

TEST REPORT

Test report no.: 1-6234/13-08-12



Testing laboratory

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Accredited Testing Laboratory:

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

Applicant

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Manufacturer

Blackberry Limited
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Test standard/s

47 CFR Part 22 Title 47 of the Code of Federal Regulations; Chapter I; Part 22 - Public mobile services
47 CFR Part 24 Title 47 of the Code of Federal Regulations; Chapter I; Part 24 - Personal communications services
47 CFR Part 27 Title 47 of the Code of Federal Regulations; Chapter I; Part 27 - Miscellaneous wireless communications services

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

Test Item

Kind of test item: Blackberry GSM Phones
Model name: RGF111LW
FCC ID: L6ARGF110LW
IC: 2503A-RGF110LW
Frequency: See table chapter 5
Technology tested: GSM, UMTS, LTE, Bluetooth®, WLAN
Antenna: Integrated antenna
Power supply: 3.80V DC by Li - polymer battery
Temperature range: +22°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:

Andreas Luckenbill
Expert

Test performed:

Marco Bertolino
Testing Manager

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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2.2 Application details

| | |
|------------------------------------|------------|
| Date of receipt of order: | 2013-08-19 |
| Date of receipt of test item: | 2013-08-23 |
| Start of test: | 2013-08-23 |
| End of test: | 2013-09-26 |
| Person(s) present during the test: | -/- |

3 Test standard/s

| Test standard | Date | Test standard description |
|-------------------|------------|--|
| 47 CFR Part 22 | 01.10.2012 | Title 47 of the Code of Federal Regulations; Chapter I; Part 22 - Public mobile services |
| 47 CFR Part 24 | 01.10.2012 | Title 47 of the Code of Federal Regulations; Chapter I; Part 24 - Personal communications services |
| 47 CFR Part 27 | 01.10.2012 | Title 47 of the Code of Federal Regulations; Chapter I; Part 27 - Miscellaneous wireless communications services |
| RSS - 132 Issue 3 | 01.01.2013 | Spectrum Management and Telecommunications Radio Standards Specification - Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz |
| RSS - 133 Issue 6 | 01.01.2013 | Spectrum Management and Telecommunications Policy - Radio Standards Specifications, 2 GHz Personal Communication Services |
| RSS - 139 Issue 2 | 01.02.2009 | Spectrum Management and Telecommunications Radio Standards Specification - Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz |

4 Test environment

| | | |
|----------------------------|-----------|---------------------------------------|
| Temperature: | T_{nom} | +22 °C during room temperature tests |
| | T_{max} | -/- °C during high temperature tests |
| | T_{min} | -/- °C during low temperature tests |
| Relative humidity content: | | 53 % |
| Barometric pressure: | | not relevant for this kind of testing |
| Power supply: | V_{nom} | 3.80 V DC by Li - polymer battery |
| | V_{max} | -/- V |
| | V_{min} | -/- V |

5 Test item

| | | |
|----------------------|---|--|
| Kind of test item | : | Blackberry GSM Phones |
| Type identification | : | RGF111LW |
| S/N serial number | : | Radiated units: IMEI EUT 1: 004402242479081 IMEI EUT 2: 004402242479065 |
| HW hardware status | : | CER-57711-001 Rev. 2 |
| SW software status | : | 10.2.0.1155 |
| Frequency band [MHz] | : | GSM: 824.2 – 848.8 MHz; 1850.2 – 1909.8 MHz UMTS: 826.4 – 846.6 MHz, 1712.4 – 1752.6 MHz, 1852.4 – 1907.6 MHz LTE: 824.7 MHz – 848.3 MHz, 706.50 MHz – 713.50 MHz, 1710.70 MHz – 1754.30 MHz, 1850.7 MHz – 1909.3 MHz BT: ISM band 2400 MHz to 2483.5 MHz WLAN: ISM band 2400 MHz to 2483.5 MHz |
| Type of modulation | : | GFSK, Pi/4 DQPSK, 8 DPSK, BPSK, QPSK, 16 – QAM, GMSK, 8 PSK |
| Antenna | : | Integrated antenna |
| Power supply | : | 3.80 V DC by Li - polymer battery |

5.1 Additional information

Test setup- and EUT-photos are included in test reports: 1-6234/13-08-01_AnnexA
1-6234/13-08-01_AnnexC

6 Test laboratories sub-contracted

None

7 Summary of measurement results

- No deviations from the technical specifications were ascertained
 There were deviations from the technical specifications ascertained

| TC identifier | Description | verdict | date | Remark |
|---------------|--|---------|------------|---|
| RF-Testing | CFR Part 22, 24, 27 RSS 132, 133, 139 | passed | 2013-09-26 | Only radiated simultaneous transmissions measured |

7.1 GSM 850

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 190) + BT Testmode DH5 (Ch 0) + WiFi (Ch 11 @ 6 Mbps) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.2 PCS 1900

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 661) + BT Testmode 2-DH5 (Ch 0) + WiFi (Ch 11 @ 6 Mbps) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.3 UMTS band II

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|---|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 9262) + BT Testmode 3-DH5 (Ch 0) + WiFi (Ch 11 @ MCS0) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.4 UMTS band IV

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|---|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 1413) + BT Testmode 3-DH5 (Ch 0) |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 1413) + WiFi (Ch 36 @ 6Mbps) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.5 UMTS band V

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|---|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 4182) + BT Testmode 3-DH5 (Ch 0) |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 4182) + WiFi (Ch 36 @ 6Mbps) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.6 LTE band II

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 18900) + BT Testmode 3-DH5 (Ch 0) + WiFi (Ch 11 @ MCS0) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.7 LTE band IV

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|---|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 20175, 20MHz) + BT Testmode DH5 (Ch 0) |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 20175, 20MHz) + WiFi (Ch 64 @ 6 Mbps) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.8 LTE band V

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 20525) + BT Testmode 3-DH5 (Ch 0) |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 20525) + WiFi (Ch 36 @ 6 Mbps) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

7.9 LTE band 17

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Remark |
|------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|---|
| RF Output Power | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Frequency Stability | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 23790, 10MHz) + BT Testmode DH5 (Ch 0) |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | TCH(Ch 23790, 10MHz) + WiFi (Ch 64 @ 6 Mbps) |
| Spurious Emissions Conducted | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Block Edge Compliance | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| Occupied Bandwidth | Nominal | Nominal | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |

Note: NA = Not applicable; NP = Not performed

8 RF measurements

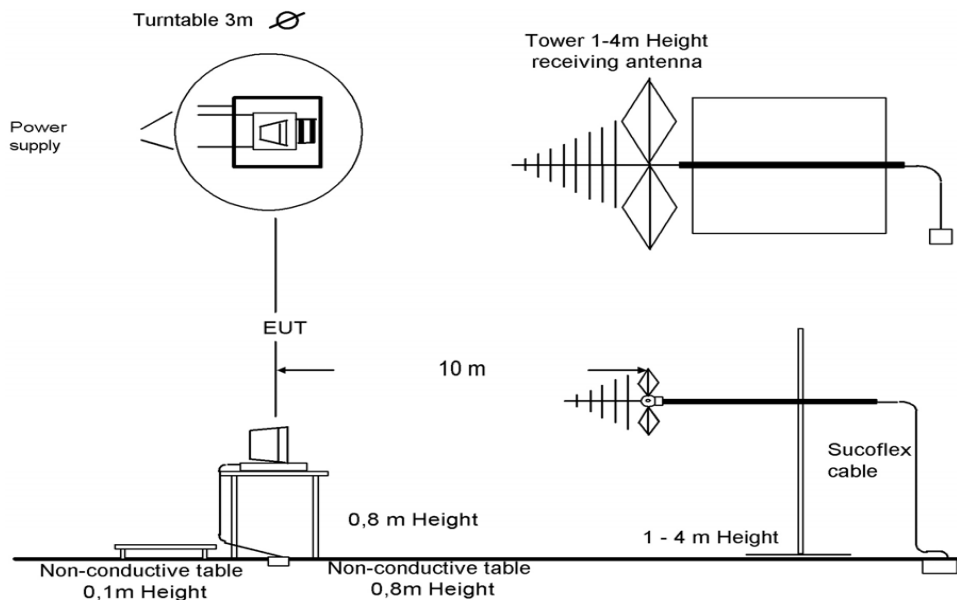
8.1 Description of test setup

For the spurious measurements we use the substitution method according TIA/EIA 603.

8.1.1 Radiated measurements

The radiated emissions from the EUT are performed in a semi anechoic chamber. The EUT is placed on a conductive turntable and powered with nominal voltage. The signalling is performed either from outside the chamber with a signalling unit (AP or other) by air link using a signalling antenna or directly by special test software from the customer.

Semi anechoic chamber



Picture 1: Diagram radiated measurements

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

8.2 Results GSM 850

All GSM-band measurements are done in GSM mode only (circuit switched).

All relevant tests have been repeated using 8-PSK modulation if EDGE mode is supported. All tests were performed with one timeslot in uplink activated and one timeslot in downlink activated. For each mode the highest output power was determined and used.

8.2.1 RF output power

Not performed

8.2.2 Frequency stability

Not performed

8.2.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 848.8 MHz. This was rounded up to 12 GHz. The resolution bandwidth is set as outlined in Part 22.917. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the GSM-850 band.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 22.917 CFR Part 2.1053 | RSS 132 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the GSM-850 band. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the GSM-850 band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages.

All measurements were done in horizontal and vertical polarization; the plots show the worst case.

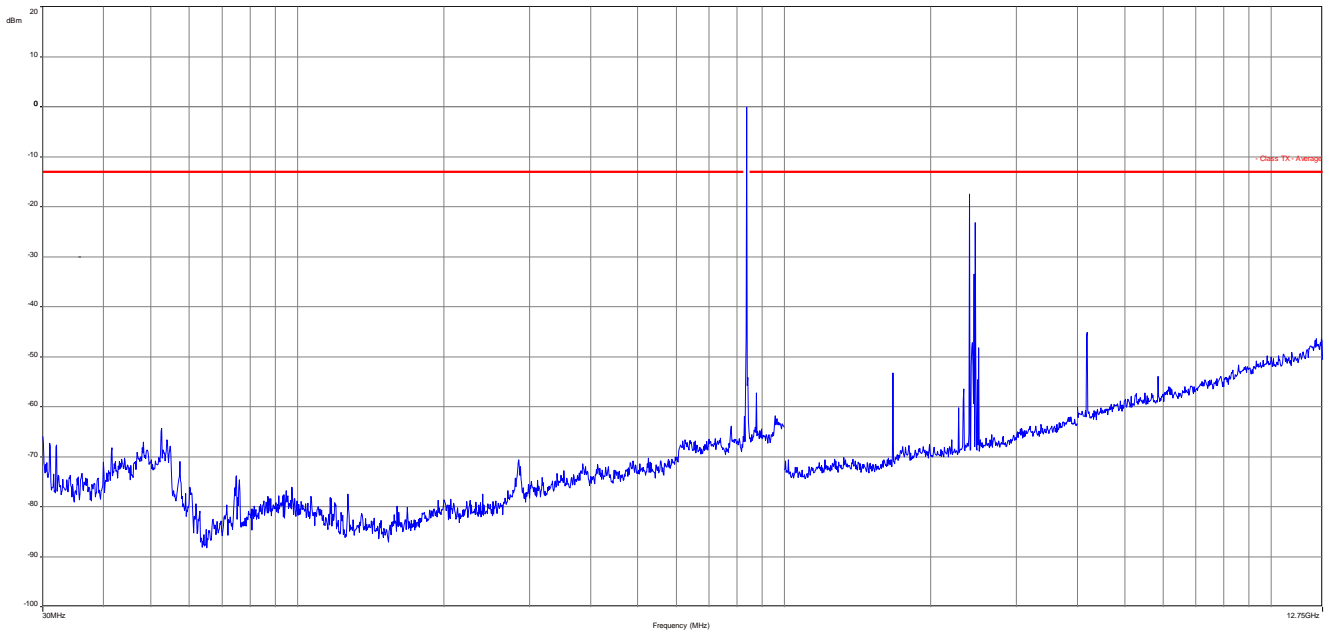
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values are stated in the table below.

As can be seen from this data, the emissions from the test item were within the specification limit.

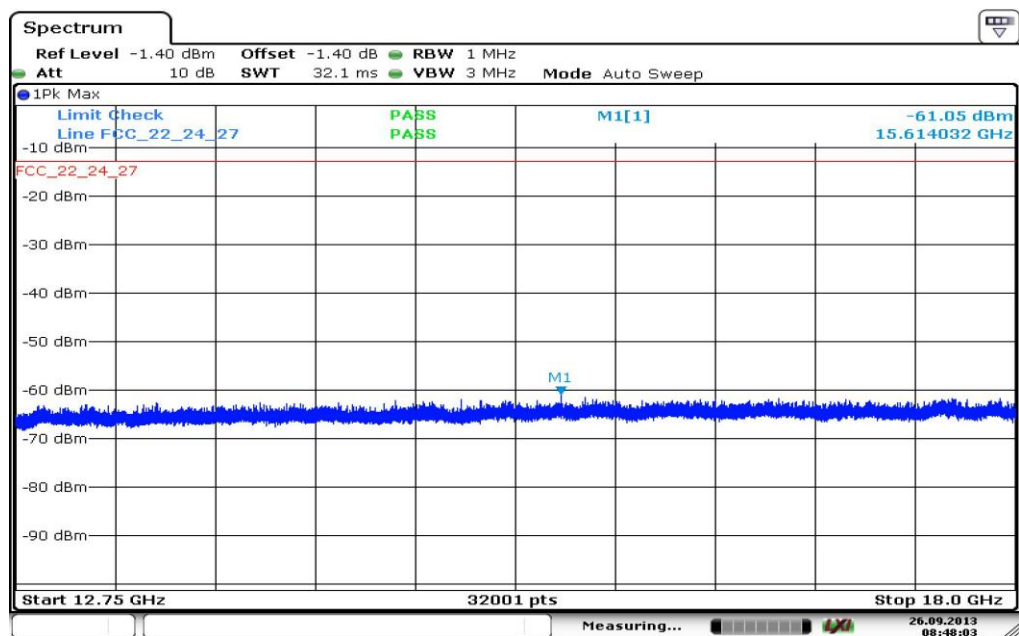
Result: Passed

Plots: TCH (Ch 190) + BT Testmode DH5 (Ch 0) + WiFi (Ch 11 @ 6 Mbps)

Plot 1: 30 MHz – 12.75 GHz



Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:48:04

8.2.4 Spurious emissions conducted

Not performed

8.2.5 Block edge compliance

Not performed

8.2.6 Occupied bandwidth

Not performed

8.3 Results PCS 1900

All GSM-band measurements are done in GSM mode only (circuit switched).

All relevant tests have been repeated using 8-PSK modulation if EDGE mode is supported. All tests were performed with one timeslot in uplink activated and one timeslot in downlink activated. For each mode the highest output power was determined and used.

8.3.1 RF output power

Not performed

8.3.2 Frequency stability

Not performed

8.3.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the PCS1900 band.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 24.238 CFR Part 2.1053 | RSS 133 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the PCS1900 band. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages.

All measurements were done in horizontal and vertical polarization; the plots show the worst case.

The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values are stated in the table below.

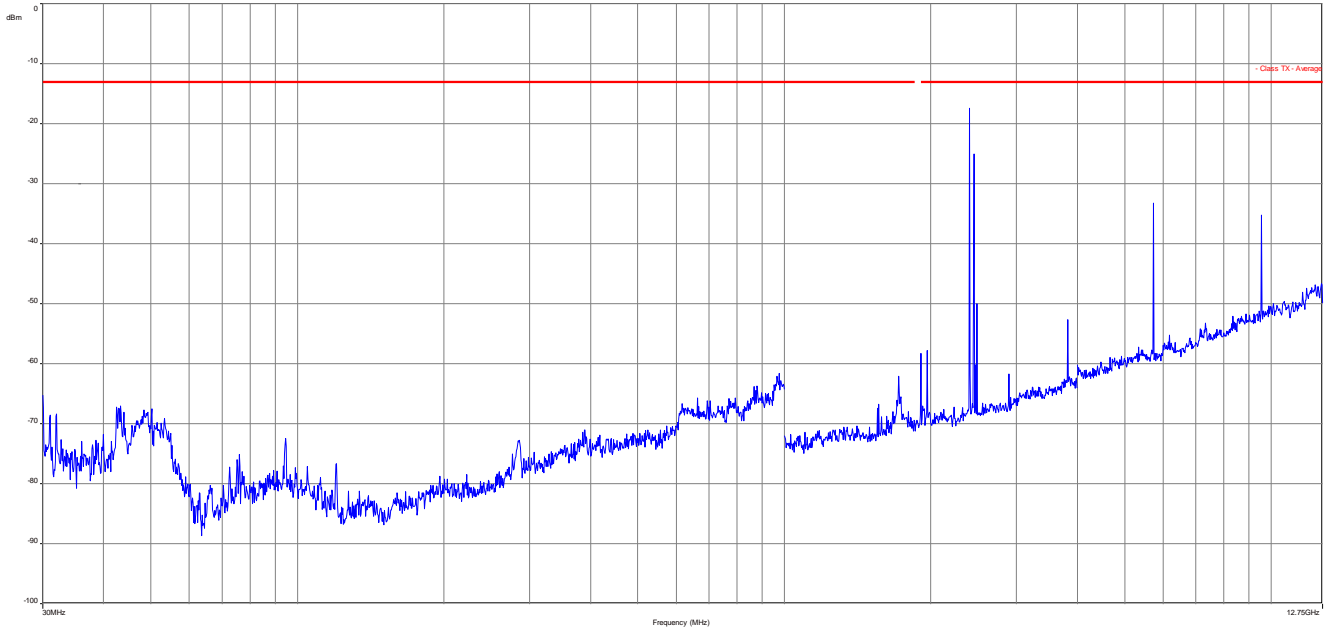
As can be seen from this data, the emissions from the test item were within the specification limit.

| Spurious Emission Level (dBm) | | | | | | | | |
|-------------------------------|------------------------|----------------|----------|------------------------|----------------|----------|------------------------|----------------|
| Harmonic | Ch. 512 Freq. (MHz) | Level [dBm] | Harmonic | Ch. 661 Freq. (MHz) | Level [dBm] | Harmonic | Ch. 810 Freq. (MHz) | Level [dBm] |
| 2 | 3700.4 | - | 2 | 3760.0 | - | 2 | 3819.6 | - |
| 3 | 5550.6 | - | 3 | 5640.0 | - | 3 | 5729.4 | - |
| 4 | 7400.8 | - | 4 | 7520.0 | - | 4 | 7639.2 | - |
| 5 | 9251.0 | - | 5 | 9400.0 | - | 5 | 9549.0 | - |
| 6 | 11101.2 | - | 6 | 11280.0 | - | 6 | 11458.8 | - |
| 7 | 12951.4 | - | 7 | 13160.0 | - | 7 | 13368.6 | - |
| 8 | 14801.6 | - | 8 | 15040.0 | - | 8 | 15278.4 | - |
| 9 | 16651.8 | - | 9 | 16920.0 | - | 9 | 17188.2 | - |
| 10 | 18502.0 | - | 10 | 18800.0 | - | 10 | 19098.0 | - |
| Measurement uncertainty | | | | | ± 3dB | | | |

Result: Passed

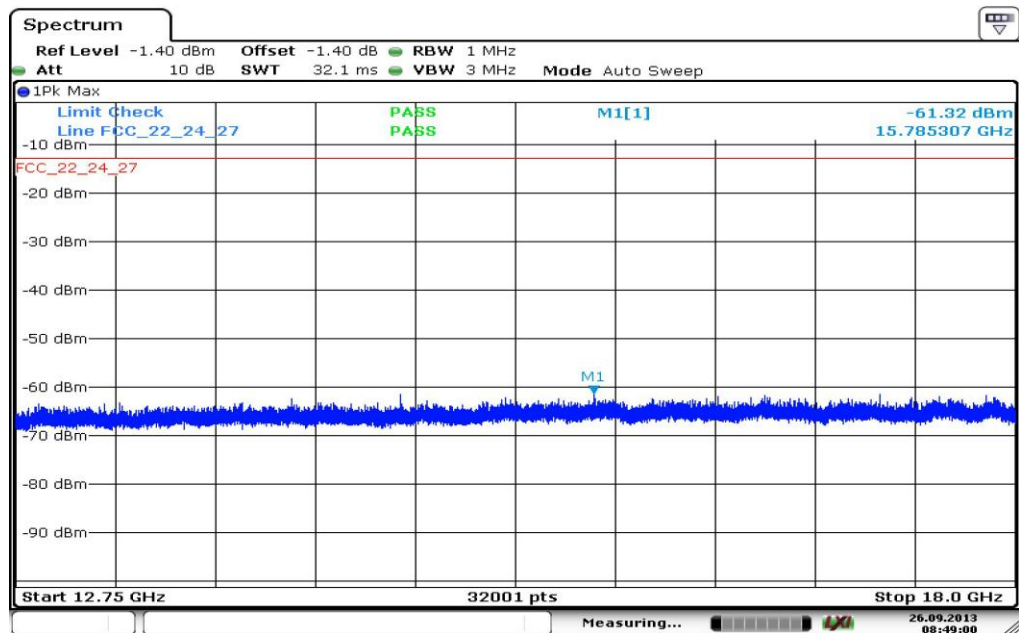
Plots: TCH (Ch 661) + BT Testmode 2-DH5 (Ch 0) + WiFi (Ch 11 @ 6 Mbps)

Plot 1: 30 MHz – 12.75 GHz



GSM-carrier suppressed with a band rejection filter

Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:49:01

8.3.4 Spurious emissions conducted

Not performed

8.3.5 Block edge compliance

Not performed

8.3.6 Occupied bandwidth

Not performed

8.4 Results UMTS band II

All UMTS-band measurements are done in WCDMA mode only.

The connection was established with the following setup: WCDMA CS-RMC, Max Power (All Bit up)

8.4.1 RF output power

Not performed

8.4.2 Frequency stability

Not performed

8.4.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the UMTS band II.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 24.238 CFR Part 2.1053 | RSS 133 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the UMTS band II (1852.4 MHz, 1880.0 MHz and 1907.6 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the UMTS band II into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages.

All measurements were done in horizontal and vertical polarization; the plots show the worst case.

The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values are stated in the table below.

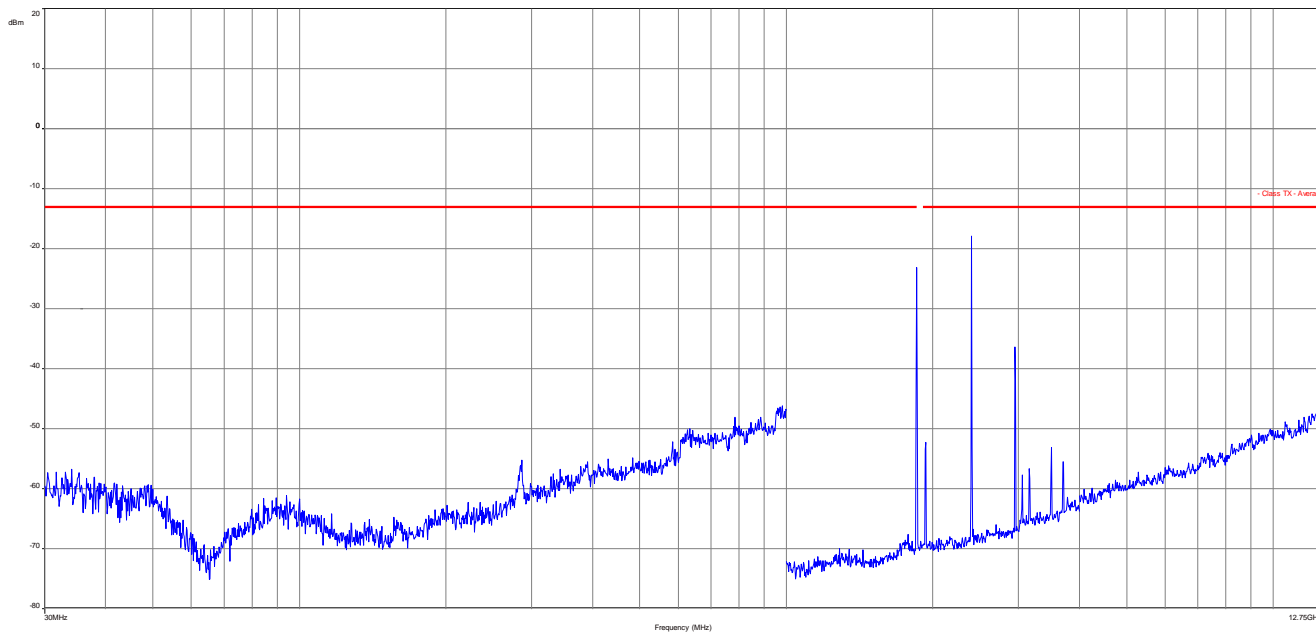
As can be seen from this data, the emissions from the test item were within the specification limit.

| Spurious Emission Level (dBm) | | | | | | | | |
|-------------------------------|----------------------|-------------|----------|----------------------|-------------|----------|----------------------|-------------|
| Harmonic | Ch. 9262 Freq. (MHz) | Level [dBm] | Harmonic | Ch. 9400 Freq. (MHz) | Level [dBm] | Harmonic | Ch. 9538 Freq. (MHz) | Level [dBm] |
| 2 | 3704.8 | - | 2 | 3760.0 | - | 2 | 3815.2 | - |
| 3 | 5557.2 | - | 3 | 5640.0 | - | 3 | 5722.8 | - |
| 4 | 7409.6 | - | 4 | 7520.0 | - | 4 | 7630.4 | - |
| 5 | 9262.0 | - | 5 | 9400.0 | - | 5 | 9538.0 | - |
| 6 | 11114.4 | - | 6 | 11280.0 | - | 6 | 11445.6 | - |
| 7 | 12966.8 | - | 7 | 13160.0 | - | 7 | 13353.2 | - |
| 8 | 14819.2 | - | 8 | 15040.0 | - | 8 | 15260.8 | - |
| 9 | 16671.6 | - | 9 | 16920.0 | - | 9 | 17168.4 | - |
| 10 | 18524.0 | - | 10 | 18800.0 | - | 10 | 19076.0 | - |
| Measurement uncertainty | | | | | ± 3dB | | | |

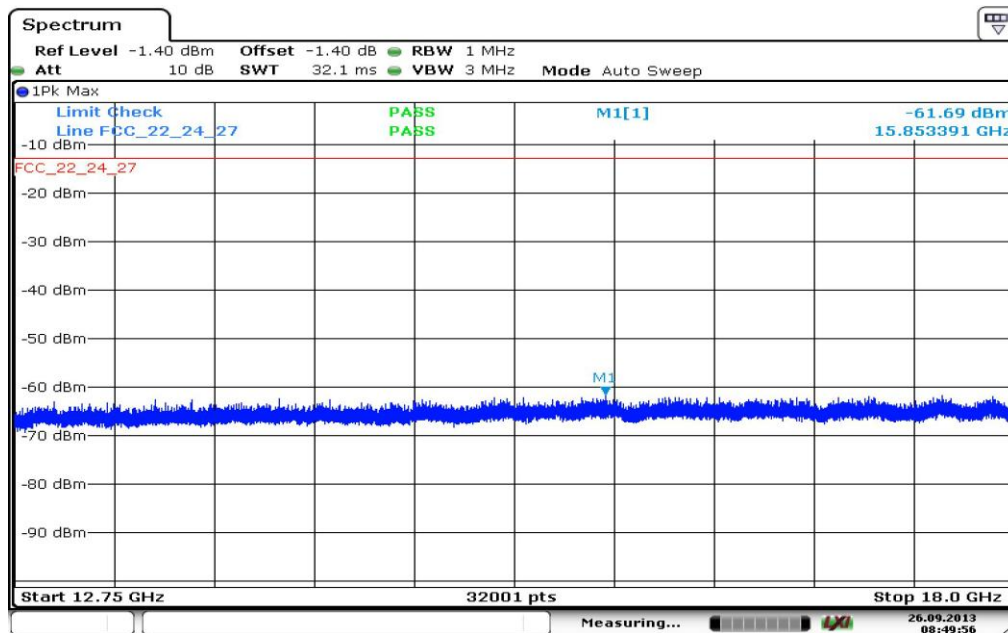
Result: Passed

Plots: TCH(Ch 9262) + BT Testmode 3-DH5 (Ch 0) + WiFi (Ch 11 @ MCS0)

Plot 1: 30 MHz – 12.75 GHz



Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:49:56

8.4.4 Spurious emissions conducted

Not performed

8.4.5 Block edge compliance

Not performed

8.4.6 Occupied bandwidth

Not performed

8.5 Results UMTS band IV

All UMTS-band measurements are done in WCDMA mode only.

The connection was established with the following setup: WCDMA CS-RMC, Max Power (All Bit up)

8.5.1 RF output power

Not performed

8.5.2 Frequency stability

Not performed

8.5.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1755 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the UMTS band IV.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 27.53(g) CFR Part 2.1053 | RSS 139 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the UMTS band IV. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the UMTS band IV into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages.

All measurements were done in horizontal and vertical polarization; the plots show the worst case.

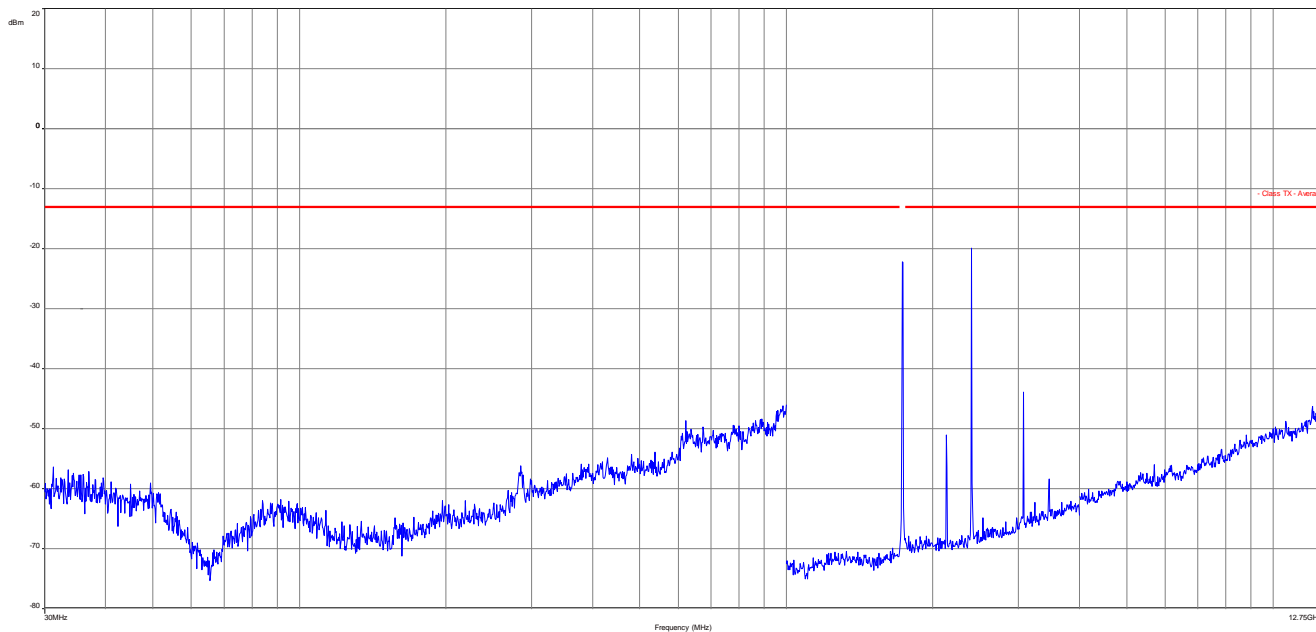
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values are stated in the table below.

As can be seen from this data, the emissions from the test item were within the specification limit.

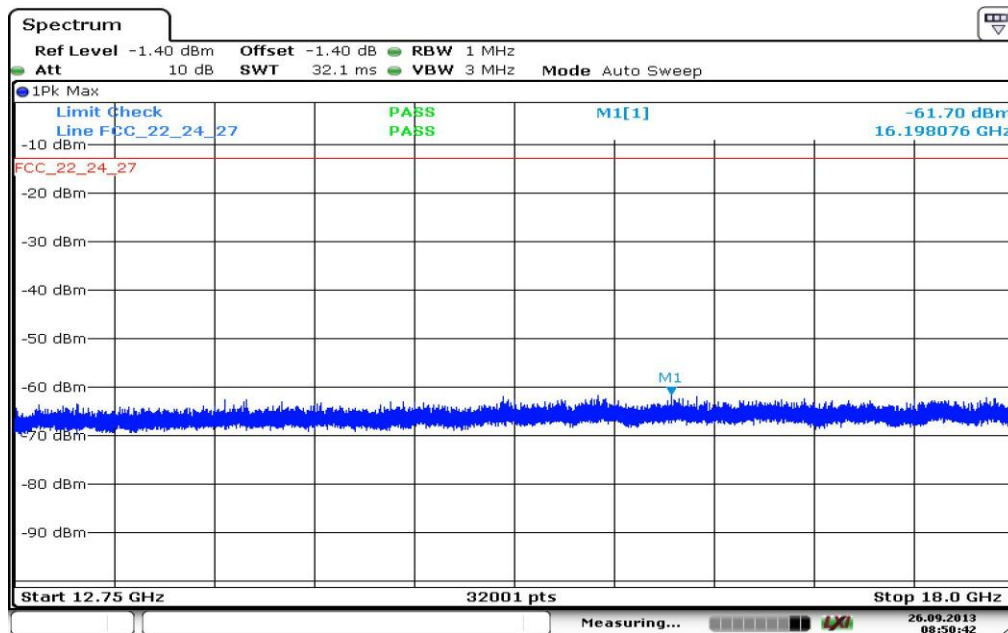
Result: [Passed](#)

Plots: TCH (Ch 1413) + BT Testmode 3-DH5 (Ch 0)

Plot 1: 30 MHz – 12.75 GHz



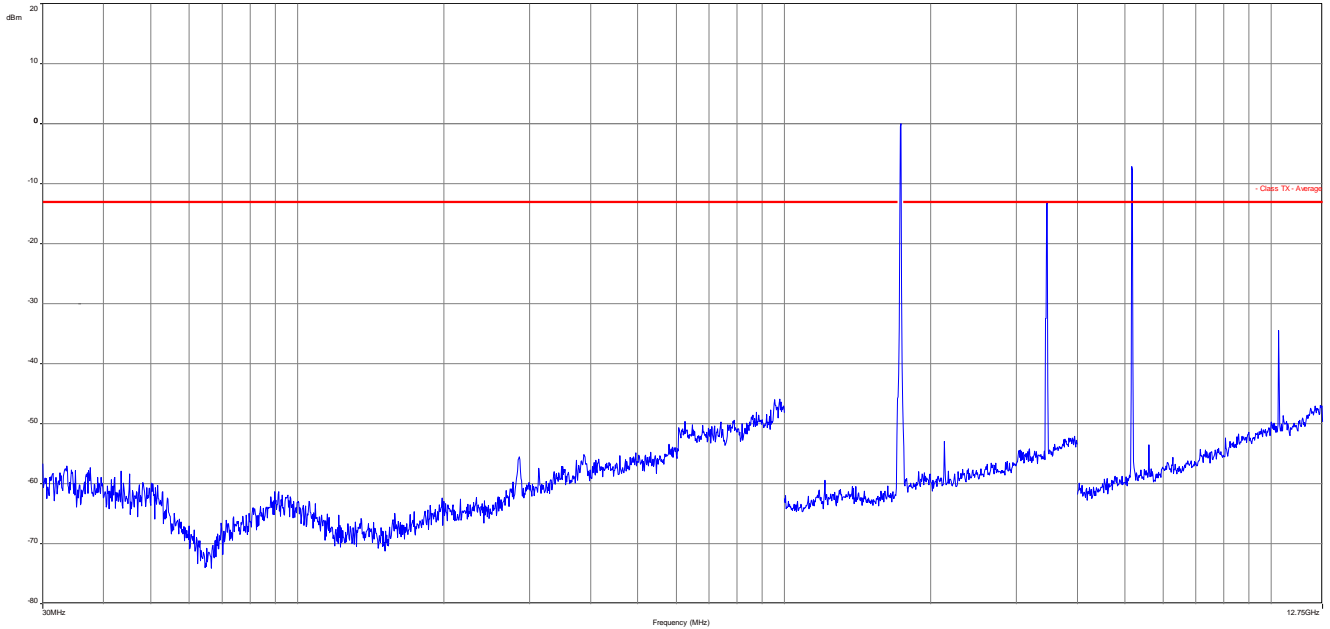
Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:50:42

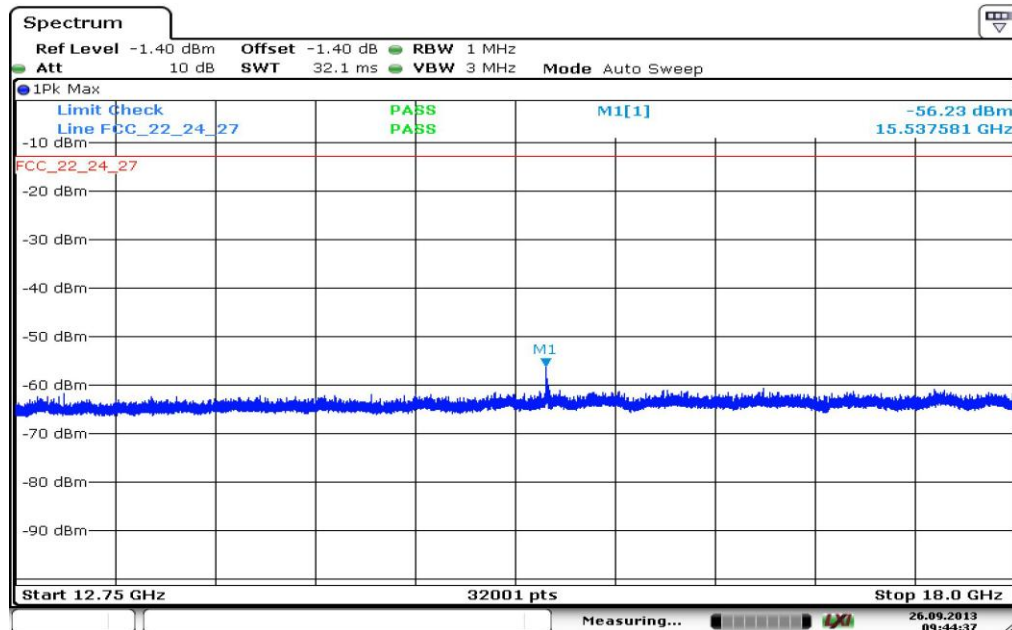
Plots: TCH (Ch 1413) + WiFi (Ch 36 @ 6Mbps)

Plot 1: 30 MHz – 12.75 GHz



The emission at 3465 MHz is generated by an overload effect of the measuring system and not by the EUT. This was checked.

Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 09:44:36

8.5.4 Spurious emissions conducted

Not performed

8.5.5 Block edge compliance

Not performed

8.5.6 Occupied bandwidth

Not performed

8.6 Results UMTS band V

All UMTS-band measurements are done in WCDMA mode only.

The connection was established with the following setup: WCDMA CS-RMC, Max Power (All Bit up)

8.6.1 RF output power

Not performed

8.6.2 Frequency stability

Not performed

8.6.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 846.6 MHz. This was rounded up to 12 GHz. The resolution bandwidth is set as outlined in Part 22.917. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the UMTS band V.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 22.917 CFR Part 2.1053 | RSS 132 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the UMTS band V (826.4 MHz, 836.0 MHz and 846.6 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the UMTS band V into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages.

All measurements were done in horizontal and vertical polarization; the plots show the worst case.

The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values are stated in the table below.

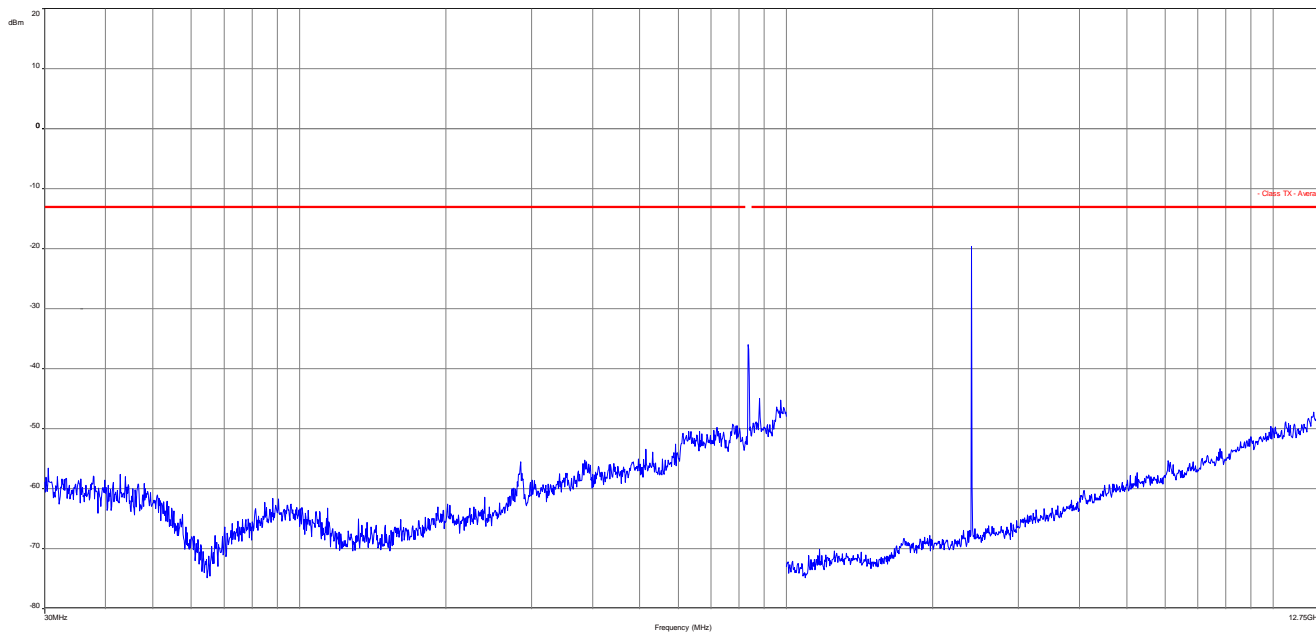
As can be seen from this data, the emissions from the test item were within the specification limit.

| Spurious Emission Level (dBm) | | | | | | | | |
|-------------------------------|----------------------|-------------|----------|----------------------|-------------|----------|----------------------|-------------|
| Harmonic | Ch. 4132 Freq. (MHz) | Level [dBm] | Harmonic | Ch. 4180 Freq. (MHz) | Level [dBm] | Harmonic | Ch. 4233 Freq. (MHz) | Level [dBm] |
| 2 | 1652.8 | - | 2 | 1672.0 | - | 2 | 1693.2 | - |
| 3 | 2479.2 | - | 3 | 2508.0 | - | 3 | 2539.8 | - |
| 4 | 3305.6 | - | 4 | 3344.0 | - | 4 | 3386.4 | - |
| 5 | 4132.0 | - | 5 | 4180.0 | - | 5 | 4233.0 | - |
| 6 | 4958.4 | - | 6 | 5016.0 | - | 6 | 5079.6 | - |
| 7 | 5784.8 | - | 7 | 5852.0 | - | 7 | 5926.2 | - |
| 8 | 6611.2 | - | 8 | 6688.0 | - | 8 | 6772.8 | - |
| 9 | 7437.6 | - | 9 | 7524.0 | - | 9 | 7619.4 | - |
| 10 | 8264.0 | - | 10 | 8360.0 | - | 10 | 8466.0 | - |
| Measurement uncertainty | | | | | ± 3dB | | | |

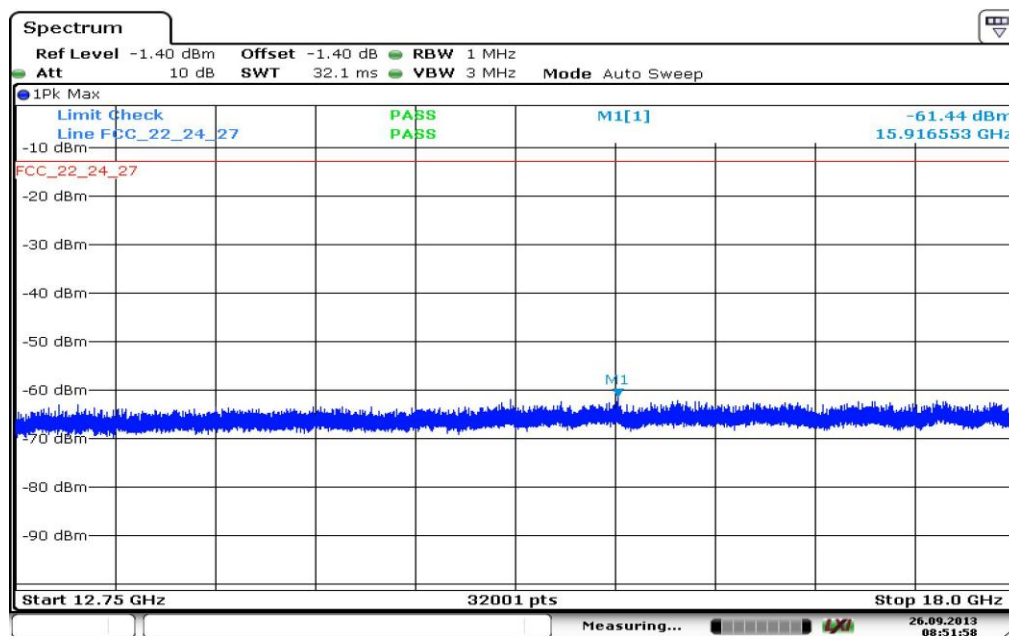
Result: Passed

Plots: TCH (Ch 4182) + BT Testmode 3-DH5 (Ch 0)

Plot 1: 30 MHz – 12.75 GHz

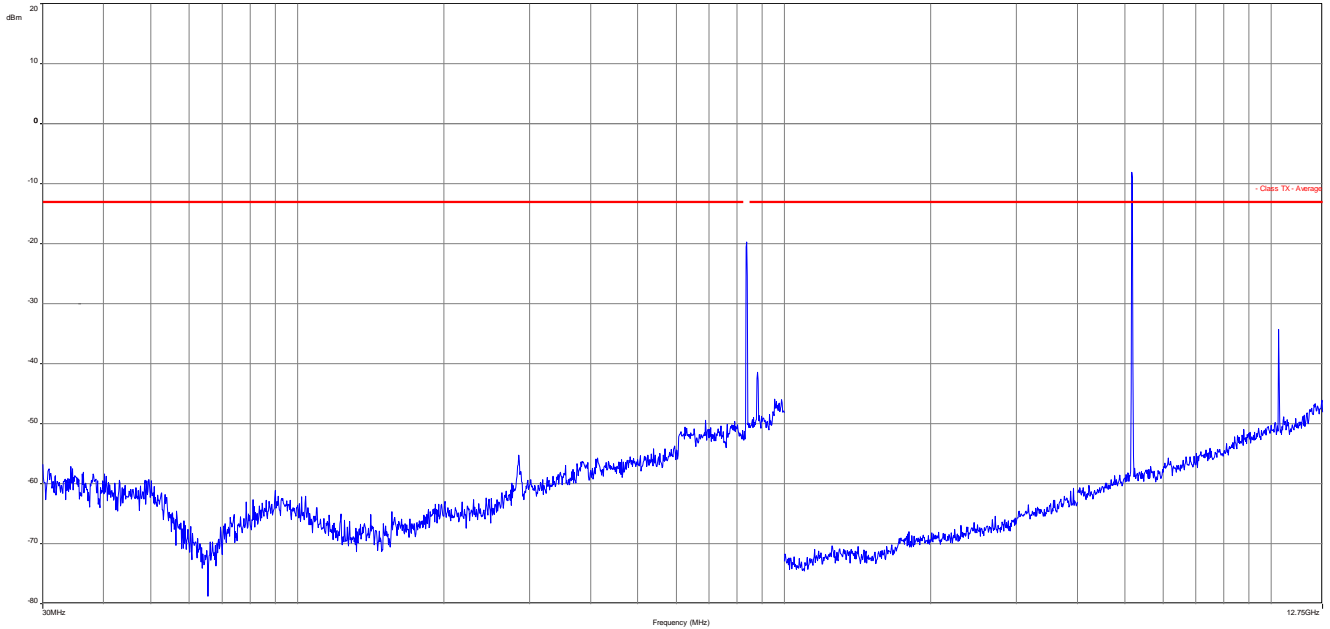


Plot 2: 12.75 GHz – 18 GHz

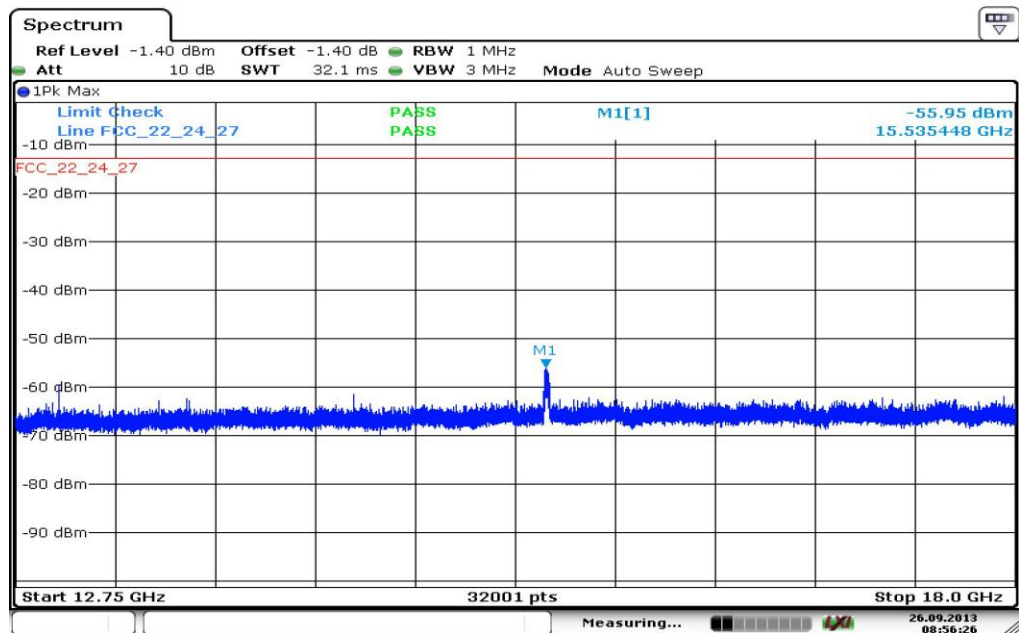


Plots: TCH (Ch 4182) + WiFi (Ch 36 @ 6Mbps)

Plot 1: 30 MHz – 12.75 GHz



Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:56:26

8.6.4 Spurious emissions conducted

Not performed

8.6.5 Block edge compliance

Not performed

8.6.6 Occupied bandwidth

Not performed

8.7 Results LTE band II

The EUT was set to transmit the maximum power.

8.7.1 RF output power

Not performed

8.7.2 Frequency stability

Not performed

8.7.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band II.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 24.238 CFR Part 2.1053 | RSS 133 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the center carrier frequency of the LTE band II (1880 MHz). It was decided that measurements at this carrier frequency would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE band II into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages. All measurements were done in horizontal and vertical polarization; the plots show the worst case. The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values are stated in the table below.

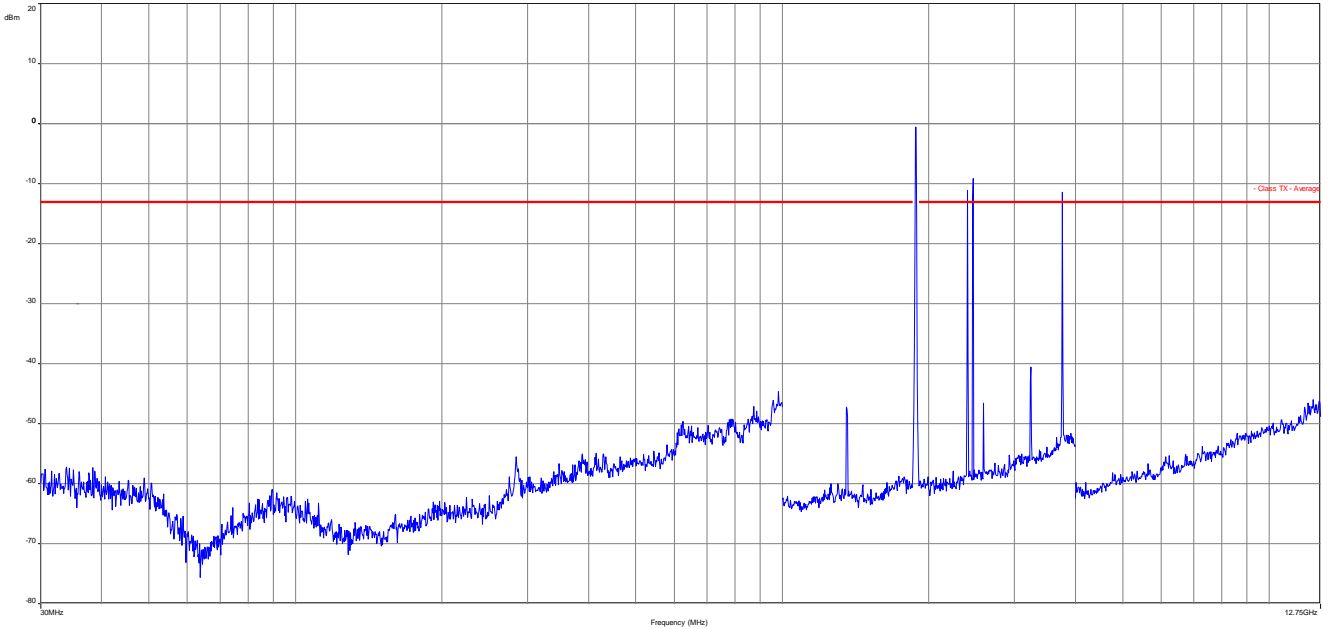
As can be seen from this data, the emissions from the test item were within the specification limit.

| Spurious Emission Level (dBm) | | | | | | | | |
|-------------------------------|----------------------------|-------------|----------|----------------------------|-------------|----------|-----------------------------|-------------|
| Harmonic | Lowest channel Freq. (MHz) | Level [dBm] | Harmonic | Middle channel Freq. (MHz) | Level [dBm] | Harmonic | Highest channel Freq. (MHz) | Level [dBm] |
| 2 | 3710.0 | - | 2 | 3760.0 | - | 2 | 3810.0 | - |
| 3 | 5565.0 | - | 3 | 5640.0 | - | 3 | 5715.0 | - |
| 4 | 7420.0 | - | 4 | 7520.0 | - | 4 | 7620.0 | - |
| 5 | 9275.0 | - | 5 | 9400.0 | - | 5 | 9525.0 | - |
| 6 | 11130.0 | - | 6 | 11280.0 | - | 6 | 11430.0 | - |
| 7 | 12985.0 | - | 7 | 13160.0 | - | 7 | 13335.0 | - |
| 8 | 14840.0 | - | 8 | 15040.0 | - | 8 | 15240.0 | - |
| 9 | 16695.0 | - | 9 | 16920.0 | - | 9 | 17145.0 | - |
| 10 | 18550.0 | - | 10 | 18800.0 | - | 10 | 19050.0 | - |
| Measurement uncertainty | | | | | ± 3dB | | | |

Result: Passed

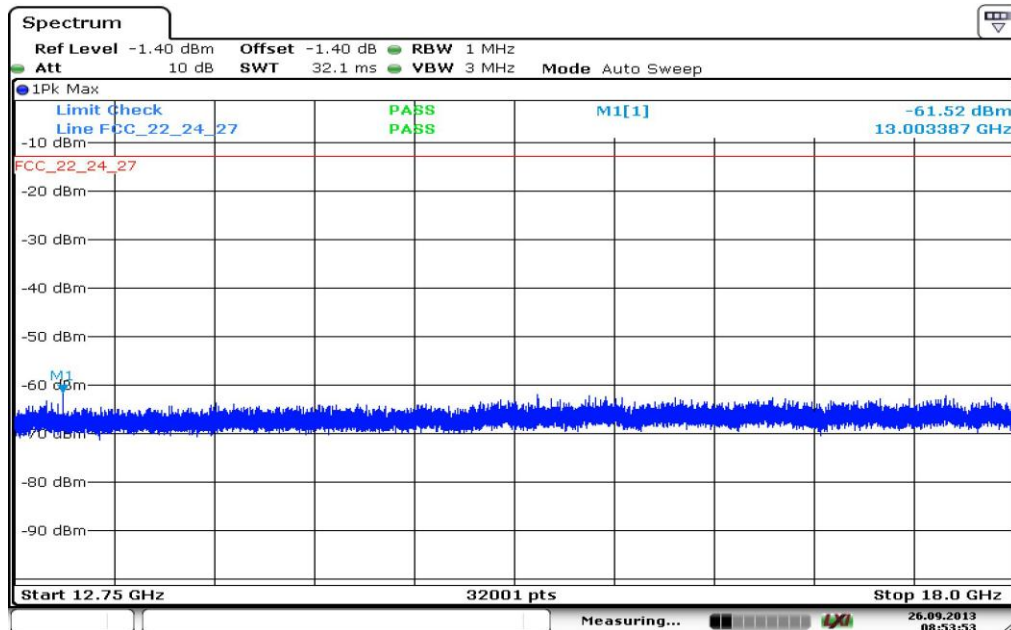
Plots: TCH (Ch 18900) + BT Testmode 3-DH5 (Ch 0) + WiFi (Ch 11 @ MCS0)

Plot 1: 30 MHz – 12.75 GHz



The emission at 3760 MHz is generated by an overload effect of the measuring system and not by the EUT. This was checked.

Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:53:53

8.7.4 Spurious emissions conducted

Not performed

8.7.5 Block edge compliance

Not performed

8.7.6 Occupied bandwidth

Not performed

8.8 Results LTE – Band IV

The EUT was set to transmit the maximum power.

8.8.1 RF output power

Not performed

8.8.2 Frequency stability

Not performed

8.8.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1755 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band 4.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 27.53(g) CFR Part 2.1053 | RSS 139 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the LTE band 4. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE band 4 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

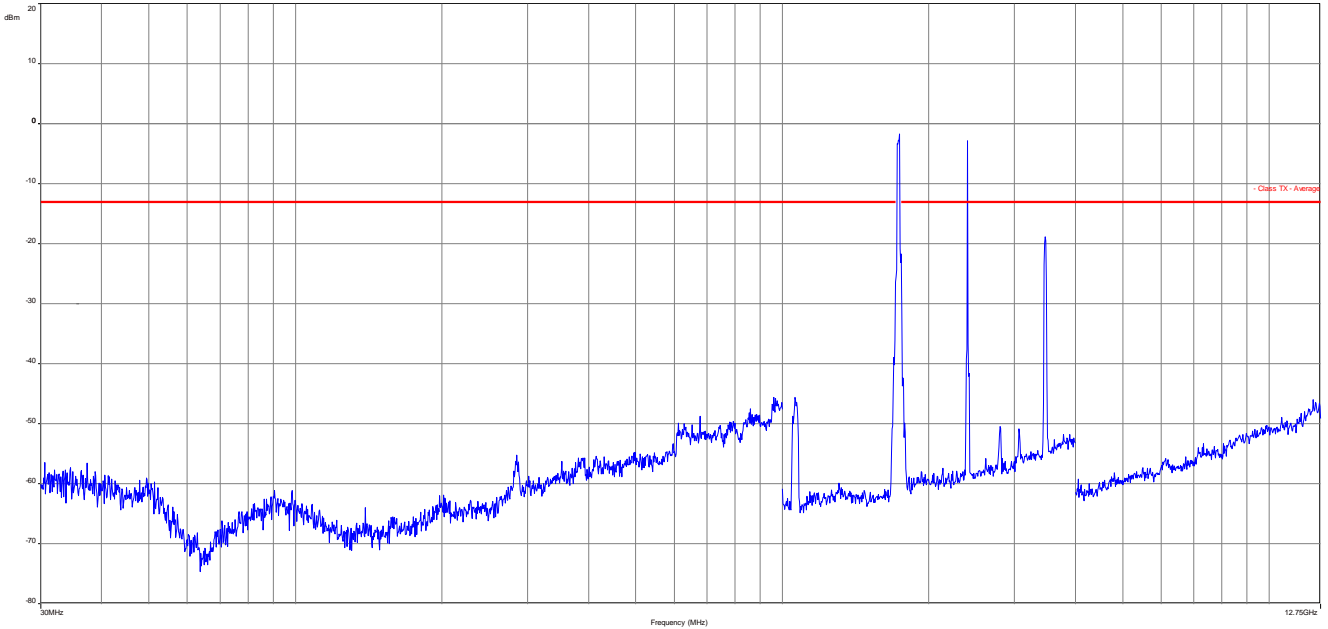
The final open field radiated levels are presented on the next pages.
All measurements were done in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel at the channel bandwidth and resource blocks with the highest output power. If spurious were detected, the lowest and highest channel and all supported channel bandwidths were checked, too.

As can be seen from this data, the emissions from the test item were within the specification limit.

Result: Passed

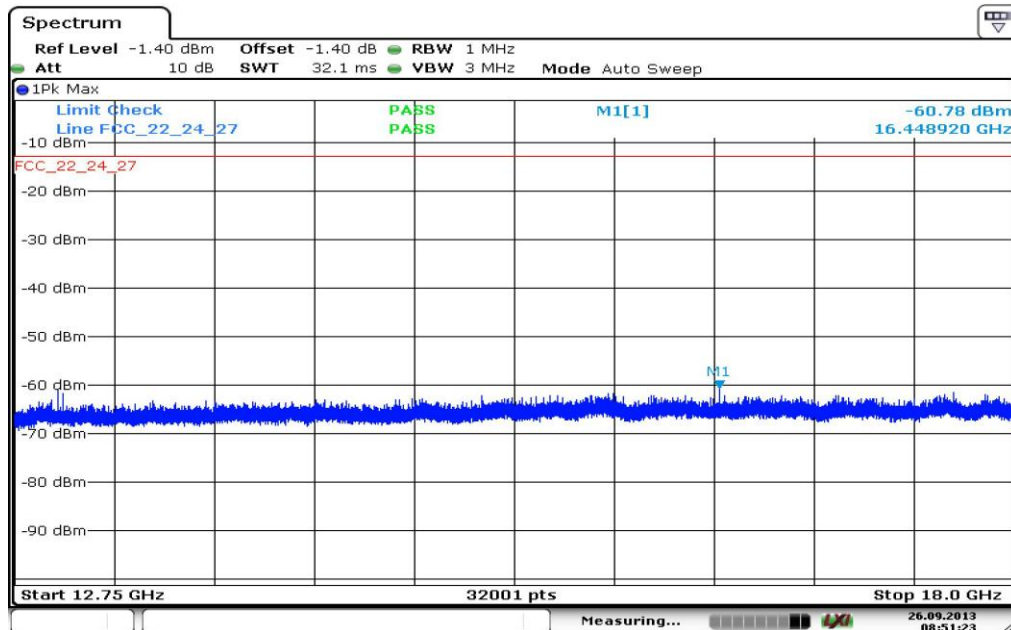
Plots: TCH (Ch 20175, 20MHz) + BT Testmode DH5 (Ch 0)

Plot 1: 30 MHz – 12.75 GHz



The emission at 3465 MHz is generated by an overload effect of the measuring system and not by the EUT. This was checked.

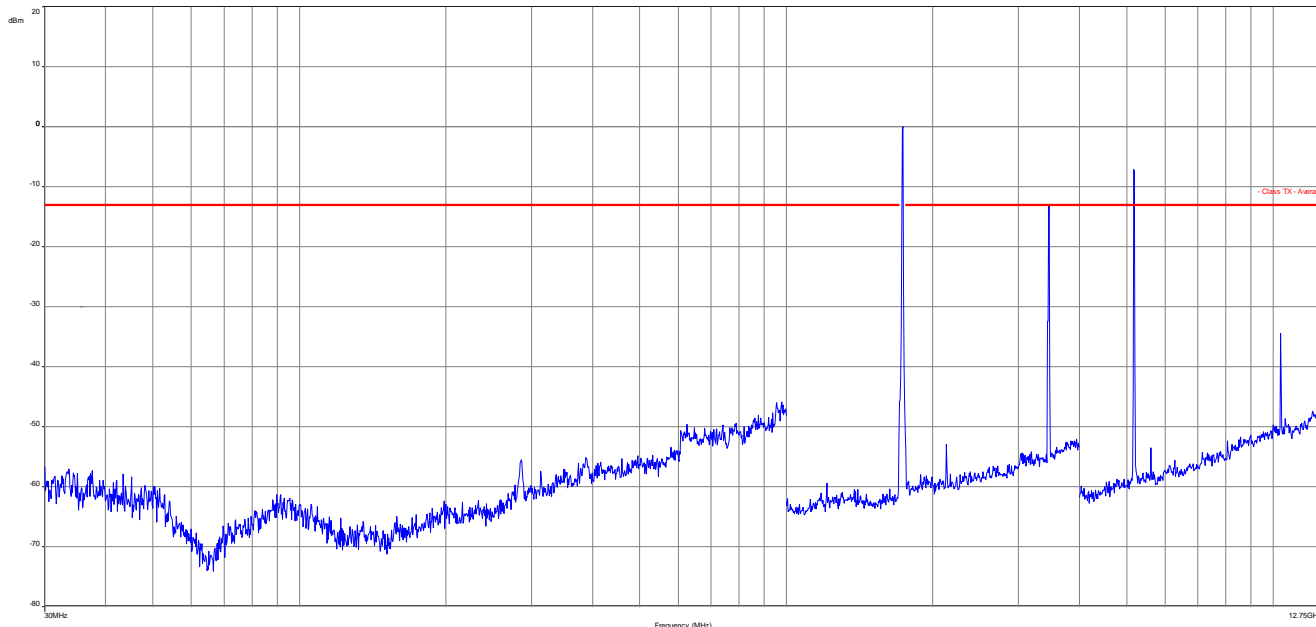
Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:51:23

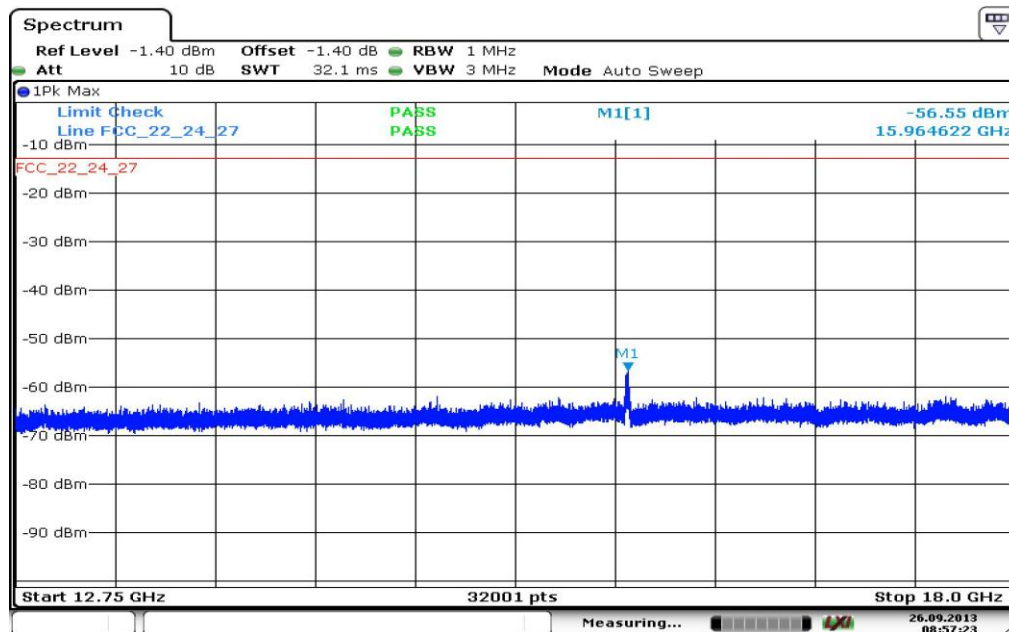
Plots: TCH (Ch 20175, 20MHz) + WiFi (Ch 64 @ 6 Mbps)

Plot 1: 30 MHz – 12.75 GHz



The emission at 3465 MHz is generated by an overload effect of the measuring system and not by the EUT. This was checked.

Plot 2: 12.75 GHz – 18 GHz



Date: 26.SEP.2013 08:57:23

8.8.4 Spurious emissions conducted

Not performed

8.8.5 Block edge compliance

Not performed

8.8.6 Occupied bandwidth

Not performed

8.9 Results LTE band V

The EUT was set to transmit the maximum power.

8.9.1 RF output power

Not performed

8.9.2 Frequency stability

Not performed

8.9.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 846.6 MHz. This was rounded up to 12 GHz. The resolution bandwidth is set as outlined in Part 22.917. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band V.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 sec. |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 22.917 CFR Part 2.1053 | RSS 132 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the center carrier frequency of the LTE band V (836.5 MHz). It was decided that measurements at this carrier frequency would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE band V into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages. All measurements were done in horizontal and vertical polarization; the plots show the worst case. The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values are stated in the table below.

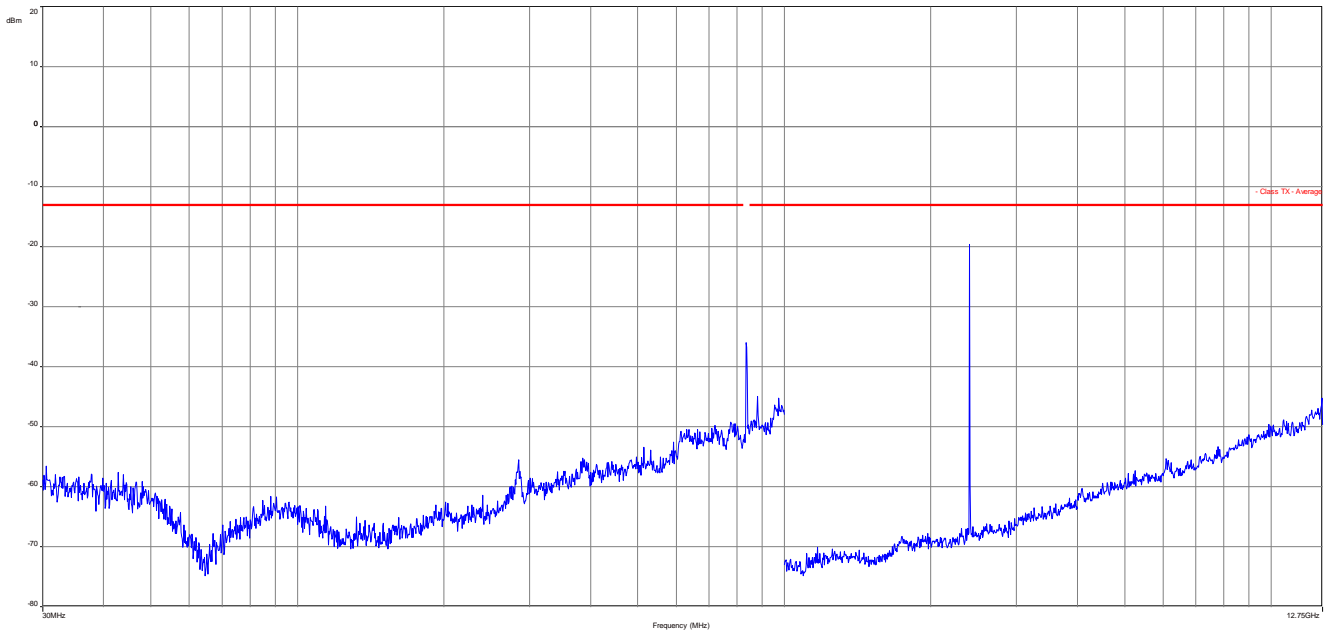
As can be seen from this data, the emissions from the test item were within the specification limit.

| Spurious Emission Level (dBm) | | | | | | | | |
|-------------------------------|----------------------------|-------------|----------|----------------------------|-------------|----------|-----------------------------|-------------|
| Harmonic | Lowest channel Freq. (MHz) | Level [dBm] | Harmonic | Middle channel Freq. (MHz) | Level [dBm] | Harmonic | Highest channel Freq. (MHz) | Level [dBm] |
| 2 | 1658.0 | - | 2 | 1673.0 | - | 2 | 1688.0 | - |
| 3 | 2487.0 | - | 3 | 2509.5 | - | 3 | 2532.0 | - |
| 4 | 3316.0 | - | 4 | 3346.0 | - | 4 | 3376.0 | - |
| 5 | 4145.0 | - | 5 | 4182.5 | - | 5 | 4220.0 | - |
| 6 | 4974.0 | - | 6 | 5019.0 | - | 6 | 5064.0 | - |
| 7 | 5803.0 | - | 7 | 5855.5 | - | 7 | 5908.0 | - |
| 8 | 6632.0 | - | 8 | 6692.0 | - | 8 | 6752.0 | - |
| 9 | 7461.0 | - | 9 | 7528.5 | - | 9 | 7596.0 | - |
| 10 | 8290.0 | - | 10 | 8365.0 | - | 10 | 8440.0 | - |
| Measurement uncertainty | | | | | ± 3dB | | | |

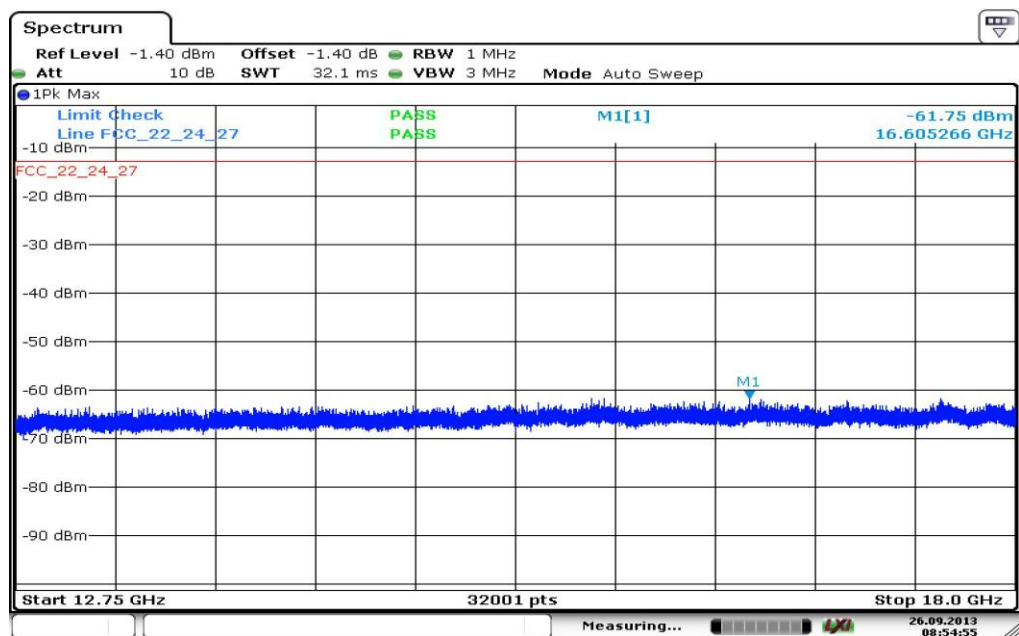
Result: Passed

Plots: TCH (Ch 20525) + BT Testmode 3-DH5 (Ch 0)

Plot 1: 30 MHz – 12.75 GHz

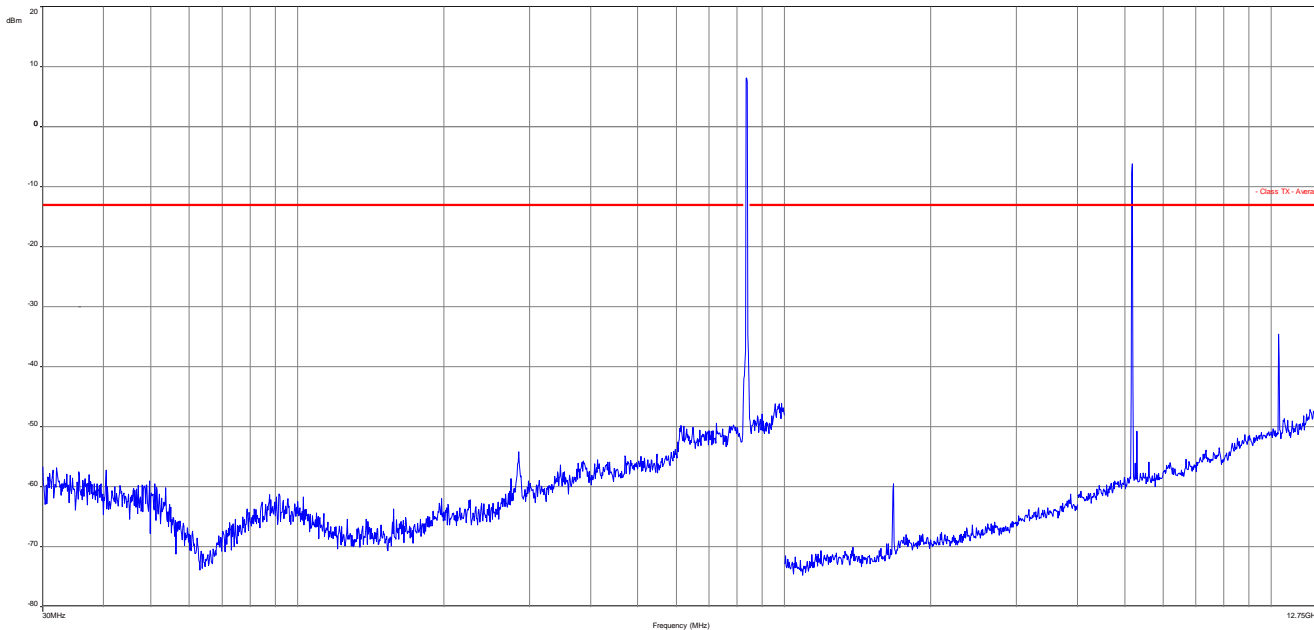


Plot 2: 12.75 GHz – 18 GHz

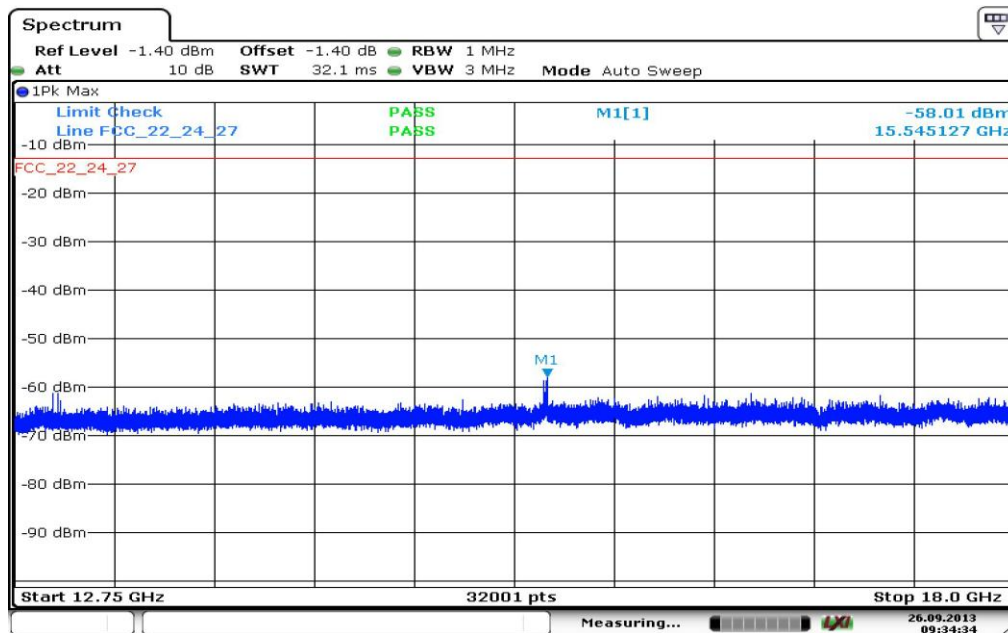


Plots: TCH(Ch 20525) + WiFi (Ch 36 @ 6 Mbps)

Plot 1: 30 MHz – 12.75 GHz



Plot 2: 12.75 GHz – 18 GHz



8.9.4 Spurious emissions conducted

Not performed

8.9.5 Block edge compliance

Not performed

8.9.6 Occupied bandwidth

Not performed

8.10 Results LTE – Band 17

The EUT was set to transmit the maximum power.

8.10.1 RF output power

Not performed

8.10.2 Frequency stability

Not performed

8.10.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2009 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 746 MHz. This was rounded up to 12 GHz. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band 17.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in a 50 ohm load (if possible).
- c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1 MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters.
- e) Now each detected emissions were substituted by the substitution method, in accordance with the TIA/EIA 603.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Peak |
| Sweep time: | 2 s |
| Video bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Resolution bandwidth: | Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|---------|
| CFR Part 27.53(g) CFR Part 2.1053 | RSS 139 |
| Spurious Emissions Radiated | |
| Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts) | |
| -13 dBm | |

Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the LTE band 17 (706.5 MHz, 710.0 MHz and 713.5 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE band 17 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

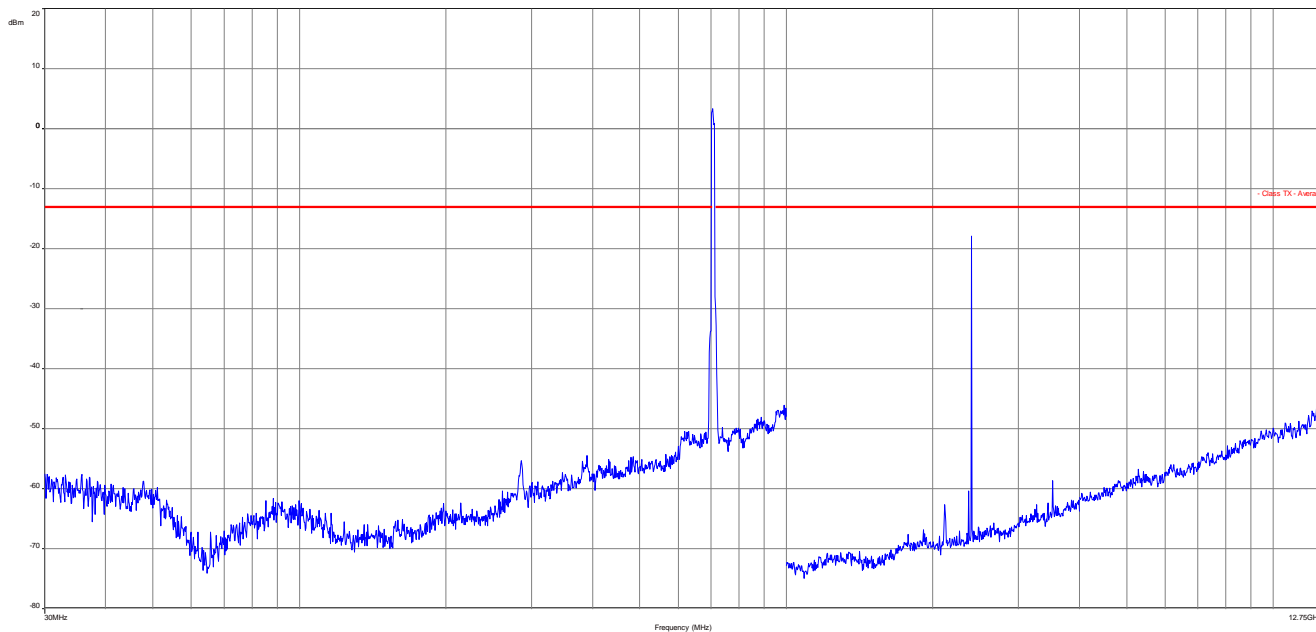
The final open field radiated levels are presented on the next pages. All measurements were done in horizontal and vertical polarization; the plots show the worst case. The plots show only the middle channel at the channel bandwidth and resource blocks with the highest output power. If spurious were detected, the lowest and highest channel and all supported channel bandwidths were checked, too.

As can be seen from this data, the emissions from the test item were within the specification limit.

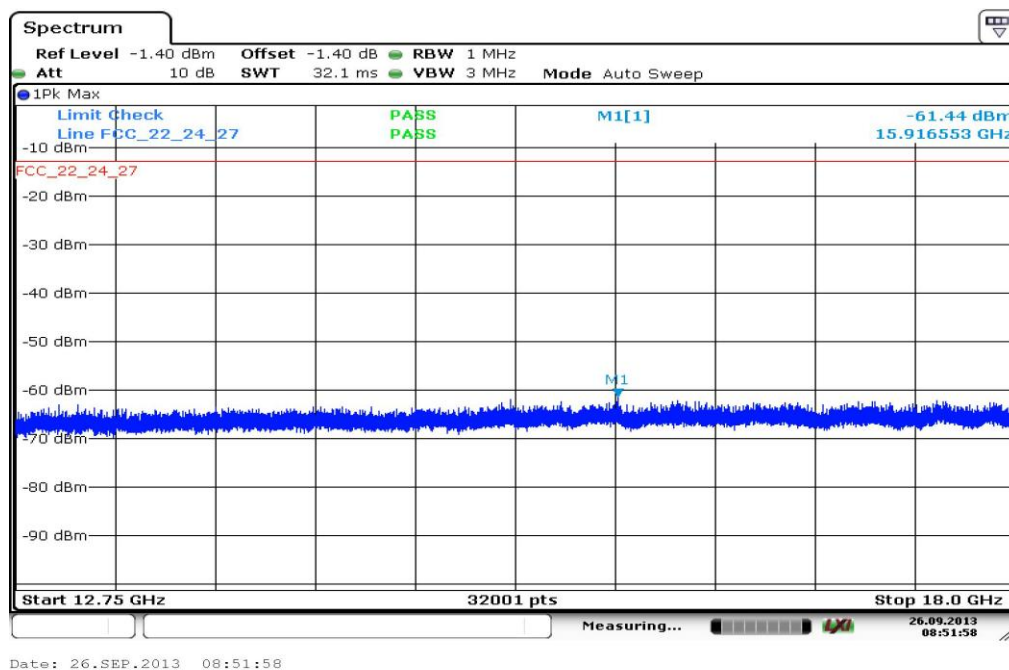
Result: Passed

Plots: TCH (Ch 23790, 10MHz) + BT Testmode DH5 (Ch 0)

Plot 1: 30 MHz – 12.75 GHz

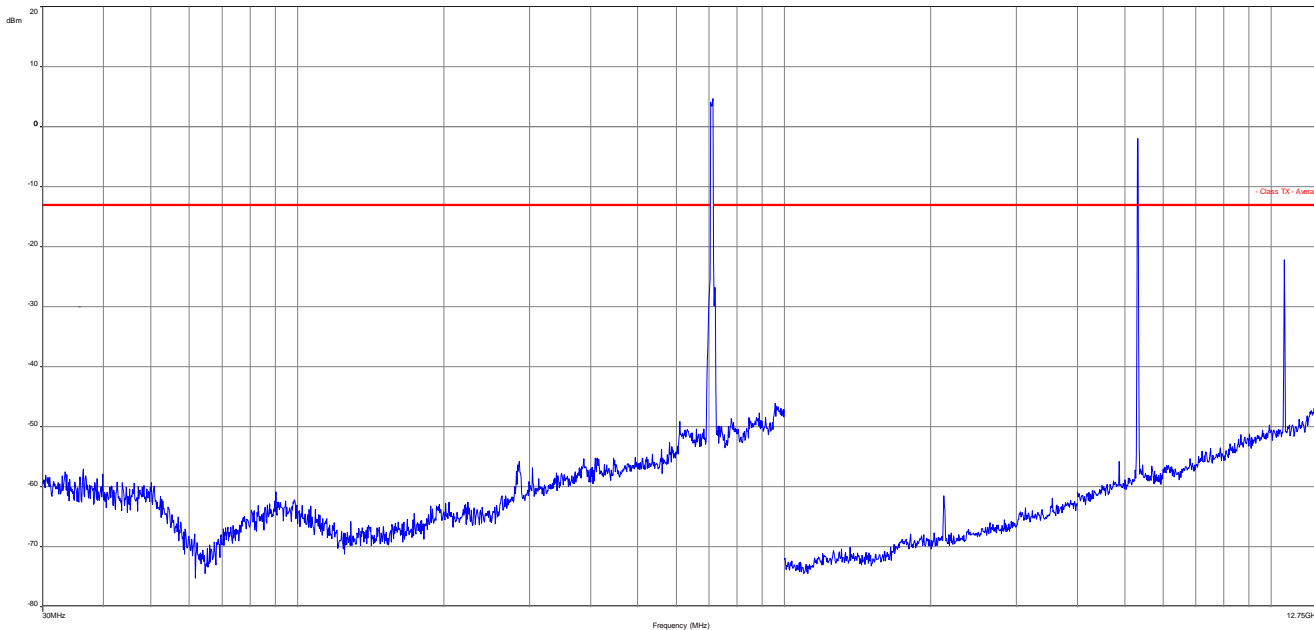


Plot 2: 12.75 GHz – 18 GHz

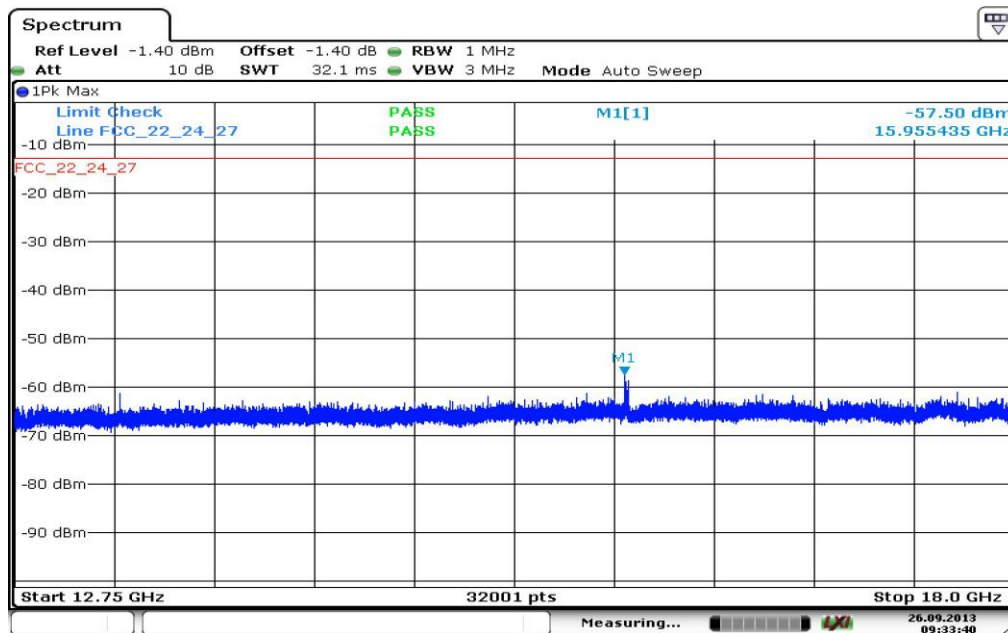


Plots: TCH (Ch 23790, 10MHz) + WiFi (Ch 64 @ 6 Mbps)

Plot 1: 30 MHz – 12.75 GHz



Plot 2: 12.75 GHz – 18 GHz



8.10.4 Spurious emissions conducted

Not performed

8.10.5 Block edge compliance

Not performed

8.10.6 Occupied bandwidth

Not performed

9 Test equipment and ancillaries used for tests

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

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

| No. | Lab / Item | Equipment | Type | Manufact. | Serial No. | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|--|----------------------------------|----------------------|------------|--------------------|------------------------|---------------------|---------------------|
| 1 | n. a. | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2818A03450 | 300001040 | Ve | 12.01.2012 | 12.01.2015 |
| 2 | n. a. | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115 | EMCO | 8812-3088 | 300001032 | vIKI! | 08.05.2013 | 08.05.2015 |
| 3 | n. a. | Anechoic chamber | FAC 3/5m | MWB / TDK | 87400/02 | 300000996 | ev | | |
| 4 | n. a. | Switch / Control Unit | 3488A | HP Meßtechnik | * | 300000199 | ne | | |
| 5 | 9 | Artificial Mains 9 kHz to 30 MHz | ESH3-Z5 | R&S | 828576/020 | 300001210 | Ve | 06.01.2012 | 06.01.2014 |
| 6 | n. a. | Switch / Control Unit | 3488A | HP Meßtechnik | 2719A15013 | 300001156 | ne | | |
| 7 | 9 | Isolating Transformer | MPL IEC625 Bus Regeltrennt ravo | Erfi | 91350 | 300001155 | ne | | |
| 8 | n. a. | Three-Way Power Splitter, 50 Ohm | 11850C | HP Meßtechnik | | 300000997 | ne | | |
| 9 | 90 | Active Loop Antenna 10 kHz to 30 MHz | 6502 | Kontron Psychotech | 8905-2342 | 300000256 | k | 13.06.2013 | 13.06.2015 |
| 10 | n. a. | Amplifier | js42-00502650-28-5a | Parzich GMBH | 928979 | 300003143 | ne | | |
| 11 | n. a. | Band Reject filter | WRCG185 5/1910-1835/1925-40/8SS | Wainwright | 7 | 300003350 | ev | | |
| 12 | n. a. | Band Reject filter | WRCG240 0/2483-2375/2505-50/10SS | Wainwright | 11 | 300003351 | ev | | |
| 13 | n. a. | Highpass Filter | WHKX7.0/1 8G-8SS | Wainwright | 18 | 300003789 | ne | | |
| 14 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 371 | 300003854 | vIKI! | 14.10.2011 | 14.10.2014 |
| 15 | n. a. | MXE EMI Receiver 20 Hz bis 26,5 GHz | N9038A | Agilent Technologies | MY51210197 | 300004405 | k | 21.02.2013 | 21.02.2014 |
| 16 | CR 79 | Std. Gain Horn Antenna 26.5-40.0 GHz | V637 | Narda | 7911 | 300001751 | ne | | |
| 17 | 11b | Microwave System Amplifier, 0.5-26.5 GHz | 83017A | HP Meßtechnik | 00419 | 300002268 | ev | | |
| 18 | A025 | Std. Gain Horn Antenna 12.4 to 18.0 GHz | 639 | Narda | | 300000786 | ne | | |
| 19 | A026 | Std. Gain Horn Antenna 12.4 to 18.0 GHz | 639 | Narda | 8402 | 300000787 | k | 22.07.2013 | 22.07.2015 |
| 20 | A027 | Std. Gain Horn | 638 | Narda | | 300000486 | ne | | |

| | | | | | | | | | |
|----|-------|---|----------------------------|----------------------|------------|-----------|------|------------|------------|
| | | Antenna 18.0 to 26.5 GHz | | | | | | | |
| 21 | A028 | Std. Gain Horn Antenna 18.0 to 26.5 GHz | 638 | Narda | | 300002440 | ne | | |
| 22 | A029 | Std. Gain Horn Antenna 18.0 to 26.5 GHz | 638 | Narda | | 300002442 | k | 19.07.2013 | 19.07.2015 |
| 23 | A030 | Std. Gain Horn Antenna 18.0 to 26.5 GHz | 638 | Narda | | 300000487 | ne | | |
| 24 | n. a. | Std. Gain Horn Antenna 26.5-40.0 GHz | V637 | Narda | 7911 | 300001752 | ne | | |
| 25 | n. a. | Spectrum Analyzer 20 Hz - 50 GHz | FSU50 | R&S | 200012 | 300003443 | Ve | 09.10.2012 | 09.10.2014 |
| 26 | n. a. | Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm | FSP30 | R&S | 100886 | 300003575 | k | 22.08.2012 | 22.08.2014 |
| 27 | n. a. | MXA Signal Analyzer 20 Hz - 26.5 GHz | N9020A MXA Signal Analyzer | Agilent Technologies | US46220229 | 300003805 | vlk! | 16.01.2013 | 16.01.2015 |
| 28 | n. a. | Broadband Low Noise Amplifier 18-50 GHz | CBL18503 070-XX | CERNEX | 19338 | 300004273 | ne | | |
| 29 | n. a. | PXA Spectrum Analyzer 3Hz to 50GHz | N9030A PXA Signal Analyzer | Agilent Technologies | US51350267 | 300004338 | k | 16.12.2012 | 16.12.2013 |
| 30 | n. a. | Signal Analyzer 40 GHz | FSV40 | R&S | 101042 | 300004517 | k | 22.10.2012 | 22.01.2014 |

Agenda: Kind of Calibration

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

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

10 Observations

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

Annex A Document history

| Version | Applied changes | Date of release |
|---------|-----------------|-----------------|
| 1.0 | Initial release | 2013-09-26 |

Annex B Further information**Glossary**

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

Annex C Accreditation Certificate

Front side of certificate

DAkKS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH
Befehlense 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
- WiFiMax und Richtfunk
- Mobilfunk (GSM / DCS, Over the Air (OTA) Performance)
- Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive
- Produktsicherheit
- SAR und Hearing Aid Compatibility (HAC)
- Umweltsimulation
- Smart Carq Terminals
- Bluetooth
- Wi-Fi- Services

Die Akkreditierungskunde gilt nur in Verbindung mit dem Bescheid vom 18.01.2013 mit der Akkreditierungsnummer D-PL-12076-01 und ist gültig 17.01.2018. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 80 Seiten.

Registrierungsnummer der Urkunde: D-PL-12076-01-01

Frankfurt am Main, 18.01.2013

Im Auftrag
Dirk Lang (PH) Leiter
Abteilung 1000

Siehe Hinweise auf der Rückseite

Back side of certificate

Deutsche Akkreditierungsstelle GmbH

| | | |
|--|---|--|
| Standort Berlin Spittelmarkt 10 10117 Berlin | Standort Frankfurt am Main Gartenstraße 6 60594 Frankfurt am Main | Standort Braunschweig Rundeschaue 100 38116 Braunschweig |
|--|---|--|

Die auszugsweise Veröffentlichung der Akkreditierungskunde bedarf der vorherigen schriftlichen Zustimmung der Deutsche 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 (Abt. 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
ILAC: www.ilac.org
IAF: www.iaf.nu

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>