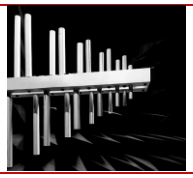
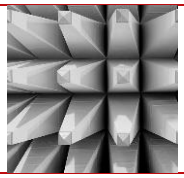

CETECOM™

CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-0825/15-01-03

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-00

Testing laboratory

CETECOM ICT Services GmbH
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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-12076-01-00

Applicant

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Phone: +33 3 90 20 66 39

Manufacturer

RSI Video Technologies
Siège Social -Headquarters
25 rue Jacobi-Netter
67200 Strasbourg / FRANCE

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:	**Alarm system**
Model name:	**XTO-iP630**
FCC ID:	**X46XT06**
IC:	**8816A-XT06**
Frequency:	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
Technology tested:	GSM, UMTS
Antenna:	Integrated antenna
Power supply:	4.2 V to 14.4 V DC by 6 Lithium batteries
Temperature range:	-25°C to +70°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 authorized:

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Stefan Bös
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Test performed:

Tobias Wittenmeier
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Radio Communications & EMC

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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:	2015-11-03
Date of receipt of test item:	2015-11-09
Start of test:	2015-11-09
End of test:	2015-11-13
Person(s) present during the test:	-/-

3 Test standard/s and references

Test standard	Date	Description
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
RSS - 132 Issue 3	January 2013	Spectrum Management and Telecommunications Policy - Radio Standards Specifications Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz
RSS - 133 Issue 6	January 2013	Spectrum Management and Telecommunications Policy - Radio Standards Specifications, 2 GHz Personal Communication Services
RSS - 139 Issue 3	July 2015	Spectrum Management and Telecommunications Radio Standards Specification - Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1755 MHz and 2110-2180 MHz

3.1 Measurement guidance

Guidance	Version	Description
ANSI C63.4-2014	-/-	American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz

4 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+22 °C during room temperature tests +70 °C during high temperature tests -25 °C during low temperature tests
Relative humidity content	:		55 %
Barometric pressure	:		not relevant for this kind of testing
Power supply	:	V_{nom} V_{max} V_{min}	12.0 V DC by 6 Lithium batteries 14.4 V 4.2 V

Note: All tests were performed under normal conditions only.

5 Test item

5.1 General description

Kind of test item	:	Alarm system
Type identification	:	XTO-iP630
HMN	:	-/-
PMN	:	XTOIP630
HVIN	:	XTOIP630
FVIN	:	-/-
S/N serial number	:	WI122833
HW hardware status	:	5CA1249c-0d1 (Motherboard) 5CA0775A-0b (Input/Output board) 5CA0743C-1a (Ethernet board)
SW software status	:	V.04.04.43.078D
Frequency band	:	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
Type of modulation	:	GMSK, 8PSK, QPSK, 16 – QAM
Antenna	:	Integrated antenna
Power supply	:	4.2 V to 14.4 V DC by 6 Lithium batteries
Temperature range	:	-25°C to +70°C

5.2 Additional information

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

Test setup- and EUT-photos are included in test report: 1-0825_15-01-01_AnnexA
1-0825_15-01-01_AnnexB
1-0825_15-01-01_AnnexC

6 Test laboratories sub-contracted

None

7 Description of the test setup

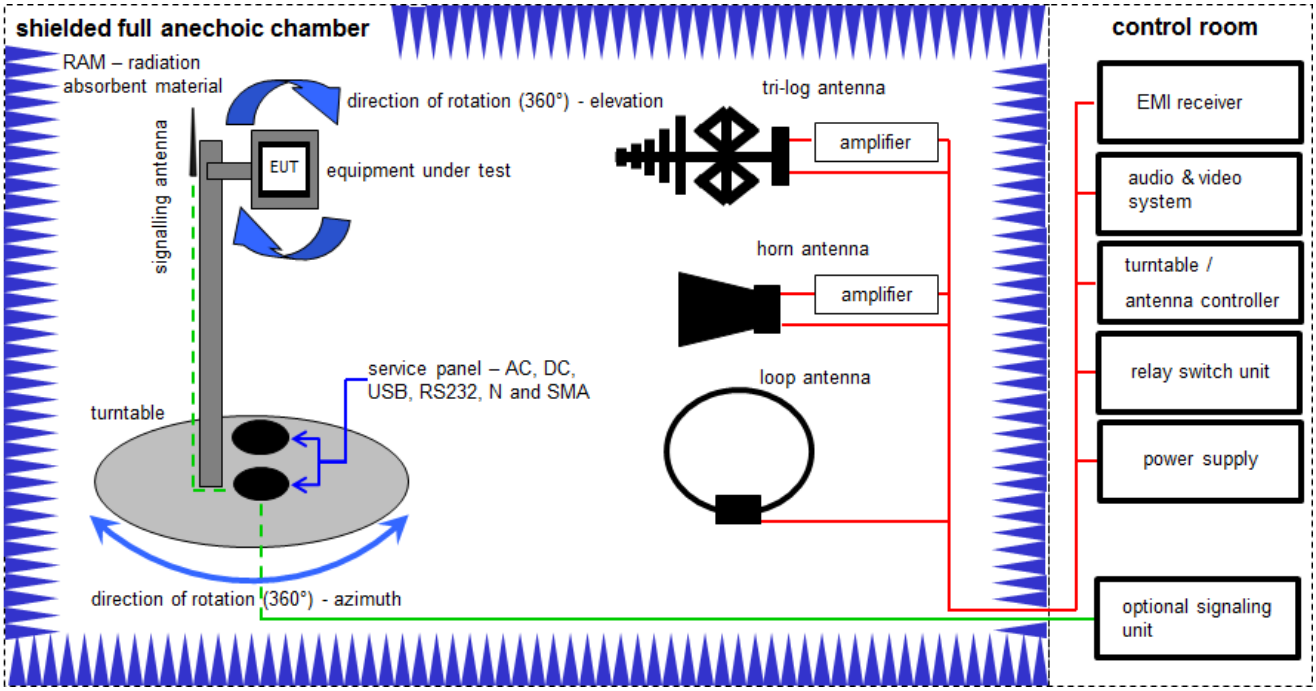
Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling 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 (Lab/Item).

Agenda: Kind of Calibration

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

7.1 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter; loop antenna 3 meter

FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

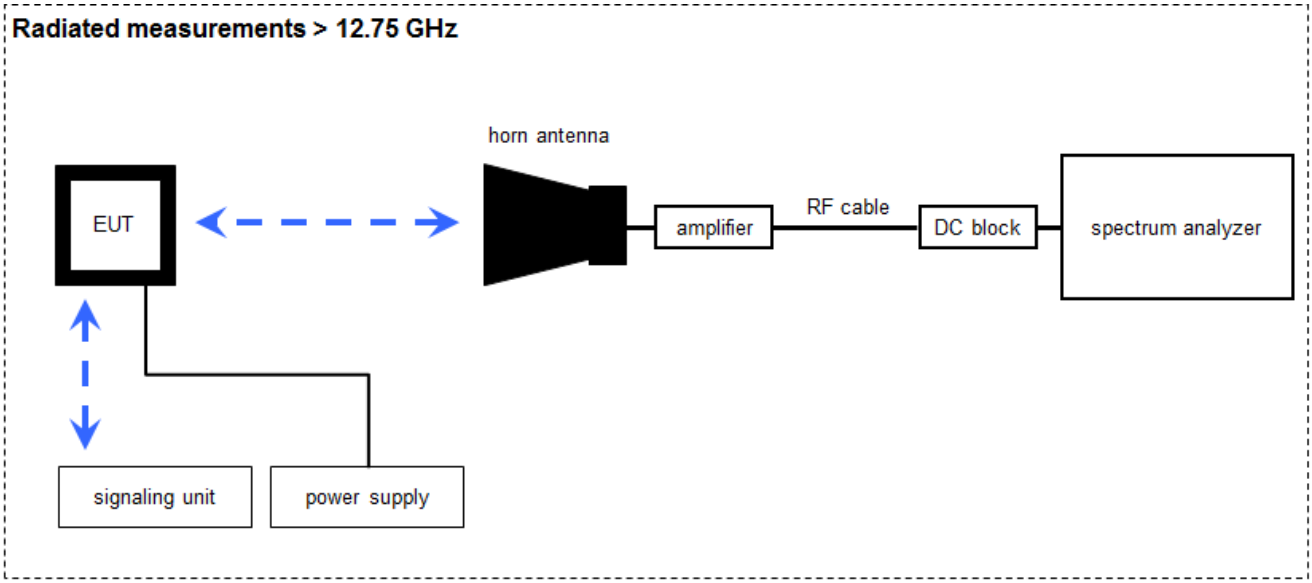
OP = AV + D - G + CA
(OP-radiated output power; AV-analyzer value; D-free field atteuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

Example calculation:
OP [dBm] = -65.0 [dBm] + 50 [dB] - 20 [dBi] + 5 [dB] = -30 [dBm] (1 µW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9709-5290	300000212	k	13.08.2015	13.08.2017
2	A	Universal Communication Tester	CMU200	R&S	106826	300003346	k	11.02.2015	11.02.2016
3	A	Software Option für CMU 200	CMU-Kxx	R&S	106826	300003345	ne		
4	A.	EMI Test Receiver 20Hz-26,5GHz	ESU26	R&S	100037	300003555	k	22.01.2015	22.01.2016
5	A	Highpass Filter	WHK1.1/15G-10SS	Wainwright	37	400000148	ne		
6	A	Band Reject Filter	WRCG1850/1910-1835/1925-40/8SS	Wainwright	23	400000149	ne		
7	A	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
8	A	Band Reject Filter	WRCG1710/1755-1690/1775-90/14SS	Wainwright	7	300003793	ne		
9	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	318	300003696	k	22.04.2014	22.04.2017
10	A	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22050	300004482	ev		
11	A	Broadband Amplifier 5-13 GHz	CBLU5135235	CERNEX	22011	300004492	ev		
12	A	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000032	300004510	ne		
13	A	Messrechner und Monitor	Intel Core i3 3220/3,3 GHz, Prozessor	Agilent Technologies	2V2403033A5421	300004591	ne		
14	A	Highpass Filter	WHKX2.6/18G-10SS	Wainwright	12	300004651	ne		
15	A	NEXIO EMV-Software	BAT EMC	EMCO	12	300004682	ne		

7.2 Radiated measurements > 12.75 GHz



Measurement distance: horn antenna 25 cm

OP = AV + D - G + CA
(OP-radiated output power; AV-analyzer value; D-free field attenuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

Example calculation:
OP [dBm] = -59.0 [dBm] + 44.0 [dB] - 20.0 [dBi] + 5.0 [dB] = -30 [dBm] (1 µW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm	FSP30	R&S	100886	300003575	k	26.08.2014	26.08.2016
2	A	RF-Cable	ST18/SMAm/SMAm/60	Huber & Suhner	Batch no. 606844	400001181	ev		
3	A	DC-Blocker 0.1-40 GHz	8141A	Inmet	Batch no. 606844	400001185	ev		
4	A	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP	00419	300002268	ev		
5	A	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	14.08.2015	14.08.2017
6	A	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442	NK!	19.07.2013	

8 Measurement uncertainty

Measurement uncertainty	
Test case	**Uncertainty**
RF output power radiated	± 3 dB
Spurious emissions radiated below 30 MHz	± 3 dB
Spurious emissions radiated 30 MHz to 1 GHz	± 3 dB
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB
Spurious emissions radiated above 12.75 GHz	± 4.5 dB

9 Sequence of testing

9.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

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

Final measurement

- Identified emissions during the premeasurement are maximized by the software by rotating the turntable from 0° to 360°. In case of the 2-axis positioner is used the elevation axis is also rotated from 0° to 360°.
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

9.2 Sequence of testing radiated spurious 30 MHz to 12.75 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

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

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

9.3 Sequence of testing radiated spurious above 12.75 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet.
- The measurement distance is as appropriate (e.g. 0.5 m).
- The EUT is set into operation.

Premeasurement

- The test antenna is handheld and moved carefully over the EUT to cover the EUT's whole sphere and different polarizations of the antenna.

Final measurement

- The final measurement is performed at the position and antenna orientation causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement and the limit is stored.

10 Summary of measurement results

☐	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☒	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC identifier	Description	verdict	date	Remark
RF-Testing	CFR Part 22, 24, 27 RSS 132, 133, 139	See table	2015-12-16	-/-

10.1 GSM 850

Test Case	temperature conditions	power source voltages	C	NC	NA	NP	Remark
RF Output Power	Nominal	Nominal	☒	☐	☐	☐	-/-
Frequency Stability	Nominal	Nominal	☐	☐	☐	☒	-/-
Spurious Emissions Radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
Spurious Emissions Conducted	Nominal	Nominal	☐	☐	☐	☒	-/-
Block Edge Compliance	Nominal	Nominal	☐	☐	☐	☒	-/-
Occupied Bandwidth	Nominal	Nominal	☐	☐	☐	☒	-/-

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

10.2 PCS 1900

Test Case	temperature conditions	power source voltages	C	NC	NA	NP	Remark
RF Output Power	Nominal	Nominal	☒	☐	☐	☐	-/-
Frequency Stability	Nominal	Nominal	☐	☐	☐	☒	-/-
Spurious Emissions Radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
Spurious Emissions Conducted	Nominal	Nominal	☐	☐	☐	☒	-/-
Block Edge Compliance	Nominal	Nominal	☐	☐	☐	☒	-/-
Occupied Bandwidth	Nominal	Nominal	☐	☐	☐	☒	-/-

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

10.3 UMTS band II

Test Case	temperature conditions	power source voltages	C	NC	NA	NP	Remark
RF Output Power	Nominal	Nominal	☒	☐	☐	☐	-/-
Frequency Stability	Nominal	Nominal	☐	☐	☐	☒	-/-
Spurious Emissions Radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
Spurious Emissions Conducted	Nominal	Nominal	☐	☐	☐	☒	-/-
Block Edge Compliance	Nominal	Nominal	☐	☐	☐	☒	-/-
Occupied Bandwidth	Nominal	Nominal	☐	☐	☐	☒	-/-

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

10.4 UMTS band IV

Test Case	temperature conditions	power source voltages	C	NC	NA	NP	Remark
RF Output Power	Nominal	Nominal	☒	☐	☐	☐	-/-
Frequency Stability	Nominal	Nominal	☐	☐	☐	☒	-/-
Spurious Emissions Radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
Spurious Emissions Conducted	Nominal	Nominal	☐	☐	☐	☒	-/-
Block Edge Compliance	Nominal	Nominal	☐	☐	☐	☒	-/-
Occupied Bandwidth	Nominal	Nominal	☐	☐	☐	☒	-/-

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

10.5 UMTS band V

Test Case	temperature conditions	power source voltages	C	V	NA	NP	Remark
RF Output Power	Nominal	Nominal	☒	☐	☐	☐	-/-
Frequency Stability	Nominal	Nominal	☐	☐	☐	☒	-/-
Spurious Emissions Radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
Spurious Emissions Conducted	Nominal	Nominal	☐	☐	☐	☒	-/-
Block Edge Compliance	Nominal	Nominal	☐	☐	☐	☒	-/-
Occupied Bandwidth	Nominal	Nominal	☐	☐	☐	☒	-/-

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

10.6 Additional comments

Reference documents: 1-5865/13-09-03-C

Special test descriptions: Only radiated measurements were performed. The customer uses the same RF module and the same firmware settings as in the reference test report, only the housing is changed.

Configuration descriptions: None

11 RF measurements

11.1 Results GSM 850

All GSM-band measurements are made 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.

11.1.1 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
Test setup	See sub clause 7.1 B
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
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)**	**Peak to Average Ratio (dB)**
824.2	33.11	0.3
836.4	33.56	0.3
848.8	34.40	0.3

Output Power (radiated) 8-PSK mode		
Frequency (MHz)	**Average Output Power (dBm)**	**Peak to Average Ratio (dB)**
824.2	28.95	3.7
836.4	30.18	3.7
848.8	30.77	3.7

11.1.2 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 C63.4:2014 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
Test setup	See sub clause 7.1 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Spurious Emissions Radiated	
Attenuation ≥ 43 + 10log(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 (824.2 MHz, 836.4 MHz and 848.8 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 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.

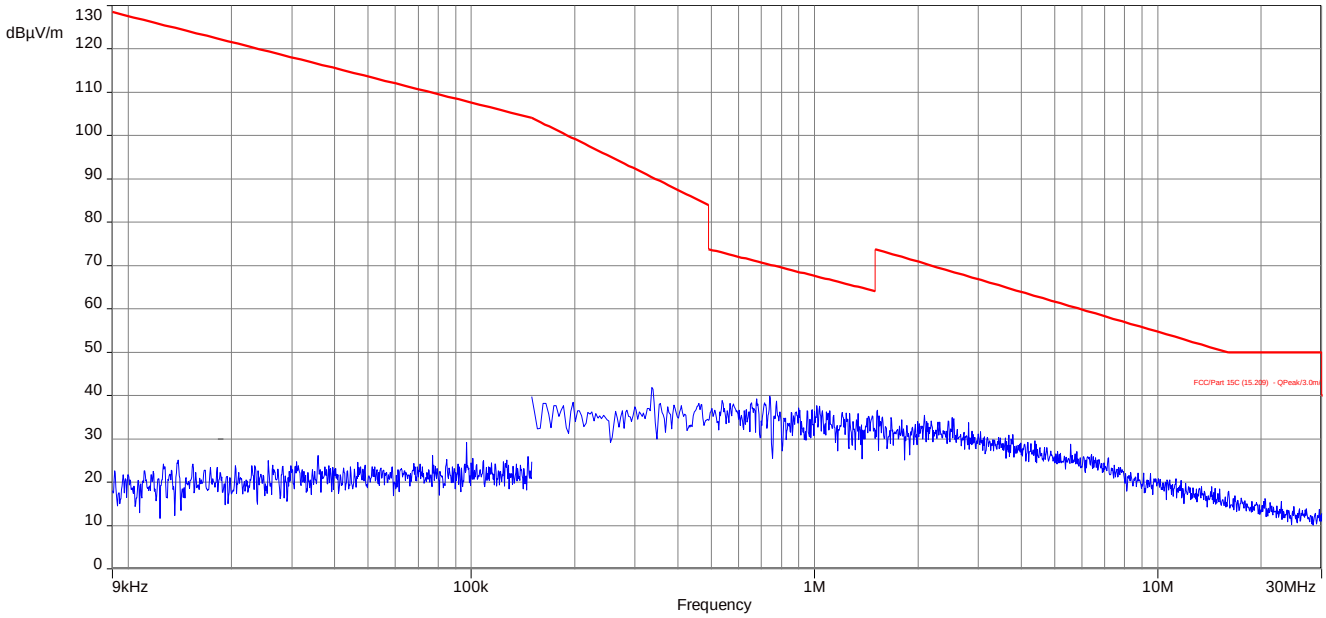
The final open field radiated levels are presented on the next pages.
All measurements were made in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values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

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

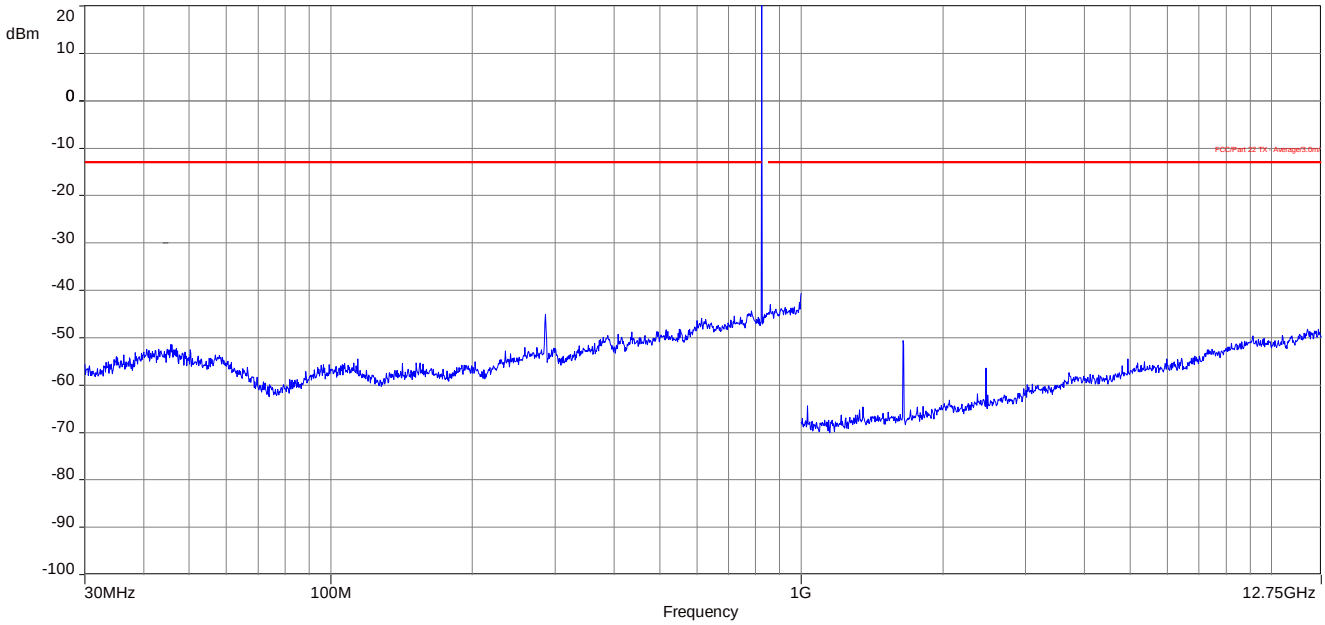
Spurious Emission Level (dBm) (valid for GMSK & 8PSK modulation)								
Harmonic	Ch. 128 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 189 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 251 Freq. (MHz)	Level [dBm]
2	1648.4	-	2	1672.8	-	2	1697.6	-
3	2472.6	-	3	2509.2	-	3	2546.4	-
4	3296.8	-	4	3345.6	-	4	3395.2	-
5	4121.0	-	5	4182.0	-	5	4244.0	-
6	4945.2	-	6	5018.4	-	6	5092.8	-
7	5769.4	-	7	5854.8	-	7	5941.6	-
8	6593.6	-	8	6691.2	-	8	6790.4	-
9	7417.8	-	9	7527.6	-	9	7639.2	-
10	8242.0	-	10	8364.0	-	10	8488.0	-

Plots GMSK:

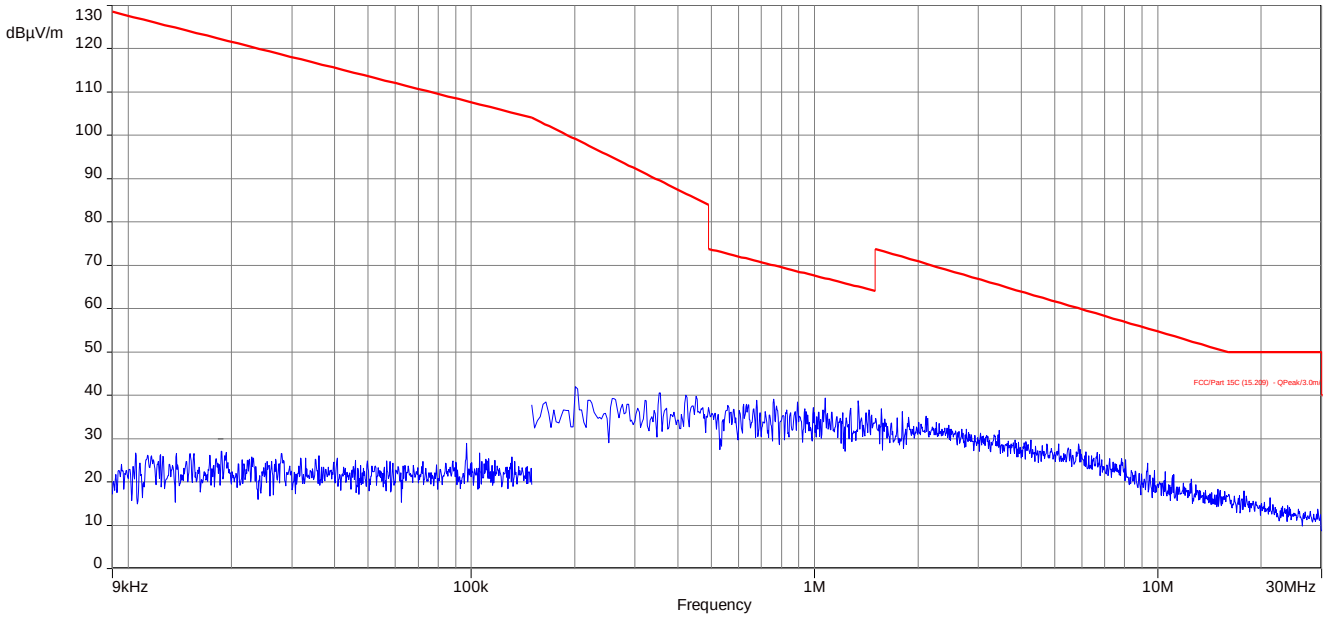
Plot 1: Channel 128 (Traffic mode up to 30 MHz)



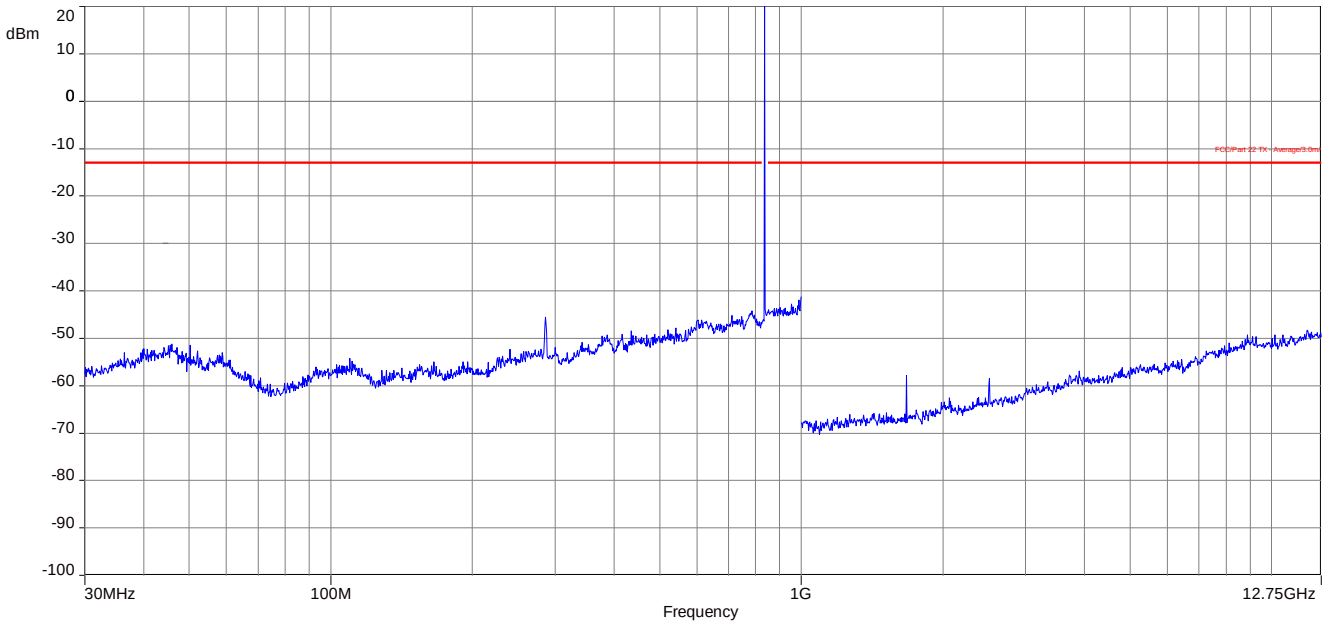
Plot 2: Channel 128 (30 MHz – 12.75 GHz)



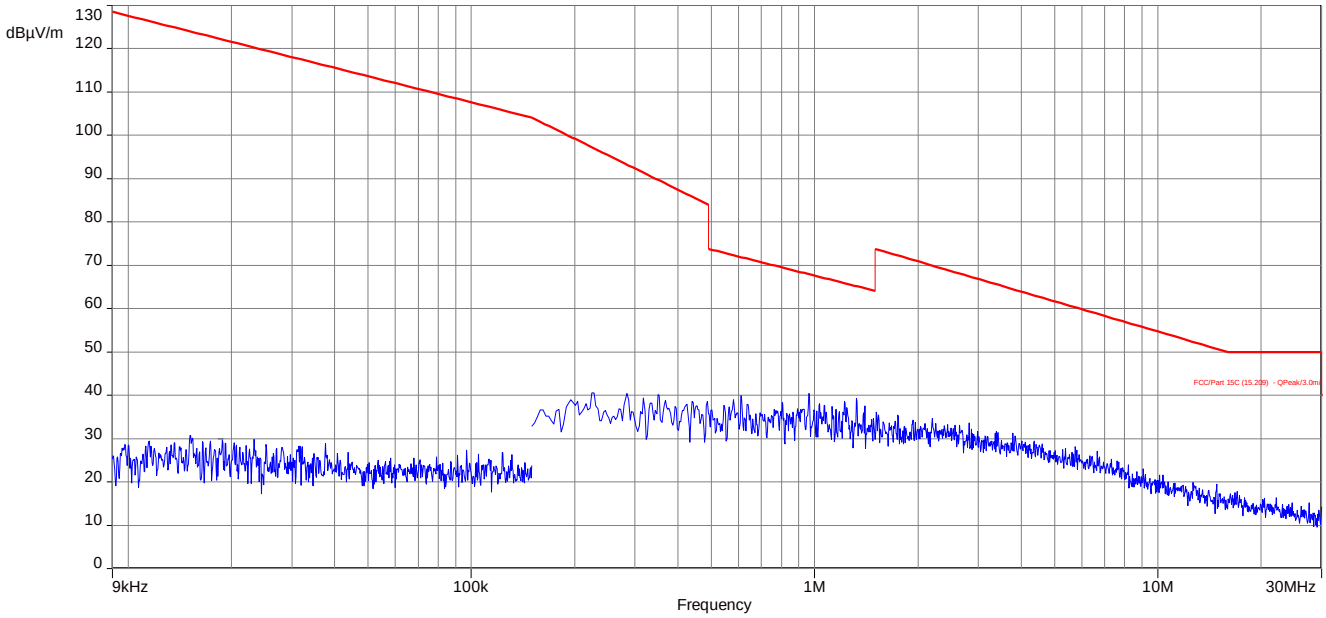
Plot 3: Channel 189 (Traffic mode up to 30 MHz)



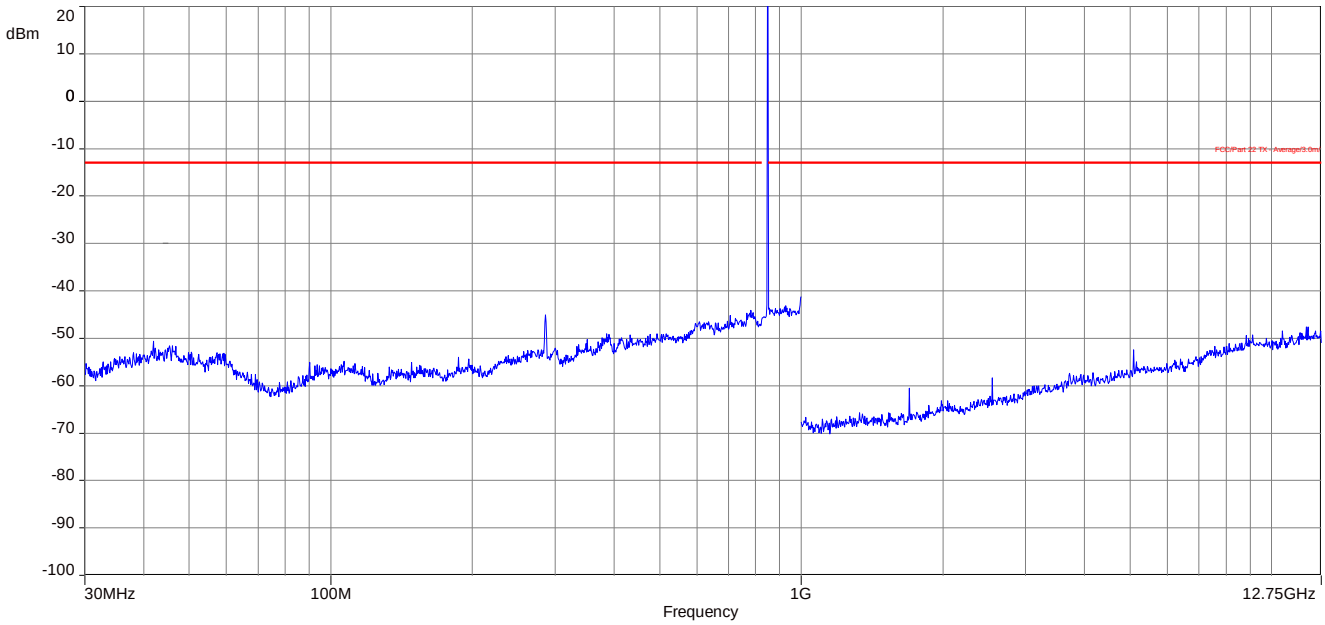
Plot 4: Channel 189 (30 MHz – 12.75 GHz)



Plot 5: Channel 251 (Traffic mode up to 30 MHz)

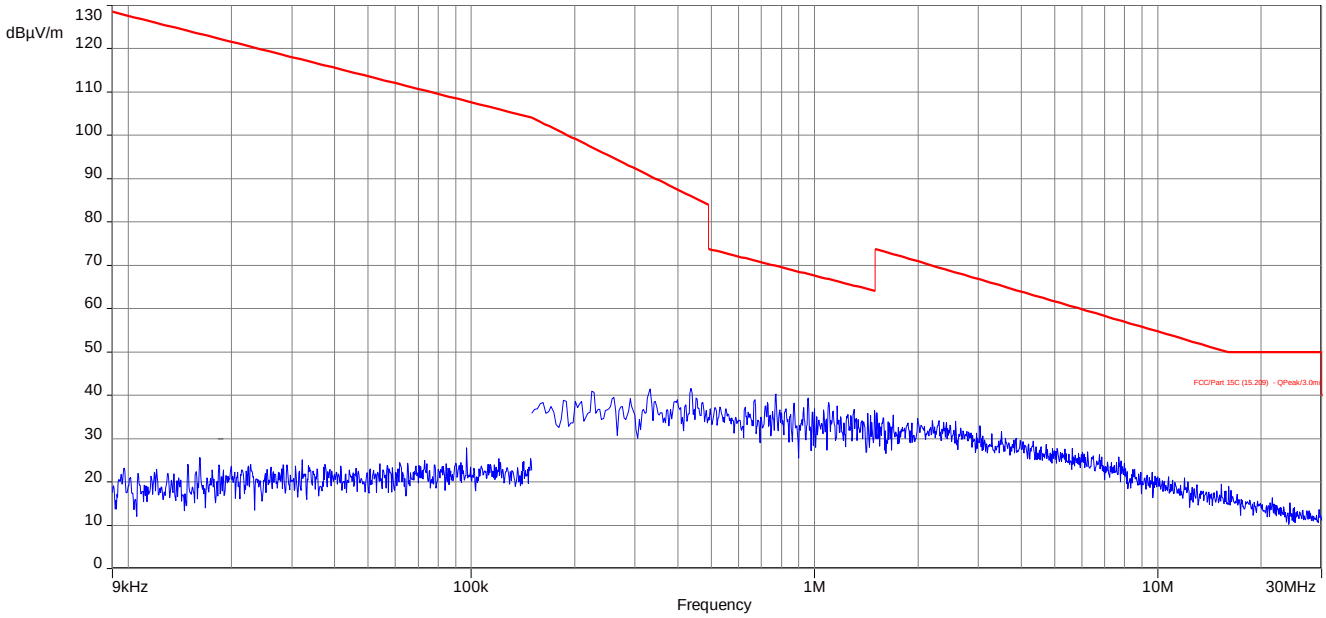


Plot 6: Channel 251 (30 MHz – 12.75 GHz)

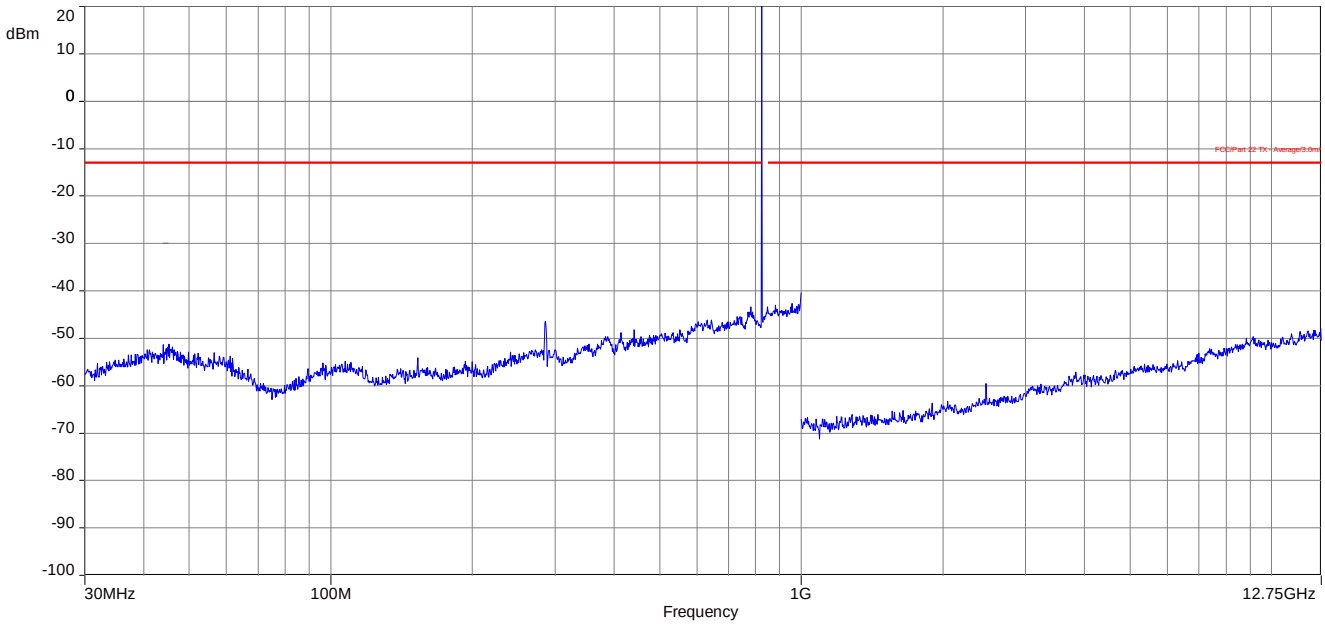


Plots 8PSK:

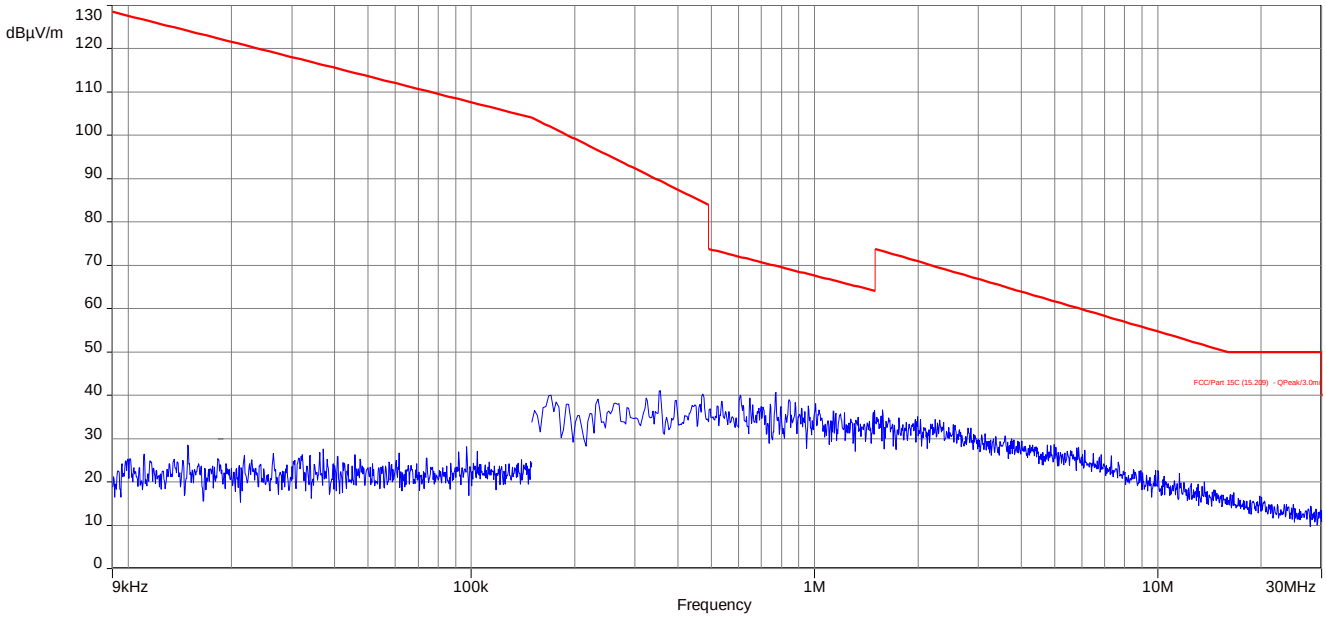
Plot 1: Channel 128 (Traffic mode up to 30 MHz)



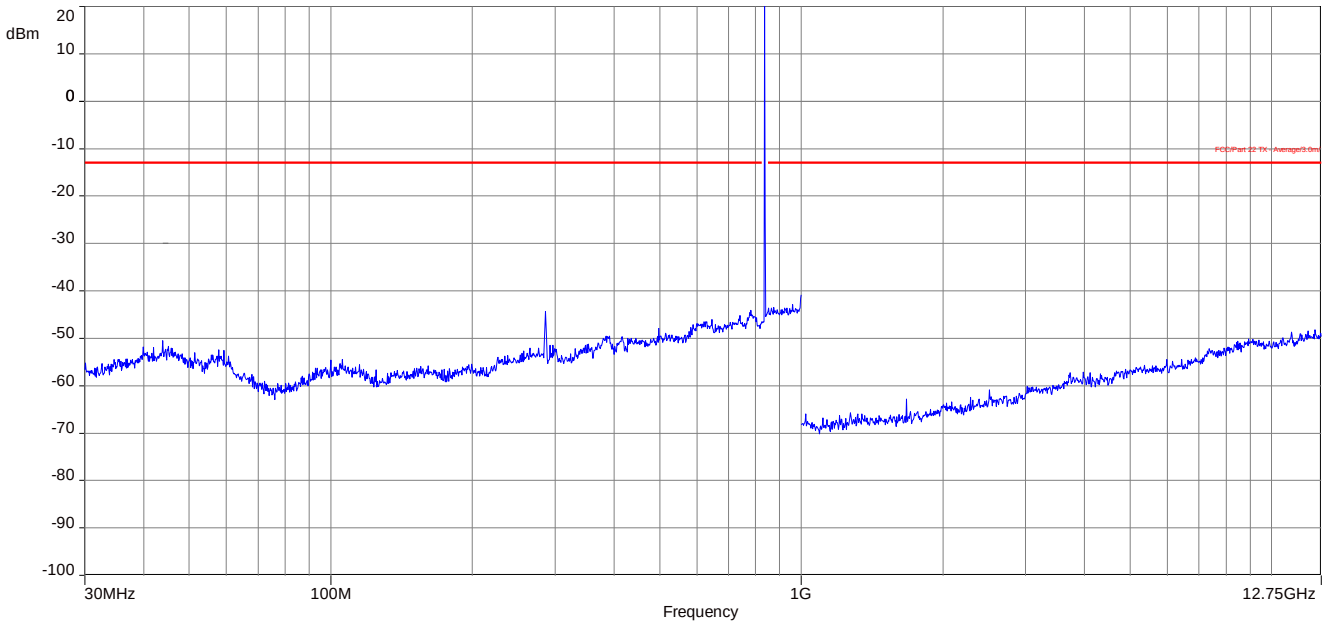
Plot 2: Channel 128 (30 MHz – 12.75 GHz)



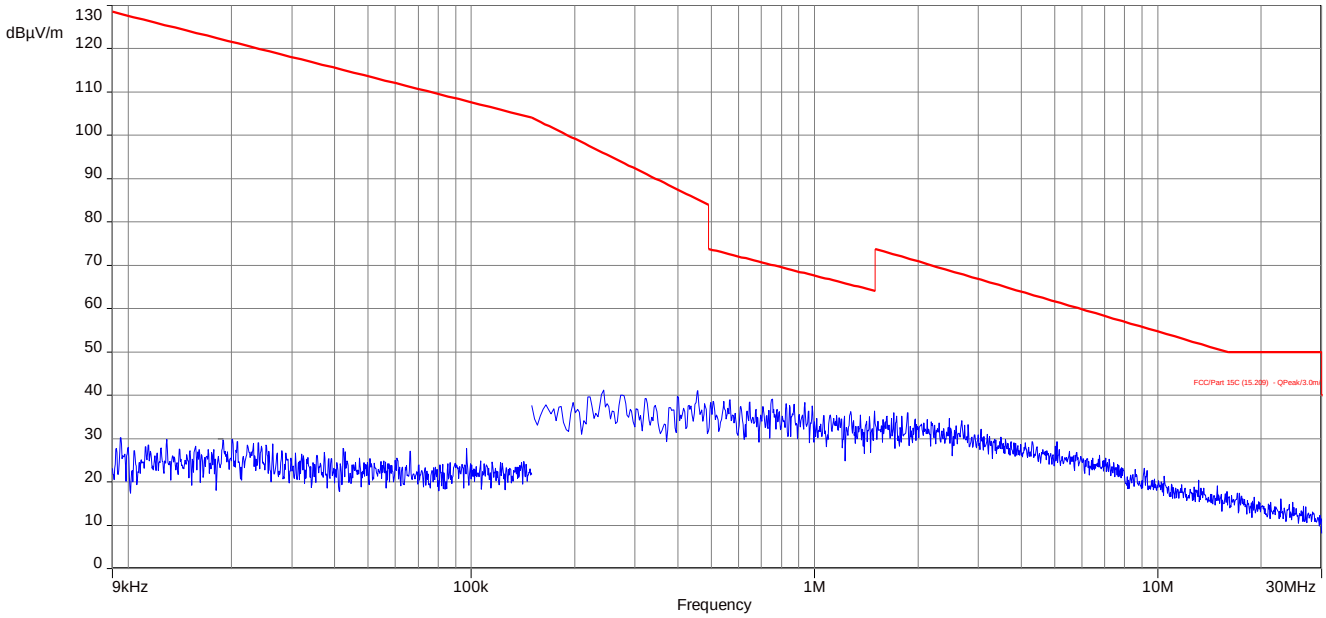
Plot 3: Channel 189 (Traffic mode up to 30 MHz)



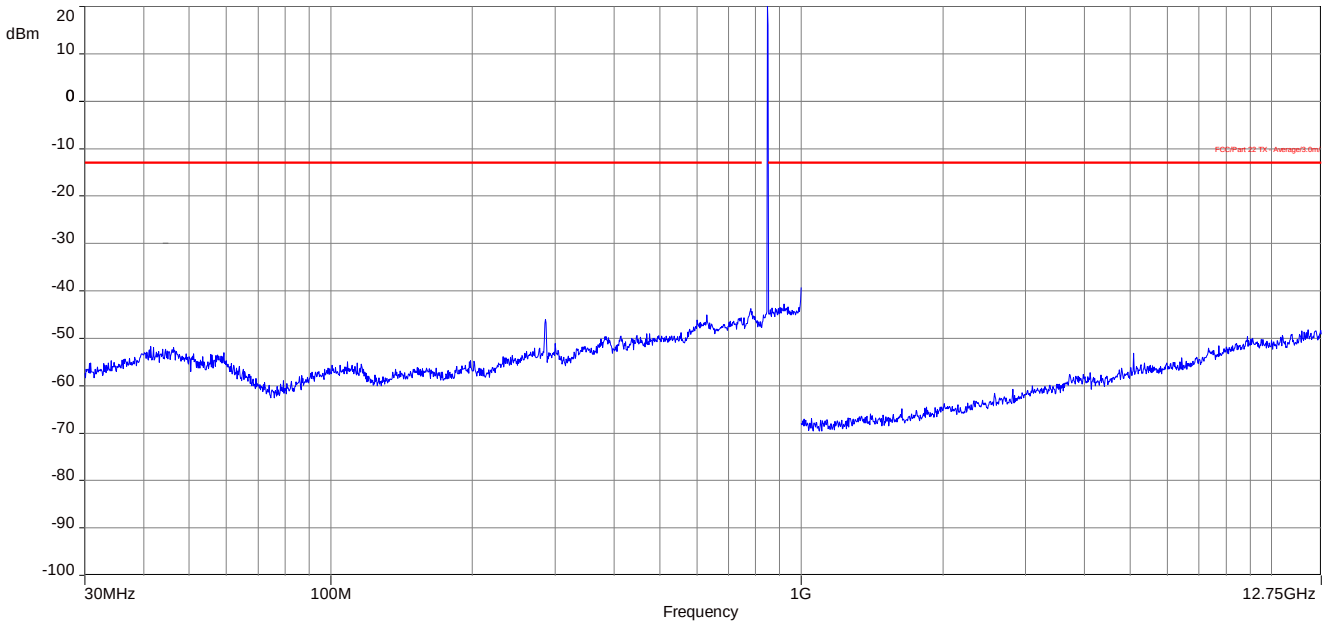
Plot 4: Channel 189 (30 MHz – 12.75 GHz)



Plot 5: Channel 251 (Traffic mode up to 30 MHz)



Plot 6: Channel 251 (30 MHz – 12.75 GHz)



11.2 Results PCS 1900

All GSM-band measurements are made 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.

11.2.1 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
Test setup	See sub clause 7.1 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
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)**	**Peak to Average Ratio (dB)**
1850.2	32.75	0.4
1880.0	32.32	0.4
1909.8	32.38	0.4

Output Power (radiated) 8-PSK mode		
Frequency (MHz)	**Average Output Power (dBm)**	**Peak to Average Ratio (dB)**
1850.2	28.86	3.3
1880.0	29.41	3.3
1909.8	29.53	3.3

11.2.2 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 C63.4:2014 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. Measurement made up to 25 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
Test setup	See sub clause 7.1 A and 7.2. A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Spurious Emissions Radiated	
Attenuation ≥ 43 + 10log(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 (1850.2 MHz, 1880.0 MHz and 1909.8 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 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.

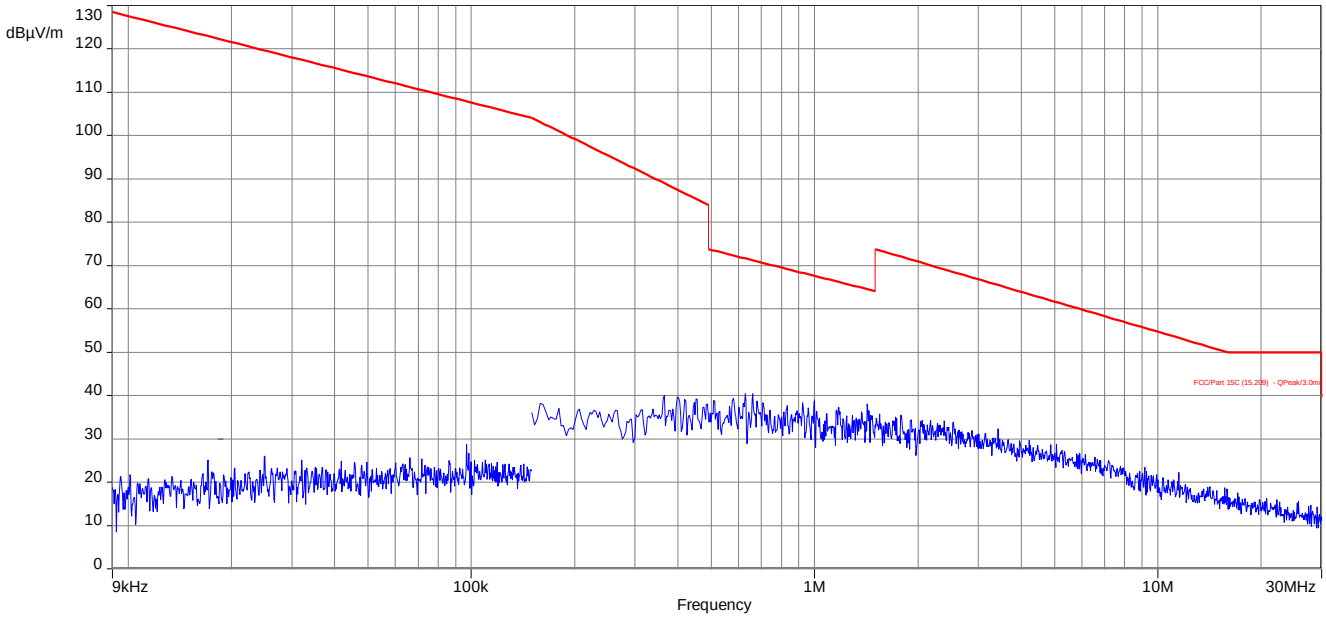
The final open field radiated levels are presented on the next pages.
All measurements were made in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values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

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

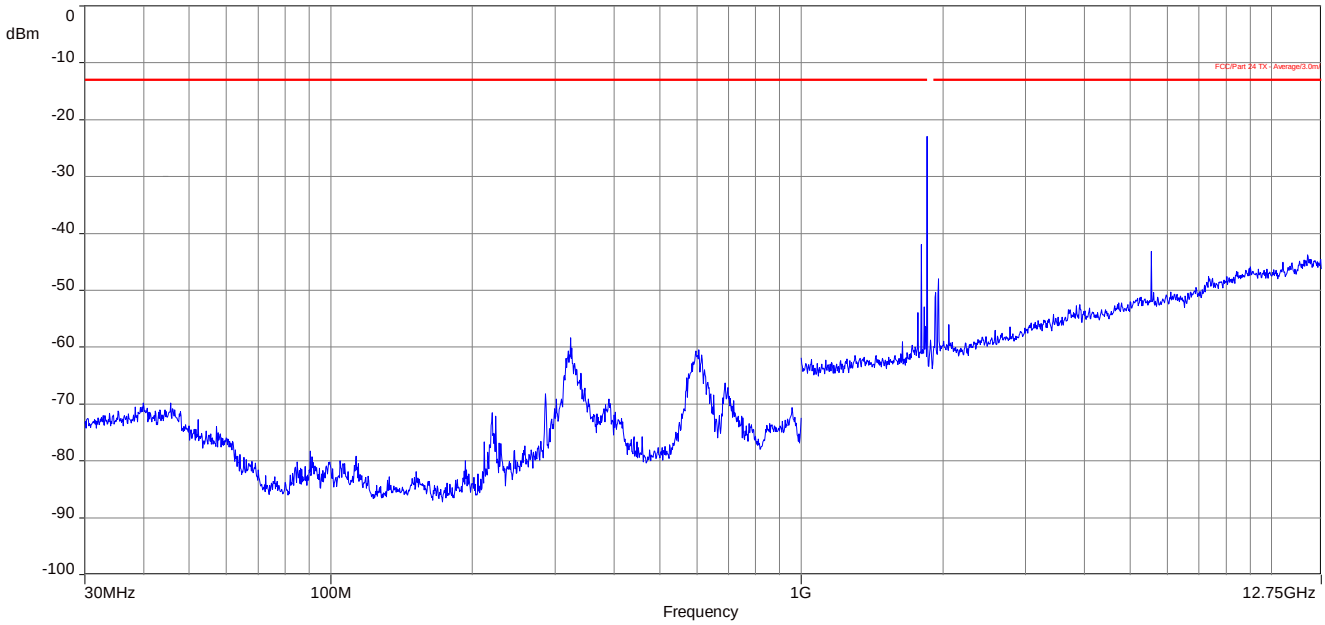
Spurious Emission Level (dBm) (valid for GMSK & 8PSK modulation)								
Harmonic	Ch. 512 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 661 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 810 Freq. (MHz)	Level [dBm]
2	3700.4	-	2	3760.0	-	2	3819.6	-
3	5550.6	-	3	5640.0	-	3	5729.4	-
4	7400.8	-	4	7520.0	-	4	7639.2	-
5	9251.0	-	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	-

Plots GMSK:

Plot 1: Channel 512 (Traffic mode up to 30 MHz)

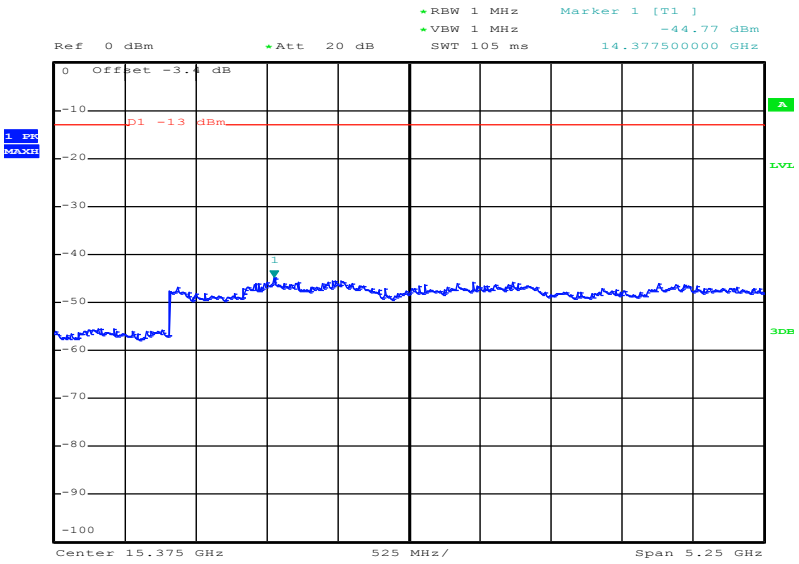


Plot 2: Channel 512 (30 MHz – 12.75 GHz)



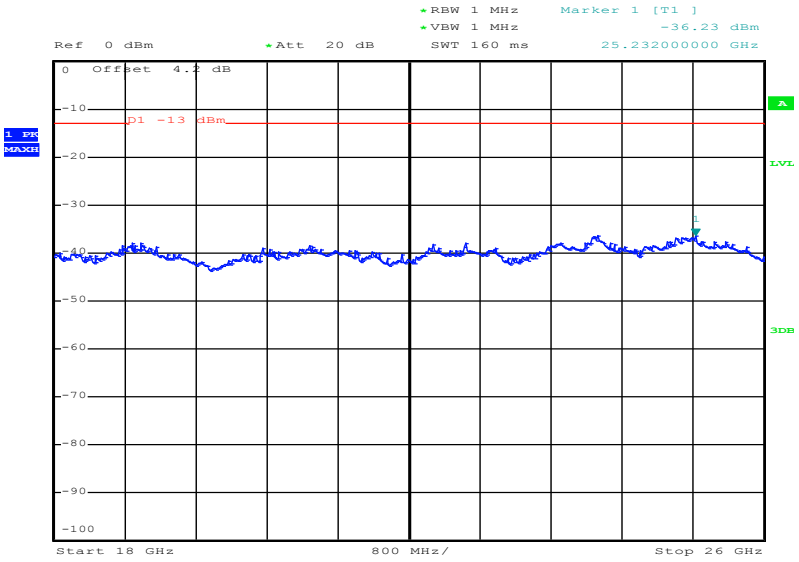
Carrier notched with 1.9 GHz band rejection filter

Plot 3: Channel 512 (12.75 GHz – 18 GHz)



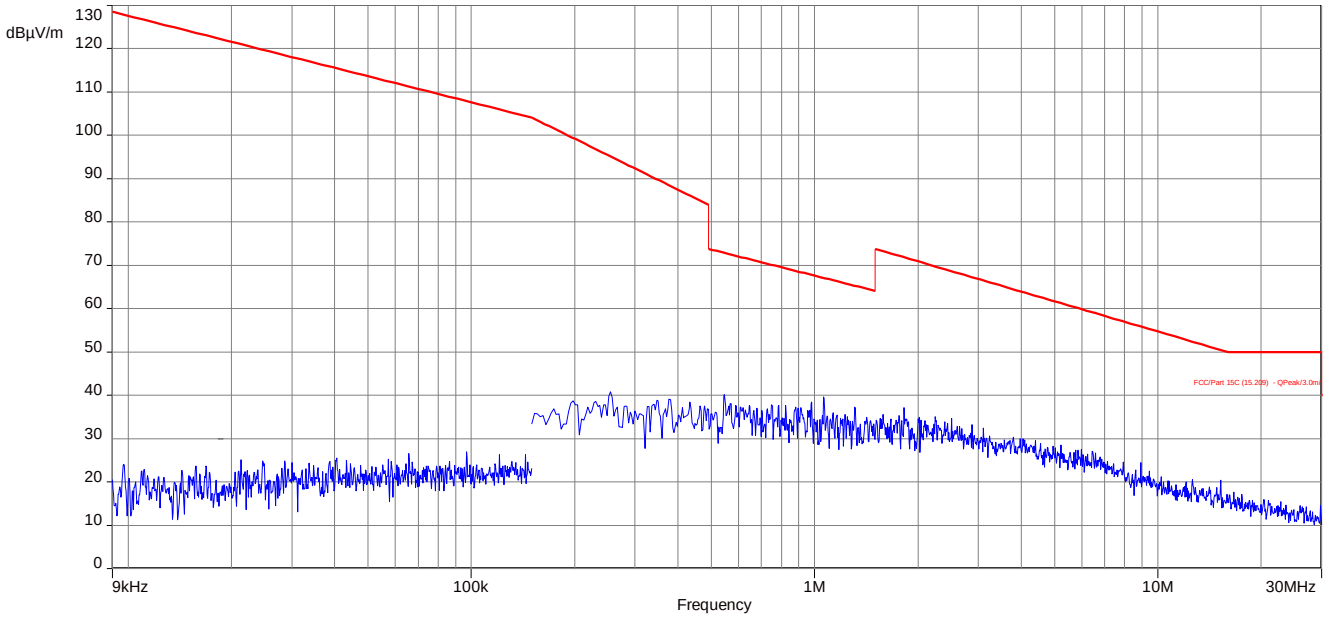
Date: 25.NOV.2015 08:46:03

Plot 4: Channel 512 (18 GHz – 26 GHz)

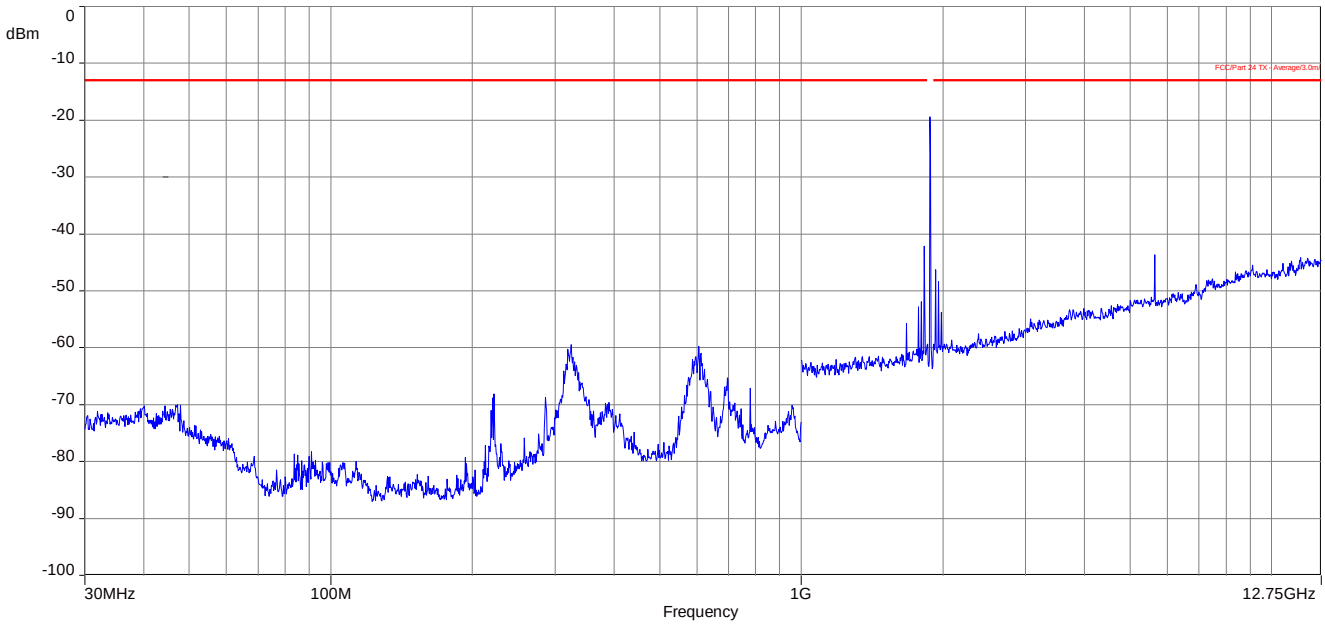


Date: 25.NOV.2015 08:52:52

Plot 5: Channel 661 (Traffic mode up to 30 MHz)

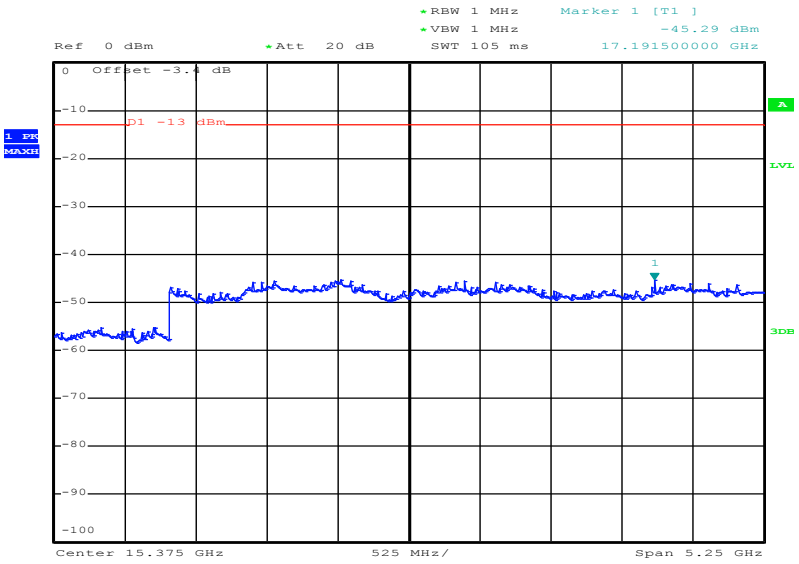


Plot 6: Channel 661 (30 MHz – 12.75 GHz)



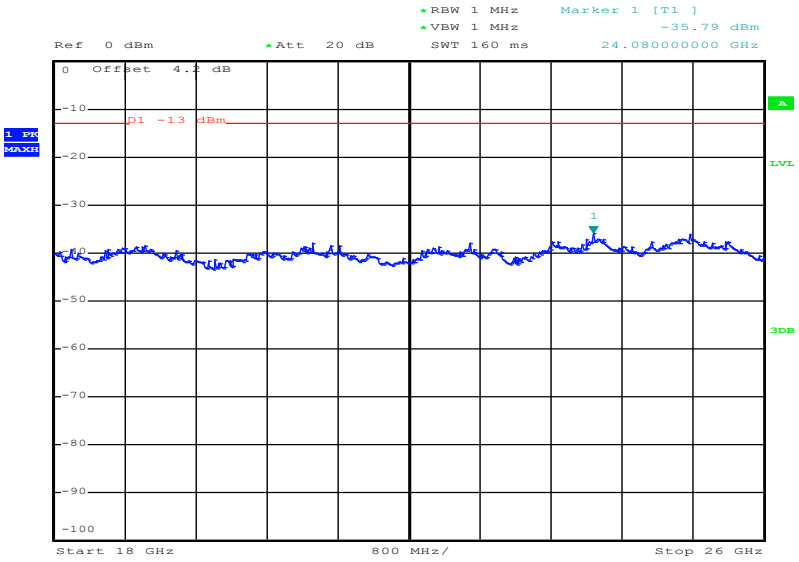
Carrier notched with 1.9 GHz band rejection filter

Plot 7: Channel 661 (12.75 GHz – 18 GHz)



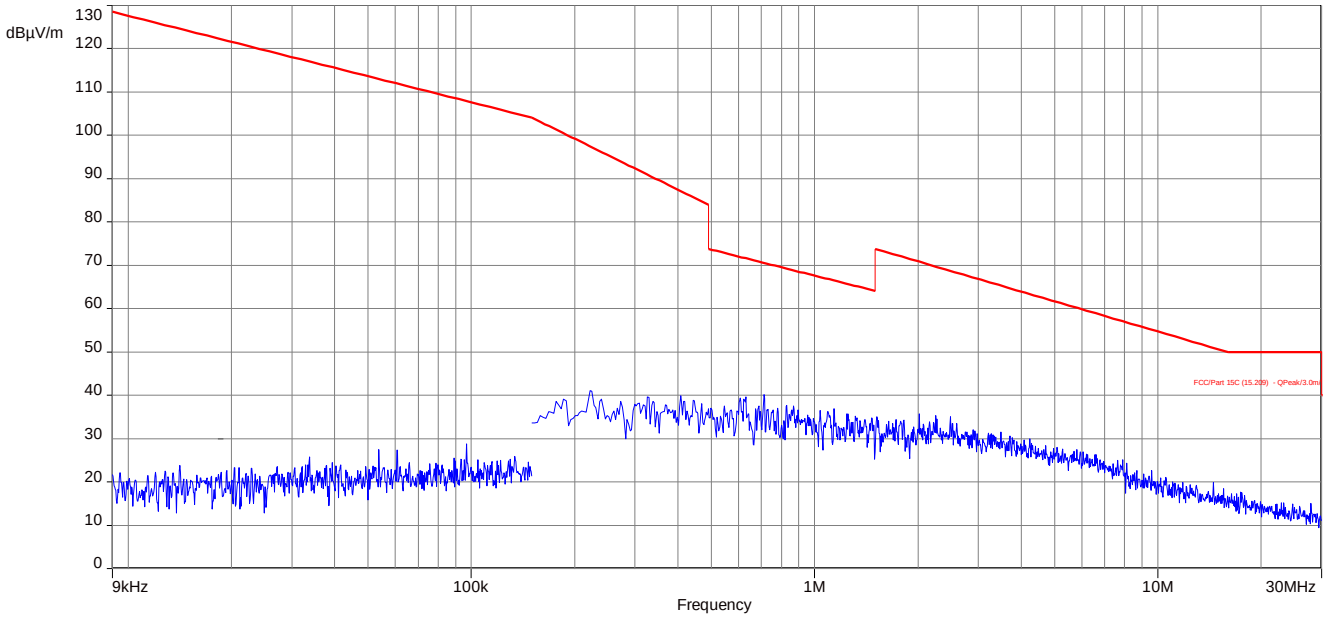
Date: 25.NOV.2015 08:46:34

Plot 8: Channel 661 (18 GHz – 26 GHz)

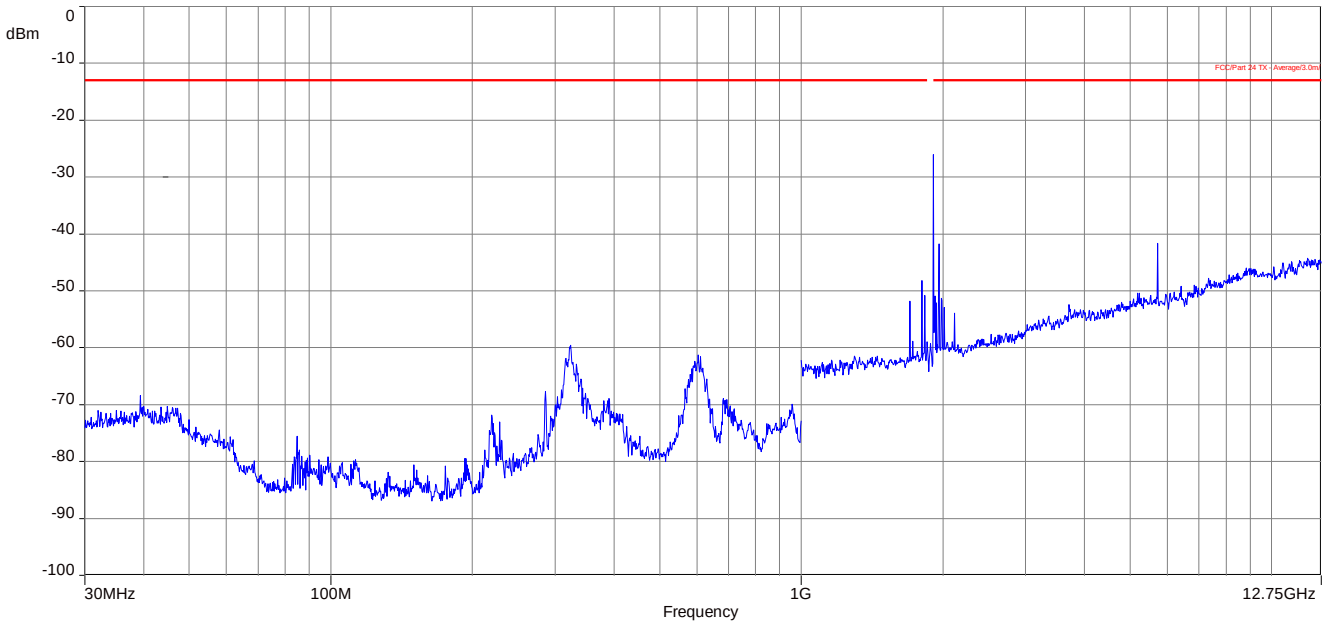


Date: 25.NOV.2015 08:53:18

Plot 9: Channel 810 (Traffic mode up to 30 MHz)

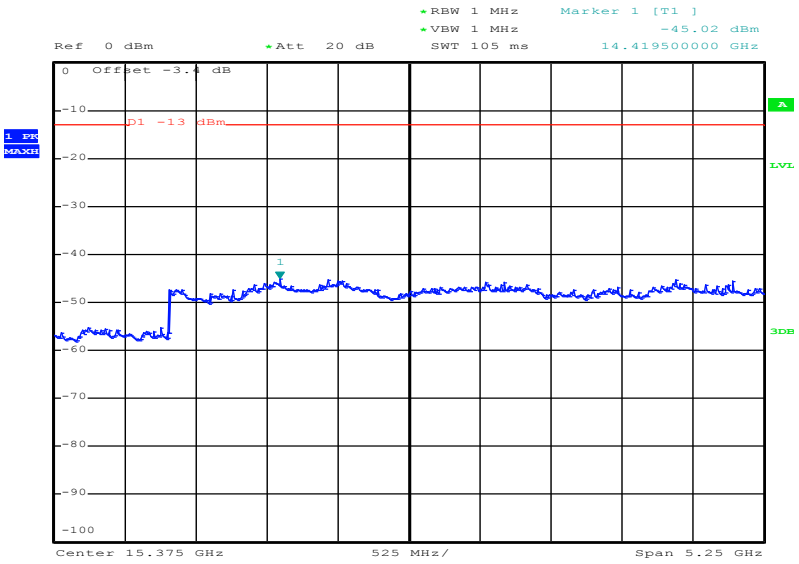


Plot 10: Channel 810 (30 MHz – 12.75 GHz)



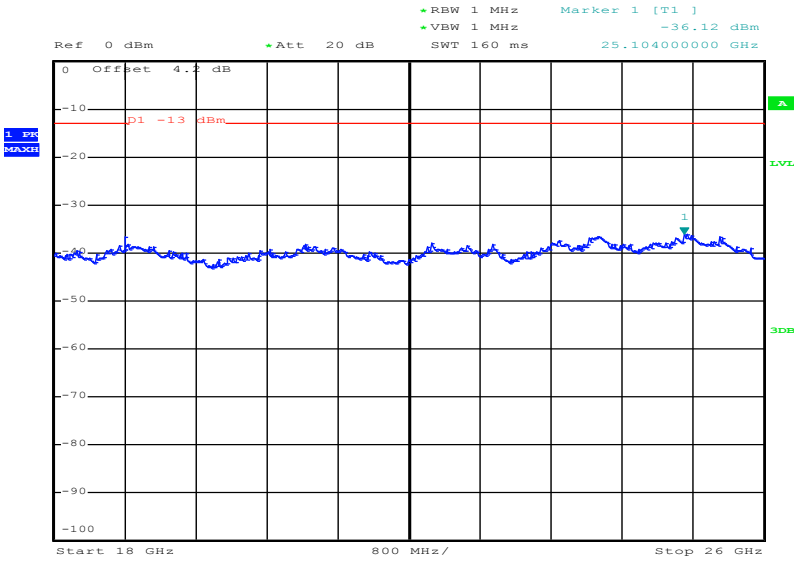
Carrier notched with 1.9 GHz band rejection filter

Plot 11: Channel 810 (12.75 GHz – 18 GHz)



Date: 25.NOV.2015 08:47:21

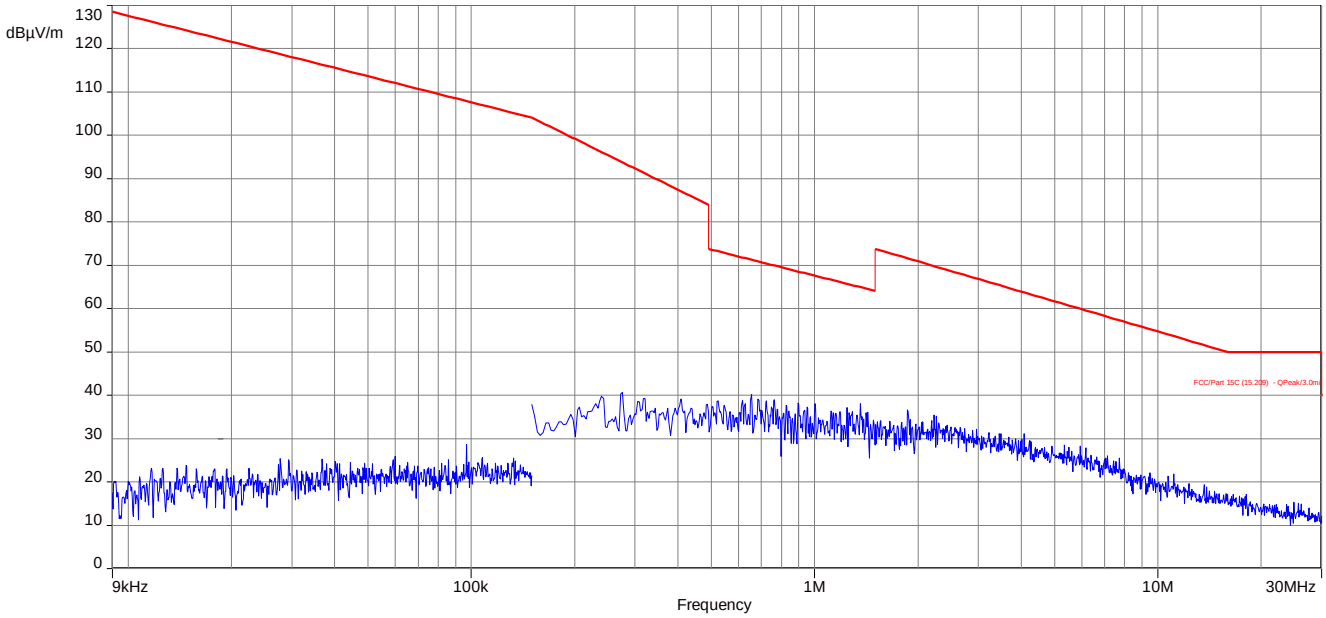
Plot 12: Channel 810 (18 GHz – 26 GHz)



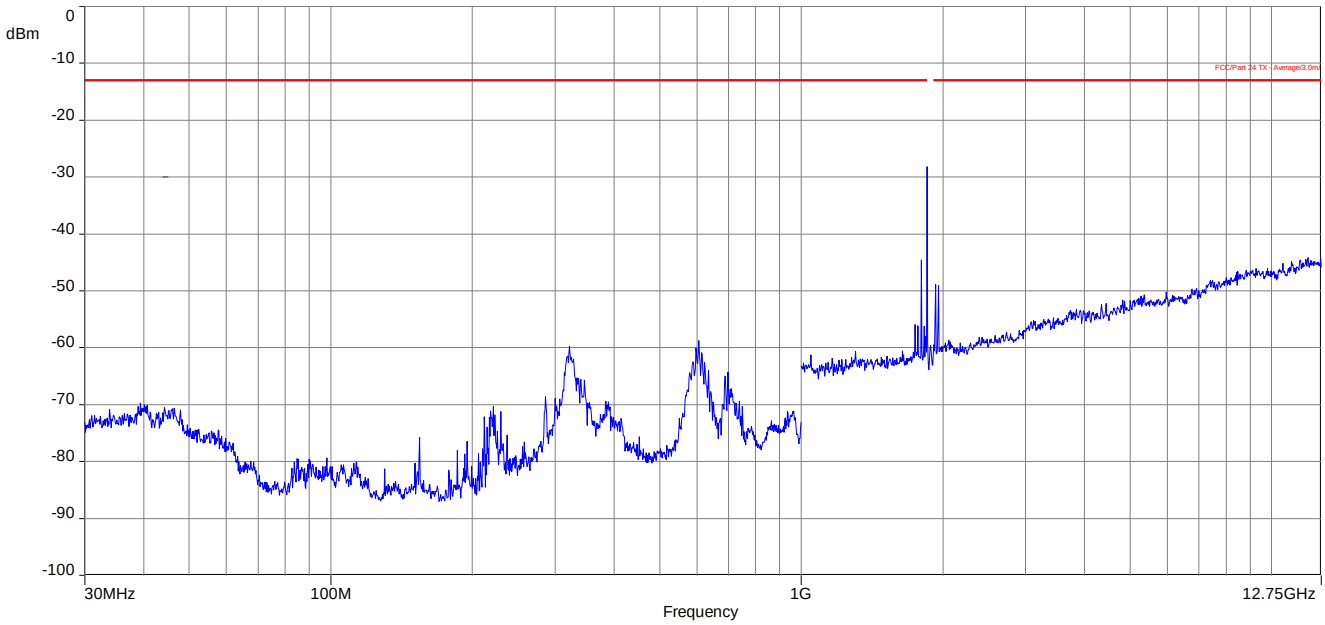
Date: 25.NOV.2015 08:54:17

Plots 8PSK:

Plot 1: Channel 512 (Traffic mode up to 30 MHz)

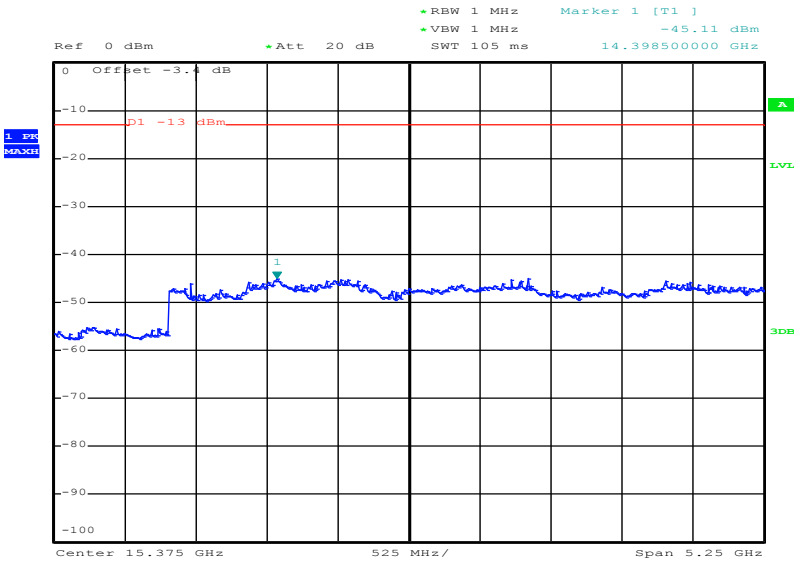


Plot 2: Channel 512 (30 MHz – 12.75 GHz)



Carrier notched with 1.9 GHz band rejection filter

Plot 3: Channel 512 (12.75 GHz – 18 GHz)



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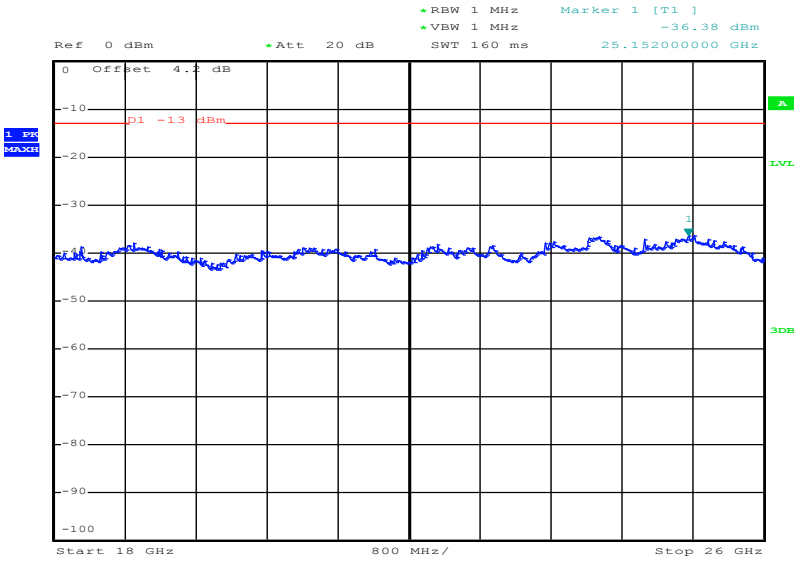
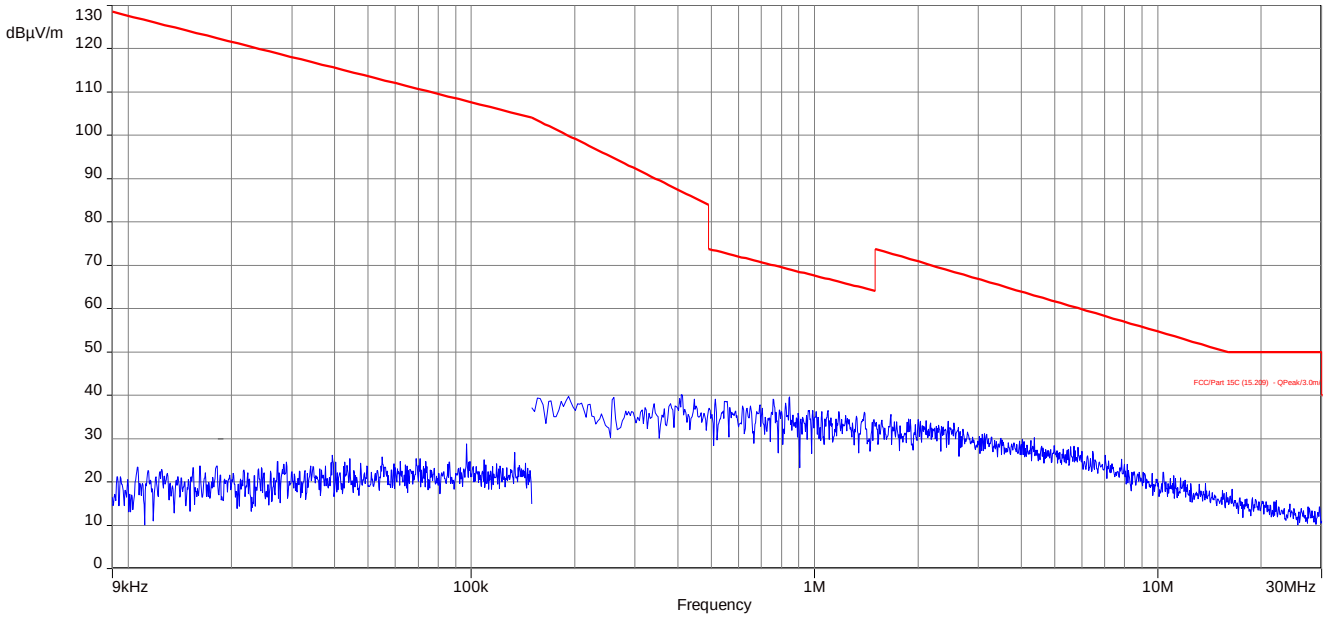
Plot 4: Channel 512 (18 GHz – 26 GHz)

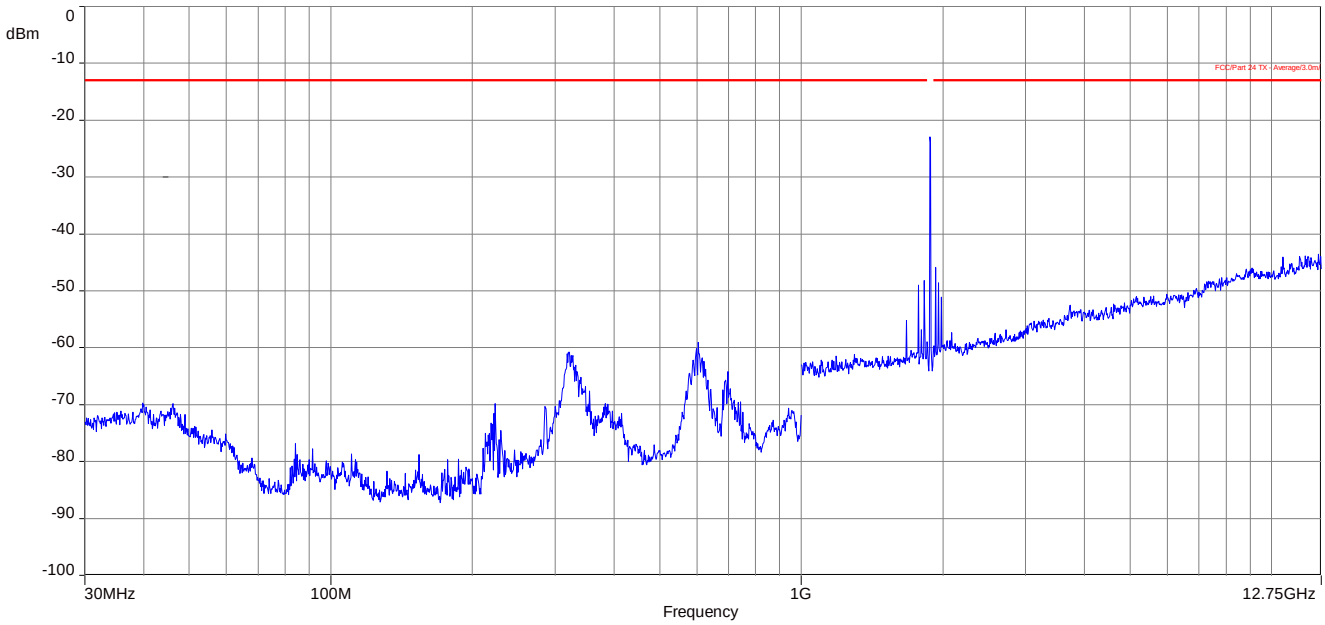


Date: 25.NOV.2015 08:52:18

Plot 5: Channel 661 (Traffic mode up to 30 MHz)

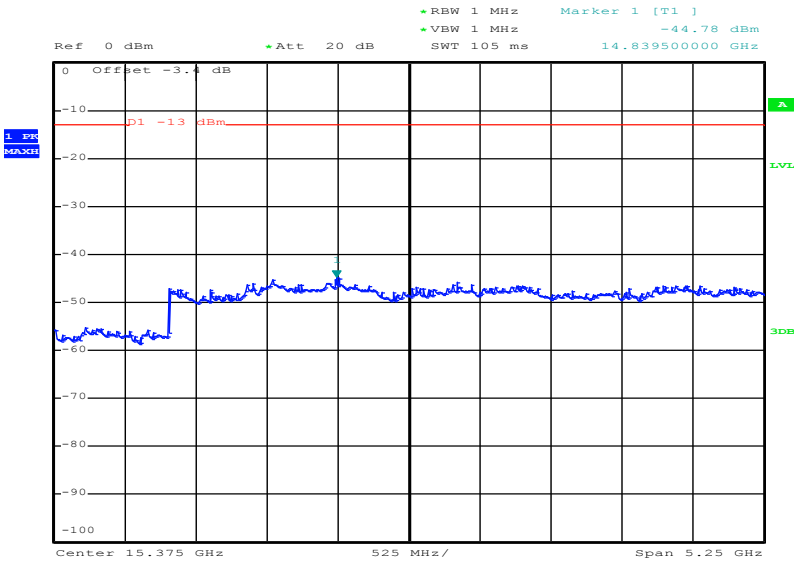


Plot 6: Channel 661 (30 MHz – 12.75 GHz)



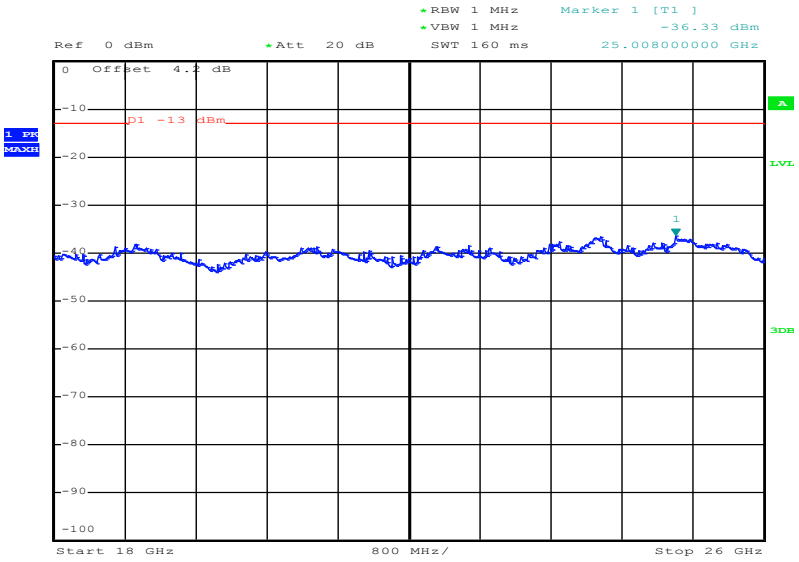
Carrier notched with 1.9 GHz band rejection filter

Plot 7: Channel 661 (12.75 GHz – 18 GHz)



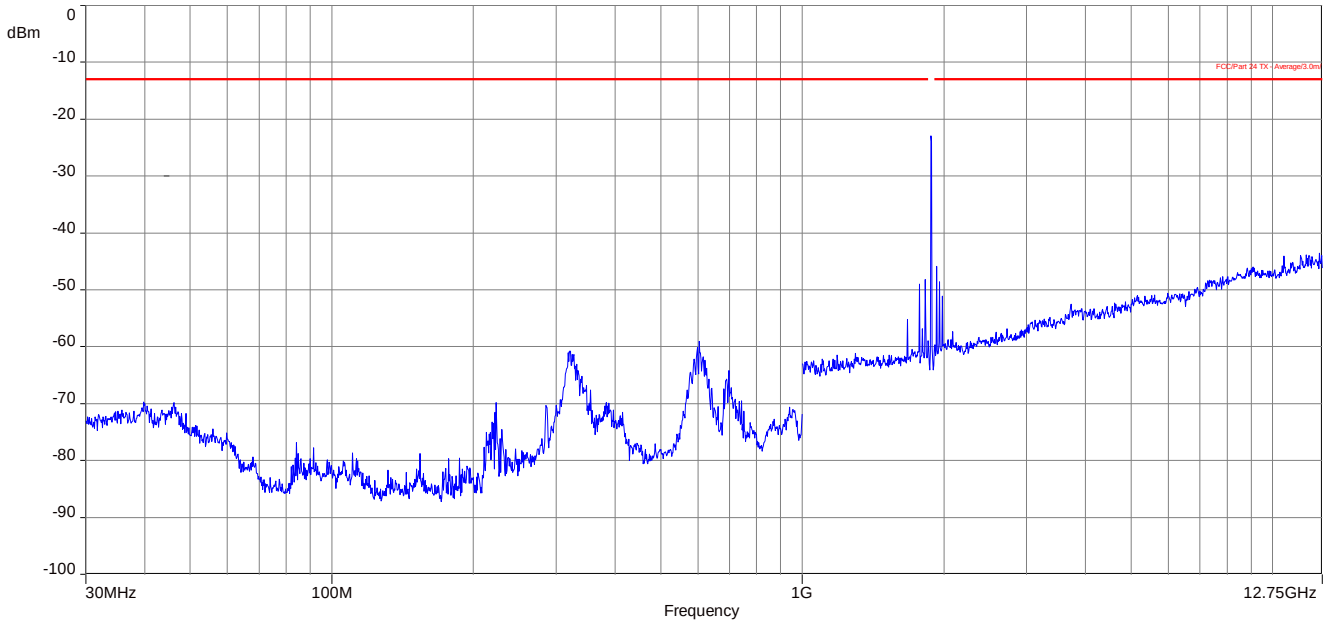
Date: 25.NOV.2015 08:49:21

Plot 8: Channel 661 (18 GHz – 26 GHz)

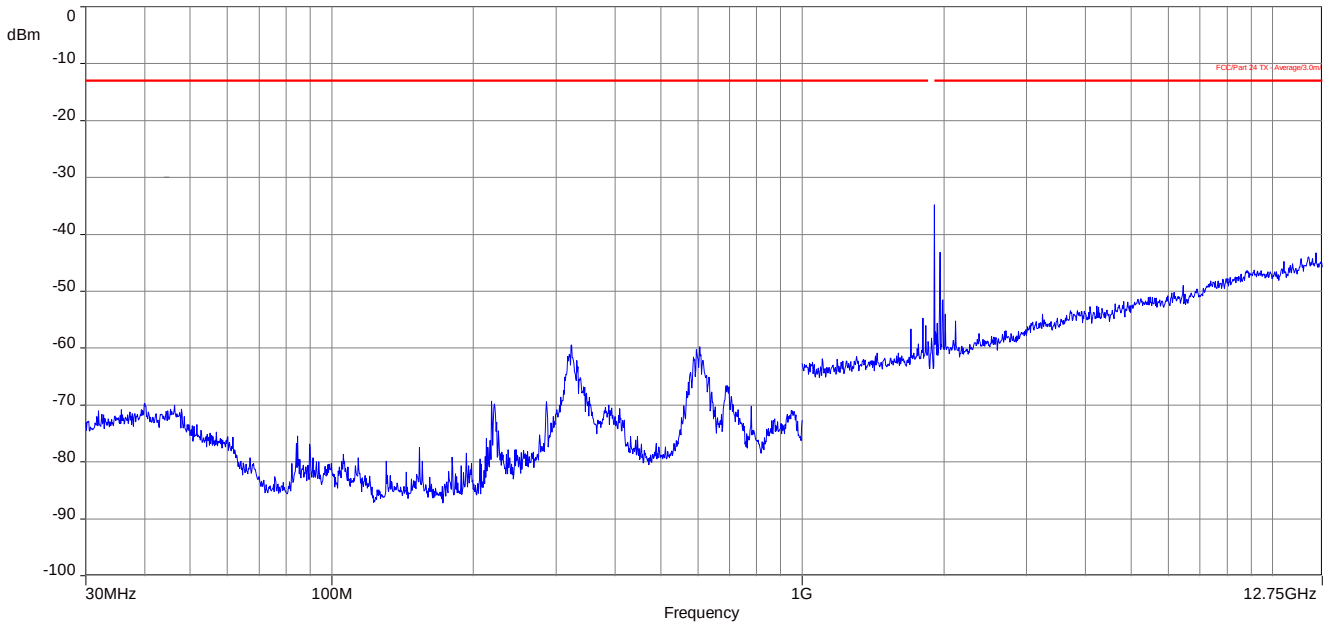


Date: 25.NOV.2015 08:51:45

Plot 9: Channel 810 (Traffic mode up to 30 MHz)

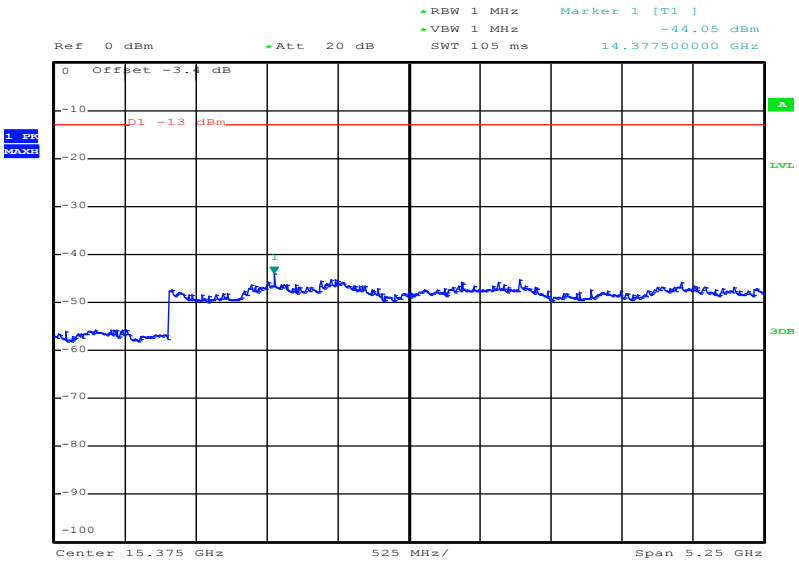


Plot 10: Channel 810 (30 MHz – 12.75 GHz)



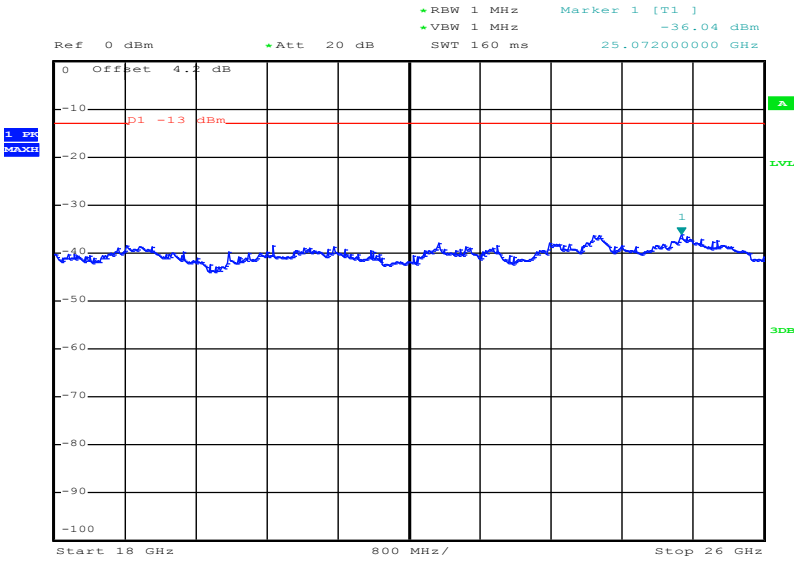
Carrier notched with 1.9 GHz band rejection filter

Plot 11: Channel 810 (12.75 GHz – 18 GHz)



Date: 25.NOV.2015 08:50:06

Plot 12: Channel 810 (18 GHz – 26 GHz)



Date: 25.NOV.2015 08:51:18

11.3 Results UMTS band II

All UMTS-band measurements are made in WCDMA mode only.
The connection was established with the following setup: WCDMA CS-RMC, Max Power (All Bit up)

11.3.1 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.

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
Test setup	See sub clause 7.1 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
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		
Frequency (MHz)	**Average Output Power (dBm)**	**Peak to Average Ratio (dB)**
1852.4	25.84	2.9
1880.0	26.86	2.9
1907.6	26.79	2.9

11.3.2 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 C63.4:2014 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
Test setup	See sub clause 7.1 A and 7.2 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Spurious Emissions Radiated	
Attenuation ≥ 43 + 10log(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.

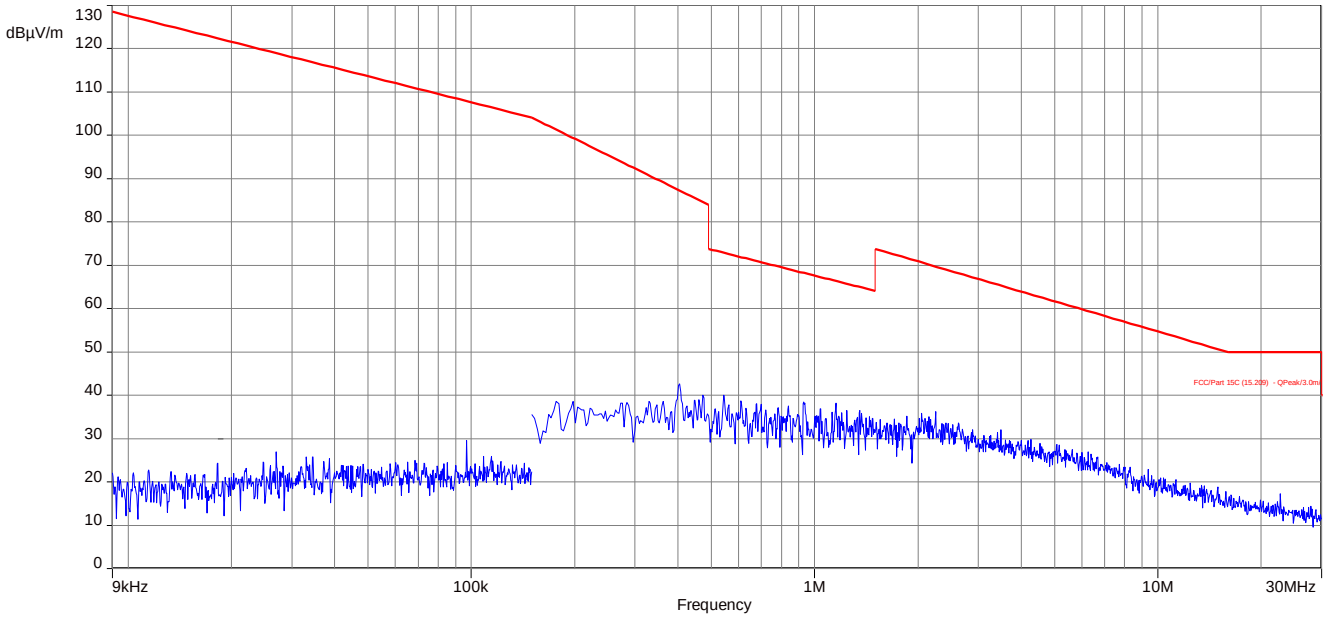
The final open field radiated levels are presented on the next pages.
All measurements were made in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values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

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

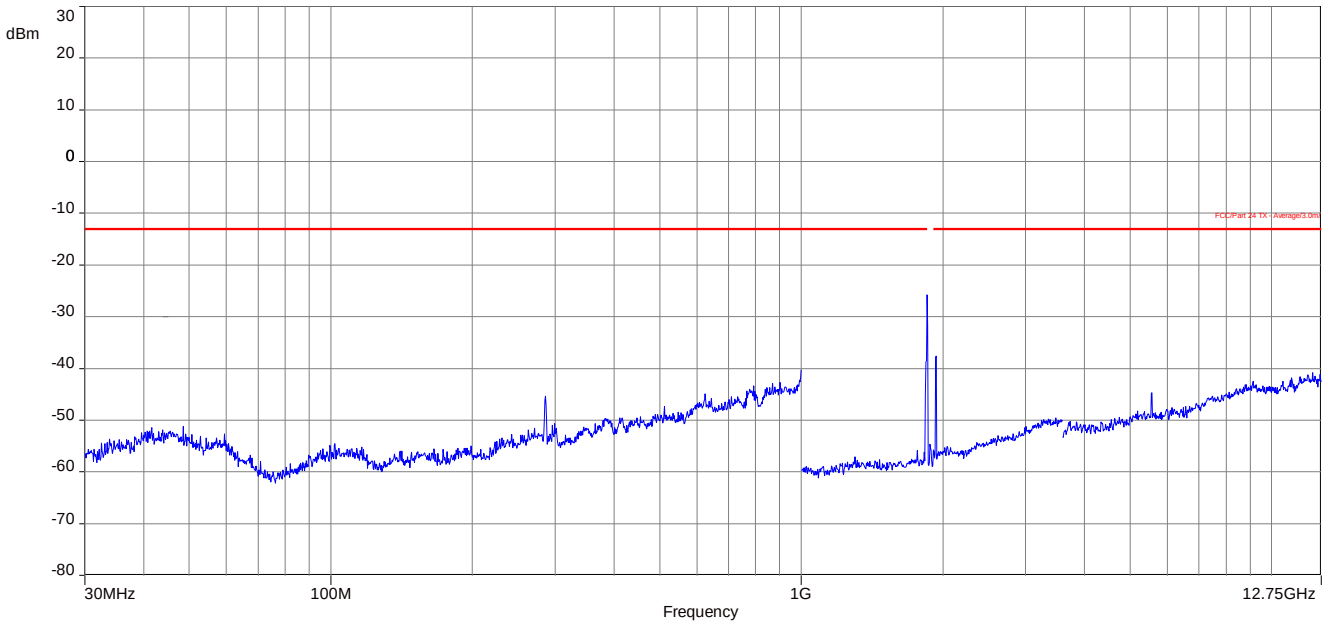
Spurious Emission Level (dBm)								
Harmonic	Ch. 9262 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 9400 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 9538 Freq. (MHz)	Level [dBm]
2	3704.8	-	2	3760.0	-	2	3815.2	-
3	5557.2	-	3	5640.0	-	3	5722.8	-
4	7409.6	-	4	7520.0	-	4	7630.4	-
5	9262.0	-	5	9400.0	-	5	9538.0	-
6	11114.4	-	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	-

Plots:

Plot 1: Channel 9262 (Traffic mode up to 30 MHz)

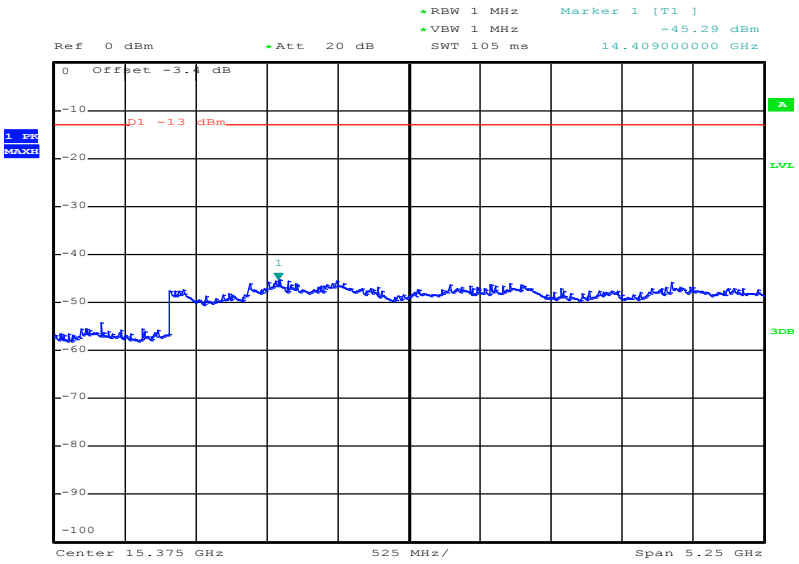


Plot 2: Channel 9262 (30 MHz – 12.75 GHz)



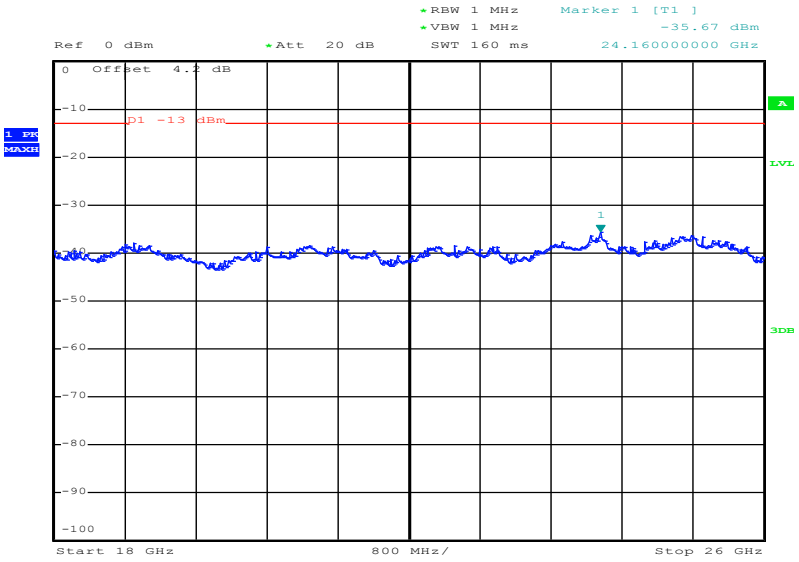
Carrier notched with 1.9 GHz band rejection filter

Plot 3: Channel 9262(12.75 GHz – 18 GHz)



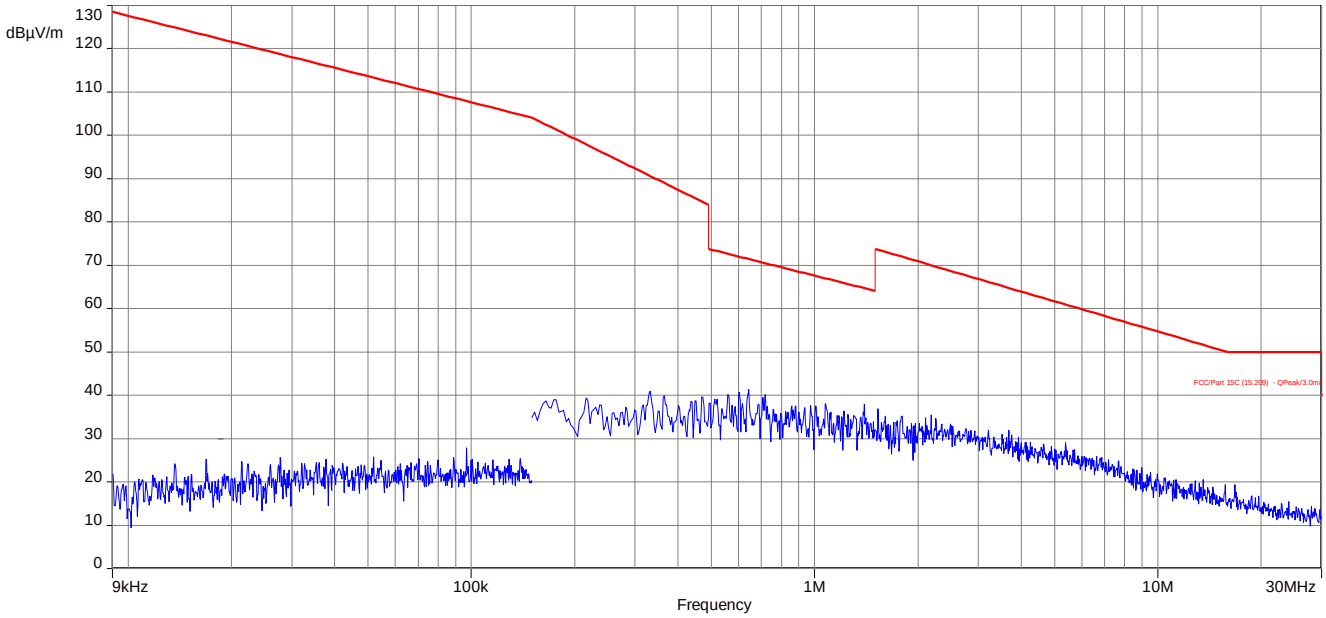
Date: 25.NOV.2015 08:43:30

Plot 4: Channel 9262 (18 GHz – 26 GHz)

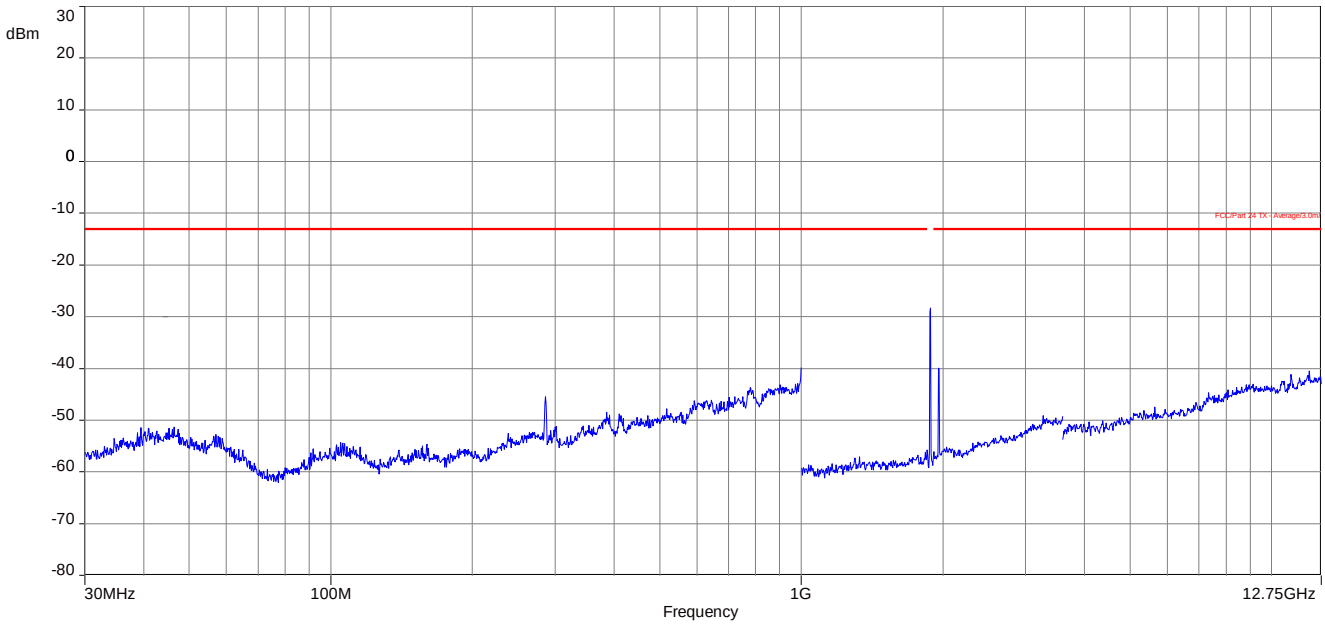


Date: 25.NOV.2015 08:55:40

Plot 5: Channel 9400 (Traffic mode up to 30 MHz)

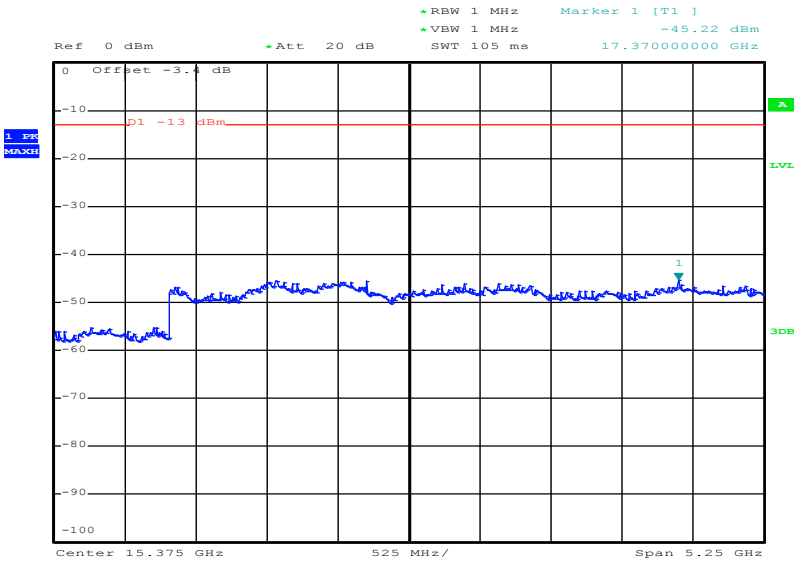


Plot 6: Channel 9400 (30 MHz – 12.75 GHz)



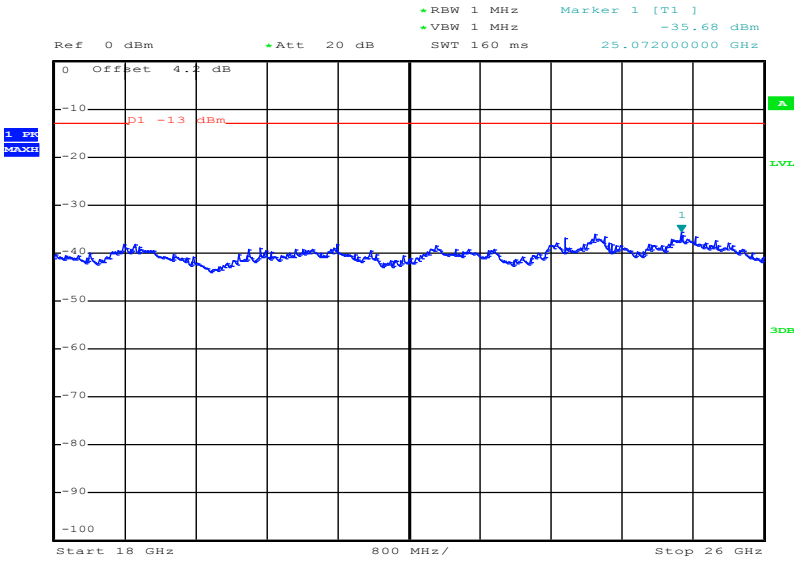
Carrier notched with 1.9 GHz band rejection filter

Plot 7: Channel 9400 (12.75 GHz – 18 GHz)



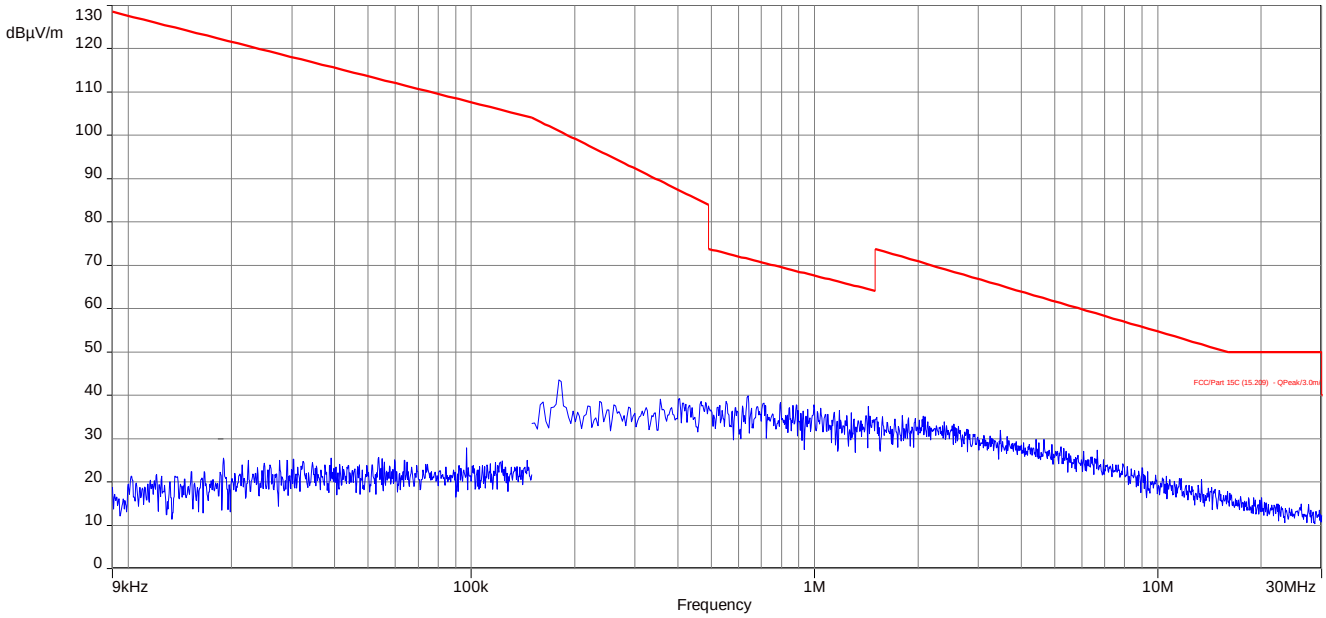
Date: 25.NOV.2015 08:44:01

Plot 8: Channel 9400 (18 GHz – 26 GHz)

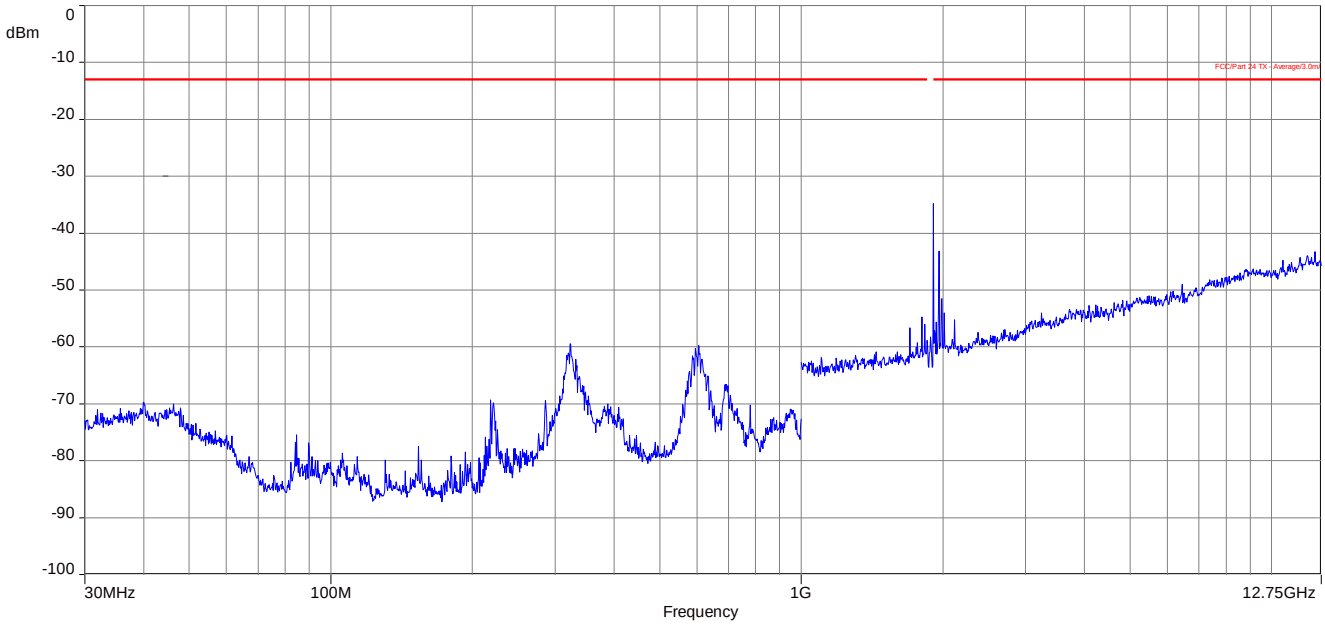


Date: 25.NOV.2015 08:56:02

Plot 9: Channel 9538 (Traffic mode up to 30 MHz)

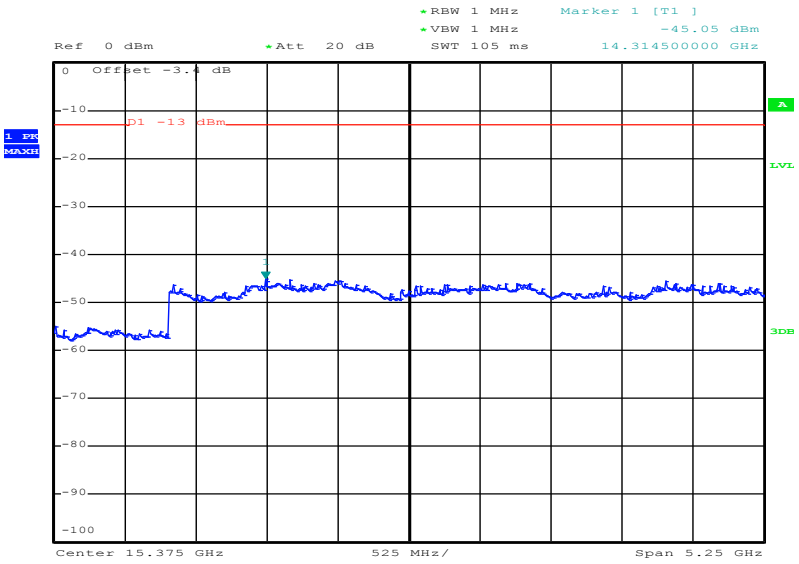


Plot 10: Channel 9538 (30 MHz – 12.75 GHz)



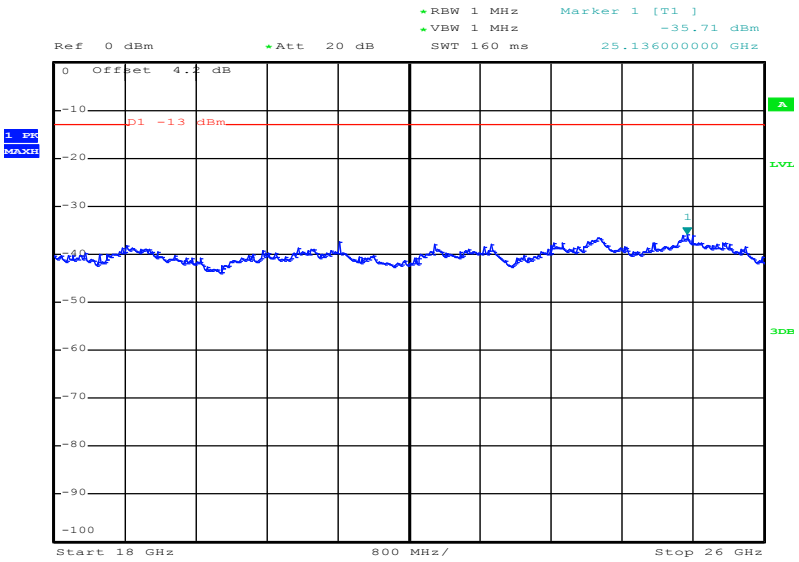
Carrier notched with 1.9 GHz band rejection filter

Plot 11: Channel 9538 (12.75 GHz – 18 GHz)



Date: 25.NOV.2015 08:44:39

Plot 12: Channel 9538 (18 GHz – 26 GHz)



Date: 25.NOV.2015 08:56:36

11.4 Results UMTS band IV

All UMTS-band measurements are made in WCDMA mode only.
The connection was established with the following setup: WCDMA CS-RMC, Max Power (All Bit up)

11.4.1 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
Test setup	See sub clause 7.1 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Nominal Peak Output Power	
+30.00 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		
Frequency (MHz)	**Average Output Power (dBm)**	**Peak to Average Ratio (dB)**
1712.4	24.67	3.1
1732.4	26.60	3.1
1752.6	25.81	3.1

11.4.2 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 C63.4:2014 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. Measurement made up to 25 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
Test setup	See sub clause 7.1 A and 7.2 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Spurious Emissions Radiated	
Attenuation ≥ 43 + 10log(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 (1712.4 MHz, 1732.4 MHz and 1752.6 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 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.

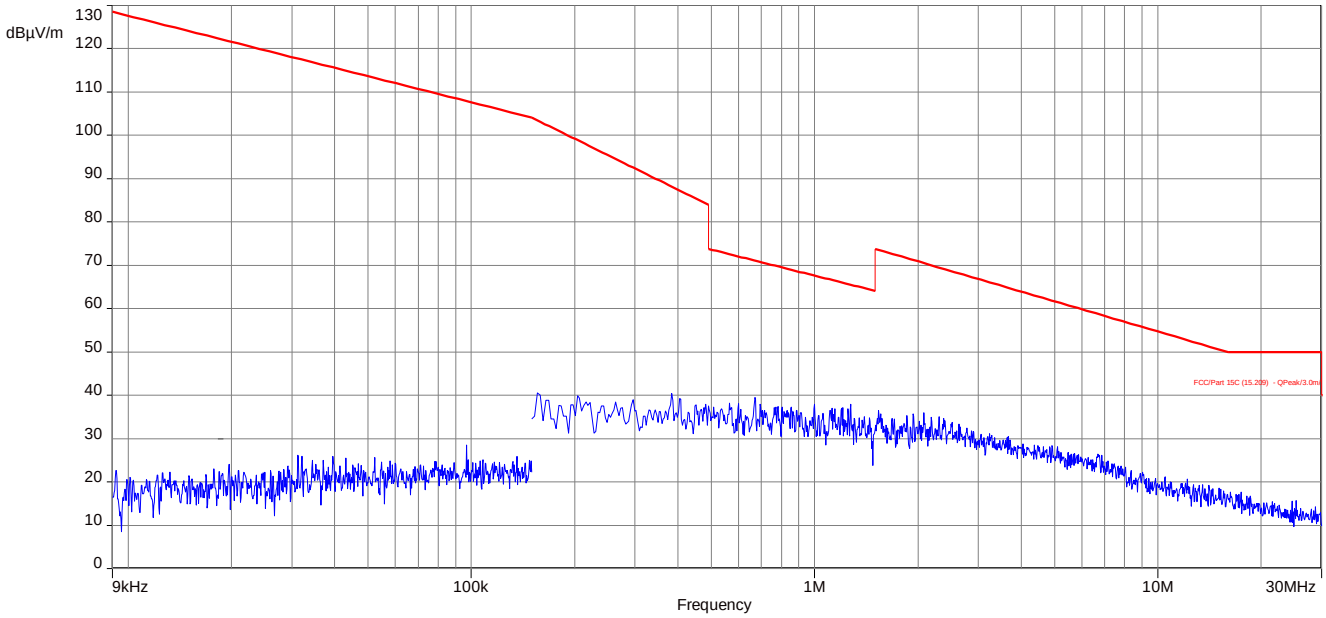
The final open field radiated levels are presented on the next pages.
All measurements were made in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values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

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

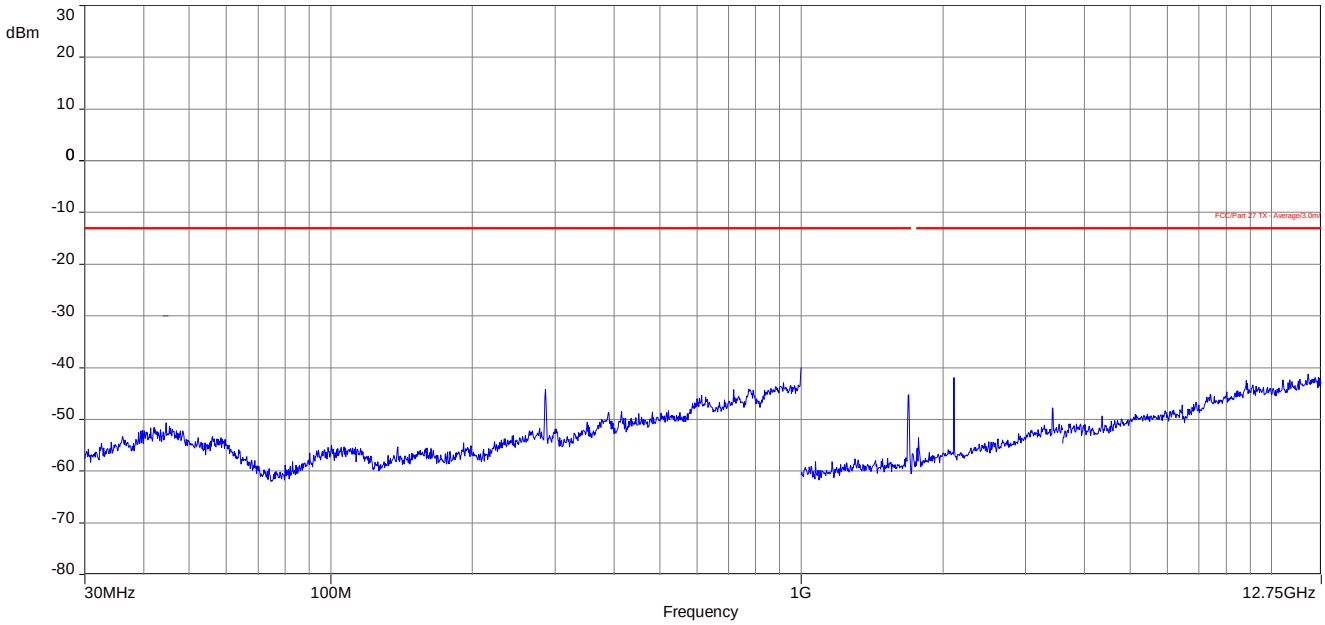
Spurious Emission Level (dBm)								
Harmonic	Ch. 1312 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 1412 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 1513 Freq. (MHz)	Level [dBm]
2	3424.8	-	2	3464.8	-	2	3505.2	-
3	5137.2	-	3	5197.2	-	3	5257.8	-
4	6849.6	-	4	6929.6	-	4	7010.4	-
5	8562.0	-	5	8662.0	-	5	8763.0	-
6	10274.4	-	6	10394.4	-	6	10515.6	-
7	11986.8	-	7	12126.8	-	7	12268.2	-
8	13699.2	-	8	13859.2	-	8	14020.8	-
9	15411.6	-	9	15591.6	-	9	15773.4	-
10	17124.0	-	10	17324.0	-	10	17526.0	-

Plots:

Plot 1: Channel 1312 (Traffic mode up to 30 MHz)

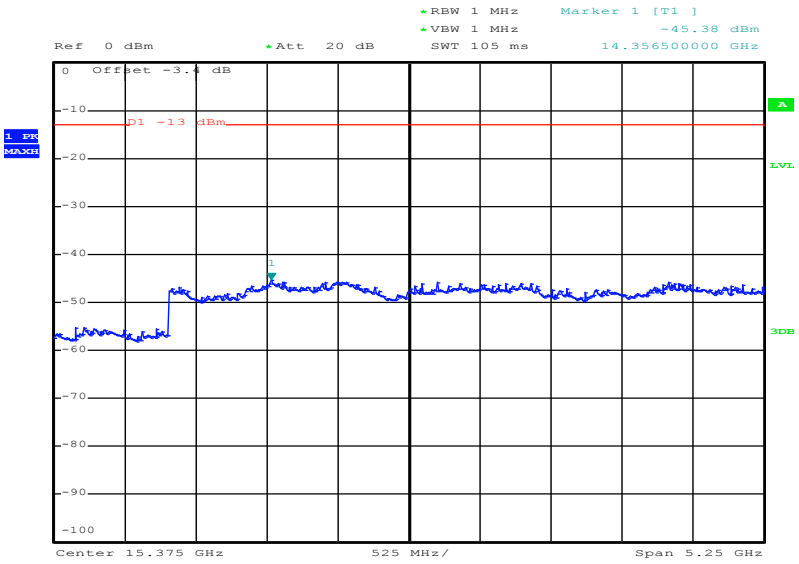


Plot 2: Channel 1312 (30 MHz – 12.75 GHz)



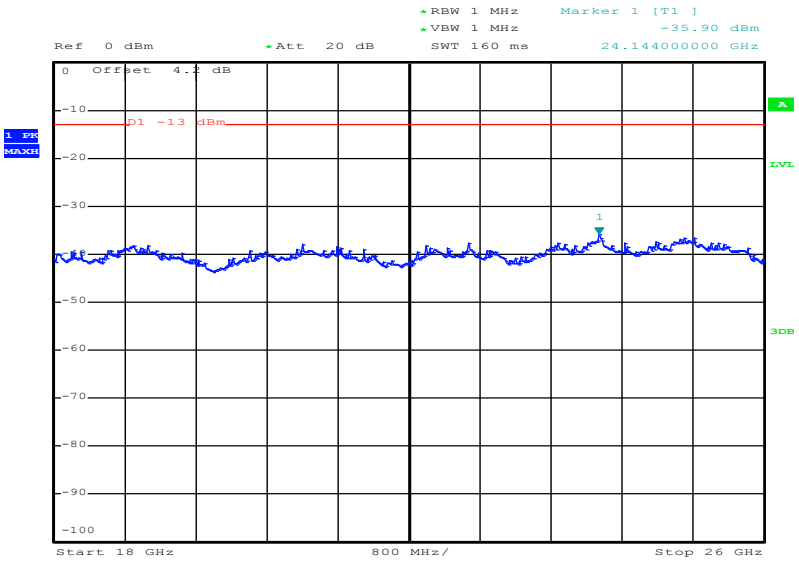
Carrier notched with 1.9 GHz band rejection filter

Plot 3: Channel 1312 (12.75 GHz – 18 GHz)



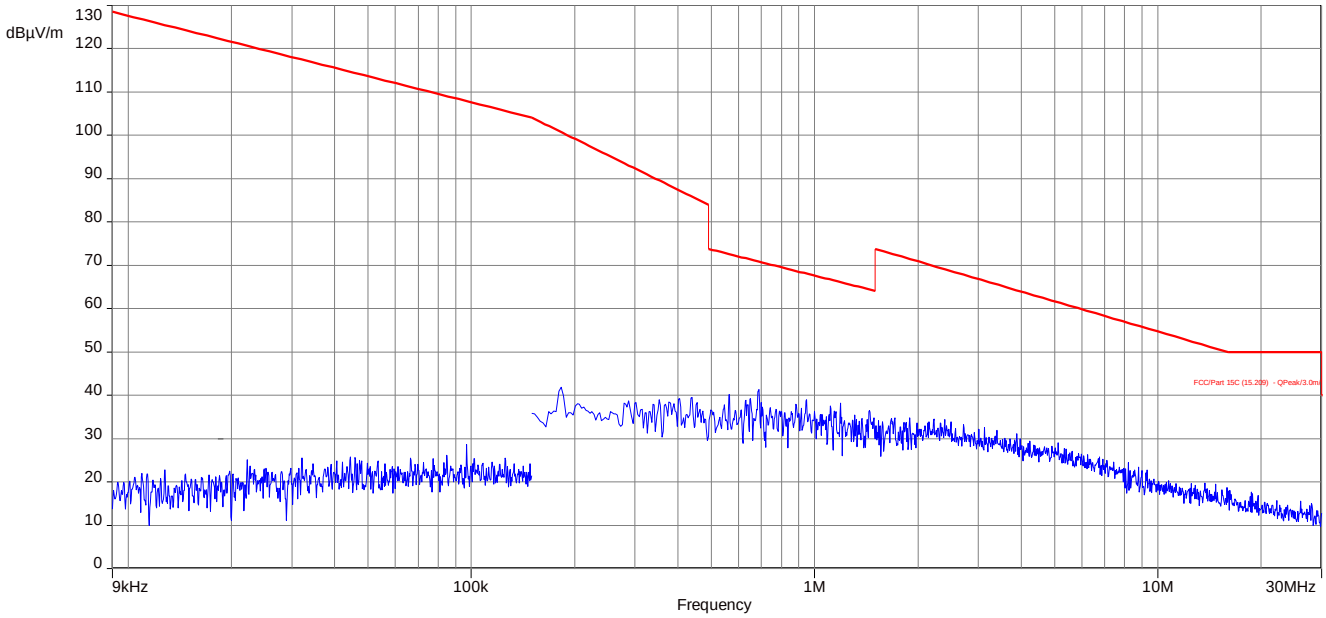
Date: 25.NOV.2015 08:42:53

Plot 4: Channel 1312 (18 GHz – 26 GHz)

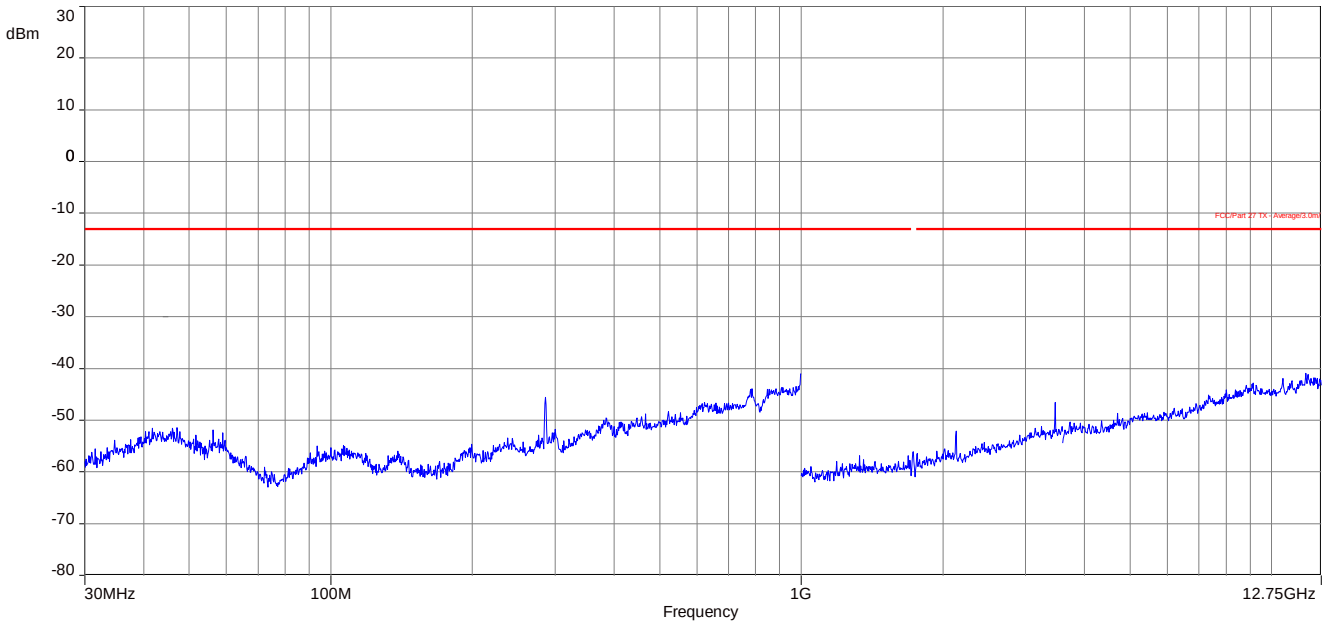


Date: 25.NOV.2015 08:57:17

Plot 5: Channel 1412 (Traffic mode up to 30 MHz)

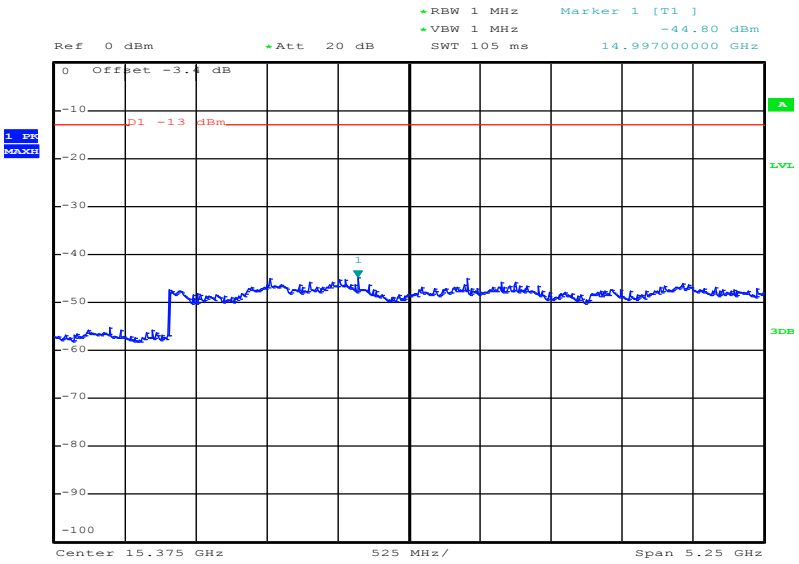


Plot 6: Channel 1412 (30 MHz – 12.75 GHz)



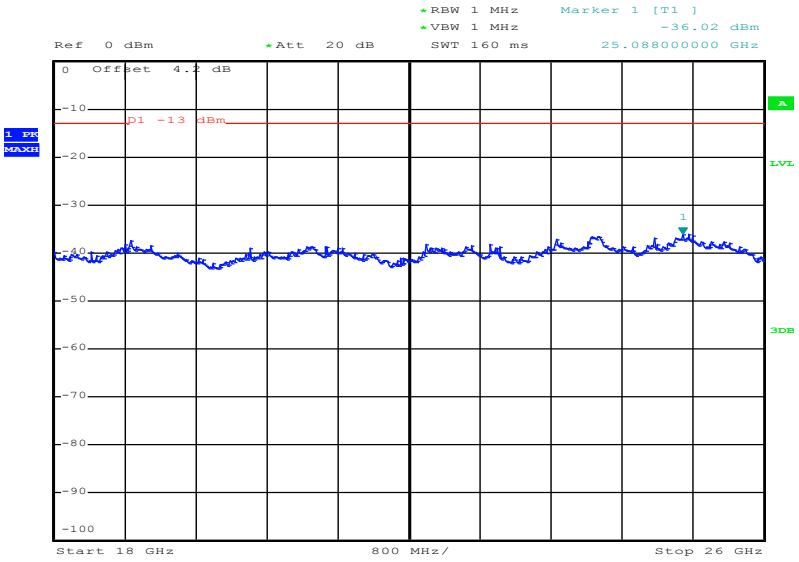
Carrier notched with 1.9 GHz band rejection filter

Plot 7: Channel 1412 (12.75 GHz – 18 GHz)



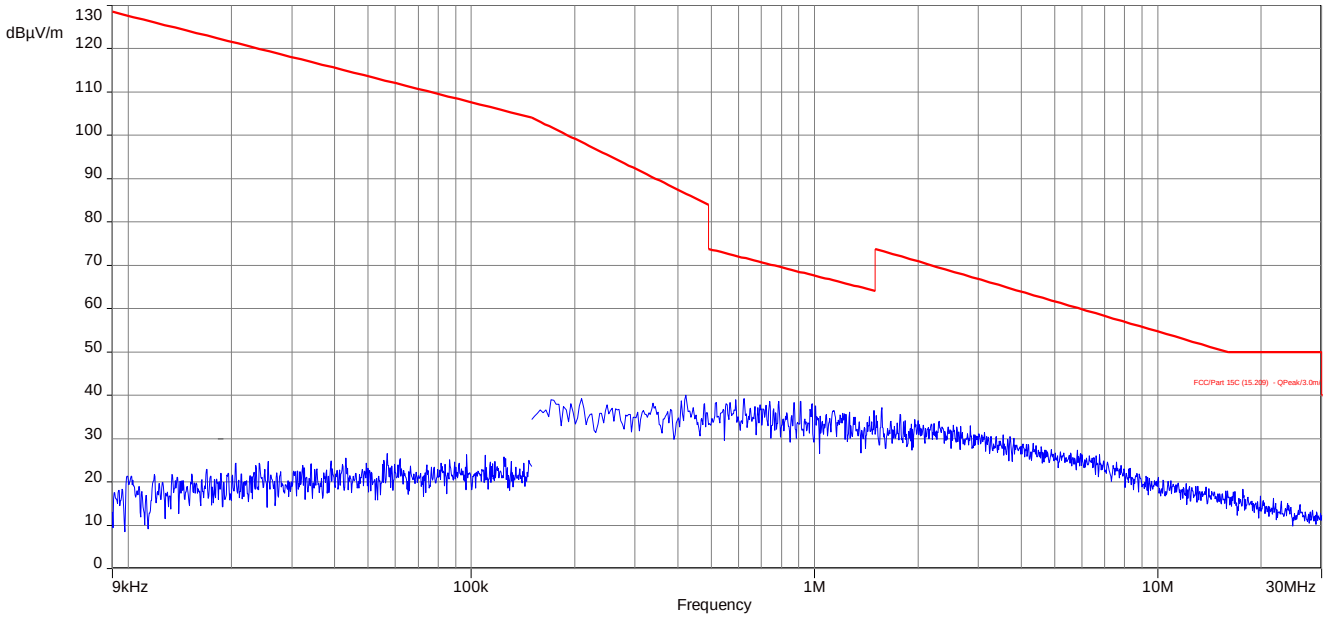
Date: 25.NOV.2015 08:42:15

Plot 8: Channel 1412 (18 GHz – 26 GHz)

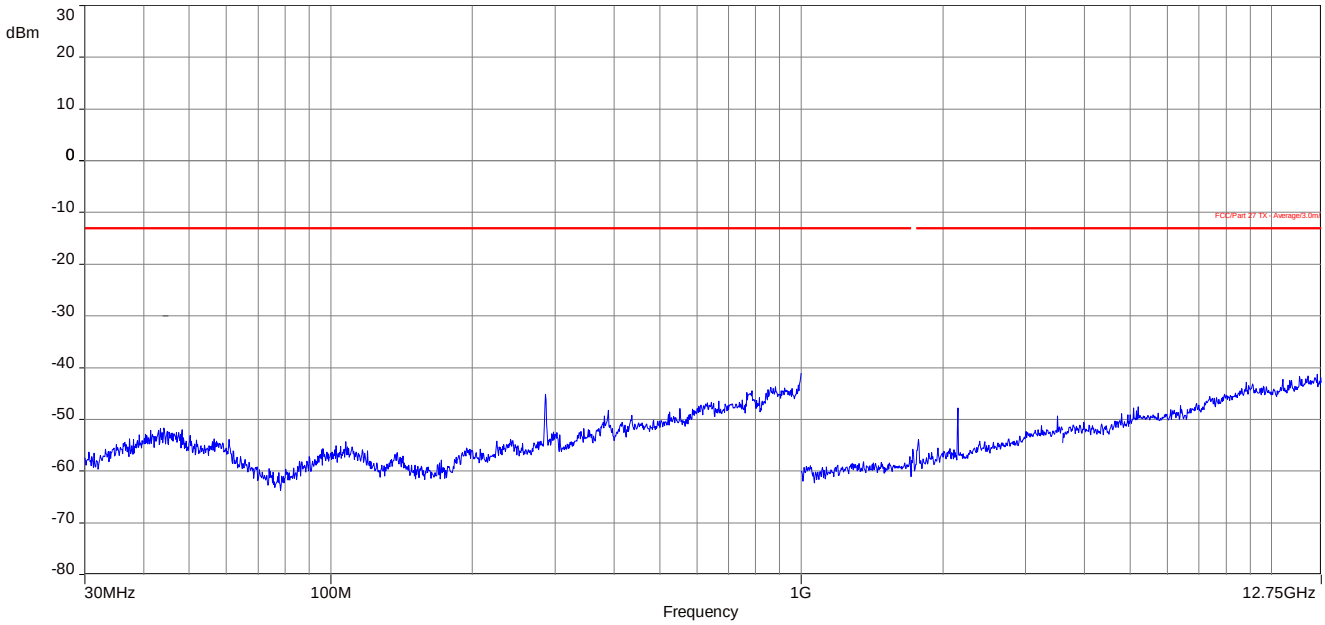


Date: 25.NOV.2015 08:57:48

Plot 9: Channel 1513 (Traffic mode up to 30 MHz)

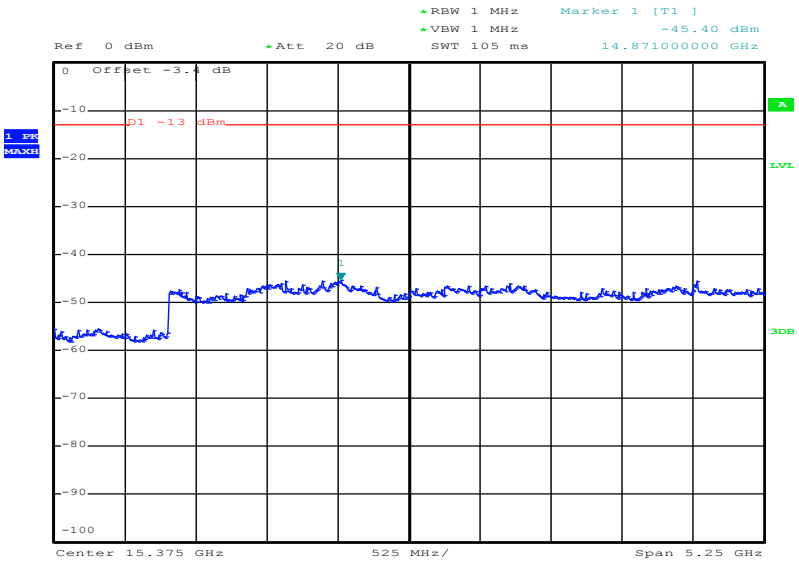


Plot 10: Channel 1513 (30 MHz – 12.75 GHz)



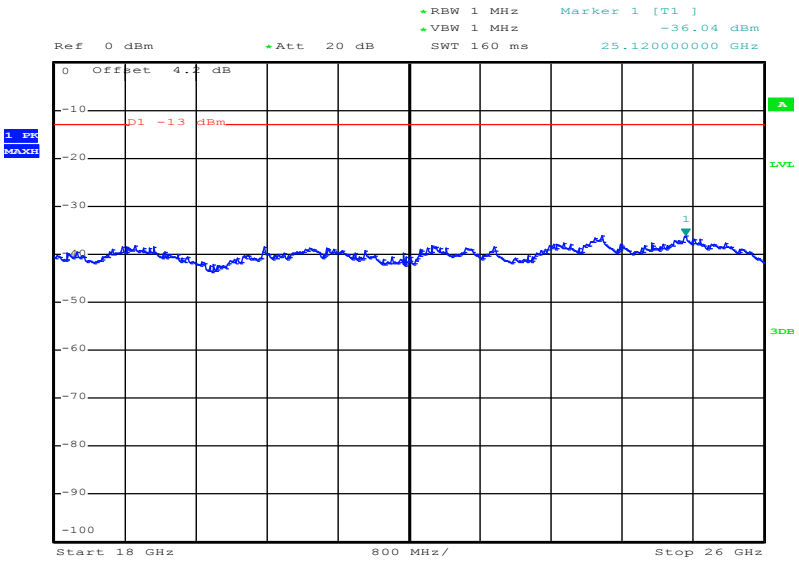
Carrier notched with 1.9 GHz band rejection filter

Plot 11: Channel 1513 (12.75 GHz – 18 GHz)



Date: 25.NOV.2015 08:41:44

Plot 12: Channel 1513 (18 GHz – 26 GHz)



Date: 25.NOV.2015 08:59:05

11.5 Results UMTS band V

All UMTS-band measurements are made in WCDMA mode only.
The connection was established with the following setup: WCDMA CS-RMC, Max Power (All Bit up)

11.5.1 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
Test setup	See sub clause 7.1 B
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
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		
Frequency (MHz)	**Average Output Power (dBm)**	**Peak to Average Ratio (dB)**
826.4	23.28	3.0
836.0	23.82	3.0
846.6	24.01	3.0

11.5.2 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 C63.4:2014 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
Test setup	See sub clause 7.1 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Spurious Emissions Radiated	
Attenuation ≥ 43 + 10log(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.

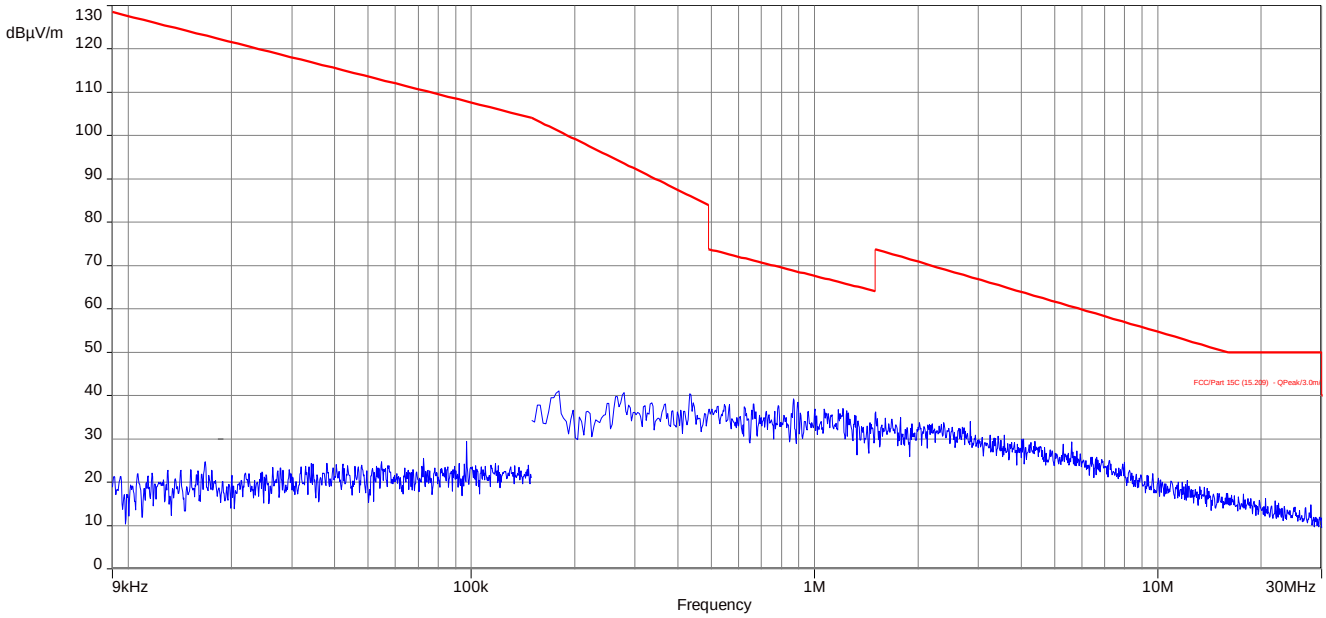
The final open field radiated levels are presented on the next pages.
All measurements were made in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked too. The found values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

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

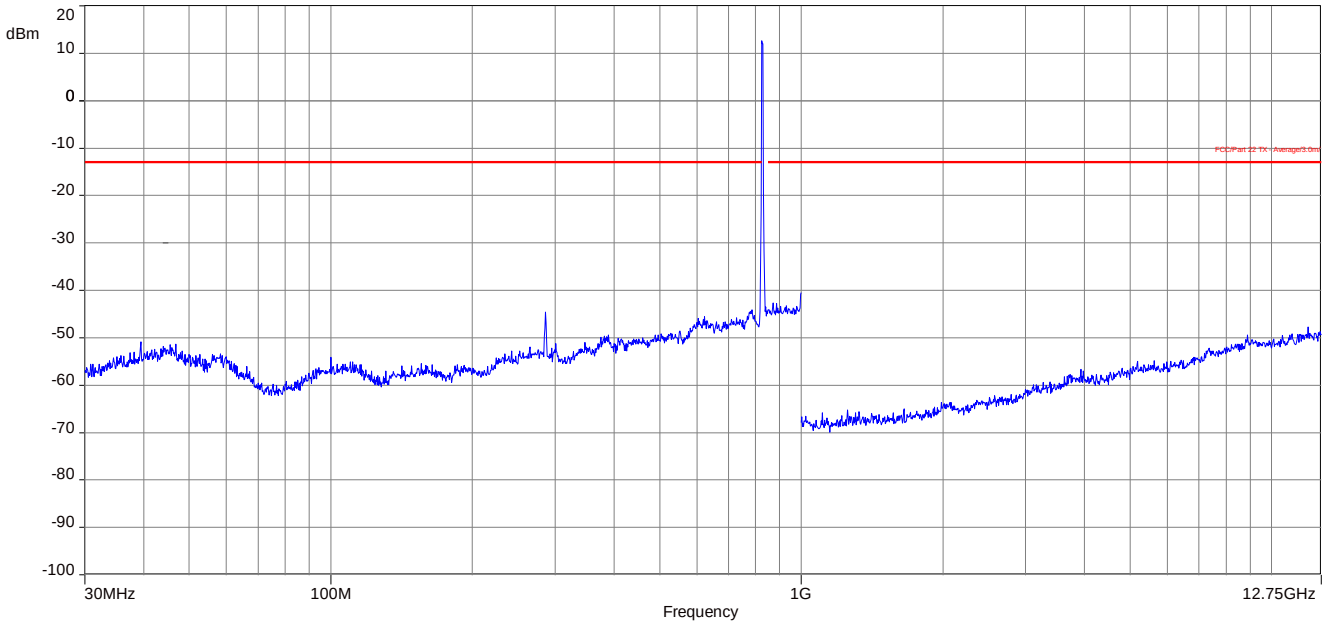
Spurious Emission Level (dBm)								
Harmonic	Ch. 4132 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 4180 Freq. (MHz)	Level [dBm]	Harmonic	Ch. 4233 Freq. (MHz)	Level [dBm]
2	1652.8	-	2	1672.0	-	2	1693.2	-
3	2479.2	-	3	2508.0	-	3	2539.8	-
4	3305.6	-	4	3344.0	-	4	3386.4	-
5	4132.0	-	5	4180.0	-	5	4233.0	-
6	4958.4	-	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	-

Plots:

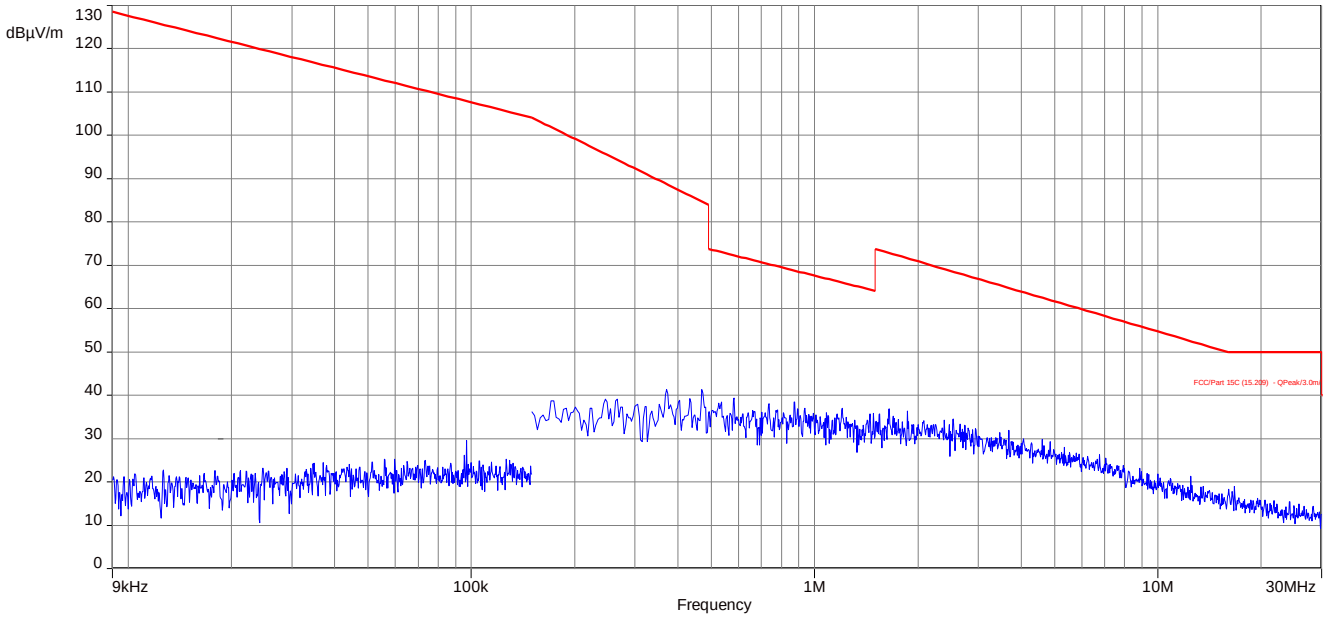
Plot 1: Channel 4132 (Traffic mode up to 30 MHz)



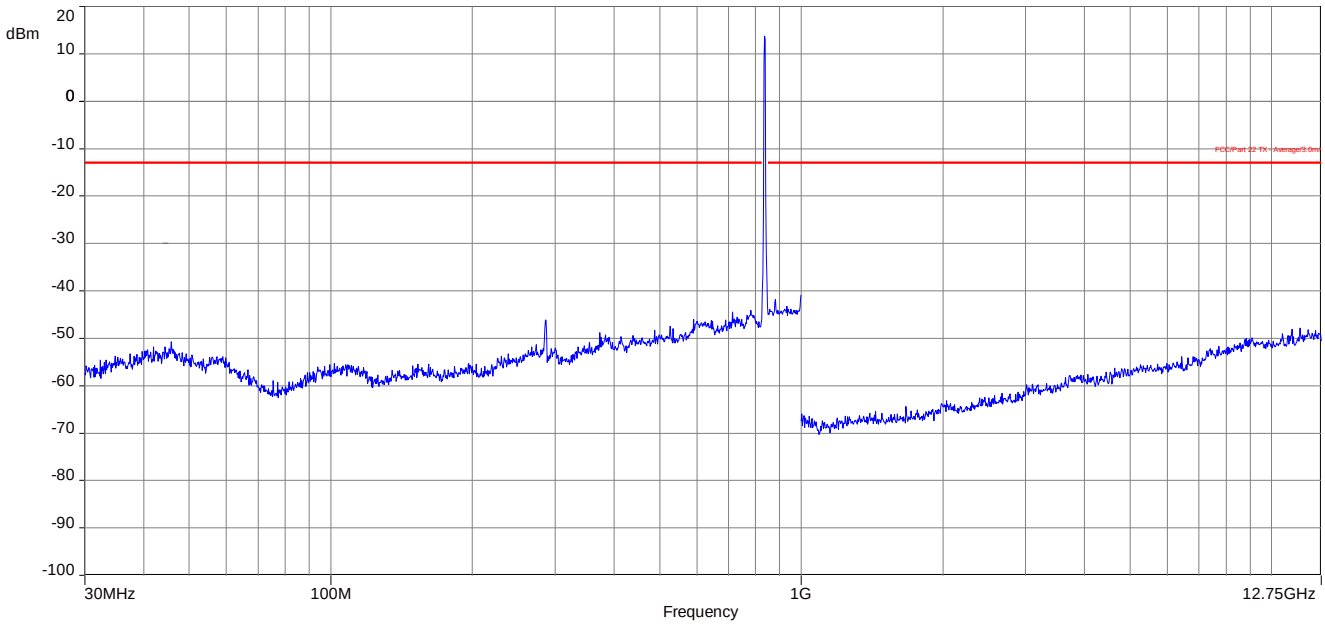
Plot 2: Channel 4132 (30 MHz – 12.75 GHz)



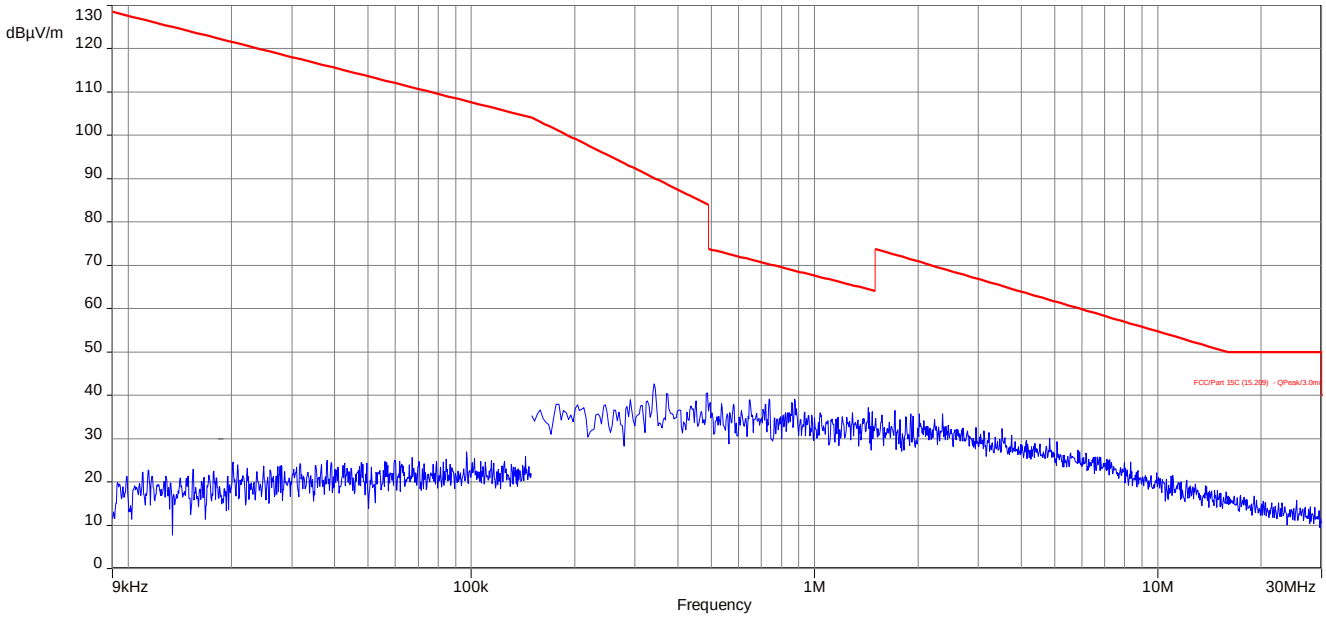
Plot 3: Channel 4180 (Traffic mode up to 30 MHz)



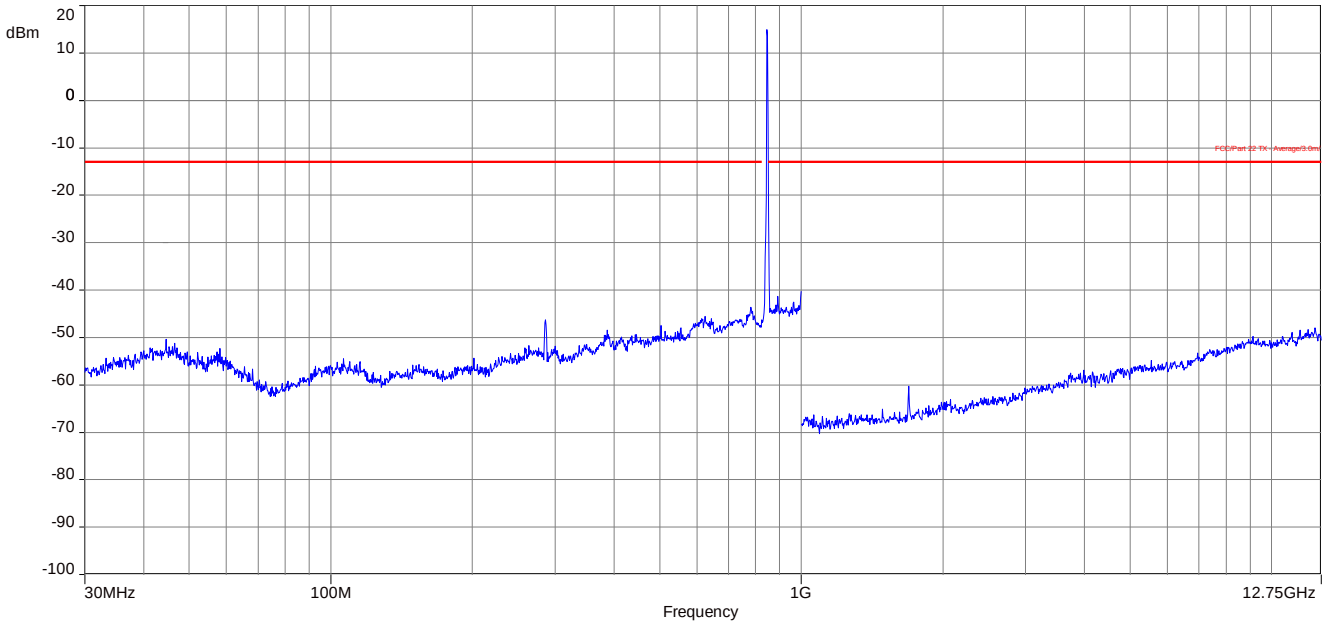
Plot 4: Channel 4180 (30 MHz – 12.75 GHz)



Plot 5: Channel 4233 (Traffic mode up to 30 MHz)



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



12 Observations

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

Annex A Document history

Version	Applied changes	Date of release
	Initial release	2015-12-16

Annex B Further information

Glossary

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

Annex C Accreditation Certificate

Front side of certificate

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene 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 07.03.2014 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 77 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12076-01-00**

Frankfurt am Main, 07.03.2014

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Abteilungsleiter

Back side of certificate

Deutsche Akkreditierungsstelle GmbH

Standort Berlin	Standort Frankfurt am Main	Standort Braunschweig
Spittelmarkt 10	Gartenstraße 6	Bundesallee 100
10117 Berlin	60594 Frankfurt am Main	38116 Braunschweig

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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 (Abl. 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:
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ILAC: www.ilac.org
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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.

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