

Test report

251770-1TRFWL

Date of issue: January 21, 2014

Applicant:

Redline Communications Inc.

Product:

Broadband Wireless Infrastructure Product

Model:

RDL-3000-RMD

FCC ID:

QC8-RDL3000RMD

Specification:

FCC Part 90, Subpart Z

Private land mobile radio services. Wireless broadband services in the 3650–3700 MHz band

Test location

| | |
|---------------|------------------------------------|
| Company name: | Nemko Canada Inc. |
| Address: | 303 River Road |
| City: | Ottawa |
| Province: | Ontario |
| Postal code: | K1V 1H2 |
| Country: | Canada |
| Telephone: | +1 613 737 9680 |
| Facsimile: | +1 613 737 9691 |
| Toll free: | +1 800 563 6336 |
| Website: | www.nemko.com |
| Site number: | 176392 (3 m semi anechoic chamber) |

| | |
|--------------|---|
| Tested by: | Kevin Rose, Wireless/EMC Specialist |
| Reviewed by: | Andrey Adelberg, Senior Wireless/EMC Specialist |
| Date: | January 21, 2014 |
| Signature: | |

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and Manufacturer

| | |
|------------------|-----------------------------|
| Company name: | Redline Communications Inc. |
| Address: | 302 Town Center Blvd. |
| City: | Markham |
| Province/State: | Ontario |
| Postal/Zip code: | L3R 0E8 |
| Country: | Canada |

1.2 Test specifications

| | |
|------------------------|---|
| FCC Part 90, Subpart Z | Private land mobile radio services. Wireless broadband services in the 3650–3700 MHz band |
|------------------------|---|

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See “Summary of test results” for full details.

1.4 Exclusions

None

1.5 Test report revision history

| Revision # | Details of changes made to test report |
|------------|--|
| TRF | Original report issued |



Section 2. Summary of test results

2.1 FCC Part 90, tests results

| Clause | Test description | Verdict |
|-----------|--------------------------|---------|
| 90.209 | Occupied bandwidth | Pass |
| 90.210(b) | Emission mask | Pass |
| 90.213(a) | Frequency stability | Pass |
| 90.1321 | Power and antenna limits | Pass |
| 90.1323 | Emission limits | Pass |

Section 3. Equipment under test (EUT) details

3.1 Sample information

| | |
|------------------------|------------------|
| Receipt date | December 2, 2013 |
| Nemko sample ID number | 1 |

3.2 EUT information

| | |
|--------------|---|
| Product name | Broadband wireless infrastructure product |
| Model | RDL-3000-RMD |

3.3 Technical information

| | |
|---------------------------|---|
| Operating band | 3650–3700 MHz |
| Operating frequencies | 5 MHz (3652.5–3697.5 MHz) and 10 MHz (3655–3695 MHz) |
| Modulation type | OFDM using BPSK, QPSK 16-QAM, and 64-QAM modulations |
| Channel bandwidth | 5 MHz, and 10 MHz |
| Occupied bandwidth (99 %) | 4.18 MHz (for 5 MHz channel), and 8.24 MHz (for 10 MHz channel) |
| Emission designator | W7D |
| Power requirements | 48 V _{DC} |
| MIMO type | 2 × 2 with completely uncorrelated type of signal |

3.4 Product description and theory of operation

The EUT is a point-to-multipoint (PMP) carrier grade broadband wireless infrastructure product, designed to operate in 3650–3700 MHz band

3.5 EUT exercise details

The EUT was controlled from laptop via Ethernet. Software version 2.25.107

3.6 EUT setup diagram

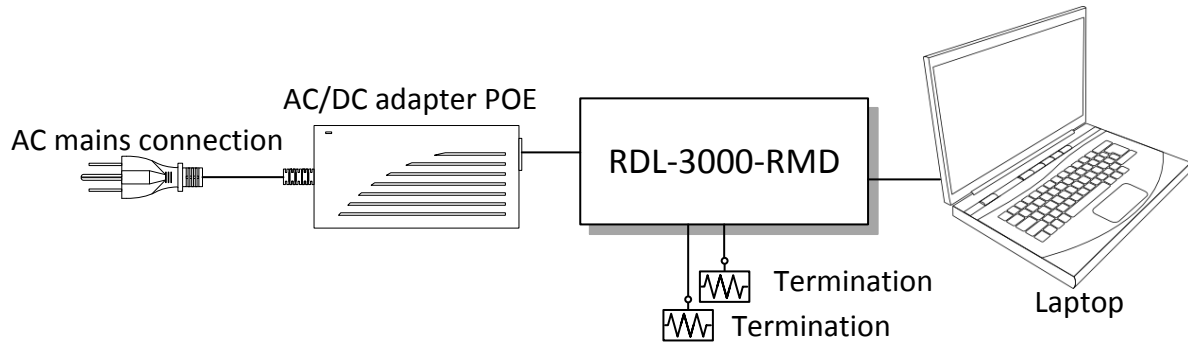


Figure 3.6-1: Setup diagram

3.7 EUT sub assemblies

Table 3.7-1: EUT sub assemblies

| Description | Brand name | Model/Part number | Serial number |
|-------------------------|------------|-------------------|---------------|
| CINCON Power supply POE | Mean Well | TR60A-POE-L | - |
| Laptop | Dell | D630C | - |

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

| | |
|-------------------|---------------|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 860–1060 mbar |

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 "Uncertainty in EMC measurements." Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of $K=2$ with 95% certainty.

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|-----------------------------|------------------------|--------------|-----------|-----------|-------------|
| 3 m EMI test chamber | TDK | SAC-3 | FA002047 | 1 year | Mar. 09/14 |
| Flush mount turntable | Sunol | FM2022 | FA002082 | — | NCR |
| Controller | Sunol | SC104V | FA002060 | — | NCR |
| Antenna mast | Sunol | TLT2 | FA002061 | — | NCR |
| Power source | California Instruments | 3001i | FA001021 | 1 year | June 04/14 |
| Receiver/spectrum analyzer | Rohde & Schwarz | ESU 26 | FA002043 | 1 year | Oct. 24/14 |
| Spectrum analyzer | Rohde & Schwarz | FSU | FA001877 | 1 year | Jan. 16/14 |
| Bilog antenna (20–3000 MHz) | Sunol | JB3 | FA002108 | 1 year | Feb. 21/14 |
| Horn antenna (1–18 GHz) | EMCO | 3115 | FA000825 | 1 year | Feb. 21/14 |
| Horn antenna (18–40 GHz) | EMCO | 3116 | FA001847 | 2 year | Sept. 06/14 |
| Pre-amplifier (1–18 GHz) | JCA | JCA118-503 | FA002091 | 1 year | June 21/14 |
| Pre-amplifier (18–26 GHz) | Narda | BBS-1826N612 | FA001550 | — | VOU |
| Pre-amplifier (26–40 GHz) | Narda | DBL-2640N610 | FA001556 | — | VOU |
| Temperature chamber | Thermotron | SM-16C | FA001030 | 1 year | NCR |
| Multimeter | Fluke | 16 | FA001831 | 1 year | Jan. 30/14 |

Note: NCR - no calibration required, VOU - verify on use

Section 8. Testing data

8.1 FCC 90.209 Occupied bandwidth

8.1.1 Definitions and limits

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

8.1.2 Test summary

| | | | |
|----------------|------------------|--------------------|-----------|
| Test date: | January 13, 2014 | Temperature: | 22 °C |
| Test engineer: | Kevin Rose | Air pressure: | 1002 mbar |
| Verdict: | Pass | Relative humidity: | 36 % |

8.1.3 Observations settings and special notes

Spectrum analyser settings:

| | |
|-----------------------|---------------------|
| Resolution bandwidth: | ≥ 1 % of span |
| Video bandwidth: | $\geq 3 \times$ RBW |
| Frequency span: | 30 MHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

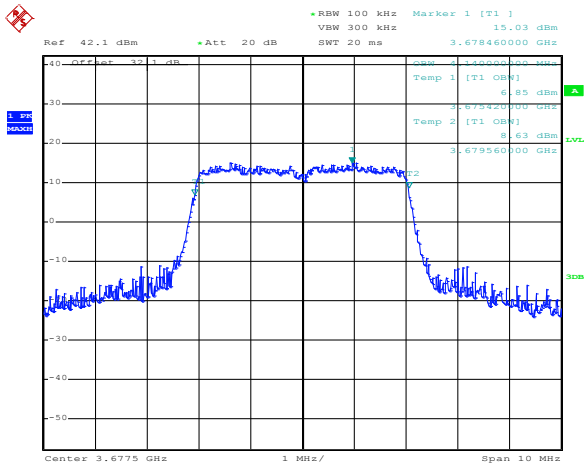
8.1.4 Test data

Table 8.1-1: 99 % bandwidth results for 5 MHz port 1

| Modulation | Frequency, MHz | 99 % bandwidth, MHz |
|------------|----------------|---------------------|
| BPSK | 3652.5 | 4.14 |
| | 3677.5 | 4.14 |
| | 3697.5 | 4.14 |
| QPSK | 3652.5 | 4.14 |
| | 3677.5 | 4.14 |
| | 3697.5 | 4.14 |
| 16-QAM | 3652.5 | 4.16 |
| | 3677.5 | 4.14 |
| | 3697.5 | 4.14 |
| 64-QAM | 3652.5 | 4.14 |
| | 3677.5 | 4.14 |
| | 3697.5 | 4.14 |

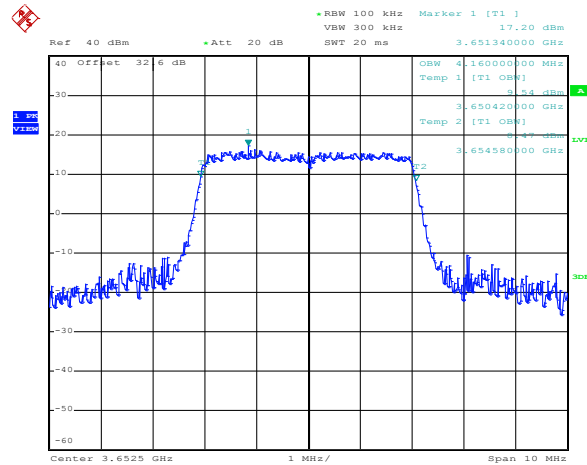
Table 8.1-2: 99 % bandwidth results for 5 MHz port 2

| Modulation | Frequency, MHz | 99 % bandwidth, MHz |
|------------|----------------|---------------------|
| BPSK | 3652.5 | 4.14 |
| | 3677.5 | 4.16 |
| | 3697.5 | 4.18 |
| QPSK | 3652.5 | 4.14 |
| | 3677.5 | 4.16 |
| | 3697.5 | 4.14 |
| 16-QAM | 3652.5 | 4.14 |
| | 3677.5 | 4.16 |
| | 3697.5 | 4.14 |
| 64-QAM | 3652.5 | 4.16 |
| | 3677.5 | 4.14 |
| | 3697.5 | 4.14 |



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Figure 8.1-1: 99 % bandwidth, BPSK 5 MHz modulation sample



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Figure 8.1-2: 99 % bandwidth, 64-QAM 5 MHz modulation sample

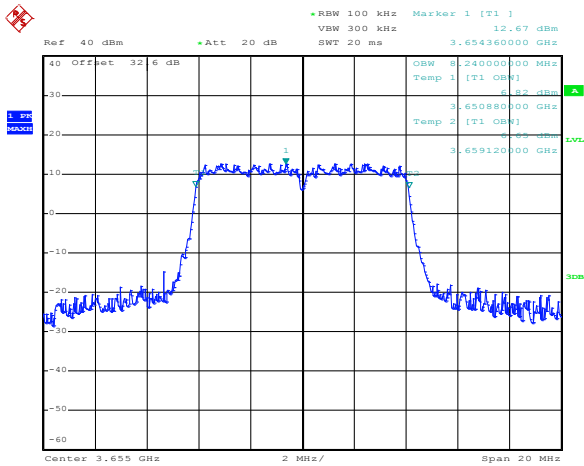
8.1.4 Test data continued

Table 8.1-3: 99 % bandwidth results for 10 MHz port 1

| Modulation | Frequency, MHz | 99 % bandwidth, MHz |
|------------|----------------|---------------------|
| BPSK | 3655 | 8.20 |
| | 3680 | 8.22 |
| | 3695 | 8.20 |
| QPSK | 3655 | 8.20 |
| | 3680 | 8.20 |
| | 3695 | 8.18 |
| 16-QAM | 3655 | 8.24 |
| | 3680 | 8.20 |
| | 3695 | 8.18 |
| 64-QAM | 3655 | 8.24 |
| | 3680 | 8.20 |
| | 3695 | 8.20 |

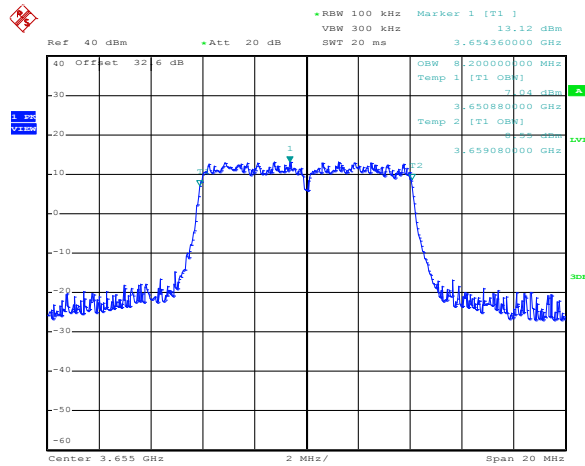
Table 8.1-4: 99 % bandwidth results for 10 MHz port 2

| Modulation | Frequency, MHz | 99 % bandwidth, MHz |
|------------|----------------|---------------------|
| BPSK | 3655 | 8.24 |
| | 3680 | 8.18 |
| | 3695 | 8.22 |
| QPSK | 3655 | 8.24 |
| | 3680 | 8.20 |
| | 3695 | 8.22 |
| 16-QAM | 3655 | 8.20 |
| | 3680 | 8.20 |
| | 3695 | 8.18 |
| 64-QAM | 3655 | 8.20 |
| | 3680 | 8.20 |
| | 3695 | 8.20 |



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Figure 8.1-3: 99 % bandwidth, 16-QAM 10 MHz modulation sample



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Figure 8.1-4: 99 % bandwidth, 64-QAM 10 MHz modulation sample

8.2 FCC 90.213(a) Transmitter frequency stability

8.2.1 Definitions and limits

(a) Unless noted elsewhere, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following table:

Table 8.2-1: Minimum frequency stability

| Frequency range (MHz) | Fixed and base stations (\pm ppm) | Mobile stations (\pm ppm) | |
|-----------------------|--------------------------------------|------------------------------|------------------------------|
| | | Over 2 watts output power | 2 watts or less output power |
| Below 25 | 100 | 100 | 200 |
| 25–50 | 20 | 20 | 50 |
| 72–76 | 5 | | 50 |
| 150–174 | 5 | 5 | 50 |
| 216–220 | 1.0 | | 1.0 |
| 220–222 | 0.1 | 1.5 | 1.5 |
| 421–512 | 2.5 | 5 | 5 |
| 806–809 | 1.0 | 1.5 | 1.5 |
| 809–824 | 1.5 | 2.5 | 2.5 |
| 851–854 | 1.0 | 1.5 | 1.5 |
| 854–869 | 1.5 | 2.5 | 2.5 |
| 896–901 | 0.1 | 1.5 | 1.5 |
| 902–928 | 2.5 | 2.5 | 2.5 |
| 902–928 | 2.5 | 2.5 | 2.5 |
| 929–930 | 1.5 | | |
| 935–940 | 0.1 | 1.5 | 1.5 |
| 1427–1435 | 300 | 300 | 300 |
| Above 2450 | | | |

8.2.2 Test summary

| | | | |
|----------------|------------------|--------------------|-----------|
| Test date: | January 13, 2014 | Temperature: | 22 °C |
| Test engineer: | Kevin Rose | Air pressure: | 1003 mbar |
| Verdict: | Pass | Relative humidity: | 30 % |

8.2.3 Observations settings and special notes

Spectrum analyser settings:

| | |
|-----------------------|----------------|
| Resolution bandwidth: | 20 kHz/30 kHz |
| Video bandwidth: | 50 kHz/100 kHz |
| Frequency span: | 2 MHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

8.2.4 Test data

Table 8.2-2: Frequency drift measurement

| Test conditions | Frequency, GHz | Drift, kHz |
|-----------------|----------------|------------|
| +50 °C, Nominal | 3.675291667 | -3.205 |
| +40 °C, Nominal | 3.675285256 | -9.616 |
| +30 °C, Nominal | 3.675291667 | -3.205 |
| +20 °C, +15 % | 3.675294872 | 0 |
| +20 °C, Nominal | 3.675294872 | Reference |
| +20 °C, -15 % | 3.675294872 | 0 |
| +10 °C, Nominal | 3.675307692 | 12.82 |
| 0 °C, Nominal | 3.675317308 | 22.436 |
| -10 °C, Nominal | 3.675323718 | 28.846 |
| -20 °C, Nominal | 3.675330128 | 35.256 |
| -30 °C, Nominal | 3.675333333 | 38.461 |

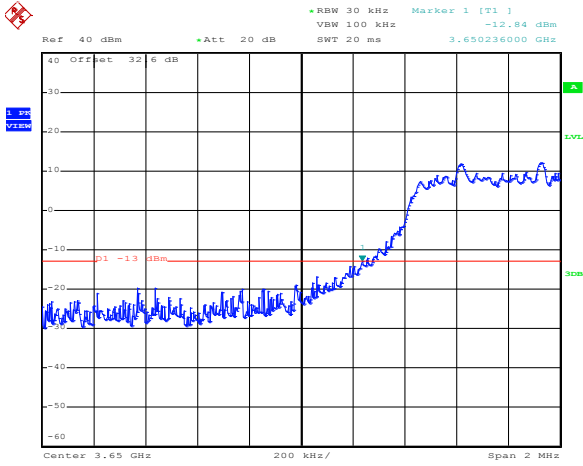
Table 8.2-3: Frequency stability at lower band edge

| BW, MHz | Port | Modulation | Lower cross point (f _L), GHz | Max negative drift, kHz | Drifted cross point, GHz | Limit (band edge), GHz | Margin, kHz |
|---------|------|------------|--|-------------------------|--------------------------|------------------------|-------------|
| 5 | 0 | BPSK | 3.650204 | 9.61 | 3.6502136 | 3.65 | 213.61 |
| 5 | 0 | QPSK | 3.650236 | 9.61 | 3.6502456 | 3.65 | 245.61 |
| 5 | 0 | 16-QAM | 3.650232 | 9.61 | 3.6502416 | 3.65 | 241.61 |
| 5 | 0 | 64-QAM | 3.650236 | 9.61 | 3.6502456 | 3.65 | 245.61 |
| 5 | 1 | BPSK | 3.650204 | 9.61 | 3.6502136 | 3.65 | 213.61 |
| 5 | 1 | QPSK | 3.650228 | 9.61 | 3.6502376 | 3.65 | 237.61 |
| 5 | 1 | 16-QAM | 3.650168 | 9.61 | 3.6501776 | 3.65 | 177.61 |
| 5 | 1 | 64-QAM | 3.650192 | 9.61 | 3.6502016 | 3.65 | 201.61 |
| 10 | 0 | BPSK | 3.650604 | 9.61 | 3.6506136 | 3.65 | 613.61 |
| 10 | 0 | QPSK | 3.650612 | 9.61 | 3.6506216 | 3.65 | 621.61 |
| 10 | 0 | 16-QAM | 3.650600 | 9.61 | 3.6506096 | 3.65 | 609.61 |
| 10 | 0 | 64-QAM | 3.650608 | 9.61 | 3.6506176 | 3.65 | 617.61 |
| 10 | 1 | BPSK | 3.650600 | 9.61 | 3.6506096 | 3.65 | 609.61 |
| 10 | 1 | QPSK | 3.650592 | 9.61 | 3.6506016 | 3.65 | 601.61 |
| 10 | 1 | 16-QAM | 3.650604 | 9.61 | 3.6506136 | 3.65 | 613.61 |
| 10 | 1 | 64-QAM | 3.650600 | 9.61 | 3.6506096 | 3.65 | 609.61 |

Table 8.2-4: Frequency stability at upper band edge

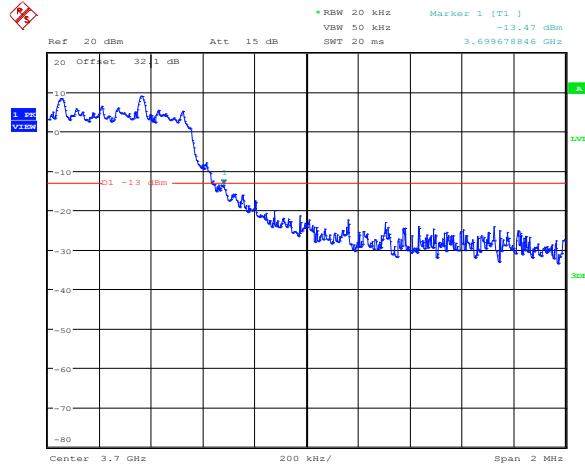
| BW, MHz | Port | Modulation | Upper cross point (f _H), GHz | Max positive drift, kHz | Drifted cross point, GHz | Limit (band edge), GHz | Margin, kHz |
|---------|------|------------|--|-------------------------|--------------------------|------------------------|-------------|
| 5 | 0 | BPSK | 3.699685256 | 38.461 | 3.699723717 | 3.7 | 276.28 |
| 5 | 0 | QPSK | 3.699678846 | 38.461 | 3.699717307 | 3.7 | 282.69 |
| 5 | 0 | 16-QAM | 3.699642051 | 38.461 | 3.699680512 | 3.7 | 319.49 |
| 5 | 0 | 64-QAM | 3.699685256 | 38.461 | 3.699723717 | 3.7 | 276.28 |
| 5 | 1 | BPSK | 3.699733974 | 38.461 | 3.699772435 | 3.7 | 227.56 |
| 5 | 1 | QPSK | 3.699724694 | 38.461 | 3.699763155 | 3.7 | 236.84 |
| 5 | 1 | 16-QAM | 3.699731568 | 38.461 | 3.699770029 | 3.7 | 229.97 |
| 5 | 1 | 64-QAM | 3.699732857 | 38.461 | 3.699771318 | 3.7 | 228.68 |
| 10 | 0 | BPSK | 3.699249359 | 38.461 | 3.699287820 | 3.7 | 712.18 |
| 10 | 0 | QPSK | 3.699249359 | 38.461 | 3.699287820 | 3.7 | 712.18 |
| 10 | 0 | 16-QAM | 3.699252564 | 38.461 | 3.699291025 | 3.7 | 708.97 |
| 10 | 0 | 64-QAM | 3.699252564 | 38.461 | 3.699291025 | 3.7 | 708.97 |
| 10 | 1 | BPSK | 3.699258974 | 38.461 | 3.699297435 | 3.7 | 702.56 |
| 10 | 1 | QPSK | 3.699262179 | 38.461 | 3.699300640 | 3.7 | 699.36 |
| 10 | 1 | 16-QAM | 3.699258974 | 38.461 | 3.699297435 | 3.7 | 702.56 |
| 10 | 1 | 64-QAM | 3.699255769 | 38.461 | 3.699294230 | 3.7 | 705.77 |

8.2.4 Test data, continued



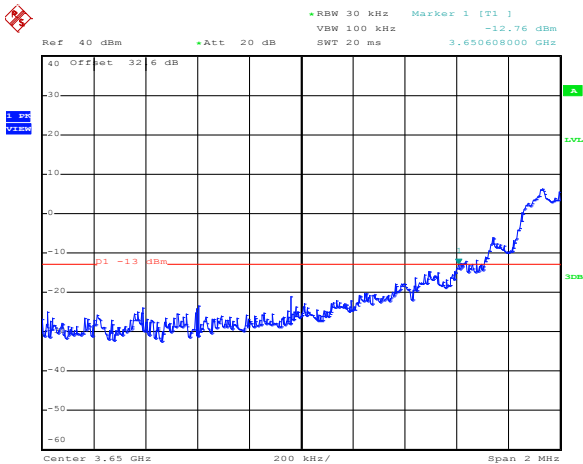
Date: 13.JAN.2014 18:30:37

Figure 8.2-1: Lower cross point (f_L) sample plot for 5 MHz



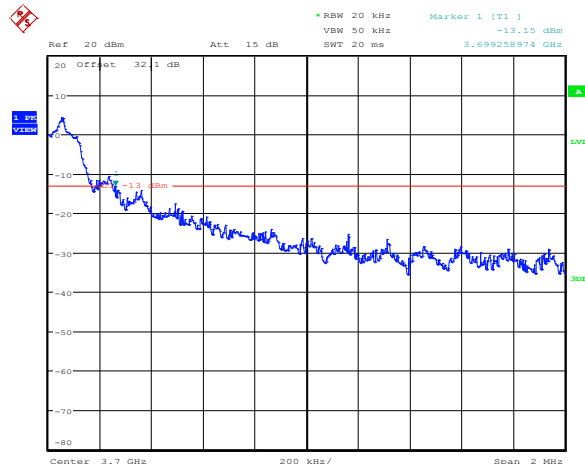
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Figure 8.2-2: Upper cross point (f_H) sample plot for 5 MHz



Date: 13.JAN.2014 18:14:58

Figure 8.2-3: Lower cross point (f_L) sample plot for 10 MHz



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Figure 8.2-4: Upper cross point (f_H) sample plot for 10 MHz

8.3 FCC 90.1321(a) Transmit output power and PSD

8.3.1 Definitions and limits

a) Base and fixed stations are limited to 25 W/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 W in any one-megahertz slice of spectrum.

(b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650–3700 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(1) Different information must be transmitted to each receiver.

(2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (a) of this section, as applicable. The directional antenna gain shall be computed as follows:

(i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi, of the individual element or stave having the highest gain.

(ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence is presented, e.g., due to shading of the array or coherence loss in the beam-forming.

(3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does not exceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limit specified in paragraph (b)(2) of this section by more than 8 dB.

(4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.

8.3.2 Test summary

| | | | |
|----------------|------------------|--------------------|-----------|
| Test date: | January 13, 2014 | Temperature: | 22 °C |
| Test engineer: | Kevin Rose | Air pressure: | 1003 mbar |
| Verdict: | Pass | Relative humidity: | 30 % |

8.3.3 Observations settings and special notes

The transmit power was measured in conducted mode, using an RMS detector, over a period of continuous transmission of sufficient duration such that the acquired trace is maximized. Video averaging was not allowed. Spectrum analyser settings:

| | |
|-----------------------|---------------------|
| Resolution bandwidth: | Wider than 99 % OBW |
| Video bandwidth: | ≥ 3 times the RBW |
| Detector mode: | RMS |
| Trace mode: | Max Hold |

The transmitter power spectral density was measured over a bandwidth of 1 MHz. With the power measured as per above. A resolution bandwidth less than the measurement bandwidth can be used provided that the measured power is integrated to show total power over the measurement bandwidth. Spectrum analyser settings:

| | |
|-----------------------|----------|
| Resolution bandwidth: | 1 MHz |
| Video bandwidth: | 3 MHz |
| Detector mode: | RMS |
| Trace mode: | Max Hold |



8.3.4 Test data

Table 8.3-1: EIRP measurements results for 5 MHz

| Port | Modulation | Frequency, MHz | Power setting | Peak output power, dBm/5 MHz | EIRP limit, dBm/5 MHz | Margin, dB |
|------|------------|----------------|---------------|------------------------------|-----------------------|------------|
| 1 | BPSK | 3652.5 | 23 | 22.58 | 37 | 14.42 |
| | | 3677.5 | 23 | 22.66 | 37 | 14.34 |
| | | 3697.5 | 23 | 22.35 | 37 | 14.65 |
| | QPSK | 3652.5 | 23 | 22.58 | 37 | 14.42 |
| | | 3677.5 | 23 | 22.58 | 37 | 14.42 |
| | | 3697.5 | 23 | 22.38 | 37 | 14.62 |
| | 16-QAM | 3652.5 | 23 | 22.62 | 37 | 14.38 |
| | | 3677.5 | 23 | 22.35 | 37 | 14.65 |
| | | 3697.5 | 23 | 22.56 | 37 | 14.44 |
| | 64-QAM | 3652.5 | 23 | 22.46 | 37 | 14.54 |
| | | 3677.5 | 23 | 22.42 | 37 | 14.58 |
| | | 3697.5 | 23 | 22.68 | 37 | 14.32 |
| 2 | BPSK | 3652.5 | 23 | 22.97 | 37 | 14.03 |
| | | 3677.5 | 23 | 22.76 | 37 | 14.24 |
| | | 3697.5 | 23 | 22.38 | 37 | 14.62 |
| | QPSK | 3652.5 | 23 | 22.99 | 37 | 14.01 |
| | | 3677.5 | 23 | 22.74 | 37 | 14.26 |
| | | 3697.5 | 23 | 22.59 | 37 | 14.41 |
| | 16-QAM | 3652.5 | 23 | 22.90 | 37 | 14.10 |
| | | 3677.5 | 23 | 22.82 | 37 | 14.18 |
| | | 3697.5 | 23 | 22.47 | 37 | 14.53 |
| | 64-QAM | 3652.5 | 23 | 22.97 | 37 | 14.03 |
| | | 3677.5 | 23 | 22.73 | 37 | 14.27 |
| | | 3697.5 | 23 | 22.48 | 37 | 14.52 |

Note: limit (25 W/25 MHz) = 44 dBm/25 MHz. Limit (5 W/5 MHz) = 37 dBm/5 MHz

8.3.4 Test data, continued

Table 8.3-2: PSD measurements results for 5 MHz

| Port | Modulation | Frequency, MHz | Power setting | PSD, dBm/MHz | EIRP PSD limit, dBm/MHz | Margin, dB |
|------|------------|----------------|---------------|--------------|-------------------------|------------|
| 1 | BPSK | 3652.5 | 23 | 17.65 | 30 | 12.35 |
| | | 3677.5 | 23 | 17.60 | 30 | 12.40 |
| | | 3697.5 | 23 | 17.29 | 30 | 12.71 |
| | QPSK | 3652.5 | 23 | 17.83 | 30 | 12.17 |
| | | 3677.5 | 23 | 17.53 | 30 | 12.47 |
| | | 3697.5 | 23 | 17.33 | 30 | 12.67 |
| | 16-QAM | 3652.5 | 23 | 17.68 | 30 | 12.32 |
| | | 3677.5 | 23 | 17.31 | 30 | 12.69 |
| | | 3697.5 | 23 | 17.42 | 30 | 12.58 |
| | 64-QAM | 3652.5 | 23 | 17.81 | 30 | 12.19 |
| | | 3677.5 | 23 | 17.27 | 30 | 12.73 |
| | | 3697.5 | 23 | 17.69 | 30 | 12.31 |
| 2 | BPSK | 3652.5 | 23 | 18.03 | 30 | 11.97 |
| | | 3677.5 | 23 | 17.74 | 30 | 12.26 |
| | | 3697.5 | 23 | 17.36 | 30 | 12.64 |
| | QPSK | 3652.5 | 23 | 18.14 | 30 | 11.86 |
| | | 3677.5 | 23 | 17.66 | 30 | 12.34 |
| | | 3697.5 | 23 | 17.42 | 30 | 12.58 |
| | 16-QAM | 3652.5 | 23 | 18.15 | 30 | 11.85 |
| | | 3677.5 | 23 | 17.23 | 30 | 12.77 |
| | | 3697.5 | 23 | 17.31 | 30 | 12.69 |
| | 64-QAM | 3652.5 | 23 | 18.32 | 30 | 11.68 |
| | | 3677.5 | 23 | 17.68 | 30 | 12.32 |
| | | 3697.5 | 23 | 17.36 | 30 | 12.64 |

Note: The Maximum allowed antenna gain per 5 MHz bandwidth with the power setting of 23 is 11.68 dBi , if higher antenna gain is used the output power should be reduced by amounts of dB that the antenna gain is higher than 11.68 dBi.



8.3.4 Test data, continued

Table 8.3-3: EIRP measurements results for 10 MHz

| Port | Modulation | Frequency, MHz | Power setting | Peak output power, dBm/10 MHz | EIRP limit, dBm/10 MHz | Margin, dB |
|------|------------|----------------|---------------|-------------------------------|------------------------|------------|
| 1 | BPSK | 3655 | 23 | 22.83 | 40 | 17.17 |
| | | 3680 | 23 | 22.22 | 40 | 17.78 |
| | | 3695 | 23 | 22.04 | 40 | 17.96 |
| | QPSK | 3655 | 23 | 22.80 | 40 | 17.20 |
| | | 3680 | 23 | 21.72 | 40 | 18.28 |
| | | 3695 | 23 | 22.02 | 40 | 17.98 |
| | 16-QAM | 3655 | 23 | 22.85 | 40 | 17.15 |
| | | 3680 | 23 | 22.27 | 40 | 17.73 |
| | | 3695 | 23 | 22.00 | 40 | 18.00 |
| | 64-QAM | 3655 | 23 | 22.83 | 40 | 17.17 |
| | | 3680 | 23 | 22.25 | 40 | 17.75 |
| | | 3695 | 23 | 21.80 | 40 | 18.20 |
| 2 | BPSK | 3655 | 23 | 22.95 | 40 | 17.05 |
| | | 3680 | 23 | 22.34 | 40 | 17.66 |
| | | 3695 | 23 | 22.06 | 40 | 17.94 |
| | QPSK | 3655 | 23 | 22.98 | 40 | 17.02 |
| | | 3680 | 23 | 22.37 | 40 | 17.63 |
| | | 3695 | 23 | 22.07 | 40 | 17.93 |
| | 16-QAM | 3655 | 23 | 22.95 | 40 | 17.05 |
| | | 3680 | 23 | 22.42 | 40 | 17.58 |
| | | 3695 | 23 | 22.00 | 40 | 18.00 |
| | 64-QAM | 3655 | 23 | 22.89 | 40 | 17.11 |
| | | 3680 | 23 | 22.52 | 40 | 17.48 |
| | | | 3695 | 23 | 22.12 | 40 |

Note: limit (25 W/25 MHz) = 44 dBm/25 MHz. Limit (10 W/10 MHz) = 40 dBm/10 MHz

8.3.4 Test data, continued

Table 8.3-4: PSD measurements results for 10 MHz

| Port | Modulation | Frequency, MHz | Power setting | PSD, dBm/MHz | PSD EIRP limit, dBm/MHz | Margin, dB | |
|--------|------------|----------------|---------------|--------------|-------------------------|------------|-------|
| 1 | BPSK | 3655 | 23 | 15.04 | 30 | 14.96 | |
| | | 3680 | 23 | 14.33 | 30 | 15.67 | |
| | | 3695 | 23 | 14.03 | 30 | 15.97 | |
| | QPSK | 3655 | 23 | 15.01 | 30 | 14.99 | |
| | | 3680 | 23 | 13.69 | 30 | 16.31 | |
| | | 3695 | 23 | 14.02 | 30 | 15.98 | |
| | 16-QAM | 3655 | 23 | 14.97 | 30 | 15.03 | |
| | | 3680 | 23 | 14.42 | 30 | 15.58 | |
| | | 3695 | 23 | 14.03 | 30 | 15.97 | |
| | 64-QAM | 3655 | 23 | 15.04 | 30 | 14.96 | |
| | | 3680 | 23 | 14.37 | 30 | 15.63 | |
| | | 3695 | 23 | 13.90 | 30 | 16.10 | |
| | 2 | BPSK | 3655 | 23 | 15.24 | 30 | 14.76 |
| | | | 3680 | 23 | 14.59 | 30 | 15.41 |
| | | | 3695 | 23 | 14.07 | 30 | 15.93 |
| QPSK | | 3655 | 23 | 15.29 | 30 | 14.71 | |
| | | 3680 | 23 | 14.50 | 30 | 15.50 | |
| | | 3695 | 23 | 14.09 | 30 | 15.91 | |
| 16-QAM | | 3655 | 23 | 15.41 | 30 | 14.59 | |
| | | 3680 | 23 | 14.54 | 30 | 15.46 | |
| | | 3695 | 23 | 14.09 | 30 | 15.91 | |
| 64-QAM | | 3655 | 23 | 15.31 | 30 | 14.69 | |
| | | 3680 | 23 | 14.60 | 30 | 15.40 | |
| | | 3695 | 23 | 14.10 | 30 | 15.90 | |

Note: The Maximum allowed antenna gain per 10 MHz bandwidth with the power setting of 23 is 14.59 dBi, if higher antenna gain is used the output power should be reduced by amounts of dB that the antenna gain is higher than 14.59 dBi.

8.3.4 Test data, continued

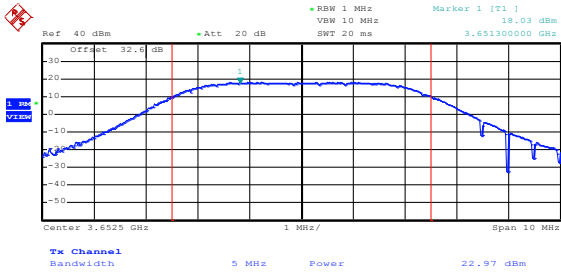


Figure 8.3-1: Output power and PSD 5 MHz sample plot with BPSK

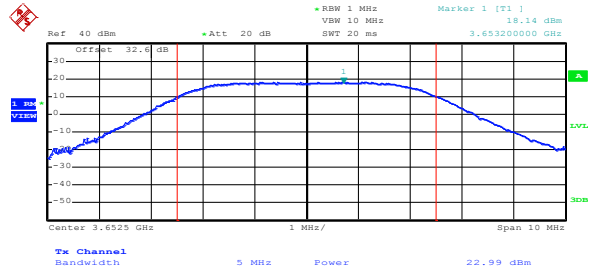


Figure 8.3-2: Output power and PSD 5 MHz sample plot with QPSK

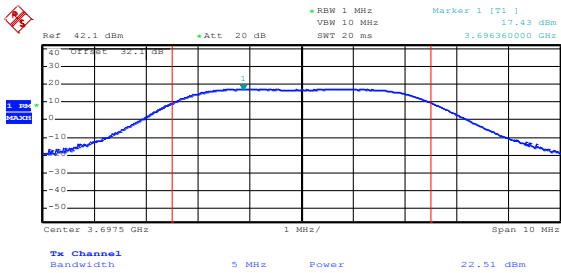


Figure 8.3-3: Output power and PSD 5 MHz sample plot with 16QAM

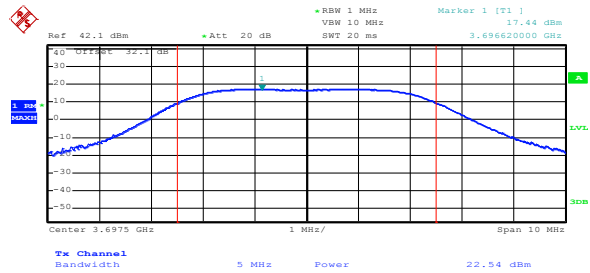


Figure 8.3-4: Output power and PSD 5 MHz sample plot with 64QAM

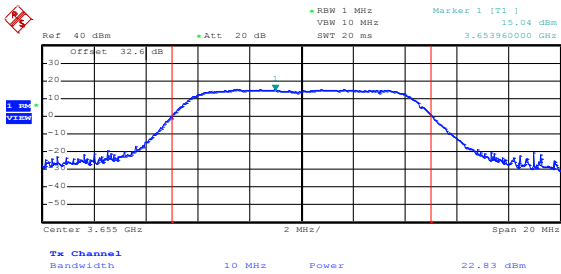


Figure 8.3-5: Output power and PSD 10 MHz sample plot with BPSK

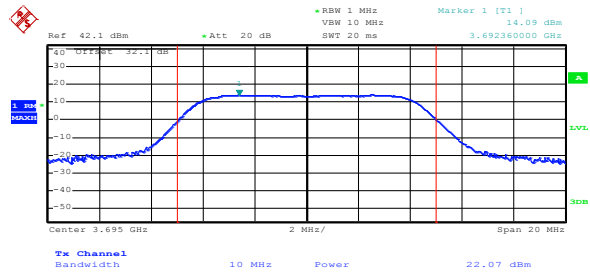


Figure 8.3-6: Output power and PSD 10 MHz sample plot with QPSK

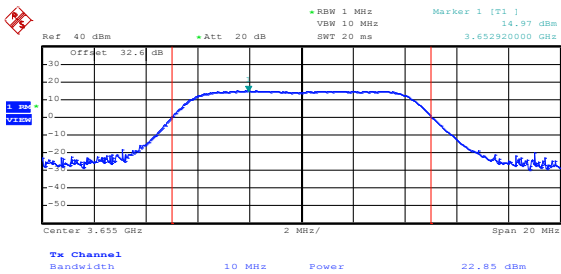


Figure 8.3-7: Output power and PSD 10 MHz sample plot with 16QAM

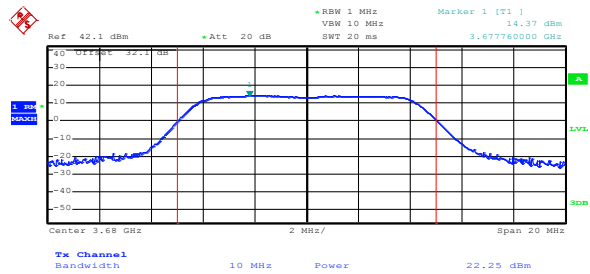


Figure 8.3-8: Output power and PSD 10 MHz sample plot with 64QAM

8.4 FCC 90.210(b) Emission mask

8.4.1 Definitions and limits

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

8.4.2 Test summary

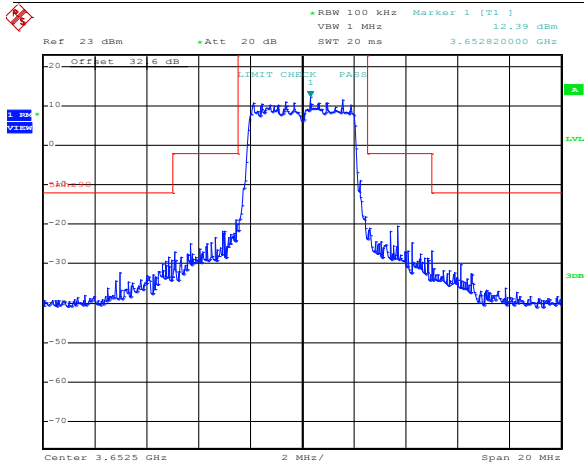
| | | | |
|----------------|------------------|--------------------|-----------|
| Test date: | December 3, 2013 | Temperature: | 21 °C |
| Test engineer: | Kevin Rose | Air pressure: | 1002 mbar |
| Verdict: | Pass | Relative humidity: | 35 % |

8.4.3 Observations settings and special notes

The 0 dB reference level in the unwanted emission mask plots is the maximum in-band power
Spectrum analyser settings:

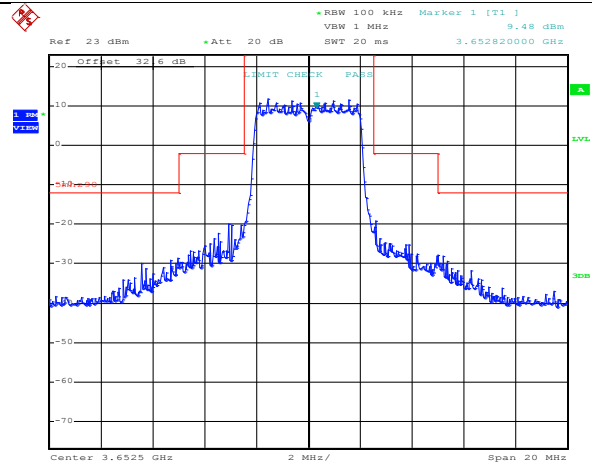
| | |
|-----------------------|---------------------------------|
| Resolution bandwidth: | 100 kHz |
| Video bandwidth: | 1 MHz |
| Detector mode: | RMS |
| Trace mode: | Power averaging over 100 sweeps |

8.4.4 Test data



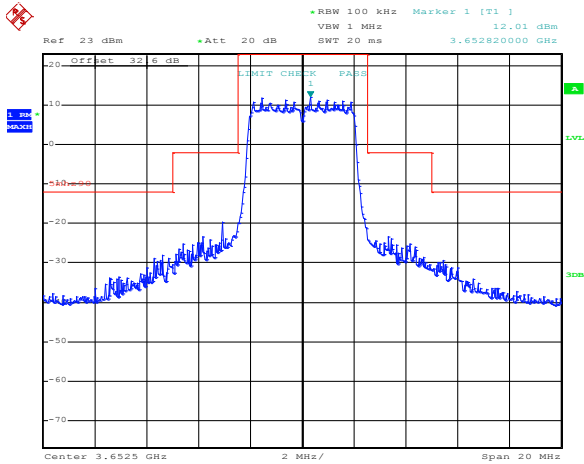
Date: 13.JAN.2014 20:51:53

Figure 8.4-1: Emission mask at Port 1 5 MHz with BPSK, Low channel



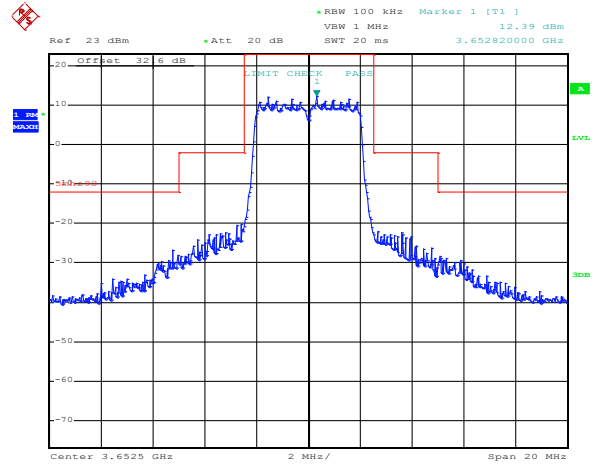
Date: 13.JAN.2014 20:51:27

Figure 8.4-2: Emission mask at Port 1 5 MHz with QPSK, Low channel



Date: 13.JAN.2014 20:50:51

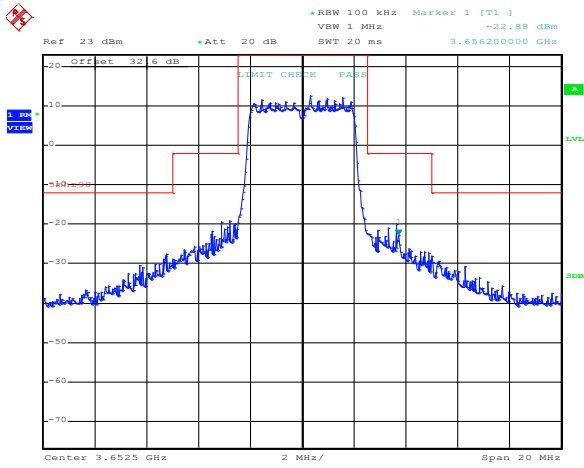
Figure 8.4-3: Emission mask at Port 1 5 MHz with 16-QAM, Low channel



Date: 13.JAN.2014 20:50:26

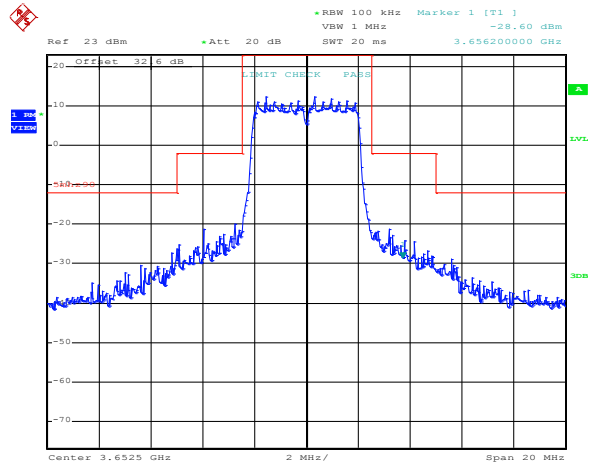
Figure 8.4-4: Emission mask at Port 1 5 MHz with 64-QAM, Low channel

8.4.4 Test data, continued



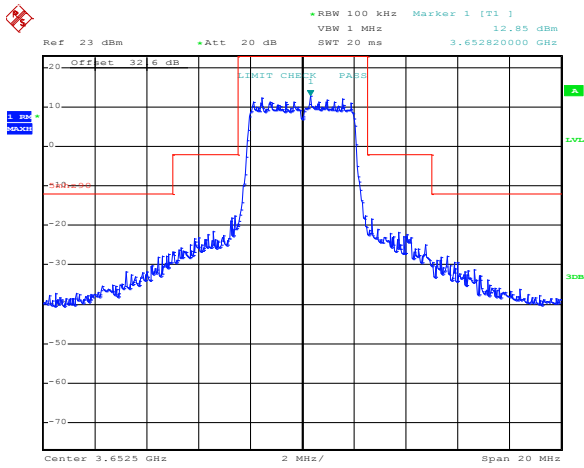
Date: 13.JAN.2014 20:47:29

Figure 8.4-5: Emission mask at Port 2 5 MHz with BPSK, Low channel



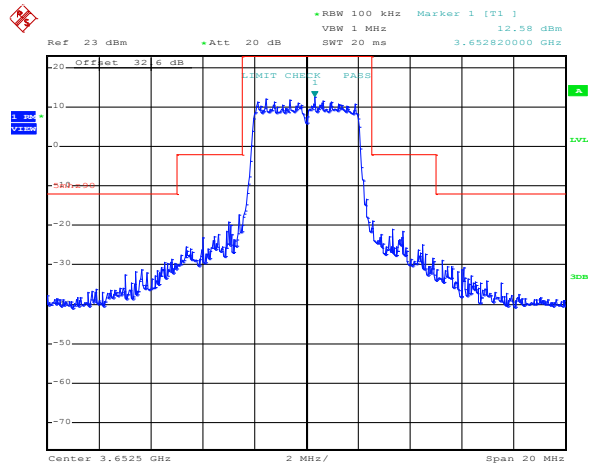
Date: 13.JAN.2014 20:47:59

Figure 8.4-6: Emission mask at Port 2 5 MHz with QPSK, Low channel



Date: 13.JAN.2014 20:48:37

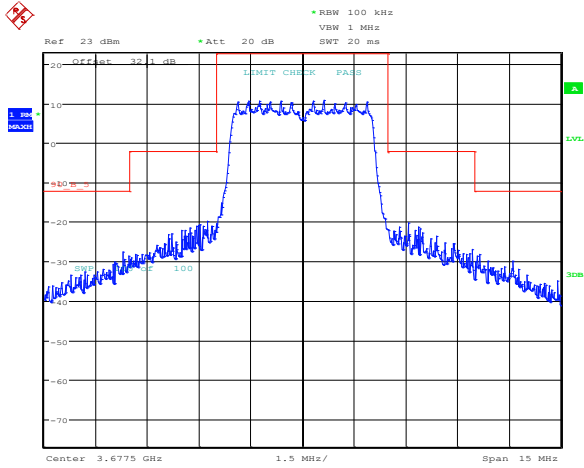
Figure 8.4-7: Emission mask at Port 2 5 MHz with 16-QAM, Low channel



Date: 13.JAN.2014 20:49:09

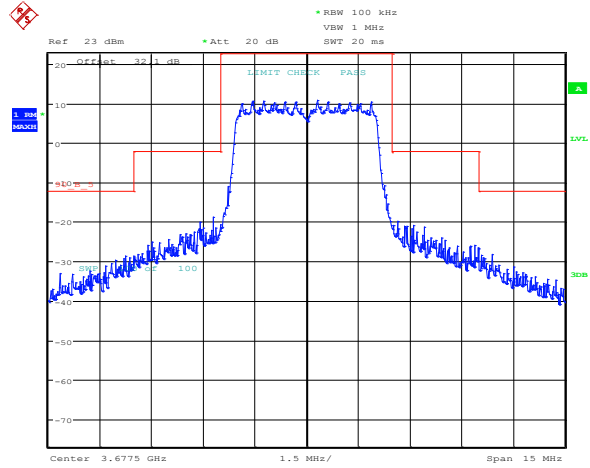
Figure 8.4-8: Emission mask at Port 2 5 MHz with 64-QAM, Low channel

8.4.4 Test data Continued



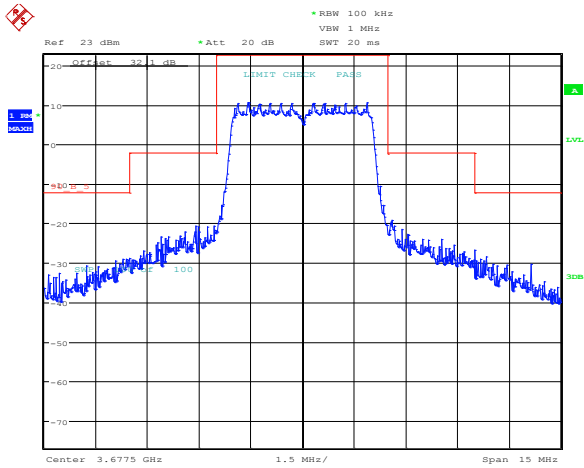
Date: 4.DEC.2013 17:17:17

Figure 8.4-9: Emission mask at Port 1 5 MHz with BPSK, Mid channel



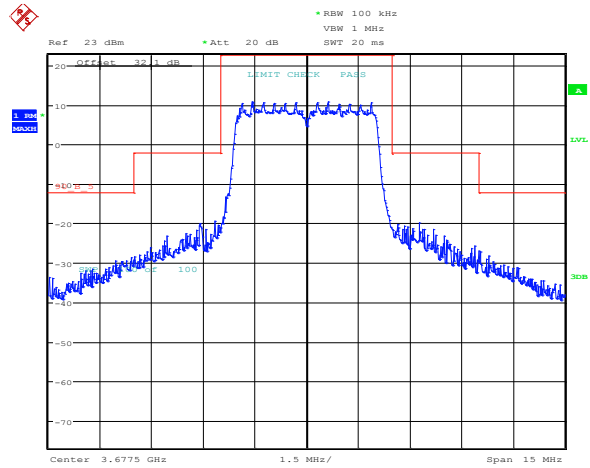
Date: 4.DEC.2013 17:16:54

Figure 8.4-10: Emission mask at Port 1 5 MHz with QPSK, Mid channel



Date: 4.DEC.2013 17:16:29

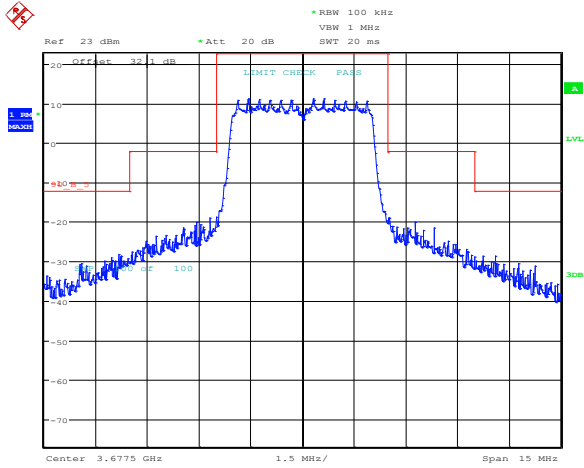
Figure 8.4-11: Emission mask at Port 1 5 MHz with 16-QAM, Mid channel



Date: 4.DEC.2013 17:15:57

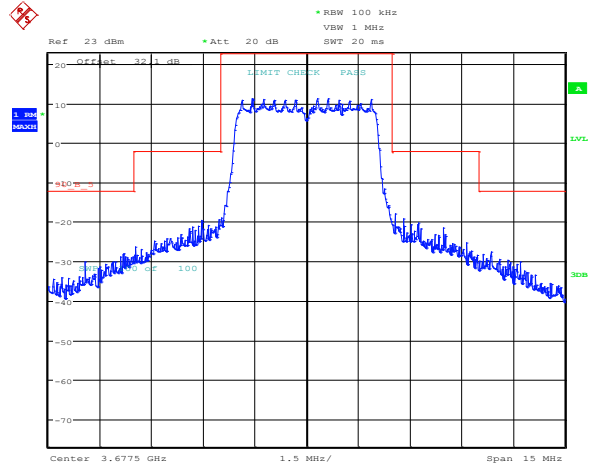
Figure 8.4-12: Emission mask at Port 1 5 MHz with 64-QAM, Mid channel

8.4.4 Test data, continued



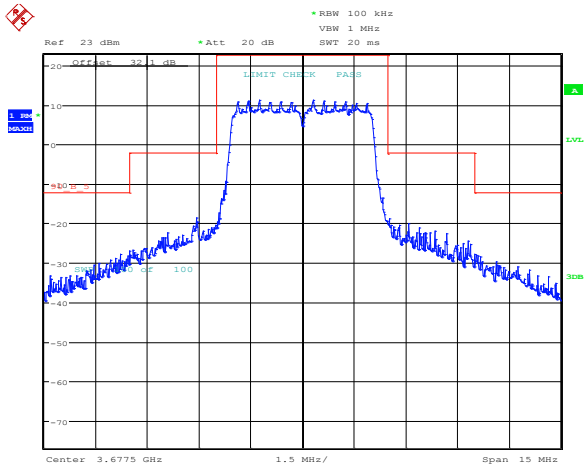
Date: 4.DEC.2013 16:58:34

Figure 8.4-13: Emission mask at Port 2 5 MHz with BPSK, Mid channel



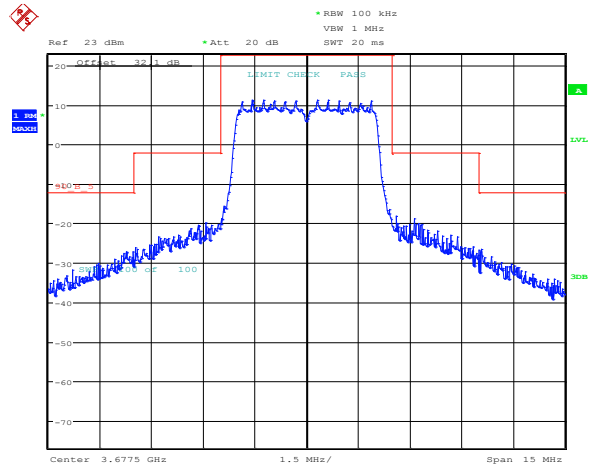
Date: 4.DEC.2013 16:58:07

Figure 8.4-14: Emission mask at Port 2 5 MHz with QPSK, Mid channel



Date: 4.DEC.2013 16:57:37

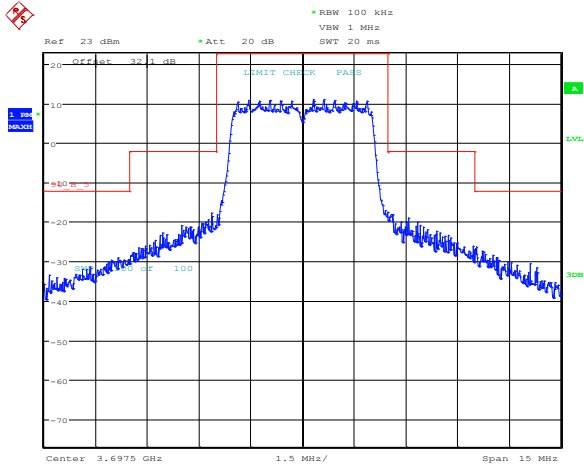
Figure 8.4-15: Emission mask at Port 2 5 MHz with 16-QAM, Mid channel



Date: 4.DEC.2013 16:57:06

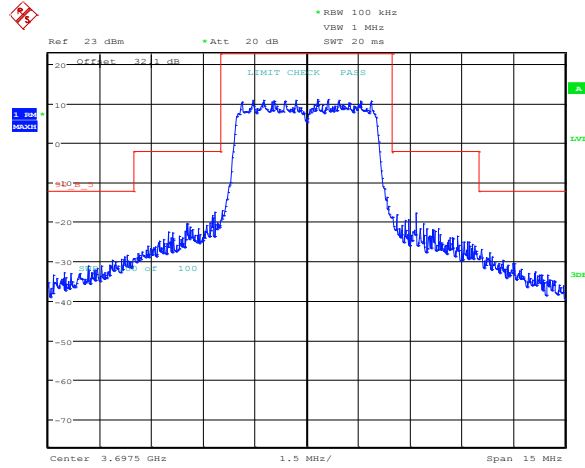
Figure 8.4-16: Emission mask at Port 2 5 MHz with 64-QAM, Mid channel

8.4.4 Test data, continued



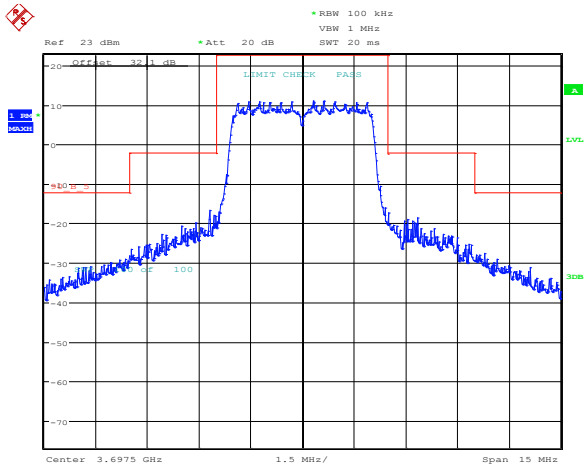
Date: 4.DEC.2013 17:12:32

Figure 8.4-17: Emission mask at Port 1 5 MHz with BPSK, High channel



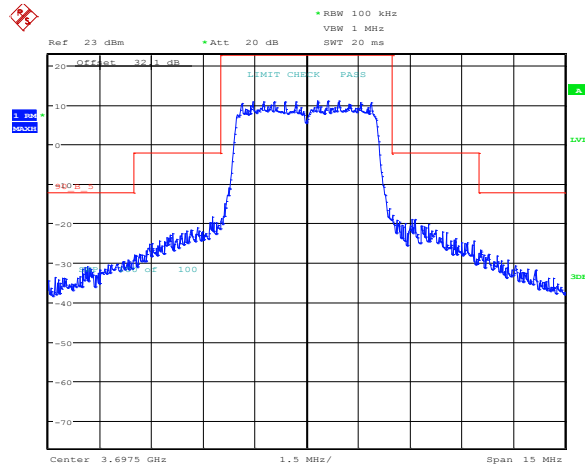
Date: 4.DEC.2013 17:11:56

Figure 8.4-18: Emission mask at Port 1 5 MHz with QPSK, High channel



Date: 4.DEC.2013 17:11:22

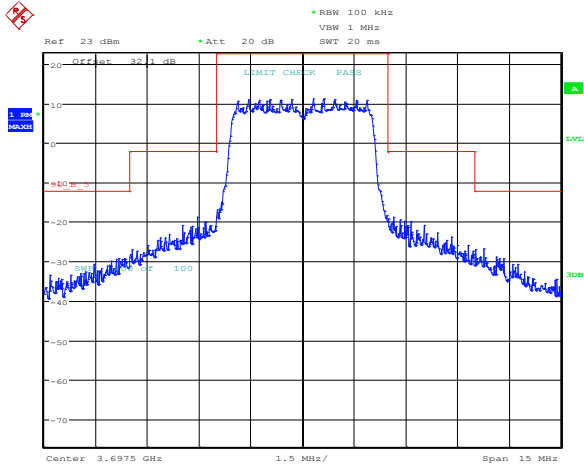
Figure 8.4-19: Emission mask at Port 1 5 MHz with 16-QAM, High channel



Date: 4.DEC.2013 17:10:45

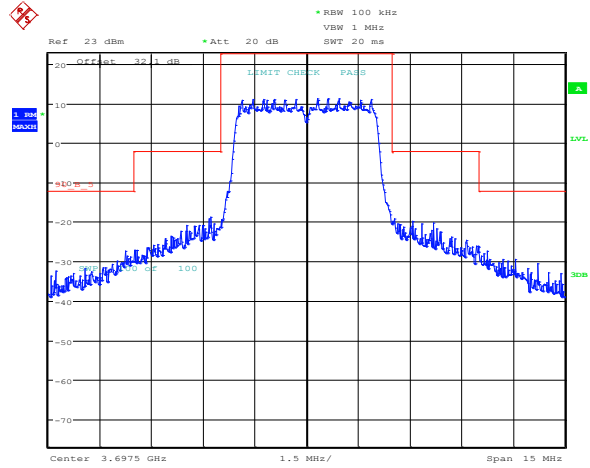
Figure 8.4-20: Emission mask at Port 1 5 MHz with 64-QAM, High channel

8.4.4 Test data, continued



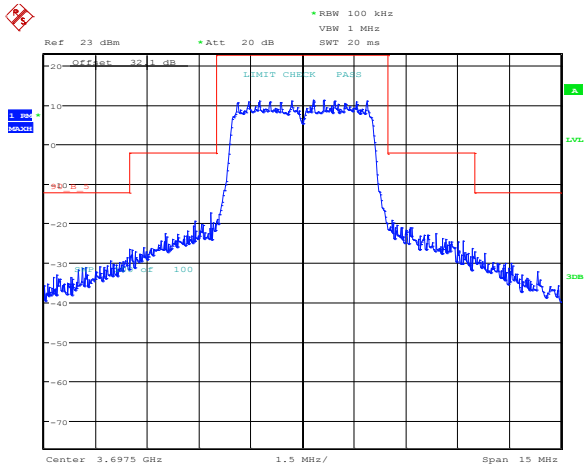
Date: 4.DEC.2013 17:03:31

Figure 8.4-21: Emission mask at Port 2 5 MHz with BPSK, High channel



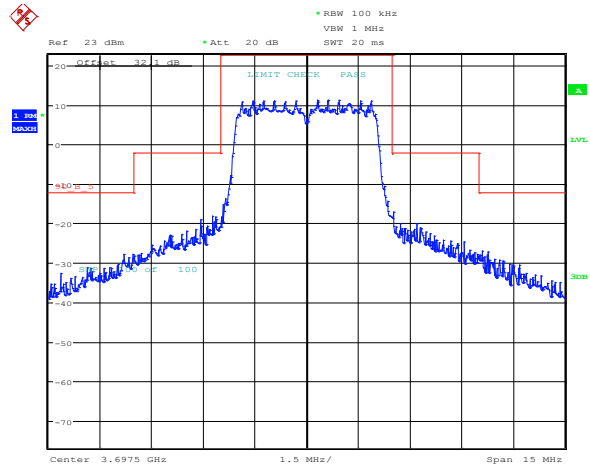
Date: 4.DEC.2013 17:03:07

Figure 8.4-22: Emission mask at Port 2 5 MHz with QPSK, High channel



Date: 4.DEC.2013 17:02:42

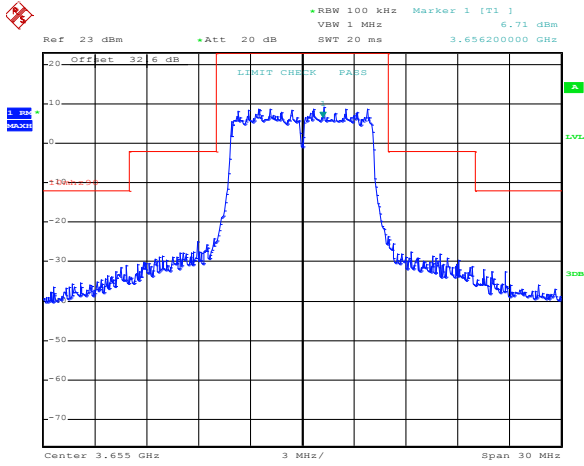
Figure 8.4-23: Emission mask at Port 2 5 MHz with 16-QAM, High channel



Date: 4.DEC.2013 17:02:17

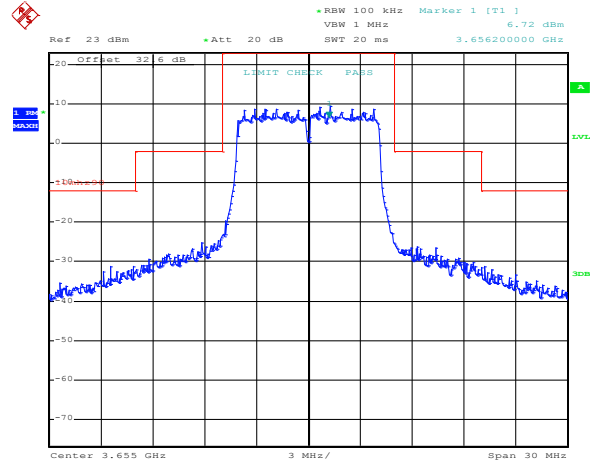
Figure 8.4-24: Emission mask at Port 2 5 MHz with 64-QAM, High channel

8.4.4 Test data, continued



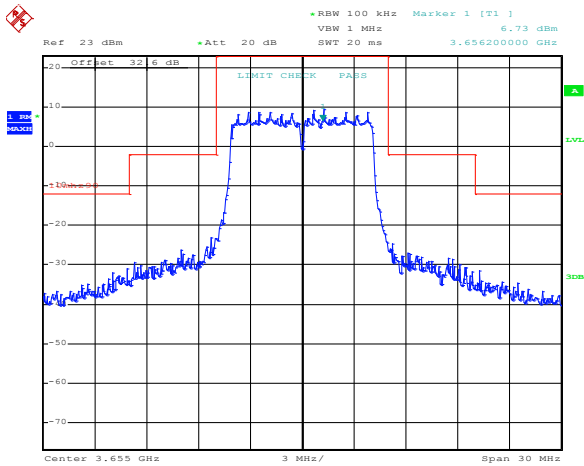
Date: 13.JAN.2014 20:42:25

Figure 8.4-25: Emission mask at Port 1 10 MHz with BPSK, Low channel



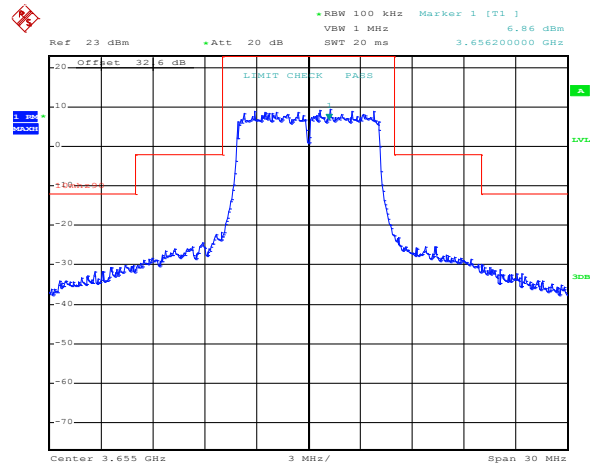
Date: 13.JAN.2014 20:42:01

Figure 8.4-26: Emission mask at Port 1 10 MHz with QPSK, Low channel



Date: 13.JAN.2014 20:41:09

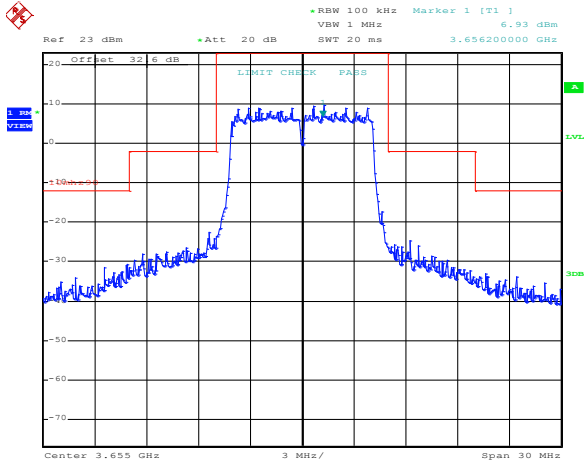
Figure 8.4-27: Emission mask at Port 1 10 MHz with 16-QAM, Low channel



Date: 13.JAN.2014 20:40:36

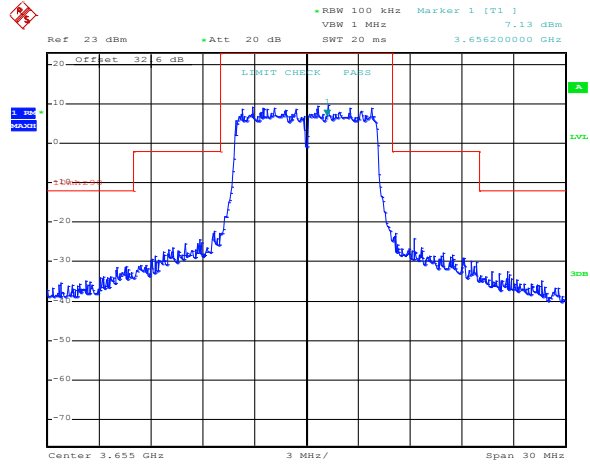
Figure 8.4-28: Emission mask at Port 1 10 MHz with 64-QAM, Low channel

8.4.4 Test data, continued



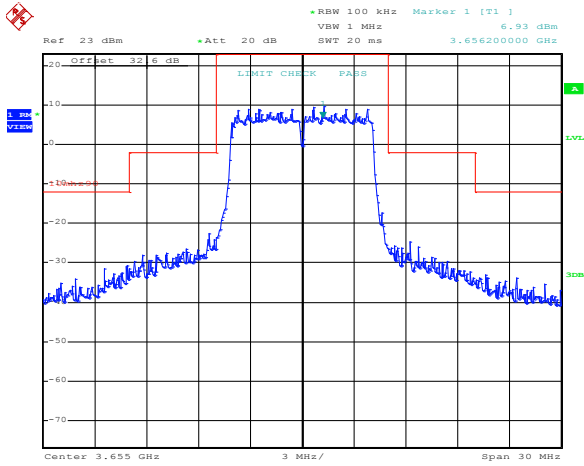
Date: 13.JAN.2014 20:43:37

Figure 8.4-29: Emission mask at Port 2 10 MHz with BPSK, Low channel



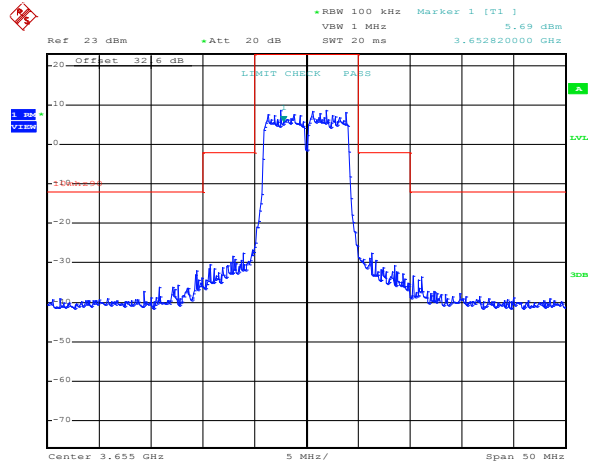
Date: 13.JAN.2014 20:44:11

Figure 8.4-30: Emission mask at Port 2 10 MHz with QPSK, Low channel



Date: 13.JAN.2014 20:43:37

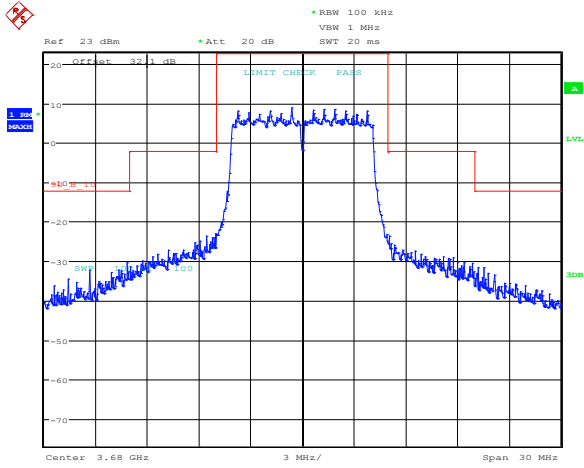
Figure 8.4-31: Emission mask at Port 2 10 MHz with 16-QAM, Low channel



Date: 13.JAN.2014 20:59:44

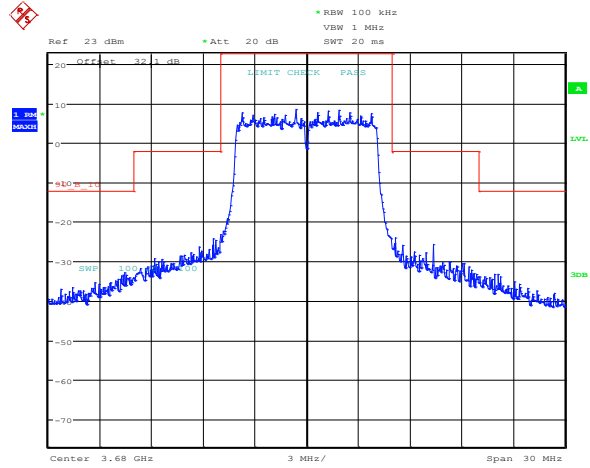
Figure 8.4-32: Emission mask at Port 2 10 MHz with 64-QAM, Low channel

8.4.4 Test data



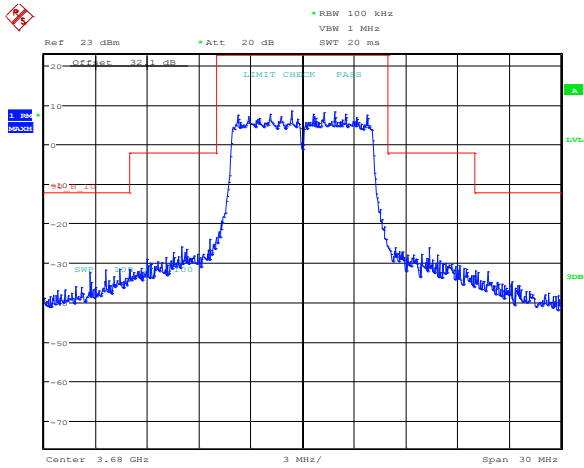
Date: 4.DEC.2013 16:52:11

Figure 8.4-33: Emission mask at Port 1 10 MHz with BPSK, Mid channel



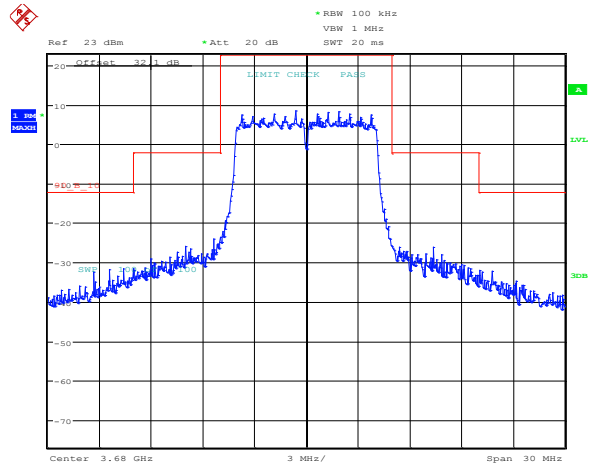
Date: 4.DEC.2013 16:34:45

Figure 8.4-34: Emission mask at Port 1 10 MHz with QPSK, Mid channel



Date: 4.DEC.2013 16:34:04

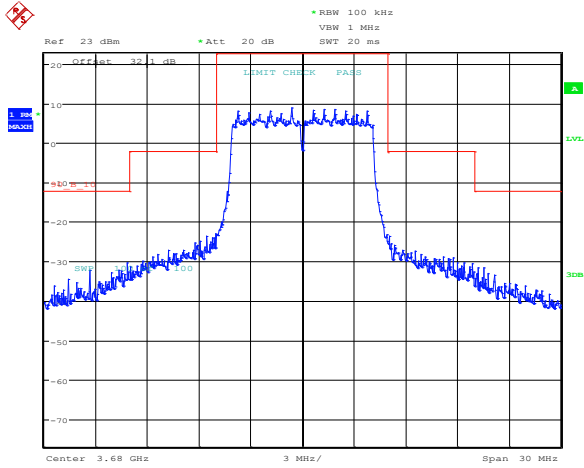
Figure 8.4-35: Emission mask at Port 1 10 MHz with 16-QAM, Mid channel



Date: 4.DEC.2013 16:34:04

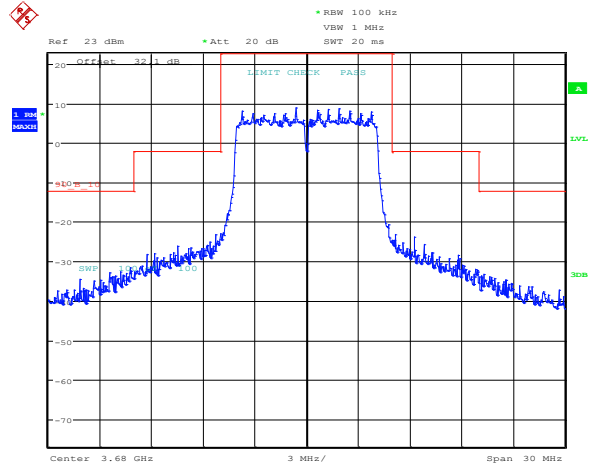
Figure 8.4-36: Emission mask at Port 1 10 MHz with 64-QAM, Mid channel

8.4.4 Test data, continued



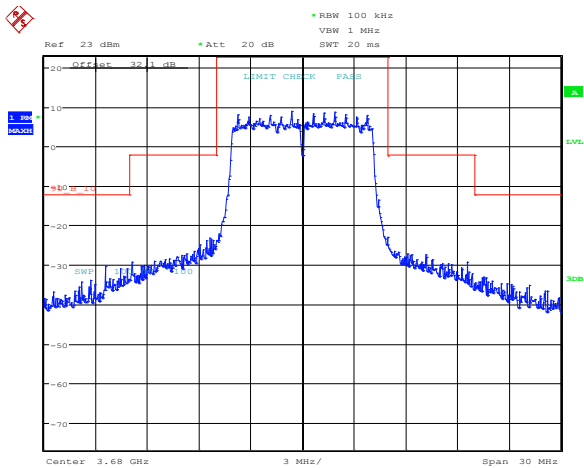
Date: 4.DEC.2013 16:52:11

Figure 8.4-37: Emission mask at Port 2 10 MHz with BPSK, Mid channel



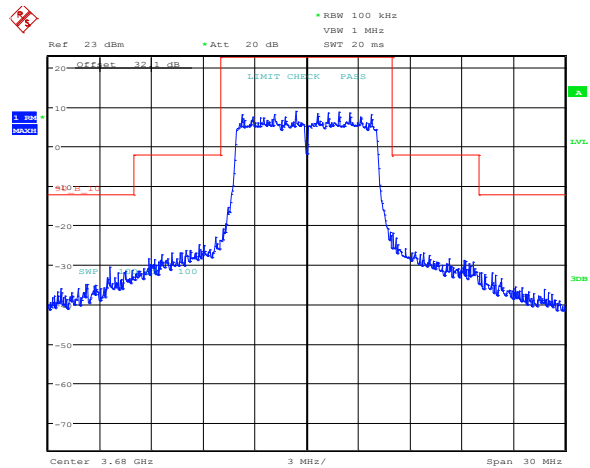
Date: 4.DEC.2013 16:51:46

Figure 8.4-38: Emission mask at Port 2 10 MHz with QPSK, Mid channel



Date: 4.DEC.2013 16:51:14

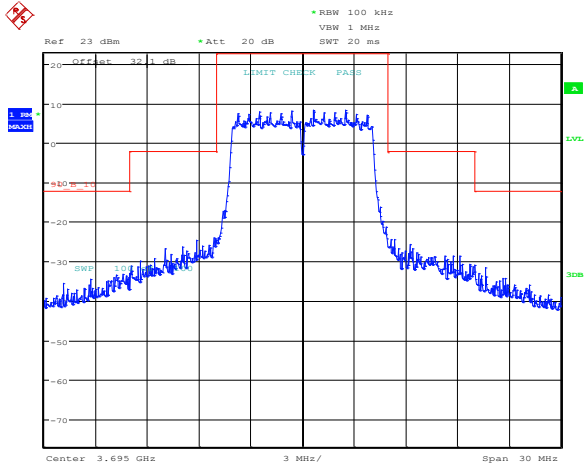
Figure 8.4-39: Emission mask at Port 2 10 MHz with 16-QAM, Mid channel



Date: 4.DEC.2013 16:50:35

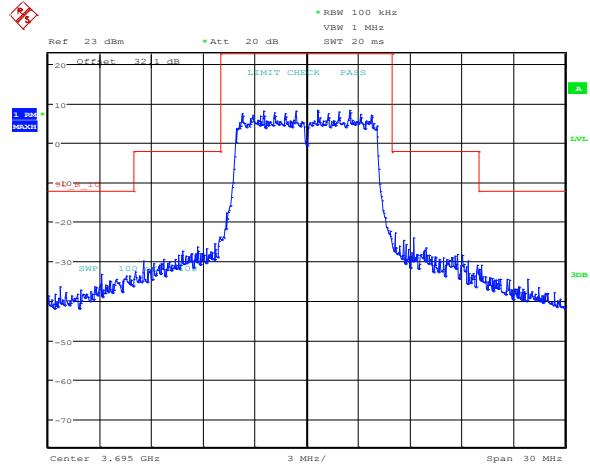
Figure 8.4-40: Emission mask at Port 2 10 MHz with 64-QAM, Mid channel

8.4.4 Test data, continued



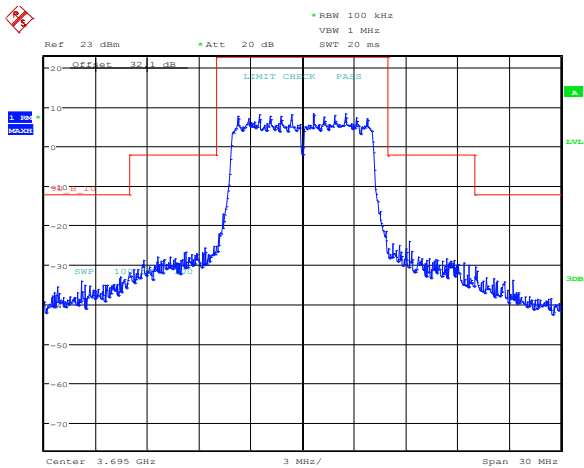
Date: 4.DEC.2013 16:43:03

Figure 8.4-41: Emission mask at Port 1 10 MHz with BPSK, High channel



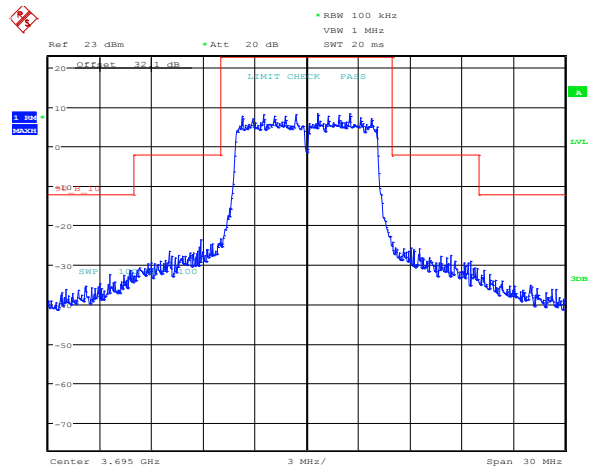
Date: 4.DEC.2013 16:42:36

Figure 8.4-42: Emission mask at Port 1 10 MHz with, QPSK, High channel



Date: 4.DEC.2013 16:42:07

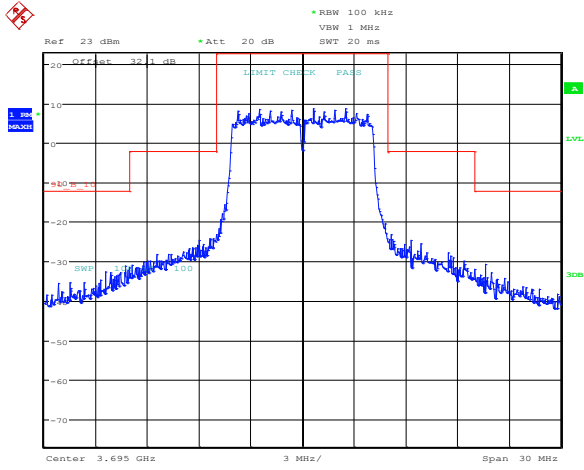
Figure 8.4-43: Emission mask at Port 1 10 MHz with 16-QAM, High channel



Date: 4.DEC.2013 16:41:35

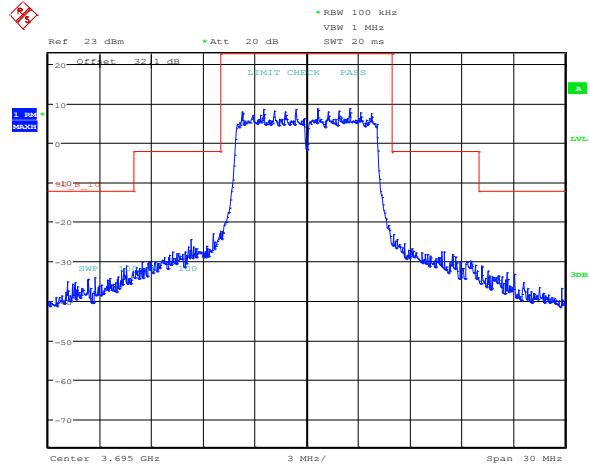
Figure 8.4-44: Emission mask at Port 1 10 MHz with 64-QAM, High channel

8.4.4 Test data, continued



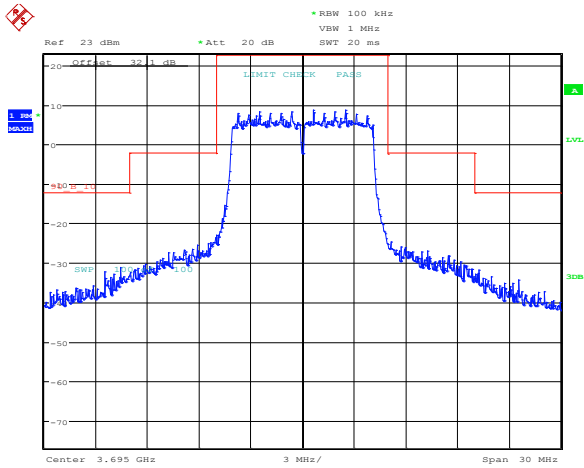
Date: 4.DEC.2013 16:46:39

Figure 8.4-45: Emission mask at Port 2 10 MHz with BPSK, High channel



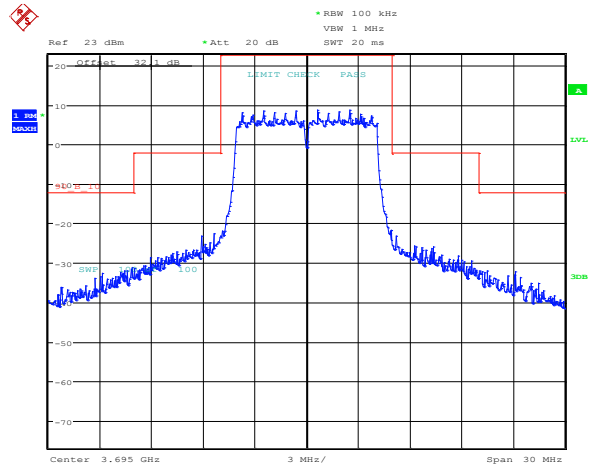
Date: 4.DEC.2013 16:46:04

Figure 8.4-46: Emission mask at Port 2 10 MHz with QPSK, High channel



Date: 4.DEC.2013 16:45:31

Figure 8.4-47: Emission mask at Port 2 10 MHz with 16-QAM, High channel



Date: 4.DEC.2013 16:45:00

Figure 8.4-48: Emission mask at Port 2 10 MHz with 64-QAM, High channel

8.5 FCC 90.1323 Transmitter unwanted emissions

8.5.1 Definitions and limits

(a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

8.5.2 Test summary

| | | | |
|----------------|------------------|--------------------|-----------|
| Test date: | January 13, 2014 | Temperature: | 22 °C |
| Test engineer: | Kevin Rose | Air pressure: | 1003 mbar |
| Verdict: | Pass | Relative humidity: | 31 % |

8.5.3 Observations settings and special notes

EUT was scanned 30 MHz to 10th harmonic.

Radiated measurements were performed at a distance of 3 m, the EUT was transmitting on both MIMO chains simultaneously. Radiated emissions were performed while both antenna connectors were terminated with 50 Ω load. No radiated spurious emissions were detected more than 15 dB below the limit.

Spectrum analyser settings for peak conducted measurements:

| | |
|-----------------------|----------|
| Resolution bandwidth: | 1 MHz |
| Video bandwidth: | 3 MHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

Spectrum analyser settings for band edge measurements:

| | |
|-----------------------|-------------------------------------|
| Resolution bandwidth: | 100 kHz (1 % of occupied bandwidth) |
| Video bandwidth: | 1 MHz |
| Detector mode: | RMS |
| Trace mode: | Max-hold |
| Measured bandwidth: | Power integration over 1 MHz |

8.5.4 Test data

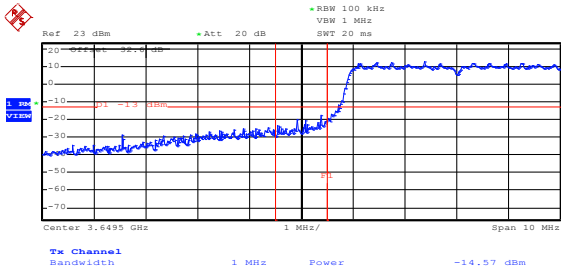


Figure 8.5-1: Lower band edge at 5 MHz Port 1 with BPSK

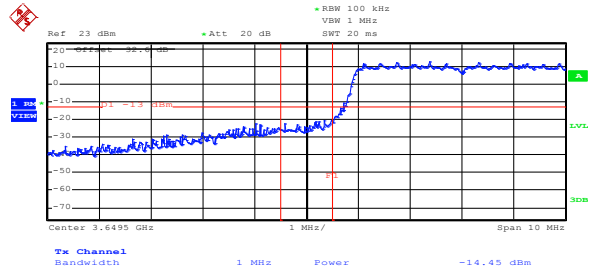


Figure 8.5-2: Lower band edge at 5 MHz Port 2 with 64-QAM

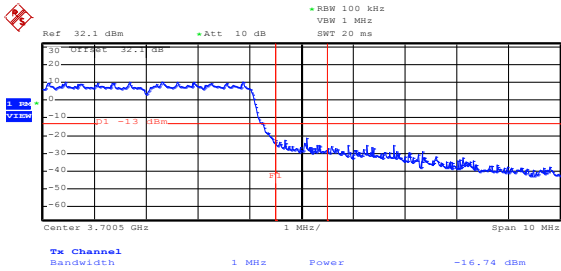


Figure 8.5-3: Upper band edge at 5 MHz Port 1 with QPSK

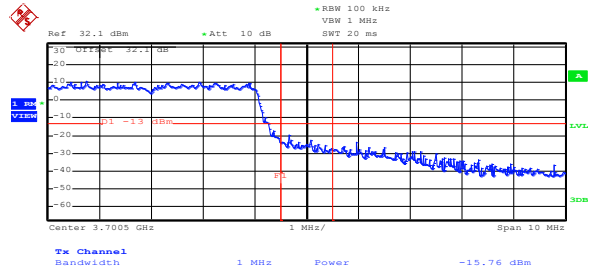


Figure 8.5-4: Upper band edge at 5 MHz Port 2 with 16-QAM

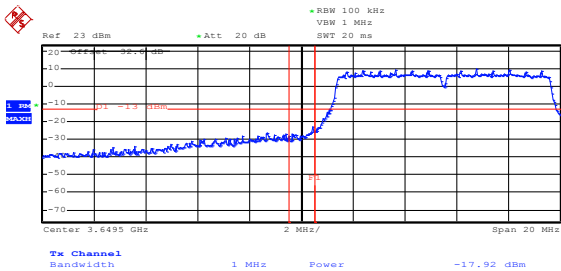


Figure 8.5-5: Lower band edge at 10 MHz Port 1 with BPSK

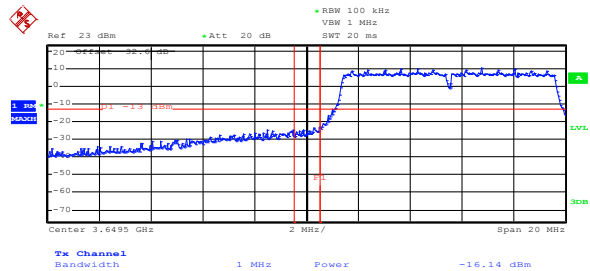


Figure 8.5-6: Lower band edge at 10 MHz Port 2 with 64-QAM

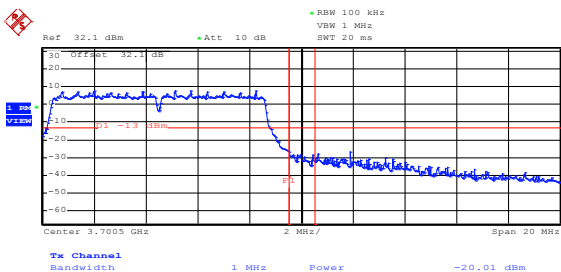


Figure 8.5-7: Upper band edge at 10 MHz Port 1 with QPSK

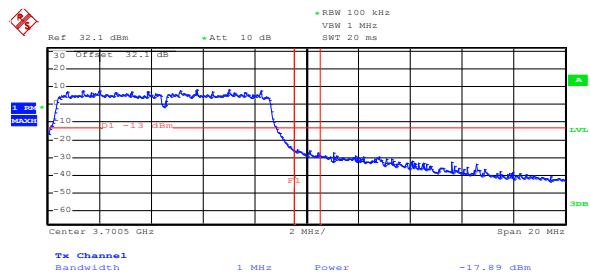
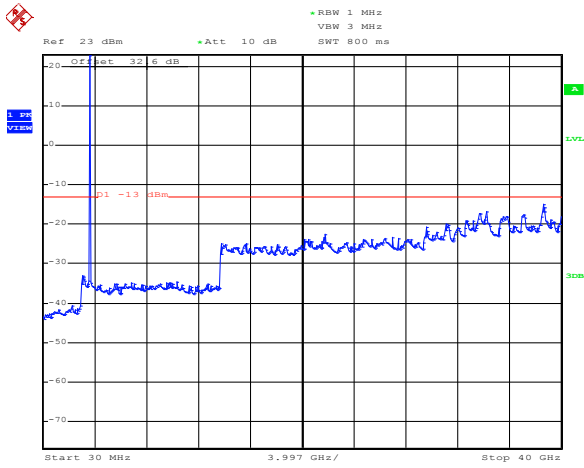


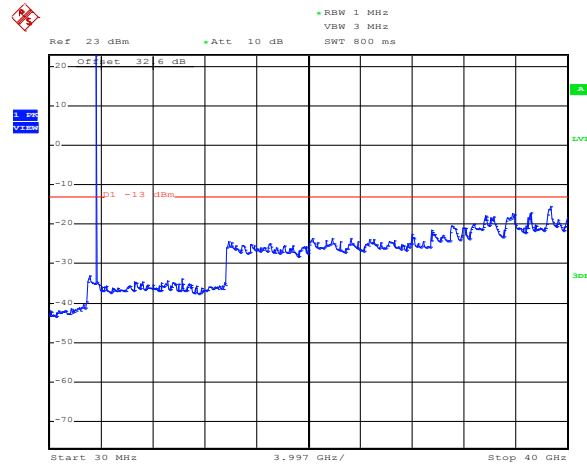
Figure 8.5-8: Upper band edge at 10 MHz Port 2 with 16-QAM

8.5.4 Test data, continued



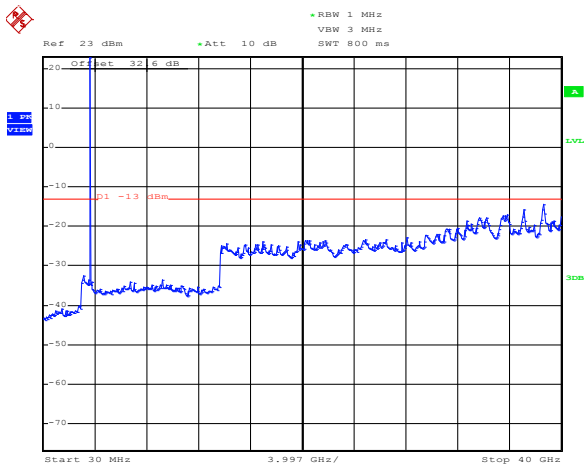
Date: 13.JAN.2014 21:45:16

Figure 8.5-9: Spurious out-of-band emissions at Port 1 with 5 MHz BPSK, Low channel



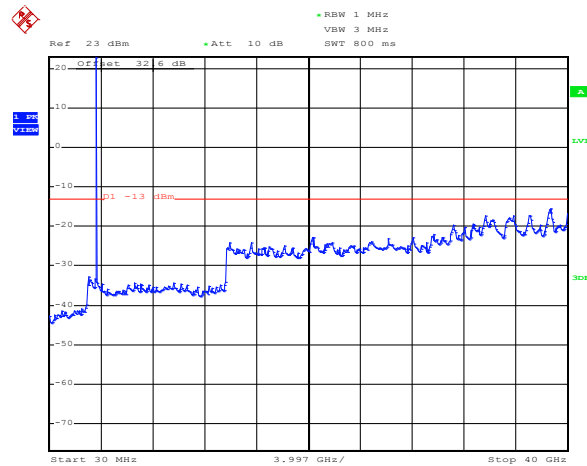
Date: 13.JAN.2014 21:45:53

Figure 8.5-10: Spurious out-of-band emissions at Port 1 with 5 MHz 64-QAM, Low channel



Date: 13.JAN.2014 21:47:42

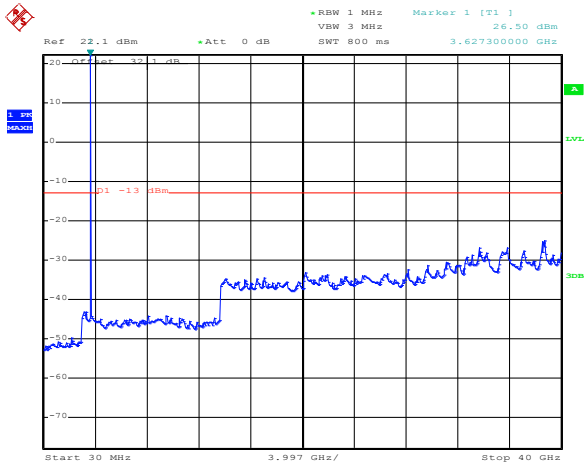
Figure 8.5-11: Spurious out-of-band emissions at Port 2 with 5 MHz BPSK, Low channel



Date: 13.JAN.2014 21:47:10

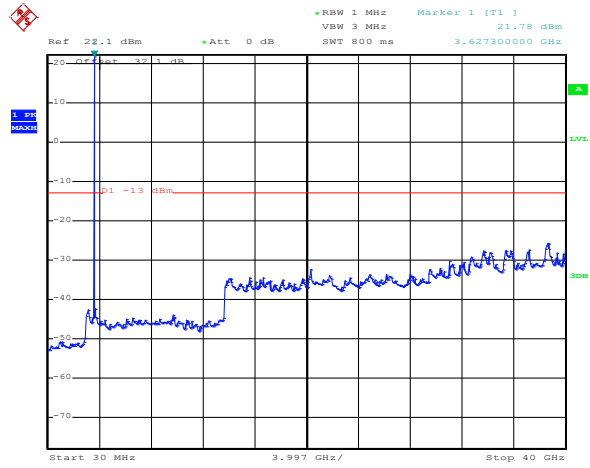
Figure 8.5-12: Spurious out-of-band emissions at Port 2 with 5 MHz 64-QAM, Low channel

8.5.5 Test data, continued



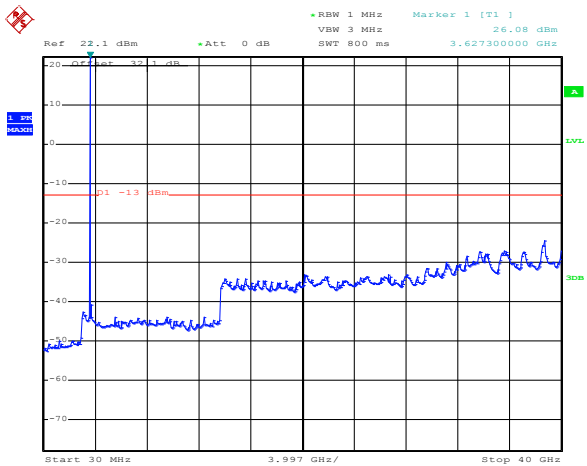
Date: 3.DEC.2013 20:39:03

Figure 8.5-13: Spurious out-of-band emissions at Port 1 with 5 MHz BPSK, Mid channel



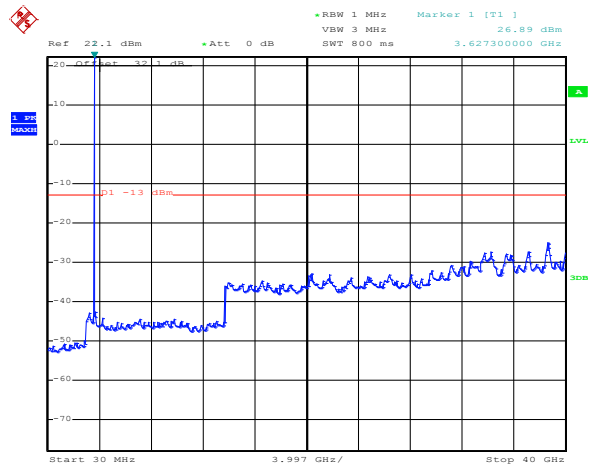
Date: 3.DEC.2013 20:42:35

Figure 8.5-14: Spurious out-of-band emissions at Port 1 with 5 MHz 64-QAM, Mid channel



Date: 3.DEC.2013 20:47:15

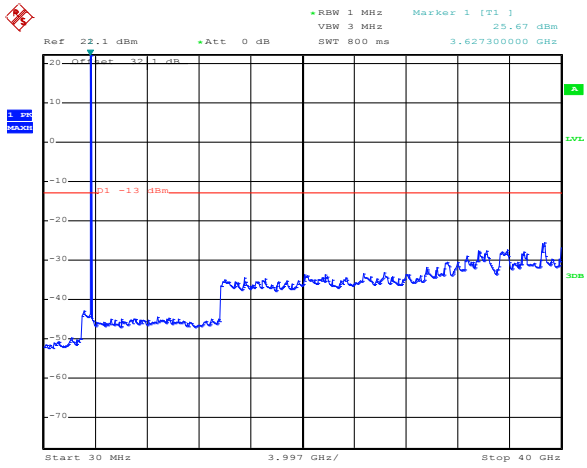
Figure 8.5-15: Spurious out-of-band emissions at Port 2 with 5 MHz BPSK, Mid channel



Date: 3.DEC.2013 20:43:25

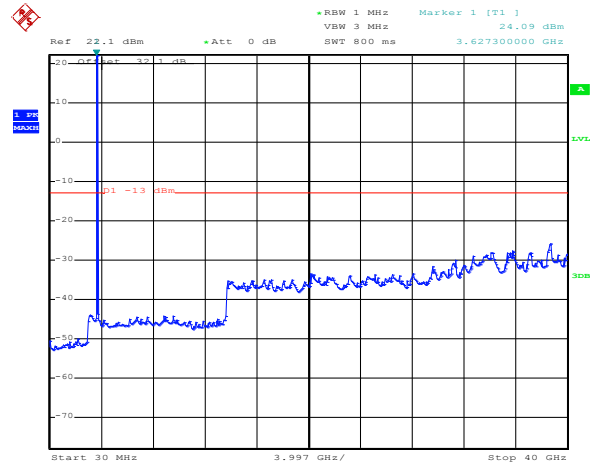
Figure 8.5-16: Spurious out-of-band emissions at Port 2 with 5 MHz 64-QAM, Mid channel

8.5.4 Test data, continued



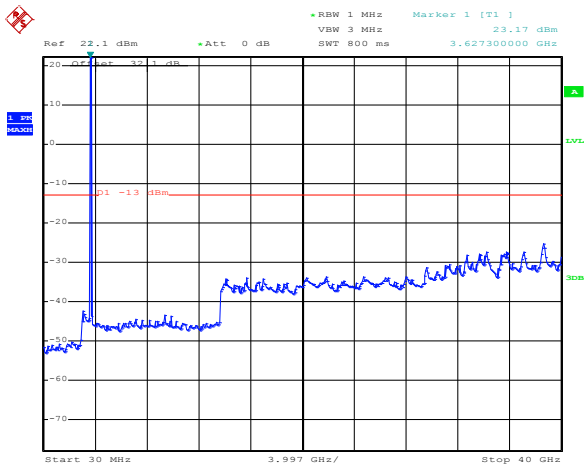
Date: 3.DEC.2013 20:40:36

Figure 8.5-17: Spurious out-of-band emissions at Port 1 with 5 MHz BPSK, high channel



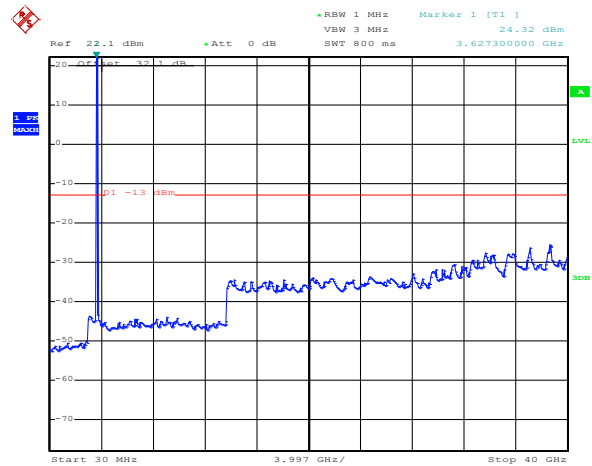
Date: 3.DEC.2013 20:41:11

Figure 8.5-18: Spurious out-of-band emissions at Port 1 with 5 MHz 64-QAM, high channel



Date: 3.DEC.2013 20:45:25

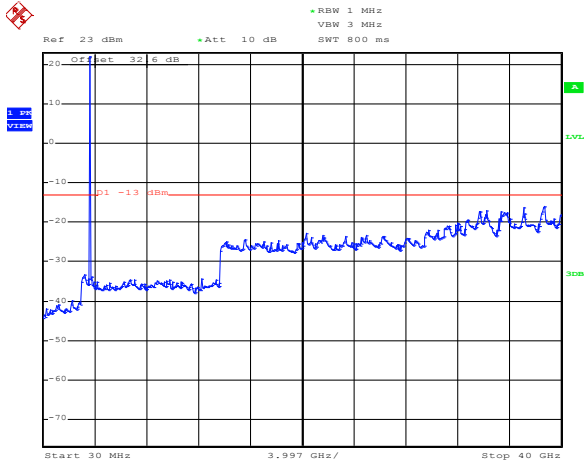
Figure 8.5-19: Spurious out-of-band emissions at Port 2 with 5 MHz BPSK, high channel



Date: 3.DEC.2013 20:44:43

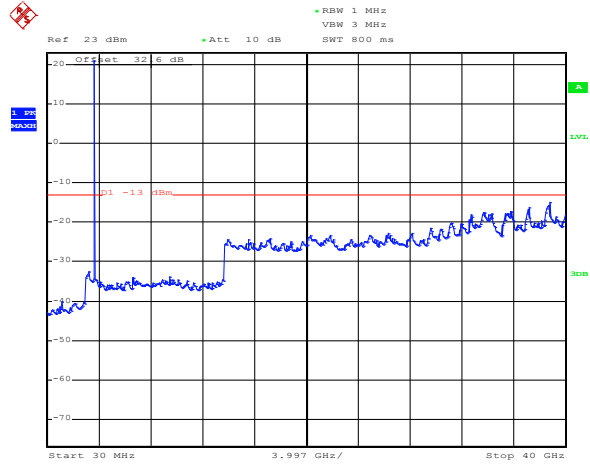
Figure 8.5-20: Spurious out-of-band emissions at Port 2 with 5 MHz 64-QAM, high channel

8.5.4 Test data, continued



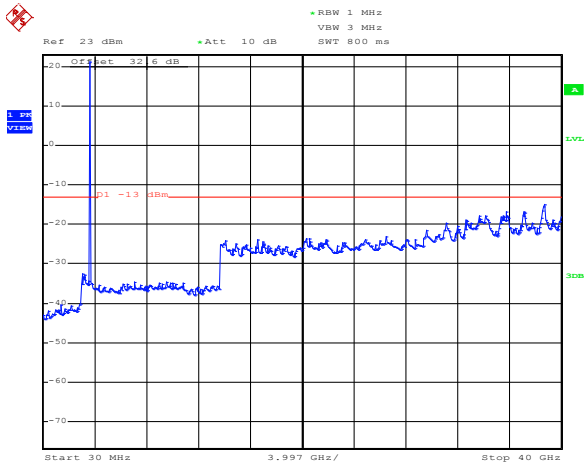
Date: 13.JAN.2014 21:50:42

Figure 8.5-21: Spurious out-of-band emissions at Port 1 with 10 MHz BPSK, Low channel



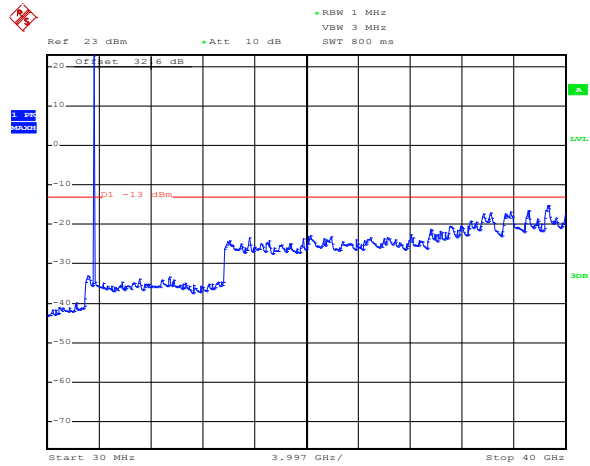
Date: 13.JAN.2014 21:50:13

Figure 8.5-22: Spurious out-of-band emissions at Port 1 with 10 MHz 64-QAM, Low channel



Date: 13.JAN.2014 21:48:49

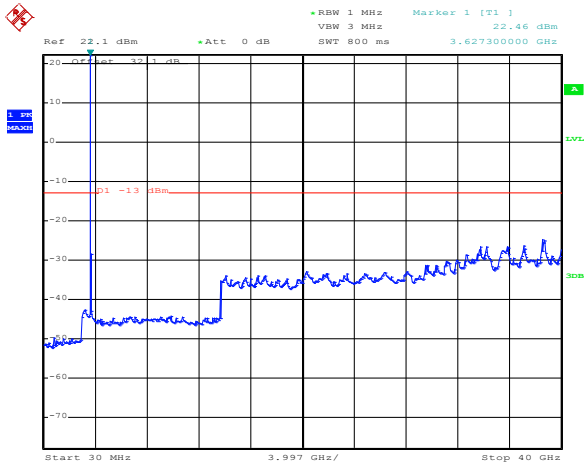
Figure 8.5-23: Spurious out-of-band emissions at Port 2 with 10 MHz BPSK, Low channel



Date: 13.JAN.2014 21:49:28

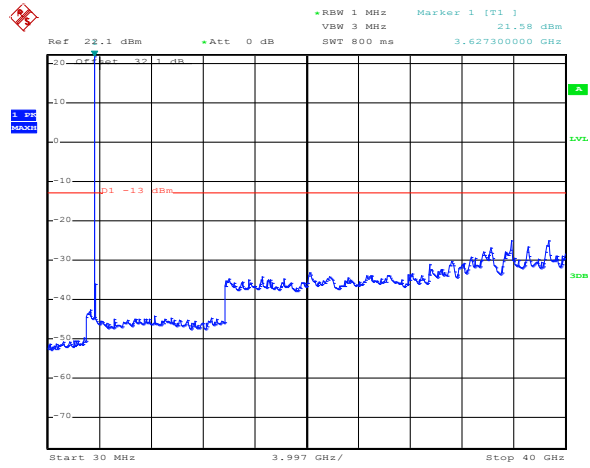
Figure 8.5-24: Spurious out-of-band emissions at Port 2 with 10 MHz 64-QAM, Low channel

8.5.4 Test data, continued



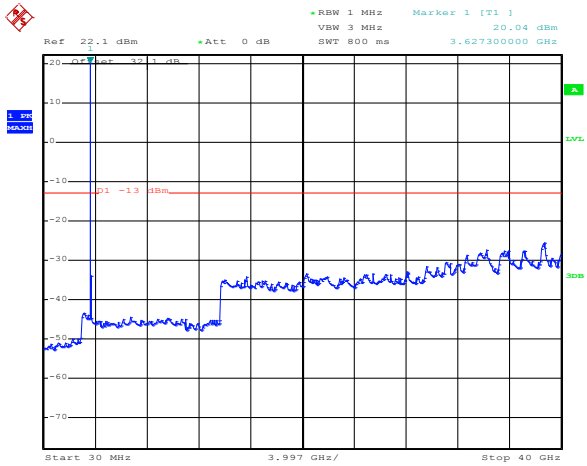
Date: 3.DEC.2013 20:34:42

Figure 8.5-25: Spurious out-of-band emissions at Port 1 with 10 MHz BPSK, Mid channel



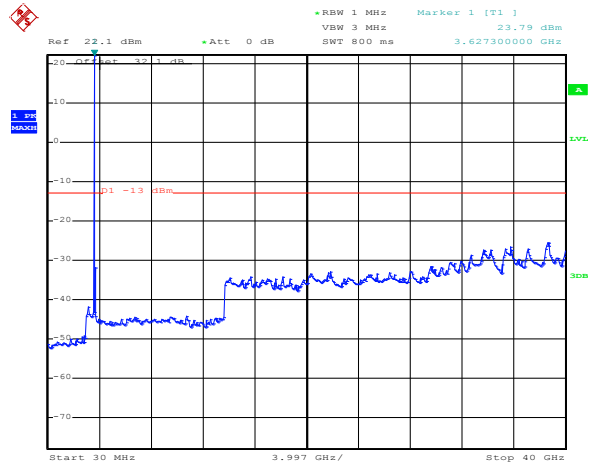
Date: 3.DEC.2013 20:32:47

Figure 8.5-26: Spurious out-of-band emissions at Port 1 with 10 MHz 64-QAM, Mid channel



Date: 3.DEC.2013 20:30:51

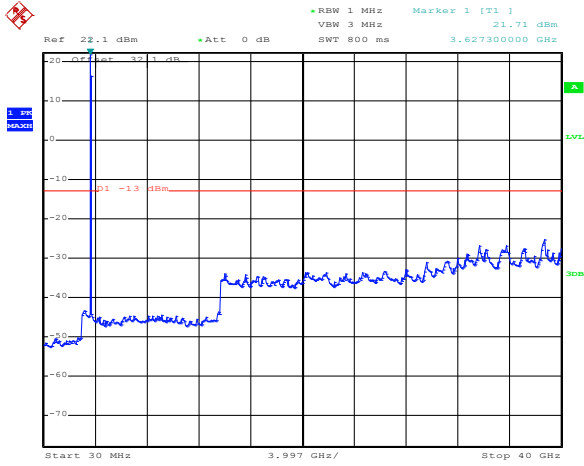
Figure 8.5-27: Spurious out-of-band emissions at Port 2 with 10 MHz BPSK, Mid channel



Date: 3.DEC.2013 20:31:34

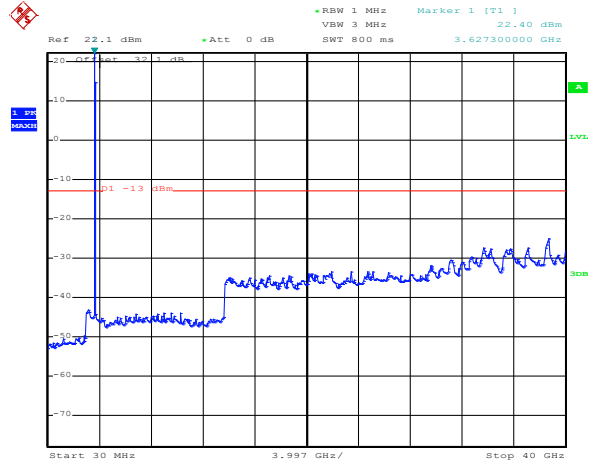
Figure 8.5-28: Spurious out-of-band emissions at Port 2 with 10 MHz 64-QAM, Mid channel

8.5.4 Test data, continued



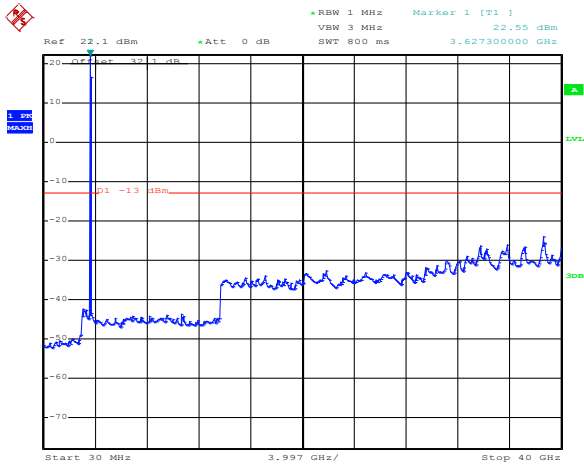
Date: 3.DEC.2013 20:37:36

Figure 8.5-29: Spurious out-of-band emissions at Port 1 with 10 MHz BPSK, high channel



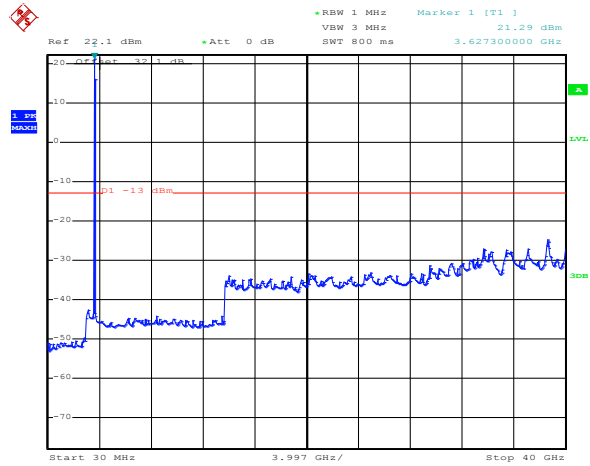
Date: 3.DEC.2013 20:36:55

Figure 8.5-30: Spurious out-of-band emissions at Port 1 with 10 MHz 64-QAM, high channel



Date: 3.DEC.2013 20:27:23

Figure 8.5-31: Spurious out-of-band emissions at Port 2 with 10 MHz BPSK, high channel



Date: 3.DEC.2013 20:28:22

Figure 8.5-32: Spurious out-of-band emissions at Port 2 with 10 MHz 64-QAM, high channel

8.5.4 Test data, continued

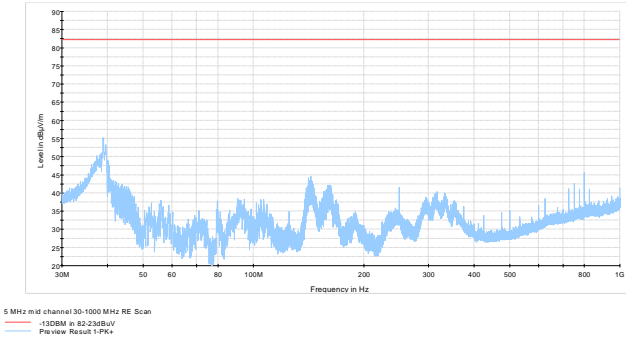


Figure 8.5-33: Spurious radiated emissions sample
 plot 30-1000 MHz, 5 MHz

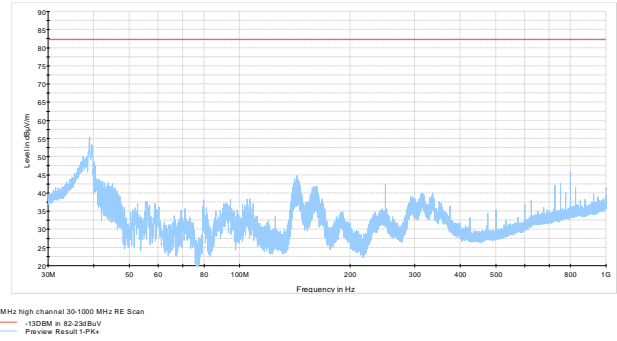


Figure 8.5-34: Spurious radiated emissions sample
 plot 30-1000 MHz, 10 MHz

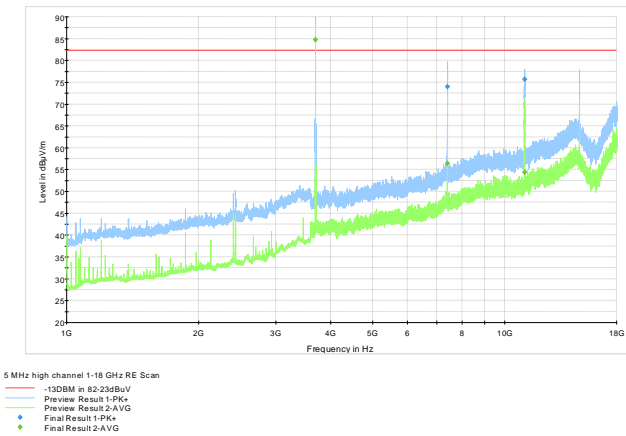


Figure 8.5-35: Spurious radiated emissions sample
 plot 1-18 GHz, 5 MHz

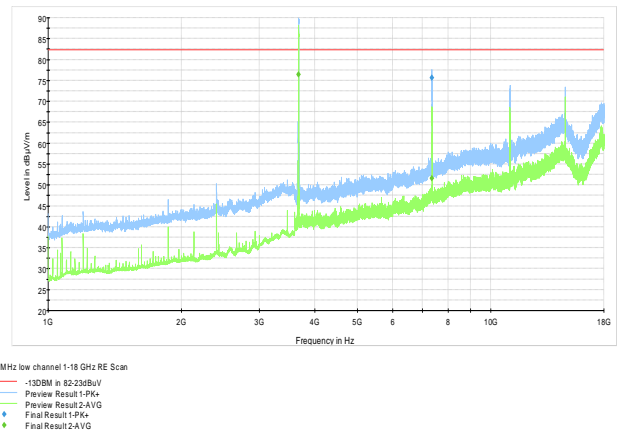


Figure 8.5-36: Spurious radiated emissions sample
 plot 1-18 GHz, 10 MHz

Table 8.5-1: EIRP measurements results

| Channel | Frequency, MHz | Field strength dBµV/m | Substitution factor, dB | EIRP Level, dBm | EIRP Limit, dBm | Margin, dB |
|-------------|----------------|-----------------------|-------------------------|-----------------|-----------------|------------|
| 5 MHz High | 7396.38 | 74.00 | 100.48 | -26.48 | -13 | 13.48 |
| 5 MHz High | 11093.16 | 75.60 | 95.63 | -20.03 | -13 | 7.03 |
| 5 MHz Mid | 7354.74 | 78.30 | 100.48 | -22.18 | -13 | 9.18 |
| 5 MHz Low | 7297.60 | 77.30 | 100.23 | -22.93 | -13 | 9.93 |
| 5 MHz Low | 10950.00 | 79.90 | 95.48 | -15.58 | -13 | 2.58 |
| 10 MHz High | 11091.57 | 72.90 | 95.63 | -22.73 | -13 | 9.73 |
| 10 MHz Mid | 7358.04 | 75.70 | 100.48 | -24.78 | -13 | 11.78 |

Note: EIRP is a product of the calculation of Signal Generator minus the Cable plus Antenna Gain.

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up

