CERTIFICATE #3478.01

TEST REPORT

EUT Description	**GSM, WCDMA and LTE Module**
Brand Name	**Intel**
Model Name	**7272LGANA**
FCC/IC ID	**FCC ID: PD97272NA/IC ID: 1000M-7272NA**
Date of Test Start/End	**2016-10-17 / 2016-12-09**
Features	**2G: GSM/GPRS/EDGE 850 / 1900** **3G: WCDMA/HSPA FDD II / IV / V** **4G: Band 2/4/5(19)/7/12(17)/13/29** (see section 5)

Applicant	**Intel Mobile Communication**
Address	**100 Center Point Circle, Suite 200**
Contact Person	**Columbia, South Carolina, 29210 USA**
Telephone/Fax/ Email	**Steve Hackett**

Reference Standards	**FCC CFR Title 47 Part 2, 22, 24, 27** **RSS-Gen issue 4, RSS 132 issue 3, RSS 133 issue 6, RSS 139 issue 3** (see section 1)

Test Report identification	**160912-04.TR01**
Revision Control	**Rev. 01** **This test report revision replaces any previous test report revision** (see section 8)

The test results relate only to the samples tested.
The test report shall not be reproduced in full, without written approval of the laboratory.

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1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 2 - Subpart J - EQUIPMENT AUTHORIZATION PROCEDURES
2. FCC 47 CFR part 22 - Subpart H - Cellular Radiotelephone Service
3. FCC 47 CFR part 24 – Subpart E - Broadband PCS.
4. FCC 47 CFR part 27 – Subpart C - Technical Standards.
5. FCC 47 CFR part 27 – Subpart L - 1695-1710, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands
6. FCC OET KDB 412172 D01 v01r01 Guidelines for determining the effective radiated power (ERP) and equivalent isotropically radiated power (EIRP) of an RF transmitting system.
7. FCC OET KDB 971168 D01 v02r02 Measurement guidance for certification of licensed digital transmitters
8. RSS-Gen issue 4 - General Requirements for Compliance of Radio Apparatus.
9. RSS 132 issue 3 - Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
10. RSS 133 issue 6 - 2 GHz Personal Communications Services
11. RSS 139 issue 3 - Advanced Wireless Services Equipment Operating in the Bands 1710–1755 MHz and 2110–2155 MHz
12. ANSI/TIA-603-D June 2010 – Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
13. ANSI C63.26-2015 American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
14. R&S Application note 1CM96 – HSDPA RF Measurements with the R&S®CMW500 in line with 3GPP TS 34.121.
15. R&S Application note 1CM97 – HSUPA RF Measurements with the R&S®CMW500 in line with 3GPP TS 34.121.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2005 testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by IC, with IC Assigned Code 1000Y.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	22ºC ± 3ºC
Humidity	50% ± 20%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	160912-04.S07	Carrier board with Module	MOD_7272 NA+	0431.3.2.086	2016-10-17	Used for radiated test
	160912-04.S04	AC Adapter	HNP18-050	N/A	2016-09-15	
	14112408.S08	Antenna	Dipole Pulse SPDA 24700/2700	N/A	2014-11-24	
#02	160912-04.S02	Carrier board with Module	MOD_7272 NA+	0431.3.2.317	2016-09-15	Used for conducted test

5. EUT Features

Brand Name	Intel	
Model Name	7272LGANA	
FCC/IC ID	FCC ID: PD97272NA/IC ID: 1000M-7272NA	
Software Version	XMM7272_2016-09-22_0008_UTC	
Driver Version	4.38.0	
Prototype / Production	Production	
Supported Radios	GSM / GPRS / EDGE	GSM 850 (824.0 – 849.0 MHz) PCS 1900 (1850.0 – 1910.0 MHz)
	WCDMA / HSPA+	FDD II (1850.0 – 1910.0 MHz) FDD IV (1710.0 – 1755.0 MHz) FDD V (824.0 – 849.0 MHz)
	LTE FDD	Band 2 (1850.0 – 1910.0 MHz) Band 4 (1710.0 – 1755.0 MHz) Band 5 (824.0 – 849.0 MHz) Band 7 (2500.0 – 2570.0 MHz) Band 12 (699.0 – 716.0 MHz) Band 13 (777.0 – 787.0 MHz) Band 17 (704.0 – 716.0 MHz) Band 19 (830.0 – 845.0 MHz)
	LTE TDD	Band 29 (Downlink 717.0 – 728.0 MHz)
Antenna Information	LTE Dipole Pulse Part number SPDA 24700/2700	

5.1. Emission designator for IC cert

Band	Type of modulation	Emission designator
GSM850	GMSK	245KGXW
GSM850	8PSK	248KG7W
PCS1900	GMSK	247KGXW
PCS1900	8PSK	254KG7W
WCDMA Band II RMC	QPSK	4M18F9W
WCDMA Band IV RMC	QPSK	4M09F9W
WCDMA Band V RMC	QPSK	4M11F9W

6. Remarks and comments

7. Test Verdicts summary

7.1. GSM/EDGE/GPRS

Band	FCC part	RSS part	Test name	Verdict
PCS 1900	2.1046	-	RF power output	P
	24.238	-	Emission bandwidth 26dB	P
	24.232	133-ch.6.4	Equivalent isotropic radiated power	P
	2.1049	133-ch.2.3	Occupied bandwidth 99%	P
	24.232	133-ch.6.4	Peak to average ratio	P
	24.235, 2.1055	133-ch.6.3	Frequency Stability	P
	24.238	133-ch.6.5.1	Conducted band-edge	P
	24.238	133-ch.6.5.1	Conducted spurious emission	P
	24.238	133-ch.6.5.1	Radiated spurious emission	P
GSM 850	2.1046	-	RF power output	P
	2.1049	-	Occupied bandwidth (99%)	P
	22.917	-	Occupied bandwidth (26dB)	P
	22.355, 2.1055	132-ch.5.3	Frequency Stability	P
	22.917, 2.1051	132-ch.5.5	Band Edge conducted emission	P
	22.917, 2.1051	132-ch.5.5	Spurious emission	P
	22.913	132-ch.5.4	Effective radiated power	P
	22.917, 2.1053	132-ch.5.5	Radiated spurious emission	P
	-	132-ch.5.4	Peak-to-average power ratio	P

P: Pass
F: Fail
NM: Not Measured
NA: Not Applicable

7.2. WCDMA/HSPA+

Band	FCC part	RSS part	Test name	Verdict
FDD II	2.1046	-	RF power output	P
	24.238	-	Emission bandwidth 26dB	P
	24.232	133-ch6.4	Equivalent isotropic radiated power	P
	2.1049	-	Occupied bandwidth 99%	P
	24.232	133-ch6.4	Peak to average ratio	P
	24.235, 2.1055	133-ch.6.3	Frequency Stability	P
	24.238	133-ch.6.5.1	Conducted band-edge	P
	24.238	133-ch.6.5.1	Conducted spurious emission	P
	24.238	133-ch.6.5.1	Radiated spurious emission	P
FDD IV	2.1046	-	RF power output	P
	27.53	-	Emission bandwidth 26dB	P
	27.50	139-ch.6.5	Equivalent isotropic radiated power	P
	2.1049	-	Occupied bandwidth 99%	P
	27.50	139-ch.6.5	Peak to average ratio	P
	27.54, 2.1055	139-ch.6.4	Frequency Stability	P
	27.53, 2.1051	139-ch.6.6	Conducted band-edge	P
	27.53	139-ch.6.6	Conducted spurious emission	P
	27.53, 2.1053	139-ch.6.6	Radiated spurious emission	P
FDD V	2.1046	-	RF power output	P
	2.1049	-	Occupied bandwidth (99%)	P
	22.917	-	Occupied bandwidth (26dB)	P
	22.355, 2.1055	132-ch.5.3	Frequency Stability	P
	22.917, 2.1051	132-ch.5.5	Band Edge conducted emission	P
	22.917, 2.1051	132-ch.5.5	Spurious emission	P
	22.913	132-ch.5.4	Effective radiated power	P
	22.917, 2.1053	132-ch.5.5	Radiated spurious emission	P
	-	132-ch.5.4	Peak-to-average power ratio	P

P: Pass
F: Fail
NM: Not Measured
NA: Not Applicable

8. Document Revision History

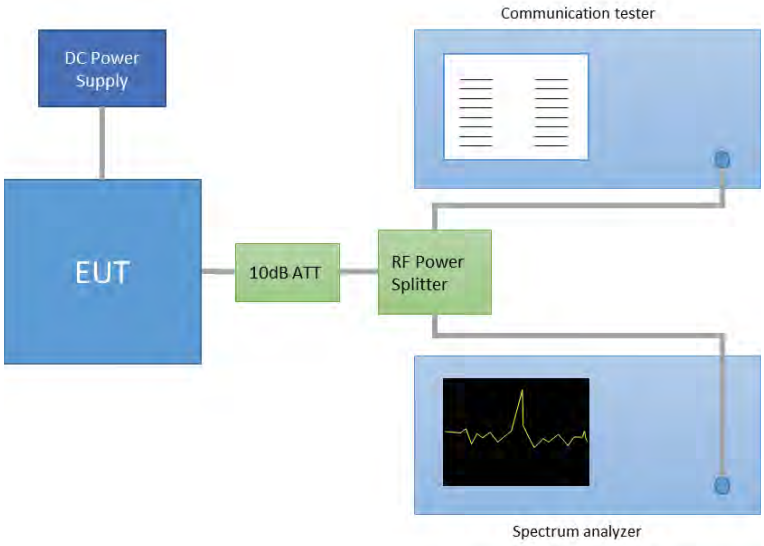
Revision #	Date	Modified by	Revision Details
Rev. 00	2016-12-13	Z.Ouachicha I. Kharrat	First Issue
Rev. 01	2016-12-16	O.Fargant	Added additional sample pictures on Annex C

Annex A. Test & System Description

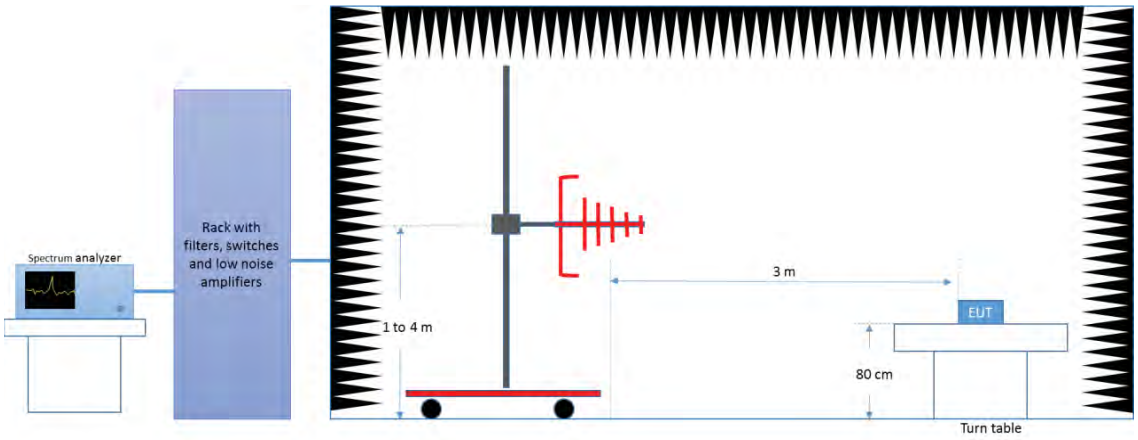
A.1 Measurement System

Measurements were performed using the following setups. A communication tester was used to establish a communication link with the EUT, and the communication tester parameters were set to get the maximum output power from the EUT.

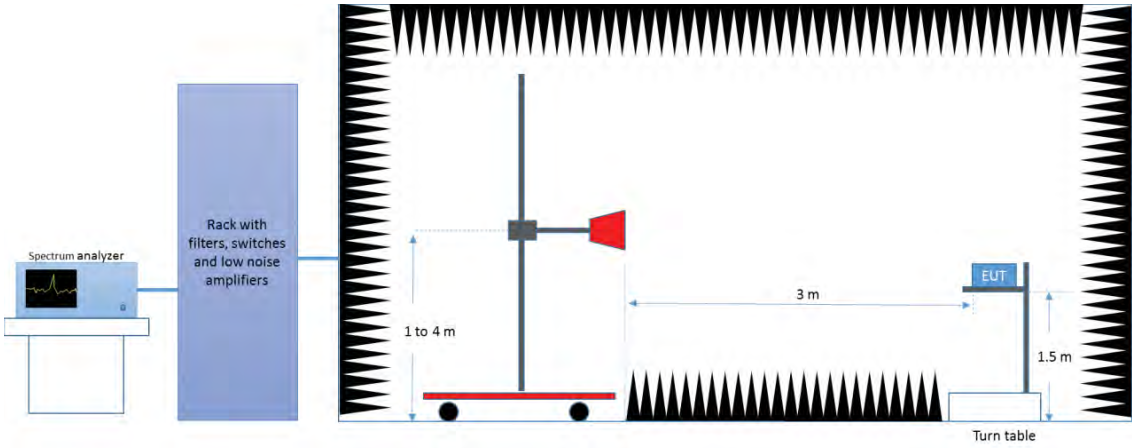
Conducted Setup 1



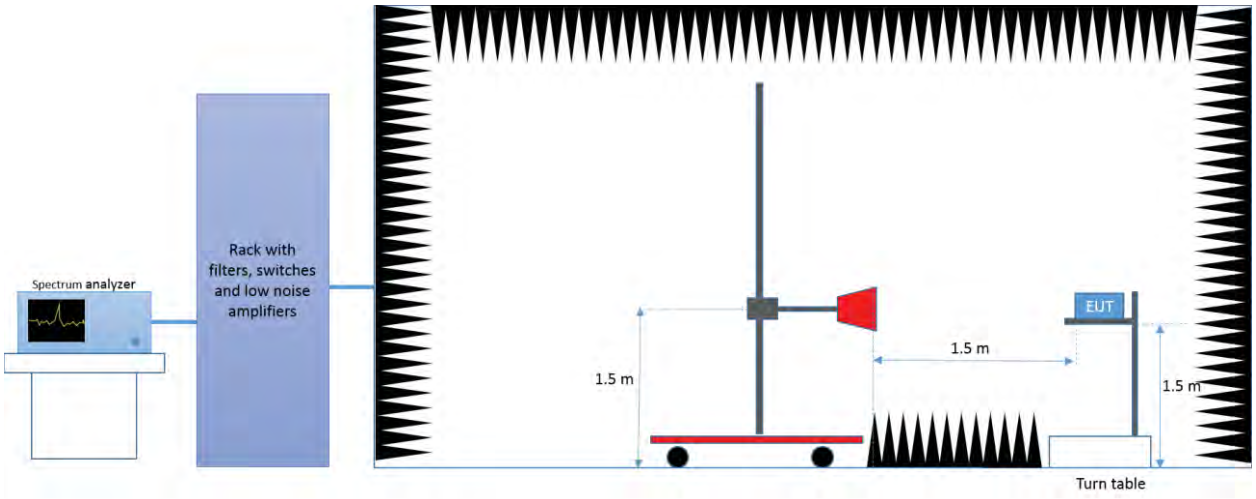
Radiated Setup < 1GHz



Radiated Setup Frequency range 1 GHz to 18 GHz



Radiated Setup > 18GHz



A.2 Test Equipment List

A.2.1 Conducted Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0311	Communication tester	CMW500	152720	Rohde & Schwarz	2015-03-19	2017-03-19
0310	Spectrum analyzer	FSV40	101425	Rohde & Schwarz	2015-03-25	2017-03-25
0293	DC power supply	E3640A	MY40006885	Agilent	NA	NA
0036	Multimeter	IDM 103	03902163	ISO-TECH	2016-03-24	2018-03-24
0300	Climatic chamber	SLT34/40	56746020930010	SECASI	2015-03-09	2017-03-09

A.2.2 Radiated Setup #1

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0133	Spectrum analyzer	FSV40	101358	Rohde & Schwarz	2016-04-15	2018-04-15
0137	BiConiLog antenna 26 MHz – 6 GHz	3142E	00156946	ETS Lindgren	2015-12-11	2017-12-11
0143	Biconical 30MHz – 3GHz	3180B	00165215	ETS Lindgren	2016-04-11	2018-04-11
0325	Double Ridge Horn 1GHz -18 GHz	3117	00157734	ETS Lindgren	2015-07-24	2017-07-24
0141	Double-ridged Horn Antenna with preamplifier 1 GHz – 18 GHz	3117-PA	00157736	ETS Lindgren	2016-04-13	2018-04-13
0139	Horn Antenna 18 GHz - 26.5 GHz	114514	00167100	ETS Lindgren	2016-03-16	2018-03-16
0135	Semi Anechoic chamber	FACT 3	5720	ETS Lindgren	2016-04-28	2018-04-28
0329	Measurement Software	EMC32	100401	Rohde & Schwarz	N/A	N/A
0210	Communication tester	CMW500	147712	Rohde & Schwarz	N/A	N/A
0340	Communication tester	CMU200	104365	Rohde & Schwarz	N/A	N/A

A.2.3 Radiated Setup #2

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0420	Spectrum analyzer	FSV40	101556	Rohde & Schwarz	2016-04-15	2018-04-15
0248	Double Ridge Antenna with preamplifier 1 GHz – 18 GHz	3117-PA	00167062	ETS Lindgren	2016-07-26	2018-07-26
0138	Horn antenna 1 GHz – 18 GHz	3117	00152266	ETS Lindgren	2016-03-14	2018-03-14
0337	Full Anechoic chamber	RFD_FA_100	5996	ETS Lindgren	2016-04-28	2018-04-28
0530	Measurement Software	EMC32	100623	Rohde & Schwarz	N/A	N/A
0319	Wideband Radio Communication Tester	CMW500	152721	Rohde & Schwarz	2015-03-19	2017-03-19

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

Measurement type	Uncertainty [±dB]
Conducted Power (power meter)	± 1.0
Conducted spurious emission	± 2.9
Radiated test < 1GHz	± 3.8
Radiated test 1GHz - 26 GHz	± 4.7

Annex B. Test Results

B.1 Radiated RF power & Peak to average ratio

B.1.1 Standard references

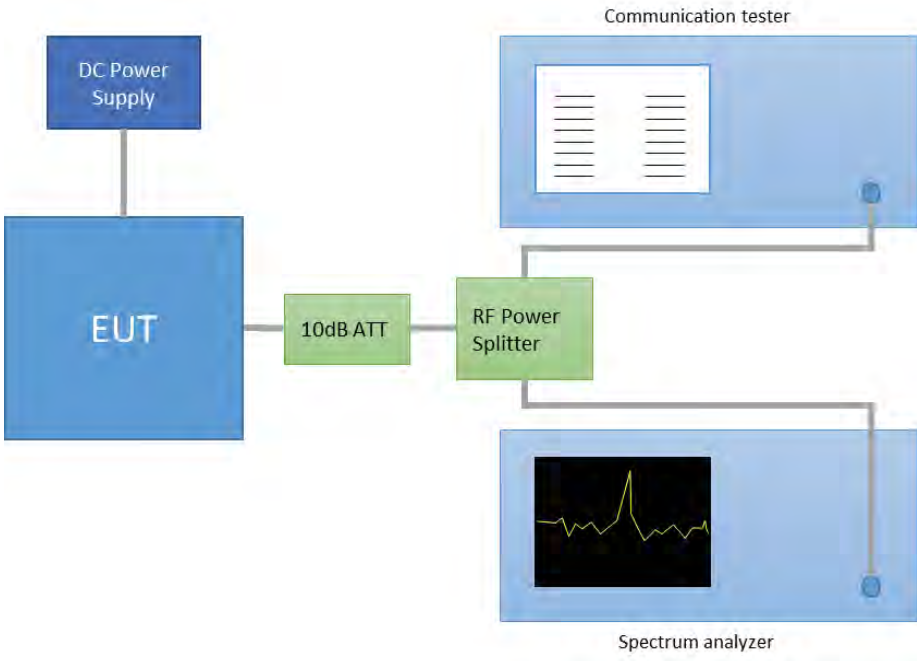
BAND	FCC part	RSS part	Radiated RF power Limits [Watts]	Declared max. Antenna Gain [dBi]
PCS 1900 WCDMA FDD II	2.1046, 24.232	133-ch6.4	< 2 watts EIRP	2.0
WCDMA FDD IV	2.1046, 27.50	139-ch.6.4, 199 ch.4.4	< 1 watts EIRP	2.0
GSM 850 WCDMA FDD V	2.1046, 22.913	132-ch.5.4	< 7 watts ERP	2.0

BAND	FCC part	RSS part	Peak to average ratio Limits
PCS 1900 WCDMA II	24.232	133-ch.6.4	In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAPR) of the transmission may not exceed 13 dB
GSM 850 WCDMA V	-	132-ch.5.4	
WCDMA IV	27.50	139-ch.6.5	

B.1.2 Test procedure

The radiated power is determined by adding the antenna gain to the conducted measured power. The setup below was used to measure the peak, the average power and the peak to average ratio. The antenna terminal of the EUT is connected to the spectrum analyzer and the communication tester through an attenuator and a power splitter. This test was performed according to the KDB 971168 D01 § 5.1 and 5.2 and 5.7.2.
PAPR is determined from:

$$PAPR(dB) = P_{Pk}(dBm) - P_{Avg}(dBm)$$



According to the KDB 412172 D01, the EIRP and ERP was determined with the following calculation:

$$EIRP = P_t + G_t$$
$$ERP = EIRP - 2.15$$

Where:

$EIRP$ = Equivalent Isotropically Radiated Power in **dBm.**
ERP = Equivalent Radiated Power in **dBm.**
G_t = Maximum antenna gain in **dBi**.

B.1.3 Results tables

Band	Mode	Channel Number	Frequency [MHz]	#UL Slots	Average power [dBm]	Peak power [dBm]	PAPR [dB]	Average ERP [W]	Peak ERP [W]
GSM850	GPRS GMSK	128	824.2	1	31.55	31.94	0.39	**1.38**	**1.51**
				2	31.34	31.93	0.59	1.32	1.51
				3	30.57	31.13	0.56	1.10	1.25
				4	29.32	29.88	0.56	**0.83**	**0.94**
		190	836.6	1	31.50	31.91	0.41	1.36	1.50
				2	31.36	31.89	0.53	1.32	1.49
				3	30.60	31.13	0.53	1.11	1.25
				4	29.35	29.88	0.53	**0.83**	**0.94**
		251	848.8	1	31.55	31.90	0.35	**1.38**	1.54
				2	31.49	31.90	0.41	1.36	1.50
				3	30.73	31.09	0.36	1.14	1.24
				4	29.56	29.91	0.35	0.87	0.95
	EDGE 8PSK	128	824.2	1	26.30	30.17	0.48	1.35	1.51
				2	26.31	30.13	0.59	1.32	**1.51**
				3	25.45	29.35	0.59	1.09	1.25
				4	24.40	28.25	0.59	**0.83**	0.95
		190	836.6	1	26.33	30.13	0.50	1.33	1.49
				2	26.23	30.04	0.52	1.32	1.49
				3	25.46	29.25	0.53	1.11	1.25
				4	24.34	28.01	0.52	0.84	**0.94**
		251	848.8	1	26.31	29.89	0.37	1.38	1.50
				2	26.20	29.82	0.36	1.36	1.48
				3	25.45	29.06	0.37	1.14	1.24
				4	24.30	27.88	0.36	0.87	**0.94**

Max values
Min values

Band	Mode	Channel Number	Frequency [MHz]	#UL Slots	Avera power [dBm]	Peak power [dBm]	PAPR [dB]	Average EIRP [W]	Peak EIRP [W]
PCS 1900	GPRS GMSK	512	1850.2	1	29.82	29.86	0.01	**1.52**	**1.53**
				2	29.80	29.84	0.03	1.51	**1.53**
				3	29.81	29.85	0.02	**1.52**	**1.53**
				4	29.80	29.83	0.02	1.51	1.52
		661	1880	1	29.77	29.80	0.02	1.50	1.51
				2	29.77	29.81	0.04	1.50	1.52
				3	28.46	29.80	0.04	1.11	1.51
				4	29.79	29.81	0.02	1.51	1.52
		810	1909.8	1	29.79	29.80	0.02	1.51	1.51
				2	29.79	29.80	0.03	1.51	1.51
				3	29.78	29.80	0.03	1.51	1.51
				4	29.78	29.79	0.03	1.51	1.51
	EDGE 8PSK	512	1850.2	1	28.30	28.58	0.04	1.07	1.14
				2	28.03	28.75	0.04	1.01	1.19
				3	27.49	27.94	0.04	0.89	0.99
				4	26.56	26.87	0.03	**0.72**	**0.77**
		661	1880	1	28.80	28.93	0.03	1.20	1.24
				2	28.46	28.84	0.04	1.11	1.21
				3	28.04	28.11	0.03	1.01	1.03
				4	27.02	27.07	0.04	0.80	0.81
		810	1909.8	1	29.01	29.18	0.01	1.26	1.31
				2	28.88	29.15	0.01	1.22	1.30
				3	28.69	28.70	0.02	1.17	1.17
				4	27.30	27.38	0.01	0.85	0.87

Max values
Min values

Band	Mode	Channel Number	Frequency [MHz]	Subtest	Avera power [dBm]	Peak power [dBm]	PAPR [dB]	Average EIRP [W]	Peak EIRP [W]
WCDMA FDD II	RMC	9262	1852.4	-	23.35	25.96	2.61	0.34	0.63
		9400	1880	-	22.38	25.55	3.17	0.27	0.57
		9538	1907.6	-	23.97	27.01	3.04	**0.40**	0.80
	HSDPA	9262	1852.4	1	23.49	25.96	2.47	0.35	0.63
				2	23.29	26.66	3.37	0.34	0.73
				3	22.81	26.45	3.64	0.30	0.70
				4	22.60	26.23	3.63	0.29	0.67
		9400	1880	1	22.42	25.65	3.23	0.28	0.58
				2	22.28	26.24	3.96	0.27	0.67
				3	21.84	26.28	4.44	0.24	0.67
				4	21.69	26.09	4.40	0.23	0.64
		9538	1907.6	1	23.68	27.41	2.99	0.38	0.76
				2	23.82	26.81	3.73	0.37	0.87
				3	23.27	27.35	4.08	0.34	0.86
				4	23.12	27.15	4.03	0.33	0.82
	HSUPA	9262	1852.4	1	23.44	26.69	3.25	0.35	0.74
				2	20.80	26.06	5.26	0.19	0.64
				3	22.92	26.55	3.63	0.31	0.72
				4	21.28	25.96	4.68	0.21	0.63
				5	23.26	26.31	3.05	0.34	0.68
		9400	1880	1	22.57	26.40	3.83	0.29	0.69
				2	20.57	25.97	5.40	**0.18**	0.63
				3	22.01	26.33	4.32	0.25	0.68
				4	21.63	24.76	3.13	0.23	**0.47**
				5	22.27	26.61	4.34	0.27	0.73
		9538	1907.6	1	23.93	27.52	3.59	0.39	0.90
				2	21.19	26.74	5.55	0.21	0.75
				3	22.12	27.07	4.95	0.26	0.81
				4	21.45	25.46	4.01	0.22	0.56
				5	23.93	27.63	3.70	0.39	**0.92**

Max values
Min values

Band	Mode	Channel Number	Frequency [MHz]	Subtest	Avera power [dBm]	Peak power [dBm]	PAPR [dB]	Average EIRP [W]	Peak EIRP [W]
WCDMA FDD IV	RMC	1312	1712.4	-	23.32	26.19	2.87	**0.34**	0.66
		1413	1732.6	-	22.84	26.04	3.20	0.30	0.64
		1513	1752.6	-	22.73	25.64	2.91	0.30	0.58
	HSDPA	1312	1712.4	1	23.18	26.08	2.90	0.33	0.64
				2	22.88	26.75	3.87	0.31	0.75
				3	22.66	26.88	4.22	0.29	0.77
				4	22.47	26.67	4.20	0.28	0.74
		1413	1732.6	1	22.67	25.97	3.30	0.29	0.63
				2	22.35	26.60	4.25	0.27	0.72
				3	22.15	26.78	4.63	0.26	0.76
				4	21.97	26.60	4.63	0.25	0.72
		1513	1752.6	1	22.55	25.51	2.96	0.29	0.56
				2	22.24	26.08	3.84	0.27	0.64
				3	21.93	26.22	4.29	0.25	0.66
				4	21.76	26.07	4.31	0.24	0.64
	HSUPA	1312	1712.4	1	21.59	25.67	4.08	0.23	0.58
				2	20.70	26.49	5.79	0.19	0.71
				3	21.71	26.78	5.07	0.23	0.76
				4	20.94	26.28	5.34	0.20	0.67
				5	22.98	26.87	3.89	0.31	0.77
		1413	1732.6	1	21.23	26.67	5.44	0.21	0.74
				2	20.20	26.49	6.29	**0.17**	0.71
				3	21.33	26.82	5.49	0.22	0.76
				4	20.41	26.15	5.74	**0.17**	0.65
				5	22.54	27.04	4.50	0.28	**0.80**
		1513	1752.6	1	21.10	25.30	4.20	0.20	**0.54**
				2	20.19	26.22	6.03	**0.17**	0.66
				3	21.19	26.36	5.17	0.21	0.69
				4	20.46	25.79	5.33	0.18	0.60
				5	22.44	26.43	3.99	0.28	0.70

Max values
Min values

Band	Mode	Channel Number	Frequency [MHz]	Subtest	Avera power [dBm]	Peak power [dBm]	PAPR [dB]	Average ERP [W]	Peak ERP [W]
WCDMA FDD V	RMC	4132	826.4	-	23.06	26.98	3.92	**0.20**	0.37
		4183	836.6	-	22.98	26.07	3.09	0.19	0.39
		4233	846.6	-	22.92	25.28	2.36	0.19	0.33
	HSDPA	4132	826.4	1	23.00	26.14	3.14	0.19	0.40
				2	23.03	27.47	4.44	0.19	0.54
				3	22.97	27.57	4.60	0.19	0.55
				4	22.78	27.39	4.61	0.18	0.53
		4183	836.6	1	22.93	26.33	3.40	0.19	0.41
				2	22.96	27.62	4.66	0.19	**0.56**
				3	22.91	27.60	4.69	0.19	**0.56**
				4	22.72	27.39	4.67	0.18	0.53
		4233	846.6	1	22.89	25.26	2.37	0.19	0.32
				2	22.96	26.52	3.56	0.19	0.43
				3	22.90	26.57	3.67	0.19	0.44
				4	22.71	26.36	3.65	0.18	0.42
	HSUPA	4132	826.4	1	21.45	25.76	4.31	0.13	0.36
				2	20.37	26.26	5.89	0.11	0.41
				3	21.42	26.69	5.27	0.13	0.45
				4	20.63	25.99	5.36	0.11	0.38
				5	22.62	26.83	4.21	0.18	0.47
		4183	836.6	1	21.47	25.78	4.31	0.14	0.37
				2	20.34	26.46	6.12	**0.10**	0.43
				3	21.48	26.56	5.08	0.14	0.44
				4	20.54	26.13	5.59	0.11	0.40
				5	22.58	26.83	4.25	0.17	0.47
		4233	846.6	1	21.29	24.45	3.16	0.13	0.27
				2	20.25	25.11	4.86	**0.10**	0.31
				3	21.34	25.33	3.99	0.13	0.33
				4	20.58	24.78	4.20	0.11	**0.29**
				5	22.45	25.48	3.03	0.17	0.34

Max values
Min values

B.2 Occupied bandwidth

B.2.1 Standard references

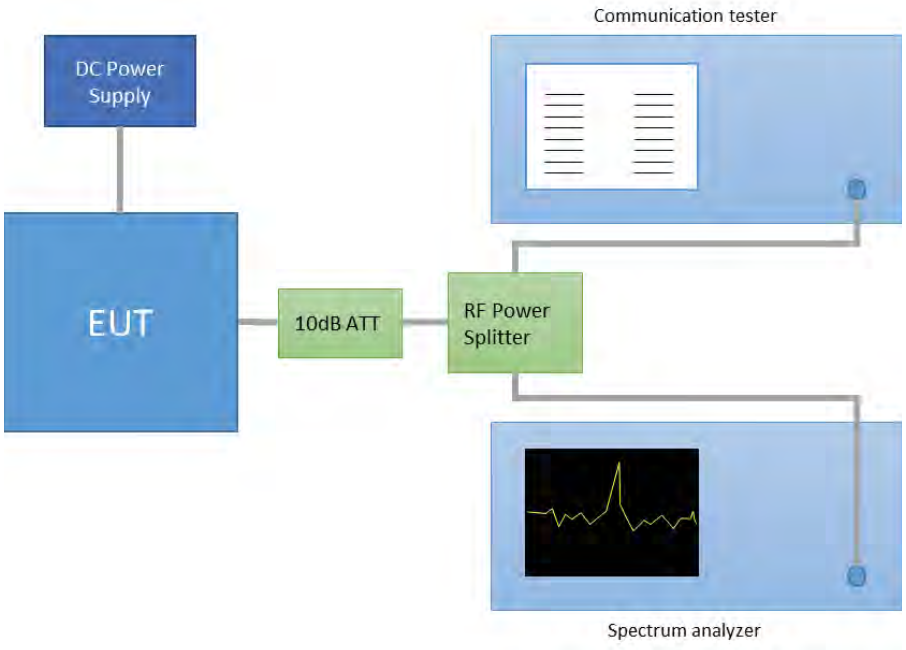
BAND	FCC part	RSS part
PCS 1900, WCDMA FDD II	2.1049, 24.238	133-ch2.3
WCDMA FDD IV	2.1049, 27.53	-
GSM 850, WCDMA FDD V	2.1049, 22.917	-

B.2.2 Test procedure

This test was performed according to the KDB 971168 D01 § 4.1 Occupied bandwidth – relative (-26dB OBW) measurement procedure and § 4.2 Occupied bandwidth – power bandwidth (99%) measurement procedure.

The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in the worst case modes selected from Conducted RF output power.

The setup below was used to measure the transmitted occupied bandwidth. The antenna terminal of the EUT is connected to the spectrum analyzer and the communication tester through an attenuator and a power splitter.



B.2.3 Results tables

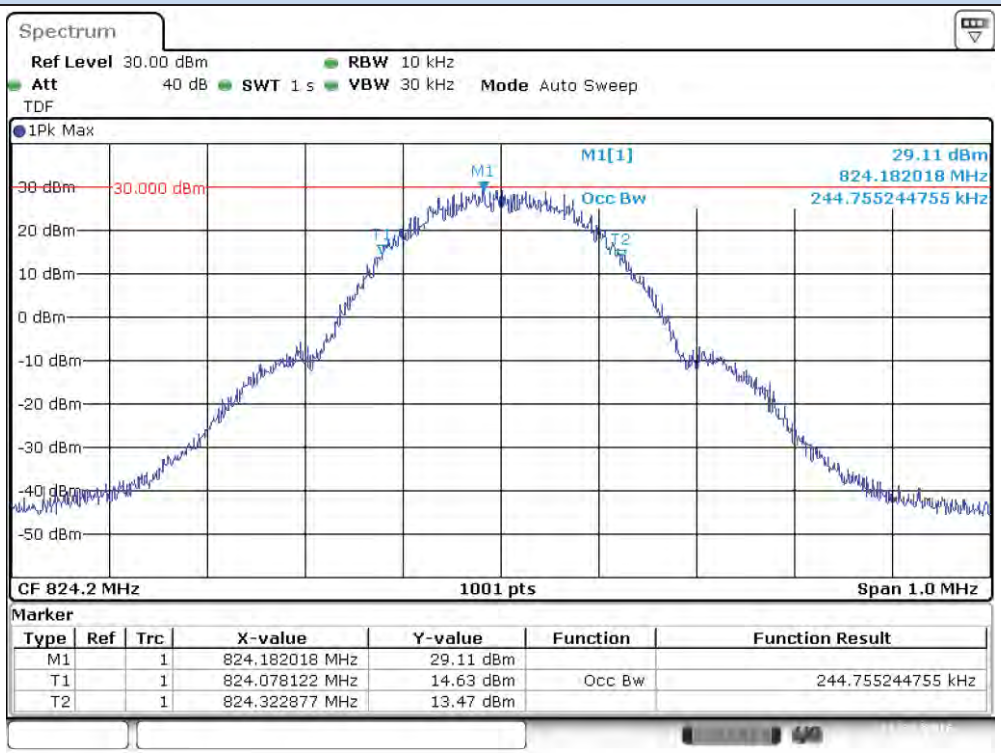
Band	Mode	Channel #	Freq [MHz]	OBW [MHz]	EBW [MHz]
GSM850	GPRS GMSK	128	824.2	**0.245**	0.318
		190	836.6	0.242	0.322
		251	848.8	0.243	0.316
	EDGE 8PSK	128	824.2	**0.248**	0.313
		190	836.6	0.244	0.307
		251	848.8	0.244	0.308
PCS 1900	GPRS GMSK	512	1850.2	0.243	0.314
		661	1880	**0.247**	0.317
		810	1909.8	0.245	0.315
	EDGE 8PSK	512	1850.2	0.253	0.324
		661	1880	**0.254**	0.325
		810	1909.8	0.247	0.334

Band	Mode	Channel #	Freq [MHz]	OBW [MHz]	EBW [MHz]
WCDMA FDD II	RMC	9262	1852.4	**4.18**	4.71
		9400	1880.0	4.06	4.67
		9538	1907.6	4.08	4.65
	HSDPA	9262	1852.4	4.06	4.66
		9400	1880.0	4.06	4.65
		9538	1907.6	4.05	4.66
	HSUPA	9262	1852.4	4.06	4.65
		9400	1880.0	4.06	4.64
		9538	1907.6	4.05	4.65
WCDMA FDD IV	RMC	1312	1712.4	**4.09**	4.70
		1413	1732.6	4.06	4.66
		1513	1752.6	4.06	4.67
	HSDPA	1312	1712.4	4.06	4.66
		1413	1732.6	4.06	4.66
		1513	1752.6	4.08	4.67
	HSUPA	1312	1712.4	4.06	4.67
		1413	1732.6	4.06	4.66
		1513	1752.6	4.08	4.64
WCDMA FDD V	RMC	4132	826.4	4.06	4.66
		4183	836.6	4.06	4.64
		4233	846.6	4.11	4.73
	HSDPA	4132	826.4	4.05	4.67
		4183	836.6	4.06	4.66
		4233	846.6	4.10	4.71
	HSUPA	4132	826.4	4.05	4.67
		4183	836.6	4.08	4.64
		4233	846.6	**4.11**	4.77

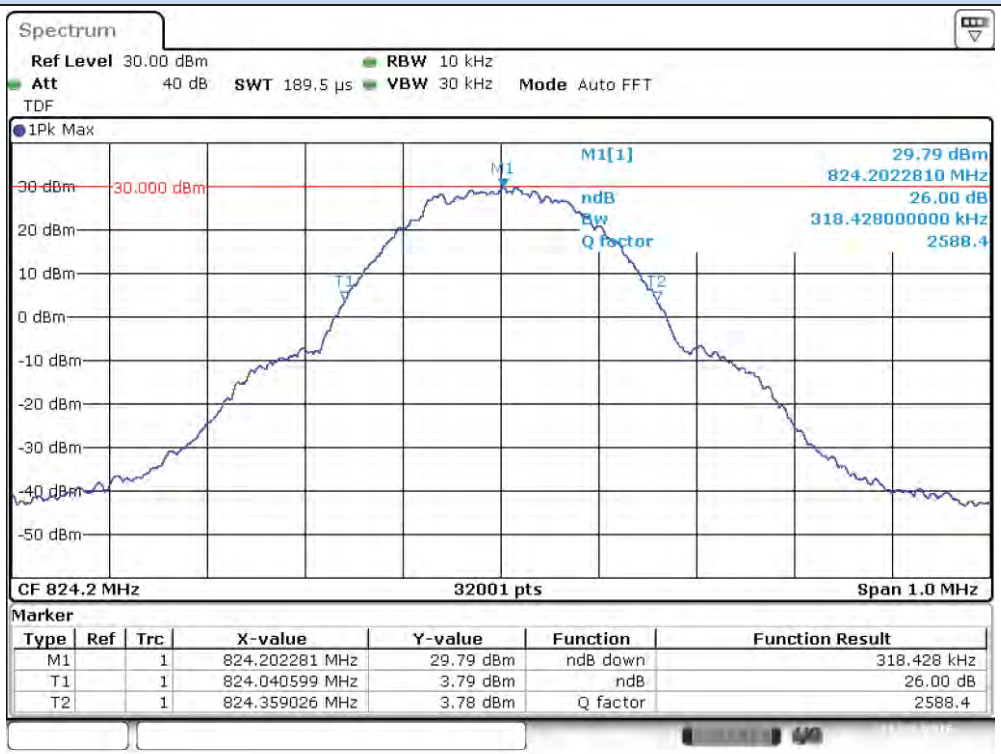
Max values

B.2.4 Results screenshot

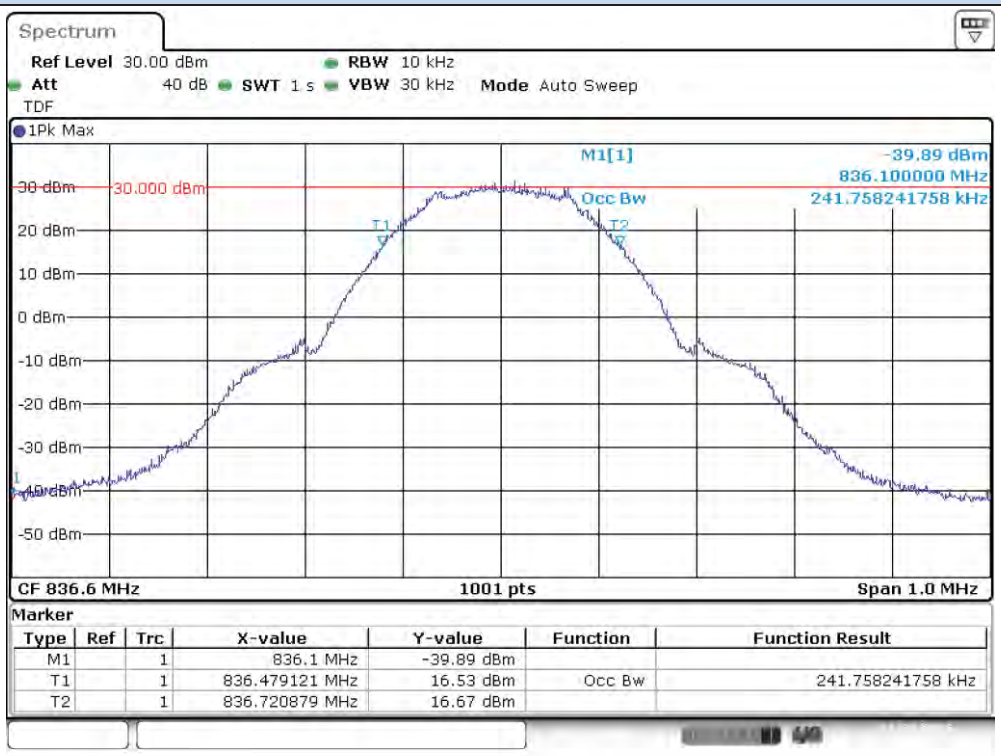
GSM850 GPRS GMSK Low channel 128 – OBW



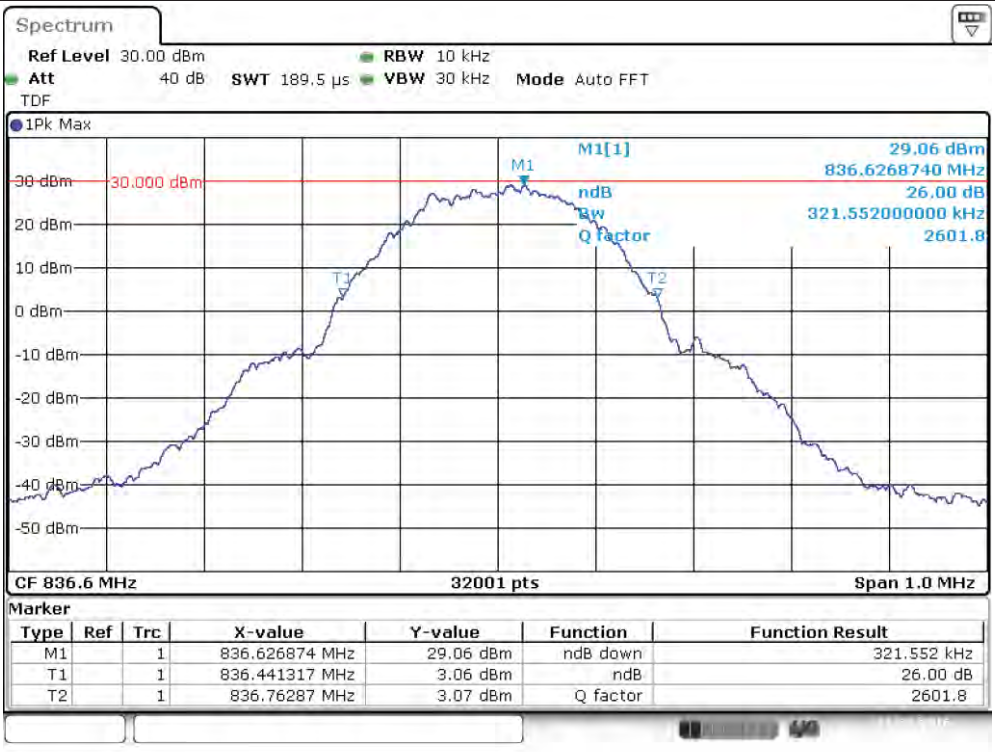
GSM850 GPRS GMSK Low channel 128 – EBW



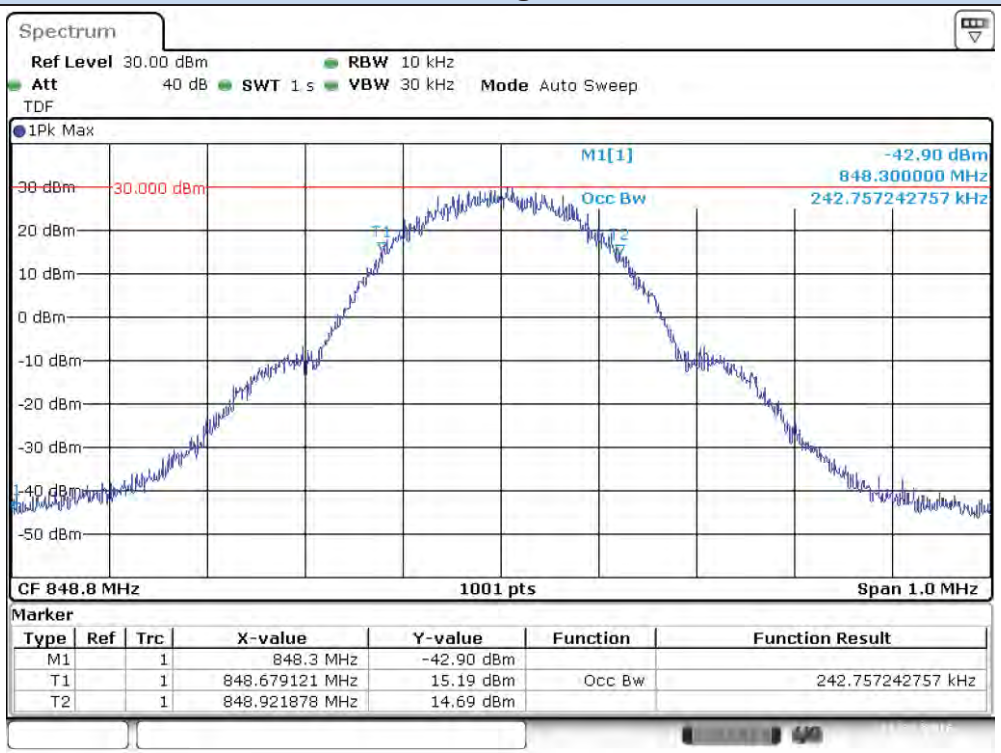
GSM850 GPRS GMSK Mid channel 190 – OBW



GSM850 GPRS GMSK Mid channel 190 – EBW



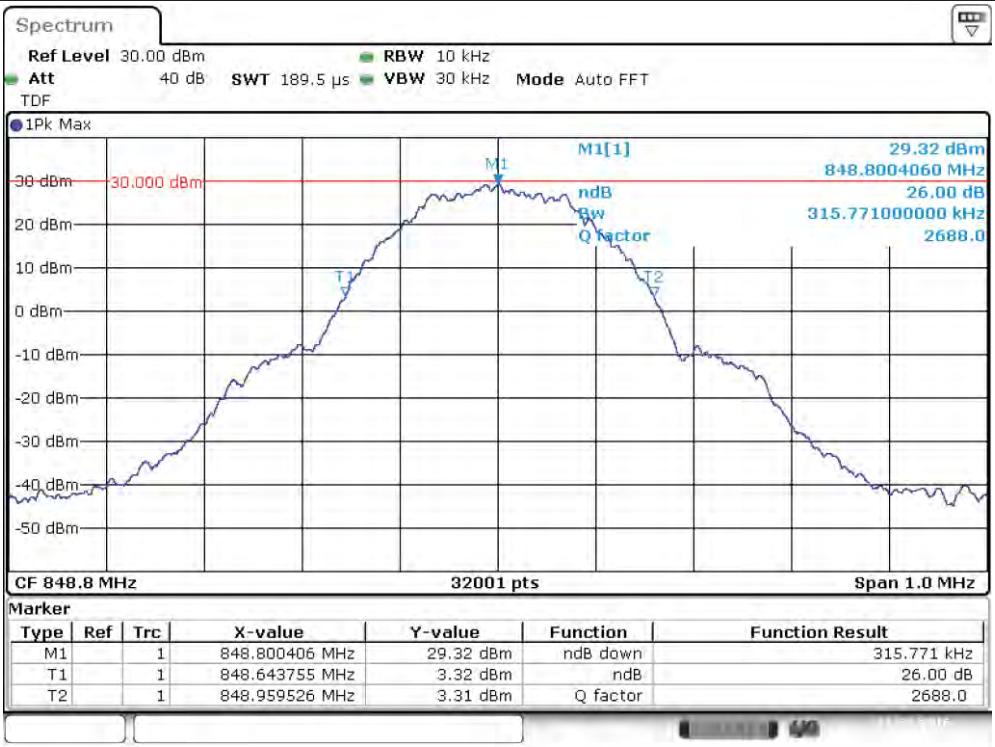
GSM850 GPRS GMSK High channel 251 – OBW



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	848.3 MHz	-42.90 dBm		
T1		1	848.679121 MHz	15.19 dBm	Occ Bw	242.757242757 kHz
T2		1	848.921878 MHz	14.69 dBm		

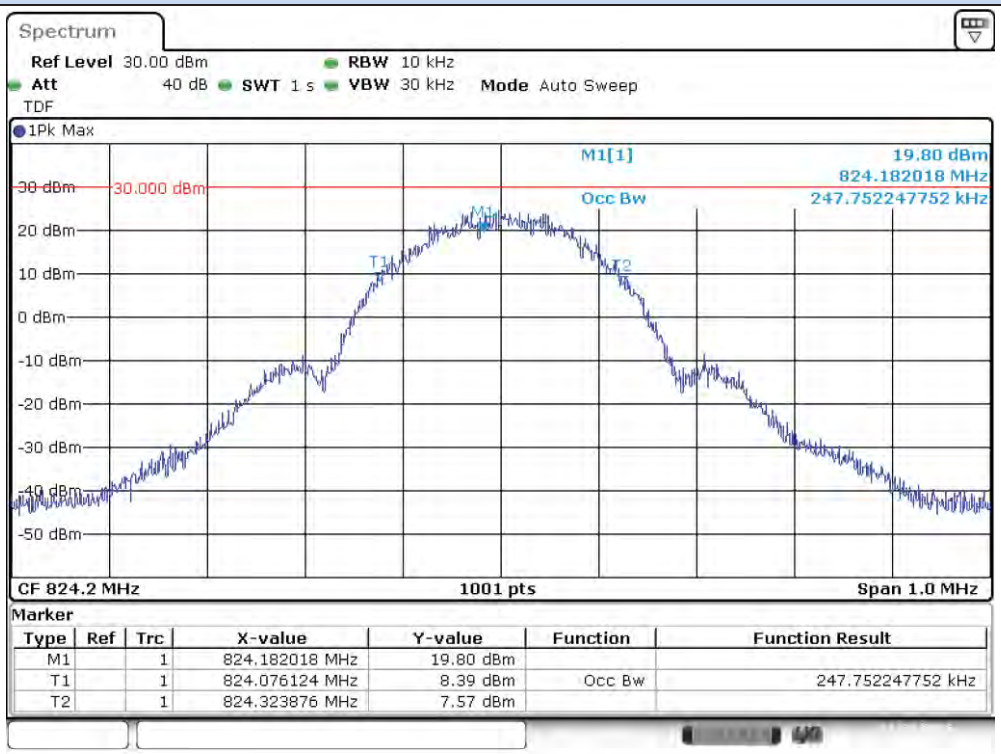
GSM850 GPRS GMSK High channel 251 – EBW



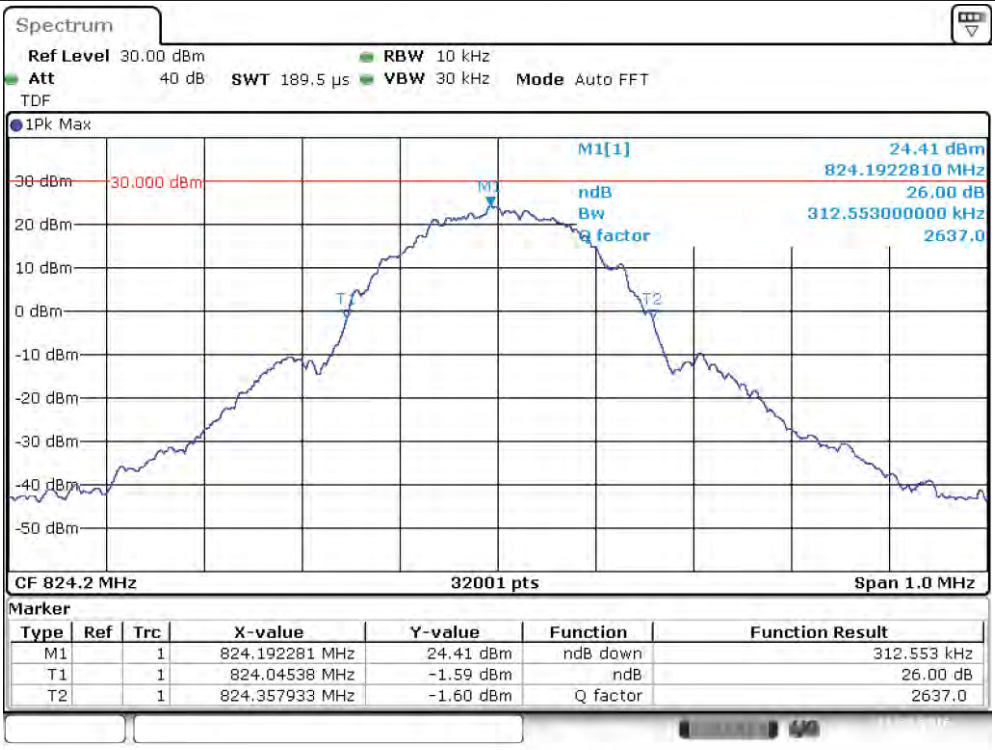
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	848.800406 MHz	29.32 dBm	ndB down	315.771 kHz
T1		1	848.643755 MHz	3.32 dBm	ndB	26.00 dB
T2		1	848.959526 MHz	3.31 dBm	Q factor	2688.0

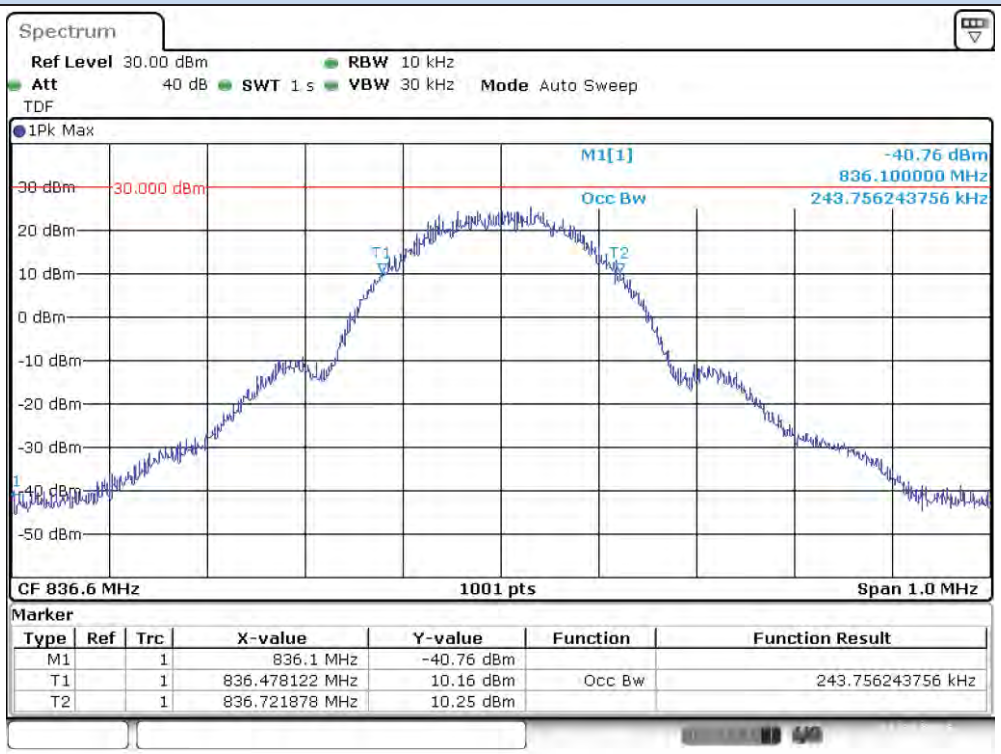
GSM850 EDGE 8PSK Low channel 128 – OBW



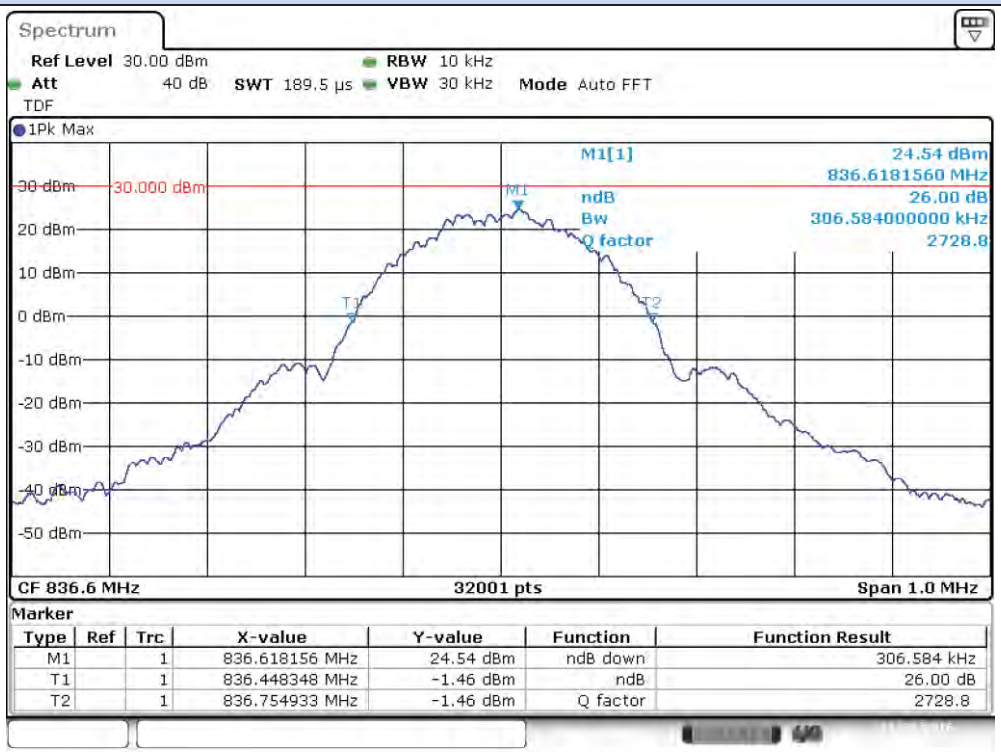
GSM850 EDGE 8PSK Low channel 128 – EBW



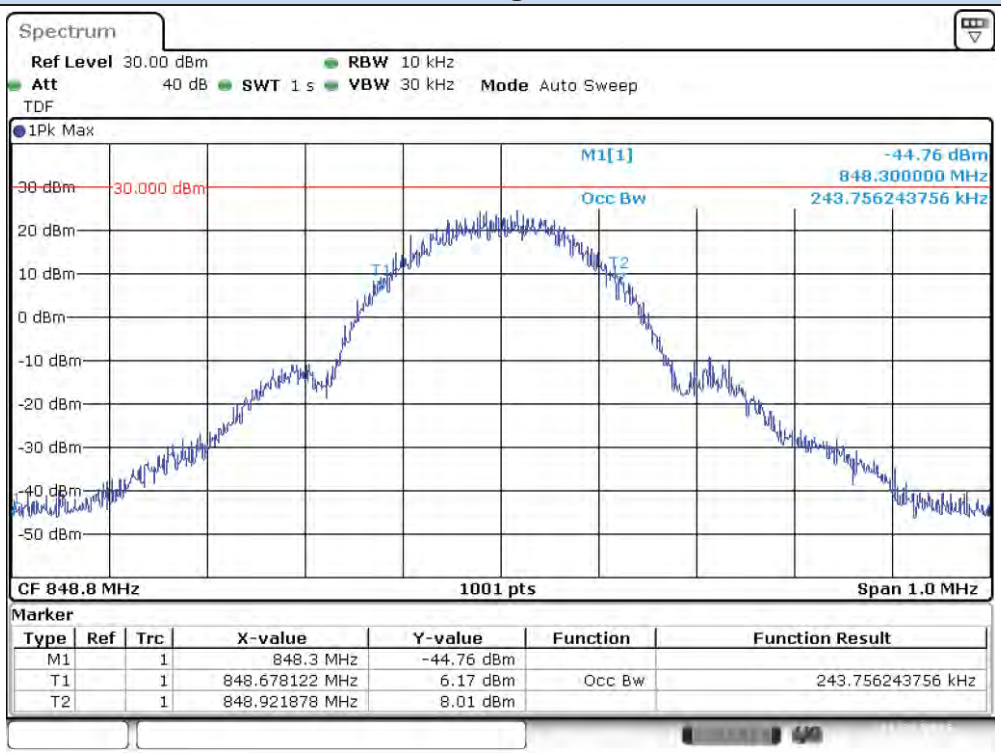
GSM850 EDGE 8PSK Mid channel 190 – OBW



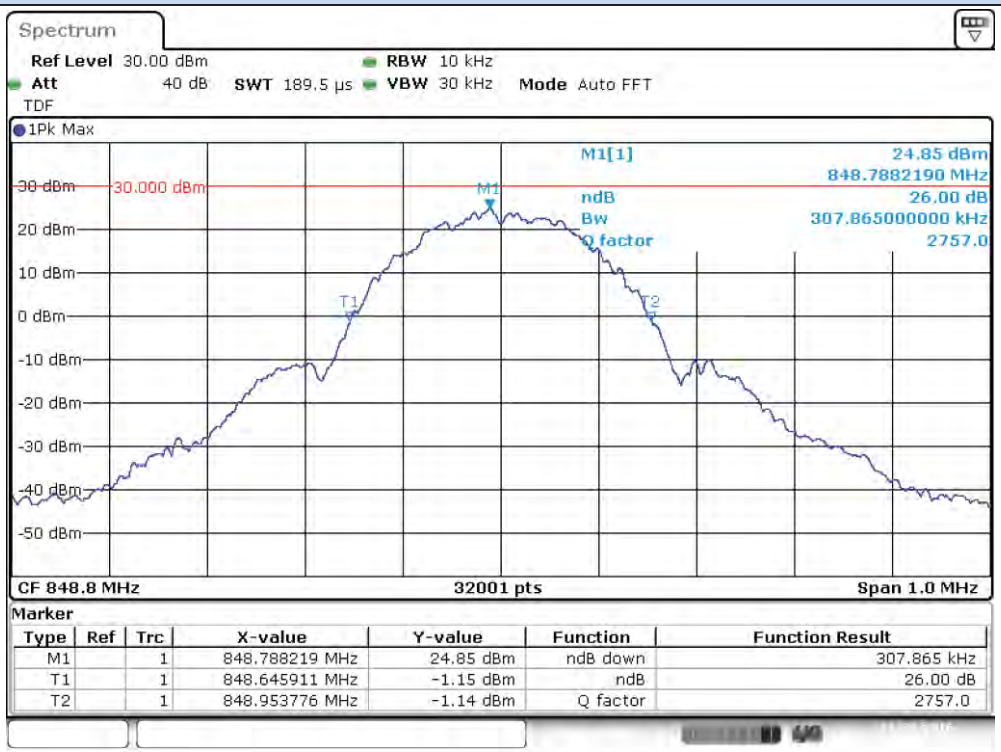
GSM850 EDGE 8PSK Mid channel 190 – EBW



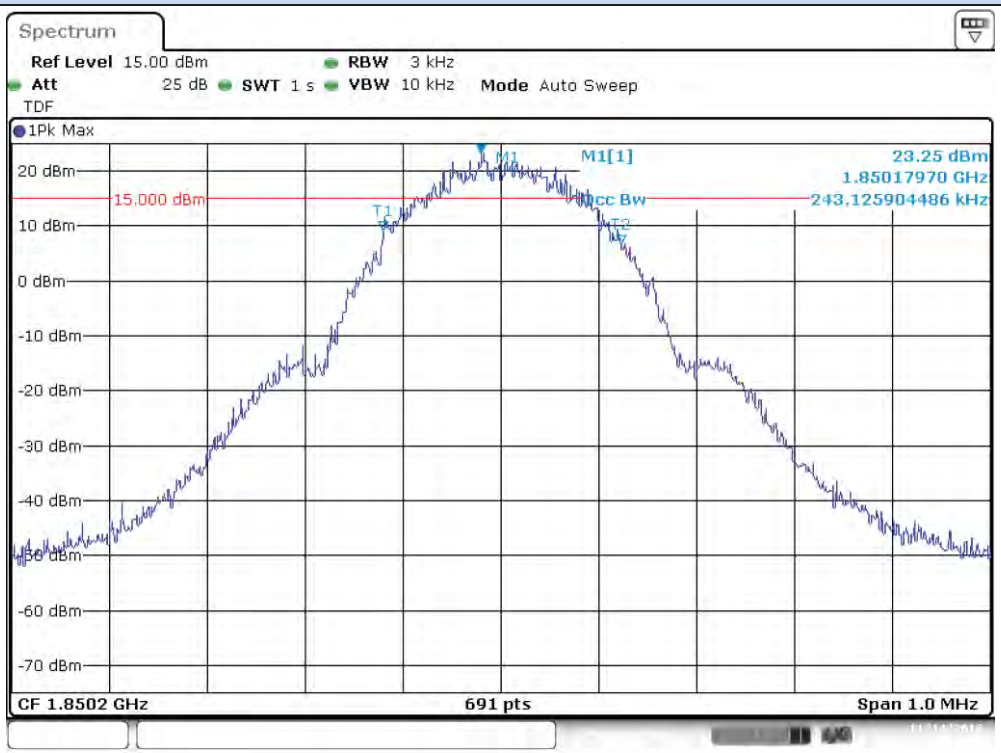
GSM850 EDGE 8PSK High channel 251 – OBW



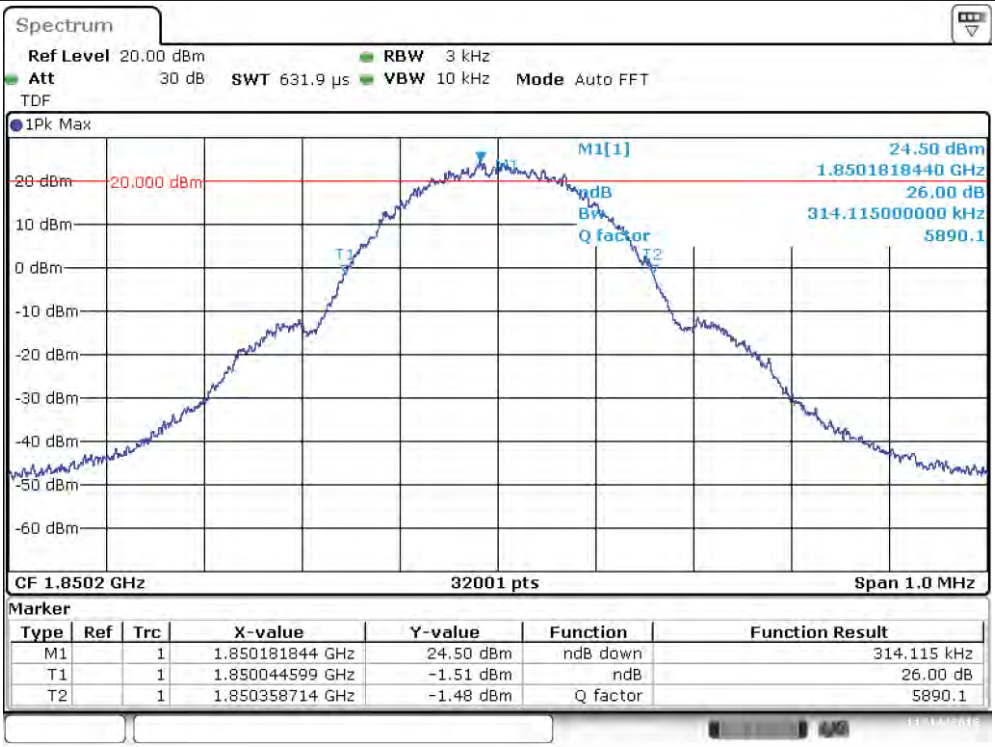
GSM850 EDGE 8PSK High channel 251 – EBW



PCS1900 GPRS GMSK Low channel 512 – OBW

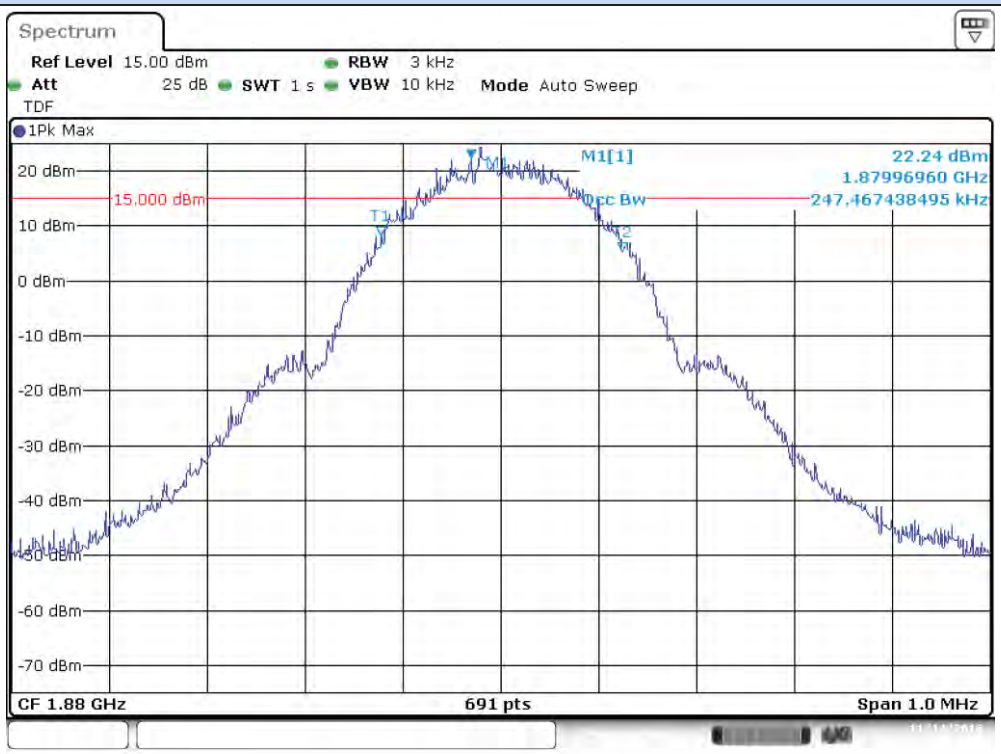


PCS1900 GPRS GMSK Low channel 512 – EBW

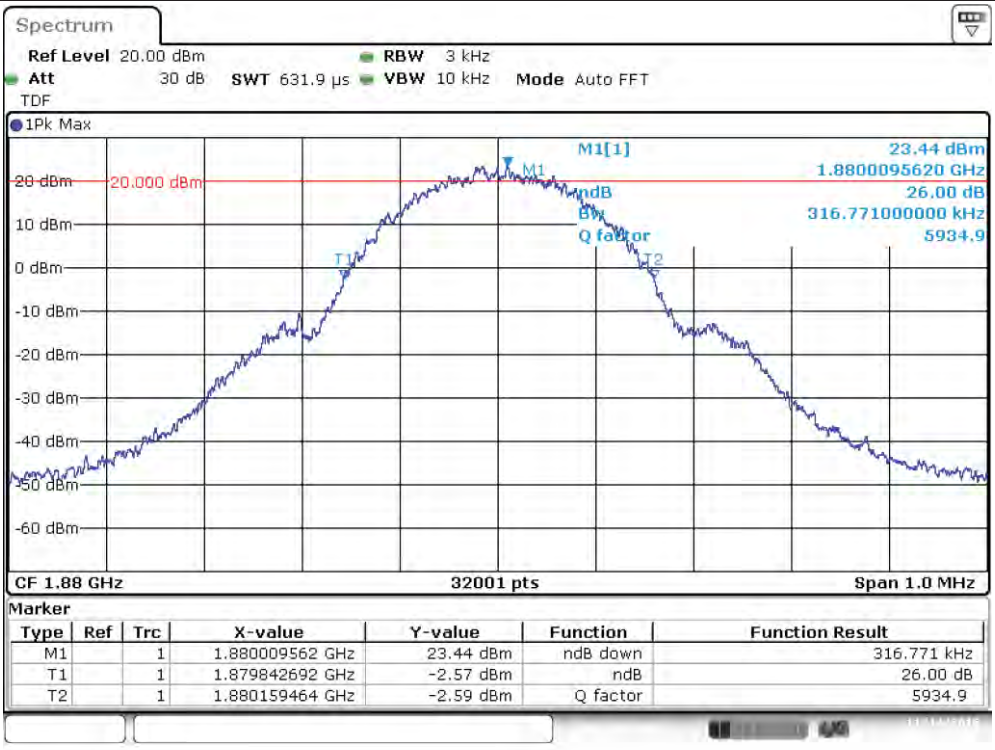


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.850181844 GHz	24.50 dBm	ndB down	314.115 kHz
T1		1	1.850044599 GHz	-1.51 dBm	ndB	26.00 dB
T2		1	1.850358714 GHz	-1.48 dBm	Q factor	5890.1

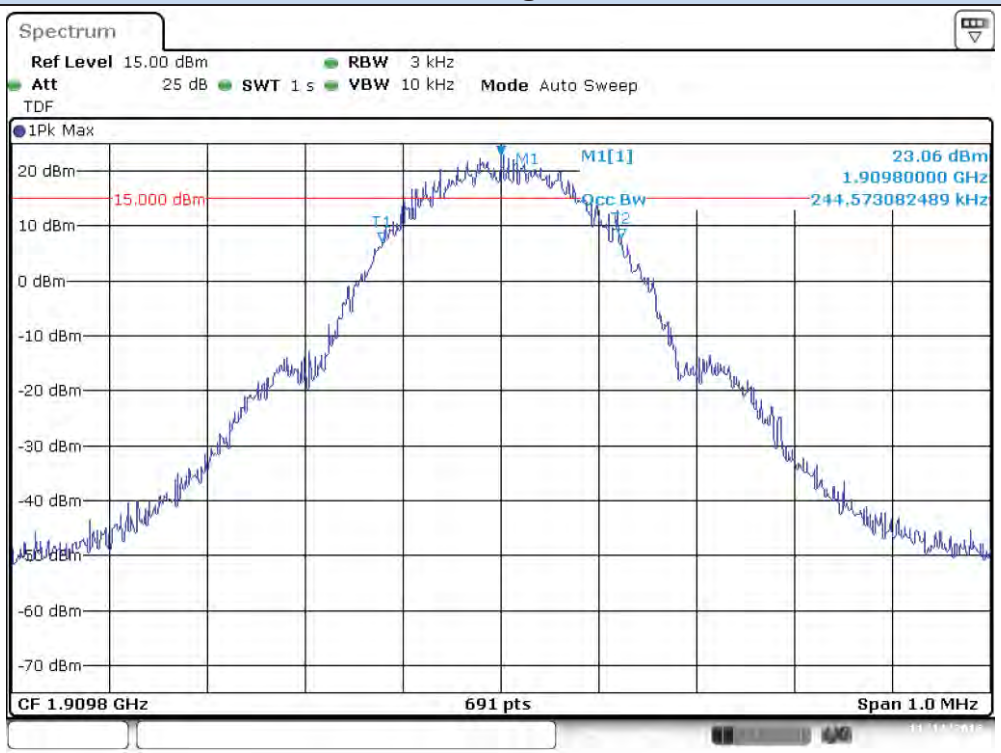
PCS1900 GPRS GMSK Mid channel 661 – OBW



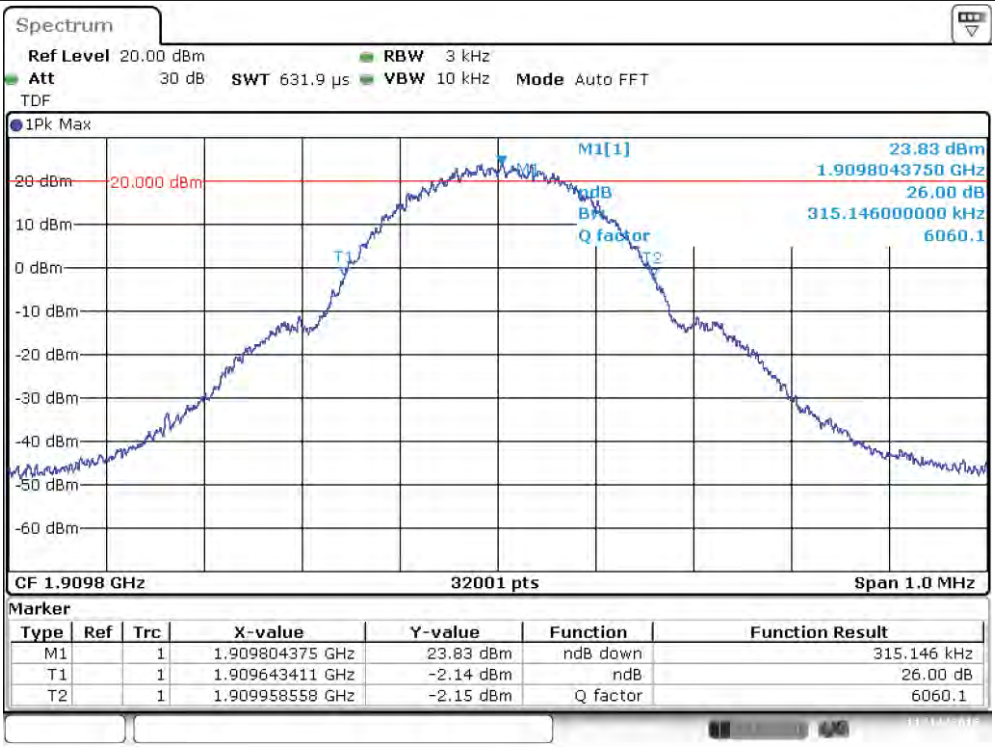
PCS1900 GPRS GMSK Mid channel 661 – EBW



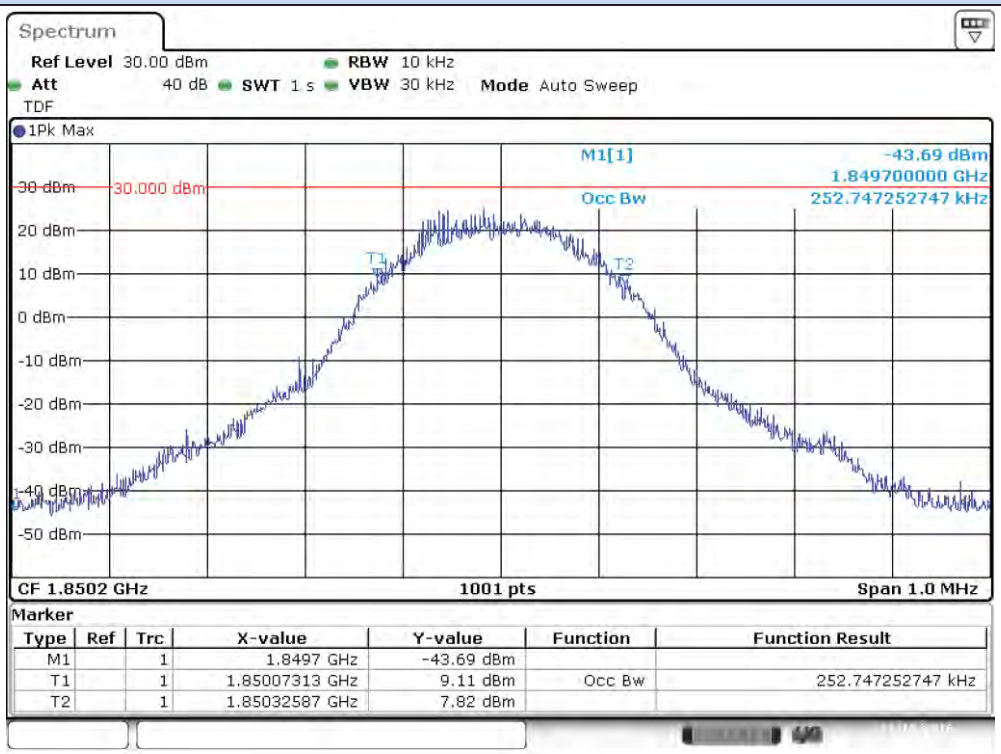
PCS1900 GPRS GMSK High channel 810 – OBW



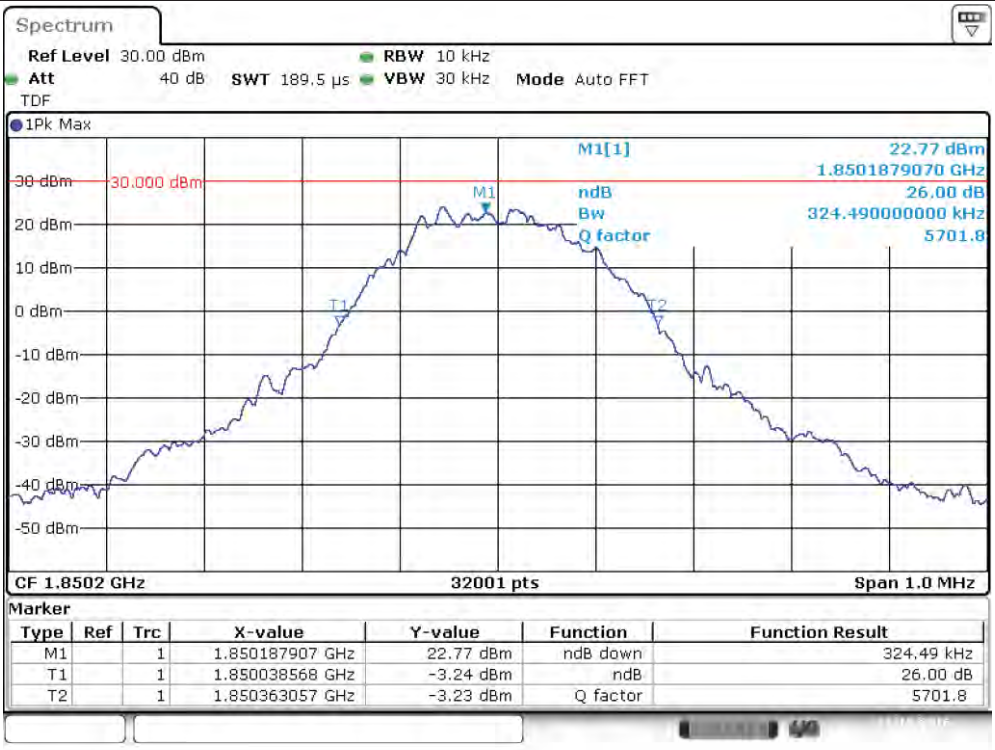
PCS1900 GPRS GMSK High channel 810 – EBW



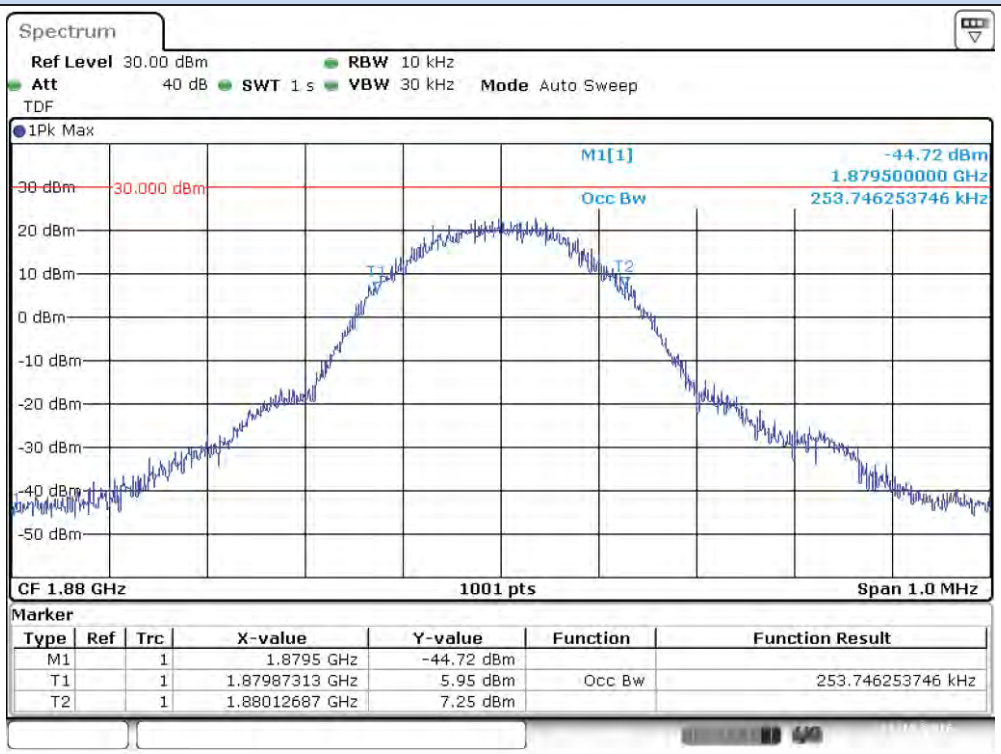
PCS1900 EDGE 8PSK Low channel 512 – OBW



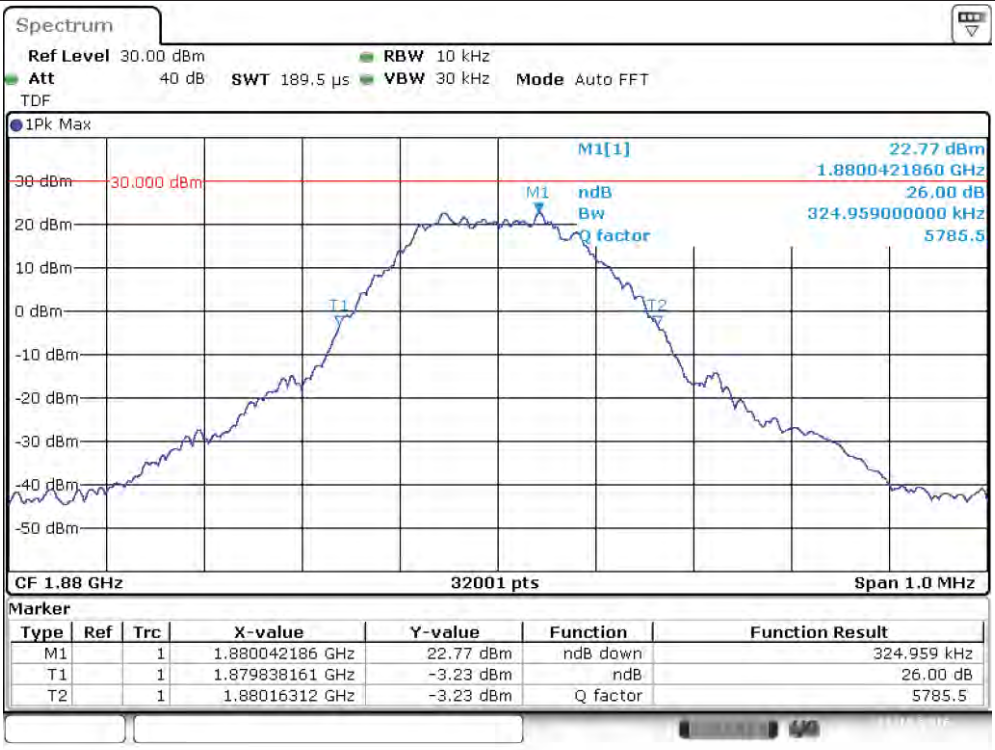
PCS1900 EDGE 8PSK Low channel 512 – EBW



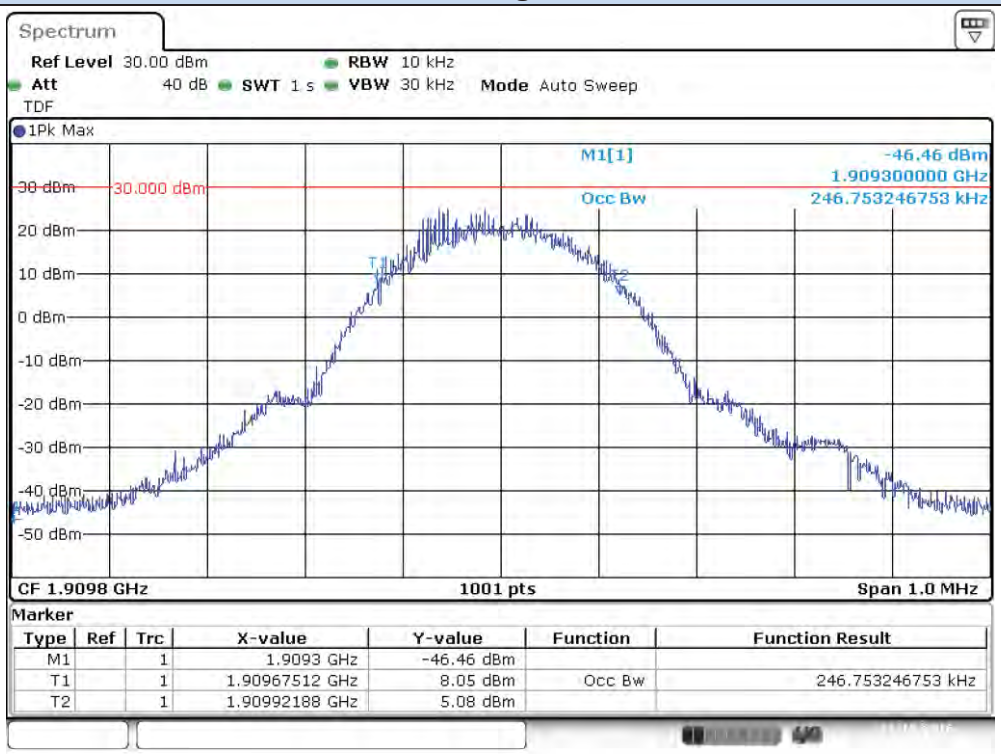
PCS1900 EDGE 8PSK Mid channel 661 – OBW



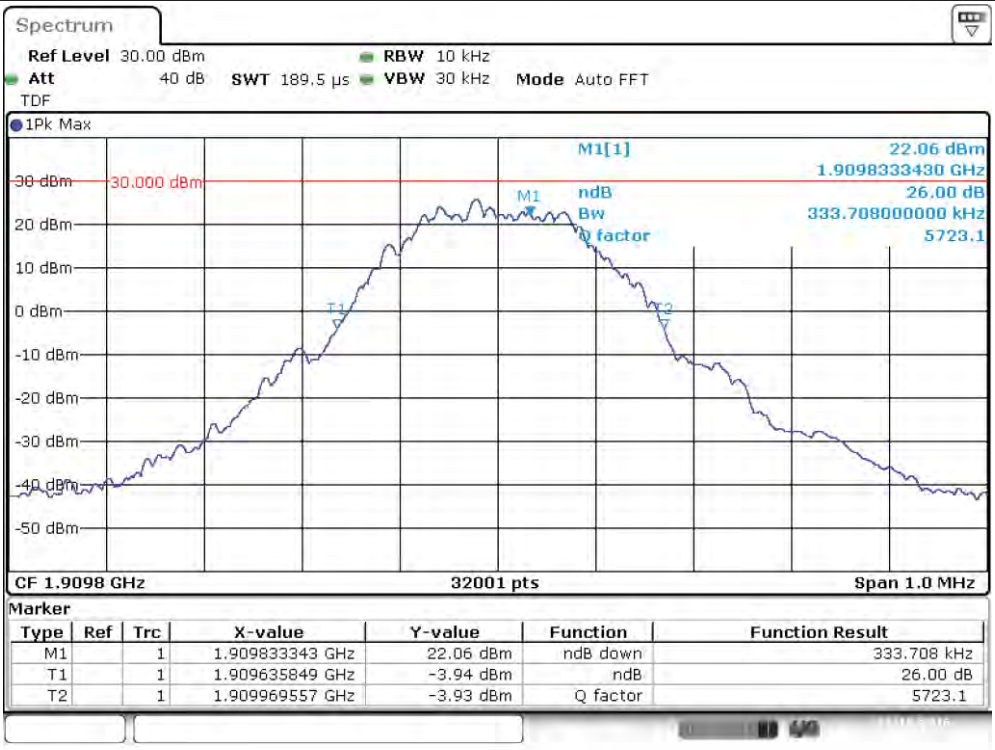
PCS1900 EDGE 8PSK Mid channel 661 – EBW



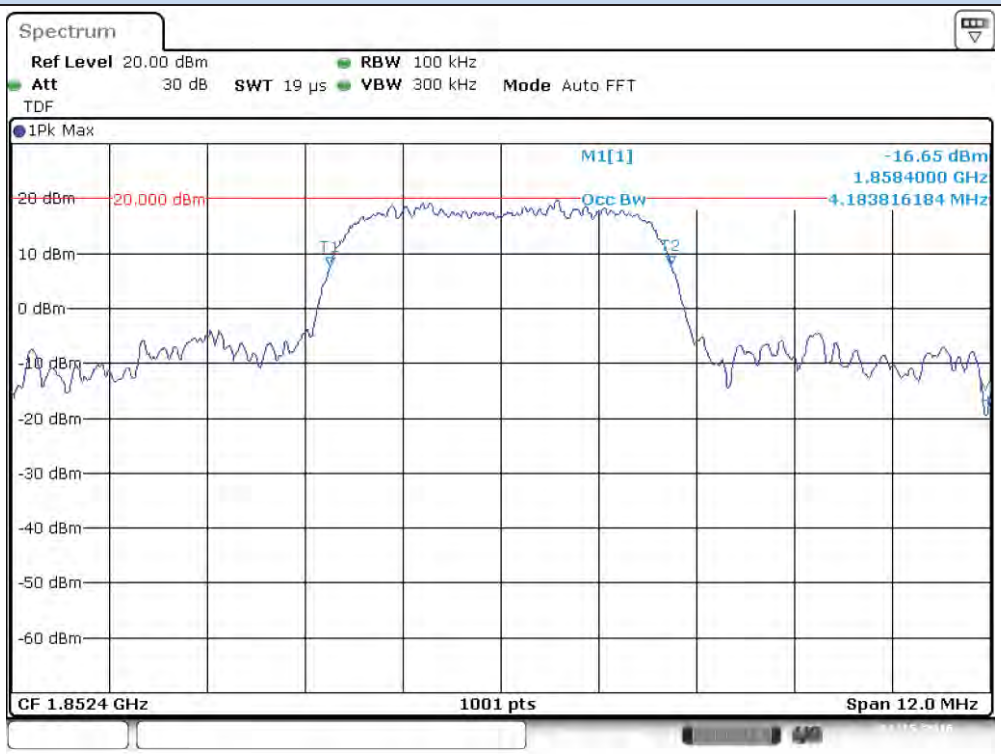
PCS1900 EDGE 8PSK High channel 810 – OBW



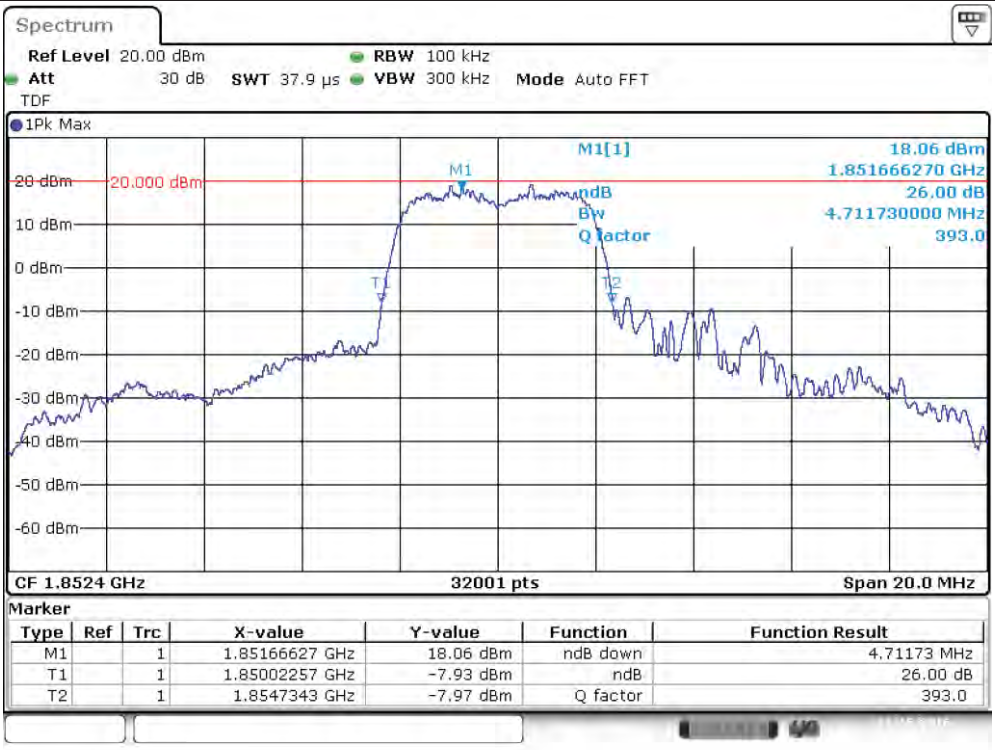
PCS1900 EDGE 8PSK High channel 810 – EBW



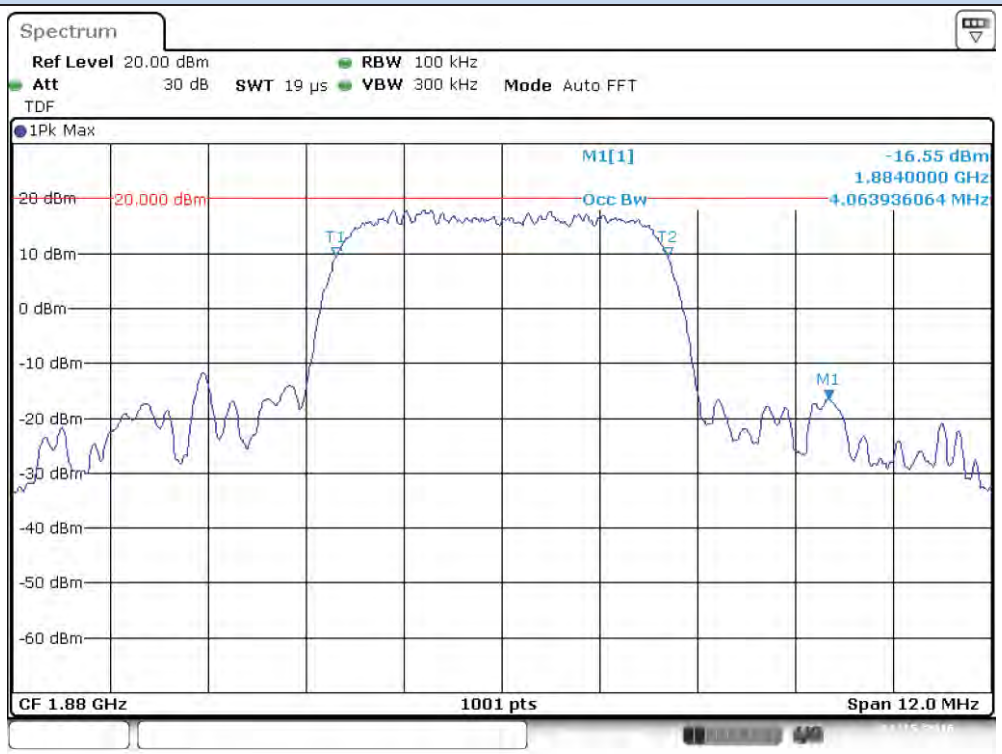
WCDMA Band II RMC Low channel 9262 – OBW



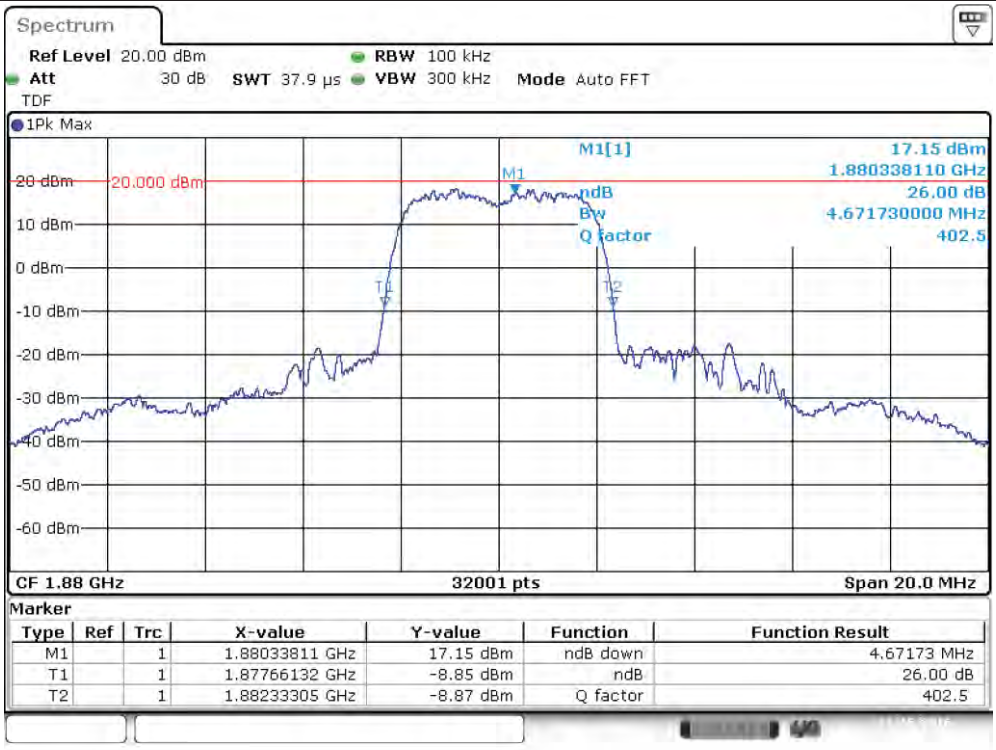
WCDMA Band II RMC Low channel 9262 – EBW



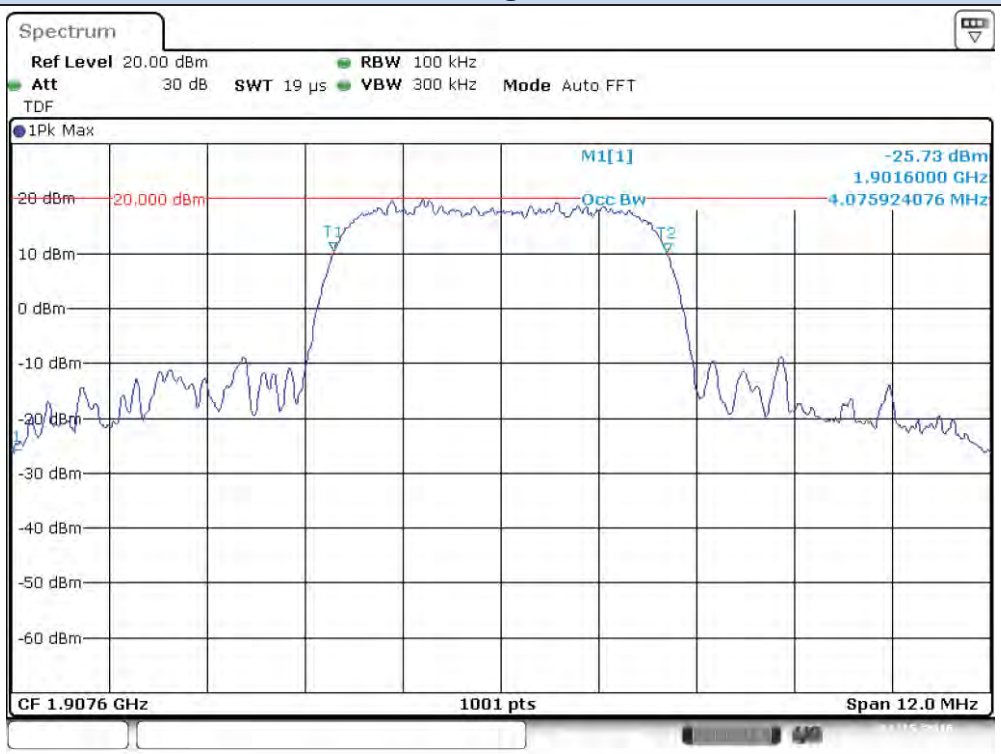
WCDMA Band II RMC Mid channel 9400 – OBW



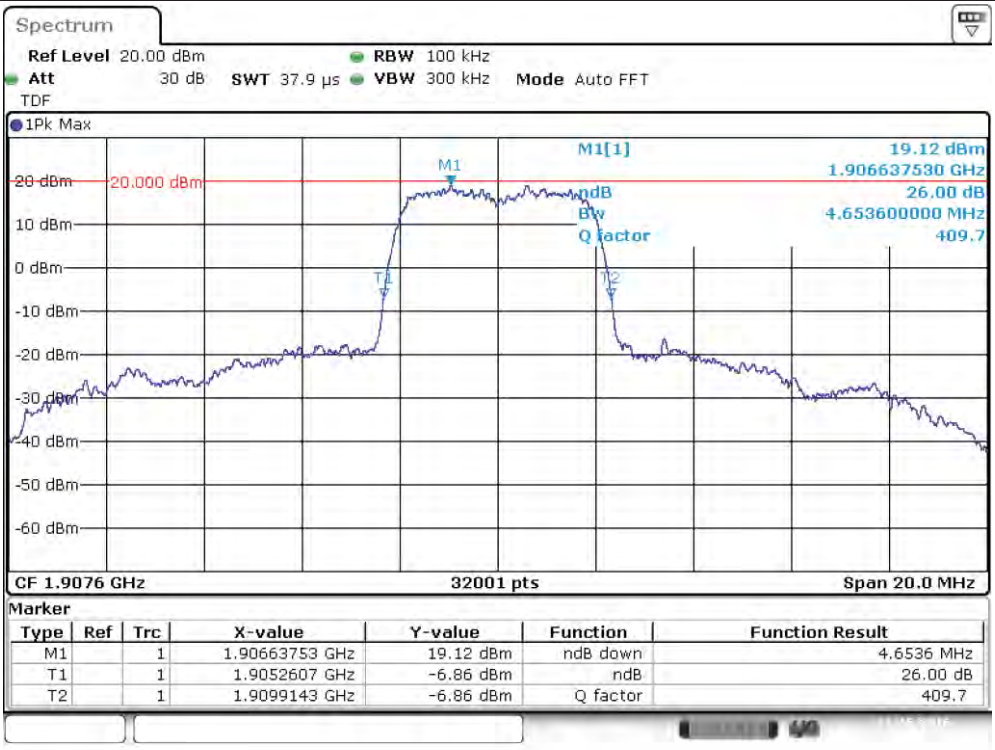
WCDMA Band II RMC Mid channel 9400 – EBW



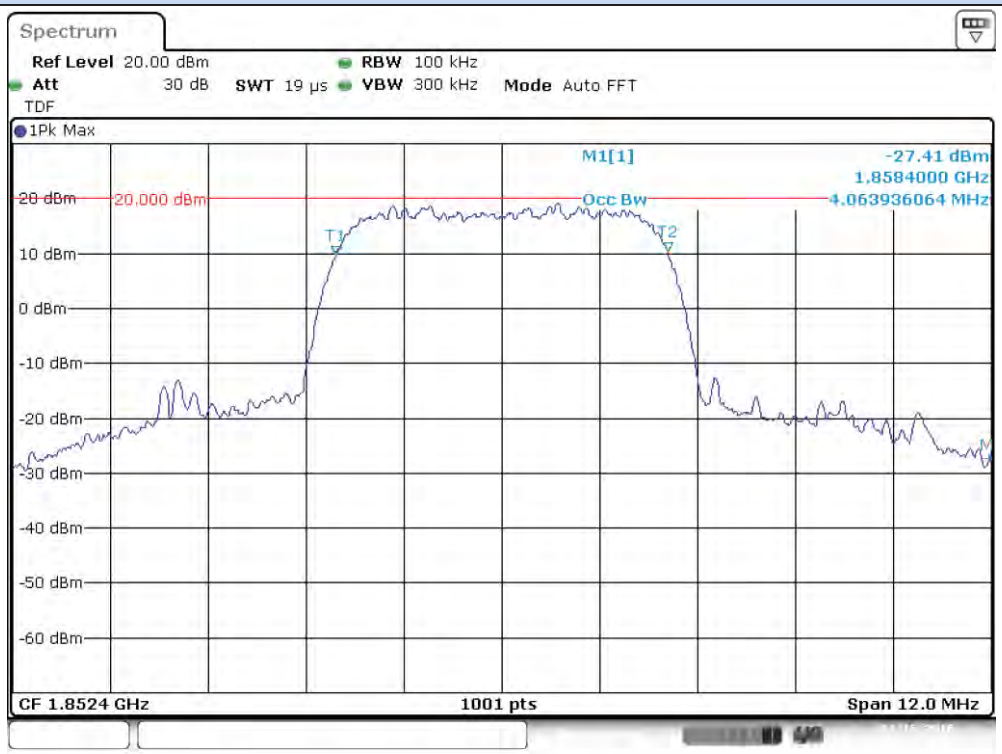
WCDMA Band II RMC High channel 9538 – OBW



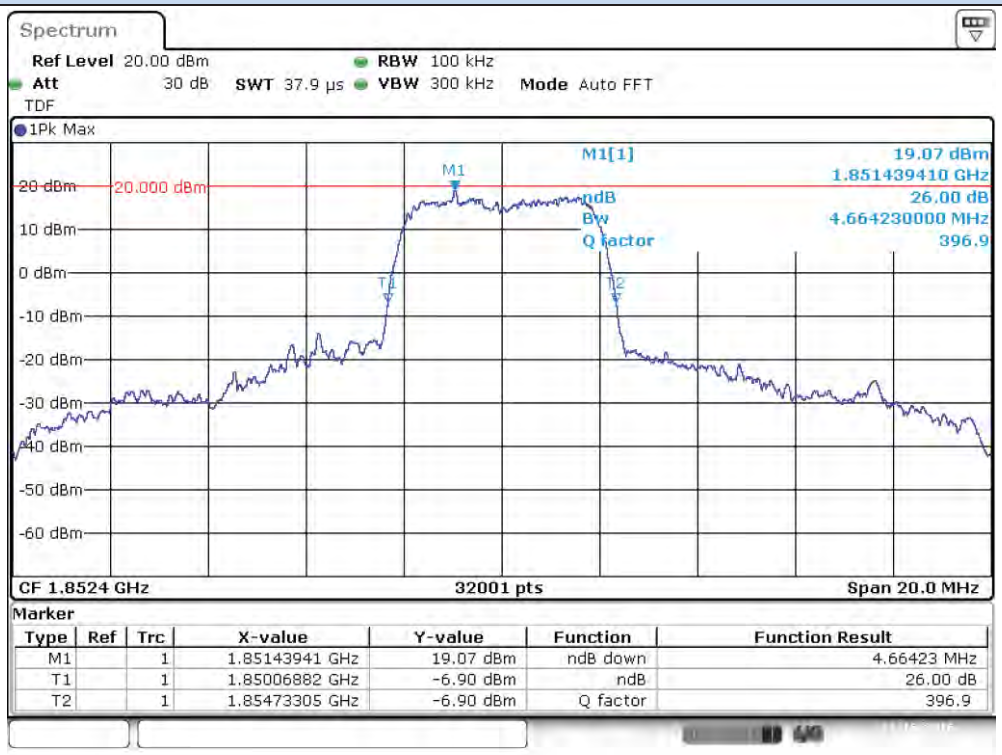
WCDMA Band II RMC High channel 9538 – EBW



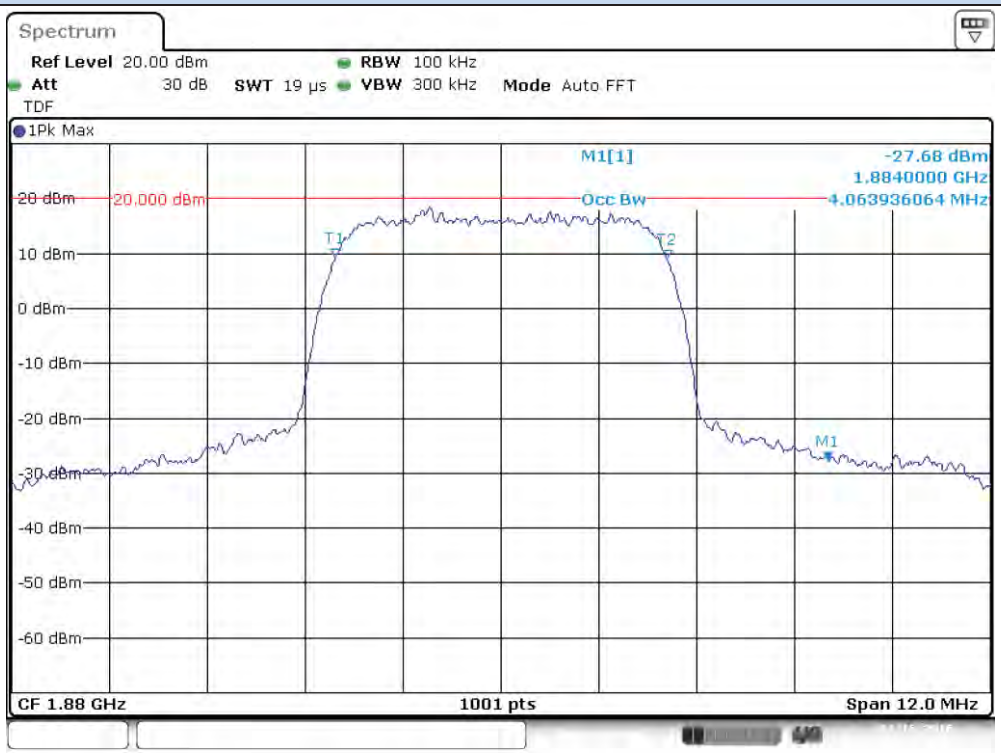
WCDMA Band II HSDPA Low channel 9262 – OBW



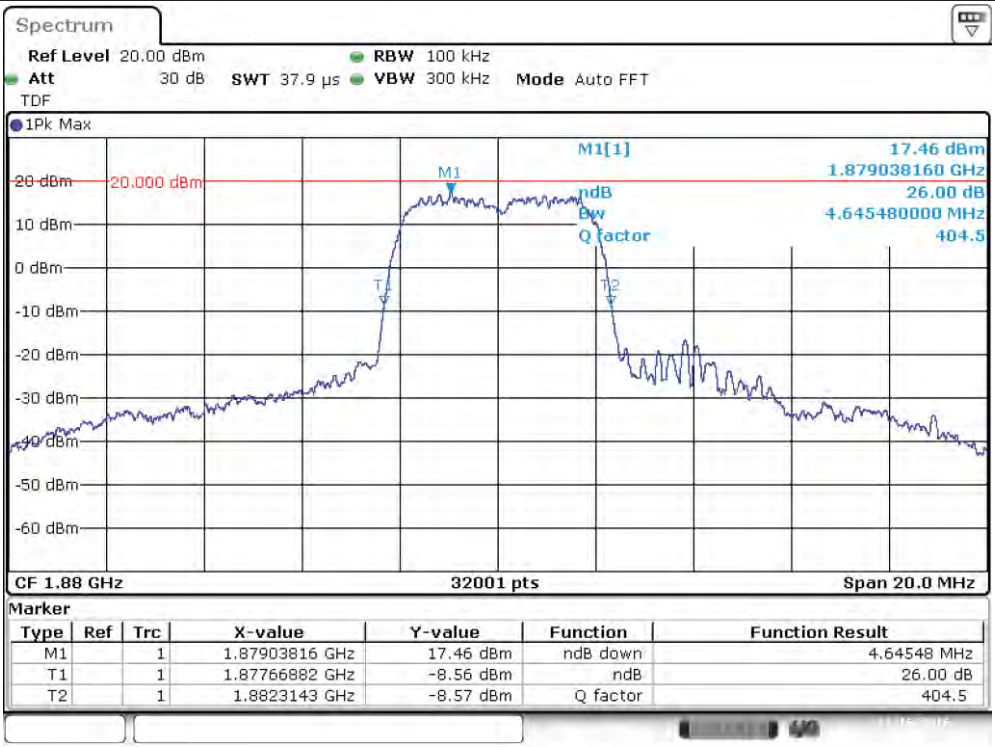
WCDMA Band II HSDPA Low channel 9262 – EBW



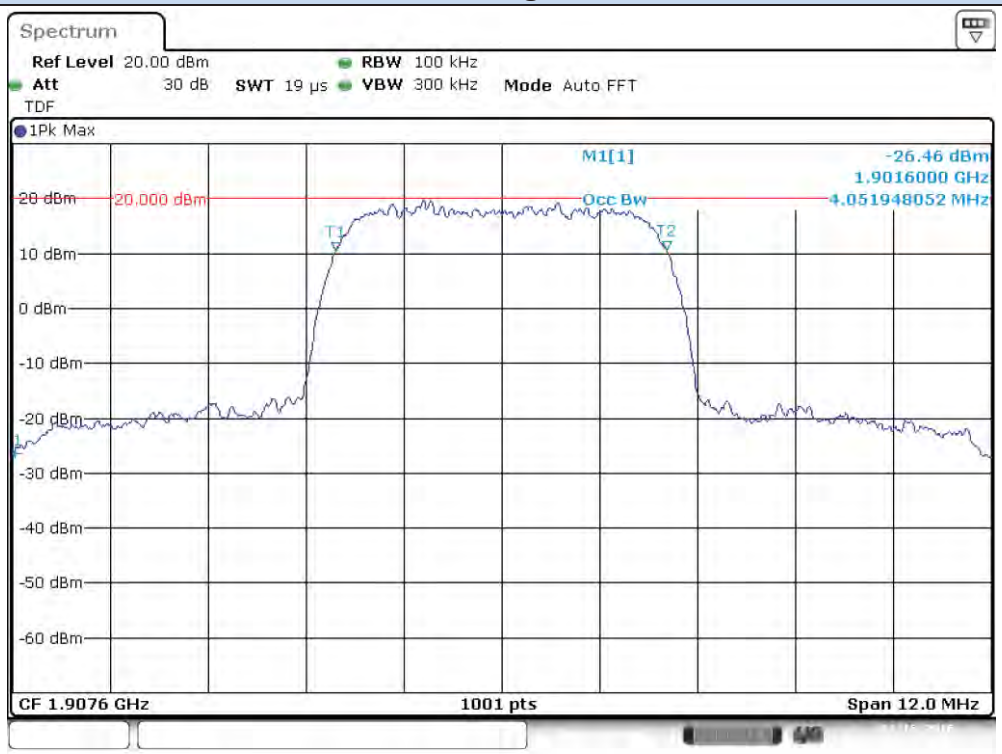
WCDMA Band II HSDPA Mid channel 9400 – OBW



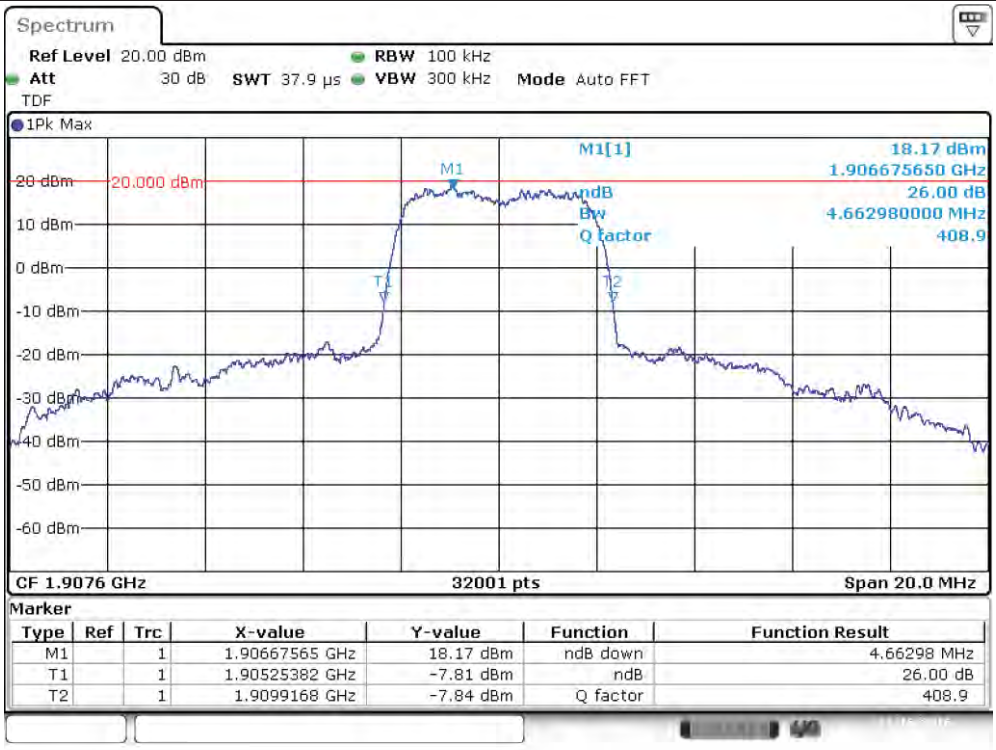
WCDMA Band II HSDPA Mid channel 9400 – EBW



WCDMA Band II HSDPA High channel 9538 – OBW

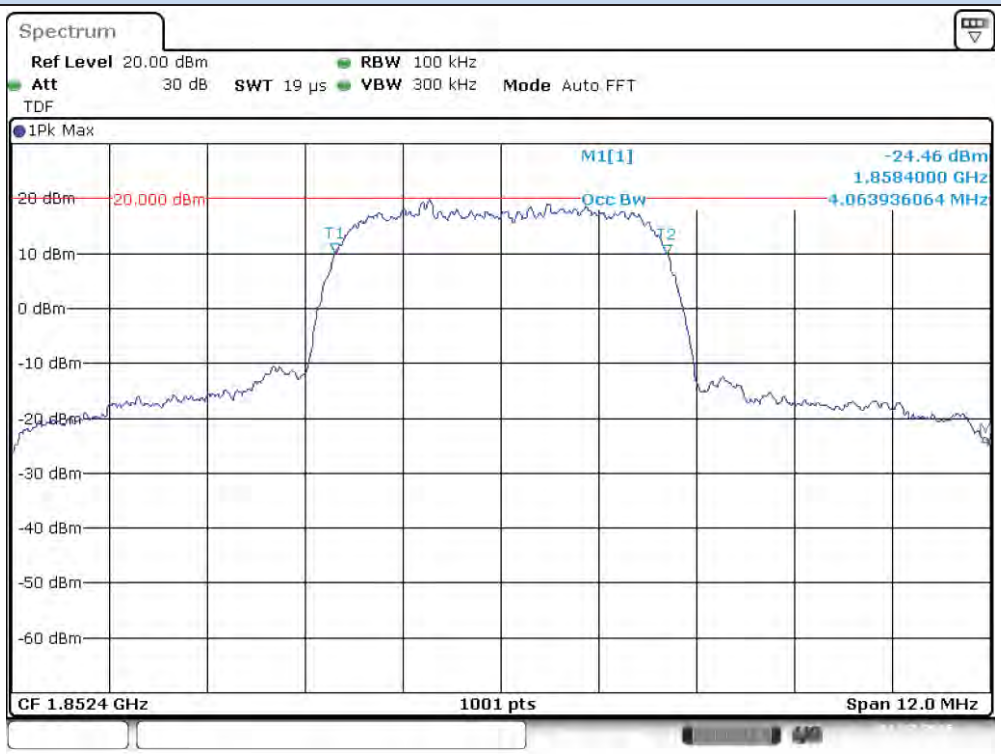


WCDMA Band II HSDPA High channel 9538 – EBW

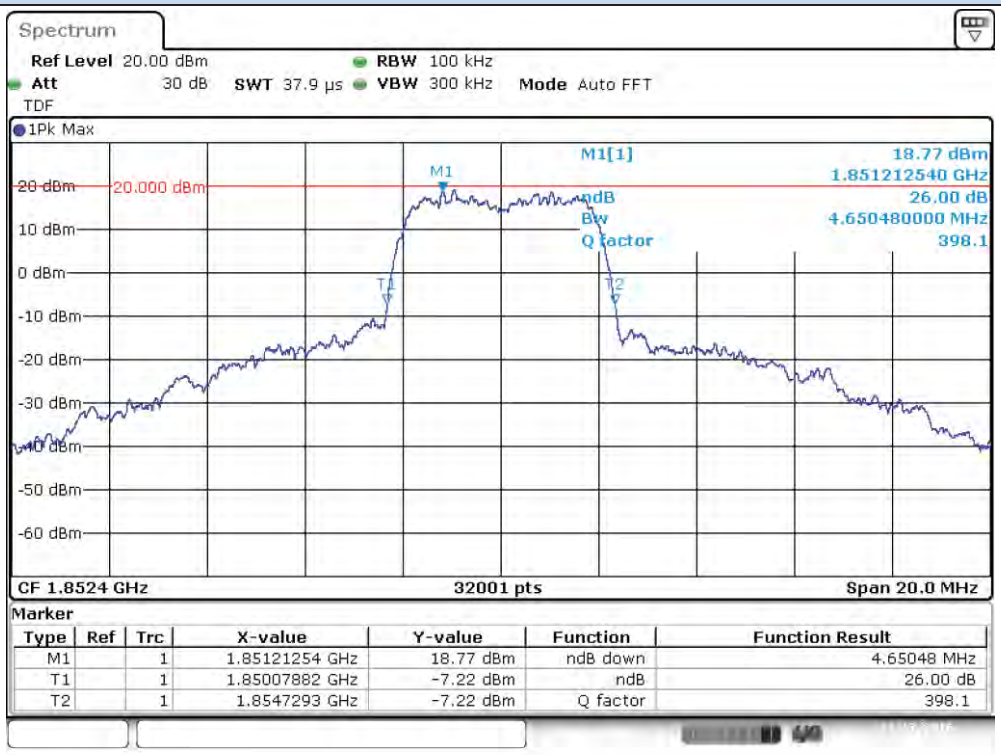


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.90667565 GHz	18.17 dBm	ndB down	4.66298 MHz
T1		1	1.90525382 GHz	-7.81 dBm	ndB	26.00 dB
T2		1	1.9099168 GHz	-7.84 dBm	Q factor	408.9

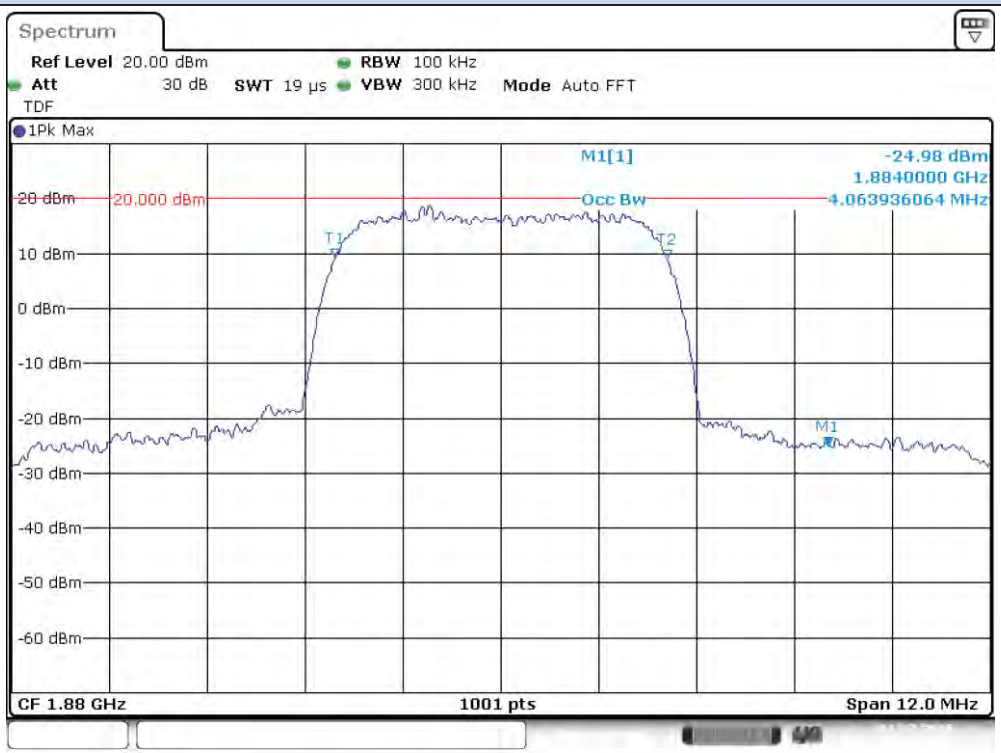
WCDMA Band II HSUPA Low channel 9262 – OBW



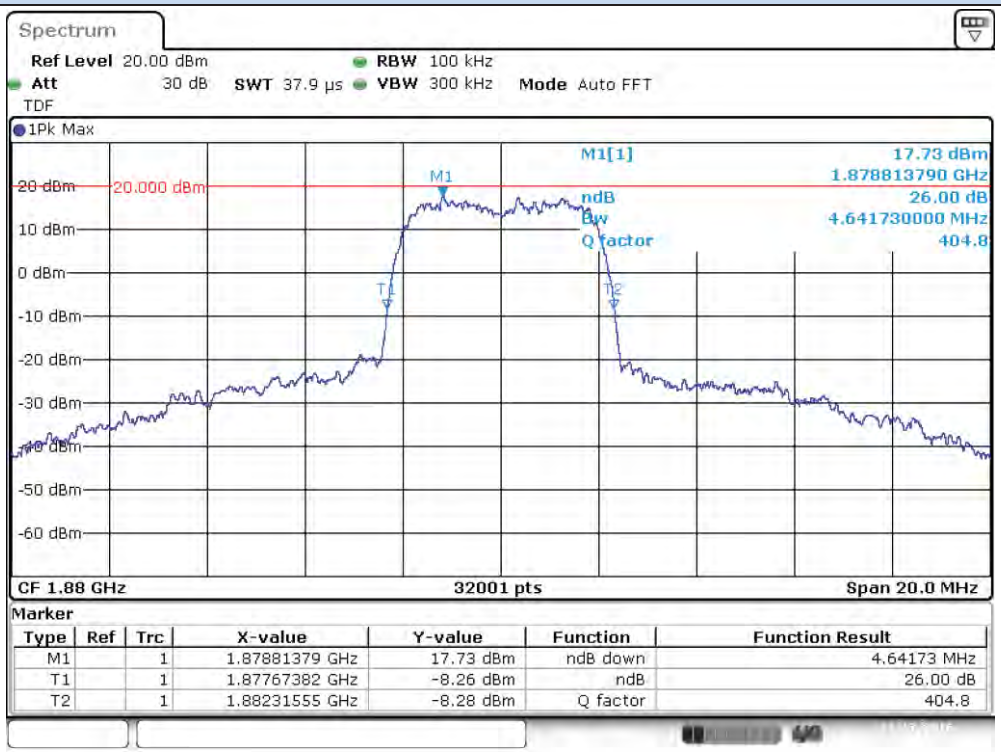
WCDMA Band II HSUPA Low channel 9262 – EBW



WCDMA Band II HSUPA Mid channel 9400 – OBW



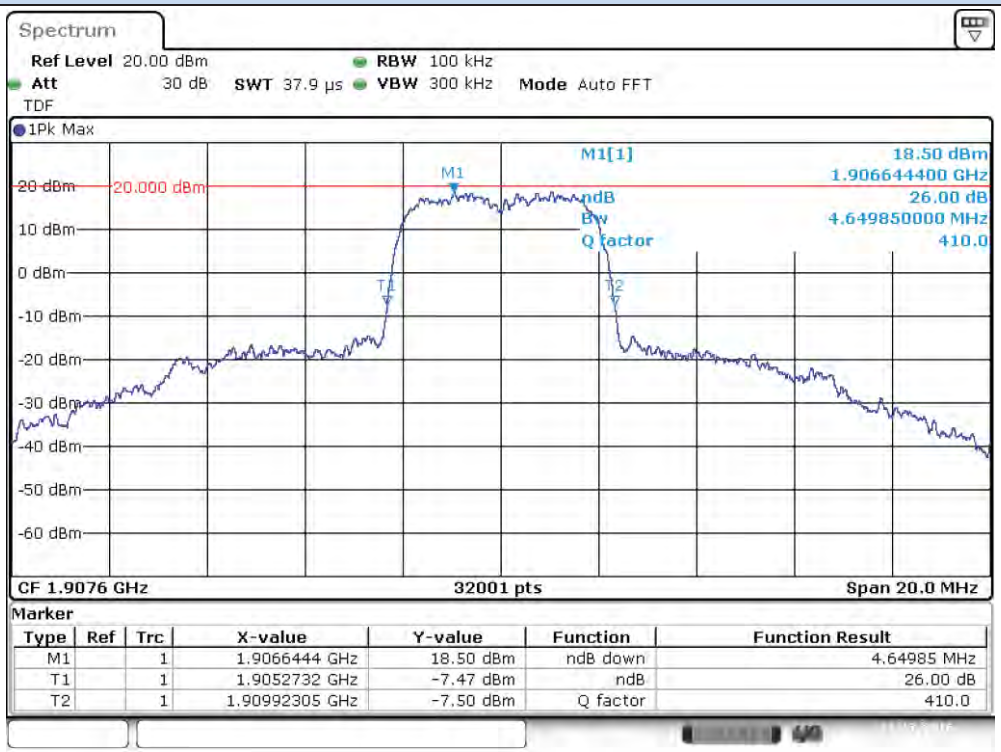
WCDMA Band II HSUPA Mid channel 9400 – EBW



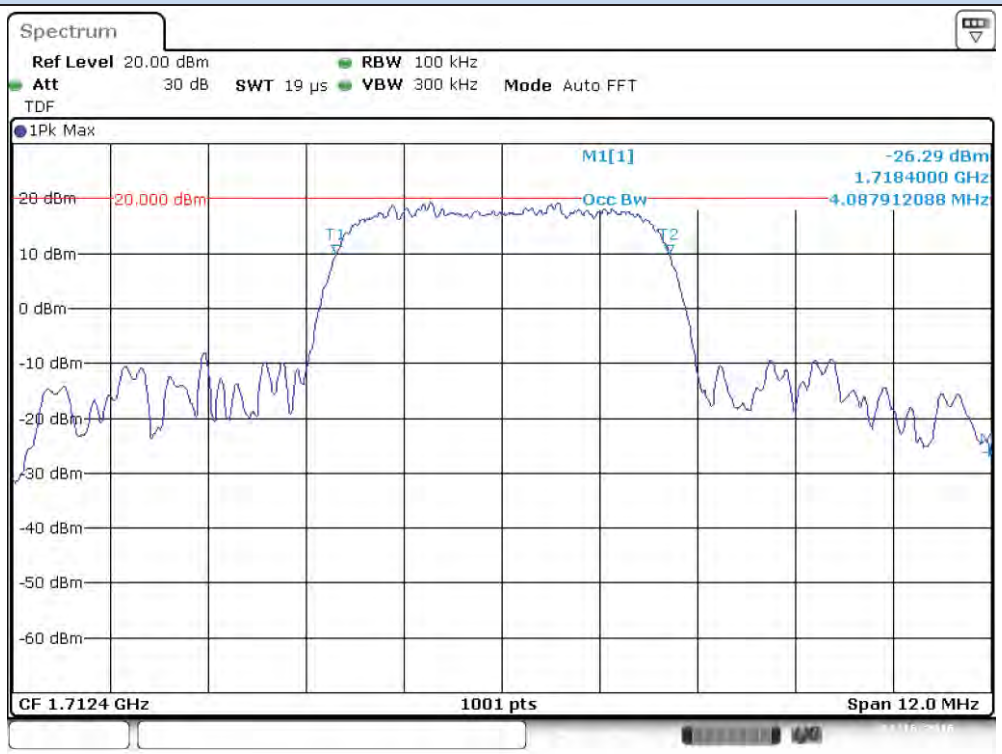
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.87881379 GHz	17.73 dBm	ndB down	4.64173 MHz
T1		1	1.87767382 GHz	-8.26 dBm	ndB	26.00 dB
T2		1	1.88231555 GHz	-8.28 dBm	Q factor	404.8

WCDMA Band II HSUPA High channel 9538 – OBW

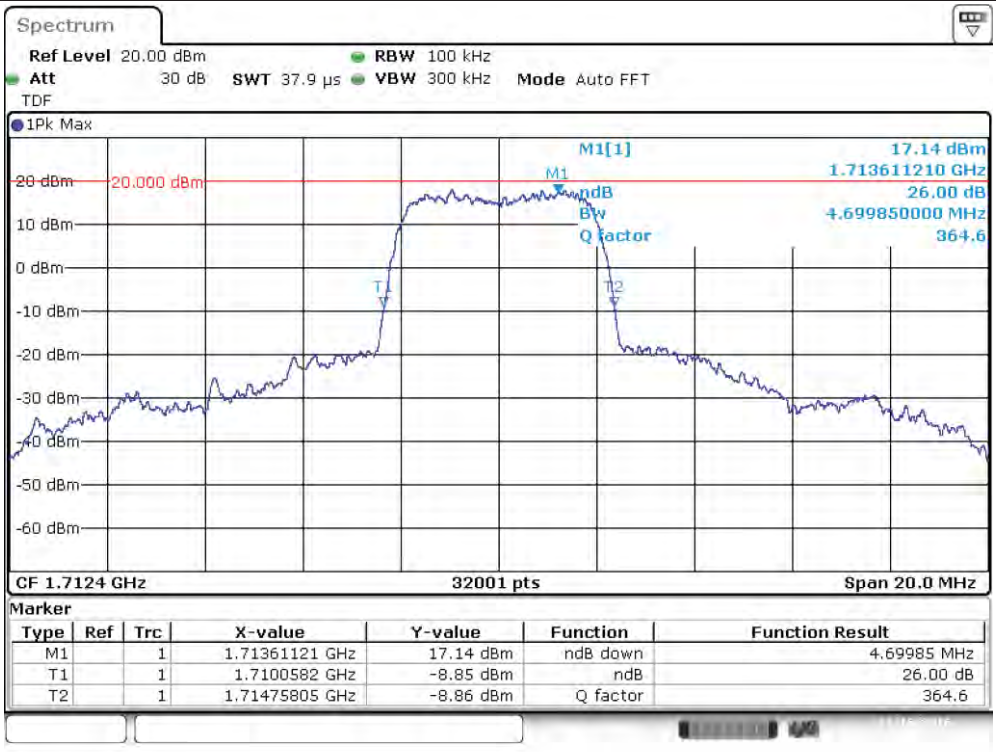
WCDMA Band II HSUPA High channel 9538 – EBW



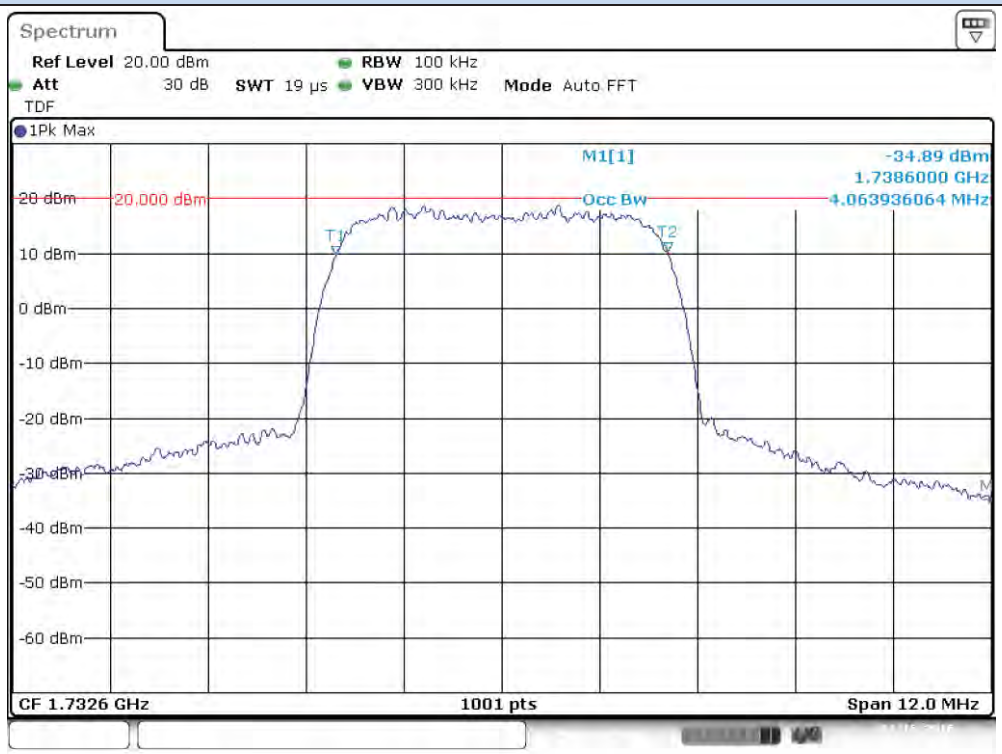
WCDMA Band IV RMC Low channel 1312 – OBW



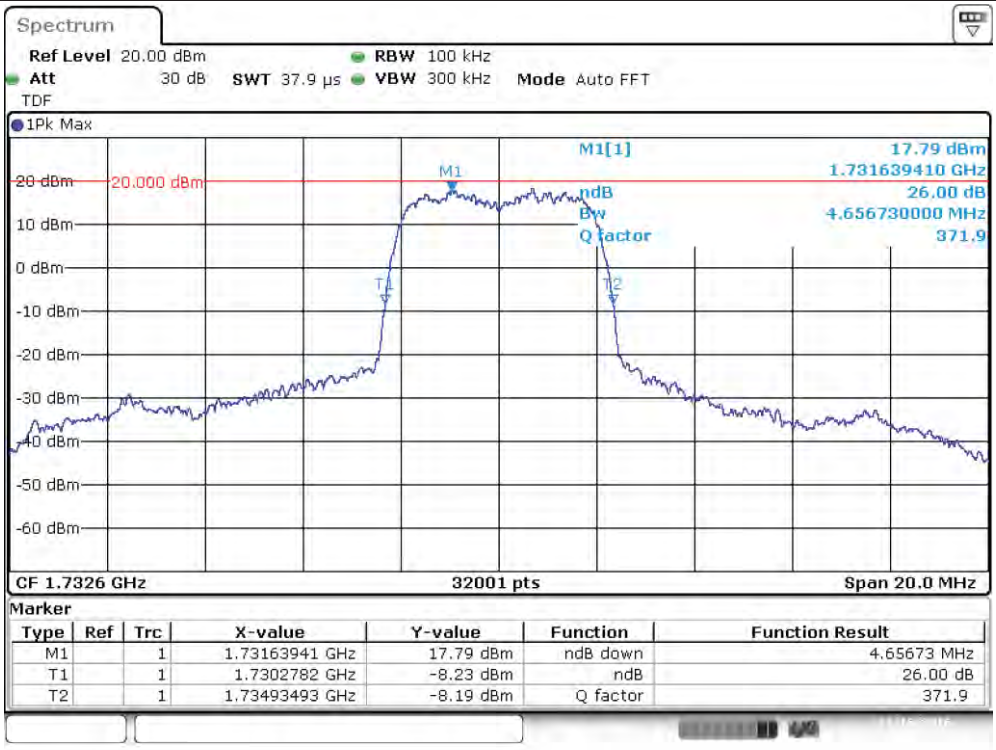
WCDMA Band IV RMC Low channel 1312 – EBW



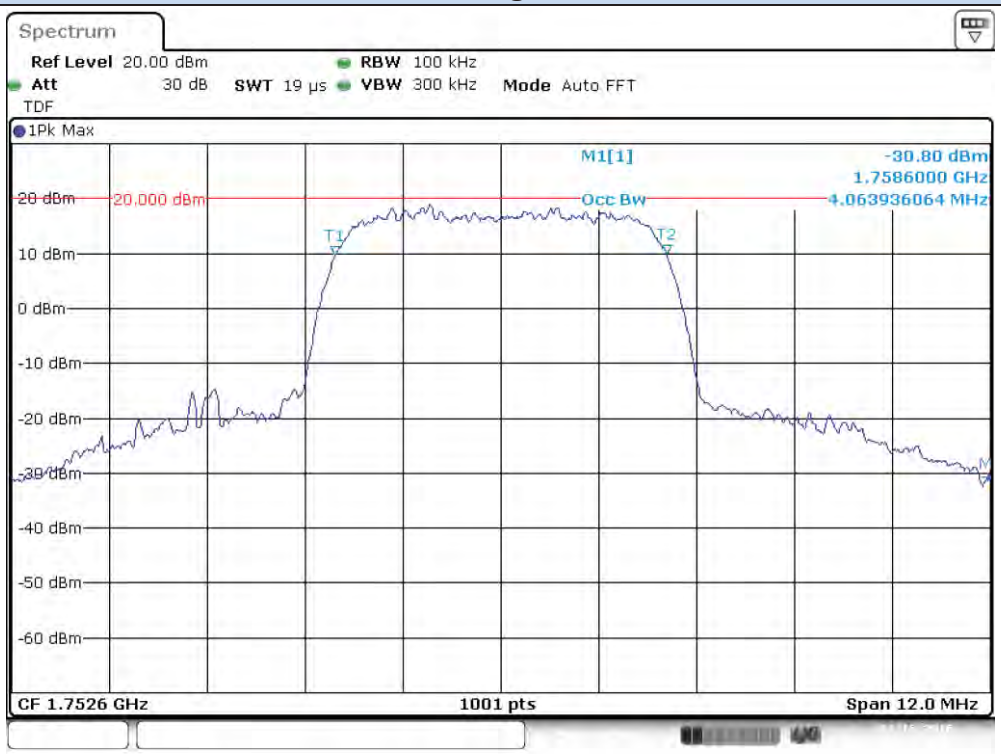
WCDMA Band IV RMC Mid channel 1413 – OBW



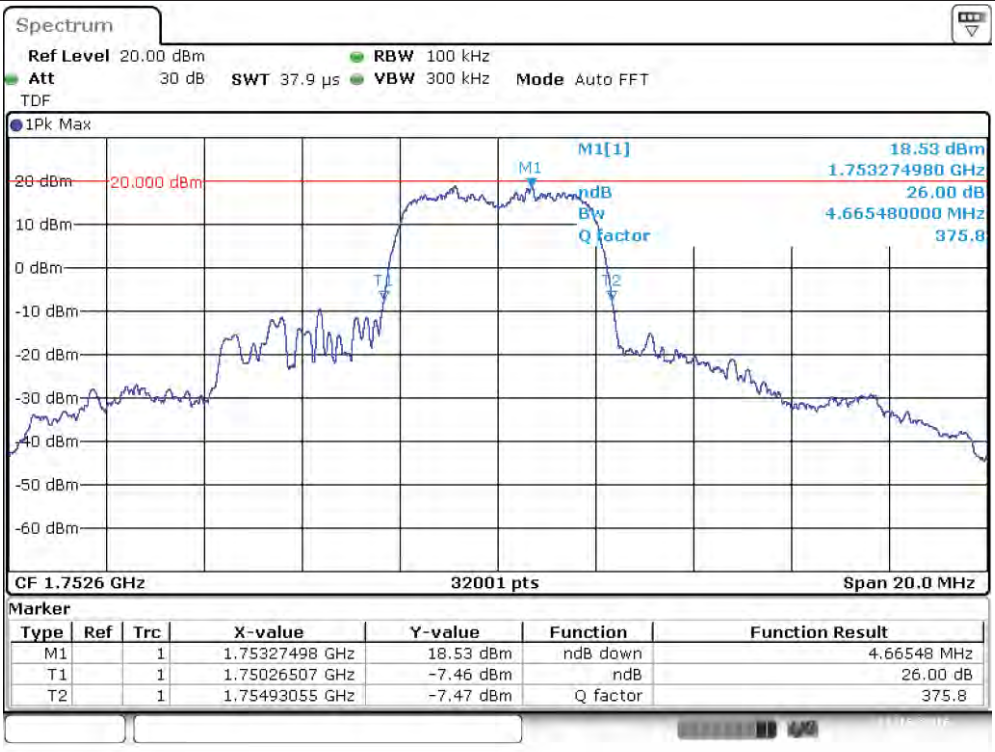
WCDMA Band IV RMC Mid channel 1413 – EBW



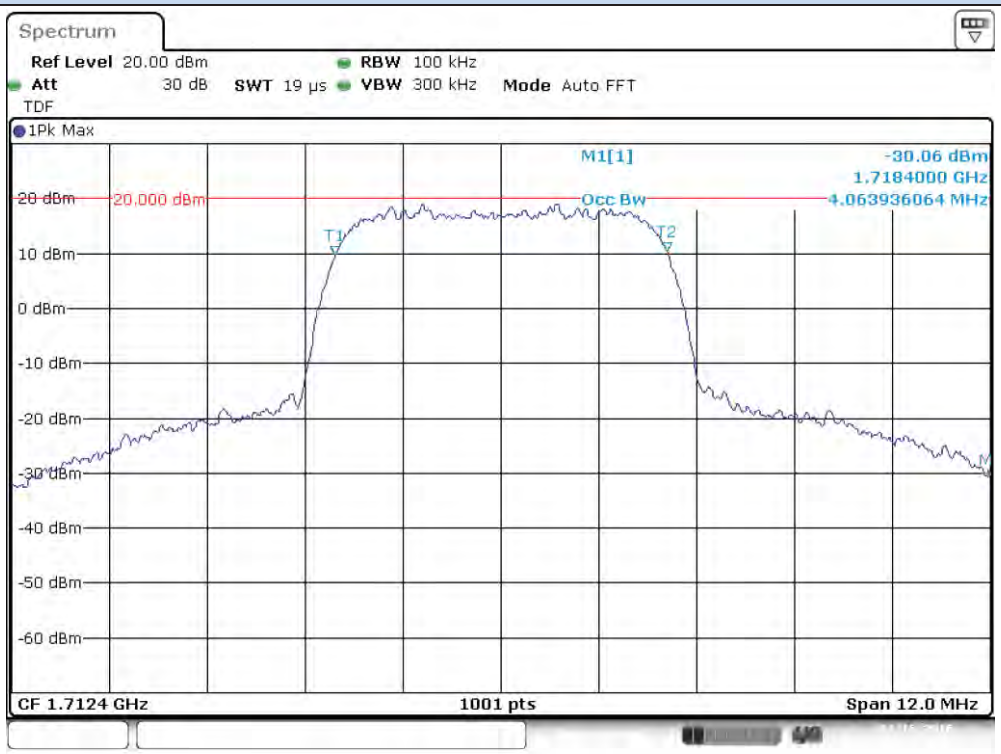
WCDMA Band IV RMC High channel 1513 – OBW



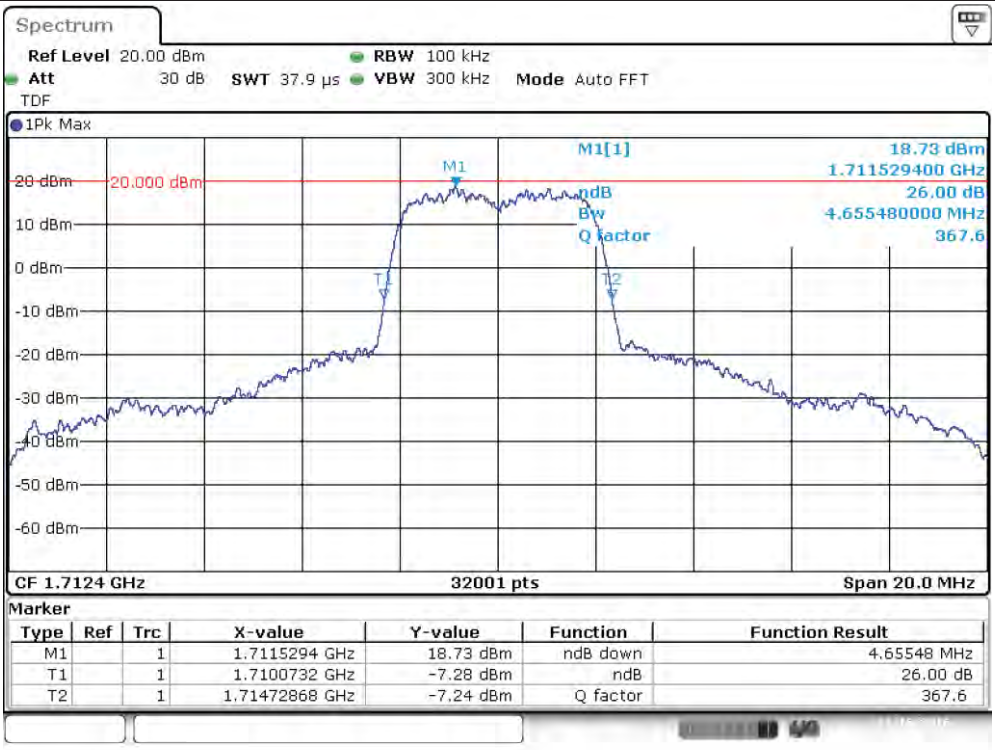
WCDMA Band IV RMC High channel 1513 – EBW



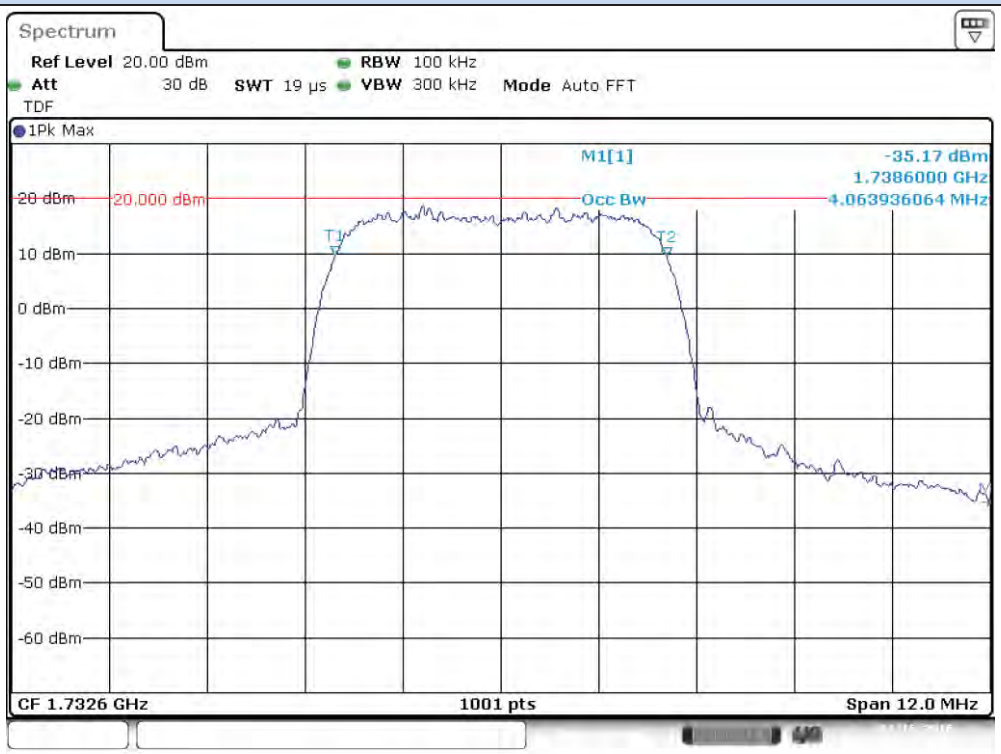
WCDMA Band IV HSDPA Low channel 1312 – OBW



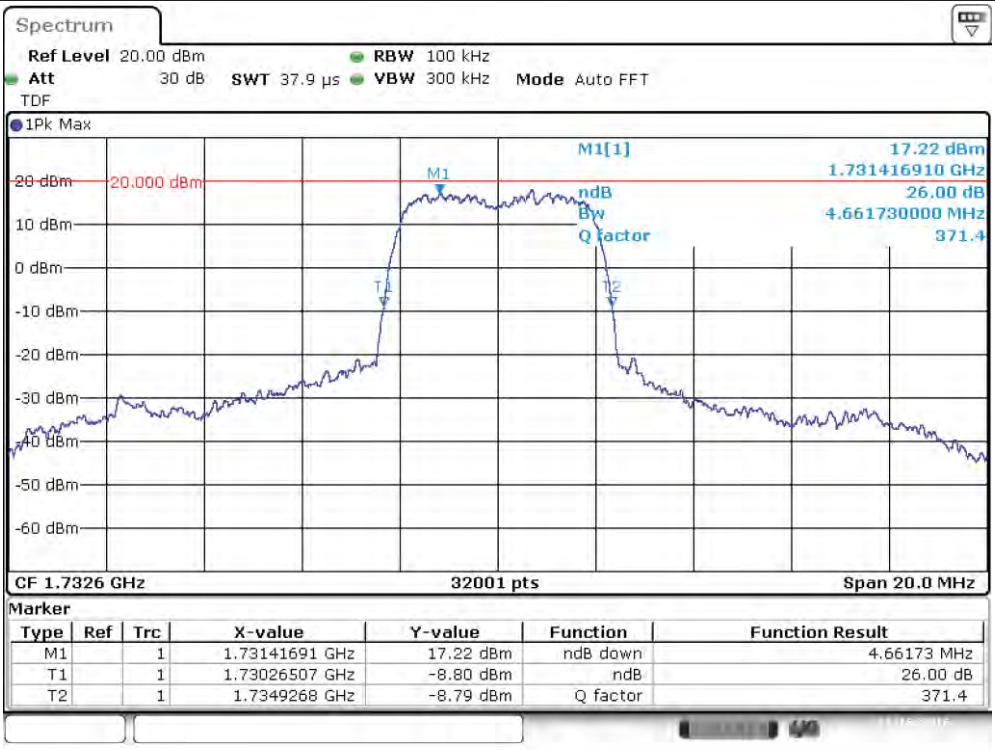
WCDMA Band IV HSDPA Low channel 1312 – EBW



WCDMA Band IV HSDPA Mid channel 1413 – OBW

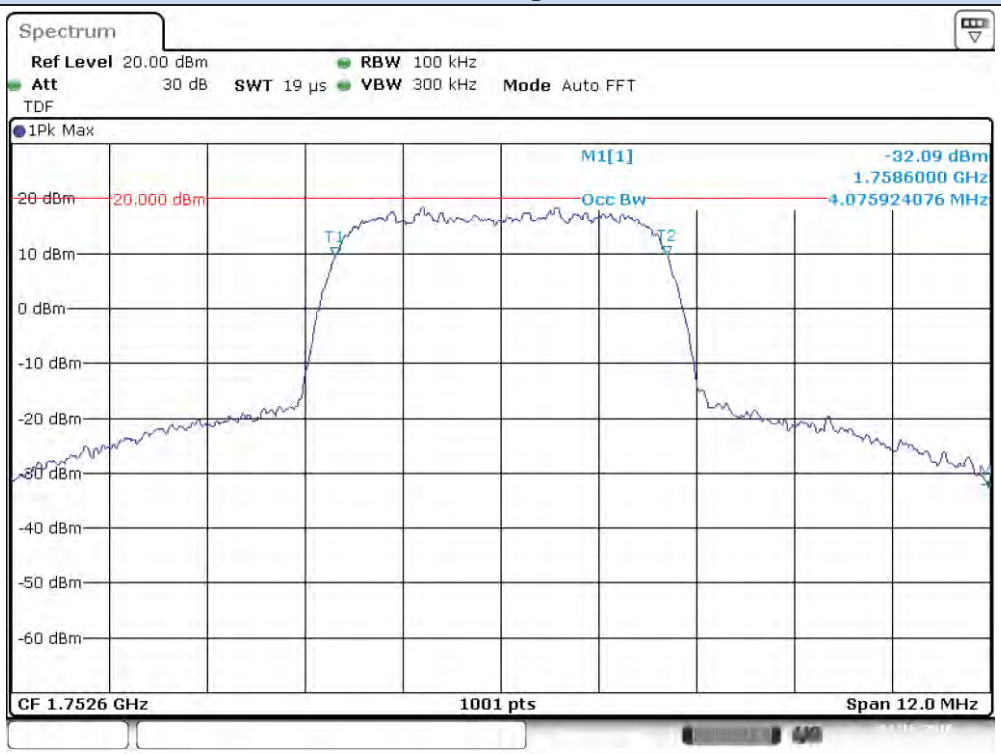


WCDMA Band IV HSDPA Mid channel 1413 – EBW

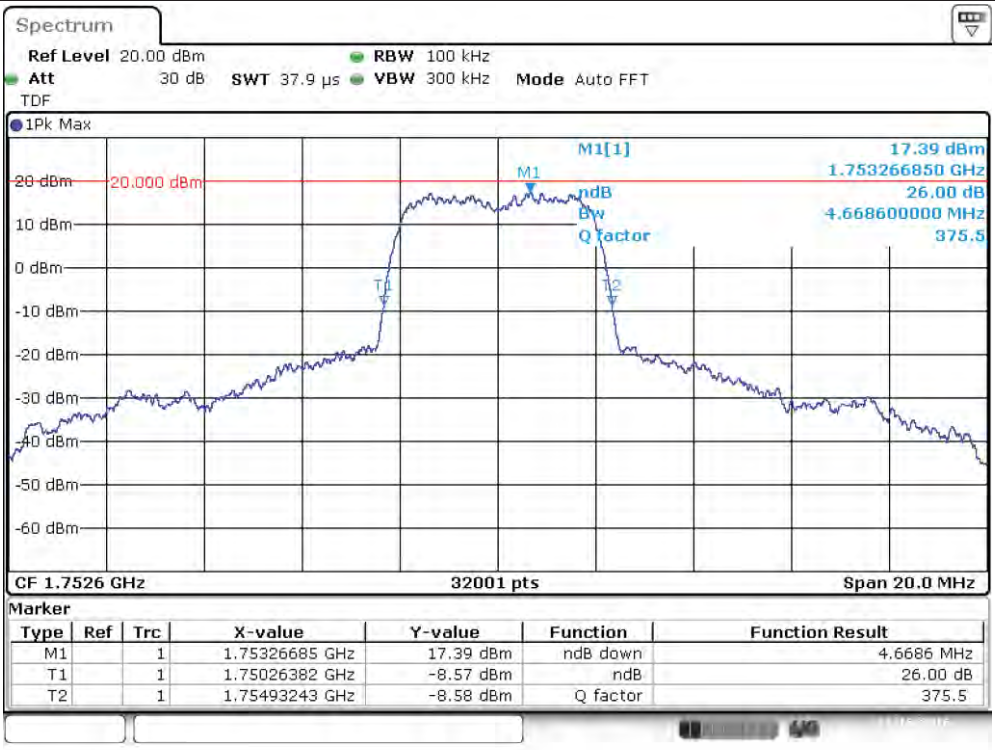


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.73141691 GHz	17.22 dBm	ndB down	4.66173 MHz
T1		1	1.73026507 GHz	-8.80 dBm	ndB	26.00 dB
T2		1	1.7349268 GHz	-8.79 dBm	Q factor	371.4

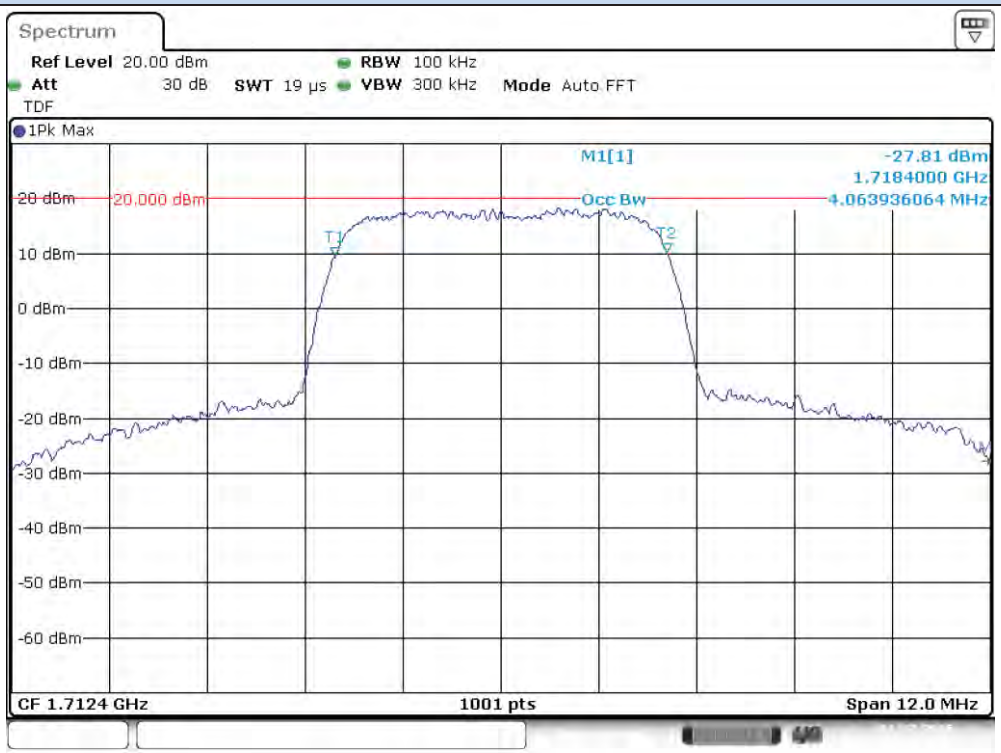
WCDMA Band IV HSDPA High channel 1513 – OBW



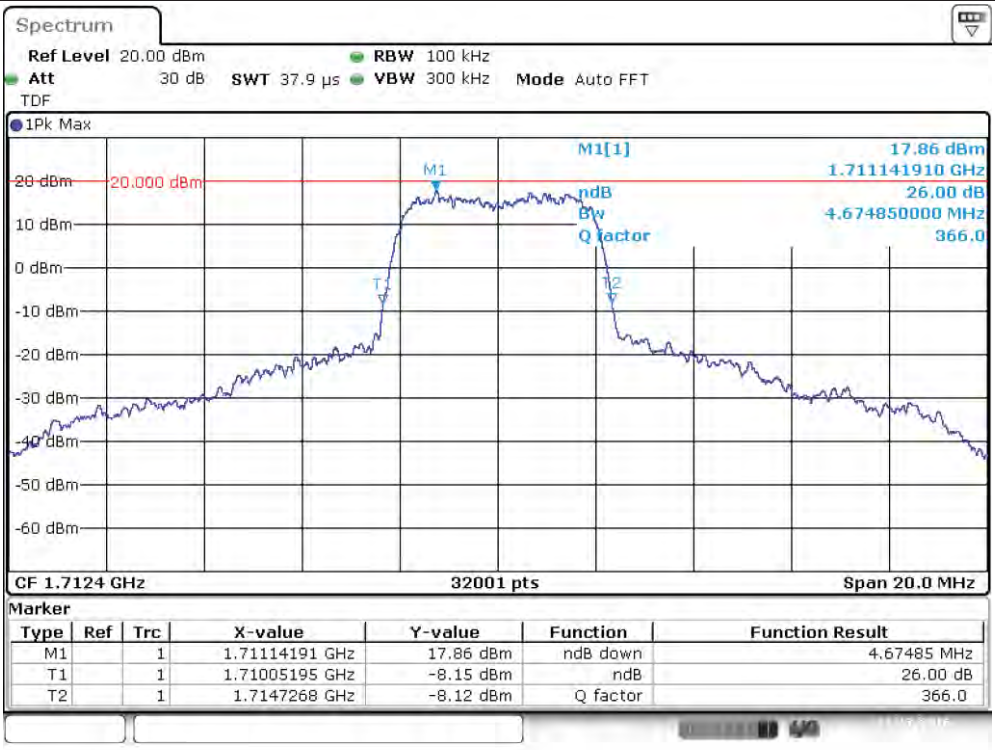
WCDMA Band IV HSDPA High channel 1513 – EBW



WCDMA Band IV HSUPA Low channel 1312 – OBW

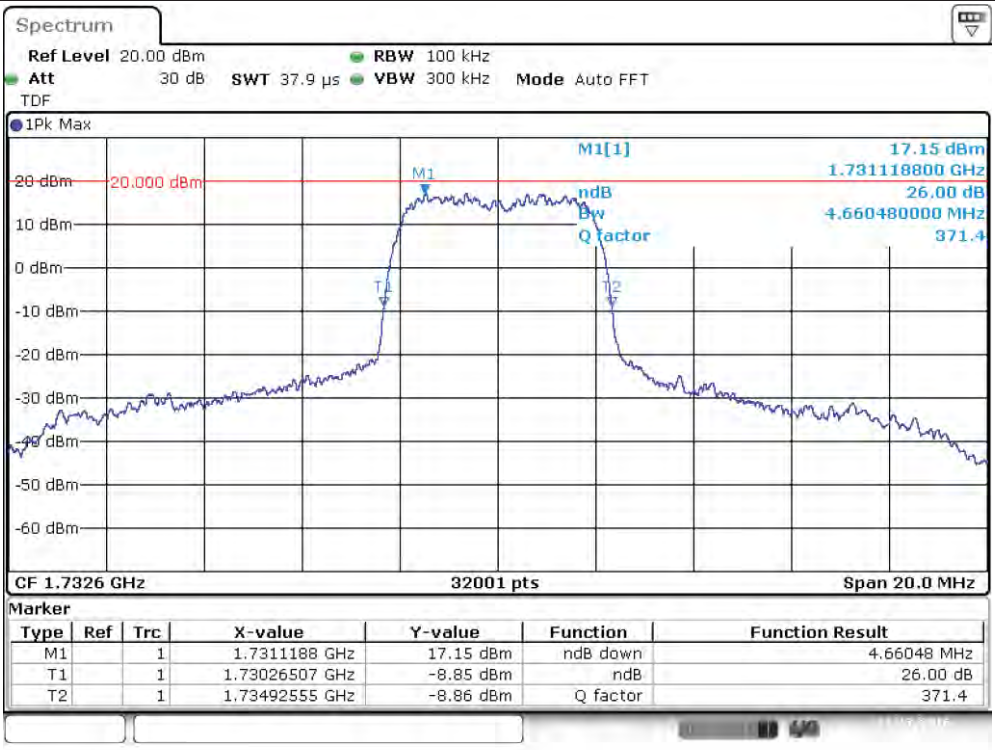


WCDMA Band IV HSUPA Low channel 1312 – EBW



WCDMA Band IV HSUPA Mid channel 1413 – OBW

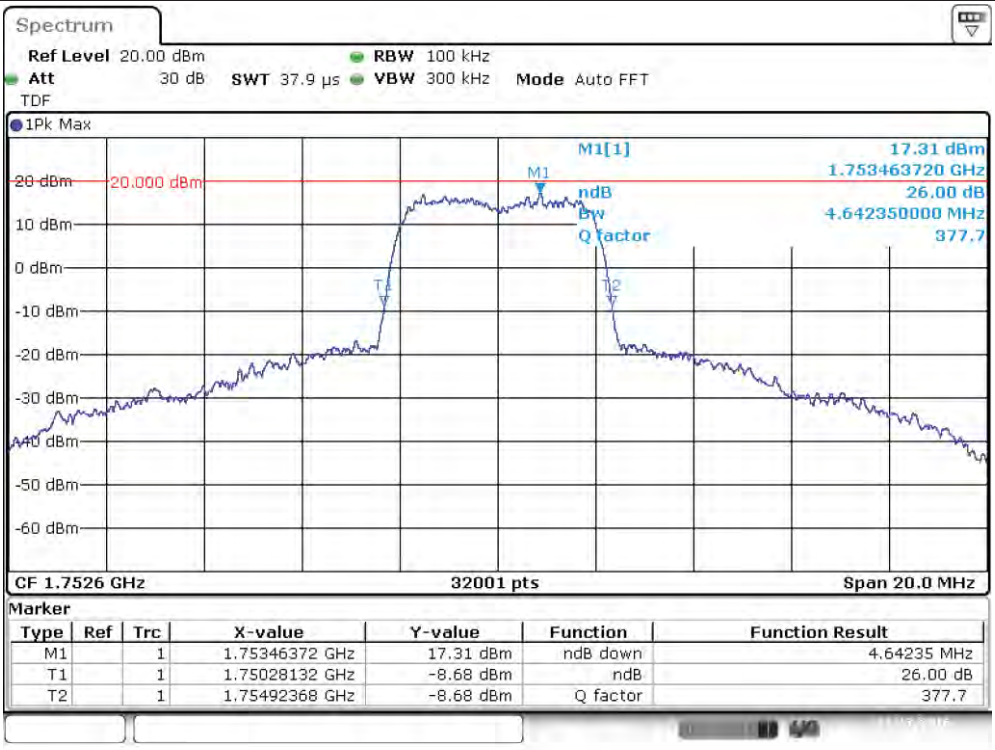
WCDMA Band IV HSUPA Mid channel 1413 – EBW



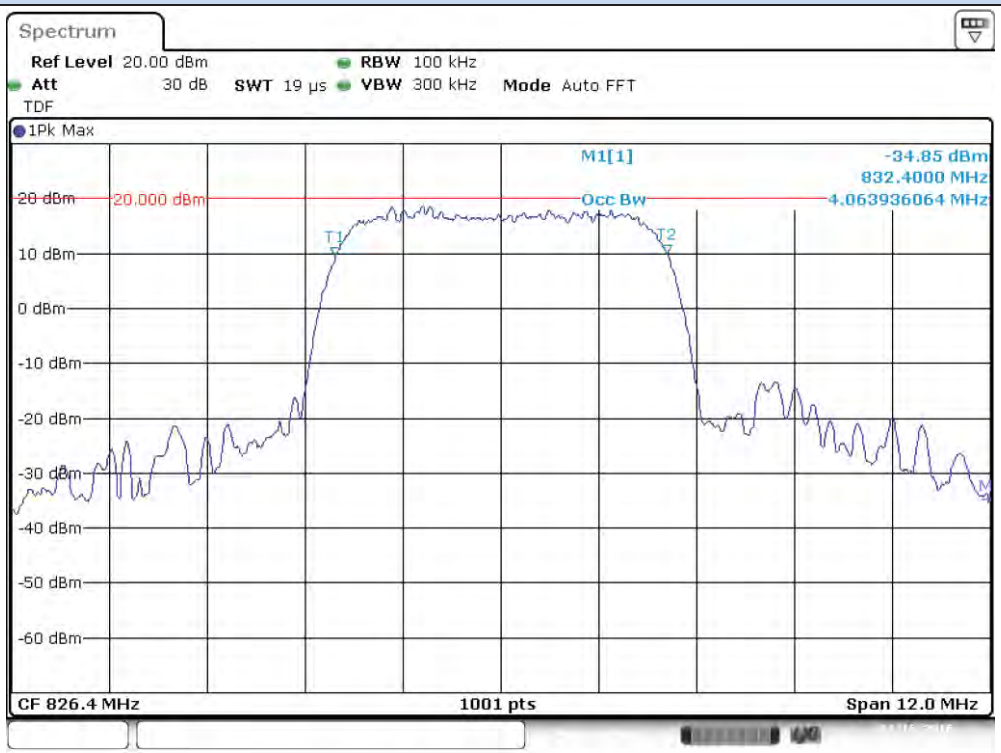
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.7311188 GHz	17.15 dBm	ndB down	4.66048 MHz
T1		1	1.73026507 GHz	-8.85 dBm	ndB	26.00 dB
T2		1	1.73492555 GHz	-8.86 dBm	Q factor	371.4

WCDMA Band IV HSUPA High channel 1513 – OBW

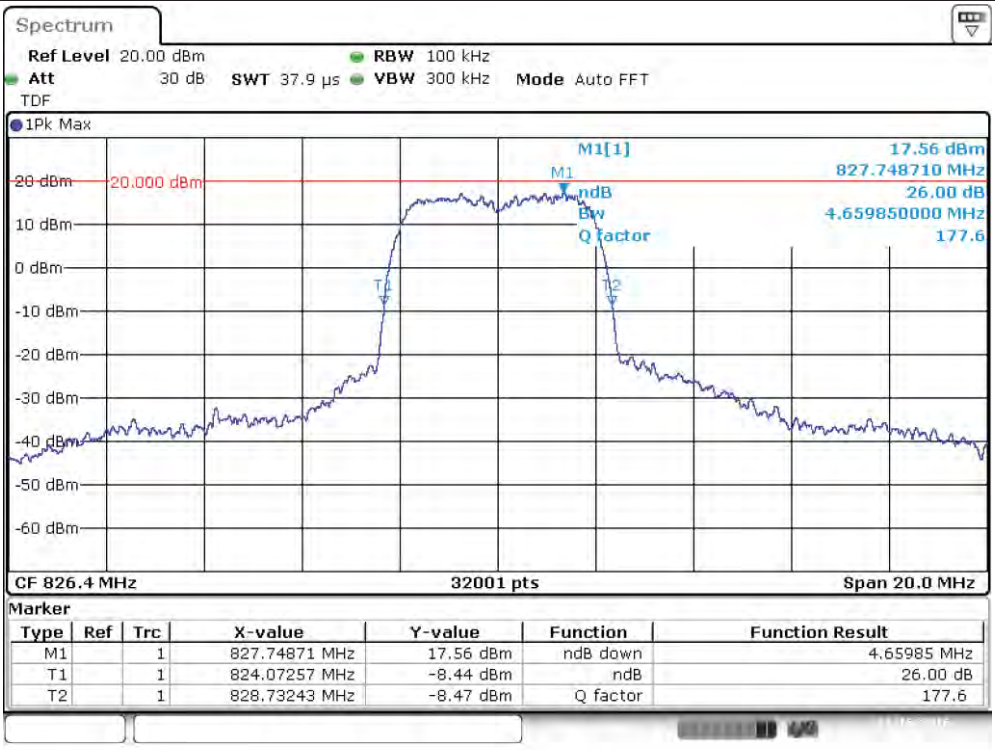
WCDMA Band IV HSUPA High channel 1513 – EBW



WCDMA Band V RMC Low channel 4132 – OBW

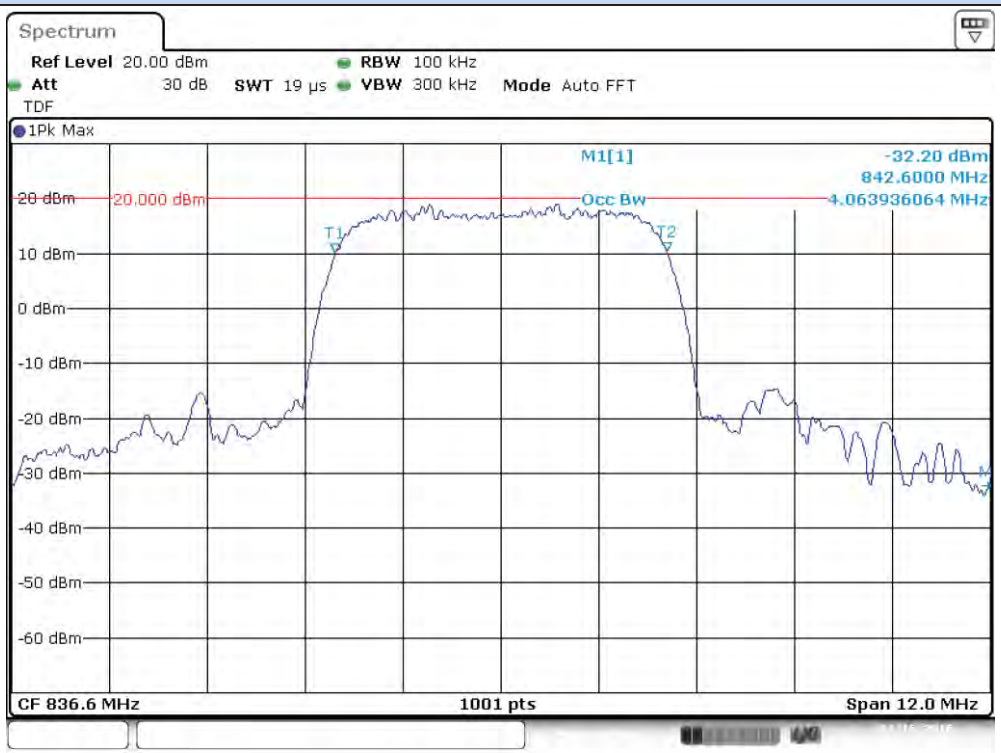


WCDMA Band V RMC Low channel 4132 – EBW

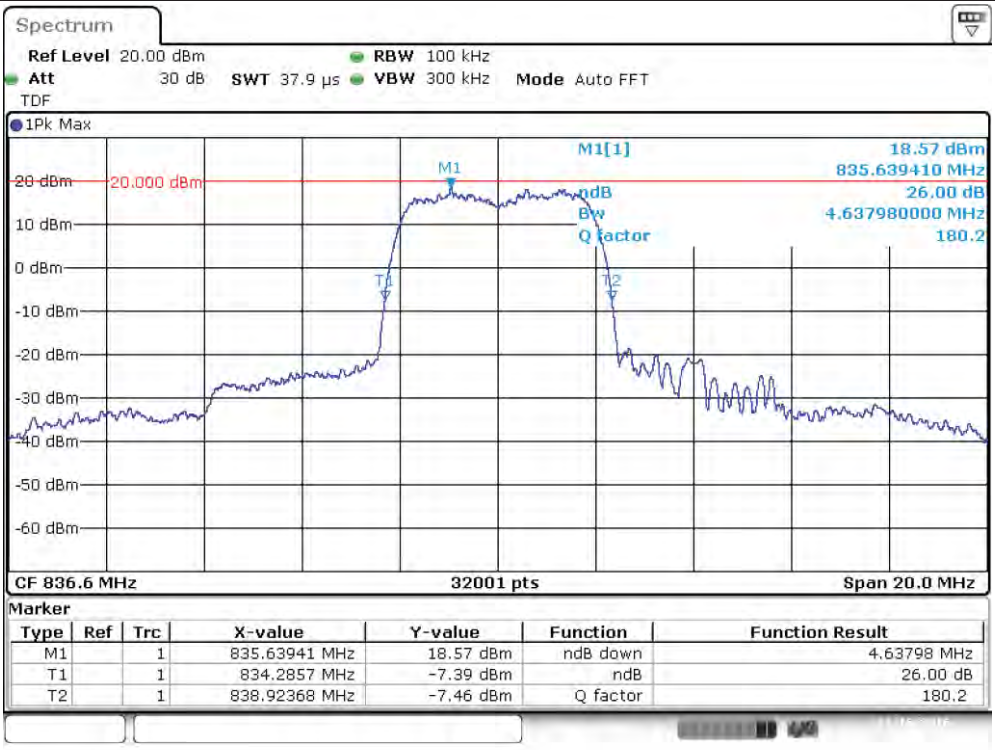


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	827.74871 MHz	17.56 dBm	ndB down	4.65985 MHz
T1		1	824.07257 MHz	-8.44 dBm	ndB	26.00 dB
T2		1	828.73243 MHz	-8.47 dBm	Q factor	177.6

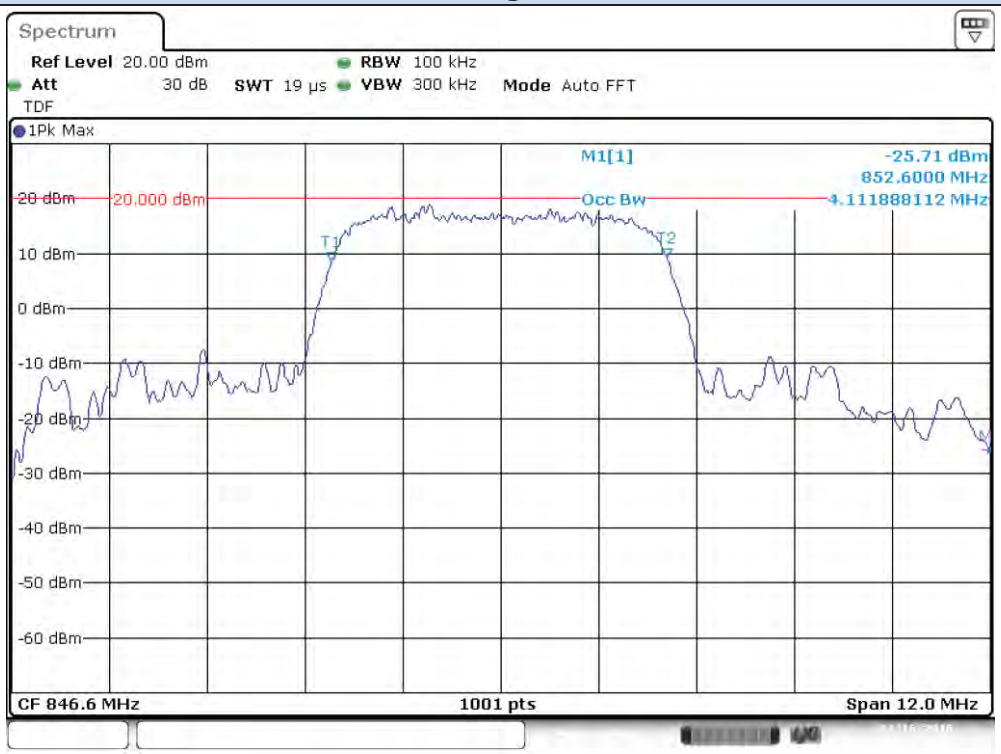
WCDMA Band V RMC Mid channel 4183 – OBW



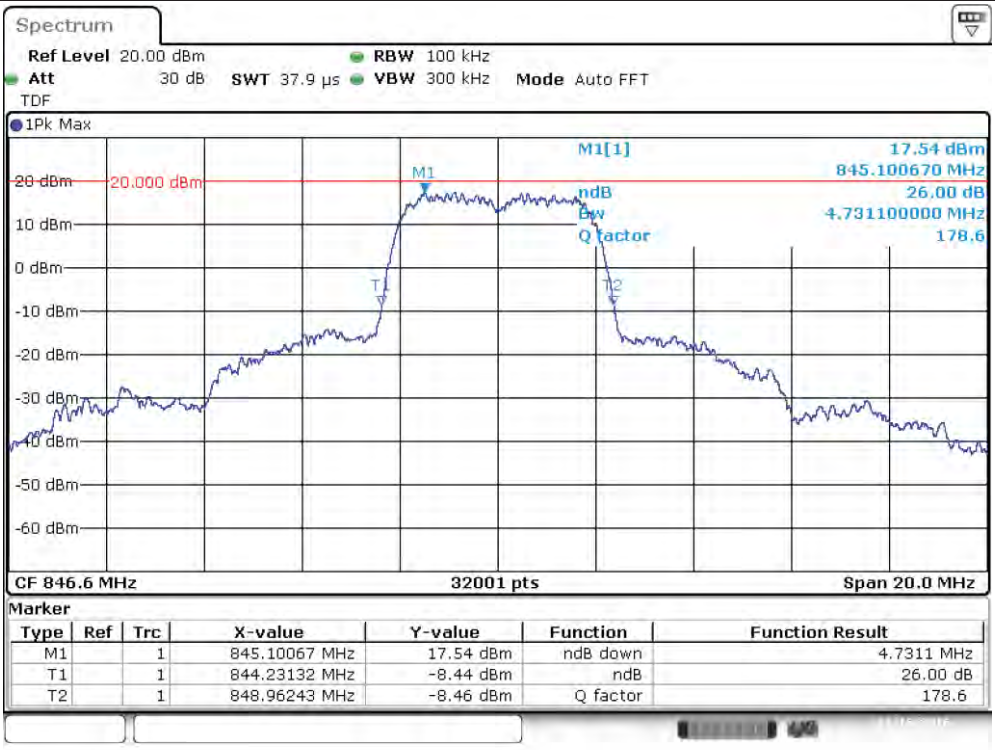
WCDMA Band V RMC Mid channel 4183 – EBW



WCDMA Band V RMC High channel 4233 – OBW

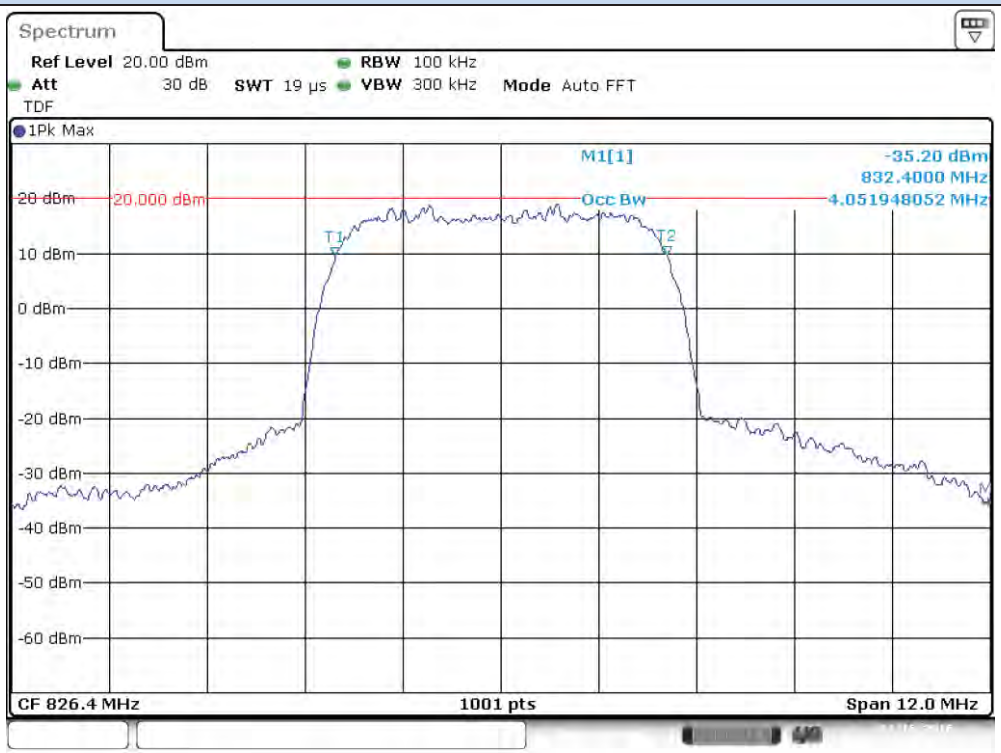


WCDMA Band V RMC High channel 4233 – EBW

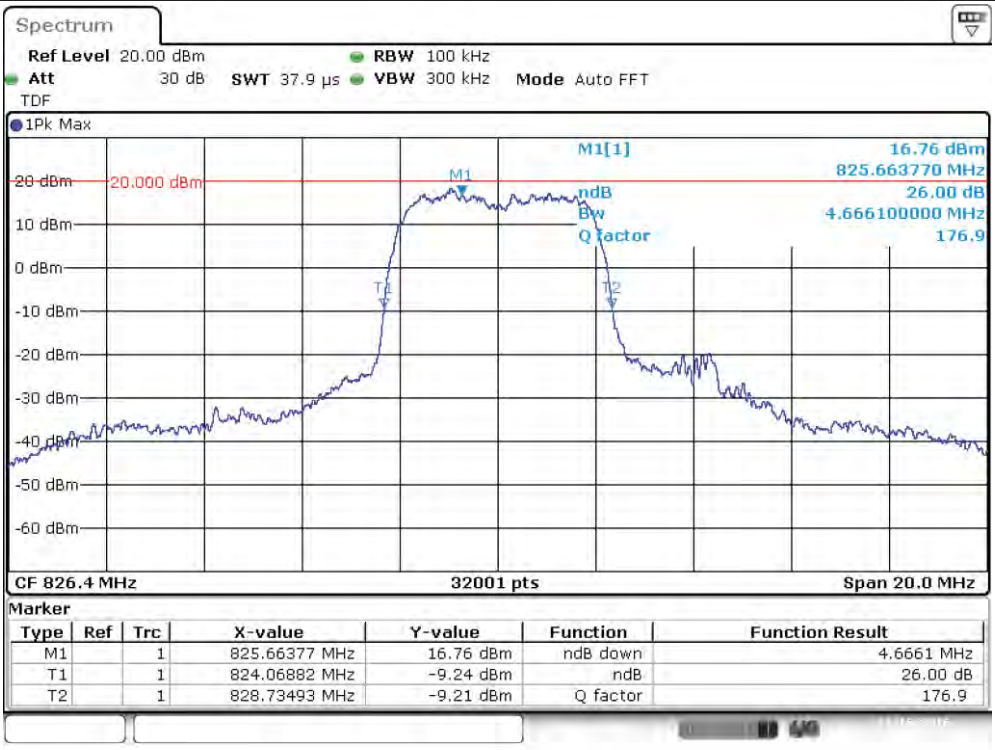


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	845.10067 MHz	17.54 dBm	ndB down	4.7311 MHz
T1		1	844.23132 MHz	-8.44 dBm	ndB	26.00 dB
T2		1	848.96243 MHz	-8.46 dBm	Q factor	178.6

WCDMA Band V HSDPA Low channel 4132 – OBW

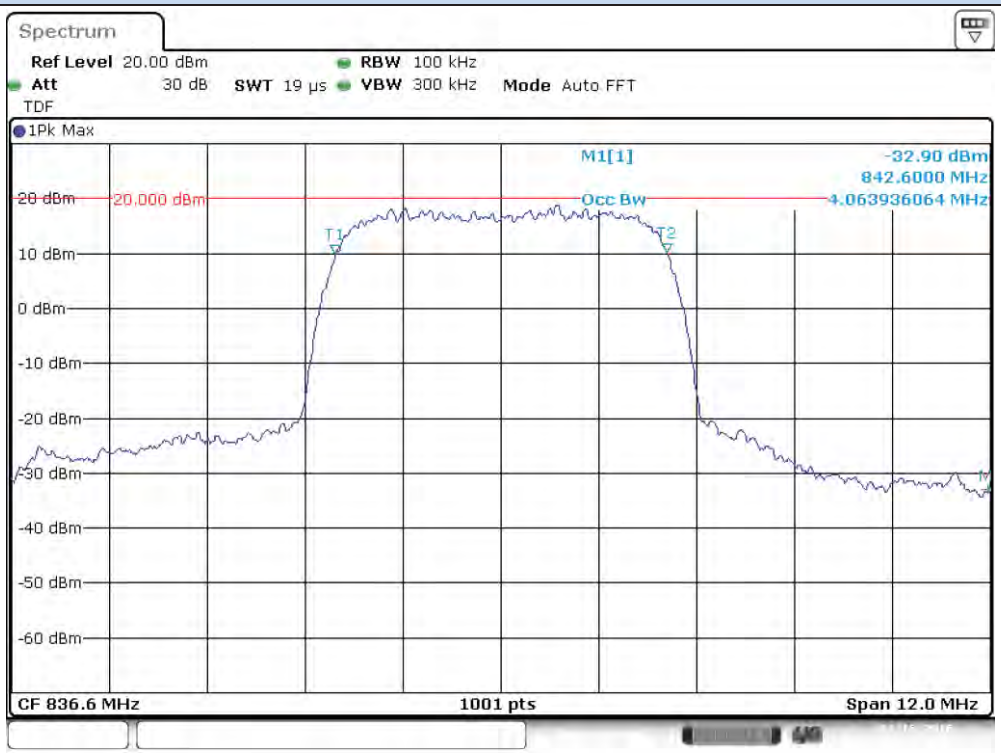


WCDMA Band V HSDPA Low channel 4132 – EBW

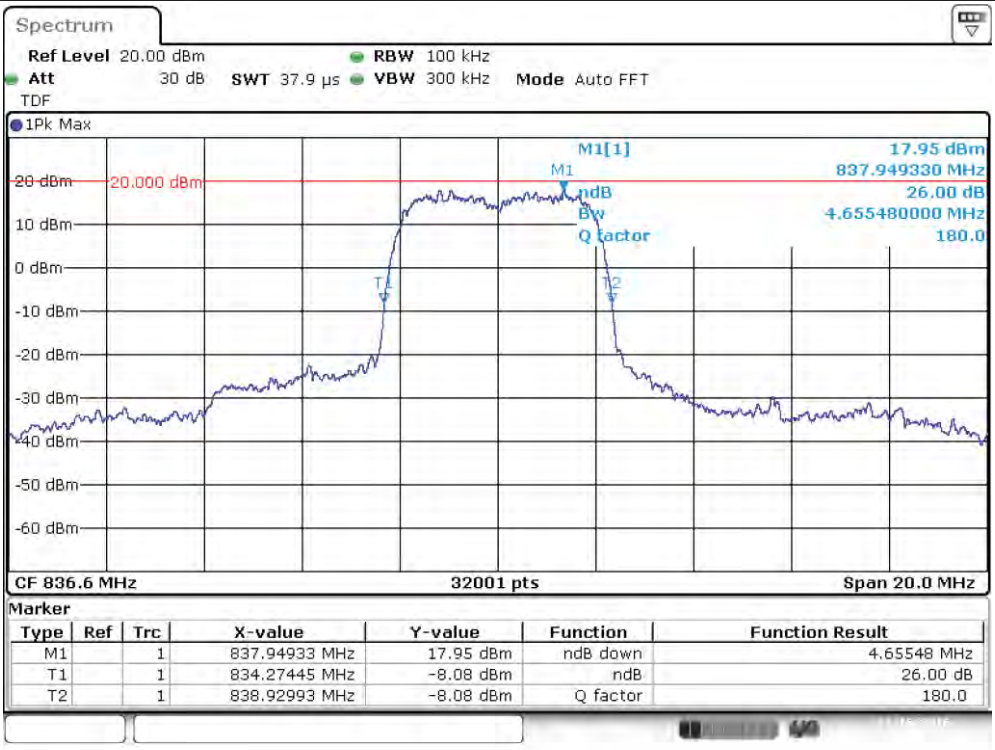


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	825.66377 MHz	16.76 dBm	ndB down	4.6661 MHz
T1		1	824.06882 MHz	-9.24 dBm	ndB	26.00 dB
T2		1	828.73493 MHz	-9.21 dBm	Q factor	176.9

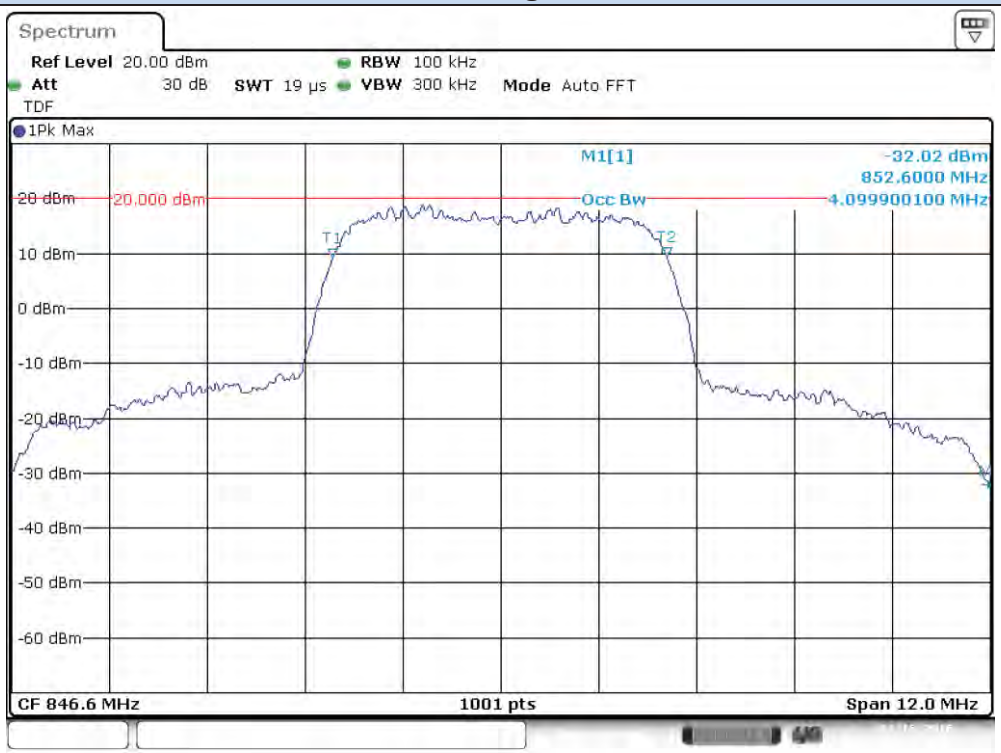
WCDMA Band V HSDPA Mid channel 4183 – OBW



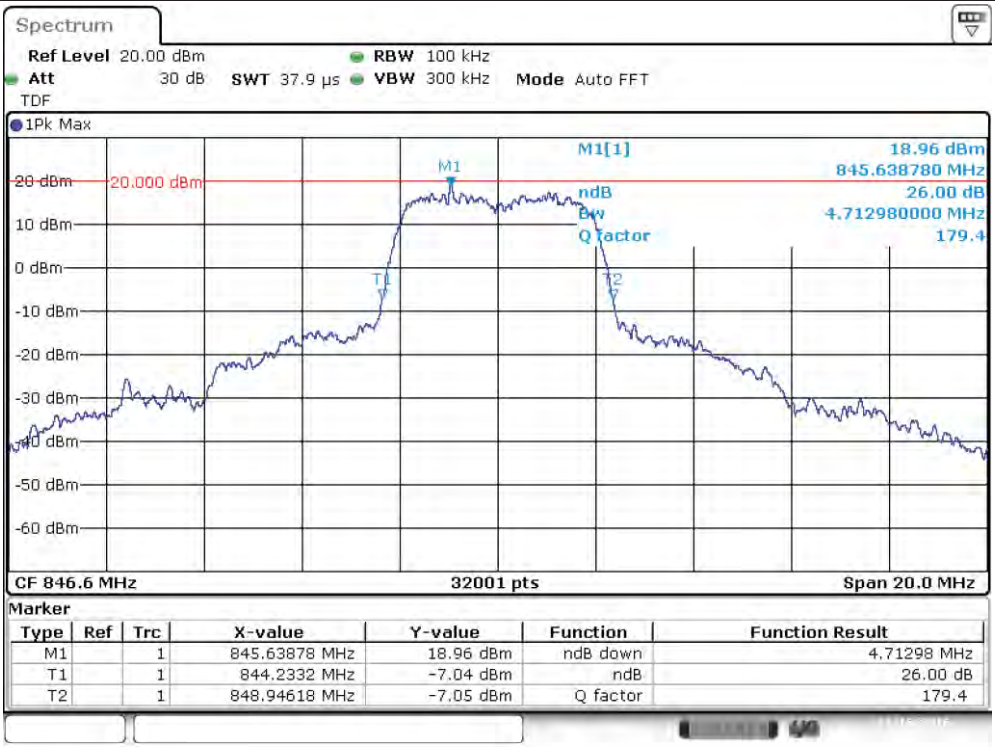
WCDMA Band V HSDPA Mid channel 4183 – EBW



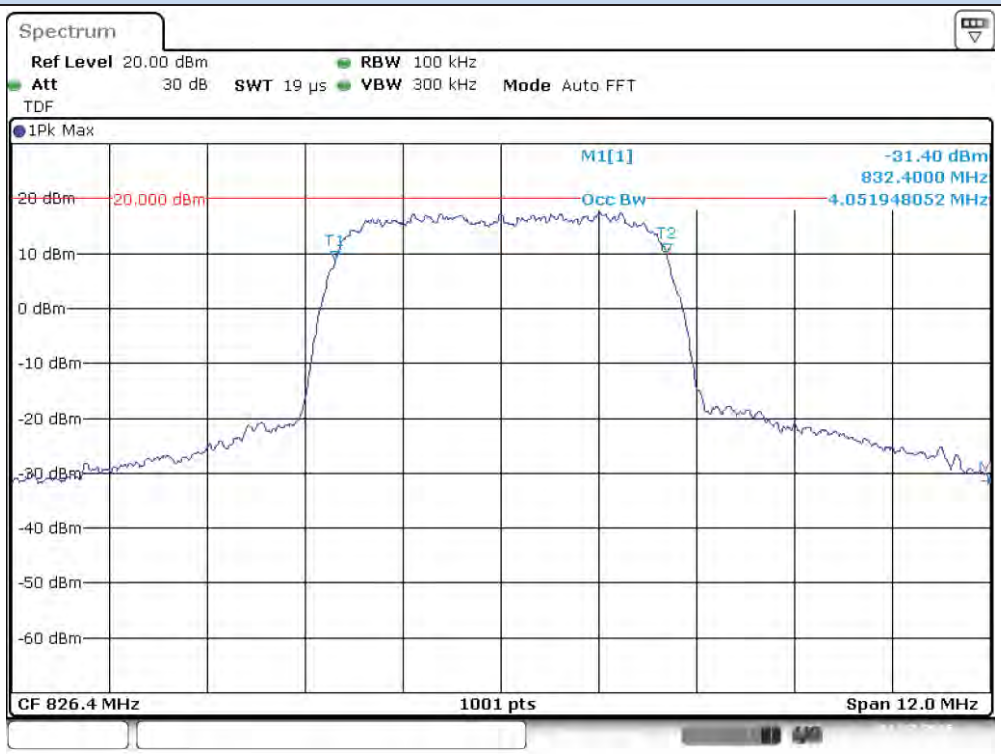
WCDMA Band V HSDPA High channel 4233 – OBW



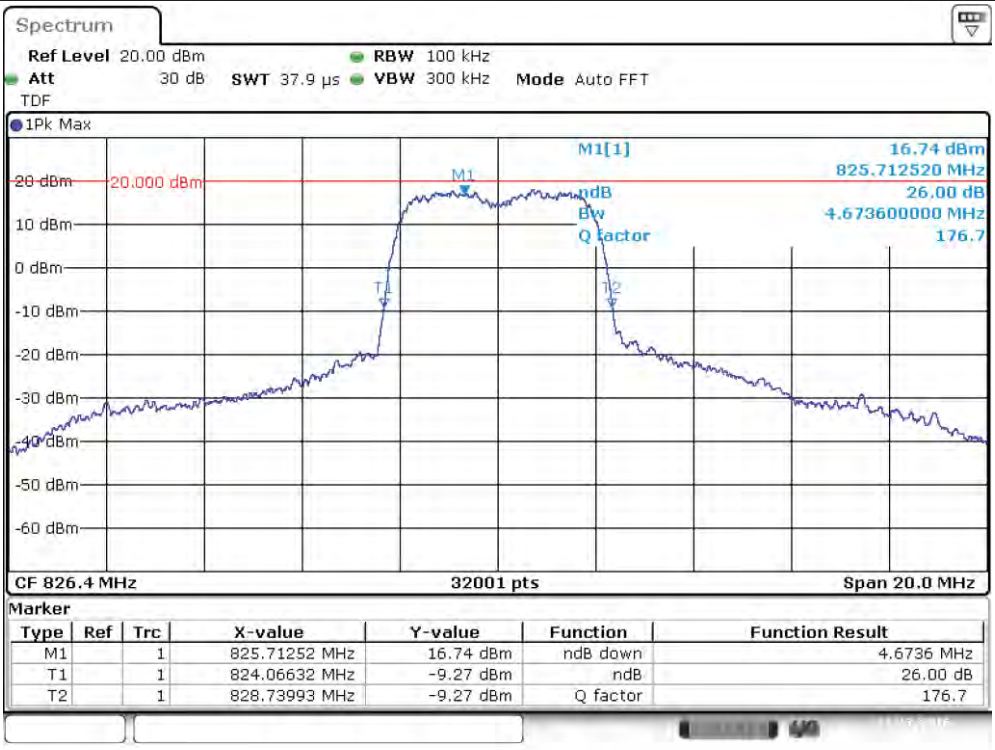
WCDMA Band V HSDPA High channel 4233 – EBW



WCDMA Band V HSUPA Low channel 4132 – OBW

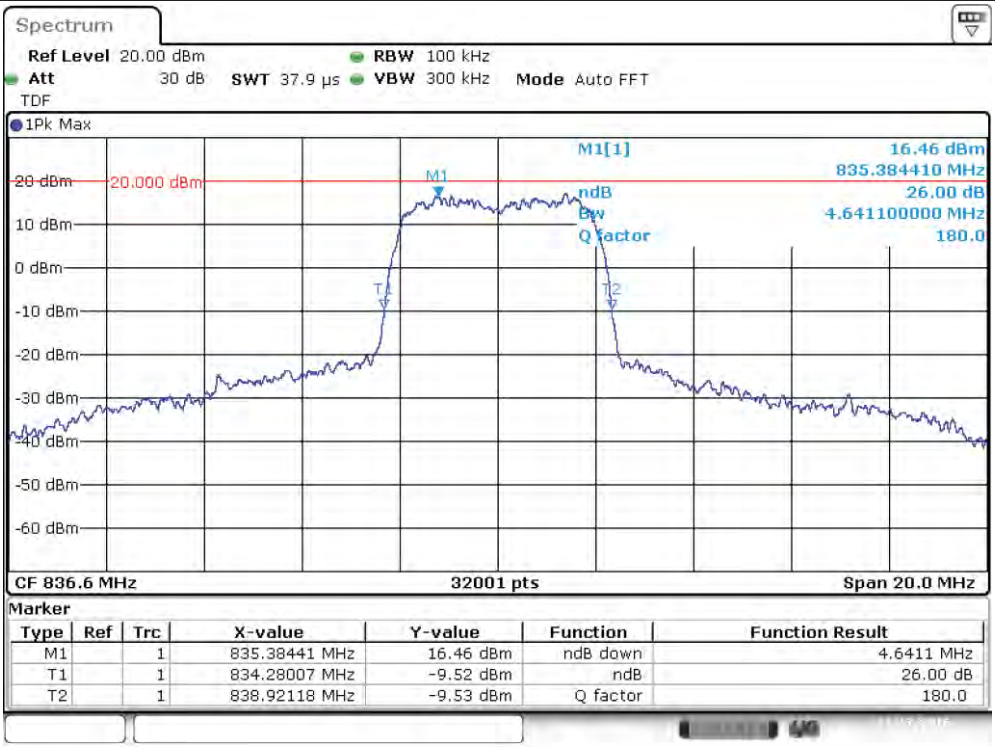


WCDMA Band V HSUPA Low channel 4132 – EBW

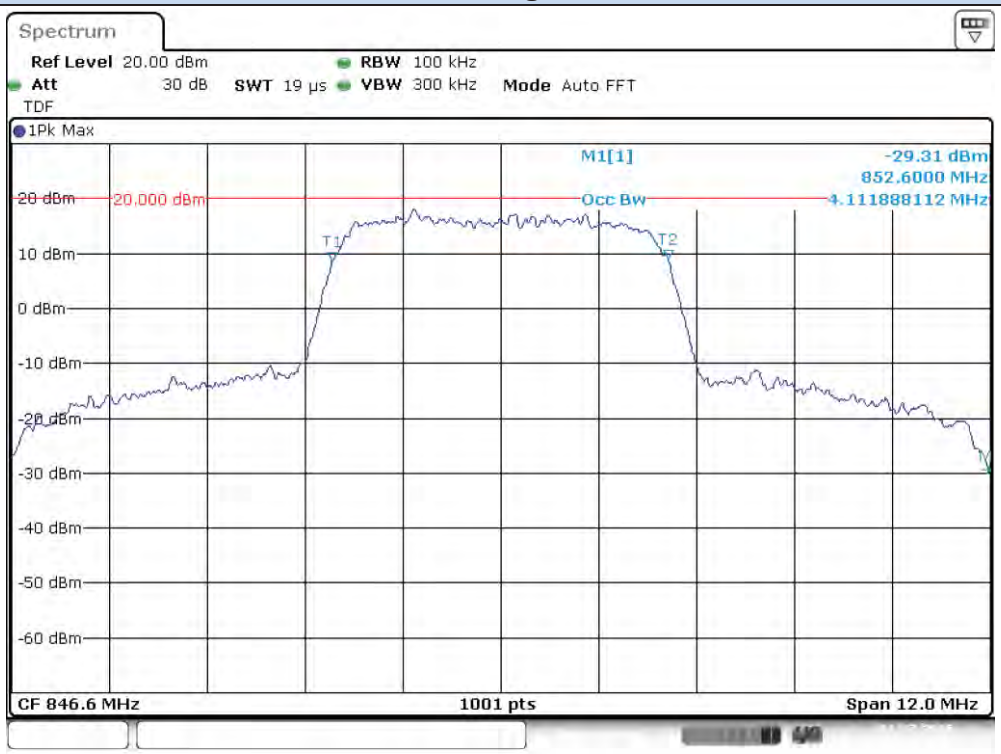


WCDMA Band V HSUPA Mid channel 4183 – OBW

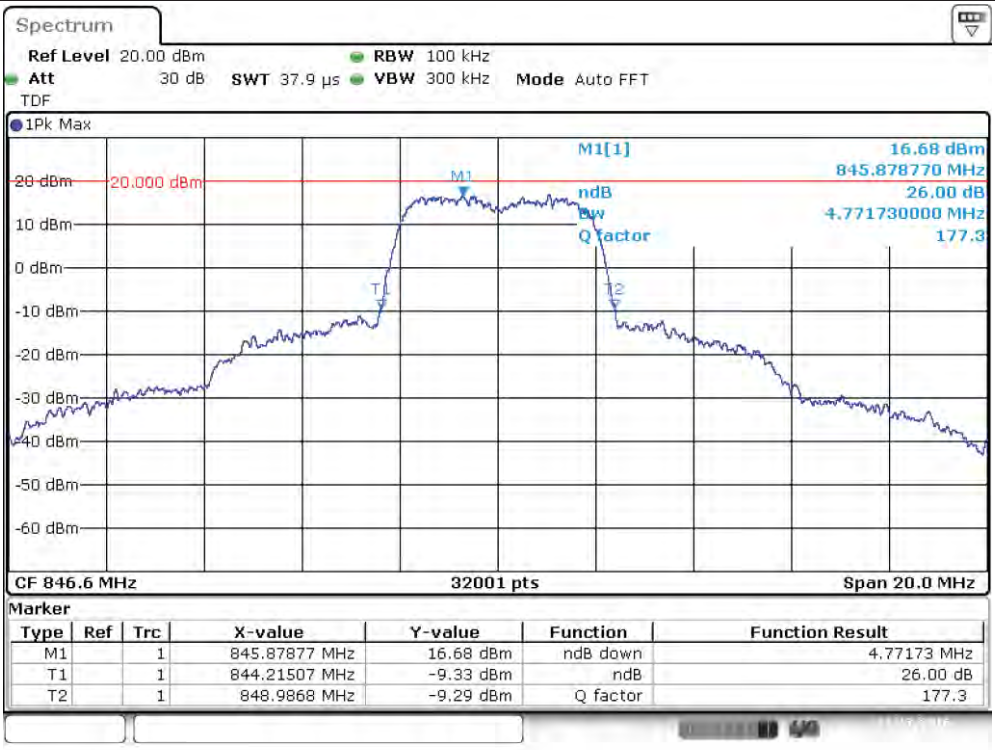
WCDMA Band V HSUPA Mid channel 4183 – EBW



WCDMA Band V HSUPA High channel 4233 – OBW



WCDMA Band V HSUPA High channel 4233 – EBW



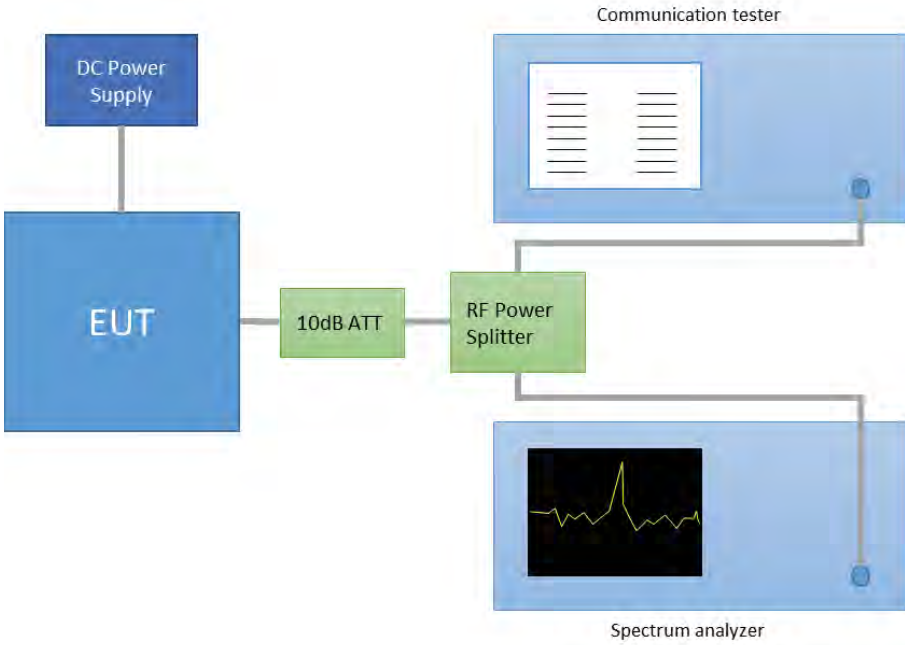
B.3 Conducted band-edge and spurious emission

B.3.1 Standard references

BAND	FCC part	RSS part	Limits
PCS 1900 WCDMA FDD II	2.1051, 24.238	133-ch6.5.1	§2.1051 The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified. §22. 917 & 24.238 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
WCDMA FDD IV	2.1051, 27.53	139-ch.6.6	
GSM 850 WCDMA FDD V	2.1051, 22.917	132-ch.5.5	

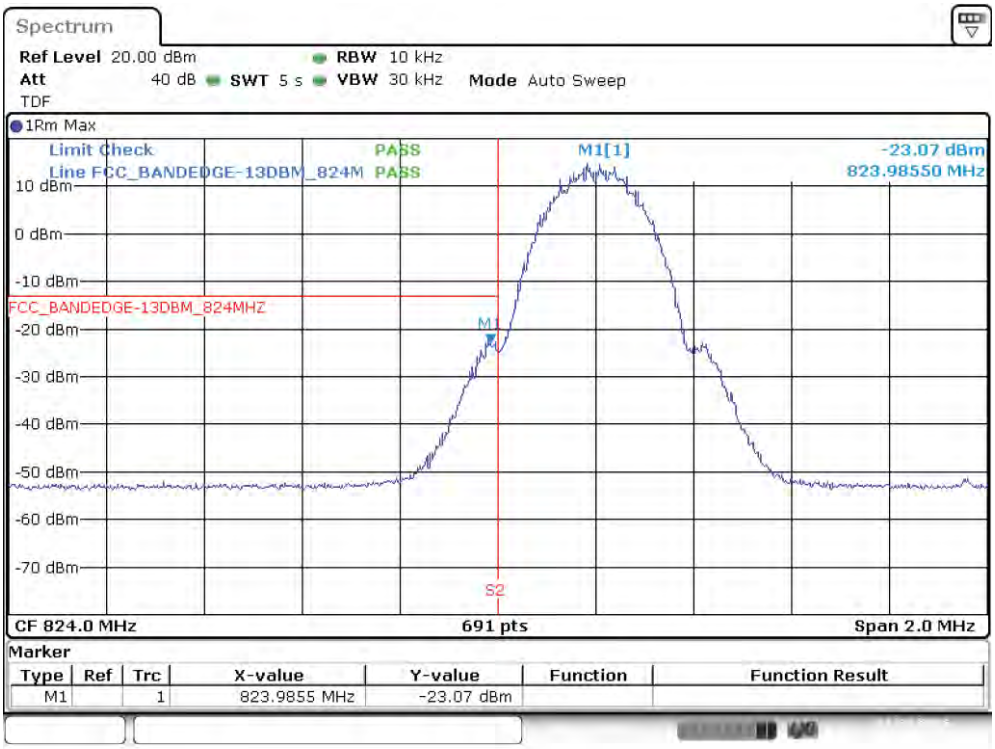
B.3.2 Test procedure

The setup below was used to measure the band-edge and the conducted spurious. The antenna terminal of the EUT is connected to the spectrum analyzer and the communication tester through an attenuator and a power splitter. According to the standard reference, at 1 MHz immediately outside and adjacent to the authorized operating frequency range, a resolution bandwidth of at least 1% has been applied.

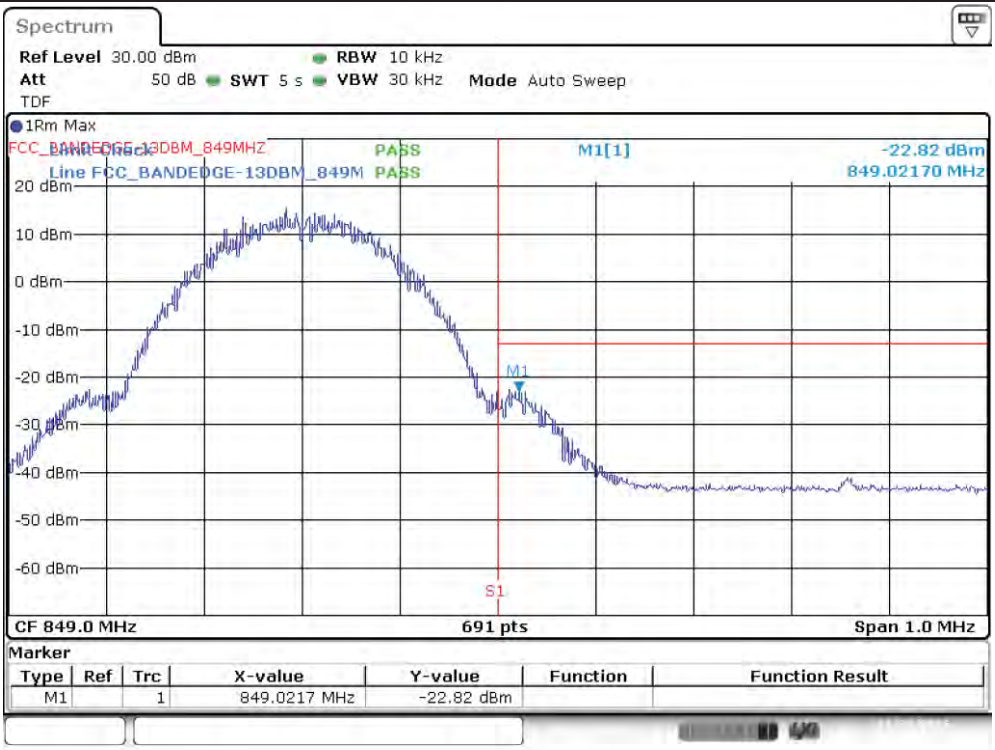


B.3.3 Conducted Band-edge emission results screenshot

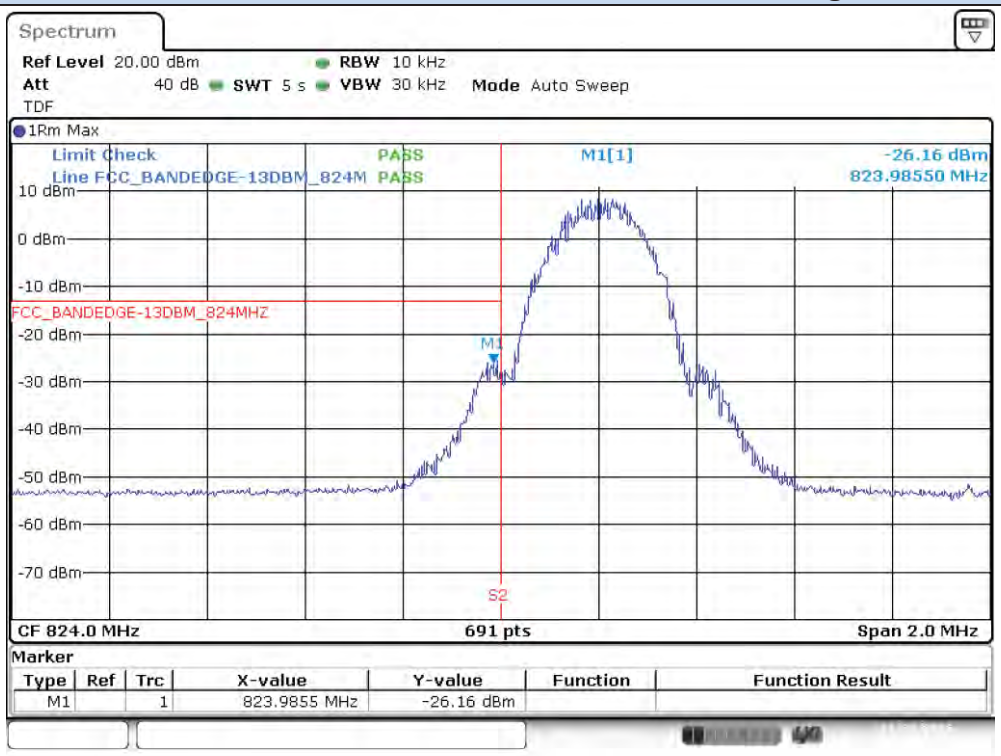
GSM850 GPRS GMSK Low channel 128 – Band Edge low



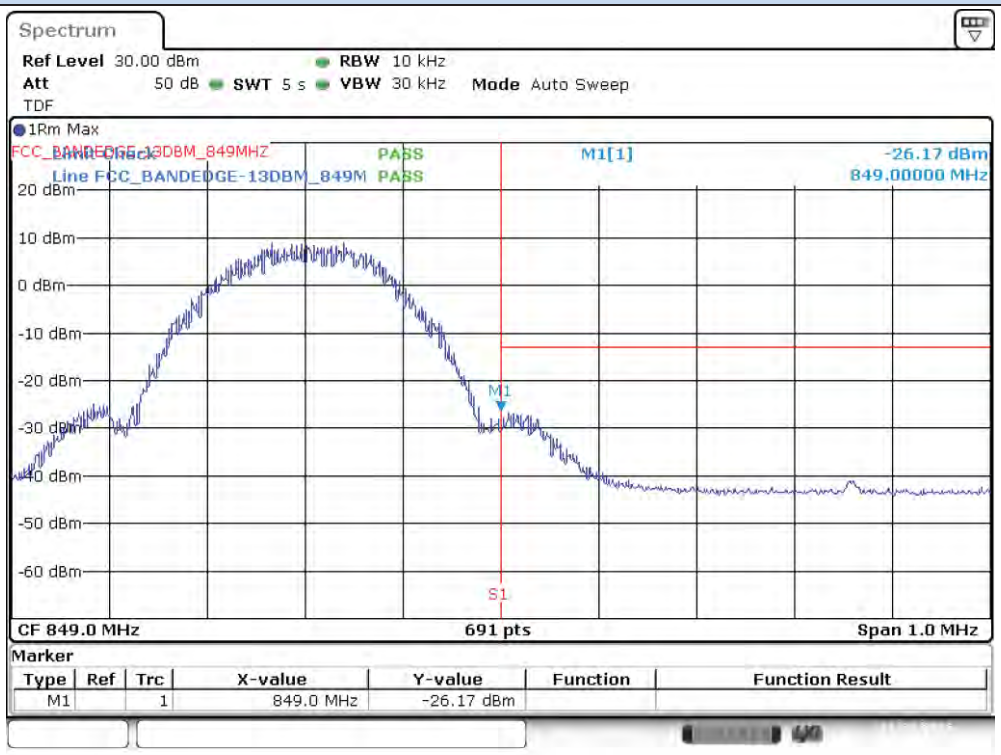
GSM850 GPRS GMSK High channel 251 – Band Edge high



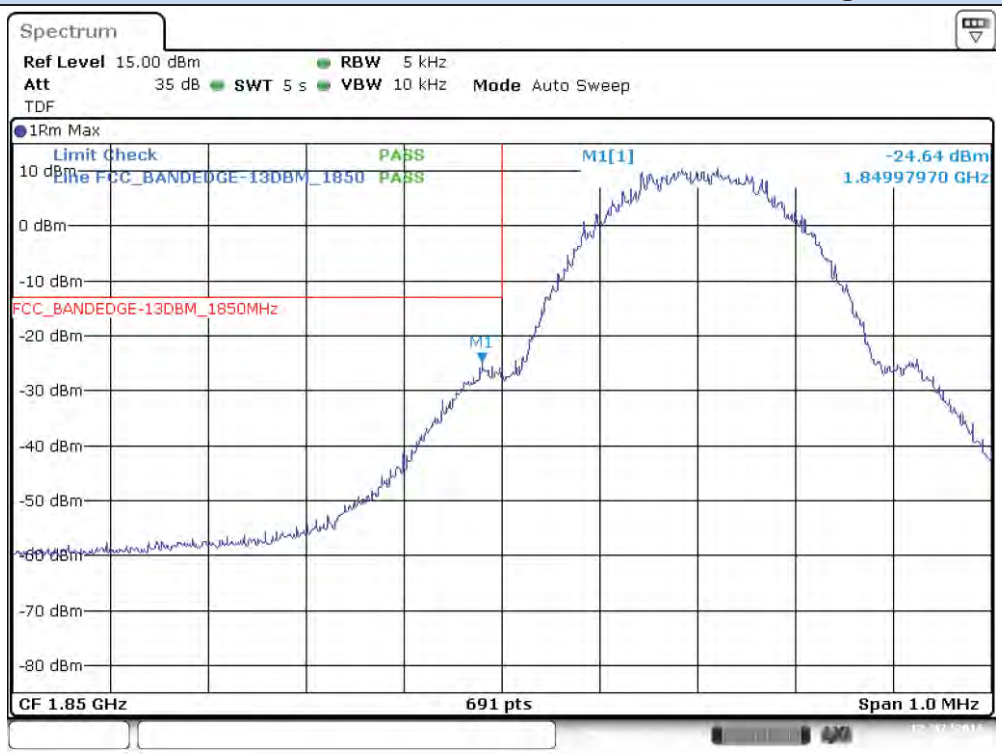
GSM850 EDGE 8PSK Low channel 128 – Band Edge low



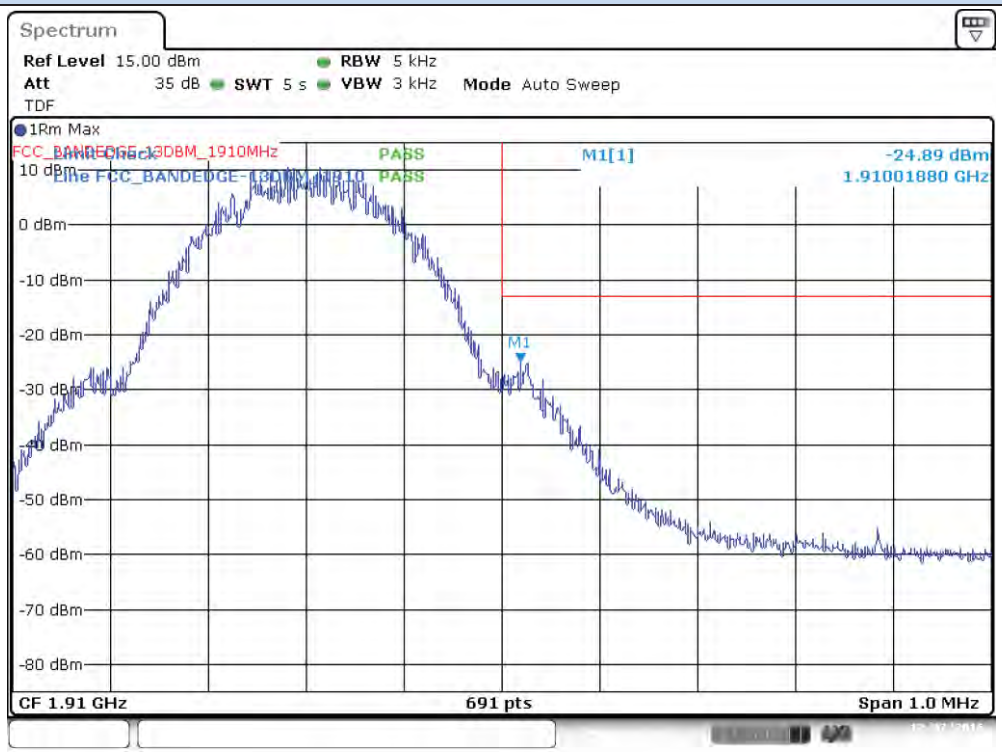
GSM850 EDGE 8PSK Low channel 251– Band Edge high



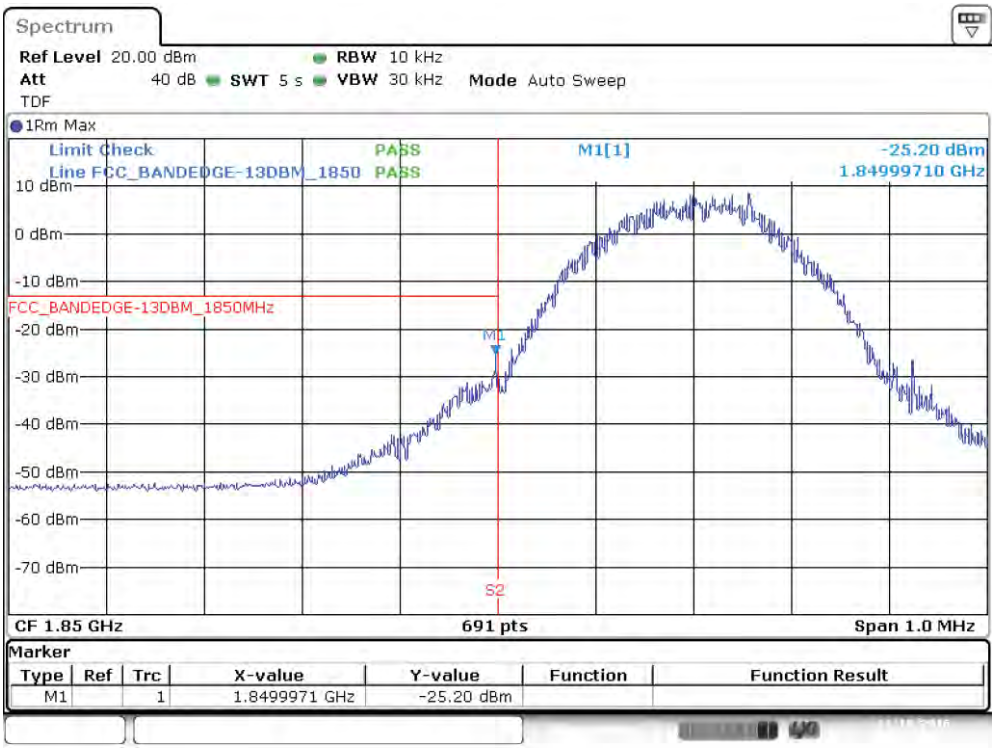
PCS1900 GPRS GMSK Low channel 512 – Band Edge low



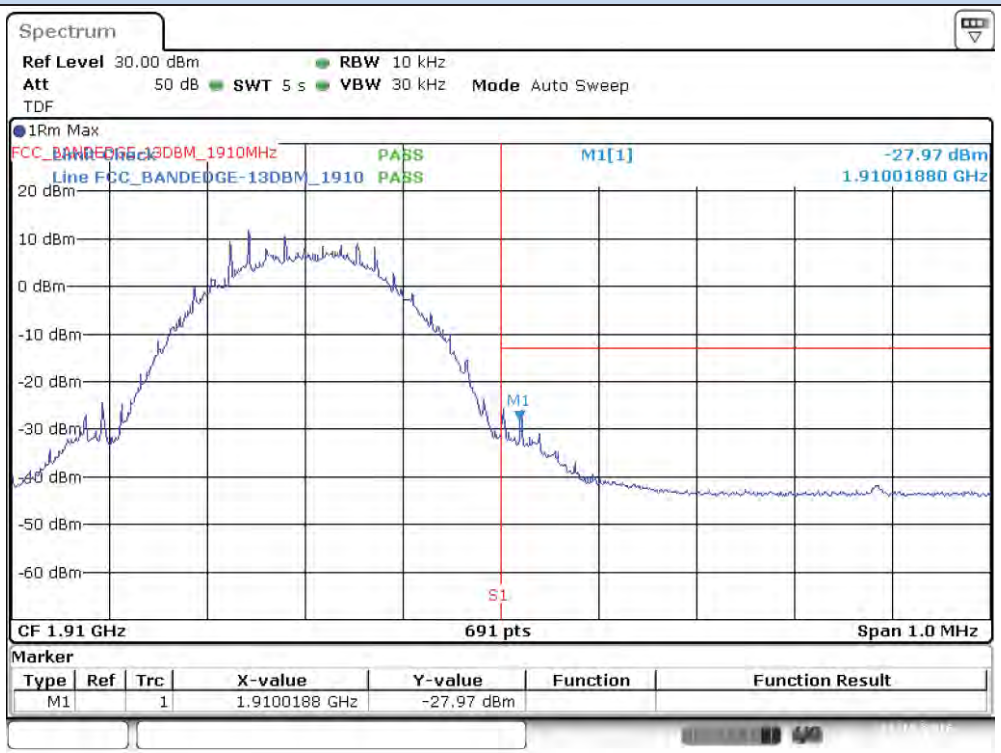
PCS1900 GPRS GMSK High channel 810 – Band Edge high



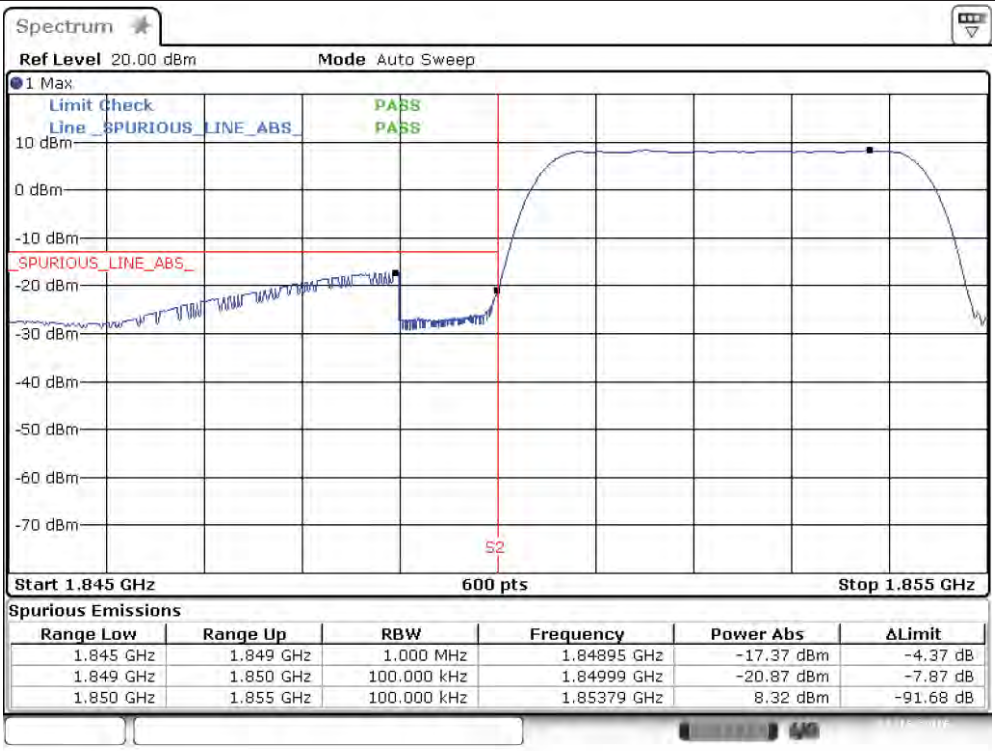
PCS1900 EDGE 8 PSK Low channel 512 – Band Edge low



PCS1900 EDGE 8 PSK High channel 810 – Band Edge high



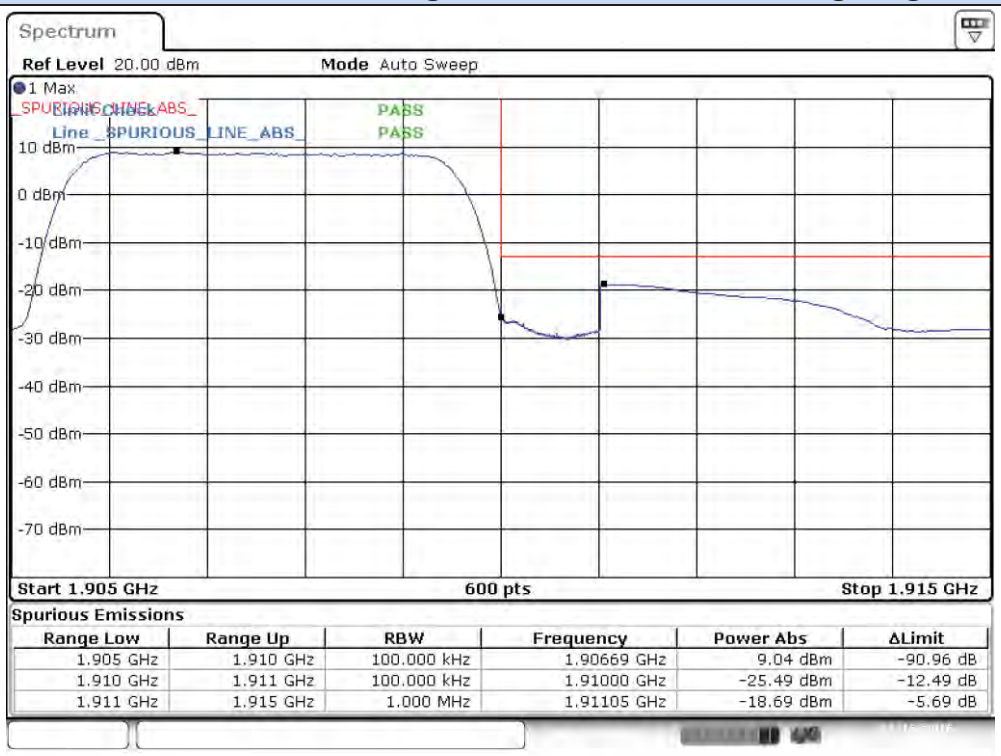
WCDMA Band II RMC Low channel 9262– Band Edge low



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.845 GHz	1.849 GHz	1.000 MHz	1.84895 GHz	-17.37 dBm	-4.37 dB
1.849 GHz	1.850 GHz	100.000 kHz	1.84999 GHz	-20.87 dBm	-7.87 dB
1.850 GHz	1.855 GHz	100.000 kHz	1.85379 GHz	8.32 dBm	-91.68 dB

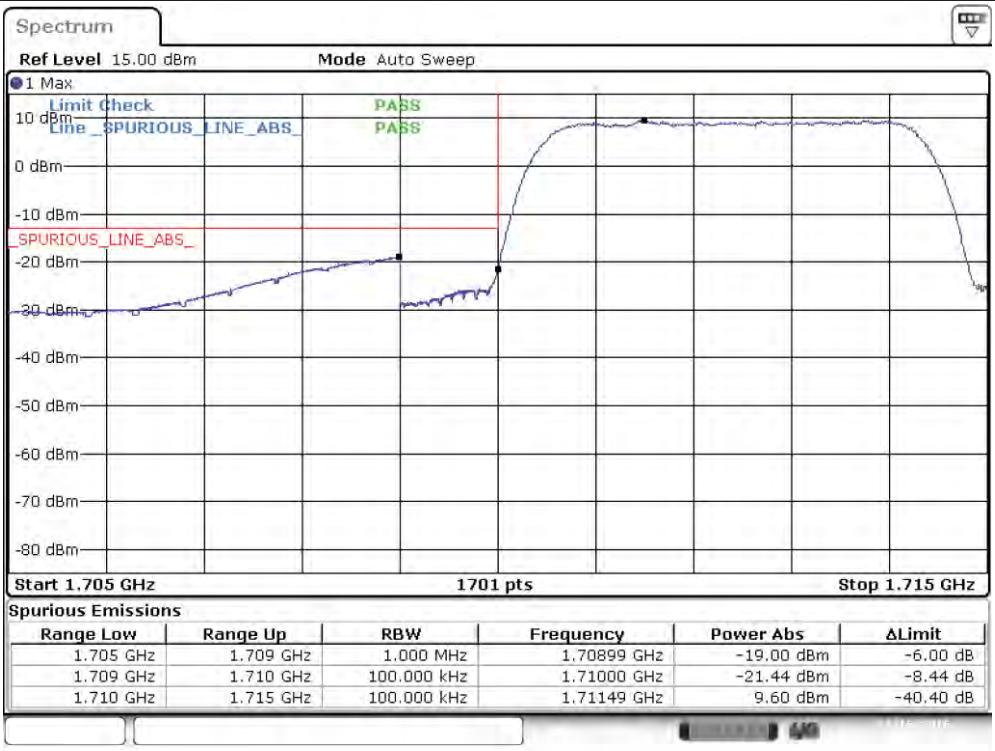
WCDMA Band II RMC High channel 9538– Band Edge high



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.905 GHz	1.910 GHz	100.000 kHz	1.90669 GHz	9.04 dBm	-90.96 dB
1.910 GHz	1.911 GHz	100.000 kHz	1.91000 GHz	-25.49 dBm	-12.49 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91105 GHz	-18.69 dBm	-5.69 dB

WCDMA Band IV RMC Low channel 1312– Band Edge low



Spurious Emissions

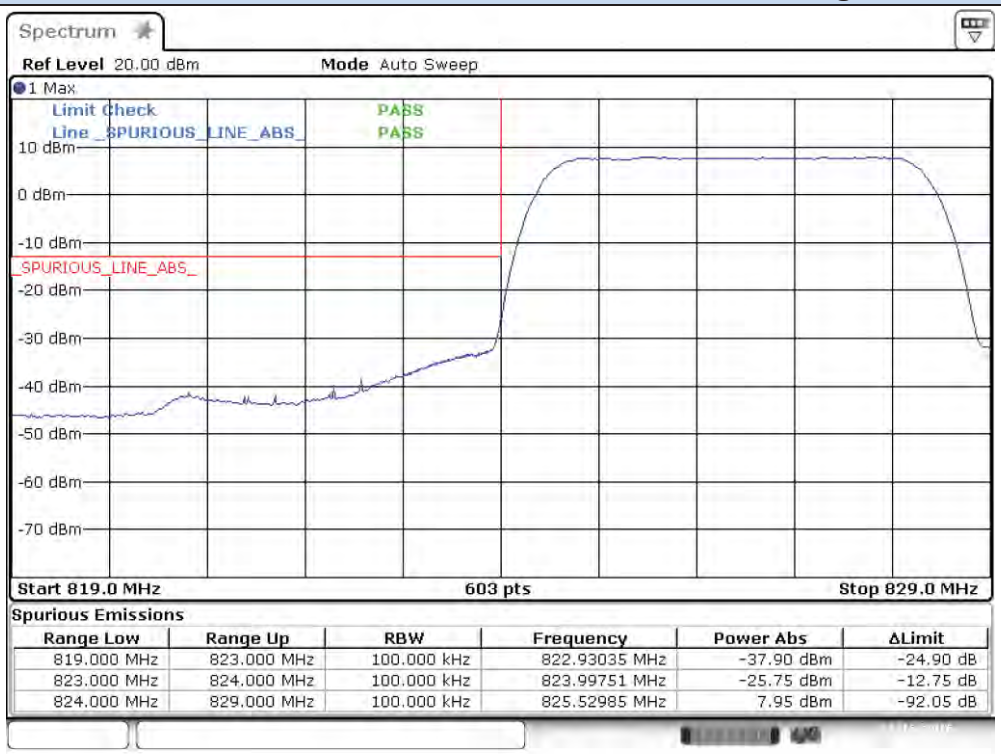
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.705 GHz	1.709 GHz	1.000 MHz	1.70899 GHz	-19.00 dBm	-6.00 dB
1.709 GHz	1.710 GHz	100.000 kHz	1.71000 GHz	-21.44 dBm	-8.44 dB
1.710 GHz	1.715 GHz	100.000 kHz	1.71149 GHz	9.60 dBm	-40.40 dB

WCDMA Band IV RMC High channel 1513– Band Edge high

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.750 GHz	1.755 GHz	100.000 kHz	1.75164 GHz	12.11 dBm	-37.89 dB
1.755 GHz	1.756 GHz	100.000 kHz	1.75500 GHz	-18.31 dBm	-5.31 dB
1.756 GHz	1.760 GHz	1.000 MHz	1.75629 GHz	-14.85 dBm	-1.85 dB

WCDMA Band V RMC Low channel 4132– Band Edge low



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
819.000 MHz	823.000 MHz	100.000 kHz	822.93035 MHz	-37.90 dBm	-24.90 dB
823.000 MHz	824.000 MHz	100.000 kHz	823.99751 MHz	-25.75 dBm	-12.75 dB
824.000 MHz	829.000 MHz	100.000 kHz	825.52985 MHz	7.95 dBm	-92.05 dB

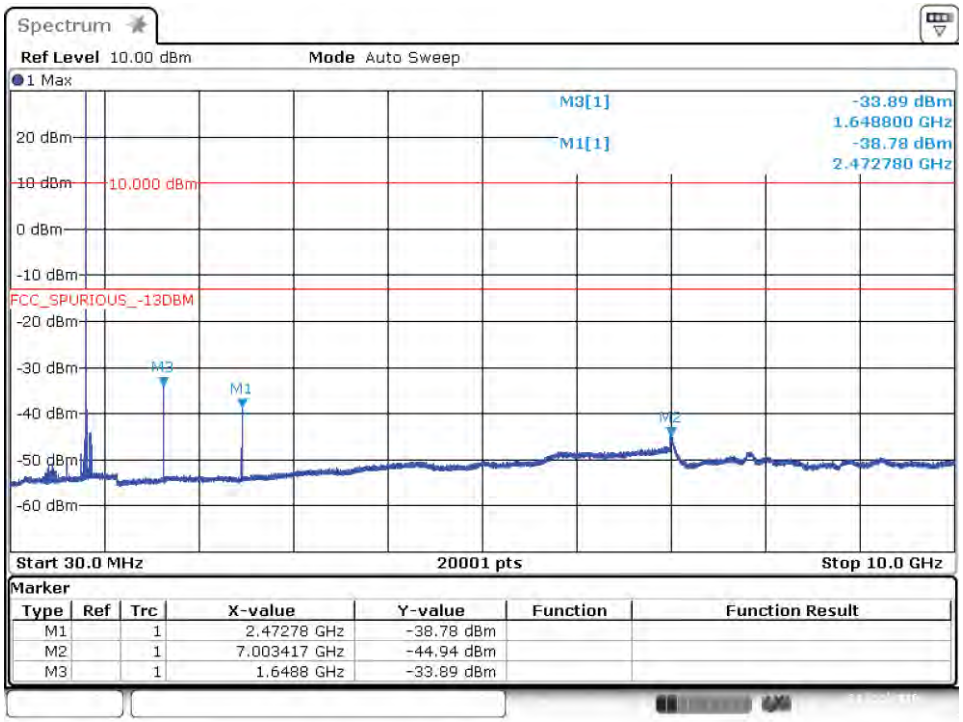
WCDMA Band V RMC High channel 4233– Band Edge high

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
844.000 MHz	849.000 MHz	100.000 kHz	845.67910 MHz	7.95 dBm	-92.05 dB
849.000 MHz	850.000 MHz	100.000 kHz	849.00249 MHz	-19.94 dBm	-6.94 dB
850.000 MHz	854.000 MHz	100.000 kHz	850.08955 MHz	-25.68 dBm	-12.68 dB

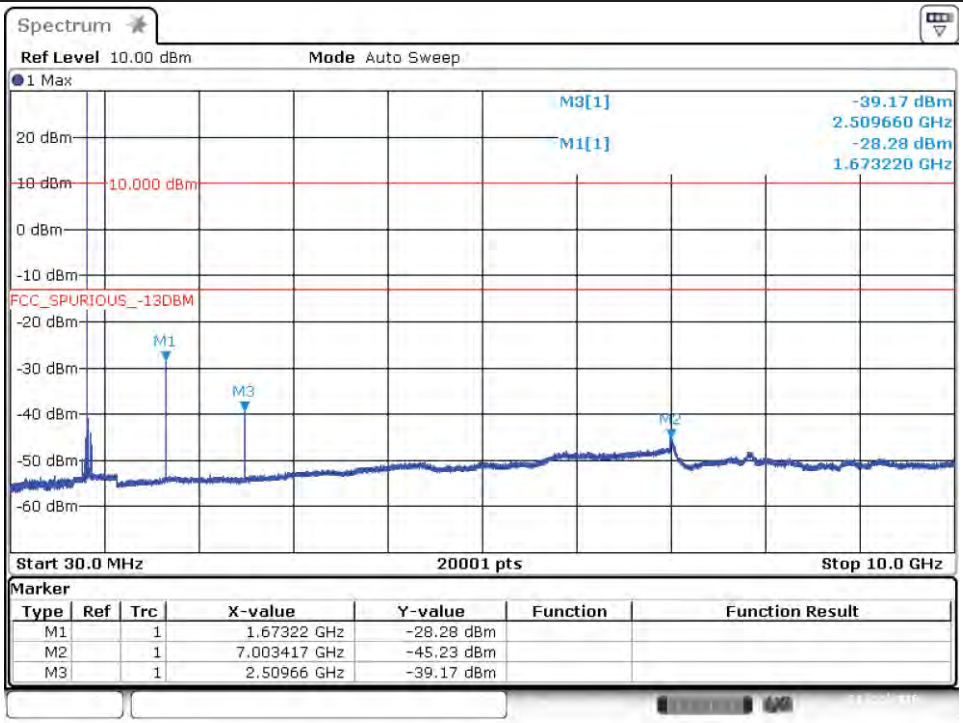
B.3.4 Conduced Spurious Emission results screenshot

GSM850 GPRS GMSK Low channel 128 – Spurious Emissions



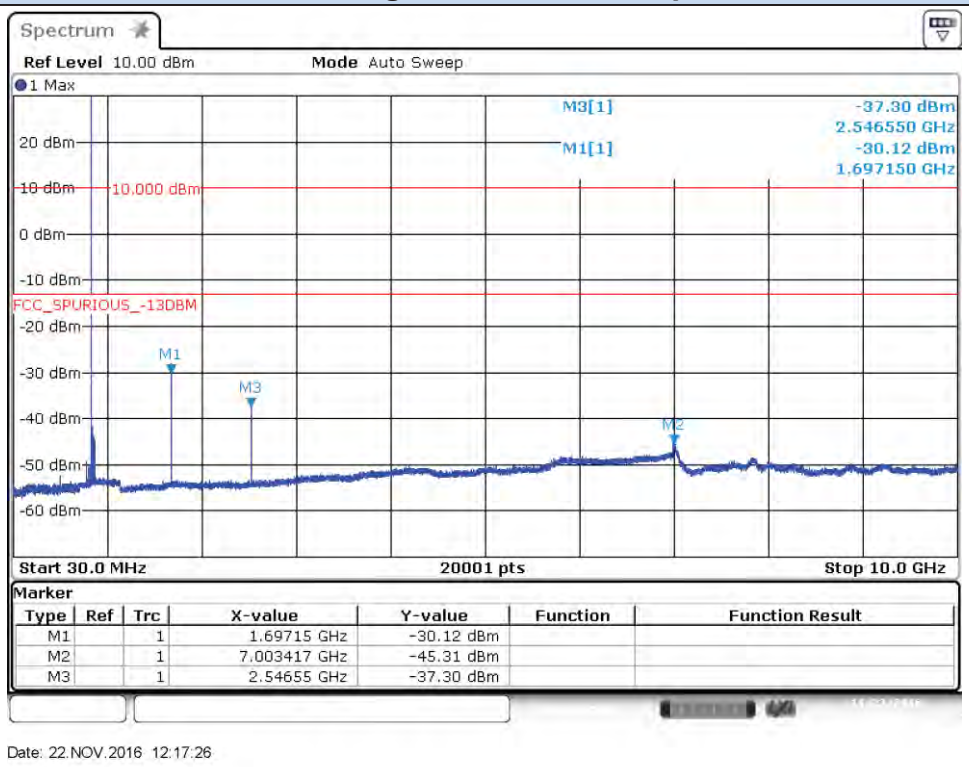
Date: 22.NOV.2016 11:59:59

GSM850 GPRS GMSK Mid channel 190 – Spurious Emissions

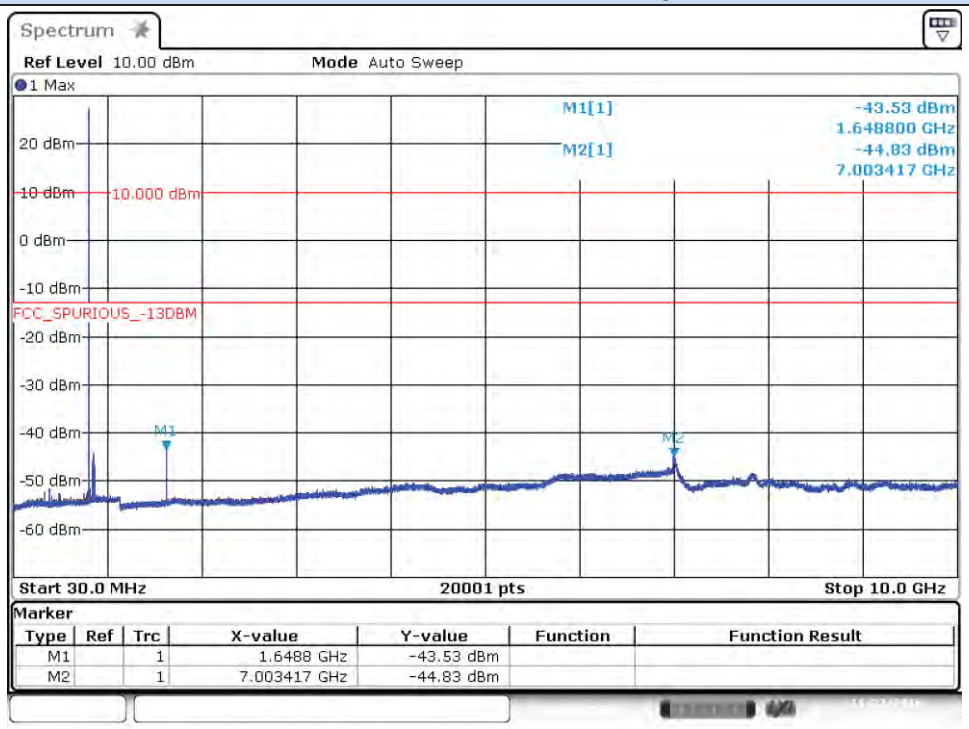


Date: 22.NOV.2016 12:14:58

GSM850 GPRS GMSK High channel 251 – Spurious Emissions

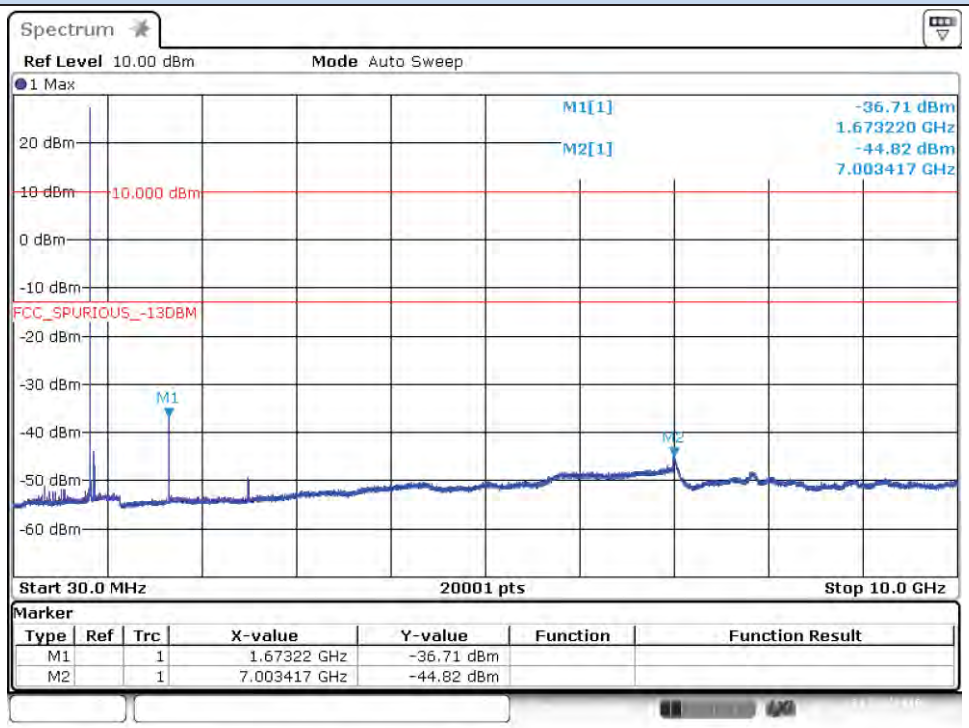


GSM850 EDGE 8PSK Low channel 128 – Spurious Emissions



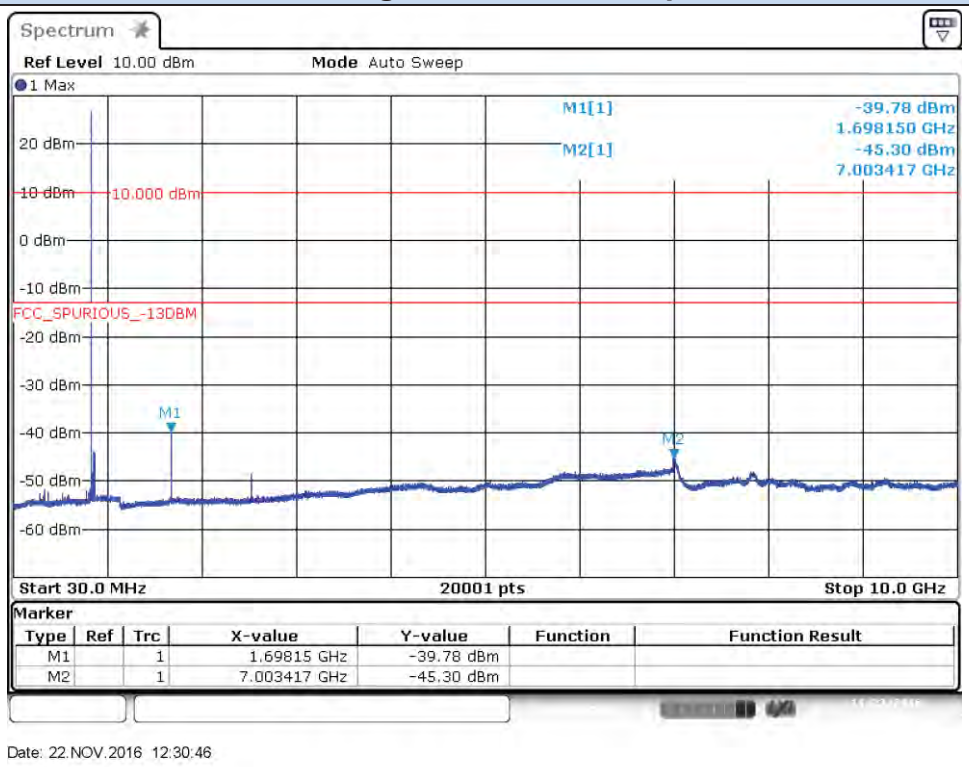
Date: 22.NOV.2016 12:35:23

GSM850 EDGE 8PSK Mid channel 190 – Spurious Emissions

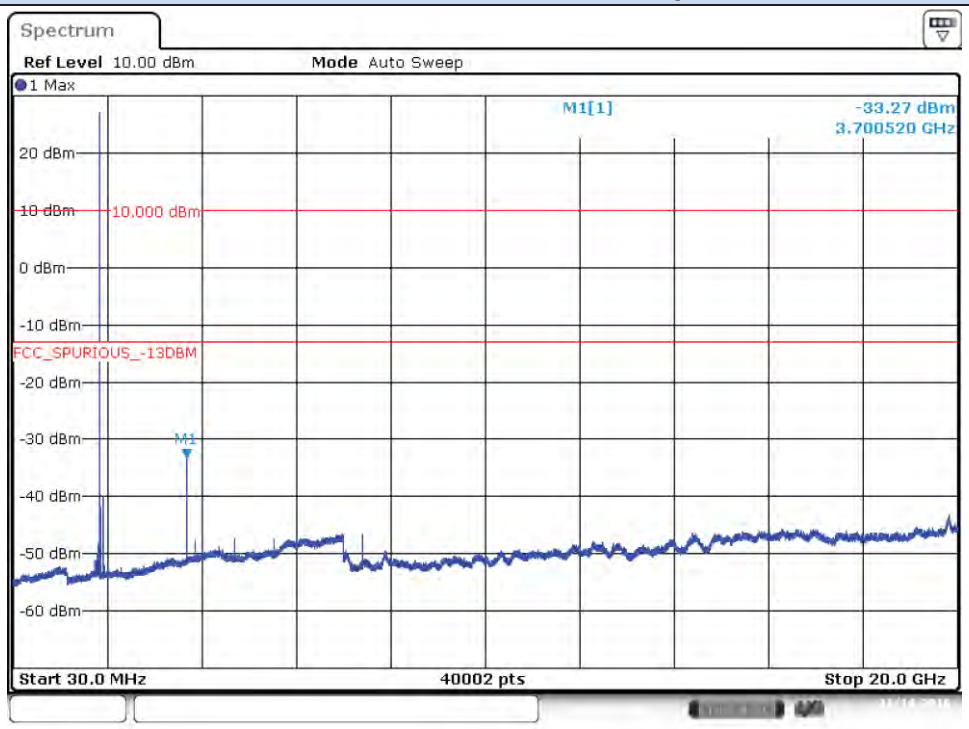


Date: 22.NOV.2016 12:40:59

GSM850 EDGE 8PSK High channel 251 – Spurious Emissions

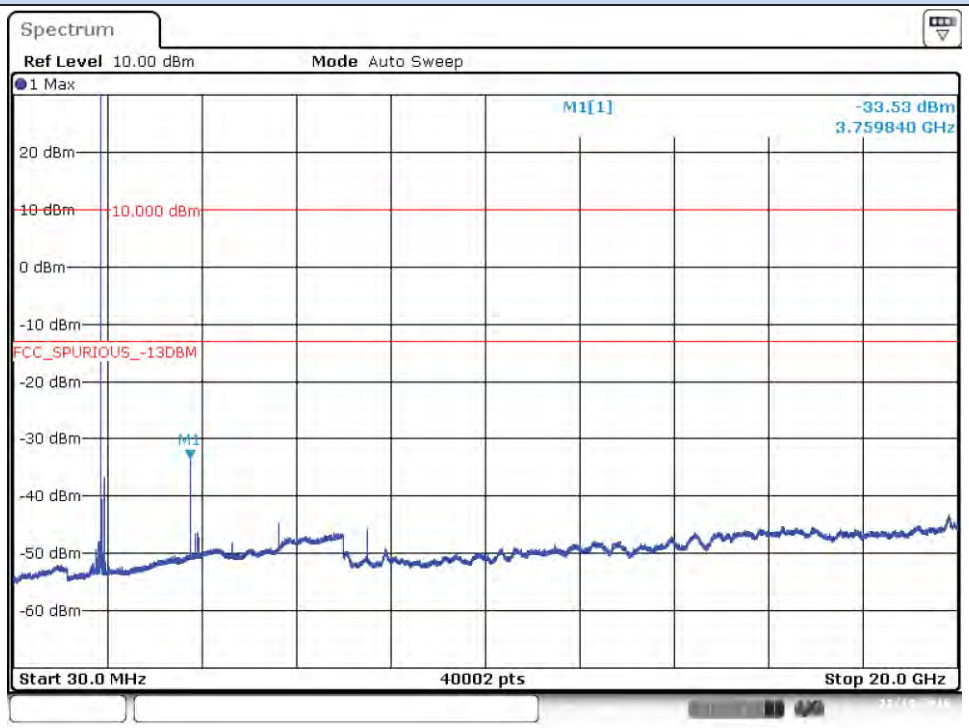


PCS1900 GPRS GMSK Low channel 512 – Spurious Emissions



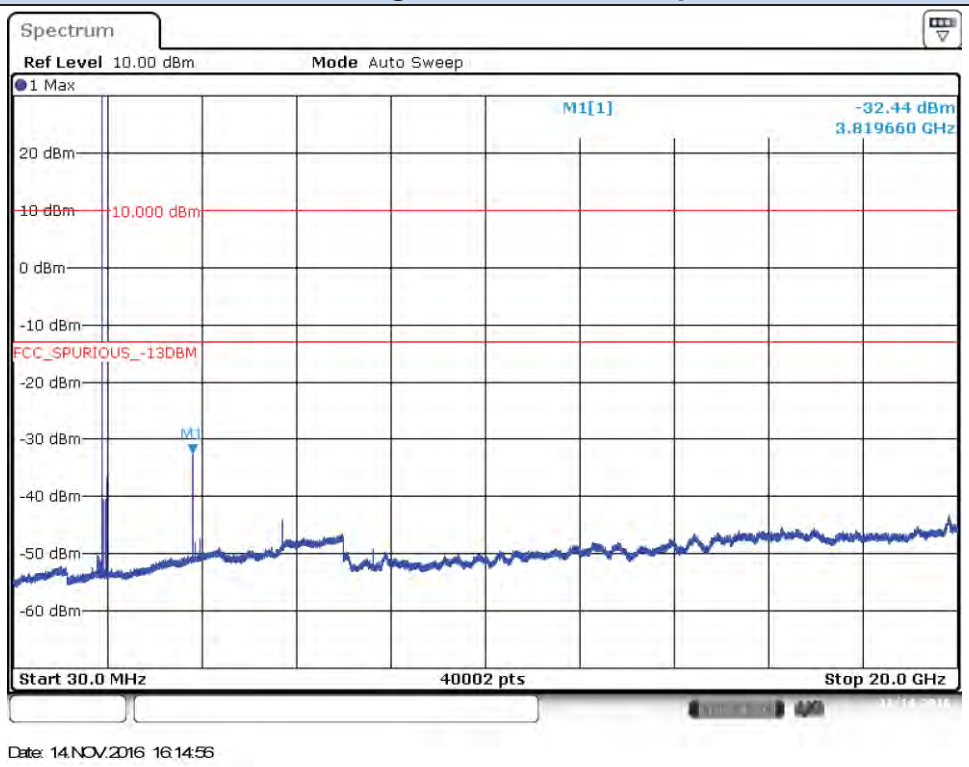
Date: 14.NOV.2016 15:36:31

PCS1900 GPRS GMSK Mid channel 661 – Spurious Emissions

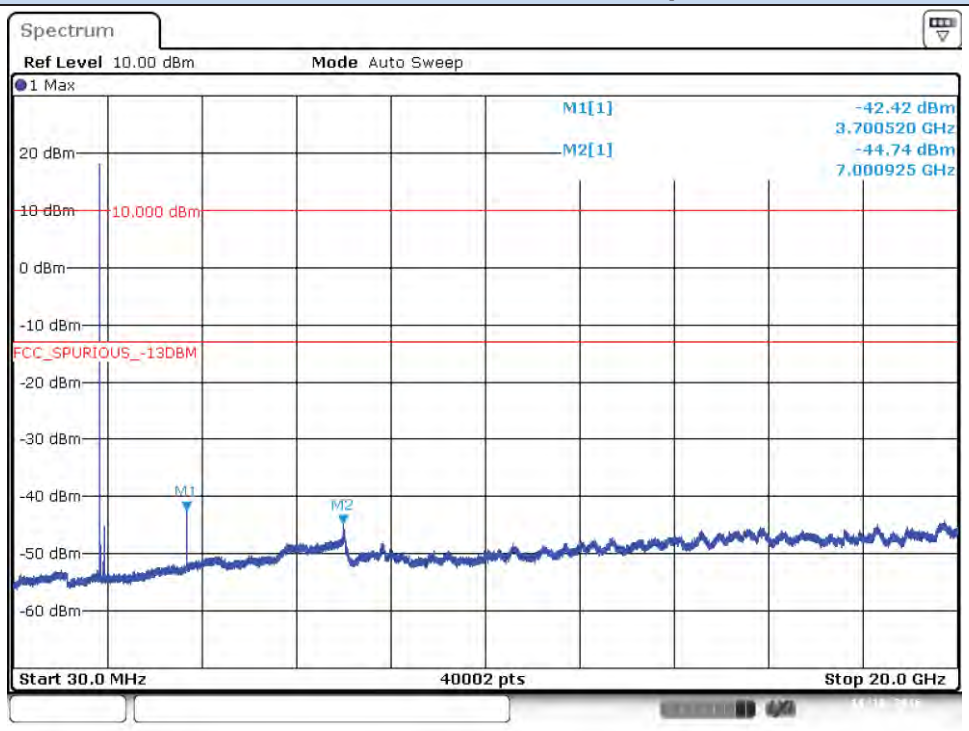


Date: 14.NOV.2016 16:02:11

PCS1900 GPRS GMSK High channel 810 – Spurious Emissions

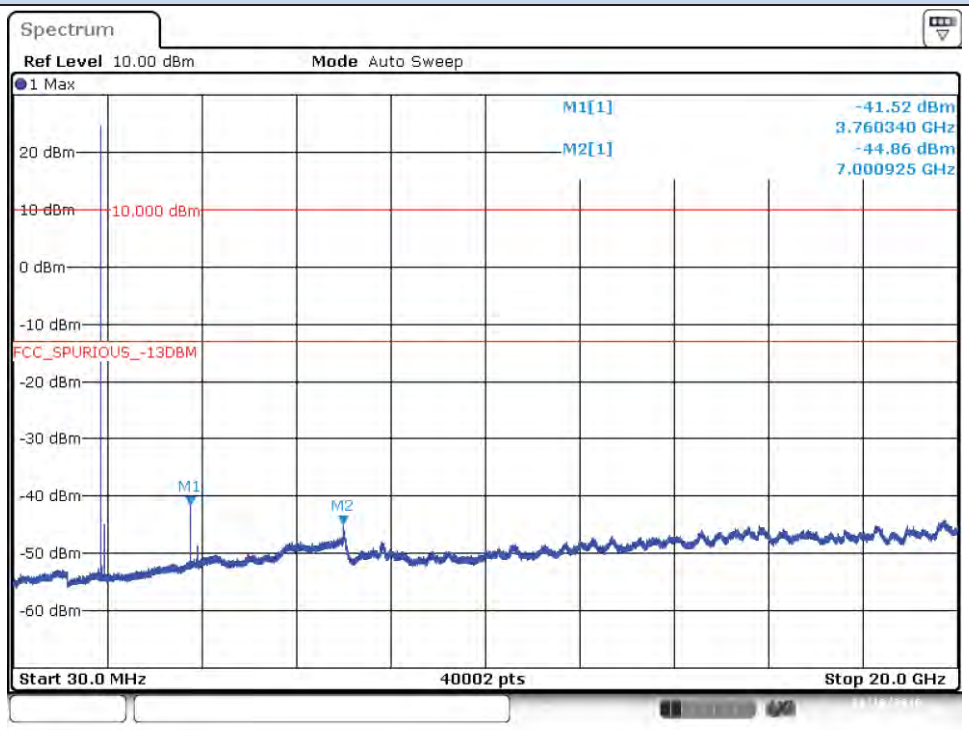


PCS1900 EDGE 8PSK Low channel 512 – Spurious Emissions



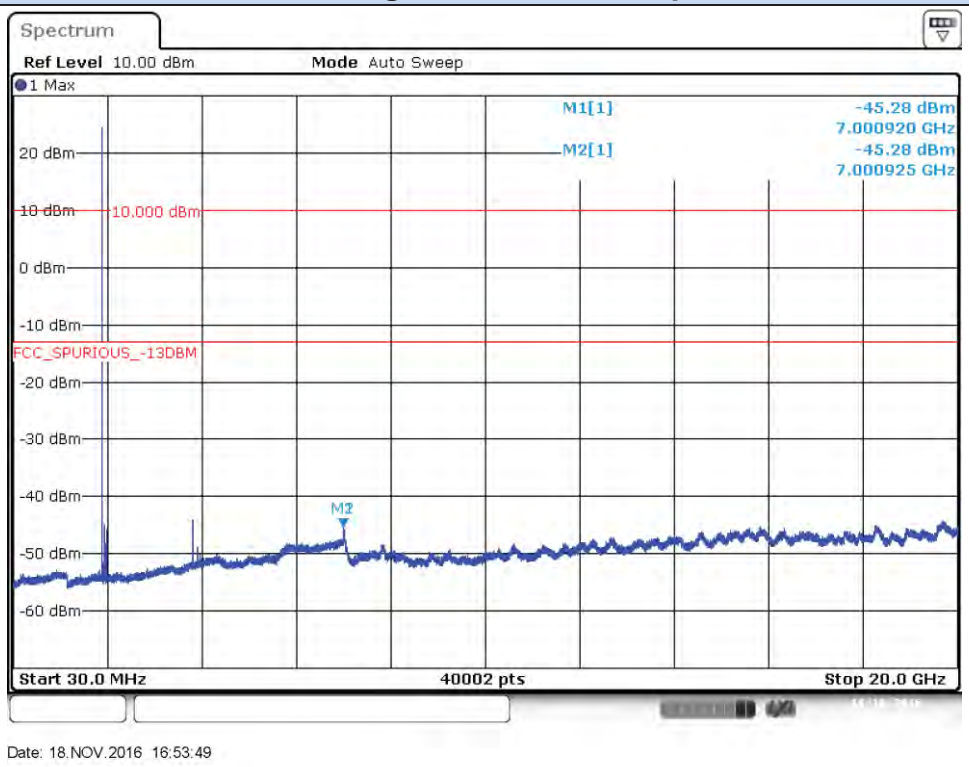
Date: 18.NOV.2016 16:40:49

PCS1900 EDGE 8PSK Mid channel 661 – Spurious Emissions

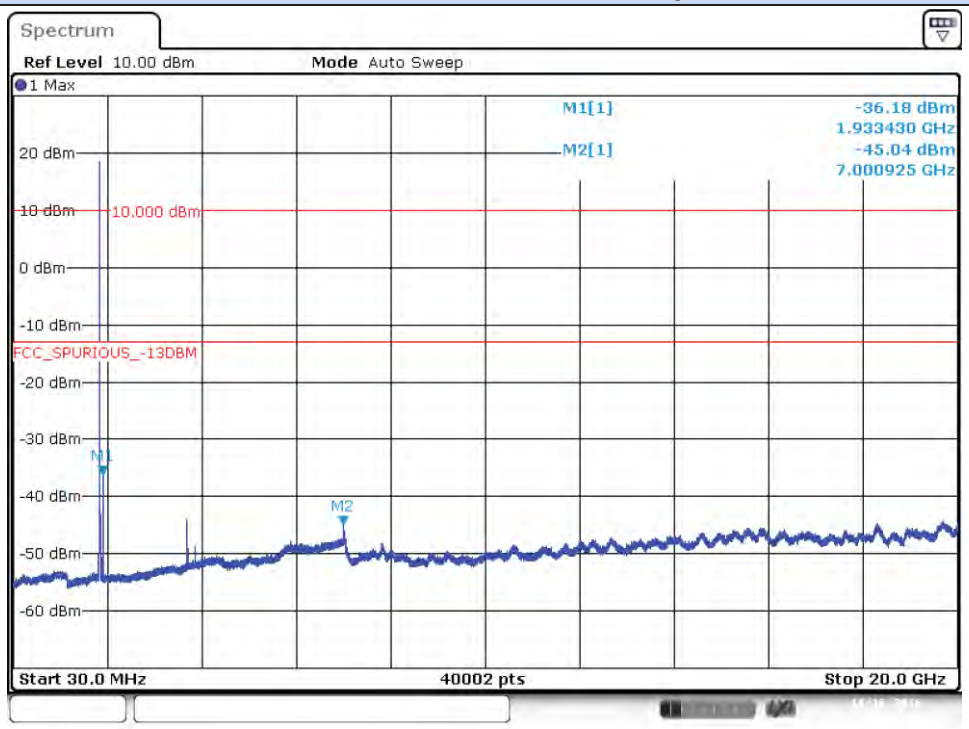


Date: 18.NOV.2016 16:42:48

PCS1900 EDGE 8PSK High channel 810 – Spurious Emissions

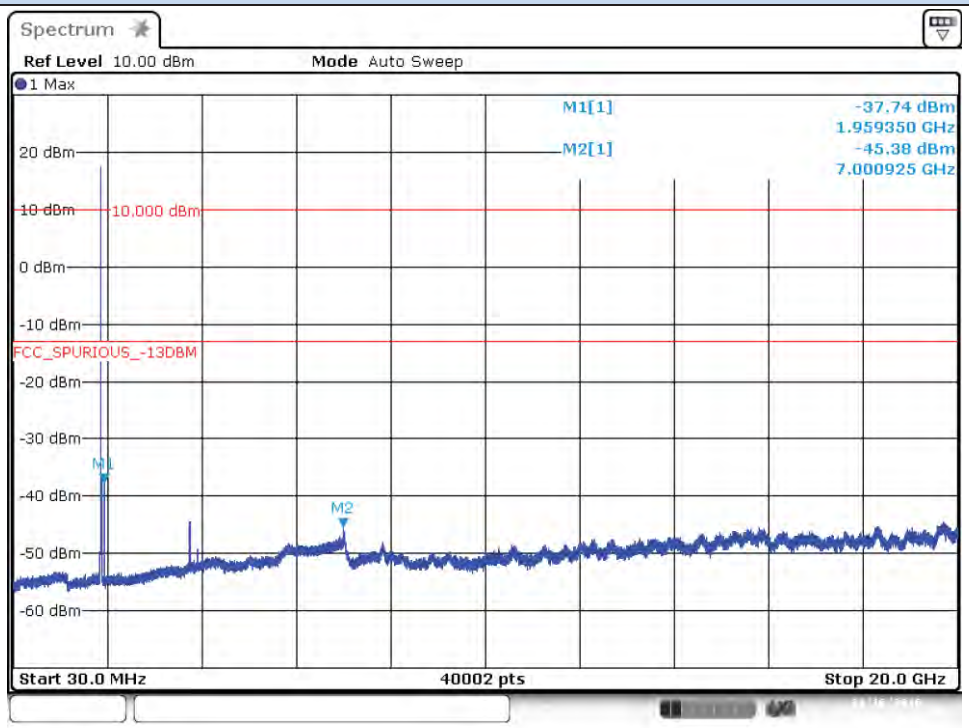


WCDMA Band II RMC Low channel 9262 – Spurious Emissions



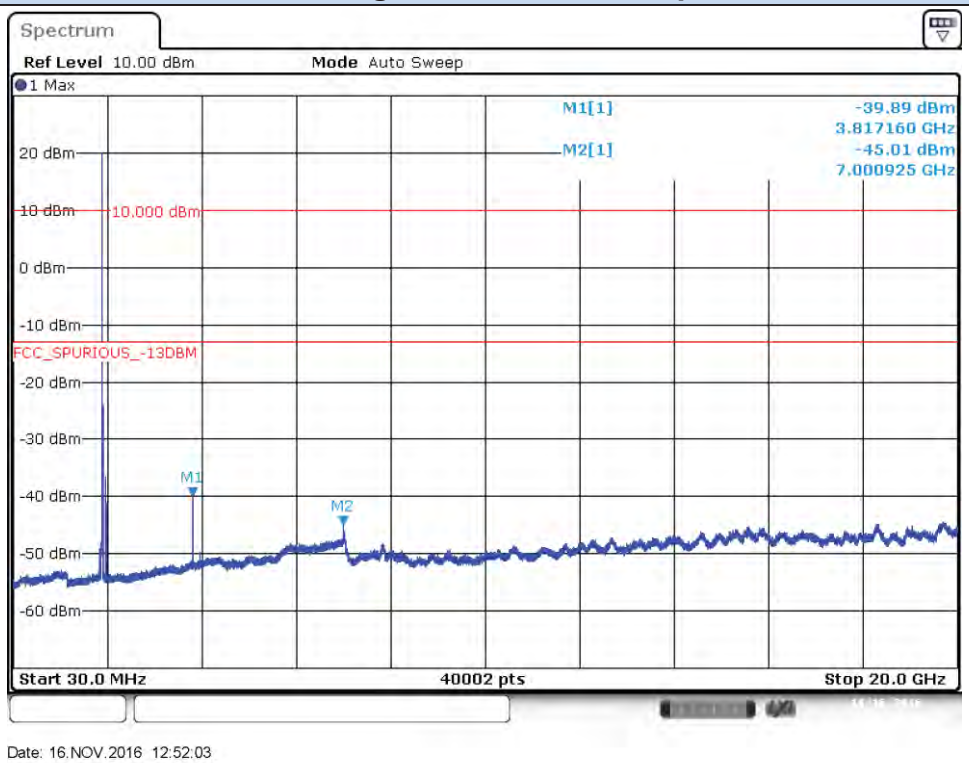
Date: 16.NOV.2016 12:49:42

WCDMA Band II RMC Mid channel 9400 – Spurious Emissions

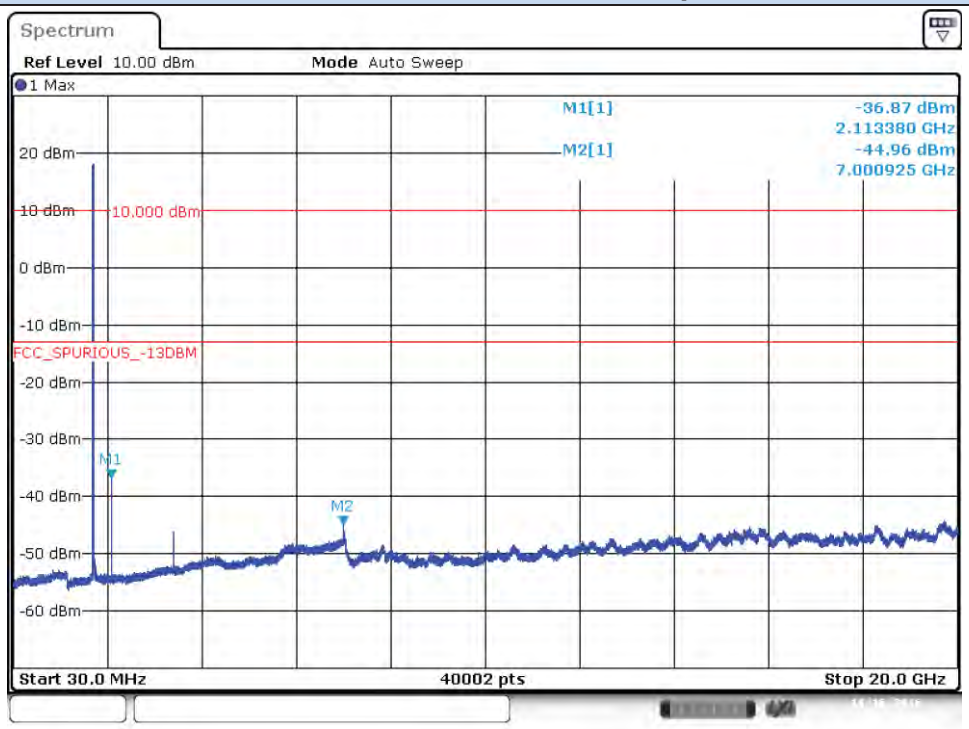


Date: 16.NOV.2016 12:50:25

WCDMA Band II RMC High channel 9538 – Spurious Emissions

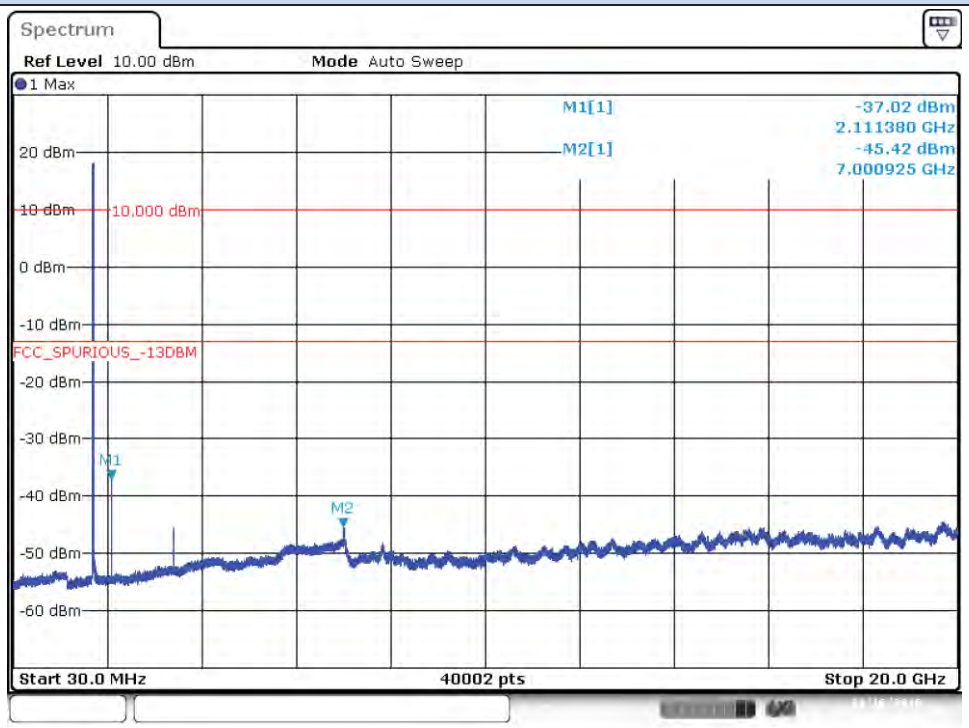


WCDMA Band IV RMC Low channel 1312 – Spurious Emissions



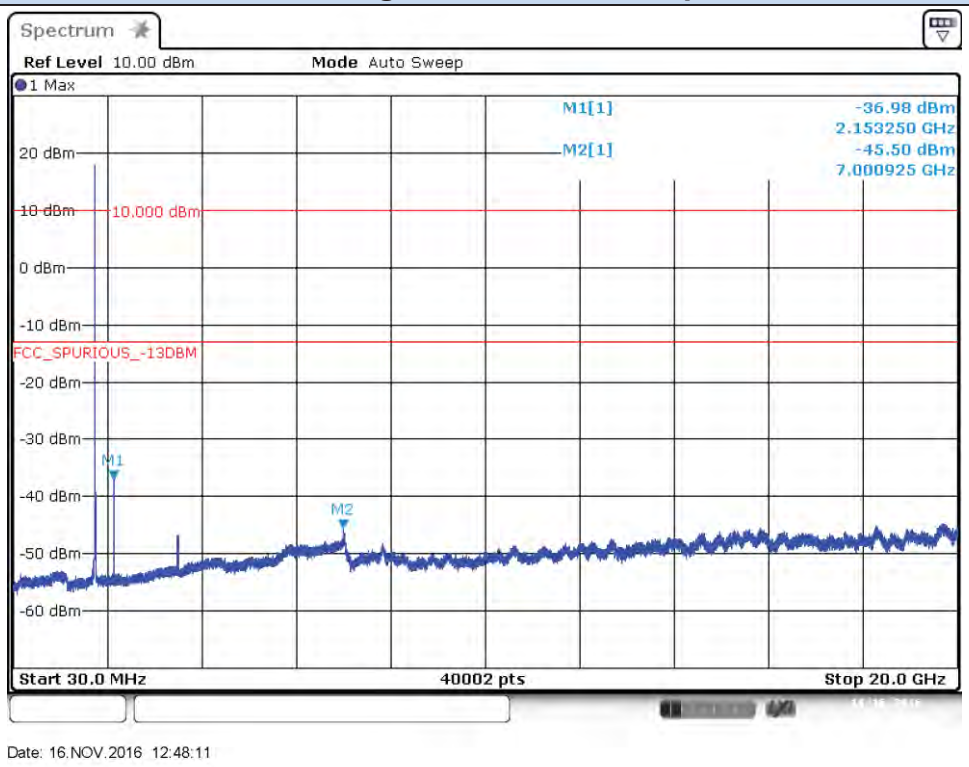
Date: 16.NOV.2016 12:46:26

WCDMA Band IV RMC Mid channel 1413 – Spurious Emissions

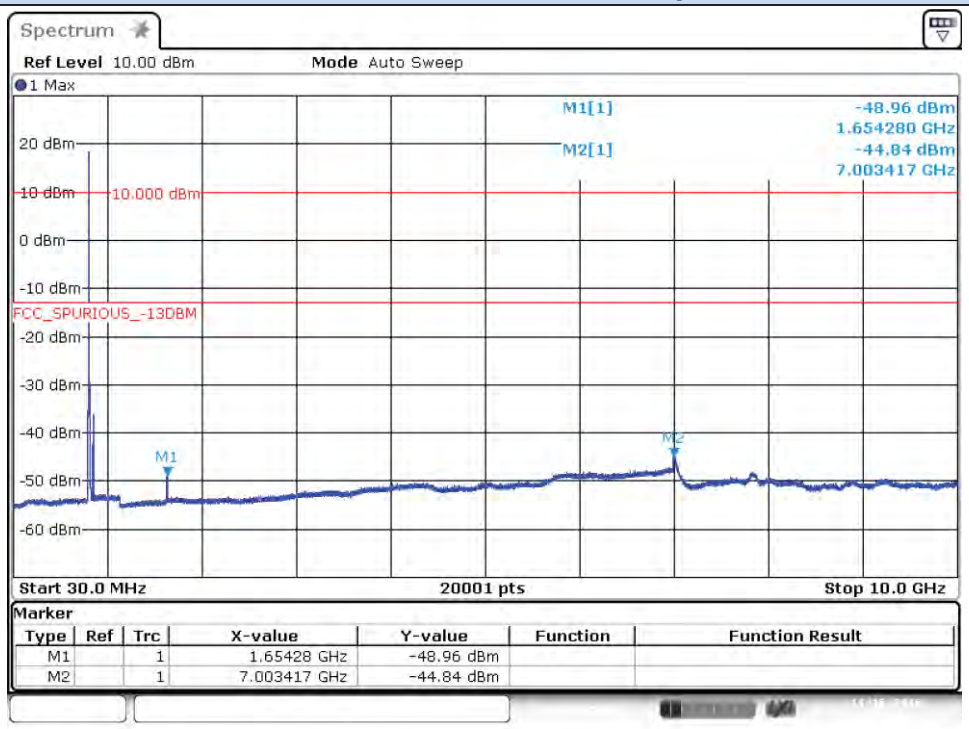


Date: 16.NOV.2016 12:47:10

WCDMA Band IV RMC High channel 1513 – Spurious Emissions

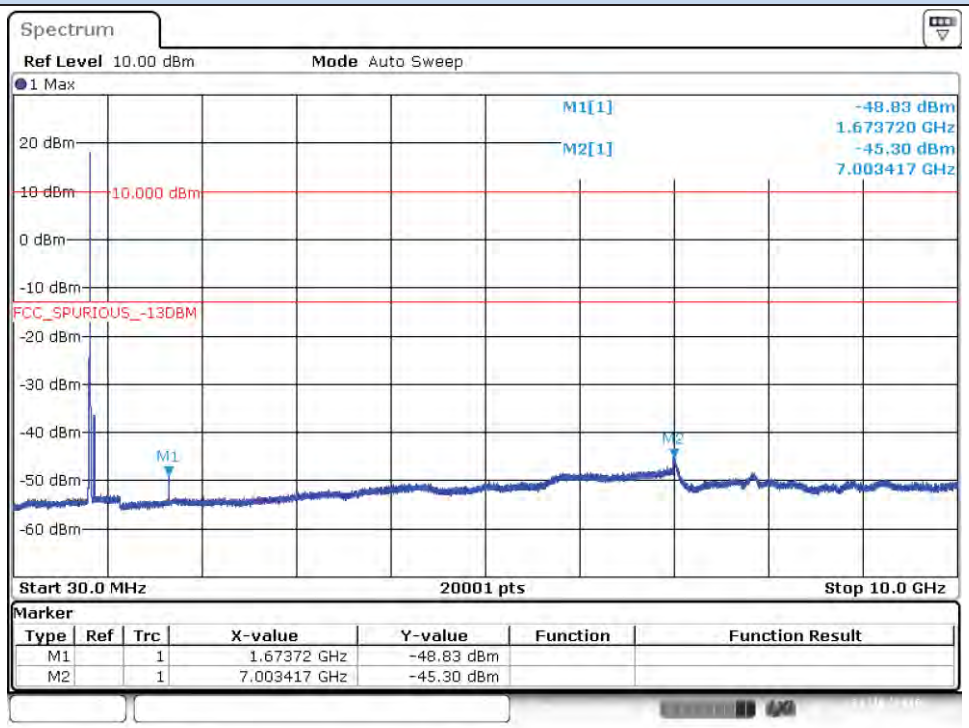


WCDMA Band V RMC Low channel 4132 – Spurious Emissions



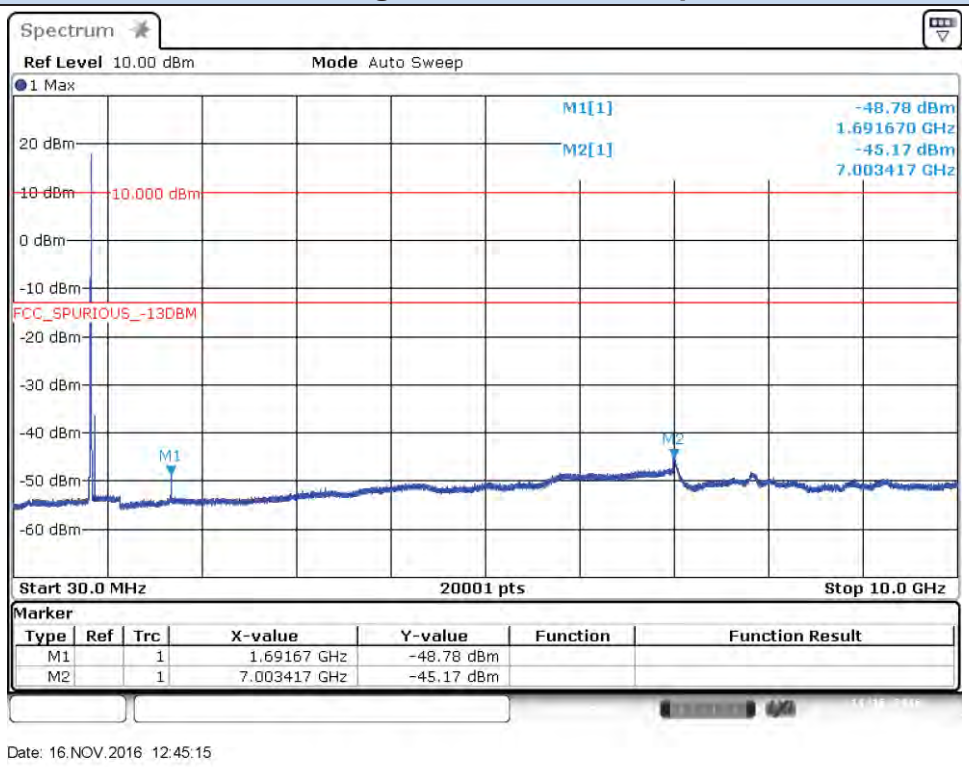
Date: 16.NOV.2016 12:41:20

WCDMA Band V RMC Mid channel 4183 – Spurious Emissions



Date: 16.NOV.2016 12:44:16

WCDMA Band V RMC High channel 4233 – Spurious Emissions



-

B.4 Frequency stability

B.4.1 Standard references

BAND	FCC parts	Limits
GSM850	2.1055	§2.1055 The frequency stability shall be measured with variation of ambient temperature from −30° to +50° centigrade, at intervals of not more than 10° centigrade through the range.
PCS1900		(d)(2)For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
WCDMA FDD II	22.355	§22.355 – (for transmitters from 821 to 896 MHz) The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.
WCDMA FDD V	24.235	§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

B.4.2 Test procedure

The setup showed below is used to measure the frequency stability. The antenna terminal of the EUT is connected to the communication tester and its Frequency Error measurement capability is used. The peak frequency error is recorded (worst-case).

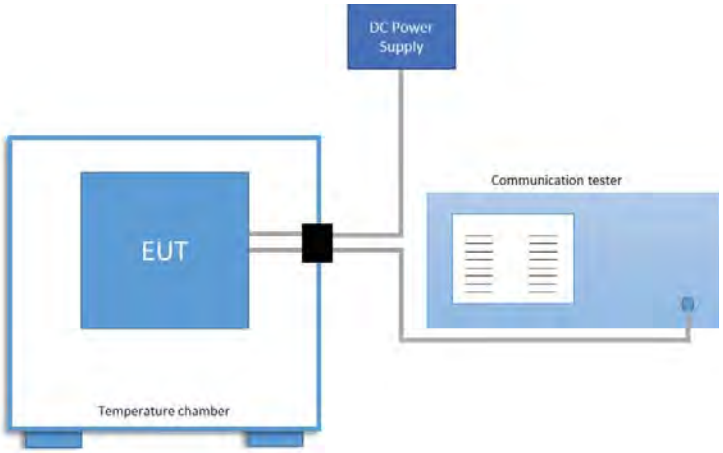
- Temperature = -30 ºC to +50 ºC
- Voltage = Low 3.23V, Normal 3.8 V, High 4.37V

Frequency Stability vs. Temperature:

The EUT is placed inside a temperature chamber. The temperature is varied from -30ºC to +50ºC in 10ºC increment. For each temperature increment the frequency error is measured after sufficient soak time.

Frequency Stability vs. Voltage:

The frequency error was measured at ambient temperature for both the operating end point specified 3.23V and the specified high voltage 4.37V.



B.4.3 Results tables

Band	Channel #	Frequency [MHz]	Mode	Temperature [°C]	Frequency Error [Hz]	Frequency Error [ppm]
GSM850	190	836.6	GPRS GMSK	+50	23.44	0.0280
				+40	21.83	0.0261
				+30	21.86	0.0261
				+20	21.18	0.0253
				+10	17.50	0.0209
				0	15.17	0.0181
				-10	14.04	0.0168
				-20	15.31	0.0183
				-30	-24.86	-0.0297
				Supply Voltage [V]	Frequency Error [Hz]	Frequency Error [ppm]
				4.37	18.89	0.0226
				3.8	21.73	0.0260
				3.23	22.41	0.0268

Band	Channel #	Frequency [MHz]	Mode	Temperature [°C]	Frequency Error [Hz]	Frequency Error [ppm]
GSM850	190	836.6	EDGE 8PSK	+50	20.73	0.0248
				+40	18.11	0.0216
				+30	22.60	0.0270
				+20	19.40	0.0232
				+10	19.47	0.0233
				0	-17.53	-0.0210
				-10	-27.35	-0.0327
				-20	-36.10	-0.0432
				-30	-41.20	-0.0492
				Supply Voltage [V]	Frequency Error [Hz]	Frequency Error [ppm]
				4.37	21.14	0.0253
				3.8	21.79	0.0260
				3.23	20.73	0.0248

Band	Channel #	Frequency [MHz]	Mode	Temperature [°C]	Frequency Error [Hz]	Frequency Error [ppm]
PCS1900	661	1880	GPRS GMSK	+50	22.6	0.0120
				+40	29.41	0.0156
				+30	29.12	0.0155
				+20	27.15	0.0144
				+10	28.77	0.0153
				0	32.54	0.0173
				-10	29.05	0.0155
				-20	34.84	0.0185
				-30	28.61	0.0152
				Supply Voltage [V]	Frequency Error [Hz]	Frequency Error [ppm]
				4.37	26.35	0.0140
				3.8	29.17	0.0155
				3.23	29.35	0.0156

Band	Channel #	Frequency [MHz]	Mode	Temperature [°C]	Frequency Error [Hz]	Frequency Error [ppm]
PCS1900	661	1880	EDGE 8PSK	+50	-18.37	-0.0098
				+40	-21.21	-0.0113
				+30	-20.37	-0.0108
				+20	23.73	0.0126
				+10	23.34	0.0124
				0	23.83	0.0127
				-10	21.14	0.0112
				-20	30.38	0.0162
				-30	32.38	0.0172
				Supply Voltage [V]	Frequency Error [Hz]	Frequency Error [ppm]
				4.37	24.11	0.0128
				3.8	29.22	0.0155
				323	26.73	0.0142

Band	Channel #	Frequency [MHz]	Mode	Temperature [ºC]	Frequency Error [Hz]	Frequency Error [ppm]
WCDMA FDD II	9400	1880	RMC	+50	-16.19	-0.0086
				+40	-11.96	-0.0064
				+30	-13.73	-0.0073
				+20	-12.8	-0.0068
				+10	-12.82	-0.0068
				0	-14.27	-0.0076
				-10	-16.74	-0.0089
				-20	-13.68	-0.0073
				-30	-13.92	-0.0074
				Supply Voltage [V]	Frequency Error [Hz]	Frequency Error [ppm]
				4.37	-15.70	-0.0084
				3.8	-15.95	-0.0085
				3.23	-14.00	-0.0074

Band	Channel #	Frequency [MHz]	Mode	Temperature [ºC]	Frequency Error [Hz]	Frequency Error [ppm]
WCDMA FDD IV	1413	1732.6	RMC	+50	-16.57	-0.0096
				+40	-8.32	-0.0048
				+30	-17.69	-0.0102
				+20	-18.08	-0.0104
				+10	-14.53	-0.0084
				0	-16.91	-0.0098
				-10	-16.96	-0.0098
				-20	-15.06	-0.0087
				-30	-13.45	-0.0078
				Supply Voltage [V]	Frequency Error [Hz]	Frequency Error [ppm]
				4.37	-17.42	-0.0101
				3.8	-14.93	-0.0086
				3.23	-18.38	-0.0106

Band	Channel #	Frequency [MHz]	Mode	Temperature [ºC]	Frequency Error [Hz]	Frequency Error [ppm]
WCDMA FDD V	4183	836.6	RMC	+50	-8.29	-0.0099
				+40	-7.82	-0.0093
				+30	-7.75	-0.0093
				+20	-8.08	-0.0097
				+10	-6.89	-0.0082
				0	-7.29	-0.0087
				-10	-6.80	-0.0081
				-20	-8.35	-0.0100
				-30	-8.17	-0.0098
				Supply Voltage [V]	Frequency Error [Hz]	Frequency Error [ppm]
				4.37	-8.40	-0.0100
				3.8	-6.22	-0.0074
				3.23	-8.72	-0.0104

B.5 Radiated spurious emission

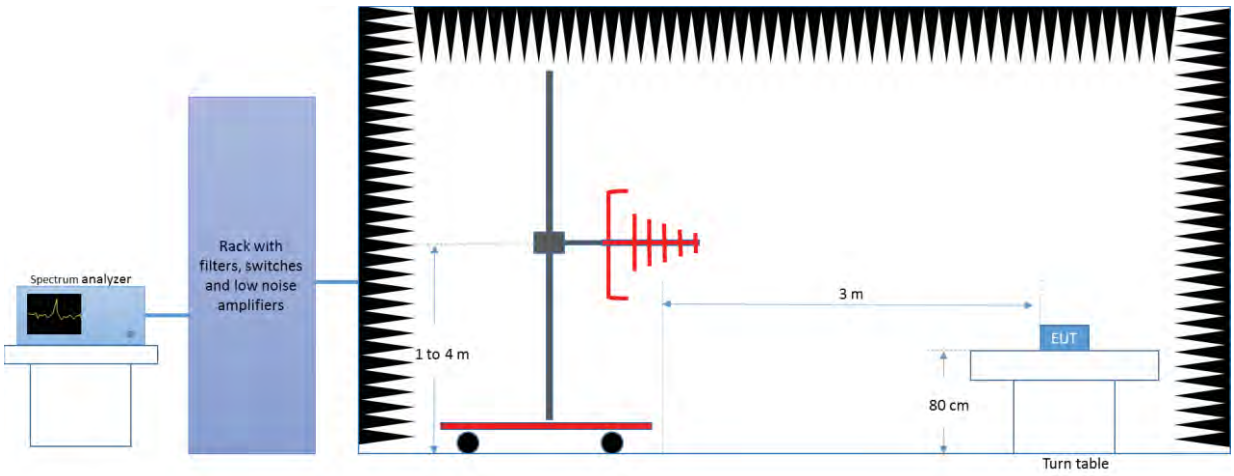
B.5.1 Standard references

BAND	FCC part	RSS part	Limits
PCS 1900 WCDMA FDD II	2.1051, 24.238	133-ch6.5.1	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.
WCDMA FDD IV	2.1051, 27.53	139-ch.6.5, 199-ch.4.5	
GSM 850 WCDMA FDD V	2.1051, 22.917	132-ch.5.5	

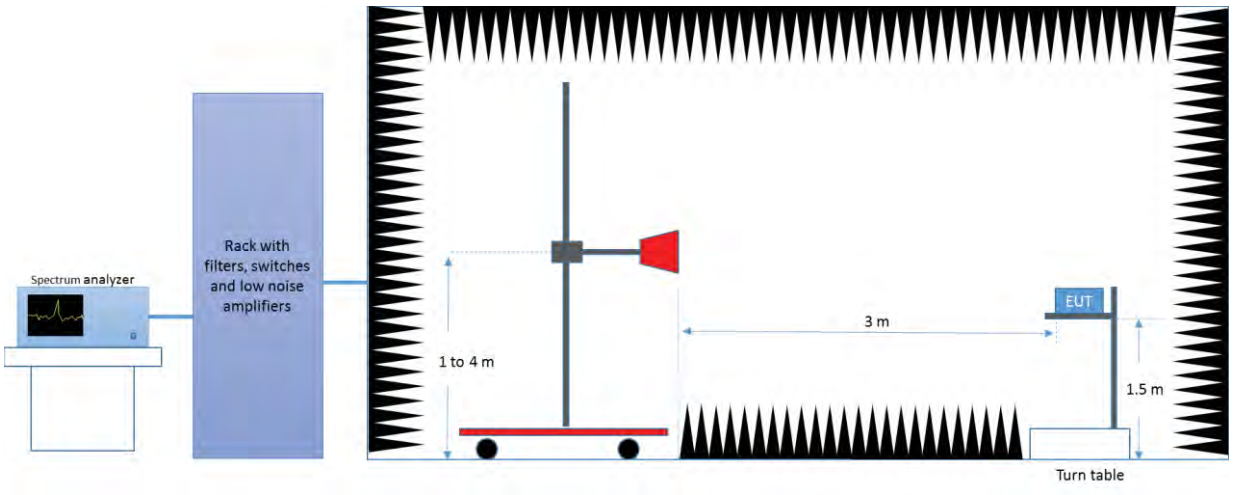
B.5.2 Test procedure

The setup below was used to measure the radiated spurious emissions. The test was done following the FCC OET KDB 971168 D01 v02r02 § 7. The receiver's resolution bandwidth was set to 1MHz and the video bandwidth set to 3MHz for all radiated measurements.
Depending of the frequency range and bands being tested, different antennas and filters were used.
The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations. The substitution method according to the ANSI/TIA-603-D was used to determine the spurious level identified during the exploratory radiated emissions measurements.
The radiated spurious emission was measured on the worst case configuration selected from the chapter B.2.1 and on the low, middle and high channel.

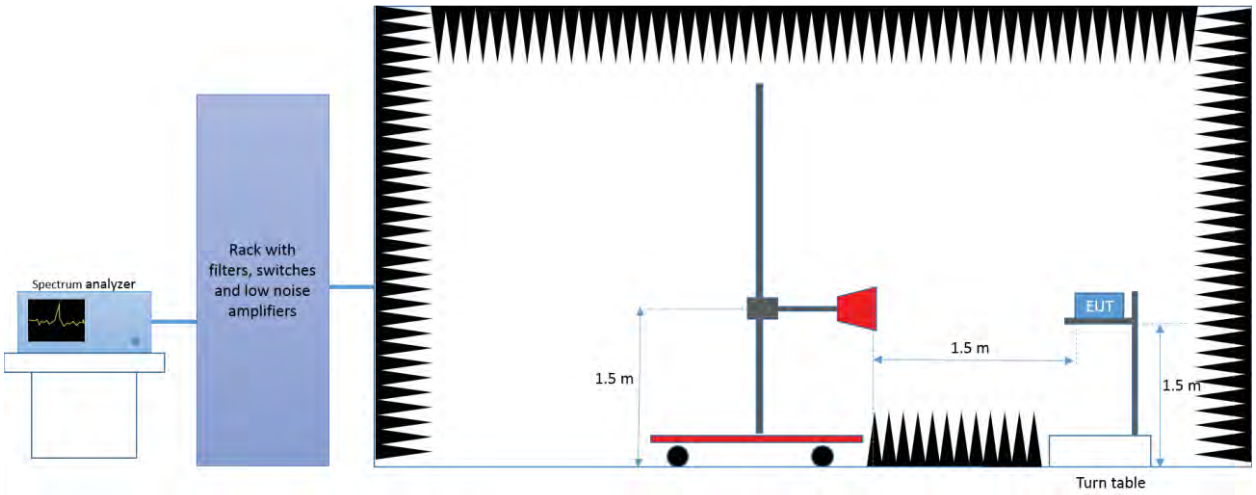
Radiated Setup < 1GHz



Radiated Setup Frequency range 1 GHz to 18 GHz

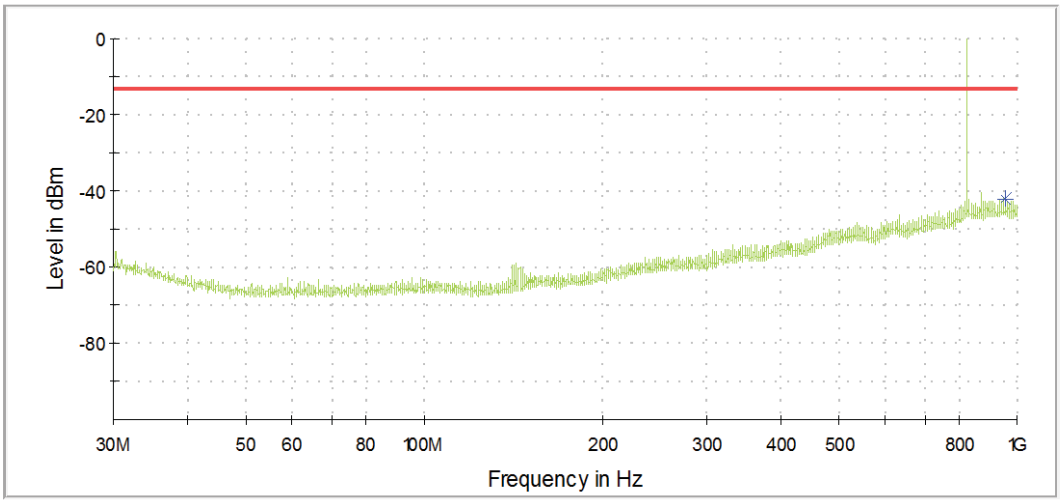


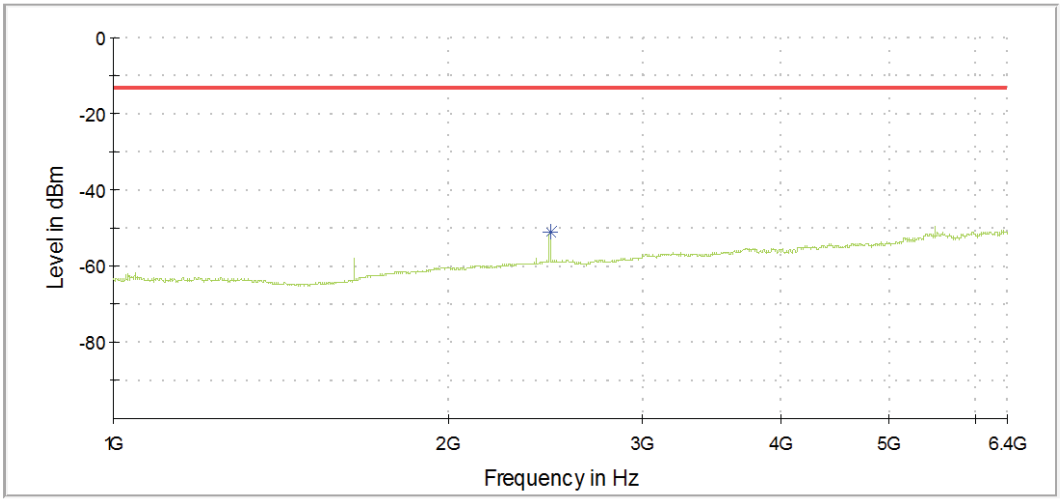
Radiated Setup > 18GHz



B.5.3 Test Results

30MHz to 6.4GHz - Radiated Spurious
GSM850 - GPRS/GMSK - Low Channel 128





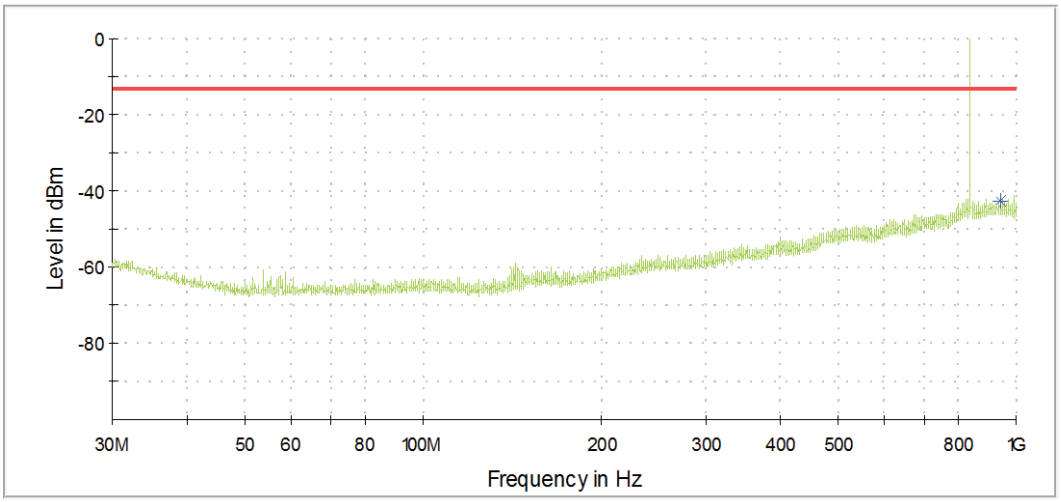
RMS measurements Limit FCC

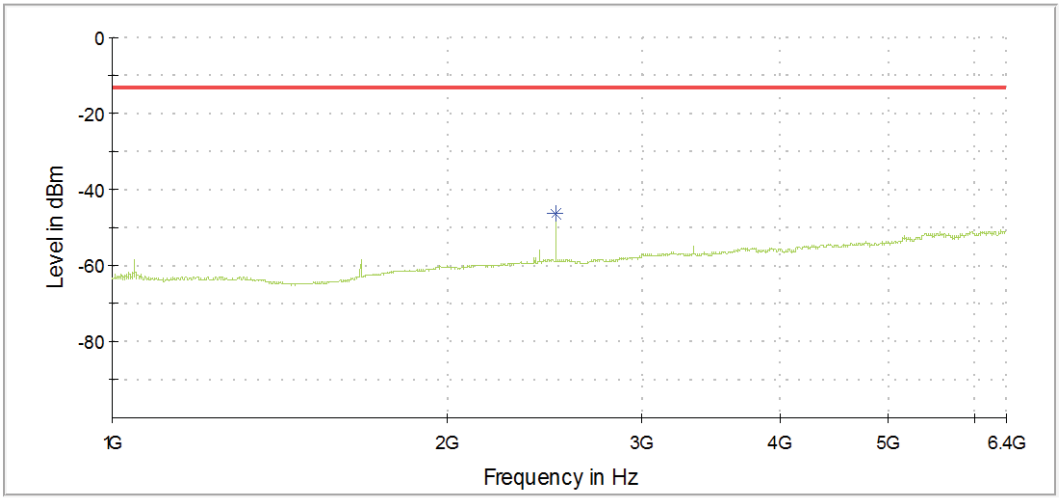
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
954.0	-42.1	-13.0	29.1
2472.9	-51.1	-13.0	38.1

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 869.2MHz corresponds to the downlink frequency

30MHz to 6.4GHz - Radiated Spurious
GSM850 - GPRS/GMSK - Mid channel 189



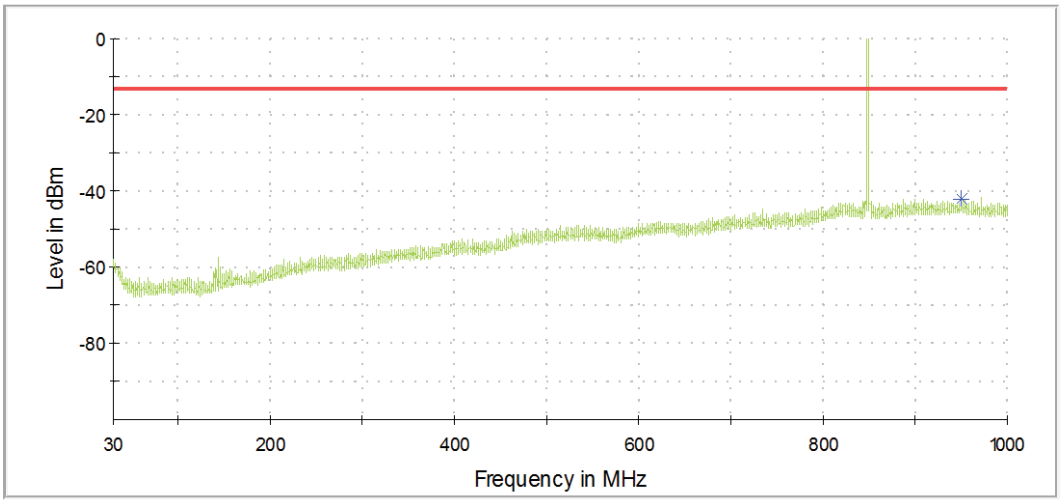


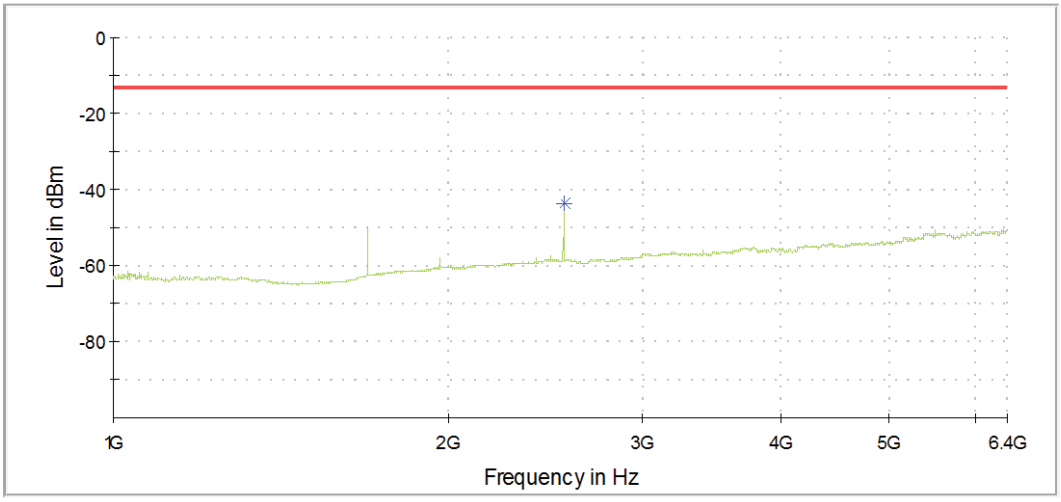
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
943.1	-42.6	-13.0	29.6
2509.5	-46.1	-13.0	33.1

Note1: the peak showed above the limit is the fundamental emission

30MHz to 6.4GHz - Radiated Spurious
GSM850 - GPRS/GMSK - High channel 251



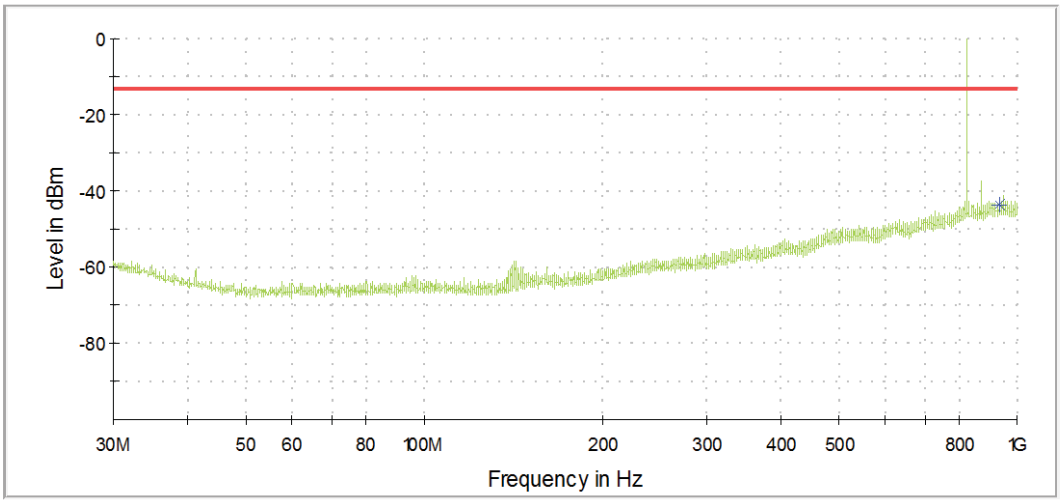


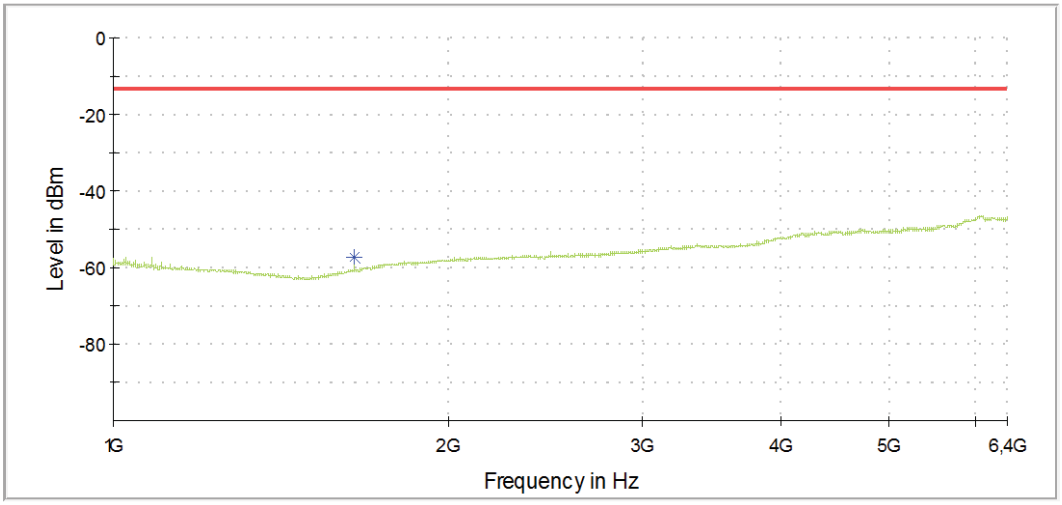
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
950.2	-42.2	-13.0	29.2
2546.7	-43.7	-13.0	30.7

Note1: the peak showed above the limit is the fundamental emission

30MHz to 6.4GHz - Radiated Spurious
GSM850 – 8PSK - Low Channel 128





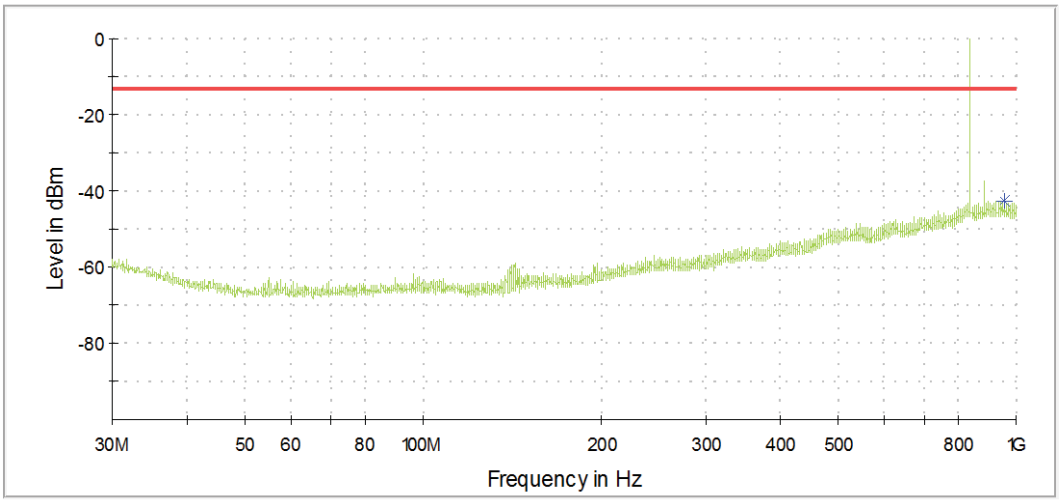
RMS measurements Limit FCC

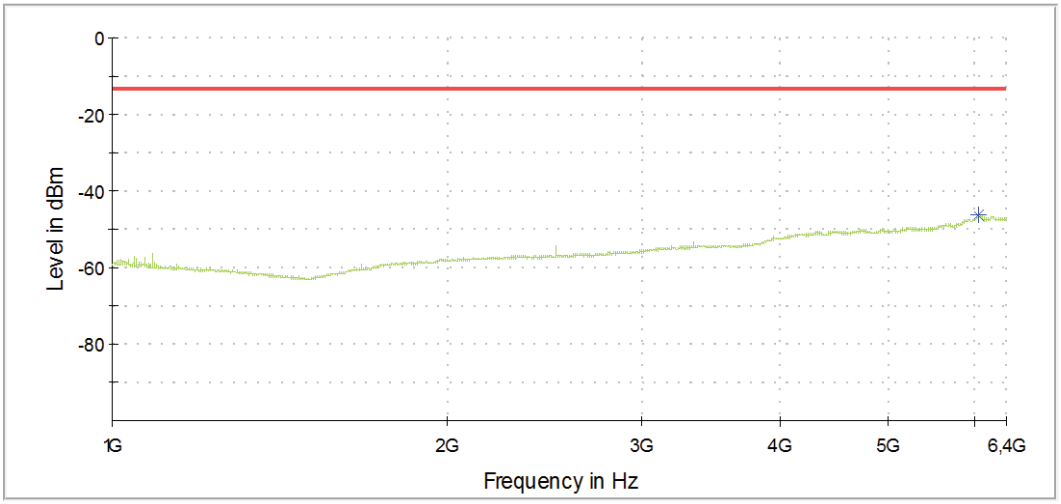
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
935.6	-43.5	-13.0	30.5
1649.0	-57.3	-13.0	44.3

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 869.2MHz corresponds to the downlink frequency

30MHz to 6.4GHz - Radiated Spurious
GSM850 – 8PSK - Mid channel 189





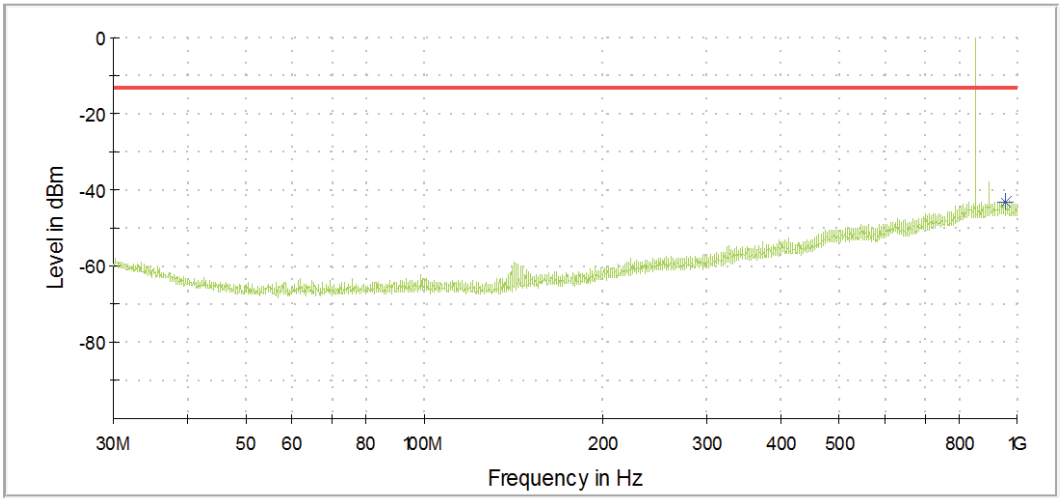
RMS measurements Limit FCC

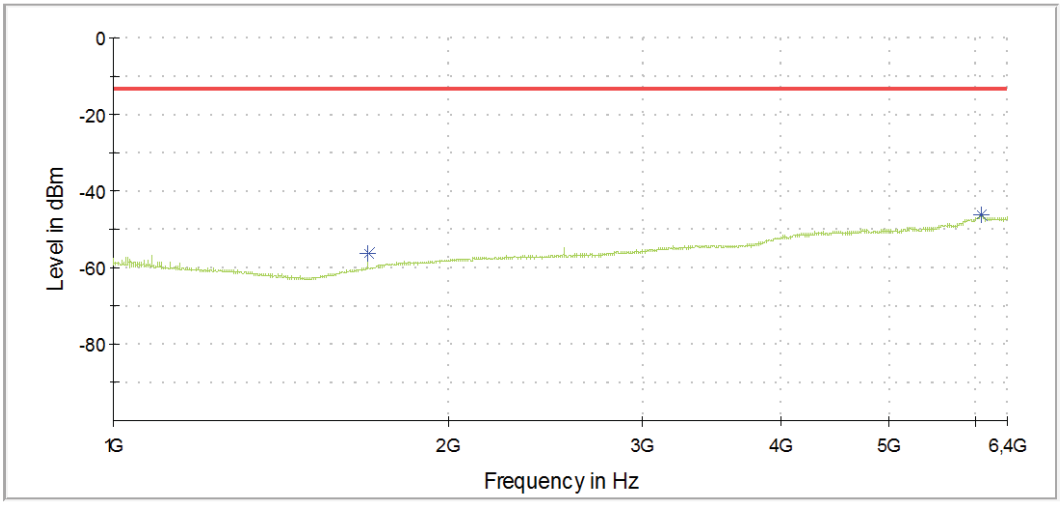
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
951.3	-42.8	-13.0	29.8
6038.0	-46.3	-13.0	33.3

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 881.5MHz corresponds to the downlink frequency

30MHz to 6.4GHz - Radiated Spurious
GSM850 – 8PSK - High channel 251





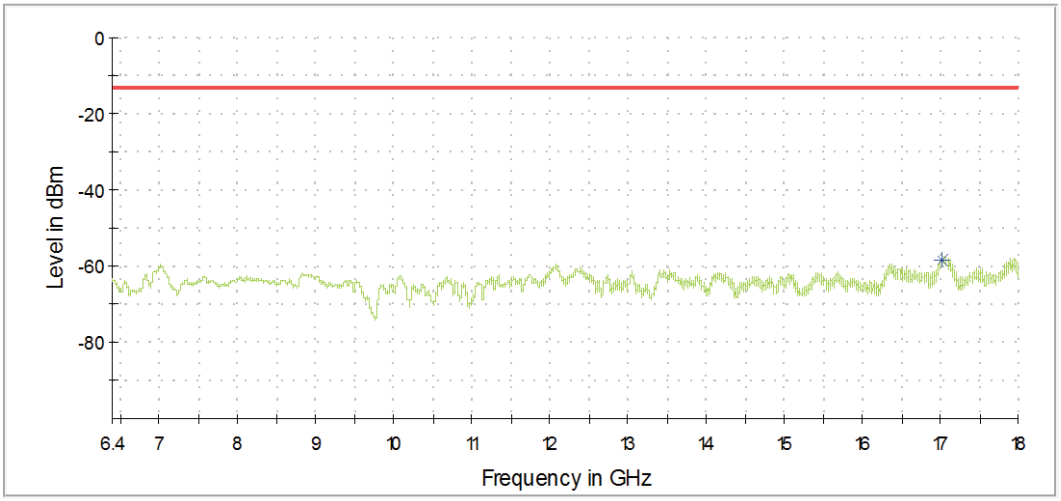
RMS measurements Limit FCC

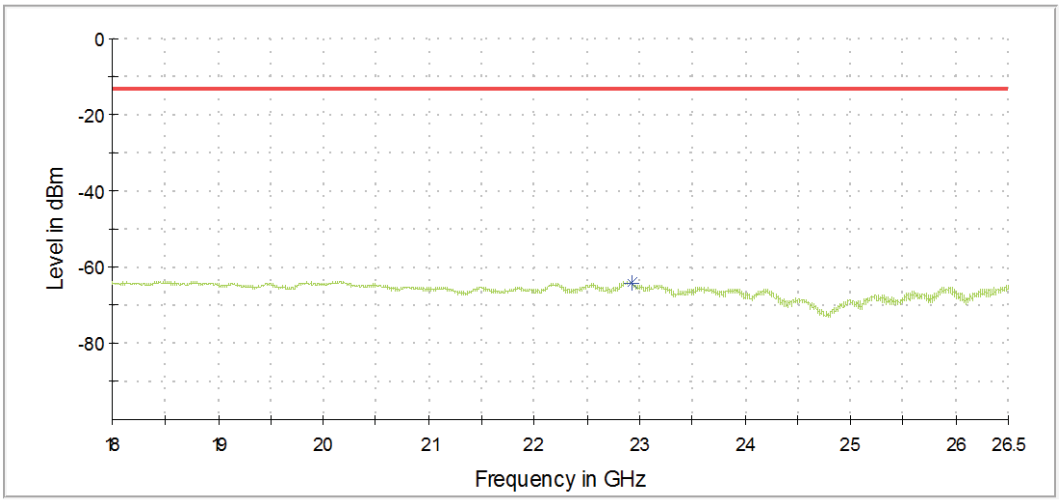
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
951.0	-43.0	-13.0	30.0
1698.0	-56.4	-13.0	43.4
6054.9	-46.3	-13.0	33.3

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 893.8MHz corresponds to the downlink frequency

6.4GHz to 26.5GHz - Radiated Spurious
All modes





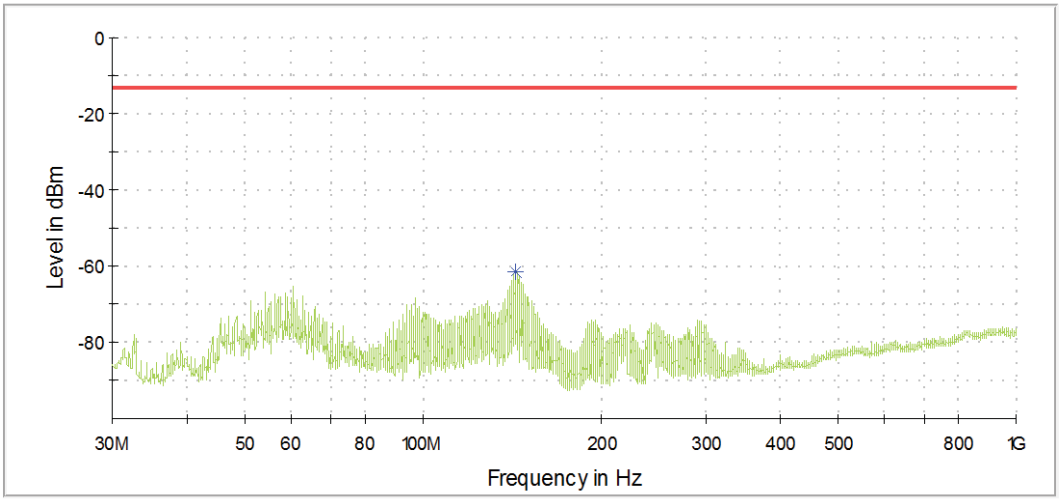
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
17035.3	-58.2	-13.0	45.2
22919.6	-64.1	-13.0	51.1

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

Test Results – PCS1900

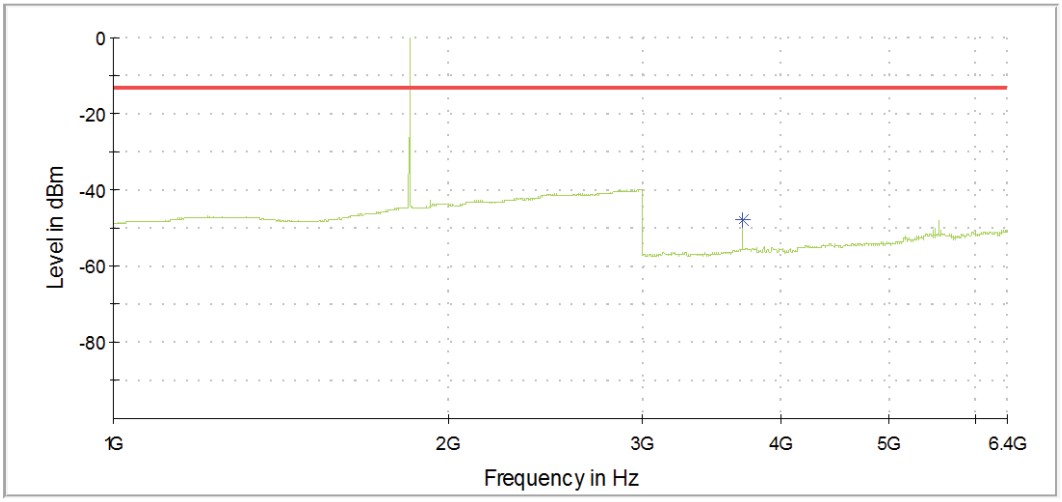
30MHz to 1GHz - Radiated Spurious
All modes



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
143.4	-61.6	-13.0	48.6

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

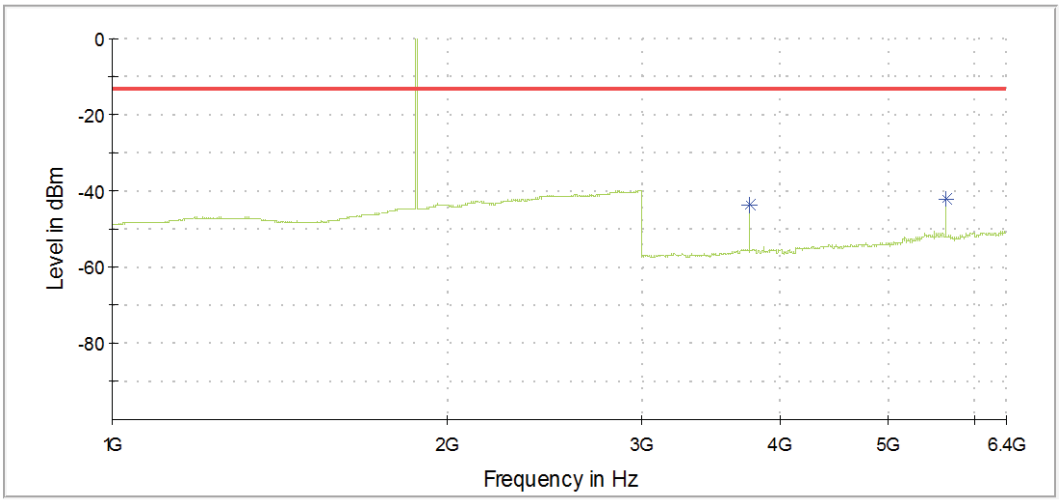
1GHz to 6.4GHz - Radiated Spurious
GSM1900 - GPRS/GMSK - Low channel 512



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3700.5	-47.7	-13.0	34.7

Note1: the peak showed above the limit is the fundamental emission

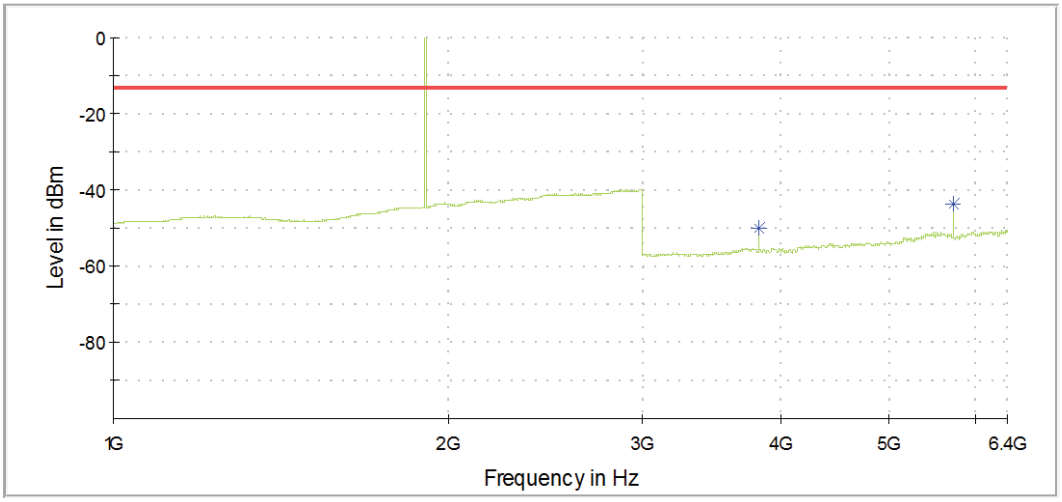
1GHz to 6.4GHz - Radiated Spurious
GSM1900 - GPRS/GMSK - Mid channel 661



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3759.5	-43.8	-13.0	30.8
5640.5	-42.1	-13.0	29.1

Note1: the peak showed above the limit is the fundamental emission

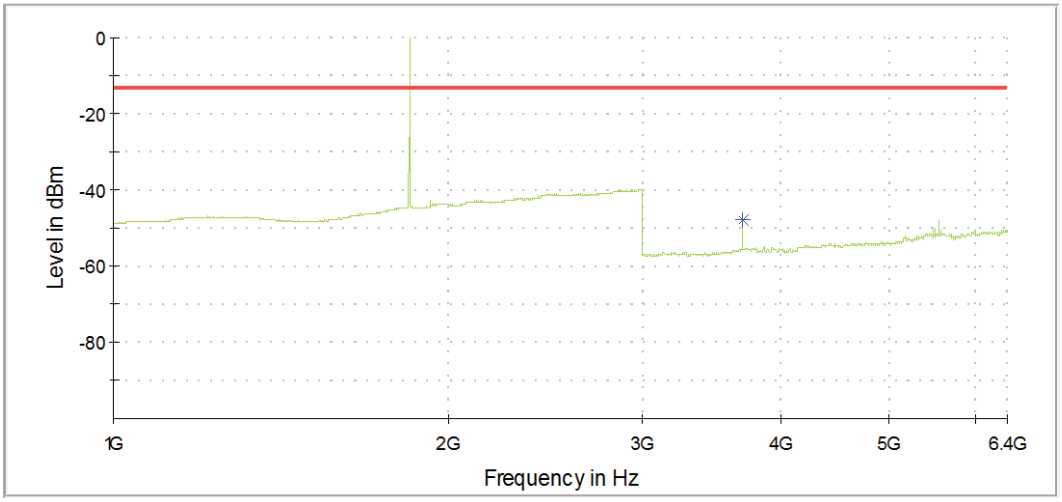
1GHz to 6.4GHz - Radiated Spurious
GSM1900 - GPRS/GMSK - High channel 810



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3759.5	-43.8	-13.0	30.8
5640.5	-42.1	-13.0	29.1

Note1: the peak showed above the limit is the fundamental emission

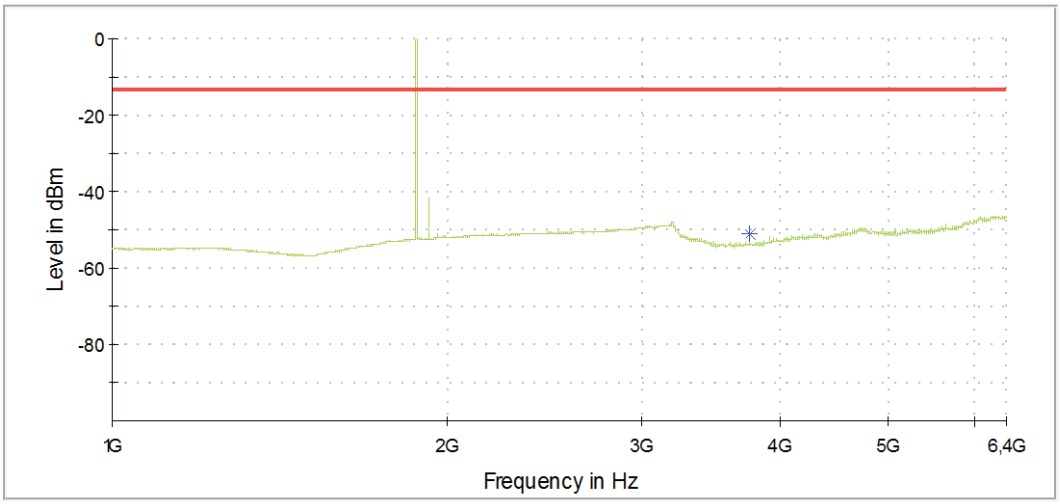
1GHz to 6.4GHz - Radiated Spurious
GSM1900 – 8PSK - Low channel 512



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3700.5	-47.7	-13.0	34.7

Note1: the peak showed above the limit is the fundamental emission

1GHz to 6.4GHz - Radiated Spurious
GSM1900 – 8PSK - Mid channel 661

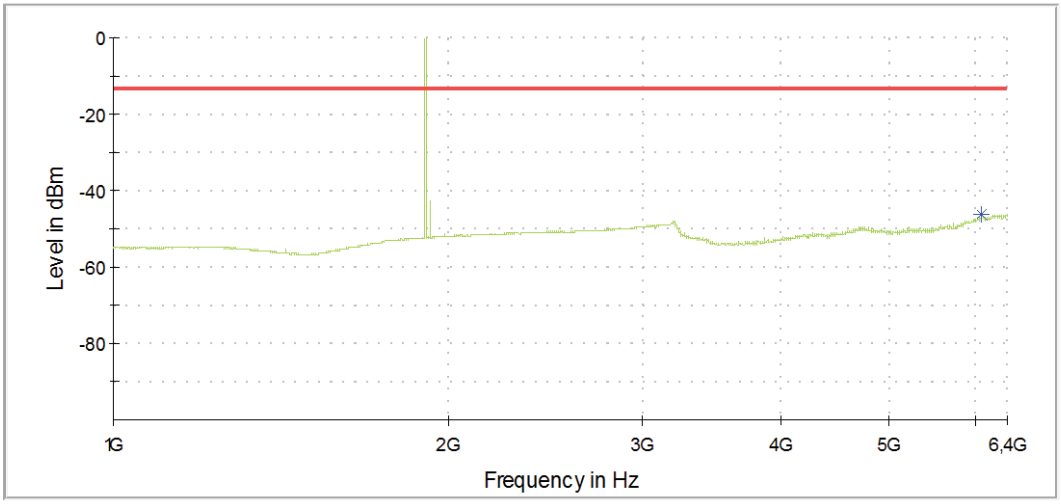


Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
497.9	-72.5	-13.0	59.5
3760.1	-51.2	-13.0	38.2

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 1960MHz corresponds to the downlink frequency

1GHz to 6.4GHz - Radiated Spurious
GSM1900 – 8PSK - High channel 810

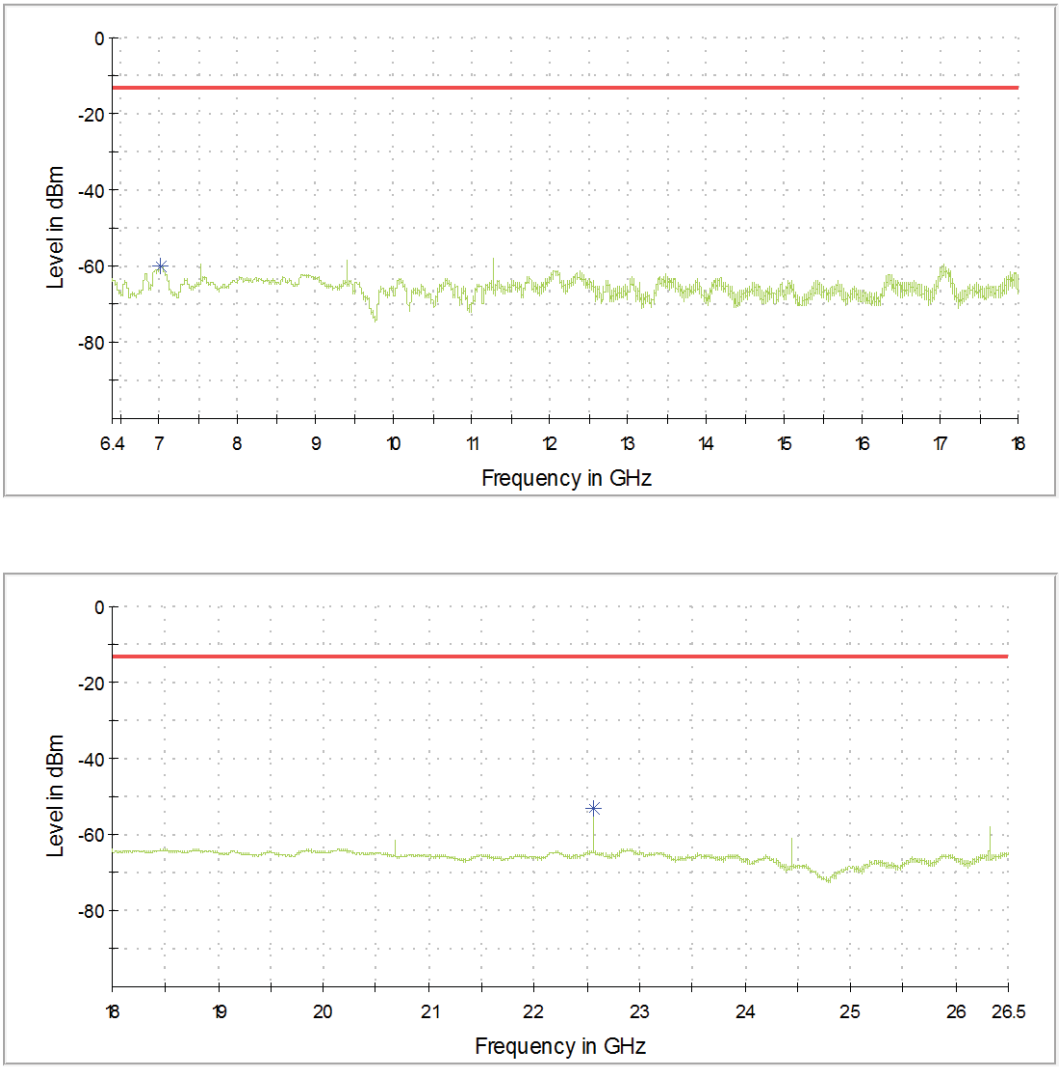


Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
6061.0	-46.5	-13.0	33.5

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 1989.8MHz corresponds to the downlink frequency

6.4GHz to 26.5GHz - Radiated Spurious
All modes

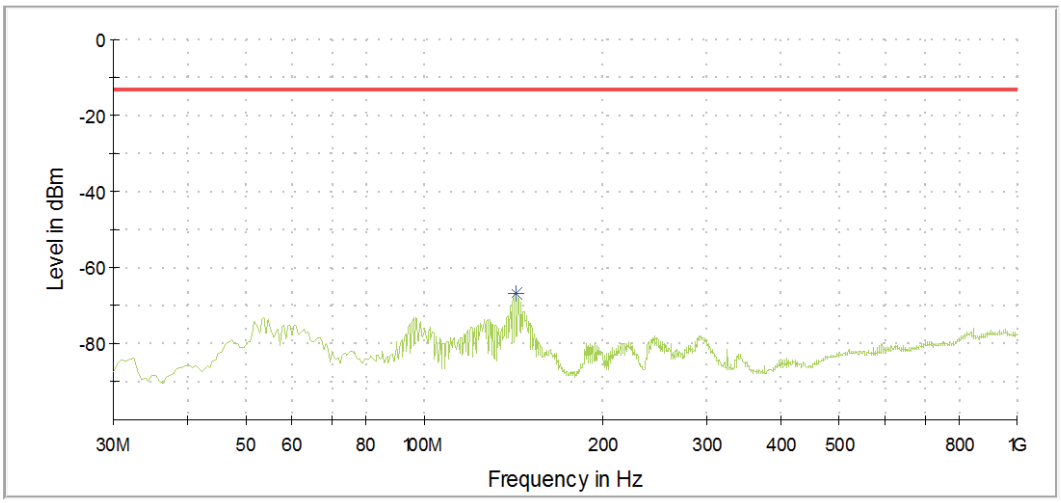


Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
7021.1	-60.1	-13.0	47.1
22559.3	-53.4	-13.0	40.4

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

Test Results – WCDMA 2

30MHz to 1GHz - Radiated Spurious
All modes

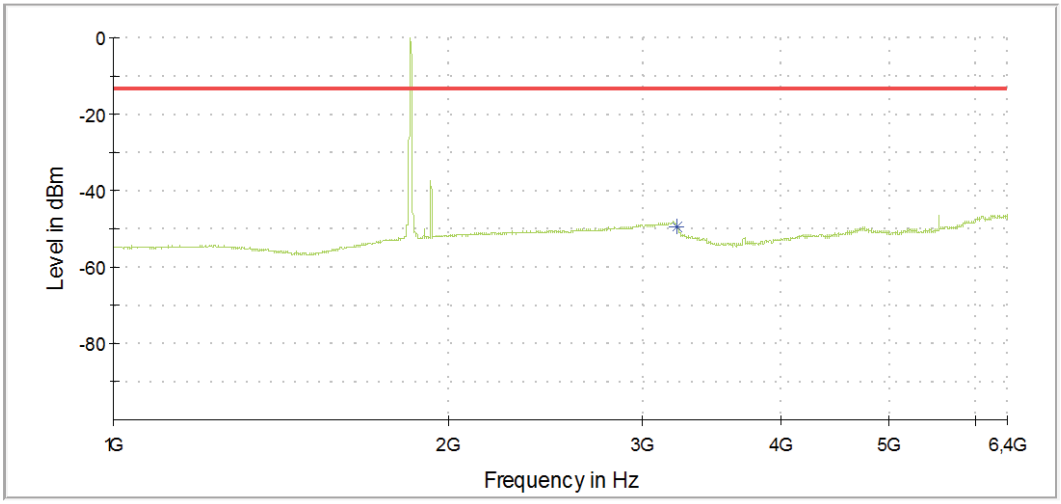


RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
143.0	-66.7	-13.0	53.7

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

1GHz to 6.4GHz - Radiated Spurious
WCDMA 2 - RMC - Low channel 9262

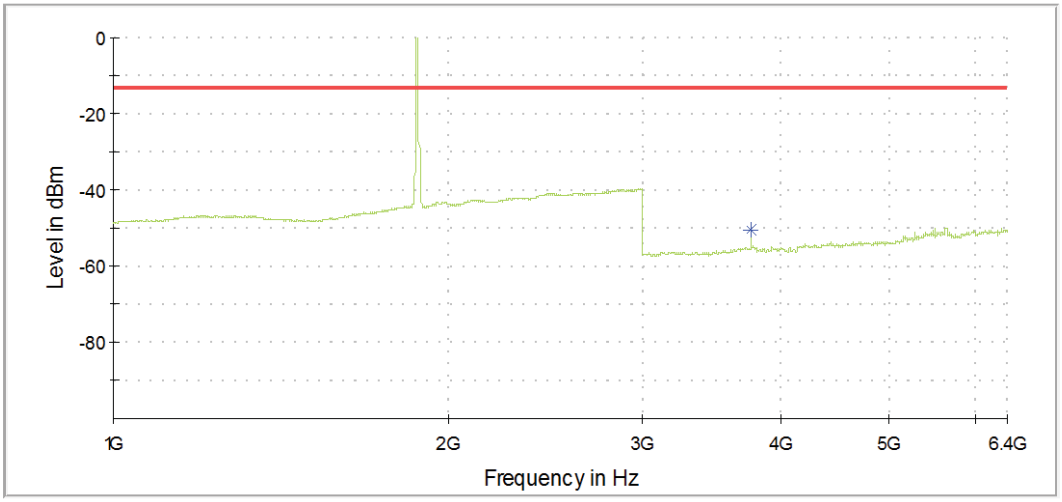


Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3220.8	-49.5	-13.0	36.5

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 1932.4MHz corresponds to the downlink frequency

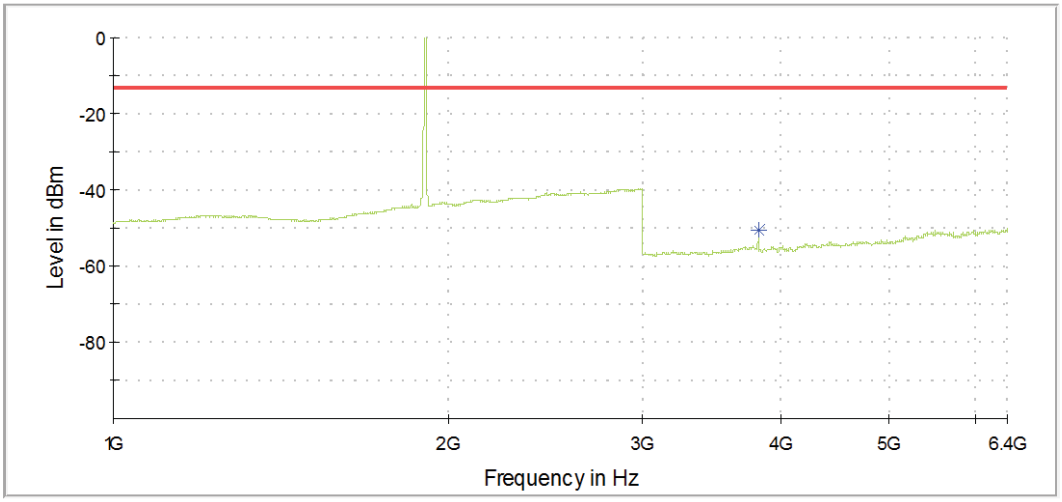
1GHz to 6.4GHz - Radiated Spurious
WCDMA 2 - RMC - Mid channel 9400



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3762.0	-50.5	-13.0	37.5

Note1: the peak showed above the limit is the fundamental emission

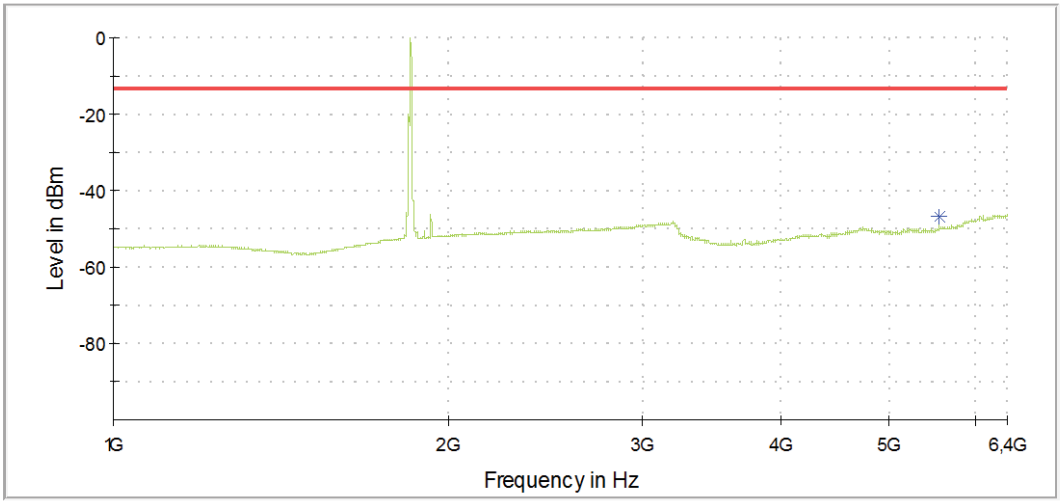
1GHz to 6.4GHz - Radiated Spurious
WCDMA 2 - RMC - High channel 9538



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3814.0	-50.4	-13.0	37.4

Note1: the peak showed above the limit is the fundamental emission

1GHz to 6.4GHz - Radiated Spurious
WCDMA 2 - HSPA - Low channel 9262

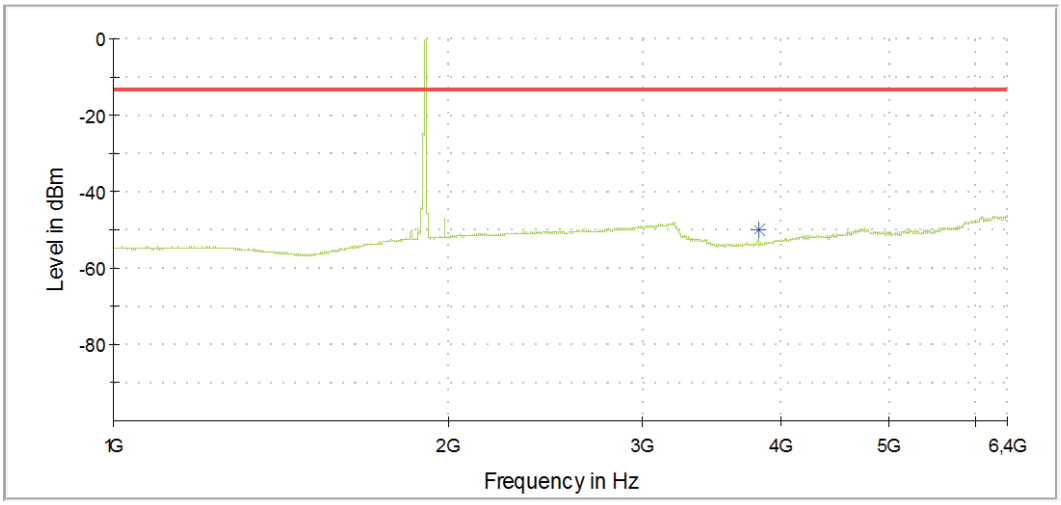


Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
5555.1	-47.0	-13.0	34.0

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 1932.4MHz corresponds to the downlink frequency

1GHz to 6.4GHz - Radiated Spurious
WCDMA 2 - HSPA - Mid channel CH9400

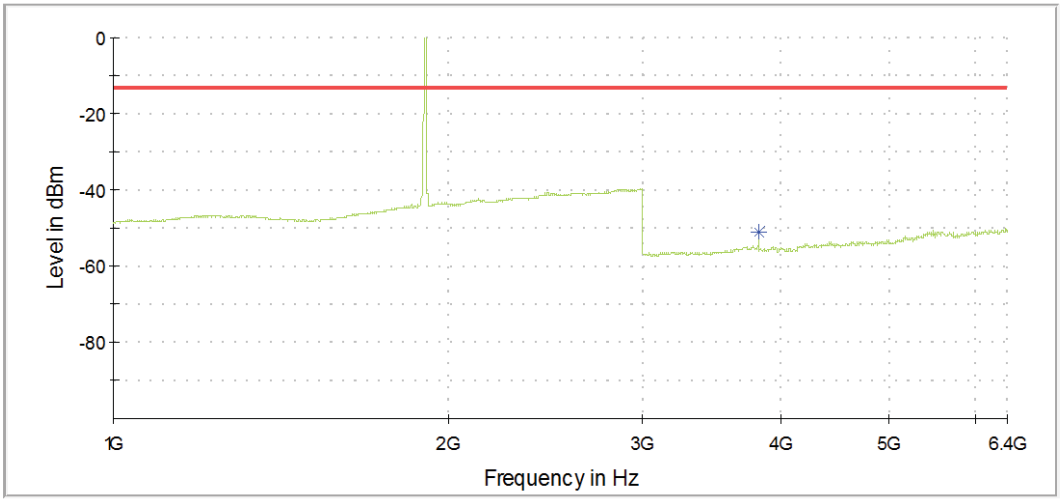


Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3813.8	-49.8	-13.0	36.8

Note1: the peak showed above the limit is the fundamental emission

Note2: the peak at 1960MHz corresponds to the downlink frequency

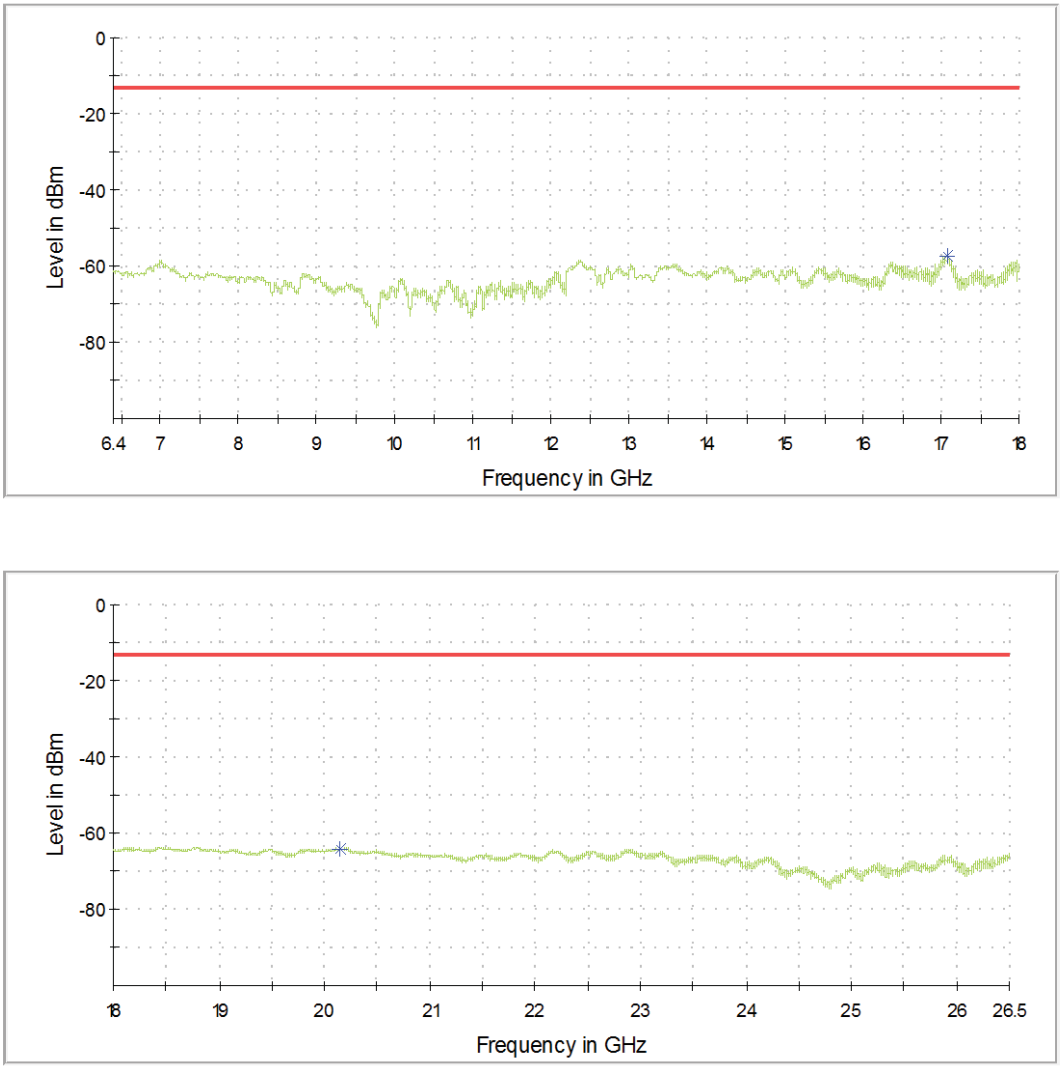
1GHz to 6.4GHz - Radiated Spurious
WCDMA 2 - HSPA - High channel 9538



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3816.5	-51.3	-13.0	38.3

Note1: the peak showed above the limit is the fundamental emission

6.4GHz to 26.5GHz - Radiated Spurious
All modes

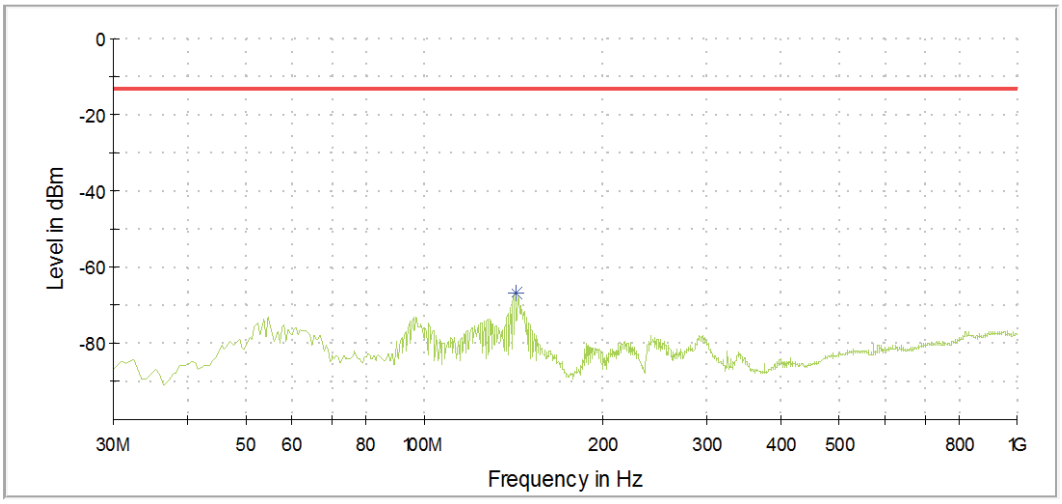


Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
17071.5	-57.5	-13.0	44.5
20152.9	-64.0	-13.0	51.0

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

Test Results – WCDMA 4

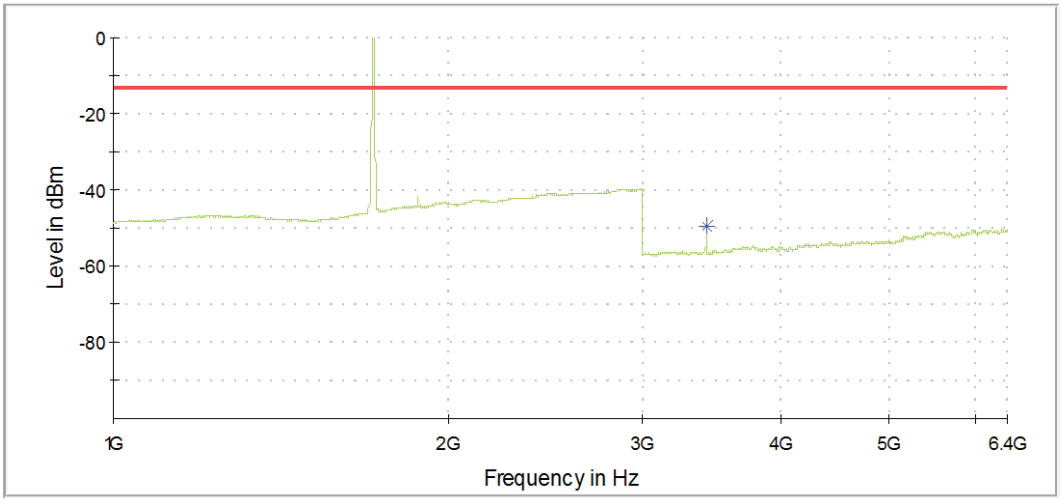
30MHz to 1GHz - Radiated Spurious
All modes



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
143.0	-66.9	-13.0	53.9

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

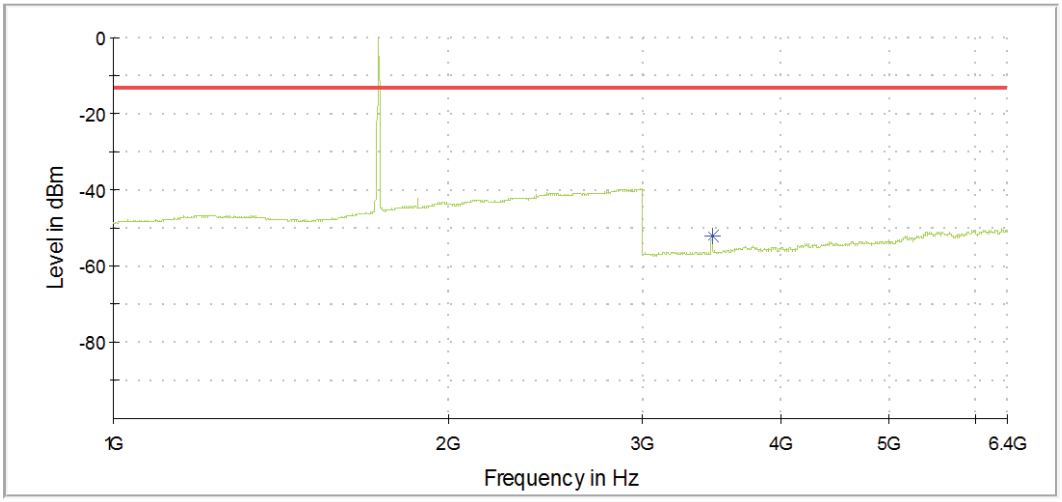
1GHz to 6.4GHz - Radiated Spurious
WCDMA 4 - RMC - Low channel CH1312



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3426.0	-49.5	-13.0	36.5

Note1: the peak showed above the limit is the fundamental emission

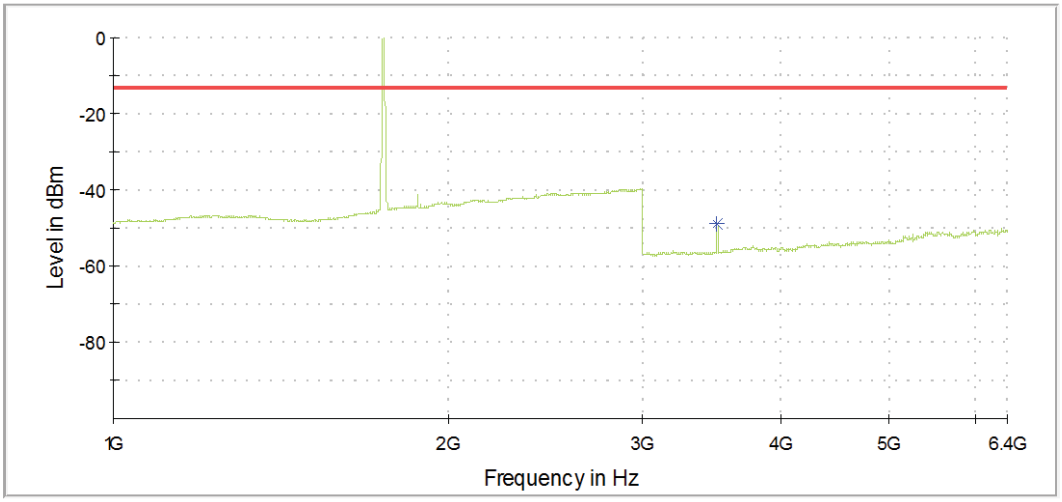
1GHz to 6.4GHz - Radiated Spurious
WCDMA 4 - RMC - Mid channel 1413



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3467.0	-52.3	-13.0	39.3

Note1: the peak showed above the limit is the fundamental emission

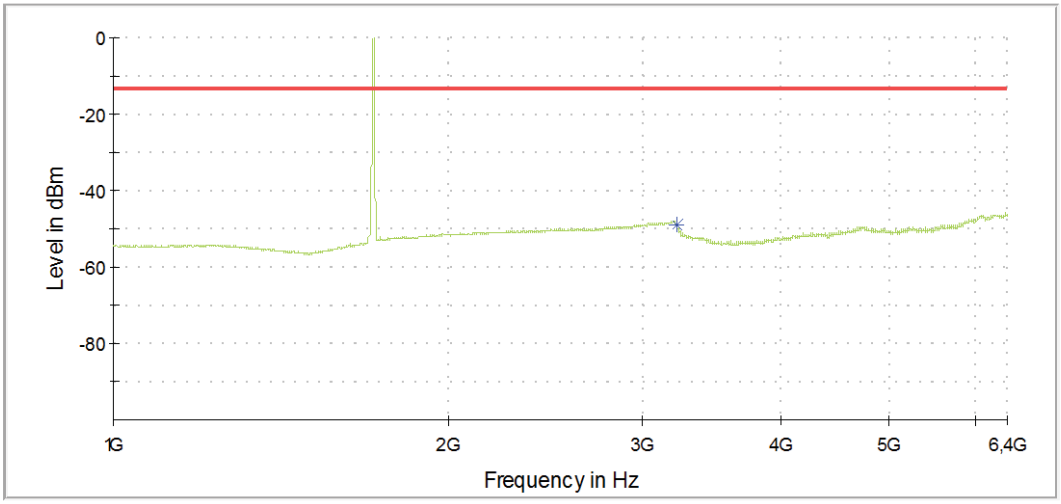
1GHz to 6.4GHz - Radiated Spurious
WCDMA 4 - RMC - High channel 1513



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3506.5	-48.7	-13.0	35.7

Note1: the peak showed above the limit is the fundamental emission

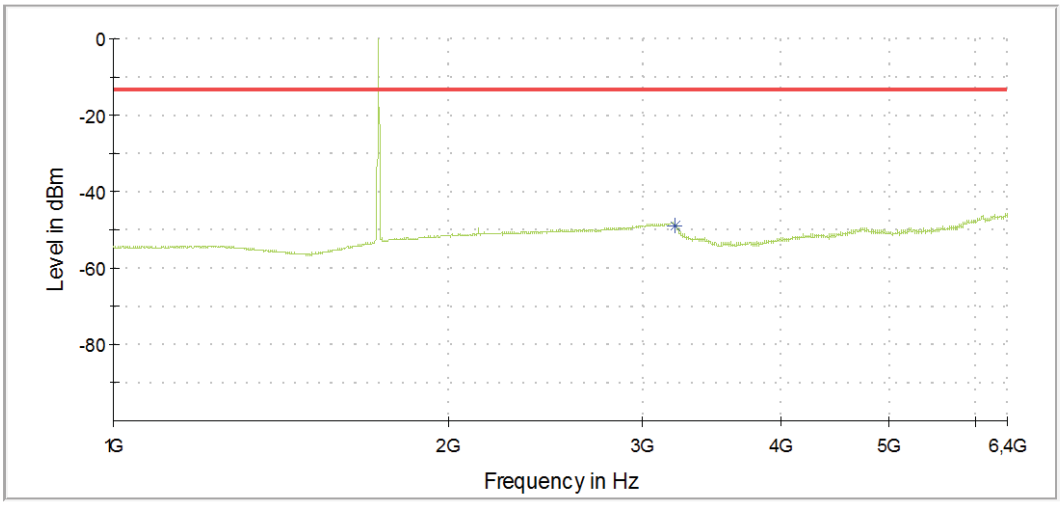
1GHz to 6.4GHz - Radiated Spurious
WCDMA 4 - HSPA - Low channel CH1312



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3214.4	-48.7	-13.0	35.7

Note1: the peak showed above the limit is the fundamental emission

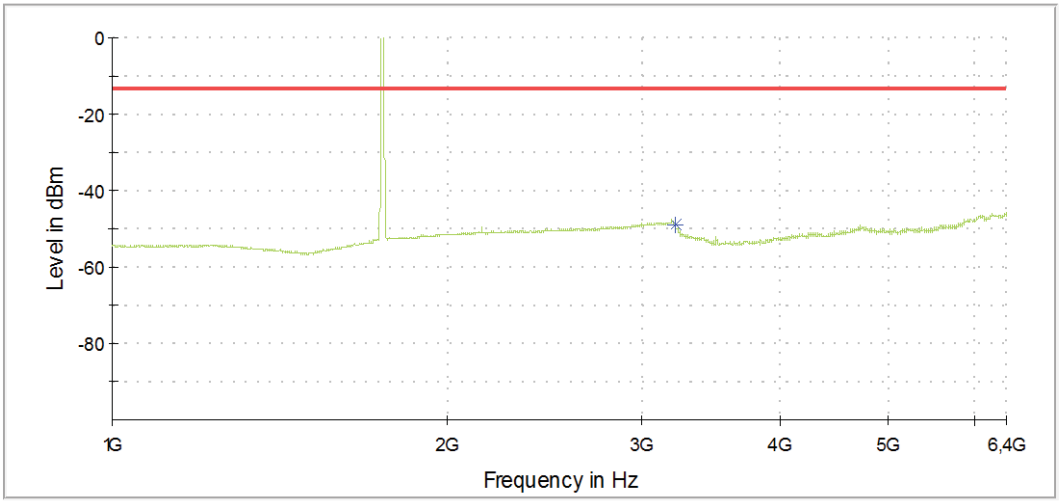
1GHz to 6.4GHz - Radiated Spurious
WCDMA 4 - HSPA - Mid channel 1413



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3208.1	-48.8	-13.0	35.8

Note1: the peak showed above the limit is the fundamental emission

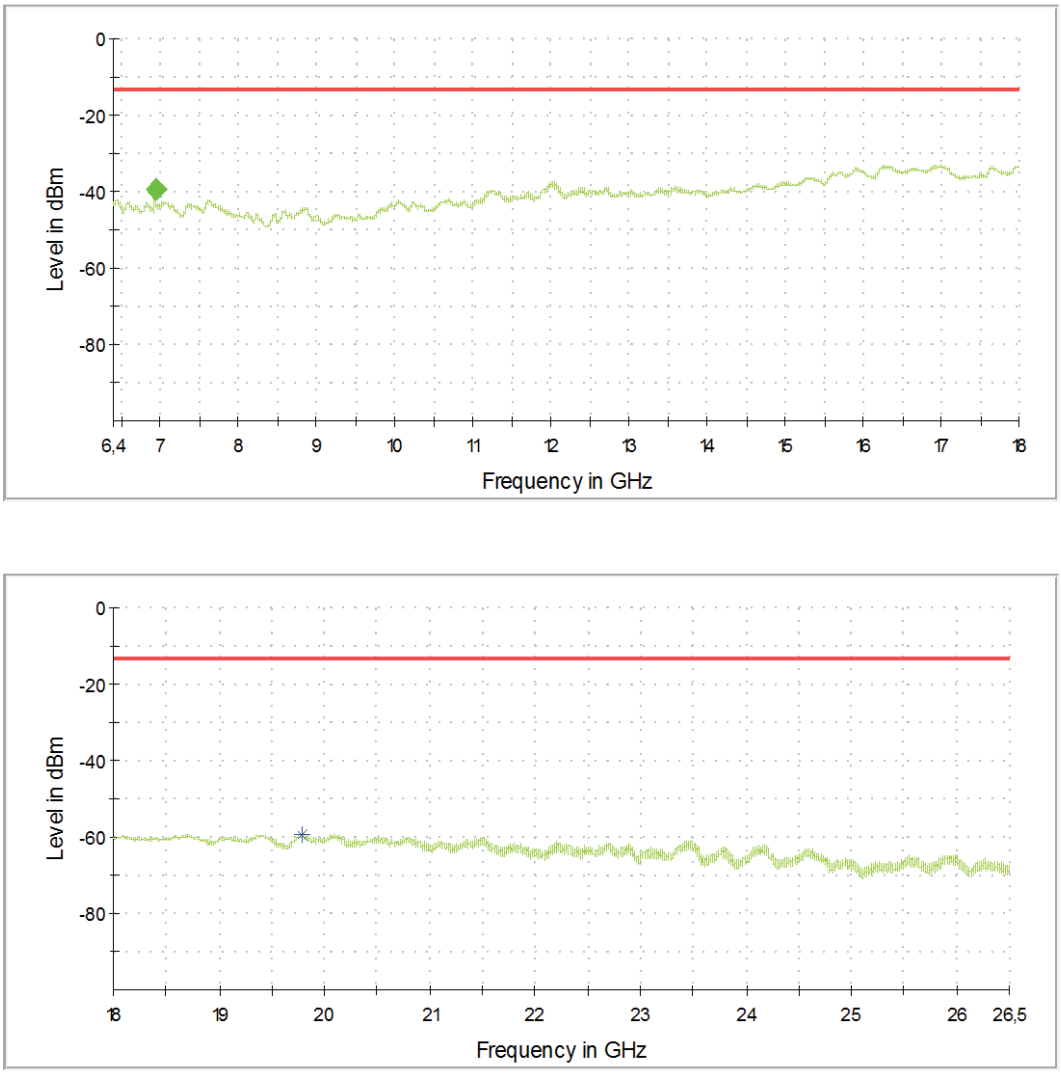
1GHz to 6.4GHz - Radiated Spurious
WCDMA 4 - HSPA - High channel 1413



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
3214.5	-48.8	-13.0	35.8

Note1: the peak showed above the limit is the fundamental emission

6.4GHz to 26.5GHz - Radiated Spurious
All modes

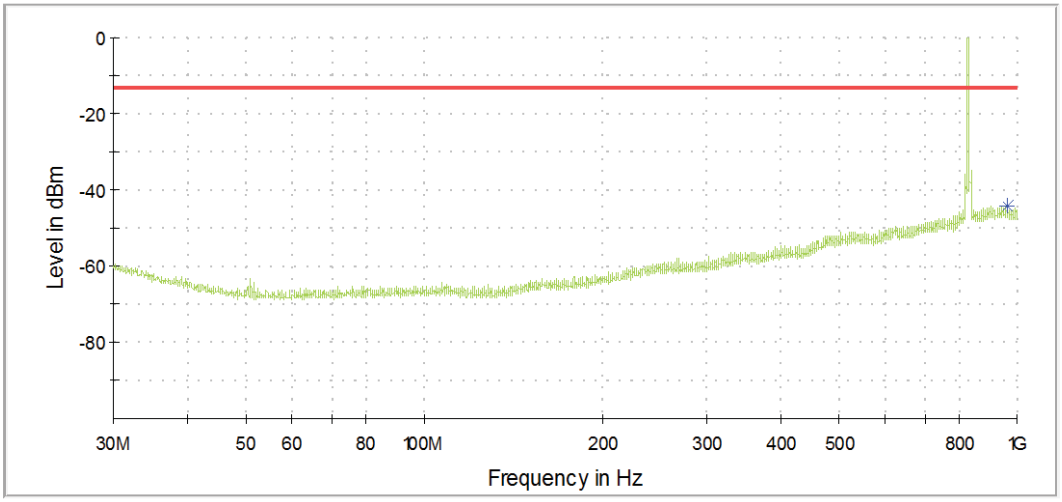


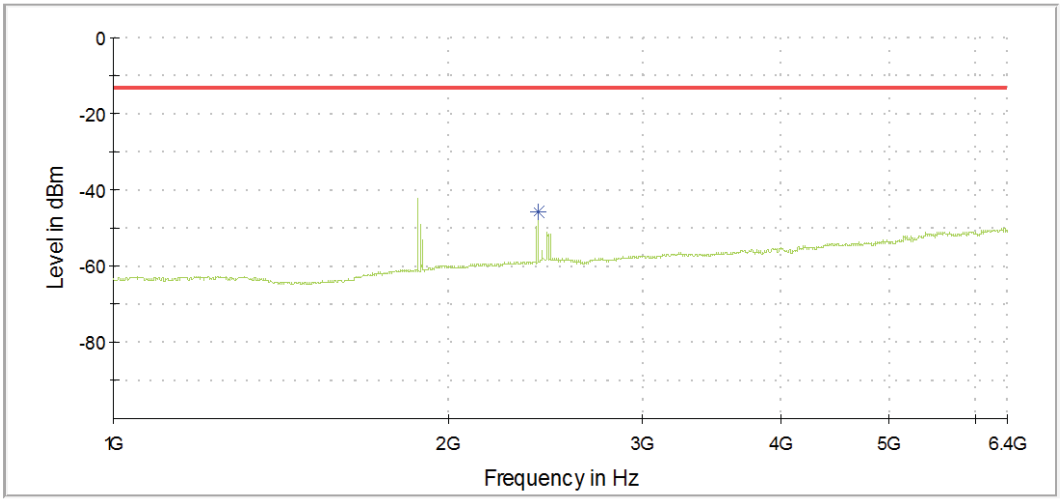
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
6934.7	-39.6	-13.0	26.6
19795.0	-59.4	-13.0	46.4

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

Test Results – WCDMA 5

30MHz to 6.4GHz - Radiated Spurious
WCDMA 5 - RMC - Low channel 4132



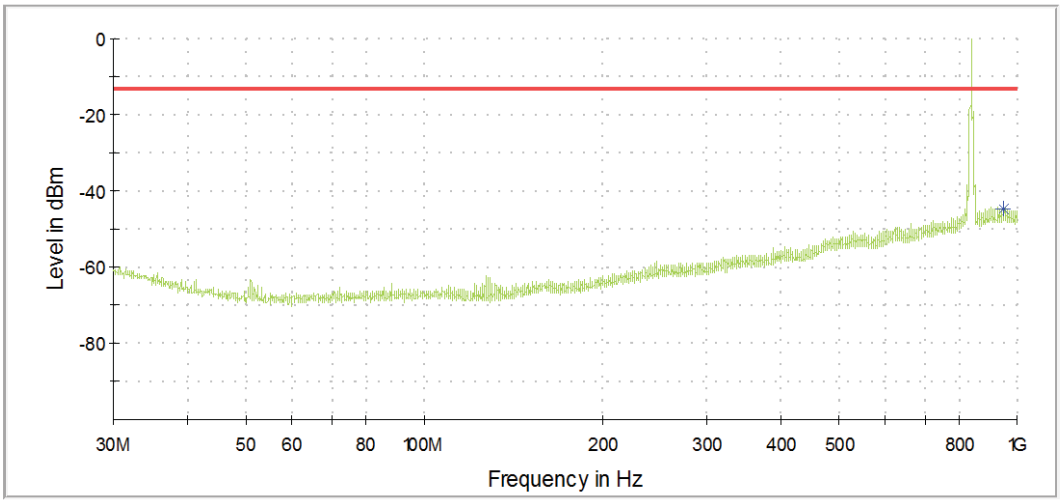


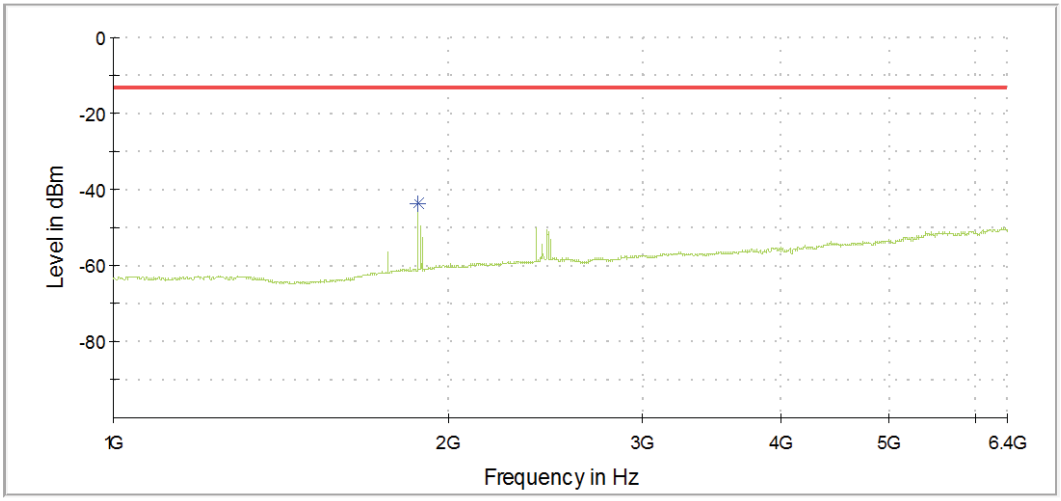
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
960.8	-44.5	-13.0	31.5
2417.5	-45.7	-13.0	32.7

Note1: the peak showed above the limit is the fundamental emission

30MHz to 6.4GHz - Radiated Spurious
WCDMA 5 - RMC - Mid channel CH4183



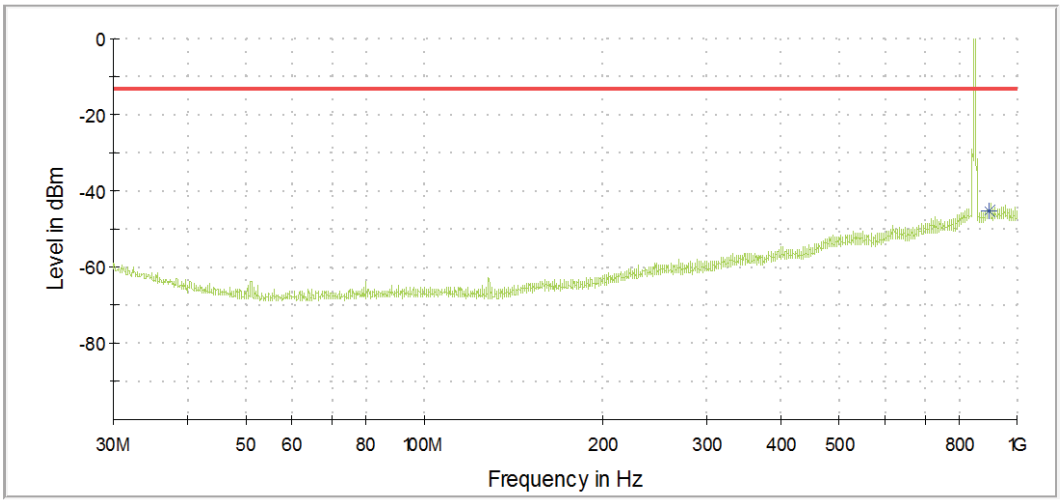


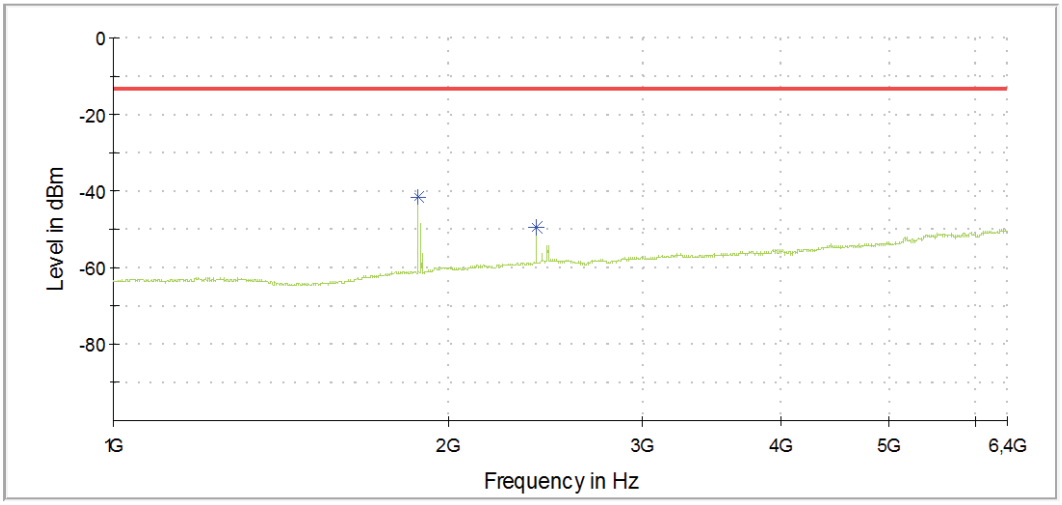
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
946.5	-44.5	-13.0	31.5
1882.0	-43.7	-13.0	30.7

Note1: the peak showed above the limit is the fundamental emission

30MHz to 6.4GHz - Radiated Spurious
WCDMA 5 - RMC - High channel 4233



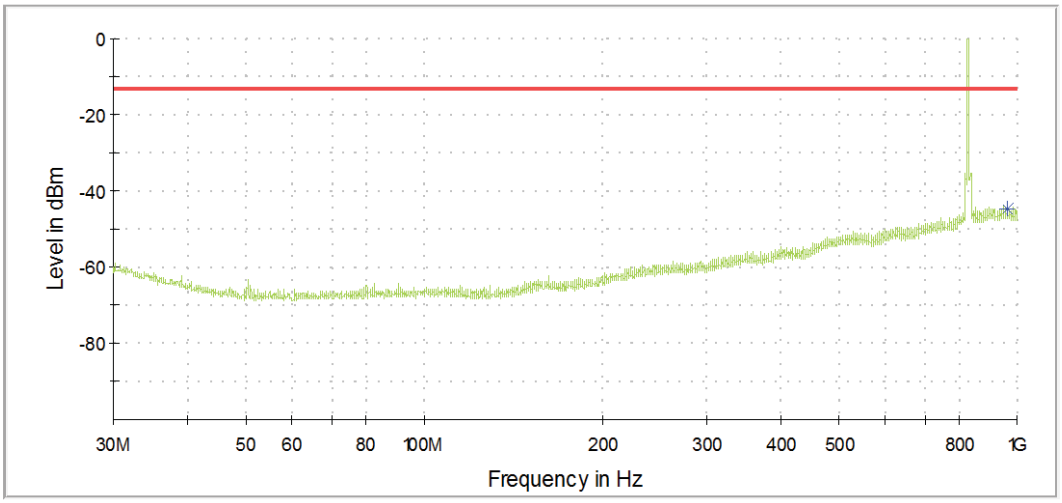


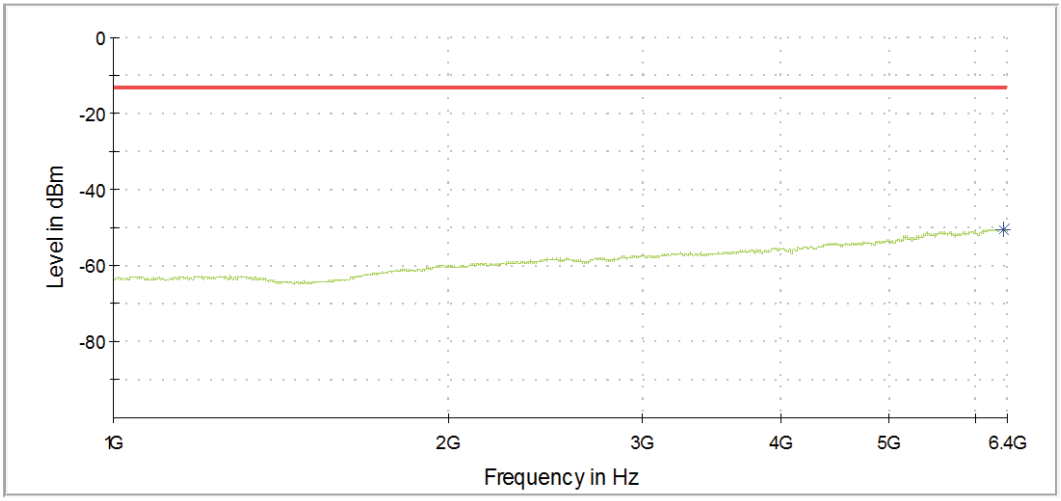
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
894.9	-45.3	-13.0	32.3
1881.5	-41.7	-13.0	28.7
2405.4	-49.4	-13.0	36.4

Note1: the peak showed above the limit is the fundamental emission

30MHz to 6.4GHz - Radiated Spurious
WCDMA 5 - HSPA - Low channel 4132



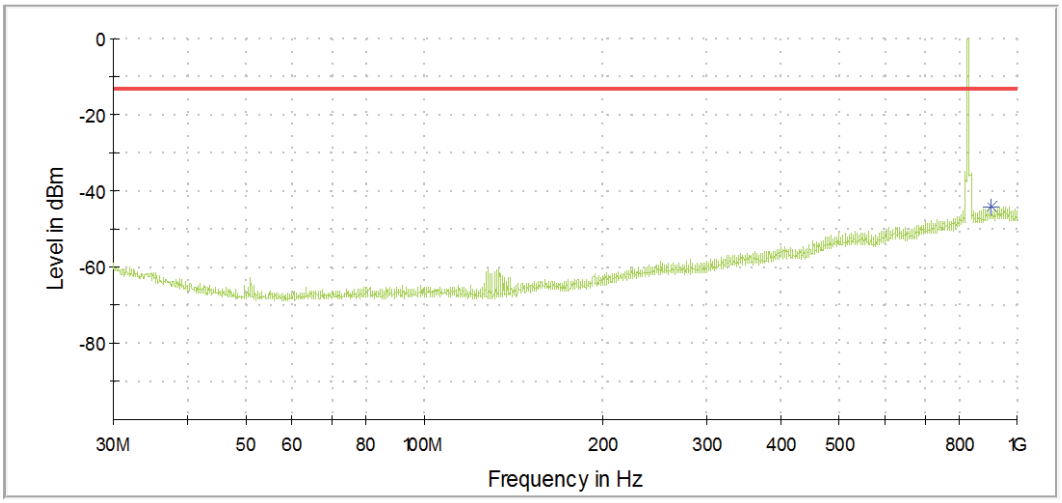


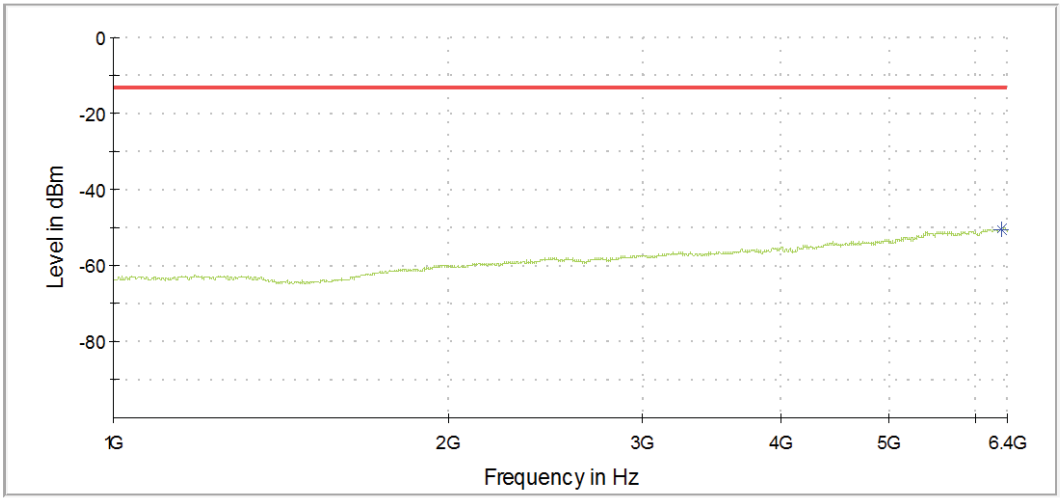
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
6348.3	-50.4	-13.0	37.4
965.5	-44.7	-13.0	31.7

Note1: the peak showed above the limit is the fundamental emission

30MHz to 6.4GHz - Radiated Spurious
WCDMA 5 - HSPA - Mid channel 4183



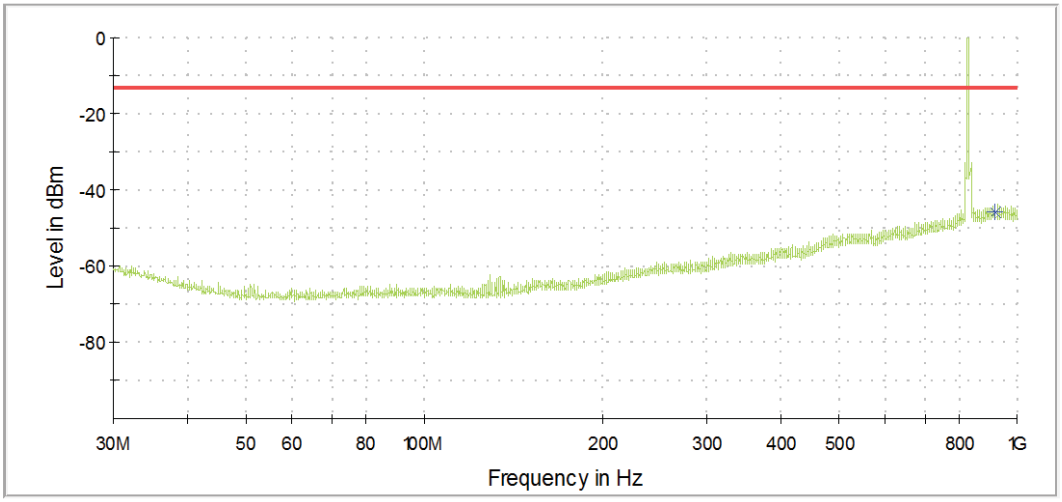


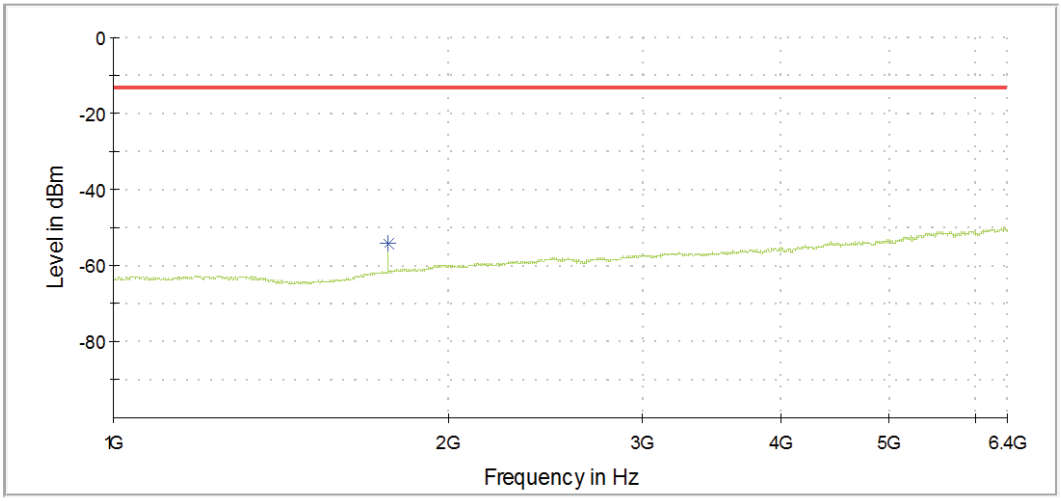
RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
906.2	-44.3	-13.0	31.3
6327.6	-50.4	-13.0	37.4

Note1: the peak showed above the limit is the fundamental emission

30MHz to 6.4GHz - Radiated Spurious
WCDMA 5 - HSPA - High channel 4233



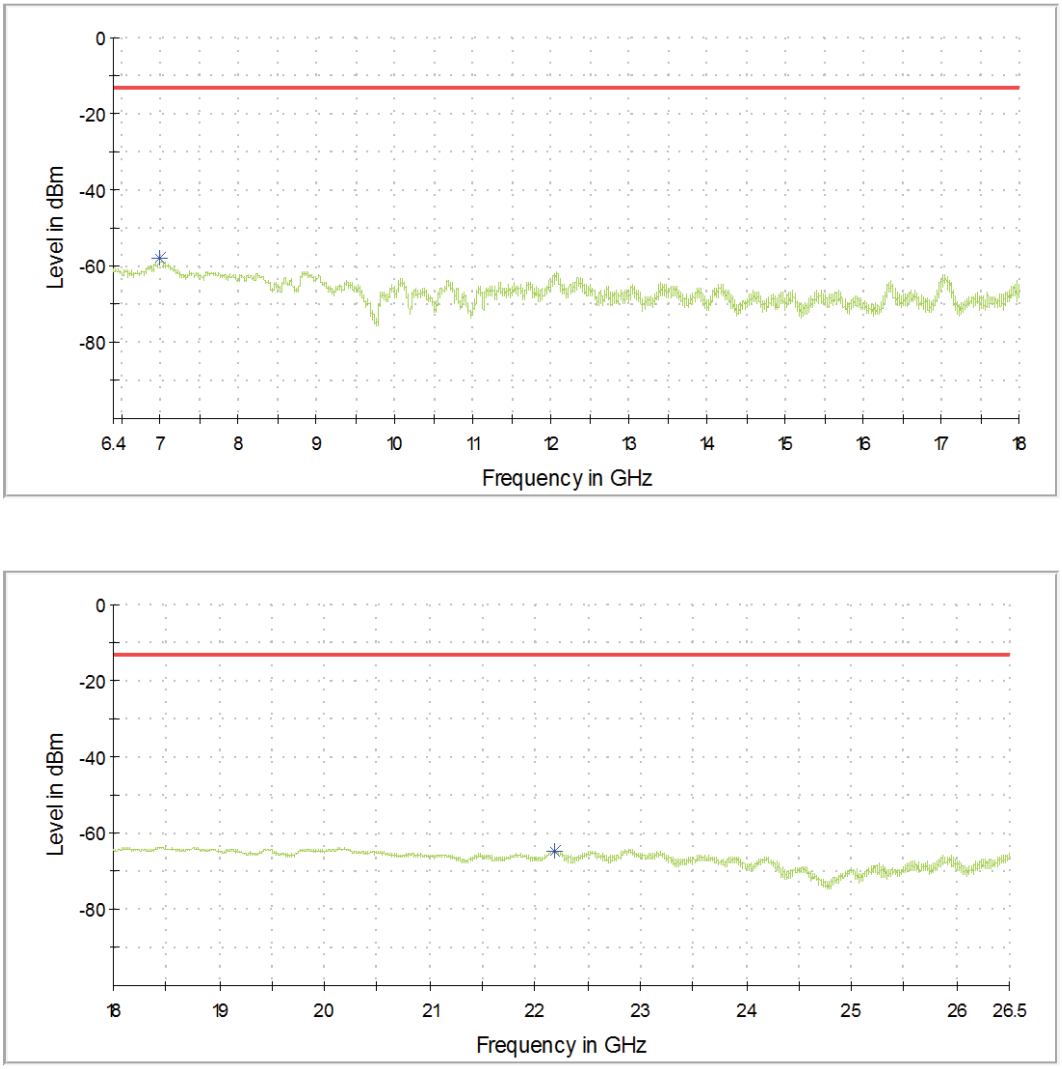


RMS measurements Limit FCC

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
914.5	-45.7	-13.0	32.7
1770.9	-54.1	-13.0	---

Note1: the peak showed above the limit is the fundamental emission

6.4GHz to 26.5GHz - Radiated Spurious
All modes



Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
6996.0	-57.9	-13.0	44.9
22177.8	-64.6	-13.0	51.6

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.