

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® Test Facility (BQTF)

|                      |                                          |
|----------------------|------------------------------------------|
| Test report no.      | : 2-4011-01-04/05                        |
| Applicant            | : Sony Ericsson Mobile Communications AB |
| Type                 | : FAD-3022011-BV                         |
| Test Standard        | : FCC Part 15.247 RSS210                 |
| FCC ID               | : PY7FD022011                            |
| Certification No. IC | : 4170B-FD022011                         |

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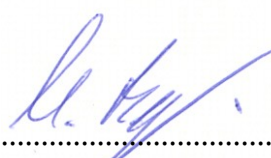
## ANNEX 1: TECHNICAL PRODUCT DESCRIPTION

## 1. Administrative data

### 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)           |
| Responsible for testing laboratory: | Dirk hausknecht<br>Phone: +49 681 598 0<br>Fax: +49 681 598 9075<br>email: info@ict.cetecom.de |

  
.....  
Responsible for testing  
( Michael Berg)

#### 1.1.2 Organizational items

|                                  |                          |
|----------------------------------|--------------------------|
| Reference No.:                   | 2-4011-01-04/05          |
| Order No.:                       |                          |
| Receipt of EUT:                  | 2006-02-16               |
| Date(s) of test:                 | 2006-02-20 to 2006-02-23 |
| Date of report:                  | 2006-02-22               |
| Number of report pages:          | 60                       |
| Number of diagram pages (annex): |                          |
| -----                            |                          |
| Version of template:             | 1.2                      |

  
.....  
Responsible for laboratory  
(Dirk hausknecht)

## Note:

The test results of this test report relate exclusively to the item tested as specified in this report. 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.

During the test no hardware and software changes are allowed to be performed at the EUT.

### 1.1.3 Applicant's details

|         |                                          |
|---------|------------------------------------------|
| Name    | : Sony Ericsson Mobile Communications AB |
| Address | : Torshamnsgatan 27                      |
| City    | : S-16494 Kista                          |
| Country | : Sweden                                 |
| Phone   | : +46 (0) 70 320 7056                    |
| Fax     | : +46 (0) 8 404 3430                     |
| Contact | : Mr.Kenth Skoglund                      |
| Phone   | : +46 (0) 70 320 7056                    |
| Fax     | : +46 (0) 8 404 3430                     |
| e-mail  | : Kenth.Skoglund@sonyericsson.com        |

### 1.2 Application Details

|                                |                            |
|--------------------------------|----------------------------|
| Date of receipt of application | : 2005-07-06               |
| Date of receipt of test item   | : 2006-02-16               |
| Date(s) of test                | : 2006-02-20 to 2006-02-07 |
| Date of report                 | : 2006-02-21               |

**1.3 Description of the Equipment under test (EUT)****1.3.1 EUT: Type, S/N etc.**

|                        |                                                                                      |
|------------------------|--------------------------------------------------------------------------------------|
| Product Name:          | FAD-3022011-BV                                                                       |
| Product ID:            | FAD-3022011-BV                                                                       |
| Product Description:   | GSM Mobile Phone 900/1800/1900/, UMTS (Band 1), Bluetooth V2.0 and WLAN (802.11b)    |
| Manufacturer:          | Sony Ericsson Mobile Communications AB<br>Nya Vattentorget<br>S-22188 Lund<br>Sweden |
| S/N serial number:     | ALR0000L9G                                                                           |
| HW Hardware Status:    | A                                                                                    |
| SW Software Status:    | ITP R1B015<br>OTP R1B                                                                |
| Frequency Range [MHz]: | 2412 – 2462 MHz                                                                      |
| Type of Modulation:    | DSSS                                                                                 |
| Number of Channels:    | 11                                                                                   |
| Antenna:               | Integrated antenna                                                                   |
| Power Supply:          | 3.8 V Li-Polymer                                                                     |
| Temperature Range:     | -10°C to +55°C                                                                       |

Max. power radiated: 16.23 dBm

Max. power conducted: 18.91 dBm

FCC ID: **PY7FD022011**IC: **4170B-FD022011****1.3.2 If RF component testing only, description of additional used HW/SW**

|   | Product name | Product ID | Description | S/N serial number | HW hardware status | SW software status |
|---|--------------|------------|-------------|-------------------|--------------------|--------------------|
| 1 |              |            |             |                   |                    |                    |
| 2 |              |            |             |                   |                    |                    |
| 3 |              |            |             |                   |                    |                    |
| 4 |              |            |             |                   |                    |                    |

**1.3.3 Additional EUT information For IC Canada (appendix 2)**

|                                                       |                                                                                    |
|-------------------------------------------------------|------------------------------------------------------------------------------------|
| Company Number:                                       | 4170B                                                                              |
| Model Number:                                         | FAD-3022011-BV                                                                     |
| Product Name:                                         | FAD-3022011-BV                                                                     |
| Manufacturer:                                         | SonyEricsson Mobile Communication AB<br>Nya Vattentorget<br>S-22188 Lund<br>Sweden |
| Tested to Radio Standards Specification (RSS) No.:    | RSS-210                                                                            |
| Open Area Test Site Industry Canada Number:           | 3463                                                                               |
| Frequency Range (or fixed frequency) [MHz]:           | 2412 – 2462 MHz                                                                    |
| RF: Power [W] (max):                                  | Rad. EIRP: 0.042 W<br>Conducted : 0.0778 W                                         |
| Antenna Type:                                         | integrated                                                                         |
| Field Strength [dB $\mu$ V/m in 3m]:                  |                                                                                    |
| Occupied Bandwidth (99% BW) [kHz]:                    | 10,599                                                                             |
| Type of Modulation:                                   | DSSS                                                                               |
| Emission Designator (TRC-43):                         | 10M6P7D (DSSS)                                                                     |
| Transmitter Spurious (worst case) [ $\mu$ V/m in 3m]: | 114.7                                                                              |
| Receiver Spurious (worst case) [ $\mu$ V/m in 3m]:    | 152.6                                                                              |

**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.

Signature:



Date: 2006-02-22

Test engineer: Michael Berg

### 1.3.4 EUT operating modes

| EUT operating mode no.*) | Description of operating modes | Additional information                         |
|--------------------------|--------------------------------|------------------------------------------------|
| Op. 0                    | Normal mode                    | Normal temperature and power source conditions |
| Op. 1                    |                                | low temperature, low power source conditions   |
| Op. 3                    |                                | low temperature, high power source conditions  |
| Op. 4                    |                                | high temperature, low power source conditions  |
| Op. 5                    |                                | high temperature, high power source conditions |

\*) EUT operating mode no. is used to simplify the test report.

### 1.3.5 Extreme conditions testing values

| Description                    | Shortcut          | Unit   | Value    |
|--------------------------------|-------------------|--------|----------|
| Nominal Temperature / humidity | T <sub>nom</sub>  | °C / % | +23 / 56 |
| Low Temperature                | T <sub>low</sub>  | °C     | -10      |
| High Temperature               | T <sub>high</sub> | °C     | +55      |
| Nominal Power Source           | V <sub>nom</sub>  | V      | 3.8      |
| Low Power Source               | V <sub>low</sub>  | V      | 3.4      |
| High Power Source              | V <sub>high</sub> | V      | 4.0      |

Type of powersource: 3.8 V DC

Voltage variation was performed with a special board-extender with external power supply.

During extreme voltage tests there were no change of behavior on the card.  
Output power, power density and bandwidth did not change.

## 2 Teststandard & summary list of all performed test cases

| TC identifier | Description                          | verdict | date       | Remark |
|---------------|--------------------------------------|---------|------------|--------|
| RF-Testing    | FCC Part 15 §15.247 - CANADA RSS-210 | PASS    | 2006-02-23 |        |

| Test Specification Clause | Test Case                                    | Pass | Fail | Not applicable | Not performed |
|---------------------------|----------------------------------------------|------|------|----------------|---------------|
| None                      | Antenna Gain                                 | Yes  |      |                |               |
| §15.247 (e)               | Peak power spectral density                  | Yes  |      |                |               |
| §15.247(a)(2)             | Spectrum Bandwidth of a DSSS System / 6dB BW | Yes  |      |                |               |
| § 15.247 (b)(3)           | Maximum output power (conducted)             | Yes  |      |                |               |
| § 15.247 (b)(3)           | Max. peak output power (radiated)            | Yes  |      |                |               |
| §15.247 (c)               | Band-edge compliance of conducted emissions  | Yes  |      |                |               |
| §15.205                   | Band-edge compliance of radiated emissions   | Yes  |      |                |               |
| §15.247 (c)               | Spurious Emission - conducted (Transmitter)  | Yes  |      |                |               |
| § 15.209                  | Spurious Emission -radiated (Transmitter)    | Yes  |      |                |               |
| § 15.247 (c)              | Spurious Emissions-radiated (Receiver)       | Yes  |      |                |               |
| § 15.109                  | Spurious Emissions-radiated <30 MHz          | Yes  |      |                |               |
| § 15.107/207              | Conducted Emissions <30 MHz                  | Yes  |      |                |               |

## 3 RF measurement testing

### 3.1 Description of test set-up

#### 3.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

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

9 kHz - 150 MHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.

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

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

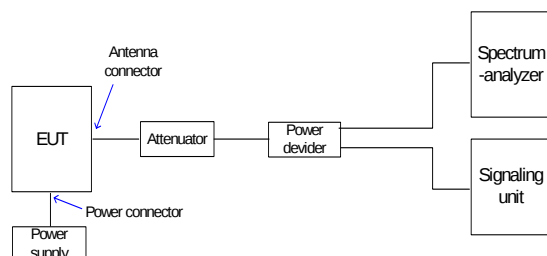
200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

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

All measurement settings are according to FCC 15.209 and 15.207

#### 3.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal paths are first checked within a calibration. The measurement readings on the spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signaling unit and the spectrum analyzer are impedance matched on 50 Ohm.



### 3.2 Referenced Documents

none

### 3.3 Additional comments

Hardware / software changes during testing

| Setup revision | Description of change | Change referenced to setup revision | Already perf. testcases influenced yes (repeated) / no |
|----------------|-----------------------|-------------------------------------|--------------------------------------------------------|
| 1.0            | Start setup           | -                                   | -                                                      |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |
|                |                       |                                     |                                                        |

### 3.4 Antenna gain

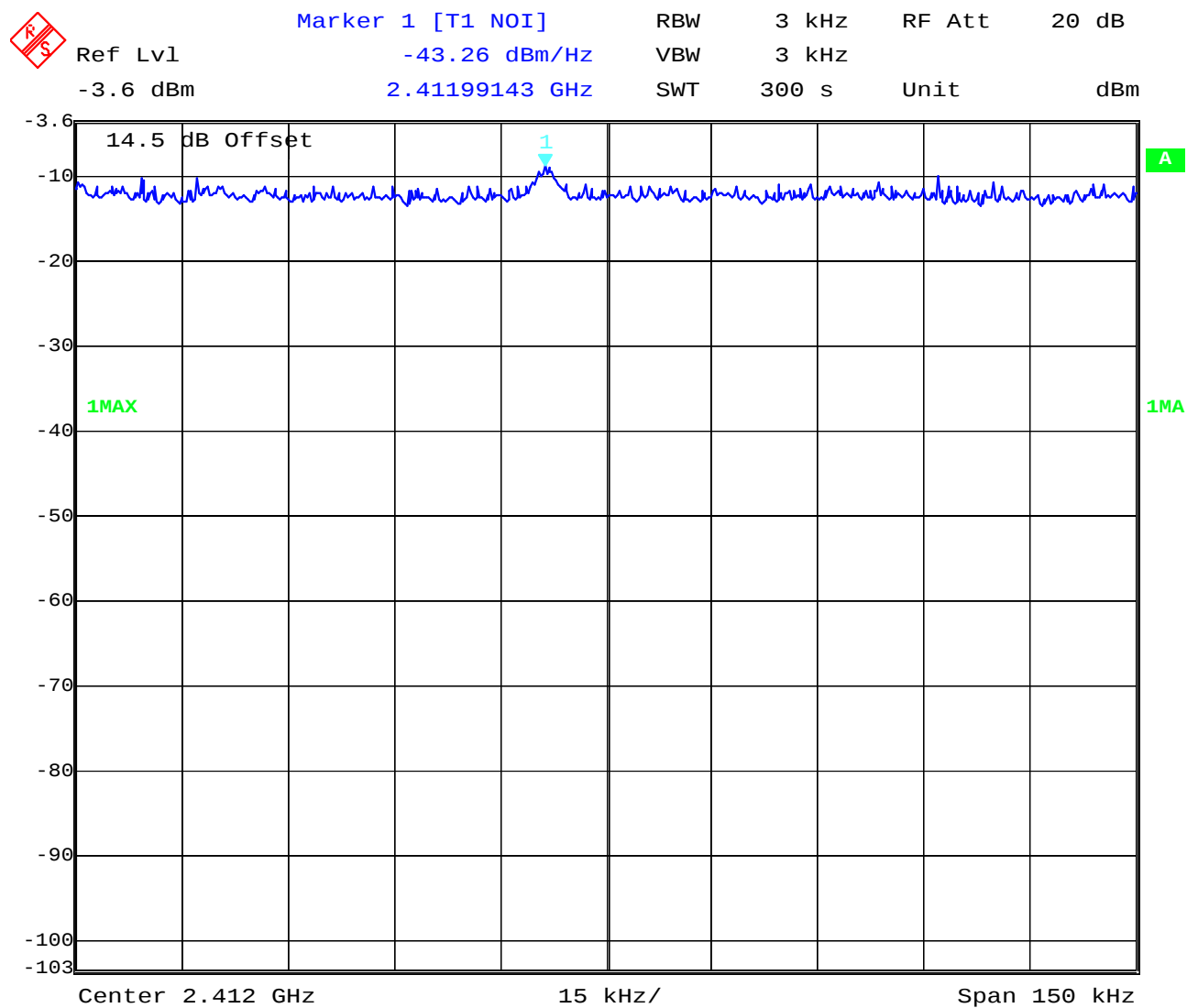
The antenna gain of the complete system is calculated by the difference of conducted power of the module and the radiated power in EIRP.

|                       | low channel | mid channel | high channel |
|-----------------------|-------------|-------------|--------------|
| Conducted power [dBm] | 18.66*      | 18.35*      | 18.10*       |
| Radiated power [dBm]  | 16.08*      | 15.39*      | 16.08*       |
| Gain [dBi]            | -2.58       | -2.96       | -2.02        |

\* without bandwidth correction factor

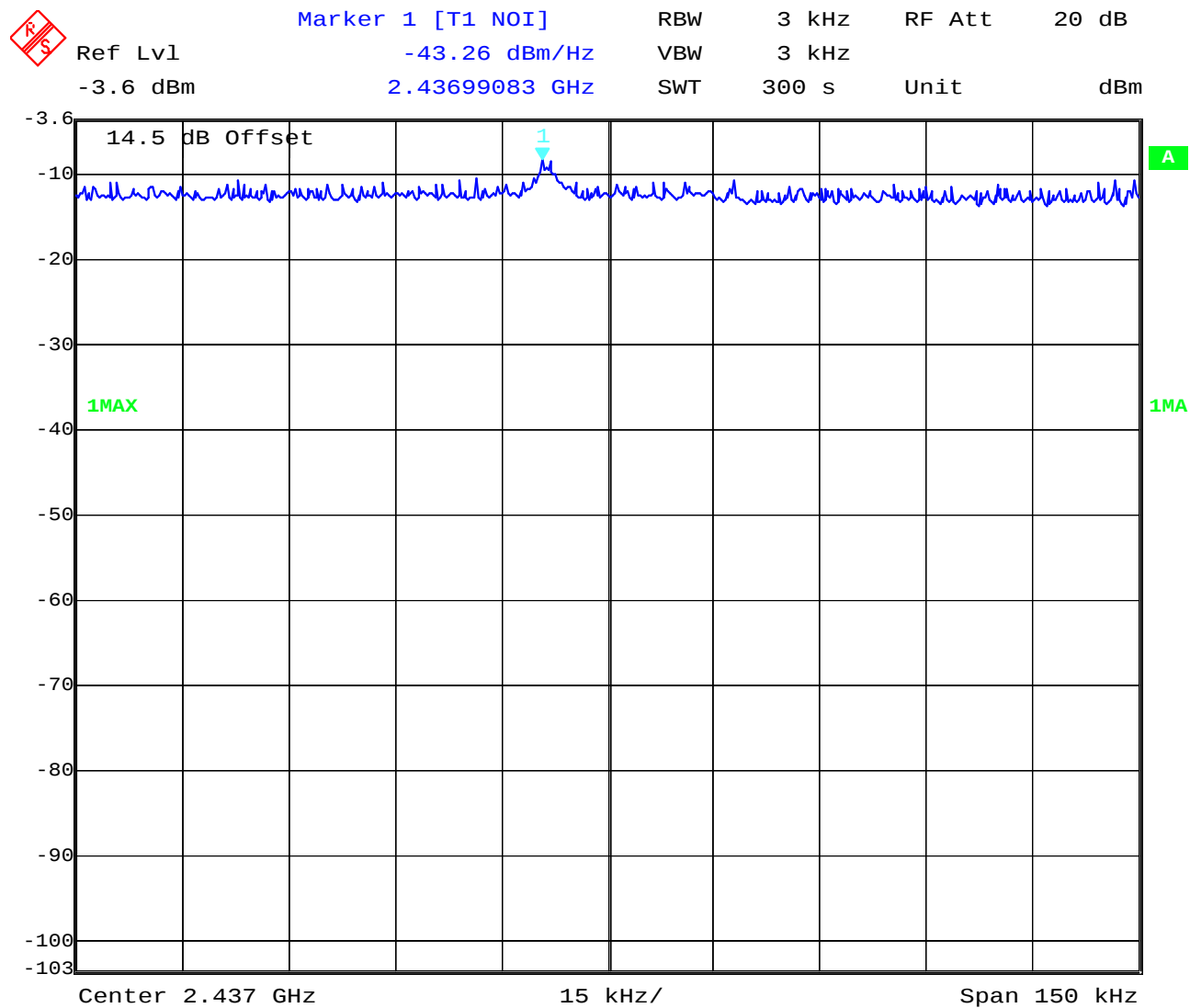
## 3.5 Peak Power Spectral density (digitally modulated systems) §15.247(e)

Plot 1: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



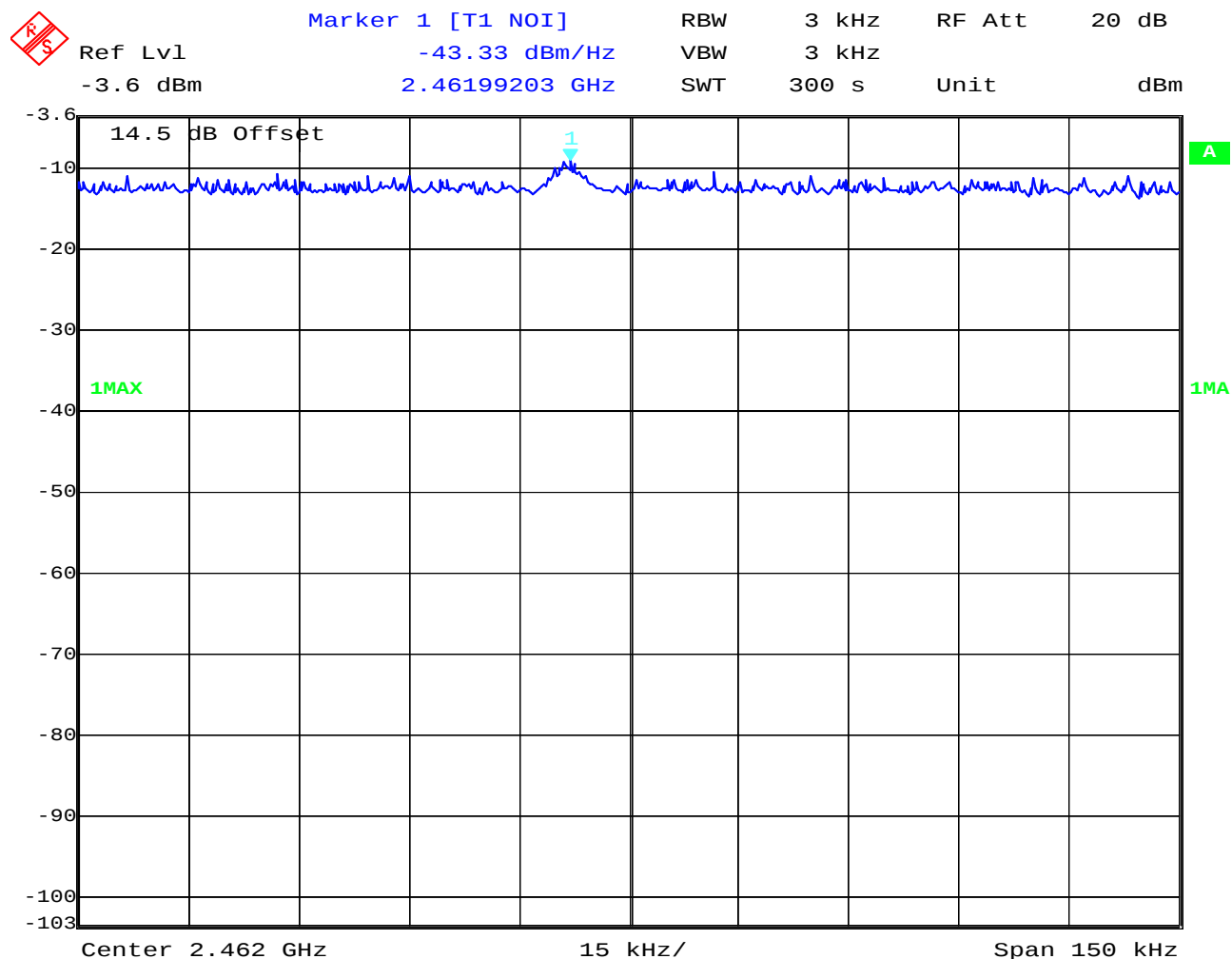
Date: 21.FEB.2006 10:26:26

Plot 2: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Date: 21.FEB.2006 10:20:34

Plot 3: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Date: 21.FEB.2006 10:11:49

Results: Plot 1: Power density : -43.26 dBm/Hz = -8.46 dBm / 3 KHz  
Plot 2: Power density : -43.26 dBm/Hz = -8.46 dBm / 3 KHz  
Plot 3: Power density : -43.33 dBm/Hz = -8.53 dBm / 3 KHz

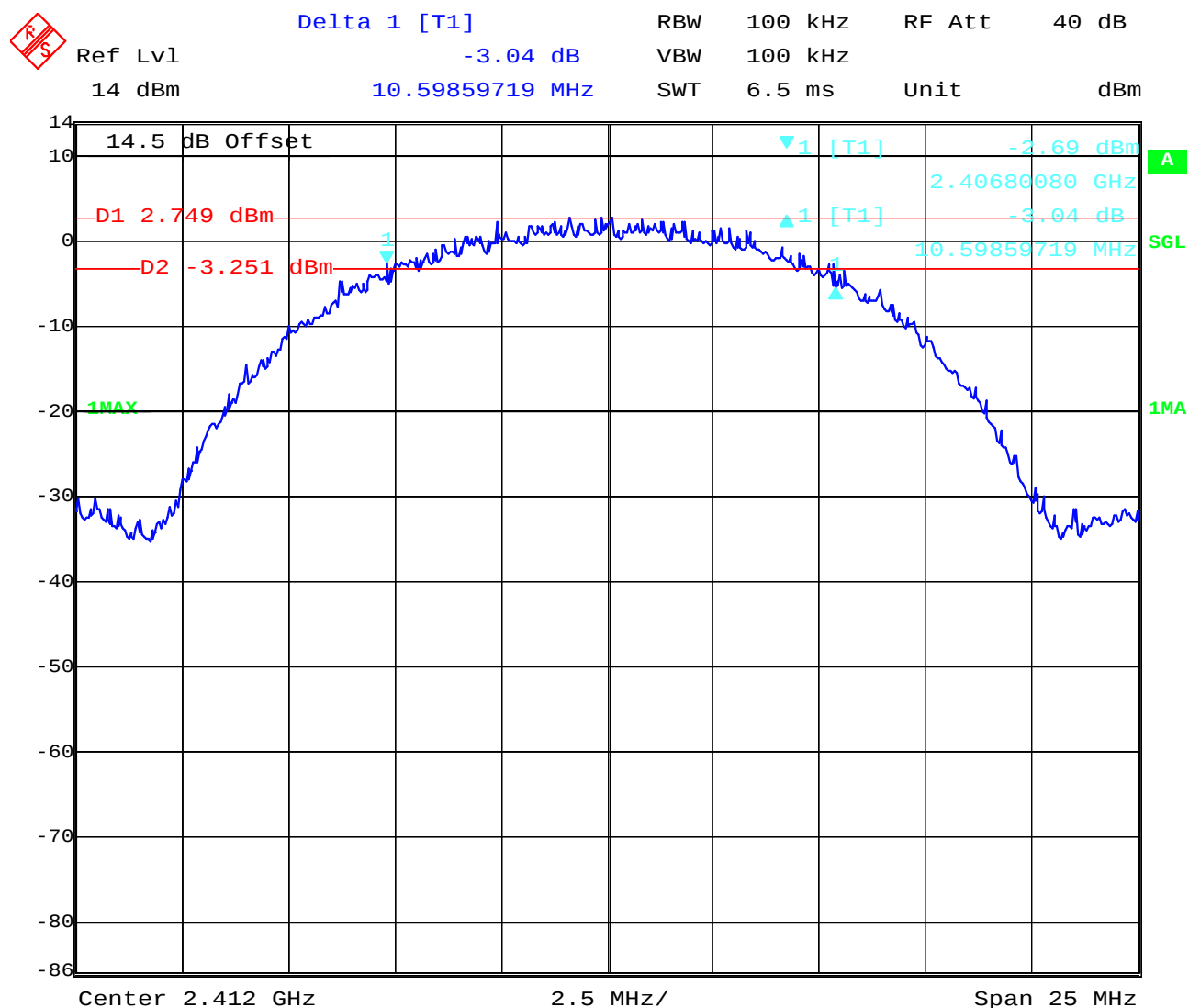
Correction factor from dBm/Hz to dBm/3KHz is +34,8 dB

Limits :

|                                   |                                                                                                                                                                                                                               |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Under normal test conditions only | For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmission |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

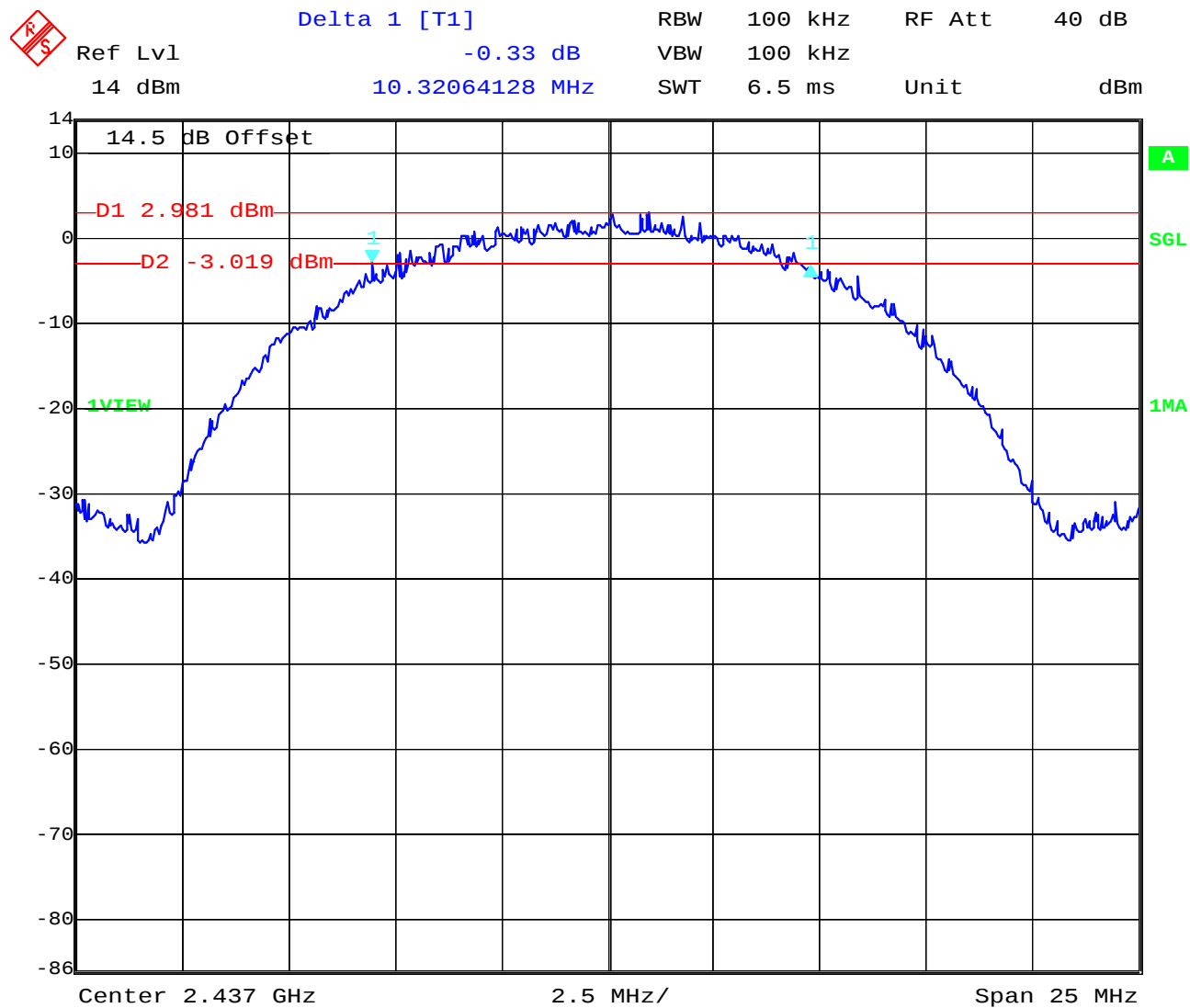
## 3.6 Spectrum Bandwidth of a DSSS System / 6 dB Bandwidth §15.247(a)(2)

Plot 1 :



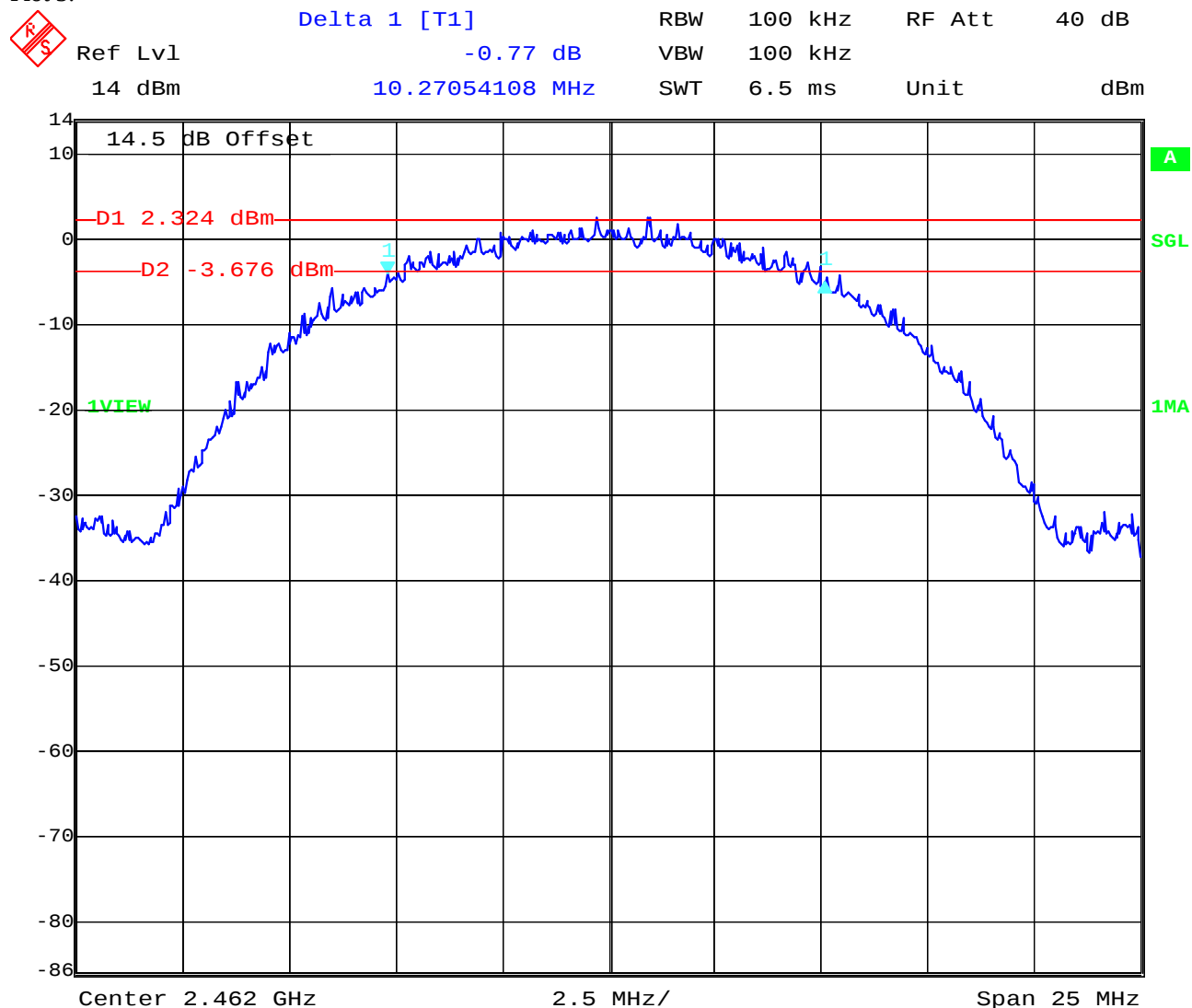
Date: 21.FEB.2006 10:51:33

Plot 2:



Date: 21.FEB.2006 10:53:15

Plot 3:



Date: 21.FEB.2006 10:55:08

Results:

| Test conditions         |                  | 6 dB BANDWIDTH [MHz] |        |        |
|-------------------------|------------------|----------------------|--------|--------|
| Frequency [MHz]         |                  | 2412                 | 2437   | 2462   |
| T <sub>nom</sub>        | V <sub>nom</sub> | 10.599               | 10.321 | 10.271 |
| Measurement uncertainty |                  | ±1kHz                |        |        |

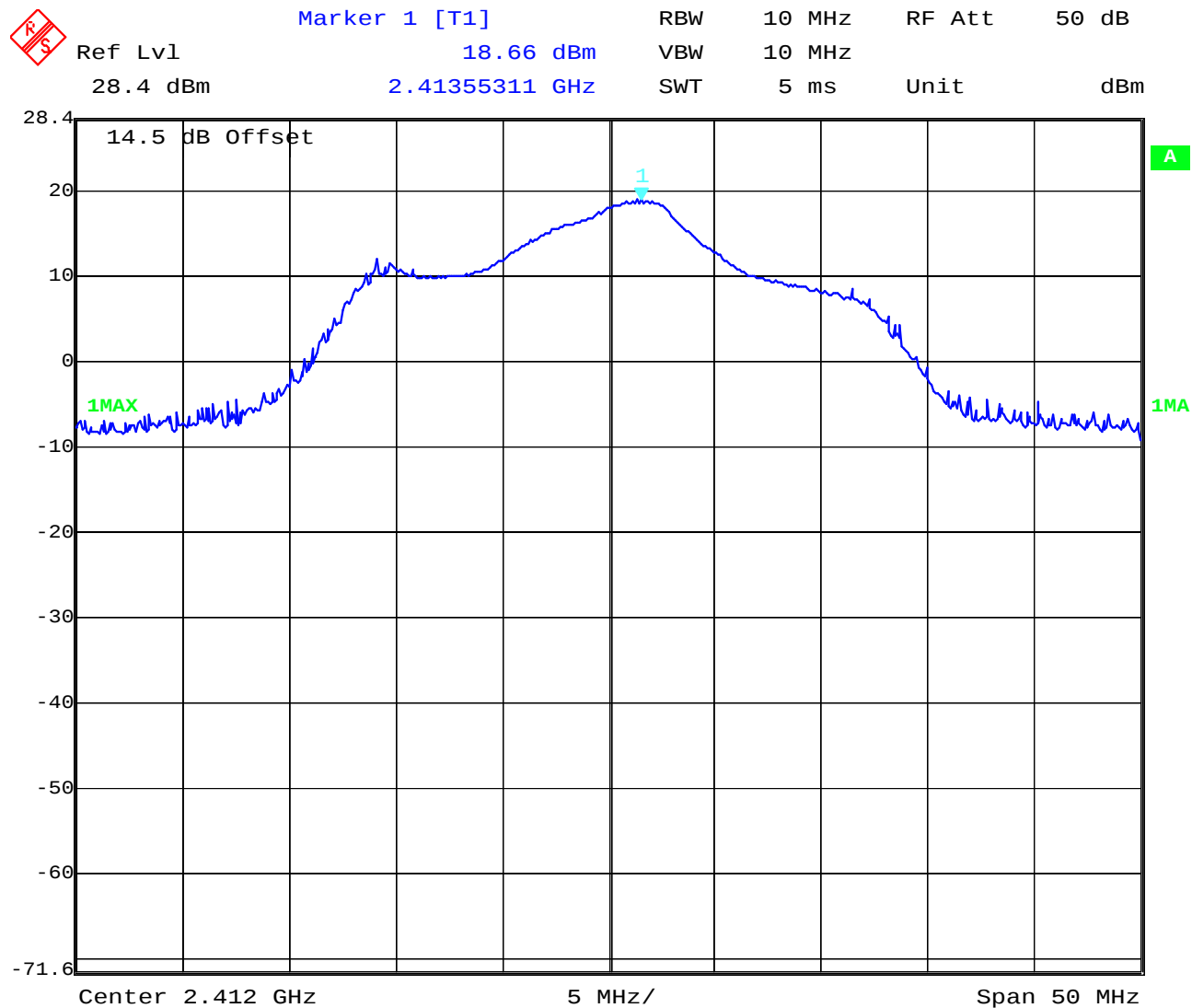
RBW: 100 kHz / VBW 100 kHz

Limits :

|                                   |           |
|-----------------------------------|-----------|
| Under normal test conditions only | > 500 KHz |
|-----------------------------------|-----------|

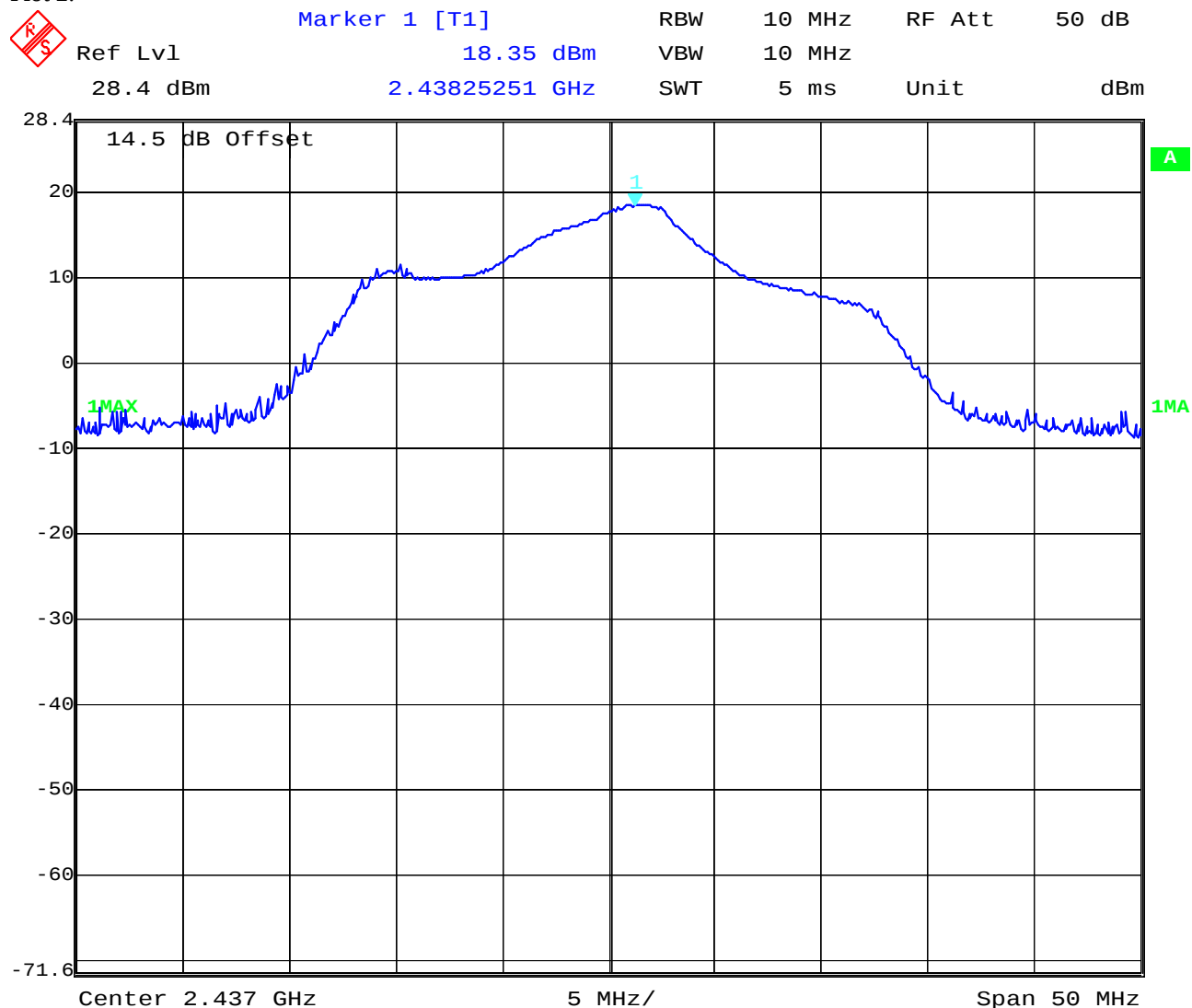
## 3.7 Maximum output power (conducted) §15.247 (b)(3)

Plot 1:



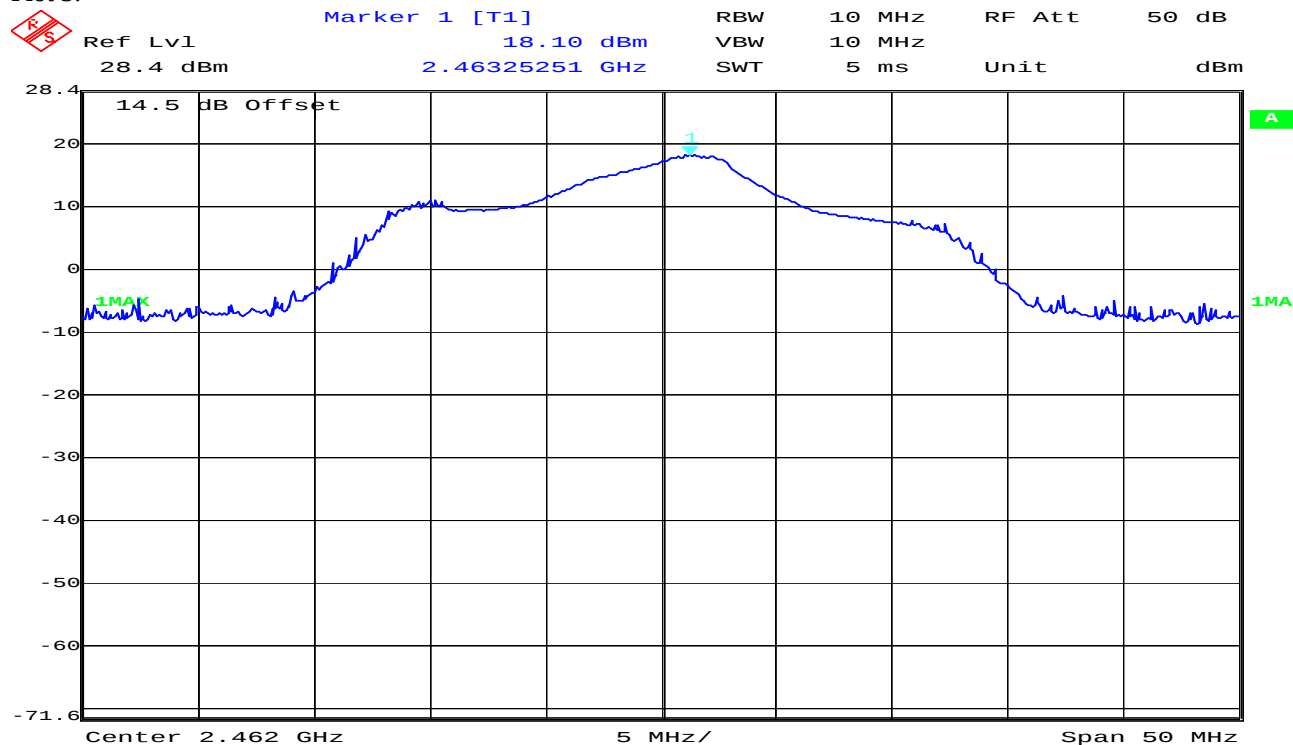
Date: 21.FEB.2006 11:14:32

Plot 2:



Date: 21.FEB.2006 11:13:49

Plot 3:



Date: 21.FEB.2006 11:15:43

## Results:

| Test conditions            |                  | Max. peak output power [dBm] |       |       |       |
|----------------------------|------------------|------------------------------|-------|-------|-------|
| Frequency [MHz]            |                  | 2412                         |       | 2437  | 2462  |
| T <sub>nom</sub>           | V <sub>nom</sub> | PK                           | 18.66 | 18.35 | 18.10 |
|                            |                  | PK<br>corrected              | 18.91 | 18.60 | 18.25 |
| De facto EIRP (Peak) [dBm] |                  | 16.33                        |       | 15.64 | 16.23 |
| Antenna gain: [dBi]        |                  | -2.58                        |       | -2.96 | -2.02 |
| Measurement uncertainty    |                  | ±3dB                         |       |       |       |

RBW / VBW : 10 MHz

## Remark:

The correction factor is calculated by  $10 \times \log(\text{measured BW} / \text{used BW})$  [dB] =  $10 \times \log(10.599/10)$  = +0.25 dB

## Limits:

|                                                                        |                        |
|------------------------------------------------------------------------|------------------------|
| Under normal test conditions only, for frequency range 2400-2483.5 MHz | Max. 1.0 Watt / 30 dBm |
|------------------------------------------------------------------------|------------------------|

## MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density ( in appropriate units, e.g. mW/cm<sup>2</sup>)  
P = power input to the antenna (in appropriate units e.g. mW)  
G = power gain of the antenna in the direction of interest relative to the isotropic radiator  
R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

### Calculation:

(Calculated for max. EIRP)

EIRP: 16.33 dBm (42.95 mW)

calculated at distance of 20 cm:

$$\text{power density} = 42.95 \text{ mW} / 4\pi 20^2 = 0.0085 \text{ mW} / \text{cm}^2$$

Limit:

1mW/ cm<sup>2</sup> is the reference level for general public exposure according to the OET Bulletin 65,  
Edition 97-01 Table 1.

## 3.8 Max. peak output power (radiated) §15.247 (b)(3)

Results:

| Test conditions         |                  | Max. peak output power EIRP [dBm]<br>(results with bandwidth correction factor) |       |       |
|-------------------------|------------------|---------------------------------------------------------------------------------|-------|-------|
| Frequency [MHz]         |                  | 2412                                                                            | 2437  | 2462  |
| T <sub>nom</sub>        | V <sub>nom</sub> | 16.33                                                                           | 15.64 | 16.33 |
| Measurement uncertainty |                  | ±3dB                                                                            |       |       |

RBW / VBW : 10 MHz

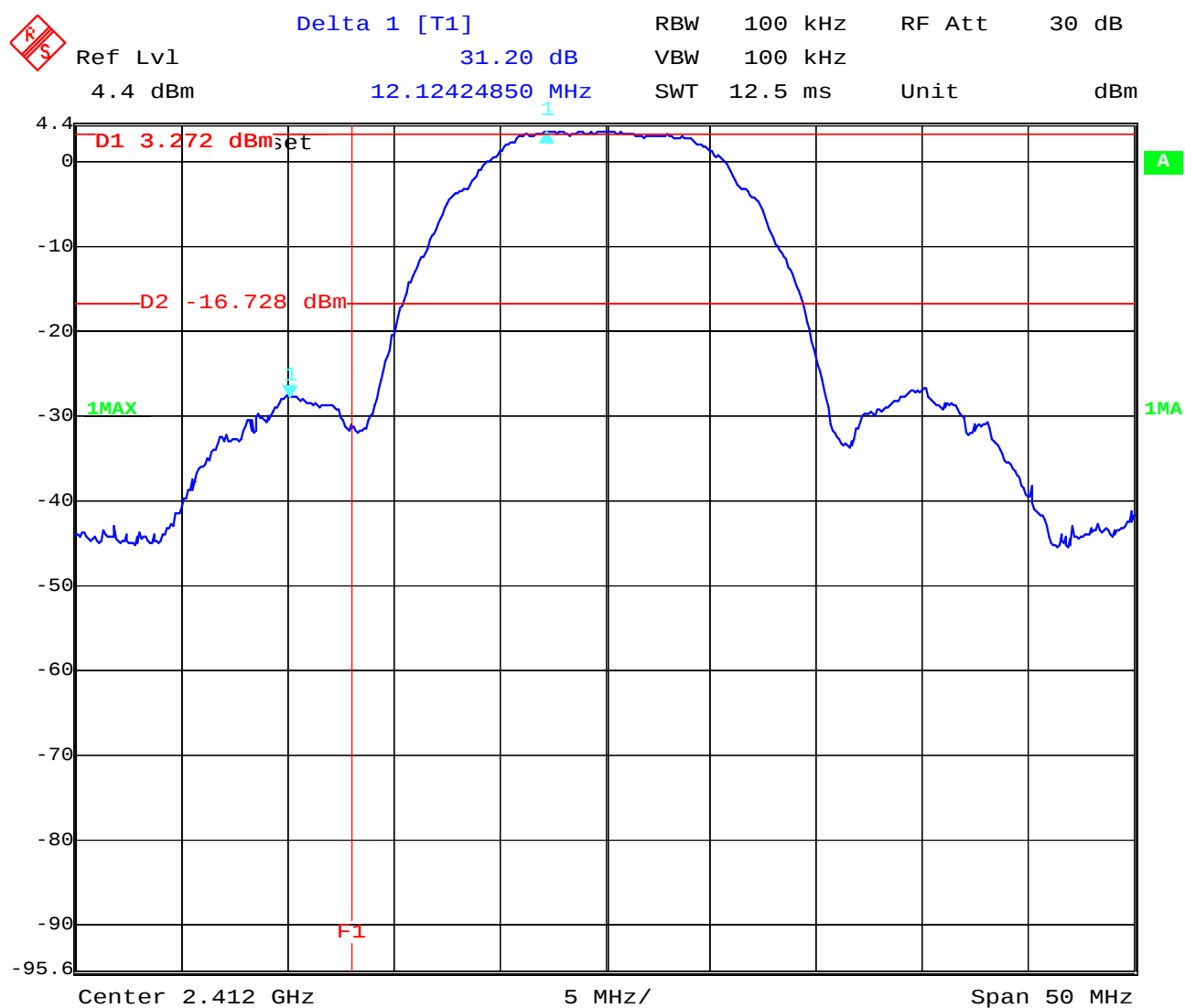
Measured at a distance of 3m

Limits:

|                                                                        |               |
|------------------------------------------------------------------------|---------------|
| Under normal test conditions only, for frequency range 2400-2483.5 MHz | Max. 1.0 Watt |
|------------------------------------------------------------------------|---------------|

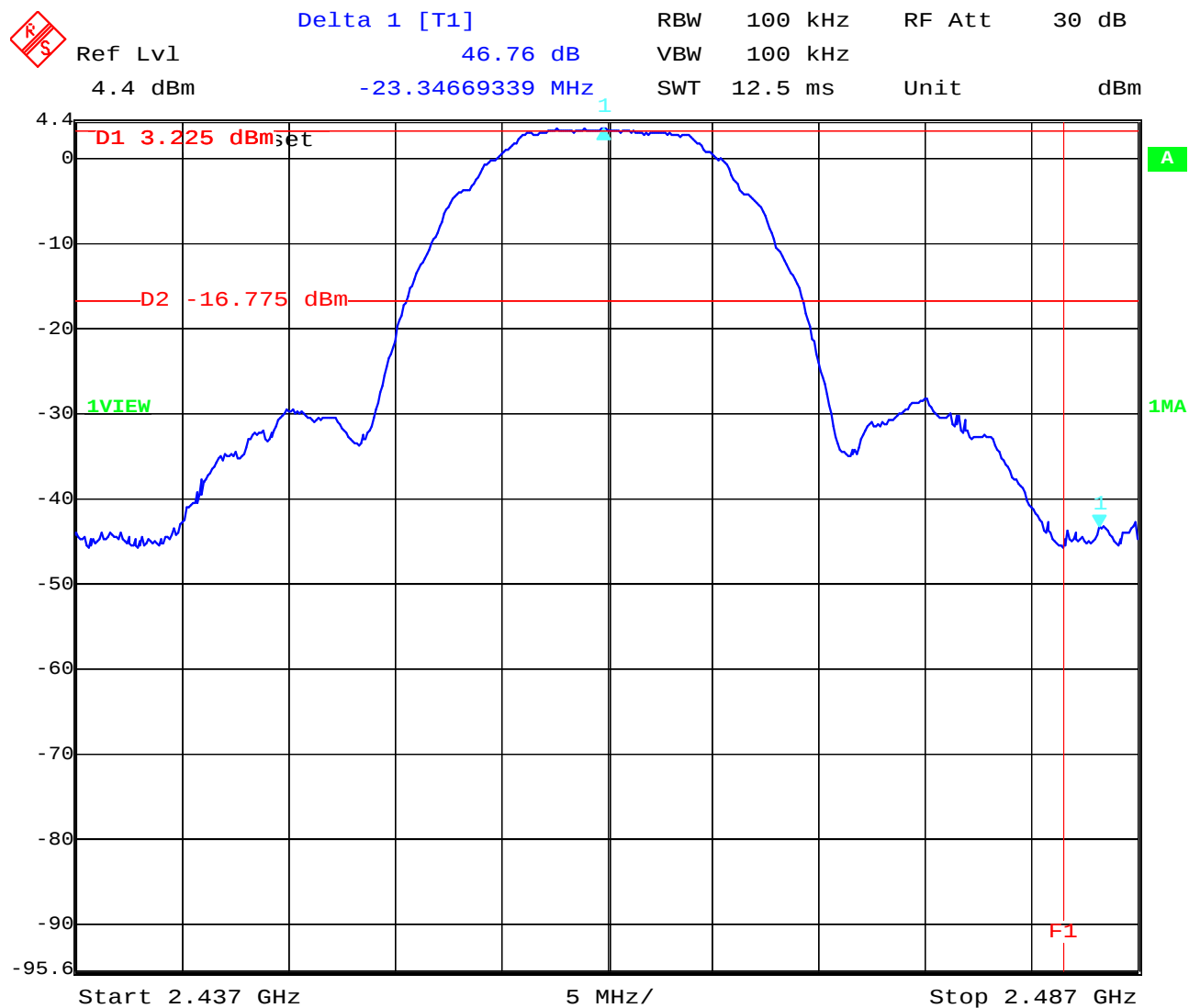
## 3.9 Band-edge compliance of conducted emissions §15.247 (c)

Plot 1, lowest channel



Date: 21.FEB.2006 11:41:28

Plot 2, highest channel



Date: 21.FEB.2006 11:42:49

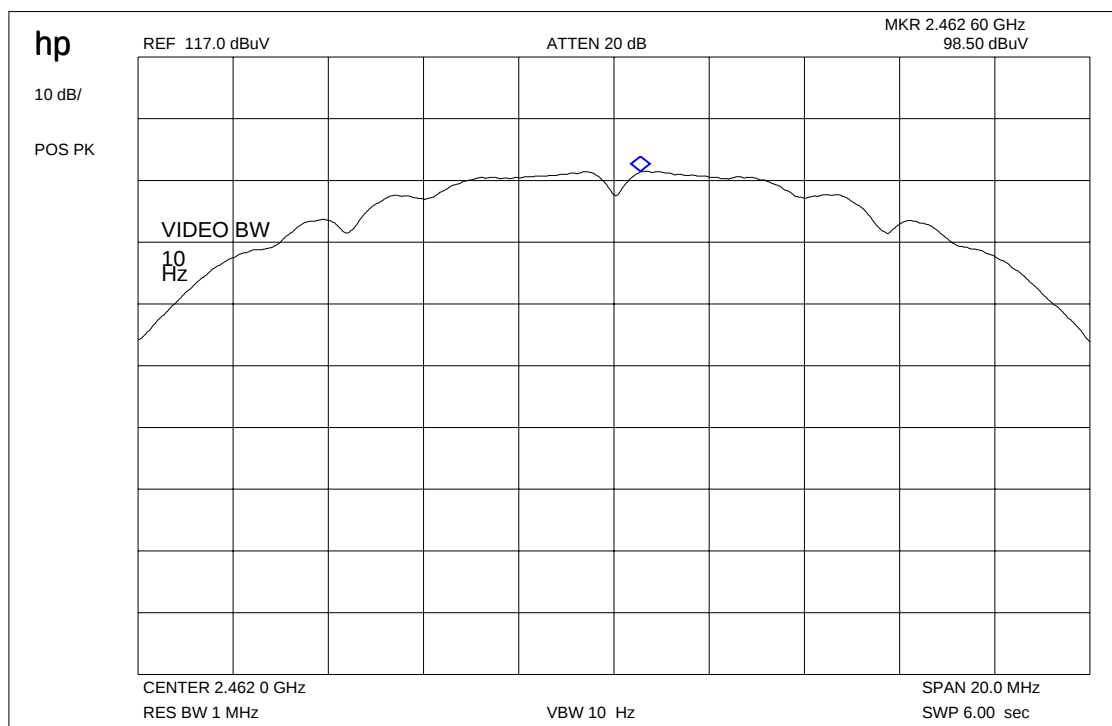
Limits:

Under normal test conditions only

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).

## 3.10 Band-edge compliance of radiated emissions §15.205

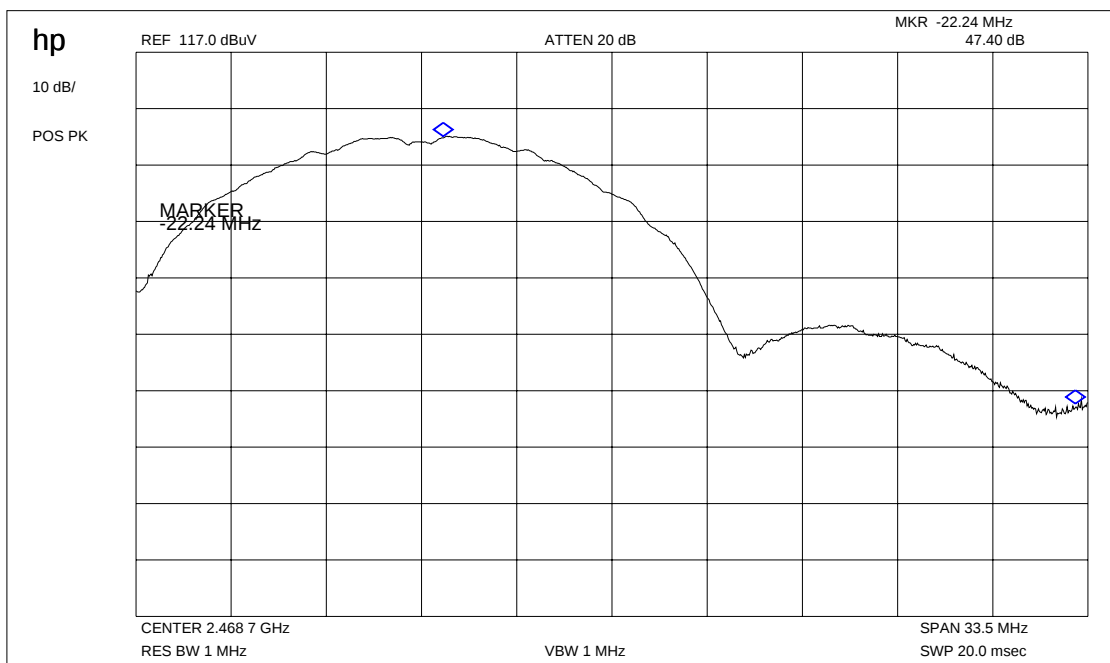
Plot 1 : Max field strength in 3m distance Average



Result:

| Frequency | Meter reading | Cable loss                      | Antenna factor | Results |
|-----------|---------------|---------------------------------|----------------|---------|
| 2462 MHz  | 98.5          | 13.25 dB – Pre-Amp gain 43.48dB | 29.3 dB/m      | 104.1   |
|           |               |                                 |                |         |

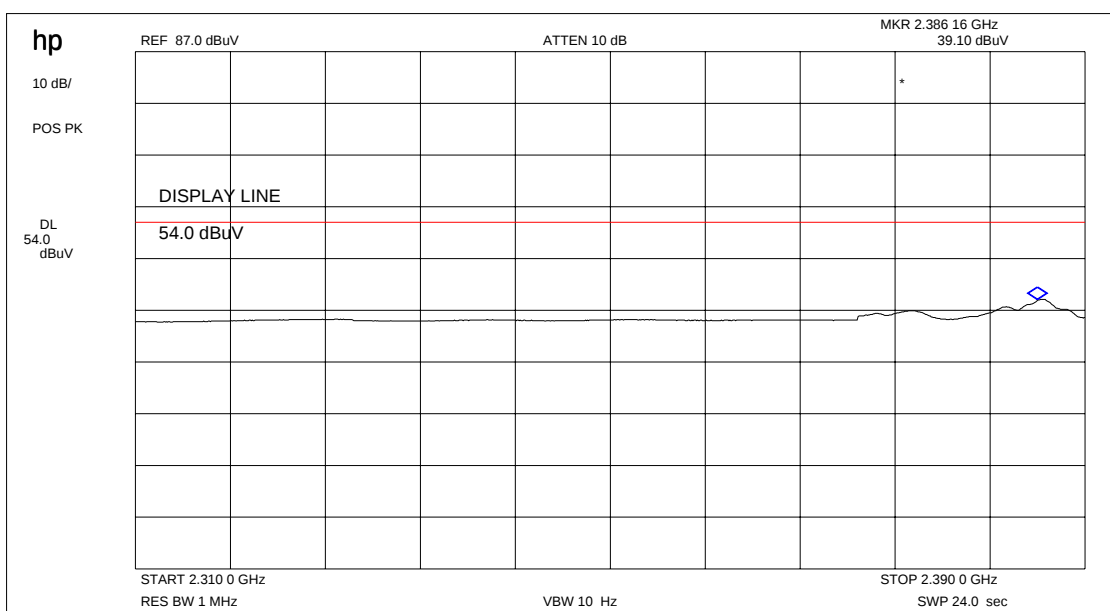
Plot 3: Marker-Delta Method RBW/VBW = 1% of span



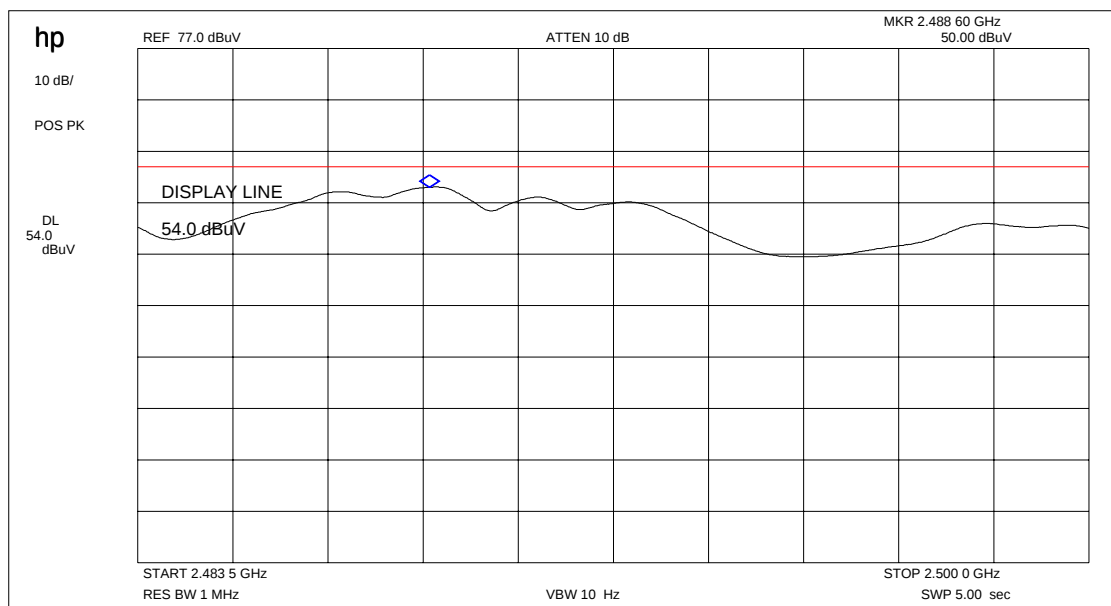
Result:

Marker-Delta-Value : 47.40dB

This measurement was made to show that the behavior of the system is conform to FCC 15.205 (restricted bands)  
Resticte band 2310 to 2390 MHz



Resticted band 2483.5 to 2500 MHz



## Results & Limits:

The field strength was measured with an EMI measuring receiver and 1 MHz RBW / VBW for peak and with 1MHz RBW / 10Hz VBW for average at a distance of 3m.

| high channel       | setup                      | measured value (3m) | correction factor (3m) | calculated value (3m) |
|--------------------|----------------------------|---------------------|------------------------|-----------------------|
| Max. average value | 1 MHz RBW<br>10 Hz VBW     | 98.5 dB $\mu$ V/m   | -0.93 dB               | 97.57dB $\mu$ V/m     |
| Delta value        | Peak<br>300 kHz<br>RBW/VBW | 47.40dB             |                        |                       |
| Value at band edge | limit 54 dB $\mu$ V/m      |                     |                        | 50.17 dB $\mu$ V/m    |
| Statement:         |                            |                     |                        | Complies              |

## 3.11 Spurious Emissions - conducted (Transmitter) §15.247 (c)

plots see § 3.9 Band-edge compliance of conducted emissions

Result & Limits:

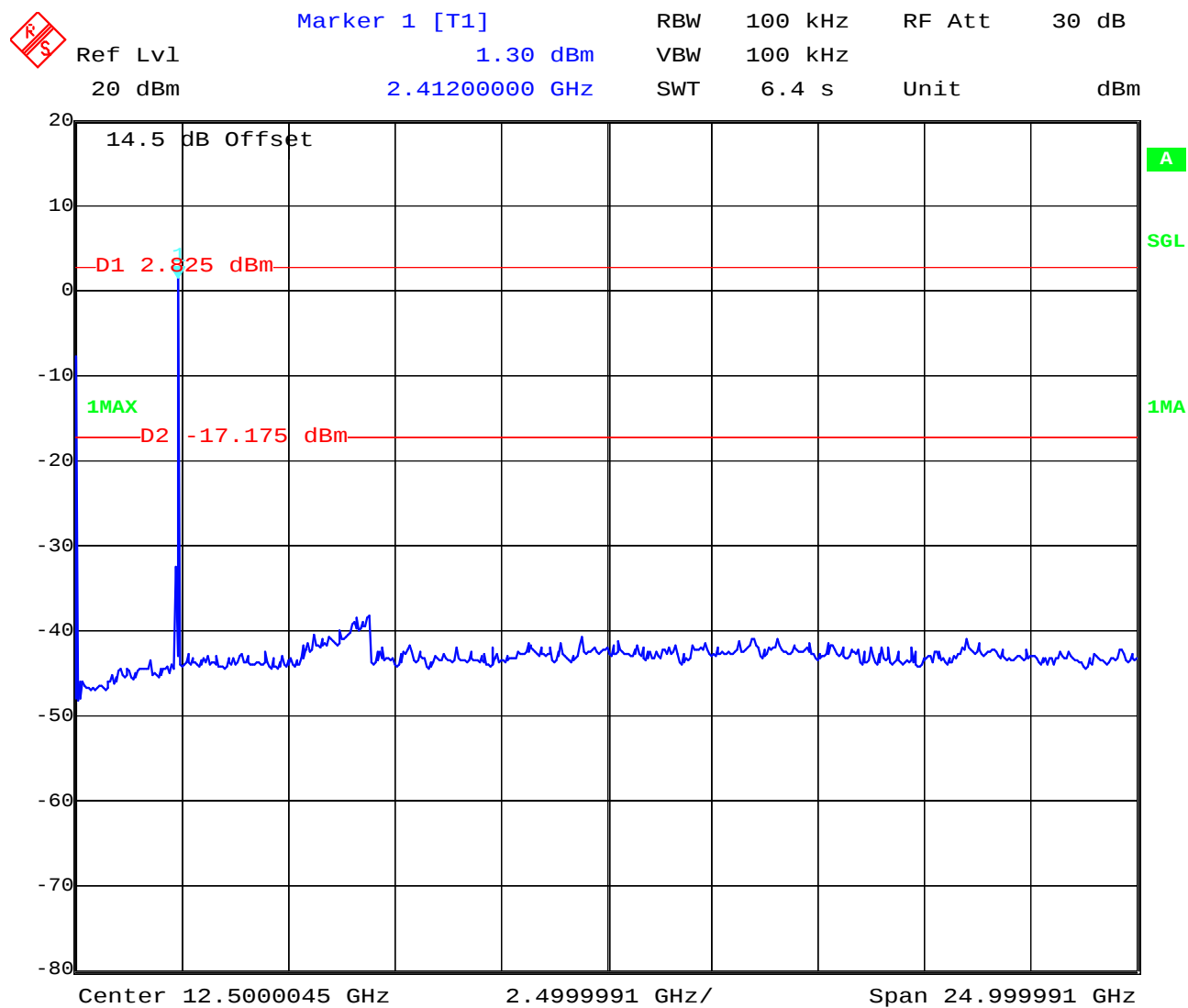
| Emission Limitations    |  |                             |                                   |                                                      |                     |
|-------------------------|--|-----------------------------|-----------------------------------|------------------------------------------------------|---------------------|
| f [MHz]                 |  | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results             |
| 2412                    |  |                             | 30 dBm                            | -                                                    | Operating frequency |
|                         |  |                             | -20 dBc                           |                                                      |                     |
|                         |  |                             |                                   |                                                      |                     |
|                         |  |                             |                                   |                                                      |                     |
| 2437                    |  |                             | 30 dBm                            |                                                      | Operating frequency |
|                         |  |                             | -20 dBc                           |                                                      |                     |
|                         |  |                             |                                   |                                                      |                     |
|                         |  |                             |                                   |                                                      |                     |
| 2462                    |  |                             | 30 dBm                            |                                                      | Operating frequency |
|                         |  |                             | -20 dBc                           |                                                      |                     |
|                         |  |                             |                                   |                                                      |                     |
|                         |  |                             |                                   |                                                      |                     |
| Measurement uncertainty |  | ± 3dB                       |                                   |                                                      |                     |

RBW : 100 kHz VBW: 100 kHz

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

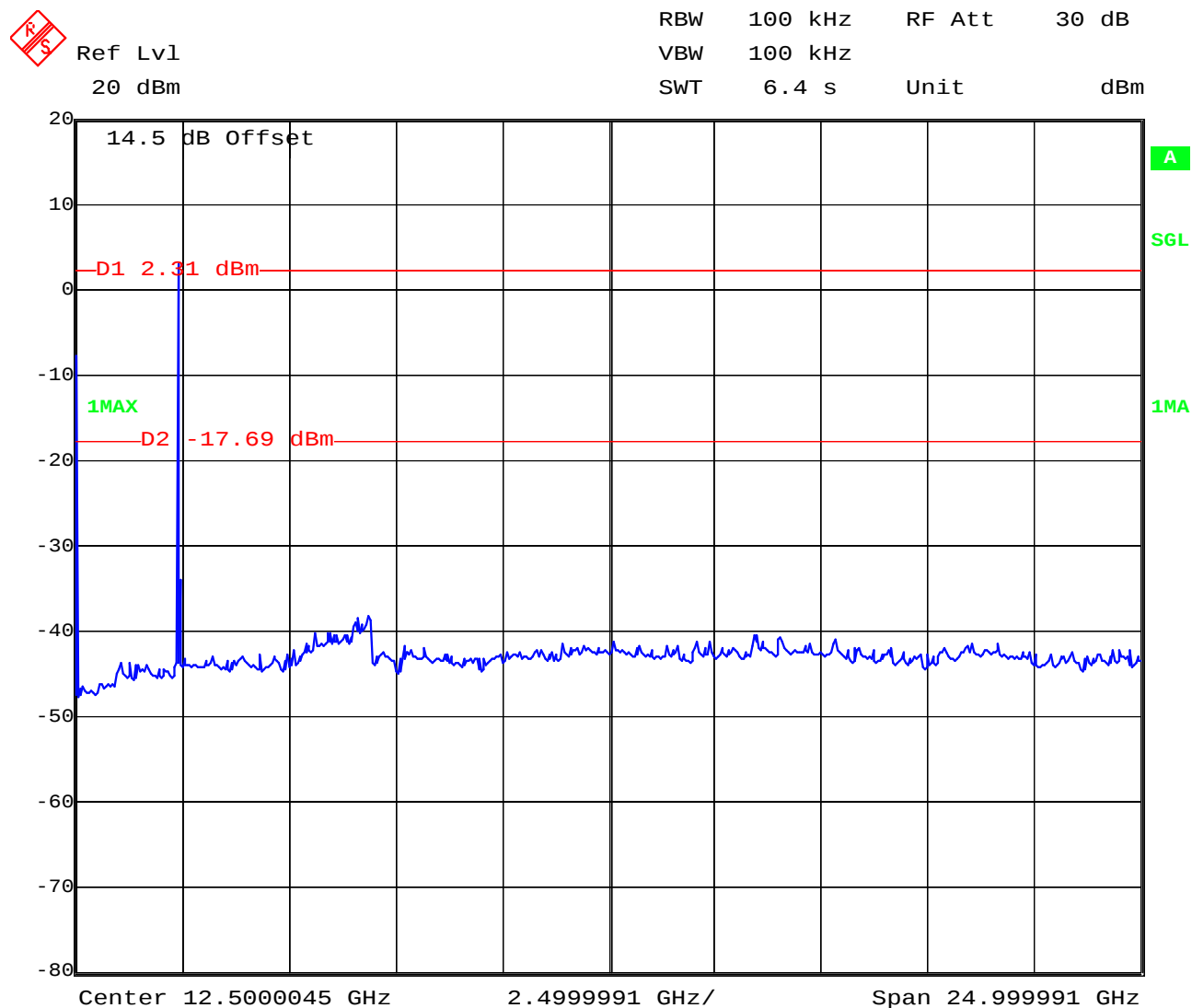
Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

Plot 1: Lowest channel



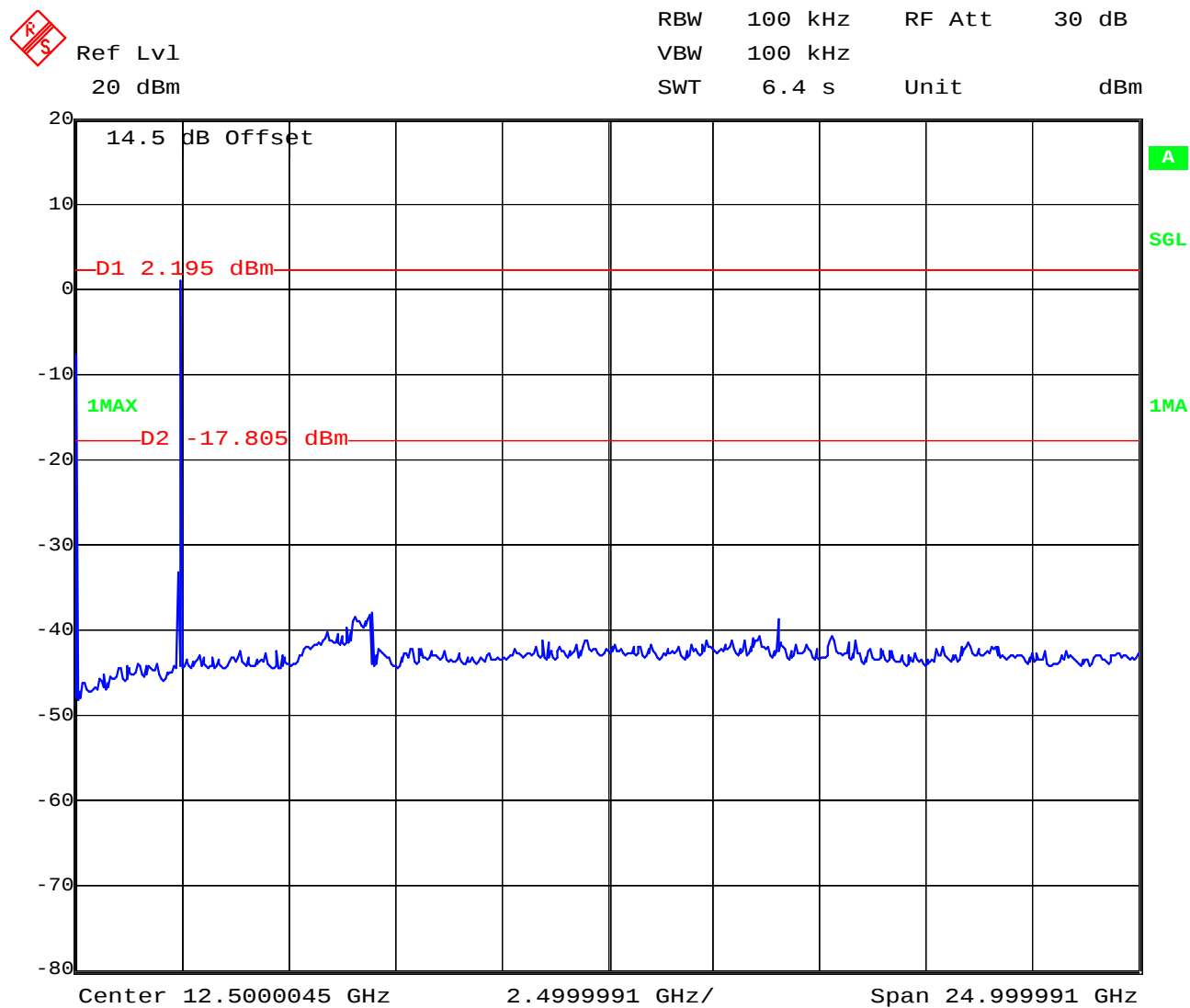
Date: 21.FEB.2006 11:40:06

Plot 1: Middle channel



Date: 21.FEB.2006 11:33:26

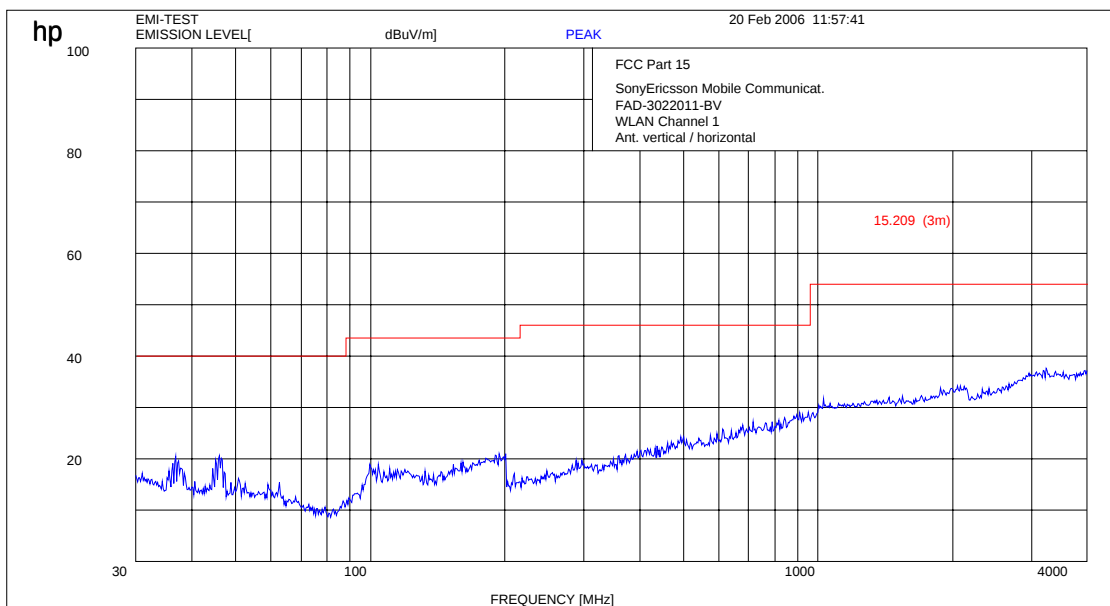
Plot 1: Highest channel



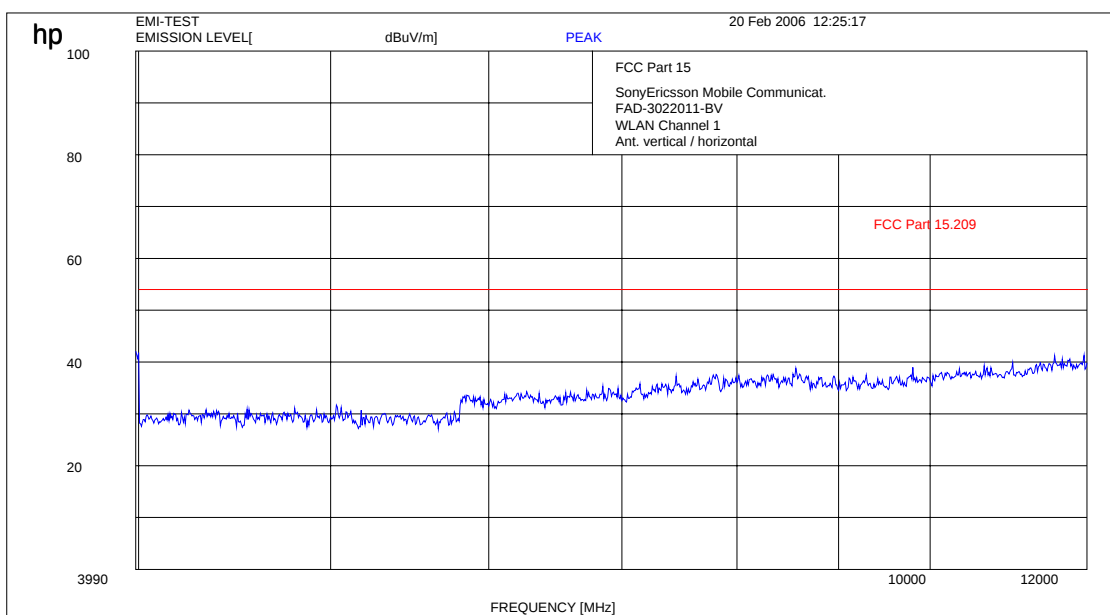
Date: 21.FEB.2006 11:25:16

## 3.12 Spurious Emissions - radiated (Transmitter) §15.209

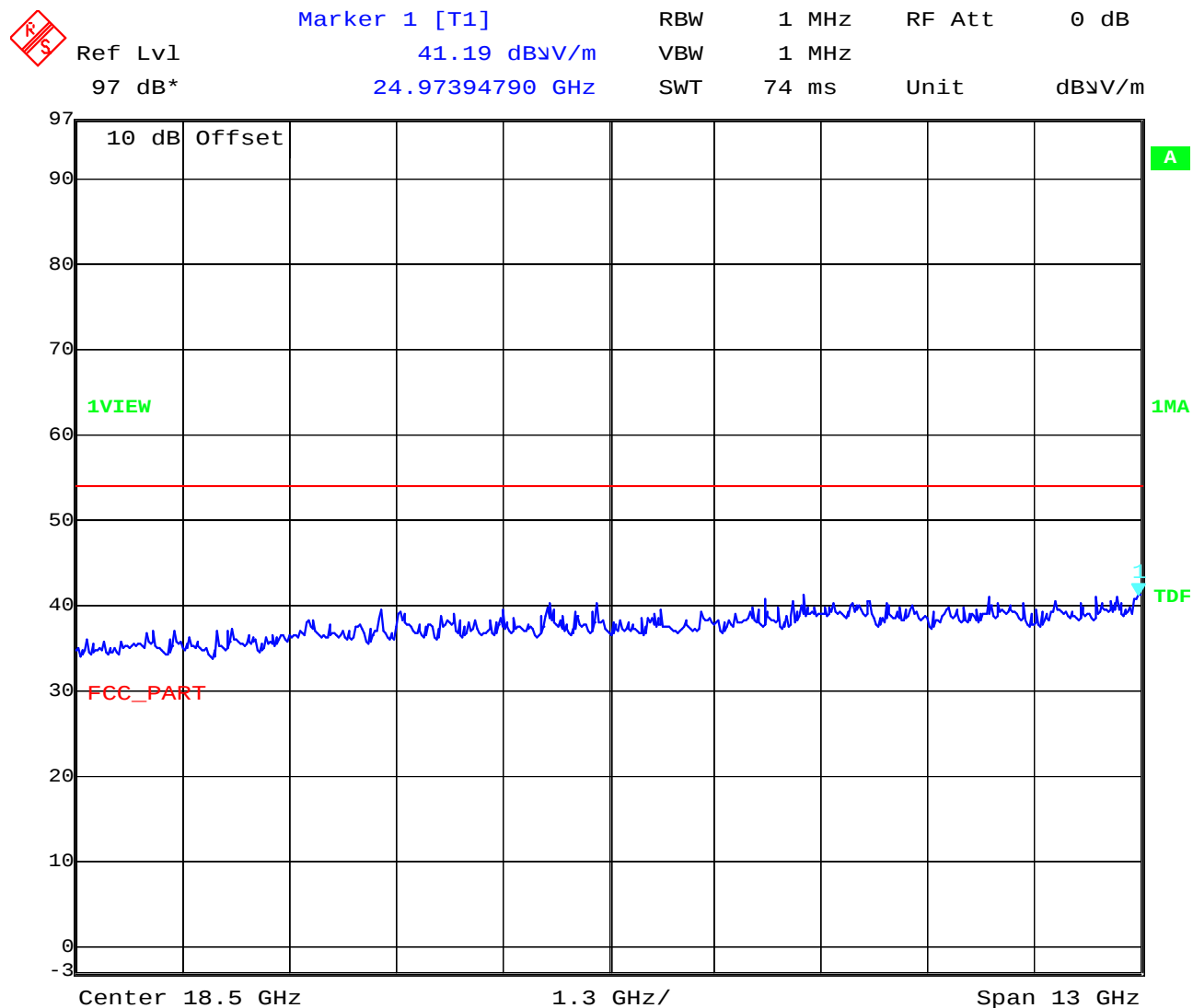
Plot 1: 0.03 - 4 GHz vertical / horizontal (lowest channel)



Plot 2: 4- 12 GHz (lowest channel)

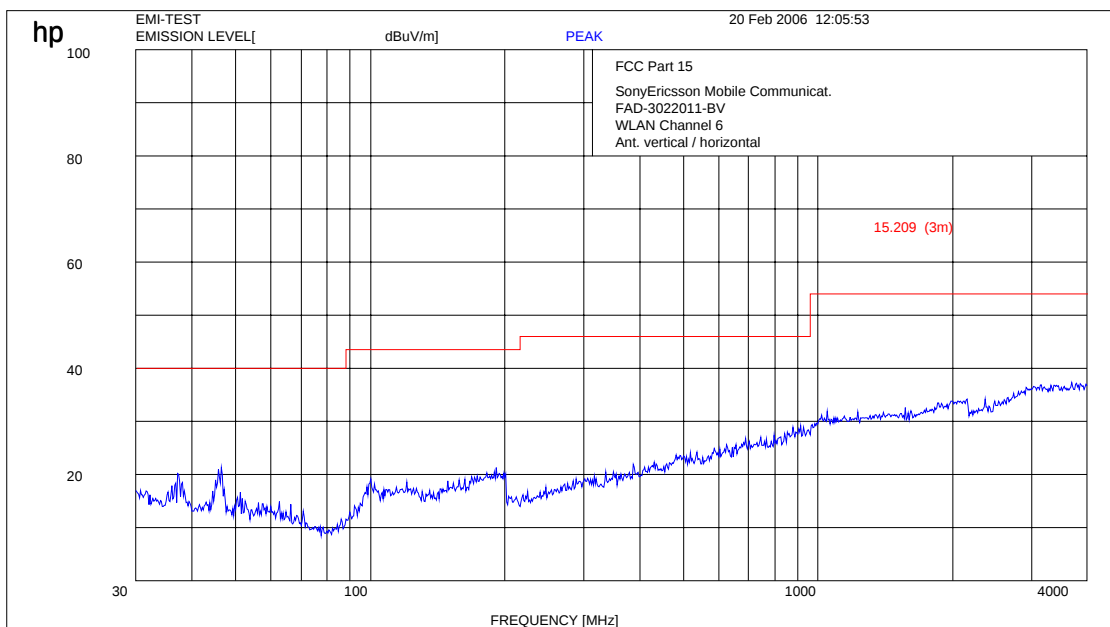


Plot 3: 12 – 25 GHz horizontal / vertical (valid for all three channels)

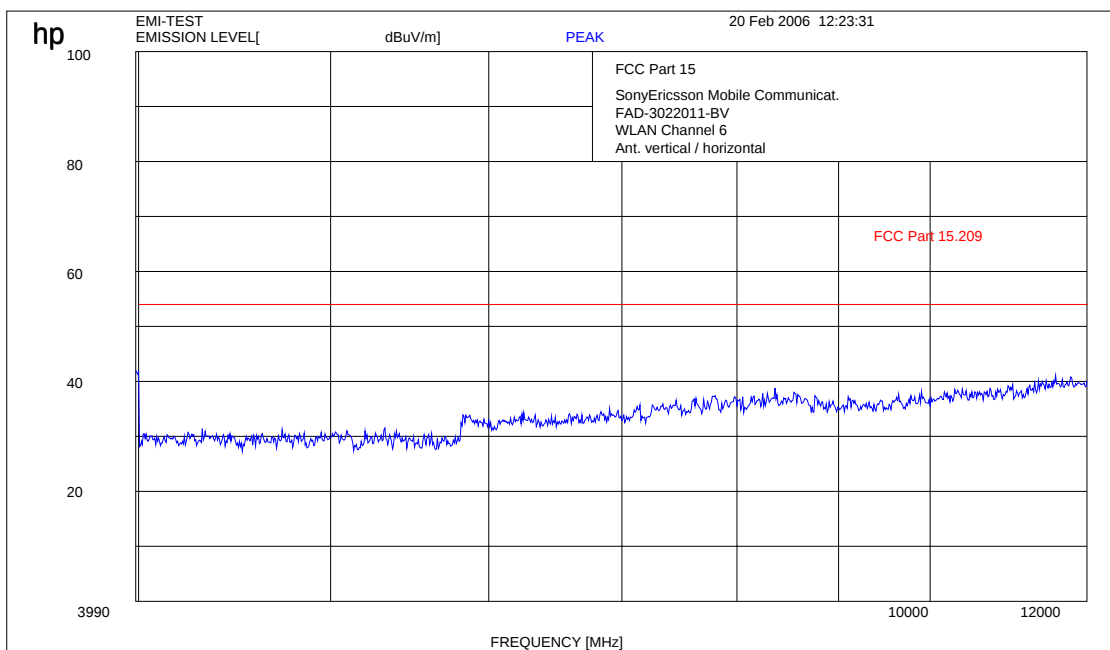


Date: 21.FEB.2006 12:37:57

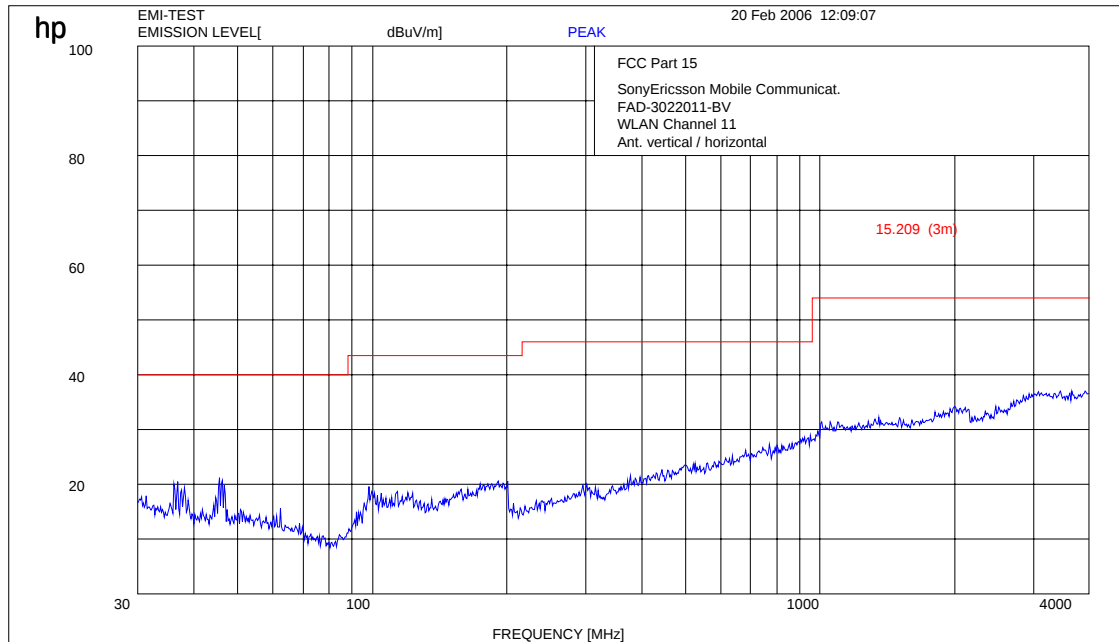
Plot 4: 0.03 - 4 GHz vertical / horizontal (middle channel)



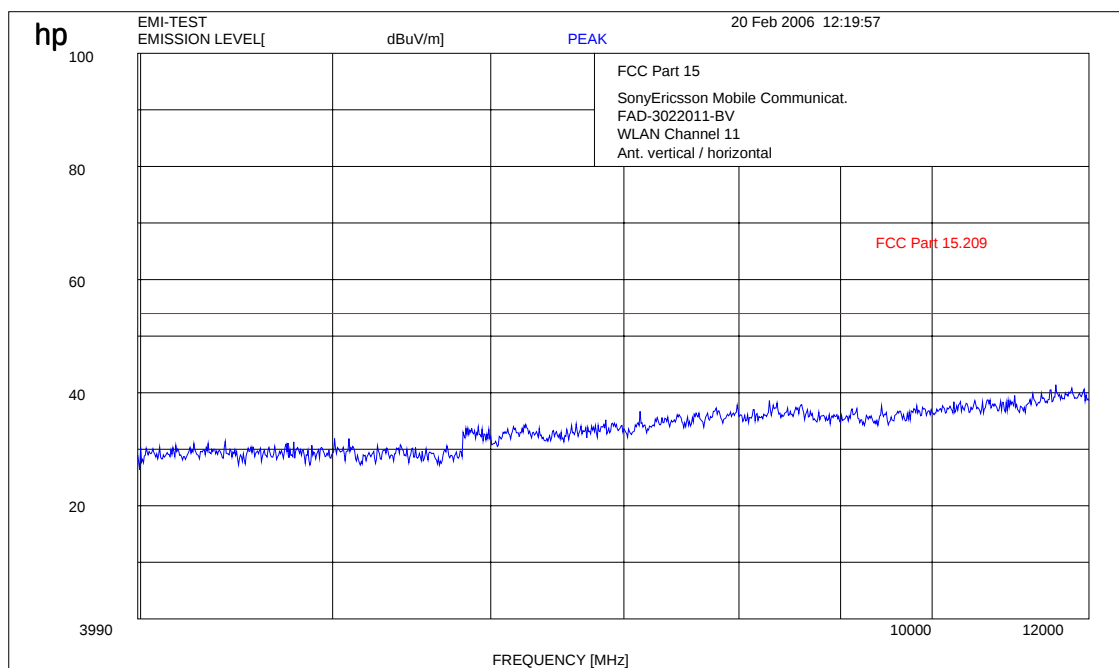
Plot 5: 4- 12 GHz (middle channel)



Plot 6: 0.03 - 4 GHz vertical / horizontal (highest channel)



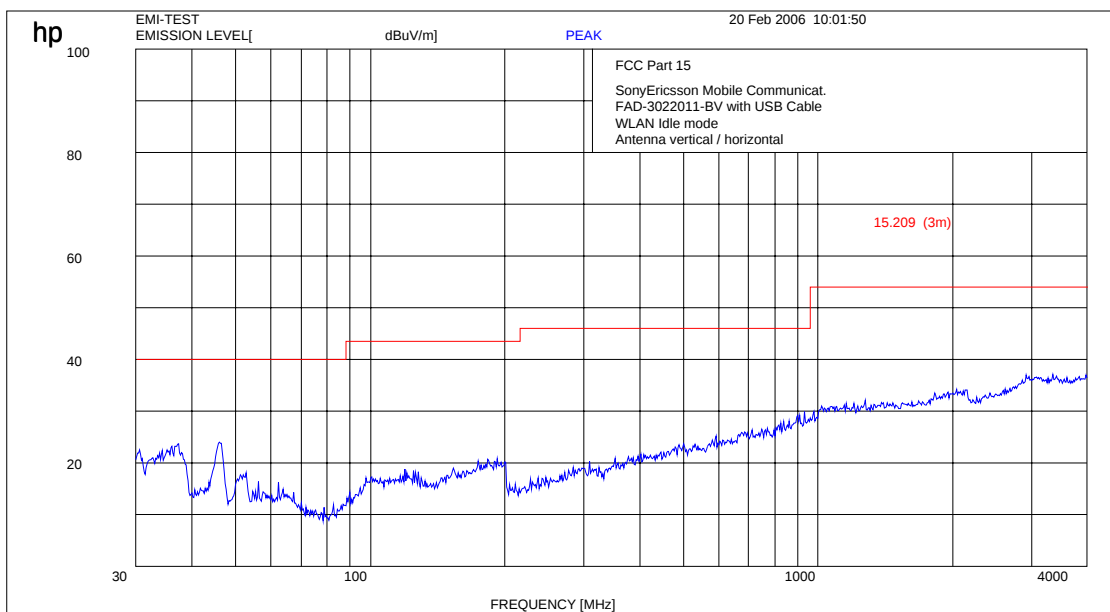
Plot 7: 4- 12 GHz (highest channel)



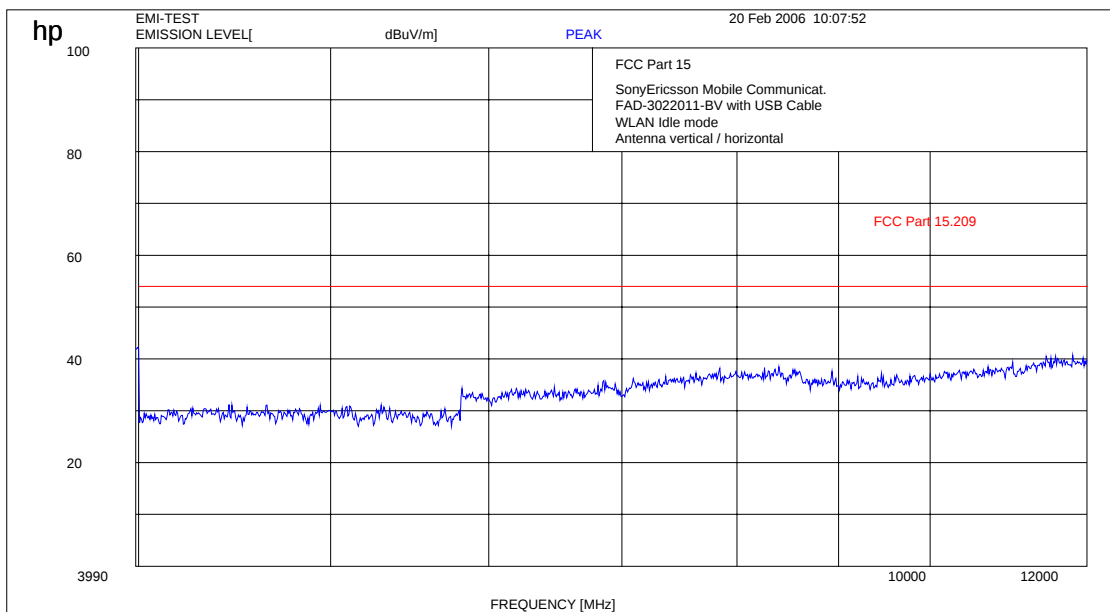
| Frequency [MHz] | Field strength [ $\mu\text{V/m}$ ] | Measurement distance (m) |
|-----------------|------------------------------------|--------------------------|
| 30 - 88         | 100 (40 dB $\mu\text{V/m}$ )       | 3                        |
| 88 - 216        | 150 (43.5 dB $\mu\text{V/m}$ )     | 3                        |
| 216 - 960       | 200 (46 dB $\mu\text{V/m}$ )       | 3                        |
| above 960       | 500 (54 dB $\mu\text{V/m}$ )       | 3                        |

## 3.13 Spurious Emissions - radiated (Receiver) §15.109 / 209

Plot 1: 0.03 - 4 GHz vertical / horizontal (receiver)



Plot 2: 4- 12 GHz (receiver)

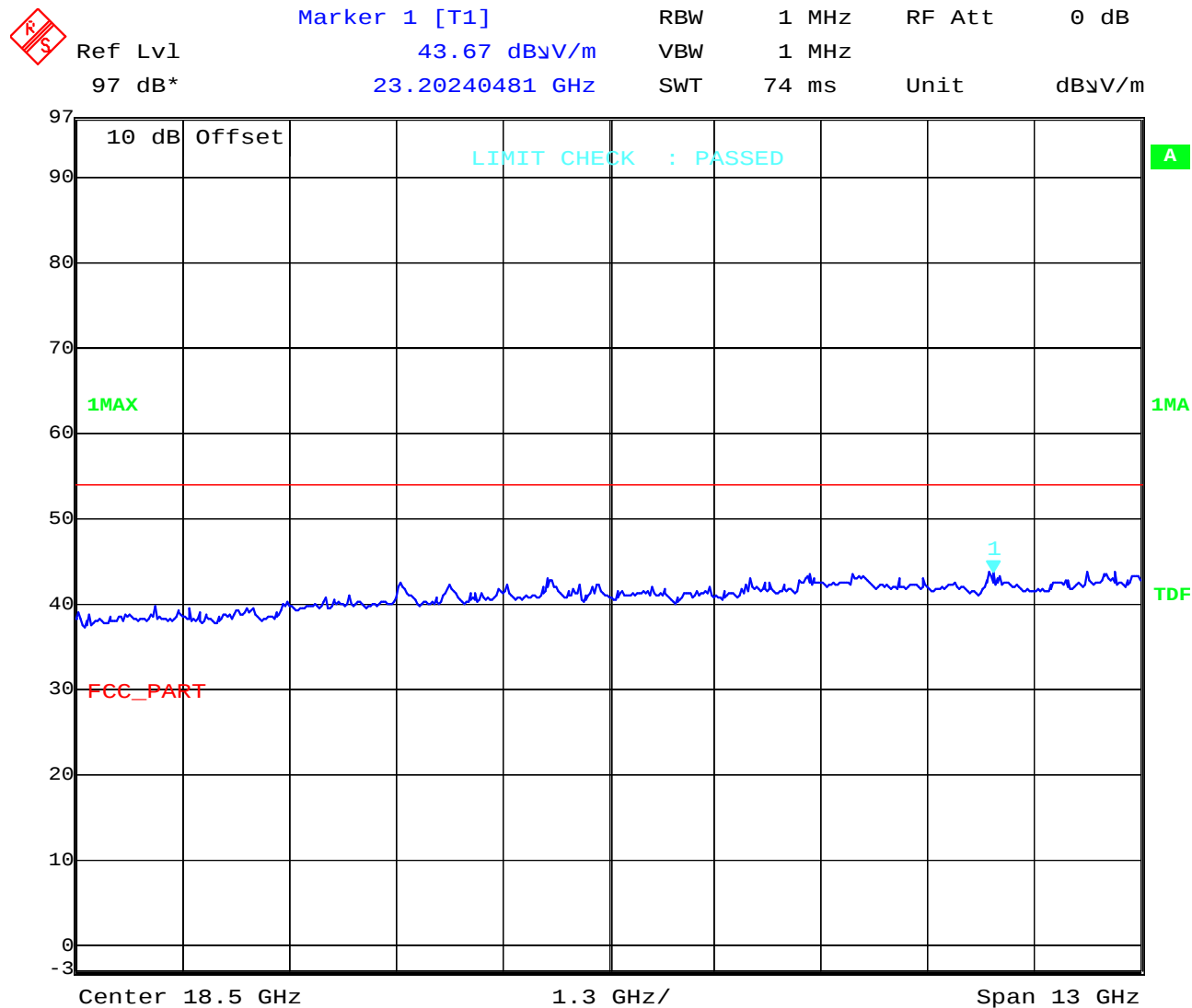


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Plot 3: 12- 25 GHz (receiver)



Date: 21.FEB.2006 12:36:35

Results:

| Spurious Emissions level [ $\mu\text{V/m}$ ] |          |                           |                    |          |                           |        |          |                           |
|----------------------------------------------|----------|---------------------------|--------------------|----------|---------------------------|--------|----------|---------------------------|
| CH 1 / 2 / 3                                 |          |                           |                    |          |                           |        |          |                           |
| f[MHz]                                       | Detector | Level [ $\mu\text{V/m}$ ] | f[MHz]             | Detector | Level [ $\mu\text{V/m}$ ] | f[MHz] | Detector | Level [ $\mu\text{V/m}$ ] |
| 37.2                                         | PK/V     | 18.6                      |                    |          |                           |        |          |                           |
| 46.12                                        | PK/V     | 23.4                      |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
|                                              |          |                           |                    |          |                           |        |          |                           |
| Measurement uncertainty                      |          |                           | $\pm 3 \text{ dB}$ |          |                           |        |          |                           |

f < 1 GHz : RBW/VBW: 100 kHz  
see above plots

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

Measurement distance see table

Limits : § 15.109 / 209

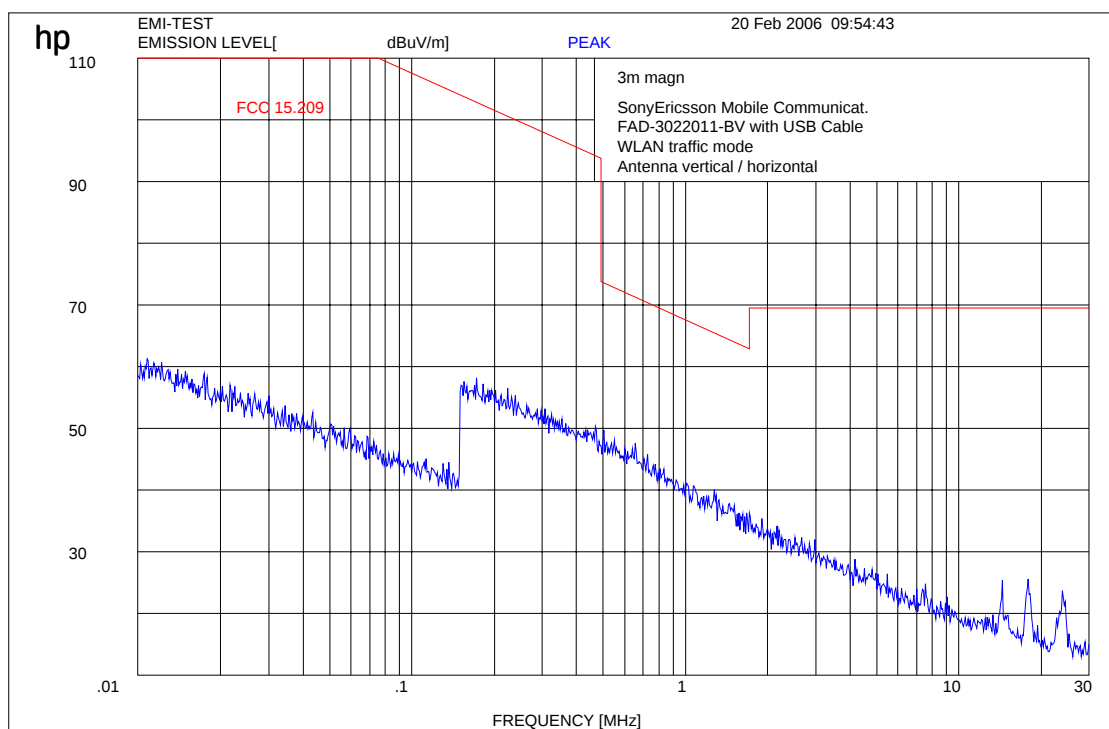
| Frequency (MHz) | Field strength ( $\mu\text{V/m}$ ) | Measurement distance (m) |
|-----------------|------------------------------------|--------------------------|
| 30 - 88         | 100 (40 dB $\mu\text{V/m}$ )       | 3                        |
| 88 - 216        | 150 (43.5 dB $\mu\text{V/m}$ )     | 3                        |
| 216 - 960       | 200 (46 dB $\mu\text{V/m}$ )       | 3                        |
| above 960       | 500 (54 dB $\mu\text{V/m}$ )       | 3                        |

## 3.14 Spurious Emissions - radiated <30 MHz §15.209

Measured at 10 m distance.

Values recalculated with 40 dB/decade according to FCC rules.

Plot 1:



Limits:

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

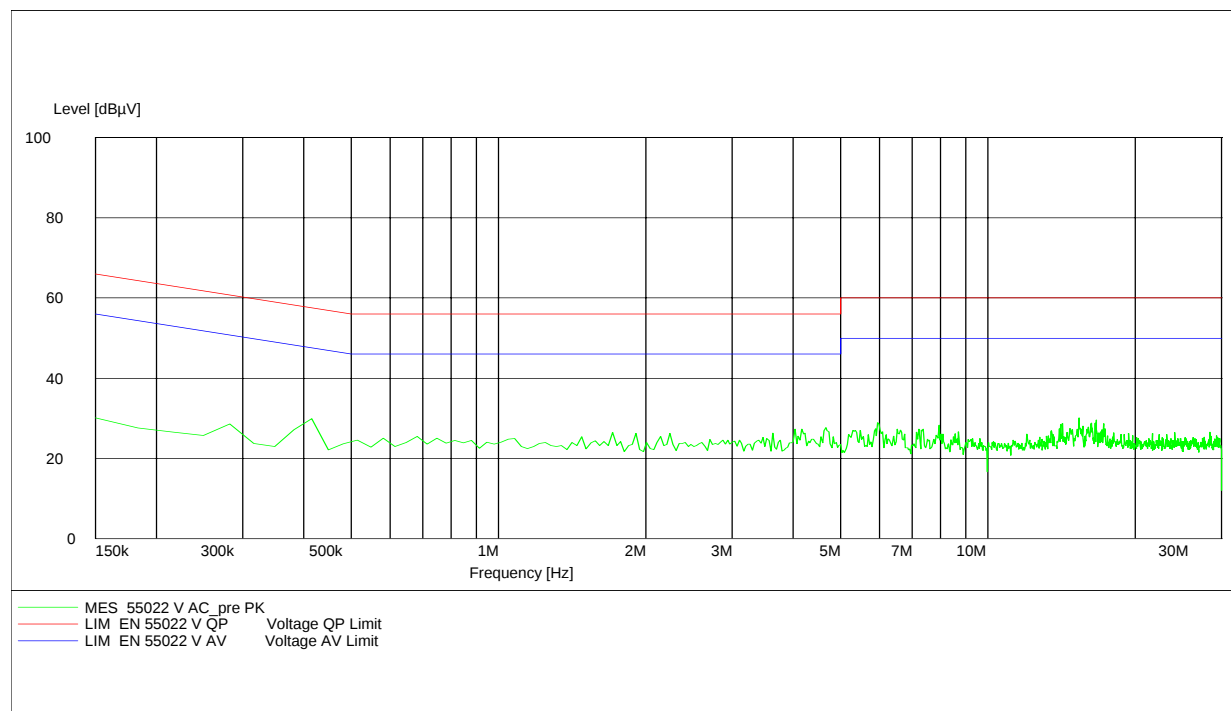
## 3.15 Conducted Emissions <30 MHz §15.107/207

Plot 1: normal operating  
CISPR 22

EUT: FAD-3022011-BV  
Manufacturer: SonyEricsson Mobile Communication  
Operating Condition: WLAN operating  
Test Site: CETECOM ICT Services Room 006  
Operator: Berg M.  
Test Specification: EN 55022/ CISPR 22  
Power Supply: 115V /60 Hz  
Start of Test: 23.02.2006 / 07:39:11

### SCAN TABLE: "EN 55022 V"

| Short Description: |          |         | Voltage Mains 1.60 |            |           |                 |
|--------------------|----------|---------|--------------------|------------|-----------|-----------------|
| Start              | Stop     | Step    | Detector           | Meas. Time | IF Bandw. | Transducer      |
| 150.0 kHz          | 30.0 MHz | 7.5 kHz | MaxPeak            | 100.0 ms   | 10 kHz    | ESH3-Z5 L1 1458 |
|                    |          |         | Average            |            |           |                 |



Limits :

|                                   |           |
|-----------------------------------|-----------|
| Under normal test conditions only | See plots |
|-----------------------------------|-----------|

## 3.16 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                     | Erft            | 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                     | Erft            | 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                     | Erft            | 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                     | Erft            | 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                     | Erft            | 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                     | Erft            | 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 |

## 4 Photographs

Photo 1 (Radiated Emissions):

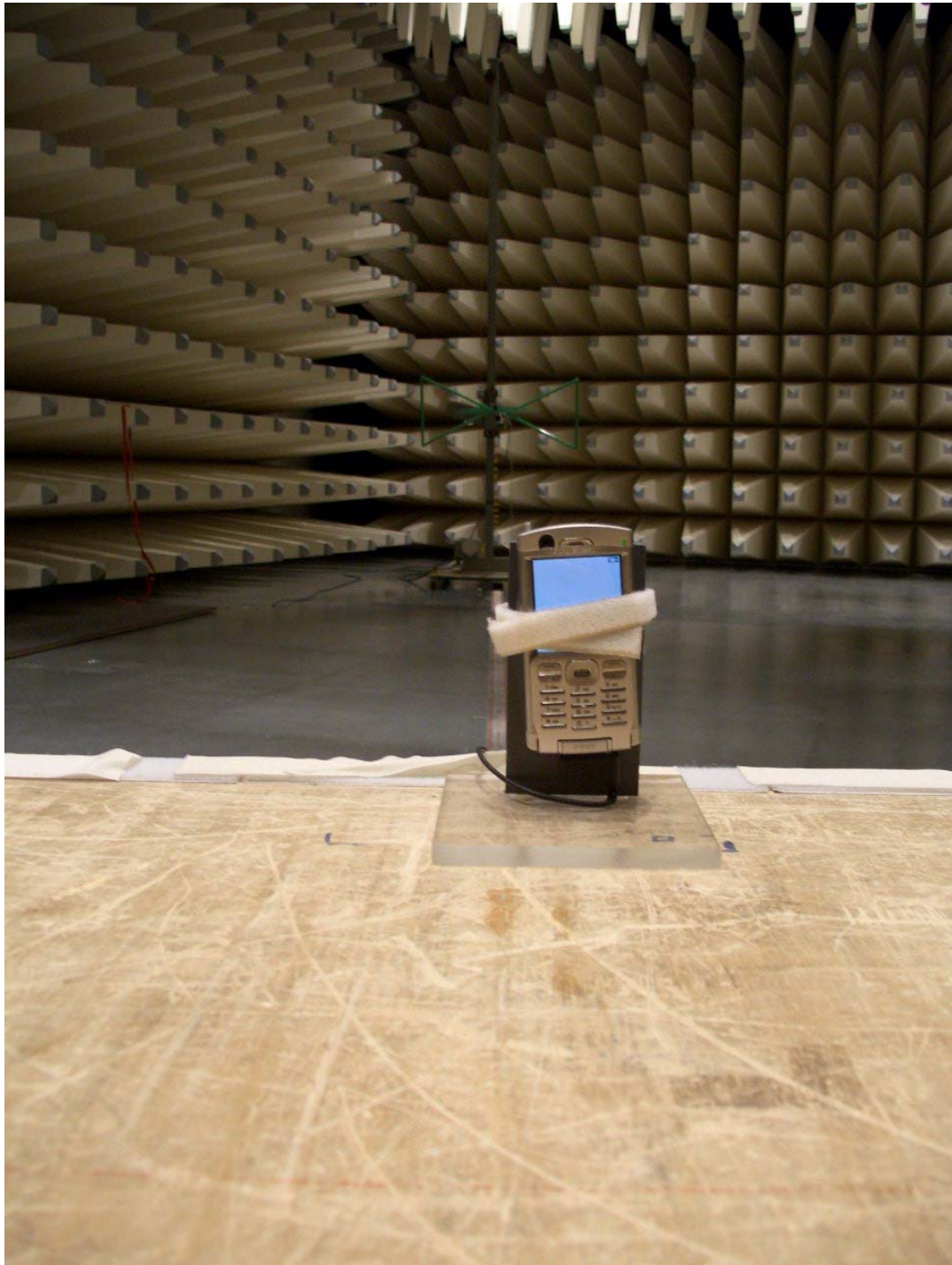
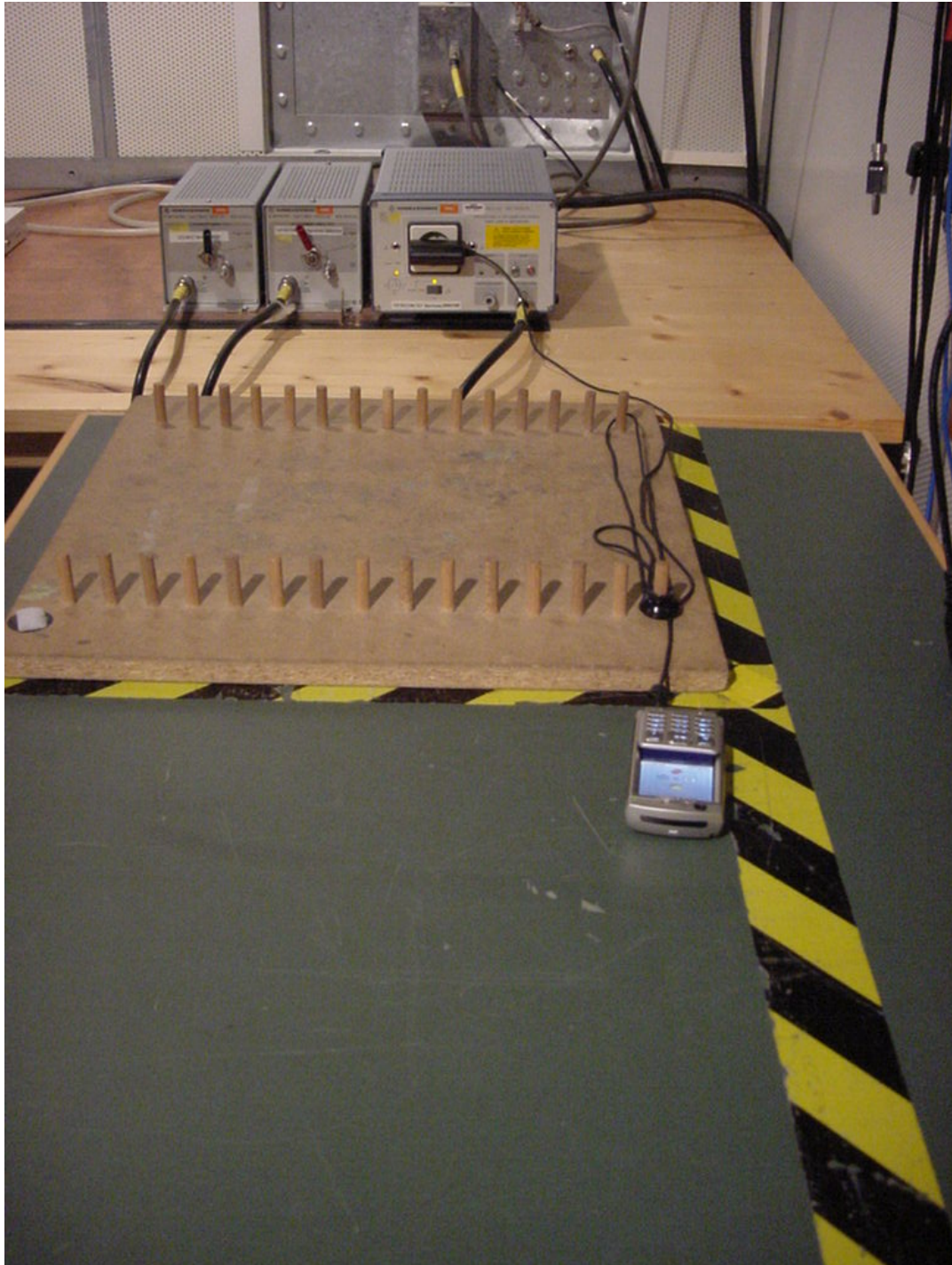


Photo 2 (Radiated Emissions):



Photo 3 (Conducted Emissions):



## 5 Annex C: External Photographs of the Equipment

Photo 1:



Photo 2:



Photo 3:



Photo 4:



Photo 5:



Photo 6:



Photo 6:



## 6 Annex D: Internal Photographs of the Equipment

Photo 1:



Photo 2:



Photo 3:

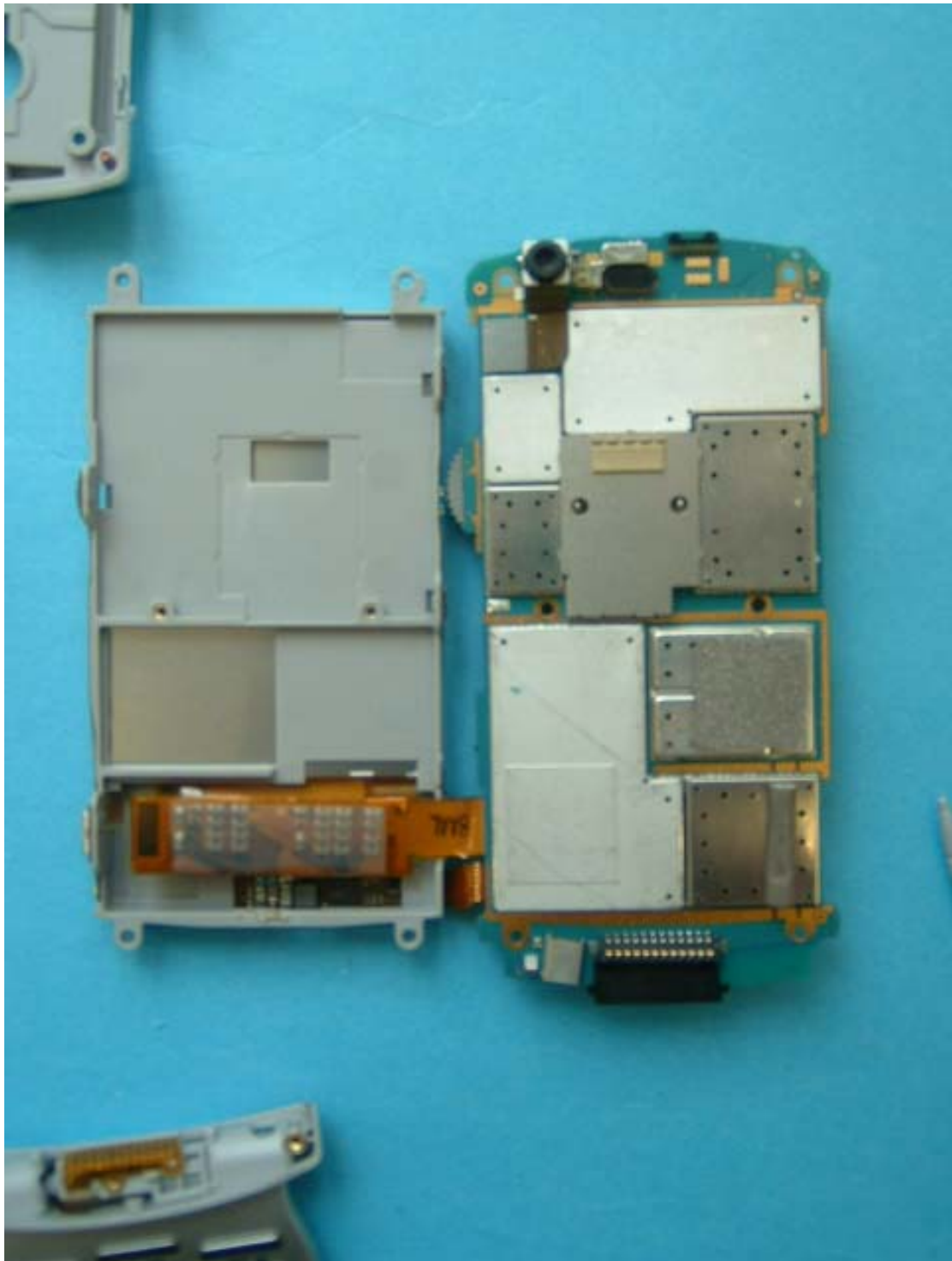


Photo 4:



Photo 5:



Photo 6:

