

Test Report

Product	Inmarsat Portable Mobile Earth Station
Name and address of the applicant	Thrane & Thrane A/S Lundtoftegaardsvej 93D 2800 Kgs. Lyngby DK Denmark
Name and address of the manufacturer	Thrane & Thrane A/S Lundtoftegaardsvej 93D 2800 Kgs. Lyngby DK Denmark
Model	TT-3720B
Rating	/
Trademark	Thrane & Thrane
Serial number	/
Additional information	/
Tested according to	FCC CFR 47 Part 25C Satellite Communications
Order number	238073
Tested in period	2013.07.02 – 2013.08.22 and 2014.03.20
Issue date	2014.05.15
Name and address of the testing laboratory	 FCC No: 994405 IC OATS: 2040D-1 Instituttveien 6 Kjeller, Norway TEL: (+47) 22 96 03 30 FAX: (+47) 22 96 05 50
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1 Test Information

1.1 Test Item

Name :	Thrane & Thrane
FCC ID :	ROJEXPLORER-710
Model/version :	TT-3720B (Explorer 710 System) TT-3732B (Explorer 710 Transceiver) TT-3703B (Explorer 710 Antenna)
Serial number :	/
Hardware identity and/or version:	/
Software identity and/or version :	/
Frequency Range :	Transmit: 1626.5 – 1660.5 MHz Receive: 1525.0 – 1559.0 MHz
Operating Modes :	Transmitting and receiving
Type of Modulation :	Digital (Single channel 16QAM and QPSK/4)
User Frequency Adjustment :	None
Output Power :	3.72 Watt (Conducted)
Type of Power Supply :	Secondary Battery and/or AC Adaptor
Antenna Connector :	50 Ω for testing only
Antenna Diversity Supported :	None
Desktop Charger :	None

Description of Test Item

The tested system TT-3720B is a BGAN Inmarsat Terminal.

The system TT-3720B consists of TT-3723B Transceiver and TT-3703B Antenna.

Exposure Evaluation

The EUT require RF Exposure Evaluation to Industry Canada requirements, this has been provided in the form of MPE calculation at 90 cm.

1.2 Test Environment

1.2.1 Normal test condition

Temperature:	20 - 24 °C
Relative humidity:	20 - 50 %
Normal test voltage:	18 V DC

The values above are the limits registered during the test period.

1.3 Test Engineer(s)

Thomas Dangle

Bjørn Nordset

1.4 Test Equipment

See list of test equipment in clause 6.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC Part 25, Subpart C.

Radiated tests (if any) were performed in accordance with ANSI C63.4-2009. Radiated tests were performed in a semi-anechoic chamber at measuring distances of 3m and 10m.

A description of the test facility is on file with the FCC and Industry Canada.

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-production Unit

☐ Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC Part 25C, reference	Result
Frequency Bands	§ 25.202, (4) (iii) (A)	Complies
Frequency Stability	§ 25.202, (11) (ii) (d)	Complies
Power Limits	§ 25.204, (a)	Complies
Occupied Bandwidth	-	Not required
Emission Limitations	§ 25.202, (f) (1), (2), (3) and (4)	Complies
Emission Limitations for Protection of Aeronautical Radionavigation-Satellite Service		
- 1626.5-1660.5 MHz	§ 25.216, (h)	Complies
Carrier-off state Emissions	§ 25.216, (i)	Complies
Receiver Spurious Emissions	N/A	

2.3 Description of modification for Modification Filing

Not applicable.

2.4 Comments

The measurements were done with the EUT powered by 18 VDC. It was checked that power variations at 10.5 V and 32 V DC did not have major influence on the measurements

2.5 Family List Rational

Not Applicable.

3 TEST RESULTS

3.1 Frequency Bands

Type of Equipment:	Mobile Earth Station
Transmit Frequency:	1626.5 – 1660.5 MHz
Receive Frequency:	1525 -1559 MHz
Application:	Mixed Voice and Data

Requirement:

The EUT complies with the requirements in § 25.202, (4) (iii) (A).

3.2 Frequency Tolerance

Carrier Frequency Tolerance, Temperature Variations				
Temperature	Frequency (MHz)	Difference (kHz)	Difference (%)	Limit (%)
+50 °C	1643.498834	-1.166	-7E-5	<0.001
+40 °C	1643.499346	-0.654	-4E-5	
+30 °C	1643.499808	-0.192	-1E-5	
+20 °C	1643.500175	0.175	1E-5	
+10 °C	1643.500310	0.310	2E-5	
0 °C	1643.500099	0.099	6E-6	
-10 °C	1643.500011	0.011	6E-7	
-20 °C	1643.499931	-0.069	-4E-6	
-30 °C	1643.500008	0.008	5E-7	

Carrier Frequency Tolerance, Voltage Variations				
Voltage	Frequency (MHz)	Difference (kHz)	Difference (%)	Limit (%)
18 VDC	1643.500175	0.175	1E-5	<0.001
10.5 VDC	1643.500226	0.226	1E-5	
32 VDC	1643.500162	0.162	1E-5	

Test Results: **Complies**

Requirement:

The EUT complies with the requirements in § 25.202, (11) (ii) (d).

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

3.3 Output Power

Peak Output Power:

Modulation Scheme	Peak Conducted Output Power (dBm)			Calculated e.i.r.p (dBW)			Limit e.i.r.p (dBW)
	1626.6 MHz	1643.5 MHz	1660.4 MHz	1626.6 MHz	1643.5 MHz	1660.4 MHz	
R20T0.5Q	37.4	37.4	37.1	23.3	23.3	23.0	+40 dBW
R20T1Q	36.2	36.5	36.3	22.1	22.4	22.2	
R5T1X	35.7	36.4	36.0	21.6	22.3	21.9	
R20T1X							
R5T2Q	34.4	35.3	34.7	20.3	21.2	20.6	
R20T2Q							
R5T2X	33.5	34.8	33.8	19.4	20.7	19.7	
R20T2X							
R5T4.5Q	30.8	31.0	31.0	16.7	16.9	16.9	
R20T4.5Q							
R5T4.5X	30.8	30.9	30.9	16.7	16.8	16.8	
R20T4.5X							
R80T0.5Q	37.4	37.4	37.1	23.3	23.3	23.0	
R80T1Q	36.2	36.5	36.3	22.1	22.4	22.2	
FR80T2.5X4	34.0	33.3	32.9	19.9	19.2	18.8	
FR80T2.5X16	33.2	33.7	33.1	19.1	19.6	19.0	
FR80T2.5X32	33.5	33.8	33.9	19.4	19.7	19.8	
FR80T2.5X64	33.5	33.1	33.6	19.4	19.0	19.5	
FR80T5X4	31.0	30.0	30.5	16.9	15.9	16.4	
FR80T5X16	31.8	30.9	31.0	17.7	16.8	16.9	
FR80T5X32	31.1	31.2	30.7	17.0	17.1	16.6	
FR80T5X64	30.8	30.7	30.6	16.7	16.6	16.5	

Output Power was measured at the antenna connector with a spectrum analyzer with RBW of 3 kHz and Peak Detector. EUT was transmitting with 100% duty cycle.

The maximum output power variations measured at 10.5 V DC, 18 V DC and 32 V DC is less than 1.0 dB. The table shows only the measured values at the nominal supply voltage 18 V DC. See also plots.

Manufacturer stated Antenna Gain: 14.6 dBi

Manufacturer stated e.i.r.p: 20 dBW

RBW correction factor = $10 \log(4/3) = 1.25 \text{ dB}$

Calculated e.i.r.p (dBW) = Conducted power (dBm) + 1.25 dB + 14.6 dBi -30 dB

Average Output Power (RMS):

Modulation Scheme	Average Conducted Output Power (dBm)		Calculated e.i.r.p. (dBW)		Limit e.i.r.p (dBW)
	1626.6 MHz	1660.4 MHz	1626.6 MHz	1660.4 MHz	
R20T0.5Q	35.4	35.1	20.0	19.7	+40 dBW
R20T1Q	35.2	35.0	19.8	19.6	
R5T1X	35.7	35.4	20.3	20.0	
R20T1X					
R5T2Q	35.3	35.3	19.9	19.9	
R20T2Q					
R5T2X	35.6	35.3	20.2	19.9	
R20T2X					
R5T4.5Q	35.3	35.2	19.9	19.8	
R20T4.5Q					
R5T4.5X	35.3	35.0	19.9	19.6	
R20T4.5X					
R80T0.5Q	35.4	35.1	20.0	19.7	
R80T1Q	35.2	35.0	19.8	19.6	
FR80T2.5X4	35.3	35.1	19.9	19.7	
FR80T2.5X16	35.3	35.1	19.9	19.7	
FR80T2.5X32	35.3	35.2	19.9	19.8	
FR80T2.5X64	35.2	35.2	19.8	19.8	
FR80T5X4	35.3	35.1	19.9	19.7	
FR80T5X16	35.3	35.1	19.9	19.7	
FR80T5X32	35.3	35.1	19.9	19.7	
FR80T5X64	35.4	35.2	20.0	19.8	

Average Output Power was measured at the antenna connector with a RMS power meter.

EUT was transmitting with 100% duty cycle.

The maximum output power variations measured at 10.5 V DC, 18 V DC and 32 V DC is less than 0.5 dB. The table shows only the measured values at the nominal supply voltage 18 V DC.

Manufacturer stated Antenna Gain: 14.6 dBi

Manufacturer stated e.i.r.p: 20 dBW

Calculated e.i.r.p (dBW) = Conducted power (dBm) + 14.6 dBi -30 dB

Test Results: Complies

Requirements:

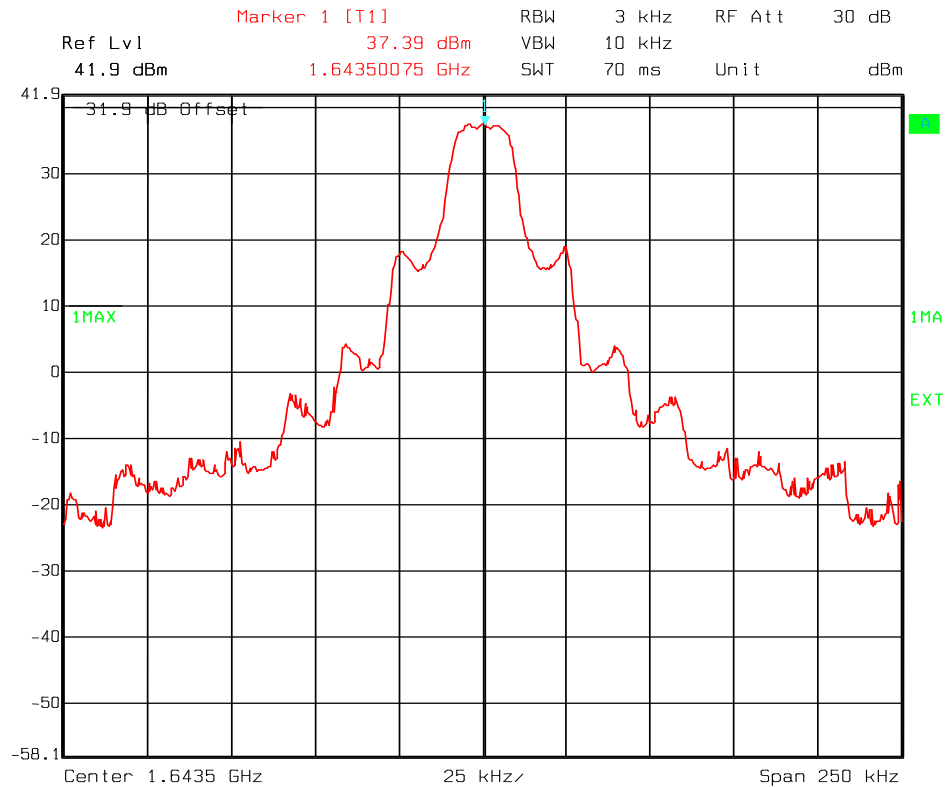
The EUT complies with the requirements in § 25.204, (a).

In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits:

+40 dBW in any 4 kHz band for $\theta \leq 0^\circ$

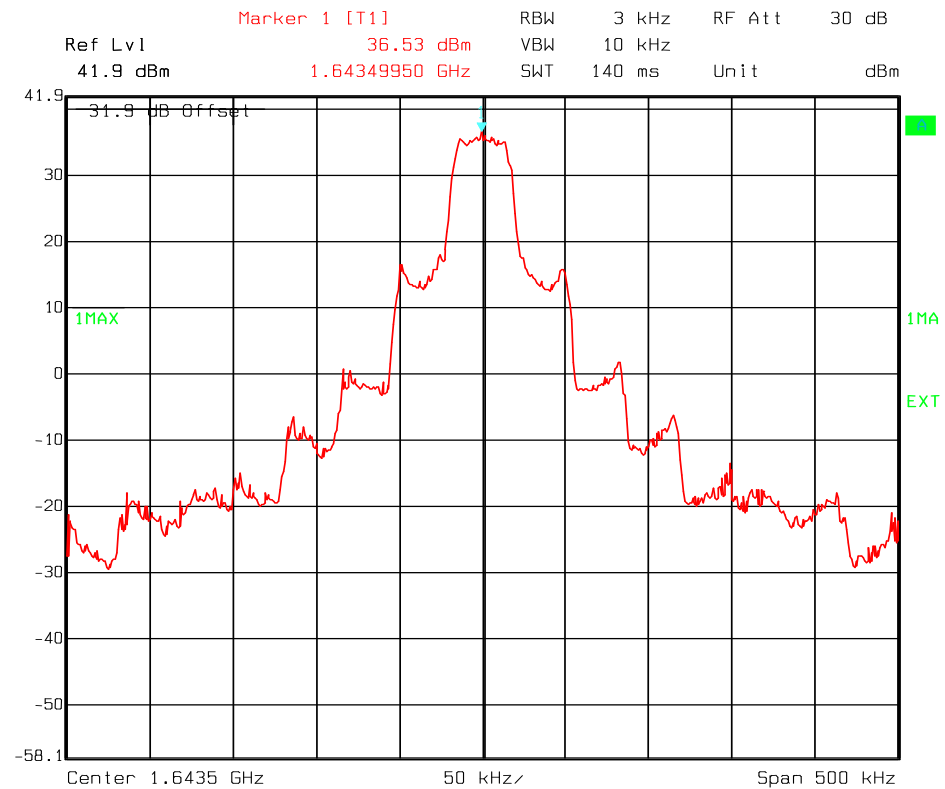
+40 + 3 * θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

Where θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.



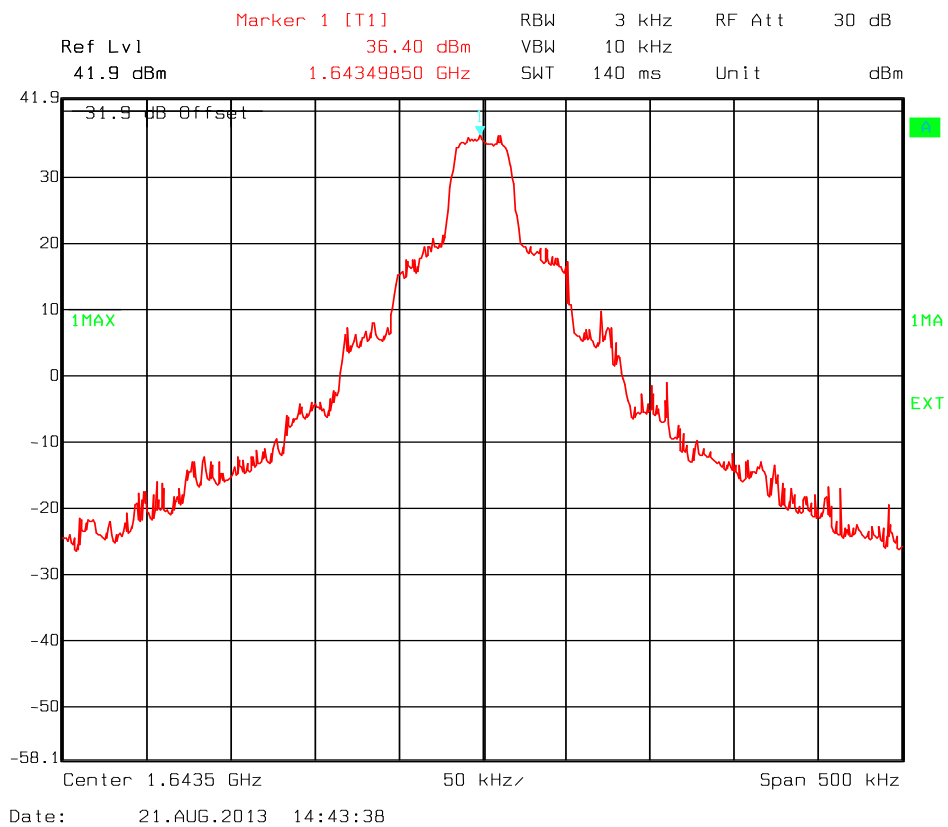
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Conducted power, r20t0.5q/r80t0.5q, 1643.5 MHz – 18 V DC

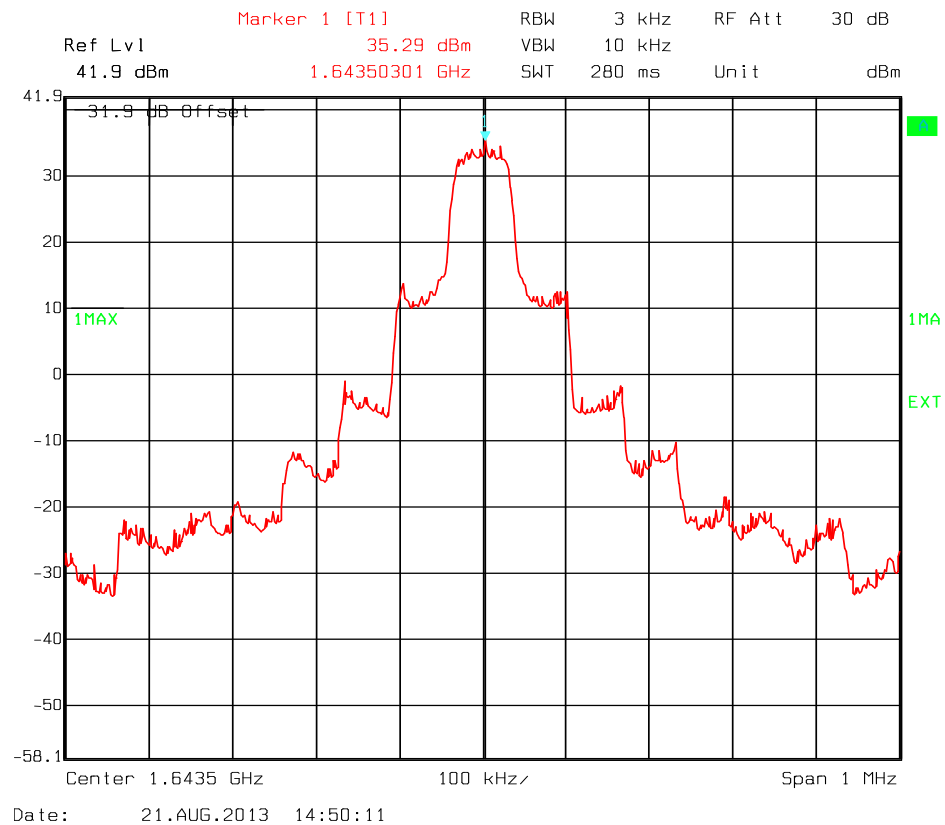


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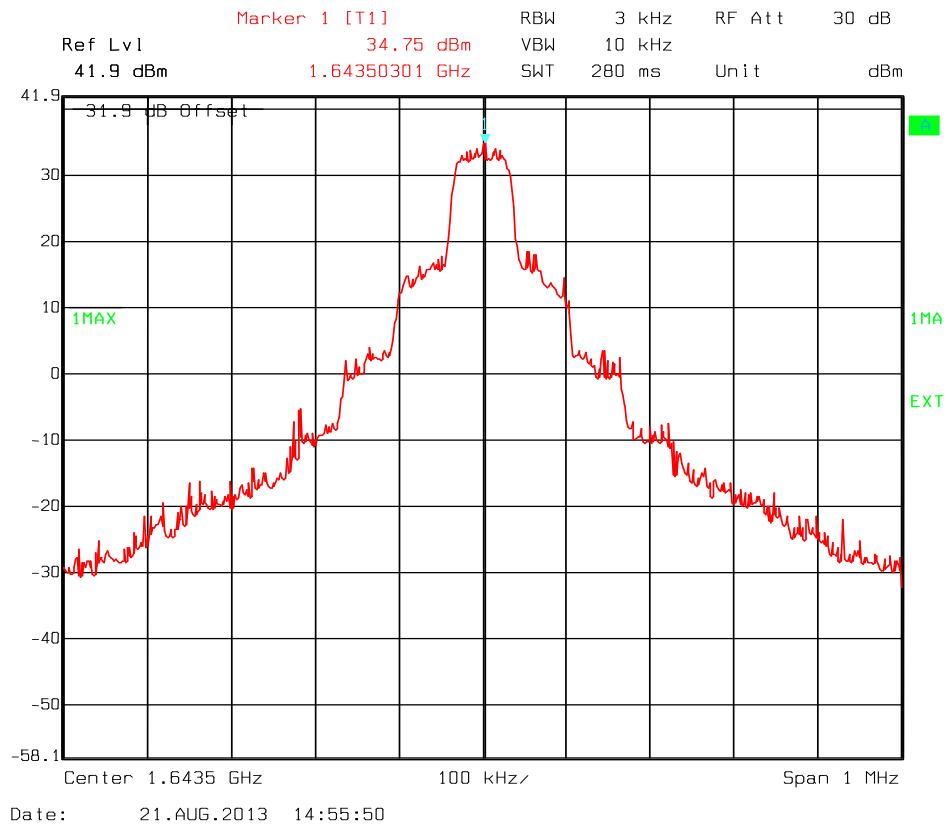
Conducted power, r20t1q/r80t1q, 1643.5 MHz – 18 V DC



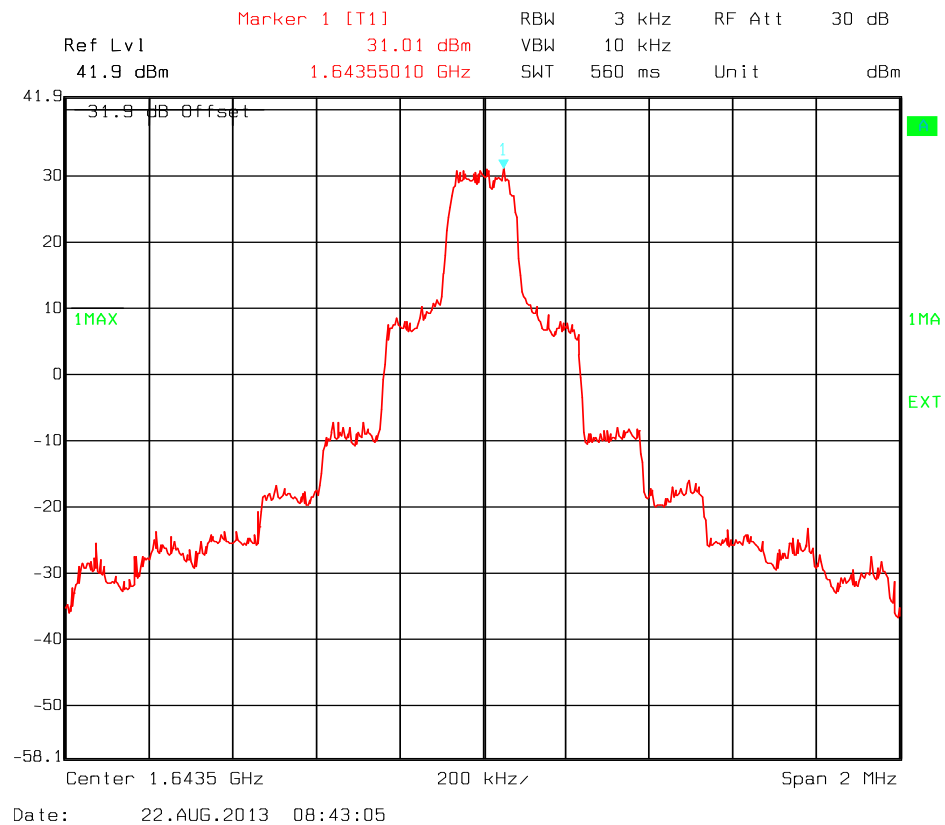
Conducted power, r5t1x/r20t1x, 1643.5 MHz – 18 V DC



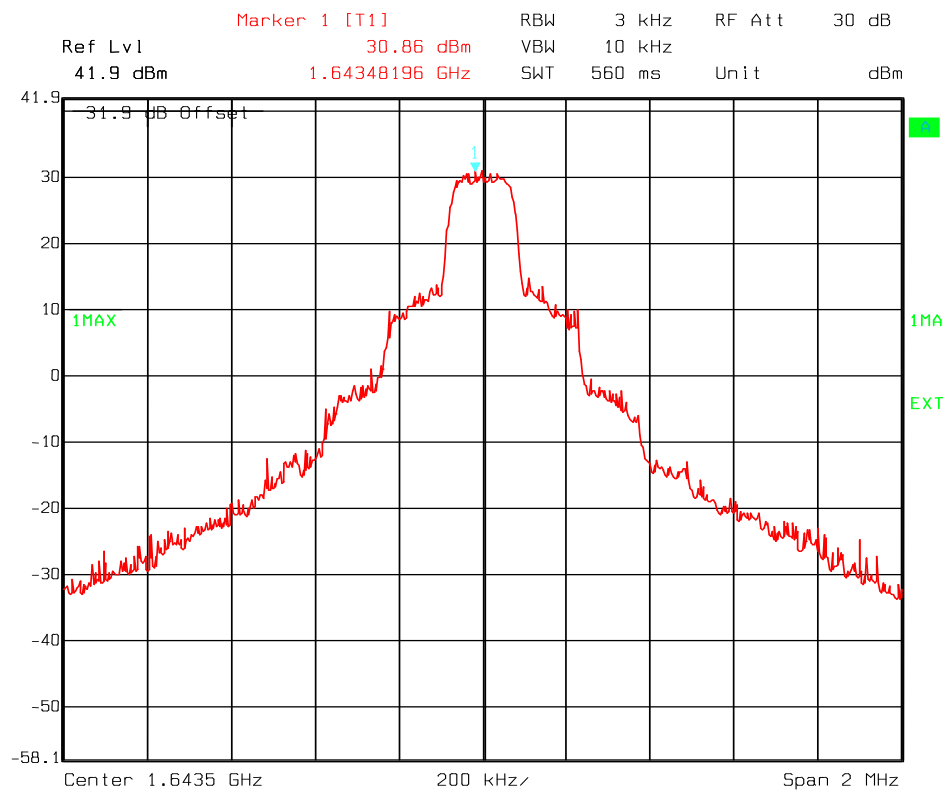
Conducted power, r5t2q/r20t2q, 1643.5 MHz – 18 V DC



Conducted power, r5t2x/r20t2x, 1643.5 MHz – 18 V DC

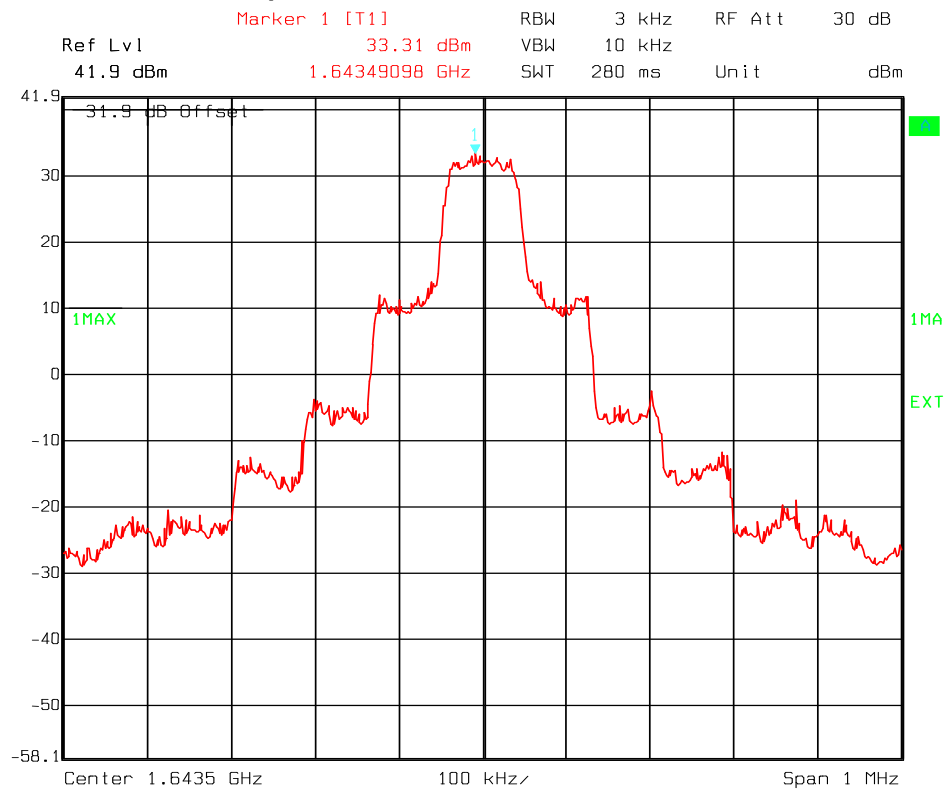


Conducted power, r5t4.5q/r20t4.5q, 1643.5 MHz – 18 V DC



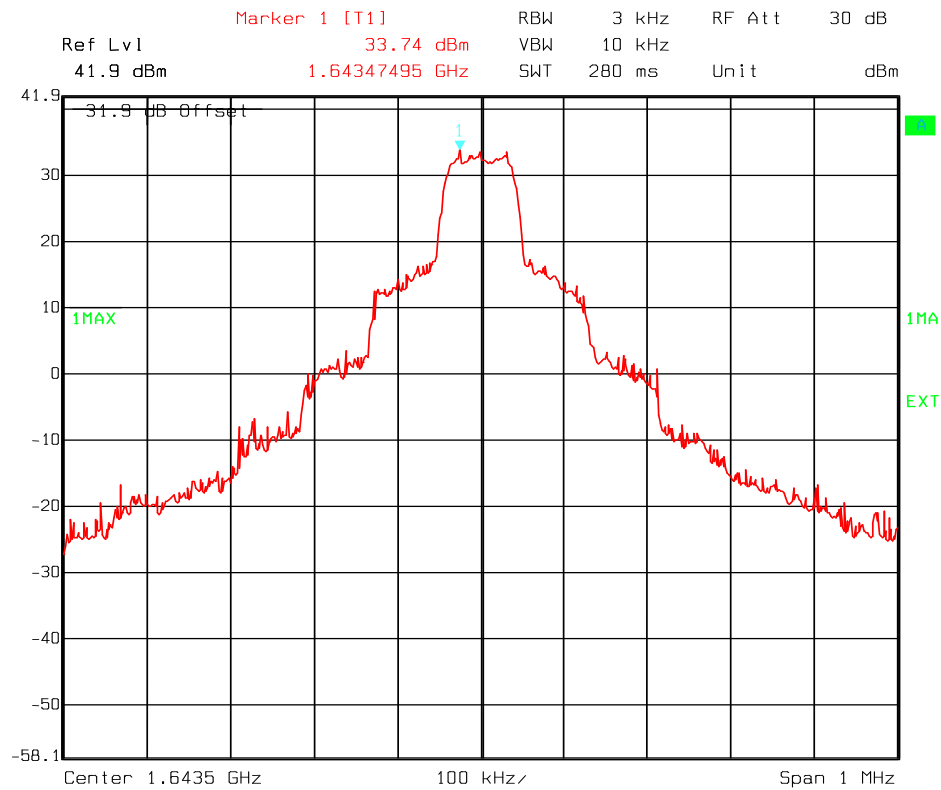
Date: 22.AUG.2013 08:48:45

Conducted power, r5t4.5x/r20t4.5x, 1643.5 MHz – 18 V DC



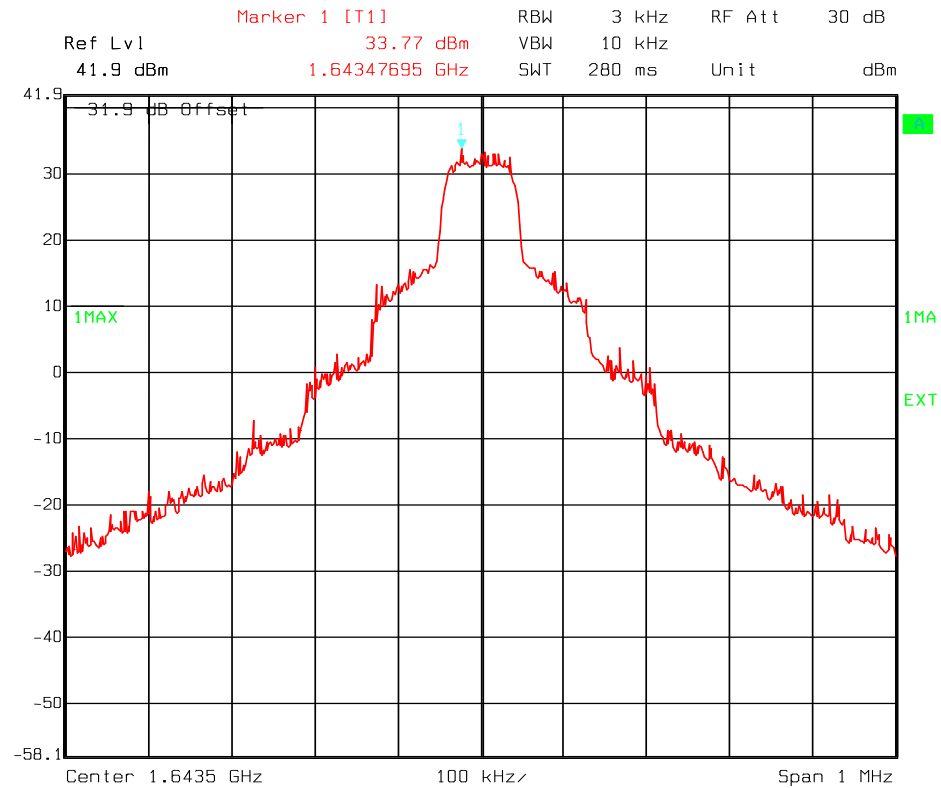
Date: 21.AUG.2013 13:50:11

Conducted power, fr80t2.5x4, 1643.5 MHz – 18 V DC



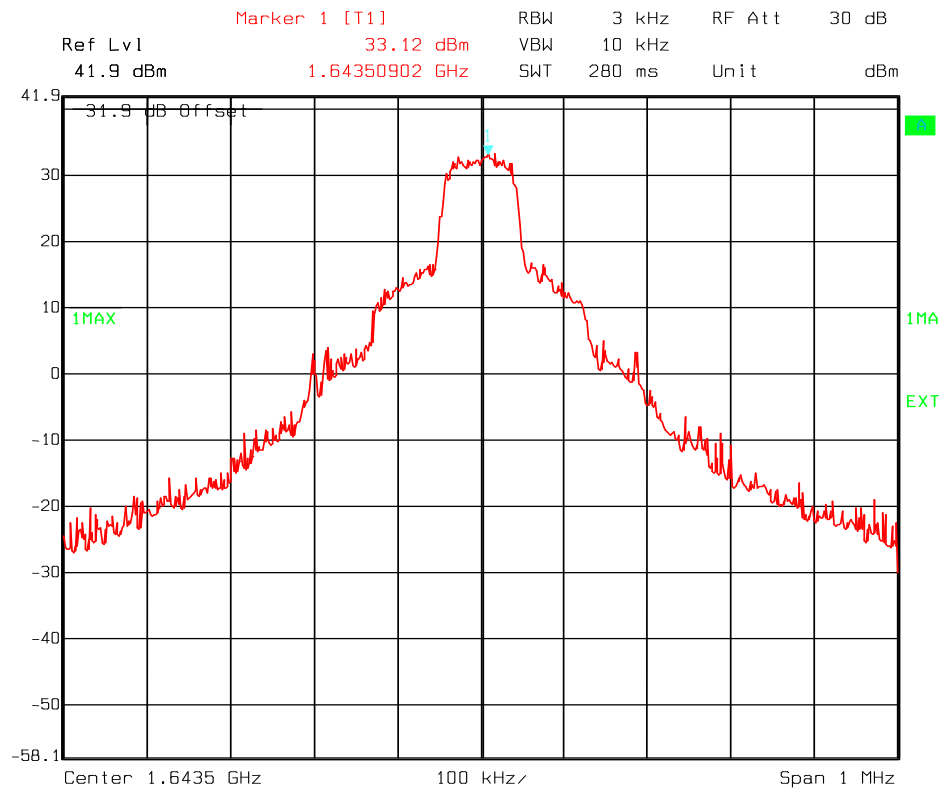
Date: 21.AUG.2013 13:58:02

Conducted power, fr80t2.5x16, 1643.5 MHz – 18 V DC



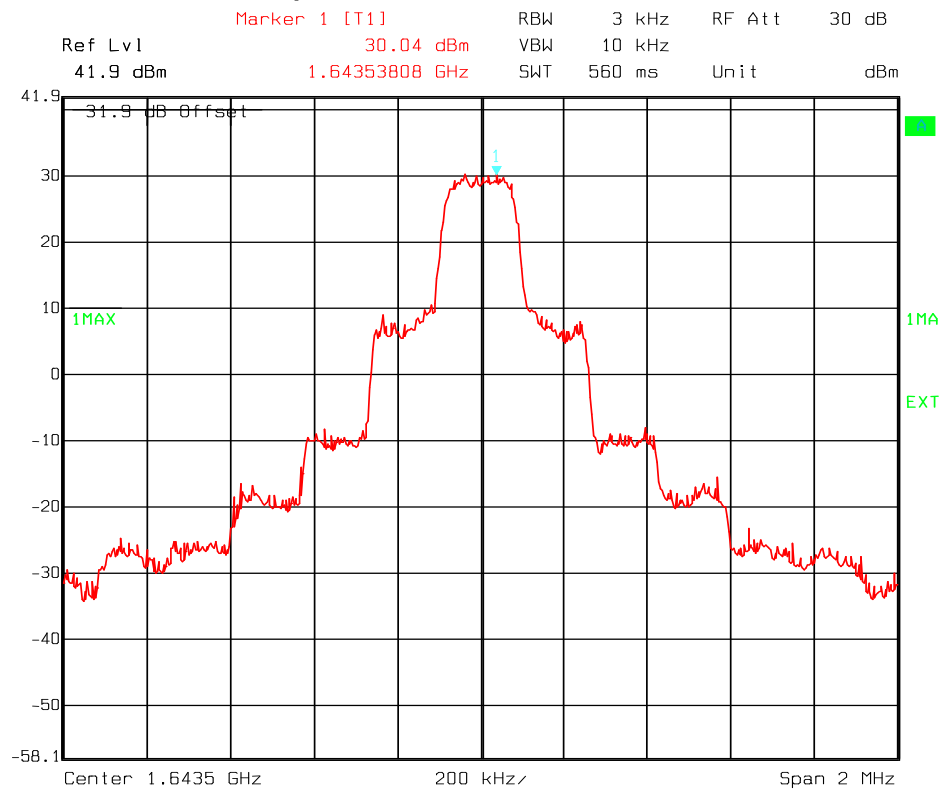
Date: 21.AUG.2013 14:16:20

Conducted power, fr80t2.5x32, 1643.5 MHz – 18 V DC



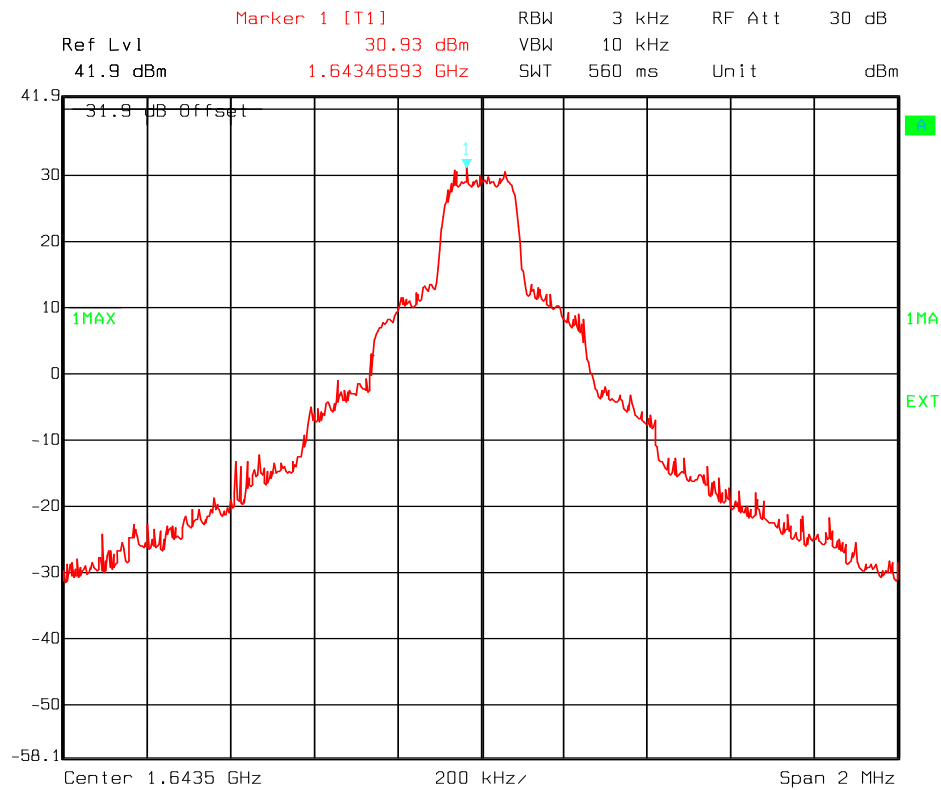
Date: 21.AUG.2013 14:23:29

Conducted power, fr80t2.5x64, 1643.5 MHz – 18 V DC



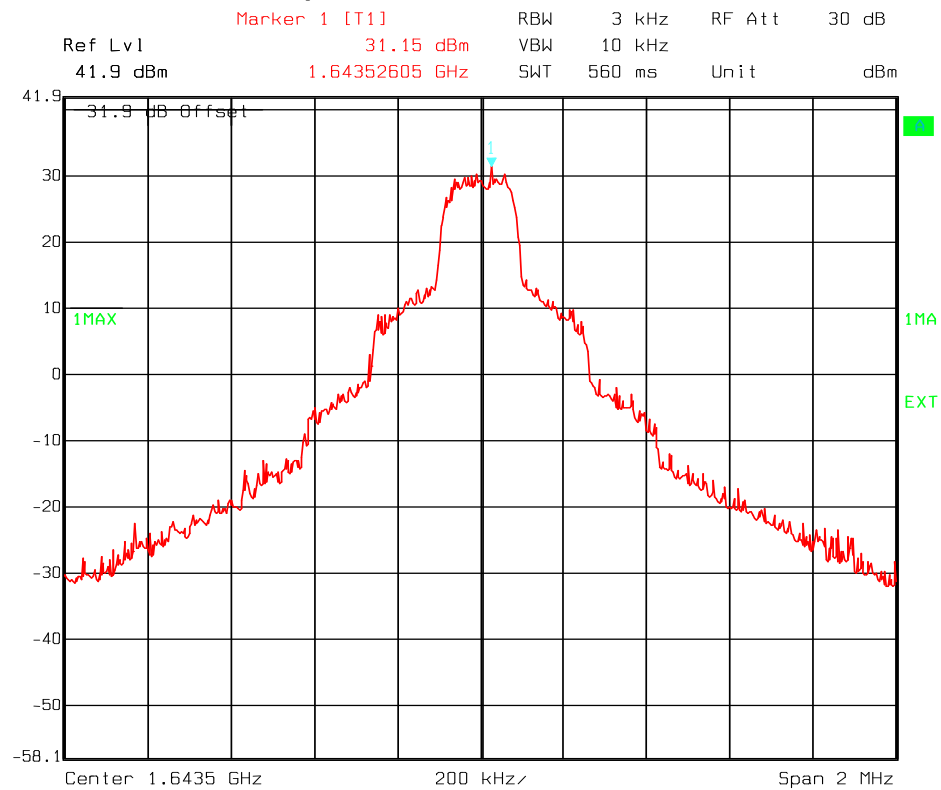
Date: 21.AUG.2013 13:17:36

Conducted power, fr80t5x4, 1643.5 MHz – 18 V DC



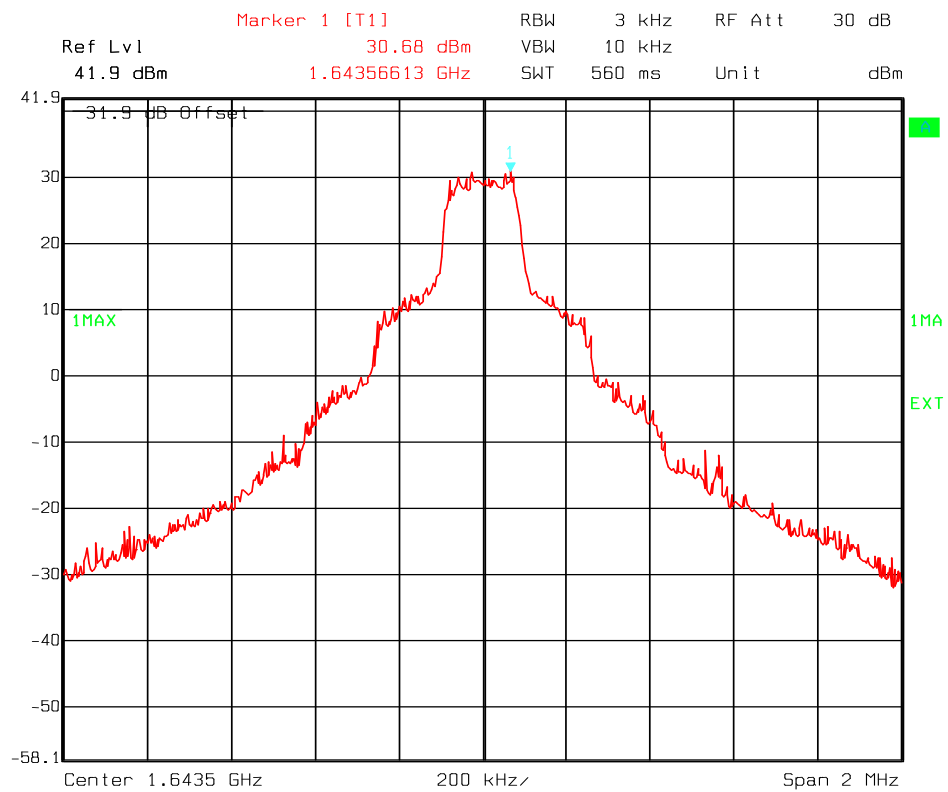
Date: 21.AUG.2013 13:25:24

Conducted power, fr80t5x16, 1643.5 MHz – 18 V DC



Date: 21.AUG.2013 13:31:50

Conducted power, fr80t5x32, 1643.5 MHz – 18 V DC



Date: 21.AUG.2013 13:38:08

Conducted power, fr80t5x64, 1643.5 MHz – 18 V DC

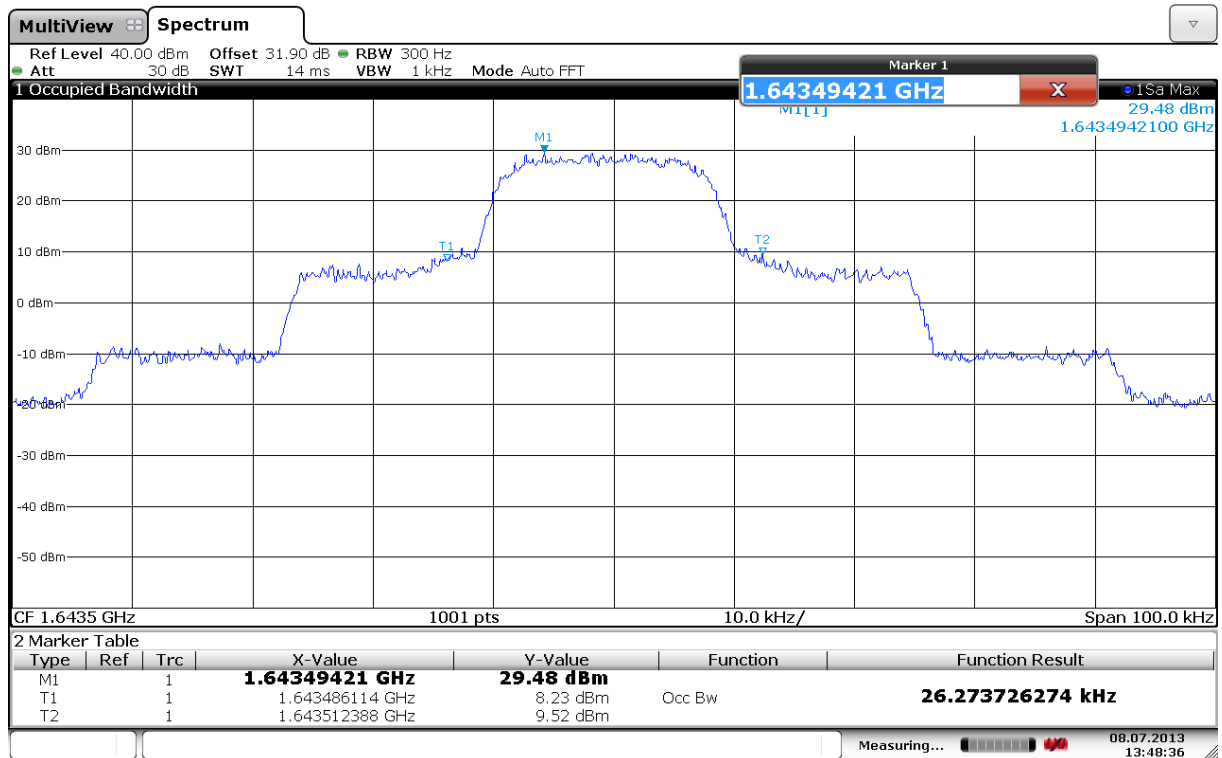
3.4 Occupied Bandwidth

Transmitter Occupied Bandwidth, Conducted measurement at 1643.5 MHz			
Modulation Scheme	Bitrate (kbps)	Measured Occupied Bandwidth (kHz)	Stated necessary Bandwidth (kHz)
R20T0.5Q	16.8 * 2	26.3	24
R20T1Q	33.6 * 2	51.7	48
R5T1X	33.6 * 4	73.5	48
R20T1X			
R5T2Q	67.2 * 2	108.4	96
R20T2Q			
R5T2X	67.2 * 4	147.4	96
R20T2X			
R5T4.5Q	151.2 * 2	254.7	204
R20T4.5Q			
R5T4.5X	151.2 * 4	323.7	204
R20T4.5X			
R80T0.5Q	16.8 * 2	26.3	24
R80T1Q	33.6 * 2	51.7	48
FR80T2.5X4	84 * 2	137.4	102
FR80T2.5X16	84 * 4	181.3	
FR80T2.5X32	84 * 5	185.8	
FR80T2.5X64	84 * 6	187.3	
FR80T5X4	168 * 2	266.7	204
FR80T5X16	168 * 4	359.6	
FR80T5X32	168 * 5	349.7	
FR80T5X64	168 * 6	366.6	

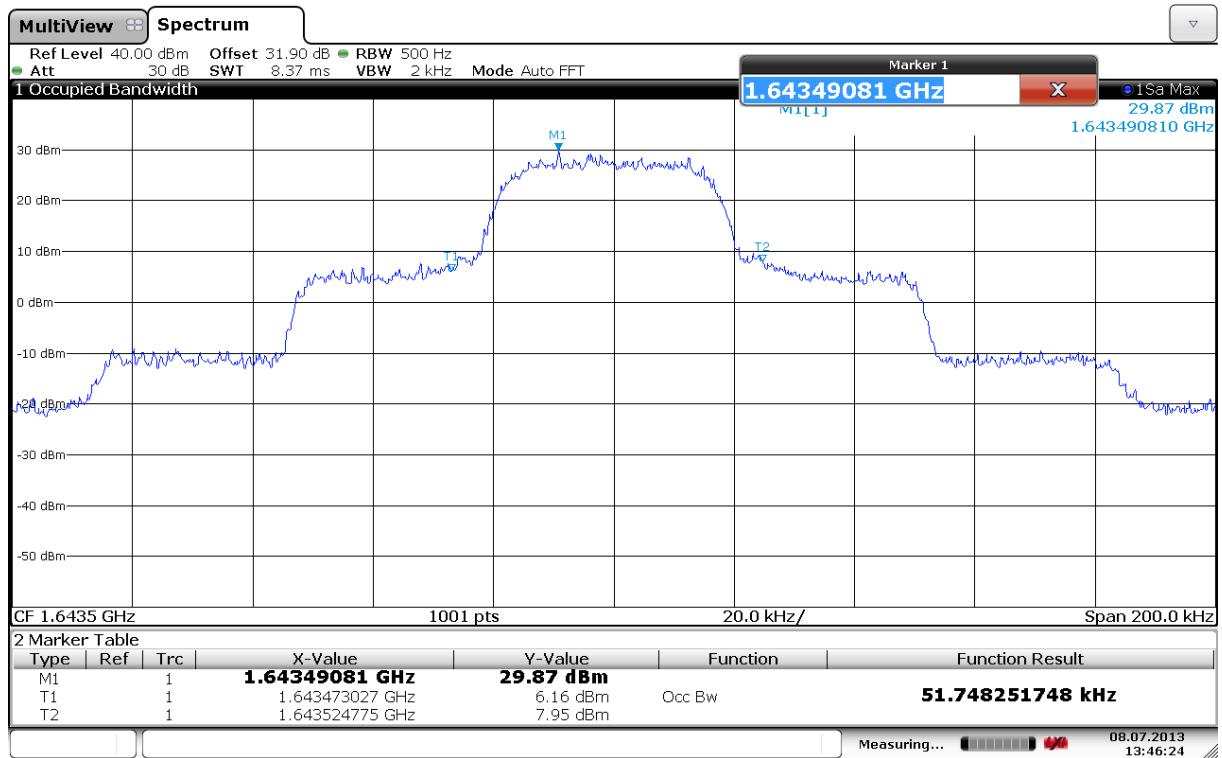
See plots.

Requirements:

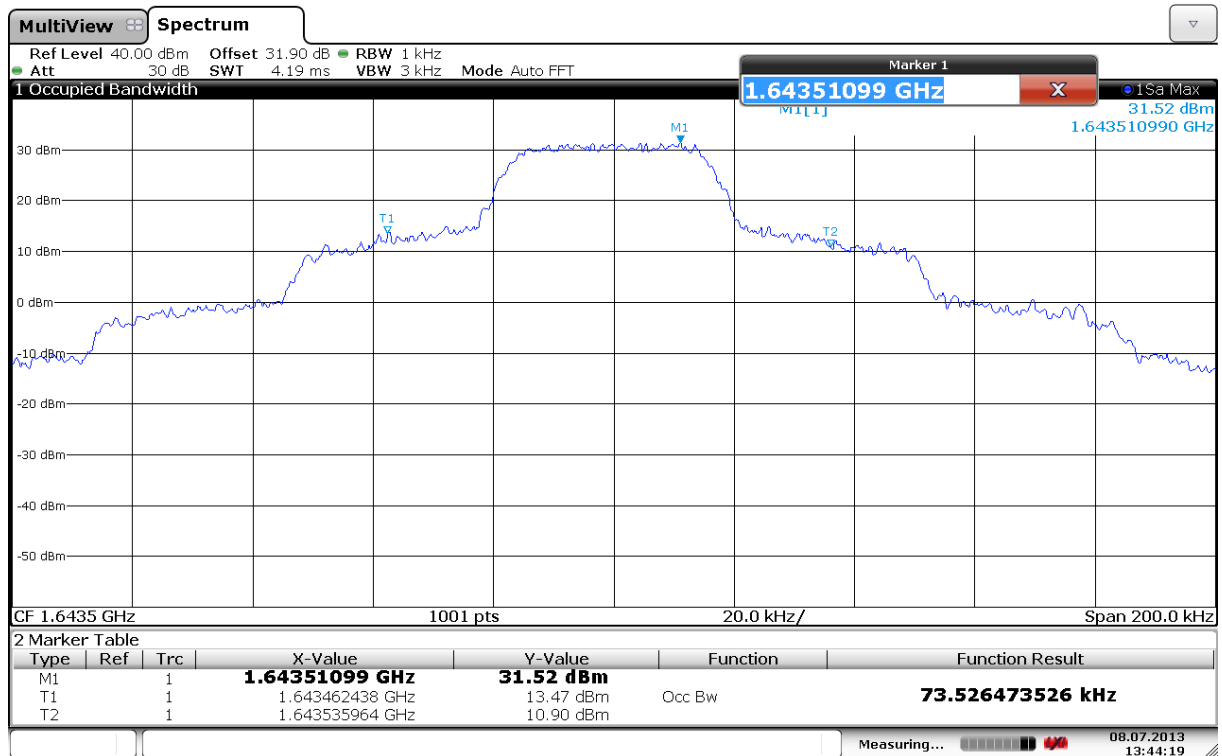
No requirements.



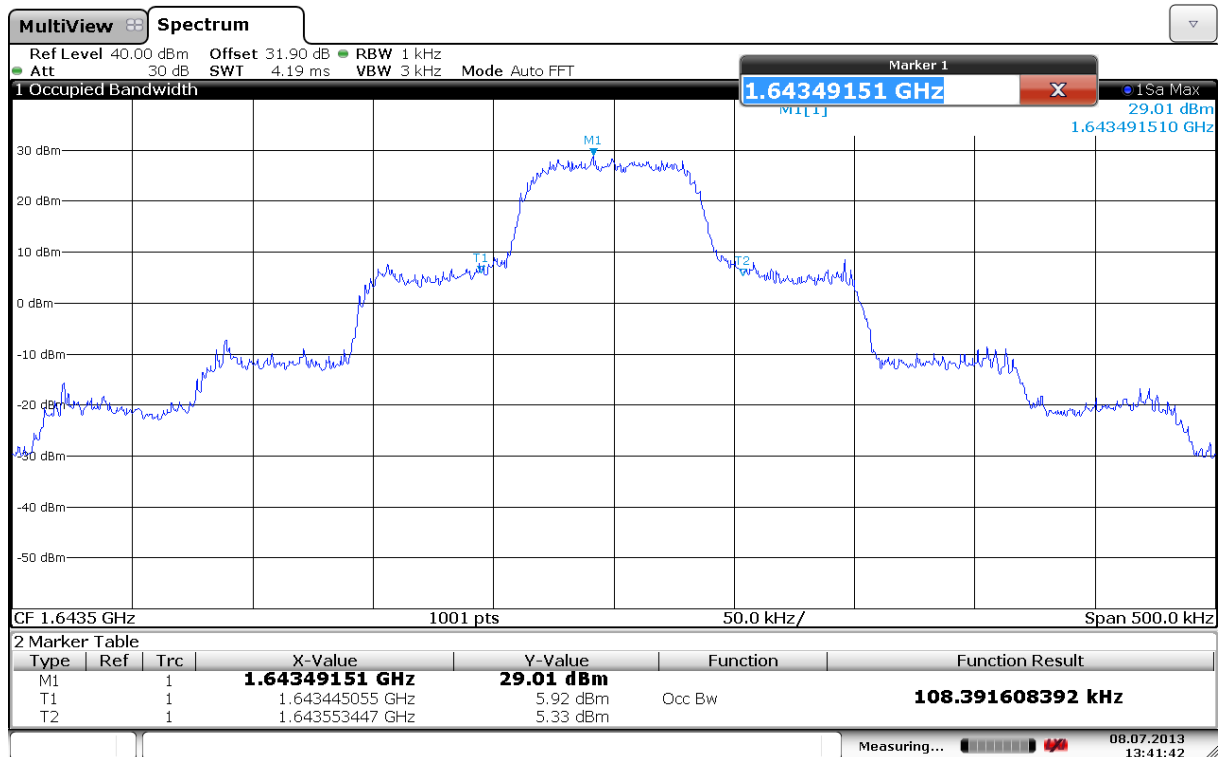
Occupied Bandwidth, r20t0.5q & r80t0.5q



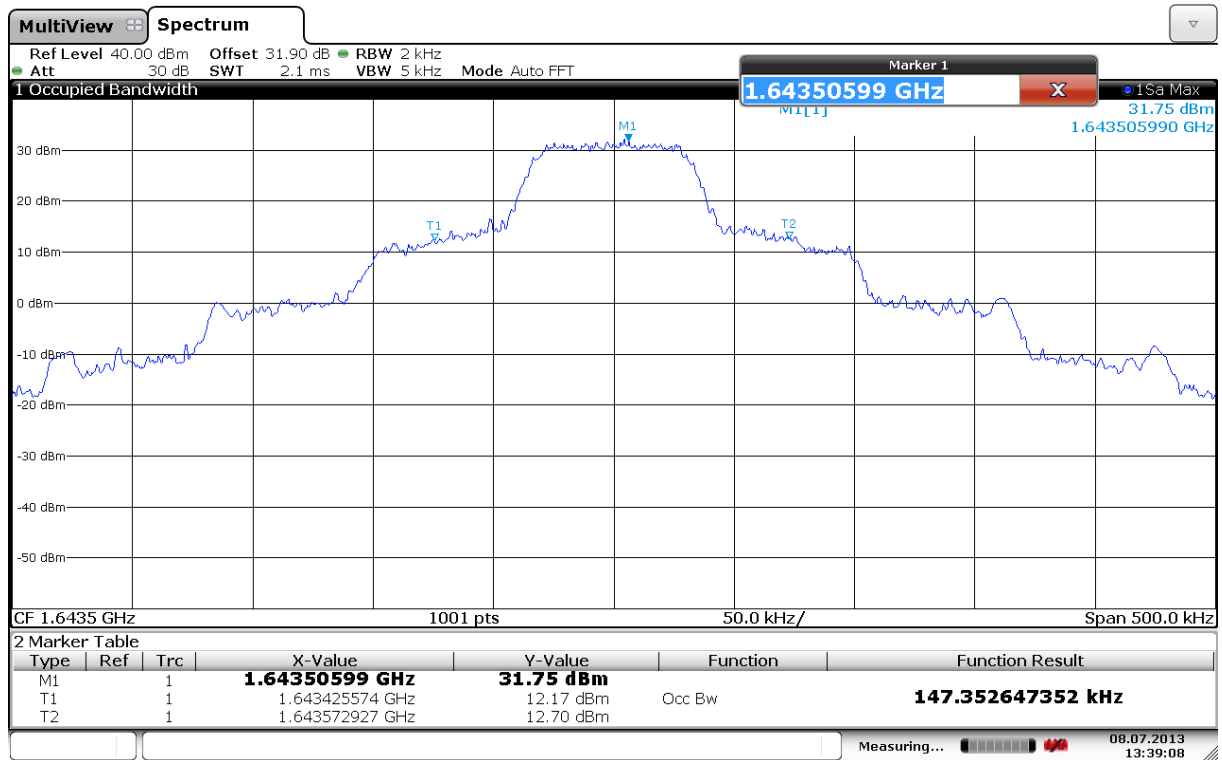
Occupied Bandwidth, r20t1q & r80t1q



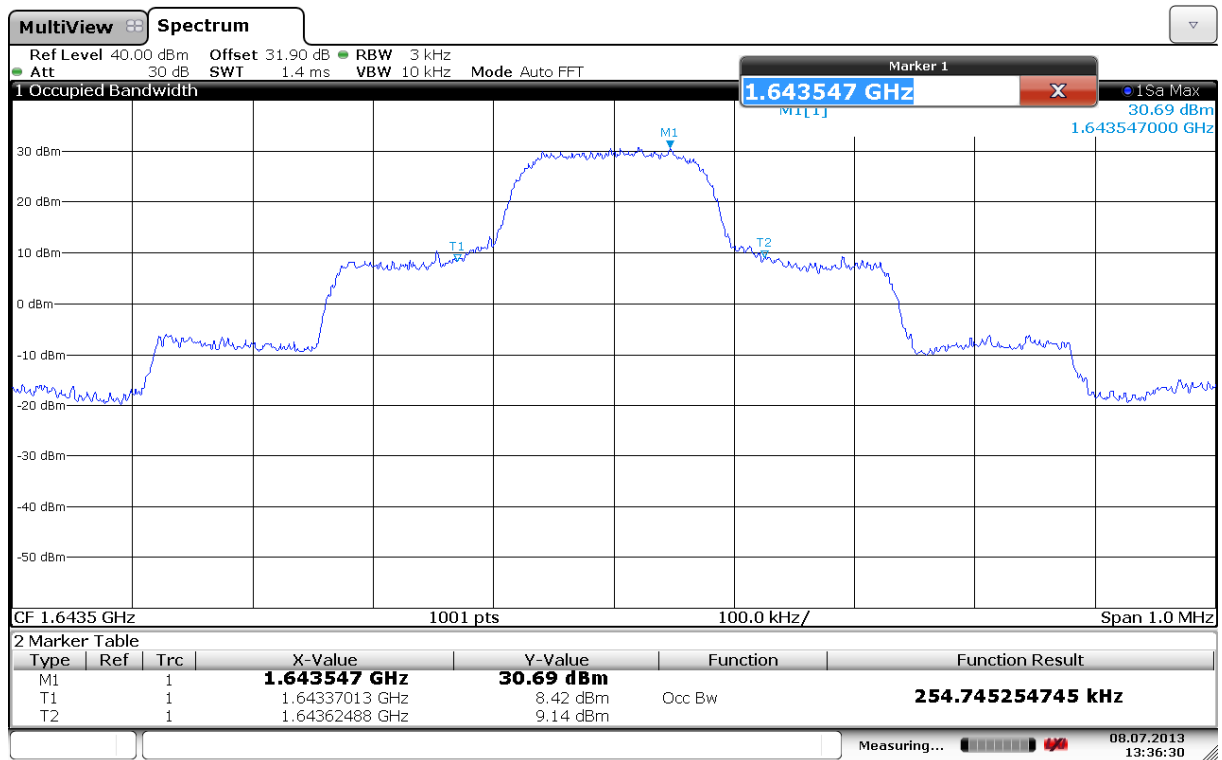
Occupied Bandwidth, r5t1x & r20t1x



Occupied Bandwidth, r5t2q & r20t2q



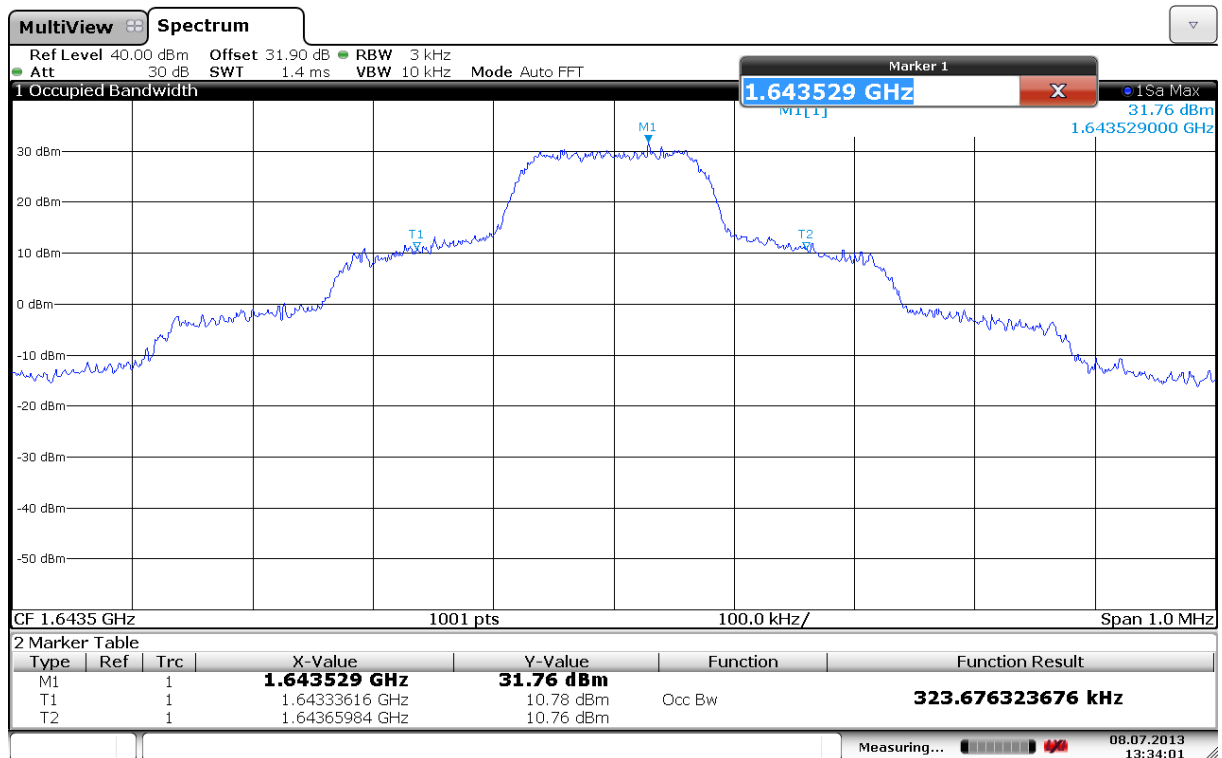
Occupied Bandwidth, r5t2x & r20t2x



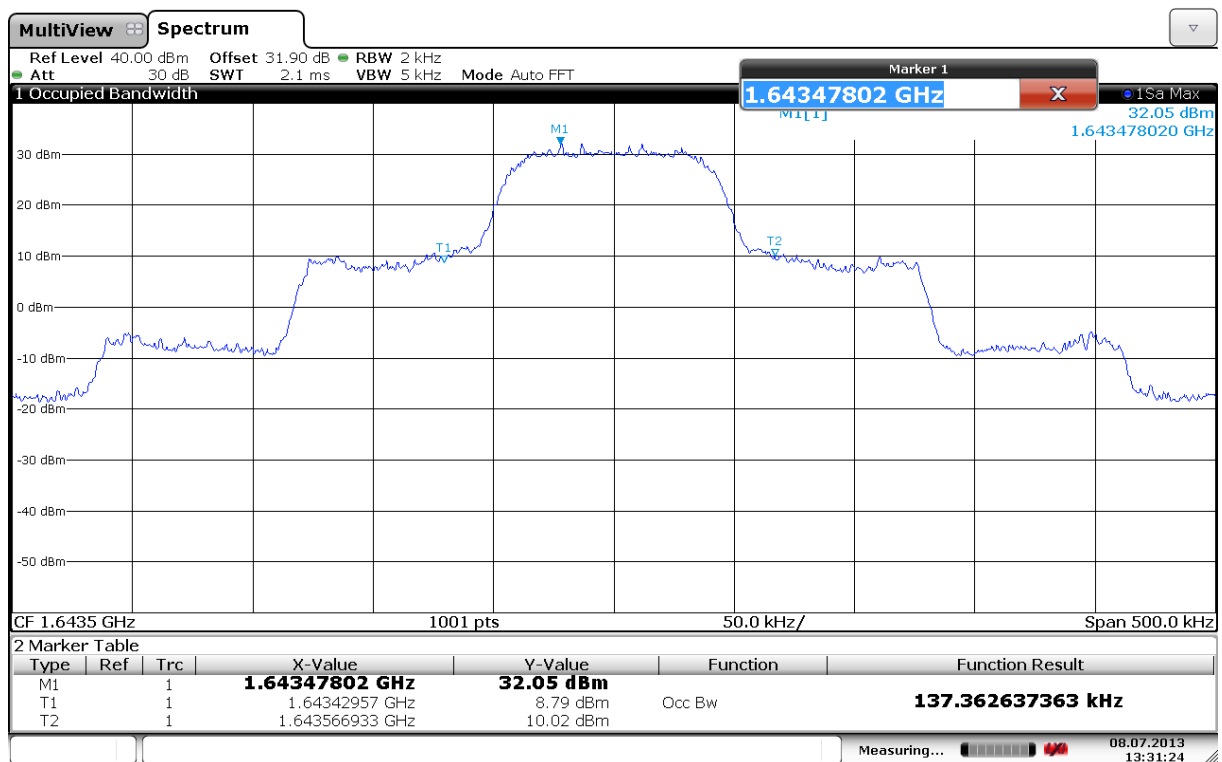
2397.500MHz

Date: 8 JUL 2013 13:36:30

Occupied Bandwidth, r5t4.5q & r20t4.5q



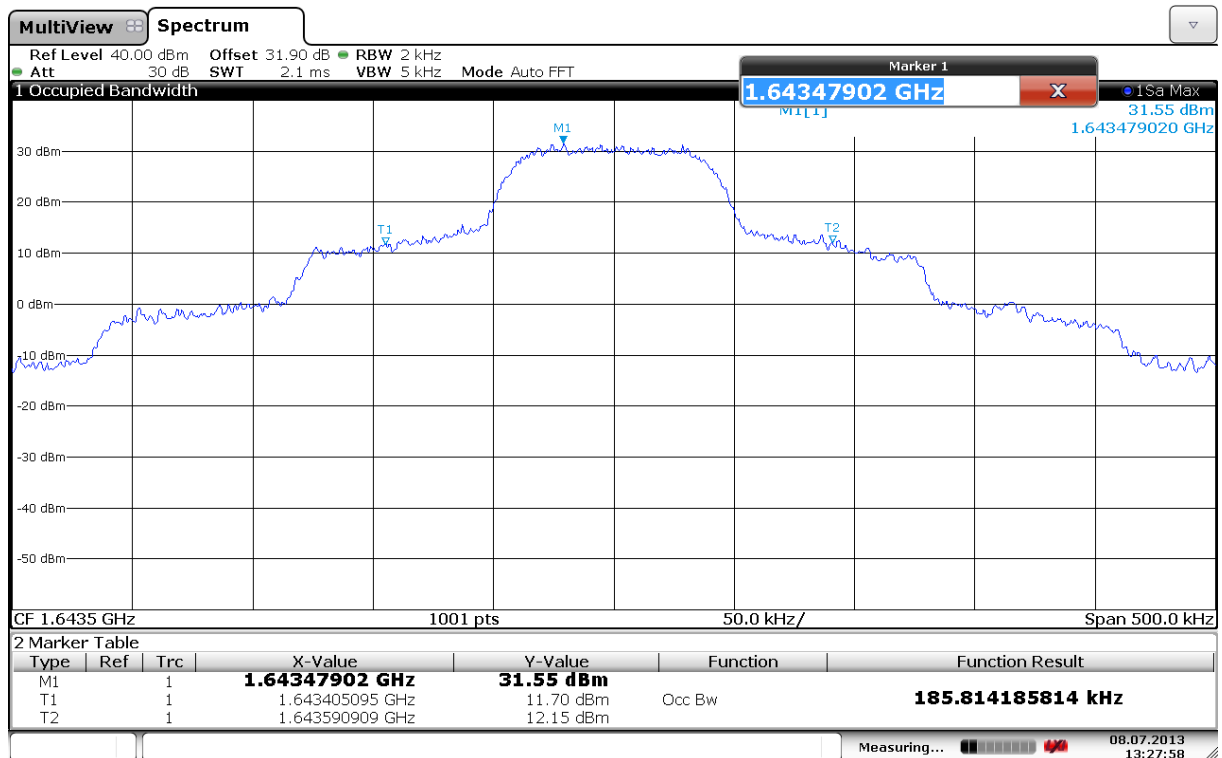
Occupied Bandwidth, r5t4.5x & r20t4.5x



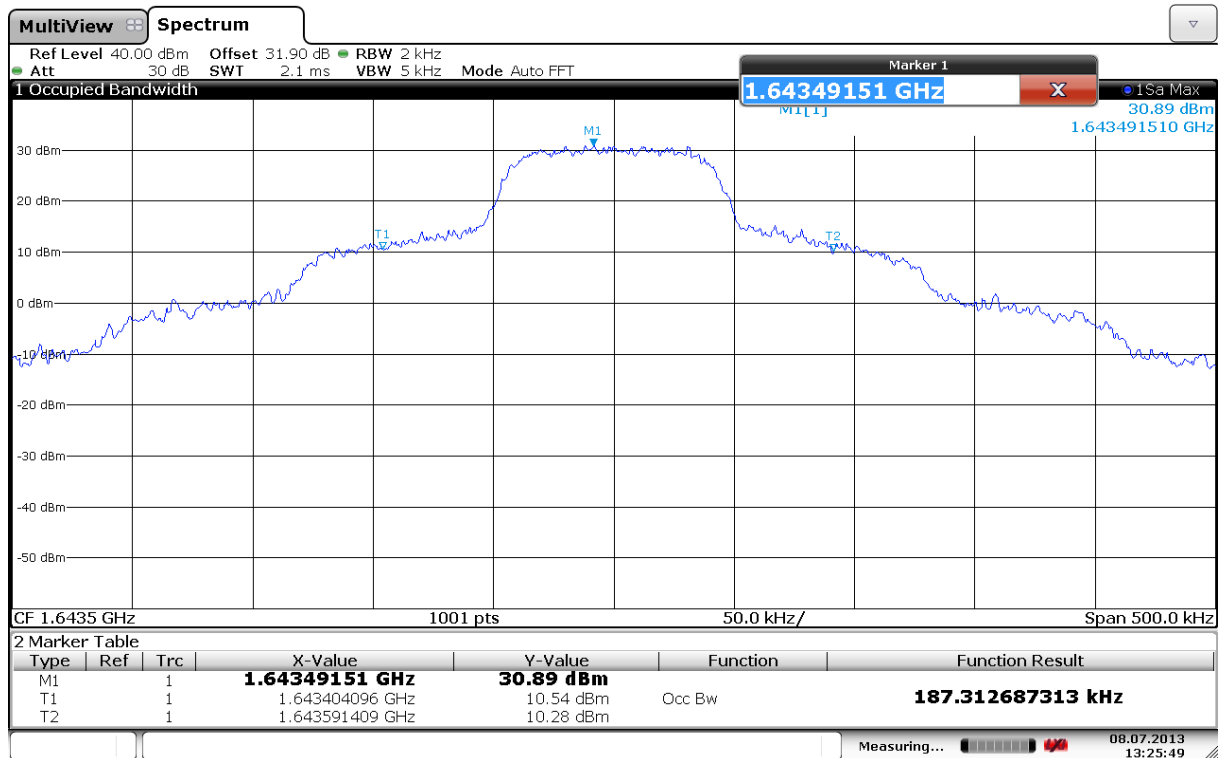
Occupied Bandwidth, fr80t2.5x4



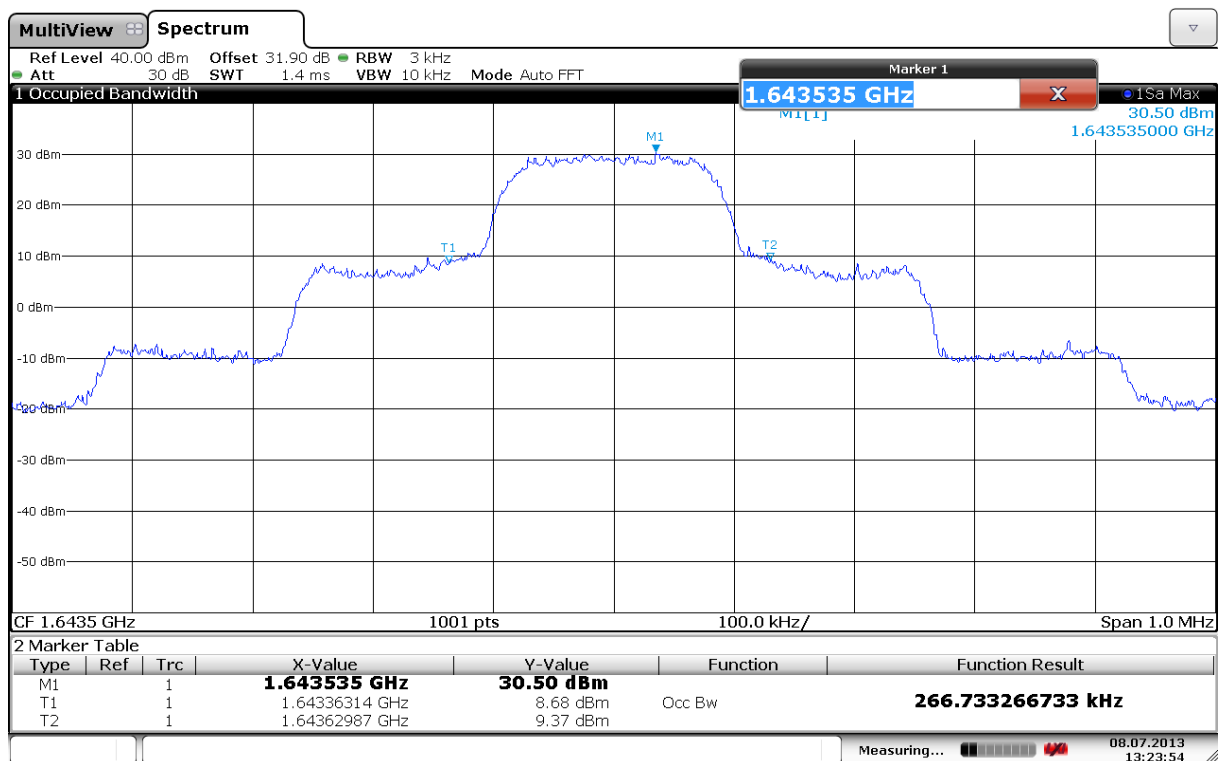
Occupied Bandwidth, fr80t2.5x16



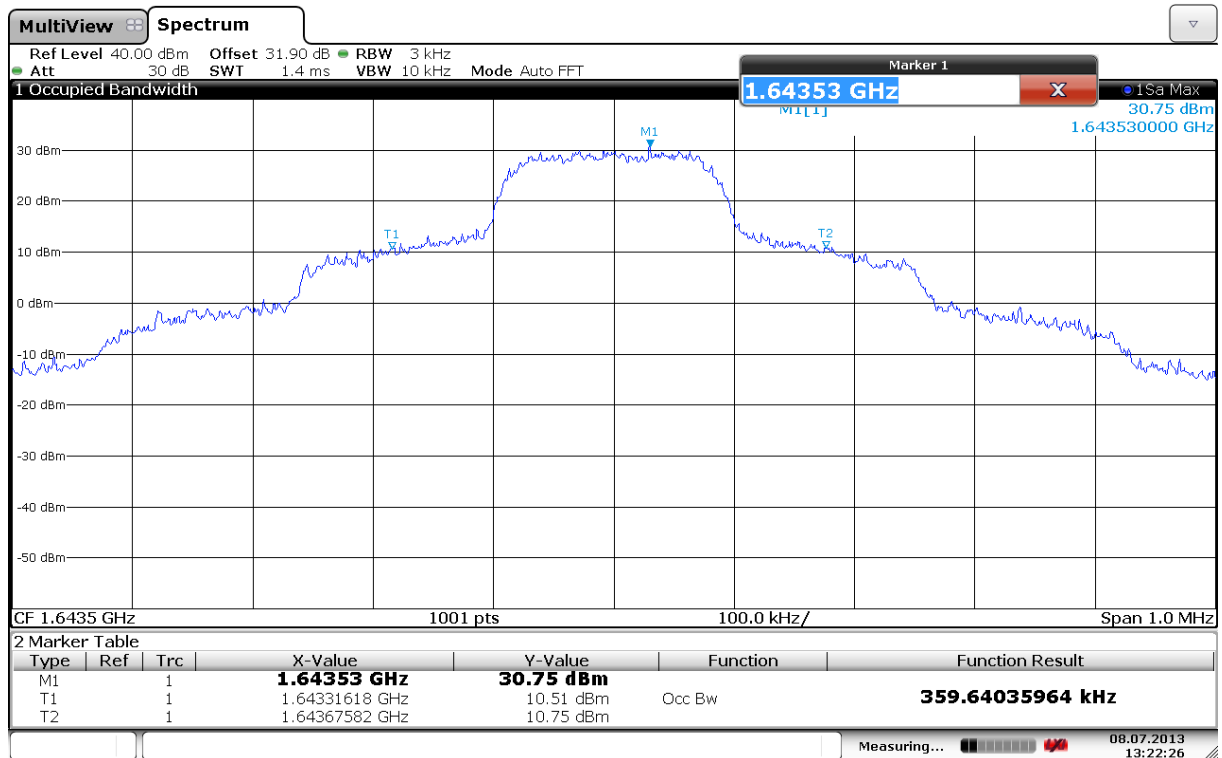
Occupied Bandwidth, fr80t2.5x32



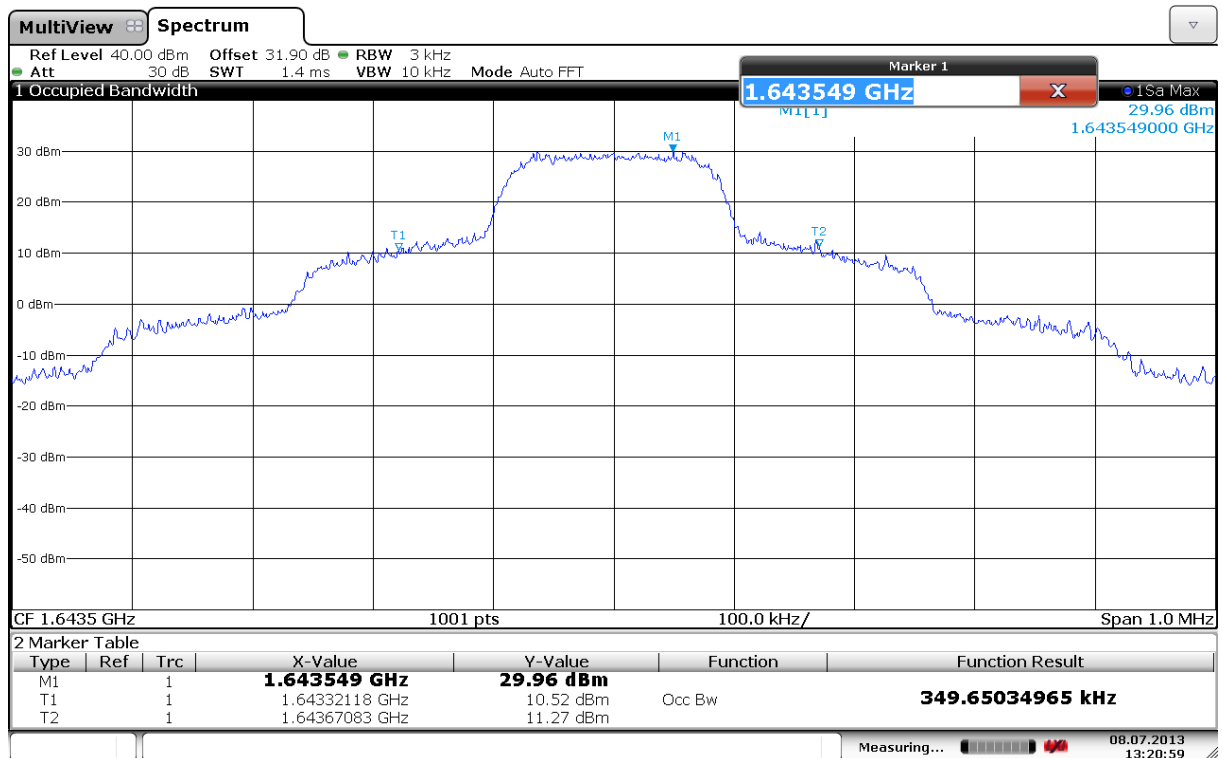
Occupied Bandwidth, fr80t2.5x64



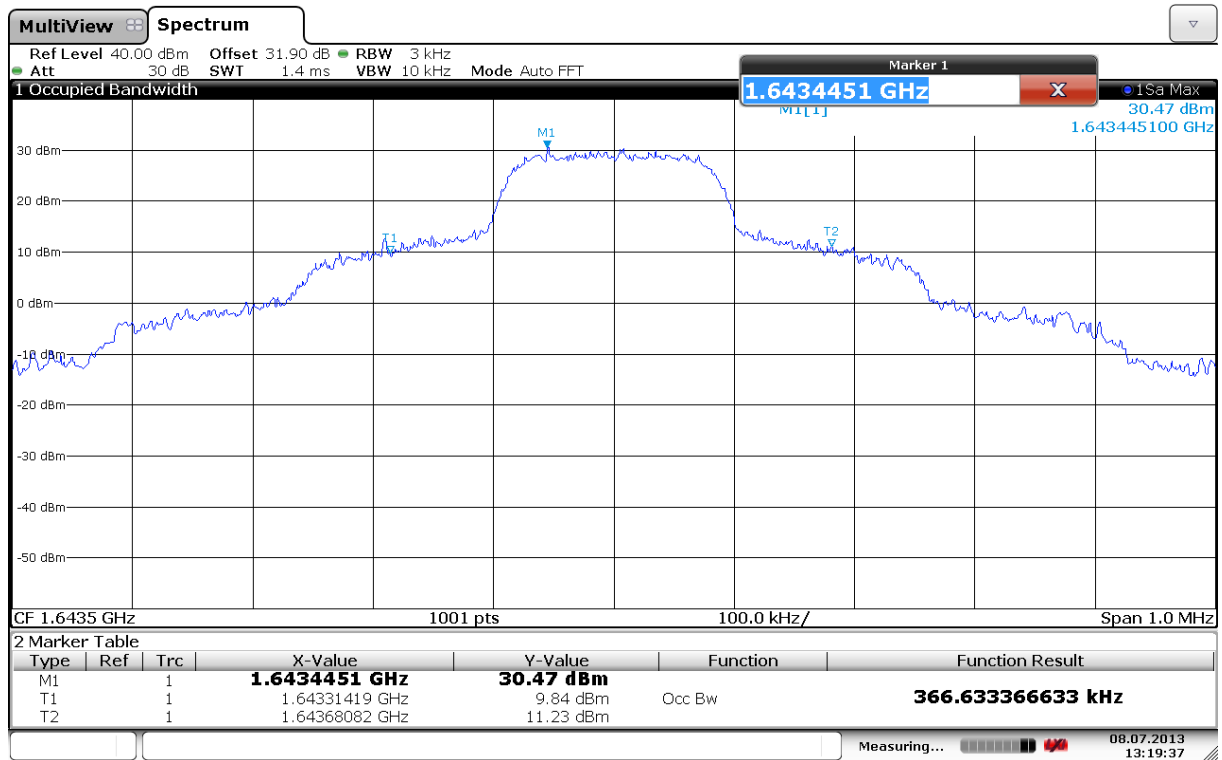
Occupied Bandwidth, fr80t5x4



Occupied Bandwidth, fr80t5x16



Occupied Bandwidth, fr80t5x32



Occupied Bandwidth, fr80t5x64

3.5 Emission Limitations

5.4.3.1 Transmitter Emissions Limitations, In-band emissions

		Frequency Range		
Modulation Scheme	Necessary BW or OBW kHz	50 to 100% of necessary BW or OBW -25 dBc	100 to 250% of necessary BW or OBW -35 dBc	More than 250% of necessary BW or OBW -14.25 dBm
R20T0.5Q	26	Pass	Pass	Pass
R20T1Q	48	Pass	Pass	Pass
R5T1X	48	Pass	Pass	Pass
R20T1X		Pass	Pass	Pass
R5T2Q	96	Pass	Pass	Pass
R20T2Q		Pass	Pass	Pass
R5T2X	96	Pass	Pass	Pass
R20T2X		Pass	Pass	Pass
R5T4.5Q	204	Pass	Pass	Pass
R20T4.5Q		Pass	Pass	Pass
R5T4.5X	204	Pass	Pass	Pass
R20T4.5X		Pass	Pass	Pass
R80T0.5Q	26	Pass	Pass	Pass
R80T1Q	48	Pass	Pass	Pass
FR80T2.5X4	137	Pass	Pass	Pass
FR80T2.5X16		Pass	Pass	Pass
FR80T2.5X32		Pass	Pass	Pass
FR80T2.5X64		Pass	Pass	Pass
FR80T5X4	266	Pass	Pass	Pass
FR80T5X16		Pass	Pass	Pass
FR80T5X32		Pass	Pass	Pass
FR80T5X64		Pass	Pass	Pass

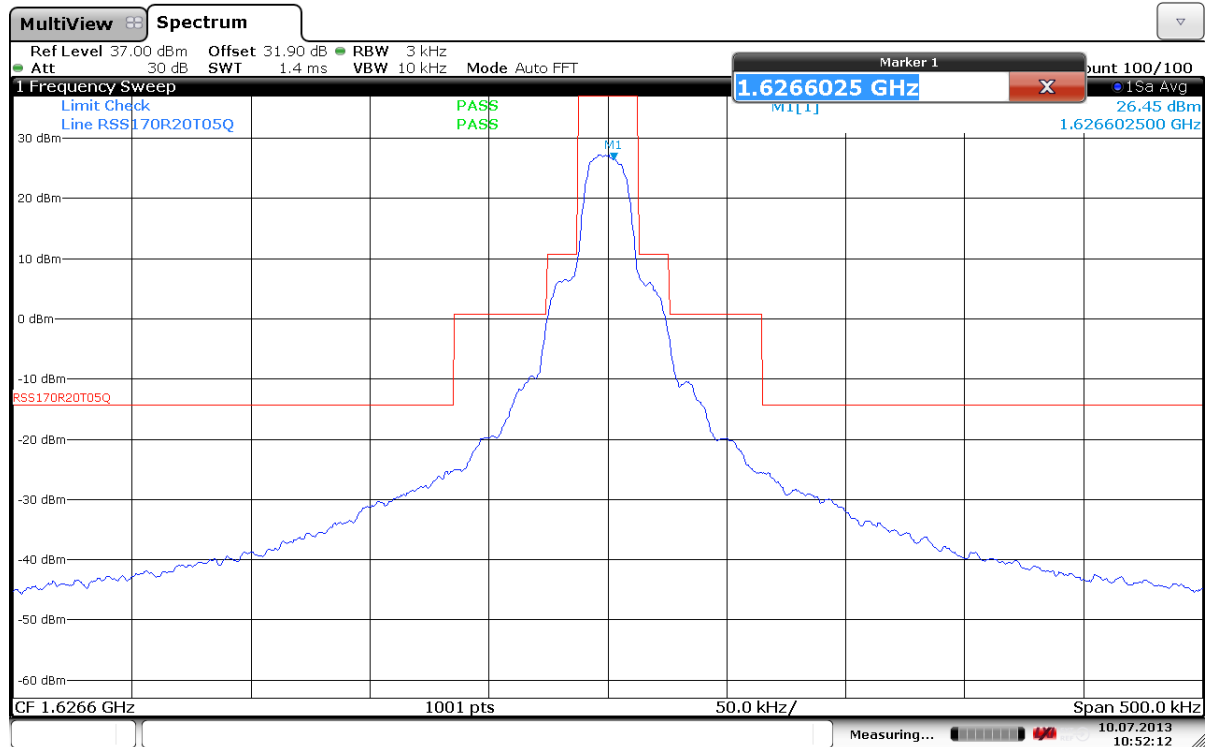
See plots.

Requirements:

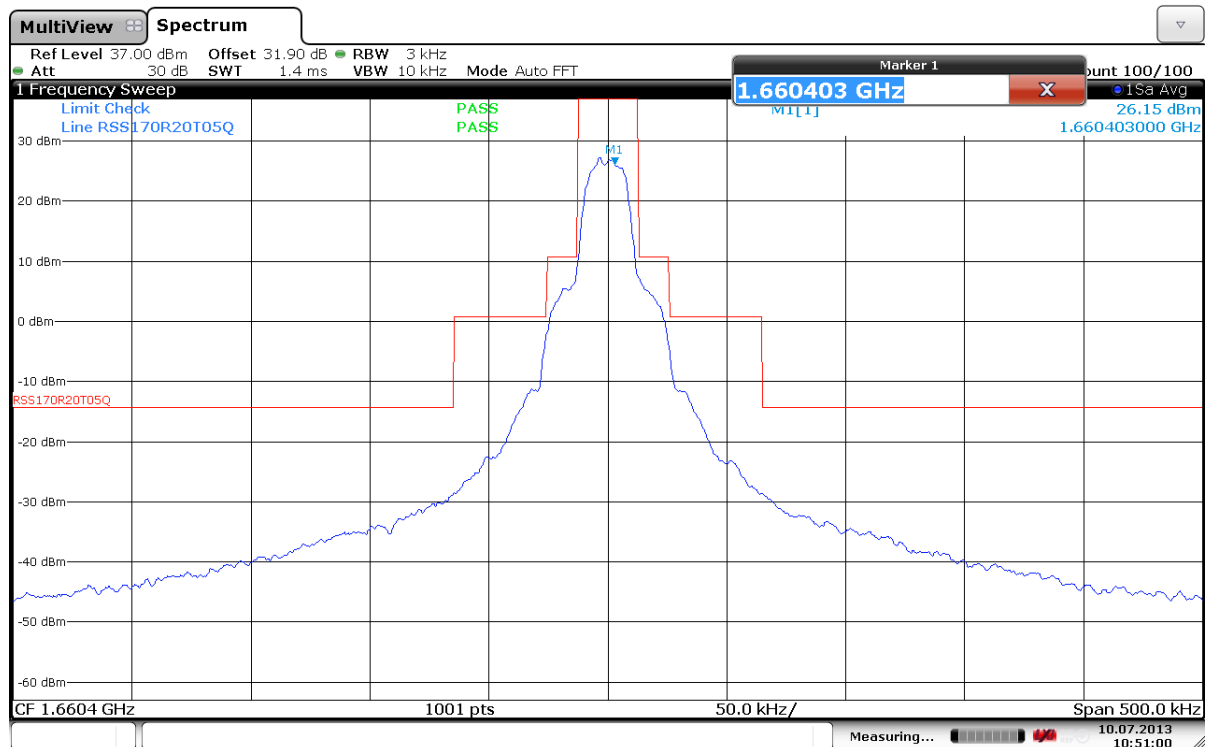
The EUT complies with the requirements in § 25.202, (f) (1), (2), (3) and (4).

Emission limitations. Except for SDARS terrestrial repeaters, the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f) (1) through (f) (4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

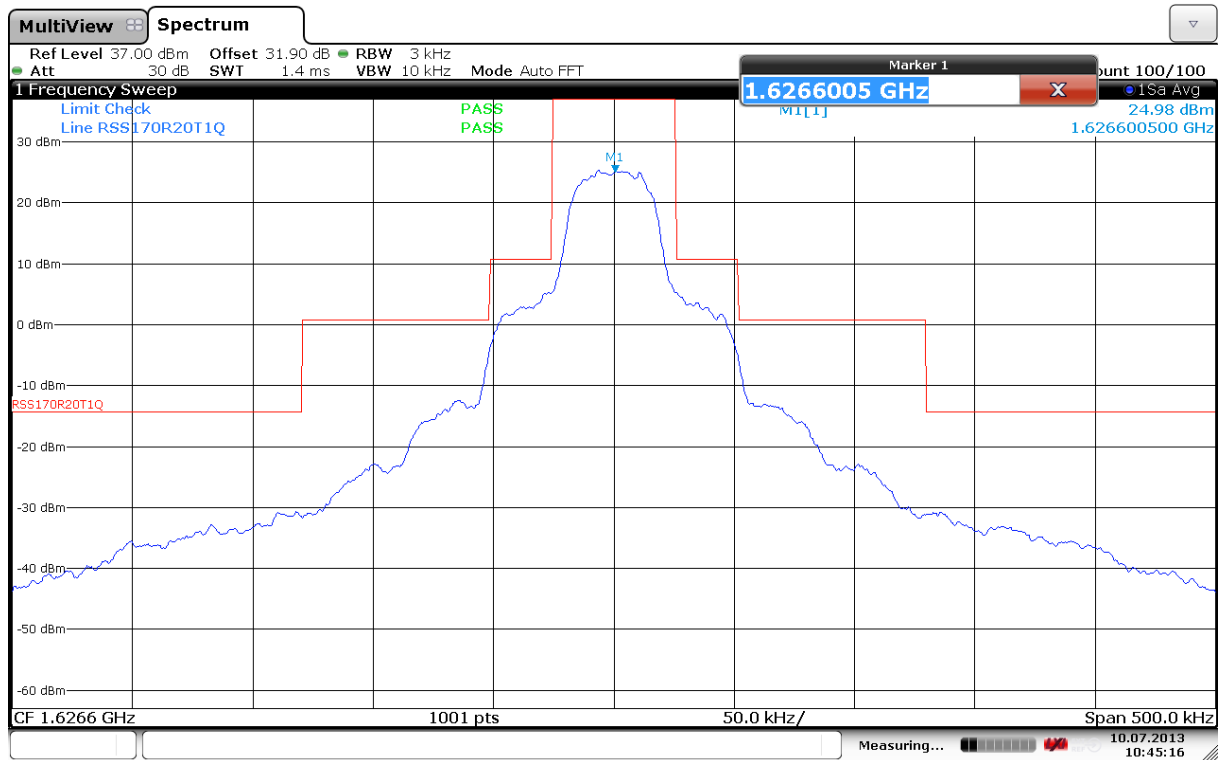
- (1) In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 50% up to and including 100% of the authorized bandwidth: 25 dB;
- (2) In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 100% up to and including 250% of the authorized bandwidth: 35 dB;
- (3) In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 250% of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the power in watts;
- (4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.



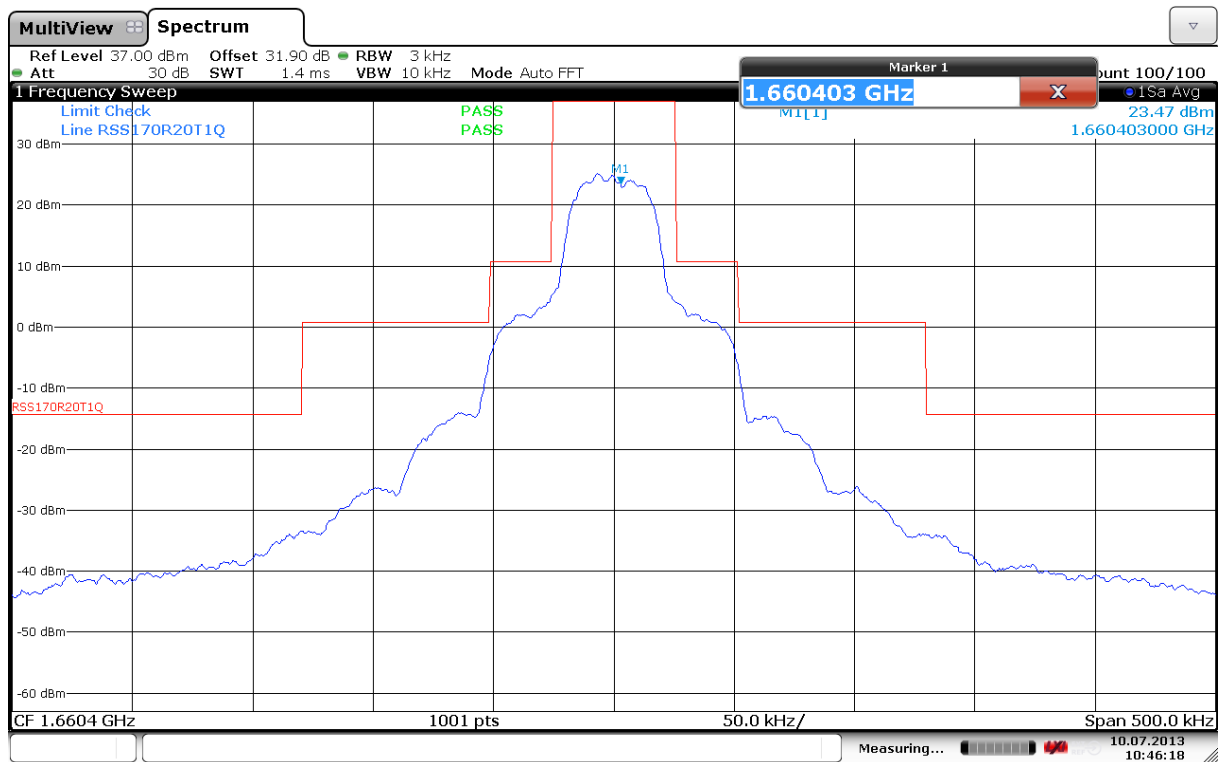
Emission mask, r20t0.5q/r80t0.5q, 1626.6 MHz



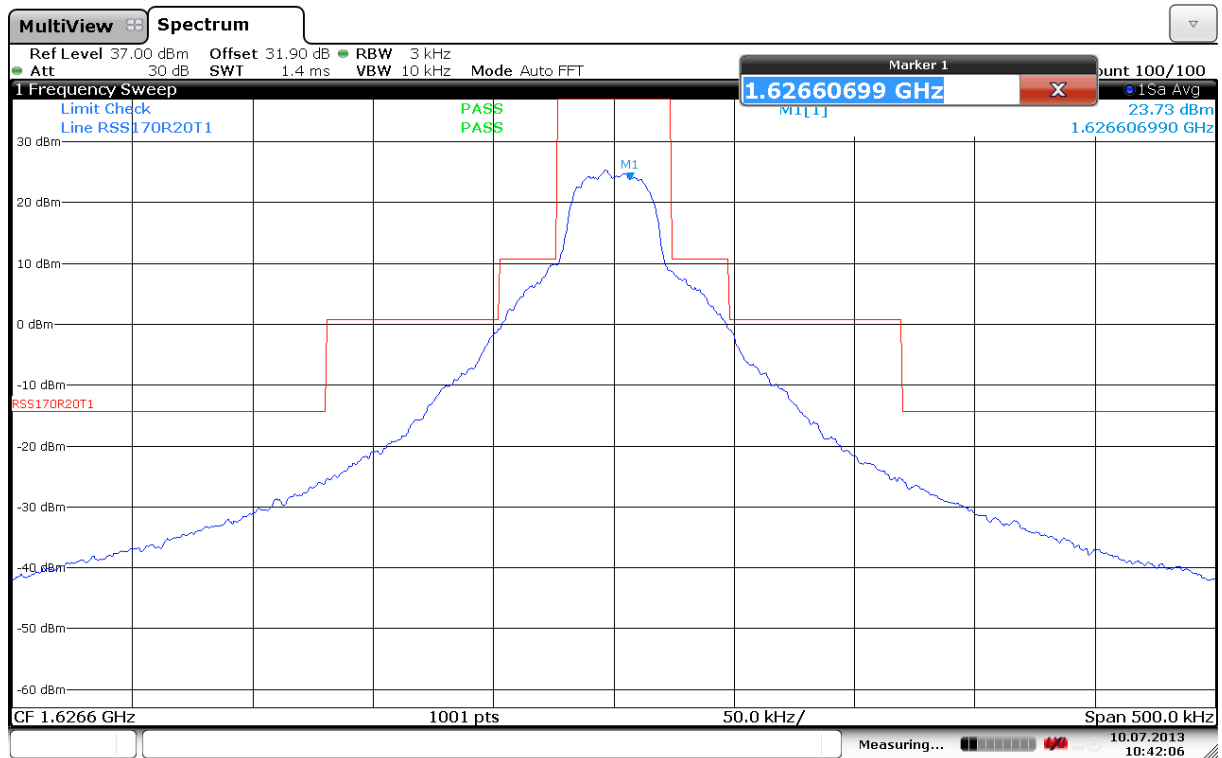
Emission mask, r20t0.5q/r80t0.5q, 1660.4 MHz



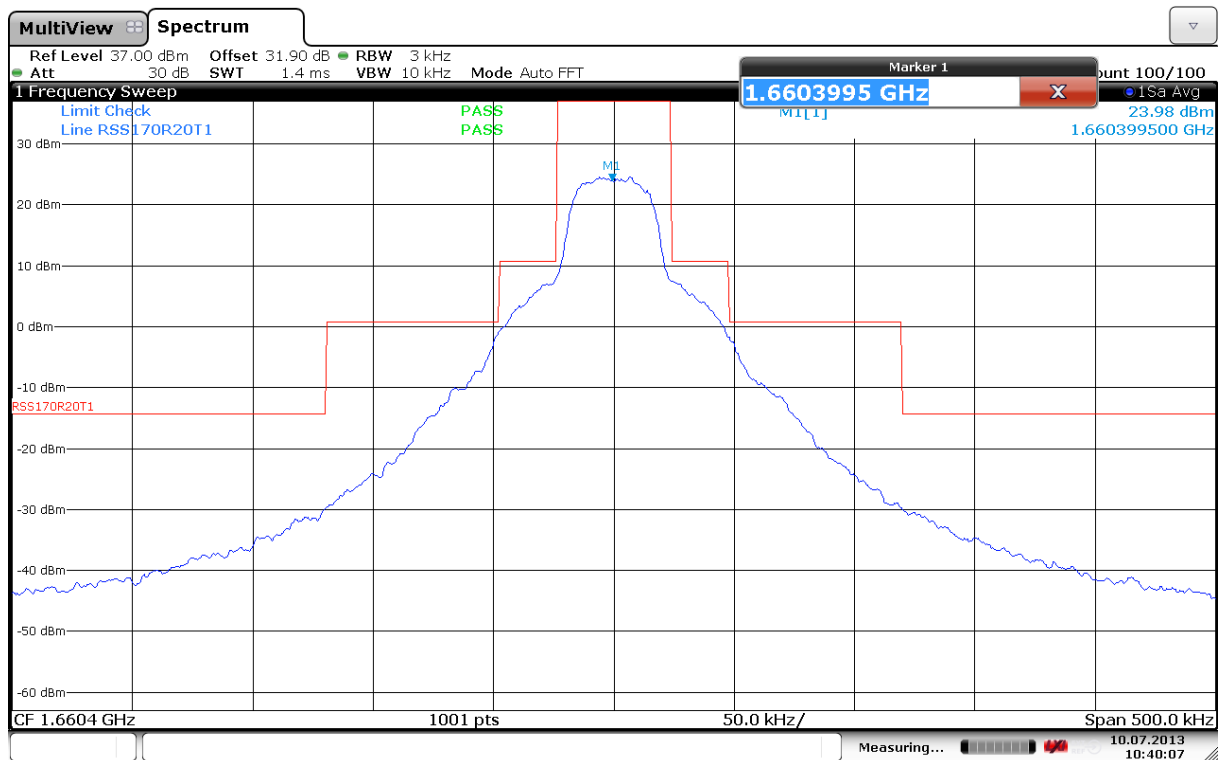
Emission mask, r20t1q/r80t1q, 1626.6 MHz



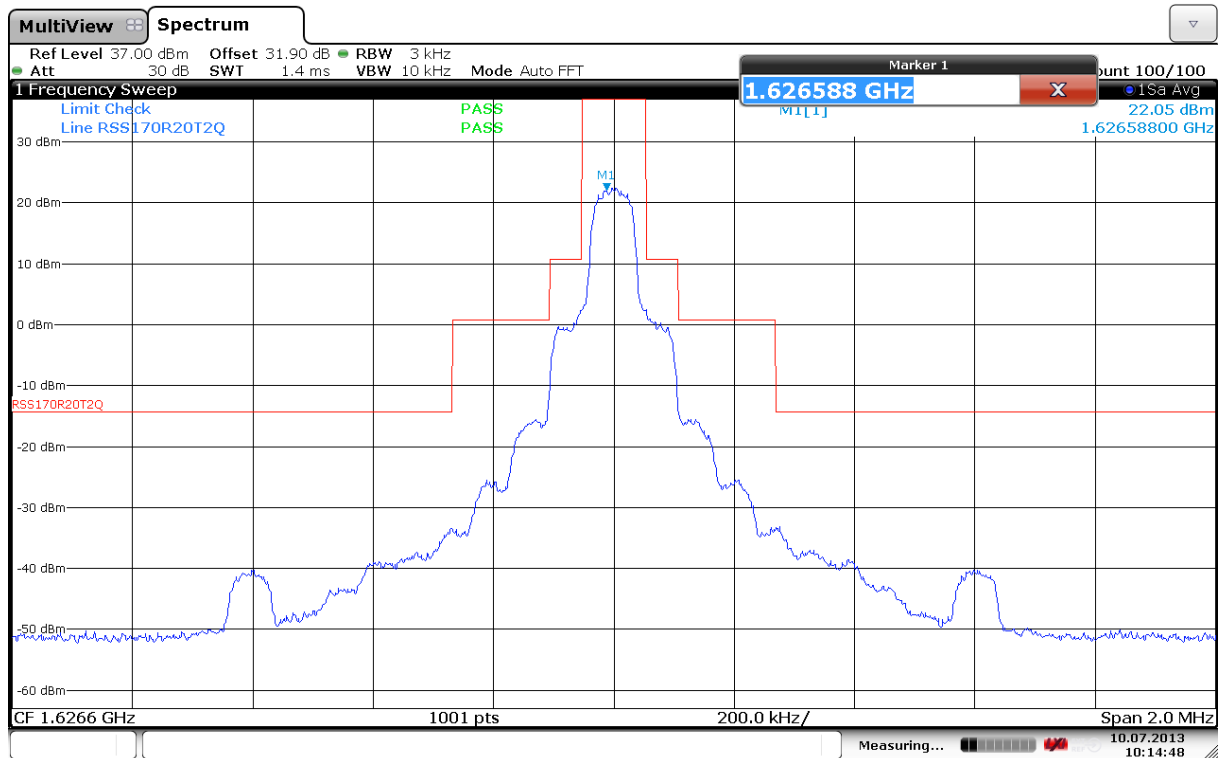
Emission mask, r20t1q/r80t1q, 1660.4 MHz



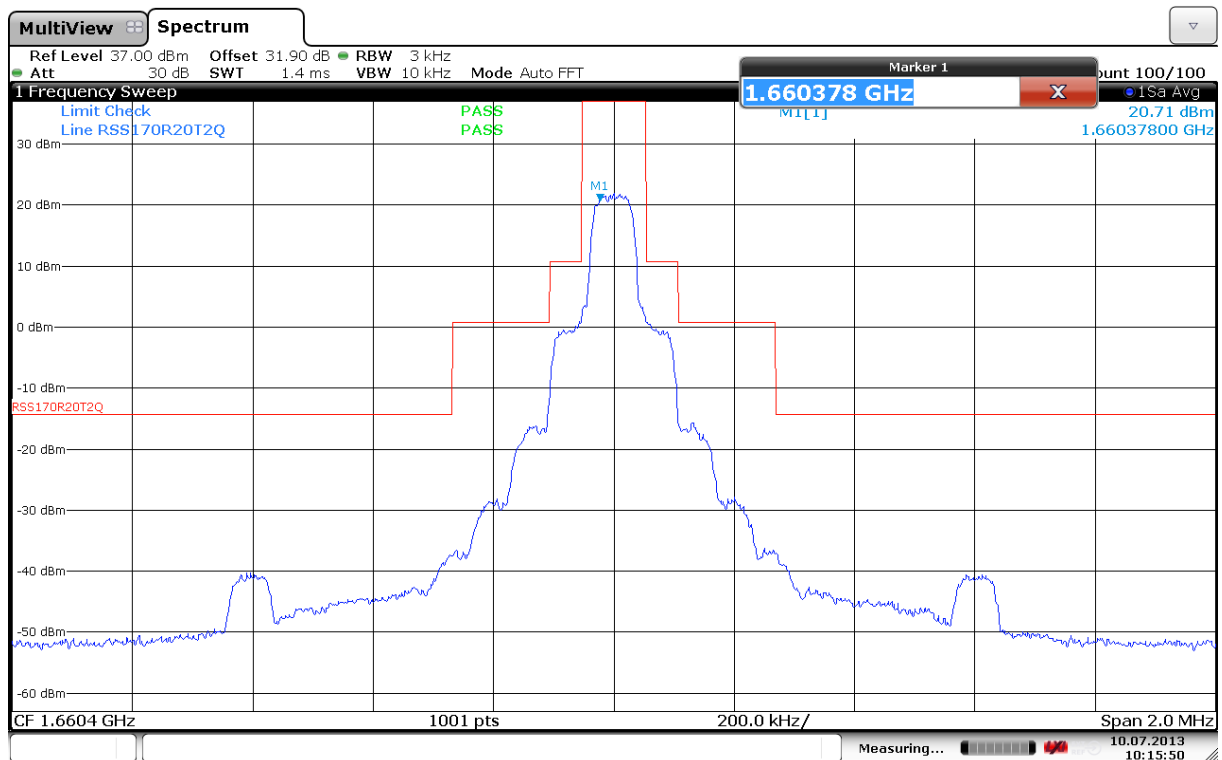
Emission mask, r5t1x/r20t1x, 1626.6 MHz



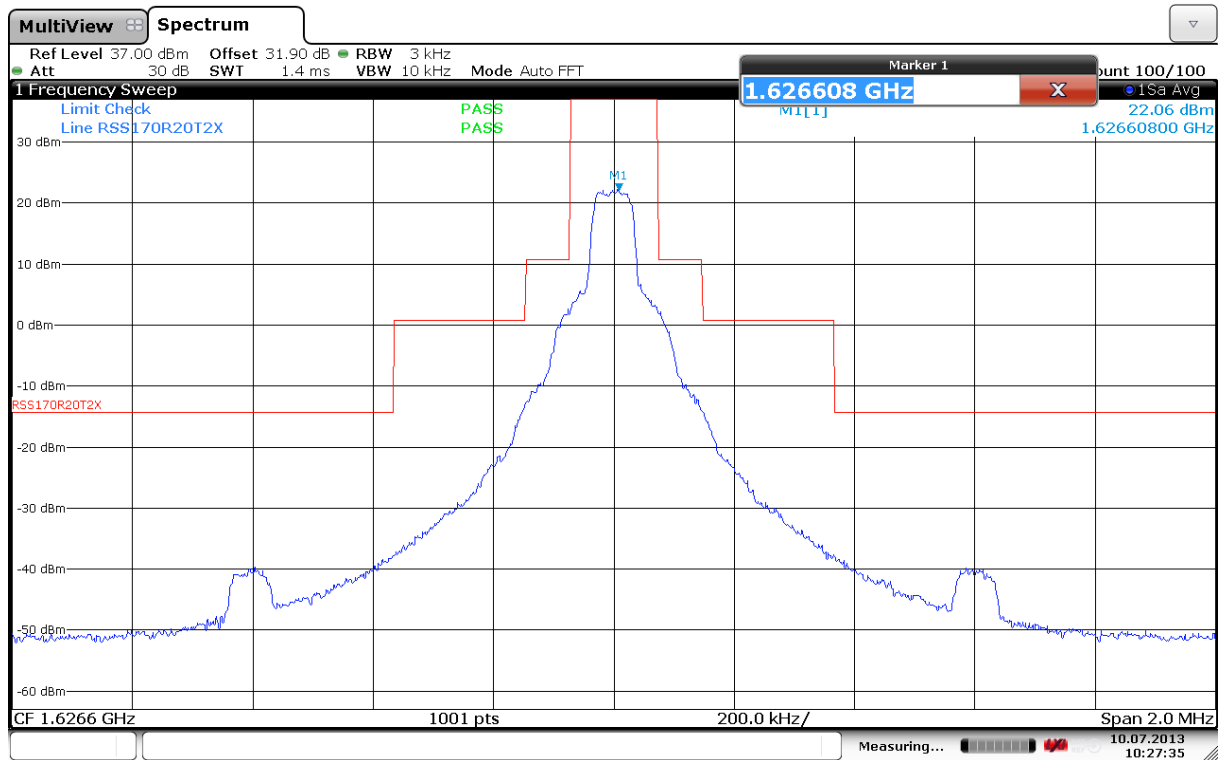
Emission mask, r5t1x/r20t1x, 1660.4 MHz



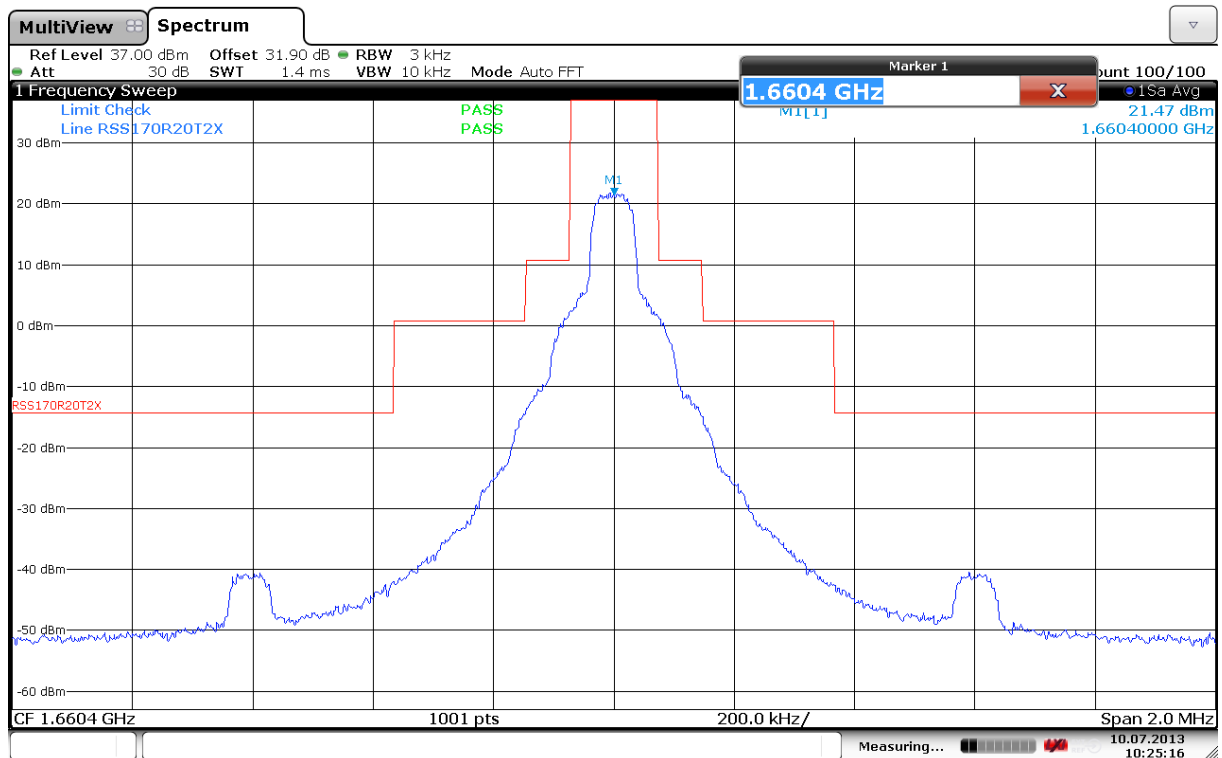
Emission mask, r5t2q/r20t2q, 1626.6 MHz



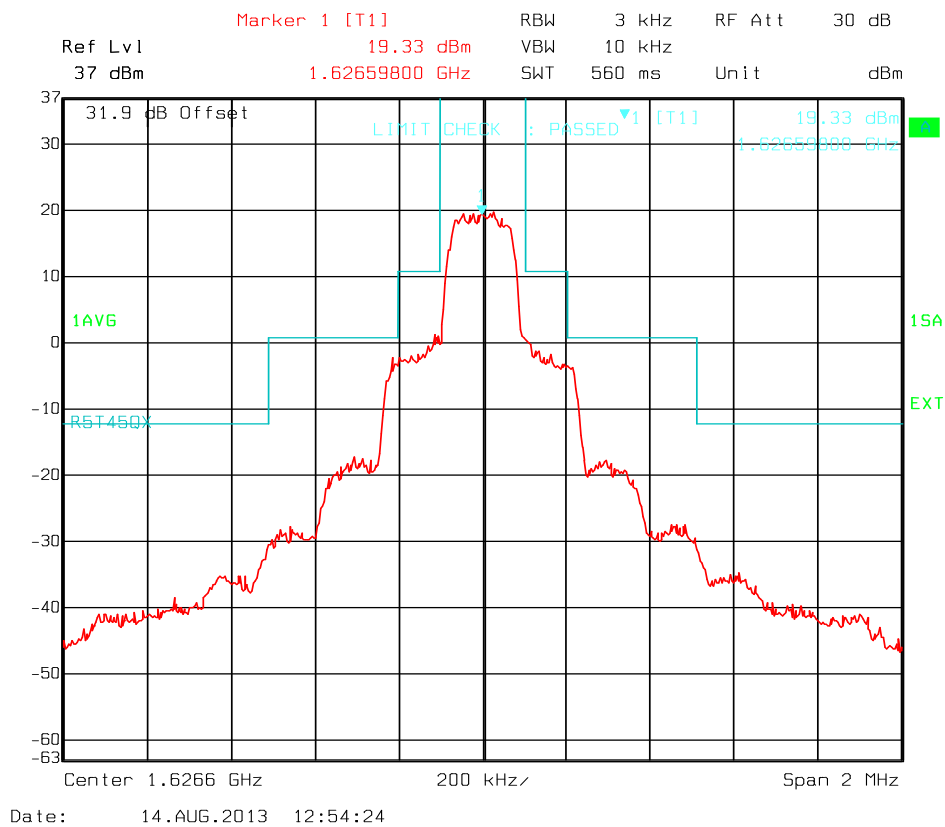
Emission mask, r5t2q/r20t2q, 1660.4 MHz



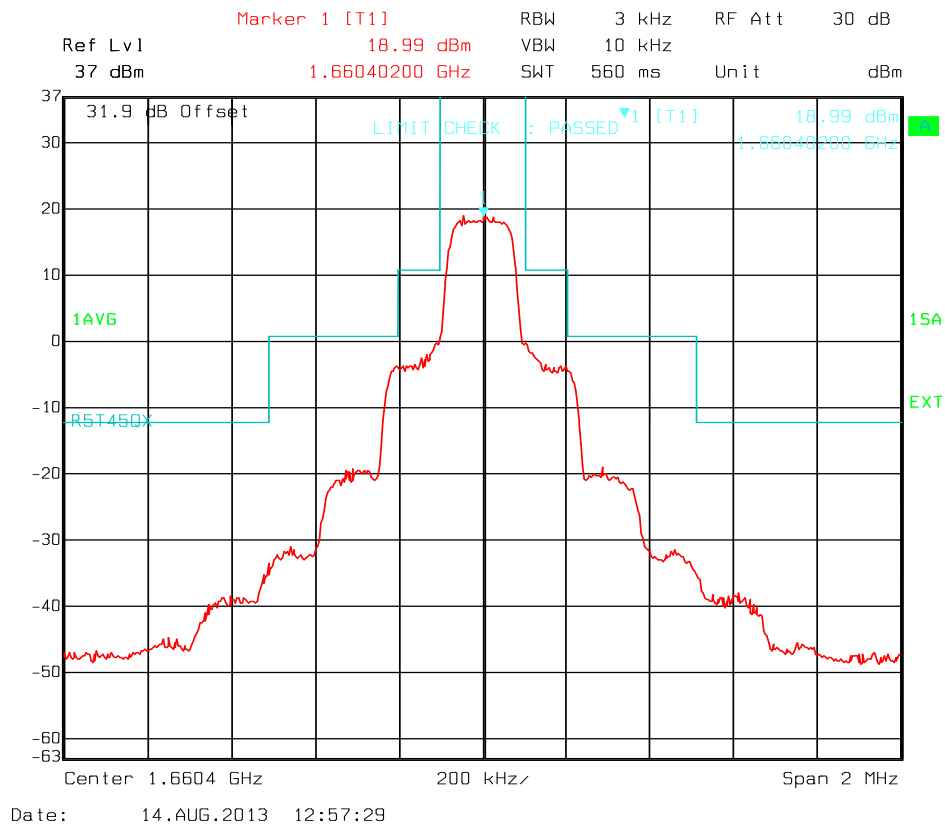
Emission mask, r5t2x/r20t2x, 1626.6 MHz



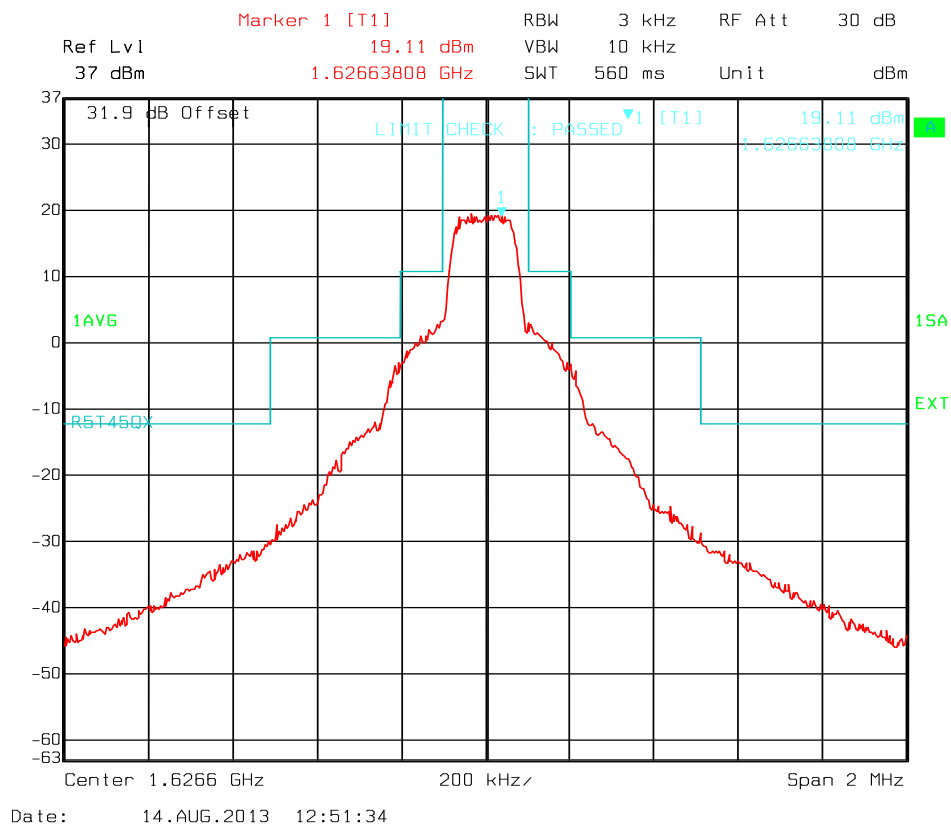
Emission mask, r5t2x/r20t2x, 1660.4 MHz



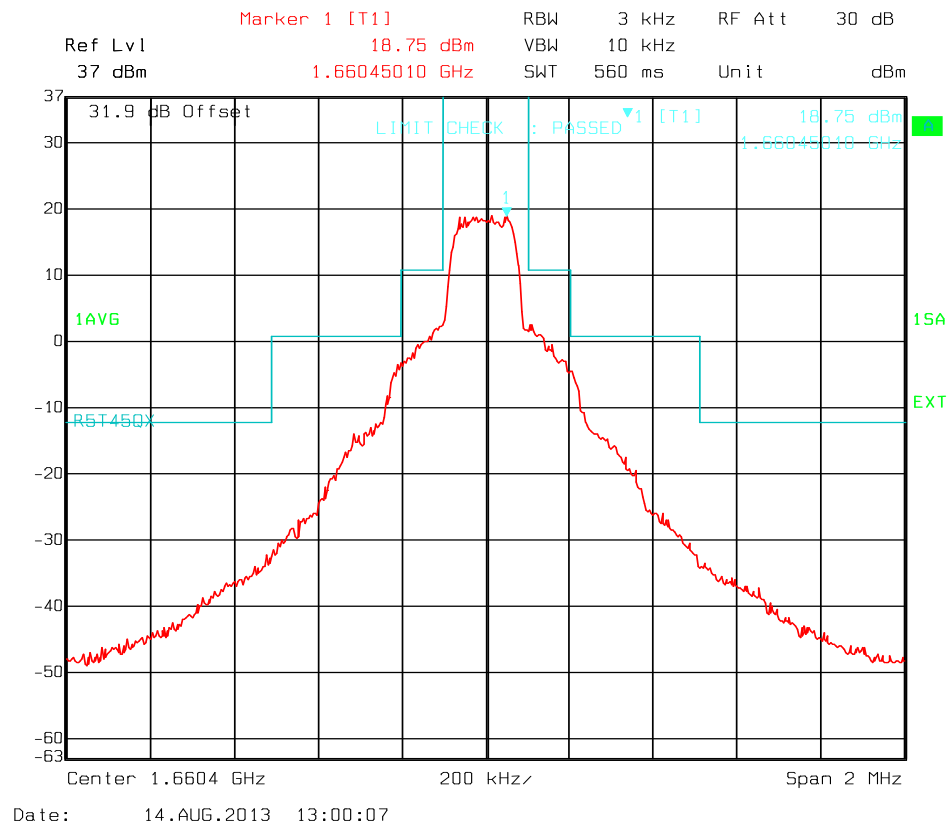
Emission mask, r5t4.5q/r20t4.5q, 1626.6 MHz



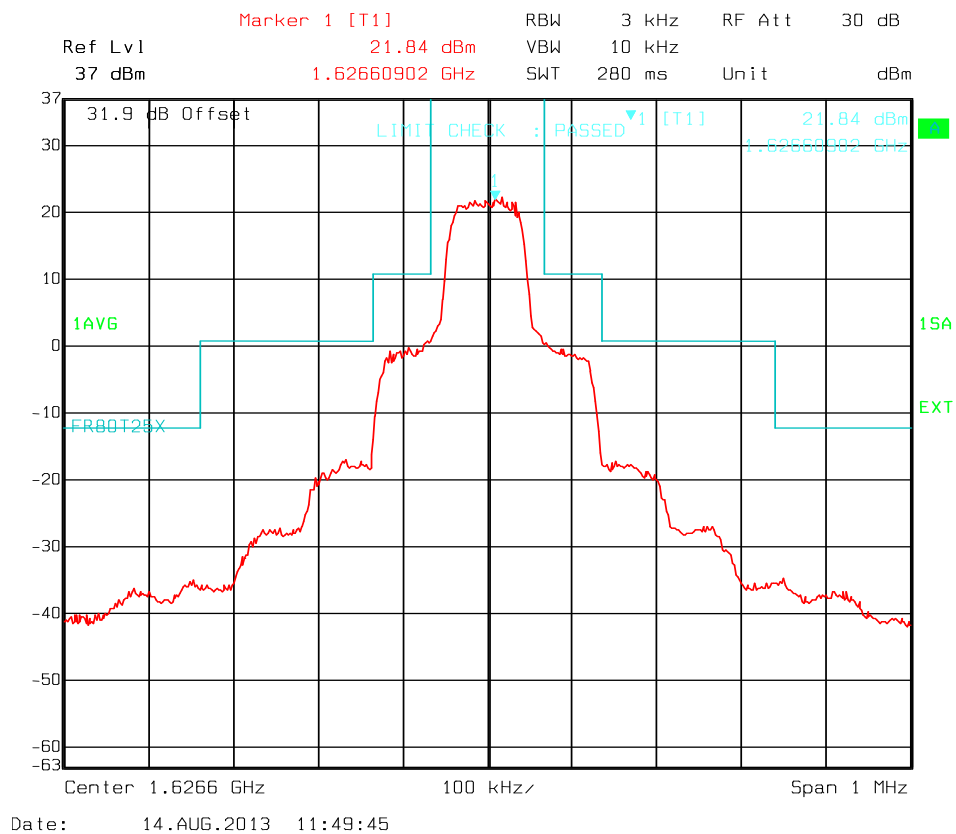
Emission mask, r5t4.5q/r20t4.5q, 1660.4 MHz



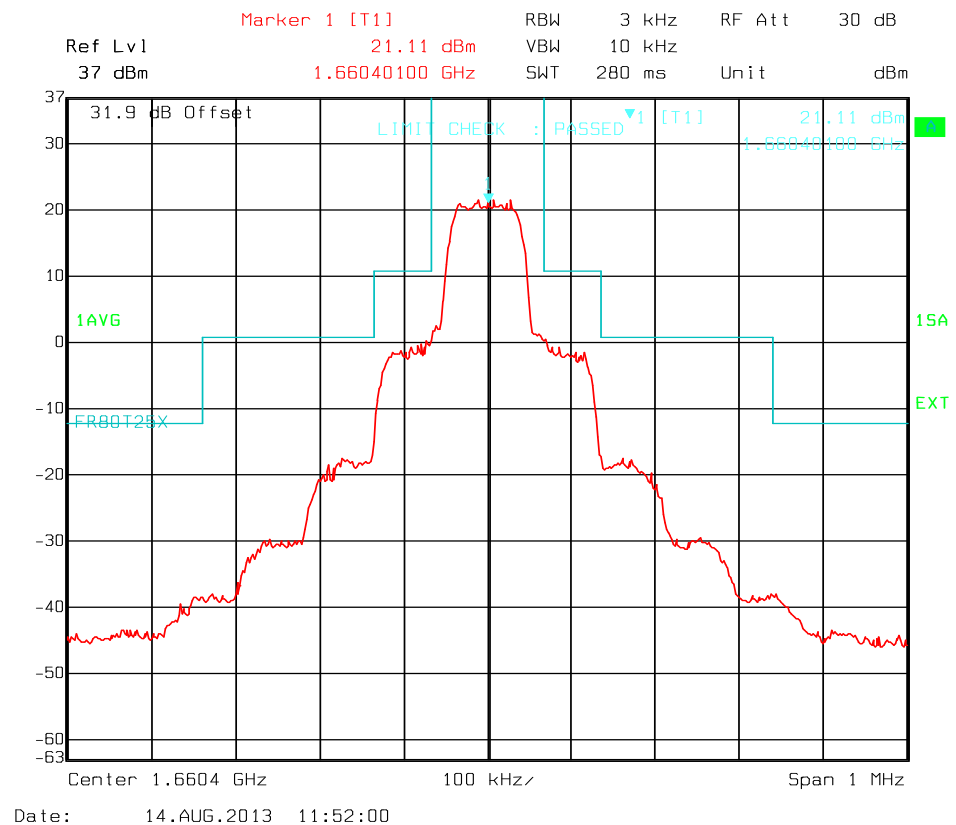
Emission mask, r5t4.5x/r20t4.5x, 1626.6 MHz



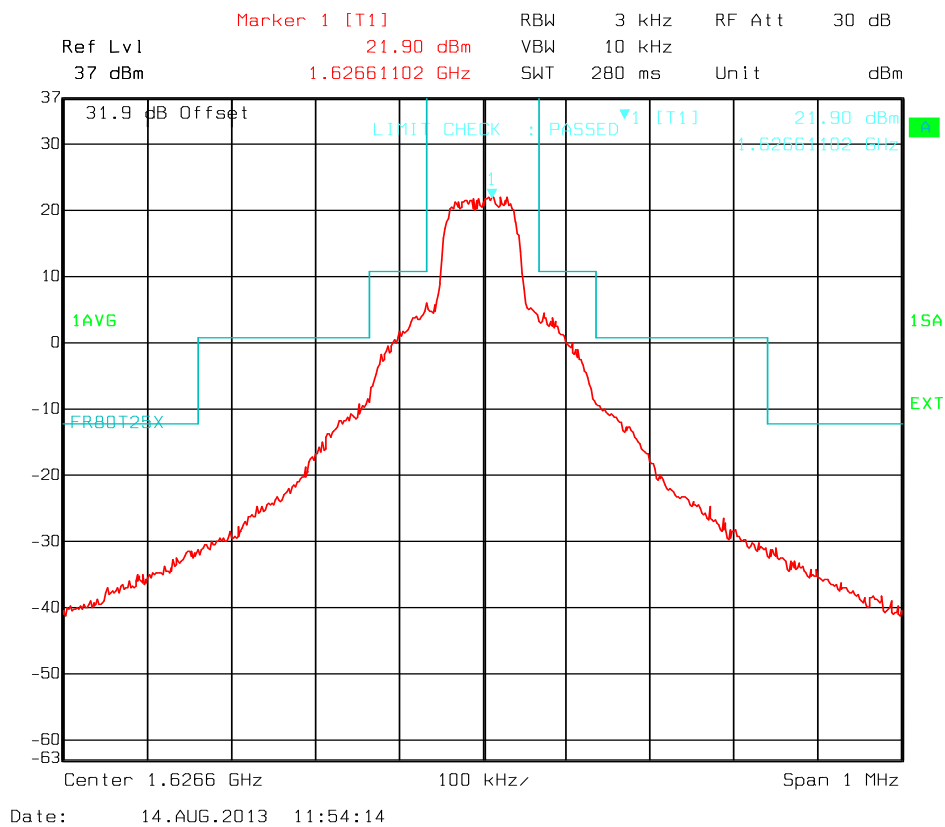
Emission mask, r5t4.5x/r20t4.5x, 1660.4 MHz



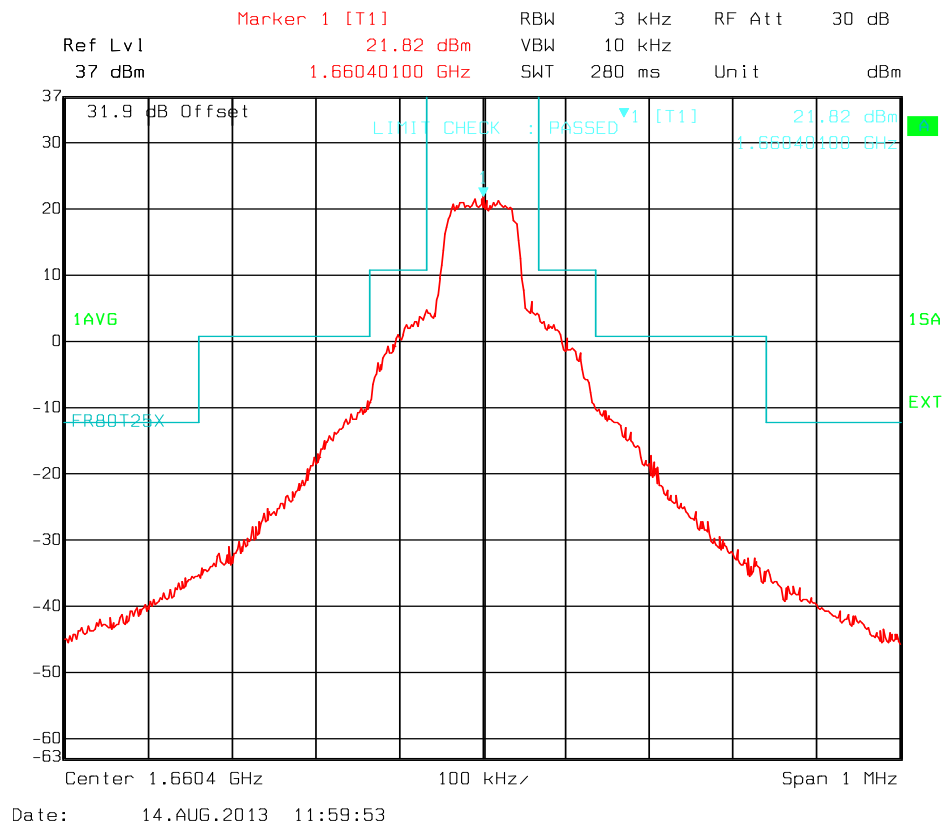
Emission mask, fr80t2.5x4, 1626.6 MHz



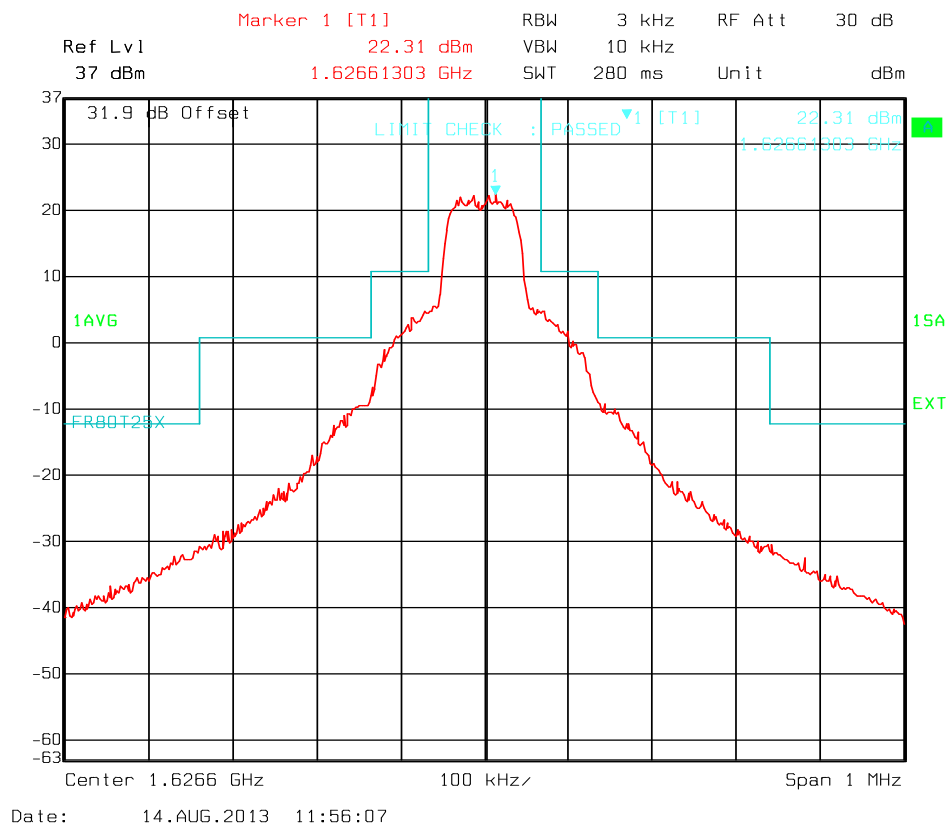
Emission mask, fr80t2.5x4, 1660.4 MHz



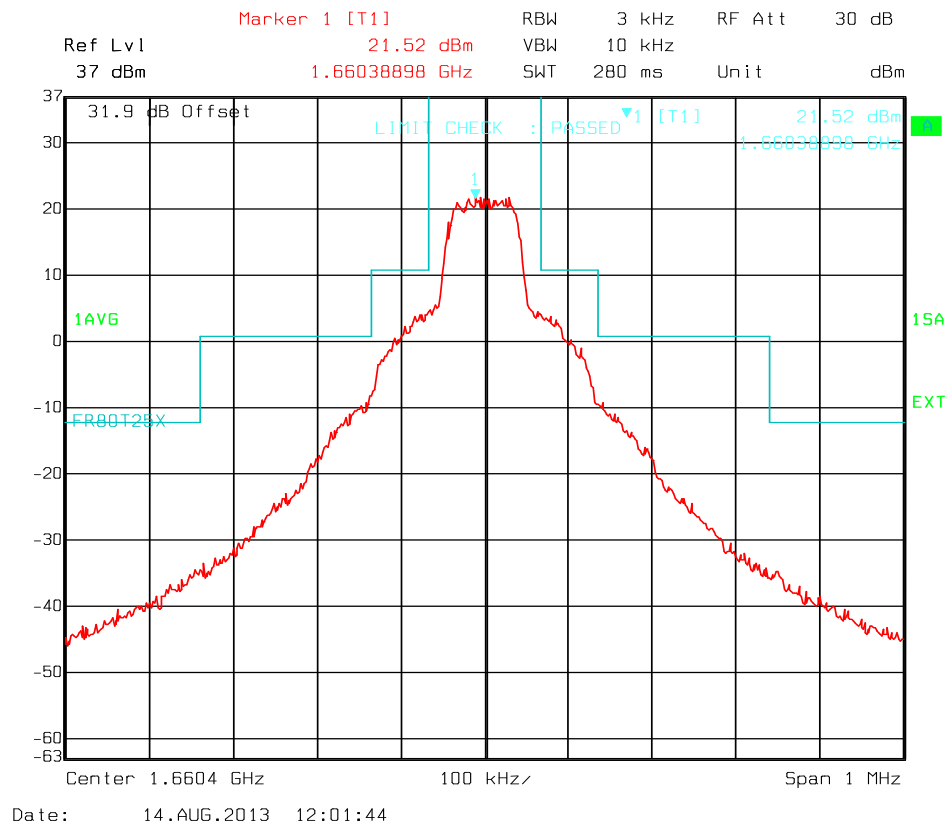
Emission mask, fr80t2.5x16, 1626.6 MHz



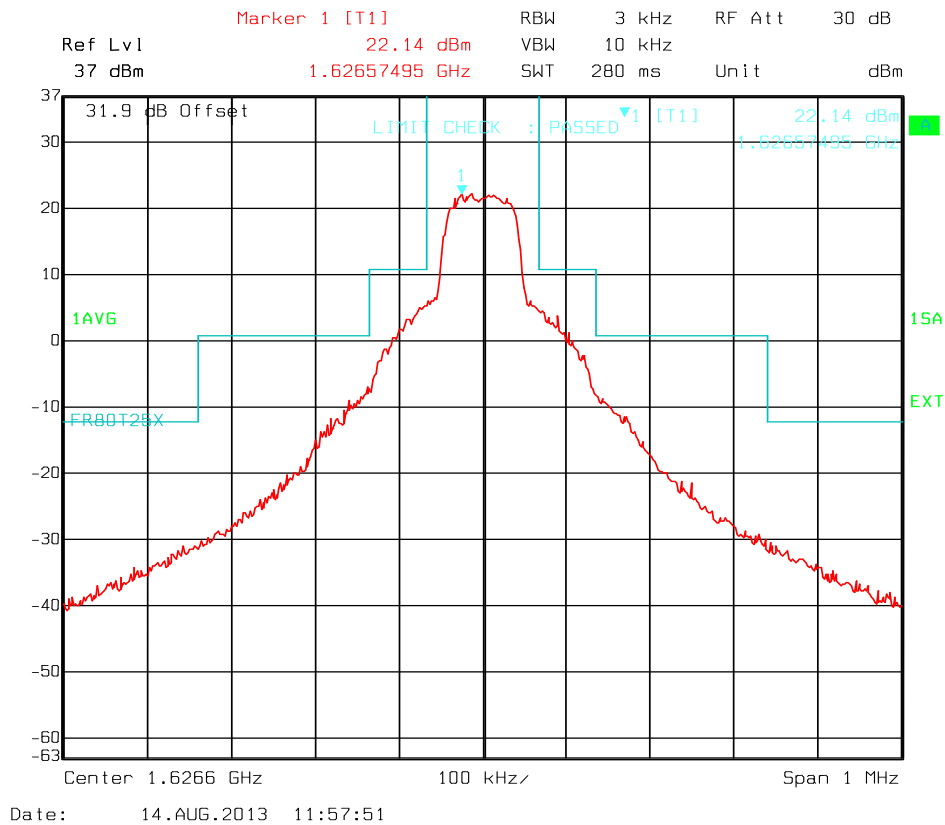
Emission mask, fr80t2.5x16, 1660.4 MHz



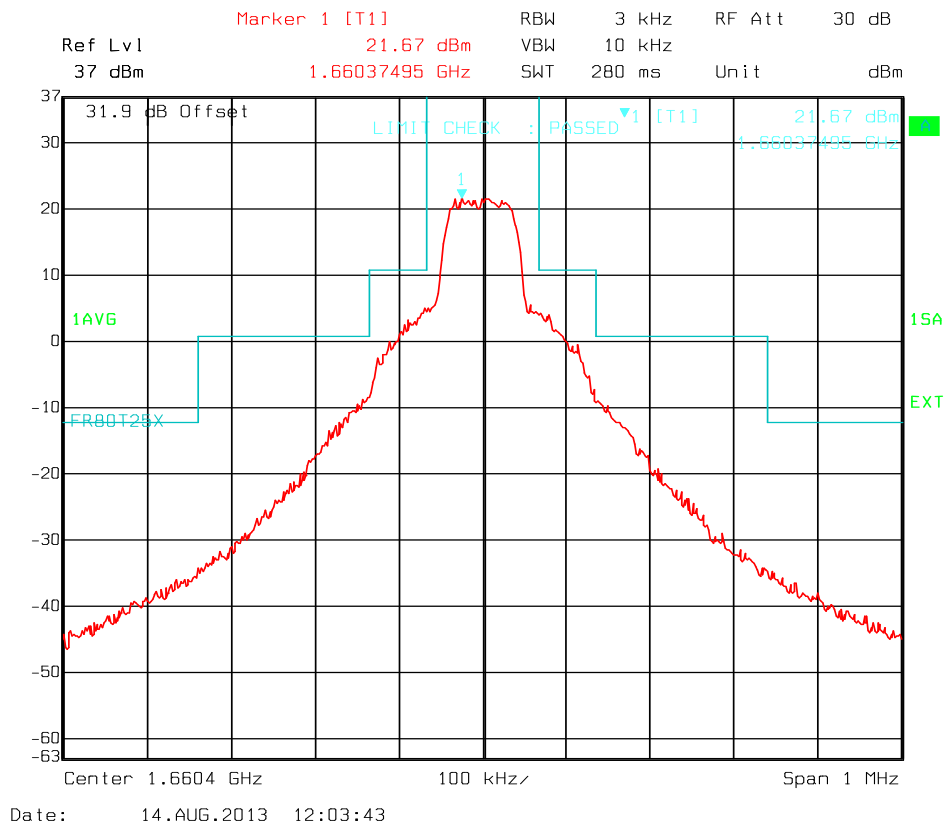
Emission mask, fr80t2.5x32, 1626.6 MHz



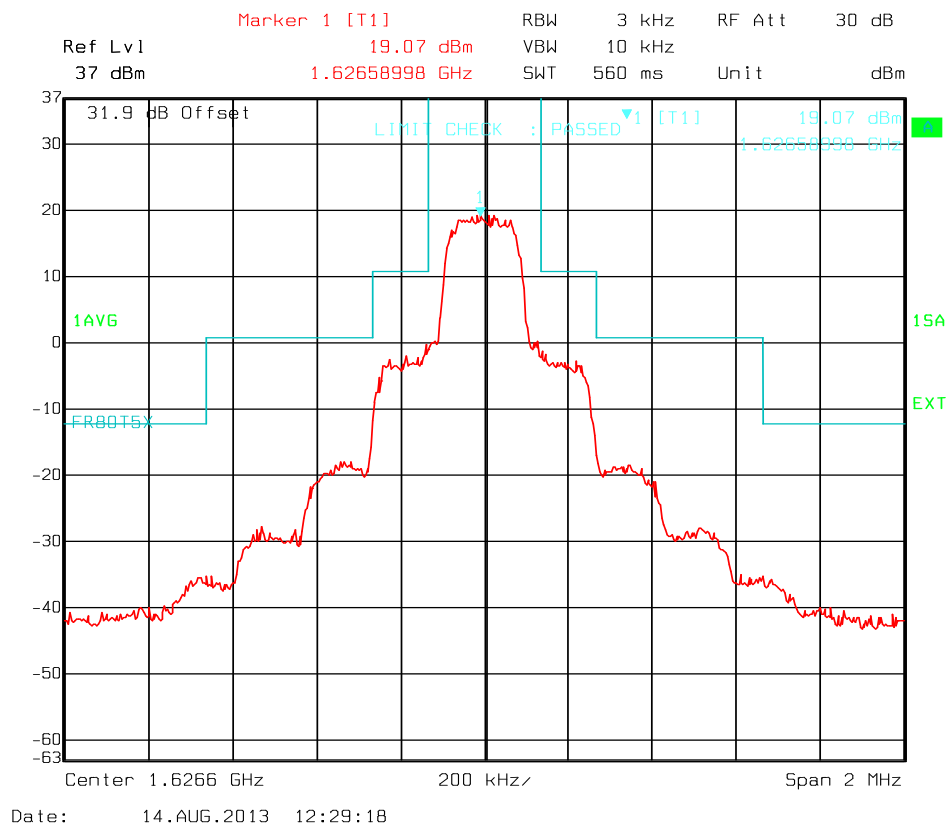
Emission mask, fr80t2.5x32, 1660.4 MHz



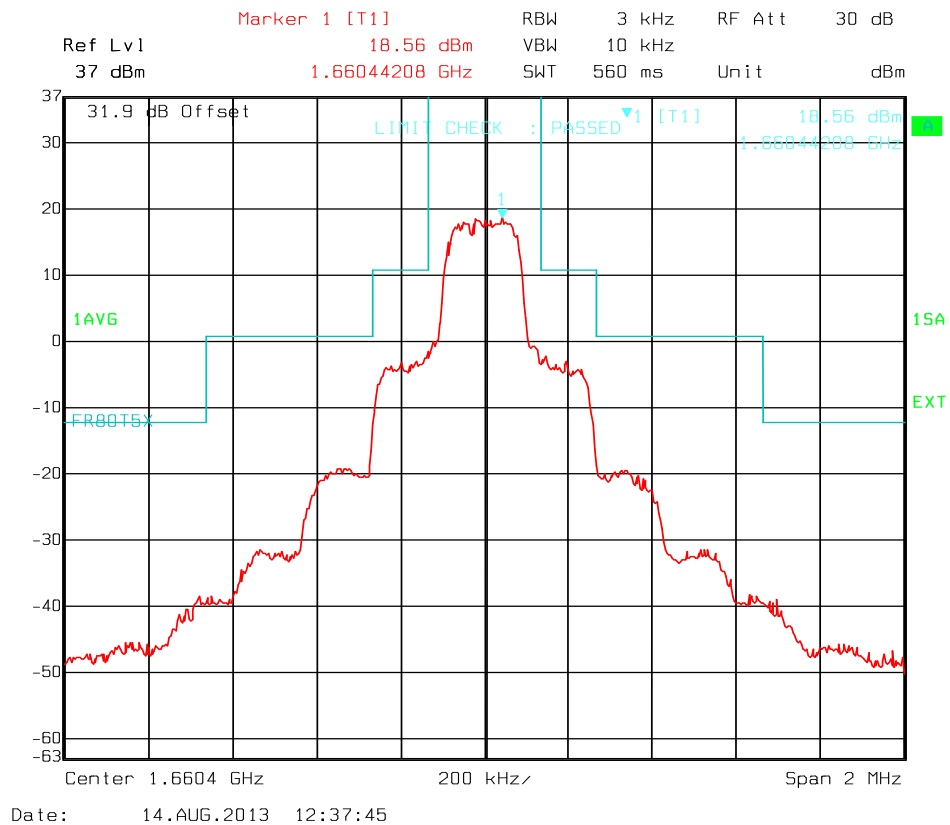
Emission mask, fr80t2.5x64, 1626.6 MHz



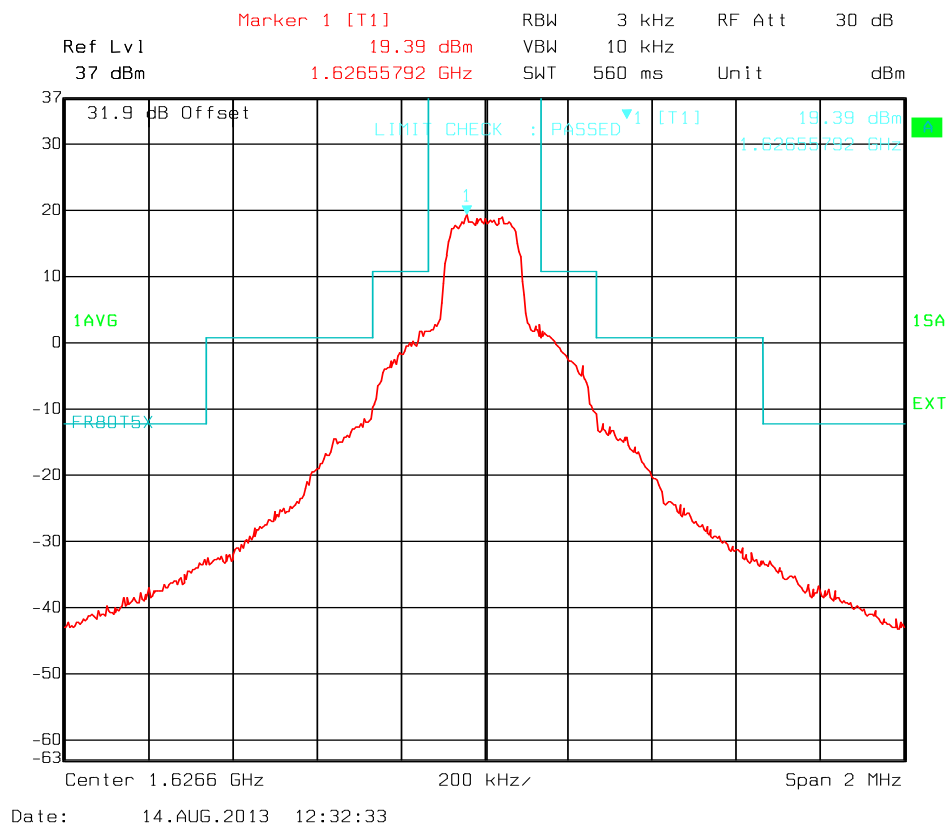
Emission mask, fr80t2.5x64, 1660.4 MHz



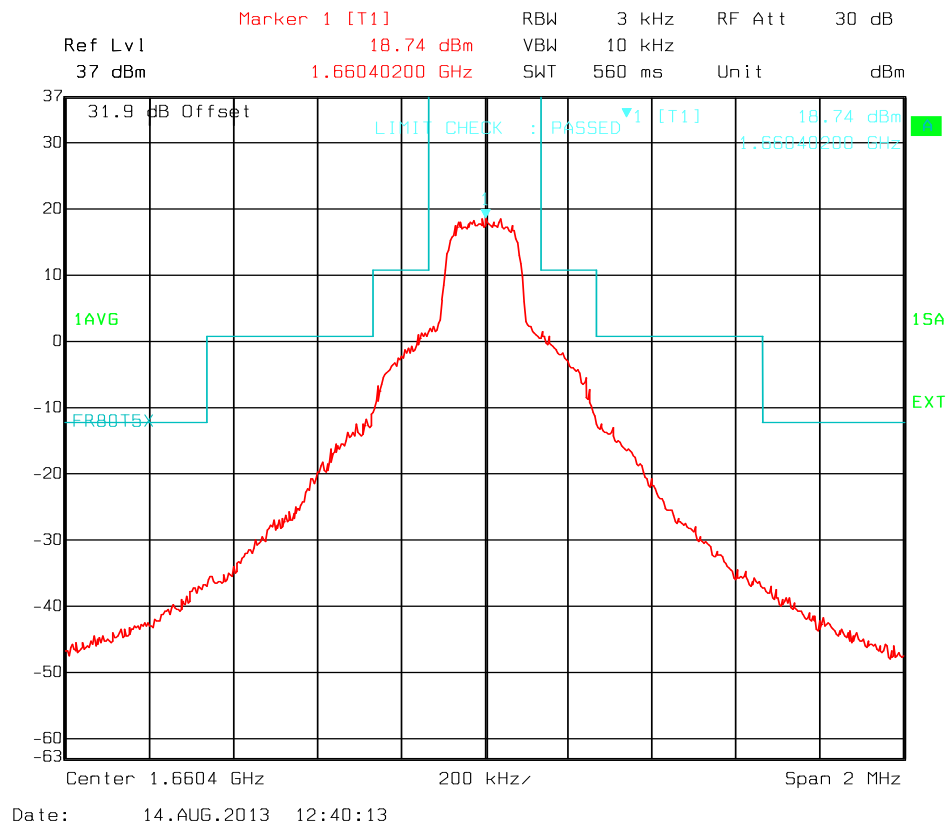
Emission mask, fr80t5x4, 1626.6 MHz



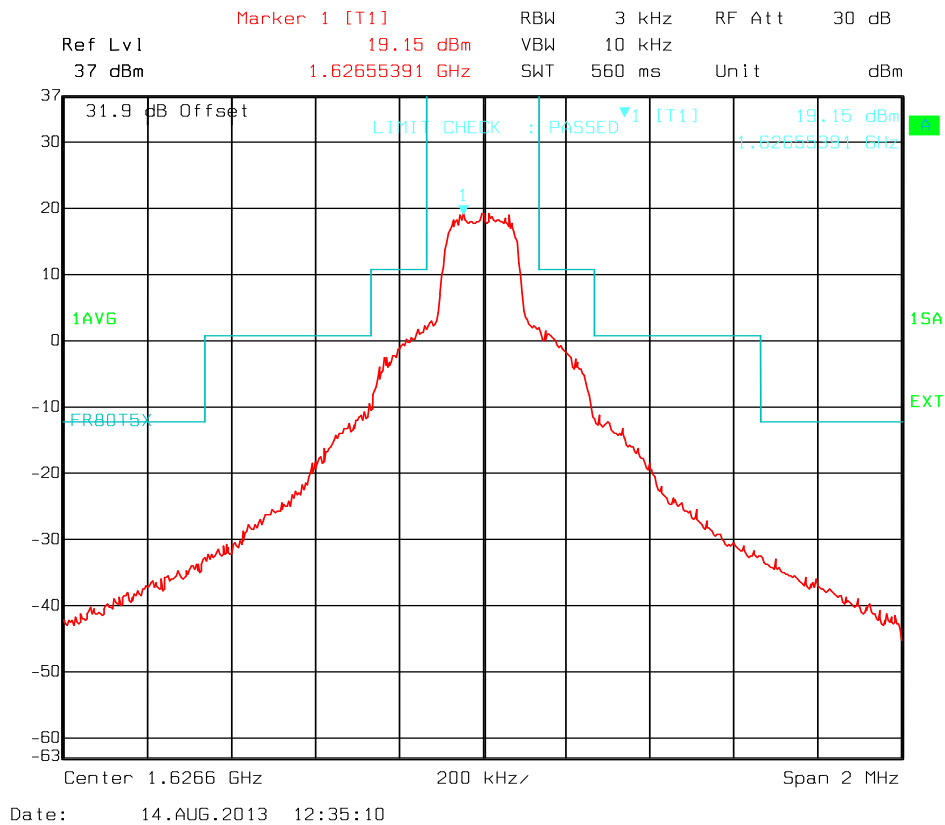
Emission mask, fr80t5x4, 1660.4 MHz



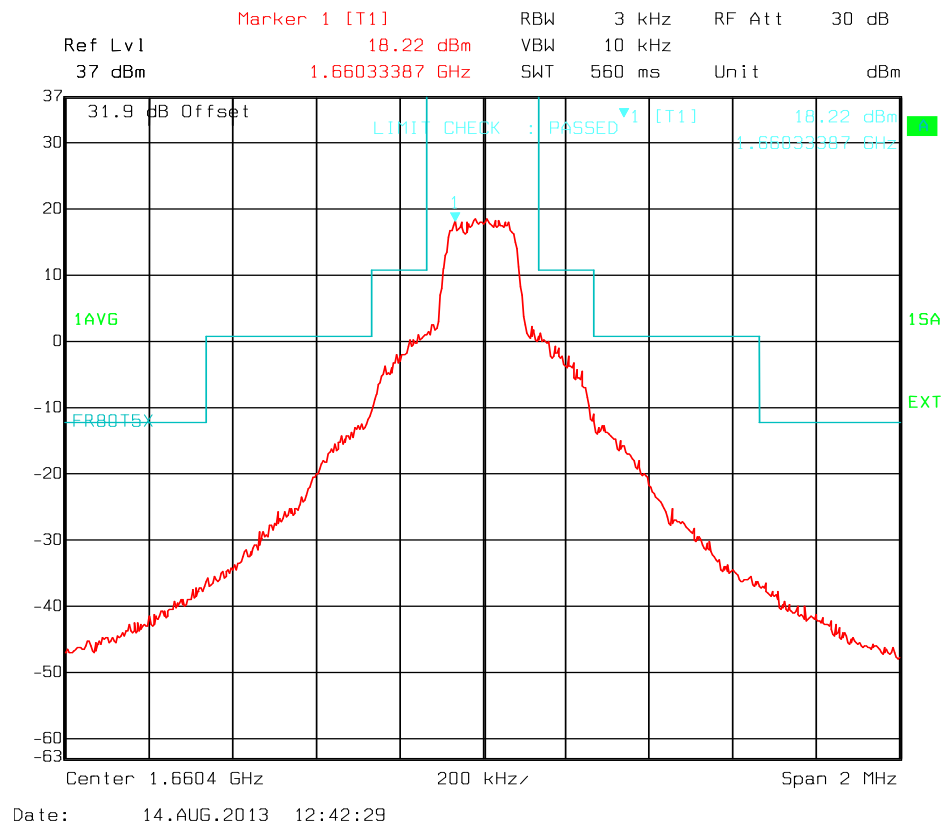
Emission mask, fr80t5x16, 1626.6 MHz



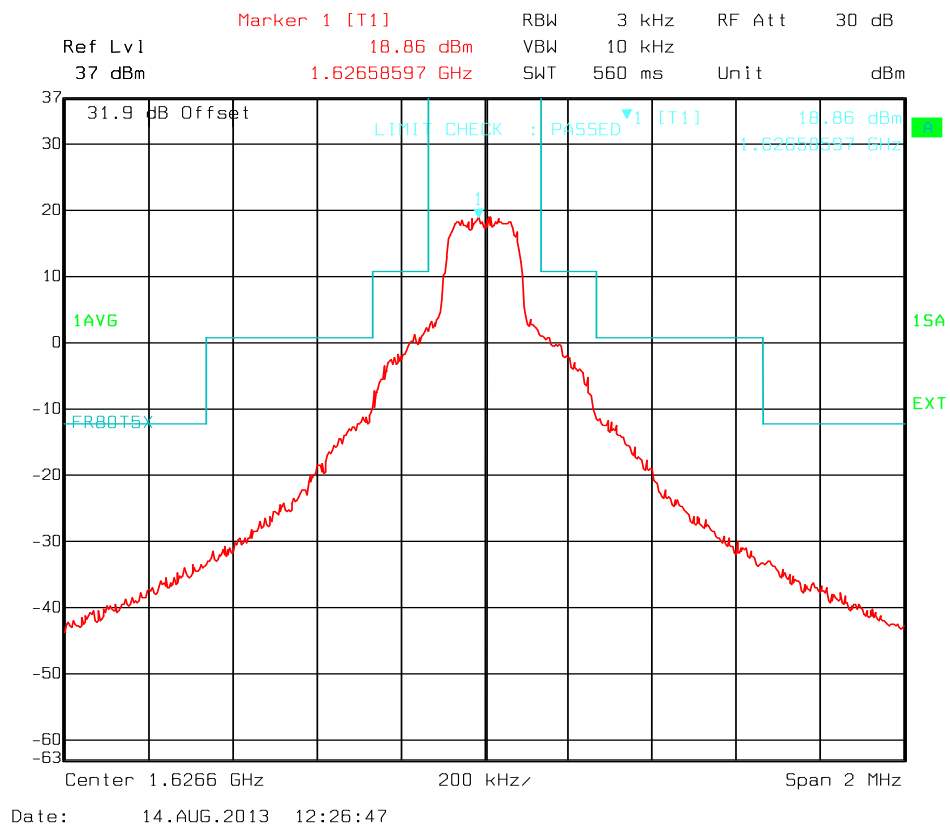
Emission mask, fr80t5x16, 1660.4 MHz



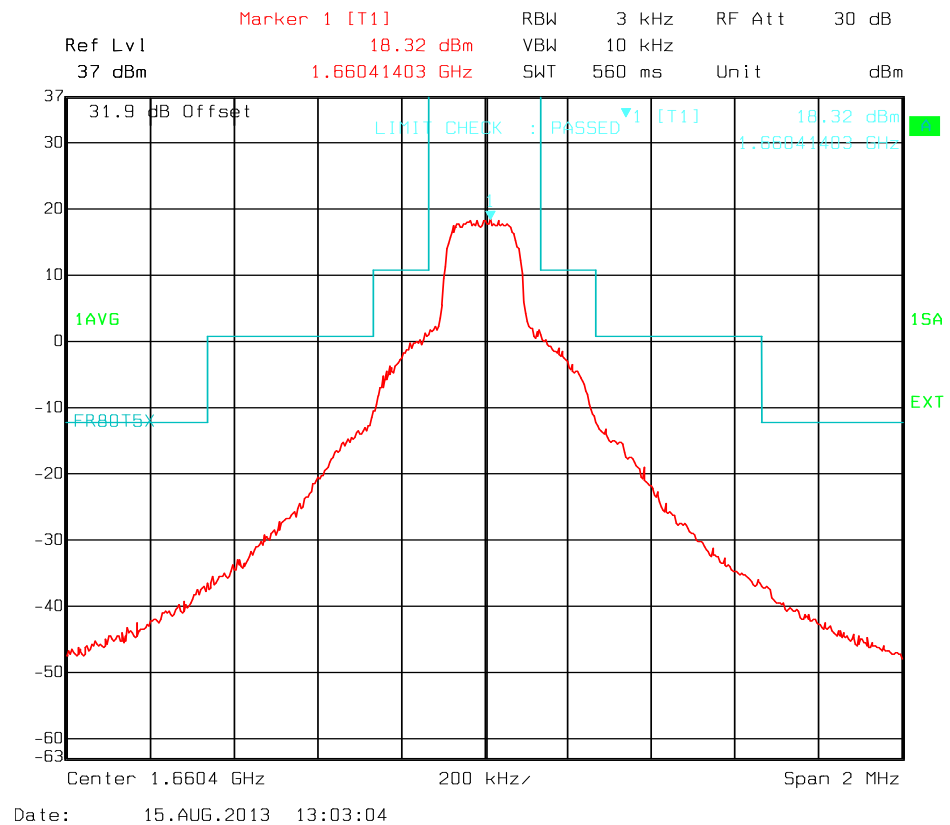
Emission mask, fr80t5x32, 1626.6 MHz



Emission mask, fr80t5x32, 1660.4 MHz



Emission mask, fr80t5x64, 1626.6 MHz



Emission mask, fr80t5x64, 1660.4 MHz

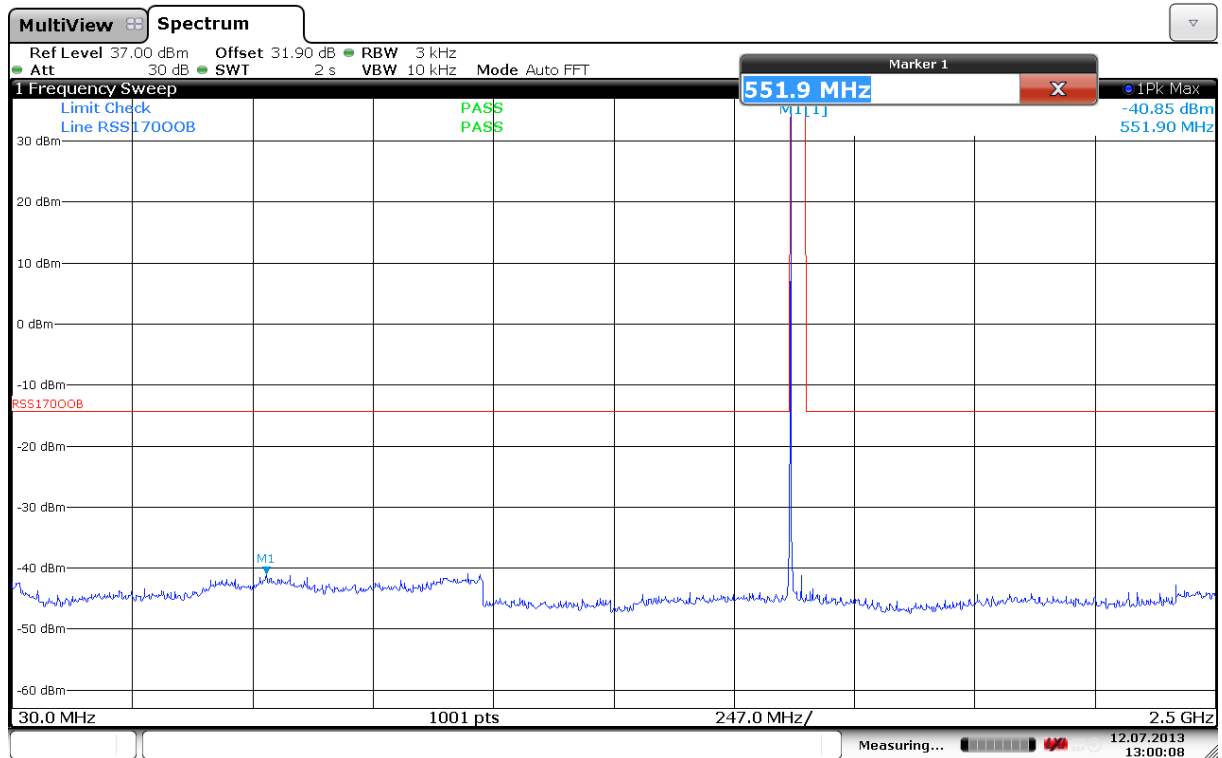
5.4.3.1 Transmitter Emissions Limitations, Out-of-band Emissions

		Unwanted Emissions (dBm)		
Modulation Scheme	Necessary BW or OBW OBW kHz	3287 MHz	All others	Limit
R20T0.5Q	26	-41.8 dBm	< -40 dBm	-14.3 dBm
R20T1Q	48	-42.5 dBm		
R5T1X	48	-43.3 dBm		
R20T1X				
R5T2Q	96	-46.5 dBm		
R20T2Q				
R5T2X	96	-45.3 dBm		
R20T2X				
R5T4.5Q	204	-48.1 dBm		
R20T4.5Q				
R5T4.5X	204	-48.5 dBm		
R20T4.5X				
R80T0.5Q	26	-41.8 dBm		
R80T1Q	48	-42.5 dBm		
FR80T2.5X4	137	-45.9 dBm		
FR80T2.5X16		-46.3 dBm		
FR80T2.5X32		-46.4 dBm		
FR80T2.5X64		-46.5 dBm		
FR80T5X4	266	-48.9 dBm		
FR80T5X16		-49.1 dBm		
FR80T5X32		-48.0 dBm		
FR80T5X64		-48.8 dBm		

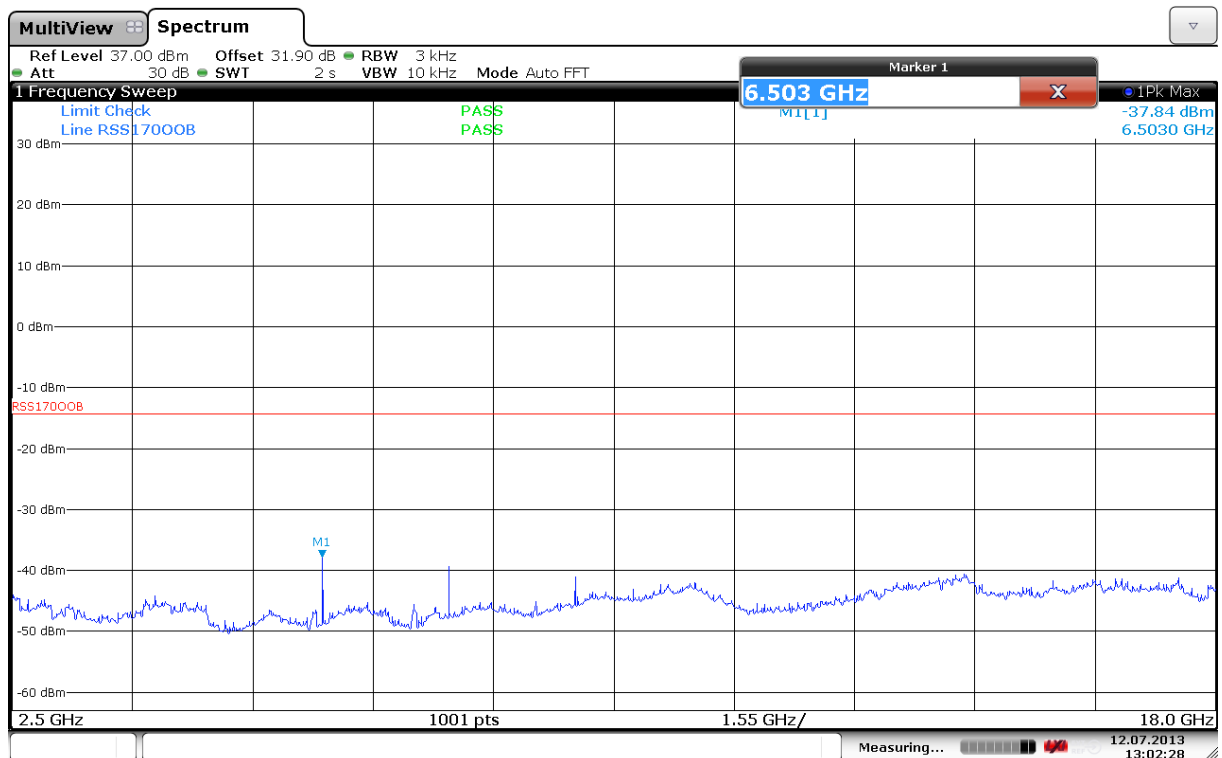
Calculated Limit: $35.8 \text{ dBm} - (43 + 5.8) - 1.25 \text{ dB} = -14.25 \text{ dBm}$

Requirements:

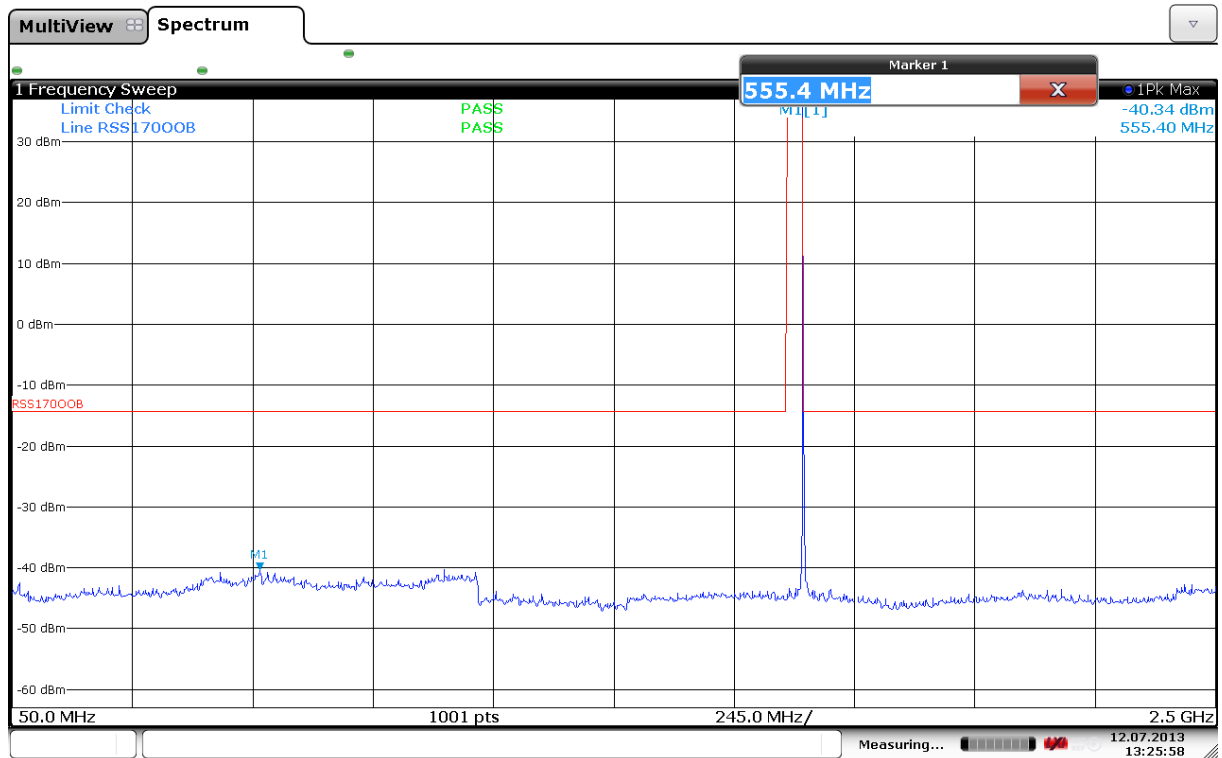
- (1) In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 250% of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the power in watts;



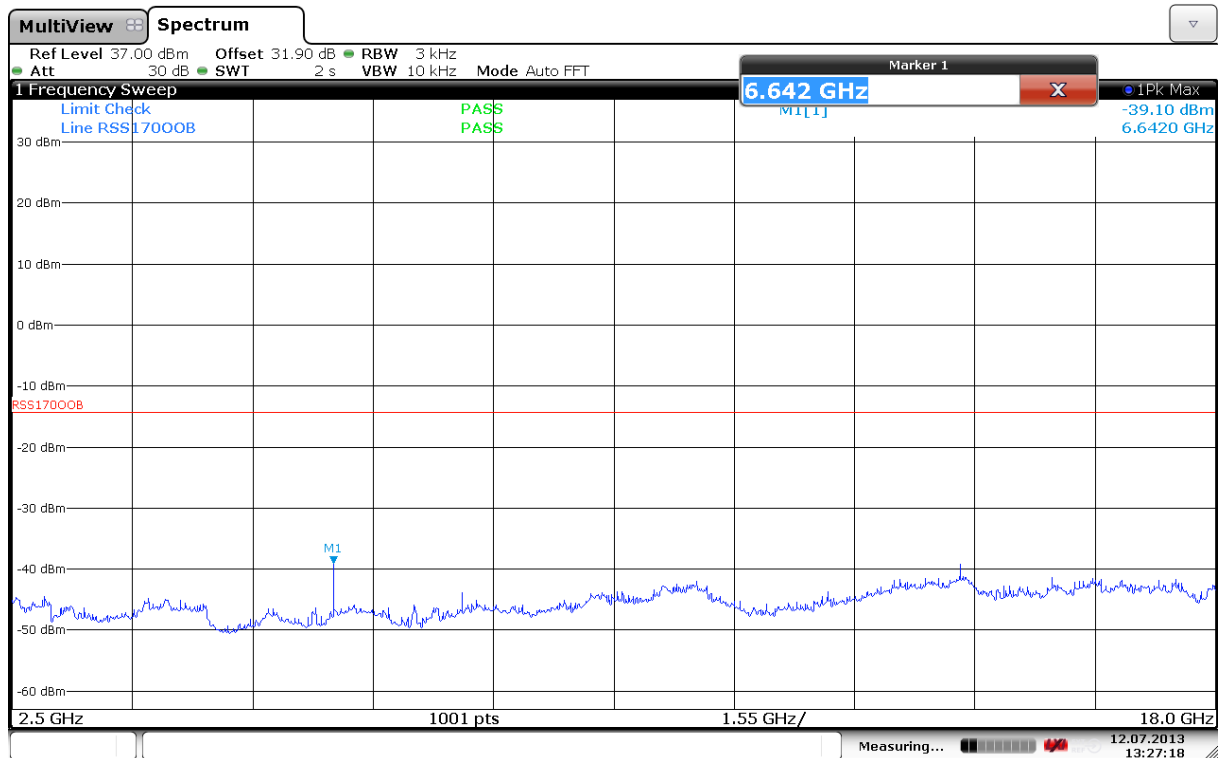
Out-of-Band Emissions, 30- 2500 MHz, R20T0.5Q/R80T0.5Q, 1626.6 MHz



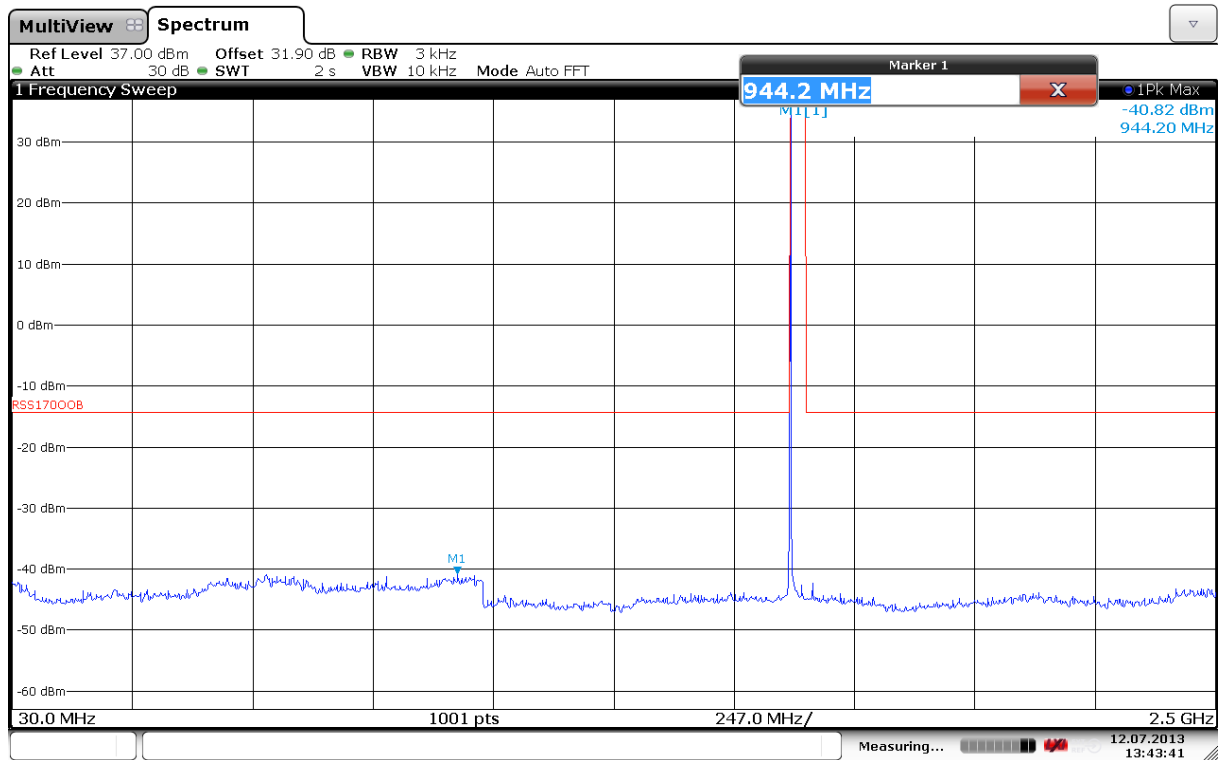
Out-of-Band Emissions, 25000- 18000 MHz, R20T0.5Q/R80T0.5Q, 1626.6 MHz



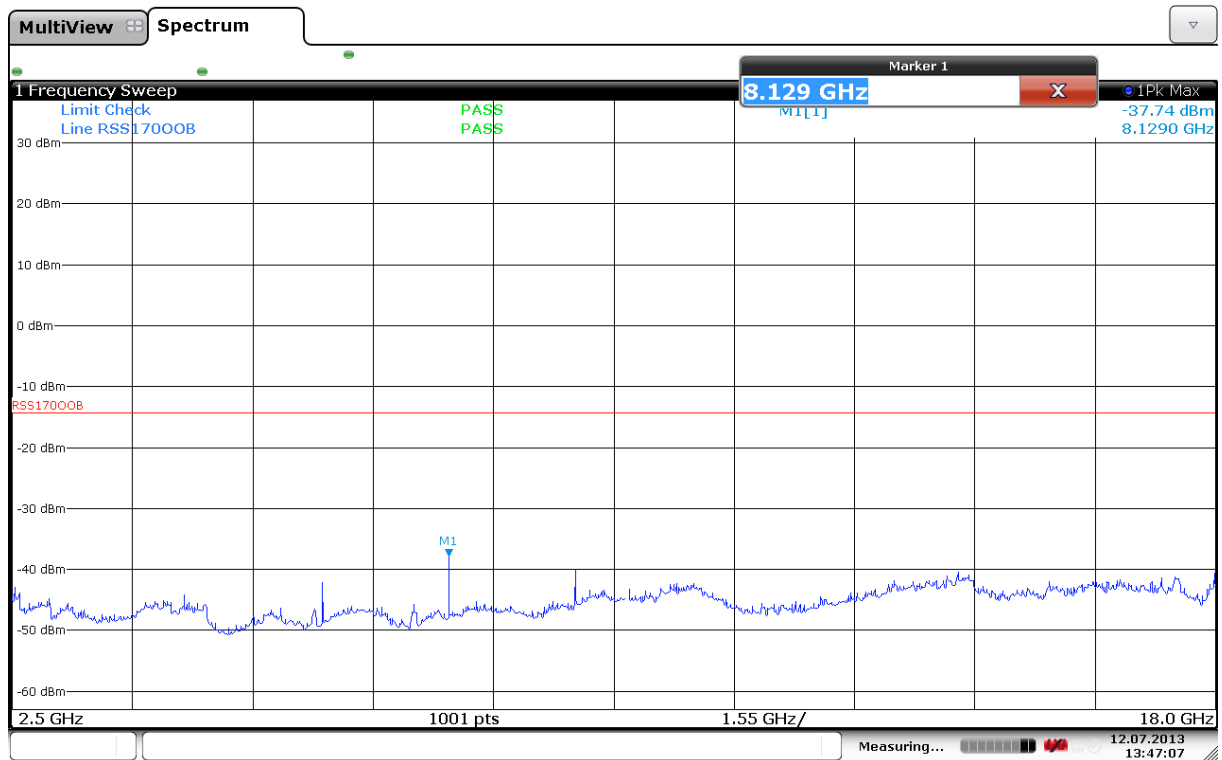
Out-of-Band Emissions, 30- 2500 MHz, R20T0.5Q/R80T0.5Q, 1660.4 MHz



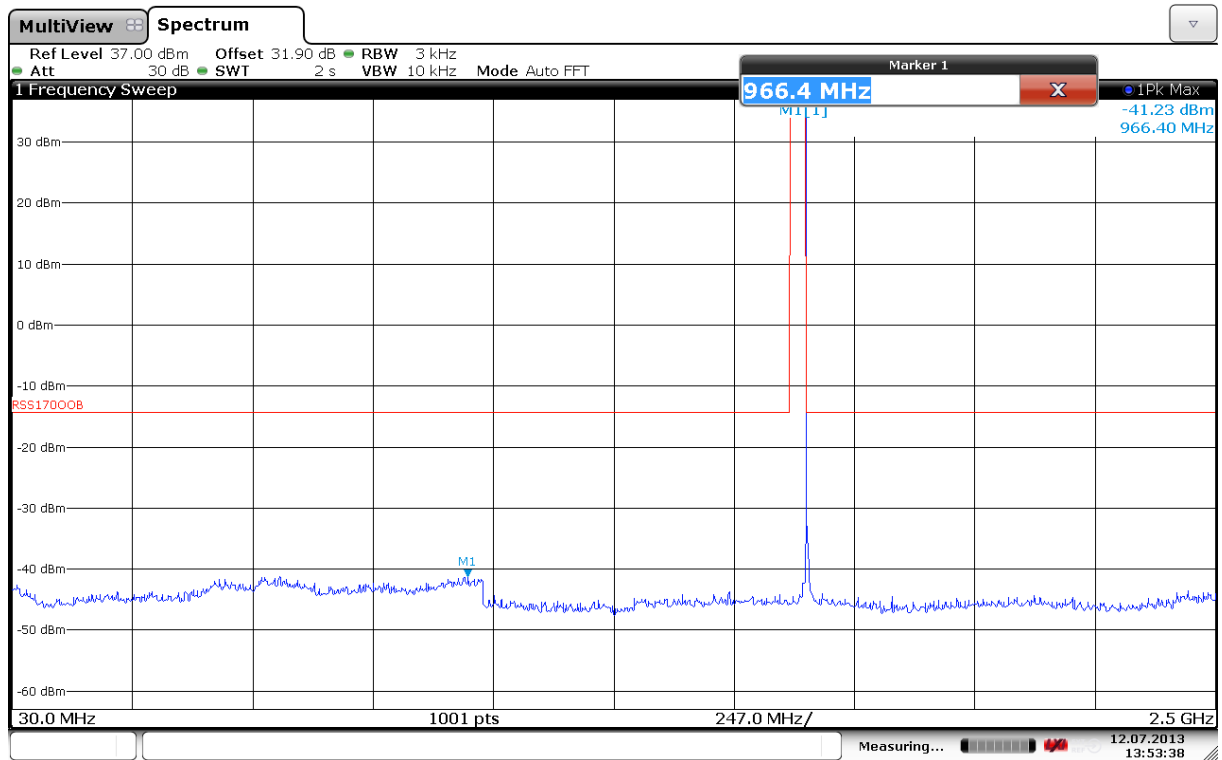
Out-of-Band Emissions, 25000- 18000 MHz, R20T0.5Q/R80T0.5Q, 1660.4 MHz



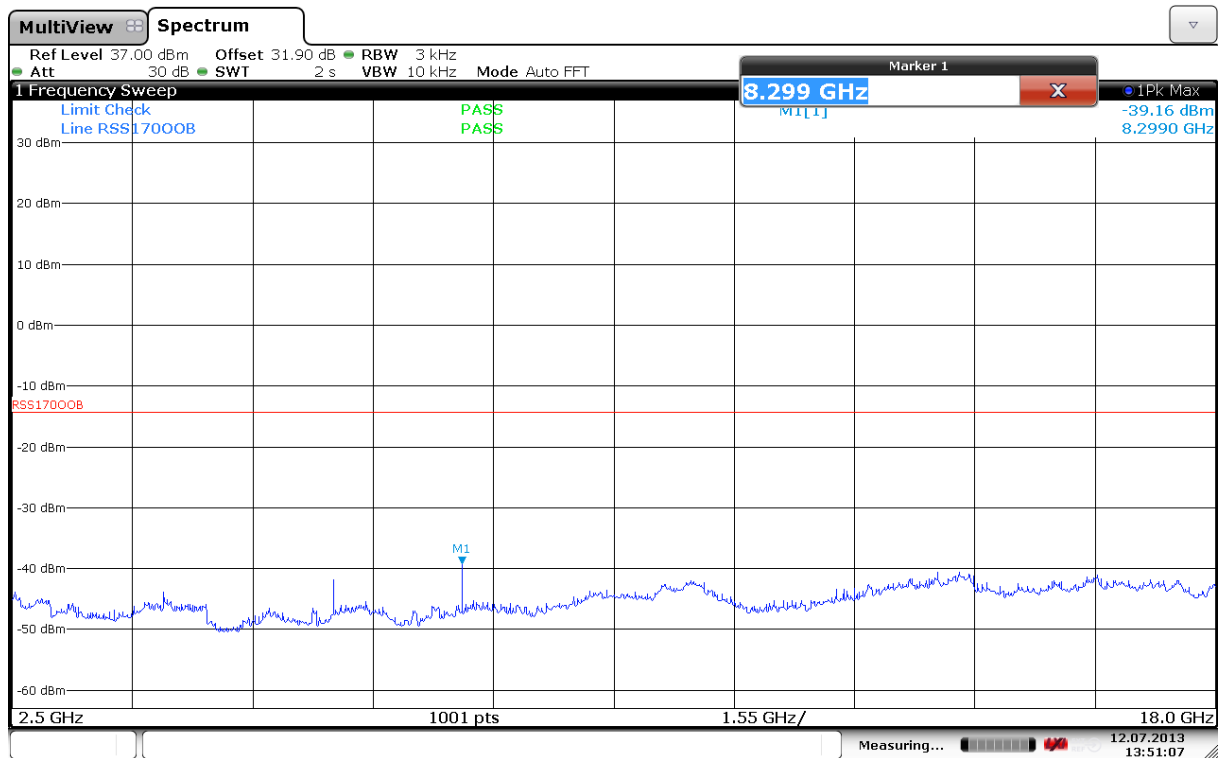
Out-of-Band Emissions, 30- 2500 MHz, R5T1X/R20T1X, 1626.6 MHz



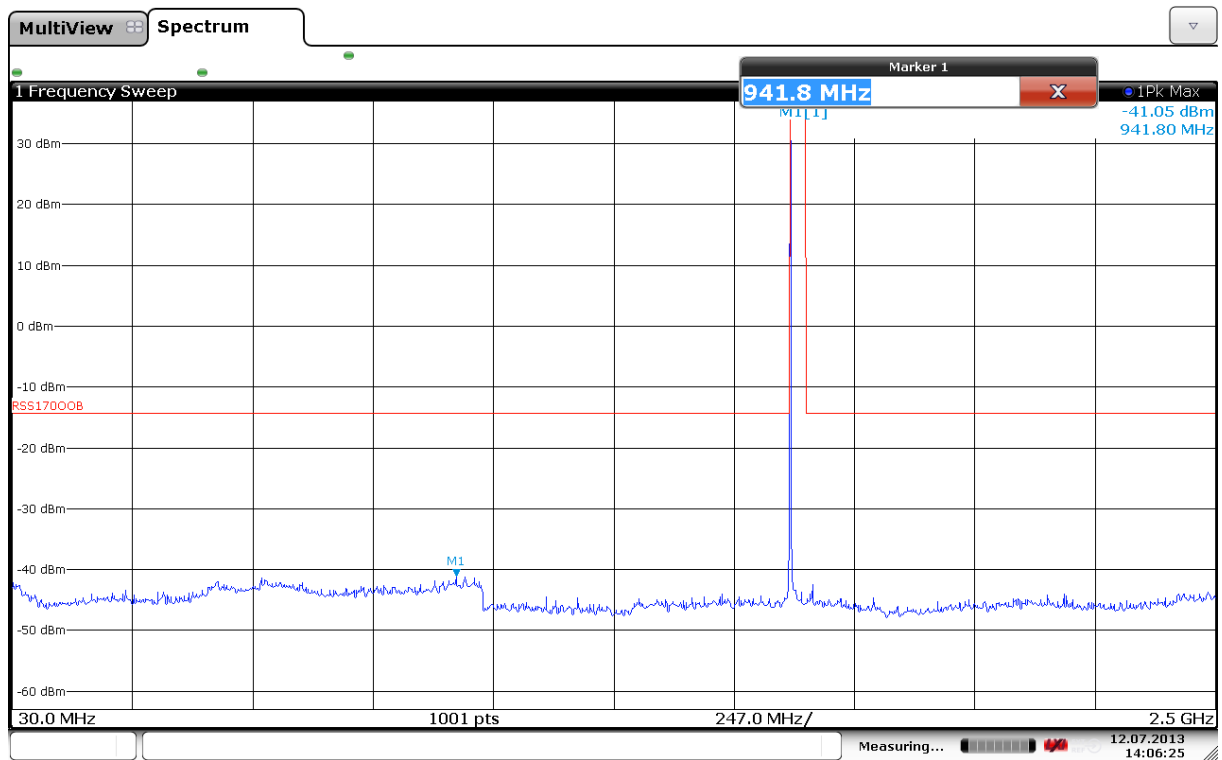
Out-of-Band Emissions, 2500- 18000 MHz, R5T1X/R20T1X, 1626.6 MHz



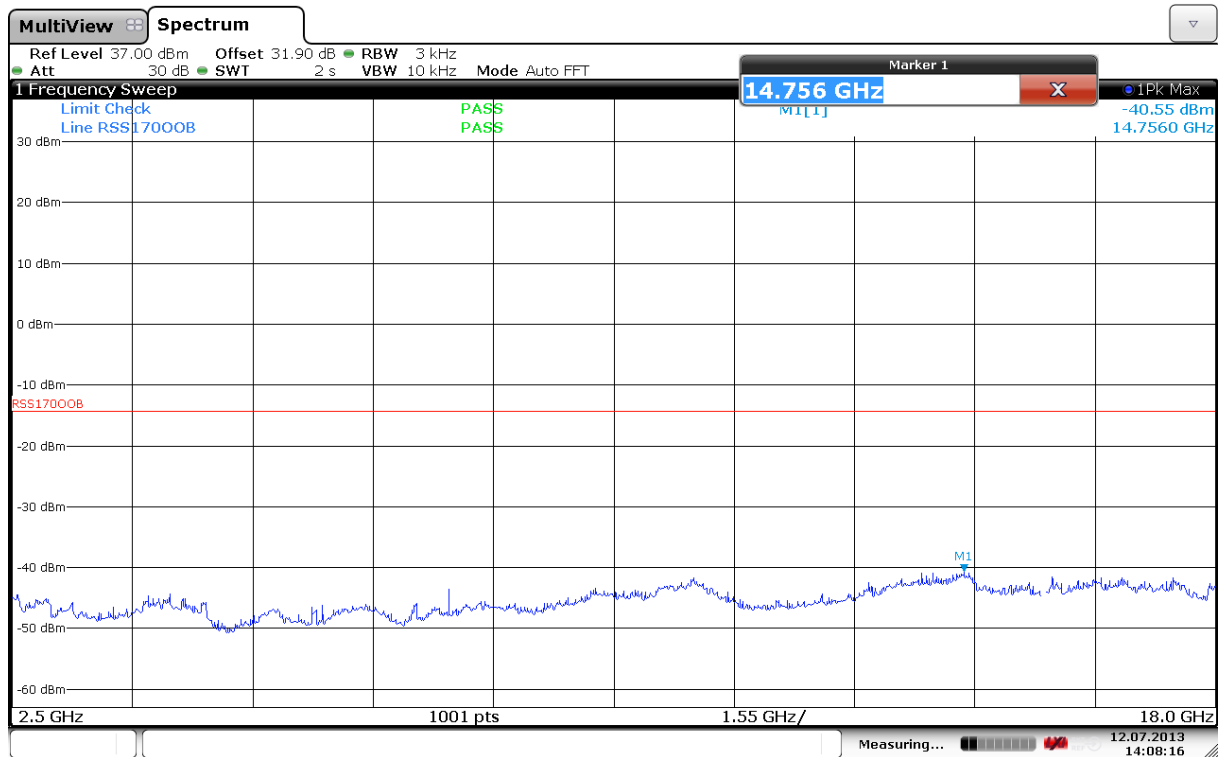
Out-of-Band Emissions, 30- 2500 MHz, R5T1X/R20T1X, 1660.4 MHz



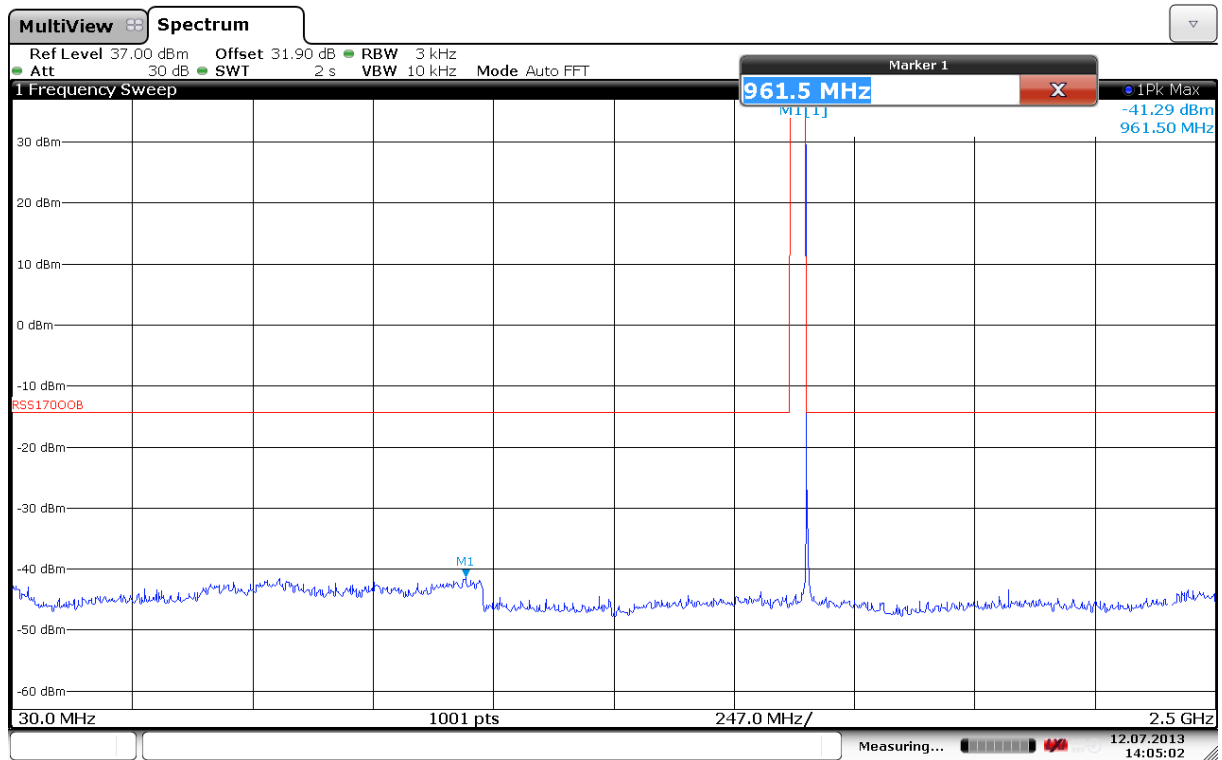
Out-of-Band Emissions, 2500- 18000 MHz, R5T1X/R20T1X, 1660.4 MHz



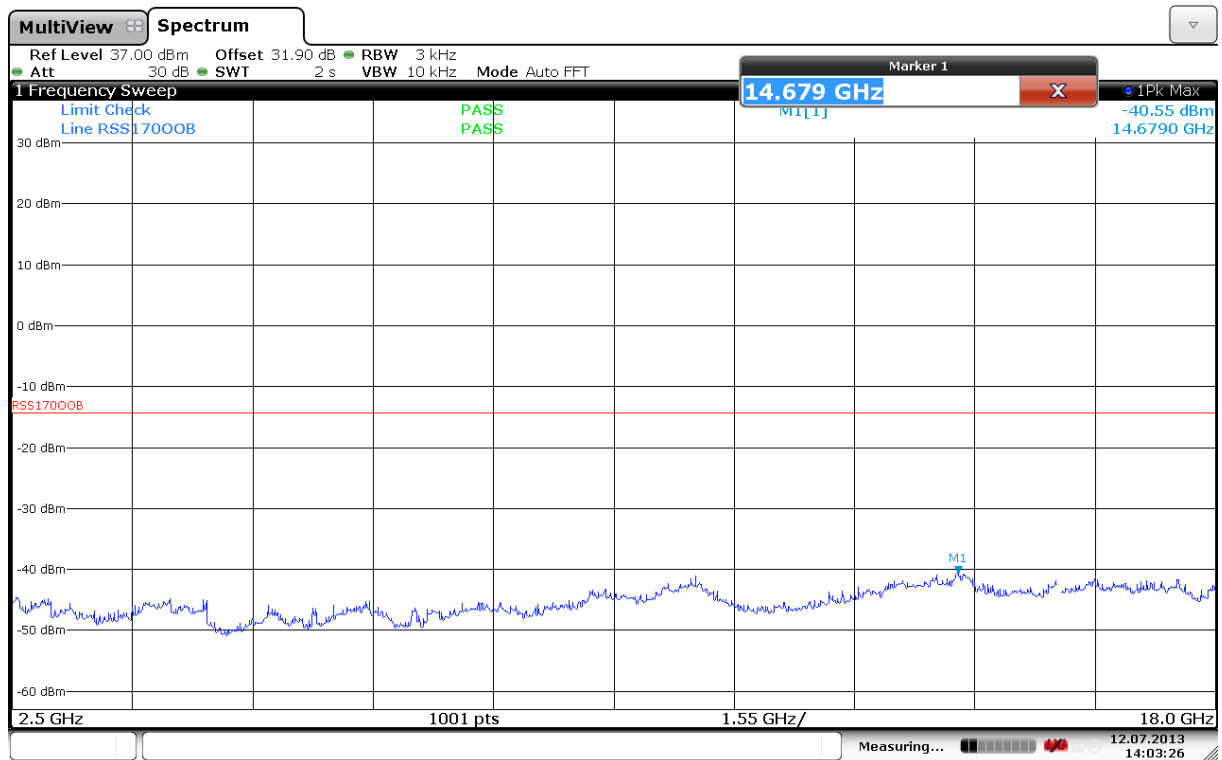
Out-of-Band Emissions, 30- 2500 MHz, R5T4.5X/R20T4.5X, 1626.6 MHz



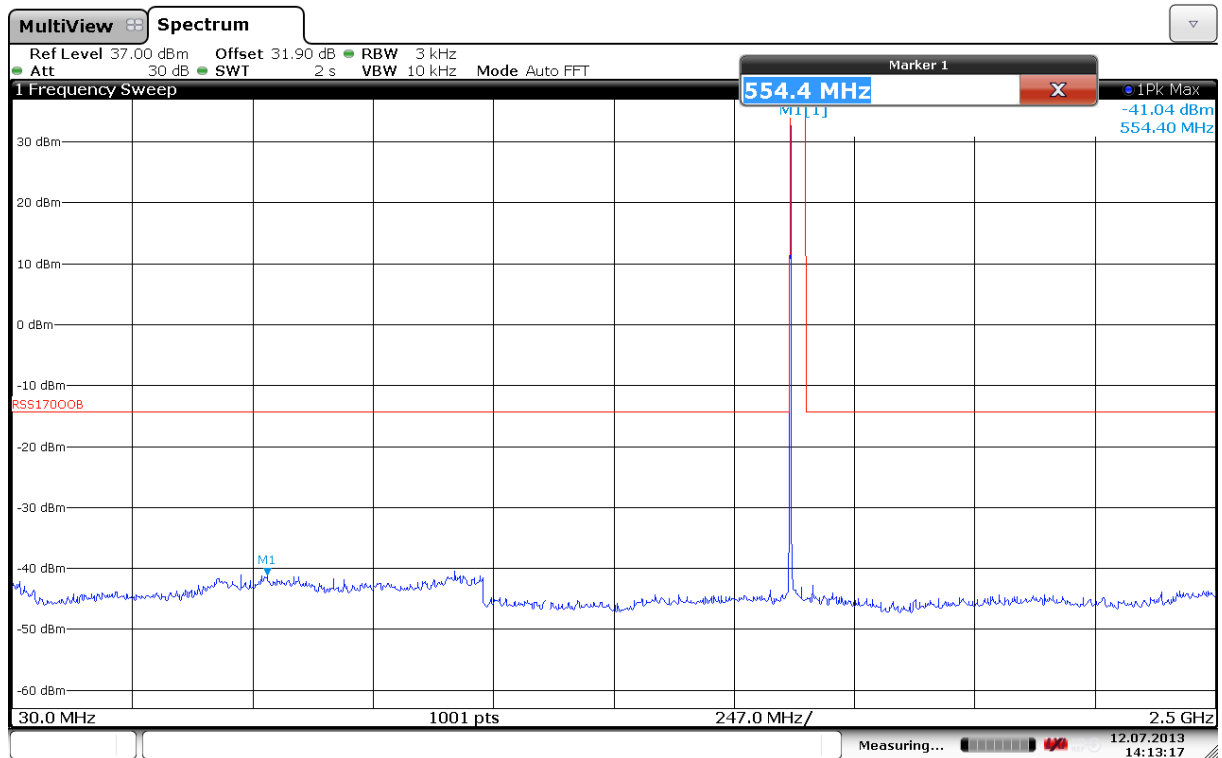
Out-of-Band Emissions, 2500- 18000 MHz, R5T4.5X/R20T4.5X, 1626.6 MHz



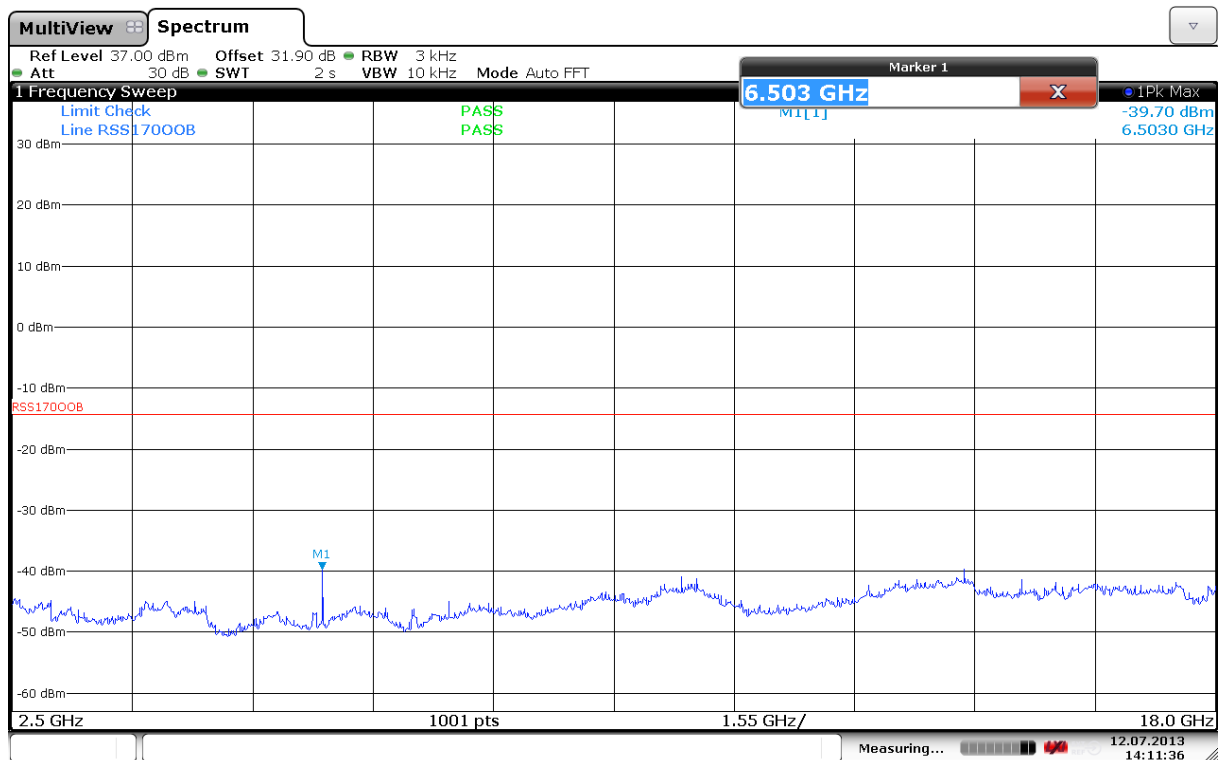
Out-of-Band Emissions, 30- 2500 MHz, R5T4.5X/R20T4.5X, 1660.4 MHz



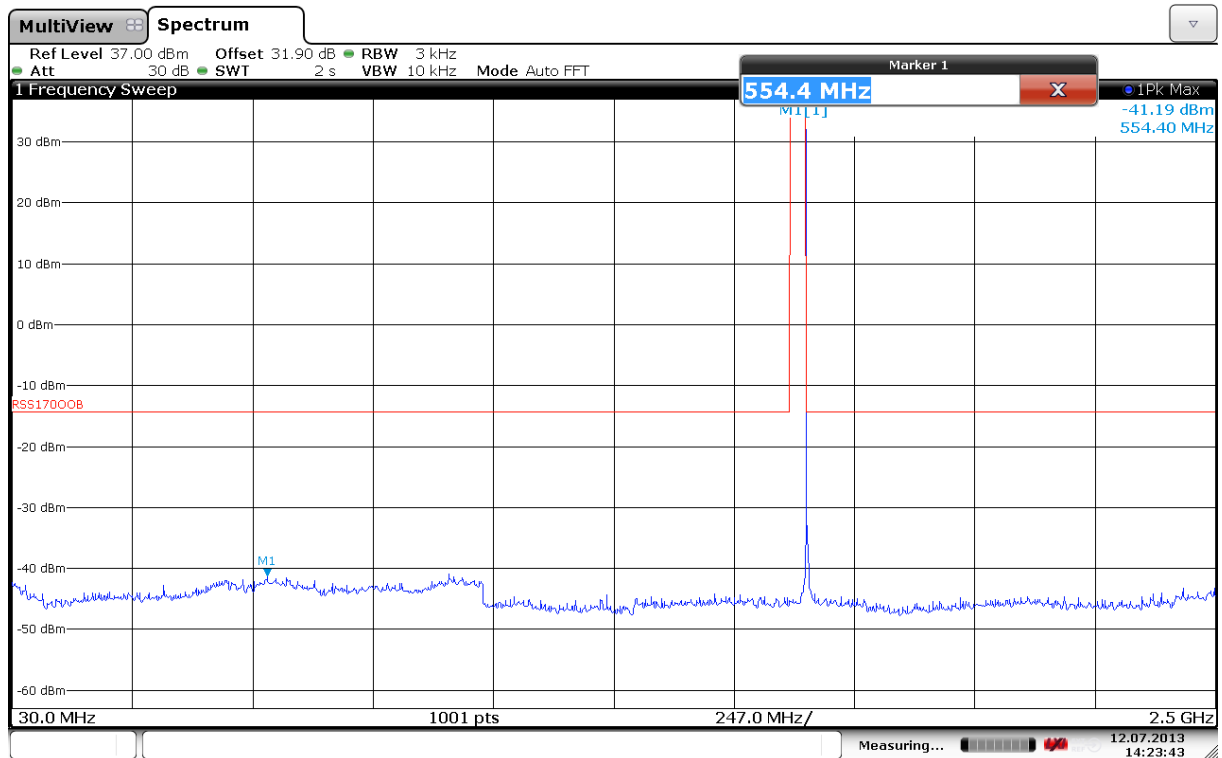
Out-of-Band Emissions, 2500- 18000 MHz, R5T4.5X/R20T4.5X, 1660.4 MHz



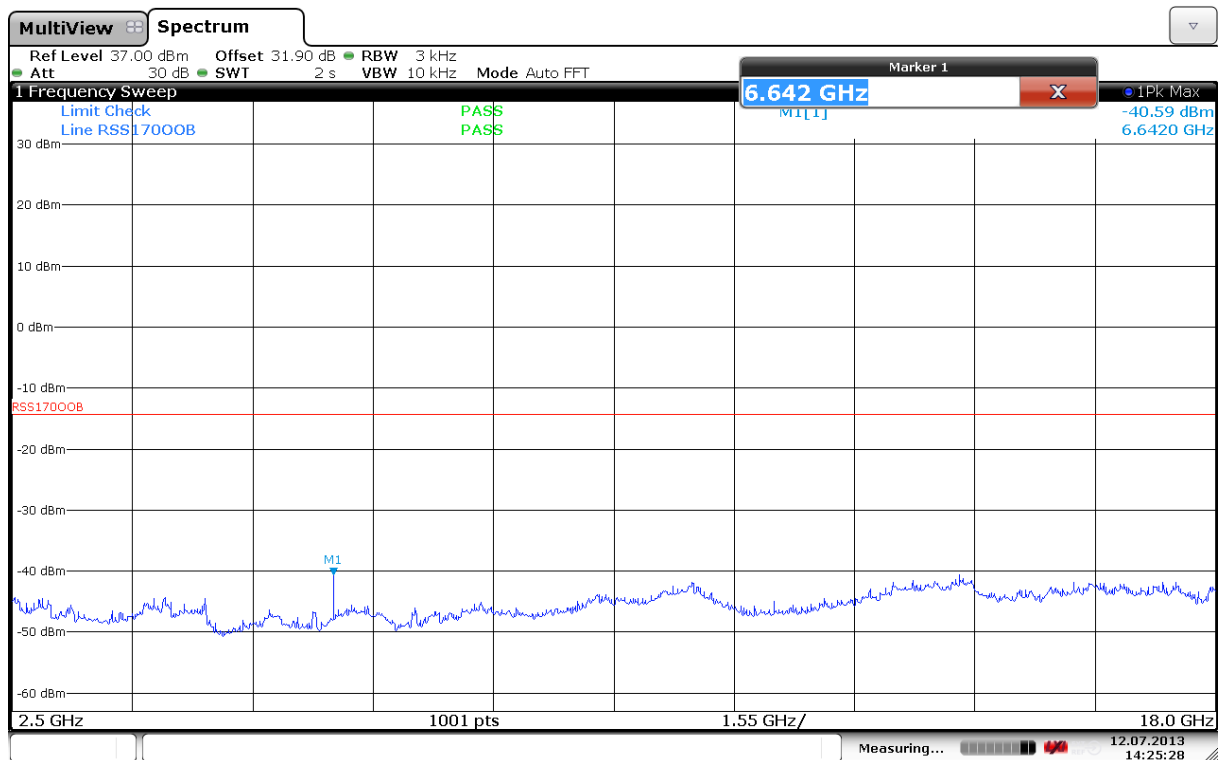
Out-of-Band Emissions, 30- 2500 MHz, FR80T2.5X4/FR80T2.5X4, 1626.6 MHz



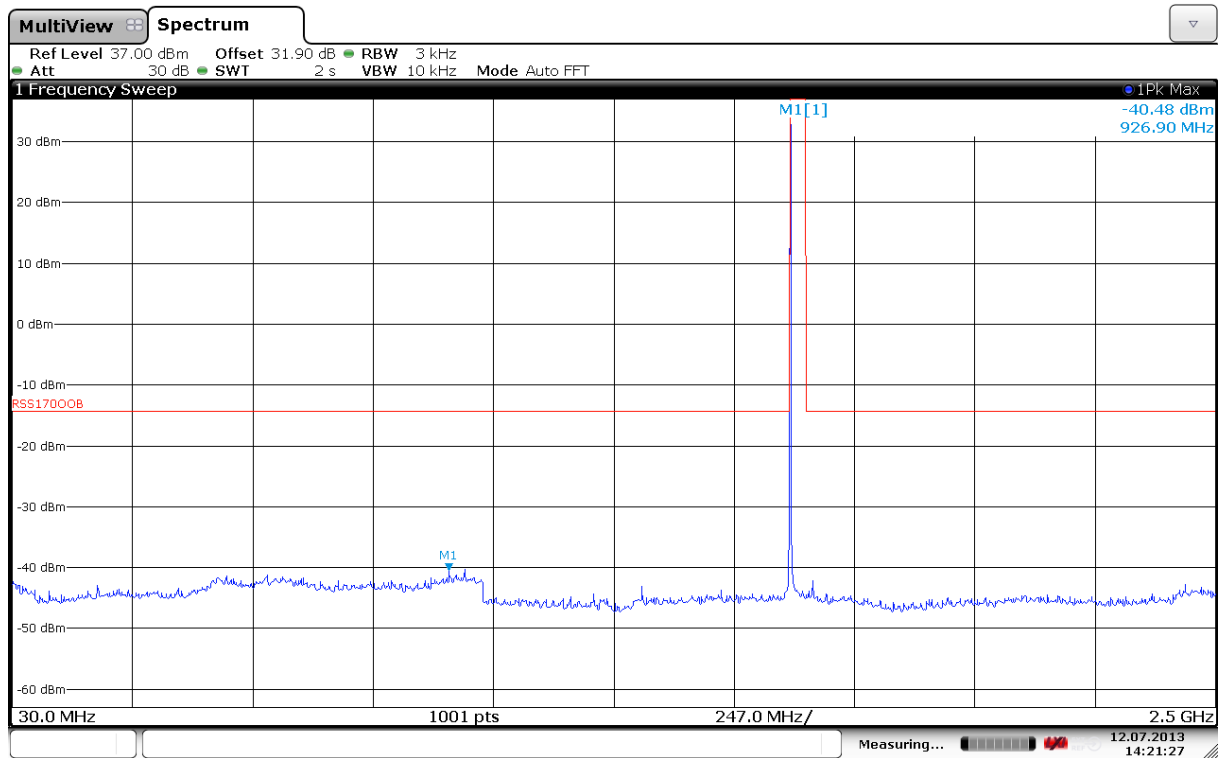
Out-of-Band Emissions, 2500- 18000 MHz, FR80T2.5X4/FR80T2.5X4, 1626.6 MHz



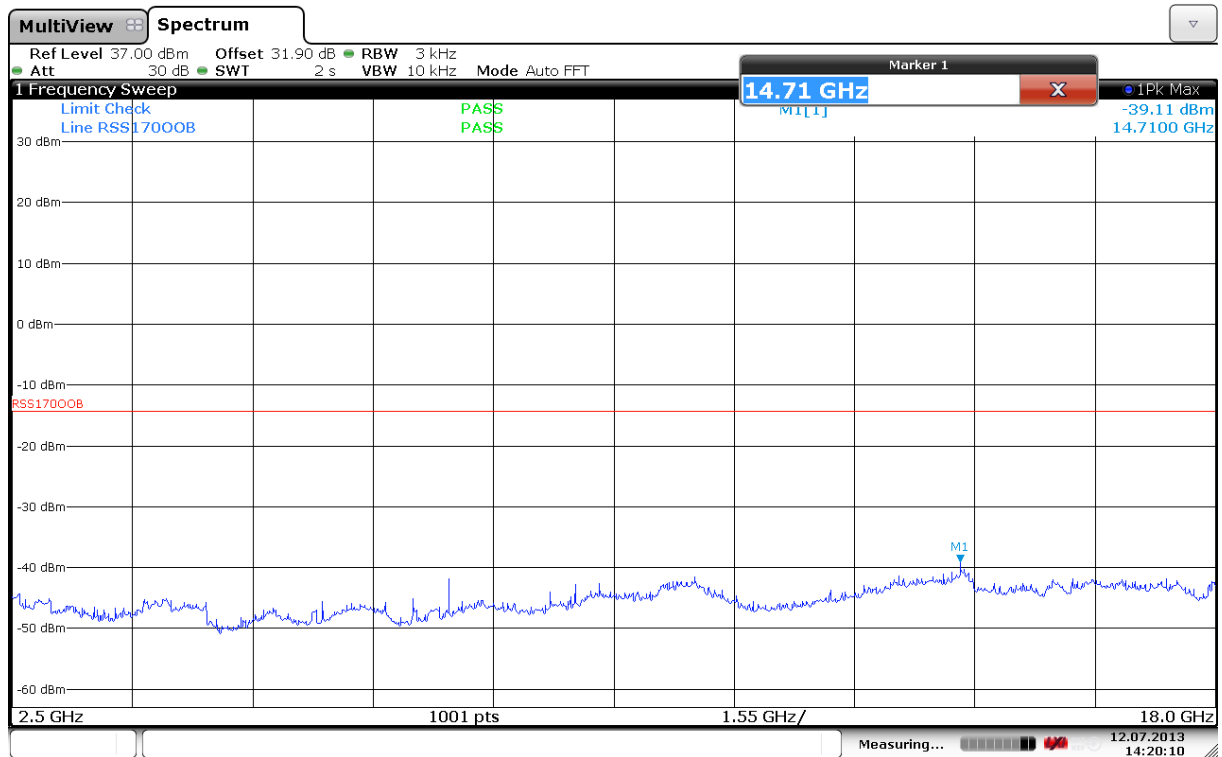
Out-of-Band Emissions, 30- 2500 MHz, FR80T2.5X4/FR80T2.5X4, 1660.4 MHz



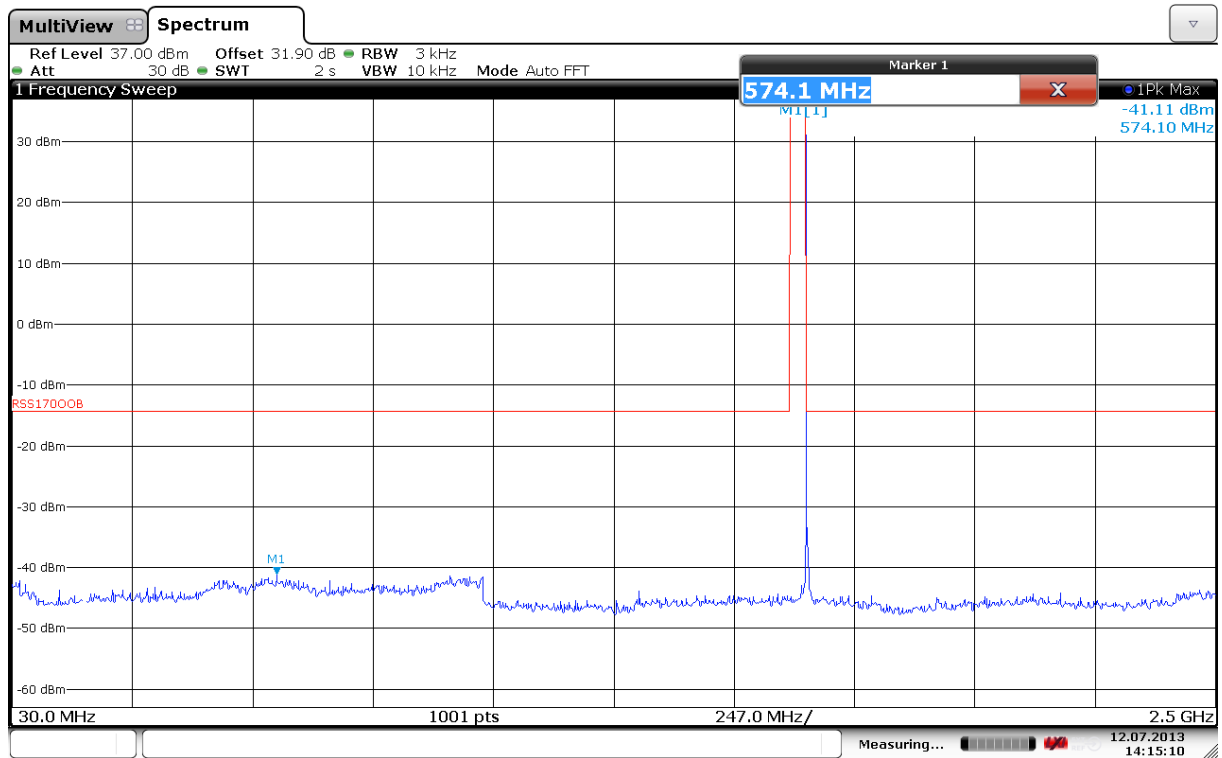
Out-of-Band Emissions, 2500- 18000 MHz, FR80T2.5X4/FR80T2.5X4, 1660.4 MHz



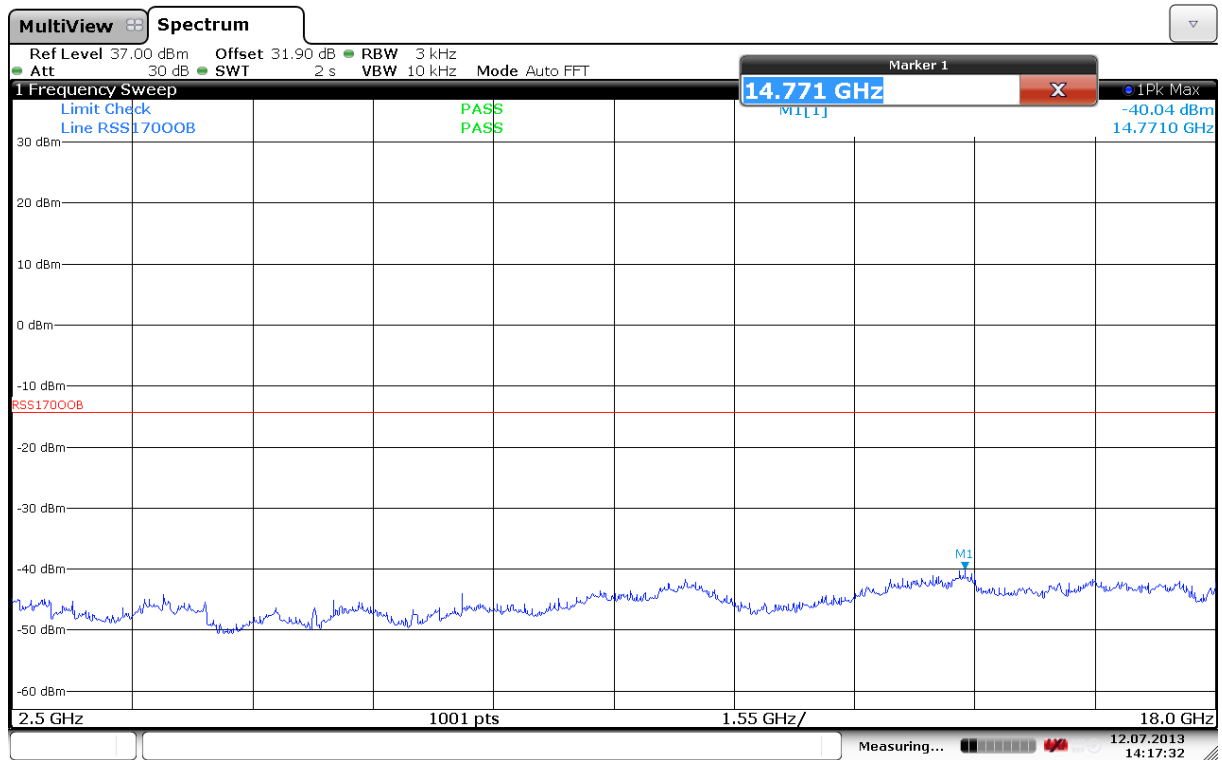
Out-of-Band Emissions, 30- 2500 MHz, FR80T2.5X64/FR80T2.5X64, 1626.6 MHz



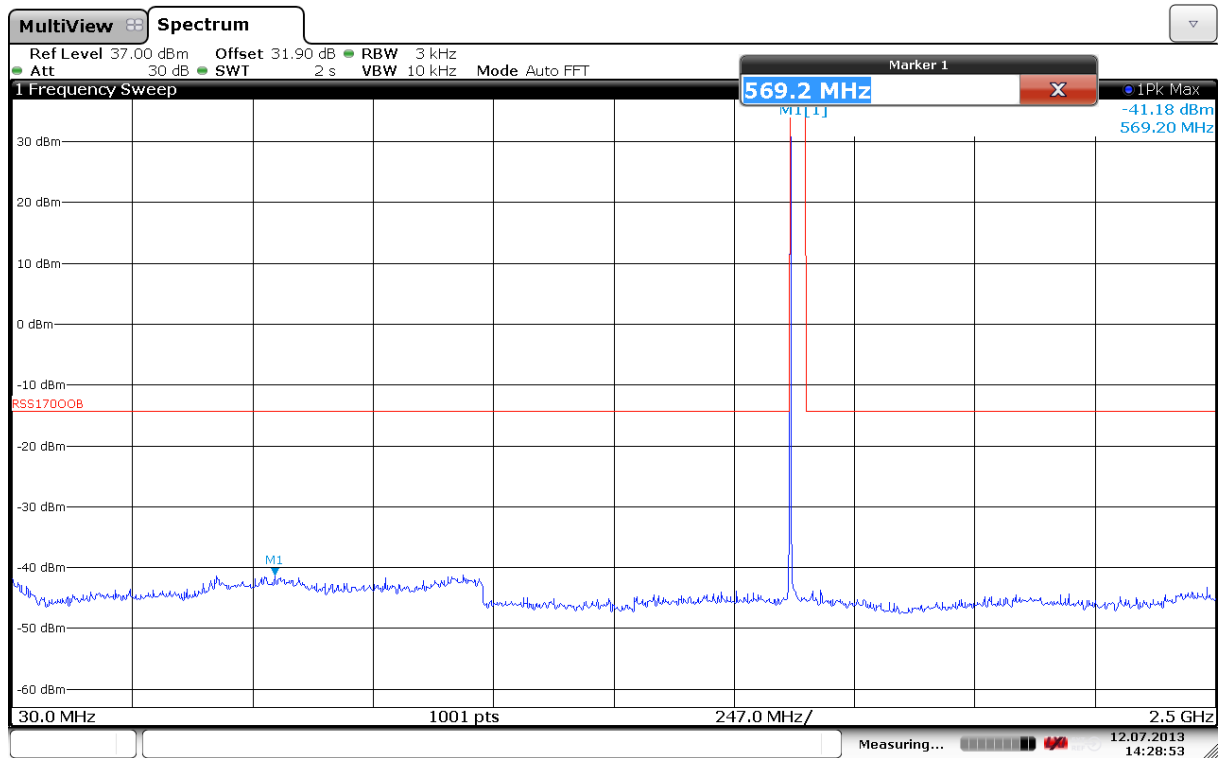
Out-of-Band Emissions, 2500- 18000 MHz, FR80T2.5X64/FR80T2.5X64, 1626.6 MHz



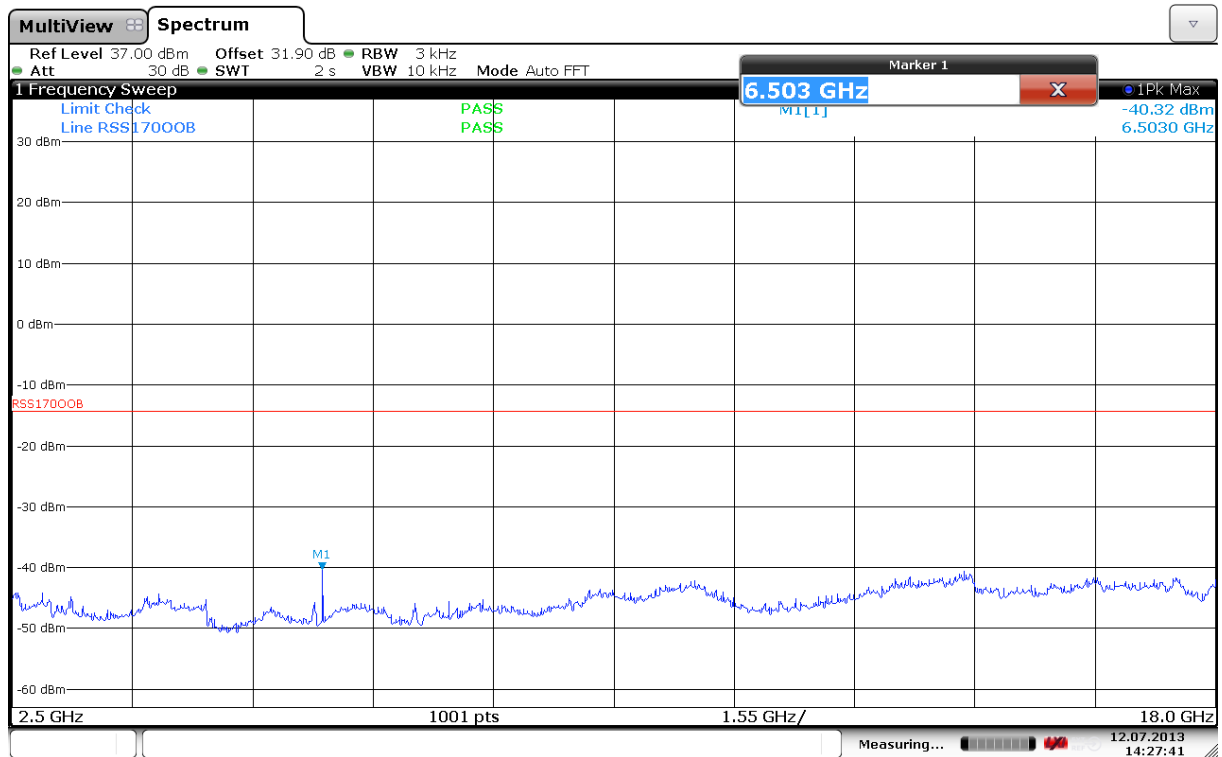
Out-of-Band Emissions, 30- 2500 MHz, FR80T2.5X64/FR80T2.5X64, 1660.4 MHz



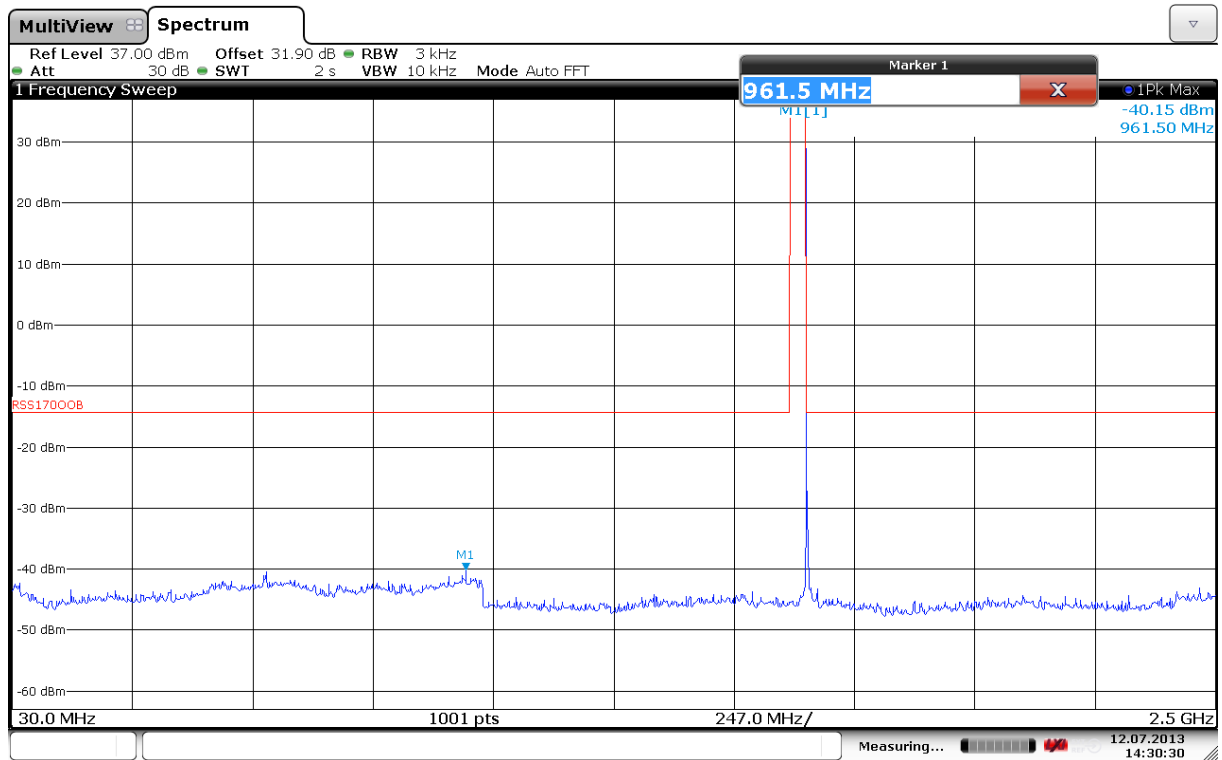
Out-of-Band Emissions, 2500- 18000 MHz, FR80T2.5X64/FR80T2.5X64, 1660.4 MHz



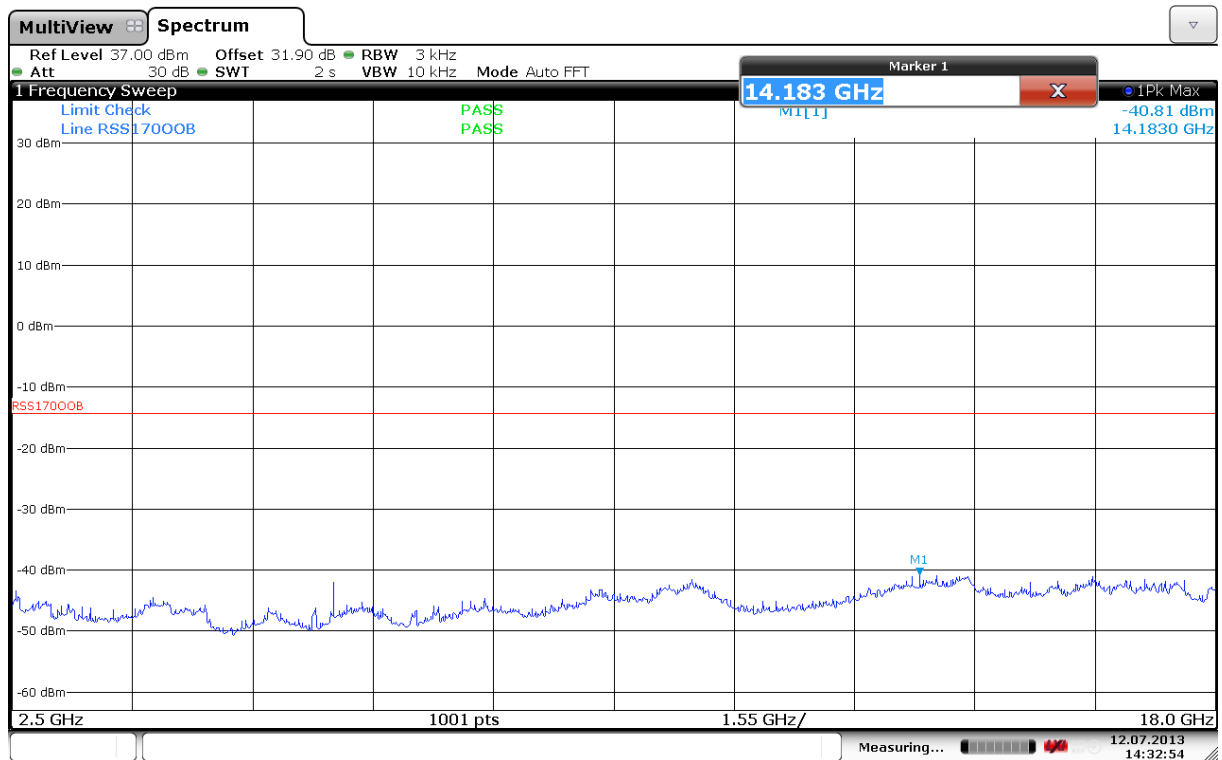
Out-of-Band Emissions, 30- 2500 MHz, FR80T5X4/FR80T5X4, 1626.6 MHz



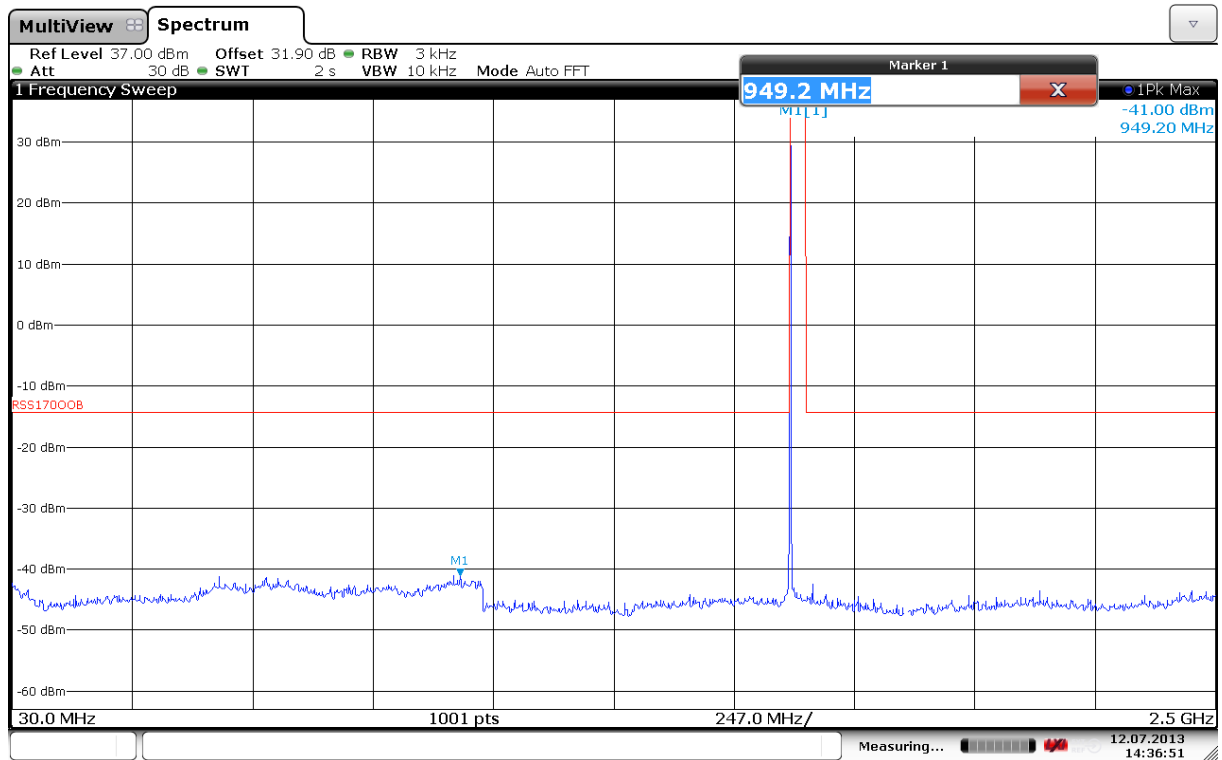
Out-of-Band Emissions, 2500- 18000 MHz, FR80T5X4/FR80T5X4, 1626.6 MHz



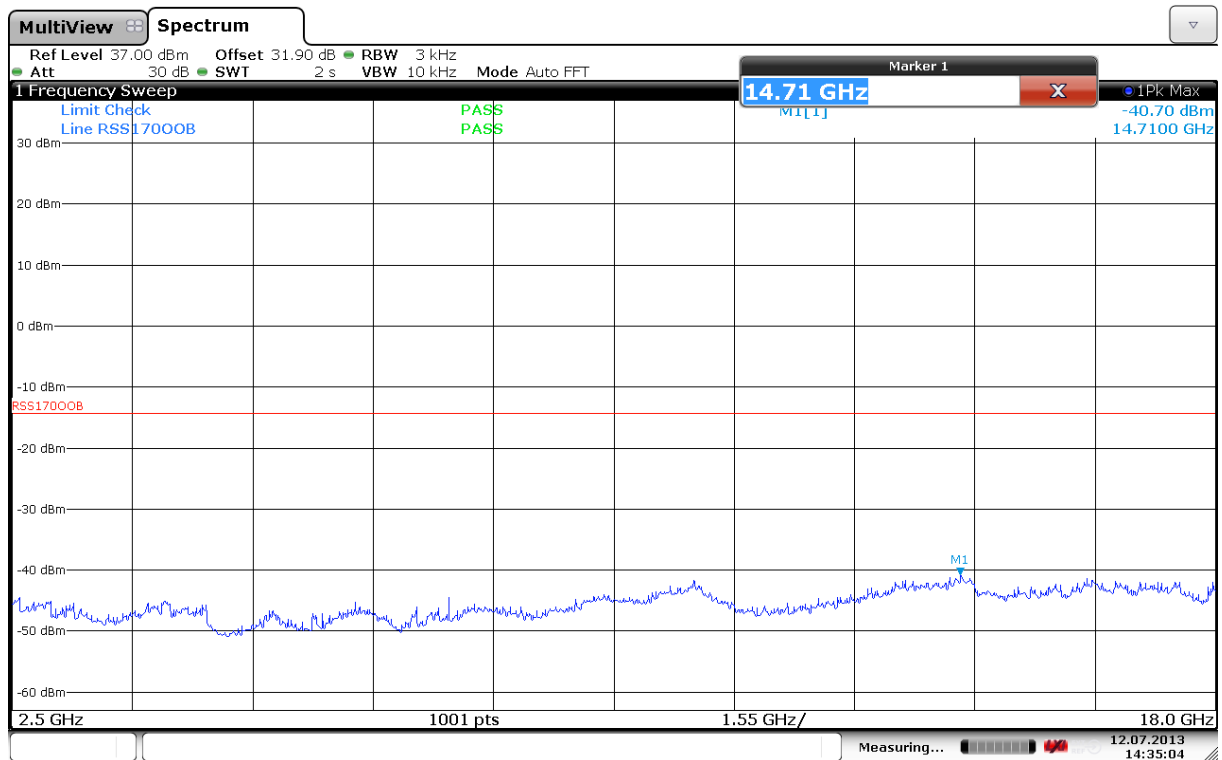
Out-of-Band Emissions, 30- 2500 MHz, FR80T5X4/FR80T5X4, 1660.4 MHz



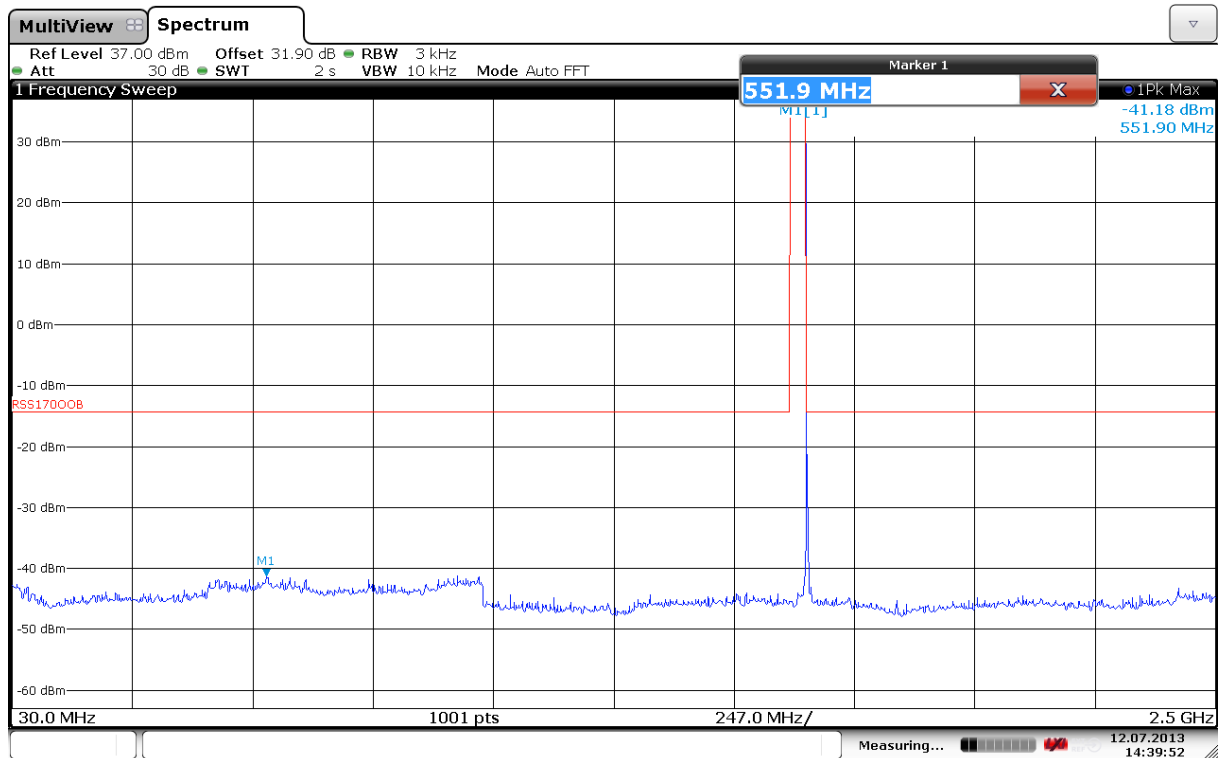
Out-of-Band Emissions, 2500- 18000 MHz, FR80T5X4/FR80T5X4, 1660.4 MHz



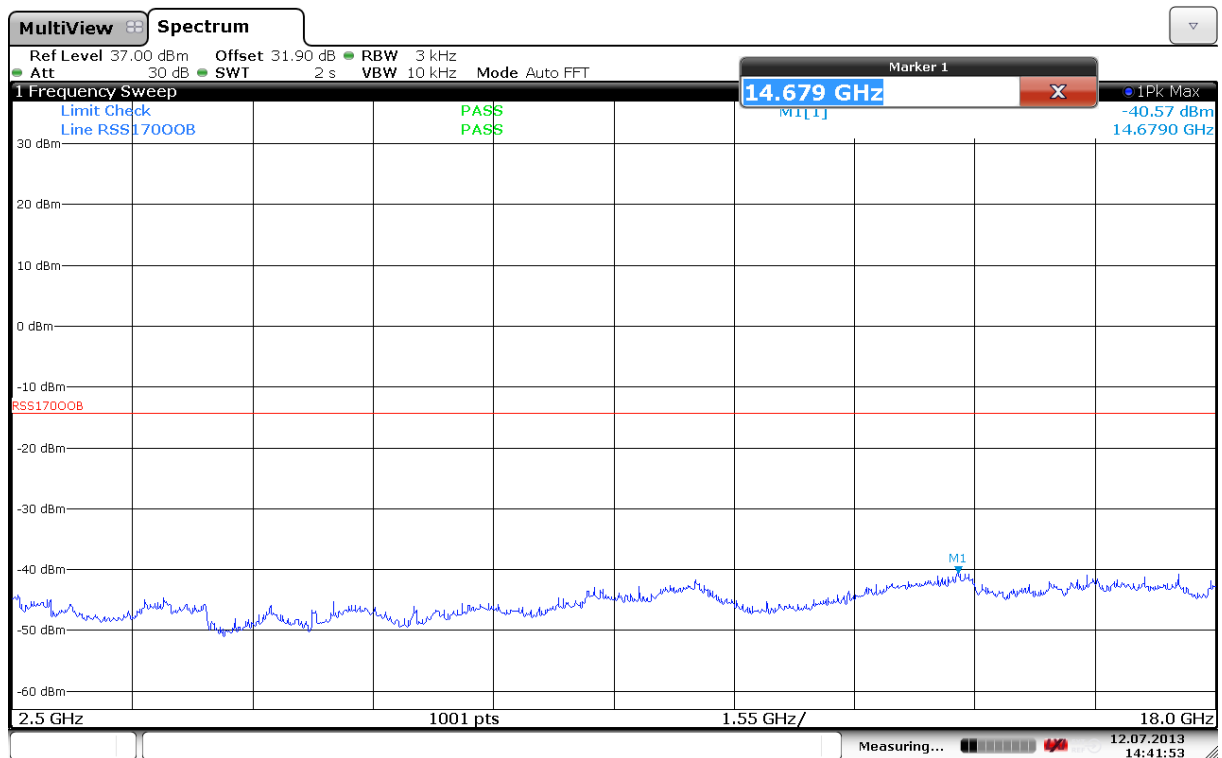
Out-of-Band Emissions, 30- 2500 MHz, FR80T5X64/FR80T5X64, 1626.6 MHz



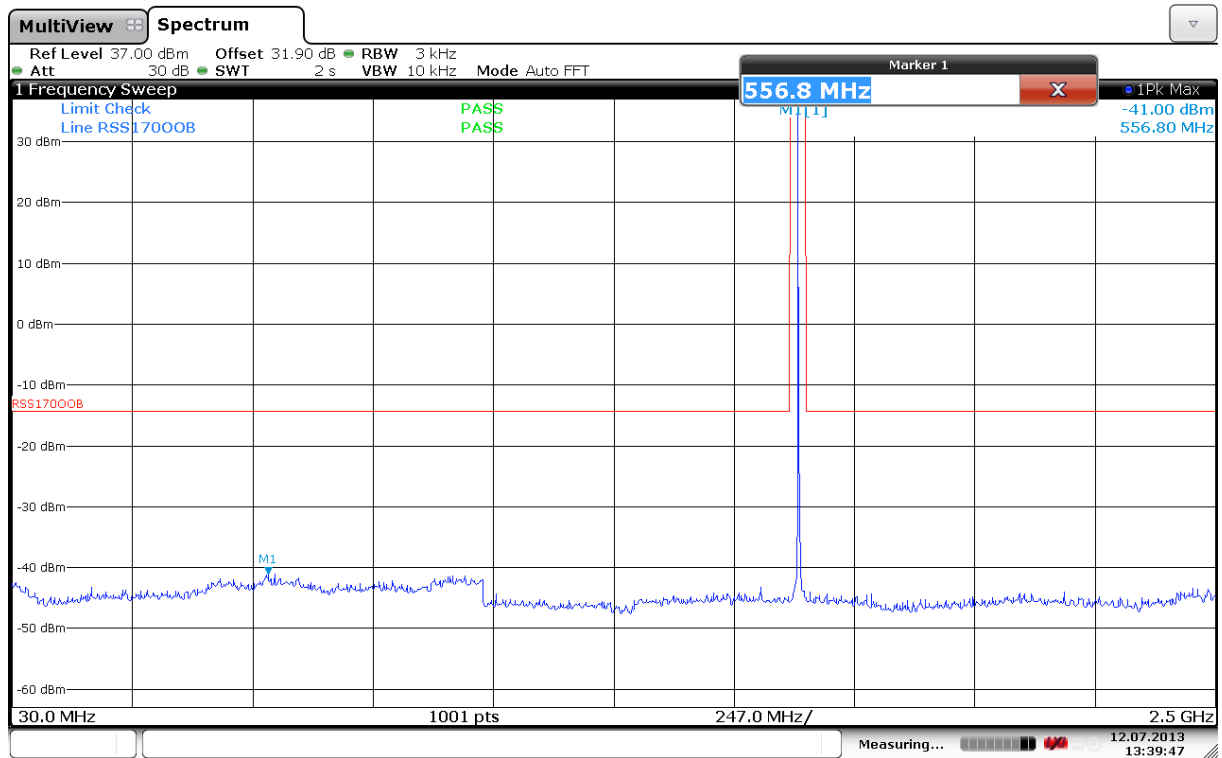
Out-of-Band Emissions, 2500- 18000 MHz, FR80T5X64/FR80T5X64, 1626.6 MHz



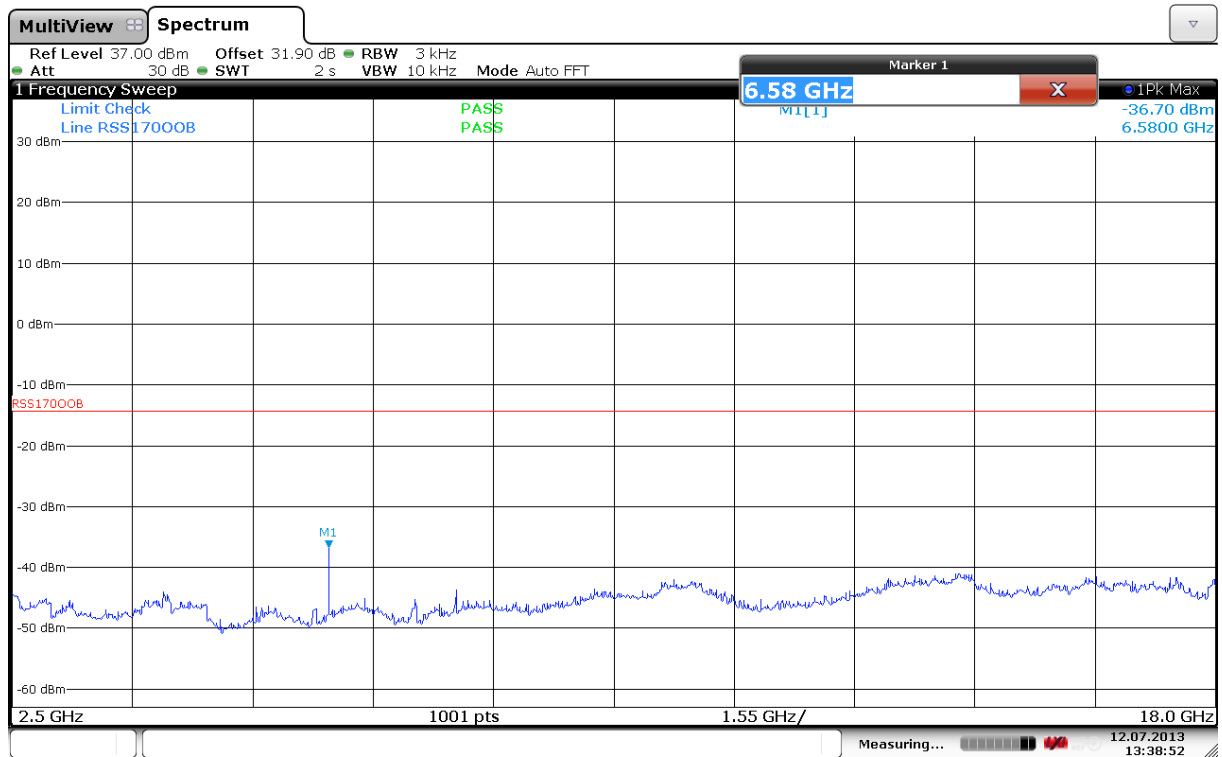
Out-of-Band Emissions, 30- 2500 MHz, FR80T5X64/FR80T5X64, 1660.4 MHz



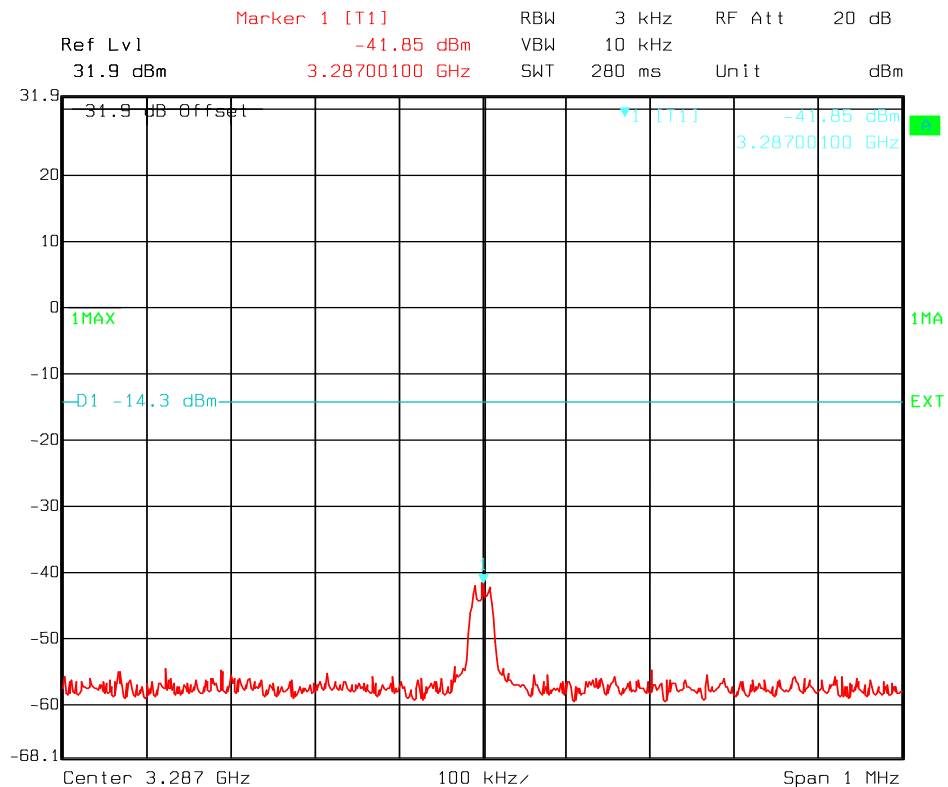
Out-of-Band Emissions, 2500- 18000 MHz, FR80T5X64/FR80T5X64, 1660.4 MHz



Out-of-Band Emissions, 30- 2500 MHz, R20T0.5Q/R80T0.5Q, 1643.5 MHz

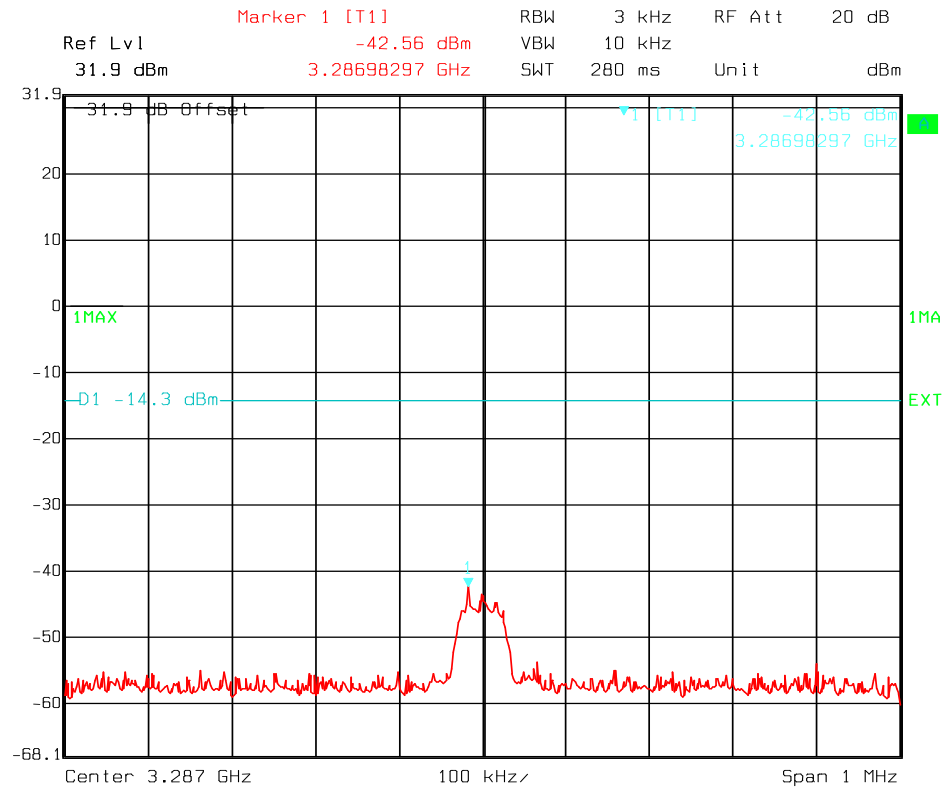


Out-of-Band Emissions, 2500- 18000 MHz, R20T0.5Q/R80T0.5Q, 1643.5 MHz



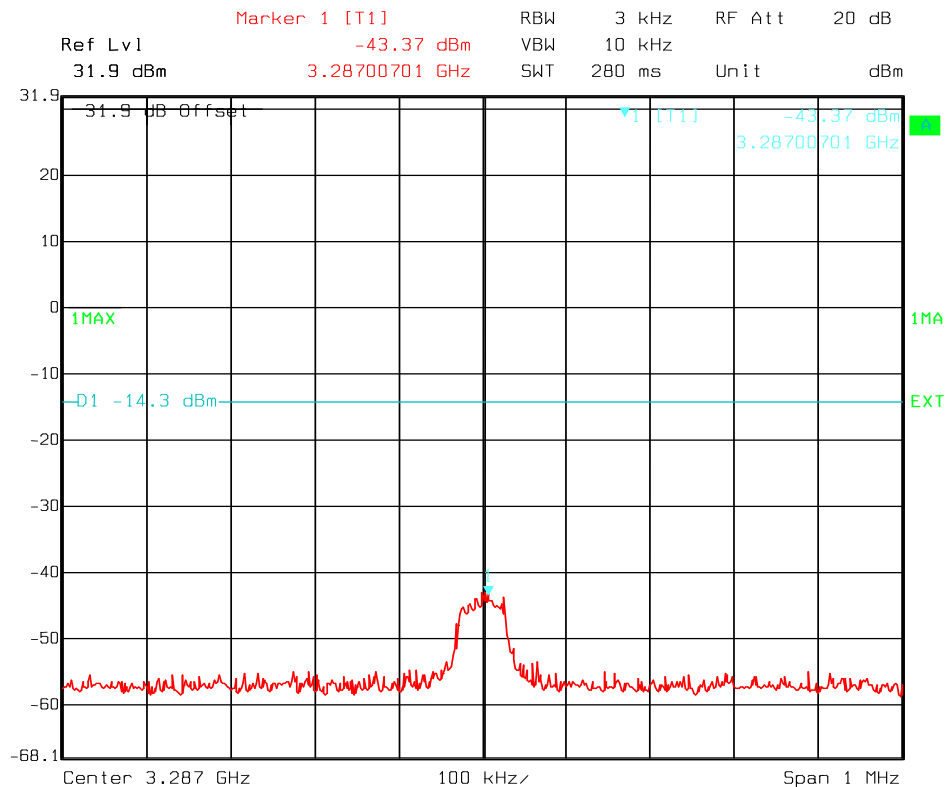
Date: 16.AUG.2013 12:04:12

Out-of-Band Emissions, 3287 MHz, R20T0.5Q/R80T0.5Q, 1643.5 MHz



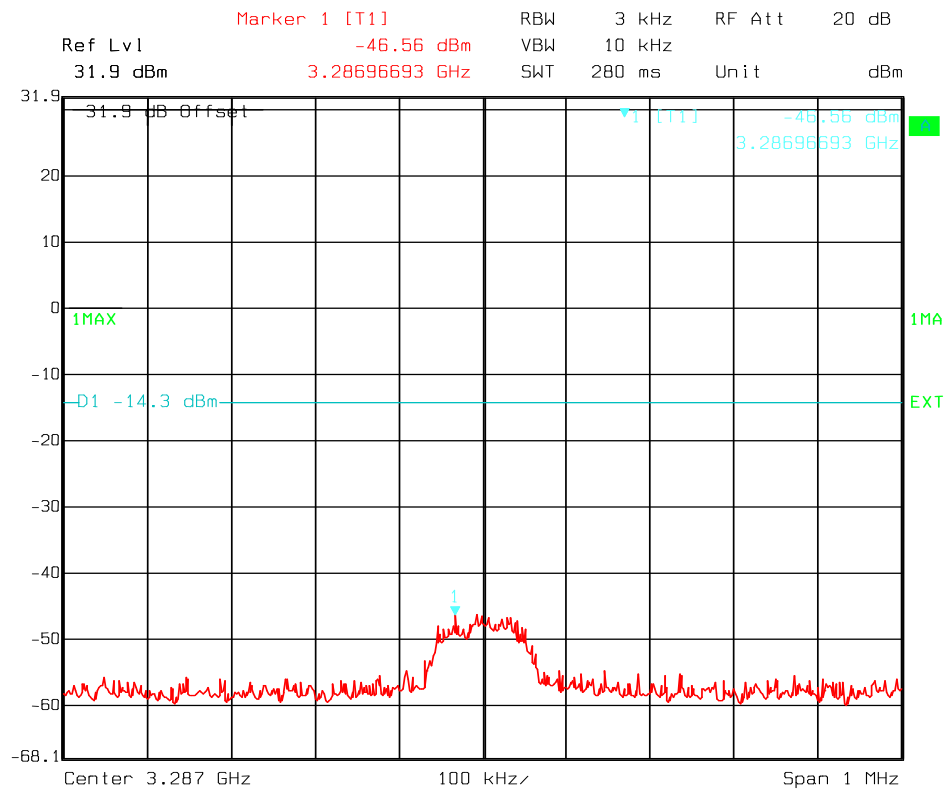
Date: 16.AUG.2013 12:08:12

Out-of-Band Emissions, 3287 MHz, R20T1Q/R80T1Q, 1643.5 MHz



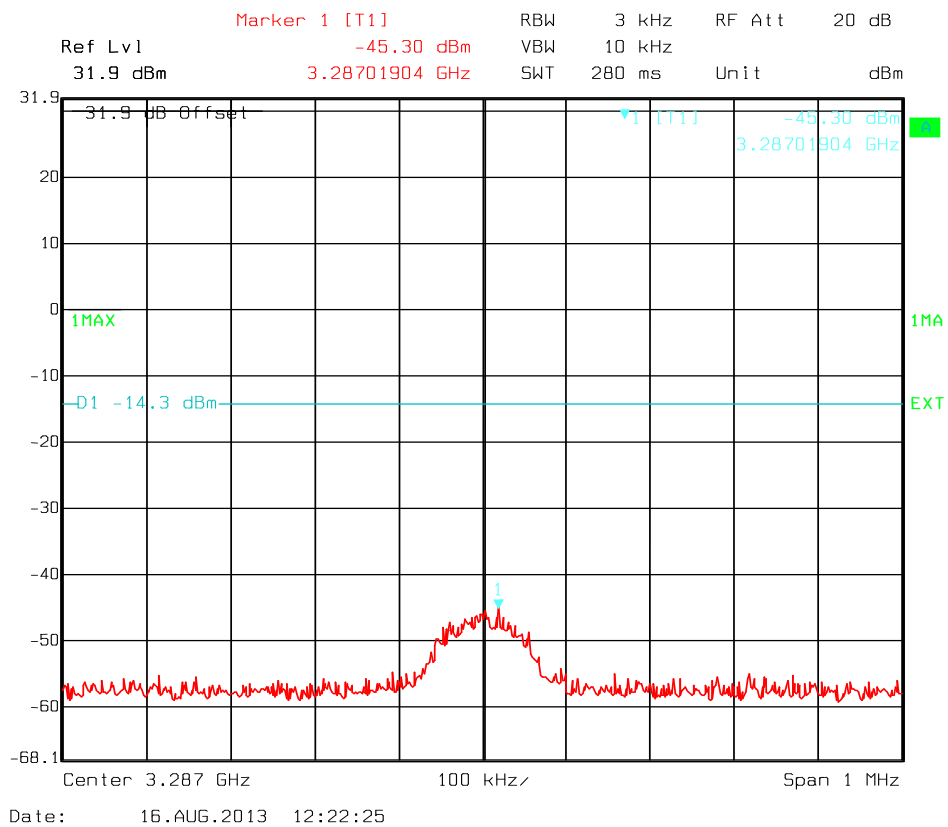
Date: 16.AUG.2013 12:11:42

Out-of-Band Emissions, 3287 MHz, R5T1X/R20T1X, 1643.5 MHz

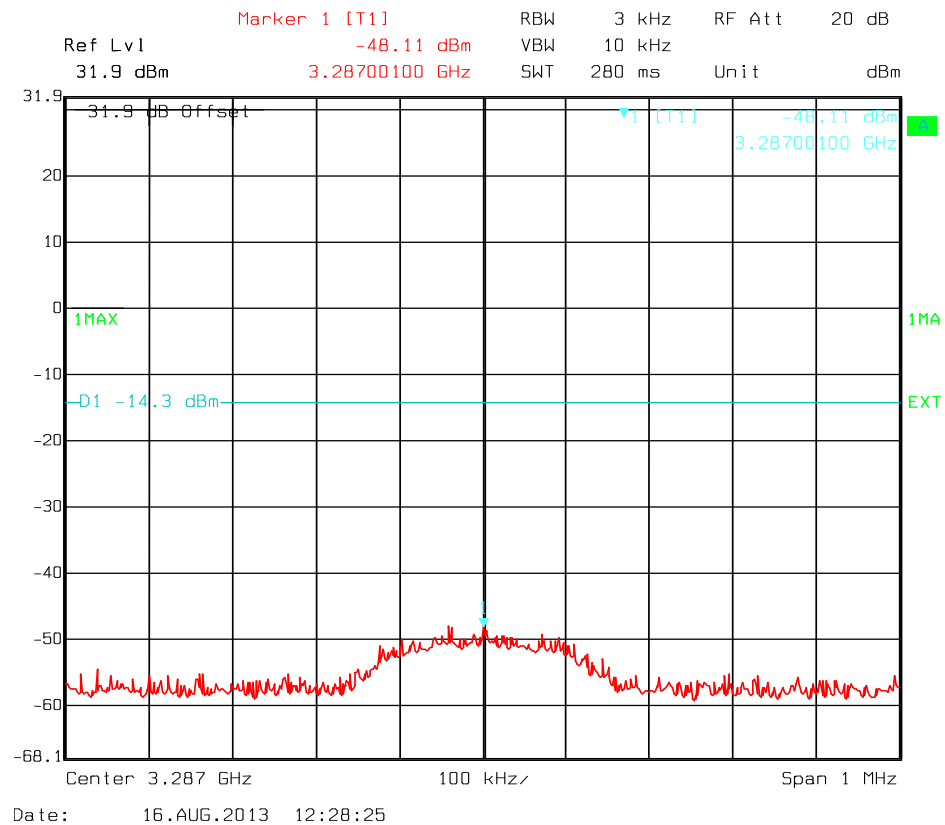


Date: 16.AUG.2013 12:19:09

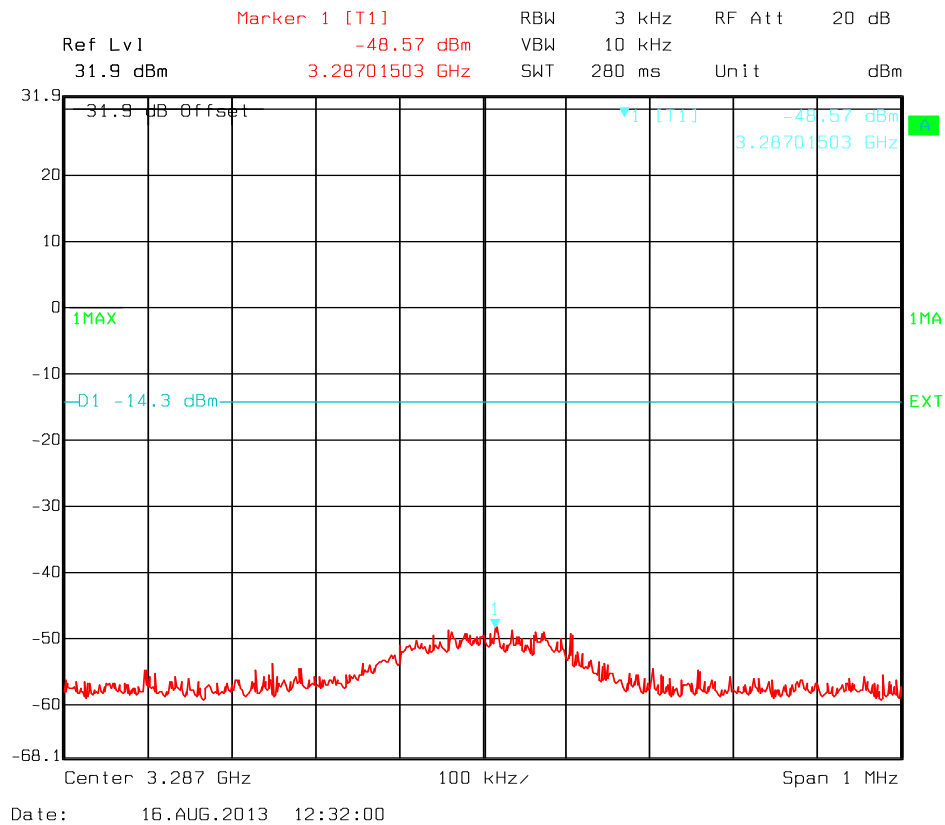
Out-of-Band Emissions, 3287 MHz, R5T2Q/R20T2Q, 1643.5 MHz



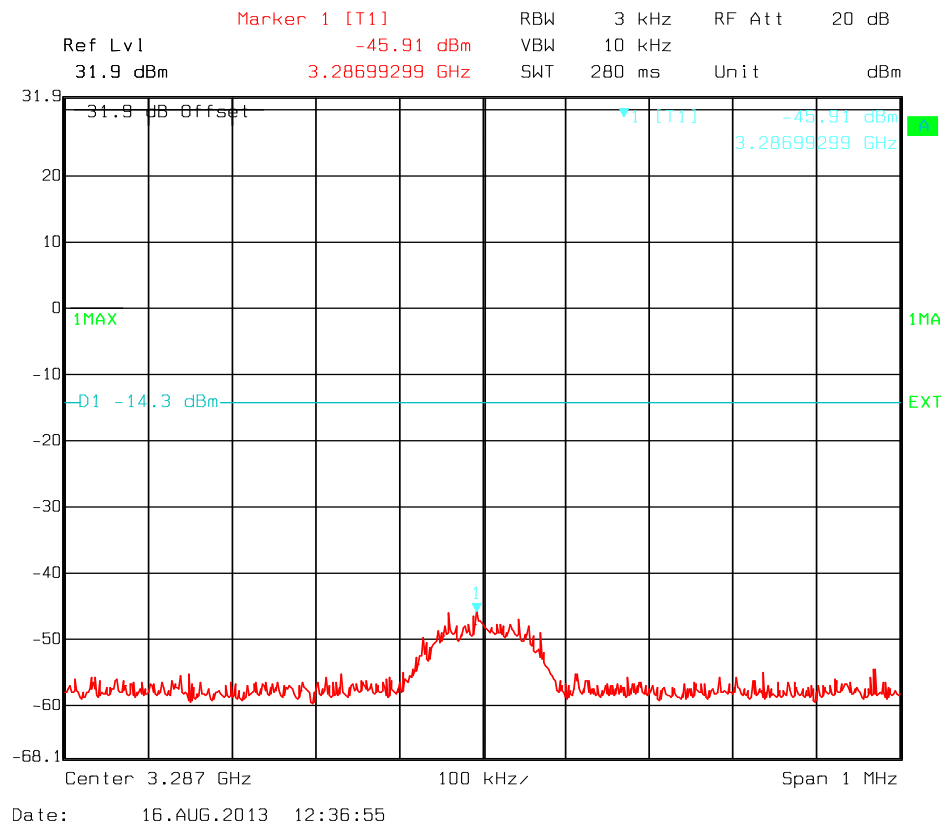
Out-of-Band Emissions, 3287 MHz, R5T2X/R20T2X, 1643.5 MHz



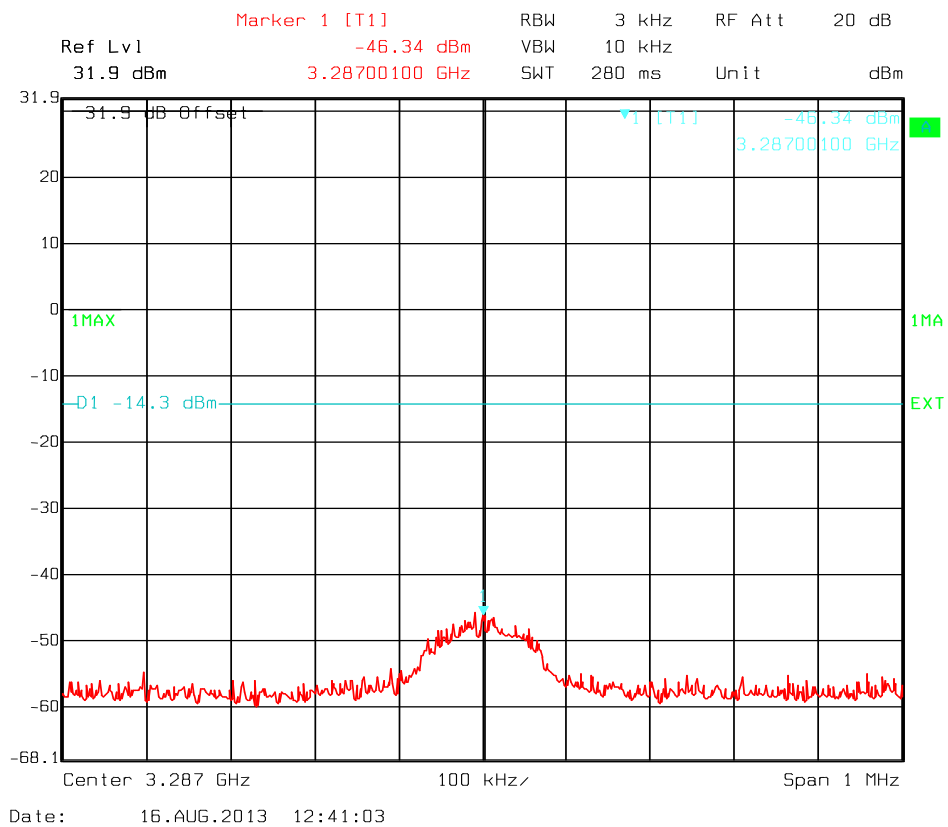
Out-of-Band Emissions, 3287 MHz, R5T4.5Q/R20T4.5Q, 1643.5 MHz



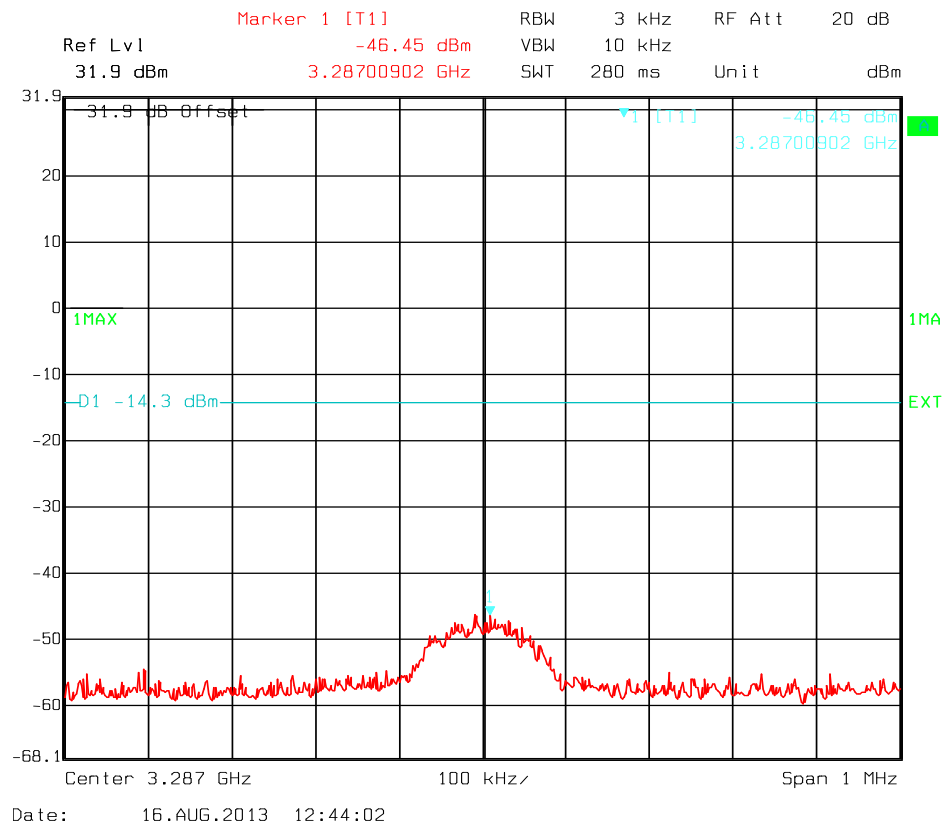
Out-of-Band Emissions, 3287 MHz, R5T4.5X/R20T4.5X, 1643.5 MHz



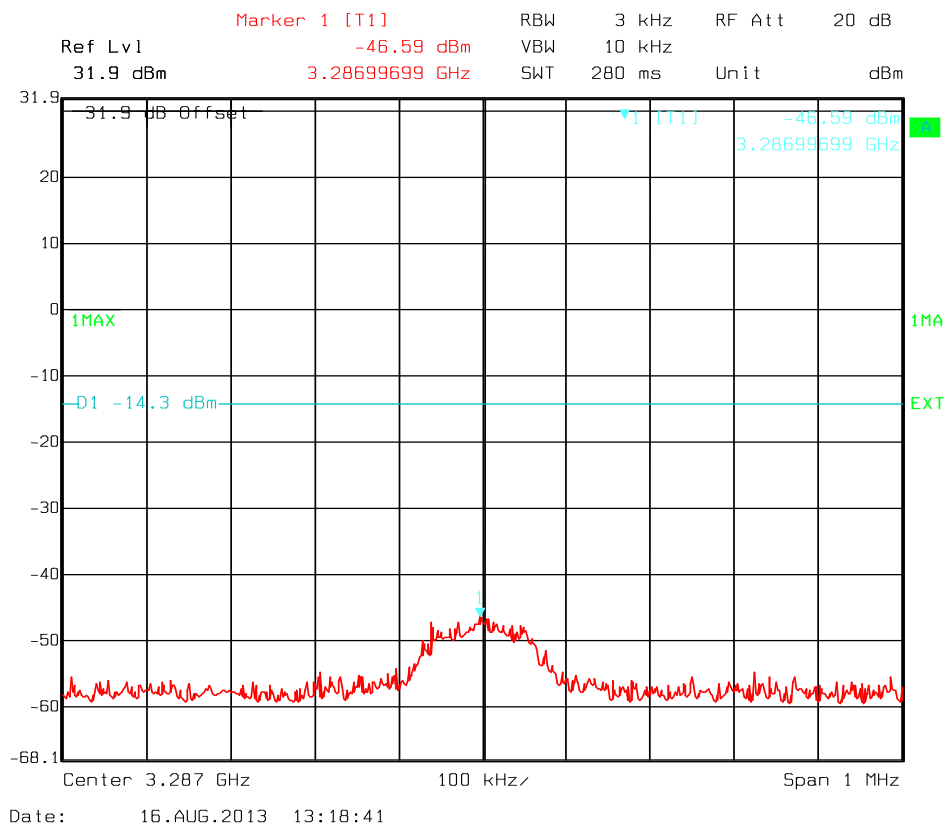
Out-of-Band Emissions, 3287 MHz, FR80T2.5X4, 1643.5 MHz



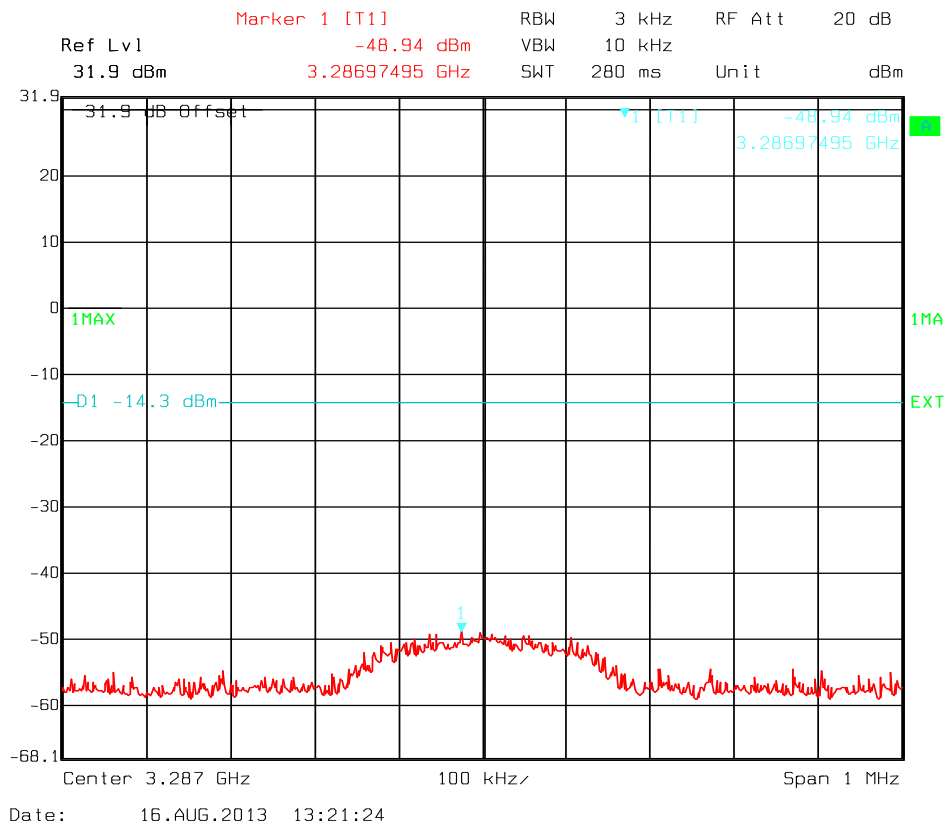
Out-of-Band Emissions, 3287 MHz, FR80T2.5X16, 1643.5 MHz



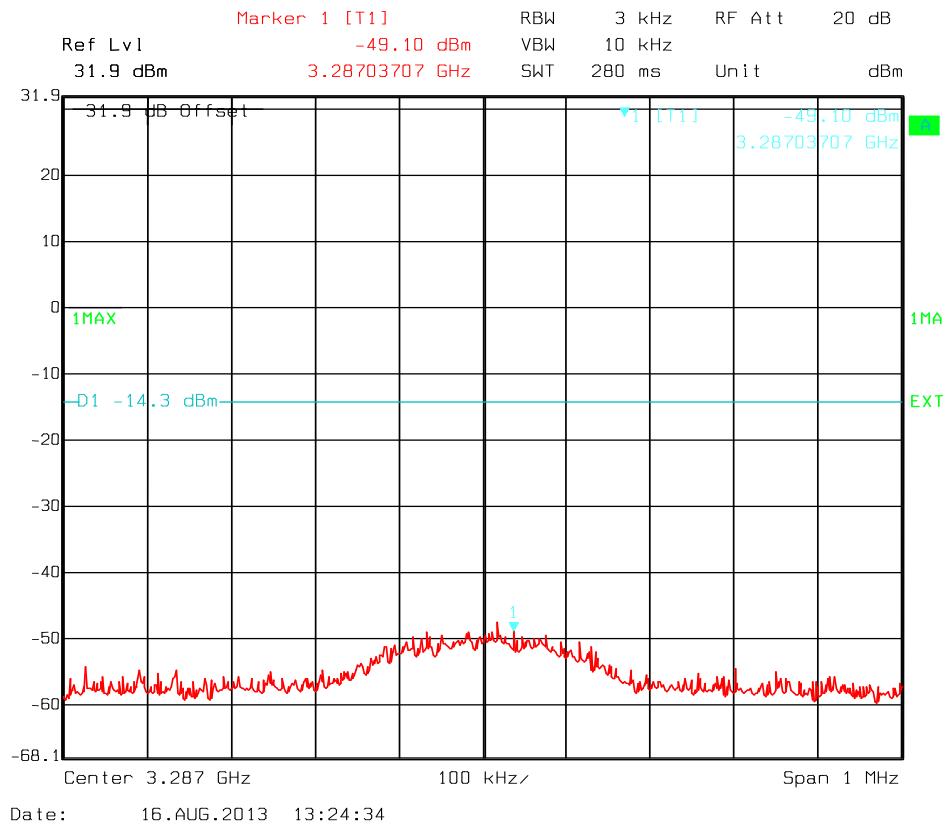
Out-of-Band Emissions, 3287 MHz, FR80T2.5X32, 1643.5 MHz



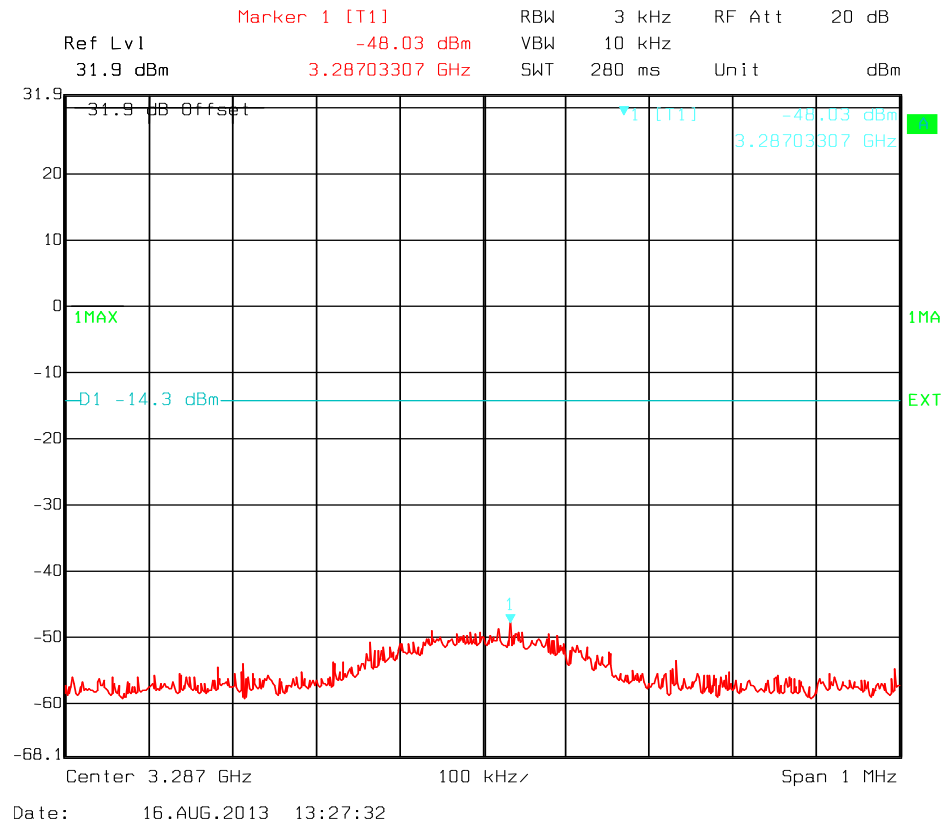
Out-of-Band Emissions, 3287 MHz, FR80T2.5X64, 1643.5 MHz



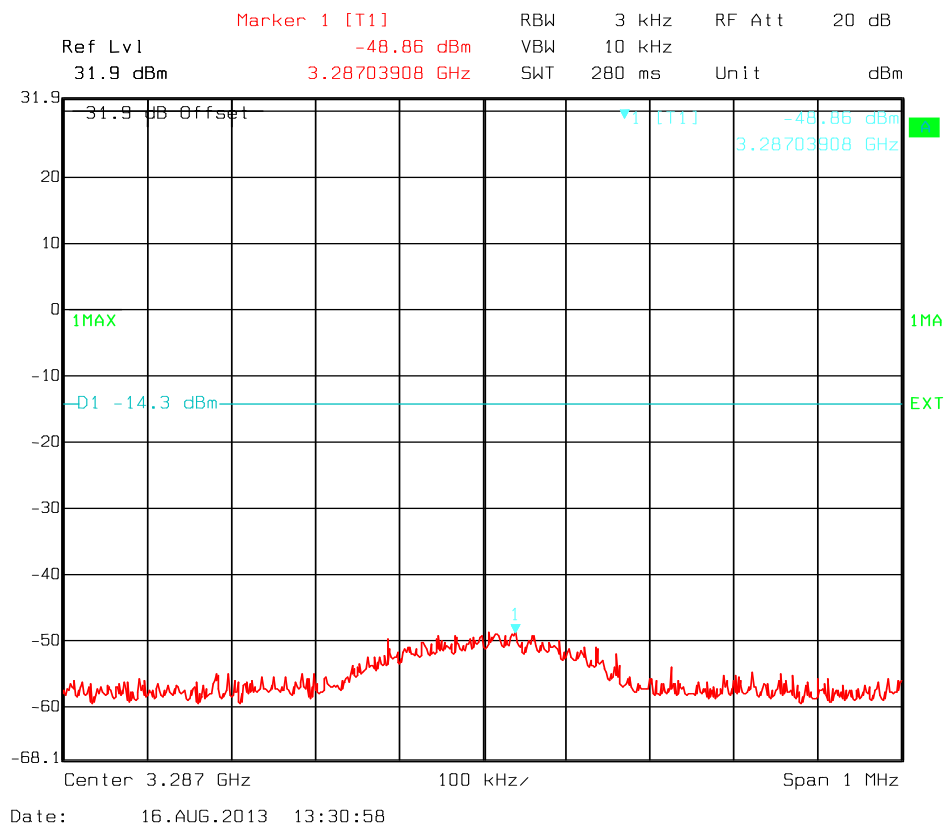
Out-of-Band Emissions, 3287 MHz, FR80T5X4, 1643.5 MHz



Out-of-Band Emissions, 3287 MHz, FR80T5X16, 1643.5 MHz



Out-of-Band Emissions, 3287 MHz, FR80T5X32, 1643.5 MHz



Out-of-Band Emissions, 3287 MHz, FR80T5X64, 1643.5 MHz

5.4.3.2 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radionavigation-Satellite Service

5.4.3.2.2 1626.5 – 1660.5 MHz

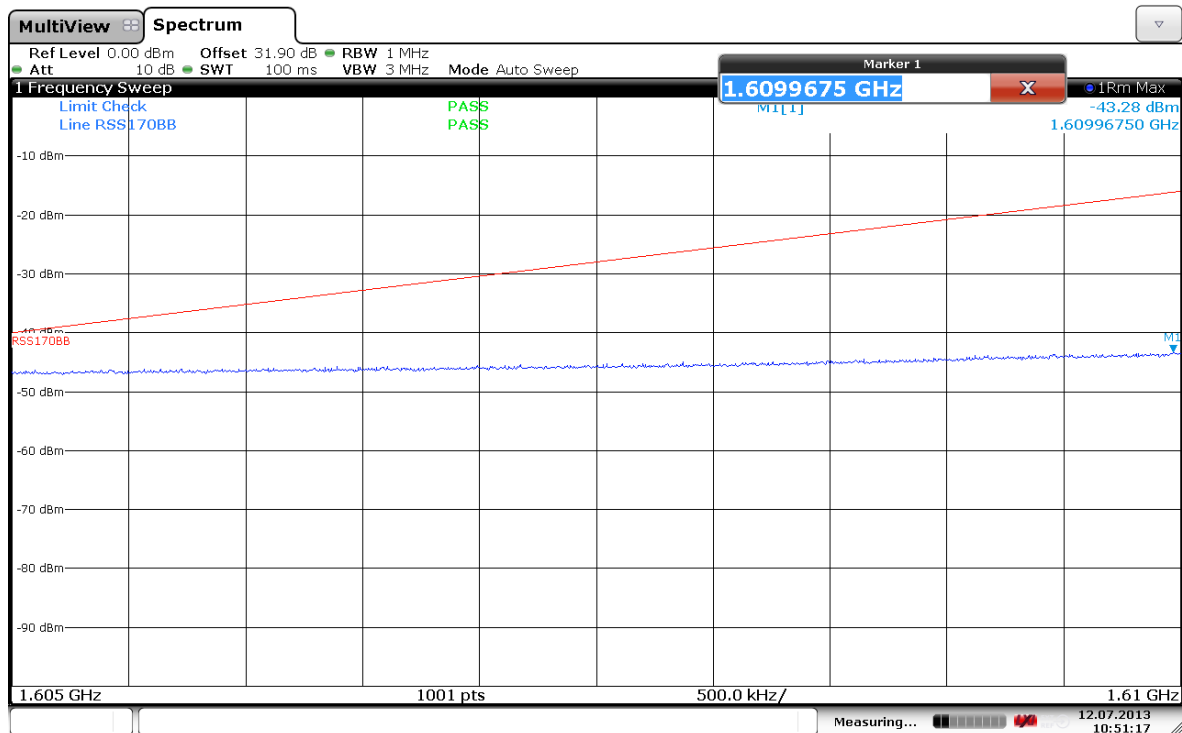
Modulation Scheme	(1) Broadband Emissions	(2) Discrete Emissions
R20T0.5Q	Pass	Pass
R20T1Q	Pass	Pass
R5T1X	Pass	Pass
R20T1X	Pass	Pass
R5T2Q	Pass	Pass
R20T2Q	Pass	Pass
R5T2X	Pass	Pass
R20T2X	Pass	Pass
R5T4.5Q	Pass	Pass
R20T4.5Q	Pass	Pass
R5T4.5X	Pass	Pass
R20T4.5 X	Pass	Pass
FR80T2.5X4	Pass	Pass
FR80T2.5X16	Pass	Pass
FR80T2.5X32	Pass	Pass
FR80T2.5X64	Pass	Pass
FR80T5X4	Pass	Pass
FR80T5X16	Pass	Pass
FR80T5X32	Pass	Pass
FR80T5X64	Pass	Pass

See plots. No discrete emissions were found.

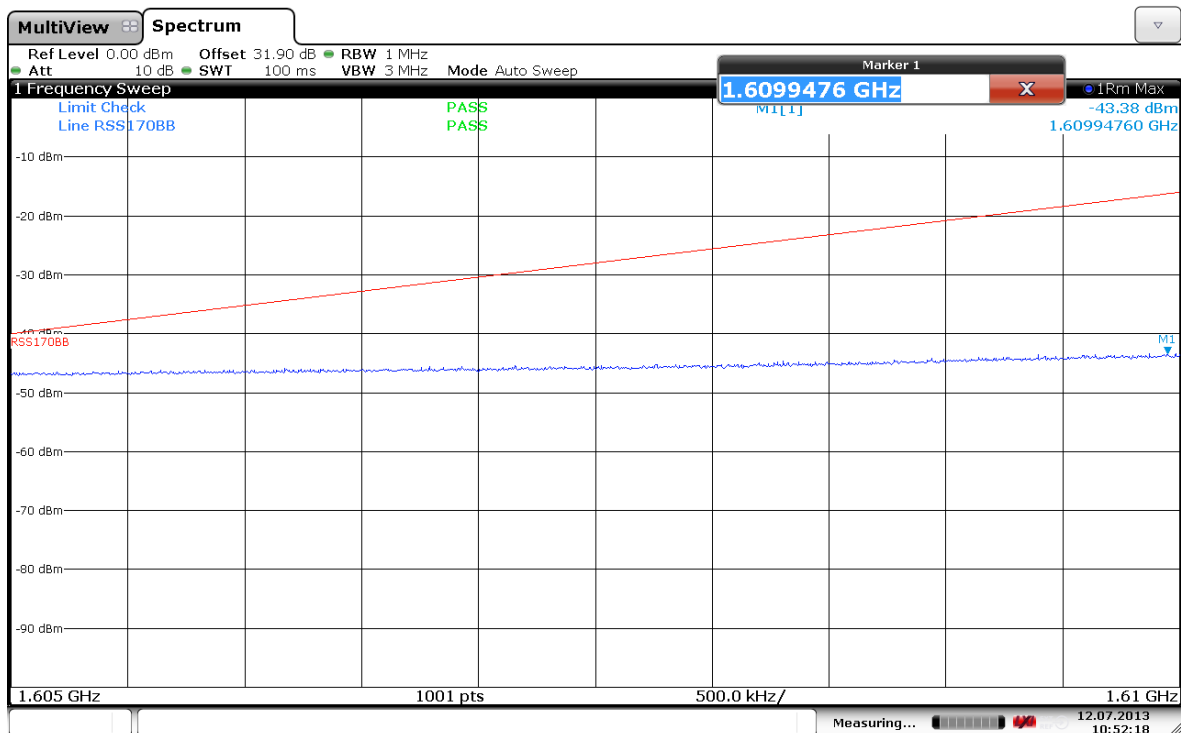
Requirements:

The EUT complies with the requirements in § 25.216, (h).

Mobile earth stations manufactured more than six months after FEDERAL REGISTER publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies in the 1626.5 – 1660.5 MHz band shall suppress the power density of emissions in the 1559-1610 MHz band-segment to an extent determined by linear interpolation from -70 dBW/MHz at 1605 MHz to -46 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmissiopl interval. The e.i.r.p of discrete emissions of interpolation from -80 dBW/MHz at 1605 MHz to -56 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmissiopl interval.



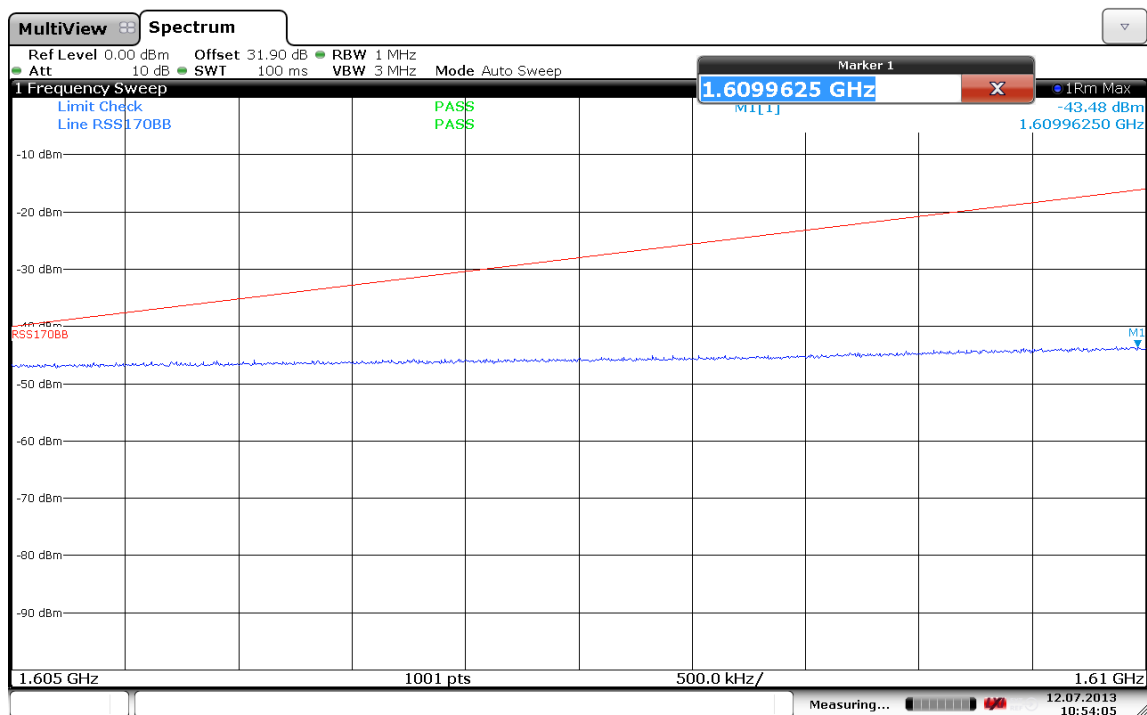
Additional Unwanted BB Emissions, r20t0.5q/r80t0.5q, 1626.6 MHz



Additional Unwanted BB Emissions, r20t1q/r80t1q, 1626.6 MHz



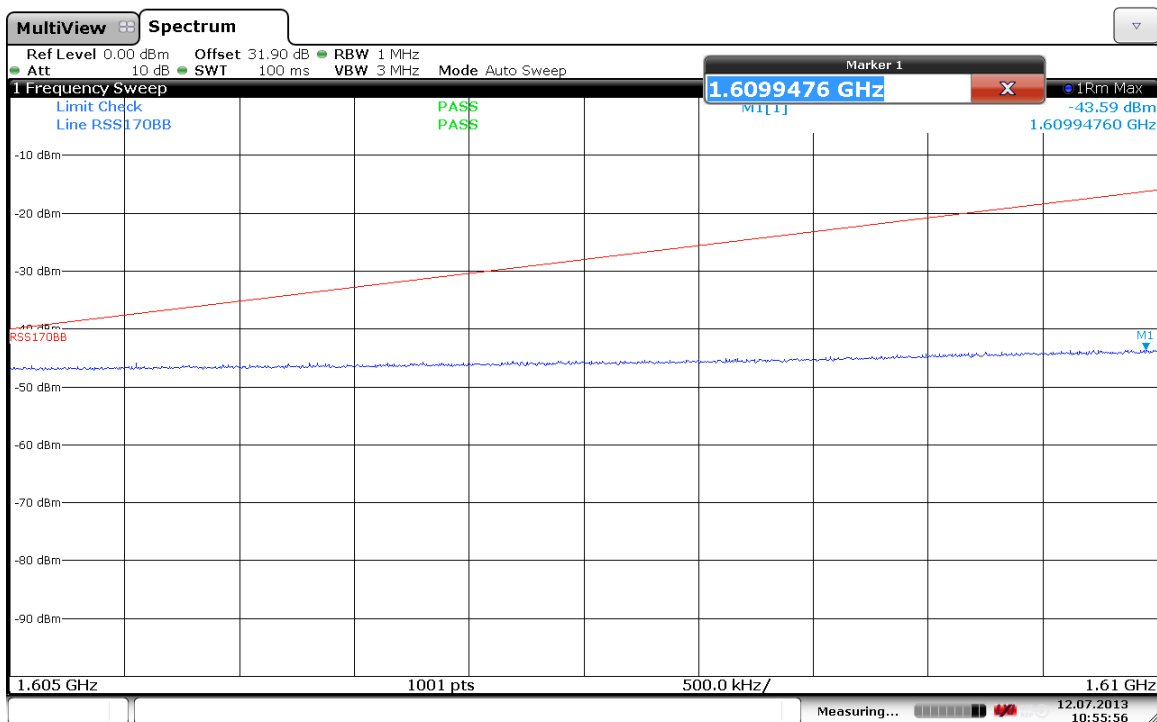
Additional Unwanted BB Emissions, r5t1x/r20t1x, 1626.6 MHz



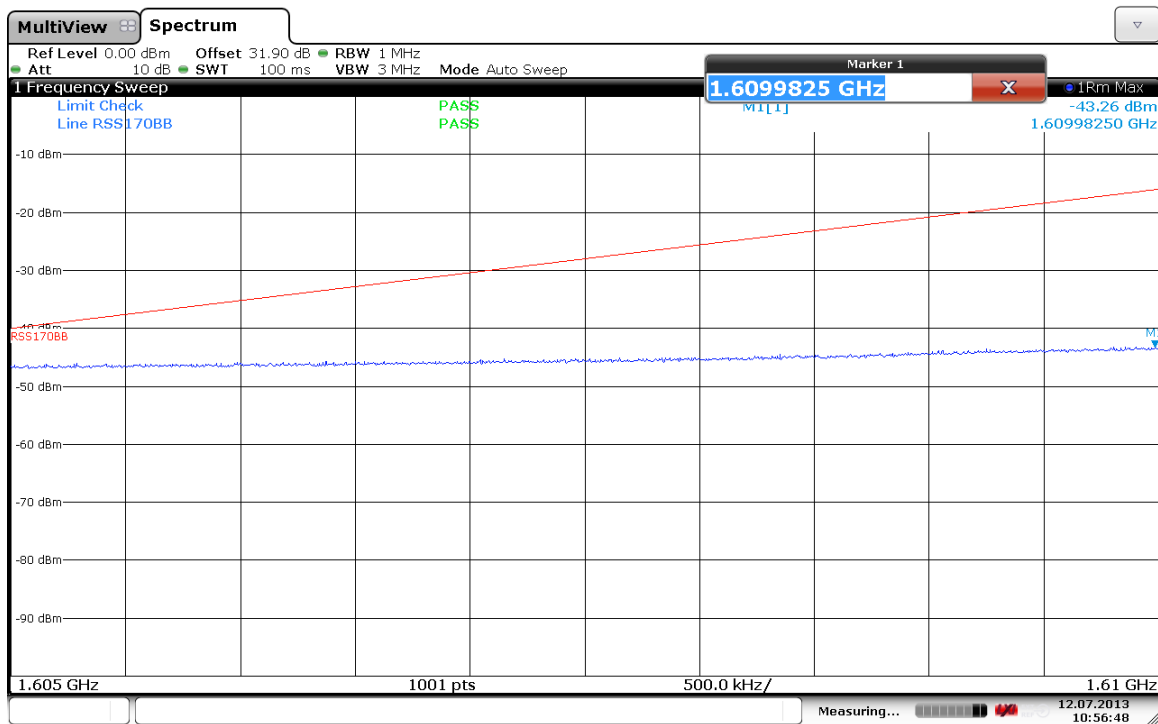
Additional Unwanted BB Emissions, r5t2q/r20t2q, 1626.6 MHz



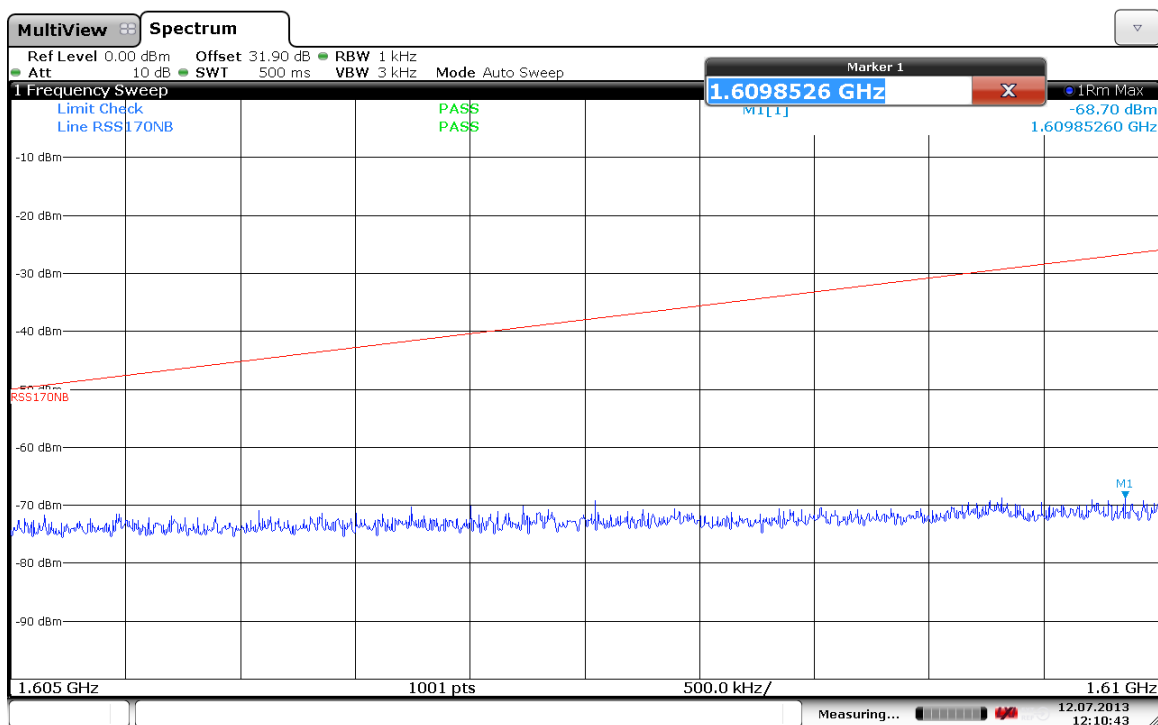
Additional Unwanted BB Emissions, r5t2x/r20t2x, 1626.6 MHz



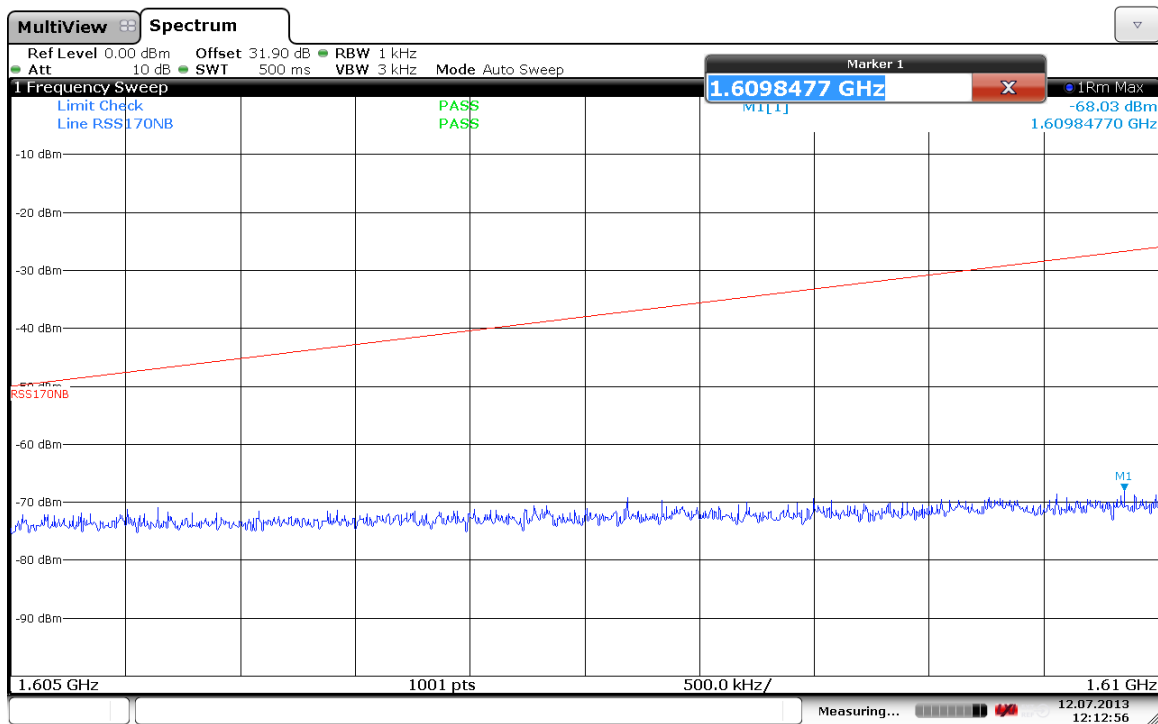
Additional Unwanted BB Emissions, r5t4.5q/r20t4.5q, 1626.6 MHz



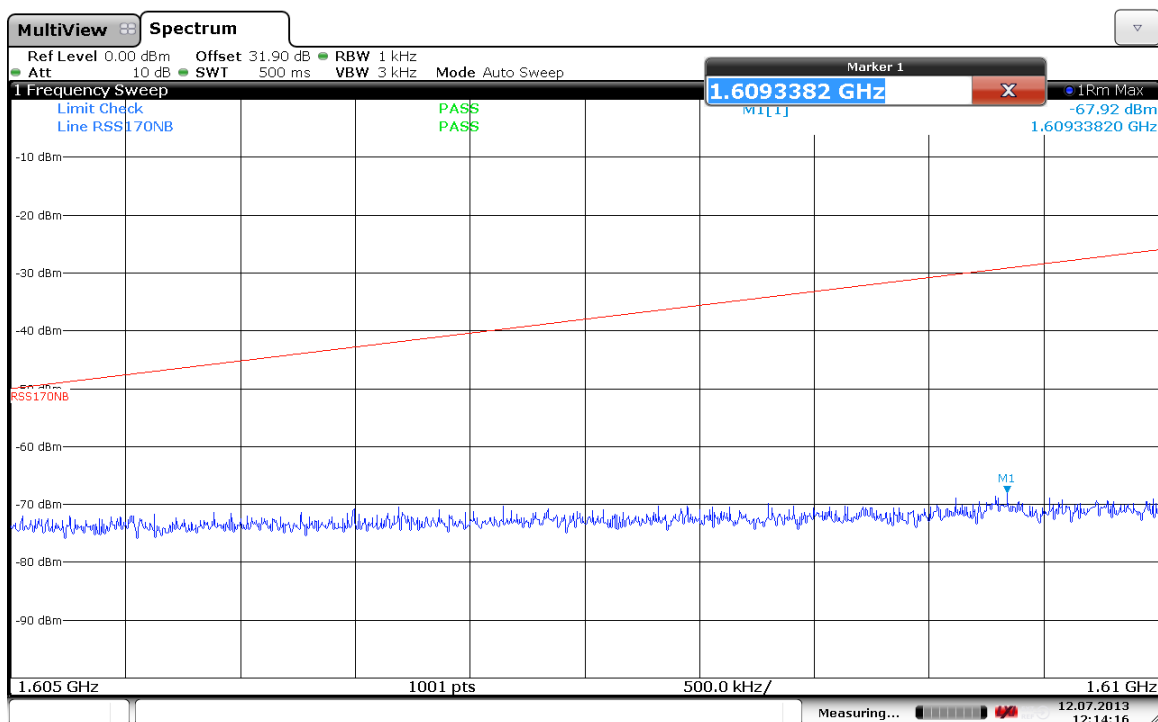
Additional Unwanted BB Emissions, r5t4.5x/r20t4.5x, 1626.6 MHz



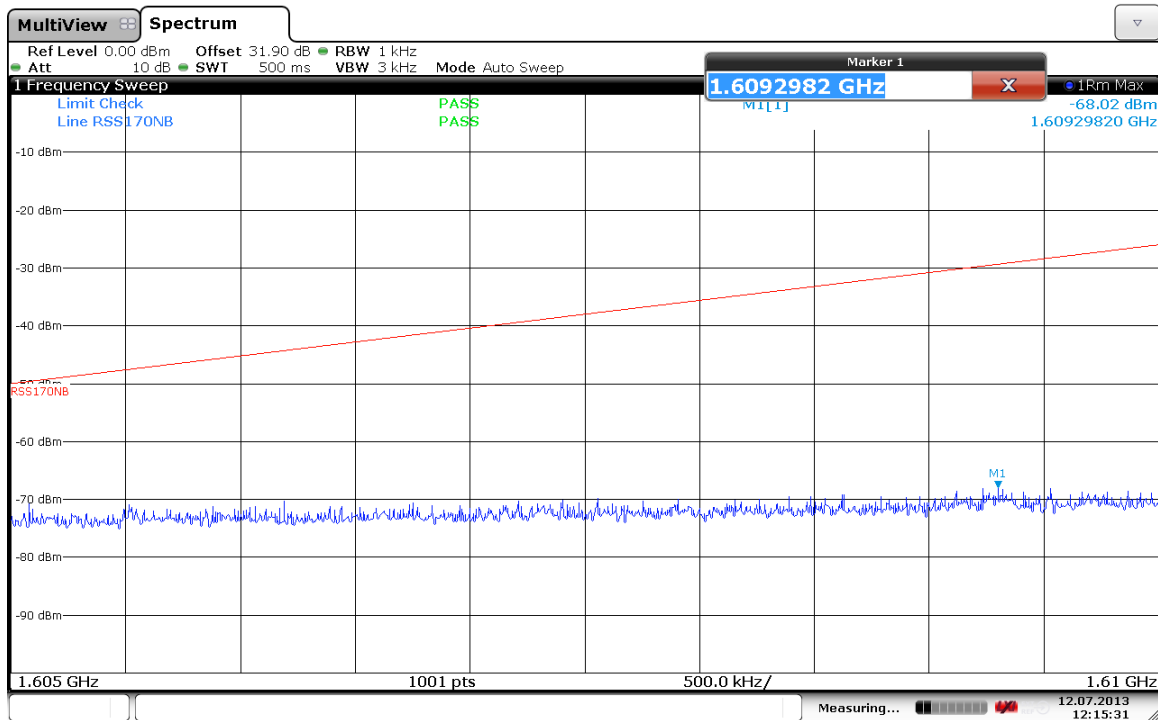
Additional Unwanted BB Emissions, fr80t2.5x4, 1626.6 MHz



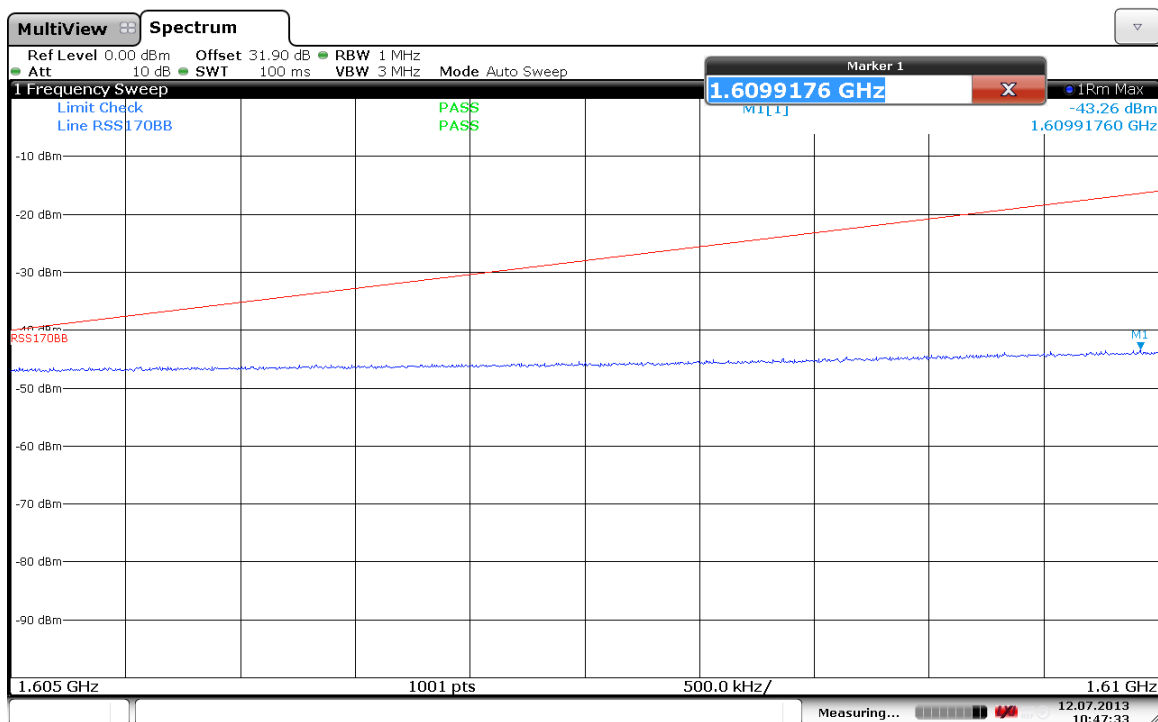
Additional Unwanted BB Emissions, fr80t2.5x16, 1626.6 MHz



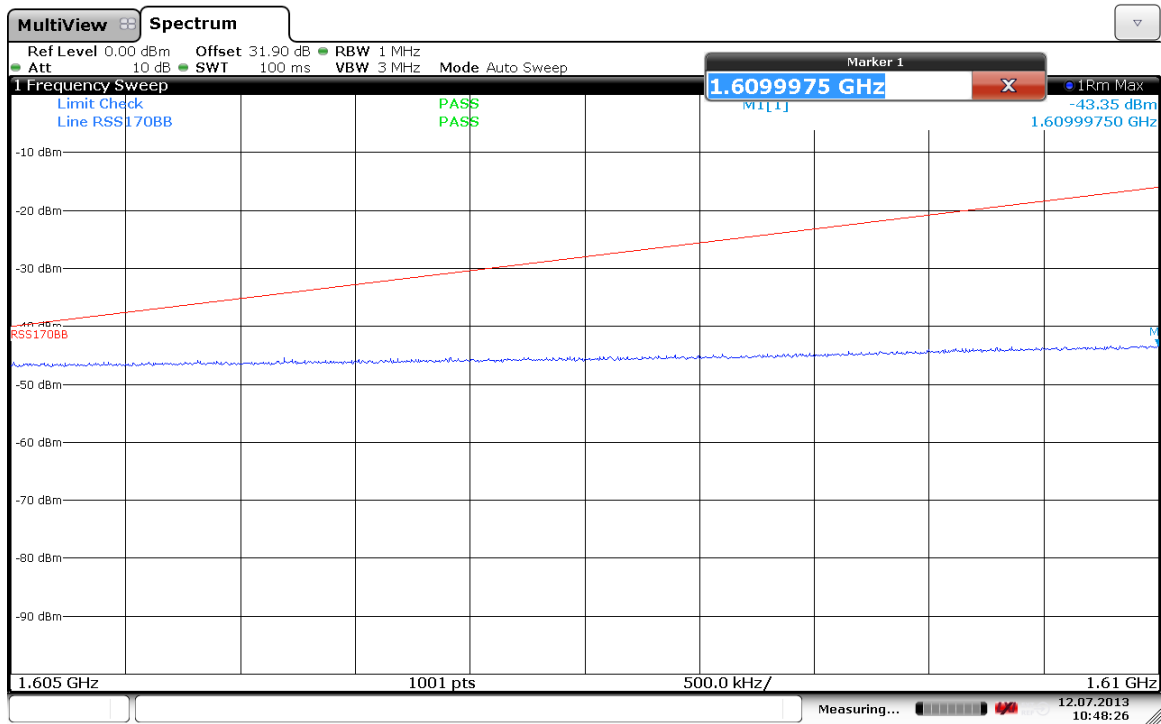
Additional Unwanted BB Emissions, fr80t2.5x32, 1626.6 MHz



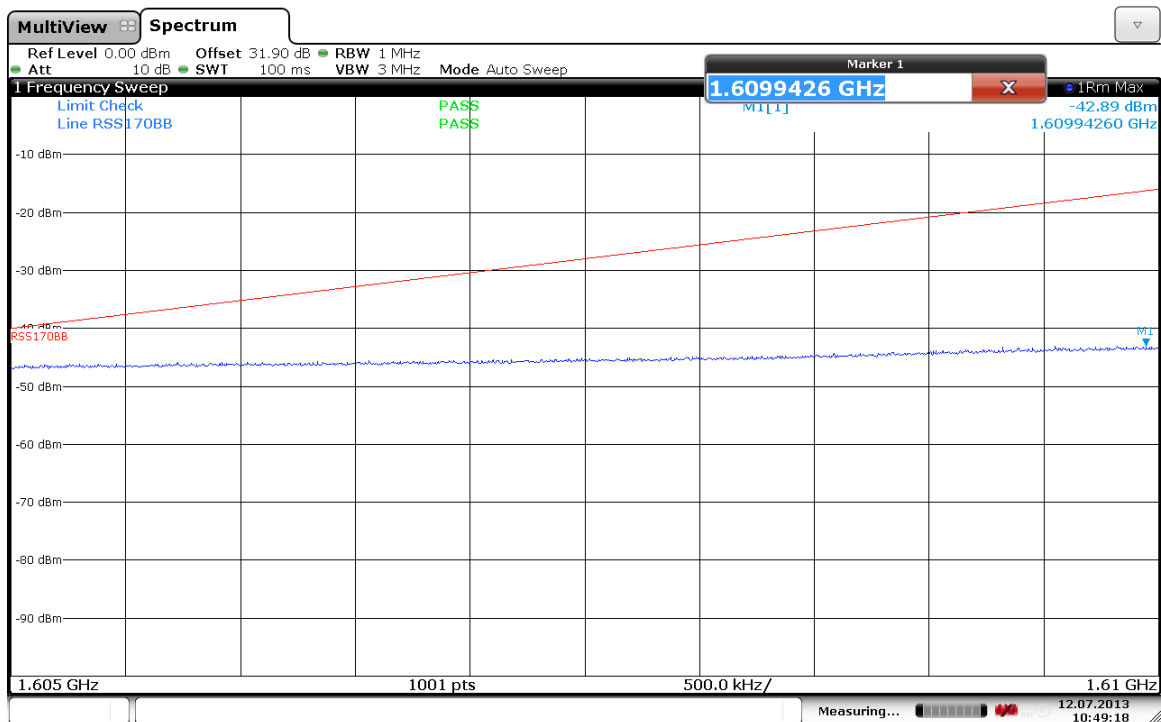
Additional Unwanted BB Emissions, fr80t2.5x64, 1626.6 MHz



Additional Unwanted BB Emissions, fr80t5x4, 1626.6 MHz



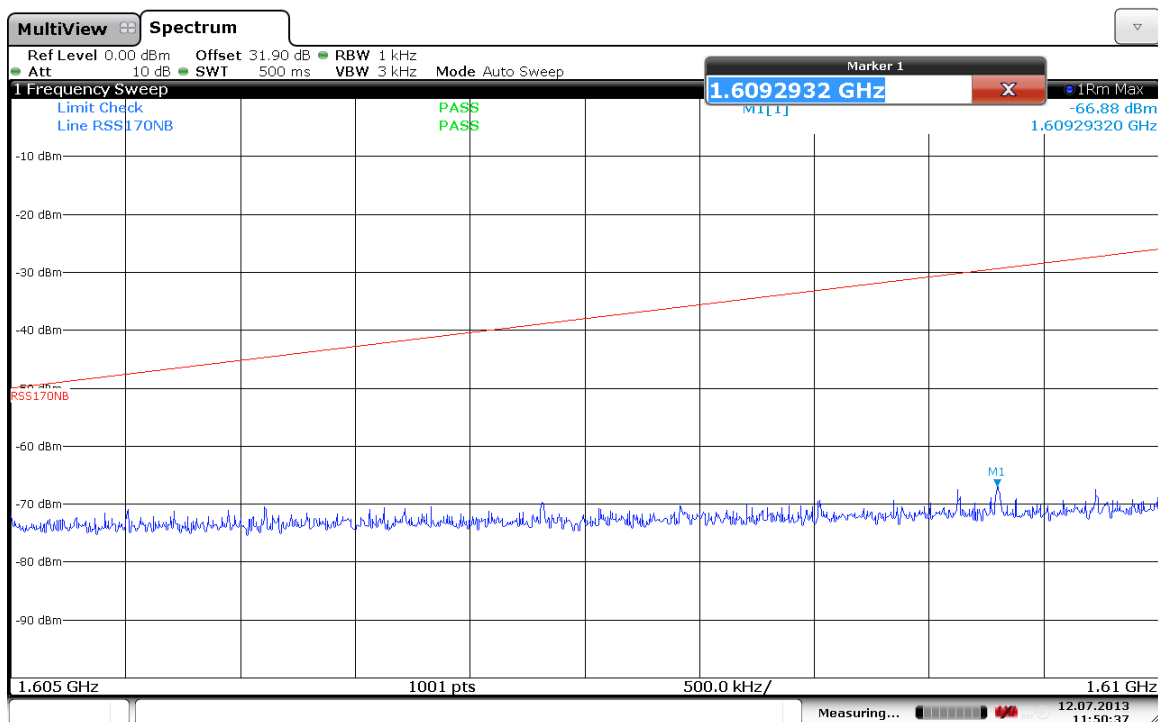
Additional Unwanted BB Emissions, fr80t5x16, 1626.6 MHz



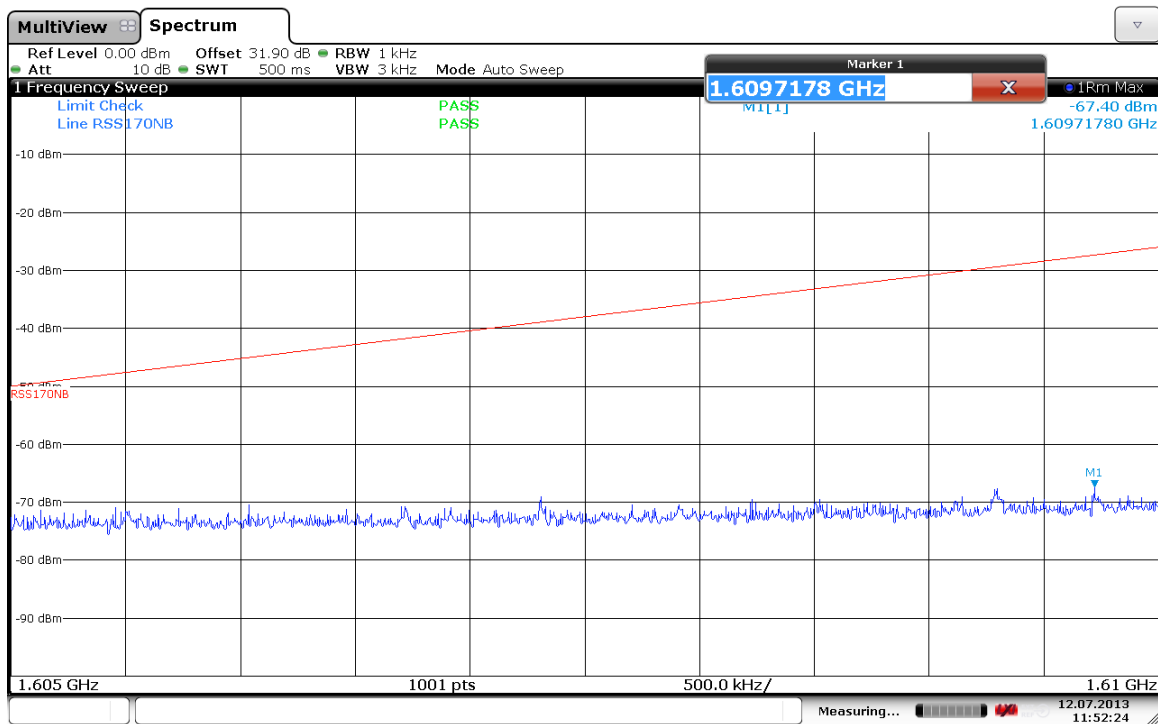
Additional Unwanted BB Emissions, fr80t5x32, 1626.6 MHz



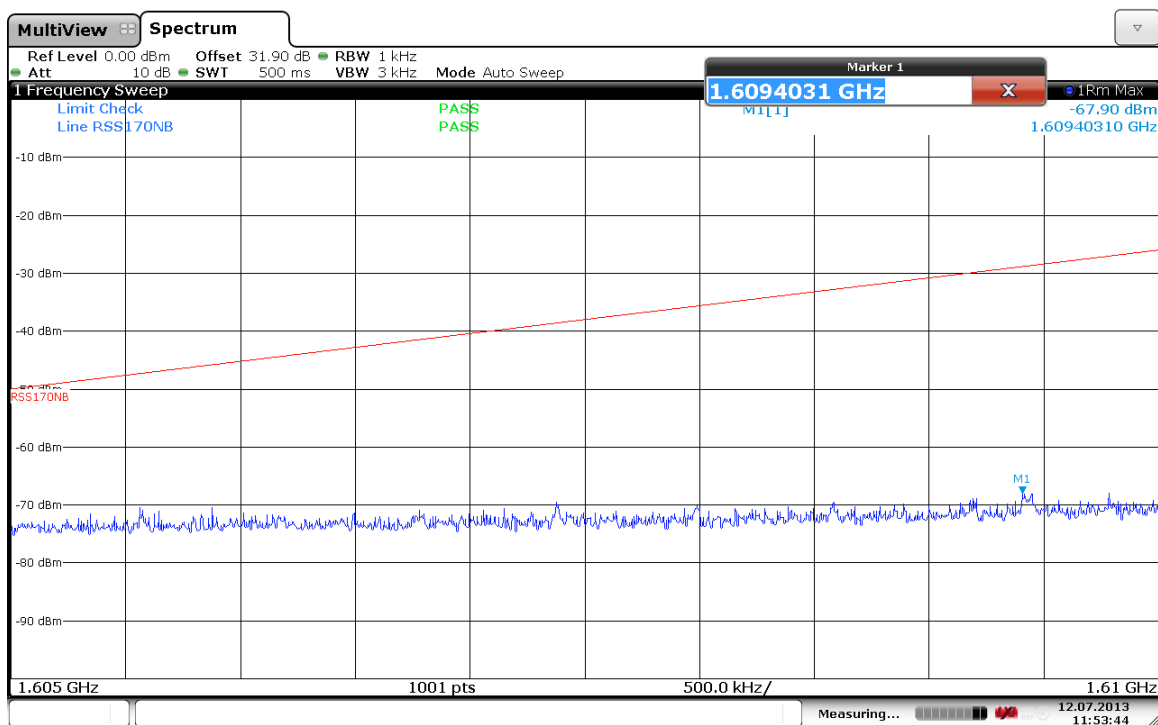
Additional Unwanted BB Emissions, fr80t5x64, 1626.6 MHz



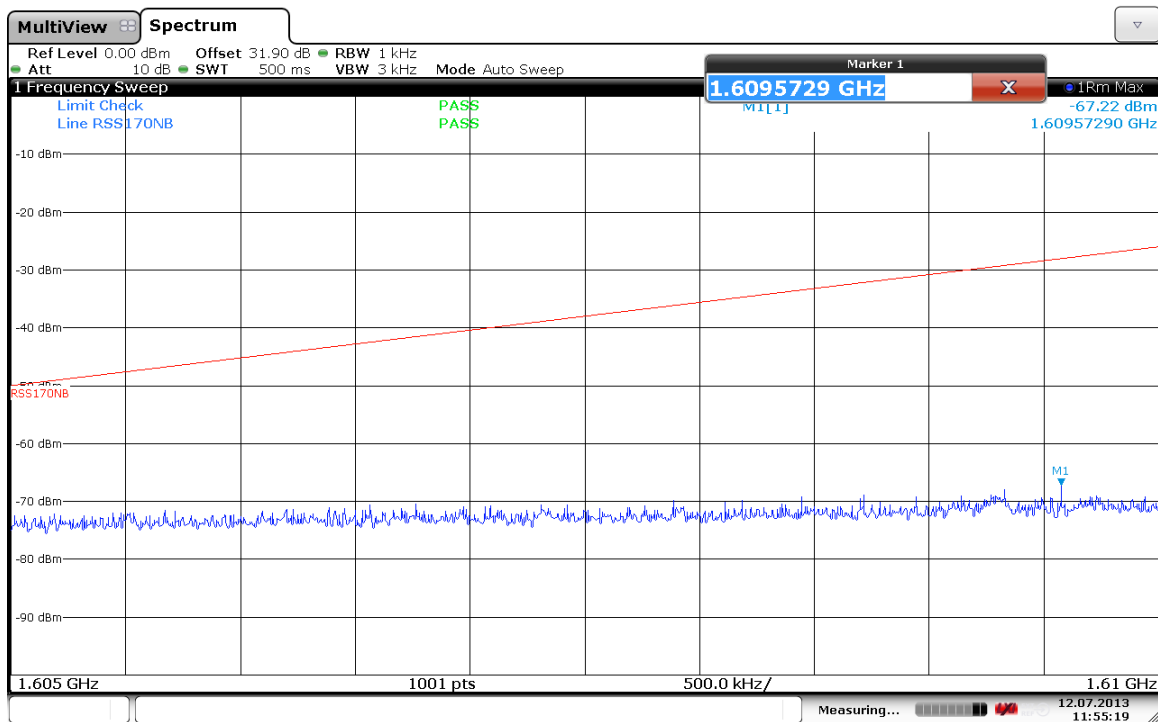
Additional Unwanted NB Emissions, r20t0.5q/r80t0.5q, 1626.6 MHz



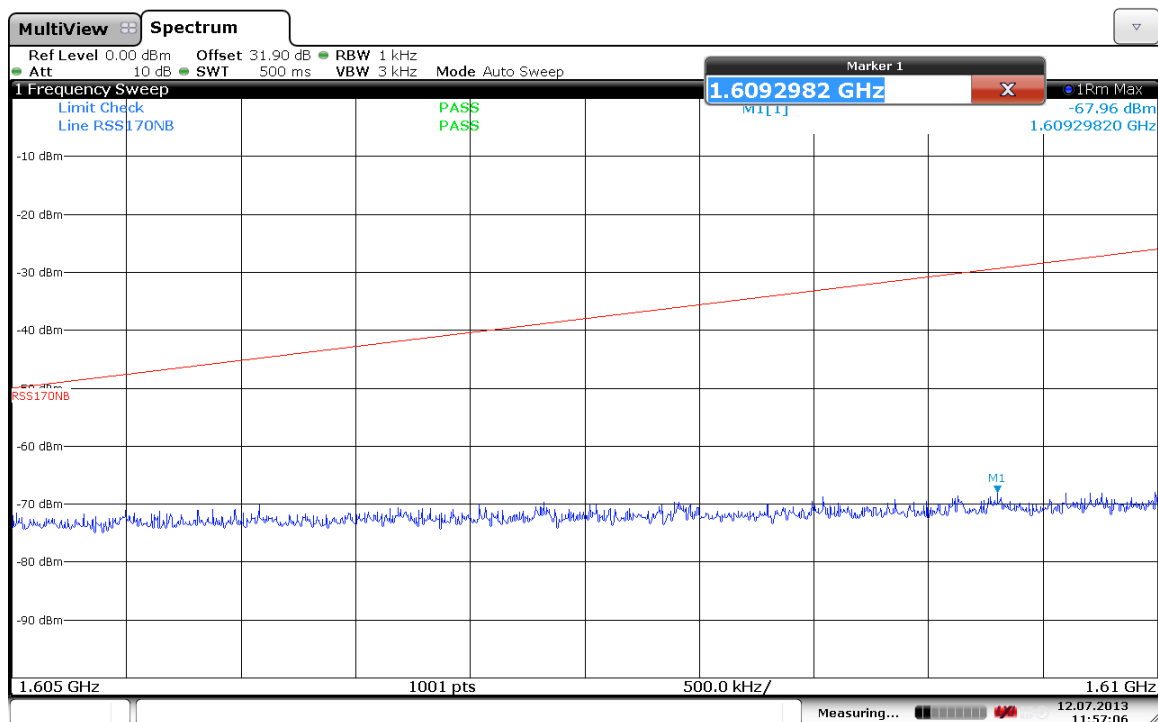
Additional Unwanted NB Emissions, r20t1q/r80t1q, 1626.6 MHz



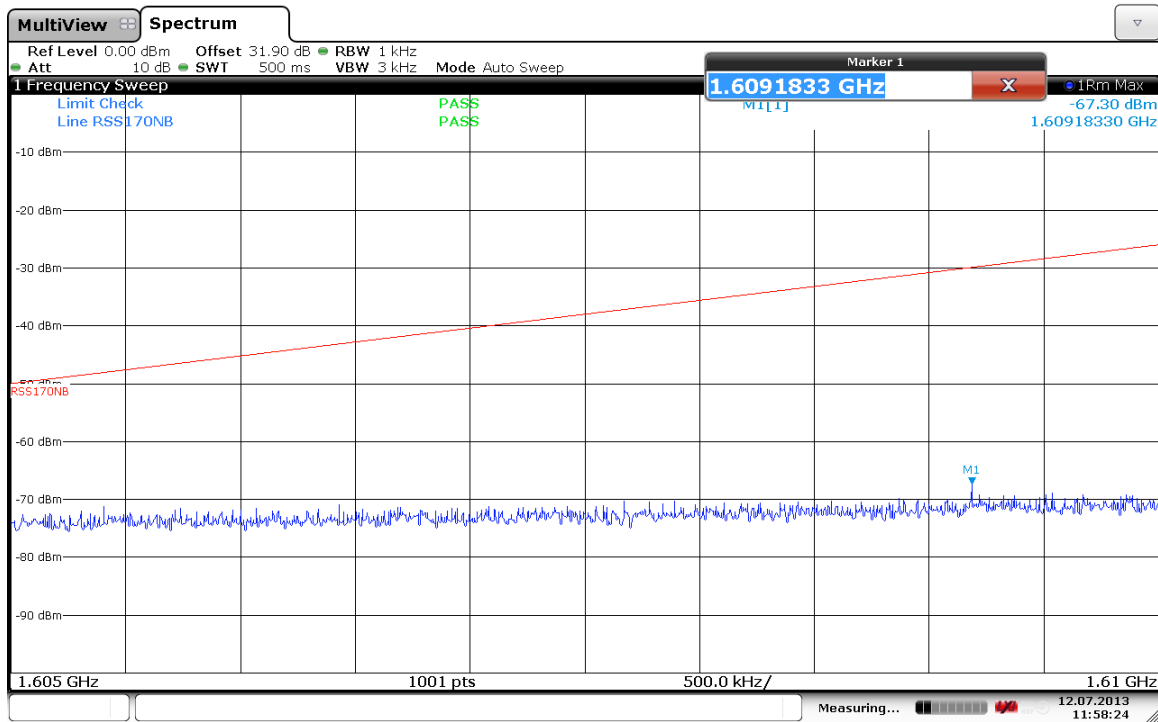
Additional Unwanted NB Emissions, r5t1x/r20t1x, 1626.6 MHz



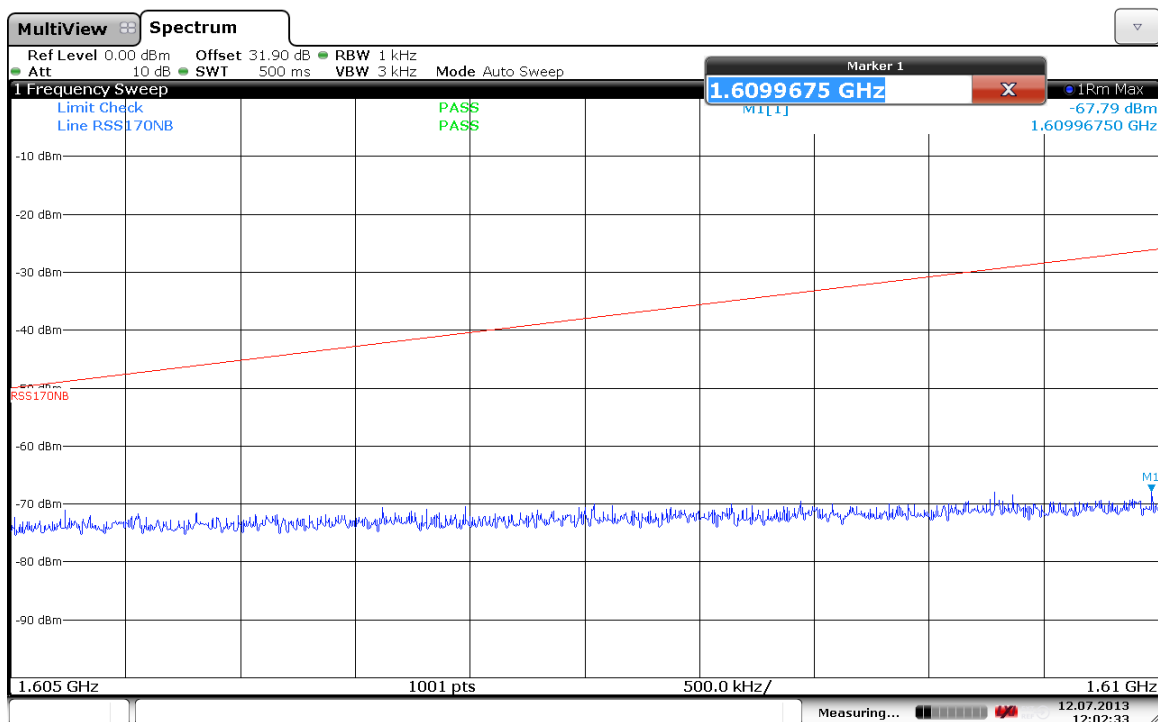
Additional Unwanted NB Emissions, r5t2q/r20t2q, 1626.6 MHz



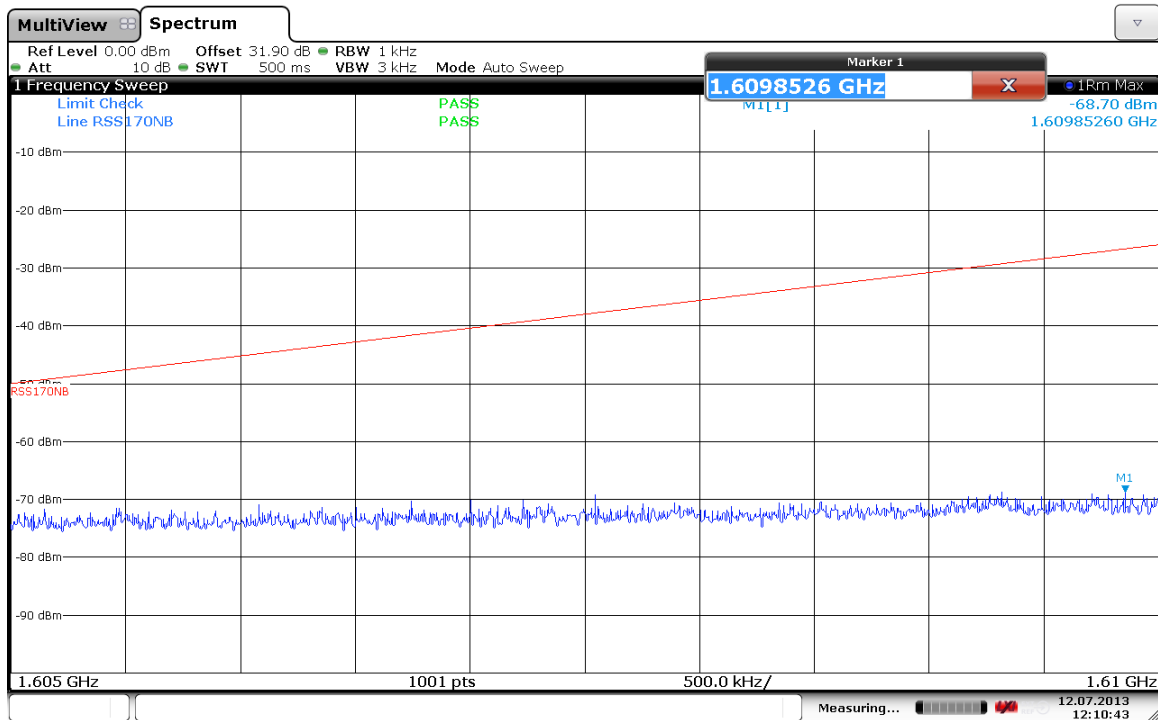
Additional Unwanted NB Emissions, r5t2x/r20t2x, 1626.6 MHz



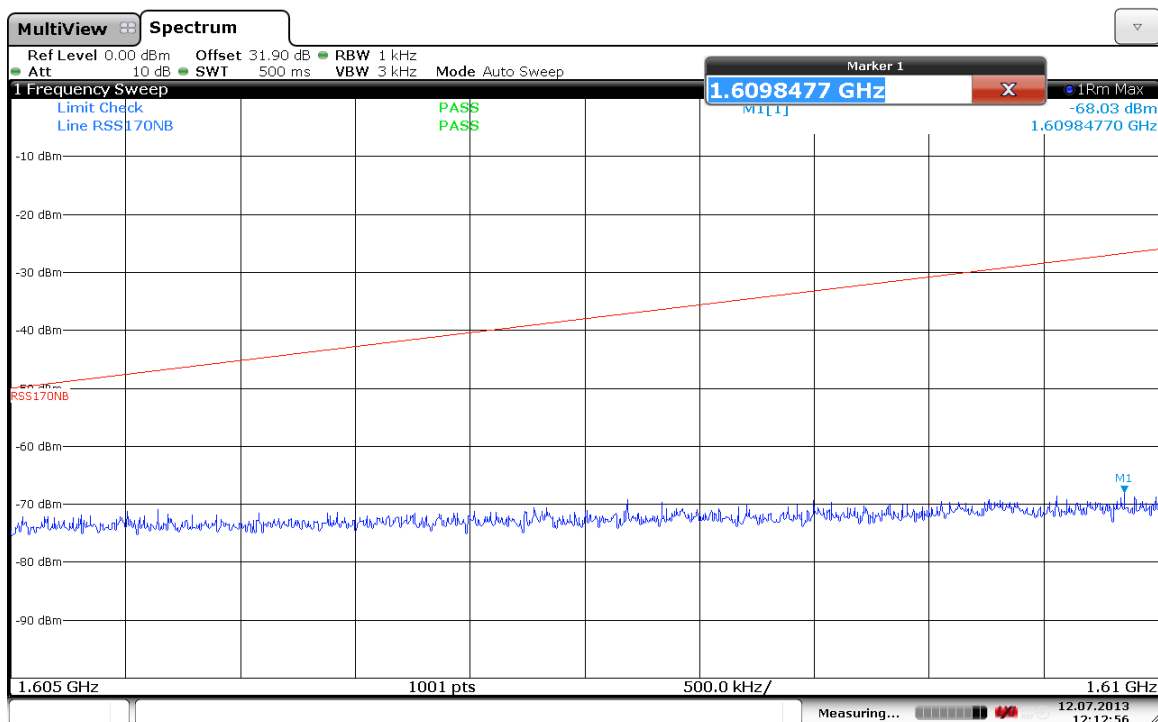
Additional Unwanted NB Emissions, r5t4.5q/r20t4.5q, 1626.6 MHz



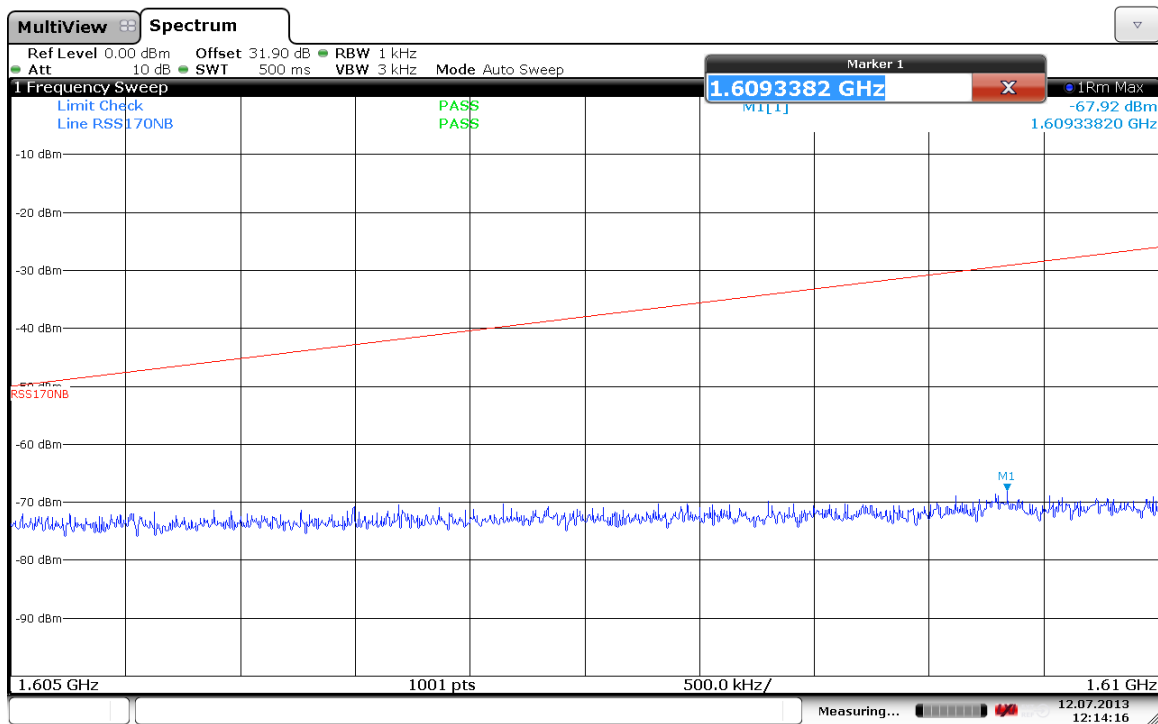
Additional Unwanted NB Emissions, r5t4.5x/r20t4.5x, 1626.6 MHz



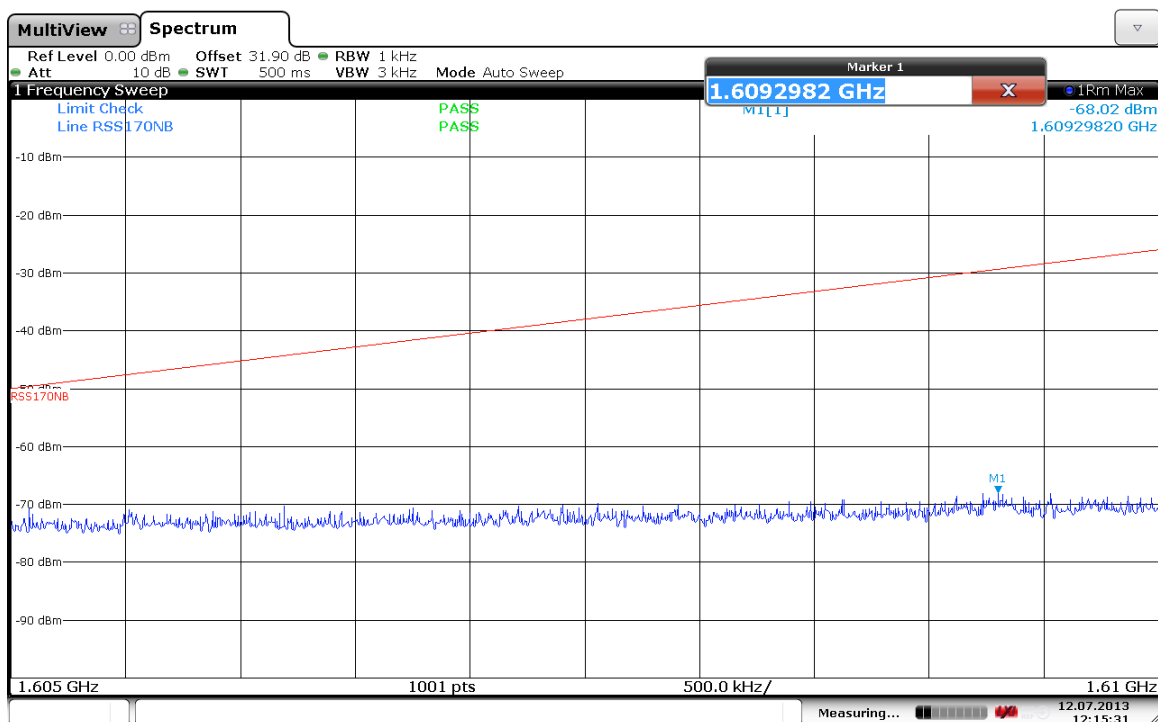
Additional Unwanted NB Emissions, fr80t2.5x4, 1626.6 MHz



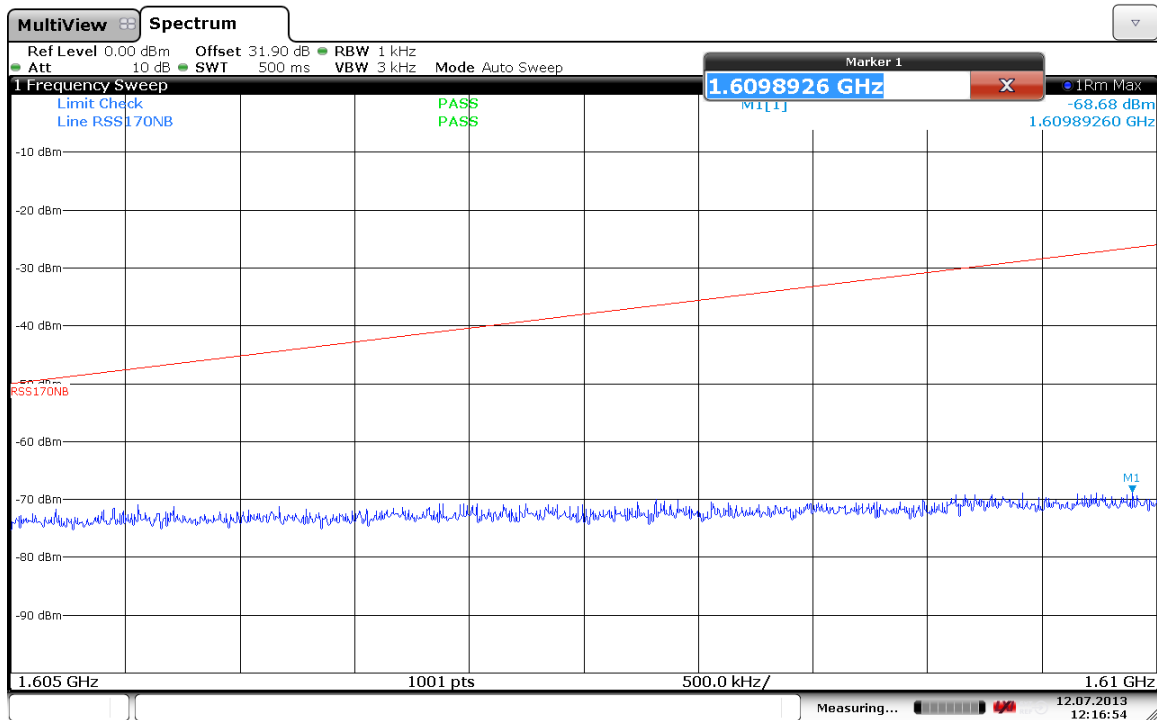
Additional Unwanted NB Emissions, fr80t2.5x16, 1626.6 MHz



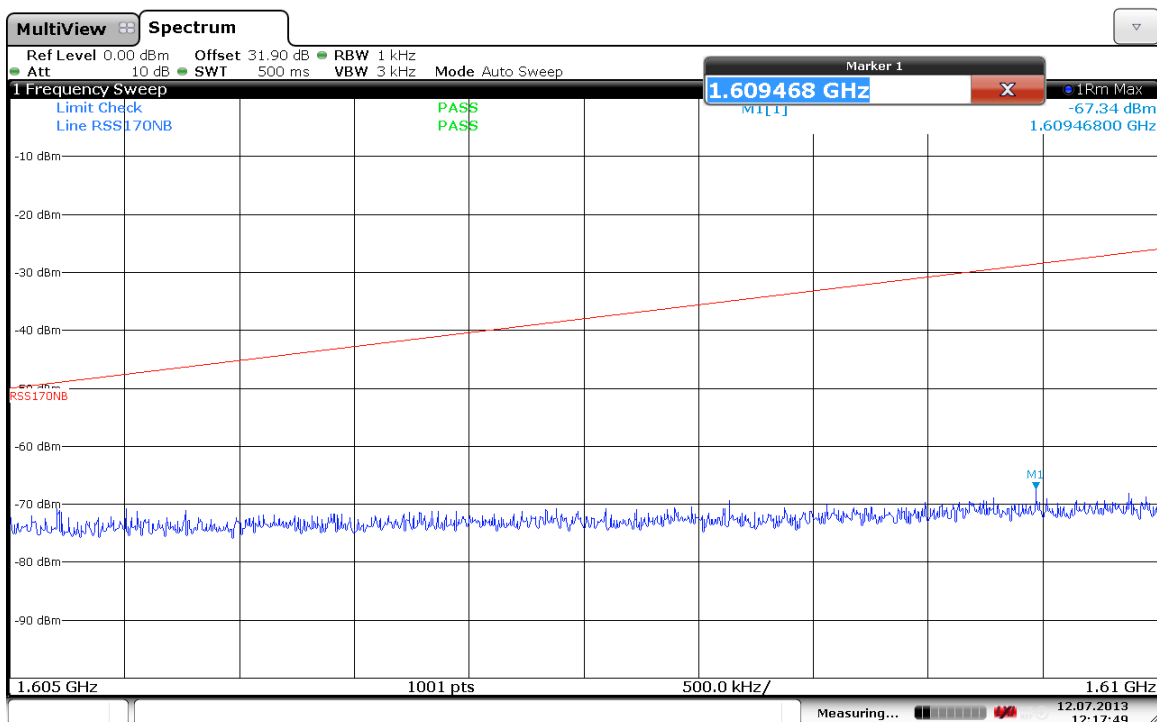
Additional Unwanted NB Emissions, fr80t2.5x32, 1626.6 MHz



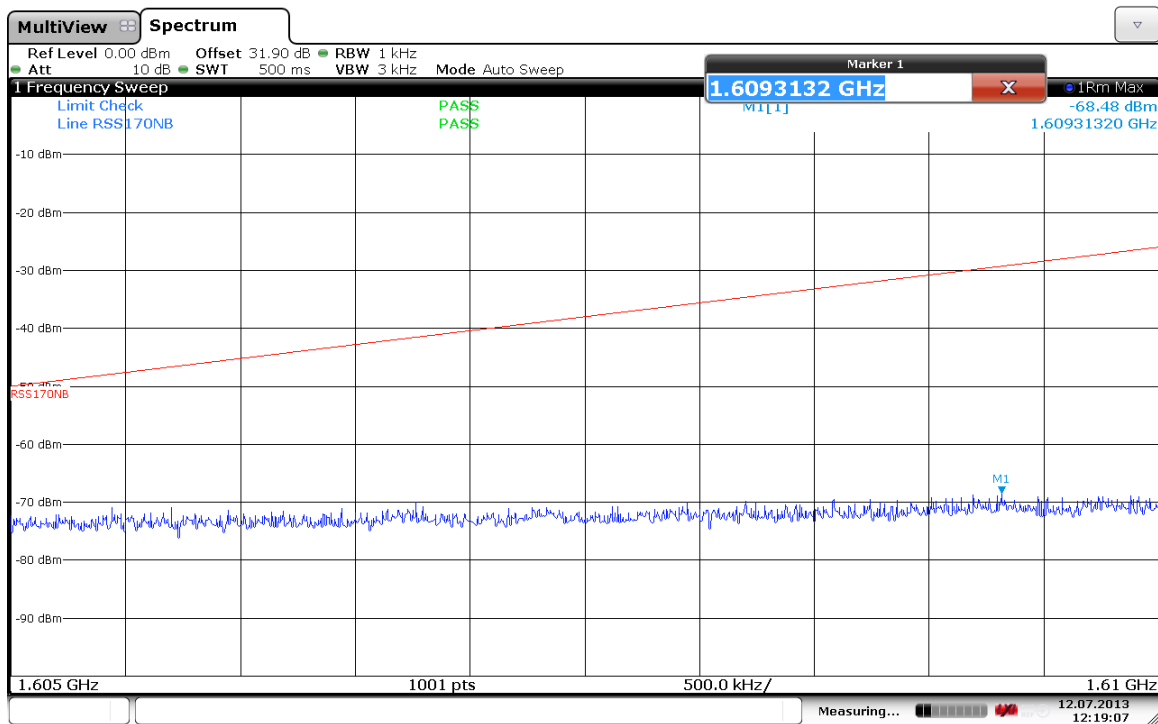
Additional Unwanted NB Emissions, fr80t2.5x64, 1626.6 MHz



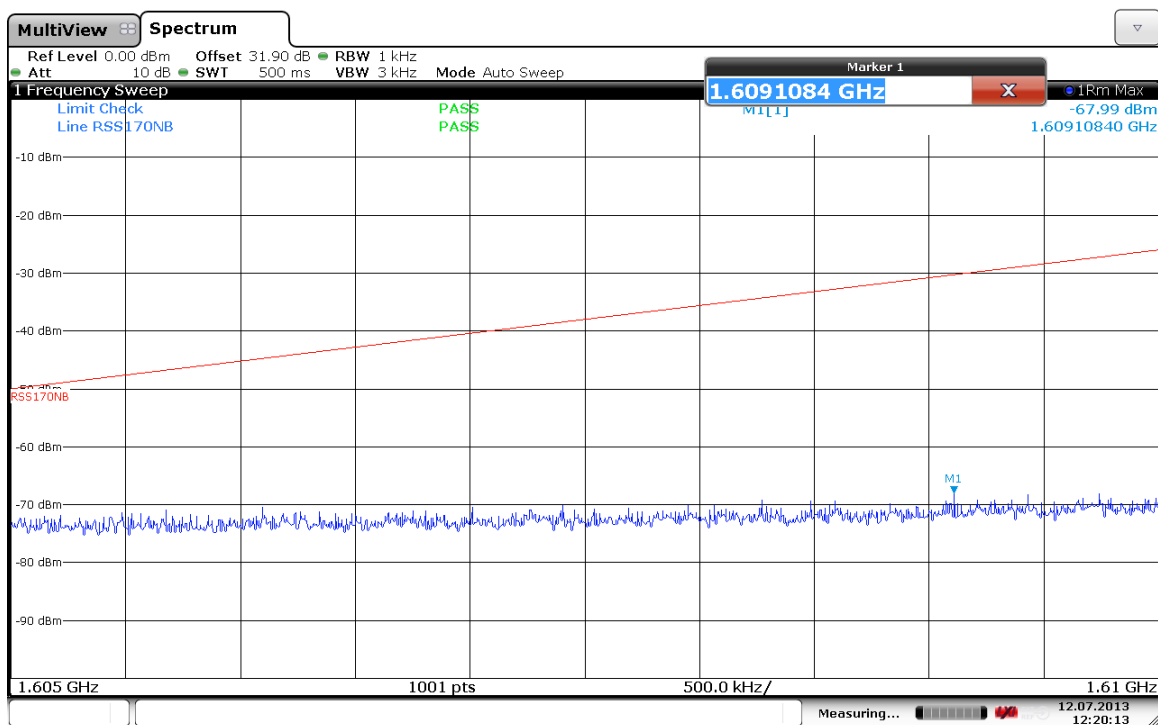
Additional Unwanted NB Emissions, fr80t5x4, 1626.6 MHz



Additional Unwanted NB Emissions, fr80t5x16, 1626.6 MHz



Additional Unwanted NB Emissions, fr80t5x32, 1626.6 MHz



Additional Unwanted NB Emissions, fr80t5x64, 1626.6 MHz

3.6 Carrier-off State Emissions

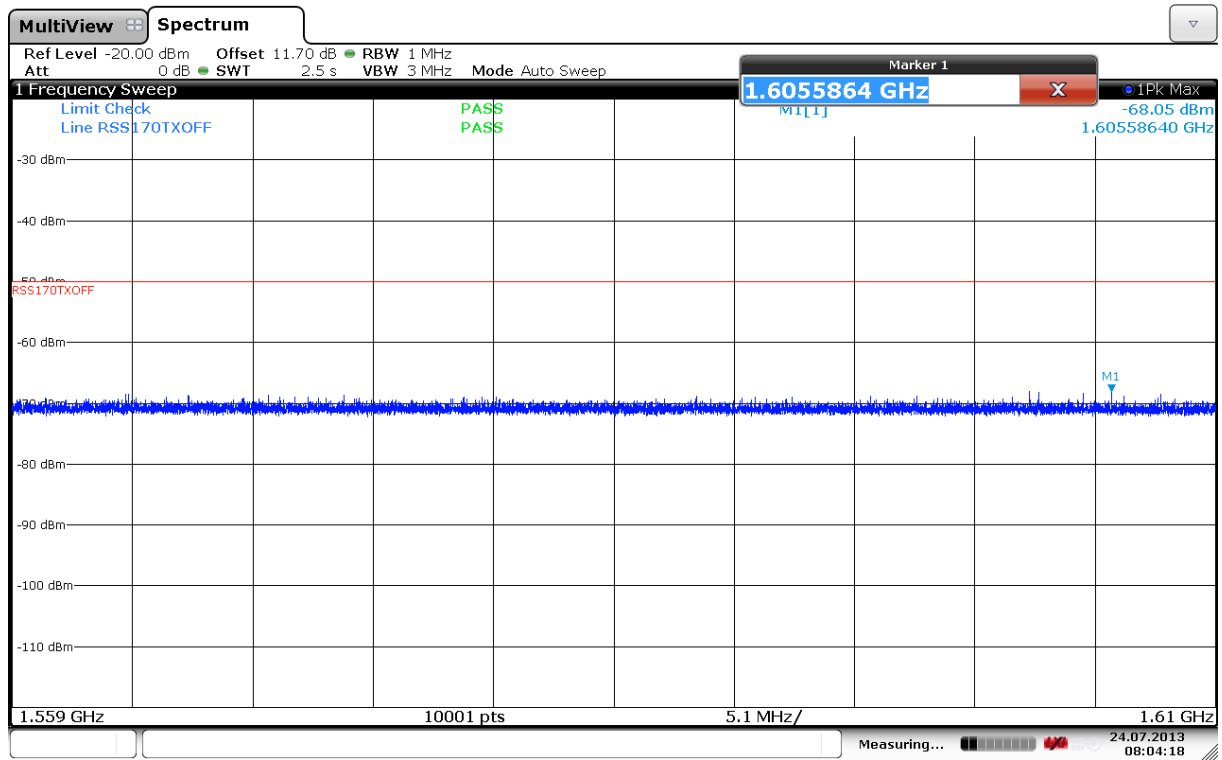
Test result: **Complies**

See plot. Limit line is corrected for Antenna Gain.

Requirements:

The EUT complies with the requirements in § 25.216, (i).

The e.i.r.p density of carrier-off state emissions from mobile earth stations manufactured more than six months after FEDERAL REGISTER publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies between 1 and 3 GHz shall not exceed -80 dBW/MHz in the band 1559-1610 MHz band averaged over any two millisecond interval.



Carrier Off Emissions

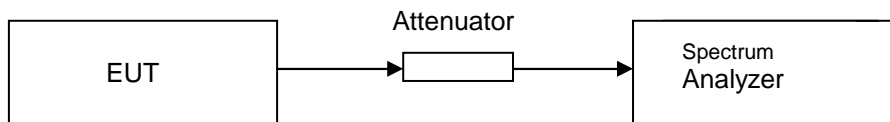
4 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

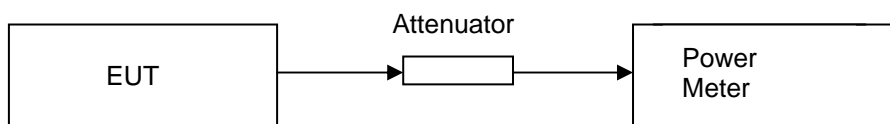
No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	FSW	Signal & Spectrum Analyzer	Rohde & Schwarz	LR 1640	2012.06	2014.06
2	B32-10R	DC Power Source	Oltronix	LR 126	N/A	
3	87 V	True RMS Multimeter	Fluke	N-4673	2012-09	2013-09
4	VC4060	Climatic chamber	Votsch	LR1435	2012-05	2014-05
5	FSEK	Spectrum Analyzer	Rohde & Schwarz	LR1337	2013-02	2015-02

5 BLOCK DIAGRAMS

5.1 Frequency Error



5.2 Output Power



5.3 Transmitter Unwanted Emissions

