

Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: IC 3463A-1
TCB ID: DE 0001



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



Accredited Bluetooth® Test Facility (BQTF)

Test report no. : 2-4689-01-03/07
Applicant : Ads-tec GmbH
Type : WLAN AP RAP1X1X
Test Standard : FCC Part 15.247
RSS 210 Issue 7
FCC ID : T9GRAX1X1X
IC Certification No. : 6275A-RAX1X1X

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Table of contents


| | |
|---|-----------|
| 1. ADMINISTRATIVE DATA | 3 |
| 1.1. ADMINISTRATIVE DATA OF THE TEST FACILITY | 3 |
| 1.1.1 Identification of the testing laboratory | 3 |
| 1.1.2 Organizational items..... | 3 |
| 1.1.3 Applicant´s details | 4 |
| 1.2. ADMINISTRATIVE DATA OF MANUFACTURER / MEMBER | 4 |
| 1.3. DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT) | 5 |
| 1.3.1 EUT: Type, S/N etc. | 5 |
| 1.3.2 If RF component testing only, description of additional used HW/SW..... | 5 |
| 1.3.3 Additional EUT information | 6 |
| 1.3.4 Additional EUT information For IC Canada (appendix 2)..... | 7 |
| 1.3.5 EUT operating modes..... | 8 |
| 1.3.5 Extreme conditions testing values..... | 8 |
| 2 TEST STANDARD & SUMMARY LIST OF ALL PERFORMED TEST CASES | 9 |
| 3 RF MEASUREMENT TESTING | 10 |
| 3.1 DESCRIPTION OF TEST SET-UP | 10 |
| 3.1.1 Radiated measurements | 10 |
| 3.1.2 Conducted measurements | 10 |
| 3.1.3 AC-conducted measurements..... | 10 |
| 3.2 REFERENCED DOCUMENTS | 11 |
| 3.3 ADDITIONAL COMMENTS | 11 |
| 3.4 ANTENNA GAIN | 11 |
| 3.5 PEAK POWER SPECTRAL DENSITY §15.247(E) | 12 |
| 3.6 SPECTRUM BANDWIDTH OF AN OFDM SYSTEM §15.247(A2) | 14 |
| 3.7 MAXIMUM OUTPUT POWER (CONDUCTED) (OFDM) §15.247 (B) (3)..... | 19 |
| 3.8 MAX. PEAK OUTPUT POWER (RADIATED) §15.247 (B) (3) | 22 |
| 3.9 BAND-EDGE COMPLIANCE OF CONDUCTED EMISSIONS §15.247 (D) | 23 |
| 3.10 BAND-EDGE COMPLIANCE OF RADIATED EMISSIONS (OFDM) §15.205 | 25 |
| 3.11 SPURIOUS EMISSIONS - CONDUCTED (TRANSMITTER) §15.247 (D)..... | 26 |
| 3.12 SPURIOUS EMISSIONS - RADIATED (TRANSMITTER) §15.209 | 32 |
| 3.13 SPURIOUS EMISSIONS - RADIATED RECEIVER §15.109 / 209 | 42 |
| 3.14 SPURIOUS EMISSIONS - RADIATED <30 MHZ §15.209 | 47 |
| 3.15 CONDUCTED EMISSIONS <30 MHZ §15.107/207 | 48 |
| 4 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS | 49 |
| 5 PHOTOGRAPHS OF TEST SITE | 52 |
| 6 PHOTOGRAPHS OF EQUIPMENT UNDER TEST | 55 |

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 D-66117 Saarbruecken Germany |
| Laboratory accreditation: | DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF) |
| Responsible for testing laboratory: | Harro Ames, Michael Berg Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de |



.....
Responsible for testing laboratory
(Harro Ames)

1.1.2 Organizational items

| | |
|---|--------------------------|
| Reference No.: | 2-4689-01-03/07 |
| Order No.: | |
| Responsible for test report and project leader: | Harro Ames, Michael Berg |
| Receipt of EUT: | 2007-10-22 |
| Date(s) of test: | 2007-10-22 to 2007-11-20 |
| Date of report: | 2007-11-21 |
| Number of report pages: | 59 |
| Number of diagram pages (annex): | |
| ----- | |
| Version of template: | 1.6 |



.....
Responsible for test report
(Michael Berg)

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.

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

1.1.3 Applicant's details

| | |
|-------------------|--|
| Applicant's name: | ads-tec GmbH |
| Address: | Raiffeisenstr. 14 D- 70771 Leinfelden-Echterdingen Germany |
| Contact person: | Mr. Steffen Pfendtner Tel: +49 (0)711 45894-380 Fax: +49 (0)711 45894-987 email: s.pfendtner@ads-tec.de |

1.2 Administrative data of manufacturer / member

| | |
|----------------------|---------------|
| Manufacturer's name: | - applicant - |
| Address: | |

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

| Product name | Product ID | Description | S/N serial number | HW hardware status | SW software status |
|----------------------|--------------------|---|---------------------------------------|---------------------------------|--------------------|
| RAP1X1X | | Dual band WLAN AP/Client single card version | - | - | - |
| Frequency Band [MHz] | Type of Modulation | Number of channels | Antenna | Power Supply | Temperature Range |
| ISM 5725 - 5850 | OFDM | 5 | 2 external antennas RBH-H01-01 | External AC power supply | -20°C to +55°C |

for more infos see subpart 1.3.3

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 | | | | | | |

1.3.3 Additional EUT information

The sample is a dual access point / dual client for dualband use. (2.4 and 5 GHz).

Inside the AP there is only one RF part, able to work on 2.4 and 5 GHz.

The only difference between AP and client is the software setting, RF-part is identical.

There are no differences in RF behaviour between AP and client.

In this report we test the AP the dedicated rod antennas at 2.4 GHz.

Other antennas and frequency ranges are tested in separate reports.

| Access Point | RAP1110 | RAP1111 | RAP1210 | RAP1211 | RAP1120 | RAP1121 | RAP1220 | RAP1221 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 WLAN Module | X | X | X | X | | | | |
| 2 WLAN Modules | | | | | X | X | X | X |
| 1xCU Ethernet Port (RJ45) | X | X | | | X | X | | |
| 5xCU Ethernet Port (integrated switch) (RJ45) | | | | | | | | |
| 1xOptical Ethernet Port | | | X | X | | | X | X |
| PoE (IEEE 802.3af) 48V DC | X | X | | | X | X | | |
| 24 V DC | X | | X | | X | | X | |
| AC integrated 110-230 V AC | | X | | X | | X | | X |
| Client Mode available | X | X | X | X | X | X | X | X |
| Access Client | RAC1110 | RAC1111 | RAC1510 | RAC1511 | RAC1120 | RAC1121 | RAC1220 | RAC1221 |
| 1 WLAN Module | X | X | X | X | | | | |
| 2 WLAN Modules | | | | | X | X | X | X |
| 1xCU Ethernet Port | X | X | | | X | X | | |
| 5xCU Ethernet Port (integrated switch) | | | X | X | | | | |
| 1xOptical Ethernet Port | | | | | | | X | X |
| PoE (IEEE 802.3af) 48V DC | X | X | X | X | X | X | | |
| 24 V DC | X | | X | | X | | X | |
| AC integrated 110-230 V AC | | X | | X | | X | | X |

1.3.4 Additional EUT information For IC Canada (appendix 2)

| | |
|---|---|
| IC Certification Number: | 6275A-RAX1X1X |
| Model Name: | RAP1110, RAP1111, RAP1210, RAP1211 / RAC1110, RAC1111, RAC1510, RAC1511 |
| Manufacturer (complete Adress): | ads-tec GmbH Raiffeisenstr. 14 D-70771 Leinfelden-Echterdingen Germany |
| Tested to Radio Standards Specification (RSS) No.: | RSS-210 Issue 7 |
| Open Area Test Site Industry Canada Number: | IC 3463A-1 |
| Frequency Range (or fixed frequency) [MHz]: | 5745 - 5825 MHz |
| RF: Power [W] (max): | Rad. EIRP: 36.3 mW Conducted : 27.5 mW |
| Antenna Type: | rod antennas: DZ-PCKO-11033-0 |
| Occupied Bandwidth (99% BW) [MHz]: | 19.09 MHz |
| Type of Modulation: | OFDM |
| Emission Designator (TRC-43): | 19M1G7D |
| Transmitter Spurious (worst case) [μ V/m in 3m]: | No peaks found <15 dB below limits |
| Receiver Spurious (worst case) [μ V/m in 3m]: | No peaks found <15 dB below limits |

ATTESTATION: I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all the applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Date: 2007-11-21

Testengineer: Harro Ames

1.3.5 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.

1.3.6 Extreme conditions testing values

| Description | Shortcut | Unit | Value |
|--------------------------------|-------------------|--------|------------|
| Nominal Temperature / humidity | T _{nom} | °C / % | 22°C / 33% |
| Low Temperature | T _{low} | °C | -20°C |
| High Temperature | T _{high} | °C | 55°C |
| Nominal Power Source | V _{nom} | V | 115V AC |
| Low Power Source | V _{low} | V | 100V AC |
| High Power Source | V _{high} | V | 130V AC |

Type of powersource: External AC power supply with 24V DC output, delivered by the customer

2 Test standard & summary list of all performed test cases

| TC identifier | Description | verdict | date | Remark |
|---------------|--------------------------------------|---------|------------|--------|
| RF-Testing | FCC Part 15 §15.247 - CANADA RSS-210 | pass | 2007-11-21 | |

| 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(a2) | Spectrum Bandwidth of an OFDMSystem 6dB/20dB/26dB BW | Yes | | | |
| § 15.247 (b) (3) | Maximum output power (conducted) | Yes | | | |
| § 15.247 (b) (3) | Max. peak output power (radiated) | Yes | | | |
| §15.247 d) | Band-edge compliance of conducted emissions | Yes | | | |
| §15.205 | Band-edge compliance of radiated emissions | Yes | | | |
| §15.247 (d) | Spurious Emission - conducted (Transmitter) | Yes | | | |
| § 15.209 | Spurious Emission -radiated (Transmitter) | Yes | | | |
| § 15.247 (d) | Spurious Emissions-radiated (Receiver) | Yes | | | |
| § 15.209 | 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 25 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 setups 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 kHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.

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

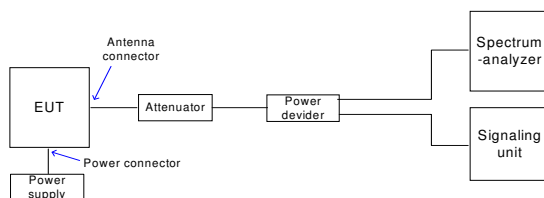
30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

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

>1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn with lownoise preamp

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.



3.1.3 AC-conducted measurements

We used the dedicated power supply delivered by the customer.

3.2 Referenced Documents

none

3.3 Additional comments

This test report covers all type of hosts that includes one RF-card only.

3.4 Antenna gain

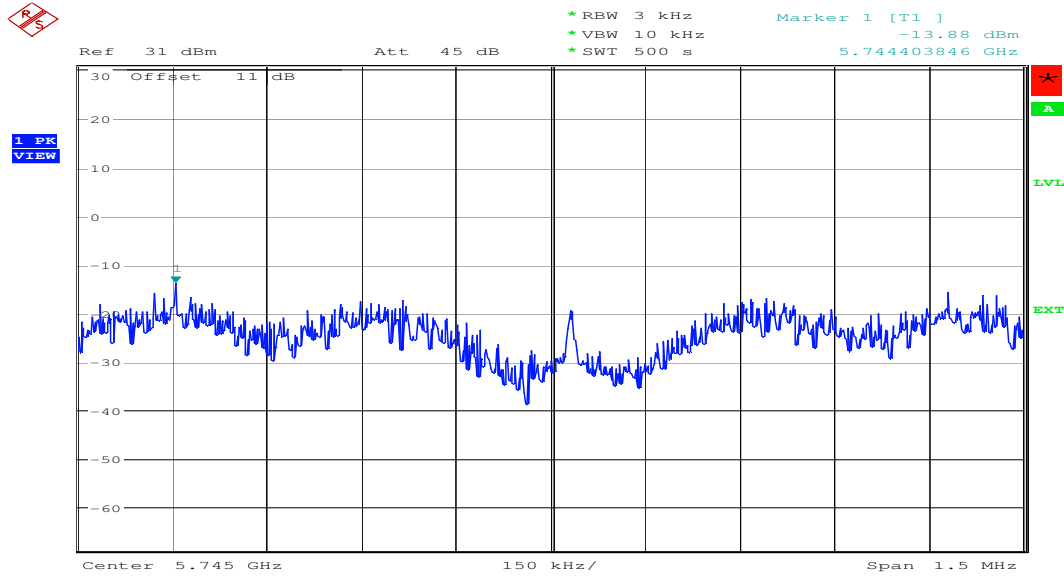
The antenna gain is calculated by subtracting the conducted from the radiated power.

For the dedicated rod antenna, we calculated max 1.6 dBi at 5745 MHz. (see page 22)

3.5 Peak Power Spectral density

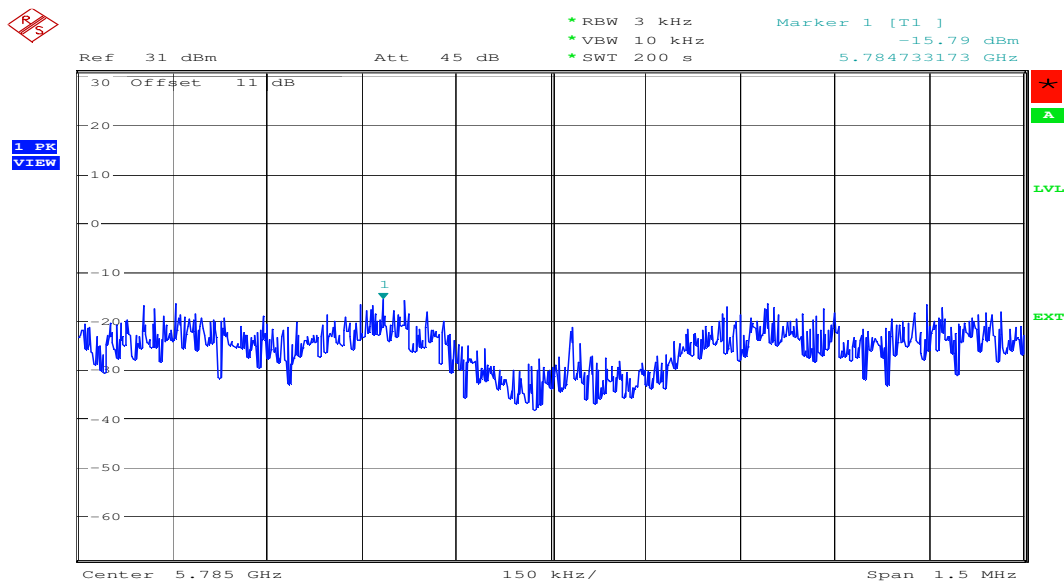
§15.247(e)

Plot 1:



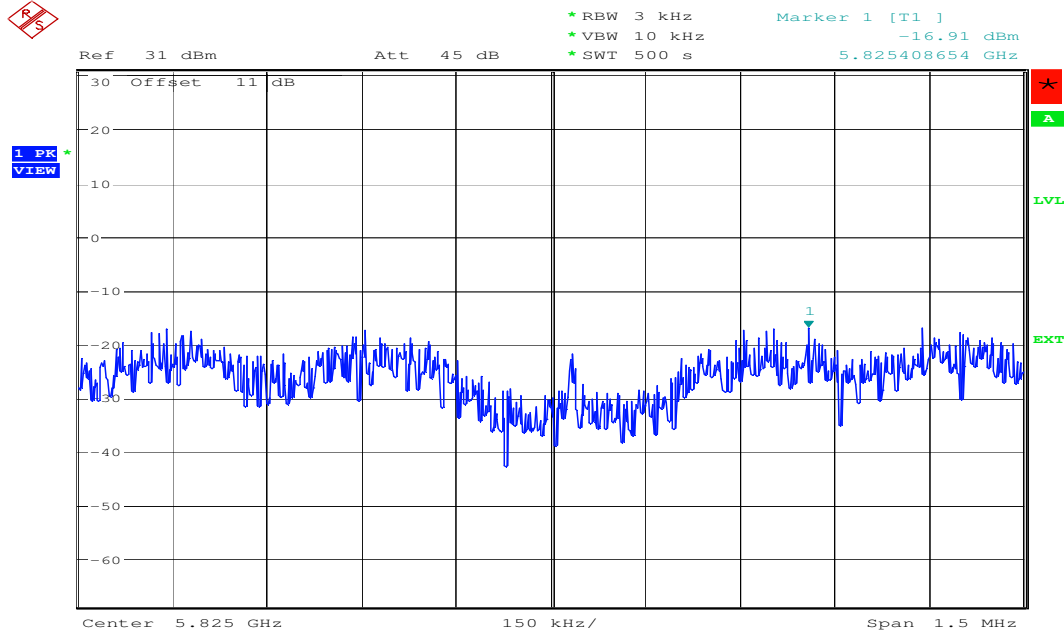
Date: 10.NOV.2007 14:39:56

Plot 2:



Date: 10.NOV.2007 14:44:48

Plot 3:



Date: 10.NOV.2007 14:51:17

Results: Plot 1: Power density : = - 13.9 dBm / 3 KHz
Plot 2: Power density : = - 15.8 dBm / 3 KHz
Plot 3: Power density : = - 16.9 dBm / 3 KHz

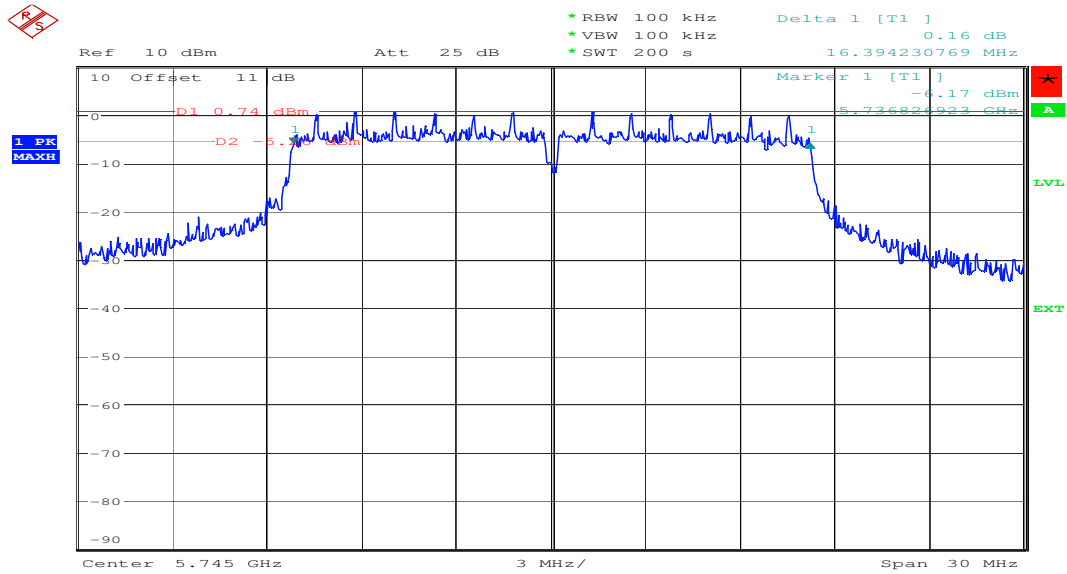
Limits :

| | |
|-----------------------------------|---|
| 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 an OFDM System

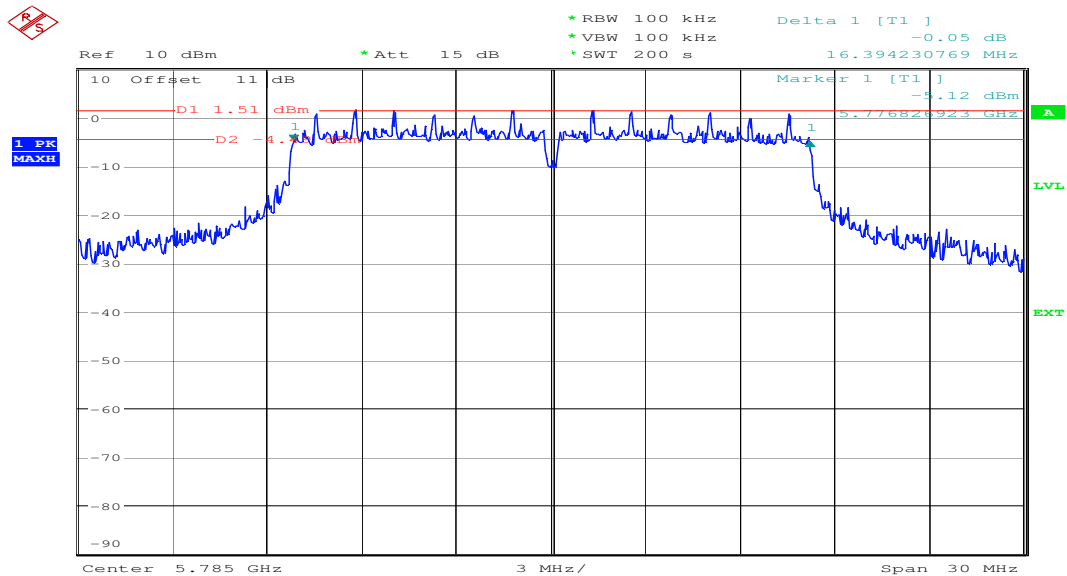
§15.247(a2)

Plot 1: 6 dB-Bandwidth (5745 MHz)



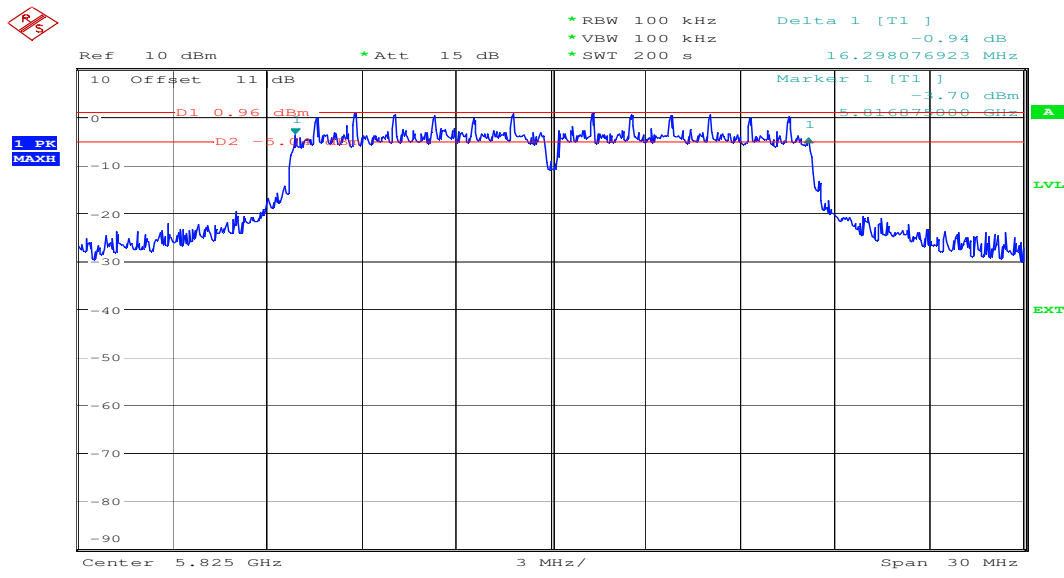
Date: 10.NOV.2007 14:57:32

Plot 2: 6 dB-Bandwidth (5785MHz)



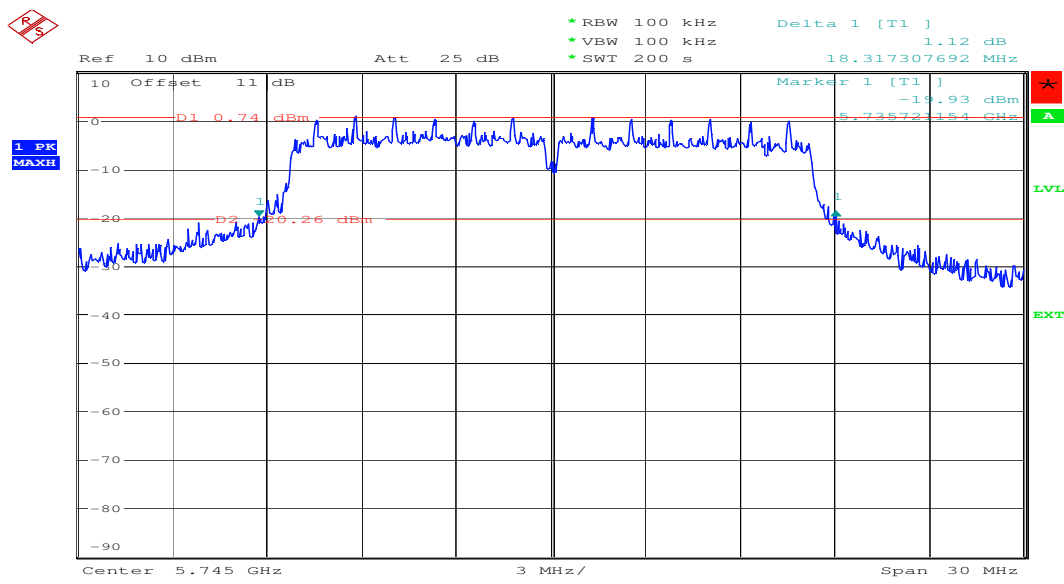
Date: 10.NOV.2007 15:08:34

Plot 3: 6 dB-Bandwidth (5825 MHz)



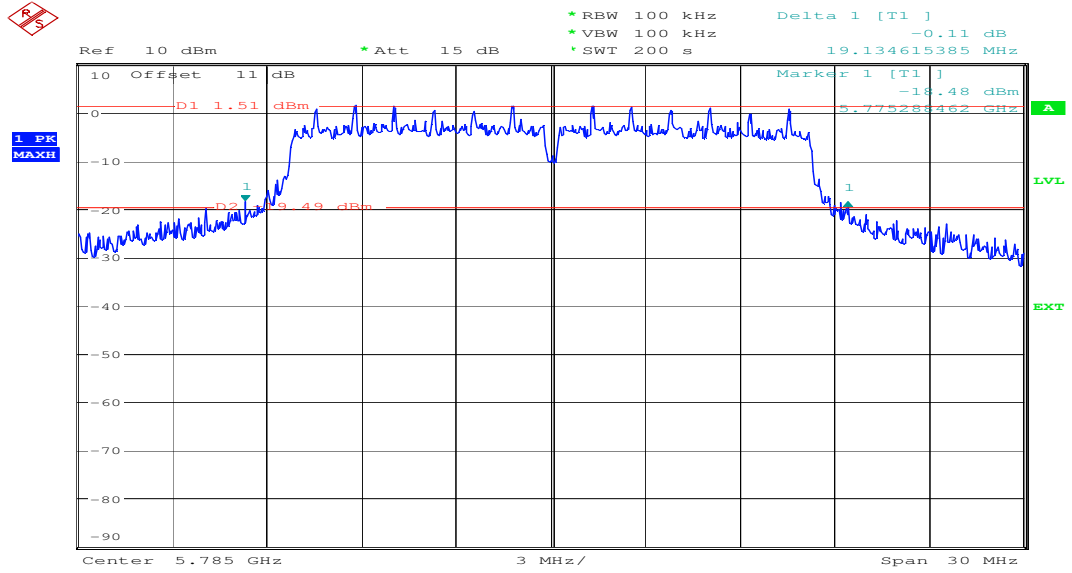
Date: 10.NOV.2007 15:20:05

Plot 4: 20 dB-Bandwidth (5745 MHz)



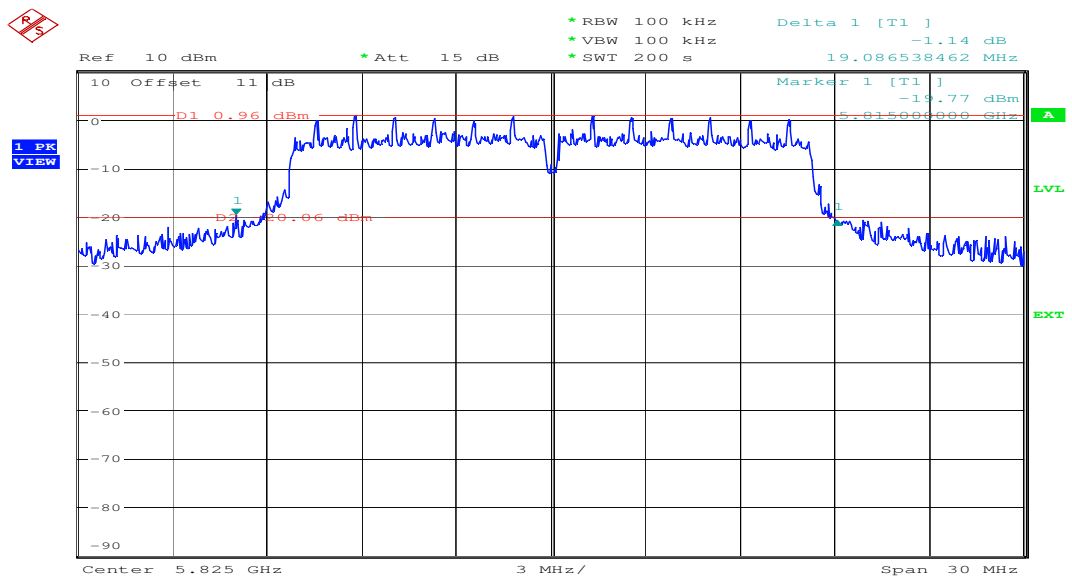
Date: 10.NOV.2007 14:58:48

Plot 5: 20 dB-Bandwidth (5785 MHz)



Date: 10.NOV.2007 15:09:22

Plot 6: 20 dB-Bandwidth (5825 MHz)



Date: 10.NOV.2007 15:20:53

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

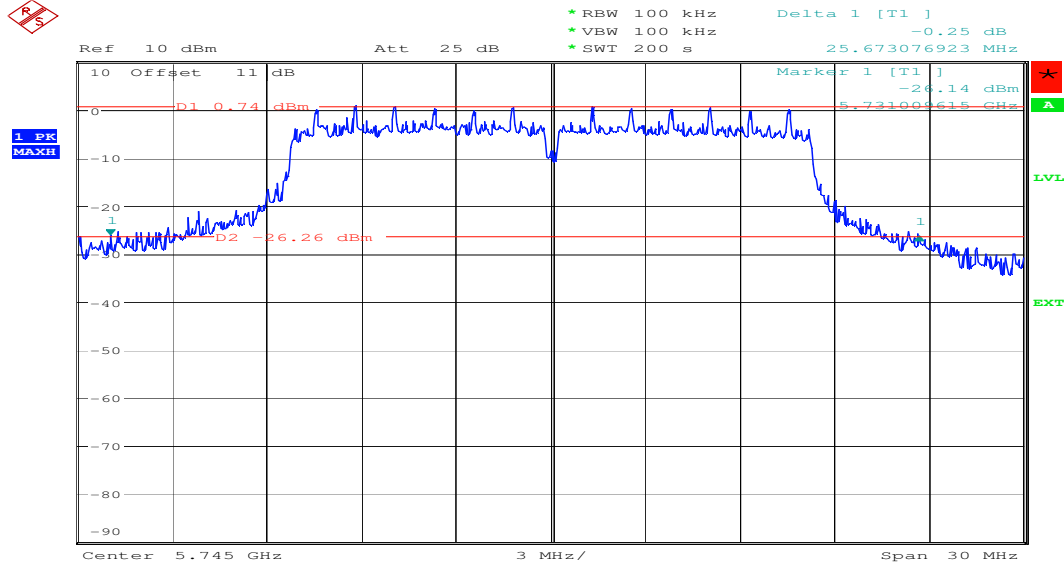


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

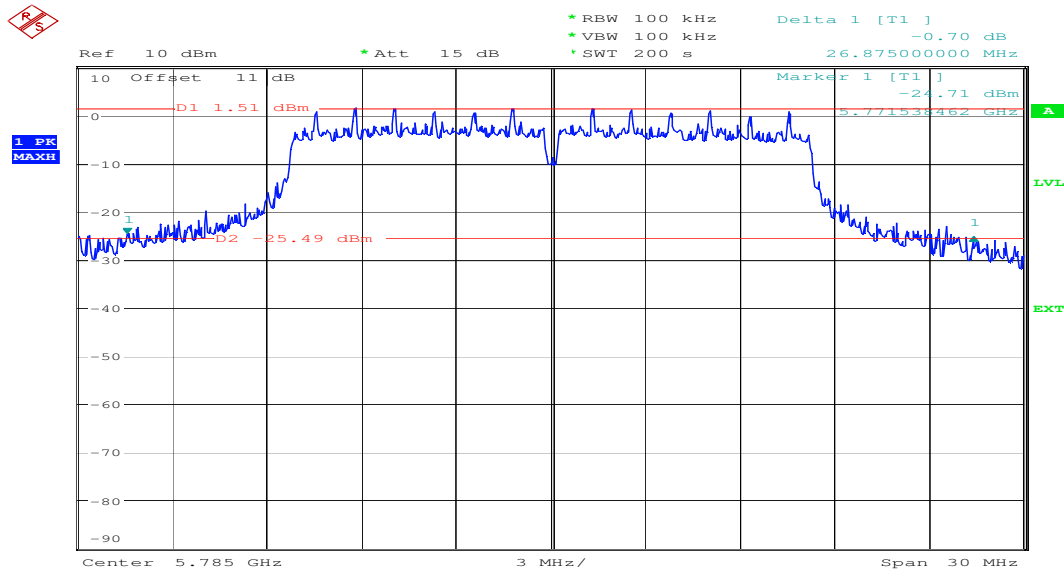
Page 17 of 59

Plot 7: 26 dB-Bandwidth (5745MHz)



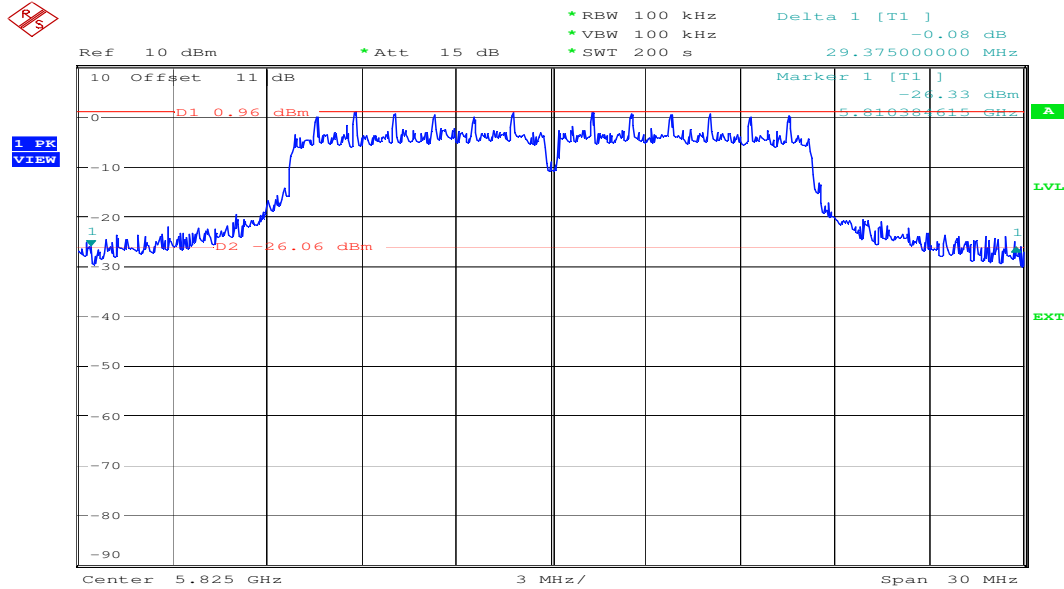
Date: 10.NOV.2007 15:00:10

Plot 8: 26 dB-Bandwidth (5785 MHz)



Date: 10.NOV.2007 15:10:16

Plot 9: 26 dB-Bandwidth (5825 MHz)



Date: 10.NOV.2007 15:21:34

Results:

| Test conditions | BANDWIDTH [MHz] | | |
|-------------------------|-----------------|-------|-------|
| | 5745 | 5785 | 5825 |
| 6 dB - Bandwidth | 16.39 | 16.40 | 16.30 |
| 20 dB - Bandwidth | 18.32 | 19.13 | 19.09 |
| 26 dB - Bandwidth | 25.67 | 26.88 | 29.38 |
| Measurement uncertainty | ±1kHz | | |

RBW: 100 kHz / VBW 100 kHz

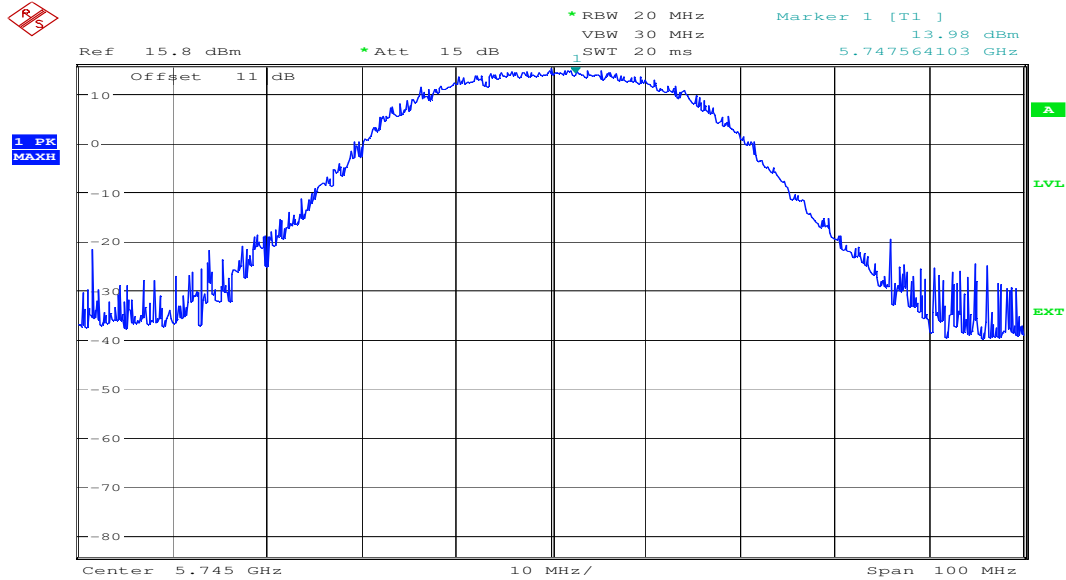
Limits :

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

3.7 Maximum output power (conducted) (OFDM)

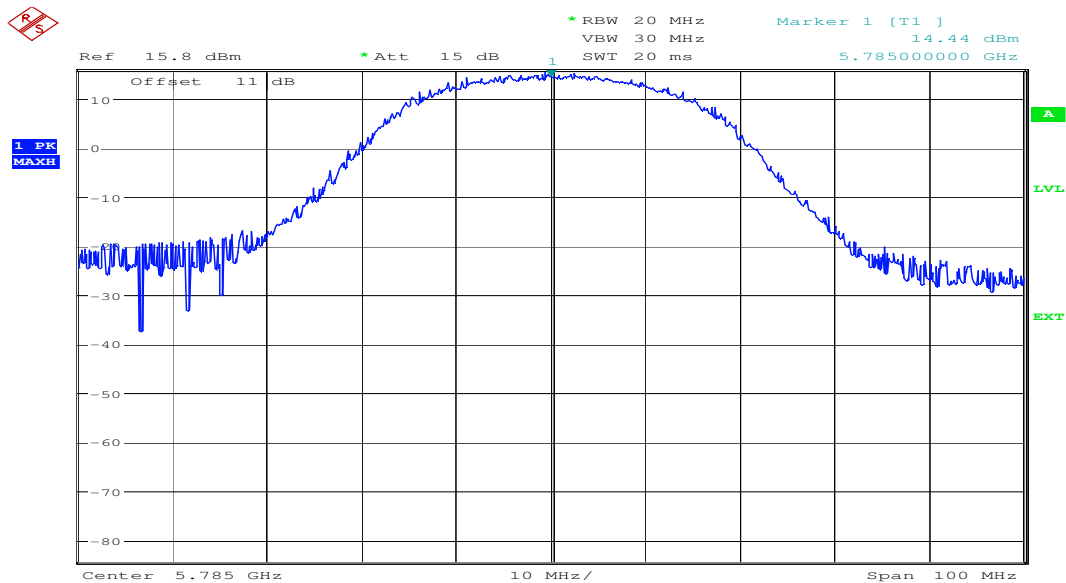
§15.247 (b) (3)

Plot 1:



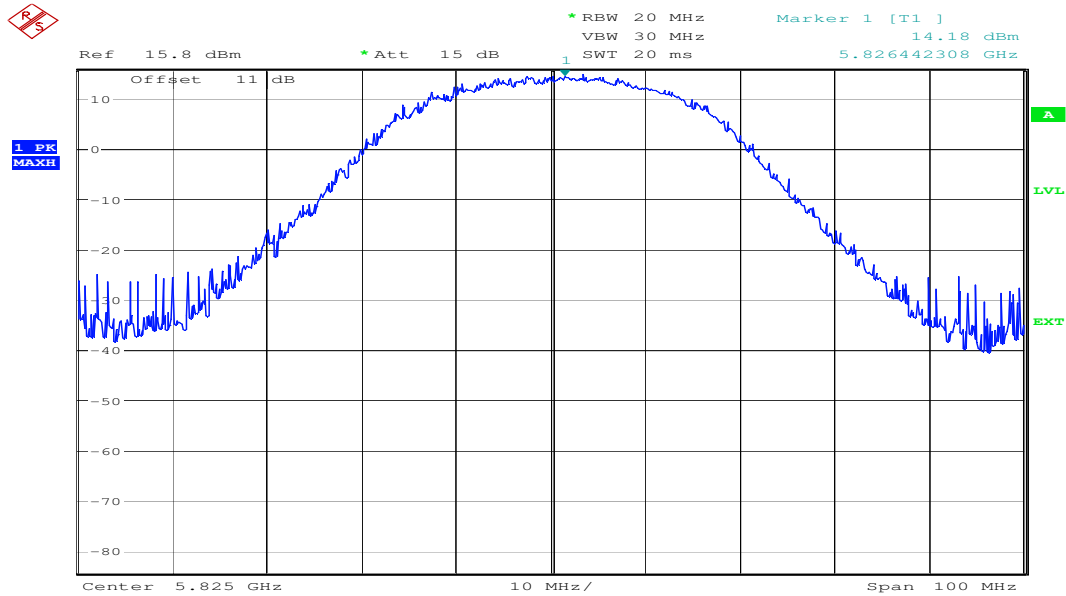
Date: 28.NOV.2007 08:32:20

Plot 2:



Date: 28.NOV.2007 08:53:45

Plot 3:



Date: 28.NOV.2007 09:00:57

Results:

| Test conditions | | Max. peak output power [dBm] | | | |
|-------------------------|------------------|------------------------------|------|------|------|
| Frequency [MHz] | | 5745 | 5785 | 5825 | |
| T _{nom} | V _{nom} | PK | 14.0 | 14.4 | 14.2 |
| Measurement uncertainty | | ±3dB | | | |

| | |
|--|------------------------|
| Under normal test conditions only, for frequency range 5725 - 5850 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/cm²)
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: 15.6 dBm = 36.3 mW

calculated at distance of 20 cm:

power density = $36.3 / 4\pi 20^2 = 0.007 \text{ mW/ cm}^2$

Limit:

| |
|---|
| 1mW/ cm ² 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] | | |
|-------------------------|-----------|-----------------------------------|-----------|-----------|
| Frequency [MHz] | | 5745 | 5785 | 5825 |
| T_{nom} | V_{nom} | 14.0 cond | 14.4 cond | 14.2 cond |
| OFDM | | 15.6 rad | 15.2 rad | 14.8 rad |
| Measurement uncertainty | | ±3dB | | |

RBW / VBW : 20 MHz

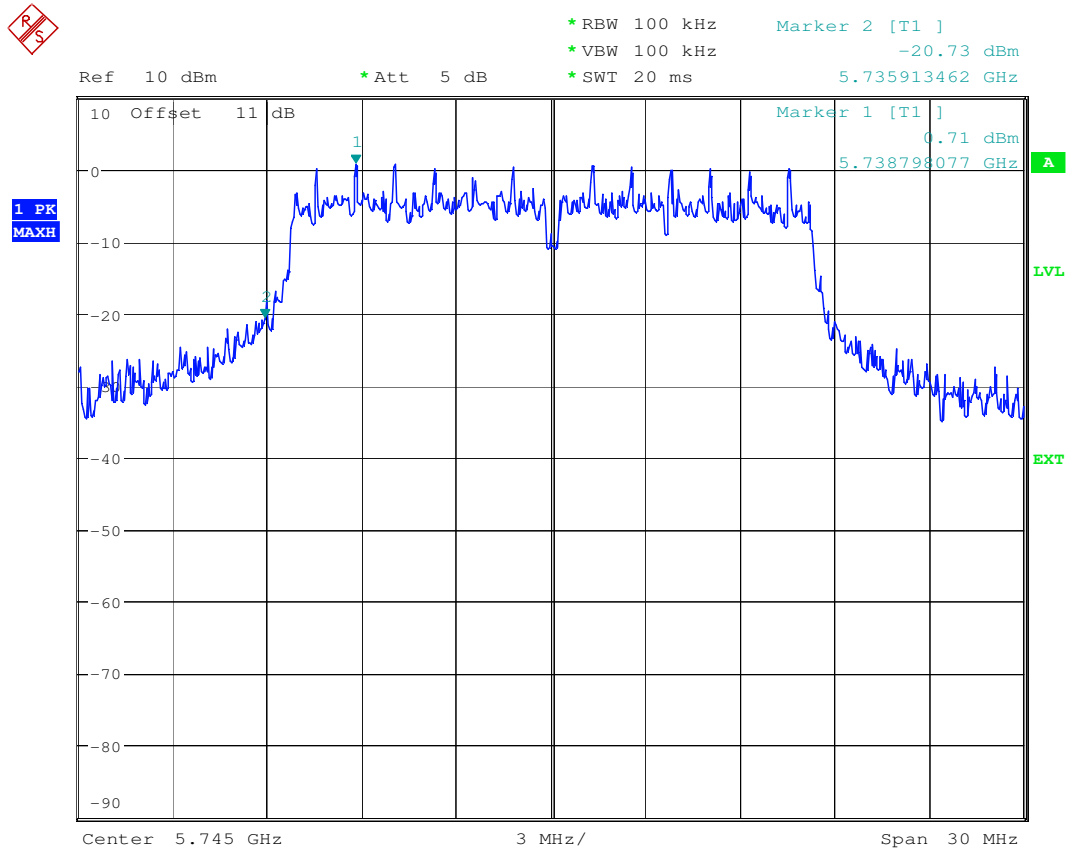
Limits:

| | |
|--|------------------------|
| Under normal test conditions only, for frequency range 5725 - 5850 MHz | Max. 1.0 Watt / 30 dBm |
|--|------------------------|

3.9 Band-edge compliance of conducted emissions

§15.247 (d)

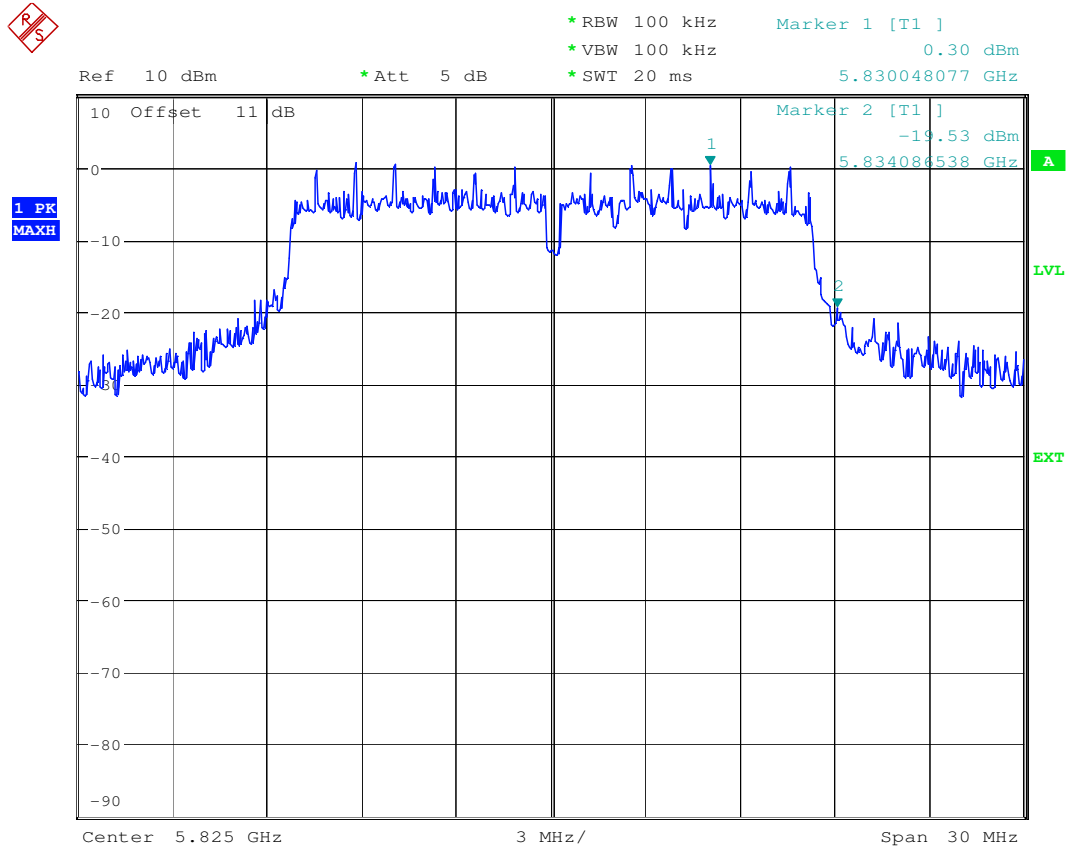
Plot 1, lowest channel



Date: 10.NOV.2007 15:42:15

The -20dBc point is at 5735.91 MHz

Plot 2, highest channel



Date: 10.NOV.2007 15:49:24

The -20dBc point is at 5834.09 MHz

Limits:

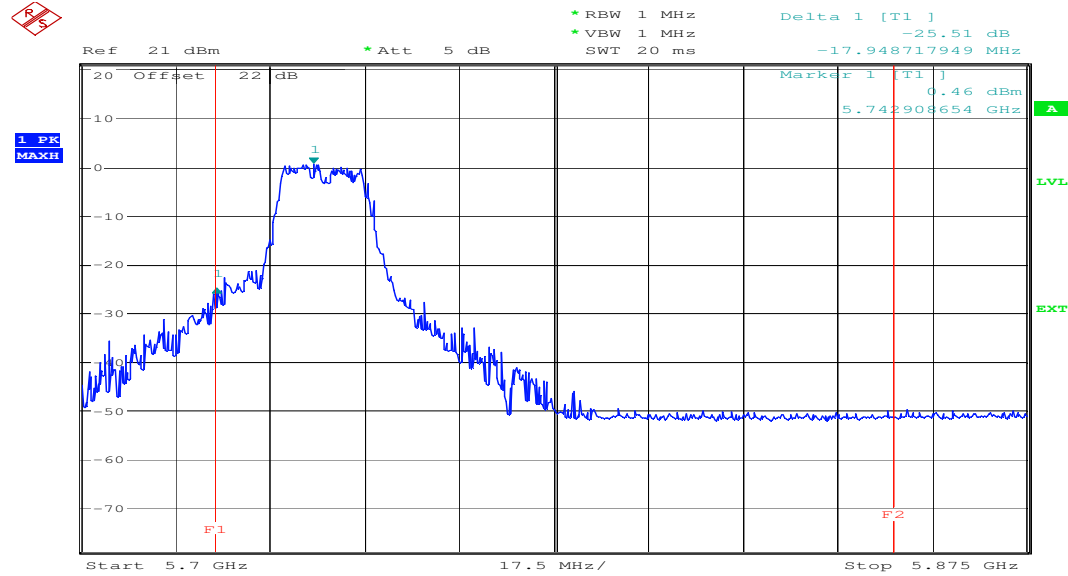
| | |
|-----------------------------------|--|
| Under normal test conditions only | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall 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 (OFDM)

§15.205

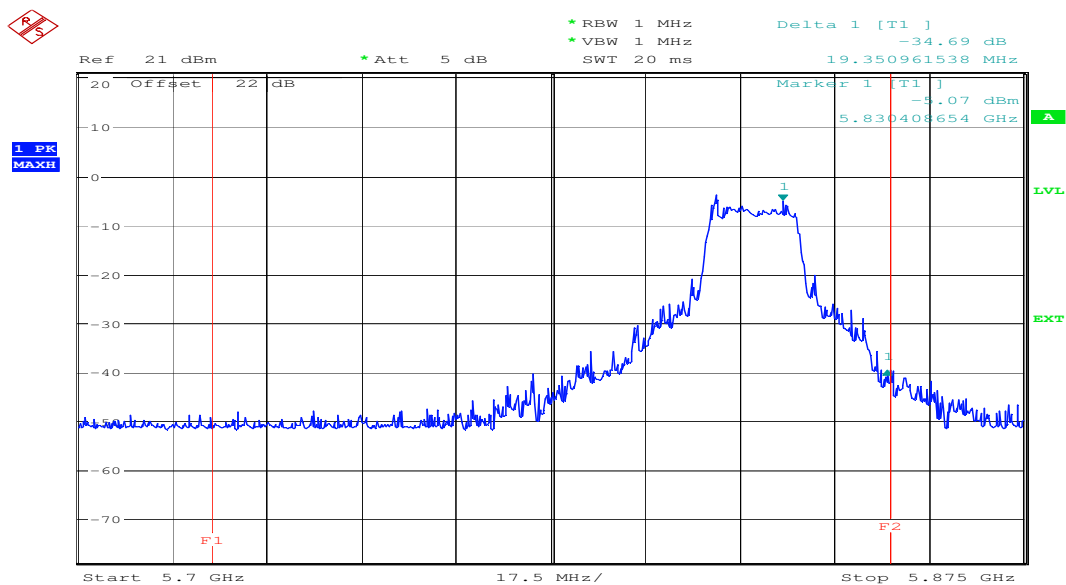
There are no restricted bands besides the tested frequency range.

5745 MHz



Date: 10.NOV.2007 16:13:40

5825 MHz



Date: 10.NOV.2007 16:18:36

3.11 Spurious Emissions - conducted (Transmitter)

§15.247 (d)

Result & Limits

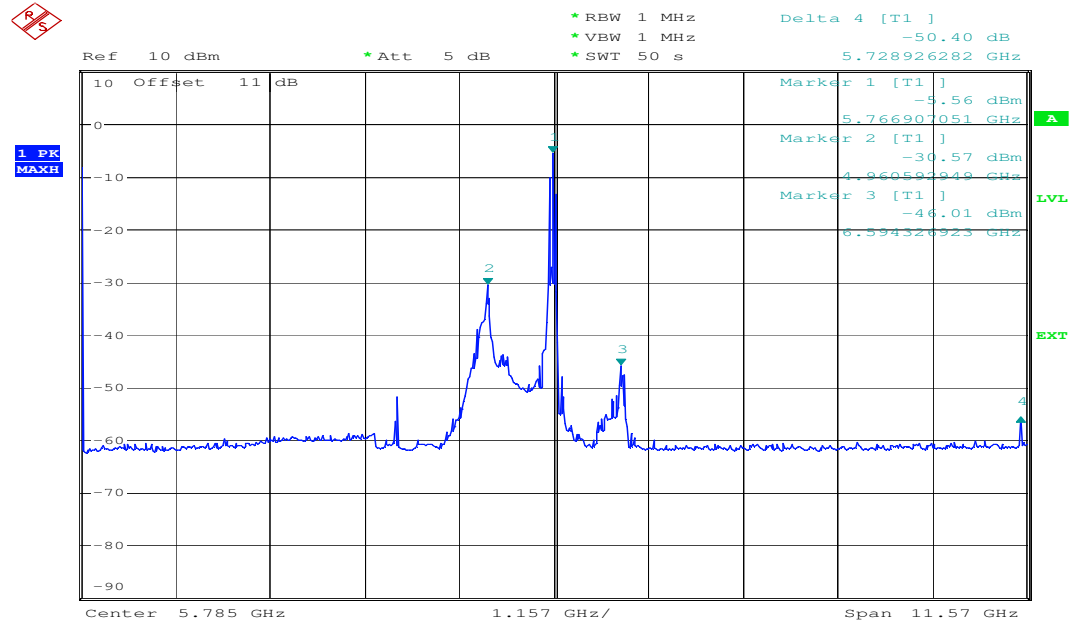
| Emission Limitations (worst case) | | | | | |
|-----------------------------------|-------------------|-----------------------------|------------------------------------|--|---------------------|
| f [MHz] | Modulation (OFDM) | amplitude of emission [dBm] | limit max. allowed emmission power | actual attenuation below frequency of operation [dB] | results |
| 5745 | | 15.6 | 30 dBm | - | Operating frequency |
| all peaks | > 20 dB | below limit | -20 dBc | | |
| 5785 | | 15.2 | 30 dBm | | Operating frequency |
| all peaks | > 20 dB | below limit | -20 dBc | | |
| 5825 | | 14.8 | 30 dBm | | Operating frequency |
| all peaks | > 20 dB | below limit | -20 dBc | | |
| Measurement uncertainty | | ± 3dB | | | |

RBW : 100 kHz VBW: 100 kHz

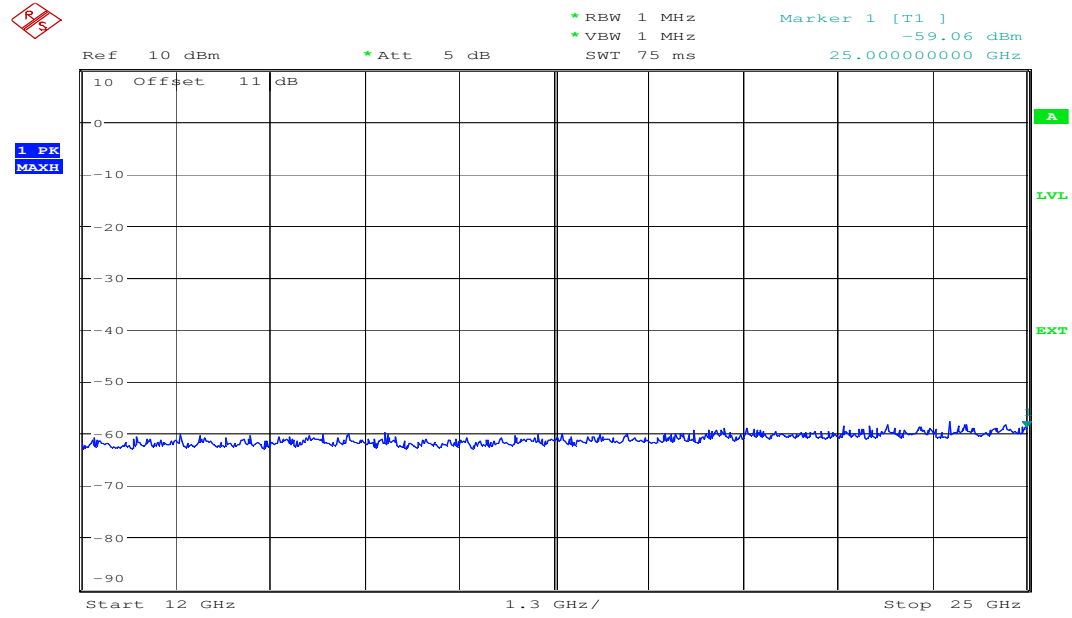
| | |
|-----------------------------------|--|
| Under normal test conditions only | In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also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

5745 MHz



Date: 10.NOV.2007 16:04:21



Date: 10.NOV.2007 16:06:58

SRD-Testreport

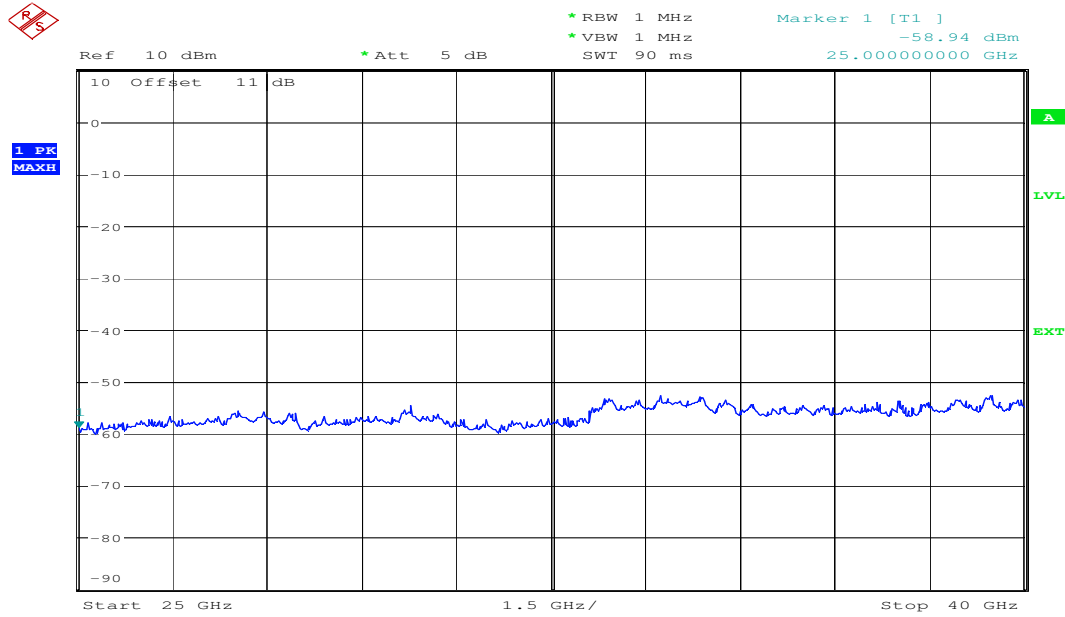
CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

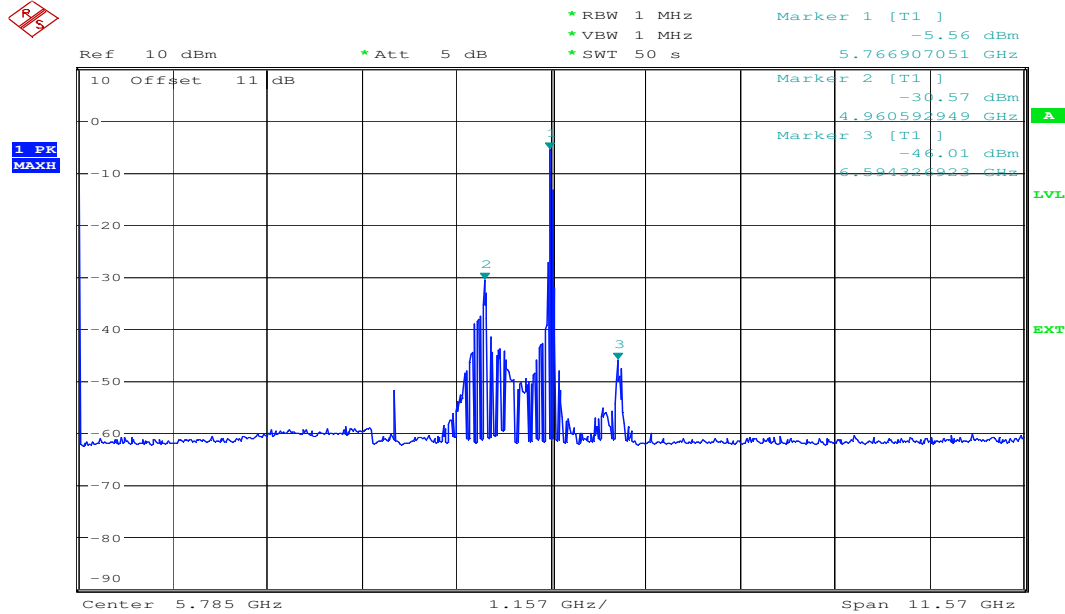
Date: 2007-11-21

Page 28 of 59



Date: 10.NOV.2007 16:05:53

5785 MHz



Date: 10.NOV.2007 15:59:40

SRD-Testreport

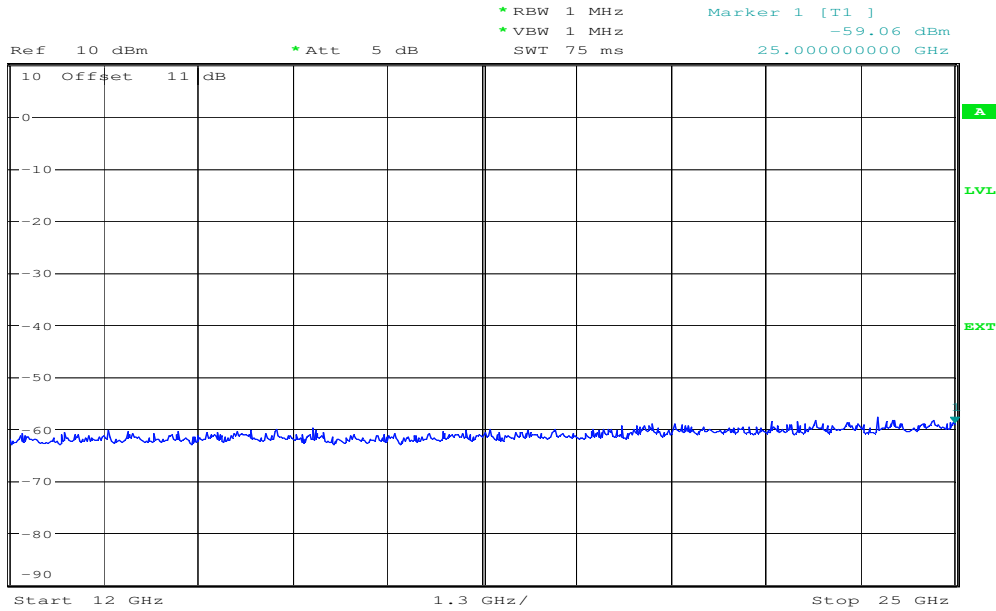
CETECOM ICT Services GmbH Saarbruecken, Germany



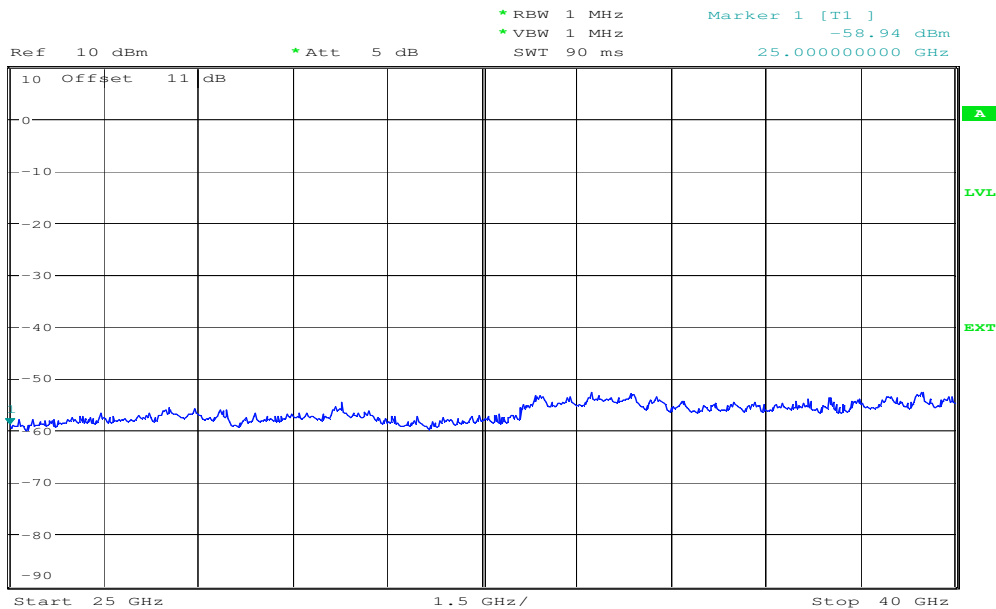
Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 29 of 59



Date: 10.NOV.2007 16:06:58



Date: 10.NOV.2007 16:05:53

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

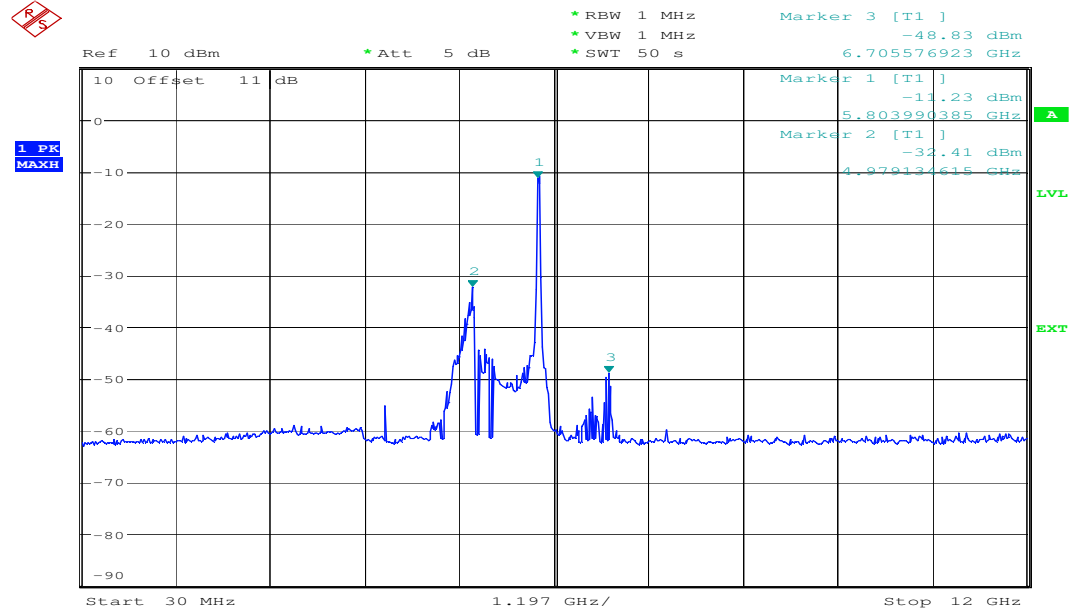


Test report No.: 2-4689-01-03/07

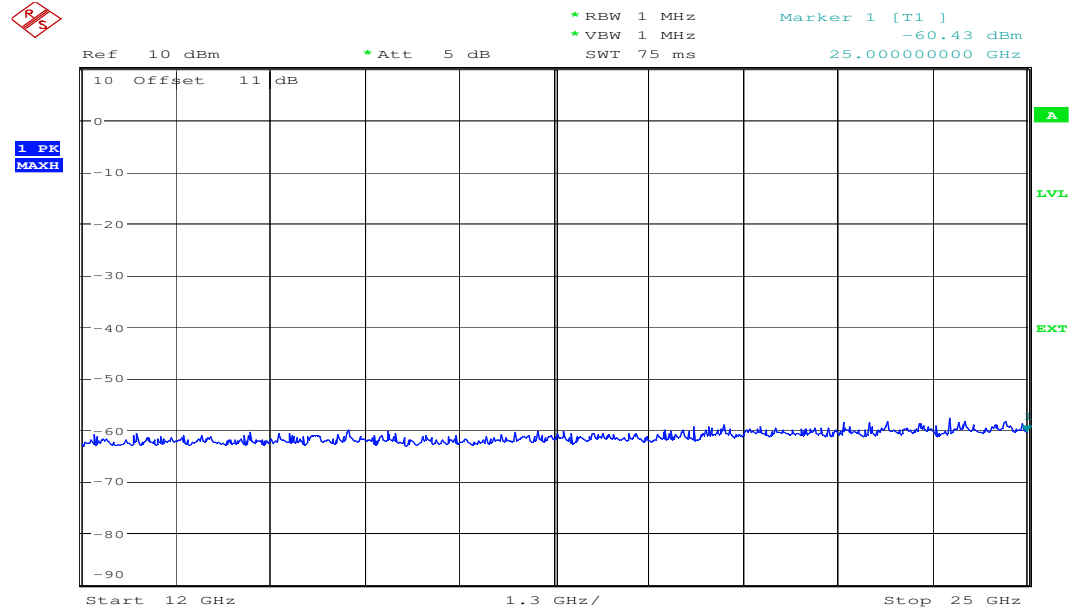
Date: 2007-11-21

Page 30 of 59

5825 MHz



Date: 10.NOV.2007 15:52:52



Date: 10.NOV.2007 16:06:42

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



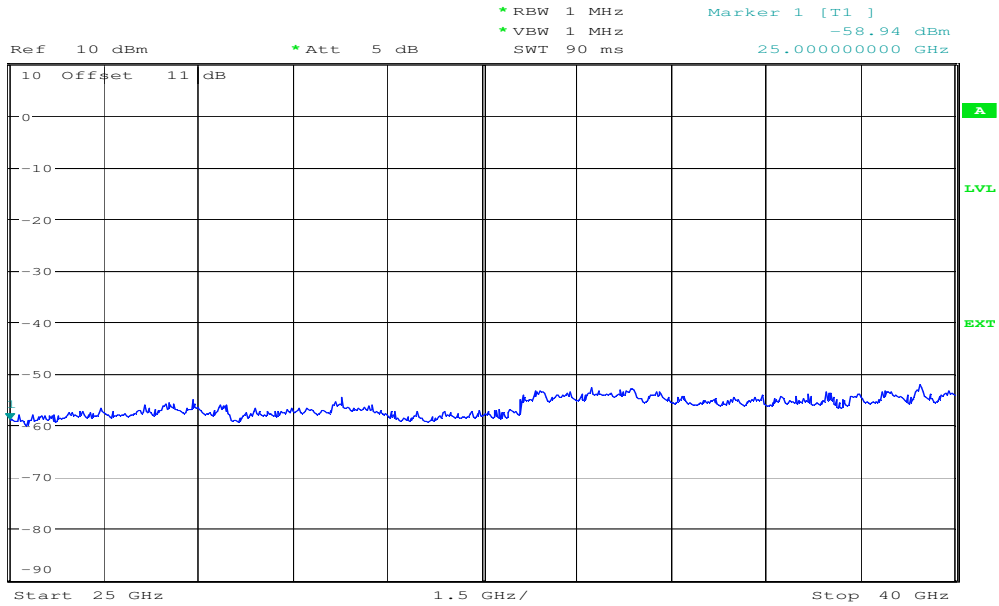
Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 31 of 59



1 PK
MAXH

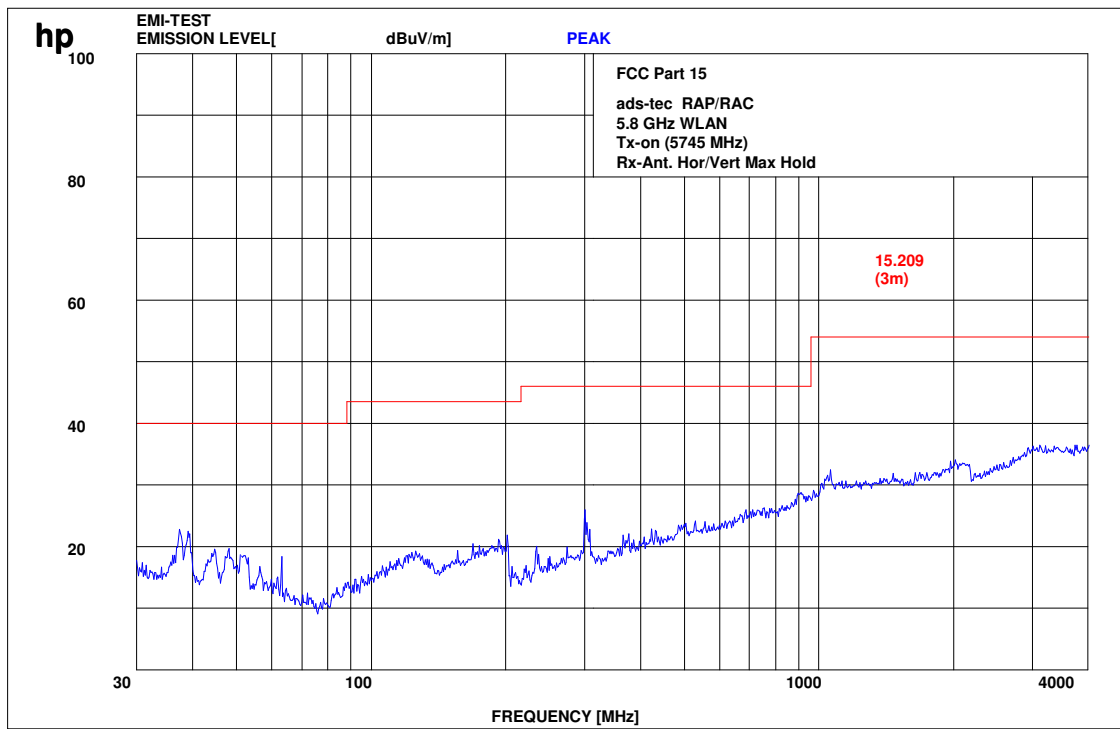


Date: 10.NOV.2007 16:06:11

3.12 Spurious Emissions - radiated (Transmitter)

§15.209

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



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

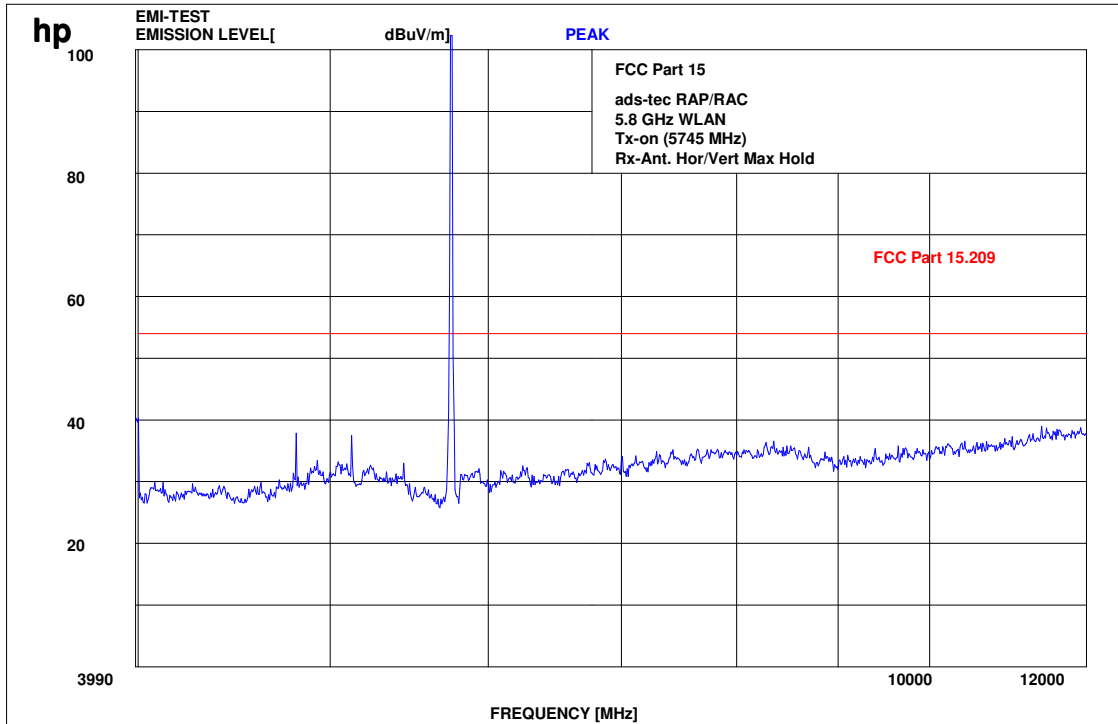


Test report No.: 2-4689-01-03/07

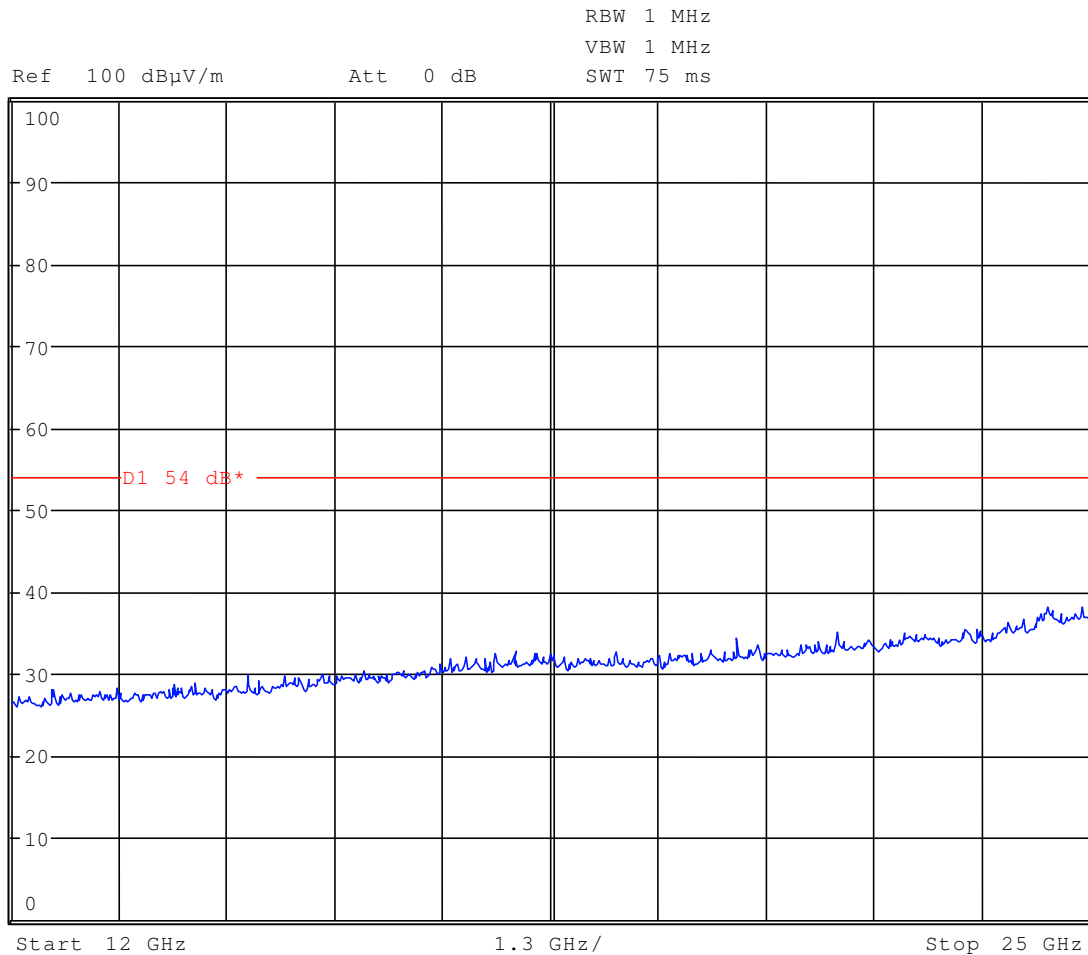
Date: 2007-11-21

Page 33 of 59

Plot 2: 4- 12 GHz (lowest channel)



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



There were no peaks found.

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

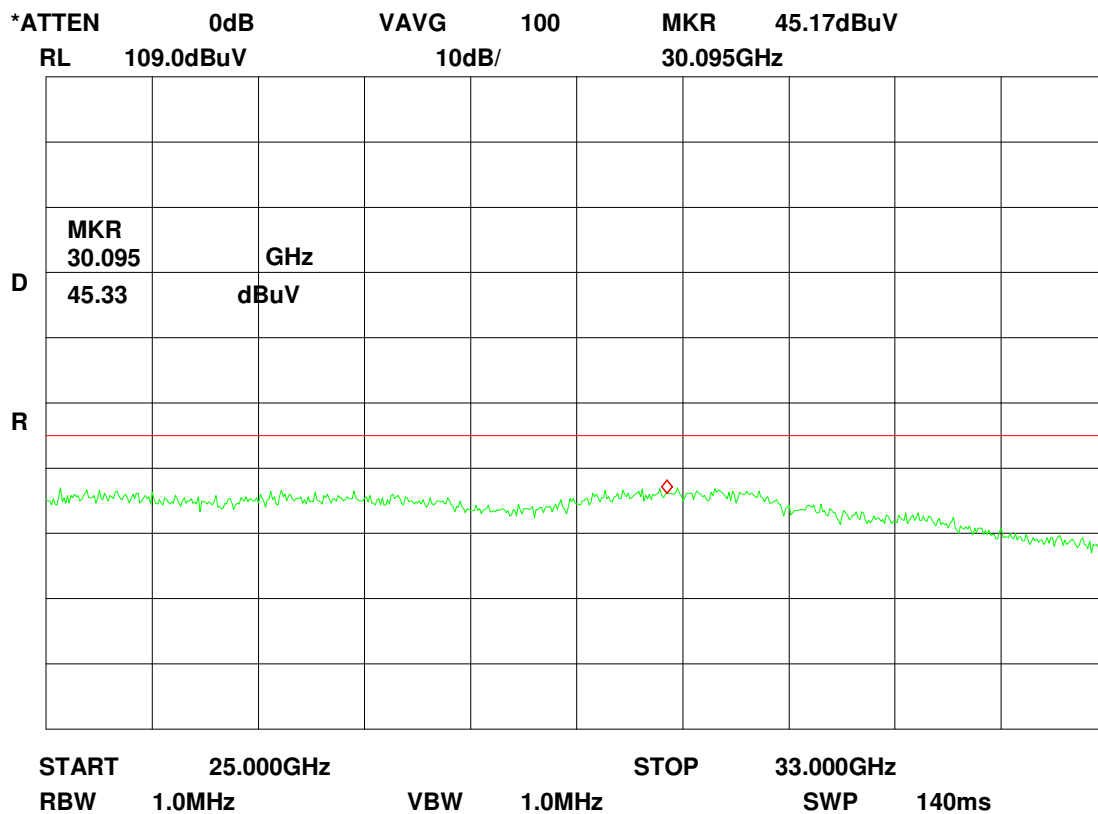


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 35 of 59

25 - 33 GHz horizontal / vertical (valid for all three channels)



Calculation: Field strength = analyzer reading + cable loss - amplifier gain + antenna factor

$$e \text{ [dB}(\mu\text{V/m)}] = u \text{ [dB}(\mu\text{V)}] + a \text{ [dB]} - g \text{ [dB]} + k \text{ [dB(1/m)]}$$

see page 9-11

The offset (cable loss - amplifier gain + antenna factor) is calculated in the analyzer reading.

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

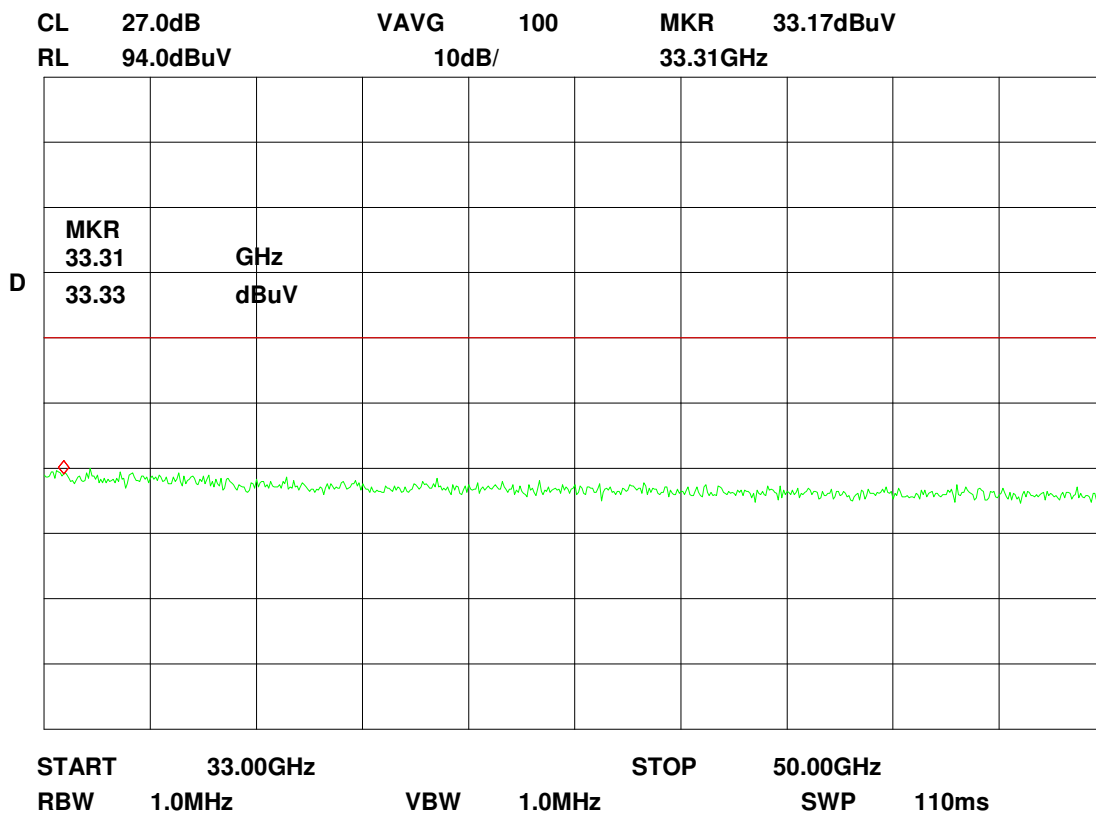


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 36 of 59

33 – 50 GHz horizontal / vertical (valid for all three channels)



Calculation: Field strength = analyser reading + antenna factor - distance correction
 $e \text{ [dB}(\mu\text{V/m)}] = u \text{ [dB}(\mu\text{V)}] + k \text{ [dB(1/m)}] - d \text{ [dB]}$
 see page 9-11

The offset (antenna factor - distance correction) is considered in the analyzer reading.

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

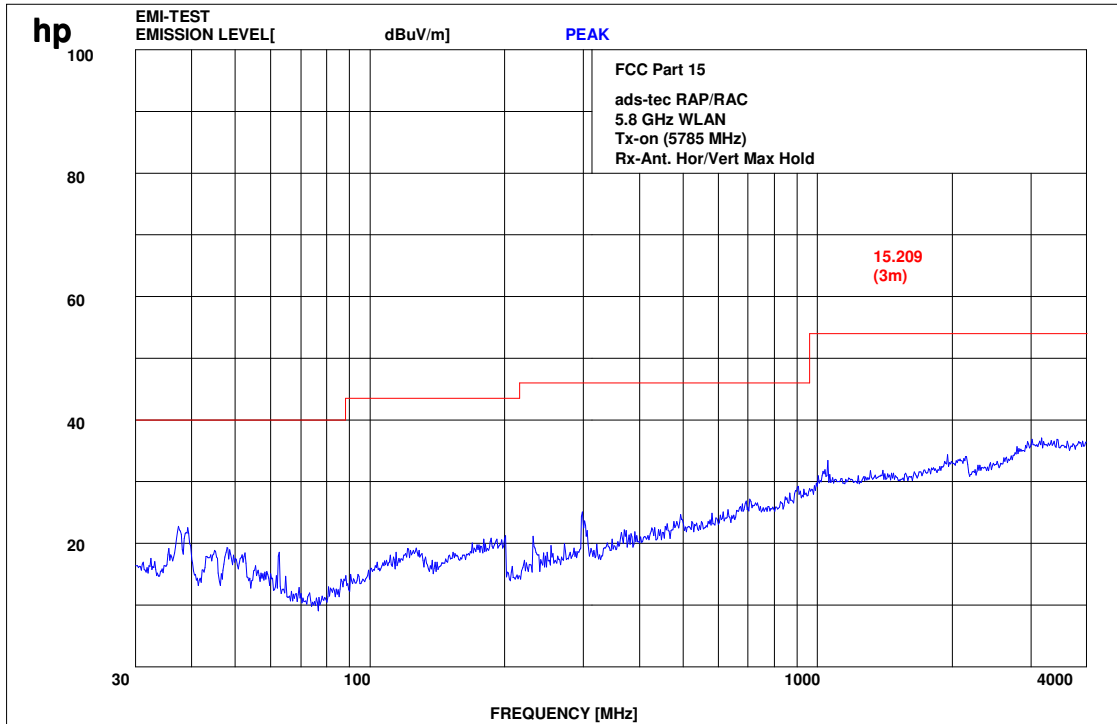


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 37 of 59

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



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

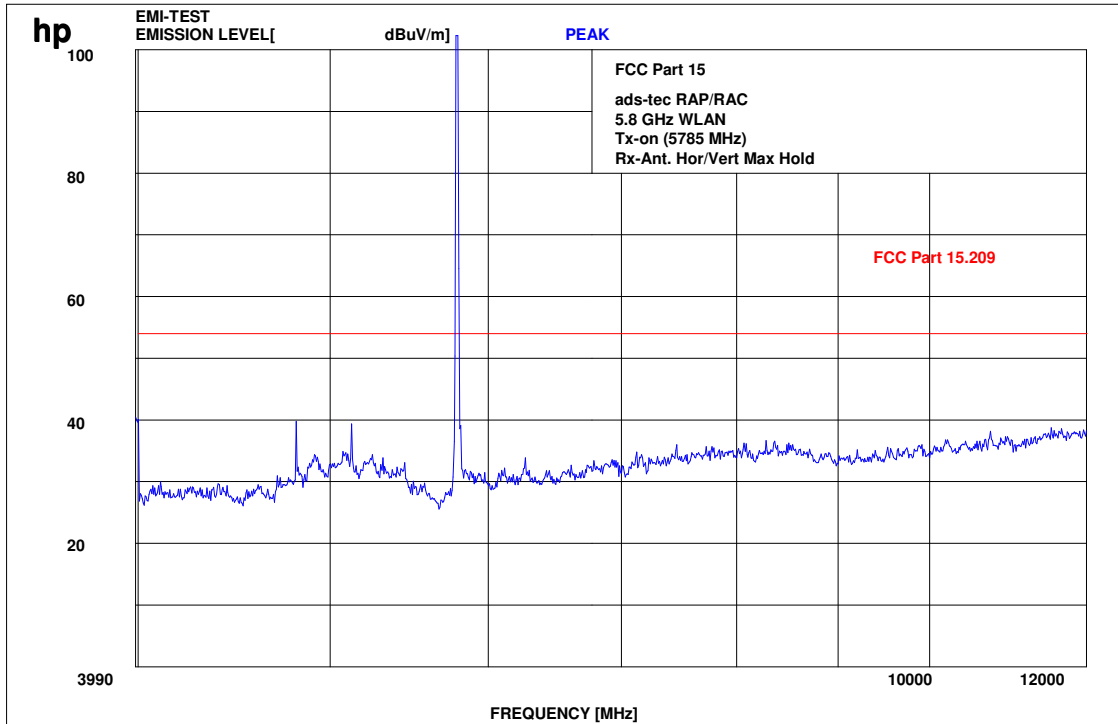


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 38 of 59

Plot 5: 4- 12 GHz (middle channel)



SRD-Testreport

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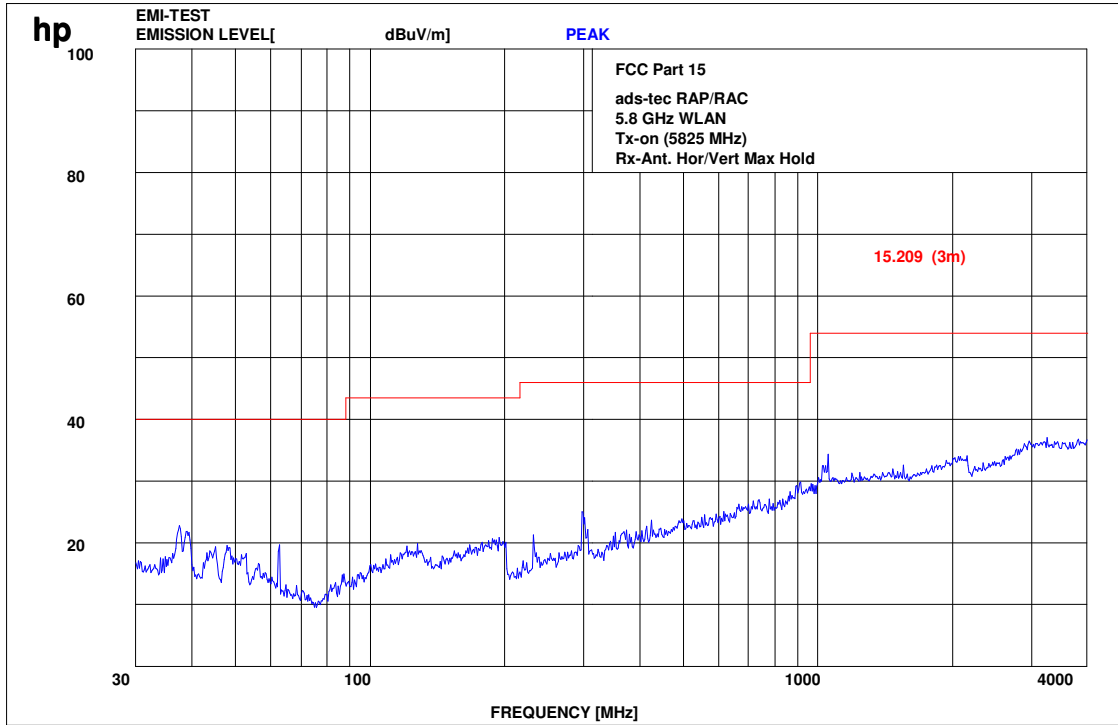


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 39 of 59

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



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

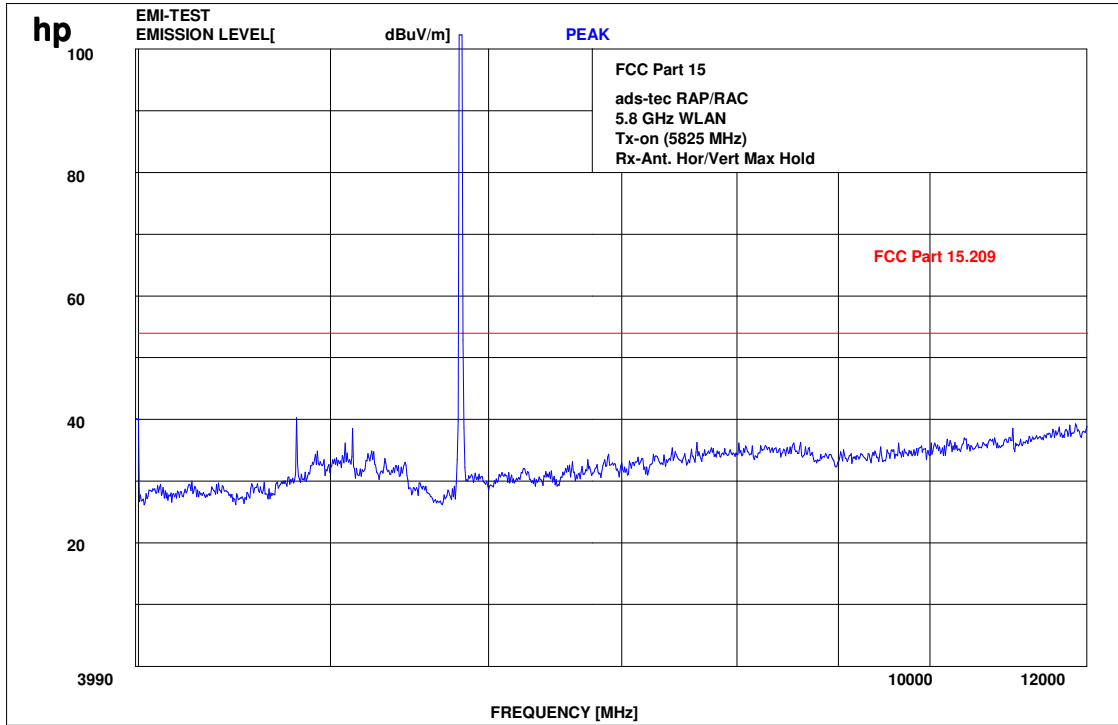


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 40 of 59

Plot 7: 4- 12 GHz (highest channel)



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 41 of 59

Results: (black line on the plots)

| SPURIOUS EMISSIONS LEVEL §15.209 | | | | | | | | |
|---|----------|----------------|----------|----------|----------------|----------|----------|----------------|
| 5745 MHz | | | 5785 MHz | | | 5805 MHz | | |
| F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] |
| No peaks found < 15 dB below limit line | | | | | | | | |
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| | | | | | | | | |
| Measurement uncertainty | | | ±3 dB | | | | | |

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits: § 15.247 (d)

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)).

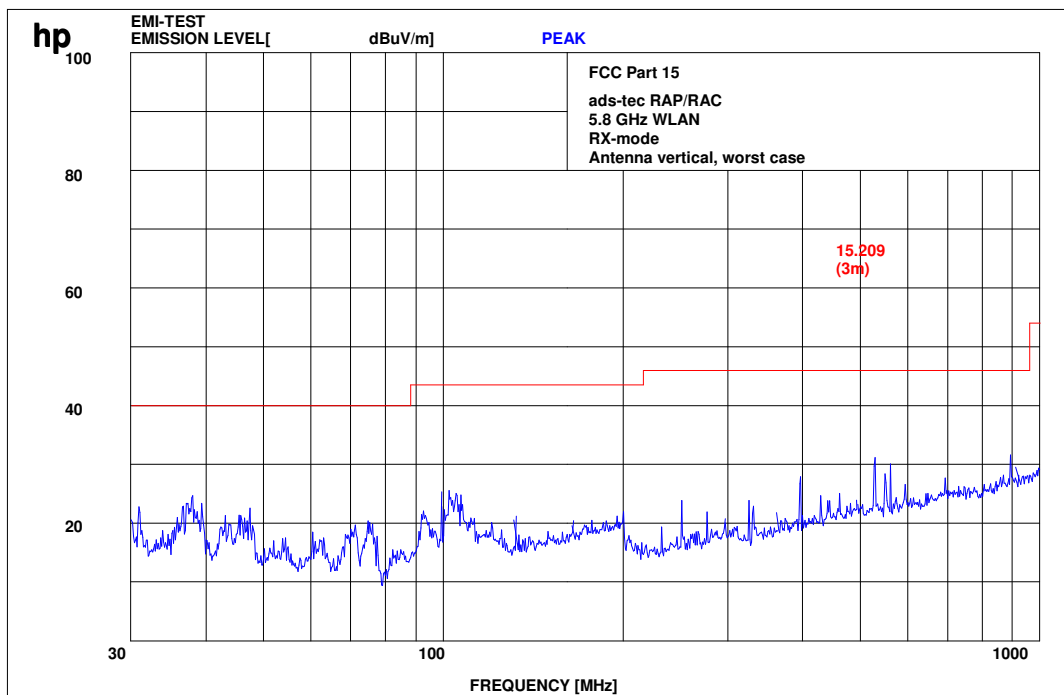
Limits: § 15.209

| Frequency [MHz] | Field strength [µV/m] | Measurement distance (m) |
|-----------------|-----------------------|--------------------------|
| 30 - 88 | 100 (40 dBµV/m) | 3 |
| 88 - 216 | 150 (43.5 dBµV/m) | 3 |
| 216 - 960 | 200 (46 dBµV/m) | 3 |
| above 960 | 500 (54 dBµV/m) | 3 |

3.13 Spurious Emissions - radiated Receiver

§15.109 / 209

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



SRD-Testreport

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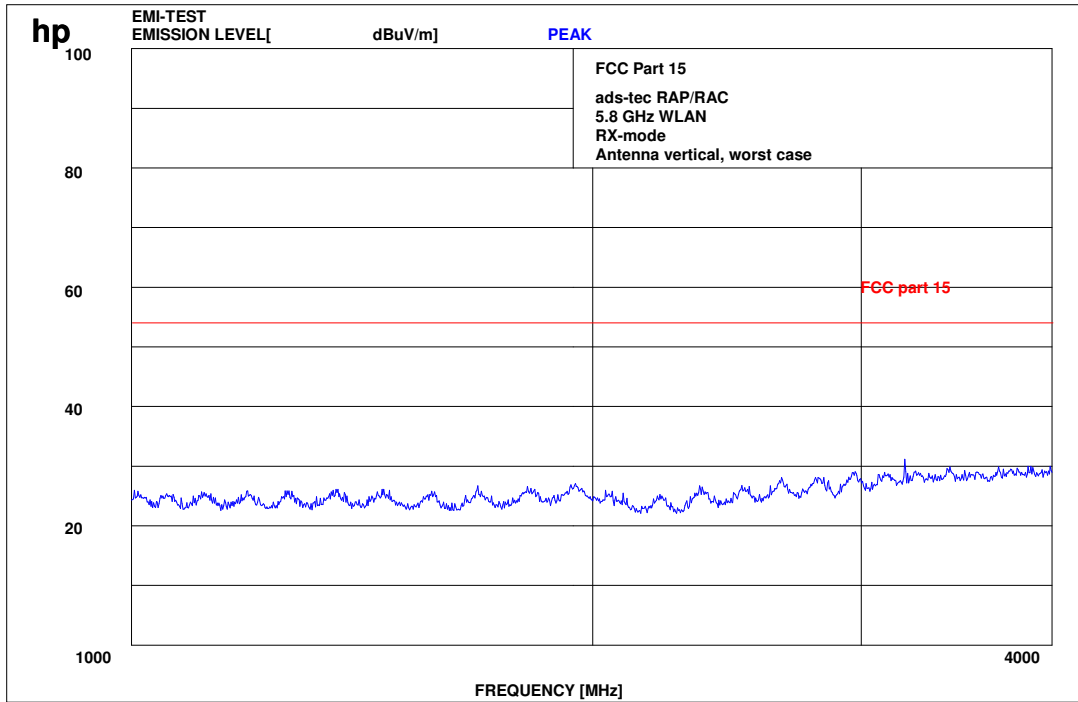


Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 43 of 59

Plot 2: 1- 4 GHz (receiver)



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany

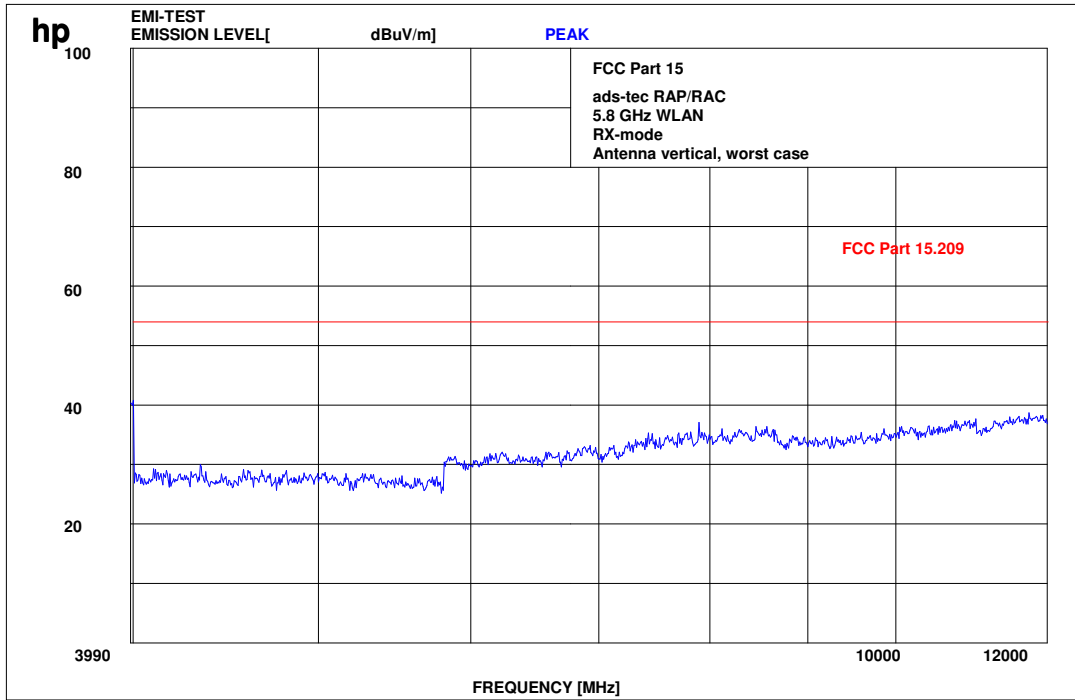


Test report No.: 2-4689-01-03/07

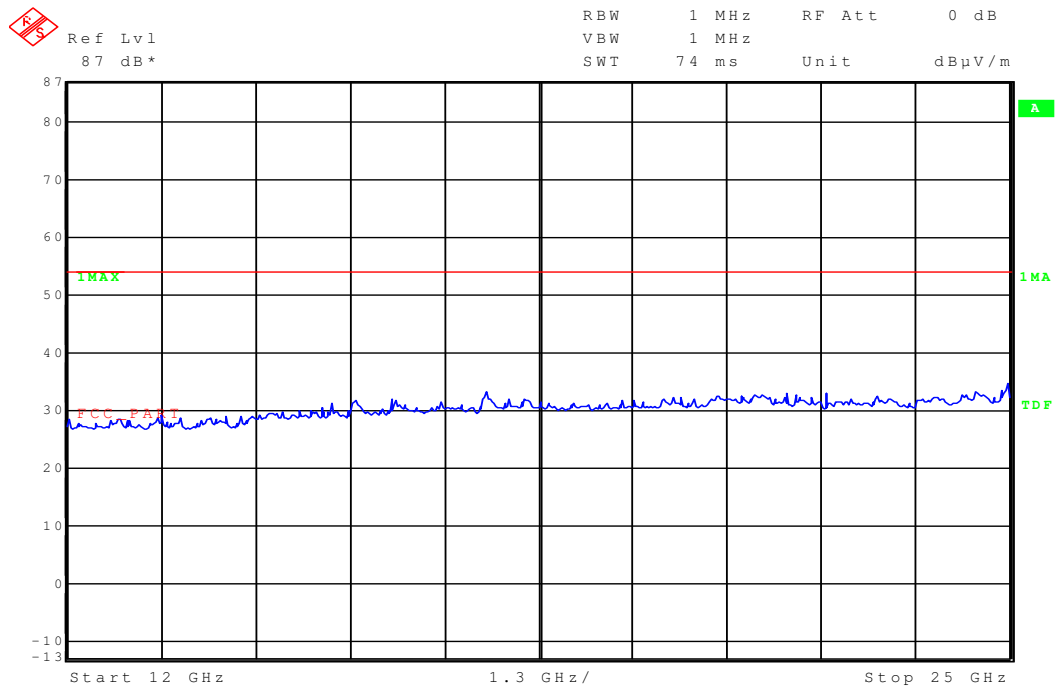
Date: 2007-11-21

Page 44 of 59

Plot 3: 4- 12 GHz (receiver)



Plot 4: 12- 25 GHz (receiver)



The measurements were performed up to 40 GHz. There were no peaks found.

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 46 of 59

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 [$\mu\text{V/m}$] |
| All peaks found below 1 Ghz were caused by the laptop we used to set the sample. | | | | | | | | |
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| | | | | | | | | |
| Measurement uncertainty | | | ±3 dB | | | | | |

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

f ≥ 1GHz : RBW/VBW: 1 MHz

Measurement distance see table

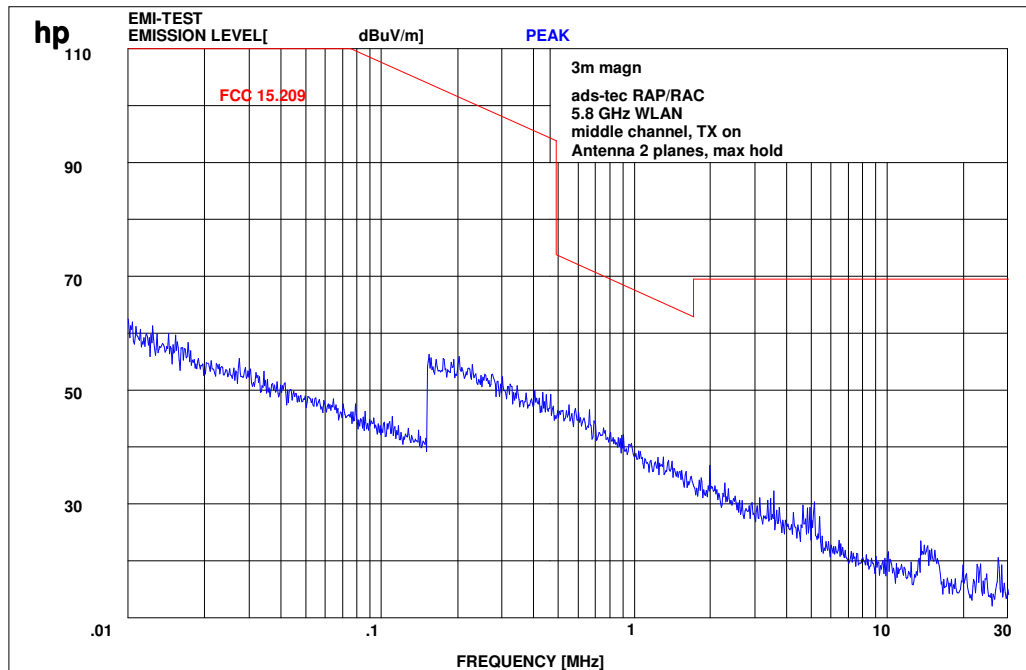
Limits : § 15.109 / 209

| 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

Transmit mode, valid for all three channels



Measured at 3 m distance.

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

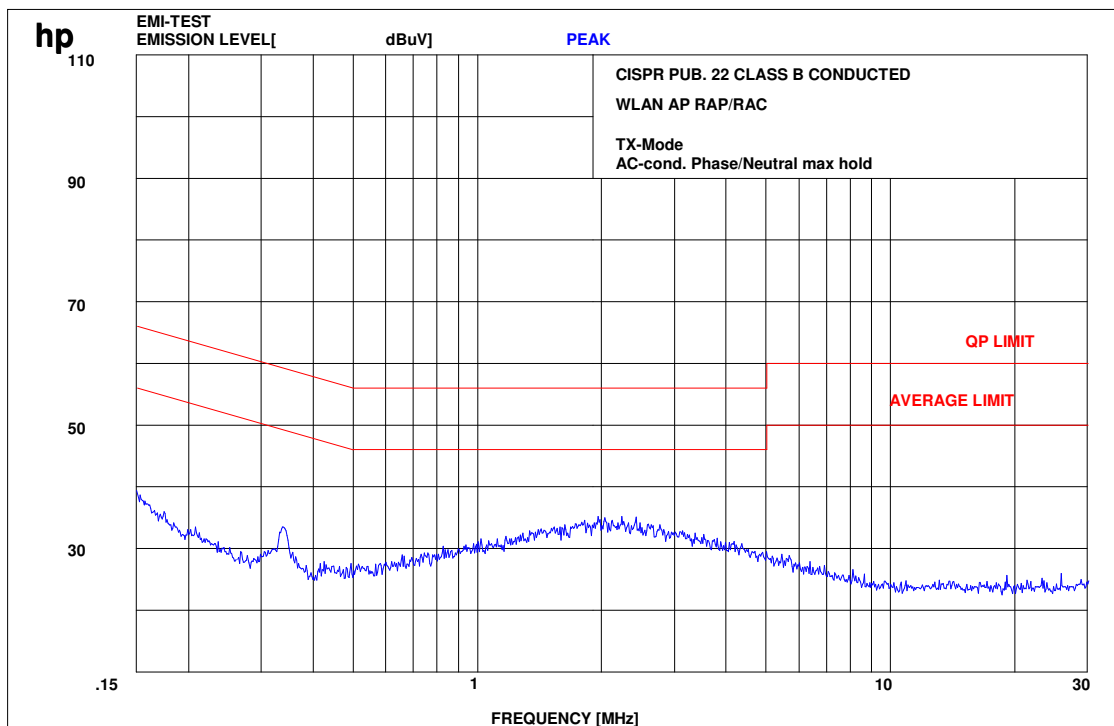
Limits:

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

3.15 Conducted Emissions <30 MHz **§15.107/207**
 (measured with the 115V AC power supplied by the customer)

Transmit mode

Plot 1: CISPR 22



We measured L1 and N floating and grounded, max value was hold.

Limits :

| | |
|-----------------------------------|--|
| Under normal test conditions only | 0.15 to 0.5 MHz, 66-56 dB μ V QP, 56-46 dB μ V AV 0.5 to 5.0 MHz, 56 dB μ V QP, 46 dB μ V AV 5.0 to 30 MHz, 60 dB μ V QP, 50 dB μ V AV |
|-----------------------------------|--|

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 50 of 59

SRD Laboratory Room 002:

| No | Equipment/Type | Manuf. | Serial Nr. | Inv. No. Cetecom | Last Calibration | Frequency (months) | Next Calibration |
|----|---|--------|-----------------|---------------------|------------------|-----------------------|---------------------|
| 1 | System Controller PSM 12 | R&S | 835259/007 | 3000002681-00xx | n.a. | | |
| 2 | Memory Extension PSM-K10 | R&S | To 1 | 3000002681 | n.a. | | |
| 3 | Operating Software PSM-B2 | R&S | To 1 | 3000002681 | n.a. | | |
| 4 | 19" Monitor | | 22759020-ED | 3000002681 | n.a. | | |
| 5 | Mouse | | LZE 0095/6639 | 3000002681 | n.a. | | |
| 6 | Keyboard | | G00013834L 461 | 3000002681 | n.a. | | |
| 7 | Spectrum Analyser FSIQ 26 | R&S | 835540/018 | 3000002681-0005 | 01.08.2006 | 24 | 01.08.2008 |
| 8 | Tracking Generator FSIQ-B10 | R&S | 835107/015 | 3000002681 | s.No.7 | | |
| 10 | RF-Generator SMIQ03 (B1 Signal) | R&S | 835541/056 | 3000002681-0002 | 01.08.2006 | 36 | 01.08.2009 |
| 11 | Modulation Coder SMIQ-B20 | R&S | To 10 | 3000002681 | s.No.10 | | |
| 12 | Data Generator SMIQ-B11 | R&S | To 10 | 3000002681 | s.No.10 | | |
| 13 | RF Rear Connection SMIQ-B19 | R&S | To 10 | 3000002681 | s.No.10 | | |
| 14 | Fast CPU SM-B50 | R&S | To 10 | 3000002681 | s.No.10 | | |
| 15 | FM Modulator SM-B5 | R&S | 835676/033 | 3000002681 | s.No.10 | | |
| 16 | RF-Generator SMIQ03 (B2 Signal) | R&S | 835541/055 | 3000002681-0001 | 01.08.2006 | 36 | 01.08.2009 |
| 17 | Modulation Coder SMIQ-B20 | R&S | To 16 | 3000002681 | s.No.16 | | |
| 18 | Data Generator SMIQ-B11 | R&S | To 16 | 3000002681 | s.No.16 | | |
| 19 | RF Rear Connection SMIQ-B19 | R&S | To 16 | 3000002681 | s.No.16 | | |
| 20 | Fast CPU SM-B50 | R&S | To 16 | 3000002681 | s.No.16 | | |
| 21 | FM Modulator SM-B5 | R&S | 836061/022 | 3000002681 | s.No.16 | | |
| 22 | RF-Generator SMP03 (B3 Signal) | R&S | 835133/011 | 3000002681-0003 | 01.08.2006 | 36 | 01.08.2009 |
| 23 | Attenuator SMP-B15 | R&S | 835136/014 | 3000002681 | S.No.22 | | |
| 24 | RF Rear Connection SMP-B19 | R&S | 834745/007 | 3000002681 | S.No.22 | | |
| 25 | Power Meter NRVD | R&S | 835430/044 | 3000002681-0004 | 01.08.2006 | 24 | 01.08.2008 |
| 26 | Power Sensor NRVD-Z1 | R&S | 833894/012 | 3000002681-0013 | 01.08.2006 | 24 | 01.08.2008 |
| 27 | Power Sensor NRVD-Z1 | R&S | 833894/011 | 3000002681-0010 | 01.08.2006 | 24 | 01.08.2008 |
| 28 | Rubidium Standard RUB | R&S | | 3000002681-0009 | 01.08.2006 | 24 | 01.08.2008 |
| 29 | Switching and Signal Conditioning Unit SSCU | R&S | 338864/003 | 3000002681-0006 | 01.08.2006 | 24 | 01.08.2008 |
| 30 | Laser Printer HP Deskjet 2100 | HP | N/A | 3000002681-0011 | n.a. | | |
| 31 | 19" Rack | R&S | 11138363000 004 | 3000002681 | n.a. | | |
| 32 | RF-cable set | R&S | N/A | 3000002681 | n.a. | | |
| 33 | IEEE-cables | R&S | N/A | 3000002681 | n.a. | | |

SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 51 of 59

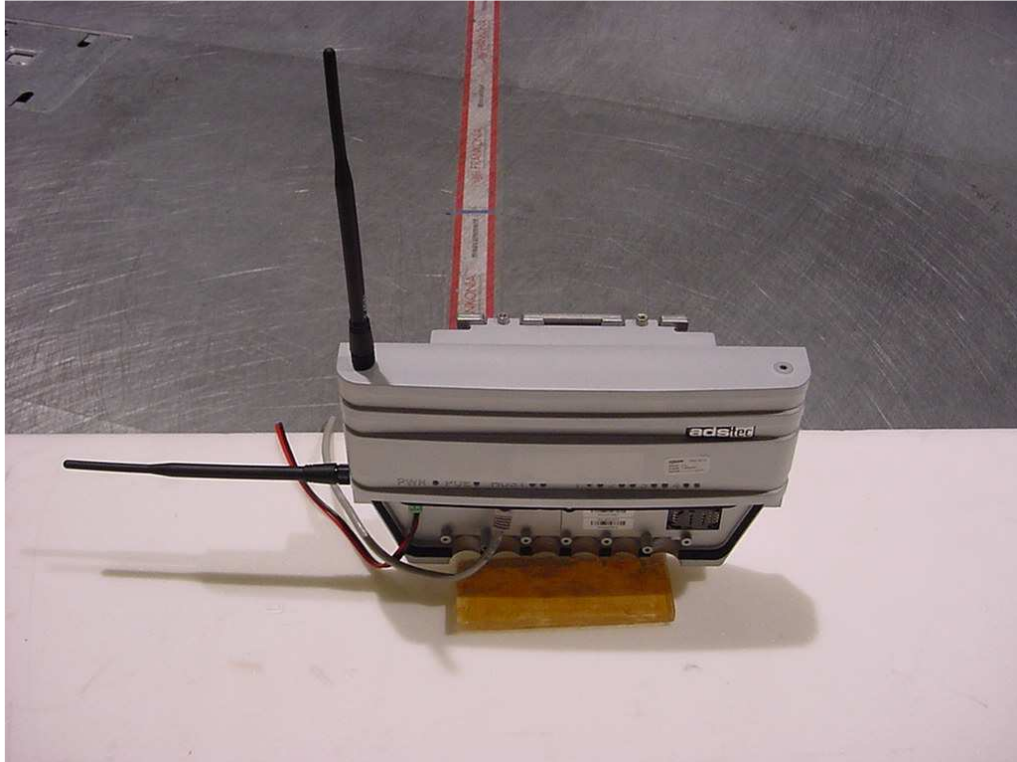
| | | | | | | | |
|----|--|----------------|----------------|-----------------|------------|----|------------|
| 34 | Sampling System FSIQ-B70 | R&S | 835355/009 | 3000002681 | s.No.7 | | |
| 35 | RSP programmable attenuator | R&S | 834500/010 | 3000002681-0007 | 01.08.2006 | 24 | 01.08.2008 |
| 36 | Signalling Unit | R&S | 838312/011 | 3000002681 | n.a. | | |
| 37 | NGPE programmable Power Supply for EUT | R&S | 192.033.41 | 3000002681 | | | |
| 38 | Climatic box VT 4002 | Heraeus Vötsch | 58566046820010 | 300003019 | 11.05.2007 | 24 | 11.05.2009 |
| 39 | Signaling Unit CMU200 | R&S | 832221/0055 | 300002862 | 12.01.2006 | 24 | 12.01.2008 |
| 40 | Power Splitter 6005-3 | Inmet Corp. | none | 300002841 | 23.12.2006 | 24 | 23.12.2008 |
| 41 | SMA Cables SPS-1151-985-SPS | Insulated Wire | different | different | n.a. | | |
| 42 | CBT32 with EDR Signaling Unit | R&S | | | | | |
| 43 | Coupling unit | Narda | N/A | -- | n.a. | | |
| 44 | 2xSwitch Matrix PSU | R&S | 872584/021 | 300001329 | n.a. | | |
| 45 | RF-cable set | R&S | N/A | different | n.a. | | |
| 46 | IEEE-cables | R&S | N/A | -- | n.a. | | |
| | | | | | | | |

SRD Laboratory Room 005:

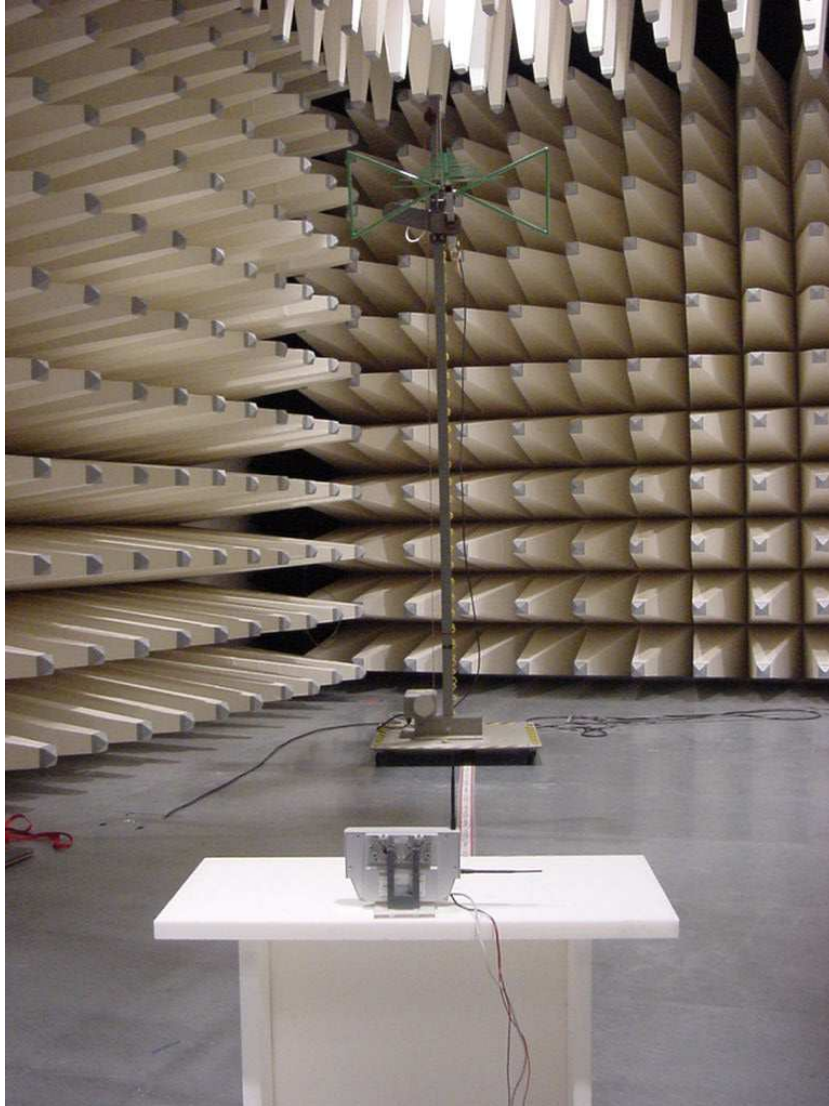
| No | Equipment/Type | Manuf. | Serial Nr. | Inv. No. Cetecom | Last Calibration | Frequency (months) | Next Calibration |
|----|----------------------------------|--------|------------|------------------|------------------|--------------------|------------------|
| 1 | Spektrum Analyzer 8566B | HP | 2747A05275 | 300000219 | 08.11.2006 | 24 | 08.11.2008 |
| 2 | Spektrum Analyzer Display 85662A | HP | 2816A16497 | 300001690 | 08.11.2006 | 24 | 08.11.2008 |
| 3 | Quasi-Peak-Adapter 85650A | HP | 2811A01135 | 300000216 | 08.11.2006 | 24 | 08.11.2008 |
| 4 | Power Supply | Heiden | 003202 | 300001187 | 12.05.2007 | 36 | 12.05.2010 |
| 5 | Power Supply | Heiden | 1701 | 300001392 | 12.05.2007 | 36 | 12.05.2010 |
| | | | | | | | |

5 Photographs of test site

Test site Radiated Emissions:



Test site Radiated Emissions:



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 54 of 59

AC-conducted:



6 Photographs of equipment under test

Photograph No.: 1



Photograph No.: 2



Photograph No.: 3



Photograph No.: 4



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 57 of 59

Photograph No.: 5



Photograph No.: 6



Photograph No.: 7



Photograph No.: 8



SRD-Testreport

CETECOM ICT Services GmbH Saarbruecken, Germany



Test report No.: 2-4689-01-03/07

Date: 2007-11-21

Page 59 of 59

Photograph No.: 9

