

CETECOM ICT Services GmbH

Radio Satellite Communication

Untertürkheimer Straße 6-10 . D-66117 Saarbrücken

Telephone: +49 (0)681 598-0

Telefax: -9075

RSC14

issue test report consist of 78 Pages

Page 1 (78)

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Federal Communications Commission
FCC-Identification Number: 90462
TCB ID: DE 0001



Accredited by the
German Accreditation Council
DAR-Registration Number
TTI-P-G 166/98



Independent ETSI
compliance test house



Accredited Bluetooth™ Test Facility (BQTF)

Test Report No.: 4_0989-01-03/03
FCC Part 74.861 / CANADA RSS-123
P7T / P7R (PSM 700 Series)
FCC ID : DD4P7TB

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

Telephone: + 49 (0) 681 / 598-0
Fax: + 49 (0) 681 / 589-9075

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CETECOM ICT Services GmbH

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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.

Test Laboratory Manager:

2003-07-11	RSC8411	Berg M.
Date	Section	Name


Signature

Technical Responsibility for Area of Testing:

2003-07-11	RSC8412	Hausknecht D.
Date	Section	Name


Signature

CETECOM ICT Services GmbH

Test report no.: **4_0989-01-03/03** Issue Date: 23.05.2003 Page 4 (78)

1.2 Testing Laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Telephone : + 49 681 598 - 0

Telefax : + 49 681 598 - 9075

E-mail : info@ict.cetecom.de

Internet : www.cetecom-ict.de

Accredited testing laboratory

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

DAR-registration number : TTI-P-G 166/98-30

Accredited Bluetooth™ Test Facility (BQTF)

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1.3 Details of Applicant

Name : SHURE Europe GmbH

Street : Wannenäckerstrasse 28

City : D-74048 Heilbronn

Country : Germany

Telephone : +49 (0) 7131 72 14 0

Telefax : +49 (0) 7131 72 14 14

Contact : Mr. Wolfgang Bilz

Telephone : +49 (0) 7131 72 14 34

1.4 Application Details

Date of receipt of application : 2003-05-14

Date of receipt of test item : 2003-05-16

Date of test : 2003-05-16/19/20

CETECOM ICT Services GmbH

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1.5 Test Item

Type of equipment : **In Ear Monitoring System**
Type designation : **Tx: P7T and Rx: P7R (PSM 700 Series)**
Manufacturer : **SHURE Inc.**
Street : **5800 West Toughy Avenue**
City : **Niles, IL 60714-4608**
Country : **USA**
Serial number : **-.-**
FCC-ID : **DD4P7TB**
IC : **-**
Hardware : **H3, L2**
Software : **-**
Additional information :
Frequency : **L3= 632-663 MHz ; H2= 524-554**
Type of modulation : **98K0F8E (2x max.Audio Frequency + 2x max. FM Deviation)**
Number of channels : **32**
Antenna : **BNC**
Power supply : **Tx: 115C AC / 60 Hz; Rx: 9V DC Battery**
Output power : **110.2 mW**
Field strength : **87.0 dB μ V/m at 3m**
Occupied bandwidth : **max. 100 kHz**
Transmitter spurious : **46.4 dB μ V/m at 3m (706.32 MHz)**
Receiver spurious : **43.1 dB μ V/m at 3m (7522.2 MHz)**

Temperature range : **-30°C - +50°C**

DECLARATION OF COMPLIANCE: I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Signature: _____

Date: 2003-05-09 Michael Berg ; Test management
NAME AND TITLE (Please print or type):

1.6 Test Specifications:

FCC Part 74 Subpart H
CANADA RSS-123

2 Technical Test

2.1 Summary of Test Results

TEST PROCEDURE

All tests were done in accordance with the EIA/TIA 603.

FOR PART 74 H WE USE THE SUBSTITUTION METHOD (TIA/EIA 603).

The product fullfills also the requirements for CANADA RSS-123

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

Final verdict : PASS

2.2 Testreport

TEST REPORT

Testreport no.: 4_0989-01-03/03

CETECOM ICT Services GmbH

Test report no.: **4_0989-01-03/03** Issue Date: 23.05.2003 Page 8 (78)

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

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Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OUTPUT POWER (conducted)

FCC Rule Part 74.861 (e)(1)(ii)

Method of measurement

The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the un-modulated output power was measured by means of a RF power Meter.

Results:

TEST CONDITIONS		TRANSMITTER POWER (mW)					
		524.0	539.3	554.0	632.0	647.3	662.0
Frequency (MHz)							
T _{nom} (23)°C	V _{nom} (115)V	107.4	91.4	74.0	110.2	108.9	104.7
Maximum deviation from output power under extreme test conditions (dBc)		±0.2 dB					
Measurement uncertainty		±0.5dB					

LIMIT

FCC Rule Part 74.861

Frequency range MHz	Power level conducted mW
54-72, 76-88, 174-216	50
470-608, 614-806	250

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

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Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

AFC FREQ ERROR vs. VOLTAGE

FCC Rule Part 74.861

Method of measurement:

The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by means of a spectrum analyzer .

The input voltage was varied in an range ± 15 % of the nominal voltage and the maximum change in frequency was noted within one minute.

The temperature tests were performed for each frequency range on one channel

539.300 MHz

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
97.15	397	0,00007361	0,7361
100.05	397	0,00007361	0,7361
103.50	397	0,00007361	0,7361
105.80	397	0,00007361	0,7361
109.25	397	0,00007361	0,7361
111.55	397	0,00007361	0,7361
115.0	397	0,00007361	0,7361
117.30	397	0,00007361	0,7361
120.75	397	0,00007361	0,7361
123.05	397	0,00007361	0,7361
126.50	397	0,00007361	0,7361
132.25	397	0,00007361	0,7361

647.3 MHz

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
97.15	-781	-0,00012066	-1,2066
100.05	-781	-0,00012066	-1,2066
103.50	-781	-0,00012066	-1,2066
105.80	-781	-0,00012066	-1,2066
109.25	-781	-0,00012066	-1,2066
111.55	-781	-0,00012066	-1,2066
115.0	-781	-0,00012066	-1,2066
117.30	-781	-0,00012066	-1,2066
120.75	-781	-0,00012066	-1,2066
123.05	-781	-0,00012066	-1,2066
126.50	-781	-0,00012066	-1,2066
132.25	-781	-0,00012066	-1,2066

LIMIT

FCC Rule Part 74.861(4)

The frequency tolerance of the transmitter shall be 0.005 percent

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 ; 02 ; 05

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Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 11 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

AFC FREQ ERROR vs. TEMPERATURE

Method of measurement:

The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by means of a spectrum analyzer .

With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours . Power was applied and the maximum change in frequency was noted within one minute.

With power OFF , the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency error was noted within one minute .

The temperature tests were performed for each frequency range on one channel

539.300 MHz

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	677	0,00010459	1,0459
-20	2153	0,00039922	3,9922
-10	2072	0,00038420	3,8420
±0.0	1470	0,00027258	2,7258
+10	852	0,00015798	1,5798
+20	397	0,00007361	0,7361
+30	637	0,00011812	1,1812
+40	1071	0,00019859	1,9859
+50	1153	0,00021380	2,1380

AFC FREQ ERROR vs. TEMPERATURE

647.300 MHz

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	-501	-0,00007740	-0,7740
-20	982	0,00015171	1,5171
-10	902	0,00013935	1,3935
±0.0	301	0,00004650	0,4650
+10	-340	-0,00005253	-0,5253
+20	-781	-0,00012066	-1,2066
+30	-541	-0,00008358	-0,8358
+40	-100	-0,00001545	-0,1545
+50	-180	-0,00002781	-0,2781

LIMIT

FCC Rule Part 74.861

The frequency tolerance of the transmitter shall be 0.005 percent

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 ; 02 ; 05

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Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY FCC Rule Part 74 Sec. 2.1047

Method of measurement :

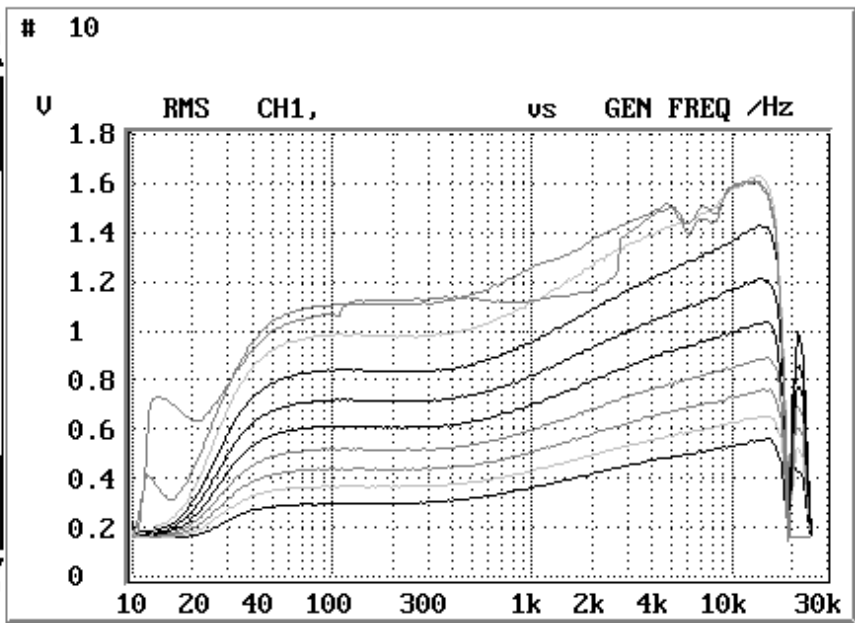
The audio frequency responds was measured in accordance with EIA/TIA 603.
 The plots shows 10 curves with different modulation levels, starting from 0.1mV to 80mV,
 the frequency is varied from 10 Hz to 25 kHz .

Frequency: 524.000 MHz

	CH1	RMS 0.1591 V	OFF	OFF	GEN RUNNING
	CH2	OFF	OFF	OFF	ANL 1: TERM 2: OFF SWP TERMINATED May 23 2003 Fri 12:11:23

DISPLAY

- Limit Ref VALUE: 1.0000 V
- Scale AUTO ONCE
- Spacing LIN
- TRACE B OFF
- X AXIS: FREQ
 - Unit Hz
 - Reference 1000.0 Hz
 - Scale MANUAL
 - Spacing LOG
 - Left 10.000 Hz
 - Right 30.000 kHz
- LIMIT CHECK Mode OFF



GENERATOR

- Low Dist OFF
- DC Offset OFF
- Equalizer OFF
- SWEEP CTRL AUTO SWEEP
- Next Step ANLR SYNC
- X Axis FREQ
- Z Axis VOLT
- FREQUENCY
 - Spacing LOG POINTS
 - Start 10.000 Hz
 - Stop 25.000 kHz
 - Points 500
- VOLTAGE
 - Spacing LIN POINTS
 - Start 0.1000 mV
 - Stop 80.000 mV
 - Points 10

TEST EQUIPMENT USED
 (Equipment listing)

CETECOM ICT Services GmbH

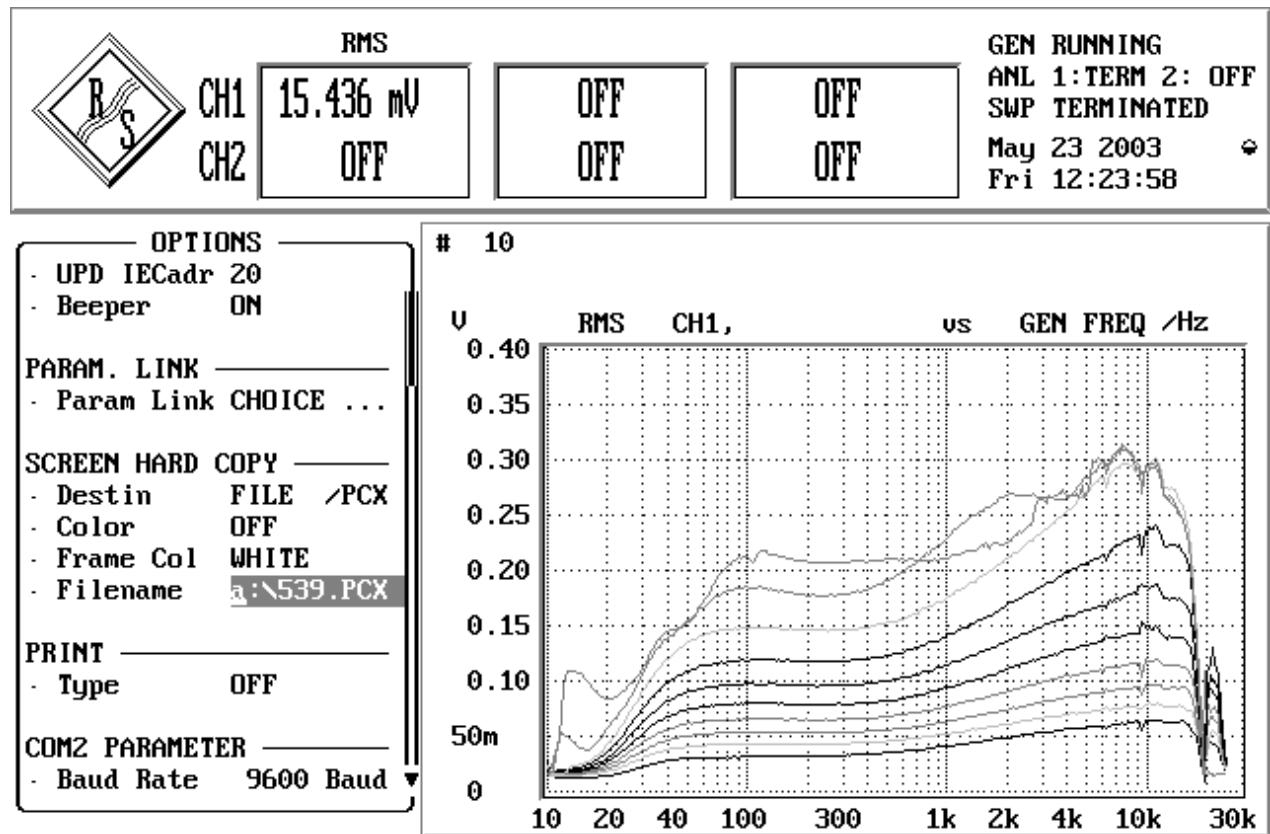
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 13 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY

FCC Rule Part 74 Sec. 2.1047

Frequency: 539.300 MHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

04 ;51

CETECOM ICT Services GmbH


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Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY

FCC Rule Part 74 Sec. 2.1047

Frequency: 554.000 MHz

	CH1	RMS 0.1442 V	OFF	OFF
	CH2	OFF	OFF	OFF
				GEN RUNNING
				ANL 1: TERM 2: OFF
				SWP TERMINATED
				May 23 2003
				Fri 12:29:01

OPTIONS

- UPD IECadr 20
- Beeper ON

PARAM. LINK

- Param Link CHOICE ...

SCREEN HARD COPY

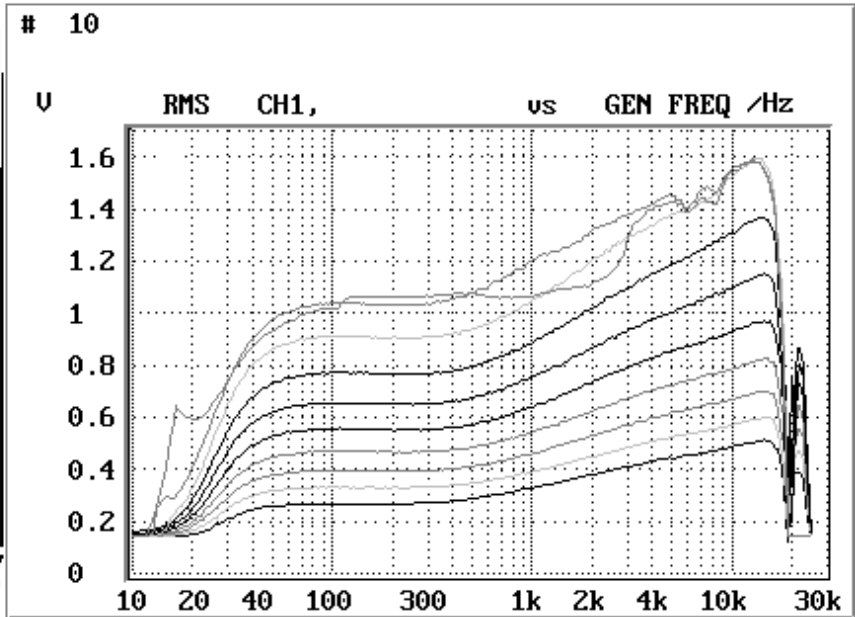
- Destin FILE /PCX
- Color OFF
- Frame Col WHITE
- Filename a:\554.PCX

PRINT

- Type OFF

COM2 PARAMETER

- Baud Rate 9600 Baud



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

04 ;51

CETECOM ICT Services GmbH


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Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY

FCC Rule Part 74 Sec. 2.1047

Frequency: 632.000 MHz

	RMS	CH1 0.1500 V	OFF	OFF
		CH2 OFF	OFF	OFF
		GEN RUNNING		
		ANL 1: TERM 2: OFF		
		SWP TERMINATED		
		May 23 2003		
		Fri 12:40:39		

OPTIONS

- UPD IECadr 20
- Beeper ON

PARAM. LINK

- Param Link CHOICE ...

SCREEN HARD COPY

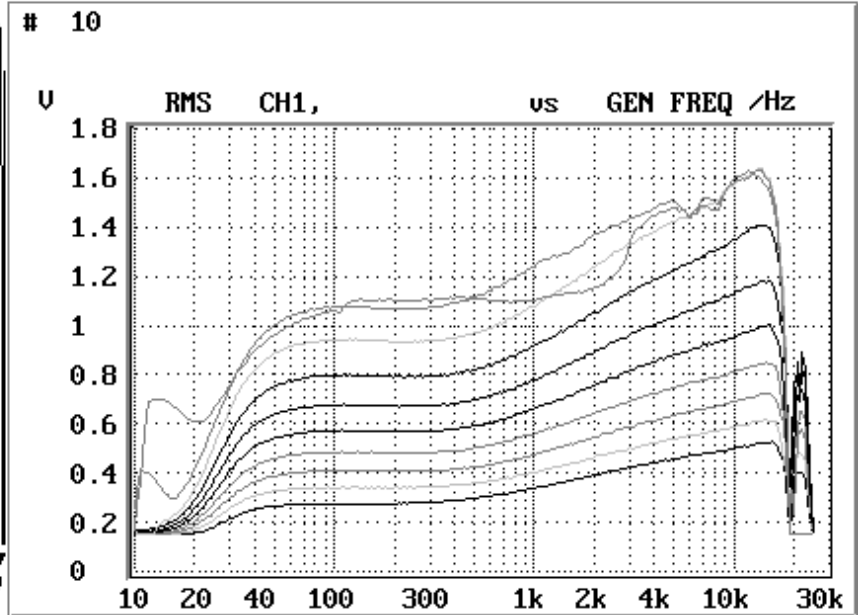
- Destin FILE /PCX
- Color OFF
- Frame Col WHITE
- Filename a:\632.PCX

PRINT

- Type OFF

COM2 PARAMETER

- Baud Rate 9600 Baud



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

04 ;51

CETECOM ICT Services GmbH


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Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY

FCC Rule Part 74 Sec. 2.1047

Frequency: 647.300 MHz

	RMS	CH1 0.1483 V	OFF	OFF
		CH2 OFF	OFF	OFF
GEN RUNNING ANL 1: TERM 2: OFF SWP TERMINATED May 23 2003 Fri 12:47:43				

OPTIONS

- UPD IECadr 20
- Beeper ON

PARAM. LINK

- Param Link CHOICE ...

SCREEN HARD COPY

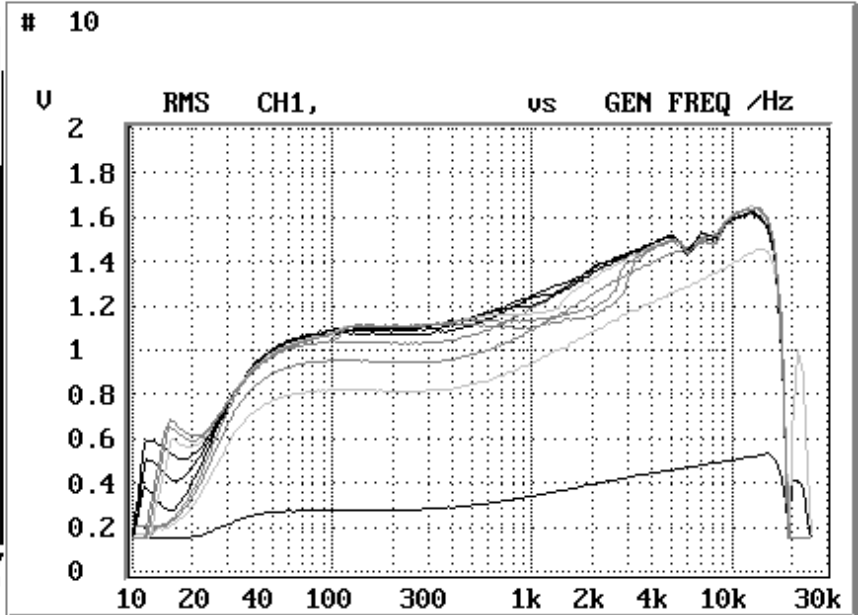
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- Color OFF
- Frame Col WHITE
- Filename a:\647.PCX

PRINT

- Type OFF

COM2 PARAMETER

- Baud Rate 9600 Baud



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

04 ;51

CETECOM ICT Services GmbH

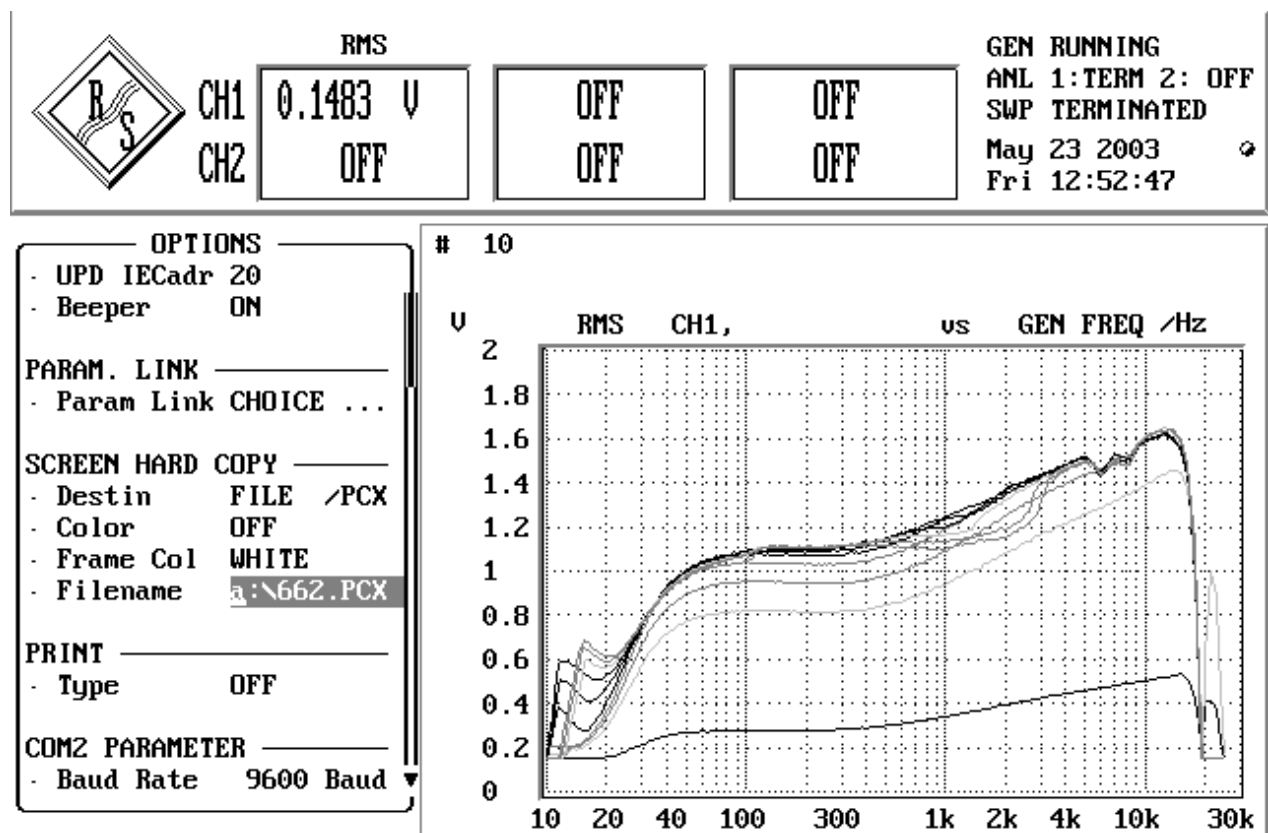
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 17 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY

FCC Rule Part 74 Sec. 2.1047

Frequency: 662.000 MHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

04 ;51

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 18 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Test method :

The audio frequency responds was measured in accordance with EIA/TIA 603.

Data in the plots show that all sidebands between 50 &100% for the authorized bandwidth are attenuated by at least 25dB. From 100 to 250% of the authorize3d bandwidth they are attenuated by at least 35dB and beyond 250% 43 log(Po) dB. The plot shows the transmitter modulated with 15000 Hz(the highest modulation frequency), adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the unmodulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plots follow.

TEST CONDITIONS		OCCUPIED BANDWIDTH (kHz)					
		524.0	539.3	554.0	632.0	647.3	662.0
Frequency (MHz)							
T _{nom} (23)°C	V _{nom} (115)V	97.194	99.198	98.196	99.198	99.198	99.189
max. Deviation (FM)		± 30 kHz					
Measurement uncertainty		±0.5%					

Limits

FCC Rule Part 74.861(e)(5)

The operating bandwidth shall not exceed 200 kHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 ; 02 ;05

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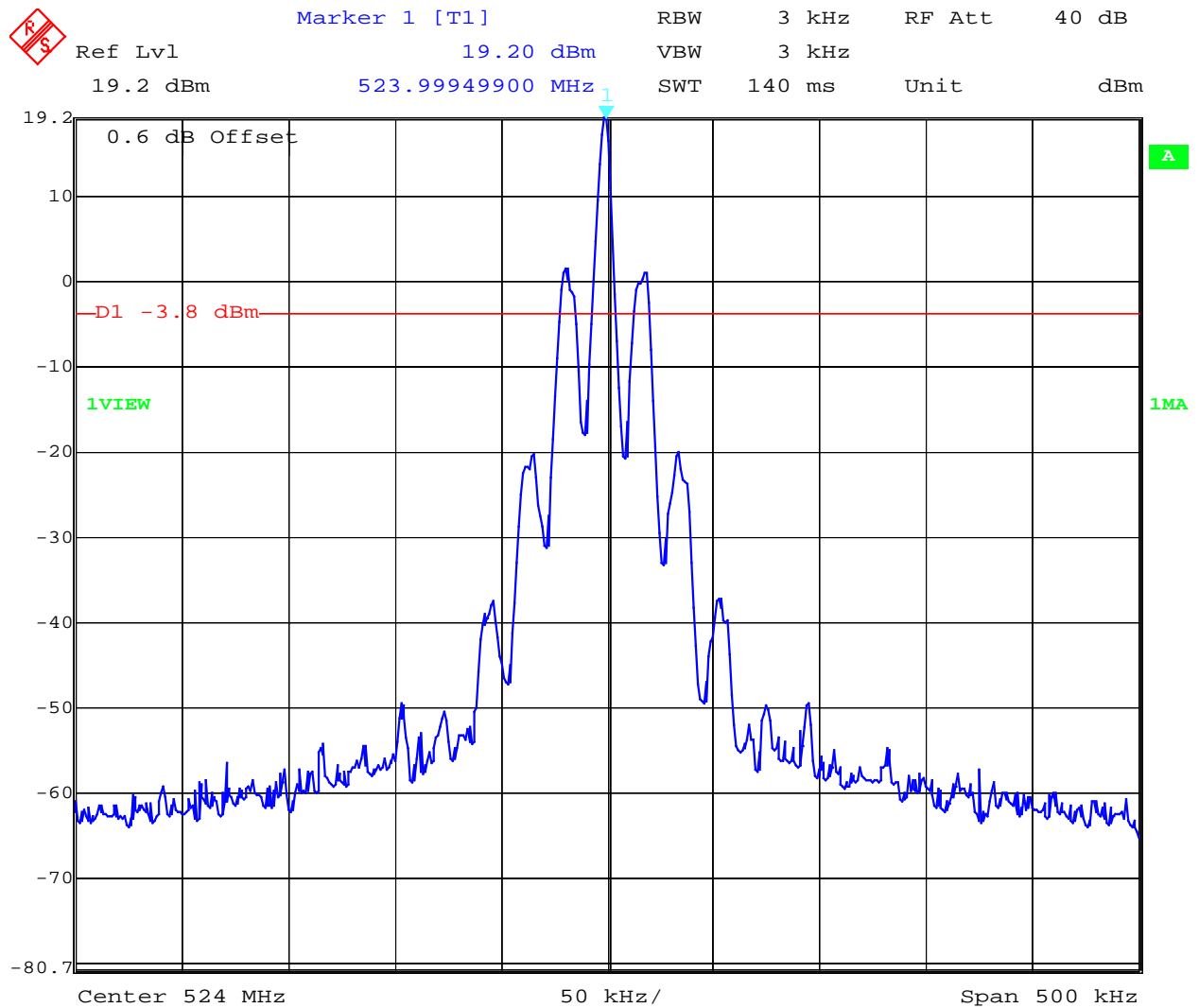
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.989

Frequency: 524.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

no Modulation



Date: 23.MAY.2003 09:21:54

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 ; 02 ;05

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 20 (78)


Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

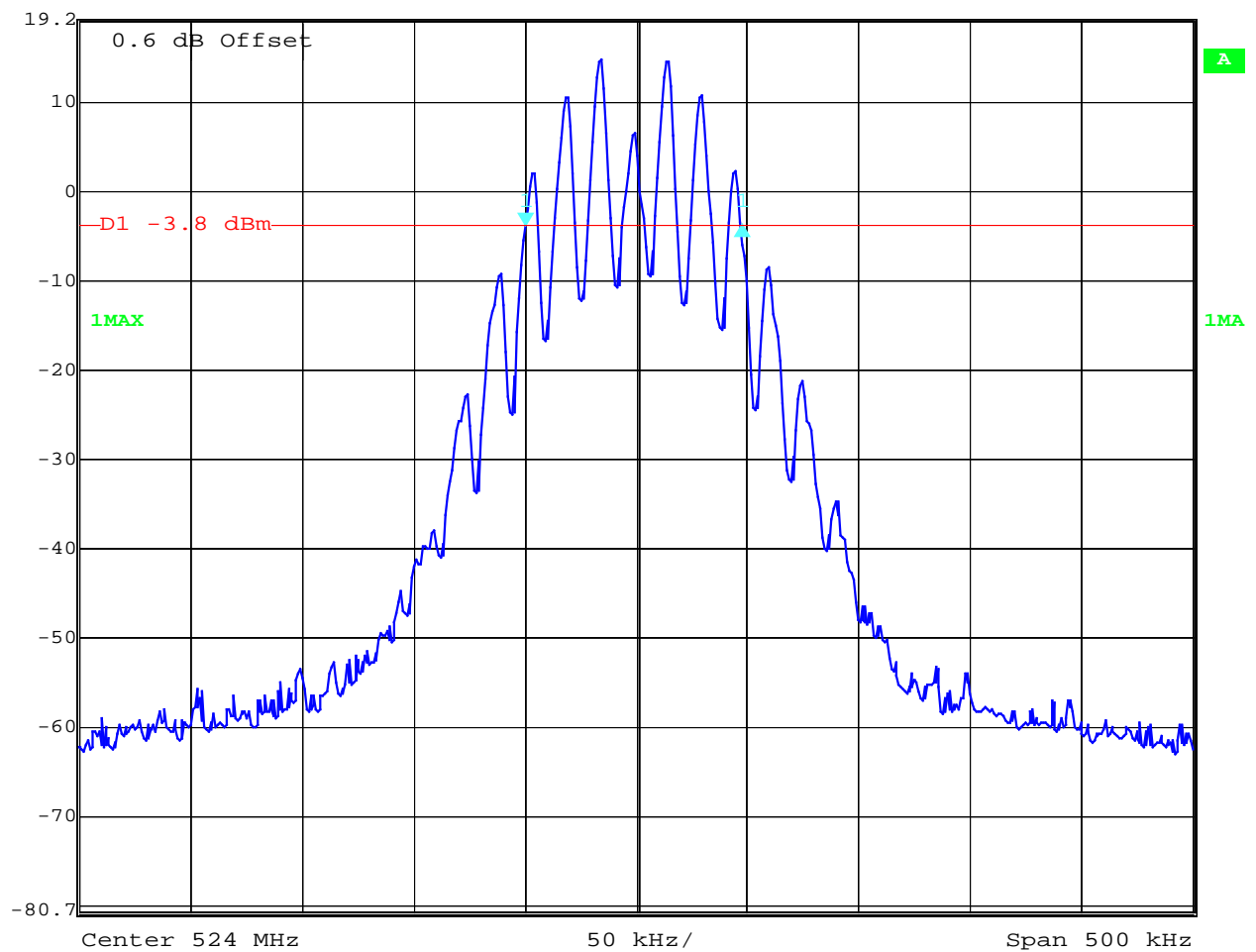
OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 524.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

50%+16 dB Modulation (15 kHz)

	Delta 1 [T1]	RBW	3 kHz	RF Att	40 dB
Ref Lvl	0.00 dB	VBW	3 kHz		
19.2 dBm	97.19438878 kHz	SWT	140 ms	Unit	dBm



Date: 23.MAY.2003 09:22:31

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 ; 02 ;05

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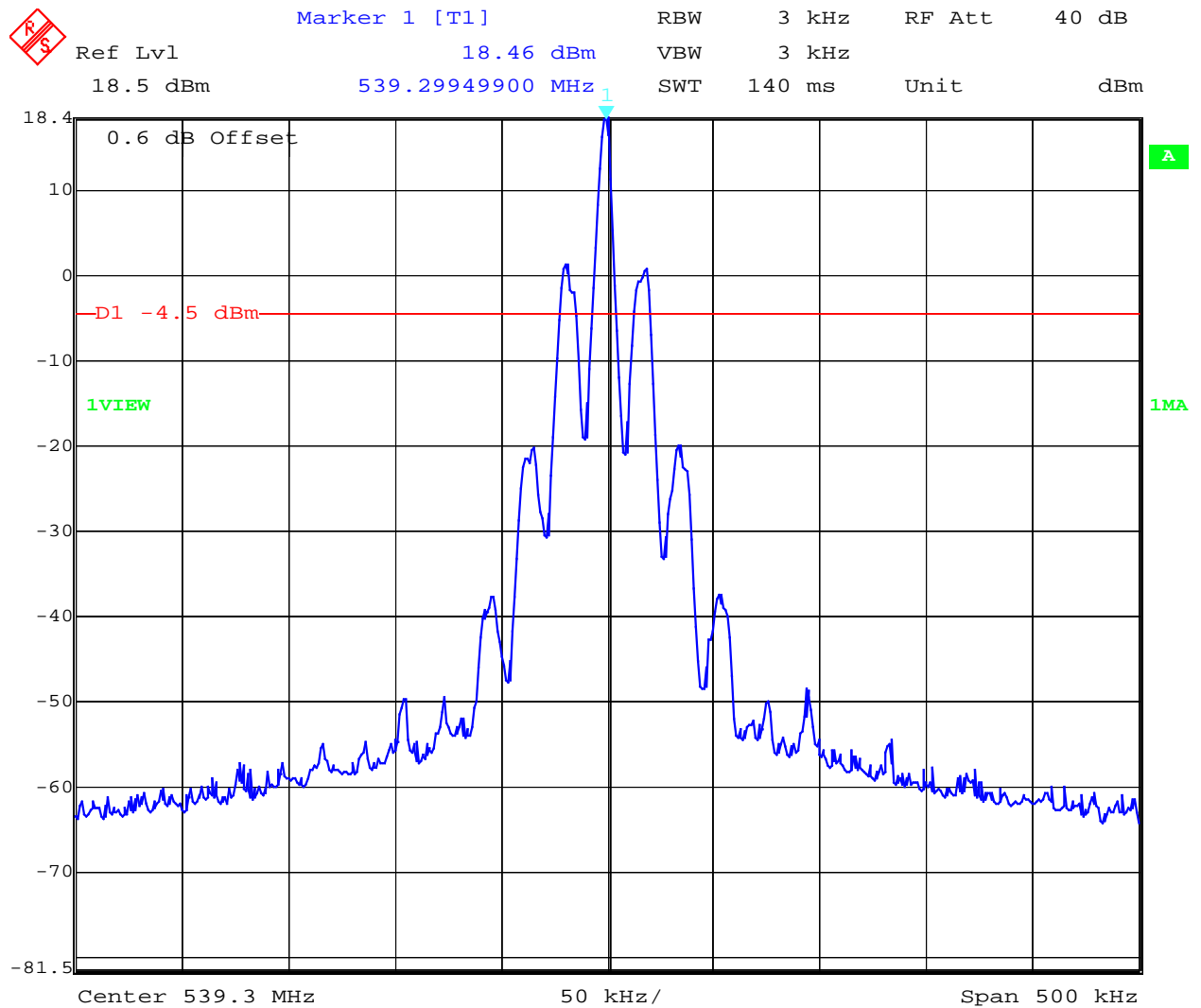
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 539.300 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

no Modulation



Date: 23.MAY.2003 09:19:43

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
01 ; 02 ;05

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 22 (78)


Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

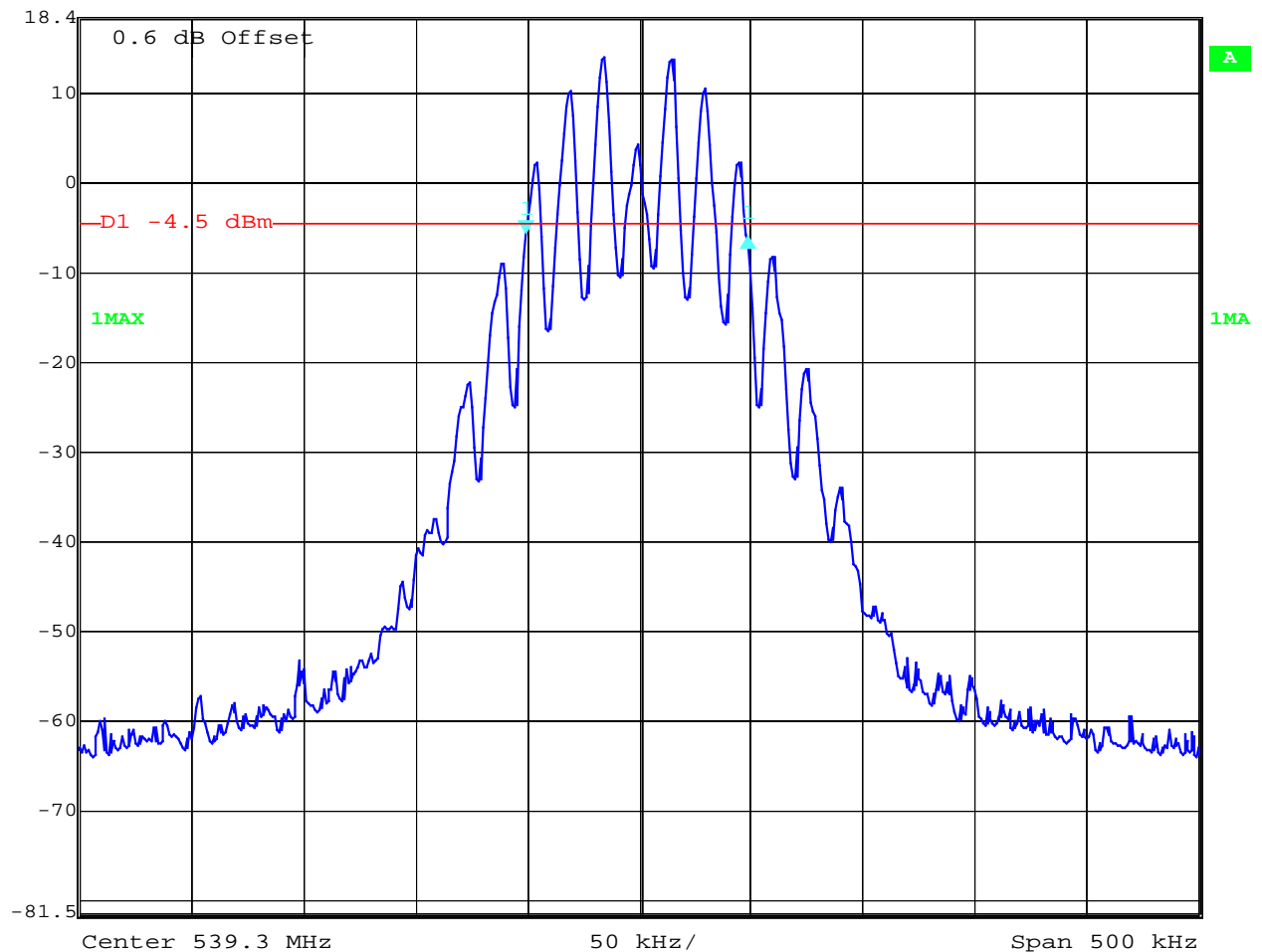
OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.989

Frequency: 539.300 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

50%+16 dB Modulation (15 kHz)

	Delta 1 [T1]	RBW	3 kHz	RF Att	40 dB
Ref Lvl	-0.60 dB	VBW	3 kHz	Unit	dBm
18.5 dBm	99.19839679 kHz	SWT	140 ms		



Date: 23.MAY.2003 09:20:27

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
01 ; 02 ; 05

CETECOM ICT Services GmbH

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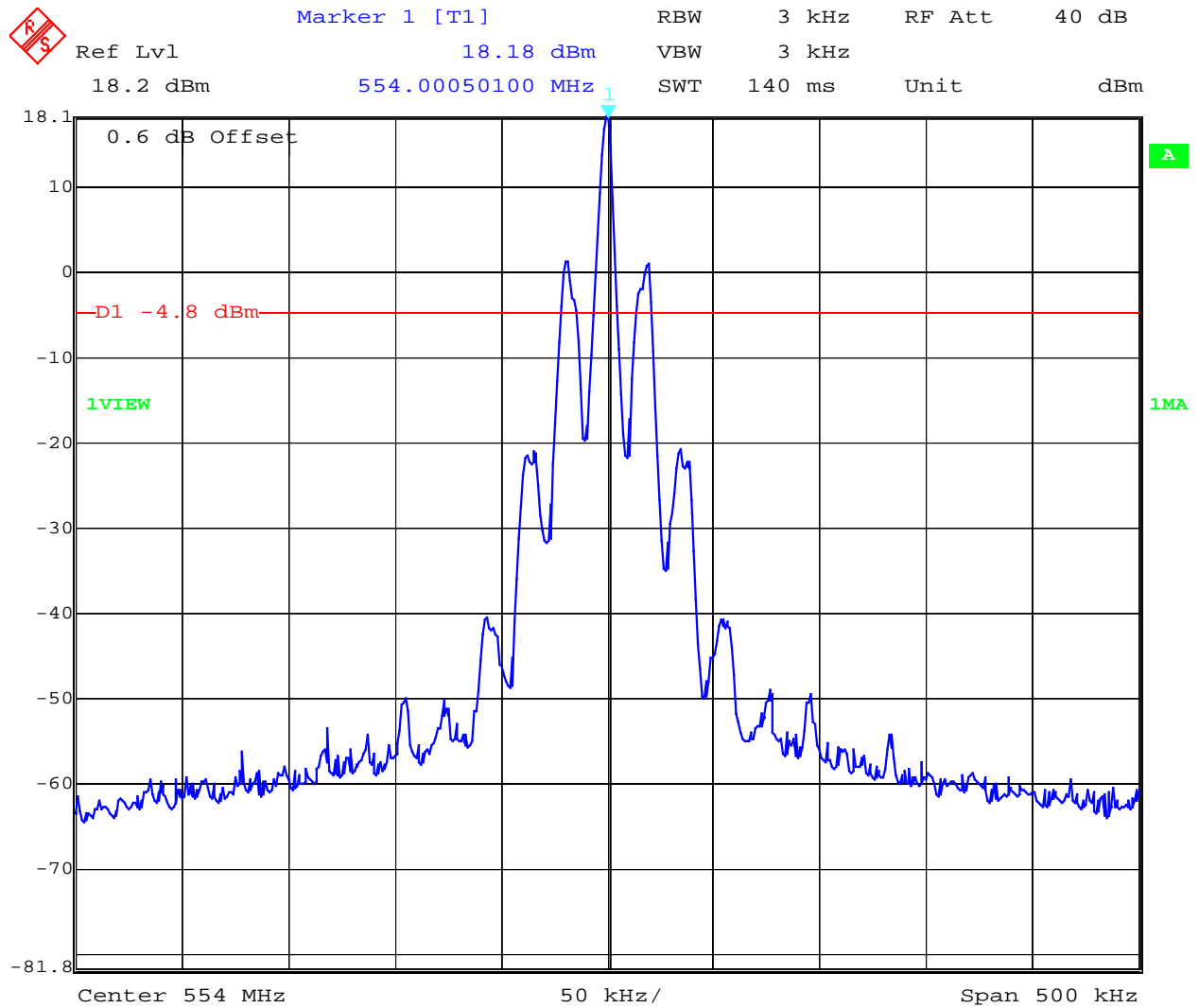
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 554.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

no Modulation



Date: 23.MAY.2003 09:16:32

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
01 ; 02 ;05

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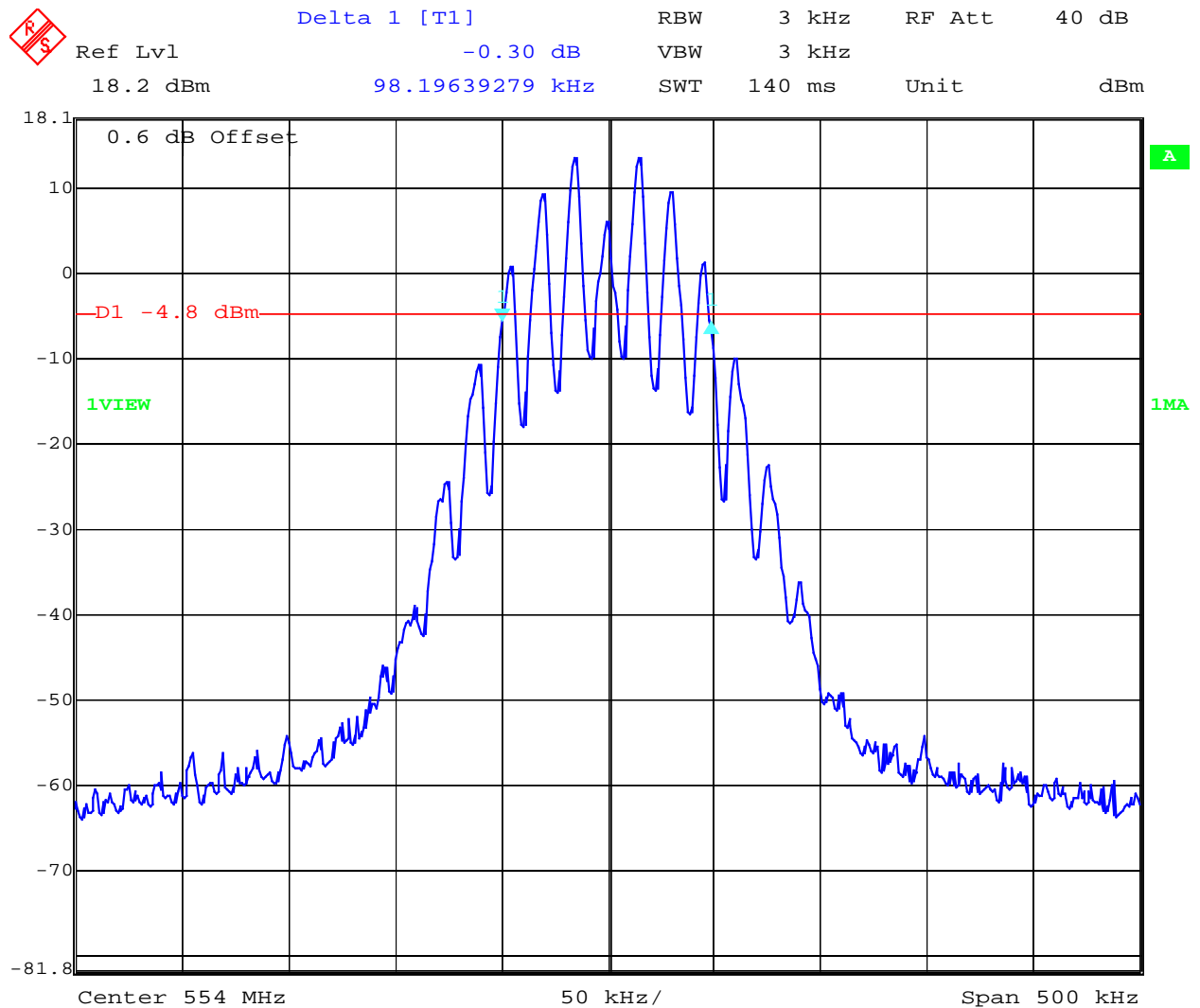
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.989

Frequency: 554.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

50%+16 dB Modulation (15 kHz)



Date: 23.MAY.2003 09:17:32

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
01 ; 02 ; 05

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 25 (78)

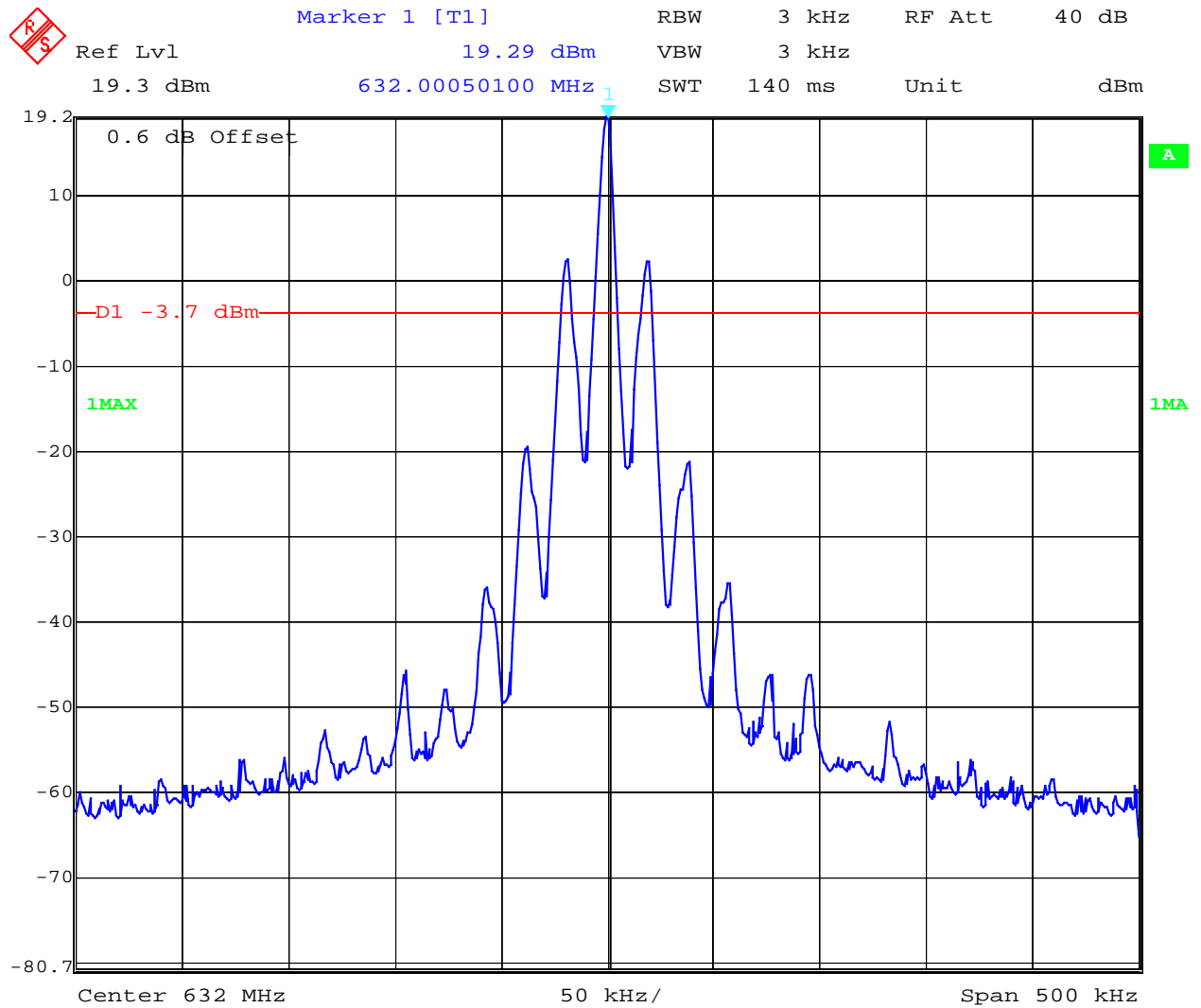
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 632.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

no Modulation



Date: 23.MAY.2003 09:14:23

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
01 ; 02 ;05

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 26 (78)


Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

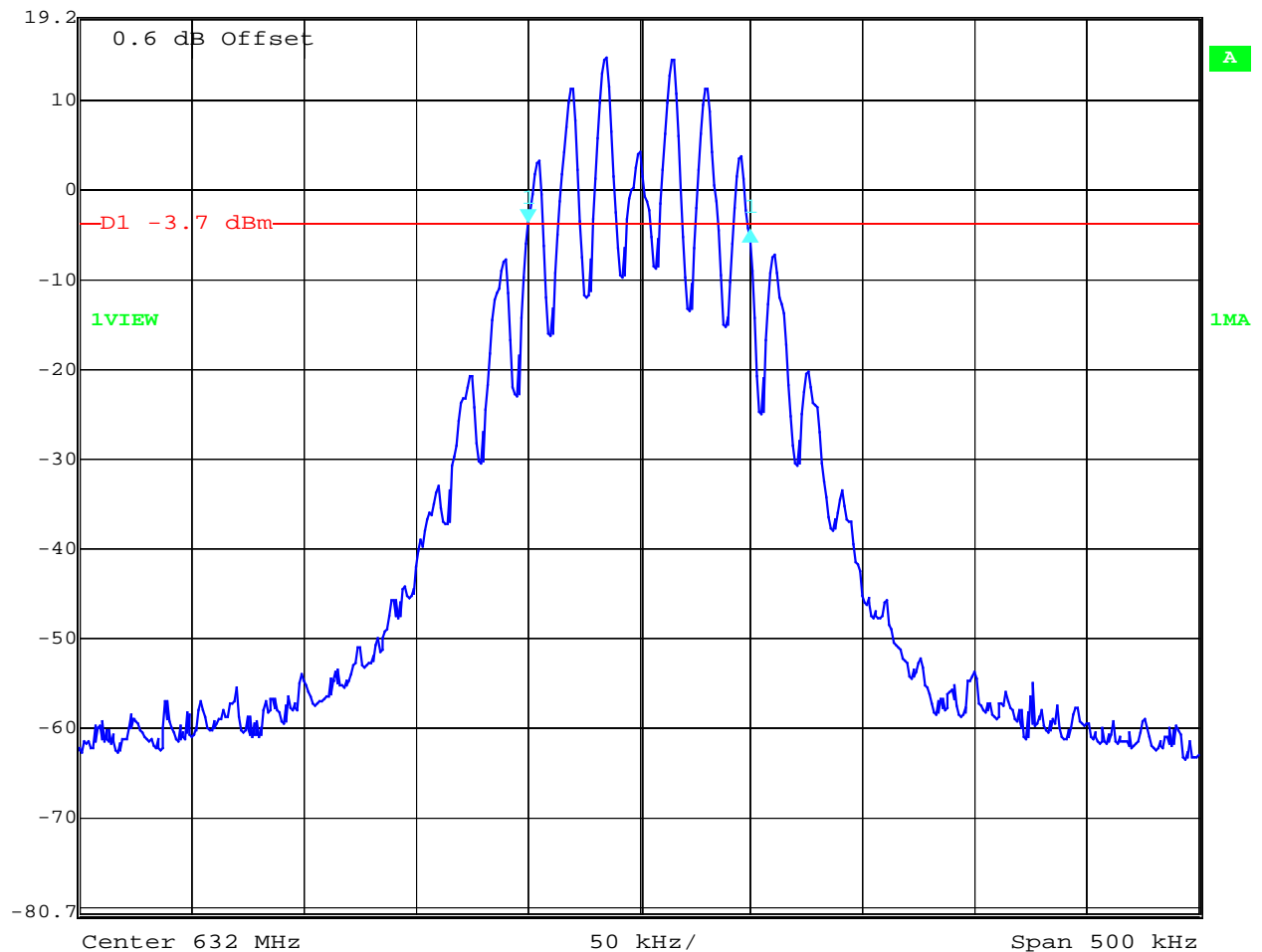
OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 632.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

50%+16 dB Modulation (15 kHz)

 Delta 1 [T1] RBW 3 kHz RF Att 40 dB
Ref Lvl -0.98 dB VBW 3 kHz
19.3 dBm 99.19839679 kHz SWT 140 ms Unit dBm



Date: 23.MAY.2003 09:15:05

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
01 ; 02 ;05

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 27 (78)


Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

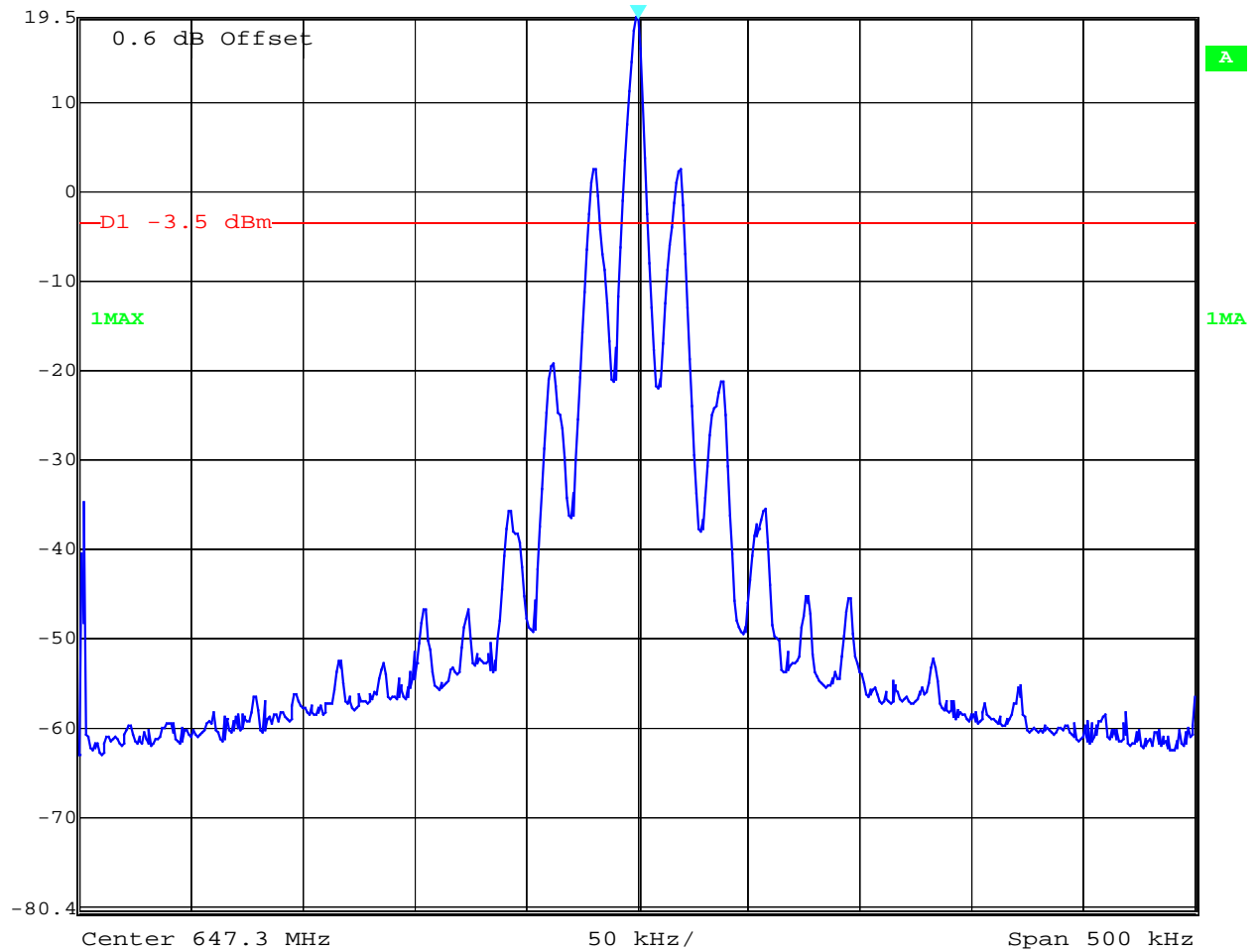
OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 647.300 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

no Modulation

 Marker 1 [T1] RBW 3 kHz RF Att 40 dB
Ref Lvl 19.53 dBm VBW 3 kHz
19.5 dBm 647.30050100 MHz SWT 140 ms Unit dBm



Date: 23.MAY.2003 09:12:25

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
01 ; 02 ;05

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 28 (78)


Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

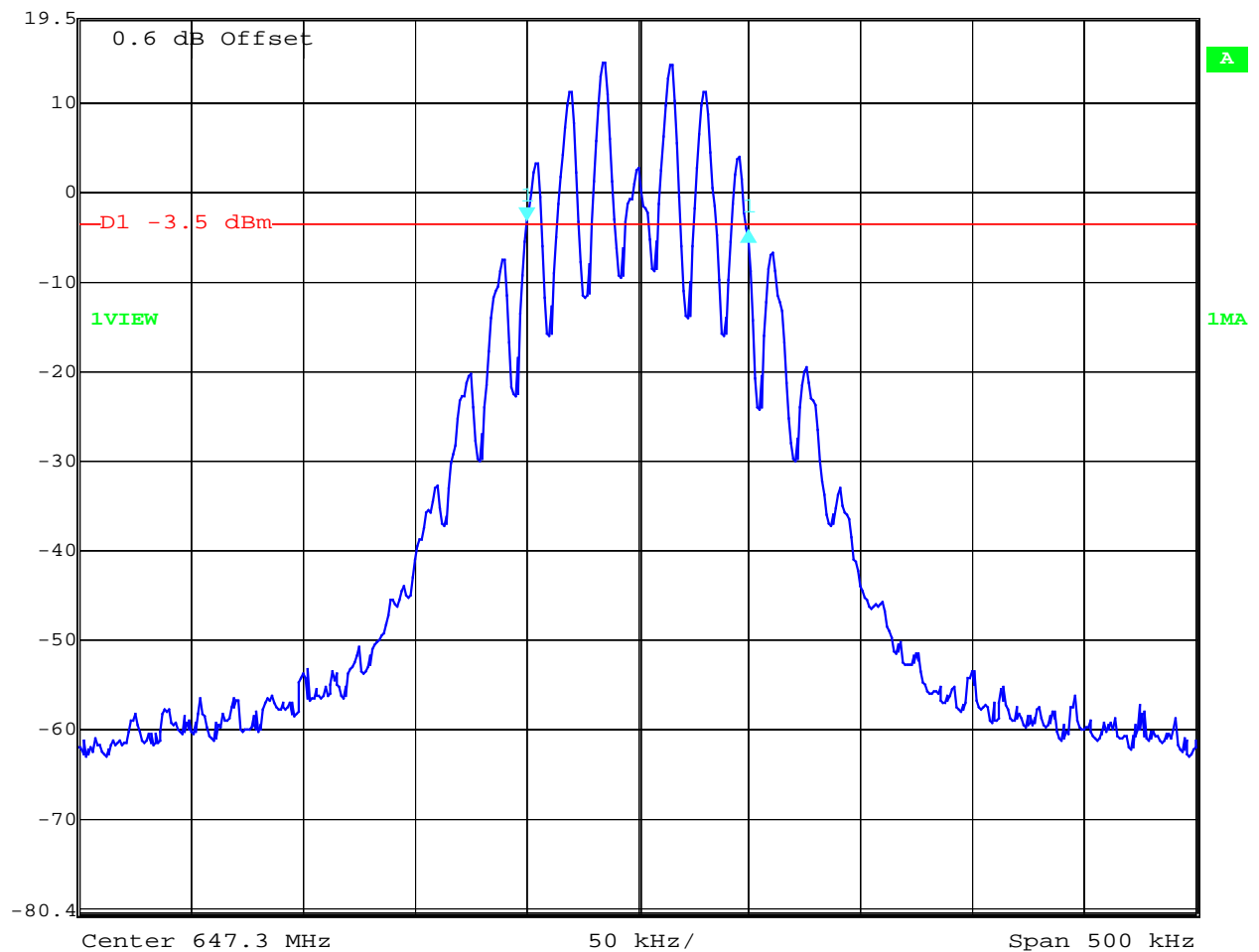
OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 647.300 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

50%+16 dB Modulation (15 kHz)

 Delta 1 [T1] RBW 3 kHz RF Att 40 dB
Ref Lvl -1.20 dB VBW 3 kHz
19.5 dBm 99.19839679 kHz SWT 140 ms Unit dBm



Date: 23.MAY.2003 09:13:19

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 ; 02 ;05

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 29 (78)

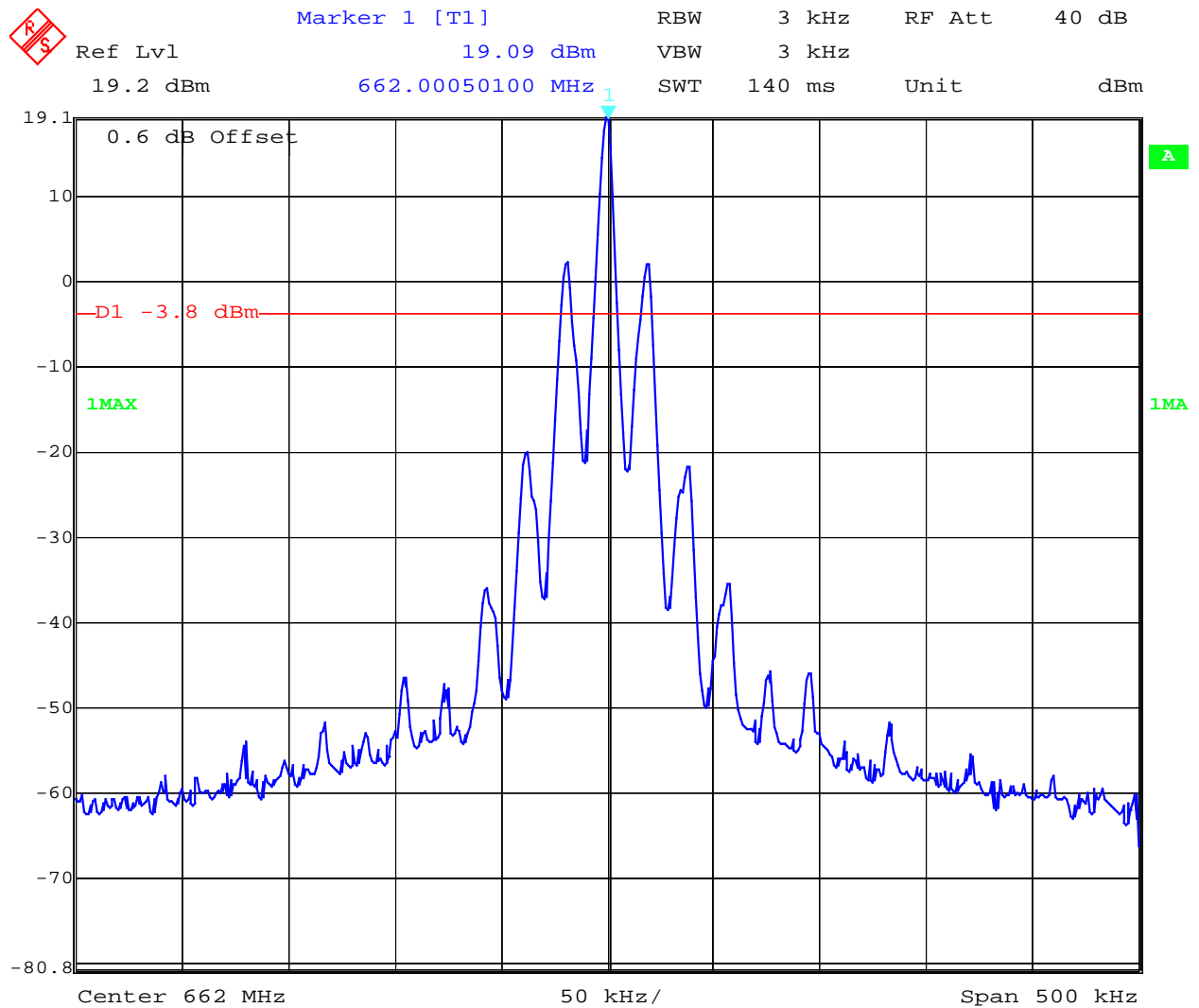
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 662.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

no Modulation



Date: 23.MAY.2003 09:11:08

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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 30 (78)

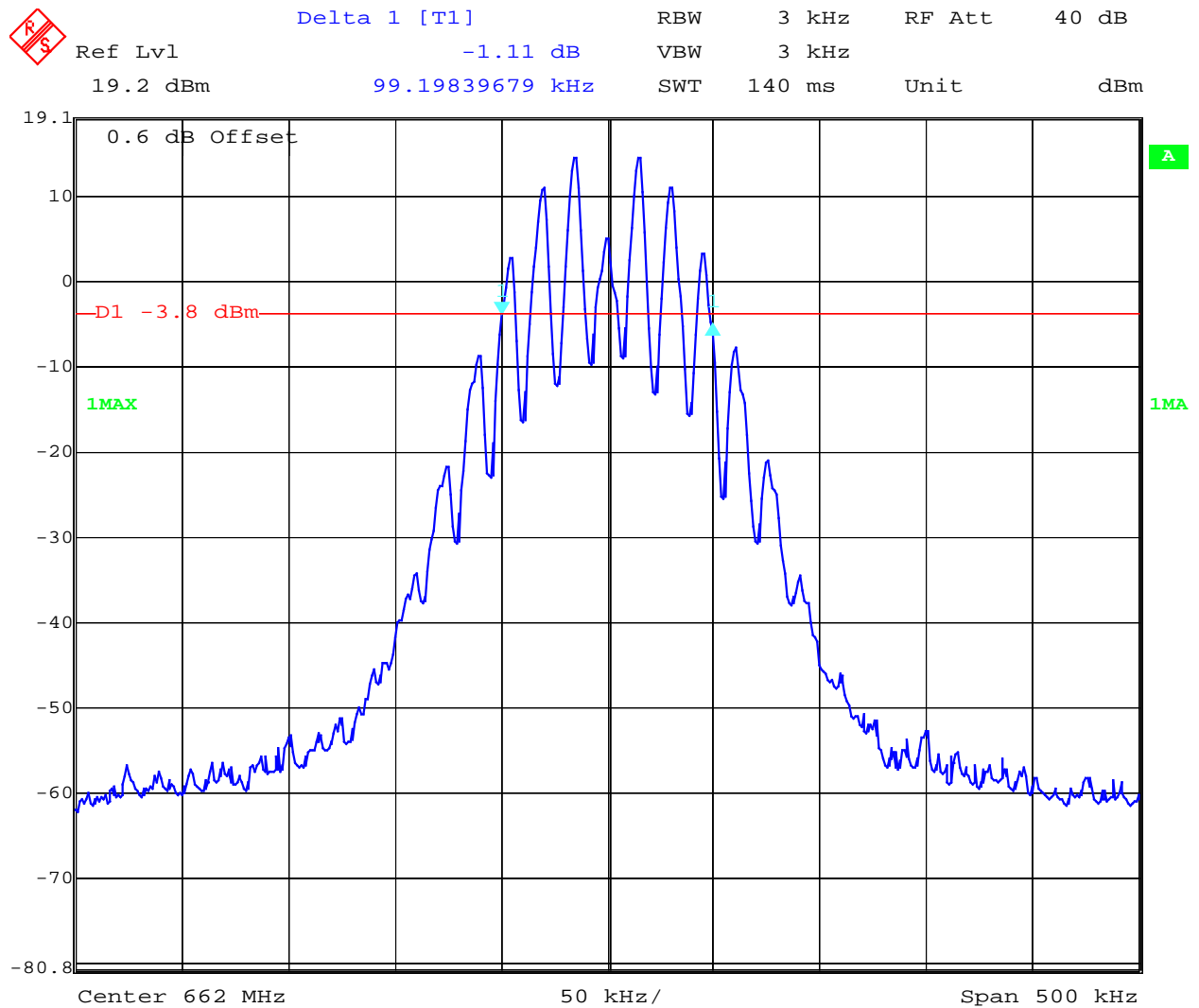
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

OCCUPIED BANDWIDTH

FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Frequency: 662.000 MHz / max. deviation : ± 30 kHz (Limit ± 75 kHz)

50%+16 dB Modulation (15 kHz)



Date: 23.MAY.2003 09:10:34

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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 31 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

CONDUCTED EMISSIONS

FCC 74 861(e)(6)

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBm)	limit max. allowed emission power (dBm)	actual attenuation below frequency of operation (dBc)	results
524.0 MHz					
524.0		20.31	-13.0 (33.31 dBc)		carrier
240.489		-47.55		67.86	complies
539.300 MHz					
539.3		19.61	-13.0 (32.61 dBc)		carrier
no peak	found				complies
554.000 MHz					
554.0		18.69	-13.0 (31.69 dBc)		carrier
no peak	found				complies
632.0 MHz					
632.0		20.42	-13.0 (33.42 dBc)		carrier
1699.406		-46.58		67.0	complies
647.300 MHz					
647.3		20.37	-13.0 (33.37 dBc)		carrier
3687.380		-46.46		66.83	complies
662.000 MHz					
662.0		20.20	-13.0 (33.20 dBc)		carrier
2645.297		-44.20		64.20	complies
Measurement uncertainty			± 0.5dB		

Limits

FCC Rule Part 74.861(e)(6)

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43 + 10 \log_{10}$ (mean output power in watts) dB.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 32 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

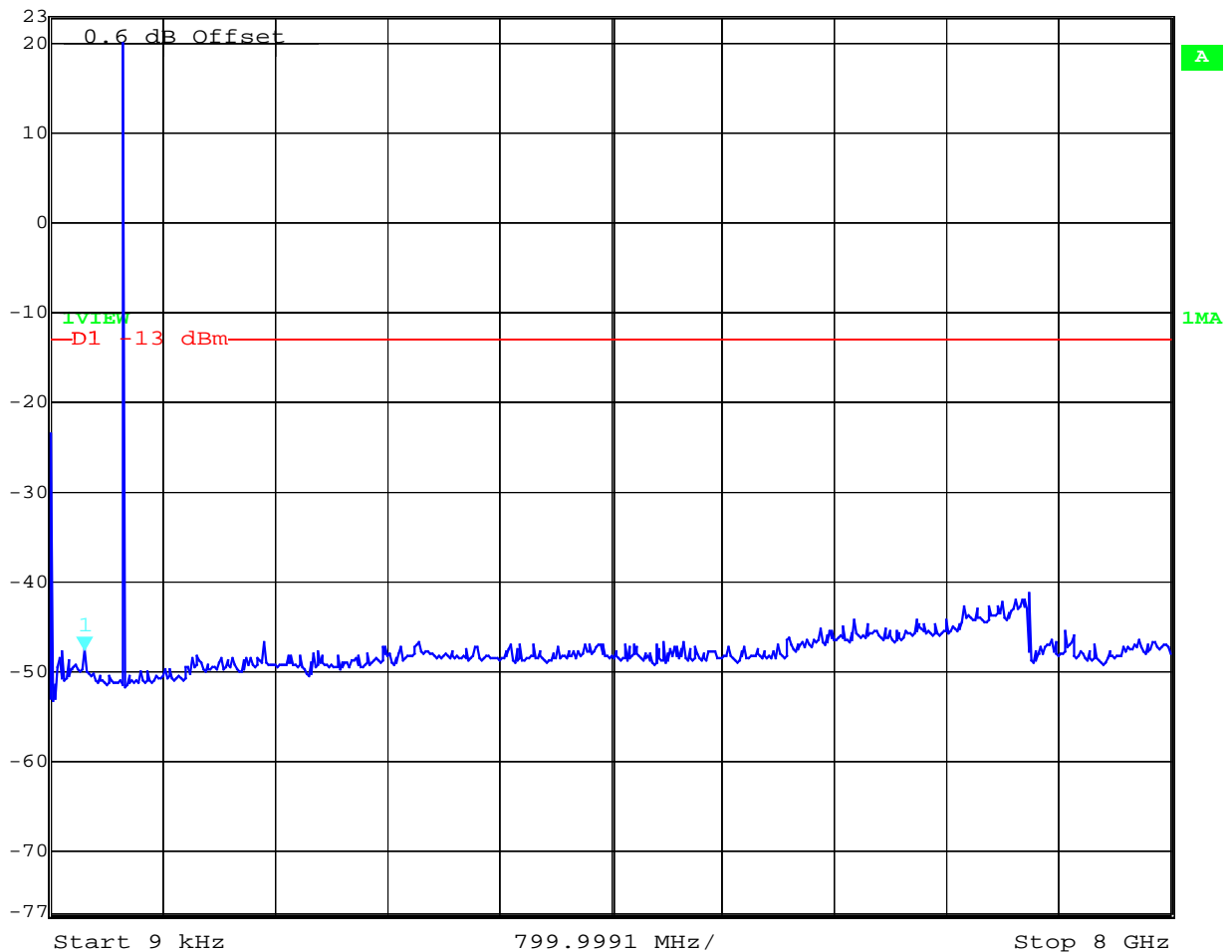
CONDUCTED EMISSIONS

FCC 74.861(e)(6)

Frequency: 524.000 MHz



Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-47.55 dBm	VBW	100 kHz	
23 dBm	240.48969138 MHz	SWT	2 s	Unit dBm



Date: 23.MAY.2003 08:29:56

Limits

FCC Rule Part 74.861(e)(6)

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 33 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

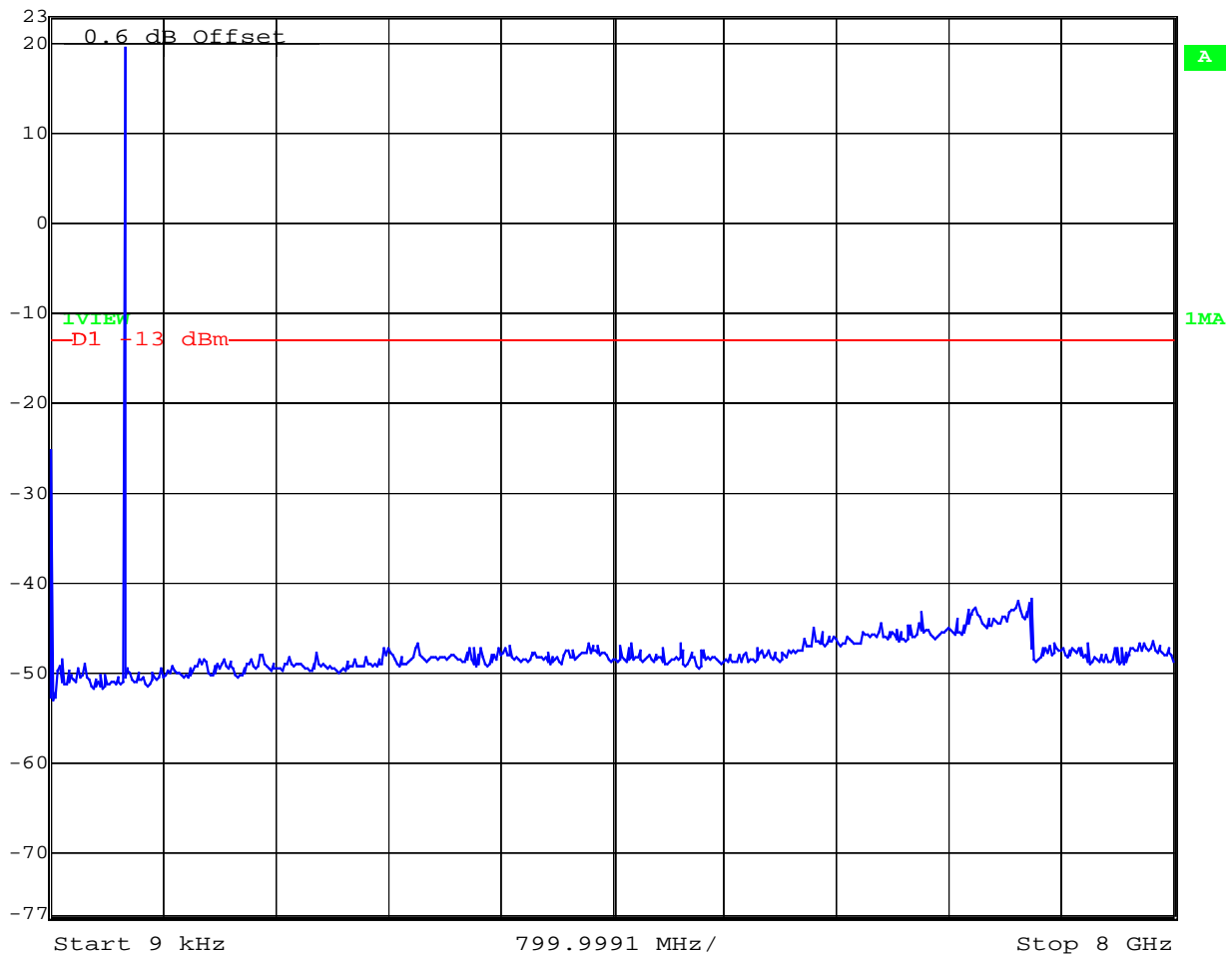
CONDUCTED EMISSIONS Frequency: 539.300 MHz

FCC 74.861(e)(6)



Ref Lvl
23 dBm

RBW 100 kHz RF Att 40 dB
VBW 100 kHz
SWT 2 s Unit dBm



Date: 23.MAY.2003 08:31:48

Limits

FCC Rule Part 74.861(e)(6)

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 34 (78)

Equipment under test : P7T

Ambient temperature : 23°C

Relative humidity : 50%

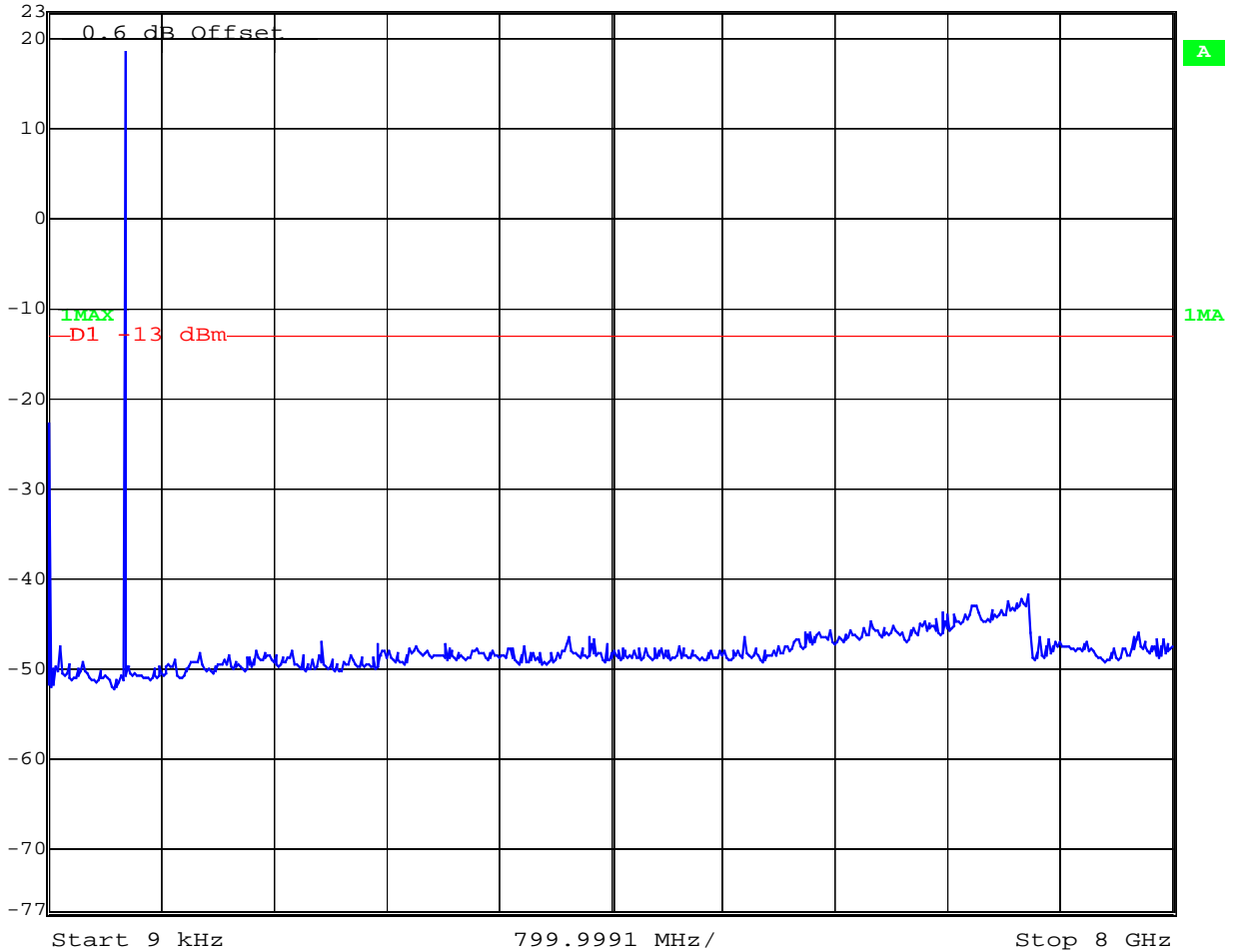
CONDUCTED EMISSIONS

FCC 74.891(e)(6)

Frequency: 554.000 MHz



Ref Lvl	RBW	100 kHz	RF Att	40 dB
23 dBm	VBW	100 kHz	Unit	dBm
	SWT	2 s		



Date: 23.MAY.2003 08:32:35

Limits

FCC Rule Part 74.861(e)(6)

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43 + 10 \log_{10}$ (mean output power in watts) dB.

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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 35 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

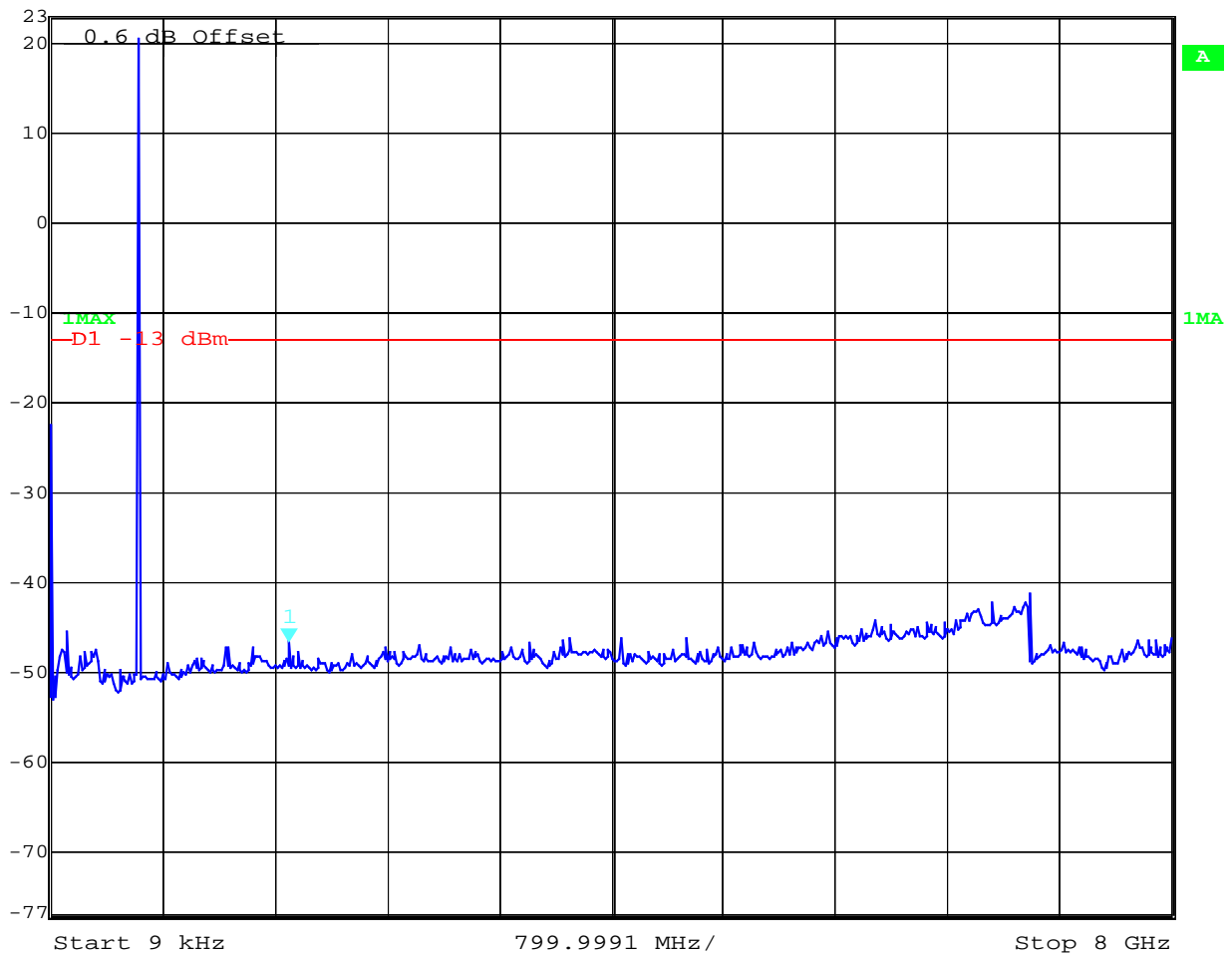
CONDUCTED EMISSIONS

FCC 74.861(e)(6)

Frequency: 632.000 MHz



Ref Lvl	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
23 dBm	-46.58 dBm	VBW	100 kHz		
	1.69940589 GHz	SWT	2 s	Unit	dBm



Date: 23.MAY.2003 08:34:17

Limits

FCC Rule Part 74.861(e)(6)

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24

CETECOM ICT Services GmbH


Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 36 (78)

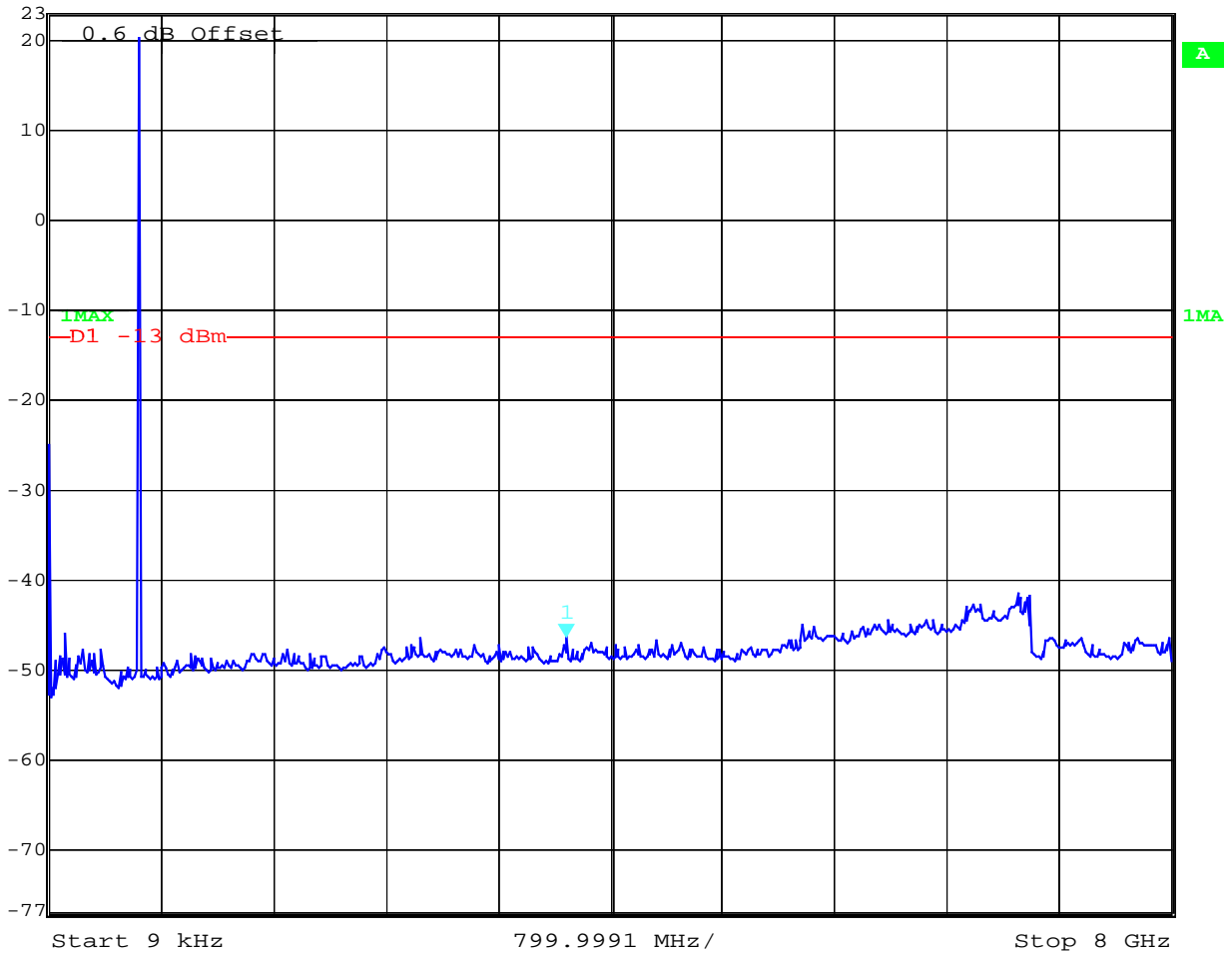
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

CONDUCTED EMISSIONS

FCC 74.861(e)(6)

Frequency: 647.300 MHz

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
	Ref Lvl	-46.46 dBm	VBW	100 kHz	
	23 dBm	3.68737960 GHz	SWT	2 s	Unit dBm



Date: 23.MAY.2003 08:35:38

Limits

FCC Rule Part 74.861(e)(6)

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24

CETECOM ICT Services GmbH


Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 37 (78)

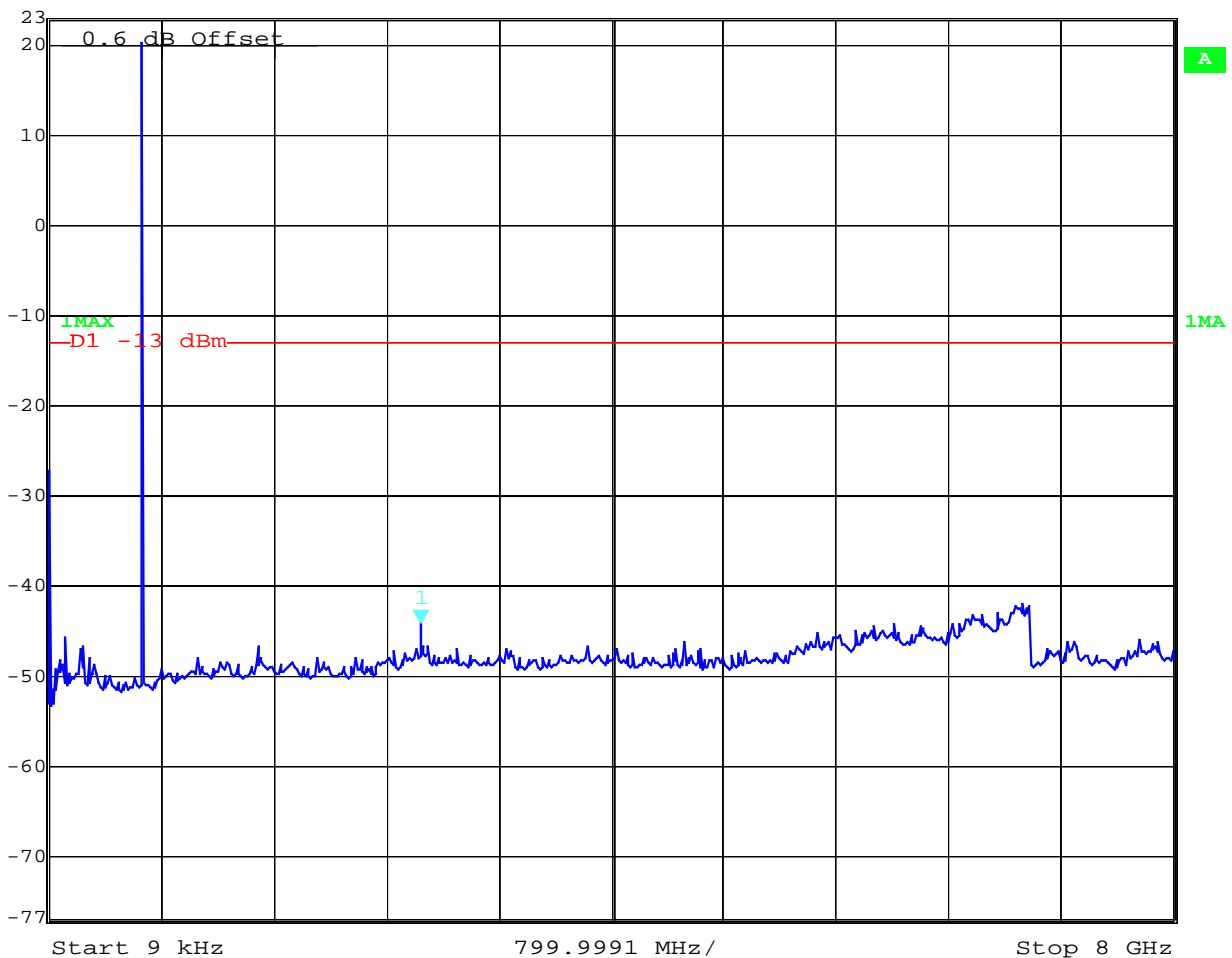
Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

CONDUCTED EMISSIONS

FCC 74.861(e)(6)

Frequency: 662.000 MHz

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
	Ref Lvl	-44.20 dBm	VBW	100 kHz	
	23 dBm	2.64529661 GHz	SWT	2 s	Unit dBm



Date: 23.MAY.2003 08:36:54

Limits

FCC Rule Part 74.861(e)(6)

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24


CETECOM ICT Services GmbH

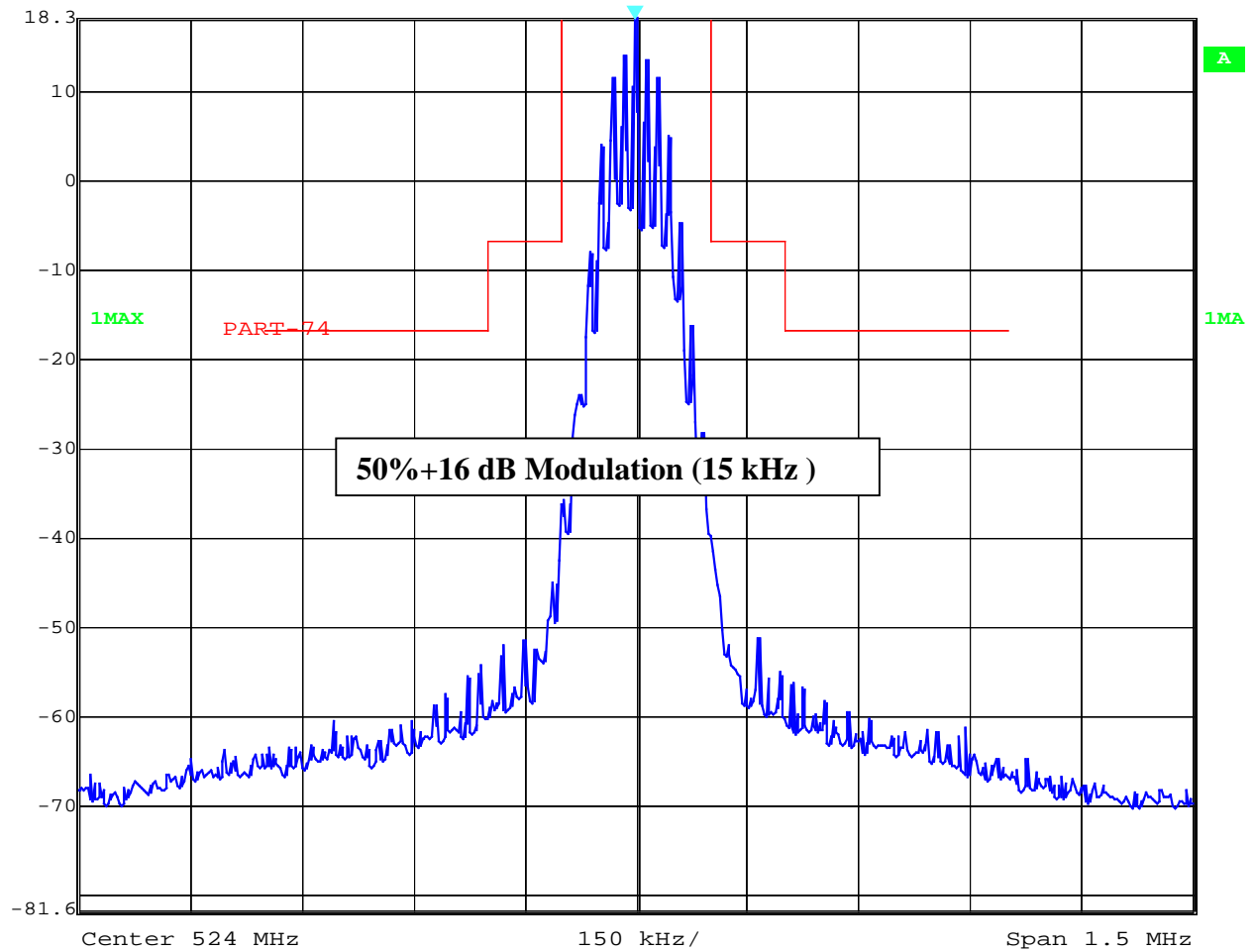
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 38 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

Emission mask FCC 74 861(e)(6)

524.00 MHz


 Marker 1 [T1] RBW 3 kHz RF Att 40 dB
 Ref Lvl 18.32 dBm VBW 3 kHz
 18.3 dBm 523.99849699 MHz SWT 420 ms Unit dBm



Date: 2.JUN.2003 14:49:45

Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100$ kHz to $f \pm 200$ kHz	$f \pm 200$ kHz to $f \pm 500$ kHz	$f \pm 500$ kHz
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

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

17 - 24


CETECOM ICT Services GmbH

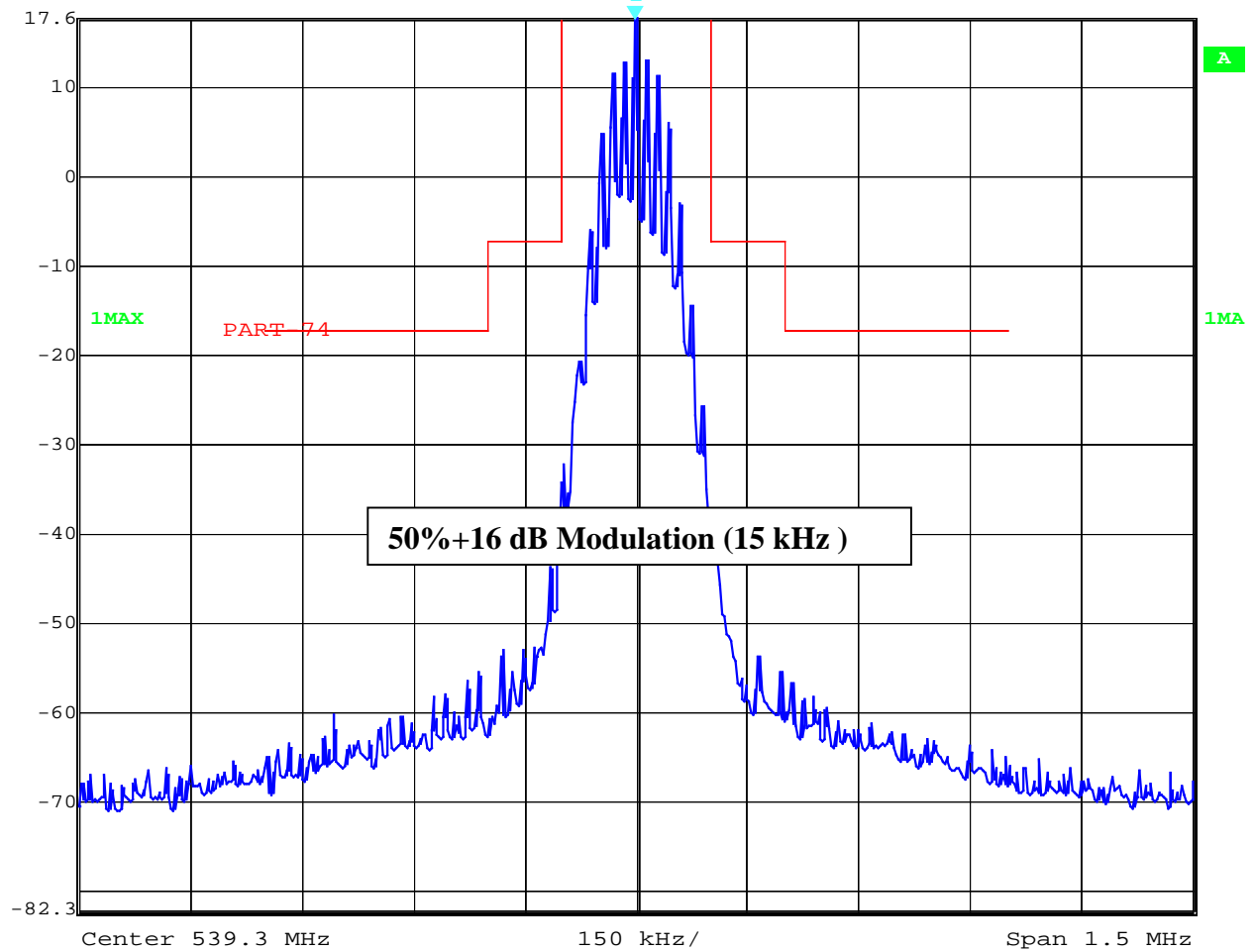
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 39 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

Emission mask
 539.300 MHz

FCC 74 861(e)(6)


 Marker 1 [T1] RBW 3 kHz RF Att 40 dB
 Ref Lvl 17.63 dBm VBW 3 kHz
 17.6 dBm 539.29849699 MHz SWT 420 ms Unit dBm



Date: 2.JUN.2003 14:50:48

Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100 \text{ kHz to } f \pm 200 \text{ kHz}$	$f \pm 200 \text{ kHz to } f \pm 500 \text{ kHz}$	$f \pm 500 \text{ kHz}$
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

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

17 - 24


CETECOM ICT Services GmbH

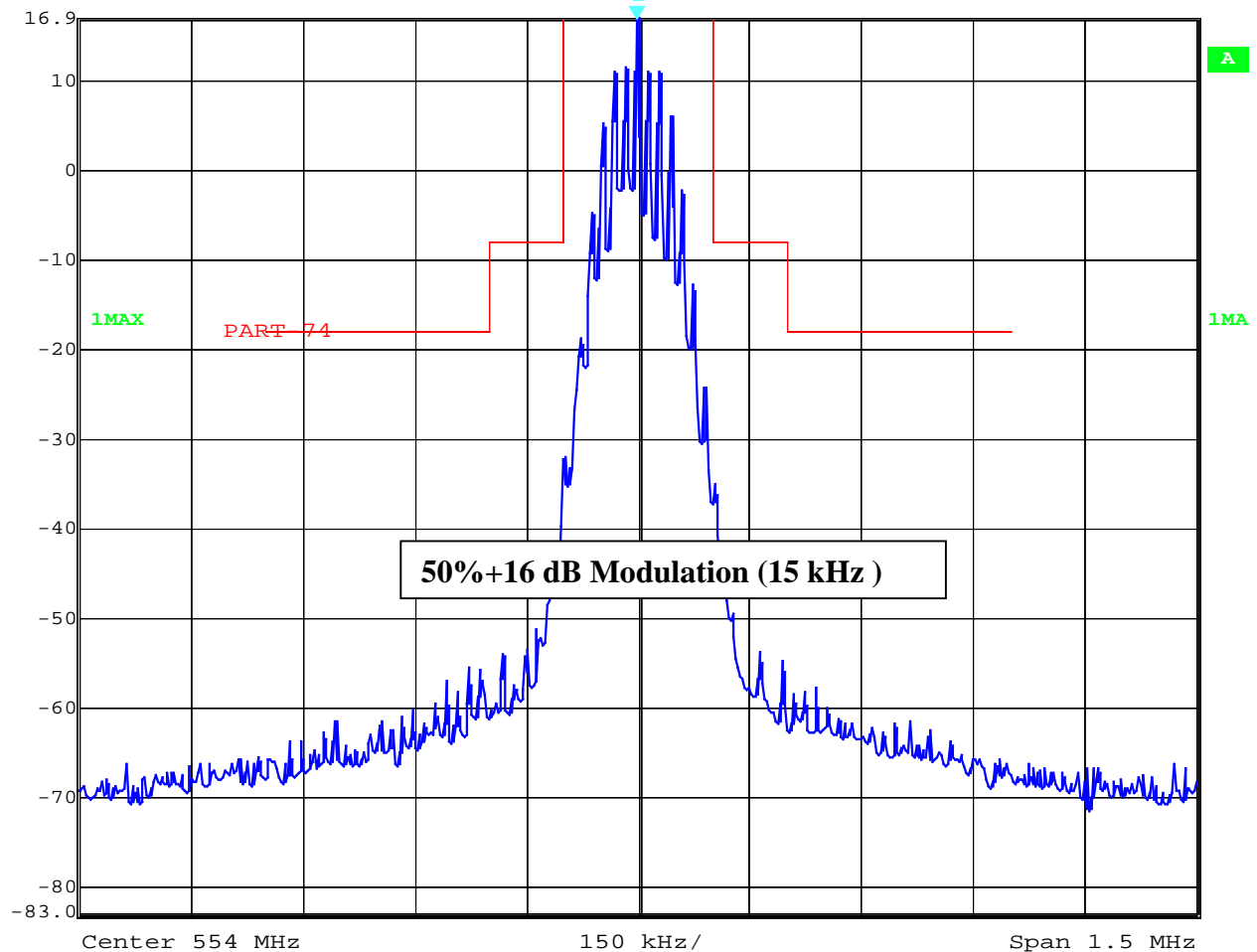
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 40 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

Emission mask
 554.000 MHz

FCC 74 861(e)(6)


 Marker 1 [T1] RBW 3 kHz RF Att 40 dB
 Ref Lvl 16.92 dBm VBW 3 kHz
 16.9 dBm 553.99849699 MHz SWT 420 ms Unit dBm



Date: 2.JUN.2003 14:51:30

Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100 \text{ kHz}$ to $f \pm 200 \text{ kHz}$	$f \pm 200 \text{ kHz}$ to $f \pm 500 \text{ kHz}$	$f \pm 500 \text{ kHz}$
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

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

17 - 24


CETECOM ICT Services GmbH

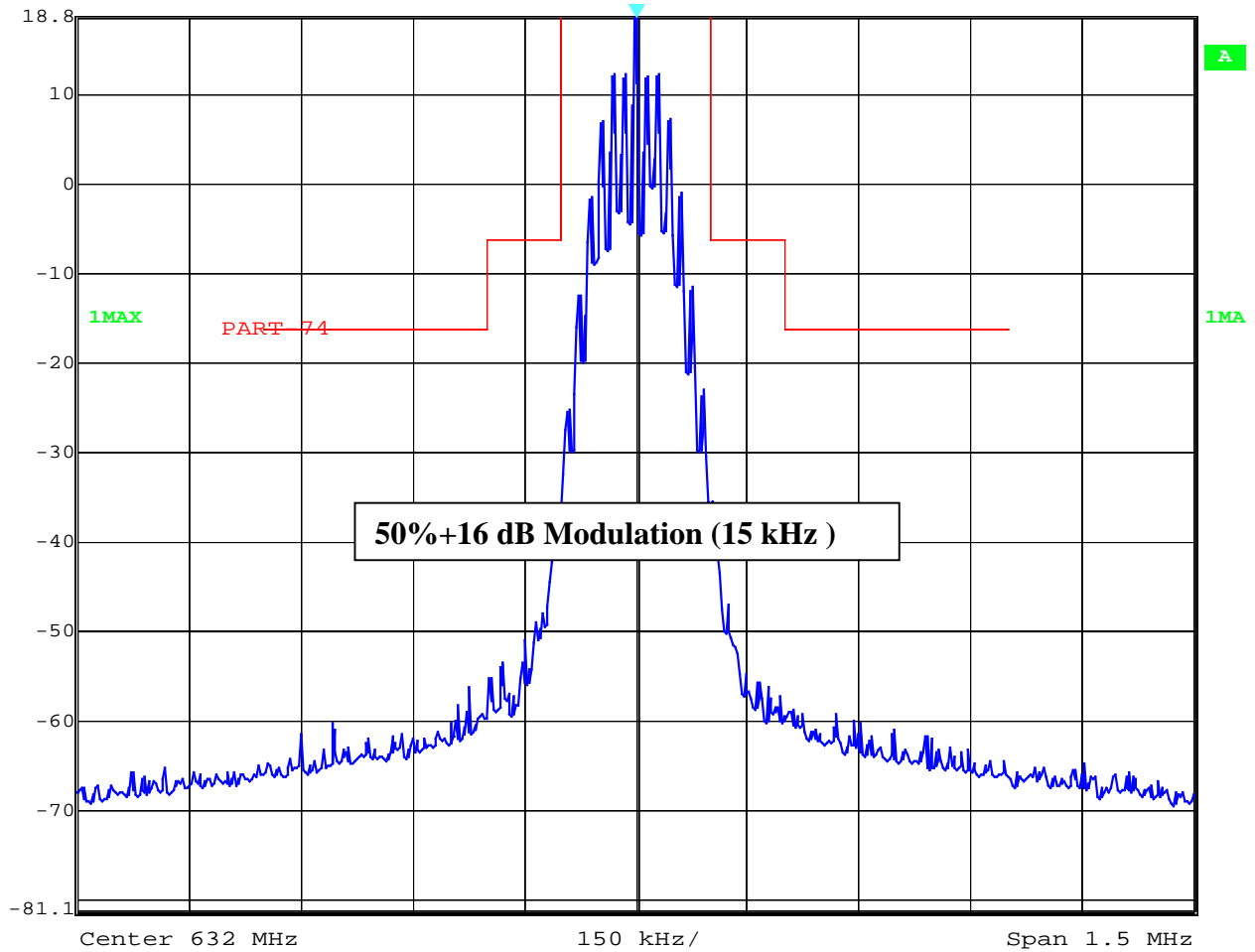
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 41 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

Emission mask
 632.000 MHz

FCC 74 861(e)(6)


 Marker 1 [T1] RBW 3 kHz RF Att 40 dB
 Ref Lvl 18.66 dBm VBW 3 kHz
 18.8 dBm 632.00150301 MHz SWT 420 ms Unit dBm



Date: 2.JUN.2003 14:39:51

Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100 \text{ kHz to } f \pm 200 \text{ kHz}$	$f \pm 200 \text{ kHz to } f \pm 500 \text{ kHz}$	$f \pm 500 \text{ kHz}$
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

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

17 - 24


CETECOM ICT Services GmbH

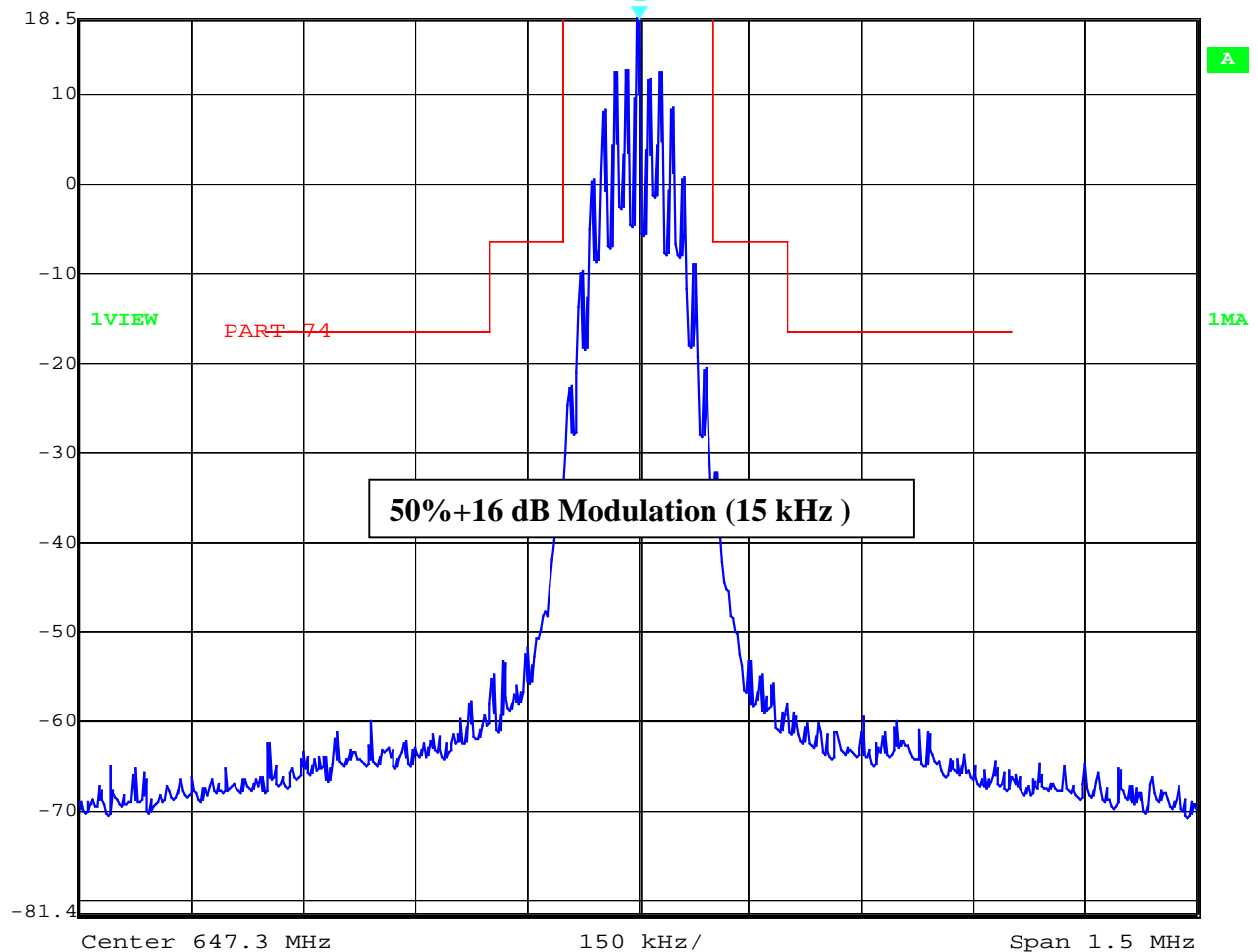
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 42 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

Emission mask
 647.300 MHz

FCC 74 861(e)(6)


 Marker 1 [T1] RBW 3 kHz RF Att 40 dB
 Ref Lvl 18.59 dBm VBW 3 kHz
 18.6 dBm 647.30150301 MHz SWT 420 ms Unit dBm



Date: 2.JUN.2003 14:43:06

Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100$ kHz to $f \pm 200$ kHz	$f \pm 200$ kHz to $f \pm 500$ kHz	$f \pm 500$ kHz
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

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

17 - 24


CETECOM ICT Services GmbH

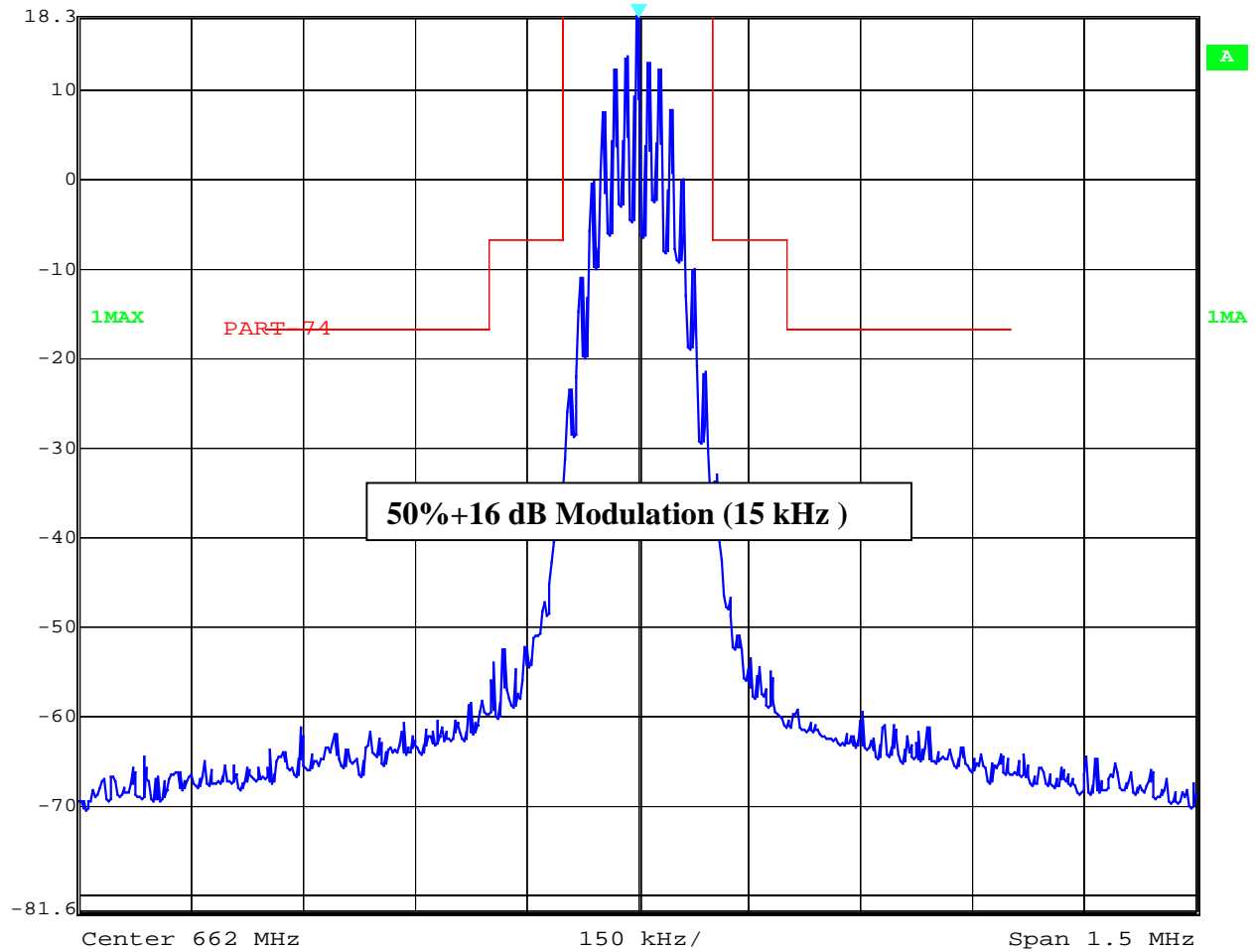
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 43 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

Emission mask
 662.000 MHz

FCC 74 861(e)(6)


 Marker 1 [T1] RBW 3 kHz RF Att 40 dB
 Ref Lvl 18.33 dBm VBW 3 kHz
 18.3 dBm 662.00150301 MHz SWT 420 ms Unit dBm



Date: 2.JUN.2003 14:45:52

Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100 \text{ kHz to } f \pm 200 \text{ kHz}$	$f \pm 200 \text{ kHz to } f \pm 500 \text{ kHz}$	$f \pm 500 \text{ kHz}$
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 44 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS

FCC Rule Part 74 subpart H

Test procedure

- 1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
- 2). The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.
- 3). The output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- 4). The transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- 5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 6). The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- 7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 8). The maximum signal level detected by the measuring receiver shall be noted.
- 9). The transmitter shall be replaced by a substitution antenna (tuned dipole for f less than 1GHz and horn for frequency higher than 1GHz).
- 10). The substitution antenna shall be oriented for vertical polarization and the length (if a dipole antenna is used) of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- 11). The substitution antenna shall be connected to a calibrated signal generator.
- 12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- 13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- 14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- 15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- 16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
- 17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.
- 18). Repeat above substitution measurement procedure for fundamental and all harmonica emissions.

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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 45 (78)

Equipment under test : P7T
 Ambient temperature : 23°C
 Relative humidity : 50%

Freg	SA Reading	SG Setting	Ant. gain	Dipole gain	Cable loss	ERP Result	Limit	Margin	Pol
MHz	dB μ V	dBm	dB i	dB d	dB	dBm	dBm	dBm	H/V
524.0	84.7	14.5	0.0	0.0	2.7	11.8			V
524.0	83.2	11.1	0.0	0.0	2.7	8.4			H
no traceable peak found									
539..3	80.1	10.2		0.0	2.8	7.4			V
539..3	78.7	7.3		0.0	2.8	4.5			H
no traceable peak found									
554.0	81.1	11.3		0.0	2.9	8.4			V
554.0	79.5	8.1		0.0	2.9	5.2			H
no traceable peak found									

Freg	SA Reading	SG Setting	Ant. gain	Dipole gain	Cable loss	ERP Result	Limit	Margin Limit	Pol
MHz	dB μ V	dBm	dB i	dB d	dB	dBm	dBm	dB	H/V
632.0	85.4	17.6		0.0	3.1	14.5			V
632.0	81.0	14.5		0.0	3.1	11.4			H
no traceable peak found									
647.3	87.0	17.6		0.0	3.2	14.4			V
647.3	79.8	14.6		0.0	3.2	11.4			H
606.66	41.0	-29.8		0.0	3.1	-32.9	-13	19.9	V
692.14	44.3	-23.1		0.0	3.4	-26.5	-13	13.5	V
662.0	81.9	16.4		0.0	3.3	13.1			V
662.0	77.3	13.6		0.0	3.3	10.3			H
579.6	31.8	-36.3		0.0	3.0	-39.3	-13	23.3	V
622.24	46.1	-22.5		0.0	3.1	-25.6	-13	12.6	V
706.32	46.4	-17.3		0.0	3.3	-20.6	-13	7.4	V
746.84	29.2	-35.0		0.0	3.5	-38.5	-13	25.5	V

all results worst case

Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100$ kHz to $f \pm 200$ kHz	$f \pm 200$ kHz to $f \pm 500$ kHz	$f \pm 500$ kHz
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 46 (78)

Equipment under test : P7T

Ambient temperature : 23°C

Relative humidity : 50%

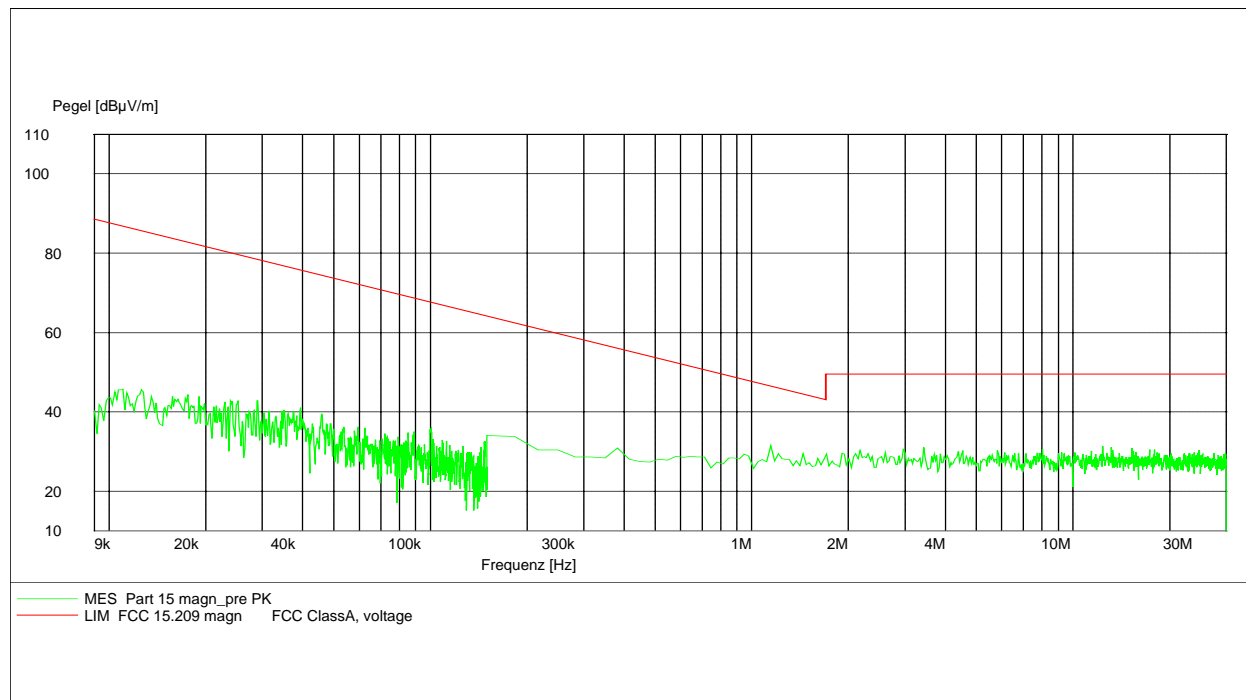
RADIATED EMISSIONS

FCC Rule Part 74 subpart H

(this plot is valid for all channels)

Part 15.209 Magnetics

EUT: PSM700
Manufacturer: SHURE
Operating Condition: normal mode
Test Site: Cetecom, Room 6
Operator: Berg
Test Specification: 115v / 60 Hz
Comment:
Start of Test: 23.05.03 / 07:29:52



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

17 - 24

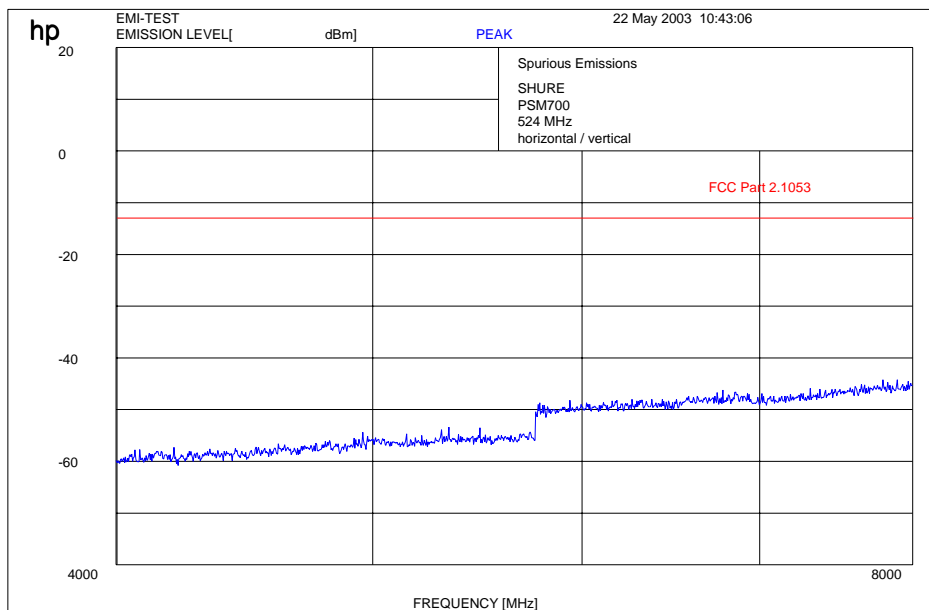
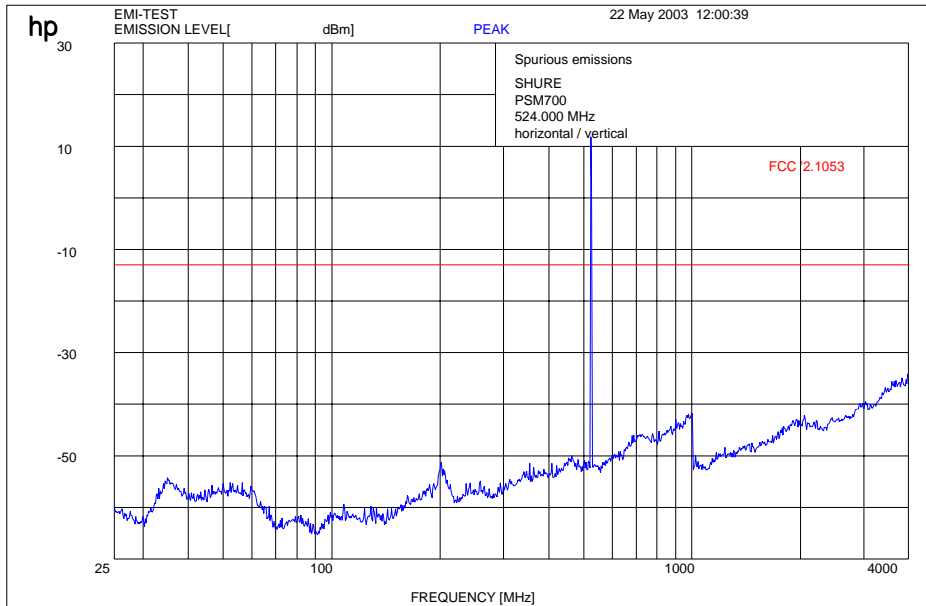
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 47 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 524.00 MHz

FCC Rule Part 74 subpart H



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

17 - 24

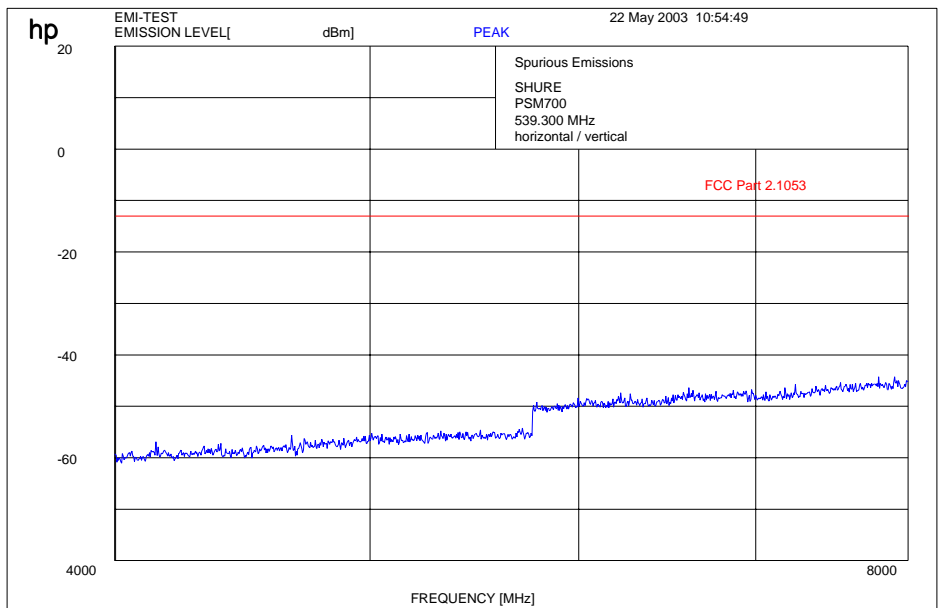
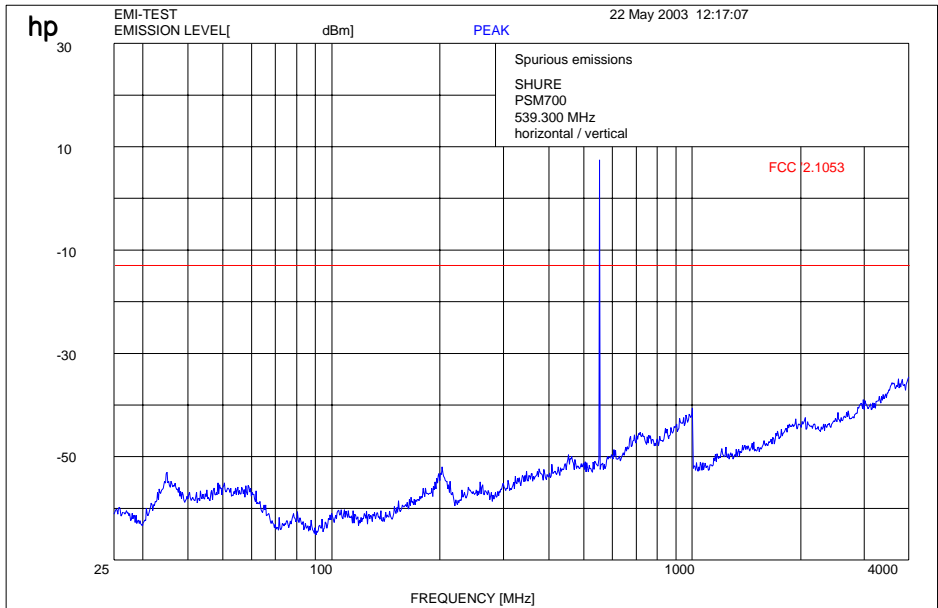
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 48 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 539.300 MHz

FCC Rule Part 74 subpart H



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

17 - 24

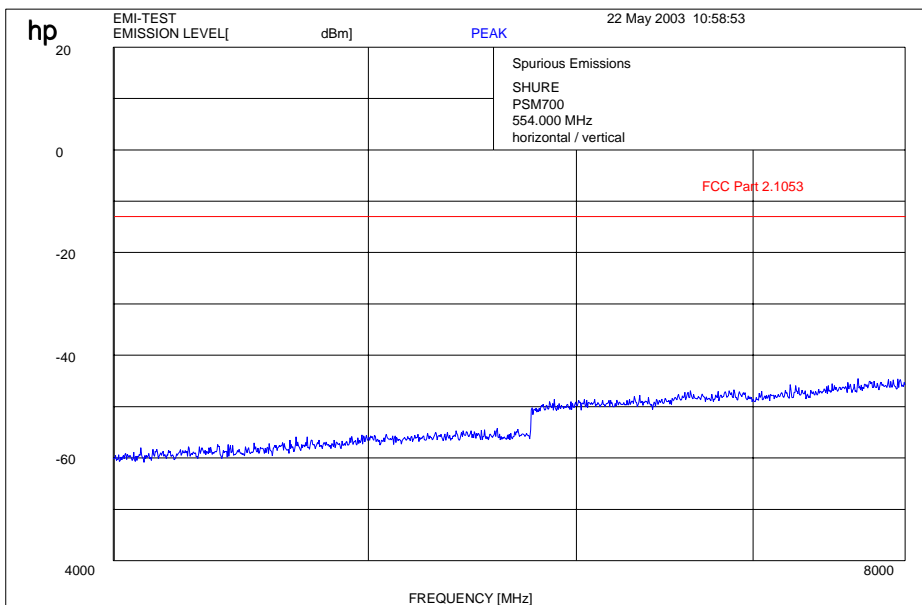
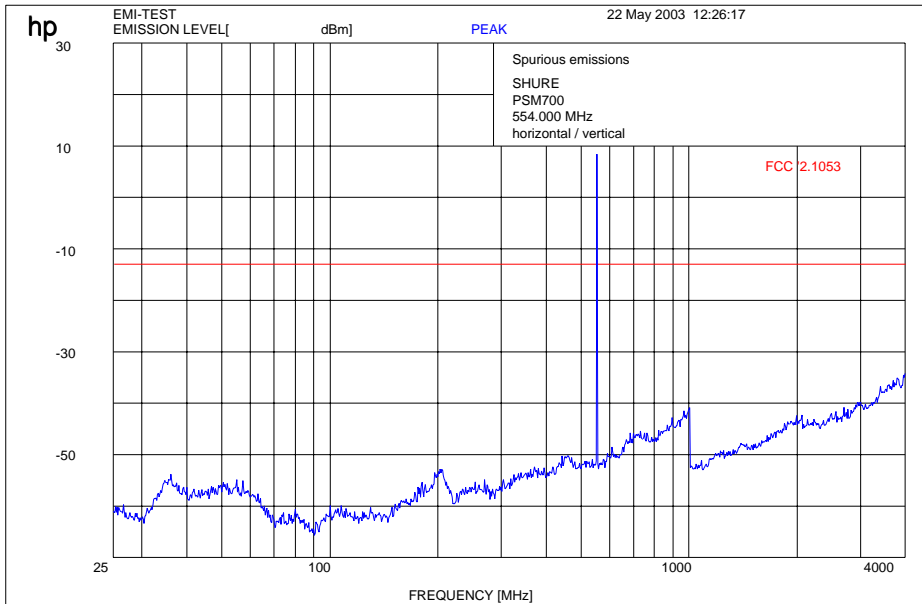
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 49 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 554.00 MHz

FCC Rule Part 74 subpart H



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

17 - 24

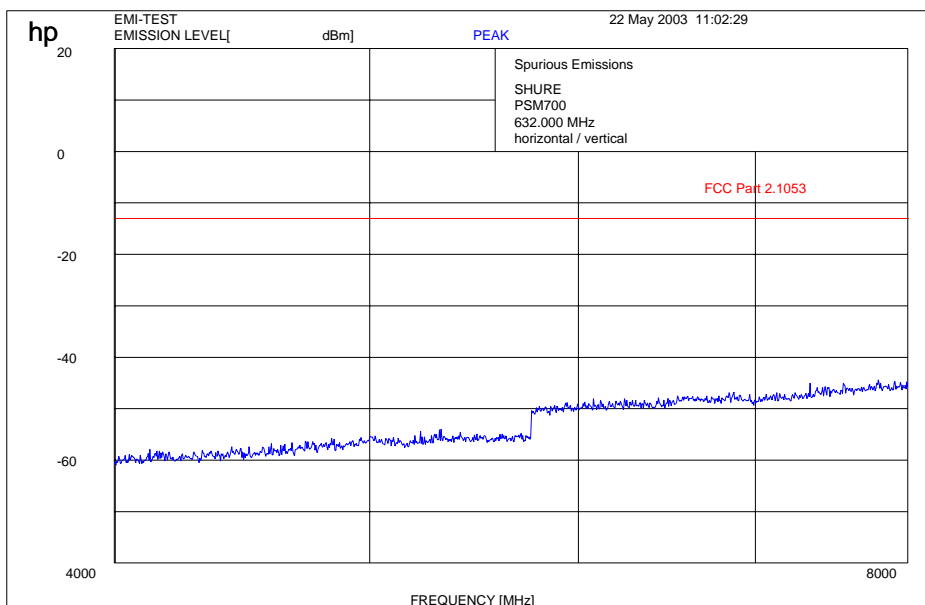
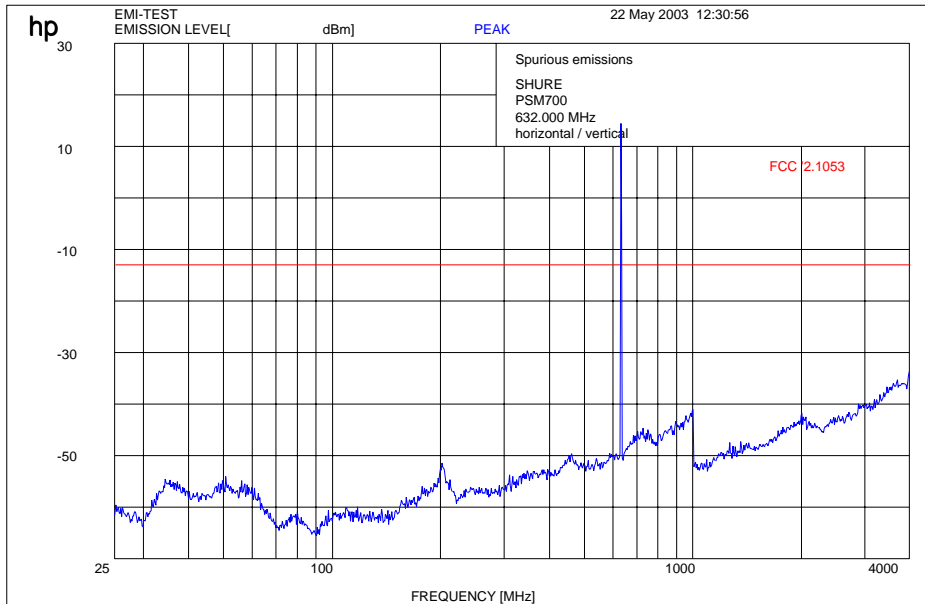
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 50 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 632.00 MHz

FCC Rule Part 74 subpart H



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

17 - 24

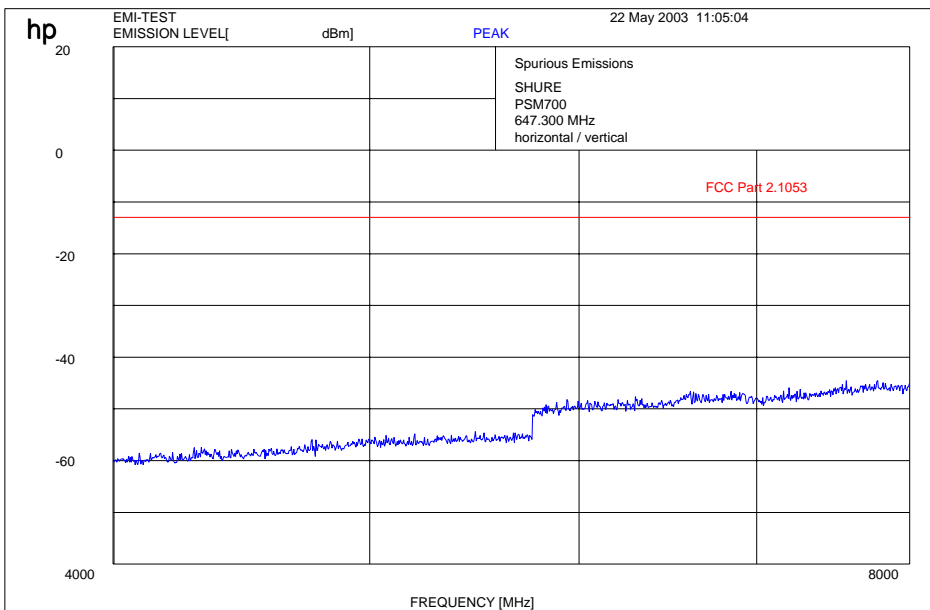
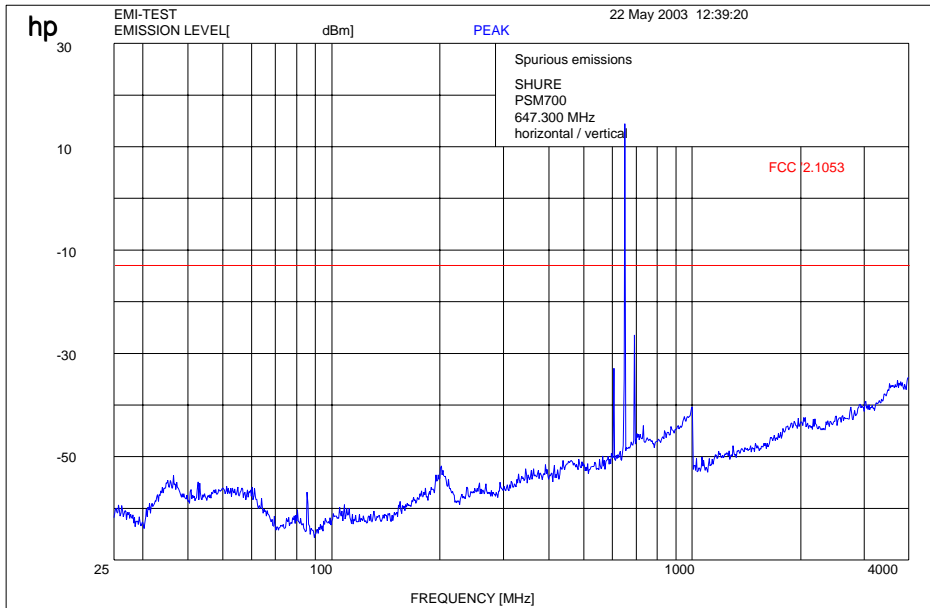
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 51 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 647.30 MHz

FCC Rule Part 74 subpart H



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

17 - 24

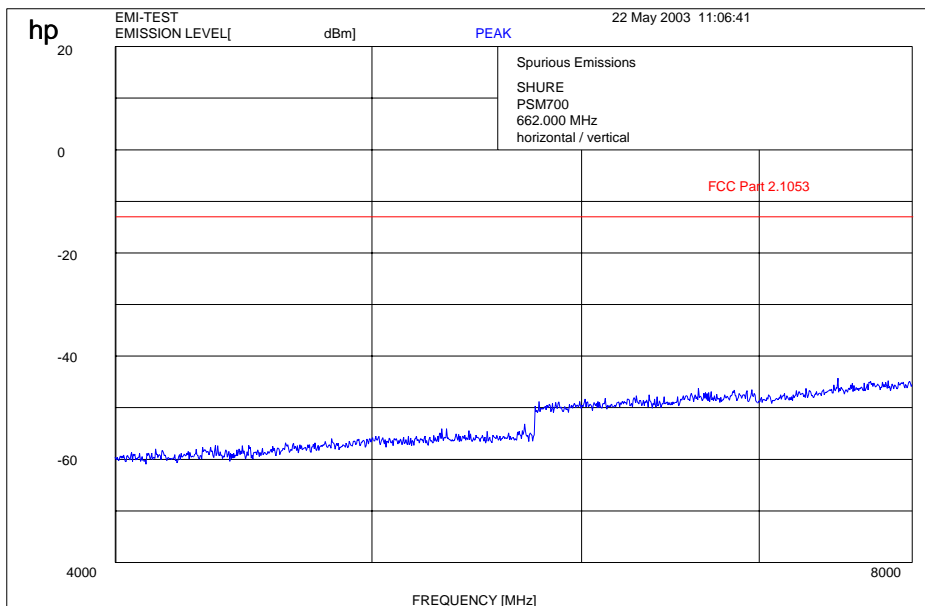
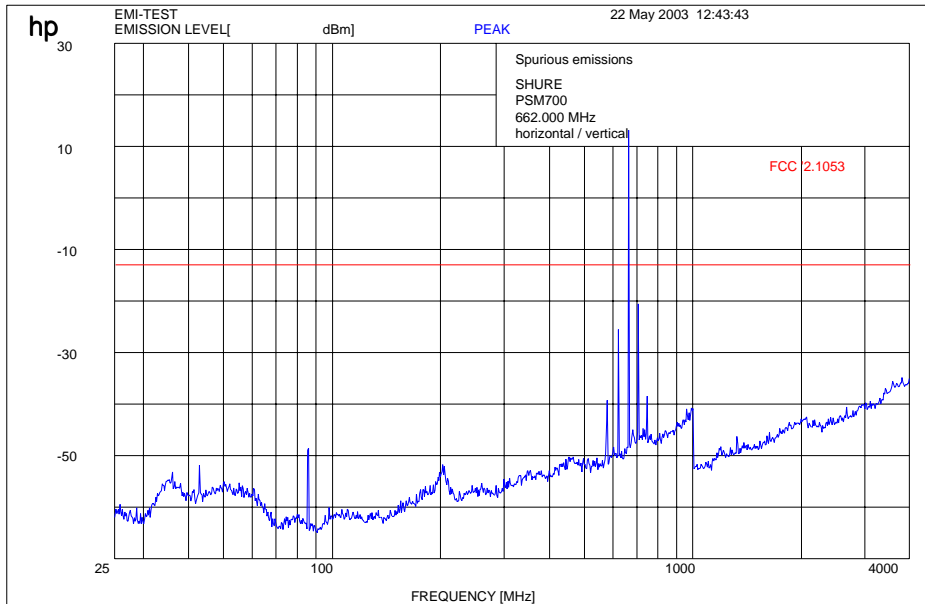
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 52 (78)

Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 662.00 MHz

FCC Rule Part 74 subpart H



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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 53 (78)

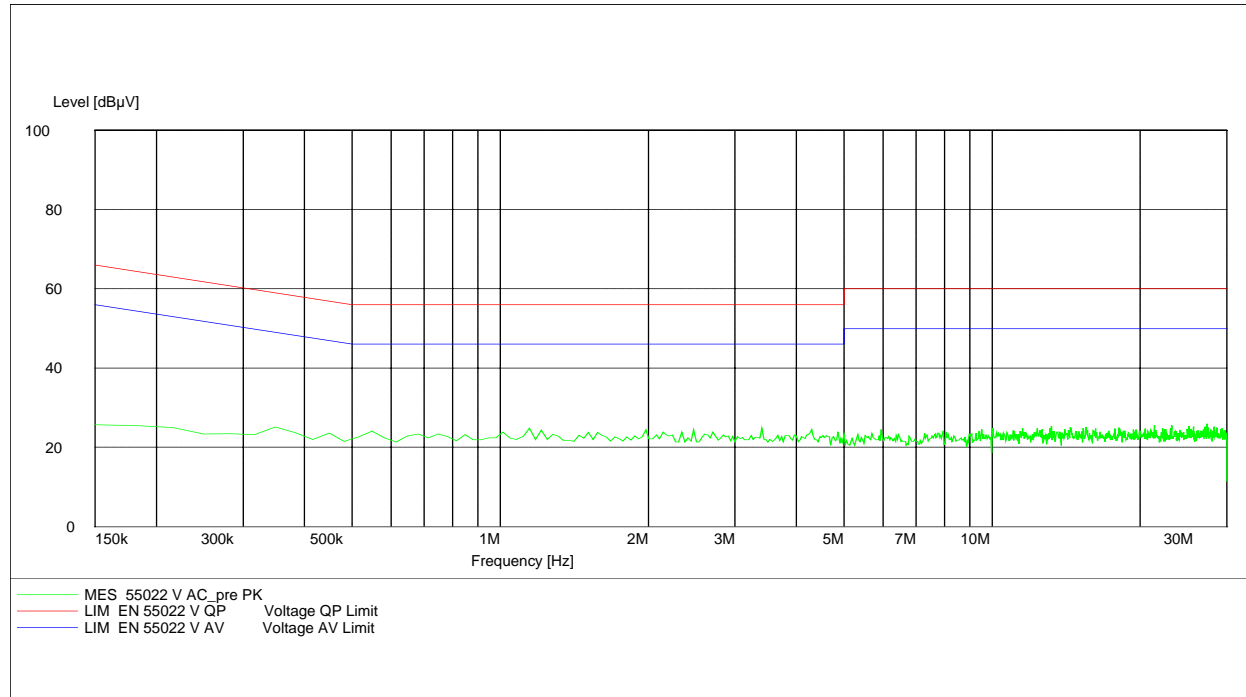
Equipment under test : P7T
Ambient temperature : 23°C
Relative humidity : 50%

Conducted emissions

§ 15.107/207

CISPR 22

EUT: PSM700
Manufacturer: SHURE
Operating Condition: normal mode
Test Site: Room 006
Operator: Berg
Test Specification: 115V / 66 Hz
Comment:
Start of Test: 23.05.03 / 07:20:18



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

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 54 (78)

Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

FCC Part 15 Subpart B (Receiver P7R)

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas conform with specifications ANSI C63.2-1987 clause 15 and ANSI C63.4-1992 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-1992 clause 4.2.

Antennas conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120kHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120kHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.35, 15.209.

The product fulfils 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

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

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 55 (78)

Equipment under test : P7R
 Ambient temperature : 23°C
 Relative humidity : 50%

SPURIOUS RADIATION

§ 15.109

Radiated

SPURIOUS EMISSIONS LEVEL ($\mu\text{V/m}$)								
524.000 MHz			539.300 MHz			554.000 MHz		
f (MHz)	Detector	Level (dB $\mu\text{V/m}$)	f (MHz)	Detector	Level (dB $\mu\text{V/m}$)	f (MHz)	Detector	Level (dB $\mu\text{V/m}$)
100.83	PK	27.5	100.34	PK	27.6	100.34	PK	26.8
200.86	PK	27.1	200.88	PK	25.7	200.86	PK	26.4
5320.2	PK	35.8	5373.3	PK	32.9	5540.2	PK	32.1
			7522.2	PK	43.1			
632.000 MHz			647.300 MHz			662.000 MHz		
100.34	PK	28.5	100.34	PK	28.9	100.34	PK	28.1
190.35	PK	26.4	200.86	PK	26.3	200.88	PK	27.0
4616.9	PK	39.4	4553.2	PK	38.2	4238.7	PK	30.6
			5305.4	PK	34.0	4484.1	PK	38.9
						5228.5	PK	35.0
Measurement uncertainty			± 3 dB					

$f < 1$ GHz : RBW/VBW: 100 kHz

$f \geq 1$ GHz : RBW/VBW: 1 MHz

H = Horizontal ; V= Vertical

Measurement distance see table

Limits

SUBCLAUSE § 15.109

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dB $\mu\text{V/m}$	30
30 - 88	100 / 40 dB $\mu\text{V/m}$	3
88 - 216	150 / 43.5 dB $\mu\text{V/m}$	3
216 - 960	200 / 46 dB $\mu\text{V/m}$	3
above 960	500 / 54 dB $\mu\text{V/m}$	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24

CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 56 (78)

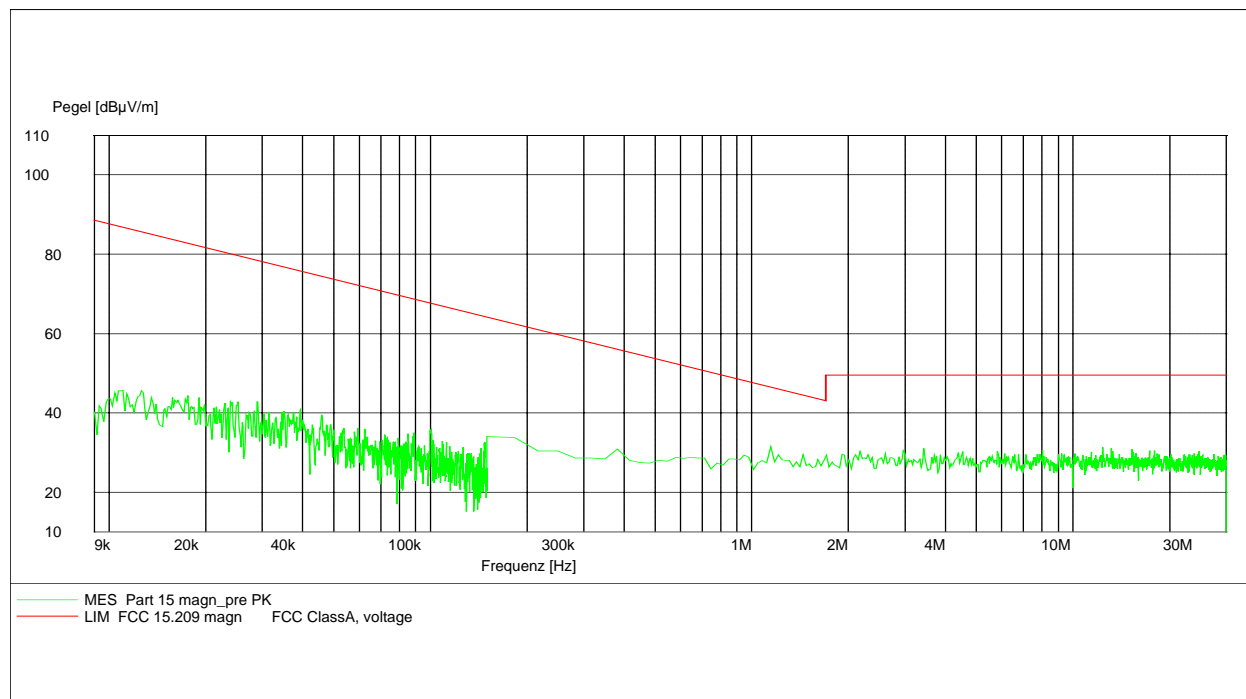
Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS (this plot is valid for all channels)

§ 15.109

FCC Rule 47

EUT: P7R
Manufacturer: SHURE
Operating Condition: normal mode
Test Site: Cetecom, Room 6
Operator: Berg
Test Specification: 115v / 60 Hz
Comment:
Start of Test: 23.05.03 / 07:35:02



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

17 - 24

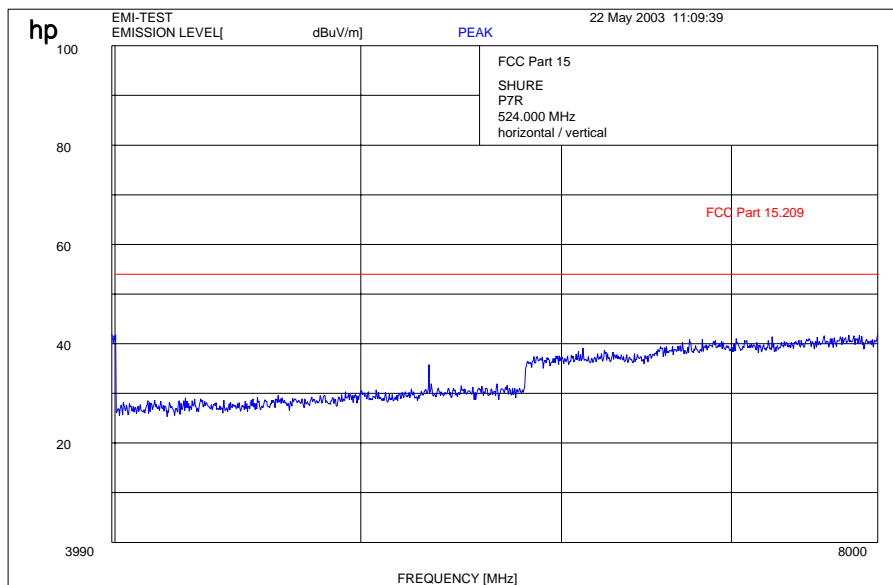
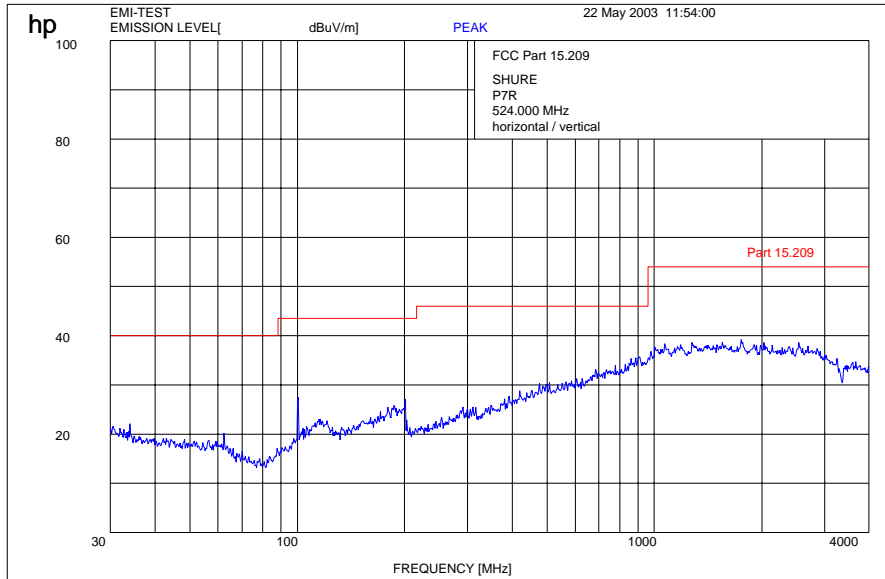
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 57 (78)

Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 524.00 MHz

§ 15.109



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

17 - 24

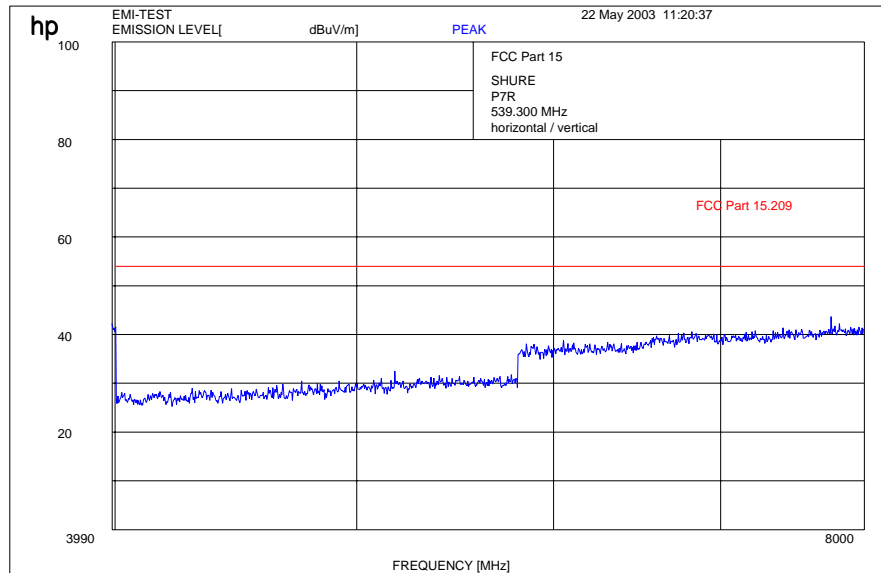
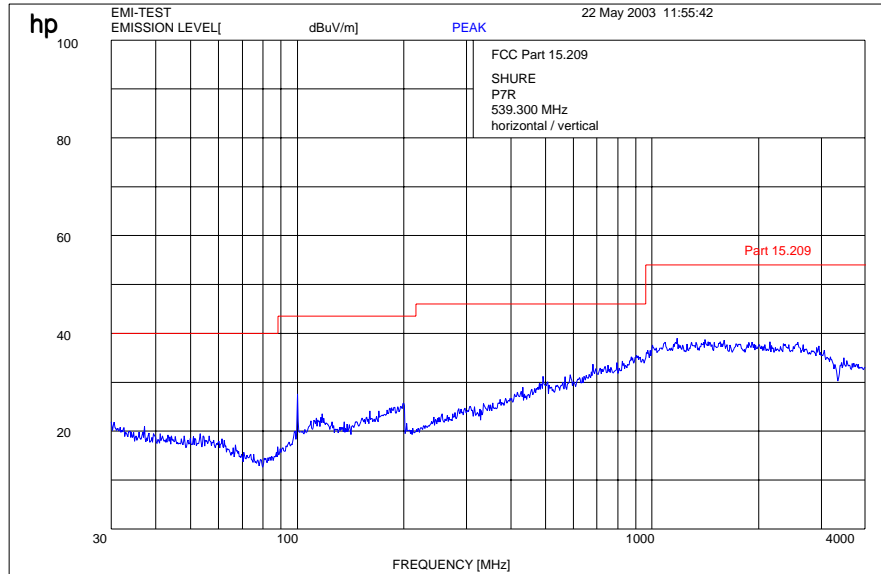
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 58 (78)

Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 539.300 MHz

§ 15.109



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

17 - 24

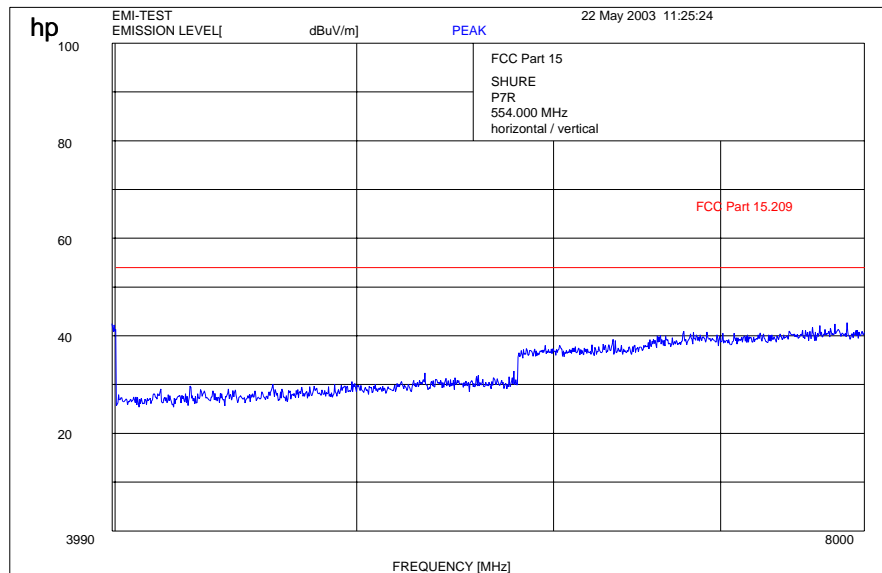
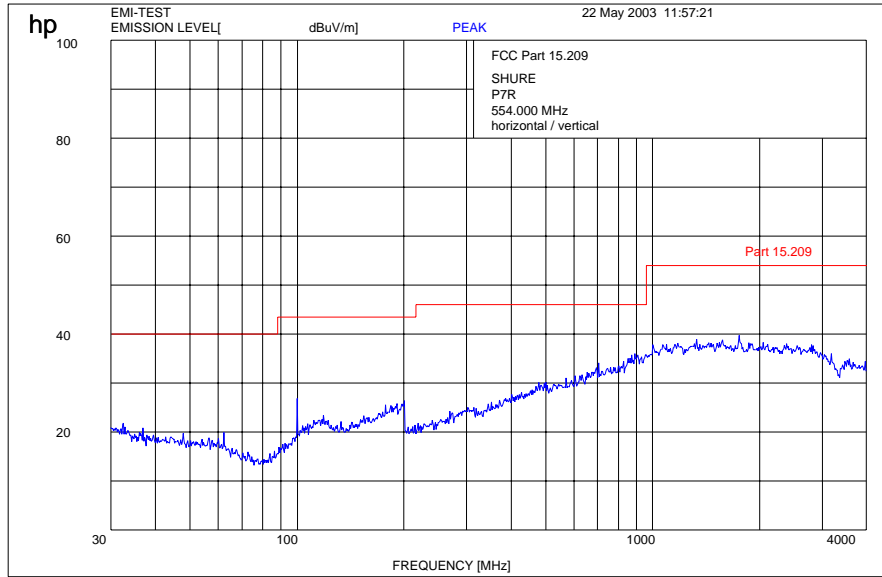
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 59 (78)

Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 554.000 MHz

§ 15.109



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

17 - 24

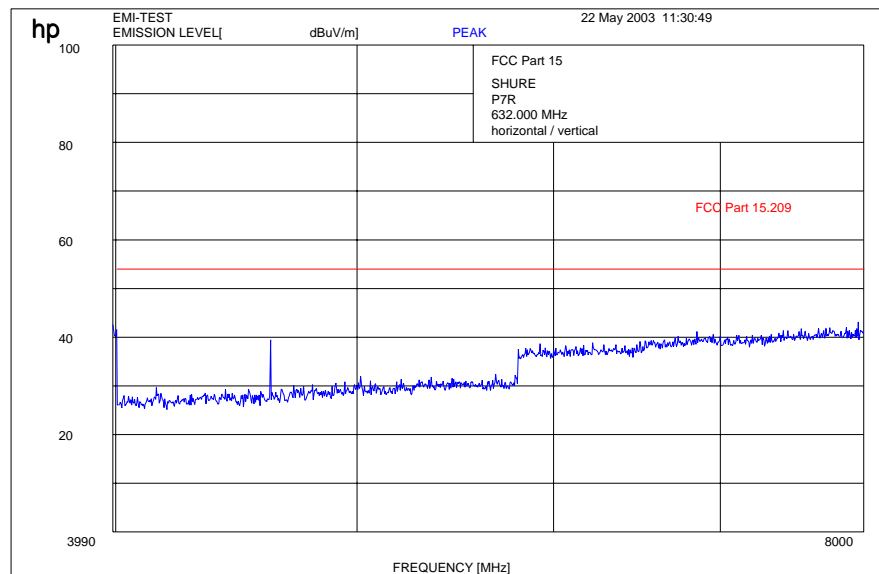
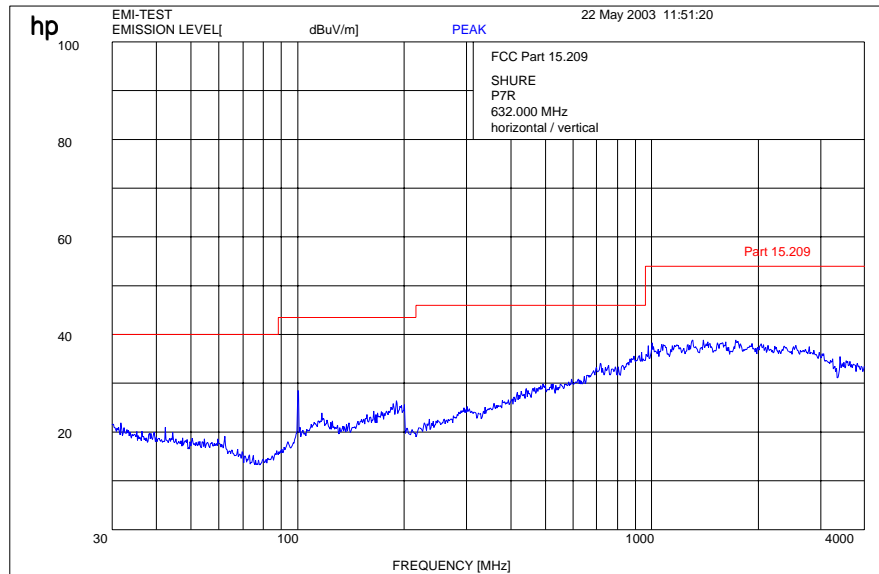
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 60 (78)

Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 632.000 MHz

§ 15.109



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

17 - 24

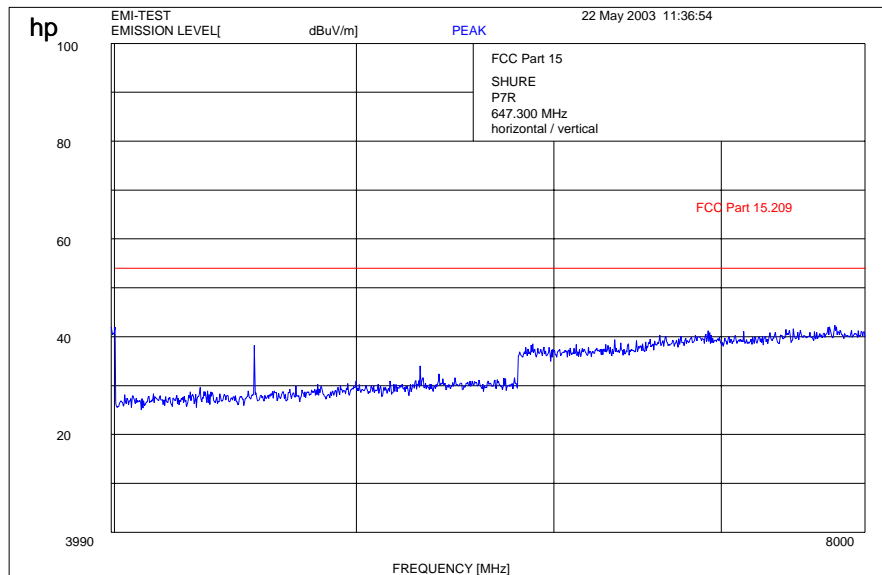
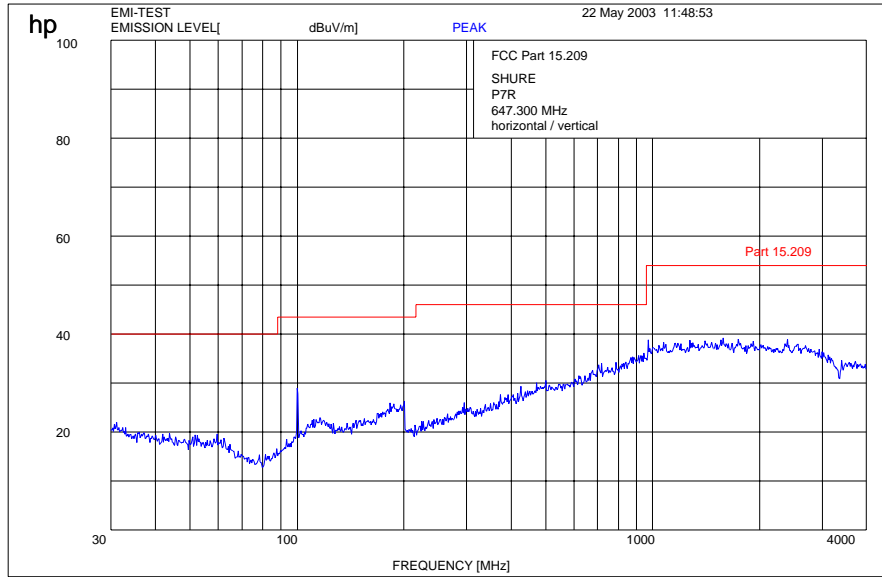
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 61 (78)

Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 647.300 MHz

§ 15.109



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

17 - 24

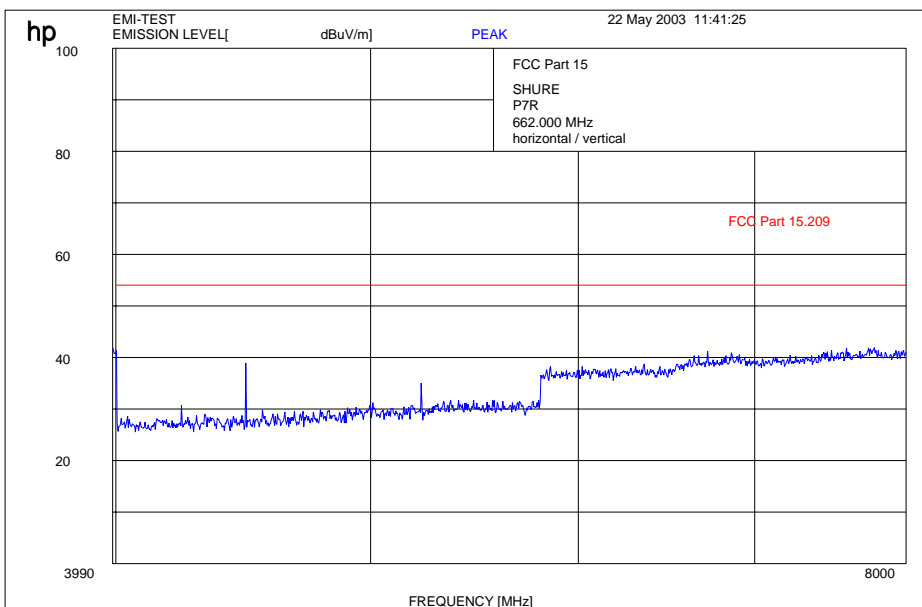
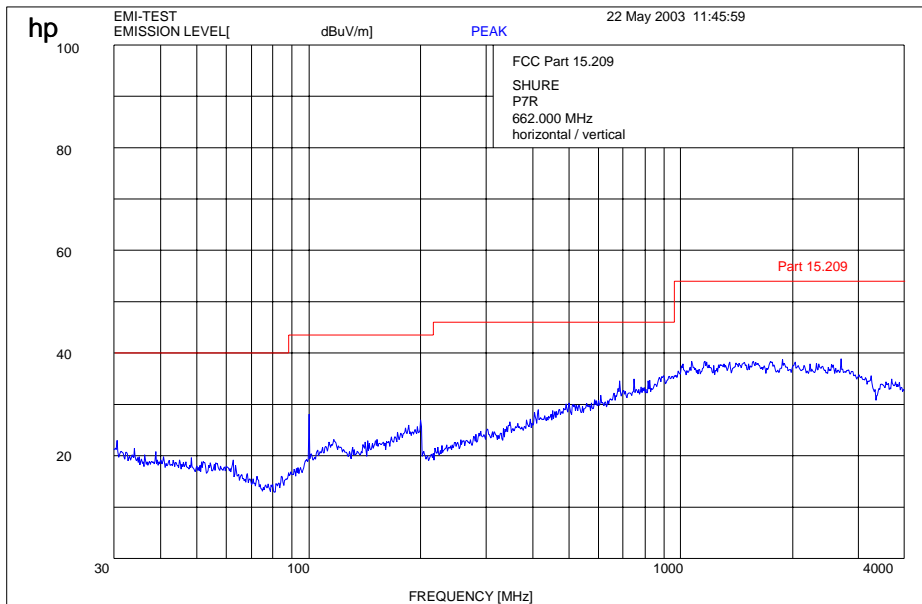
CETECOM ICT Services GmbH

Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 62 (78)

Equipment under test : P7R
Ambient temperature : 23°C
Relative humidity : 50%

RADIATED EMISSIONS 662.000 MHz

§ 15.109



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

CETECOM ICT Services GmbH

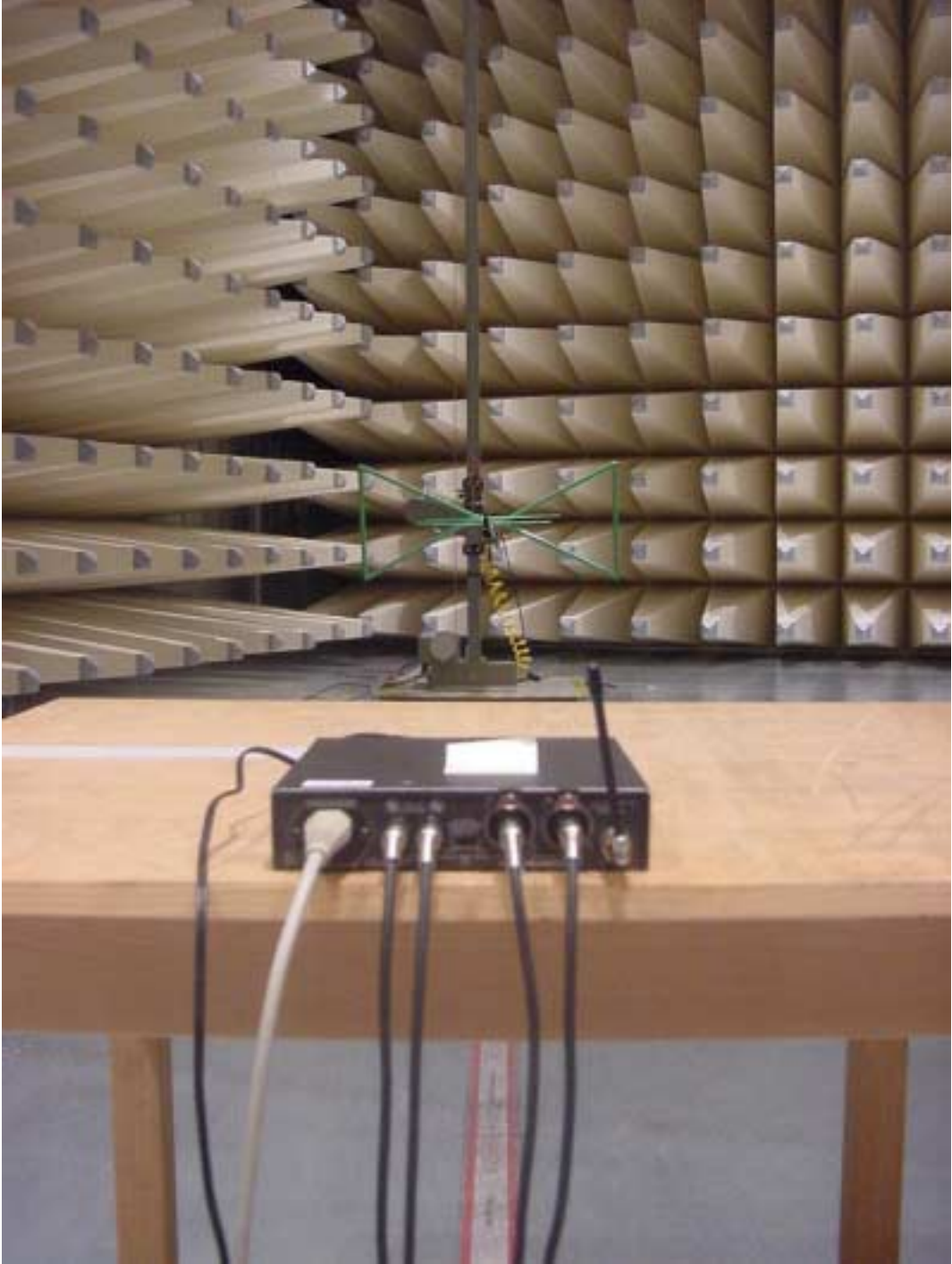
Test report no.: 4_0989-01-03/03 Issue Date: 23.05.2003 Page 64 (78)

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

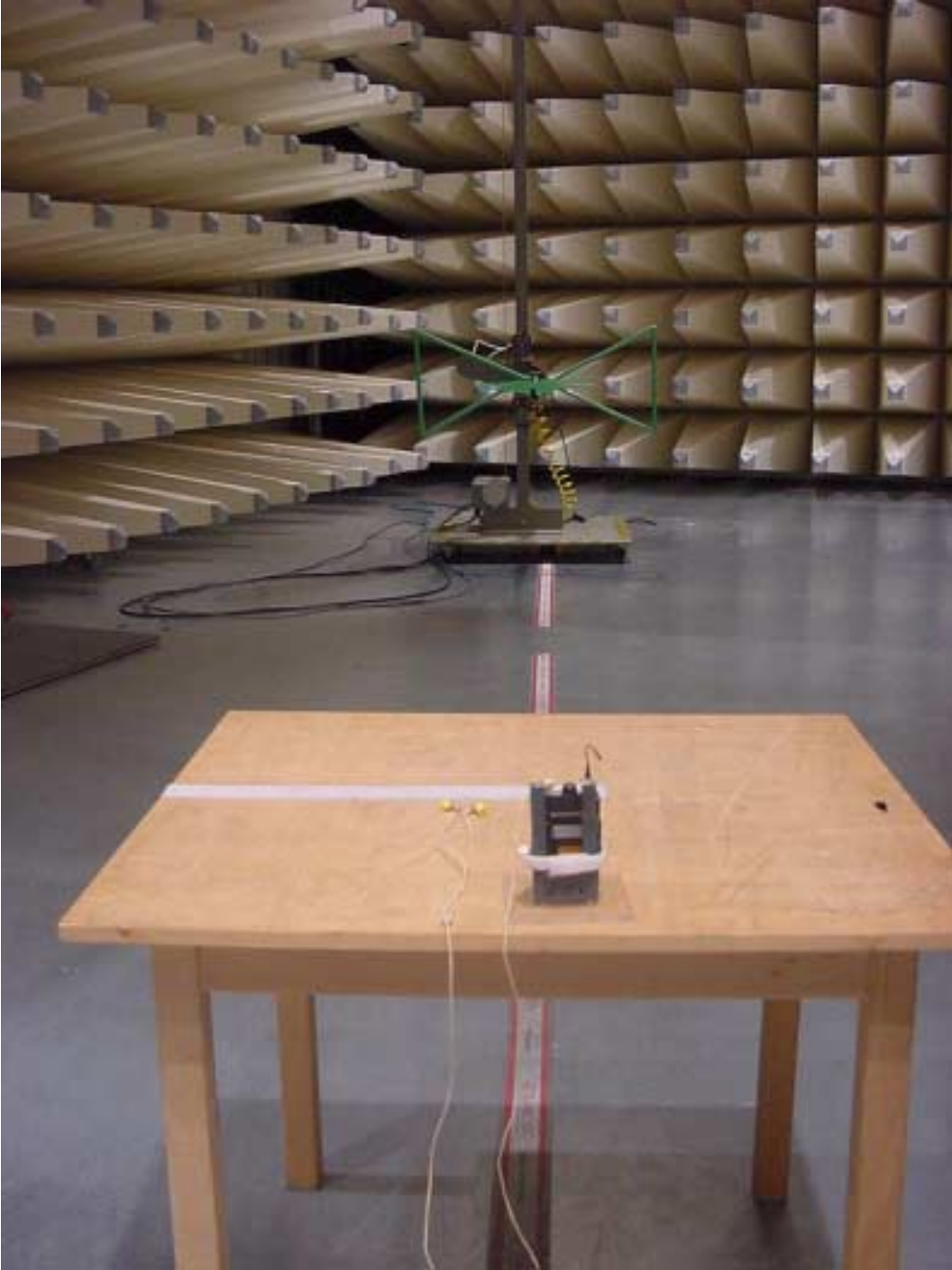
To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

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
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70				

Test setup
Radiated Emissions
P7T



Test site
Radiated Emissions
P7R



Test site
Conducted emissions



Photographs of the equipment

P7T

Photograph no.: 1



Photographs of the equipment

P7T

Photograph no.: 2



CETECOM ICT Services GmbH

Photographs of the equipment

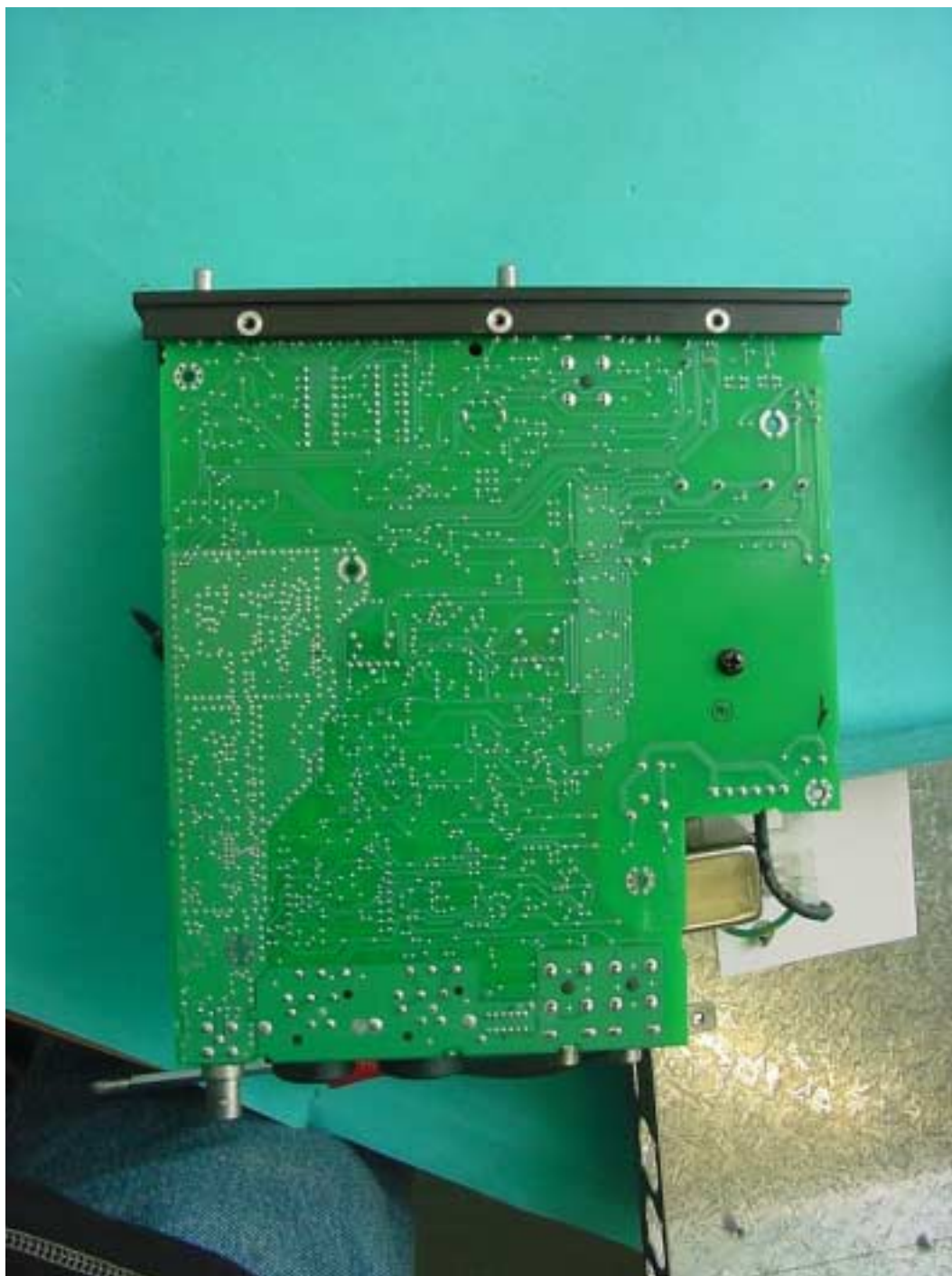
P7T
Photograph no.: 3



Photographs of the equipment

P7T

Photograph no.: 4



Photographs of the equipment

P7R

Photograph no.: 5



Photographs of the equipment

P7R

Photograph no.: 6



Photographs of the equipment

P7R

Photograph no.: 7



Photographs of the equipment

P7R

Photograph no.: 9



Photographs of the equipment

P7R
Photograph no.: 10



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Photographs of the equipment

P7R
Photograph no.: 11

