**CETECOM™****CETECOM ICT Services**  
consulting - testing - certification >>>

## TEST REPORT

Test report no.: 1-9849/15-01-04-A

Deutsche  
Akkreditierungsstelle  
D-PL-12076-01-00

### Testing laboratory

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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-12076-01-00

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### Manufacturer

**Swissphone Wireless AG**

Fälmisstrasse 21

8833 Samstagern / SWITZERLAND

### Test standard/s

CFR47 Part 90

Part 90 – Private land mobile radio services

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

### Test Item

**Kind of test item:** UHF Data Transceiver**Model name:** ITC 2100-NA 4H7**FCC ID:** L3M-ITC2100-4H7**Frequency:** 450 MHz – 512 MHz band  
(Lowest channel 453.03125 MHz; highest channel 511.975 MHz)**Technology tested:** Proprietary**Output:** External antenna connector type N**Power supply:** 115.0 V AC by main power supply**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:

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### Test performed:

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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.

**This test report replaces the test report with the number 1-9849/15-01-04 and dated 2015-09-08.**

### 2.2 Application details

|                                    |            |
|------------------------------------|------------|
| Date of receipt of order:          | 2015-06-30 |
| Date of receipt of test item:      | 2015-07-06 |
| Start of test:                     | 2015-07-06 |
| End of test:                       | 2015-08-19 |
| Person(s) present during the test: | -/-        |

## 3 Test standard/s

| Test standard | Date | Test standard description                    |
|---------------|------|----------------------------------------------|
| CFR47 Part 90 | -/-  | Part 90 – Private land mobile radio services |

### 3.1 Measurement guidance

| Guidance        | Version | Description                                                                                                                                                         |
|-----------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KDB 971168 D01  | v02r02  | Measurement guidance for certification of licensed digital transmitters                                                                                             |
| ANSI C63.4-2014 | -/-     | American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz |

#### 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: |           | 56 %                                  |
| Barometric pressure:       |           | not relevant for this kind of testing |
| Power supply:              | $V_{nom}$ | 115.0 V AC by main power supply       |
|                            | $V_{max}$ | 126.5 V                               |
|                            | $V_{min}$ | 103.5 V                               |

#### 5 Test item

|                     |   |                                                                                       |
|---------------------|---|---------------------------------------------------------------------------------------|
| Kind of test item   | : | UHF Data Transceiver                                                                  |
| Type identification | : | ITC 2100 NA-4H7                                                                       |
| S/N serial number   | : | C201515.00414                                                                         |
| HW hardware status  | : | No information available                                                              |
| SW software status  | : | No information available                                                              |
| Frequency band      | : | 450 MHz – 512 MHz band<br>(Lowest channel 453.03125 MHz; highest channel 511.975 MHz) |
| Type of modulation  | : | FSK                                                                                   |
| Channel bandwidth   | : | 12.5 kHz                                                                              |
| Output              | : | External antenna connector type N                                                     |
| Power supply        | : | 115.0 V AC by main power supply                                                       |
| Temperature range   | : | -20°C to +55°C                                                                        |

##### 5.1 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report: 1-9849/15-01-07\_AnnexA  
1-9849/15-01-07\_AnnexB  
1-9849/15-01-07\_AnnexC

#### 6 Test laboratories sub-contracted

None

## 7 Additional comments

Reference documents: Statement One Way Paging.pdf

Special test descriptions: None

Configuration descriptions: None

## 8 Description of the test setup

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 analysers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

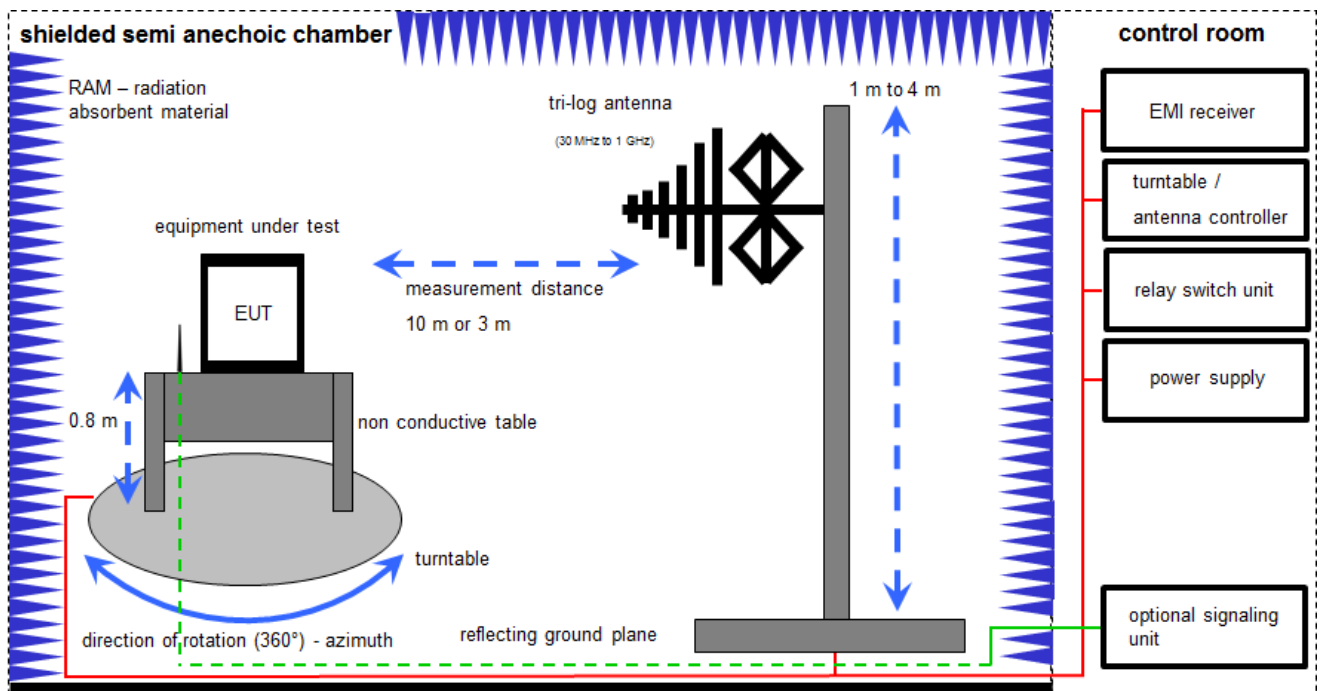
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

**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                       |
| v/k! | Attention: extended calibration interval   |     |                                                      |
| NK!  | Attention: not calibrated                  | *)  | next calibration ordered / currently in progress     |

## 8.1 Shielded semi anechoic chamber

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 C63.4. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4.



$$SS = U_R + CL + AF$$

(SS-signal strength;  $U_R$ -voltage at the receiver; CL-loss of the cable; AF-antenna factor)

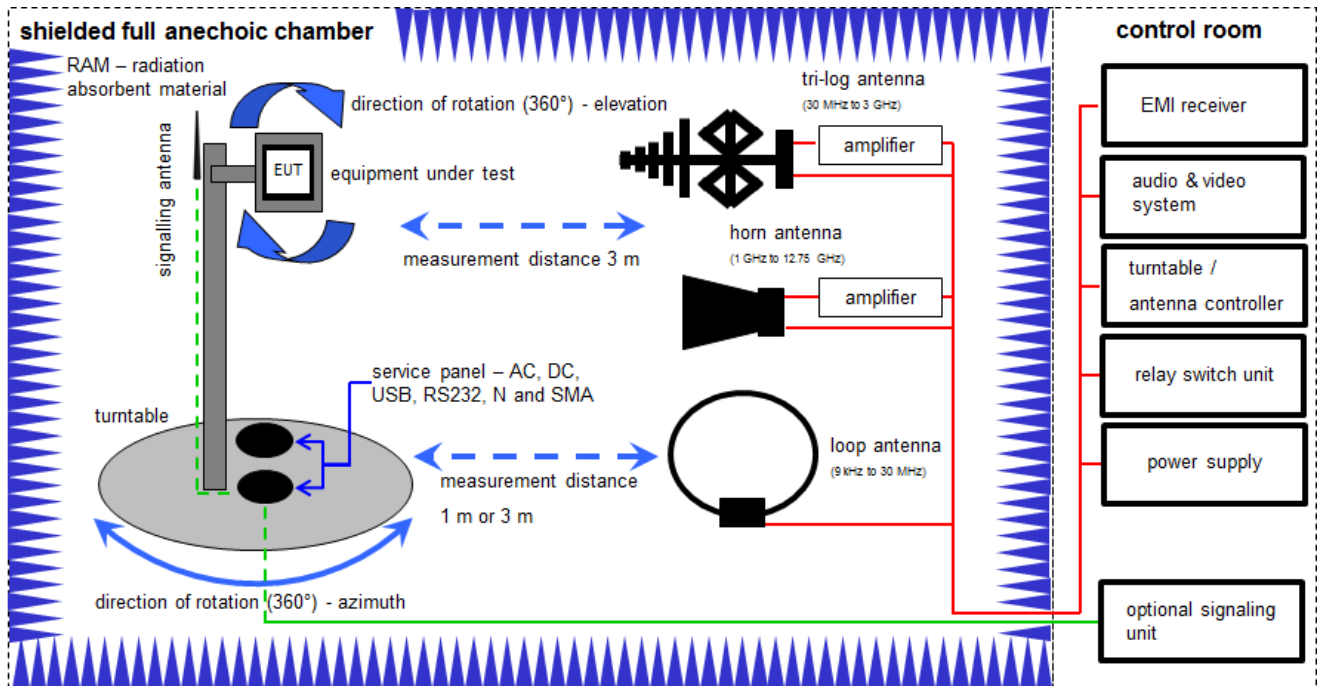
### Example calculation:

$$SS \text{ [dB}\mu\text{V/m]} = 12.35 \text{ [dB}\mu\text{V/m]} + 1.90 \text{ [dB]} + 16.80 \text{ [dB}\mu\text{V/m]} = 31.05 \text{ [dB}\mu\text{V/m]} \text{ (35.69 } \mu\text{V/m)}$$

### Used equipment:

| No. | Lab / Item | Equipment                                    | Type                           | Manufact.    | Serial No. | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|----------------------------------------------|--------------------------------|--------------|------------|-----------------|---------------------|------------------|------------------|
| 1   | A          | Switch-Unit                                  | 3488A                          | HP           | 2719A14505 | 300000368       | ev                  | -/-              | -/-              |
| 2   | A          | Isolating Transformer                        | MPL IEC625 Bus Regeltrenntravo | Erfi         | 91350      | 300001155       | ne                  | -/-              | -/-              |
| 3   | A          | EMI Test Receiver                            | ESCI 3                         | R&S          | 100083     | 300003312       | k                   | 26.01.2015       | 26.01.2016       |
| 4   | A          | Antenna Tower                                | Model 2175                     | ETS-Lindgren | 64762      | 300003745       | izw                 | 30.01.2014       | 30.01.2016       |
| 5   | A          | Positioning Controller                       | Model 2090                     | ETS-Lindgren | 64672      | 300003746       | izw                 | 29.01.2015       | 29.01.2017       |
| 6   | A          | Turntable Interface-Box                      | Model 105637                   | ETS-Lindgren | 44583      | 300003747       | izw                 | 26.08.2014       | 26.08.2016       |
| 7   | A          | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163                       | Schwarzbeck  | 295        | 300003787       | k                   | 22.04.2014       | 22.04.2016       |

## 8.2 Shielded fully anechoic chamber



### Field strength measurements:

$$SS = U_R + CA + AF$$

(SS-signal strength;  $U_R$ -voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

### Example calculation:

$$SS \text{ [dB}\mu\text{V/m]} = 40.0 \text{ [dB}\mu\text{V/m]} + (-35.8) \text{ [dB]} + 32.9 \text{ [dB}\mu\text{V/m]} = 37.1 \text{ [dB}\mu\text{V/m]} (71.61 \mu\text{V/m})$$

### Substitution measurements:

$$SP = P_R + CA$$

(SP-signal power;  $P_R$ -Power at the receiver; CA-loss of the signal path)

### Example calculation:

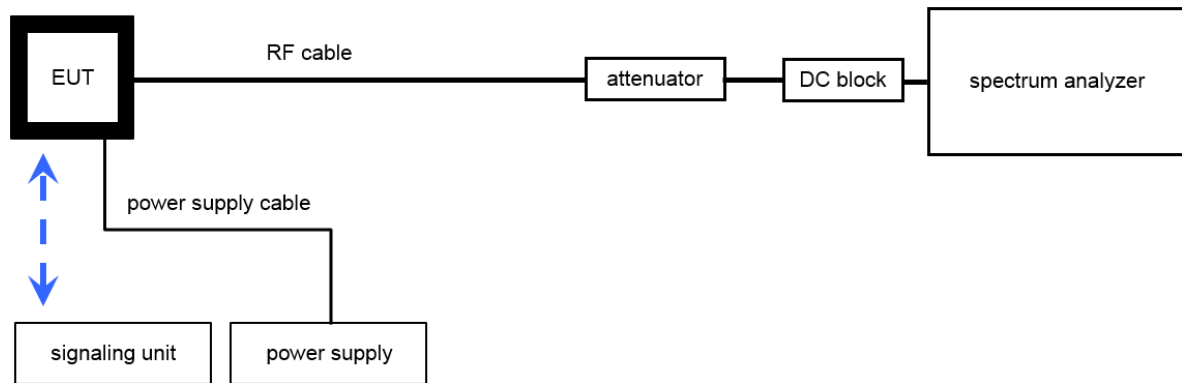
$$SP \text{ [dBm]} = -40.0 \text{ [dB}\mu\text{V/m]} + (4.6) \text{ [dB]} = -35.4 \text{ [dBm]} (2.9 \mu\text{W})$$

### Used equipment:

| No. | Lab / Item | Equipment                                      | Type                | Manufact.            | Serial No. | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|------------------------------------------------|---------------------|----------------------|------------|-----------------|---------------------|------------------|------------------|
| 1   | A          | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115                | EMCO                 | 8812-3088  | 300001032       | vIKI!               | 20.05.2015       | 20.05.2017       |
| 2   | A, B       | Anechoic chamber                               | FAC 3/5m            | MWB / TDK            | 87400/02   | 300000996       | ev                  | -/-              | -/-              |
| 3   | A, B       | Switch / Control Unit                          | 3488A               | HP                   | *          | 300000199       | ne                  | -/-              | -/-              |
| 4   | B          | Active Loop Antenna 10 kHz to 30 MHz           | 6502                | Kontron Psychotech   | 8905-2342  | 300000256       | k                   | 24.06.2015       | 24.06.2017       |
| 5   | A, B       | Amplifier                                      | js42-00502650-28-5a | Parzich GMBH         | 928979     | 300003143       | ne                  | -/-              | -/-              |
| 6   | A          | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz   | VULB9163            | Schwarzbeck          | 371        | 300003854       | vIKI!               | 29.10.2014       | 29.10.2017       |
| 7   | A, B       | MXE EMI Receiver 20 Hz to 26,5 GHz             | N9038A              | Agilent Technologies | MY51210197 | 300004405       | k                   | 06.03.2015       | 06.03.2016       |
| 8   | A, B       | 4U RF Switch Platform                          | L4491A              | Agilent Technologies | MY50000037 | 300004509       | ne                  | -/-              | -/-              |
| 9   | A, B       | Fixed Coaxial Attenuator, 40dB 100W DC-18GHz   | WA91-20-43          | Weinschel Ass        | A514       | 300004824       | ev                  | -/-              | -/-              |

### 8.3 Conducted measurements

#### Conducted measurements normal conditions



$$OP = AV + CA$$

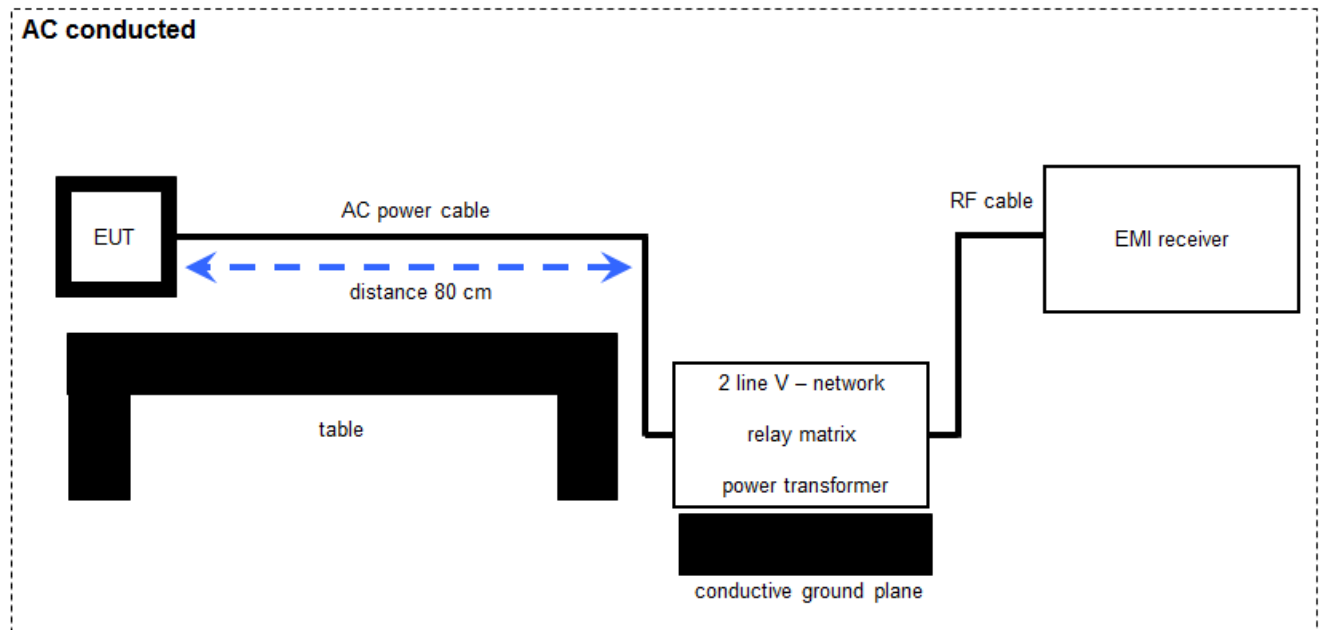
(OP-output power; AV-analyzer value; CA-loss signal path)

#### Example calculation:

$$OP \text{ [dBm]} = 6.0 \text{ [dBm]} + (11.7) \text{ [dB]} = 17.7 \text{ [dBm]} (58.88 \text{ mW})$$

#### Equipment table:

| No. | Lab / Item | Equipment                                    | Type              | Manufact.      | Serial No.       | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|----------------------------------------------|-------------------|----------------|------------------|-----------------|---------------------|------------------|------------------|
| 1   | B          | Signal Analyzer 40 GHz                       | FSV40             | R&S            | 101042           | 300004517       | k                   | 22.01.2015       | 22.01.2016       |
| 2   | A, B       | Fixed Coaxial Attenuator, 40dB 100W DC-18GHz | WA91-20-43        | Weinschel Ass  | A514             | 300004824       | ev                  | -/-              | -/-              |
| 3   | A, B       | RF-Cable                                     | ST18/SMAM/SMAM/60 | Huber & Suhner | Batch no. 606844 | 400001181       | ev                  | -/-              | -/-              |
| 4   | A, B       | DC-Blocker 0.1-40 GHz                        | 8141A             | Inmet          | Batch no. 127377 | 400001185       | ev                  | -/-              | -/-              |
| 5   | A          | Spectrum Analyzer 9kHz to 30 GHz             | FSP30             | R&S            | 700886           | 300003575       | k                   | 26.08.2014       | 26.08.2016       |

**8.4 AC conducted**

$$SS = UR + CF + VC$$

(SS-signal strength; UR-voltage at the receiver; CR-loss of the cable and filter; VC-correction factor of the ISN)

Example calculation:

$$SS \text{ [dB}\mu\text{V/m]} = 37.62 \text{ [dB}\mu\text{V/m]} + 9.90 \text{ [dB]} + 0.23 \text{ [dB]} = 47.75 \text{ [dB}\mu\text{V/m]} \text{ (244.06 } \mu\text{V/m)}$$

Used equipment:

| No. | Lab / Item | Equipment                                    | Type       | Manufact.     | Serial No. | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|----------------------------------------------|------------|---------------|------------|-----------------|---------------------|------------------|------------------|
| 1   | A          | Netznachbildung                              | ESH3-Z5    | R&S           | 892475/017 | 300002209       | k                   | 17.06.2014       | 17.06.2016       |
| 2   | A          | RF-Filter-section                            | 85420E     | HP            | 3427A00162 | 300002214       | k                   | 27.11.2006       |                  |
| 3   | A          | EMI-Receiver                                 | 8542E      | HP            | 3617A00170 | 300000568       | k                   | 28.01.2015       | 28.01.2016       |
| 4   | A          | Fixed Coaxial Attenuator, 40dB 100W DC-18GHz | WA91-20-43 | Weinschel Ass | A514       | 300004824       | ev                  | -/-              | -/-              |

**9 Measurement uncertainty**

| Measurement uncertainty                                  |                                          |
|----------------------------------------------------------|------------------------------------------|
| Maximum output power                                     | ± 1 dB                                   |
| Audio frequency filter response                          | ± 1 dB                                   |
| Transmitter modulation limiting                          | ± 2 dB                                   |
| Spectrum efficiency                                      | ± 1 dB                                   |
| Occupied bandwidth                                       | ± 21.5 kHz absolute; ± 15.0 kHz relative |
| Frequency stability                                      | ± 30 Hz                                  |
| Spurious emissions conducted                             | ± 3 dB                                   |
| Spurious emissions radiated below 30 MHz                 | ± 3 dB                                   |
| Spurious emissions radiated 30 MHz to 1 GHz              | ± 3 dB                                   |
| Spurious emissions radiated 1 GHz to 12.75 GHz           | ± 3 dB                                   |
| Spurious emissions conducted below 30 MHz (AC conducted) | ± 2.6 dB                                 |

## 10 Sequence of testing

### 10.1 Sequence of testing 9 kHz to 30 MHz

#### Setup

- The Equipment was setup to simulate a typical usage like described in the user manual / or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter (see ANSI C 63.4) – see each test details
- The EUT was set into operation.

#### Pre measurement

- The turntable rotates from 0° to 315° with 45° steps.
- The antenna height is 1.5 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

#### Final measurement

- According to the maximum found antenna polarization and turntable position of the premeasurement the software maximizes the peaks by rotating the turntable position (0° to 360°).
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with QPK (QPK / see ANSI C 63.4) detector
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit, and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.
- The calculation of the results is appropriate to the descriptions in sub clause 10 using the appropriate correction factors for the measured frequency range.

## 10.2 Sequence of testing 30 MHz to 1 GHz

### Setup

- The Equipment was setup to simulate a typical usage like described in the user manual / or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 10 or 3 meter (see ANSI C 63.4) – see each test details
- The EUT was set into operation.

### Pre measurement

- The turntable rotates from 0° to 315° with 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions

### Final measurement

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP (Quasi-Peak / see ANSI C 63.4) detector
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit, and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

### 10.3 Sequence of testing 1 GHz to 12.75 GHz

#### Setup

- The Equipment was setup to simulate a typical usage like described in the user manual / or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter (see ANSI C 63.4) – see each test details
- The EUT was set into operation.

#### Pre measurement

- The turntable rotates from 0° to 315° with 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions

#### Final measurement

- The final measurement will be performed with minimum the six highest peaks according the requirements of the ANSI C63.4.
- According to the maximum found antenna polarization and turntable position of the premeasurement the software maximizes the peaks by rotating the turntable position (0° to 360°). This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps). This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with RMS (RMS / see ANSI C 63.4) detector
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit, and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.
- The calculation of the results is appropriate to the descriptions in sub clause 10 using the appropriate correction factors for the measured frequency range.

## 11 Summary of measurement results

|                                     |                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | No deviations from the technical specifications were ascertained                                                         |
| <input type="checkbox"/>            | There were deviations from the technical specifications ascertained                                                      |
| <input type="checkbox"/>            | This test report is only a partial test report.<br>The content and verdict of the performed test cases are listed below. |

| TC Identifier | Description                       | Verdict   | Date       | Remark |
|---------------|-----------------------------------|-----------|------------|--------|
| RF-Testing    | 47 CFR Part 2<br>47 CFR Part 90 C | See table | 2015-10-27 | -/-    |

| Test Specification Clause                                     | Test Case                                 | Temperature Conditions | Power Source Voltages | C                                   | NC                       | NA                                  | NP                       | Remark              |
|---------------------------------------------------------------|-------------------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|---------------------|
| FCC 47 CFR<br>§ 2.1046<br>§ 90.205                            | Transmitter output power                  | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |
| FCC 47 CFR<br>§ 90.203 (j)(3)/(7)                             | Spectrum efficiency                       | Nominal                | Nominal               | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | One way transmitter |
| FCC 47 CFR<br>§ 2.1049 (c)<br>§ 90.209 (b)(5)<br>§ 90.210 (d) | Occupied bandwidth /<br>Spectrum Mask     | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |
| FCC 47 CFR<br>§ 90.214                                        | Transient frequency behaviour             | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |
| FCC 47 CFR<br>§ 2.1055 (a)(1)<br>§ 90.213                     | Frequency stability                       | Nominal                | Extreme               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |
|                                                               |                                           | Extreme                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                     |
| FCC 47 CFR<br>§ 2.1051<br>§ 90.210                            | Transmitter spurious emissions conducted  | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |
| FCC 47 CFR<br>§ 2.1051<br>§ 90.210                            | Transmitter spurious emissions (radiated) | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |
| FCC 47 CFR<br>§ 15.209                                        | Receiver spurious emissions (radiated)    | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |
| §15.107(a)<br>§15.207                                         | Conducted emissions < 30 MHz              | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | -/-                 |

**Note:** C = compliant; NC = Not compliant; NA = Not applicable; NP = Not performed

## 12 Measurement results

### 12.1 Transmitter output power

#### Measurement:

| Measurement parameter                          |                      |
|------------------------------------------------|----------------------|
| Measured according KDB 971168 D01 clause 5.1.1 |                      |
| Detector:                                      | Peak                 |
| Sweep time:                                    | Auto                 |
| Resolution bandwidth:                          | 1 MHz                |
| Video bandwidth:                               | 3 MHz                |
| Span:                                          | 3 MHz                |
| Trace mode:                                    | Max. hold            |
| Test setup:                                    | See sub clause 8.3 A |
| Measurement uncertainty                        | See sub clause 9     |

#### Limits:

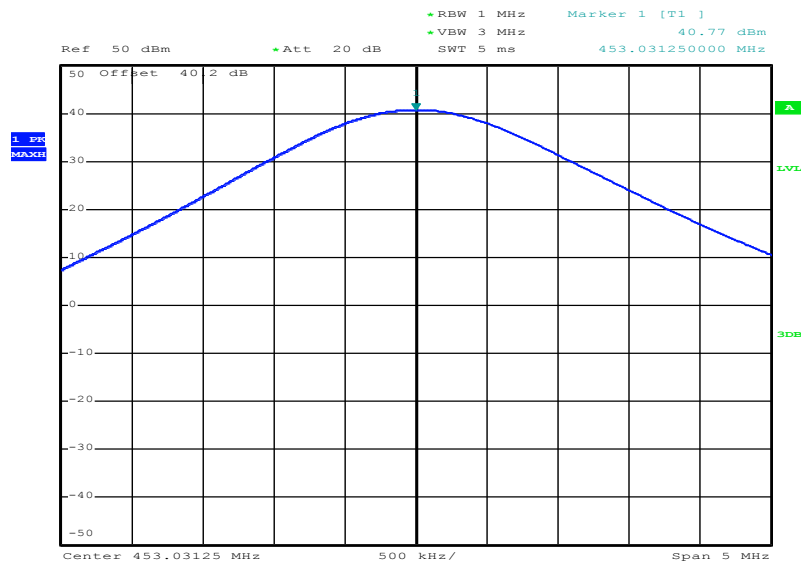
| FCC                                                                                  |
|--------------------------------------------------------------------------------------|
| CFR § 2.1046<br>CFR § 90.205                                                         |
| Maximum transmitter power shall not exceed 120%<br>of the manufacturer's rated power |

#### Result:

| Frequency (channel)                | Transmitter output power |                       |
|------------------------------------|--------------------------|-----------------------|
| Rated output power by manufacturer | 40 dBm / 10 W nominal    | 46 dBm / 40 W nominal |
| 453.03125 MHz                      | 40.77 dBm / 11.94 W      | 46.70 dBm / 46.77 W   |
| 480.0 MHz                          | 40.74 dBm / 11.86 W      | 46.76 dBm / 47.42 W   |
| 511.975 MHz                        | 40.46 dBm / 11.12 W      | 46.42 dBm / 43.85 W   |

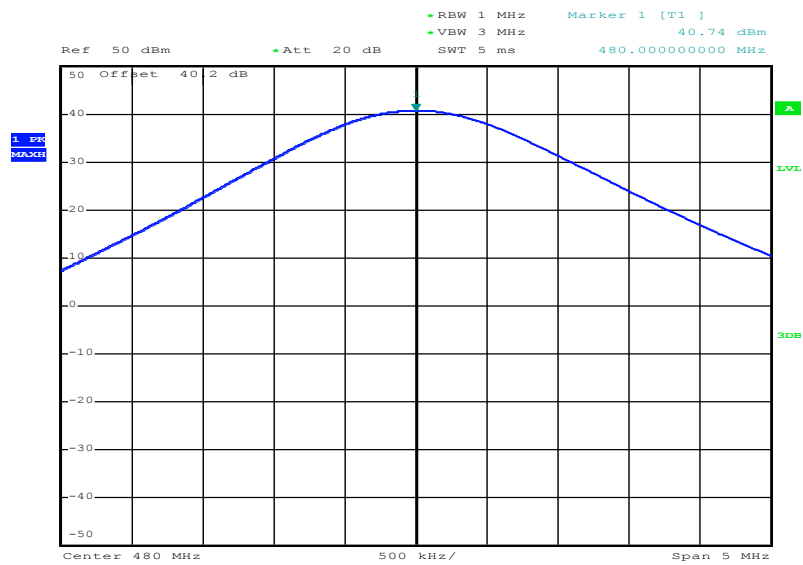
## Plots of the measurements (Transmitter output power)

Plot 1: Lowest channel – Low power



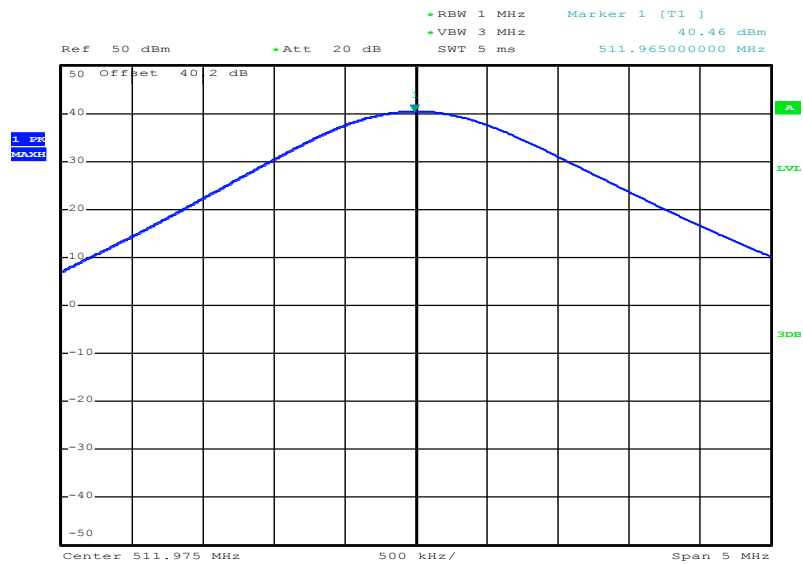
Date: 14.AUG.2015 10:29:43

Plot 2: Middle channel – Low power



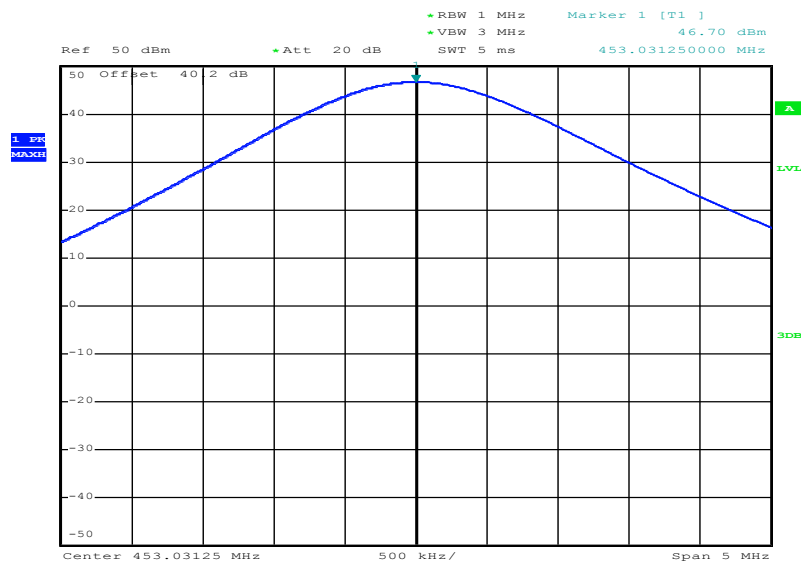
Date: 14.AUG.2015 10:32:48

Plot 3: Highest channel – Low power



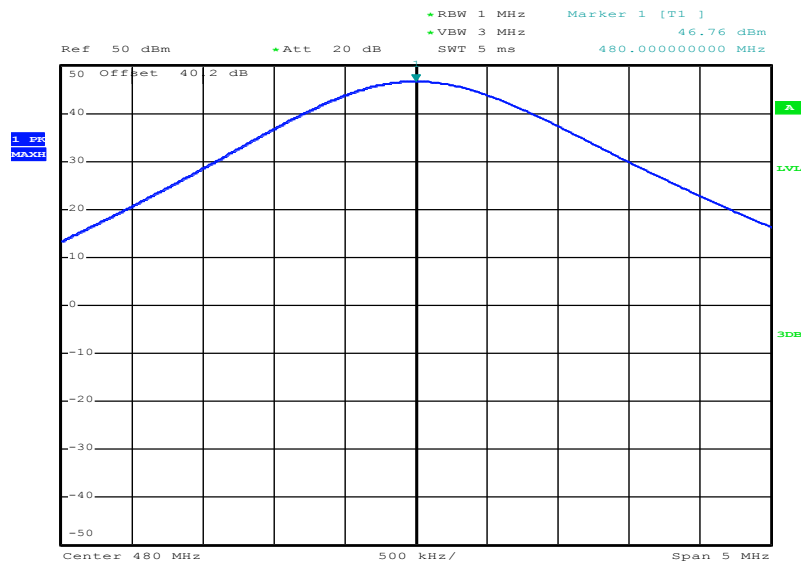
Date: 14.AUG.2015 10:33:45

Plot 4: Lowest channel – High power



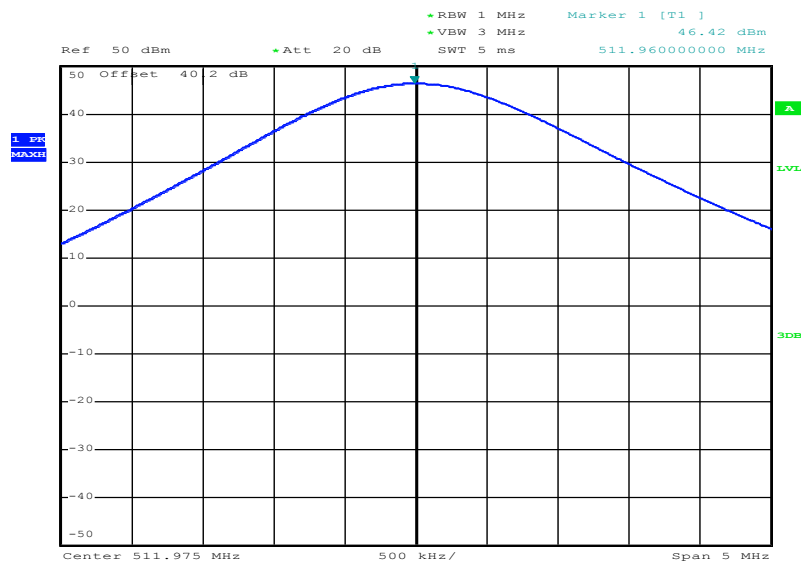
Date: 14.AUG.2015 10:30:33

Plot 5: Middle channel – High power



Date: 14.AUG.2015 10:32:11

Plot 6: Highest channel – High power



Date: 14.AUG.2015 10:34:21

## 12.2 Spectrum efficiency

### Limits:

| FCC                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC 47 CFR<br>§ 90.203 (j)(3)                                                                                                                                                                                                                                                    |
| If the equipment is capable of transmitting data, has transmitter power greater than 500 mW, and has a channel bandwidth of more than 6.25 kHz, the equipment must be capable of supporting a minimum data rate of 4800 bits per second (bps) per 6.25 kHz of channel bandwidth. |

### Result:

| Supported channel bandwidth | Supported data rates  |
|-----------------------------|-----------------------|
| 12.5 kHz                    | 512, 1200, 2400, 4800 |

According customer declaration (Statement One Way Paging.pdf) the EUT is a One Way Transmitter which is excluded from the spectrum efficiency requirements according FCC 47 CFR §90.203(j)(7).

**Verdict:** Not applicable

## 12.3 Occupied bandwidth

### Measurement:

| Measurement parameter                        |                      |
|----------------------------------------------|----------------------|
| Measured according KDB 971168 D01 clause 4.2 |                      |
| Detector:                                    | Peak                 |
| Sweep time:                                  | Auto                 |
| Resolution bandwidth:                        | 100 Hz               |
| Video bandwidth:                             | 300 Hz               |
| Span:                                        | 30 kHz               |
| Trace mode:                                  | Max. hold            |
| Test setup:                                  | See sub clause 8.3 A |
| Measurement uncertainty                      | See sub clause 9     |

### Limits:

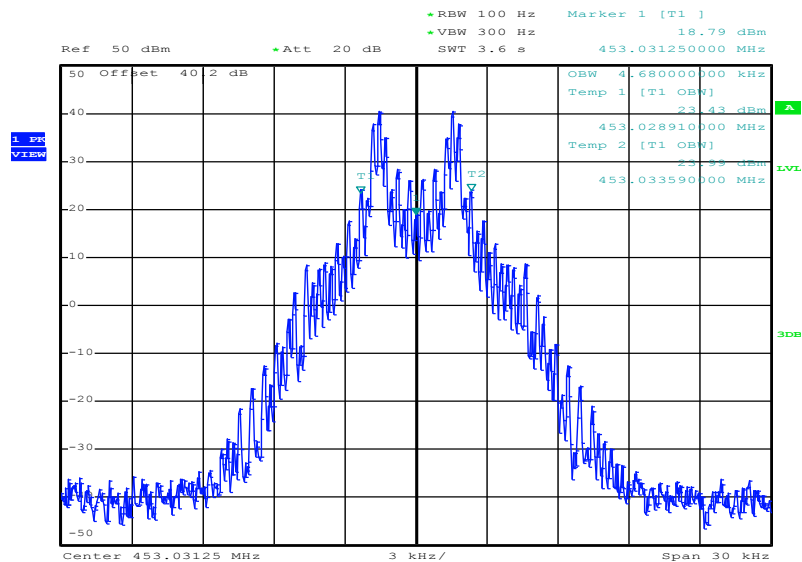
| FCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC 47 CFR<br>§ 2.1049 (c)<br>§ 90.209 (b)(5)<br>§ 90.210 (d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Requirements of emission mask D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>Authorized bandwidth for 12.5 kHz channel bandwidth: 11.25 kHz</b></p> <p><b>Emission mask D: 12.5 kHz channel bandwidth equipment.</b> For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:</p> <p>(1) On any frequency from the center of the authorized bandwidth <math>f_0</math> to 5.625 kHz removed from <math>f_0</math>: Zero dB.</p> <p>(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (<math>f_d</math> in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least <math>7.27(f_d - 2.88 \text{ kHz})</math> dB.</p> <p>(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (<math>f_d</math> in kHz) of more than 12.5 kHz: At least <math>50 + 10 \log(P)</math> dB or 70 dB, whichever is the lesser attenuation.</p> <p>(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two to three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emissions mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (m) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, then an alternate procedure may be used provided prior Commission approval is obtained.</p> |

**Result: 99%-bandwidth**

|                             | 99%-bandwidth [kHz] |      |      |      |
|-----------------------------|---------------------|------|------|------|
| Data rate [bits per second] | 512                 | 1200 | 2400 | 4800 |
| 453.03125 MHz               | 4.68                | 4.95 | 7.14 | 9.54 |
| 480.0 MHz                   | 4.68                | 4.95 | 7.17 | 9.54 |
| 511.975 MHz                 | 4.71                | 4.95 | 7.17 | 9.57 |

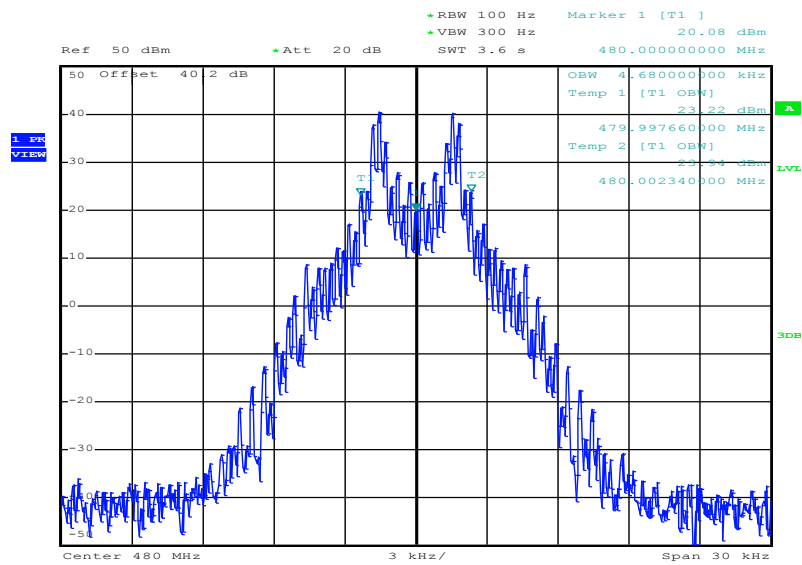
**Plots of the measurements (99%-bandwidth)**

Plot 1: Low channel / 512 bits per second



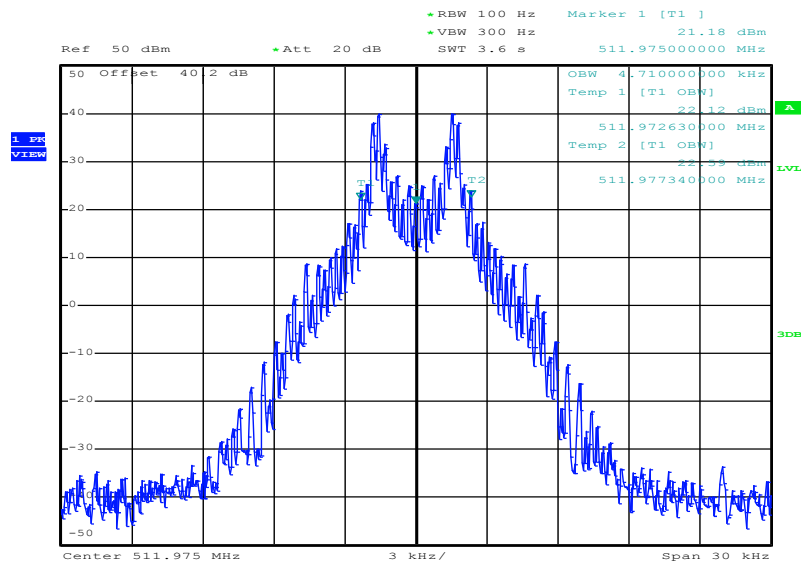
Date: 14.AUG.2015 10:51:07

Plot 2: Middle channel / 512 bits per second



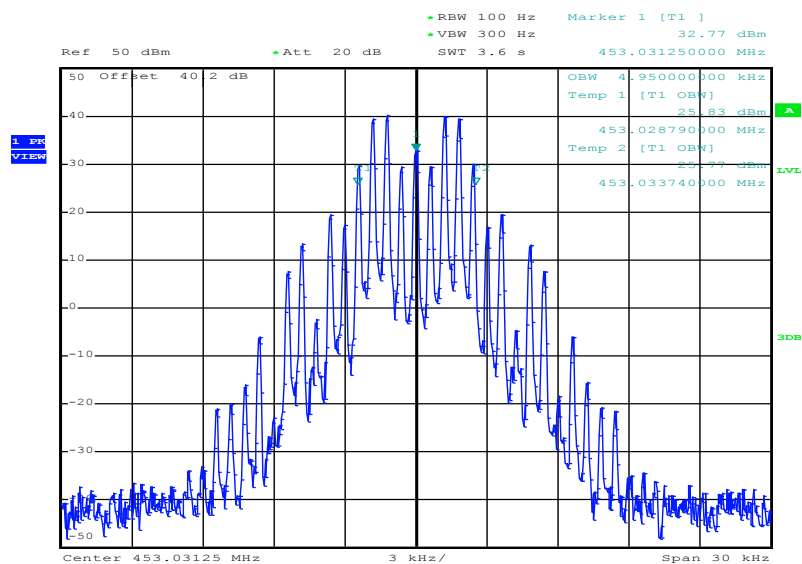
Date: 14.AUG.2015 10:45:37

Plot 3: High channel / 512 bits per second



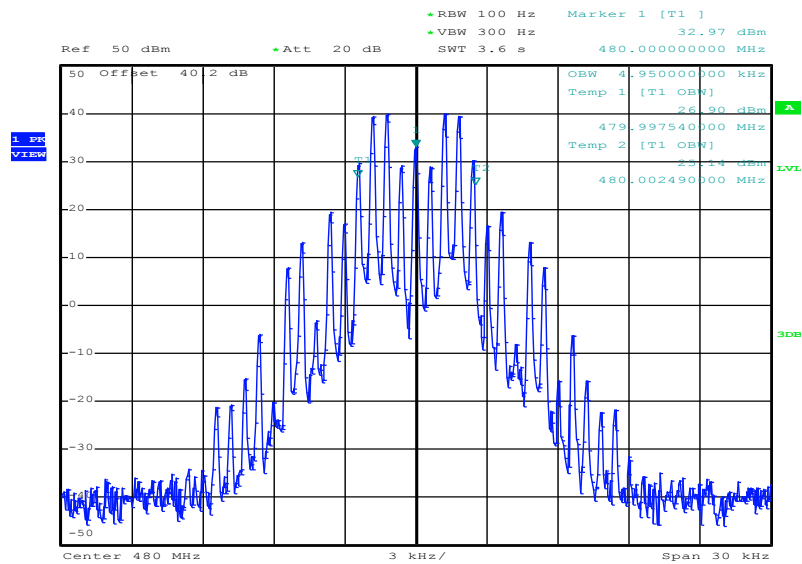
Date: 14.AUG.2015 10:44:07

Plot 4: Low channel / 1200 bits per second



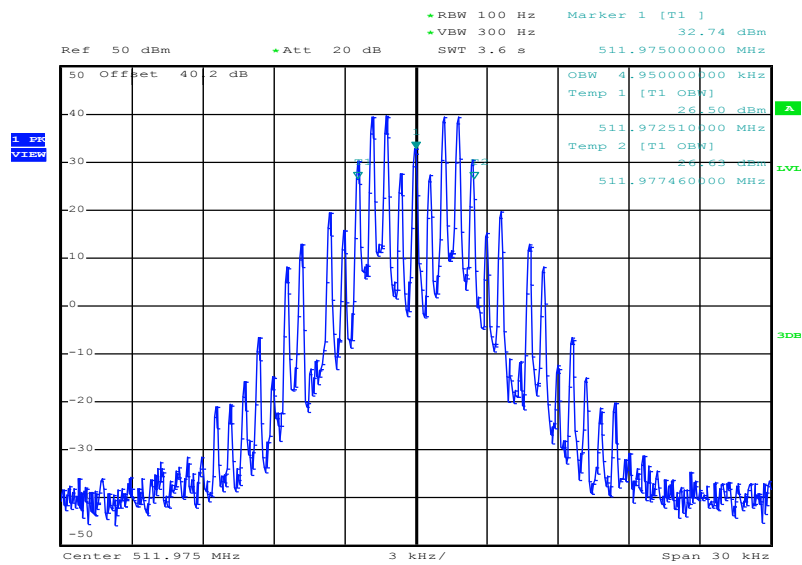
Date: 14.AUG.2015 10:50:23

Plot 5: Middle channel / 1200 bits per second



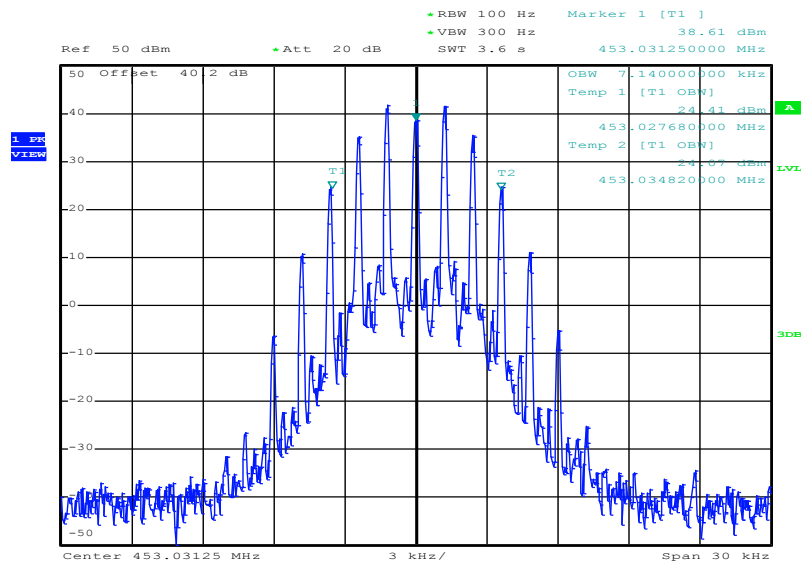
Date: 14.AUG.2015 10:46:20

Plot 6: High channel / 1200 bits per second



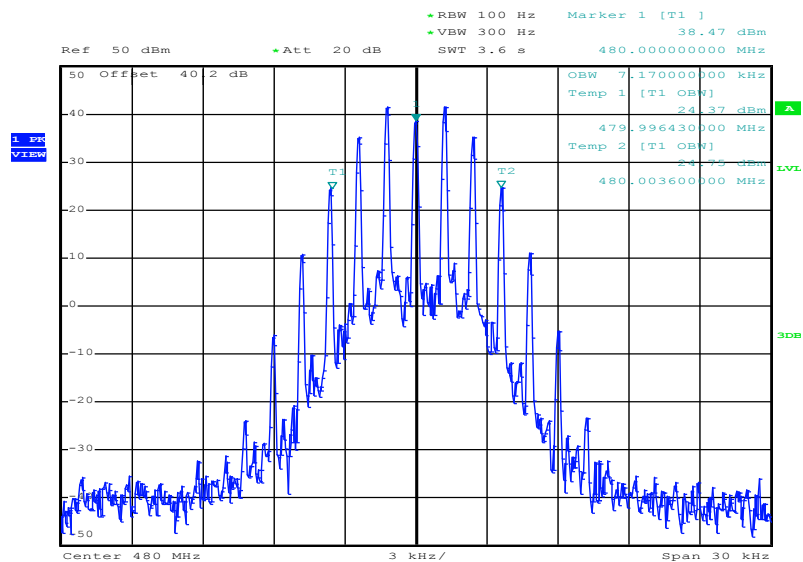
Date: 14.AUG.2015 10:42:56

Plot 7: Low channel / 2400 bits per second



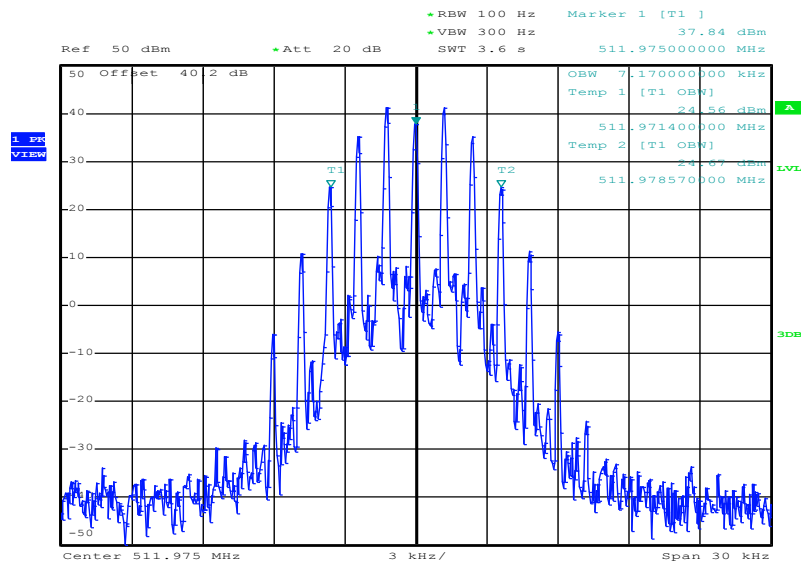
Date: 14.AUG.2015 10:49:43

Plot 8: Middle channel / 2400 b bits is per second



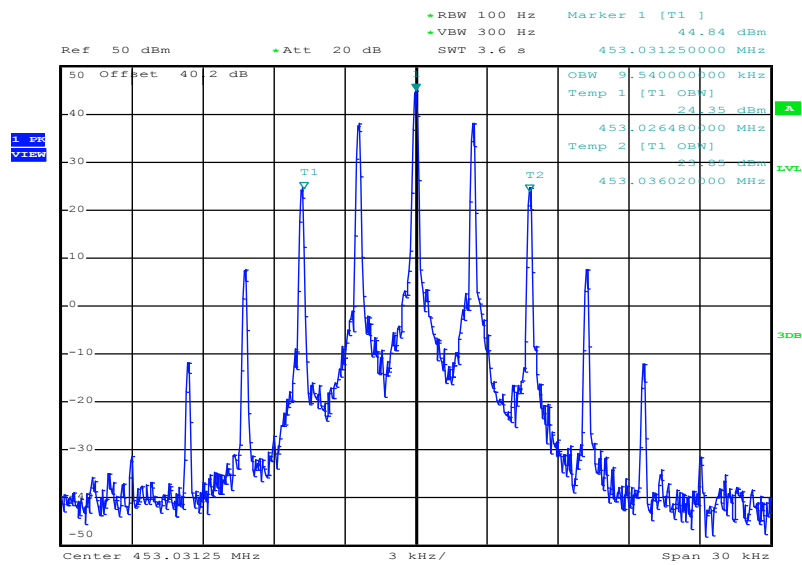
Date: 14.AUG.2015 10:47:04

Plot 9: High channel / 2400 bits per second



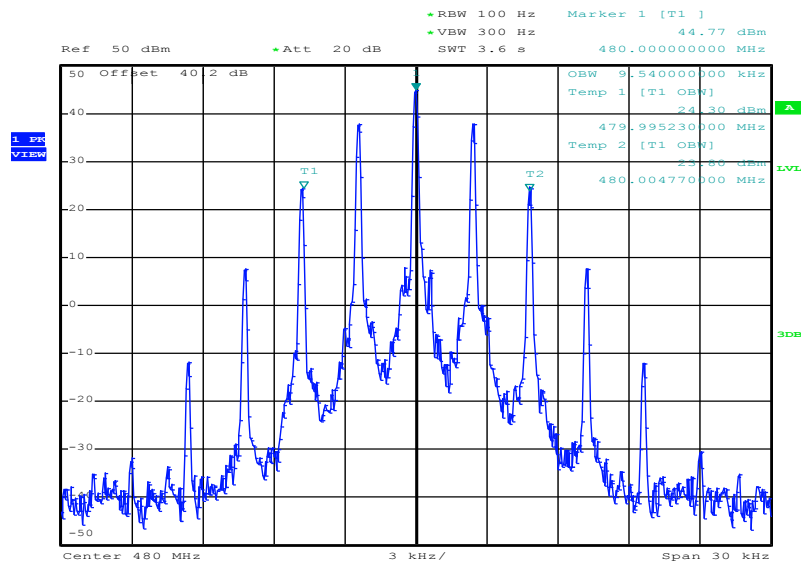
Date: 14.AUG.2015 10:42:07

Plot 10: Low channel / 4800 bits per second



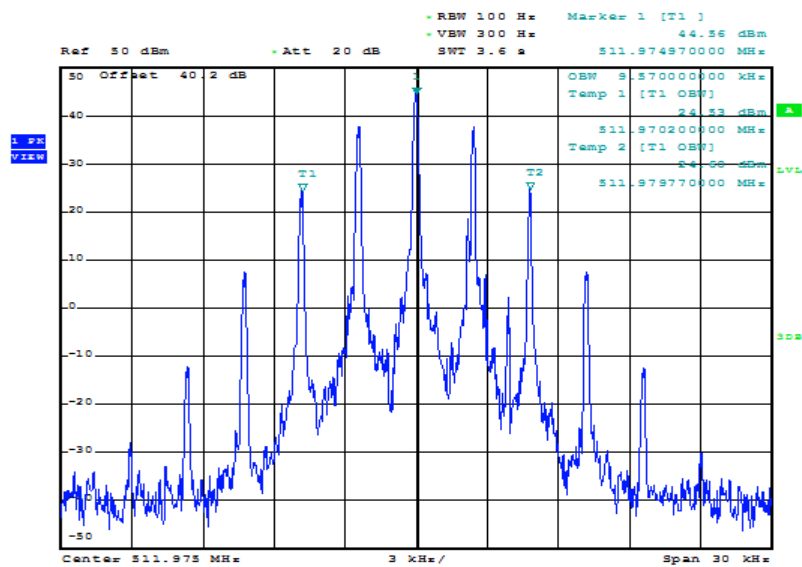
Date: 14.AUG.2015 10:49:01

Plot 11: Middle channel / 4800 bits per second



Date: 14.AUG.2015 10:47:50

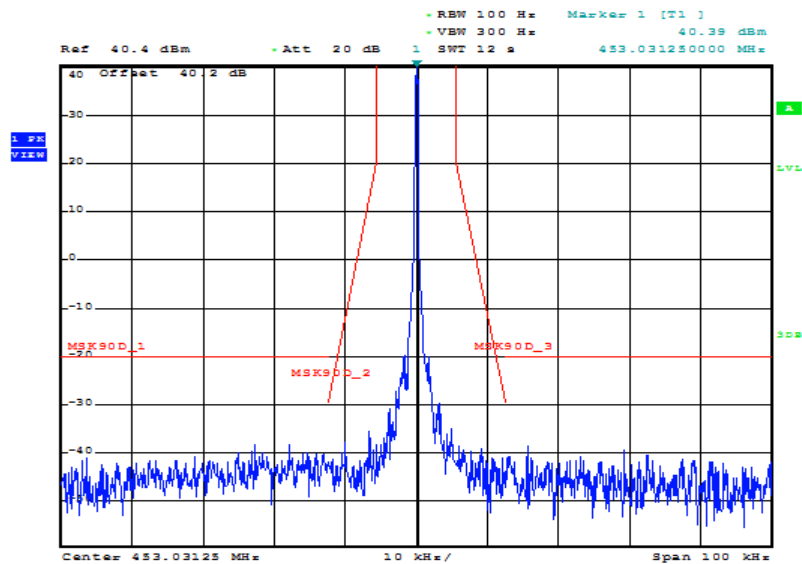
Plot 12: High channel / 4800 bits per second



Date: 14.AUG.2015 10:39:26

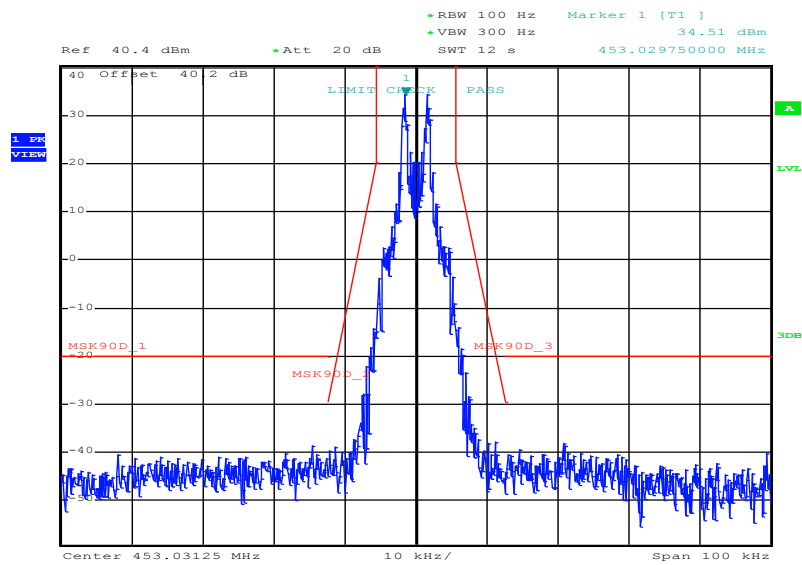
**Plots of the measurements (Emission mask D)**

Plot 1: Emission mask D – Low channel – 512 bits per second – Low power – Carrier unmodulated



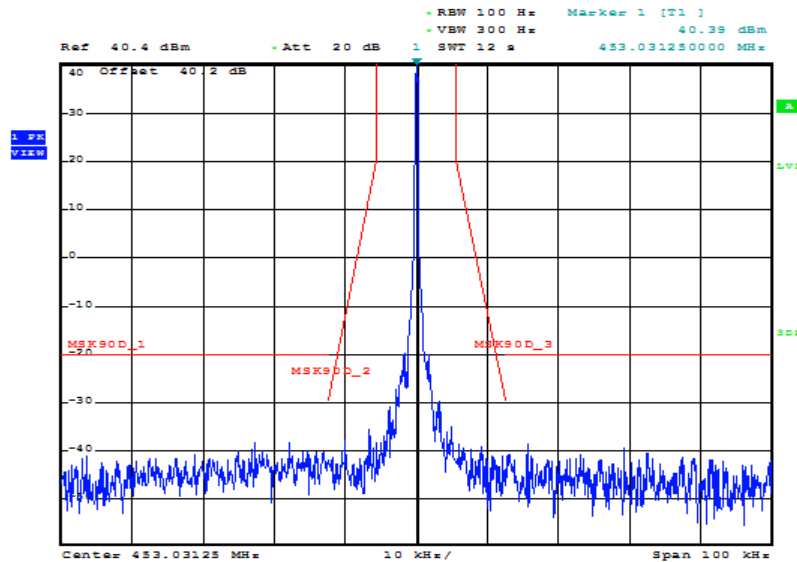
Date: 14.AUG.2015 10:06:19

Plot 2: Emission mask D – Low channel – 512 bits per second – Low power – Carrier modulated



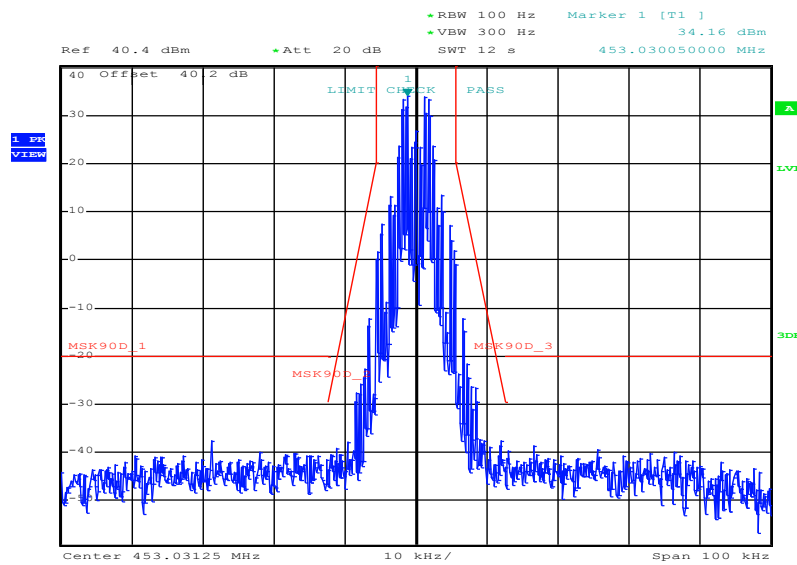
Date: 14.AUG.2015 10:07:17

Plot 3: Emission mask D – Low channel – 1200 bits per second – Low power – Carrier unmodulated



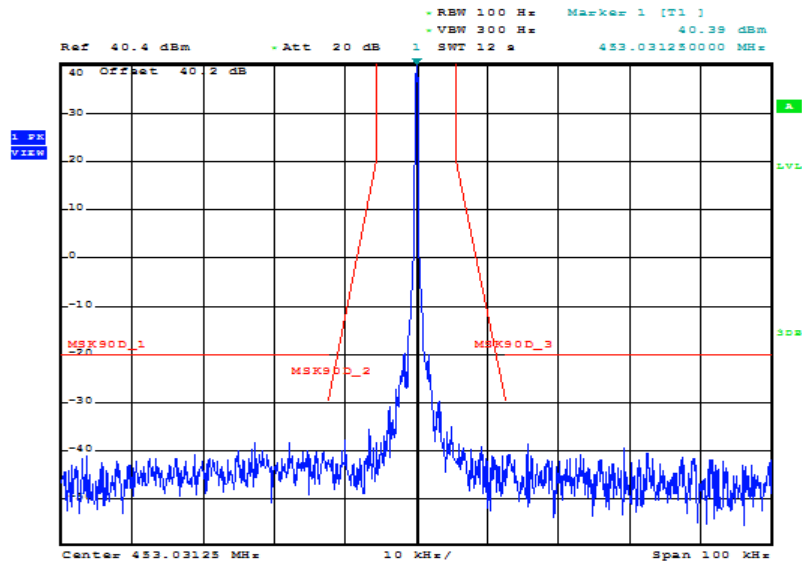
Date: 14.AUG.2015 10:06:19

Plot 4: Emission mask D – Low channel – 1200 bits per second – Low power – Carrier modulated



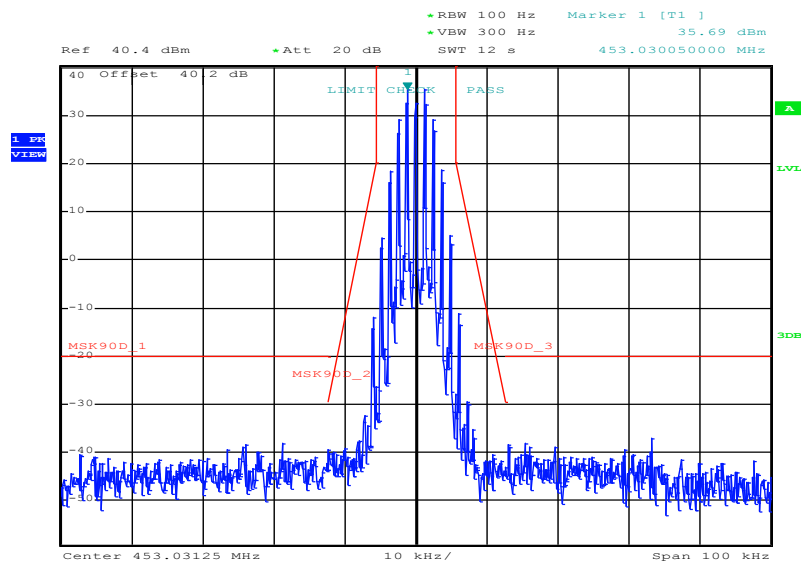
Date: 14.AUG.2015 10:08:18

Plot 5: Emission mask D – Low channel – 2400 bits per second – Low power – Carrier unmodulated



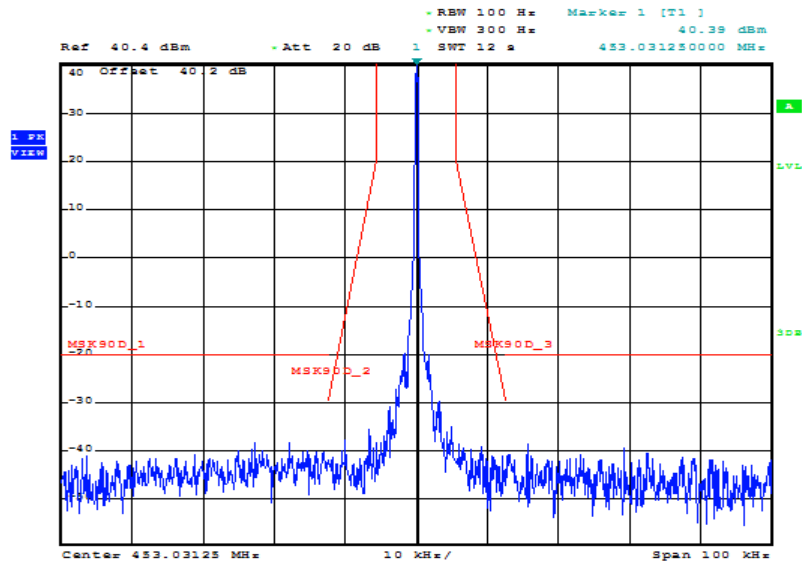
Date: 14.AUG.2015 10:06:19

Plot 6: Emission mask D – Low channel – 2400 bits per second – Low power – Carrier modulated



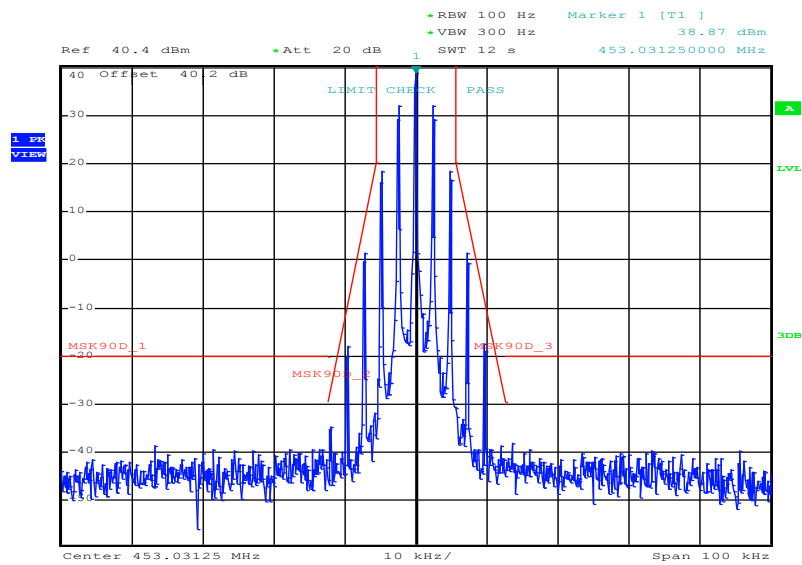
Date: 14.AUG.2015 10:09:09

Plot 7: Emission mask D – Low channel – 4800 bits per second – Low power – Carrier unmodulated



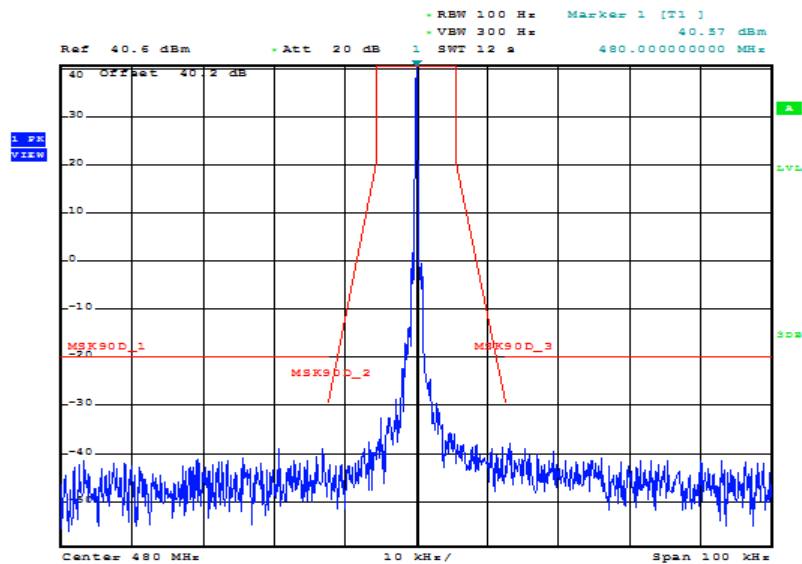
Date: 14.AUG.2015 10:06:19

Plot 8: Emission mask D – Low channel – 4800 bits per second – Low power – Carrier modulated



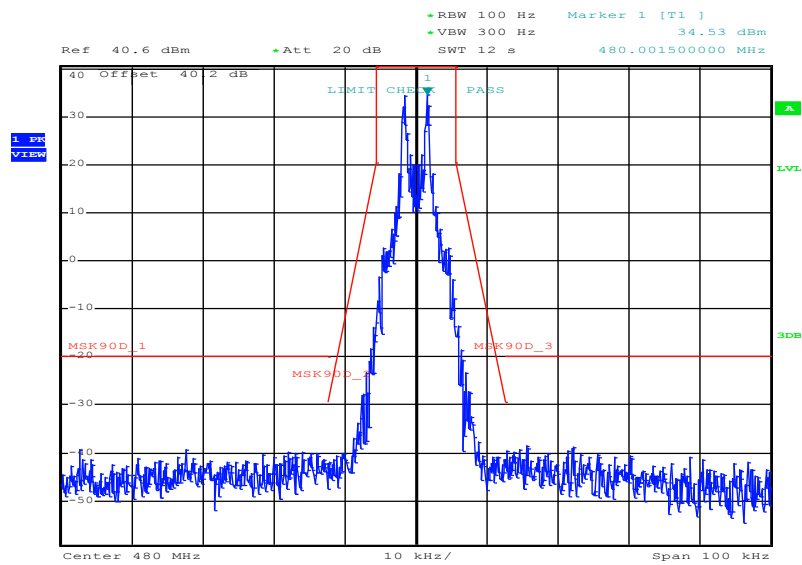
Date: 14.AUG.2015 10:10:12

Plot 9: Emission mask D – Mid channel – 512 bits per second – Low power – Carrier unmodulated



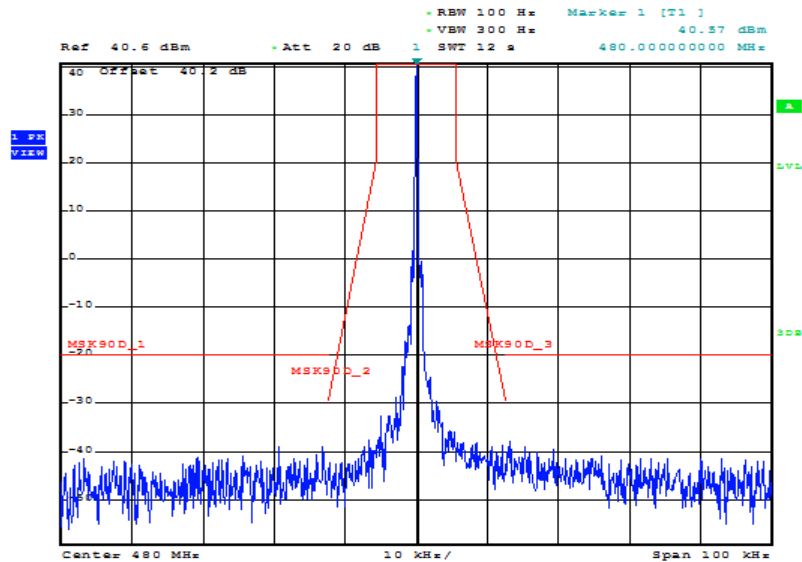
Date: 14.AUG.2015 09:49:45

Plot 10: Emission mask D – Mid channel – 512 bits per second – Low power – Carrier modulated



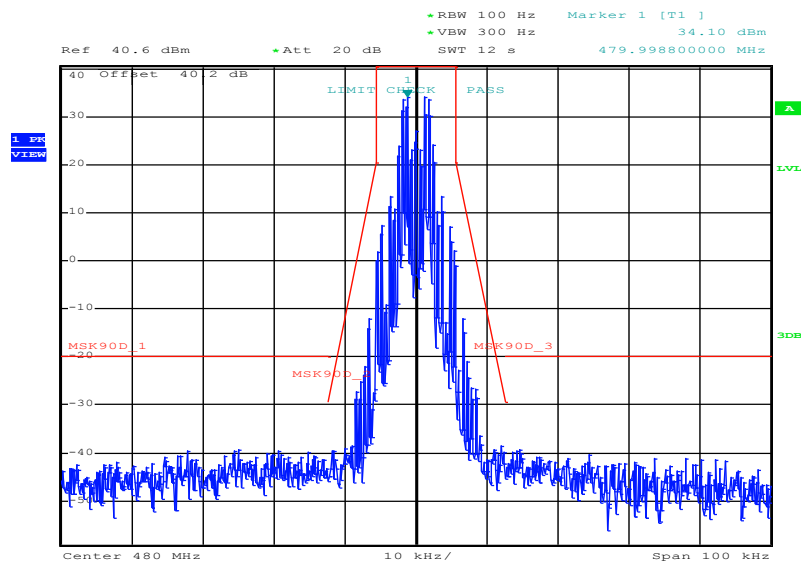
Date: 14.AUG.2015 09:53:57

Plot 11: Emission mask D – Mid channel – 1200 bits per second – Low power – Carrier unmodulated



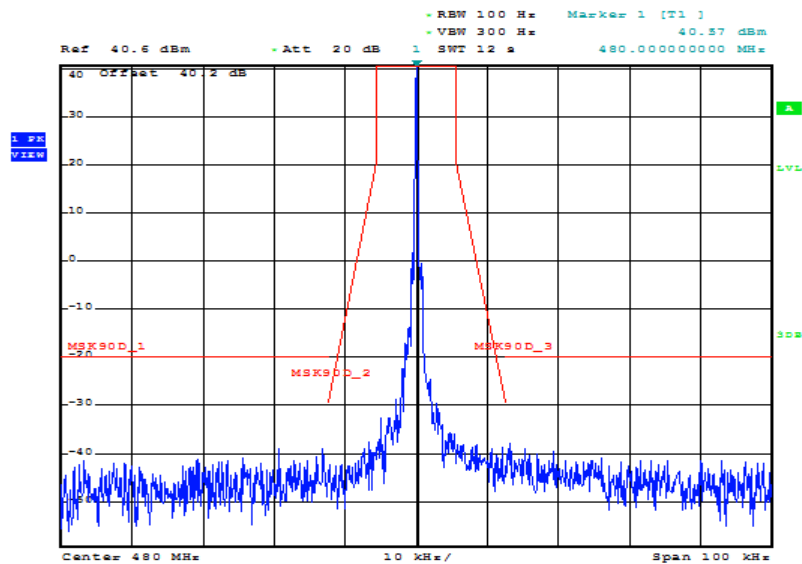
Date: 14.AUG.2015 09:49:45

Plot 12: Emission mask D – Mid channel – 1200 bits per second – Low power – Carrier modulated



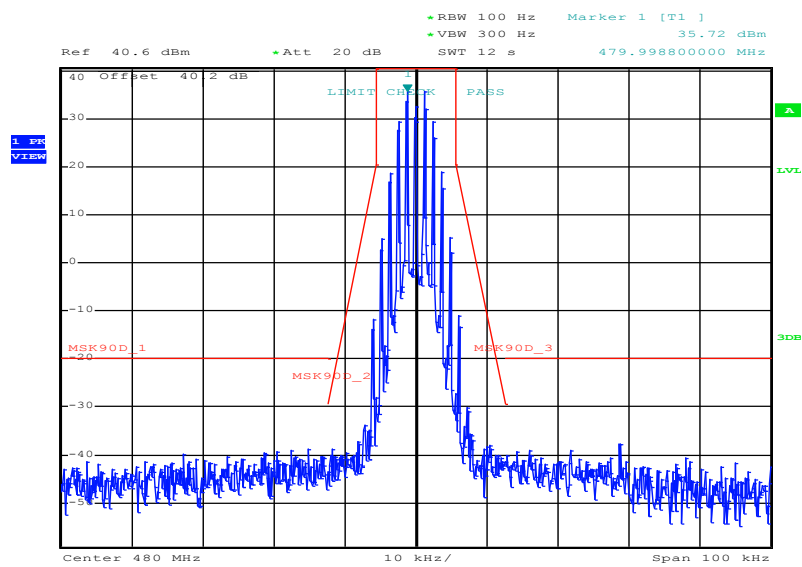
Date: 14.AUG.2015 09:52:57

Plot 13: Emission mask D – Mid channel – 2400 bits per second – Low power – Carrier unmodulated



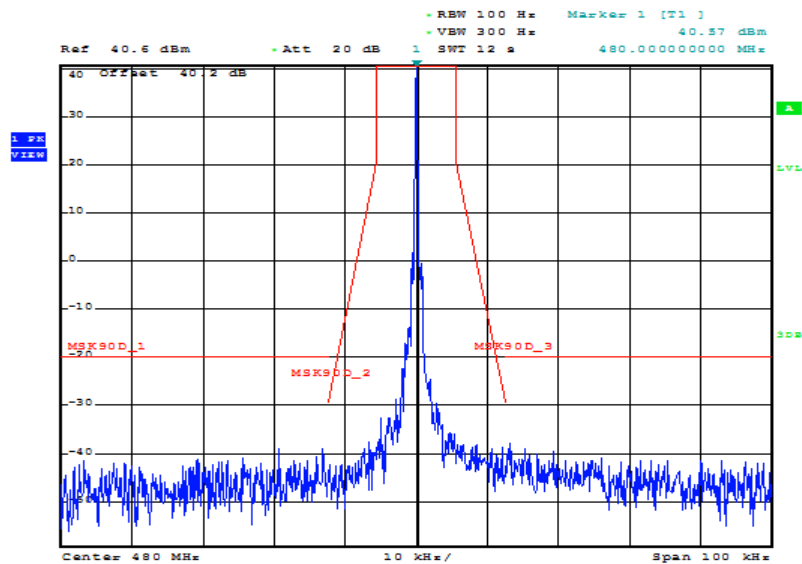
Date: 14.AUG.2015 09:49:45

Plot 14: Emission mask D – Mid channel – 2400 bits per second – Low power – Carrier modulated



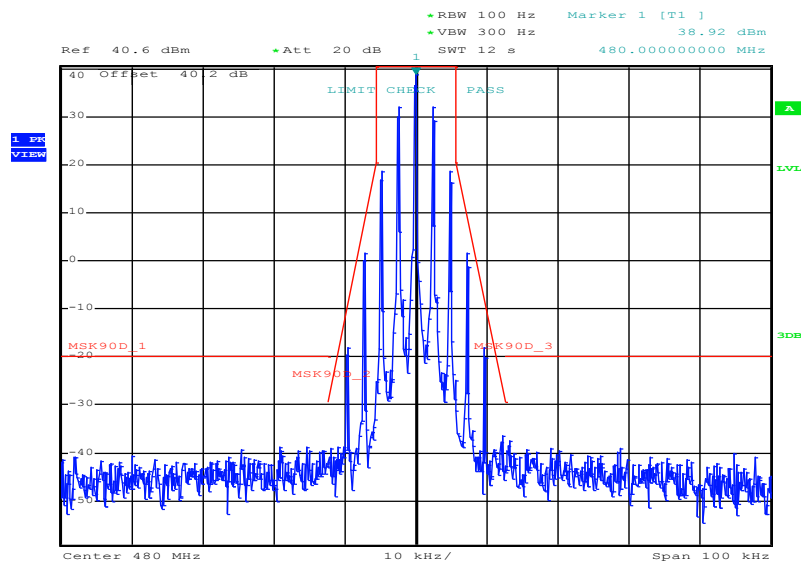
Date: 14.AUG.2015 09:51:48

Plot 15: Emission mask D – Mid channel – 4800 bits per second – Low power – Carrier unmodulated



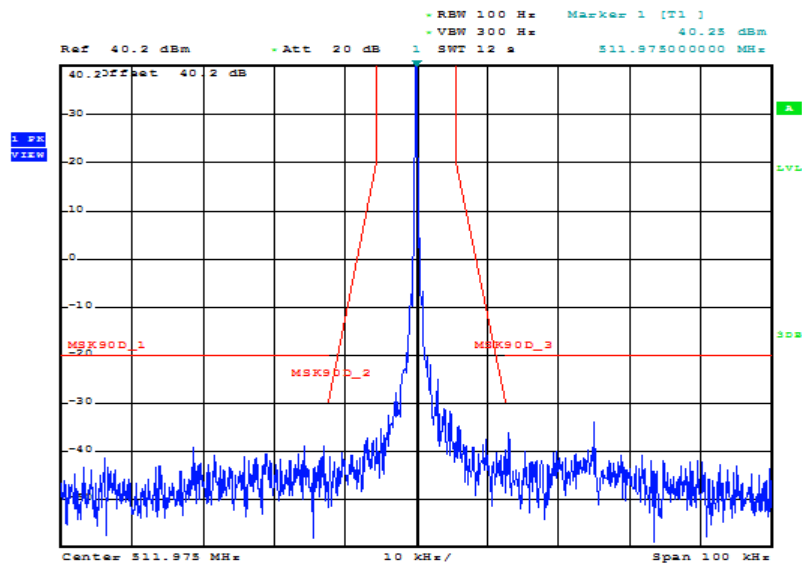
Date: 14.AUG.2015 09:49:45

Plot 16: Emission mask D – Mid channel – 4800 bits per second – Low power – Carrier modulated



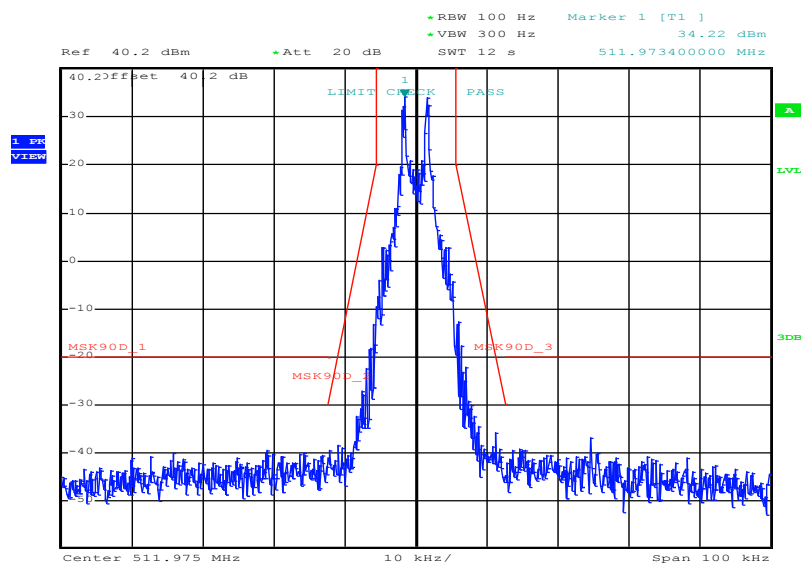
Date: 14.AUG.2015 09:50:50

Plot 17: Emission mask D – High channel – 512 bits per second – Low power – Carrier unmodulated



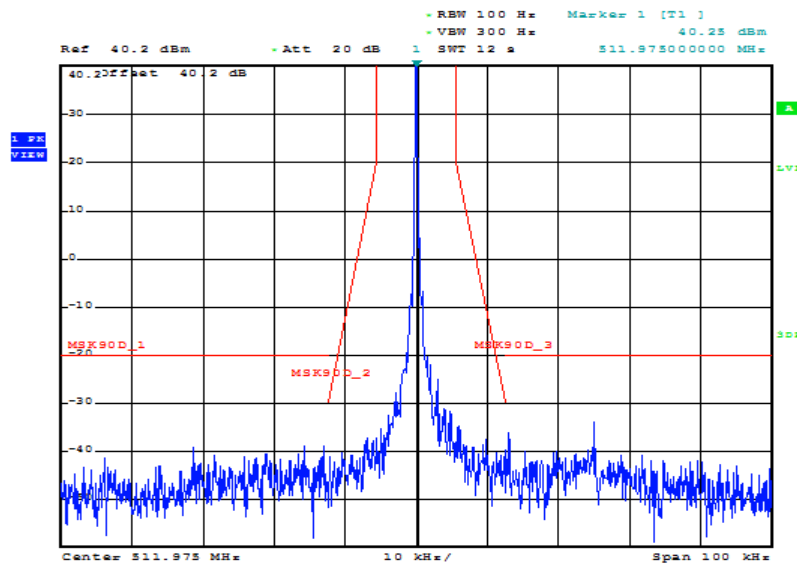
Date: 14.AUG.2015 09:43:32

Plot 18: Emission mask D – High channel – 512 bits per second – Low power – Carrier modulated



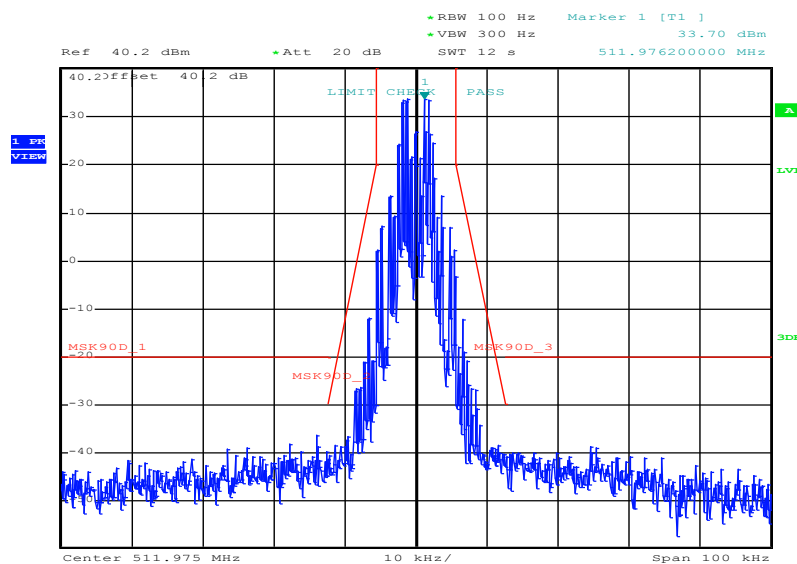
Date: 14.AUG.2015 09:44:42

Plot 19: Emission mask D – High channel – 1200 bits per second – Low power – Carrier unmodulated



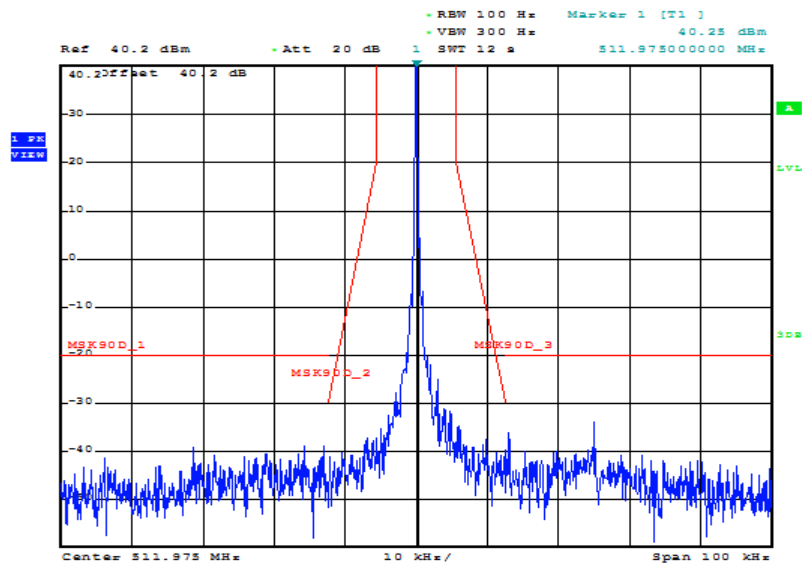
Date: 14.AUG.2015 09:43:32

Plot 20: Emission mask D – High channel – 1200 bits per second – Low power – Carrier modulated



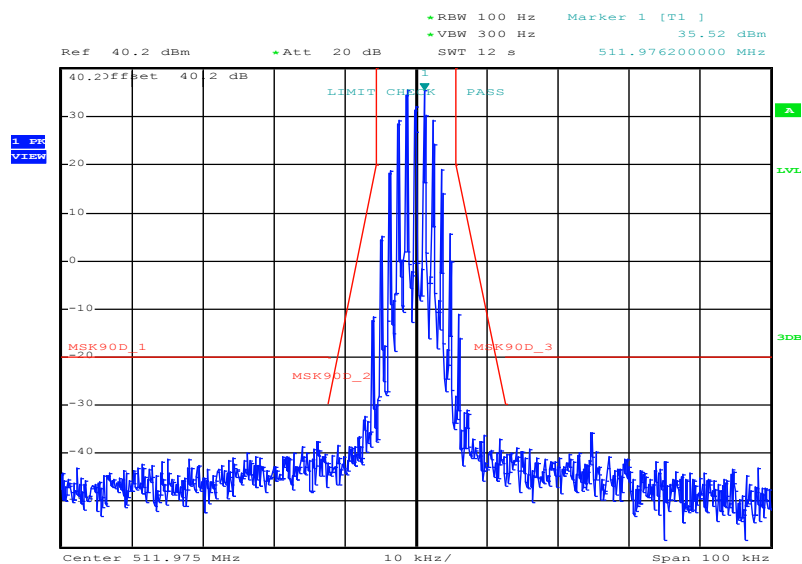
Date: 14.AUG.2015 09:46:00

Plot 21: Emission mask D – High channel – 2400 bits per second – Low power – Carrier unmodulated



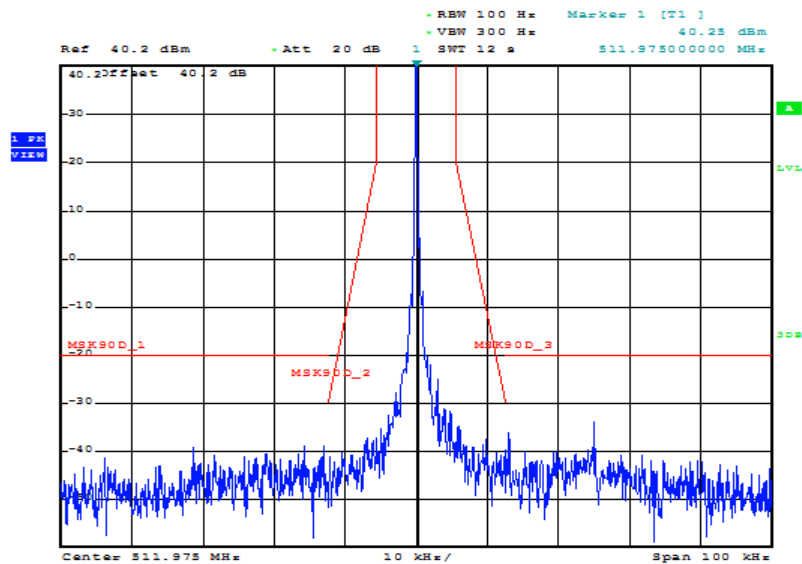
Date: 14.AUG.2015 09:43:32

Plot 22: Emission mask D – High channel – 2400 bits per second – Low power – Carrier modulated



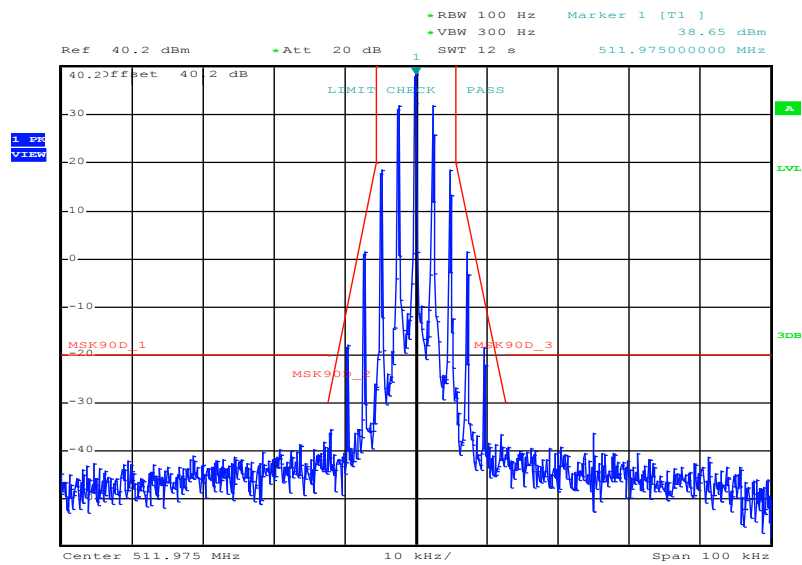
Date: 14.AUG.2015 09:46:59

Plot 23: Emission mask D – High channel – 4800 bits per second – Low power – Carrier unmodulated



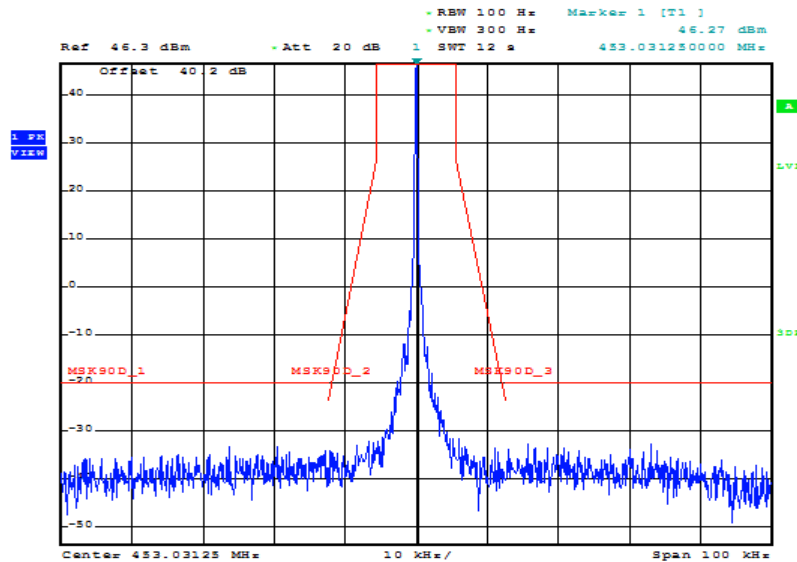
Date: 14.AUG.2015 09:43:32

Plot 24: Emission mask D – High channel – 4800 bits per second – Low power – Carrier modulated



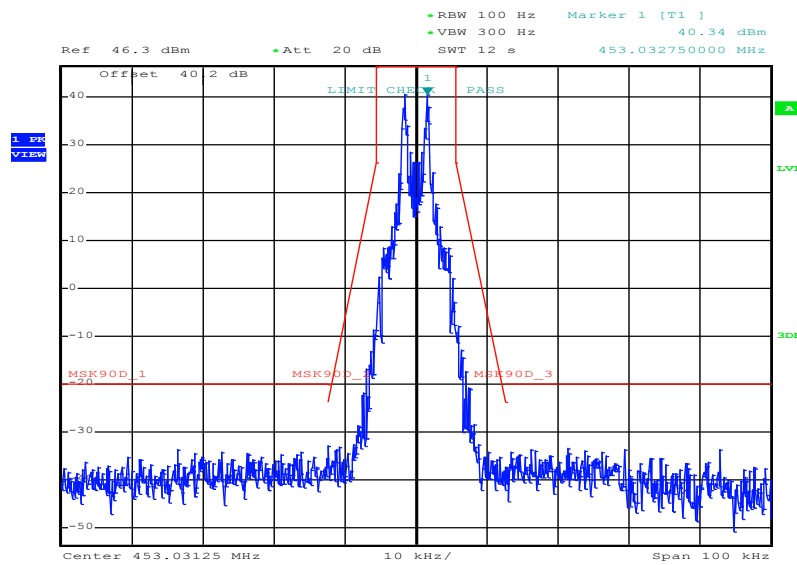
Date: 14.AUG.2015 09:48:02

Plot 25: Emission mask D – Low channel – 512 bits per second – High power – Carrier unmodulated



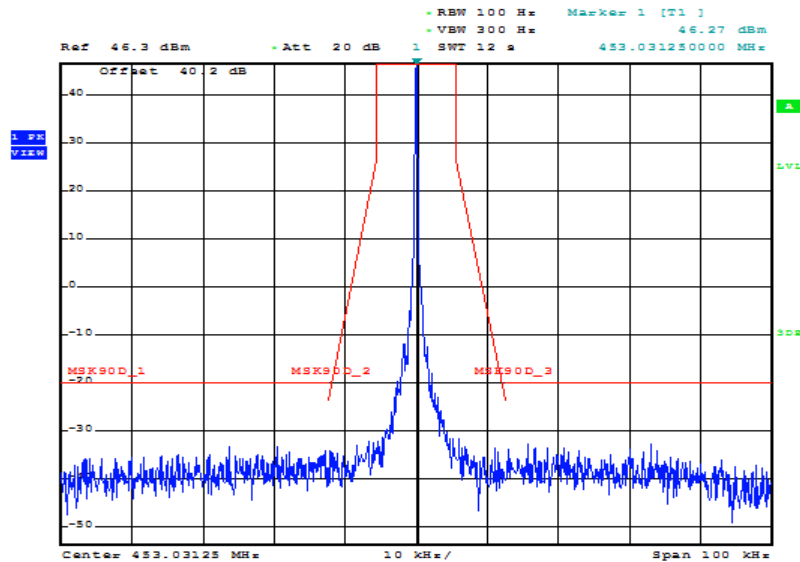
Date: 14.AUG.2015 10:00:51

Plot 26: Emission mask D – Low channel – 512 bits per second – High power – Carrier modulated



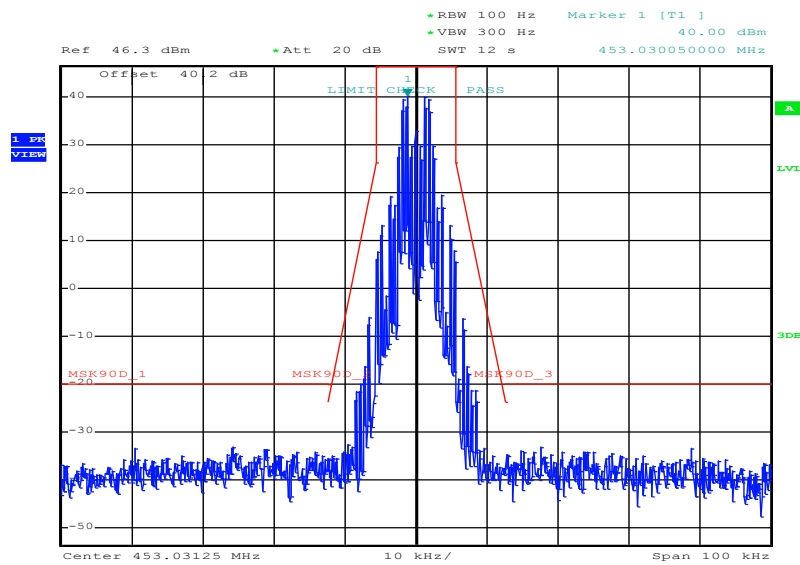
Date: 14.AUG.2015 10:04:28

Plot 27: Emission mask D – Low channel – 1200 bits per second – High power – Carrier unmodulated



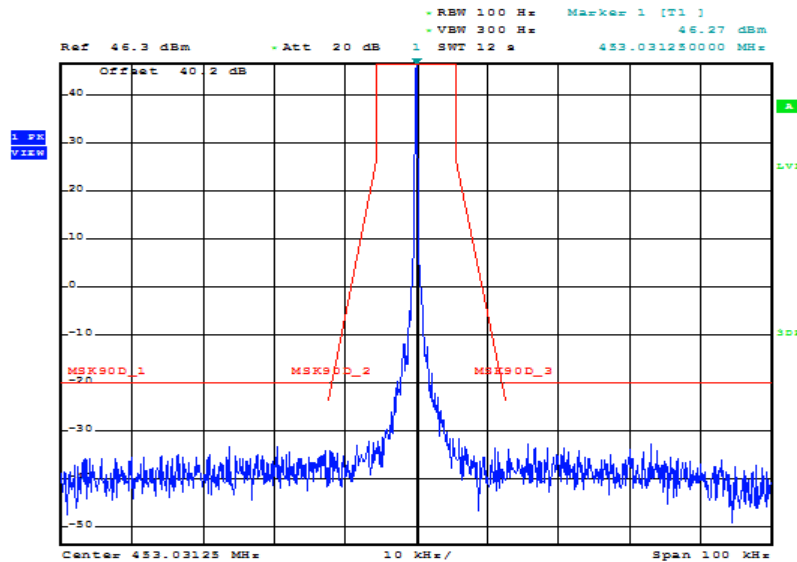
Date: 14.AUG.2015 10:00:51

Plot 28: Emission mask D – Low channel – 1200 bits per second – High power – Carrier modulated



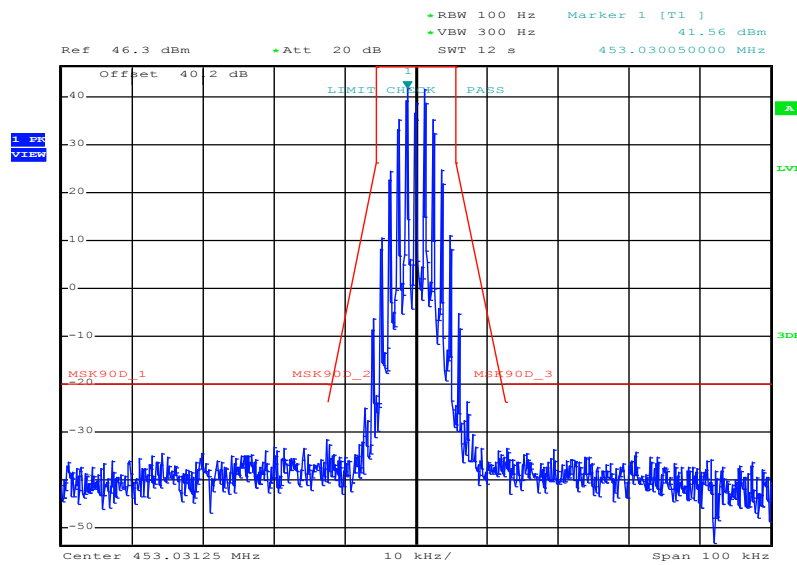
Date: 14.AUG.2015 10:03:38

Plot 29: Emission mask D – Low channel – 2400 bits per second – High power – Carrier unmodulated



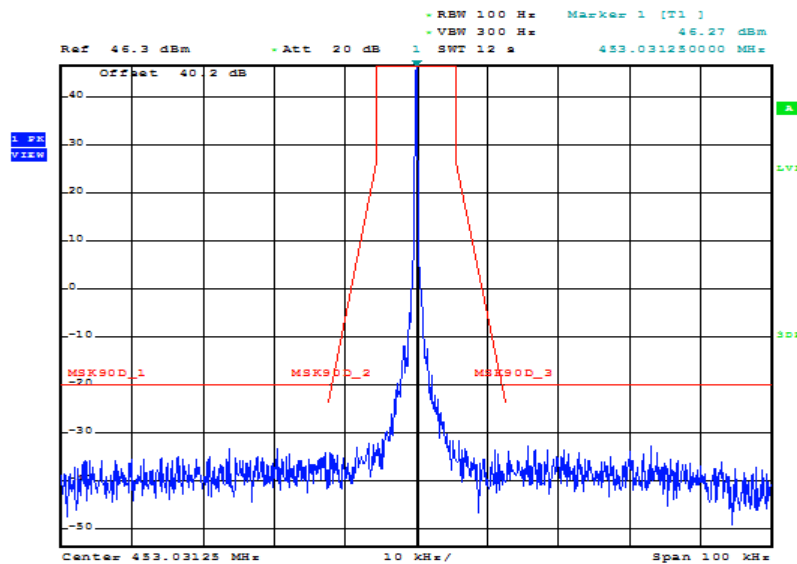
Date: 14.AUG.2015 10:00:51

Plot 30: Emission mask D – Low channel – 2400 bits per second – High power – Carrier modulated



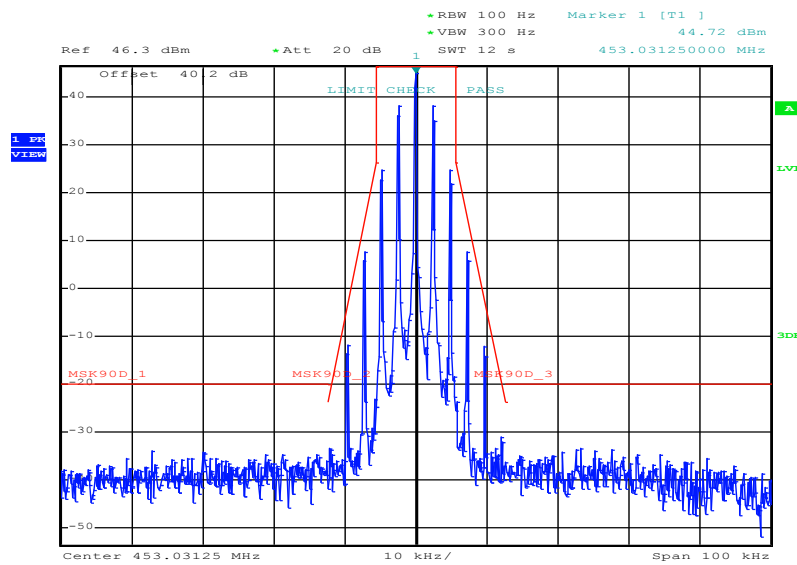
Date: 14.AUG.2015 10:02:38

Plot 31: Emission mask D – Low channel – 4800 bits per second – High power – Carrier unmodulated



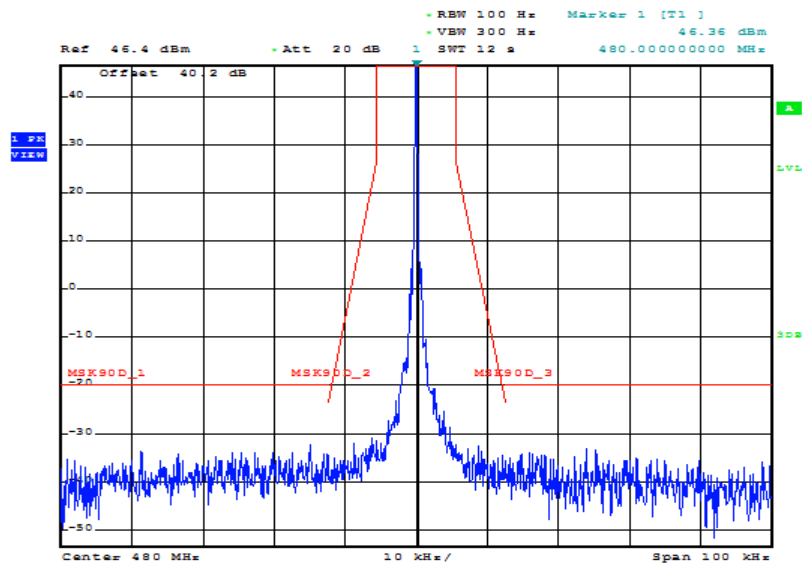
Date: 14.AUG.2015 10:00:51

Plot 32: Emission mask D – Low channel – 4800 bits per second – High power – Carrier modulated



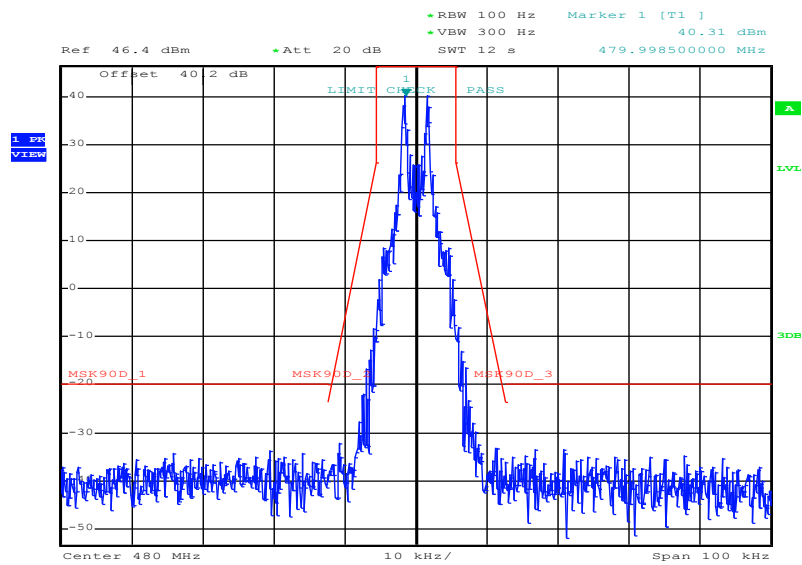
Date: 14.AUG.2015 10:01:48

Plot 33: Emission mask D – Mid channel – 512 bits per second – High power – Carrier unmodulated



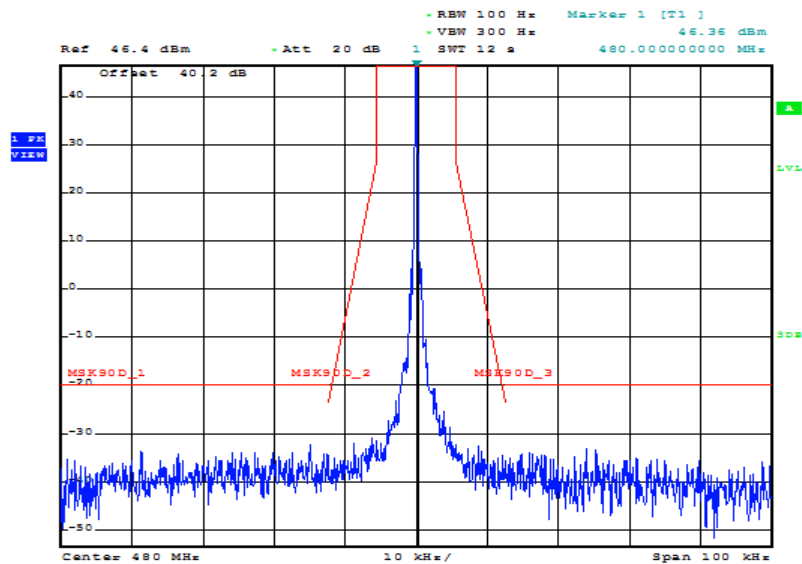
Date: 14.AUG.2015 09:55:29

Plot 34: Emission mask D – Mid channel – 512 bits per second – High power – Carrier modulated



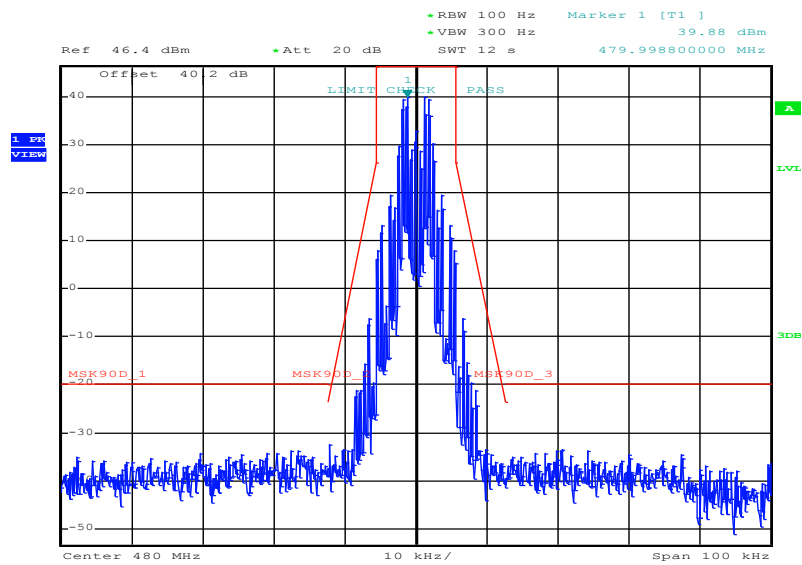
Date: 14.AUG.2015 09:56:41

Plot 35: Emission mask D – Mid channel – 1200 bits per second – High power – Carrier unmodulated



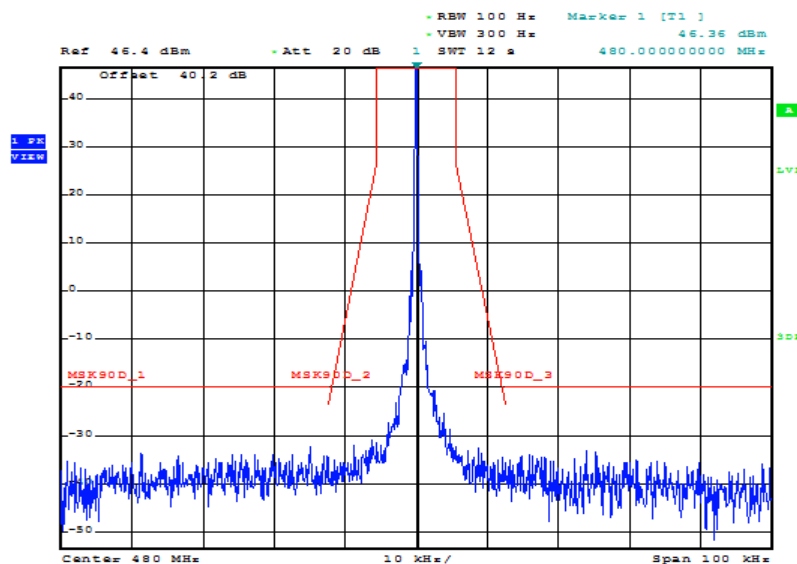
Date: 14.AUG.2015 09:55:29

Plot 36: Emission mask D – Mid channel – 1200 bits per second – High power – Carrier modulated



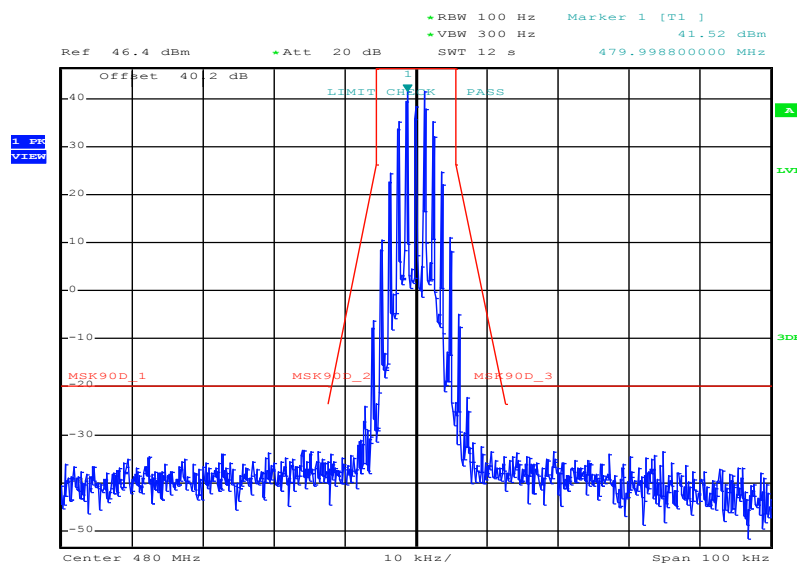
Date: 14.AUG.2015 09:57:33

Plot 37: Emission mask D – Mid channel – 2400 bits per second – High power – Carrier unmodulated



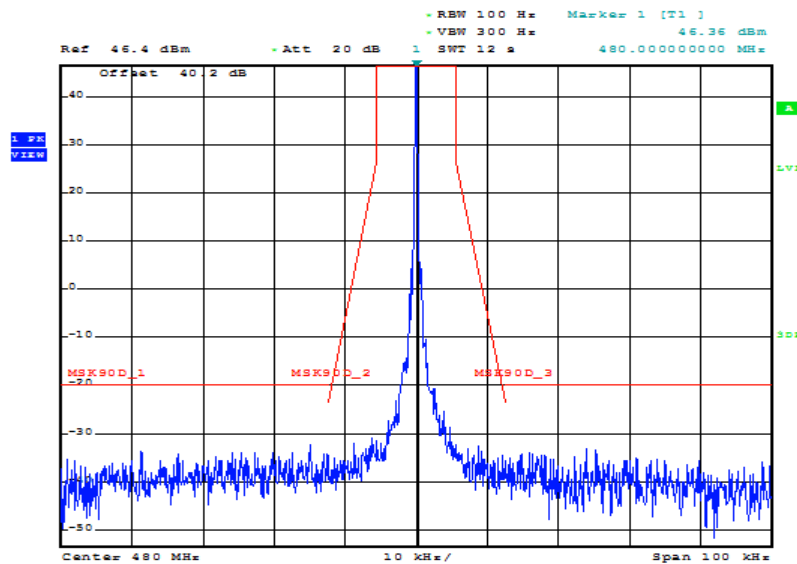
Date: 14.AUG.2015 09:55:29

Plot 38: Emission mask D – Mid channel – 2400 bits per second – High power – Carrier modulated



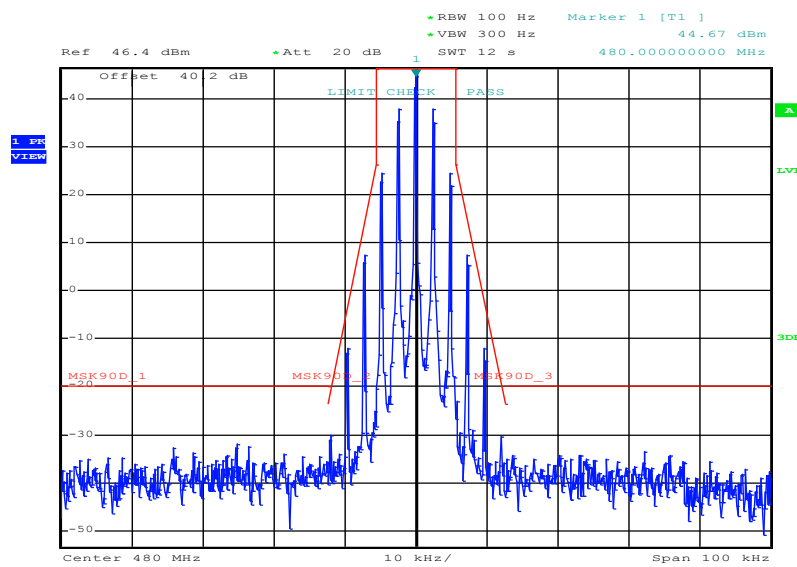
Date: 14.AUG.2015 09:58:32

Plot 39: Emission mask D – Mid channel – 4800 bits per second – High power – Carrier unmodulated



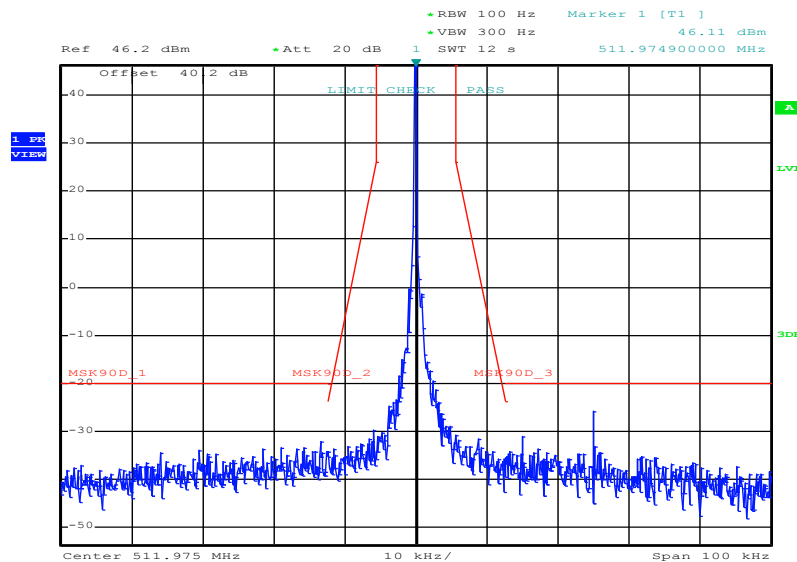
Date: 14.AUG.2015 09:55:29

Plot 40: Emission mask D – Mid channel – 4800 bits per second – High power – Carrier modulated



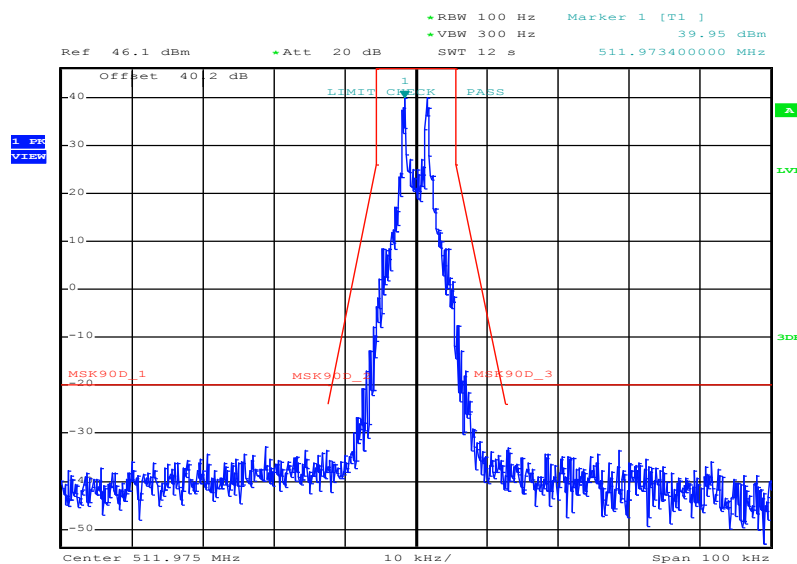
Date: 14.AUG.2015 09:59:27

Plot 41: Emission mask D – High channel – 512 bits per second – High power – Carrier unmodulated



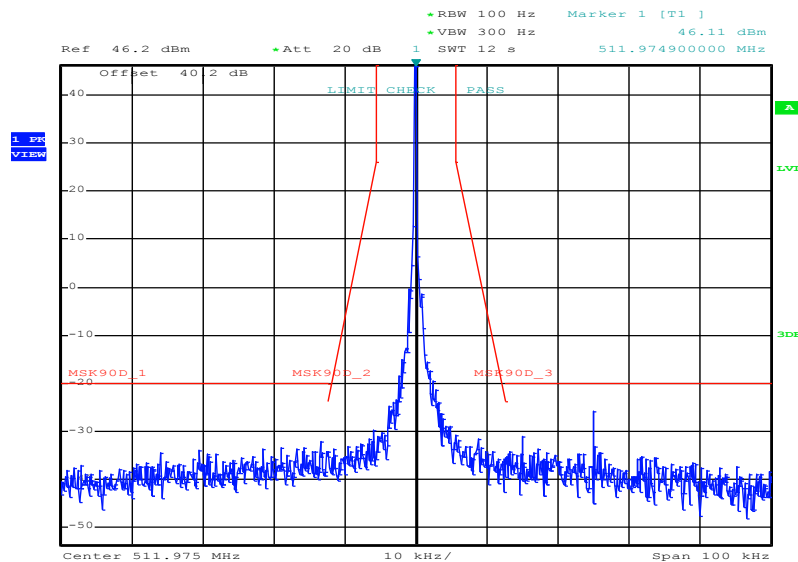
Date: 14.AUG.2015 09:31:54

Plot 42: Emission mask D – High channel – 512 bits per second – High power – Carrier modulated



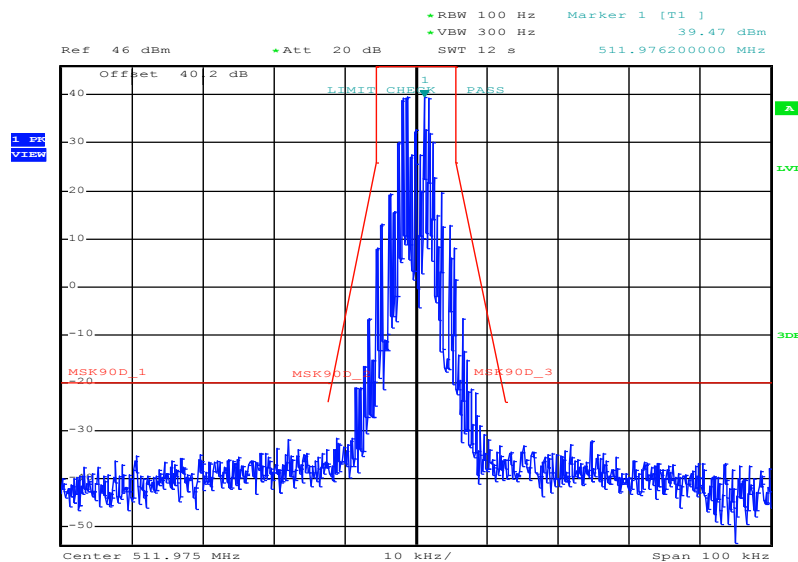
Date: 14.AUG.2015 09:41:47

Plot 43: Emission mask D – High channel – 1200 bits per second – High power – Carrier unmodulated



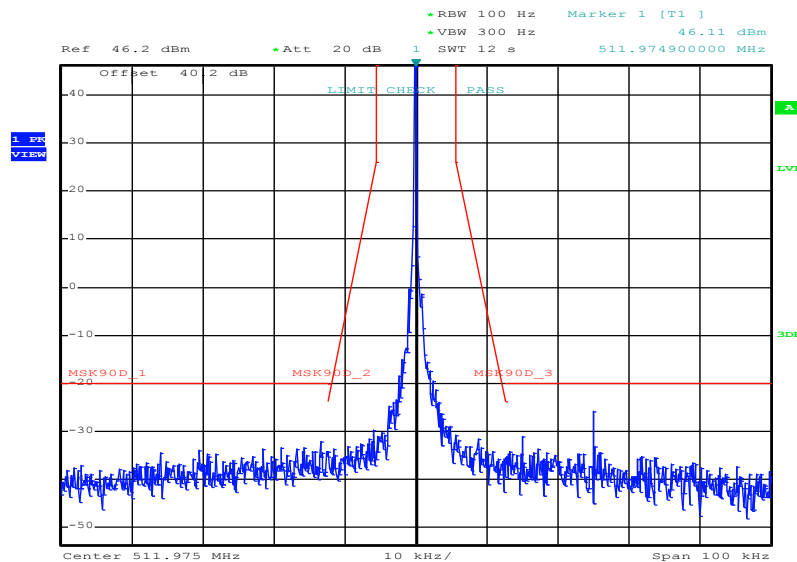
Date: 14.AUG.2015 09:31:54

Plot 44: Emission mask D – High channel – 1200 bits per second – High power – Carrier modulated



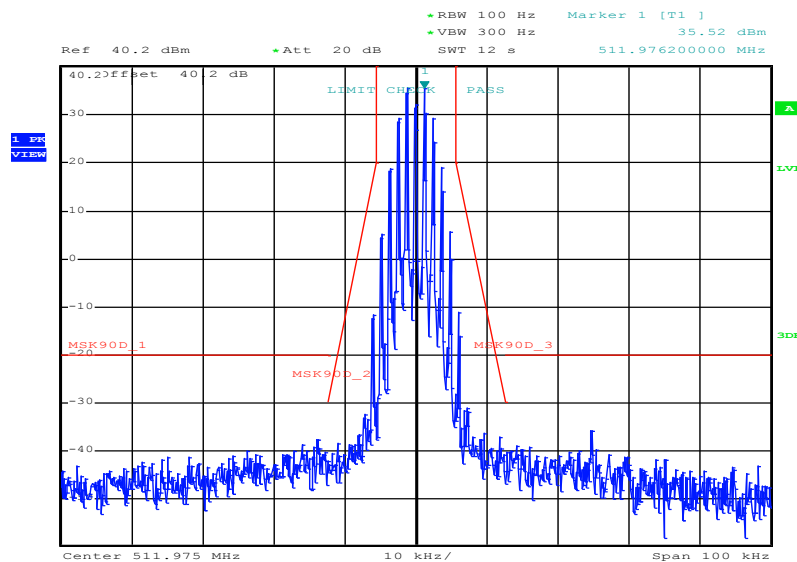
Date: 14.AUG.2015 09:38:25

Plot 45: Emission mask D – High channel – 2400 bits per second – High power – Carrier unmodulated



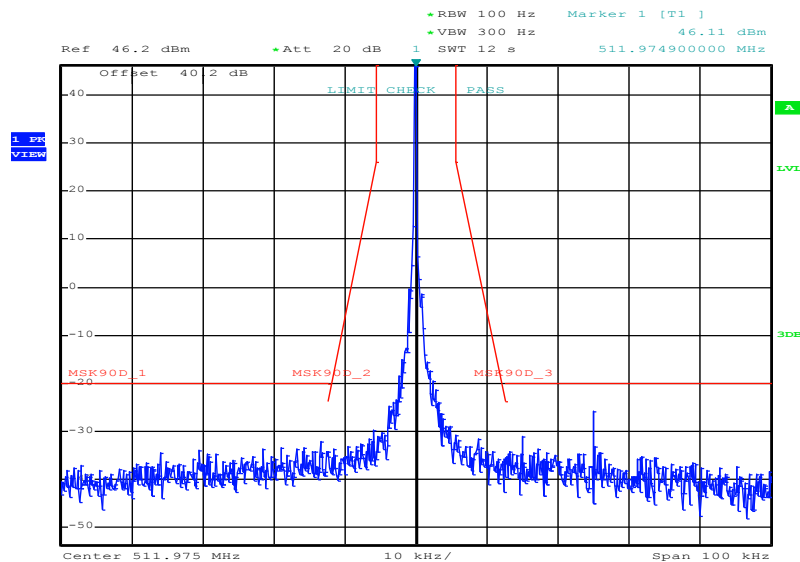
Date: 14.AUG.2015 09:31:54

Plot 46: Emission mask D – High channel – 2400 bits per second – High power – Carrier modulated



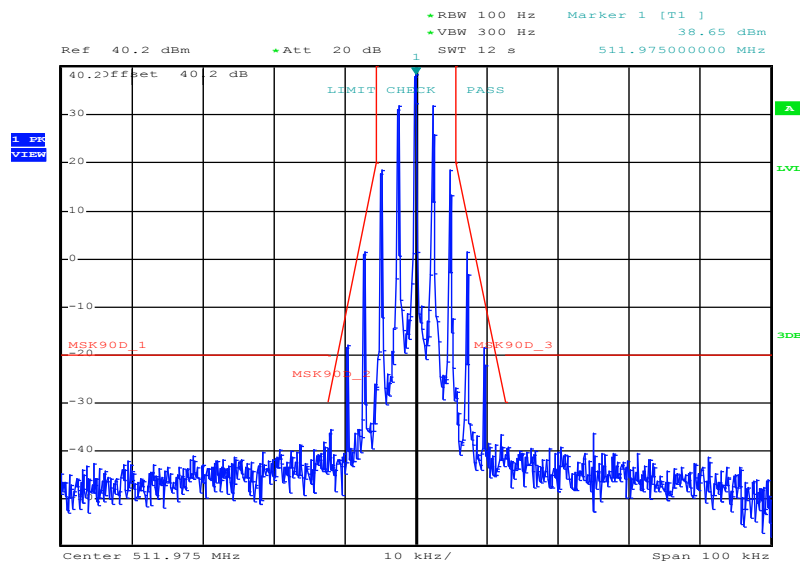
Date: 14.AUG.2015 09:46:59

Plot 47: Emission mask D – High channel – 4800 bits per second – High power – Carrier unmodulated



Date: 14.AUG.2015 09:31:54

Plot 48: Emission mask D – High channel – 4800 bits per second – High power – Carrier modulated



Date: 14.AUG.2015 09:48:02

## 12.4 Transient frequency behaviour

### Measurement:

The first plot shows the measurement of the carrier signal to show that a clean carrier is transmitted which results in a measured bandwidth of nearly twice the used RBW.  
 The following plots show triggered measurements in the time domain with a RBW of 6.25 kHz (3-dB filter). A decrease of this power level of 3 dB can be correlated to a frequency error of a half RBW (3.125 kHz). Therefore the frequency error is less than  $\pm 3.125$  kHz as long as the power level is in the 3 dB range. This criteria was taken as worst case condition to show compliance.

### Limits:

| FCC                           |                              |                                  |                                  |
|-------------------------------|------------------------------|----------------------------------|----------------------------------|
| FCC 47 CFR<br>§ 90.214        |                              |                                  |                                  |
| Transient frequency behaviour |                              |                                  |                                  |
| For 12.5 kHz channels         |                              |                                  |                                  |
| Transient periods             | Maximum frequency difference | Frequency range<br>150 – 174 MHz | Frequency range<br>421 - 512 MHz |
| $t_1$ (ms)                    | $\pm 12.5$ kHz               | 5.0 ms                           | 10.0 ms                          |
| $t_2$ (ms)                    | $\pm 6.5$ kHz                | 20.0 ms                          | 25.0 ms                          |
| $t_3$ (ms)                    | $\pm 12.5$ kHz               | 5.0 ms                           | 10.0 ms                          |

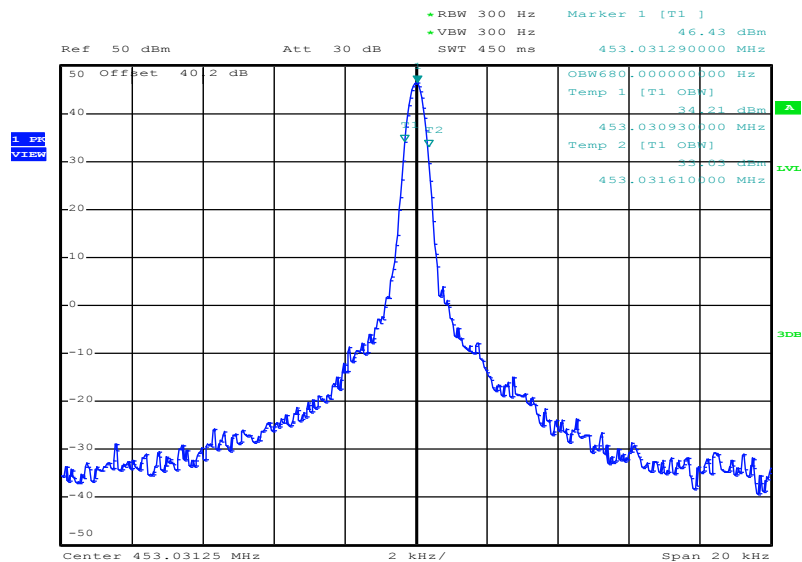
$t_1$  is the time period immediately following  $t_{on}$ .  
 $t_2$  is the time period immediately following  $t_1$ .  
 $t_3$  is the time period from the instant when the transmitter is turned off until  $t_{off}$ .

### Result: (also see plots)

| Test szenario                                                                                                                        | Lowest channel | Middle channel | Highest channel |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|
| The frequency stabilizes within the required frequency tolerance range after switching on the transmitter during period $t_1$ after: | 1.9 ms         | 0.4 ms         | 0.4 ms          |
| Maximum power deviation during $t_2$ :<br>(power deviation below 3 dB conforms a frequency deviation below $\pm 3.125$ kHz)          | 0.01 dB        | 0.03 dB        | 0.01 dB         |
| Switch off time ( $t_3$ ):                                                                                                           | 1.5 ms         | 1.6 ms         | 1.3 ms          |

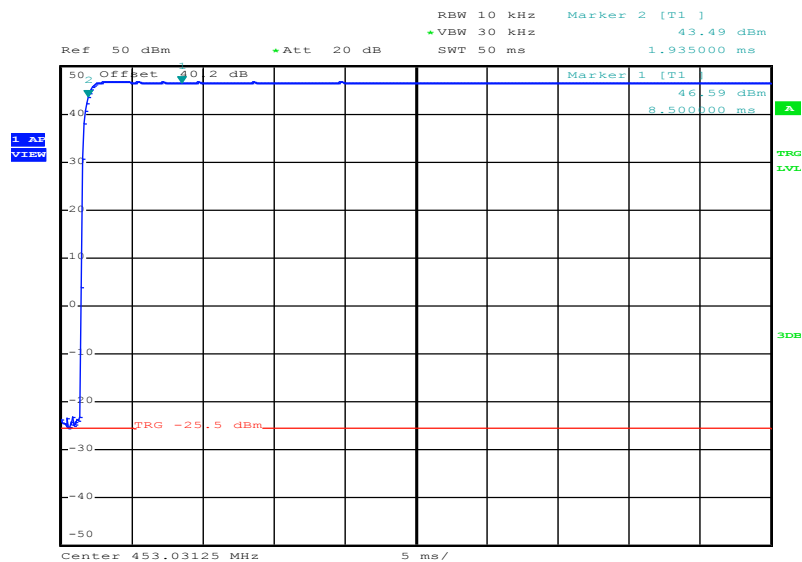
## Plots of the measurement:

## Plot 1: Lowest channel - Carrier



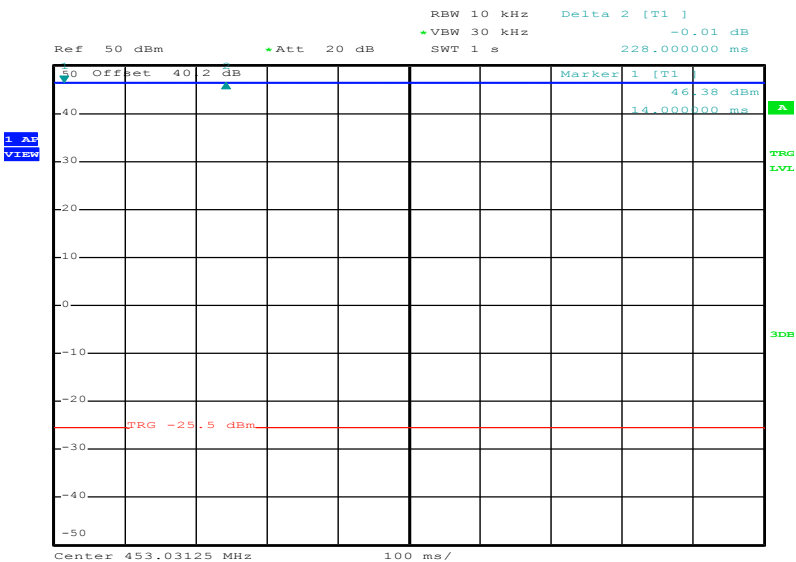
Date: 20.AUG.2015 09:49:10

## Plot 2: Lowest channel – Switch on (zoomed)



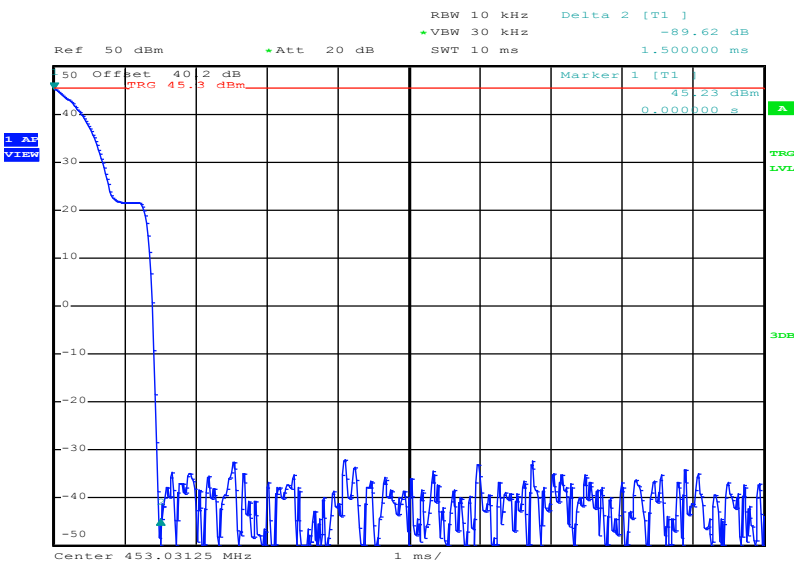
Date: 20.AUG.2015 10:19:59

Plot 3: Lowest channel – Operating



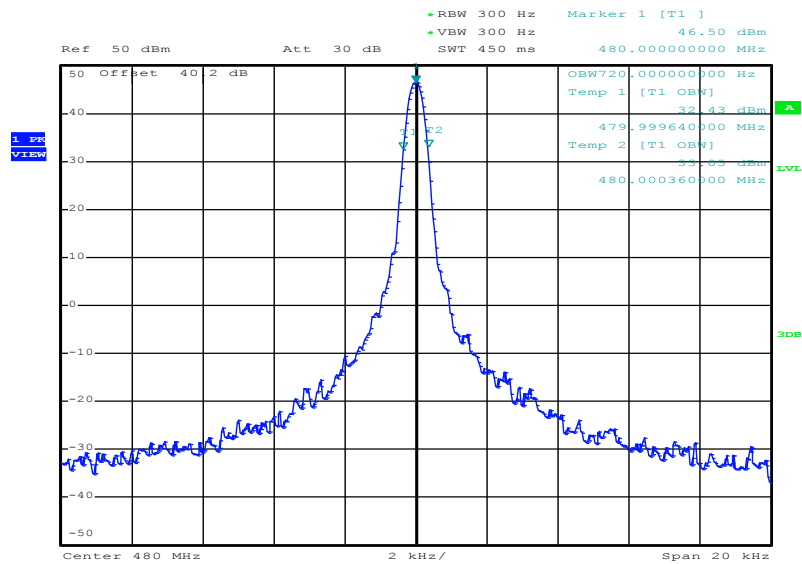
Date: 20.AUG.2015 10:29:55

Plot 4: Lowest channel – Switch off (zoomed)



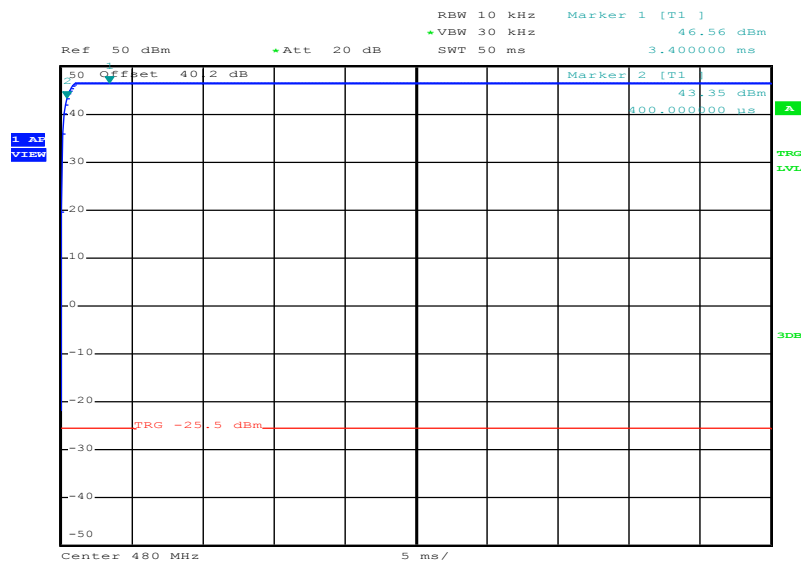
Date: 20.AUG.2015 10:39:24

**Plot 5: Middle channel - Carrier**



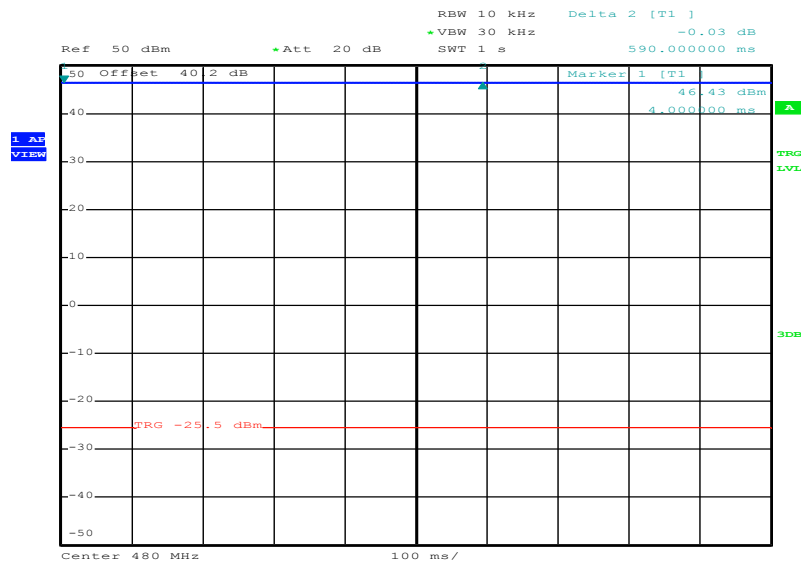
Date: 20.AUG.2015 09:50:14

**Plot 6: Middle channel – Switch on (zoomed)**



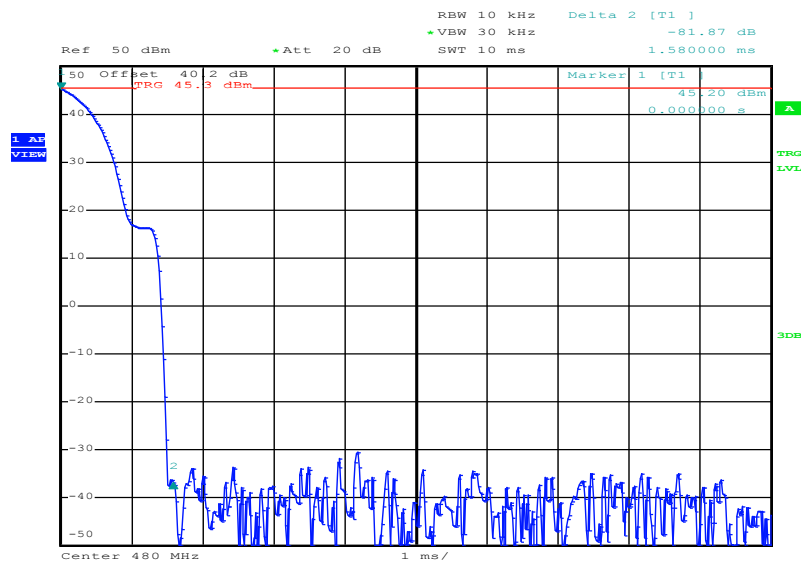
Date: 20.AUG.2015 10:21:50

Plot 7: Middle channel – Operating

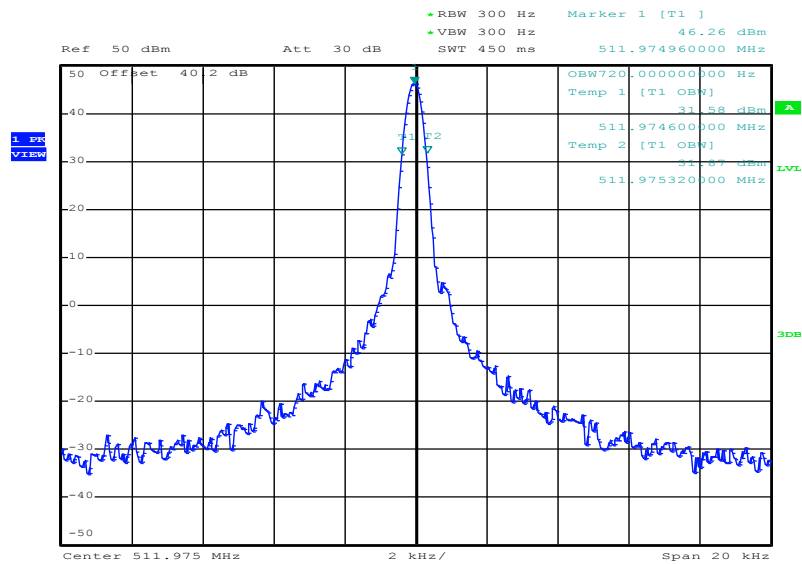


Date: 20.AUG.2015 10:28:24

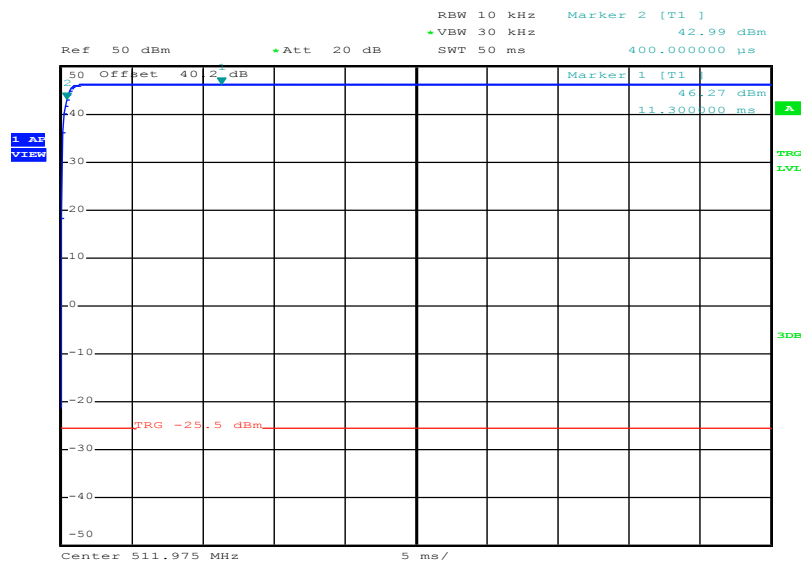
Plot 8: Middle channel – Switch off (zoomed)



Date: 20.AUG.2015 10:40:31

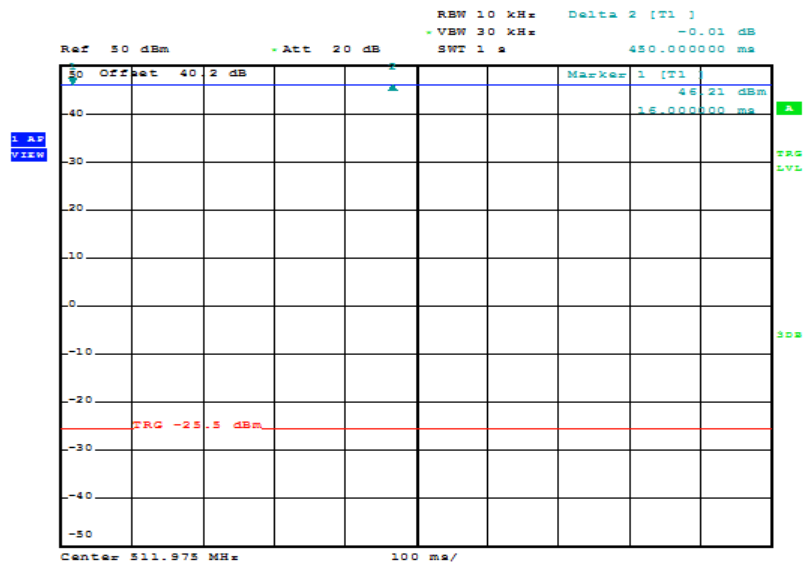
**Plot 9: Highest channel - Carrier**

Date: 20.AUG.2015 09:51:28

**Plot 10: Highest channel – Switch on (zoomed)**

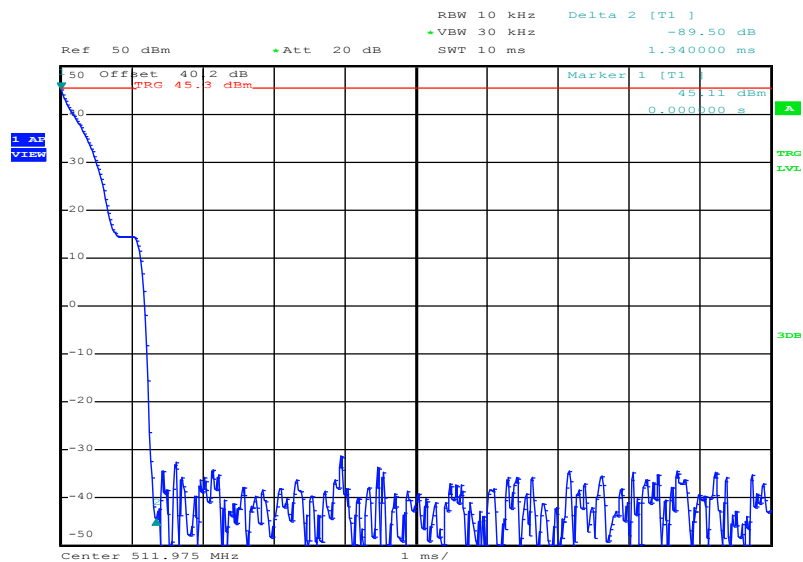
Date: 20.AUG.2015 10:23:47

Plot 11: Highest channel – Operating



Date: 20.AUG.2015 10:26:06

Plot 12: Highest channel – Switch off (zoomed)



Date: 20.AUG.2015 10:41:33

## 12.5 Frequency stability

### Measurement:

| Measurement parameter   |                      |
|-------------------------|----------------------|
| Detector:               | Peak                 |
| Sweep time:             | Auto                 |
| Resolution bandwidth:   | 30 Hz                |
| Video bandwidth:        | 300 Hz               |
| Span:                   | 5 kHz                |
| Trace mode:             | Max. hold            |
| Test setup:             | See sub clause 8.3 A |
| Measurement uncertainty | See sub clause 9     |

### Limits:

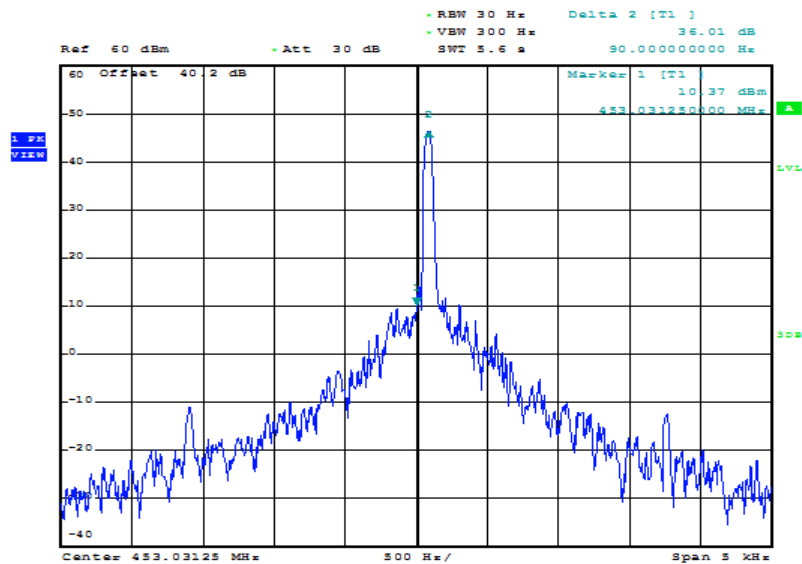
| FCC                                       |                                      |
|-------------------------------------------|--------------------------------------|
| FCC 47 CFR<br>§ 2.1055 (a)(1)<br>§ 90.213 |                                      |
| 150–174 MHz band:                         | 5 ppm for 12.5 kHz channel spacing   |
| 421–512 MHz band:                         | 2.5 ppm for 12.5 kHz channel spacing |

### Results:

| Temperature   | Deviation (Hz) | Deviation (ppm) | Deviation (Hz) | Deviation (ppm) | Deviation (Hz) | Deviation (ppm) |
|---------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
|               | Low channel    |                 | Middle channel |                 | High channel   |                 |
| -20 °C        | 90             | 0.20            | 85             | 0.18            | 40             | 0.08            |
| -10 °C        | -10            | -0.02           | -5             | -0.01           | 5              | 0.01            |
| 0 °C          | -20            | -0.04           | -5             | -0.01           | -30            | -0.06           |
| 10 °C         | 50             | 0.11            | 40             | 0.08            | 60             | 0.12            |
| 20 °C (V nom) | 65             | 0.15            | 70             | 0.15            | 50             | 0.10            |
| 30 °C         | 45             | 0.10            | 65             | 0.14            | 35             | 0.07            |
| 40 °C         | 5              | 0.01            | 20             | 0.04            | 5              | 0.01            |
| 50 °C         | 10             | 0.02            | 10             | 0.02            | -5             | -0.01           |
| Voltage       | Deviation (Hz) | Deviation (ppm) | Deviation (Hz) | Deviation (ppm) | Deviation (Hz) | Deviation (ppm) |
| 85 %          | 70             | 0.15            | 45             | 0.09            | 80             | 0.16            |
| 115 %         | 75             | 0.17            | 70             | 0.15            | 40             | 0.08            |

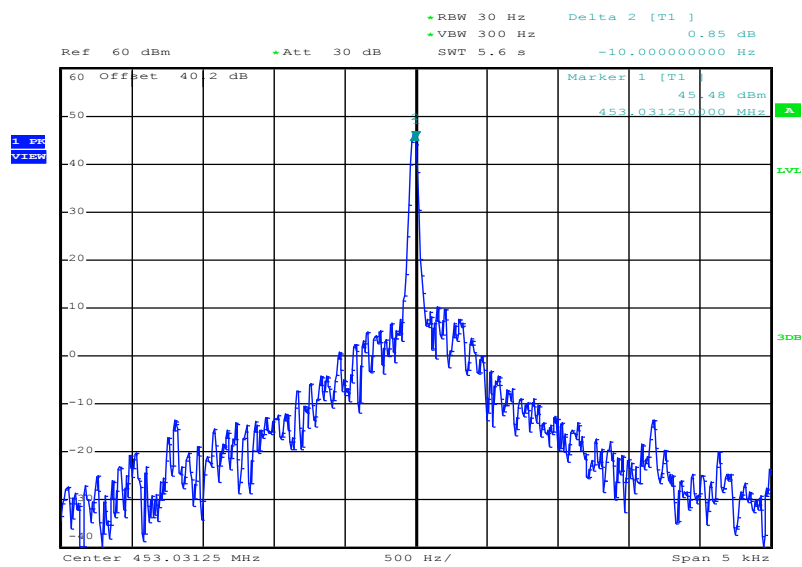
## Plots of the measurements

Plot 1: Low channel – Temperature: -20°C



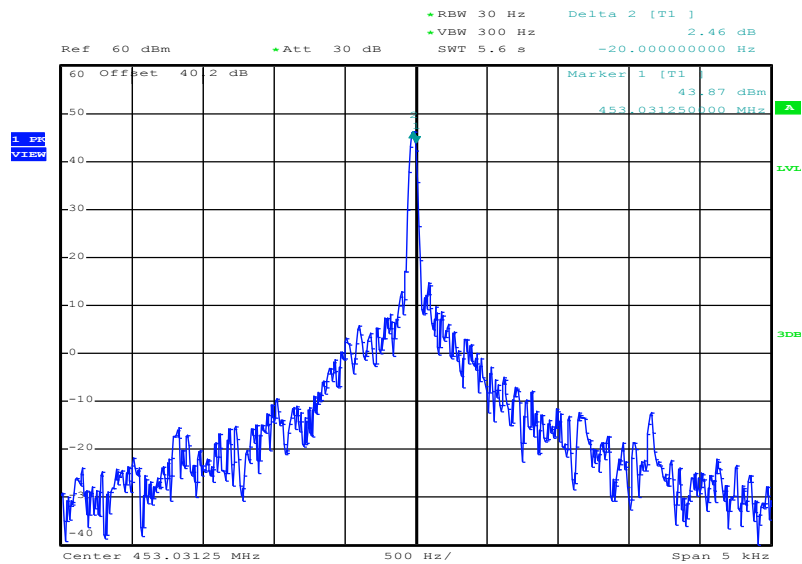
Date: 14.AUG.2015 12:21:14

Plot 2: Low channel – Temperature: -10°C



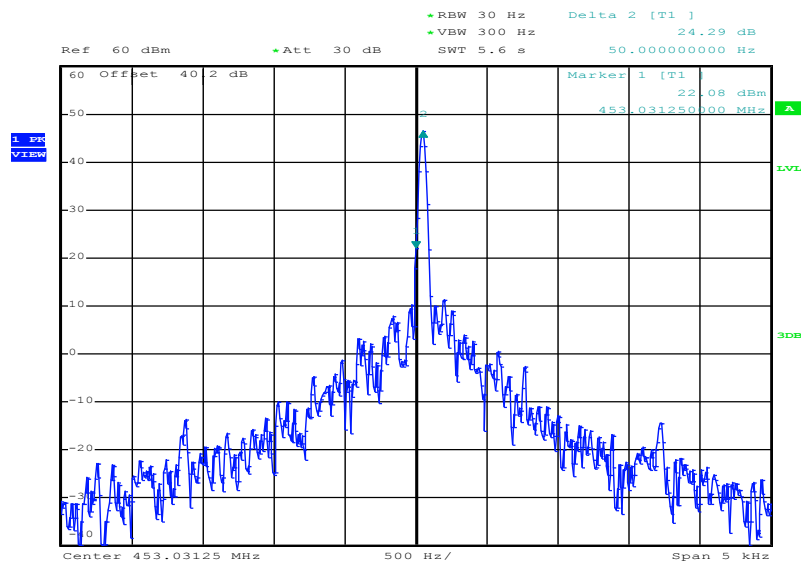
Date: 14.AUG.2015 13:11:56

Plot 3: Low channel – Temperature: 0°C



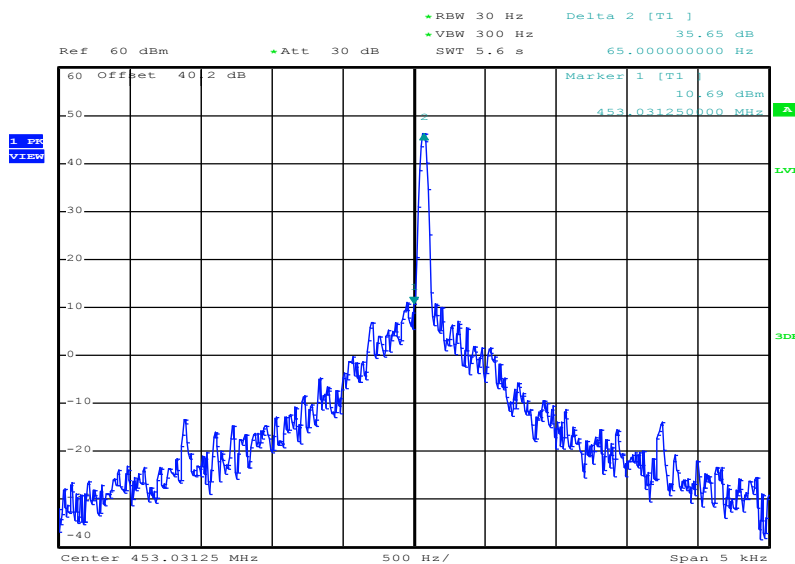
Date: 14.AUG.2015 13:13:35

Plot 4: Low channel – Temperature: 10°C



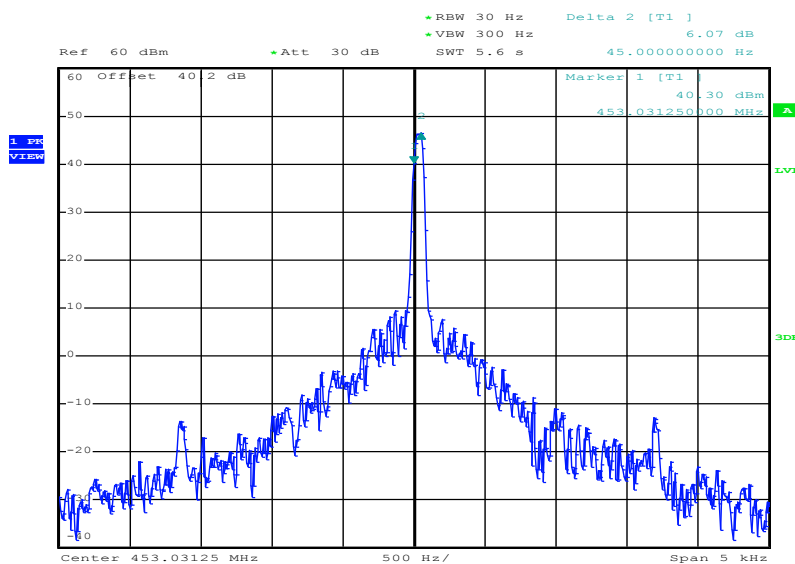
Date: 14.AUG.2015 13:41:36

Plot 5: Low channel – Temperature: 20°C



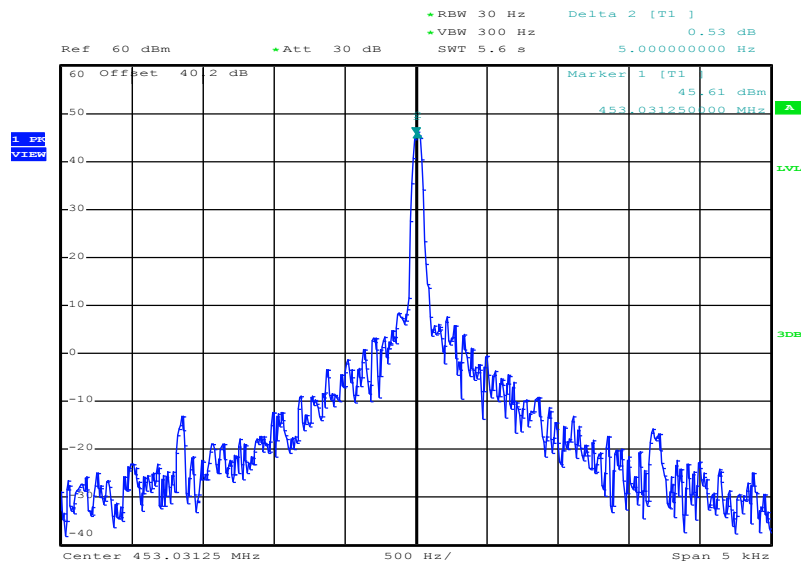
Date: 14.AUG.2015 13:44:45

Plot 6: Low channel – Temperature: 30°C



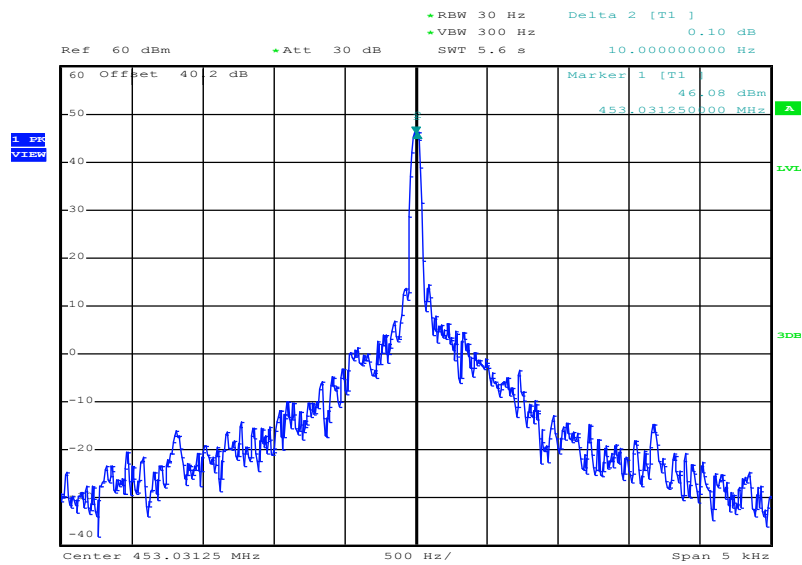
Date: 14.AUG.2015 14:02:28

Plot 7: Low channel – Temperature: 40°C



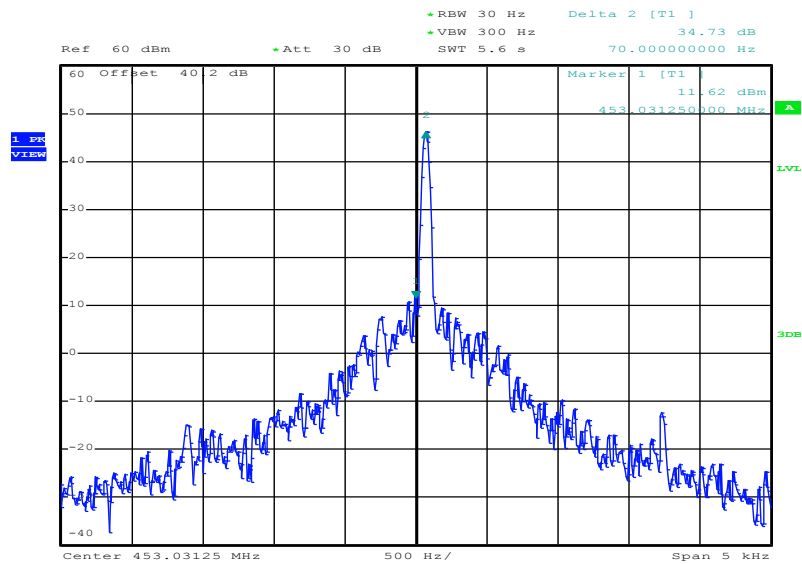
Date: 14.AUG.2015 14:14:05

Plot 8: Low channel – Temperature: 50°C



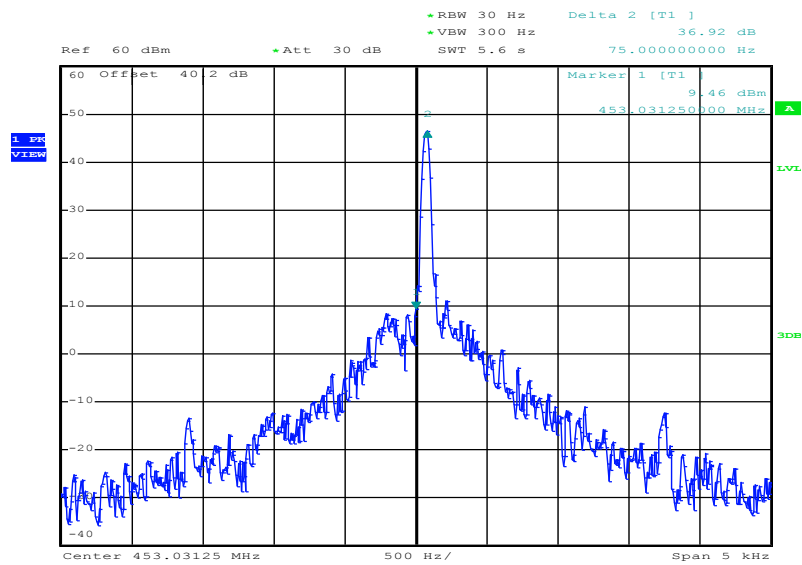
Date: 14.AUG.2015 14:29:03

Plot 9: Low channel – Temperature: 20°C – 85% Voltage



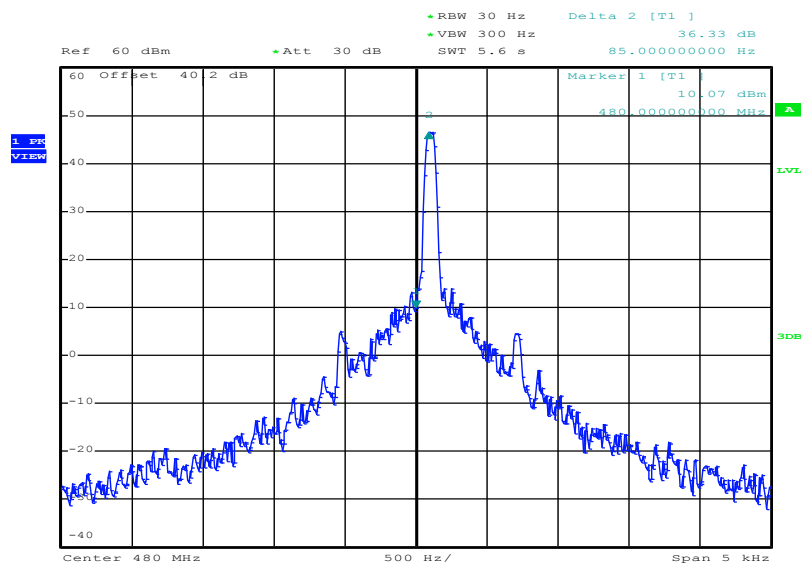
Date: 14.AUG.2015 13:43:05

Plot 10: Low channel – Temperature: 20°C – 115% Voltage



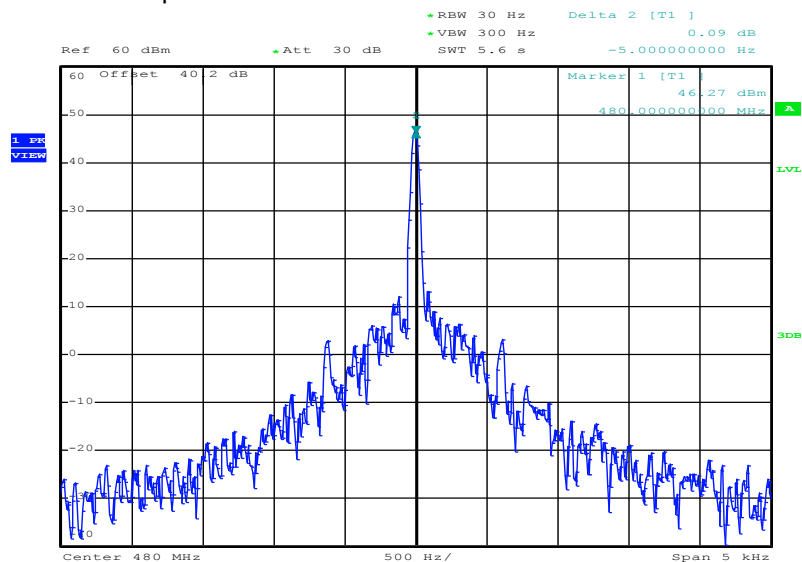
Date: 14.AUG.2015 13:44:01

Plot 11: Middle channel – Temperature: -20°C



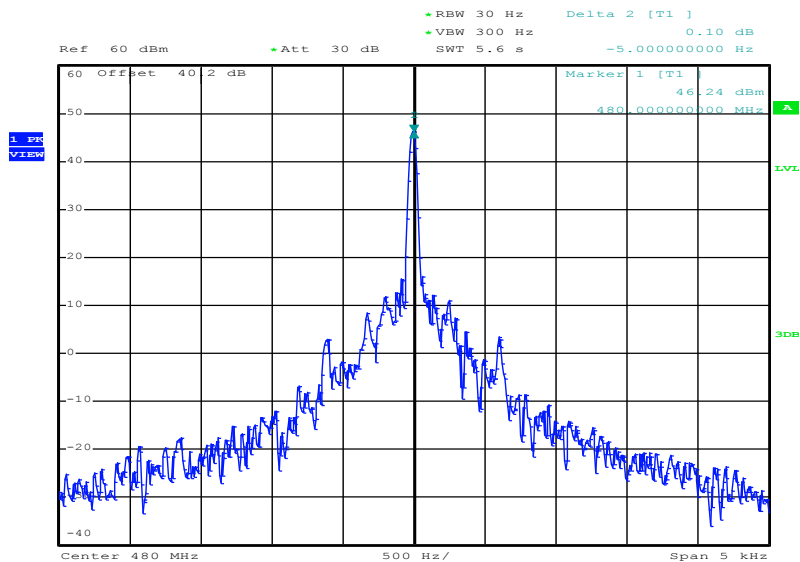
Date: 14.AUG.2015 12:23:15

Plot 12: Middle channel – Temperature: -10°C



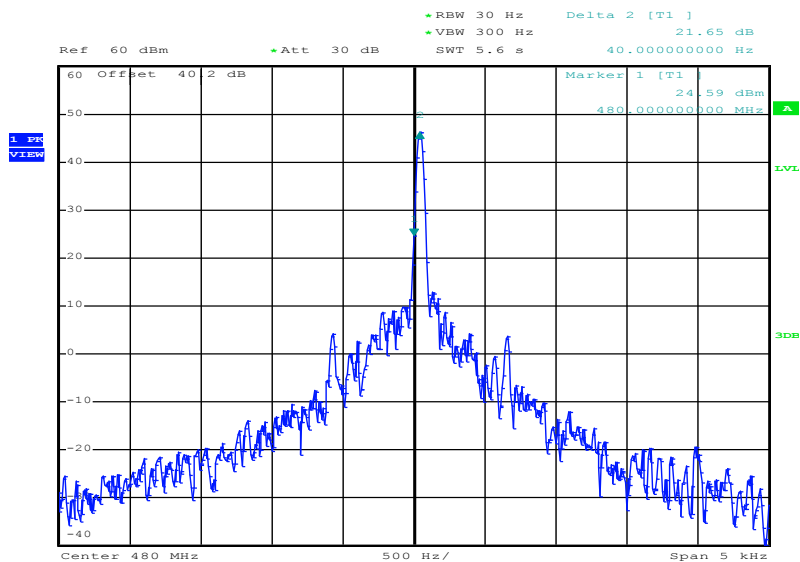
Date: 14.AUG.2015 13:09:55

Plot 13: Middle channel – Temperature: 0°C



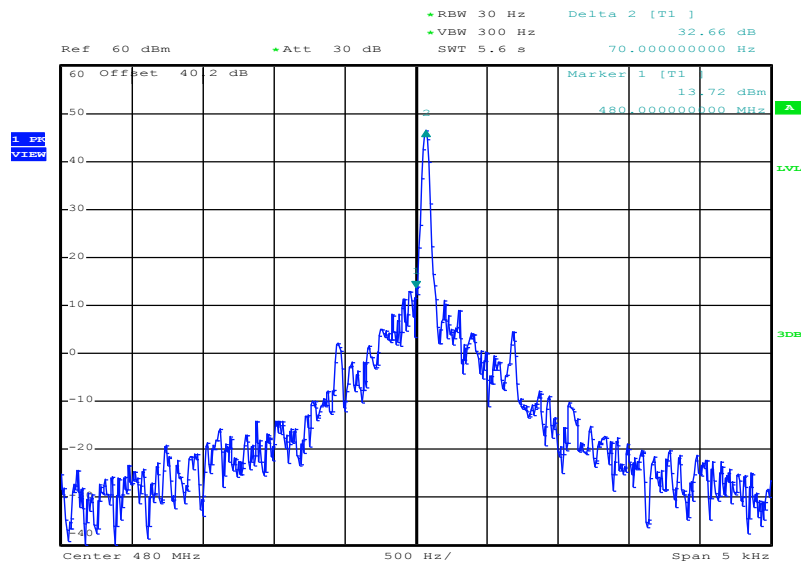
Date: 14.AUG.2015 13:14:41

Plot 14: Middle channel – Temperature: 10°C



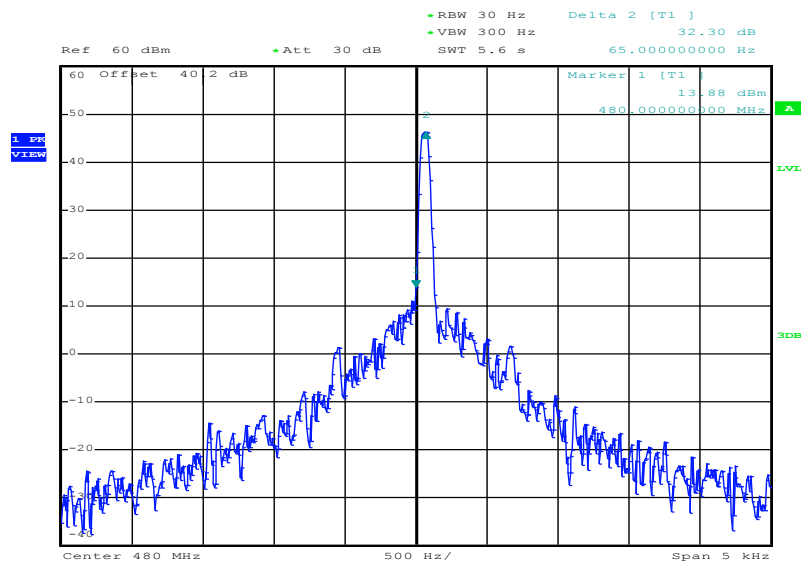
Date: 14.AUG.2015 13:40:23

Plot 15: Middle channel – Temperature: 20°C



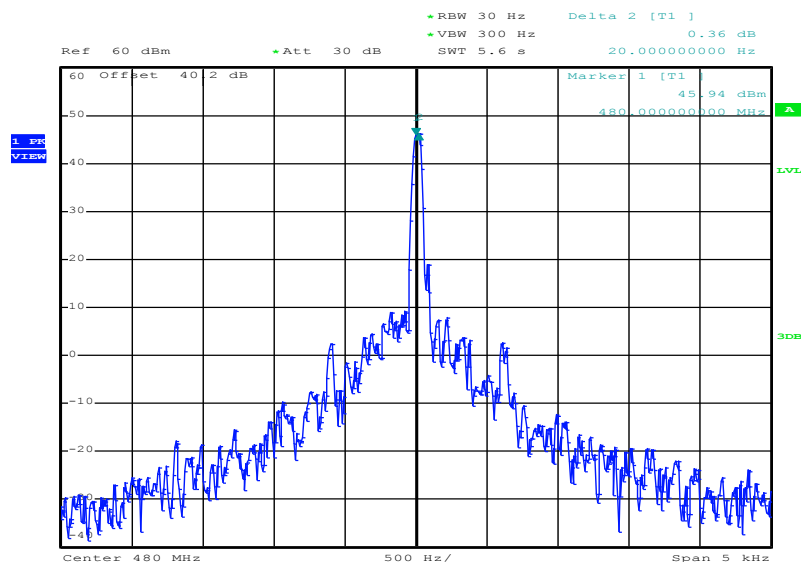
Date: 14.AUG.2015 13:45:47

Plot 16: Middle channel – Temperature: 30°C



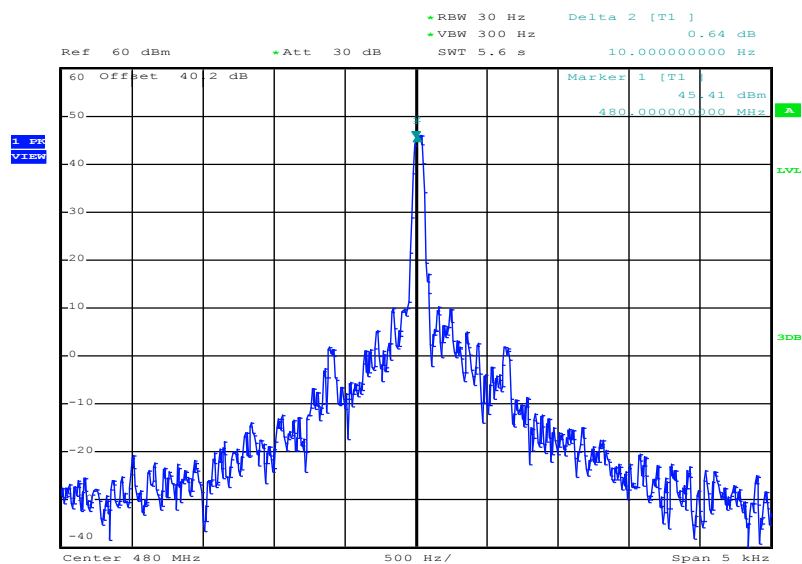
Date: 14.AUG.2015 14:01:34

Plot 17: Middle channel – Temperature: 40°C



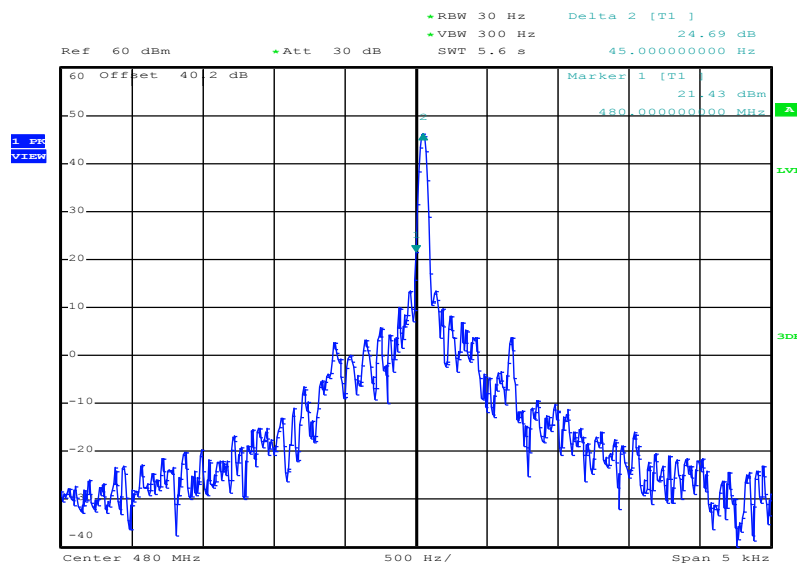
Date: 14.AUG.2015 14:14:58

Plot 18: Middle channel – Temperature: 50°C



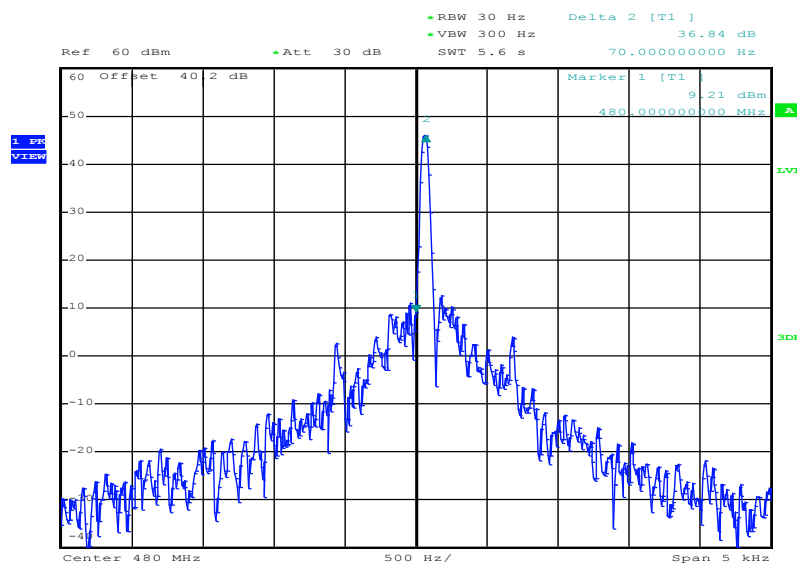
Date: 14.AUG.2015 14:27:56

Plot 19: Middle channel – Temperature: 20°C – 85% Voltage



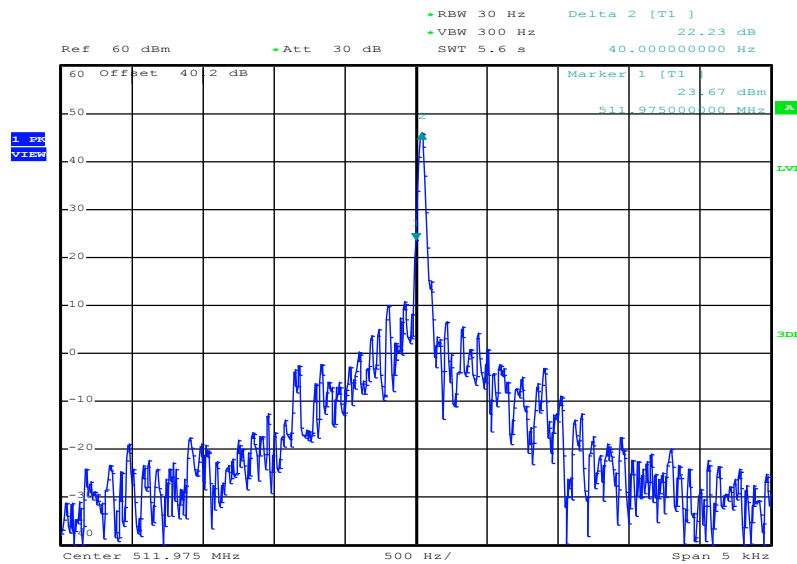
Date: 14.AUG.2015 13:46:23

Plot 20: Middle channel – Temperature: 20°C – 115% Voltage



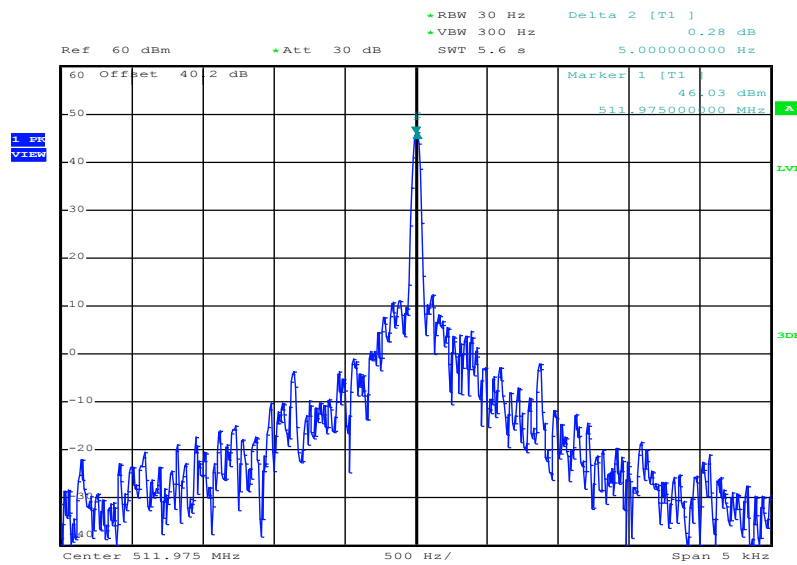
Date: 14.AUG.2015 13:47:10

Plot 21: High channel – Temperature: -20°C



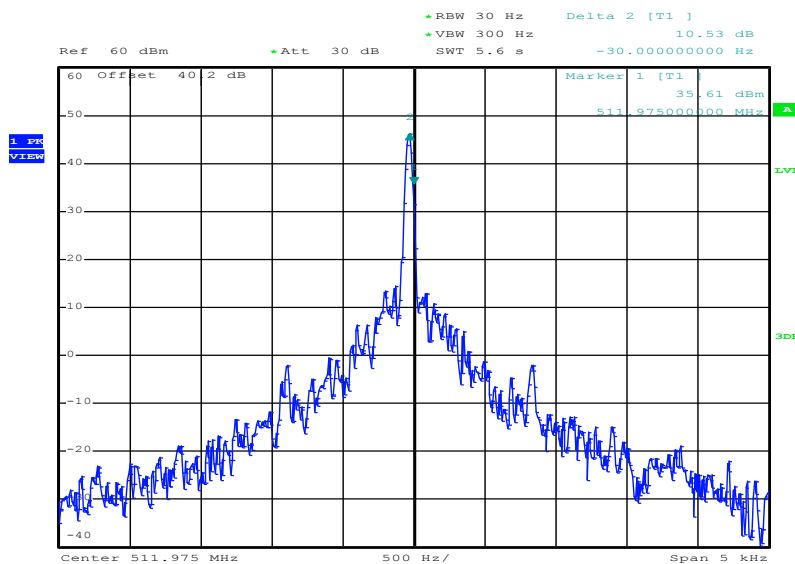
Date: 14.AUG.2015 13:07:39

Plot 22: High channel – Temperature: -10°C



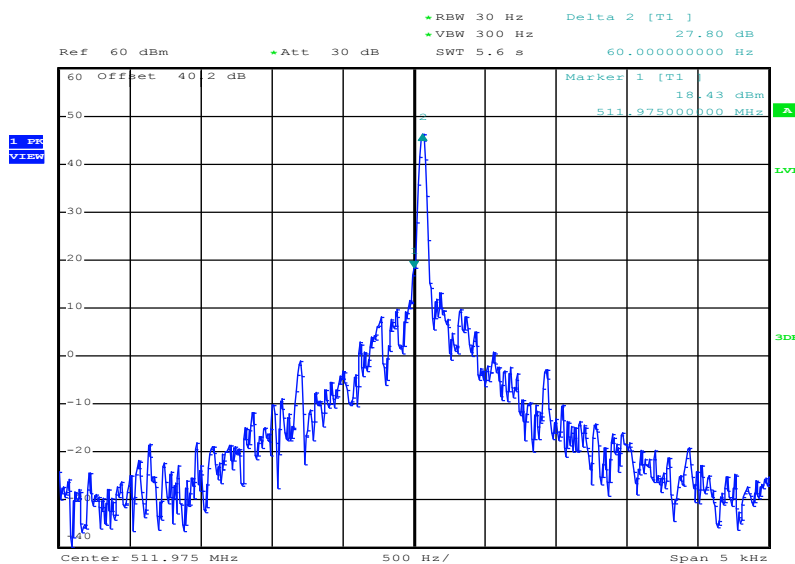
Date: 14.AUG.2015 13:08:36

Plot 23: High channel – Temperature: 0°C



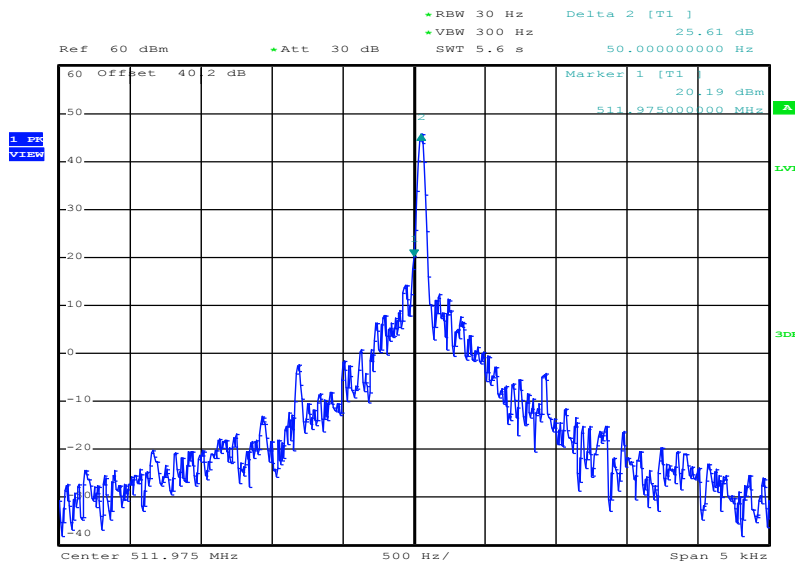
Date: 14.AUG.2015 13:16:21

Plot 24: High channel – Temperature: 10°C



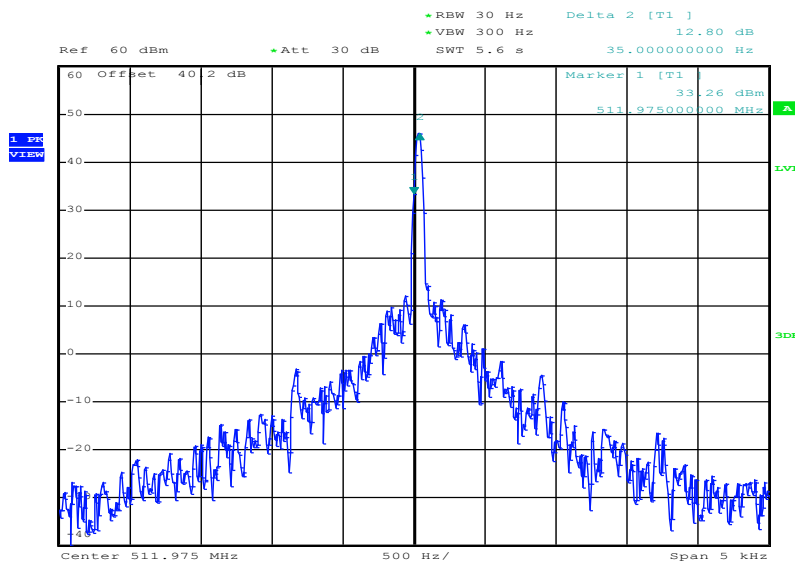
Date: 14.AUG.2015 13:39:06

Plot 25: High channel – Temperature: 20°C



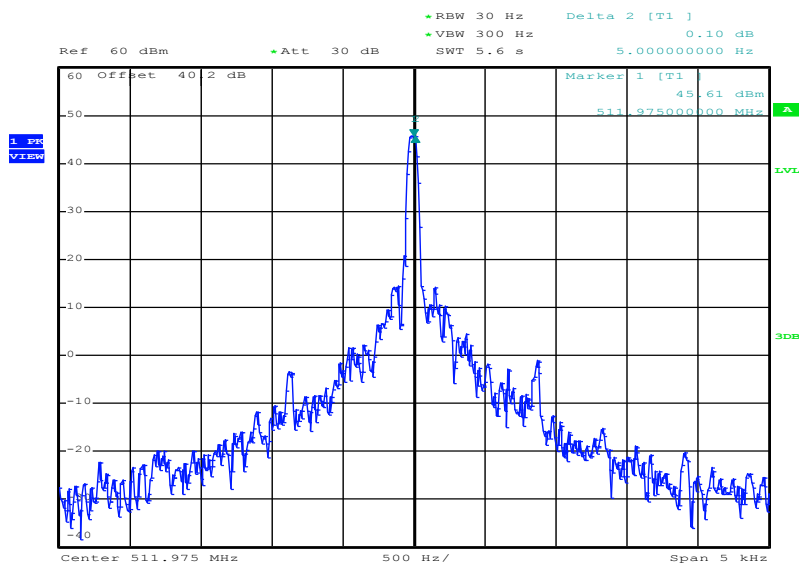
Date: 14.AUG.2015 13:48:18

Plot 26: High channel – Temperature: 30°C



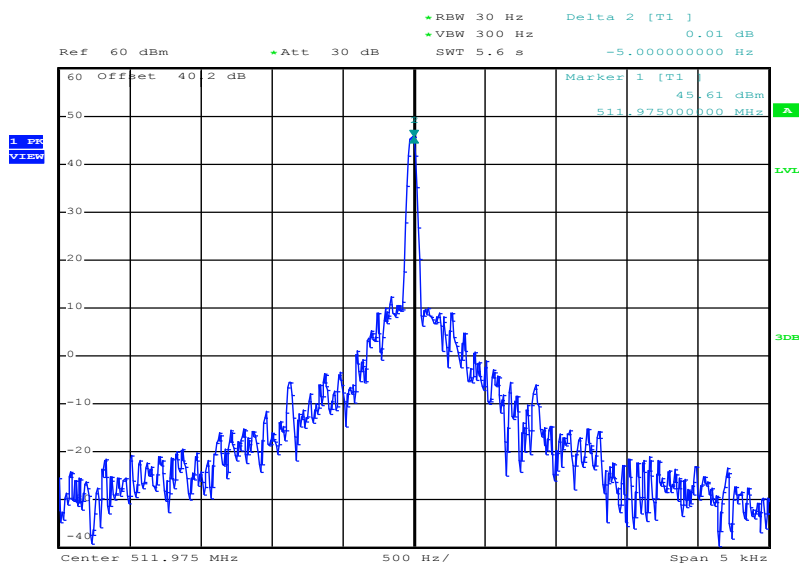
Date: 14.AUG.2015 14:00:29

Plot 27: High channel – Temperature: 40°C



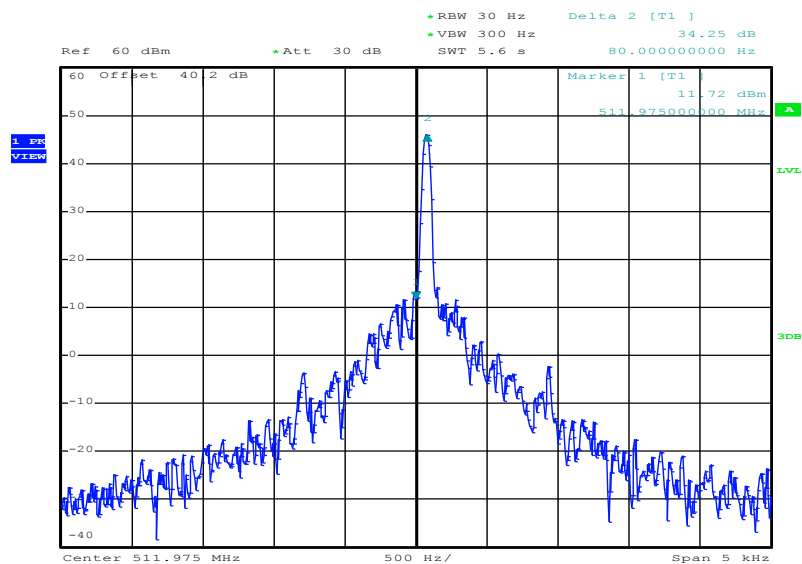
Date: 14.AUG.2015 14:16:24

Plot 28: High channel – Temperature: 50°C



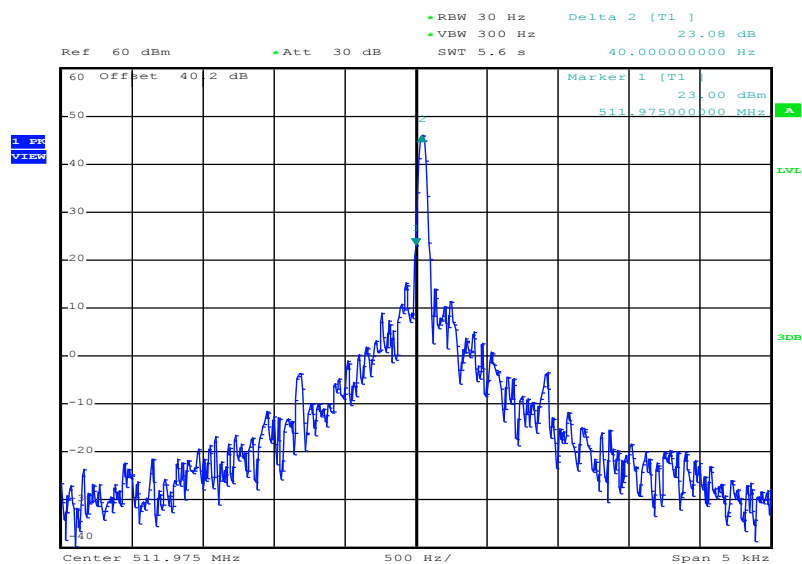
Date: 14.AUG.2015 14:27:03

Plot 29: High channel – Temperature: 20°C – 85% Voltage



Date: 14.AUG.2015 13:48:51

Plot 30: High channel – Temperature: 20°C - 115% Voltage



Date: 14.AUG.2015 13:49:22

## 12.6 Transmitter spurious emissions (conducted)

### Measurement:

| Measurement parameter   |                                         |
|-------------------------|-----------------------------------------|
| Detector:               | Peak                                    |
| Sweep time:             | Auto                                    |
| Resolution bandwidth:   | f < 1 GHz : 100 kHz<br>f ≥ 1GHz : 1 MHz |
| Video bandwidth:        | f < 1 GHz : 100 kHz<br>f ≥ 1GHz : 1 MHz |
| Span:                   | See plots                               |
| Trace mode:             | Max. hold                               |
| Test setup:             | See sub clause 8.3 B                    |
| Measurement uncertainty | See sub clause 9                        |

### Limits:

| FCC                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC 47 CFR<br>§ 2.1051<br>§ 90.210                                                                                                                                                                                                                                                    |
| Emission mask D<br>12.5 kHz channel spacing<br>On any frequency removed from the center of the<br>authorized bandwidth by a displacement frequency<br>(f <sub>d</sub> in kHz) of more than 12.5 kHz:<br>At least 50 + 10 log (P) dB or 70 dB, whichever is the<br>lesser attenuation. |

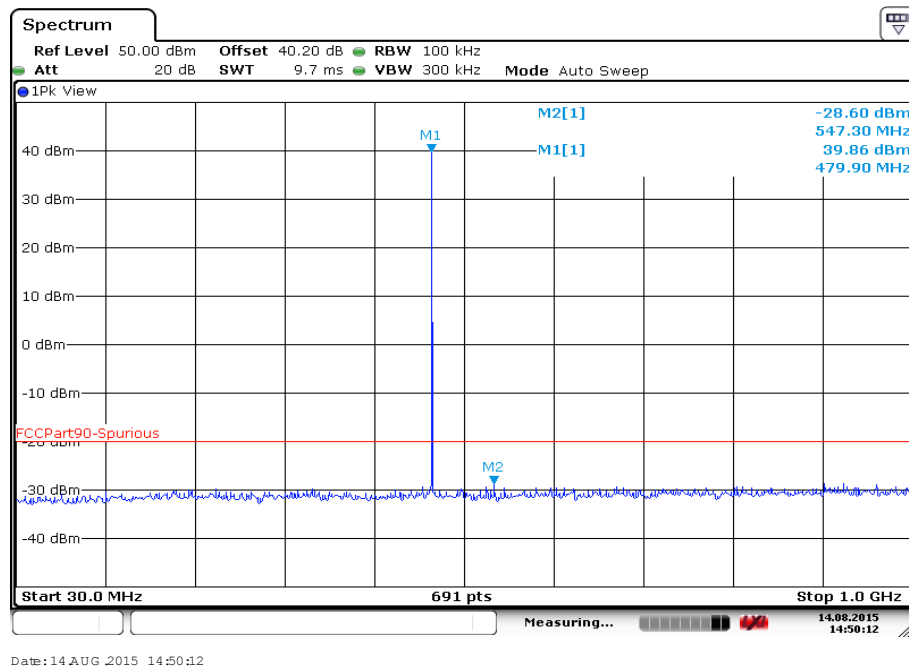
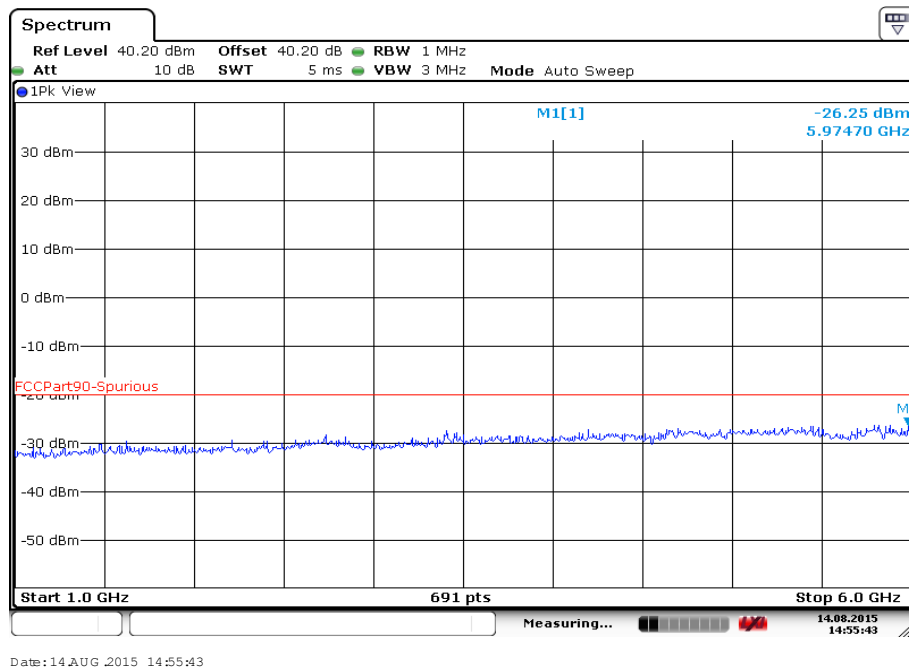
### Results: Low power

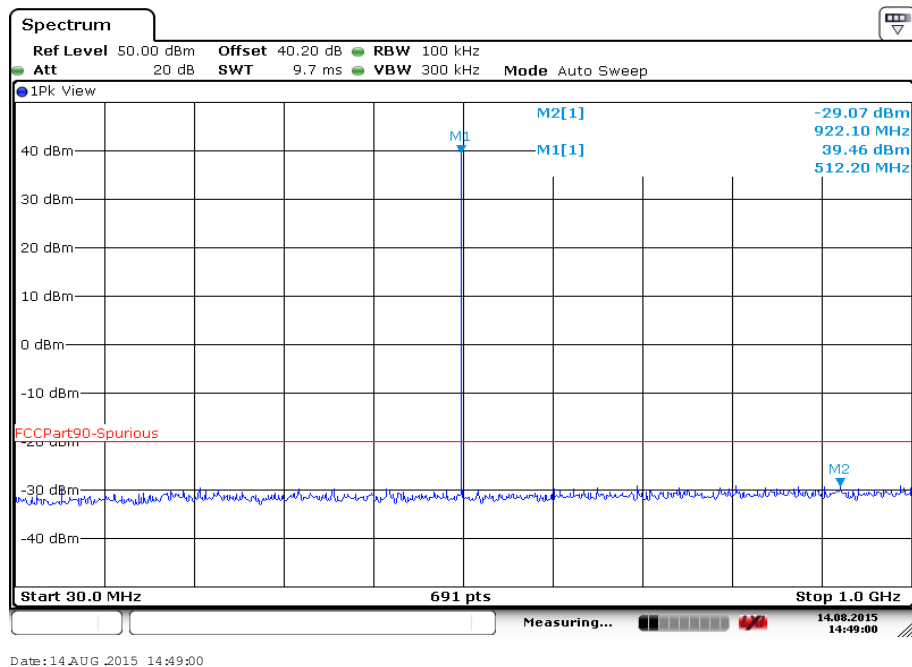
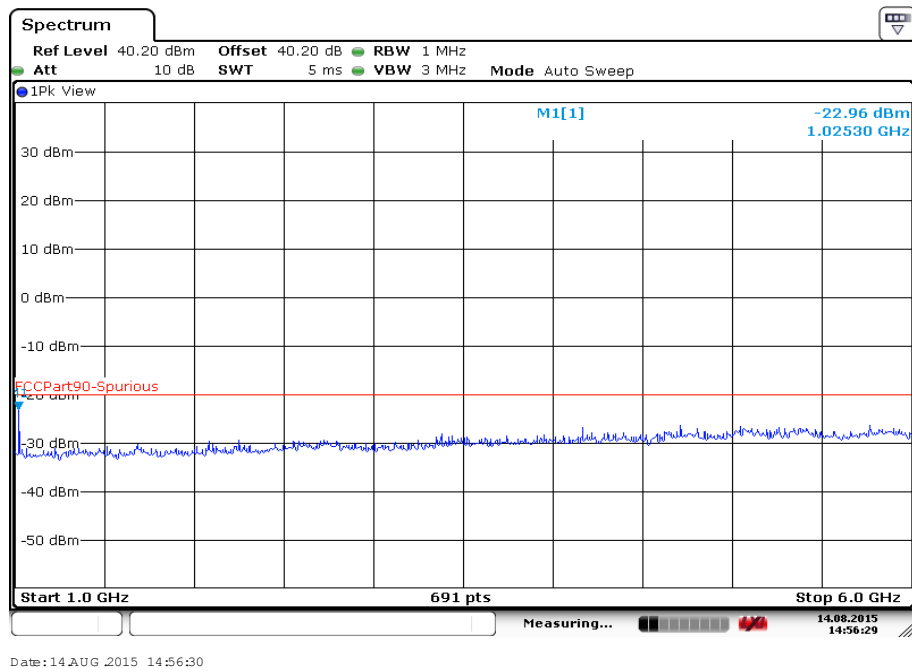
| Spurious emission level (dBm) |                     |             |          |                     |             |          |                      |             |
|-------------------------------|---------------------|-------------|----------|---------------------|-------------|----------|----------------------|-------------|
| Harmonic                      | Ch. low Freq. (MHz) | Level [dBm] | Harmonic | Ch. mid Freq. (MHz) | Level [dBm] | Harmonic | Ch. high Freq. (MHz) | Level [dBm] |
| 2                             | 906.06              | -29.4       | 2        | 960.0               | -/-         | 2        | 1023.95              | -23.0       |
| 3                             | 1359.01             | -/-         | 3        | 1440.0              | -/-         | 3        | 1535.93              | -/-         |
| 4                             | 1812.13             | -/-         | 4        | 1920                | -/-         | 4        | 2047.90              | -/-         |
| 5                             | 2265.16             | -/-         | 5        | 2400                | -/-         | 5        | 2559.88              | -/-         |
| 6                             | 2718.19             | -/-         | 6        | 2880                | -/-         | 6        | 3071.85              | -/-         |
| 7                             | 3171.22             | -/-         | 7        | 3360                | -/-         | 7        | 3583.83              | -/-         |
| 8                             | 3624.25             | -/-         | 8        | 3840                | -/-         | 8        | 4095.80              | -/-         |
| 9                             | 4077.28             | -/-         | 9        | 4320                | -/-         | 9        | 4607.78              | -/-         |
| 10                            | 4530.30             | -/-         | 10       | 4800                | -/-         | 10       | 5119.75              | -/-         |

**Results: High power**

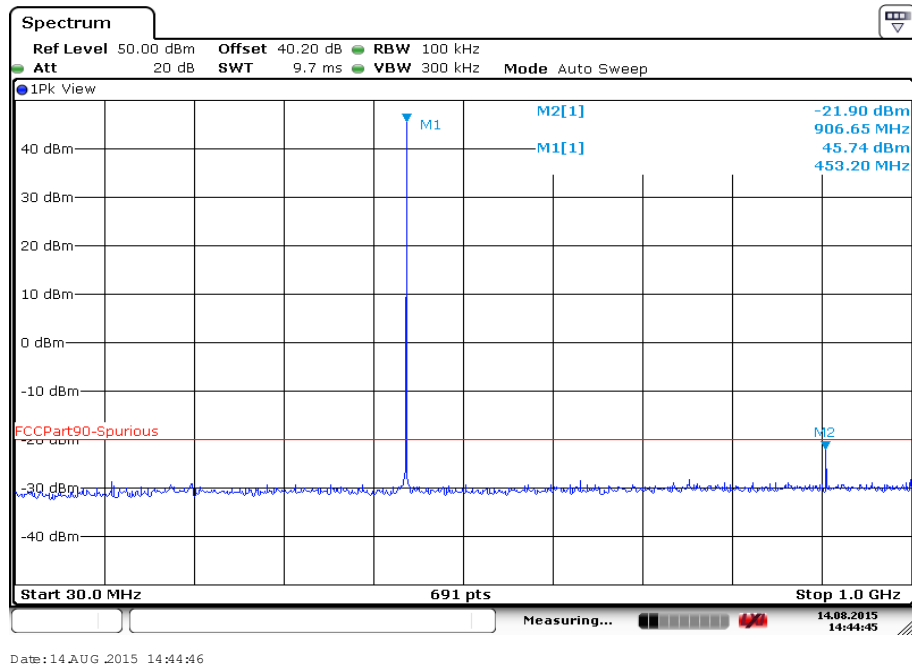
| Spurious emission level (dBm) |                     |             |          |                     |             |          |                      |             |
|-------------------------------|---------------------|-------------|----------|---------------------|-------------|----------|----------------------|-------------|
| Harmonic                      | Ch. low Freq. (MHz) | Level [dBm] | Harmonic | Ch. mid Freq. (MHz) | Level [dBm] | Harmonic | Ch. high Freq. (MHz) | Level [dBm] |
| 2                             | 906.06              | -21.9       | 2        | 960.0               | -21.1       | 2        | 1023.95              | -26.0       |
| 3                             | 1359.01             | -27.1       | 3        | 1440.0              | -28.2       | 3        | 1535.93              | -24.6       |
| 4                             | 1812.13             | -/-         | 4        | 1920                | -/-         | 4        | 2047.90              | -/-         |
| 5                             | 2265.16             | -/-         | 5        | 2400                | -/-         | 5        | 2559.88              | -/-         |
| 6                             | 2718.19             | -/-         | 6        | 2880                | -/-         | 6        | 3071.85              | -/-         |
| 7                             | 3171.22             | -/-         | 7        | 3360                | -/-         | 7        | 3583.83              | -/-         |
| 8                             | 3624.25             | -/-         | 8        | 3840                | -/-         | 8        | 4095.80              | -/-         |
| 9                             | 4077.28             | -/-         | 9        | 4320                | -/-         | 9        | 4607.78              | -/-         |
| 10                            | 4530.30             | -/-         | 10       | 4800                | -/-         | 10       | 5119.75              | -/-         |



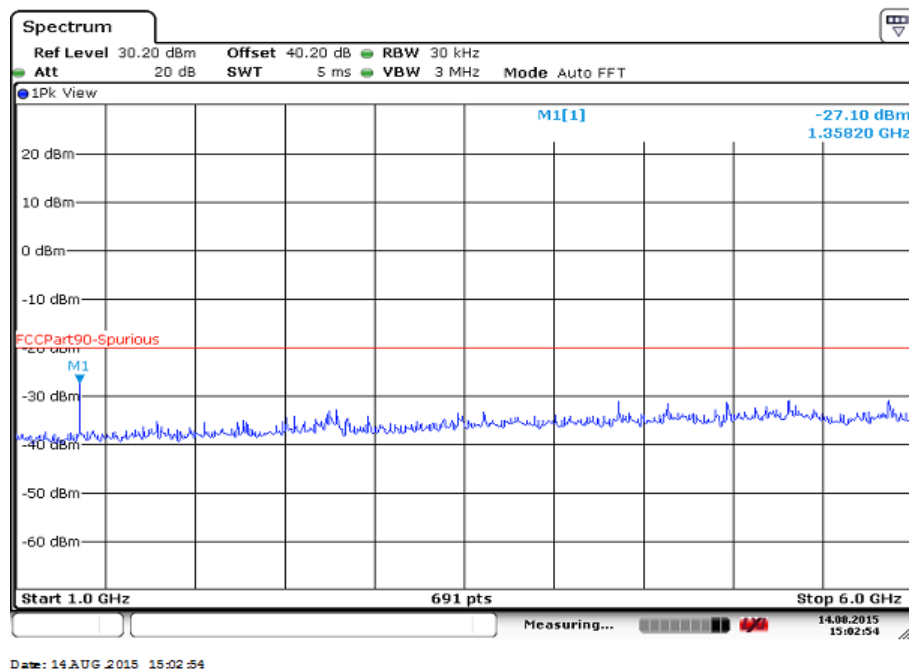
**Plot 3: Middle channel – Low power - 30 MHz to 1 GHz****Plot 4: Middle channel – Low power – 1 GHz to 6 GHz**

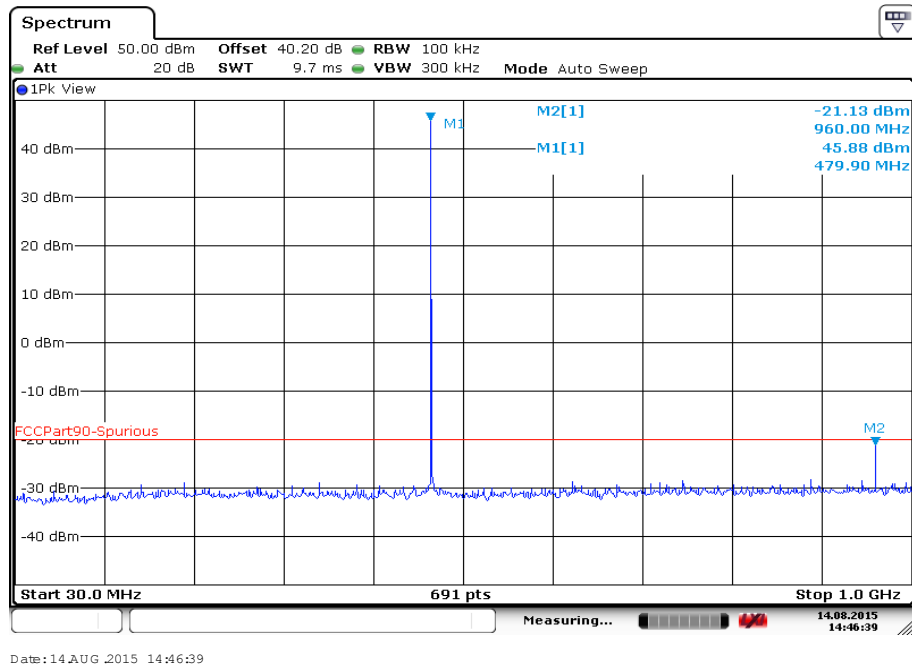
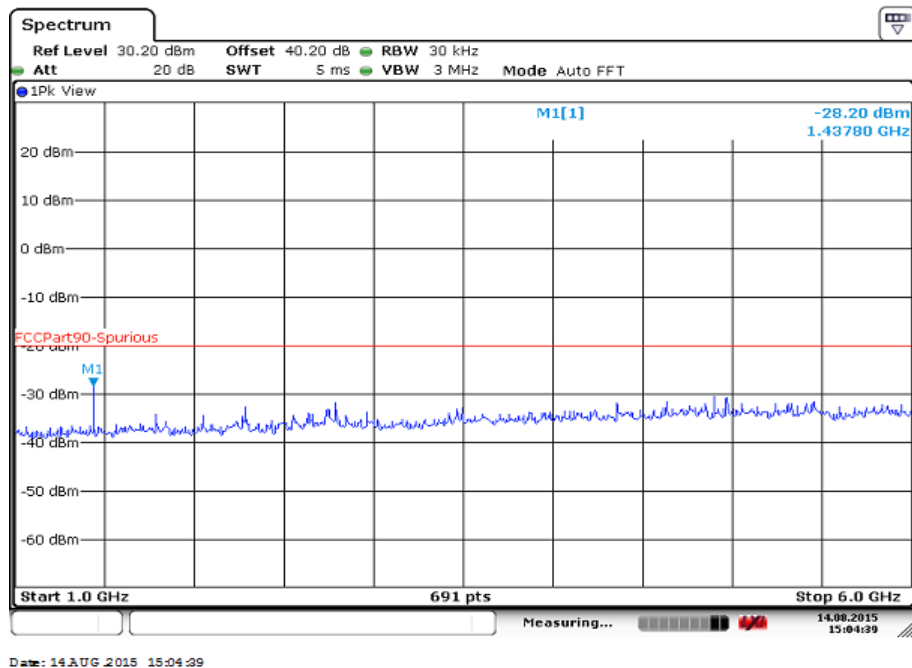
**Plot 5: High channel – Low power - 30 MHz to 1 GHz****Plot 6: High channel – Low power – 1 GHz to 6 GHz**

Plot 7: Low channel – High power - 30 MHz to 1 GHz

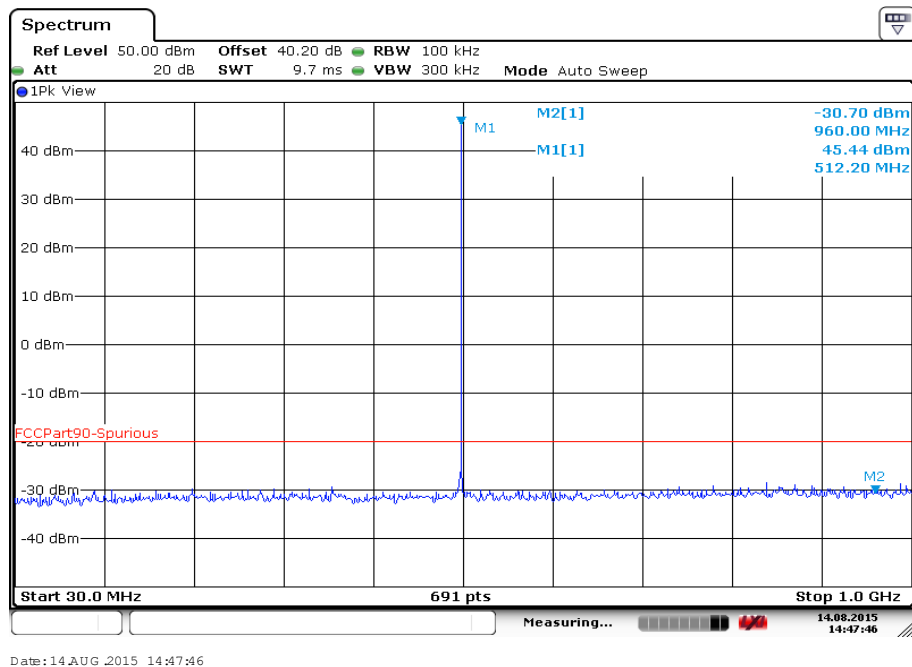


Plot 8: Low channel – High power – 1 GHz to 6 GHz

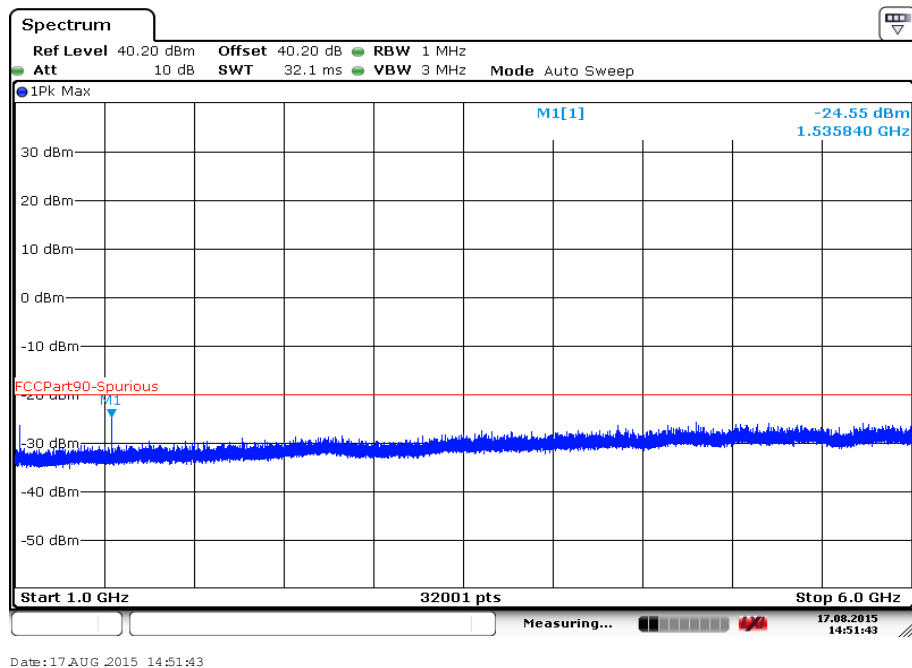


**Plot 9: Middle channel – High power - 30 MHz to 1 GHz****Plot 10: Middle channel – High power – 1 GHz to 6 GHz**

Plot 11: High channel – High power - 30 MHz to 1 GHz



Plot 12: High channel – High power – 1 GHz to 6 GHz



## 12.7 Transmitter spurious emissions (radiated)

### Measurement:

| Measurement parameter   |                                         |
|-------------------------|-----------------------------------------|
| Detector:               | Peak                                    |
| Sweep time:             | Auto                                    |
| Resolution bandwidth:   | f < 1 GHz : 100 kHz<br>f ≥ 1GHz : 1 MHz |
| Video bandwidth:        | f < 1 GHz : 100 kHz<br>f ≥ 1GHz : 1 MHz |
| Span:                   | See plots                               |
| Trace mode:             | Max. hold                               |
| Test setup:             | See sub clause 8.2 A                    |
| Measurement uncertainty | See sub clause 9                        |

### Limits:

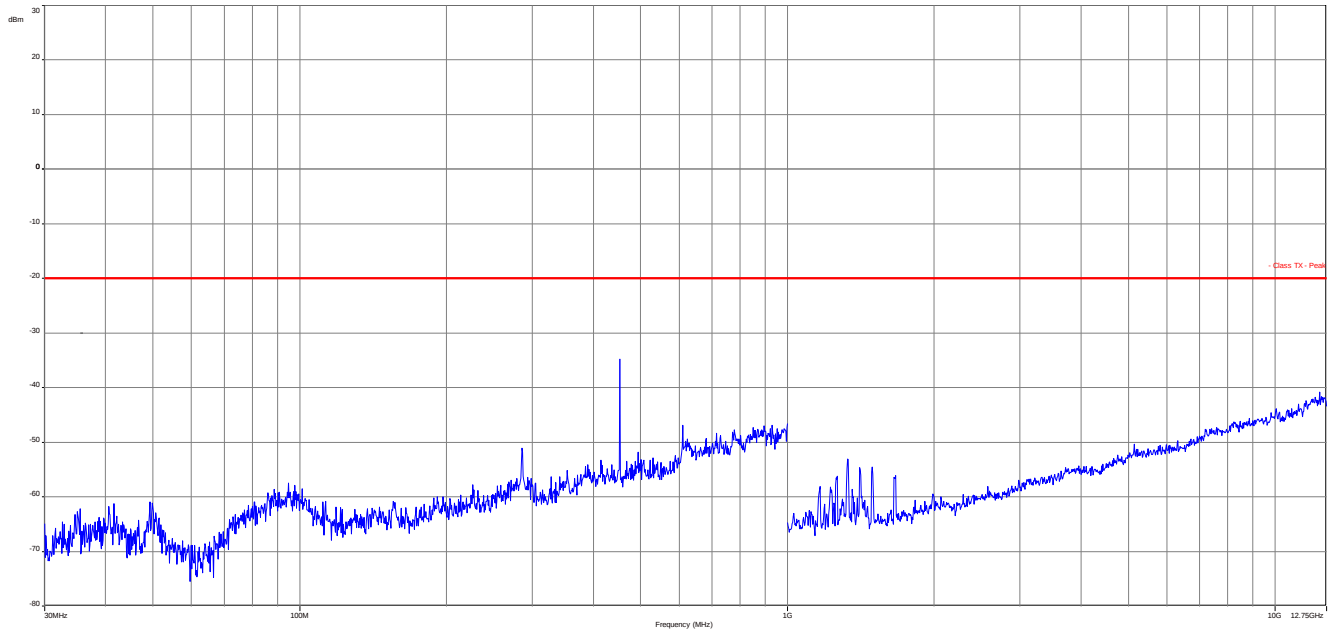
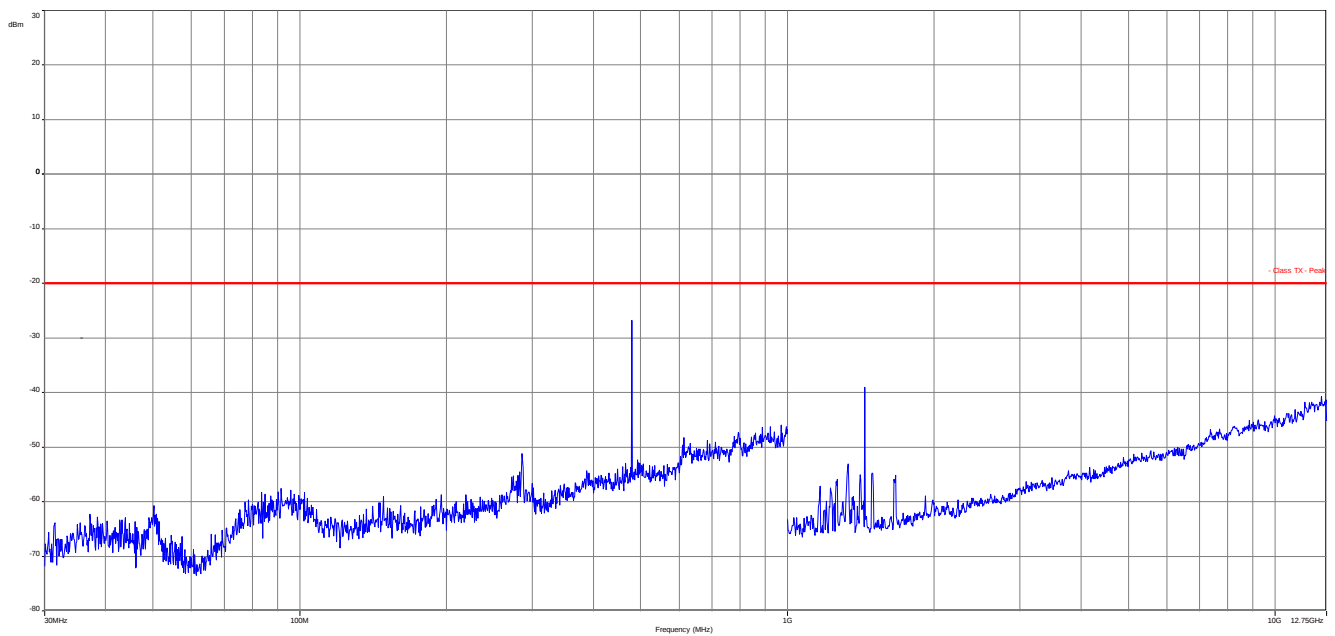
| FCC                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC 47 CFR<br>§ 2.1051<br>§ 90.210                                                                                                                                                                                                                                                    |
| Emission mask D<br>12.5 kHz channel spacing<br>On any frequency removed from the center of the<br>authorized bandwidth by a displacement frequency<br>(f <sub>d</sub> in kHz) of more than 12.5 kHz:<br>At least 50 + 10 log (P) dB or 70 dB, whichever is the<br>lesser attenuation. |

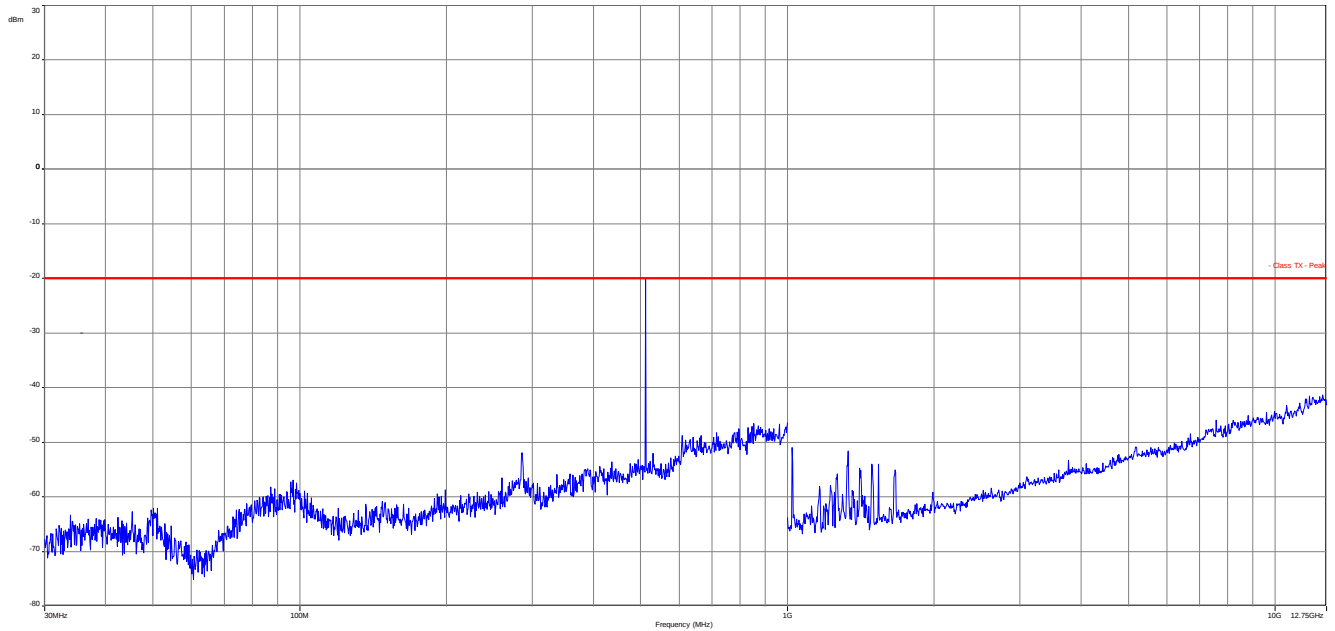
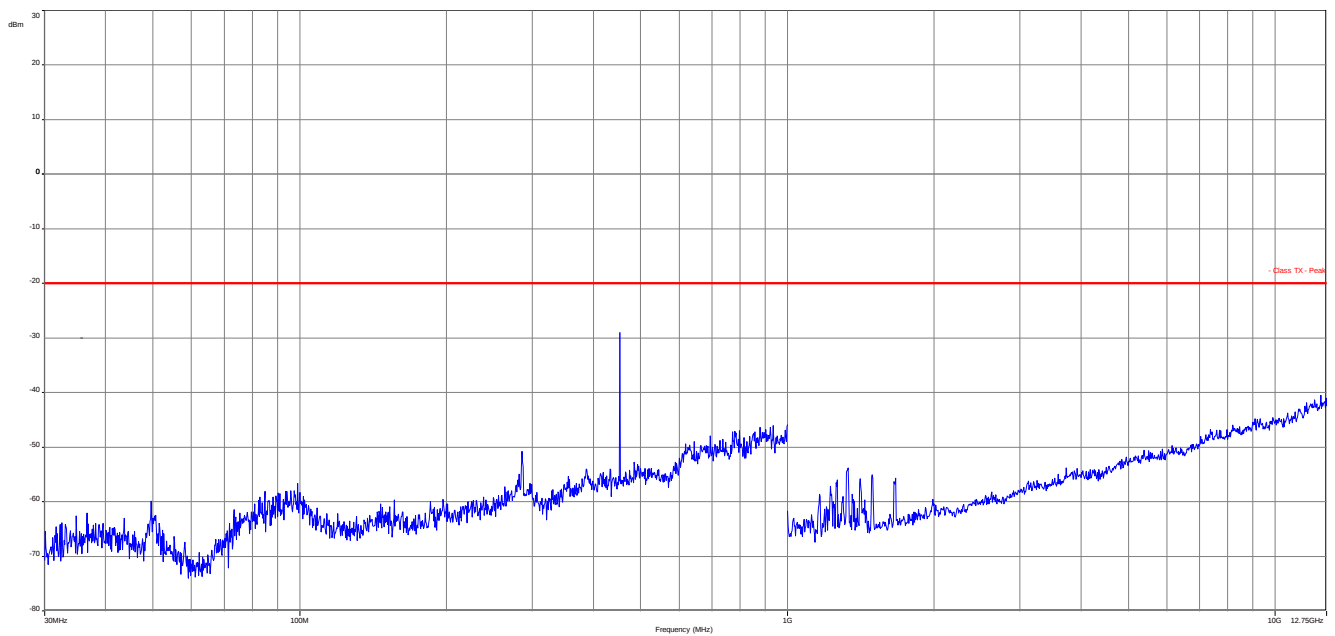
### Low Power:

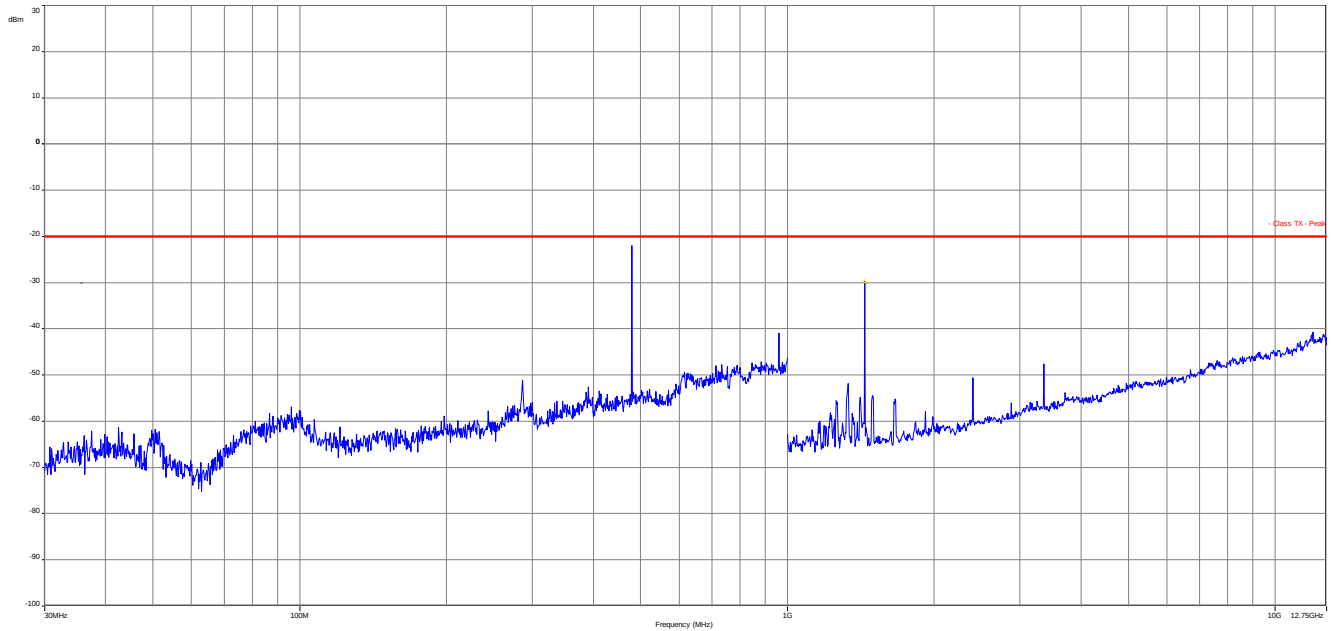
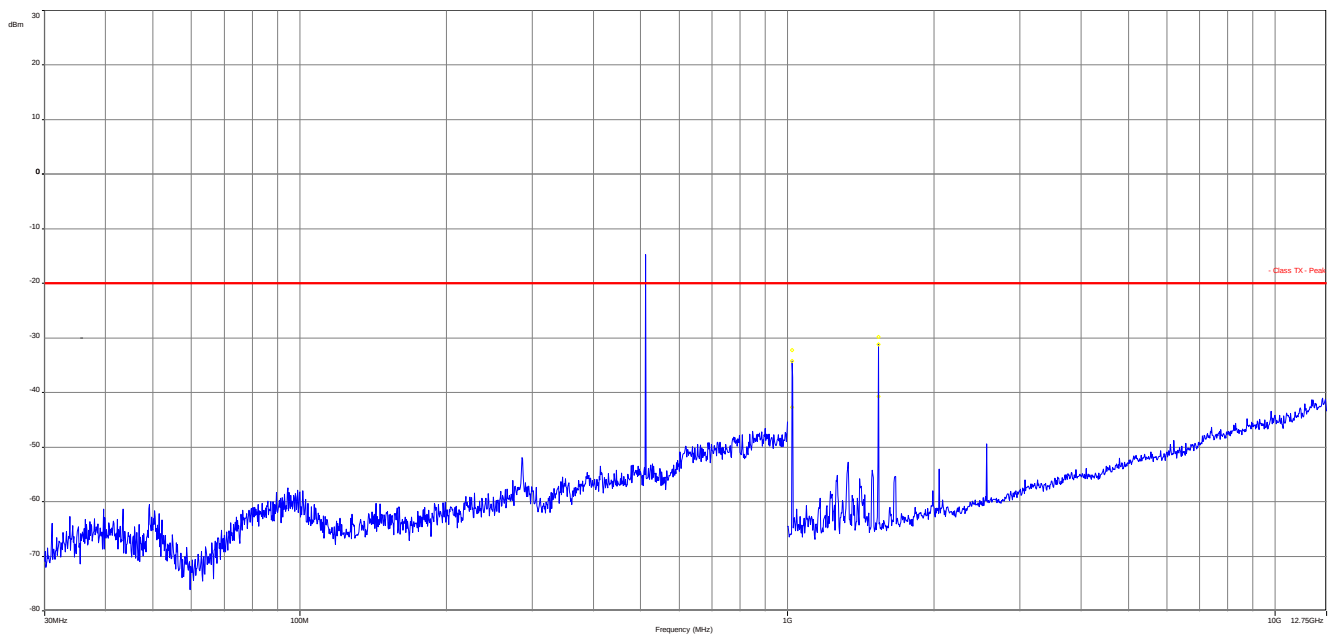
| Transmitter spurious emissions (dBm)                                 |          |       |                |          |       |                                                                      |          |       |
|----------------------------------------------------------------------|----------|-------|----------------|----------|-------|----------------------------------------------------------------------|----------|-------|
| Lowest channel                                                       |          |       | Middle channel |          |       | Highest channel                                                      |          |       |
| Frequency                                                            | Detector | Level | Frequency      | Detector | Level | Frequency                                                            | Detector | Level |
| All detected spurious emissions are more than 10 dB below the limit. |          |       | 1440           | Peak     | -34.8 | All detected spurious emissions are more than 10 dB below the limit. |          |       |

**High Power:**

| Transmitter spurious emissions (dBm)                                 |          |       |                |          |       |                 |          |       |
|----------------------------------------------------------------------|----------|-------|----------------|----------|-------|-----------------|----------|-------|
| Lowest channel                                                       |          |       | Middle channel |          |       | Highest channel |          |       |
| Frequency                                                            | Detector | Level | Frequency      | Detector | Level | Frequency       | Detector | Level |
| All detected spurious emissions are more than 10 dB below the limit. |          |       | 1440           | Peak     | -25.0 | 1023.5          | Peak     | -29.6 |
|                                                                      |          |       | -/-            | -/-      | -/-   | 1535.8          | Peak     | -27.5 |

**Plots of the measurements (measured with dummy load)****Plot 1:** 30 MHz – 12.75 GHz, low channel, antenna vertical/horizontal, Low power**Plot 2:** 30 MHz – 12.75 GHz, middle channel, antenna vertical/horizontal, Low power

**Plot 3:** 30 MHz – 12.75 GHz, high channel, antenna vertical/horizontal, Low power**Plot 4:** 30 MHz – 12.75 GHz, low channel, antenna vertical/horizontal, High power

**Plot 5:** 30 MHz – 12.75 GHz, middle channel, antenna vertical/horizontal, High power**Plot 6:** 30 MHz – 12.75 GHz, high channel, antenna vertical/horizontal, High power

## 12.8 Spurious emissions radiated < 30 MHz

### Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

### Measurement:

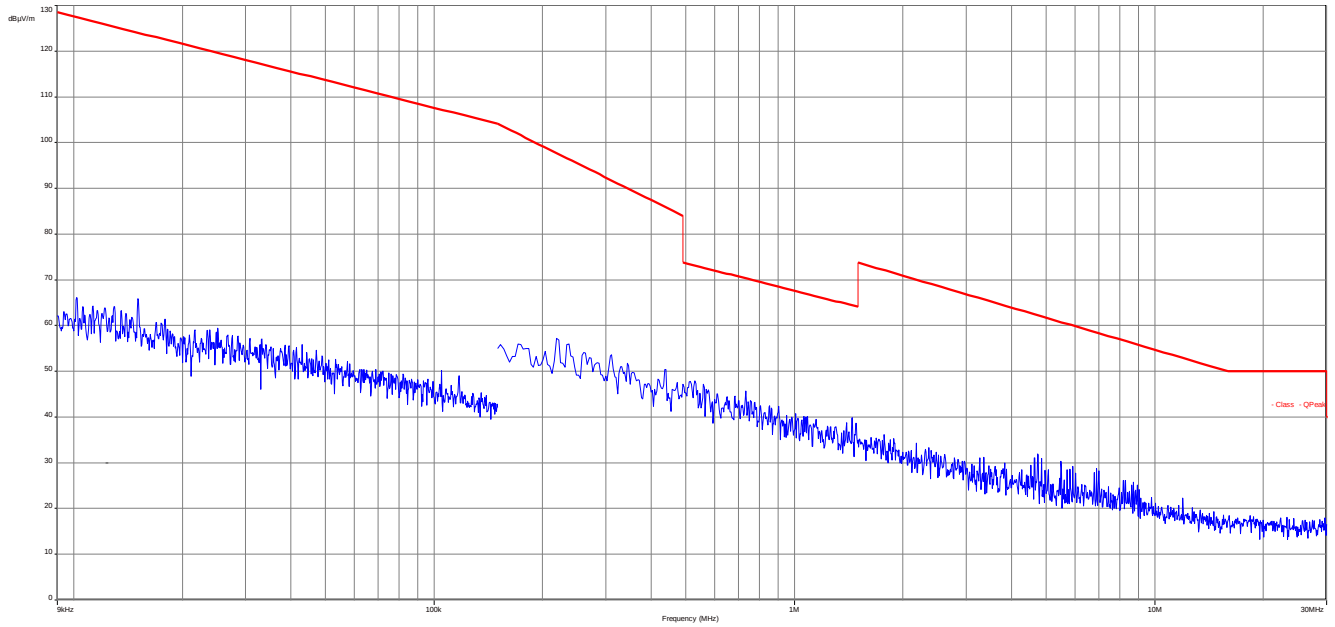
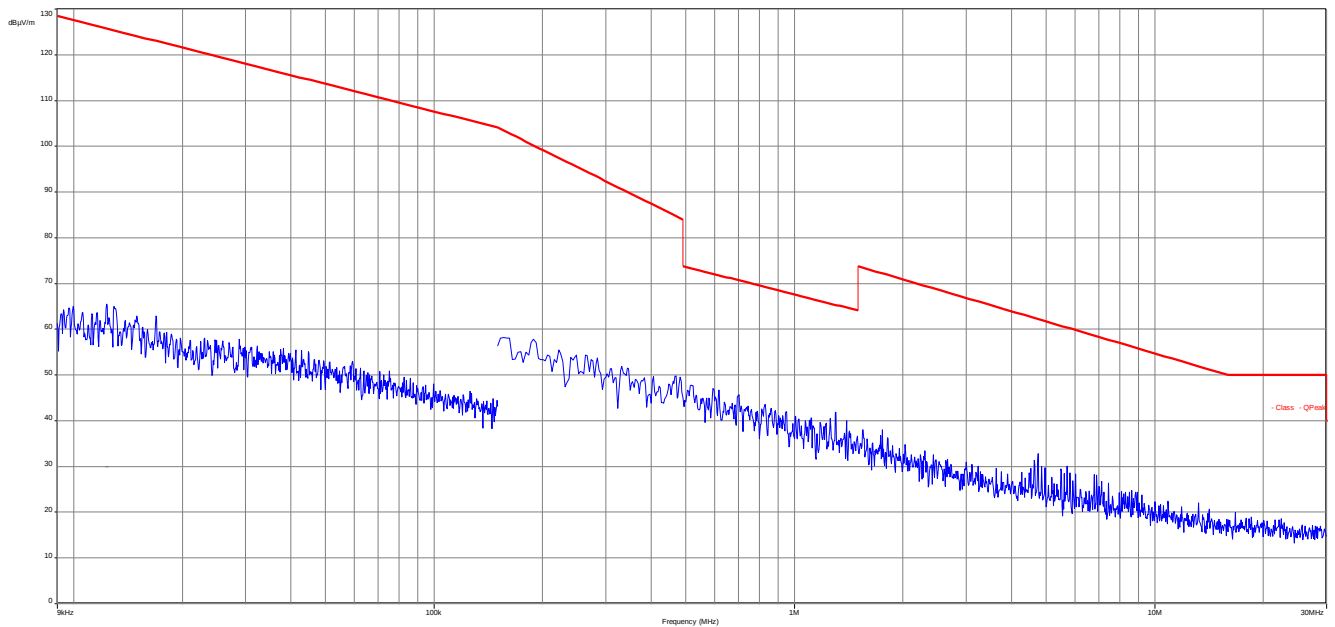
| Measurement parameter   |                      |         |
|-------------------------|----------------------|---------|
| Detector:               | Peak / Quasi peak    |         |
| Sweep time:             | Auto                 |         |
| Video bandwidth:        | F < 150 kHz:         | 200 Hz  |
|                         | F > 150 kHz:         | 9 kHz   |
| Resolution bandwidth:   | F < 150 kHz:         | 1 kHz   |
|                         | F > 150 kHz:         | 100 kHz |
| Span:                   | 9 kHz to 30 MHz      |         |
| Trace mode:             | Max hold             |         |
| Test setup:             | See sub clause 8.2 B |         |
| Measurement uncertainty | See sub clause 9     |         |

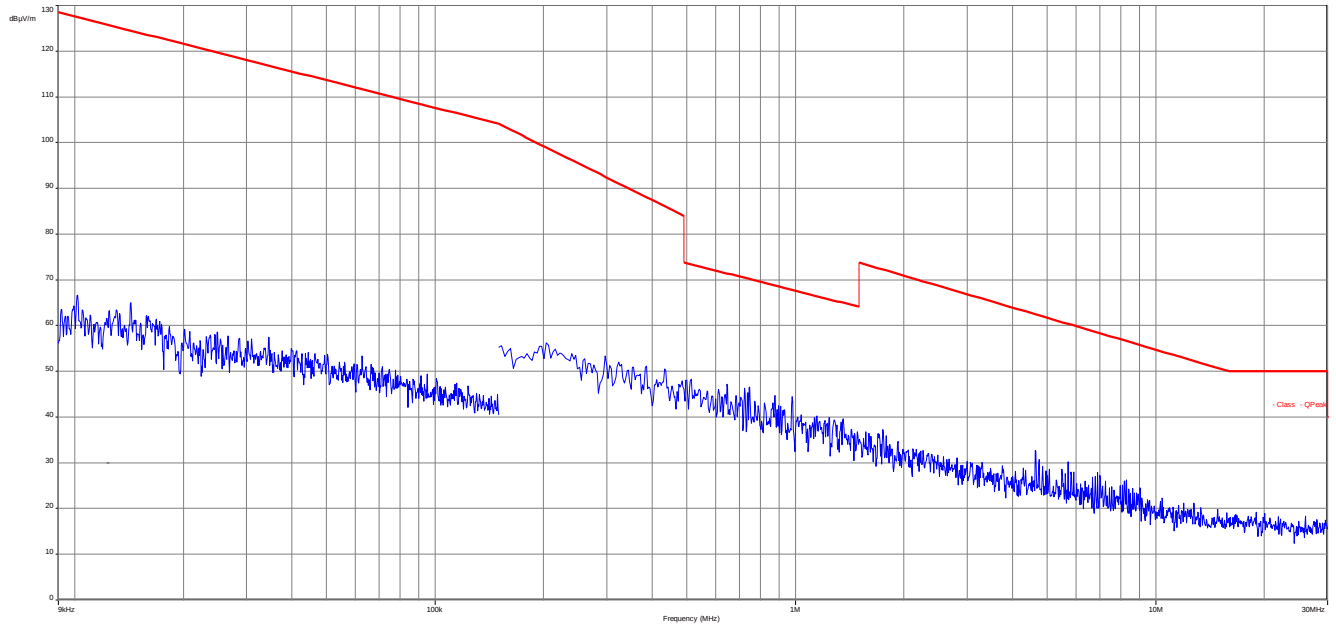
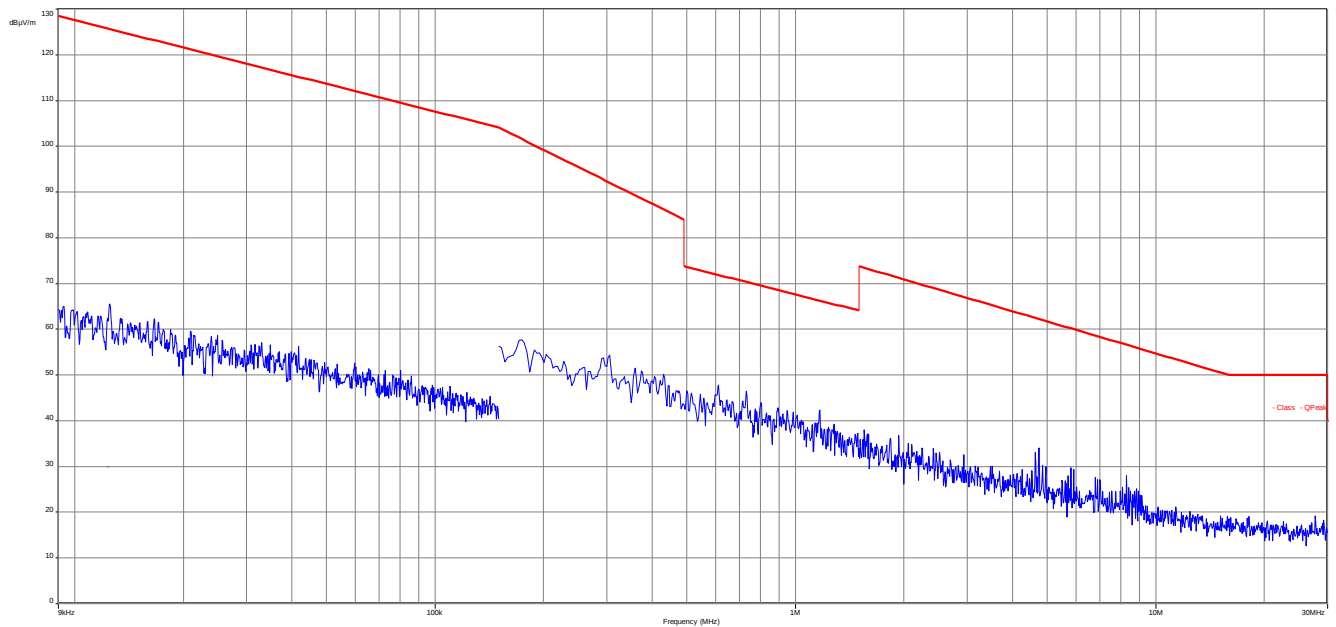
### Limits:

| 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                   |

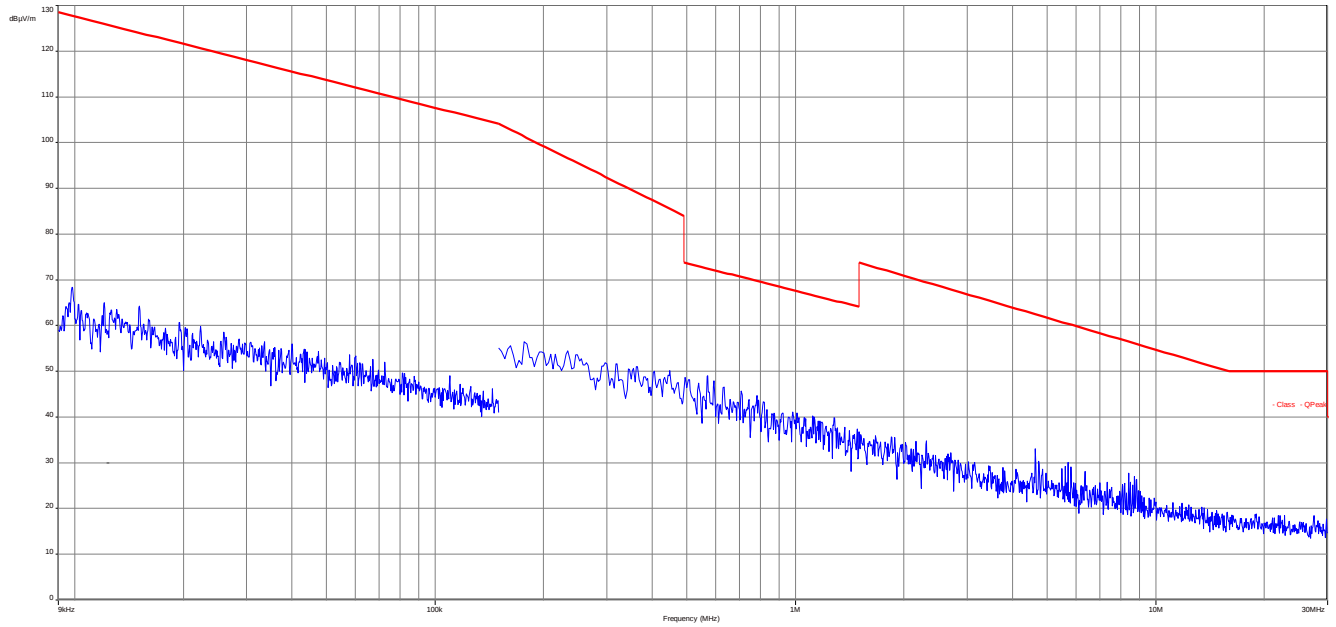
### Results:

| TX Spurious emissions radiated < 30 MHz [dBμV/m] |          |                |
|--------------------------------------------------|----------|----------------|
| F [MHz]                                          | Detector | Level [dBμV/m] |
| No peaks detected.                               |          |                |
|                                                  |          |                |

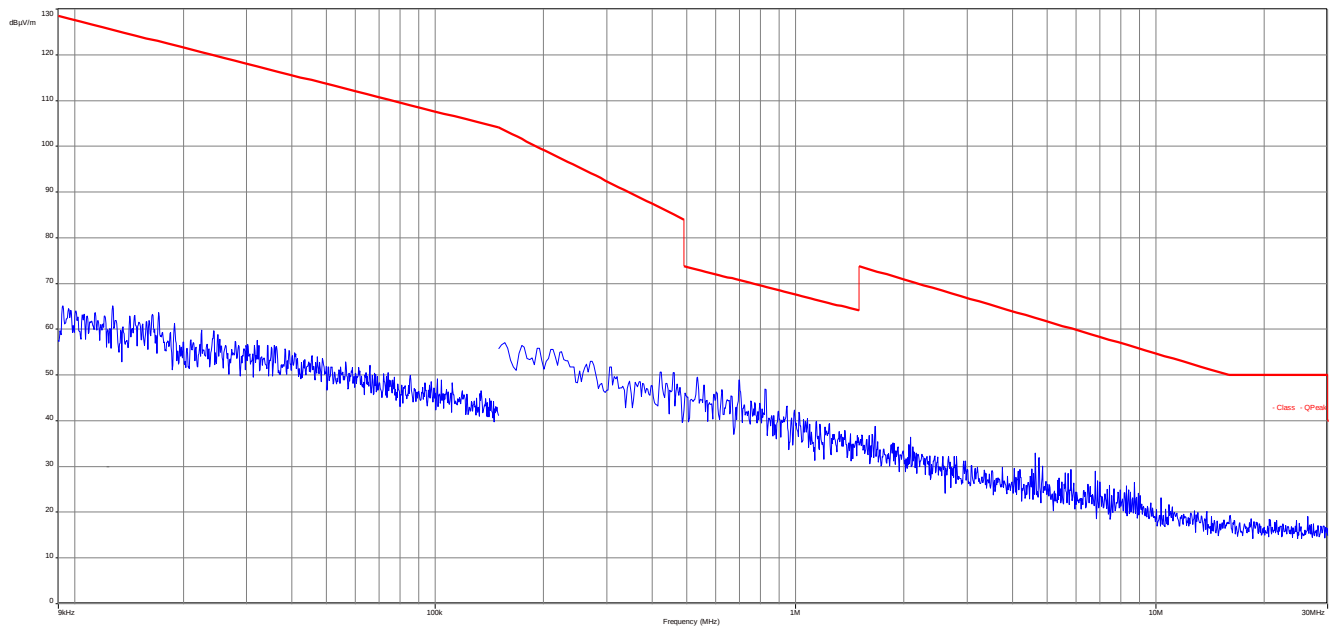
**Plots: TX mode****Plot 1: 9 kHz to 30 MHz – Low channel – Low power****Plot 2: 9 kHz to 30 MHz – Middle channel – Low power**

**Plot 3: 9 kHz to 30 MHz – High channel – Low power****Plot 4: 9 kHz to 30 MHz – Low channel – High power**

**Plot 5: 9 kHz to 30 MHz – Middle channel – High power**



**Plot 6: 9 kHz to 30 MHz – High channel – High power**



## 12.9 Receiver spurious emissions (radiated)

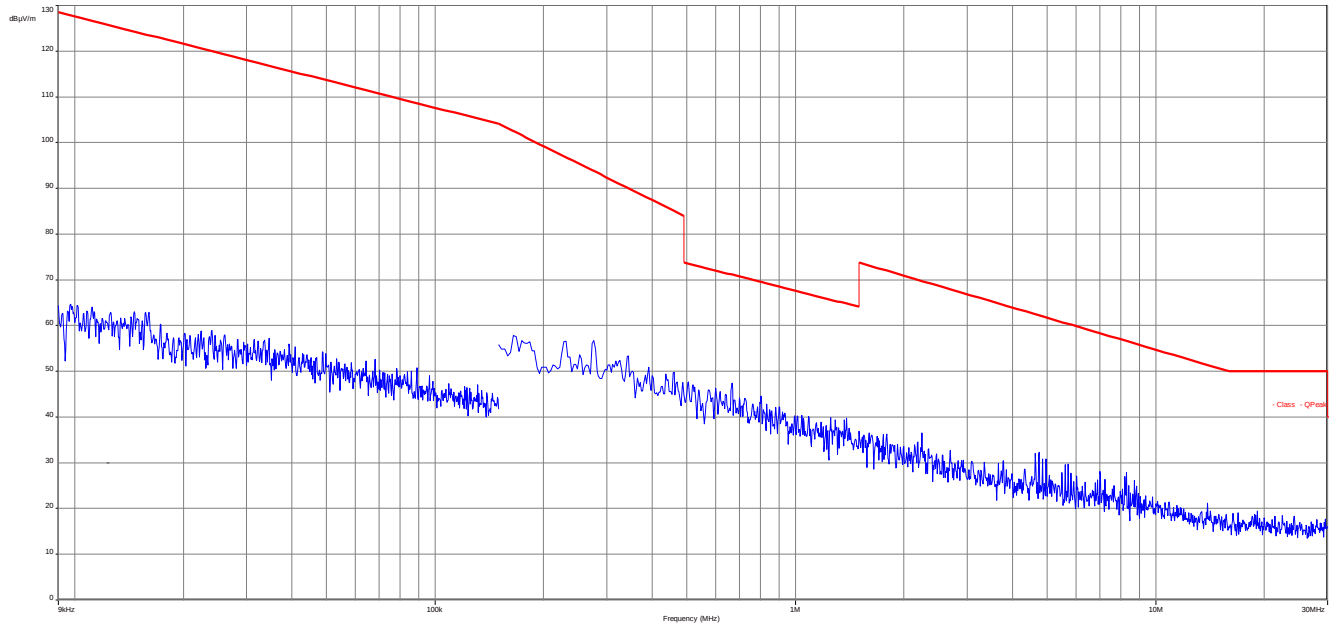
### Measurement:

| Measurement parameter   |                                         |
|-------------------------|-----------------------------------------|
| Detector:               | Peak                                    |
| Sweep time:             | Auto                                    |
| Video bandwidth:        | f < 1 GHz : 100 kHz<br>f ≥ 1GHz : 1 MHz |
| Resolution bandwidth:   | f < 1 GHz : 100 kHz<br>f ≥ 1GHz : 1 MHz |
| Span:                   | See plots                               |
| Trace mode:             | Max. hold                               |
| Test setup:             | See sub clause 8.1 / 8.2 A & B          |
| Measurement uncertainty | See sub clause 9                        |

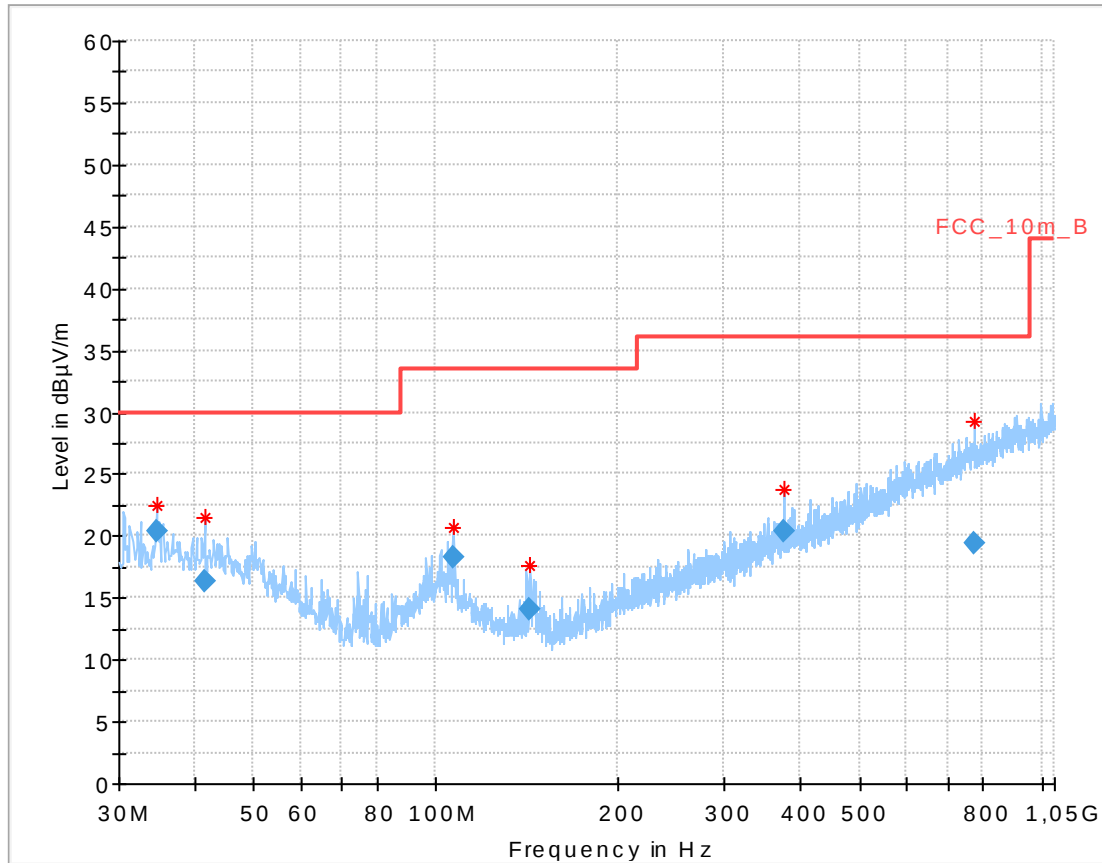
### Limits:

| FCC                                   |                       |                          |
|---------------------------------------|-----------------------|--------------------------|
| FCC 47 CFR<br>§ 15.209                |                       |                          |
| Receiver spurious emission (radiated) |                       |                          |
| Frequency (MHz)                       | Field strength (µV/m) | Measurement distance (m) |
| 30 - 88                               | 100                   | 3                        |
| 88 - 216                              | 150                   | 3                        |
| 216 - 960                             | 200                   | 3                        |
| above 960                             | 500                   | 3                        |

| Receiver spurious emissions (dBµV/m)                                                                      |          |       |
|-----------------------------------------------------------------------------------------------------------|----------|-------|
| RX-mode                                                                                                   |          |       |
| Frequency                                                                                                 | Detector | Level |
|                                                                                                           |          |       |
| All other detected spurious emissions are more than 6 dB below the limit.<br>Also see table below plot 2. |          |       |

**Plots of the measurements****Plot 1: 9 kHz - 30 MHz**

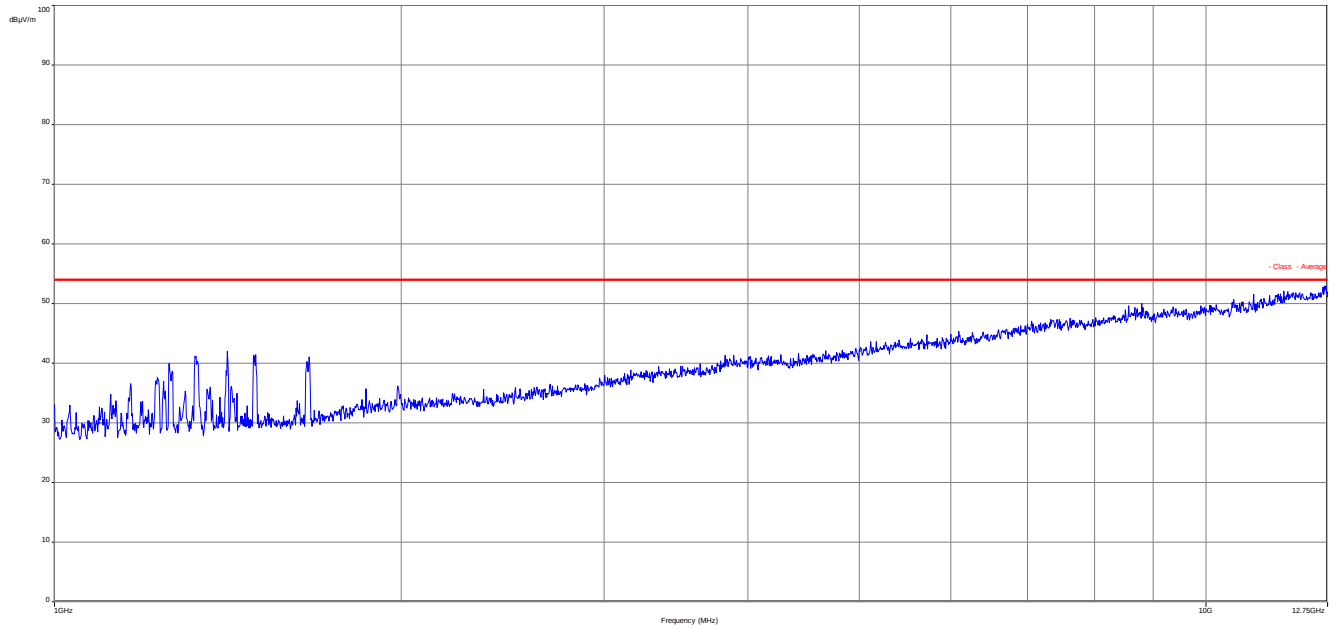
Plot 2: 30 MHz – 1 GHz



## Final\_Result

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 34.631700       | 20.32              | 30.00          | 9.68        | 1000.0          | 120.000         | 169.0       | V   | 122           | 13.8       |
| 41.580450       | 16.26              | 30.00          | 13.74       | 1000.0          | 120.000         | 102.0       | V   | 257           | 14.0       |
| 106.692750      | 18.23              | 33.50          | 15.27       | 1000.0          | 120.000         | 102.0       | V   | 117           | 11.5       |
| 143.254200      | 14.14              | 33.50          | 19.36       | 1000.0          | 120.000         | 103.0       | V   | 282           | 8.8        |
| 375.022050      | 20.39              | 36.00          | 15.61       | 1000.0          | 120.000         | 200.0       | V   | 1             | 16.5       |
| 775.242000      | 19.37              | 36.00          | 16.63       | 1000.0          | 120.000         | 173.0       | H   | 206           | 22.7       |

**Plot 3:** 1 GHz – 12.75 GHz, antenna vertical/horizontal



## 12.10 Spurious emissions conducted < 30 MHz

### Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. Both power lines, phase and neutral line, are measured. Found peaks are remeasured 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                                   |
| Test setup:             | See sub clause 8.4                         |
| Measurement uncertainty | See sub clause 9                           |

**Limits:** Class A device according manufacturer declaration

| FCC                                      |                   |           |                |           |
|------------------------------------------|-------------------|-----------|----------------|-----------|
| TX Spurious emissions conducted < 30 MHz |                   |           |                |           |
| Frequency (MHz)                          | Quasi-peak [dBμV] |           | Average [dBμV] |           |
|                                          | Class A           | Class B   | Class A        | Class B   |
| 0.15 – 0.5                               | 79                | 66 to 56* | 66             | 56 to 46* |
| 0.5 – 5                                  | 73                | 56        | 60             | 46        |
| 5 – 30.0                                 | 73                | 60        | 60             | 50        |

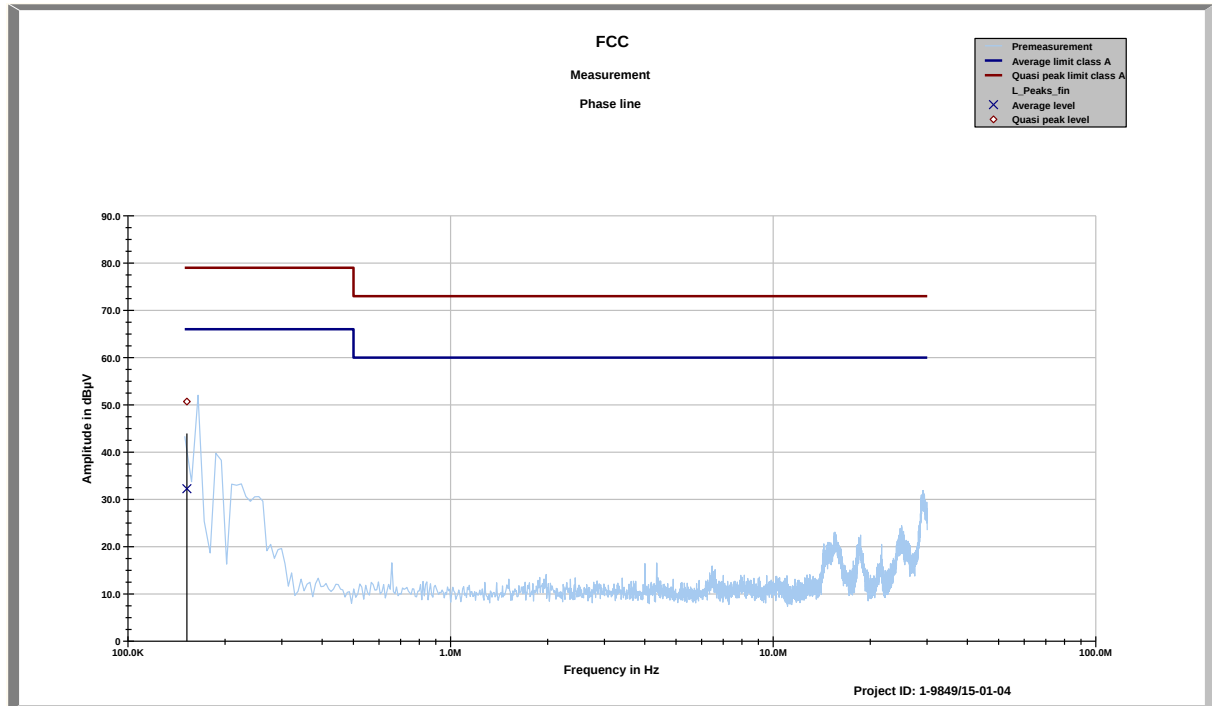
\*Decreases with the logarithm of the frequency

### Results:

| TX Spurious emissions conducted < 30 MHz [dBμV] |          |                |
|-------------------------------------------------|----------|----------------|
| F [MHz]                                         | Detector | Level [dBμV/m] |
| See tables below the plots                      |          |                |

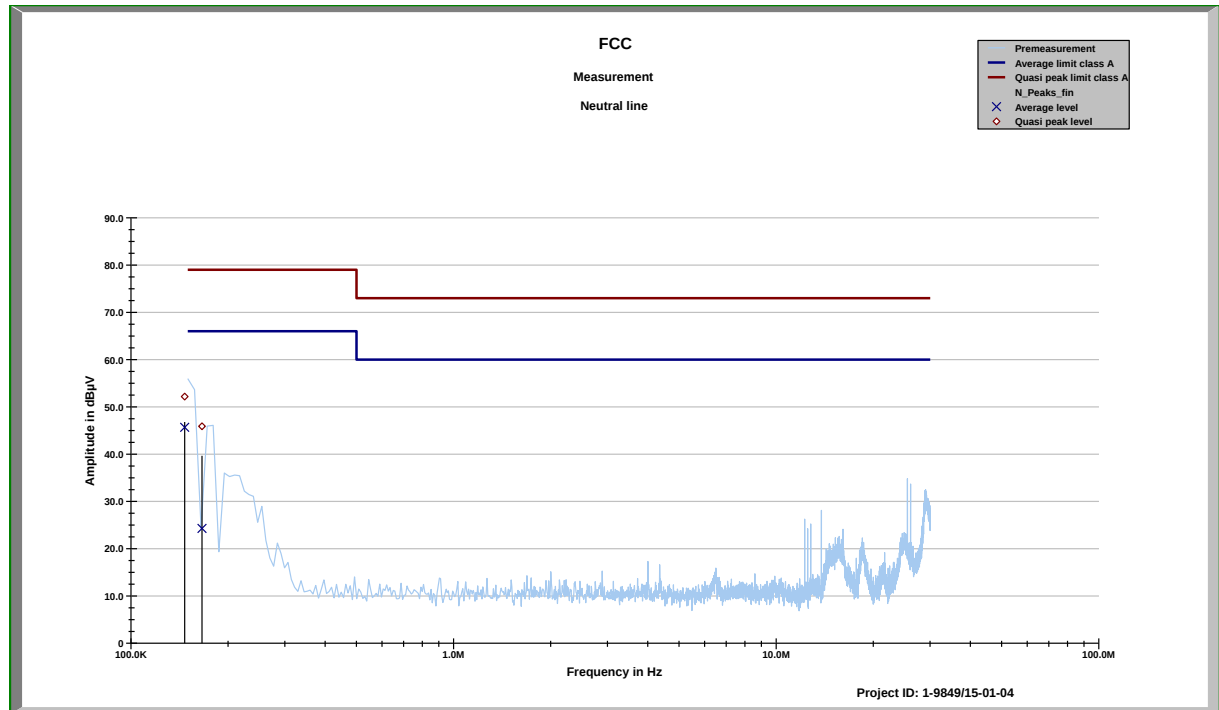
### Plots:

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



### Results:

| Frequency | Quasi peak level | Margin quasi peak | Average level | Margin average |
|-----------|------------------|-------------------|---------------|----------------|
| MHz       | dBμV             | dBμV              | dBμV          | dBμV           |
| 0.15228   | 50.69            | 28.31             | 32.25         | 33.75          |

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

| Frequency | Quasi peak level | Margin quasi peak | Average level | Margin Average |
|-----------|------------------|-------------------|---------------|----------------|
| MHz       | dBµV             | dBµV              | dBµV          | dBµV           |
| 0.16606   | 45.89            | 33.11             | 24.28         | 41.72          |

### 13 Observations

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

### Annex A Document history

| Version | Applied changes                             | Date of release |
|---------|---------------------------------------------|-----------------|
|         | Initial release                             | 2015-09-08      |
| -A      | References to Canadian requirements removed | 2015-10-27      |

### 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                                       |
| PMN      |   | Product marketing name                         |
| HMN      |   | Host marketing name                            |
| HVIN     |   | Hardware version identification number         |
| FVIN     |   | Firmware version identification number         |

## Annex C Accreditation Certificate

Front side of certificate

Back side of certificate



Deutsche Akkreditierungsstelle GmbH

Befähigung gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV  
 Unterzeichnerin der Multilateralen Abkommen  
 von EA, ILAC und IAF zur gegenseitigen Anerkennung

### Akkreditierung



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

**CETECOM ICT Services GmbH**  
 Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Drahtgebundene Kommunikation einschließlich xDSL  
 VoIP und DECT  
 Akustik  
 Funk einschließlich WLAN  
 Short Range Devices (SRD)  
 RFID  
 WiMax und Richtfunk  
 Mobilfunk (GSM / GPRS, Over the Air (OTA) Performance)  
 Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive  
 Produktsicherheit  
 SAR und Hearing Aid Compatibility (HAC)  
 Umweltsimulation  
 Smart Card Terminals  
 Bluetooth  
 Wi-Fi-Services

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 07.03.2014 mit der  
 Akkreditierungsnummer D-PL-12676-01 und ist gültig bis 17.01.2018. Sie besteht aus diesem Deckblatt, der  
 Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 77 Seiten.

Registrierungsnummer der Urkunde: D-PL-12676-01-00

Frankfurt am Main, 07.03.2014

Date of issue of the Certificate

In Auftrag der DAkkS  
 Akkreditierungsstelle  
 Dr. Ingrid Kollmann

Deutsche Akkreditierungsstelle GmbH

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 Spittelmarkt 10  
 10117 Berlin

Standort Frankfurt am Main  
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 60594 Frankfurt am Main

Standort Braunschweig  
 Bundesallee 100  
 38115 Braunschweig

Die auszugsweise Veröffentlichung der Akkreditierungsurkunde bedarf der vorherigen schriftlichen  
 Zustimmung der Deutschen Akkreditierungsstelle GmbH (DAkkS). Ausgenommen davon ist die separate  
 Weiterverbreitung des Deckblattes durch die umseitig genannte Konformitätsbewertungsstelle in  
 unveränderter Form.

Es darf nicht der Anschein erweckt werden, dass sich die Akkreditierung auch auf Bereiche erstreckt,  
 die über den durch die DAkkS bestätigten Akkreditierungsbereich hinausgehen.

Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstelle (AkkStelleG) vom  
 31. Juli 2009 (BGBl. I S. 2625) sowie der Verordnung (EG) Nr. 765/2008 des Europäischen Parlaments  
 und des Rates vom 9. Juli 2008 über die Vorschriften für die Akkreditierung und Marktüberwachung  
 im Zusammenhang mit der Vermarktung von Produkten (Abbl. L 218 vom 9. Juli 2008, S. 30).  
 Die DAkkS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der  
 European co-operation for Accreditation (EA), des International Accreditation Forum (IAF) und  
 der International Laboratory Accreditation Cooperation (ILAC). Die Unterzeichner dieser Abkommen  
 erkennen ihre Akkreditierungen gegenseitig an.

Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:

EA: [www.european-accreditation.org](http://www.european-accreditation.org)  
 IAF: [www.iaf.or.jp](http://www.iaf.or.jp)  
 ILAC: [www.ilac.org](http://www.ilac.org)

### Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

<http://www.cetecom.com/eu/de/cetecom-group/europa/deutschland-saarbruecken/akkreditierungen.html>