
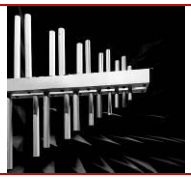
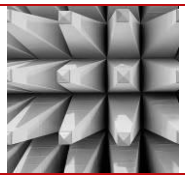

CETECOM™
CETECOM ICT Services
consulting - testing - certification

# TEST REPORT

**Test report no.: 1-6965/13-04-18-A**

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

## Testing laboratory


**CETECOM ICT Services GmbH**
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com


**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 Communications & Compatibility Testing (RCT)

## Applicant


**Sony Mobile Communications AB**
Nya Vattentornet
22188 Lund / SWEDEN
Phone: +46 46 19 30 00
Fax: -/-
Contact: Mikael Nilsson
e-mail: Micke.nilsson@sonymobile.com
Phone: +46 7 03 22 75 03


## Manufacturer


**Sony Mobile Communications AB**
Nya Vattentornet
22188 Lund / SWEDEN


## Test standard/s

| | |
|---|---|
| 47 CFR Part 15 | Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices |

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

## Test Item

| | |
|---|---|
| **Kind of test item:** | **Smart Phone GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/II/IV/V/VIII; LTE FDD1/2/3/4/5/7/8/13/17/20; WLAN b/g/n/a/ac; BT 4.0; RFID; A-GPS** |
| **Type name:** | **PM-0740-BV** |
| **FCC ID:** | **PY7PM-0740** |
| Frequency: | DTS band 5725 MHz to 5850 MHz<br>(lowest channel 149 – 5745 MHz; highest channel 165 – 5825 MHz) |
| Technology tested: | WLAN (OFDM/a – mode; n/ac HT20 / HT40 – mode and ac HT80 – mode) |
| Antenna: | Integrated antenna |
| Power supply: | 3.7 V DC by Li - polymer battery |
| Temperature range: | -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:

cn=Andreas Luckenbill, o=CETECOM ICT Services GmbH, ou=LUC-111202, email=andreas.luckenbill@cetecom.com, c=DE
2014.01.22 13:47:59 +01'00'

Andreas Luckenbill
Expert

## Test performed:

cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-100826, email=marco.bertolino@cetecom.com, c=DE
2014.01.22 13:49:23 +01'00'

Marco Bertolino
Testing Manager

# 1 Table of contents

# 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: | 2013-11-29 |
| Date of receipt of test item: | 2013-12-02 |
| Start of test: | 2013-12-11 |
| End of test: | 2013-12-21 |
| Person(s) present during the test: | -/- |

# 3 Test standard/s

| Test standard | Date | Test standard description |
|---|---|---|
| 47 CFR Part 15 | | Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices |

## 3.1 Measurement guidance

| | | |
|---|---|---|
| DTS : KDB 558074 | 2013-04 | Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 |

## 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: | | 41 % | |
| Barometric pressure: | | not relevant for this kind of testing | |
| Power supply: | $V_{nom}$ | 3.7 V | DC by Li - polymer battery |
| | $V_{max}$ | 4.2 V | |
| | $V_{min}$ | 3.3 V | |

## 5 Test item

| | | |
|---|---|---|
| **Kind of test item** | **:** | **Smart Phone GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/II/IV/V/VIII; LTE FDD1/2/3/4/5/7/8/13/17/20; WLAN b/g/n/a/ac; BT 4.0; RFID; A-GPS** |
| **Type name** | **:** | **PM-0740-BV** |
| | | |
| **S/N serial number** | **:** | **Radiated unit: CB5A1W1HPG** |
| **HW hardware status** | **:** | **AP1.1** |
| **SW software status** | **:** | **RF test software** |
| **Frequency band [MHz]** | **:** | **DTS band 5725 MHz to 5850MHz (lowest channel 149 – 5745 MHz; highest channel 165 – 5825 MHz)** |
| **Type of radio transmission**<br>**Use of frequency spectrum** | **:**<br>**:** | **OFDM** |
| **Type of modulation** | **:** | **BPSK, QPSK, 16 – QAM, 64 – QAM and 256 – QAM** |
| **Number of channels** | **:** | **5** |
| **Antenna** | **:** | **Integrated antenna** |
| **Power supply** | **:** | **3.7 V DC by Li - polymer battery** |
| **Temperature range** | **:** | **-20°C to +55 °C** |

### 5.1 Additional information

Test setup- and EUT-photos are included in test report: 1-6965/13-04-01_AnnexA
1-6965/13-04-01_AnnexB
1-6965/13-04-01_AnnexD

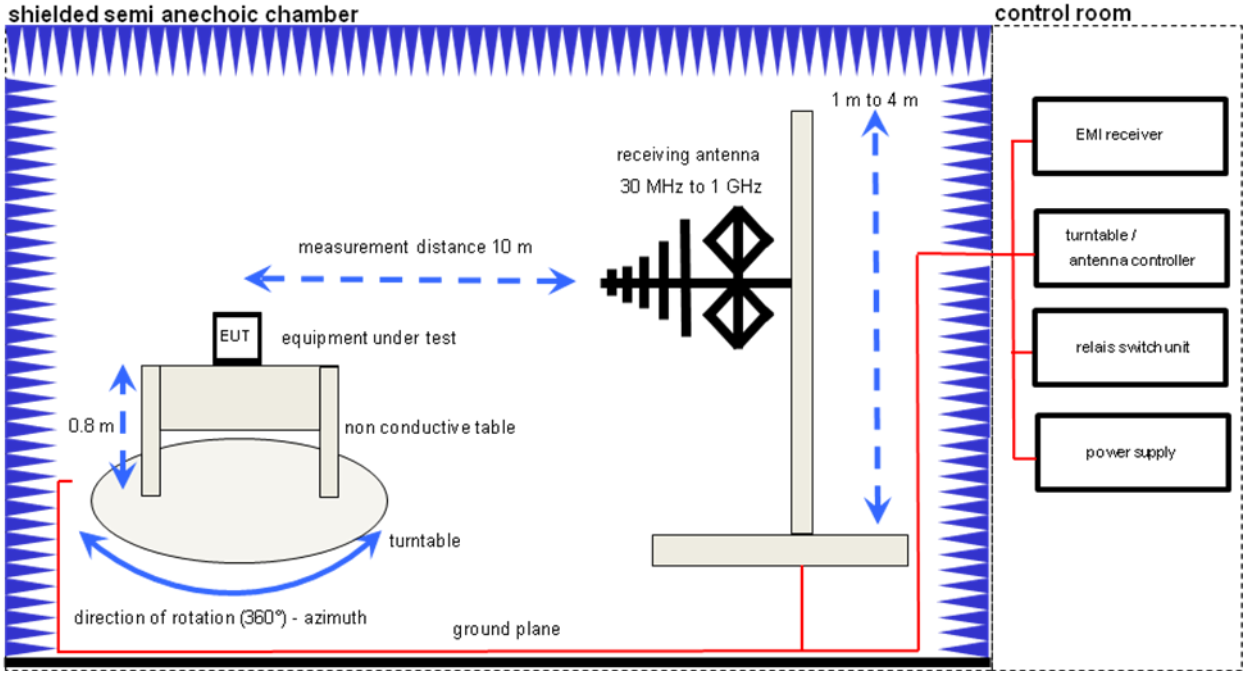
## 6 Test laboratories sub-contracted

None

# 7 Description of the test setup

## 7.1 Radiated measurements chamber F

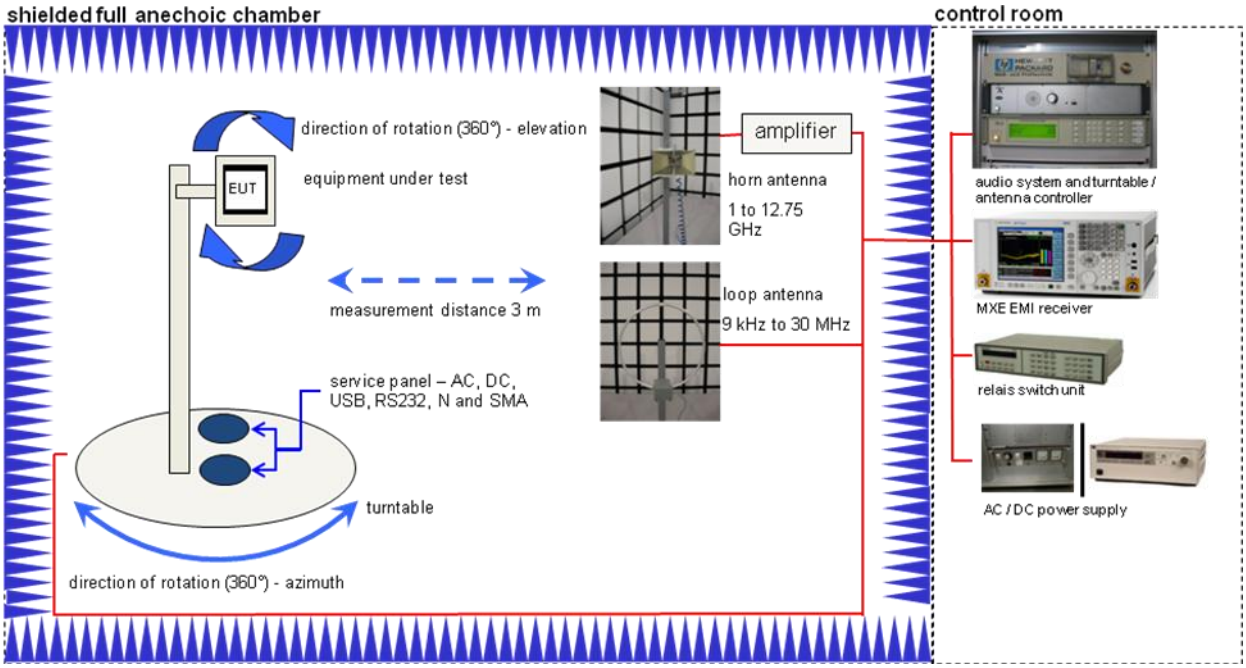
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. 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.




**Equipment table:**

| Equipment | Type | Manufacturer | Serial No. | INV. No Cetecom |
|---|---|---|---|---|
| Switch-Unit | 3488A | HP Meßtechnik | 2719A14505 | 300000368 |
| DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2920A04466 | 300000580 |
| EMI Test Receiver | ESCI 3 | R&S | 100083 | 300003312 |
| Amplifier | JS42-00502650-28-5A | MITEQ | 1084532 | 300003379 |
| Antenna Tower | Model 2175 | ETS-LINDGREN | 64762 | 300003745 |
| Positioning Controller | Model 2090 | ETS-LINDGREN | 64672 | 300003746 |
| Turntable Interface-Box | Model 105637 | ETS-LINDGREN | 44583 | 300003747 |
| TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 295 | 300003787 |

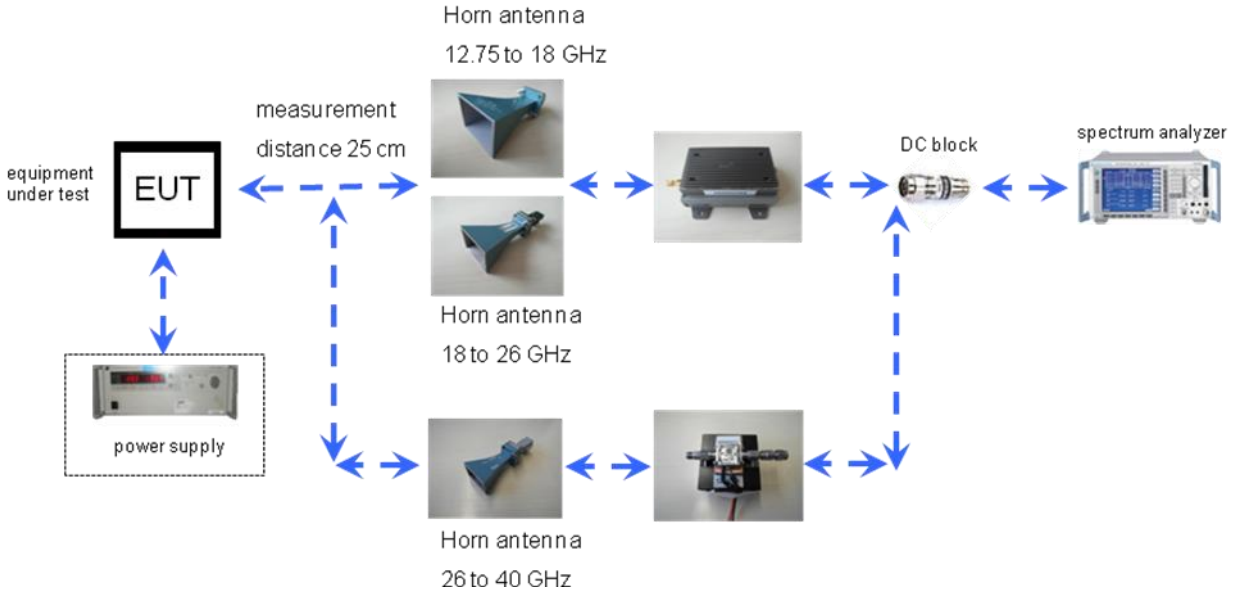
## 7.2 Radiated measurements chamber C




**Equipment table:**

| Equipment | Type | Manufacturer | Serial No. | INV. No Cetecom |
|---|---|---|---|---|
| MXE EMI Receiver 20 Hz bis 26,5 GHz | N9038A | Agilent Technologies | MY51210197 | 300004405 |
| Highpass Filter | WHKX7.0/18G-8SS | Wainwright | 18 | 300003789 |
| Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115 | EMCO | 8812-3088 | 300001032 |
| Active Loop Antenna | 6502 | EMCO | 8905-2342 | 300000256 |
| Anechoic chamber | FAC 3/5m | MWB / TDK | 87400/02 | 300000996 |
| Switch / Control Unit | 3488A | HP Meßtechnik | * | 300000199 |
| Switch / Control Unit | 3488A | HP Meßtechnik | 2719A15013 | 300001156 |
| Isolating Transformer | MPL IEC625 Bus Regeltrenntravo | Erfi | 91350 | 300001155 |
| Three-Way Power Splitter, 50 Ohm | 11850C | HP Meßtechnik | | 300000997 |
| Amplifier | js42-00502650-28-5a | Parzich GMBH | 928979 | 300003143 |

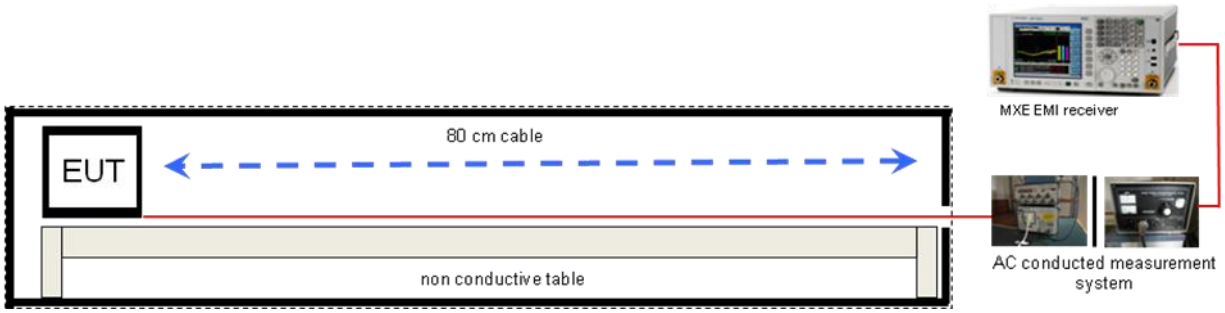
## 7.3 Radiated measurements 12.75 GHz to 40 GHz




**Equipment table:**

| Equipment | Type | Manufacturer | Serial No. | INV. No Cetecom |
|---|---|---|---|---|
| Std. Gain Horn Antenna 12.4 to 18.0 GHz | 639 | Narda | 8402 | 300000787 |
| Std. Gain Horn Antenna 18.0 to 26.5 GHz | 638 | Narda | 8205 | 300002442 |
| Std. Gain Horn Antenna 26.5 to 40.0 GHz | 637 | Narda | GB42110541 | 300000510 |
| Microwave System Amplifier, 0.5-26.5 GHz | 83017A | HP Meßtechnik | 00419 | 300002268 |
| Broadband Low Noise Amplifier 18-50 GHz | CBL18503070-XX | CERNEX | 19338 | 300004273 |
| Spectrum Analyzer 20 Hz - 50 GHz | FSU50 | R&S | 200012 | 300003443 |
| Signal Analyzer 40 GHz | FSV40 | R&S | 101042 | 300004517 |

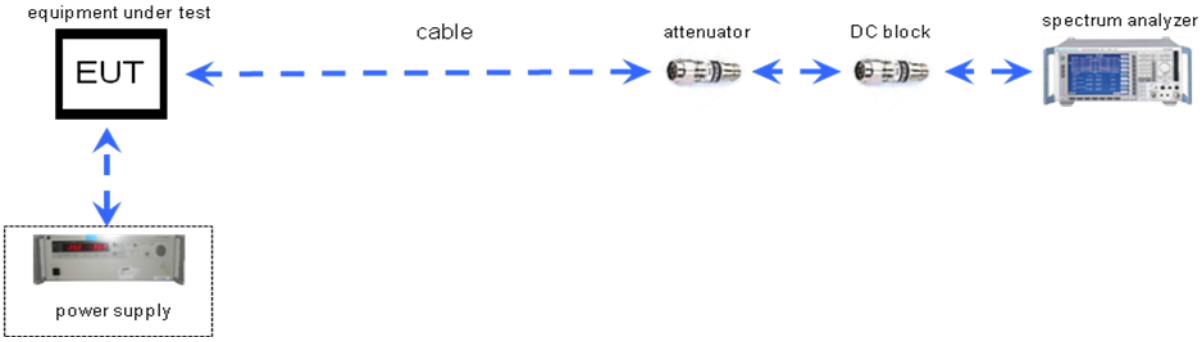
## 7.4 AC conducted




**Equipment table:**

| Equipment | Type | Manufacturer | Serial No. | INV. No Cetecom |
|---|---|---|---|---|
| MXE EMI Receiver 20 Hz bis 26,5 GHz | N9038A | Agilent Technologies | MY51210197 | 300004405 |
| Isolating Transformer | MPL IEC625 Bus Regeltrenntravo | Erfi | 91350 | 300001155 |
| Switch / Control Unit | 3488A | HP Meßtechnik | * | 300000199 |
| Switch / Control Unit | 3488A | HP Meßtechnik | 2719A15013 | 300001168 |
| Artificial Mains 9 kHz to 30 MHz | ESH3-Z5 | R&S | 828576/020 | 300001210 |

## 7.5 Conducted measurements




**Equipment table:**

| Equipment | Type | Manufacturer | Serial No. | INV. No Cetecom |
|---|---|---|---|---|
| Signal Analyzer 40 GHz | FSV40 | R&S | 101042 | 300004517 |

## 8 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 | Passed | 2014-01-22 | -/- |

| Test specification clause | Test case | Temperature conditions | Power source voltages | Mode | Pass | Fail | NA | NP | Remark |
|---|---|---|---|---|---|---|---|---|---|
| §15.247(b)(4) | Antenna gain | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.247(e) | Power spectral density DTS clause 10.2 | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.247(a)(2) | Spectrum bandwidth - 6dB bandwidth DTS clause 8.2 | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.247(a)(2) | Spectrum bandwidth - 20dB bandwidth | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.247(b)(3) | Maximum output power DTS clause 9.1.2 | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.247(d) | TX spurious emissions conducted DTS clause 11.1 & 2 | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.247(d) | TX spurious emissions radiated | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.109 | RX spurious emissions radiated | Nominal | Nominal | -/- | ☒ | ☐ | ☐ | ☐ | complies |
| §15.209(a) | TX spurious emissions radiated < 30 MHz | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |
| §15.107(a) §15.207 | Conducted emissions < 30 MHz | Nominal | Nominal | OFDM | ☒ | ☐ | ☐ | ☐ | complies |

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

## 9 Additional comments

Reference documents: None

Special test descriptions: None

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

# 10 Measurement results

## 10.1 Antenna gain

**Limits:**

| FCC | -/- |
|---|---|
| Antenna Gain | |
| 6 dBi | |

**Results:**

| $T_{nom}$ | $V_{nom}$ | lowest channel 5745 MHz | middle channel 5785 MHz | highest channel 5825 MHz |
|---|---|---|---|---|
| Gain [dBi] Declared by the manufacturer | | 1.7 | 2.3 | 2.0 |

**Result:** **Passed**

## 10.2 Maximum conducted output power

**Description:**

Measurement of the maximum output power conducted.

**Measurement:**

| Measurement parameter | |
|---|---|
| Detector: | Peak |
| Sweep time: | Auto |
| Resolution bandwidth: | 1 MHz |
| Video bandwidth: | 3 MHz |
| Span: | 40 MHz / 80 MHz |
| Measurement type: | Channel power |
| Integration bandwidth: | 75 % power - bandwidth (DTS BW) |
| Trace-Mode: | Max hold<br>(allow trace to fully stabilize) |

**Limits:**

| FCC | -/- |
|---|---|
| Maximum Output Power | |
| Conducted: 1.0 W – Antenna Gain max. 6 dBi | |

**Results: OFDM / a – mode**

| OFDM / a – mode | Maximum Output Power [dBm] | | |
|---|---|---|---|
| Frequency | 5745 MHz | 5785 MHz | 5825 MHz |
| Peak output power conducted 6 MBit/s | 20.8 | 20.6 | 20.9 |
| Peak output power conducted 9 MBit/s | 20.8 | 20.4 | 20.8 |
| Peak output power conducted 12 MBit/s | 19.9 | 20.1 | 20.4 |
| Peak output power conducted 18 MBit/s | 19.8 | 20.1 | 20.4 |
| Peak output power conducted 24 MBit/s | 20.4 | 20.4 | 20.4 |
| Peak output power conducted 36 MBit/s | 20.4 | 20.5 | 20.9 |
| Peak output power conducted 48 MBit/s | 20.4 | 20.3 | 20.6 |
| Peak output power conducted 54 MBit/s | 20.4 | 20.4 | 20.1 |
| Measurement uncertainty | ± 1.5 dB (cond.) | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT20**

| OFDM / ac – mode | Maximum Output Power [dBm] | | |
|---|---|---|---|
| Frequency | 5745 MHz | 5785 MHz | 5825 MHz |
| Peak output power conducted MCS0 | 20.6 | 21.1 | 20.8 |
| Peak output power conducted MCS1 | 20.9 | 20.9 | 20.8 |
| Peak output power conducted MCS2 | 20.8 | 20.9 | 21.1 |
| Peak output power conducted MCS3 | 21.2 | 21.4 | 21.5 |
| Peak output power conducted MCS4 | 21.1 | 21.3 | 21.3 |
| Peak output power conducted MCS5 | 21.2 | 21.3 | 21.2 |
| Peak output power conducted MCS6 | 21.5 | 21.4 | 21.4 |
| Peak output power conducted MCS7 | 21.3 | 21.1 | 21.3 |
| Peak output power conducted MCS8 | 21.2 | 21.2 | 21.0 |
| Measurement uncertainty | ± 1.5 dB (cond.) | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT40**

| OFDM / ac – mode HT40 | Maximum Output Power [dBm] | | |
|---|---|---|---|
| Frequency | 5755 MHz | 5795 MHz | -/- |
| Peak output power conducted MCS0 | 20.6 | 20.5 | -/- |
| Peak output power conducted MCS1 | 20.7 | 20.6 | -/- |
| Peak output power conducted MCS2 | 20.4 | 20.5 | -/- |
| Peak output power conducted MCS3 | 21.2 | 21.0 | -/- |
| Peak output power conducted MCS4 | 21.2 | 20.9 | -/- |
| Peak output power conducted MCS5 | 21.1 | 21.2 | -/- |
| Peak output power conducted MCS6 | 21.1 | 21.1 | -/- |
| Peak output power conducted MCS7 | 20.9 | 21.0 | -/- |
| Peak output power conducted MCS8 | 20.8 | 20.7 | -/- |
| Measurement uncertainty | ± 1.5 dB (cond.) | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT80**

| OFDM / ac – mode HT80 | Maximum Output Power [dBm] | | |
|---|---|---|---|
| Frequency | 5775 MHz | -/- | -/- |
| Peak output power conducted MCS0 | 18.4 | -/- | -/- |
| Peak output power conducted MCS1 | 18.5 | -/- | -/- |
| Peak output power conducted MCS2 | 16.9 | -/- | -/- |
| Peak output power conducted MCS3 | 18.6 | -/- | -/- |
| Peak output power conducted MCS4 | 18.3 | -/- | -/- |
| Peak output power conducted MCS5 | 18.6 | -/- | -/- |
| Peak output power conducted MCS6 | 18.8 | -/- | -/- |
| Peak output power conducted MCS7 | 17.0 | -/- | -/- |
| Peak output power conducted MCS8 | 18.8 | -/- | -/- |
| Peak output power conducted MCS9 | 19.1 | -/- | -/- |
| Measurement uncertainty | ± 1.5 dB (cond.) | | |

**Result:** **Passed**

## 10.3 Power spectral density

**Description:**

Measurement of the power spectral density of a digital modulated system. The measurement is repeated for both modulations at the lowest, middle and highest channel.

**Measurement:**

| Measurement parameter | |
|---|---|
| **According to:** | |
| Detector: | Peak |
| Sweep time: | Auto |
| Resolution bandwidth: | 3 kHz |
| Video bandwidth: | 10 kHz |
| Span: | 40 MHz / 80 MHz |
| Trace-Mode: | Max hold (allow trace to fully stabilize) |

**Limits:**

| FCC | -/- |
|---|---|
| Power Spectral Density | |
| 8 dBm (conducted) | |

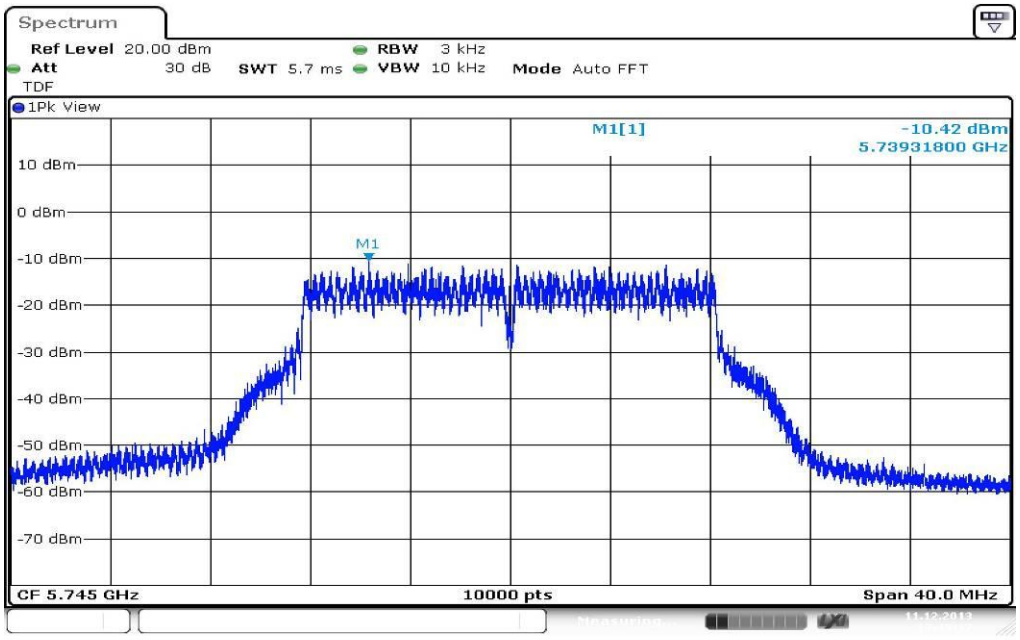
**Results:**

| Modulation | Power Spectral density [dBm] | | |
|---|---|---|---|
| Frequency | 5745 MHz | 5785 MHz | 5825 MHz |
| OFDM / a – mode | -10.42 | -11.04 | -12.63 |
| OFDM / ac – mode HT20 | -10.44 | -10.92 | -10.53 |
| Frequency | 5755 MHz | 5795 MHz | -/- |
| OFDM / ac – mode HT40 | -13.98 | -13.65 | -/- |
| Frequency | 5775 MHz | -/- | -/- |
| OFDM / ac – mode HT80 | -19.16 | -/- | -/- |
| Measurement uncertainty | ± 1.5 dB | | |

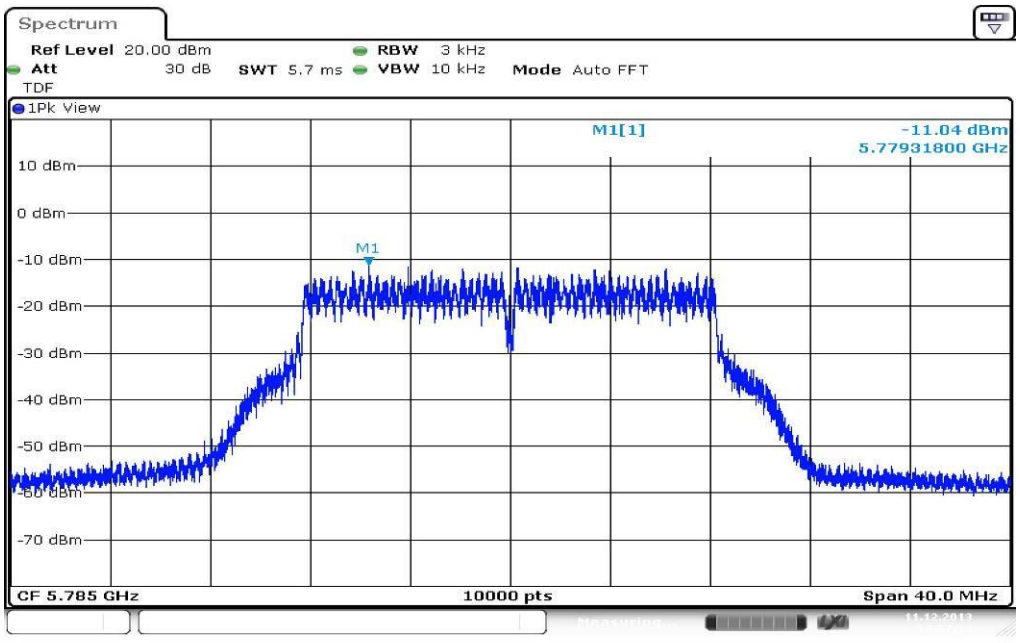
**Result:** **Passed**

**Plots: OFDM / a – mode**

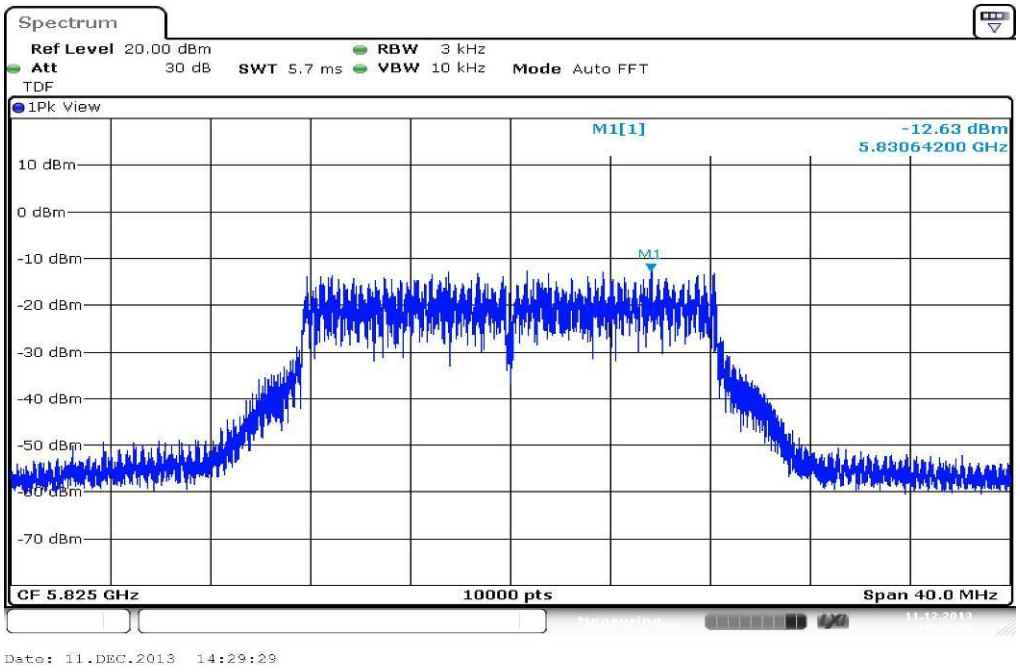
**Plot 1:** TX mode, lowest channel




**Plot 2:** TX mode, middle channel

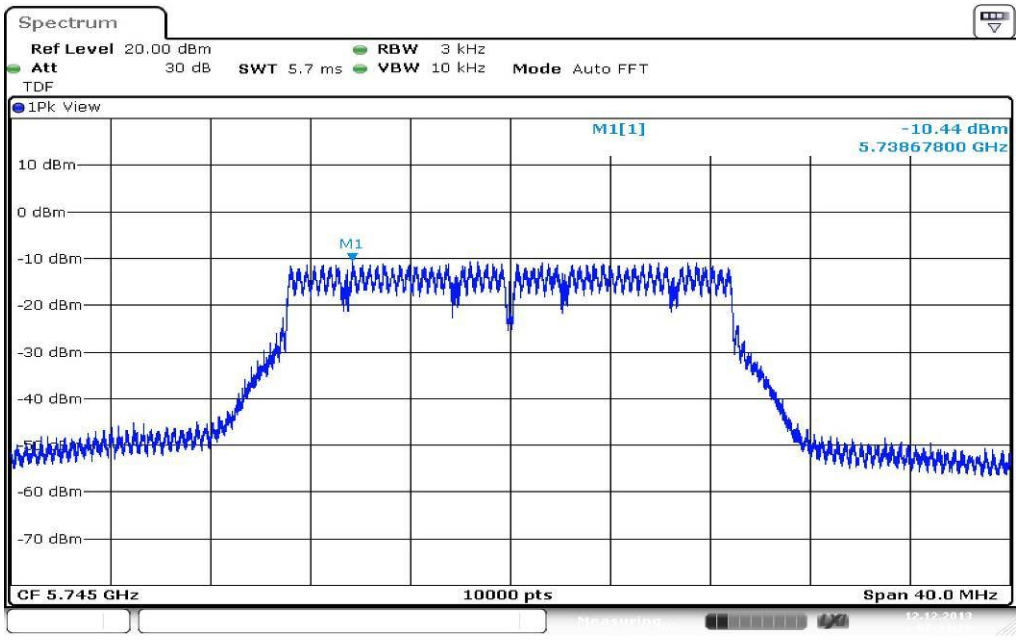


**Plot 3:** TX mode, highest channel

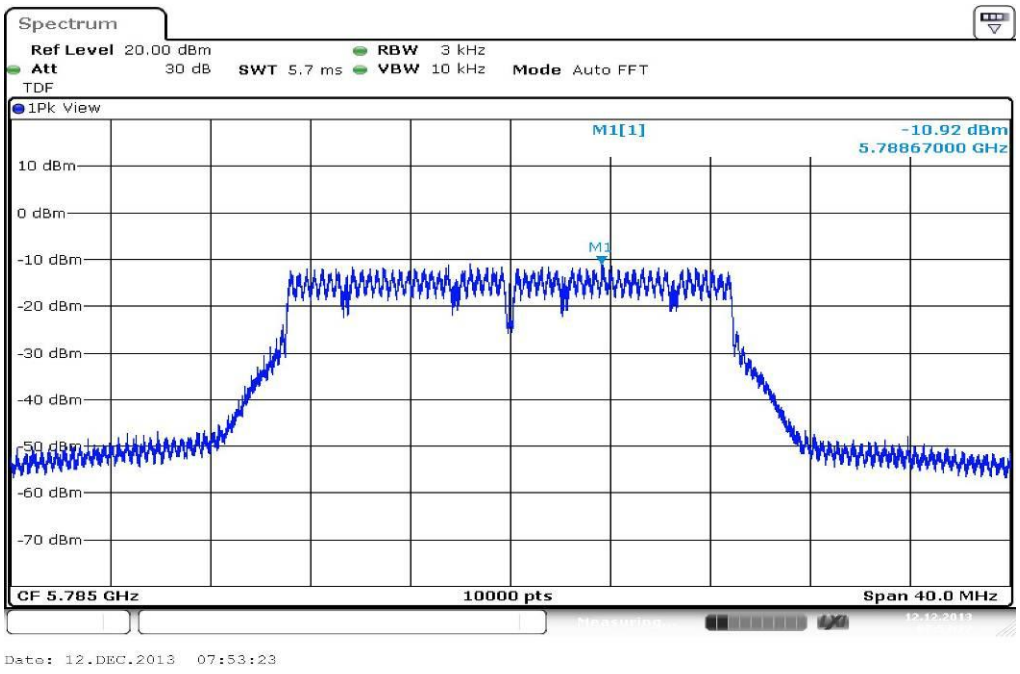


**Plots: OFDM / ac – mode HT20**

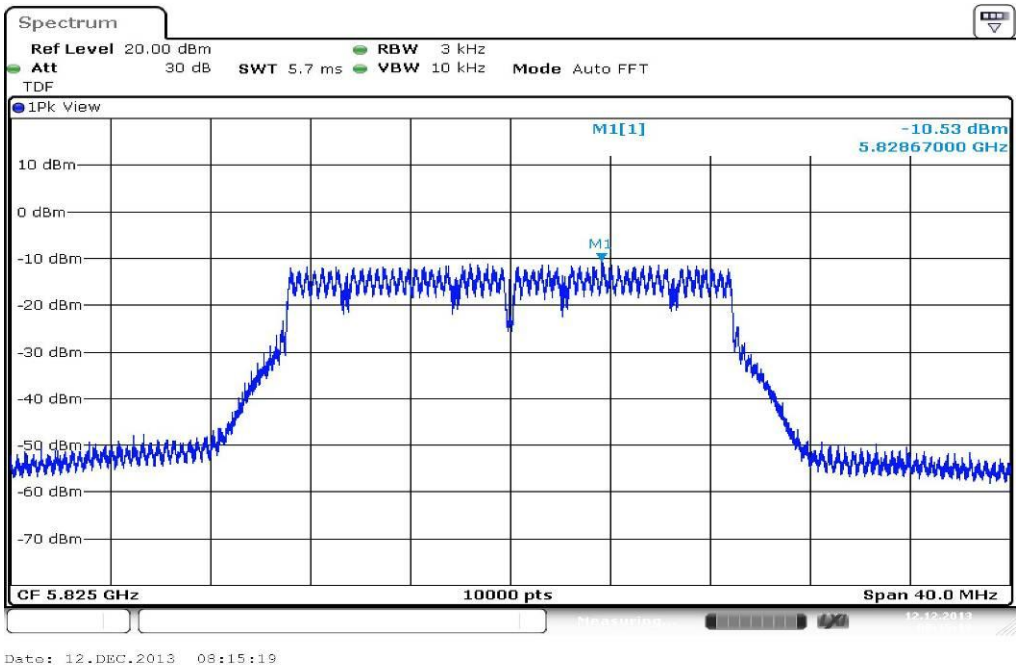
**Plot 1:** TX mode, lowest channel




**Plot 2:** TX mode, middle channel

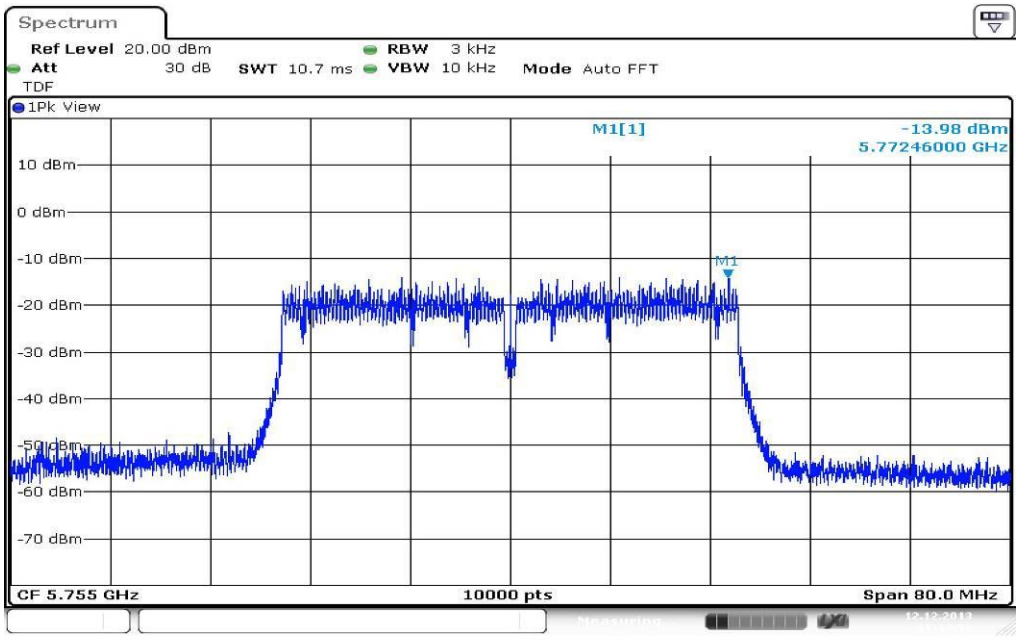


**Plot 3:** TX mode, highest channel

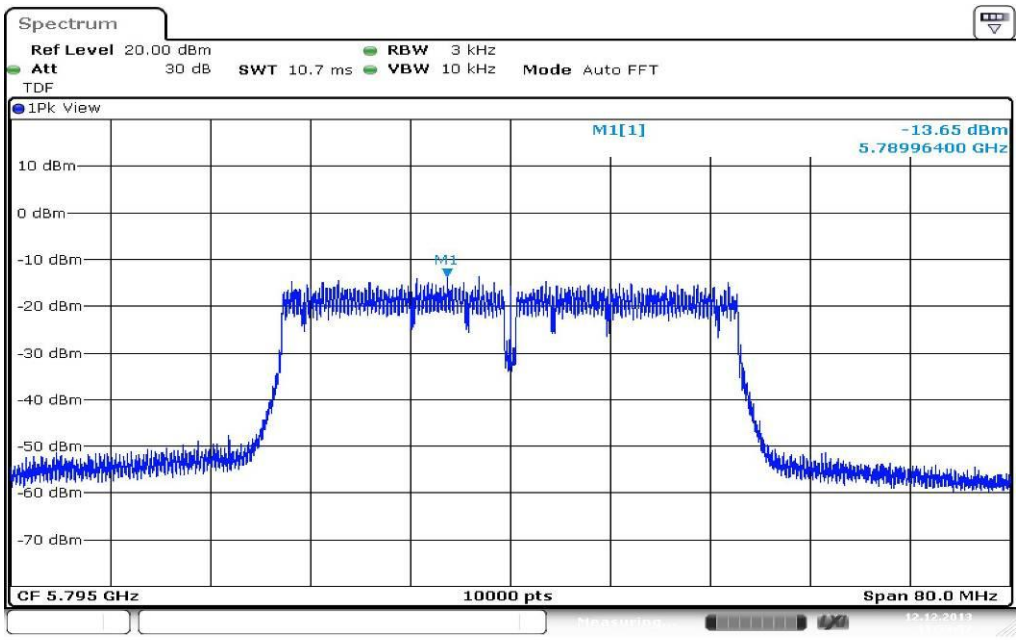


**Plots: OFDM / ac – mode HT40**

**Plot 1:** TX mode, lowest channel

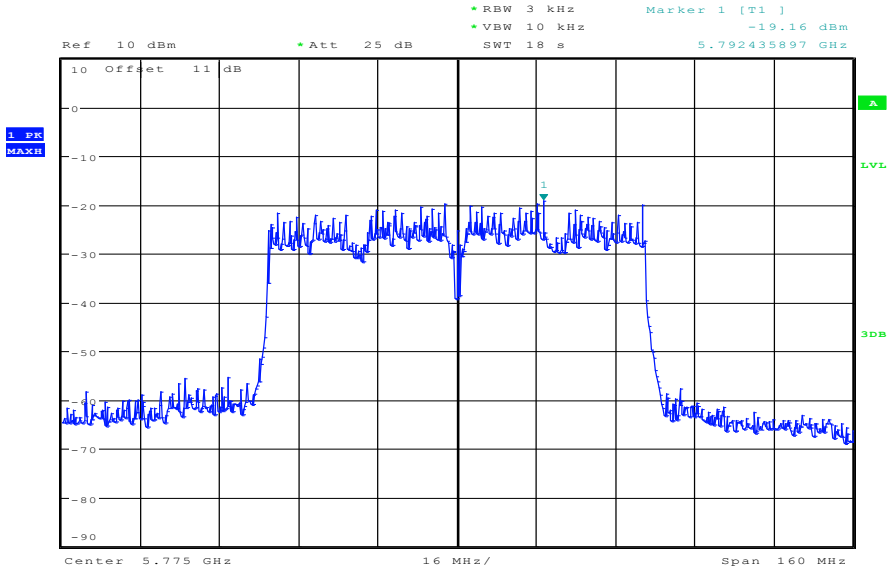



**Plot 2:** TX mode, highest channel



## Plots: OFDM / ac – mode HT80

**Plot 1:** TX mode



## 10.4 Spectrum bandwidth – 6 dB

**Description:**

Measurement of the 6 dB bandwidth of the modulated signal.

**Measurement:**

| Measurement parameter | |
|---|---|
| **According to:** | |
| Detector: | Peak |
| Sweep time: | Auto |
| Resolution bandwidth: | 100 kHz |
| Video bandwidth: | 300 kHz |
| Span: | 40 MHz |
| Measurement procedure: | Measurement of the 75% bandwidth using the integration function of the analyzer |
| Trace-Mode: | Max hold (allow trace to stabilize) |

**Limits:**

| FCC | -/- |
|---|---|
| Spectrum Bandwidth – 6 dB | |
| Systems using digital modulation techniques may operate in the 2400–2483.5 MHz band.<br>The minimum 6 dB bandwidth shall be at least 500 kHz. | |

**Results: OFDM / a – mode**

| Modulation<br>Frequency | 6 dB bandwidth [MHz] | | |
|---|---|---|---|
| | 5745 MHz | 5785 MHz | 5825 MHz |
| OFDM / a – mode<br>6 Mbit/s | 12.4 | 12.4 | 12.4 |
| OFDM / a – mode<br>9 Mbit/s | 12.4 | 12.4 | 12.4 |
| OFDM / a – mode<br>12 Mbit/s | 12.4 | 12.4 | 12.4 |
| OFDM / a – mode<br>18 Mbit/s | 12.4 | 12.4 | 12.4 |
| OFDM / a – mode<br>24 Mbit/s | 12.4 | 12.4 | 12.4 |
| OFDM / a – mode<br>36 Mbit/s | 12.5 | 12.5 | 12.5 |
| OFDM / a – mode<br>48 Mbit/s | 12.4 | 12.4 | 12.4 |
| OFDM / a – mode<br>54 Mbit/s | 12.4 | 12.4 | 12.4 |
| Measurement uncertainty | ± RBW | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT20**

| Modulation<br>Frequency | 6 dB bandwidth [MHz] | | |
|---|---|---|---|
| | 5745 MHz | 5785 MHz | 5825 MHz |
| OFDM / ac – mode HT20 MCS0 | 13.1 | 12.9 | 13.0 |
| OFDM / ac – mode HT20 MCS1 | 13.1 | 13.1 | 13.0 |
| OFDM / ac – mode HT20 MCS2 | 13.1 | 13.0 | 13.1 |
| OFDM / ac – mode HT20 MCS3 | 13.2 | 13.2 | 13.3 |
| OFDM / ac – mode HT20 MCS4 | 13.2 | 13.1 | 13.2 |
| OFDM / ac – mode HT20 MCS5 | 13.2 | 13.1 | 13.2 |
| OFDM / ac – mode HT20 MCS6 | 13.3 | 13.2 | 13.2 |
| OFDM / ac – mode HT20 MCS7 | 13.2 | 13.3 | 13.2 |
| OFDM / ac – mode HT20 MCS8 | 13.2 | 13.1 | 13.2 |
| Measurement uncertainty | ± RBW | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT40**

| Modulation | 6 dB bandwidth [MHz] | | |
|---|---|---|---|
| Frequency | 5755 MHz | 5795 MHz | -/- |
| OFDM / ac – mode HT40 MCS0 | 27.2 | 27.3 | -/- |
| OFDM / ac – mode HT40 MCS1 | 27.2 | 27.3 | -/- |
| OFDM / ac – mode HT40 MCS2 | 27.3 | 27.2 | -/- |
| OFDM / ac – mode HT40 MCS3 | 27.3 | 27.2 | -/- |
| OFDM / ac – mode HT40 MCS4 | 27.1 | 27.2 | -/- |
| OFDM / ac – mode HT40 MCS5 | 27.1 | 27.2 | -/- |
| OFDM / ac – mode HT40 MCS6 | 27.3 | 27.3 | -/- |
| OFDM / ac – mode HT40 MCS7 | 27.2 | 27.2 | -/- |
| OFDM / ac – mode HT40 MCS8 | 27.3 | 27.2 | -/- |
| Measurement uncertainty | ± RBW | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT80**

| Modulation | 6 dB bandwidth [MHz] | | |
|---|---|---|---|
| Frequency | 5775 MHz | -/- | -/- |
| OFDM / ac – mode HT80 MCS0 | 55.63 | -/- | -/- |
| OFDM / ac – mode HT80 MCS1 | 55.88 | -/- | -/- |
| OFDM / ac – mode HT80 MCS2 | 55.83 | -/- | -/- |
| OFDM / ac – mode HT80 MCS3 | 55.63 | -/- | -/- |
| OFDM / ac – mode HT80 MCS4 | 55.42 | -/- | -/- |
| OFDM / ac – mode HT80 MCS5 | 55.63 | -/- | -/- |
| OFDM / ac – mode HT80 MCS6 | 55.63 | -/- | -/- |
| OFDM / ac – mode HT80 MCS7 | 56.04 | -/- | -/- |
| OFDM / ac – mode HT80 MCS8 | 55.41 | -/- | -/- |
| OFDM / ac – mode HT80 MCS9 | 55.41 | -/- | -/- |
| Measurement uncertainty | ± RBW | | |

**Result:** **Passed**

## 10.5 Spectrum bandwidth – 20 dB

**Description:**

Measurement of the 20 dB bandwidth of the modulated signal.

**Measurement:**

| Measurement parameter | |
|---|---|
| Detector: | Peak |
| Sweep time: | Auto |
| Resolution bandwidth: | 1 - 5% of the DTS BW |
| Video bandwidth: | ≥ 3 x RBW |
| Span: | Complete signal |
| Measurement procedure: | Measurement of the 99% bandwidth using the integration function of the analyzer |
| Trace-Mode: | Max hold (allow trace to stabilize) |

**Limits:**

| -/- | -/- |
|---|---|
| Spectrum Bandwidth – 20 dB | |
| Systems using digital modulation techniques may operate in the 2400–2483.5 MHz band.<br>The minimum 6 dB bandwidth shall be at least 500 kHz. | |

**Results:**

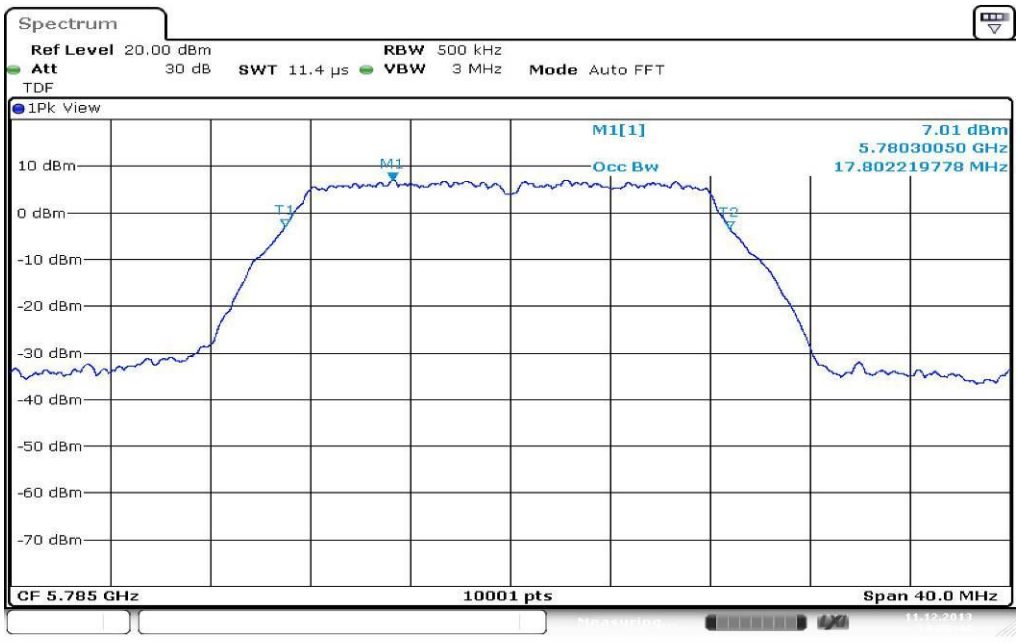
| Modulation<br>Frequency | 20 dB bandwidth [MHz] | | |
|---|---|---|---|
| | Lowest channel | Middle channel | Highest channel |
| OFDM / a – mode | 17.84 | 17.80 | 17.40 |
| OFDM / ac – mode HT20 | 18.43 | 18.40 | 18.46 |
| OFDM / ac – mode HT40 | 36.78 | -/- | 36.77 |
| OFDM / ac – mode HT80 | -/- | 75.90 | -/- |
| Measurement uncertainty | ± RBW | | |

**Result:** **Passed**

**Plots: OFDM / a – mode**

**Plot 1:** TX mode, lowest channel

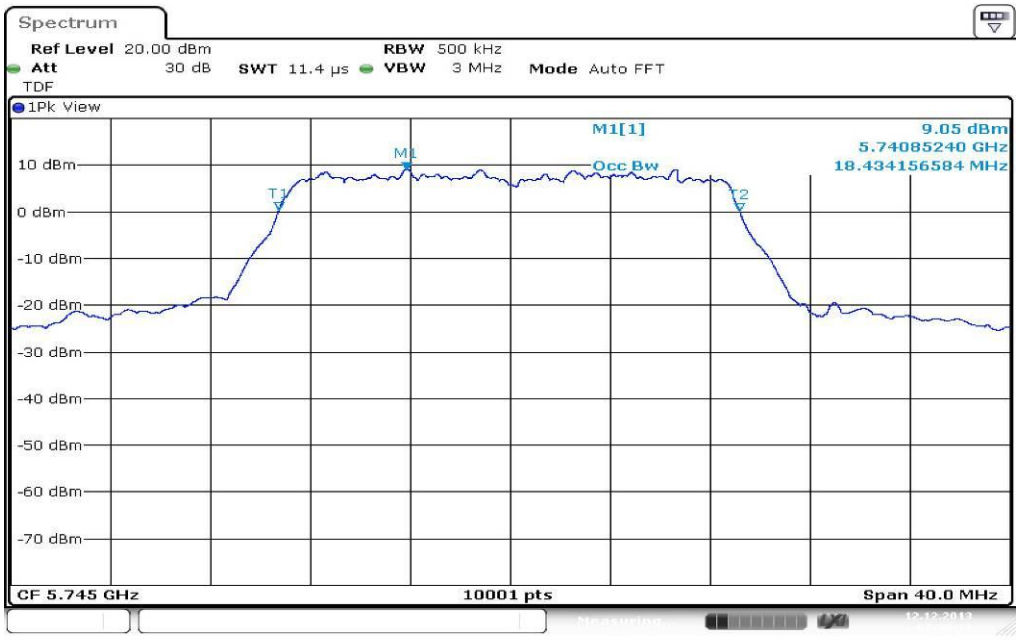

**Plot 2:** TX mode, middle channel



**Plot 3:** TX mode, highest channel

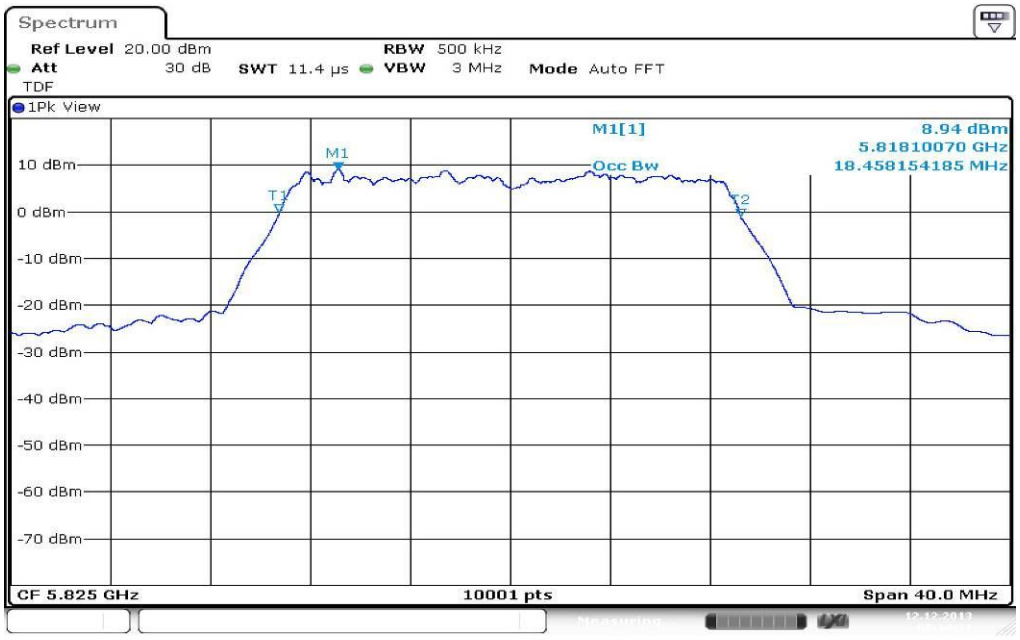
**Plots: OFDM / ac – mode HT20**

**Plot 1:** TX mode, lowest channel



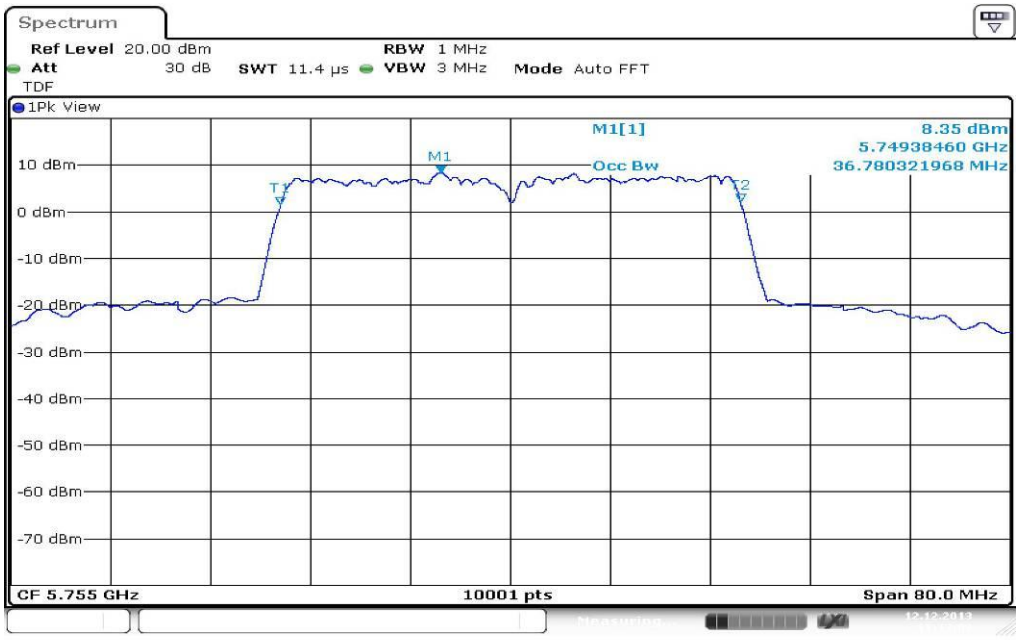

**Plot 2:** TX mode, middle channel

**Plot 3:** TX mode, highest channel

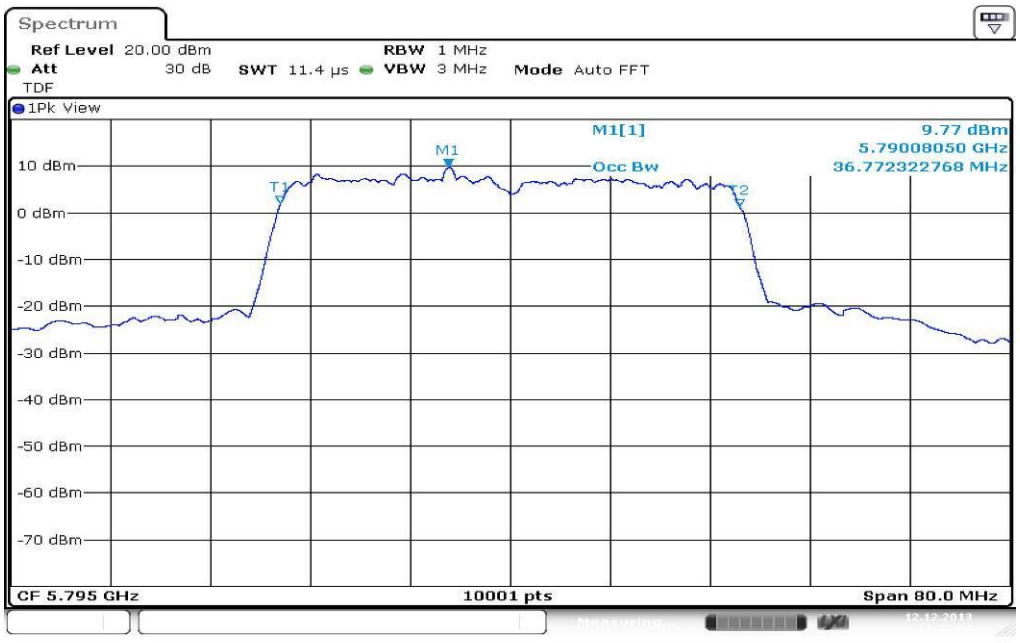


**Plots: OFDM / ac – mode HT40**

**Plot 1:** TX mode, lowest channel

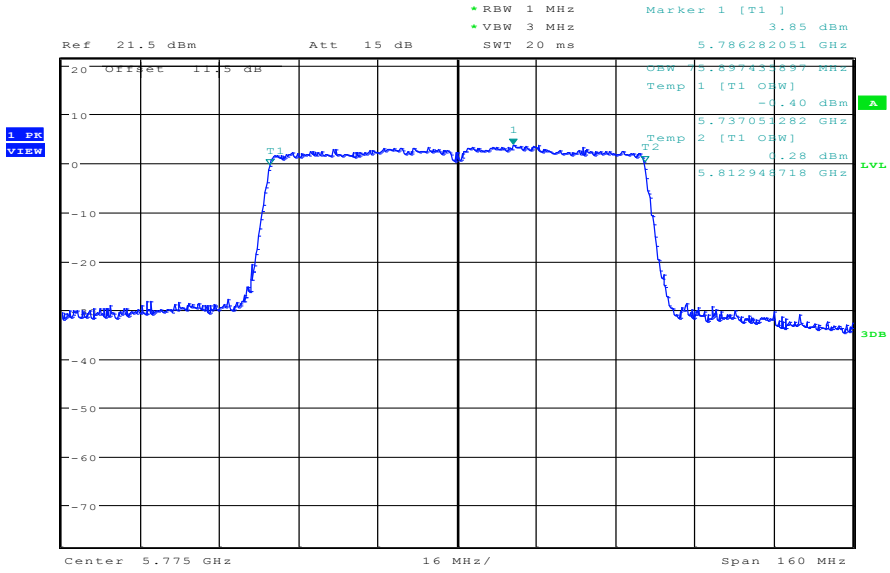



**Plot 2:** TX mode, highest channel



## Plots: OFDM / ac – mode HT80

**Plot 1:** TX mode



## 10.6 TX spurious emissions conducted

**Description:**

Measurement of the conducted spurious emissions in transmit mode The measurement is performed at the lowest, middle and highest channel. The measurement is repeated for all modulations.

**Measurement:**

| Measurement parameter | |
|---|---|
| **According to:** | |
| Detector: | Peak |
| Sweep time: | Auto |
| Resolution bandwidth: | 100 kHz |
| Video bandwidth: | 500 kHz |
| Span: | 9 kHz to 25 GHz |
| Trace-Mode: | Max Hold |

**Limits:**

| FCC | -/- |
|---|---|
| TX Spurious Emissions Conducted | |
| 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 | |

**Results: OFDM / a – mode**

| TX Spurious Emissions Conducted | | | | | |
|---|---|---|---|---|---|
| OFDM / a – mode | | | | | |
| f [MHz] | | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results |
| 5745 | | 3.21 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| 5785 | | 2.62 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| 5825 | | 2.73 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| Measurement uncertainty | | ± 3 dB | | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT20**

| TX Spurious Emissions Conducted | | | | | |
|---|---|---|---|---|---|
| OFDM / ac – mode HT20 | | | | | |
| f [MHz] | | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results |
| 5745 | | 3.12 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| 5785 | | 2.44 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| 5825 | | 2.66 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| Measurement uncertainty | | ± 3 dB | | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT40**

| TX Spurious Emissions Conducted | | | | | |
|---|---|---|---|---|---|
| OFDM / ac – mode HT40 | | | | | |
| f [MHz] | | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results |
| 5755 | | -0.39 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| 5785 | | -0.32 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| | | | 30 dBm | | Operating frequency |
| -/- | | | -20 dBc (peak) -30 dBc (average) | | -/- |
| | | | | | |
| | | | | | |
| Measurement uncertainty | | ± 3 dB | | | |

**Result:** **Passed**

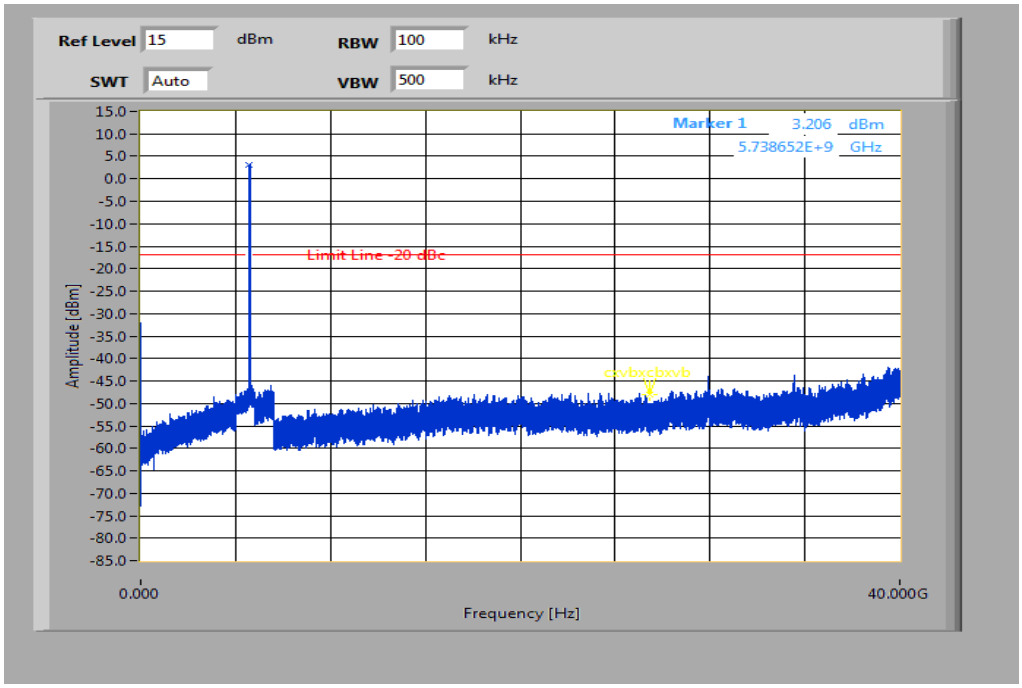
**Results: OFDM / ac – mode HT80**

| TX Spurious Emissions Conducted | | | | | |
|---|---|---|---|---|---|
| OFDM / ac – mode HT80 | | | | | |
| f [MHz] | | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results |
| 5775 | | -6.01 | 30 dBm | | Operating frequency |
| No peaks detected. All detected emissions are below the -20 dBc criteria. | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| | | | 30 dBm | | Operating frequency |
| -/- | | | -20 dBc (peak) -30 dBc (average) | | complies |
| | | | | | |
| | | | | | |
| | | | 30 dBm | | Operating frequency |
| -/- | | | -20 dBc (peak) -30 dBc (average) | | -/- |
| | | | | | |
| | | | | | |
| Measurement uncertainty | | ± 3 dB | | | |

**Result:** **Passed**

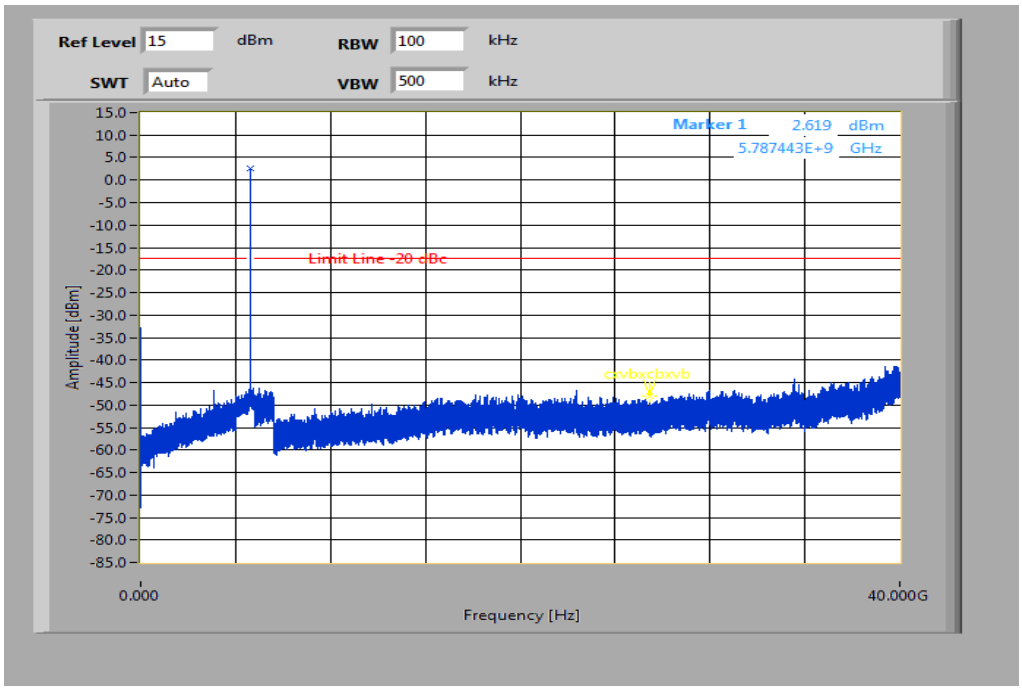
**Plots: OFDM / a – mode**

**Plot 1:** TX mode, lowest channel, up to 40 GHz



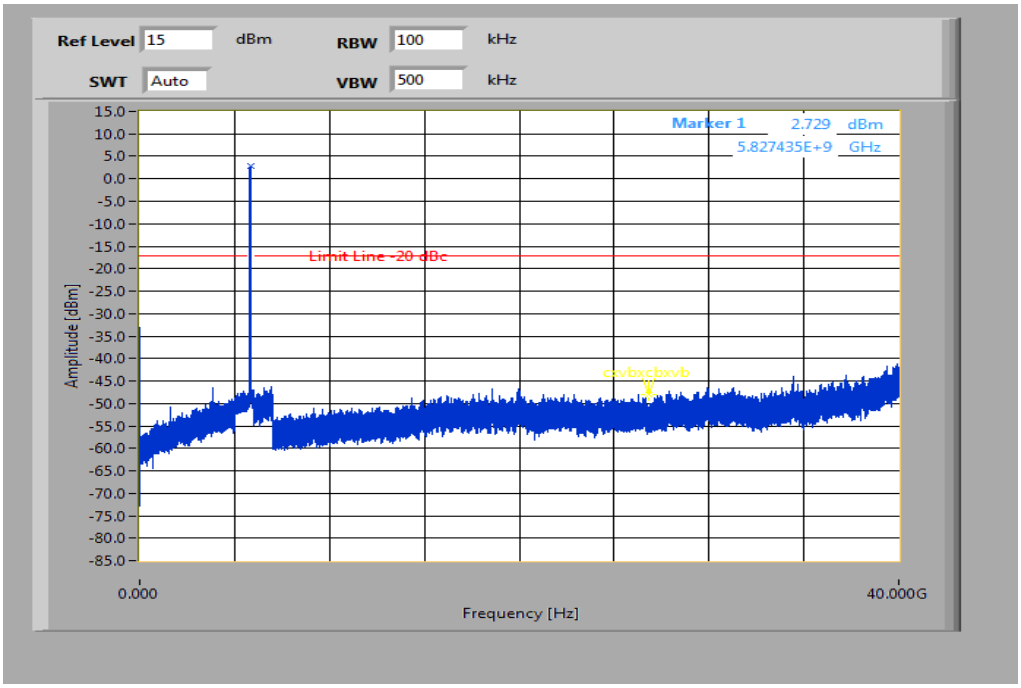

The peak at the beginning of the plot is the LO from the SA.

**Plot 2:** TX mode, middle channel, up to 40 GHz




The peak at the beginning of the plot is the LO from the SA.

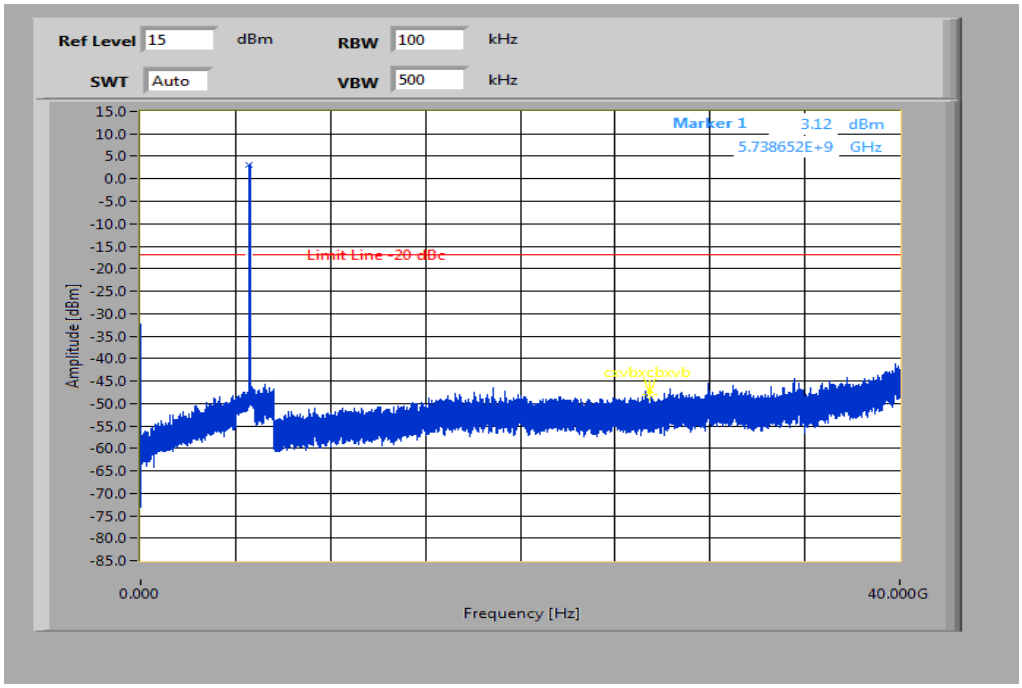
**Plot 3:** TX mode, highest channel, up to 40 GHz




The peak at the beginning of the plot is the LO from the SA.

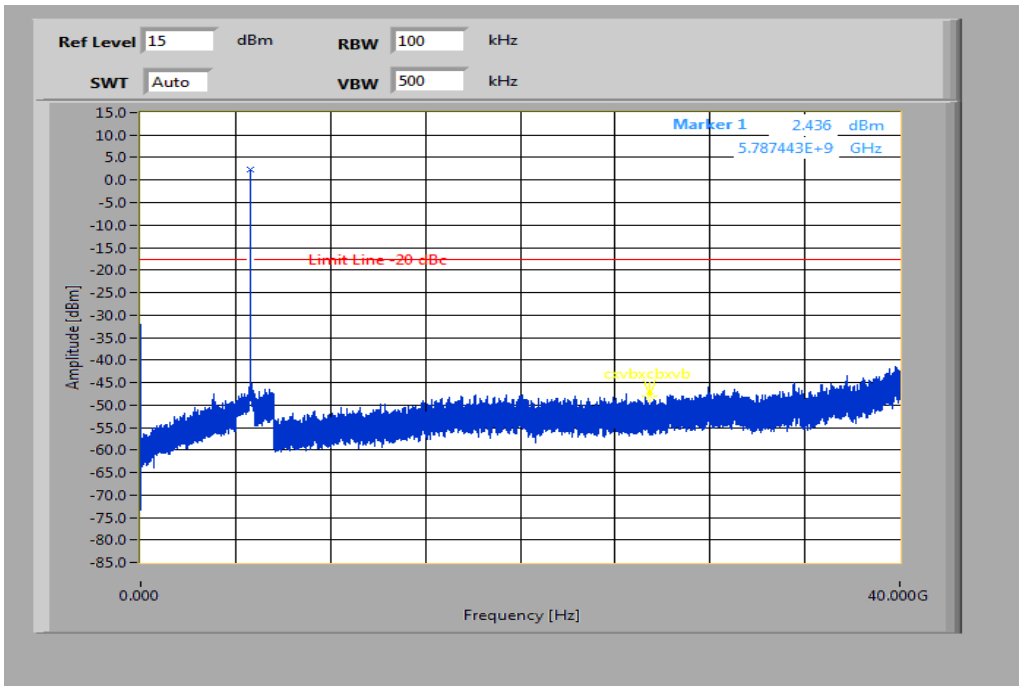
**Plots: OFDM / ac – mode HT20**

**Plot 1:** TX mode, lowest channel, up to 40 GHz



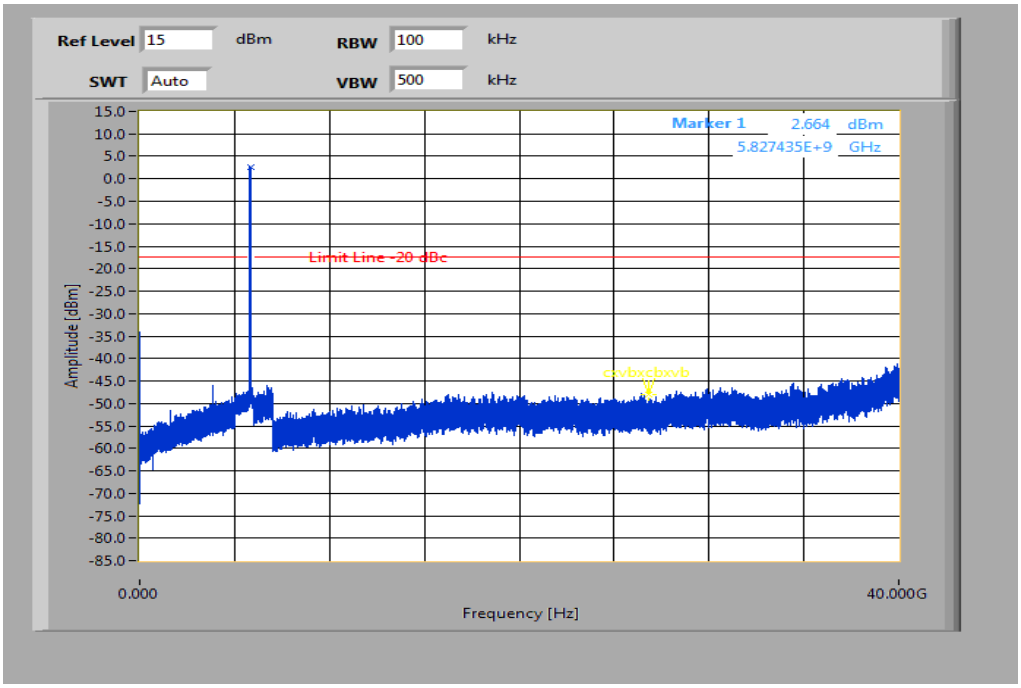

The peak at the beginning of the plot is the LO from the SA.

**Plot 2:** TX mode, middle channel, up to 40 GHz




The peak at the beginning of the plot is the LO from the SA.

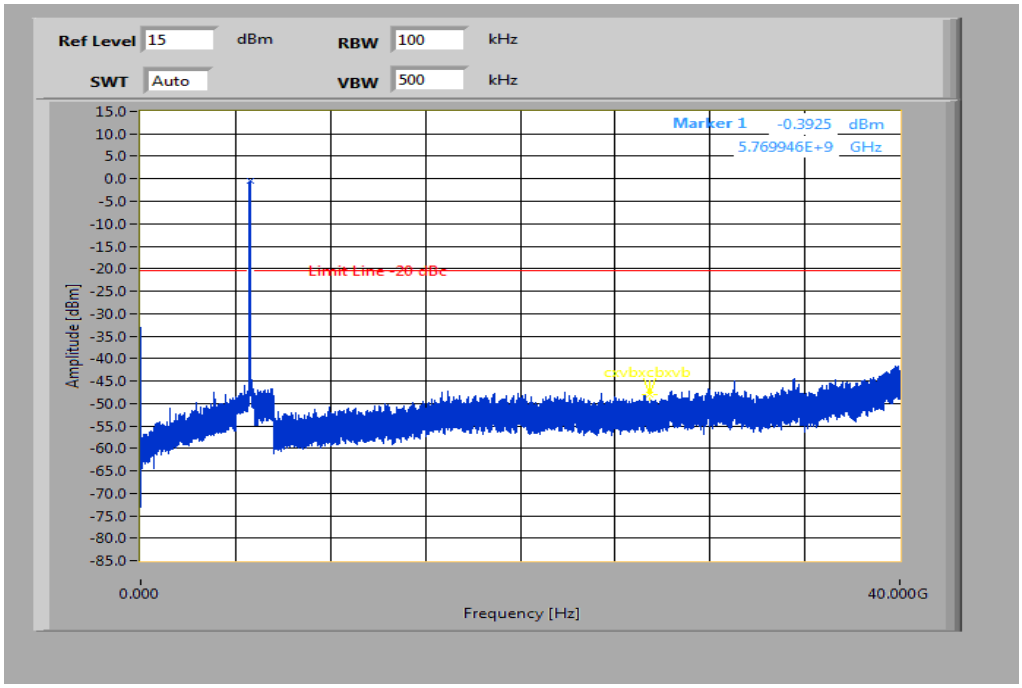
**Plot 3:** TX mode, highest channel, up to 40 GHz




The peak at the beginning of the plot is the LO from the SA.

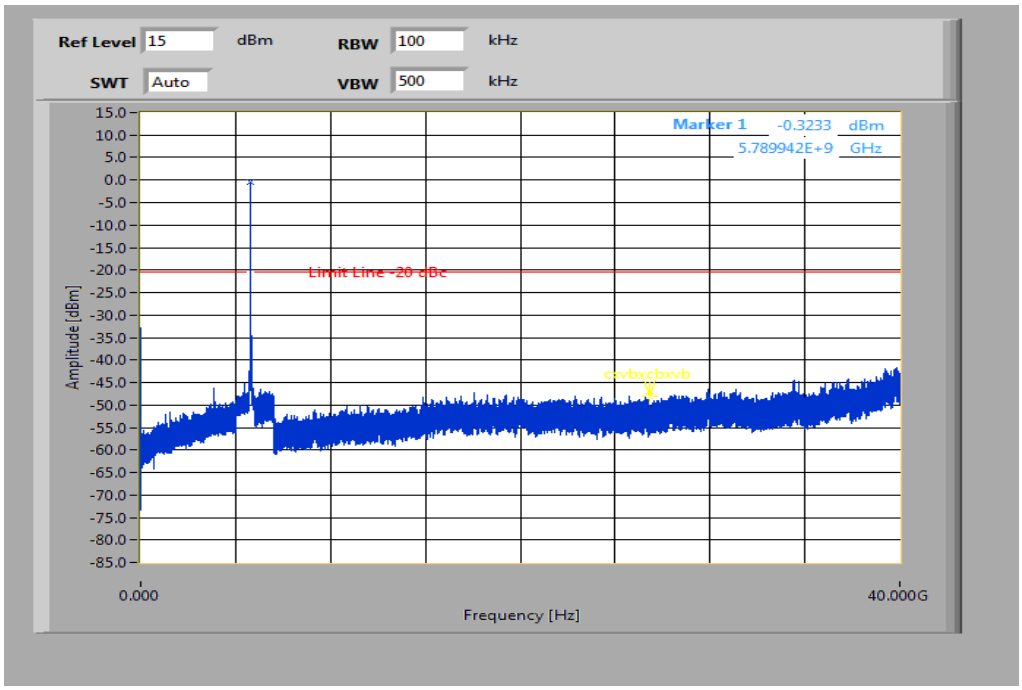
**Plots: OFDM / ac – mode HT40**

**Plot 1:** TX mode, lowest channel, up to 40 GHz




The peak at the beginning of the plot is the LO from the SA.

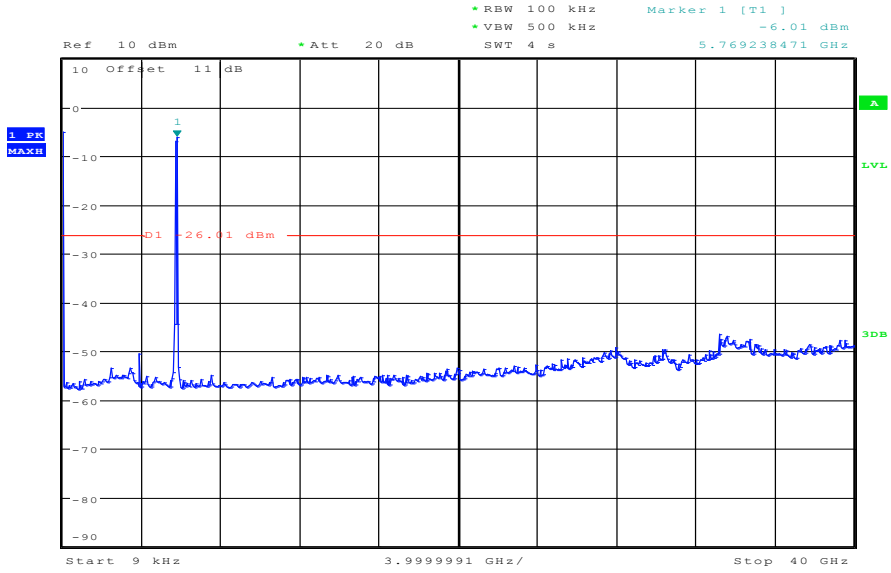
**Plot 2:** TX mode, highest channel, up to 40 GHz




The peak at the beginning of the plot is the LO from the SA.

**Plots: OFDM / ac – mode HT80**

**Plot 1:** TX mode, up to 40 GHz




Date: 19.DEC.2013 12:40:47

The peak at the beginning of the plot is the LO from the SA.

## 10.7 TX spurious emissions radiated

**Description:**

Measurement of the radiated spurious emissions in transmit mode. The measurement is performed at the lowest, middle and highest channel. The measurement is repeated for all modulations.

**Measurement:**

| Measurement parameter | |
|---|---|
| Detector: | Peak / Quasi Peak / RMS |
| Sweep time: | Auto |
| Resolution bandwidth: | F > 1 GHz: 1 MHz<br>F < 1 GHz: 100 kHz |
| Video bandwidth: | 3 x RBW<br>Remeasurement: 10 Hz / 3 MHz |
| Span: | 30 MHz to 25 GHz |
| Trace-Mode: | Max Hold |
| Measured Modulation | ☒ OFDM a – mode<br>☒ OFDM ac – mode HT20<br>☒ OFDM ac – mode HT40<br>☒ OFDM ac – mode HT80 |

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 | -/- | |
|---|---|---|
| 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)). | | |
| 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: OFDM / a – mode**

| TX Spurious Emissions Radiated [dBµV/m] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| OFDM / a – mode | | | | | | | | |
| 5745 MHz | | | 5785 MHz | | | 5825 MHz | | |
| F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] |
| For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | | For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | | For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | |
| All detected peaks are below the average limit! | | | All detected peaks are below the average limit! | | | All detected peaks are below the average limit! | | |
| Measurement uncertainty | | | ± 3 dB | | | | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT20**

| TX Spurious Emissions Radiated [dBµV/m] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| OFDM / ac – mode HT20 | | | | | | | | |
| 5745 MHz | | | 5785 MHz | | | 5825 MHz | | |
| F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] |
| For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | | For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | | For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | |
| All detected peaks are below the average limit! | | | All detected peaks are below the average limit! | | | All detected peaks are below the average limit! | | |
| Measurement uncertainty | | | ± 3 dB | | | | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT40**

| TX Spurious Emissions Radiated [dBµV/m] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| OFDM / ac – mode HT40 | | | | | | | | |
| 5755 MHz | | | 5795 MHz | | | -/- | | |
| F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] |
| For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | | For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | | -/- | | |
| All detected peaks are below the average limit! | | | All detected peaks are below the average limit! | | | -/- | | |
| Measurement uncertainty | | | ± 3 dB | | | | | |

**Result:** **Passed**

**Results: OFDM / ac – mode HT80**

| TX Spurious Emissions Radiated [dBµV/m] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| OFDM / ac – mode HT80 | | | | | | | | |
| 5775 MHz | | | -/- | | | -/- | | |
| F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] |
| For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | | -/- | | | -/- | | |
| All detected peaks are below the average limit! | | | -/- | | | -/- | | |
| Measurement uncertainty | | | ± 3 dB | | | | | |

**Result:** **Passed**

**Note:** The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

**Plots: OFDM / a**

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

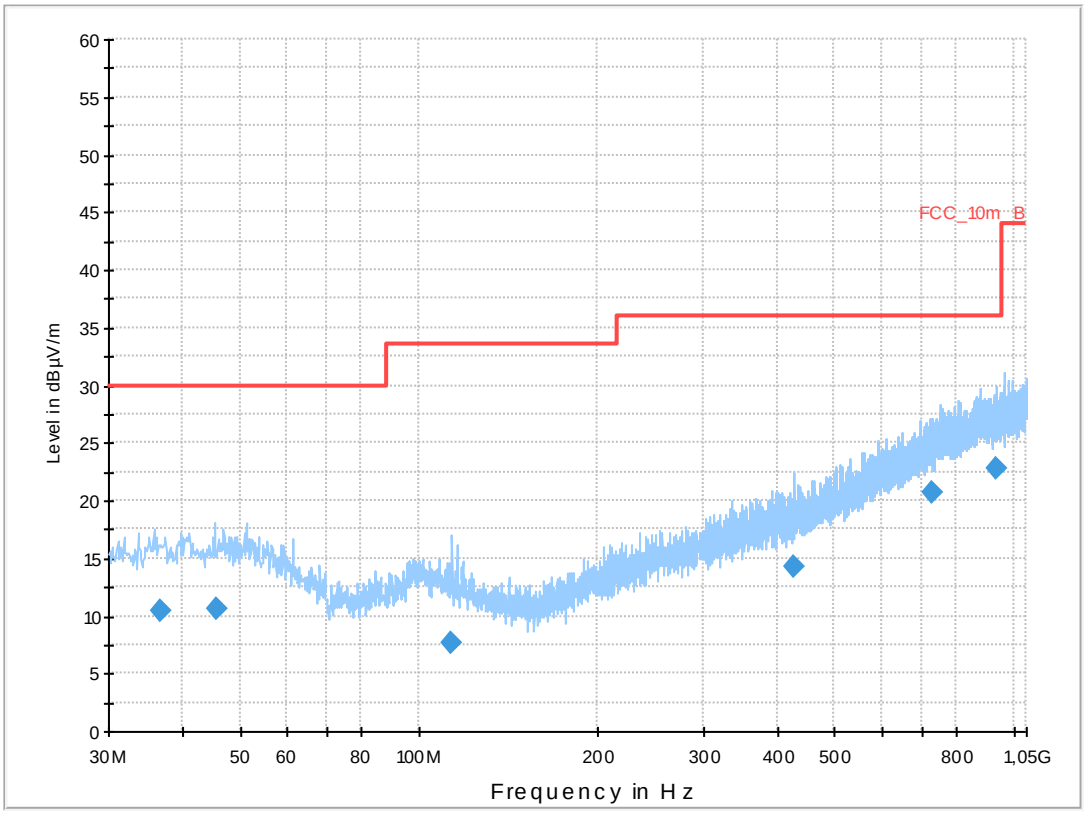
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan a-mode tx ch 149 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

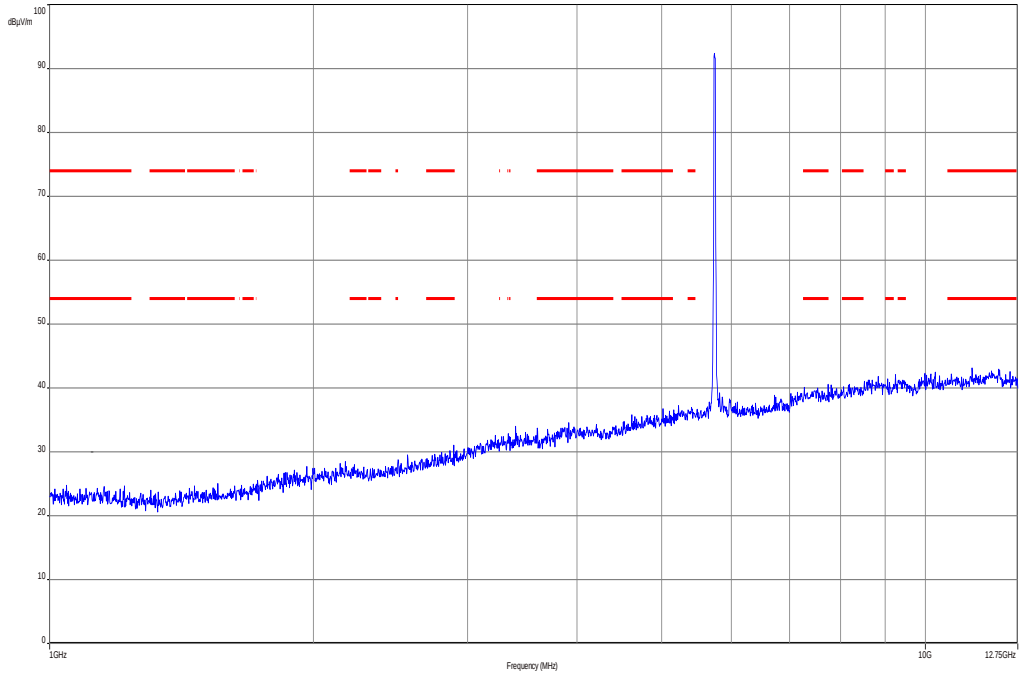
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



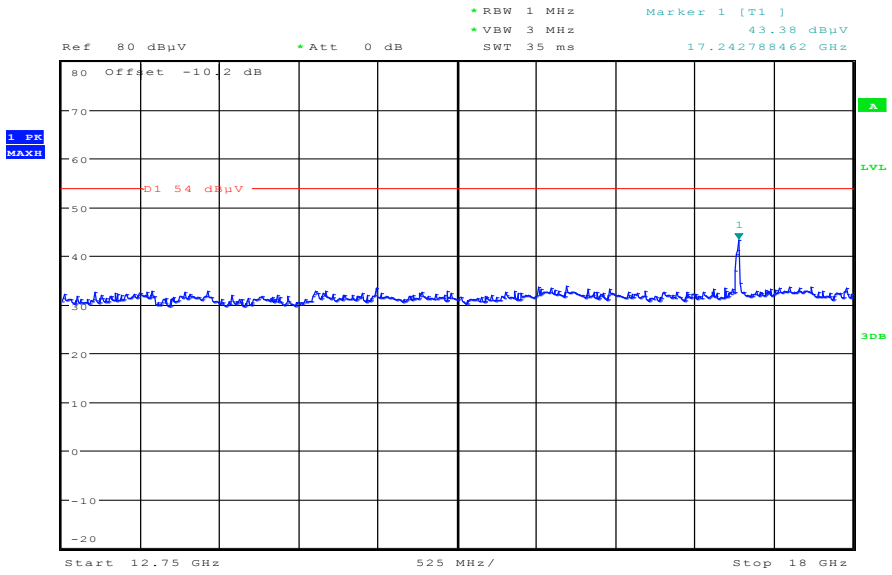

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 36.578250 | 10.5 | 1000.0 | 120.000 | 170.0 | H | 171.0 | 13.2 | 19.5 | 30.0 | |
| 45.551250 | 10.6 | 1000.0 | 120.000 | 170.0 | H | 100.0 | 13.3 | 19.4 | 30.0 | |
| 112.985100 | 7.6 | 1000.0 | 120.000 | 152.0 | V | 190.0 | 10.8 | 25.9 | 33.5 | |
| 428.271300 | 14.2 | 1000.0 | 120.000 | 160.0 | V | 92.0 | 17.3 | 21.8 | 36.0 | |
| 726.749400 | 20.6 | 1000.0 | 120.000 | 170.0 | H | 100.0 | 23.1 | 15.4 | 36.0 | |
| 937.555500 | 22.8 | 1000.0 | 120.000 | 153.0 | V | 270.0 | 25.3 | 13.2 | 36.0 | |

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

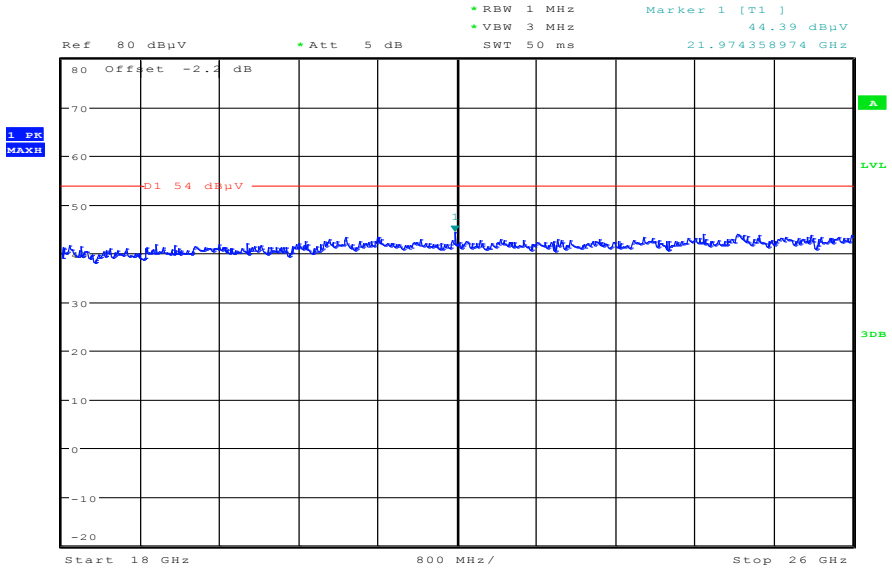



**Plot 3:** Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



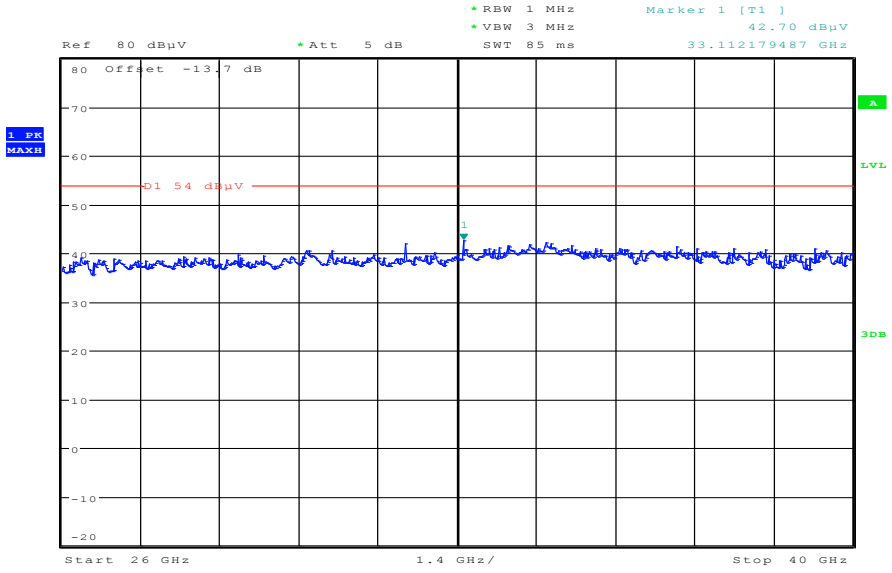

Date: 16.DEC.2013 15:28:14

**Plot 4:** Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 15:49:04

**Plot 5:** Lowest channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:55:39

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

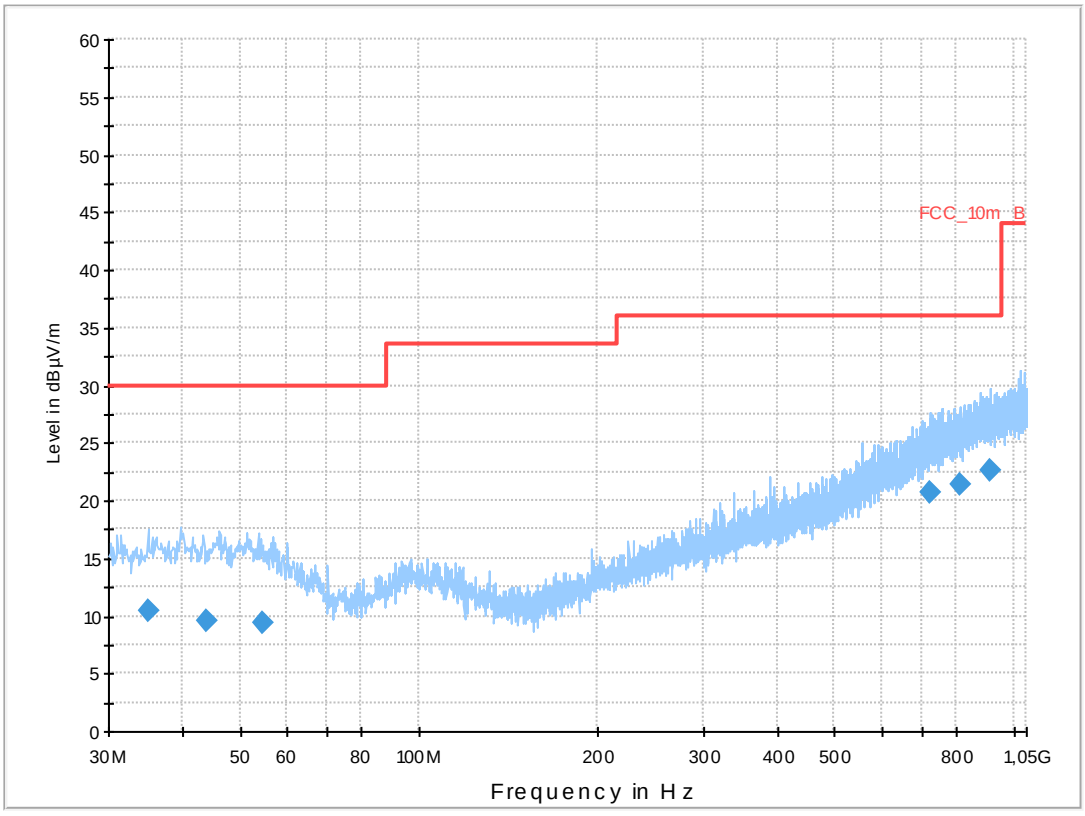
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan a-mode tx ch 157 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

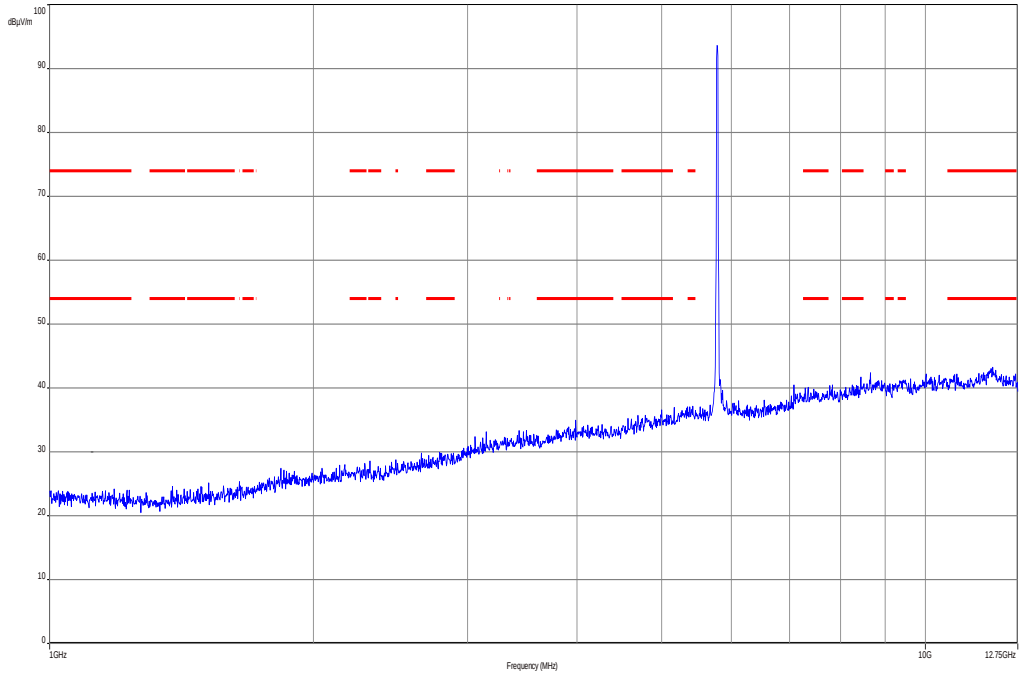
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



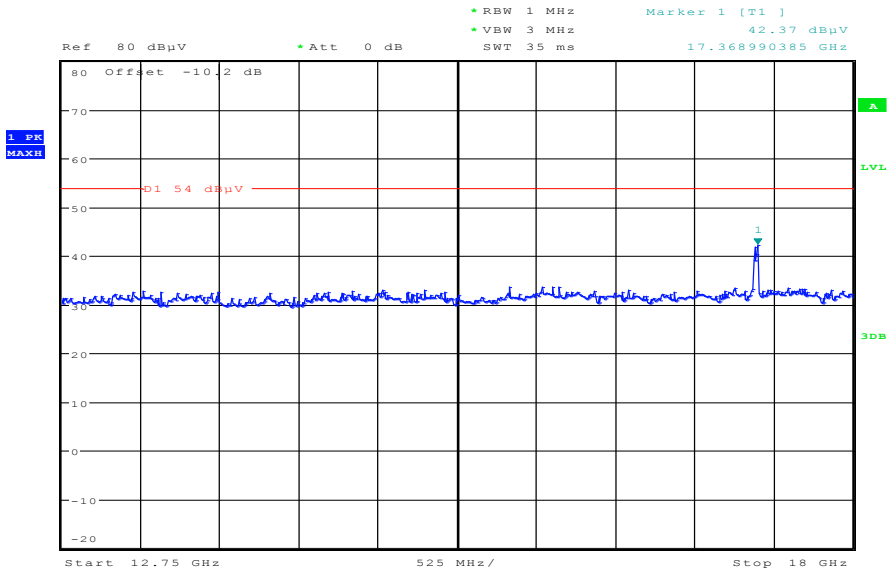

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 35.117550 | 10.4 | 1000.0 | 120.000 | 170.0 | V | 267.0 | 13.0 | 19.6 | 30.0 | |
| 43.823100 | 9.5 | 1000.0 | 120.000 | 170.0 | V | 92.0 | 13.3 | 20.5 | 30.0 | |
| 54.330450 | 9.3 | 1000.0 | 120.000 | 170.0 | H | 2.0 | 12.9 | 20.7 | 30.0 | |
| 725.596950 | 20.6 | 1000.0 | 120.000 | 111.0 | H | 180.0 | 23.1 | 15.4 | 36.0 | |
| 809.793450 | 21.4 | 1000.0 | 120.000 | 170.0 | V | 180.0 | 24.0 | 14.6 | 36.0 | |
| 911.881950 | 22.6 | 1000.0 | 120.000 | 98.0 | V | 87.0 | 25.2 | 13.4 | 36.0 | |

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

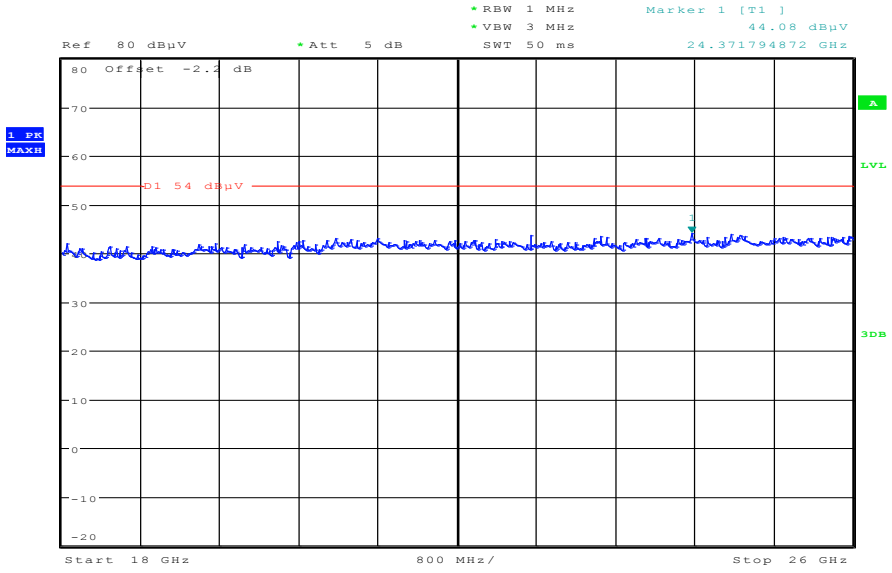



**Plot 8:** Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



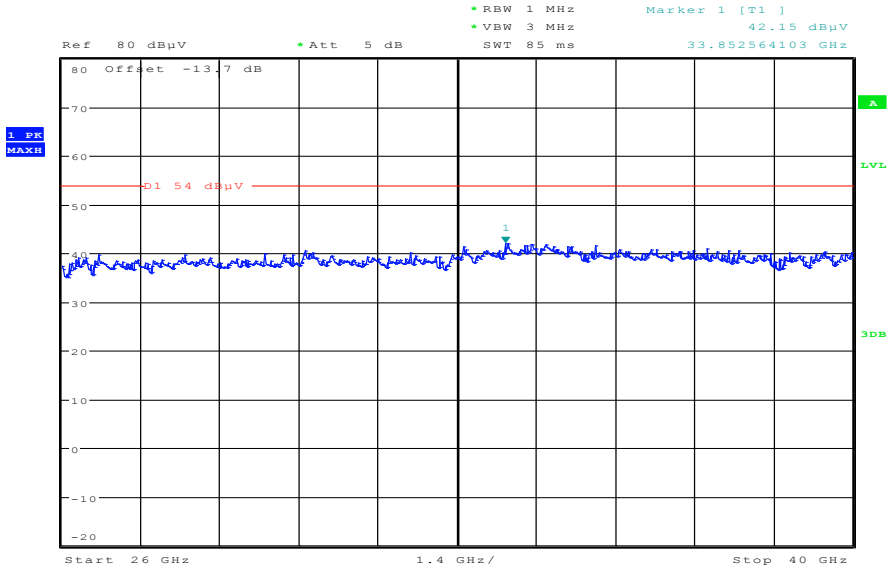

Date: 16.DEC.2013 15:28:58

**Plot 9:** Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 15:49:42

**Plot 10:** Middle channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:56:29

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

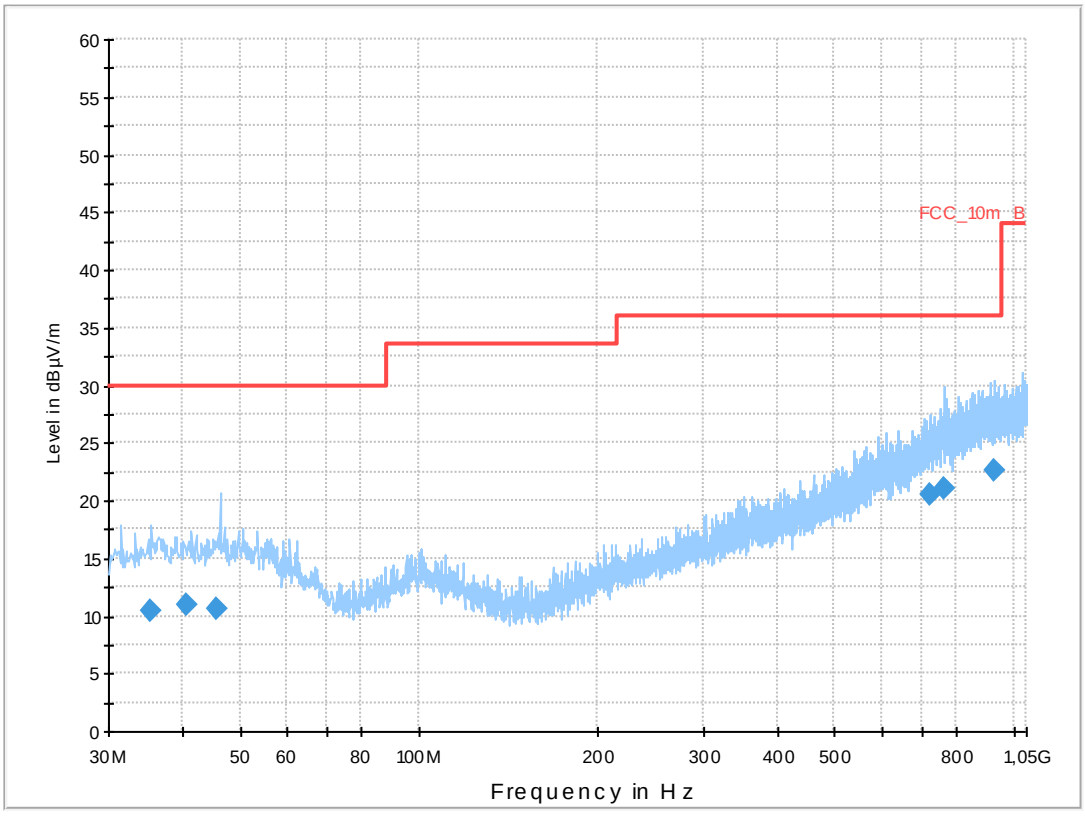
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan a-mode tx ch 165 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

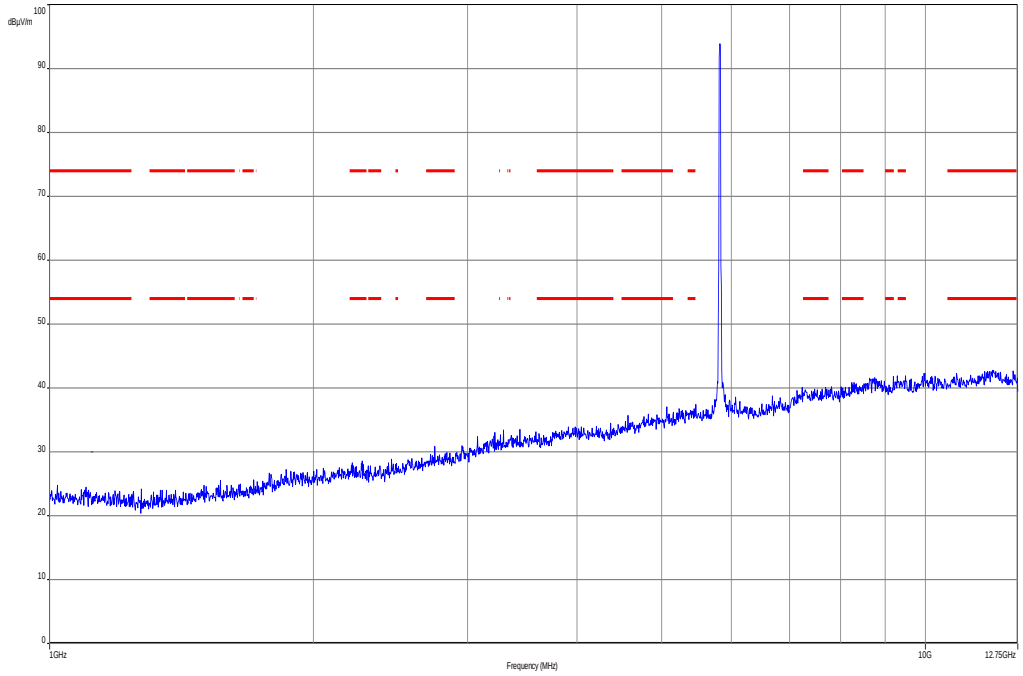
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



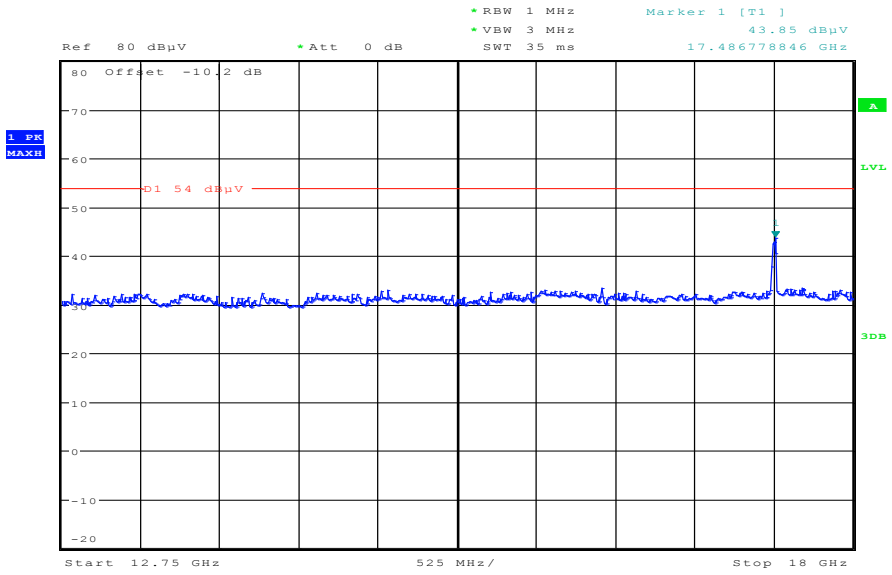

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 35.266500 | 10.5 | 1000.0 | 120.000 | 170.0 | V | 190.0 | 13.0 | 19.5 | 30.0 | |
| 40.753800 | 10.9 | 1000.0 | 120.000 | 170.0 | H | 190.0 | 13.4 | 19.1 | 30.0 | |
| 45.609750 | 10.7 | 1000.0 | 120.000 | 143.0 | V | -5.0 | 13.3 | 19.3 | 30.0 | |
| 721.327050 | 20.6 | 1000.0 | 120.000 | 170.0 | H | 261.0 | 23.0 | 15.4 | 36.0 | |
| 763.900050 | 21.1 | 1000.0 | 120.000 | 170.0 | H | 182.0 | 23.7 | 14.9 | 36.0 | |
| 929.345250 | 22.6 | 1000.0 | 120.000 | 170.0 | H | 100.0 | 25.3 | 13.4 | 36.0 | |

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

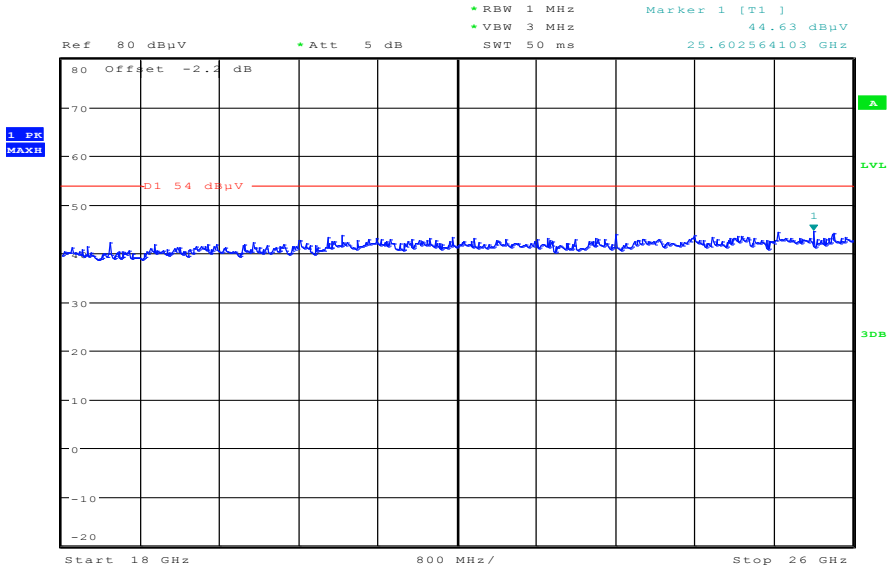



**Plot 13:** Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



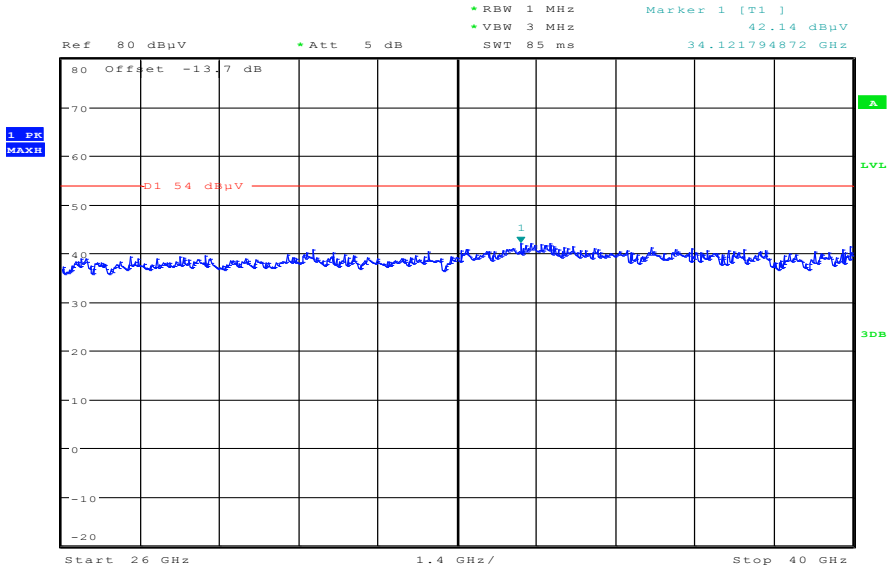

Date: 16.DEC.2013 15:29:33

**Plot 14:** Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 15:50:18

**Plot 15:** Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:57:01

**Plots: OFDM / ac HT20**

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

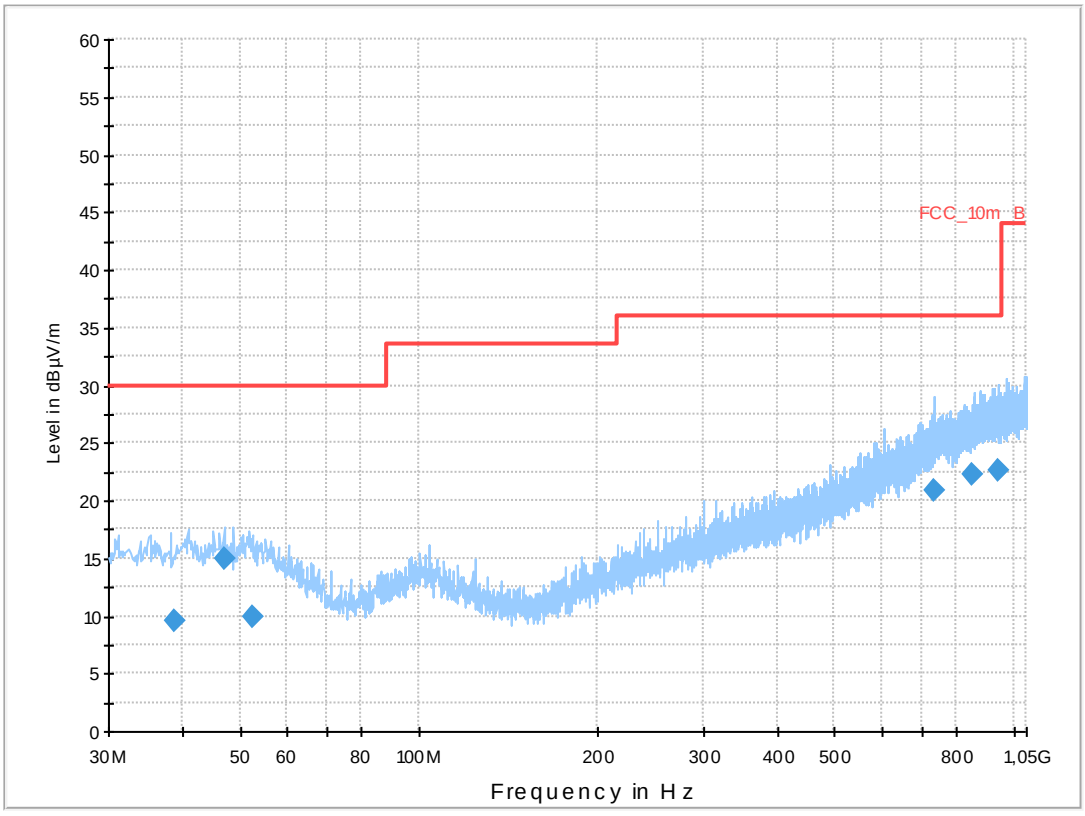
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan ac-mode (HT20) tx ch 149 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

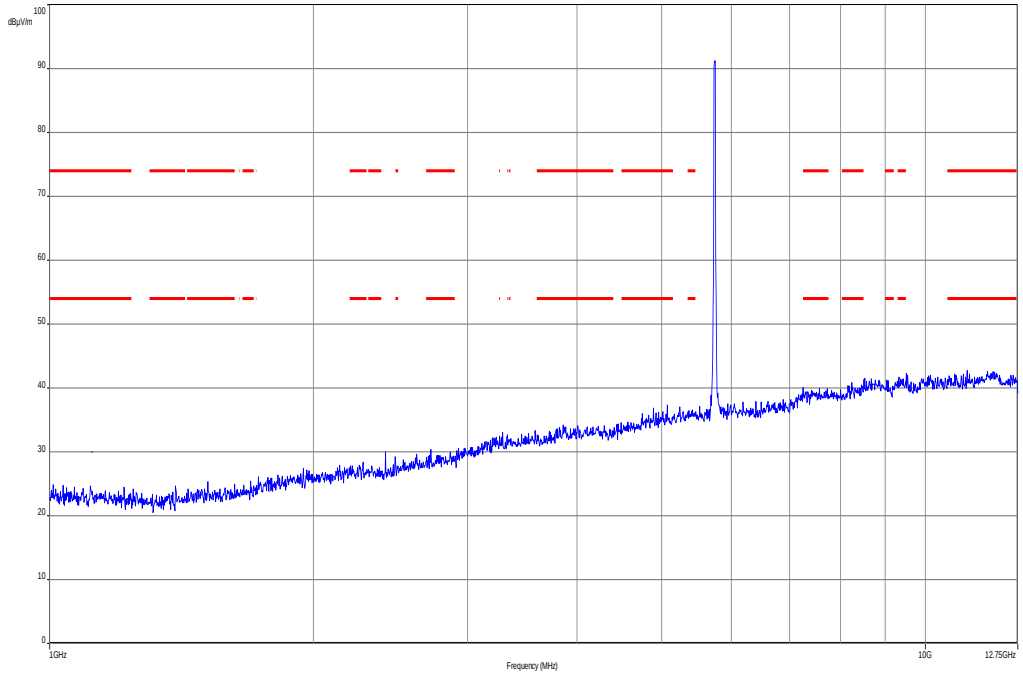
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



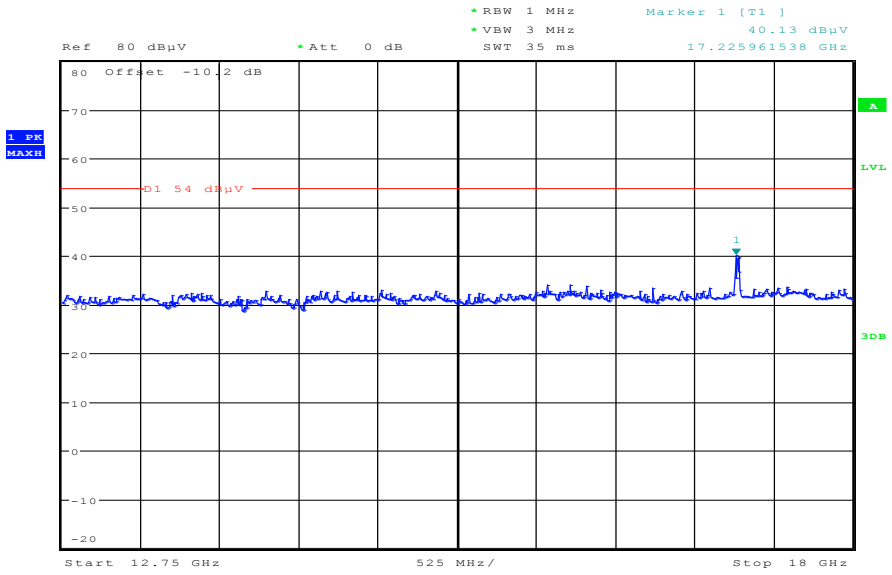

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 38.688900 | 9.5 | 1000.0 | 120.000 | 98.0 | H | 171.0 | 13.3 | 20.5 | 30.0 | |
| 47.000400 | 14.9 | 1000.0 | 120.000 | 98.0 | V | 280.0 | 13.3 | 15.1 | 30.0 | |
| 52.266450 | 10.0 | 1000.0 | 120.000 | 105.0 | V | 171.0 | 13.1 | 20.0 | 30.0 | |
| 737.075850 | 20.9 | 1000.0 | 120.000 | 135.0 | H | 100.0 | 23.4 | 15.1 | 36.0 | |
| 850.335450 | 22.2 | 1000.0 | 120.000 | 170.0 | V | 261.0 | 24.6 | 13.8 | 36.0 | |
| 940.478250 | 22.7 | 1000.0 | 120.000 | 98.0 | H | 280.0 | 25.3 | 13.3 | 36.0 | |

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

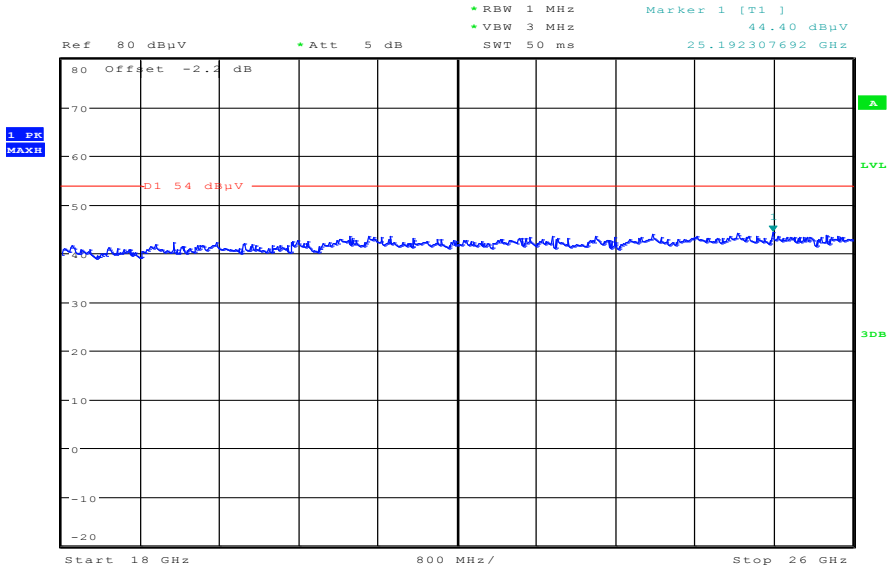



**Plot 3:** Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



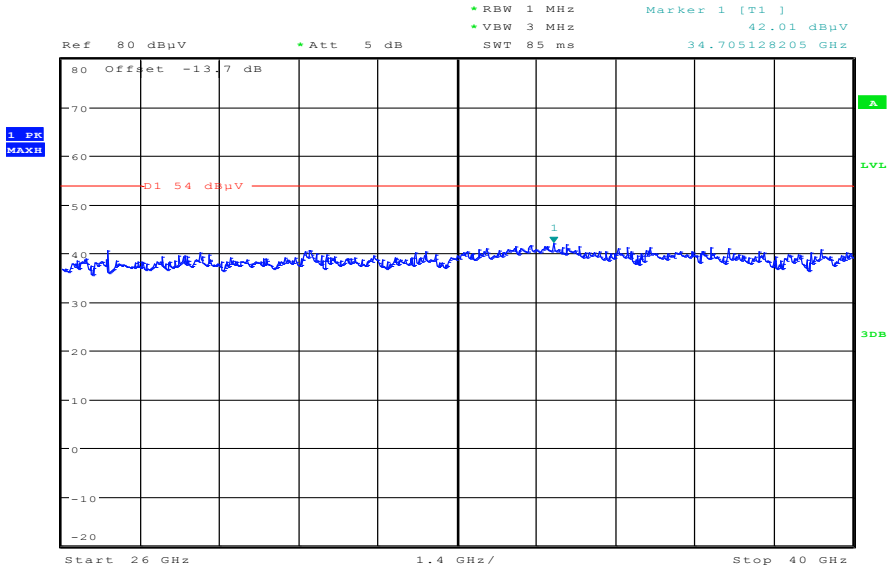

Date: 16.DEC.2013 15:30:46

**Plot 4:** Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:02:04

**Plot 5:** Lowest channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:44:11

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

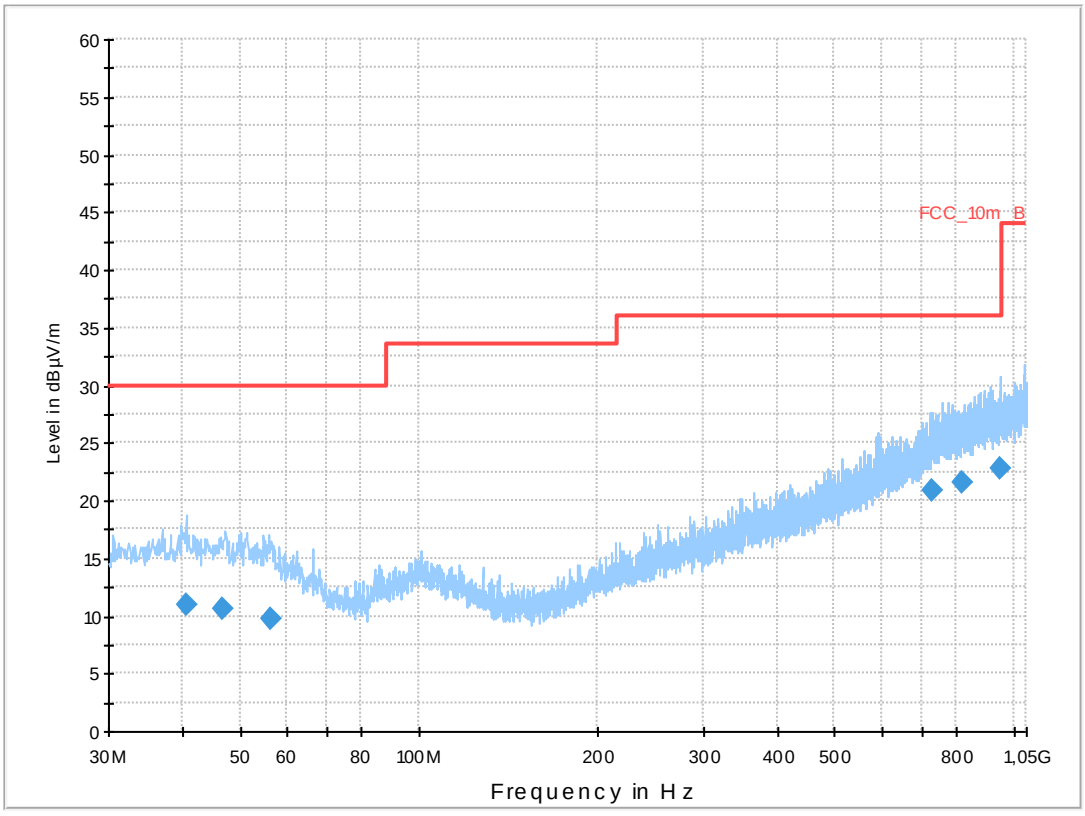
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan ac-mode (HT20) tx ch 157 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

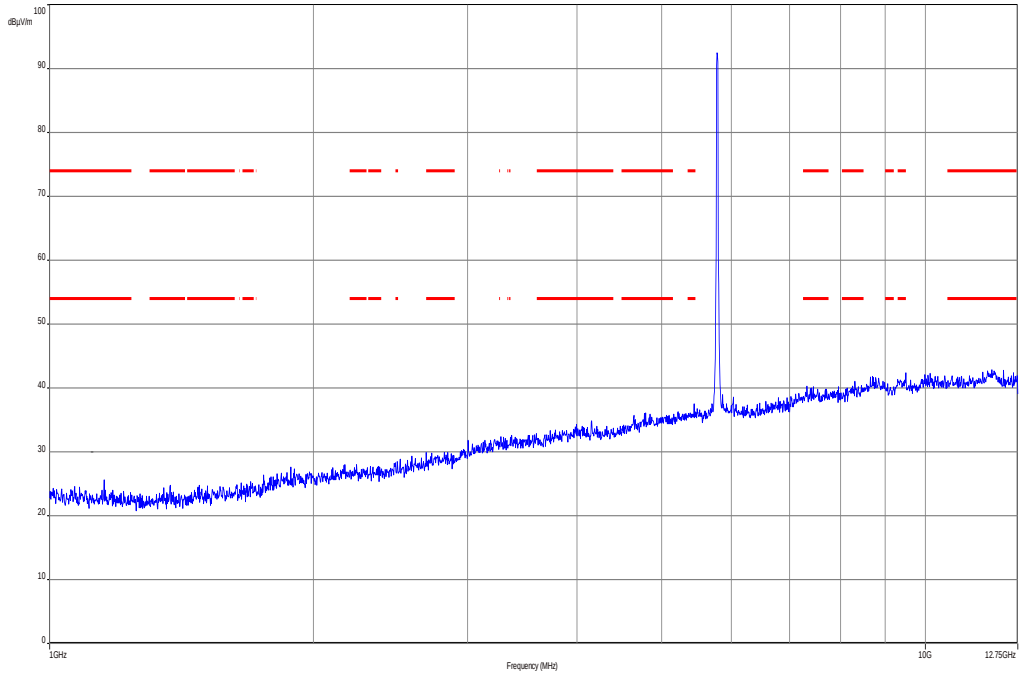
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



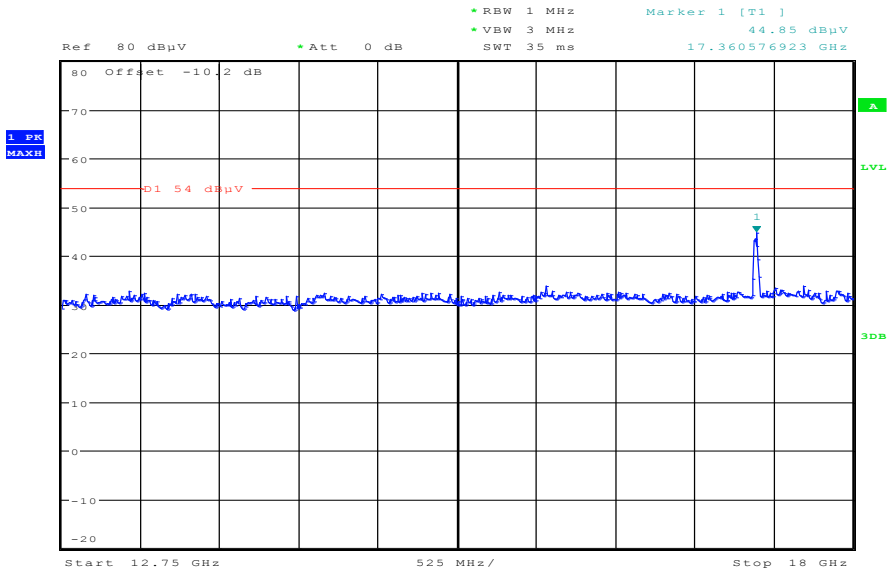

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 40.559100 | 10.9 | 1000.0 | 120.000 | 98.0 | H | 92.0 | 13.4 | 19.1 | 30.0 | |
| 46.826700 | 10.5 | 1000.0 | 120.000 | 107.0 | V | 260.0 | 13.3 | 19.5 | 30.0 | |
| 56.419350 | 9.8 | 1000.0 | 120.000 | 170.0 | V | 10.0 | 12.5 | 20.2 | 30.0 | |
| 731.806350 | 20.8 | 1000.0 | 120.000 | 170.0 | V | 85.0 | 23.2 | 15.2 | 36.0 | |
| 820.843050 | 21.6 | 1000.0 | 120.000 | 98.0 | V | 0.0 | 24.1 | 14.4 | 36.0 | |
| 948.999900 | 22.7 | 1000.0 | 120.000 | 170.0 | V | -5.0 | 25.3 | 13.3 | 36.0 | |

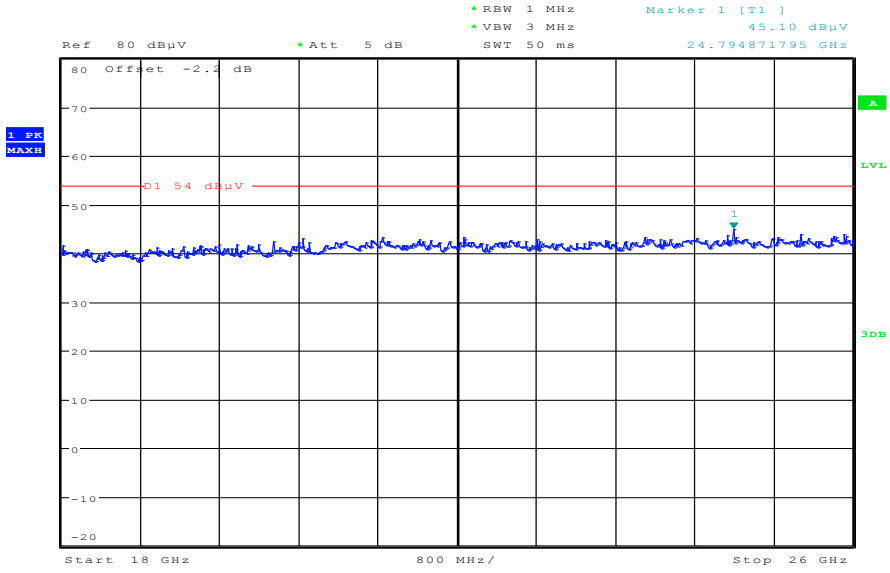
**Plot 7:** Middle channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization




**Plot 8:** Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization

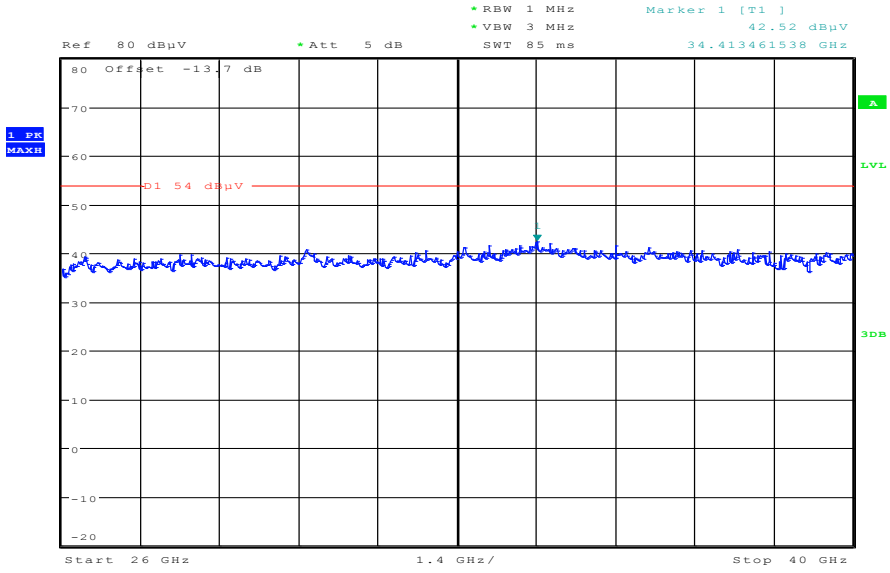


**Plot 9:** Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:02:40

**Plot 10:** Middle channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:44:49

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

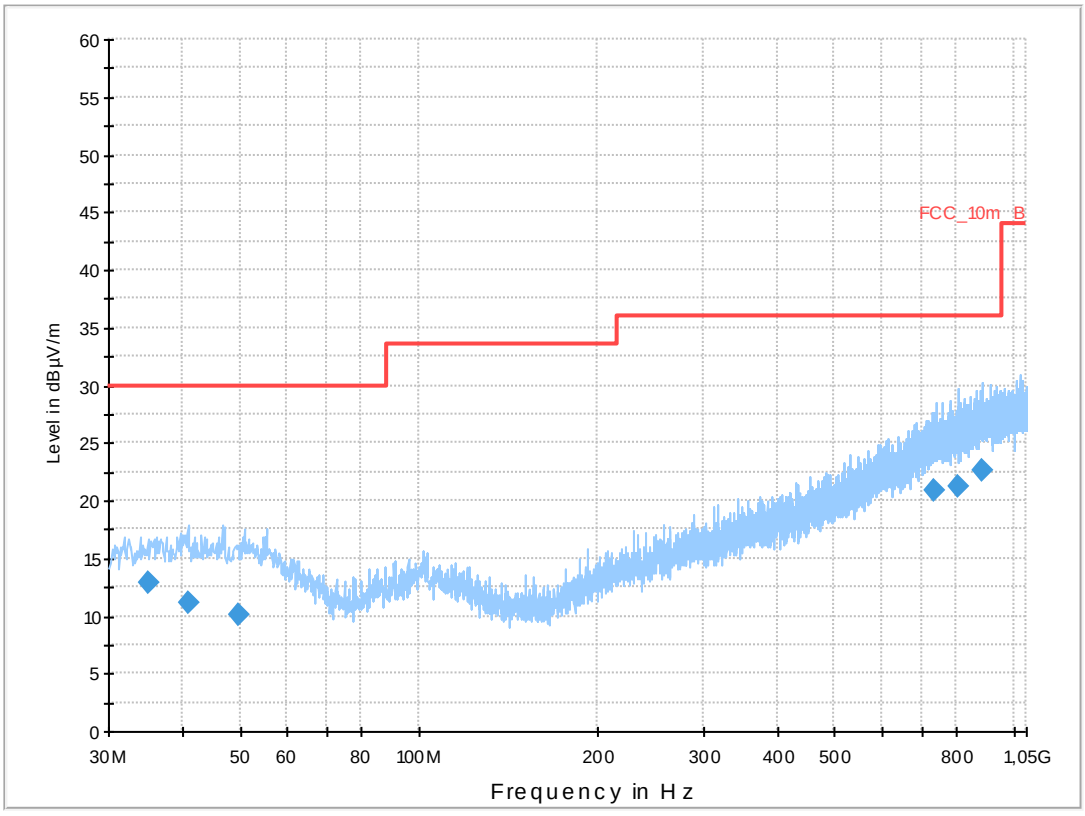
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan ac-mode (HT20) tx ch 165 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

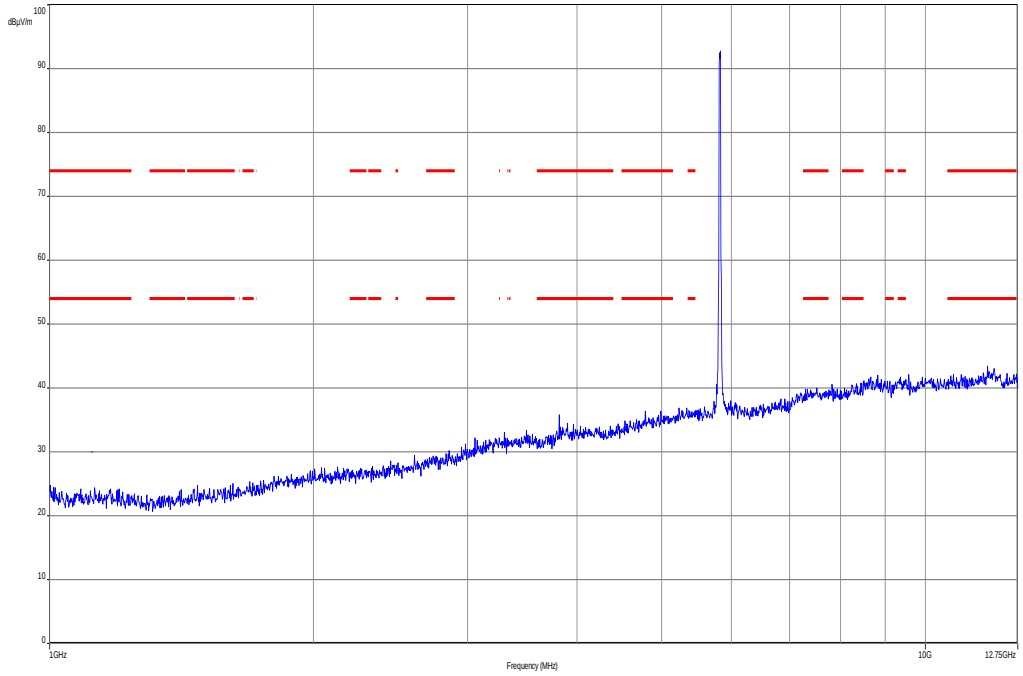
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



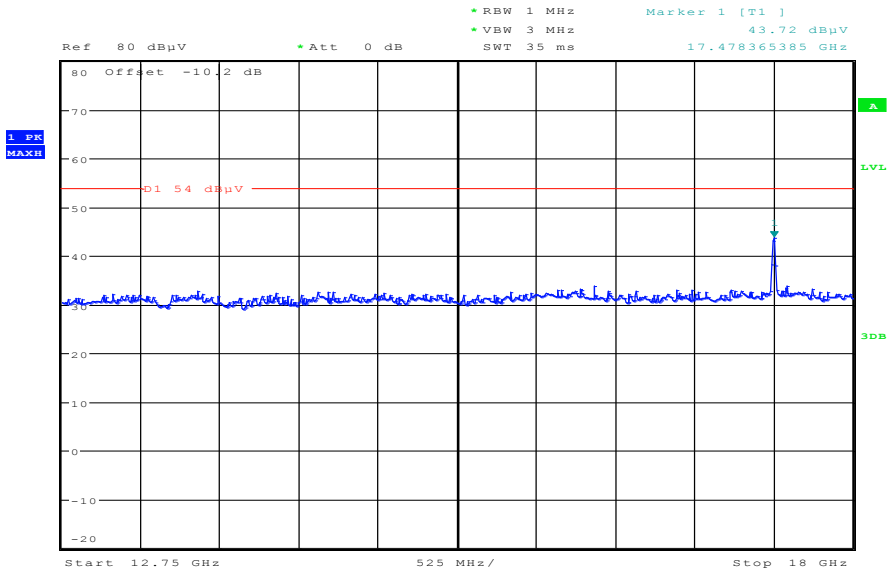

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 35.017050 | 12.9 | 1000.0 | 120.000 | 133.0 | V | 177.0 | 13.0 | 17.1 | 30.0 | |
| 40.788000 | 11.1 | 1000.0 | 120.000 | 154.0 | V | 88.0 | 13.4 | 18.9 | 30.0 | |
| 49.839450 | 10.2 | 1000.0 | 120.000 | 105.0 | H | 190.0 | 13.4 | 19.8 | 30.0 | |
| 735.691650 | 20.9 | 1000.0 | 120.000 | 98.0 | H | 171.0 | 23.3 | 15.1 | 36.0 | |
| 803.611950 | 21.3 | 1000.0 | 120.000 | 170.0 | H | 178.0 | 23.9 | 14.7 | 36.0 | |
| 882.389250 | 22.6 | 1000.0 | 120.000 | 170.0 | H | 280.0 | 25.0 | 13.4 | 36.0 | |

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

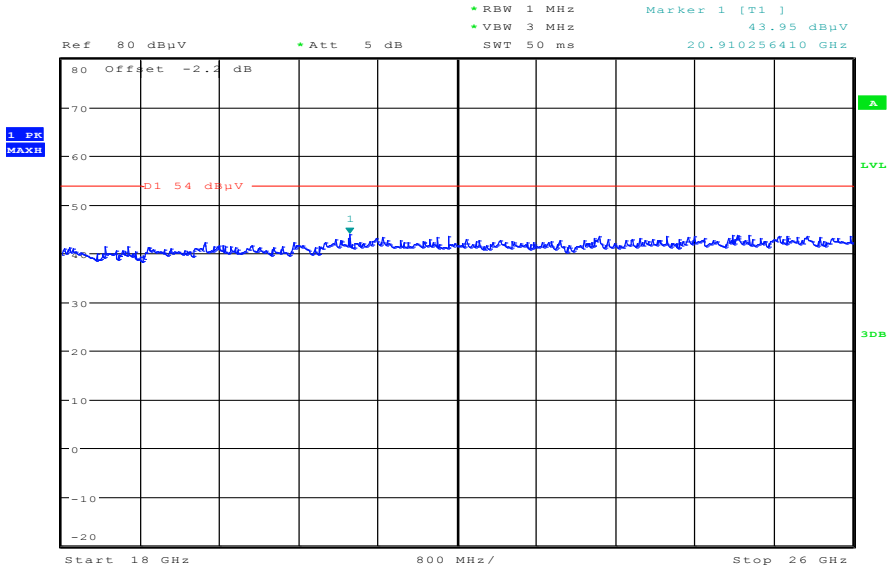



**Plot 13:** Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



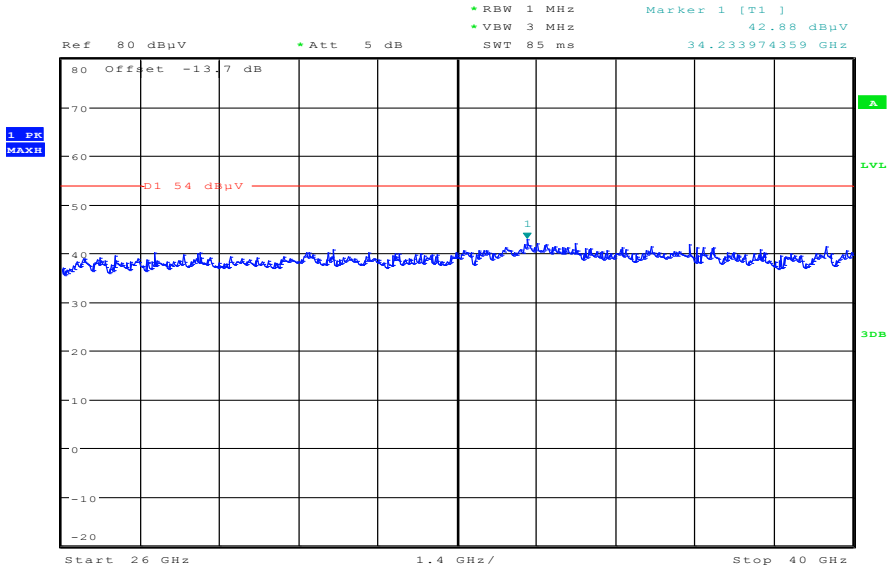

Date: 16.DEC.2013 15:31:59

**Plot 14:** Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:03:18

**Plot 15:** Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:45:35

**Plots: OFDM / ac – mode HT40**

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

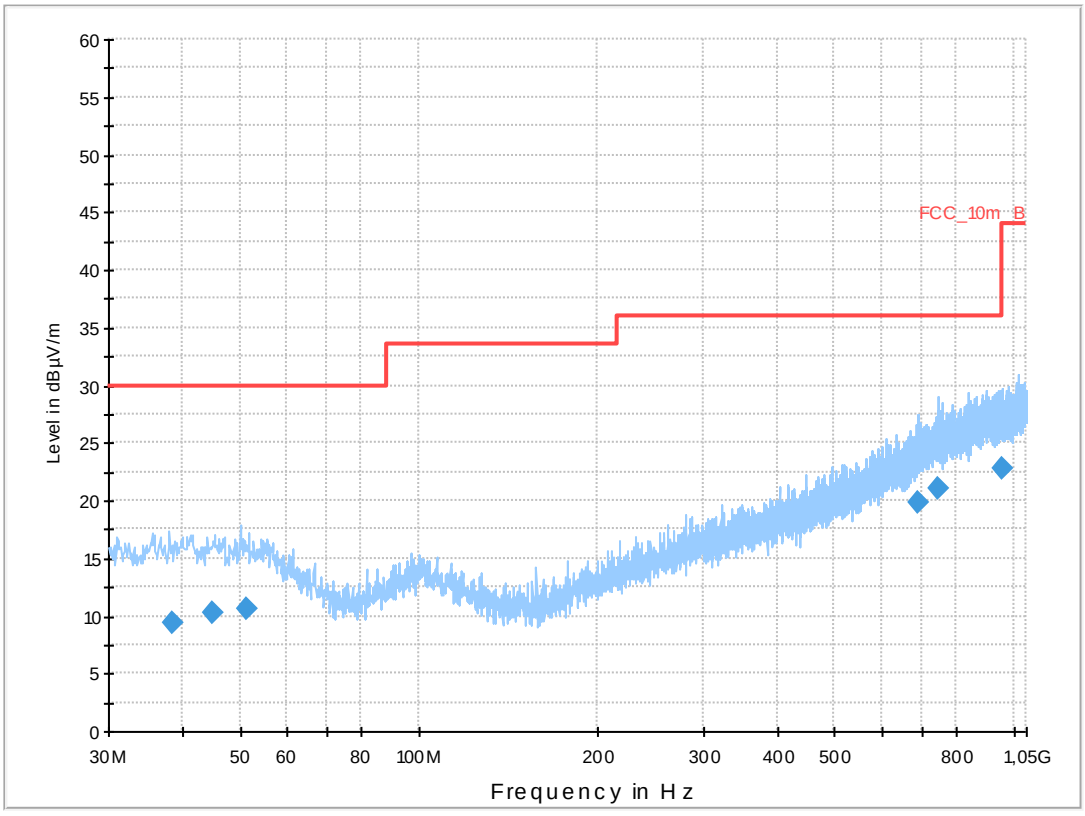
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan n-mode (HT40) tx ch 151 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

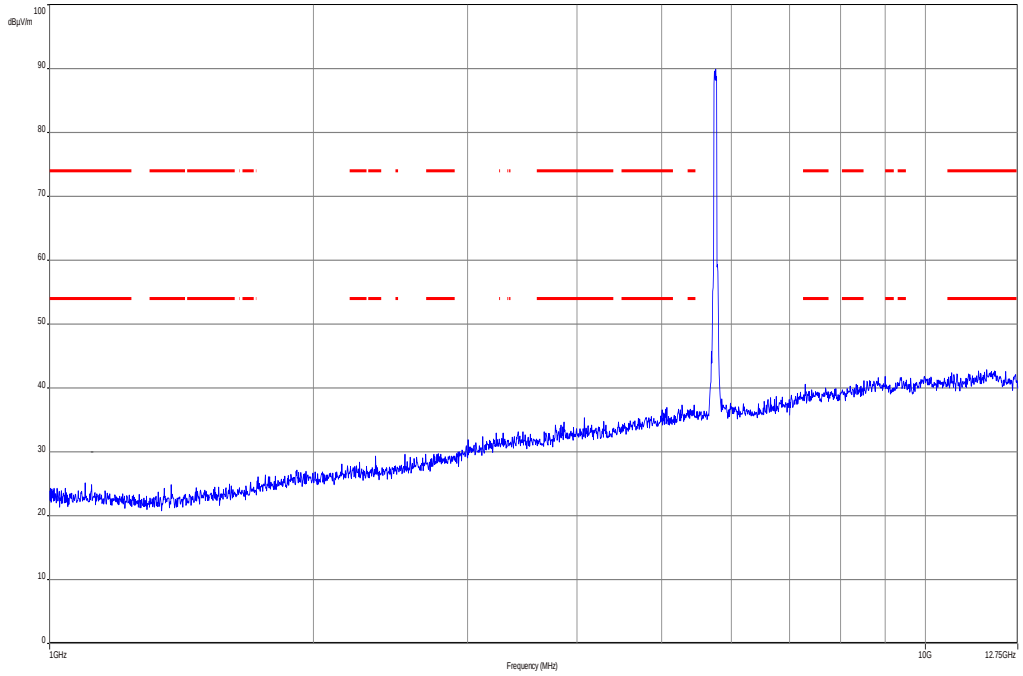
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



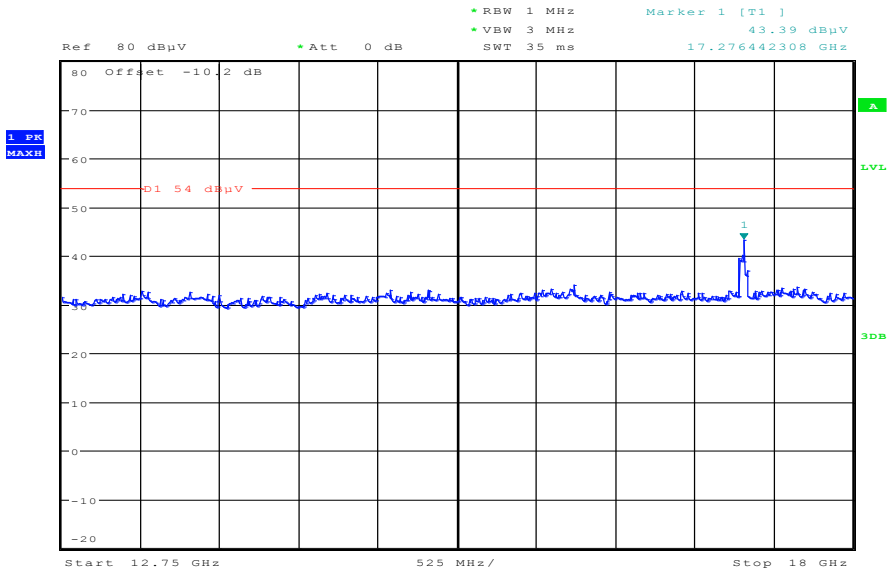

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 38.445300 | 9.5 | 1000.0 | 120.000 | 170.0 | V | -9.0 | 13.3 | 20.5 | 30.0 | |
| 44.827050 | 10.2 | 1000.0 | 120.000 | 170.0 | H | 81.0 | 13.3 | 19.8 | 30.0 | |
| 51.153900 | 10.5 | 1000.0 | 120.000 | 111.0 | H | 80.0 | 13.3 | 19.5 | 30.0 | |
| 689.797650 | 19.8 | 1000.0 | 120.000 | 160.0 | V | 182.0 | 22.2 | 16.2 | 36.0 | |
| 747.494700 | 21.1 | 1000.0 | 120.000 | 170.0 | V | 280.0 | 23.6 | 14.9 | 36.0 | |
| 954.013500 | 22.8 | 1000.0 | 120.000 | 112.0 | V | 267.0 | 25.4 | 13.2 | 36.0 | |

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

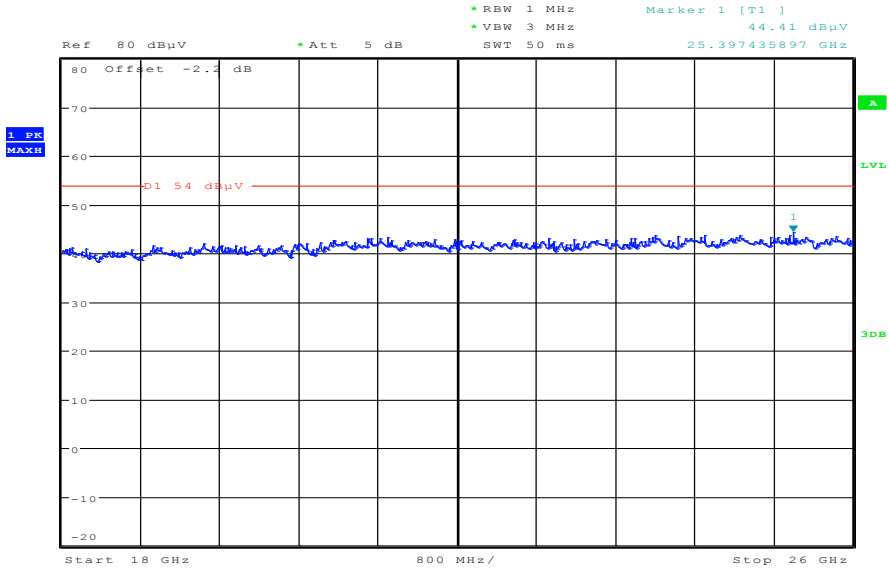



**Plot 3:** Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



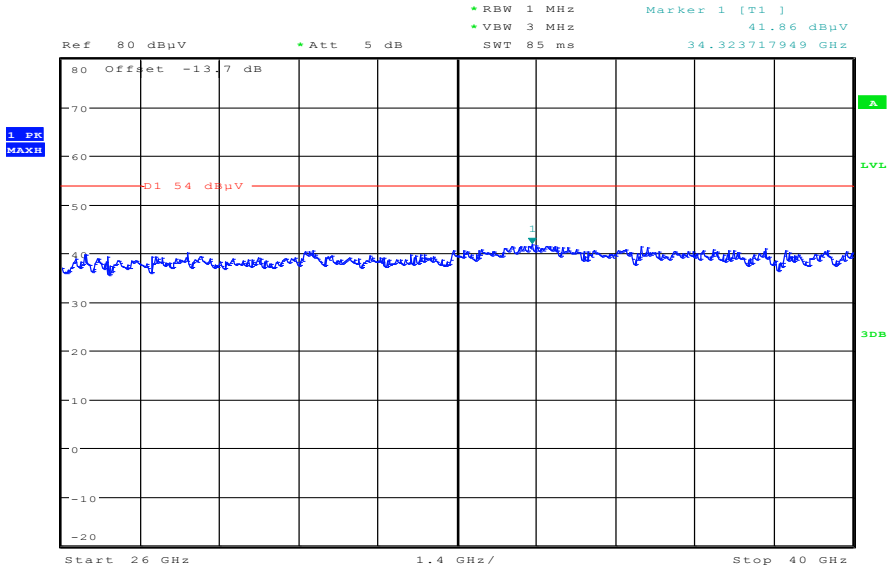

Date: 16.DEC.2013 15:24:35

**Plot 4:** Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:12:58

**Plot 5:** Lowest channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:28:04

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

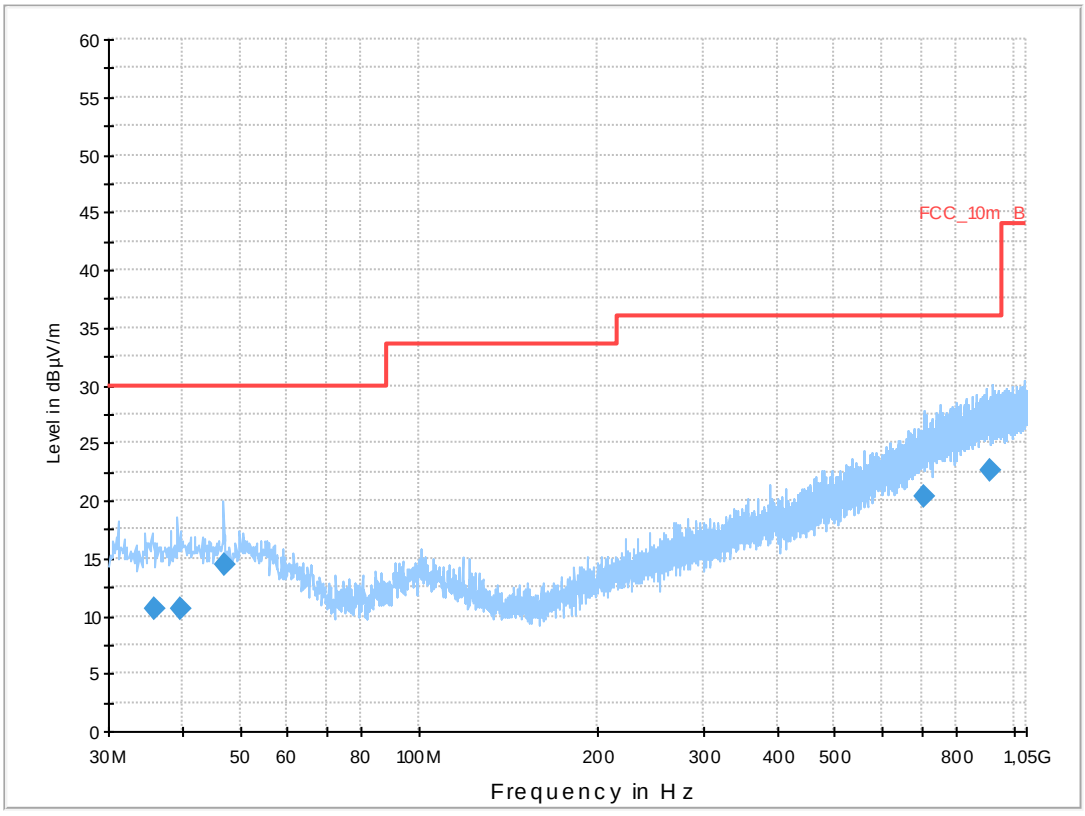
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan ac-mode (HT40) tx ch 159 |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

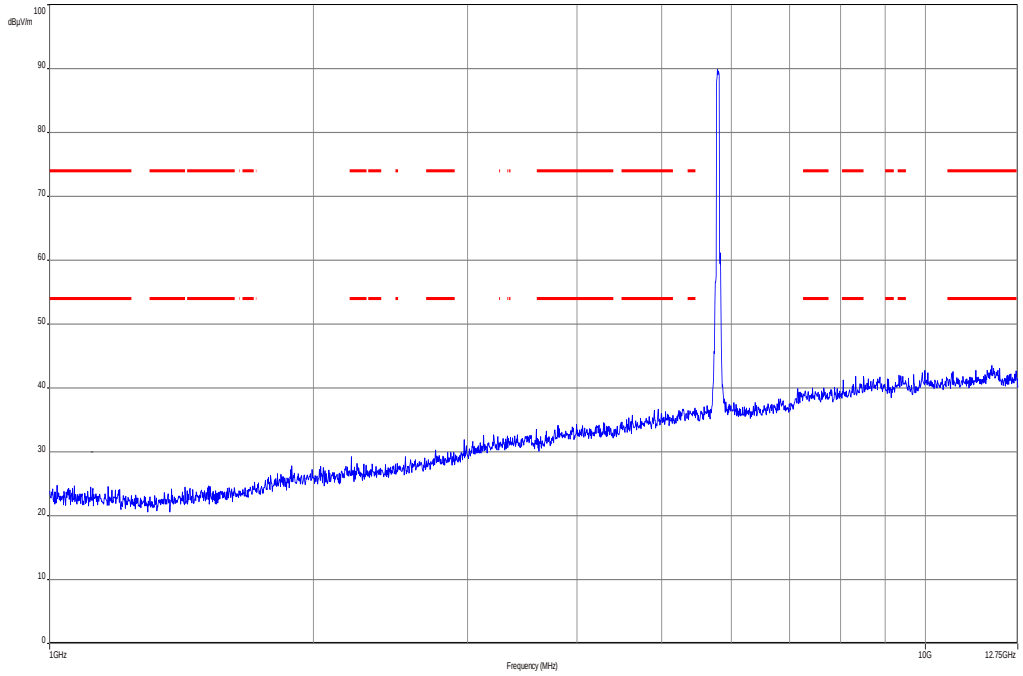
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



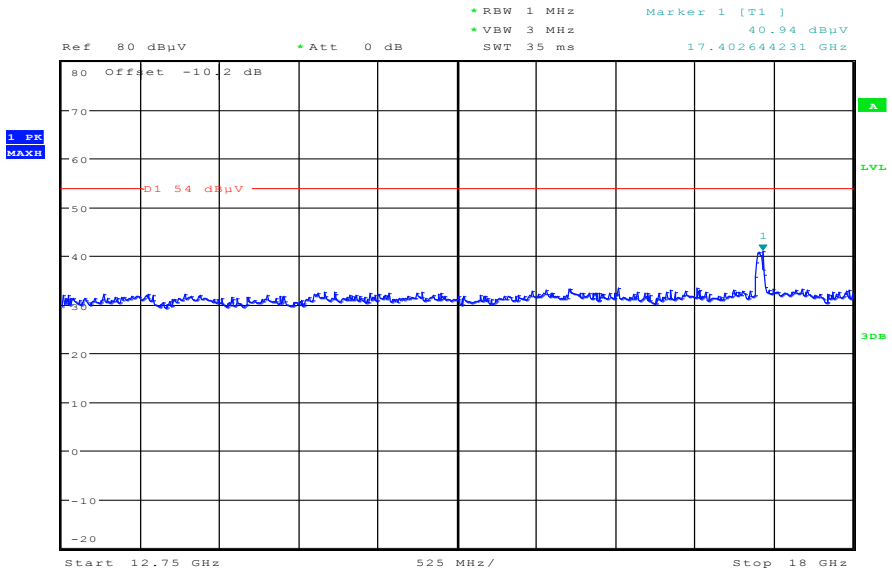

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 35.733000 | 10.7 | 1000.0 | 120.000 | 170.0 | H | 280.0 | 13.1 | 19.3 | 30.0 | |
| 39.669450 | 10.6 | 1000.0 | 120.000 | 98.0 | V | 265.0 | 13.4 | 19.4 | 30.0 | |
| 46.980750 | 14.5 | 1000.0 | 120.000 | 98.0 | V | 10.0 | 13.3 | 15.5 | 30.0 | |
| 707.749500 | 20.3 | 1000.0 | 120.000 | 170.0 | H | 171.0 | 22.7 | 15.7 | 36.0 | |
| 916.358850 | 22.6 | 1000.0 | 120.000 | 170.0 | V | 92.0 | 25.3 | 13.4 | 36.0 | |

**Plot 7:** Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization

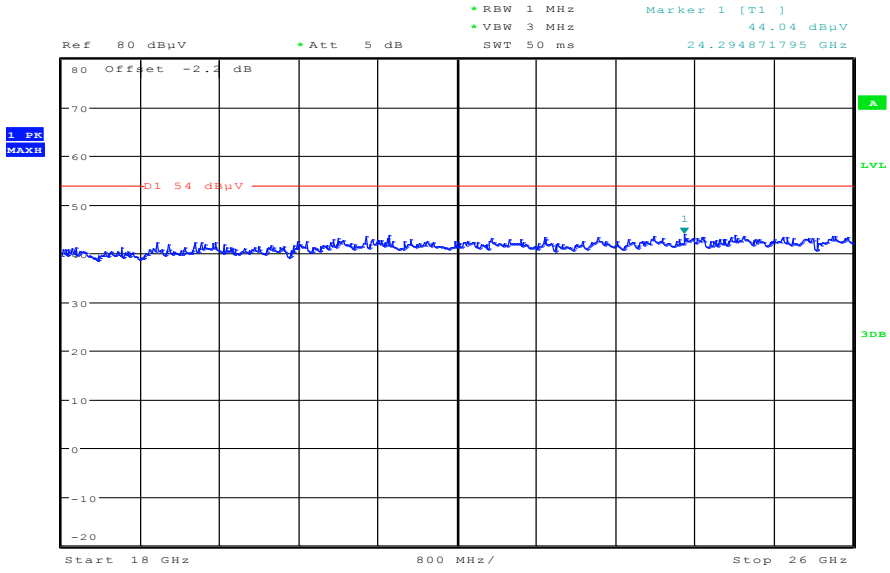



**Plot 8:** Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



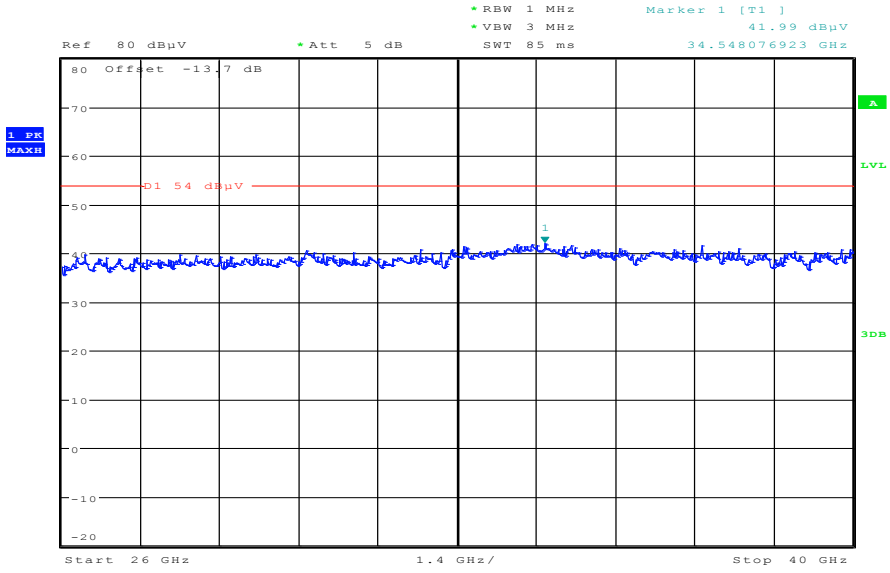

Date: 16.DEC.2013 15:25:22

**Plot 9:** Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:13:43

**Plot 10:** Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 16.DEC.2013 16:28:43

**Plots: OFDM / ac – mode HT80**

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

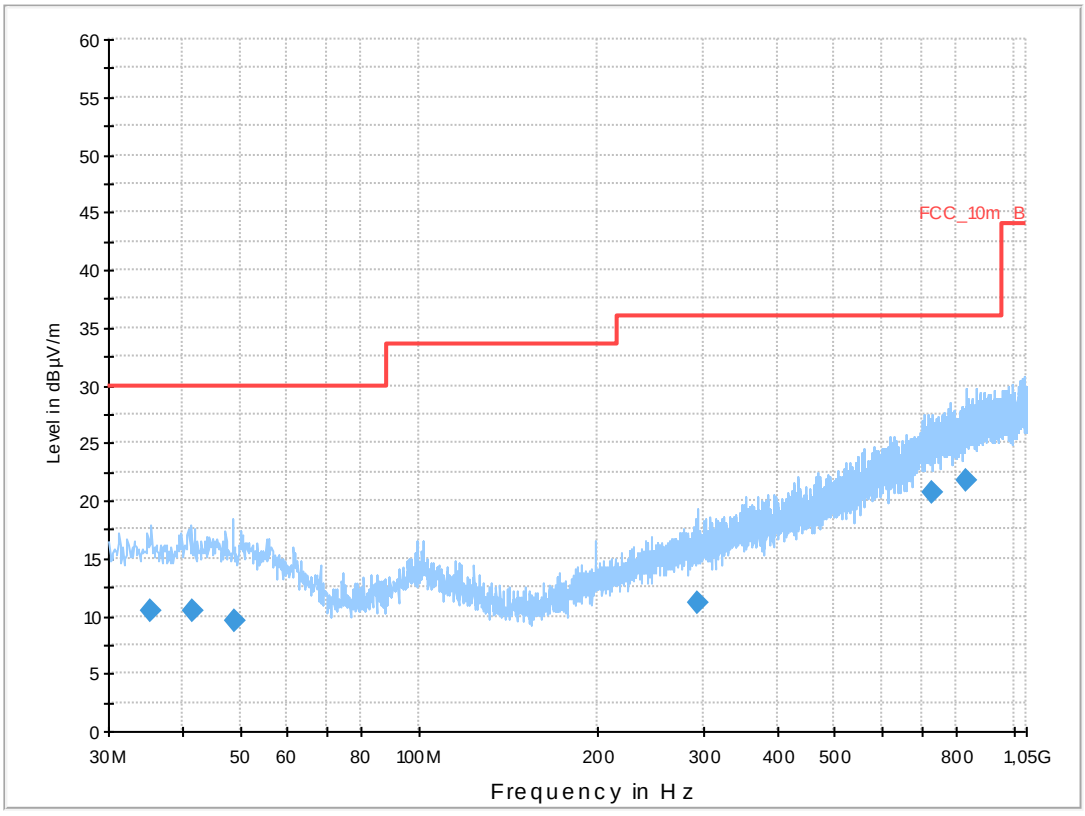
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPG |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan ac-mode (HT80) tx ch 155 |
| Operator Name: | Wolsdorfer |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

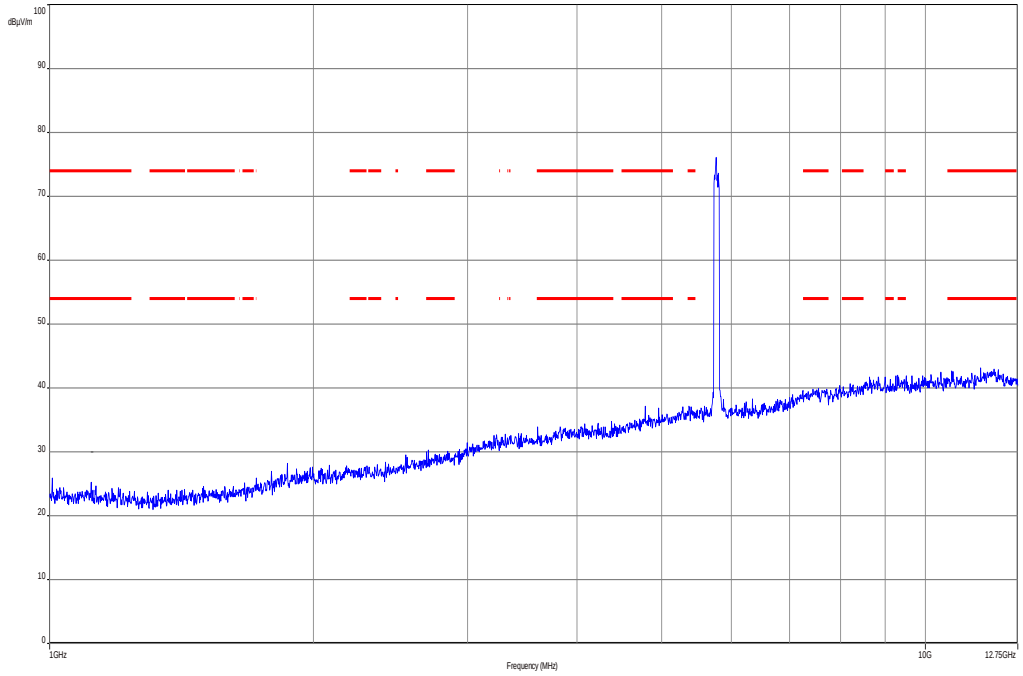
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



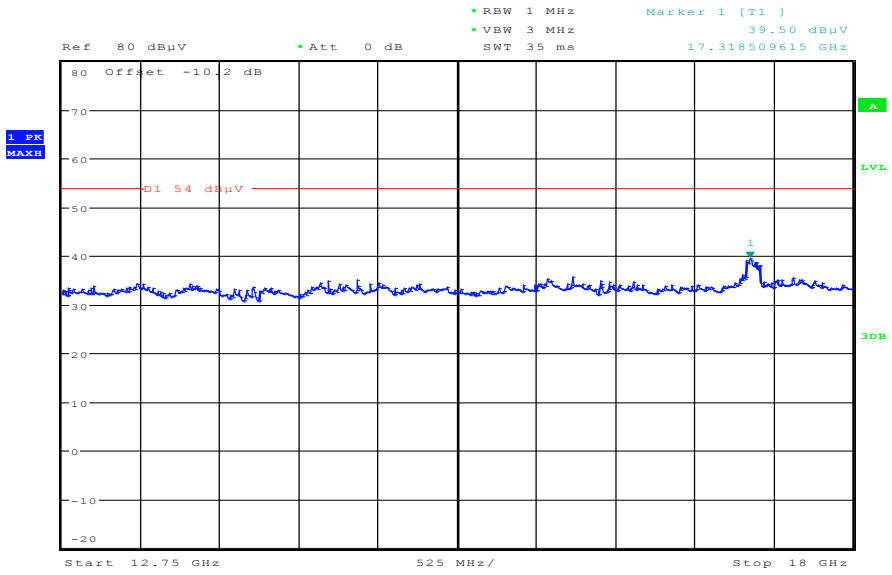

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 35.202900 | 10.4 | 1000.0 | 120.000 | 170.0 | V | 260.0 | 13.0 | 19.6 | 30.0 | |
| 41.533350 | 10.4 | 1000.0 | 120.000 | 170.0 | H | 190.0 | 13.4 | 19.6 | 30.0 | |
| 48.833550 | 9.6 | 1000.0 | 120.000 | 142.0 | V | 280.0 | 13.3 | 20.4 | 30.0 | |
| 293.284500 | 11.1 | 1000.0 | 120.000 | 141.0 | V | 100.0 | 14.4 | 24.9 | 36.0 | |
| 729.205050 | 20.7 | 1000.0 | 120.000 | 170.0 | V | 10.0 | 23.2 | 15.3 | 36.0 | |
| 829.315050 | 21.8 | 1000.0 | 120.000 | 111.0 | H | 85.0 | 24.2 | 14.2 | 36.0 | |

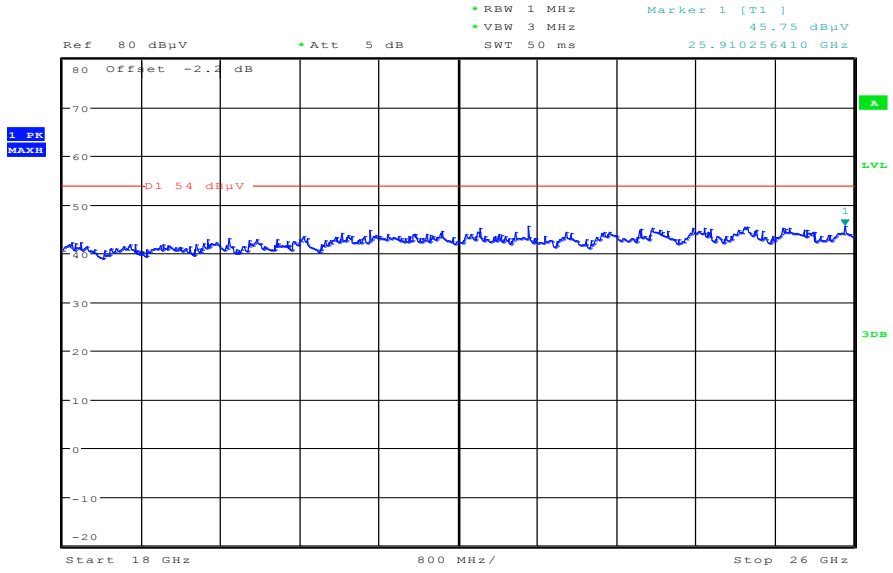
**Plot 2:** 1 GHz to 12.75 GHz, vertical & horizontal polarization




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

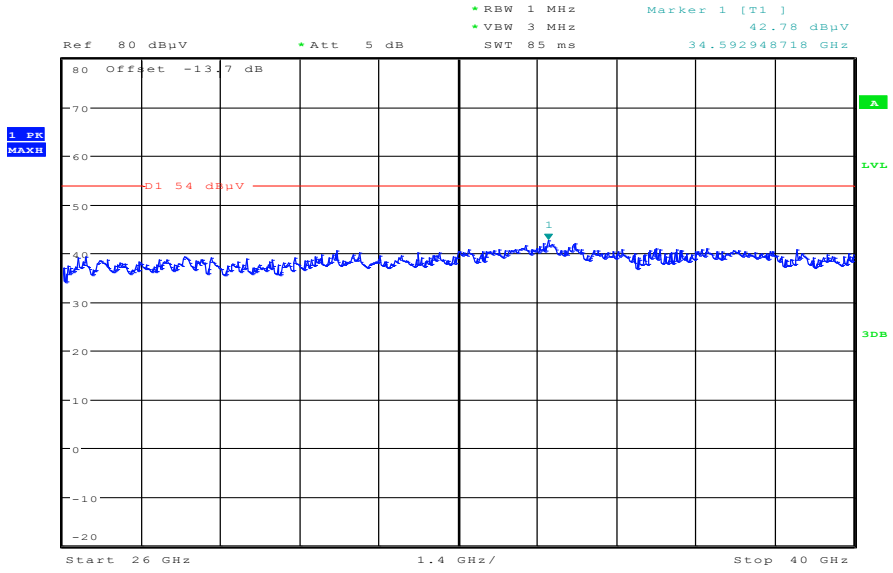


**Plot 4:** 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 21.DEC.2013 08:16:32

**Plot 5:** 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 21.DEC.2013 08:30:41

## 10.8 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 / RMS |
| Sweep time: | Auto |
| Resolution bandwidth: | F > 1 GHz: 1 MHz<br>F < 1 GHz: 100 kHz |
| Video bandwidth: | 3 x RBW<br>Remeasurement: 10 Hz / 3 MHz |
| Span: | 30 MHz to 25 GHz |
| Trace-Mode: | Max Hold |

**Limits:**

| FCC | -/- | |
|---|---|---|
| RX Spurious Emissions Radiated | | |
| 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:**

| RX Spurious Emissions Radiated [dBµV/m] | | |
|---|---|---|
| F [MHz] | Detector | Level [dBµV/m] |
| For emissions below 1 GHz, please take a look at the table below the 1 GHz plot. | | |
| All detected peaks are below the average limit! | | |
| | | |
| Measurement uncertainty | ± 3 dB | |

**Result:** **Passed.**

**Note:** The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

**Plots: RX / Idle – mode**

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

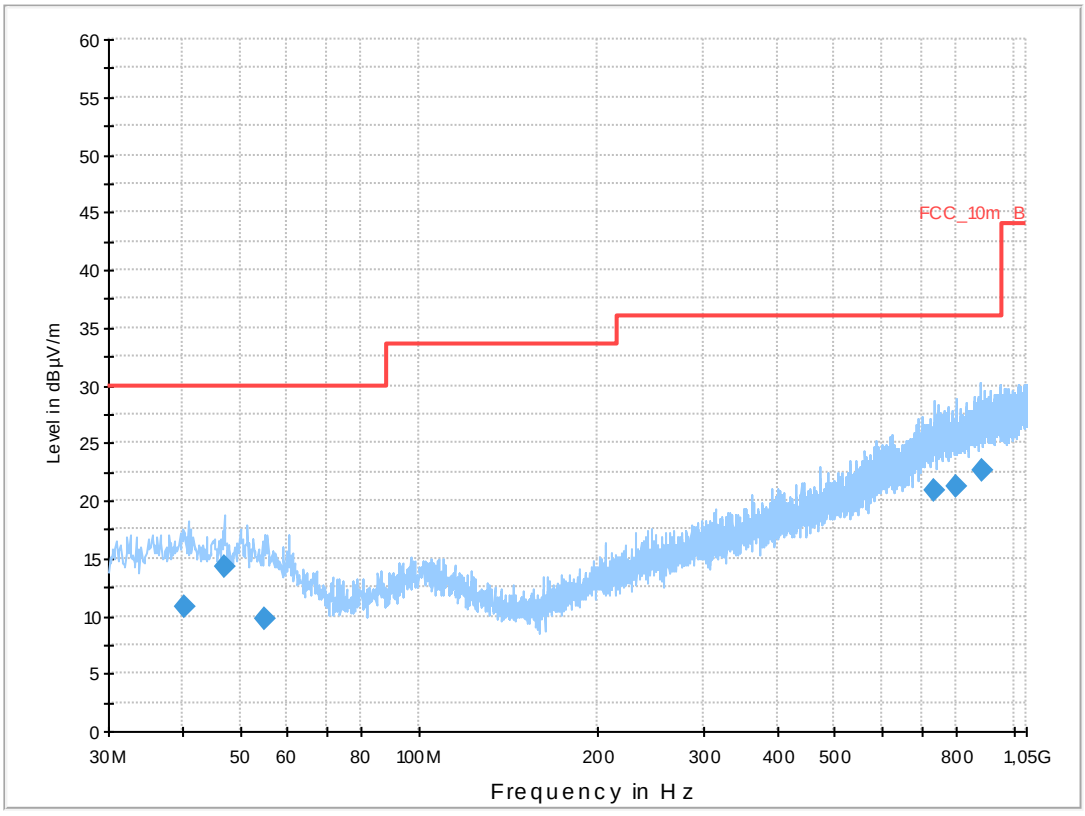
## Common Information

| | |
|---|---|
| EUT: | PM-0740-BV |
| Serial Number: | CB5A1W1HPS |
| Test Description: | FCC part 15 class B @ 10 m |
| Operating Conditions: | w-lan idle |
| Operator Name: | Hennemann |
| Comment: | battery powered |

## Scan Setup: STAN_Fin [EMI radiated]

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

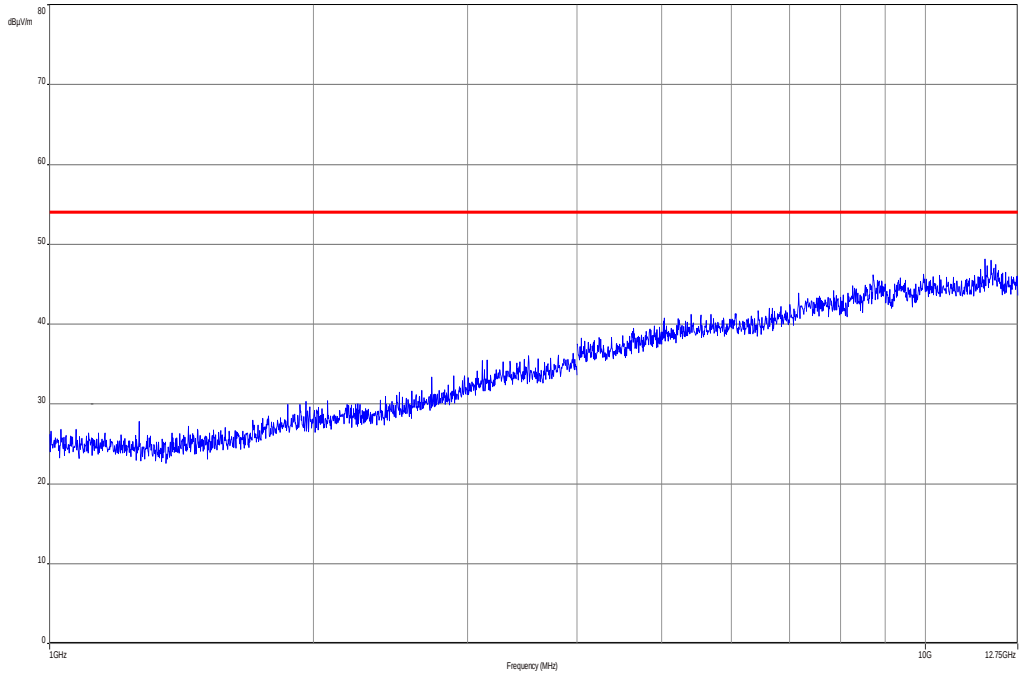
| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|---|---|---|---|---|---|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |



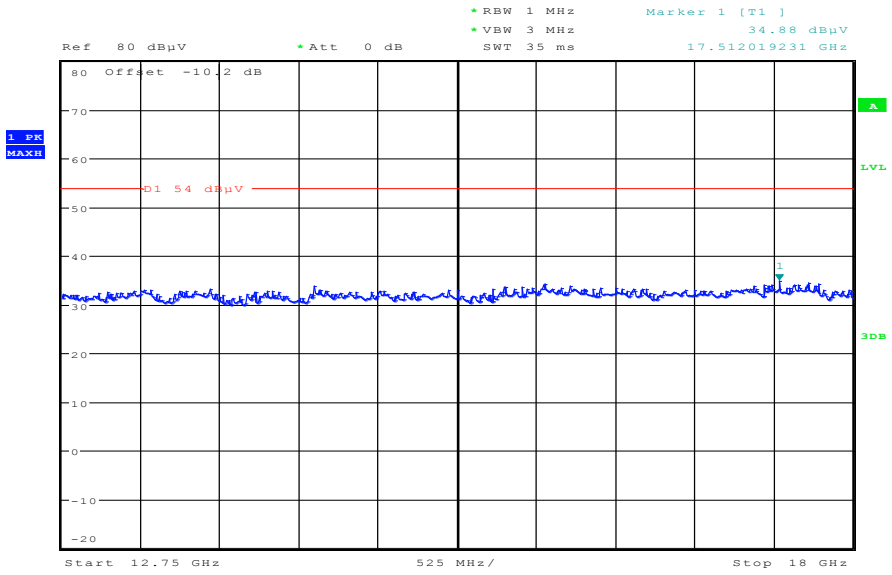

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 40.324200 | 10.8 | 1000.0 | 120.000 | 170.0 | H | 10.0 | 13.4 | 19.2 | 30.0 | |
| 46.969500 | 14.2 | 1000.0 | 120.000 | 98.0 | V | 190.0 | 13.3 | 15.8 | 30.0 | |
| 55.074450 | 9.8 | 1000.0 | 120.000 | 170.0 | V | -9.0 | 12.9 | 20.2 | 30.0 | |
| 734.392950 | 20.9 | 1000.0 | 120.000 | 111.0 | V | 280.0 | 23.3 | 15.1 | 36.0 | |
| 797.965200 | 21.2 | 1000.0 | 120.000 | 170.0 | H | -10.0 | 23.8 | 14.8 | 36.0 | |
| 881.866650 | 22.6 | 1000.0 | 120.000 | 104.0 | H | 10.0 | 25.0 | 13.4 | 36.0 | |

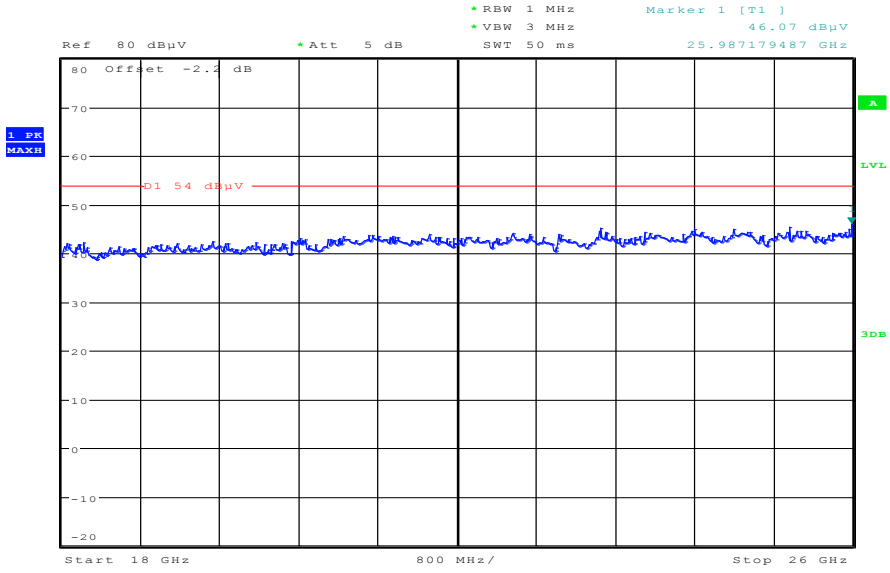
**Plot 2:** 1 GHz to 12.75 GHz, vertical & horizontal polarization




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

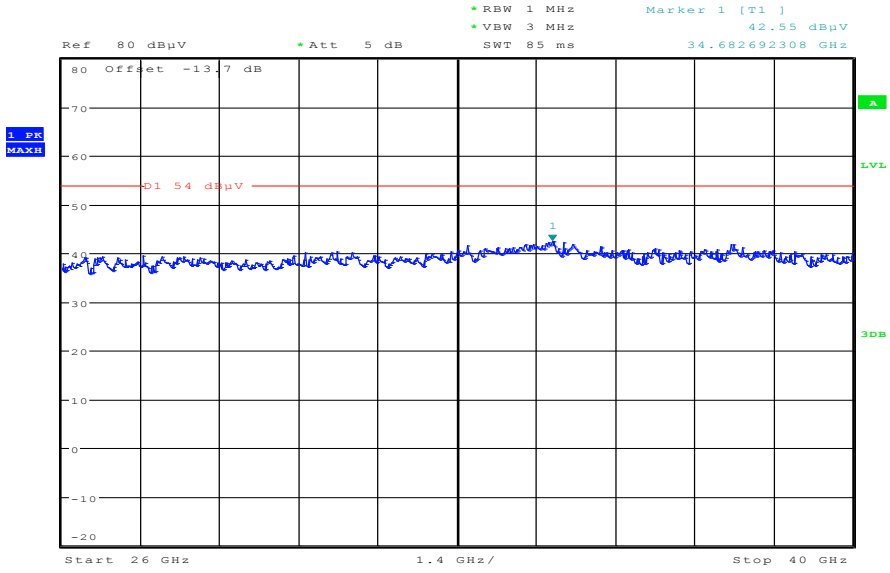


**Plot 4:** 18 GHz to 26 GHz, vertical & horizontal polarization




Date: 21.DEC.2013 08:37:11

**Plot 5:** 26 GHz to 40 GHz, vertical & horizontal polarization




Date: 21.DEC.2013 08:35:54

## 10.9 Spurious emissions radiated < 30 MHz

**Description:**

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to mid channel. This measurement is representative for all channels and modes. If peaks are found the lowest channel and the highest channel 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 | | -/- |
|---|---|---|
| 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 |

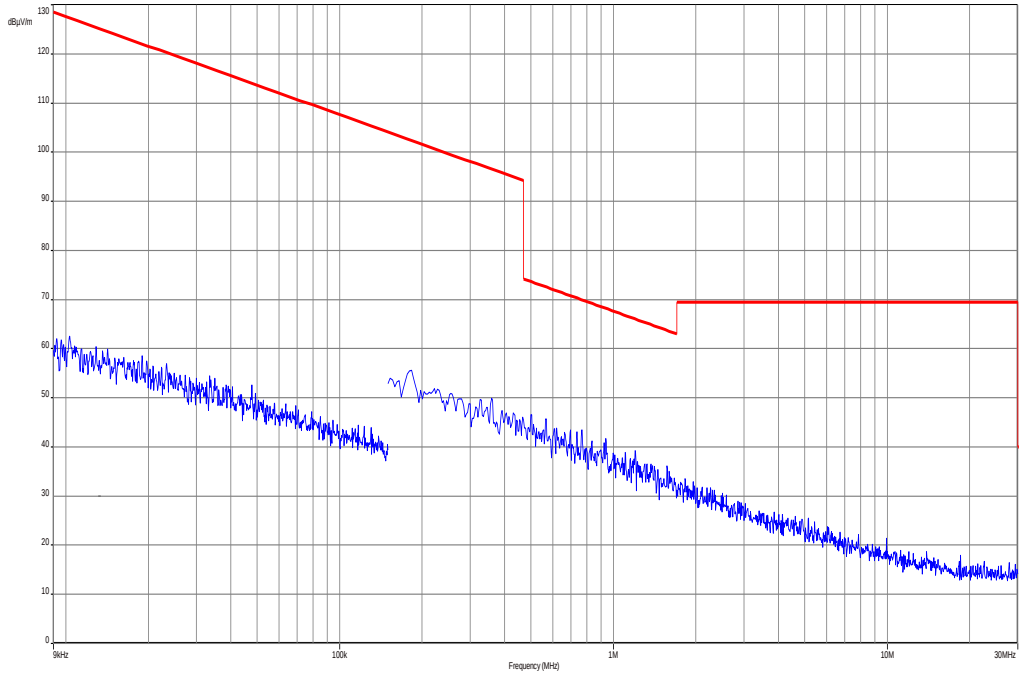
**Results:**

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

**Result:** Passed

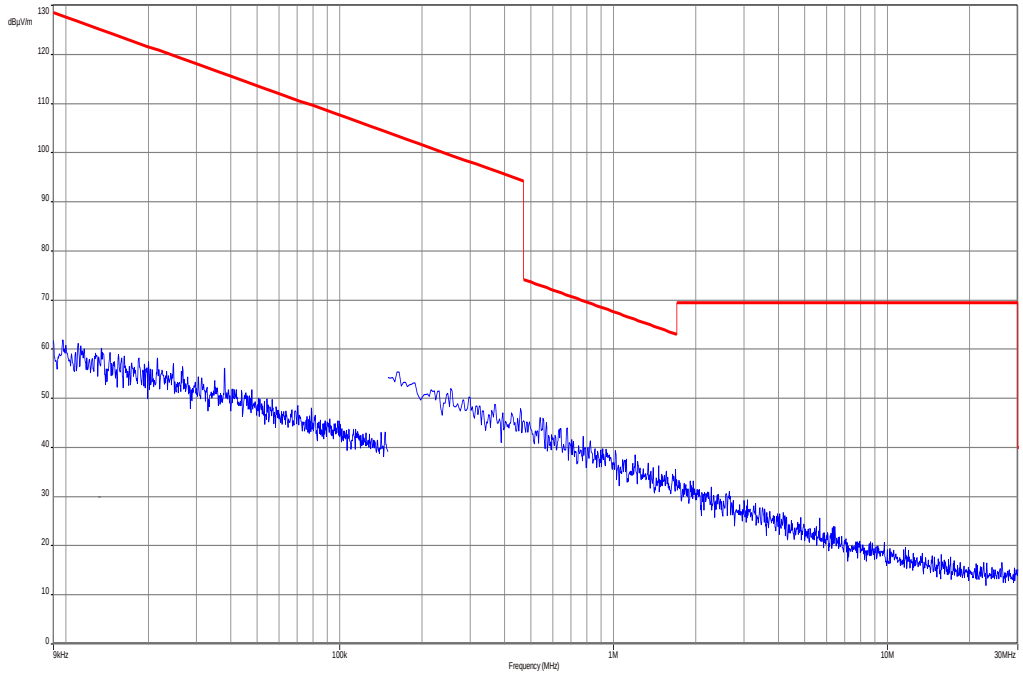
## Plots: TX mode

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




## Plots: RX / Idle – mode

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



## 10.10 Spurious emissions conducted < 30 MHz

**Description:**

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to mid channel. If peaks are found the lowest channel and the highest channel will be measured too. The measurement is performed with the data rate producing the highest output power. Both power lines, phase and neutral line, are measured. Found peaks are re-measured with average and quasi peak detection to show compliance to the limits.

**Measurement:**

| Measurement parameter | |
|---|---|
| Detector: | Peak - Quasi Peak / Average |
| 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 | -/- | |
|---|---|---|
| TX Spurious Emissions Conducted < 30 MHz | | |
| Frequency (MHz) | Quasi-Peak (dBµV/m) | Average (dBµV/m) |
| 0.15 – 0.5 | 66 to 56* | 56 to 46* |
| 0.5 – 5 | 56 | 46 |
| 5 – 30.0 | 60 | 50 |

*Decreases with the logarithm of the frequency

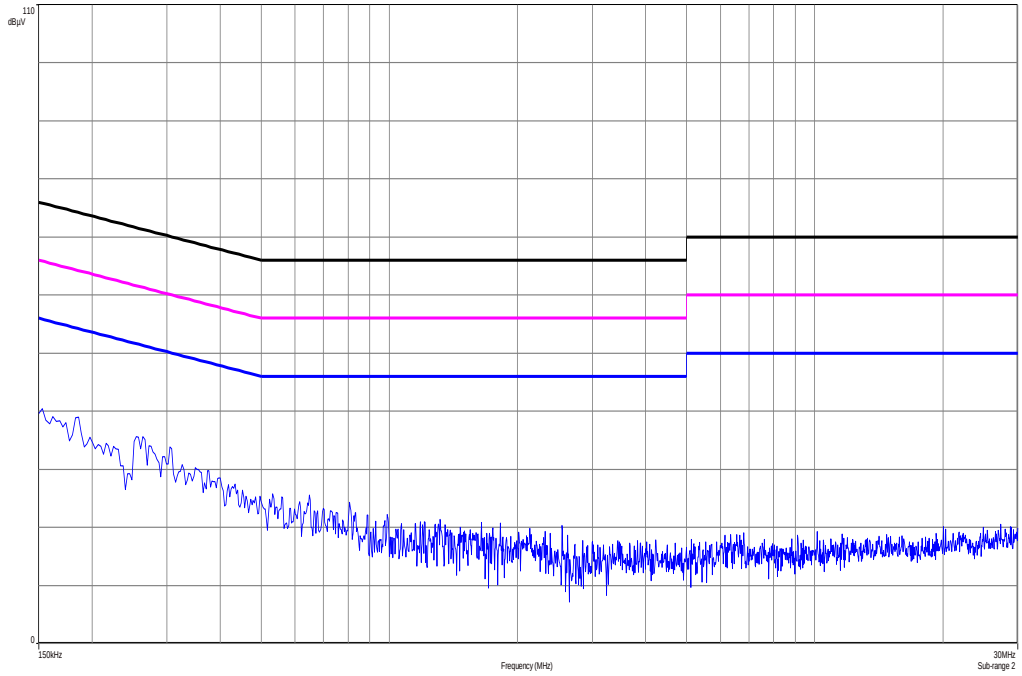
**Results:**

| TX Spurious Emissions Conducted < 30 MHz [dBµV/m] | | |
|---|---|---|
| F [MHz] | Detector | Level [dBµV/m] |
| No peaks detected. All detected peak values are below the average limits. | | |
| | | |
| Measurement uncertainty | ± 3 dB | |

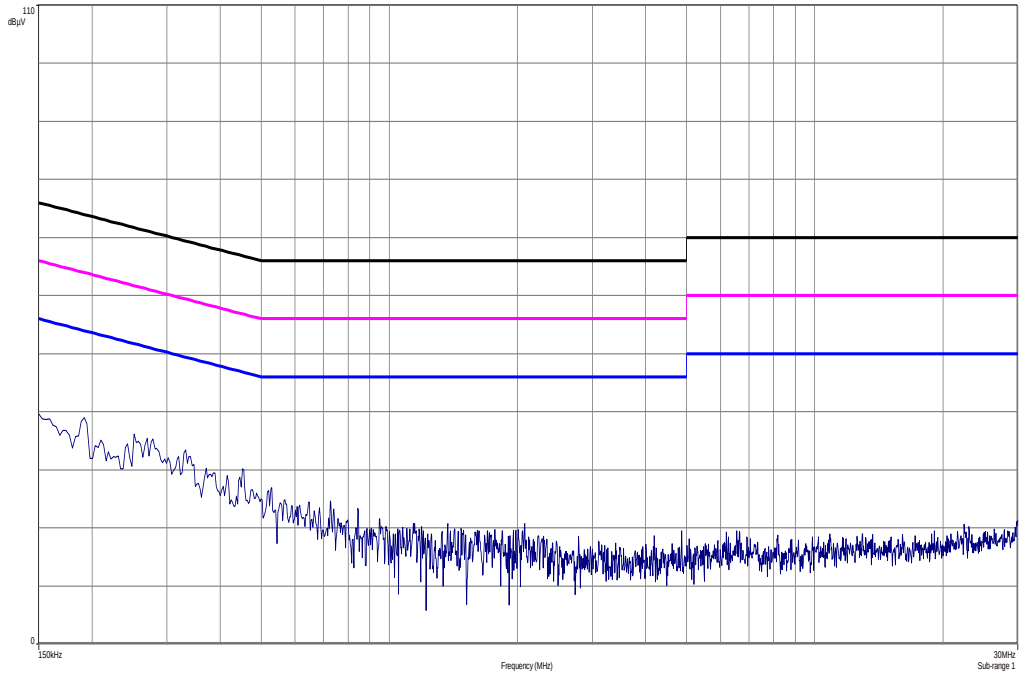
**Result:** **Passed**

**Plots:**

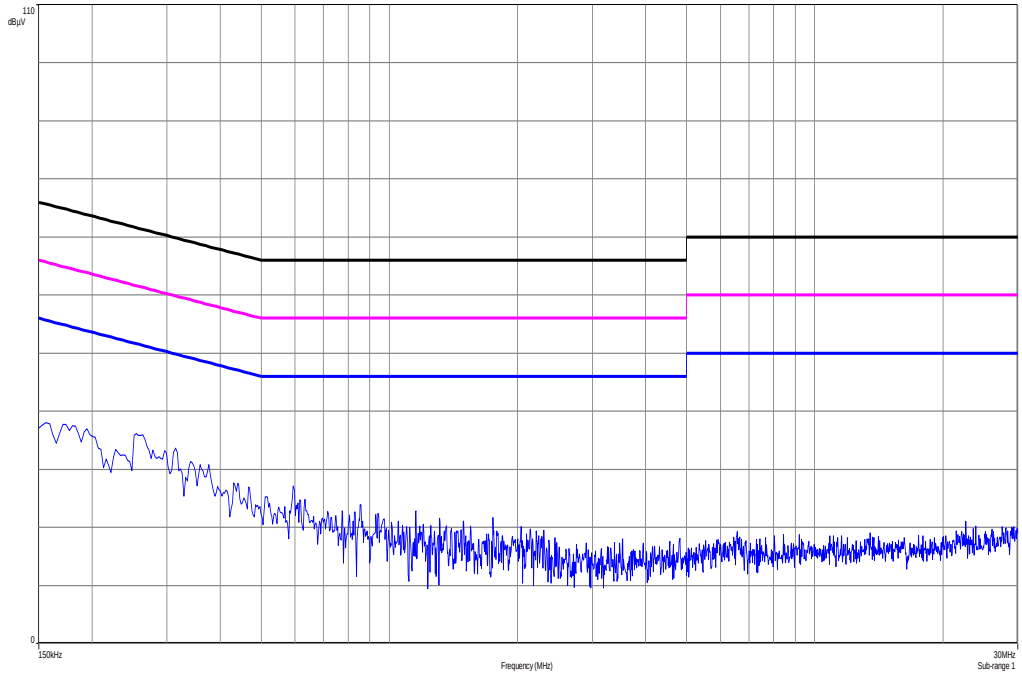
**Plot 1:** TX mode, 150 kHz to 30 MHz, phase line



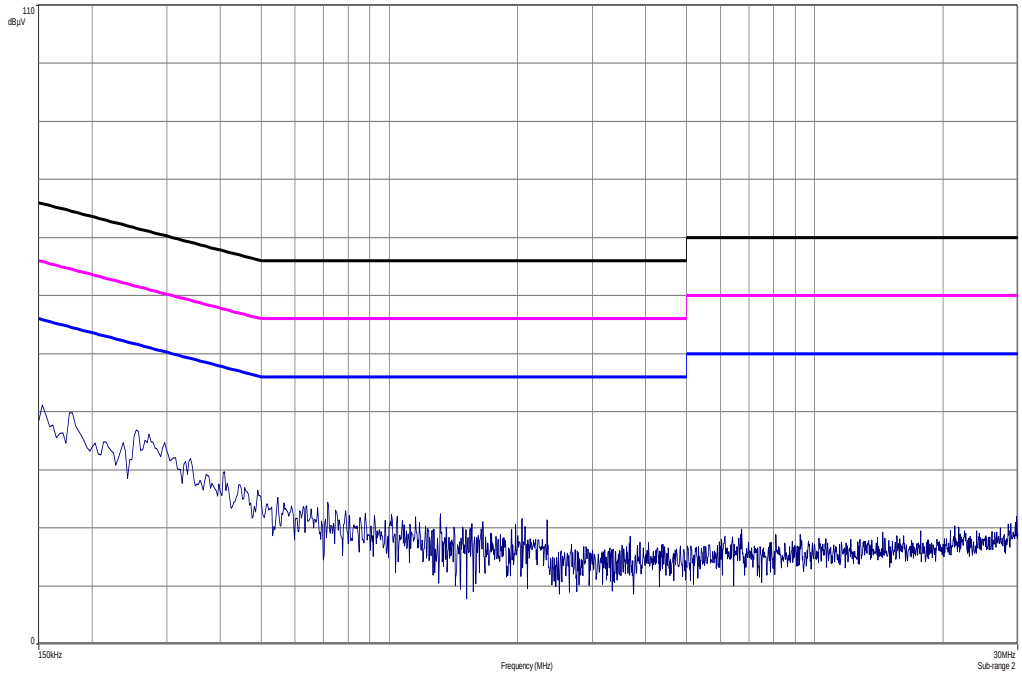

**Plot 2:** TX mode, 150 kHz to 30 MHz, neutral line



**Plot 3:** RX / Idle – mode, 150 kHz to 30 MHz, phase line




**Plot 4:** RX / Idle – mode, 150 kHz to 30 MHz, neutral line



## 11 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 | 45 | Switch-Unit | 3488A | HP Meßtechnik | 2719A14505 | 300000368 | g | | |
| 2 | 50 | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2920A04466 | 300000580 | ne | | |
| 3 | n. a. | software | SPS_PHE 1.4f | Spitzberger & Spieß | B5981; 5D1081;B5979 | 300000210 | ne | | |
| 4 | n. a. | EMI Test Receiver | ESCI 3 | R&S | 100083 | 300003312 | k | 09.01.2013 | 09.01.2014 |
| 5 | n. a. | Analyzer-Reference-System (Harmonics and Flicker) | ARS 16/1 | SPS | A3509 07/0 0205 | 300003314 | Ve | 14.07.2011 | 14.01.2014 |
| 6 | n. a. | Amplifier | JS42-00502650-28-5A | MITEQ | 1084532 | 300003379 | ev | | |
| 7 | n. a. | Antenna Tower | Model 2175 | ETS-LINDGREN | 64762 | 300003745 | izw | | |
| 8 | n. a. | Positioning Controller | Model 2090 | ETS-LINDGREN | 64672 | 300003746 | izw | | |
| 9 | n. a. | Turntable Interface-Box | Model 105637 | ETS-LINDGREN | 44583 | 300003747 | izw | | |
| 10 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 295 | 300003787 | k | 12.04.2012 | 12.04.2014 |
| 11 | n. a. | Spectrum-Analyzer | FSU26 | R&S | 200809 | 300003874 | k | 16.01.2013 | 16.01.2014 |
| 12 | n. a. | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2818A03450 | 300001040 | Ve | 12.01.2012 | 12.01.2015 |
| 13 | n. a. | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115 | EMCO | 8812-3088 | 300001032 | vIKI! | 08.05.2013 | 08.05.2015 |
| 14 | n. a. | Anechoic chamber | FAC 3/5m | MWB / TDK | 87400/02 | 300000996 | ev | | |
| 15 | n. a. | Switch / Control Unit | 3488A | HP Meßtechnik | * | 300000199 | ne | | |
| 16 | n. a. | Switch / Control Unit | 3488A | HP Meßtechnik | 2719A15013 | 300001156 | ne | | |
| 17 | 9 | Isolating Transformer | MPL IEC625 Bus Regeltrennt ravo | Erfi | 91350 | 300001155 | ne | | |
| 18 | n. a. | Three-Way Power Splitter, 50 Ohm | 11850C | HP Meßtechnik | | 300000997 | ne | | |
| 19 | 90 | Active Loop Antenna 10 kHz to 30 MHz | 6502 | Kontron Psychotech | 8905-2342 | 300000256 | k | 13.06.2013 | 13.06.2015 |
| 20 | n. a. | Amplifier | js42-00502650-28-5a | Parzich GMBH | 928979 | 300003143 | ne | | |
| 21 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 371 | 300003854 | vIKI! | 14.10.2011 | 14.10.2014 |
| 22 | n. a. | MXE EMI Receiver 20 Hz | N9038A | Agilent Technologi | MY51210197 | 300004405 | k | 21.02.2013 | 21.02.2014 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | bis 26,5 GHz | | es | | | | | |
| 23 | 11b | Microwave System Amplifier, 0.5-26.5 GHz | 83017A | HP Meßtechnik | 00419 | 300002268 | ev | | |
| 24 | A026 | Std. Gain Horn Antenna 12.4 to 18.0 GHz | 639 | Narda | 8402 | 300000787 | k | 22.07.2013 | 22.07.2015 |
| 25 | A029 | Std. Gain Horn Antenna 18.0 to 26.5 GHz | 638 | Narda | 8205 | 300002442 | k | 19.07.2013 | 19.07.2015 |
| 26 | A031 | Std. Gain Horn Antenna 26.5 to 40.0 GHz | 637 | Narda | GB42110541 | 300000510 | k | 19.07.2013 | 19.07.2015 |
| 27 | n. a. | Spectrum Analyzer 20 Hz - 50 GHz | FSU50 | R&S | 200012 | 300003443 | Ve | 09.10.2012 | 09.10.2014 |
| 28 | n. a. | Broadband Low Noise Amplifier 18-50 GHz | CBL18503 070-XX | CERNEX | 19338 | 300004273 | ne | | |
| 29 | n. a. | Signal Analyzer 40 GHz | FSV40 | R&S | 101042 | 300004517 | k | 22.10.2012 | 22.01.2014 |
| 30 | n. a. | Power Supply 0-20V, 0-5A | 6632B | Agilent Technologies | GB42110541 | 400000562 | vlKl! | 10.01.2013 | 10.01.2016 |

**Agenda:** Kind of Calibration

| | | | |
|---|---|---|---|
| k | calibration / calibrated | EK | limited calibration |
| ne | not required (k, ev, izw, zw not required) | zw | cyclical maintenance (external cyclical maintenance) |
| ev | periodic self verification | izw | internal cyclical maintenance |
| Ve | long-term stability recognized | g | blocked for accredited testing |
| vlkl! | Attention: extended calibration interval | | |
| NK! | Attention: not calibrated | *) | next calibration ordered / currently in progress |

## 12 Observations

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

## Annex A Document history

| Version | Applied changes | Date of release |
|---|---|---|
| | Initial release | 2014-01-18 |
| A | Canada removed | 2014-01-22 |

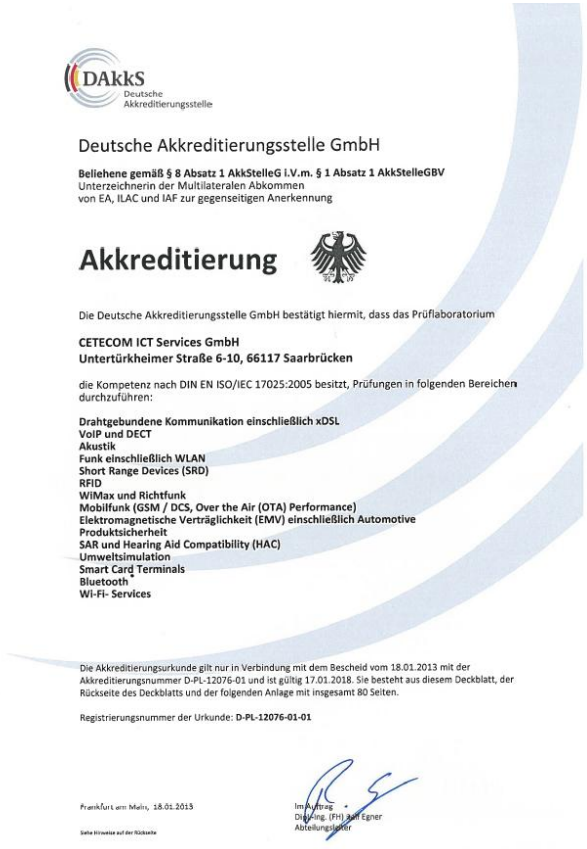
## Annex B Further information

**Glossary**

AVG - Average
DUT - Device under test
EMC - Electromagnetic Compatibility
EN - European Standard
EUT - Equipment under test
ETSI - European Telecommunications Standard Institute
FCC - Federal Communication Commission
FCC ID - Company Identifier at FCC
HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - Not applicable
PP - Positive peak
QP - Quasi peak
S/N - Serial number
SW - Software

## Annex C Accreditation Certificate

Front side of certificate



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**Short Range Devices (SRD)**
**RFID**
**WiMax und Richtfunk**
**Mobilfunk (GSM / DCS, Over the Air (OTA) Performance)**
**Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive**
**Produktsicherheit**
**SAR und Hearing Aid Compatibility (HAC)**
**Umweltsimulation**
**Smart Card Terminals**
**Bluetooth**
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