



## TEST REPORT

Test report no.: 1-6234/13-03-02-B



### Testing laboratory

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#### Accredited Testing Laboratory:

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

### Applicant

**Research In Motion Limited**  
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 e-mail: [mattayi@rim.com](mailto:mattayi@rim.com)

### Manufacturer

**Research In Motion Limited**  
 305 Phillip Street  
 Waterloo, ON N2L 3W8 / CANADA

### 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

### Test Item

<b>Kind of test item:</b>	<b>Blackberry GSM Phones</b>		
<b>Model name:</b>	<b>RFX101LW</b>		
<b>FCC ID:</b>	<b>L6ARFX100LW</b>		
<b>Frequency:</b>	GSM: 824.2 – 848.8 MHz,	1850.2 – 1909.8 MHz	
	UMTS: 826.4 – 846.6 MHz,	1852.4 – 1907.6 MHz	
	CDMA: 824.7 – 848.31 MHz,	1851.2 – 1908.75 MHz	
<b>Technology tested:</b>	GSM, UMTS		
<b>Antenna:</b>	Integrated antenna		
<b>Power supply:</b>	3.8 V DC by Li-Polymer battery		

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:

p.o.

Stefan Börs  
 Senior Testing Manager

### Test performed:

Andreas Luckenbill  
 Expert

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## 2 General information

### 2.1 Notes and disclaimer

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

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

### 2.2 Application details

Date of receipt of order:	2013-05-29
Date of receipt of test item:	2013-06-03
Start of test:	2013-06-03
End of test:	2013-07-05
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

#### 4 Test environment

Temperature:	$T_{nom}$	+20 °C during room temperature tests
	$T_{max}$	no tests under extreme conditions
	$T_{min}$	no tests under extreme conditions
Relative humidity content:		62 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	$V_{nom}$	3.8 V DC by Li-Polymer battery
	$V_{max}$	no tests under extreme conditions
	$V_{min}$	no tests under extreme conditions

#### 5 Test item

Kind of test item	:	Blackberry GSM Phones
Type identification	:	RFX101LW
S/N serial number	:	IMEI: 004401139608687; IMEI: 004401139608661
Hardware status	:	CER-54735-001 Rev1-x04-00
Software status	:	OS Version: 10.2.0.345 Build: 534884
Frequency band [MHz]	:	GSM: 824.2 – 848.8 MHz, 1850.2 – 1909.8 MHz UMTS: 826.4 – 846.6 MHz, 1852.4 – 1907.6 MHz CDMA: 824.7 – 848.31 MHz, 1851.2 – 1908.75 MHz
Type of modulation	:	GMSK, 8-PSK, QPSK, 16-QAM
Antenna	:	Integrated antenna
Power supply	:	3.8 V DC by Li-Polymer battery

#### 5.1 Additional information

Test setup- and EUT-photos are included in test reports: 1-6234/13-03-01\_AnnexA  
1-6234/13-03-01\_AnnexC

All tests are made according RIM testplan:  
RIM\_EMI\_Matrix for Cetecom\_RFX101LW-Revised (June-28-2013).xlsx

#### 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	passed	2013-08-08	Reduced testplan. All tests are made according RIM testplan!

### 7.1 GSM 850

Test Case	temperature conditions	power source voltages	Pass	Fail	NA	NP	Remark
RF Output Power	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	-/-
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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	-/-
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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	-/-
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 V

Test Case	temperature conditions	power source voltages	Pass	Fail	NA	NP	Remark
RF Output Power	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	-/-
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

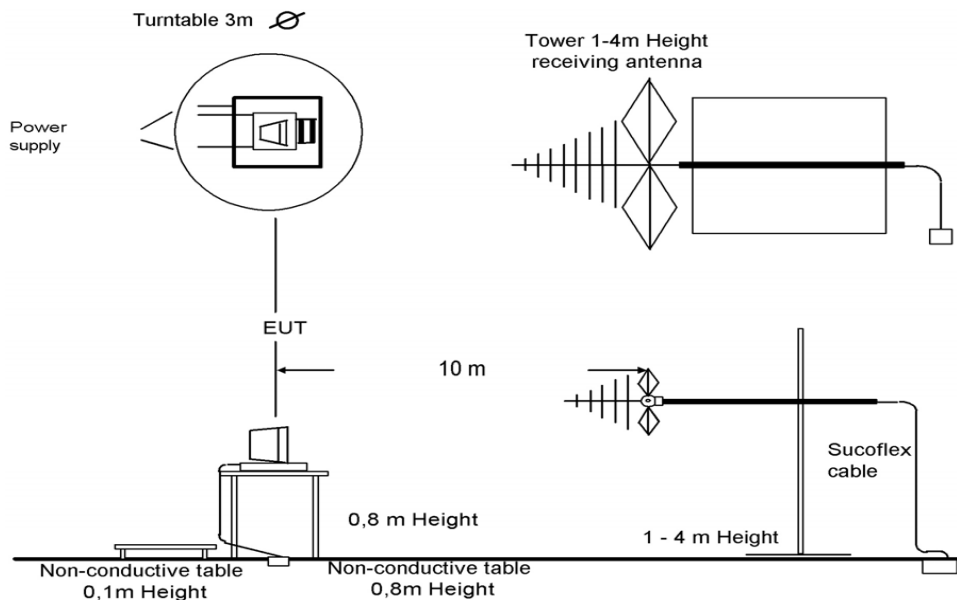
### 8.1 Description of test setup

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

The GSM tests were performed with call established and the GPRS tests were performed with data connection established.

All EDGE tests were performed with one timeslot in uplink activated and one timeslot in downlink activated.

### 8.2.1 RF output power

**Description:**

This paragraph contains average power, peak output power and ERP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

**Measurement:**

The mobile was set up for the maximum output power with pseudo random data modulation.

Measurement parameters	
Detector:	Peak and RMS (Power in Burst)
Sweep time:	Auto
Video bandwidth:	1 MHz
Resolution bandwidth:	1 MHz
Span:	Zero Span
Trace-Mode:	Max Hold

**Limits:**

FCC	
CFR Part 22.913 CFR Part 2.1046	
Nominal Peak Output Power	
+38.45 dBm	
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.	

**Results:**

Output Power (radiated) GMSK mode	
Frequency (MHz)	Average Output Power (dBm) - ERP
824.2	30.0
836.4	30.3
848.8	30.8
Measurement uncertainty	± 2.0 dB

Output Power (radiated) 8-PSK mode	
Frequency (MHz)	Average Output Power (dBm) - ERP
824.2	26.5
836.4	27.2
848.8	27.3
Measurement uncertainty	± 2.0 dB

**Result:** Passed

## 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 12.75 GHz. The resolution bandwidth is set according Part 22.917.

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	
Spurious Emissions Radiated	
Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts)	
-13 dBm	

**Results:**

Radiated emissions measurements were made according the costumers testplan.

GSM850 (CALL): CH128, CH190, CH251

GSM850 (GPRS): CH190

GSM850 (EDGE): CH128, CH190, CH251

All measurements are made with the battery powered mobile without any accessory.

All measurements were done in horizontal and vertical polarization every 120 degrees on a turntable. The plots show the maximum over all positions and polarisations.

The found values are stated in the table below.

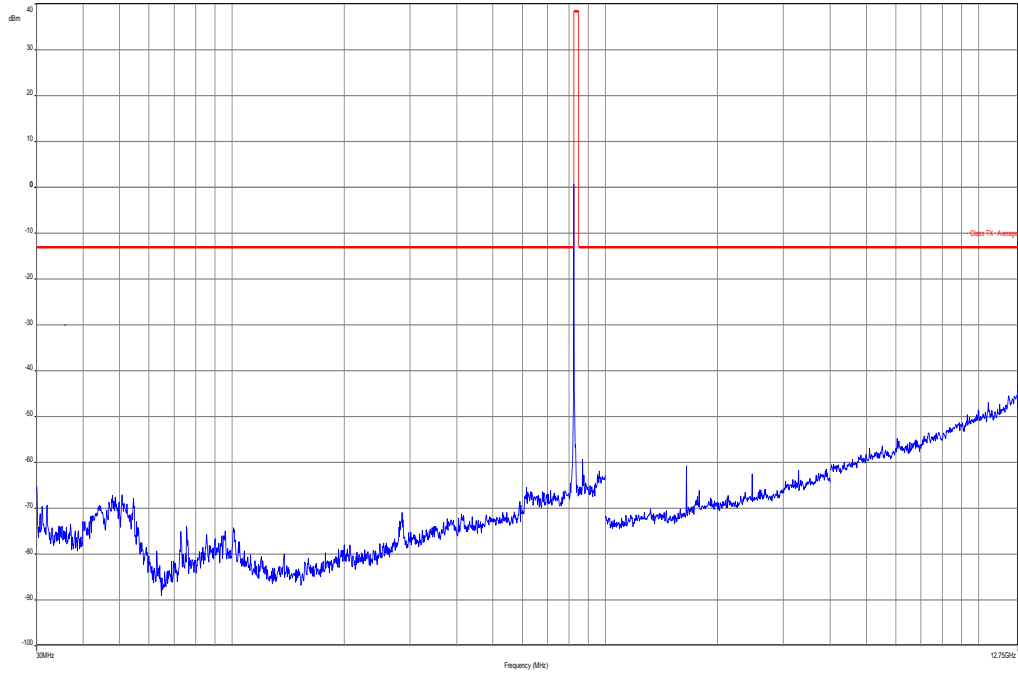
As can be seen from this data, the emissions from the test item were within the specification limit.

Spurious Emission Level (dBm)					
Lowest channel		Middle channel		Highest channel	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
No critical peaks detected!					
	-		-		-
	-		-		-
	-		-		-
Measurement uncertainty			± 3dB		

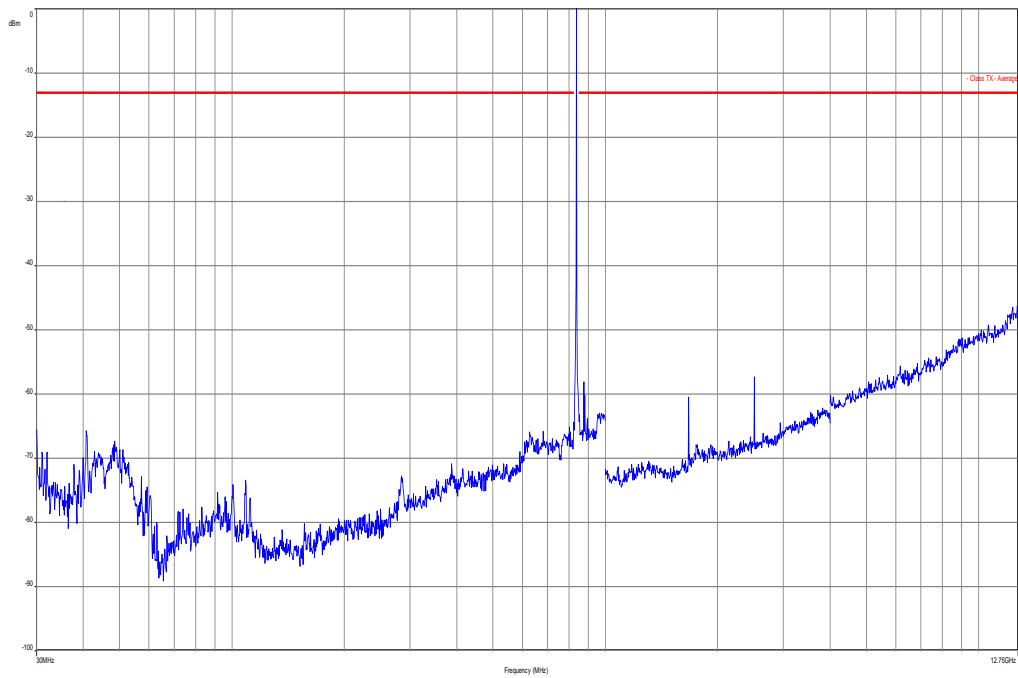
**Result: Passed**

**Plots:**

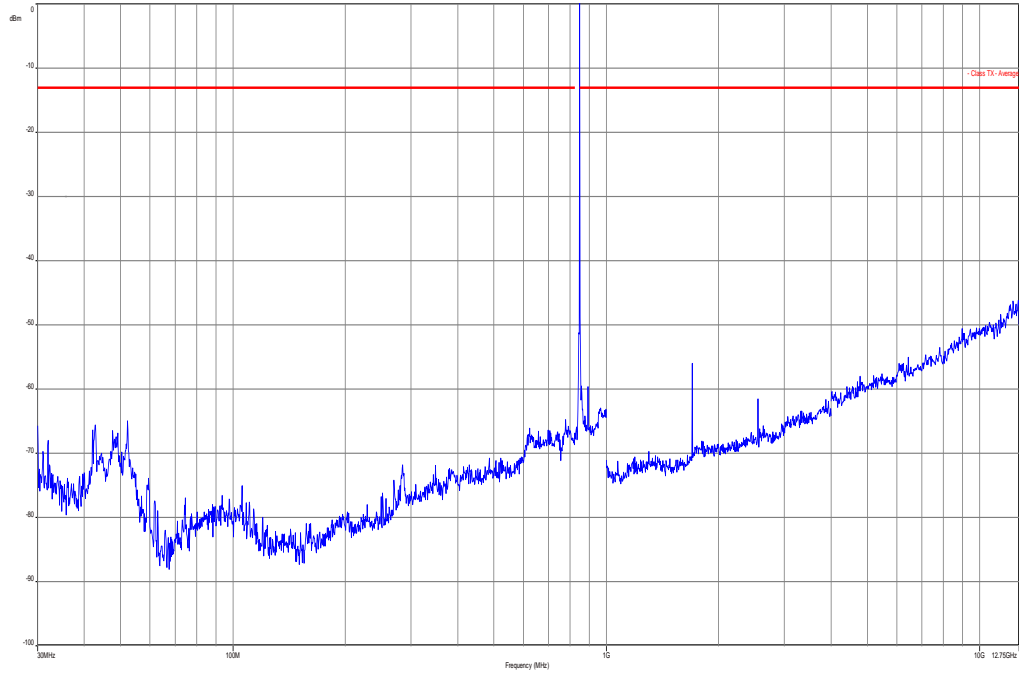
**Plot 1: CALL Channel 128 (30 MHz – 12.75 GHz)**



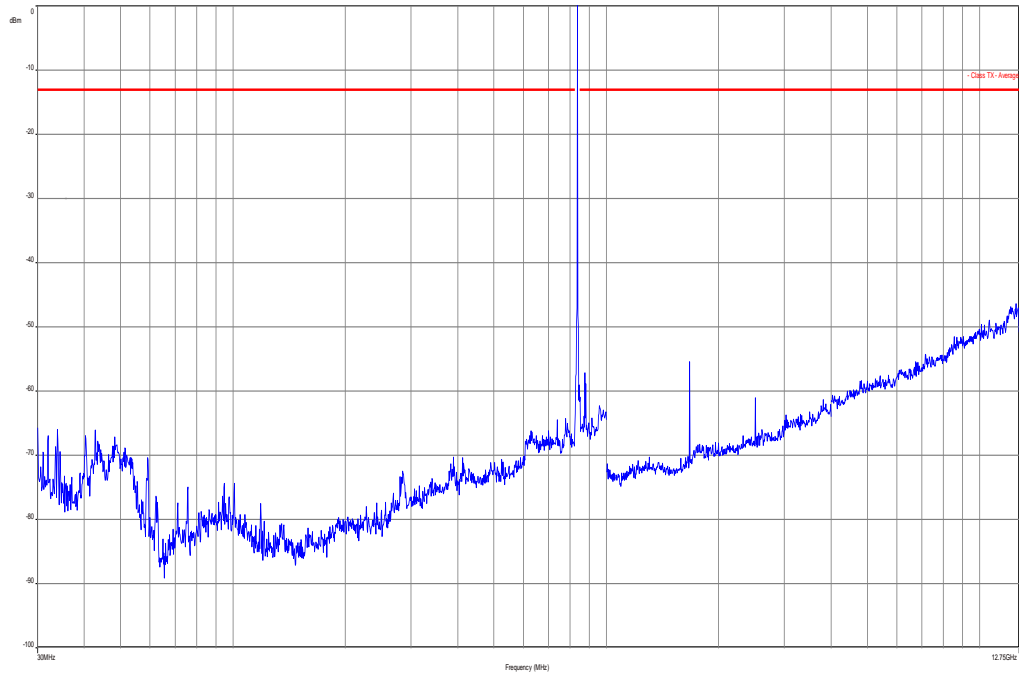
**Plot 2: CALL Channel 190 (30 MHz – 12.75 GHz)**



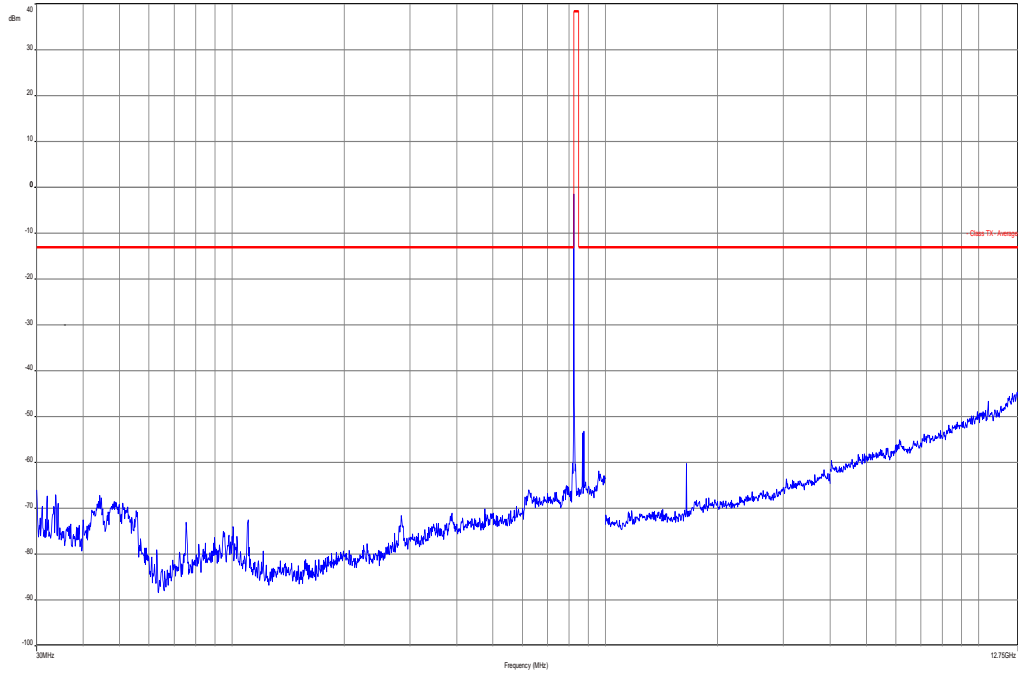
**Plot 3: CALL Channel 251 (30 MHz – 12.75 GHz)**



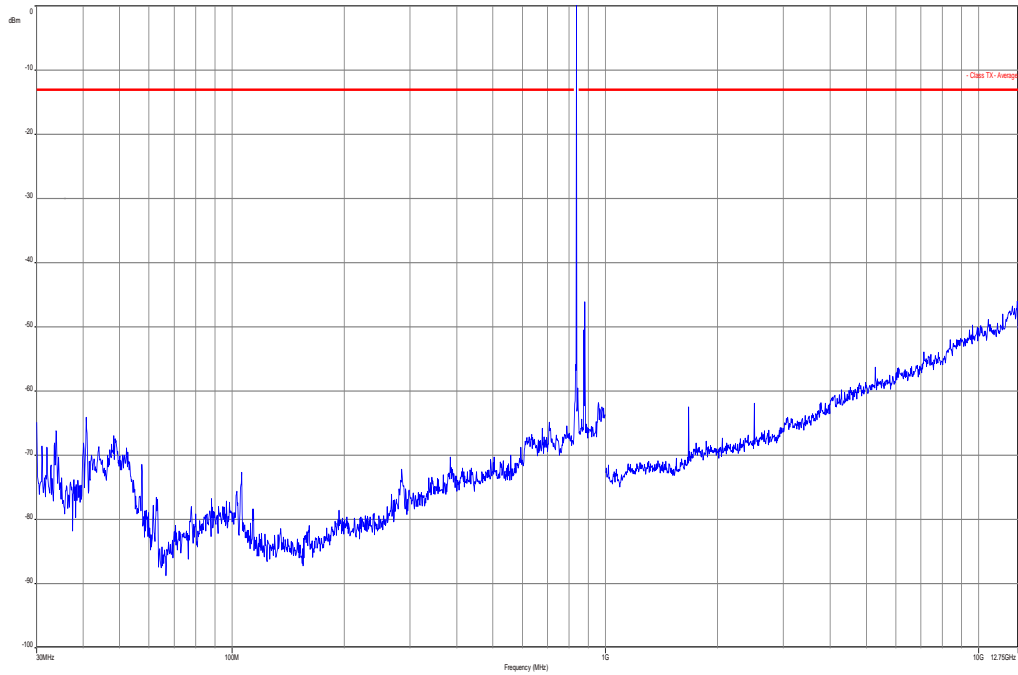
**Plot 4: GPRS Channel 190 (30 MHz – 12.75 GHz)**



Plot 5: EDGE Channel 128 (30 MHz – 12.75 GHz)

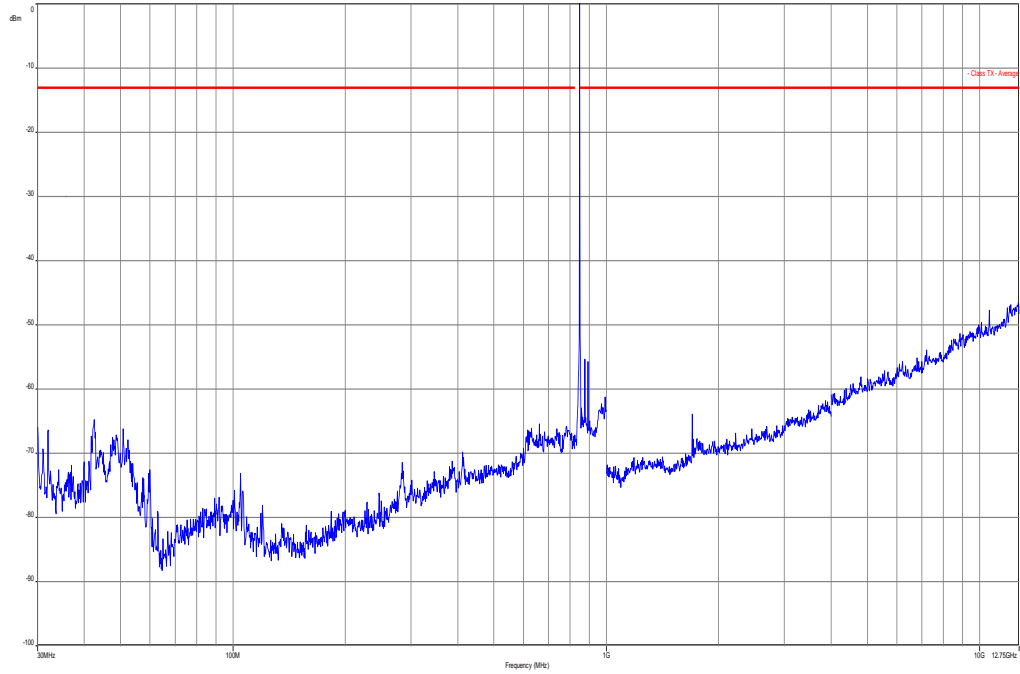


Plot 6: EDGE Channel 190 (30 MHz – 12.75 GHz)





Plot 7: EDGE Channel 251 (30 MHz – 12.75 GHz)



#### 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

The GSM tests were performed with call established and the GPRS tests were performed with data connection established.

All EDGE tests were performed with one timeslot in uplink activated and one timeslot in downlink activated.

#### 8.3.1 RF output power

**Description:**

This paragraph contains average power, peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

**Measurement:**

The mobile was set up for the maximum output power with pseudo random data modulation.

Measurement parameters	
Detector:	Peak and RMS (Power in Burst)
Sweep time:	Auto
Video bandwidth:	1 MHz
Resolution bandwidth:	1 MHz
Span:	Zero Span
Trace-Mode:	Max Hold

**Limits:**

FCC	IC
CFR Part 24.232 CFR Part 2.1046	
Nominal Peak Output Power	
+33.00 dBm	
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.	

**Results:**

Output Power (radiated) GMSK mode	
Frequency (MHz)	Average Output Power (dBm) - EIRP
1850.2	30.8
1880.0	29.4
1909.8	29.9
Measurement uncertainty	± 2.0 dB

Output Power (radiated) 8-PSK mode	
Frequency (MHz)	Average Output Power (dBm) - EIRP
1850.2	26.5
1880.0	25.9
1909.8	26.2
Measurement uncertainty	± 2.0 dB

**Result:** **Passed**

### 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 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	
Spurious Emissions Radiated	
Attenuation $\geq 43 + 10\log(P)$ (P, Power in Watts)	
-13 dBm	

**Results:**

Radiated emissions measurements were made according the costumers testplan.

GSM1900 (CALL): CH512, CH661, CH810

GSM1900 (GPRS): CH661

GSM1900 (EDGE): CH512, CH661, CH810

All measurements are made with the battery powered mobile without any accessory.

All measurements were done in horizontal and vertical polarization every 120 degrees on a turntable. The plots show the maximum over all positions and polarisations.

The found values are stated in the table below.

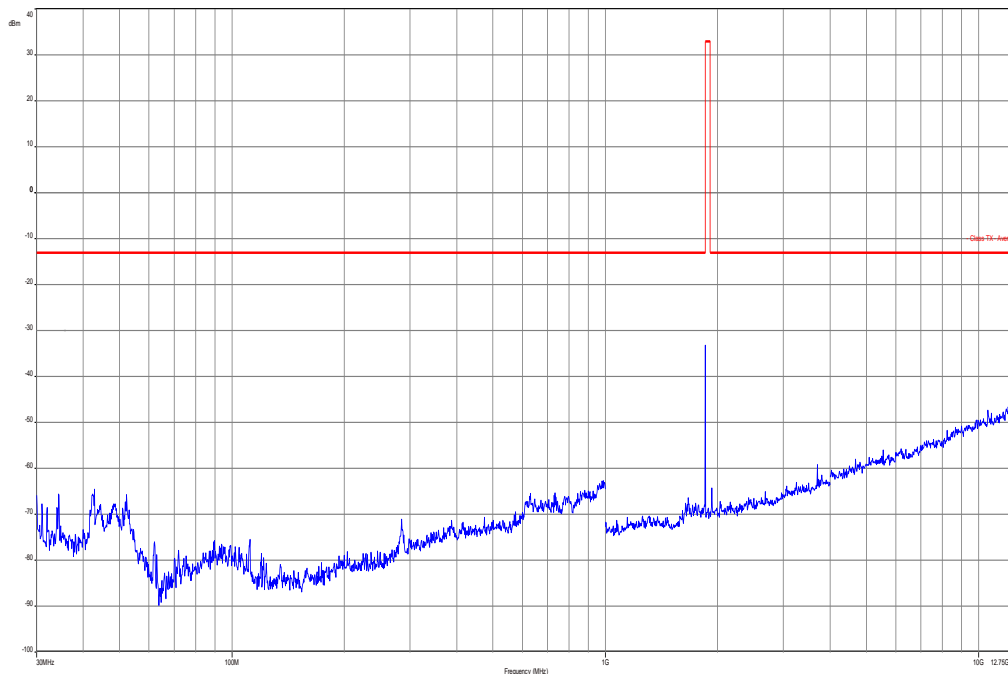
As can be seen from this data, the emissions from the test item were within the specification limit.

Spurious Emission Level (dBm)					
Lowest channel		Middle channel		Highest channel	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
No critical peaks detected!					
	-		-		-
	-		-		-
	-		-		-
Measurement uncertainty			± 3dB		

**Result: Passed**

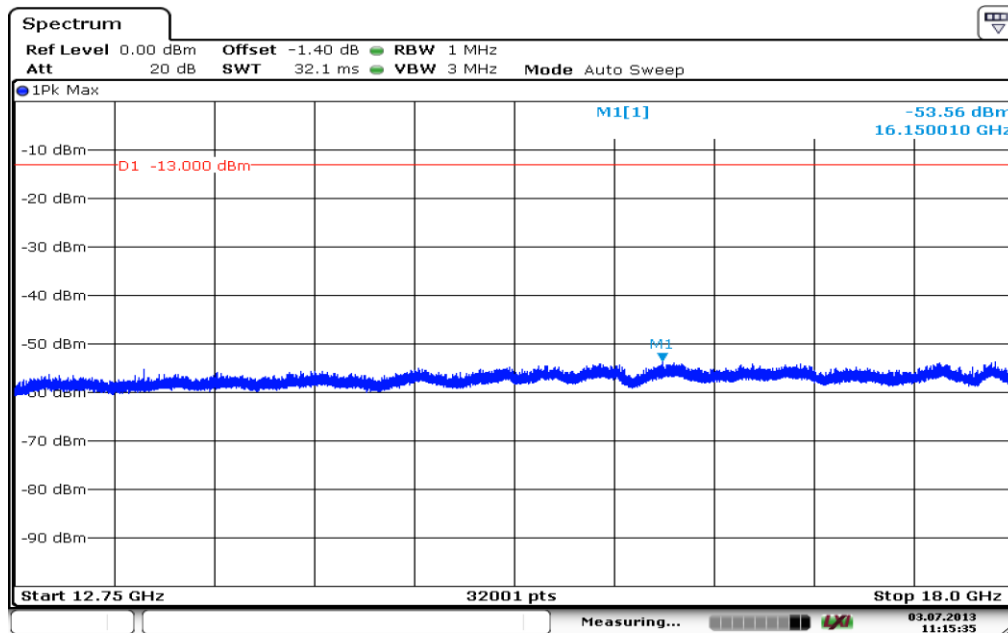
**Plots:**

**Plot 1:** CALL Channel 512 (30 MHz – 12.75 GHz)



*Carrier notched with 1.9 GHz rejection filter*

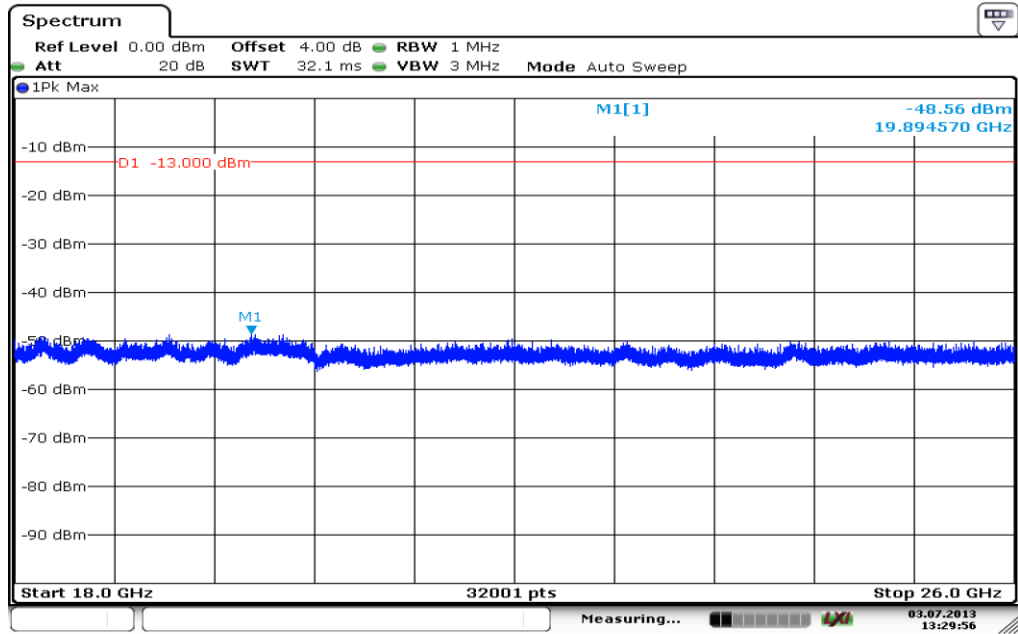
**Plot 2:** CALL Channel 512 (12.75 GHz - 18 GHz)



Date: 3.JUL.2013 11:15:35

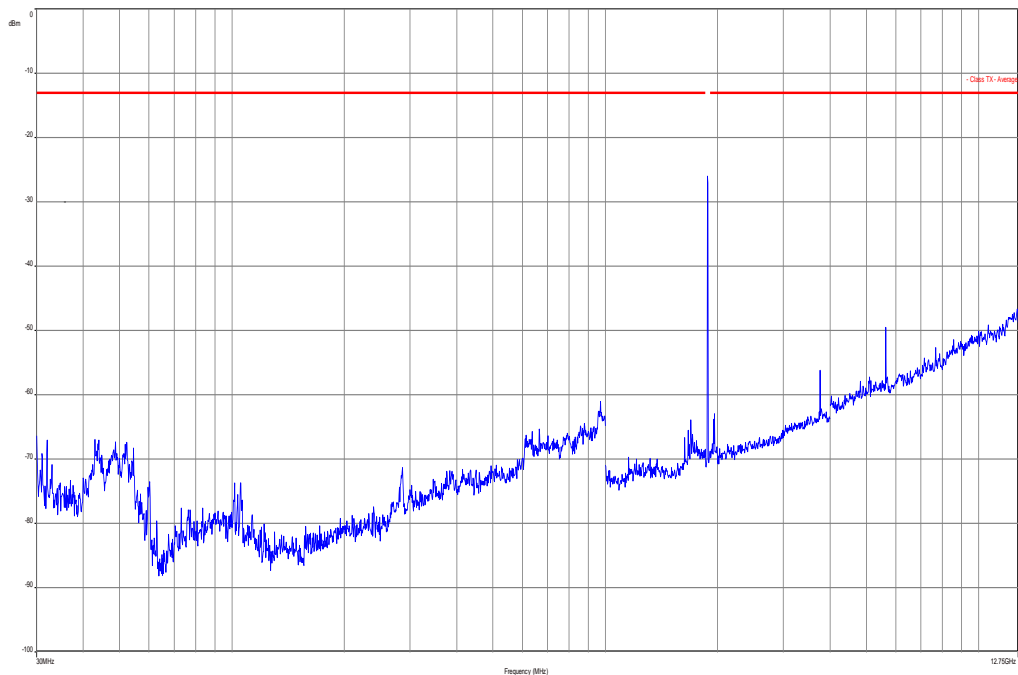


Plot 3: CALL Channel 512 (18 GHz - 26 GHz)



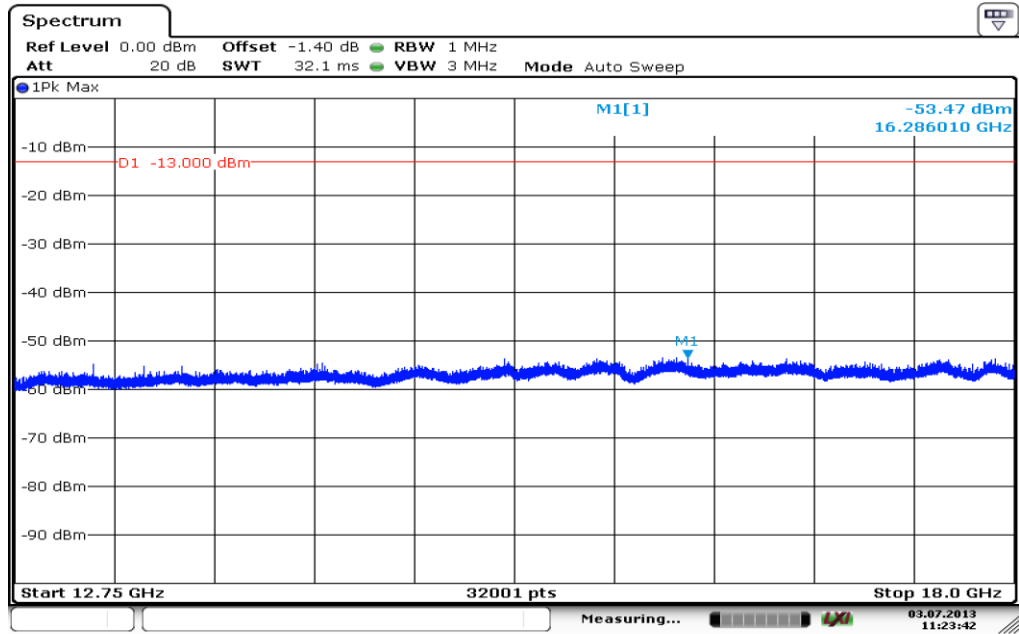
Date: 3.JUL.2013 13:29:56

Plot 4: CALL Channel 661 (30 MHz – 12.75 GHz)



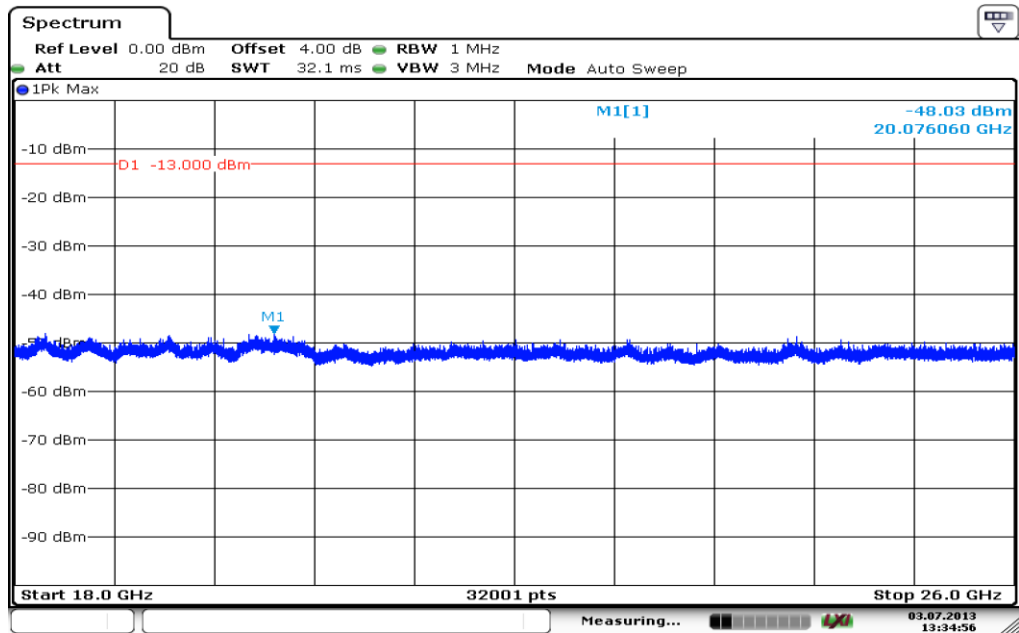
Carrier notched with 1.9 GHz rejection filter

Plot 5: CALL Channel 661 (12.75 GHz - 18 GHz)



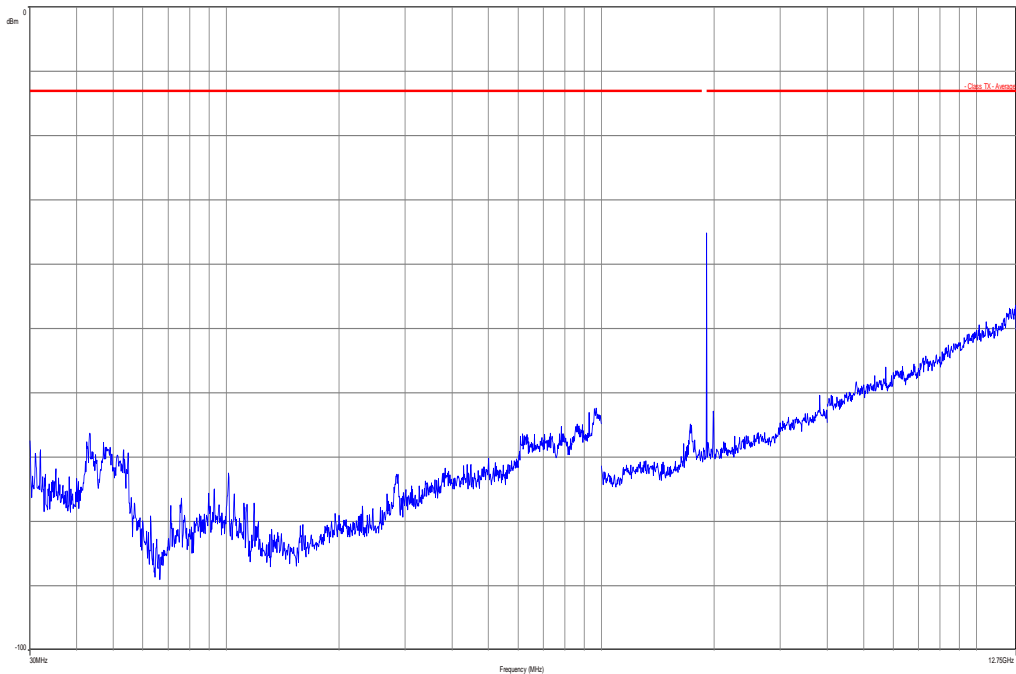
Date: 3.JUL.2013 11:23:42

Plot 6: CALL Channel 661 (18 GHz - 26 GHz)



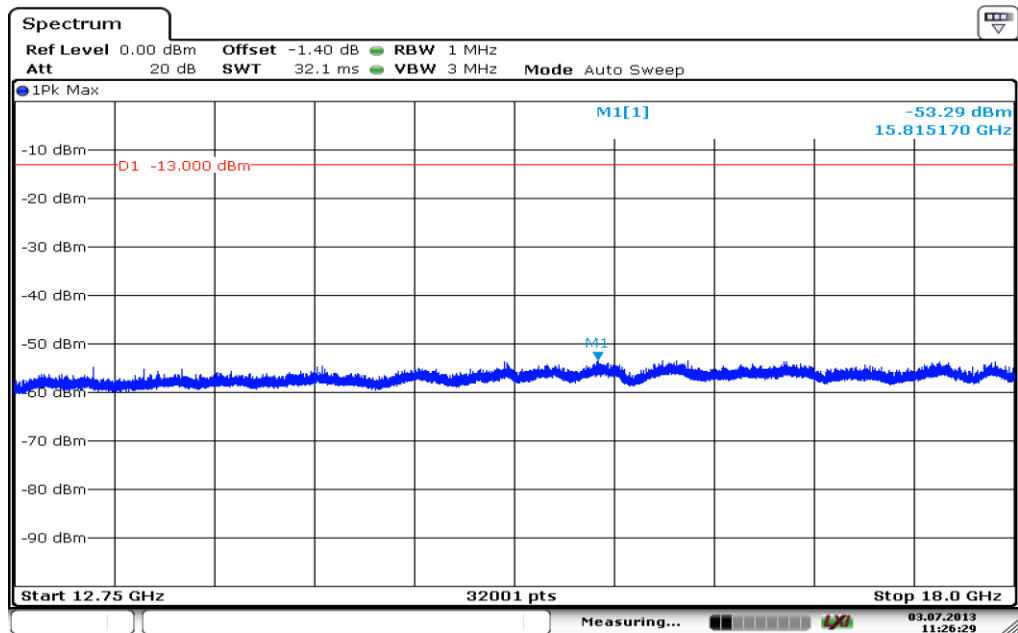
Date: 3.JUL.2013 13:34:56

Plot 7: CALL Channel 810 (30 MHz – 12.75 GHz)



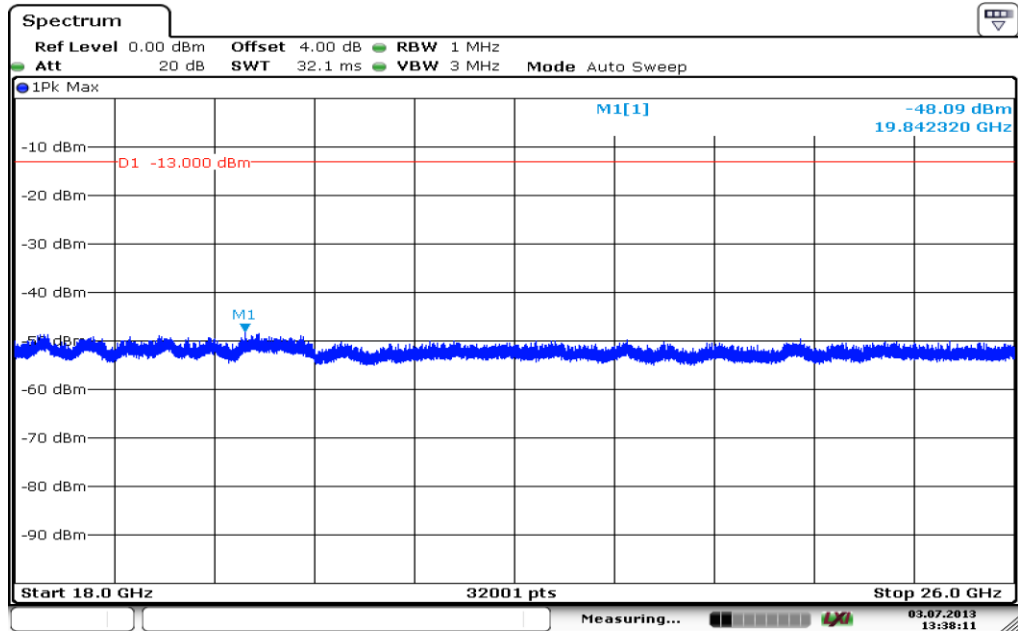
Carrier notched with 1.9 GHz rejection filter

Plot 8: CALL Channel 810 (12.75 GHz - 18 GHz)



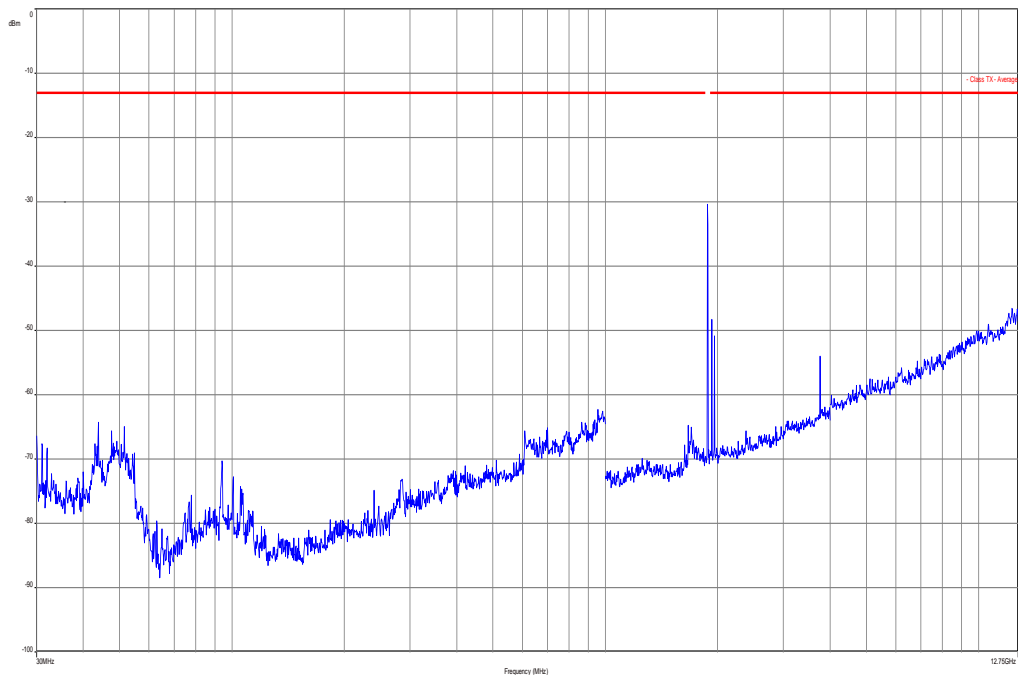
Date: 3.JUL.2013 11:26:29

Plot 9: CALL Channel 810 (18 GHz - 26 GHz)



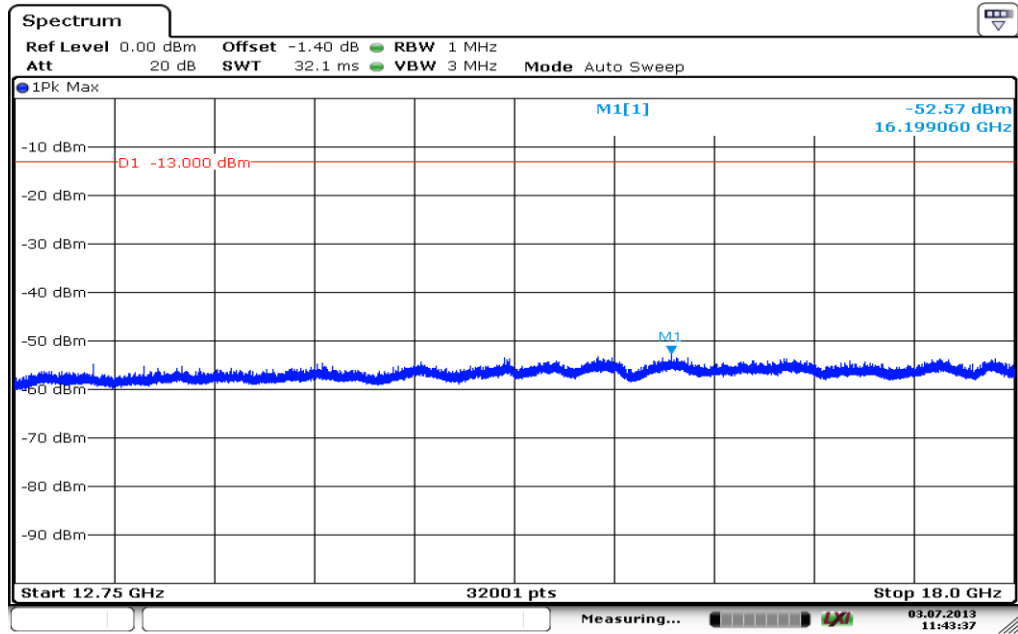
Date: 3.JUL.2013 13:38:11

Plot 10: GPRS Channel 661 (30 MHz – 12.75 GHz)

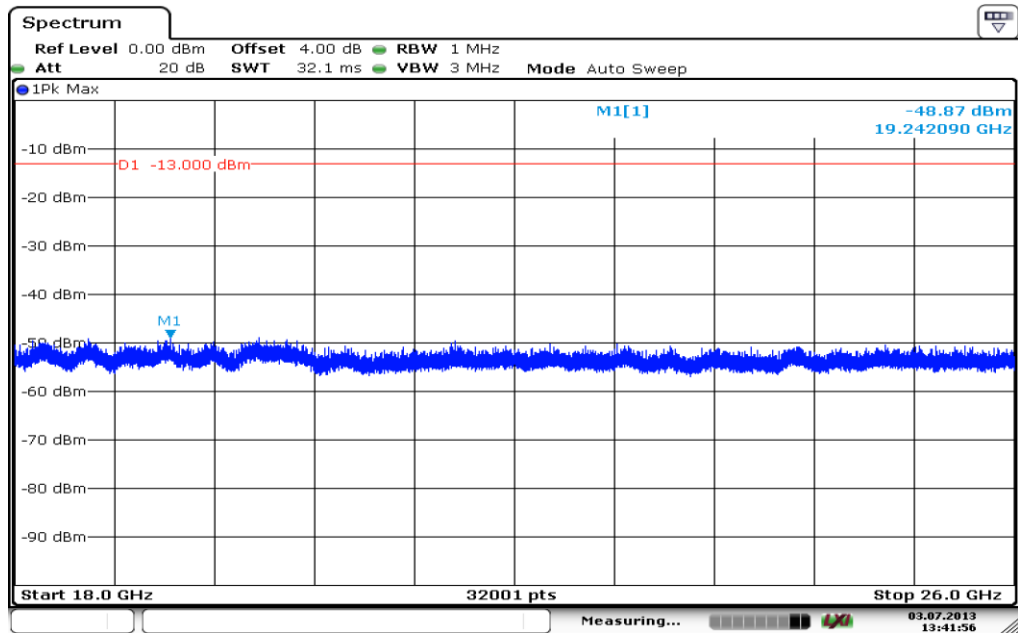


Carrier notched with 1.9 GHz rejection filter

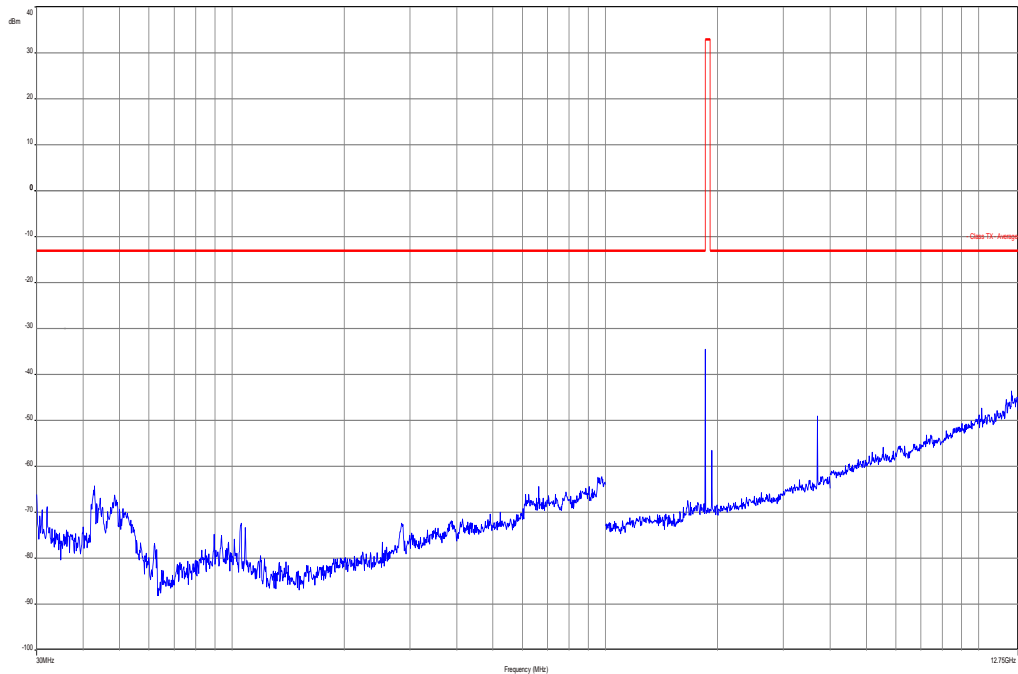
Plot 11: GPRS Channel 661 (12.75 GHz - 18 GHz)



Plot 12: GPRS Channel 661 (18 GHz - 26 GHz)

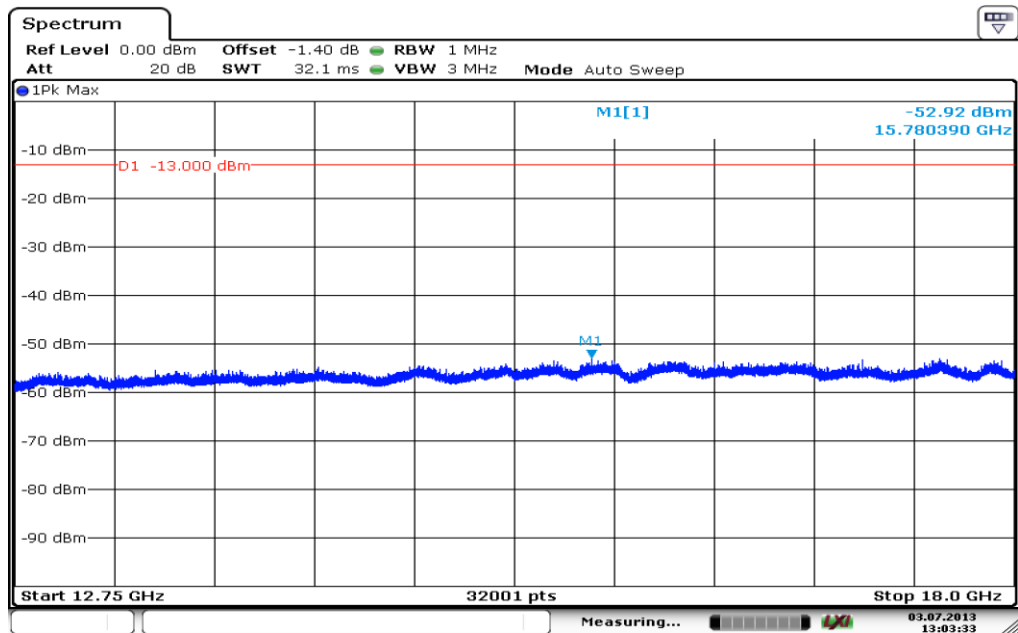


Plot 13: EDGE Channel 512 (30 MHz – 12.75 GHz)



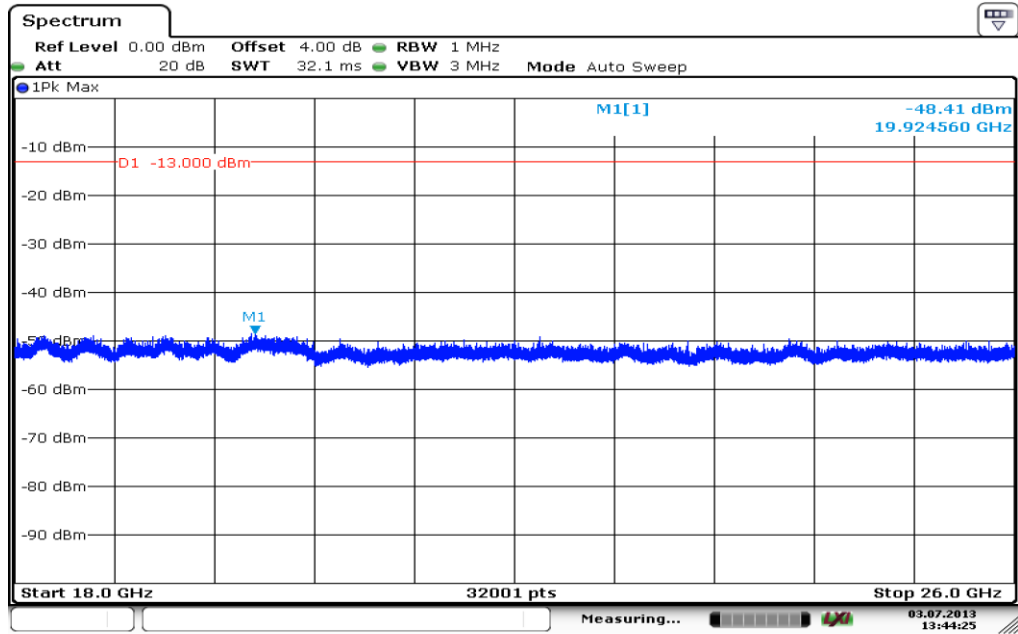
Carrier notched with 1.9 GHz rejection filter

Plot 14: EDGE Channel 512 (12.75 GHz - 18 GHz)



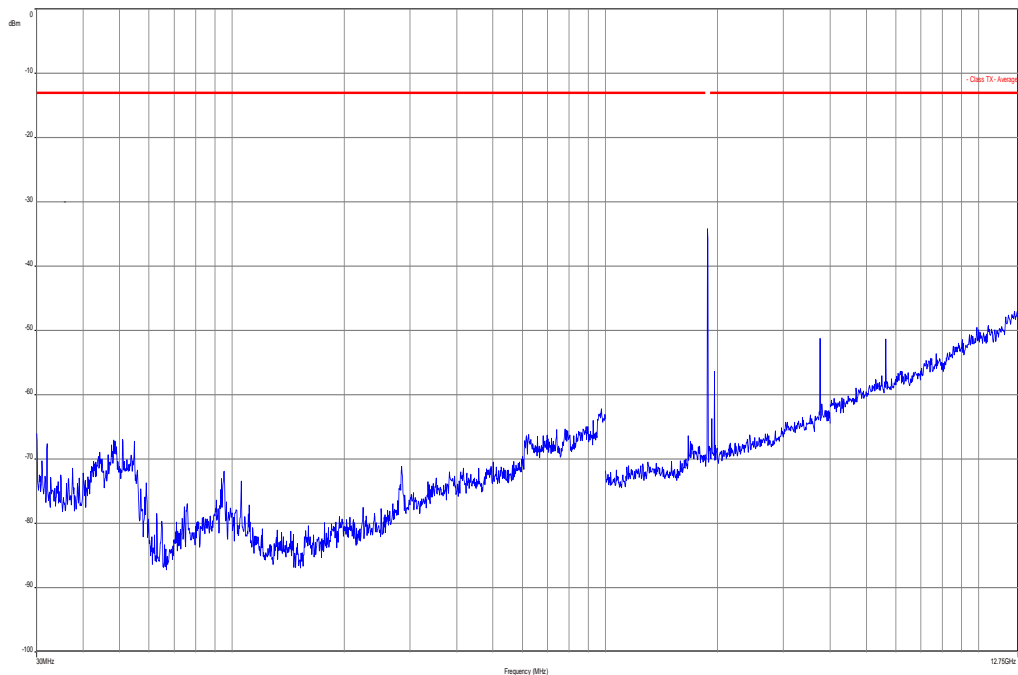
Date: 3.JUL.2013 13:03:33

Plot 15: EDGE Channel 512 (18 GHz - 26 GHz)



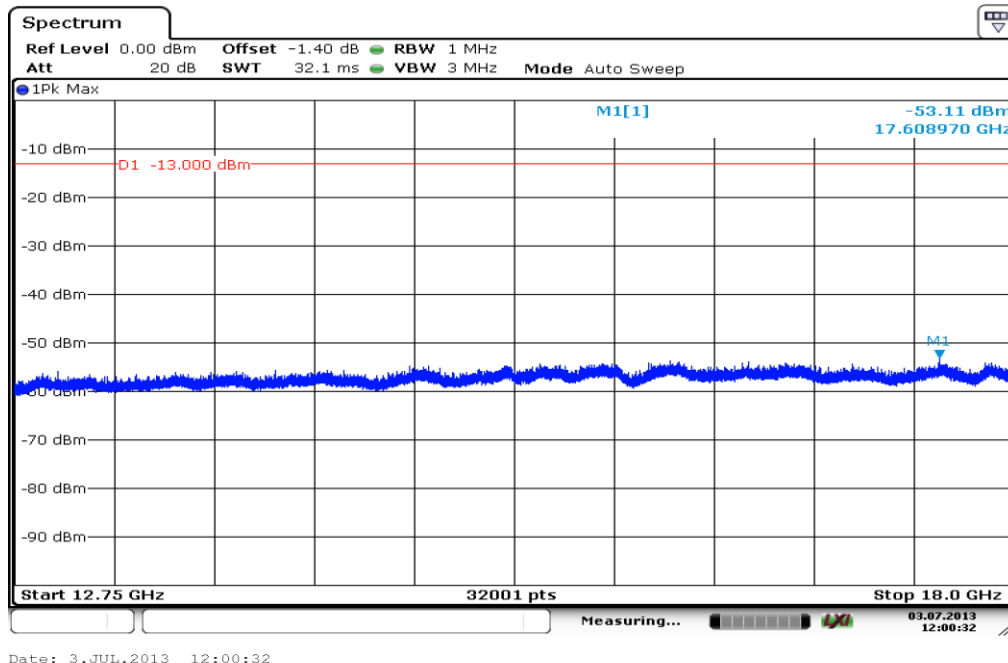
Date: 3.JUL.2013 13:44:25

Plot 16: EDGE Channel 661 (30 MHz – 12.75 GHz)

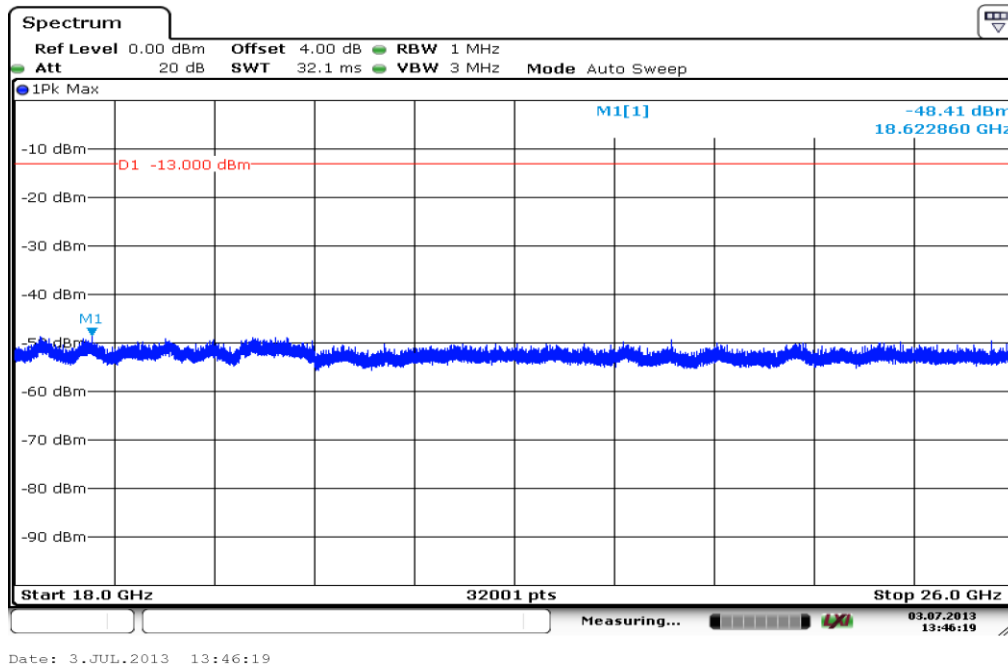


Carrier notched with 1.9 GHz rejection filter

Plot 17: EDGE Channel 661 (12.75 GHz - 18 GHz)

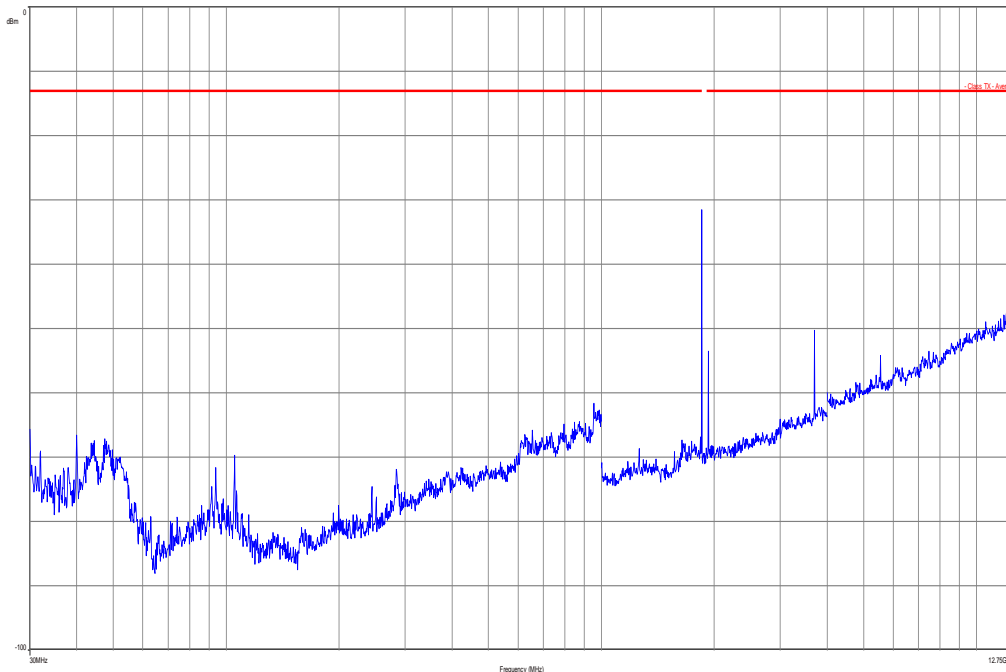


Plot 18: EDGE Channel 661 (18 GHz - 26 GHz)



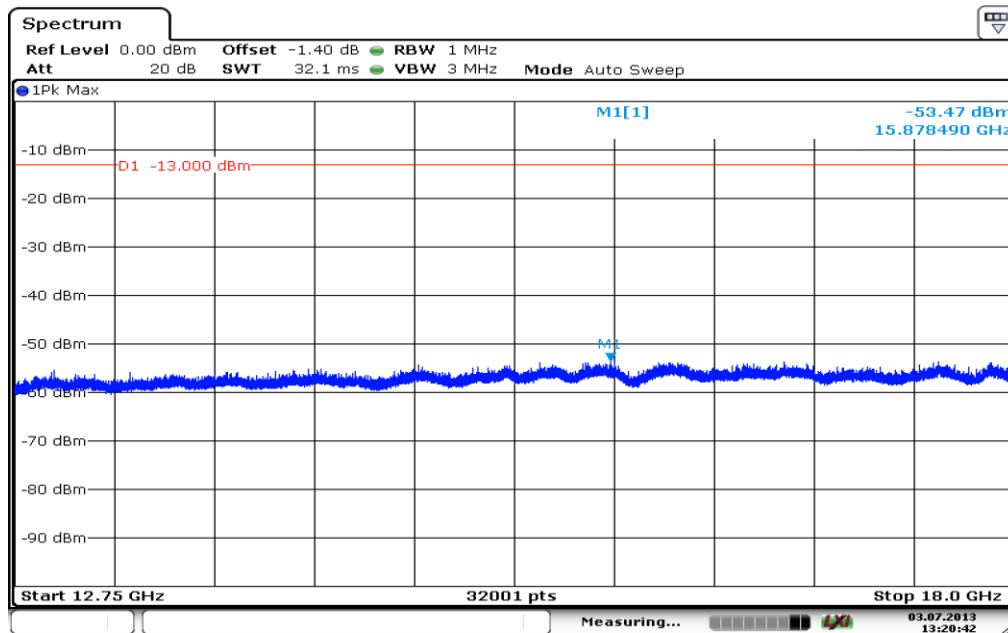


Plot 19: EDGE Channel 810 (30 MHz – 12.75 GHz)



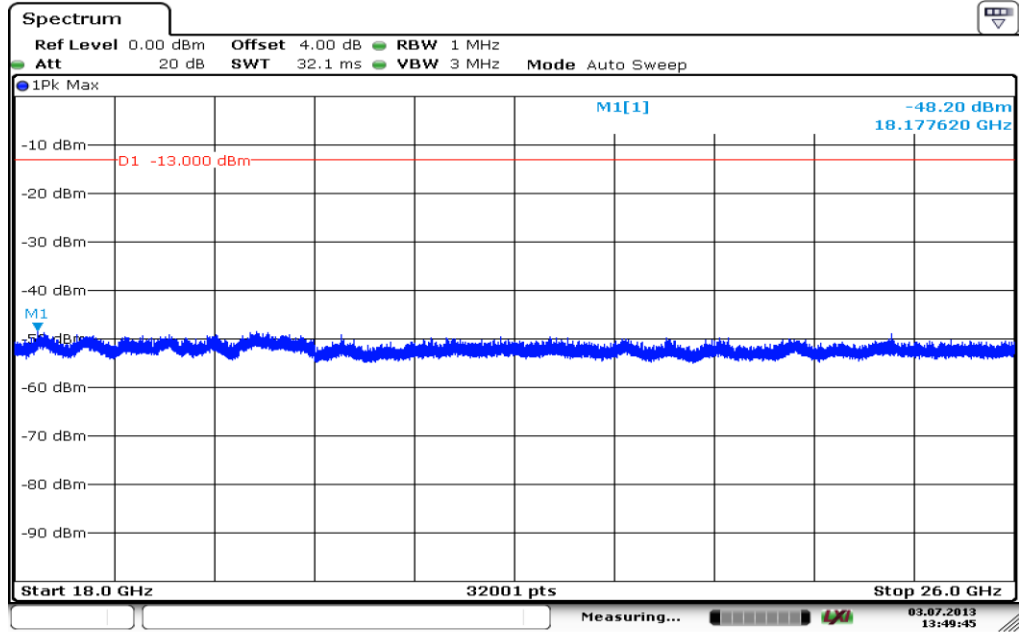
Carrier notched with 1.9 GHz rejection filter

Plot 20: EDGE Channel 810 (12.75 GHz - 18 GHz)



Date: 3.JUL.2013 13:20:42

Plot 21: EDGE Channel 810 (18 GHz - 26 GHz)



Date: 3.JUL.2013 13:49:45

#### 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

#### Description:

This paragraph contains average power, peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

#### Measurement:

The mobile was set up for the maximum output power with pseudo random data modulation.

To determine the Peak-To-Average Power Ratio (PAPR) the measurement was performed with the Power Complementary Cumulative Distribution Function (CCDF).

Measurement parameters	
Detector:	Peak and RMS (Power in Burst)
Sweep time:	Auto
Video bandwidth:	10 MHz
Resolution bandwidth:	10 MHz
Span:	Zero Span
Trace-Mode:	Max Hold

#### Limits:

FCC	
CFR Part 24.232 CFR Part 2.1046	
Nominal Peak Output Power	
+33.00 dBm	
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.	

**Results:**

Output Power (radiated) WCDMA mode (Voice)	
Frequency (MHz)	Average Output Power (dBm) - EIRP
1852.4	22.7
1880.0	23.0
1907.6	23.6
Measurement uncertainty	± 2.0 dB

Output Power (radiated) WCDMA mode (HSUPA)	
Frequency (MHz)	Average Output Power (dBm) - EIRP
1852.4	23.1
1880.0	22.6
1907.6	23.4
Measurement uncertainty	± 2.0 dB

Output Power (radiated) WCDMA mode (HSPA+)	
Frequency (MHz)	Average Output Power (dBm) - EIRP
1852.4	22.3
1880.0	21.8
1907.6	22.4
Measurement uncertainty	± 2.0 dB

**Result: Passed**

#### 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	
CFR Part 24.238 CFR Part 2.1053	
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.

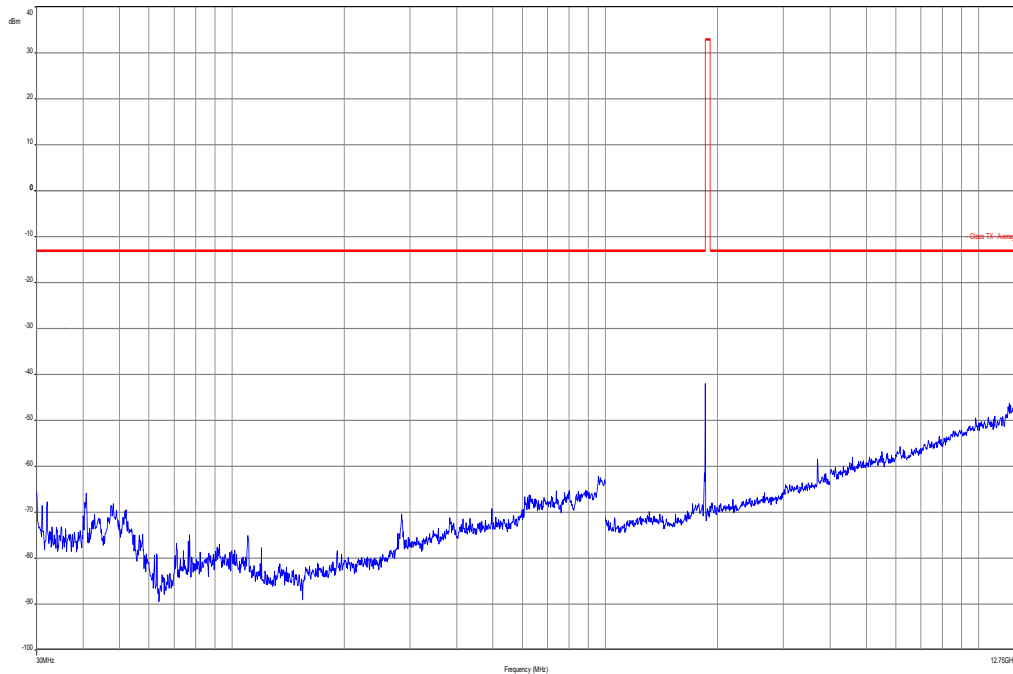
Spurious Emission Level (dBm)					
Lowest channel		Middle channel		Highest channel	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
No critical peaks detected!					
	-		-		-
	-		-		-
	-		-		-
Measurement uncertainty			± 3dB		

**Result:** Passed



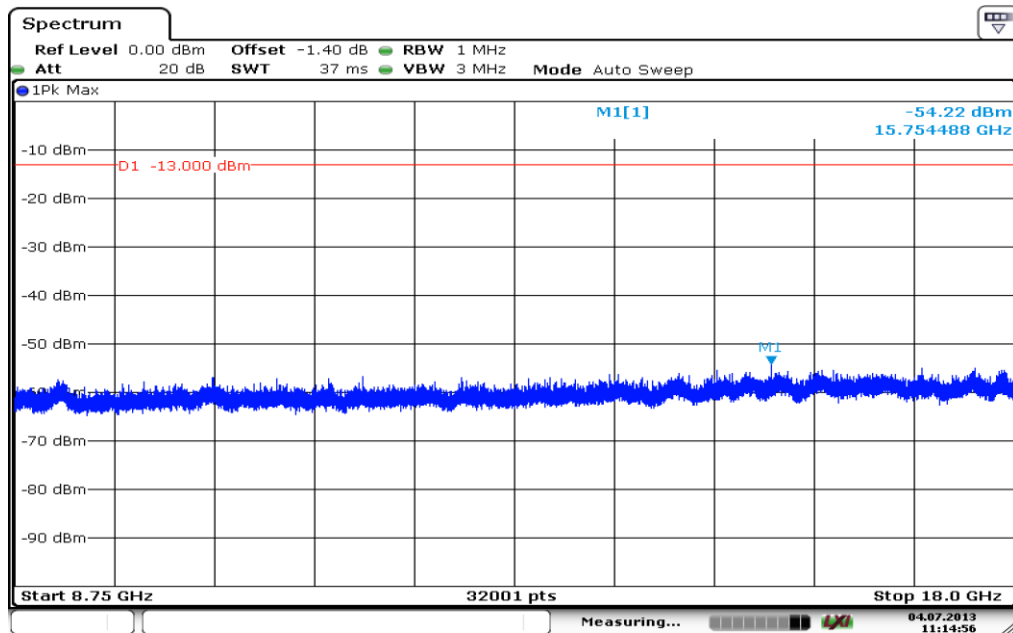
**Plots:**

**Plot 1:** Voice Channel 9262 (30 MHz – 12.75 GHz)



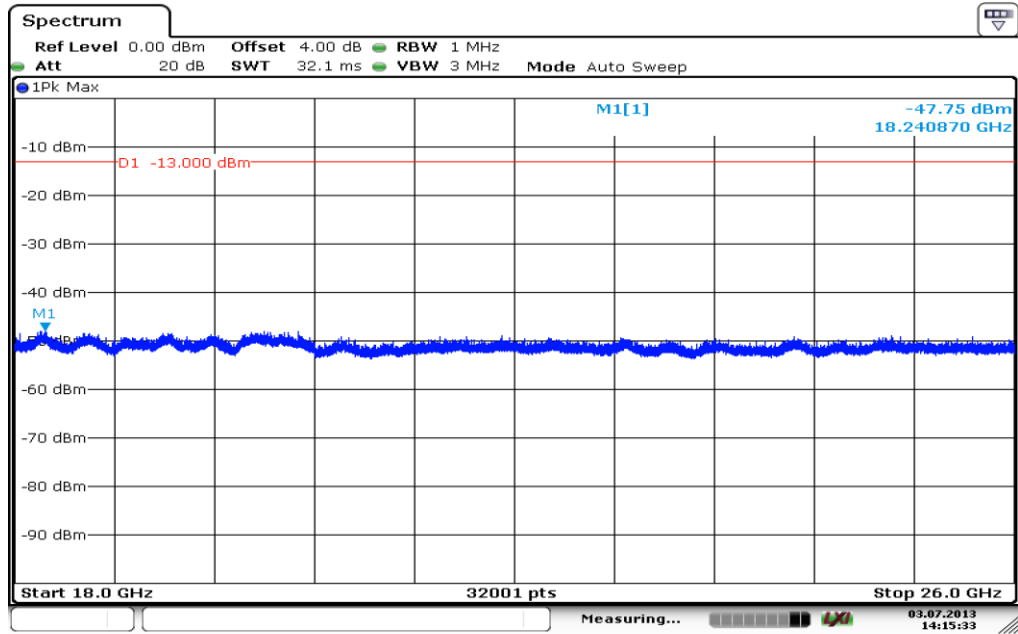
*Carrier notched with 1.9 GHz rejection filter*

**Plot 2:** Voice Channel 9262 (12.75 GHz - 18 GHz)



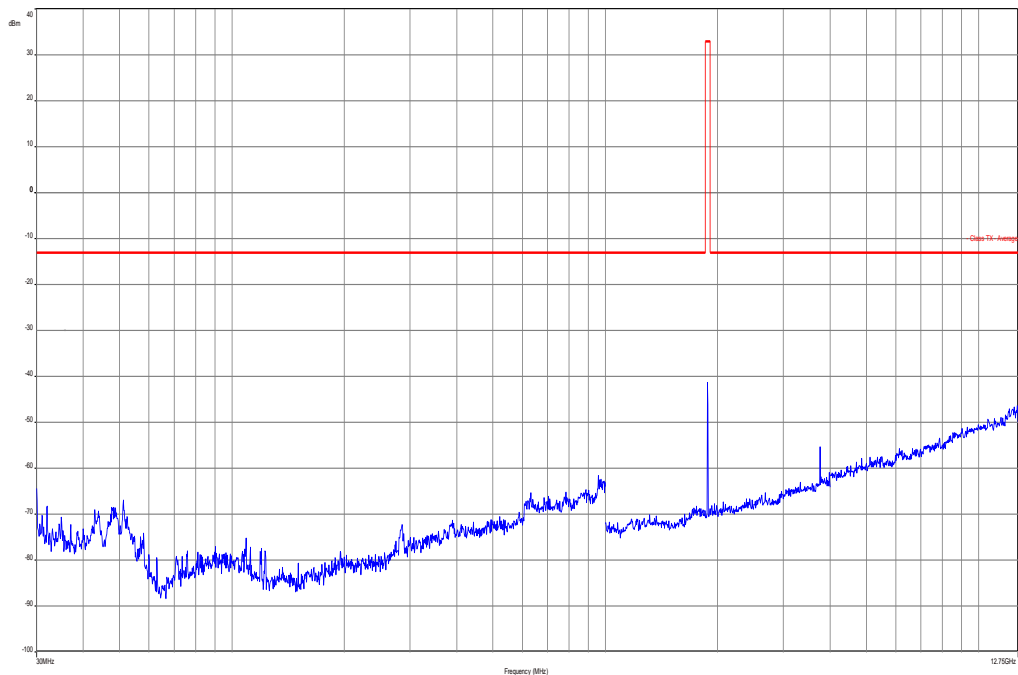
Date: 4.JUL.2013 11:14:56

Plot 3: Voice Channel 9262 (18 GHz - 26 GHz)



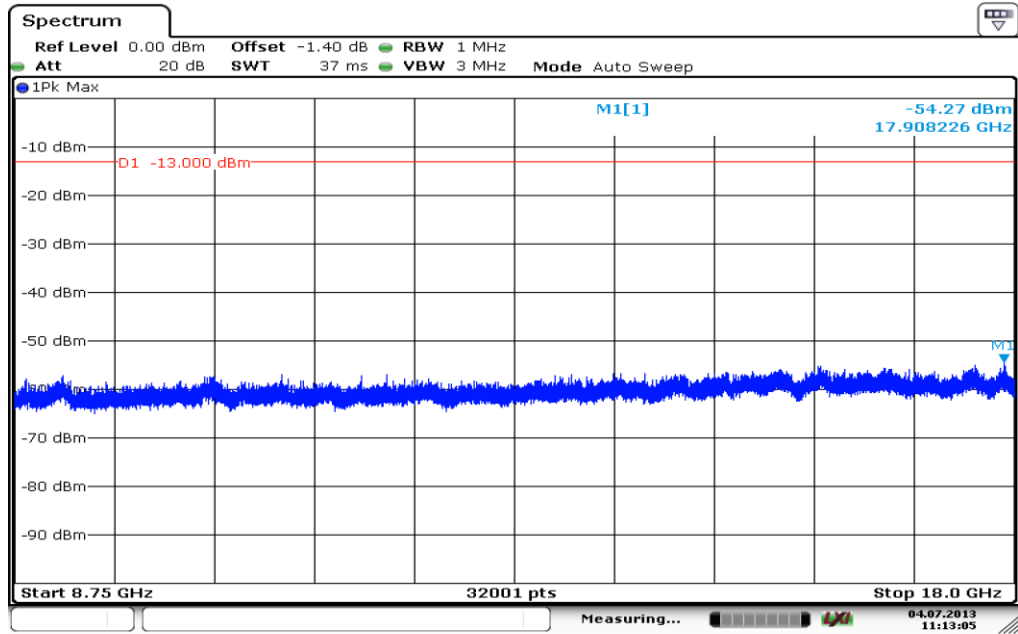
Date: 3.JUL.2013 14:15:33

Plot 4: Voice Channel 9400 (30 MHz – 12.75 GHz)



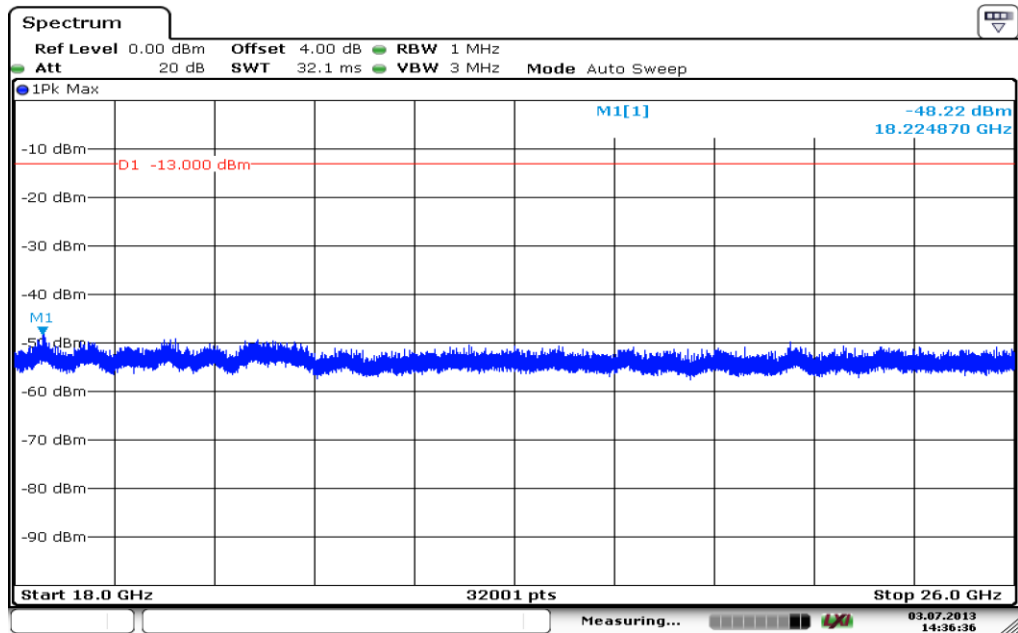
Carrier notched with 1.9 GHz rejection filter

Plot 5: Voice Channel 9400 (12.75 GHz - 18 GHz)



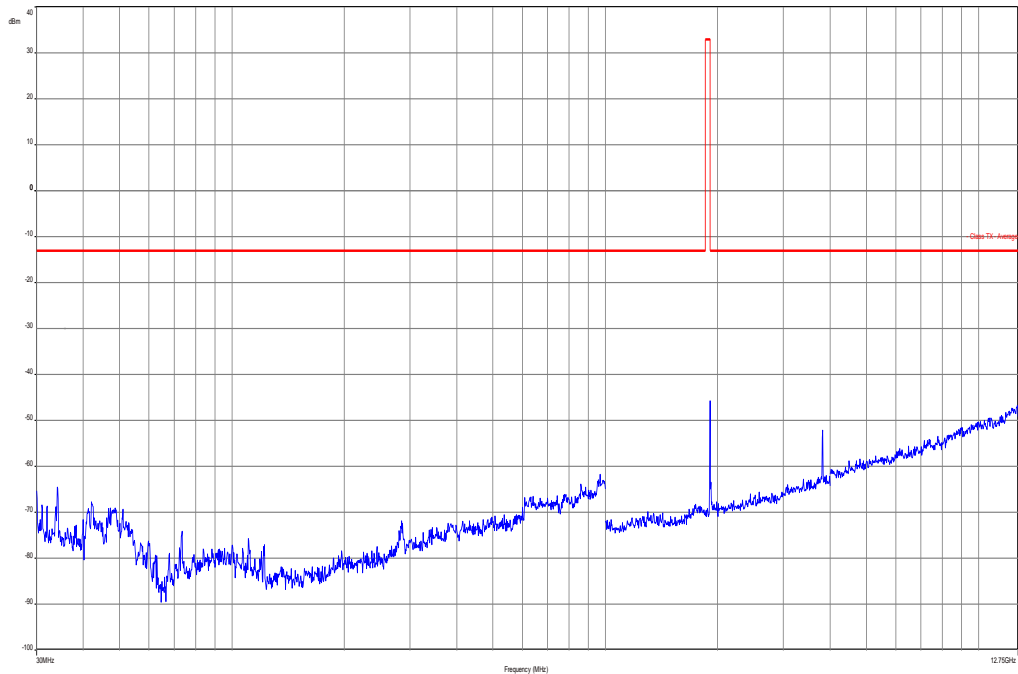
Date: 4.JUL.2013 11:13:05

Plot 6: Voice Channel 9400 (18 GHz - 26 GHz)



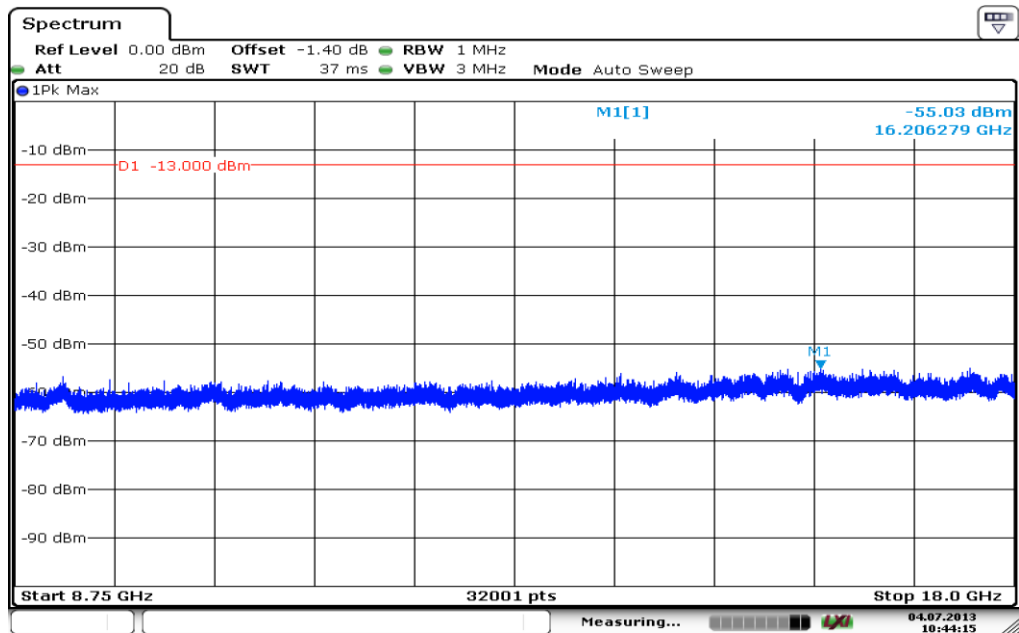
Date: 3.JUL.2013 14:36:36

**Plot 7: Voice Channel 9538 (30 MHz – 12.75 GHz)**



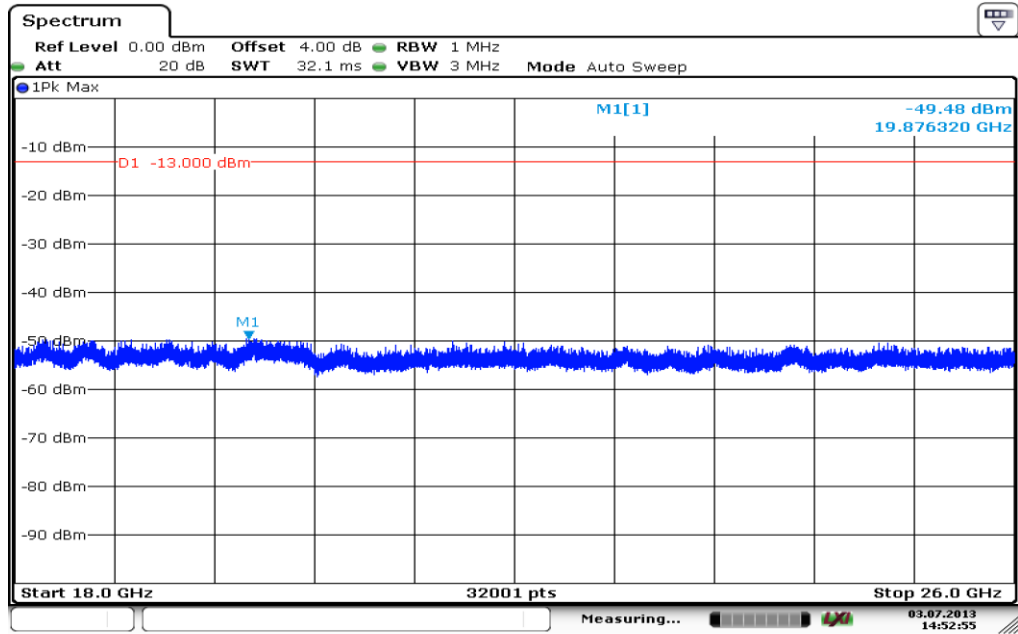
*Carrier notched with 1.9 GHz rejection filter*

**Plot 8: Voice Channel 9538 (12.75 GHz - 18 GHz)**



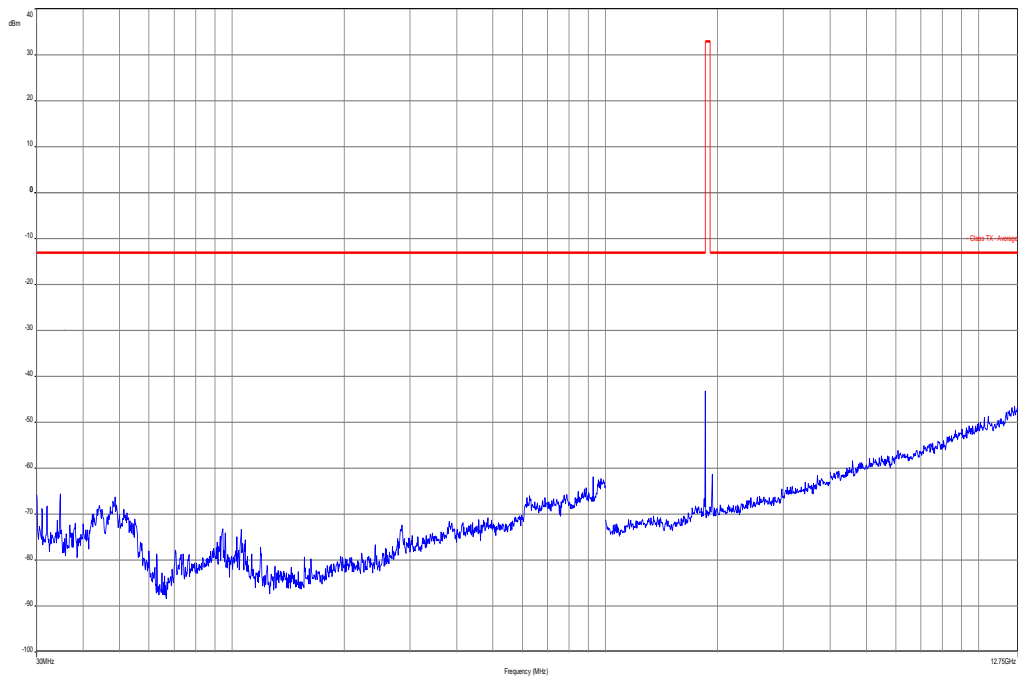
Date: 4.JUL.2013 10:44:15

Plot 9: Voice Channel 9538 (18 GHz - 26 GHz)



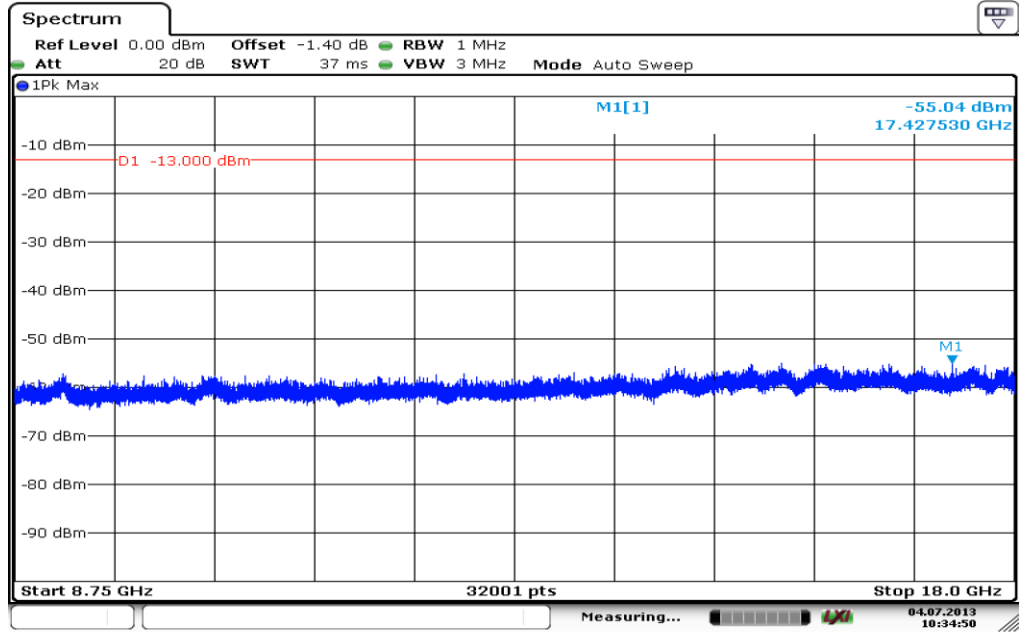
Date: 3.JUL.2013 14:52:55

Plot 10: HSUPA Channel 9262 (30 MHz – 12.75 GHz)



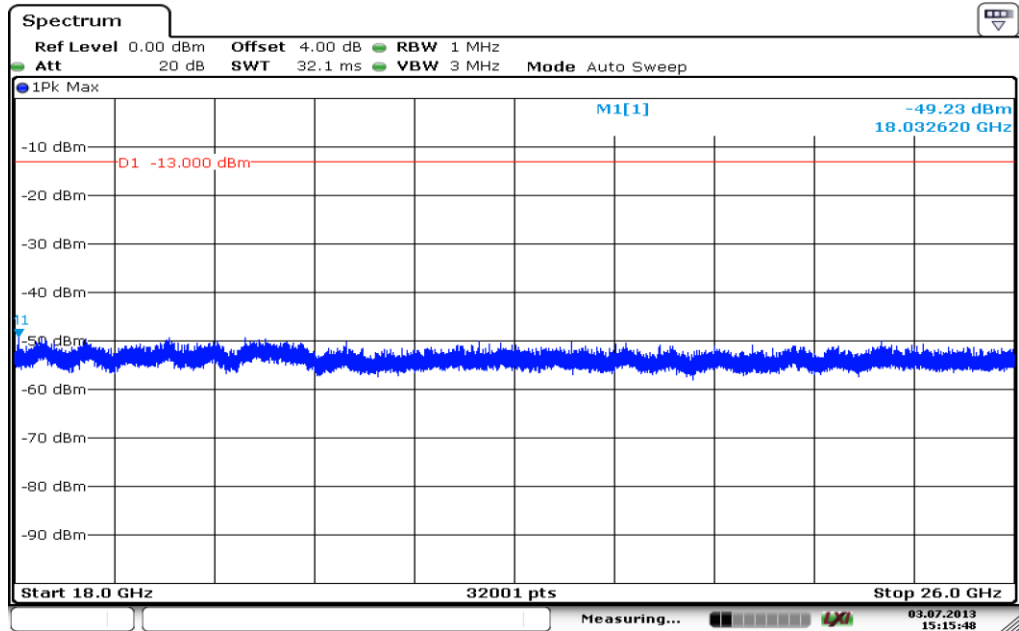
Carrier notched with 1.9 GHz rejection filter

Plot 11: HSUPA Channel 9262 (12.75 GHz - 18 GHz)



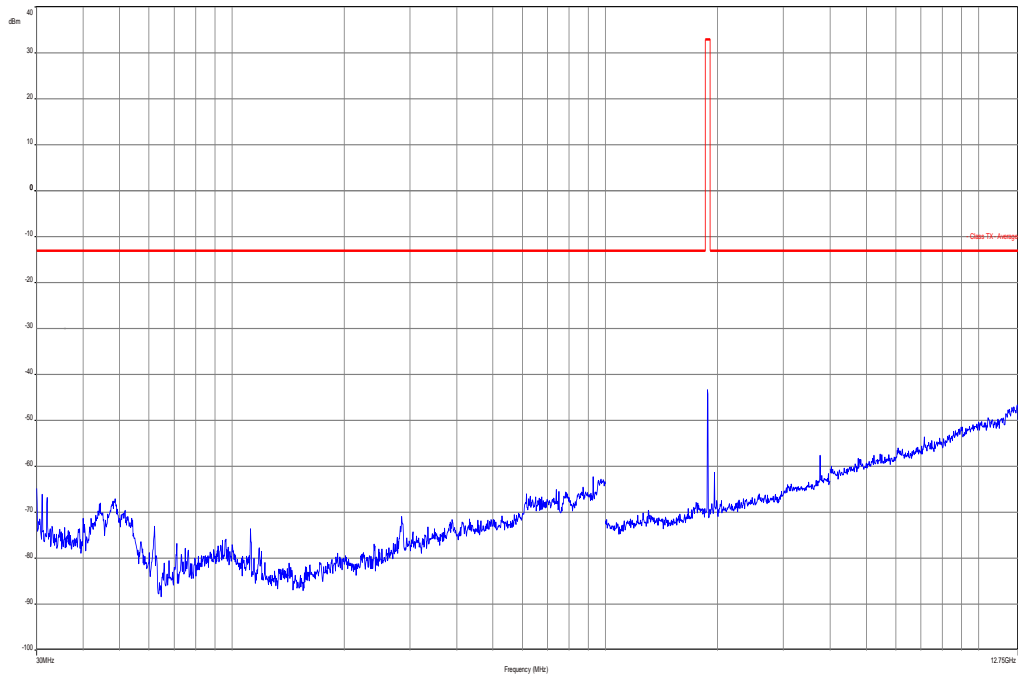
Date: 4.JUL.2013 10:34:51

Plot 12: HSUPA Channel 9262 (18 GHz - 26 GHz)



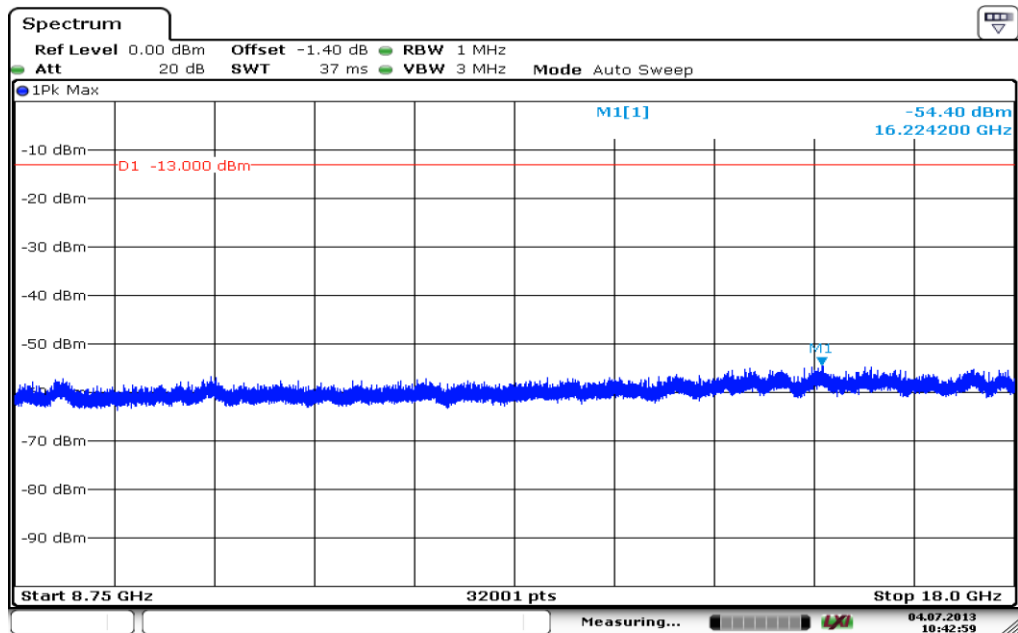
Date: 3.JUL.2013 15:15:48

Plot 13: HSUPA Channel 9400 (30 MHz – 12.75 GHz)



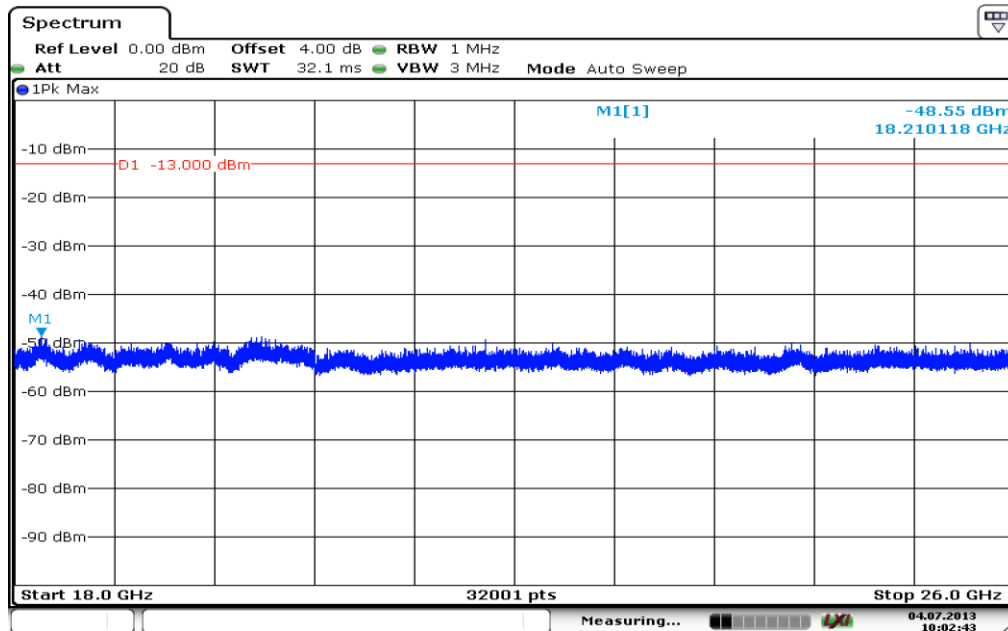
Carrier notched with 1.9 GHz rejection filter

Plot 14: HSUPA Channel 9400 (12.75 GHz - 18 GHz)



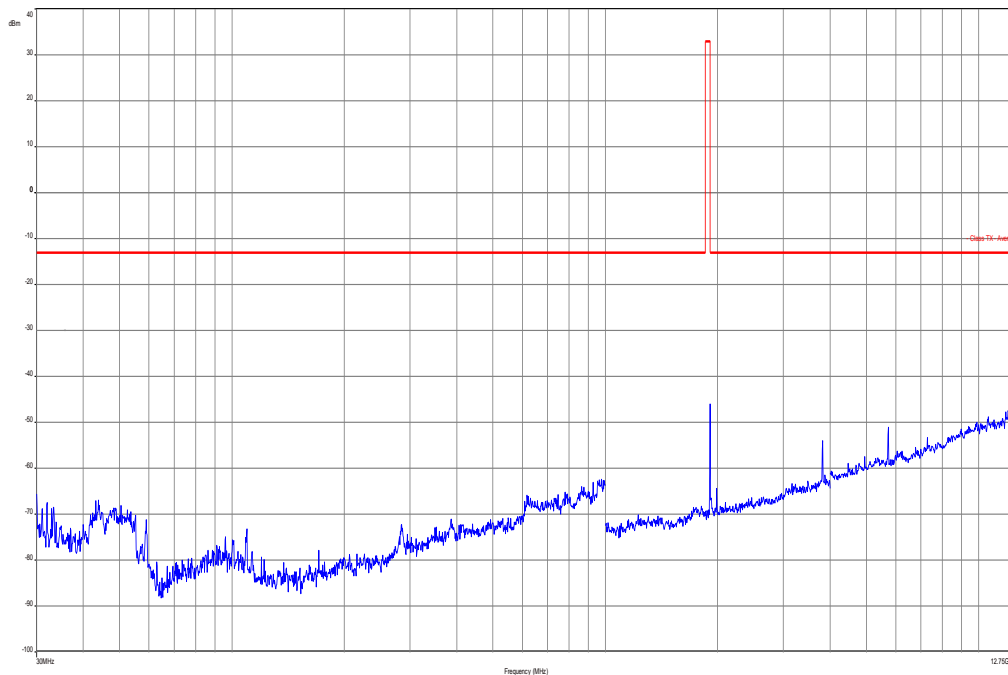
Date: 4.JUL.2013 10:42:59

Plot 15: HSUPA Channel 9400 (18 GHz - 26 GHz)



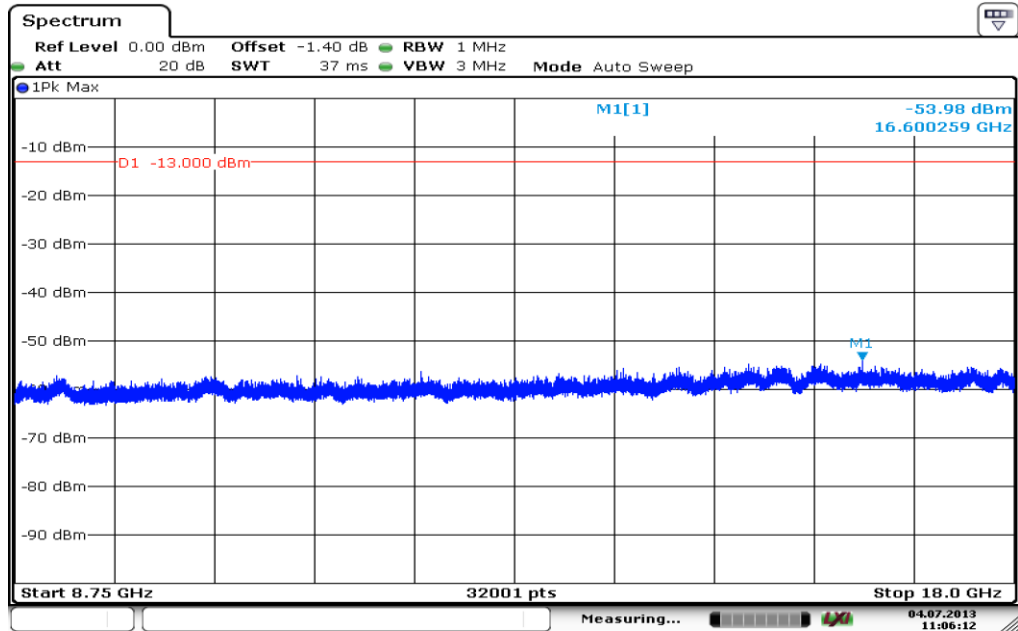
Date: 4.JUL.2013 10:02:43

Plot 16: HSUPA Channel 9538 (30 MHz – 12.75 GHz)



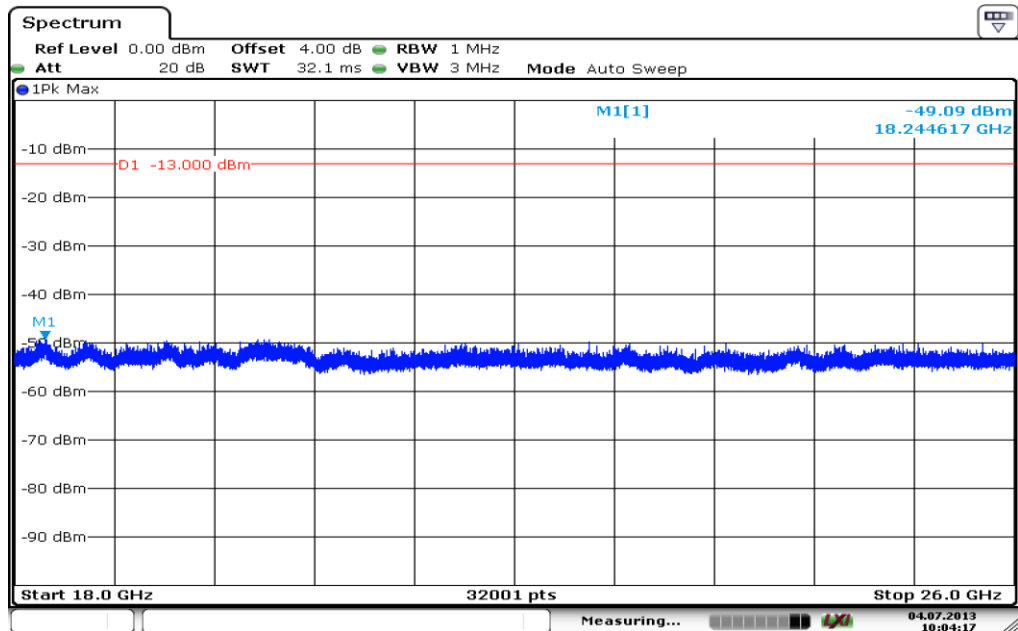


Plot 17: HSUPA Channel 9538 (12.75 GHz - 18 GHz)



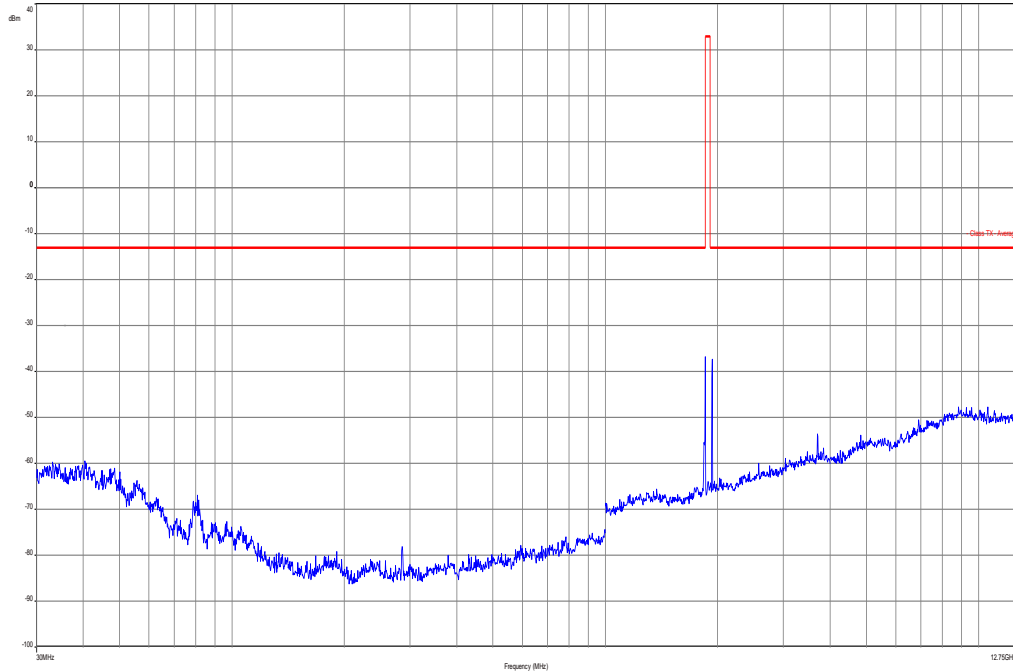
Date: 4.JUL.2013 11:06:13

Plot 18: HSUPA Channel 9538 (18 GHz - 26 GHz)



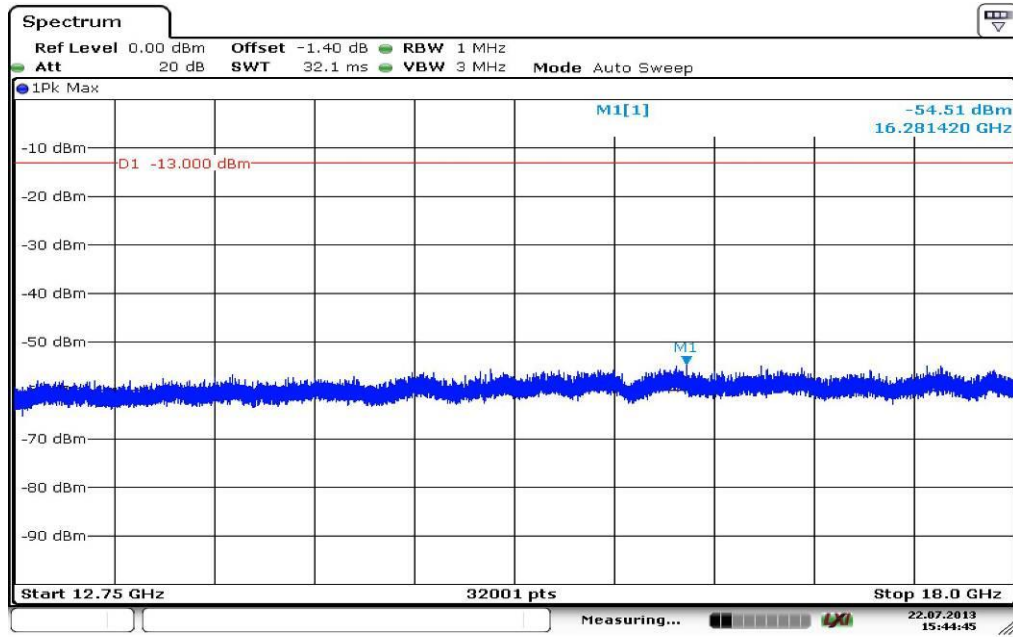
Date: 4.JUL.2013 10:04:17

Plot 19: HSPA+ Channel 9262 (30 MHz – 12.75 GHz)



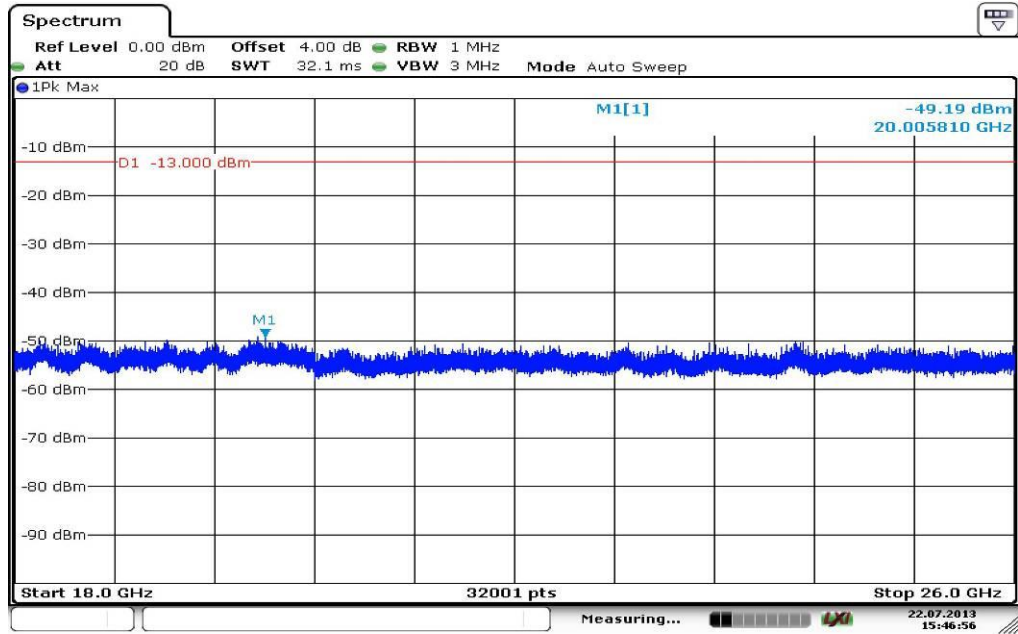
Carrier notched with 1.9 GHz rejection filter

Plot 20: HSPA+ Channel 9262 (12.75 GHz - 18 GHz)



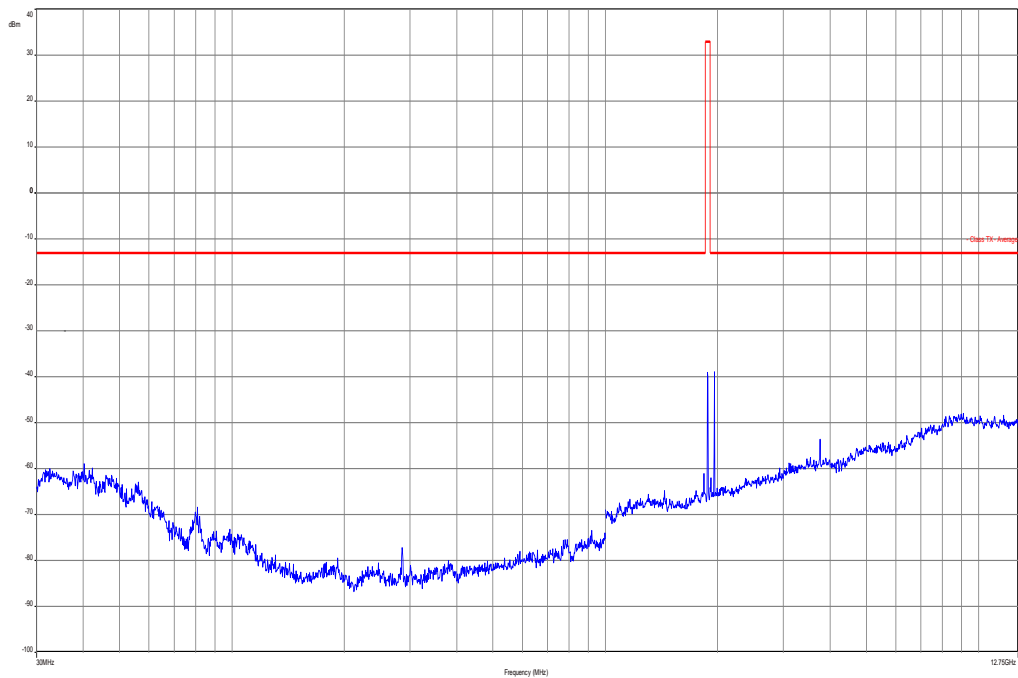
Date: 22.JUL.2013 15:44:45

Plot 21: HSPA+ Channel 9262 (18 GHz - 26 GHz)



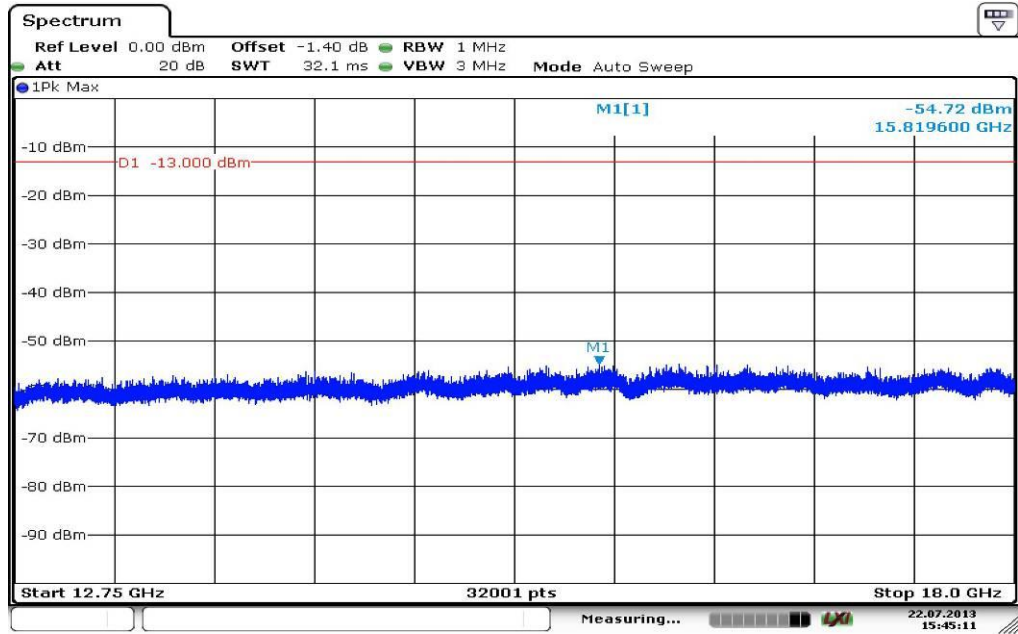
Date: 22.JUL.2013 15:46:57

Plot 22: HSPA+ Channel 9400 (30 MHz – 12.75 GHz)



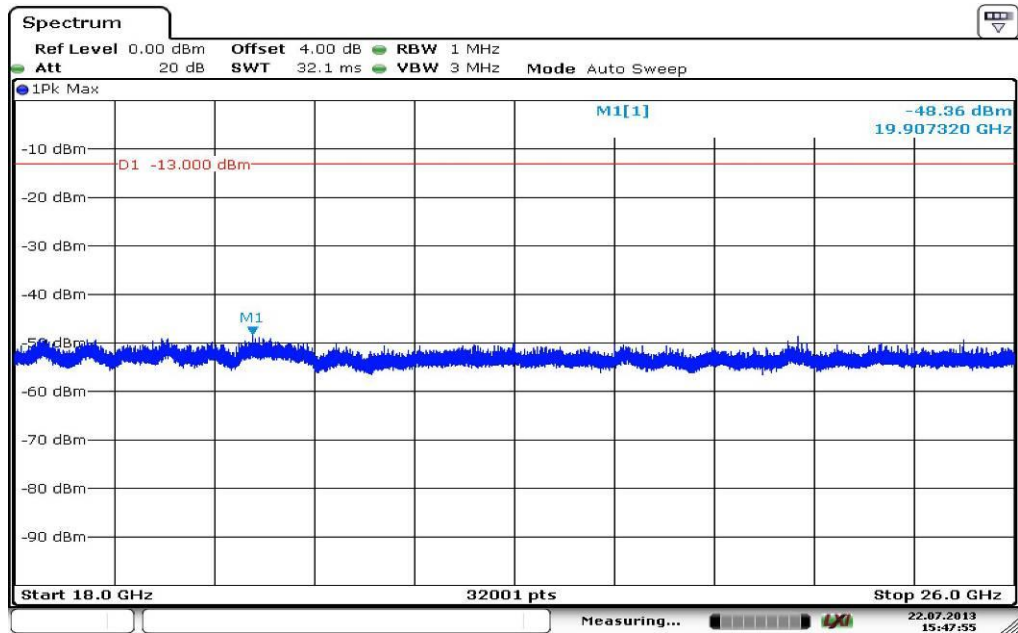
Carrier notched with 1.9 GHz rejection filter

Plot 23: HSPA+ Channel 9400 (12.75 GHz - 18 GHz)



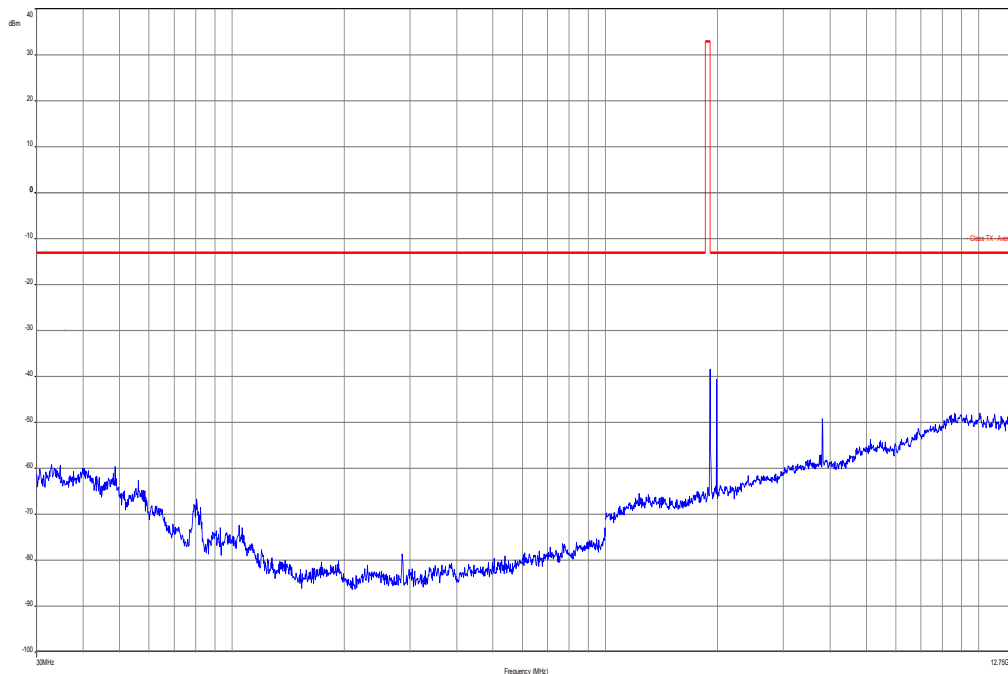
Date: 22.JUL.2013 15:45:12

Plot 24: HSPA+ Channel 9400 (18 GHz - 26 GHz)



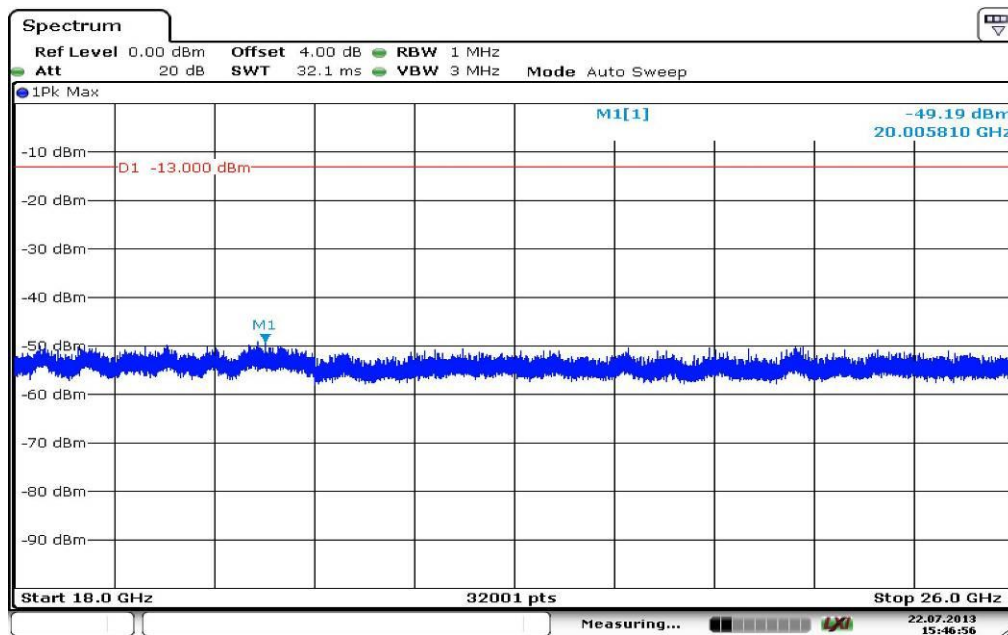
Date: 22.JUL.2013 15:47:55

Plot 25: HSPA+ Channel 9538 (30 MHz – 12.75 GHz)



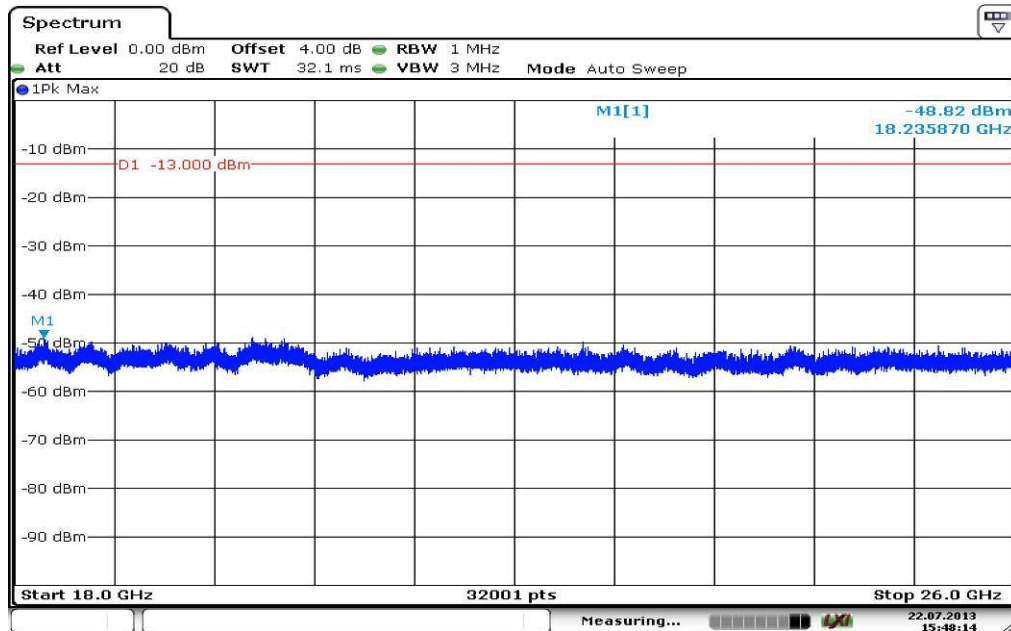
Carrier notched with 1.9 GHz rejection filter

Plot 26: HSPA+ Channel 9538 (12.75 GHz - 18 GHz)



Date: 22.JUL.2013 15:46:57

Plot 27: HSPA+ Channel 9538 (18 GHz - 26 GHz)



Date: 22.JUL.2013 15:48:14

#### 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 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)

### 8.5.1 RF output power

**Description:**

This paragraph contains average power, peak output power and ERP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

**Measurement:**

The mobile was set up for the maximum output power with pseudo random data modulation.

To determine the Peak-To-Average Power Ratio (PAPR) the measurement was performed with the Power Complementary Cumulative Distribution Function (CCDF).

Measurement parameters	
Detector:	Peak and RMS (Power in Burst)
Sweep time:	Auto
Video bandwidth:	10 MHz
Resolution bandwidth:	10 MHz
Span:	Zero Span
Trace-Mode:	Max Hold

**Limits:**

FCC	
CFR Part 22.913 CFR Part 2.1046	
Nominal Peak Output Power	
+38.45 dBm	
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.	



**Results:**

Output Power (radiated) WCDMA mode (Voice)	
Frequency (MHz)	Average Output Power (dBm) - ERP
826.4	21.9
836.0	22.1
846.6	21.6
Measurement uncertainty	± 2.0 dB

Output Power (radiated) WCDMA mode (HSUPA)	
Frequency (MHz)	Average Output Power (dBm) - ERP
826.4	20.8
836.0	20.2
846.6	21.0
Measurement uncertainty	± 2.0 dB

Output Power (radiated) WCDMA mode (HSPA+)	
Frequency (MHz)	Average Output Power (dBm) - ERP
826.4	19.7
836.0	19.6
846.6	20.3
Measurement uncertainty	± 2.0 dB

**Result: Passed**

## 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 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	
CFR Part 22.917 CFR Part 2.1053	
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. 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.

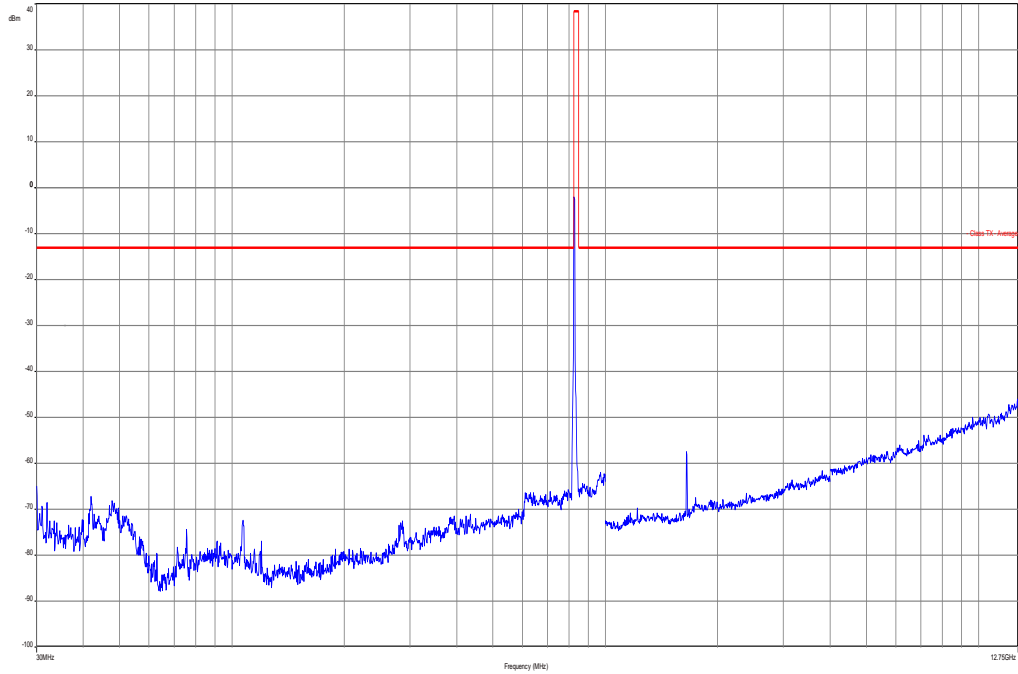
As can be seen from this data, the emissions from the test item were within the specification limit.

Spurious Emission Level (dBm)					
Lowest channel		Middle channel		Highest channel	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
No critical peaks detected!					
	-		-		-
	-		-		-
	-		-		-
Measurement uncertainty			± 3dB		

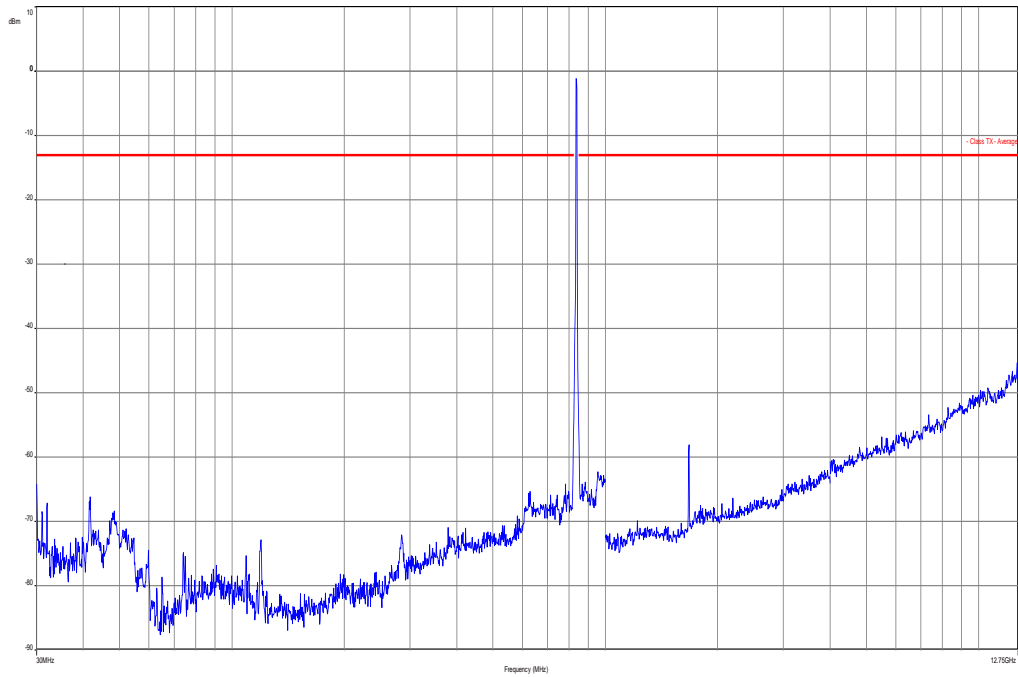
**Result:** Passed

**Plots:**

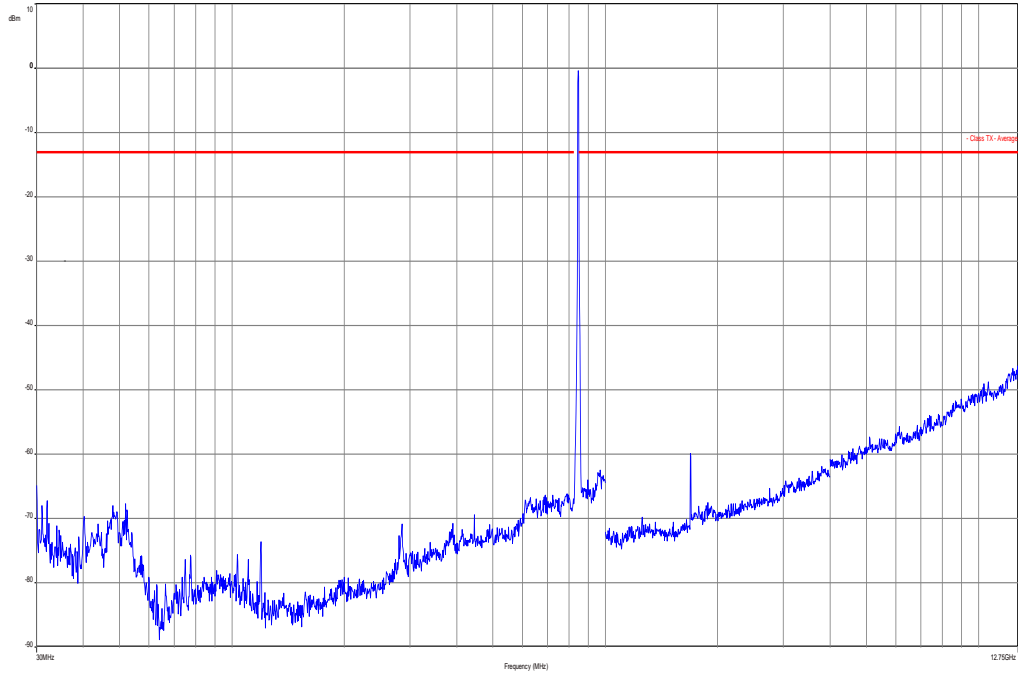
**Plot 1: Channel 4132 (30 MHz – 12.75 GHz) - Voice**



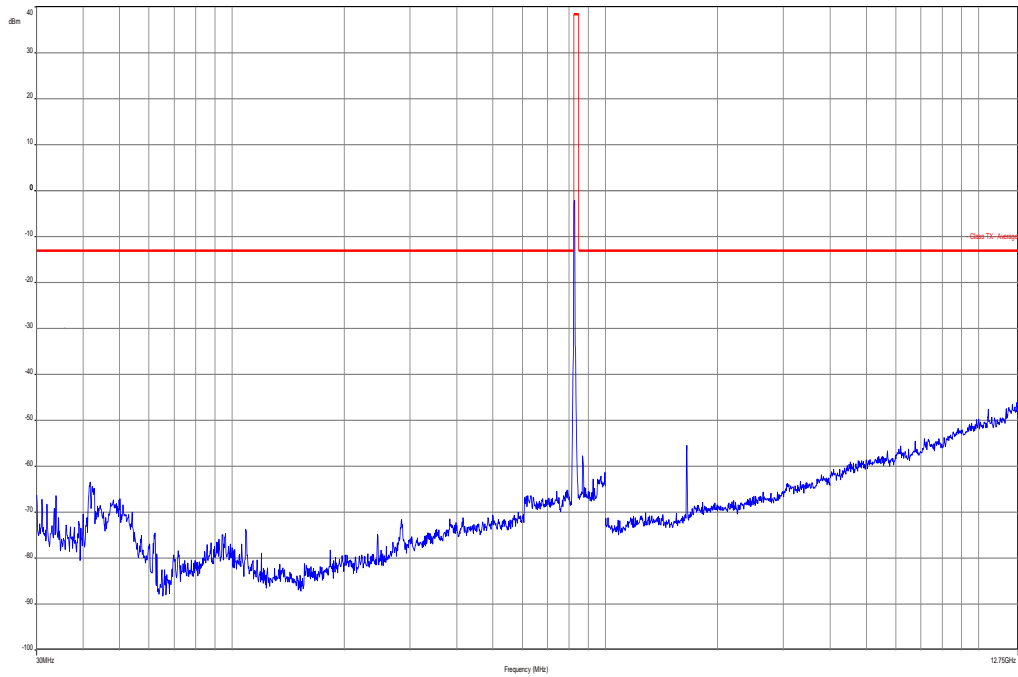
**Plot 2: Channel 4182 (30 MHz – 12.75 GHz) - Voice**



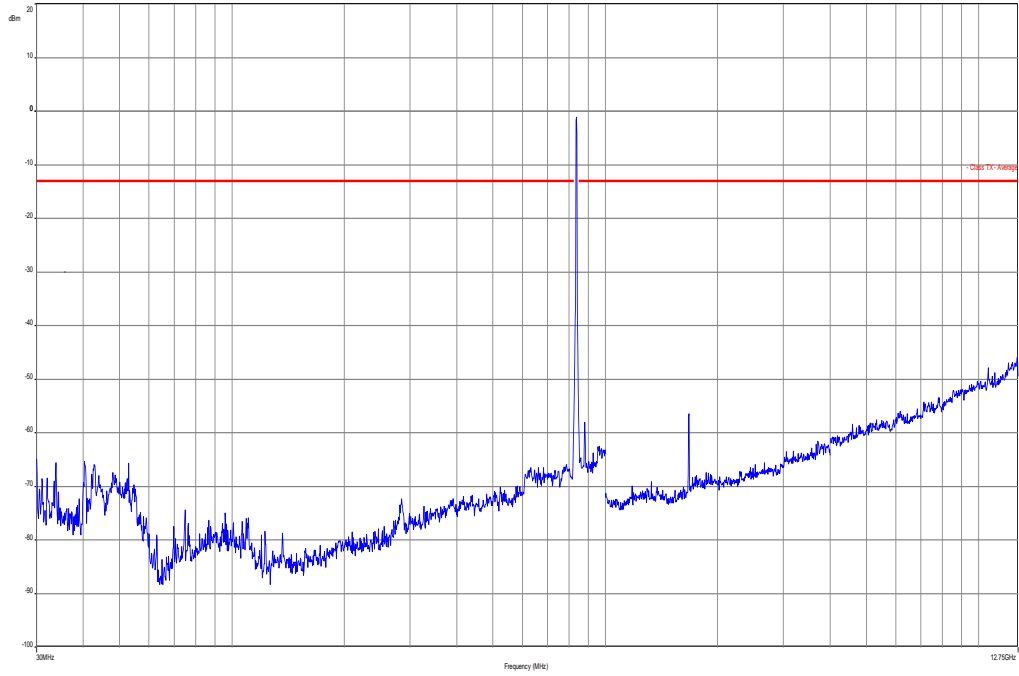
Plot 3: Channel 4233 (30 MHz – 12.75 GHz) - Voice



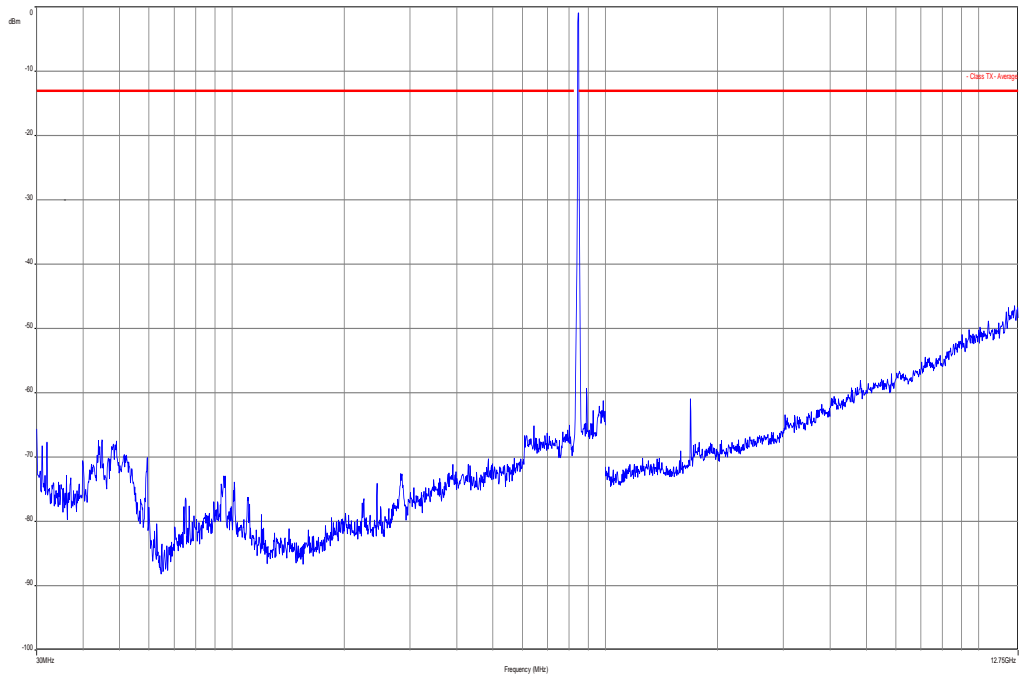
Plot 4: Channel 4132 (30 MHz – 12.75 GHz) - HSUPA



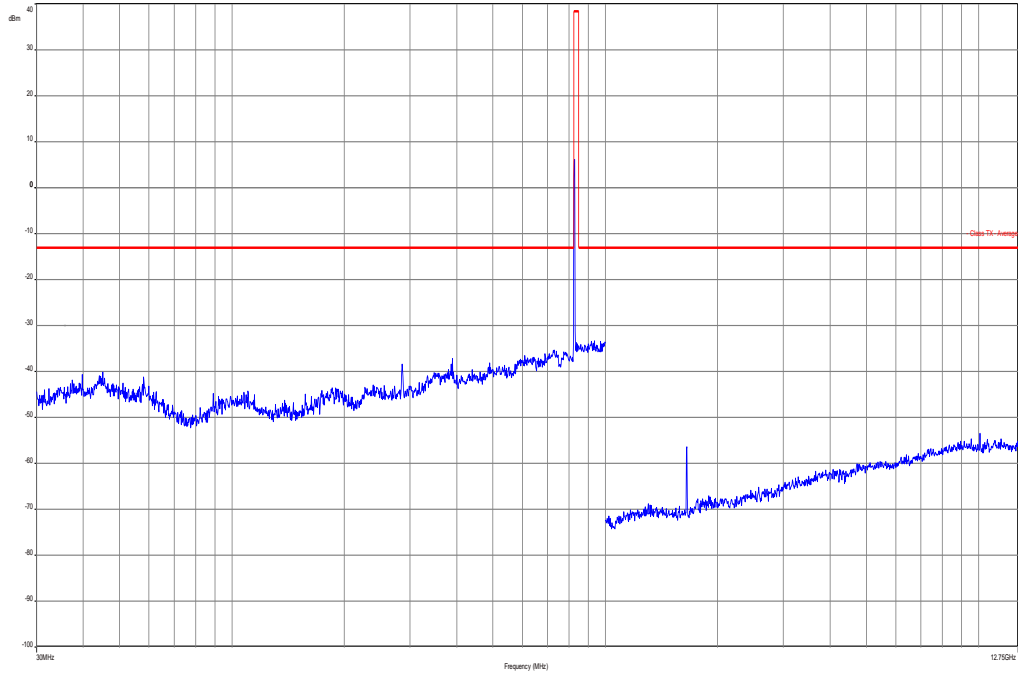
Plot 5: Channel 4182 (30 MHz – 12.75 GHz) - HSUPA



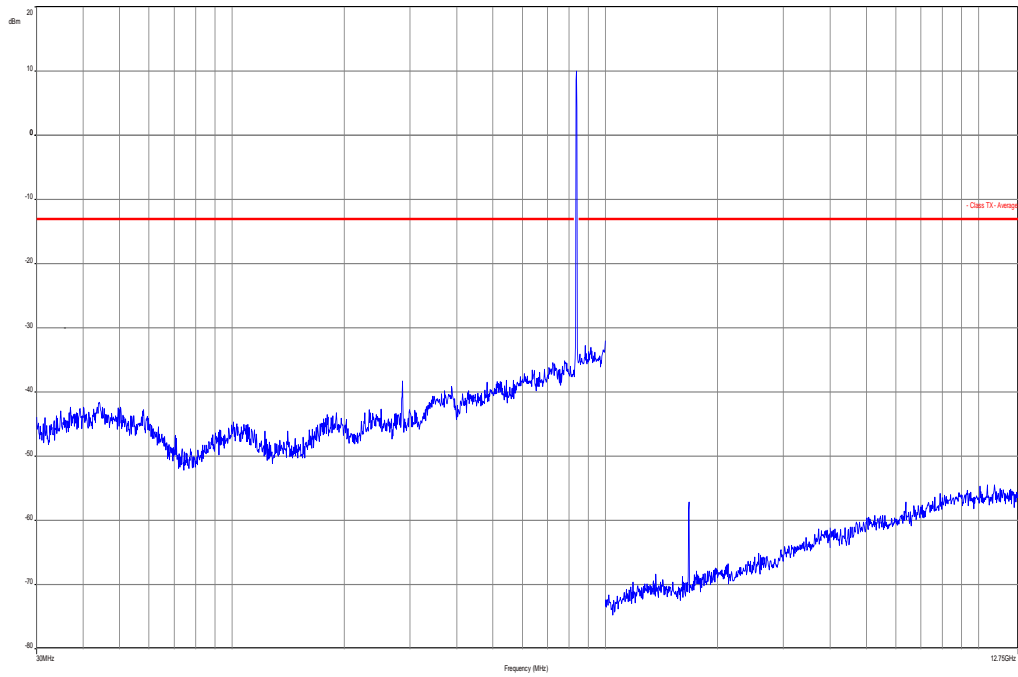
Plot 6: Channel 4233 (30 MHz – 12.75 GHz) - HSUPA



Plot 7: Channel 4132 (30 MHz – 12.75 GHz) – HSPA+

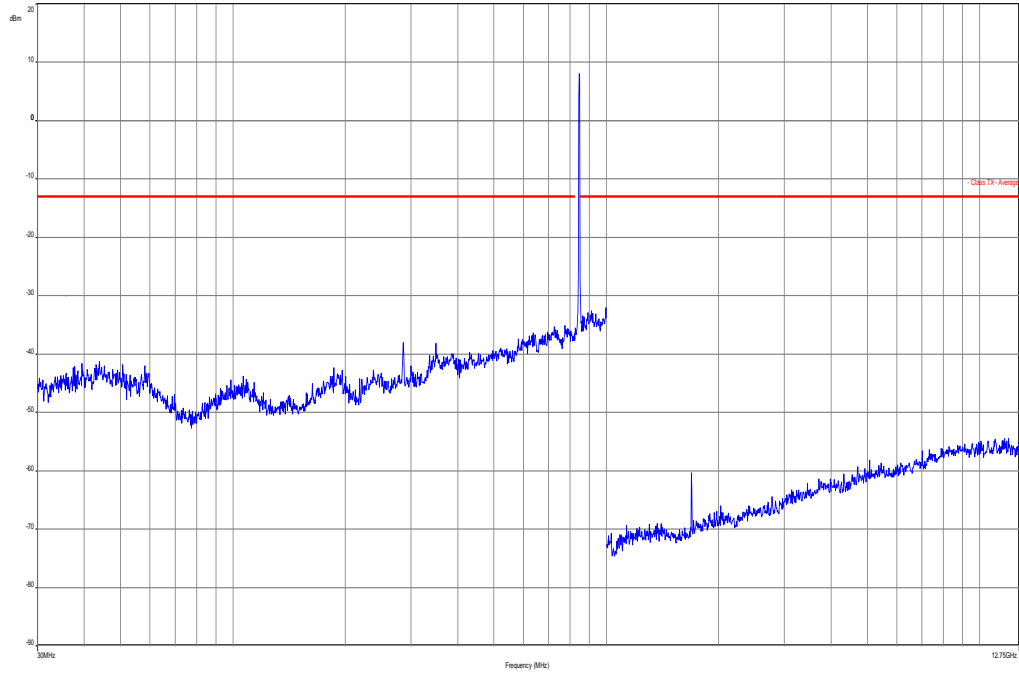


Plot 8: Channel 4182 (30 MHz – 12.75 GHz) – HSPA+





Plot 9: Channel 4233 (30 MHz – 12.75 GHz) – HSPA+



#### 8.5.4 Spurious emissions conducted

Not performed!

#### 8.5.5 Block edge compliance

Not performed!

#### 8.5.6 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.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	08.05.2013	08.05.2015
2	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
3	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
4	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
5	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
6	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
7	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
8	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
9	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKI!	14.10.2011	14.10.2014
10	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	21.02.2013	21.02.2014
11	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
12	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
13	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		
14	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.10.2012	22.10.2013
15	n. a.	Universal Communication Tester	CMU200	R&S	106240	300003321	vIKI!	13.06.2013	13.06.2015
16	n. a.	Wideband Radio Communication Tester	CMW500	R&S	102375	300004187_0	k	18.01.2013	18.01.2015

### Agenda: Kind of Calibration

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

## 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	2013-08-01
-A	Add RSS-133 standard additional on page 1	2013-08-08
-B	IC – RSS references removed	2013-08-08

**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

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

**Akkreditierung**

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium  
**CETECOM ICT Services GmbH**  
 Untertürkheimer Straße 6-10, 66117 Saarbrücken

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

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

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 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  
 Dr. Ingrid Pflüger  
 Abteilungsleiter

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 Rundesallee 100 38116 Braunschweig
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Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:  
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**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>