TEST REPORT

No.24T04N003078-002-RF GSM

for

Realme Chongqing Mobile Telecommunications Corp., Ltd.

Mobile Phone

Model Name: RMX5085

FCC ID: 2AUYFRMX5085

with

Hardware Version: 11

Software Version: realme UI 6.0

Issued Date: 2025-03-27

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04N003078-002-RF GSM	Rev.0	1st edition	2025-03-27

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1. SUMMARY OF TEST REPORT

1.1. Test Items

Description	Mobile Phone
Model Name	RMX5085
Brand Name	realme
Applicant's name	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Manufacturer's Name	Realme Chongqing Mobile Telecommunications Corp., Ltd.

1.2. Test Standards

FCC Part 2/22/24	10-1-23 Edition
ANSI C63.26	2015
KDB971168 D01	v03r01

1.3. Test Result

All test items are passed. Please refer to "6 Summary of Test Results" for detail.

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000

1.5. Project Data

Testing Start Date: 2025-01-23 Testing End Date: 2025-03-18

1.6. Signature

Wang Ping
(Prepared this test report)

Huang Qiuqin
(Reviewed this test report)

Zhang Hao
(Approved this test report)

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2. CLIENT INFORMATION

2.1. Applicant Information

Company Name:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address /Post:	No.178 Yulong Avenue,Yufengshan,Yubei District,Chongqing,China
Contact Person:	HuangMinJiang
Contact Email	mega@realme.com
Telephone:	(86)18502096102
Fax:	/

2.2. Manufacturer Information

Company Name:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address /Post:	No.178 Yulong Avenue,Yufengshan,Yubei District,Chongqing,China
Contact Person:	HuangMinJiang
Contact Email	mega@realme.com
Telephone:	(86)18502096102
Fax:	/

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3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)

3.1. About EUT

Description	Mobile Phone
Model Name	RMX5085
FCC ID	2AUYFRMX5085
Frequency Bands	GSM 850/PCS 1900
Antenna	PIFA
Extreme vol. Limits	6.80V to 9.00V (nominal: 7.66V)
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of SAICT.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT13aa	869033070021234	11	realme UI 6.0	2025-01-23
UT07aa	869033070020574	11	realme UI 6.0	2025-01-23

UT13aa are used for conduction test, UT07aa is used for radiation test.

3.3. Internal Identification of AE

AE ID*	Description
AE1	Battery
AE2	Charger
AE3	USB Cable
AE4	RF Cable

*AE ID: is used to identify the test sample in the lab internally.

AE: ancillary equipment

3.4. General Description

The Equipment Under Test (EUT) is a model RMX5085 with PIFA antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the Client.

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4. REFERENCE DOCUMENTS

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-23 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-23 Edition
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-23 Edition
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB971168 D01	Power Meas License Digital Systems	v03r01

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5. LABORATORY ENVIRONMENT

Shielded room did not exceed following limits along the RF testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz>60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

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6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured

GSM850

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/22.913	A.1	P
2	Field Strength of Spurious Radiation	2.1053/22.917	A.2	P
3	Frequency Stability	2.1055/22.355	A.3	P
4	Occupied Bandwidth	2.1049/22.917	A.4	P
5	Emission Bandwidth	2.1049/22.917	A.5	P
6	Band Edge Compliance	2.1051/22.917	A.6	P
7	Conducted Spurious Emission	2.1051/22.917	A.7	P
8	Peak-to-Average Power Ratio	KDB971168 D01	A.8	P

PCS1900

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/24.232	A.1	P
2	Field Strength of Spurious Radiation	2.1053/24.238	A.2	P
3	Frequency Stability	2.1055/24.235	A.3	P
4	Occupied Bandwidth	2.1049/24.238	A.4	P
5	Emission Bandwidth	2.1049/24.238	A.5	P
6	Band Edge Compliance	2.1051/24.238	A.6	P
7	Conducted Spurious Emission	2.1051/24.238	A.7	P
8	Peak-to-Average Power Ratio	24.232/KDB971168 D01	A.8	P

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7. STATEMENT

Since the information of samples in this report is provided by the client, the laboratory is not responsible for the authenticity of sample information.

This report takes measured values as criterion of test conclusion. The test conclusion meets the limit requirements.

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8. TEST EQUIPMENTS UTILIZED

No.	Description	Type	Manufacture	Series Number	Cal Due Date
1	Test Receiver	ESR7	R&S	101676	2025-11-21
2	Hybrid antenna	VULB 9163	Schwarzbeck	330	2027-04-21
3	Horn Antenna	3117	ETS-Lindgren	00066577	2025-04-17
4	Horn Antenna	QSH-SL-18-26-S-20	Q-par	17013	2026-02-01
5	Antenna	BBHA 9120D	Schwarzbeck	1593	2025-10-24
6	Antenna	QWH-SL-18-40-K-SG	Q-par	15979	2026-01-30
7	preamplifier	83017A	Agilent	MY39501110	/
8	Signal Generator	SMB100A	R&S	179725	2025-11-21
9	Fully Anechoic Chamber	FACT3-2.0	ETS-Lindgren	1285	2025-05-28
10	Spectrum Analyzer	FSV40	R&S	101192	2026-01-09
11	Universal Radio Communication Tester	CMU200	R&S	114545	2025-03-18
12	Universal Radio Communication Tester	CMW500	R&S	168719	2025-03-22
13	Power Supply	HMC8042	R&S	103284	2025-05-07
14	Universal Radio Communication Tester	CMW500	R&S	129146	2025-04-10
15	Spectrum Analyzer	FSW26	R&S	102197	2025-05-07
16	Temperature Chamber	SH-241	ESPEC	92007516	2025-05-07

Test software

Item	Name	Version
Radiated	EMC32	V10.50.40

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ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

A.1.1 Summary

During the process of testing, the EUT was controlled via Communication tester to ensure max power transmission and proper modulation.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each band.

GSM850

Measurement result

GSM(GMSK)

Frequency(MHz)	Output power(dBm)
824.2	32.78
836.6	32.42
848.8	32.45

GPRS(GMSK,1Slot)

Frequency(MHz)	Output power(dBm)
824.2	32.76
836.6	32.37
848.8	32.36

EGPRS(8PSK,1Slot)

Frequency(MHz)	Output power(dBm)
824.2	26.89
836.6	26.42
848.8	26.64

Note: Expanded measurement uncertainty is U = 0.49dB, k = 1.96

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PCS1900

Measurement result

GSM(GMSK)

Frequency(MHz)	Output power(dBm)
1850.2	29.98
1880.0	29.93
1909.8	29.78

GPRS(GMSK,1Slot)

Frequency(MHz)	Output power(dBm)
1850.2	30.07
1880.0	29.99
1909.8	29.82

EGPRS(8PSK,1Slot)

Frequency(MHz)	Output power(dBm)
1850.2	25.37
1880.0	25.46
1909.8	25.53

Note: Expanded measurement uncertainty is U = 0.49dB, k = 1.96

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A.1.3 Radiated

A.1.3.1 Description

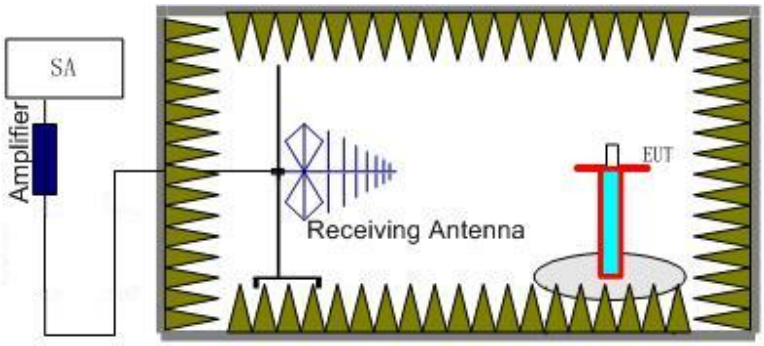
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

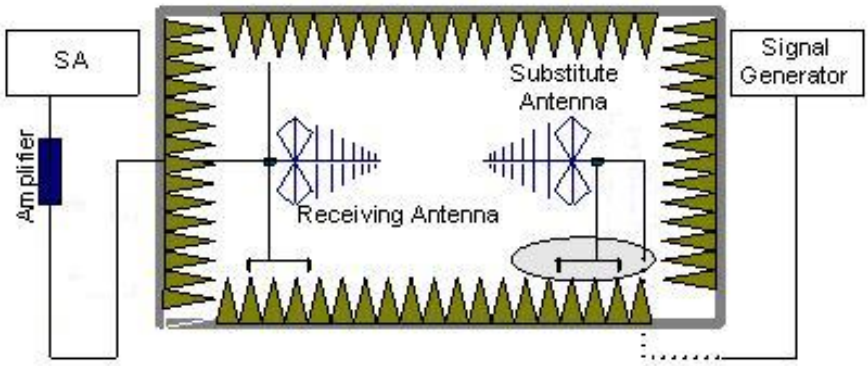
Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

A.1.3.2 Method of Measurement

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the

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receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.
   The cable loss (P_{cl}) ,the Substitution Antenna Gain(dBi) (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dB.

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GSM 850-ERP 22.913(a)

Limits

	Power Step	Burst Peak ERP (dBm)
GSM	5	≤38.45dBm (7W)
GPRS	3	≤38.45dBm (7W)
EGPRS	6	≤38.45dBm (7W)

Measurement result

Upper antenna

GSM 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
824.20	-4.24	-33.60	-0.79	2.15	26.42	38.45	V
836.60	-3.47	-33.50	-0.74	2.15	27.14	38.45	V
848.80	-2.73	-33.50	-0.73	2.15	27.89	38.45	V

GPRS 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
824.20	-5.44	-33.60	-0.79	2.15	25.21	38.45	V
836.60	-4.87	-33.50	-0.74	2.15	25.74	38.45	V
848.80	-4.27	-33.50	-0.73	2.15	26.34	38.45	V

EGPRS-8PSK 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
824.20	-9.33	-33.60	-0.79	2.15	21.32	38.45	V
836.60	-8.98	-33.50	-0.74	2.15	21.64	38.45	V
848.80	-8.57	-33.50	-0.73	2.15	22.04	38.45	V

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Lower antenna

GSM 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
824.20	-4.30	-33.60	-0.79	2.15	26.36	38.45	V
836.60	-3.89	-33.50	-0.74	2.15	26.72	38.45	V
848.80	-3.27	-33.50	-0.73	2.15	27.35	38.45	V

GPRS 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
824.20	-5.38	-33.60	-0.79	2.15	25.28	38.45	V
836.60	-4.91	-33.50	-0.74	2.15	25.70	38.45	V
848.80	-4.31	-33.50	-0.73	2.15	26.31	38.45	V

EGPRS-8PSK 850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
824.20	-9.42	-33.60	-0.79	2.15	21.24	38.45	V
836.60	-8.93	-33.50	-0.74	2.15	21.68	38.45	V
848.80	-8.29	-33.50	-0.73	2.15	22.33	38.45	V

ANALYZER SETTINGS: RBW = VBW = 3MHz

Note: The maximum value of expanded measurement uncertainty for this test item is U = 2.87dB(30MHz-3GHz)/3.35dB(3GHz-18GHz)/2.68dB(18GHz-40GHz), k = 2

Note: Both of Vertical and Horizontal polarizations are evaluated, but only the worst case is recorded in this report.

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PCS1900-EIRP 24.232(c)

Limits

	Power Step	Burst Peak EIRP (dBm)
GSM	0	≤33dBm (2W)
GPRS	3	≤33dBm (2W)
EGPRS	5	≤33dBm (2W)

Measurement result

Upper antenna

GSM 1900

Frequency (MHz)	Pmea (dBm)	Pcl(dB)+ PAg(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit(dBm)	Polarization
1850.20	-8.90	-29.30	8.10	26.35	33.00	V
1880.00	-9.57	-29.40	8.10	25.78	33.00	V
1909.80	-9.02	-29.30	8.10	26.23	33.00	V

GPRS 1900

Frequency (MHz)	Pmea (dBm)	Pcl(dB)+ PAg(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit(dBm)	Polarization
1850.20	-13.58	-29.40	8.10	21.77	33.00	V
1880.00	-13.85	-29.30	8.10	21.40	33.00	V
1909.80	-13.51	-29.30	8.10	21.74	33.00	V

EGPRS-8PSK 1900

Frequency (MHz)	Pmea (dBm)	Pcl(dB)+ PAg(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit(dBm)	Polarization
1850.20	-17.47	-29.40	8.10	17.88	33.00	V
1880.00	-18.05	-29.30	8.10	17.20	33.00	V
1909.80	-17.69	-29.30	8.10	17.56	33.00	V

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Lower antenna

GSM 1900

Frequency (MHz)	Pmea (dBm)	Pcl(dB)+ PAg(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit(dBm)	Polarization
1850.20	-10.53	-29.30	8.10	24.72	33.00	V
1880.00	-10.34	-29.40	8.10	25.01	33.00	V
1909.80	-9.91	-29.30	8.10	25.34	33.00	V

GPRS 1900

Frequency (MHz)	Pmea (dBm)	Pcl(dB)+ PAg(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit(dBm)	Polarization
1850.20	-14.20	-29.40	8.10	21.15	33.00	V
1880.00	-13.76	-29.30	8.10	21.49	33.00	V
1909.80	-13.57	-29.30	8.10	21.68	33.00	V

EGPRS-8PSK 1900

Frequency (MHz)	Pmea (dBm)	Pcl(dB)+ PAg(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit(dBm)	Polarization
1850.20	-18.04	-29.40	8.10	17.31	33.00	V
1880.00	-17.61	-29.30	8.10	17.64	33.00	V
1909.80	-17.35	-29.30	8.10	17.90	33.00	V

ANALYZER SETTINGS: RBW = VBW = 3MHz

Note: The maximum value of expanded measurement uncertainty for this test item is U = 2.87dB(30MHz-3GHz)/3.35dB(3GHz-18GHz)/2.68dB(18GHz-40GHz), k = 2

Note: Both of Vertical and Horizontal polarizations are evaluated, but only the worst case is recorded in this report.

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A.2 FIELD STRENGTH OF SPURIOUS RADIATION

Reference

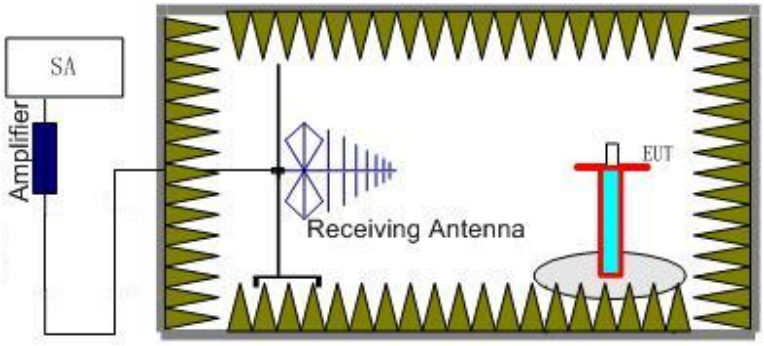
FCC: CFR 2.1053, 22.917, 24.238.

A.2.1 Measurement Method

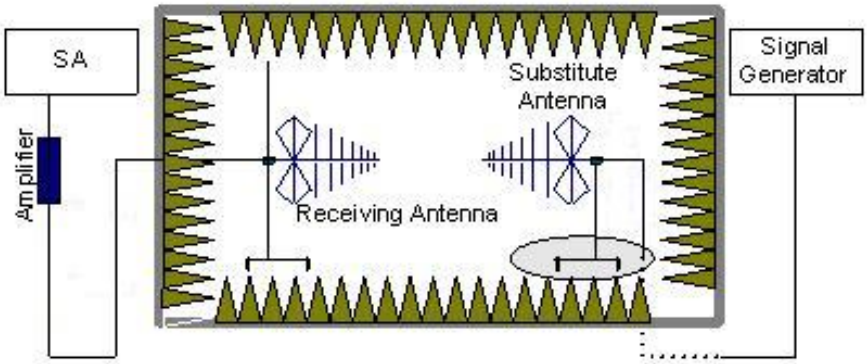
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910MHz. The resolution bandwidth is set 1MHz as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere

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with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain(dBi) (G_a) should be recorded after test.
   A amplifier should be connected in for the test.
   The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea} - P_{pl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dB.

A.2.2 Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 ,GSM850 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

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A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
GSM 850MHz	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
GSM 1900MHz	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
850MHz	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
1900MHz	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

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Upper antenna

GSM Mode Channel 128/824.2MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8735.50	-49.24	2.00	12.00	-41.39	-13.00	H
9152.00	-48.36	2.10	11.60	-41.01	-13.00	H
9224.00	-48.03	2.10	11.60	-40.68	-13.00	H
9299.50	-47.51	2.00	11.60	-40.06	-13.00	H
9365.50	-48.80	2.00	11.60	-41.35	-13.00	V
9476.50	-47.33	2.10	11.60	-39.98	-13.00	H

GSM Mode Channel 190/836.6MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8423.50	-48.96	1.80	11.30	-41.61	-13.00	H
9111.00	-48.92	2.10	11.60	-41.57	-13.00	H
9226.00	-46.48	2.10	11.60	-39.13	-13.00	H
9294.50	-48.26	2.00	11.60	-40.81	-13.00	H
9424.00	-48.50	2.10	11.60	-41.15	-13.00	H
9478.50	-48.48	2.10	11.60	-41.13	-13.00	V

GSM Mode Channel 251/848.8MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
7234.50	-49.63	1.80	12.00	-41.58	-13.00	H
9097.00	-48.96	2.20	11.60	-41.71	-13.00	H
9110.50	-48.58	2.10	11.60	-41.23	-13.00	H
9221.50	-47.79	2.10	11.60	-40.44	-13.00	H
9295.50	-47.66	2.00	11.60	-40.21	-13.00	V
9475.50	-48.28	2.10	11.60	-40.93	-13.00	H

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GSM Mode Channel 512/1850.2MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
17010.00	-40.22	2.90	14.50	-28.62	-13.00	H
17161.88	-41.31	2.90	14.50	-29.71	-13.00	H
17277.50	-39.86	3.20	14.50	-28.56	-13.00	H
17408.13	-38.86	2.90	14.50	-27.26	-13.00	H
17593.75	-37.08	3.30	12.80	-27.58	-13.00	H
17836.88	-37.77	3.60	12.80	-28.57	-13.00	H

GSM Mode Channel 661/1880.0MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16950.63	-42.29	2.90	16.50	-28.69	-13.00	H
17169.38	-40.75	2.90	14.50	-29.15	-13.00	H
17325.63	-40.28	3.20	14.50	-28.98	-13.00	H
17511.88	-37.17	2.90	12.80	-27.27	-13.00	H
17575.63	-36.50	3.30	12.80	-27.00	-13.00	H
17829.38	-37.54	3.60	12.80	-28.34	-13.00	H

GSM Mode Channel 810/1909.8MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16943.75	-42.35	2.90	16.50	-28.75	-13.00	H
17163.75	-41.10	2.90	14.50	-29.50	-13.00	H
17223.75	-39.97	3.20	14.50	-28.67	-13.00	H
17458.13	-38.98	2.90	14.50	-27.38	-13.00	H
17576.25	-36.20	3.30	12.80	-26.70	-13.00	H
17839.38	-36.61	3.60	12.80	-27.41	-13.00	H

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Lower antenna

GSM Mode Channel 128/824.2MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
9094.00	-48.75	2.20	11.60	-41.50	-13.00	H
9226.50	-47.62	2.10	11.60	-40.27	-13.00	H
9296.00	-47.66	2.00	11.60	-40.21	-13.00	H
9425.00	-48.33	2.10	11.60	-40.98	-13.00	H
9475.50	-48.21	2.10	11.60	-40.86	-13.00	H
9652.50	-48.41	2.10	11.20	-41.46	-13.00	V

GSM Mode Channel 190/836.6MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
9105.50	-47.22	2.20	11.60	-39.97	-13.00	H
9221.50	-47.11	2.10	11.60	-39.76	-13.00	H
9301.50	-46.69	2.00	11.60	-39.24	-13.00	H
9428.00	-47.78	2.10	11.60	-40.43	-13.00	H
9473.50	-48.06	2.10	11.60	-40.71	-13.00	H
9598.00	-48.22	2.10	11.20	-41.27	-13.00	V

GSM Mode Channel 251/848.8MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8434.50	-48.87	1.80	11.30	-41.52	-13.00	V
9224.00	-48.33	2.10	11.60	-40.98	-13.00	H
9311.50	-47.41	2.00	11.60	-39.96	-13.00	H
9423.50	-48.51	2.10	11.60	-41.16	-13.00	H
9477.00	-48.52	2.10	11.60	-41.17	-13.00	V
9714.50	-47.69	2.20	11.20	-40.84	-13.00	V

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GSM Mode Channel 512/1850.2MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16990.63	-42.10	2.90	16.50	-28.50	-13.00	H
17186.88	-40.43	2.90	14.50	-28.83	-13.00	H
17275.63	-40.65	3.20	14.50	-29.35	-13.00	H
17512.50	-37.45	2.90	12.80	-27.55	-13.00	H
17594.38	-35.91	3.30	12.80	-26.41	-13.00	H
17774.38	-36.74	3.60	12.80	-27.54	-13.00	H

GSM Mode Channel 661/1880.0MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16936.88	-42.21	2.90	16.50	-28.61	-13.00	H
17112.50	-41.25	2.90	14.50	-29.65	-13.00	H
17275.63	-39.34	3.20	14.50	-28.04	-13.00	H
17456.25	-38.98	2.90	14.50	-27.38	-13.00	H
17595.63	-37.20	3.30	12.80	-27.70	-13.00	H
17837.50	-36.83	3.60	12.80	-27.63	-13.00	H

GSM Mode Channel 810/1909.8MHz

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16986.88	-42.45	2.90	16.50	-28.85	-13.00	H
17106.88	-40.72	2.90	14.50	-29.12	-13.00	H
17280.00	-39.58	3.20	14.50	-28.28	-13.00	H
17498.75	-38.33	2.90	14.50	-26.73	-13.00	H
17589.38	-36.65	3.30	12.80	-27.15	-13.00	H
17835.63	-36.79	3.60	12.80	-27.59	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is U = 2.87dB(30MHz-3GHz)/3.35dB(3GHz-18GHz)/2.68dB(18GHz-40GHz), k = 2

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A.3 FREQUENCY STABILITY

A.3.1 Method of Measurement

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as F_L and F_H respectively.

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of CMW500

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on mid channel of each band, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments e-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10℃ increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

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A.3.2 Measurement results

GSM 850

Frequency Error vs Voltage

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	7.66	824.045	848.953		
50				0.00	0.0000
40				-0.90	0.0022
30				-4.91	0.0117
10				-3.36	0.0080
0				2.33	0.0056
-10				0.19	0.0005
-20				-4.23	0.0101
-30				1.94	0.0046

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
6.80	20	824.045	848.953	-0.65	0.0015
9.00				-0.29	0.0007

Expanded measurement uncertainty is 10Hz, *k* = 2

PCS 1900

Frequency Error vs Voltage

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	7.66	1850.053	1909.941		
50				0.32	0.0003
40				-1.78	0.0019
30				1.55	0.0016
10				-1.84	0.0020
0				-0.65	0.0007
-10				1.62	0.0017
-20				-2.78	0.0030
-30				2.49	0.0026

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
6.80	20	1850.053	1909.941	1.32	0.0014
9.00				2.29	0.0024

Expanded measurement uncertainty is 10Hz, *k* = 2

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A.4 OCCUPIED BANDWIDTH

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from ANSI C63.26:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
d) Set the detection mode to peak, and the trace mode to max-hold.

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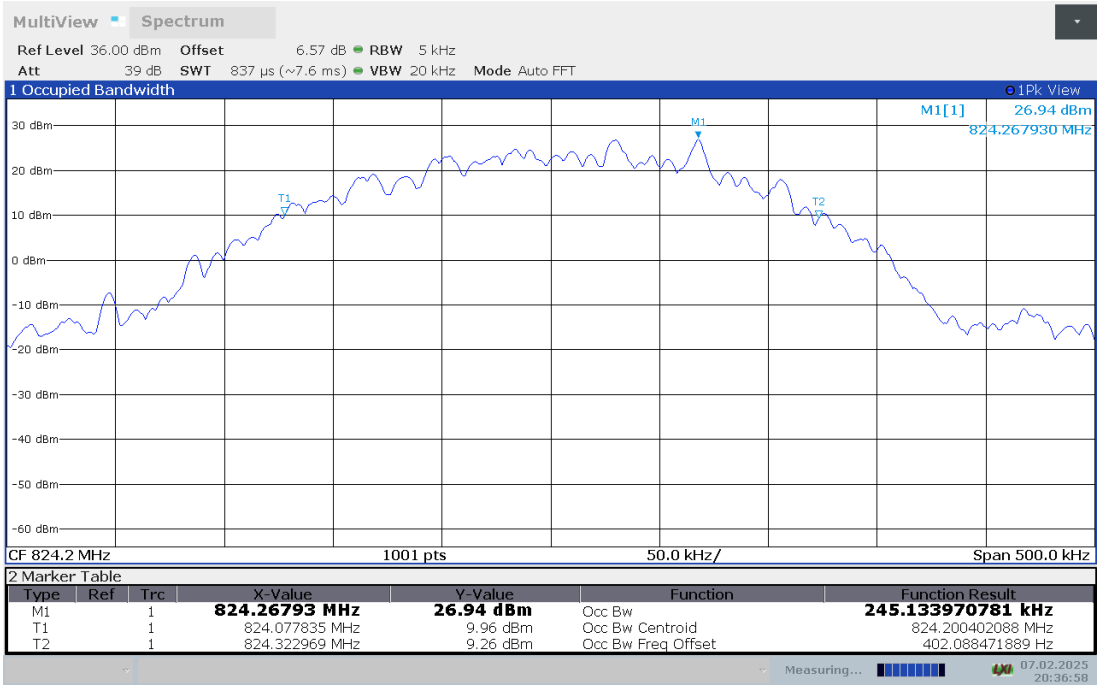
GSM850 (99% OBW)

GSM

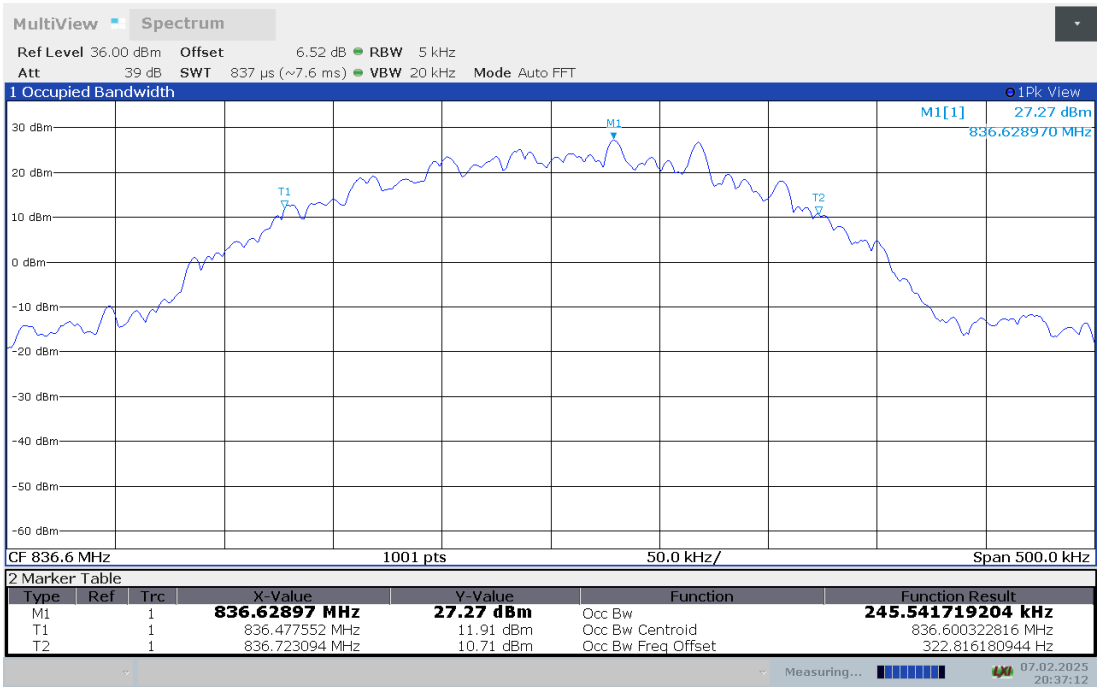
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)
824.2	245.134
836.6	245.542
848.8	245.600

GSM850

Channel 128-Occupied Bandwidth (99% OBW)



Channel 190-Occupied Bandwidth (99% OBW)



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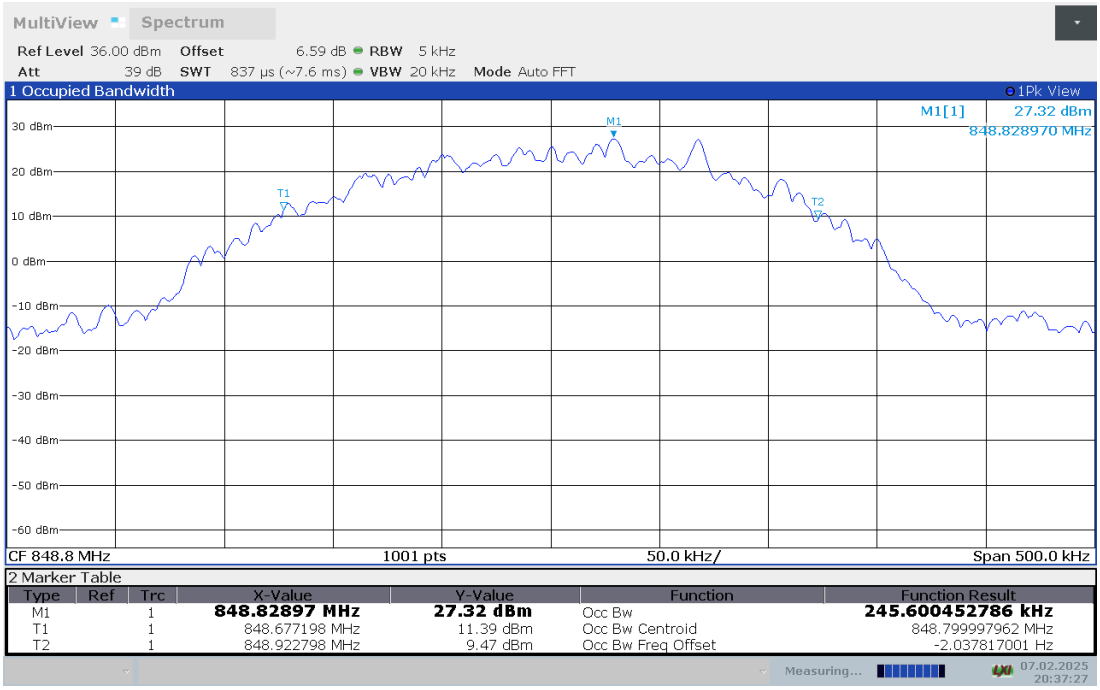
Channel 251-Occupied Bandwidth (99% OBW)



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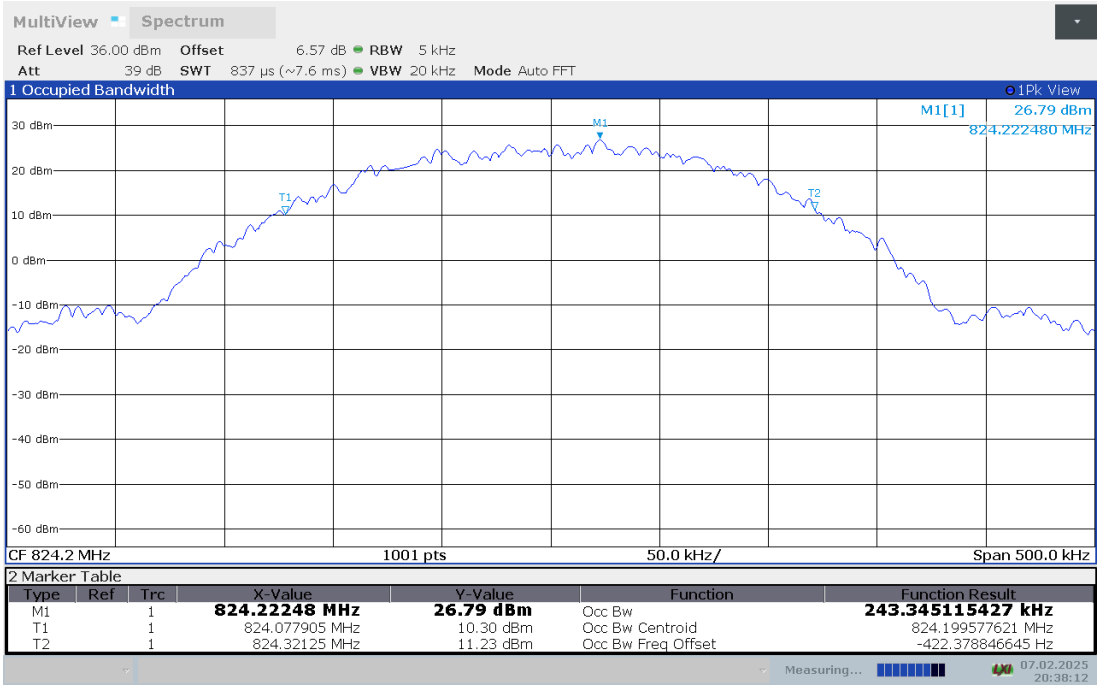
GSM850 (99% OBW)

GPRS

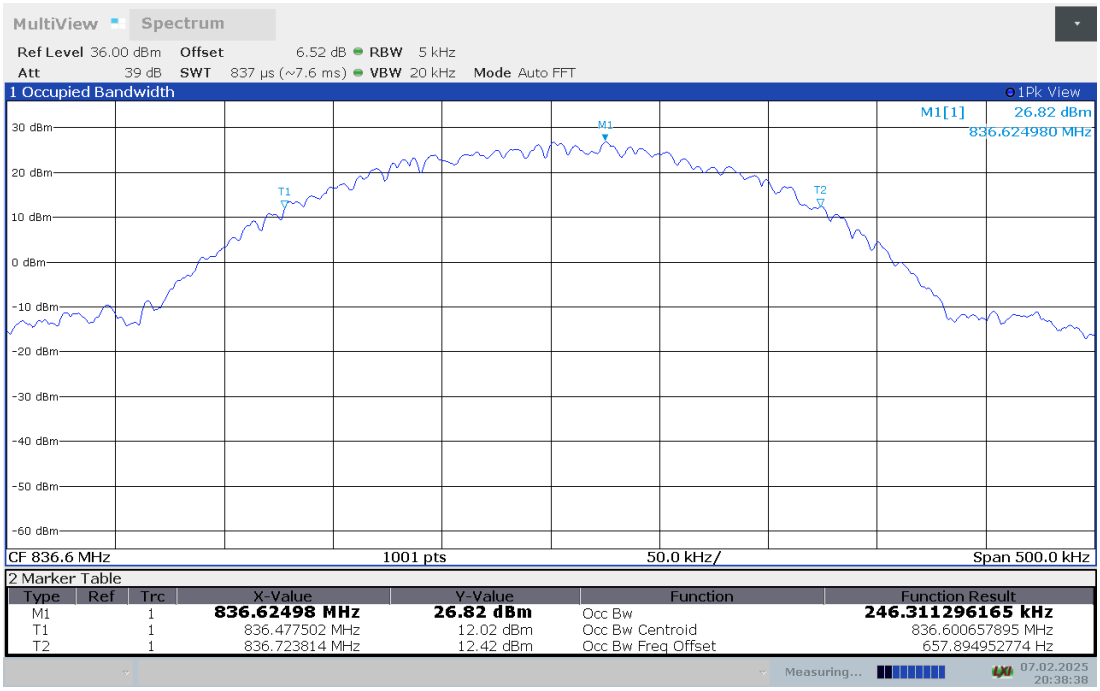
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)
824.2	243.345
836.6	246.311
848.8	246.110

GSM850

Channel 128-Occupied Bandwidth (99% OBW)



Channel 190-Occupied Bandwidth (99% OBW)



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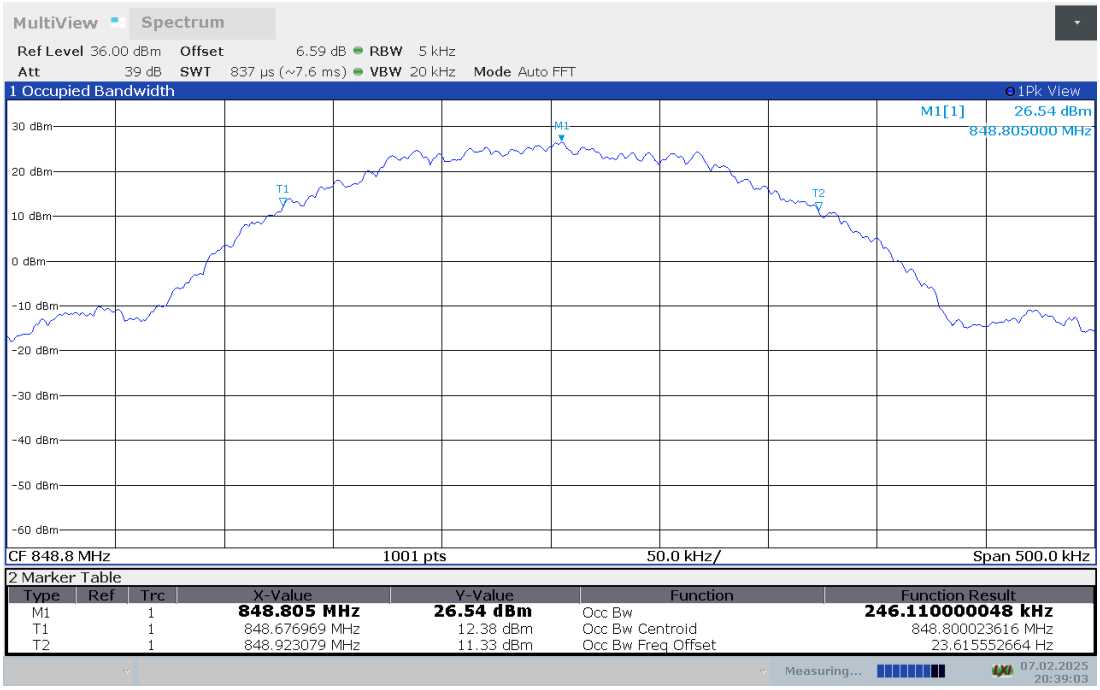
Channel 251-Occupied Bandwidth (99% OBW)



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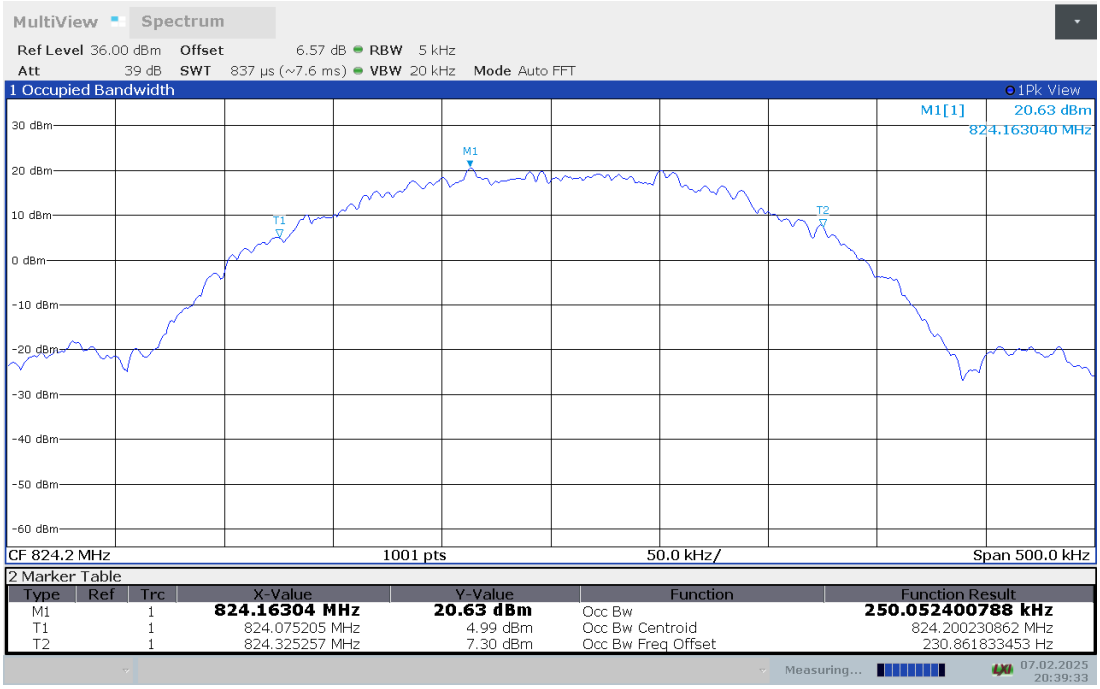
GSM850 (99% OBW)

EGPRS

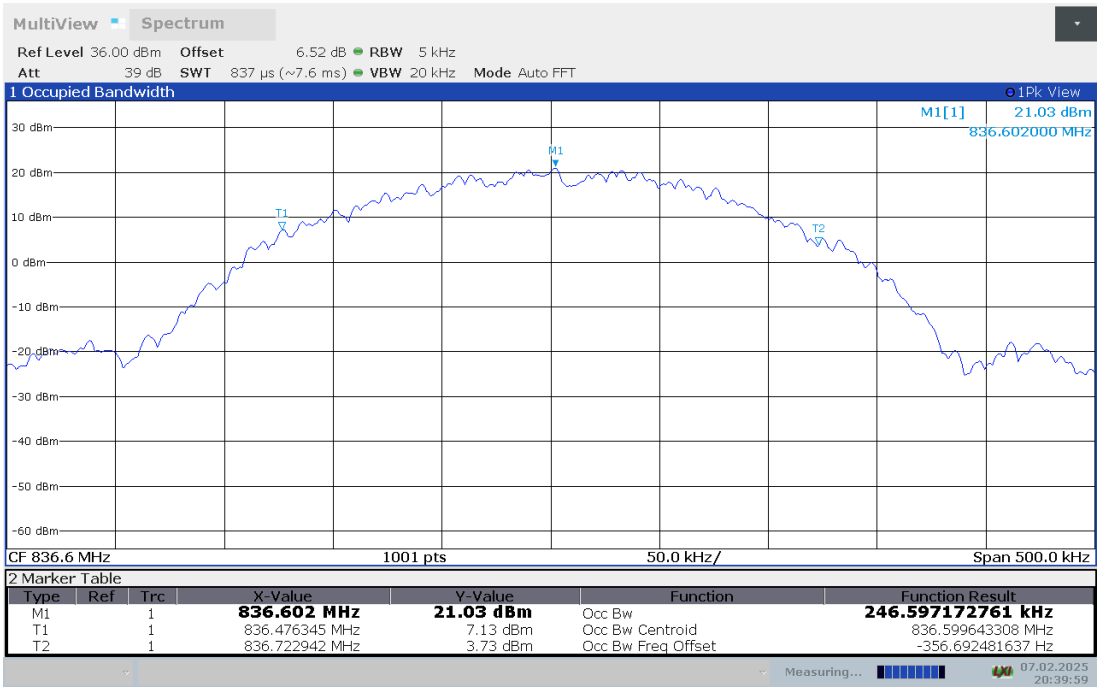
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)
824.2	250.052
836.6	246.597
848.8	243.891

GSM850

Channel 128-Occupied Bandwidth (99% OBW)



Channel 190-Occupied Bandwidth (99% OBW)



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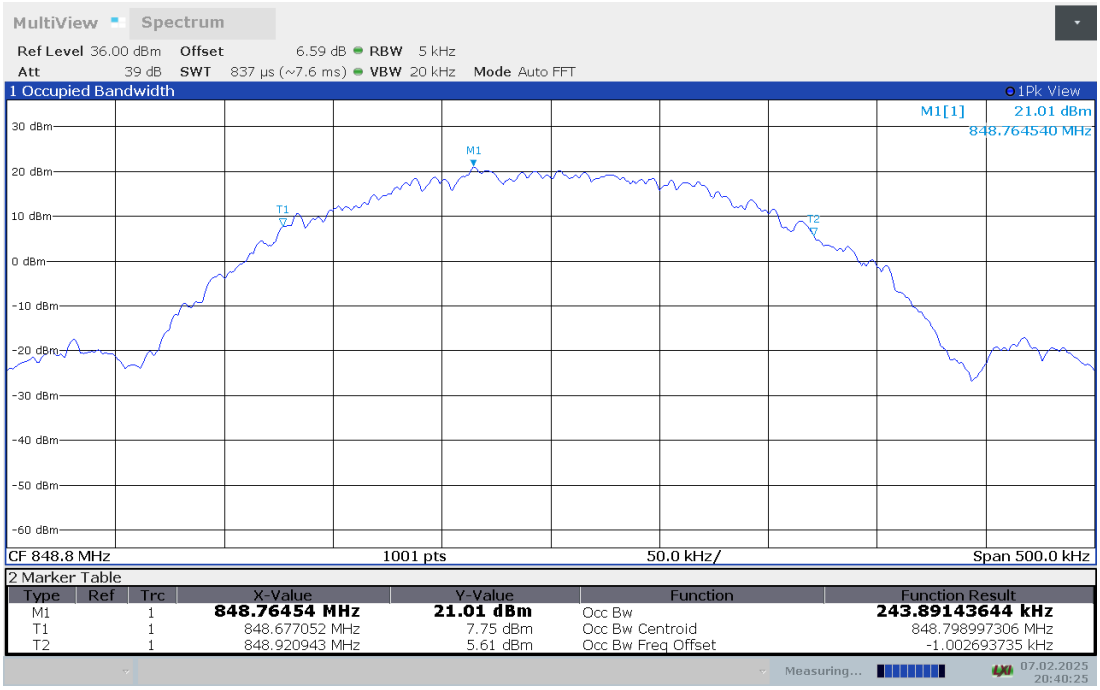
Channel 251-Occupied Bandwidth (99% OBW)



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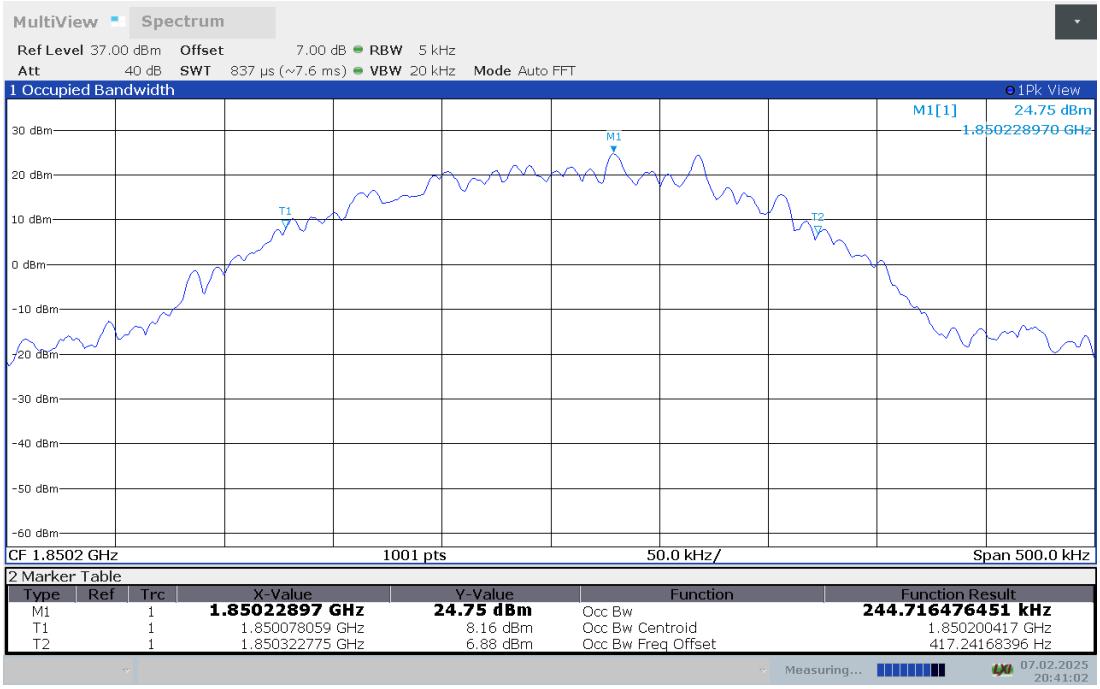
PCS1900 (99% OBW)

GSM

Frequency (MHz)	Occupied Bandwidth (99%) (kHz)
1850.2	244.716
1880	244.479
1909.8	244.499

PCS1900

Channel 512-Occupied Bandwidth (99% OBW)



Channel 661-Occupied Bandwidth (99% OBW)

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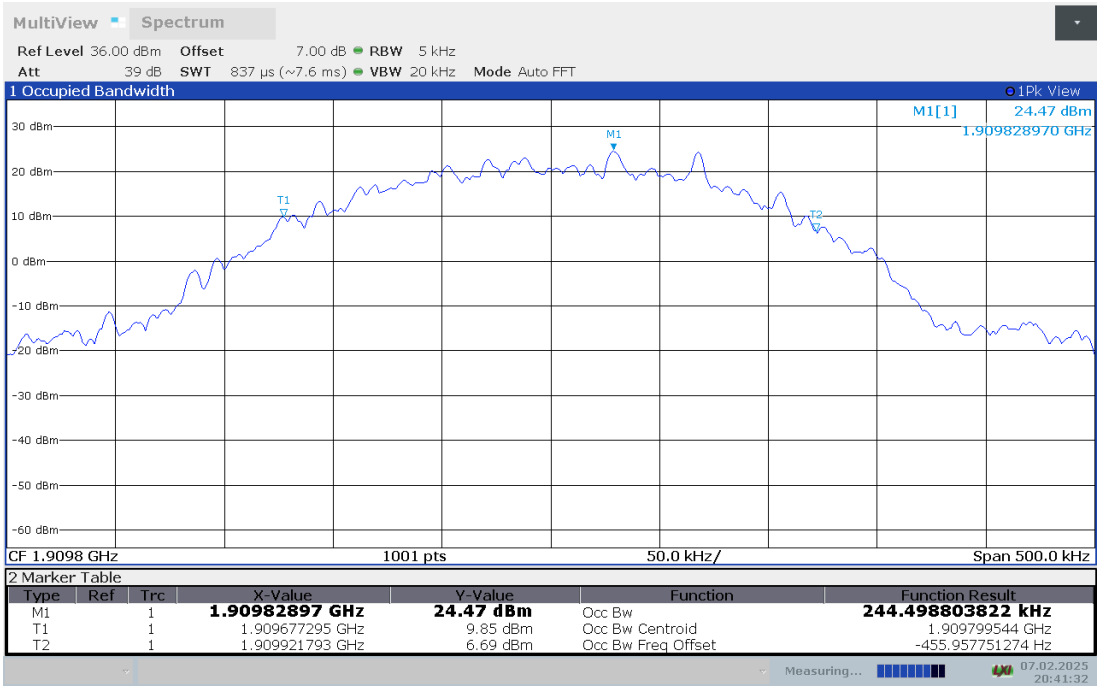
Channel 810-Occupied Bandwidth (99% OBW)



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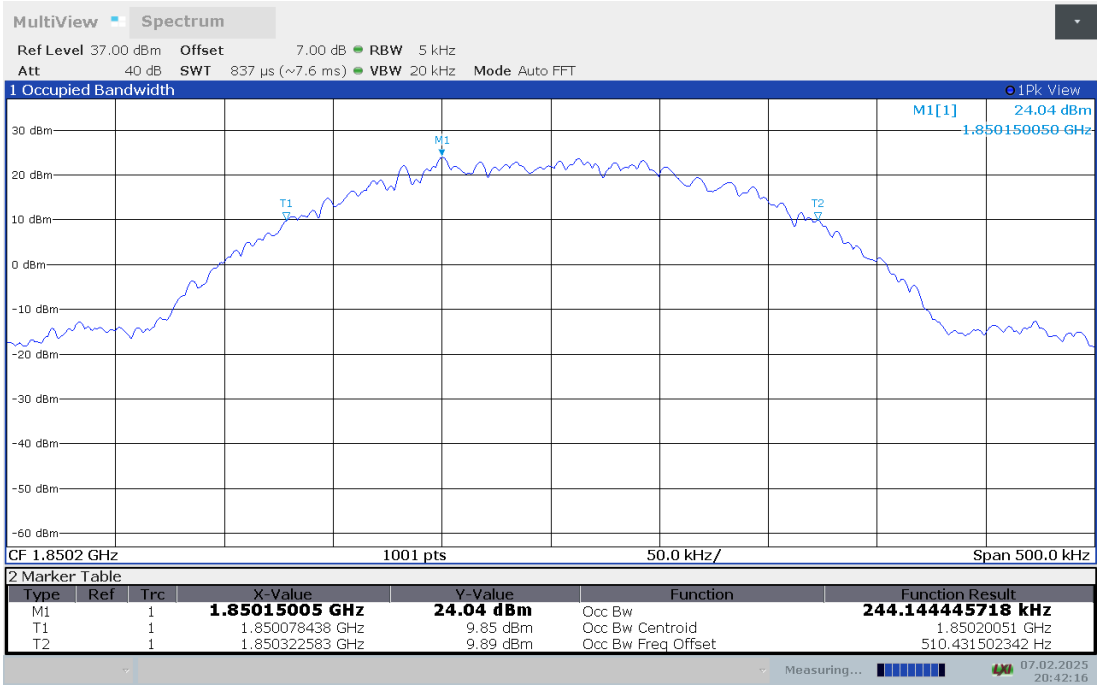
PCS1900 (99% OBW)

GPRS

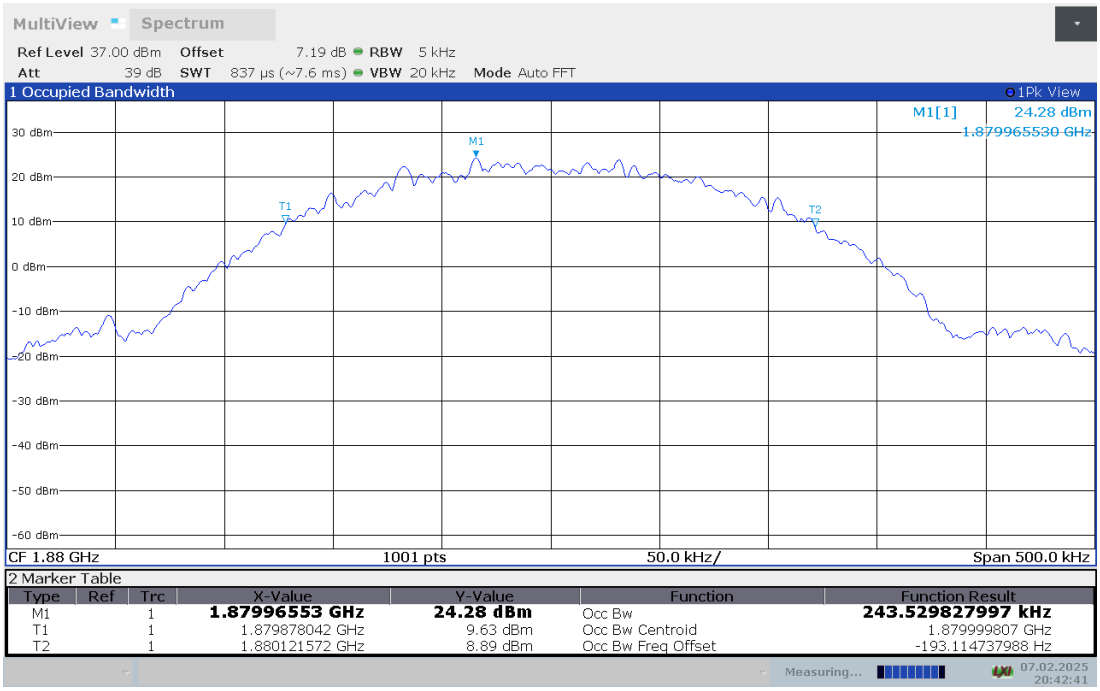
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)
1850.2	244.144
1880	243.530
1909.8	246.303

PCS1900

Channel 512-Occupied Bandwidth (99% OBW)



Channel 661-Occupied Bandwidth (99% OBW)



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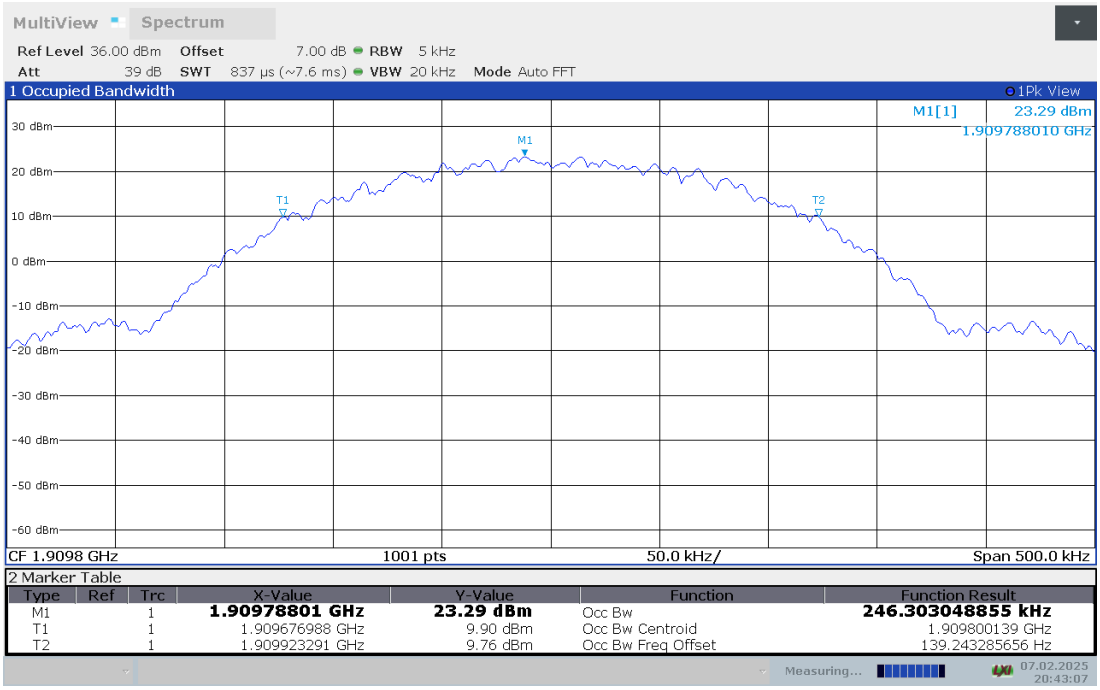
Channel 810-Occupied Bandwidth (99% OBW)



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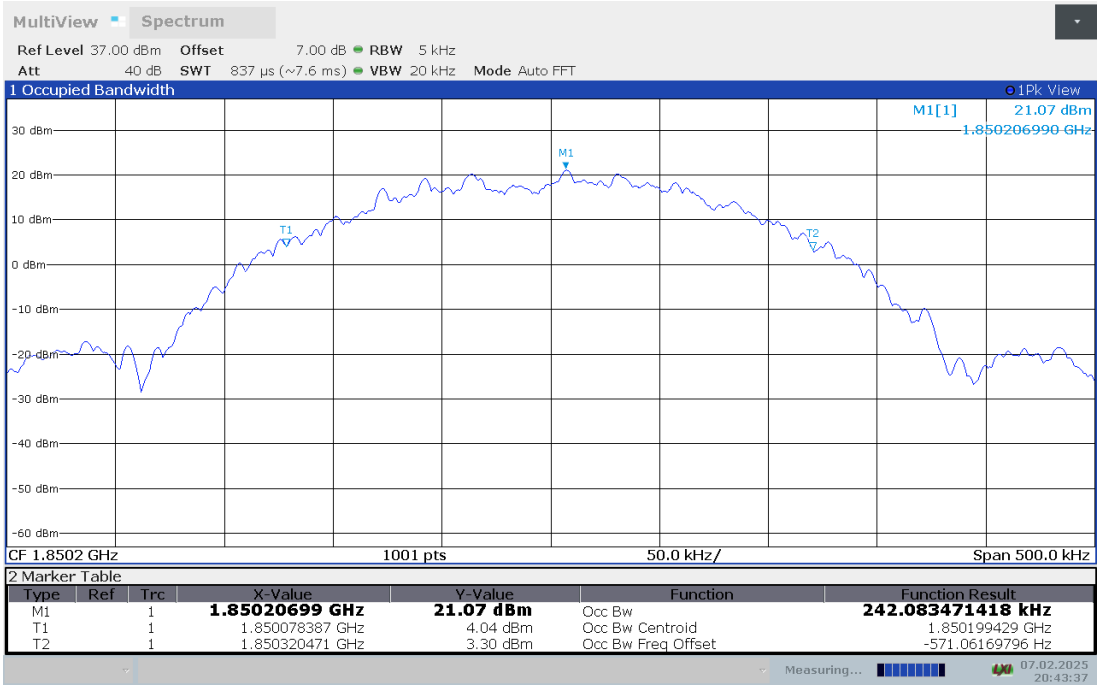
PCS1900 (99% OBW)

EGPRS

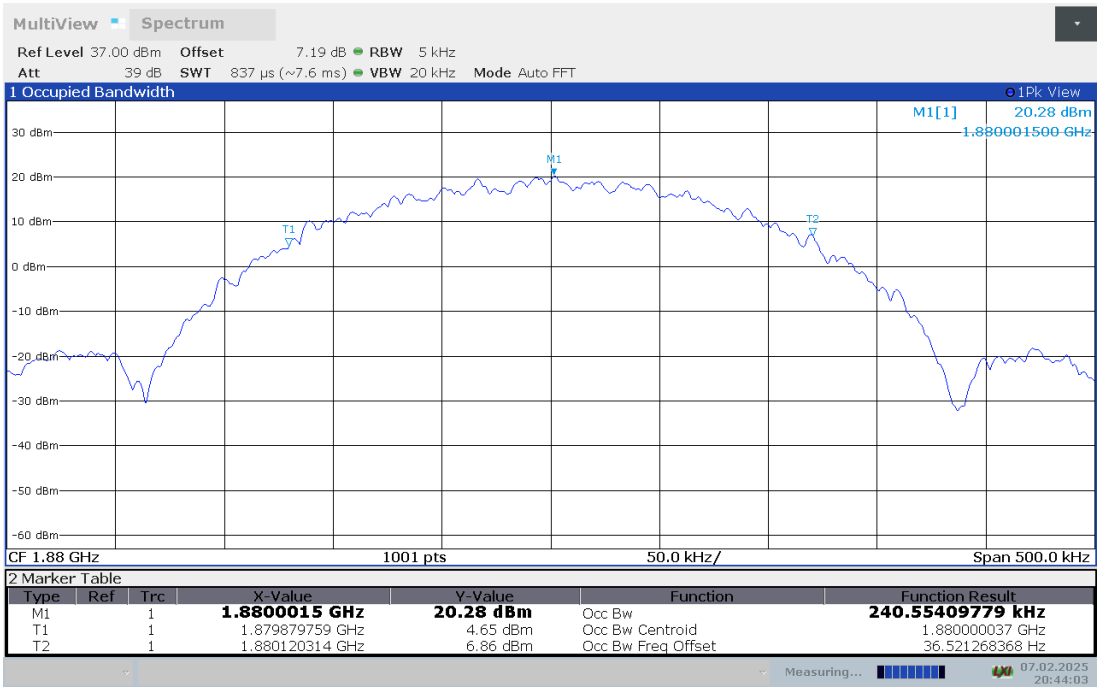
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)
1850.2	242.083
1880	240.554
1909.8	240.687

PCS1900

Channel 512-Occupied Bandwidth (99% OBW)



Channel 661-Occupied Bandwidth (99% OBW)



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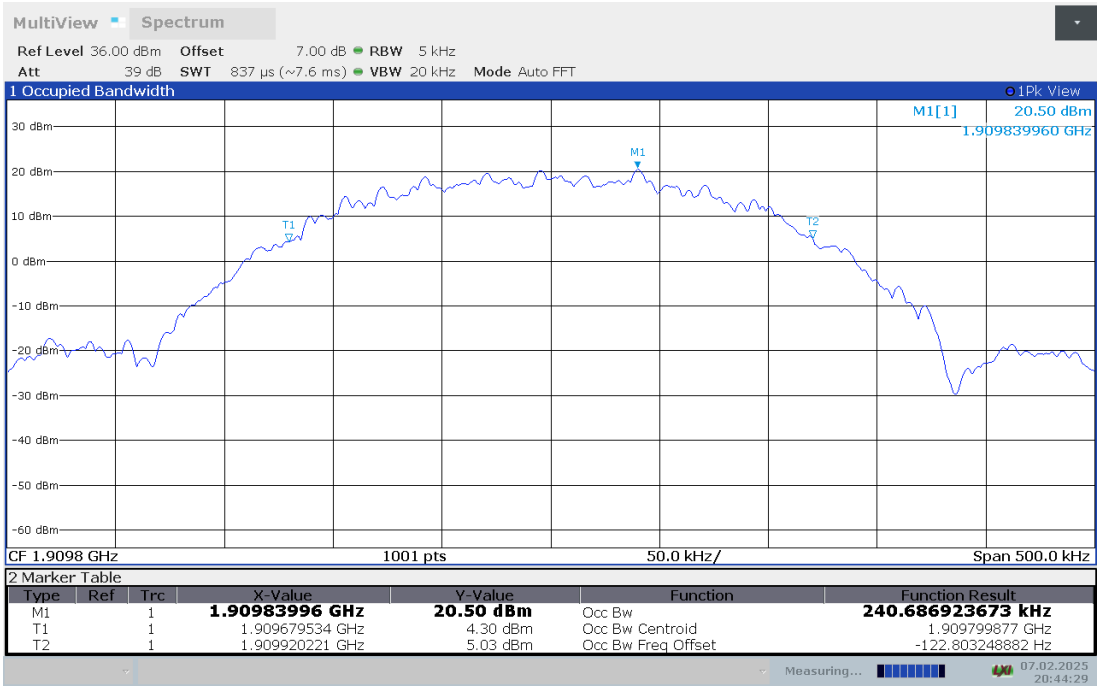
Channel 810-Occupied Bandwidth (99% OBW)



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A.5 EMISSION BANDWIDTH

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from ANSI C63.26:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.

b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.

d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW,the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.

Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

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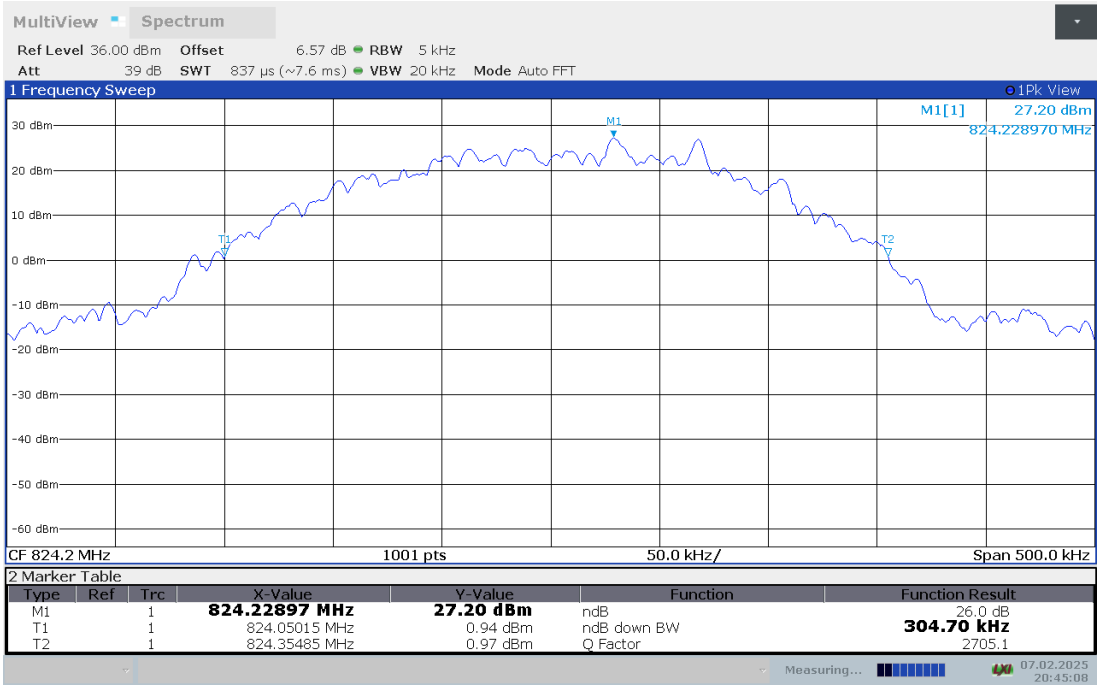
GSM 850(-26dBc OBW)

GSM

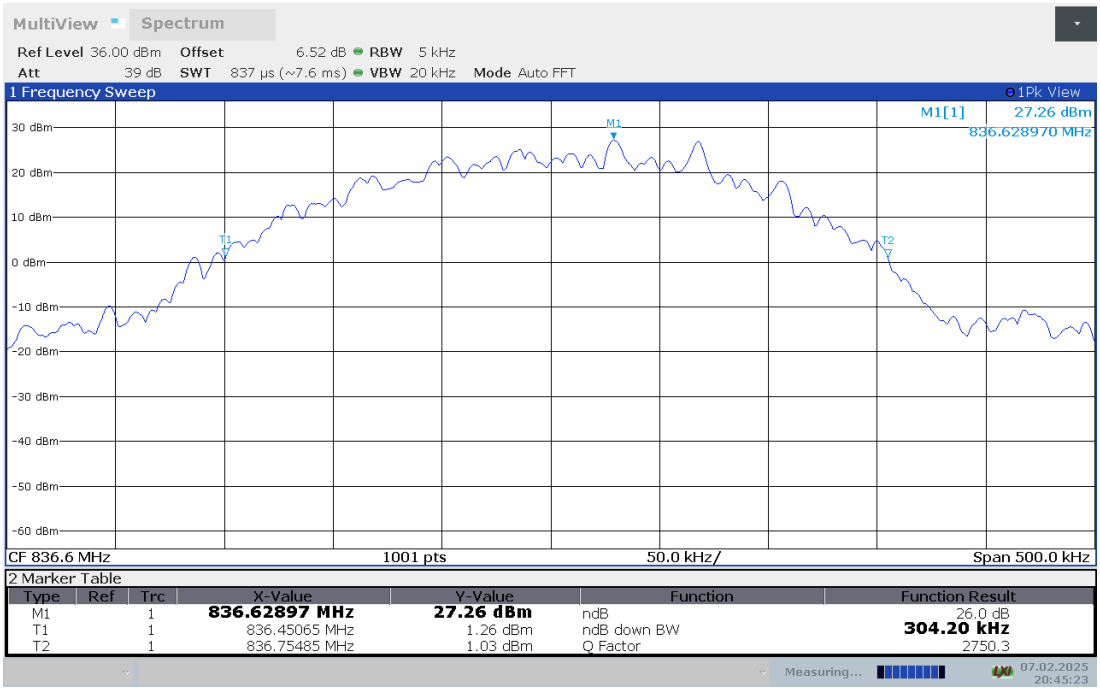
Frequency (MHz)	Emission Bandwidth (-26dBc)(kHz)
824.2	304.700
836.6	304.200
848.8	304.700

GSM850

Channel 128-Emission Bandwidth (-26dBc OBW)



Channel 190-Emission Bandwidth (-26dBc OBW)



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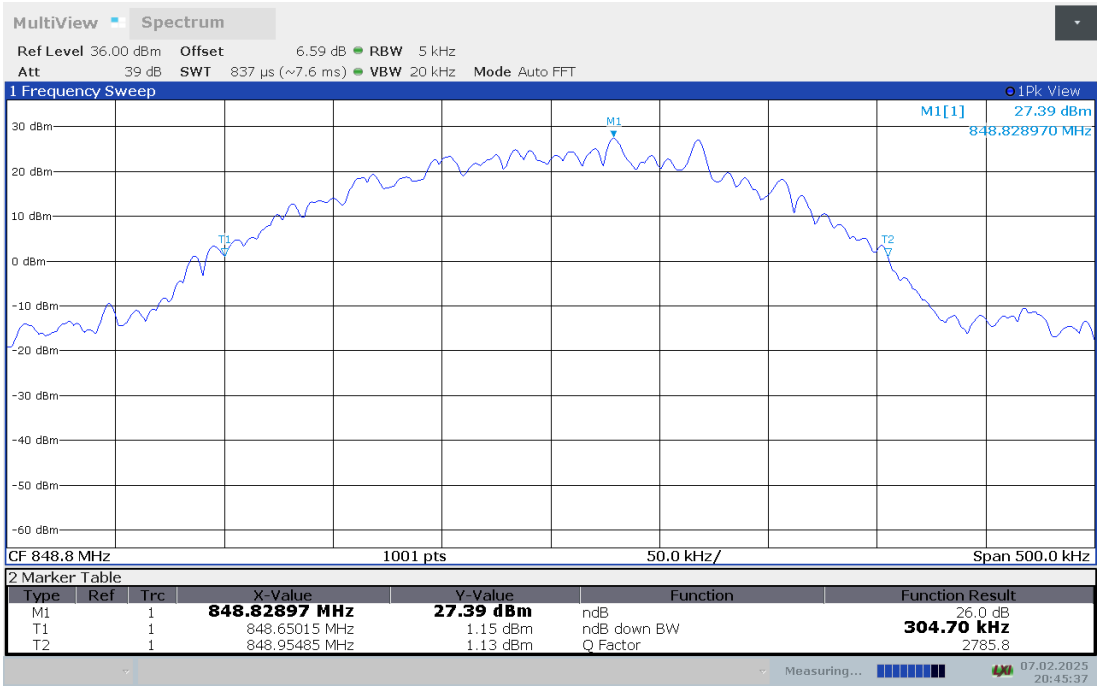
Channel 251-Emission Bandwidth (-26dBc OBW)



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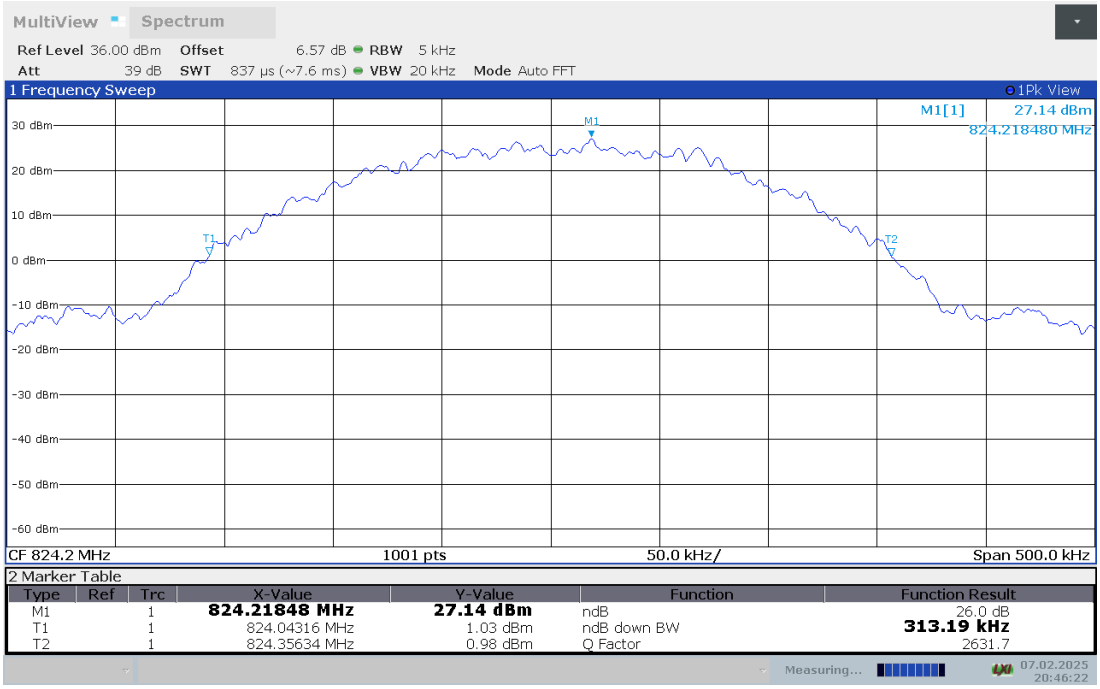
GSM850 (-26dBc OBW)

GPRS

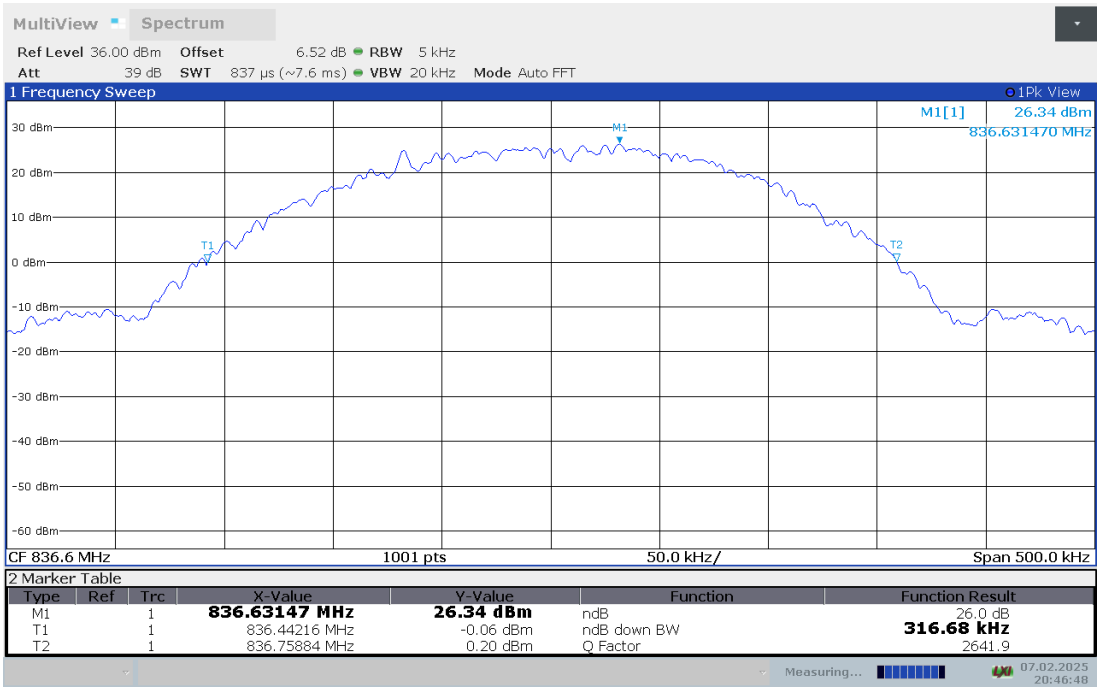
Frequency (MHz)	Emission Bandwidth (-26dBc)(kHz)
824.2	313.190
836.6	316.680
848.8	313.690

GSM850

Channel 128-Emission Bandwidth (-26dBc OBW)



Channel 190-Emission Bandwidth (-26dBc OBW)



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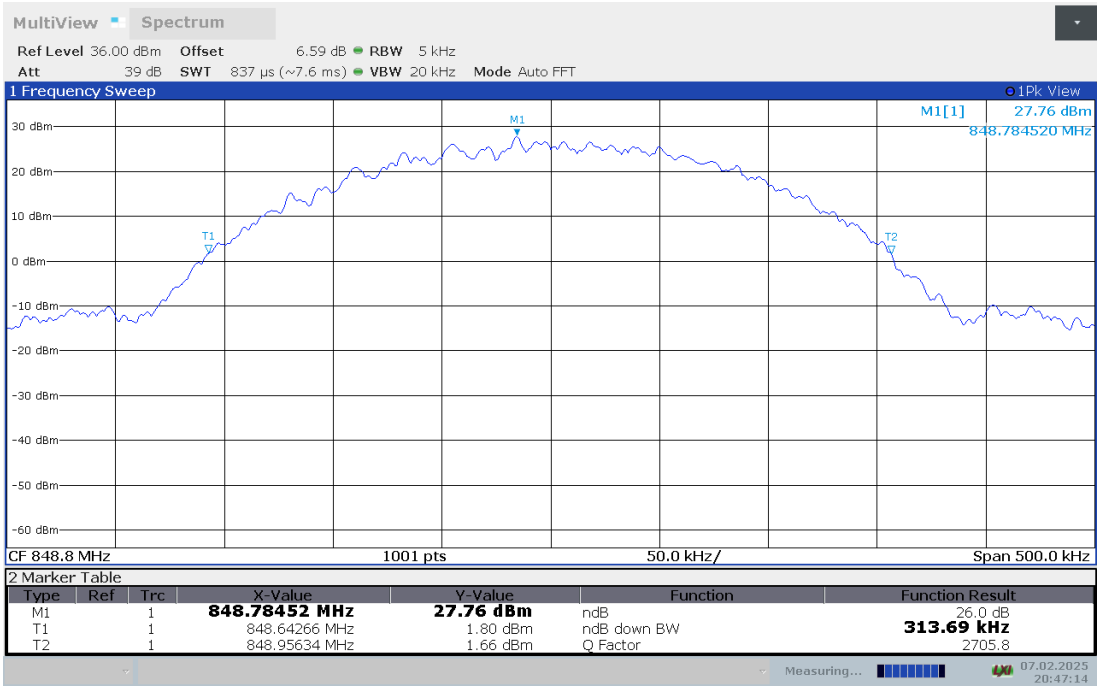
Channel 251-Emission Bandwidth (-26dBc OBW)



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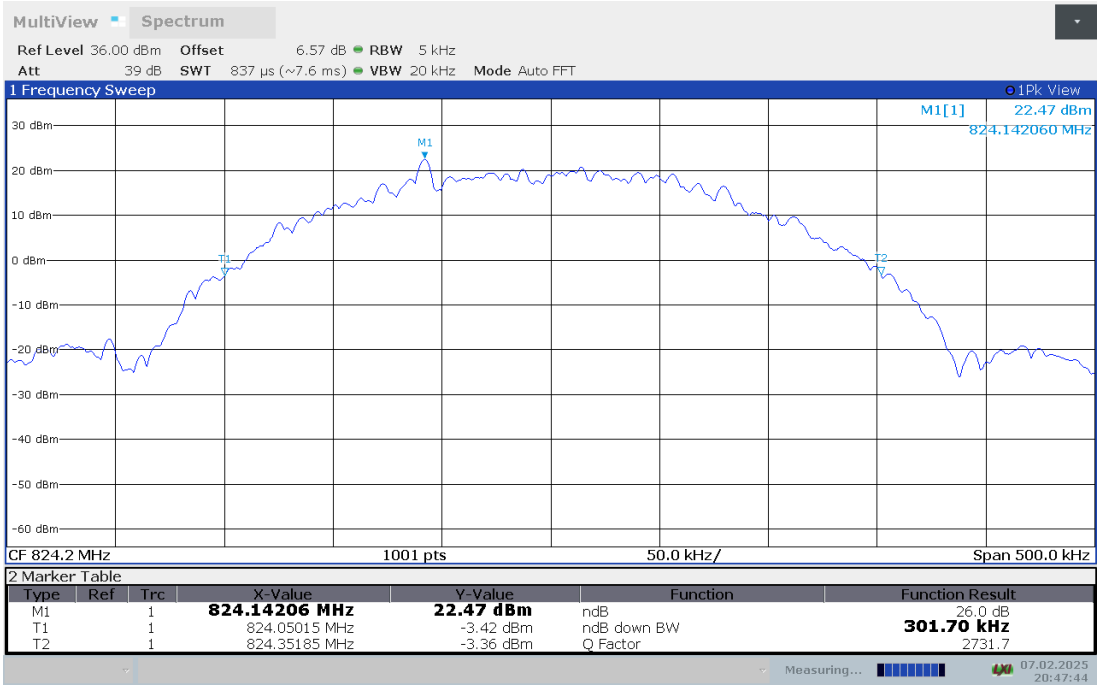
GSM850 (-26dBc OBW)

EGPRS

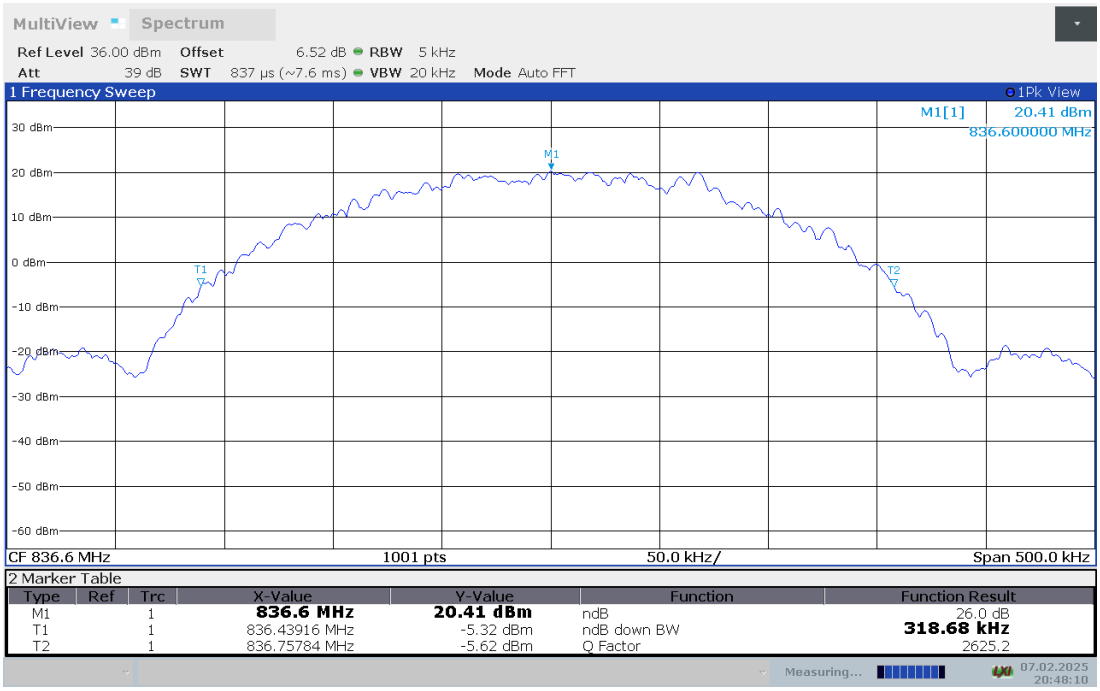
Frequency (MHz)	Emission Bandwidth (-26dBc)(kHz)
824.2	301.700
836.6	318.680
848.8	301.200

GSM850

Channel 128-Emission Bandwidth (-26dBc OBW)



Channel 190-Emission Bandwidth (-26dBc OBW)



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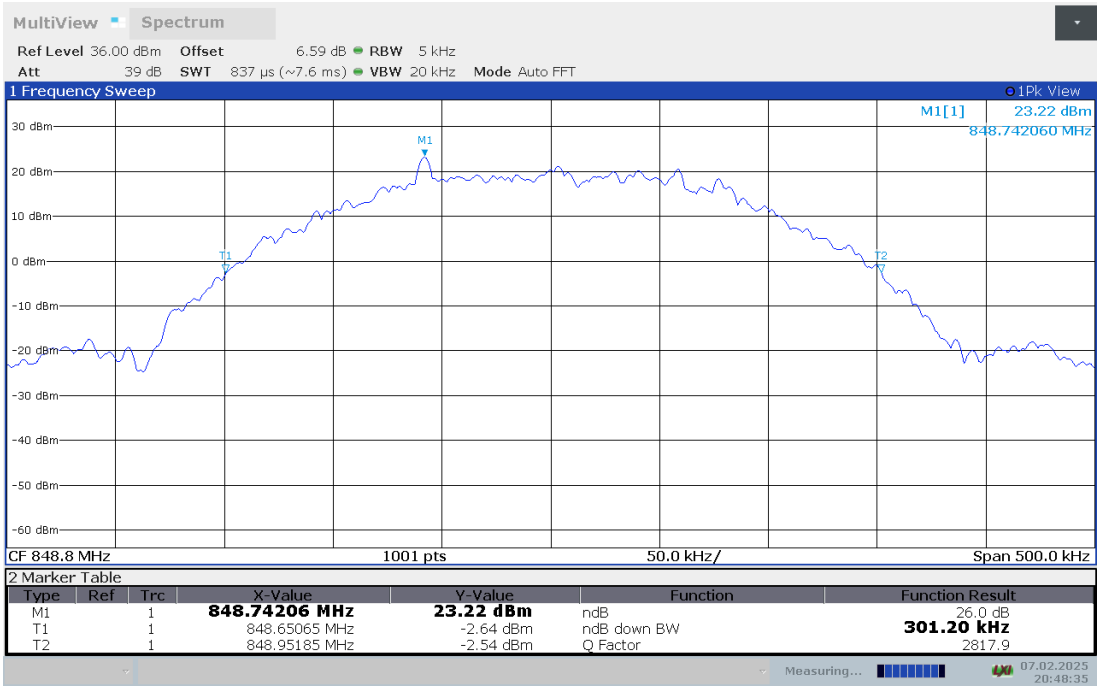
Channel 251-Emission Bandwidth (-26dBc OBW)



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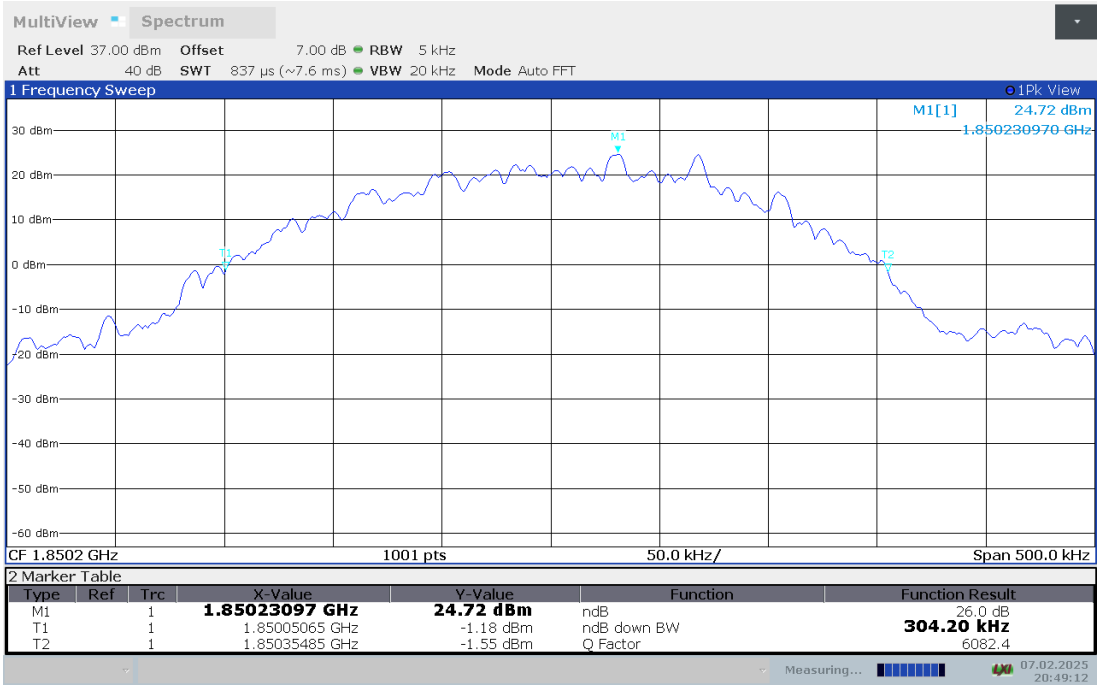
PCS1900 (-26dBc OBW)

GSM

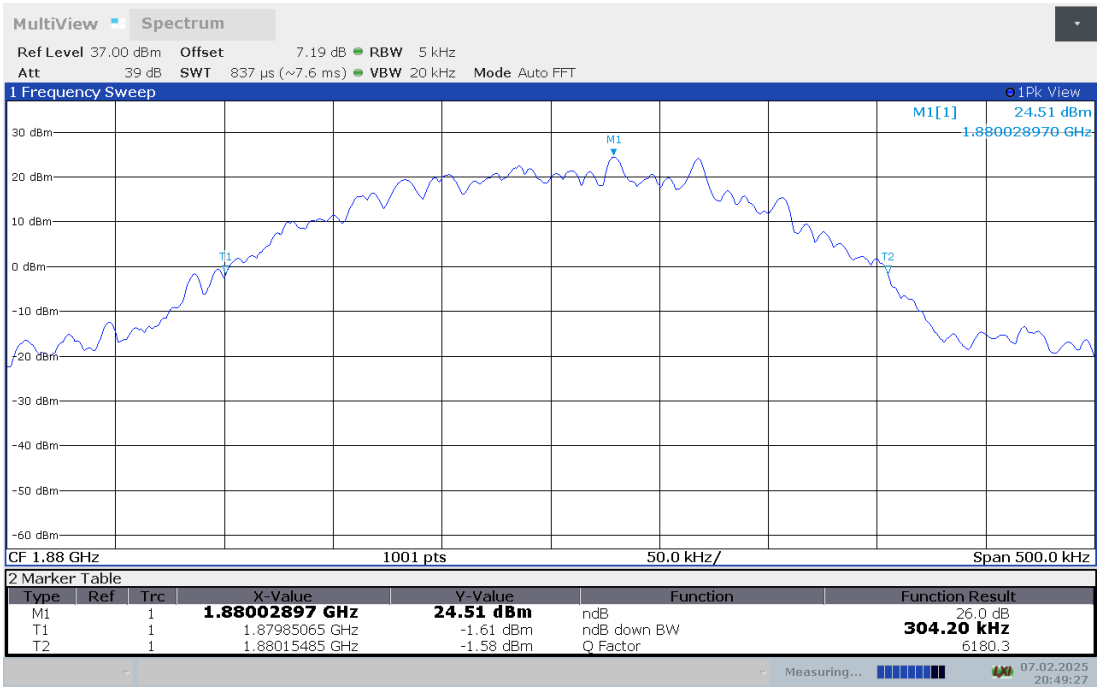
Frequency (MHz)	Emission Bandwidth (-26dBc)(kHz)
1850.2	304.200
1880	304.200
1909.8	304.200

PCS1900

Channel 512-Emission Bandwidth (-26dBc OBW)



Channel 661-Emission Bandwidth (-26dBc OBW)



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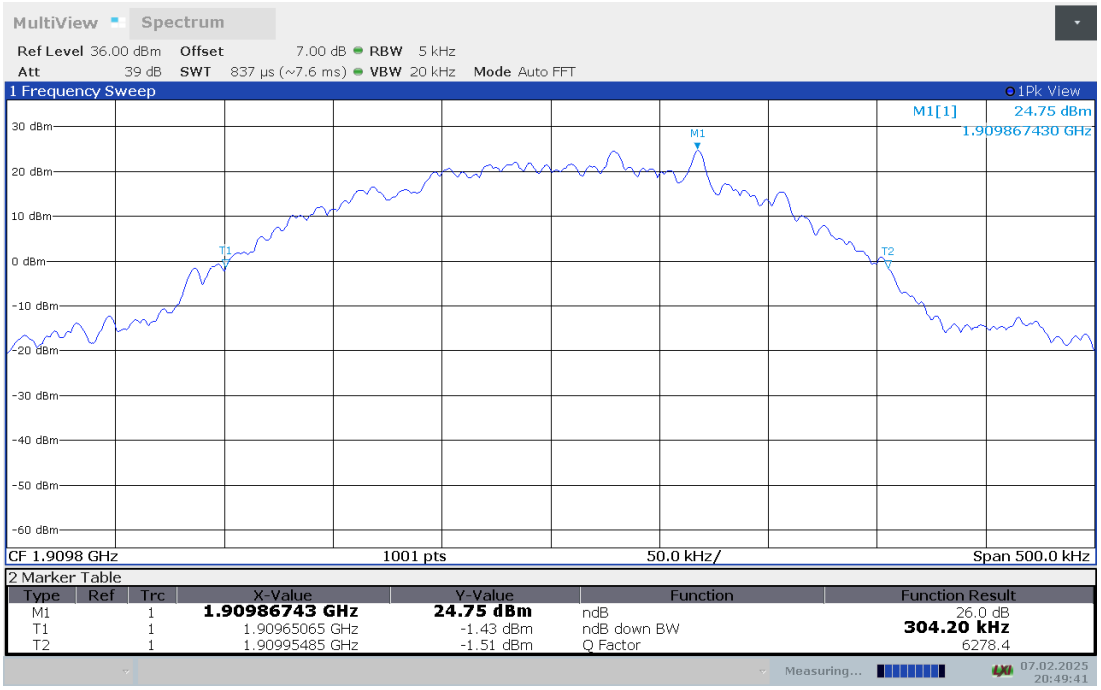
Channel 810-Emission Bandwidth (-26dBc OBW)



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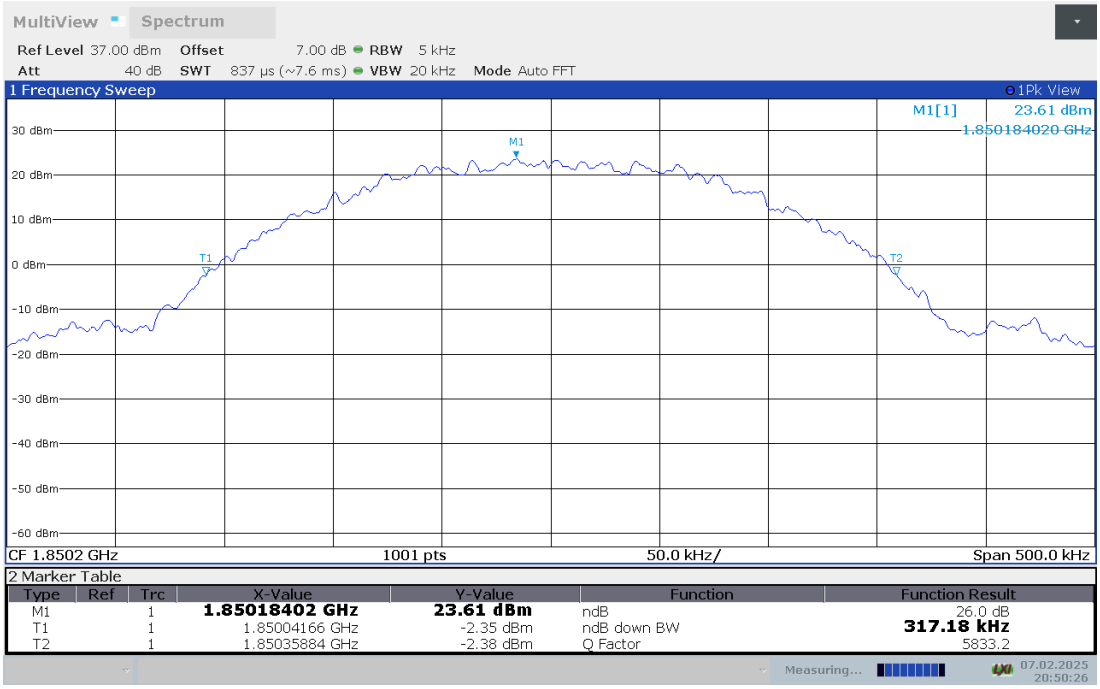
PCS1900 (-26dBc OBW)

GPRS

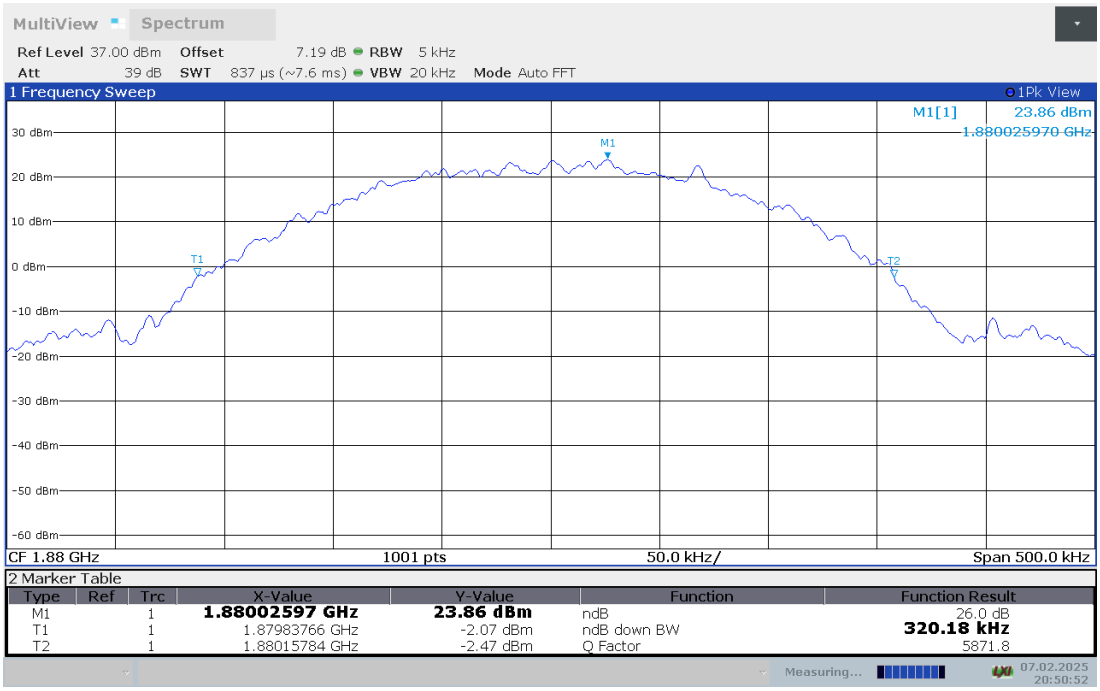
Frequency (MHz)	Emission Bandwidth (-26dBc)(kHz)
1850.2	317.180
1880	320.180
1909.8	311.690

PCS1900

Channel 512-Emission Bandwidth (-26dBc OBW)



Channel 661-Emission Bandwidth (-26dBc OBW)



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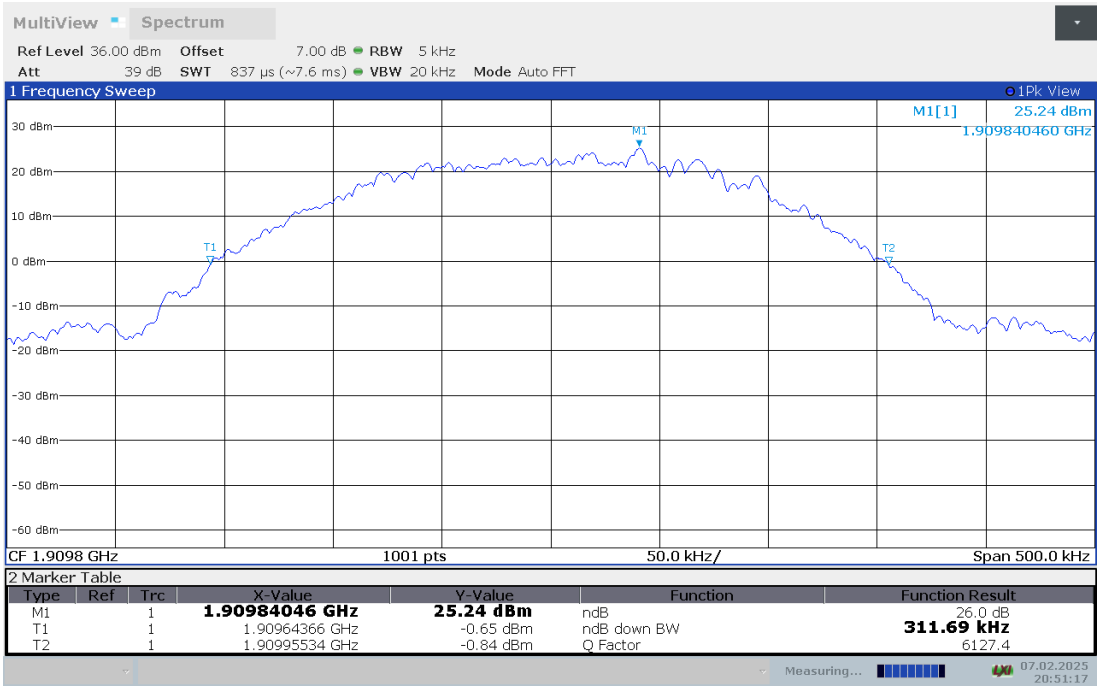
Channel 810-Emission Bandwidth (-26dBc OBW)



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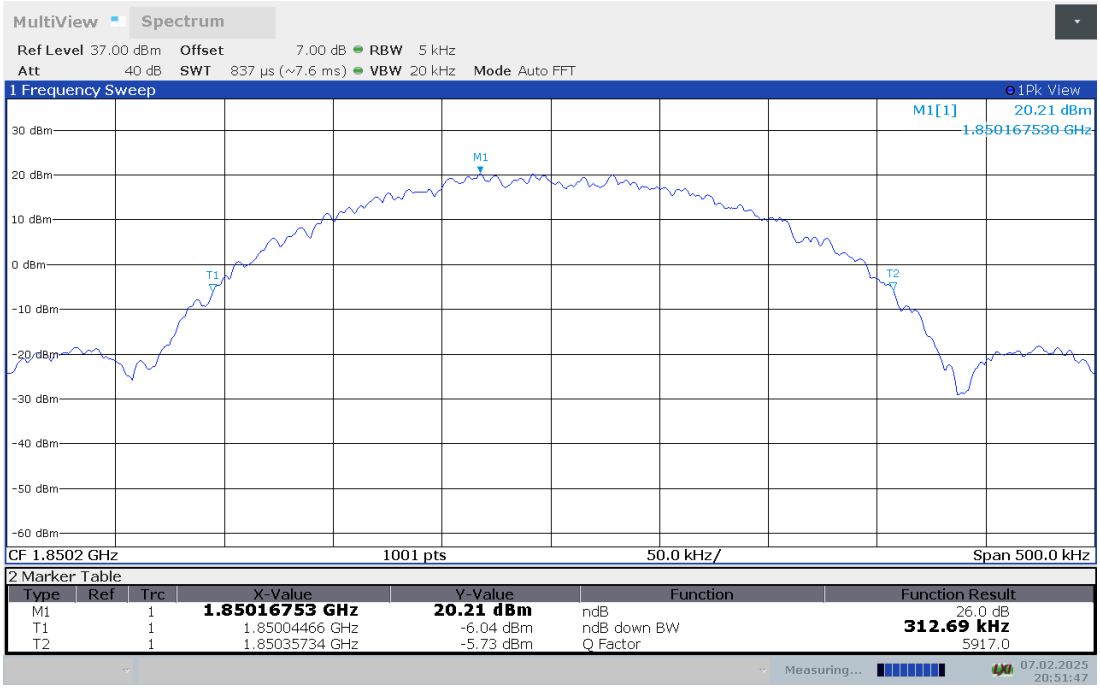
PCS1900 (-26dBc OBW)

EGPRS

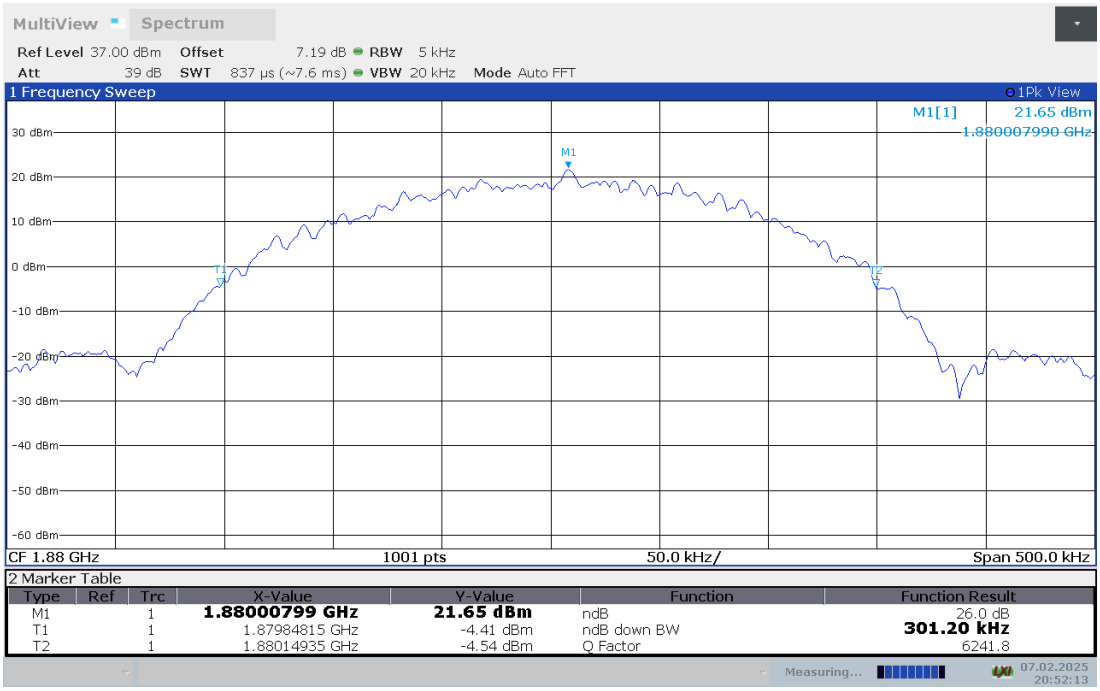
Frequency (MHz)	Emission Bandwidth (-26dBc)(kHz)
1850.2	312.690
1880	301.200
1909.8	302.200

PCS1900

Channel 512-Emission Bandwidth (-26dBc OBW)



Channel 661-Emission Bandwidth (-26dBc OBW)



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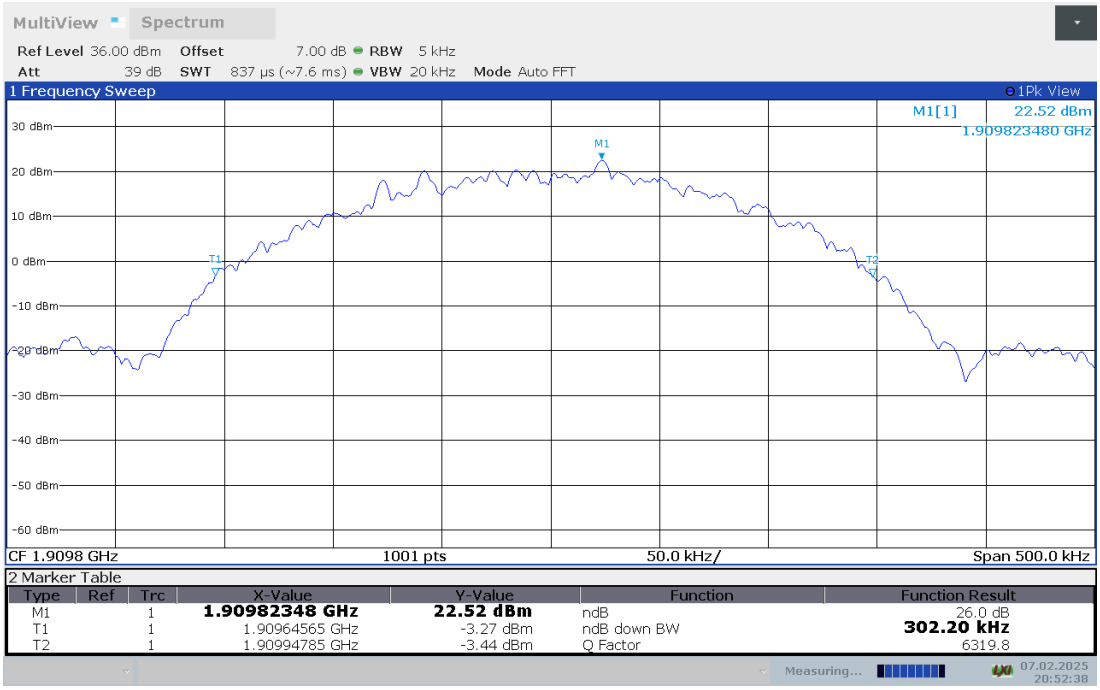
Channel 810-Emission Bandwidth (-26dBc OBW)



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A.6 BAND EDGE COMPLIANCE

A.6.1 Measurement limit

Part 22.917 and Part 24.238 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to KDB 971168, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

A.6.2Measurement result

Only worst case result is given below

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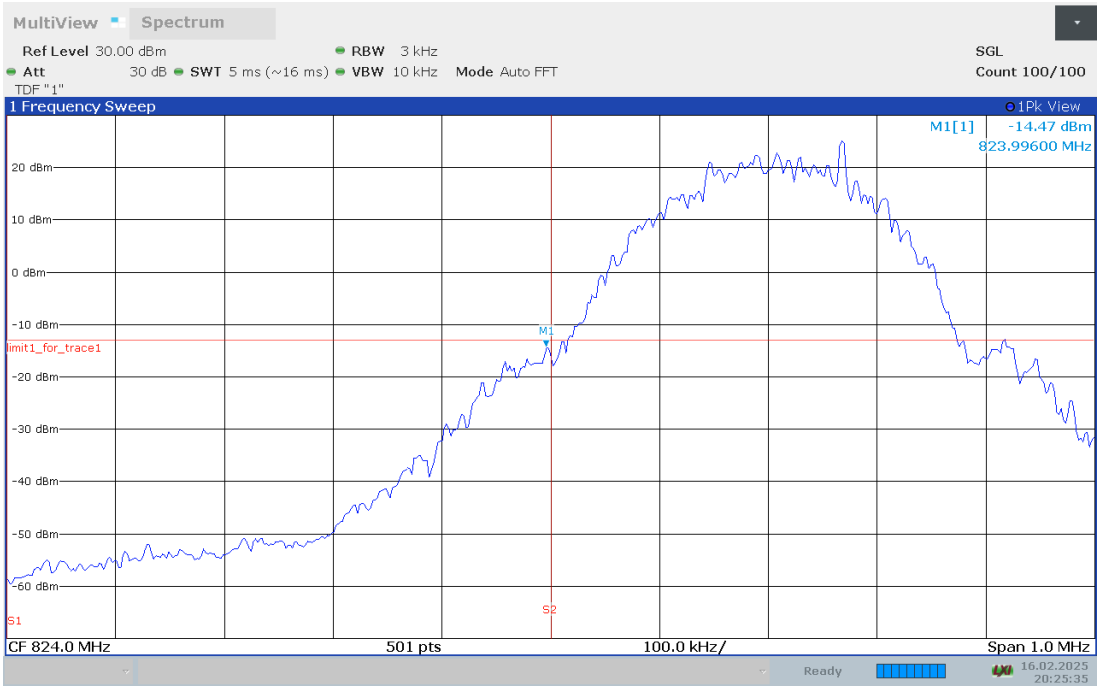
GSM 850

GSM

Channel 128



Channel 251

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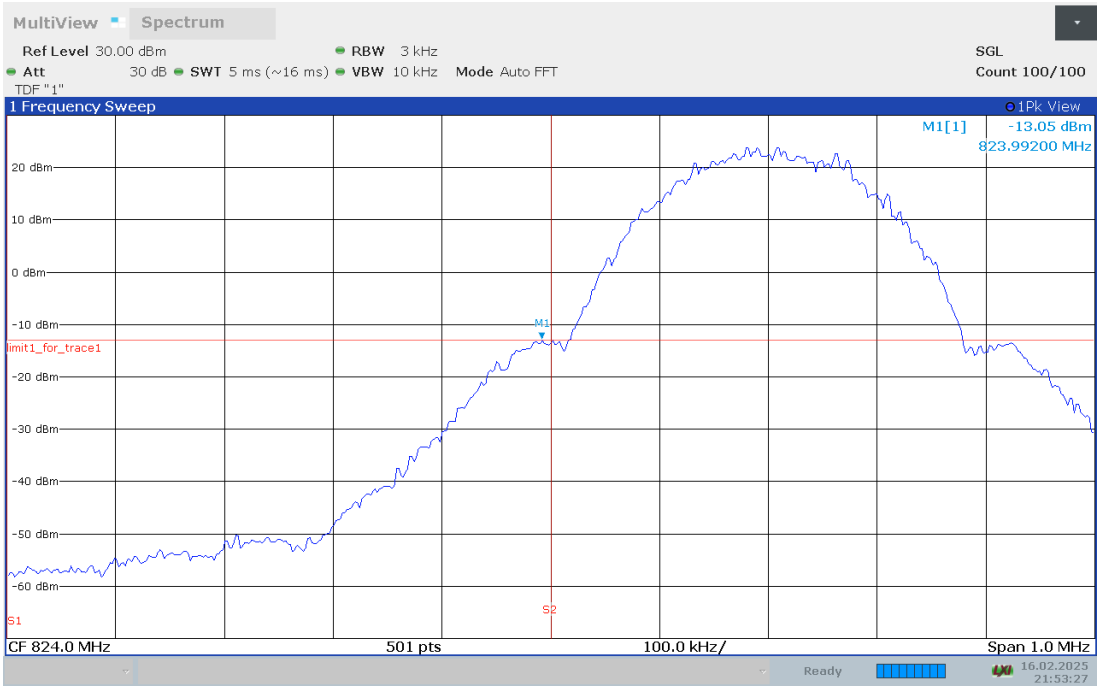
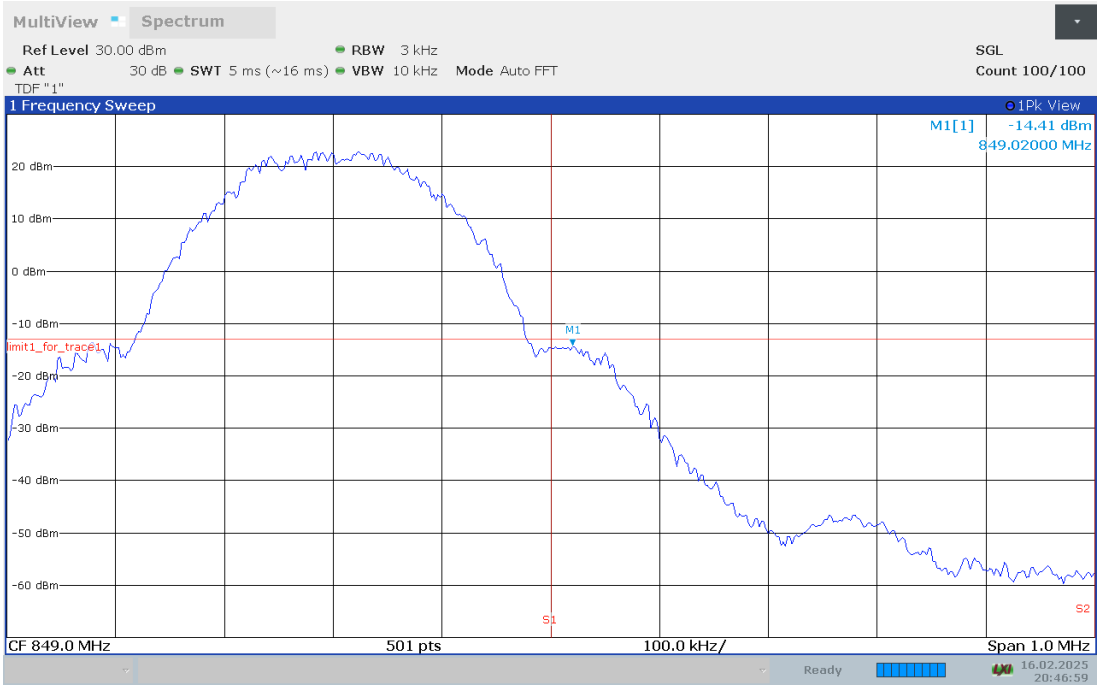
GSM850

GPRS

Channel 128



Channel 251



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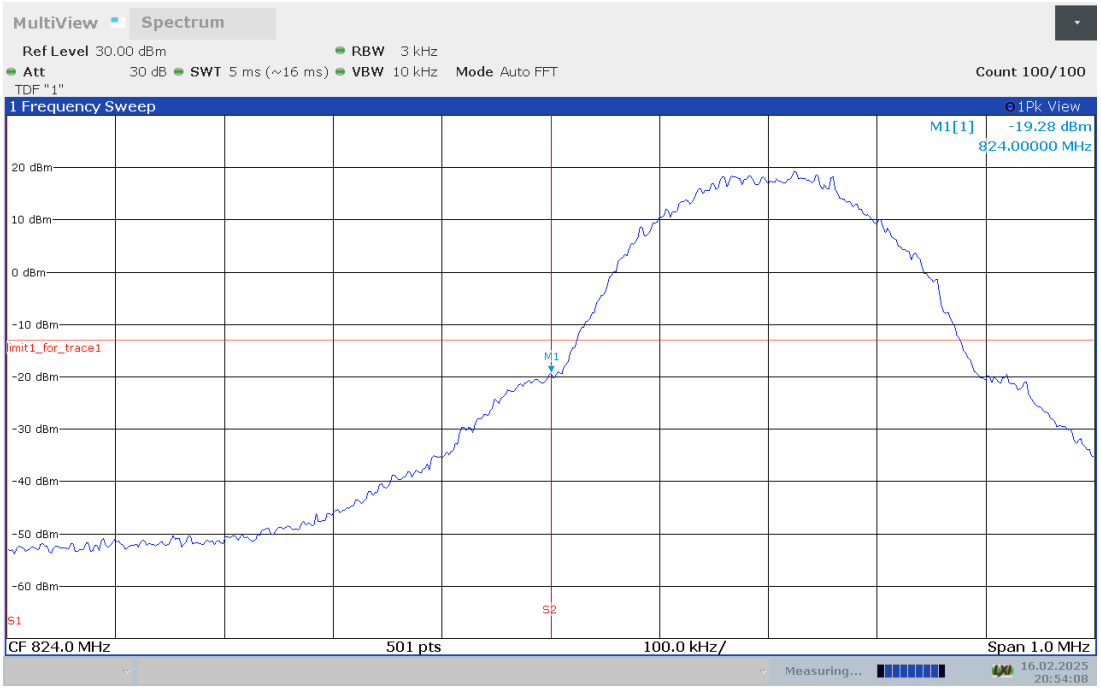
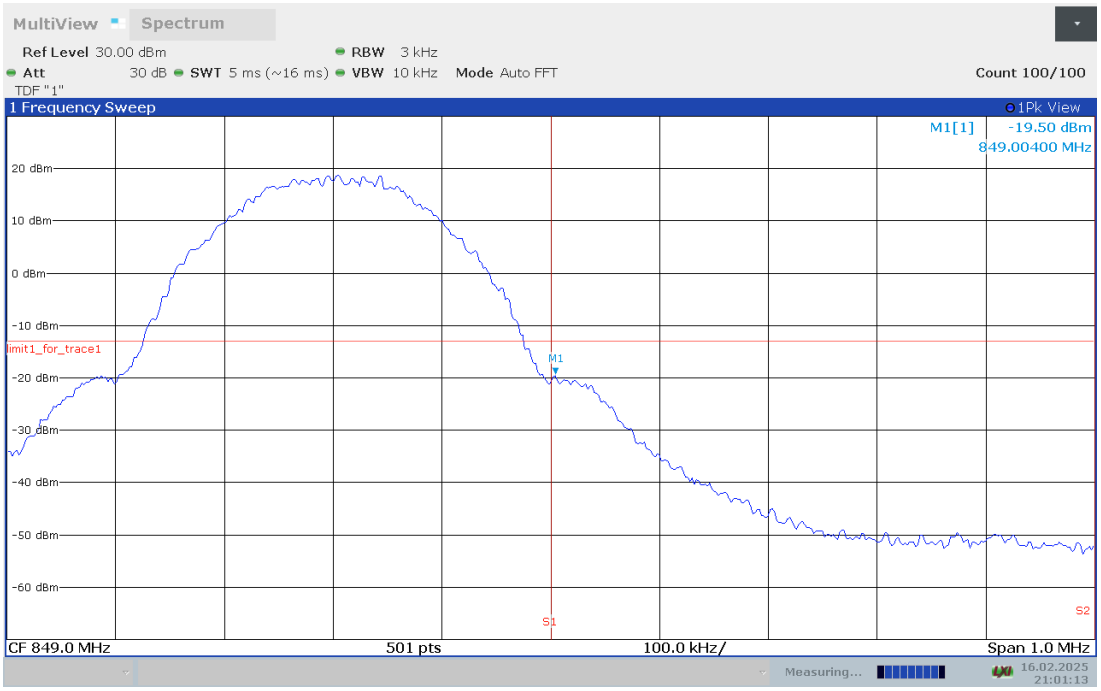
GSM850

EGPRS

Channel 128



Channel 251



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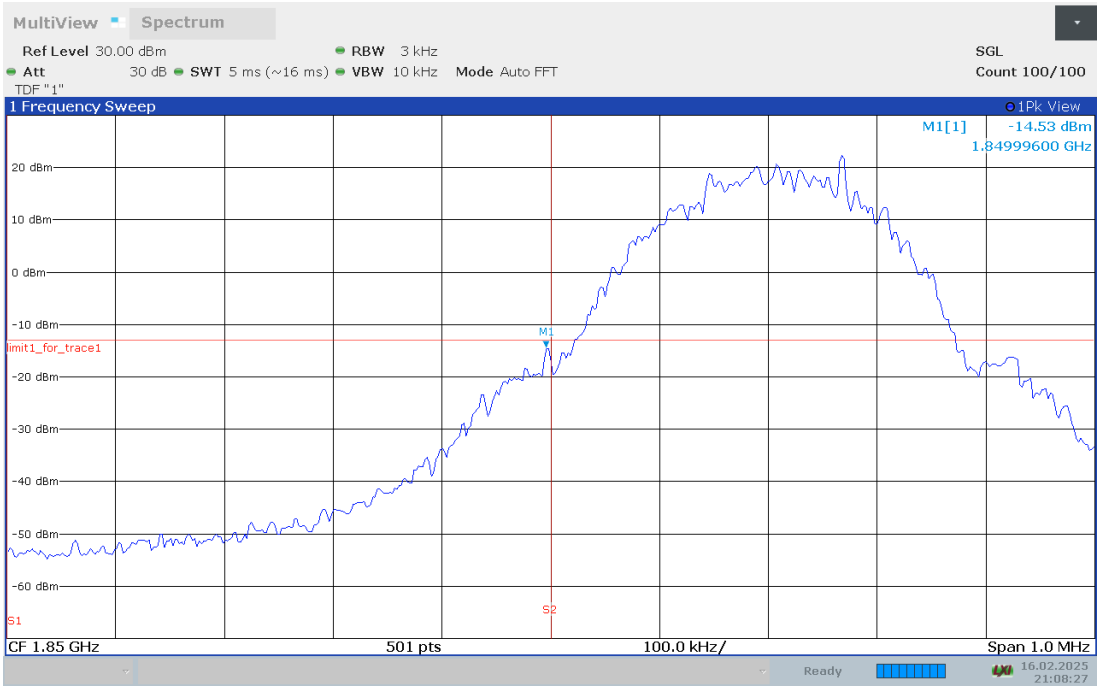
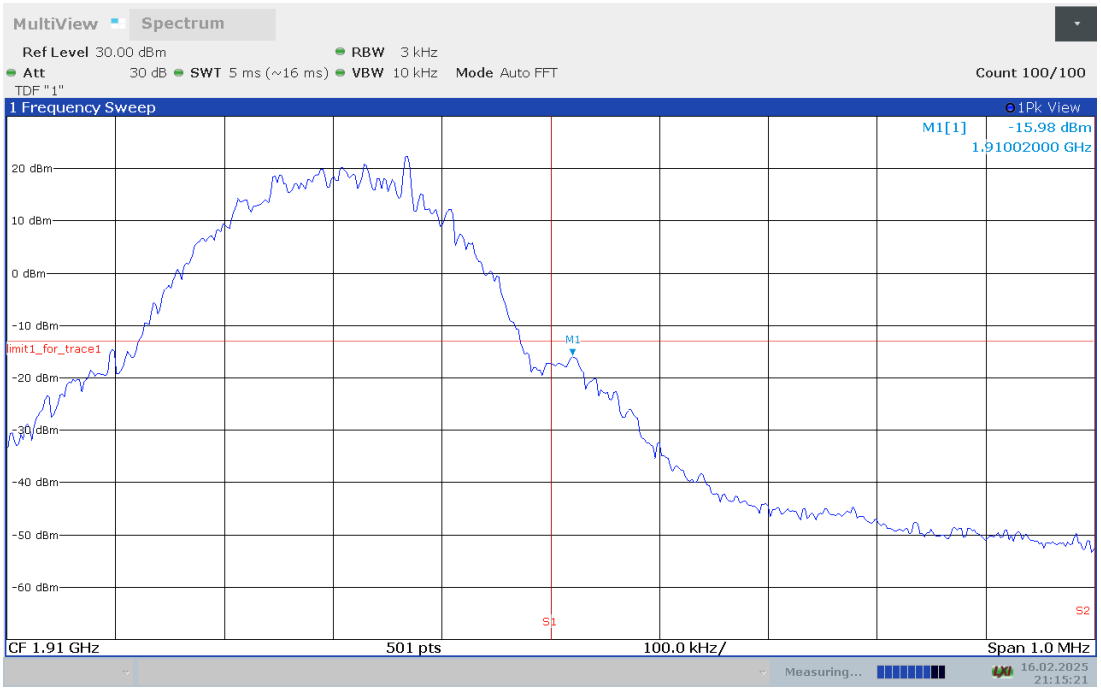
PCS1900

GSM

Channel 512



Channel 810



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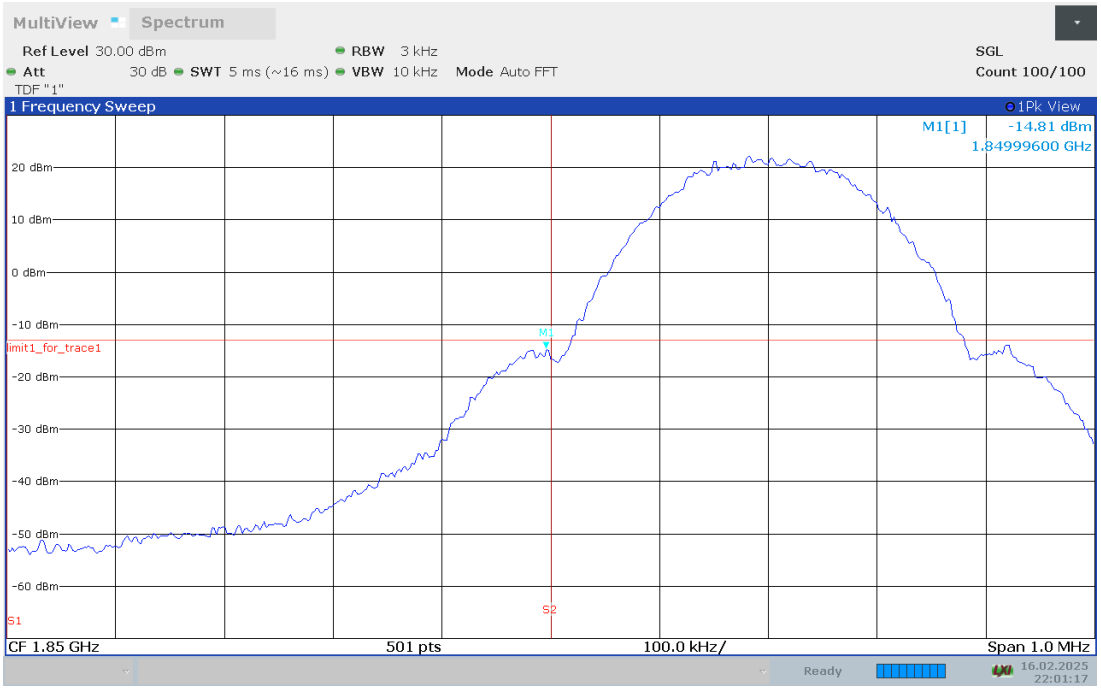
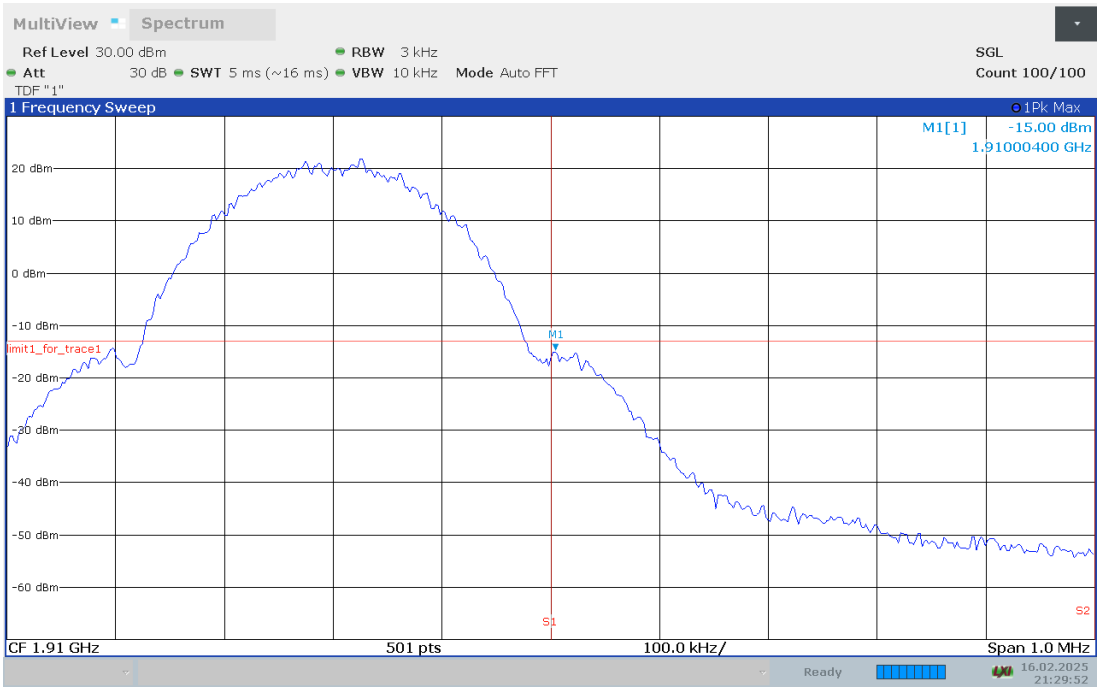
PCS1900

GPRS

Channel 512



Channel 810



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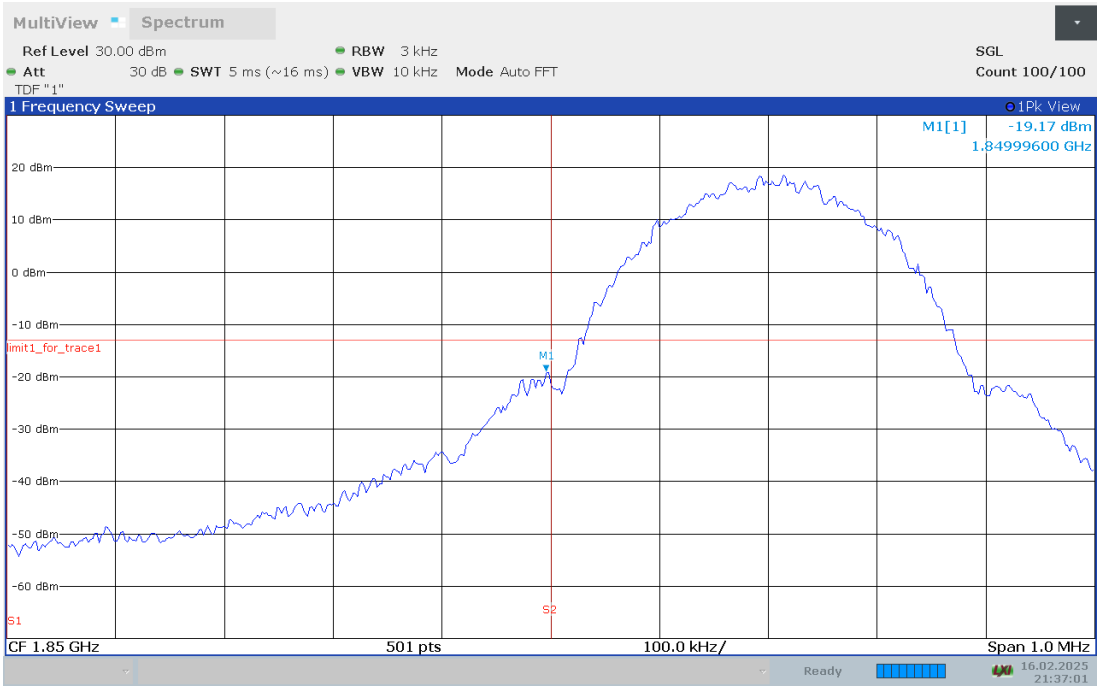
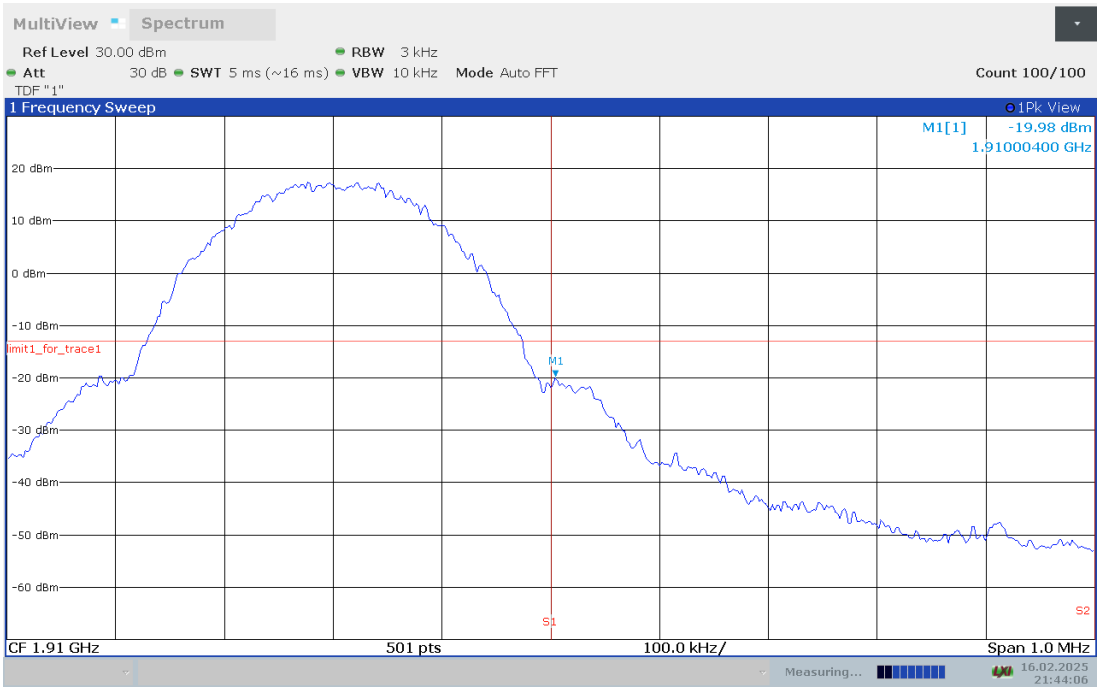
PCS1900

EGPRS

Channel 512



Channel 810



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A.7 CONDUCTED SPURIOUS EMISSION

A.7.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
   a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
   b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is greater than 2×span/RBW

A.7.2 Measurement Limit

Part 22.917 and Part 24.238 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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A.7.3 Measurement result

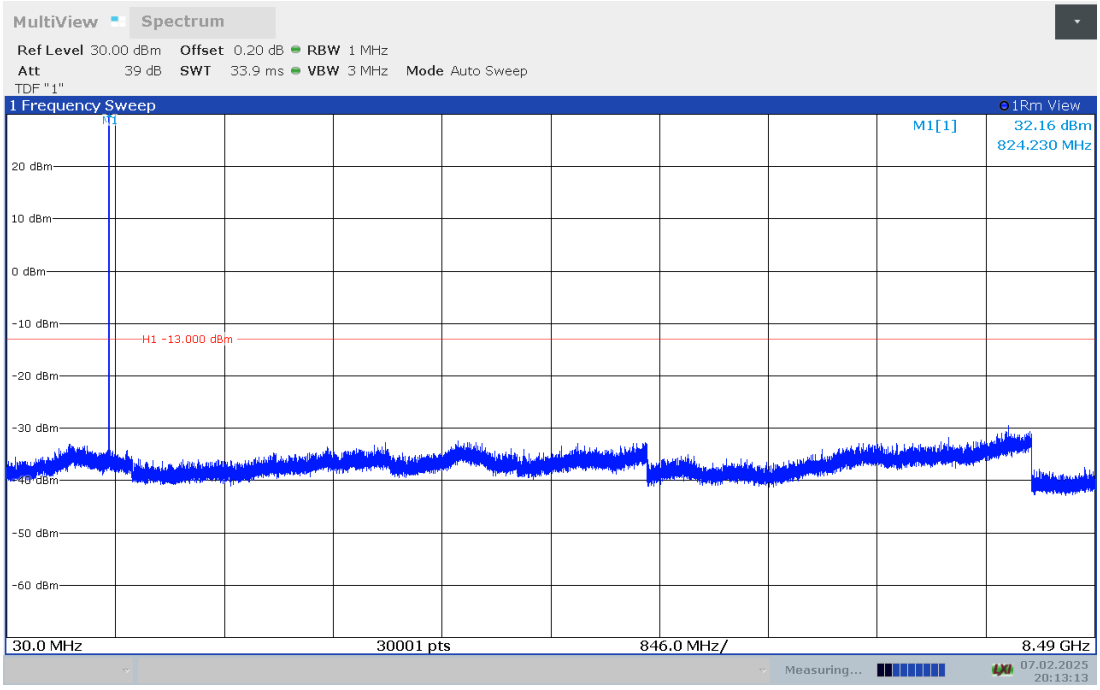
Only worst case result is given below

GSM850

Channel 128: 30MHz–8.49 GHz

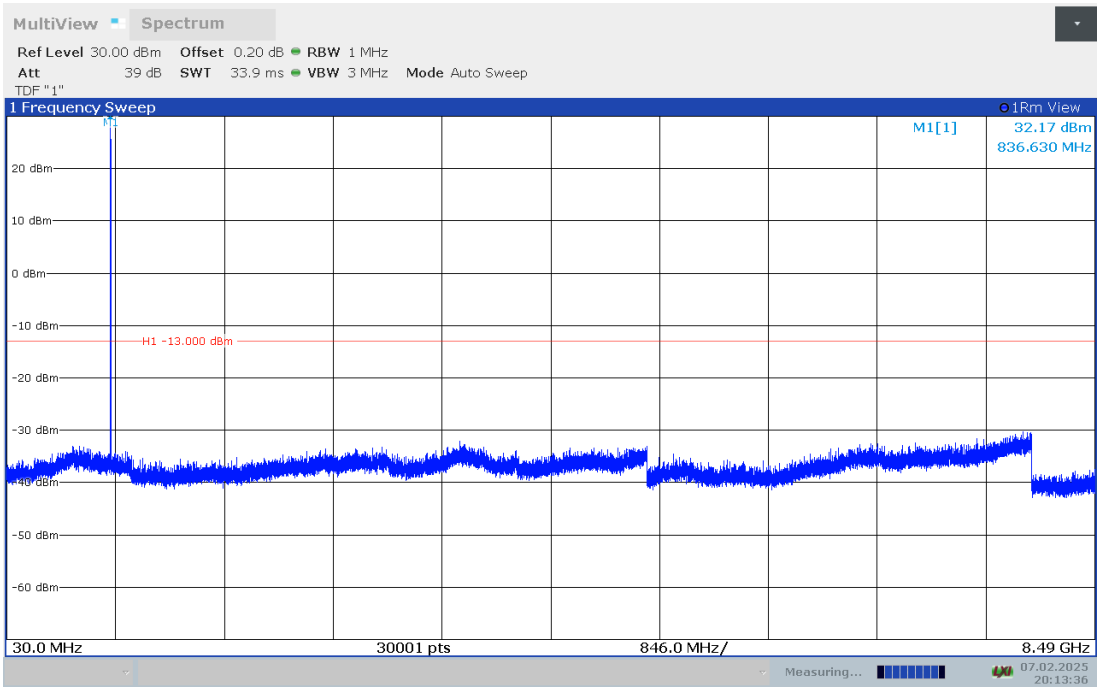
Spurious emission limit –13dBm

NOTE: peak above the limit line is the carrier frequency.



Channel 190:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 251:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.

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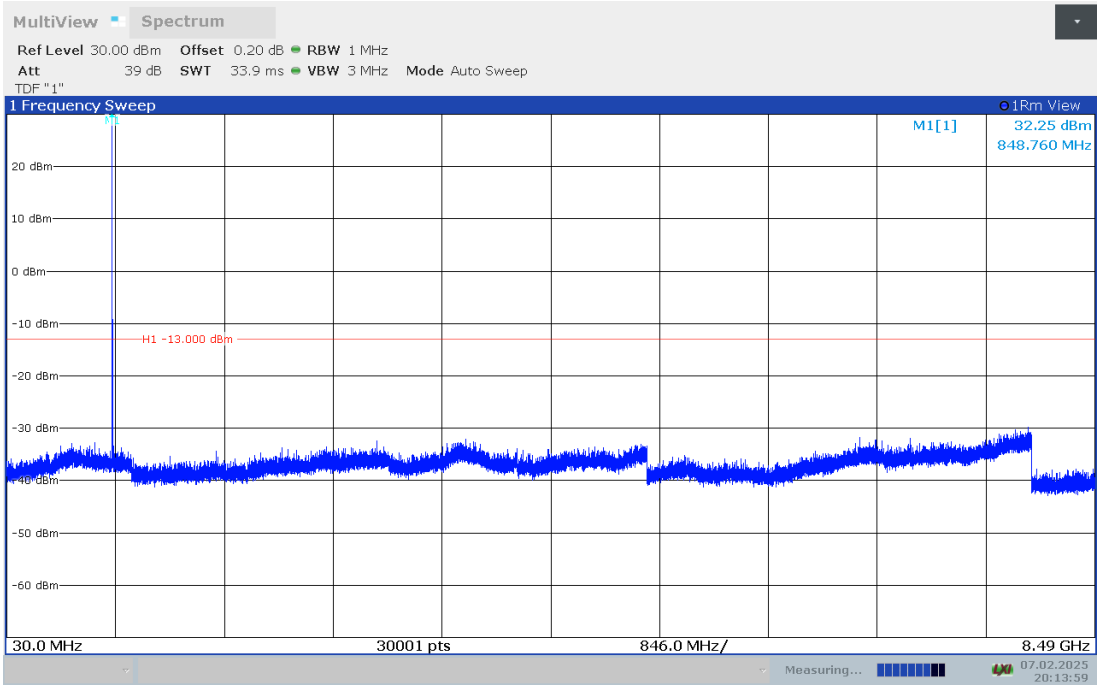

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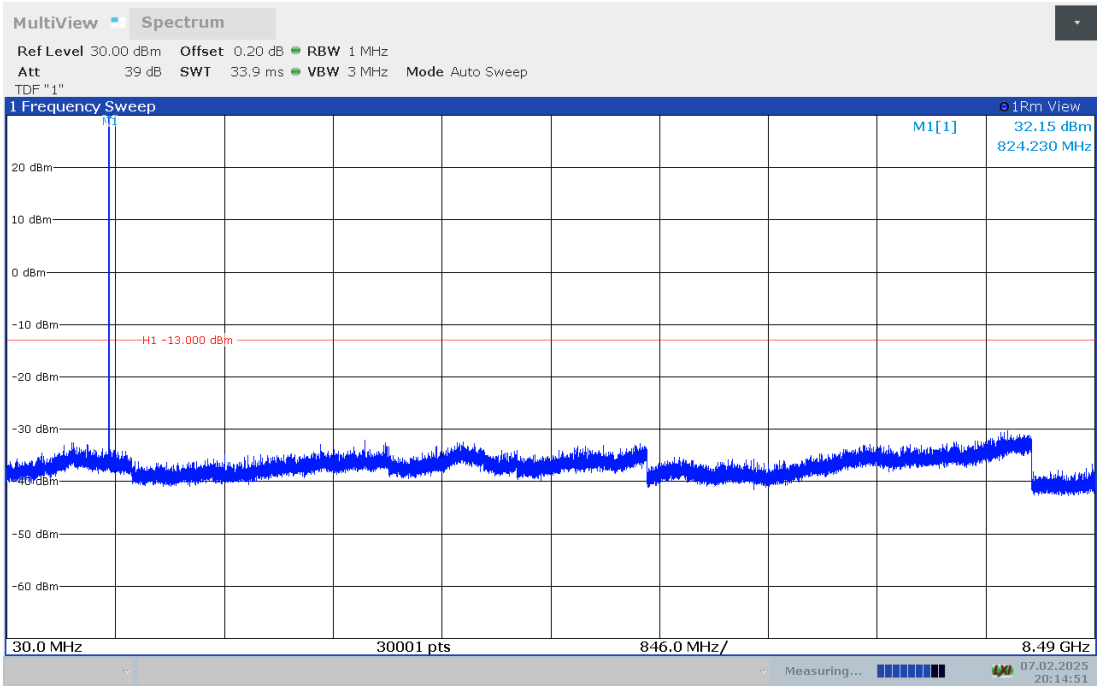
GSM850

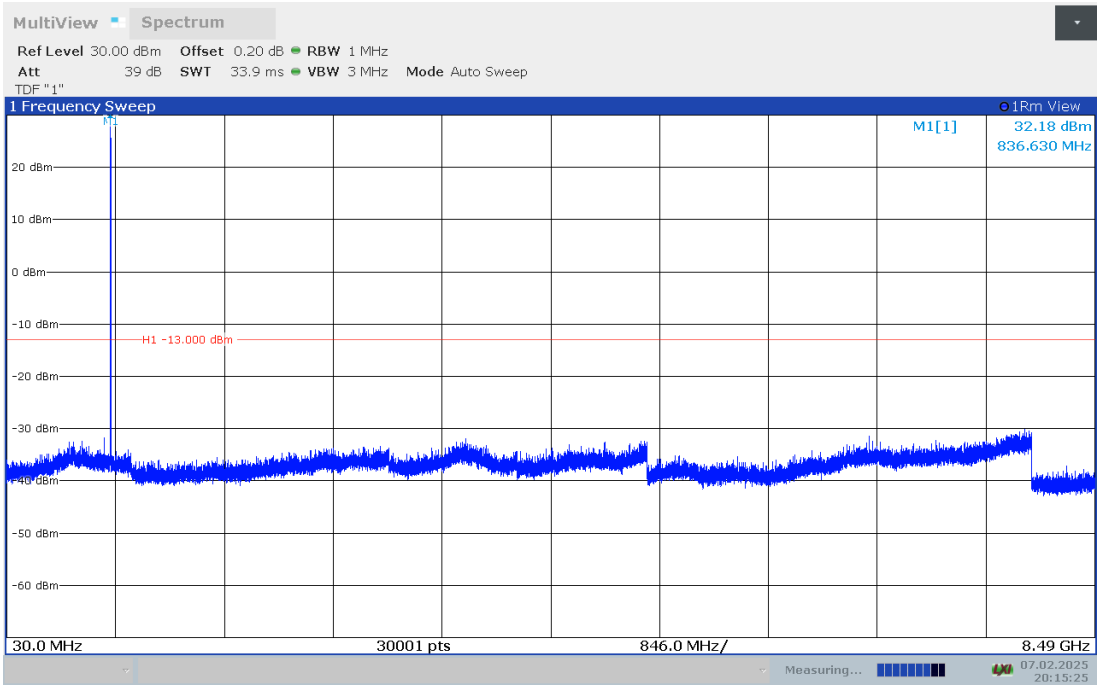
Channel 128:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 190:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 251:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.

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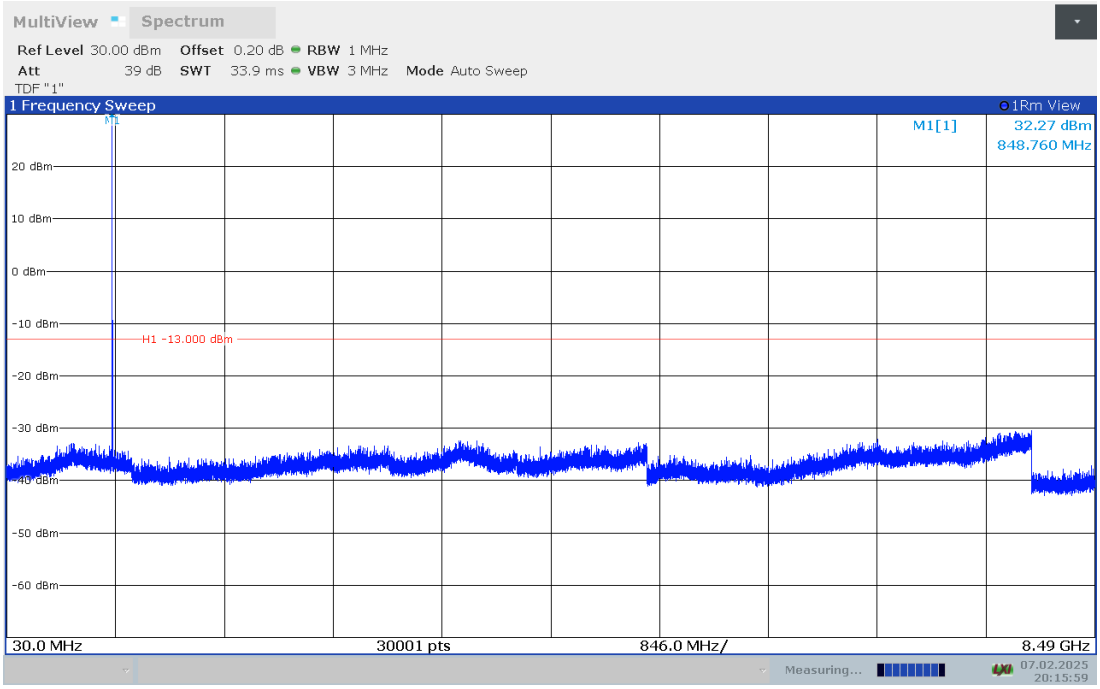

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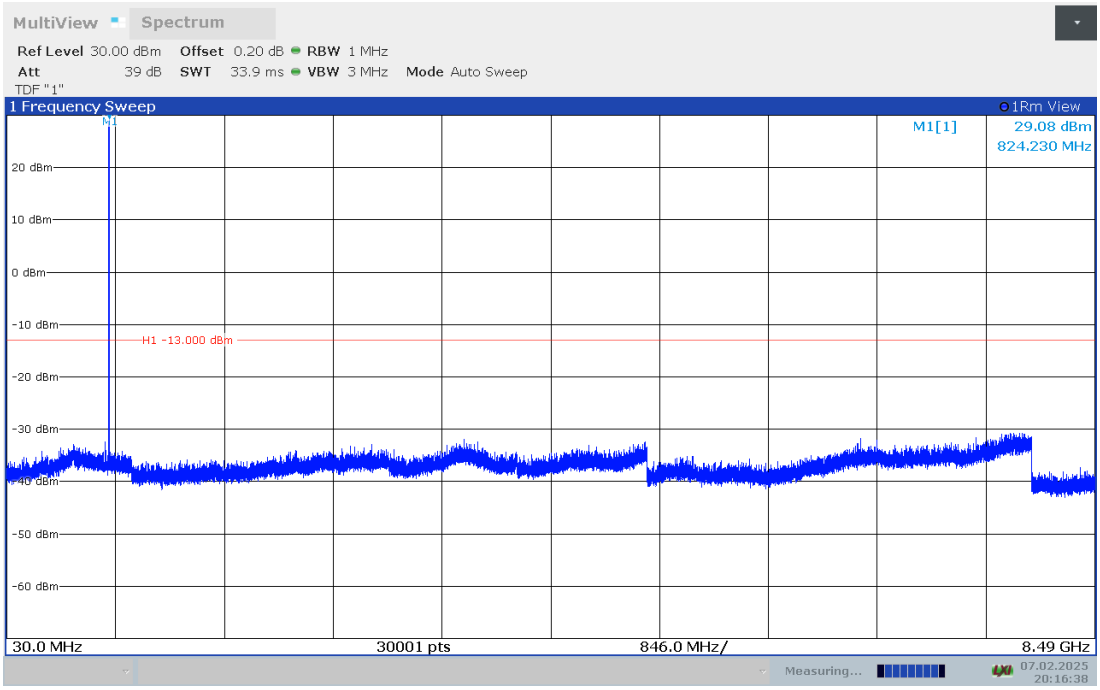
GSM850

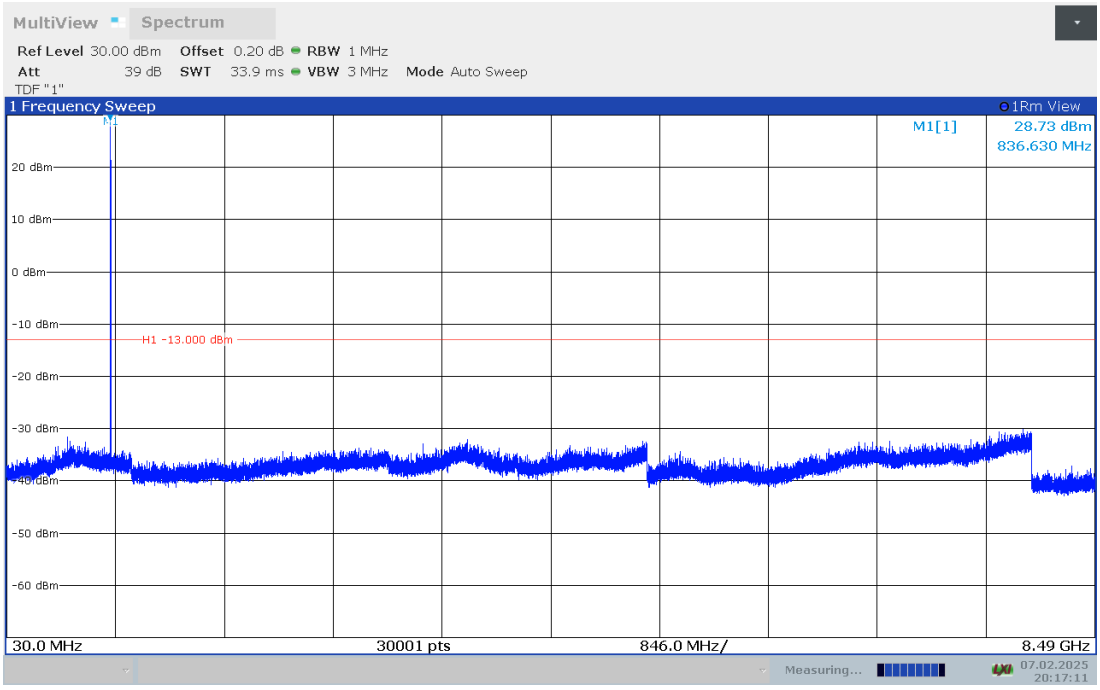
Channel 128:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 190:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 251:30MHZ - 8490MHZ

NOTE: peak above the limit line is the carrier frequency.

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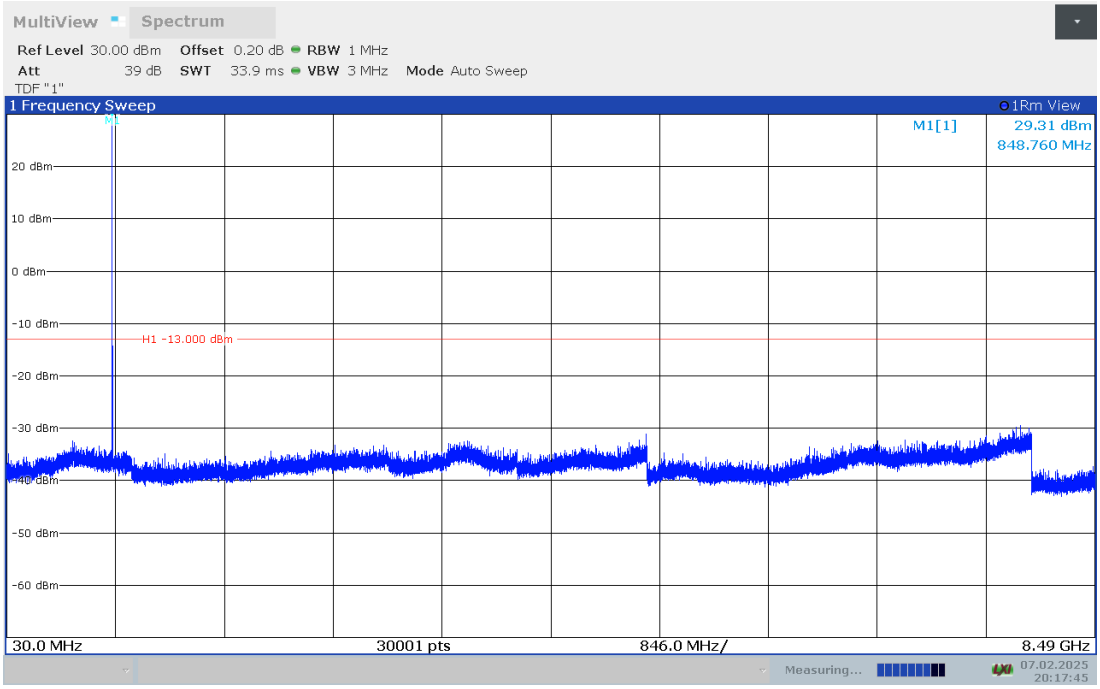

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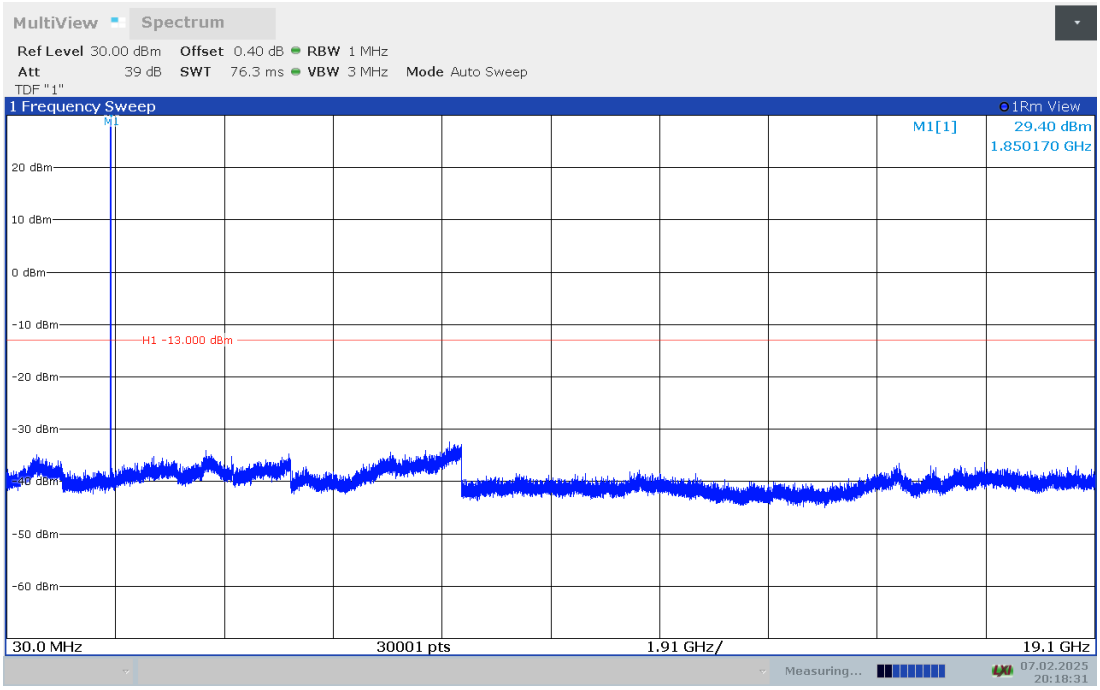
PCS1900

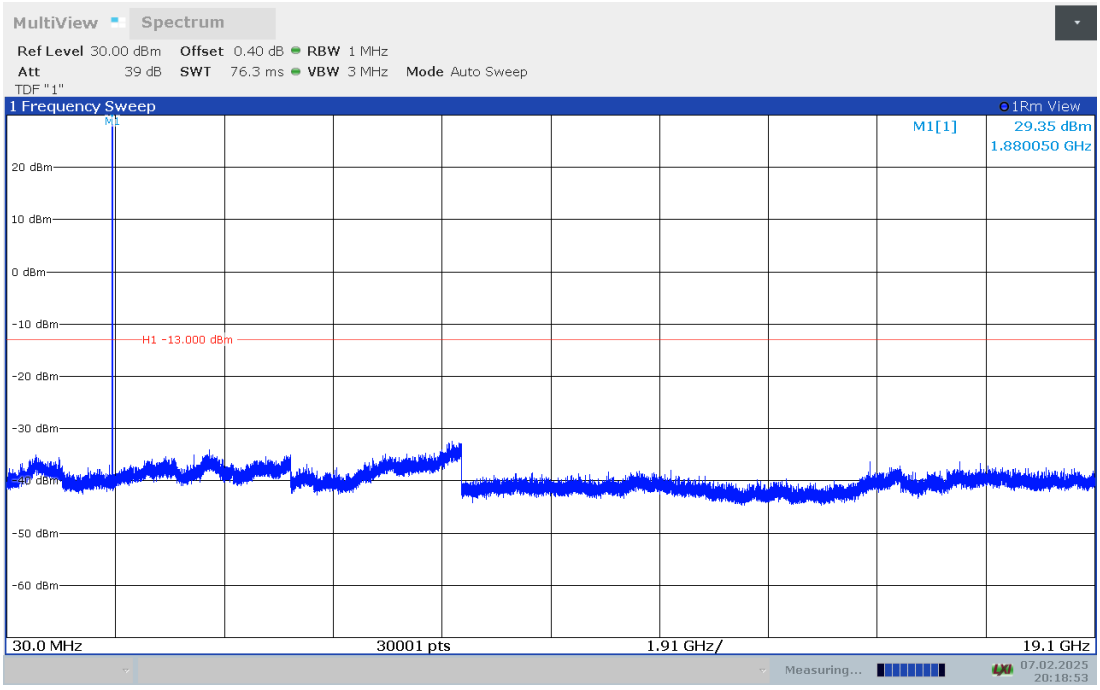
Channel 512:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 661:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 810:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.

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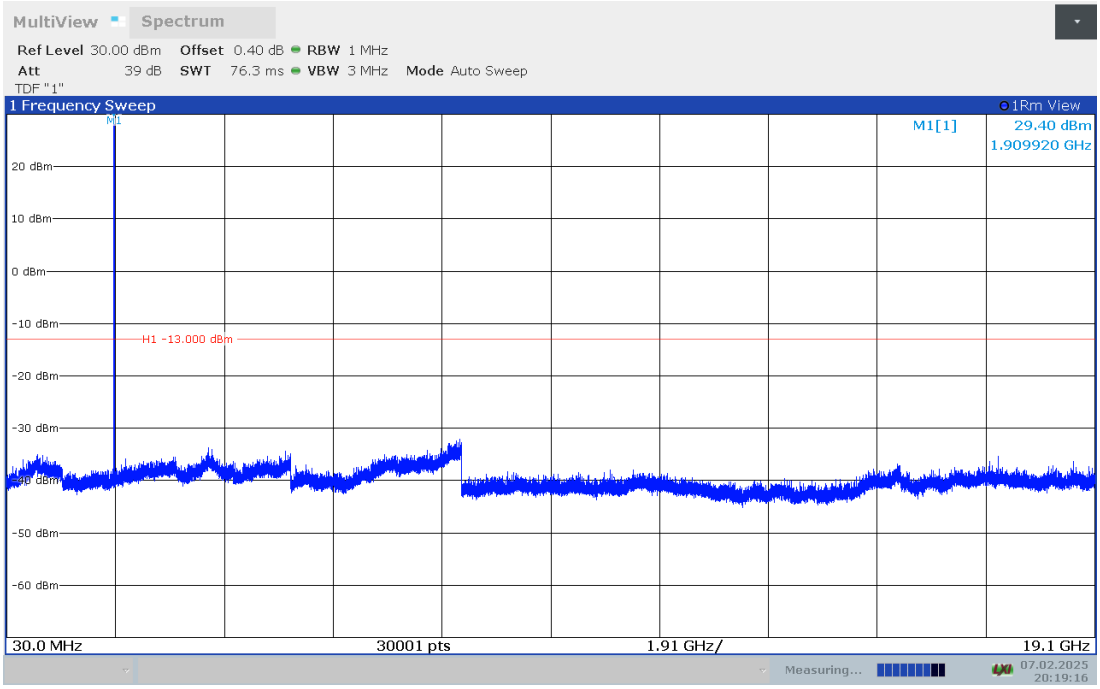

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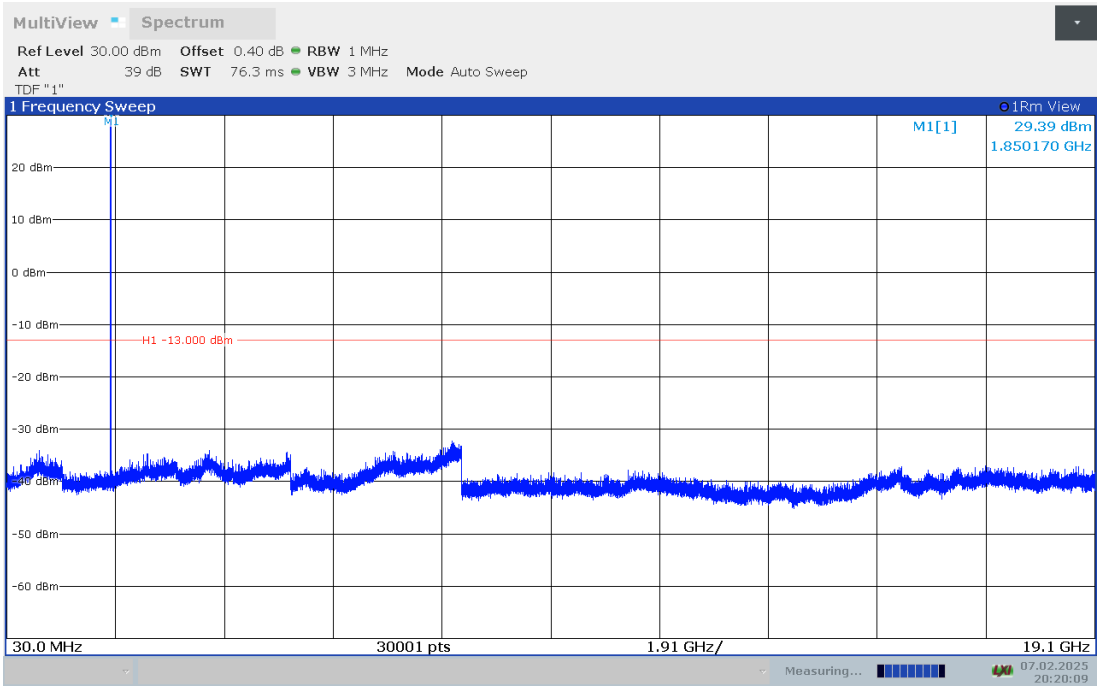
PCS1900

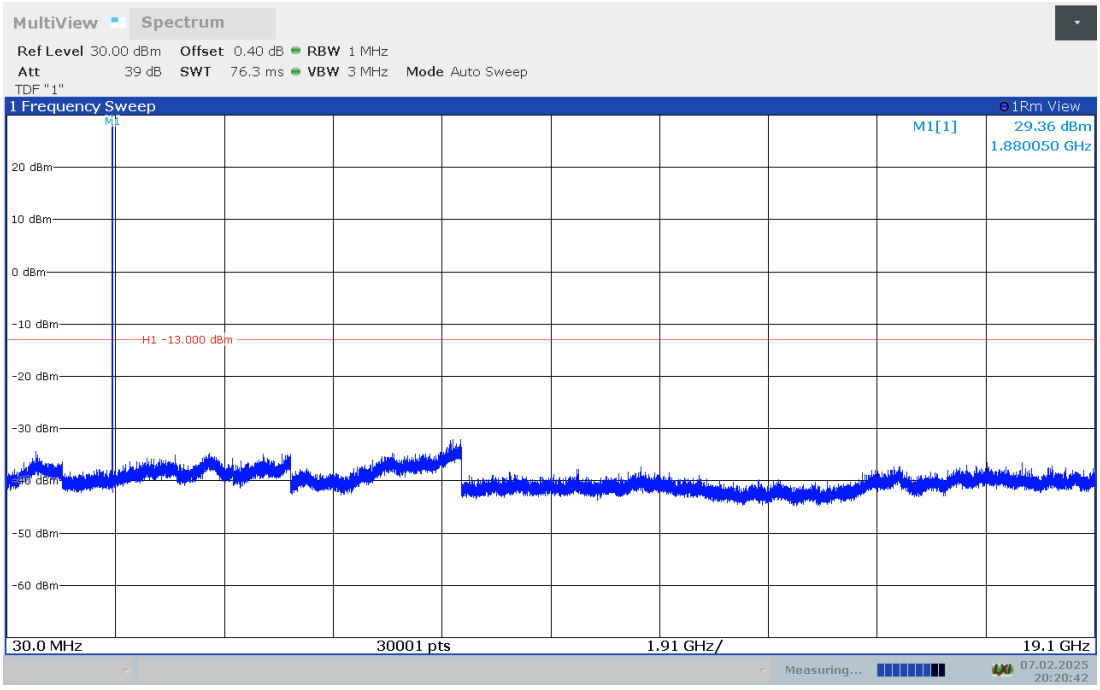
Channel 512:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 661:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 810:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.

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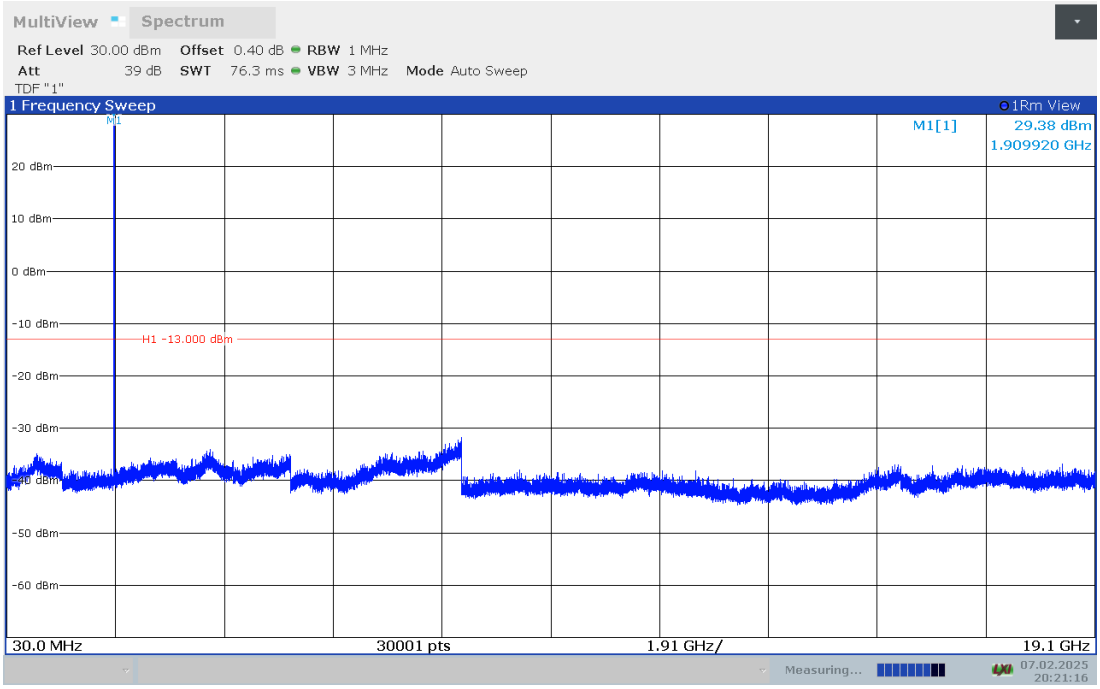

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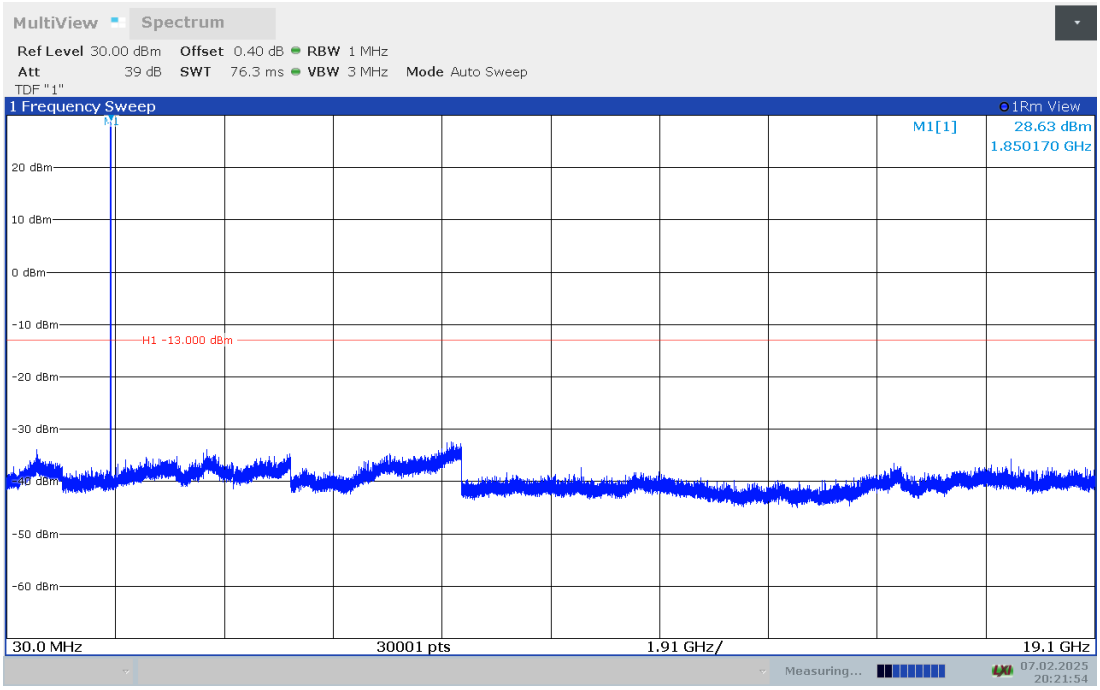
PCS1900

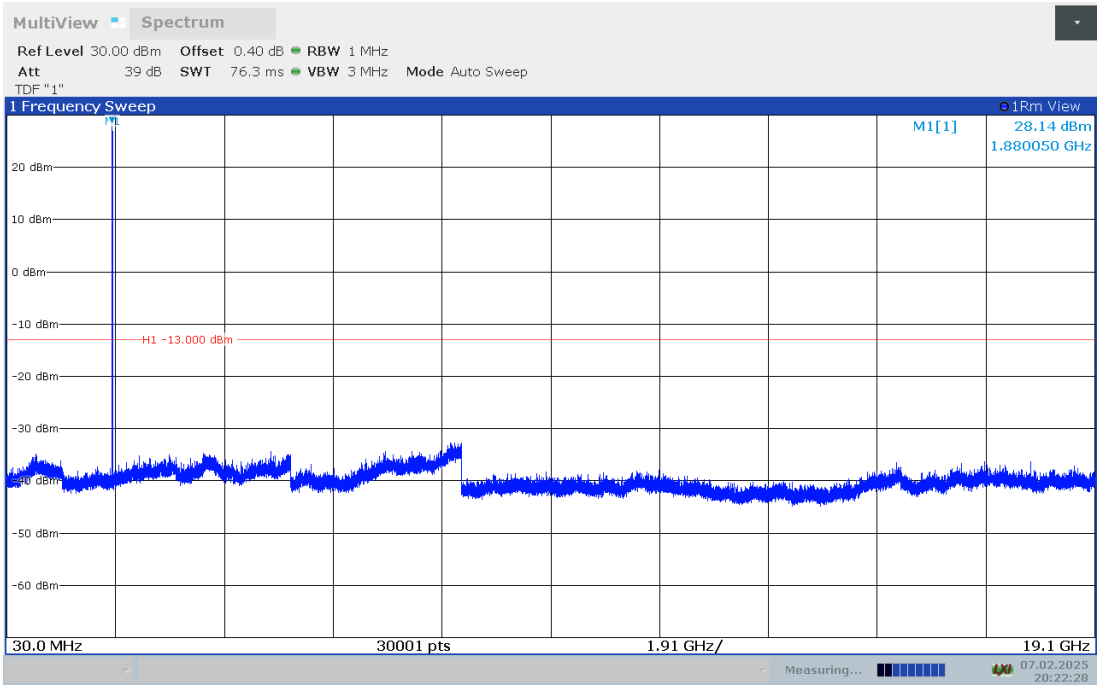
Channel 512:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 661:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.



Channel 810:30MHZ - 19100MHZ

NOTE: peak above the limit line is the carrier frequency.

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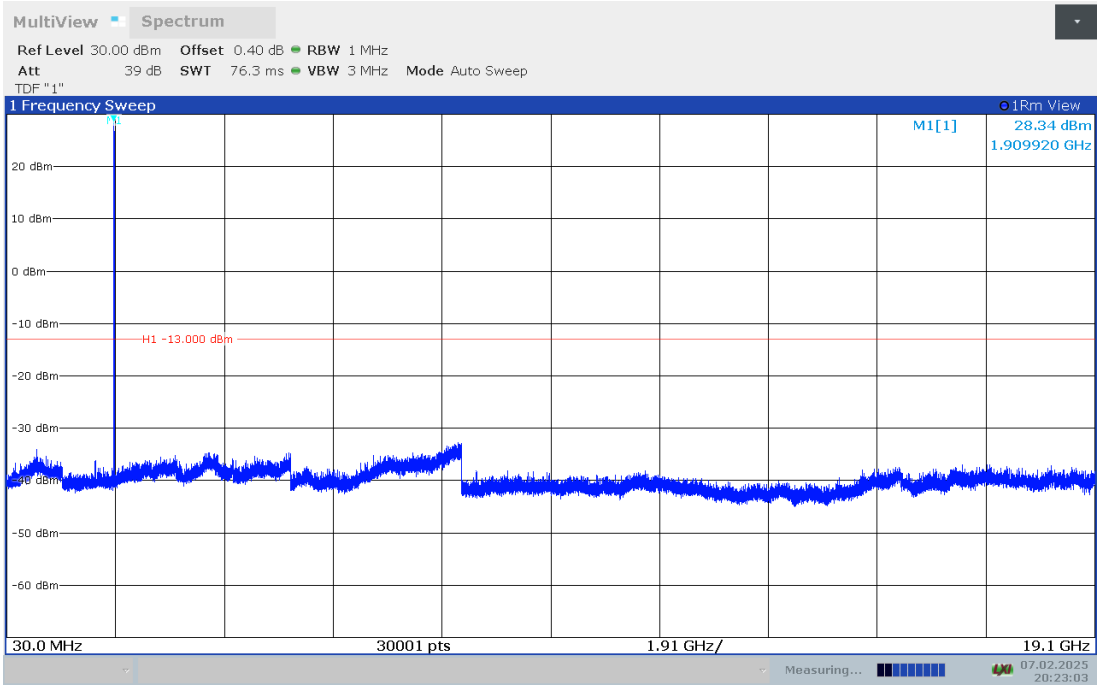

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A.8 PEAK-TO-AVERAGE POWER RATIO

The peak-to-average power ratio (PAPR) of the transmission may not exceed 13 dB

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
c) Set the number of counts to a value that stabilizes the measured CCDF curve;
d) Record the maximum PAPR level associated with a probability of 0.1%.

Measurement results

Only worst case result is given below

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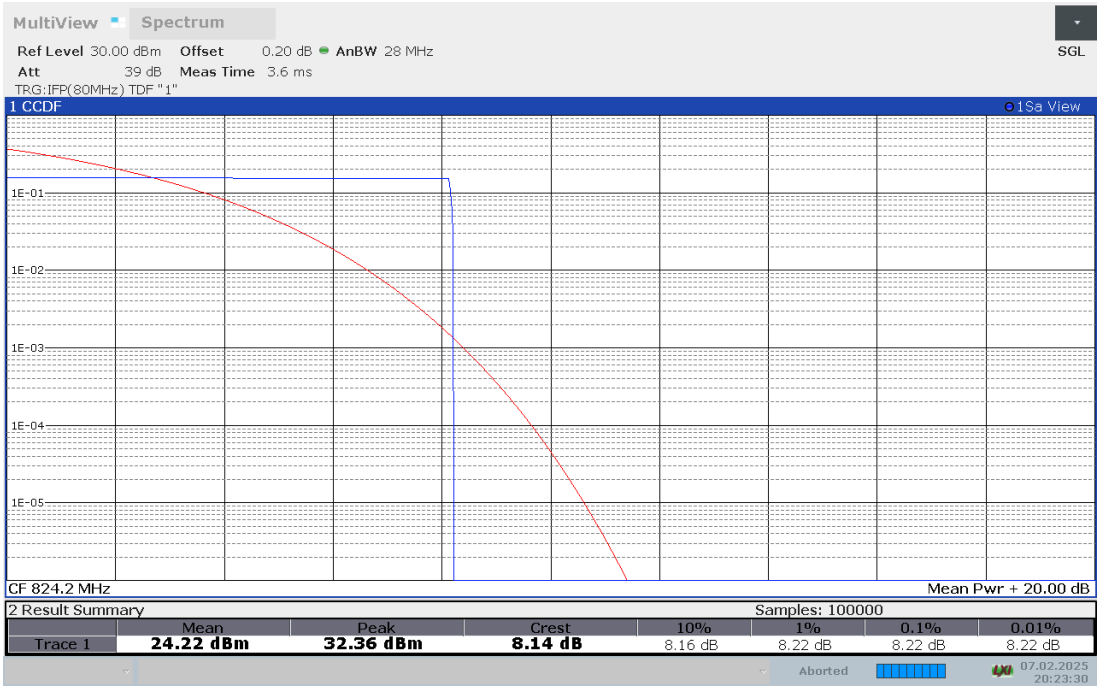
GSM850

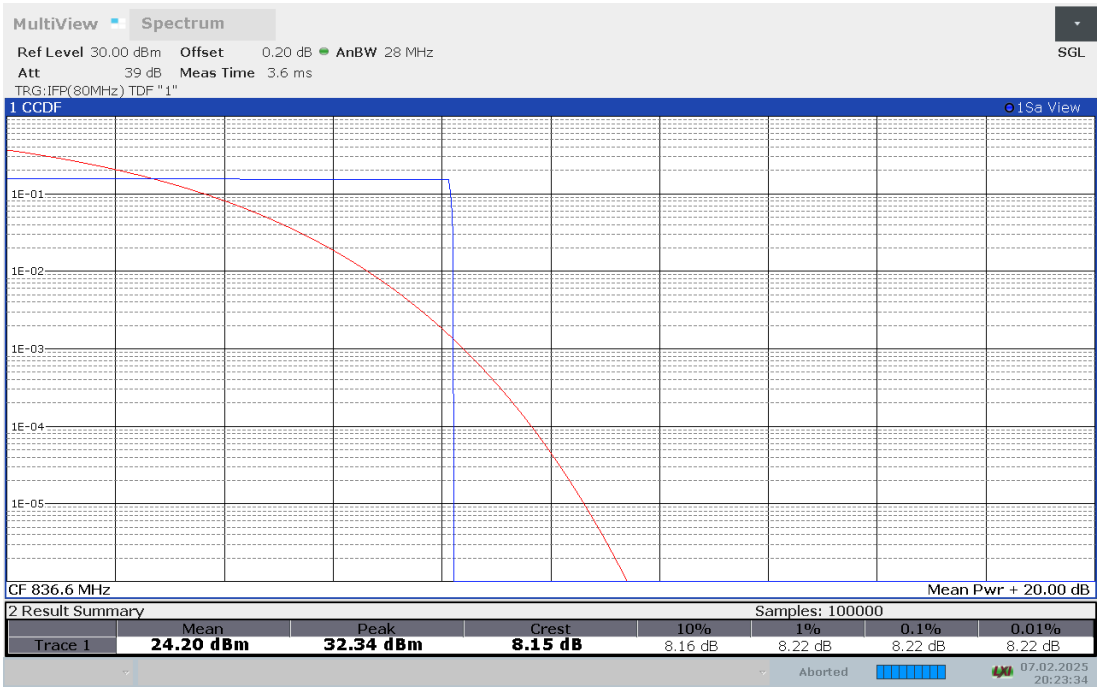
Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
824.2	8.22
836.6	8.22
848.8	8.22

GSM 850

Channel GSM-824.2MHz



Channel GSM-836.6MHz



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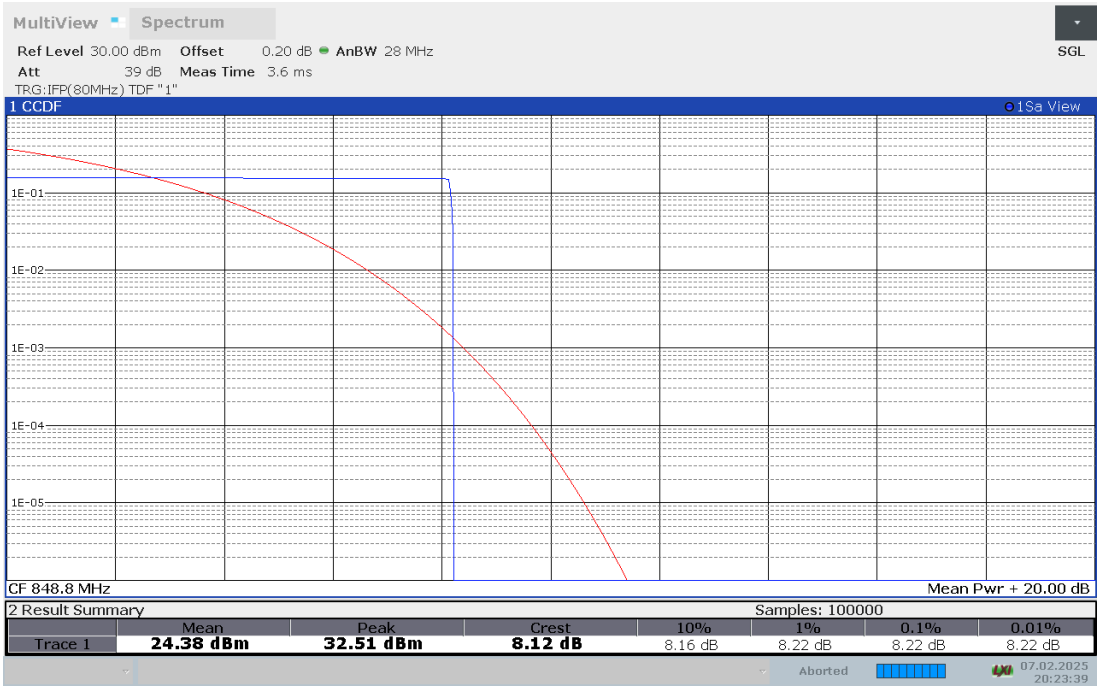
Channel GSM-848.8MHz



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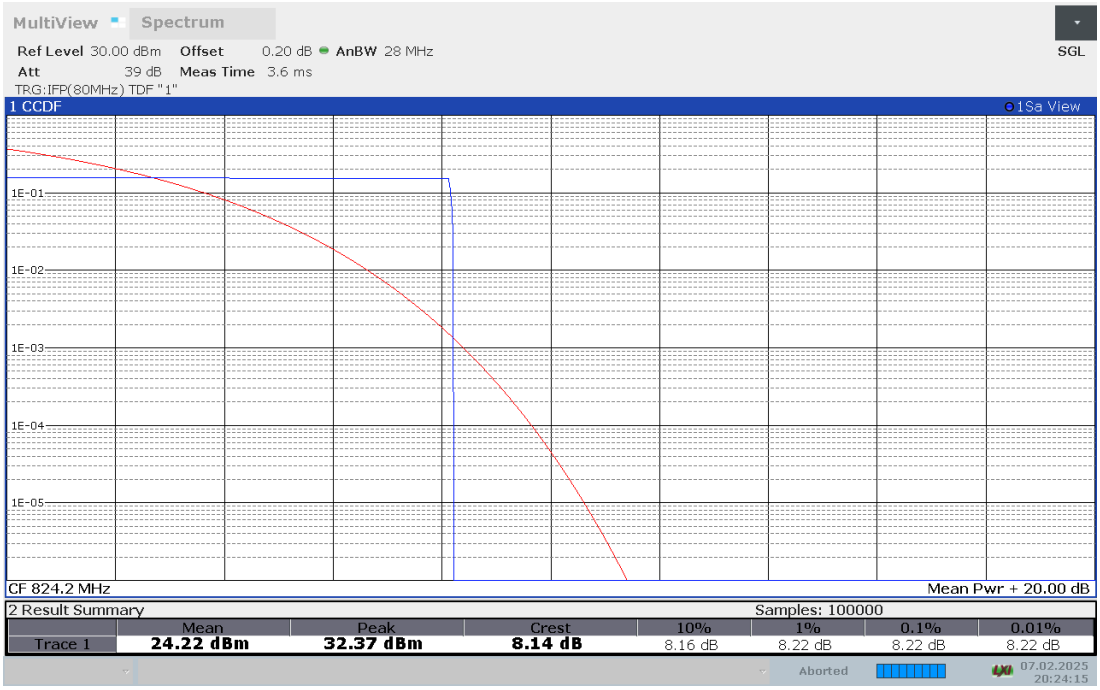
GPRS 850 (PAPR)

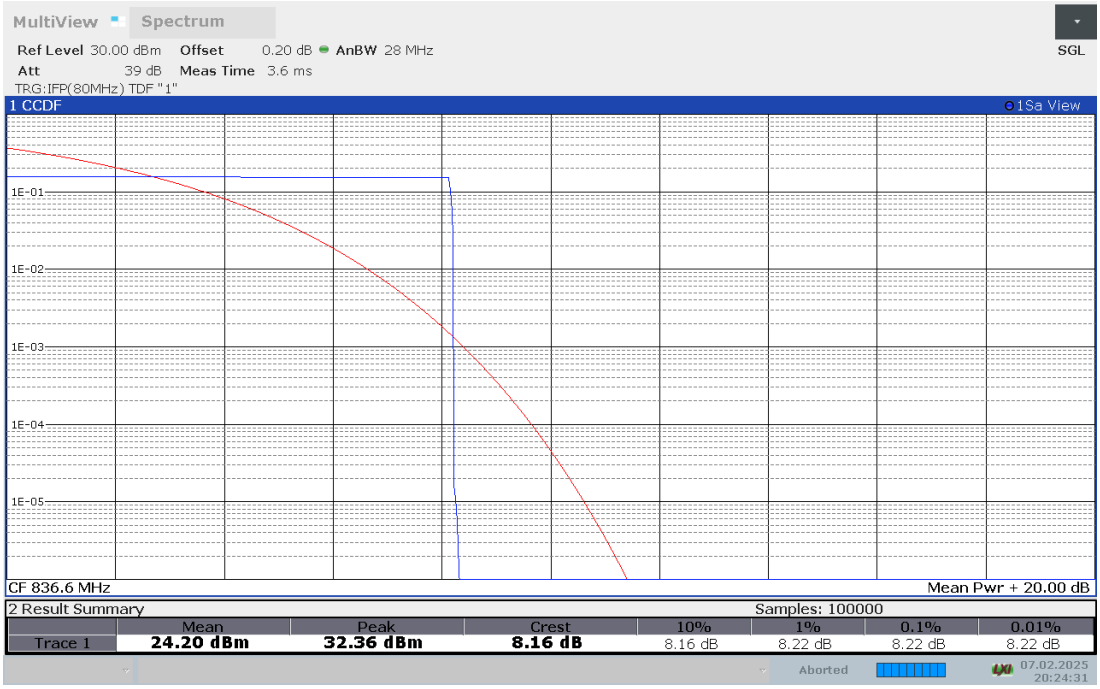
Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
824.2	8.22
836.6	8.22
848.8	8.22

GPRS 850

Channel GPRS-824.2MHz



Channel GPRS-836.6MHz



Channel GPRS-848.8MHz

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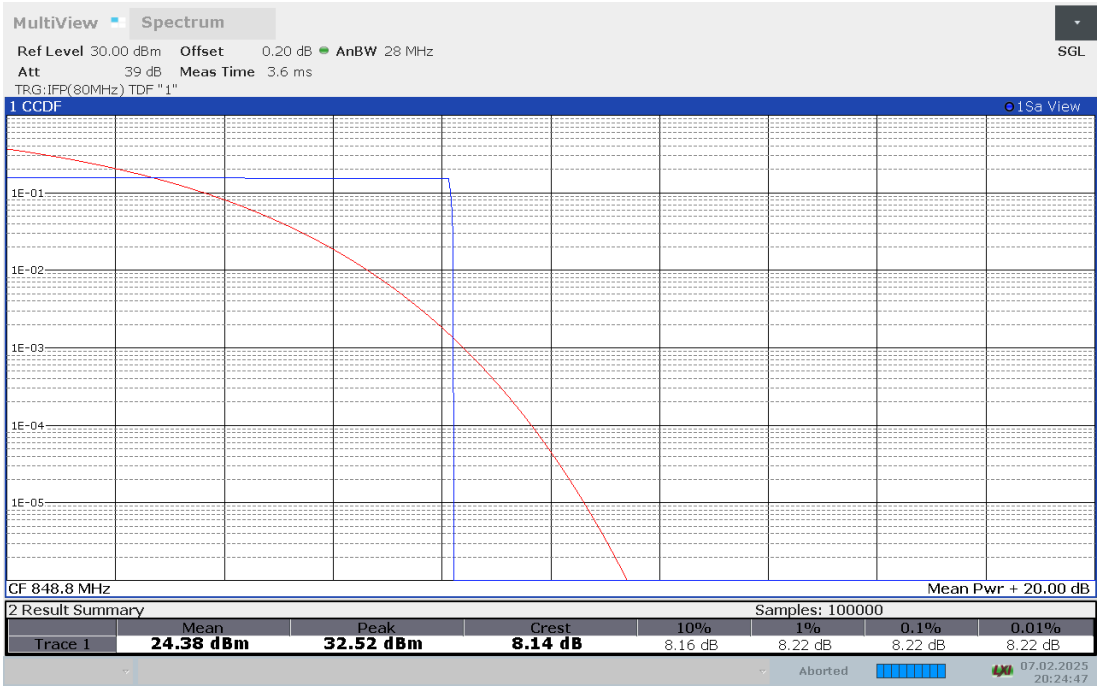

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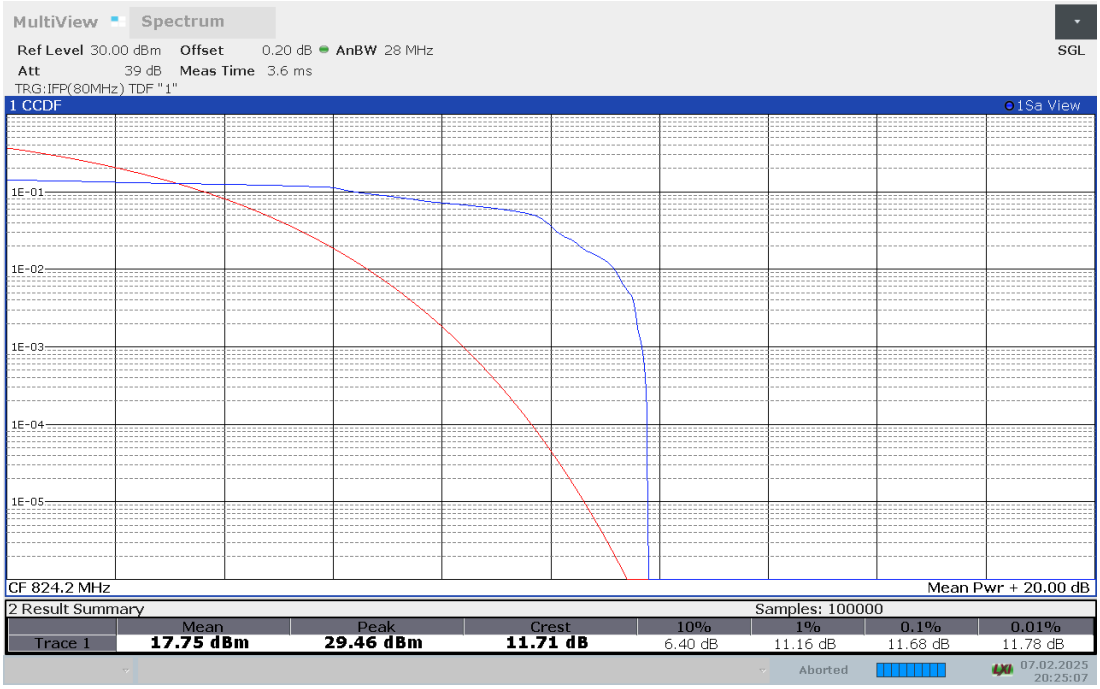
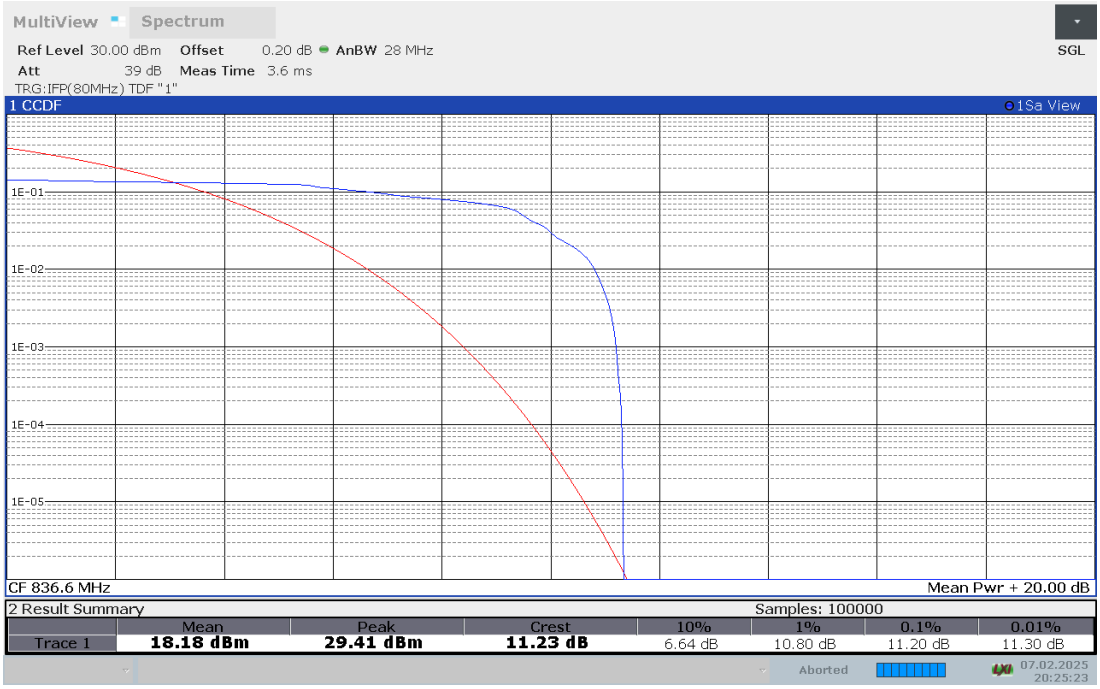
EGPRS 850 (PAPR)

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
824.2	11.68
836.6	11.20
848.8	11.24

Channel EGPRS-824.2MHz



Channel EGPRS-836.6MHz



Channel EGPRS-848.8MHz

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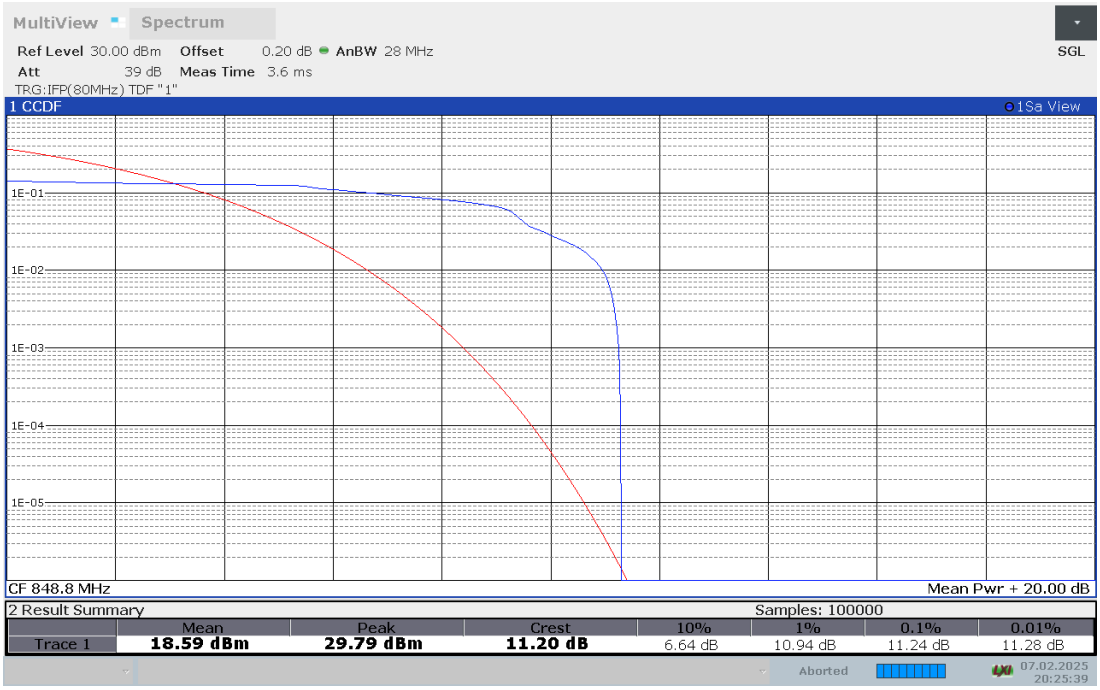

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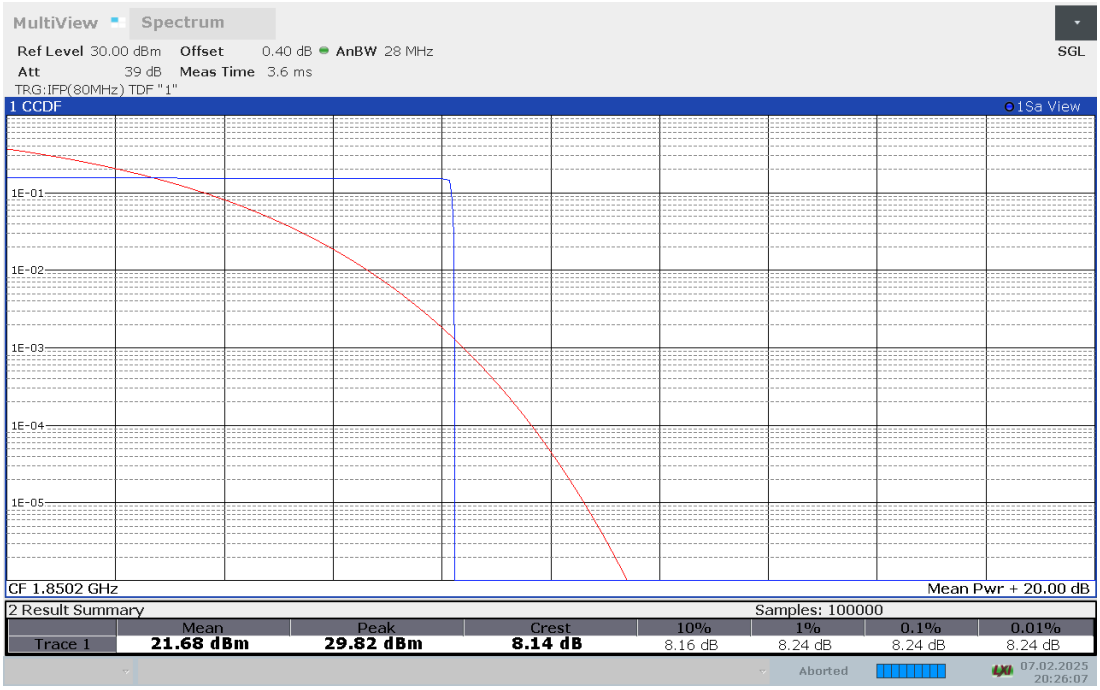
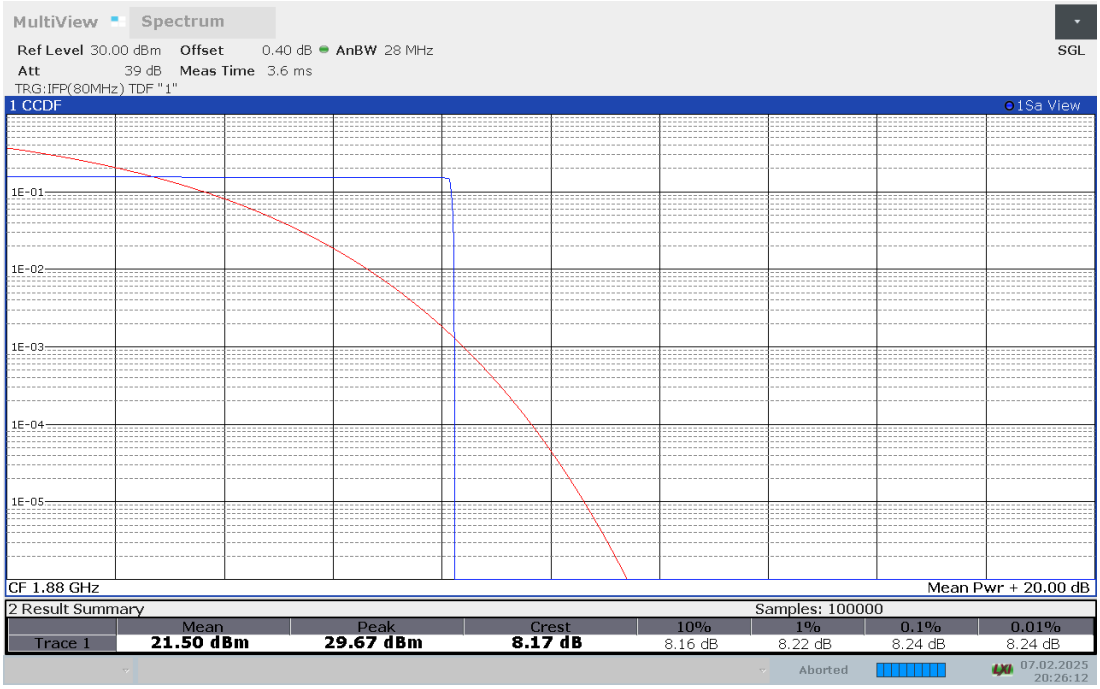
PCS1900 (PAPR)

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
1852.4	8.24
1880.0	8.24
1909.7	8.24

Channel GSM-1850.2MHz



Channel GSM-1880MHz



Channel GSM-1909.8MHz

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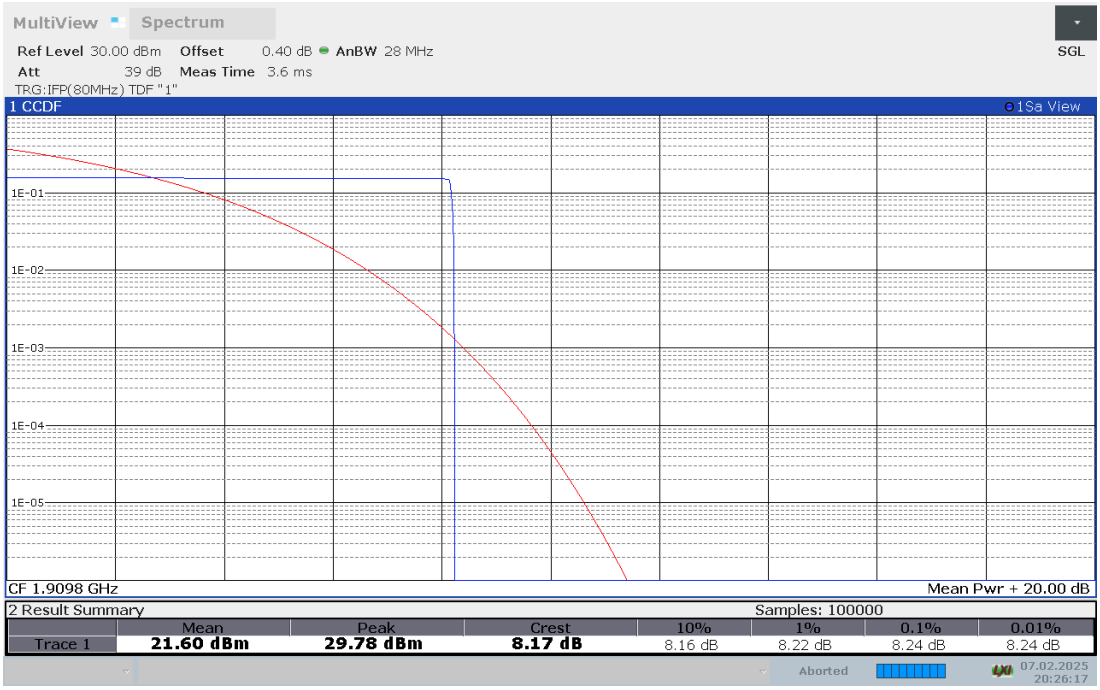

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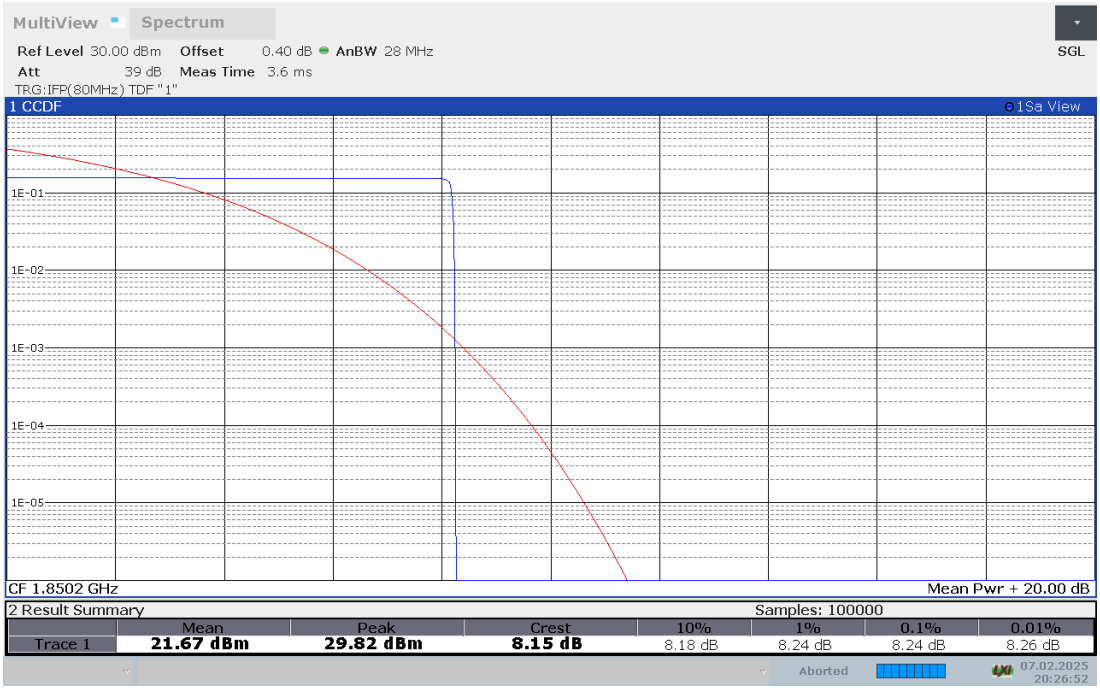
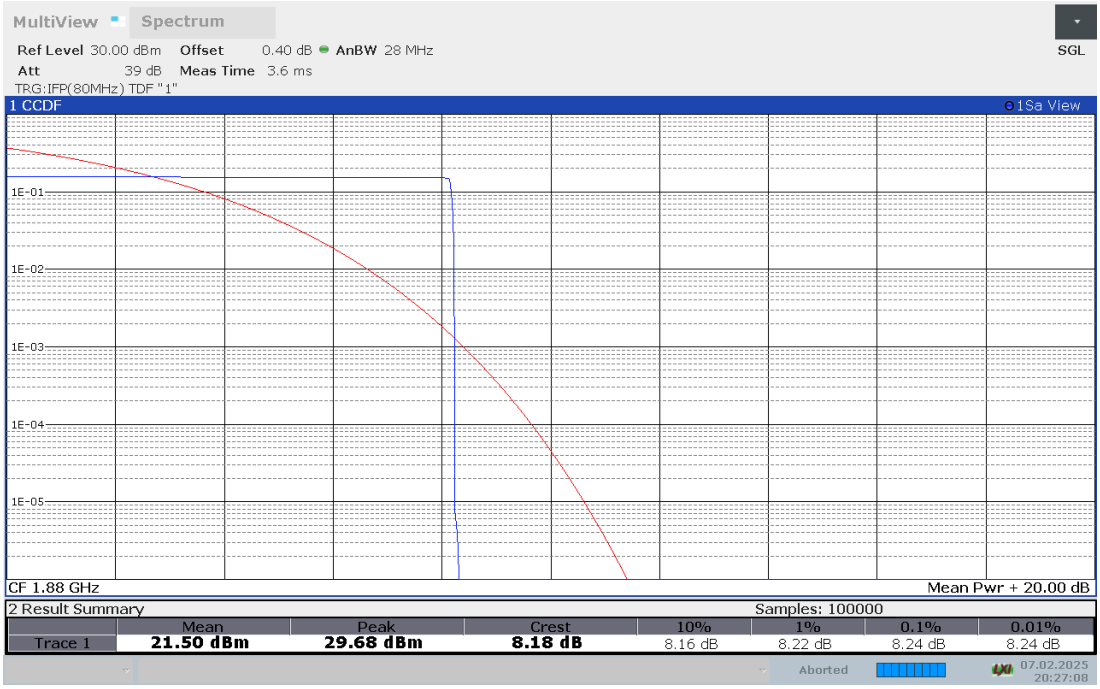
GPRS1900 (PAPR)

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
1852.4	8.24
1880.0	8.24
1909.7	8.24

Channel GPRS-1850.2MHz



Channel GPRS-1880MHz



Channel GPRS-1909.8MHz

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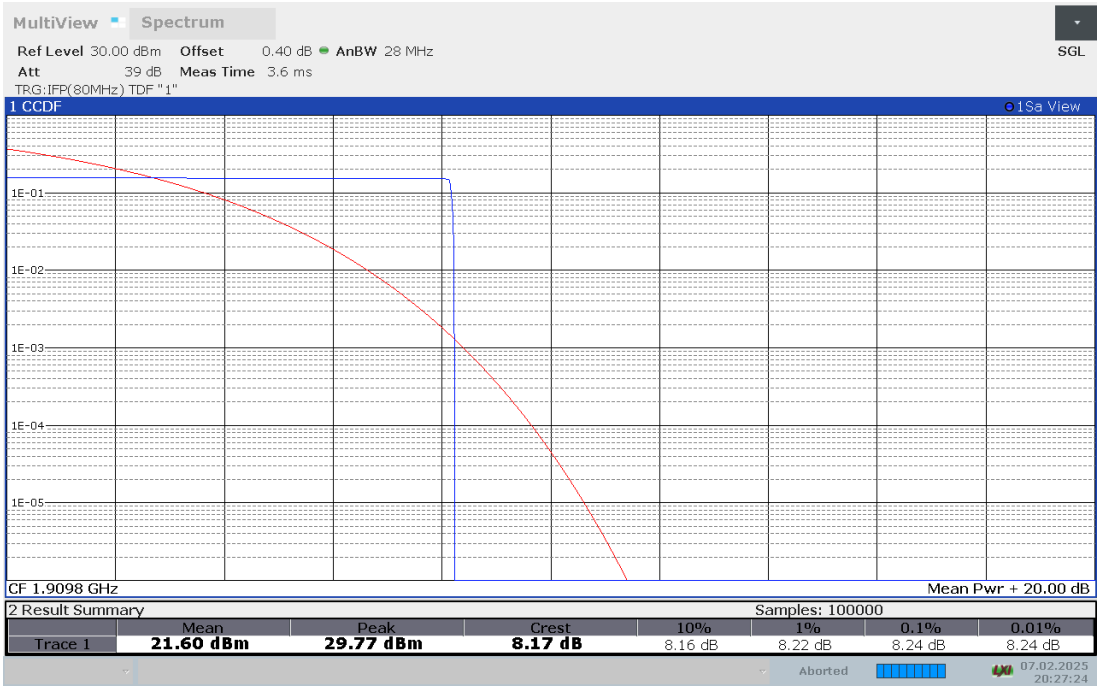

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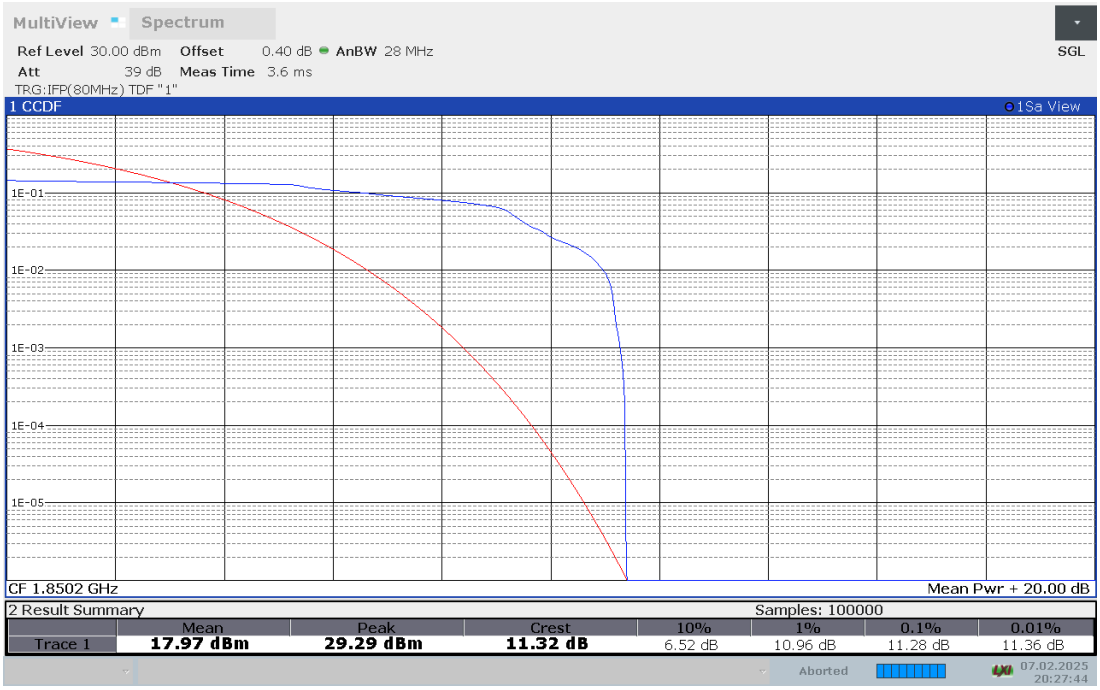
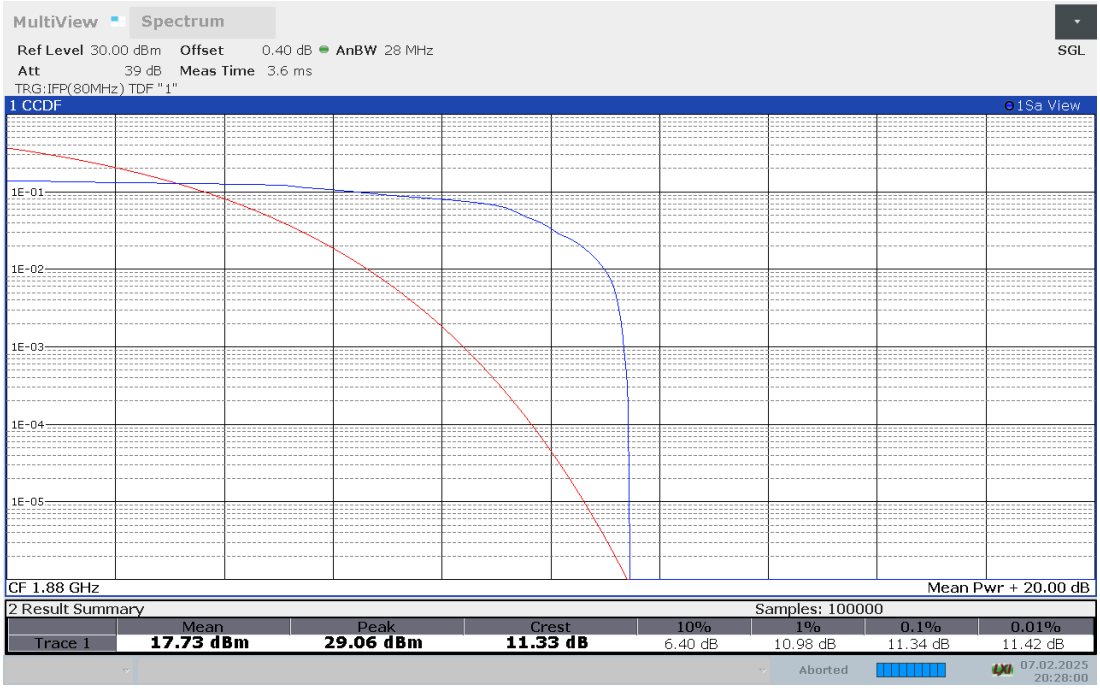
EGPRS1900 (PAPR)

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
1852.4	11.28
1880.0	11.34
1909.7	11.44

Channel EGPRS-1850.2MHz



Channel EGPRS-1880MHz



Channel EGPRS-1909.8MHz

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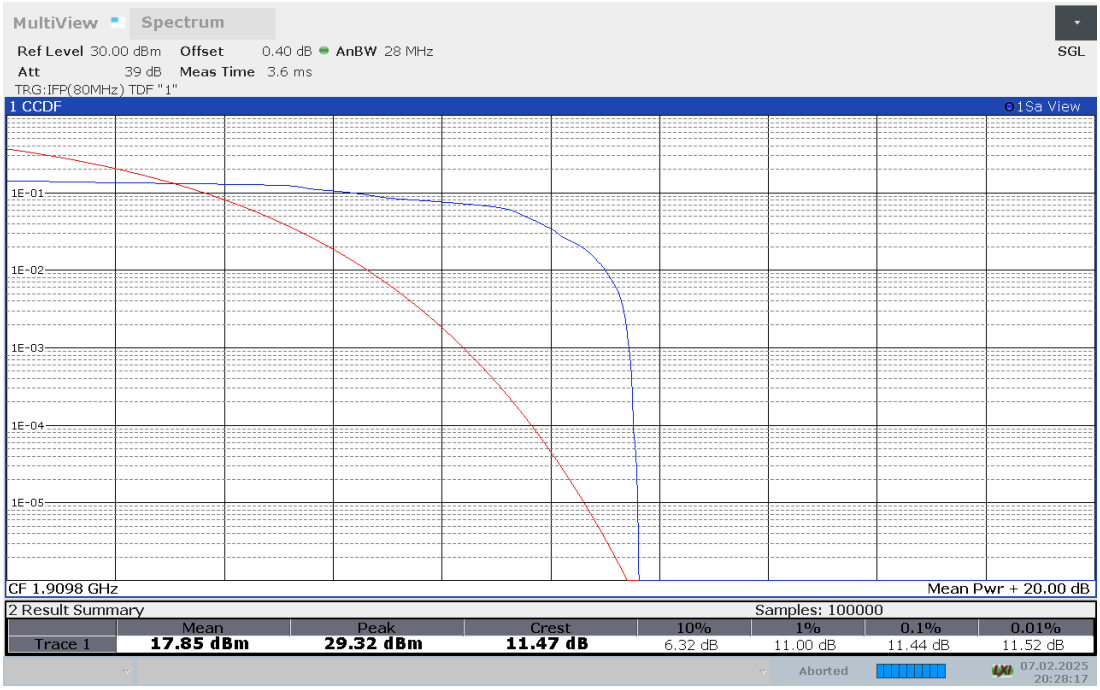

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ANNEX B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

SHENZHEN ACADEMY OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

Shenzhen, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 14th day of November 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4353.01
Valid to November 30, 2025

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

*****END OF REPORT*****

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