

## TEST REPORT

Test report no.: 1-3933/11-01-09



Deutsche  
Akkreditierungsstelle  
D-PL-12076-01-01

### Testing laboratory

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#### Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS). The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01  
Area of Testing: Radio/Satellite Communications

### Applicant

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52074 Aachen / GERMANY  
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Phone: +49 241 173014

### Manufacturer

**Cognex**  
Vaalser Straße 259  
52074 Aachen / GERMANY

### Test standard/s

|                   |                                                                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR Part 15    | Title 47 of the Code of Federal Regulations; Chapter I<br>Part 15 - Radio frequency devices                                                                                      |
| RSS - 210 Issue 8 | Spectrum Management and Telecommunications - Radio Standards Specification<br>Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands):<br>Category I Equipment |

For further applied test standards please refer to section 3 of this test report.

### Test Item

|                           |                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------|
| <b>Kind of test item:</b> | <b>Barcode Scanner Base Station</b>                                                    |
| <b>Model name:</b>        | <b>DMA-IBASE-00</b>                                                                    |
| <b>FCC ID:</b>            | <b>TXH-IBASE</b>                                                                       |
| <b>IC:</b>                | <b>6315A-IBASE</b>                                                                     |
| <b>Frequency [MHz]:</b>   | ISM-band 2400 MHz – 2483.5 MHz (Lowest Channel<br>2412 MHz – Highest Channel 2462 MHz) |
| <b>Technology tested:</b> | WLAN                                                                                   |
| <b>Antenna:</b>           | Integrated Antenna                                                                     |
| <b>Power Supply:</b>      | 24.0 V DC by AC/DC power supply or via POE                                             |
| <b>Temperature Range:</b> | -20°C to +55 °C                                                                        |



This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### Test report authorised:

Marco Bertolino  
Testing Manager

### Test performed:

Stefan Bös  
Senior Testing Manager

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## 2 General information

### 2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. 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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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### 2.2 Application details

|                                    |            |
|------------------------------------|------------|
| Date of receipt of order:          | 2011-09-16 |
| Date of receipt of test item:      | 2011-11-28 |
| Start of test:                     | 2011-11-28 |
| End of test:                       | 2011-12-06 |
| Person(s) present during the test: | -/-        |

## 3 Test standard/s

| Test standard     | Date    | Test standard description                                                                                                                                                           |
|-------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR Part 15    | 2010-10 | Title 47 of the Code of Federal Regulations; Chapter I<br>Part 15 - Radio frequency devices                                                                                         |
| RSS - 210 Issue 8 | 2010-12 | Spectrum Management and Telecommunications - Radio<br>Standards Specification<br>Low-power Licence-exempt Radiocommunication Devices (All<br>Frequency Bands): Category I Equipment |

#### 4 Test environment

|                            |           |                                            |
|----------------------------|-----------|--------------------------------------------|
| Temperature:               | $T_{nom}$ | +22 °C during room temperature tests       |
|                            | $T_{max}$ | +55 °C during high temperature tests       |
|                            | $T_{min}$ | -20 °C during low temperature tests        |
| Relative humidity content: |           | 55 %                                       |
| Barometric pressure:       |           | not relevant for this kind of testing      |
| Power supply:              | $V_{nom}$ | 24.0 V DC by AC/DC power supply or via POE |
|                            | $V_{max}$ | -/-                                        |
|                            | $V_{min}$ | -/-                                        |

#### 5 Test item

|                            |   |                                                                                        |
|----------------------------|---|----------------------------------------------------------------------------------------|
| Kind of test item          | : | Barcode Scanner Base Station                                                           |
| Type identification        | : | DMA-IBASE-00                                                                           |
|                            |   |                                                                                        |
| S/N serial number          | : | 1A1134XN005244                                                                         |
| HW hardware status         | : | Unknown                                                                                |
| SW software status         | : | Unknown                                                                                |
| Frequency band [MHz]       | : | ISM-band 2400 MHz – 2483.5 MHz<br>(Lowest Channel 2412 MHz – Highest Channel 2462 MHz) |
| Type of radio transmission | : | DSSS, OFDM                                                                             |
| Use of frequency spectrum  | : |                                                                                        |
| Type of modulation         | : | BPSK, QPSK, 16 - & 64 - QAM modulation.                                                |
| Number of channels         | : | 11                                                                                     |
| Antenna                    | : | Integrated Antenna                                                                     |
| Power supply               | : | 24.0 V DC by AC/DC power supply or via POE                                             |
| Temperature range          | : | -20°C to +55 °C                                                                        |

#### 6 Test laboratories sub-contracted

None

## 7 Summary of measurement results



No deviations from the technical specifications were ascertained



There were deviations from the technical specifications ascertained

| TC Identifier | Description                              | Verdict | Date       | Remark                            |
|---------------|------------------------------------------|---------|------------|-----------------------------------|
| RF-Testing    | CFR Part 15<br>RSS 210, Issue 8, Annex 8 | Passed  | 2011-12-13 | Only delta measurements performed |

| Test specification clause          | Test case                                             | Temperature conditions | Power source voltages | Mode           | Pass                                                                       | Fail                                                 | NA                                                   | NP                                                                         | Remark                     |
|------------------------------------|-------------------------------------------------------|------------------------|-----------------------|----------------|----------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------|----------------------------|
| §15.247(b)(4)<br>RSS 210 / A8.4(2) | Antenna gain                                          | Nominal                | Nominal               | DSSS           | <input type="checkbox"/>                                                   | <input type="checkbox"/>                             | <input type="checkbox"/>                             | <input checked="" type="checkbox"/>                                        | -/-                        |
| §15.247(e)<br>RSS 210 / A8.2(b)    | Power spectral density                                | Nominal                | Nominal               | DSSS<br>OFDM g | <input type="checkbox"/><br><input type="checkbox"/>                       | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | -/-                        |
| §15.247(a)(2)<br>RSS 210 / A8.2(a) | Spectrum bandwidth of a FHSS system<br>6dB bandwidth  | Nominal                | Nominal               | DSSS<br>OFDM g | <input type="checkbox"/><br><input type="checkbox"/>                       | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | -/-                        |
| §15.247(a)(2)<br>RSS 210 / A8.2(a) | Spectrum bandwidth of a FHSS system<br>20dB bandwidth | Nominal                | Nominal               | DSSS<br>OFDM g | <input type="checkbox"/><br><input type="checkbox"/>                       | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | -/-                        |
| §15.247(b)(3)<br>RSS-210 / A8.4(4) | Maximum output power                                  | Nominal                | Nominal               | DSSS<br>OFDM g | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/>                       | Only radiated measurements |
| §15.247(d)<br>RSS-210 / A8.5       | Band edge compliance conducted                        | Nominal                | Nominal               | DSSS<br>OFDM g | <input type="checkbox"/><br><input type="checkbox"/>                       | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | -/-                        |
| §15.205<br>RSS-210 / A8.5          | Band edge compliance radiated                         | Nominal                | Nominal               | DSSS<br>OFDM g | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/>                       | complies                   |
| §15.247(d)<br>RSS-210 / A8.5       | TX spurious emissions conducted                       | Nominal                | Nominal               | DSSS<br>OFDM g | <input type="checkbox"/><br><input type="checkbox"/>                       | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | -/-                        |
| §15.247(d)<br>RSS-210 / A8.5       | TX spurious emissions radiated                        | Nominal                | Nominal               | DSSS<br>OFDM g | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/>                       | complies                   |
| §15.109<br>RSS-Gen.                | RX spurious emissions radiated                        | Nominal                | Nominal               | -/-            | <input checked="" type="checkbox"/>                                        | <input type="checkbox"/>                             | <input type="checkbox"/>                             | <input type="checkbox"/>                                                   | complies                   |
| §15.209(a)<br>RSS-Gen              | TX spurious emissions radiated<br>< 30 MHz            | Nominal                | Nominal               | DSSS<br>OFDM g | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/>                       | complies                   |
| §15.207(a)                         | Conducted emissions<br>< 30 MHz                       | Nominal                | Nominal               | DSSS<br>OFDM g | <input type="checkbox"/><br><input type="checkbox"/>                       | <input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/><br><input type="checkbox"/> | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> | -/-                        |

**Note:** NA = Not Applicable; NP = Not Performed

## 8 RF measurements

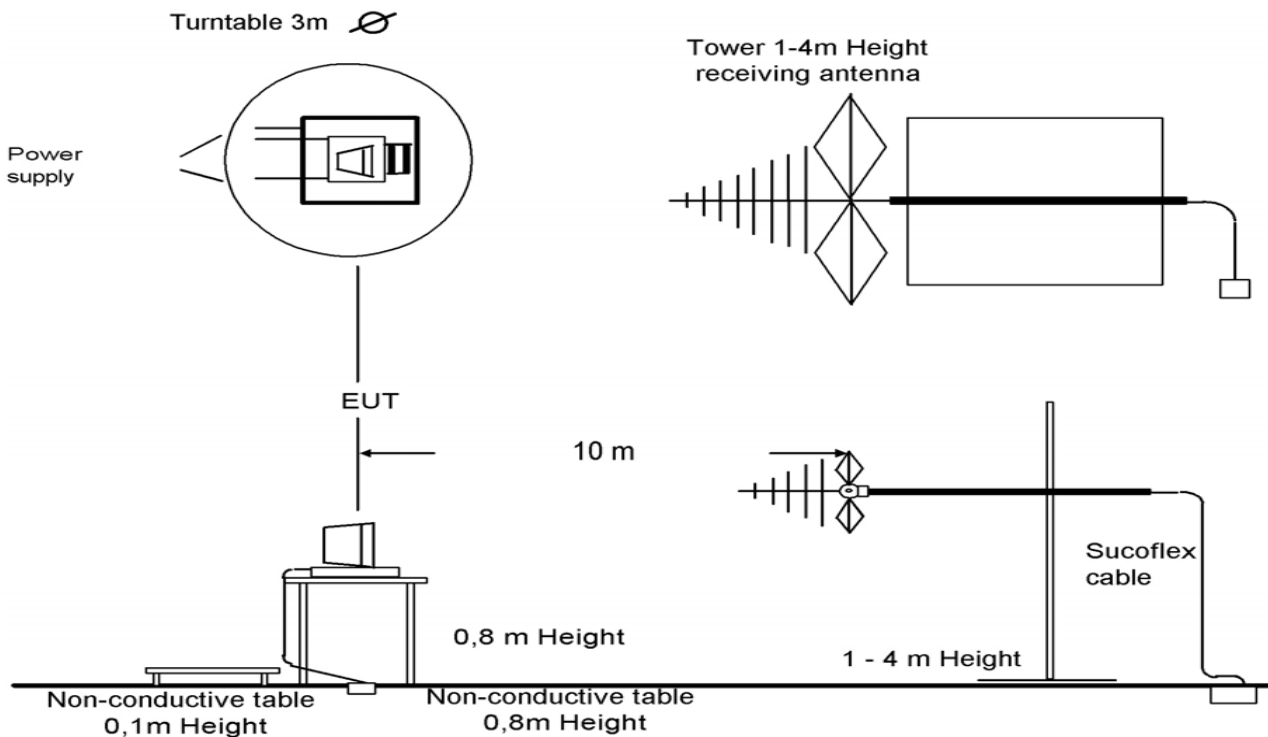
### 8.1 Description of test setup

#### 8.1.1 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 are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2009 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 analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2009 clause 4.2.

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

Semi anechoic chamber

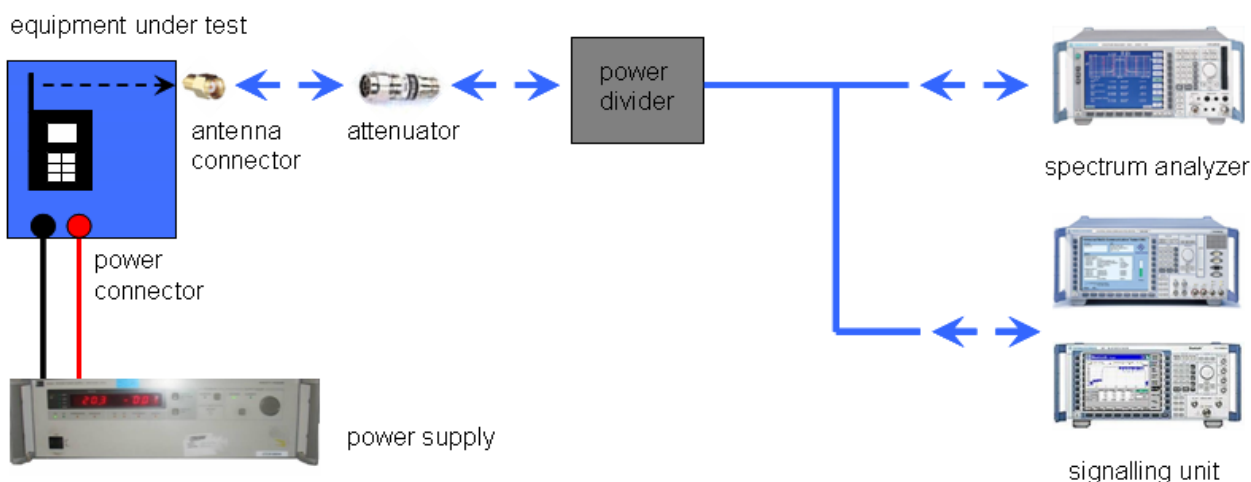


Picture 1: Diagram radiated measurements

|                 |                     |
|-----------------|---------------------|
| 9 kHz - 30 MHz: | active loop antenna |
| 30 MHz – 1 GHz: | tri-log antenna     |
| > 1 GHz:        | horn antenna        |

### 8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signaling unit/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.



Picture 2: Diagram conducted measurements

## 8.2 Additional comments

Reference documents: None

Special test descriptions: The power setting was 12 for all modes and channels except for channel 11 in b-mode. Here a power setting of 10 was used. These settings will be implemented in the firmware of the unit. The measured data rates were 2 MBit/s in b-mode and 54 MBit/s in g-mode (according manufacturer information)

Configuration descriptions: None

Test mode:

- ☐ No test mode available.  
Iperf was used to ping another device with the largest support packet size
- ☒ Special software is used.  
EUT is transmitting pseudo random data by itself

### 8.3 RSP100 test report cover sheet / performance test data

|                                                  |   |                                                                                        |
|--------------------------------------------------|---|----------------------------------------------------------------------------------------|
| Test report number                               | : | 1-3933/11-01-09                                                                        |
| Equipment model number                           | : | DMA-IBASE-00                                                                           |
| Certification number                             | : | 6315A-IBASE                                                                            |
| Manufacturer (complete address)                  | : | Cognex<br>Vaalser Straße 259<br>52074 Aachen / GERMANY                                 |
| Tested to radio standards specification no.      | : | RSS 210, Issue 8, Annex 8                                                              |
| Open area test site IC No.                       | : | IC 3462C-1                                                                             |
| Frequency range                                  | : | ISM band 2400 MHz to 2483.5 MHz<br>(lowest channel 2412 MHz, highest channel 2462 MHz) |
| RF-power [W] (max.)                              | : | cond.: 30.0 mW (DSSS) *) 17.4 mW (OFDM) *)<br>EIRP: 16.6 mW (DSSS) 19.5 mW (OFDM)      |
| Occupied bandwidth (99%-BW)                      | : | DSSS: 13.63 MHz *)<br>OFDM: 16.49 MHz *)                                               |
| Type of modulation                               | : | DSSS & OFDM technology with BPSK, QPSK, 16- and 64 QAM modulation.                     |
| Emission designator (TRC-43)                     | : | 13M6G1D (DSSS)<br>16M5G7D (OFDM)                                                       |
| Antenna information                              | : | Integrated Antenna                                                                     |
| Transmitter spurious (worst case) [dBµV/m @ 3m]: |   | 52.2 @ 4874 MHz                                                                        |
| Receiver spurious (worst case) [dBµV/m @ 3m]:    |   | 46.7 @ 12060 MHz                                                                       |

\*) Values overtaken from test report R0708036 issued by Bay Area Compliance Lab Corp from 2007-09-26.

#### ATTESTATION:

#### DECLARATION OF COMPLIANCE:

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

#### Laboratory manager:

2011-12-13  
Date

Stefan Bös  
Name

  
Signature



## 9 Measurement results

### 9.1 Maximum output power (conducted)

Not performed

### 9.2 Antenna gain

Not performed

### 9.3 Maximum output power

#### Description:

Measurement of the maximum output power conducted and radiated. The measurements are performed using the data rate producing the highest conducted output power. The determination of these data rates was performed at the beginning of the tests.

The power setting was 12 for all modes and channels except for channel 11 in b-mode. Here a power setting of 10 was used. These settings will be implemented in the firmware of the unit. These settings will be implemented in the firmware of the unit. The measured data rates were 2 MBit/s in b-mode and 54 MBit/s in g-mode (according manufacturer information)

#### Measurement:

| Measurement parameter |          |
|-----------------------|----------|
| Detector:             | Peak     |
| Sweep time:           | Auto     |
| Video bandwidth:      | 30 MHz   |
| Resolution bandwidth: | 50 MHz   |
| Span:                 | 30 MHz   |
| Trace-Mode:           | Max Hold |

#### Limits:

| FCC                                        | IC                         |
|--------------------------------------------|----------------------------|
| CFR Part 15.247 (b)(3)                     | RSS 210, Issue 8, A 8.4(4) |
| Maximum Output Power                       |                            |
| Conducted: 1.0 W – Antenna Gain max. 6 dBi |                            |

**Results: DSSS / b – mode**

| DSSS / b – mode<br>Frequency | Maximum Output Power [dBm]               |               |               |
|------------------------------|------------------------------------------|---------------|---------------|
|                              | 2412 MHz                                 | 2437 MHz      | 2462 MHz      |
| Peak Output Power Conducted  | Not performed                            | Not performed | Not performed |
| Output Power Radiated – EIRP | 11.0                                     | 11.7          | 12.2          |
| Measurement uncertainty      | $\pm 1.5$ dB (cond.) / $\pm 3$ dB (rad.) |               |               |

**Result:** The measurement is passed.**Results: OFDM / g – mode**

| OFDM / g – mode<br>Frequency | Maximum Output Power [dBm]               |               |               |
|------------------------------|------------------------------------------|---------------|---------------|
|                              | 2412 MHz                                 | 2437 MHz      | 2462 MHz      |
| Peak Output Power Conducted  | Not performed                            | Not performed | Not performed |
| Output Power Radiated – EIRP | 11.7                                     | 12.6          | 12.9          |
| Measurement uncertainty      | $\pm 1.5$ dB (cond.) / $\pm 3$ dB (rad.) |               |               |

**Result:** The measurement is passed.

#### 9.4 Power spectral density

Not performed

#### 9.5 Spectrum bandwidth of a FHSS system – 6 dB bandwidth

Not performed

#### 9.6 Spectrum bandwidth of a FHSS system – 20 dB bandwidth

Not performed

#### 9.7 Band edge compliance conducted

Not performed

## 9.8 Band edge compliance radiated

### Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to channel 1 for the lower restricted band and to channel 11 for the upper restricted band. The measurement is repeated for all modulations. Measurement distance is 3m.

### Measurement:

| Measurement parameter |                                                             |
|-----------------------|-------------------------------------------------------------|
| Detector:             | Peak                                                        |
| Sweep time:           | Auto                                                        |
| Video bandwidth:      | 10 Hz                                                       |
| Resolution bandwidth: | 1 MHz                                                       |
| Span:                 | Lower Band: 2300 – 2400 MHz<br>Higher Band: 2480 – 2500 MHz |
| Trace-Mode:           | Max Hold                                                    |

### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | IC                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| CFR Part 15.205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RSS 210, Issue 8, A 8.5 |
| Band Edge Compliance Radiated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |
| 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)). |                         |
| 54 dBμV/m AVG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |

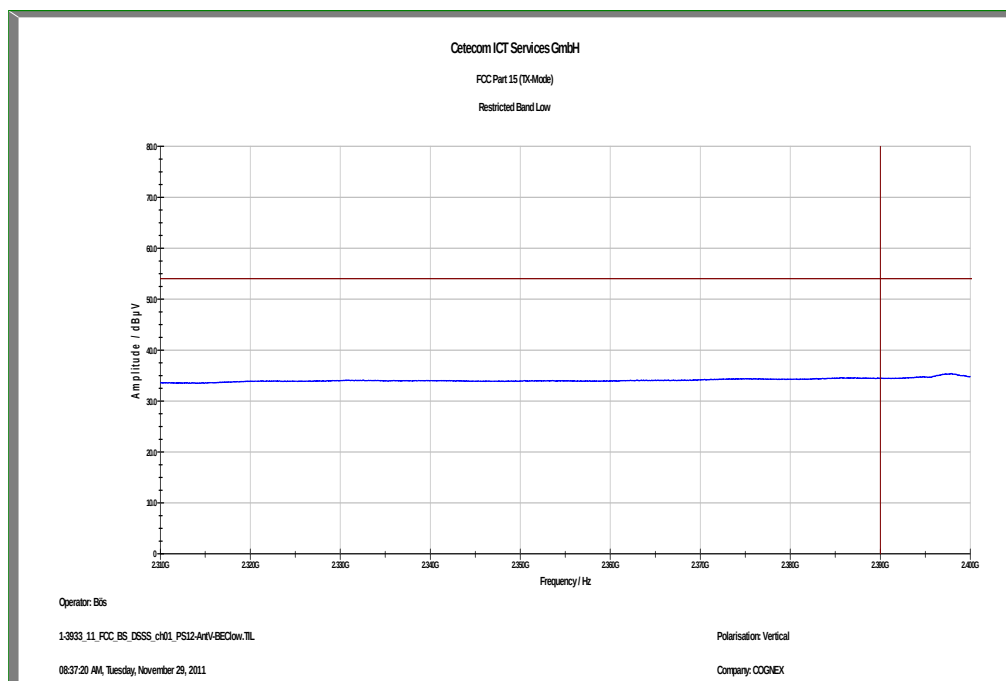
### Results:

| Szenario<br>Modulation       | Band Edge Compliance Conducted [dB] |                 |                 |
|------------------------------|-------------------------------------|-----------------|-----------------|
|                              | DSSS / b – mode                     | OFDM / g – mode | OFDM / n – mode |
| Lower Band Edge – Channel 1  | > 20 dB                             | > 20 dB         | -/-             |
| Upper Band Edge – Channel 11 | > 20 dB                             | > 20 dB         | -/-             |
| Measurement uncertainty      | ± 3 dB                              |                 |                 |

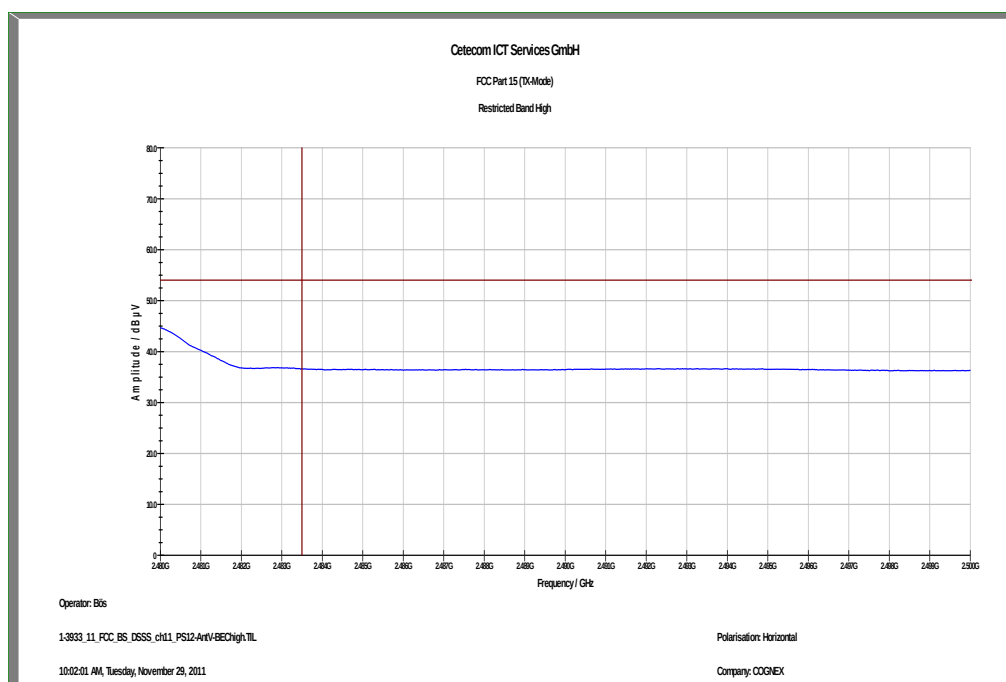
**Result:** The measurement is passed.

**Plots: DSSS / b – mode**

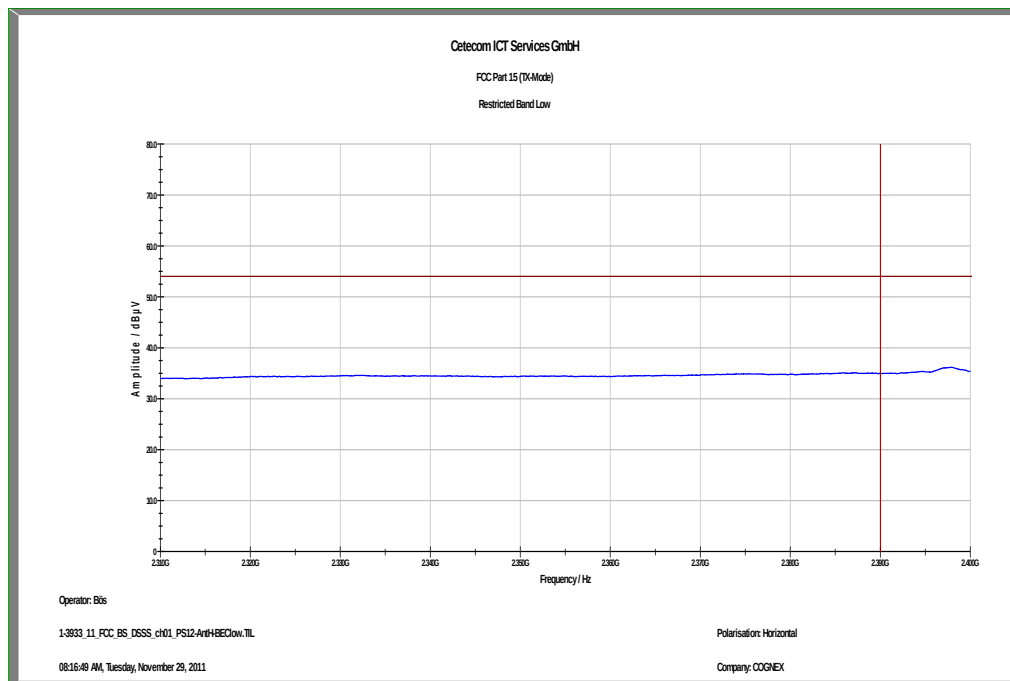
**Plot 1: TX mode, lower band edge, vertical polarization**



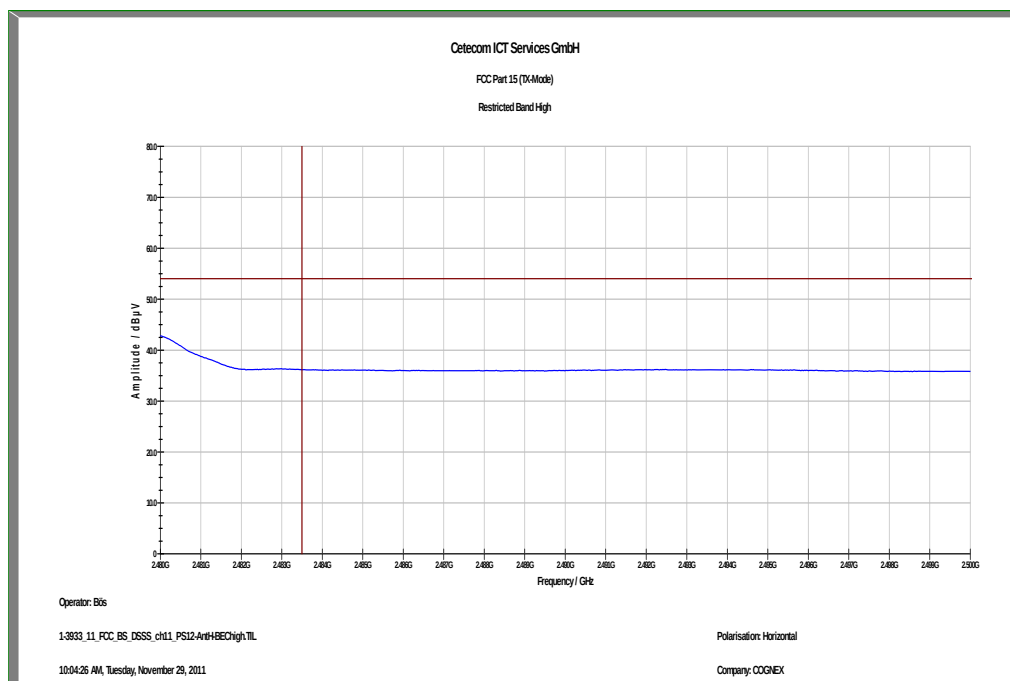
**Plot 2: TX mode, upper band edge, vertical polarization**



**Plot 3:** TX mode, lower band edge, horizontal polarization

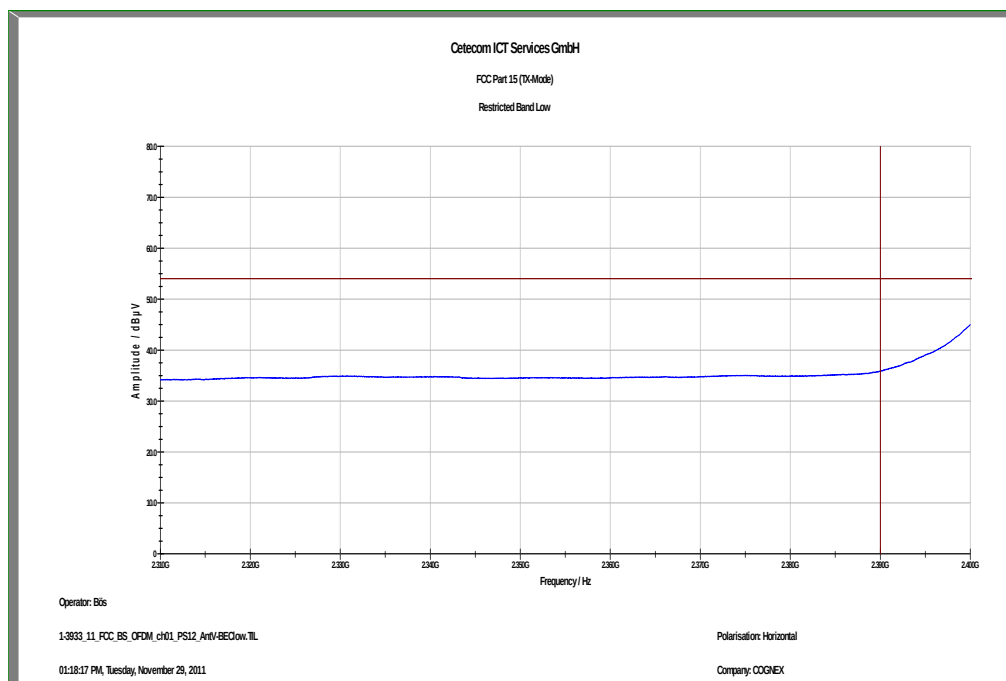


**Plot 4:** TX mode, upper band edge, horizontal polarization

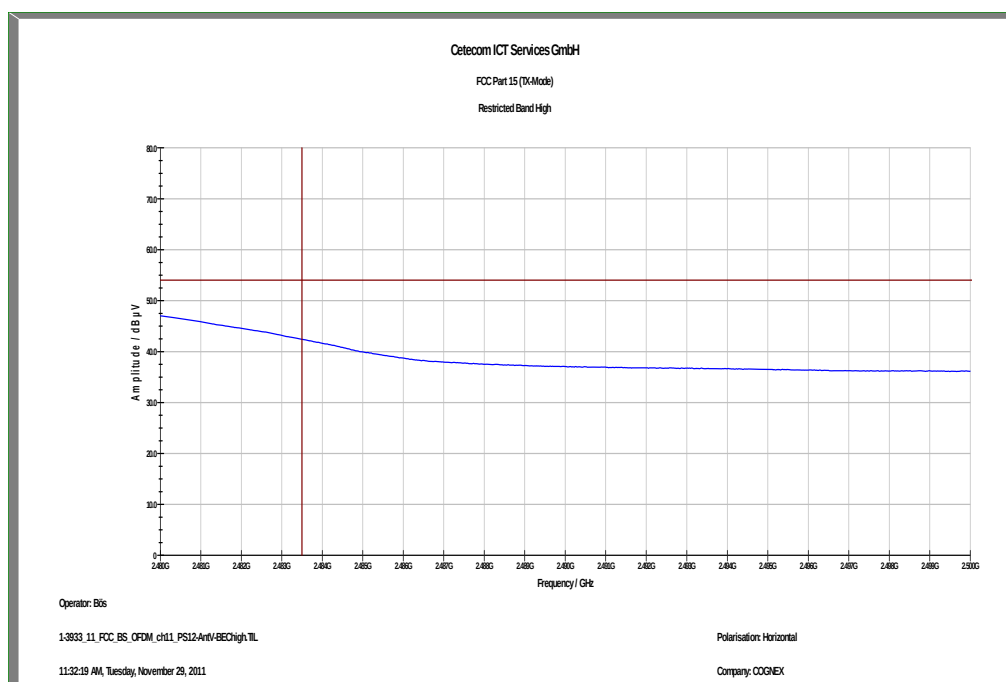


**Plots: OFDM / g – mode**

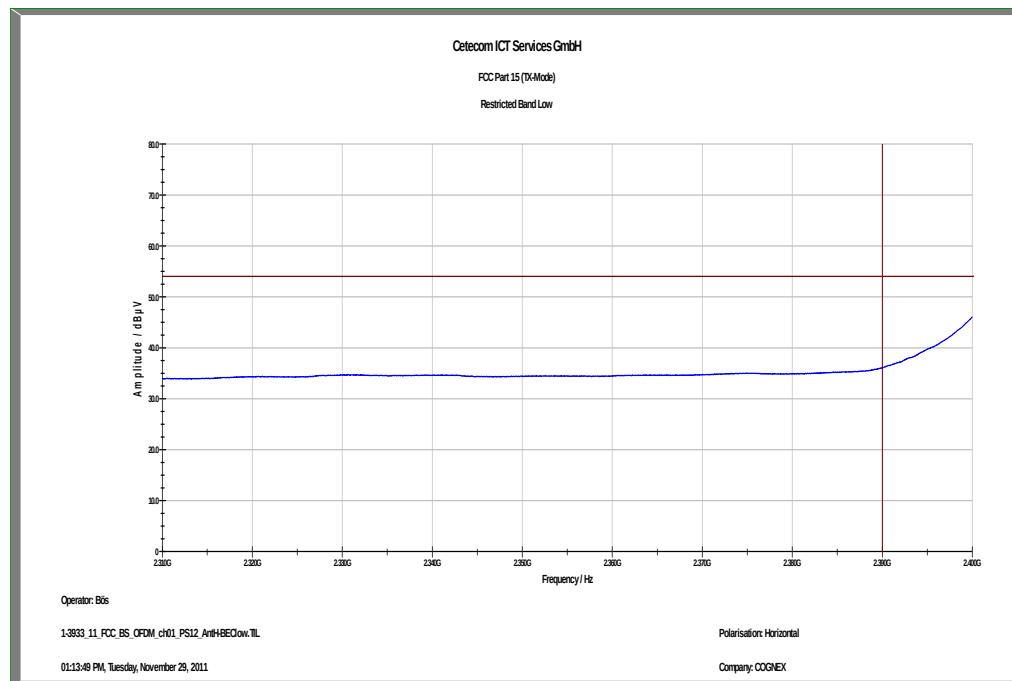
**Plot 1:** TX mode, lower band edge, vertical polarization



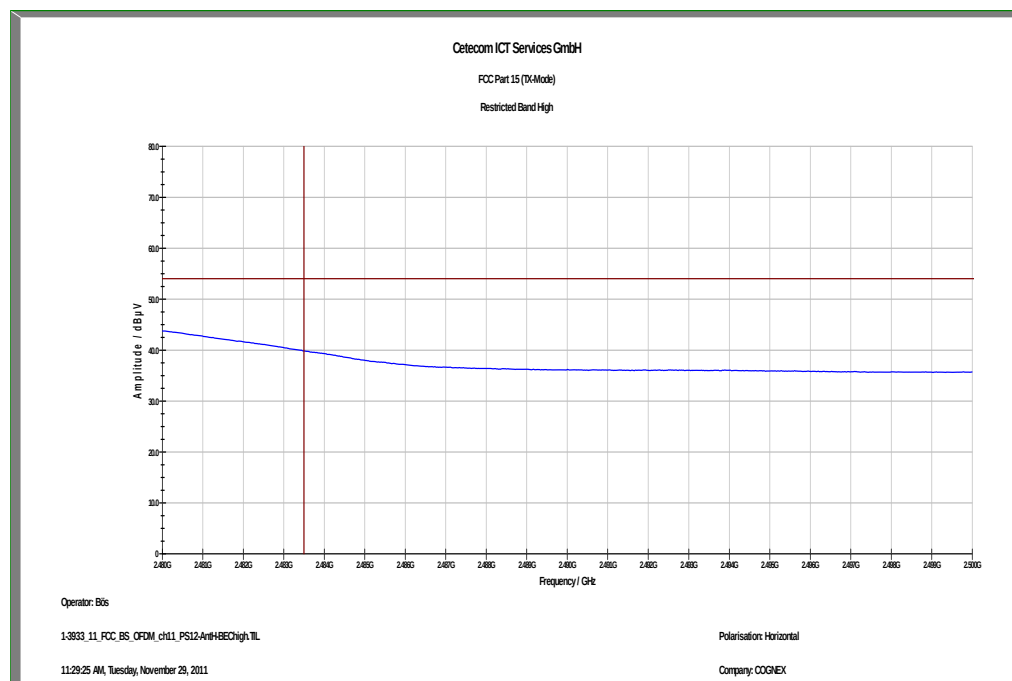
**Plot 2:** TX mode, upper band edge, vertical polarization



**Plot 3:** TX mode, lower band edge, horizontal polarization



**Plot 4:** TX mode, upper band edge, horizontal polarization





## 9.9 TX spurious emissions conducted

Not performed

## 9.10 TX spurious emissions radiated

### Description:

Measurement of the radiated spurious emissions in transmit mode. The measurement is performed at channel 1, 6 and 11. The measurement is repeated for all modulations.

### Measurement:

| Measurement parameter |                                                                                                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Detector:             | Peak / Quasi Peak / RMS above 1 GHz                                                                                                              |
| Sweep time:           | Auto                                                                                                                                             |
| Video bandwidth:      | Sweep: 100 kHz / 1 MHz<br>Remeasurement: 100 kHz / 1 MHz                                                                                         |
| Resolution bandwidth: | F < 1 GHz: 100 kHz<br>F > 1 GHz: 1 MHz                                                                                                           |
| Span:                 | 30 MHz to 25 GHz                                                                                                                                 |
| Trace-Mode:           | Max Hold                                                                                                                                         |
| Measured Modulation   | <input checked="" type="checkbox"/> DSSS b – mode<br><input checked="" type="checkbox"/> OFDM g – mode<br><input type="checkbox"/> OFDM n – mode |

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

### Limits:

| FCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         | IC                      |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|--|
| CFR Part 15.247(d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         | RSS 210, Issue 8, A 8.5 |  |
| TX Spurious Emissions Radiated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |  |
| 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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |                         |                         |  |
| §15.209                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                         |  |
| Frequency (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Field Strength (dBµV/m) | Measurement distance    |  |
| 30 - 88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 30.0                    | 10                      |  |
| 88 – 216                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 33.5                    | 10                      |  |
| 216 – 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 36.0                    | 10                      |  |
| Above 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 54.0                    | 3                       |  |

**Results: DSSS / b – mode**

| TX Spurious Emissions Radiated [dBμV/m] |          |                |                |          |                |                |          |                |
|-----------------------------------------|----------|----------------|----------------|----------|----------------|----------------|----------|----------------|
| DSSS – mode                             |          |                |                |          |                |                |          |                |
| 2412 MHz                                |          |                | 2437 MHz       |          |                | 2462 MHz       |          |                |
| F [MHz]                                 | Detector | Level [dBμV/m] | F [MHz]        | Detector | Level [dBμV/m] | F [MHz]        | Detector | Level [dBμV/m] |
| 50.9                                    | QP       | 38.0           | 48.8           | QP       | 35.1           | 50.5           | QP       | 37.7           |
| 4824                                    | AVG      | 50.7           | 51.5           | QP       | 34.9           | 4924           | AVG      | 45.0           |
| 19295                                   | PP       | 40.9           | 4874           | AVG      | 52.2           | 19694          | PP       | 49.0           |
|                                         |          |                | 19498          | PP       | 46.5           |                |          |                |
| Also see plots                          |          |                | Also see plots |          |                | Also see plots |          |                |
| Measurement uncertainty                 |          |                | ± 3 dB         |          |                |                |          |                |

**Result:** The measurement is passed.**Results: OFDM / g – mode**

| TX Spurious Emissions Radiated [dBμV/m] |          |                |                |          |                |                |          |                |
|-----------------------------------------|----------|----------------|----------------|----------|----------------|----------------|----------|----------------|
| OFDM – mode                             |          |                |                |          |                |                |          |                |
| 2412 MHz                                |          |                | 2437 MHz       |          |                | 2462 MHz       |          |                |
| F [MHz]                                 | Detector | Level [dBμV/m] | F [MHz]        | Detector | Level [dBμV/m] | F [MHz]        | Detector | Level [dBμV/m] |
| 48.0                                    | QP       | 34.5           | 48.6           | QP       | 35.0           | 48.6           | QP       | 35.7           |
| 50.6                                    | QP       | 35.2           | 50.6           | QP       | 35.8           | 50.3           | QP       | 35.0           |
| 4824                                    | AVG      | 39.8           | 4874           | AVG      | 43.4           | 51.2           | QP       | 35.2           |
| 19295                                   | PP       | 47.6           | 12186          | PP       | 44.2           | 4924           | AVG      | 47.9           |
|                                         |          |                | 19498          | PP       | 48.1           | 19694          | PP       | 48.2           |
| Also see plots                          |          |                | Also see plots |          |                | Also see plots |          |                |
| Measurement uncertainty                 |          |                | ± 3 dB         |          |                |                |          |                |

**Result:** The measurement is passed.

**Plots: DSSS / b – mode****Plot 1:** Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization**Common Information**

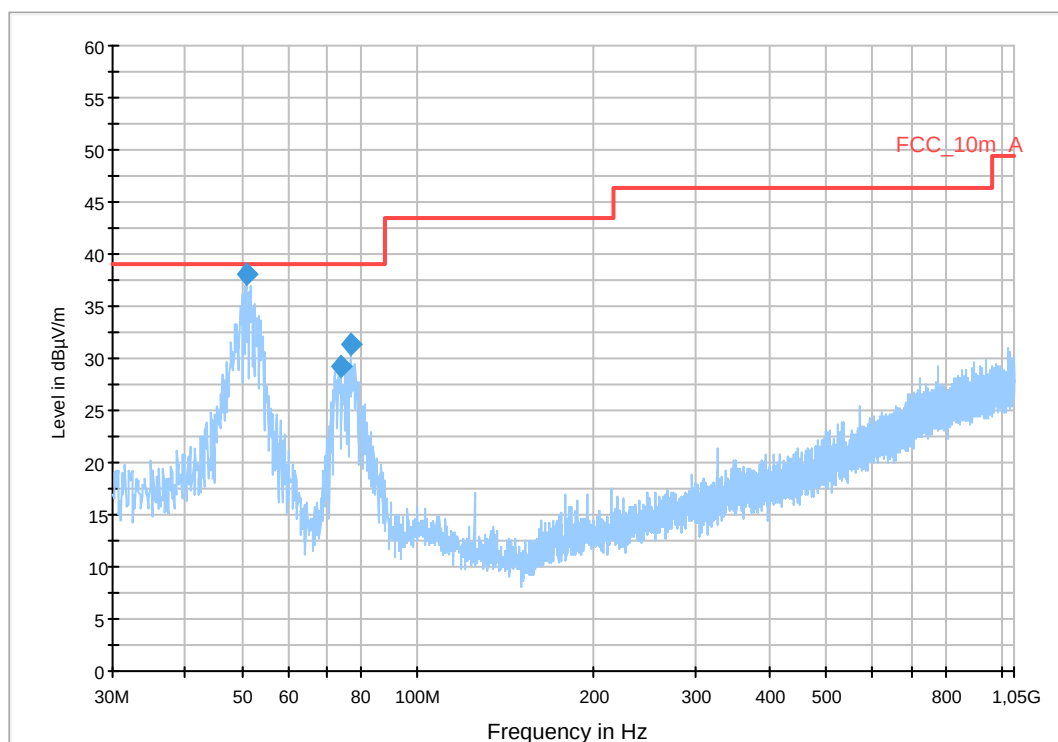
EUT: DataMan 8000 Base  
 Serial Number: prototype  
 Test Description: FCC part 15 class A @ 10 m  
 Operating Conditions: WLAN b-mode TX Ch. 1  
 Operator Name: Hennemann  
 Comment: PoE; ETH-cable: S/FTP

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup: Electric Field (NOS)  
 Receiver: [ESCI 3]  
 Level Unit: dBμV/m

| Subrange       | Step Size | Detectors | IF BW   | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz    | QPK       | 120 kHz | 1 s        | 20 dB  |

FCC\_10m(A)\_3

**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBμV/m) | Meas. Time (ms) | Bandwidth h (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) | Comment |
|-----------------|--------------------|-----------------|-------------------|-------------|--------------|---------------|------------|-------------|----------------|---------|
| 50.912700       | 38.0               | 1000.0          | 120.000           | 98.0        | V            | 31.0          | 13.3       | 1.1         | 39.1           |         |
| 74.020650       | 29.2               | 1000.0          | 120.000           | 142.0       | V            | 48.0          | 9.2        | 9.9         | 39.1           |         |
| 76.647900       | 31.4               | 1000.0          | 120.000           | 220.0       | V            | 48.0          | 9.1        | 7.7         | 39.1           |         |

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

Signal Path: without Notch  
FW 1.0

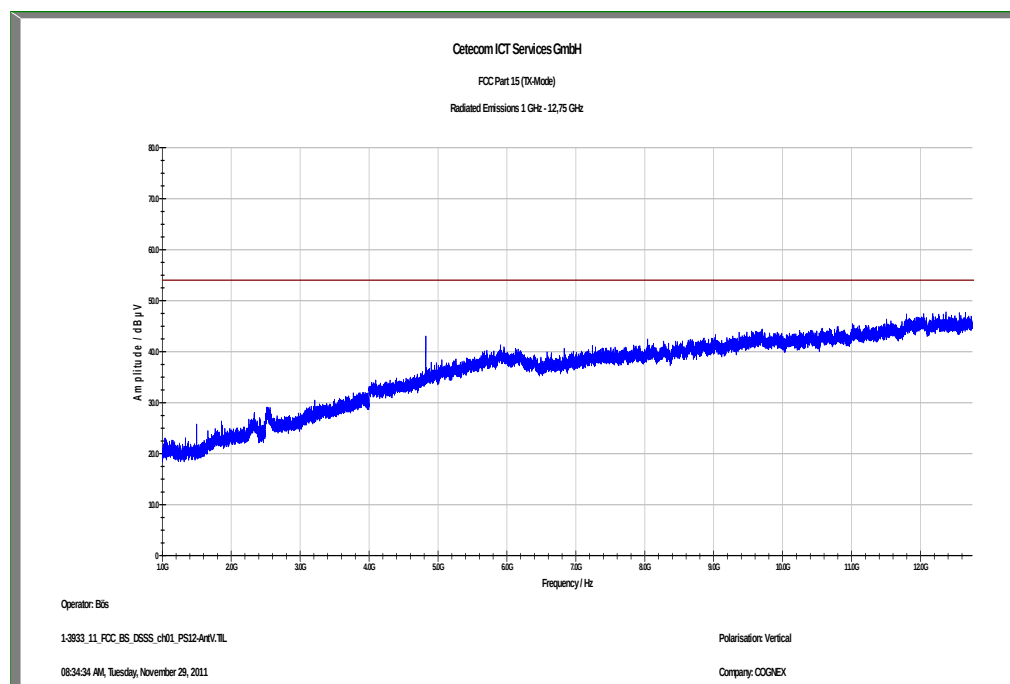
Antenna: VULB 9163  
SN 9163-295, FW ---  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table (vertical): Cable\_EN\_1GHz (1005)  
Correction Table (horizontal): Cable\_EN\_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12

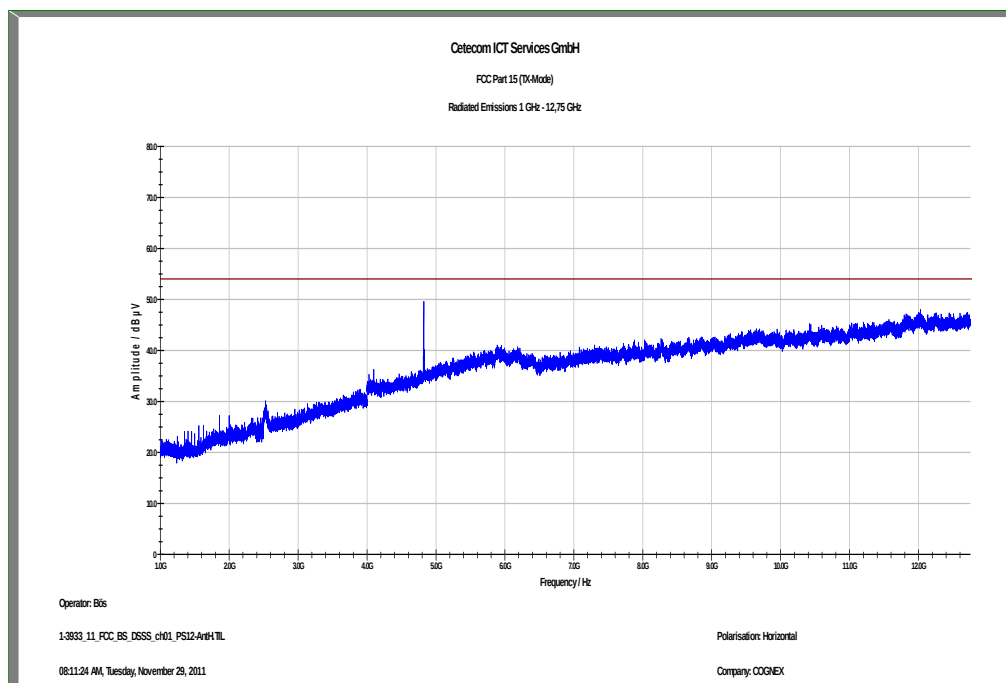
Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

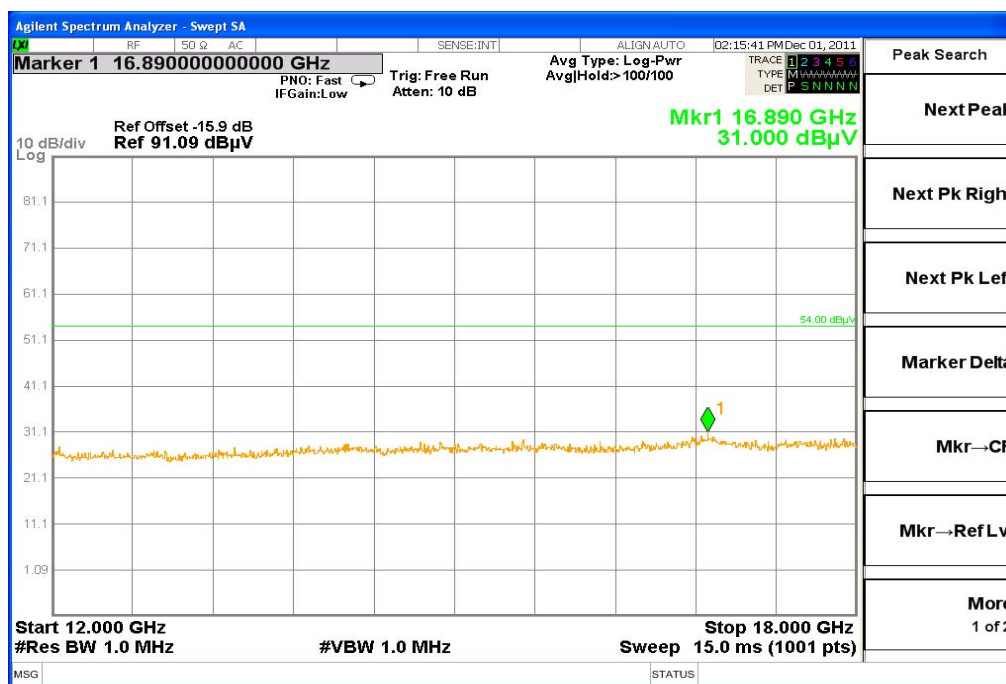
**Plot 2:** Lowest channel, 1 GHz to 12.75 GHz, vertical polarization



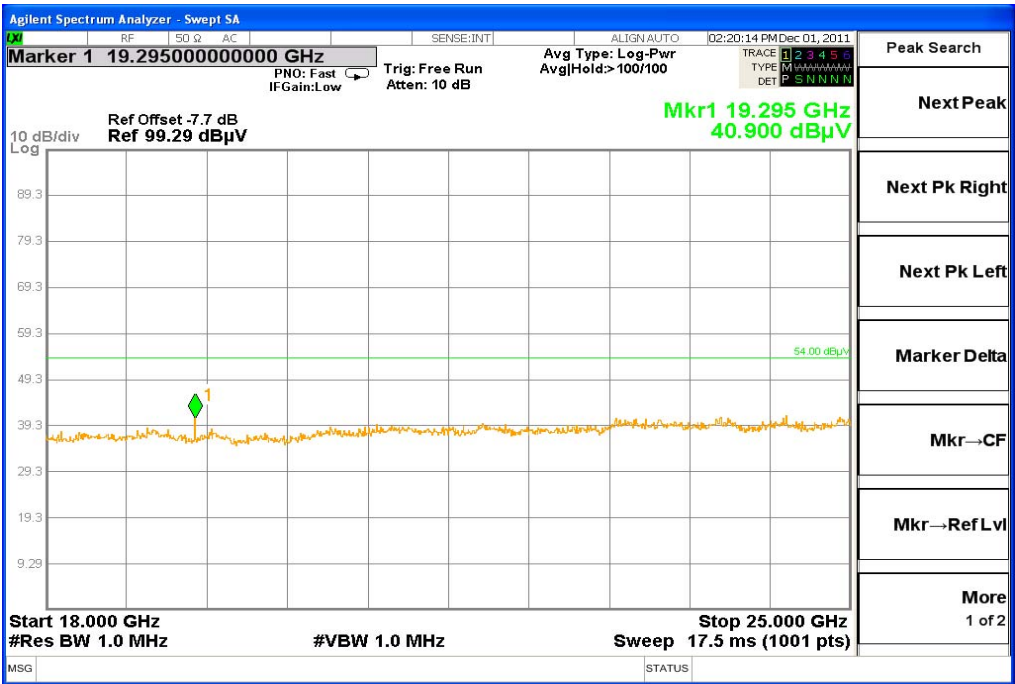
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 3:** Lowest channel, 1 GHz to 12.75 GHz, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 4:** Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization

**Plot 5:** Lowest channel, 18 GHz to 25 GHz, vertical & horizontal polarization



**Plot 6:** Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization

## Common Information

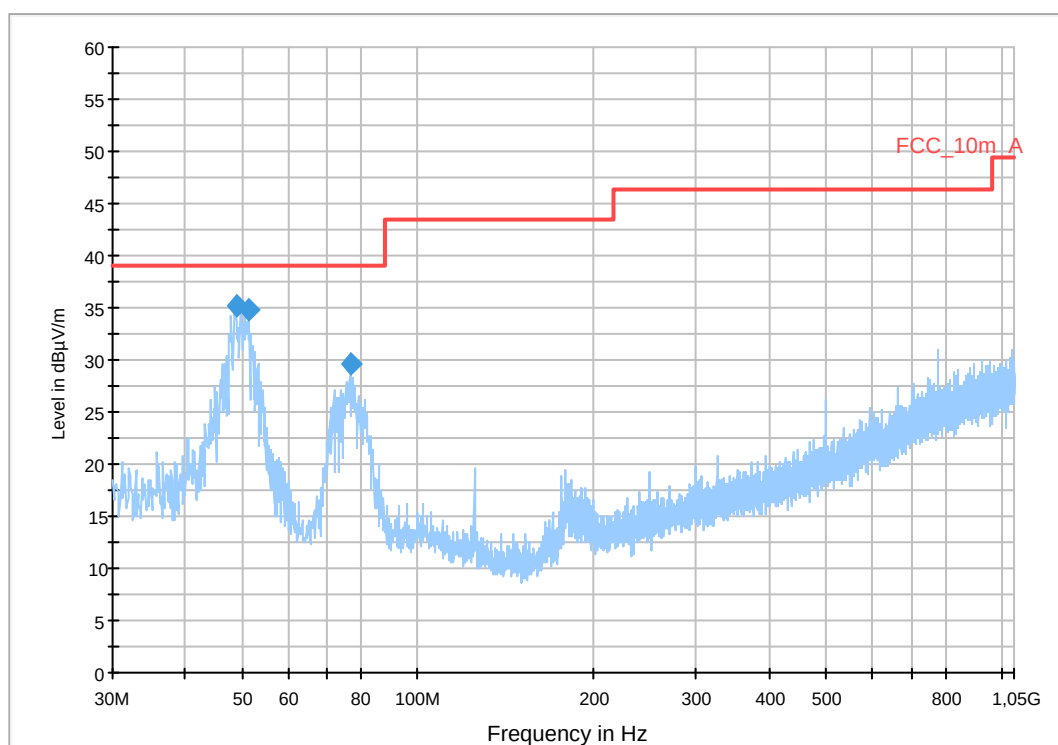
EUT: DataMan 8000 Base  
 Serial Number: prototype  
 Test Description: FCC part 15 class A @ 10 m  
 Operating Conditions: WLAN b-mode TX Ch. 6  
 Operator Name: Wolsdorfer  
 Comment: PoE; ETH-cable: S/FTP

## Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)  
 Receiver: [ESCI 3]  
 Level Unit: dBμV/m

| Subrange       | Step Size | Detectors | IF BW   | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz    | QPK       | 120 kHz | 1 s        | 20 dB  |

FCC\_10m(A)\_3



## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) | Comment |
|-----------------|--------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|---------|
| 48.844350       | 35.1               | 1000.0          | 120.000         | 98.0        | V            | 324.0         | 13.3       | 4.0         | 39.1           |         |
| 51.451200       | 34.9               | 1000.0          | 120.000         | 98.0        | V            | 189.0         | 13.2       | 4.2         | 39.1           |         |
| 76.592550       | 29.6               | 1000.0          | 120.000         | 220.0       | V            | -6.0          | 9.1        | 9.5         | 39.1           |         |



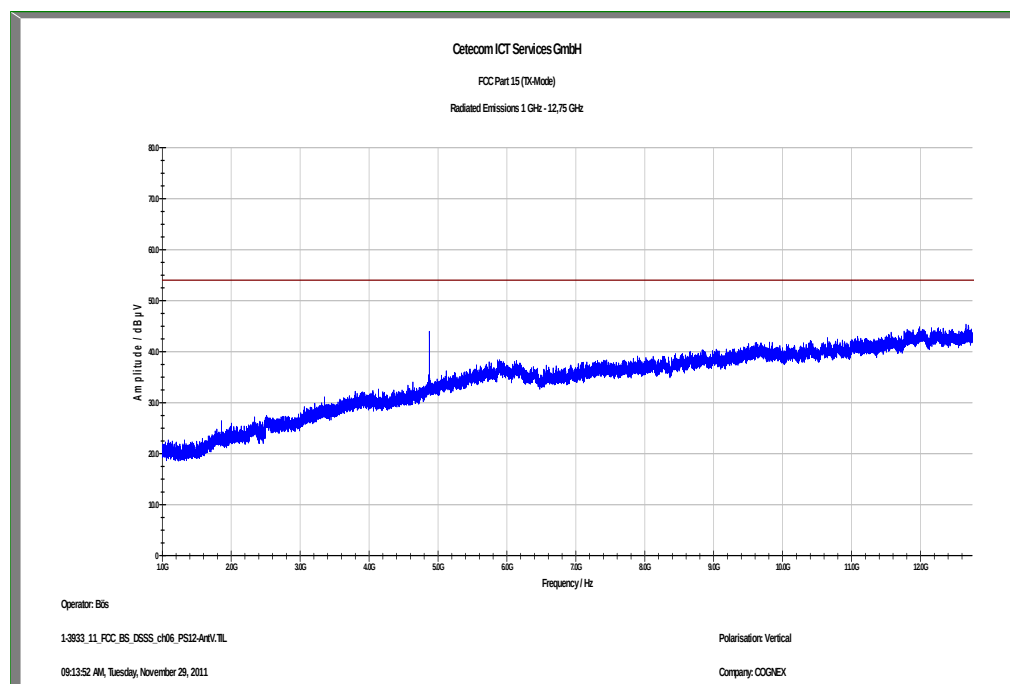
## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

## Subrange 1

Frequency Range: 30 MHz - 2 GHz

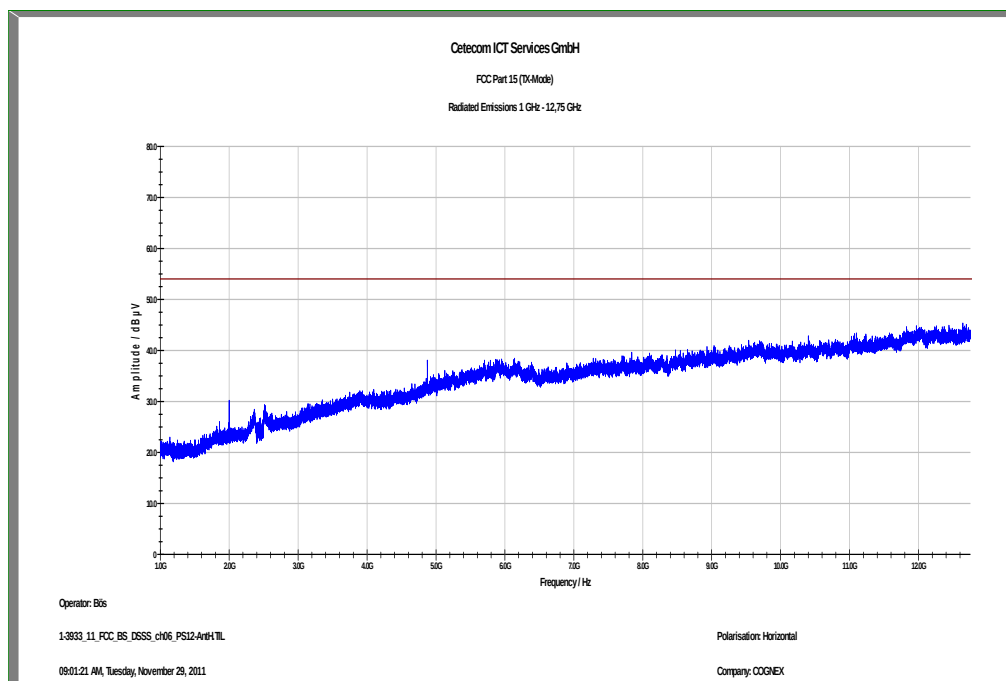
Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch  
FW 1.0Antenna: VULB 9163  
SN 9163-295, FW ---  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table (vertical): Cable\_EN\_1GHz (1005)  
Correction Table (horizontal): Cable\_EN\_1GHz (1005)  
Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

**Plot 7:** Middle channel, 1 GHz to 12.75 GHz, vertical polarization

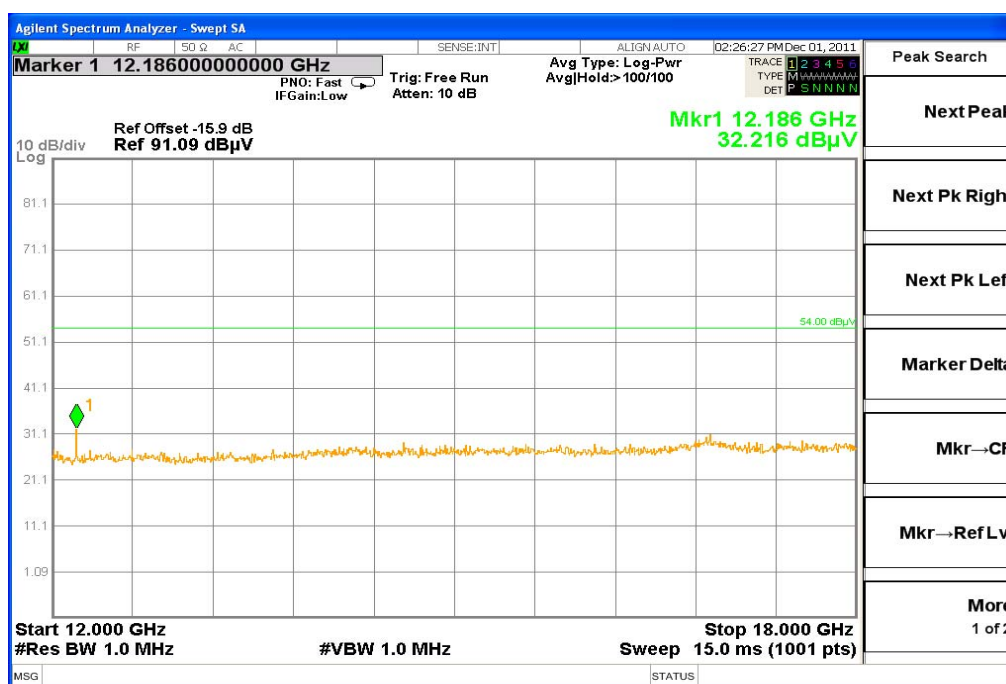
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 8:** Middle channel, 1 GHz to 12.75 GHz, horizontal polarization

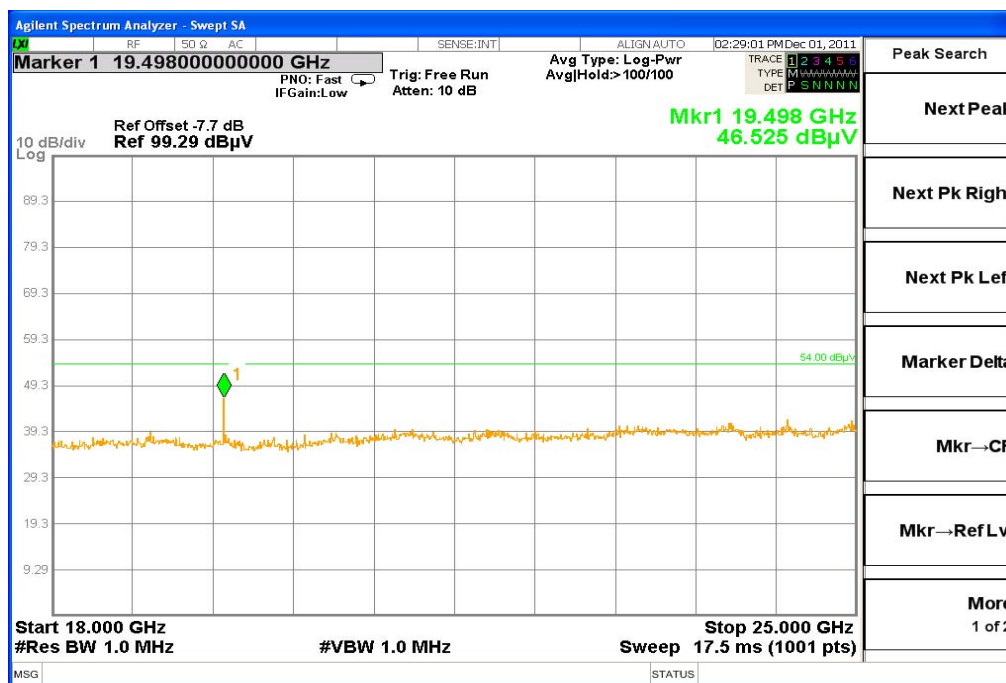


The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 9:** Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



**Plot 10:** Middle channel, 18 GHz to 25 GHz, vertical & horizontal polarization



**Plot 11:** Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

## Common Information

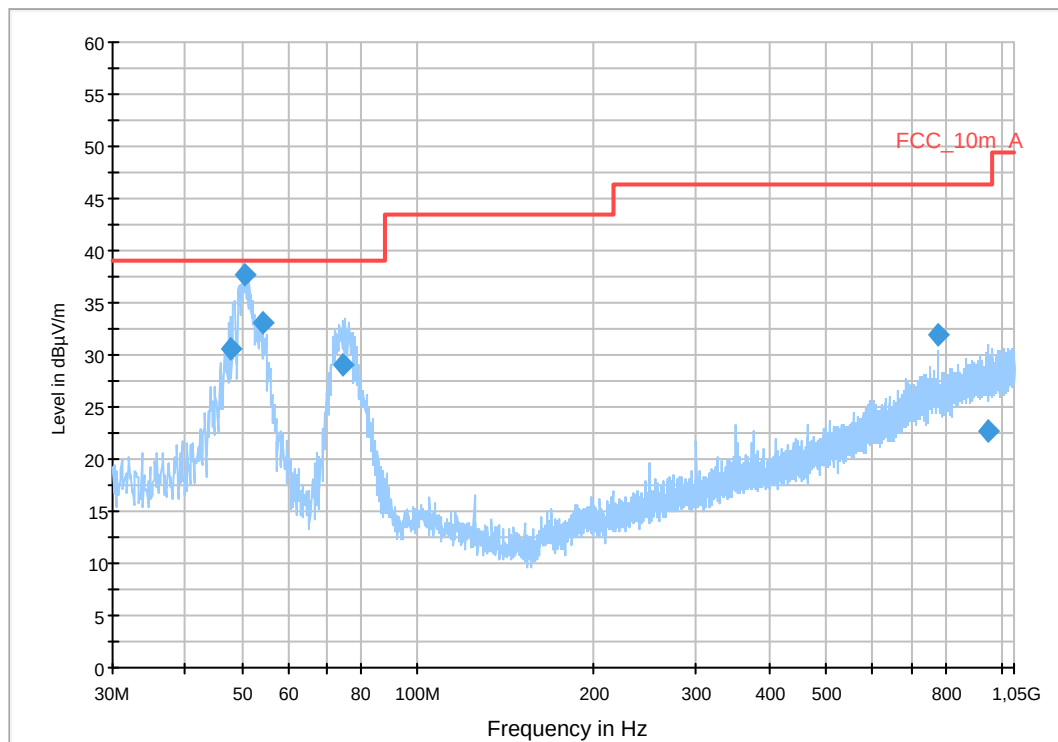
EUT: DataMan 8000 Base  
 Serial Number: prototype  
 Test Description: FCC part 15 class A @ 10 m  
 Operating Conditions: WLAN b-mode TX Ch. 11  
 Operator Name: Hennemann  
 Comment: PoE; ETH-cable: S/FTP

## Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)  
 Receiver: [ESCI 3]  
 Level Unit: dB $\mu$ V/m

| Subrange       | Step Size | Detectors | IF BW   | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz    | QPK       | 120 kHz | 1 s        | 20 dB  |

FCC\_10m(B)



## Final Result 1

| Frequency (MHz) | QuasiPeak (dB $\mu$ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|---------|
| 47.662500       | 30.6                     | 1000.0          | 120.000         | 100.0       | V            | 170.0         | 13.3       | 8.5         | 39.1                 |         |
| 50.542950       | 37.7                     | 1000.0          | 120.000         | 100.0       | V            | 316.0         | 13.3       | 1.4         | 39.1                 |         |
| 54.306300       | 33.0                     | 1000.0          | 120.000         | 259.0       | V            | 41.0          | 13.0       | 6.1         | 39.1                 |         |
| 74.459850       | 28.9                     | 1000.0          | 120.000         | 200.0       | V            | 40.0          | 9.2        | 10.2        | 39.1                 |         |
| 780.013650      | 32.0                     | 1000.0          | 120.000         | 136.0       | H            | 46.0          | 23.7       | 14.4        | 46.4                 |         |
| 944.495100      | 22.8                     | 1000.0          | 120.000         | 400.0       | V            | 317.0         | 25.3       | 23.6        | 46.4                 |         |

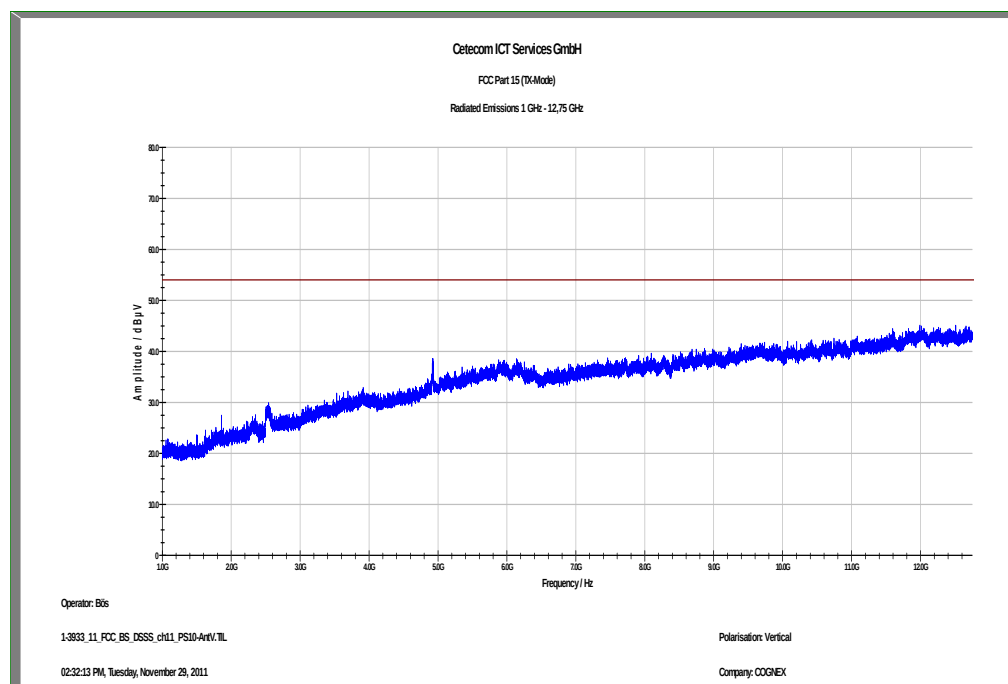
## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

## Subrange 1

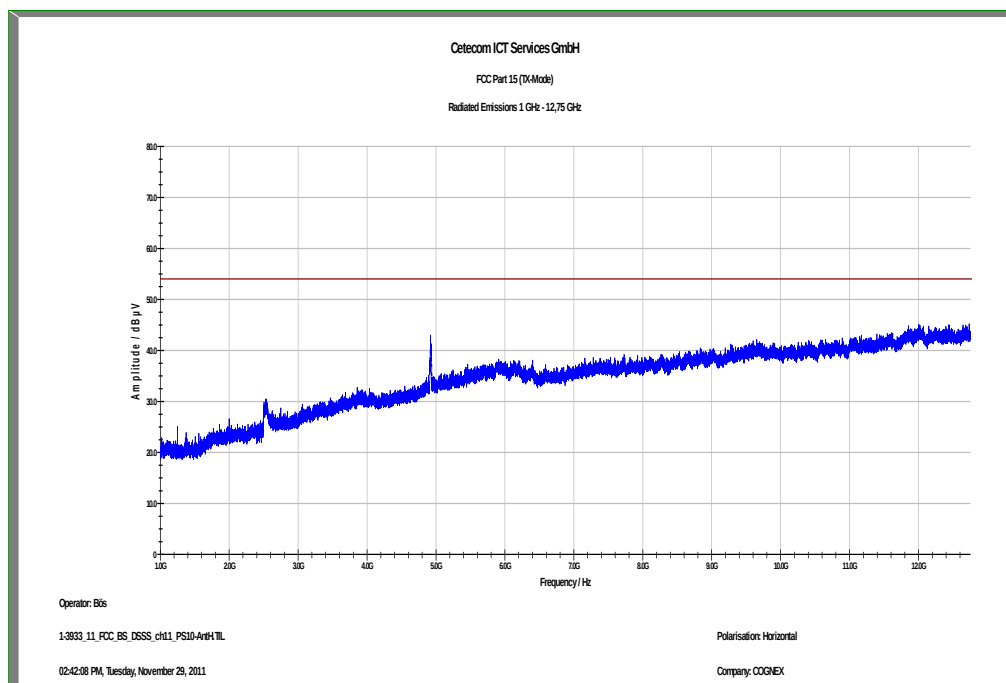
Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch  
FW 1.0Antenna: VULB 9163  
SN 9163-295, FW ---  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table (vertical): Cable\_EN\_1GHz (1005)  
Correction Table (horizontal): Cable\_EN\_1GHz (1005)  
Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

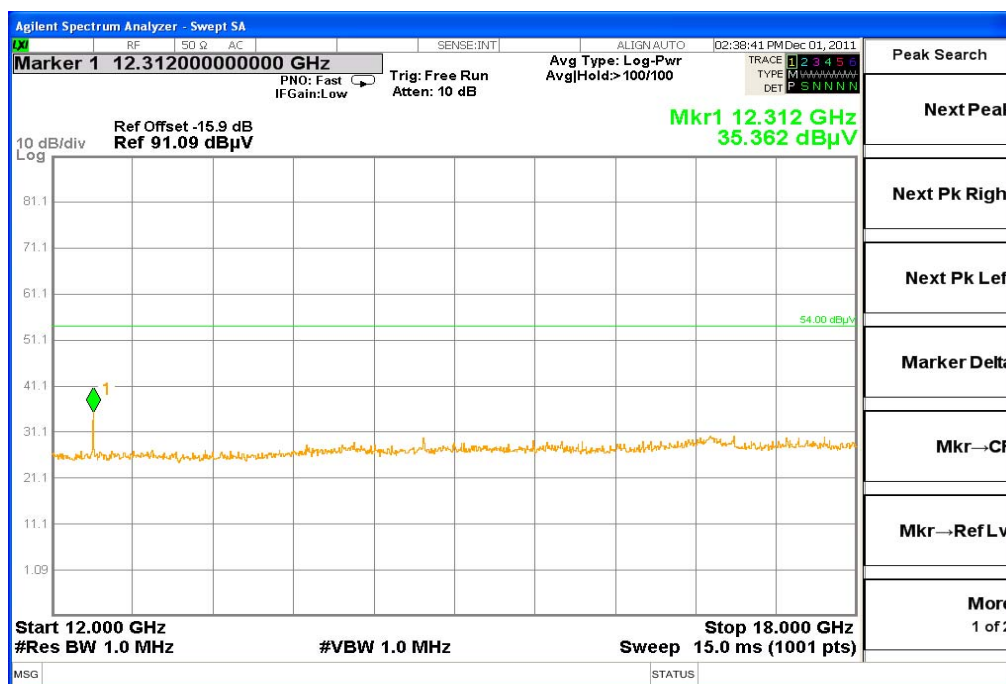
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**Plot 12:** Highest channel, 1 GHz to 12.75 GHz, vertical polarization

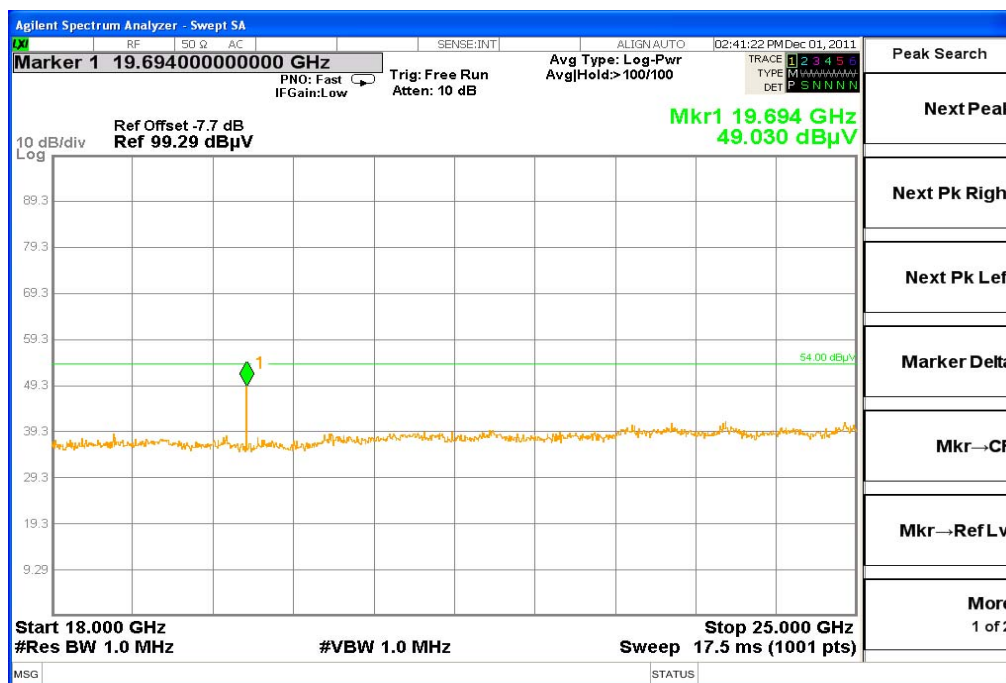
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 13:** Highest channel, 1 GHz to 12.75 GHz, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 14:** Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization

**Plot 15:** Highest channel, 18 GHz to 25 GHz, vertical & horizontal polarization



### Plots: OFDM / g – mode

**Plot 1:** Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

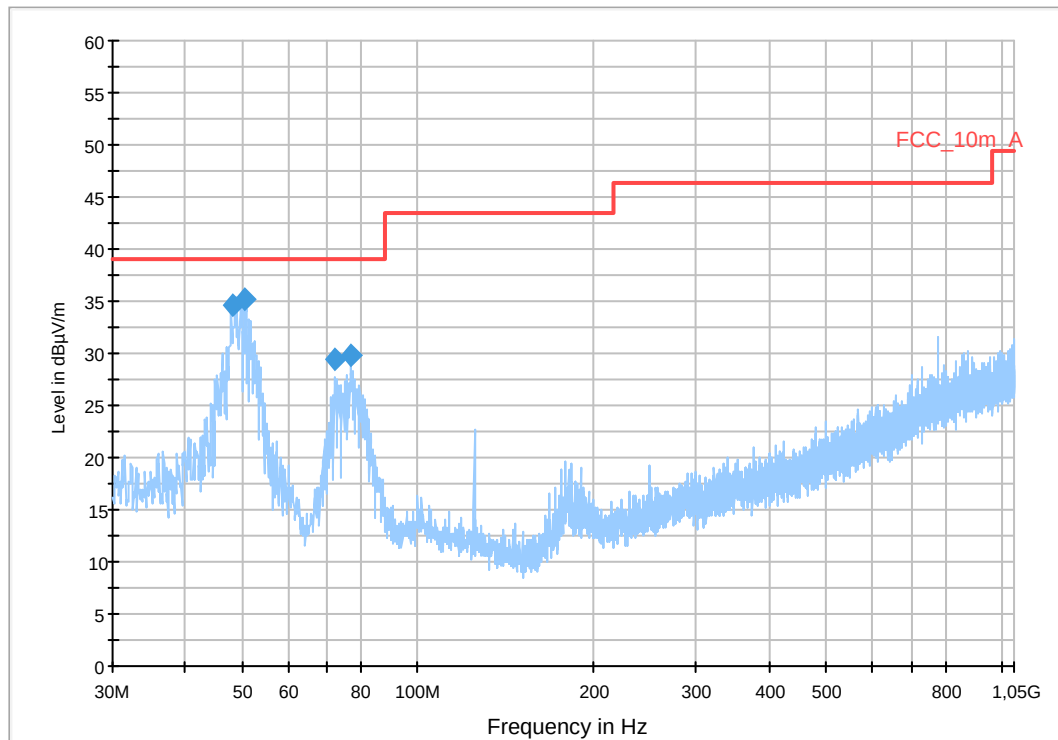
#### Common Information

EUT: DataMan 8000 Base  
 Serial Number: prototype  
 Test Description: FCC part 15 class A @ 10 m  
 Operating Conditions: WLAN g-mode 54 Mbit/s TX Ch. 1  
 Operator Name: Wolsdorfer  
 Comment: PoE; ETH-cable: S/FTP

#### Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)  
 Receiver: [ESCI 3]  
 Level Unit: dBμV/m  
**Subrange** **Step Size** **Detectors** **IF BW** **Meas. Time** **Preamp**  
 30 MHz - 2 GHz 60 kHz QPK 120 kHz 1 s 20 dB

FCC\_10m(A)\_3



#### Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) | Comment |
|-----------------|--------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|---------|
| 48.023550       | 34.5               | 1000.0          | 120.000         | 98.0        | V            | 109.0         | 13.3       | 4.6         | 39.1           |         |
| 50.612250       | 35.2               | 1000.0          | 120.000         | 98.0        | V            | 193.0         | 13.3       | 3.9         | 39.1           |         |
| 72.304650       | 29.5               | 1000.0          | 120.000         | 220.0       | V            | -7.0          | 9.2        | 9.6         | 39.1           |         |
| 76.650900       | 29.8               | 1000.0          | 120.000         | 220.0       | V            | -7.0          | 9.1        | 9.3         | 39.1           |         |



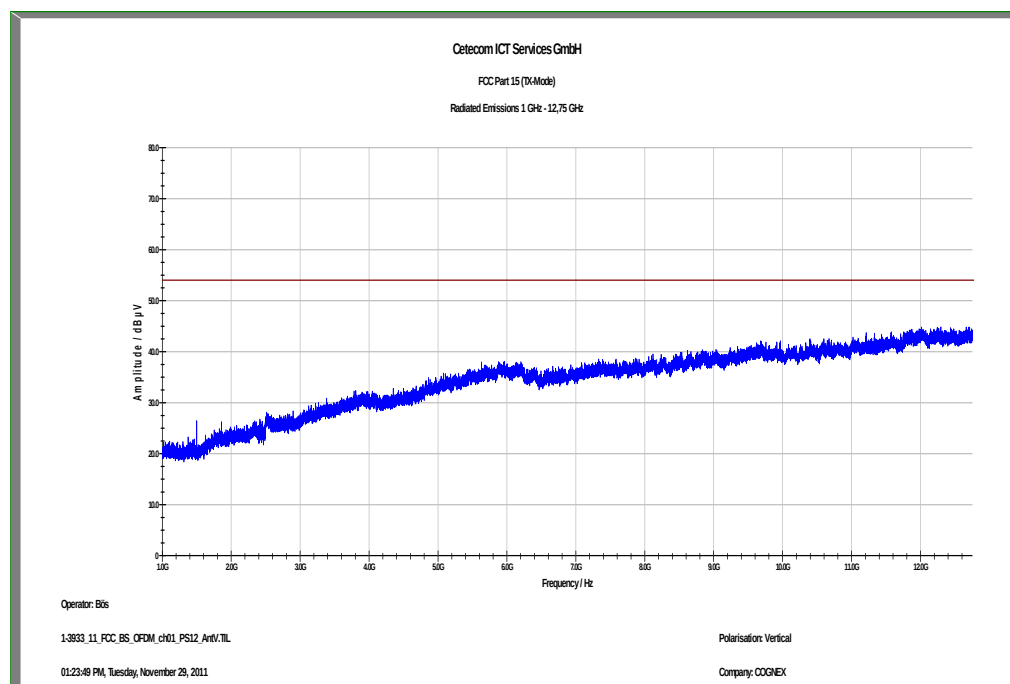
## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

## Subrange 1

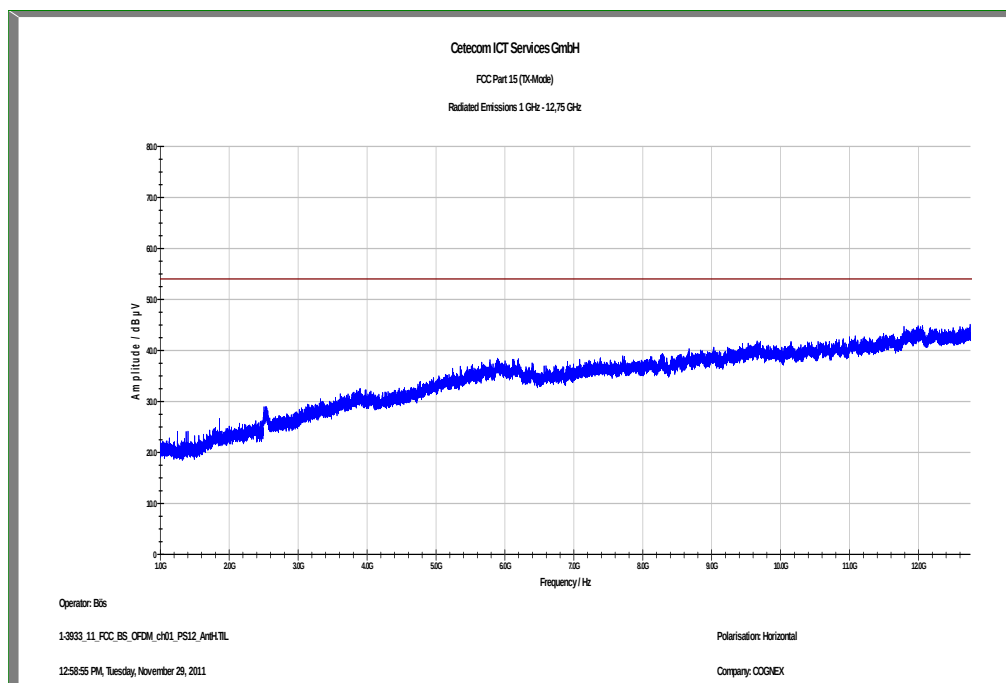
Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch  
FW 1.0Antenna: VULB 9163  
SN 9163-295, FW ---  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table (vertical): Cable\_EN\_1GHz (1005)  
Correction Table (horizontal): Cable\_EN\_1GHz (1005)  
Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

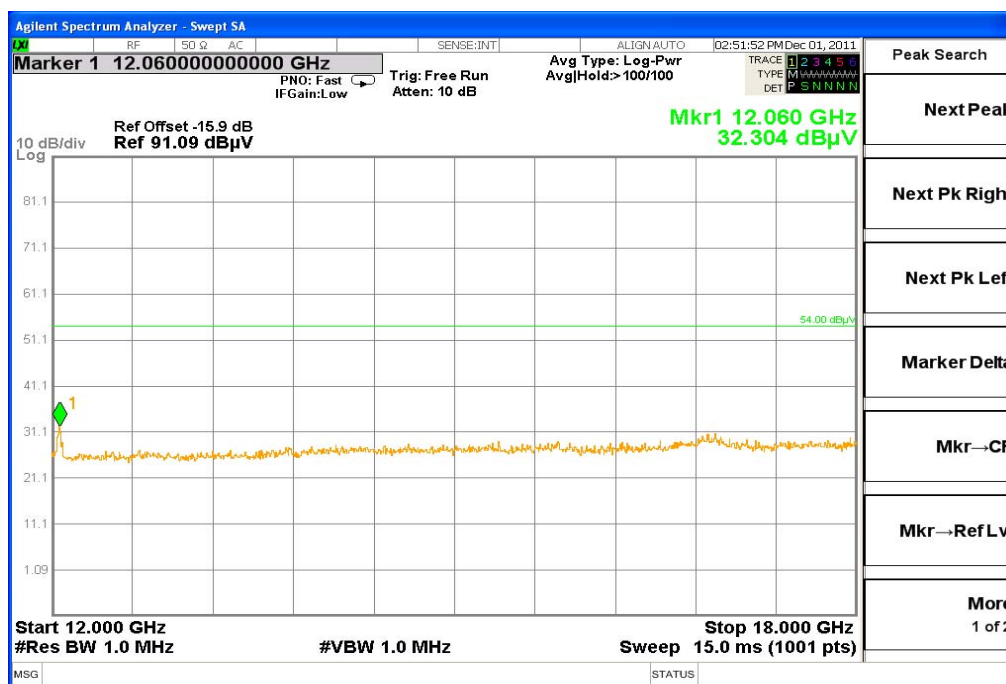
EMC 32 Version 8.10.00

**Plot 2:** Lowest channel, 1 GHz to 12.75 GHz, vertical polarization

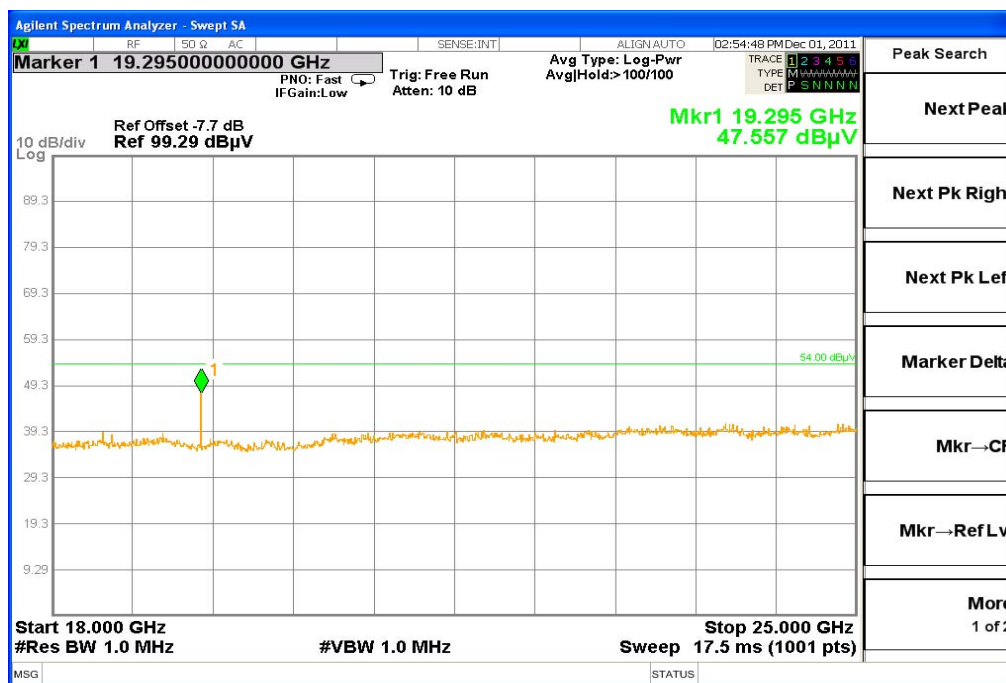
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 3:** Lowest channel, 1 GHz to 12.75 GHz, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 4:** Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization

**Plot 5:** Lowest channel, 18 GHz to 25 GHz, vertical & horizontal polarization



**Plot 6:** Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization

## Common Information

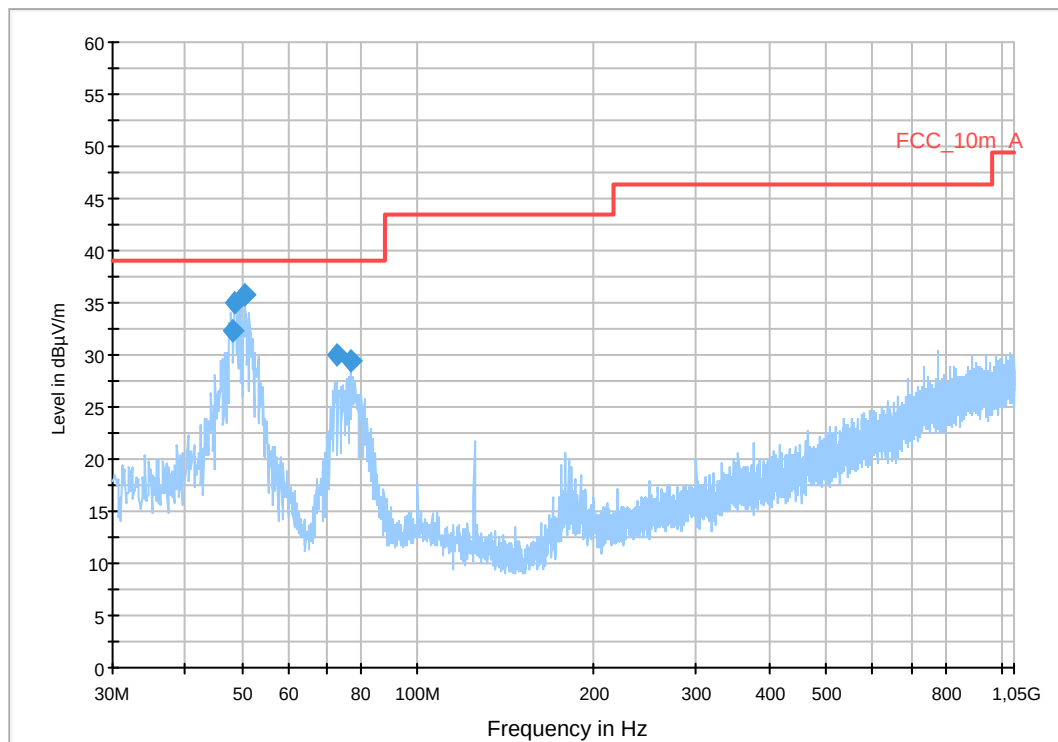
EUT: DataMan 8000 Base  
 Serial Number: prototype  
 Test Description: FCC part 15 class A @ 10 m  
 Operating Conditions: WLAN g-mode 54 Mbit/s TX Ch. 6  
 Operator Name: Wolsdorfer  
 Comment: PoE; ETH-cable: S/FTP

## Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)  
 Receiver: [ESCI 3]  
 Level Unit: dB $\mu$ V/m

| Subrange       | Step Size | Detectors | IF BW   | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz    | QPK       | 120 kHz | 1 s        | 20 dB  |

FCC\_10m(A)\_3



## Final Result 1

| Frequency (MHz) | QuasiPeak (dB $\mu$ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|---------|
| 48.024000       | 32.4                     | 1000.0          | 120.000         | 188.0       | V            | 294.0         | 13.3       | 6.7         | 39.1                 |         |
| 48.576450       | 35.0                     | 1000.0          | 120.000         | 98.0        | V            | 204.0         | 13.3       | 4.1         | 39.1                 |         |
| 50.611050       | 35.8                     | 1000.0          | 120.000         | 98.0        | V            | 324.0         | 13.3       | 3.3         | 39.1                 |         |
| 72.900300       | 30.0                     | 1000.0          | 120.000         | 220.0       | V            | 48.0          | 9.2        | 9.1         | 39.1                 |         |
| 76.616700       | 29.4                     | 1000.0          | 120.000         | 220.0       | V            | -7.0          | 9.1        | 9.7         | 39.1                 |         |

## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

## Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

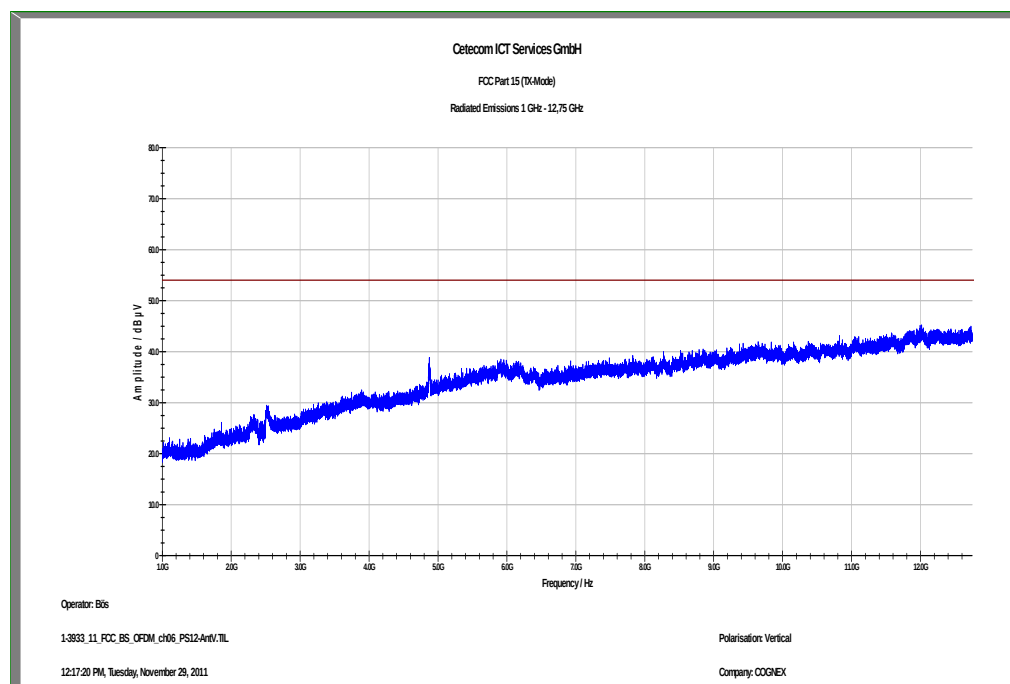
Signal Path: without Notch  
FW 1.0

Antenna: VULB 9163  
SN 9163-295, FW ---  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table (vertical): Cable\_EN\_1GHz (1005)  
Correction Table (horizontal): Cable\_EN\_1GHz (1005)

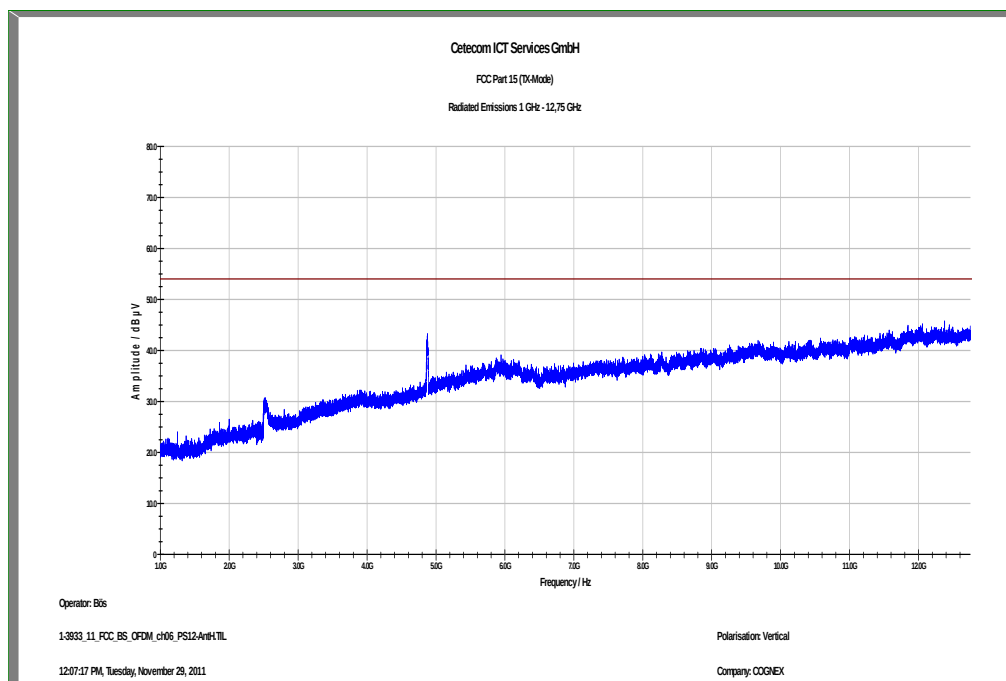
Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12

Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

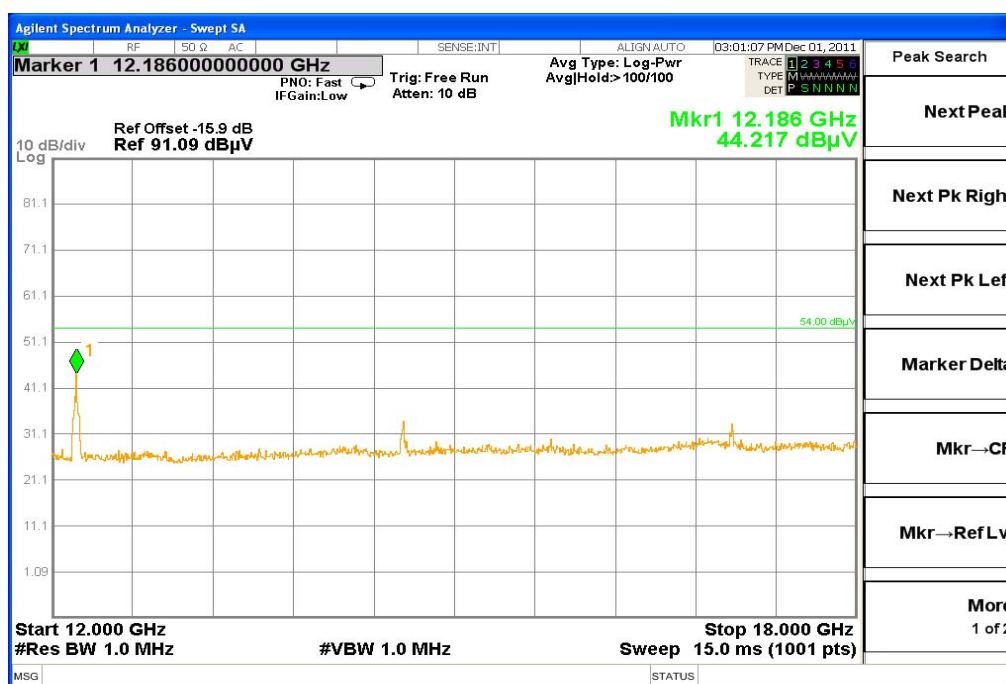
EMC 32 Version 8.10.00

**Plot 7:** Middle channel, 1 GHz to 12.75 GHz, vertical polarization

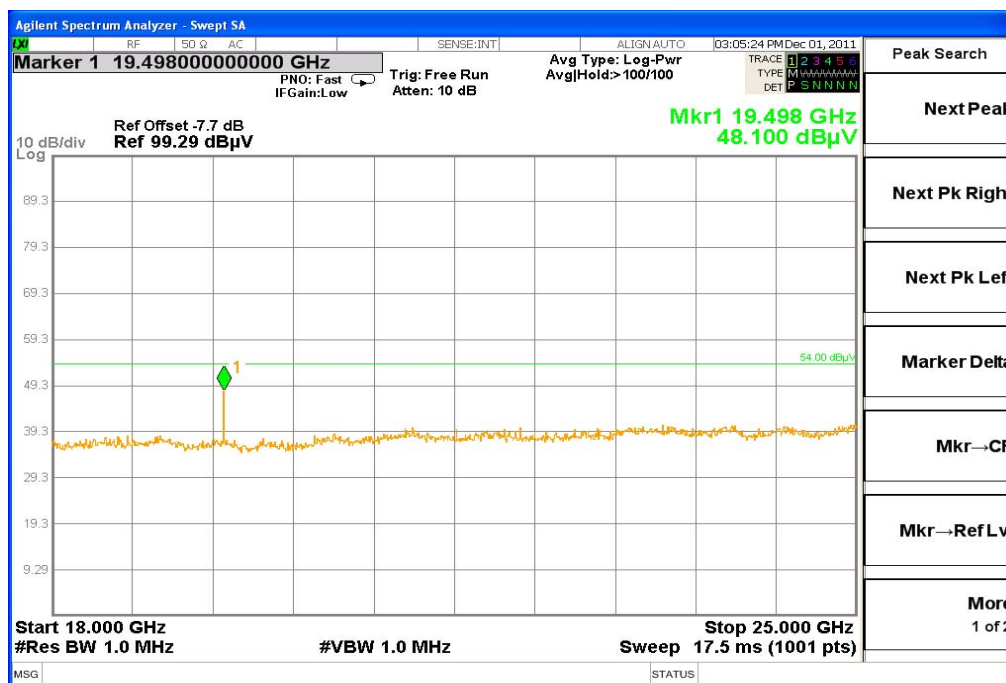
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 8:** Middle channel, 1 GHz to 12.75 GHz, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 9:** Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization

**Plot 10:** Middle channel, 18 GHz to 25 GHz, vertical & horizontal polarization



**Plot 11:** Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

## Common Information

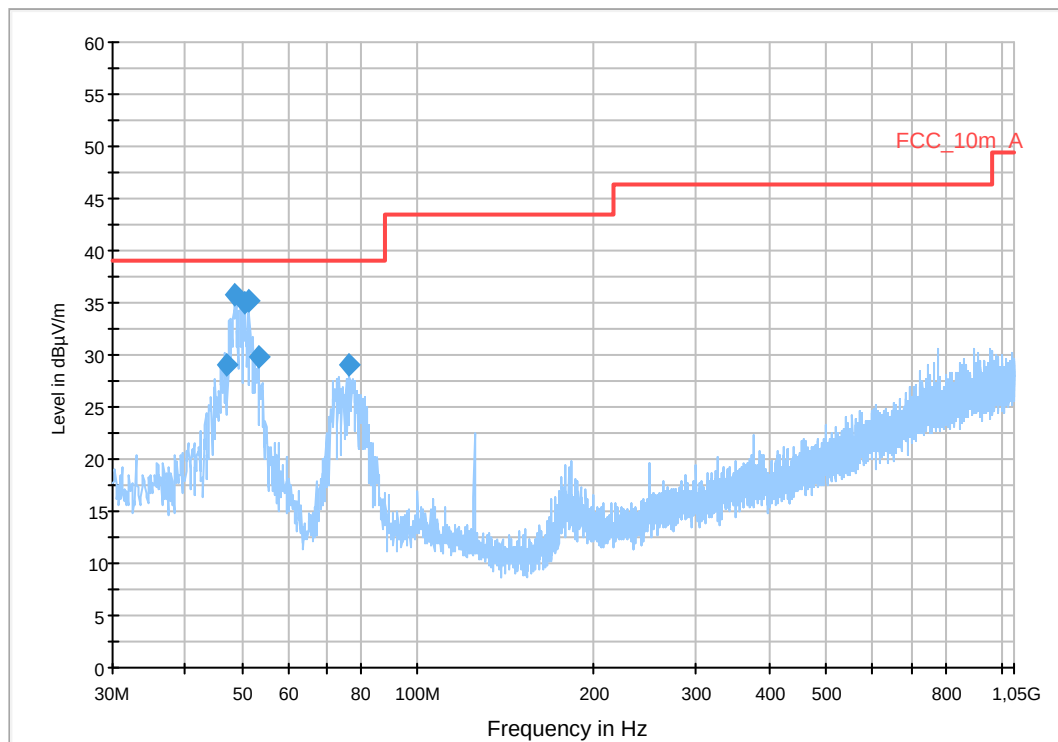
EUT: DataMan 8000 Base  
 Serial Number: prototype  
 Test Description: FCC part 15 class A @ 10 m  
 Operating Conditions: WLAN g-mode 54 Mbit/s TX Ch. 11  
 Operator Name: Wolsdorfer  
 Comment: PoE; ETH-cable: S/FTP

## Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)  
 Receiver: [ESCI 3]  
 Level Unit: dBμV/m

| Subrange       | Step Size | Detectors | IF BW   | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz    | QPK       | 120 kHz | 1 s        | 20 dB  |

FCC\_10m(A)\_3



## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) | Comment |
|-----------------|--------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|---------|
| 47.150250       | 29.1               | 1000.0          | 120.000         | 98.0        | V            | 185.0         | 13.3       | 10.0        | 39.1           |         |
| 48.594750       | 35.7               | 1000.0          | 120.000         | 98.0        | V            | 243.0         | 13.3       | 3.4         | 39.1           |         |
| 50.340900       | 35.0               | 1000.0          | 120.000         | 98.0        | V            | 93.0          | 13.3       | 4.1         | 39.1           |         |
| 51.198600       | 35.2               | 1000.0          | 120.000         | 98.0        | V            | 325.0         | 13.3       | 3.9         | 39.1           |         |
| 53.227950       | 29.8               | 1000.0          | 120.000         | 98.0        | V            | 325.0         | 13.1       | 9.3         | 39.1           |         |
| 76.387800       | 29.1               | 1000.0          | 120.000         | 220.0       | V            | 48.0          | 9.1        | 10.0        | 39.1           |         |



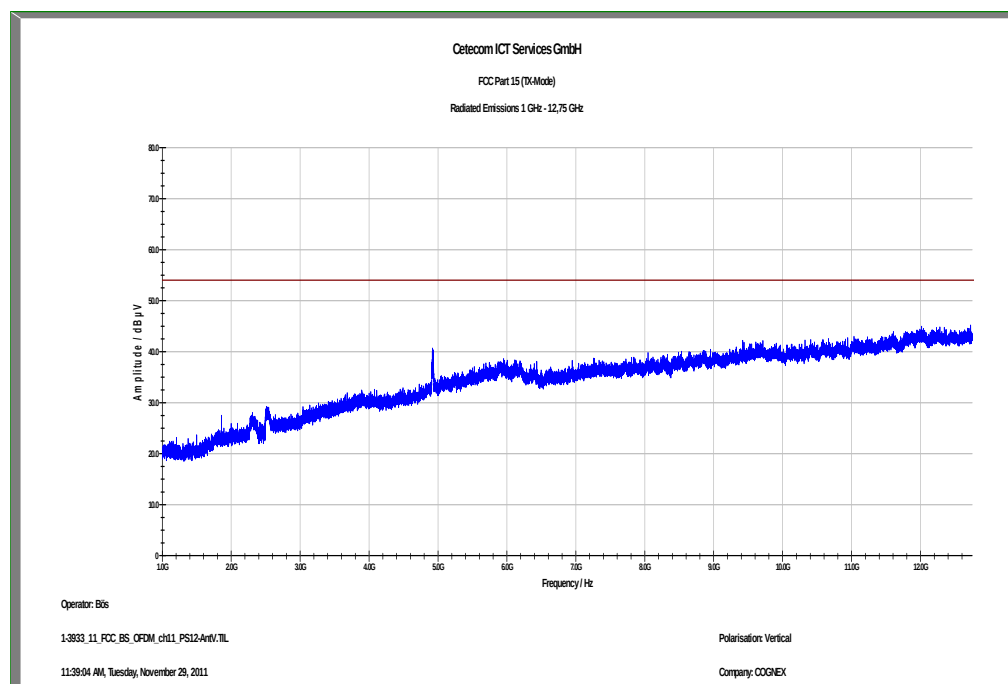
## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

## Subrange 1

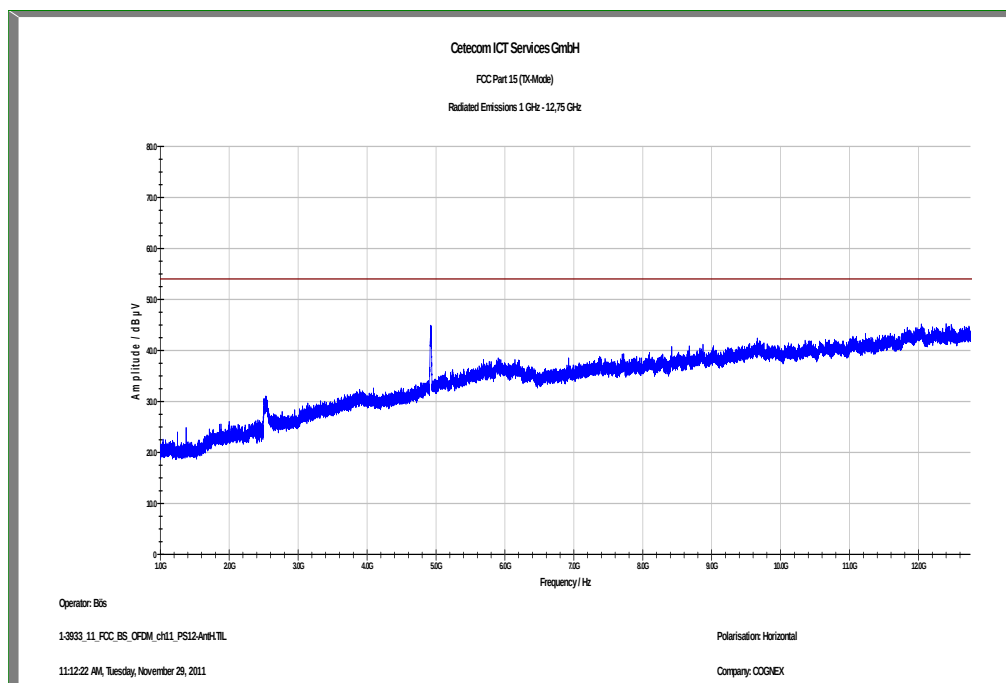
Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch  
FW 1.0Antenna: VULB 9163  
SN 9163-295, FW ---  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table (vertical): Cable\_EN\_1GHz (1005)  
Correction Table (horizontal): Cable\_EN\_1GHz (1005)  
Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

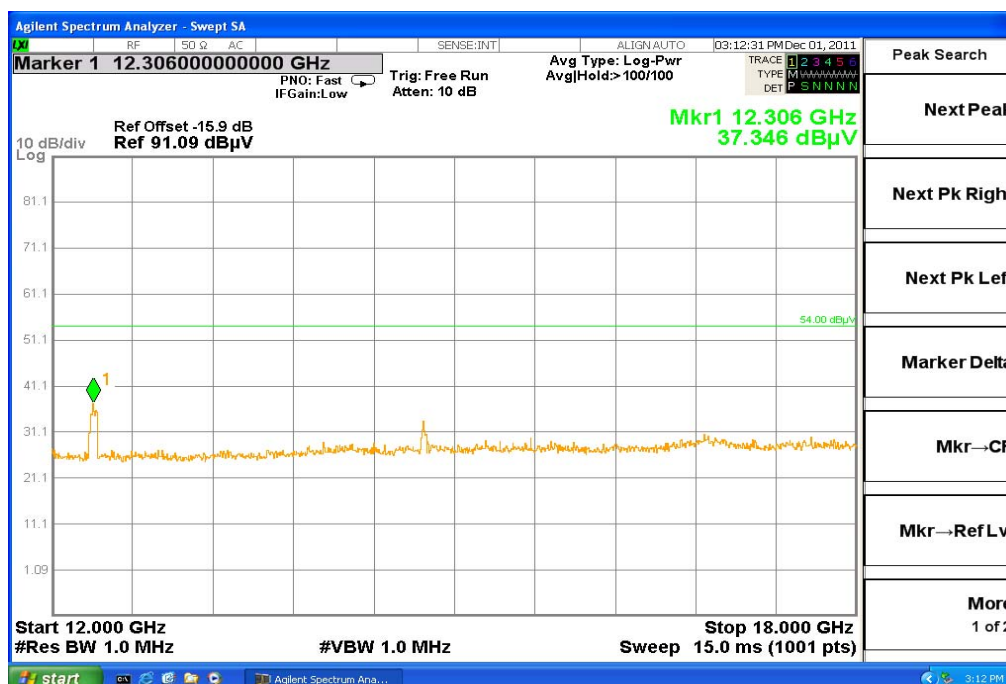
EMC 32 Version 8.10.00

**Plot 12:** Highest channel, 1 GHz to 12.75 GHz, vertical polarization

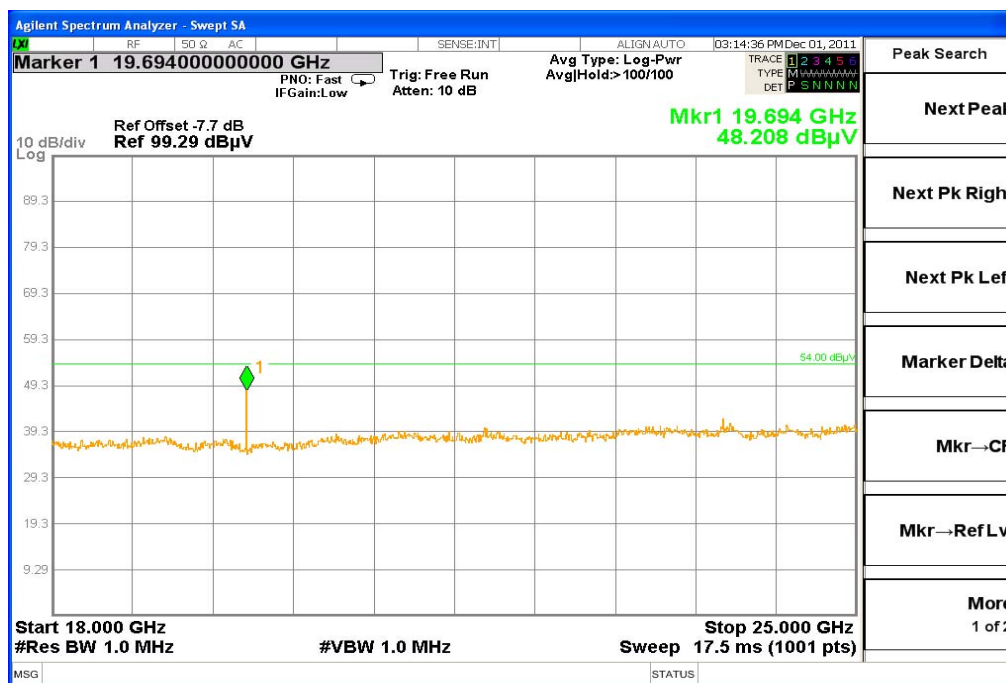
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 13:** Highest channel, 1 GHz to 12.75 GHz, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 14:** Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization

**Plot 15:** Highest channel, 18 GHz to 25 GHz, vertical & horizontal polarization



## 9.11 RX spurious emissions radiated

### Description:

Measurement of the radiated spurious emissions in idle/receive mode. The results are valid for both modes.

### Measurement:

| Measurement parameter |                                        |
|-----------------------|----------------------------------------|
| Detector:             | Peak / Quasi Peak                      |
| Sweep time:           | Auto                                   |
| Video bandwidth:      | Sweep: 100 kHz<br>Remeasurement: 10 Hz |
| Resolution bandwidth: | F < 1 GHz: 100 kHz<br>F > 1 GHz: 1 MHz |
| Span:                 | 30 MHz to 25 GHz                       |
| Trace-Mode:           | Max Hold                               |

### Limits:

| FCC                            |                               | IC                     |
|--------------------------------|-------------------------------|------------------------|
| CFR Part 15.109                |                               | RSS Gen, Issue 2, 4.10 |
| RX Spurious Emissions Radiated |                               |                        |
| Frequency (MHz)                | Field Strength (dB $\mu$ V/m) | Measurement distance   |
| 30 - 88                        | 30.0                          | 10                     |
| 88 – 216                       | 33.5                          | 10                     |
| 216 – 960                      | 36.0                          | 10                     |
| Above 960                      | 54.0                          | 3                      |

### Results:

| RX Spurious Emissions Radiated [dB $\mu$ V/m] |            |                      |
|-----------------------------------------------|------------|----------------------|
| F [MHz]                                       | Detector   | Level [dB $\mu$ V/m] |
| 50.9                                          | QP         | 34.7                 |
| 12060                                         | PP         | 46.7                 |
| 19295                                         | PP         | 43.3                 |
| Also see plots                                |            |                      |
| Measurement uncertainty                       | $\pm 3$ dB |                      |

**Result:** The measurement is passed.

**Plots: RX / Idle – mode****Plot 1:** 30 MHz to 1 GHz, vertical & horizontal polarization**Common Information**

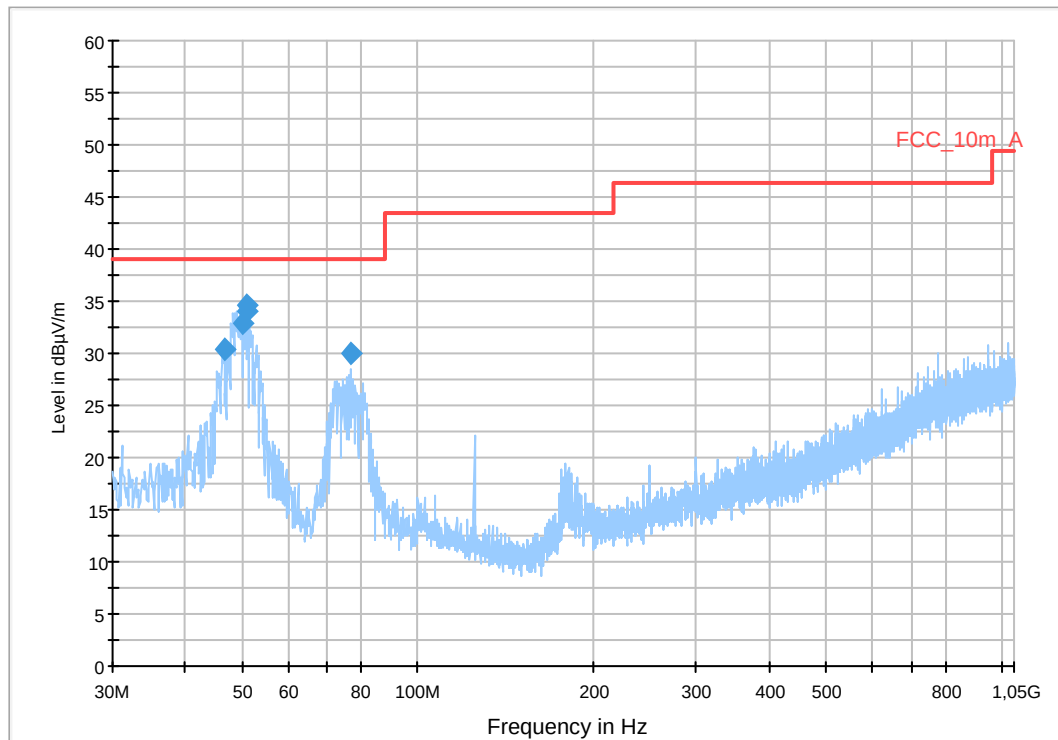
EUT: DataMan 8000 Base  
 Serial Number: prototype  
 Test Description: FCC part 15 class A @ 10 m  
 Operating Conditions: WLAN g-mode RX  
 Operator Name: Wolsdorfer  
 Comment: PoE; ETH-cable: S/FTP

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup: Electric Field (NOS)  
 Receiver: [ESCI 3]  
 Level Unit: dBμV/m

| Subrange       | Step Size | Detectors | IF BW   | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz    | QPK       | 120 kHz | 1 s        | 20 dB  |

FCC\_10m(A)\_3

**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBμV/m) | Meas. Time (ms) | Bandwidth h (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) | Comment |
|-----------------|--------------------|-----------------|-------------------|-------------|--------------|---------------|------------|-------------|----------------|---------|
| 46.542600       | 30.3               | 1000.0          | 120.000           | 98.0        | V            | 275.0         | 13.3       | 8.8         | 39.1           |         |
| 50.012850       | 32.9               | 1000.0          | 120.000           | 150.0       | V            | 199.0         | 13.4       | 6.2         | 39.1           |         |
| 50.895150       | 34.7               | 1000.0          | 120.000           | 98.0        | V            | 317.0         | 13.3       | 4.4         | 39.1           |         |
| 50.897100       | 34.1               | 1000.0          | 120.000           | 98.0        | V            | 60.0          | 13.3       | 5.0         | 39.1           |         |
| 76.625250       | 30.0               | 1000.0          | 120.000           | 220.0       | V            | 36.0          | 9.1        | 9.1         | 39.1           |         |

## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

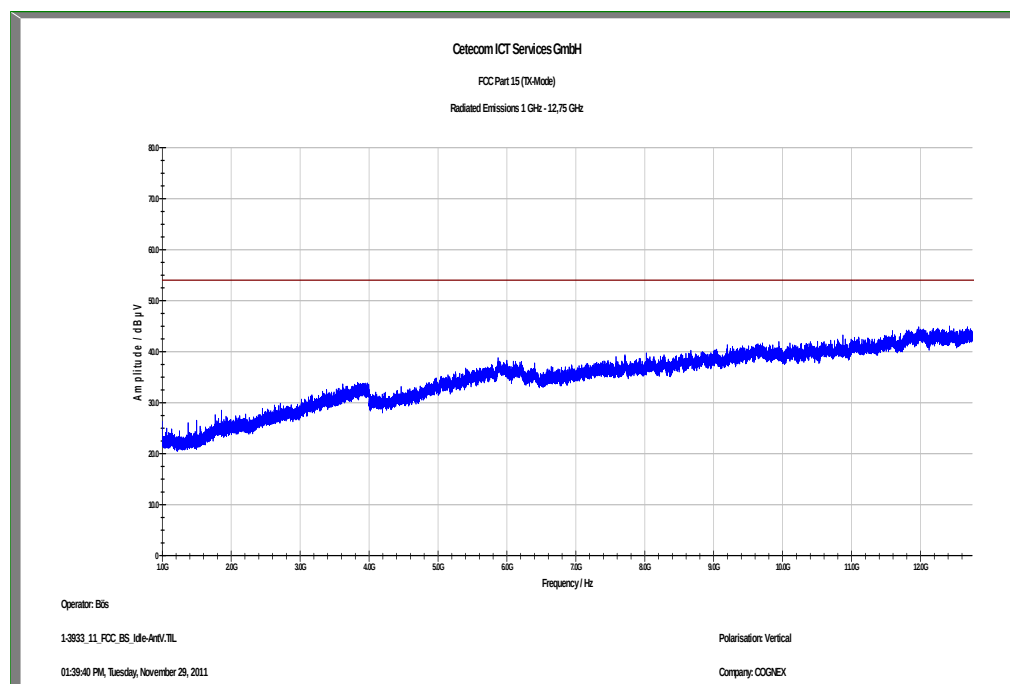
## Subrange 1

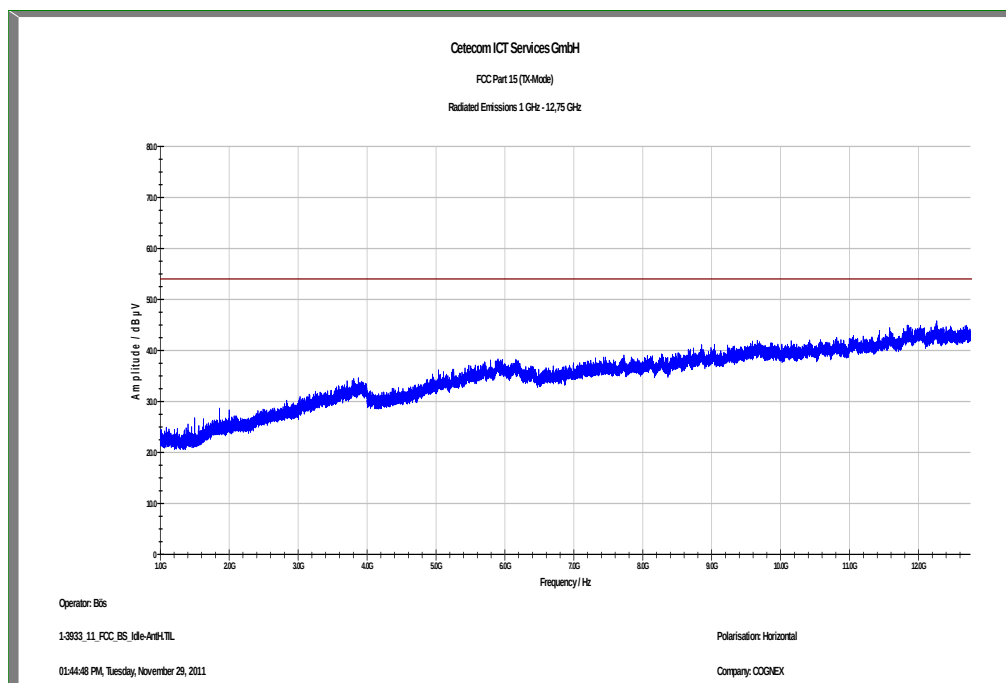
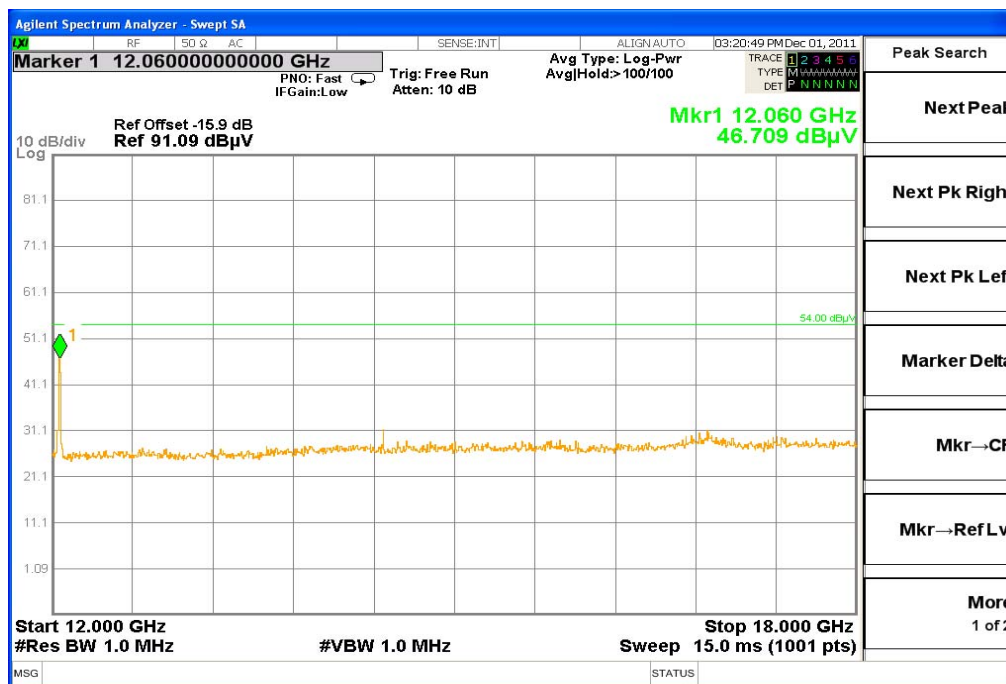
Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]  
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch  
FW 1.0Antenna: VULB 9163  
SN 9163-295, FW ---  
Correction Table (vertical): VULP6113  
Correction Table (horizontal): VULP6113  
Correction Table (vertical): Cable\_EN\_1GHz (1005)  
Correction Table (horizontal): Cable\_EN\_1GHz (1005)  
Antenna Tower: Tower [EMCO 2090 Antenna Tower]  
@ GPIB0 (ADR 8), FW REV 3.12Turntable: Turntable [EMCO Turntable]  
@ GPIB0 (ADR 9), FW REV 3.12

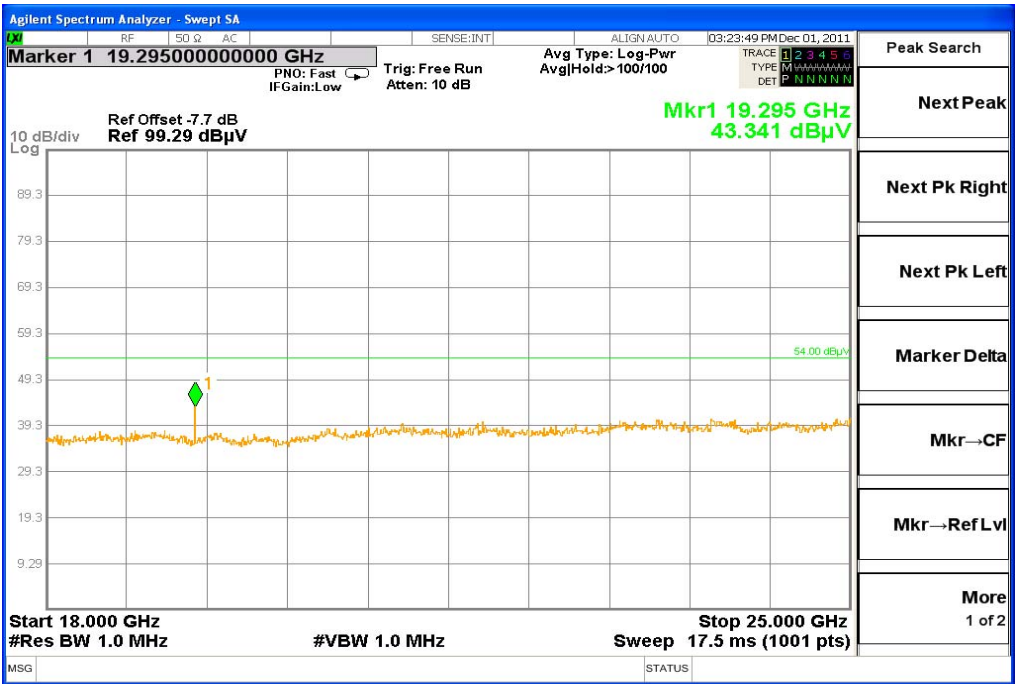
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## Plot 2: 1 GHz to 12.75 GHz, vertical polarization



**Plot 3:** 1 GHz to 12.75 GHz, horizontal polarization**Plot 4:** 12.75 GHz to 18 GHz, vertical & horizontal polarization

**Plot 5:** 18 GHz to 25 GHz, vertical & horizontal polarization





## 9.12 TX spurious emissions radiated < 30 MHz

### Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to channel 6. This measurement is representative for all channels and modes. If critical peaks are found channel 1 and channel 11 will be measured too. The measurement is performed with the data rate producing the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

### Measurement:

| Measurement parameter |                                            |
|-----------------------|--------------------------------------------|
| Detector:             | Peak / Quasi Peak                          |
| Sweep time:           | Auto                                       |
| Video bandwidth:      | F < 150 kHz: 200 Hz<br>F > 150 kHz: 9 kHz  |
| Resolution bandwidth: | F < 150 kHz: 1 kHz<br>F > 150 kHz: 100 kHz |
| Span:                 | 9 kHz to 30 MHz                            |
| Trace-Mode:           | Max Hold                                   |

### Limits:

| FCC                                     |                         | IC                   |
|-----------------------------------------|-------------------------|----------------------|
| CFR Part 15.209(a)                      |                         | RSS –Gen             |
| TX Spurious Emissions Radiated < 30 MHz |                         |                      |
| Frequency (MHz)                         | Field Strength (dBμV/m) | Measurement distance |
| 0.009 – 0.490                           | 2400/F(kHz)             | 300                  |
| 0.490 – 1.705                           | 24000/F(kHz)            | 30                   |
| 1.705 – 30.0                            | 30                      | 30                   |

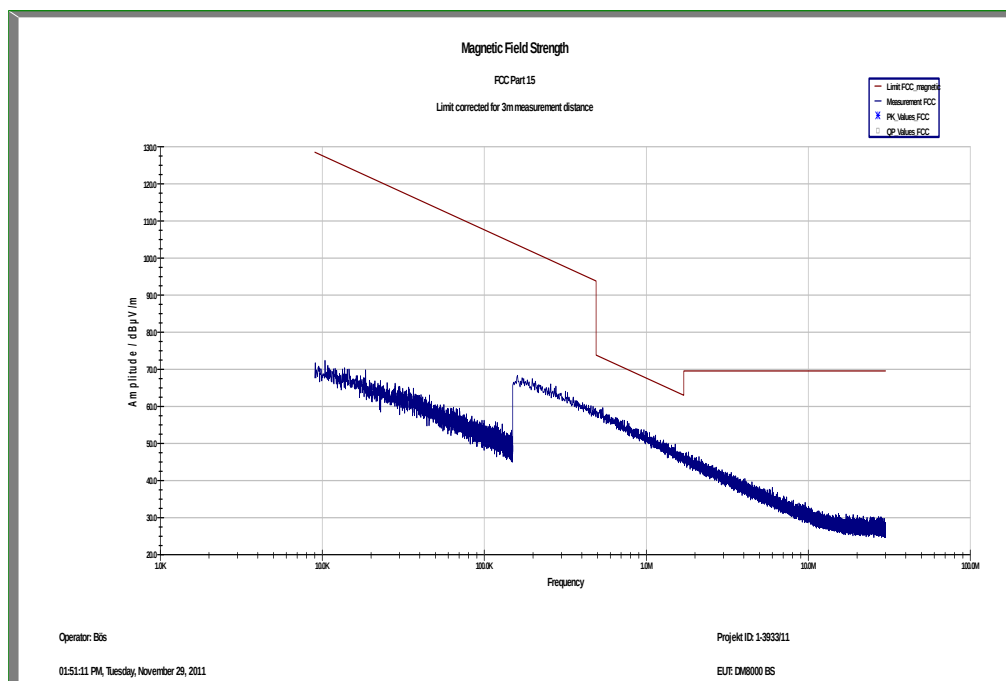
### Results:

| TX Spurious Emissions Radiated < 30 MHz [dBμV/m] |          |                |
|--------------------------------------------------|----------|----------------|
| F [MHz]                                          | Detector | Level [dBμV/m] |
| No critical peaks found                          |          |                |
|                                                  |          |                |
|                                                  |          |                |
| Measurement uncertainty                          | ± 3 dB   |                |

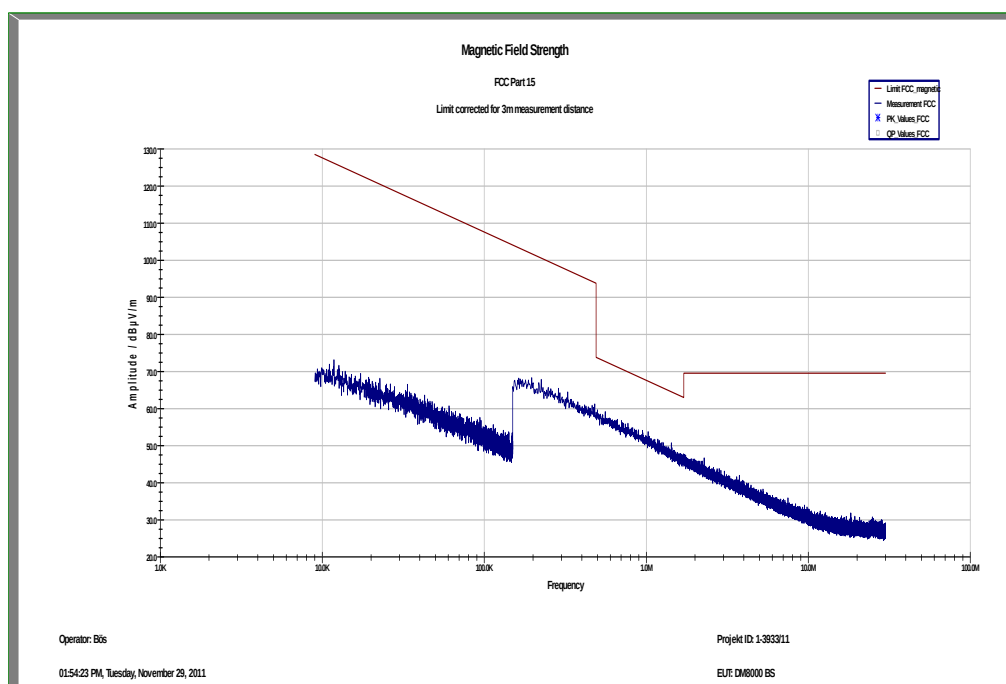
**Result:** The measurement is passed.

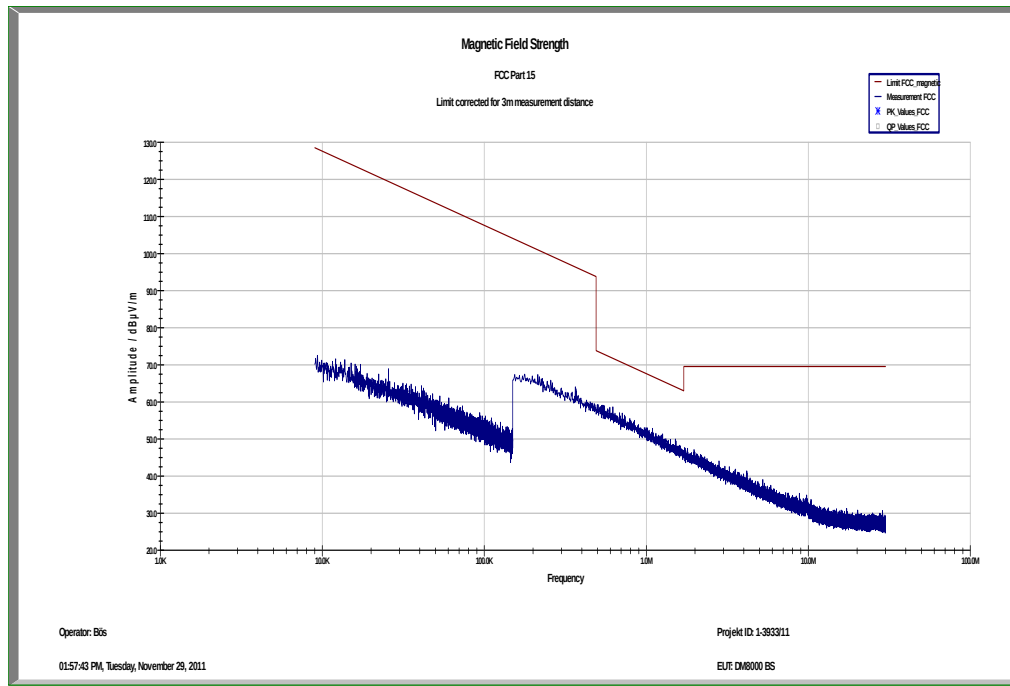
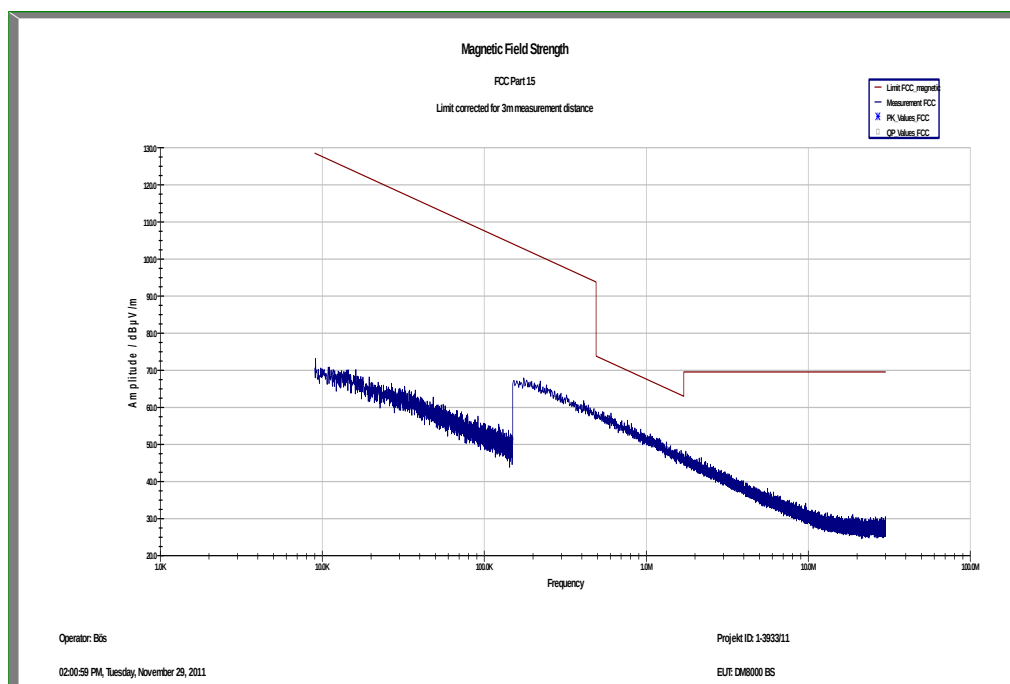
**Plots: DSSS / b – mode**

**Plot 1: Lowest channel, 9 kHz to 30 MHz**

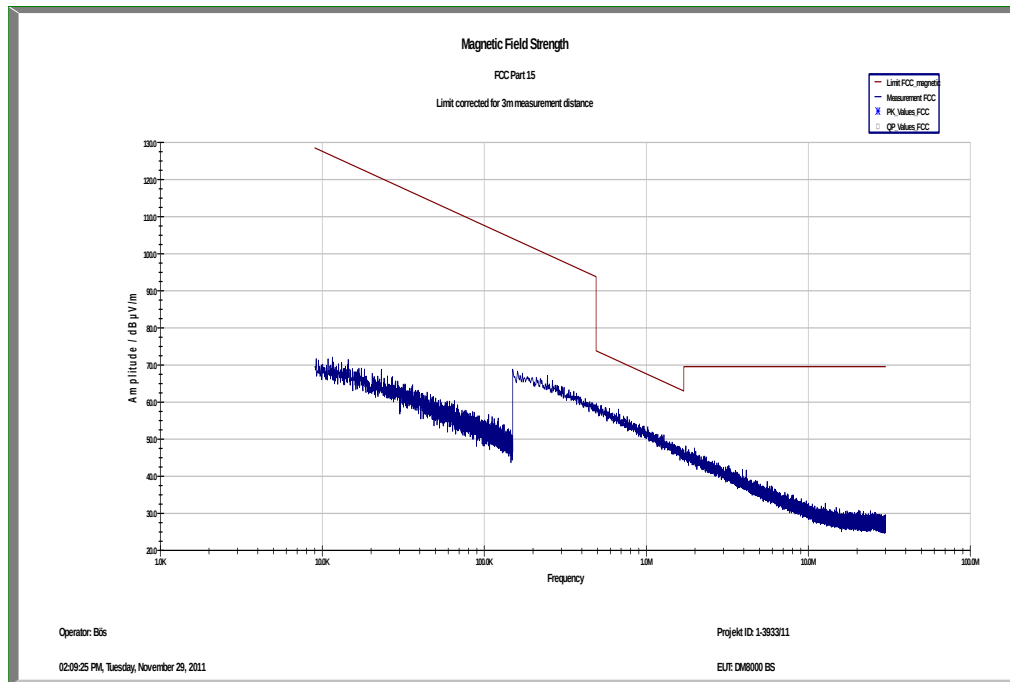


**Plot 2: Middle channel, 9 kHz to 30 MHz**

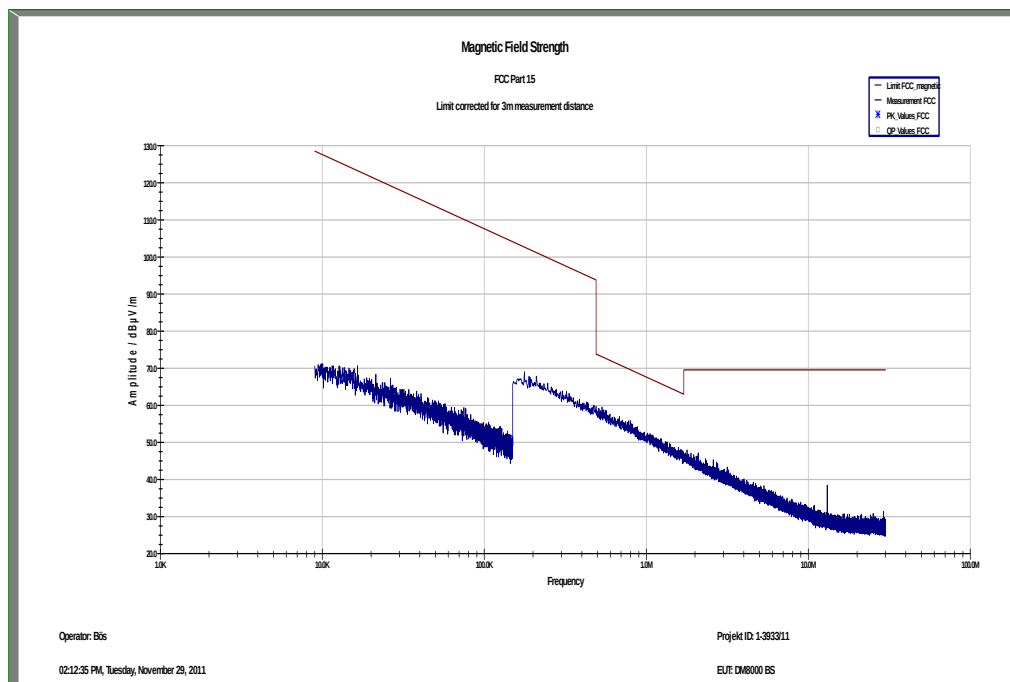


**Plot 3:** Highest channel, 9 kHz to 30 MHz**Plots: OFDM / g – mode****Plot 1:** Lowest channel, 9 kHz to 30 MHz

**Plot 2:** Middle channel, 9 kHz to 30 MHz

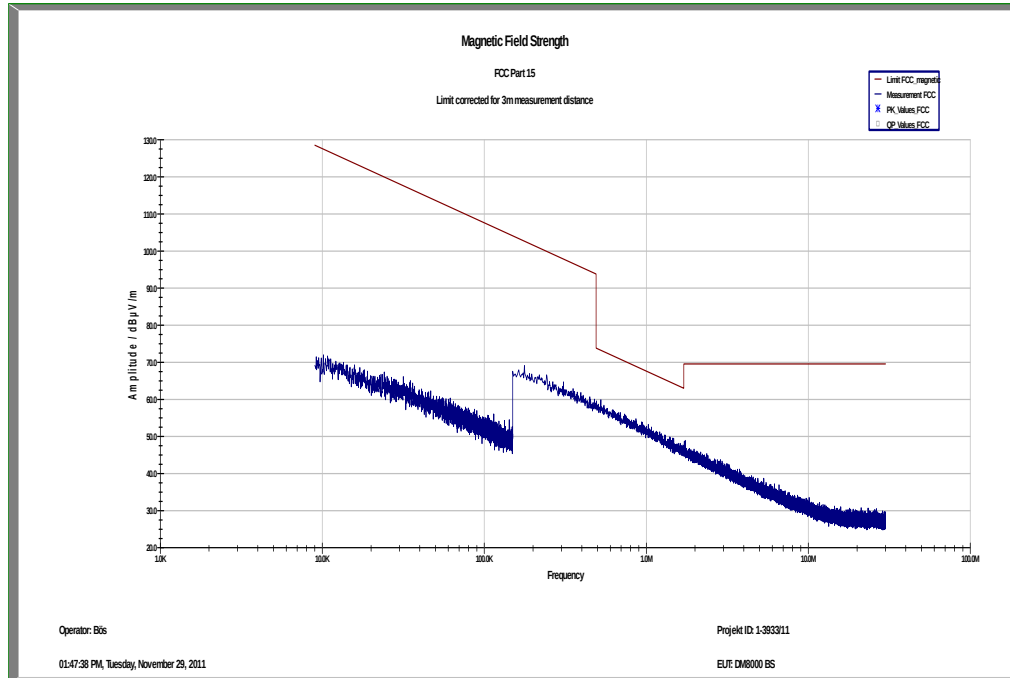


**Plot 3:** Highest channel, 9 kHz to 30 MHz



**Plots: RX / Idle – mode**

**Plot 1: 9 kHz to 30 MHz**



### 9.13 TX spurious emissions conducted < 30 MHz

Not performed

## 10 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

| No. | Lab / Item   | Equipment                                      | Type                                 | Manufact.            | Serial No. | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|--------------|------------------------------------------------|--------------------------------------|----------------------|------------|-----------------|---------------------|------------------|------------------|
| 1   | n. a.        | Isolating Transformer                          | RT5A                                 | Grundig              | 8041       | 300001626       | g                   |                  |                  |
| 2   | n. a.        | DC power supply, 60Vdc, 50A, 1200 W            | 6032A                                | HP Meßtechnik        | 2818A03450 | 300001040       | Ve                  | 08.01.2009       | 08.01.2012       |
| 3   | n. a.        | Coaxial Attenuator 30dB/500W                   | 8325                                 | Bird                 | 1530       | 300001595       | ev                  |                  |                  |
| 4   | n. a.        | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115                                 | EMCO                 | 8812-3088  | 300001032       | vlKI!               | 11.05.2011       | 11.05.2013       |
| 5   | n. a.        | Active Loop Antenna                            | 6502                                 | EMCO                 | 2210       | 300001015       | ne                  |                  |                  |
| 6   | n. a.        | Anechoic chamber                               | FAC 3/5m                             | MWB / TDK            | 87400/02   | 300000996       |                     | 23.03.2009       |                  |
| 7   | Spec.A. 2_2e | System rack for EMI measurement solution       | 85900                                | HP I.V.              | *          | 300000222       | ne                  |                  |                  |
| 8   | 9            | Artificial Mains 9 kHz to 30 MHz               | ESH3-Z5                              | R&S                  | 828576/020 | 300001210       | Ve                  | 06.01.2010       | 06.01.2012       |
| 9   | n. a.        | Relais Matrix                                  | 3488A                                | HP Meßtechnik        | 2719A15013 | 300001156       | ne                  |                  |                  |
| 10  | n. a.        | Relais Matrix                                  | PSU                                  | R&S                  | 890167/024 | 300001168       | ne                  |                  |                  |
| 11  | n. a.        | Isolating Transformer                          | RT5A                                 | Grundig              | 9242       | 300001263       | ne                  |                  |                  |
| 12  | n. a.        | Three-Way Power Splitter, 50 Ohm               | 11850C                               | HP Meßtechnik        |            | 300000997       | ne                  |                  |                  |
| 13  | n. a.        | Switch / Control Unit                          | 3488A                                | HP                   | 2605e08770 | 300001443       | ne                  |                  |                  |
| 14  | n. a.        | Amplifier                                      | js42-00502650-28-5a                  | Parzich GMBH         | 928979     | 300003143       | ne                  |                  |                  |
| 15  | n. a.        | Band Reject filter                             | WRCG1855/1910-1835/1925-40/8SS       | Wainwright           | 7          | 300003350       | ev                  |                  |                  |
| 16  | n. a.        | Band Reject filter                             | WRCG2400/2483-2375/2505-50/10SS      | Wainwright           | 11         | 300003351       | ev                  |                  |                  |
| 17  | n. a.        | TILE-Software Emission                         | Quantum Change, Modell TILE-ICS/FULL | EMCO                 | none       | 300003451       | ne                  |                  |                  |
| 18  | n. a.        | Highpass Filter                                | WHKX2.9/18G-12SS                     | Wainwright           | 1          | 300003492       | ev                  |                  |                  |
| 19  | n. a.        | Highpass Filter                                | WHK1.1/15G-10SS                      | Wainwright           | 3          | 300003255       | ev                  |                  |                  |
| 20  | n. a.        | Highpass Filter                                | WHKX7.0/18G-8SS                      | Wainwright           | 18         | 300003789       | ne                  |                  |                  |
| 21  | n. a.        | PSA Spectrum Analyzer 3 Hz - 26.5 GHz          | E4440A                               | Agilent Technologies | MY48250080 | 300003812       | k                   | 08.09.2010       | 08.09.2012       |
| 22  | n. a.        | MXG Microwave Analog Signal Generator          | N5183A                               | Agilent Technologies | MY47420220 | 300003813       | k                   | 13.09.2010       | 13.09.2012       |
| 23  | n. a.        | RF Filter Section 9kHz - 1GHz                  | N9039A                               | Agilent Technologies | MY48260003 | 300003825       | vlKI!               | 08.09.2010       | 08.09.2012       |

|    |       |                                                   |                     |                     |                      |           |      |            |            |
|----|-------|---------------------------------------------------|---------------------|---------------------|----------------------|-----------|------|------------|------------|
| 24 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz      | VULB9163            | Schwarzbeck         | 371                  | 300003854 | vkI! | 14.10.2011 | 14.10.2014 |
| 25 | A016  | Std. Gain Horn Antenna 14.5-22.0 GHz              | 1924-20             | Flann               | 33                   | 300001963 | ne   |            |            |
| 26 | A019  | Std. Gain Horn Antenna 17.6-26.7 GHz              | 2024-20             | Flann               | 156                  | 300001968 | ne   |            |            |
| 27 | n. a. | Amplifier                                         | FLNA-28B            | Farran              | FTL 1067B            | 300002843 | ne   |            |            |
| 28 | 45    | Switch-Unit                                       | 3488A               | HP Meßtechnik       | 2719A14505           | 300000368 | g    |            |            |
| 29 | 50    | DC power supply, 60Vdc, 50A, 1200 W               | 6032A               | HP Meßtechnik       | 2920A04466           | 300000580 | ne   |            |            |
| 30 | n. a. | software                                          | SPS_PHE 1.4f        | Spitzberger & Spieß | B5981; 5D1081; B5979 | 300000210 | ne   |            |            |
| 31 | n. a. | EMI Test Receiver                                 | ESCI 1166.5950.03   | R&S                 | 100083               | 300003312 | k    | 05.01.2011 | 05.01.2013 |
| 32 | n. a. | Analyzer-Reference-System (Harmonics and Flicker) | ARS 16/1            | SPS                 | A3509 07/0 0205      | 300003314 | k    | 14.07.2011 | 14.07.2013 |
| 33 | n. a. | Amplifier                                         | JS42-00502650-28-5A | MITEQ               | 1084532              | 300003379 | ev   |            |            |
| 34 | n. a. | Antenna Tower                                     | Model 2175          | ETS-LINDGREN        | 64762                | 300003745 | izw  |            |            |
| 35 | n. a. | Positioning Controller                            | Model 2090          | ETS-LINDGREN        | 64672                | 300003746 | izw  |            |            |
| 36 | n. a. | Turntable Interface-Box                           | Model 105637        | ETS-LINDGREN        | 44583                | 300003747 | izw  |            |            |
| 37 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz      | VULB9163            | Schwarzbeck         | 295                  | 300003787 | k    | 01.04.2010 | 01.04.2012 |
| 38 | n. a. | Spectrum-Analyzer                                 | FSU26               | R&S                 | 200809               | 300003874 | k    | 10.01.2011 | 10.01.2013 |

**Agenda:** Kind of Calibration

k calibration / calibrated  
 ne not required (k, ev, izw, zw not required)  
 ev periodic self verification  
 Ve long-term stability recognized  
 vkI! Attention: extended calibration interval  
 NK! Attention: not calibrated

EK limited calibration  
 zw cyclical maintenance (external cyclical maintenance)  
 izw internal cyclical maintenance  
 g blocked for accredited testing  
 \*) next calibration ordered / currently in progress

**11 Observations**

No observations exceeding those reported with the single test cases have been made.