

CETECOM ICT Services GmbH

Radio Satellite Communication

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RSC14

issue test report consist of 60 Pages

Page 1 (60)



TTI-P-G166/98

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 2_2690-C/01
FCC Part 2, 15, 90
U952T

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

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1 General information

1.1 Notes

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

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Telephone : + 49 681 598 - 9100

Telefax : + 49 681 598 - 9075

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

Internet : www.cetecom.de

Accredited testing laboratory

DAR-registration number : TTI-P-G 166/98-20

Accredited Bluetooth™ Test Facility (BQTF)

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

1.3 Details of applicant

Name : Ascom Tateco AB
Street : Grimobodalen 2 , P.O.Box 8783
City : SE-40276 Göteborg
Country : Sweden
Telephone : +46 31 55 93 00
Telefax : +46 31 55 20 31
Contact : Mr. Arne Adrian
Telephone : +46 31 55 93 00

1.4 Application details

Date of receipt of application : 16.10.2001
Date of receipt of test item : 16.10.2001
Date of test : 16.-17.10.2001

1.5 Test item

Type of equipment : Personal paging system
Type designation : U952T (base station)
Manufacturer : applicant
Street :
City :
Country :
Serial number : 1352680006 / 1352680009 / 1352680001

Additional informations: :

Frequency : 425 - 475 MHz
Type of modulation : 10K0F1D/F3E and 20K0F1D/F3E
Number of channels : 1
Antenna : TNC-socket
Power supply : 12.5V DC
RF output power : 2.0 W
Type of equipment : Temperature range : -30°C - +60°C

1.6 Test standards: FCC Part 2, 15, 90

2 Technical test

2.1 Summary of test results

The radiated measurements were performed with vertical and horizontal polarized measuring antennas in a FCC approved semi-anechoic chamber with antenna lift system and a turntable to find the maximum radiation on all three planes.

For this measurements the output connector was adapted to a 50 Ohm artificial load.

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 :

29.10.01 RSC 8411 Berg M.

Date	Section	Name	Signature
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Technical responsibility for area of testing :

29.10.01 RSC8414 Ames H.

Date	Section	Name	Signature
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2.2 Testreport

TEST REPORT

Testreport no. : 2_2690-C/0

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

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Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

Remarks:

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

The detector function and selection of bandwidth are according ANSI C63.2-1996 item 8.2.1 and ANSI C63.4-1992 Item 4.2. Antennas are conform with ANSI C63.2-1996 item 15.
150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, 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 measurements for occupied bandwidth were made with the mask for narrow band 10/12,5 kHz BW.

The TX fullfills this requirements with small and wide bandwidth. The deviation is low enough.

The reference level is related to the maximum power of the sample, here 2 Watt.

All measurements were performed with the required RBW/VBW and SWEEPTIME to fullfill all requirements of FCC part 2, 15 and 90.

Equipment under test : U952T

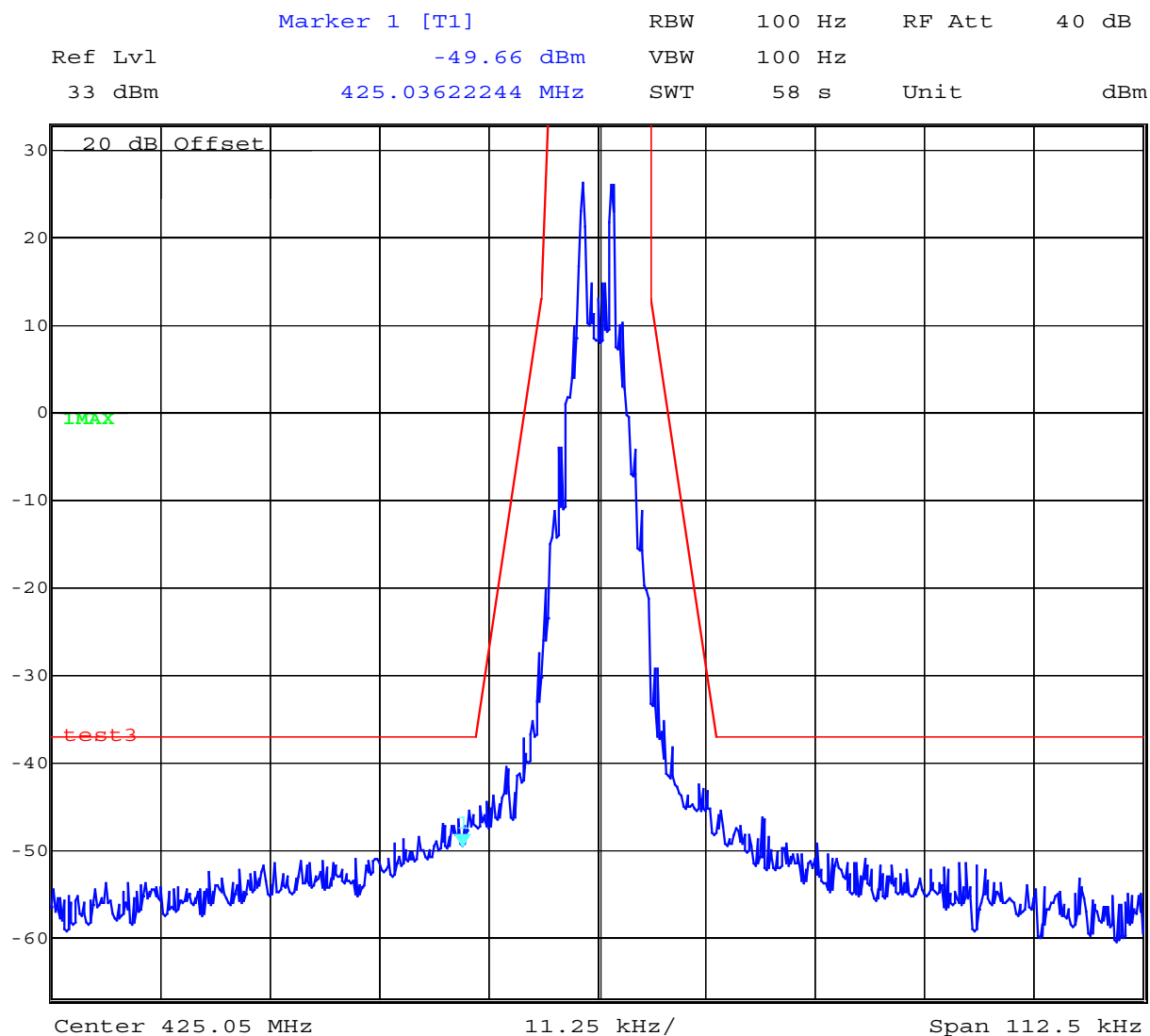
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

425.05 MHz (max. power), modulated with paging signal



Date: 17.OCT.2001 12:43:16

measured with normal Test modulation: paging signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

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

Equipment under test : U952T

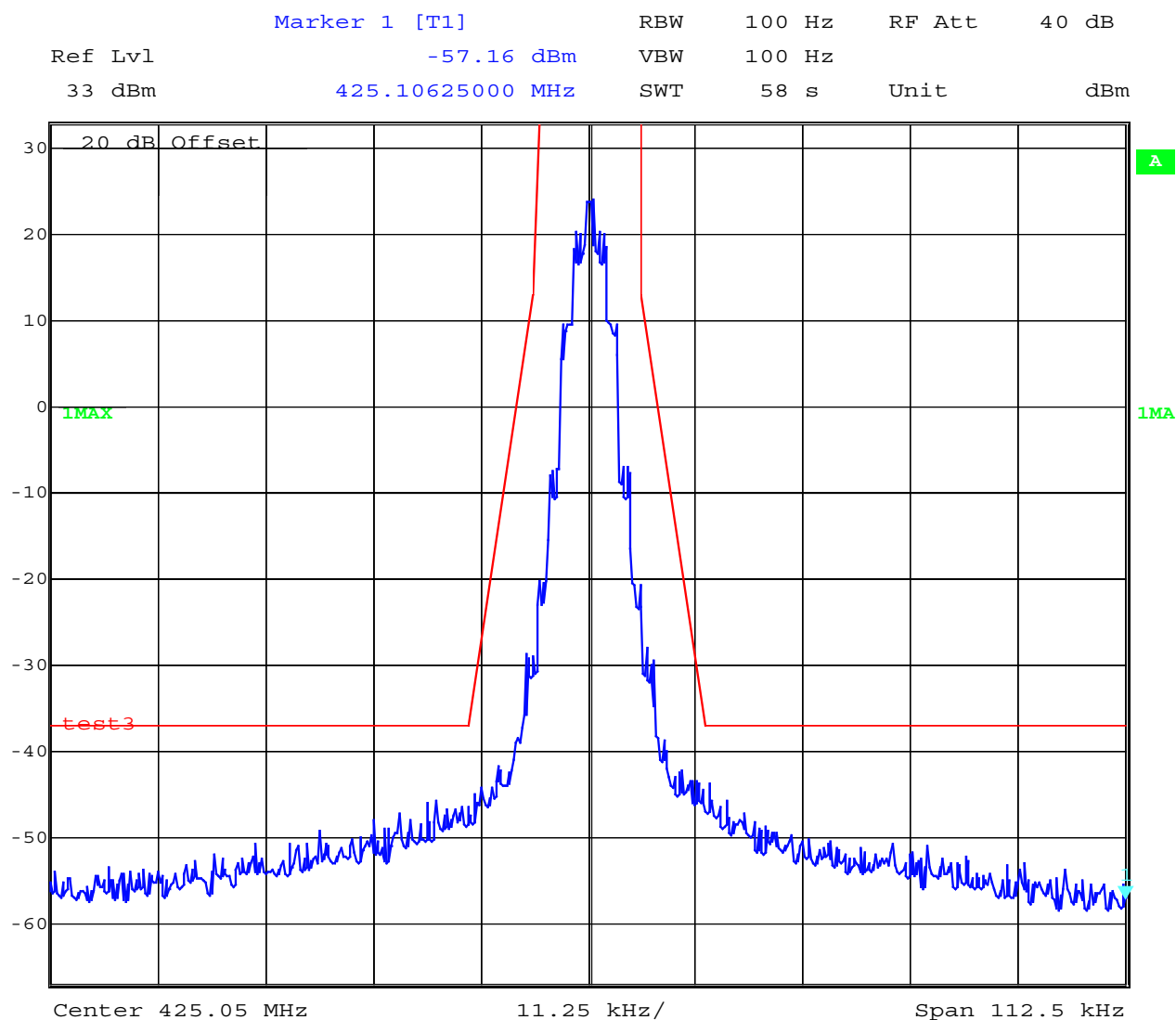
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

425.05 MHz (max. power), modulated with analog signal 12.5 kHz BW



Date: 17.OCT.2001 13:14:02

measured with normal Test modulation : audio signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

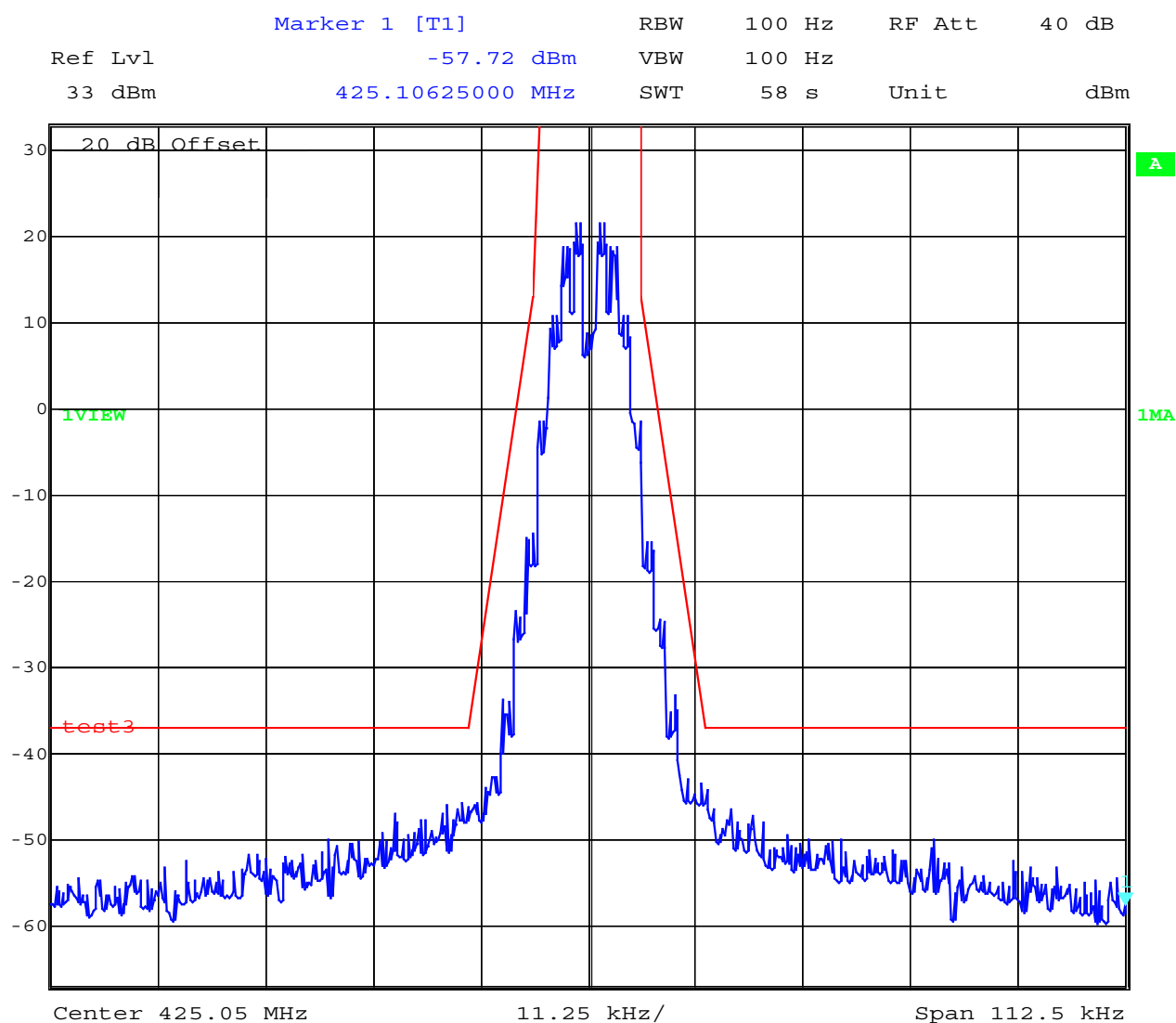
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

425.05 MHz (max. power), modulated with analog signal 25 kHz BW



Date: 17.OCT.2001 13:10:55

measured with normal Test modulation : audio signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

Ambient temperature : 23°C

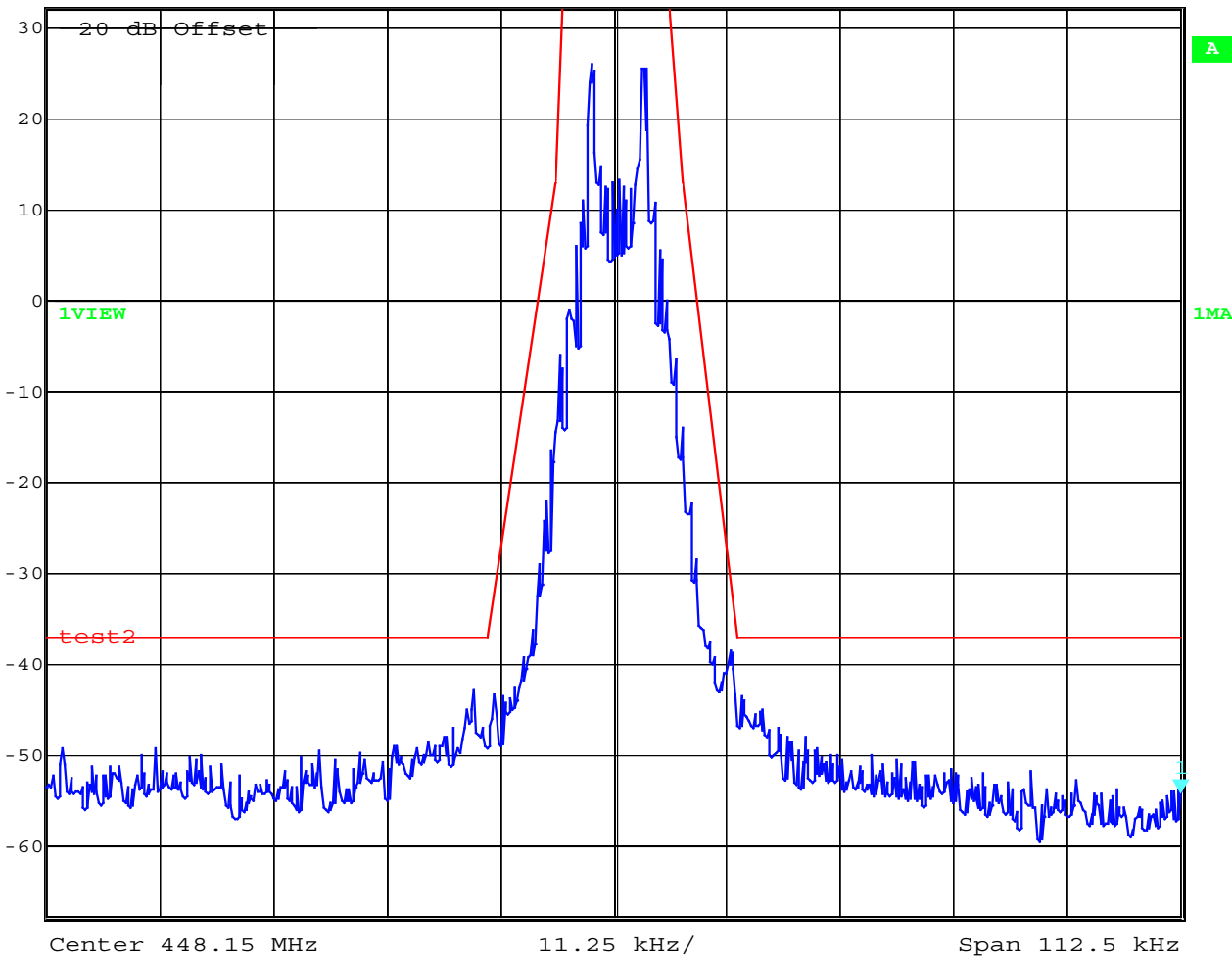
Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

448.15 MHz (max. power), modulated with paging signal

Marker 1 [T1]	RBW	100 Hz	RF Att	40 dB
Ref Lvl	-54.11 dBm	VBW	100 Hz	
32.3 dBm	448.20625000 MHz	SWT	58 s	Unit dBm



Date: 17.OCT.2001 11:47:09

measured with normal test modulation : paging signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

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

Equipment under test : U952T

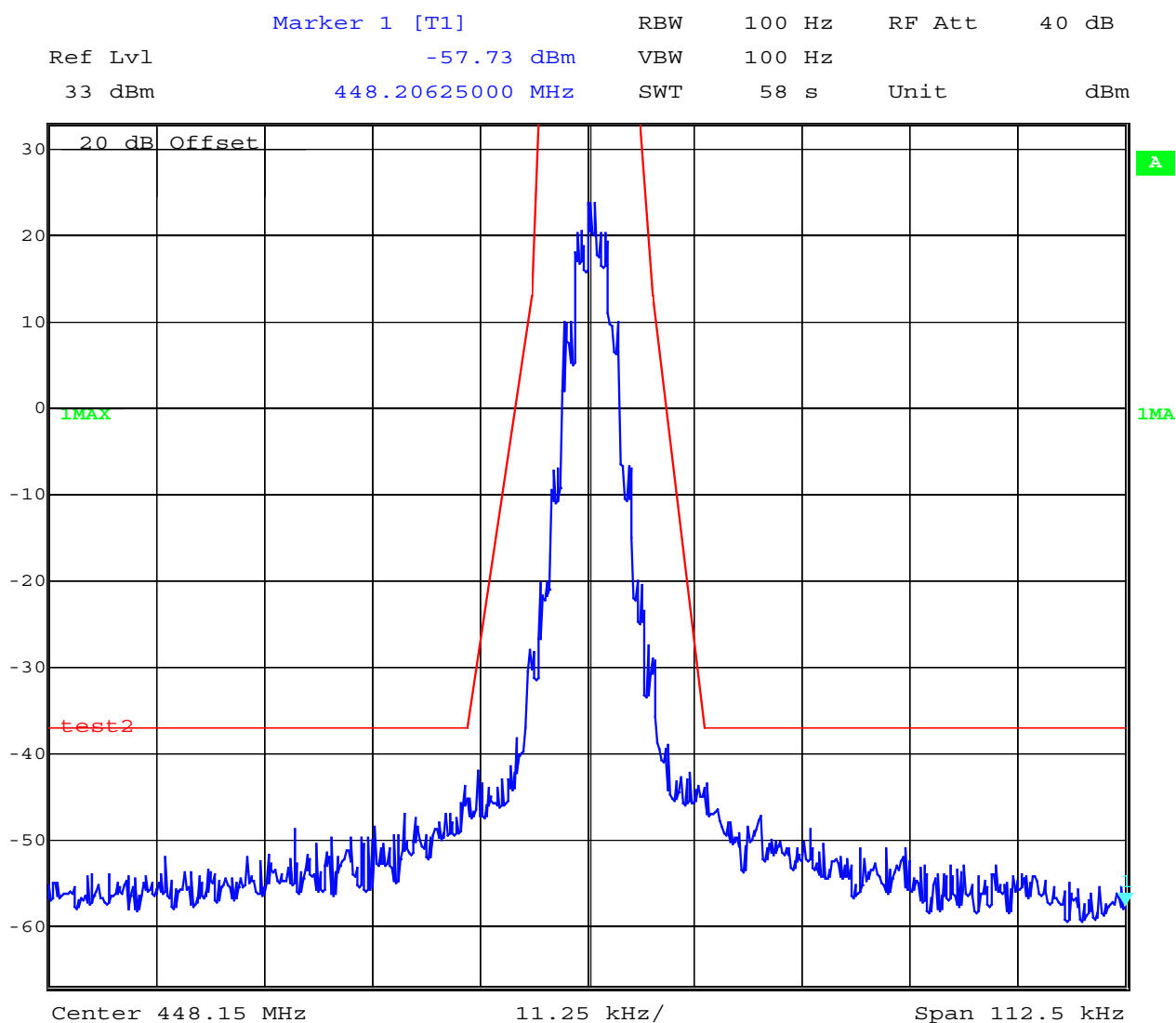
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

448.15 MHz (max. power), modulated with analog signal 12.5 kHz BW



Date: 17.OCT.2001 13:08:04

measured with normal test modulation : audio signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

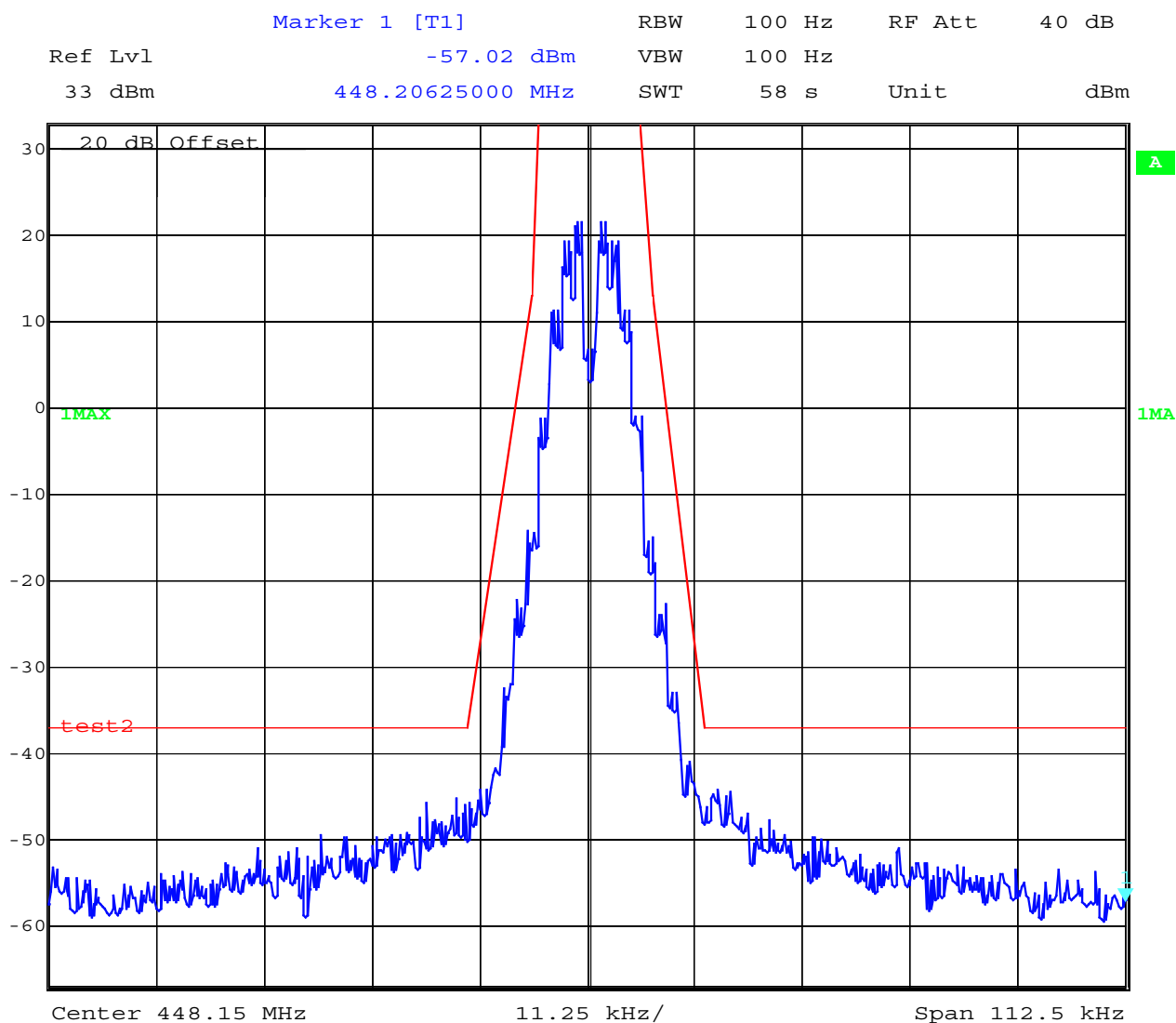
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

448.15 MHz (max. power), modulated with analog signal 25 kHz BW



Date: 17.OCT.2001 13:05:41

measured with normal Test modulation : audio signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

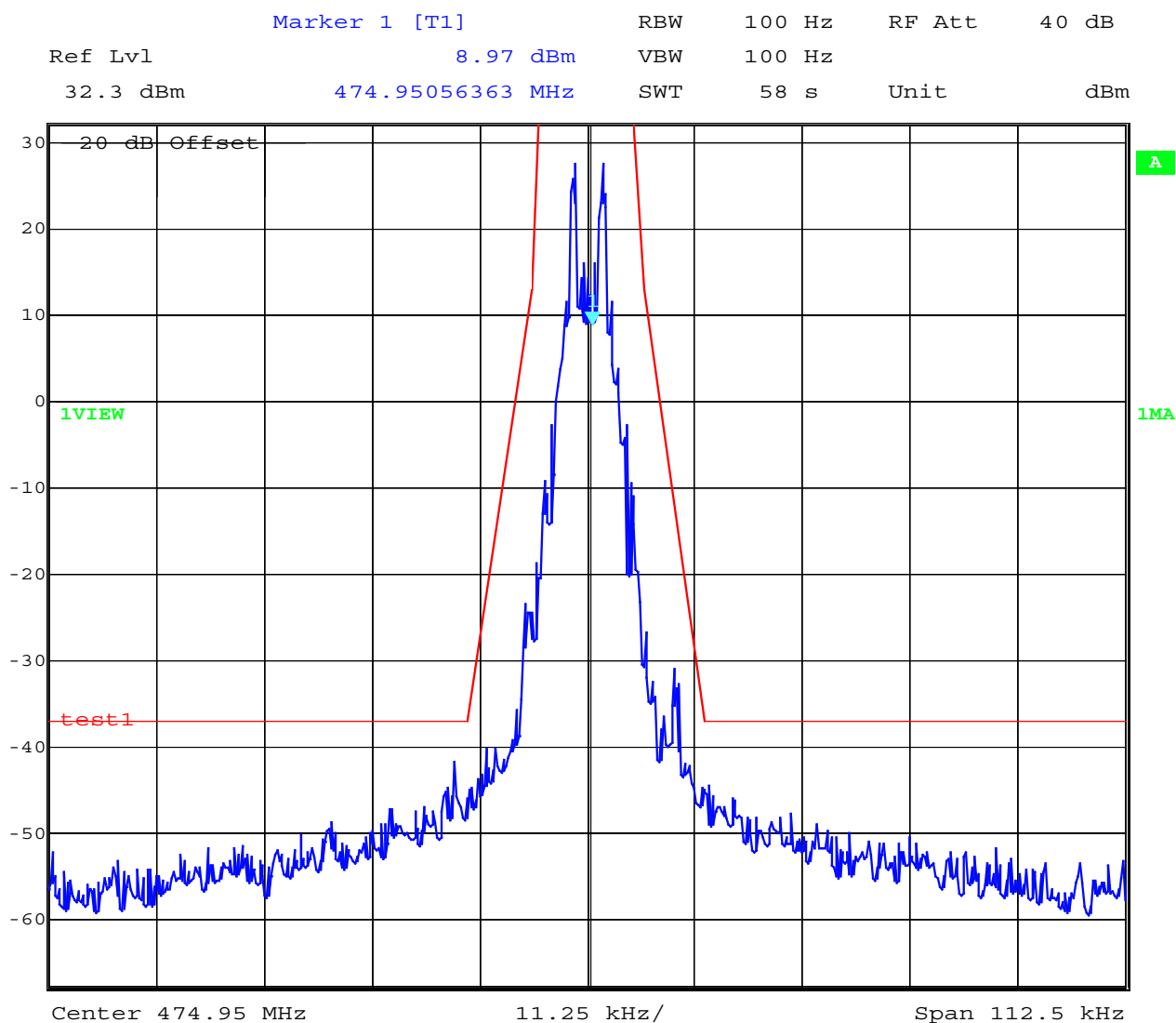
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

474.95 MHz (max. power), modulated with paging signal



Date: 17.OCT.2001 11:33:54

measured with normal test modulation : paging signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

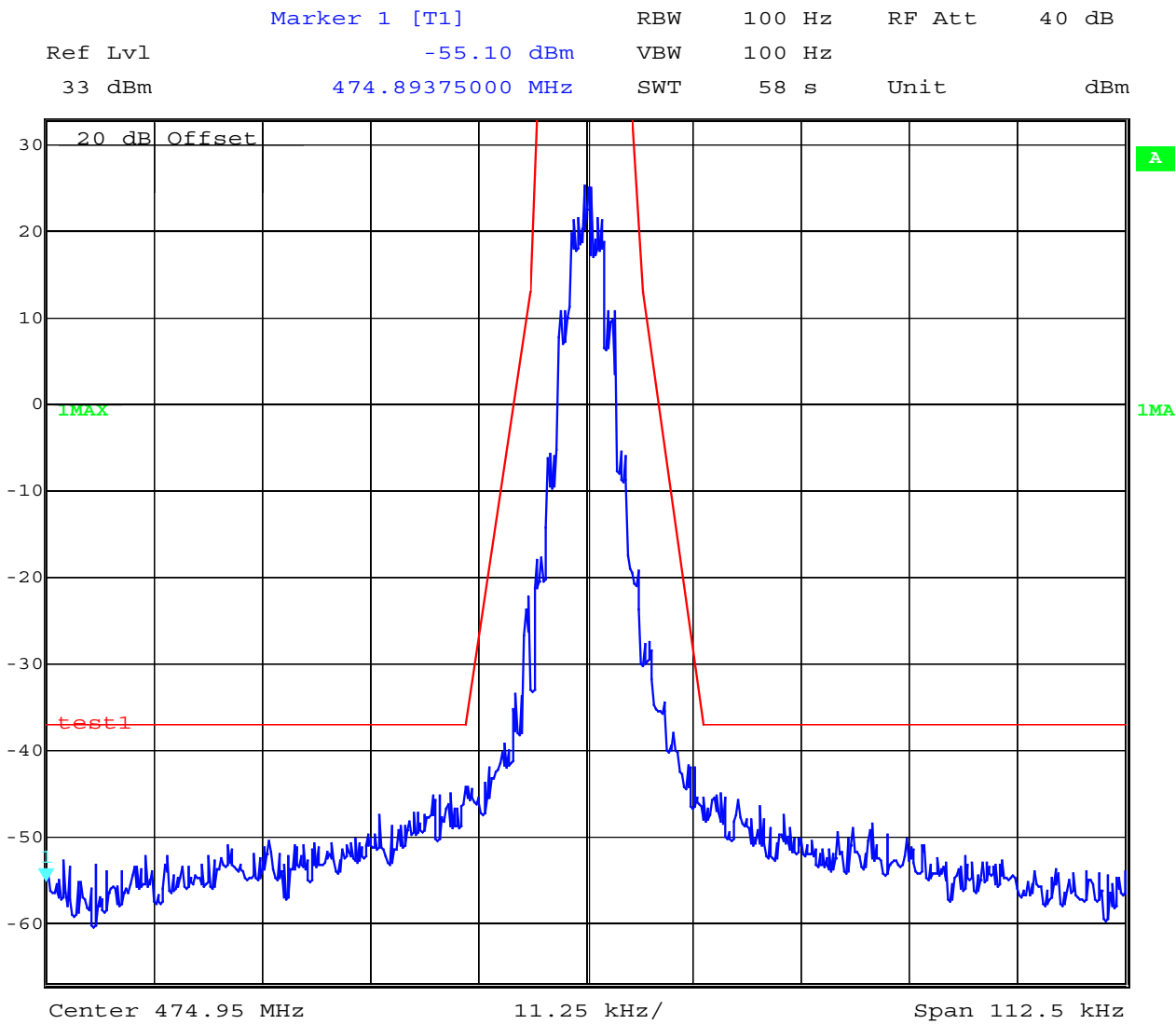
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

474.95 MHz (max. power), modulated with analog signal 12.5 kHz BW



Date: 17.OCT.2001 12:58:48

measured with normal Test modulation : audio signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

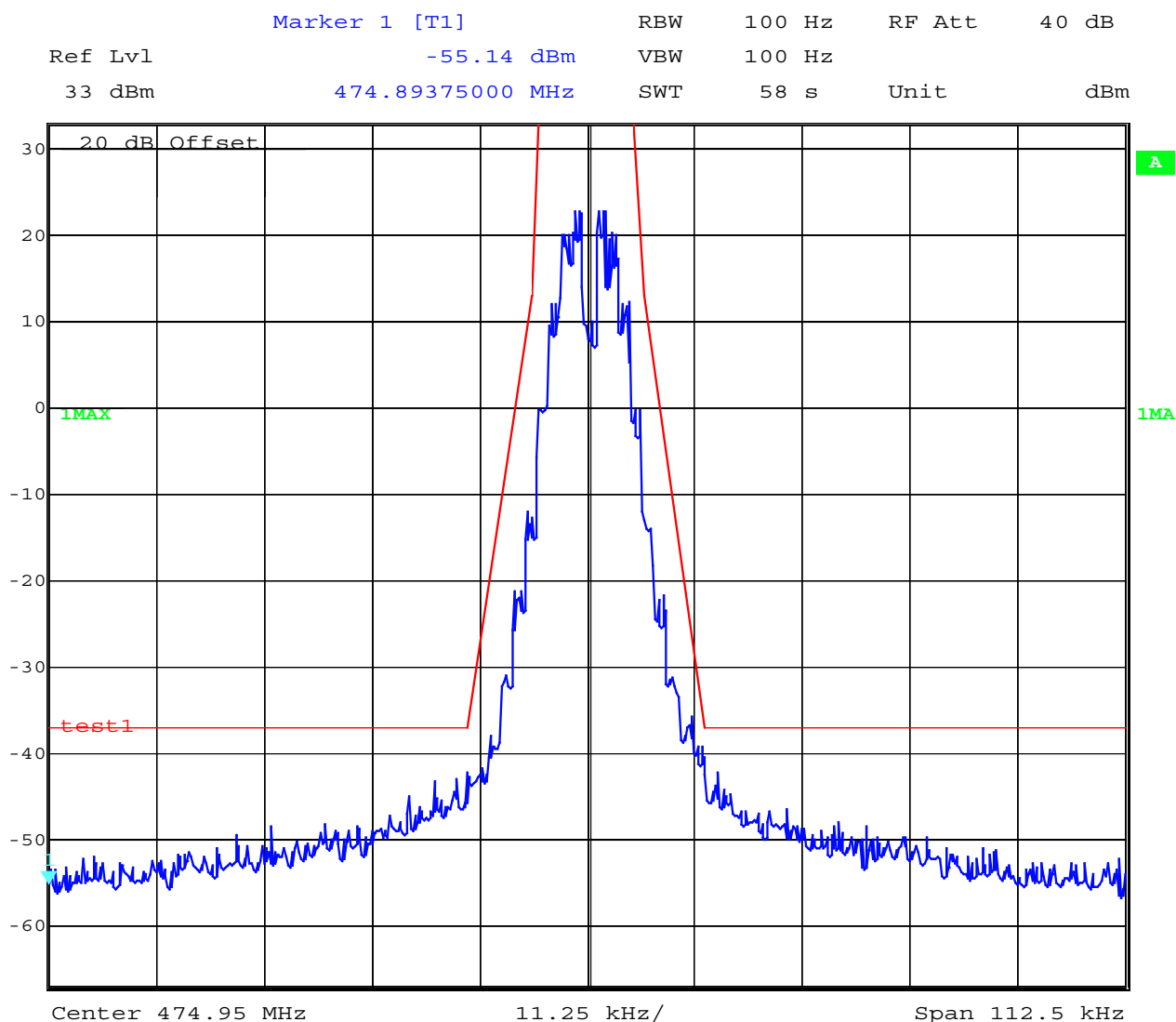
Ambient temperature : 23°C

Relative humidity : 44%

OCCUPIED BANDWIDTH

2.989 / 90.209 / 90.210 / 90.211

474.95 MHz (max. power), modulated with analog signal 25 kHz BW



Date: 17.OCT.2001 13:03:23

measured with normal Test modulation : audio signal

LIMITS

SUBCLAUSE § 90.210

Emission Mask D – 12.5 kHz channel bandwidth

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

MAXIMUM PEAK OUTPUT POWER

SUBCLAUSE § 2.1046 / 90.205

(conducted)

TEST CONDITIONS			MAXIMUM PEAK OUTPUT POWER (W)			
Frequency (MHz)			425.05	448.15	474.95	
T _{nom} (23)°C	V _{nom} (12.5)V	Max	1.967	1.954	1.981	
Maximum deviation from output power under extreme test conditions (dBc)			Not applicable			
Measurement uncertainty			±3dB			

RBW / VBW : 100 kHz

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

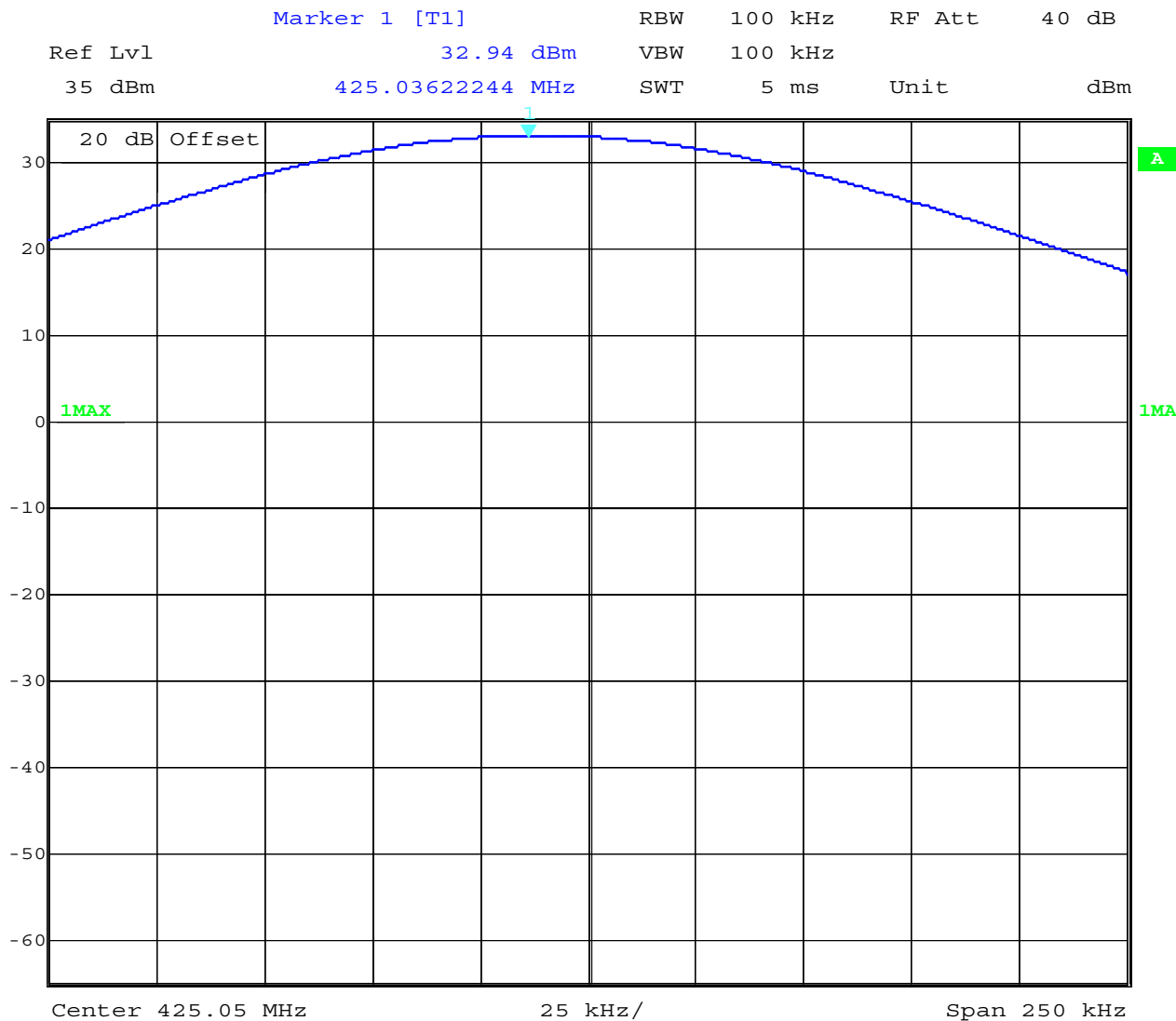
Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

Peak output power (conducted)

425.05 MHz (max. power)

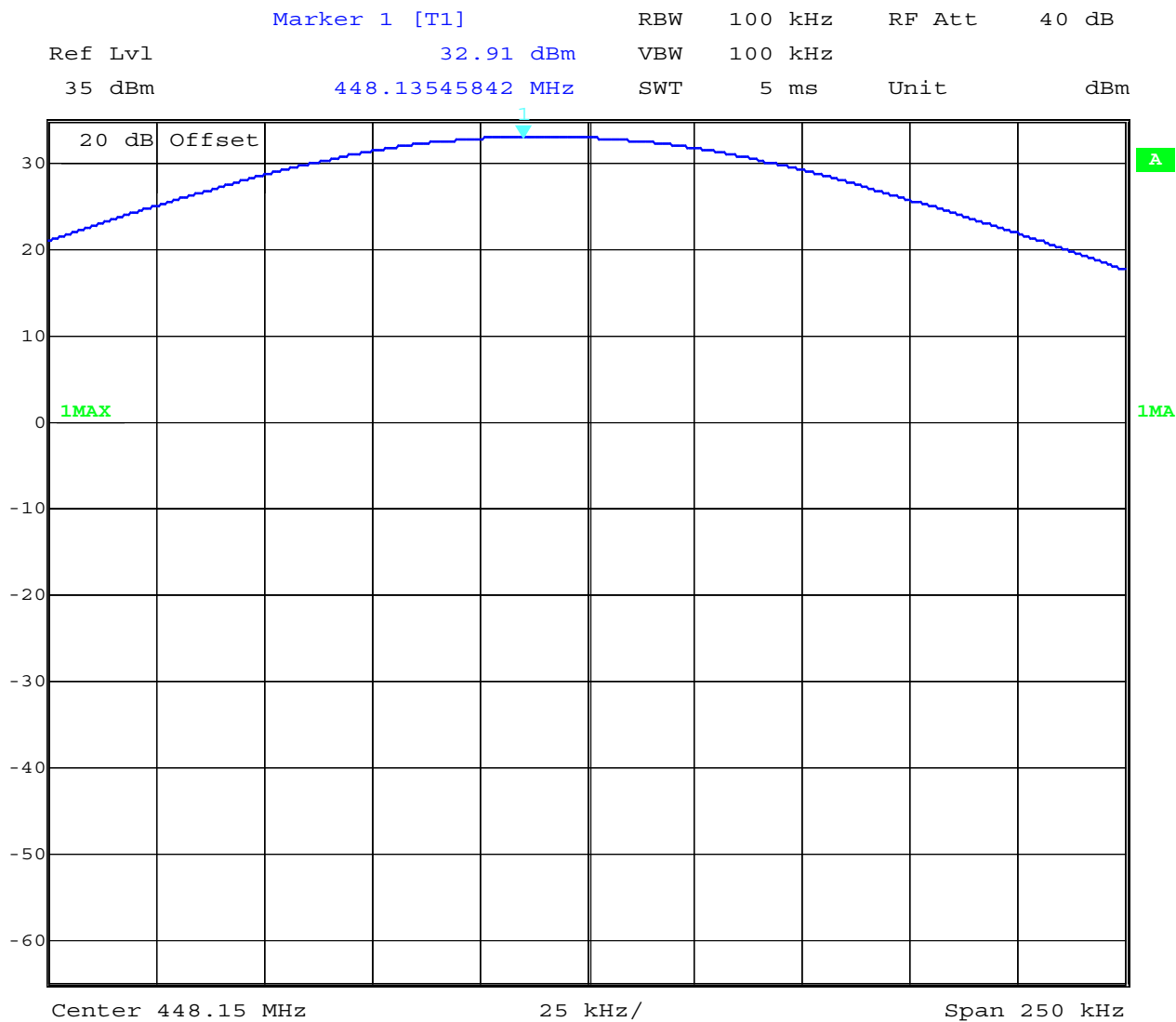


Date: 17.OCT.2001 12:36:04

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

Equipment under test : U952T
Ambient temperature : 23°C
Relative humidity : 44%

Peak output power (conducted)
448.15 MHz (max. power)



Date: 17.OCT.2001 11:50:07

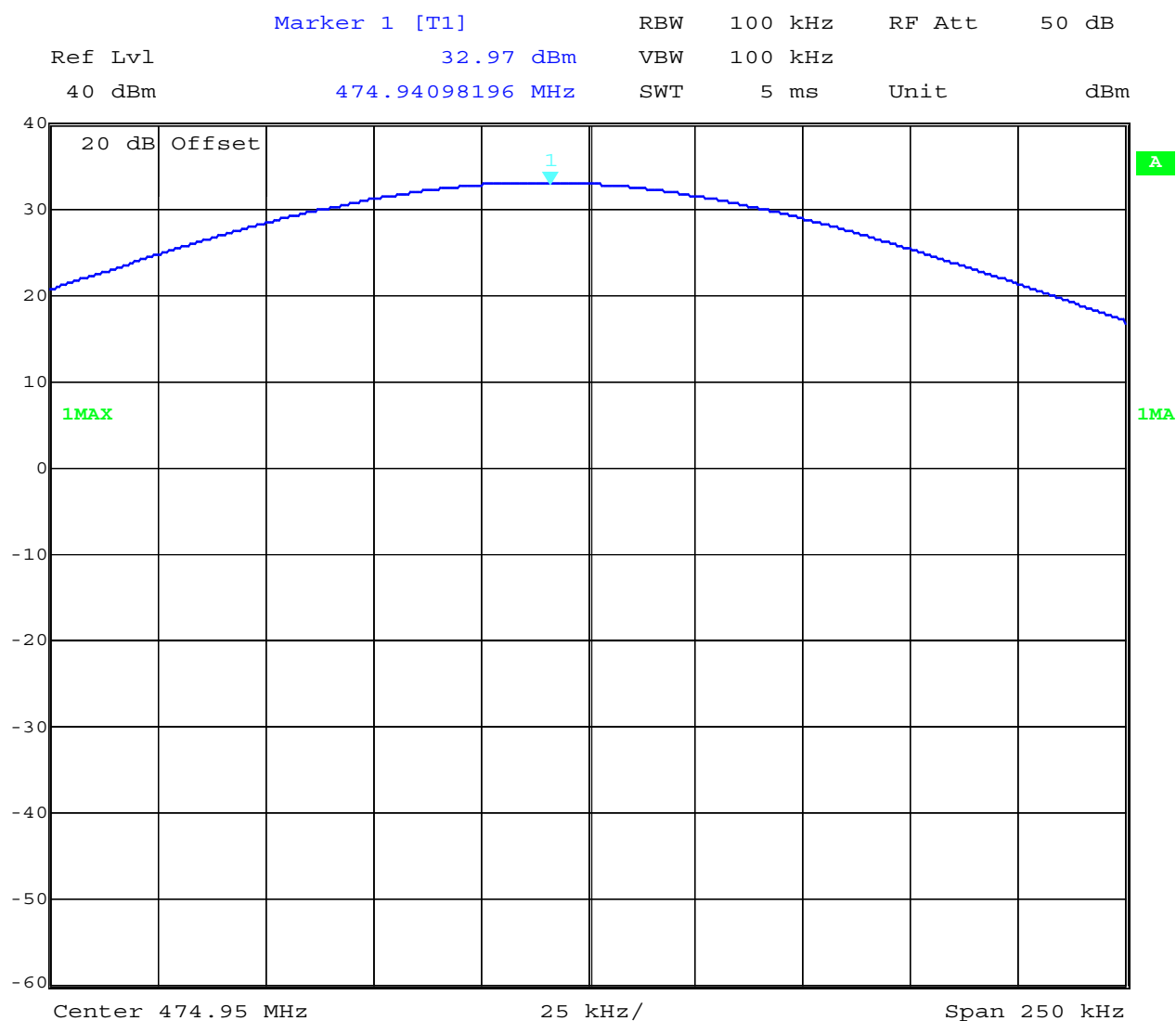
Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

Peak output power (conducted)

474.95 MHz (max. power)



Date: 17.OCT.2001 10:55:05

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

17 - 24

Equipment under test : U952T

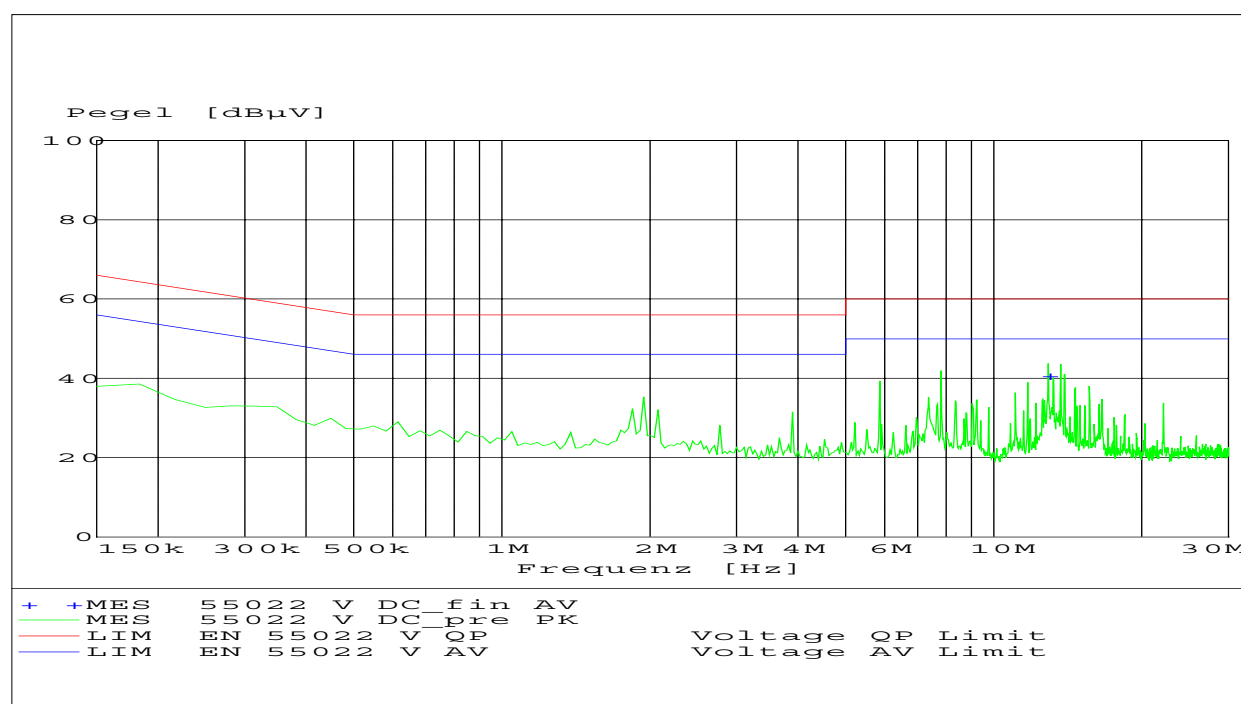
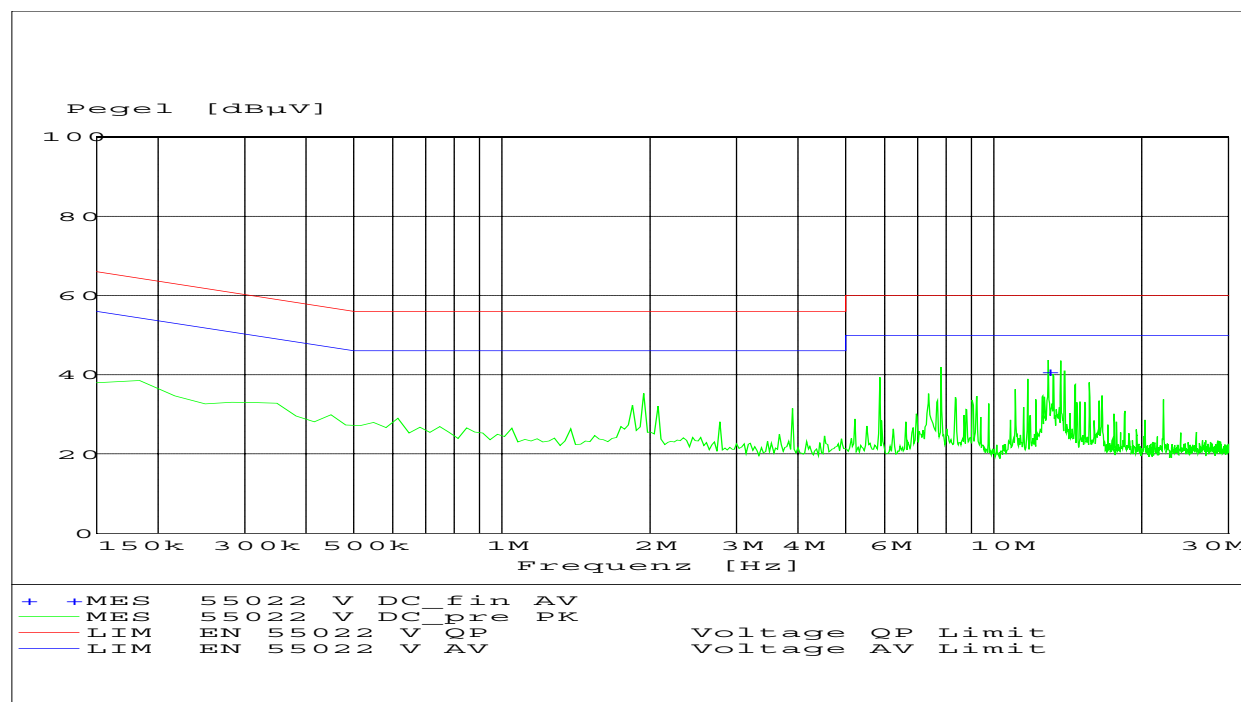
Ambient temperature : 23°C

Relative humidity : 44%

CONDUCTED SPURIOUS EMISSIONS

§15.207

Limit is 48 dBμV QP between 450 kHz and 30 MHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

CONDUCTED SPURIOUS EMISSIONS

§ 2.991 / 15.231

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBm)	limit max. allowed emmission power	actual attenuation below frequency of operation (dB)	results
All spurious are more than 65 dB below carrier					
Measurement uncertainty		± 3dB			

RBW : 100 kHz VBW: 1 MHz

LIMITS

SUBCLAUSE § 2.991

Conducted spurious emissions shall be attenuated below the maximum level of emission of the carrier frequency in accordance with the following formula:

For 12.5 kHz channel bandwidth :

$$\text{Spurious attenuation in dB} = 50 + 10 \log_{10} (\text{Power output in watt})$$

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

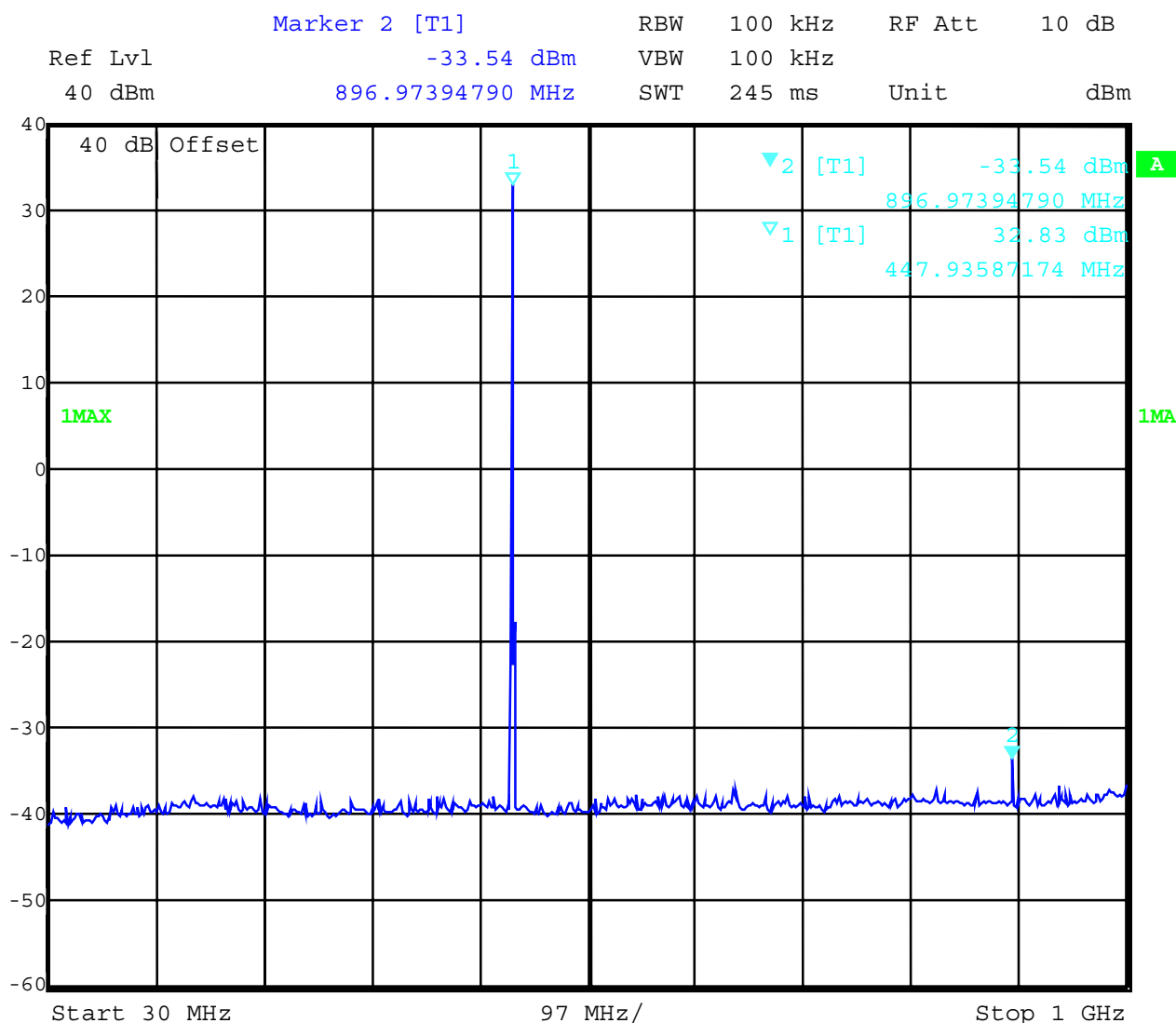
Ambient temperature : 23°C

Relative humidity : 44%

CONDUCTED SPURIOUS EMISSIONS § 2.991

Plots show the mid channel. All three channels show the same behavior.

30 MHz to 1 GHz



Date: 17.OCT.2001 07:34:36

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

Test report nr.: 2_2690-C/0

Issue Date: 26.10.01

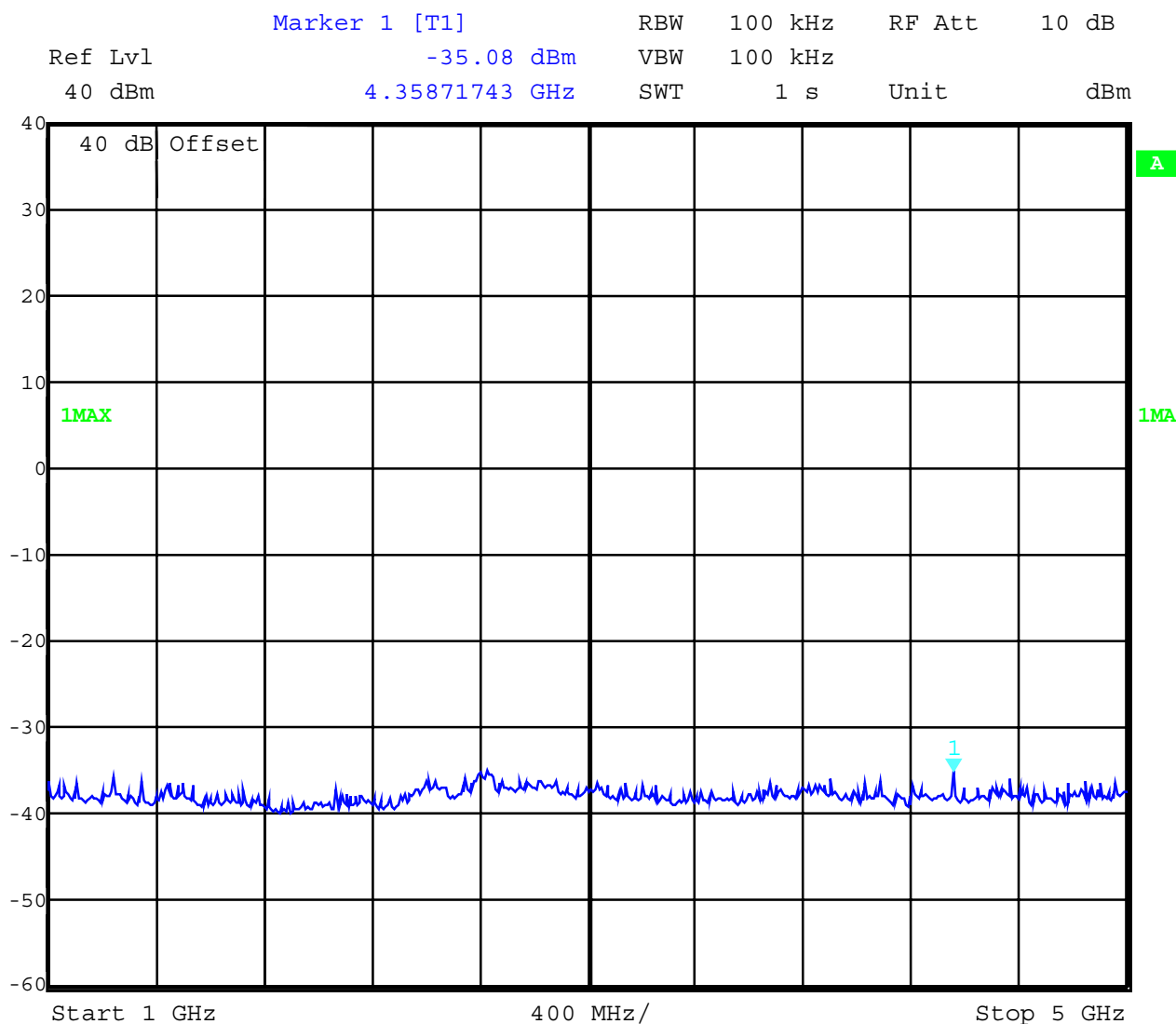
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Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

1 GHz to 5 GHz peak



Date: 17.OCT.2001 07:35:13

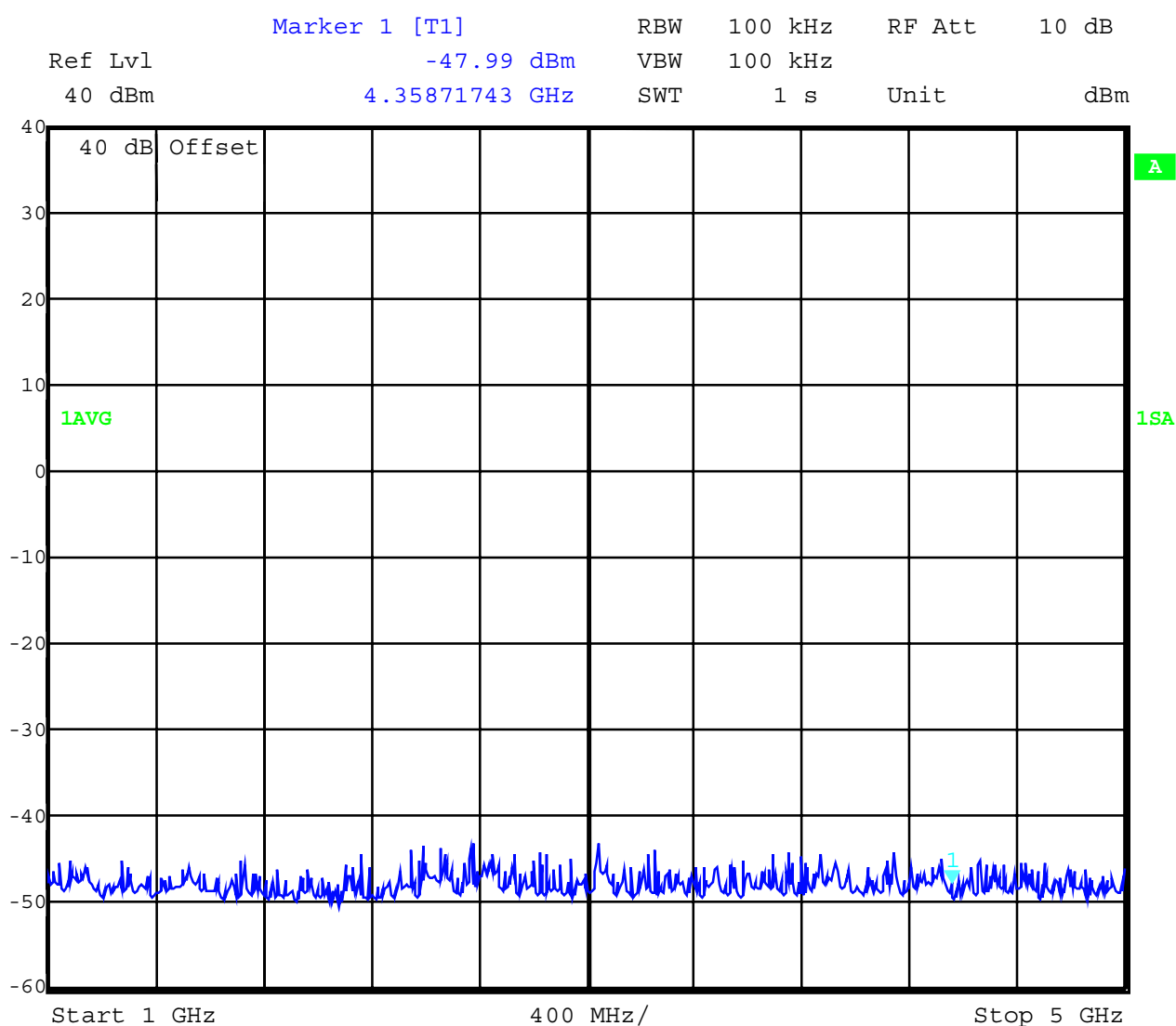
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
 (for reference numbers see test equipment listing)

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

1 GHz to 5 GHz average



Date: 17.OCT.2001 07:35:33

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSION

§2.993 / 15.205 / 15.209

Low channel 425.05 MHz

EMISSION LIMITATIONS					
f (MHz)	polarization	amplitude of emission (dBμV/m) QUASIPeAK	amplitude of emission (dBμV/m) average	limit max. allowed emmission power (dBμV/m)	results
425.05 MHz					
53.67	V	QP	33.6	40.0	Complies
55.54	V	QP	32.5	40.0	Complies
66.55	V	QP	32.0	40.0	Complies
110.64	V	QP	36.0	43.5	Complies
454.37	V	QP	23.7	46.0	Complies
671.79	V	QP	27.8	46.0	Complies
849.43	V	QP	42.4	46.0	Complies
1274.4	V	AV	40.7	54.0	Complies
1700.5	V	AV	37.1	54.0	Complies
Measurement uncertainty			± 3dB		

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

Equipment under test : U952T

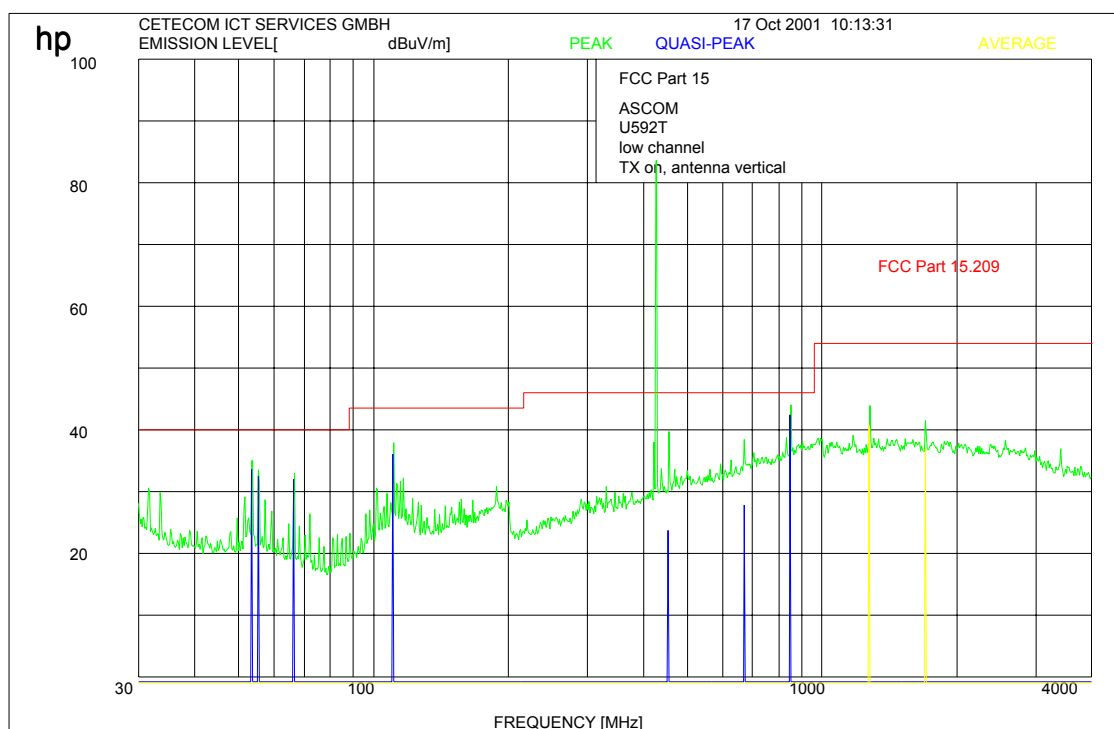
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, 2Watt in artificial load

425.05 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

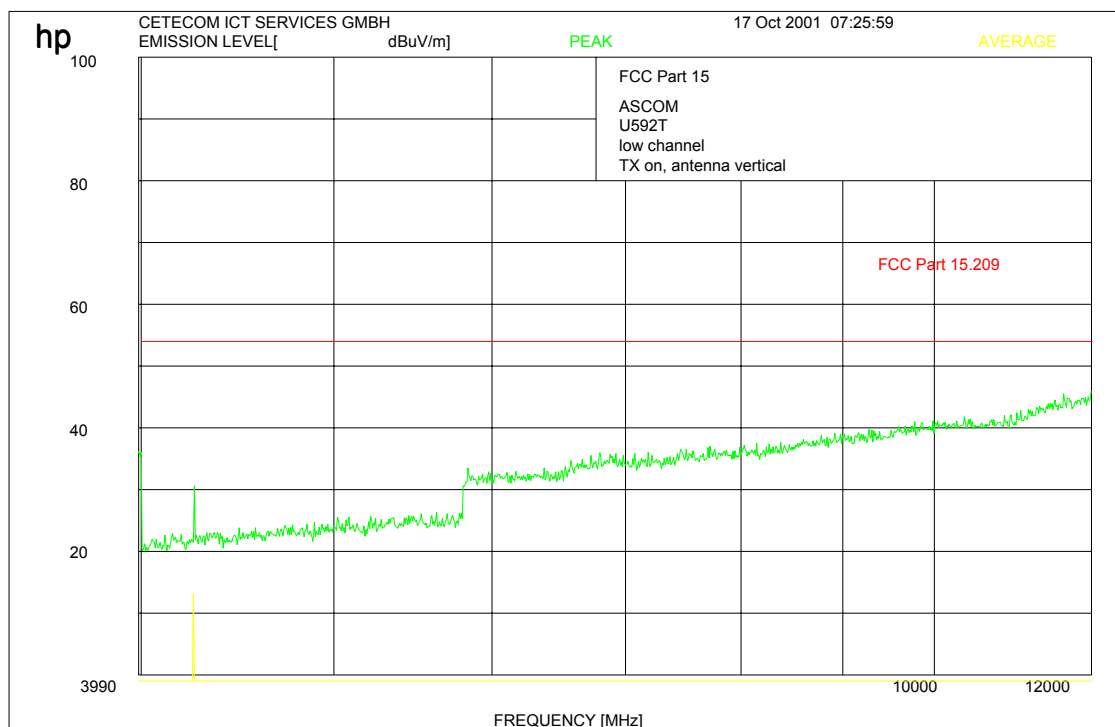
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, 2Watt in artificial load

425.05 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

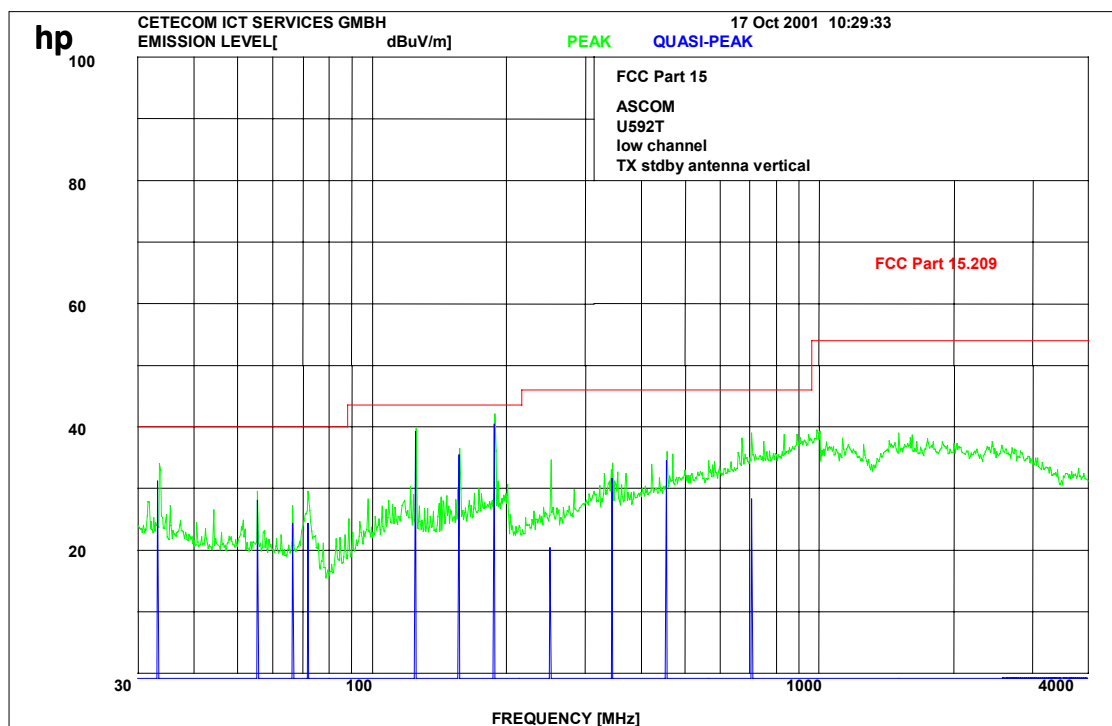
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, TX standby

425.05 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

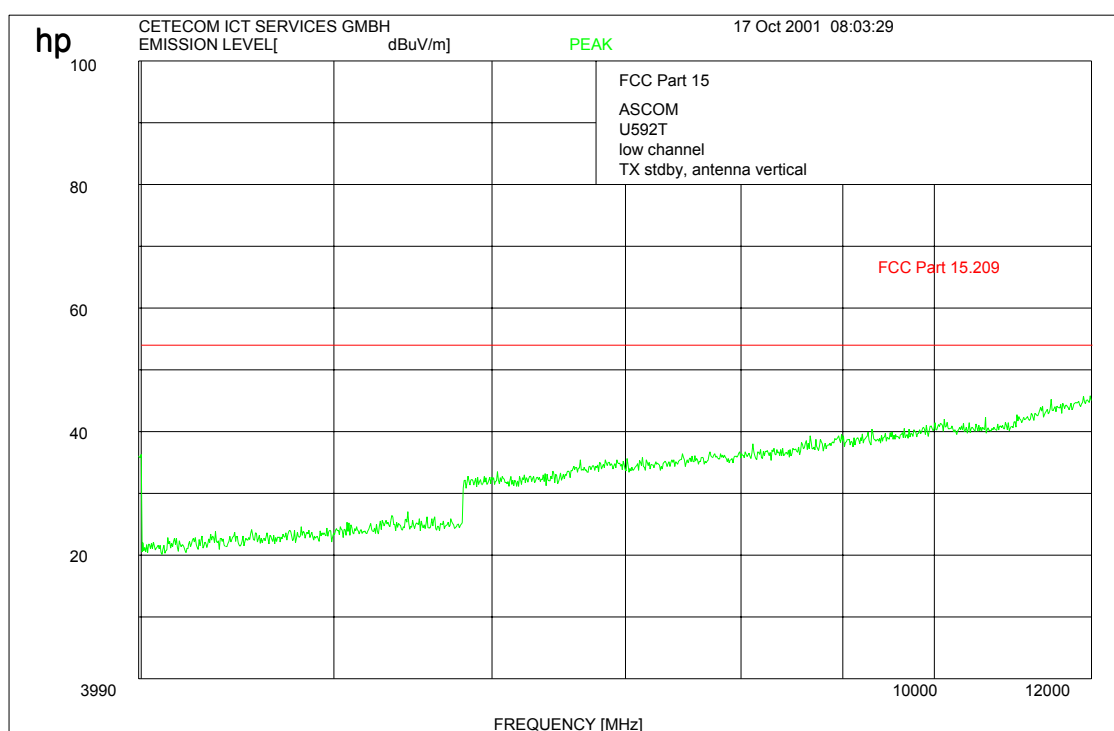
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, TX standby

425.05 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSION

§2.993 / 15.205 / 15.209

Mid channel 448.15 MHz

EMISSION LIMITATIONS					
f (MHz)	polarization	amplitude of emission (dBμV/m) QUASIPeAK	amplitude of emission (dBμV/m) average	limit max. allowed emmission power (dBμV/m)	results
448.15 MHz					
53.67	V	QP	33.6	40.0	Complies
55.54	V	QP	32.5	40.0	Complies
66.55	V	QP	32.0	40.0	Complies
125.02	V	QP	36.0	43.5	Complies
187.82	V	QP	40.2	43.5	Complies
671.79	V	QP	27.8	46.0	Complies
849.43	V	QP	42.4	46.0	Complies
1274.4	V	AV	40.7	54.0	Complies
Measurement uncertainty			± 3dB		

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

Equipment under test : U952T

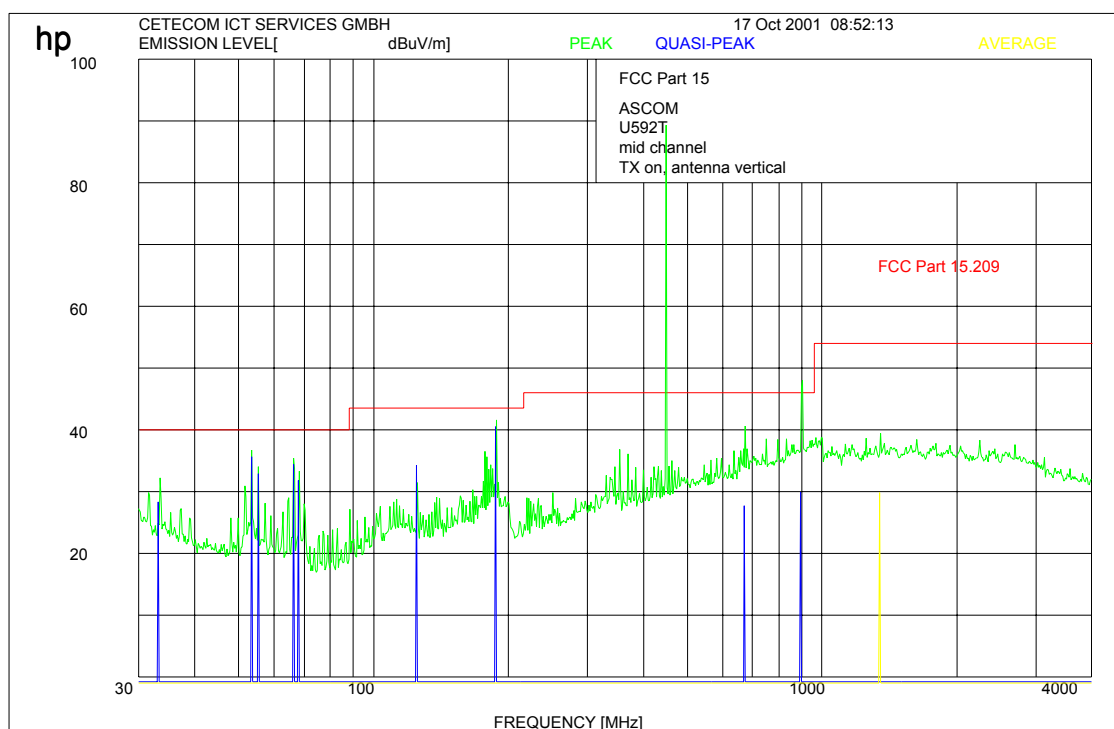
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, 2Watt in artificial load

448.15 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

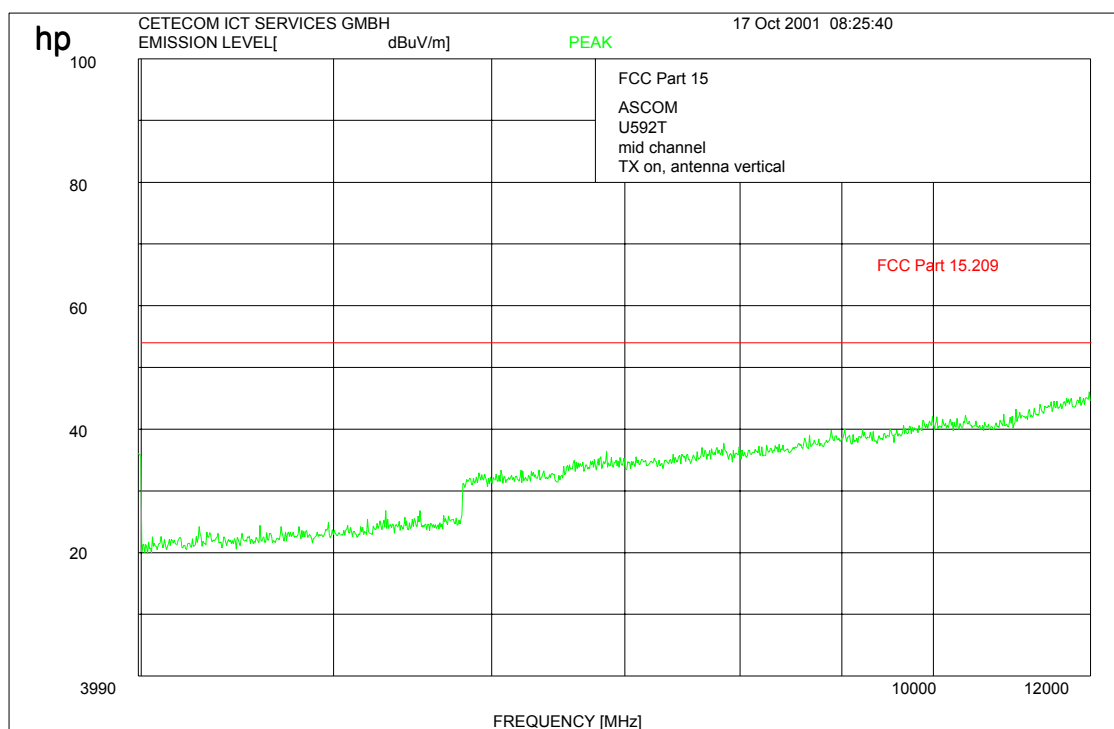
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, 2Watt in artificial load

448.15 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

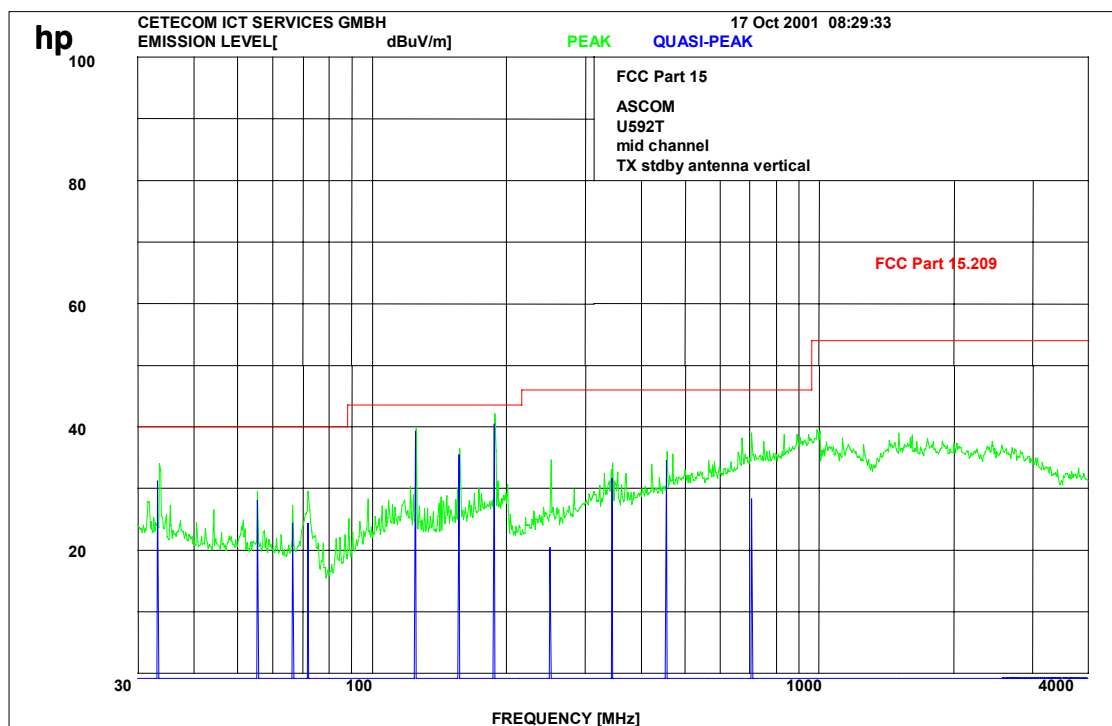
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, TX standby

448.15 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

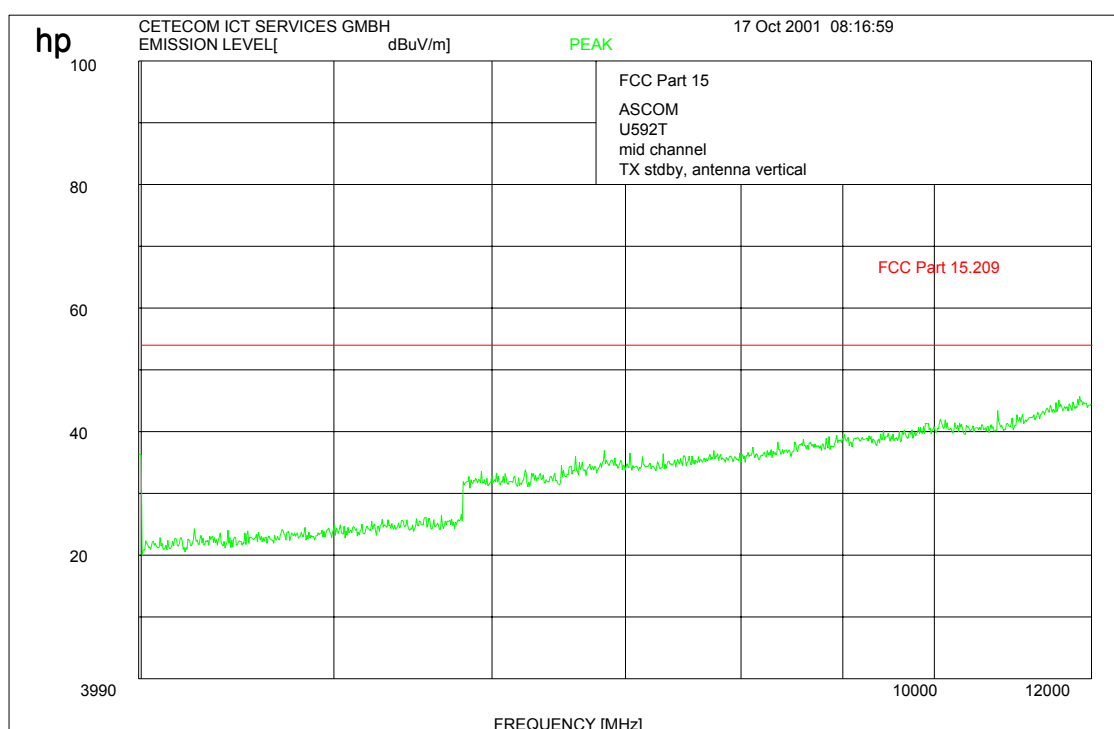
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, TX standby

448.15 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSION

§2.993 / 15.205 / 15.209

high channel 474.95 MHz

EMISSION LIMITATIONS					
f (MHz)	polarization	amplitude of emission (dBμV/m) QUASIPeAK	amplitude of emission (dBμV/m) average	limit max. allowed emission power (dBμV/m)	results
474.95 MHz					
33.24	V	QP	31.5	40.0	Complies
55.54	V	QP	26.6	40.0	Complies
66.55	V	QP	32.8	40.0	Complies
125.02	V	QP	39.7	43.5	Complies
156.54	V	QP	32.2	43.5	Complies
187.58	V	QP	41.2	43.5	Complies
250.28	V	QP	31.3	46.0	Complies
343.88	V	QP	23.4	46.0	Complies
454.37	V	QP	34.6	46.0	Complies
705.44	V	QP	36.2	46.0	Complies
950.50	V	QP	40.2	46.0	Complies
1426.1	V	AV	41.7	54.0	Complies
1902.8	V	AV	43.0	54.0	Complies
4276.3	V	AV	13.3	54.0	Complies
5224.2	V	AV	14.1	54.0	Complies
6892.9	V	AV	25.3	54.0	Complies
Measurement uncertainty		± 3dB			

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

Equipment under test : U952T

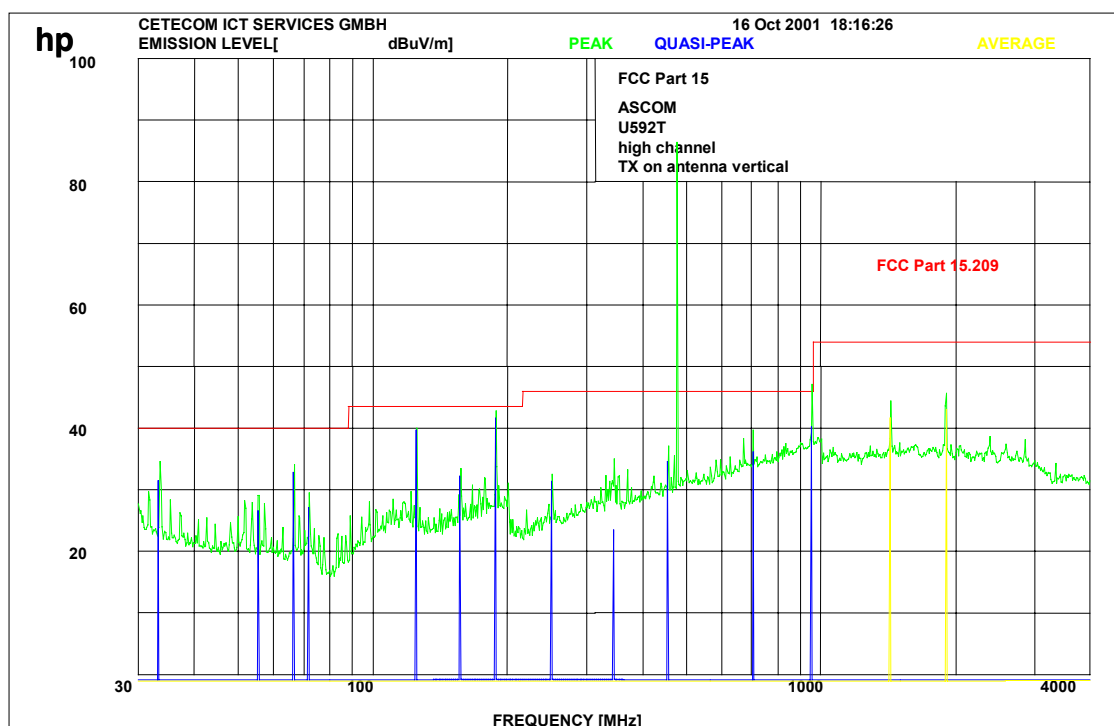
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, 2Watt in artificial load

474.95 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

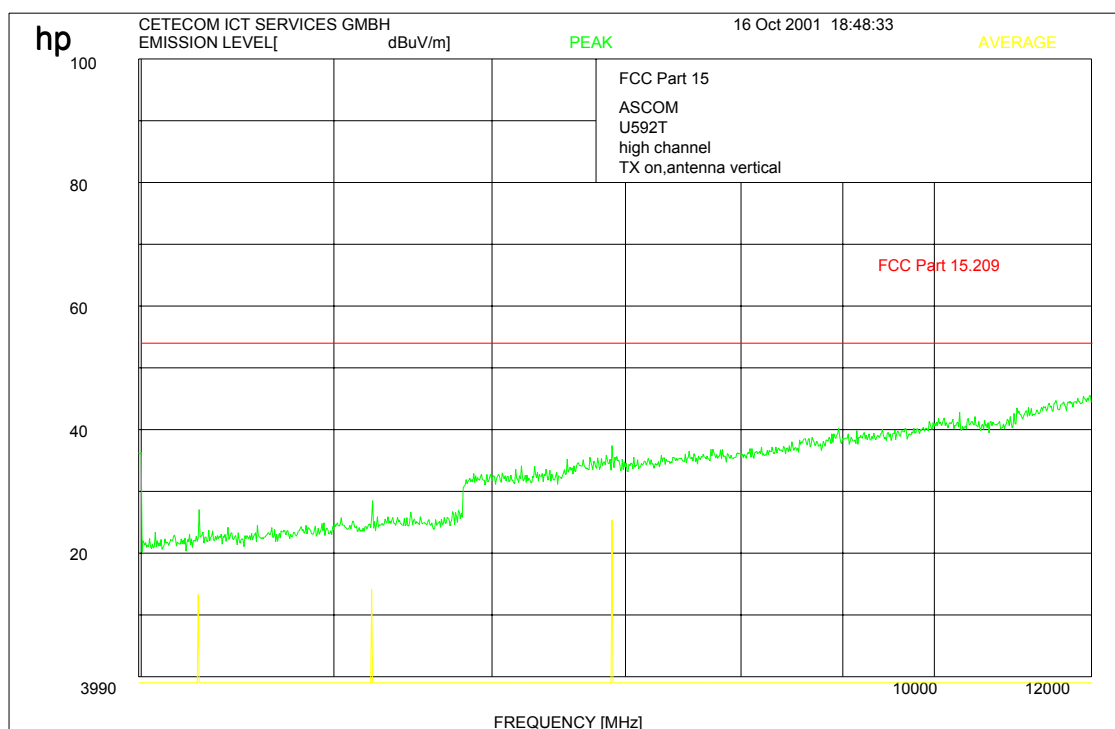
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, 2Watt in artificial load

474.95 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

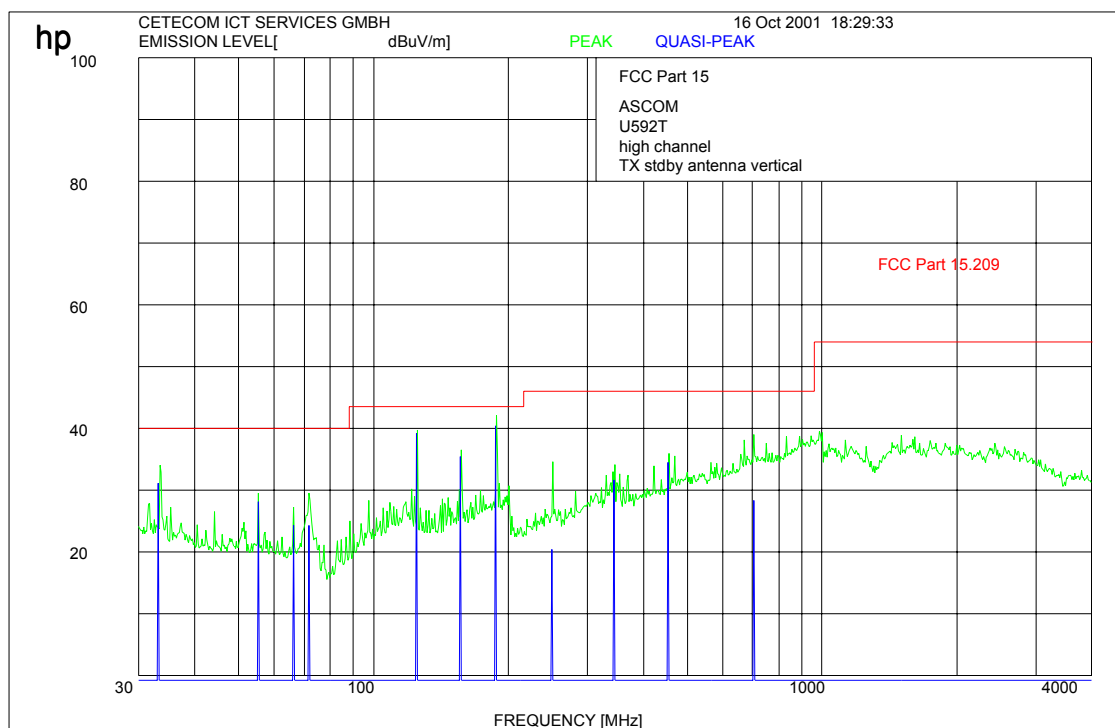
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, TX standby

474.95 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

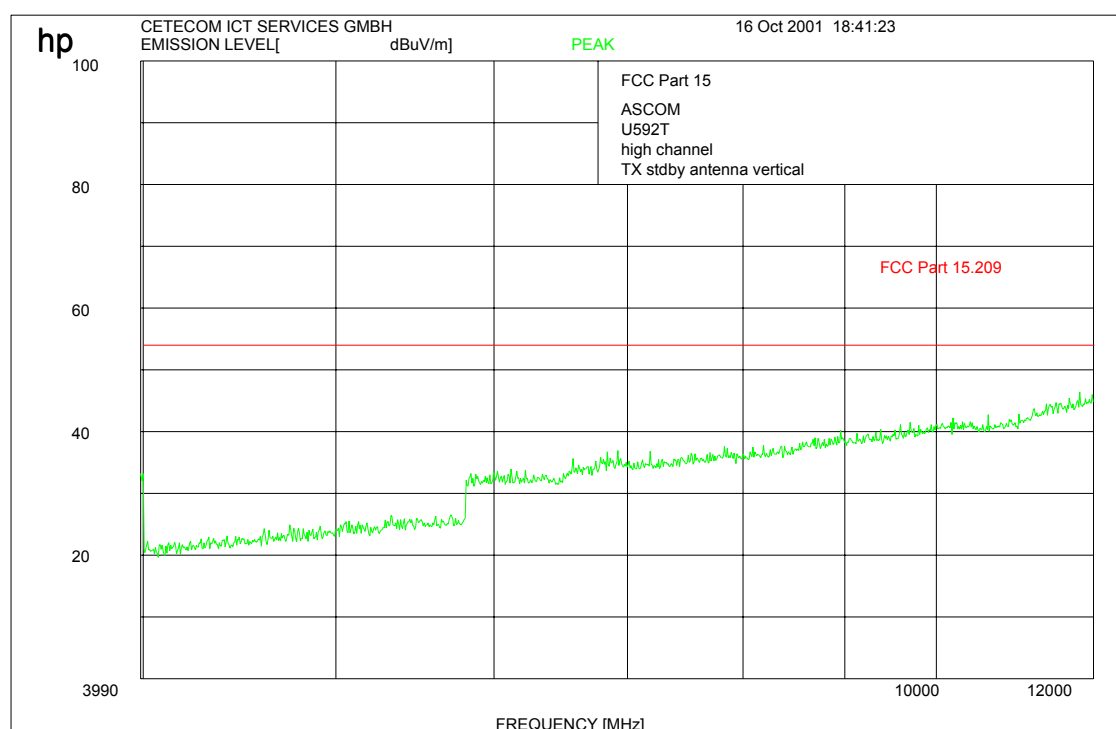
Ambient temperature : 23°C

Relative humidity : 44%

RADIATED SPURIOUS EMISSIONS

Vertical, TX standby

474.95 MHz



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

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

LIMITS

SUBCLAUSE § 15.209

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

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

FREQUENCY STABILITY Vs. TEMPERATURE

§ 2.995 / 90.213

Temperature [°C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-30°	-470	425.05		-1.10
-20°	-510	425.05		-1.20
-10°	-539	425.05		-1.27
0,0°	-595	425.05		-1.46
+10°	-569	425.05		-1.34
+20°	-459	425.05		-1.08
+30°	-348	425.05		-0.82
+40°	38	425.05		0.09
+50°	310	425.05		0.73
+60°	590	425.05		1.39

Temperature [°C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-30°	-565	448.15		-1.26
-20°	-578	448.15		-1.29
-10°	-592	448.15		-1.32
0,0°	-618	448.15		-1.38
+10°	-551	448.15		-1.23
+20°	-448	448.15		-1.00
+30°	-309	448.15		-0.69
+40°	90	448.15		0.20
+50°	390	448.15		0.87
+60°	637	448.15		1.42

Temperature [°C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-30°	-294	474.95		-0.62
-20°	-408	474.95		-0.86
-10°	-508	474.95		-1.07
0,0°	-570	474.95		-1.20
+10°	-641	474.95		-1.35
+20°	-532	474.95		-1.12
+30°	-522	474.95		-1.01
+40°	-81	474.95		-0.17
+50°	190	474.95		0.40
+60°	499	474.95		1.05

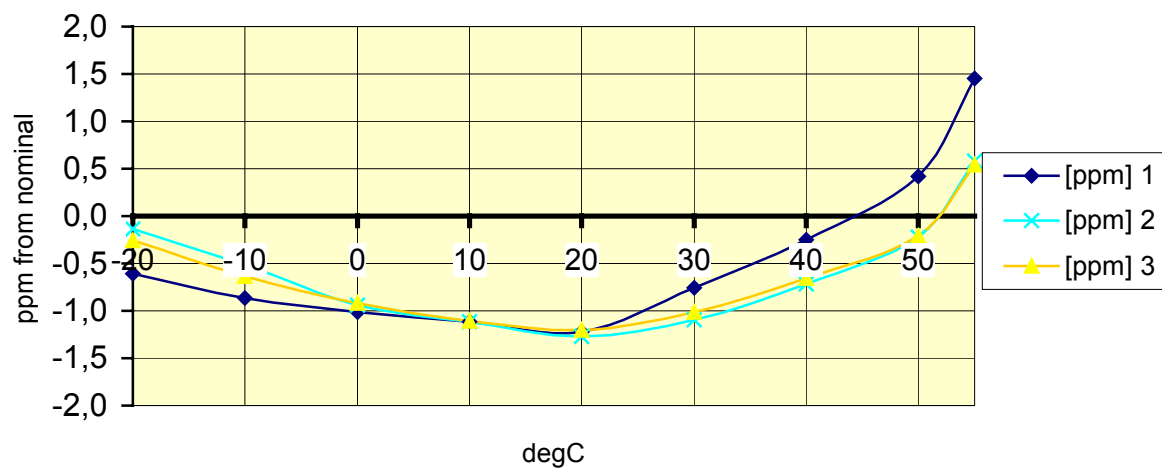
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

Frequency [ppm] vs temperature



LIMITS

SUBCLAUSE § 90.213

Temperature – Frequency Stability of 1.5 ppm from –30 to +60 °C

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

FREQUENCY STABILITY Vs. VOLTAGE § 2.991

nom. Voltage	nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
0,85	12.5	10.63	60	425.05		0.14
0,88		11.00	70	425.05		0.16
0,90		11.25	100	425.05		0.24
0,93		11.62	90	425.05		0.21
0,95		11.88	50	425.05		0.12
0,98		12.25	40	425.05		0.10
1,00		12.50	30	425.05		0.07
1,03		12.88	30	425.05		0.07
1,05		13.12	70	425.05		0.16
1,08		13.50	110	425.05		0.26
1,10		13.75	120	425.05		0.28
1,13		14.12	130	425.05		0.30
1,15		14.37	160	425.05		0.38

nom. Voltage	nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
0,85	12.5	10.63	40	448.15		0.09
0,88		11.00	0	448.15		0.00
0,90		11.25	10	448.15		0.02
0,93		11.62	20	448.15		0.05
0,95		11.88	20	448.15		0.05
0,98		12.25	20	448.15		0.05
1,00		12.50	20	448.15		0.05
1,03		12.88	30	448.15		0.07
1,05		13.12	30	448.15		0.07
1,08		13.50	30	448.15		0.07
1,10		13.75	30	448.15		0.07
1,13		14.12	30	448.15		0.07
1,15		14.37	30	448.15		0.07

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

Equipment under test : U952T

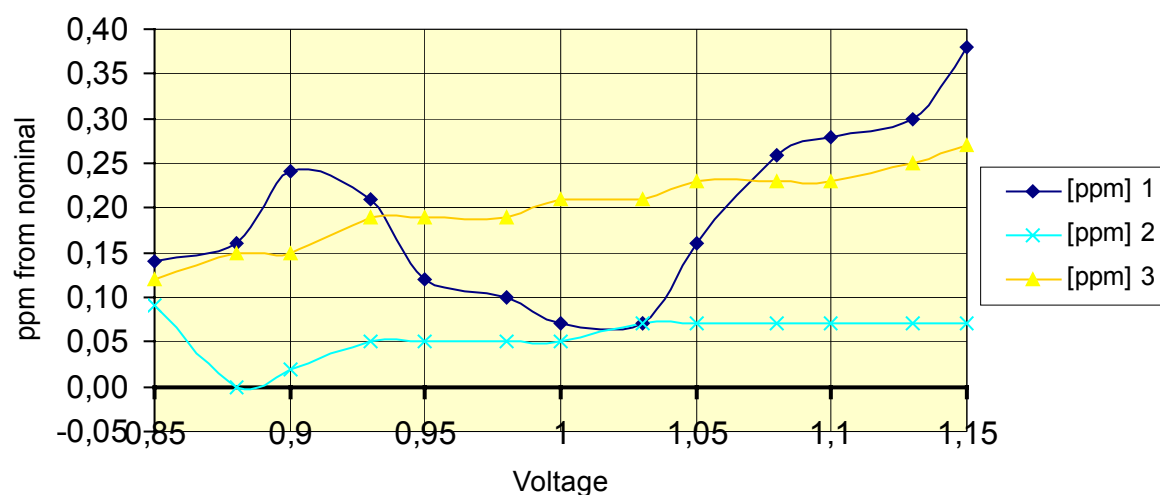
Ambient temperature : 23°C

Relative humidity : 44%

FREQUENCY STABILITY Vs. VOLTAGE § 2.991

nom. Voltage	nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
0,85	12.5	10.63	60	474.95		0.12
0,88		11.00	70	474.95		0.15
0,90		11.25	70	474.95		0.15
0,93		11.62	90	474.95		0.19
0,95		11.88	90	474.95		0.19
0,98		12.25	90	474.95		0.19
1,00		12.50	100	474.95		0.21
1,03		12.88	100	474.95		0.21
1,05		13.12	110	474.95		0.23
1,08		13.50	110	474.95		0.23
1,10		13.75	110	474.95		0.23
1,13		14.12	120	474.95		0.25
1,15		14.37	130	474.95		0.27

Frequency [ppm] vs voltage



LIMITS

SUBCLAUSE § 90.213

Power Supply Voltage – Frequency Stability of 1.5 ppm from 85% to 115% of nominal voltage

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

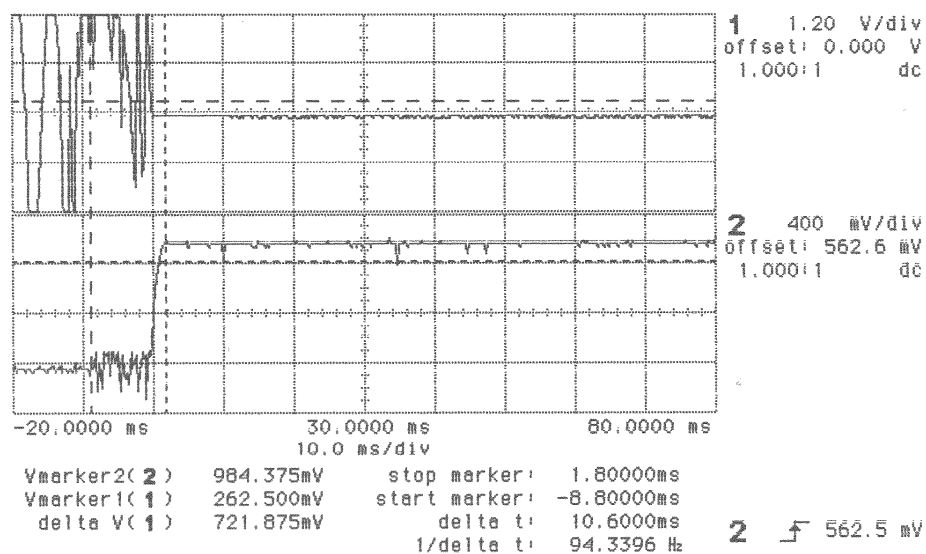
Ambient temperature : 23°C

Relative humidity : 44%

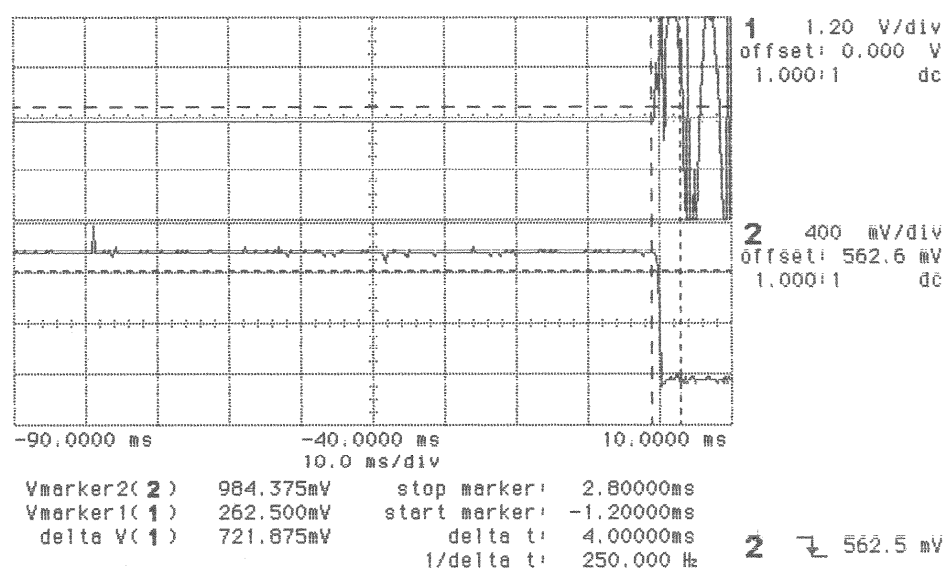
TRANSIENT FREQUENCY BEHAVIOR §90.214

425.05 MHz

hp awaiting trigger



hp awaiting trigger



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

Equipment under test : U952T

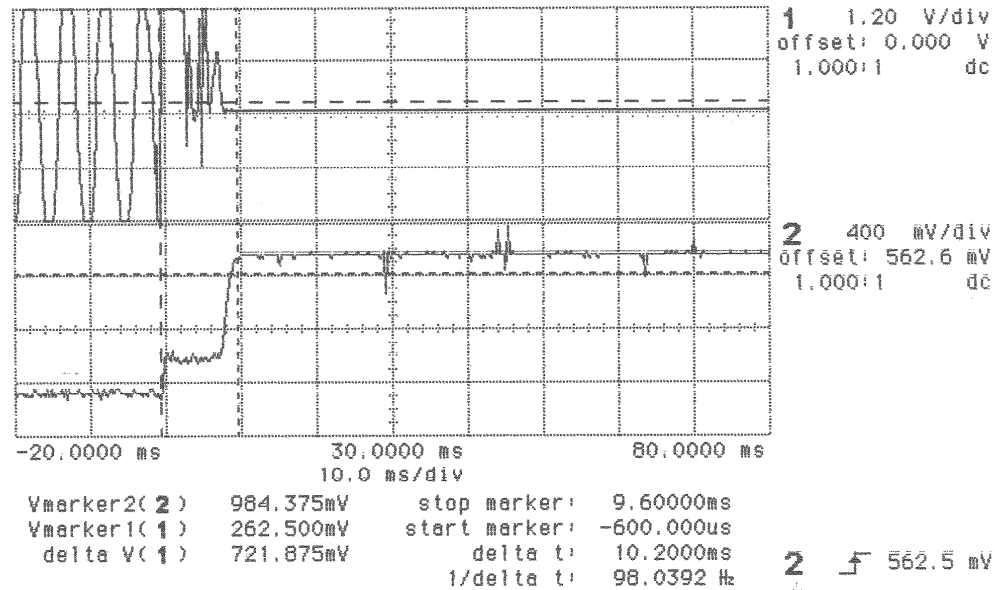
Ambient temperature : 23°C

Relative humidity : 44%

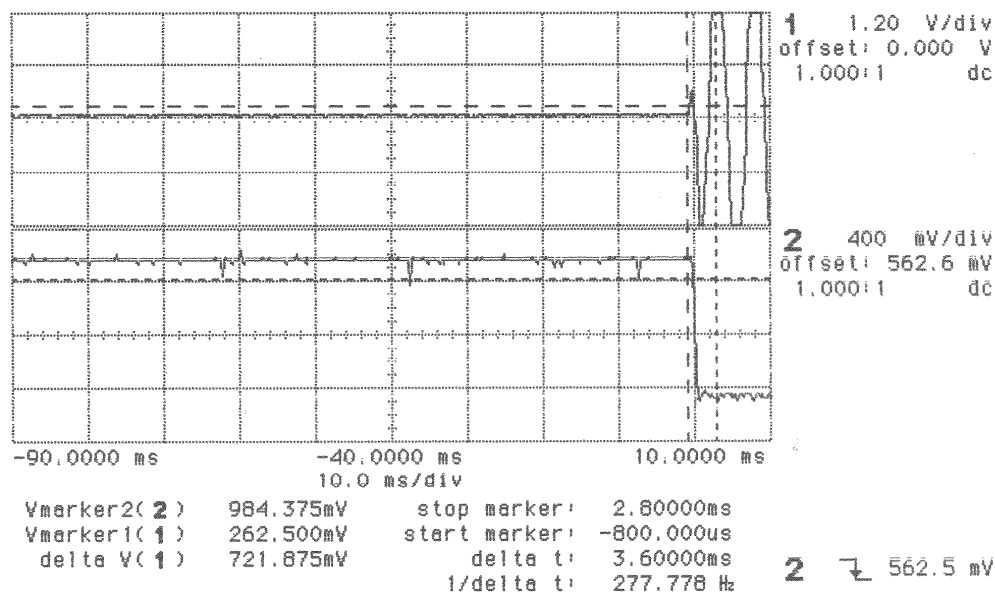
TRANSIENT FREQUENCY BEHAVIOR §90.214

448.15 MHz

hp awaiting trigger



hp awaiting trigger



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

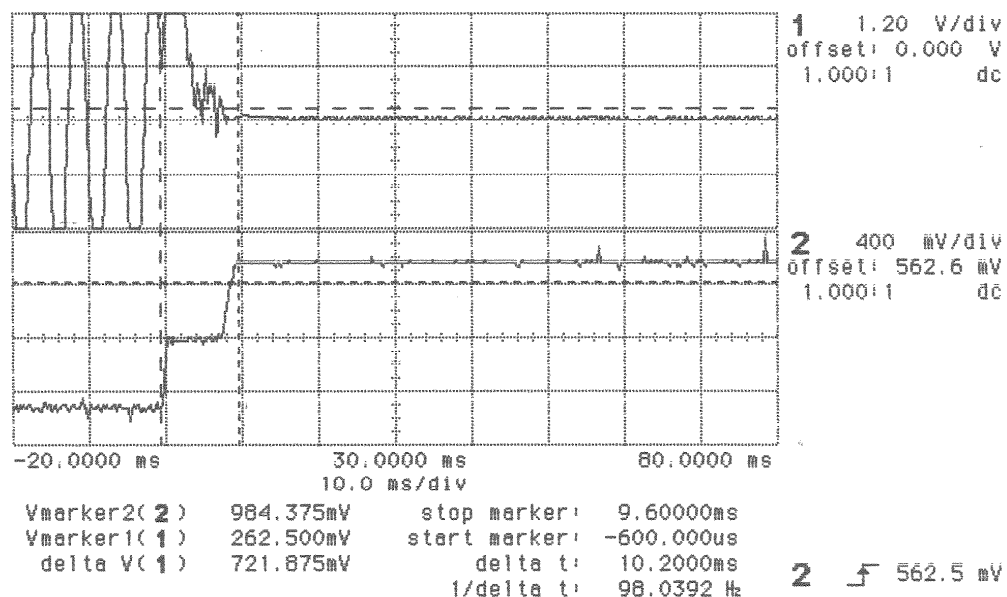
Ambient temperature : 23°C

Relative humidity : 44%

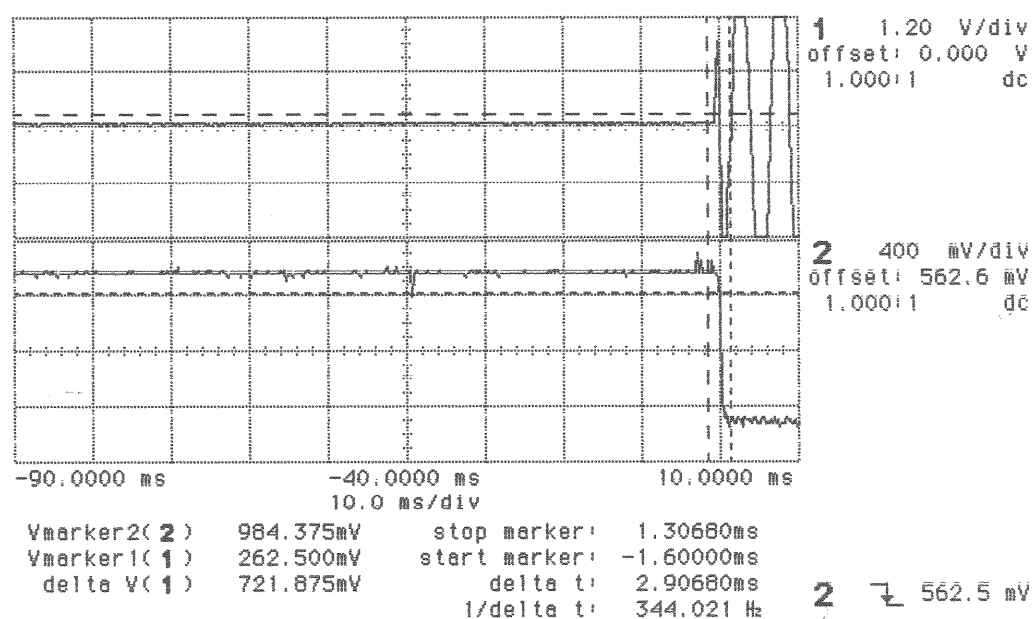
TRANSIENT FREQUENCY BEHAVIOR §90.214

474.95 MHz

hp awaiting trigger



hp awaiting trigger



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : U952T

Ambient temperature : 23°C

Relative humidity : 44%

TRANSIENT CHARACTERISTICS			
	425.05 MHz	448.15 MHz	474.95 MHz
During t1 (ms)	9,1	8,2	7,2
During t2 (ms)	2,1	2,5	2,4
During t3 (ms)	4,0	3,6	2,9
Measurement uncertainty	± 110 Hz		

Valid for both channel separations: 12,5 and 25 KHz

This measurements are done in accordance with TEST SET-UP PROCEDURES used for Submitted Data.(2.2.19 of the TIA/EIA 603, specifically the triggering level was set in a different manner, as described in the TEST SET-UP PROCEDURES used for Submitted Data).

LIMITS**SUBCLAUSE § 90.214**

Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
	Maximum frequency difference	150 to 174 MHz	421 to 512 MHz
t ₁	±12.5 kHz	5.0 ms	10.0 ms
t ₂	±6.25 kHz	20.0 ms	25.0 ms
t ₃	±12.5 kHz	5.0 ms	10.0ms

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

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erft	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

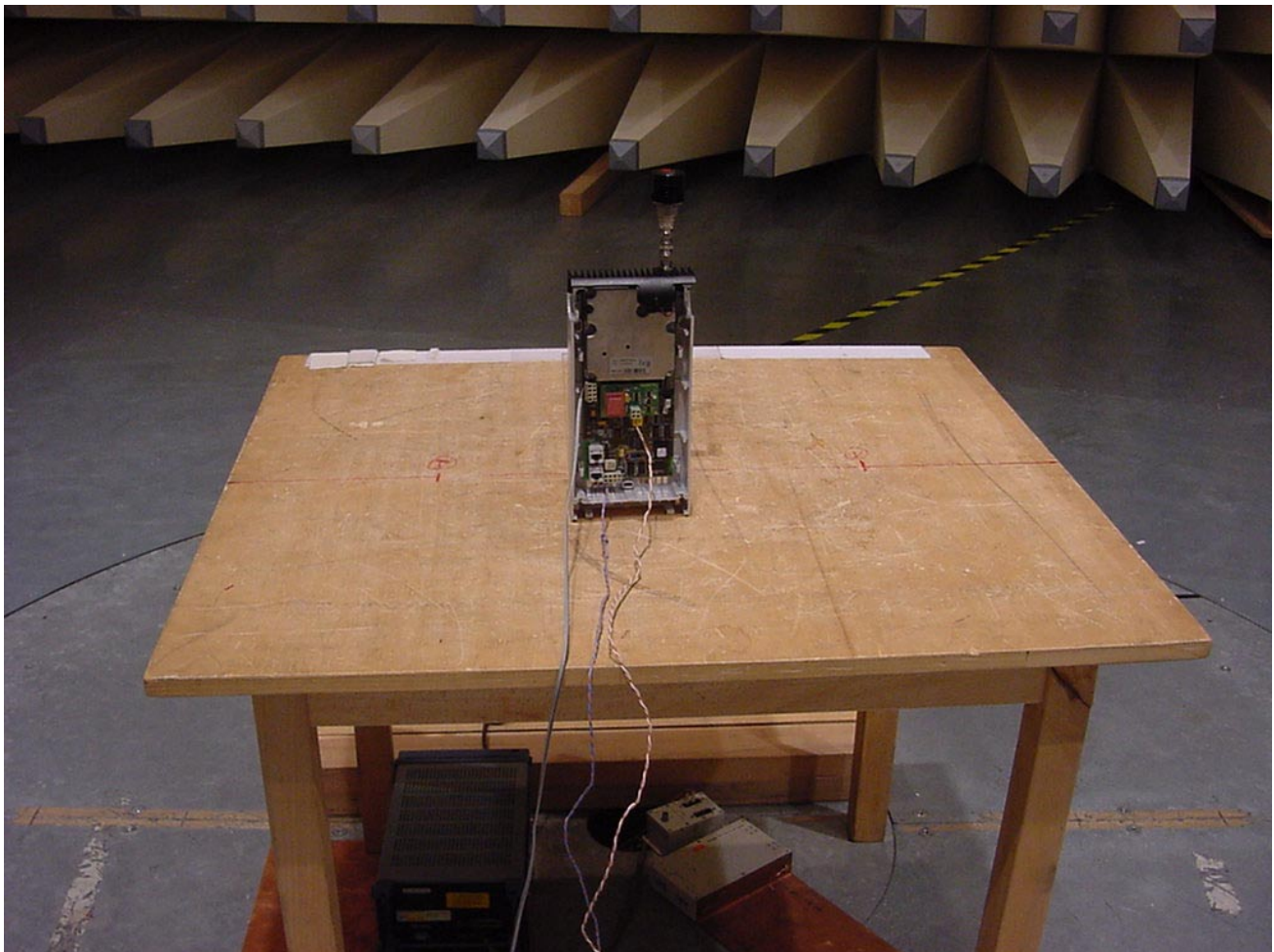
TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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.

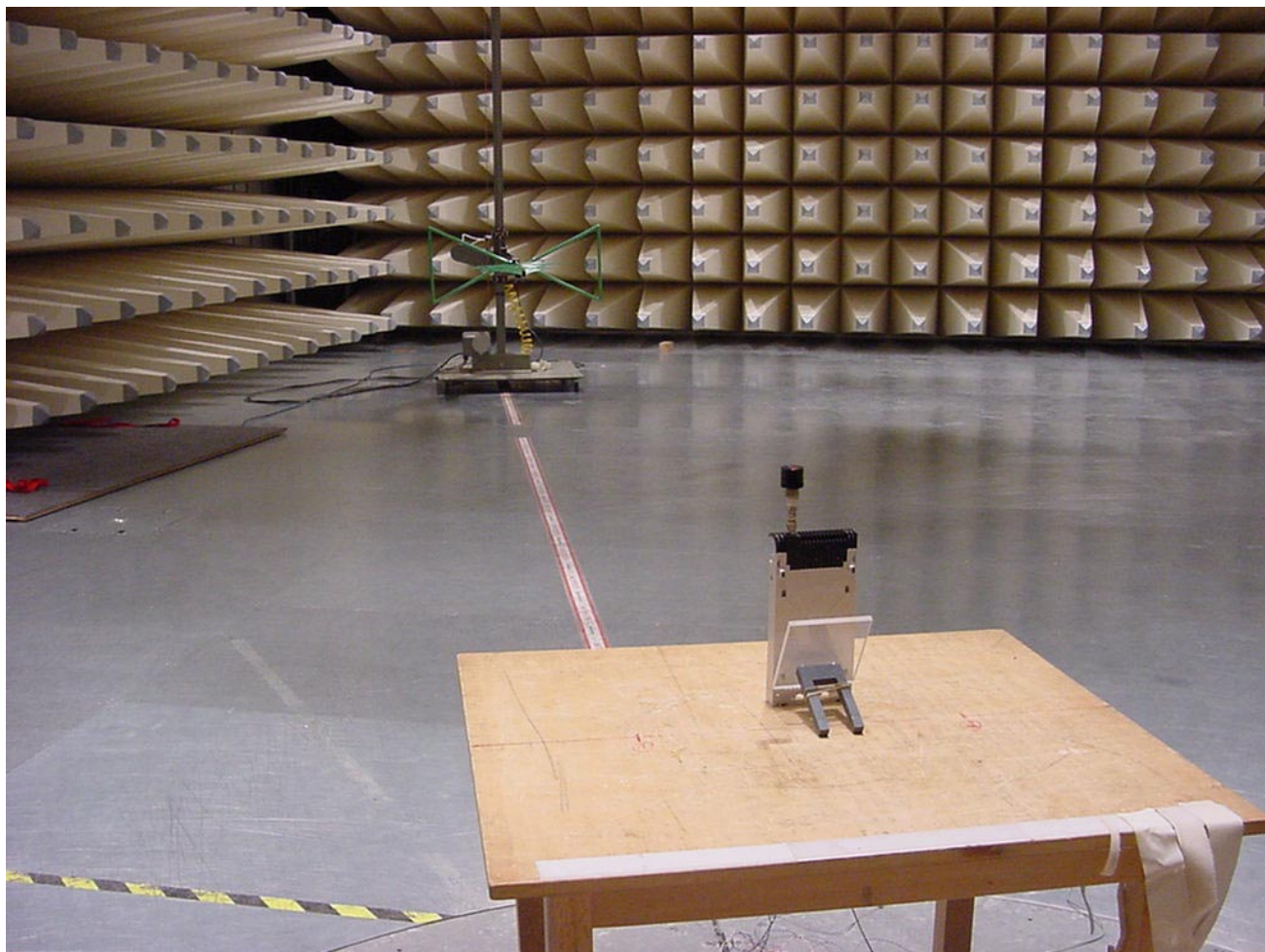
No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum 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
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773
66	Bidirektionalkoppler	DC 3010	Amplifier res.	12306
67	Oscilloscope	54502A	HP	2934A01917
68	Radiocommunic.Analyz.	4040	Schlumberger	1725117

Photographs of the equipment

Testsite



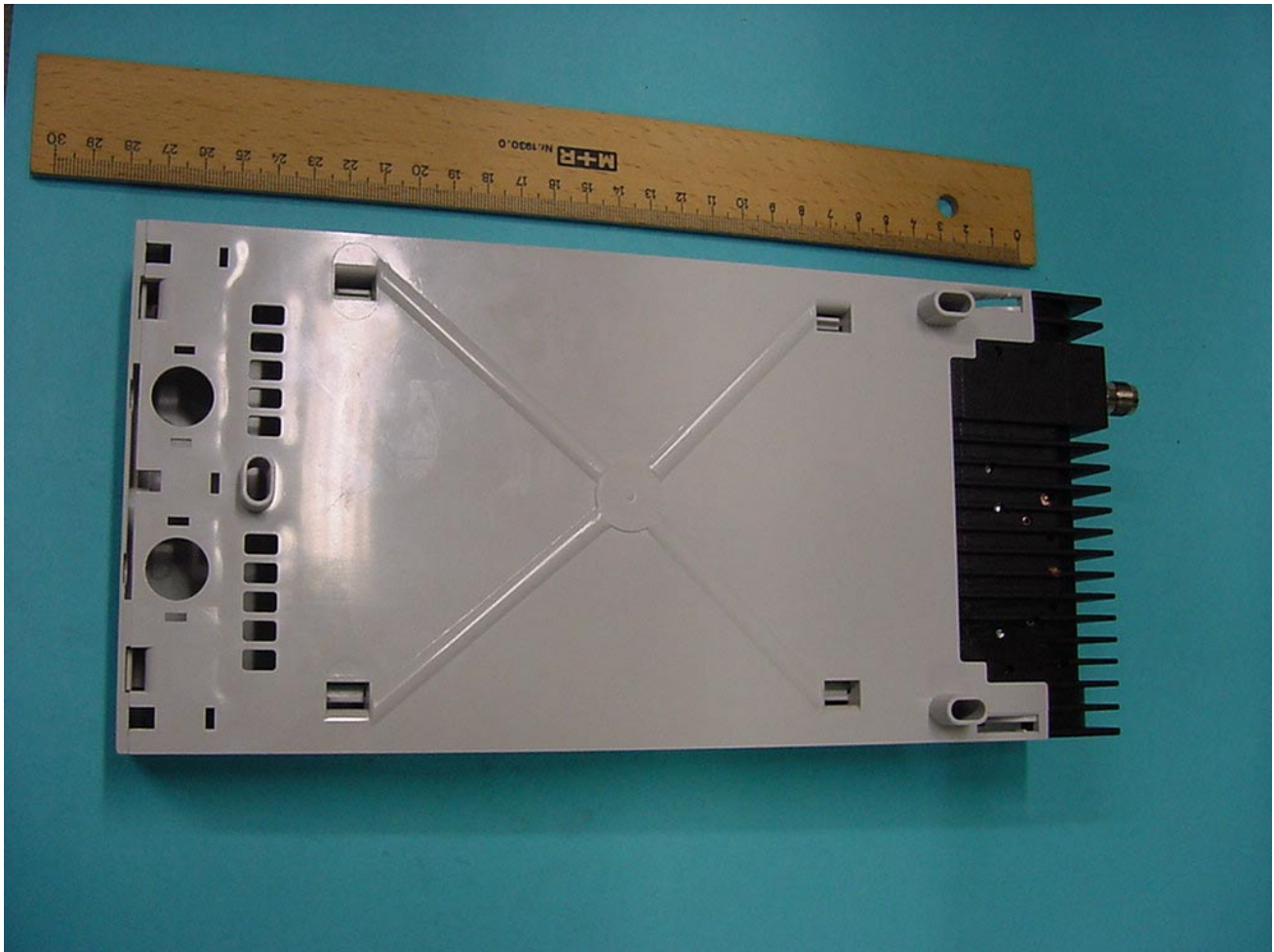
Test site



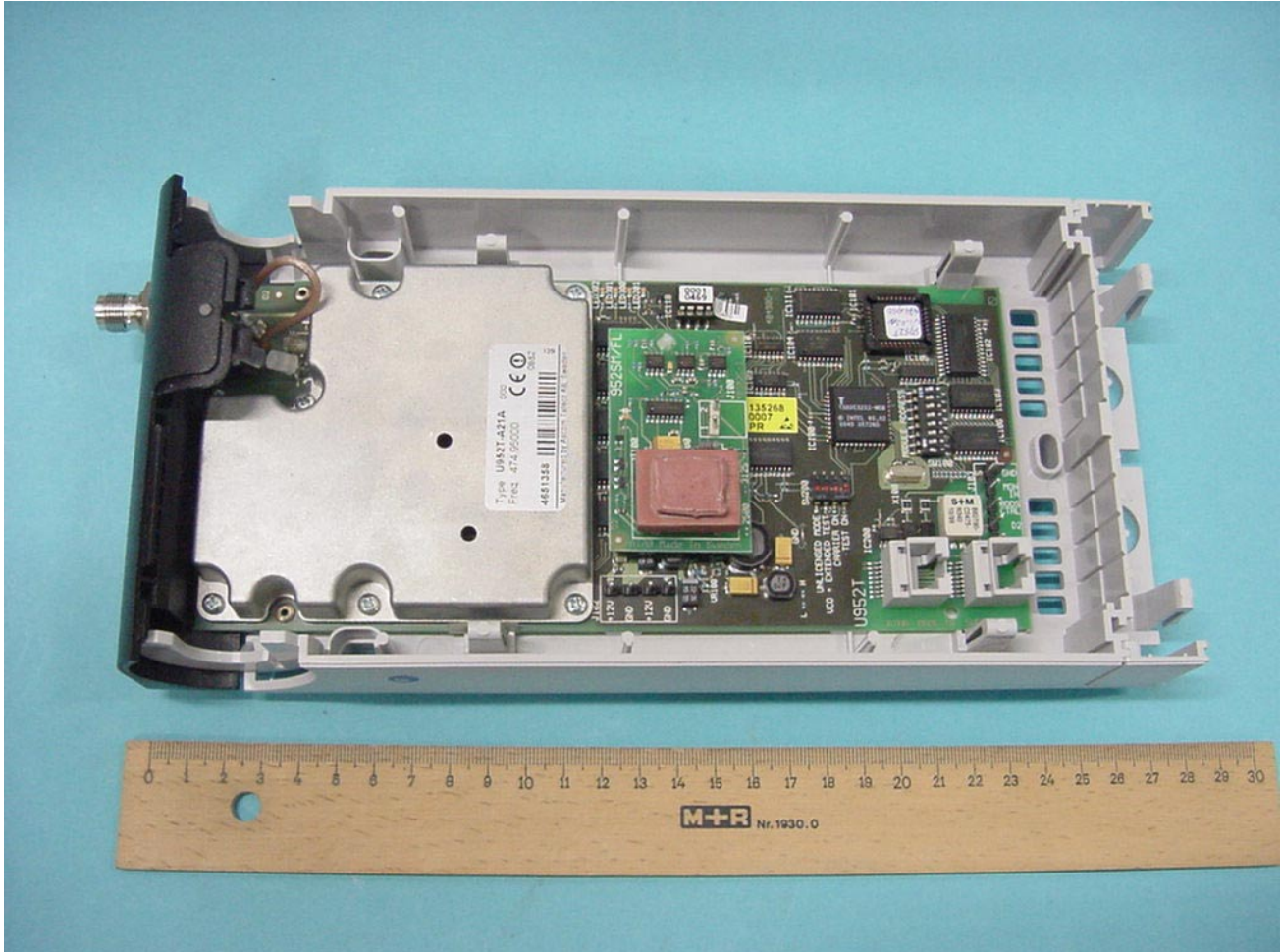
Photographs of the equipment



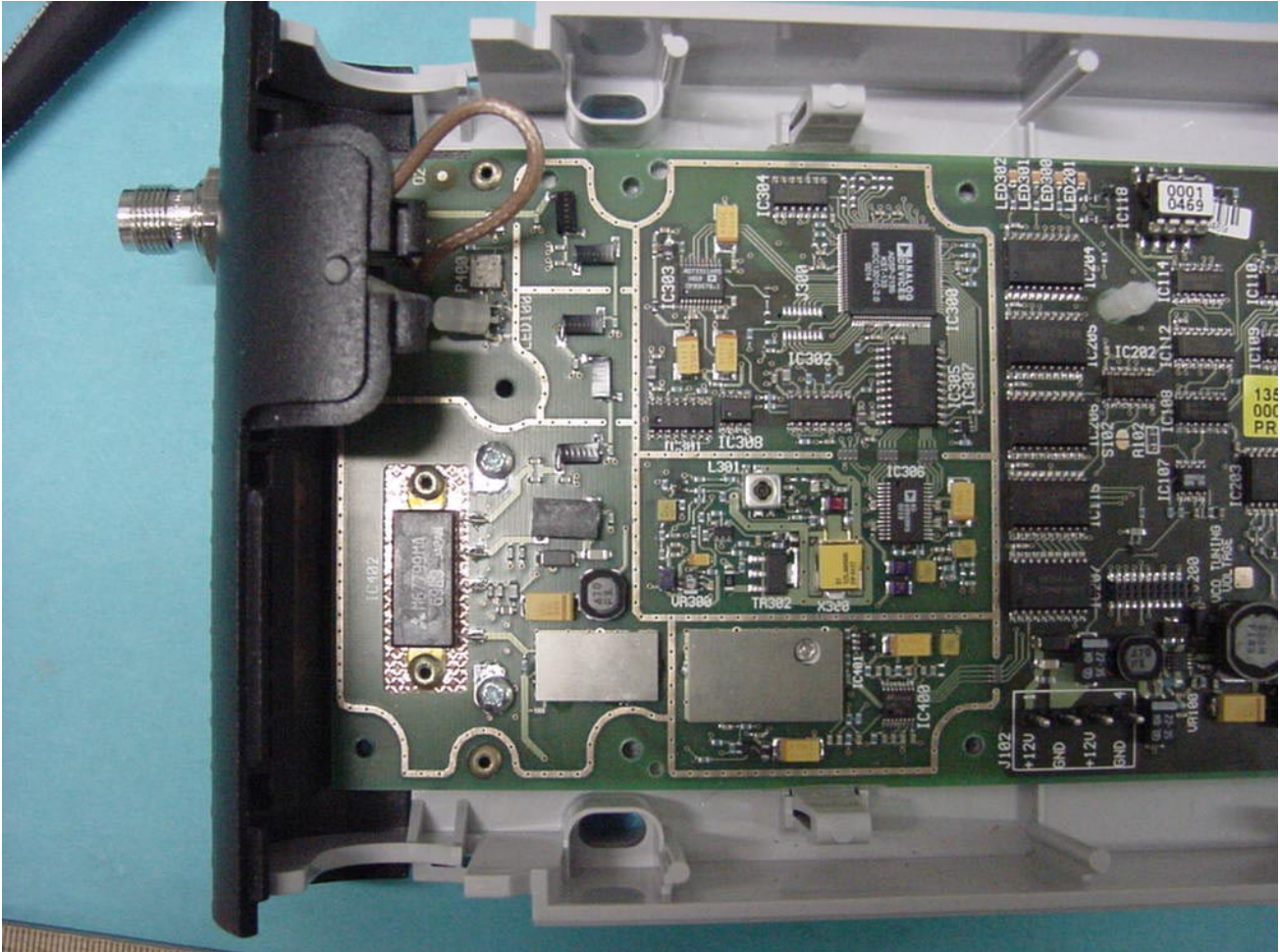
Photographs of the equipment



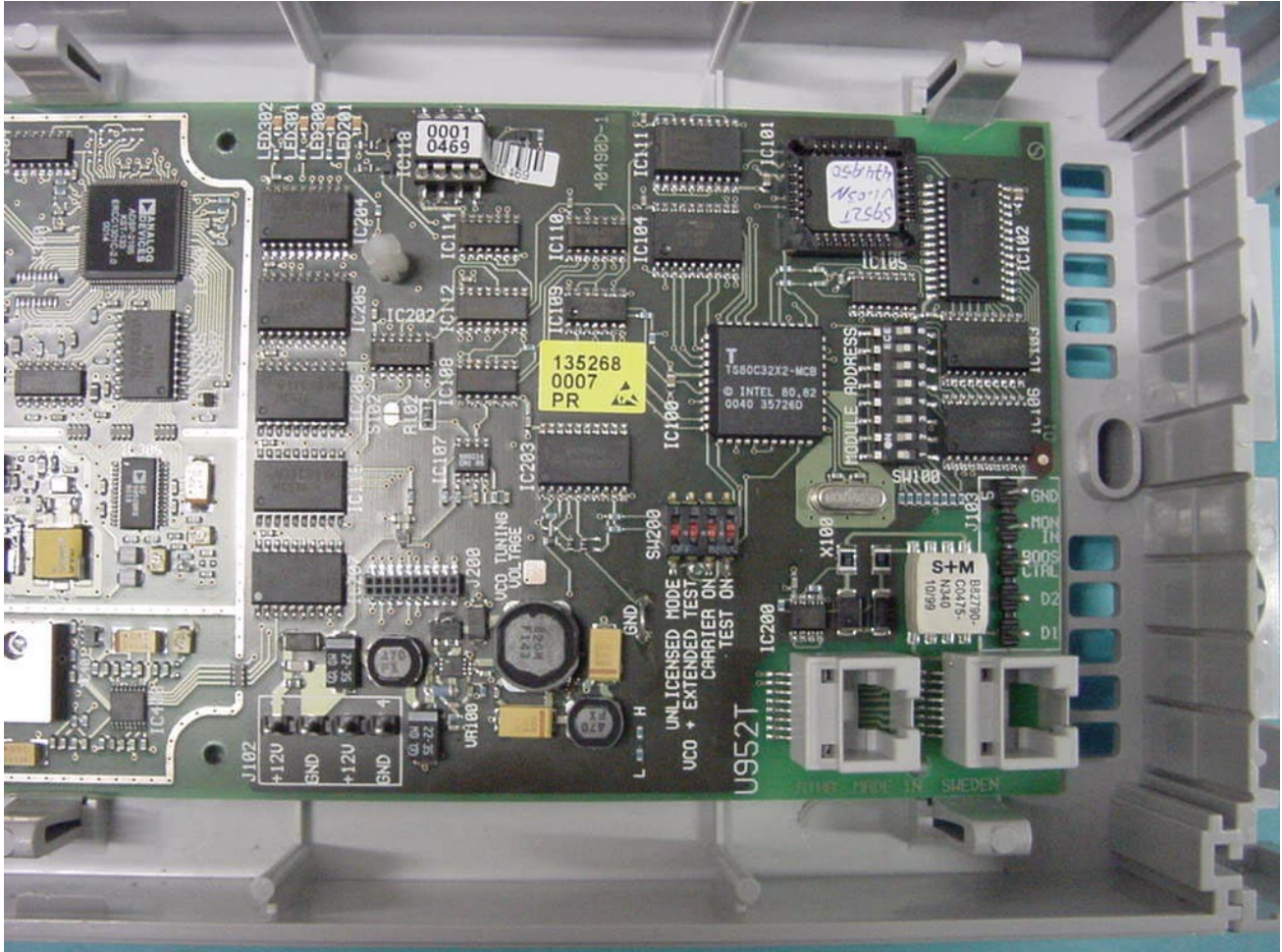
Photographs of the equipment



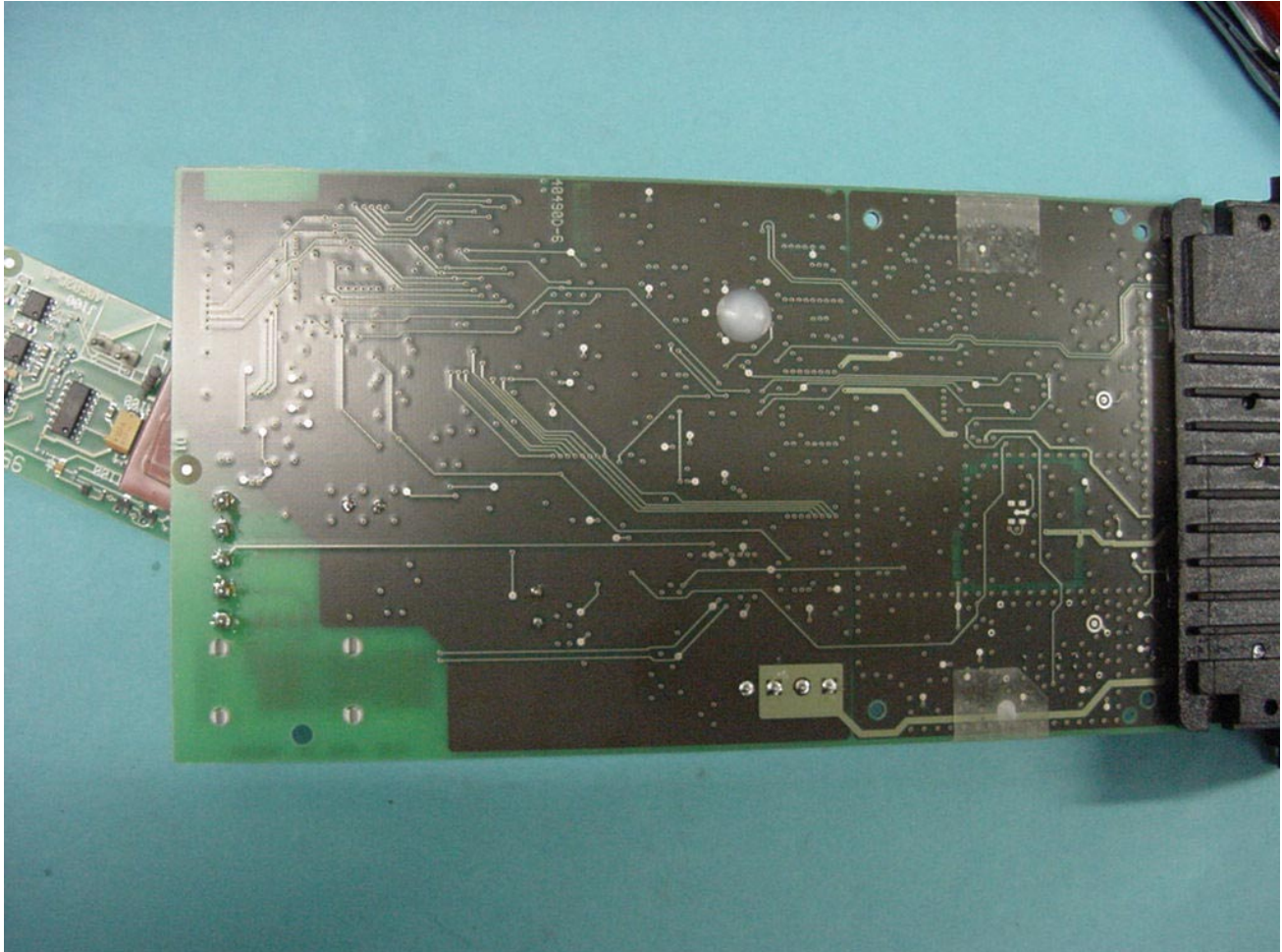
Photographs of the equipment



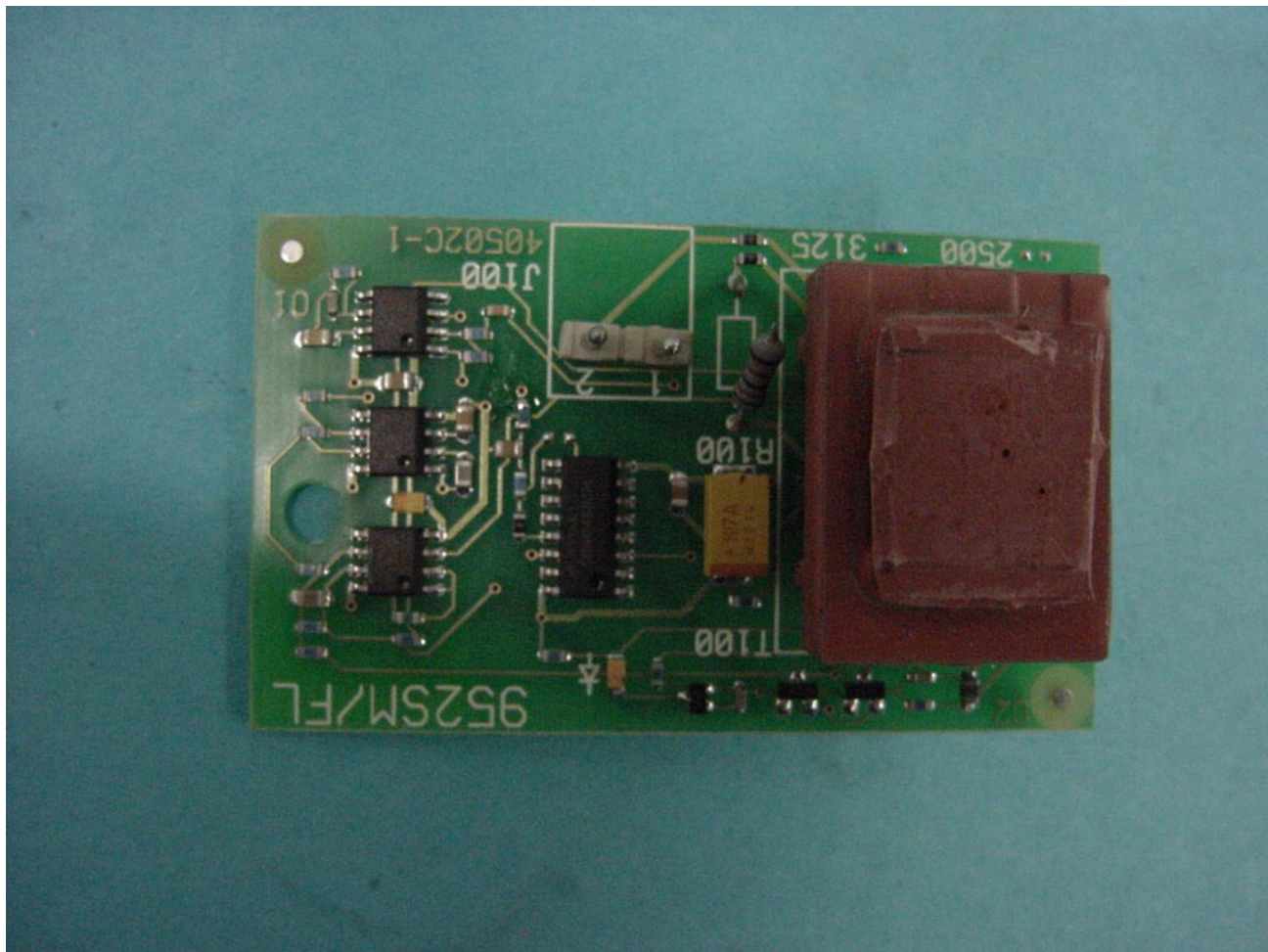
Photographs of the equipment



Photographs of the equipment



Photographs of the equipment



Photographs of the equipment

