

CETECOM ICT Services GmbH

Radio Satellite Communication

Untertürkheimer Straße 6-10 . D-66117 Saarbrücken

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RSC14

issue test report consist of 66 Pages

Page 1 (66)



TTI-P-G166/98

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.:5_3682-B/00

FCC Part 2, 15, 90

MC9620 S G2 UM

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 : Michael.Berg@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 : EADS Defence and Security Networks
Street : Rue J.P Timbaud-MS01, BP 26
City : F78392 Bois d'Arcy Cedex
Country : France
Telephone : +33 1 34 60 88 94
Telefax : +33 1 34 60 78 98
Contact : Yann Lebail
Telephone : +33 1 34 60 88 94

1.4 Application details

Date of receipt of application : 12.06.01
Date of receipt of test item : 01.08.01
Date of test : 01.-03.08.01

1.5 Test item

Type of equipment : **PMR Handheld**
Type designation : **MC9620 S G2 UM**
Manufacturer : applicant
Street :
City :
Country :
Serial number : TR1131DA S/N: HT6102DAA01010111273
Additional informations: :
Frequency : 440 - 490 MHz
Type of modulation : 12K0F1D
Number of channels : 4000
Antenna : PK1391 A
Power supply : 4,8V NiMH accu HR5932CAA02
Output power : 2.0 W
Type of equipment : Temperature range : -30°C - +60°C

Tested with following auxiliary equipment :

VIP ESCORT SET : HT6183AA

Speaker-microphone : ML43 Walker Type HR5975BAA01

Car Support : HR5871AAA01

Car Adapter : BIV EASY PG2 MC9621SIV G2; HR5824ABB01 S/N: 010302990

1.6 Test standards: FCC Part 2, 15, 90

2 Technical test

2.1 Summary of test results

The radiated measurements were performed vertically and horizontal

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 :

09.08.01 RSC 8411 Berg M.



Date	Section	Name	Signature
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Technical responsibility for area of testing :

09.08.01 RSC8414 Ames H.



Date	Section	Name	Signature
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2.2 Test report

TEST REPORT

Test report no. : 5_3682-B/00

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

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Equipment under test : MC9620 S G2 UM**Ambient temperature** : 24.2° C**Relative humidity** : 51%**RF Power Vs. DC Power Input****SUBCLAUSE § 2.993**

Power (W)					
Frequency	440 MHz	465 MHz	490 MHz		
Low power	2,640	2,544	2,496		
High power	8,352	7,296	7,104		
Measurement uncertainty	± 3 %				

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

-

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

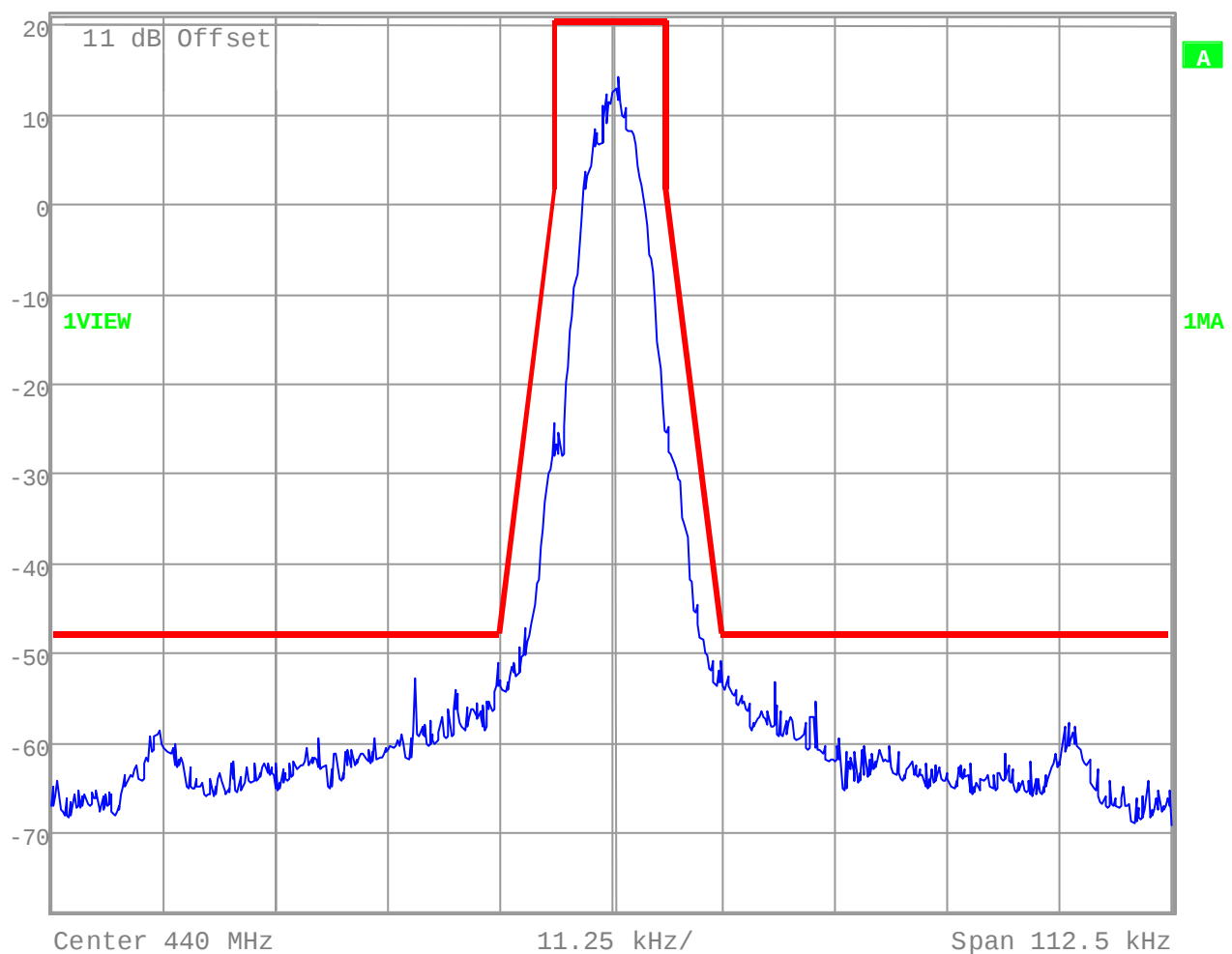
OCCUPIED BANDWIDTH §2.989

440 MHz (Low power)



Ref Lvl
21.2 dBm

RBW	100 Hz	RF Att	40 dB
VBW	100 Hz	TG Lvl	-20 dBm
SWT	58 s	Unit	dBm



Date: 2.AUG.2001 08:28:23

measured with normal Test modulation : Pseudo random data stream max. 8kBit/s

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)

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

OCCUPIED BANDWIDTH

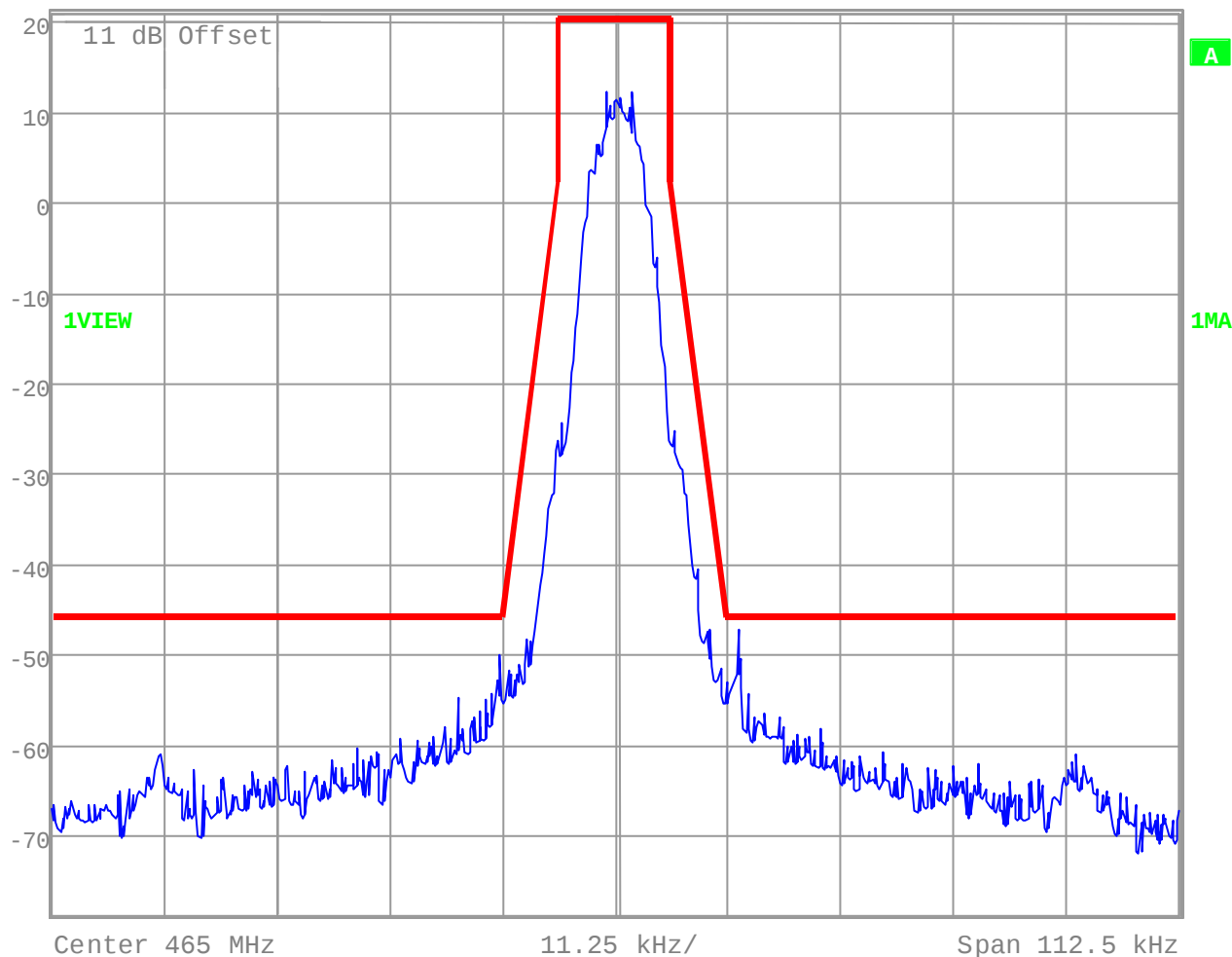
§2.989

465 MHz (low power)



Ref Lvl
21.2 dBm

RBW	100 Hz	RF Att	40 dB
VBW	100 Hz	TG Lvl	-20 dBm
SWT	58 s	Unit	dBm



Date: 2.AUG.2001 08:25:24

measured with normal Test modulation : Pseudo random data stream max. 8kBit/s

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 : MC9620 S G2 UM

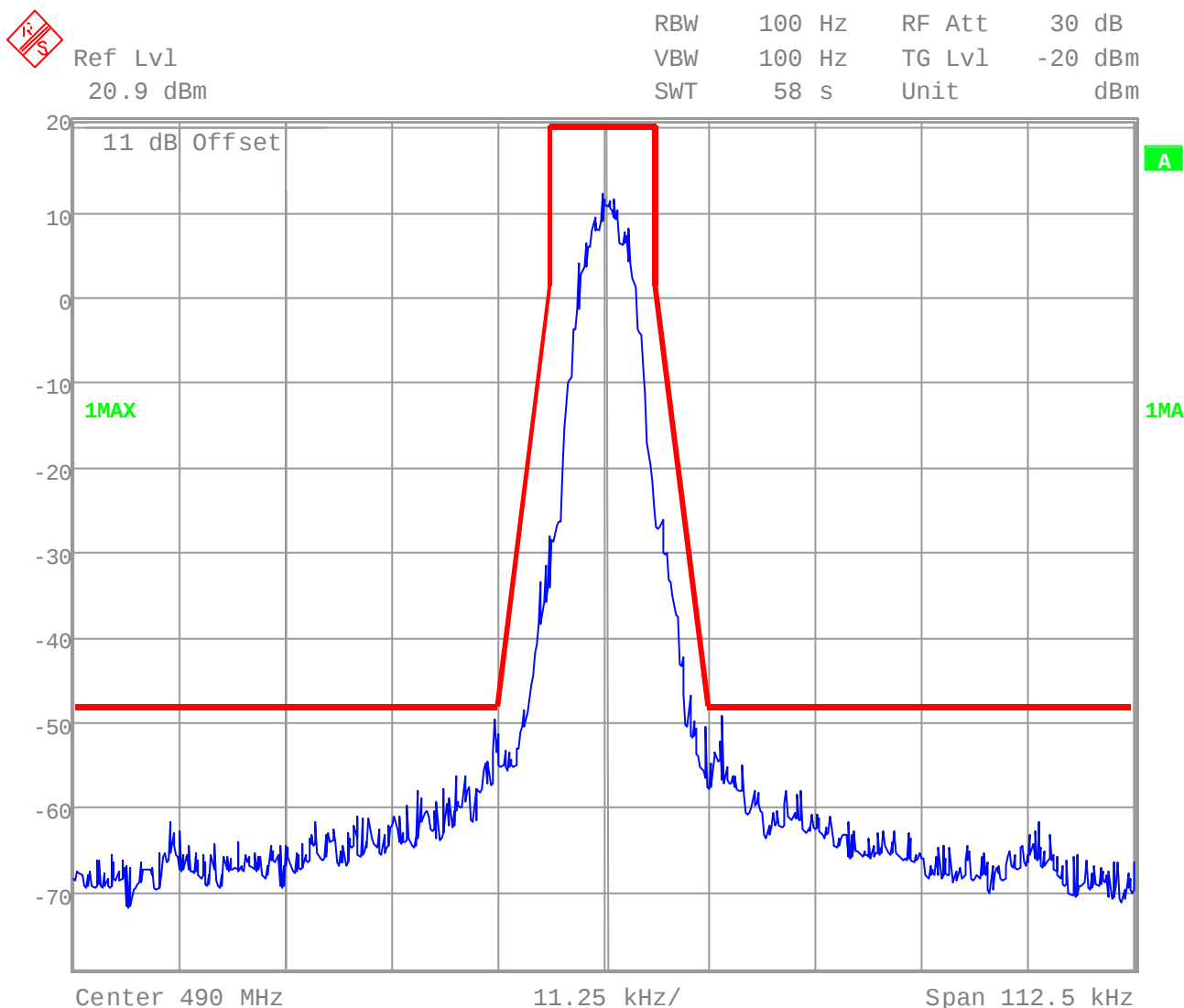
Ambient temperature : 24.2° C

Relative humidity : 51%

OCCUPIED BANDWIDTH

§2.989

490 MHz (low power)



Date: 2.AUG.2001 08:22:49

measured with normal Test modulation : Pseudo random data stream max. 8kBit/s

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)

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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Equipment under test : MC9620 S G2 UM

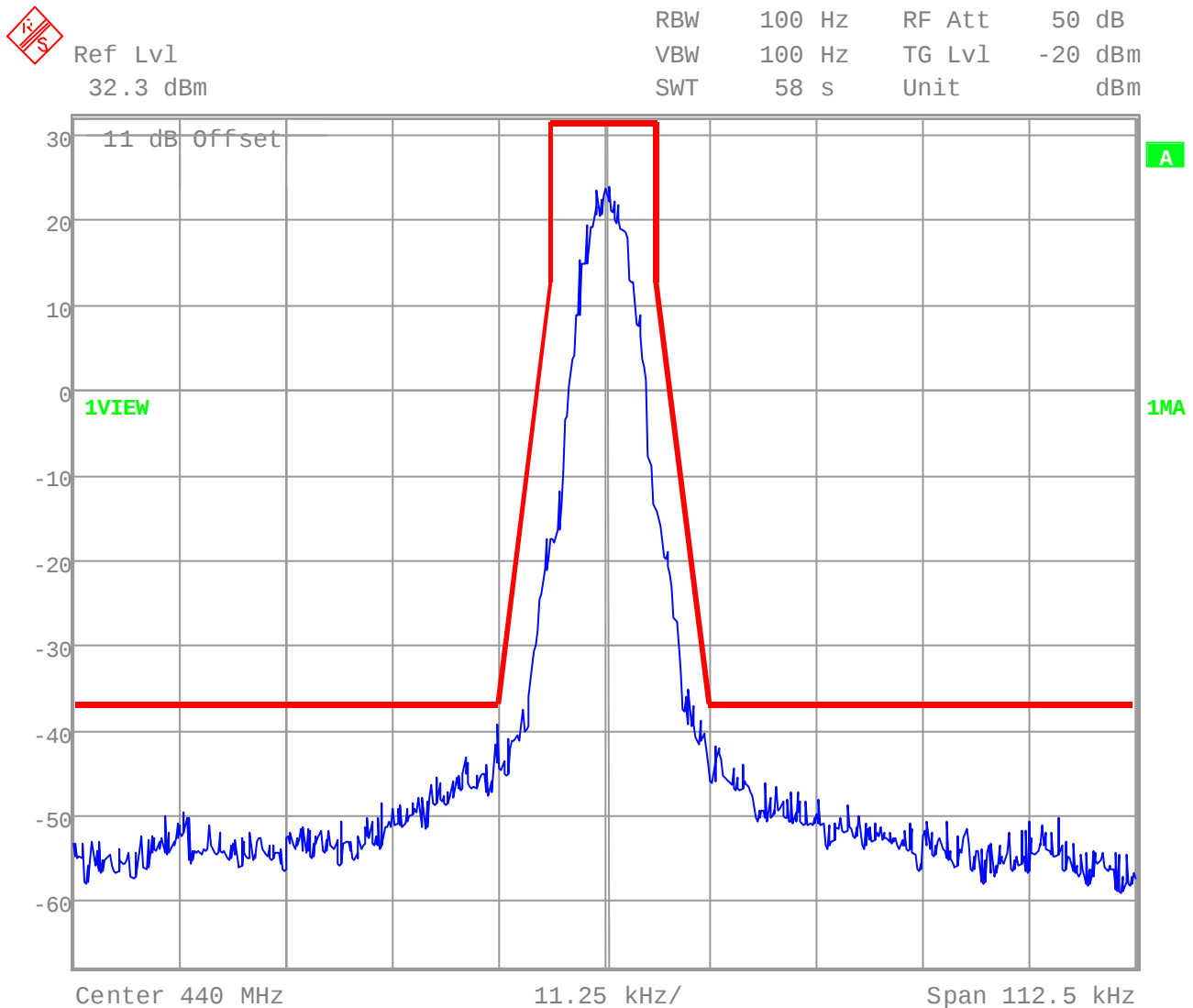
Ambient temperature : 24.2° C

Relative humidity : 51%

OCCUPIED BANDWIDTH

§2.989

440 MHz (max. power)



Date: 2.AUG.2001 08:17:11

measured with normal Test modulation : Pseudo random data stream max. 8kBit/s

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)

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

OCCUPIED BANDWIDTH

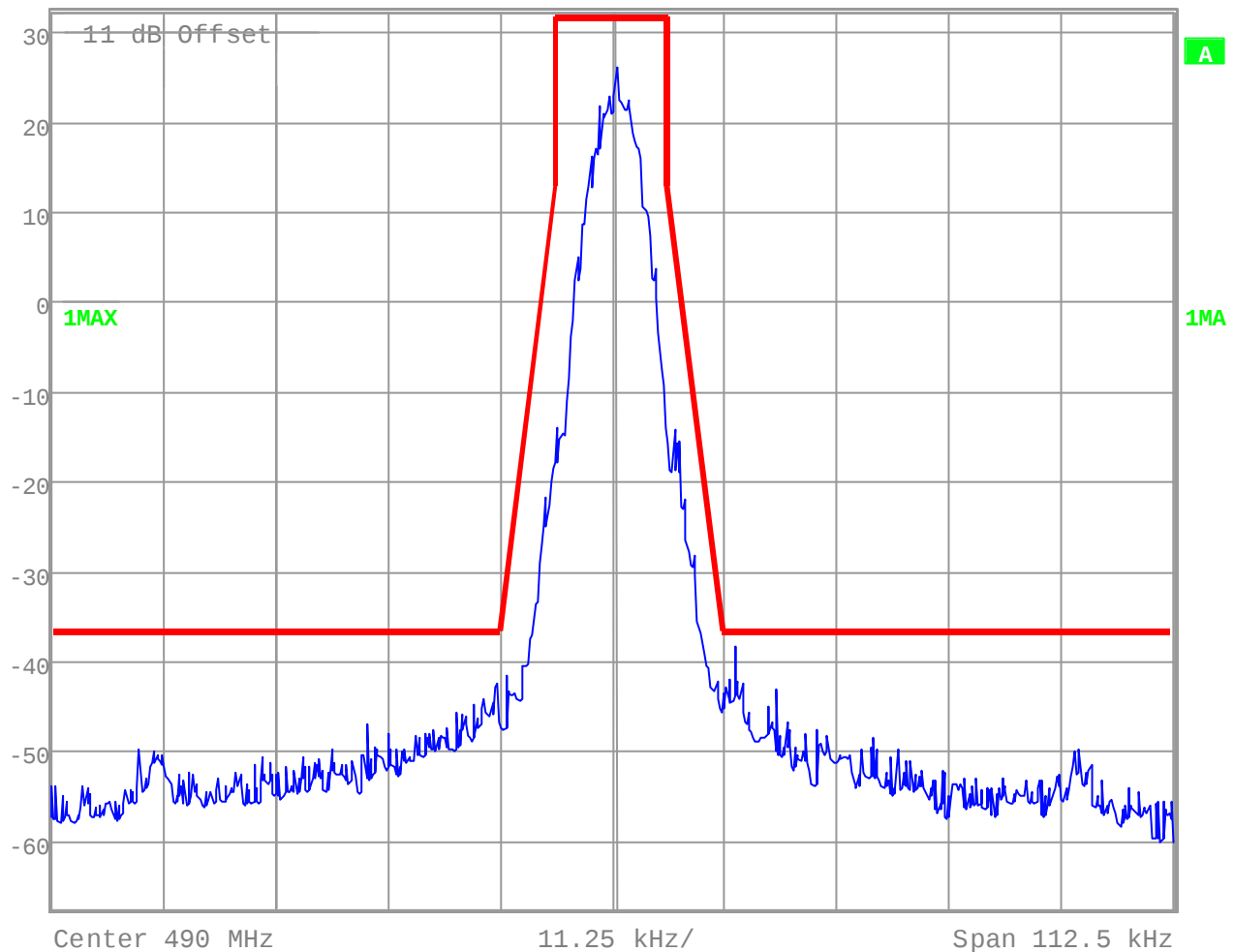
§2.989

490Hz (max. power)



Ref Lvl
32.4 dBm

RBW	100 Hz	RF Att	50 dB
VBW	100 Hz	TG Lvl	-20 dBm
SWT	58 s	Unit	dBm



Date: 2.AUG.2001 08:21:06

measured with normal Test modulation : Pseudo random data stream max. 8kBit/s

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 : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

PEAK OUTPUT POWER SUBCLAUSE § 2.1046 (conducted)

TEST CONDITIONS			OUTPUT POWER (W)				
			440	465	490		
Frequency (MHz)							
T _{nom} (23)° C	V _{nom} (4.8)V	Min	0,132	0,132	0,123		
		Max	1,820	1,862	1,862		
Maximum deviation from output power under extreme test conditions (dBc)			not applicable		not applicable		not applicable
Measurement uncertainty			±3dB				

RBW / VBW : 100 kHz

Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBm)	limit max. allowed emission power	actual attenuation below frequency of operation (dB)	results
See plots					
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 :

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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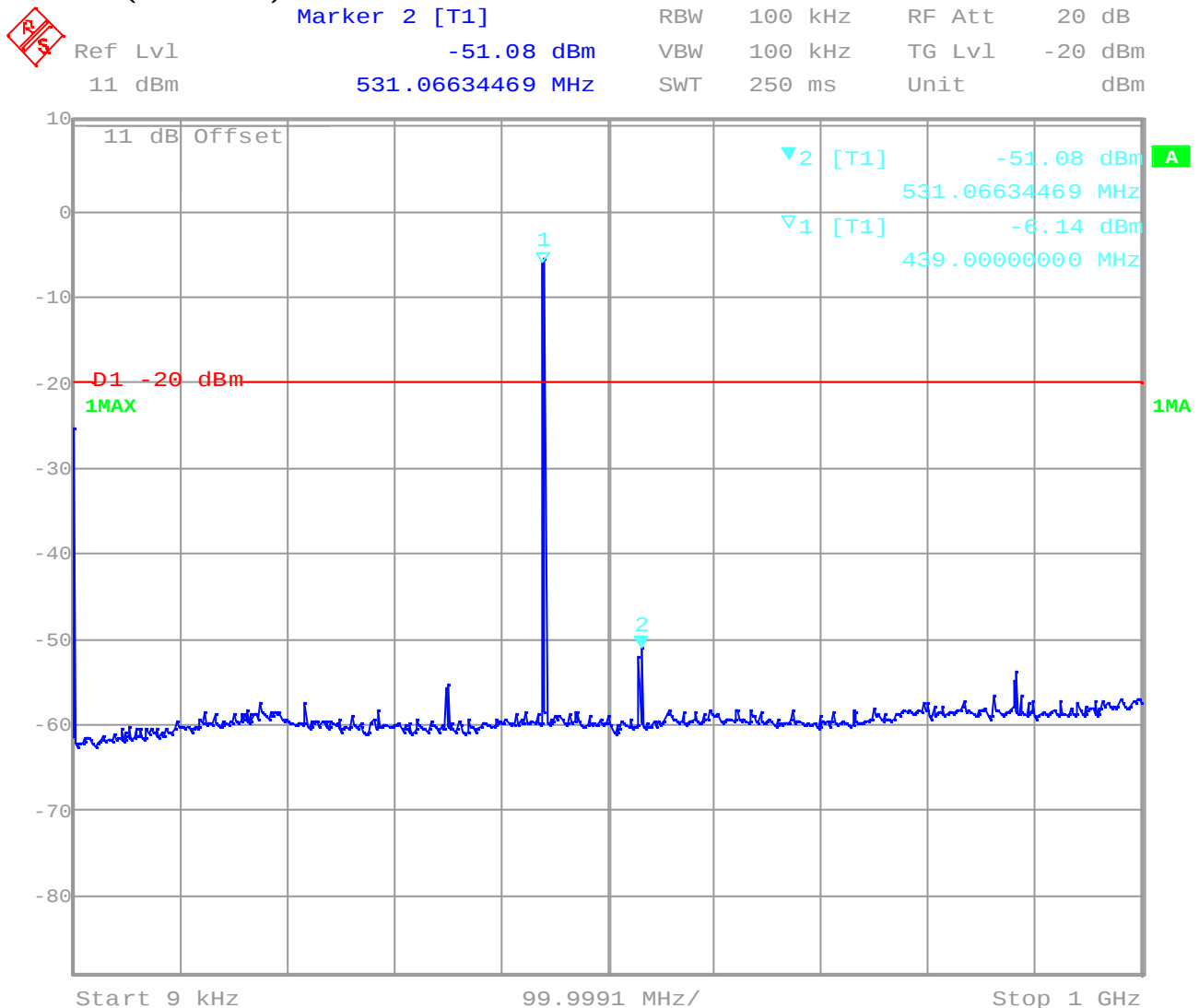
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

440 MHz (max Power)



Date: 2.AUG.2001 07:52:28

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

Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

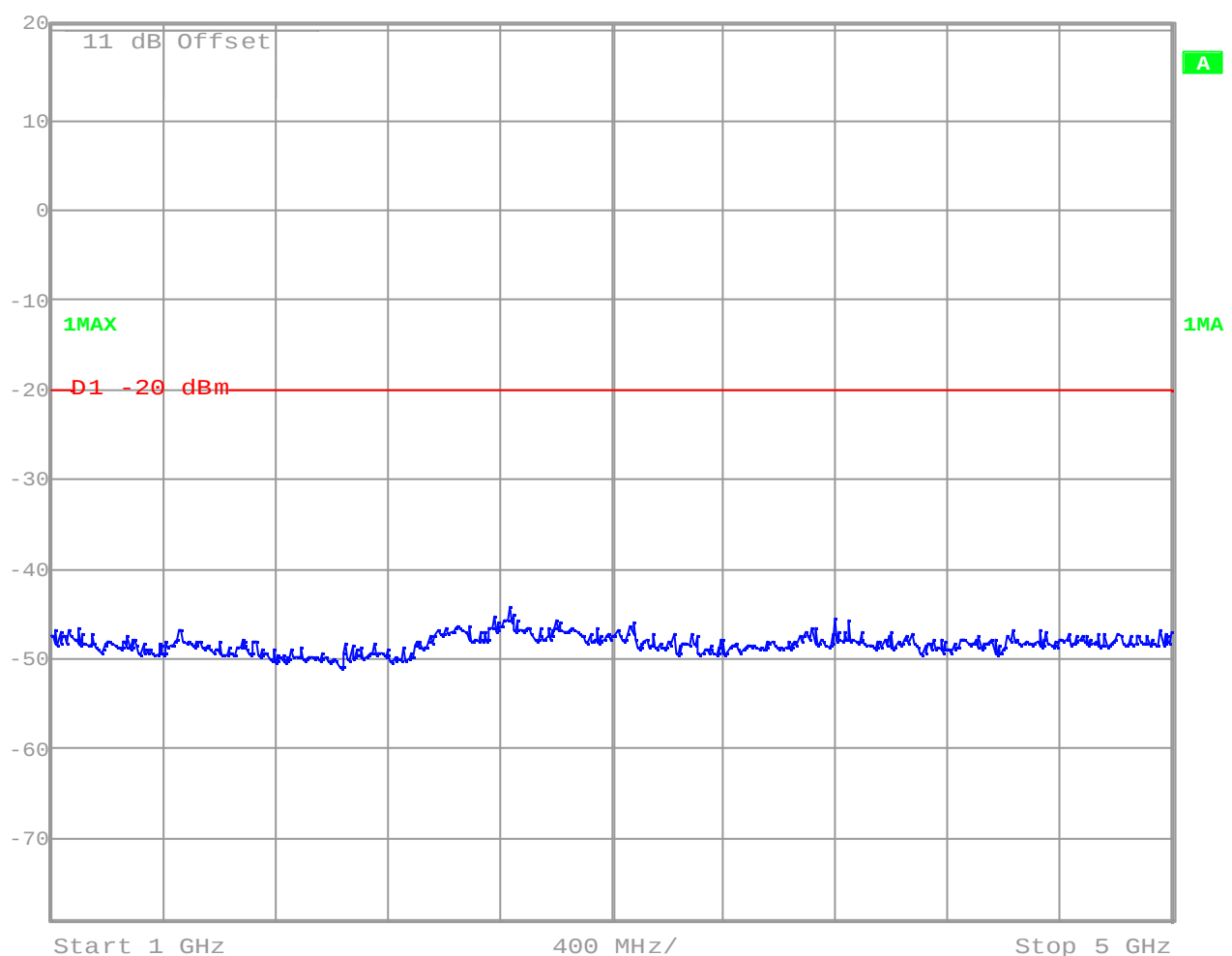
CONDUCTED SPURIOUS EMISSIONS § 2.991

440 MHz (max Power)



Ref Lvl
21 dBm

RBW	100 kHz	RF Att	30 dB
VBW	100 kHz	TG Lvl	-20 dBm
SWT	1 s	Unit	dBm



Date: 2.AUG.2001 08:07:18

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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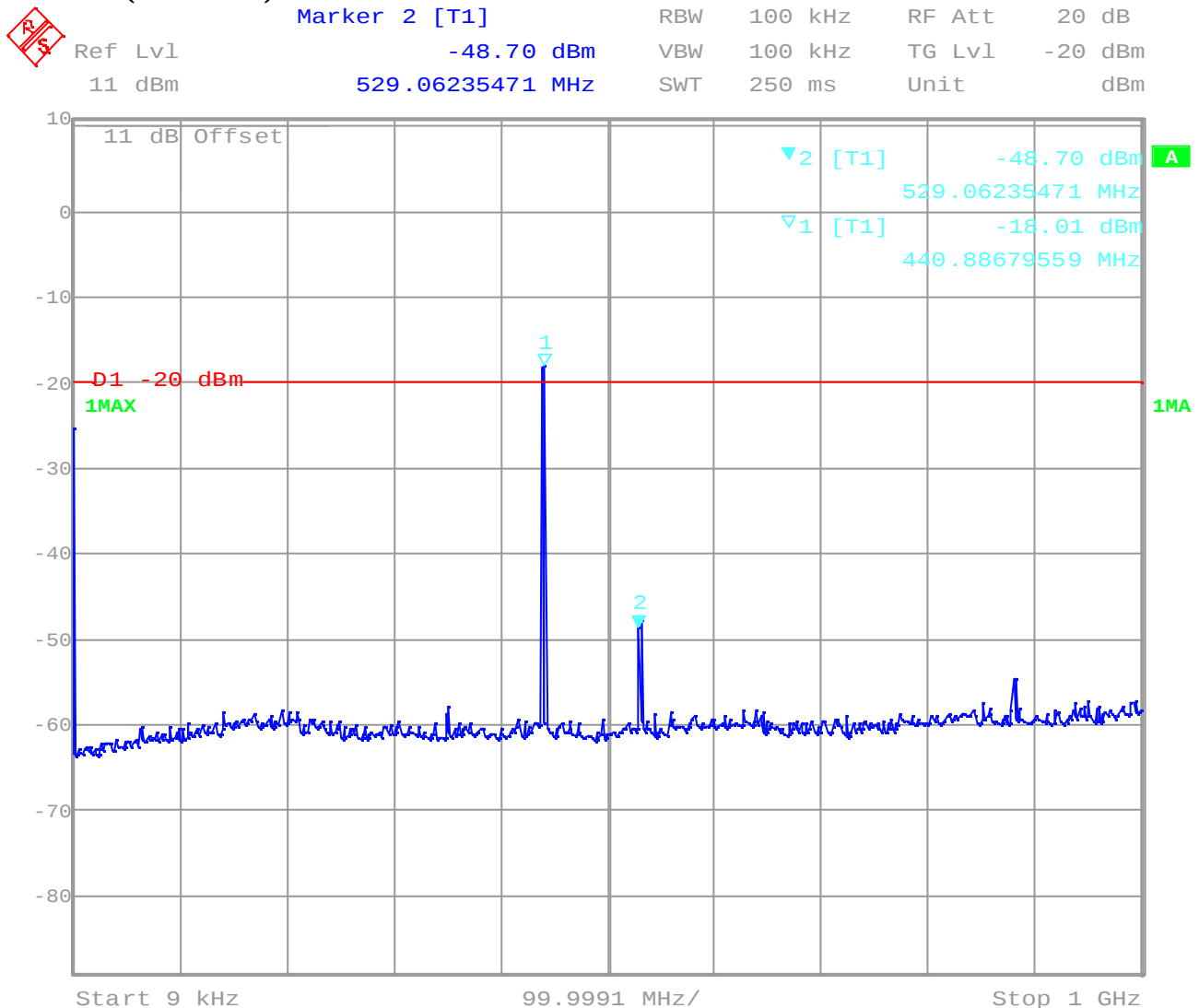
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

440 MHz (min Power)



Date: 2.AUG.2001 08:01:23

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

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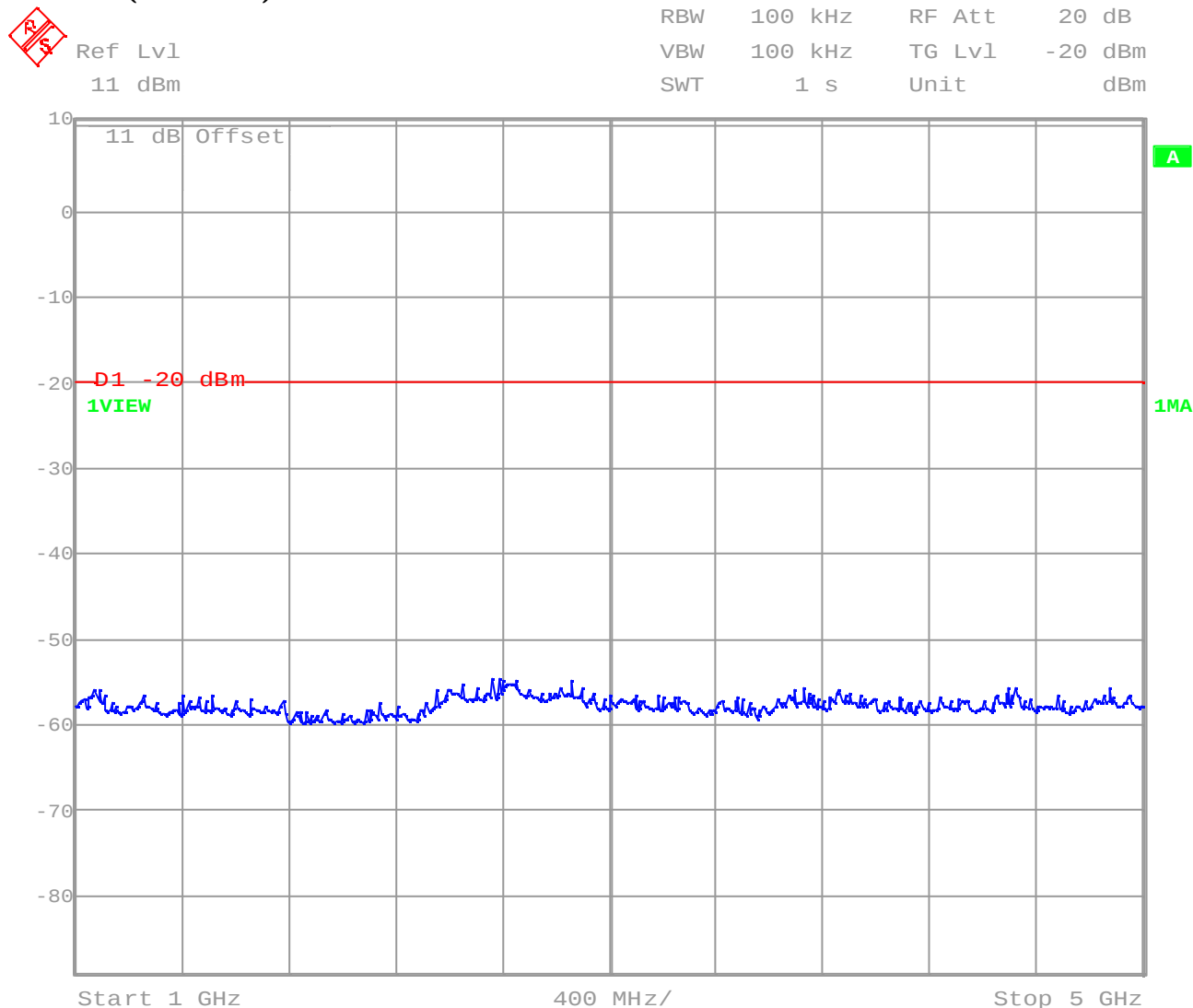
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

440 MHz (low Power)



Date: 2.AUG.2001 08:04:21

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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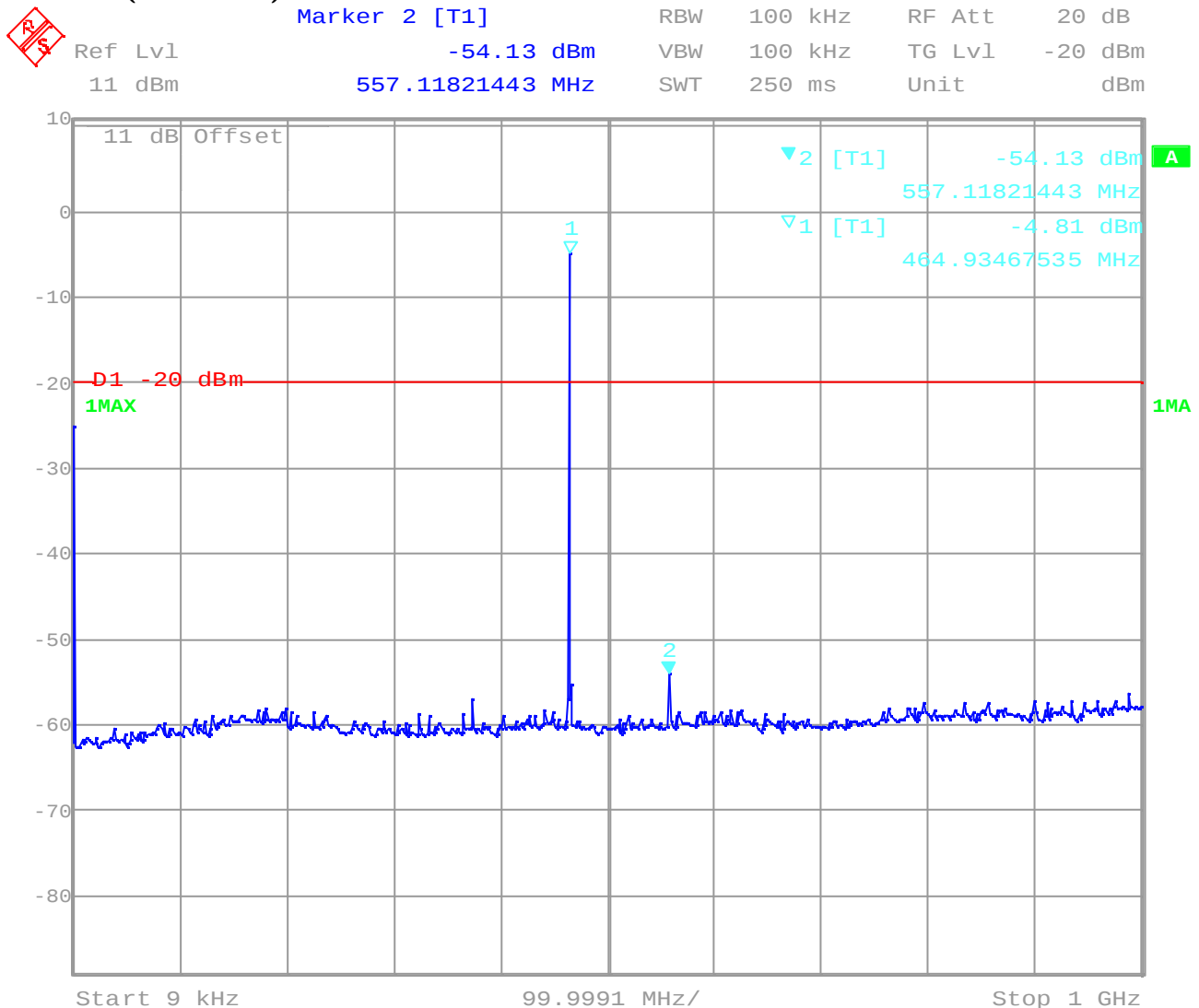
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

465 MHz (max Power)



Date: 2.AUG.2001 07:53:55

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

Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

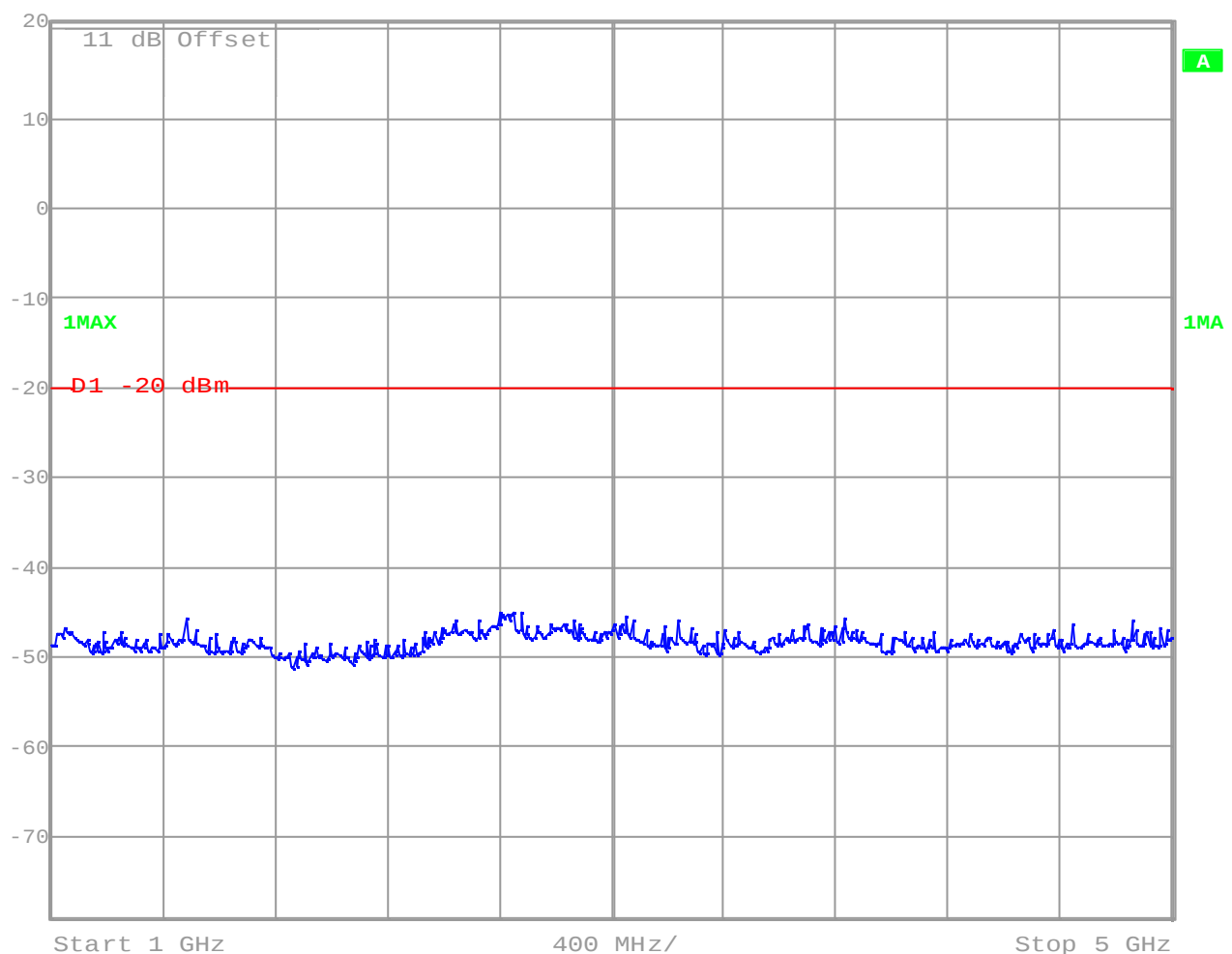
CONDUCTED SPURIOUS EMISSIONS § 2.991

465 MHz (max Power)



Ref Lvl
21 dBm

RBW	100 kHz	RF Att	30 dB
VBW	100 kHz	TG Lvl	-20 dBm
SWT	1 s	Unit	dBm



Date: 2.AUG.2001 08:06:56

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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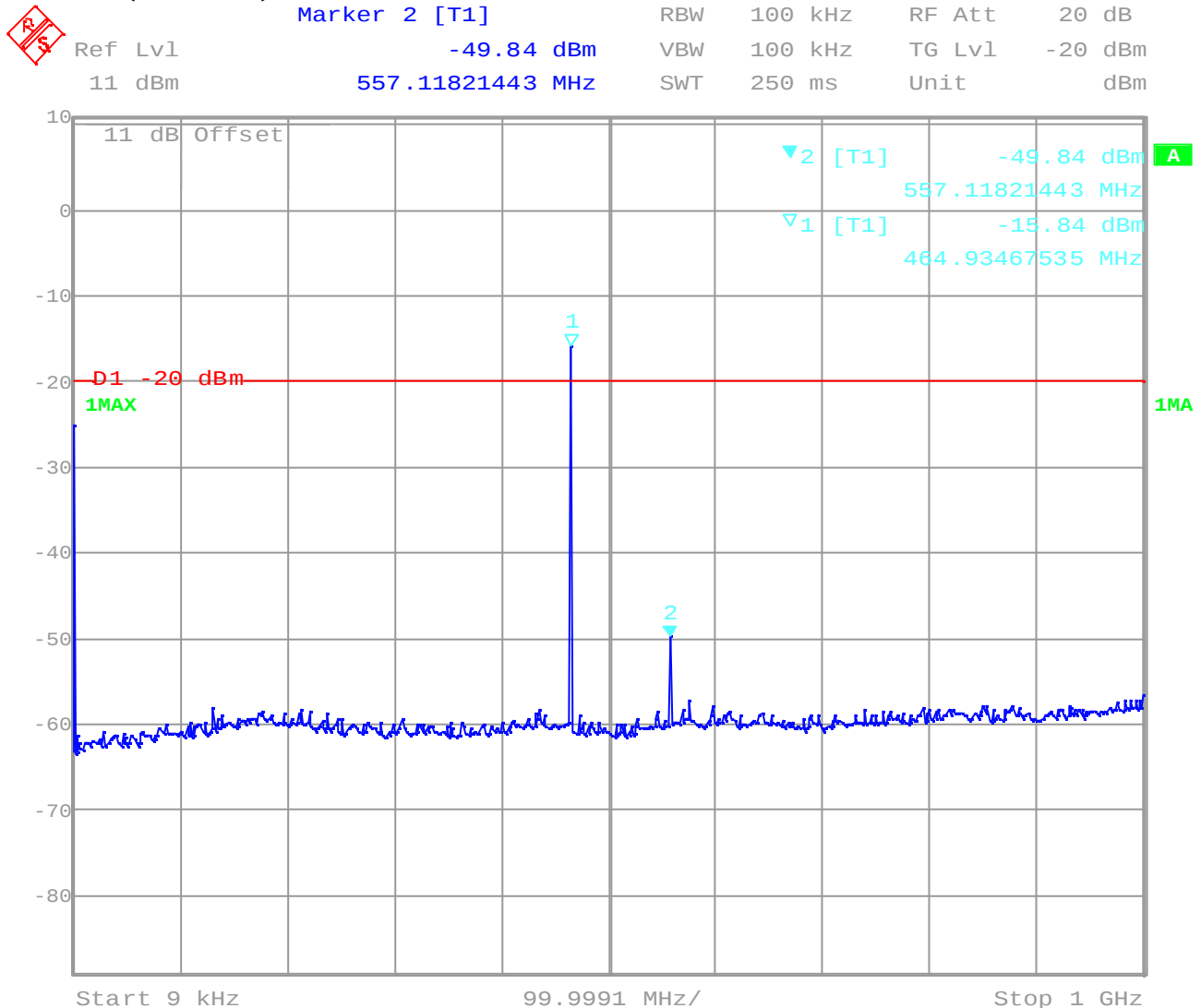
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

465 MHz (low Power)



Date: 2.AUG.2001 07:57:03

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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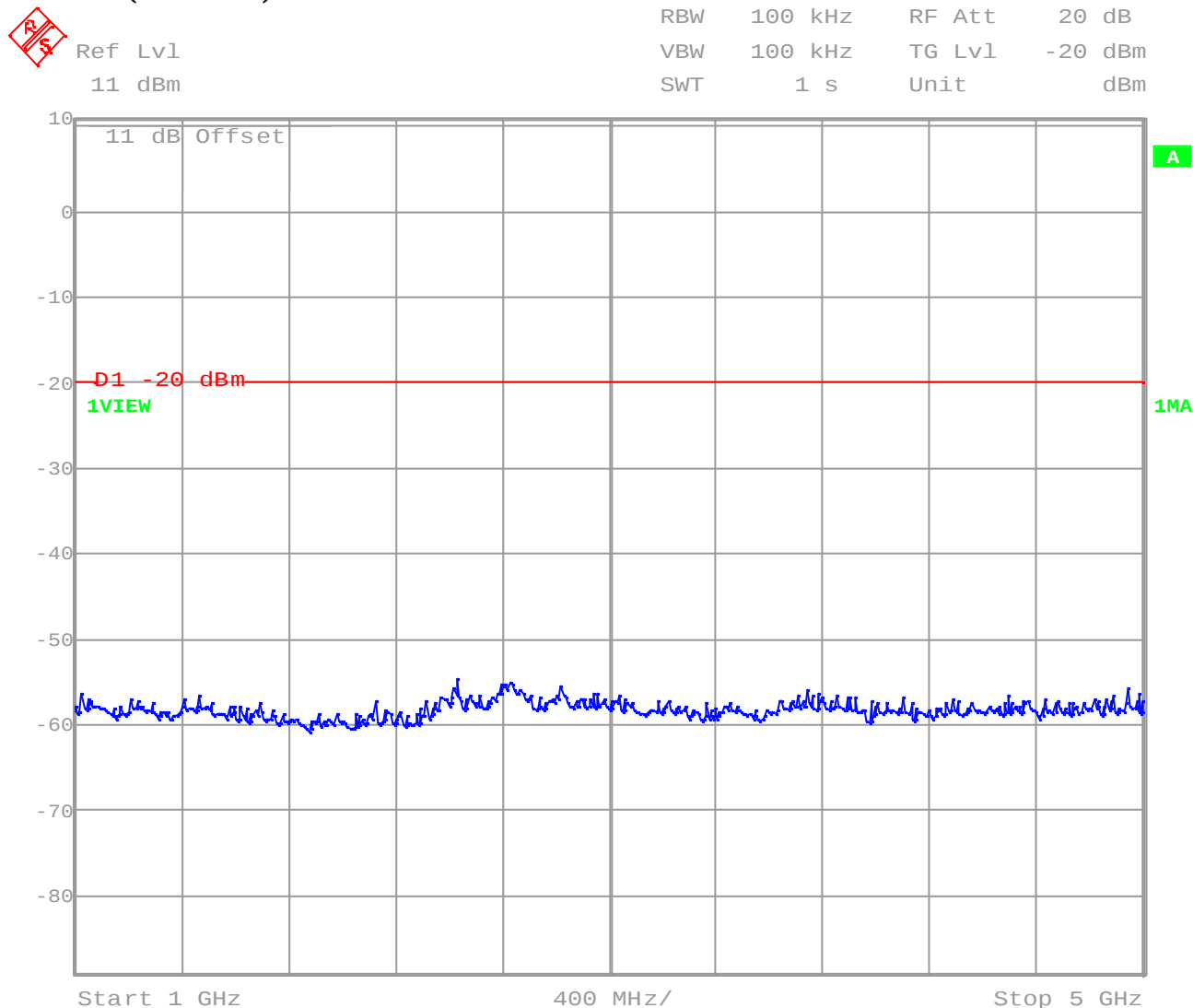
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

465 MHz (low Power)



Date: 2.AUG.2001 08:04:47

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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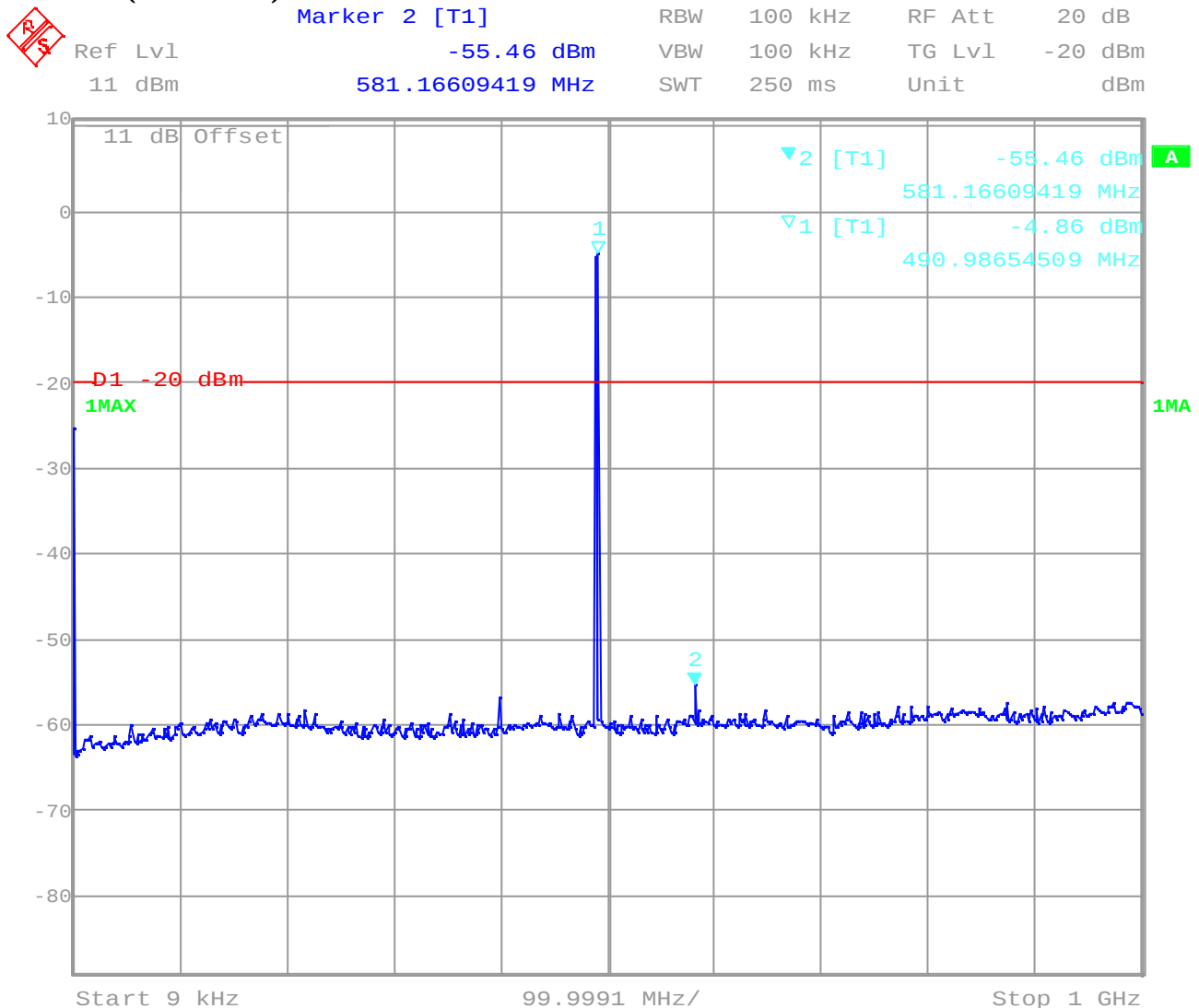
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

490 MHz (max Power)



Date: 2.AUG.2001 07:54:56

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

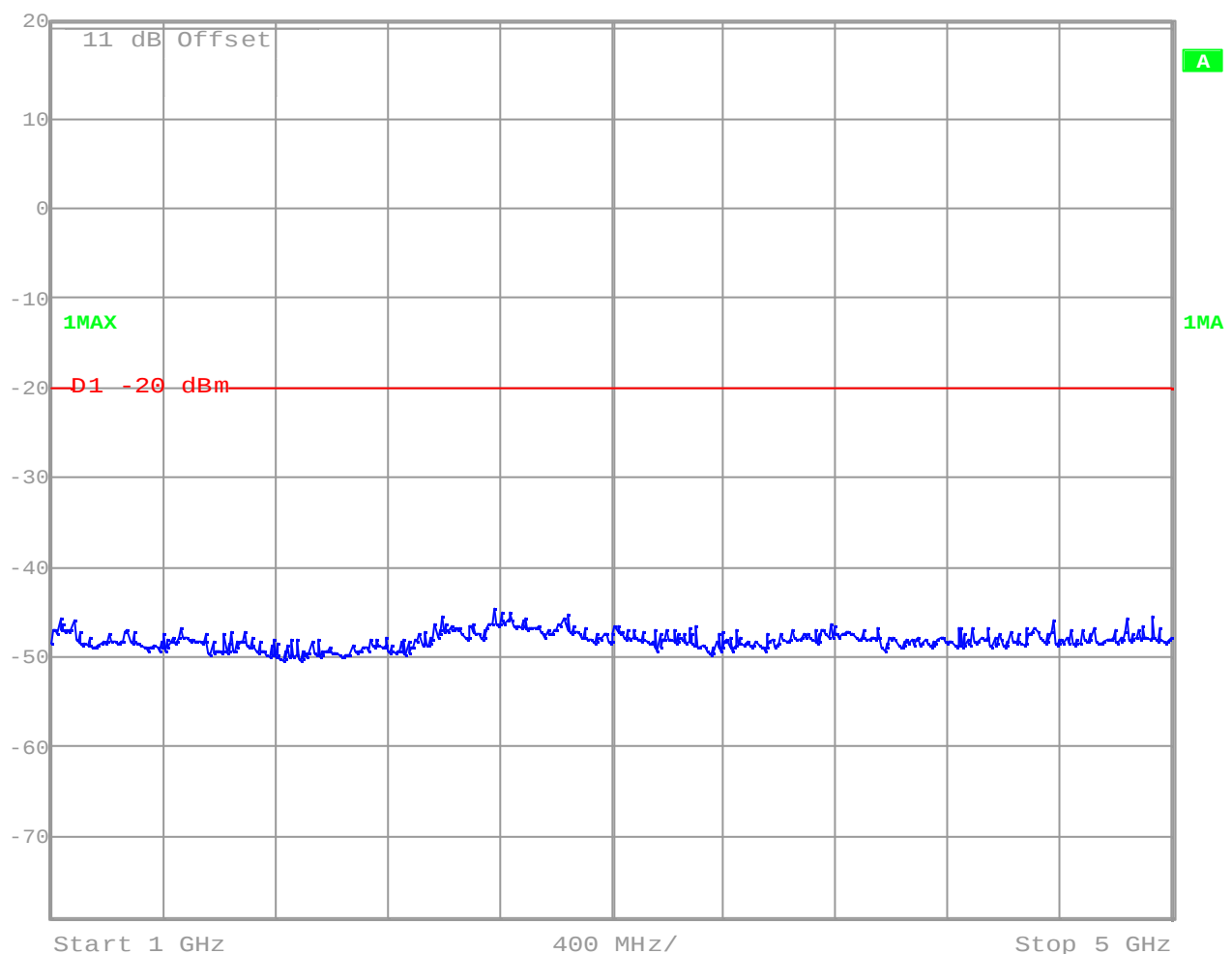
CONDUCTED SPURIOUS EMISSIONS § 2.991

490 MHz (max Power)



Ref Lvl
21 dBm

RBW	100 kHz	RF Att	30 dB
VBW	100 kHz	TG Lvl	-20 dBm
SWT	1 s	Unit	dBm



Date: 2.AUG.2001 08:06:31

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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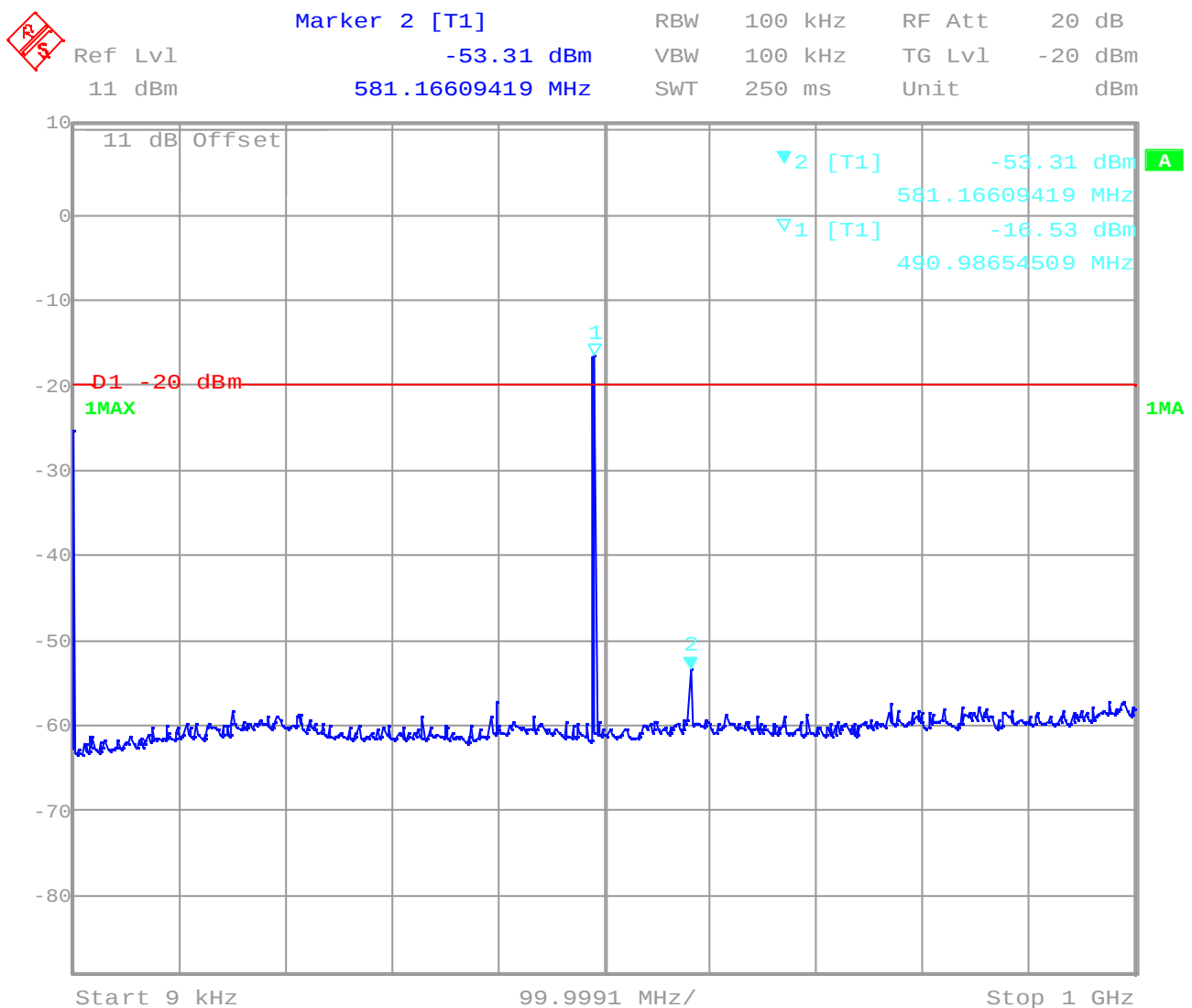
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

490 MHz (low Power)



Date: 2.AUG.2001 07:56:02

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

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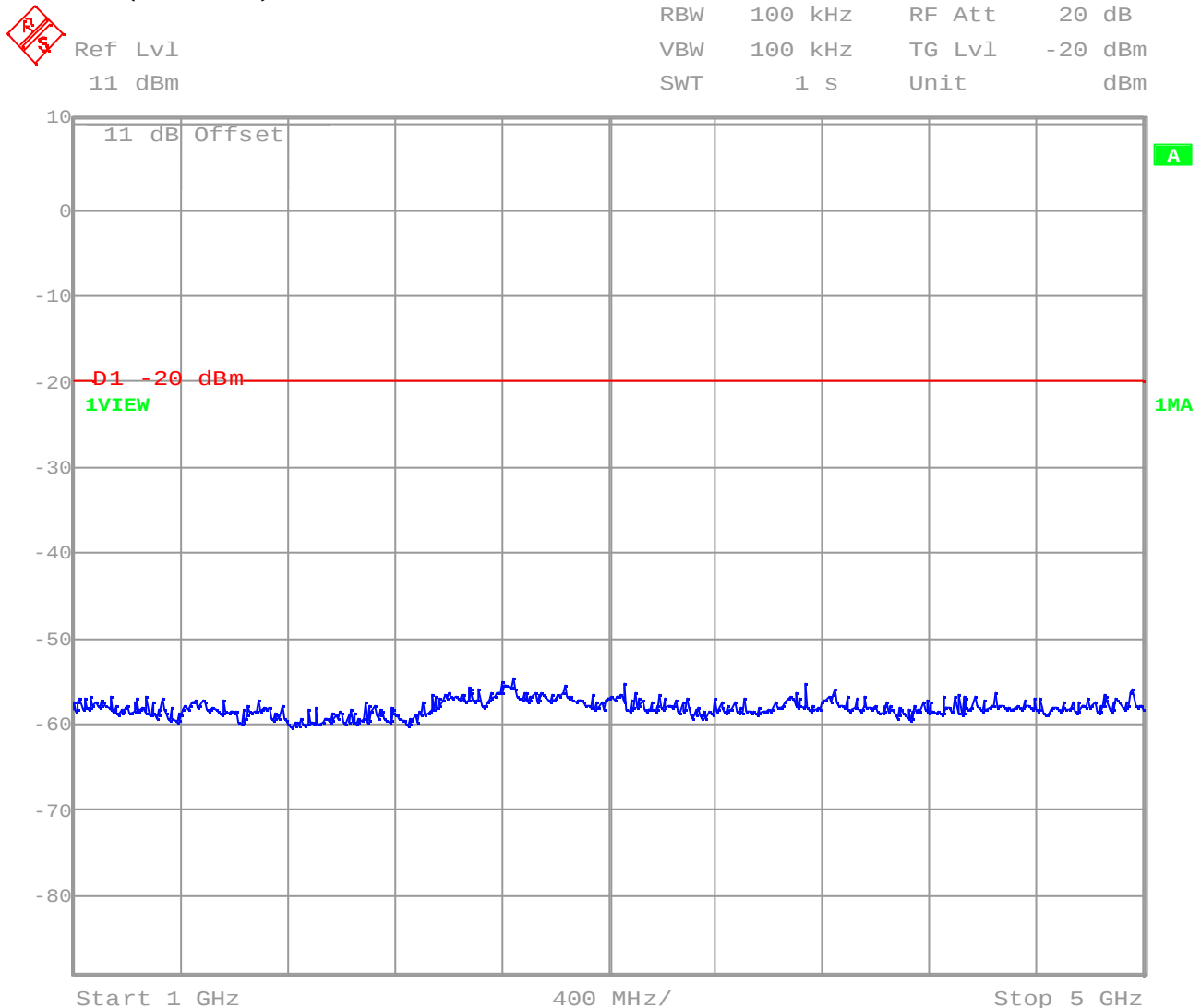
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

CONDUCTED SPURIOUS EMISSIONS § 2.991

490 MHz (low Power)



Date: 2.AUG.2001 08:05:14

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

Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSION §2.993

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
440 MHz					
440	V	PK	27,7 dBm/ 0,589 W		ERP
all	Spurs.	>20 dB	below	the	Limit
465 MHz					
465	V	PK	29,9 dBm/ 0,977 W		ERP
all	Spurs.	>20 dB	below	the	Limit
490 MHz					
490	V	PK	27,2 dBm/ 0,525 W		ERP
all	Spurs.	>20 dB	below	the	Limit
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)).

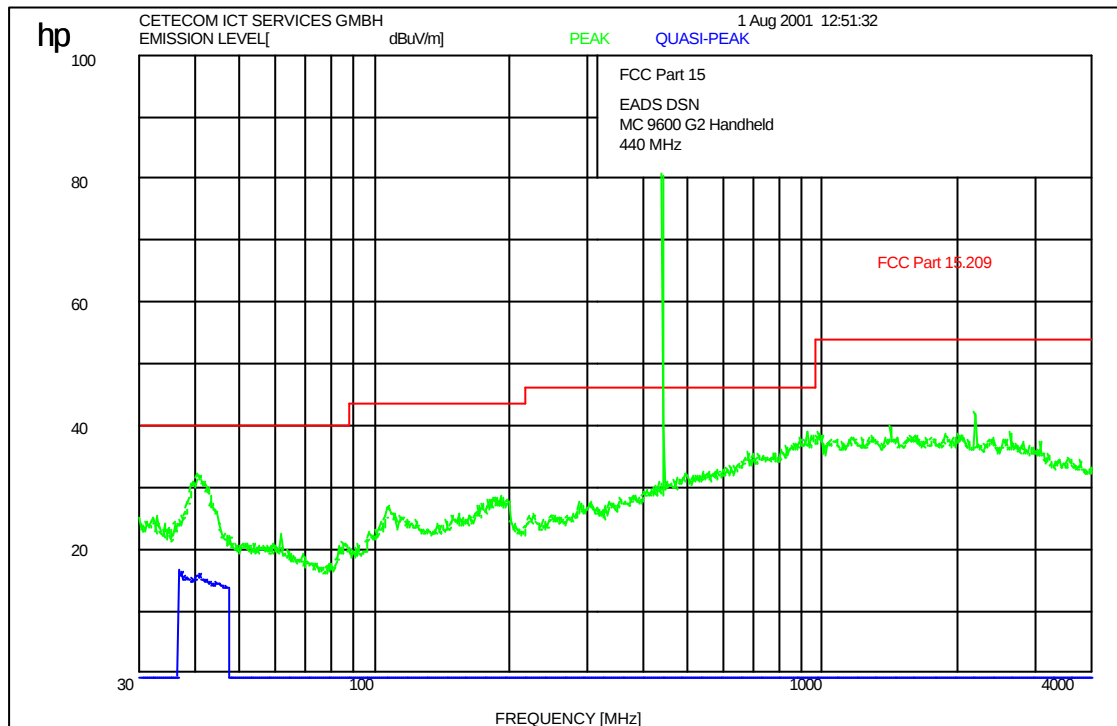
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

440 MHz (with car support and car adapter)



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

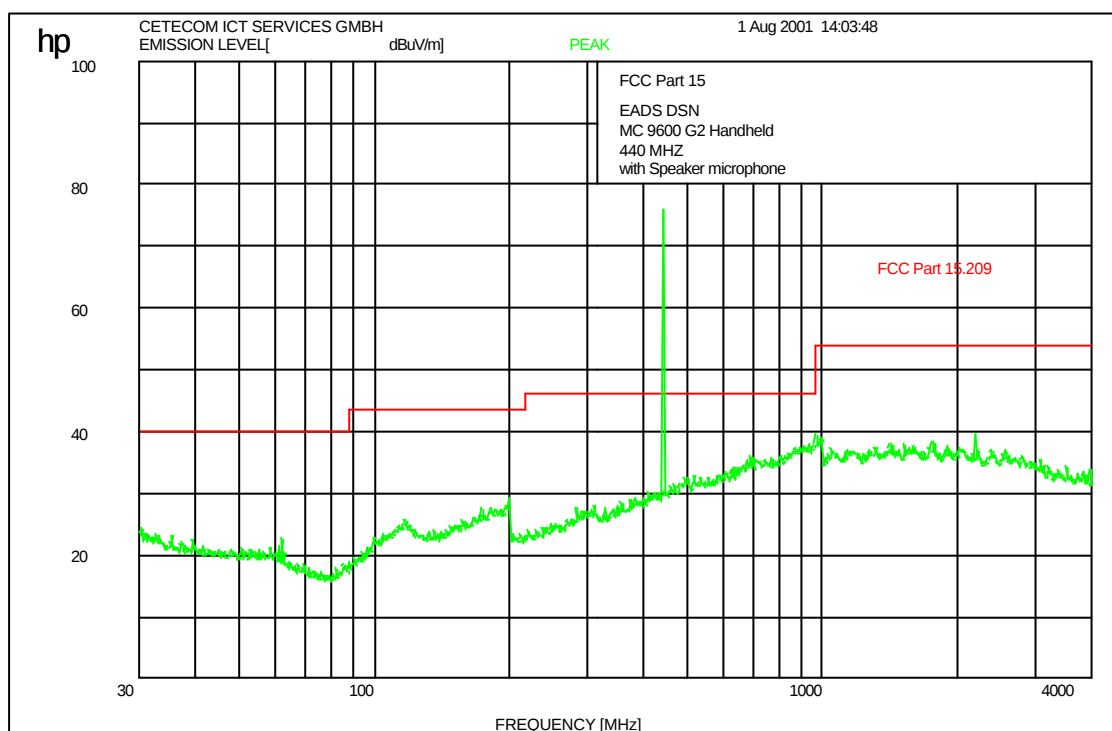
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51 %

RADIATED SPURIOUS EMISSIONS

440 MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

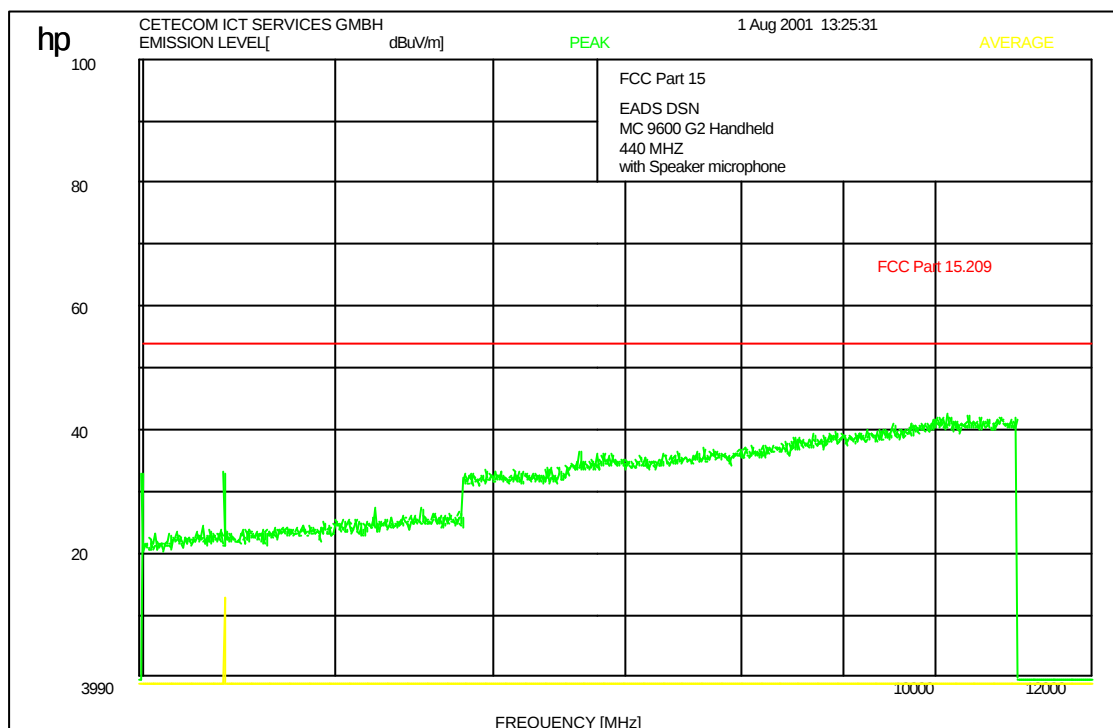
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

440 MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

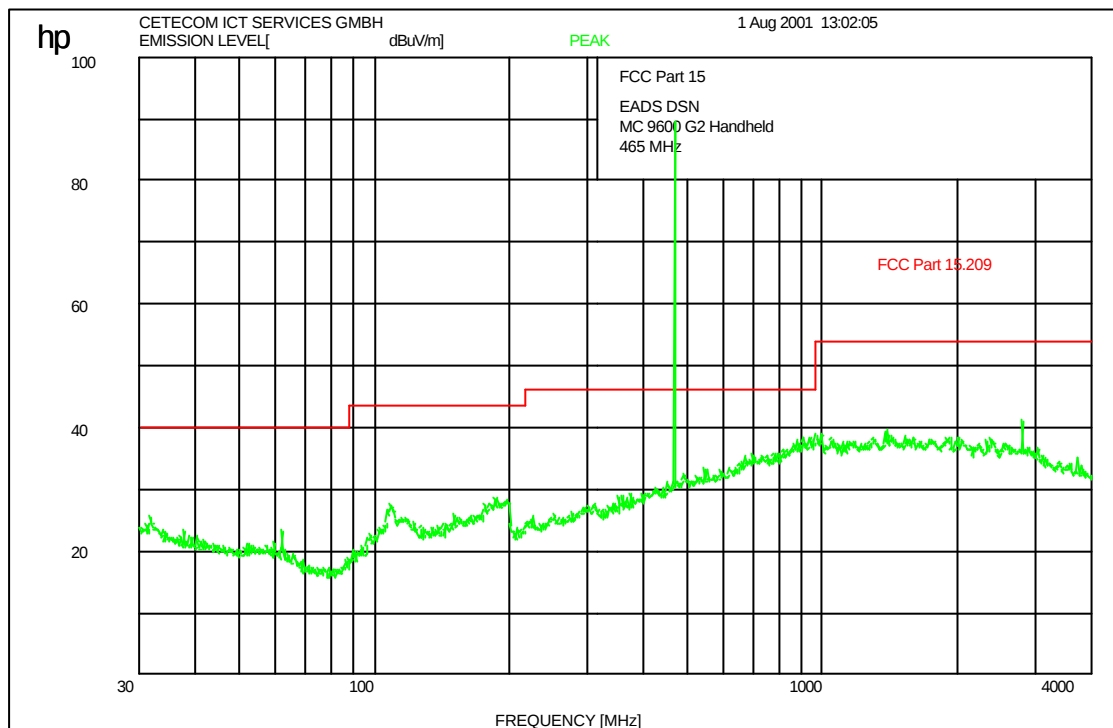
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

465 MHz (with car support and car adapter)



$f < 1 \text{ GHz}$: 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)

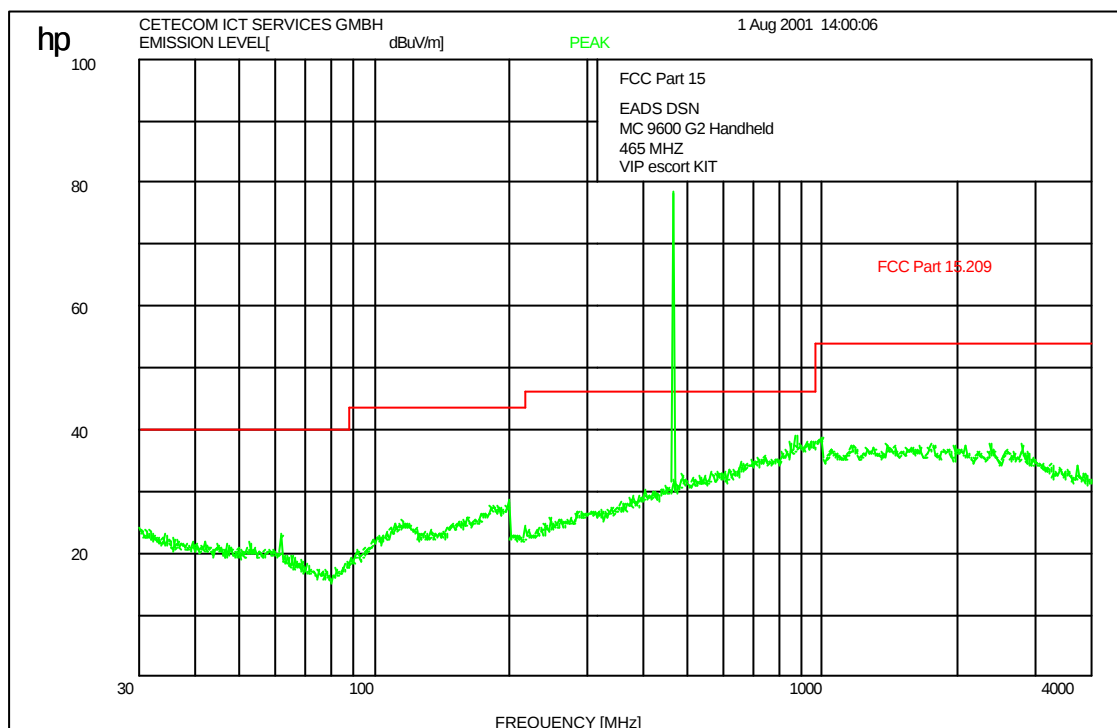
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

465 MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

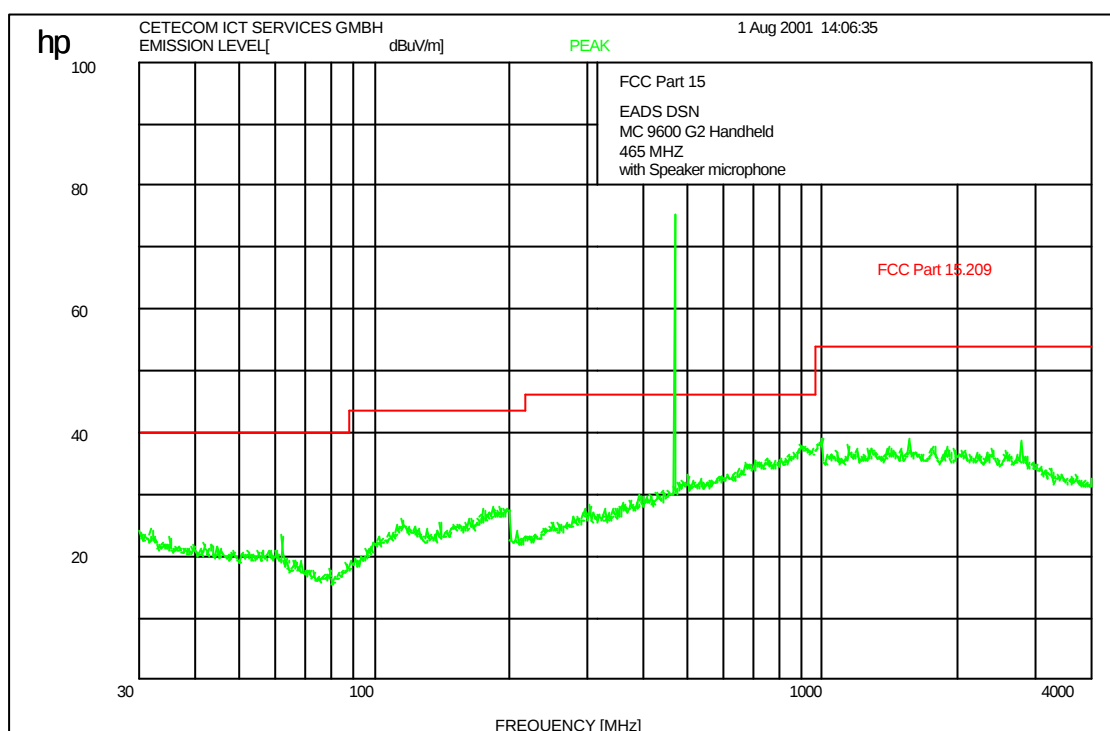
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

465 MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

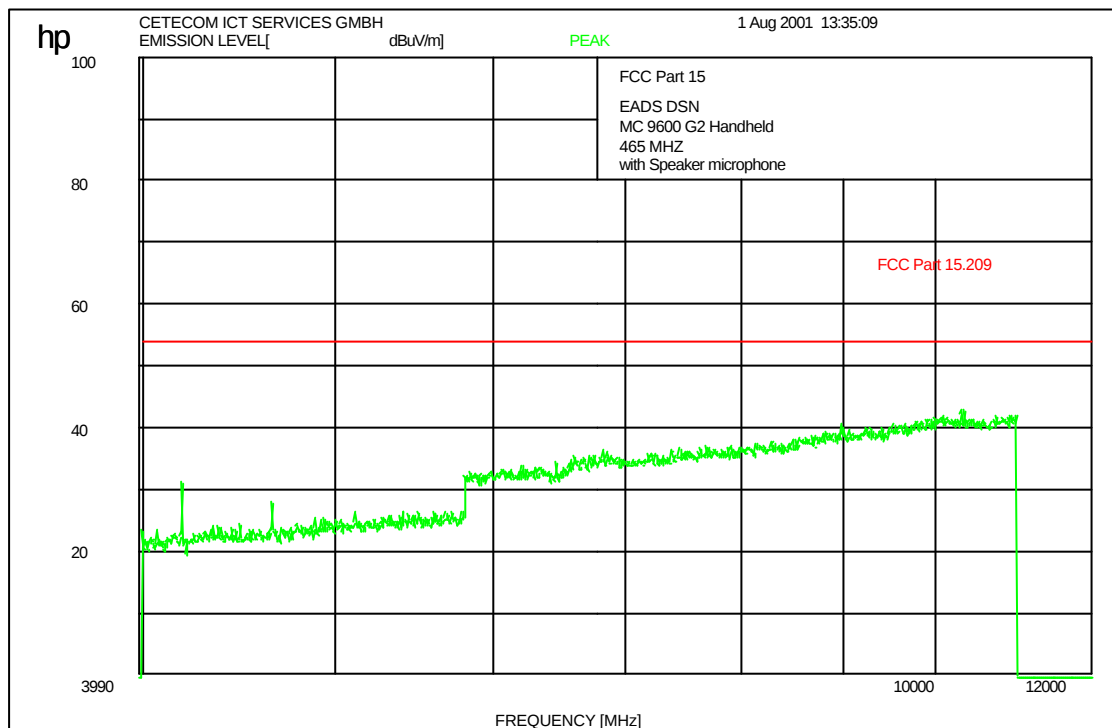
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

465 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)

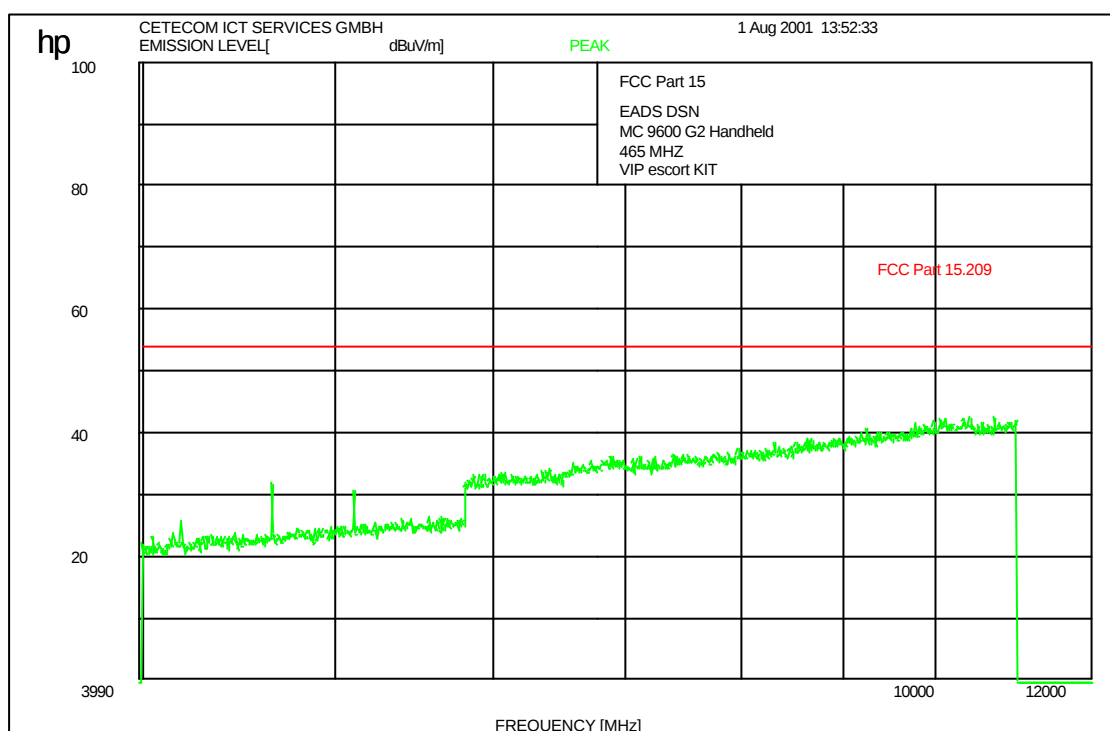
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

465 MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

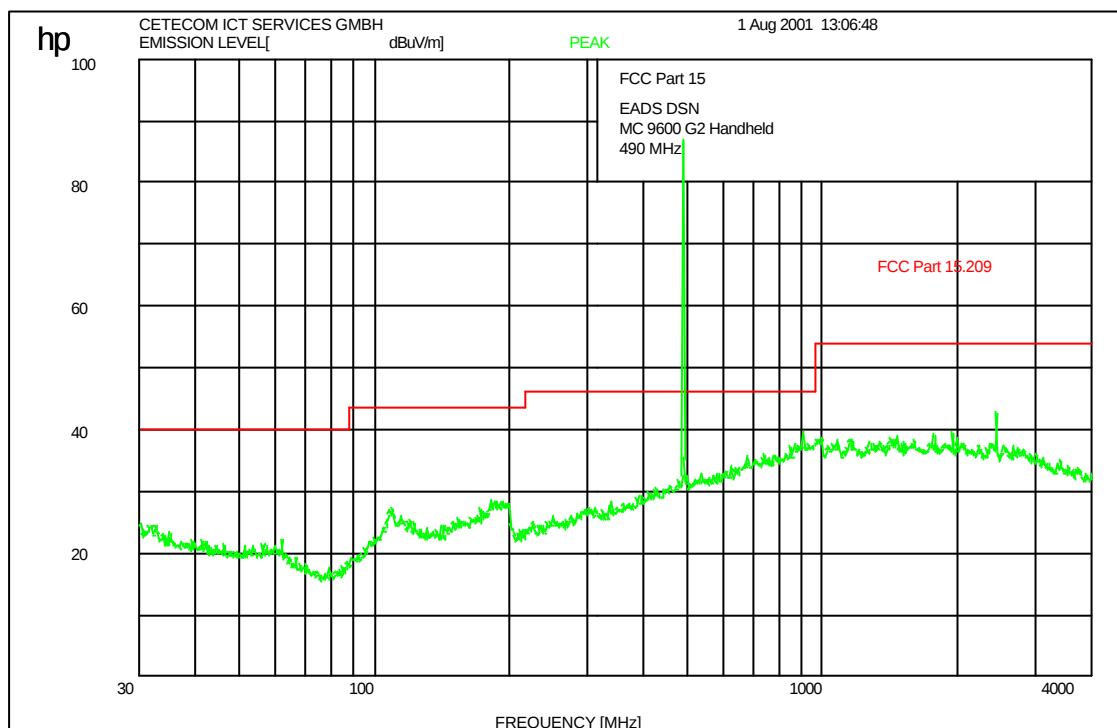
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

490MHz (with car support and car adapter)



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

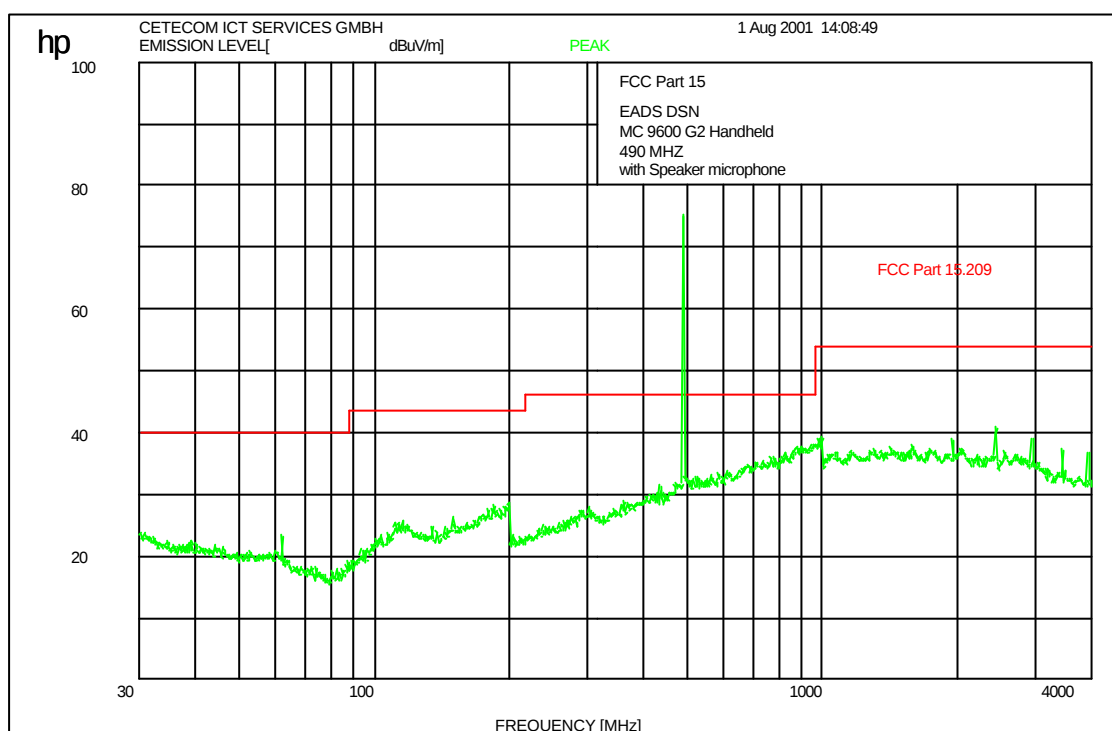
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

490MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.209

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

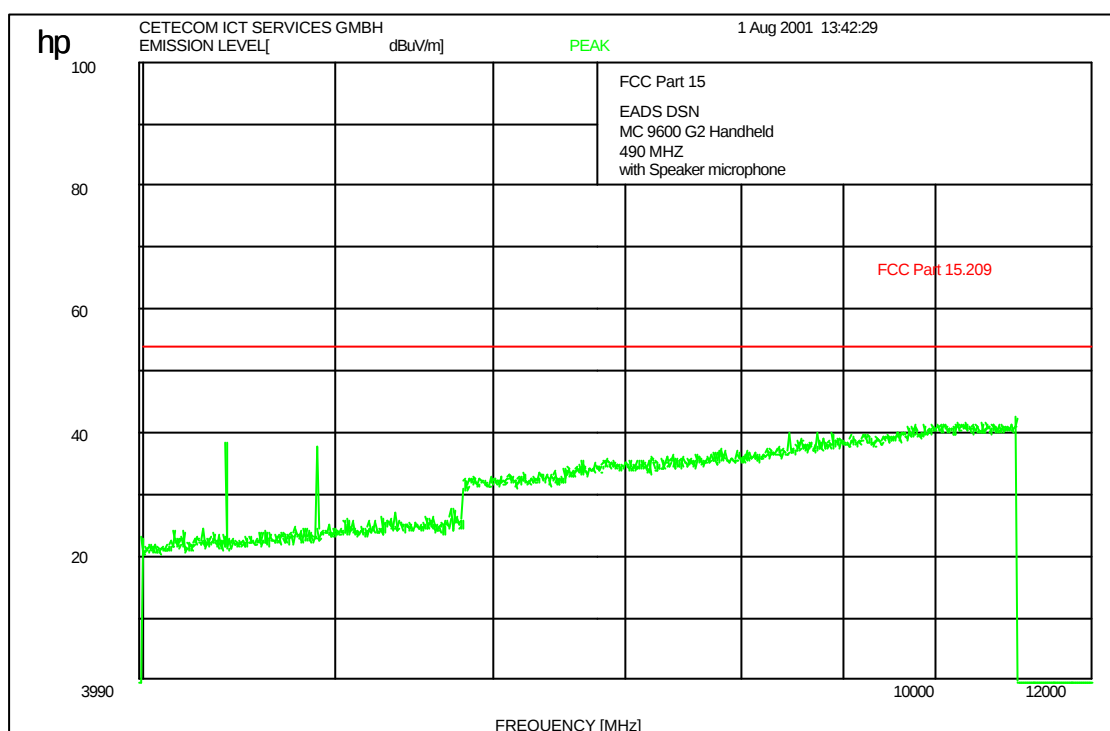
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RADIATED SPURIOUS EMISSIONS

490MHz



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : 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 : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

FREQUENCY STABILITY Vs. TEMPERATURE § 2.995

Temperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in PPM
-30°	0	440	0,00000000	0,0000
-20°	60	440	0,00000136	0,1364
-10°	50	440	0,00000114	0,1136
0,0°	10	440	0,00000023	0,0227
+10°	0	440	0,00000000	0,0000
+20°	10	440	0,00000023	0,0227
+30°	30	440	0,00000068	0,0682
+40°	50	440	0,00000114	0,1136
+50°	80	440	0,00000182	0,1818
+60°	80	440	0,00000182	0,1818

Temperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in PPM
-30°	0	465	0,00000000	0,0000
-20°	60	465	0,00000129	0,1290
-10°	40	465	0,00000086	0,0860
0,0°	10	465	0,00000022	0,0215
+10°	0	465	0,00000000	0,0000
+20°	10	465	0,00000022	0,0215
+30°	30	465	0,00000065	0,0645
+40°	50	465	0,00000108	0,1075
+50°	80	465	0,00000172	0,1720
+60°	70	465	0,00000151	0,1505

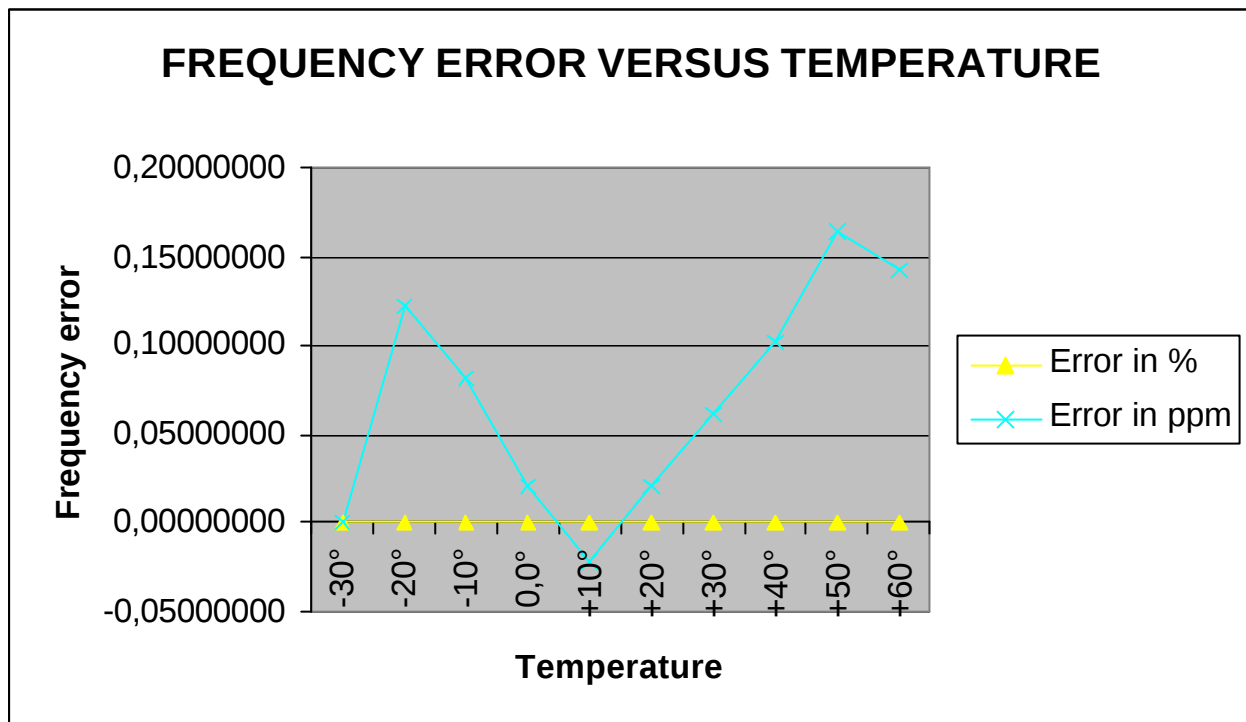
Temperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in PPM
-30°	0	490	0,00000000	0,0000
-20°	60	490	0,00000122	0,1224
-10°	40	490	0,00000082	0,0816
0,0°	10	490	0,00000020	0,0204
+10°	-10	490	-0,00000020	-0,0204
+20°	10	490	0,00000020	0,0204
+30°	30	490	0,00000061	0,0612
+40°	50	490	0,00000102	0,1020
+50°	80	490	0,00000163	0,1633
+60°	70	490	0,00000143	0,1429

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

Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%



Example for 490 MHz

LIMITS

SUBCLAUSE § 90.213

Temperature – Frequency Stability of 0.0005% from –30 to +60 °C

Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

FREQUENCY STABILITY Vs. VOLTAGE § 2.991

nom. Voltage	nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in PPM
0,85	4,8	4,08	20	440	0,00000455	0,0455
0,88		4,18	20	440	0,00000455	0,0455
0,90		4,32	20	440	0,00000455	0,0455
0,93		4,42	30	440	0,00000682	0,0682
0,95		4,56	30	440	0,00000682	0,0682
0,98		4,66	30	440	0,00000682	0,0682
1,00		4,80	30	440	0,00000682	0,0682
1,03		4,90	30	440	0,00000682	0,0682
1,05		5,04	30	440	0,00000682	0,0682
1,08		5,14	30	440	0,00000682	0,0682
1,10		5,28	30	440	0,00000682	0,0682
1,13		5,38	30	440	0,00000682	0,0682
1,15		5,52	40	440	0,00000909	0,0909

nom. Voltage	nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in PPM
0,85	4,8	4,08	30	465	0,00000645	0,0645
0,88		4,18	30	465	0,00000645	0,0645
0,90		4,32	30	465	0,00000645	0,0645
0,93		4,42	30	465	0,00000645	0,0645
0,95		4,56	30	465	0,00000645	0,0645
0,98		4,66	30	465	0,00000645	0,0645
1,00		4,80	30	465	0,00000645	0,0645
1,03		4,90	30	465	0,00000645	0,0645
1,05		5,04	30	465	0,00000645	0,0645
1,08		5,14	30	465	0,00000645	0,0645
1,10		5,28	30	465	0,00000645	0,0645
1,13		5,38	30	465	0,00000645	0,0645
1,15		5,52	30	465	0,00000645	0,0645

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

07, 64 , 66 -68

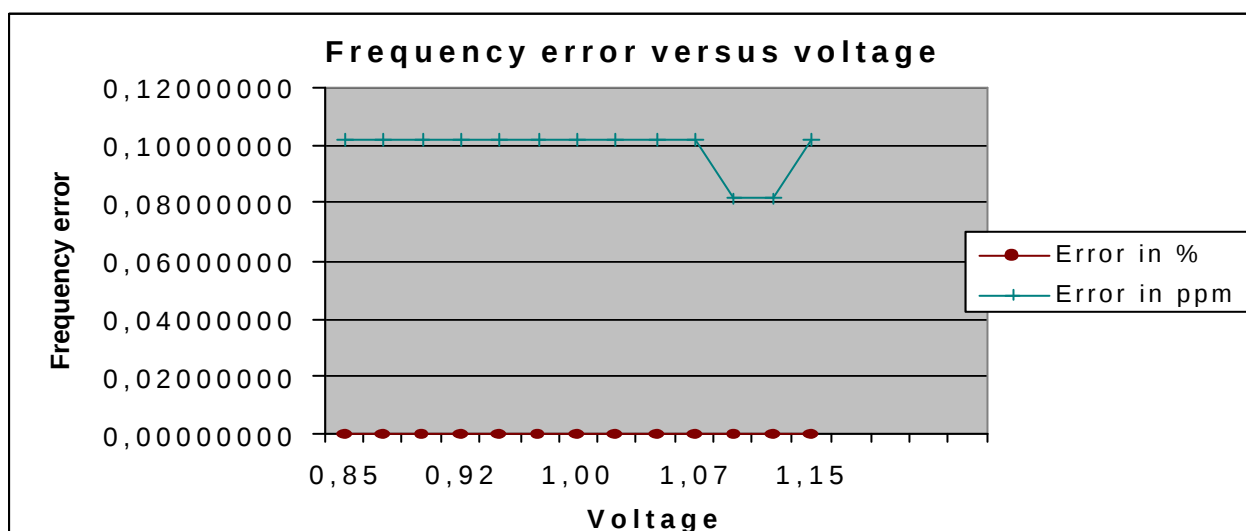
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

FREQUENCY STABILITY Vs. VOLTAGE § 2.991

nom. Voltage	nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in PPM
0,85	4,8	4,08	50	490	0,00001020	0,1020
0,88		4,18	50	490	0,00001020	0,1020
0,90		4,32	50	490	0,00001020	0,1020
0,93		4,42	50	490	0,00001020	0,1020
0,95		4,56	50	490	0,00001020	0,1020
0,98		4,66	50	490	0,00001020	0,1020
1,00		4,80	50	490	0,00001020	0,1020
1,03		4,90	50	490	0,00001020	0,1020
1,05		5,04	50	490	0,00001020	0,1020
1,08		5,14	50	490	0,00001020	0,1020
1,10		5,28	40	490	0,00000816	0,0816
1,13		5,38	40	490	0,00000816	0,0816
1,15		5,52	50	490	0,00001020	0,1020



Example for 490 MHz

LIMITS

SUBCLAUSE § 90.213

Power Supply Voltage – Frequency Stability of 0.0005% from 85% to 115% of nominal voltage

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

07, 64 , 66 -68

Equipment under test : MC9620 S G2 UM

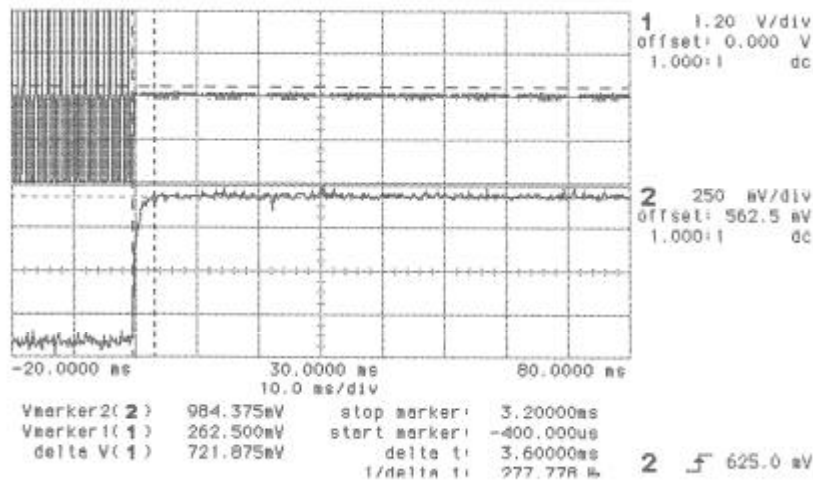
Ambient temperature : 24.2° C

Relative humidity : 51%

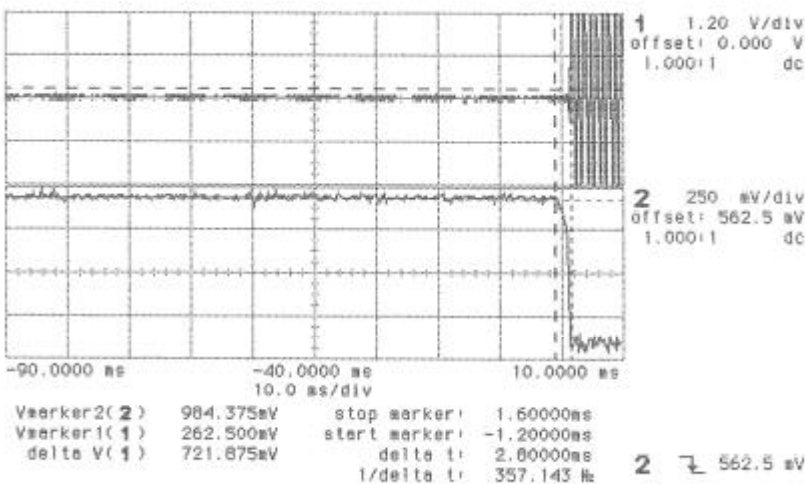
TRANSIENT FREQUENCY BEHAVIOR §90.214

440 MHz

hp stopped



hp stopped



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

07, 64, 66 -68

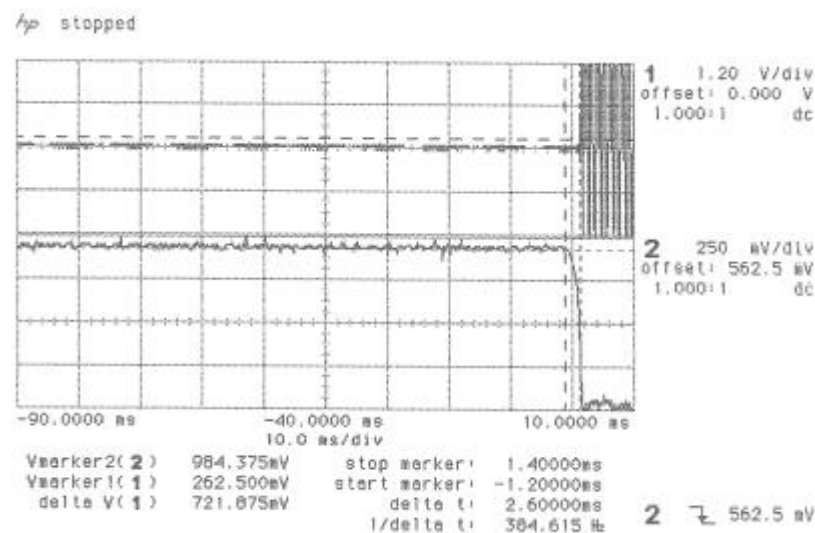
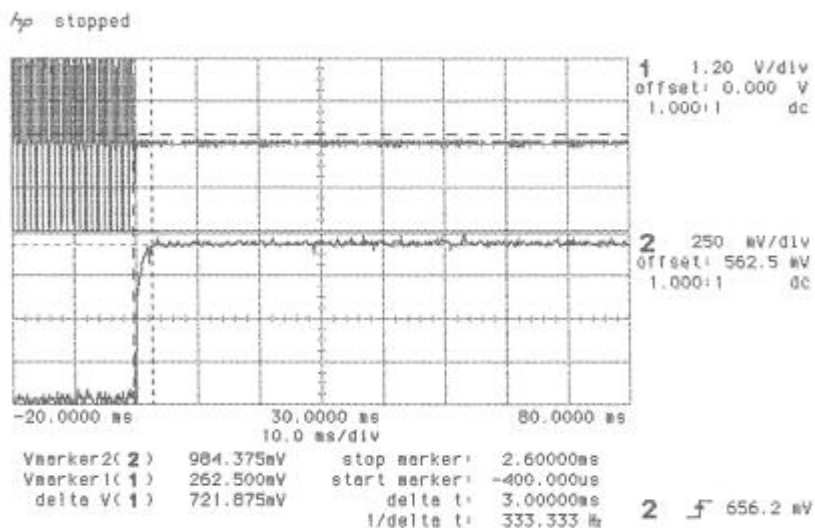
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

TRANSIENT FREQUENCY BEHAVIOR §90.214

465 MHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

07, 64, 66 -68

Equipment under test : MC9620 S G2 UM

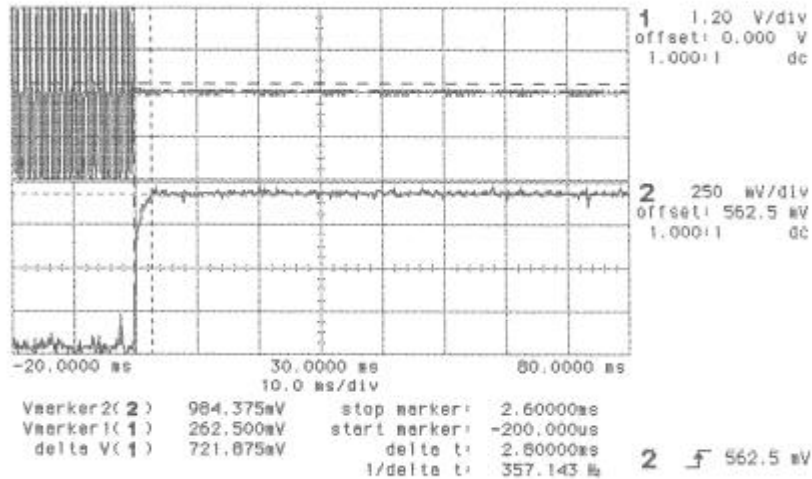
Ambient temperature : 24.2° C

Relative humidity : 51%

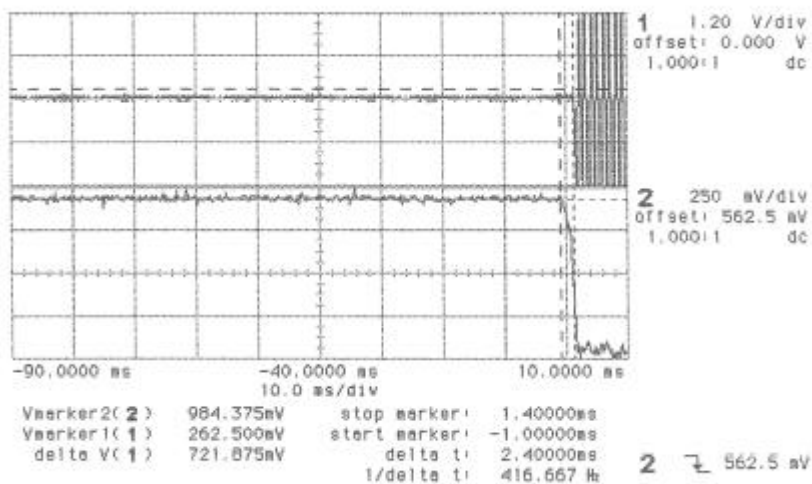
TRANSIENT FREQUENCY BEHAVIOR §90.214

490 MHz

hp stopped



hp stopped



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

07, 64, 66 -68

Equipment under test : MC9620 S G2 UM**Ambient temperature** : 24.2° C**Relative humidity** : 51%**Remark:** channel 1 : frequency difference
(100 mV conforms to 1kHz)channel 2 : transmitter output power
(100 mV conforms to 10 dB)

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
t₁	±12.5 kHz	5.0 ms	10.0 ms
t₂	±6.25 kHz	20.0 ms	25.0 ms
t₃	±12.5 kHz	5.0 ms	10.0ms

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

07, 64 , 66 -68

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

Page 48 (66)

Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RECEIVER SPURIOUS RADIATION

§ 15.209

Radiated

SPURIOUS EMISSIONS LEVEL (µV/m)								
440 MHz			465 MHz			490 MHz		
f (MHz)	Detector Polarization	Level (µV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
no	peaks	found	no	peaks	found	no	peaks	found
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1 GHz : RBW/VBW: 1 MHz

Measurement distance see table

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

Page 49 (66)

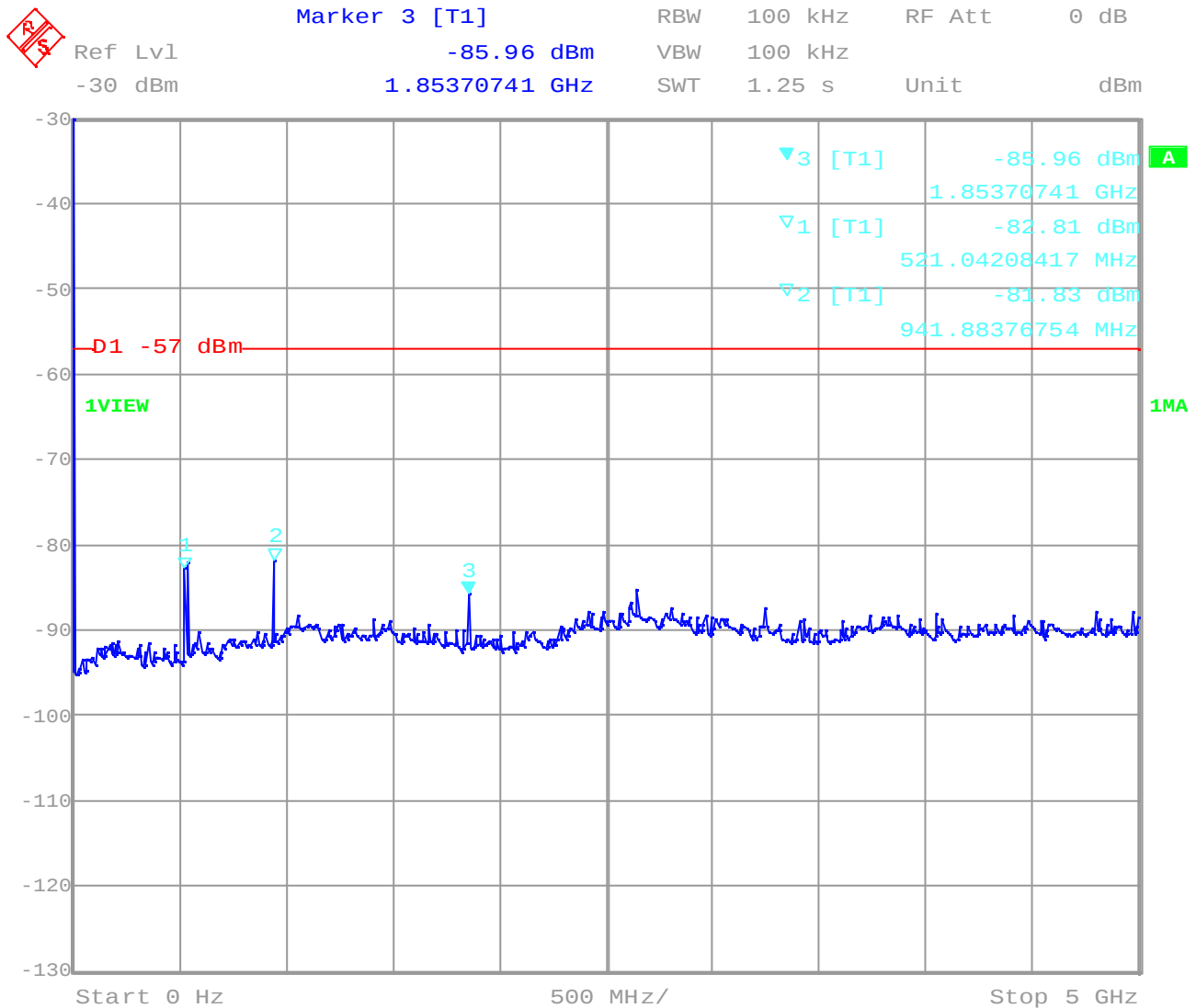
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RECEIVER SPURIOUS EMISSIONS (conducted) § 15.111

440 MHz



Date: 2.AUG.2001 08:31:49

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits

SUBCLAUSE § 15.111

9 kHz – 5 GHz	2 nW / -57 dBm
---------------	----------------

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

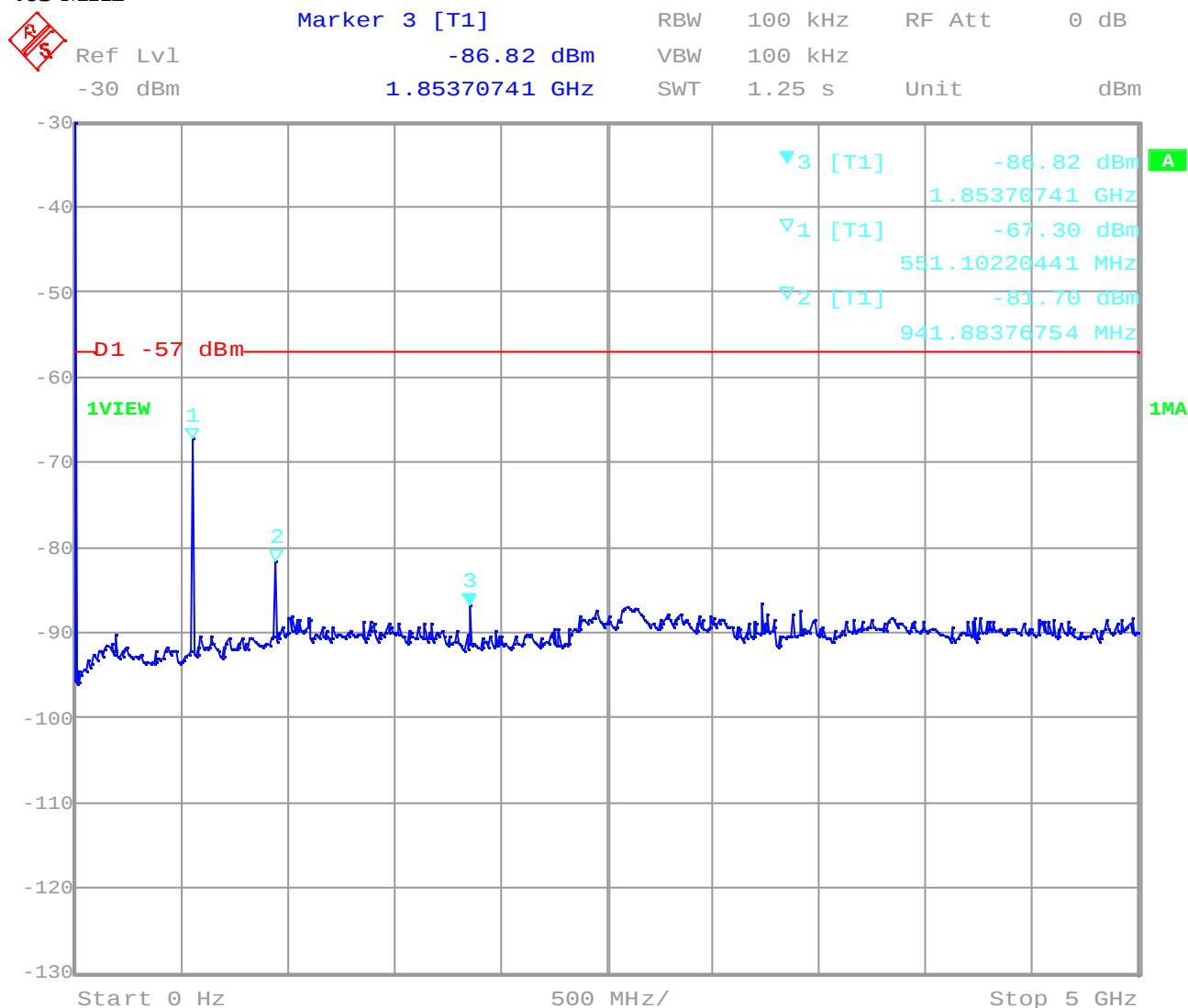
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RECEIVER SPURIOUS EMISSIONS (conducted) § 15.111

465 MHz



Date: 2.AUG.2001 08:32:35

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits

SUBCLAUSE § 15.111

9 kHz – 5 GHz	2 nW / -57 dBm
---------------	----------------

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

Test report nr.: 5_3682-B/00

Issue Date: 05.03.01

Page 51 (66)

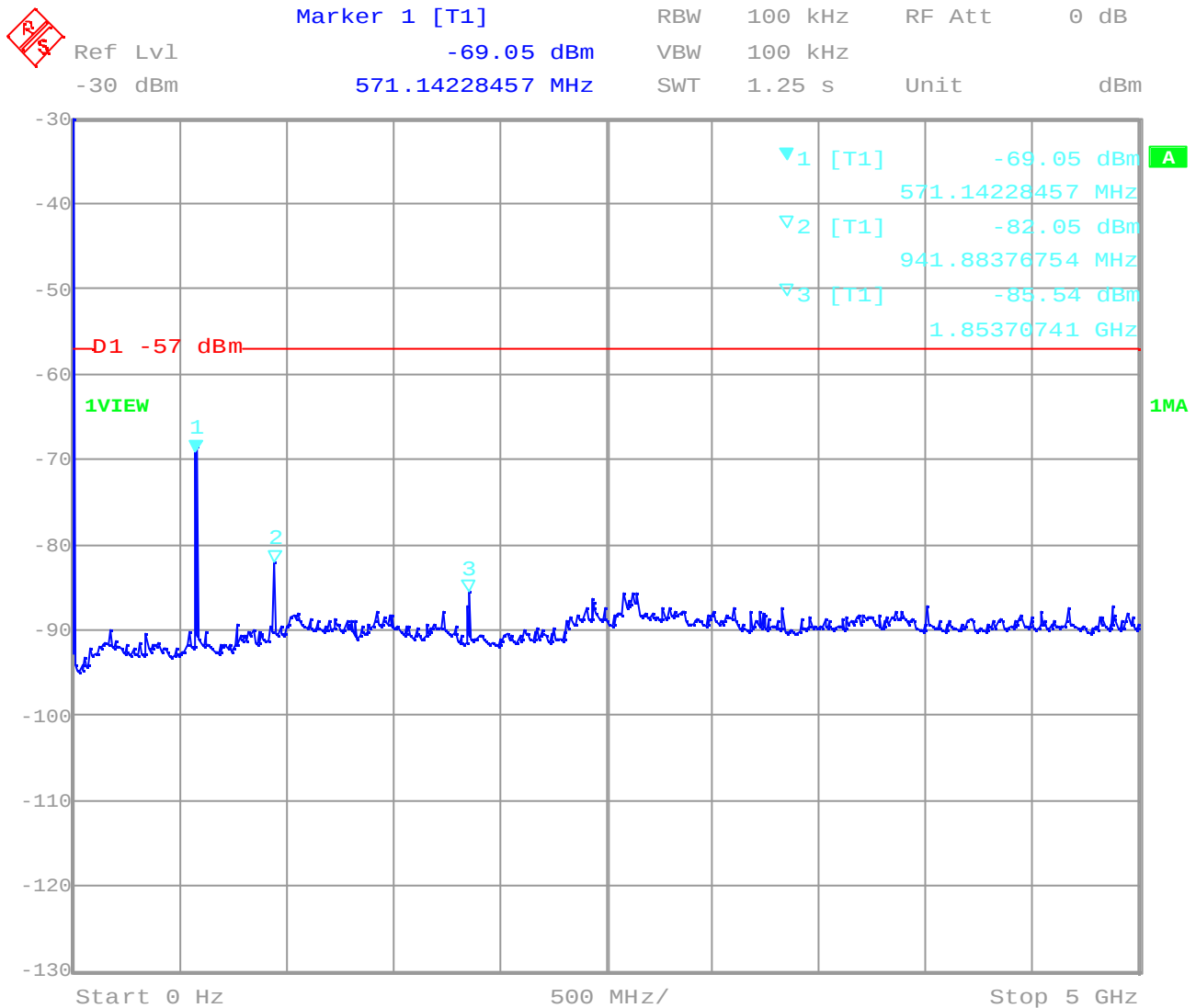
Equipment under test : MC9620 S G2 UM

Ambient temperature : 24.2° C

Relative humidity : 51%

RECEIVER SPURIOUS EMISSIONS (conducted) § 15.111

490 MHz



Date: 2.AUG.2001 08:33:06

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits

SUBCLAUSE § 15.111

9 kHz – 5 GHz	2 nW / -57 dBm
---------------	----------------

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

Equipment under test : MC9620 S G2 UM

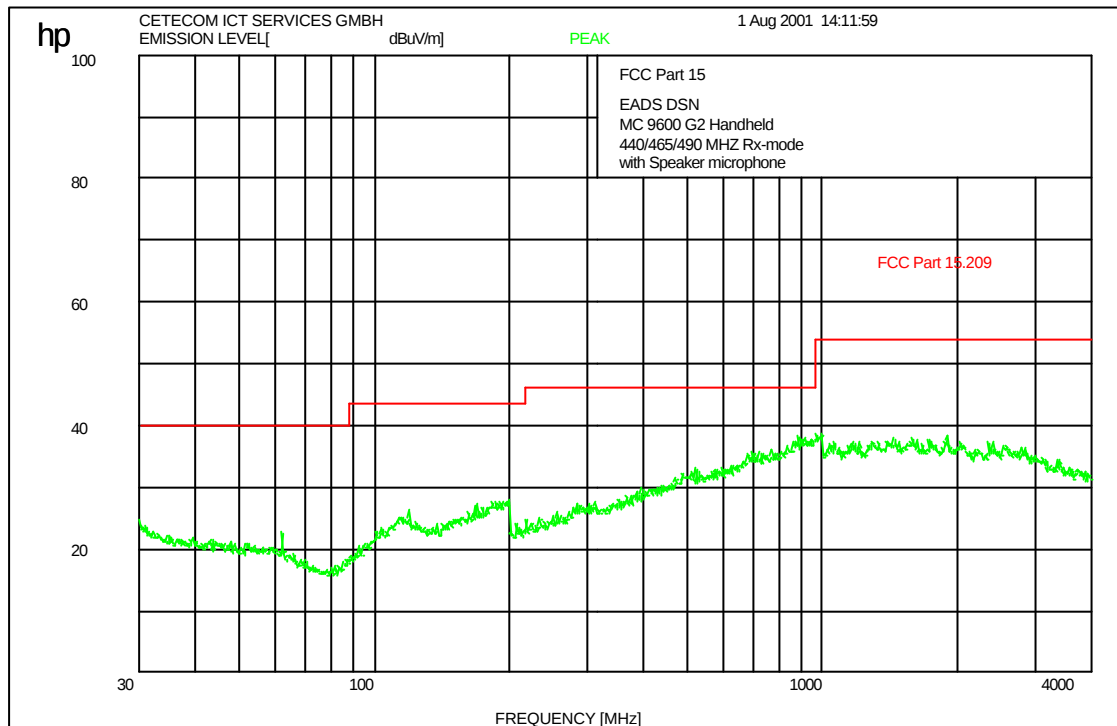
Ambient temperature : 24.2° C

Relative humidity : 51%

RECEIVER SPURIOUS RADIATION

§ 15.209

valid for all configurations



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits

SUBCLAUSE § 15.209

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

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : MC9620 S G2 UM

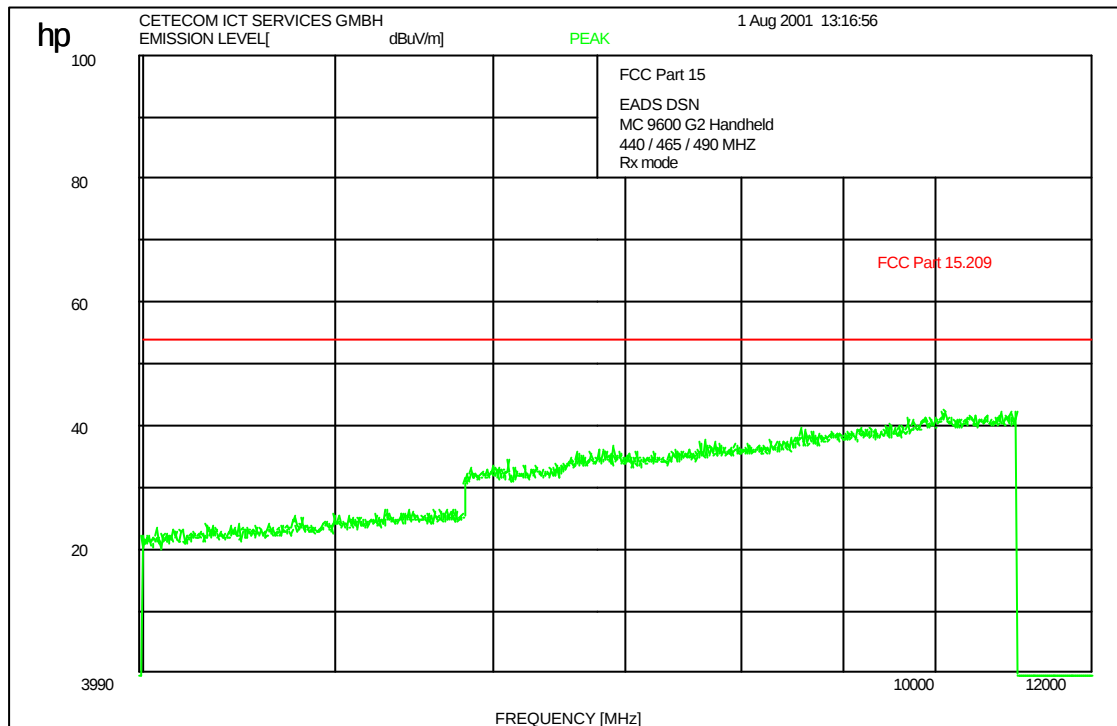
Ambient temperature : 24.2° C

Relative humidity : 51%

RECEIVER SPURIOUS RADIATION

§ 15.209

valid for all configurations



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

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

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

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

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erfi	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Receiver	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

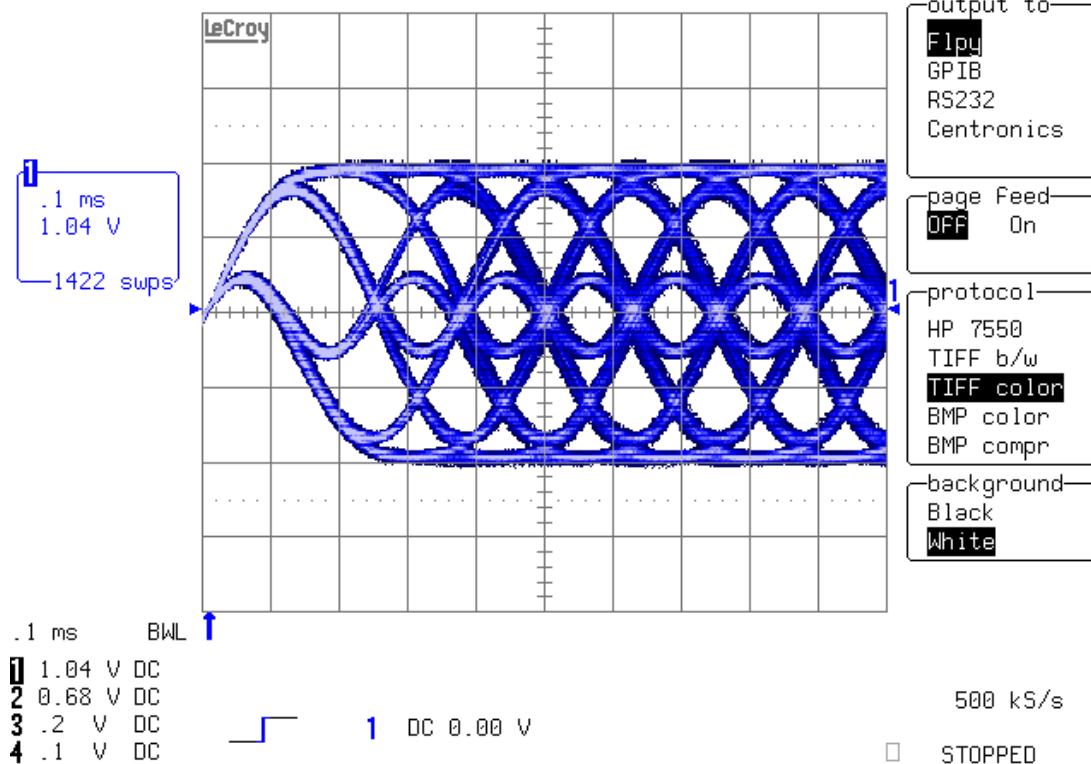
To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Meßempfänger	ESH 3	Rohde & Schwarz	890 174/002
43	Meßempfänger	ESVP	Rohde & Schwarz	891 752/005
44	Biconi Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisationsnetzwerk	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenne 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
52	Steuerrechner	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phasen V- Netzwerk	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phasen V- Netzwerk	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phasen V- Netzwerk	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Stromversorgung	6032A	Rohde & Schwarz	2933A05441
59	HF-Test Empfänger	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	HF-Test Empfänger	ESH3	Rohde & Schwarz	881 515/002
62	Relais Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relais Matrix	PSU	Rohde & Schwarz	828 628/007
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
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

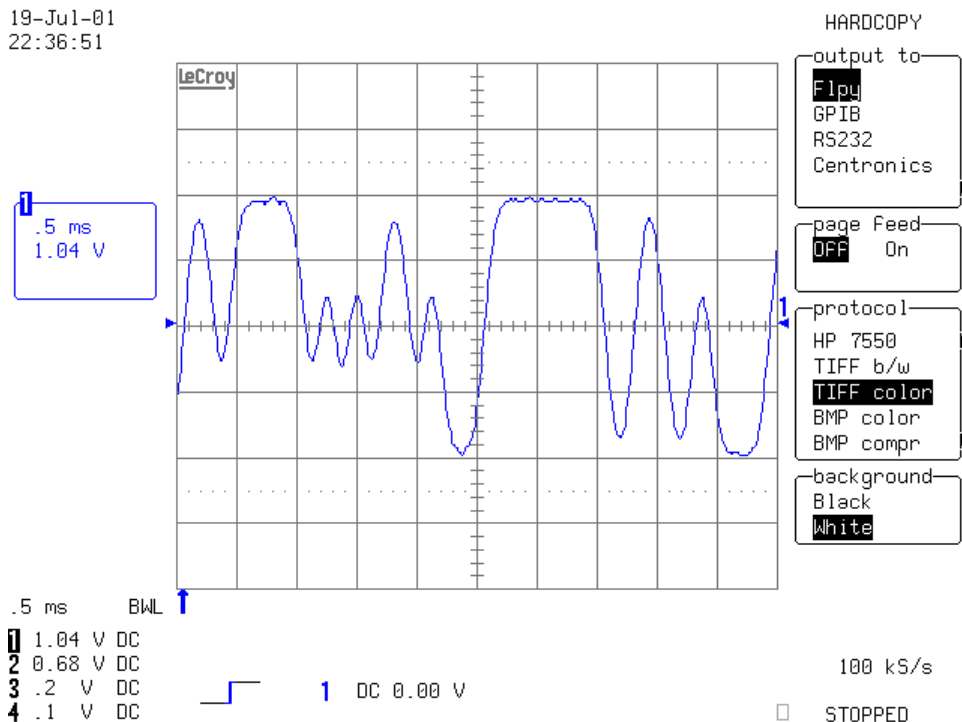
Photographs of the equipment

GMSK- Modulation

19-Jul-01
22:34:16



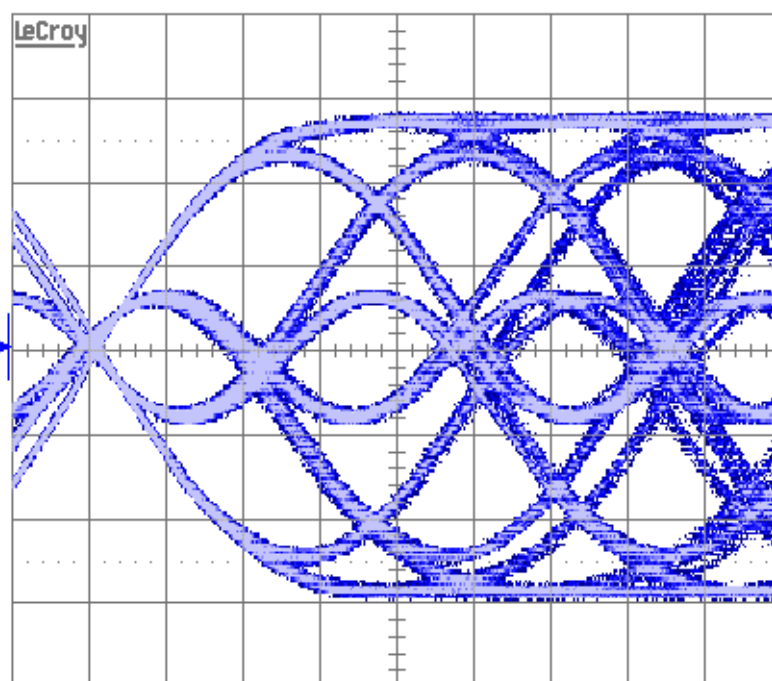
19-Jul-01
22:36:51



19-Jul-01
22:14:33

Screen Dump stored to D000.TIF on LECROY-1.DIR of

50 μ s
0.72 V
4071 swps



PANEL SETUPS

choose
Recall (or)
Save

FROM SETUP1
Empty

FROM SETUP2
Empty

FROM SETUP3
Empty

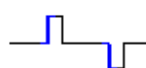
FROM SETUP4
Empty

FROM DEFAULT
SETUP

From Flpy

50 μ s

1 0.72 V DC
2 .1 V DC
3 .2 V DC
4 .1 V DC



1 DC 0.03 V $\pm$ 0.29 V

1 MS/s

☐ STOPPED