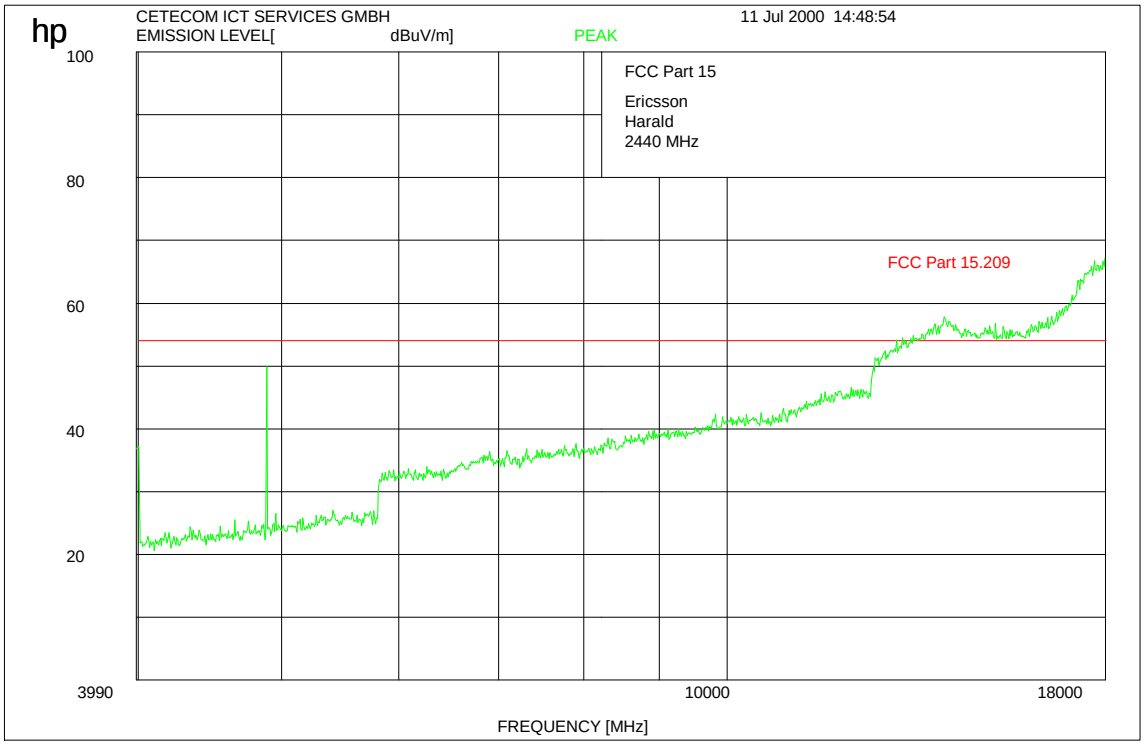
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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

2440 MHz



Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

LIMITS **SUBCLAUSE § 15.247 (c)**

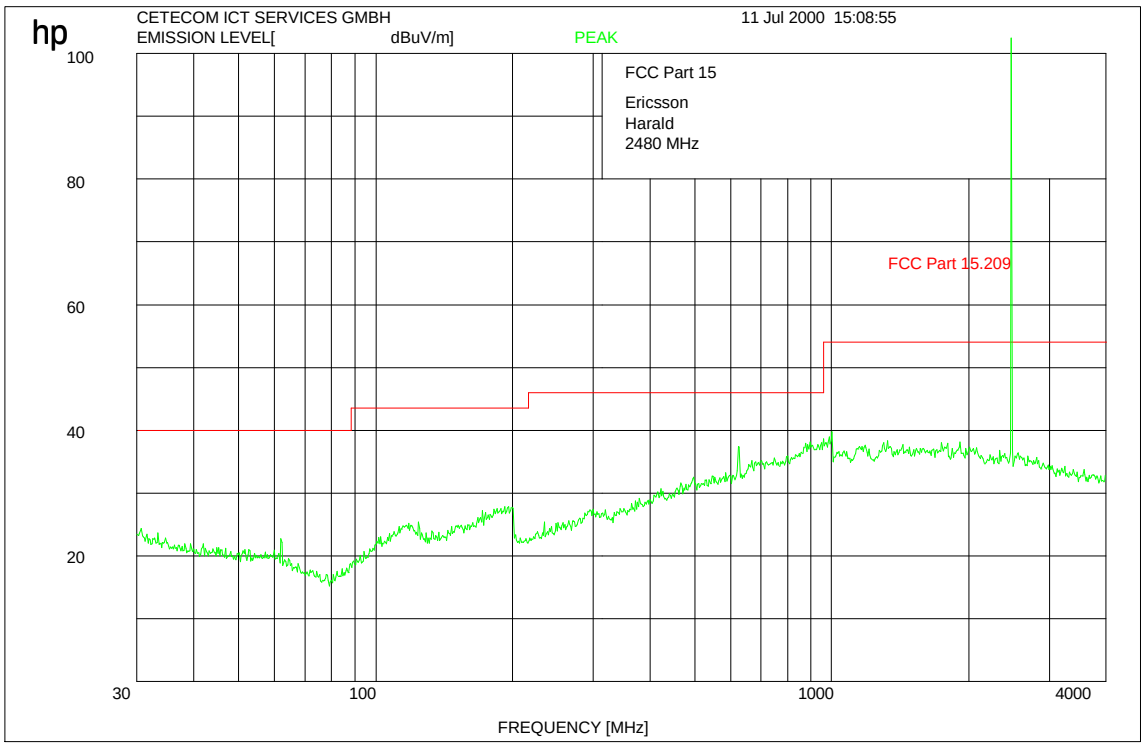
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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

2480 MHz



Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

LIMITS **SUBCLAUSE § 15.247 (c)**

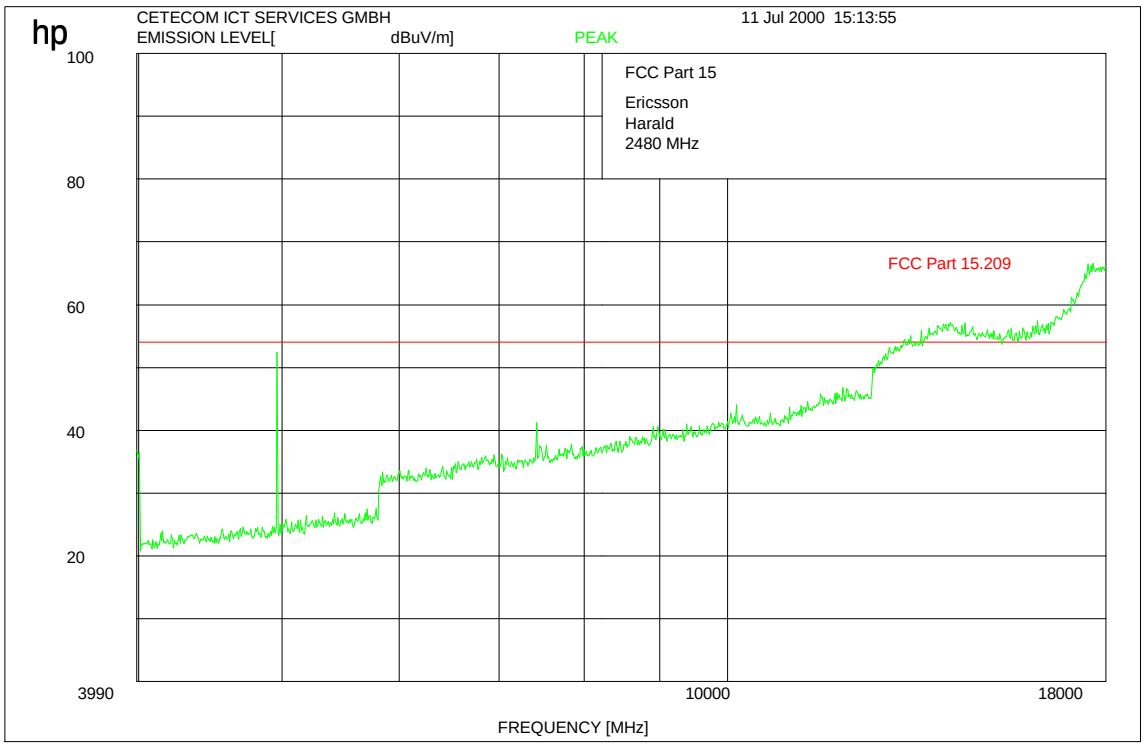
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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

2480 MHz



Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

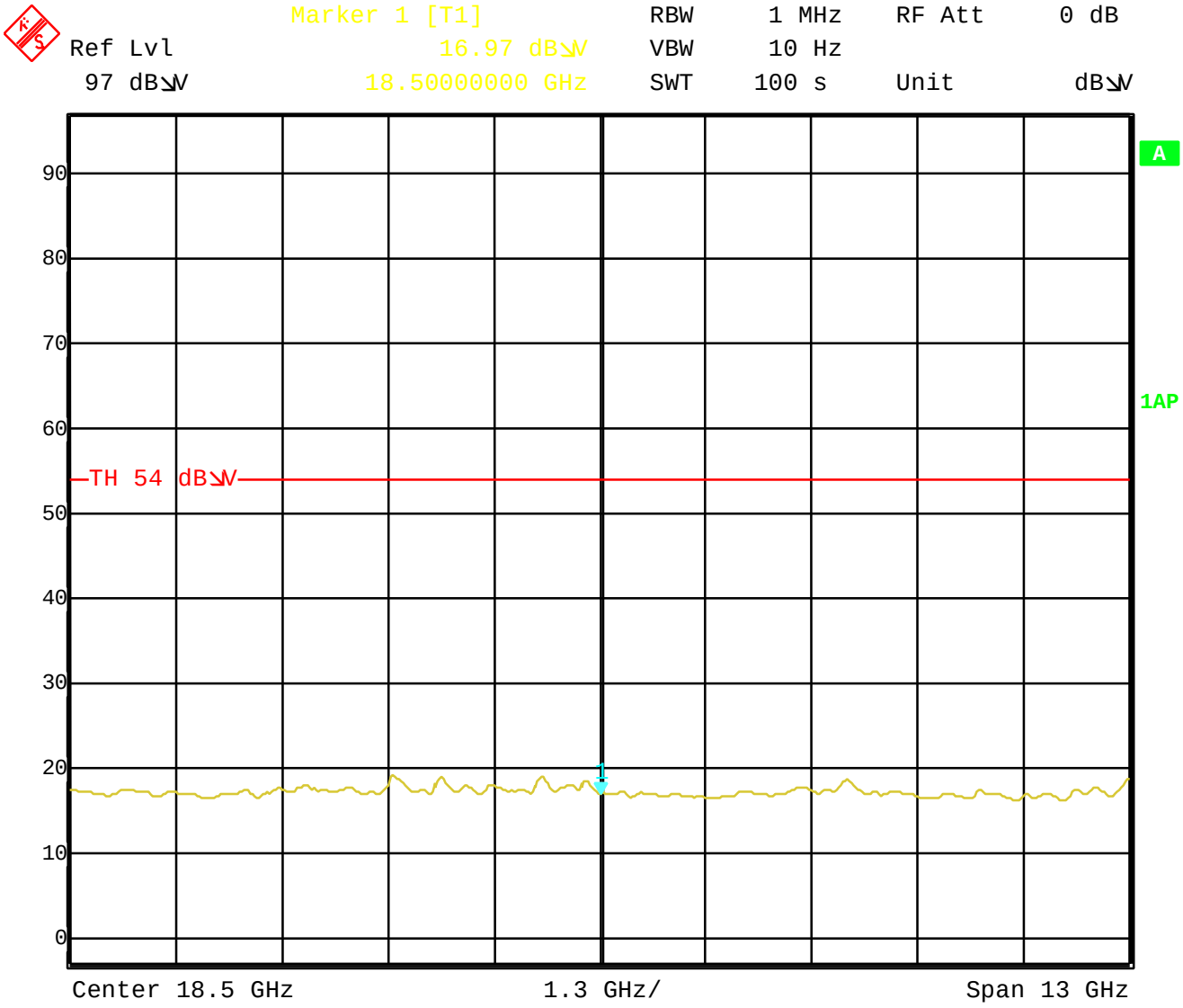
LIMITS **SUBCLAUSE § 15.247 (c)**

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

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

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

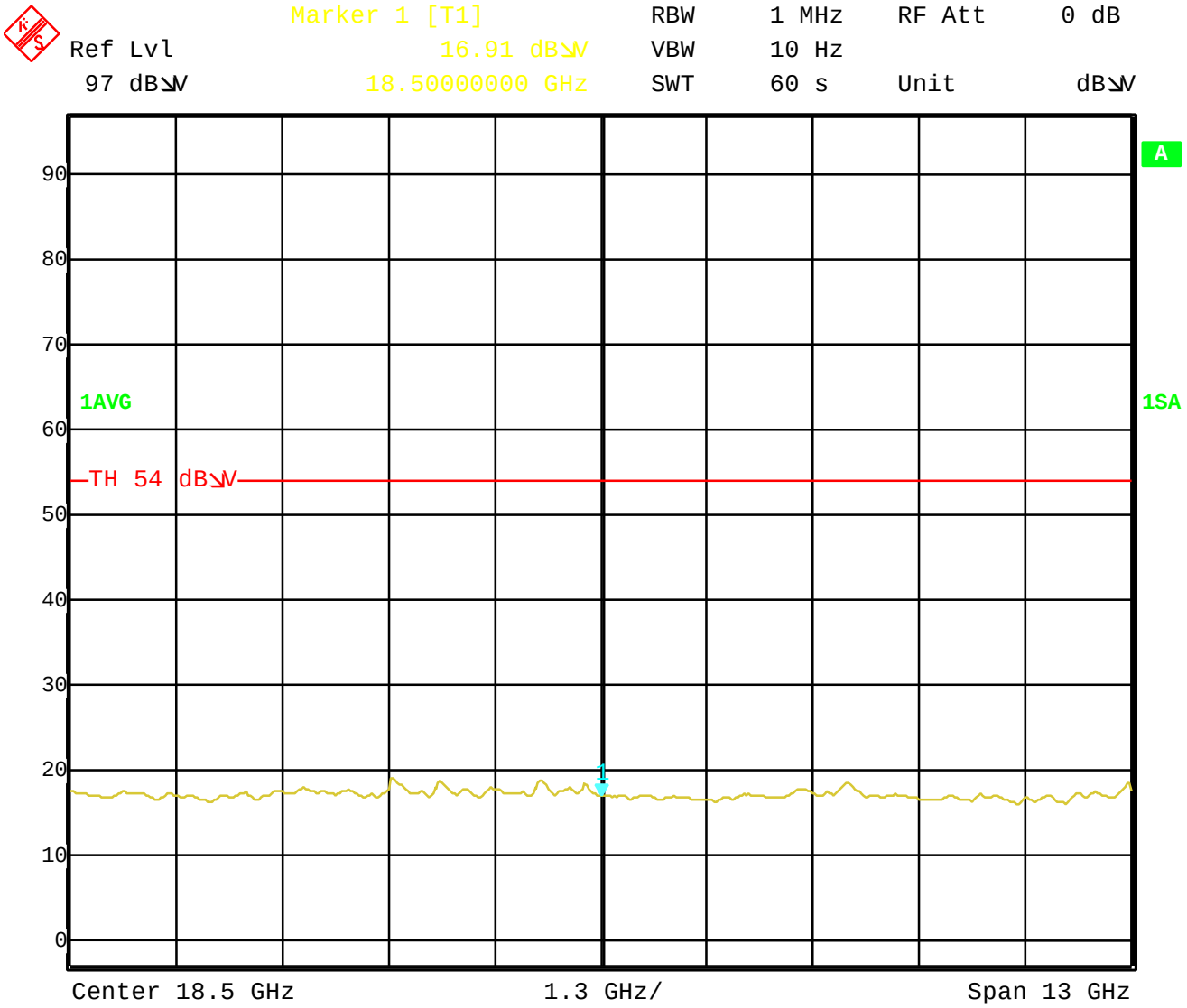


Peak

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

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



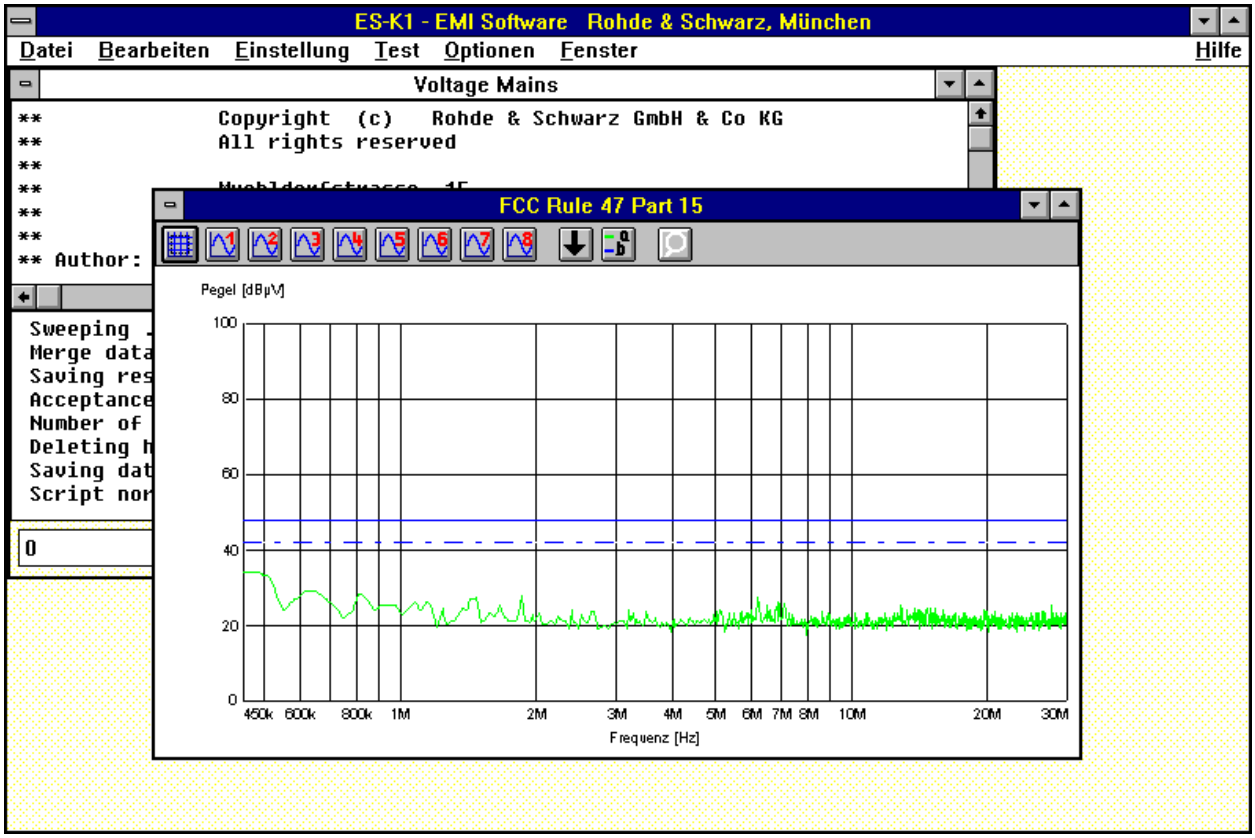
Average

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

CONDUCTED EMISSIONS **FCC Rule 47 Part 15**

tested with charger



Technical specification : 15.207 (Revised as of October 1, 1991)
Limit

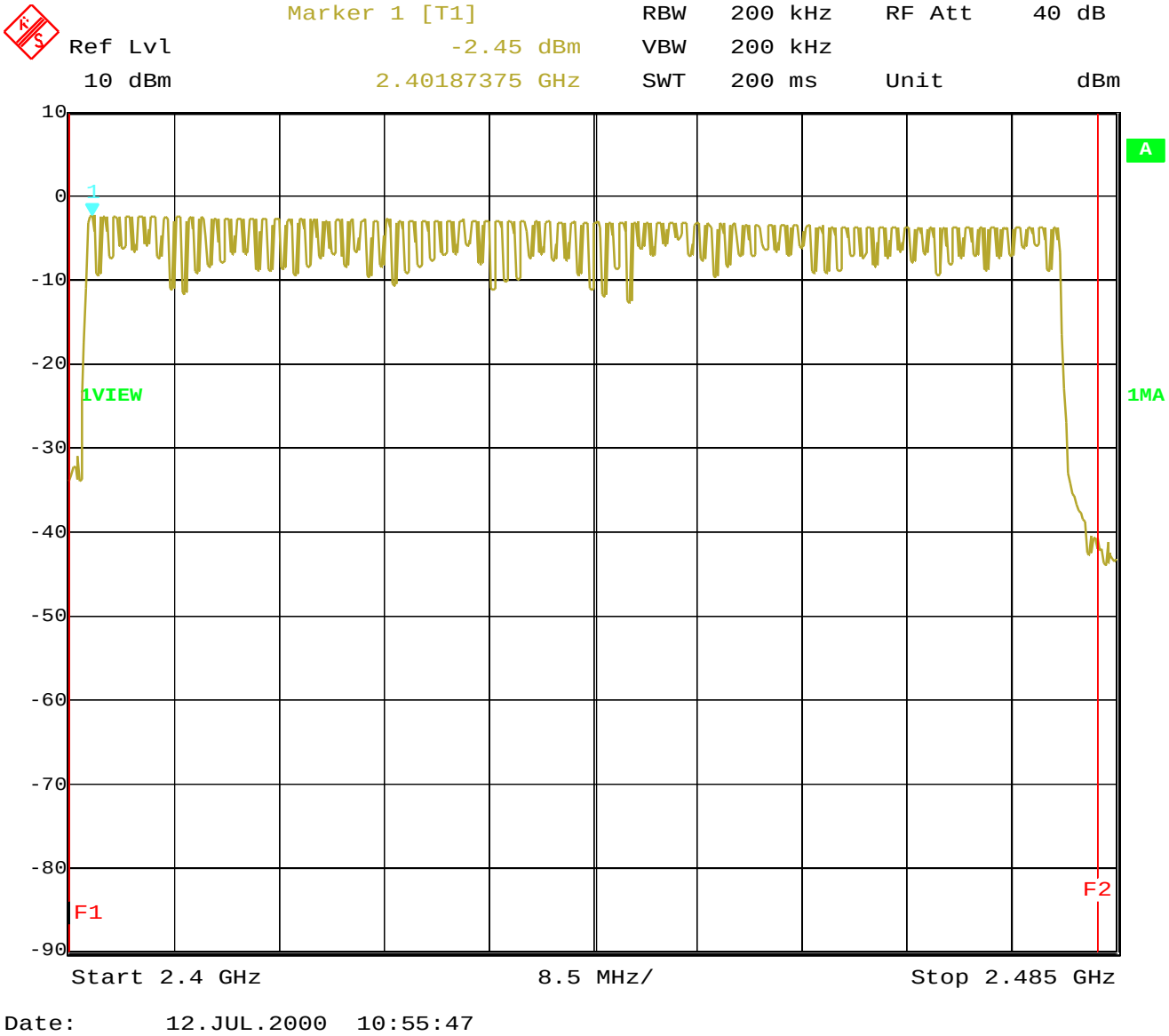
0.45 to 30 MHz	250 µV / 47.96 dBµV

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
52 - 63

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

MODULATION-SPECTRUM

Hoping mode

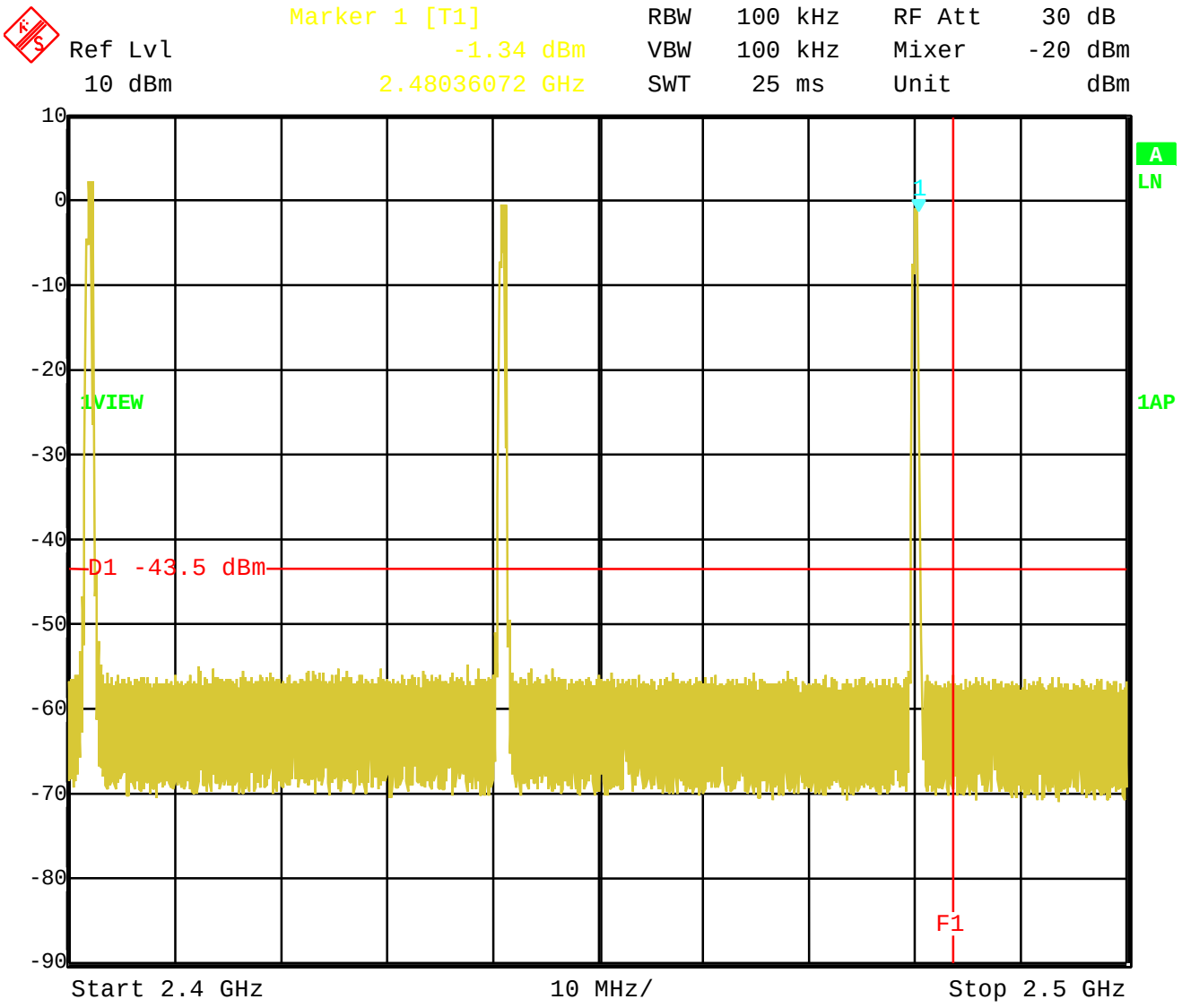


Date: 12.JUL.2000 10:55:47

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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

BAND-EDGE COMPLIANCE / RESTRICTED BAND



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

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

RECEIVER SPURIOUS RADIATION § 15.209

Radiated

SPURIOUS EMISSIONS LEVEL (µV/m)								
2402 MHz			2440 MHz			2480 MHz		
f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
all peaks <<limit								
Measurement uncertainty			±3 dB					

all measurements were done up to 25 GHz

Measurement distance see table

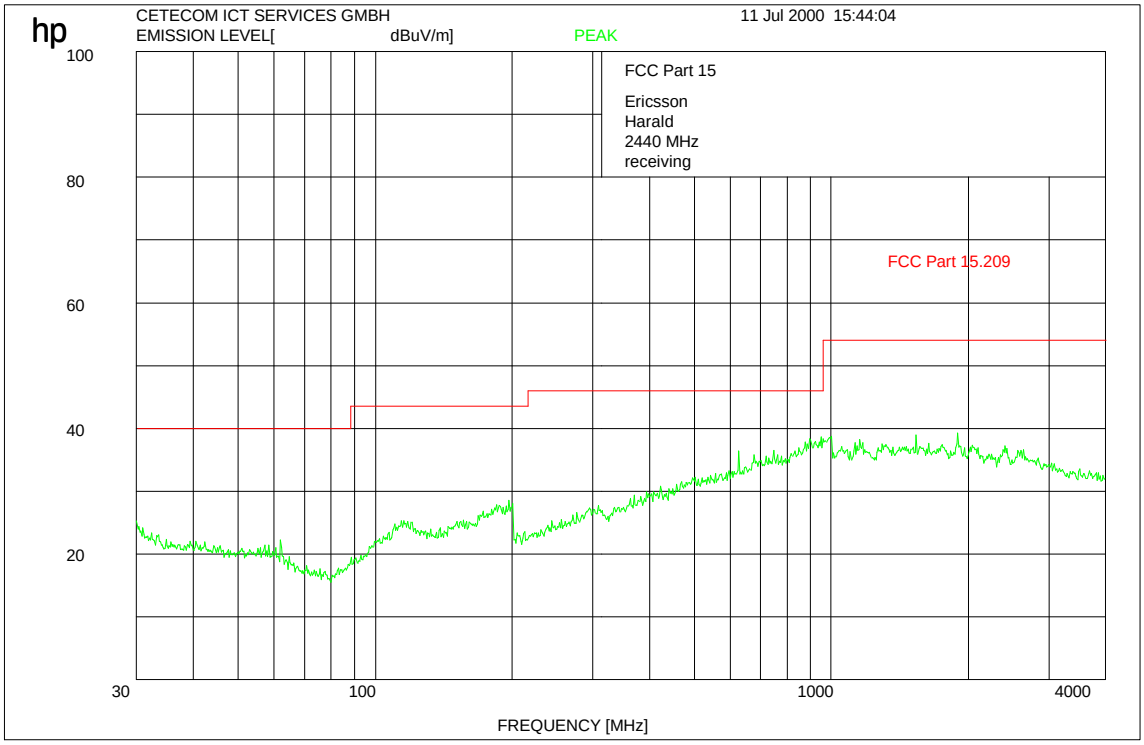
Limits SUBCLAUSE § 15.209

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)
17 - 24

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

RECEIVER SPURIOUS RADIATION § 15.209



Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

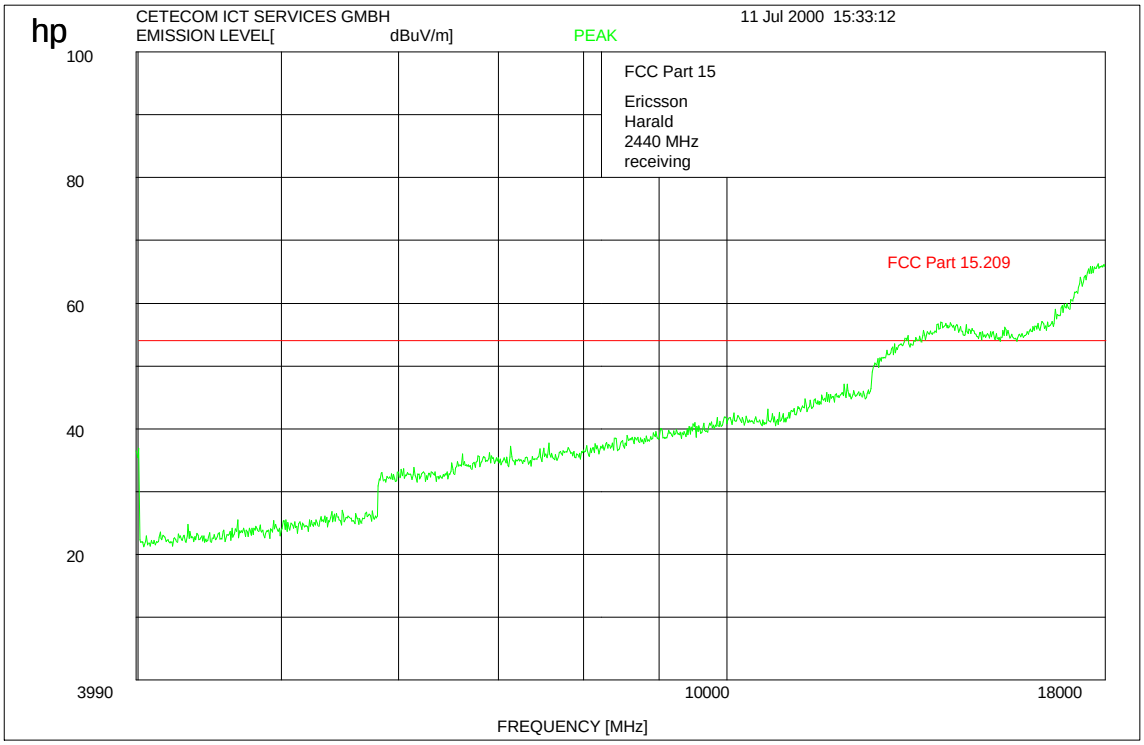
Limits SUBCLAUSE § 15.209

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)
17 - 24

Equipment under test : 8505001
Ambient temperature : 23 °C
Relative humidity : 50%

RECEIVER SPURIOUS RADIATION § 15.209



all measurements were done up to 25 GHz

Settings: **< 1 GHz : Quasi Peak (RBW:120 kHz, VBW: 1MHz)**
> 1 GHz : Peak and Average (RBW: 1MHz / VBW: 10 Hz)

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)
17 - 24

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
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