



**TTI-P-G-166/98-30**

## **Accredited Bluetooth Test Facility (BQTF)**

**Test report no.: 2\_3045-01-01/02**  
**FCC Part 24 and Part 22**  
**GM28**  
**FCC ID: PY76220502**

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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**

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#### **Accredited testing laboratory**

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

**Accredited Bluetooth™ Test Facility (BQTF)**

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## 1.3 Details of applicant

**Name** : Sony Ericsson Mobile Communication AB  
**Street** : Nya Vattentornet  
**City** : 22188 Lund  
**Country** : Sweden  
**Telephone** : +46-46-193-242  
**Telefax** : +46-46-193-295  
**Contact** : Mr. Bo Johansson  
**Telephone** : +46-46-193-242

## 1.4 Application details

Date of receipt of application : 2002.09.14  
Date of receipt of test item : 2002.10.10  
Date of test : 2002.10.14-22

## 1.5 Test item

Type of equipment : **Dual Band PCS module (PCS 850 and PCS1900)**  
Type designation : GM28 / 6220502-BV  
Manufacturer : Applicant  
Street :  
City :  
Country :  
Serial number : IMEI 010110.83.013412.0

### Additional informations:

Frequency : 1850 – 1910 MHz and 824 – 849 MHz  
Type of modulation : 300KGXW  
Number of channels : 300 (PCS1900) and 125 (PCS850)  
Antenna : coax socket and dedicated dual band antenna  
Power supply : 8V DC via socket  
Output power GSM 850 : cond.: 30.70 dBm Peak , ERP: 25.00 dBm (Burst);  
EIRP: 27.10 dBm (Burst)  
Output power GSM 1900 : cond : 27.10 dBm Peak , ERP: 18.30 dBm (Burst);  
EIRP: 20.40 dBm (Burst)  
Type of equipment : Temperature range : -30°C - +60°C  
FCC – ID : PY76220502  
Hardware : R1A  
Software : R1A008

## 1.6 Test standards:      FCC Part 22 and Part 24

## 2      Technical test

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

The detector function and selection of bandwidth are according ANSI C63.2-1996 item 8.2.1 and ANSI C63.4-1992 Item 4.2.

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

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

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

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

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

For Part 24/22 we use the substitution method ( TIA/EIA 603).

### 2.1      Summary of test results

We did measurements for GSM 850 with the same parameters as for GSM 1900.

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

### FINAL VERDICT: PASS

Technical responsibility for area of testing :

2002-10-22      RSC 8411    Berg M.

Date                      Section      Name

  
Signature

Technical responsibility for area of testing :

2002-10-22      RSC8412    Hausknecht D.

Date                      Section      Name

  
Signature

**2.2    Testreport**

**TEST REPORT**

**Test report no. : 2\_3045-01-01/022**

## TEST REPORT REFERENCE

## LIST OF MEASUREMENTS

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## PART PCS1900

### POWER OUTPUT

### SUBCLAUSE § 24.232

#### Summary:

This paragraph contains both average , peak output powers and EIRP measurements for the mobile station.

In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

#### Method of Measurements:

The mobile was set up for the max. output power with pseudo random data modulation.

The power was measured with R&S Signal Analyzer FSIQ 26 ( peak and average)

This measurements were done at 3 frequencies, 1850,2 MHz, 1880,0 MHz and 1909,8 MHz (bottom, middle and top of operational frequency range)

#### Limits:

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
0	+30	± 2

#### Power Measurements:

#### Conducted:

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average Output Power (dBm)
1850.2	0	27.10	26.90
1880.0	0	26.90	26.70
1909.8	0	26.90	26.80
Measurement uncertainty		±0.5 dB	

#### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

## EIRP Measurements

Description: This is the test for the maximum radiated power from the phone.

Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts e.i.r.p. peak power..." and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Method of Measurement:

1. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference center of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
2. A "reference path loss" is established as  $Pin + 2.1 - Pr$ .
3. The EUT is substituted for the dipole at the reference centre of the chamber. The EUT is put into CW test mode and a scan is performed to obtain the radiation pattern.
4. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs is identified.
5. The EUT is then put into pulse mode at its maximum power level (Power Step 0).
6. "Gated mode" power measurements are performed with the receiving antenna placed at the co-ordinates determined in Step 3 to determine the output power as defined in FCC Rule 24.232 (b) and (c). The "reference path loss" from Step 1 is added to this result.
7. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.1 dBi) and known input power (Pin).
8. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.1dBi$ .

### Limits:

Power Step	Burst Average EIRP (dBm)
0	<33

### Power Measurements:

#### Radiated:

Frequency (MHz)	Power Step	BURST AVERAGE (dBm)		MODULATION AVERAGE (dBm)	
		EIRP	ERP	EIRP	ERP
1850.2	0	19,82	17.72	10.81	8,71
1880.0	0	19,44	17.34	10.44	8,34
1909.8	0	20,40	18.30	11.39	9,29
Measurement uncertainty		±3 dB			

### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)





## EMISSIONS LIMITS

§24.238

### **Measurement Procedure:**

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognised by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

### **The final open field emission ( here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:**

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load.
- c) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded.
- e) Now each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603.

### **Measurement Limit:**

Sec. 24.238 Emission Limits.

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43 + 10 \log(P)$  dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**Measurement Results:**

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the USPCS band (1850.2 MHz, 1879.8 MHz and 1909.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the USPCS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**RESULTS OF OPEN FIELD RADIATED TEST FOR FCC-24:**

The final open field radiated levels are presented on the next pages.

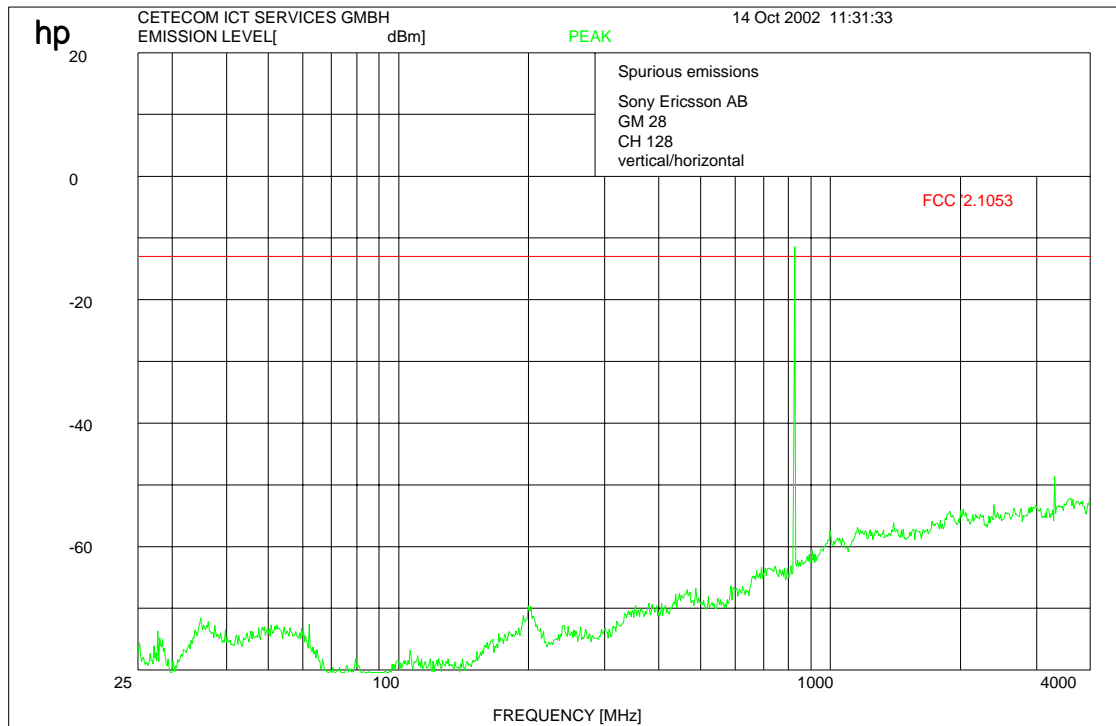
As can be seen from this data, the emissions from the test item were within the specification limit.

**RESULTS OF OPEN FIELD RADIATED TEST FOR FCC-24:**

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBm)	limit max. allowed emmision power (dBm)	actual attenuation below frequency of operation (dBc)	results
<b>CH 512</b>					
1850.2		19.82	-13.0 (32.82 dBc)	69.82	carrier complies
3700.4		-50.0			
<b>CH 661</b>					
1880.0		19.44	-13.0 (32.44 dBc)	71.14	carrier complies
3760.0		-52.7			
<b>CH 810</b>					
1909.8		20.40	-13.0 (33,40 dBc)	61,70	carrier complies
3819.6		-41.30			
<b>Measurement uncertainty</b>		<b>± 0.5dB</b>			

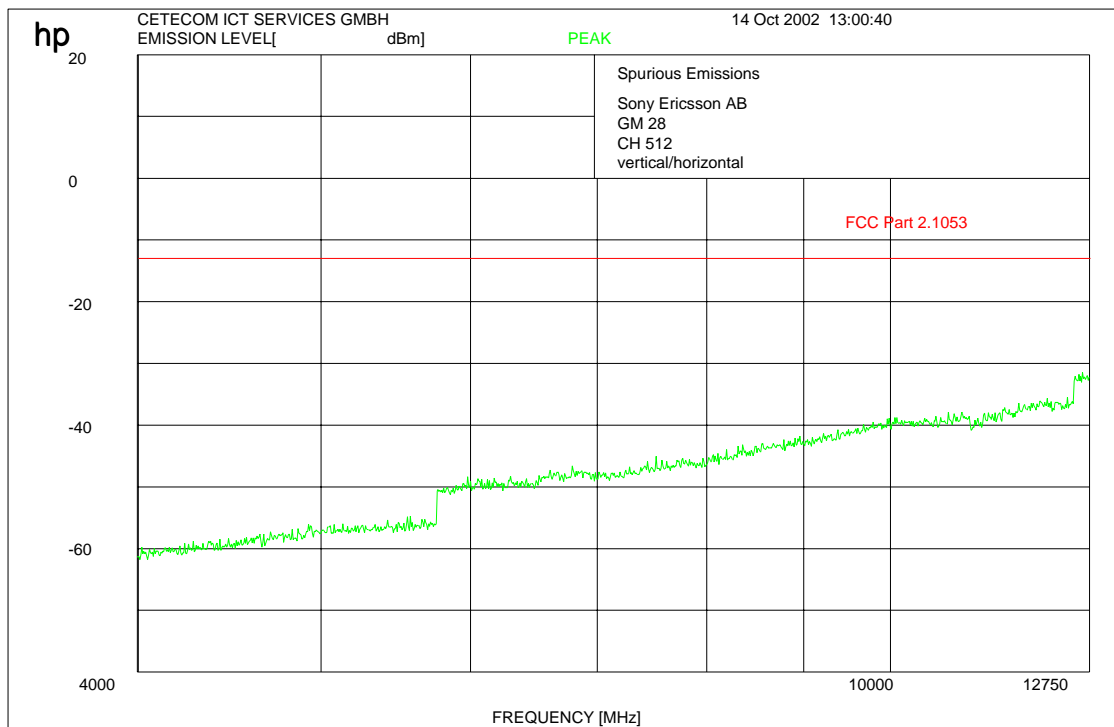
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

## Channel 512 (up to 4 GHz)



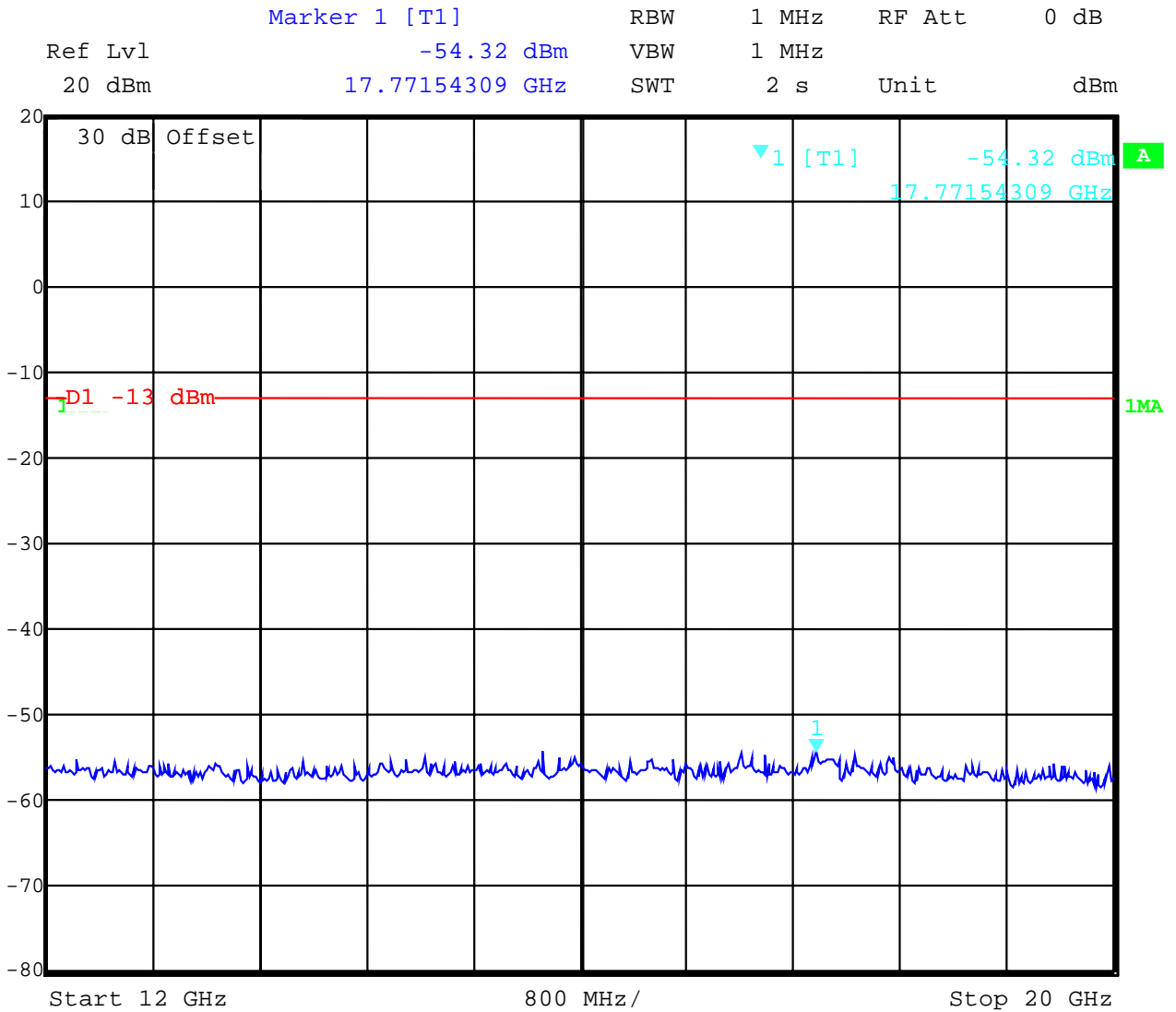
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

## Channel 512 (up to 12 GHz )



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

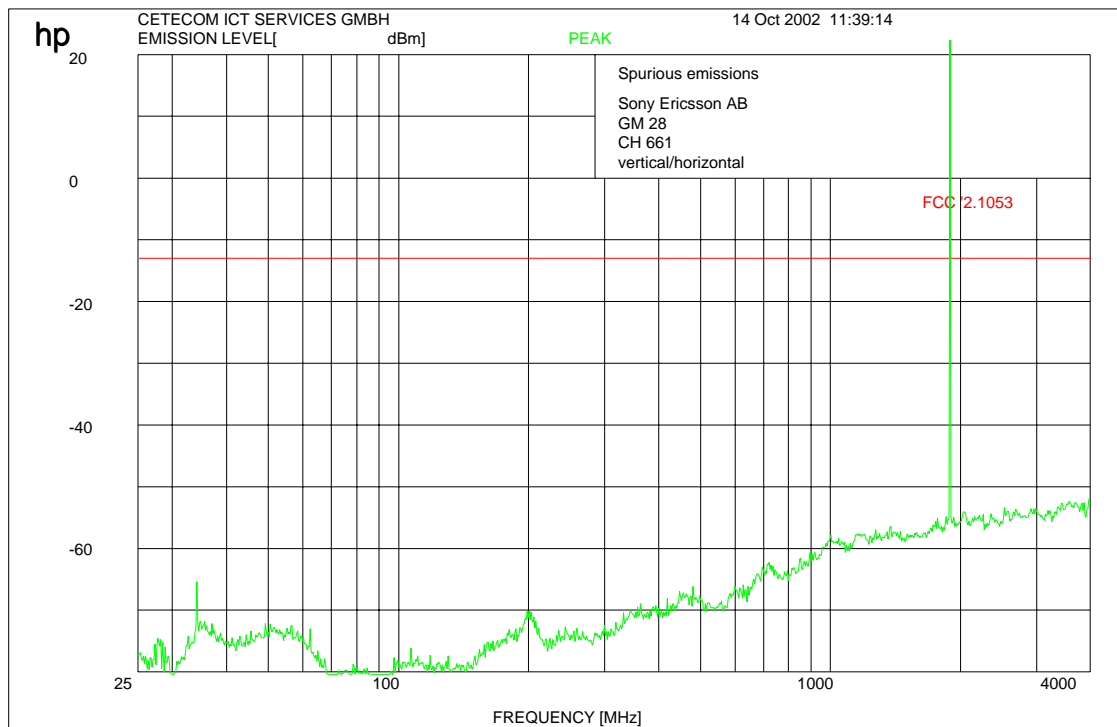
Channel 512 :- 20 GHz



Date: 21.OCT.2002 13:38:42

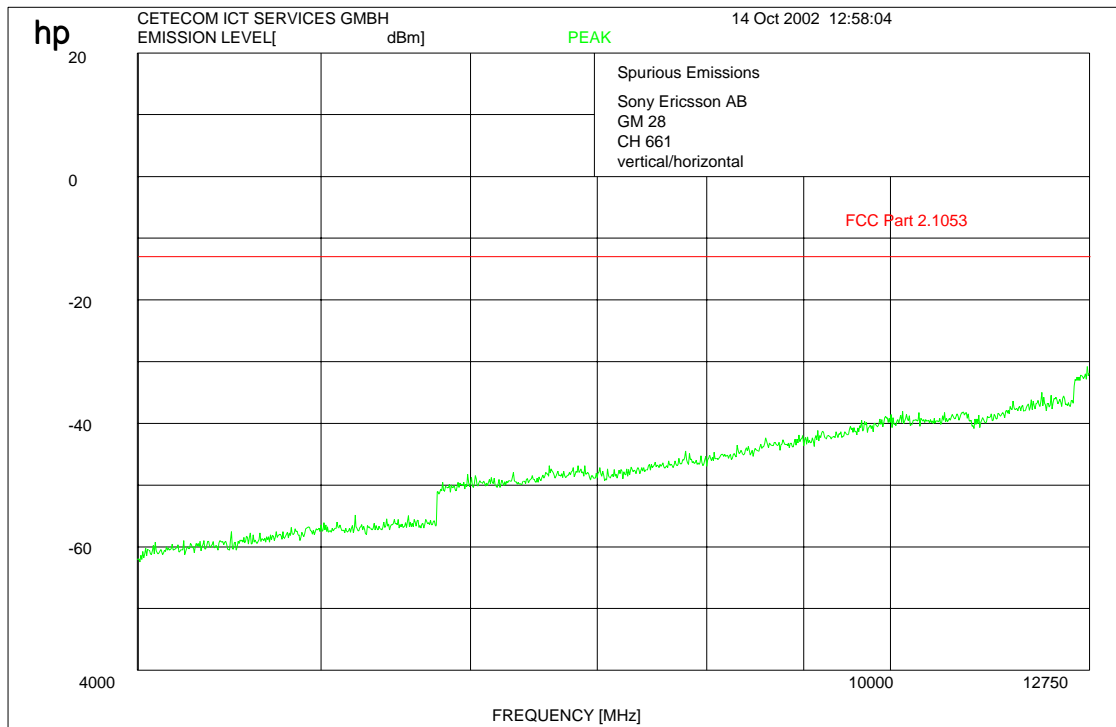
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
(for reference numbers see test equipment listing)

## Channel 661 (up to 4 GHz)



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

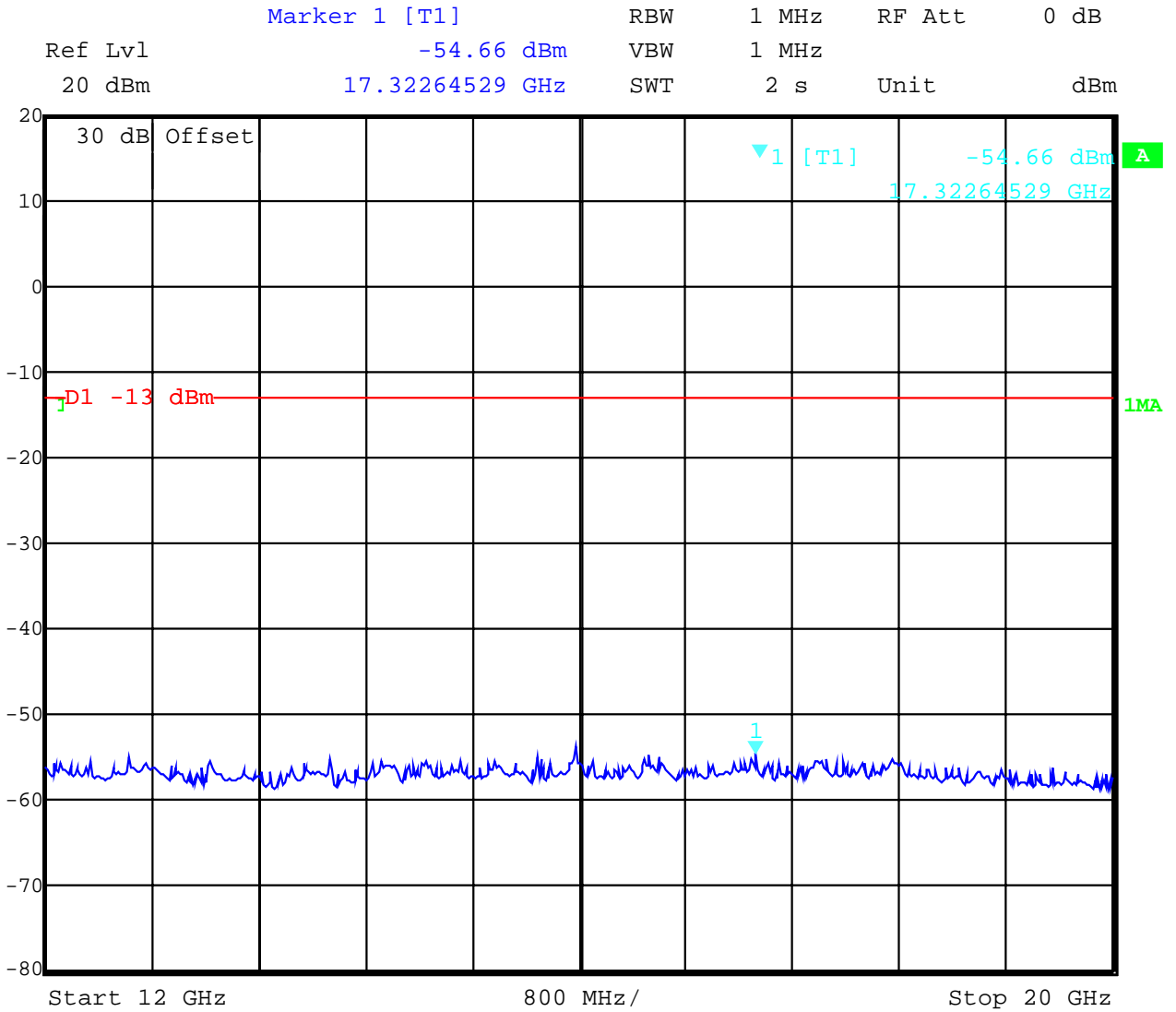
## Channel 661 (up to 12 GHz )



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



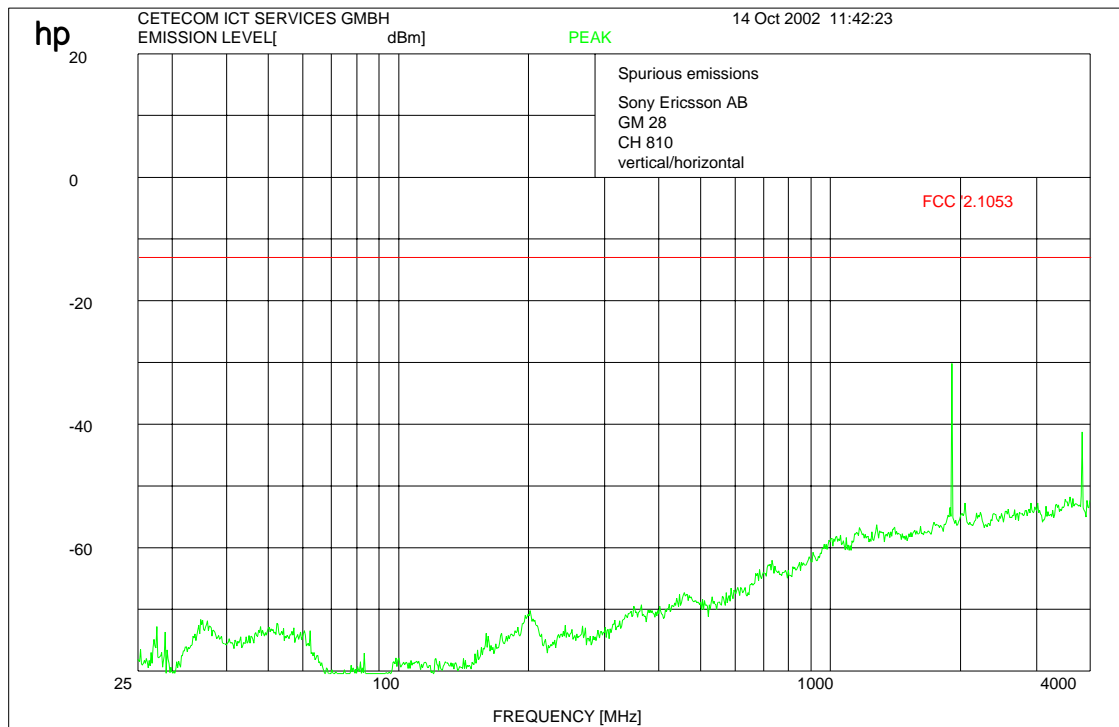
Channel 661 : -20 GHz



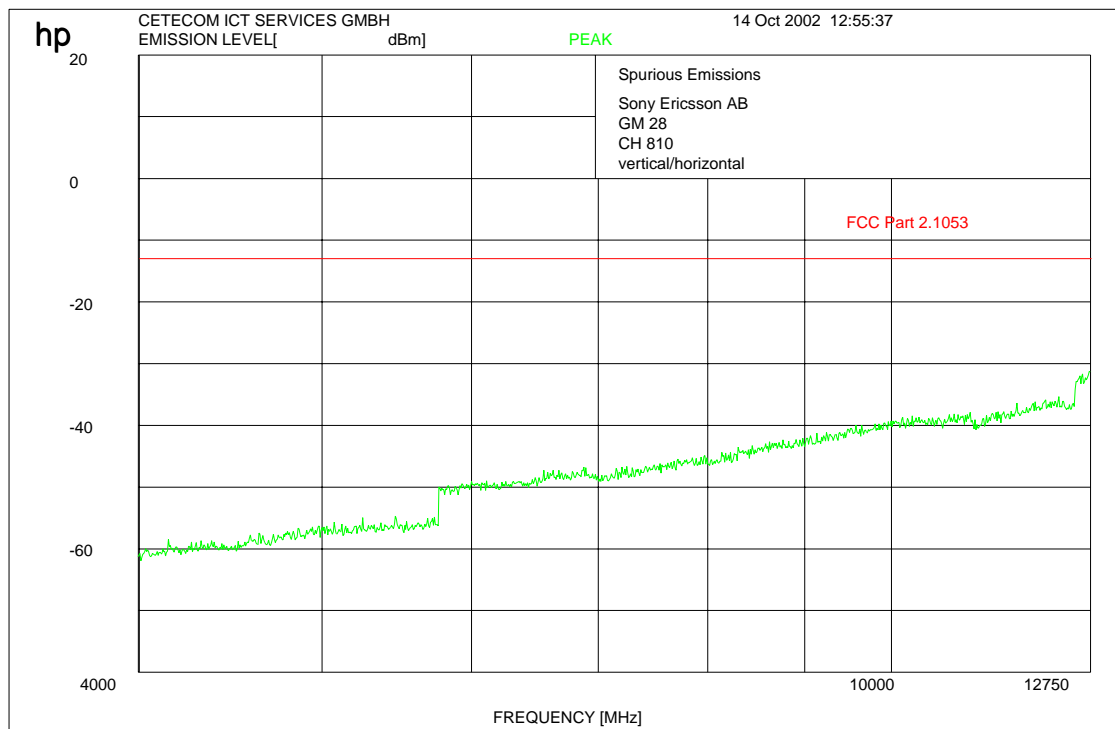
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REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
(for reference numbers see test equipment listing)

Channel 810 up to 4 GHz



## Channel 810 up to 12 GHz

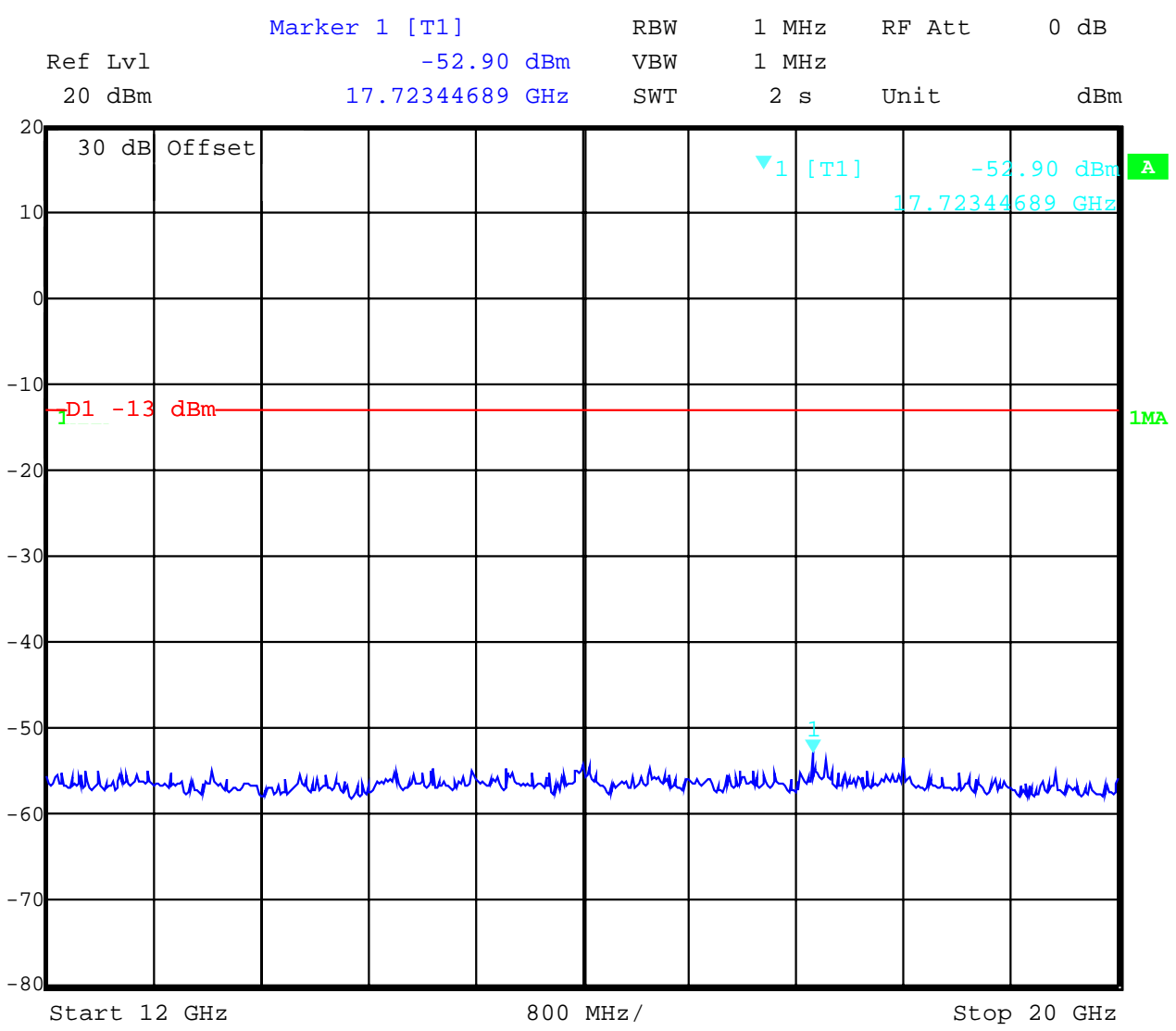


### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24, 64

## Channel 810 : -20 GHz

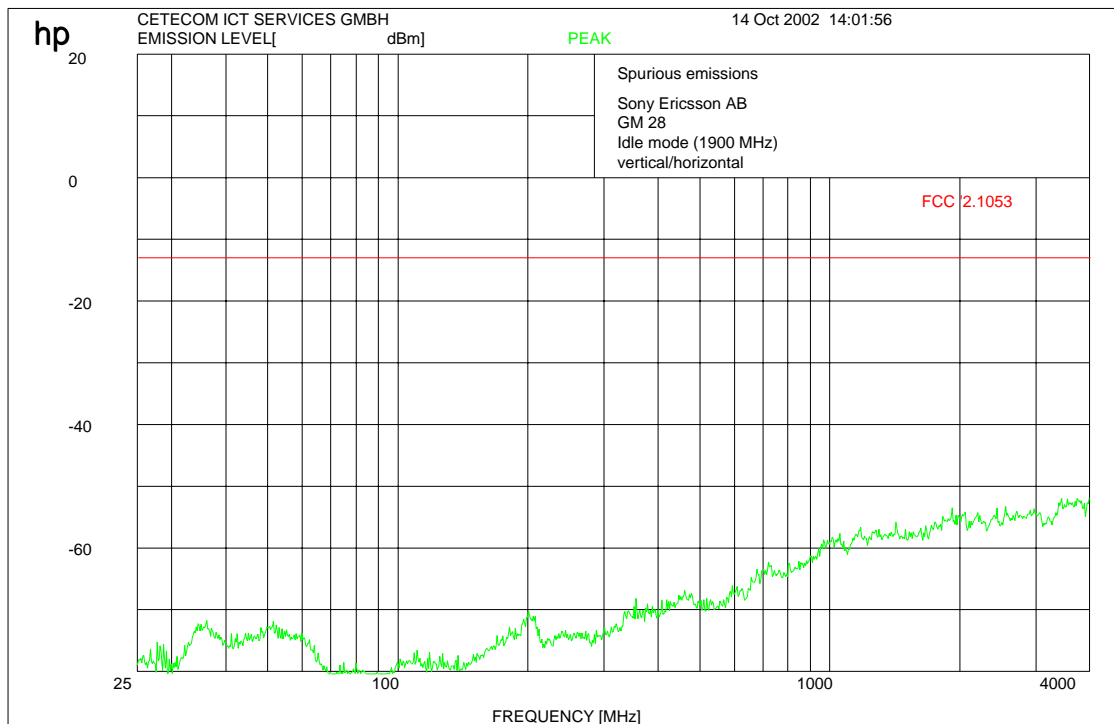


Date: 21.OCT.2002 13:41:37

**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
 (for reference numbers see test equipment listing)  
 17 – 24, 64

**Channel 661 (this is valid for all 3 channels and up to 4 GHz)**  
**Idle-Mode**

**No peak found**

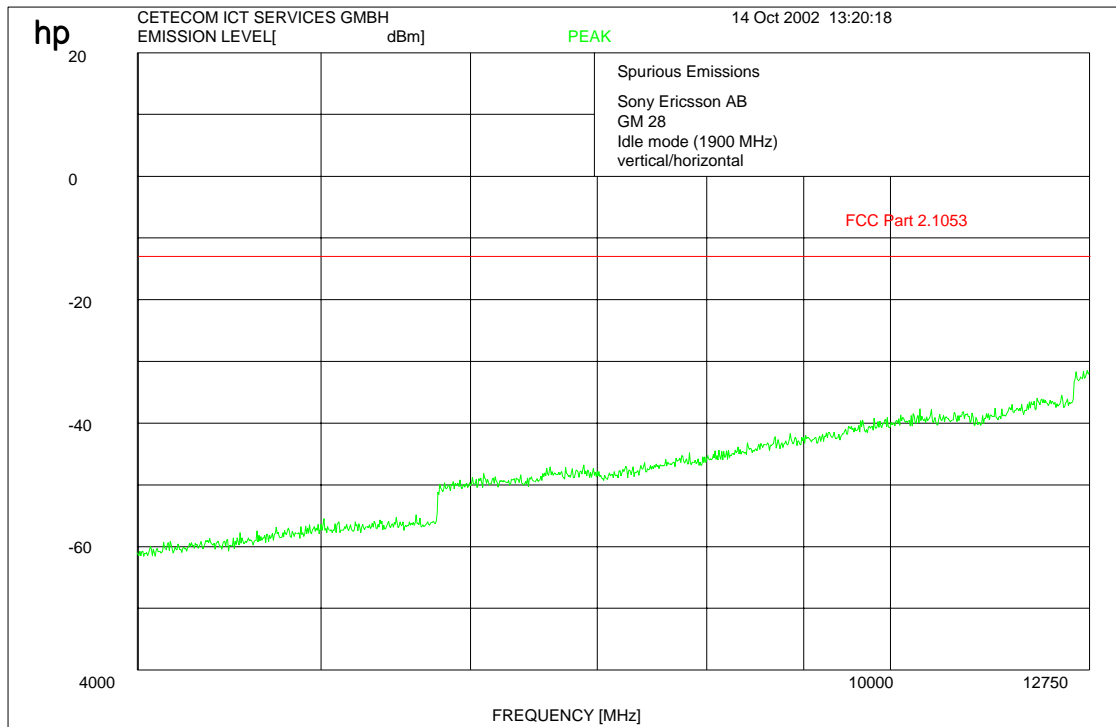


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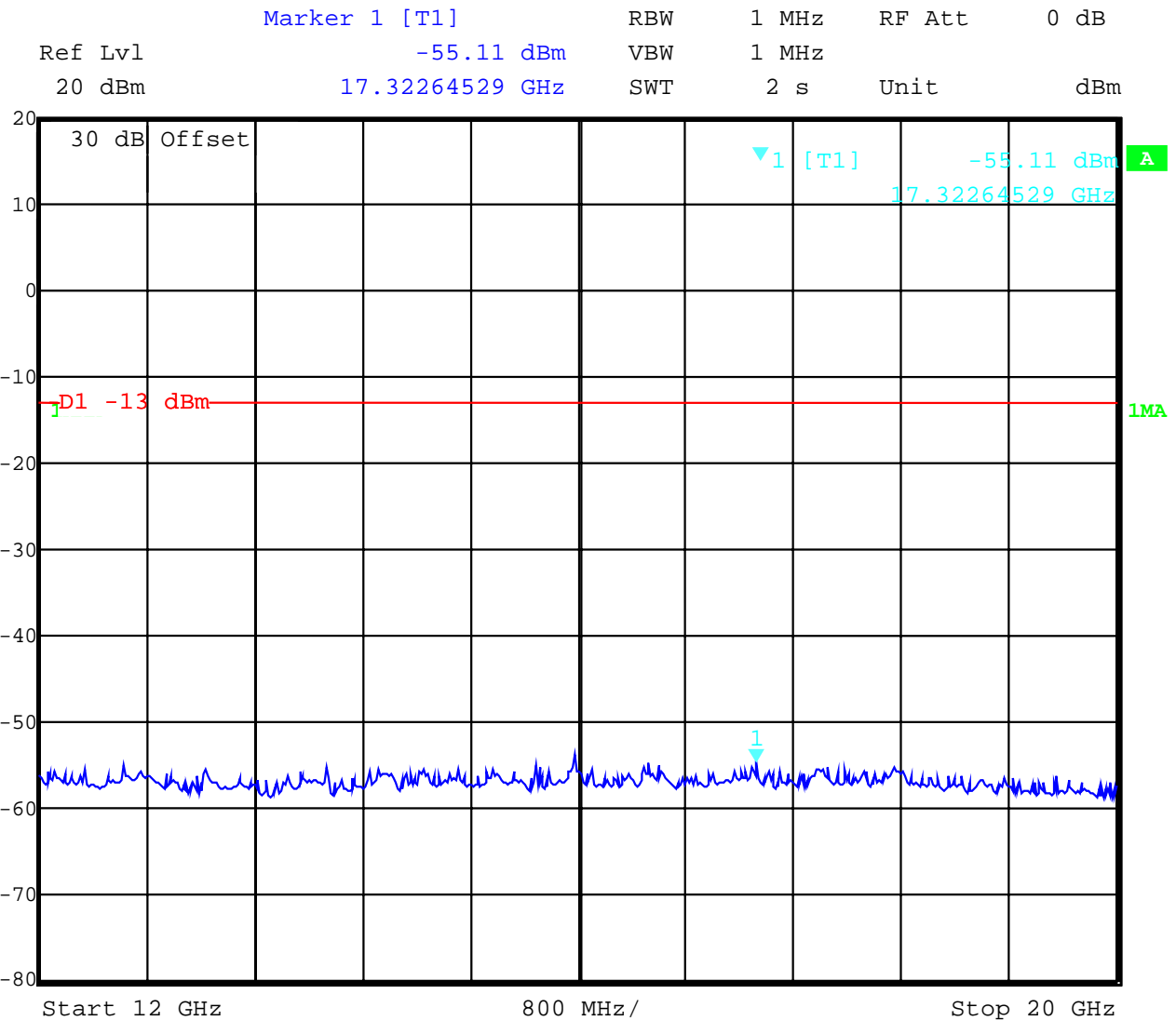
**(for reference numbers see test equipment listing)**

**17 – 24, 64**

## Channel 661 (this is valid for all 3 channels and up to 12 GHz) Idle-Mode



**Channel 661 (this is valid for all 3 channels and up to 20 GHz)**  
**Idle-Mode**



Date: 22.OCT.2002 7:56:51

## CONDUCTED SPURIOUS EMISSIONS

### Measurement Procedure:

The following steps outline the procedure used to measure the conducted emissions from the mobile station.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 19.1 GHz, data taken from 10 MHz to 20 GHz.
2. Determine mobile station transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

### USPCS Transmitter

#### Channel Frequency

512 1850.2 MHz

661 1880.0 MHz

810 1909.8 MHz

### Measurement Limit:

Sec. 24.238 Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\text{Log}(P)$  dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

<b>EMISSION LIMITATIONS</b>					
<b>f (MHz)</b>		<b>amplitude of emission (dBm)</b>	<b>limit max. allowed emission power (dBm)</b>	<b>actual attenuation below frequency of operation (dBc)</b>	<b>results</b>
<b>CH 512</b>					
<b>1850.2</b>		<b>27.10</b>	<b>-13.0 (40.10 dBc)</b>		<b>carrier</b>
<b>1850.0</b>		<b>-23.17</b>		<b>50.27</b>	<b>complies</b>
<b>9494.068</b>		<b>-36.95</b>		<b>64.05</b>	<b>complies</b>
<b>CH 661</b>					
<b>1880.0</b>		<b>26.90</b>	<b>-13.0 (39.90 dBc)</b>		<b>carrier</b>
<b>1879.0</b>		<b>-32.13</b>		<b>59.03</b>	<b>complies</b>
<b>5011.162</b>		<b>-37.26</b>		<b>64.16</b>	<b>complies</b>
<b>CH 810</b>					
<b>1909.8</b>		<b>26.90</b>	<b>-13.0 (39.90 dBc)</b>		<b>carrier</b>
<b>1694.390</b>		<b>-39.39</b>		<b>66.29</b>	<b>complies</b>
<b>1910.018</b>		<b>-19.94</b>		<b>46.84</b>	<b>complies</b>
<b>6406.062</b>		<b>-34.95</b>		<b>61.85</b>	<b>complies</b>
<b>Measurement uncertainty</b>		<b>± 0.5dB</b>			

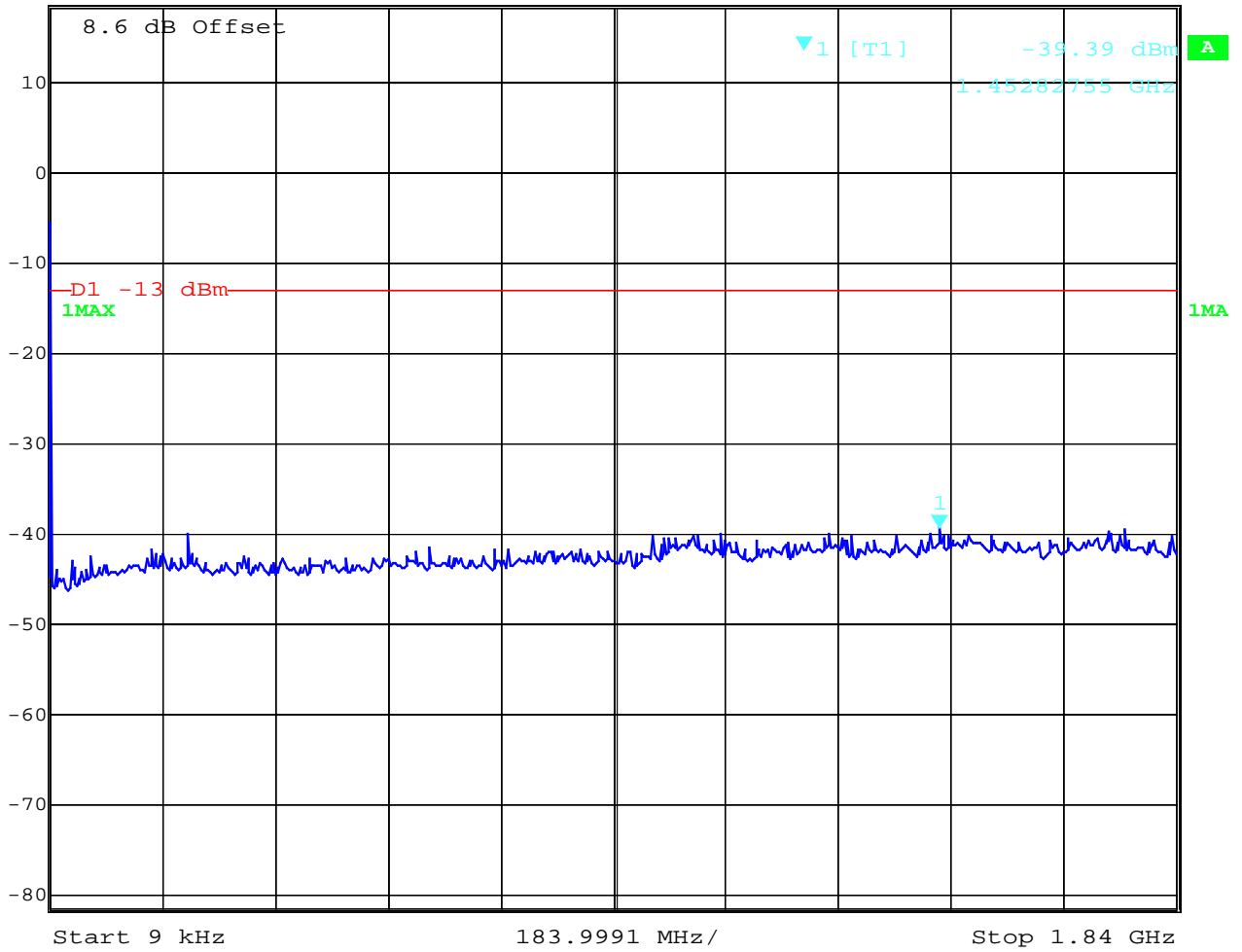
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)



Measurements:

Channel: 512

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-39.39 dBm	VBW	100 kHz		
18.6 dBm	1.45282755 GHz	SWT	460 ms	Unit	dBm

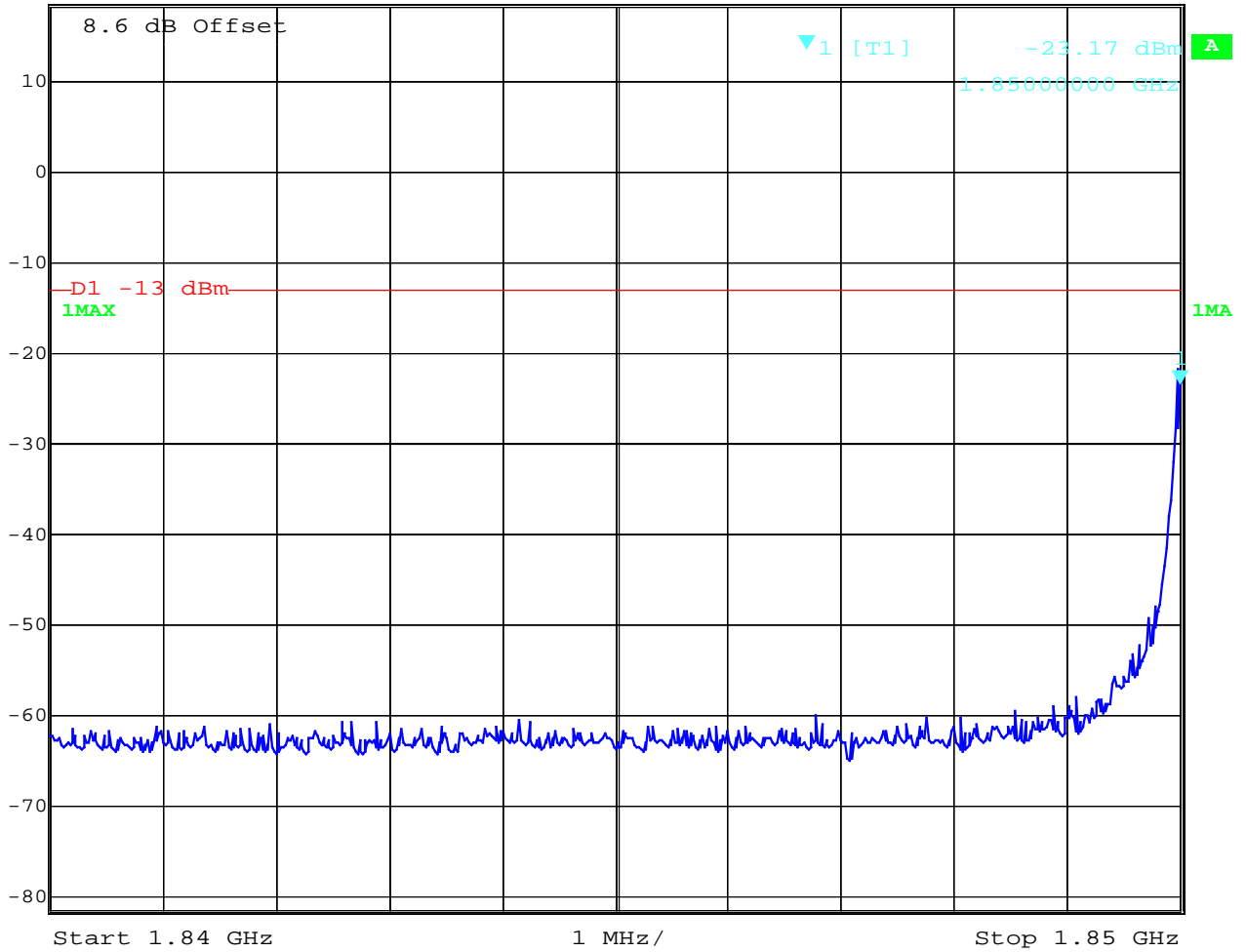


Date: 21.OCT.2002 11:12:26

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

Channel 512

	Marker 1 [T1]	RBW	3 kHz	RF Att	40 dB
Ref Lvl	-23.17 dBm	VBW	3 kHz		
18.6 dBm	1.85000000 GHz	SWT	2.8 s	Unit	dBm



Date: 21.OCT.2002 11:13:35

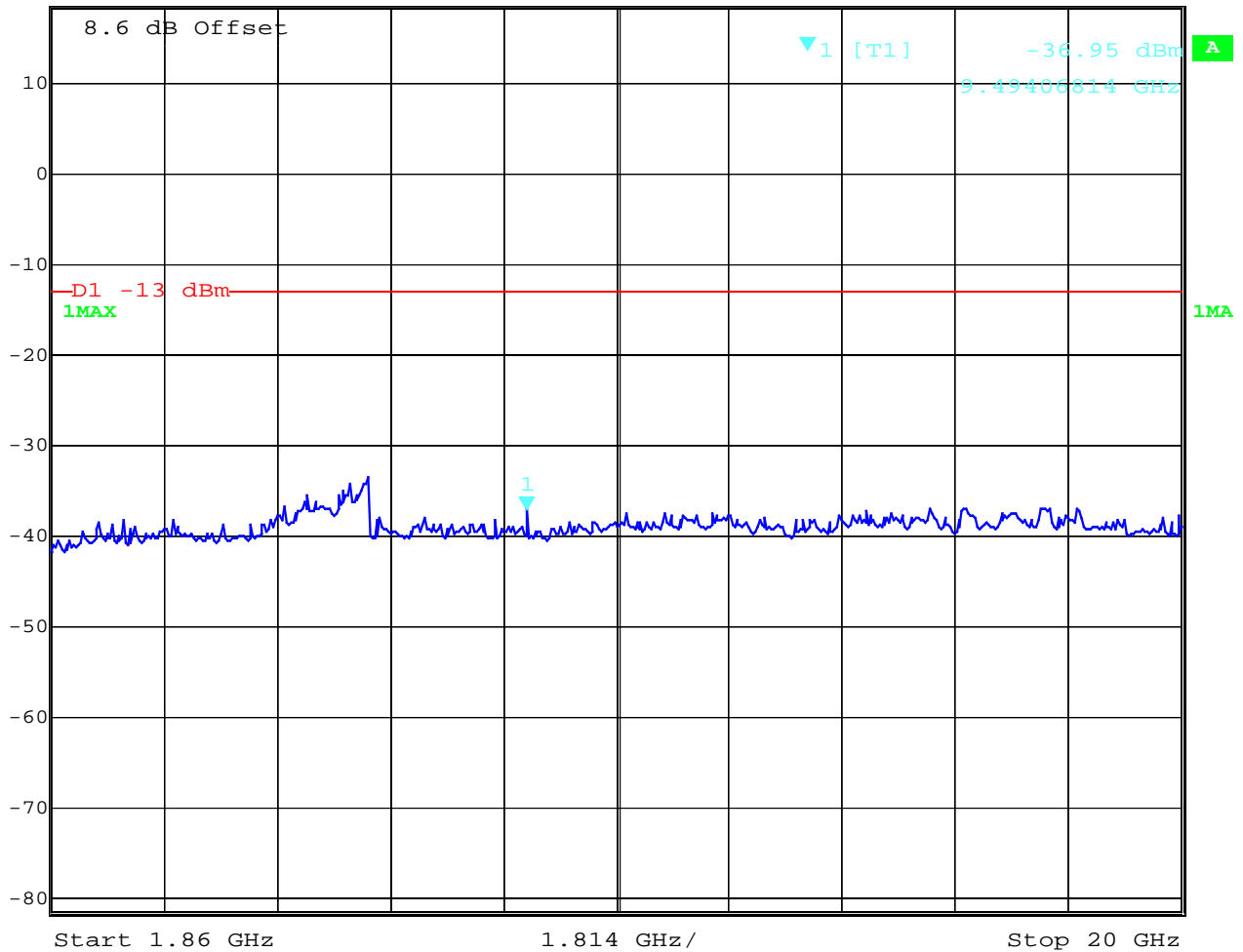
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24, 64

## Channel 512

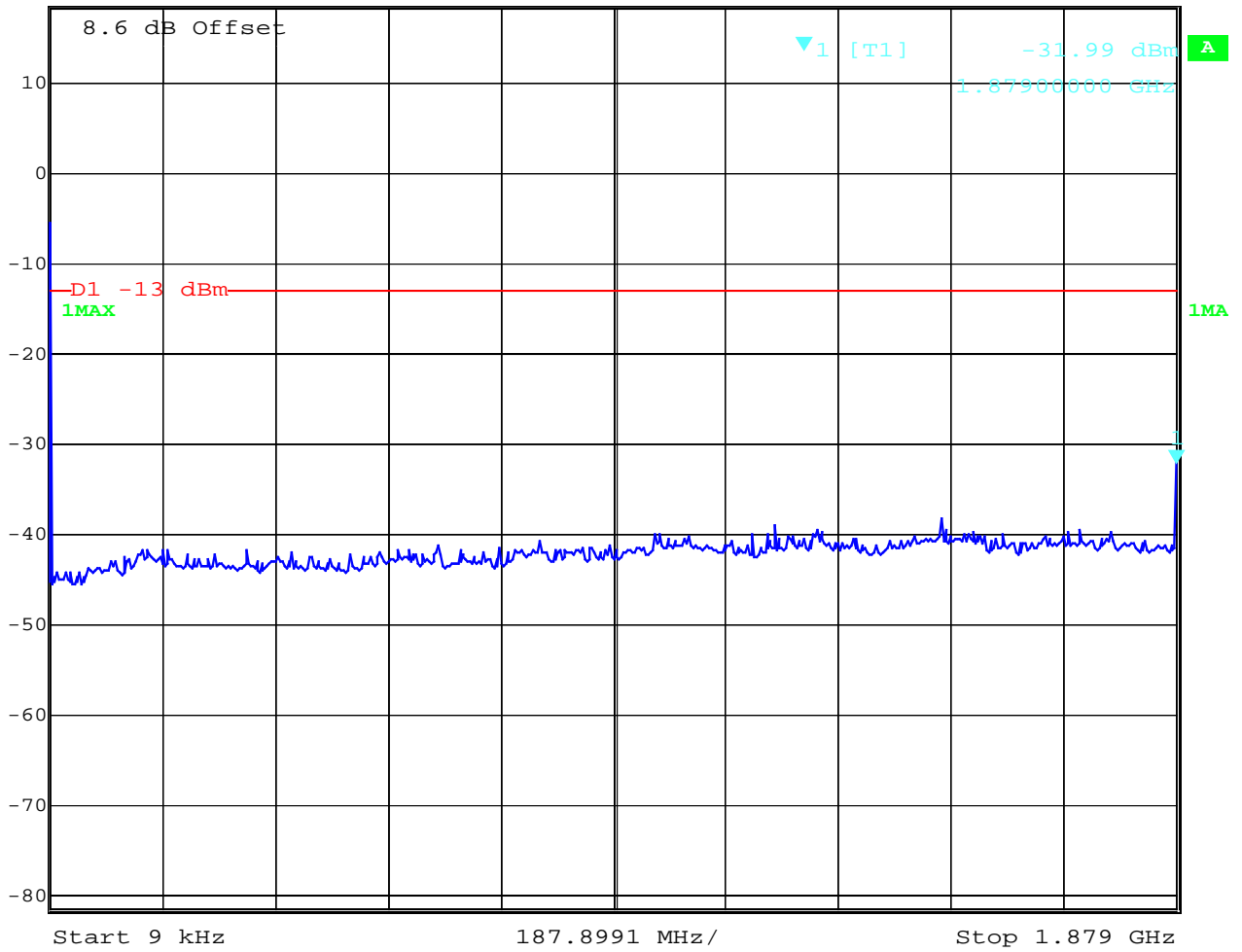
	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-36.95 dBm	VBW	100 kHz		
18.6 dBm	9.49406814 GHz	SWT	4.6 s	Unit	dBm



Date: 21.OCT.2002 11:15:35

## Channel 661

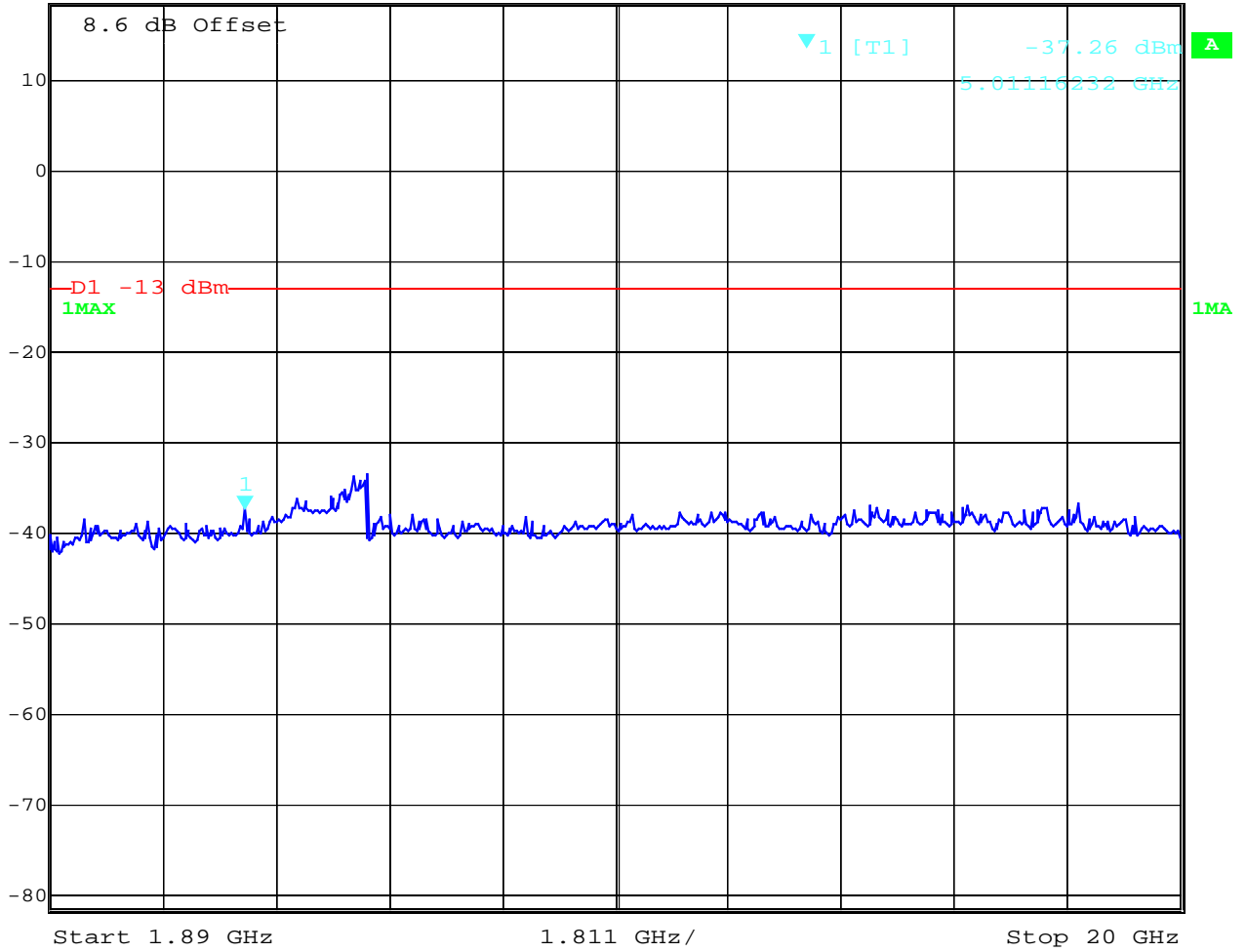
	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-31.99 dBm	VBW	100 kHz		
18.6 dBm	1.87900000 GHz	SWT	470 ms	Unit	dBm



Date: 21.OCT.2002 11:16:59

## Channel 661

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-37.26 dBm	VBW	100 kHz		
18.6 dBm	5.01116232 GHz	SWT	4.6 s	Unit	dBm



Date: 21.OCT.2002 11:17:57

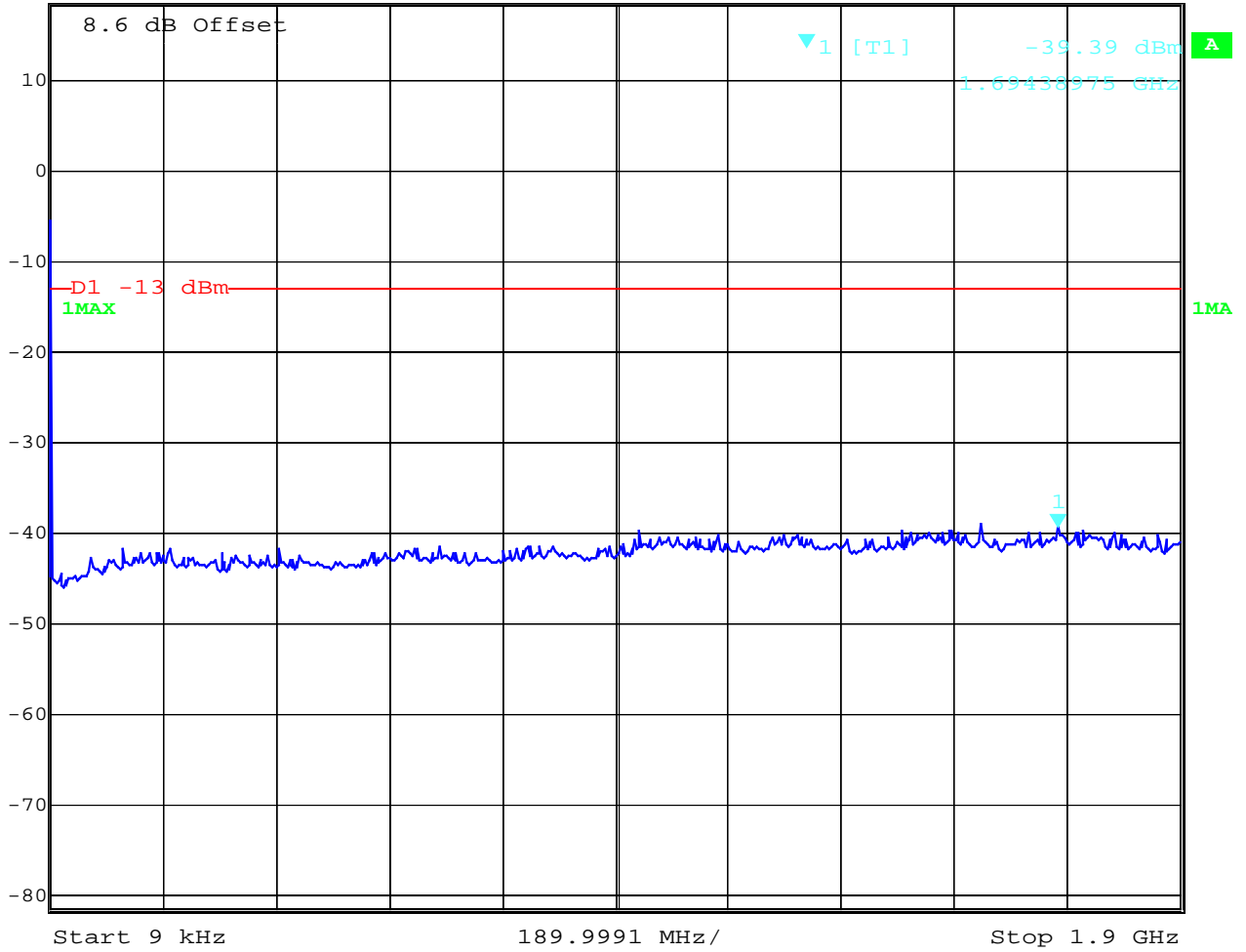
### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24, 64

## Channel 810

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-39.39 dBm	VBW	100 kHz		
18.6 dBm	1.69438975 GHz	SWT	480 ms	Unit	dBm



Date: 21.OCT.2002 11:19:01

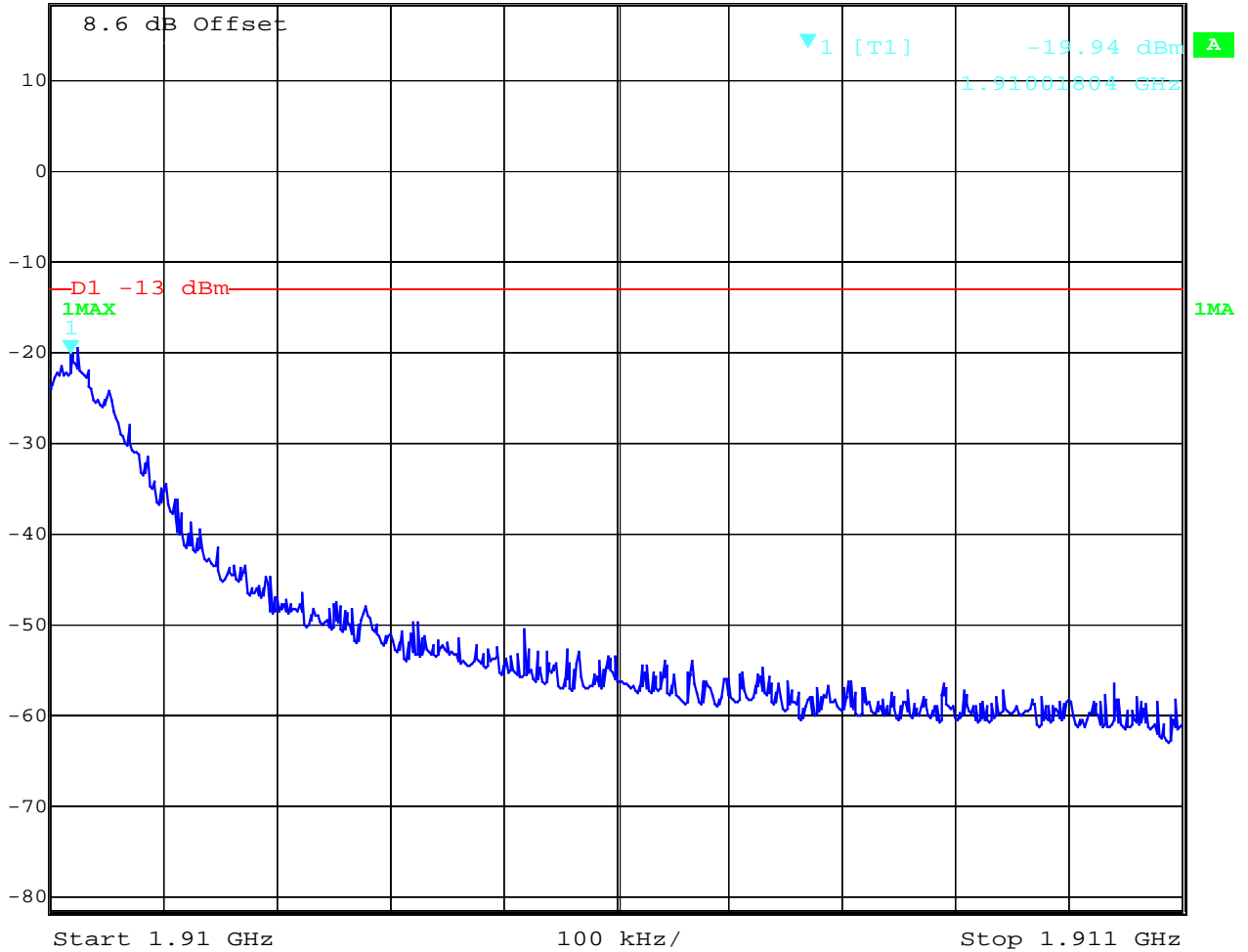
### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24, 64

## Channel 810

	Marker 1 [T1]	RBW	3 kHz	RF Att	40 dB
Ref Lvl	-19.94 dBm	VBW	3 kHz		
18.6 dBm	1.91001804 GHz	SWT	280 ms	Unit	dBm



Date: 21.OCT.2002 11:26:04

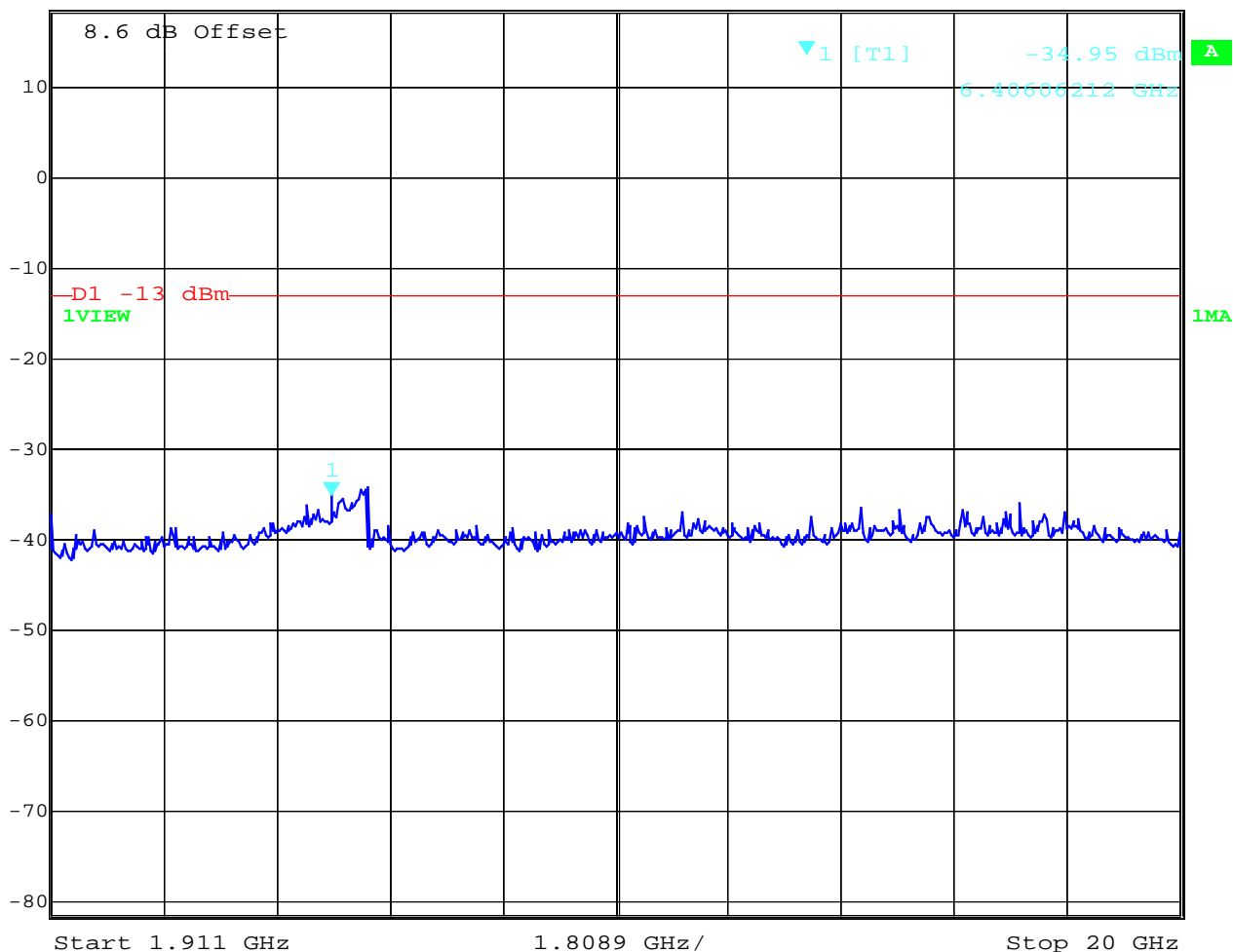
### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24, 64

## Channel 810

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-34.95 dBm	VBW	100 kHz		
18.6 dBm	6.40606212 GHz	SWT	4.6 s	Unit	dBm



Date: 21.OCT.2002 11:27:19

**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**

(for reference numbers see test equipment listing)

17 - 24, 64



**OCCUPIED BANDWIDTH** **§2.989**

**See test report no.: 4:0552-01-03/02**

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

## PART PCS850

### POWER OUTPUT

### SUBCLAUSE § 24.232

#### Summary:

This paragraph contains both average , peak output powers and EIRP measurements for the mobile station.

In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

#### Method of Measurements:

The mobile was set up for the max. output power with pseudo random data modulation.

The power was measured with R&S Signal Analyzer FSIQ 26 ( peak and average)

This measurements were done at 3 frequencies, 824.2 MHz, 836.2 MHz and 848.8 MHz (bottom, middle and top of operational frequency range)

#### Limits:

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
0	+30	± 2

#### Power Measurements:

#### Conducted:

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average Output Power (dBm)
824.2	0	30.50	30.3
836.2	0	30.70	30.5
848.8	0	30.70	30.6
Measurement uncertainty		±0.5 dB	

#### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

## EIRP Measurements

Description: This is the test for the maximum radiated power from the phone.

Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts e.i.r.p. peak power..." and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Method of Measurement:

1. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference center of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
2. A "reference path loss" is established as  $Pin + 2.1 - Pr$ .
3. The EUT is substituted for the dipole at the reference centre of the chamber. The EUT is put into CW test mode and a scan is performed to obtain the radiation pattern.
4. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs is identified.
5. The EUT is then put into pulse mode at its maximum power level (Power Step 0).
6. "Gated mode" power measurements are performed with the receiving antenna placed at the co-ordinates determined in Step 3 to determine the output power as defined in FCC Rule 24.232 (b) and (c). The "reference path loss" from Step 1 is added to this result.
7. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.1 dBi) and known input power (Pin).
8. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.1dBi$ .

### Limits:

Power Step	Burst Average EIRP (dBm)
0	<33

### Power Measurements:

#### Radiated:

Frequency (MHz)	Power Step	BURST AVERAGE (dBm)		MODULATION AVERAGE (dBm)	
		EIRP	ERP	EIRP	ERP
824.2	0	26.7	24.6	17.7	15.6
836.2	0	27.1	25.0	18.1	16.0
848.8	0	26.9	24.8	17.9	15.8
Measurement uncertainty		±3 dB			

### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)



## EMISSIONS LIMITS

§24.238

### **Measurement Procedure:**

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognized by the FCC to be in compliance for a 3 and a10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 848.8 MHz. This was rounded up to 12 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

### **The final open field emission ( here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:**

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load.
- c) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters using the equation shown below:
- e) Now each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603 .

### **Measurement Limit:**

Sec. 24.238 Emission Limits.

(a) On any frequency outside a licensee' s frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\log(P)$  dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**Measurement Results:**

Radiated emissions measurements were made only at the upper, centre, and lower carrier frequencies of the USPCS band (824.2 MHz, 836.2 MHz and 848.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the USPCS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

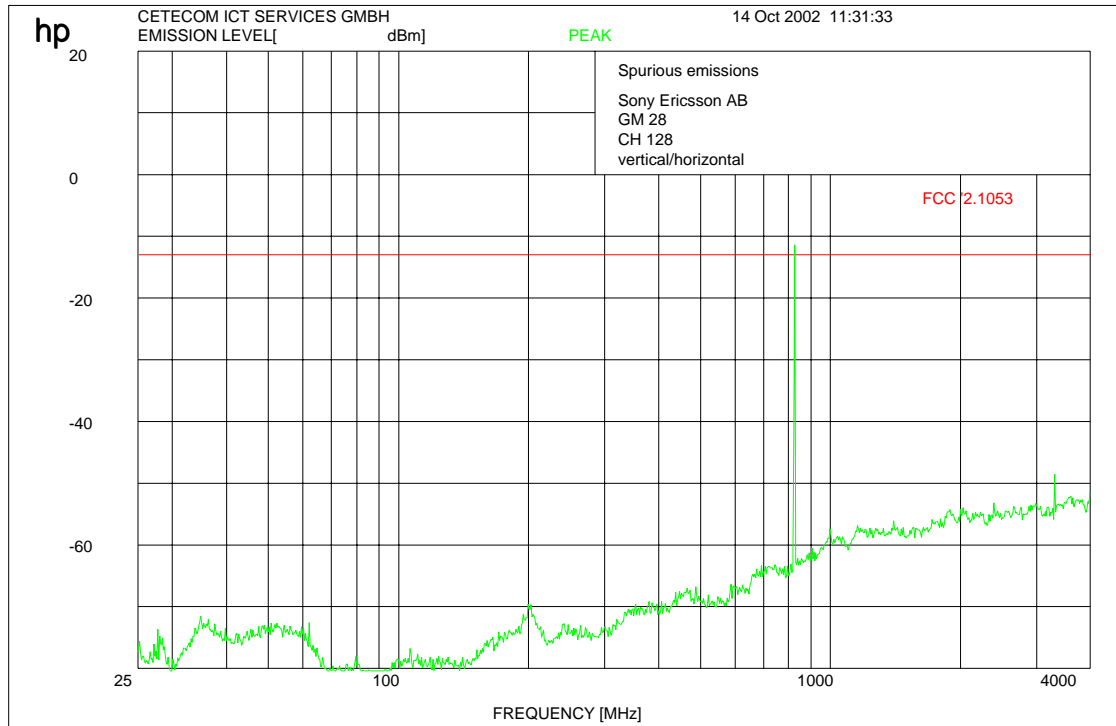
**RESULTS OF OPEN FIELD RADIATED TEST FOR FCC-24:**

The final open field radiated levels are presented on the next pages.

As can be seen from this data, the emissions from the test item were within the specification limit.

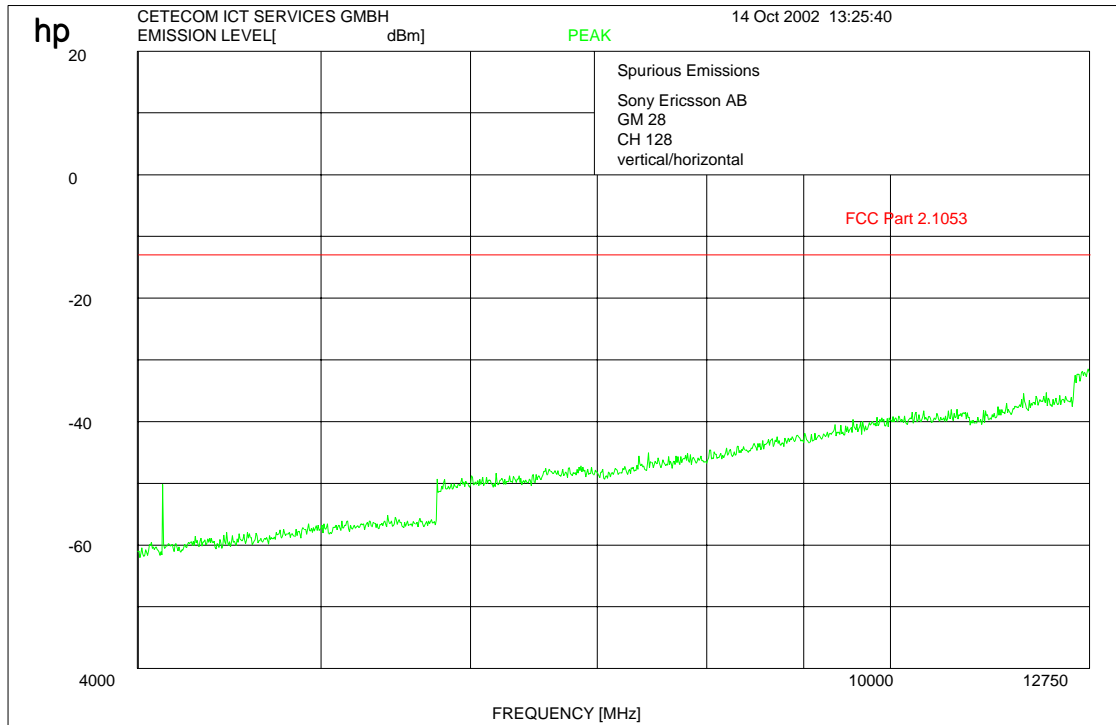
<b>EMISSION LIMITATIONS</b>					
<b>f (MHz)</b>		<b>amplitude of emission (dBm)</b>	<b>limit max. allowed emission power (dBm)</b>	<b>actual attenuation below frequency of operation (dBc)</b>	<b>results</b>
<b>CH 128</b>					
824,2		26.70	-13.0 (39.80 dBc)		carrier
3296.8		-48.6		75.3	complies
4121.0		-50.2		76.9	complies
<b>CH 189</b>					
836,2		27.10	-13.0 (40.10 dBc)		carrier
3345.6		-51.6		78.7	complies
4182.0		-52.2		79.3	complies
<b>CH 251</b>					
848,8		26.90	-13.0 (39.90 dBc)		carrier
3395.2		-45.6		72.5	complies
4244.0		-52,6		79.5	complies
<b>Measurement uncertainty</b>		<b>± 0.5dB</b>			

## Channel 128 (up to 4 GHz)



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

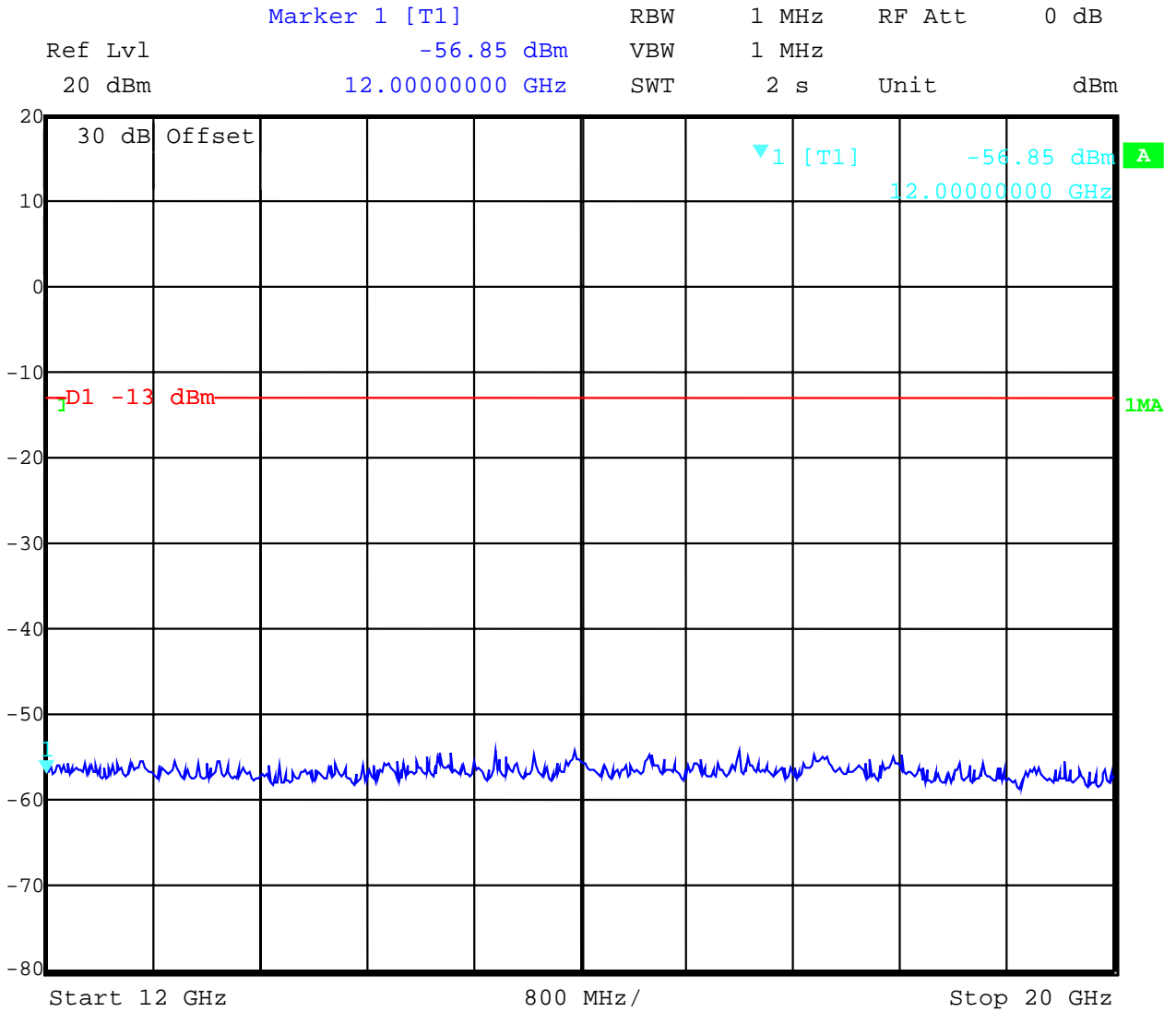
## Channel 128 (up to 12 GHz )



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



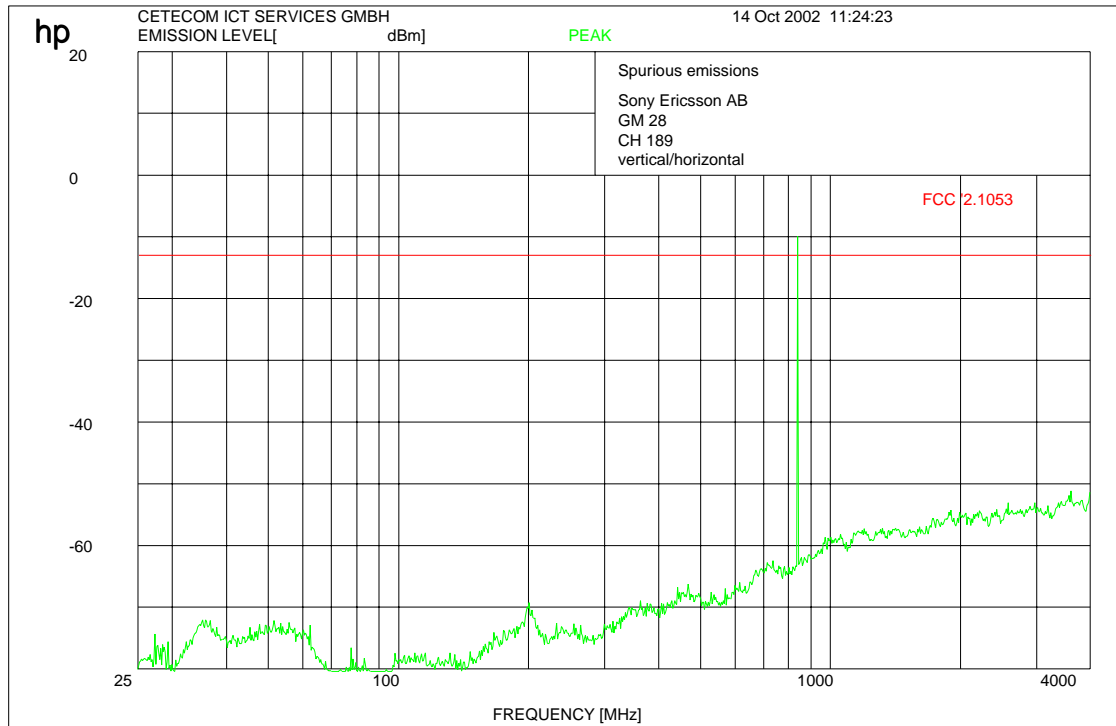
Channel 128 :- 20 GHz



Date: 21.OCT.2002 13:13:13

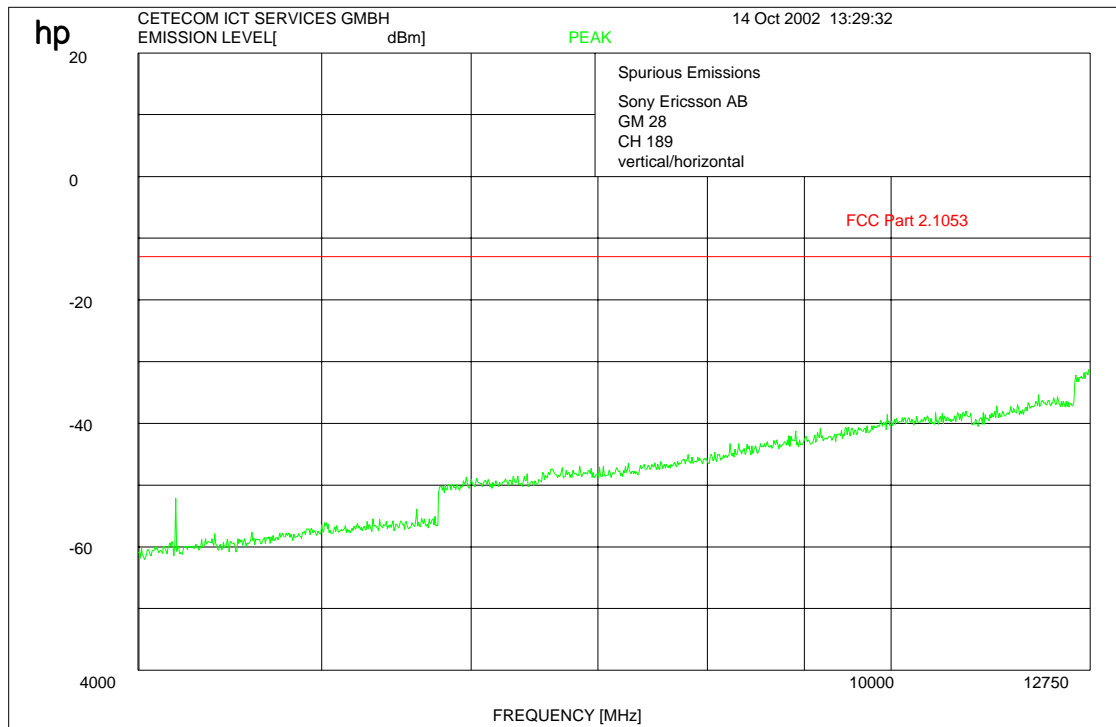
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
 (for reference numbers see test equipment listing)

## Channel 189 (up to 4 GHz )



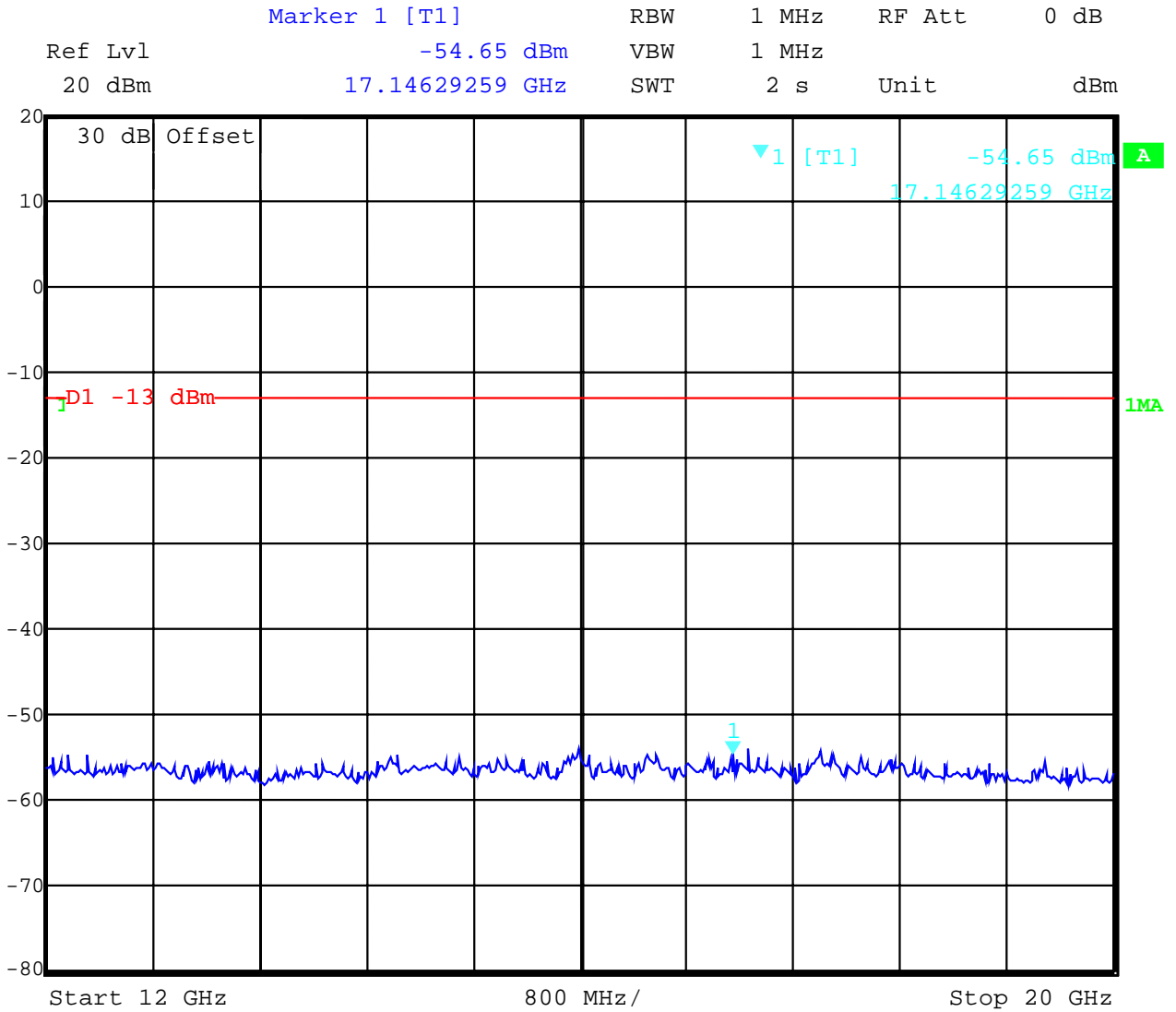
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

## Channel 189 (up to 12 GHz )



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

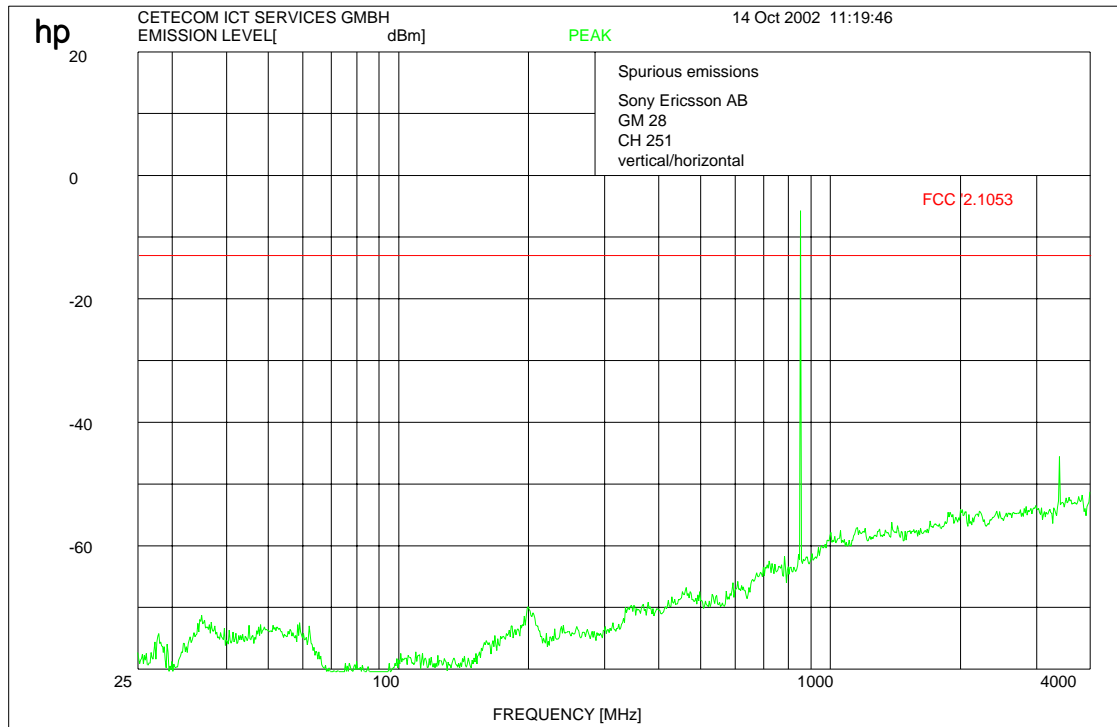
Channel 189 : -20 GHz



Date: 21.OCT.2002 13:13:46

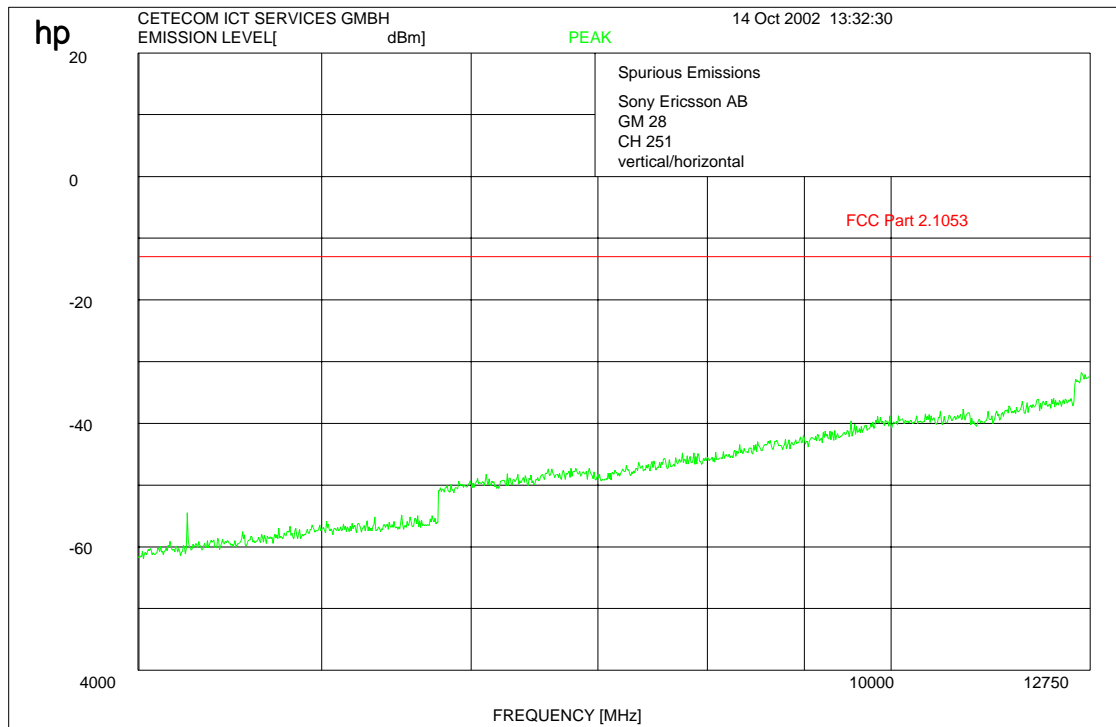
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
(for reference numbers see test equipment listing)

## Channel 251 up to 4 GHz



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

## Channel 251 up to 12 GHz

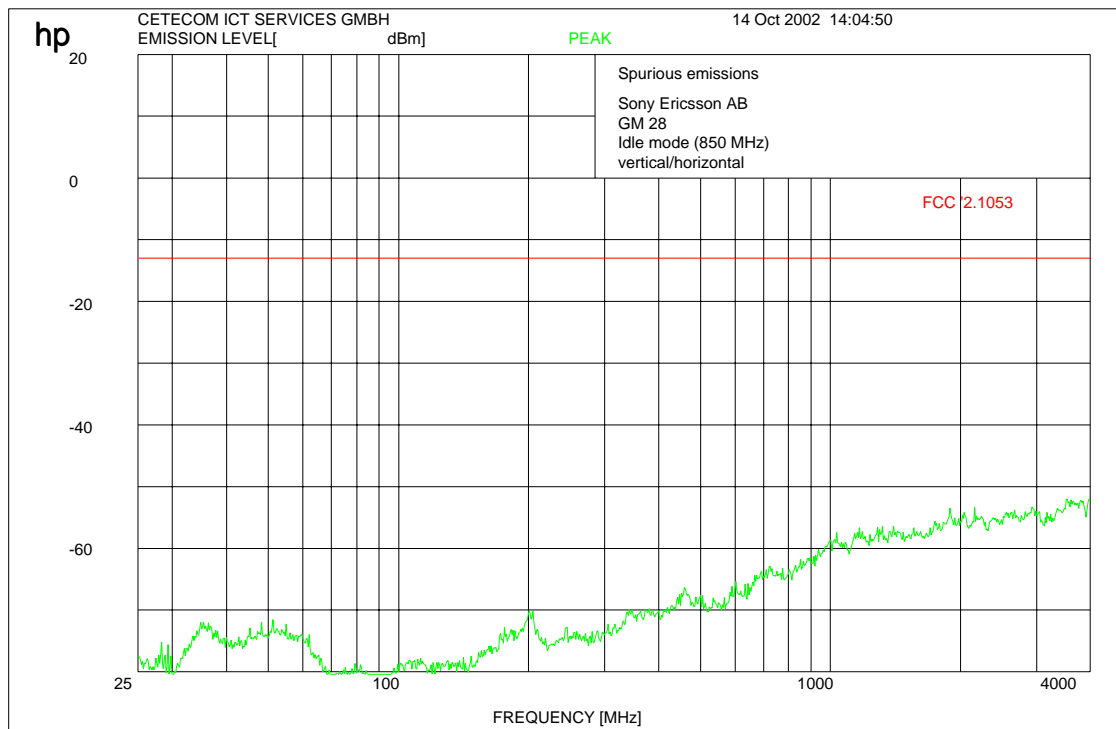


**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)



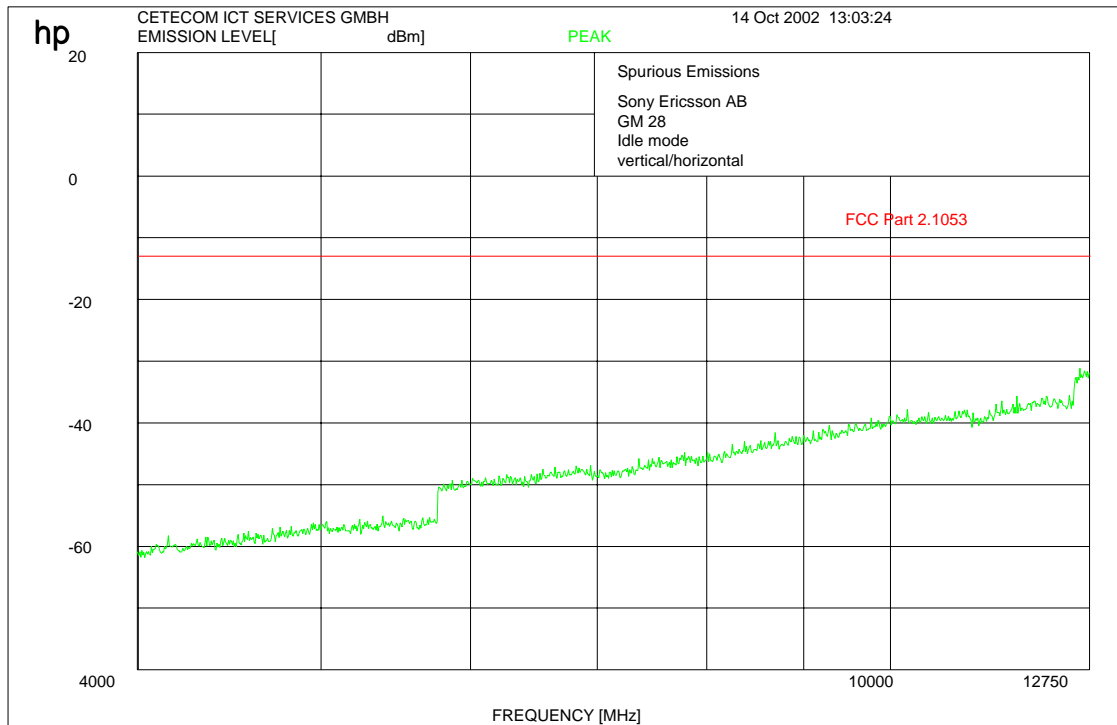
**Channel 189 (this is valid for all 3 channels and up to 4 GHz)**  
**Idle-Mode**

**No peak found**

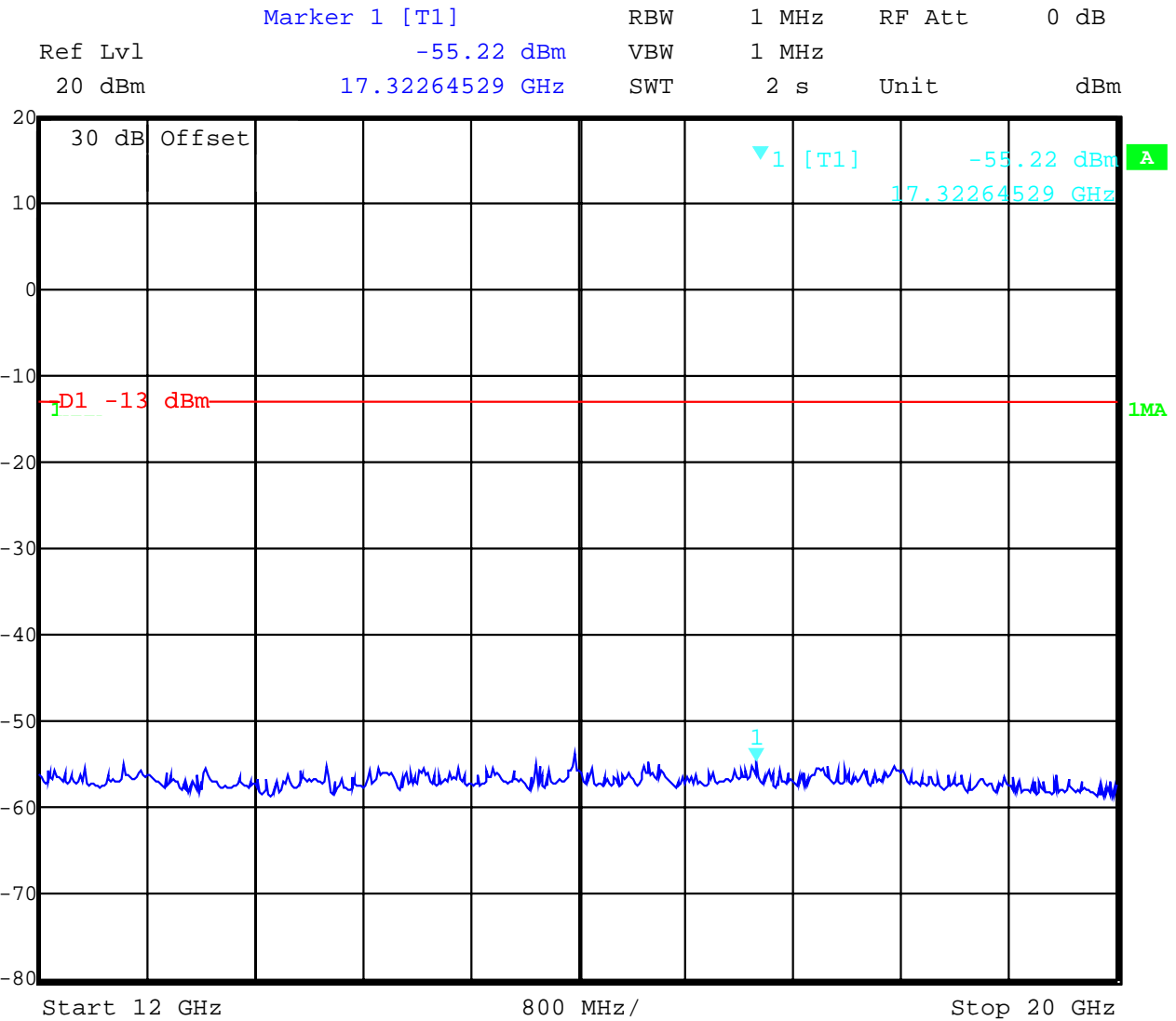




## Channel 189 (this is valid for all 3 channels and up to 12 GHz) Idle-Mode



**Channel 189 (this is valid for all 3 channels and up to 20 GHz)**  
**Idle-Mode**



Date:      22.OCT.2002      8:09:21

**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
**(for reference numbers see test equipment listing)**  
 17 – 24, 64

## CONDUCTED SPURIOUS EMISSIONS

### Measurement Procedure:

The following steps outline the procedure used to measure the conducted emissions from the mobile station.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.

For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 19.1 GHz, data taken from 10 MHz to 20 GHz.

2. Determine mobile station transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

### USPCS Transmitter

#### Channel Frequency

128 824.2 MHz

189 836.2 MHz

251 848.8 MHz

### Measurement Limit:

Sec. 24.238 Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\text{Log}(P)$  dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

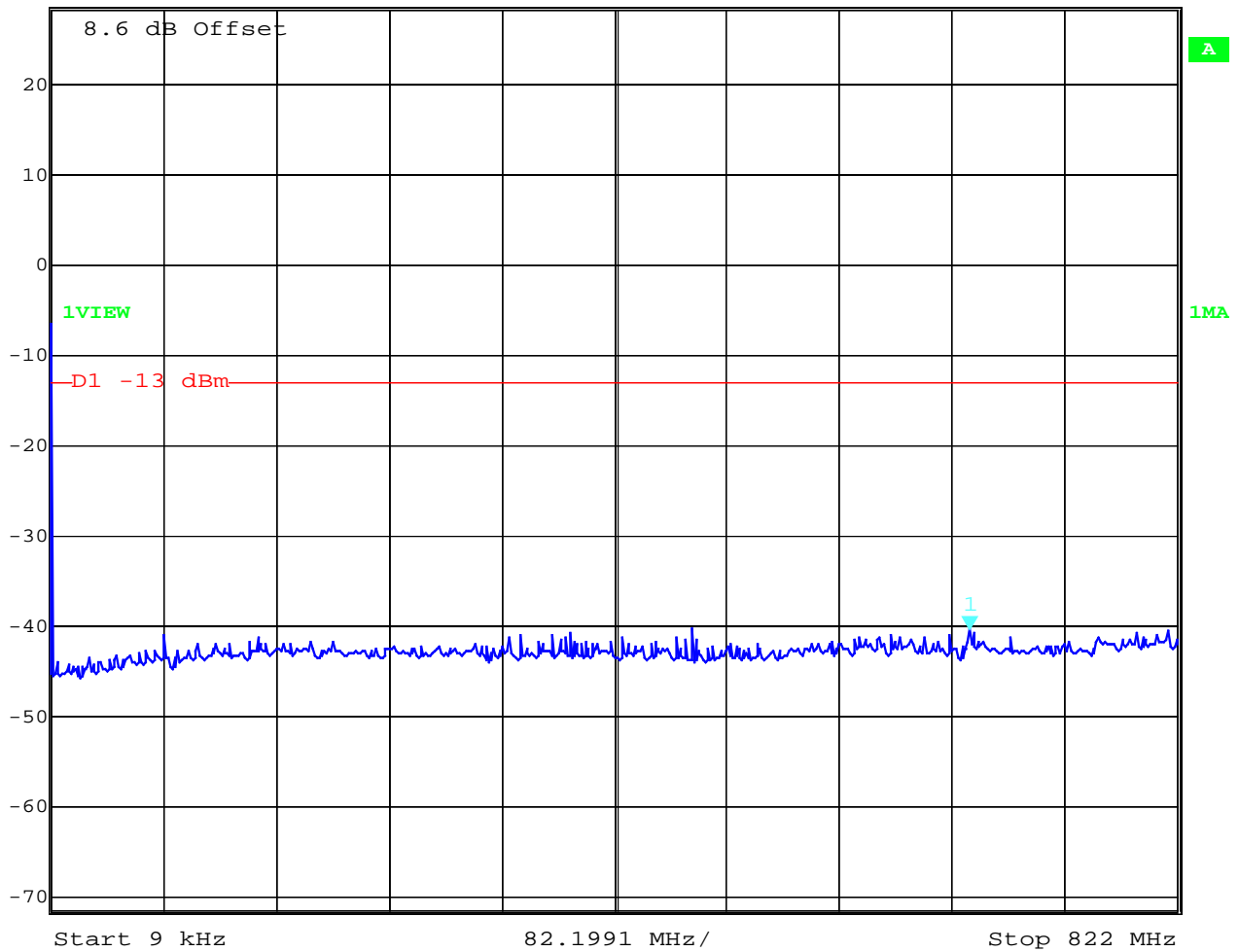
<b>EMISSION LIMITATIONS</b>					
<b>f (MHz)</b>		<b>amplitude of emission (dBm)</b>	<b>limit max. allowed emission power (dBm)</b>	<b>actual attenuation below frequency of operation (dBc)</b>	<b>results</b>
<b>CH 128</b>					
824,2		30.5	-13.0 (43.50 dBc)		carrier
670.451		-40.29		70.79	complies
823.980		-16.46		46.96	complies
4325.932		-37.60		68.10	complies
6592.525		-32.64		63.14	complies
<b>CH 189</b>					
836,2		30.7	-13.0 (43.70 dBc)		carrier
810.325		-40.26		70.96	complies
2606.253		-37.82		68.52	complies
<b>CH 251</b>					
848,8		30.7	-13.0 (43.70 dBc)		carrier
782.345		-40.34		71.04	complies
849.012		-15.71		46.41	complies
6878.577		-31.24		61.94	complies
<b>Measurement uncertainty</b>		<b>± 0.5dB</b>			

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

## Measurements:

### Channel: 128

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-40.29 dBm	VBW	100 kHz		
28.6 dBm	670.45055711 MHz	SWT	210 ms	Unit	dBm

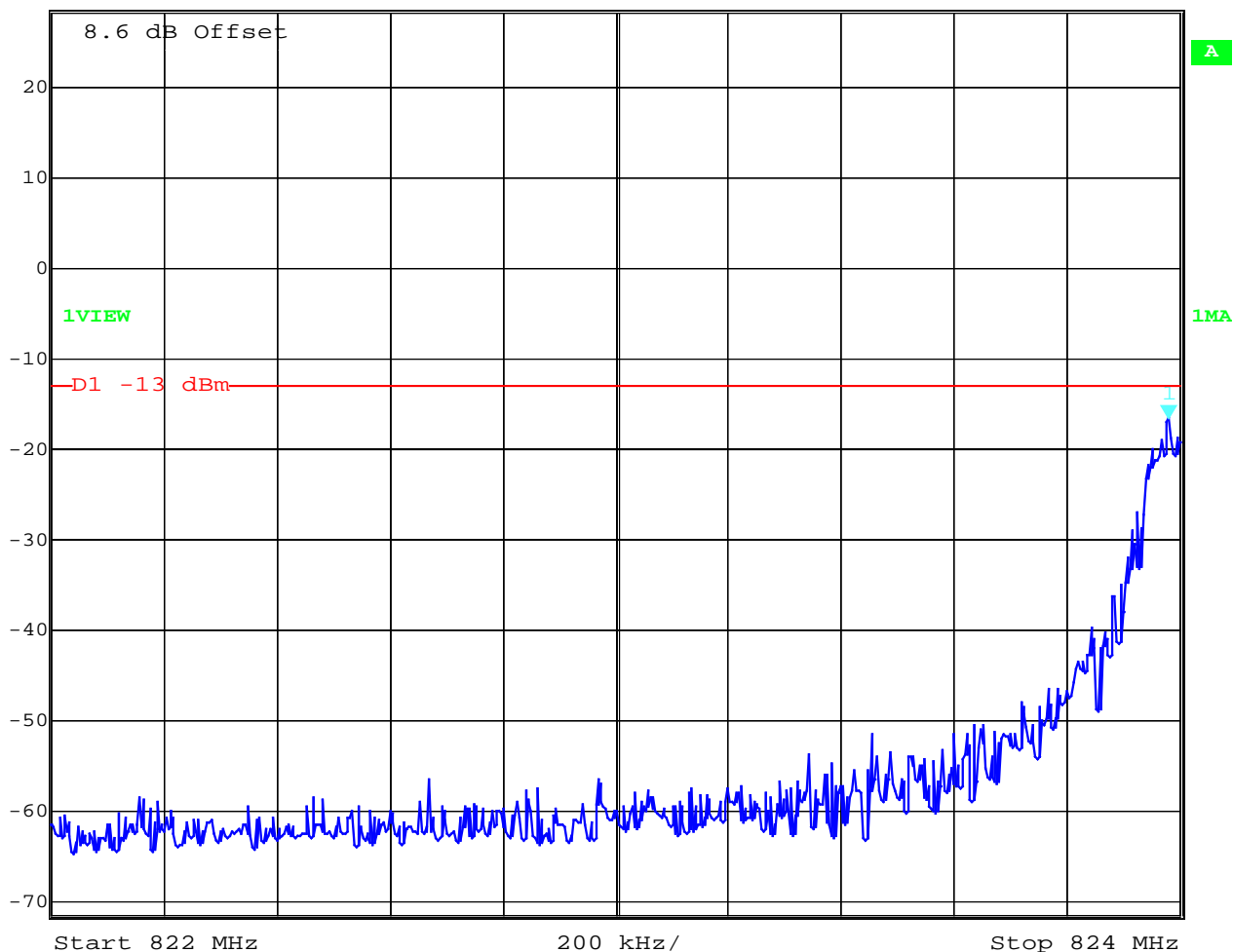


Date: 21.OCT.2002 09:56:29

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

## Channel 128

	Marker 1 [T1]	RBW	3 kHz	RF Att	40 dB
Ref Lvl	-16.46 dBm	VBW	3 kHz		
28.6 dBm	823.97995992 MHz	SWT	560 ms	Unit	dBm



Date: 21.OCT.2002 09:57:53

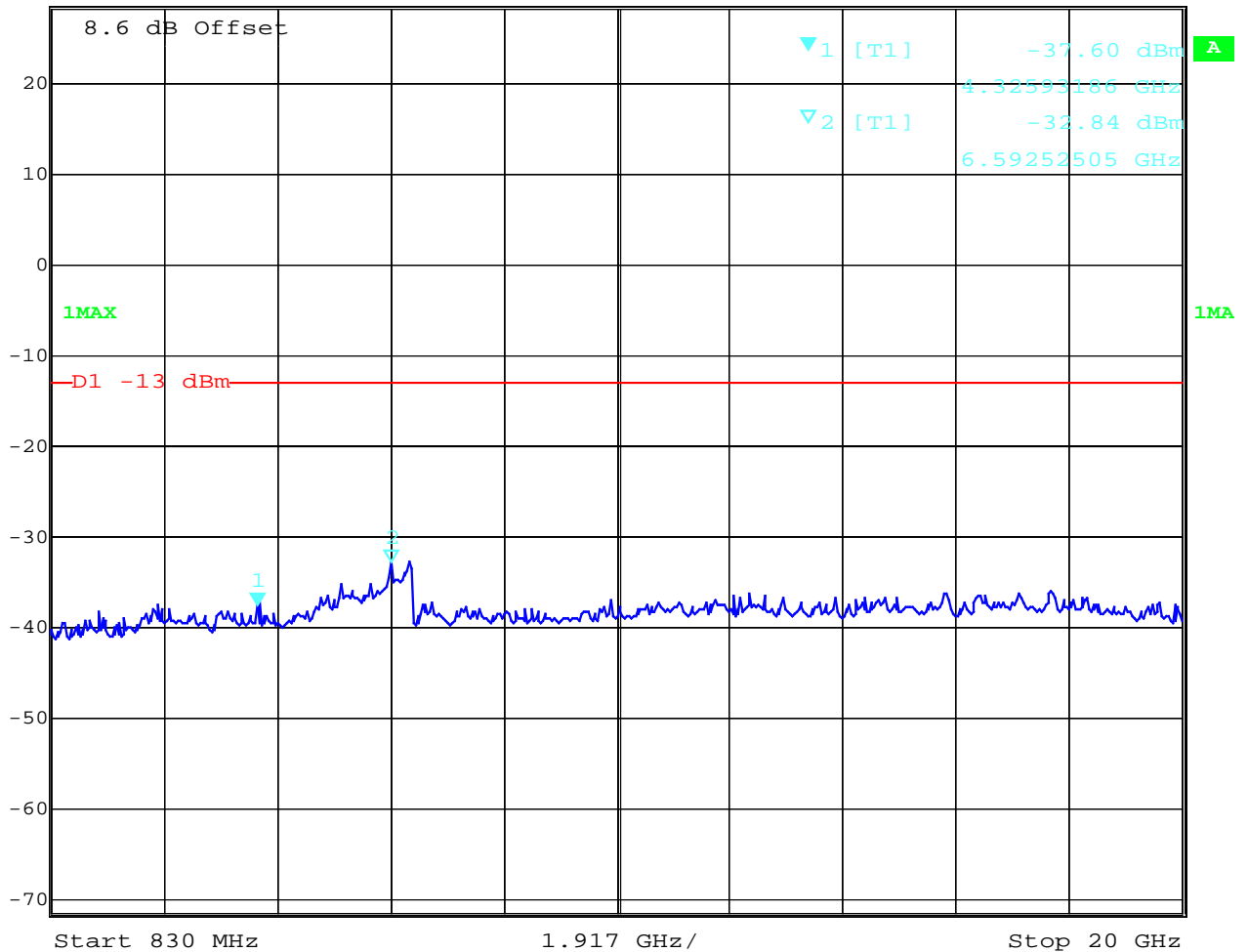
### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24, 64

## Channel 128

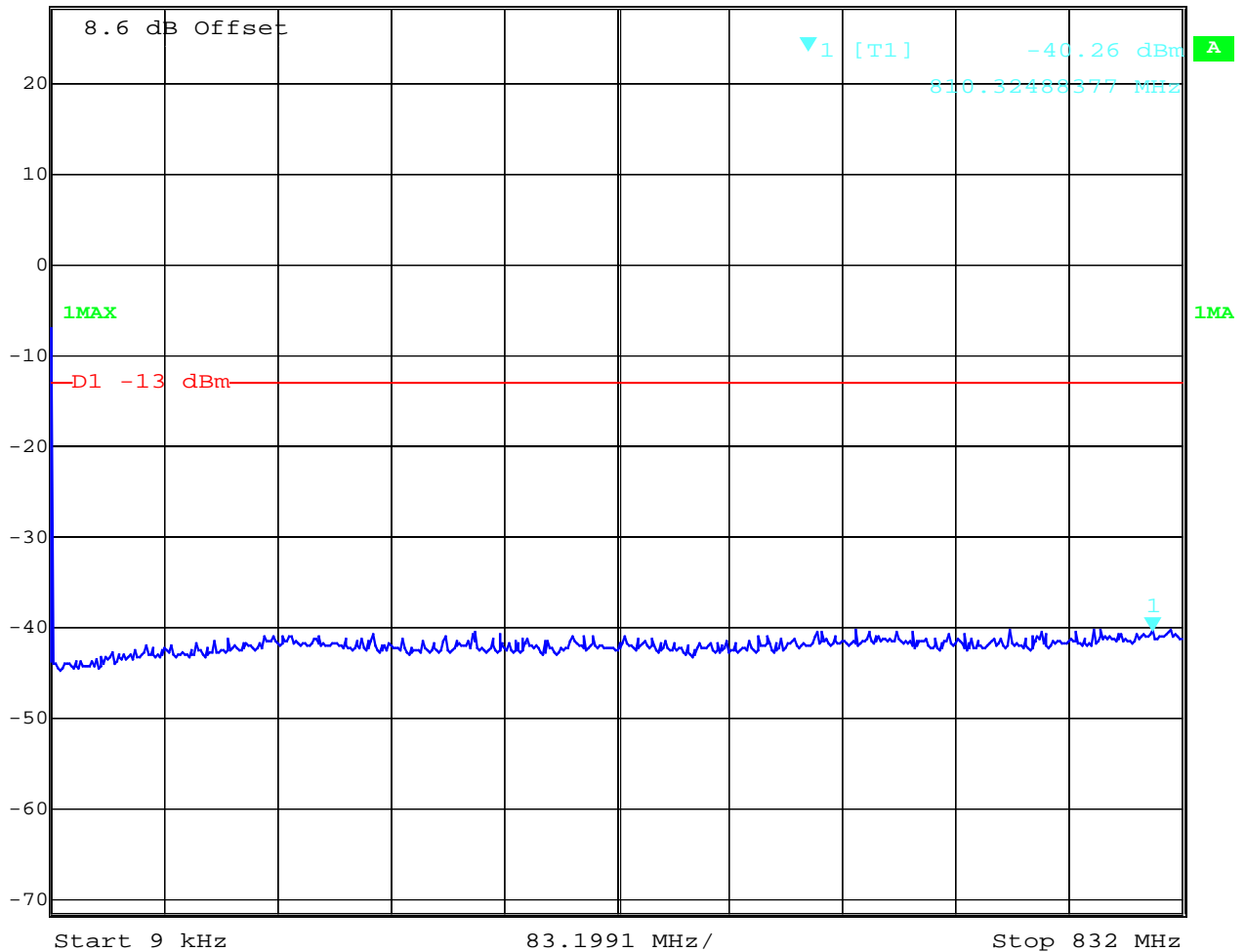
	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-37.60 dBm	VBW	100 kHz		
28.6 dBm	4.32593186 GHz	SWT	4.8 s	Unit	dBm



Date: 21.OCT.2002 10:00:16

## Channel 189

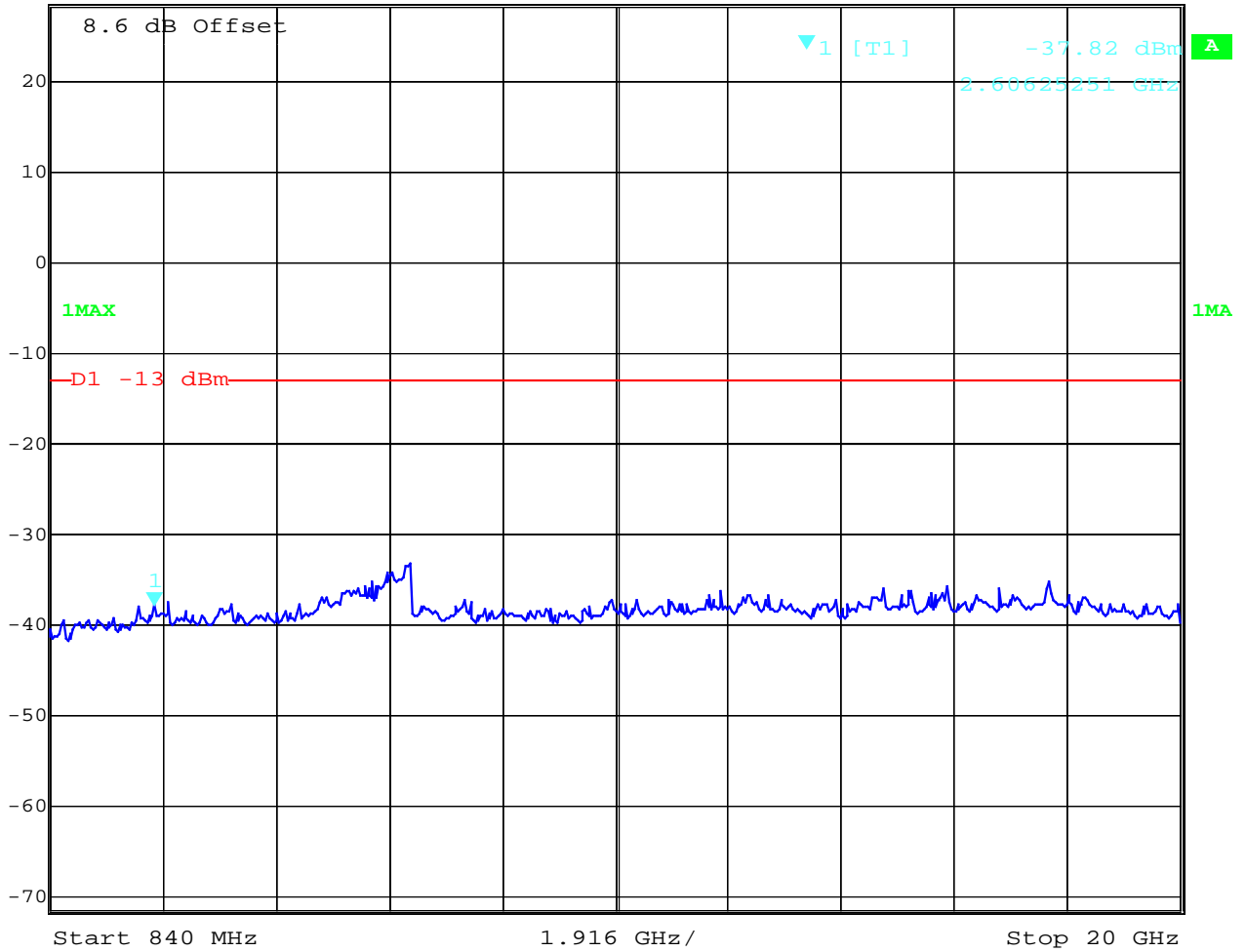
	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-40.26 dBm	VBW	100 kHz		
28.6 dBm	810.32488377 MHz	SWT	210 ms	Unit	dBm



Date: 21.OCT.2002 10:03:13

## Channel 189

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-37.82 dBm	VBW	100 kHz		
28.6 dBm	2.60625251 GHz	SWT	4.8 s	Unit	dBm



Date: 21.OCT.2002 10:05:00

**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**

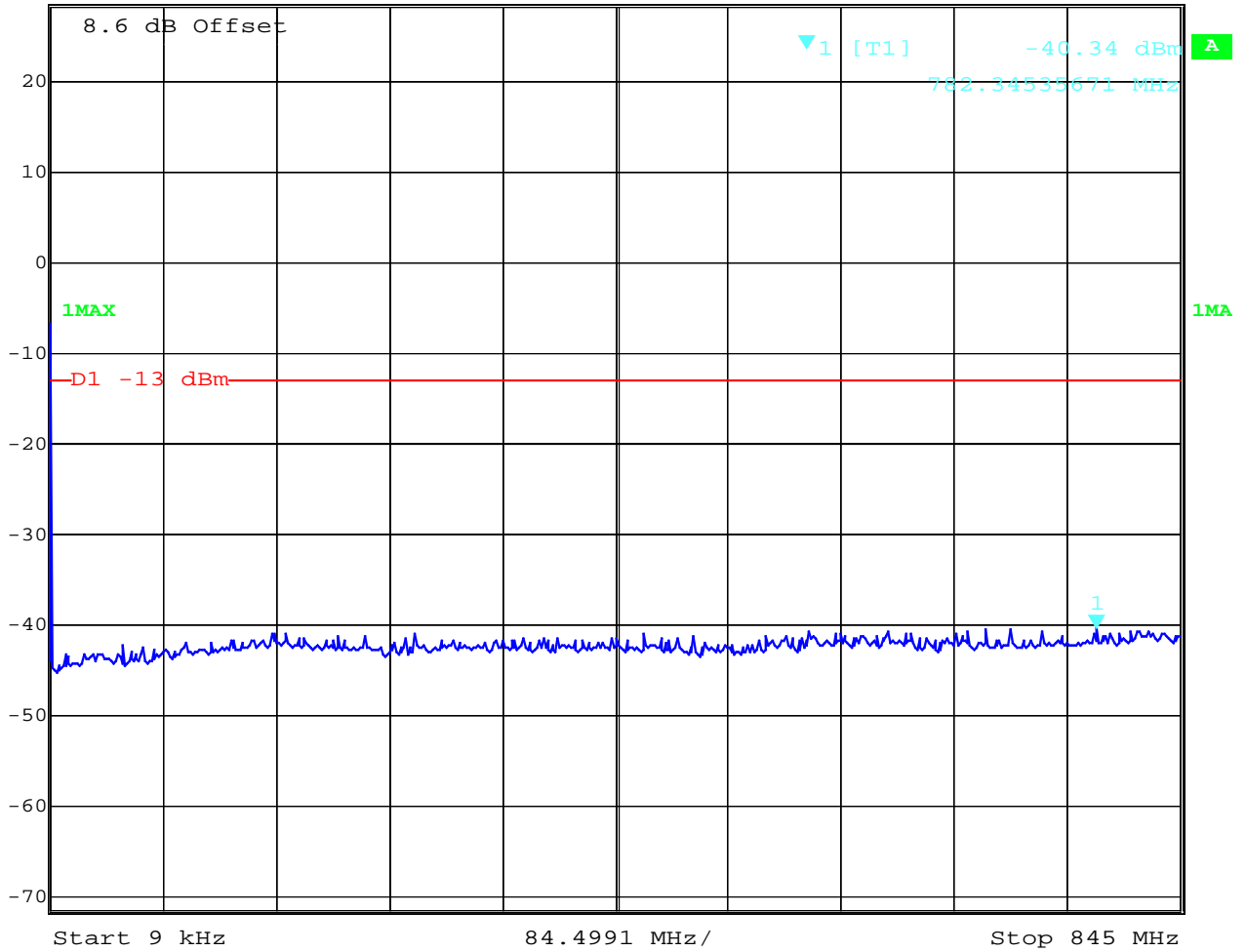
(for reference numbers see test equipment listing)

17 - 24, 64



Channel 251

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-40.34 dBm	VBW	100 kHz		
28.6 dBm	782.34535671 MHz	SWT	215 ms	Unit	dBm



Date: 21.OCT.2002 10:08:17

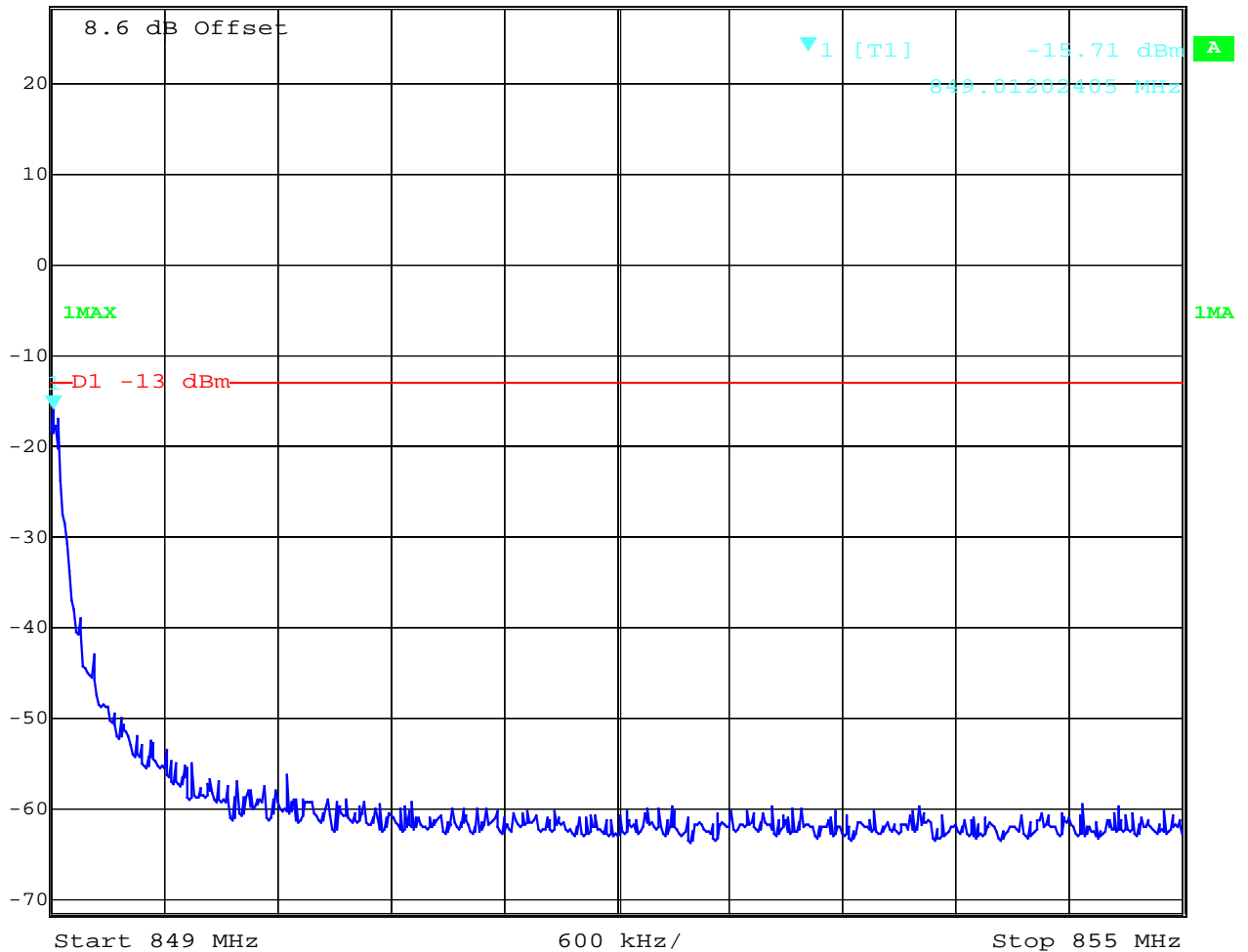
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24, 64

## Channel 251

	Marker 1 [T1]	RBW	3 kHz	RF Att	40 dB
Ref Lvl	-15.71 dBm	VBW	3 kHz		
28.6 dBm	849.01202405 MHz	SWT	1.7 s	Unit	dBm



Date: 21.OCT.2002 10:09:25

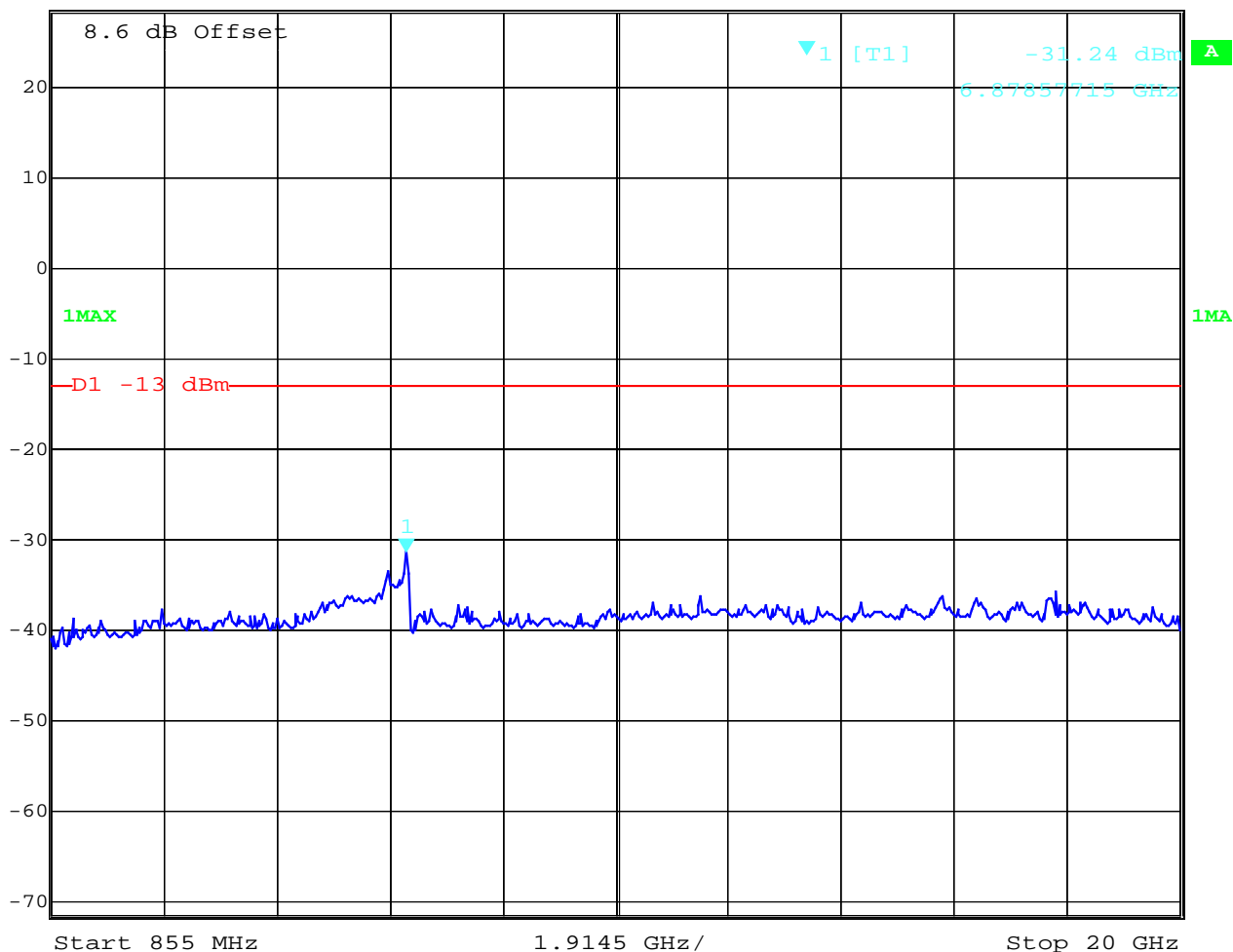
### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 - 24, 64

## Channel 251

	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-31.24 dBm	VBW	100 kHz		
28.6 dBm	6.87857715 GHz	SWT	4.8 s	Unit	dBm



Date: 21.OCT.2002 10:06:51

**OCCUPIED BANDWIDTH** **§2.989**

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See test report no.: 4\_0552-01-03/02

## CONDUCTED EMISSIONS

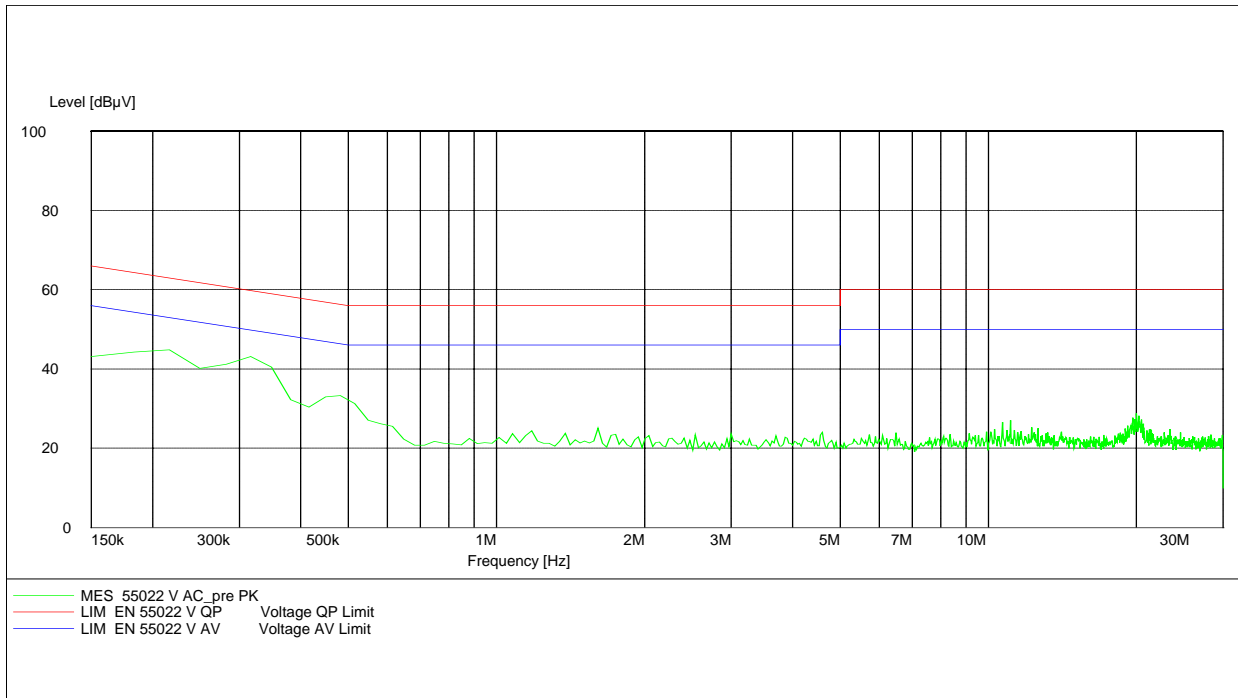
§ 15.107/207

EN 55022

EUT: GM 28  
 Manufacturer: Sony Ericsson  
 Operation condition: Traffic mode  
 Test Site: CETECOM ICT Services, Room 006  
 Operator: BER  
 Power Supply: EN 55022  
 Comment: AC power line  
 Start of Test: 21.10.02 / 14:24:56

### SCANTABELLE: "EN 55022 V"

Kurzbeschreibung:		Voltage Mains 1.60				
Start-	Stop-	Schritt-	Detektor	Meß-	ZF-	Transducer
Frequenz	Frequenz	weite		zeit	Bandbr.	
150.0 kHz	30.0 MHz	7.5 kHz	MaxPeak	100.0 ms	10 kHz	ESH3-Z5 L1 1458



### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

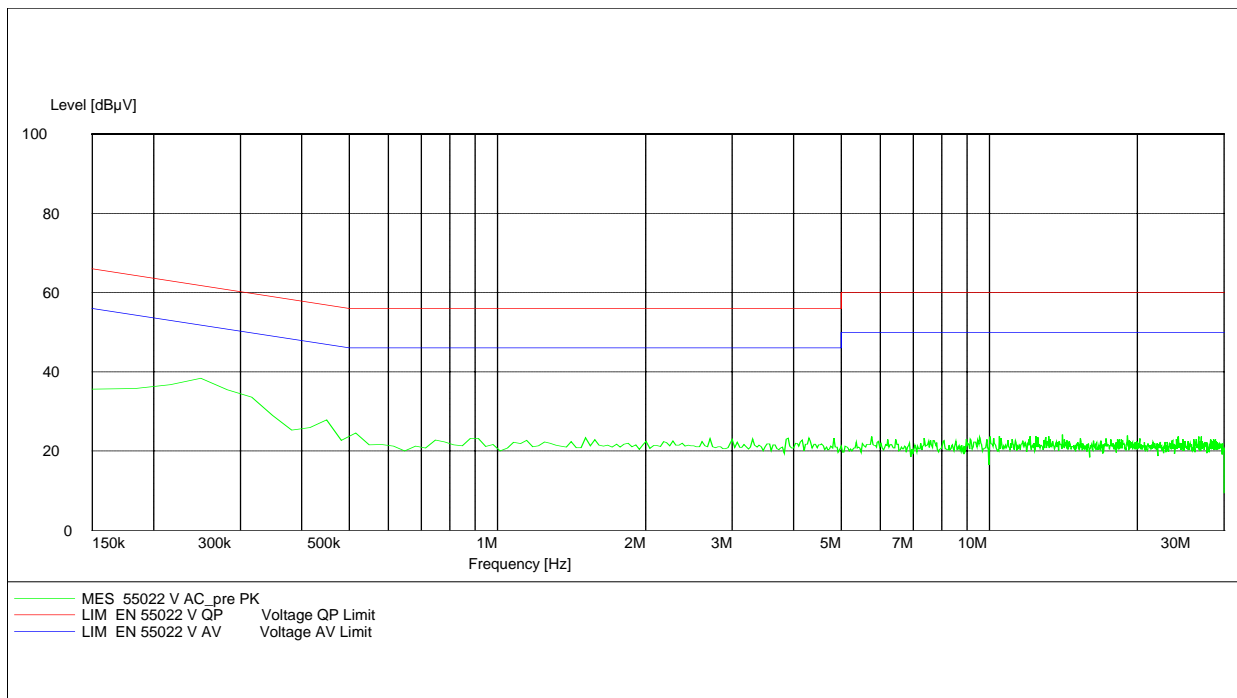
(for reference numbers see test equipment listing)

**EN 55022**

EUT: GM 28  
 Manufacturer: Sony Ericsson  
 Operation condition: Idle mode  
 Test Site: CETECOM ICT Services, Room 006  
 Operator: BER  
 Power Supply: EN 55022  
 Comment: AC power line  
 Start of Test: 21.10.02 / 14:17:34

**SCANTABELLE: "EN 55022 V"**

Kurzbeschreibung: Voltage Mains 1.60  
 Start- Stop- Schritt- Detektor Meß- ZF- Transducer  
 Frequenz Frequenz weite zeit Bandbr.  
 150.0 kHz 30.0 MHz 7.5 kHz MaxPeak 100.0 ms 10 kHz ESH3-Z5 L1 1458



**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**

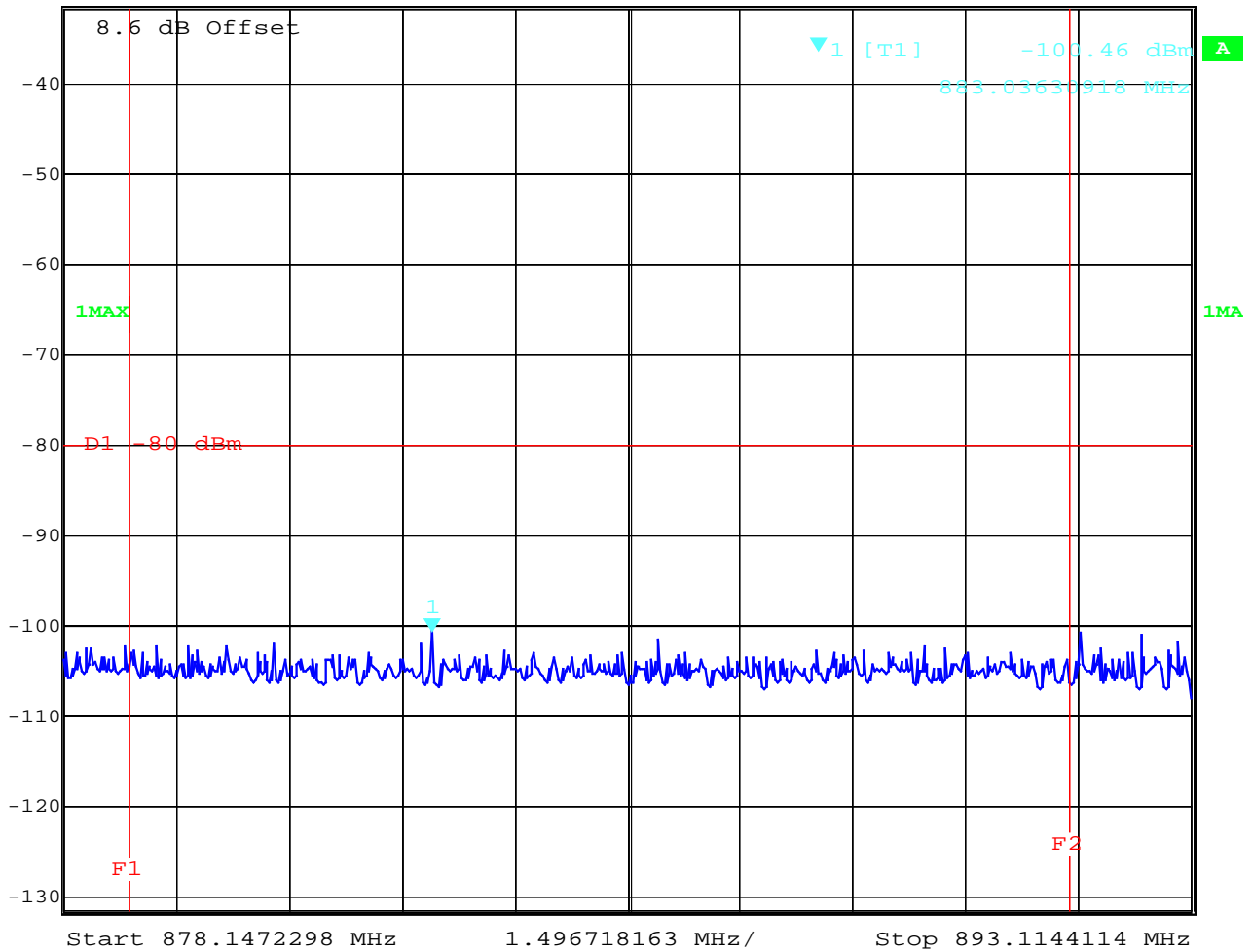
(for reference numbers see test equipment listing)

**EMISSION LIMITATIONS FOR CELLULAR §22.917(F)**

**Mobile emissions in the base frequency range**

**Idle Mode base station frequency range A**

	Marker 1 [T1]	RBW	3 kHz	RF Att	0 dB
Ref Lvl	-100.46 dBm	VBW	3 kHz		
-31.4 dBm	883.03630918 MHz	SWT	4.2 s	Unit	dBm



Date: 21.OCT.2002 11:01:39

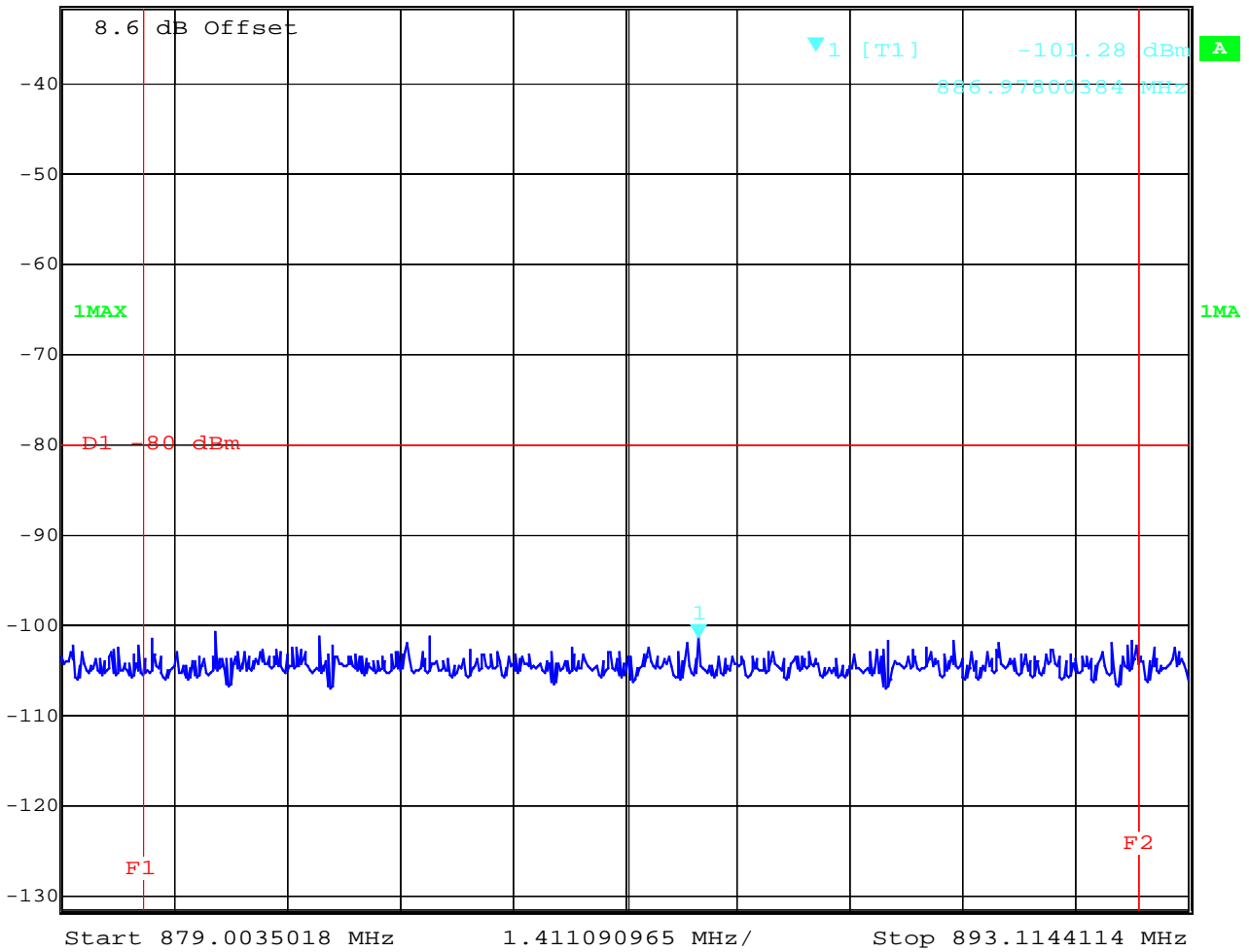
**LIMITS §22.917(f)**

The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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

Mobile emissions in the base frequency range  
**Idle Mode base station frequency range B**

	Marker 1 [T1]	RBW	3 kHz	RF Att	0 dB
Ref Lvl	-101.28 dBm	VBW	3 kHz		
-31.4 dBm	886.97800384 MHz	SWT	4 s	Unit	dBm



Date: 21.OCT.2002 11:00:45

**LIMITS**

§22.917(f)

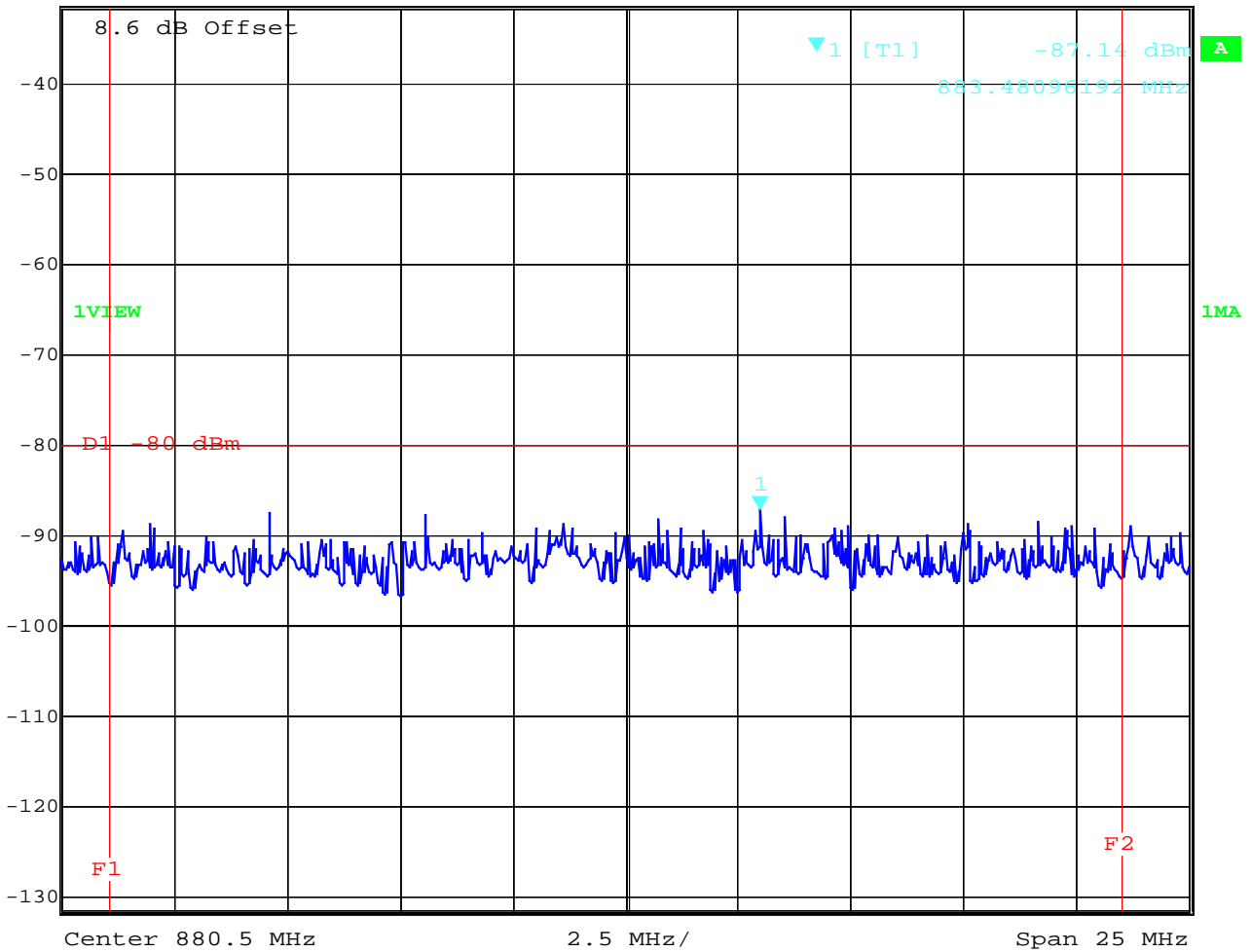
The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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



Mobile emissions in the base frequency range  
**TX Mode CH 128 base station frequency range A**

	Marker 1 [T1]	RBW	3 kHz	RF Att	0 dB
Ref Lvl	-87.14 dBm	VBW	3 kHz		
-31.4 dBm	883.48096192 MHz	SWT	7 s	Unit	dBm



Date: 21.OCT.2002 10:41:00

**LIMITS**

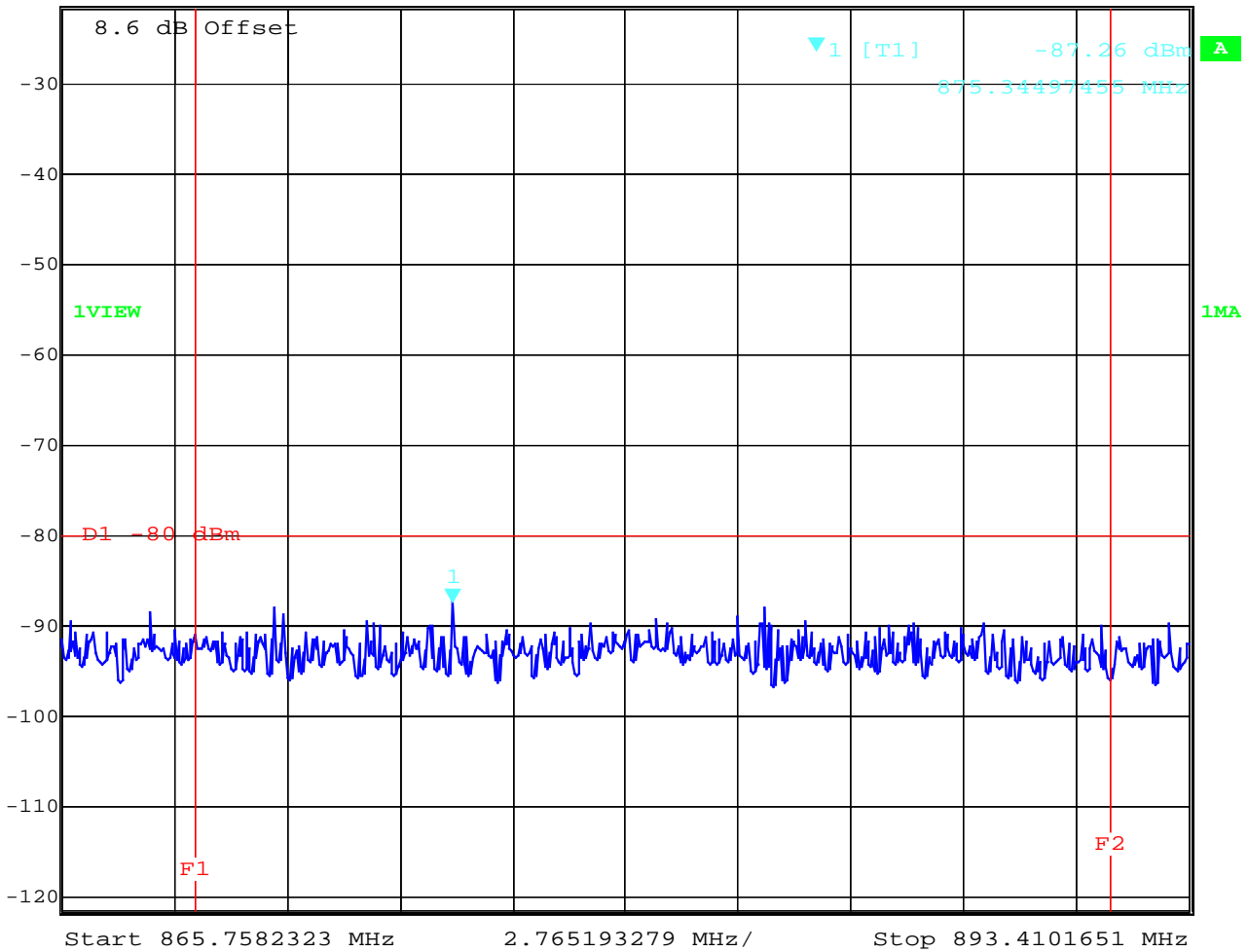
§22.917(f)

The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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

Mobile emissions in the base frequency range  
 TX Mode CH 189 base station frequency range A

Marker 1 [T1] RBW 3 kHz RF Att 0 dB  
 Ref Lvl -87.26 dBm VBW 3 kHz  
 -21.4 dBm 875.34497455 MHz SWT 7.8 s Unit dBm



Date: 21.OCT.2002 10:45:56

**LIMITS**

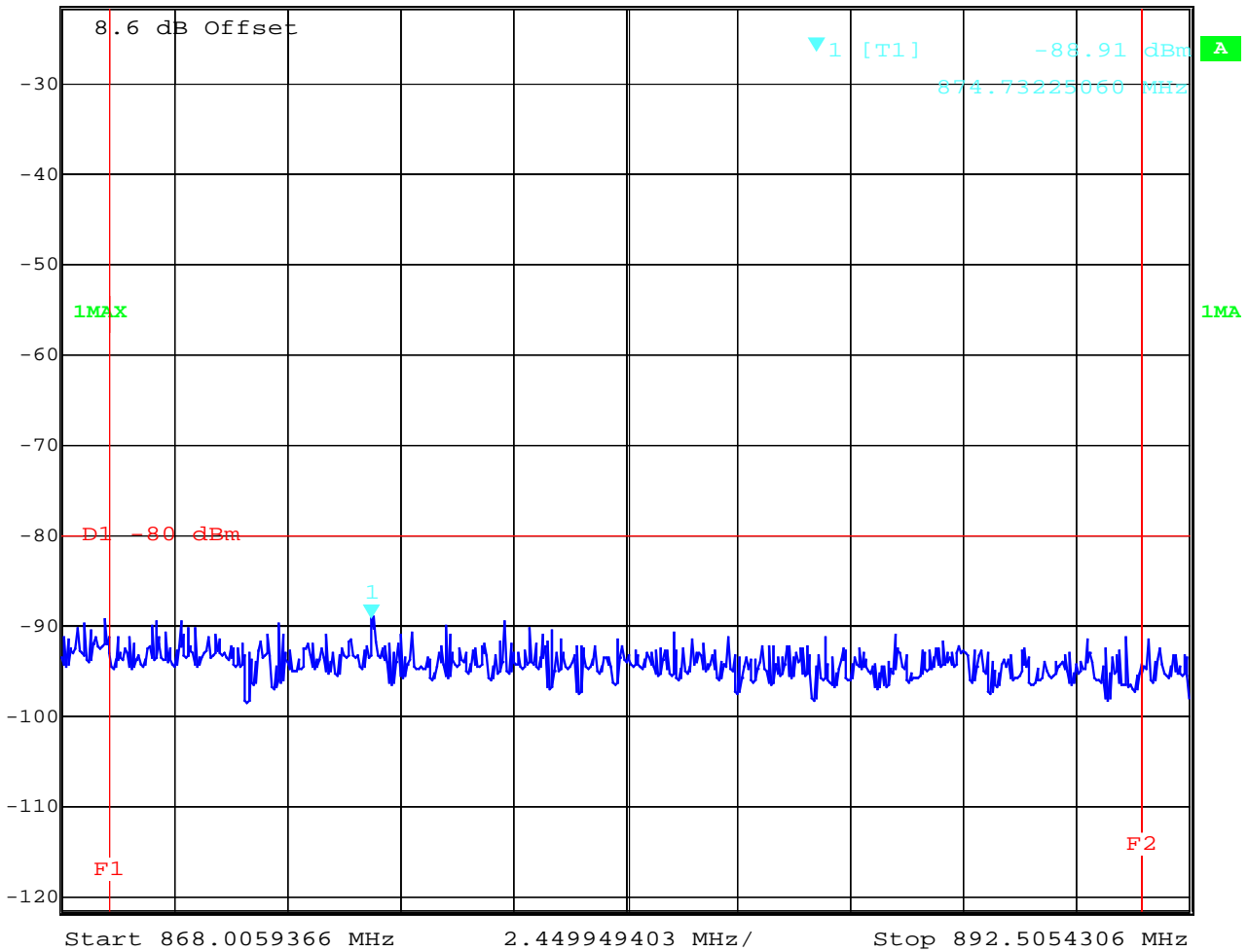
§22.917(f)

The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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

Mobile emissions in the base frequency range  
**TX Mode CH 251 base station frequency range A**

	Marker 1 [T1]	RBW	3 kHz	RF Att	0 dB
Ref Lvl	-88.91 dBm	VBW	3 kHz		
-21.4 dBm	874.73225060 MHz	SWT	7 s	Unit	dBm



Date: 21.OCT.2002 10:48:25

**LIMITS**

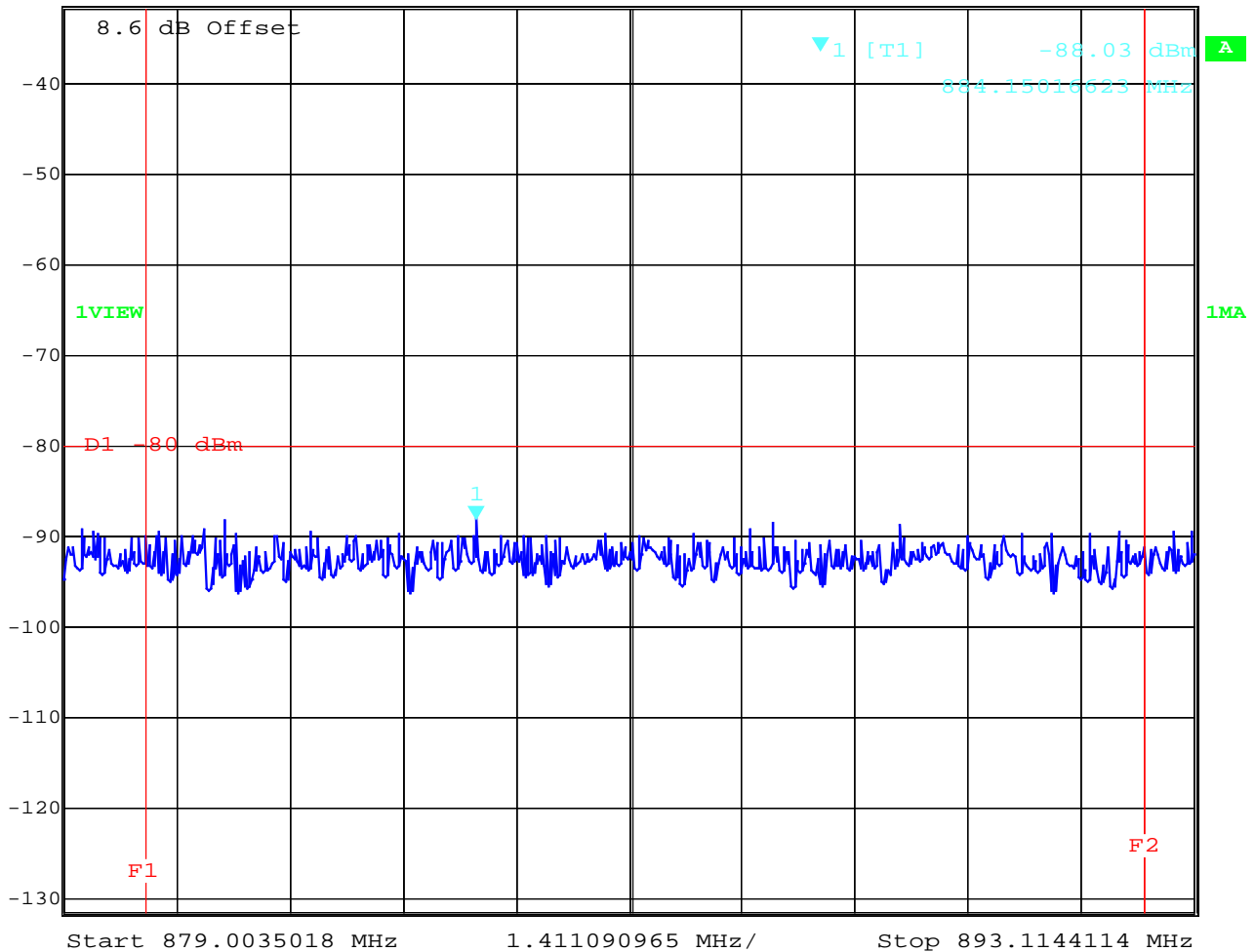
§22.917(f)

The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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

Mobile emissions in the base frequency range  
 TX Mode CH 128 base station frequency range B

Marker 1 [T1] RBW 3 kHz RF Att 0 dB  
 Ref Lvl -88.03 dBm VBW 3 kHz  
 -31.4 dBm 884.15016623 MHz SWT 4 s Unit dBm



Date: 21.OCT.2002 10:59:27

**LIMITS**

**§22.917(f)**

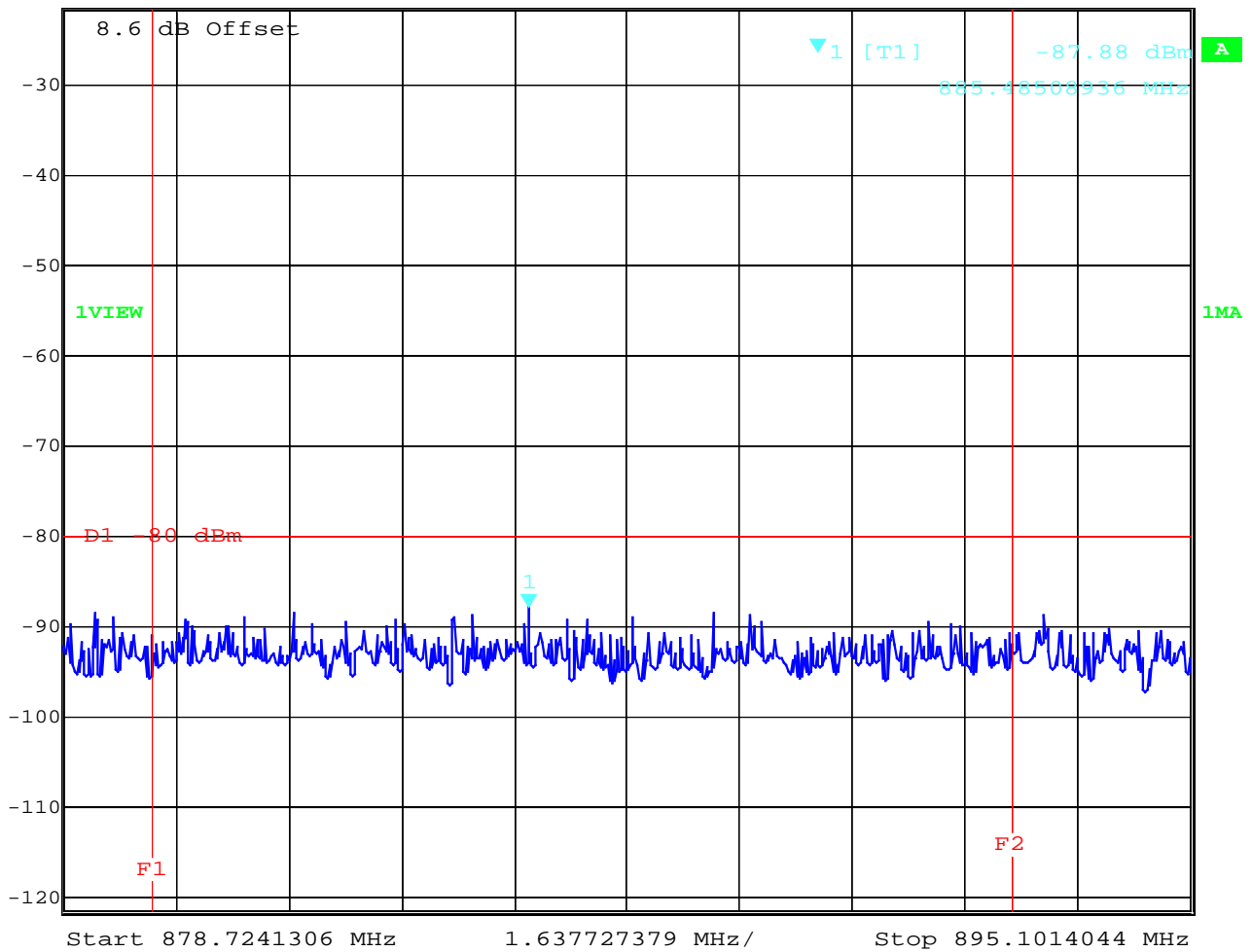
The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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

Mobile emissions in the base frequency range

**TX Mode CH 18'9 base station frequency range B**

Marker 1 [T1] RBW 3 kHz RF Att 0 dB  
 Ref Lvl -21.4 dBm -87.88 dBm VBW 3 kHz  
 885.48508936 MHz SWT 4.6 s Unit dBm



Date: 21.OCT.2002 10:56:29

**LIMITS**

§22.917(f)

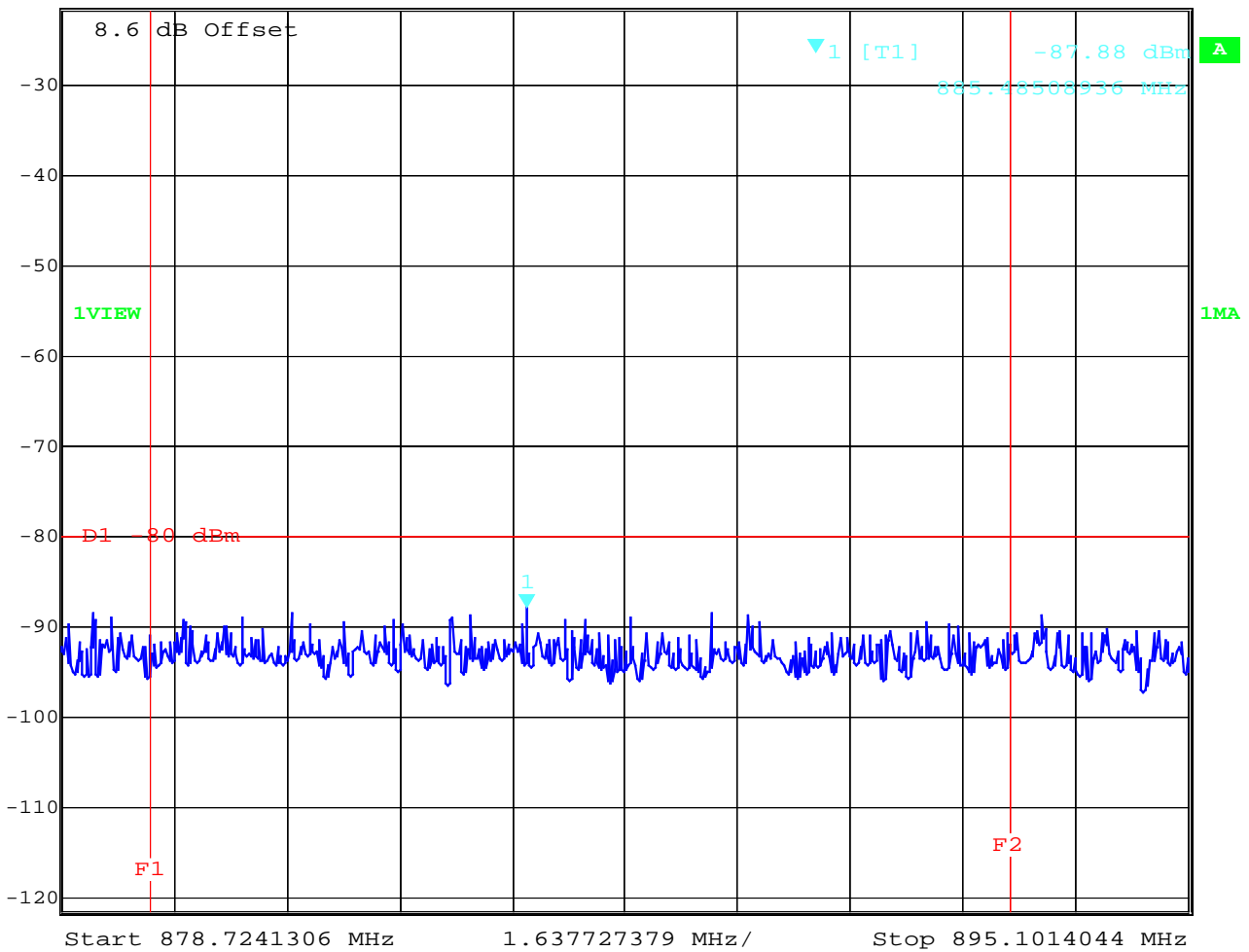
The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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

Mobile emissions in the base frequency range

## TX Mode CH 251 base station frequency range B

Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	0 dB
-21.4 dBm	-87.88 dBm	VBW	3 kHz		
	885.48508936 MHz	SWT	4.6 s	Unit	dBm



Date: 21.OCT.2002 10:56:29

### LIMITS

§22.917(f)

The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not to exceed -80dBm at the transmitter antenna connector

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

**ADDITIONEL MEASUREMENTS FOR THE DIGITAL PART**

**PART 15.109**

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

The detector function and selection of bandwidth are according ANSI C63.2-1996 item 8.2.1 and ANSI C63.4-1992 Item 4.2.

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

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

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

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

1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn

SPURIOUS EMISSIONS LEVEL (µV/m)								
CH 189			CH 661			Idle mode		
f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
3344.8	AV	27.4	3760.0	AV	28.1	no	peak	found
4181.0	AV	16.9						
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Measurement distance see table

Limits

SUBCLAUSE § 15.109

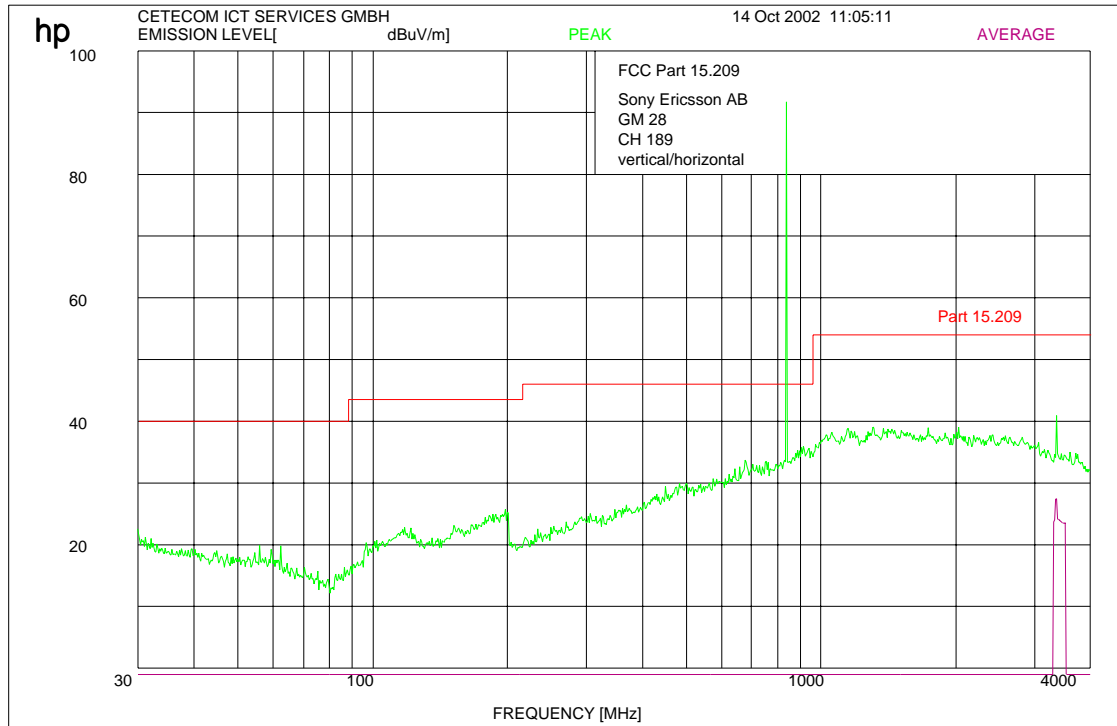
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30
30 - 88	100 / 40 dBµV/m	3
88 - 216	150 / 43.5 dBµV/m	3
216 - 960	200 / 46 dBµV/m	3
above 960	500 / 54 dBµV/m	3

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

## SPURIOUS RADIATION

## § 15.109

### CH 189 up to 4 GHz



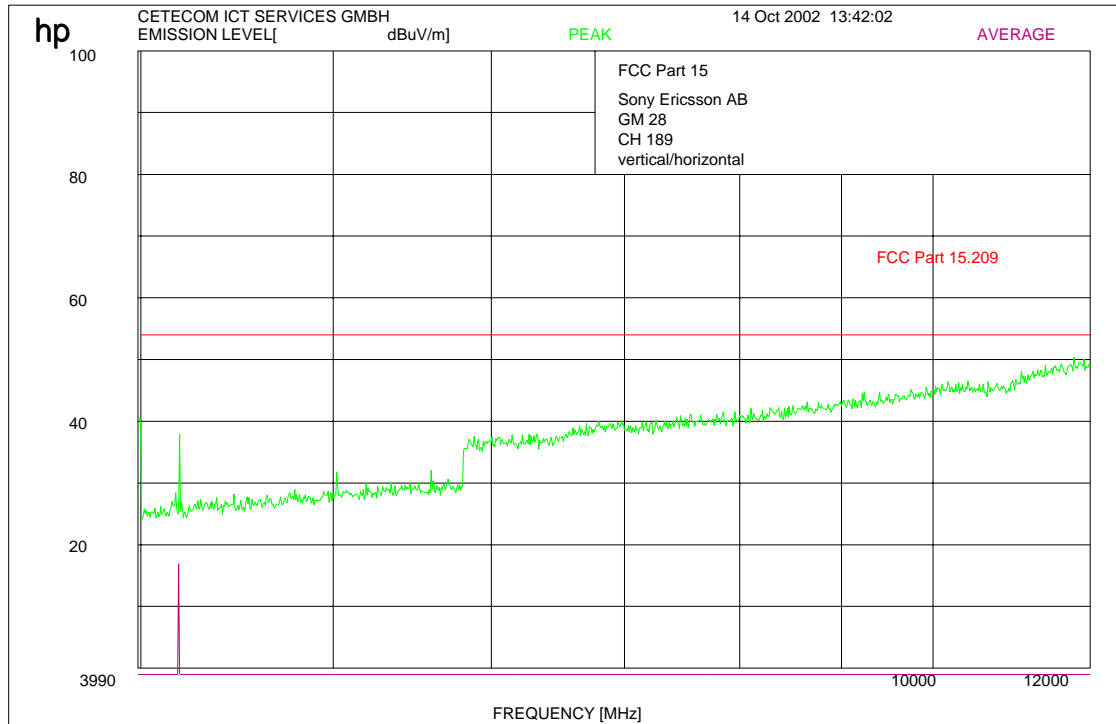
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)



## SPURIOUS RADIATION

## § 15.109

### CH 189 up to 12 GHz



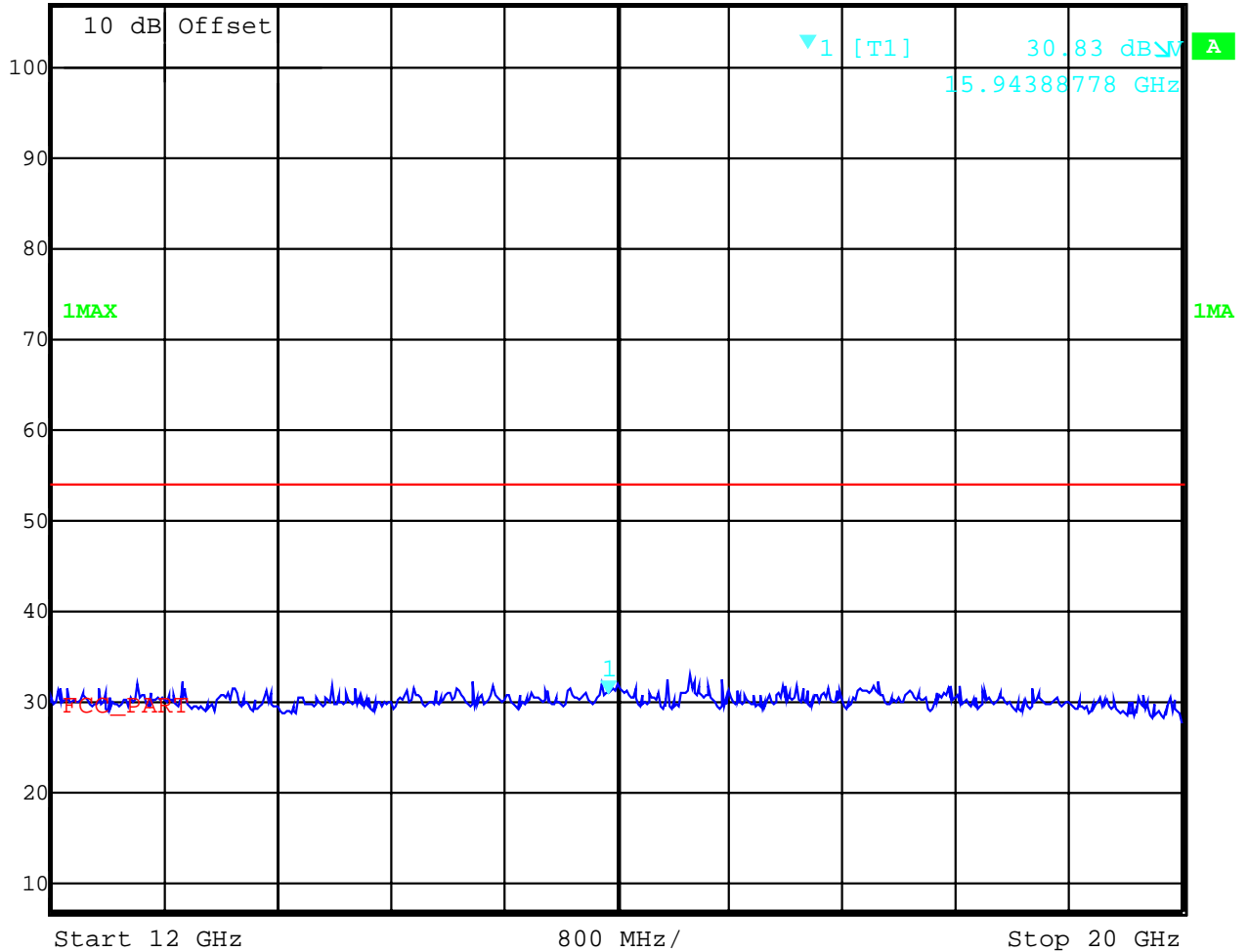
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

SPURIOUS RADIATION

§ 15.109

CH 189 up to 20 GHz

	Marker 1 [T1]	RBW	1 MHz	RF Att	0 dB
Ref Lvl	30.83 dB $\mu$ V	VBW	1 MHz		
107 dB $\mu$ V	15.94388778 GHz	SWT	2 s	Unit	dB $\mu$ V



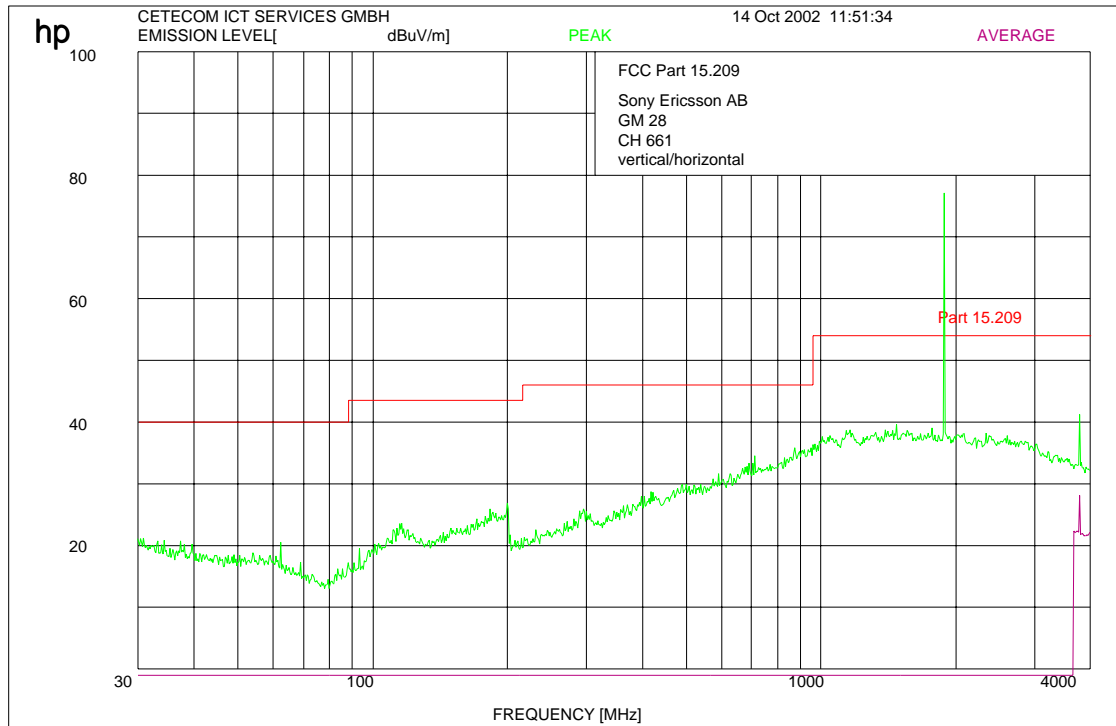
Date: 21.OCT.2002 13:15:42

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

## SPURIOUS RADIATION

## § 15.109

CH 661 up to 4 GHz

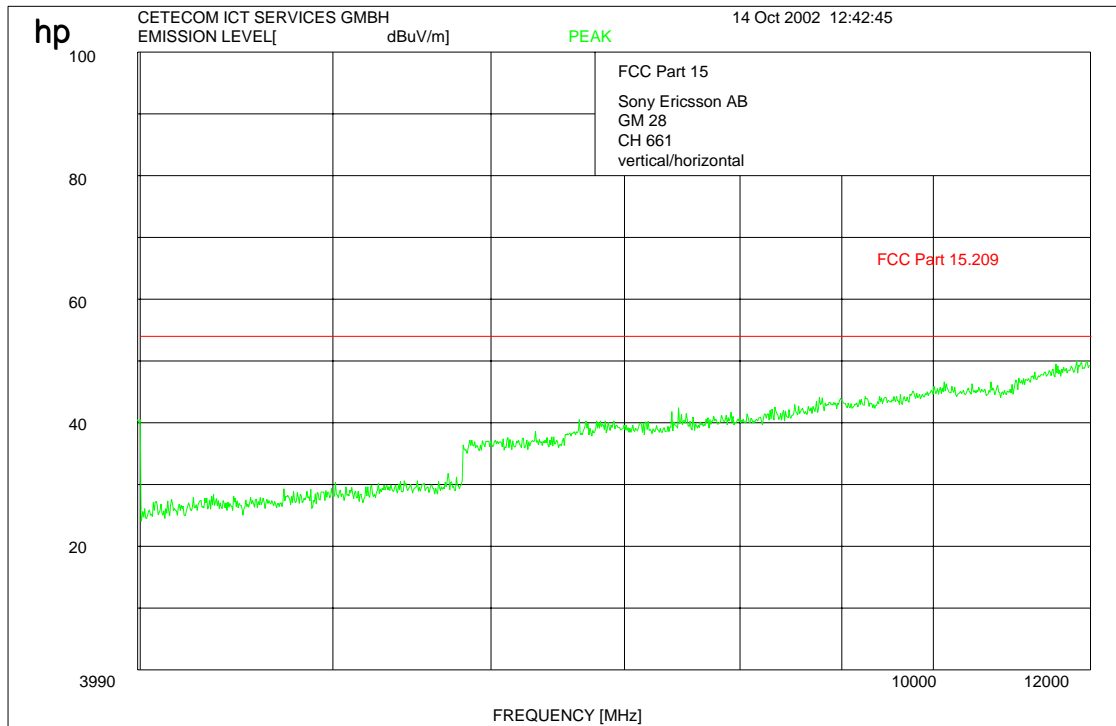


**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

## SPURIOUS RADIATION

## § 15.109

### CH 661 up to 12 GHz



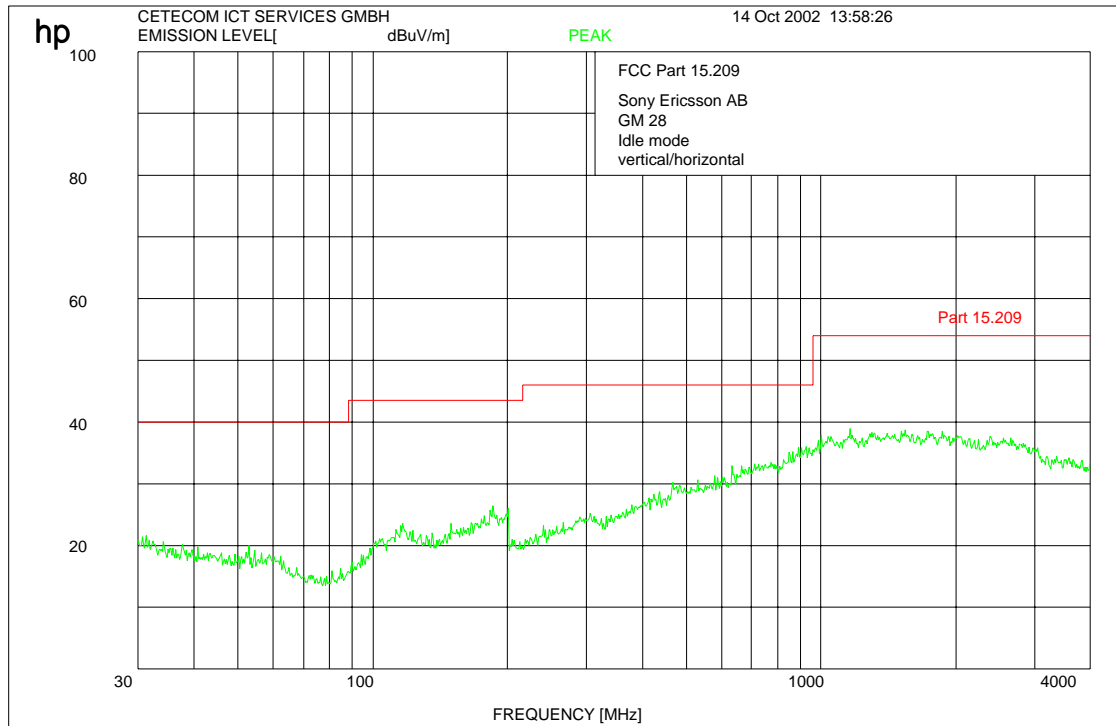
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)



## SPURIOUS RADIATION

## § 15.109

Idle mode up to 4 GHz

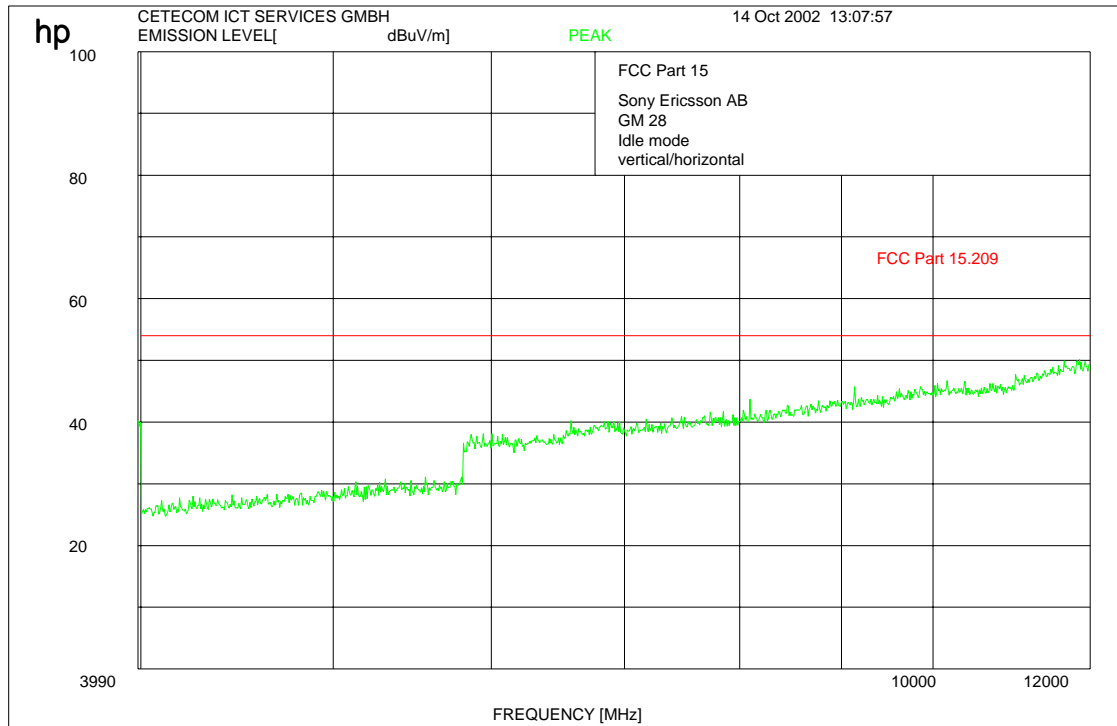


**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

## SPURIOUS RADIATION

## § 15.109

Idle mode up to 12 GHz



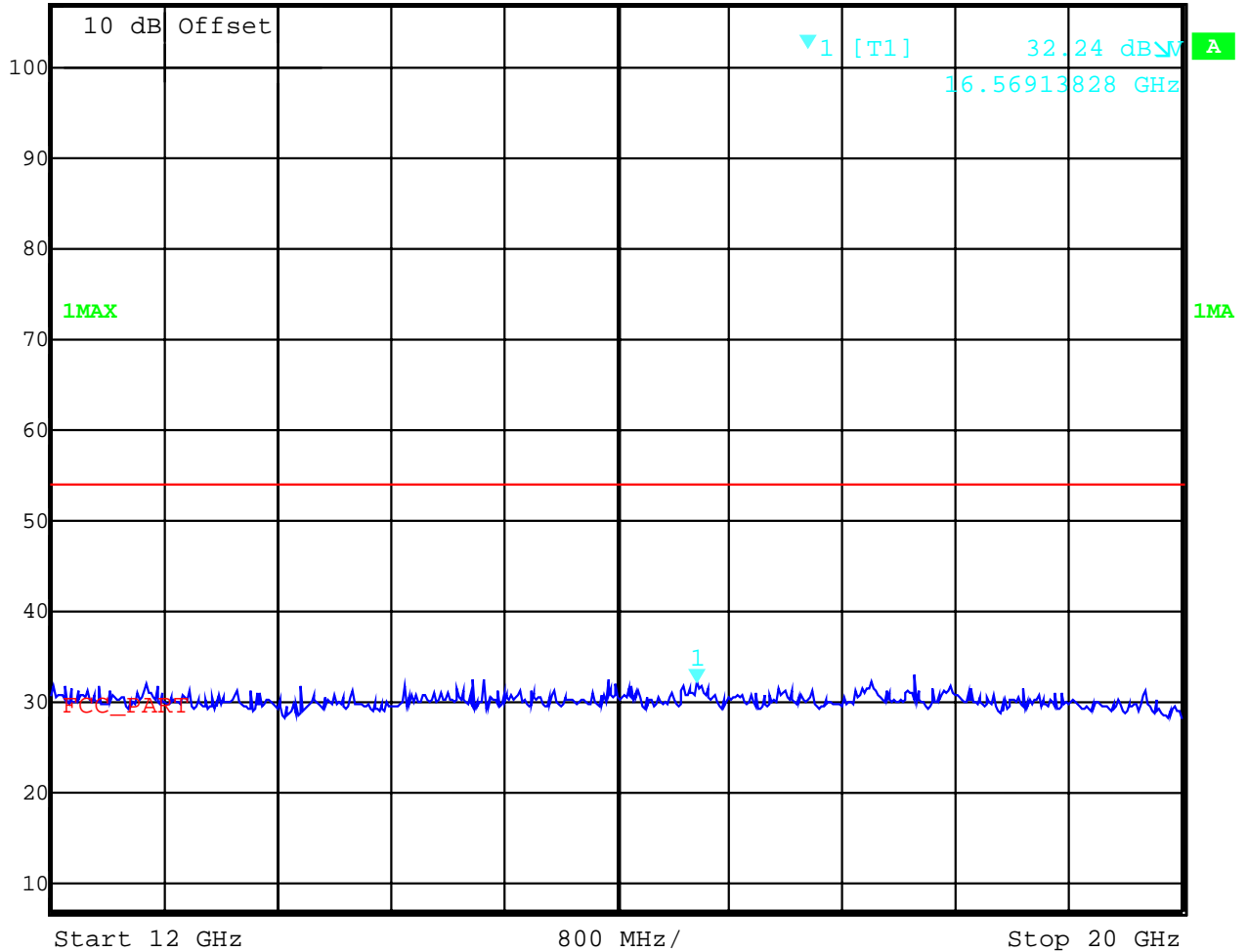
**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

SPURIOUS RADIATION

§ 15.109

Idle mode up to 20 GHz

	Marker 1 [T1]	RBW	1 MHz	RF Att	0 dB
Ref Lvl	32.24 dB $\mu$ V	VBW	1 MHz		
107 dB $\mu$ V	16.56913828 GHz	SWT	2 s	Unit	dB $\mu$ V



Date: 21.OCT.2002 13:37:14

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 Communication 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	Function Generator	AFGU	Rohde & Schwarz	862 480/032
09	Regulating Transformer	MPL	Erfi	91350
10	LISN	NNLA 8120	Schwarzbeck	8120331
11	Relay-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	Modulation Meter	9008	Racal-Dana	2647
16	Frequency Counter	5340 A	Hewlett-Packard	1532A03899
17	Anechoic Chamber	---	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 Antenna	3104	Emco	3758
23	Log. Per. Antenna	3146	Emco	2130
24	Double Ridged 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 Antenna	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenna	HL 223	Rohde & Schwarz	825 584/002
29	Relay-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Anechoic Chamber		Frankonia	
33	Control Computer	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	Control Computer	HD 100	Deisel	100/322/93
37	Relay Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relay Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spectrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Measuring Receiver	ESH 3	Rohde & Schwarz	890 174/002
43	Measuring Receiver	ESVP	Rohde & Schwarz	891 752/005
44	Bicon 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	Polarisation Network	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridged Horn Antenna 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	Controler	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Network	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Network	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phase V-Network	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Power Supply	6032A	Rohde & Schwarz	2933A05441
59	RF-Test Receiver	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	RF-Test Receiver	ESH3	Rohde & Schwarz	881 515/002
62	Relay Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relay 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				
67				
68				

**Test site**



**Test site**



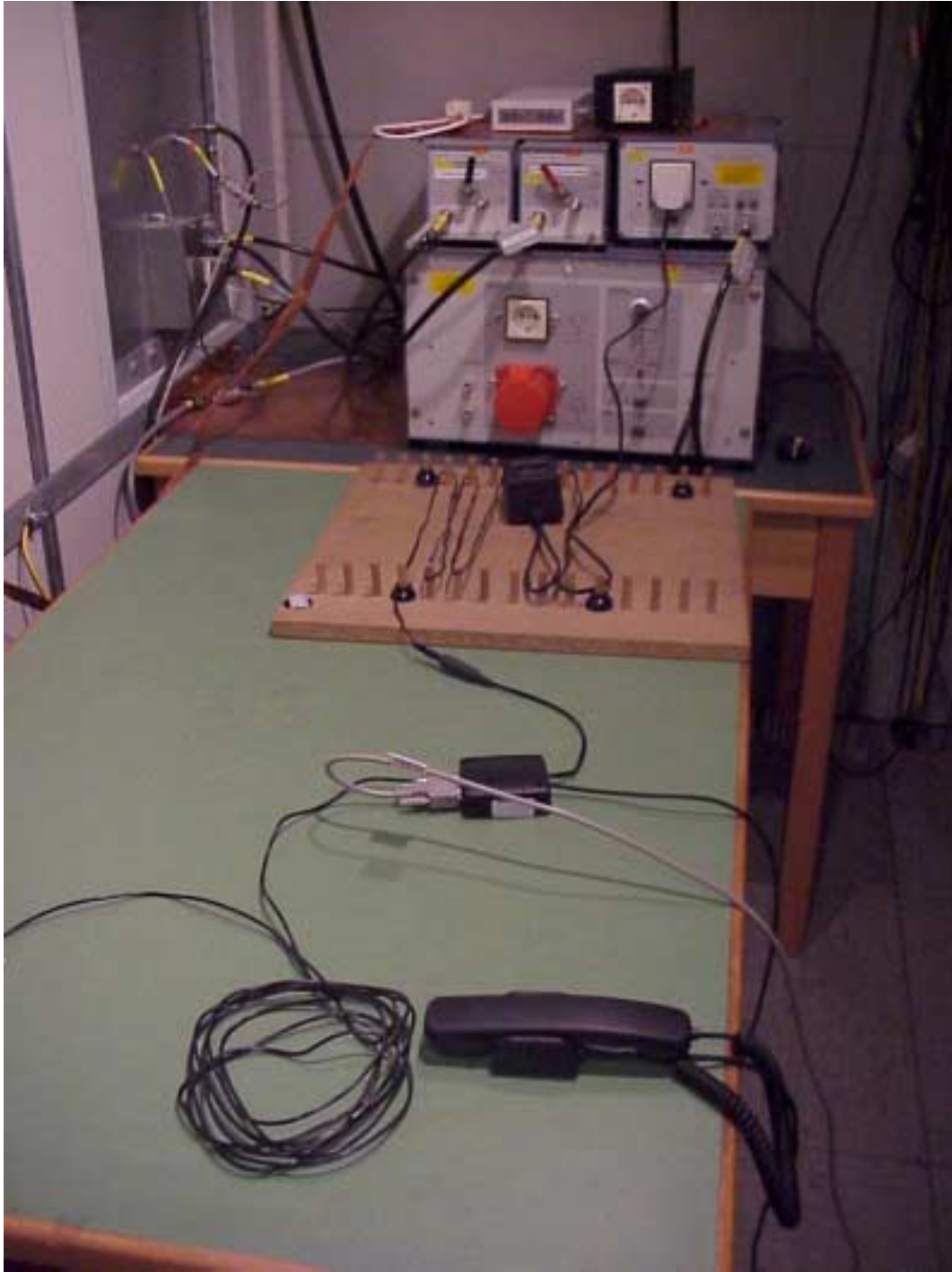
**Test site**



**Test site**



Test site



**Photographs of the equipment**





**Photographs of the equipment**



Photographs of the equipment



Photographs of the equipment



Photographs of the equipment



Photographs of the equipment



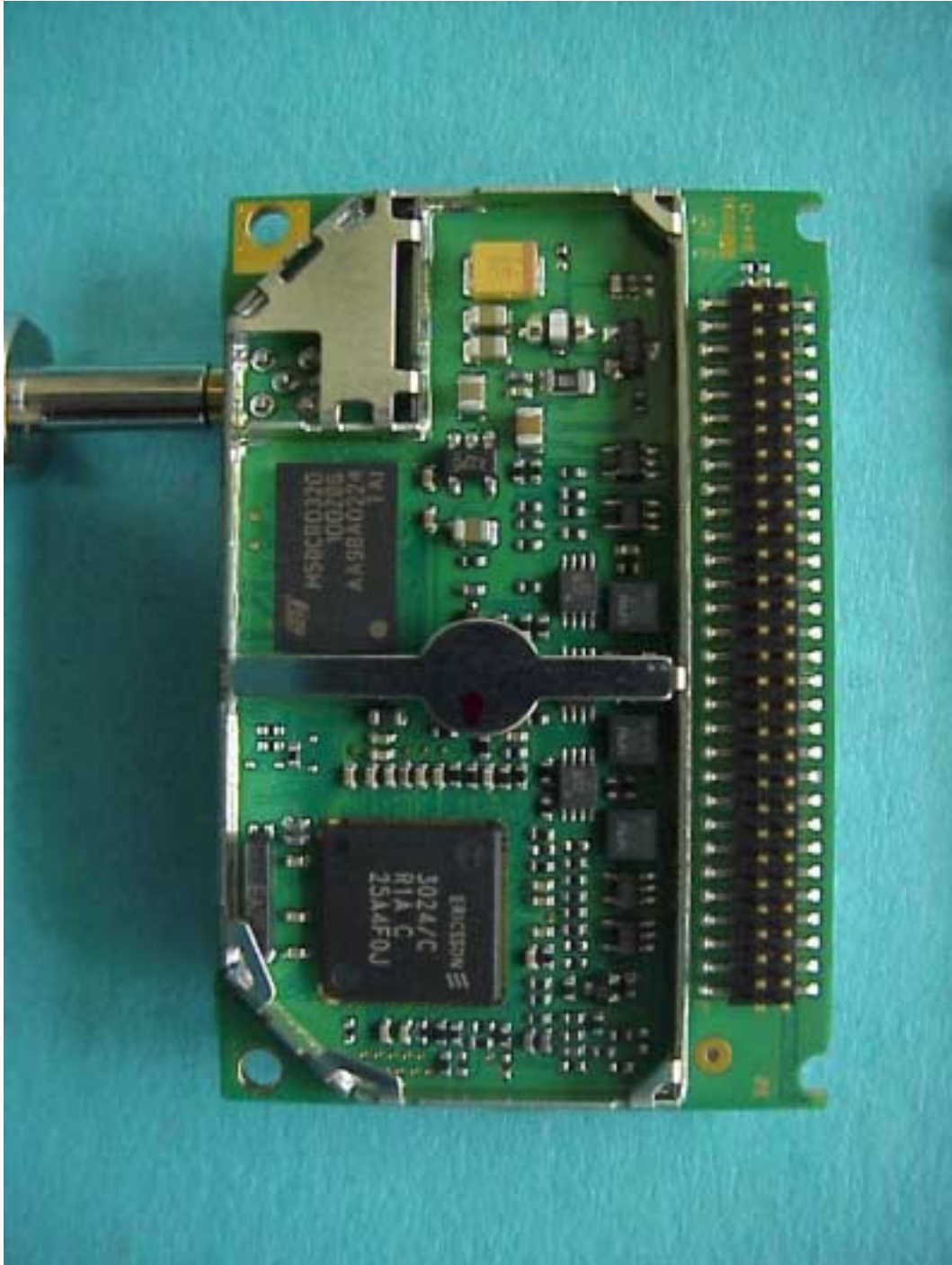
Photographs of the equipment



Photographs of the equipment



Photographs of the equipment





**Photographs of the equipment**



Photographs of the equipment



**Photographs of the equipment**



Photographs of the equipment

