
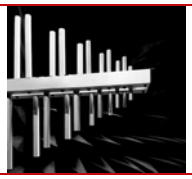
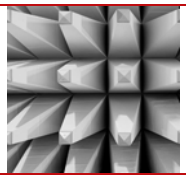

CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-5579/12-02-09-D

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
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e-mail: ict@cetecom.com

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
305 Phillip Street
Waterloo, ON N2L 3W8 / CANADA
Phone: +1 51 98 88 74 65
Fax: +1 51 98 88 69 06
Contact: Masud Attayi
e-mail: mattayi@rim.com
Phone: +1 51 98 88 74 65

Manufacturer

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

Test standard/s

47 CFR Part 27	Title 47 of the Code of Federal Regulations; Chapter I Part 27 - Miscellaneous Wireless Communications Service
RSS - 139 Issue 2	Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz

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

Test Item

Kind of test item:	**Blackberry GSM Phones**
Model name:	**RFM121LW**
FCC ID:	**L6ARFM120LW**
IC:	**2503A-RFM120LW**
Frequency:	LTE band IV: 1710.70 MHz – 1754.30 MHz
Technology tested:	LTE
Antenna:	Integrated antenna
Power Supply:	3.8 V DC by Li-Ion battery
Temperature Range:	-20°C to +55°C

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

Test report authorised:

cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-100826, email=marco.bertolino@cetecom.com, c=DE
2013.04.10 15:49:10 +02'00'

Marco Bertolino
Testing Manager

Test performed:

cn=Stefan Boes, o=CETECOM ICT Services GmbH, ou=BOE-111011, email=Stefan.Boes@cetecom.com, c=DE
2013.04.10 15:46:20 +02'00'

Stefan Bös
Senior Testing Manager

1 Table of contents

2 General information

2.1 Notes and disclaimer

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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:	2013-01-04
Date of receipt of test item:	2013-01-14
Start of test:	2013-01-14
End of test:	2013-03-28
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 27	2012-10	Title 47 of the Code of Federal Regulations; Chapter I Part 27 - Miscellaneous Wireless Communications Service
RSS - 139 Issue 2	2009-02	Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz

4 Test environment

Temperature:	T_{nom}	+22 °C	during room temperature tests
	T_{max}	+55 °C	during high temperature tests
	T_{min}	-20 °C	during low temperature tests
Relative humidity content:		52 %	
Barometric pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	3.8 V	DC by Li-Ion battery
	V_{max}	-/- V	
	V_{min}	-/- V	

5 Test item

Kind of test item	**:**	**Blackberry GSM Phones**
Type identification	**:**	**RFM121LW**
S/N serial number	**:**	**Radiated unit: IMEI 990002430036416; PIN 303E5B59** **Conducted unit: IMEI 990002430036374; PIN 303E5B55**
HW hardware status	**:**	**CER-53013-001Rev2-905-00**
SW software status	**:**	**127.0.1.4429**
Frequency band [MHz]	**:**	**LTE band IV: 1710.70 MHz – 1754.30 MHz**
Type of modulation	**:**	**QPSK, 16 – QAM**
Antenna	**:**	**Integrated antenna**
Power supply	**:**	**3.8 V DC by Li-Ion battery**
Temperature range	**:**	**-20°C to +55 °C**

5.1 Additional information

Test setup- and EUT-photos are included in test reports: 1-5579/12-02-01_AnnexA
1-5579/12-02-01_AnnexC

Result table according customers demand:

Frequency Range (MHz)	Output Power (Watts)	Emission Designator	TC Notes
1732.5	0.125	1M09G7D	LTE B4 1.4M QPSK
1732.5	0.1	1M09W7D	LTE B4 1.4M 16QAM
1732.5	0.139	2M69G7D	LTE B4 3M QPSK
1732.5	0.114	2M69W7D	LTE B4 3M 16QAM
1732.5	0.136	4M47G7D	LTE B4 5M QPSK
1732.5	0.109	4M49W7D	LTE B4 5M 16QAM
1732.5	0.094	8M97G7D	LTE B4 10M QPSK
1732.5	0.097	8M97W7D	LTE B4 10M 16QAM
1732.5	0.115	13M4G7D	LTE B4 15M QPSK
1732.5	0.095	13M4W7D	LTE B4 15M 16QAM
1732.5	0.122	17M8G7D	LTE B4 20M QPSK
1732.5	0.094	18M0W7D	LTE B4 20M 16QAM

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 27 RSS 139	passed	2013-04-10	-/-

7.1 LTE – Band 4

Test Case	temperature conditions	power source voltages	Pass	Fail	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:
NA = Not applicable; NP = Not performed

7.2 Receiver

Test Case	temperature conditions	power source voltages	Pass	Fail	NA	NP	Remark
Spurious Emissions Radiated	Nominal	Nominal	☒	☐	☐	☐	-/-

Note:
NA = Not applicable; NP = Not performed

8 RF measurements

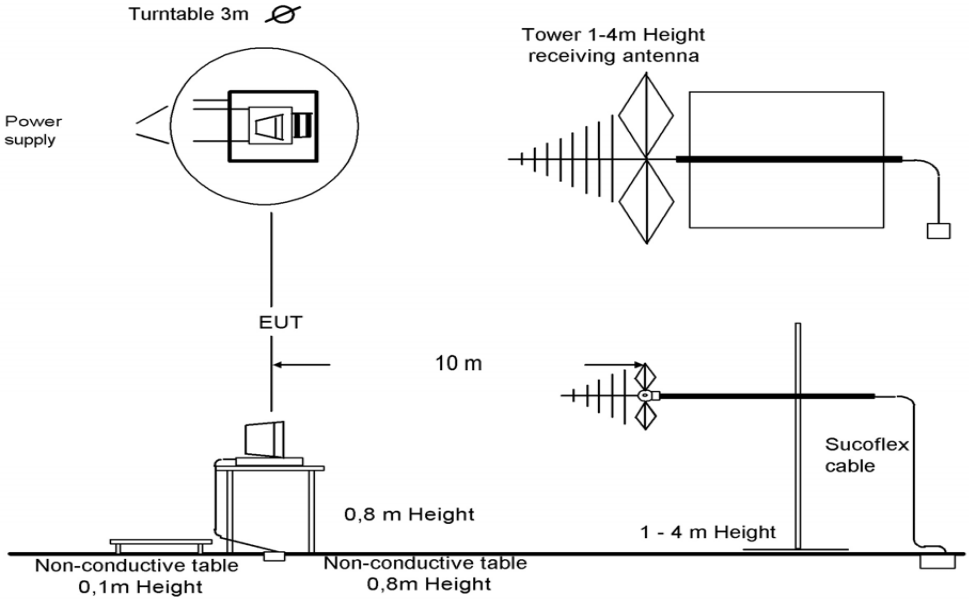
8.1 Description of test setup

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

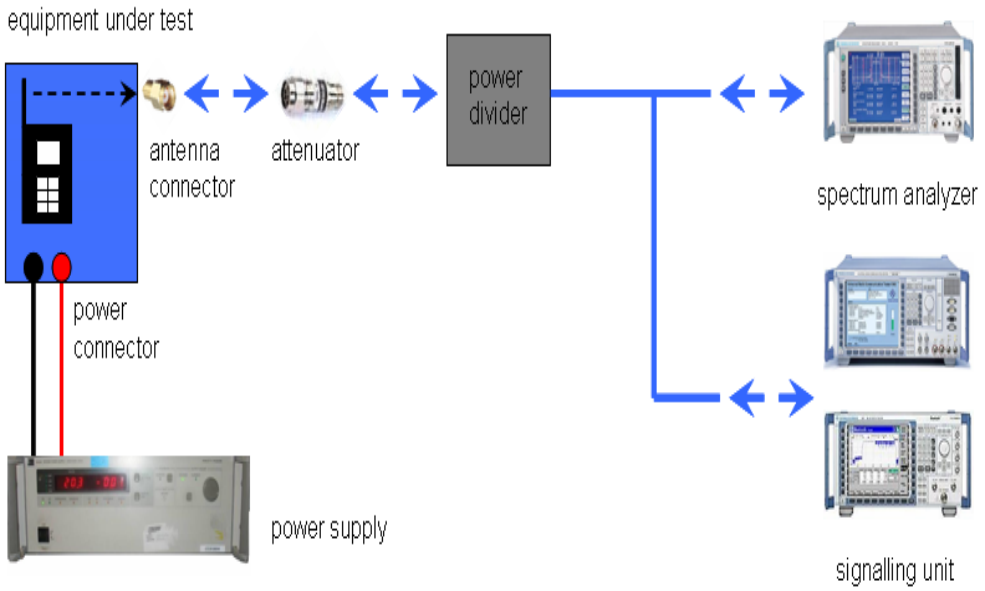


Picture 1: Diagram radiated measurements

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

8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the signalling unit (AP or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm. If special software is used, there is no power divider necessary.



Picture 2: Diagram conducted measurements

The term measuring receiver refers to either a selective voltmeter or a spectrum analyser.

Frequency being measured f	Measuring receiver bandwidth 6 dB	Spectrum analyser bandwidth 3dB
f < 150 kHz	200 Hz or	300 Hz
150 kHz ≤ f < 25 MHz	9 kHz or	10 kHz
25 MHz ≤ f < 1000 MHz	120 kHz or	100 kHz
1000 MHz ≤ f		1 MHz
NOTE: Specific requirements in CEPT/ERC/Recommendation 70-03 [2] shall be applied where applicable.		

8.2 LTE technologies supported by EUT

Channel bandwidth

	Band 4	Band 17
[MHz]		
1.4	☒	☐
3	☒	☐
5	☒	☐
10	☒	☐
15	☒	☐
20	☒	☐

Antenna

SISO	☒
SIMO	☐
MISO	☐
MIMO	☐

8.3 Results LTE – Band 4

The EUT was set to transmit the maximum power.

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.

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:	Depends on Channel Bandwidth
Resolution bandwidth:	Depends on Channel Bandwidth
Span:	Zero Span
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 27.1101 CFR Part 2.1046	RSS 139
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 (conducted)						
Bandwidth (MHz)	**Frequency (MHz)**	**Resource block allocation**	**Average Output Power (dBm) QPSK**	**Peak to Average Ratio (dB)**	**Average Output Power (dBm) 16-QAM**	**Peak to Average Ratio (dB)**
1.4	1710.7	1 RB low	22.04	4.29	21.46	5.16
		1 RB high	22.01	4.29	21.42	5.25
		50% RB mid	22.15	4.49	21.51	5.37
		100% RB	21.24	5.70	20.25	6.62
	1732.5	1 RB low	21.89	4.52	21.13	5.38
		1 RB high	21.85	4.49	21.06	5.40
		50% RB mid	21.88	4.76	21.03	5.61
		100% RB	20.97	5.63	20.00	6.68
	1754.3	1 RB low	22.45	3.96	21.74	4.94
		1 RB high	22.50	3.95	21.68	5.03
		50% RB mid	22.43	4.23	21.82	5.17
		100% RB	21.53	5.36	20.34	6.48
3	1711.5	1 RB low	22.12	4.49	21.23	5.16
		1 RB high	22.25	4.50	21.41	5.13
		50% RB mid	21.56	5.04	20.67	5.89
		100% RB	21.39	5.62	20.32	6.91
	1732.5	1 RB low	22.31	4.84	21.50	5.41
		1 RB high	22.41	4.64	21.69	5.15
		50% RB mid	21.39	5.27	20.75	5.98
		100% RB	21.44	5.67	20.57	6.78
	1753.5	1 RB low	22.71	4.17	21.49	5.02
		1 RB high	22.92	4.13	21.54	5.07
		50% RB mid	21.85	4.82	21.07	5.72
		100% RB	21.72	5.42	20.55	6.92
5	1712.5	1 RB low	22.74	4.30	21.45	5.34
		1 RB high	22.80	4.41	21.63	5.34
		50% RB mid	21.65	5.44	20.97	6.04
		100% RB	21.43	5.91	20.51	6.97
	1732.5	1 RB low	22.58	4.51	21.84	4.96
		1 RB high	22.44	4.46	21.41	5.77
		50% RB mid	21.35	5.69	20.85	6.17
		100% RB	21.33	5.79	20.38	6.85
	1752.5	1 RB low	22.57	4.18	21.33	5.15
		1 RB high	22.83	4.13	21.72	5.05
		50% RB mid	21.85	5.13	21.04	6.02
		100% RB	21.49	5.74	20.37	6.86

10	1715.0	1 RB low	22.10	4.50	21.39	5.23
		1 RB high	22.15	4.71	21.38	5.37
		50% RB mid	21.00	5.86	20.21	6.29
		100% RB	21.02	6.12	20.03	6.67
	1732.5	1 RB low	22.18	4.61	20.76	5.68
		1 RB high	22.14	4.32	20.81	5.27
		50% RB low	20.62	5.76	20.68	5.81
		100% RB	19.75	6.88	19.86	6.84
	1750.0	1 RB low	21.92	4.30	21.15	4.85
		1 RB high	22.27	4.35	21.59	4.99
		50% RB mid	20.89	5.33	20.12	5.87
		100% RB	20.82	6.01	19.99	6.44
15	1717.5	1 RB low	22.18	4.40	21.54	4.82
		1 RB high	22.17	4.63	21.54	4.99
		50% RB mid	20.90	5.96	19.98	6.42
		100% RB	21.02	6.11	19.95	7.00
	1732.5	1 RB low	22.16	4.67	21.29	5.40
		1 RB high	21.97	4.31	20.85	5.28
		50% RB mid	20.87	5.81	20.21	6.10
		100% RB	20.59	6.30	19.76	6.97
	1747.5	1 RB low	21.97	4.21	20.84	5.21
		1 RB high	22.32	4.24	21.23	5.14
		50% RB mid	21.08	5.36	20.57	6.19
		100% RB	20.82	5.97	19.79	7.01
20	1720.0	1 RB low	22.12	4.36	21.29	5.38
		1 RB high	22.10	4.51	21.25	5.59
		50% RB mid	21.05	5.90	20.73	6.41
		100% RB	21.08	6.14	19.93	7.06
	1732.5	1 RB low	22.05	4.78	21.33	5.37
		1 RB high	21.89	4.33	21.10	4.94
		50% RB low	21.86	5.59	21.19	6.07
		100% RB	20.88	5.92	19.74	6.84
	1745.0	1 RB low	21.89	4.35	20.91	5.49
		1 RB high	22.29	4.13	21.46	5.15
		50% RB mid	20.99	5.35	20.44	5.92
		100% RB	20.89	5.84	19.89	6.89
Measurement uncertainty			± 0.5 dB			

Np: Not performed according manufacturer test plan

Output Power (radiated)			
Bandwidth (MHz)	**Frequency (MHz)**	**Average Output Power (dBm) QPSK**	**Average Output Power (dBm) 16-QAM**
1.4 (6 RB)	1710.7	19.2	18.7
	1732.5	23.5	21.9
	1754.3	24.0	22.8
3 (15 RB)	1711.5	Np	Np
	1732.5	22.9	22.1
	1753.5	Np	Np
5 (25 RB)	1712.5	24.3	23.7
	1732.5	22.8	21.4
	1752.5	24.9	23.2
10 (50 RB)	1715.0	Np	Np
	1732.5	24.0	23.2
	1750.0	Np	Np
15 (75 RB)	1717.5	Np	Np
	1732.5	23.7	22.6
	1747.5	Np	Np
20 (100 RB)	1720.0	23.4	22.6
	1732.5	23.0	22.1
	1745.0	23.3	22.4
20 (1 RB)	1720.0	23.4	22.6
	1732.5	24.0	23.4
	1745.0	23.0	22.5
Measurement uncertainty		± 3.0 dB	

Np: Not performed according manufacturer test plan

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 1755 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band 4.

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

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

Measurement:

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

Limits:

FCC	IC
CFR Part 27.53(g) CFR Part 2.1053	RSS 139
Spurious Emissions Radiated	
Attenuation ≥ 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 LTE band 4 (1712.5 MHz, 1732.5 MHz and 1752.5 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE band 4 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

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

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

QPSK

SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3425.0	-	2	3465.0	-	2	3505.0	-
3	5137.5	-	3	5197.5	-	3	5257.5	-
4	6850.0	-	4	6930.0	-	4	7010.0	-
5	8562.5	-	5	8662.5	-	5	8762.5	-
6	10275.0	-	6	10395.0	-	6	10515.0	-
7	11987.5	-	7	12127.5	-	7	12267.5	-
8	13700.0	-	8	13860.0	-	8	14020.0	-
9	15412.5	-	9	15592.5	-	9	15772.5	-
10	17125.0	-	10	17325.0	-	10	17525.0	-
Measurement uncertainty			± 3dB					

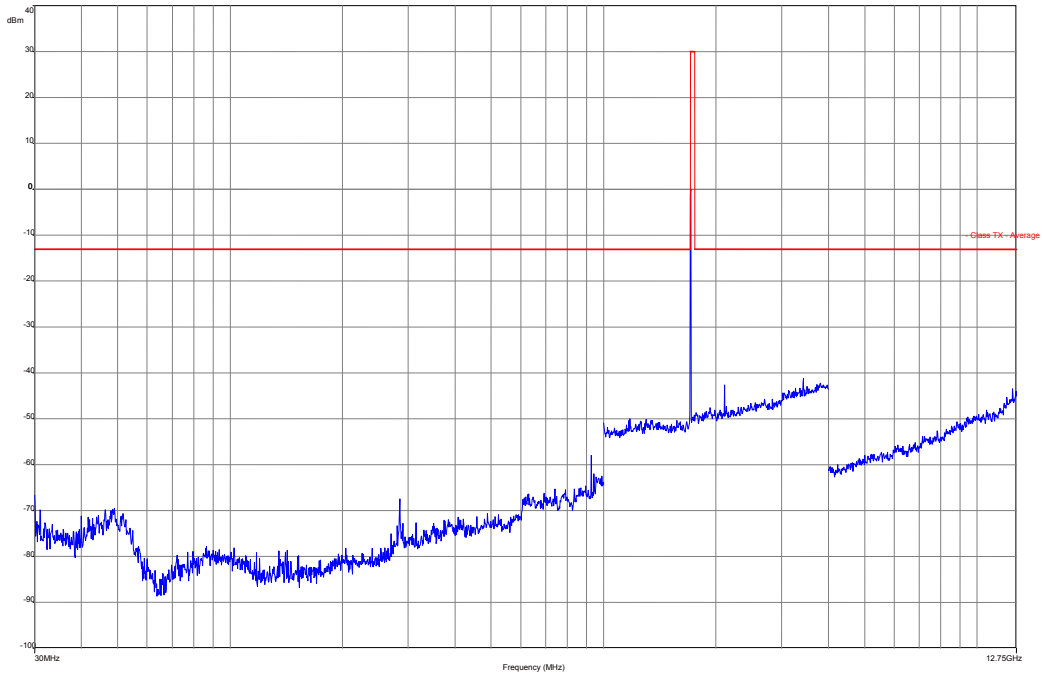
16-QAM

SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3425.0	-	2	3465.0	-	2	3505.0	-
3	5137.5	-	3	5197.5	-	3	5257.5	-
4	6850.0	-	4	6930.0	-	4	7010.0	-
5	8562.5	-	5	8662.5	-	5	8762.5	-
6	10275.0	-	6	10395.0	-	6	10515.0	-
7	11987.5	-	7	12127.5	-	7	12267.5	-
8	13700.0	-	8	13860.0	-	8	14020.0	-
9	15412.5	-	9	15592.5	-	9	15772.5	-
10	17125.0	-	10	17325.0	-	10	17525.0	-
Measurement uncertainty			± 3dB					

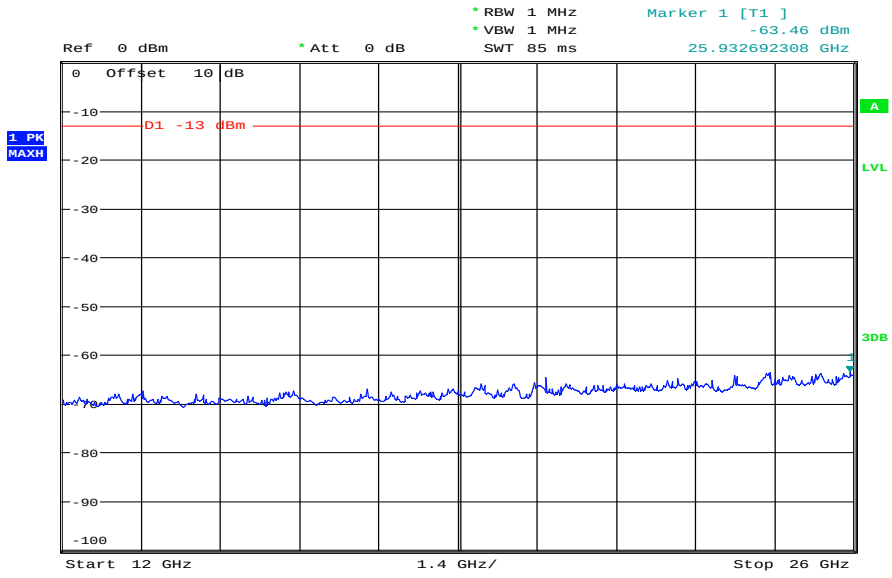
Result: Passed

QPSK with 1.4 MHz channel bandwidth

Plot 1: Channel 19957 (30 MHz – 12.75 GHz)

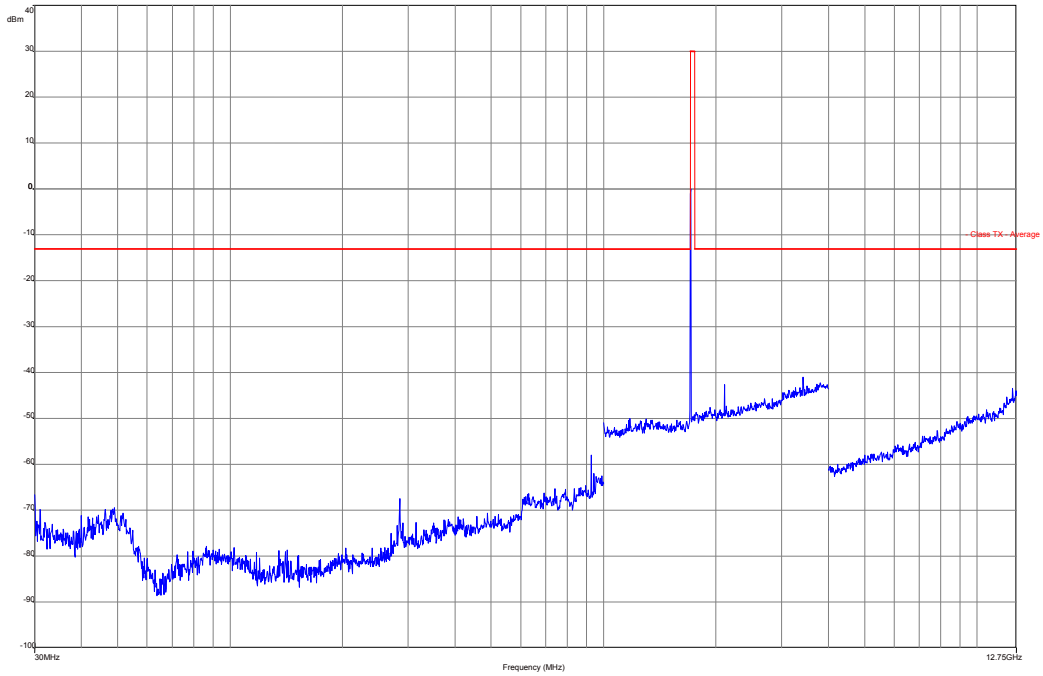


Plot 2: Channel 19957 (12.75 GHz – 26 GHz)

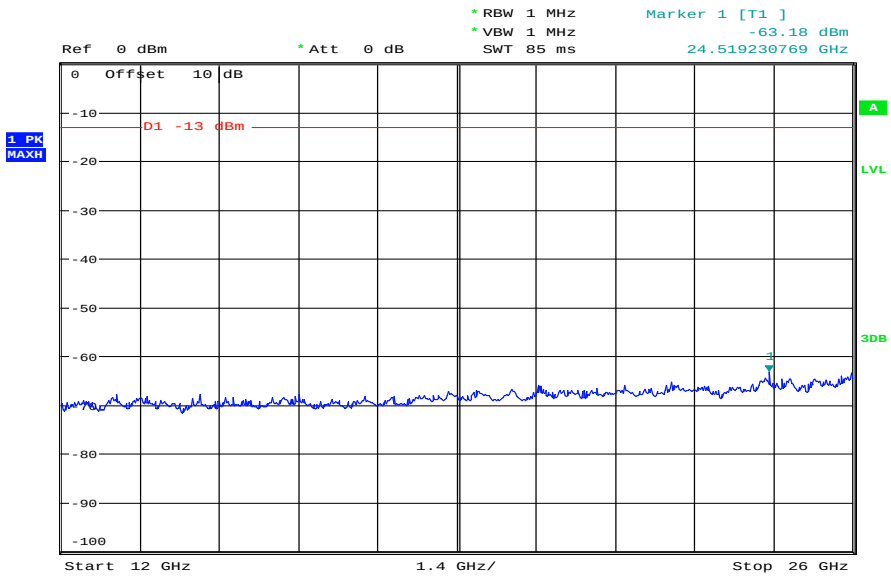


Date: 26.MAR.2013 13:09:27

Plot 3: Channel 20175 (30 MHz – 12.75 GHz)

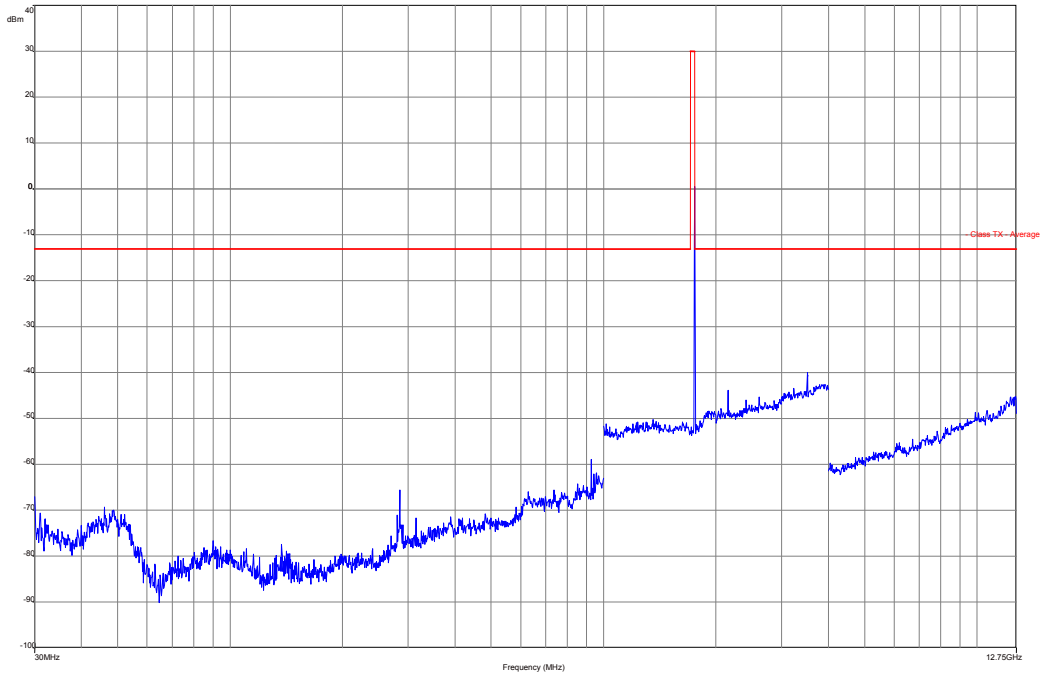


Plot 4: Channel 20175 (12.75 GHz – 26 GHz)

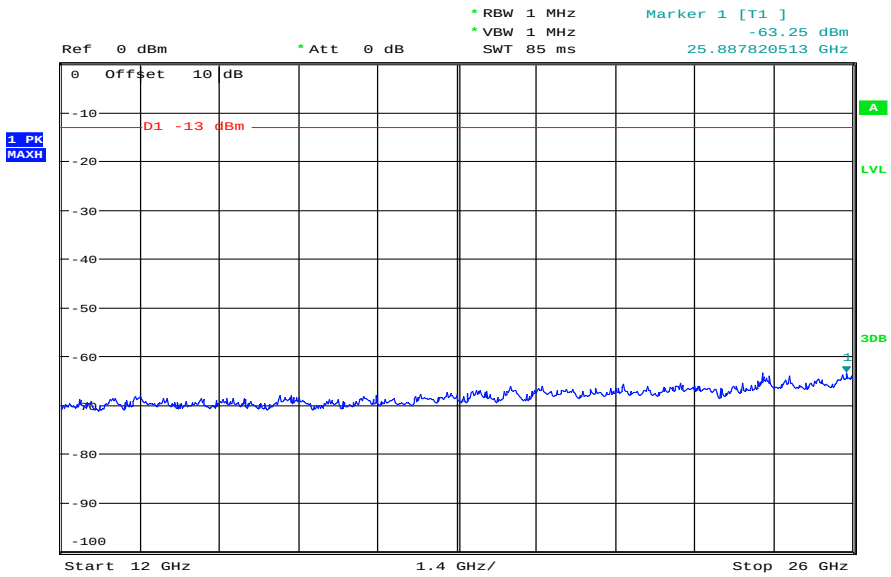


Date: 26.MAR.2013 13:10:12

Plot 5: Channel 20392 (30 MHz – 12.75 GHz)



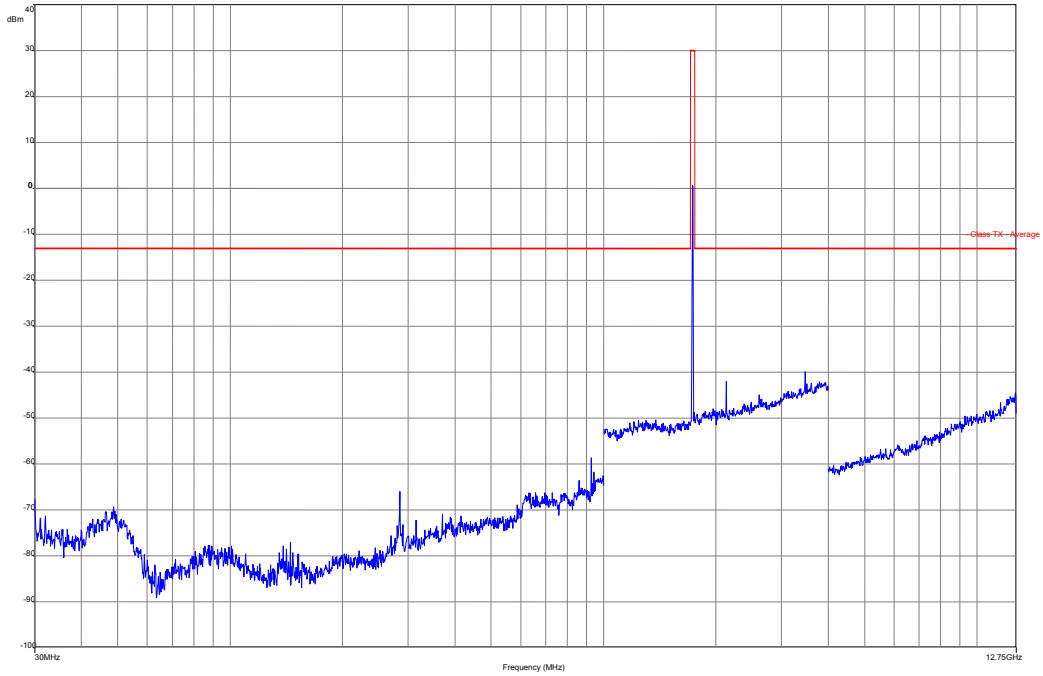
Plot 6: Channel 20392 (12.75 GHz – 26 GHz)



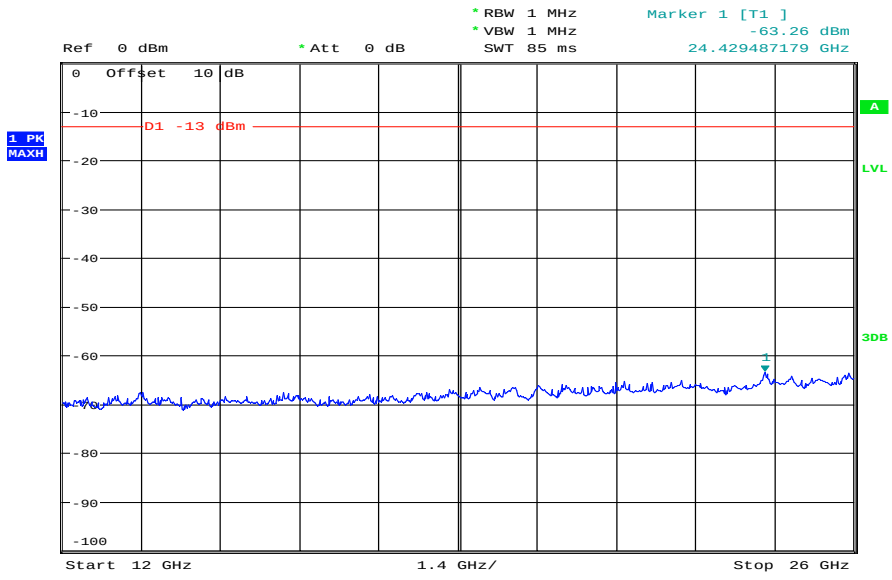
Date: 26.MAR.2013 13:11:20

QPSK with 3 MHz channel bandwidth

Plot 1: Channel 20175 (30 MHz – 12.75 GHz)



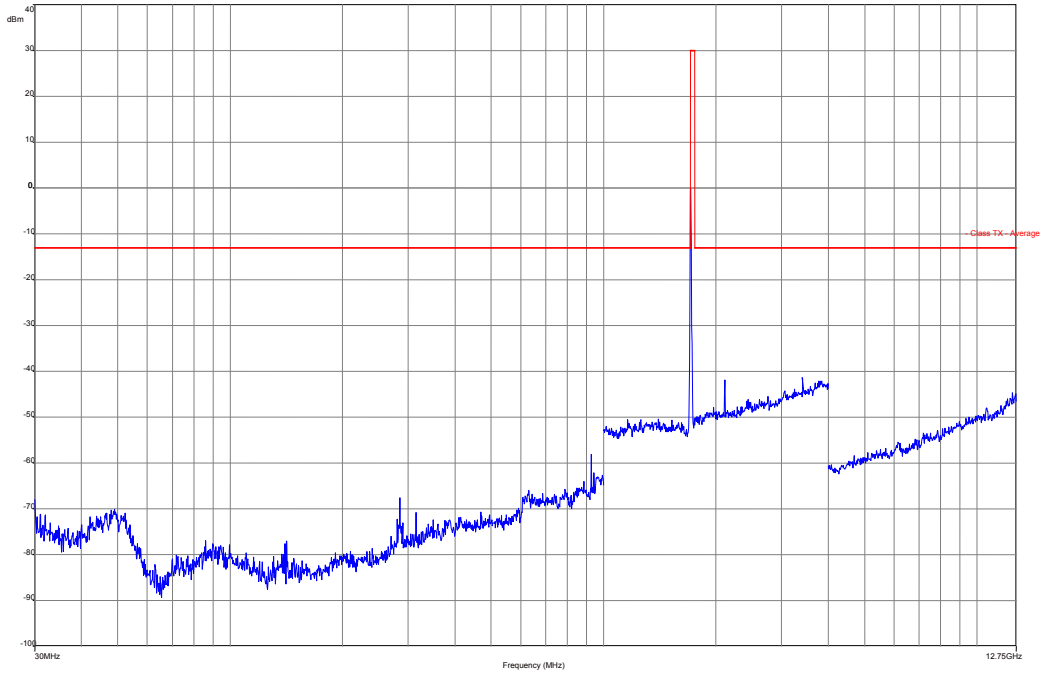
Plot 2: Channel 20175 (12.75 GHz – 26 GHz)



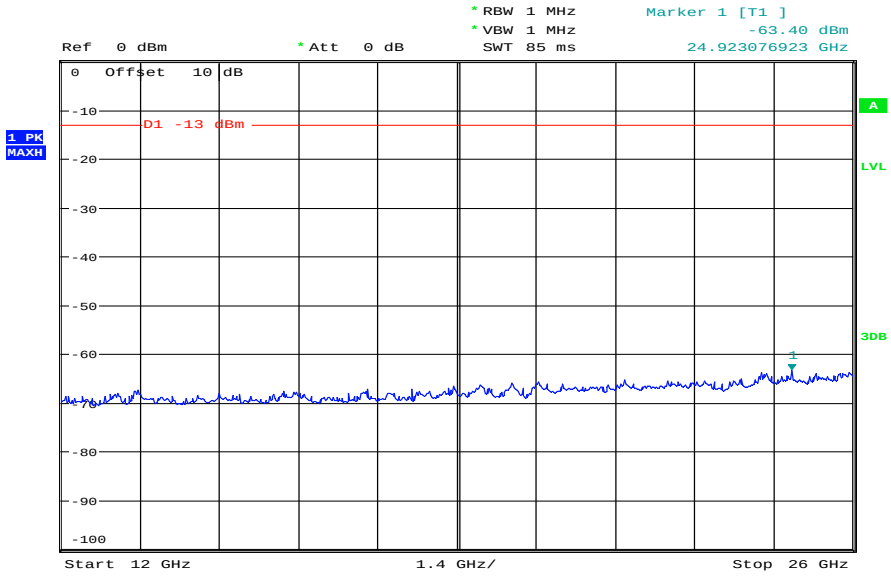
Date: 26.MAR.2013 13:15:19

QPSK with 5 MHz channel bandwidth

Plot 1: Channel 19975 (30 MHz – 12.75 GHz)

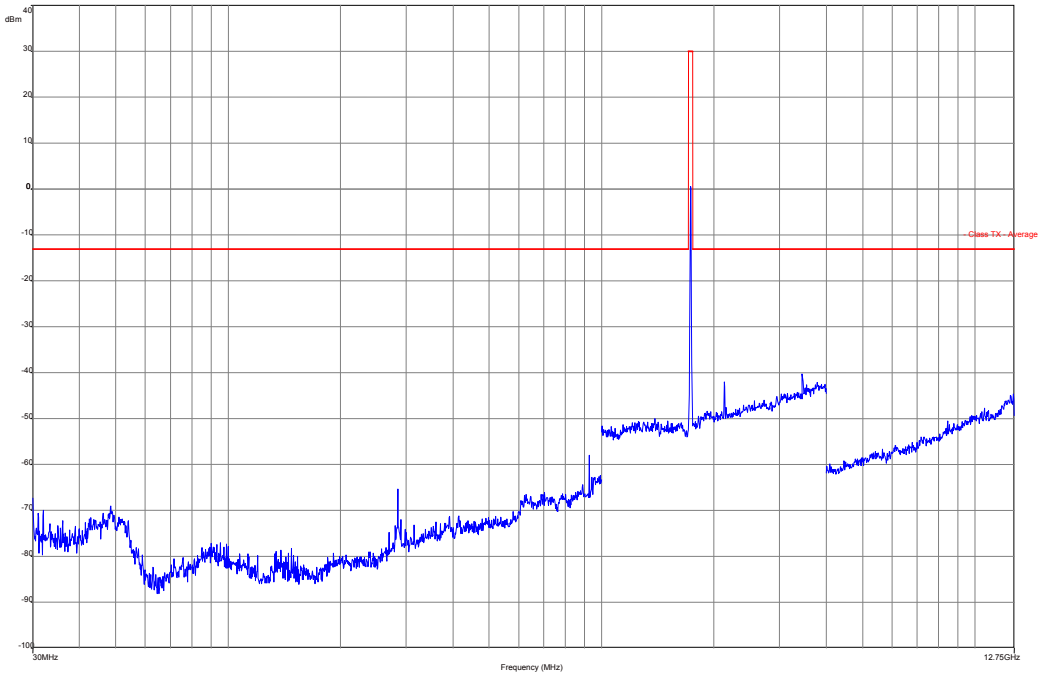


Plot 2: Channel 19975 (12.75 GHz – 26 GHz)

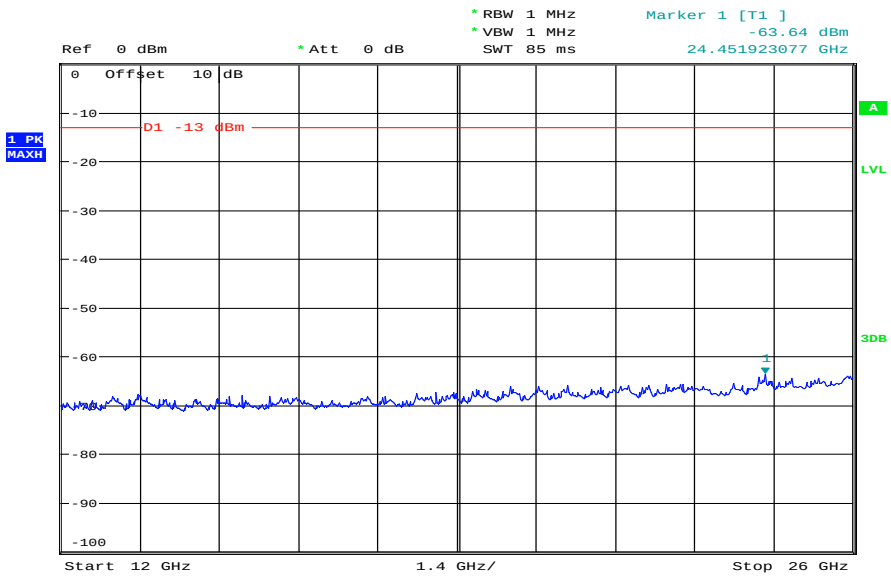


Date: 26.MAR.2013 13:19:14

Plot 3: Channel 20175 (30 MHz – 12.75 GHz)

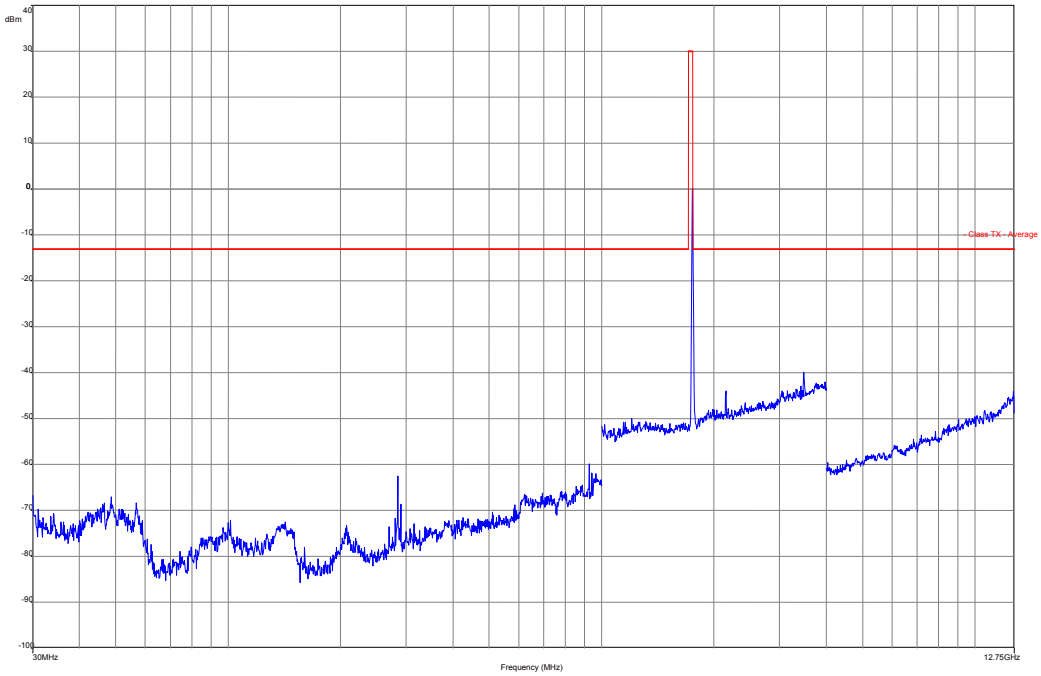


Plot 4: Channel 20175 (12.75 GHz – 26 GHz)

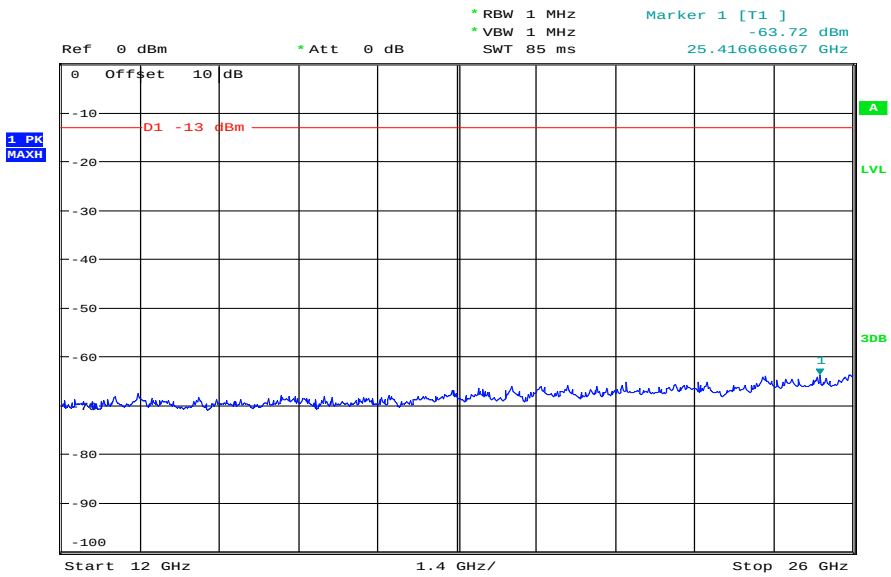


Date: 26.MAR.2013 13:20:04

Plot 5: Channel 20374 (30 MHz – 12.75 GHz)



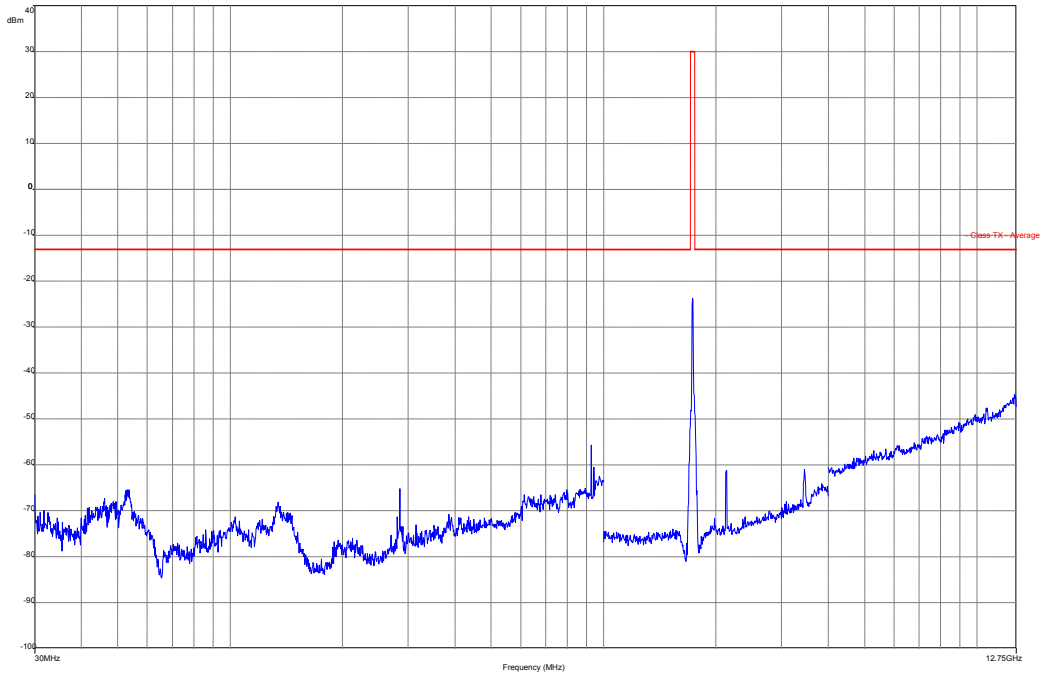
Plot 6: Channel 20374 (12.75 GHz – 26 GHz)



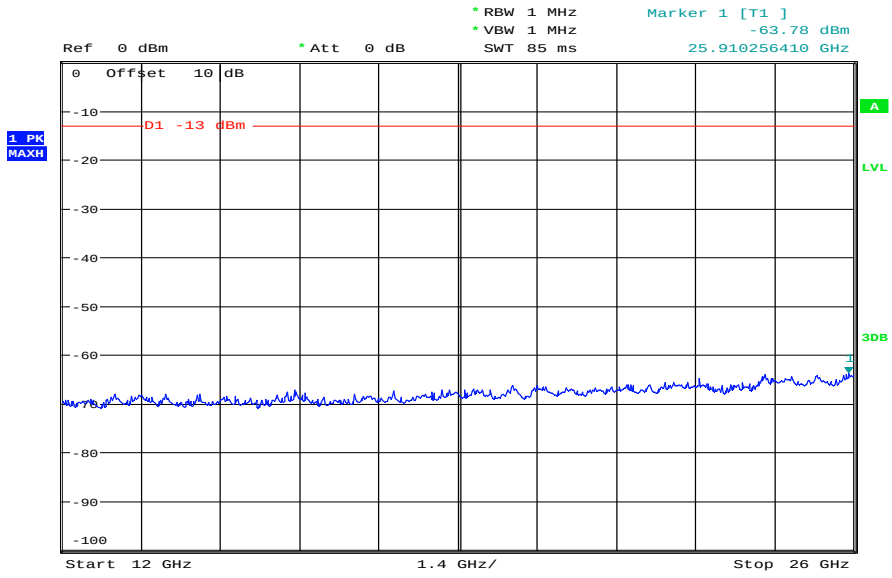
Date: 26.MAR.2013 13:22:13

QPSK with 10 MHz channel bandwidth

Plot 1: Channel 20175 (30 MHz – 12.75 GHz)



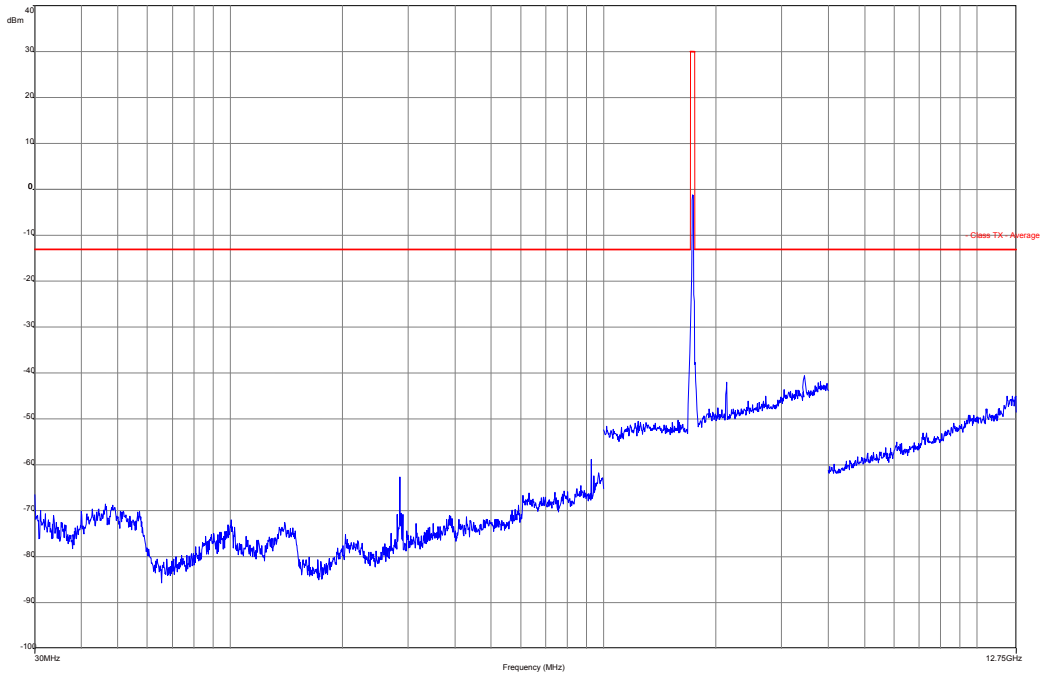
Plot 2: Channel 20175 (12.75 GHz – 26 GHz)



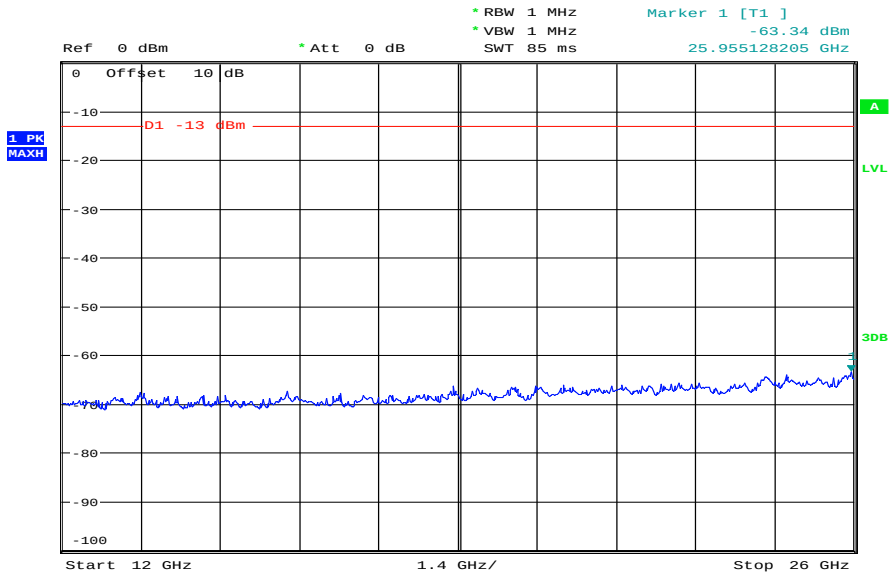
Date: 26.MAR.2013 13:24:26

QPSK with 15 MHz channel bandwidth

Plot 1: Channel 20175 (30 MHz – 12.75 GHz)



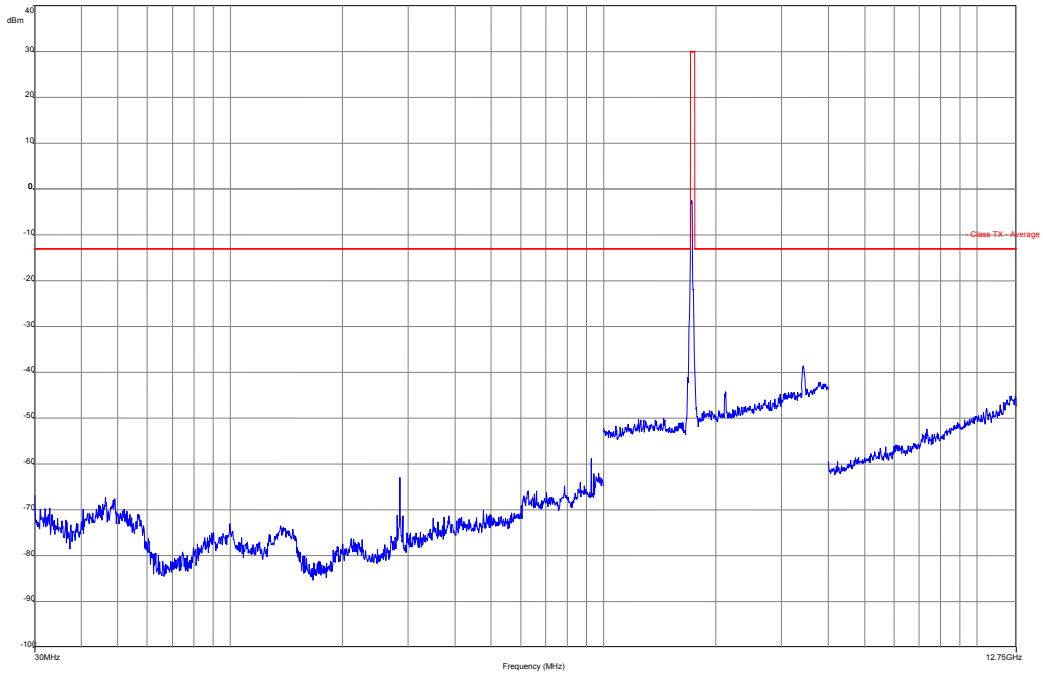
Plot 2: Channel 20175 (12.75 GHz – 26 GHz)



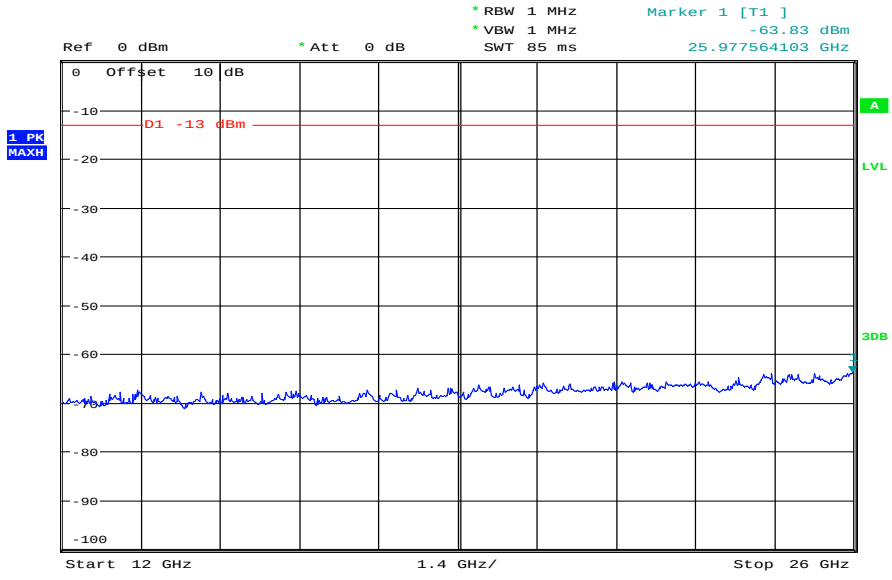
Date: 26.MAR.2013 13:26:11

QPSK with 20 MHz channel bandwidth (100 RB)

Plot 1: Channel 20050 (30 MHz – 12.75 GHz)



Plot 2: Channel 20050 (12.75 GHz – 26 GHz)



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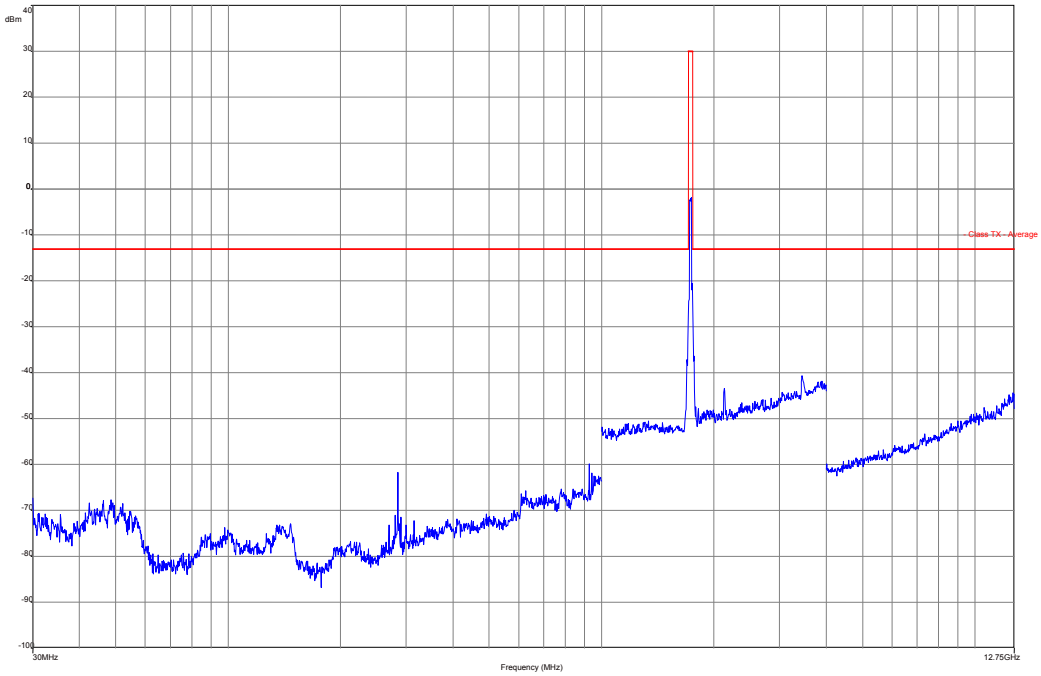
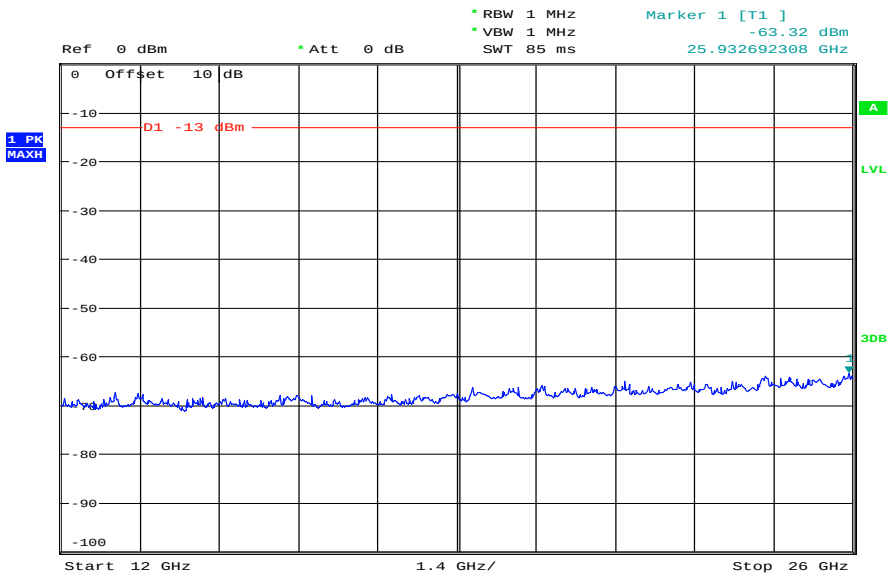
Plot 3: Channel 20175 (30 MHz – 12.75 GHz)



Plot 4: Channel 20175 (12.75 GHz – 26 GHz)



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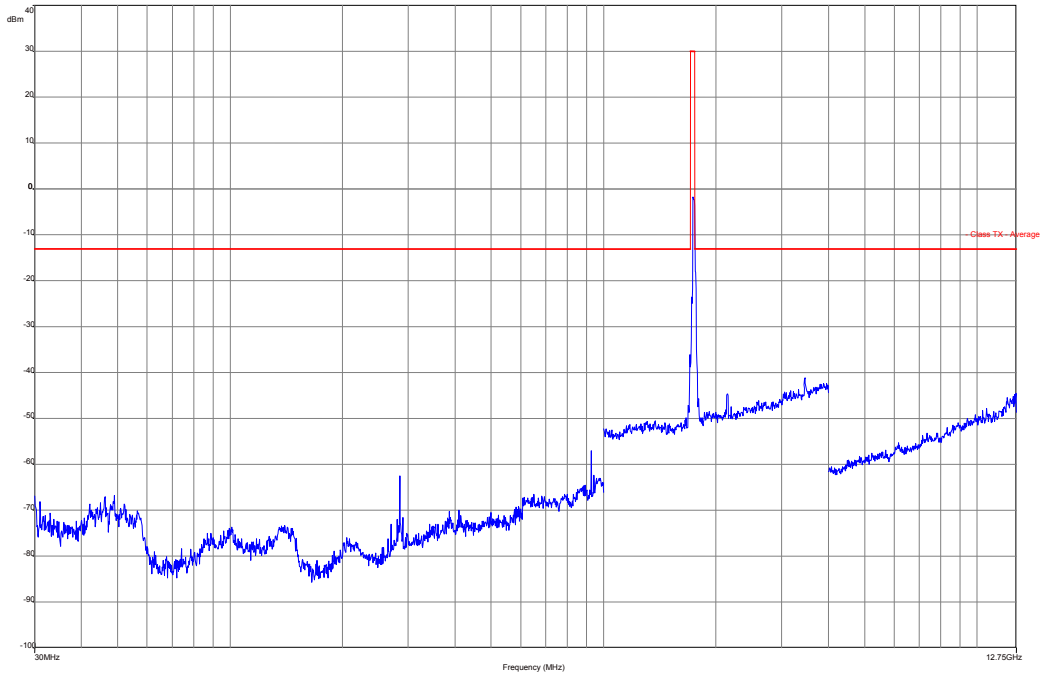
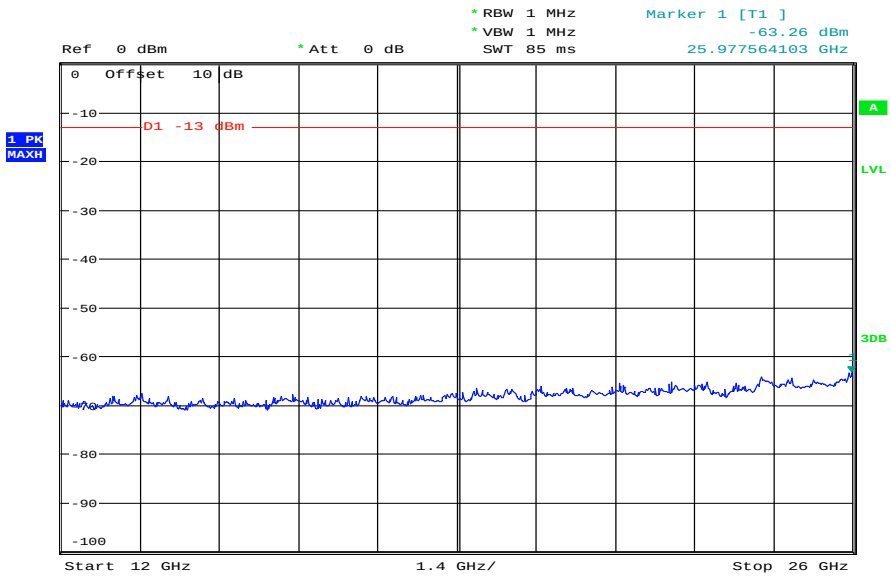
Plot 5: Channel 20299 (30 MHz – 12.75 GHz)



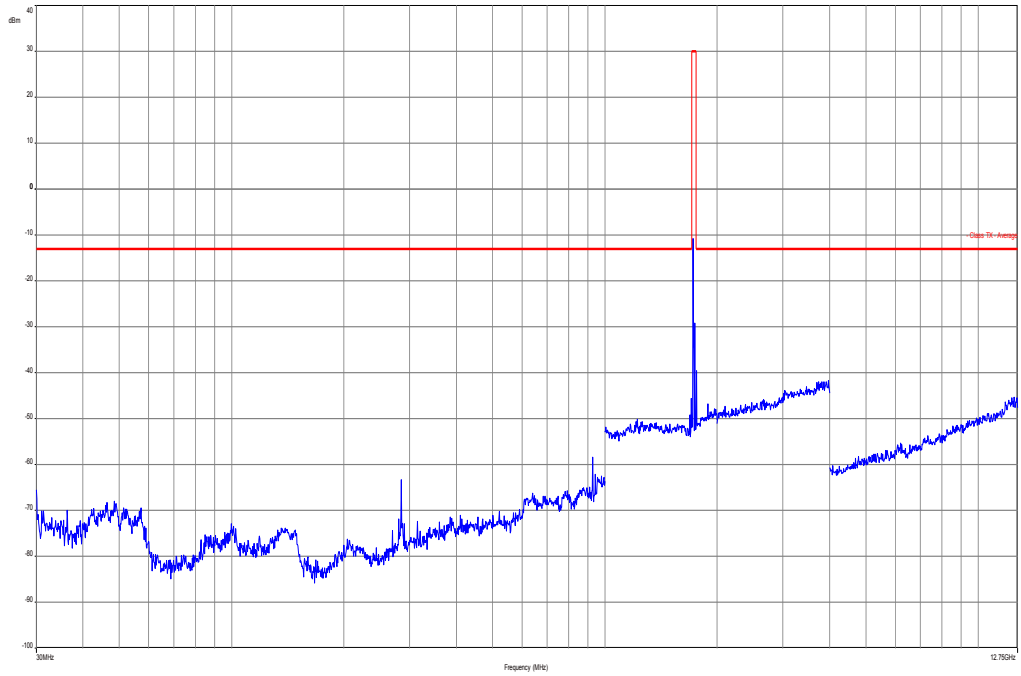
Plot 6: Channel 20299 (12.75 GHz – 26 GHz)



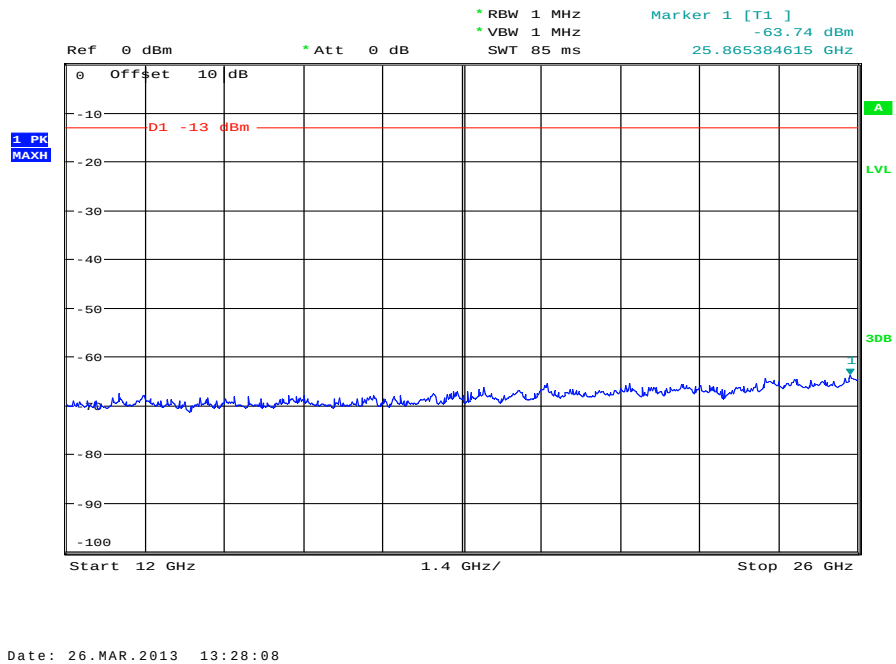
Date: 26.MAR.2013 13:33:19

QPSK with 20 MHz channel bandwidth (100 RB)

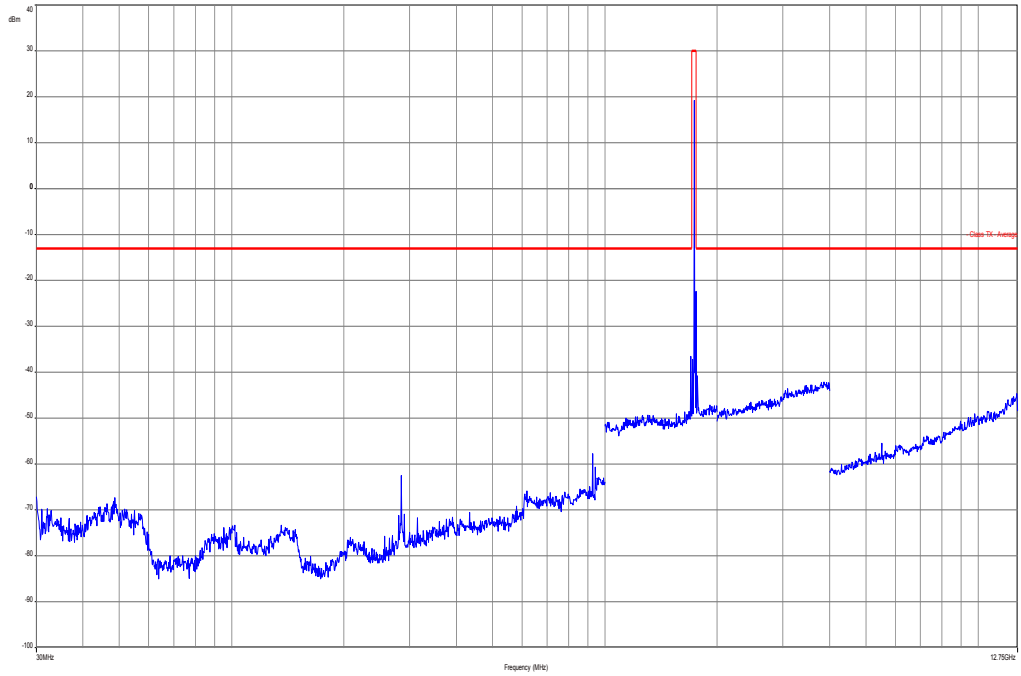
Plot 1: Channel 20050 (30 MHz – 12.75 GHz)



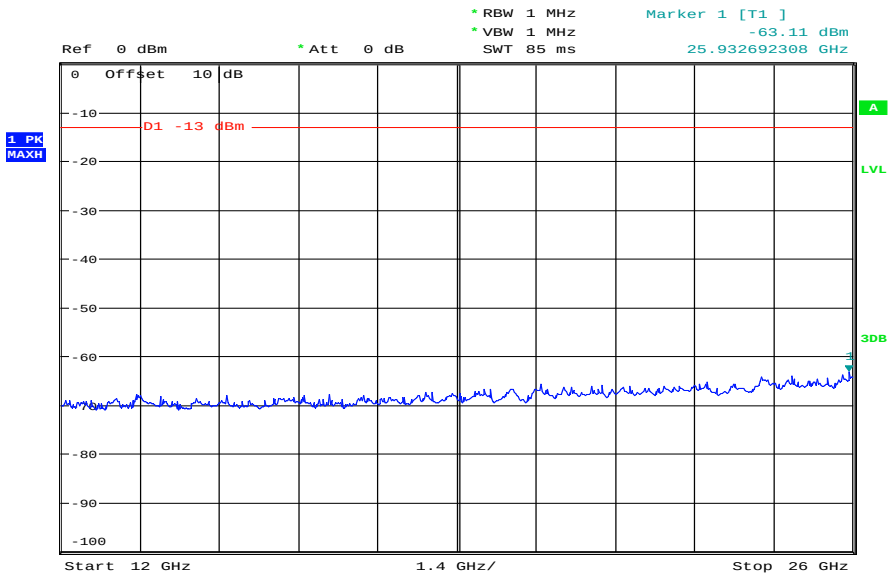
Plot 2: Channel 20050 (12.75 GHz – 26 GHz)



Plot 3: Channel 20175 (30 MHz – 12.75 GHz)



Plot 4: Channel 20175 (12.75 GHz – 26 GHz)



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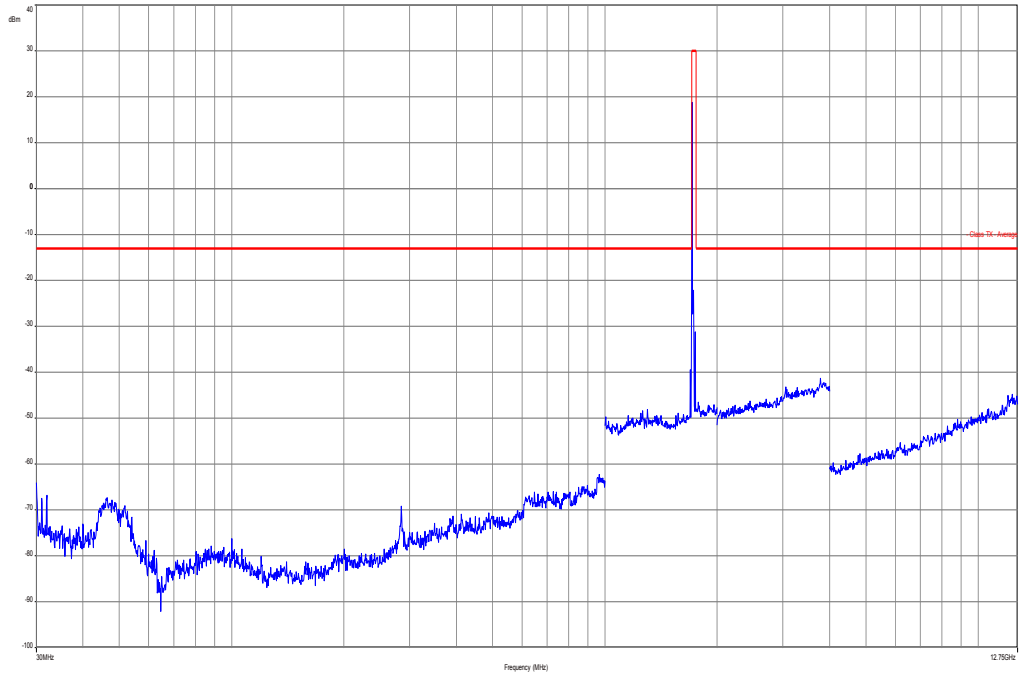
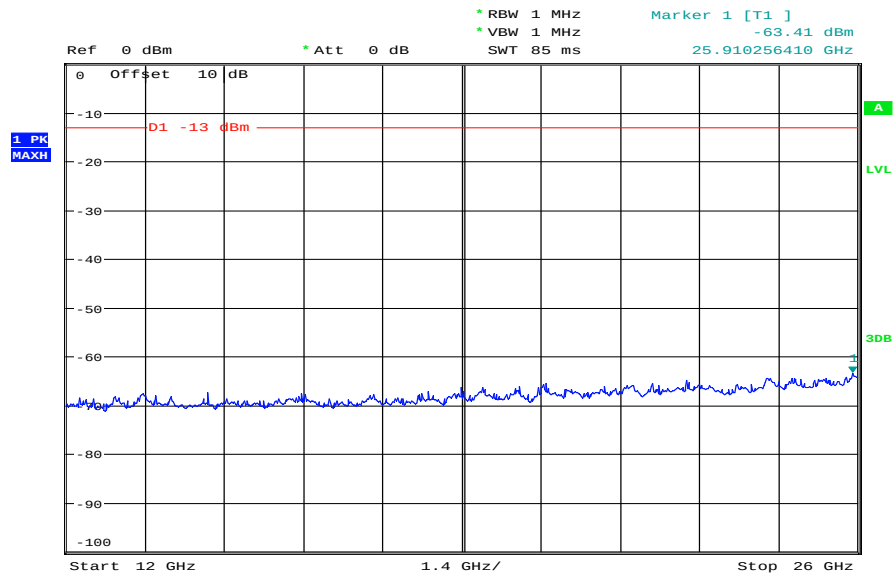
Plot 5: Channel 20299 (30 MHz – 12.75 GHz)



Plot 6: Channel 20299 (12.75 GHz – 26 GHz)



Date: 26.MAR.2013 13:31:03

8.3.4 Spurious emissions conducted

Description:

The following steps outline the procedure used to measure the conducted emissions from the mobile station.
1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 17.6 GHz, data taken from 10 MHz to 25 GHz.
2. Determine mobile station transmits frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

For the measurement the lowest, middle and highest channel bandwidth was used. If spurious were found the other bandwidths were measured, too.

Measurement:

Measurement parameters	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	Pre-measurement with 1 MHz On spurious detection re-measurement below 1 GHz with 100 kHz Above 1 GHz with 1 MHz
Resolution bandwidth:	Pre-measurement with 1 MHz On spurious detection re-measurement below 1 GHz with 100 kHz Above 1 GHz with 1 MHz
Span:	10 MHz – 25 GHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 27.53(g) CFR Part 2.1053	RSS 139
Spurious Emissions Conducted	
Attenuation ≥ 43 + 10log(P) (P, Power in Watts)	
-13 dBm	

Results: **for 1.4 MHz channel bandwidth**

QPSK

SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3421.4	-	2	3465.0	-	2	3508.6	-
3	5132.1	-	3	5197.5	-	3	5262.9	-
4	6842.8	-	4	6930.0	-	4	7017.2	-
5	8553.5	-	5	8662.5	-	5	8771.5	-
6	10264.2	-	6	10395.0	-	6	10525.8	-
7	11974.9	-	7	12127.5	-	7	12280.1	-
8	13685.6	-	8	13860.0	-	8	14034.4	-
9	15396.3	-	9	15592.5	-	9	15788.7	-
10	17107.0	-	10	17325.0	-	10	17543.0	-
Measurement uncertainty				± 0.5dB				

16-QAM

SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3421.4	-	2	3465.0	-	2	3508.6	-
3	5132.1	-	3	5197.5	-	3	5262.9	-
4	6842.8	-	4	6930.0	-	4	7017.2	-
5	8553.5	-	5	8662.5	-	5	8771.5	-
6	10264.2	-	6	10395.0	-	6	10525.8	-
7	11974.9	-	7	12127.5	-	7	12280.1	-
8	13685.6	-	8	13860.0	-	8	14034.4	-
9	15396.3	-	9	15592.5	-	9	15788.7	-
10	17107.0	-	10	17325.0	-	10	17543.0	-
Measurement uncertainty				± 0.5dB				

Results: for 5 MHz channel bandwidth

QPSK

SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3425.0	-	2	3465.0	-	2	3505.0	-
3	5137.5	-	3	5197.5	-	3	5257.5	-
4	6850.0	-	4	6930.0	-	4	7010.0	-
5	8562.5	-	5	8662.5	-	5	8762.5	-
6	10275.0	-	6	10395.0	-	6	10515.0	-
7	11987.5	-	7	12127.5	-	7	12267.5	-
8	13700.0	-	8	13860.0	-	8	14020.0	-
9	15412.5	-	9	15592.5	-	9	15772.5	-
10	17125.0	-	10	17325.0	-	10	17525.0	-
Measurement uncertainty				± 0.5dB				

16-QAM

SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3425.0	-	2	3465.0	-	2	3505.0	-
3	5137.5	-	3	5197.5	-	3	5257.5	-
4	6850.0	-	4	6930.0	-	4	7010.0	-
5	8562.5	-	5	8662.5	-	5	8762.5	-
6	10275.0	-	6	10395.0	-	6	10515.0	-
7	11987.5	-	7	12127.5	-	7	12267.5	-
8	13700.0	-	8	13860.0	-	8	14020.0	-
9	15412.5	-	9	15592.5	-	9	15772.5	-
10	17125.0	-	10	17325.0	-	10	17525.0	-
Measurement uncertainty				± 0.5dB				

Results: **for 20 MHz channel bandwidth**

QPSK

SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3440.0	-	2	3465.0	-	2	3490.0	-
3	5160.0	-	3	5197.5	-	3	5235.0	-
4	6880.0	-	4	6930.0	-	4	6980.0	-
5	8600.0	-	5	8662.5	-	5	8725.0	-
6	10320.0	-	6	10395.0	-	6	10470.0	-
7	12040.0	-	7	12127.5	-	7	12215.0	-
8	13760.0	-	8	13860.0	-	8	13960.0	-
9	15480.0	-	9	15592.5	-	9	15705.0	-
10	17200.0	-	10	17325.0	-	10	17450.0	-
Measurement uncertainty			± 0.5dB					

16-QAM

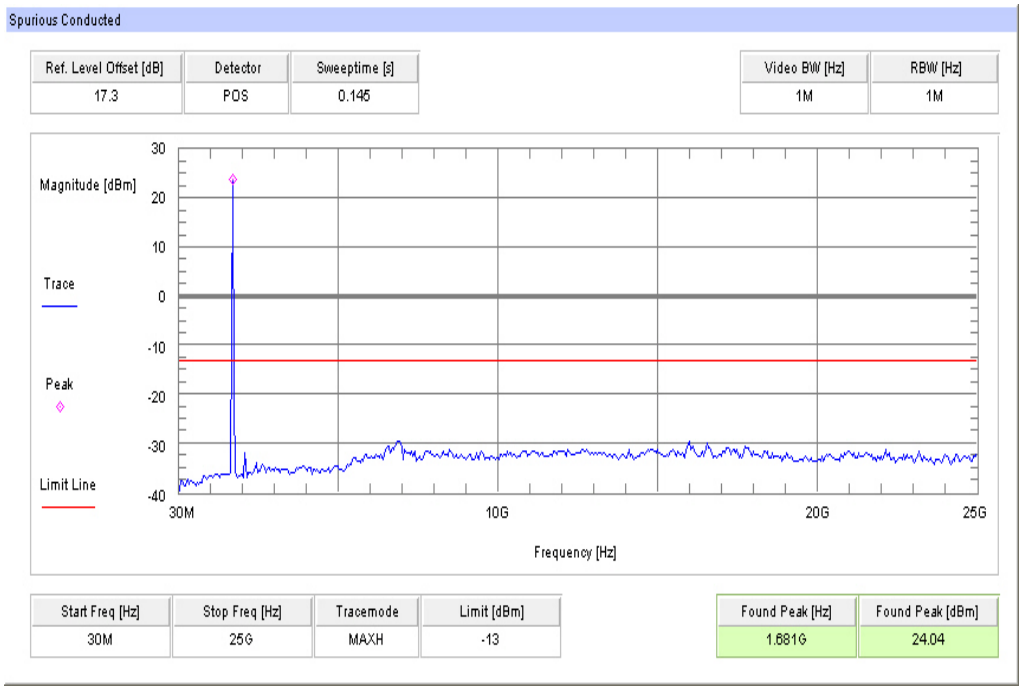
SPURIOUS EMISSION LEVEL (DBM)								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3440.0	-	2	3465.0	-	2	3490.0	-
3	5160.0	-	3	5197.5	-	3	5235.0	-
4	6880.0	-	4	6930.0	-	4	6980.0	-
5	8600.0	-	5	8662.5	-	5	8725.0	-
6	10320.0	-	6	10395.0	-	6	10470.0	-
7	12040.0	-	7	12127.5	-	7	12215.0	-
8	13760.0	-	8	13860.0	-	8	13960.0	-
9	15480.0	-	9	15592.5	-	9	15705.0	-
10	17200.0	-	10	17325.0	-	10	17450.0	-
Measurement uncertainty			± 0.5dB					

Result: **Passed**

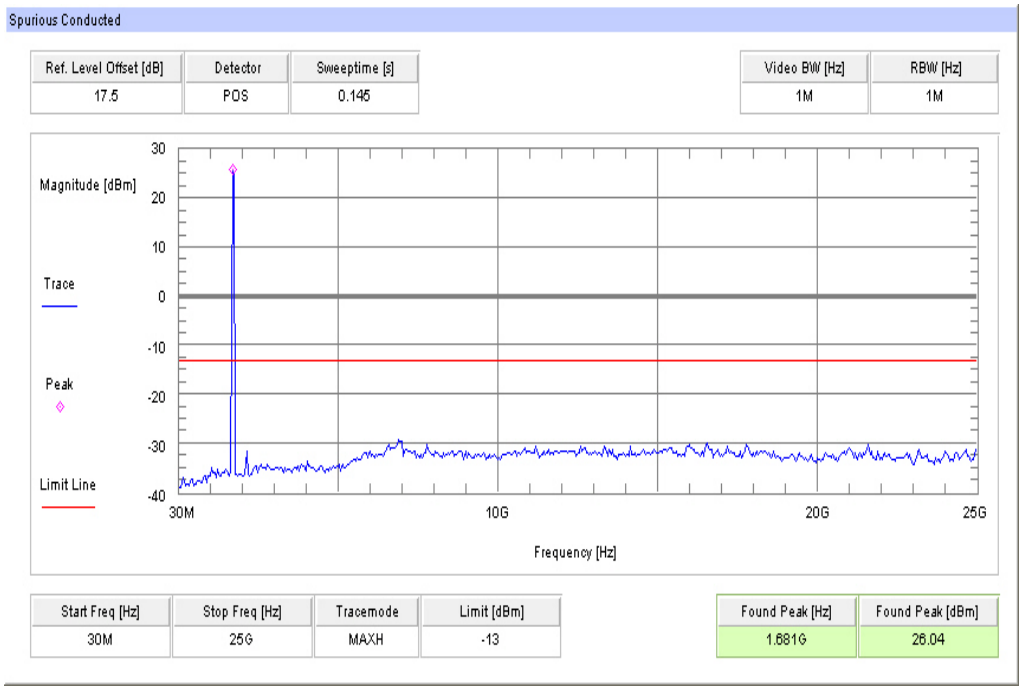
Results: for 1.4 MHz channel bandwidth

Plots: QPSK

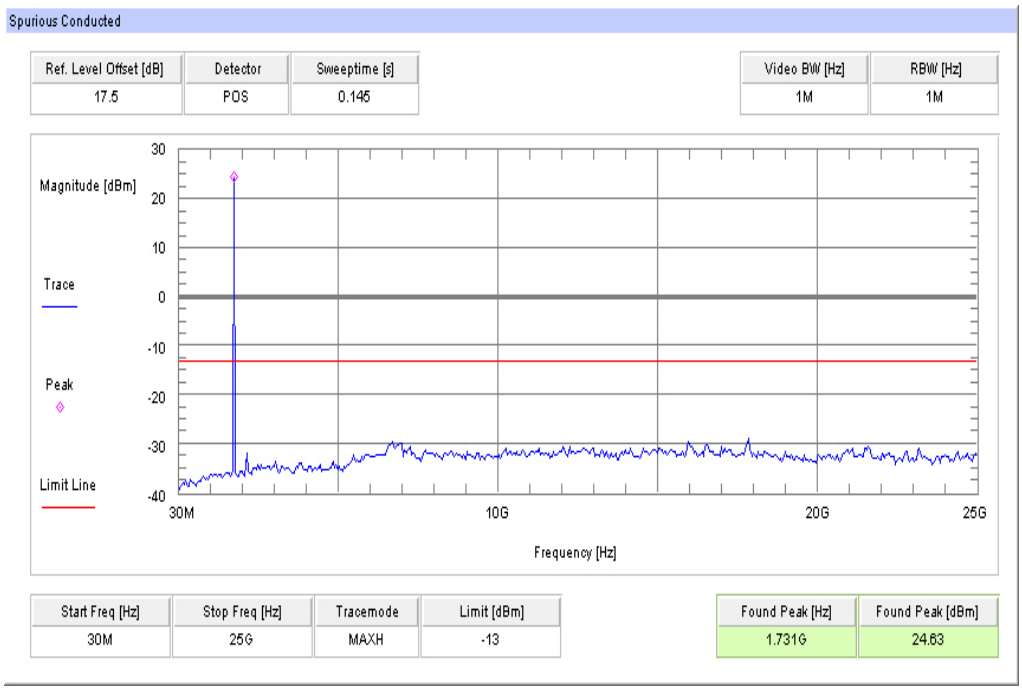
Plot 1: Lowest Channel (30 MHz - 25 GHz)



Plot 2: Middle Channel (30 MHz - 25 GHz)



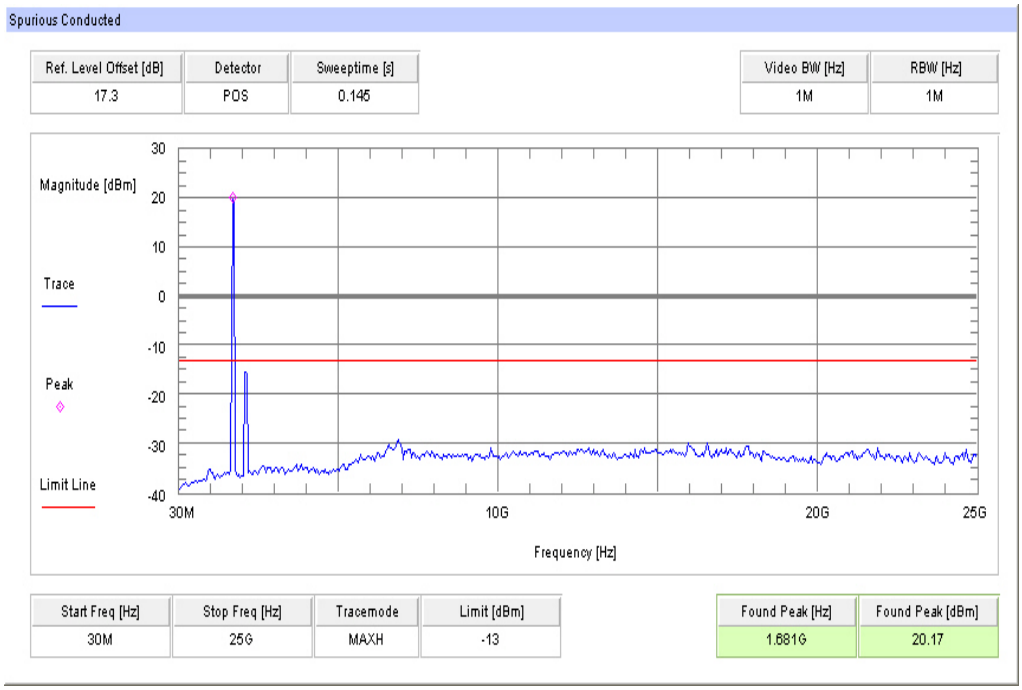
Plot 3: Highest Channel (30 MHz - 25 GHz)



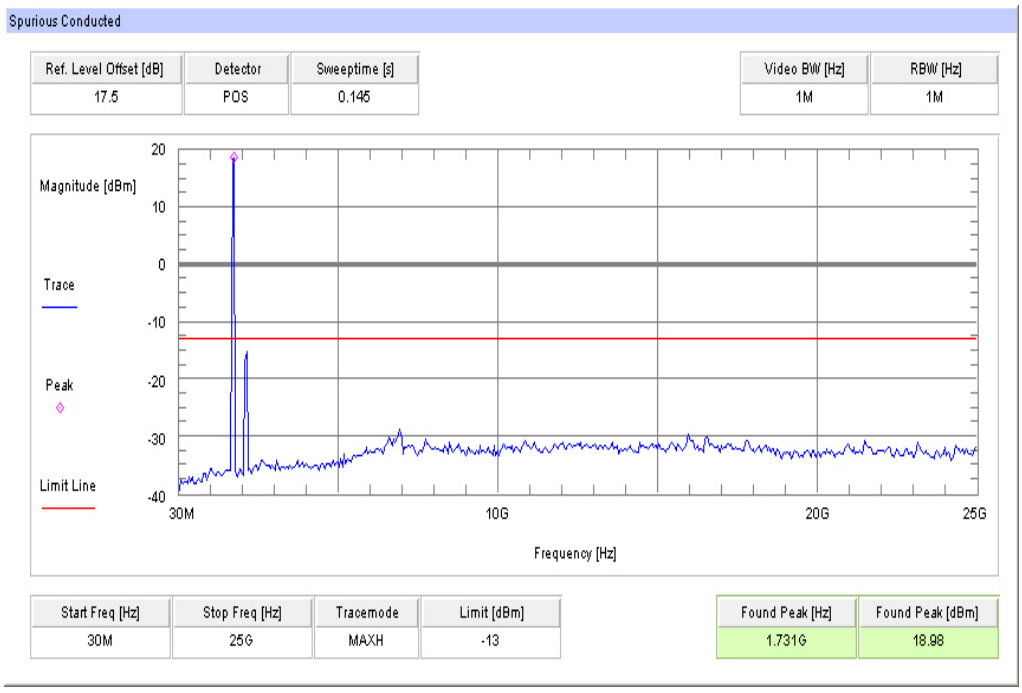
Results: for 10 MHz channel bandwidth

Plots: 16-QAM

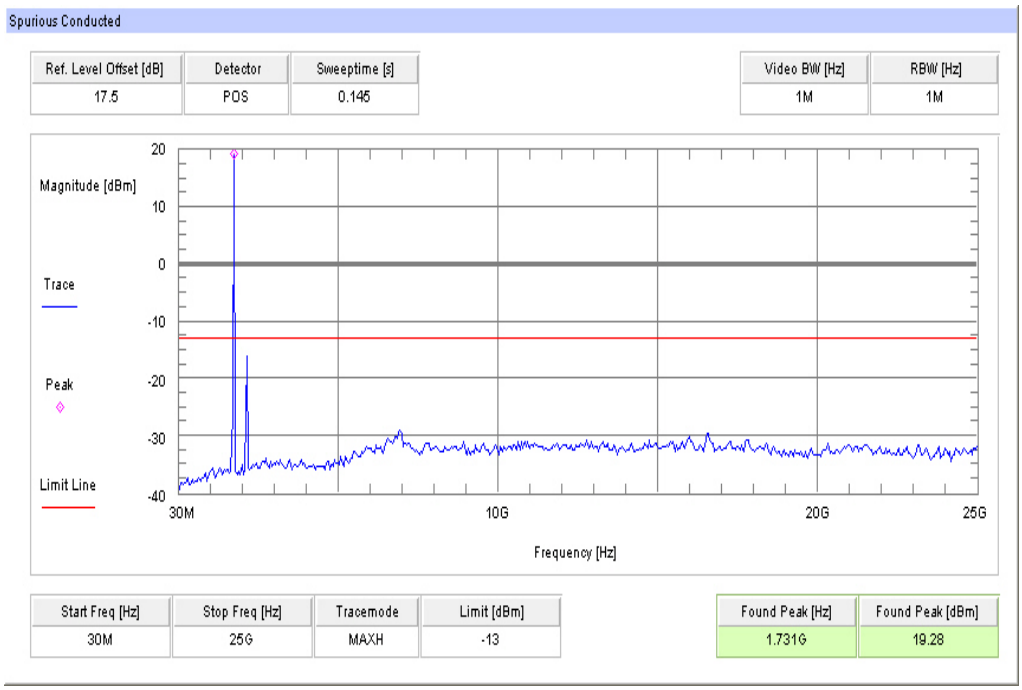
Plot 1: Lowest Channel (30 MHz - 25 GHz)



Plot 2: Middle Channel (30 MHz - 25 GHz)



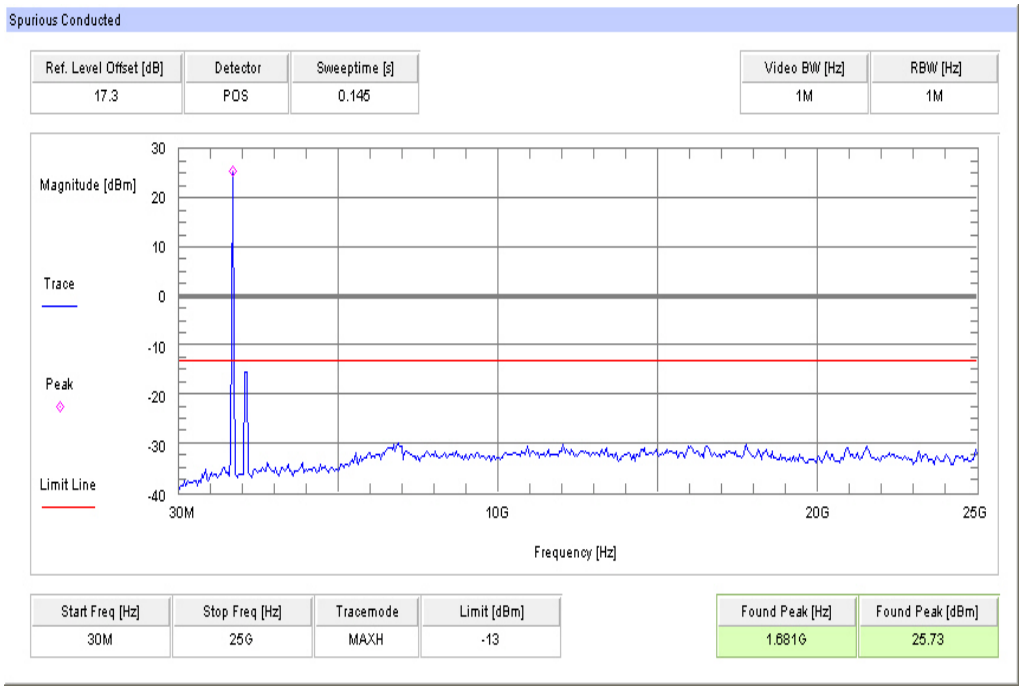
Plot 3: Highest Channel (30 MHz - 25 GHz)



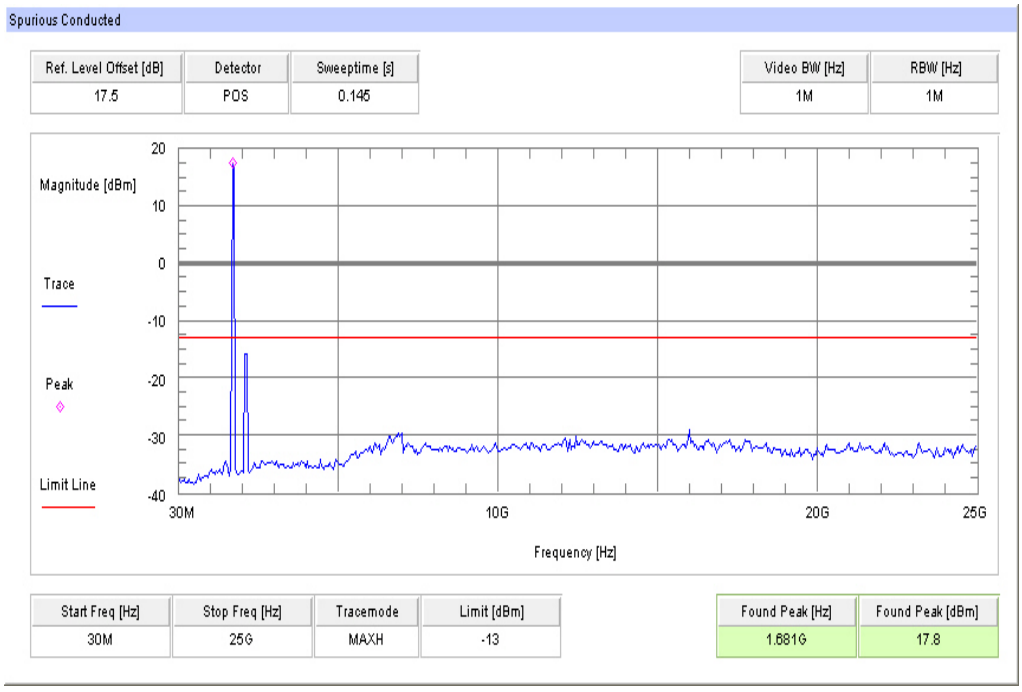
Results: for 20 MHz channel bandwidth

Plots: QPSK

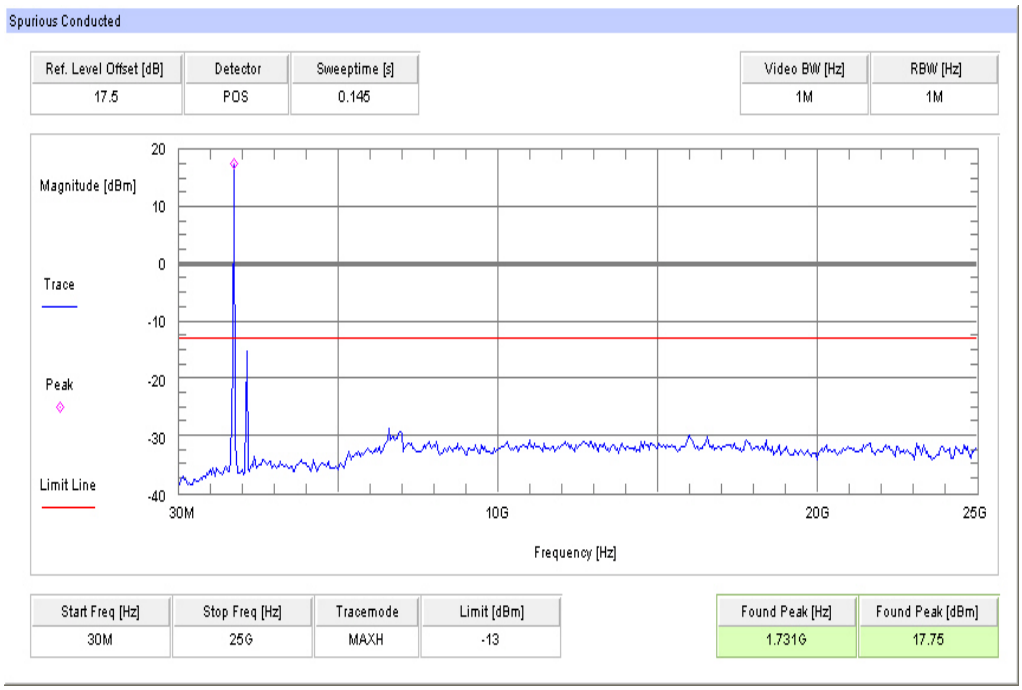
Plot 1: Lowest Channel (30 MHz - 25 GHz)



Plot 2: Middle Channel (30 MHz - 25 GHz)



Plot 3: Highest Channel (30 MHz - 25 GHz)



8.3.5 Block edge compliance

Description:

The spectrum at the band edges must comply with the spurious emissions limits.

For the measurement the lowest, middle and highest channel bandwidth was used. If spurious were found the other bandwidths were measured, too.

Measurement:

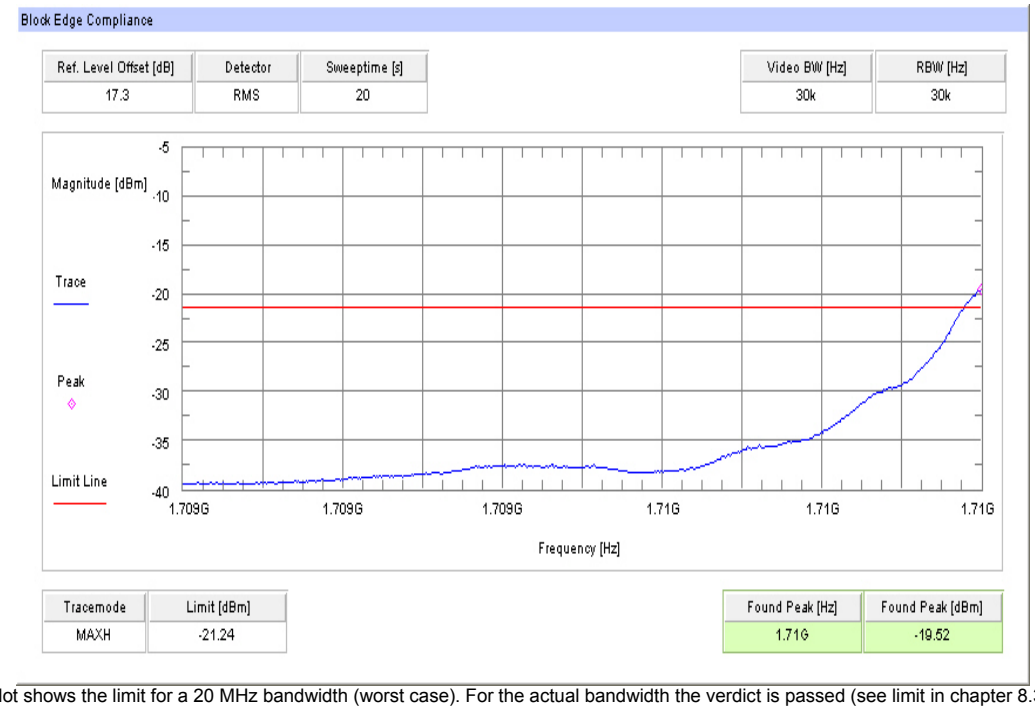
Measurement parameters	
Detector:	RMS
Sweep time:	20 sec.
Video bandwidth:	30 kHz
Resolution bandwidth:	30 kHz
Span:	1 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 27.53(h) CFR Part 2.1053	RSS 139
Block Edge Compliance	
Part 27.53 specifies that "the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB." However, in publication number 890810, The FCC Office of Engineering and Technology specified the following correction to the limits when a resolution bandwidth smaller than 1% of the emission bandwidth is used: "An alternative is to add an additional correction factor of 10 Log (RBW1/ RBW2) to the 43 +10 log(P) limit. RBW1 is the narrower measurement resolution bandwidth and RBW2 is either the 1% emissions bandwidth or 1 MHz." When using a 30 kHz bandwidth, this yields a -2.2185 adjustment to the limit [10 log(30kHz/(Bw/100)kHz) = -X.XX]. When this adjustment is applied to the limit, the limit becomes -13 –X.XX dBm.	
1.4 MHz: -6.38 dBm 3 MHz: -13.00 dBm 5 MHz: -15.22 dBm 10 MHz: -18.23 dBm 15 MHz: -19.99 dBm 20 MHz: -21.24 dBm	

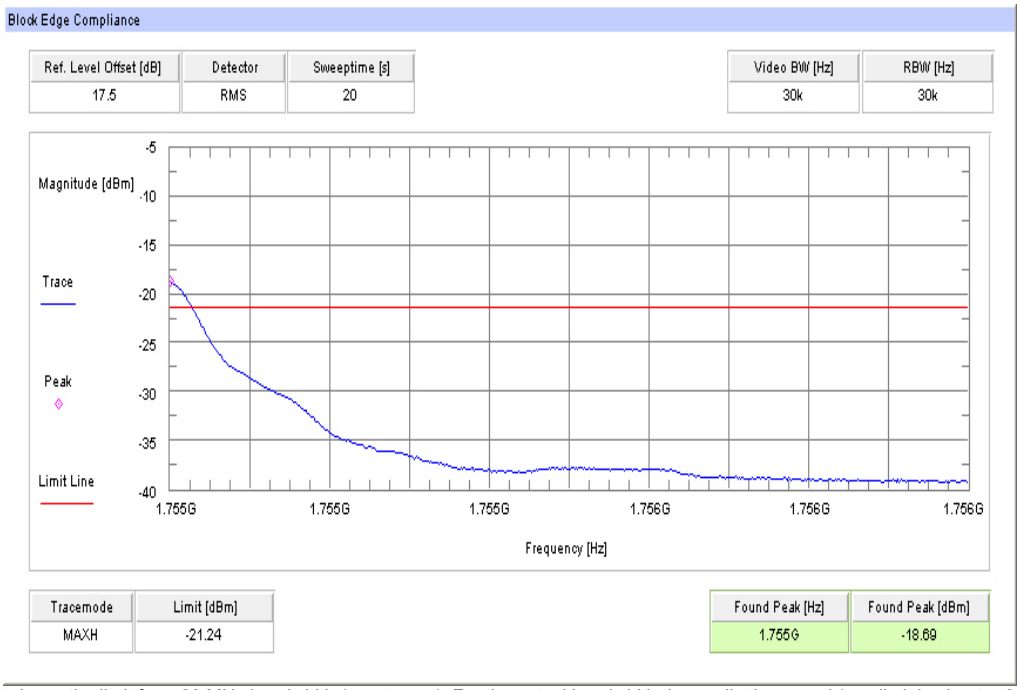
Results: 1.4 MHz channel bandwidth

Plot 1: Lowest Channel– QPSK / 1 RB low



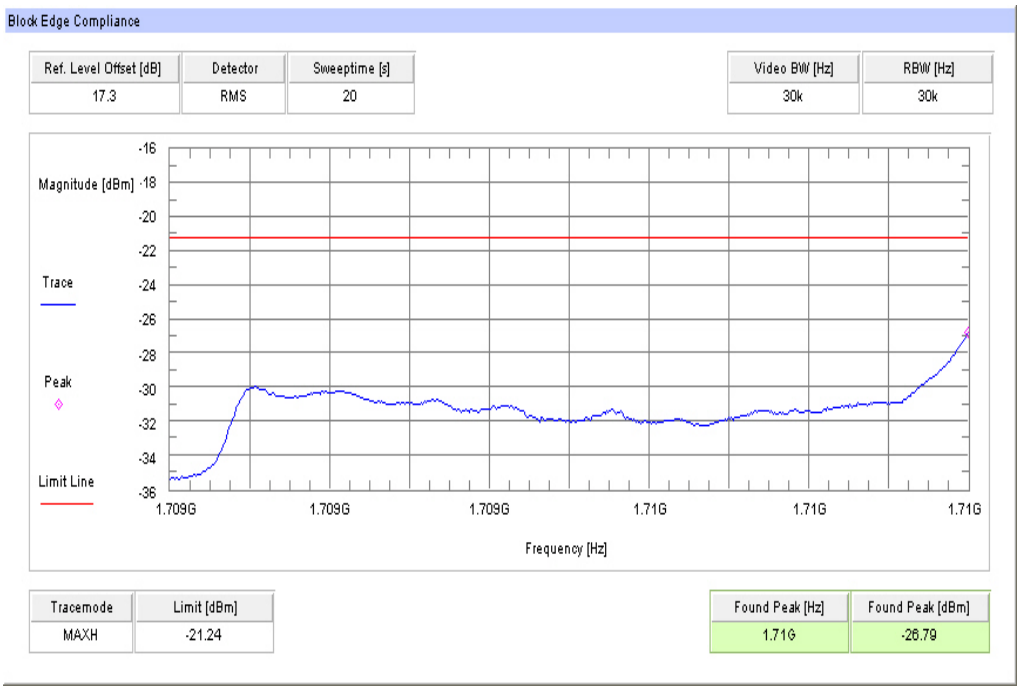
The limit in the plot shows the limit for a 20 MHz bandwidth (worst case). For the actual bandwidth the verdict is passed (see limit in chapter 8.3.5)

Plot 2: Highest Channel– QPSK / 1 RB high

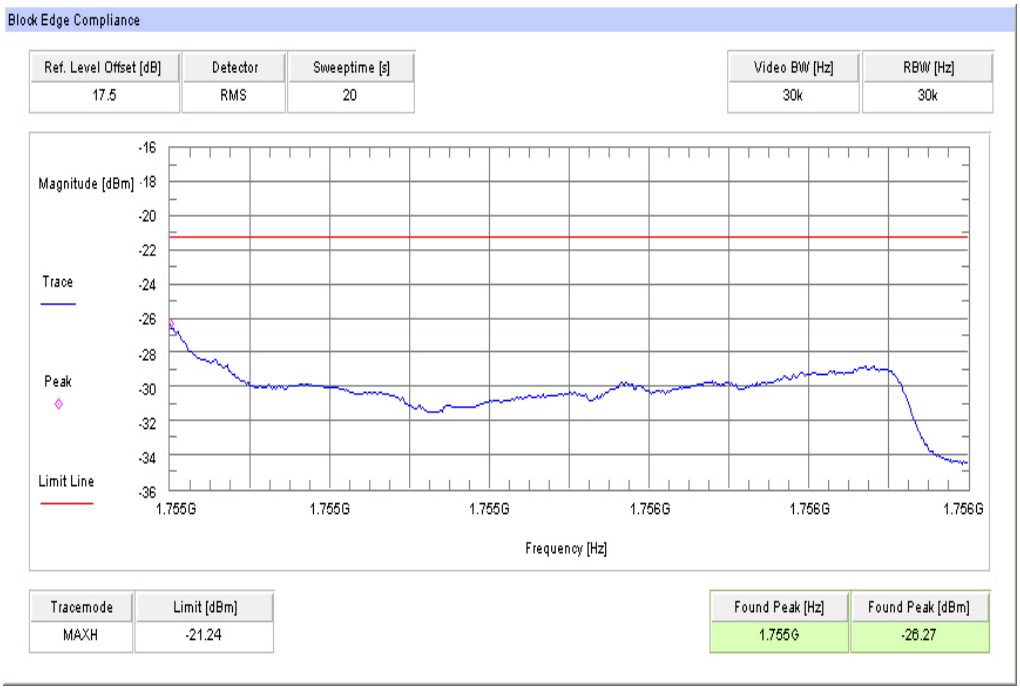


The limit in the plot shows the limit for a 20 MHz bandwidth (worst case). For the actual bandwidth the verdict is passed (see limit in chapter 8.3.5)

Plot 3: Lowest Channel– QPSK / 6 RB

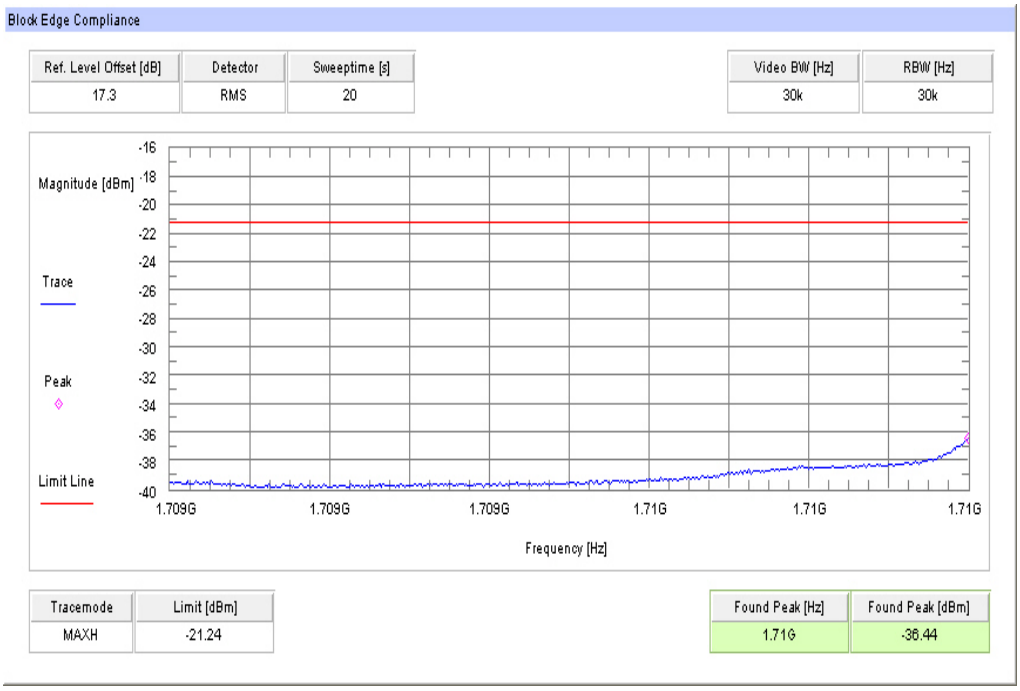


Plot 4: Highest Channel– QPSK / 6 RB

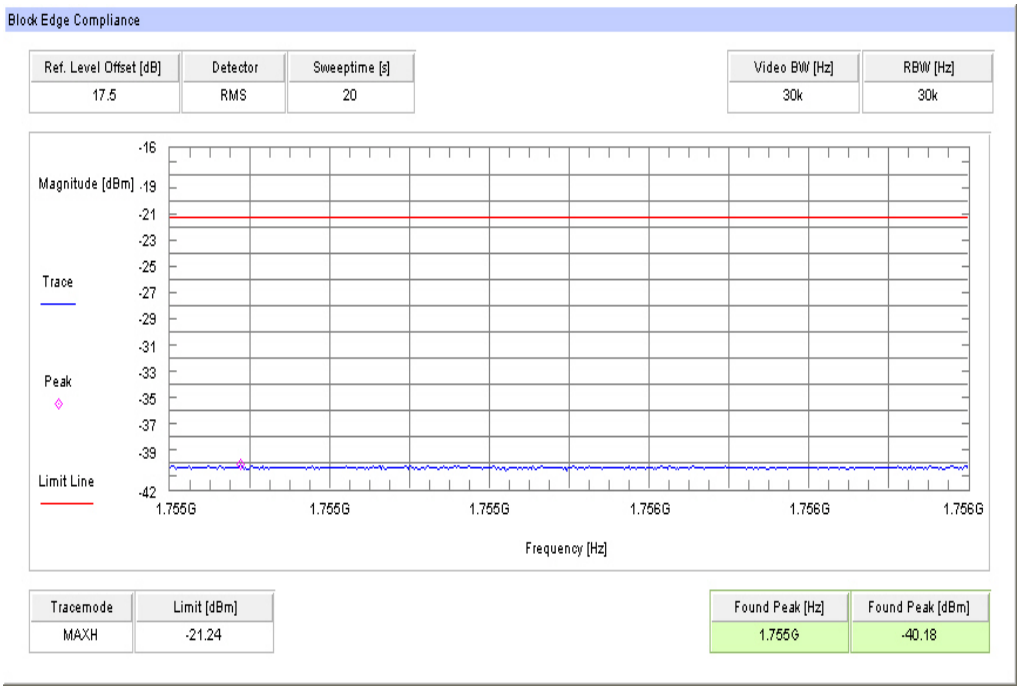


Results: 10 MHz channel bandwidth

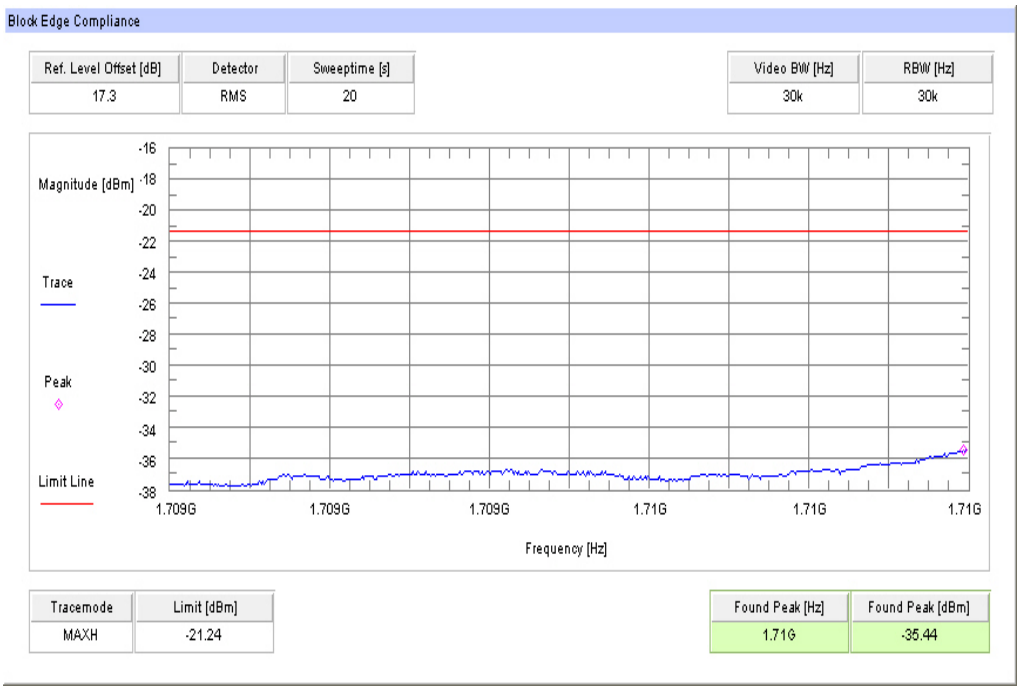
Plot 1: Lowest Channel– 16-QAM / 1 RB low



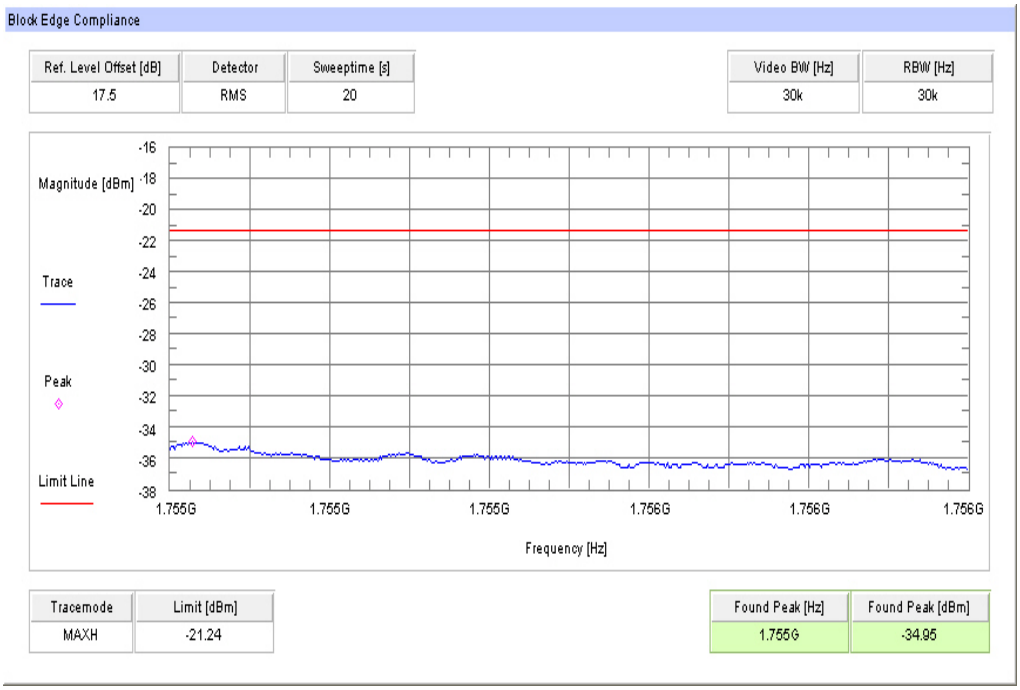
Plot 2: Highest Channel– 16-QAM / 1 RB high



Plot 3: Lowest Channel– 16-QAM / 50 RB

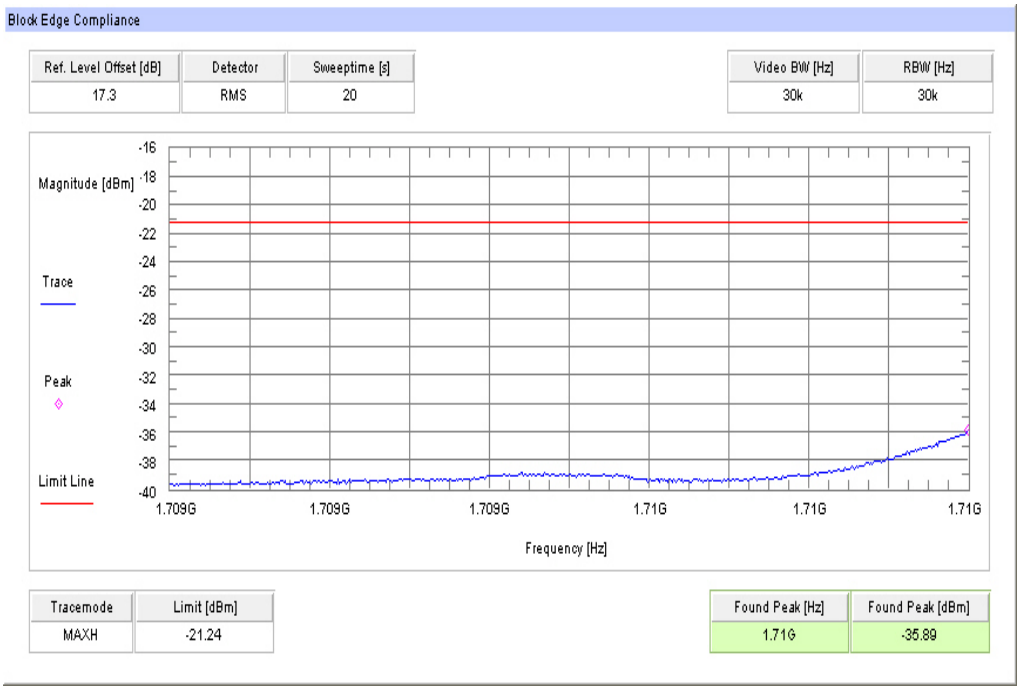


Plot 4: Highest Channel– 16-QAM / 50 RB

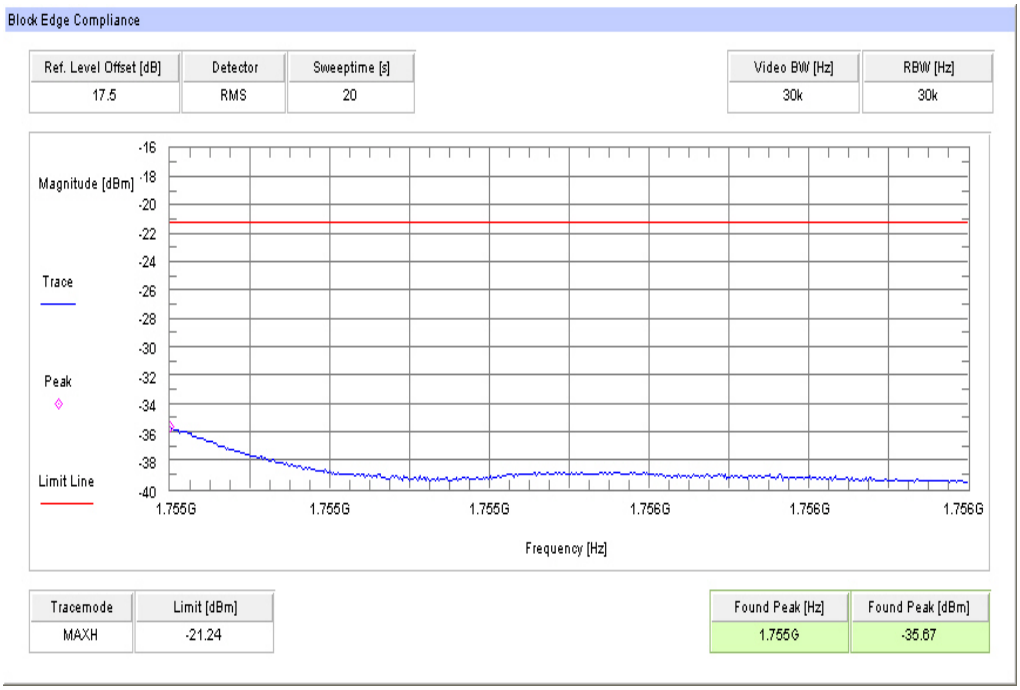


Results: 20 MHz channel bandwidth

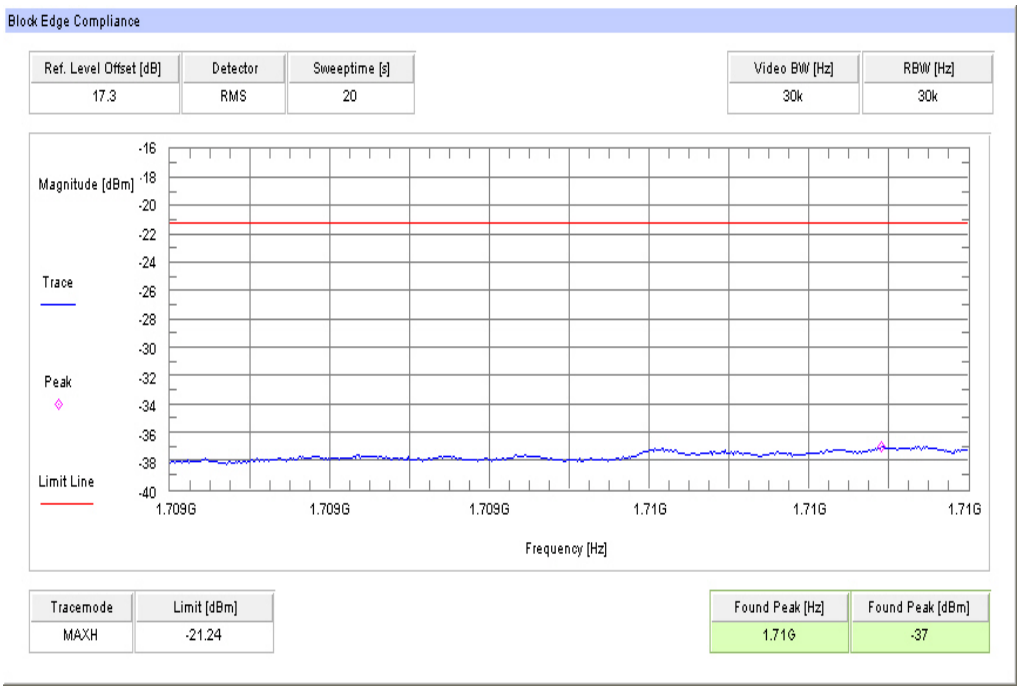
Plot 1: Lowest Channel– QPSK / 1 RB low



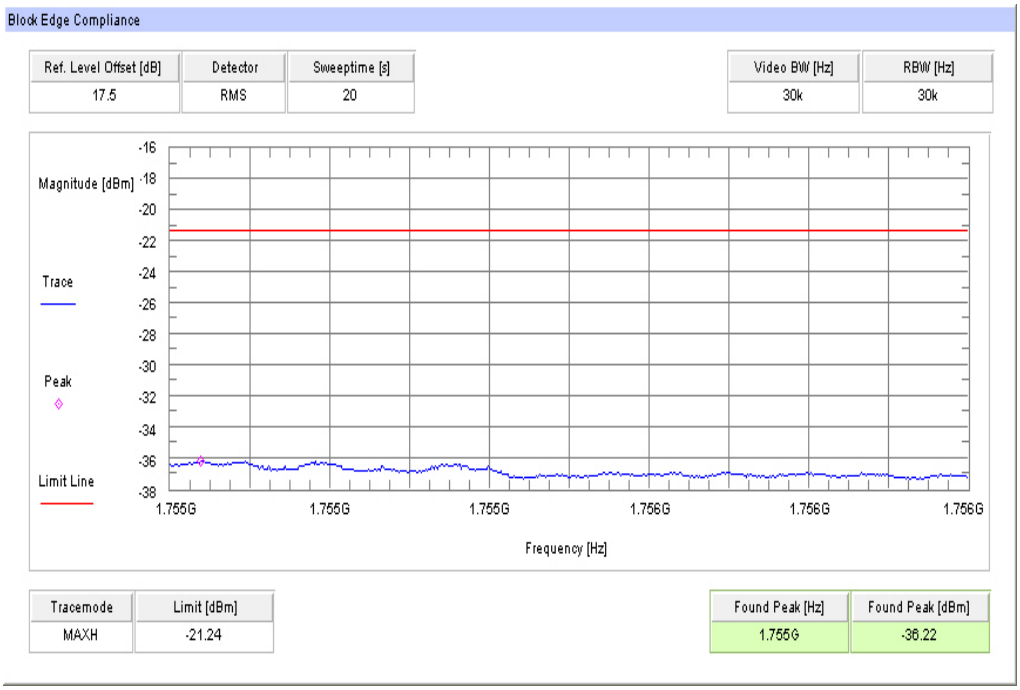
Plot 2: Highest Channel– QPSK / 1 RB high



Plot 3: Lowest Channel– QPSK / 100 RB



Plot 4: Highest Channel– QPSK / 100 RB



Result: **Passed**

8.3.6 Occupied bandwidth

Description:

Measurement of the occupied bandwidth of the transmitted signal.

Measurement:

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies of the LTE band 4 frequency band. The table below lists the measured 99% power and -26dBc occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Part 27.53 requires a measurement bandwidth of at least 1% of the occupied bandwidth.

Measurement parameters	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	Depends on Channel Bandwidth
Resolution bandwidth:	Depends on Channel Bandwidth
Span:	Depends on Channel Bandwidth
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 27.53(h) CFR Part 2.1049	RSS 139
Occupied Bandwidth	
Spectrum must fall completely in the specified band	

Results:

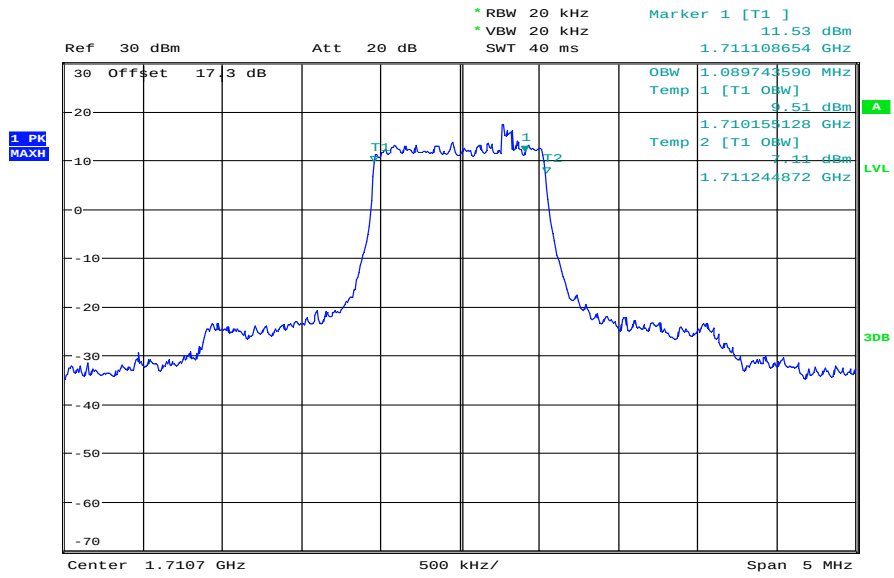
Occupied Bandwidth - QPSK		
Bandwidth [MHz]	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	1.09	1.28 (low)
	1.09	1.20 (mid)
	1.11	1.27 (high)
3	2.69	3.00
5	4.47	5.00
10	8.97	9.71
15	13.41	14.76
20	17.93	19.32 (low)
	17.88	19.32 (mid)
	17.93	19.42 (high)
Measurement uncertainty	± 100 kHz	

Occupied Bandwidth – 16-QAM		
Bandwidth [MHz]	**99% OBW (MHz)**	**-26 dBc BW (MHz)**
1.4	1.09	1.27
3	2.69	2.99
5	4.49	5.08
10	8.97 (low)	9.78 (low)
	8.97 (mid)	9.74 (mid)
	8.97 (high)	9.68 (high)
15	13.41	14.62
20	18.00 (low)	19.68 (low)
	18.00 (mid)	19.68 (mid)
	17.94 (high)	19.56 (high)
Measurement uncertainty	± 100 kHz	

Result: **Passed**

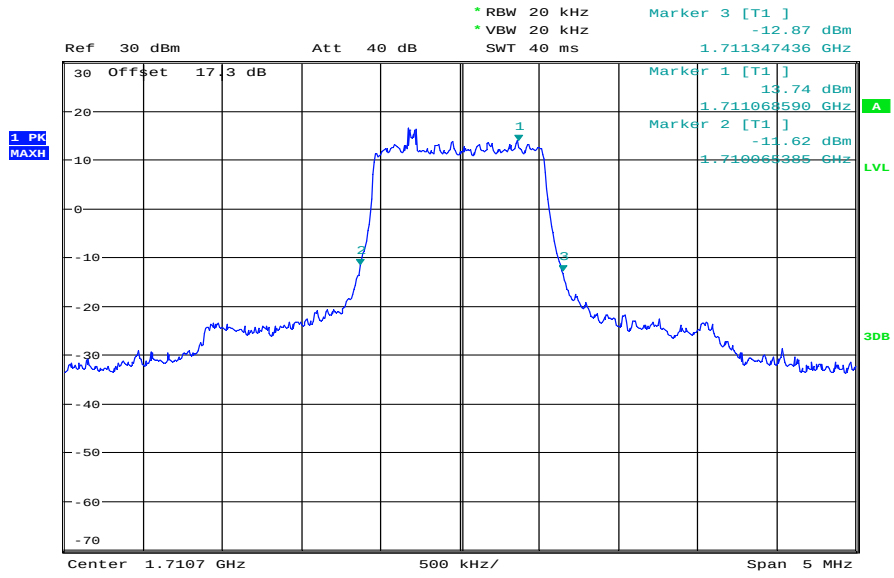
Plots: QPSK

Plot 1: 1.4 MHz (99% - OBW) / Channel low



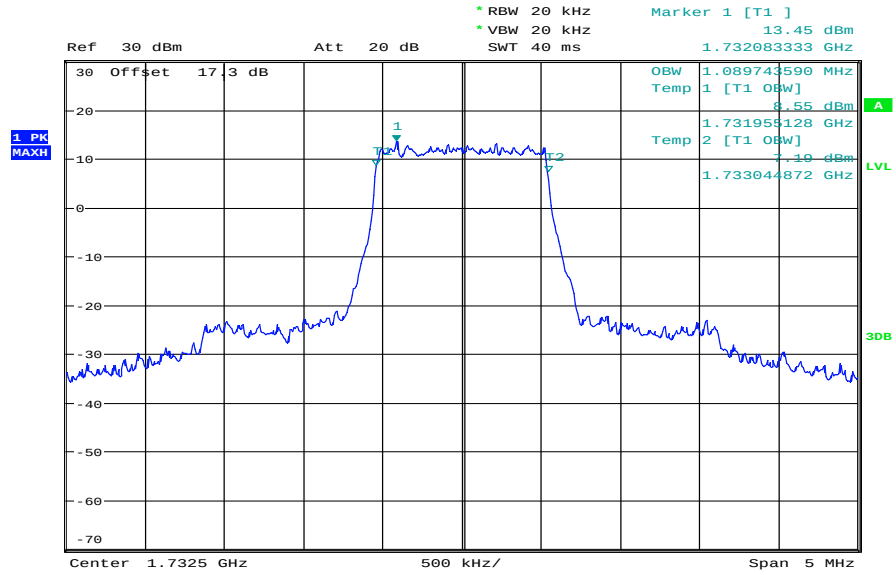
Date: 27.MAR.2013 10:00:59

Plot 2: 1.4 MHz (-26 dBc BW) / Channel low



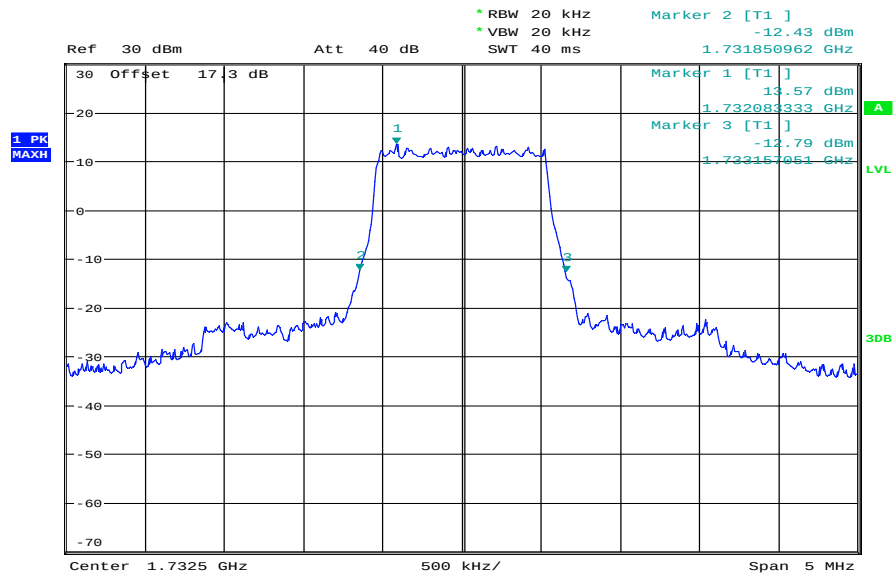
Date: 27.MAR.2013 09:51:10

Plot 3: 1.4 MHz (99% - OBW) / Channel mid



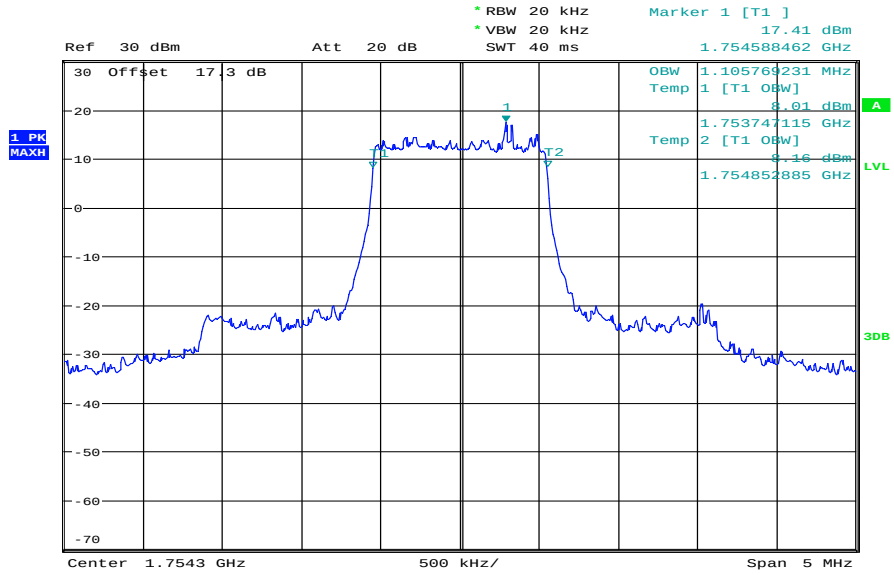
Date: 27.MAR.2013 10:02:38

Plot 4: 1.4 MHz (-26 dBc BW) / Channel mid



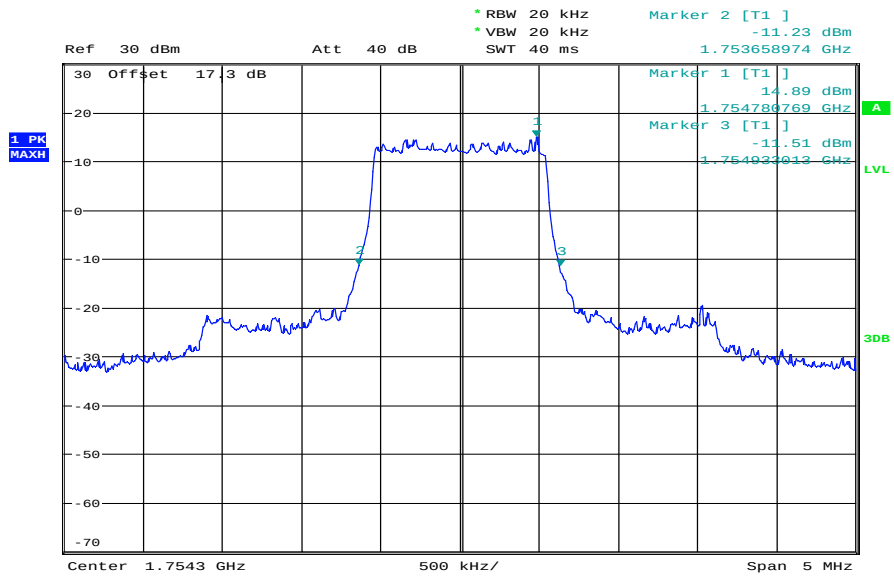
Date: 27.MAR.2013 09:54:23

Plot 5: 1.4 MHz (99% - OBW) / Channel high



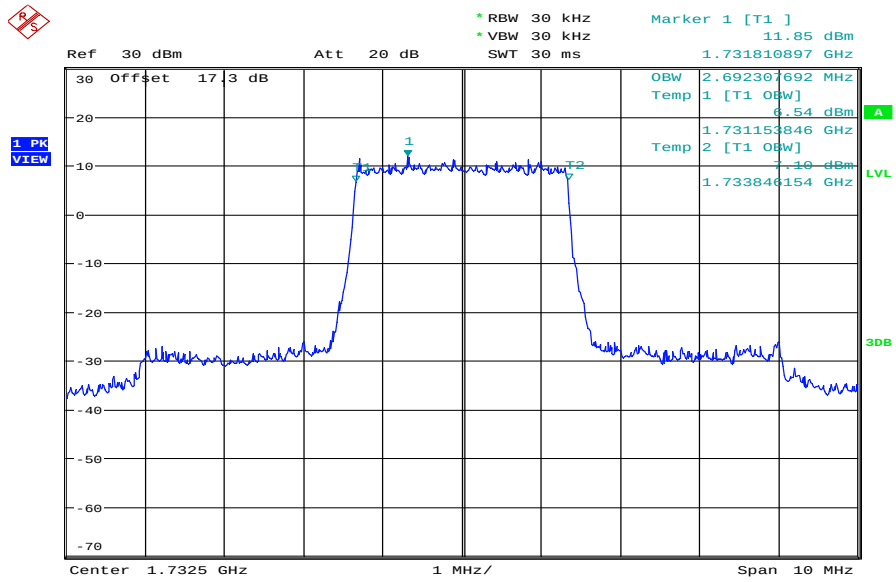
Date: 27.MAR.2013 10:05:22

Plot 6: 1.4 MHz (-26 dBc BW) / Channel high



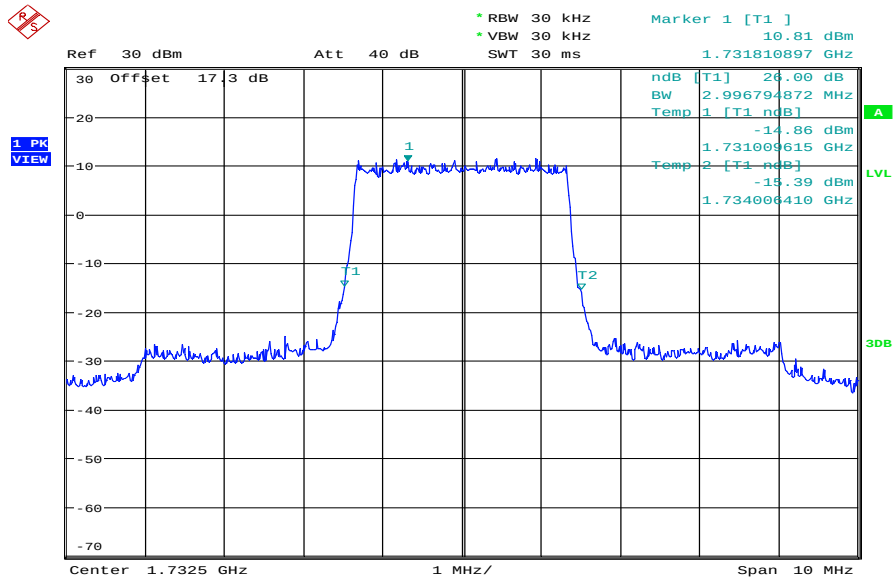
Date: 27.MAR.2013 09:57:15

Plot 7: 3 MHz (99% - OBW) / Channel mid



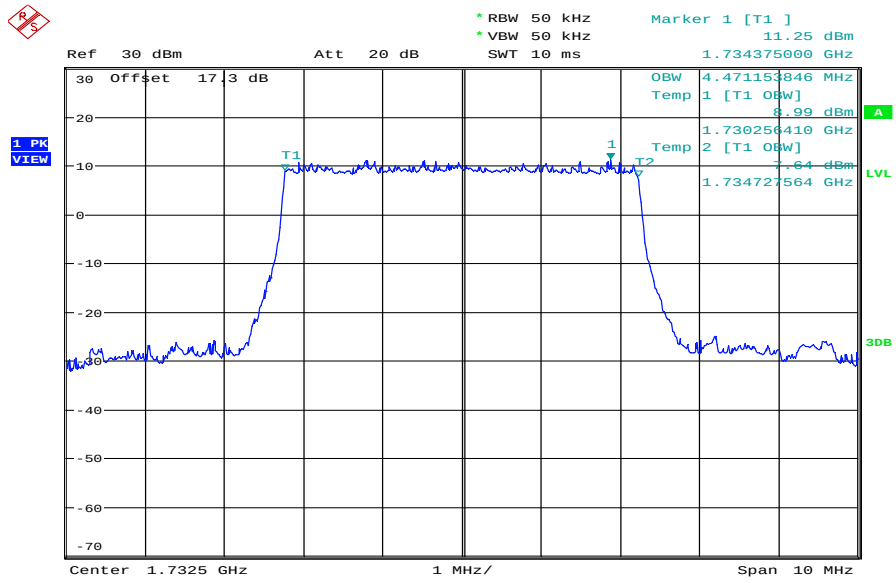
Date: 10.APR.2013 11:18:36

Plot 8: 3 MHz (-26 dBc BW) / Channel mid



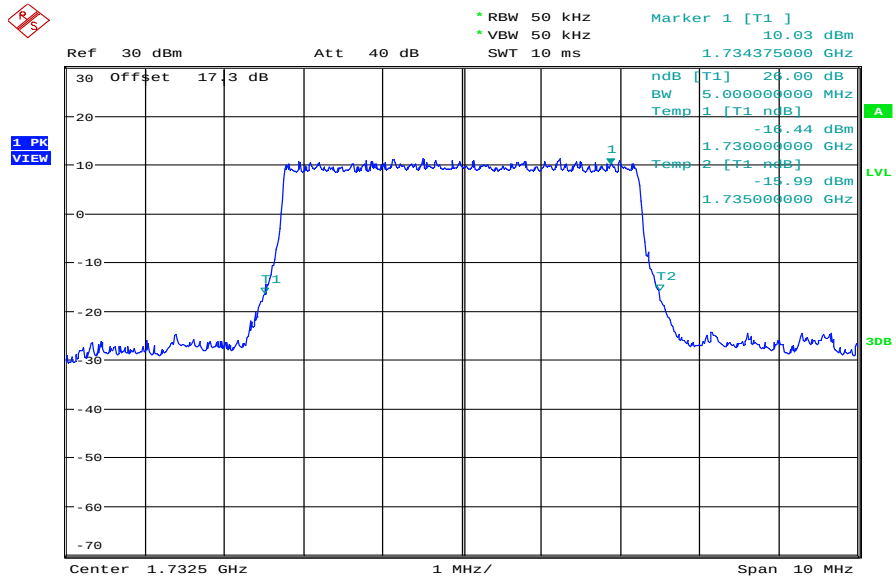
Date: 10.APR.2013 11:19:52

Plot 9: 5 MHz (99% - OBW) / Channel mid



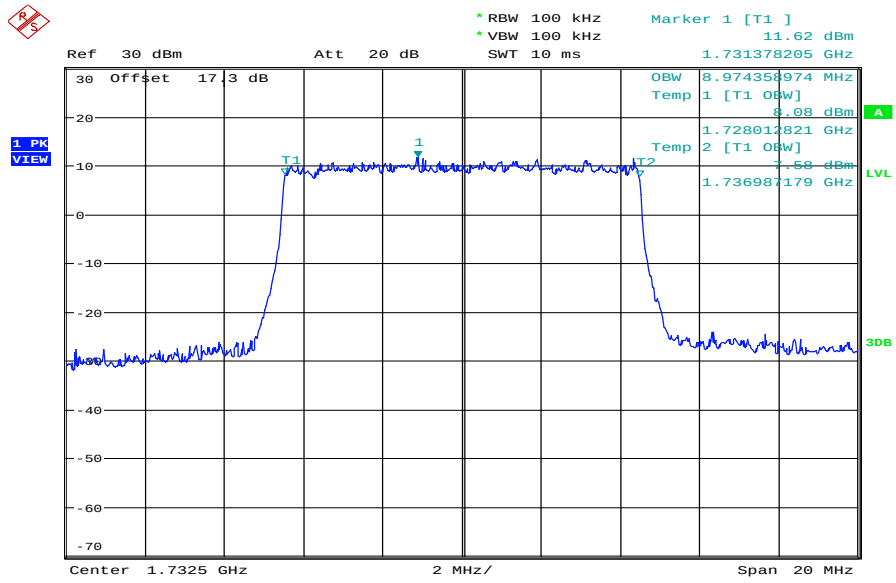
Date: 10.APR.2013 11:22:53

Plot 10: 5 MHz (-26 dBc BW) / Channel mid



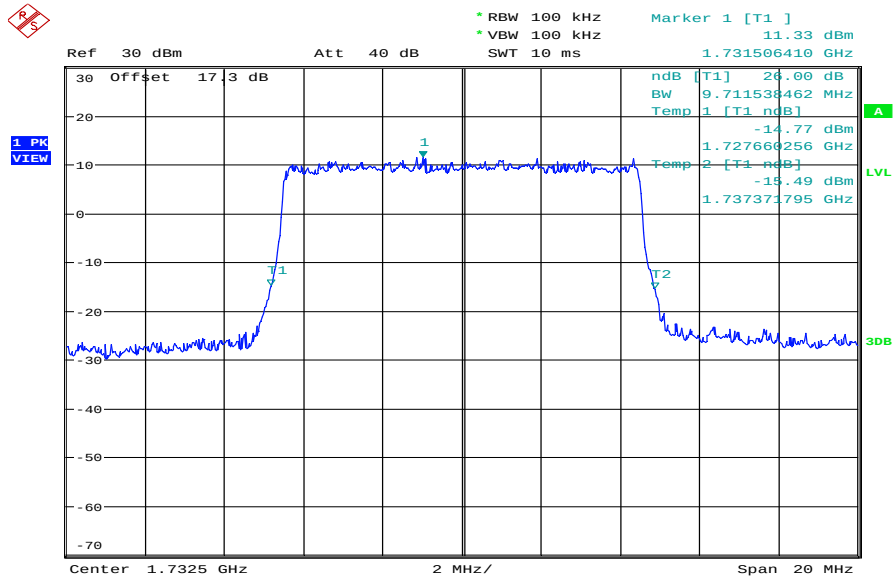
Date: 10.APR.2013 11:23:56

Plot 11: 10 MHz (99% - OBW) / Channel mid



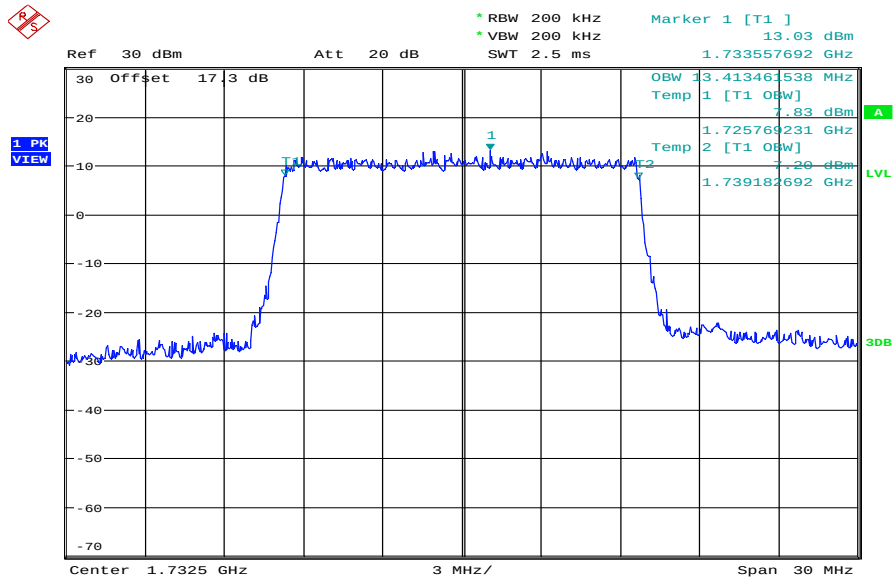
Date: 10.APR.2013 11:44:26

Plot 12: 10 MHz (-26 dBc BW) / Channel mid



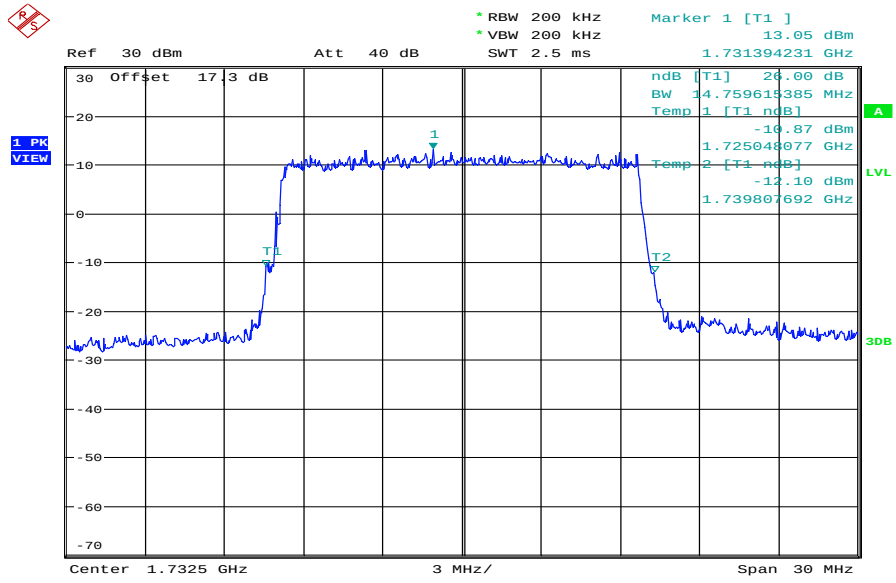
Date: 10.APR.2013 11:45:20

Plot 13: 15 MHz (99% - OBW) / Channel mid



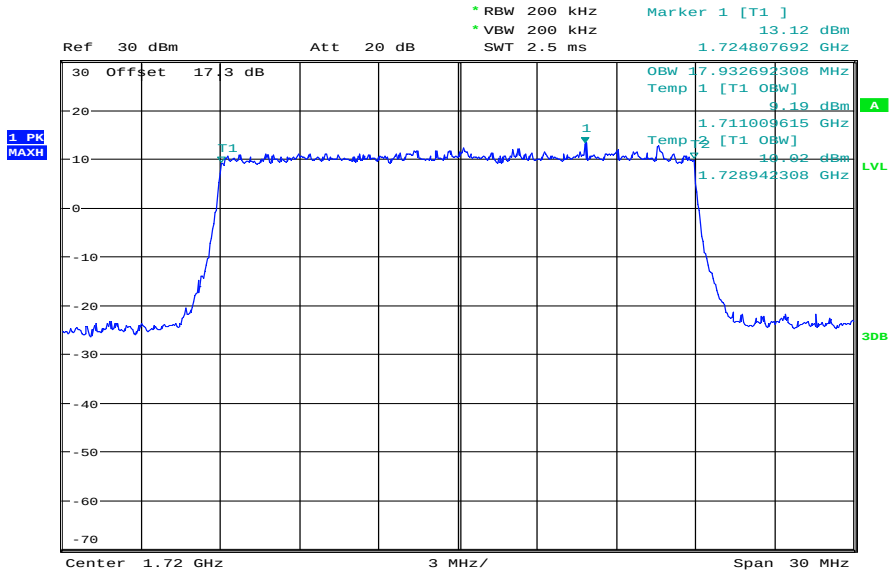
Date: 10.APR.2013 11:51:48

Plot 14: 15 MHz (-26 dBc BW) / Channel mid



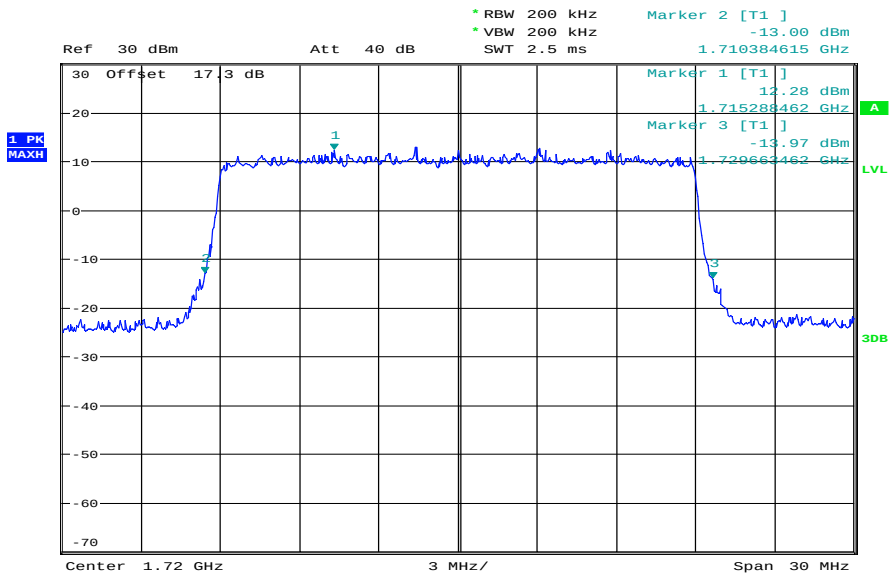
Date: 10.APR.2013 11:50:53

Plot 15: 20 MHz (99% - OBW) / Channel low



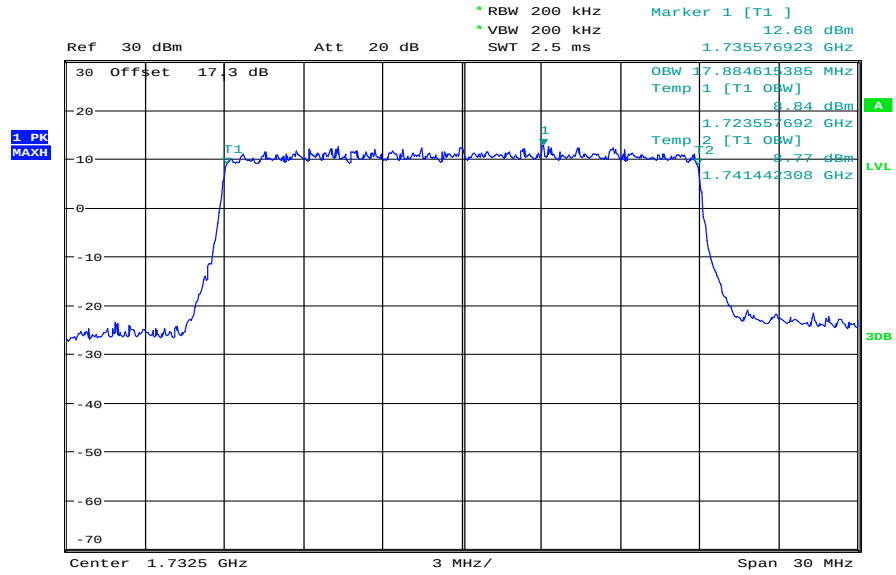
Date: 27.MAR.2013 10:08:17

Plot 16: 20 MHz (-26 dBc BW) / Channel low



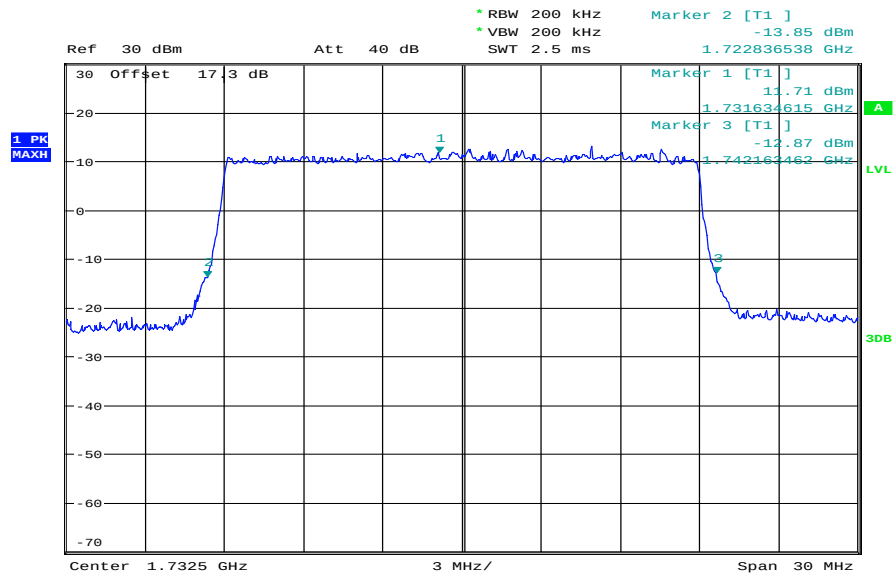
Date: 27.MAR.2013 09:23:34

Plot 17: 20 MHz (99% - OBW) / Channel mid



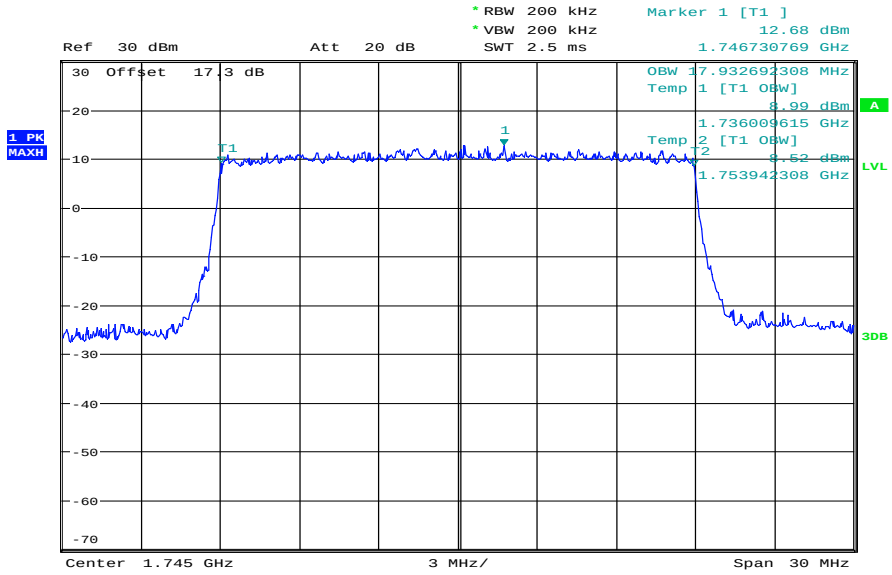
Date: 27.MAR.2013 10:10:57

Plot 18: 20 MHz (-26 dBc BW) / Channel mid



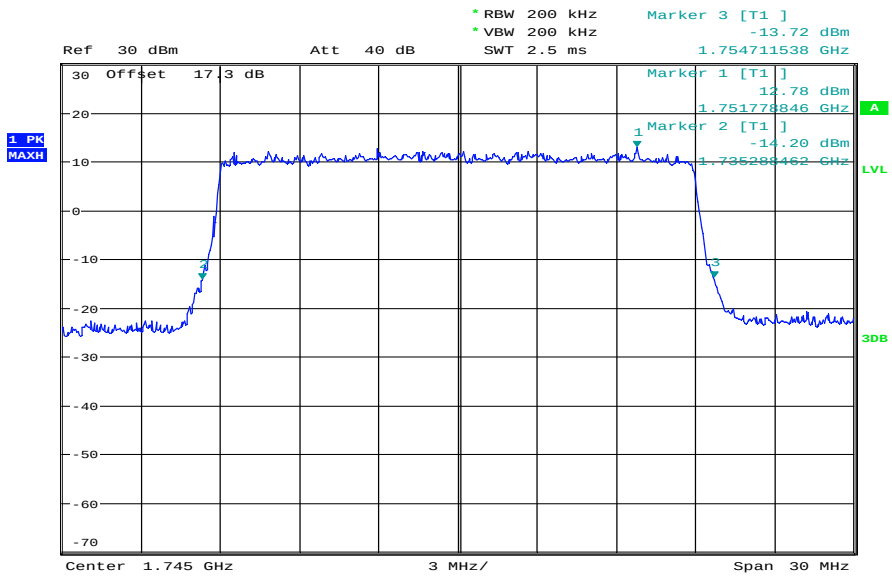
Date: 27.MAR.2013 09:22:15

Plot 19: 20 MHz (99% - OBW) / Channel high



Date: 27.MAR.2013 10:13:16

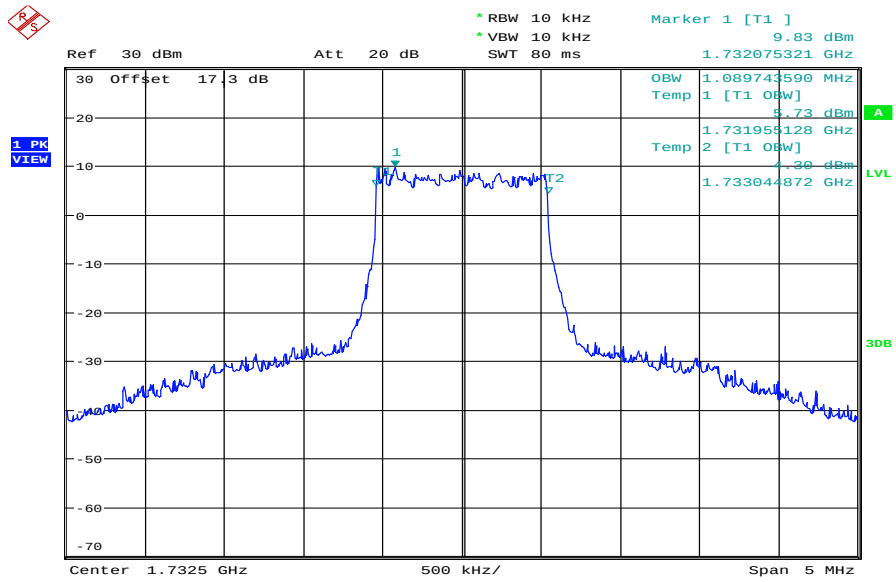
Plot 20: 20 MHz (-26 dBc BW) / Channel high



Date: 27.MAR.2013 09:26:24

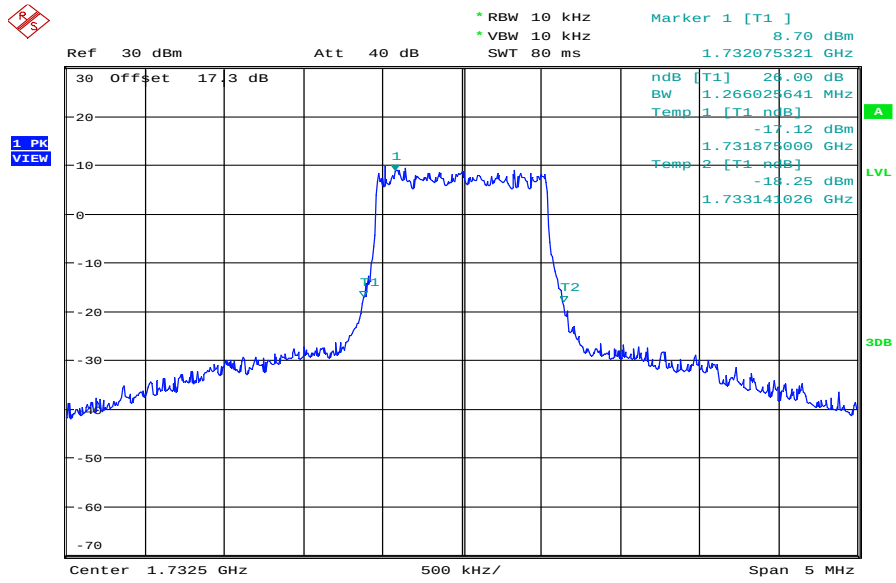
Plots: 16-QAM

Plot 1: 1.4 MHz (99% - OBW) / Channel mid



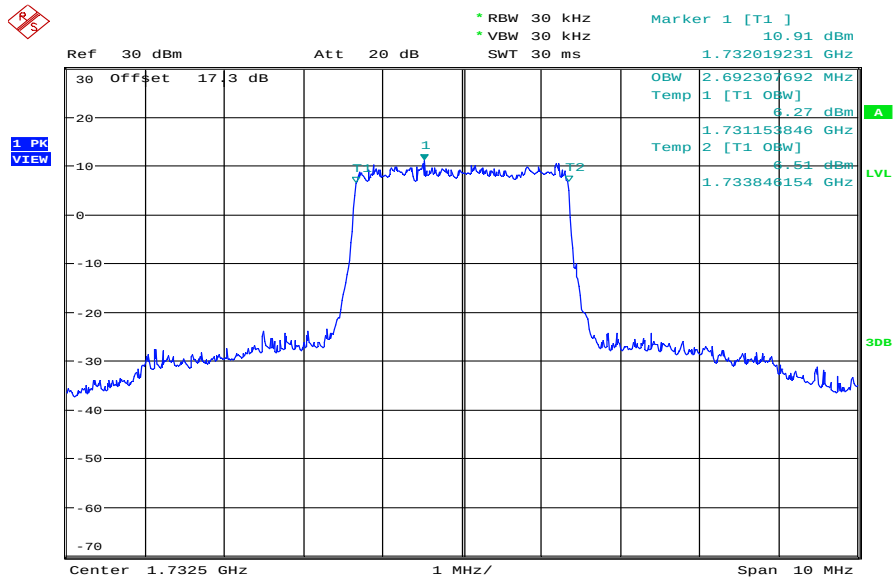
Date: 10.APR.2013 11:09:37

Plot 2: 1.4 MHz (-26 dBc BW) / Channel mid



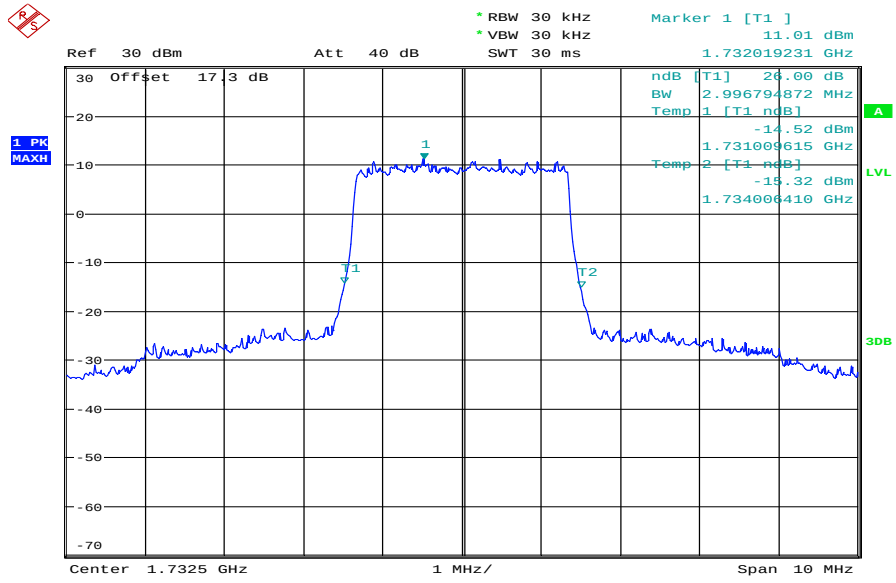
Date: 10.APR.2013 11:10:31

Plot 3: 3 MHz (99% - OBW) / Channel mid



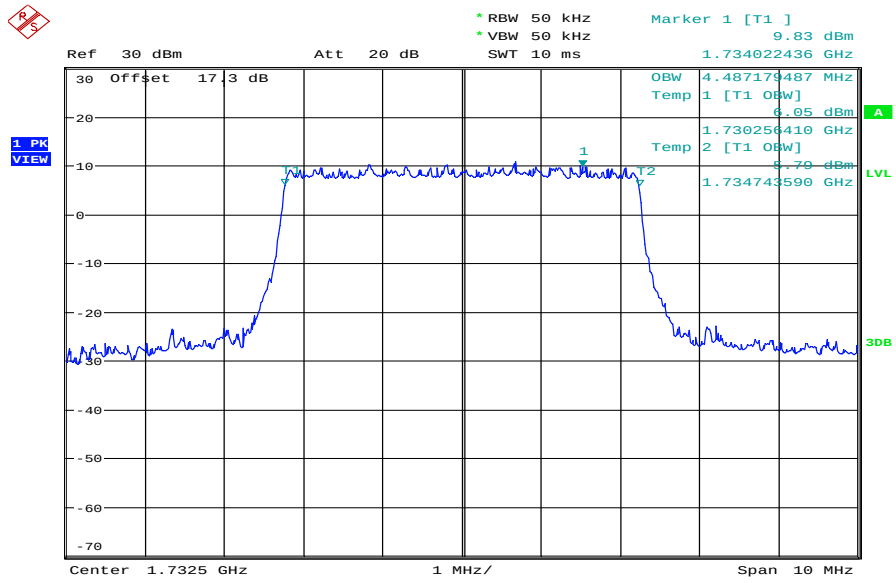
Date: 10.APR.2013 11:17:33

Plot 4: 3 MHz (-26 dBc BW) / Channel mid



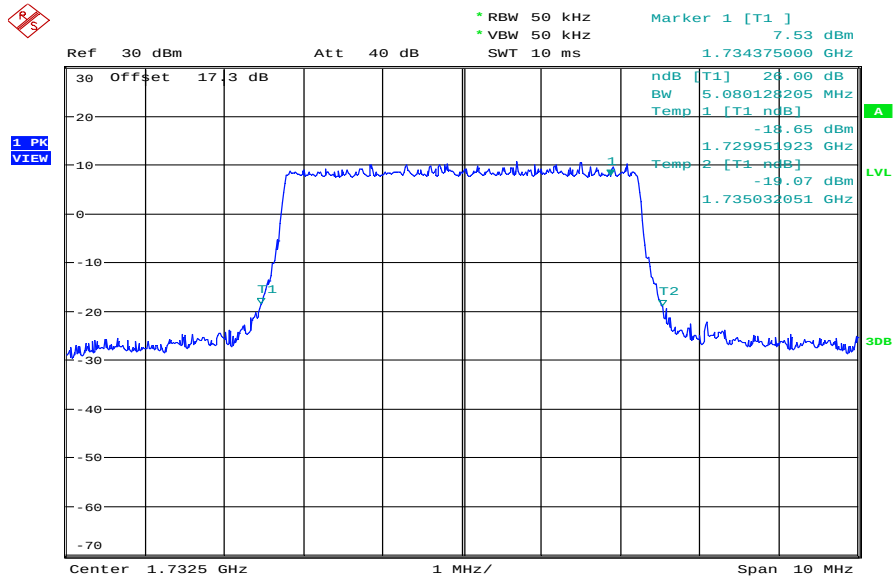
Date: 10.APR.2013 11:15:35

Plot 5: 5 MHz (99% - OBW) / Channel mid



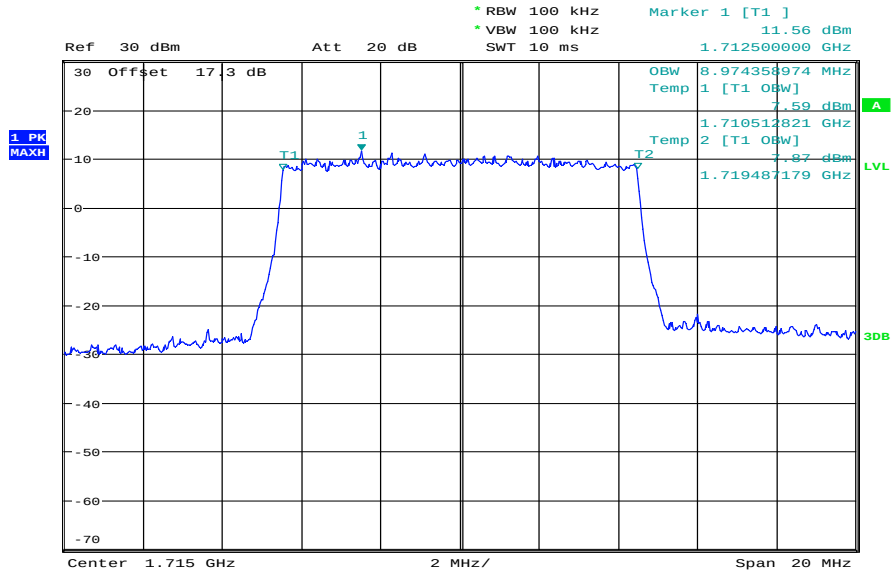
Date: 10.APR.2013 11:42:34

Plot 6: 5 MHz (-26 dBc BW) / Channel mid



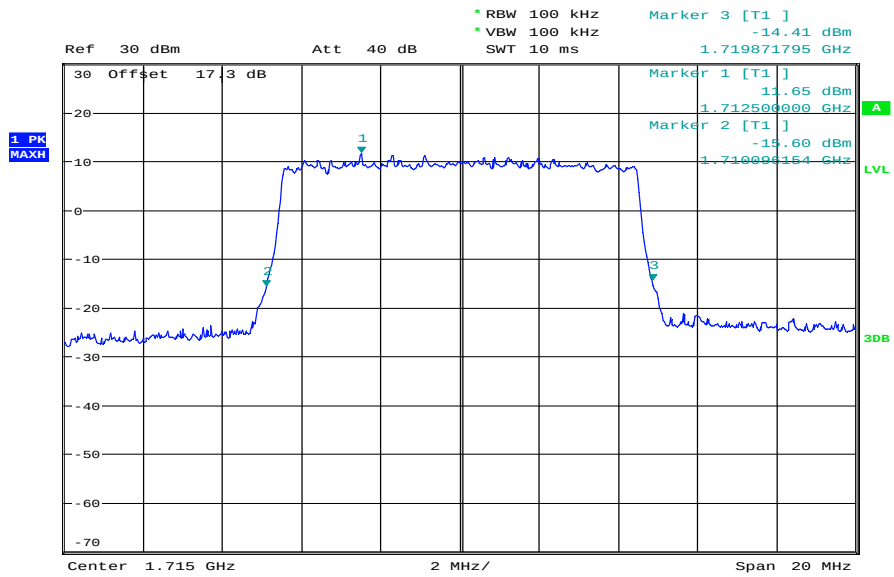
Date: 10.APR.2013 11:41:32

Plot 7: 10 MHz (99% - OBW) / Channel low



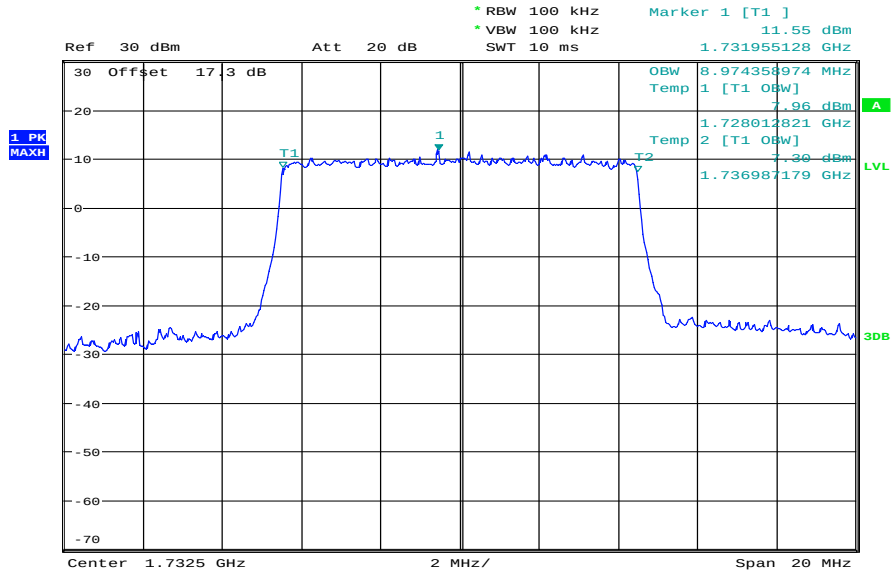
Date: 27.MAR.2013 10:16:39

Plot 8: 10 MHz (-26 dBc BW) / Channel low

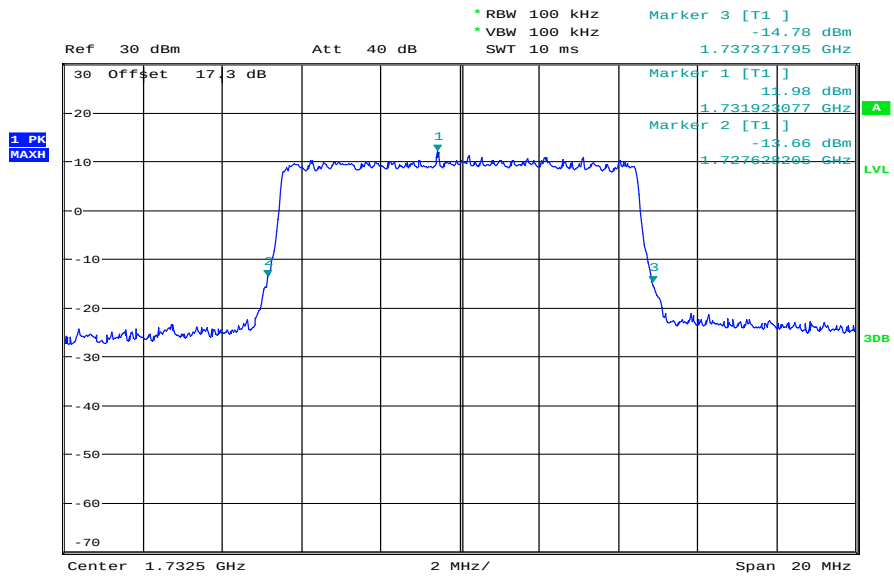


Date: 27.MAR.2013 09:38:10

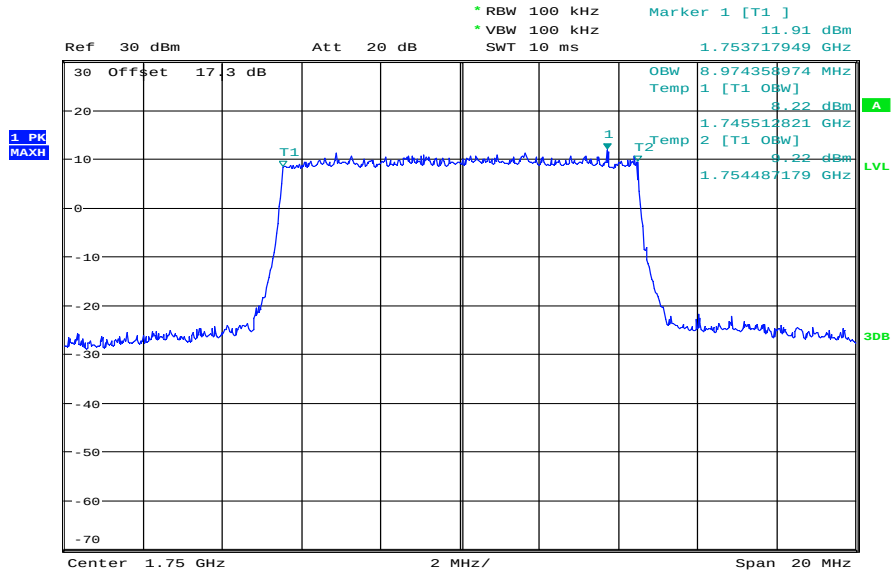
Plot 9: 10 MHz (99% - OBW) / Channel mid



Plot 4: 10 MHz (-26 dBc BW) / Channel mid

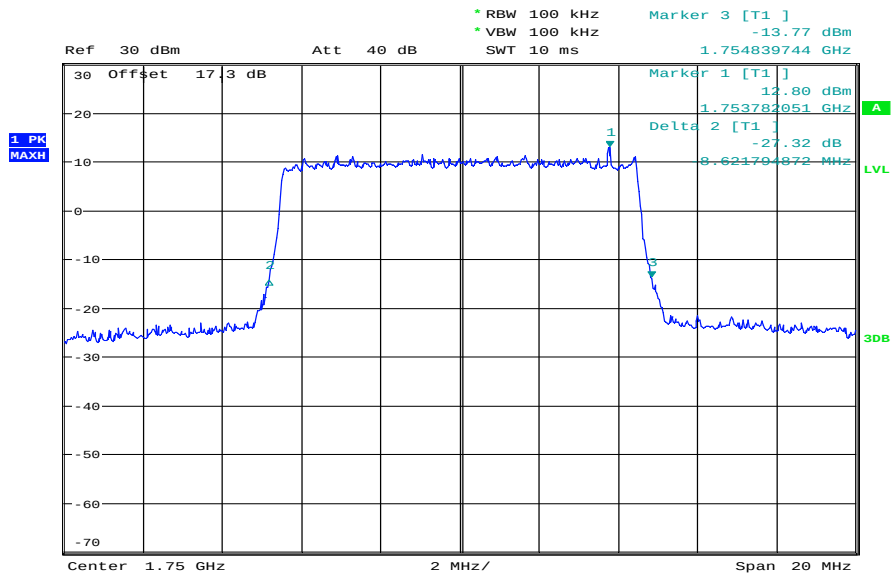


Plot 11: 10 MHz (99% - OBW) / Channel high



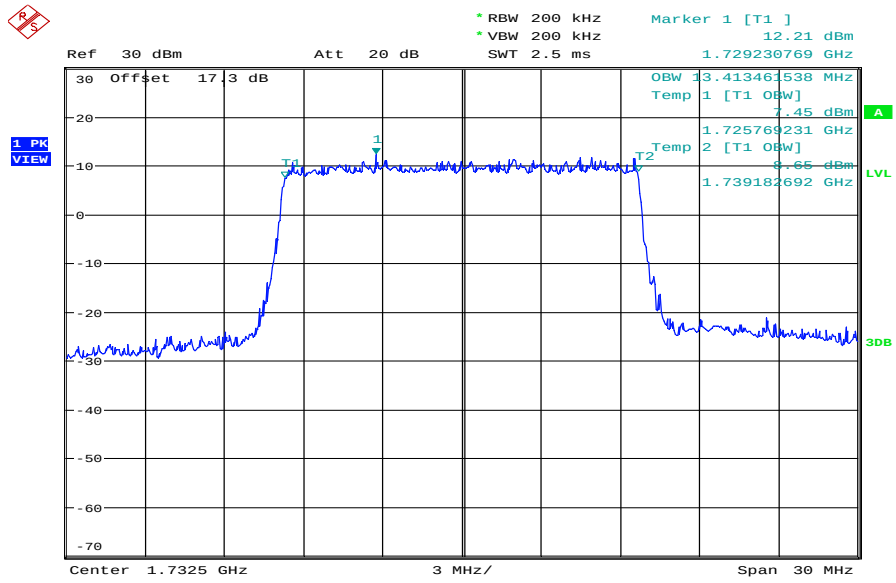
Date: 27.MAR.2013 10:20:34

Plot 6: 12 MHz (-26 dBc BW) / Channel high



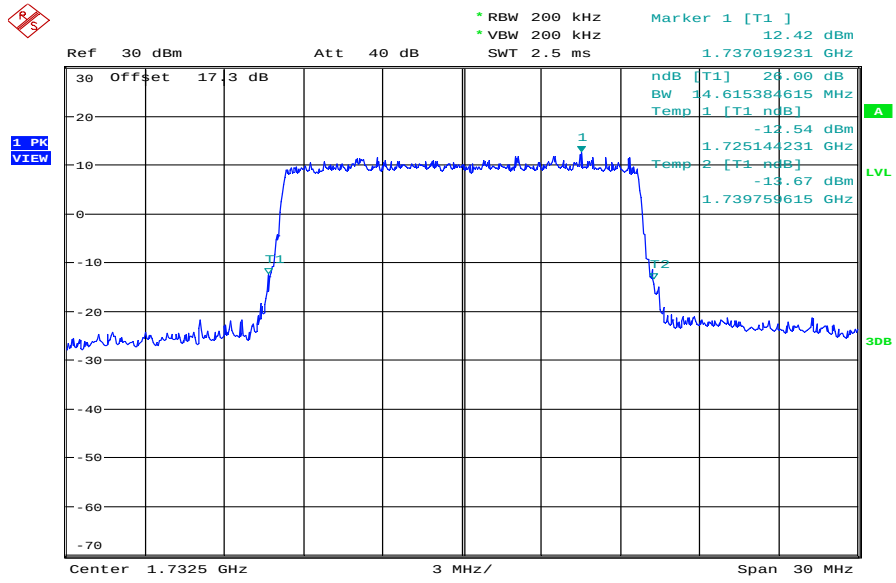
Date: 27.MAR.2013 09:45:16

Plot 13: 15 MHz (99% - OBW) / Channel mid



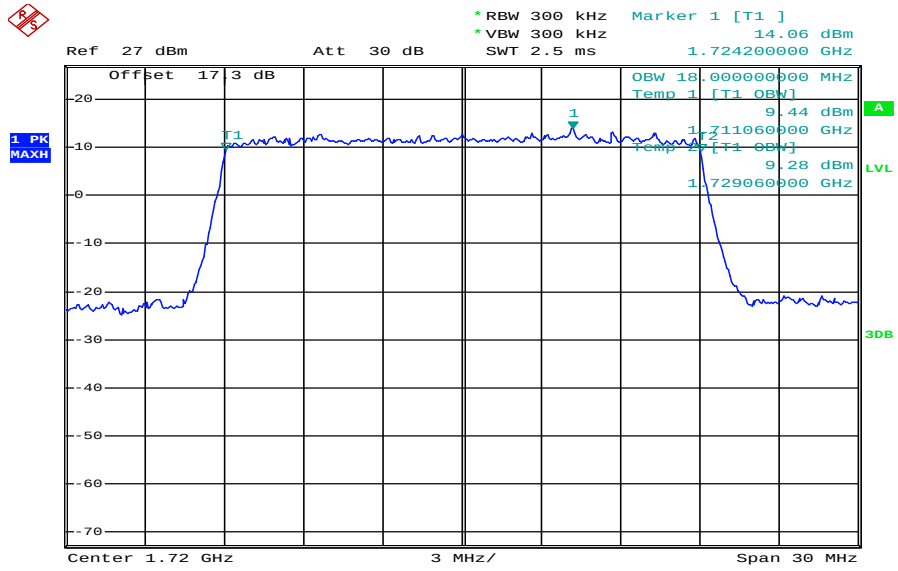
Date: 10.APR.2013 11:52:53

Plot 14: 15 MHz (-26 dBc BW) / Channel mid

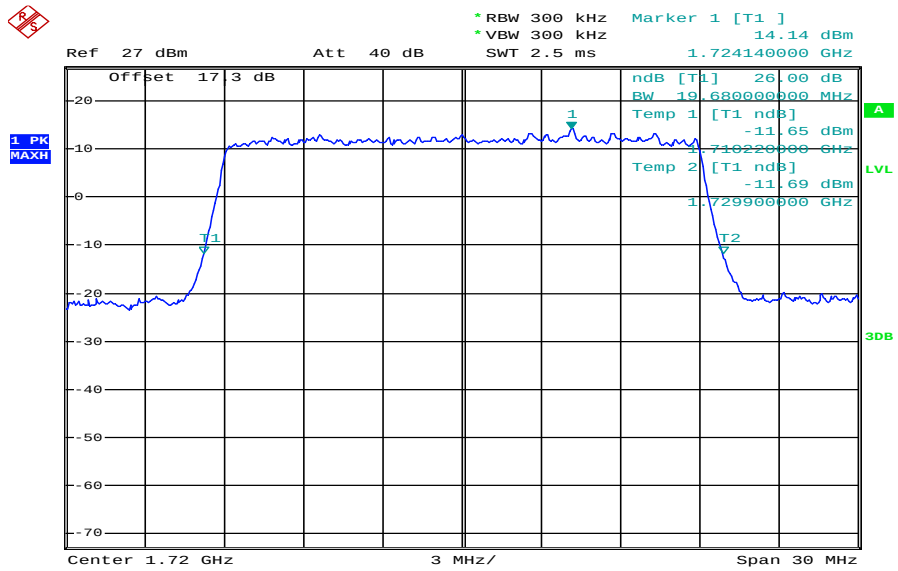


Date: 10.APR.2013 11:53:59

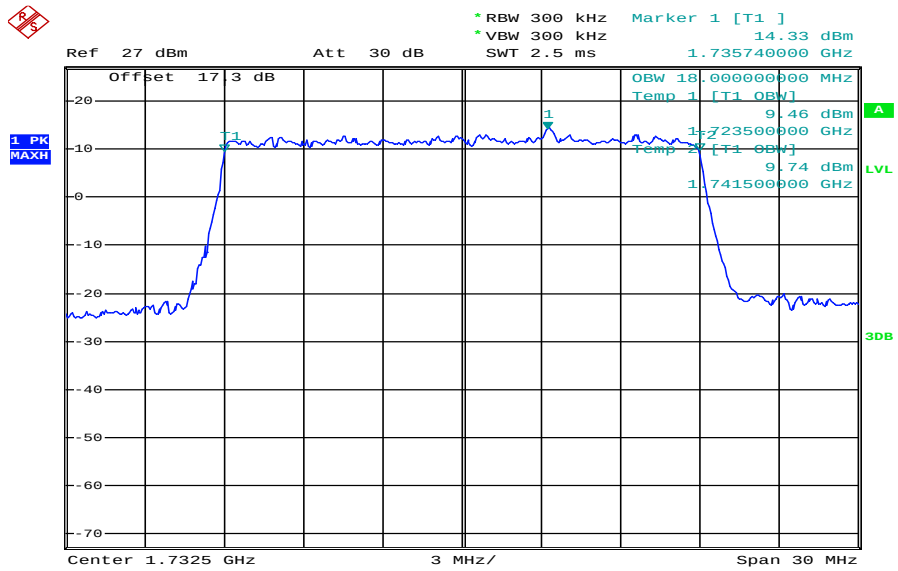
Plot 15: 20 MHz (99% - OBW) / Channel low



Plot 16: 20 MHz (-26 dBc BW) / Channel low

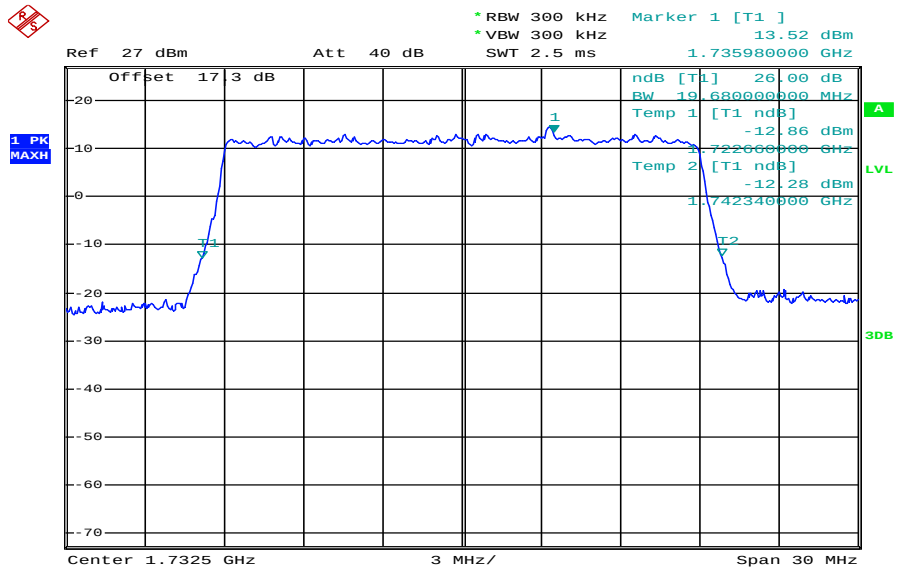


Plot 17: 20 MHz (99% - OBW) / Channel mid



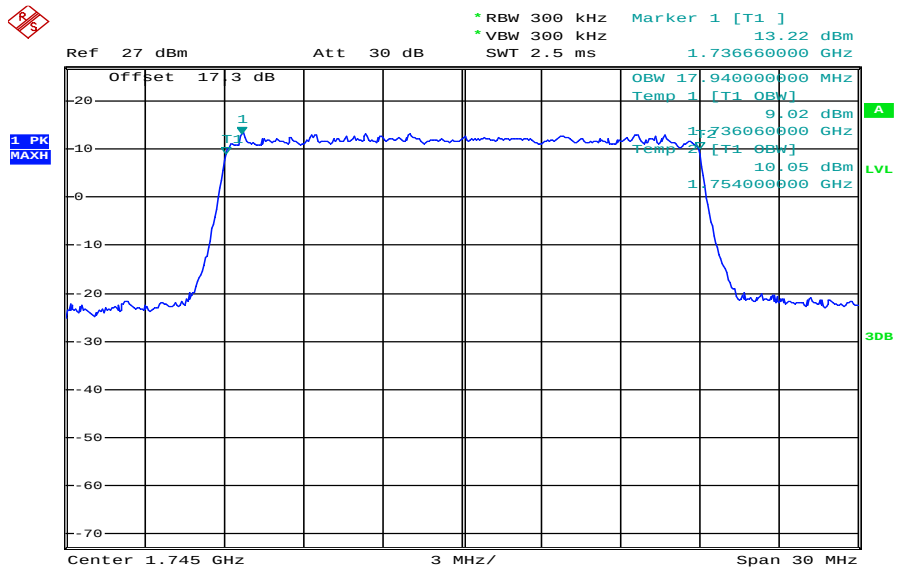
Date: 4.APR.2013 14:40:00

Plot 18: 20 MHz (-26 dBc BW) / Channel mid



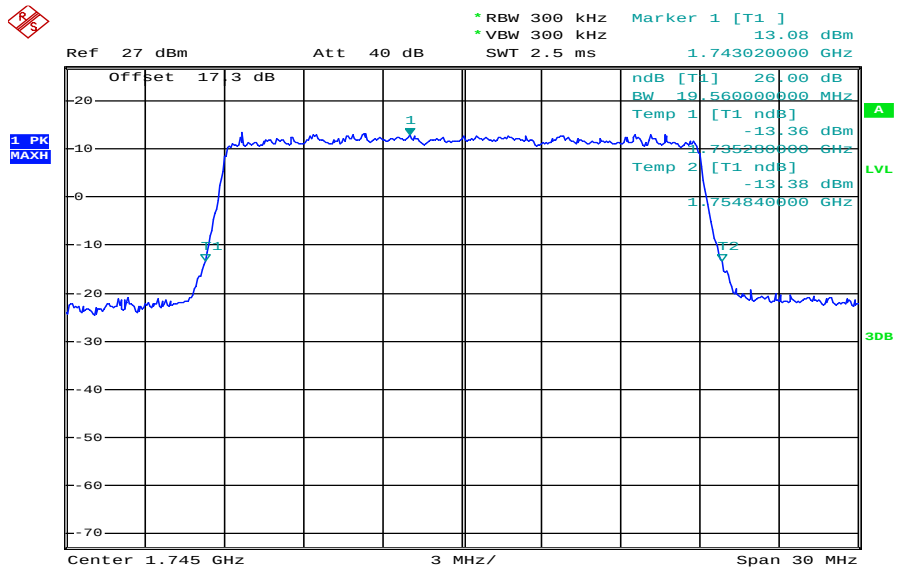
Date: 4.APR.2013 14:41:49

Plot 19: 20 MHz (99% - OBW) / Channel high



Date: 4.APR.2013 14:43:59

Plot 20: 20 MHz (-26 dBc BW) / Channel high



Date: 4.APR.2013 14:43:03

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	CR 79	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751	ne		
2	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
3	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
4	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000787	ne		
5	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		
6	A028	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002440	ne		
7	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	ne		
8	A030	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000487	ne		
9	n. a.	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001752	ne		
10	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	Ve	09.10.2012	09.10.2014
11	n. a.	Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm	FSP30	R&S	100886	300003575	k	22.08.2012	22.08.2014
12	n. a.	MXA Signal Analyzer 20 Hz - 26.5 GHz	N9020A MXA Signal Analyzer	Agilent Technologies	US46220229	300003805	vlKl!	16.01.2013	16.01.2015
13	n. a.	Broadband Low Noise Amplifier 18-50 GHz	CBL18503 070-XX	CERNEX	19338	300004273	ne		
14	n. a.	PXA Spectrum Analyzer 3Hz to 50GHz	N9030A PXA Signal Analyzer	Agilent Technologies	US51350267	300004338	k	16.12.2012	16.12.2013
15	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.10.2012	22.10.2013
16	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
17	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!	11.05.2011	11.05.2013
18	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
19	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
20	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
21	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
22	9	Isolating Transformer	MPL IEC625	Erfi	91350	300001155	ne		

			Bus Regeltrennt ravo						
23	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
24	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
25	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
26	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
27	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
28	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKl!	14.10.2011	14.10.2014
29	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	21.02.2013	21.02.2014
30	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2605e08770	300001443	ne		
31	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSiQ26	R&S	835111/0004	300002678	Ve	15.01.2013	15.01.2015
32	n. a.	Power Supply 0-20V; 0-5A	6632B	HP	US37478366	400000117	vlKl!	20.08.2012	20.08.2014

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

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	2013-03-27
-A	Addition of ERP measurement results and PIN; Correction of result tables	2013-04-02
-B	Changed standard version	2013-04-04
-C	Addition of -26dBc and OBW measurements	2013-04-04
-D	Addition of -26dBc / OBW measurements, output power values and emission designator table	2013-04-10

Annex B Further information

Glossary

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

Annex C Accreditation Certificate

Front side of certificate

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

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 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.-Ing. (FH) Ralf Egner
Abteilungsleiter

Siehe Hinweise auf der Rückseite

Back side of certificate

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60594 Frankfurt am Main

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38116 Braunschweig

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ILAC: www.ilac.org
IAF: www.iaf.nu

Note:

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

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