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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 L - 1695-1710, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands
5. FCC OET KDB 971168 D01 v02r02 Measurement guidance for certification of licensed digital transmitters
6. RSS 132 issue 3 - Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
7. RSS 133 issue 6 - 2 GHz Personal Communications Services
8. RSS 139 issue 2 - Advanced Wireless Services Equipment Operating in the Bands 1710–1755 MHz and 2110–2155 MHz
9. TIA 603 - D June 2010 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
10. ANSI C63.4-2009 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA).
- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm listed by the FCC, with Designation Number FR0011.
- ✓ Intel Mobile Communications 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.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

3. Environmental Conditions

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

Temperature	22°C ± 2°C
Humidity	45% ± 2%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of reception	Note
#02	14112501.S02	Module	7262M2WW	004402523022105	2014-11-25	Used for conducted tests
	14112401.S09	Extender	NGFF Carrier board Rev 2.0	NA	2014-11-25	
#03	14112401.S03	Module	7262M2WW	004402523021818	2014-11-24	Used for radiated tests
	14112401.S07	Antenna	Pulse SPDA24700/2700	NA	2014-11-24	
	14112401.S08	Antenna	Pulse SPDA24700/2700	NA	2014-11-24	
	14112401.S06	Extender	NGFF Carrier board Rev 2.0	NA	2014-11-24	
#04		Module	7262M2WW	004402523022303		Used for subcontracted results (Frequency stability)
		Extender	NGFF Carrier board Rev 2.0	NA		

NA: Not Applicable

5. EUT features

These are the detailed bands and modes supported by the Equipment Under Test:

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 – 2570 MHz) Band 12 (699 – 716 MHz) Band 13 (777 – 787 MHz) Band 17 (704.0 – 716.0 MHz) Band 26 (814 – 849 MHz) Band 30 (2305 – 2315 MHz)

Emission designator for IC cert

Band	Type of modulation	Emission designator
GSM850	GMSK	241KGXW
GSM850	8PSK	254KG7W
GSM1900	GMSK	243KGXW
GSM1900	8PSK	263KG7W
WCDMA Band II RMC	QPSK	4M28F9W
WCDMA Band IV RMC	QPSK	4M10F9W
WCDMA Band V RMC	QPSK	4M20F9W

6. Remarks and comments

1. The frequency stability test results, detailed in Annex C, were performed at AT4 wireless S.A., PTA – C/ Severo Ochoa 2, 29590, Málaga, SPAIN.
2. According to Applicants declaration, The HW version PR2.5 refer to the EUT version HW PR2.0, SW 1445, EUT version HW PR2.1 SW 1449 and EUT version HW PR2.3, SW 1509. There are no differences regarding the GSM850, GSM1900, WCDMA II, IV, V.

7. Test Verdicts summary

7.1. GSM/EDGE/GPRS

Mode	FCC part	RSS part	Test name	Verdict
PCS 1900	2.1046	-	Conducted output power	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
GSM 850	2.1046	-	Conducted output power	P
	2.1049	-	Occupied bandwidth (99%)	P
	22.917	-	Occupied bandwidth (26dB)	P
	22.355, 2.1055	RSS-132-ch.5.3	Frequency Stability	P
	22.917, 2.1051	RSS-132-ch.5.5	Band Edge conducted emission	P
	22.917, 2.1051	RSS-132-ch.5.5	Spurious emission	P
	22.913	RSS-132-ch.5.4	Effective radiated power	P
	22.917, 2.1053	RSS.132-ch.5.5	Radiated spurious emission	P
		RSS-132-ch.5.4	Peak-to-average power ratio	P

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

7.2. WCDMA

Mode	Band	FCC part	RSS part	Test name	Verdict
WCDMA / HSPA+ FDD	2	2.1046	-	Conducted output power	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
WCDMA / HSPA+ FDD	4	2.1046	-	Conducted output power	P
		27.53	139-ch2.3	Emission bandwidth 26dB	P
		27.50	139-ch.6.4	Equivalent isotropic radiated power	P
		2.1049		Occupied bandwidth 99%	P
			139-ch.6.4	Peak to average ratio	P
		27.54, 2.1055	139-ch.6.3	Frequency Stability	P
		27.53, 2.1051	139-ch.6.5	Conducted band-edge	P
		27.53	139-ch.6.5,	Conducted spurious emission	P
		27.53, 2.1053	139-ch.6.5	Radiated spurious emission	P
WCDMA / HSPA+ FDD	5	2.1046	-	Conducted output power	P
		2.1049	-	Occupied bandwidth (99%)	P
		22.917	-	Occupied bandwidth (26dB)	P
		22.355, 2.1055	RSS-132-ch.5.3	Frequency Stability	P
		22.917, 2.1051	RSS-132-ch.5.5	Band Edge conducted emission	P
		22.917, 2.1051	RSS-132-ch.5.5	Spurious emission	P
		22.913	RSS-132-ch.5.4	Effective radiated power	P
		22.917, 2.1053	RSS.132-ch.5.5	Radiated spurious emission	P
			RSS-132-ch.5.4	Peak-to-average power ratio	P
		2.1046	RSS-132-ch.5.3	Conducted output power	P

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

8. Document Revision History

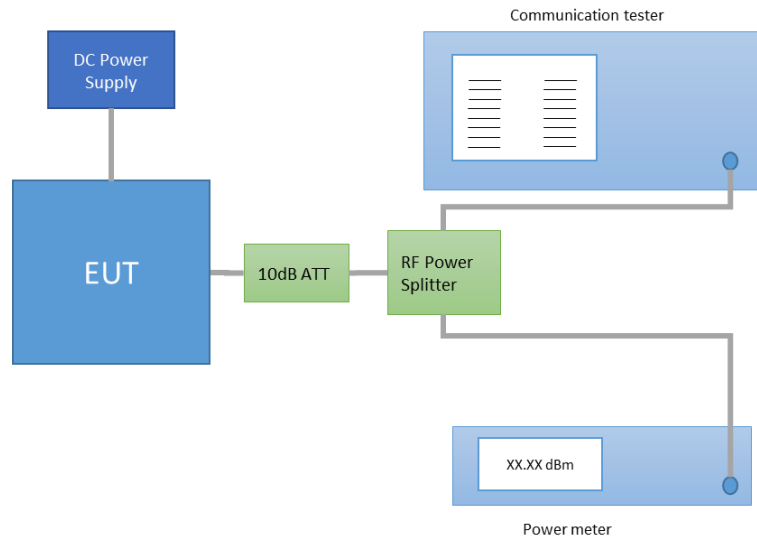
Revision #	Date	Modified by	Details
Rev. 00	2015-07-10	O. Fargant	First Issue

Annex A. Test & System Description

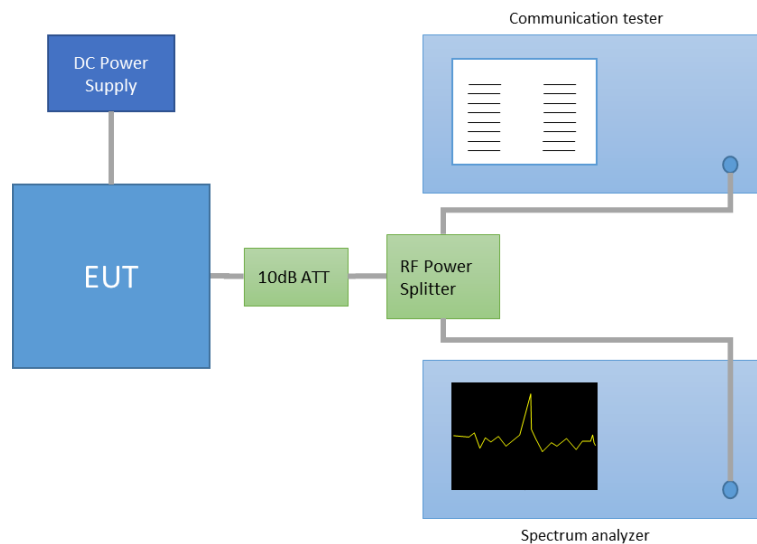
A.1 Measurement system

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.

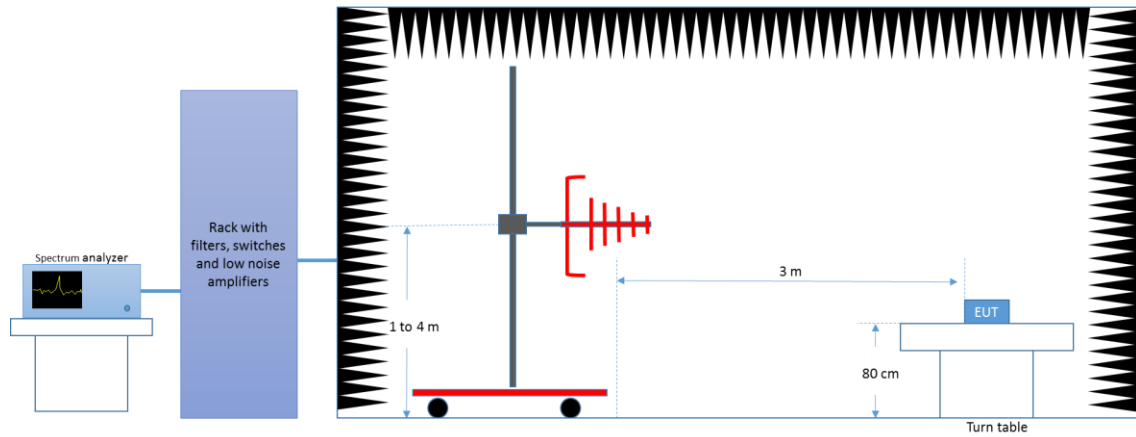
Conducted Setup 1



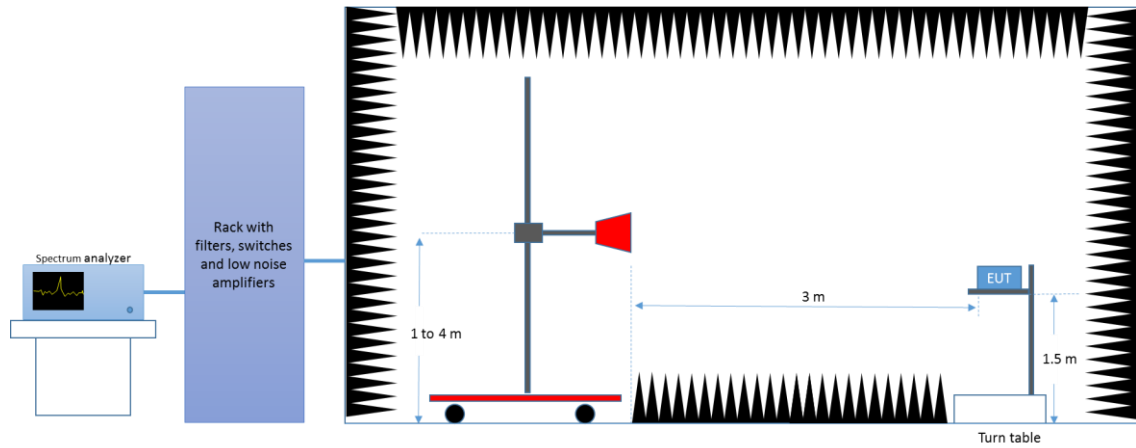
Conducted Setup 2



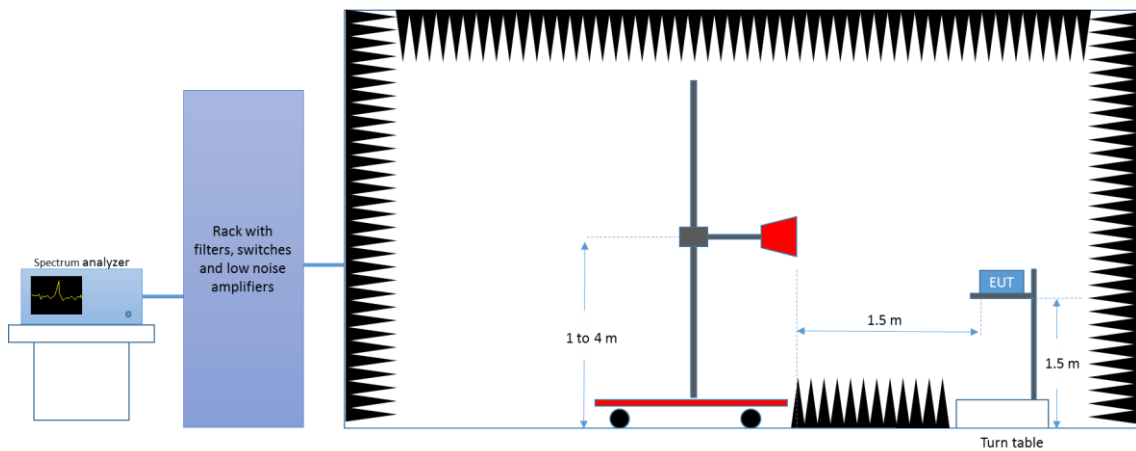
Radiated Setup < 1GHz



Radiated Setup Frequency range 1 GHz to 18 GHz



Radiated Setup > 18GHz



A.2 Test Equipment List

Conducted Setup

ID Number	Device	Type/Model	Serial Number	Manufacturer	Calibration Date	Calibration Due Date
0100	Communication tester	CMW500	129337	Rohde & Schwarz	2013-11-07	2015-11-07
0033	Spectrum analyzer	FSV40	101072	Rohde & Schwarz	2014-01-30	2016-01-30
0046	Power splitter	11667B	MY51360447	Agilent	NA	NA
0098	USB Power sensor	NRP-Z81	102278	Rohde & Schwarz	2013-07-17	2015-07-17
NA	10 dB attenuator	NA	4882640	RS	NA	NA

Radiated Setup

ID Number	Device	Type/Model	Serial Number	Manufacturer	Calibration Date	Calibration Due Date
0210	Communication tester	CMW500	147712	Rohde & Schwarz	NA	NA
0133	Spectrum analyzer	FSV40	101358	Rohde & Schwarz	2014-05-03	2016-05-03
0137	Log Antenna 30 MHz – 1 GHz	3142E	00156946	ETS Lindgren	2014-05-03	2016-05-03
0138	Horn Antenna 1 GHz – 18 GHz	3117	00152266	ETS Lindgren	2014-03-04	2016-03-04
0141	Horn Antenna + Preamplifier 1 GHz – 18 GHz	3117P	00157736	ETS Lindgren	2014-06-03	2016-06-03
0139	Horn Antenna 18 GHz – 26 GHz	114514	00167100	ETS Lindgren	2014-04-25	2016-04-25
0135	Anechoic chamber	Fact 3	RFD_FA_100	ETS Lindgren	NA	NA

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

Measurement type	Uncertainty [\pm 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 Test Conditions

For cellular transmission modes GPRS/EGPRS/WCDMA, the device was put into operation by using an R&S CMW 500 as base station simulator.

The output power of the device was set to transmit at maximum power for all tests.

B.2 Test results

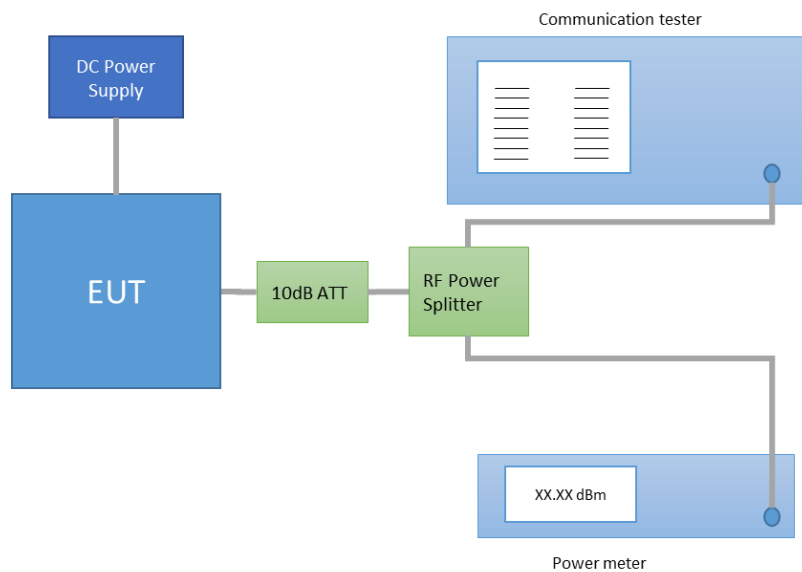
B.2.1 Conducted RF output power

Test limits

BAND	FCC part	RSS part	Power Limits [Watts]	Max Antenna Gain [dBi]	Power Limit at antenna terminal [dBm]
PCS 1900, WCDMA 2	2.1046, 24.232	133-ch6.4	< 2 watts EIRP	2.0	< 31.0
WCDMA 4	2.1046, 27.50	139-ch.6.4, 199 ch.4.4	< 3 watts ERP	2.0	< 34.9
GSM 850, WCDMA 5	2.1046, 22.913	132-ch.5.4	ERP max 7 watts	2.0	< 38.6

Test procedure

The setup below was used to measure the conducted output power. The antenna terminal of the EUT is connected to the power meter and the communication tester through an attenuator and a power splitter. The power meter reading is compensated to include the RF. This test was performed according to the KDB 971168 D01 § 5.2.



Results tables

Band	Channel	Channel Number	Frequency [MHz]	Mode	#UL Slots	Level [dBm]
GSM850	Low	128	824.2	GPRS GMSK	1	32.55
					2	32.45
					3	31.77
					4	30.11
				EDGE 8PSK	1	26.39
					2	27.02
					3	26.22
					4	24.95
	Mid	190	836.6	GPRS GMSK	1	32.60
					2	31.77
					3	31.21
					4	30.12
				EDGE 8PSK	1	26.98
					2	27.04
					3	26.36
					4	25.34
	High	251	848.8	GPRS GMSK	1	32.57
					2	31.68
					3	31.19
					4	29.99
EDGE 8PSK				1	27.03	
				2	27.07	
				3	26.28	
				4	25.20	

Max values

Min values

Band	Channel	Channel Number	Frequency [MHz]	Mode	#UL Slots	Level [dBm]
GSM1900	Low	512	1850.2	GPRS GMSK	1	29.59
					2	29.57
					3	29.06
					4	28.01
				EDGE 8PSK	1	25.98
					2	26.72
					3	25.88
					4	24.75
	Mid	661	1880	GPRS GMSK	1	29.34
					2	29.30
					3	28.84
					4	27.80
				EDGE 8PSK	1	25.75
					2	26.55
					3	25.72
					4	24.50
	High	810	1909.8	GPRS GMSK	1	29.37
					2	29.20
					3	28.83
					4	27.95
EDGE 8PSK				1	25.75	
				2	26.42	
				3	25.63	
				4	24.45	

Max values
Min values

Band	Mode	Subtest	Channel Number	Freq [MHz]	Avg [dBm]	Peak [dBm]	
WCDMA Band II	RMC	-	9262	1852.4	24.01	26.60	
			9400	1880.0	23.86	26.66	
			9538	1907.6	23.87	25.69	
	HSDPA	1	9262	1852.4	23.98	26.63	
			9400	1880.0	23.85	26.75	
			9538	1907.6	23.85	25.69	
		2	9262	1852.4	23.58	26.88	
			9400	1880.0	23.37	26.83	
			9538	1907.6	23.47	25.86	
		3	9262	1852.4	23.04	26.86	
			9400	1880.0	22.78	26.74	
			9538	1907.6	22.87	25.71	
		4	9262	1852.4	22.82	26.72	
			9400	1880.0	22.61	26.73	
			9538	1907.6	22.63	25.66	
		HSUPA	1	9262	1852.4	23.14	26.77
				9400	1880.0	22.98	27.01
				9538	1907.6	22.97	25.82
	2		9262	1852.4	21.30	26.66	
			9400	1880.0	21.18	26.71	
			9538	1907.6	21.17	25.63	
	3		9262	1852.4	22.30	27.13	
			9400	1880.0	22.16	27.06	
			9538	1907.6	22.12	26.02	
	4		9262	1852.4	21.48	25.96	
			9400	1880.0	21.41	25.07	
			9538	1907.6	21.44	24.67	
	5		9262	1852.4	23.59	27.13	
			9400	1880.0	23.44	27.11	
			9538	1907.6	23.45	26.03	

Max values

Min values

Band	Mode	Subtest	Channel Number	Freq [MHz]	Avg [dBm]	Peak [dBm]	
WCDMA Band IV	RMC	-	1312	1712.4	23.59	26.73	
			1413	1732.6	23.96	26.92	
			1513	1752.6	23.85	26.46	
	HSDPA	1	1312	1712.4	23.57	26.78	
			1413	1732.6	23.89	26.87	
			1513	1752.6	23.88	26.47	
		2	1312	1712.4	23.01	26.97	
			1413	1732.6	23.36	27.11	
			1513	1752.6	23.33	26.67	
		3	1312	1712.4	22.44	26.74	
			1413	1732.6	22.78	26.90	
			1513	1752.6	22.81	26.54	
		4	1312	1712.4	22.30	26.54	
			1413	1732.6	22.55	26.69	
			1513	1752.6	22.57	26.29	
		HSUPA	1	1312	1712.4	21.65	26.22
				1413	1732.6	22.98	27.41
				1513	1752.6	22.84	26.80
	2		1312	1712.4	20.86	26.74	
			1413	1732.6	21.15	27.88	
			1513	1752.6	21.13	27.18	
	3		1312	1712.4	21.83	27.25	
			1413	1732.6	22.17	28.49	
			1513	1752.6	22.08	27.87	
	4		1312	1712.4	20.05	24.93	
			1413	1732.6	21.38	26.11	
			1513	1752.6	21.36	25.76	
	5		1312	1712.4	23.05	28.34	
			1413	1732.6	23.43	28.54	
			1513	1752.6	23.35	28.04	

Max values

Min values

Band	Mode	Subtest	Channel Number	Freq [MHz]	Avg [dBm]	Peak [dBm]	
WCDMA Band V	RMC	-	4132	826.4	23.66	26.15	
			4183	836.6	23.67	25.40	
			4233	846.6	23.48	25.22	
	HSDPA	1	4132	826.4	23.62	26.39	
			4183	836.6	23.66	25.73	
			4233	846.6	23.45	25.46	
		2	4132	826.4	23.14	27.04	
			4183	836.6	23.17	26.51	
			4233	846.6	22.98	26.21	
		3	4132	826.4	22.59	26.97	
			4183	836.6	22.70	26.45	
			4233	846.6	22.42	26.18	
		4	4132	826.4	22.35	26.66	
			4183	836.6	22.45	26.24	
			4233	846.6	22.21	25.94	
		HSUPA	1	4132	826.4	22.64	26.91
				4183	836.6	22.72	26.21
				4233	846.6	22.54	25.71
	2		4132	826.4	21.69	28.00	
			4183	836.6	20.74	26.36	
			4233	846.6	20.63	25.99	
	3		4132	826.4	21.78	28.21	
			4183	836.6	21.82	26.46	
			4233	846.6	21.66	25.93	
	4		4132	826.4	20.99	25.51	
			4183	836.6	21.04	24.77	
			4233	846.6	20.86	23.71	
	5		4132	826.4	23.12	28.43	
			4183	836.6	23.19	26.64	
			4233	846.6	23.01	26.22	

Max values

Min values

B.2.2 Occupied bandwidth

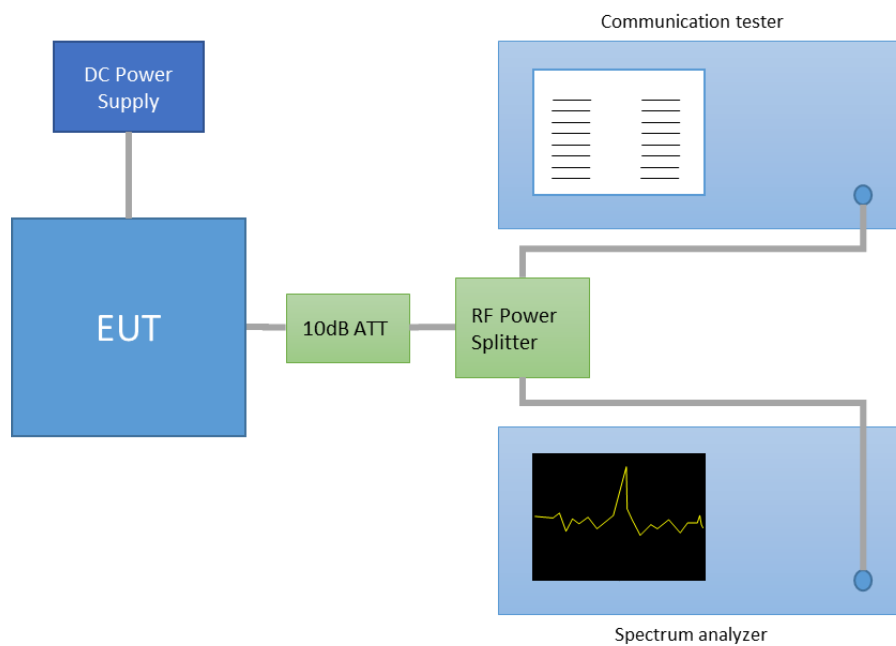
Standard references

BAND	FCC part	RSS part
PCS 1900, WCDMA 2	2.1049, 24.238	133-ch.6.4
WCDMA 4	2.1049, 27.53	139-ch.2.3, 199-ch.4.2
GSM 850, WCDMA 5	2.1049, 22.917	132-ch.5.4

Test procedure

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. This test was performed according to the KDB 971168 D01 § 4.

The occupied bandwidth was measured on the worst case configuration selected from the chapter B.2.1 and on the low, middle and high channel.



Results tables

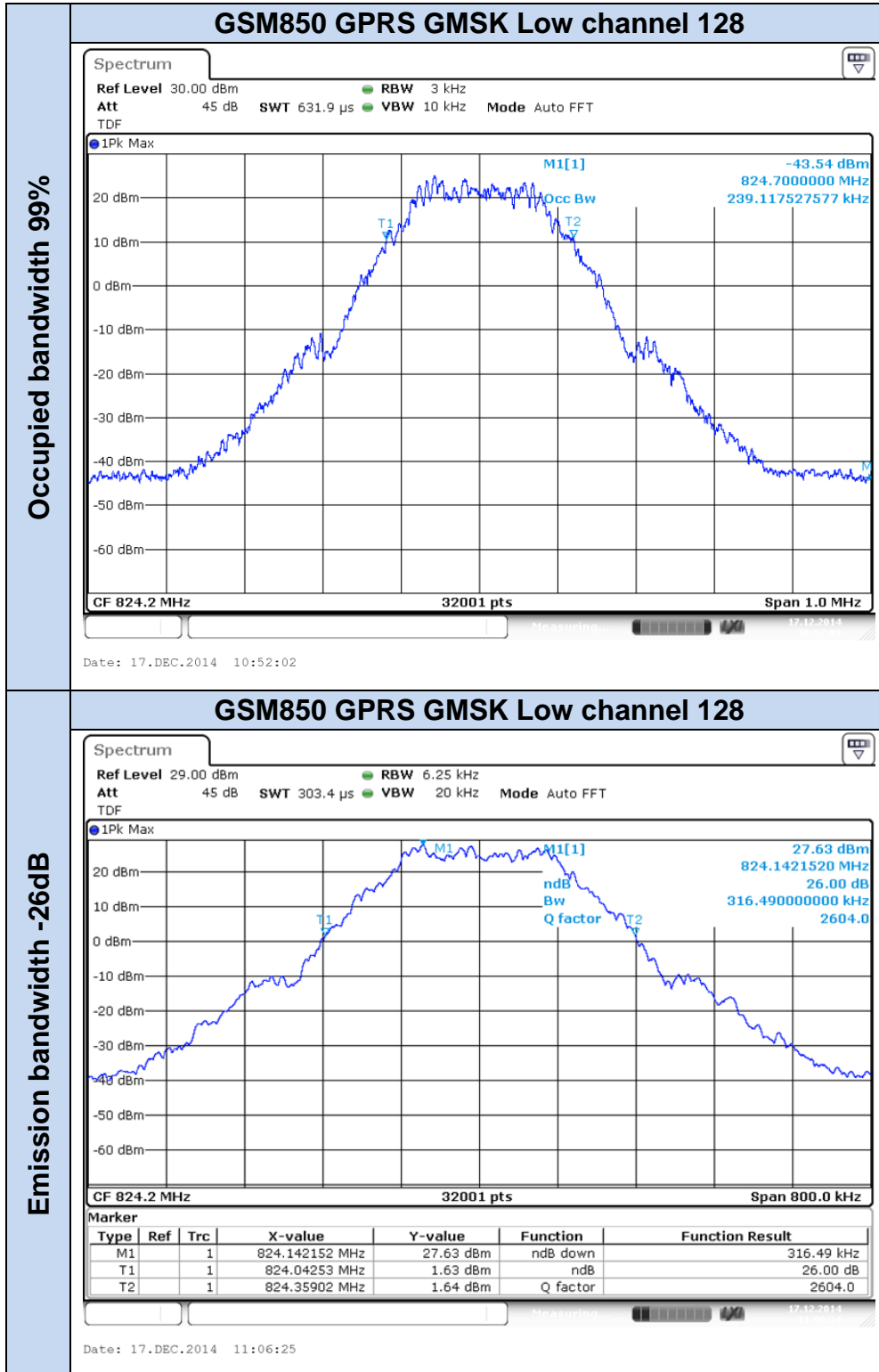
Band	Mode	Channel Number	Freq [MHz]	OBW [MHz]	EBW [MHz]
GSM850	GPRS GMSK	128	824.2	0.239	0.316
		190	836.6	0.237	0.316
		251	848.8	0.241	0.316
	EDGE 8PSK	128	824.2	0.252	0.313
		190	836.6	0.254	0.313
		251	848.8	0.250	0.311
GSM1900	GPRS GMSK	512	1850.2	0.243	0.312
		661	1880	0.244	0.318
		810	1909.8	0.240	0.315
	EDGE 8PSK	512	1850.2	0.261	0.334
		661	1880	0.263	0.328
		810	1909.8	0.261	0.340

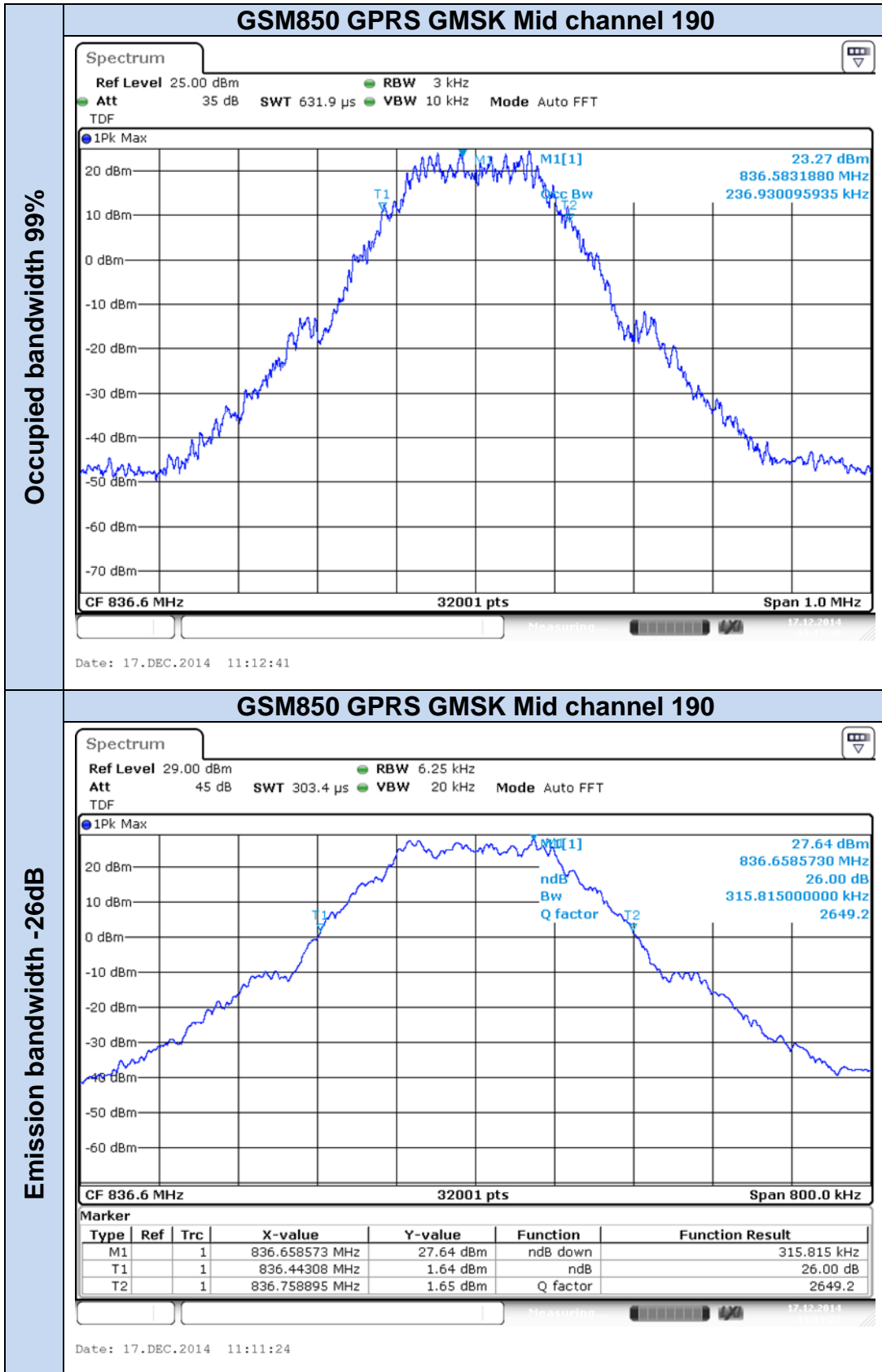
Band	Mode	Channel Number	Freq [MHz]	OBW [MHz]	EBW [MHz]
WCDMA Band II	RMC	9262	1852.4	4.12	4.73
		9400	1880.0	4.08	4.68
		9538	1907.6	4.28	5.18
	HSDPA	9262	1852.4	4.10	4.71
		9400	1880.0	4.09	4.66
		9538	1907.6	4.23	5.02
	HSUPA	9262	1852.4	4.13	4.73
		9400	1880.0	4.10	4.72
		9538	1907.6	4.24	5.51
WCDMA Band IV	RMC	1312	1712.4	4.09	4.65
		1413	1732.6	4.07	4.66
		1513	1752.6	4.10	4.71
	HSDPA	1312	1712.4	4.08	4.65
		1413	1732.6	4.09	4.65
		1513	1752.6	4.10	4.69
	HSUPA	1312	1712.4	4.09	4.65
		1413	1732.6	4.10	4.65
		1513	1752.6	4.11	4.74
WCDMA Band V	RMC	4132	826.4	4.09	4.69
		4183	836.6	4.20	4.88
		4233	846.6	4.30	5.29
	HSDPA	4132	826.4	4.07	4.67
		4183	836.6	4.13	4.85
		4233	846.6	4.16	4.85
	HSUPA	4132	826.4	4.07	4.64
		4183	836.6	4.10	4.67
		4233	846.6	4.11	4.68

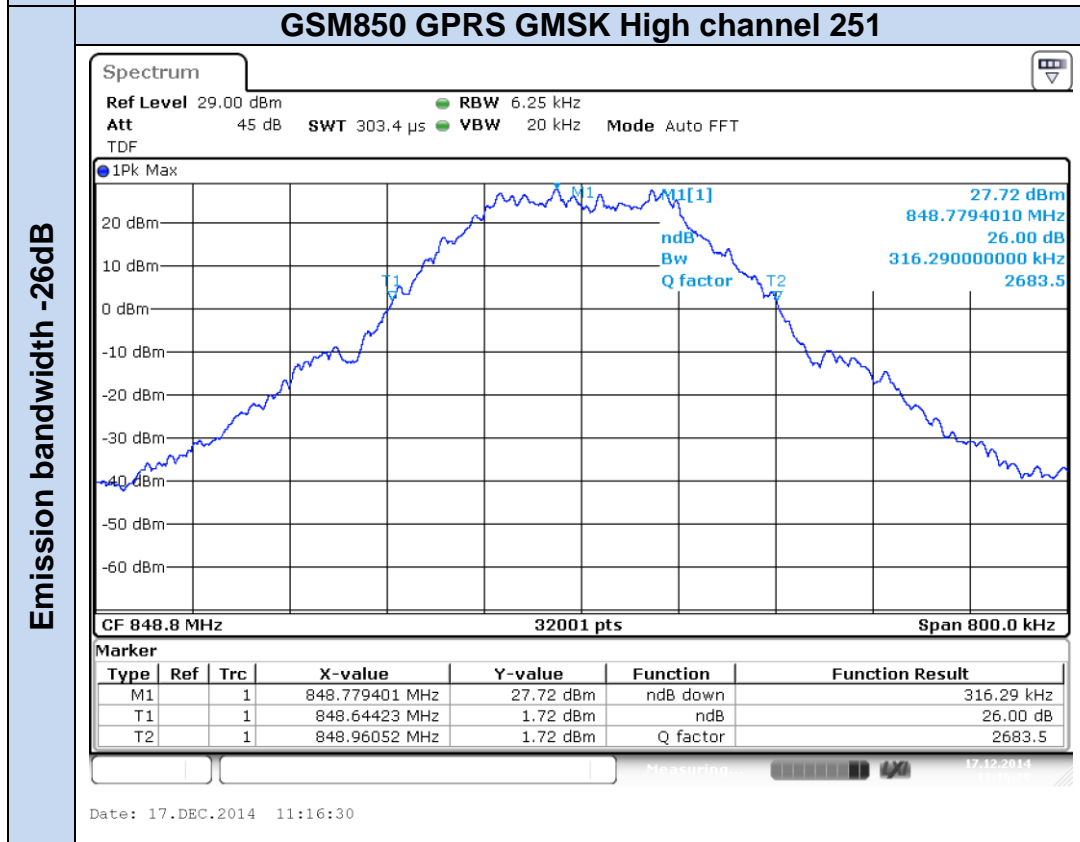
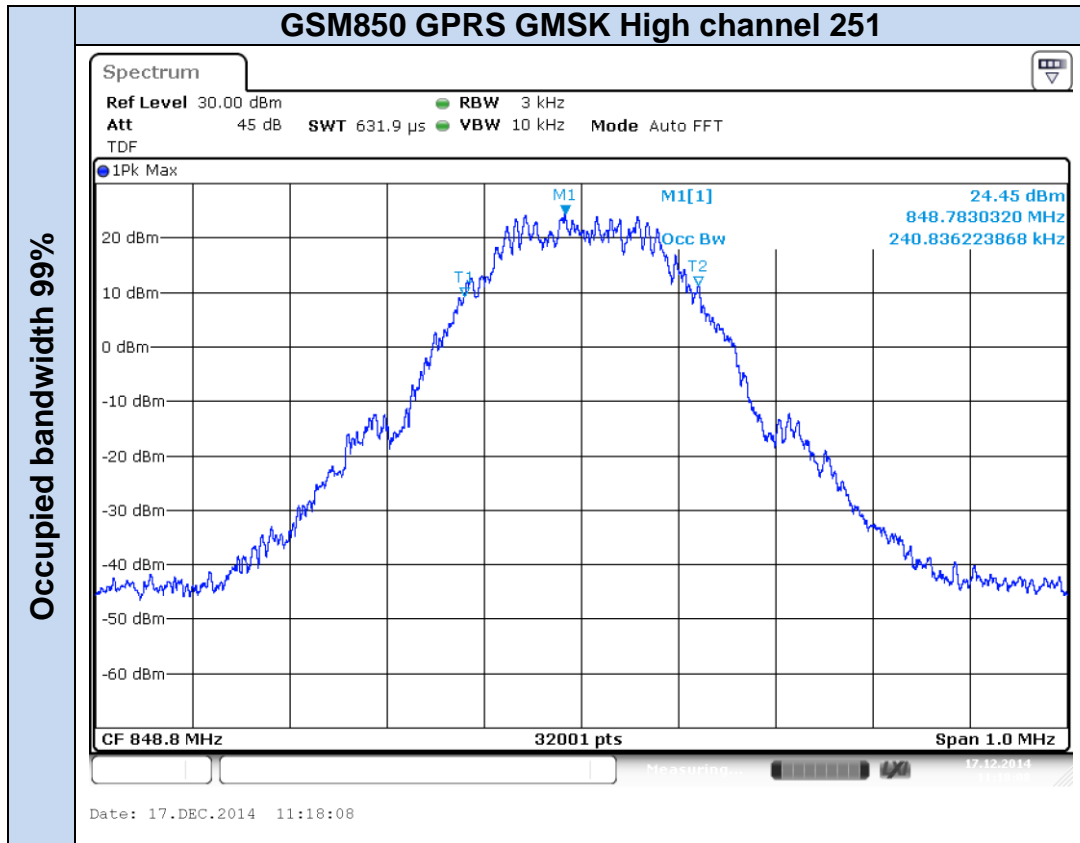
Max values

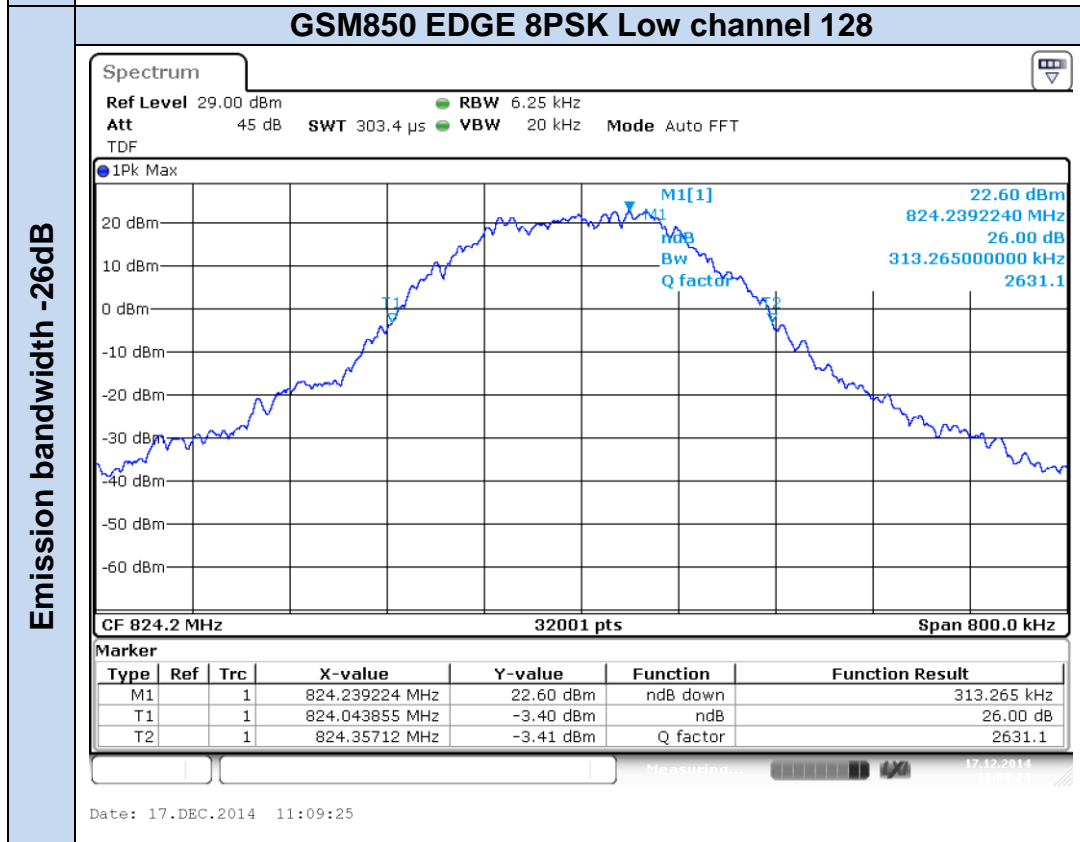
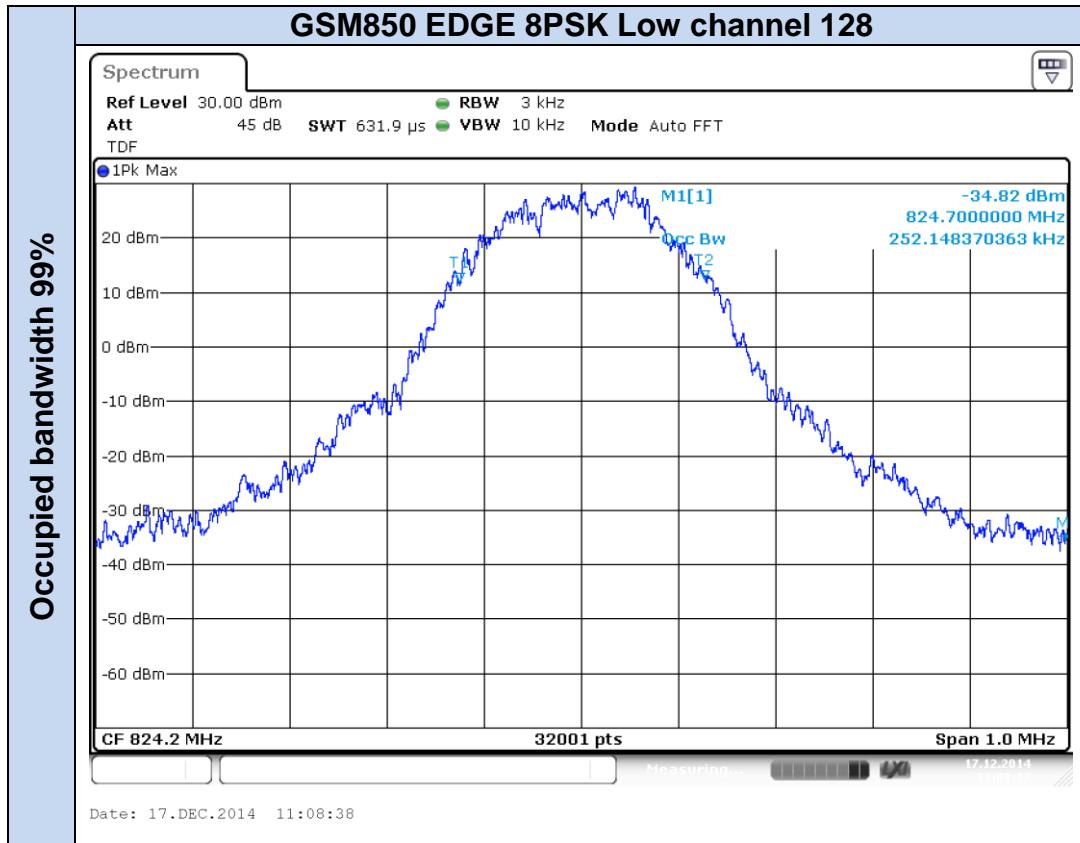
Results screenshot

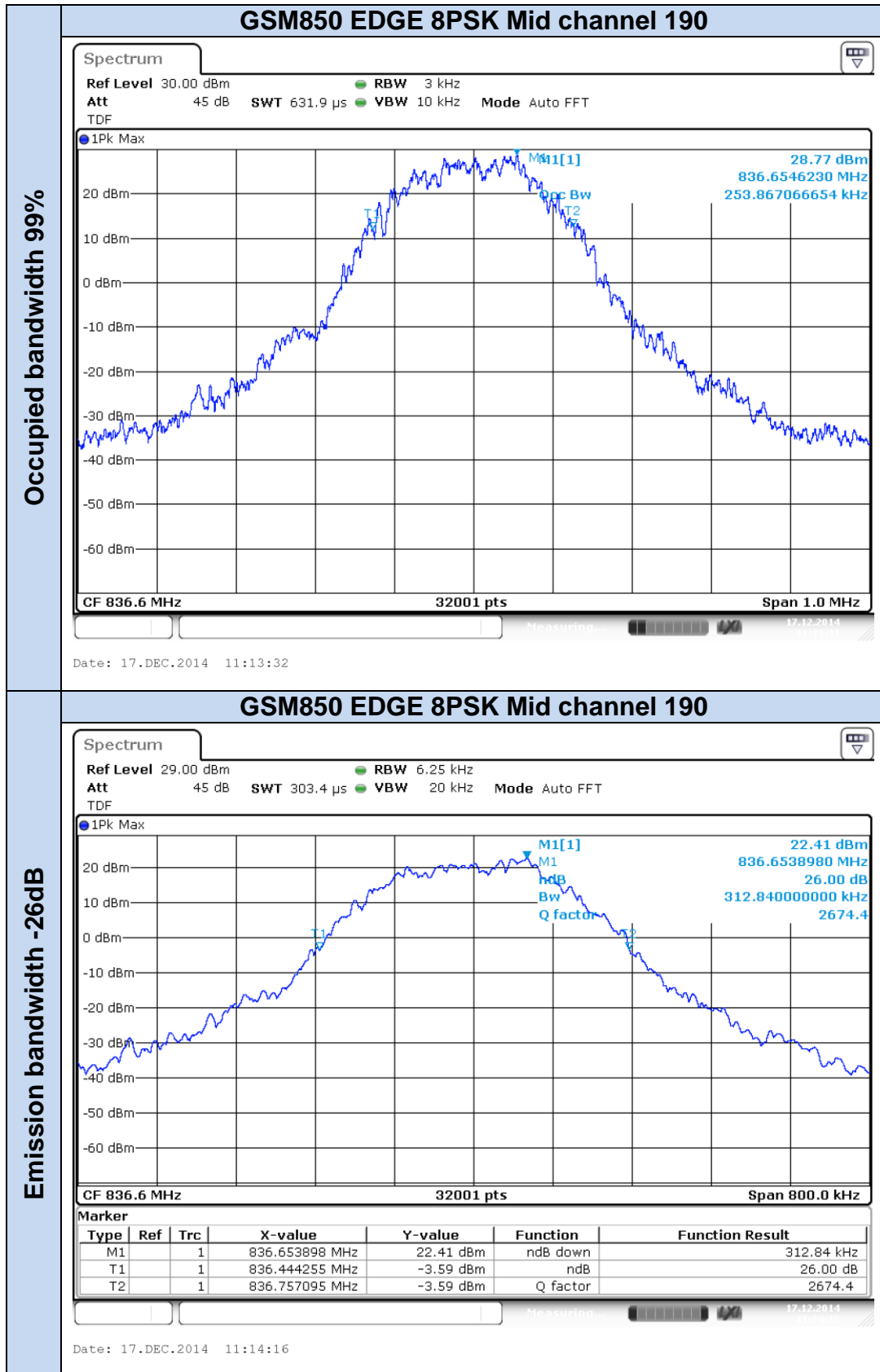
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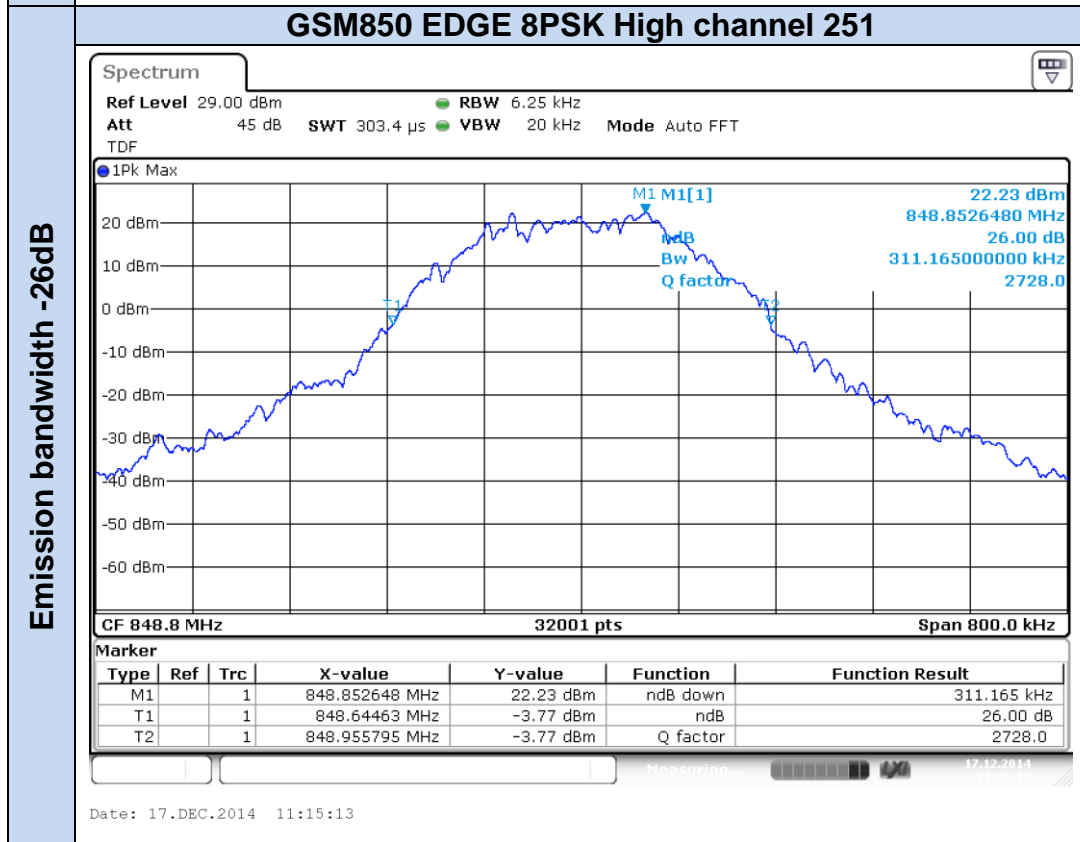
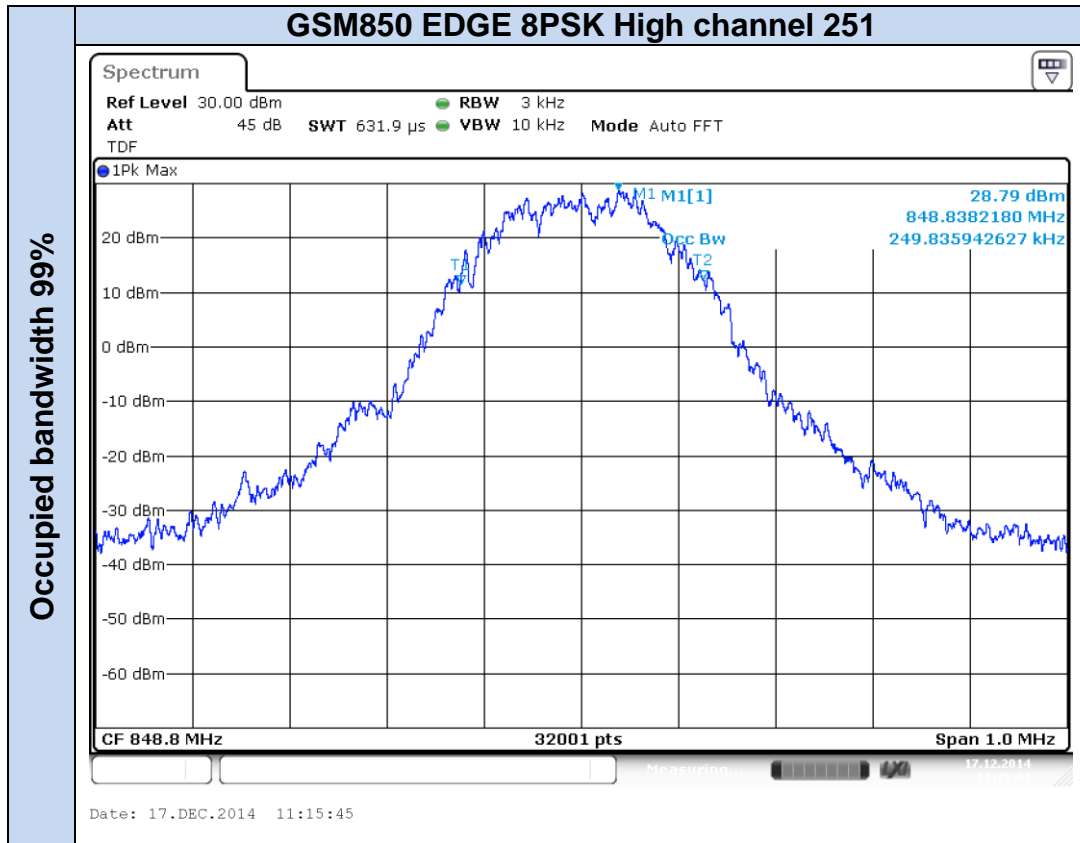




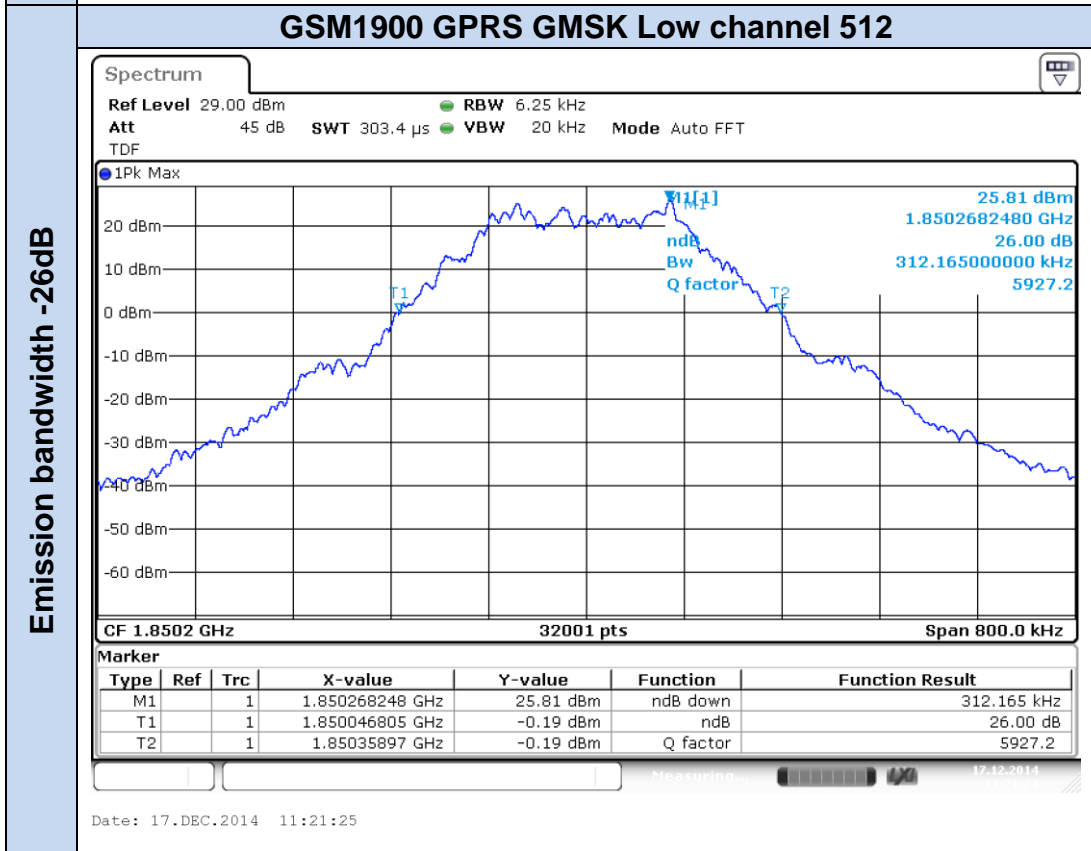
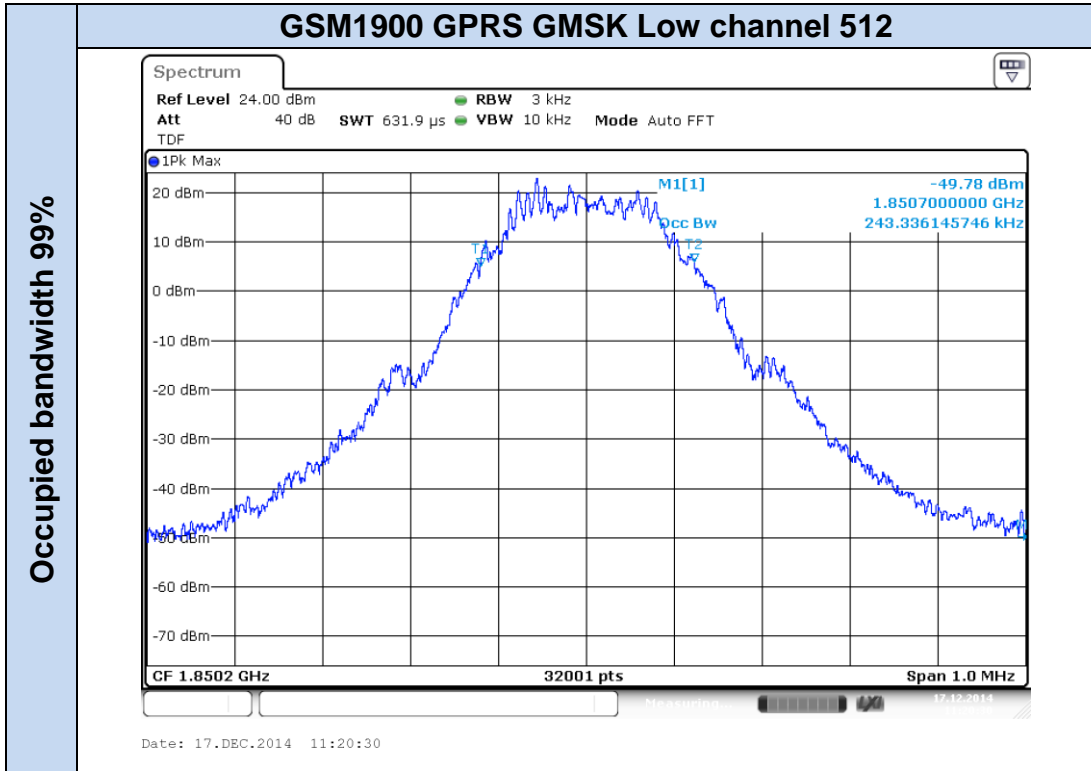


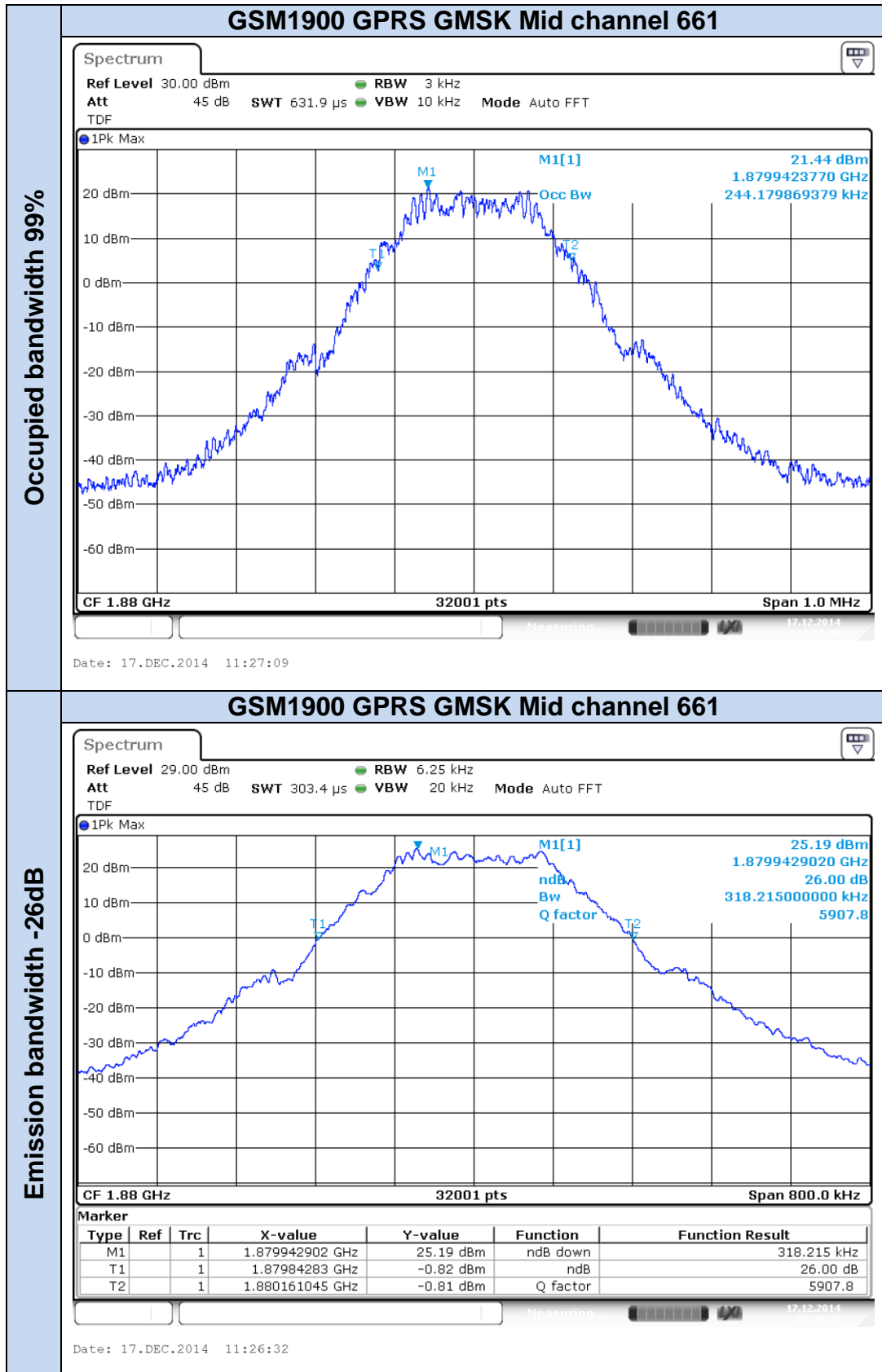


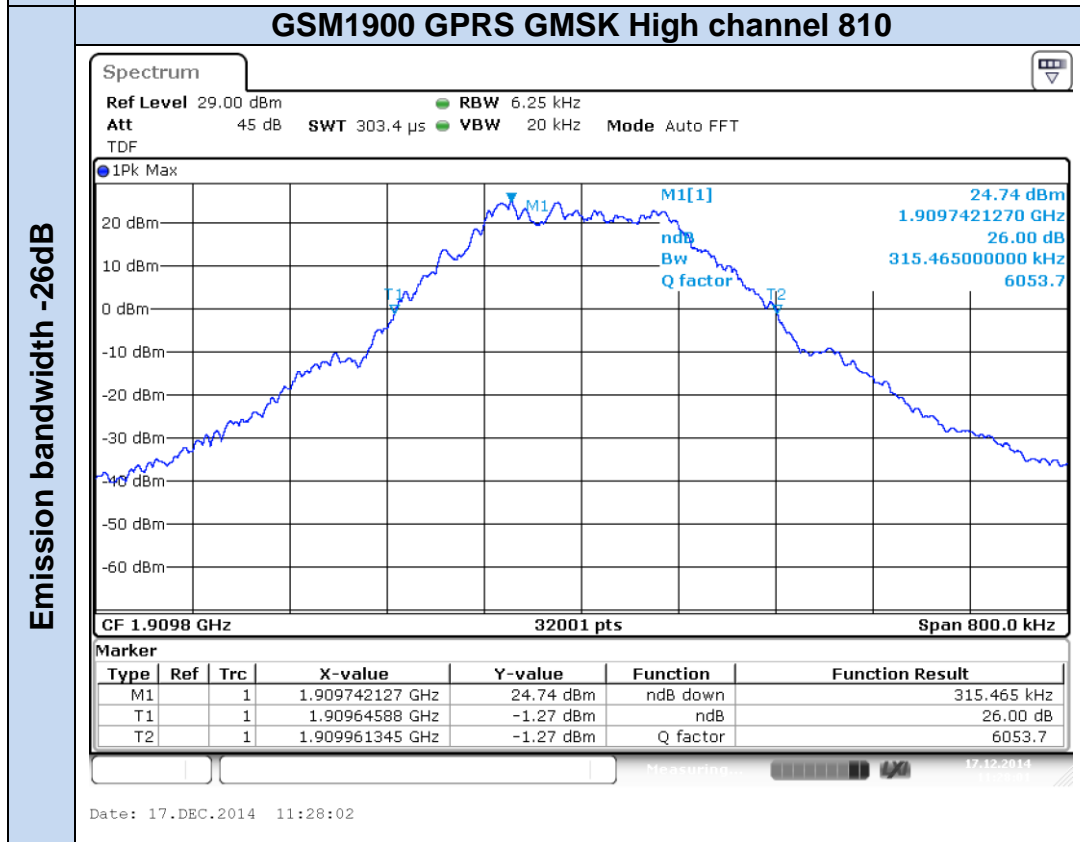
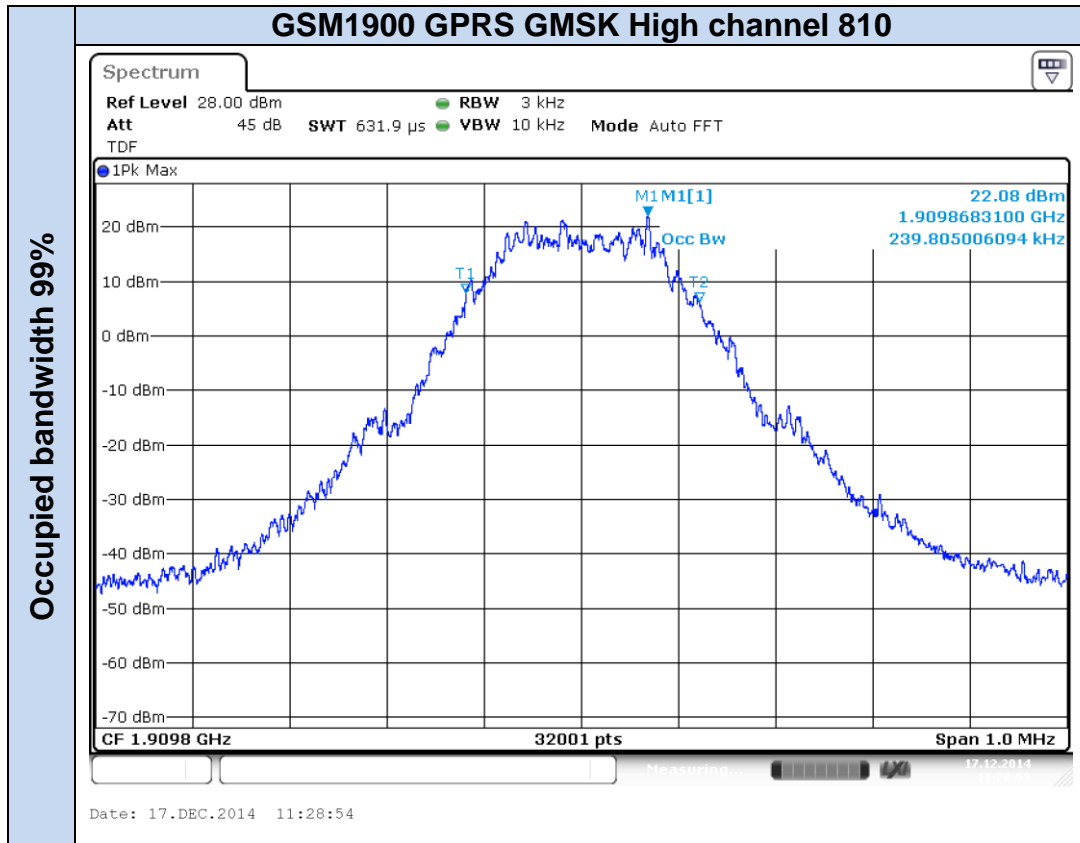


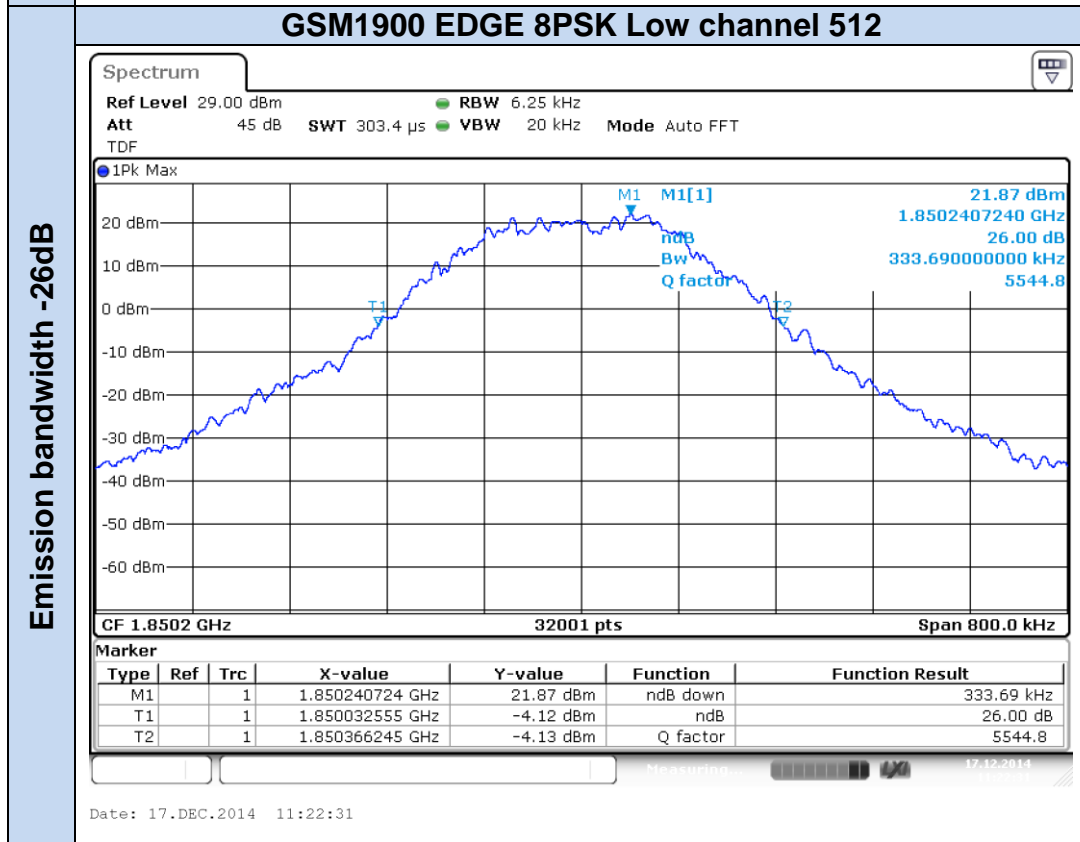
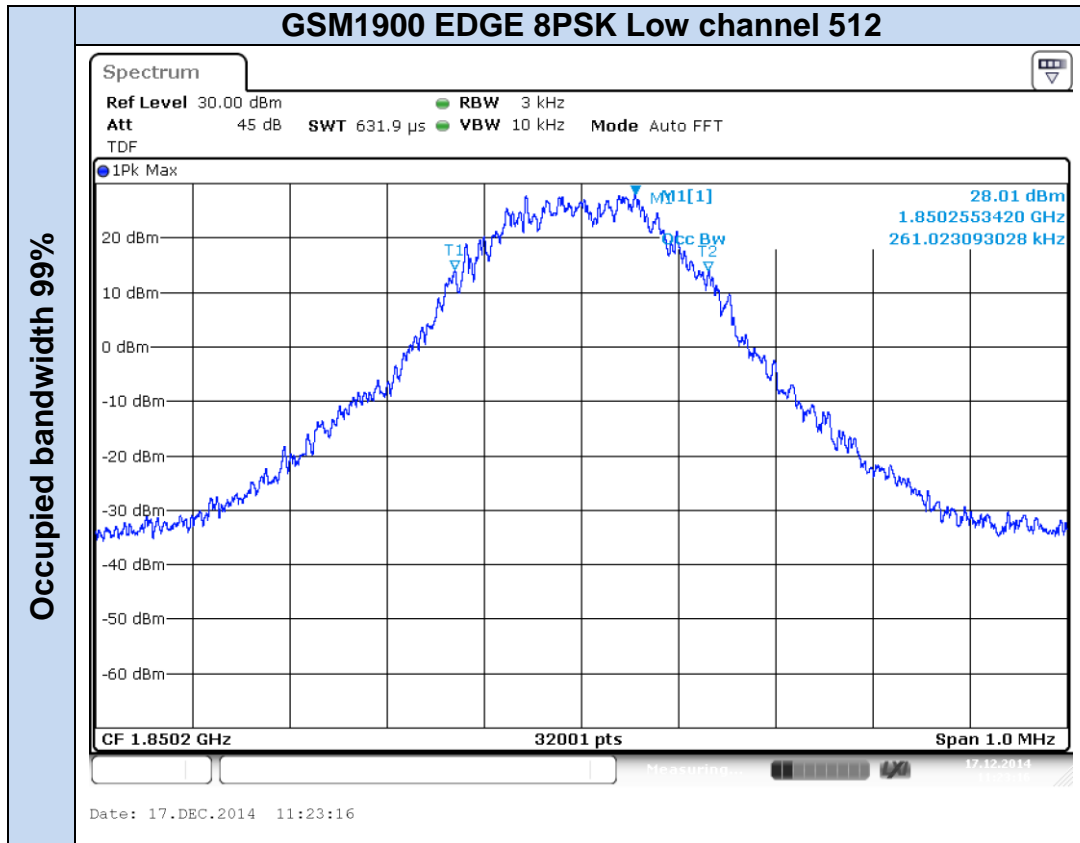


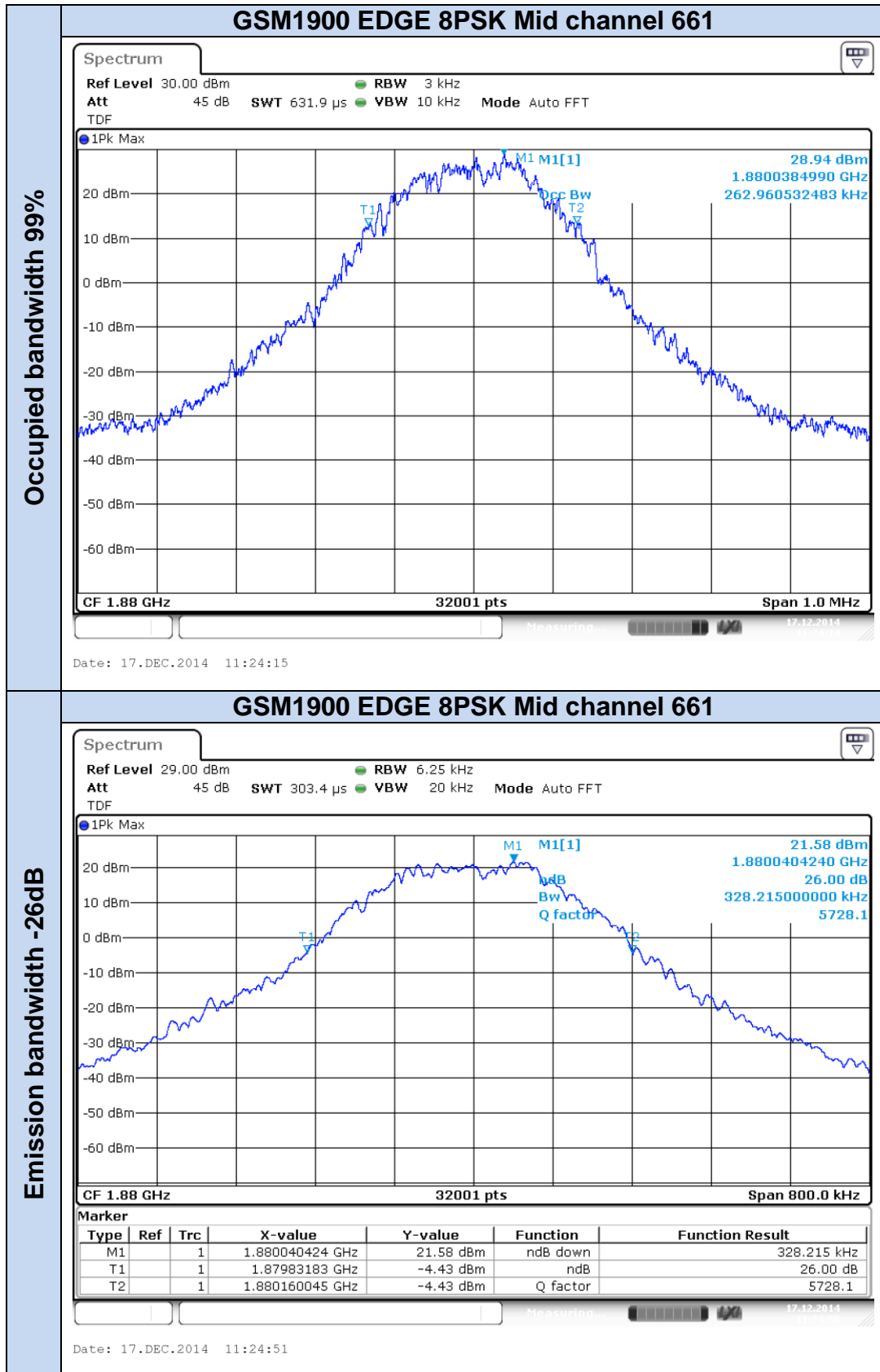
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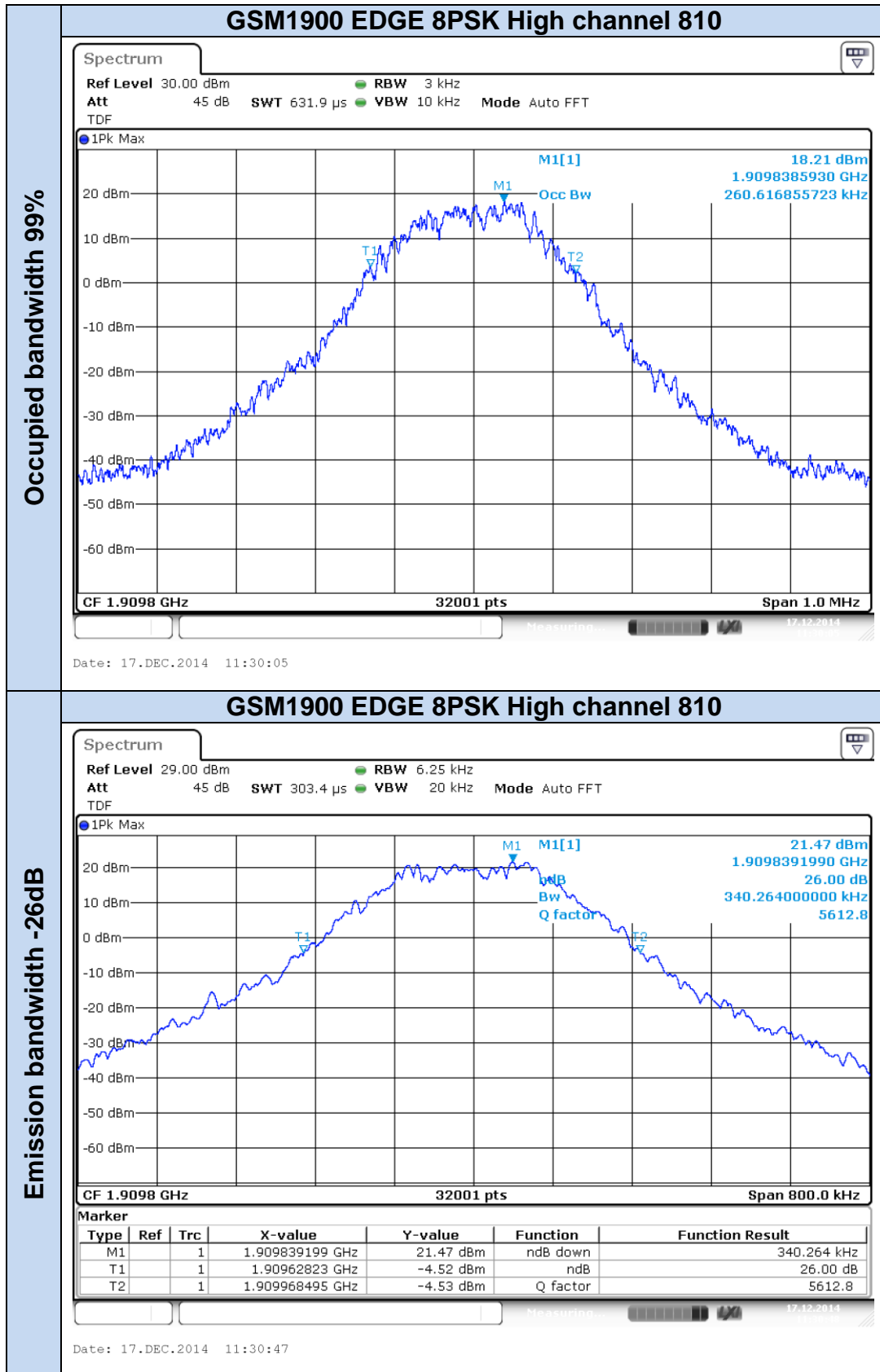




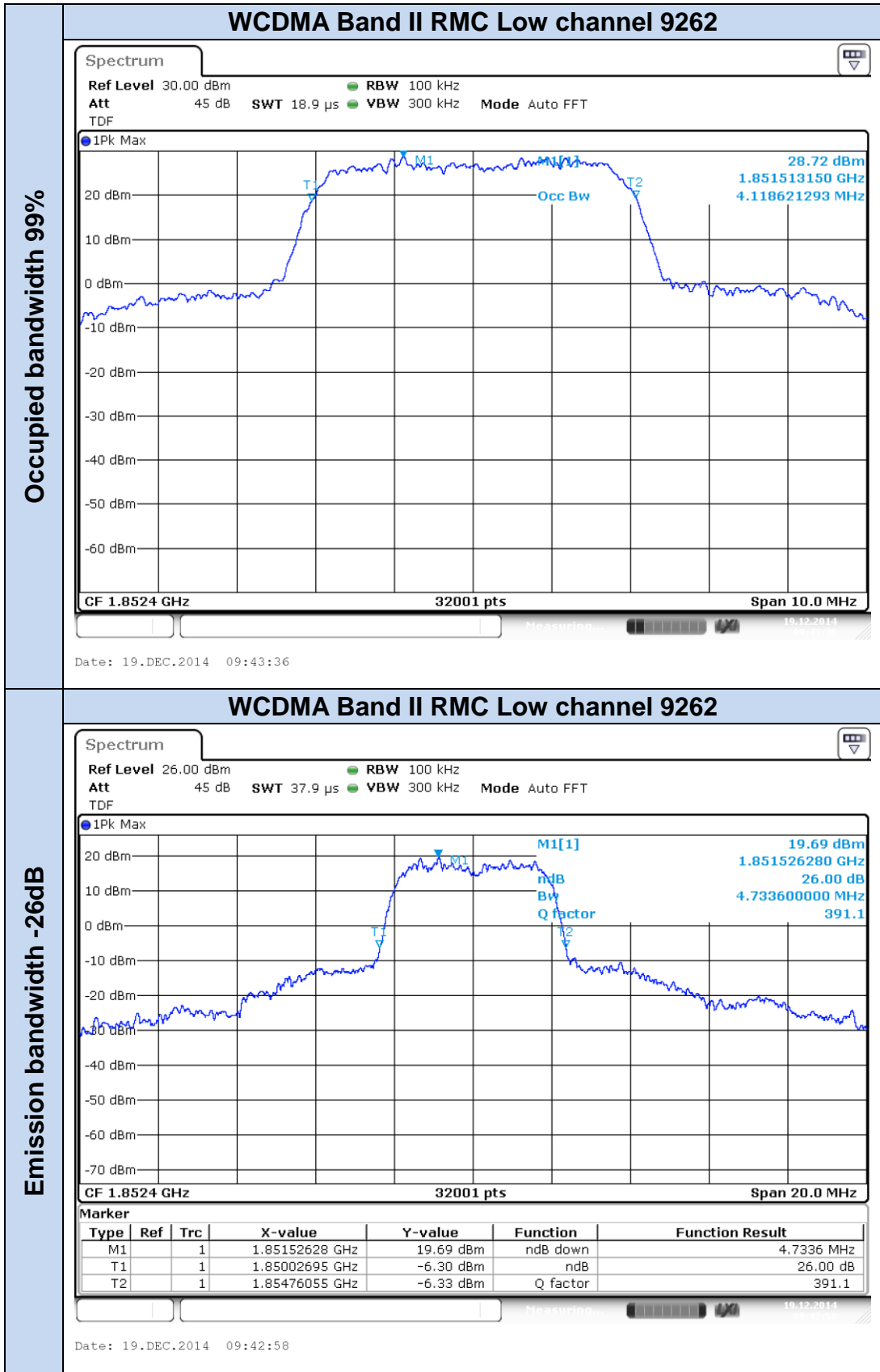


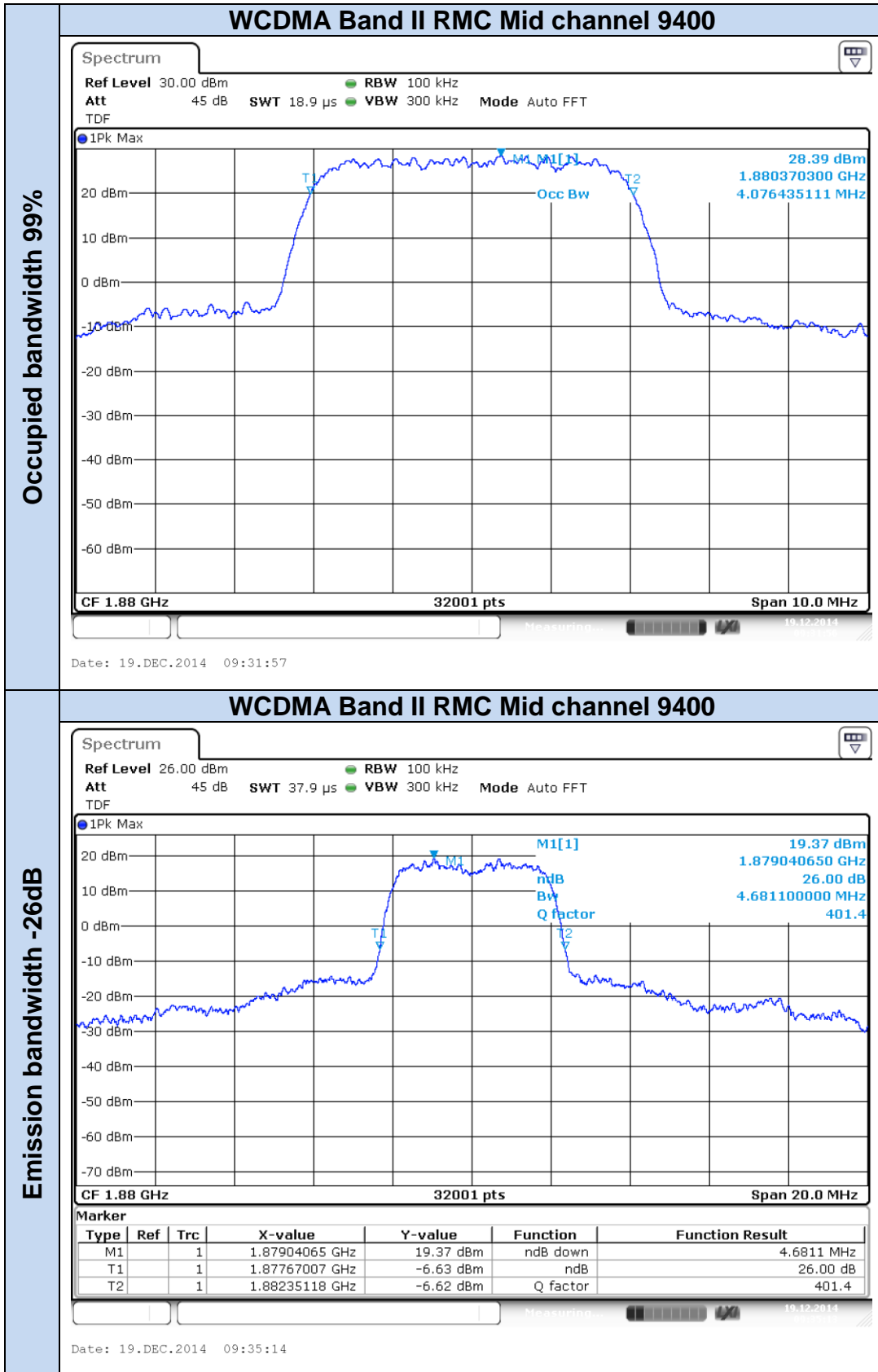


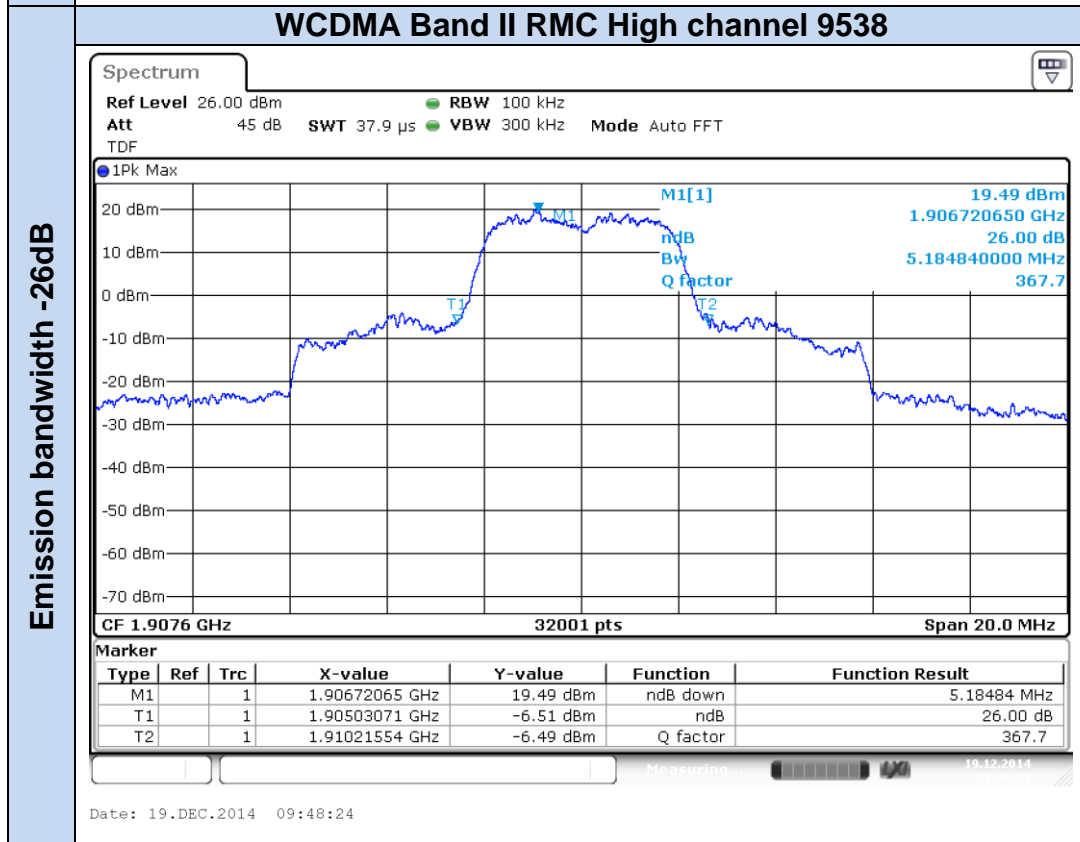
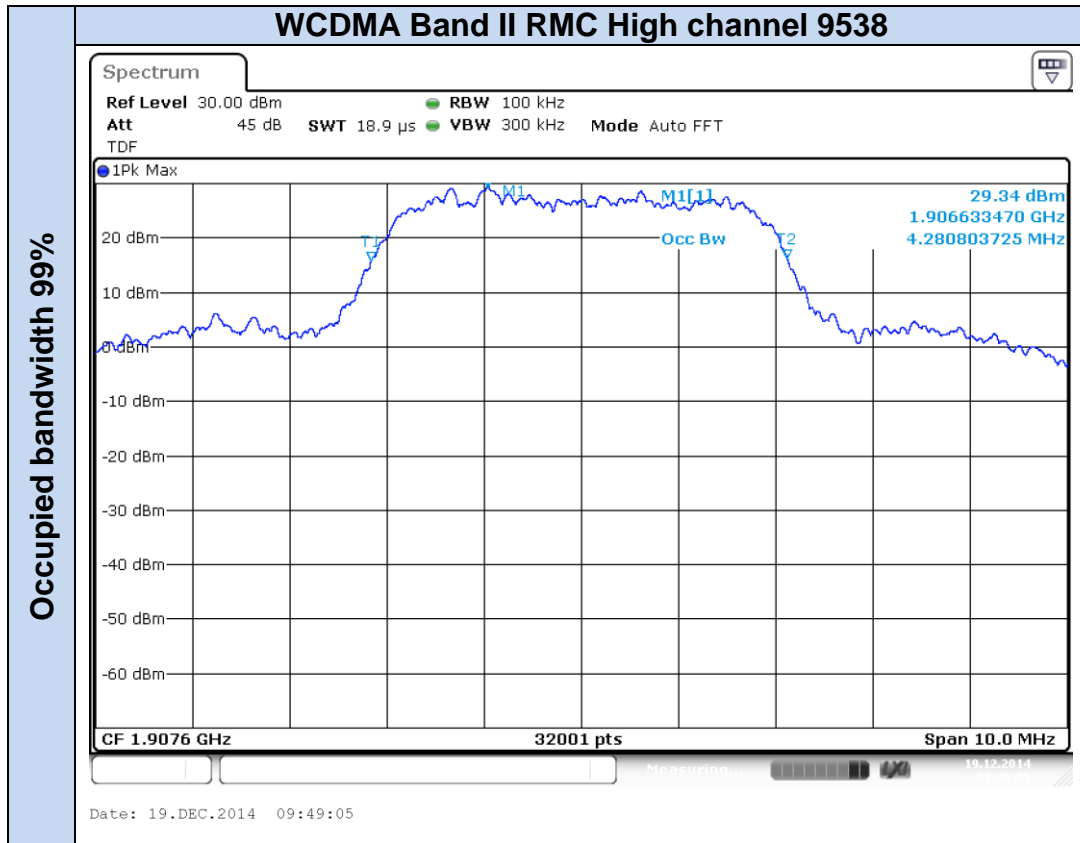


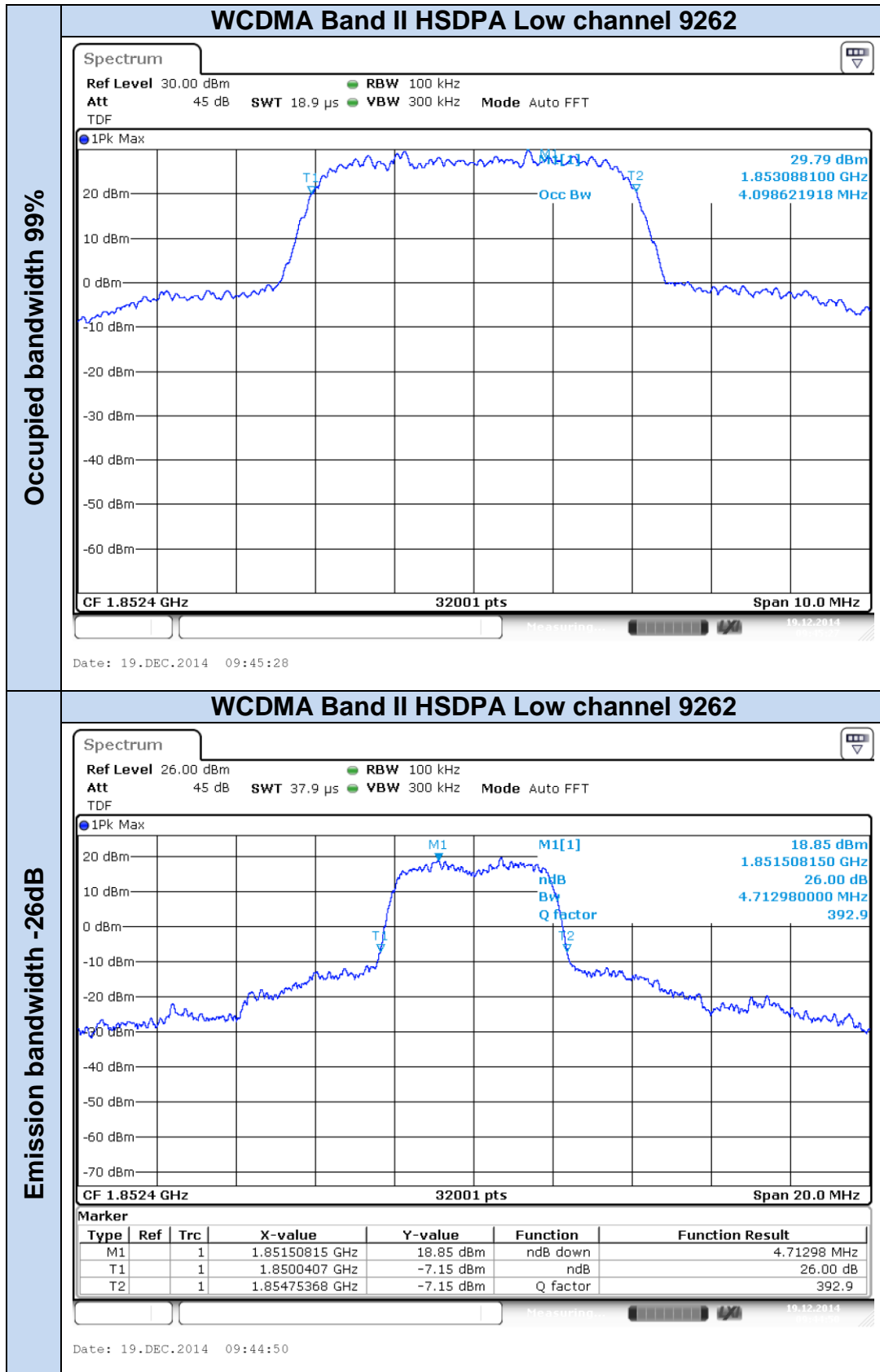


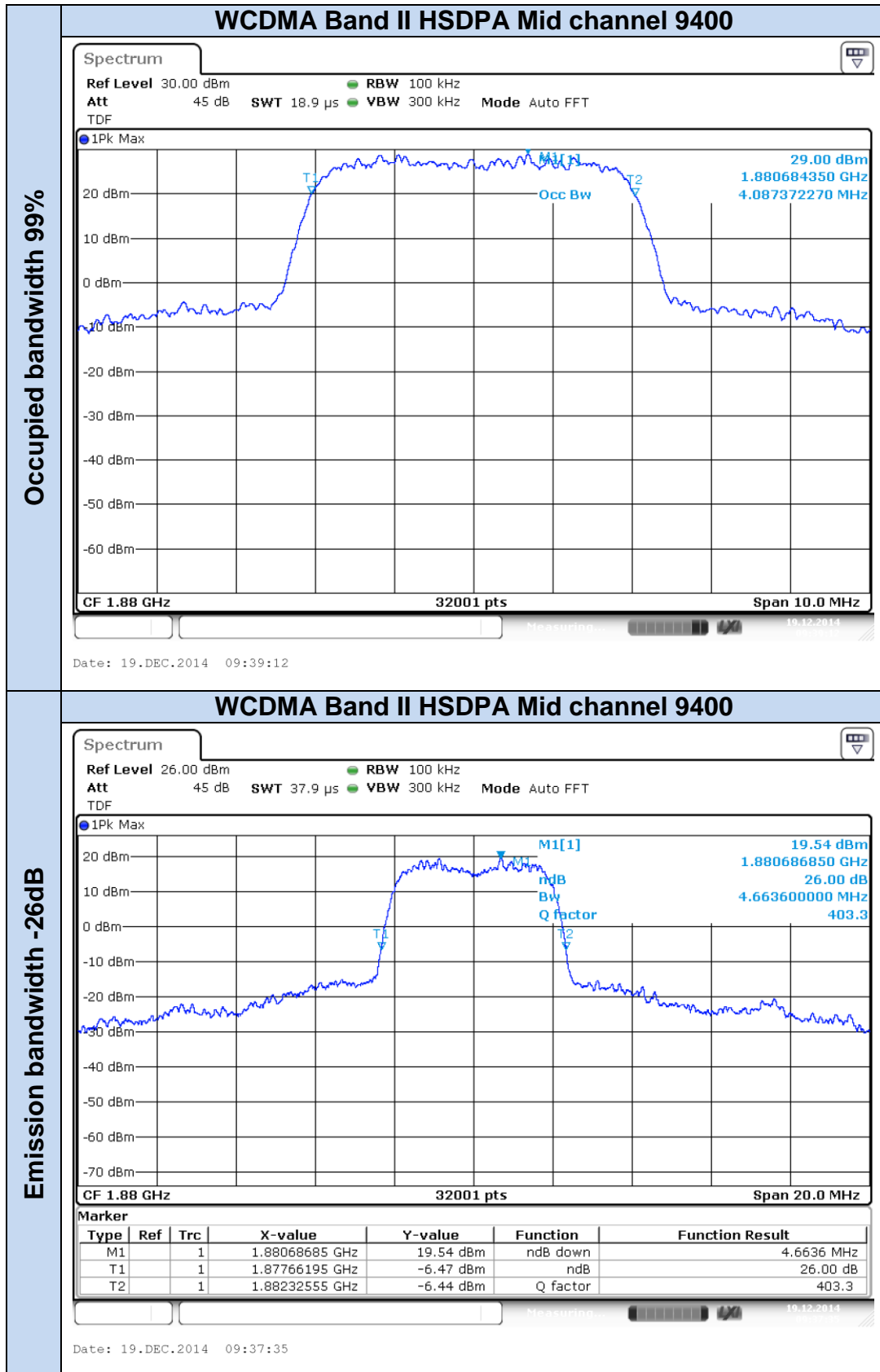
WCDMA Band II

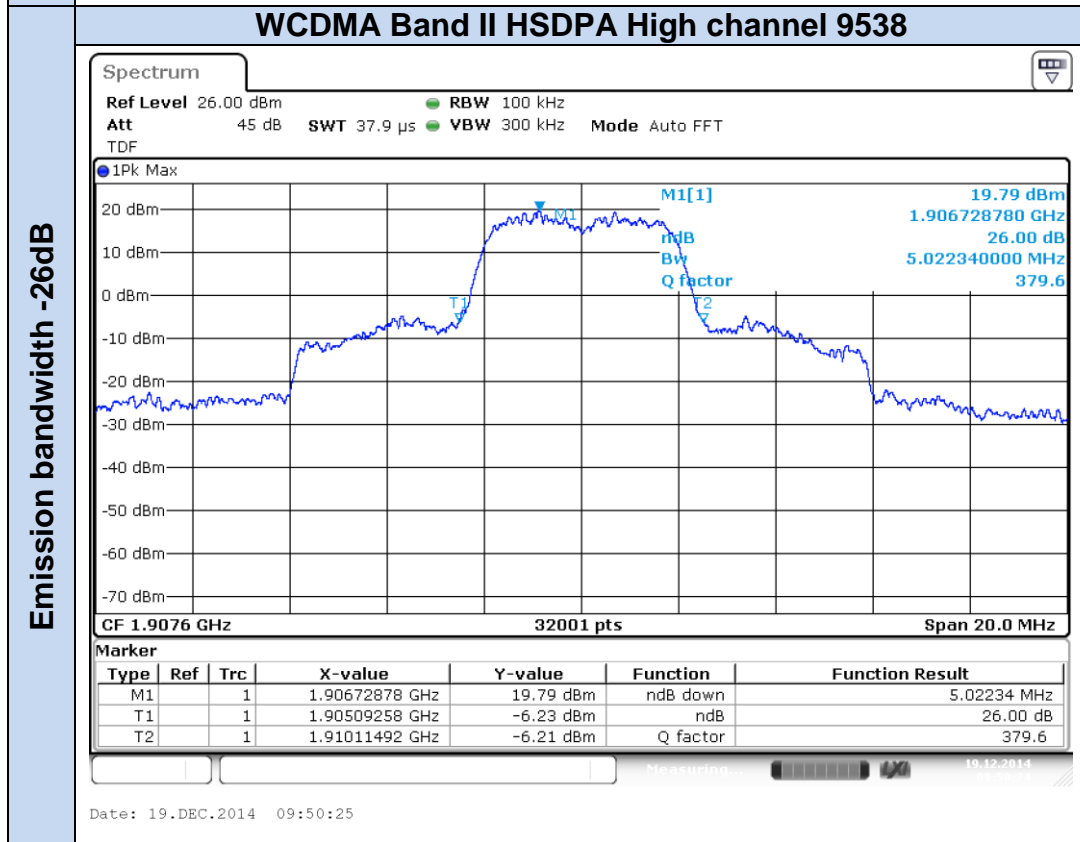
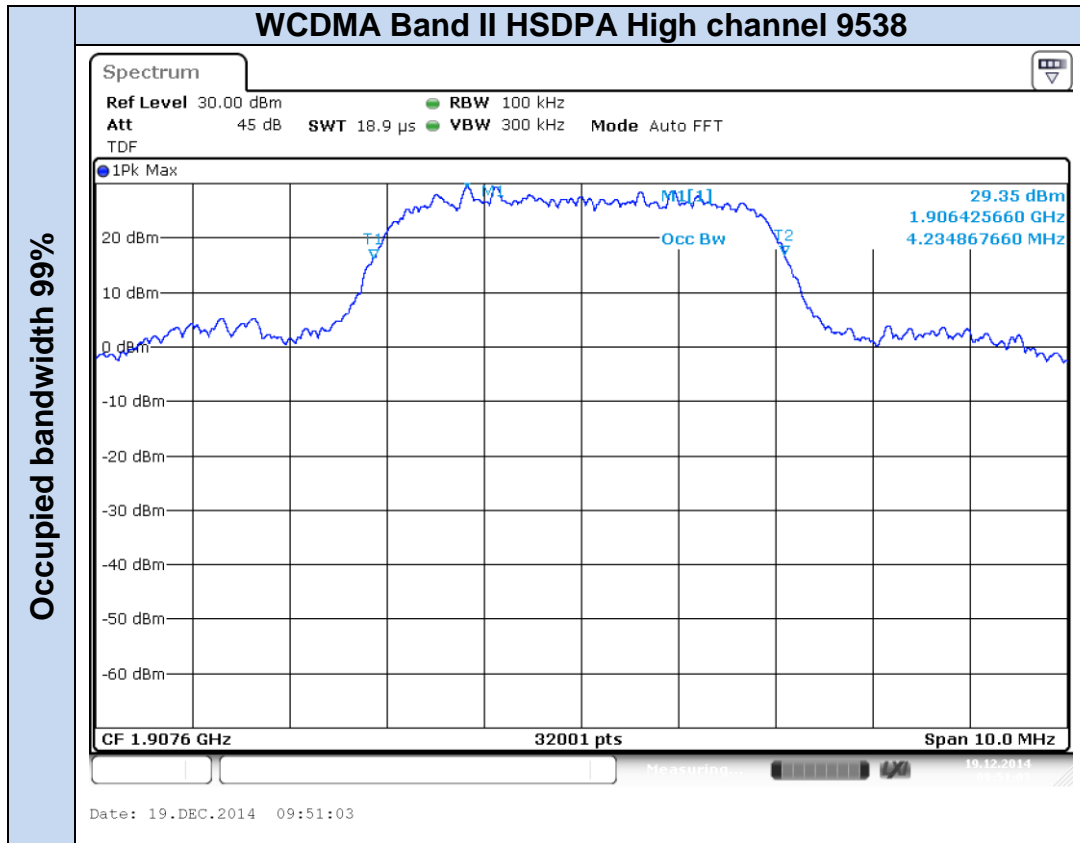


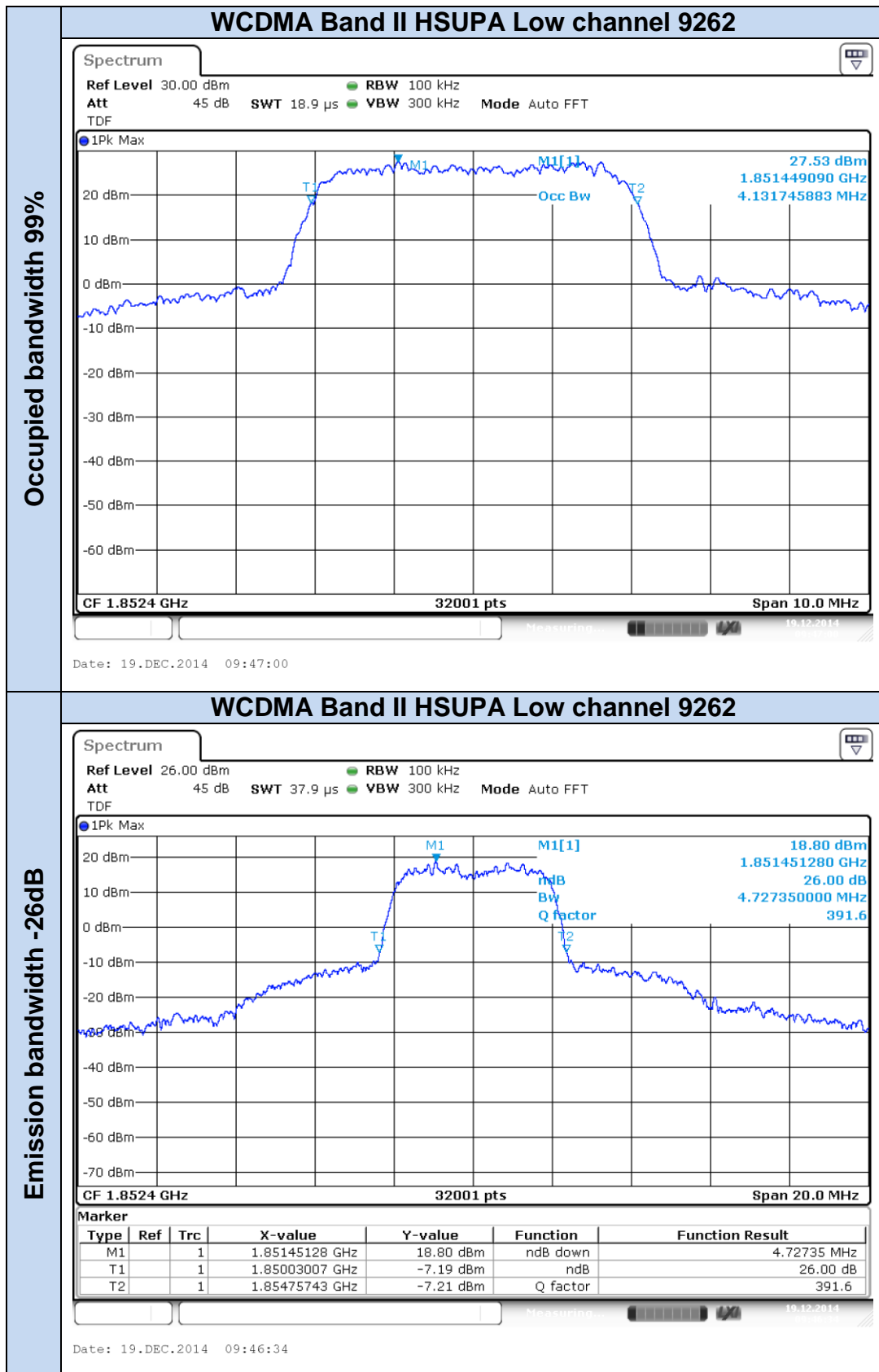


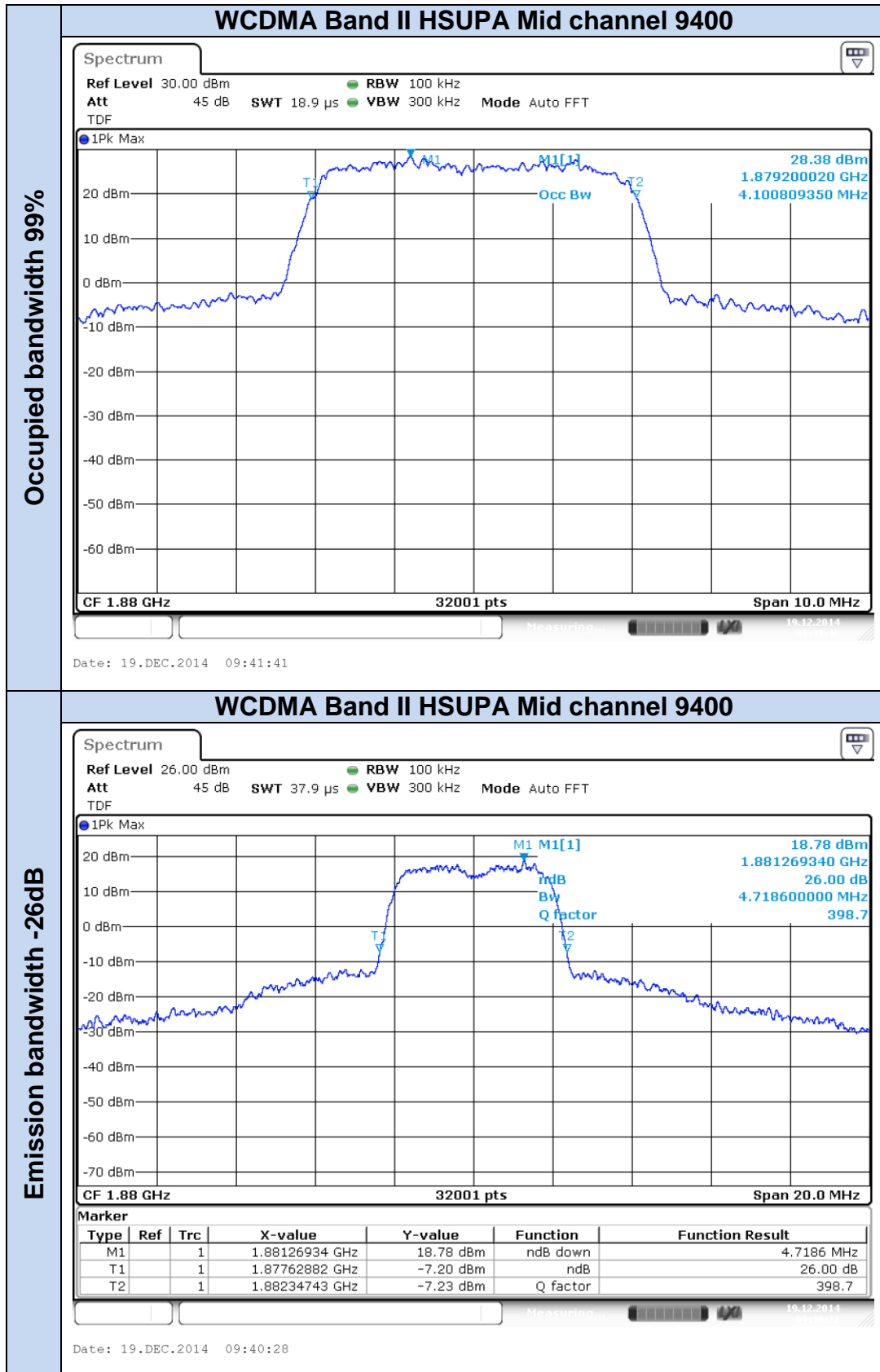


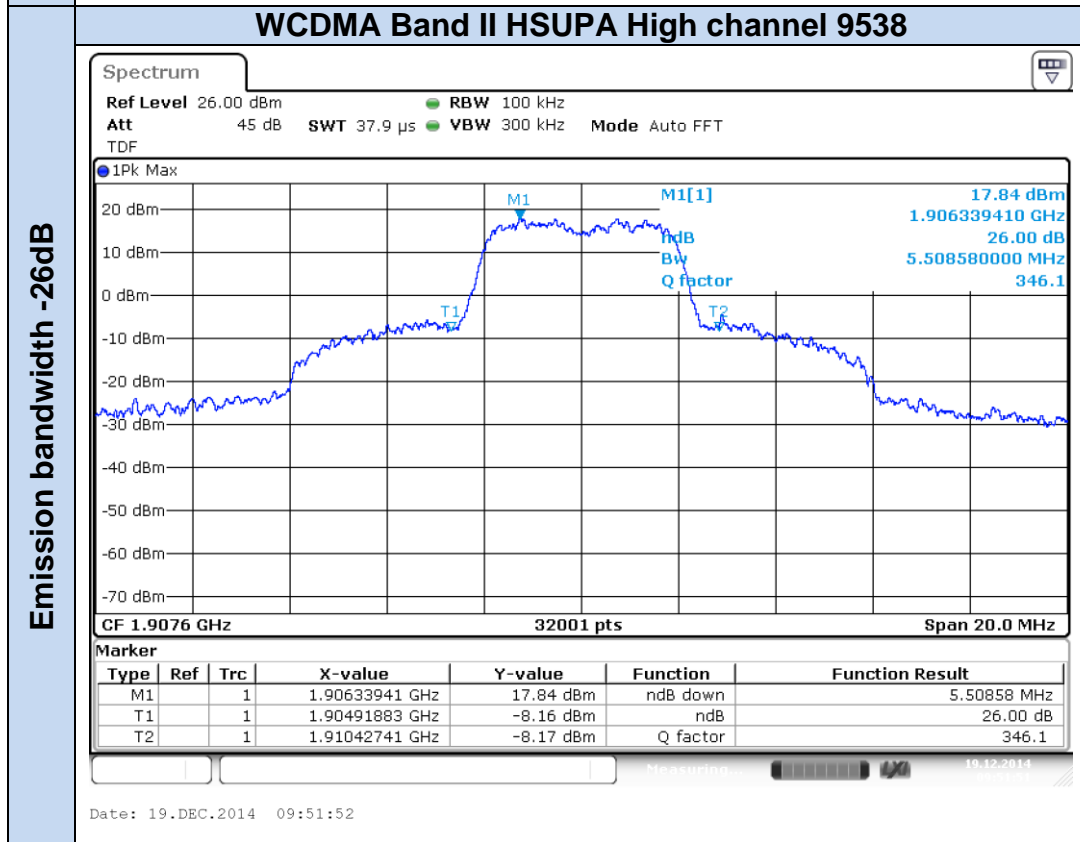
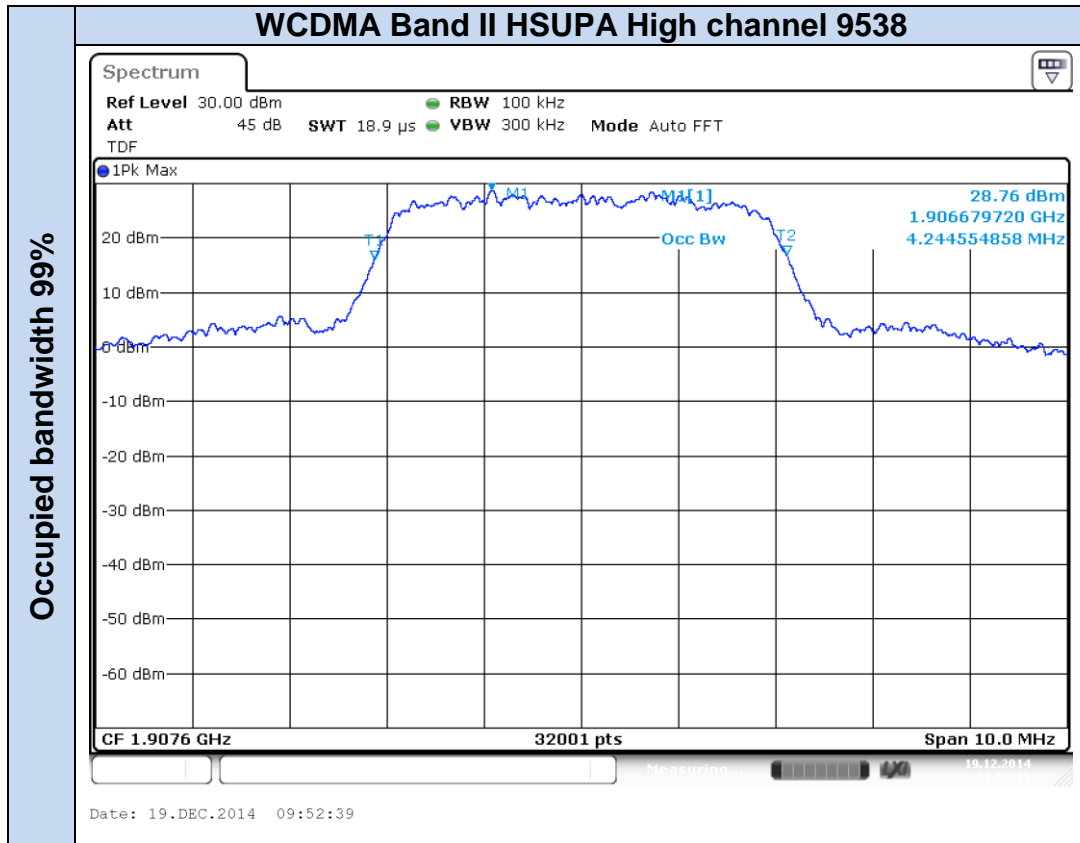












WCDMA Band IV

