

Recognized by the  
Federal Communications Commission  
**Anechoic chamber registration no.: 90462 (FCC)**  
**Anechoic chamber registration no.: 3463 (IC)**  
TCB ID: DE 0001



Accredited by the  
German Accreditation Council  
DAR-Registration Number  
DAT-P-176/94-D1



Independent ETSI  
compliance test house



Accredited Bluetooth<sup>®</sup> Test Facility (BQTF)

|                      |   |                        |
|----------------------|---|------------------------|
| Test report No.      | : | 4-1744-26-06/05        |
| Applicant            | : | Sagem Communication    |
| Type                 | : | D2005+                 |
| Test Standard        | : | FCC Part 24<br>RSS 133 |
| FCC ID               | : | M9HD2005P              |
| Certification No. IC | : | ---                    |

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## 1 General information

### 1.1. Administrative data of the test facility

#### 1.1.1 Identification of the testing laboratory

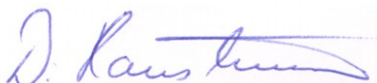
|                                     |                                                                                                                                        |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Company name:                       | Cetecom ICT Services GmbH                                                                                                              |
| Address:                            | Untertürkheimerstr. 6-10<br>D-66117 Saarbruecken<br>Germany                                                                            |
| Laboratory accreditation:           | DAR-Registration No. DAT-P-176/94-D1<br>Bluetooth Qualification Test Facility (BQTF)<br>Federal Communications Commission (FCC)        |
| Responsible for testing laboratory: | Identification/Registration No : 90462<br>Hausknecht D.<br>Phone: +49 681 598 0<br>Fax: +49 681 598 9075<br>email: info@ict.cetecom.de |

### 1.2. 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 generalizations 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.



.....  
Responsible for testing  
(Gillmann D.)



.....  
Responsible for laboratory  
(Hausknecht D.)

## 1.3 Details of Applicant

|         |                                |
|---------|--------------------------------|
| Name    | : Sagem Communication          |
| Address | : 2, rue du Petit Albi         |
| City    | : 95800 Cergy Saint-Christophe |
| Country | : France                       |
| Phone   | : + 33 1 58 11 90 90           |
| Fax     | : + 33 1 30 73 16 60           |
| Contact | : Mr. Jean Marquet             |
| Phone   | : + 33 1 58 11 91 72           |
| Fax     | : + 33 1 58 11 14 11           |
| e-mail  | : jean.marquet@sagem.com       |

## 1.4 Application Details

|                                |                            |
|--------------------------------|----------------------------|
| Date of receipt of application | : 2005-10-31               |
| Date of receipt of test item   | : 2005-11-16               |
| Date(s) of test                | : 2005-11-24 to 2005-11-25 |
| Date of report                 | : 2005-11-28               |

## 1.5 Test Item

Type of equipment : Triband 900/1800/1900 mobile phone  
Type name : D2005+  
Manufacturer : Sagem Communication  
Address : 2, rue du Petit Albi  
City : 95800 Cergy Saint-Christophe  
Country : France

Frequency : 1850.2 – 1909.8 MHz  
Type of modulation : 300KGXW  
Number of channels : 300 (PCS1900)  
Antenna Type : Integral antenna  
Power supply (normal) : 3.9V DC  
Output power GSM 1900 : EIRP: 31.8 dBm (Burst)  
Transmitter Spurious (worst case) : Nothing found - / - mW / dBm  
Receiver Spurious (worst case) : Nothing found - / - µV/m @ 3 m

FCC ID : M9HD2005P  
Certification No. IC : ---  
Open Area Test Site IC No. : 3436  
IC Standards : RSS133, Issue 3

### ATTESTATION:

#### DECLARATION OF COMPLIANCE:

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

### Laboratory Manager :

2005-11-28

Gillmann D.



Date

Name

Signature

## 1.6 Test Setup

Hardware : V0x  
Software : L 5,Bx

Mobile; (cond. measurements) : n.a.  
Mobile; (rad. measurements) : 35819900000509-8

Standard world wide charger

The radiated measurements were performed with AC charging unit.

## 1.7 Test Standards

|             |                         |
|-------------|-------------------------|
| <b>FCC:</b> | <b>CFR Part 24 E</b>    |
| <b>IC:</b>  | <b>RSS 133, Issue 3</b> |

## 2 Statement of Compliance

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

### 2.1 Summary of Measurement Results

#### 2.1.1 PCS 1900

| Section in this Report | Test Name                   | Verdict |
|------------------------|-----------------------------|---------|
| 3.1.1                  | RF Power Output             | pass    |
| 3.1.3                  | Radiated Emissions          | pass    |
| 3.1.4                  | Receiver Radiated Emissions | pass    |

## 3 Measurements and results

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

All measurements in this report are done in GSM mode. Device is able to transmit data in GPRS mode also. But because the current measurements are performed in PEAK mode no other results from GPRS mode are possible. The only different is the modulation average power, which is 3 dB higher (by using 2 timeslots in the Up-link ).

### 3.1 PART PCS 1900

#### 3.1.1 RF Power Output

##### Reference

|      |                               |
|------|-------------------------------|
| FCC: | CFR Part 24.232, 2.1046       |
| IC:  | RSS 133, Issue 3, Section 4.3 |

##### 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."

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) The measurements was performed with full rf output power and modulation.

(b) Test was performed at listed 3m test site (listed with FCC, IC).

(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)

(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.

(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor

E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(f) Set the EMI Receiver and #2 as follows:

Center Frequency: test frequency

Resolution BW: 100 kHz

Video BW: same

Detector Mode: positive

Average: off

Span: 3 x the signal bandwidth

(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.

(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.

(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.

(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.

(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.

(l) Repeat for all different test signal frequencies



## Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:

Center Frequency : equal to the signal source

Resolution BW : 10 kHz

Video BW : same

Detector Mode : positive

Average : off

Span : 3 x the signal bandwidth

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor

$E \text{ (dBuV/m)} = \text{Reading (dBuV)} + \text{Total Correction Factor (dB/m)}$

(c) Select the frequency and E-field levels for ERP/EIRP measurements.

(d) Substitute the EUT by a signal generator and one of the following transmitting antenna (substitution antenna):

DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.

(e) Mount the transmitting antenna at 1.5 meter high from the ground plane.

(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.

(g) If the DIPOLE antenna is used, tune it's elements to the frequency as specified in the calibration manual.

(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.

(i) Tune the EMI Receivers to the test frequency.

(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(k) The transmitter was rotated through 360° about a vertical axis until a higher maximum signal was received.

(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.

(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:

$$P = P_1 - L_1 = (P_2 + L_2) - L_1 = P_3 + A + L_2 - L_1$$

$$\text{EIRP} = P + G_1 = P_3 + L_2 - L_1 + A + G_1$$

$$\text{ERP} = \text{EIRP} - 2.15 \text{ dB}$$

$$\text{Total Correction factor in EMI Receiver \# 2} = L_2 - L_1 + G_1$$

Where: P: Actual RF Power fed into the substitution antenna port after corrected.

P1: Power output from the signal generator

P2: Power measured at attenuator A input

P3: Power reading on the Average Power Meter

EIRP: EIRP after correction

ERP: ERP after correction

(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)

(p) Repeat step (d) to (o) for different test frequency

(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.

(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port.

Correct the antenna gain if necessary.

## Limits:

| Power Step | Burst PEAK EIRP (dBm) |
|------------|-----------------------|
| 0          | <33                   |

## Test Results: Output Power (radiated)

| Frequency (MHz)         | Power Step | BURST PEAK EIRP (dBm) |
|-------------------------|------------|-----------------------|
| 1850.2                  | 0          | 31.8                  |
| 1880.0                  | 0          | 31.6                  |
| 1909.8                  | 0          | 30.9                  |
| Measurement uncertainty | ±3 dB      |                       |

## Sample Calculation:

| Freg   | SA Reading | SG Setting | Ant. gain | Dipol gain | Cable loss | EIRP Result |  |  |  |
|--------|------------|------------|-----------|------------|------------|-------------|--|--|--|
| MHz    | dBμV       | dBm        | dBd       | dBd        | dB         | dBm         |  |  |  |
| 1850.2 | 128.2      | 26.7       | 8.4       | 0.0        | 3.3        | 31.8        |  |  |  |

$$\text{EIRP} = \text{SG (dBm)} - \text{Cable Loss (dB)} + \text{Ant. gain (dBd)}$$

### 3.1.3 Radiated Emissions

#### Reference

|      |                               |
|------|-------------------------------|
| FCC: | CFR Part 24.238, 2.1053       |
| IC:  | RSS 133, Issue 3, Section 4.4 |

#### 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 C63.4:2003 requirements and is recognized 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:

- The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- The antenna output was terminated in a 50 ohm load.
- A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- 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.
- 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

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.

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

All measurements were done in horizontal and vertical polarization, the plots show the worst case. As can be seen from this data, the emissions from the test item were within the specification limit.

| Harmonic | Tx ch.-512<br>Freq. (MHz) | Level<br>(dBm) | Tx ch.-661<br>Freq. (MHz) | Level<br>(dBm) | Tx ch.-810<br>Freq. (MHz) | Level<br>(dBm) |
|----------|---------------------------|----------------|---------------------------|----------------|---------------------------|----------------|
| 2        | 3700.4                    | -              | 3760                      | -              | 3819.6                    | -              |
| 3        | 5550.6                    | -              | 5640                      | -              | 5729.4                    | -              |
| 4        | 7400.8                    | -              | 7520                      | -              | 7639.2                    | -              |
| 5        | 9251.0                    | -              | 9400                      | -              | 9549.0                    | -              |
| 6        | 11101.2                   | -              | 11280                     | -              | 11458.8                   | -              |
| 7        | 12951.4                   | -              | 13160                     | -              | 13368.6                   | -              |
| 8        | 14801.6                   | -              | 15040                     | -              | 15278.4                   | -              |
| 9        | 16651.8                   | -              | 16920                     | -              | 17188.2                   | -              |
| 10       | 18502.0                   | -              | 18800                     | -              | 19098.0                   | -              |

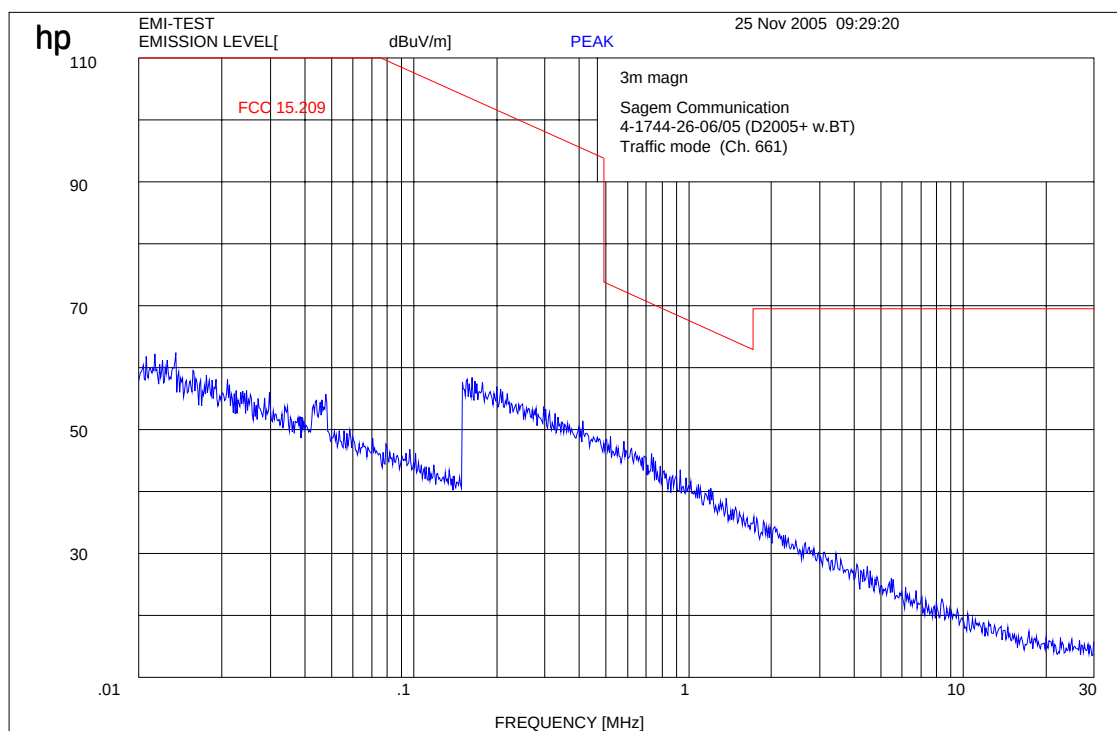
**No peaks found < 20 dB below limit.**

### Sample calculation:

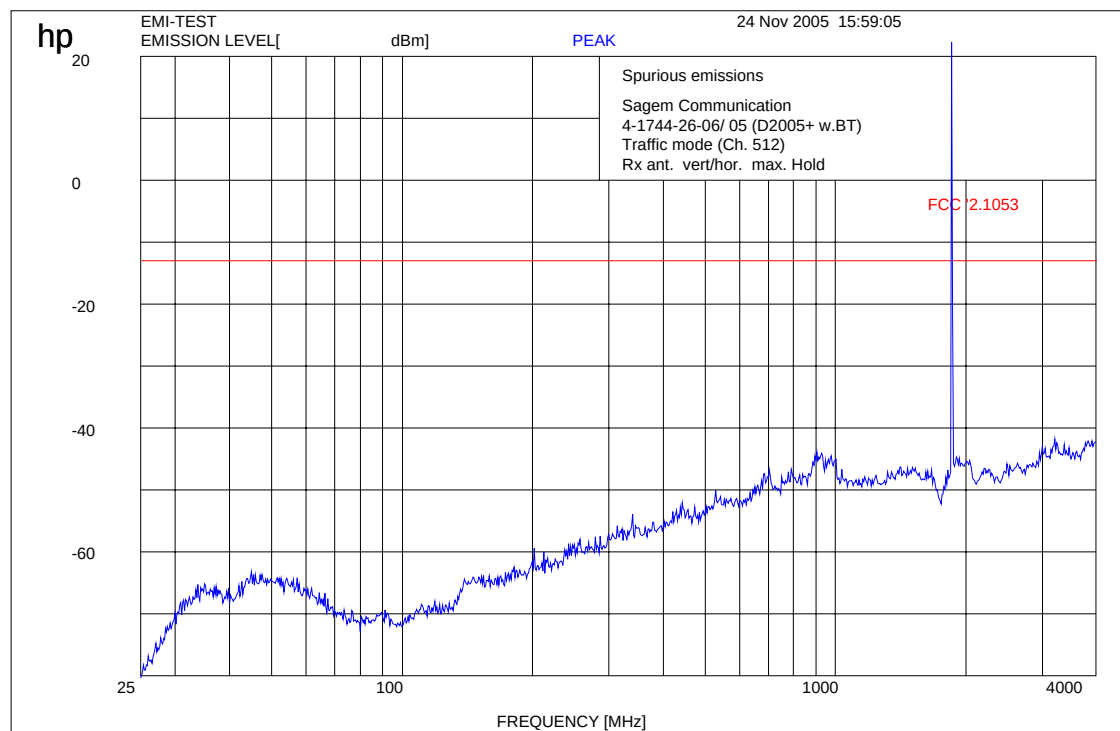
| Freq   | SA<br>Reading | SG<br>Setting | Ant.<br>gain | Dipol<br>gain | Cable<br>loss | EIRP<br>Result |  |  |  |
|--------|---------------|---------------|--------------|---------------|---------------|----------------|--|--|--|
| MHz    | dBμV          | dBm           | dBd          | dBd           | dB            | dBm            |  |  |  |
| 1850.2 | 128.2         | 26.7          | 8.4          | 0.0           | 3.3           | 31.8           |  |  |  |

EIRP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)

## Traffic mode up to 30 MHz (Valid for all 3 channels)



## Channel 512 (30 MHz - 4 GHz)

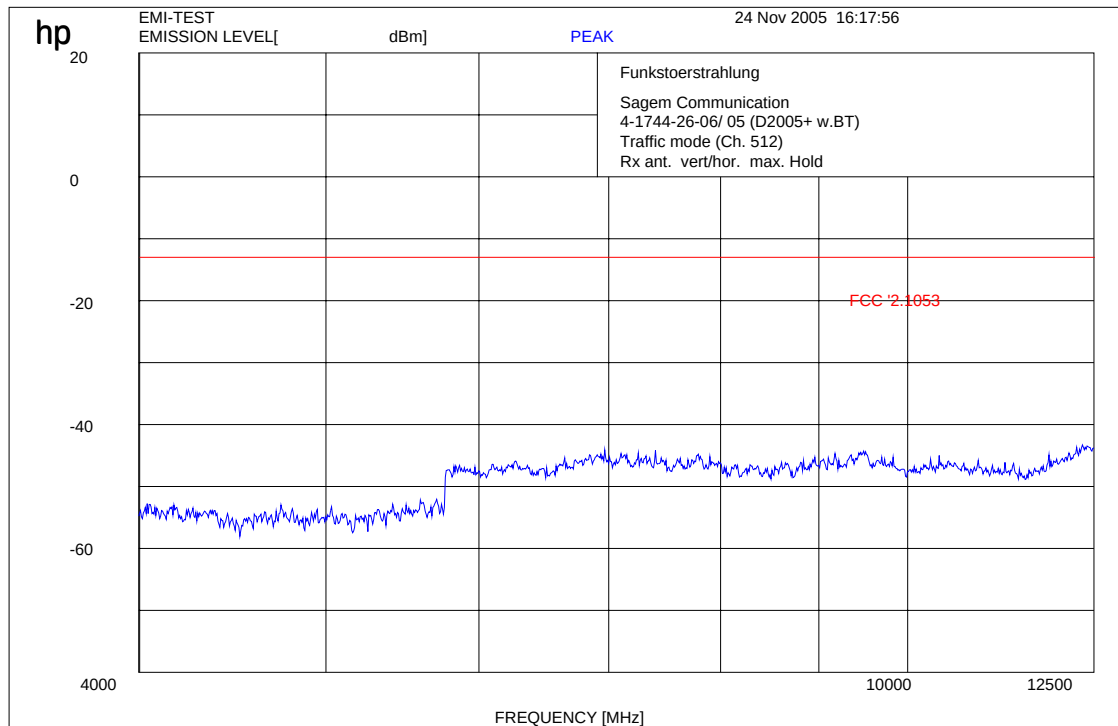


$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

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

Carrier suppressed with a rejection filter

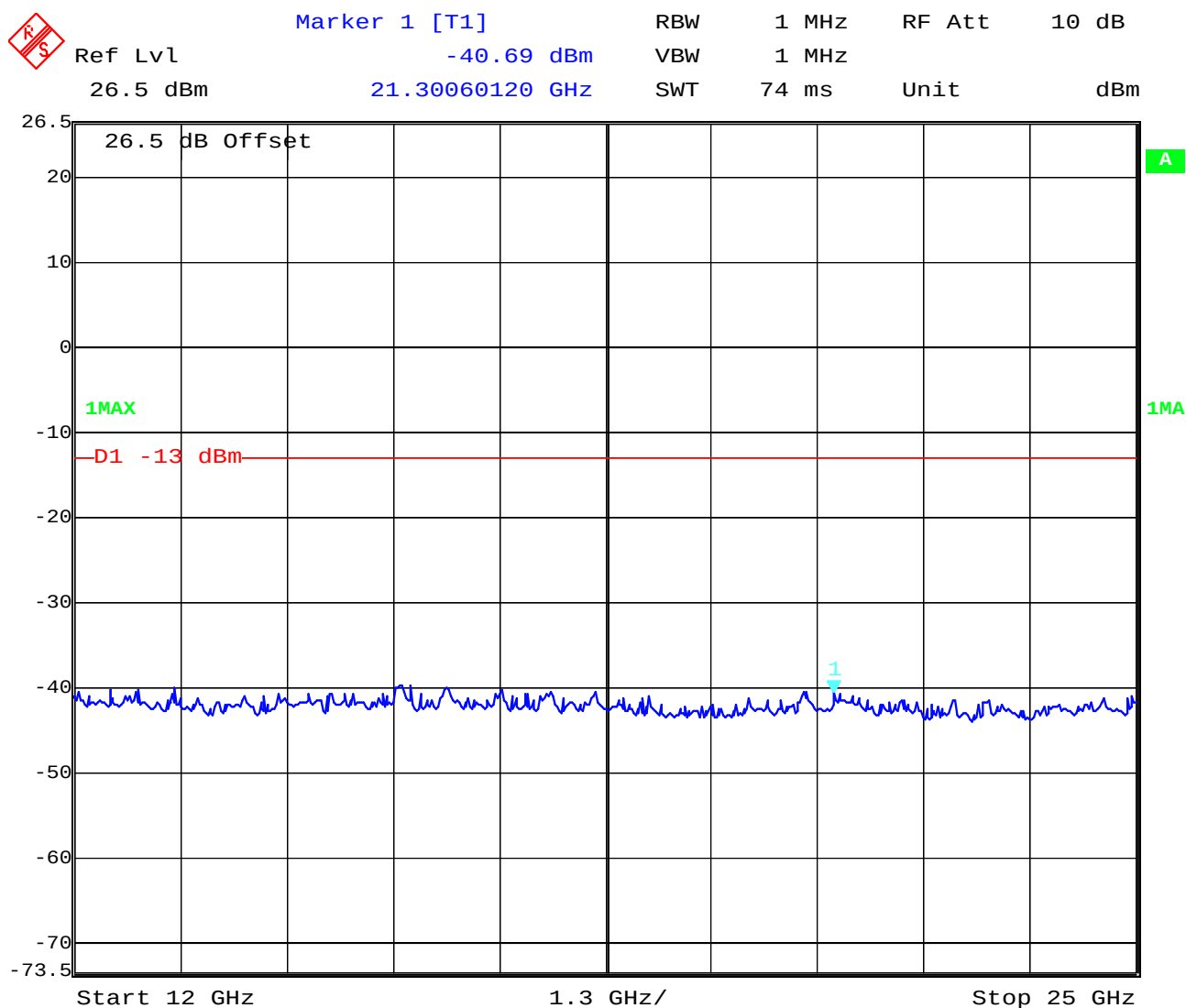
## Channel 512 (4 GHz – 12.5 GHz)



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

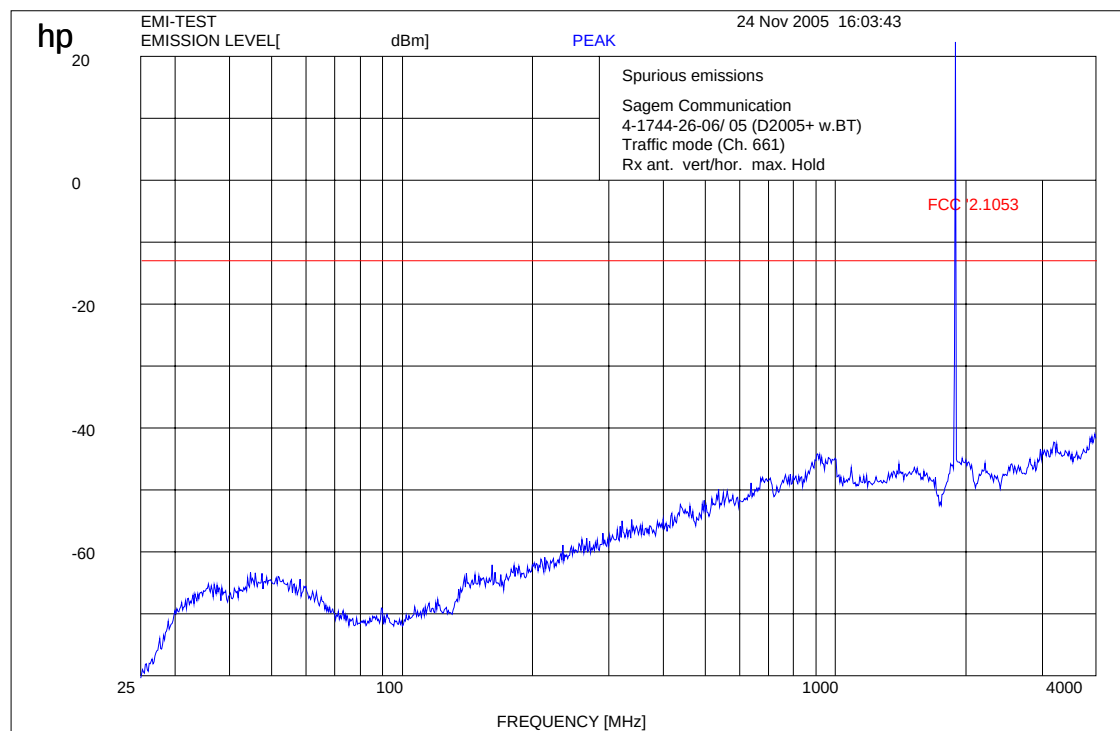
$f \geq 1 \text{ GHz}$  : RBW / VBW 1 MHz

## Channel 512 (12 GHz - 25 GHz) valid for all 3 channels





## Channel 661 (30 MHz - 4 GHz)

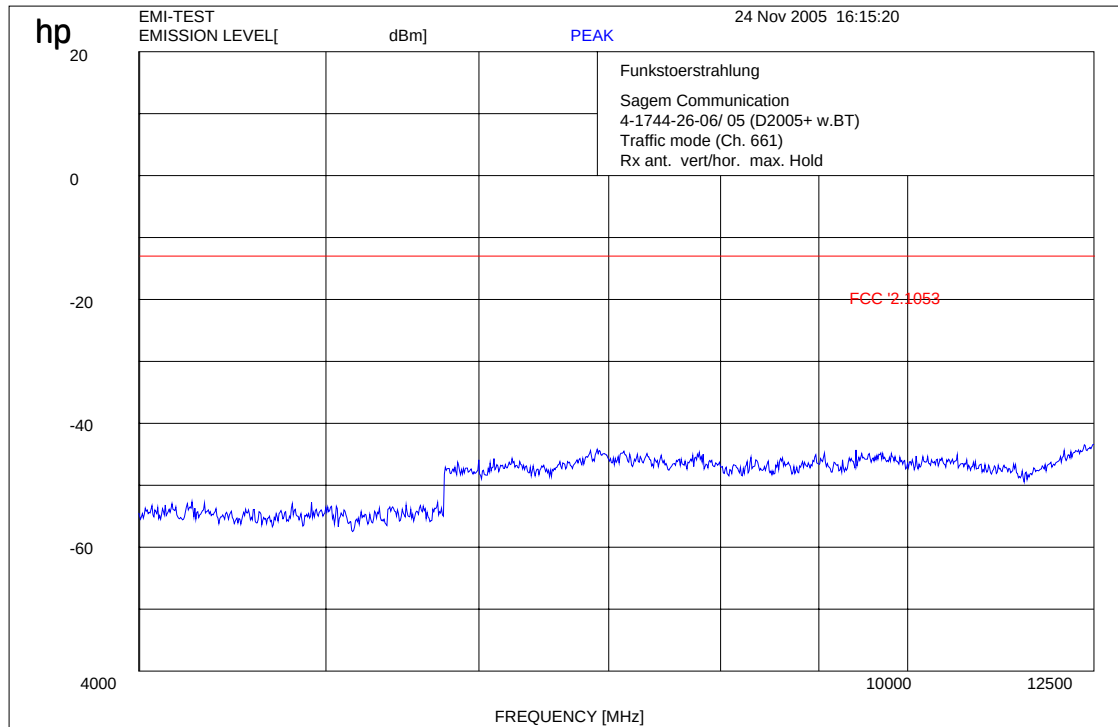


$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

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

Carrier suppressed with a rejection filter

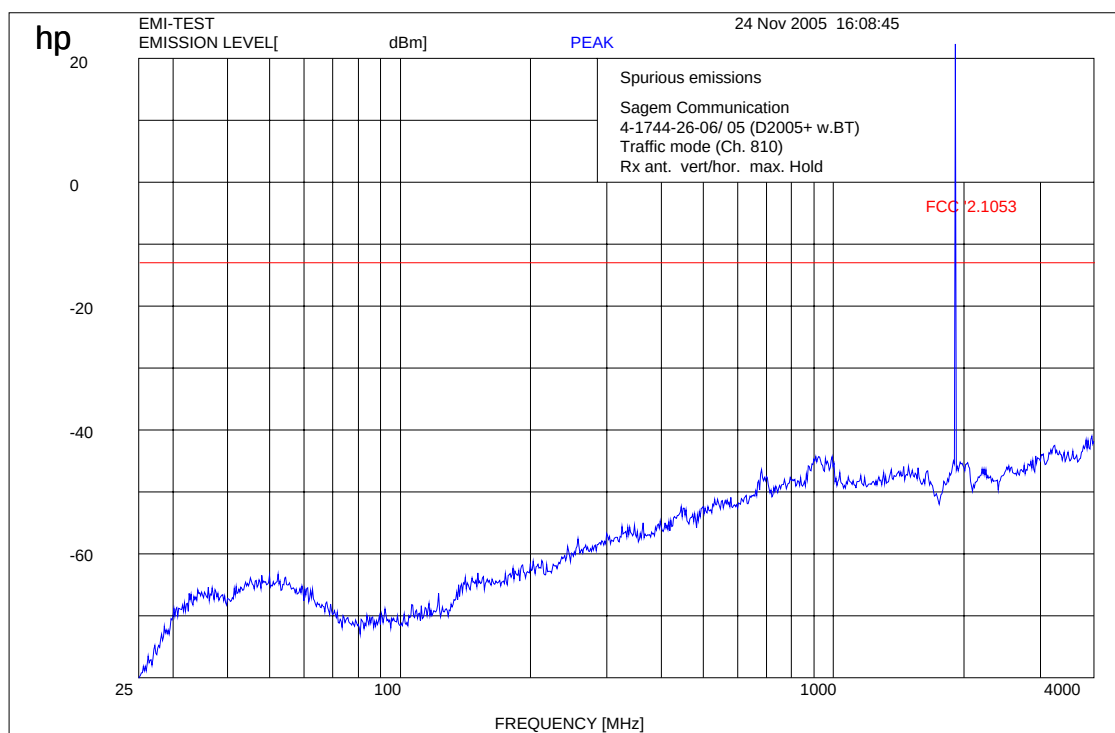
## Channel 661 (4 GHz – 12.5 GHz)



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

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

## Channel 810 (30 MHz - 4 GHz)

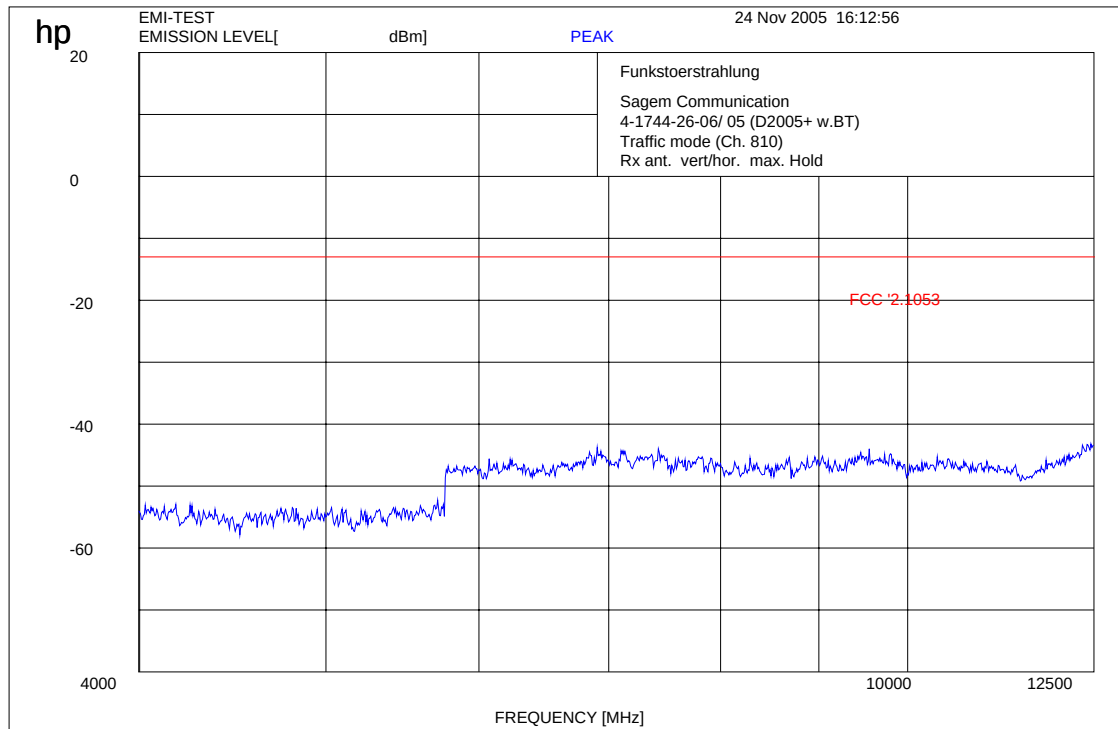


$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

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

Carrier suppressed with a rejection filter

## Channel 810 (4 GHz – 12.5 GHz)



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

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

## 3.1.4 Receiver Radiated Emissions

### Reference

|      |                               |
|------|-------------------------------|
| FCC: | CFR Part 15.109, 2.1053       |
| IC:  | RSS 133, Issue 3, Section 4.5 |

### Measurement Results

| SPURIOUS EMISSIONS LEVEL ( $\mu\text{V/m}$ ) |          |                              |                    |          |                              |            |          |                              |
|----------------------------------------------|----------|------------------------------|--------------------|----------|------------------------------|------------|----------|------------------------------|
| Idle mode                                    |          |                              |                    |          |                              |            |          |                              |
| f<br>(MHz)                                   | Detector | Level<br>( $\mu\text{V/m}$ ) | f<br>(MHz)         | Detector | Level<br>( $\mu\text{V/m}$ ) | f<br>(MHz) | Detector | Level<br>( $\mu\text{V/m}$ ) |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| -                                            | -        | -                            | -                  | -        | -                            | -          | -        | -                            |
| Measurement uncertainty                      |          |                              | $\pm 3 \text{ dB}$ |          |                              |            |          |                              |

$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz  
H = Horizontal ; V= Vertical

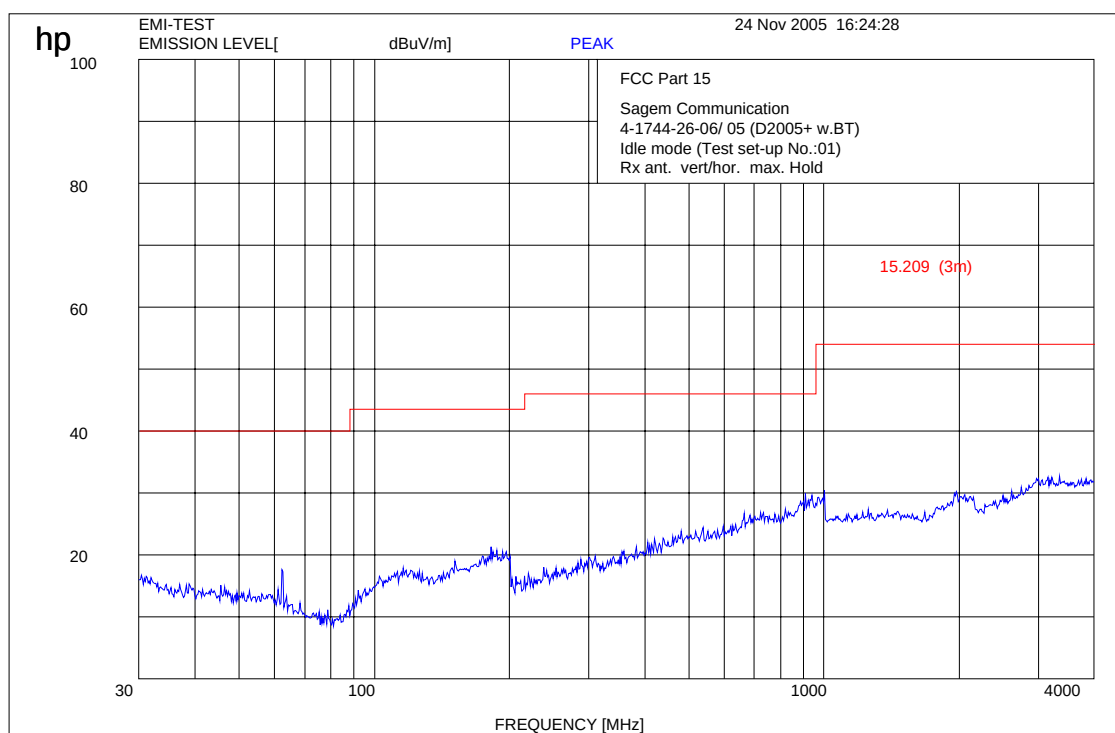
$f \geq 1 \text{ GHz}$  : RBW/VBW: 1 MHz

For measurement distance see table below

### Limits: § 15.109

| 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                        |

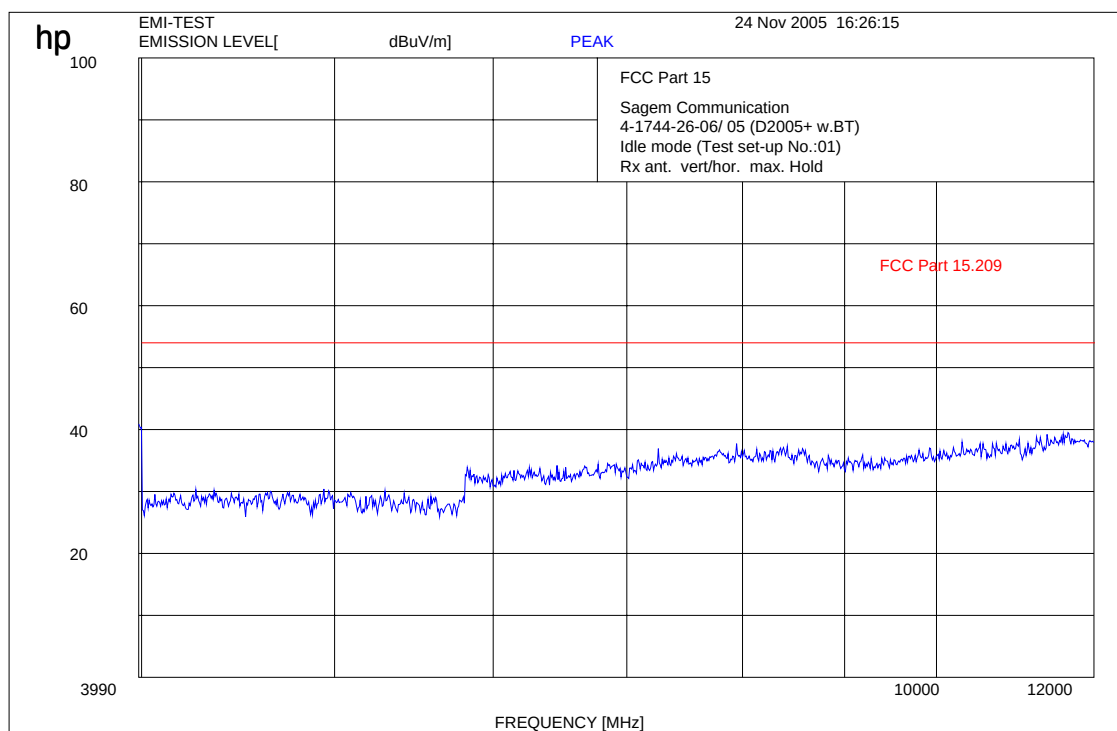
## IDLE MODE (30 MHz - 4 GHz)



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

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

## Idle Mode (4 GHz – 12.0 GHz)



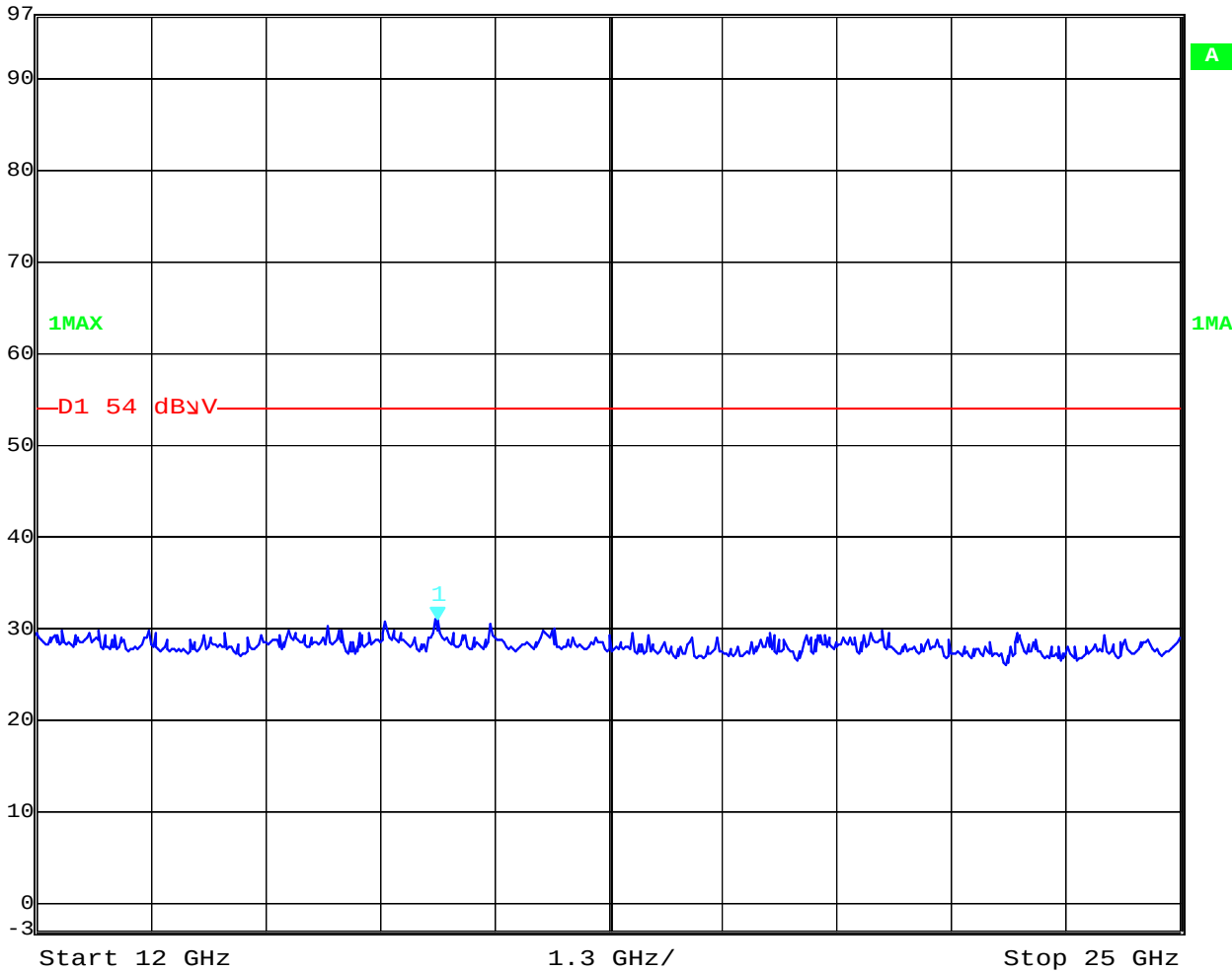
$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

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

Idle Mode (12 GHz - 25 GHz)



Marker 1 [T1] RBW 1 MHz RF Att 0 dB  
Ref Lvl 30.97 dBμV VBW 1 MHz  
97 dBμV 16.55911824 GHz SWT 74 ms Unit dBμV





## 4 Used Testequipment

### Anechoic chamber C:

| Device                    | Manufacturer | Type      | S/N Number | Inv. No. Cetecom |
|---------------------------|--------------|-----------|------------|------------------|
| Spektrum Analyser         | HP           | 8566B     | 2747A05306 | 300001000        |
| Spektrum Analyser Display | HP           | 85662A    | 2816A16541 | 300002297        |
| Quasi-Peak-Adapter        | HP           | 85650A    | 2811A01131 | 300000999        |
| Power Dupply              | HP           | 6032A     | 2818A03450 | 300001040        |
| Power Attenuator          | Byrd         | 8325      | 1530       | 300001595        |
| Bikonical Antenna         | EMCO         | 3104      | 3758       | 300001602        |
| Log. Period. Antenna      | EMCO         | 3146      | 2130       | 300001603        |
| Double Ridged Antenna     | EMCO         | HP 3115P  | 3088       | 300001032        |
| Active Loop Antenna       | EMCO         | 6502      | 2210       | 300001015        |
| Antenna VDE/FCC           |              | HP11965B  |            | 300002298        |
| SRM-Drive                 | HP           | 9144A     | 2823e46556 | 300001044        |
| Software                  | HP           | EMI       |            | 300000983        |
| Busisolator               | Kontron      |           |            | 300001056        |
| Absorberhalle             | MWB          |           | 87400/02   | 300000996        |
| Salzsäule                 | Kontron      |           |            | 300001055        |
| Antenna                   | R&S          | HMO20     | 832211/003 | 300002243        |
| Indukt.Tast Antenna       | R&S          | HFH 2 Z4  | 881468/026 | 300001464        |
| System-Rack               | HP I.V.      | 85900     | *          | 300000222        |
| Spectrum Analyzer         | HP           | 8566B     | 2747A05275 | 300000219        |
| Quasi-Peak-Adapter        | HP           | 85650A    | 2811A01135 | 300000216        |
| RF-Preselector            | HP           | 85685A    | 2837A00779 | 300000218        |
| Rahmen Antenne            | R&S          | HFH2-Z2   | 891847-35  | 300001169        |
| Leitungsteiler            | HP           | 11850C    |            | 300000997        |
| Breitband-Hornantenne EMI | HP           | 35155P    |            | 300002300        |
| PC                        | HP           | Vectra VL |            | 300001688        |
| VHF Meßantenne            | Schwarzbeck  | VHA 9103  |            | 300001778        |
| Spectrum Analyzer Display | HP           | 85662A    | 2816A16497 | 300001690        |
| VHF Meßantenna            | Schwarzbeck  | VHA 9103  |            | 300001780        |
| Biconical Antenna         | EMCO         | 3104 C    | 9909-4868  | 300002590        |

### SRD Laboratory:

| Device                          | 300001207 | Type           | S/N Number | Inv. No. Cetecom |
|---------------------------------|-----------|----------------|------------|------------------|
| Spectrum Analyzer               | 300001208 | 494AP          | B010241    | 300000863        |
| Spectrum Analyzer               | HP        | 71210A (70000) | 2731A02347 | 300000321        |
| Spectrum Analyzer Display       | HP        | 70206A         | 2840A01553 | 300002017        |
| Reference Frequency             | HP        | 70310A         | 2736A00707 | 300002018        |
| Local Oscillator                | HP        | 70900A         | 2842A02221 | 300002019        |
| ZF-Modul 10Hz-300 kHz           | HP        | 70902A         | 2840A02145 | 300002020        |
| ZF-Modul 100 kHz-3 MHz          | HP        | 70903A         | 2835A01069 | 300002021        |
| HF-Teil für 71210A 100Hz- 22GHz | HP        | 70908A         |            | 300002022        |
| Spectrum Analyzer 2             | HP        | 85660B         | 3138A07614 |                  |
| Spectrum Analyzer Display 2     | HP        | 85662A         | 3144A20627 |                  |

|                                |                 |           |            |           |
|--------------------------------|-----------------|-----------|------------|-----------|
| Signal Generator DC-600 KHz    | HP              | 8904A     | 2822A01213 | 300001157 |
| Signal Generator DC-600 KHz    | HP              | 8904A     | 2822A01214 | 300001158 |
| Powersupply                    | HP              | 6038A     | 3122A11097 | 300001204 |
| Netznachbildung                | R&S             | ESH3-Z5   | 828576/020 | 300001210 |
| Amplituden Controller          | R&S             | SMDU-Z2   | 871829/051 | 300002309 |
| Trenntrafo                     | Erfi            | 913501    |            | 300001205 |
| Trenntrafo                     | Grundig         | RT5A      | 9242       | 300001627 |
| Relais Matrix                  | HP              | 3488A     | 2719A15013 | 300001156 |
| Multimeter                     | Siemens         | Multizet  |            | 300001102 |
| Peak Power Calibrator          | HP              | 8900B     |            | 300001084 |
| Schallgeber                    | Schomandl       | SG 1      | 10159      | 300001209 |
| Schallgeber                    | Schomandl       | SG 2      | 10176      | 300002473 |
| Filter                         | FSY Microwave   |           |            | 300001206 |
| Attenuatorer                   | Pro Nova        |           |            | 300002476 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 |            | 300001012 |
| Spectrum Analyzer 3            | HP              | 8566A     | 1925A00257 | 300001098 |
| Spectrum Analyzer Display 3    | HP              | 85662     | 1925A00860 | 300002306 |
| Oszilloscope                   | Tektronix       | 2432      | 110261     | 300001165 |
| Radiocom. Analyzer             | R&S             | CMTA 54   | 894043/010 | 300001175 |
| Powersupply                    | HP              | 6038A     | 2848A07027 | 300001174 |
| Signal Generator 0.01-1280 MHz | HP              | 8662A     | 2224A01012 | 300001110 |
| Signal Generator (Funktionen)  | R&S             | AFGU      | 862490/032 | 300001201 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001155 |
| Relais Matrix                  | R&S             | PSU       | 893285/020 | 300001173 |
| Power Meter                    | HP              | 436A      | 2101A12378 | 300001136 |
| Powersensor                    | HP              | 8484A     | 2237A10156 | 300001140 |
| Powersensor                    | HP              | 8482A     | 2237A06016 | 300001139 |
| Relais Matrix                  | R&S             | PSU       | 282628/004 | 300001214 |
| Powersupply                    | Zentro          |           | 2007       | 300001109 |
| Oszilloscope                   | Tektronix       | 7633      |            | 300001111 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 | 32926      | 300001500 |
| Quasi-Peak Adapter             | HP              | 85650A    | 2811A01204 | 300002308 |
| Radiocom. Analyzer             | R&S             | CMTA 84   | 894199/012 | 300001176 |
| Oszilloscope                   | HP              | 54510A    | 3022A02062 | 300001202 |
| Funkmeßplatz                   | Schomandl       | FD1000    | 34982      | 300001115 |
| Signal Generator               | R&S             | SMPC      | 882416/019 | 300001162 |
| Frequency counter              | HP              | 5340A     | 2116A08138 | 300001104 |
| Power Meter                    | HP              | 436A      | 2031U01461 | 300001105 |
| Powersensor                    | HP              | 8482A     |            | 300001106 |
| Powersensor                    | HP              | 8484A     |            | 300001107 |
| Powersensor                    | HP              | 8485A     |            | 300001108 |
| Powersupply                    | HP              | 6038A     | 2752A04866 | 300001161 |
| Reflectionsmeter               | R&S             | NAP       | 879191     | 300001132 |
| Signal Generator NF            | R&S             | SPN       | 880139/068 | 300001142 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001151 |
| Attenuator                     | JFW             | 30 db     | 1350h/104  | 300001703 |
| Attenuator                     | JFW             | 10 db     | 1350h/103  | 300001704 |
| Attenuator                     | JFW             | 20 db     | 1350h/106  | 300001705 |
| Attenuator                     | JFW             | 20 db     | 1350h/105  | 300001766 |
| Filter                         | Spinner         | 153755    |            | 300001791 |

|                                |                 |           |            |           |
|--------------------------------|-----------------|-----------|------------|-----------|
| Powersensor                    | HP              | 8484A     | 2237A10494 | 300001666 |
| Powersupply                    | HP              | 6038A     | 3122A11097 | 300001204 |
| Netznachbildung                | R&S             | ESH3-Z5   | 828576/020 | 300001210 |
| Amplituden Controller          | R&S             | SMDU-Z2   | 871829/051 | 300002309 |
| Trenntrafo                     | Erfi            | 913501    |            | 300001205 |
| Trenntrafo                     | Grundig         | RT5A      | 9242       | 300001627 |
| Relais Matrix                  | HP              | 3488A     | 2719A15013 | 300001156 |
| Multimeter                     | Siemens         | Multizet  |            | 300001102 |
| Peak Power Calibrator          | HP              | 8900B     |            | 300001084 |
| Schallgeber                    | Schomandl       | SG 1      | 10159      | 300001209 |
| Schallgeber                    | Schomandl       | SG 2      | 10176      | 300002473 |
| Filter                         | FSY Microwave   |           |            | 300001206 |
| Attenuatorer                   | Pro Nova        |           |            | 300002476 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 |            | 300001012 |
| Spectrum Analyzer 3            | HP              | 8566A     | 1925A00257 | 300001098 |
| Spectrum Analyzer Display 3    | HP              | 85662     | 1925A00860 | 300002306 |
| Oszilloscope                   | Tektronix       | 2432      | 110261     | 300001165 |
| Radiocom. Analyzer             | R&S             | CMTA 54   | 894043/010 | 300001175 |
| Powersupply                    | HP              | 6038A     | 2848A07027 | 300001174 |
| Signal Generator 0.01-1280 MHz | HP              | 8662A     | 2224A01012 | 300001110 |
| Signal Generator (Funktionen)  | R&S             | AFGU      | 862490/032 | 300001201 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001155 |
| Relais Matrix                  | R&S             | PSU       | 893285/020 | 300001173 |
| Power Meter                    | HP              | 436A      | 2101A12378 | 300001136 |
| Powersensor                    | HP              | 8484A     | 2237A10156 | 300001140 |
| Powersensor                    | HP              | 8482A     | 2237A06016 | 300001139 |
| Relais Matrix                  | R&S             | PSU       | 282628/004 | 300001214 |
| Powersupply                    | Zentro          |           | 2007       | 300001109 |
| Oszilloscope                   | Tektronix       | 7633      |            | 300001111 |
| Klimaschrank                   | Heraeus Voetsch | VUK04/500 | 32926      | 300001500 |
| Quasi-Peak Adapter             | HP              | 85650A    | 2811A01204 | 300002308 |
| Radiocom. Analyzer             | R&S             | CMTA 84   | 894199/012 | 300001176 |
| Oszilloscope                   | HP              | 54510A    | 3022A02062 | 300001202 |
| Funkmeßplatz                   | Schomandl       | FD1000    | 34982      | 300001115 |
| Signal Generator               | R&S             | SMPC      | 882416/019 | 300001162 |
| Frequency counter              | HP              | 5340A     | 2116A08138 | 300001104 |
| Power Meter                    | HP              | 436A      | 2031U01461 | 300001105 |
| Powersensor                    | HP              | 8482A     |            | 300001106 |
| Powersensor                    | HP              | 8484A     |            | 300001107 |
| Powersensor                    | HP              | 8485A     |            | 300001108 |
| Powersupply                    | HP              | 6038A     | 2752A04866 | 300001161 |
| Reflectionsmeter               | R&S             | NAP       | 879191     | 300001132 |
| Signal Generator NF            | R&S             | SPN       | 880139/068 | 300001142 |
| Trenntrafo                     | Erfi            | MPL       | 91350      | 300001151 |
| Attenuator                     | JFW             | 30 db     | 1350h/104  | 300001703 |
| Attenuator                     | JFW             | 10 db     | 1350h/103  | 300001704 |
| Attenuator                     | JFW             | 20 db     | 1350h/106  | 300001705 |
| Attenuator                     | JFW             | 20 db     | 1350h/105  | 300001766 |
| Filter                         | Spinner         | 153755    |            | 300001791 |
| Powersensor                    | HP              | 8484A     | 2237A10494 | 300001666 |

|                               |                    |                          |            |           |
|-------------------------------|--------------------|--------------------------|------------|-----------|
| Powersensor                   | HP                 | 8485A                    | 2238A00849 | 300001668 |
| Bandfilter                    | Telonic            | TTF7255EE                | 20293-11   | 300001300 |
| Bandfilter                    | Telonic            | TTF12555EE               | 20292-6    | 300001302 |
| Bandfilter                    | Telonic            | TTF25055EE               | 20291-8    | 300001304 |
| Bandfilter                    | Telonic            | TTF50055EE               | 20290-7    | 300001305 |
| Bandfilter                    | Telonic            | TTF100055EE              | 20289-7    | 300001307 |
| Bandfilter                    | Telonic            | TTA300055EESN            | 20370-2    | 300001312 |
| Bandstop                      | Telonic            | TTR3753EE1               | 30013-1    | 300001314 |
| Bandstop                      | Telonic            | TTR723EE                 | 20417-2    | 300001316 |
| Bandstop                      | Telonic            | TTR95-3EE                | 20372-4    | 300001318 |
| Bandstop                      | Telonic            | TTR1903EE                | 30036-4    | 300001320 |
| Bandstop                      | Telonic            | TTR3753EE                | 20369-5    | 300001321 |
| Bandstop                      | Telonic            | TTR750-3EE1              | 90177-1    | 300002387 |
| Highpass                      | Pro Nova           | HDP120-6GG               | ohne       | 300001348 |
| Highpass                      | Pro Nova           | HMC500-6AA               | HJ67-01?   | 300001350 |
| Highpass                      | Narda              | NHP 9000                 | 0004       | 300001362 |
| Highpass                      | Narda              | HDP16-6GH                | JV70-01    | 300001364 |
| Highpass                      | RSD                | HDP50-6GH,<br>HDP200-6GG |            | 300001371 |
| Highpass                      | RSD                | 2099-02-01               |            | 300000370 |
| Signal Generator 0.1-2060 MHz | HP                 | 8657A                    | 2838U00736 | 300001009 |
| Radio Code Analyzer           | Schlumberger       | SL4922                   |            | 300001038 |
| Signal Analyzer               | B&K                | 2033                     |            | 300001047 |
| Frequency counter             | HP                 | 5386A                    | 2704A01243 | 300000998 |
| Laufzeitelement               | WR-Elektronik      |                          |            | 300001036 |
| Powersupply Stromversorgung   | Syston             | M5P 40/15A               | 828233     | 300001291 |
| Powersupply                   | Heiden             | 1108-32                  | 1701       | 300001392 |
| Powersupply                   | Heiden             | 1108-32                  | 1802       | 300001383 |
| Powersupply                   | Heiden             | 1108-32                  | 003202     | 300001187 |
| Powersupply                   | Zentro             | LA 2x30/5GB1             | 2011       | 300001276 |
| Powersupply                   | Zentro             | LA 2x30/5GB2             | 2012       | 300001275 |
| Powersupply                   | Zentro             | LA 30/5GA                | 2041,2042  | 300001287 |
| Trenntrafo                    | Grundig            | RT5A                     | 8781       | 300001277 |
| Trenntrafo                    | Grundig            | RT5A                     | 9242       | 300001263 |
| Multimeter                    | Goerz Elektro      | Unigor 6e P              | 911 355    | 300001625 |
| Multimeter                    | Goerz Elektro      | Unigor 6e P              | 911 391    | 300001281 |
| Climatic Box                  | Heraeus Voetsch    | VUK04/500                | 32679      | 300000299 |
| Powersensor + Att.            | HP                 | 8482B                    | 2703A02586 | 300001492 |
| Attenuator 30 dB              | HP                 | 8498A                    | 1801A02445 | 300001475 |
| Signal Generator NF           | HP                 |                          | 2822A01203 | 300001004 |
| Attenuator                    | Spinner            | BN 534171 D              | 51881      | 300001516 |
| Attenuator coaxial            | Bird               | 8325                     | 2429       | 300001513 |
| Impulsbegrenzer               | R&S                | ESH 3 Z2                 |            | 300001460 |
| 4Port Box                     | R&S                | 4Port Box                | 860457/005 | 300001472 |
| Signal Generator 0.1-4200 MHz | HP                 | 8665A                    | 2833A0011  | 300002299 |
| NF-Spektrumanalyzer           | B&K                | 2033A                    |            | 300002301 |
| Swissphone Freifeld-Messbox   | Swissphone Schweiz |                          |            | 300002302 |
| Trenntrafo regelbar           | Grundig            | RT5H                     | 9242       | 300001628 |
| Signal Generator              | HP                 | 8111A                    | 2215G00867 | 300001117 |