Certificate Number: 5055.02

TEST REPORT FOR GSM TESTING

Report No.: SRTC2021-9004(F)-21121702(A)

Product Name: LTE/WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone

Product Model: ZTE 8045

Applicant: ZTE Corporation

Manufacturer: ZTE Corporation

Specification: FCC Part 24E, Part 22H, Part 2 (2020)

FCC ID: SRQ-ZTE8045

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District, Beijing, P.R.China

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1. GENERAL INFORMATION

1.1 Notes of the test report

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1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, P.R.China
City:	Beijing
Country or Region:	P.R.China
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Designation Number:	CN1267
Registration number:	239125

1.3 Applicant’s details

Company:	ZTE Corporation
Address:	ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District,Shenzhen, Guangdong, 518057, P.R.China

1.4 Manufacturer’s details

Company:	ZTE Corporation
Address:	ZTE Plaza, #55 Keji Road South, Hi-Tech, Industrial Park, Nanshan District,Shenzhen, Guangdong, 518057, P.R.China

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2021-12-17
Testing Start Date:	2021-12-20
Testing End Date:	2021-12-22

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient:	25	40
Maximum Extreme:	55	---
Minimum Extreme:	-20	---

Normal Supply Voltage (V d.c.):	3.80
Maximum Extreme Supply Voltage (V d.c.):	4.20
Minimum Extreme Supply Voltage (V d.c.):	3.60

2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Frequency Range:	GSM850: Tx:824~849MHz Rx:869~894MHz PCS1900: Tx:1850~1910MHz Rx:1930~1990MHz
Modulation Type:	GPRS:GMSK EDGE: GMSK/8PSK
Emission Designator:	300KGXW/300KG7W
Duplex Mode:	FDD
Duplex Spacing:	GSM850:45MHz PCS1900:80MHz
Antenna Type:	GSM850: IFA antenna PCS1900: Monopole antenna
Antenna Gain:	GSM850: -2.5dBi/PCS1900: -1.4dBi ERP = EIRP(Power+Gain) – 2.15 (dB)
Power Supply:	Charger
Software Revision:	MyOS11.0.0_8045_TEL
Hardware Revision:	ZTE 8045HW1.0
IMEI:	865992060001387

2.2 Support Equipment

The following support equipment was used to exercise the DUT during testing:
N/A

3 REFERENCE SPECIFICATION

Specification	Version	Title
FCC Part2	2020	Frequency allocations and radio treaty matters; general rules and regulations
FCC Part22	2020	Public mobile services
FCC Part24	2020	Personal communications services
ANSI C63.26	2020	American national standard for compliance testing of transmitters used in licensed radio services
KDB 971168 D01	April 9, 2018	Measurement guidance for certification of licensed digital transmitters
TIA-603-E-2016	March 2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

4 KEY TO NOTES AND RESULT CODES

The following are the definition of the test result.

Code	Meaning
PASS	Test result shows that the requirements of the relevant specification have been met.
FAIL	Test result shows that the requirements of the relevant specification have not been met.
NT	Normal Temperature
NV	Nominal voltage
HV	High voltage
LV	Low voltage

5 RESULT SUMMARY

No.	Test case	FCC reference	Verdict
1	RF Power Output	2.1046	Pass
2	Effective Radiated Power and Effective Isotropic Radiated Power	22.913(a)(5)/24.232(c)	Pass
3	Occupied Bandwidth	2.1049	Pass
4	Emission Bandwidth	2.1049	Pass
5	Spurious Emissions at antenna terminals	2.1051/22.917(a)/24.238(a)	Pass
6	Band Edges Compliance	2.1051/22.917(a)/24.238(a)	Pass
7	Frequency Stability	2.1055/22.355/24.235	Pass
8	Radiated Spurious Emissions	2.1053/22.917(a)/24.238(a)	Pass
9	Peak-Average Ratio	24.232(d)	Pass

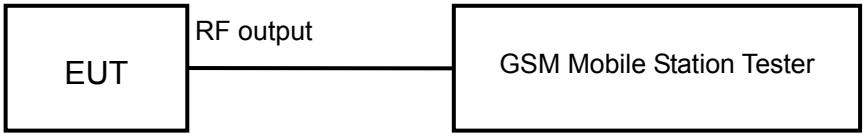
This Test Report Is Issued by: Mr. Peng Zhen	Checked by: Mr. Li Bin
Tested by: Mr. Liu Ce	Issued date: 20220112

6 TEST RESULT

6.1 RF Power Output

Rule Part(s)
FCC Part 2.1046

Test Setup:



Test procedure:
After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.
The measurement will be conducted at three channels (Low, Middle and High channels)

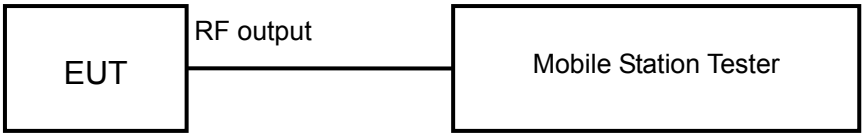
Limits: No specific conduct power requirements in part 2.1046.

Test result:
The test results are shown in Appendix A.

6.2 Effective Radiated Power and Effective Isotropic Radiated Power

Rule Part(s)
FCC Part 22.913(a)(5)/Part 24.232(c)

Test setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 5.6
Test Settings
Subclause 5.2.5.5 of ANSI C63.26-2015 is applicable, along with the following provisions. For personal/portable radios utilizing an integral antenna, the factor LC is typically negligible. However, in a fixed station transmit system that utilizes a long cable run between the transmitter and the transmitting antenna, this factor can be significant. The minimum cable loss should be used in this equation.
The relevant equation for determining the ERP or EIRP from the conducted RF output power measured is:
ERP/EIRP = PMeas – LC + GT
Where:
ERP/EIRP = effective or equivalen radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm)
PMeas = measured transmitter output power or PSD, in dBW or dBm
LC = signal attenuation in the connecting cable between the transmitter and antenna in dB
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)
Limits for GSM850:

Operation Mode	Power Step	E.R.P. (dBm)
GSM	5	≤38.45
GPRS	3	≤38.45
EDGE	6	≤38.45

Limits for PCS1900:

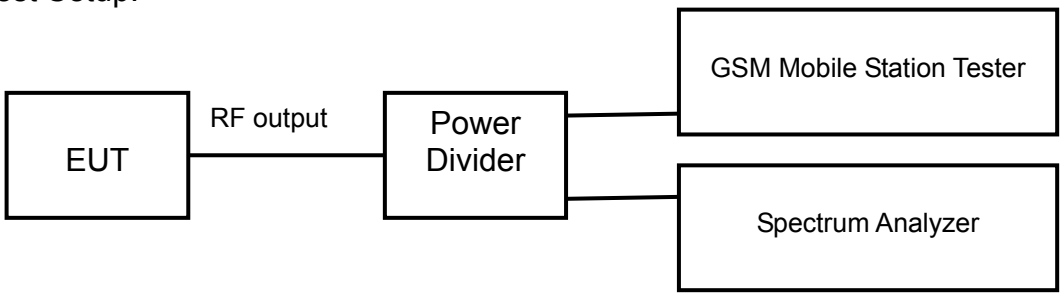
Operation Mode	Power Step	E.I.R.P. (dBm)
GSM	0	≤33
GPRS	3	≤33
EDGE	5	≤33

Test result:
The test results are shown in Appendix A.

6.3 Occupied Bandwidth

Rule Part(s)
Part 2.1049

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 4.2

Test Settings
1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

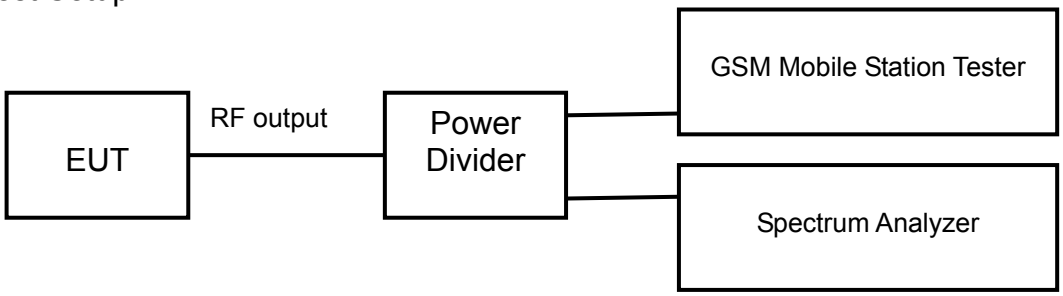
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:
The test results are shown in Appendix A.

6.4 Emission Bandwidth-

Rule Part(s)
Part 2.1049

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 4.2

Test Settings
1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 26dB occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the emission bandwidth observed in Step 7

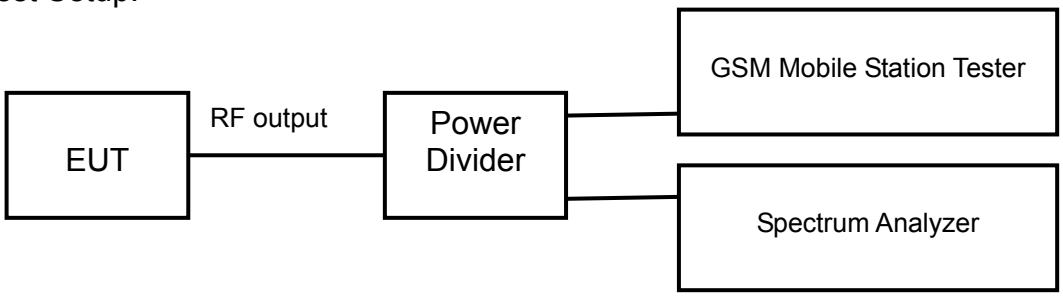
Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:
The test results are shown in Appendix A.

6.5 Spurious Emissions at antenna terminal

Rule Part(s)
FCC Part 2.1053/22.917 (a)/ 24.238(a)

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 6.0

Test Settings
1. Start frequency was set to 30MHz and stop frequency was set to 10GHz for Cell, 20GHz for PCS
2. RBW=100 kHz (For below 1GHz), 1MHz (For above 1GHz)
3. VBW ≥ 3 x RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. Sweep time = auto couple
7. The trace was allowed to stabilize

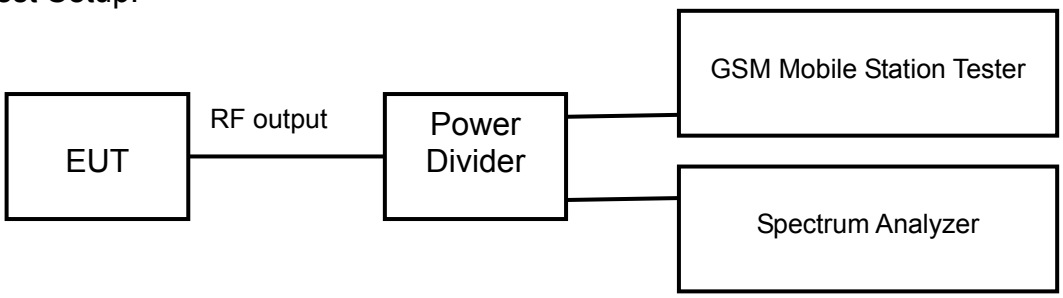
Limits:
The minimum permissible attenuation level of any spurious emission is $43+\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test result:
The test results are shown in Appendix A.

6.6 Band Edges Compliance

Rule Part (s)
FCC Part 2.1051/ 22.917(a) /Part 24.238(a)

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 6.0

Test Settings
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span=2MHz
3. RBW > 1% of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

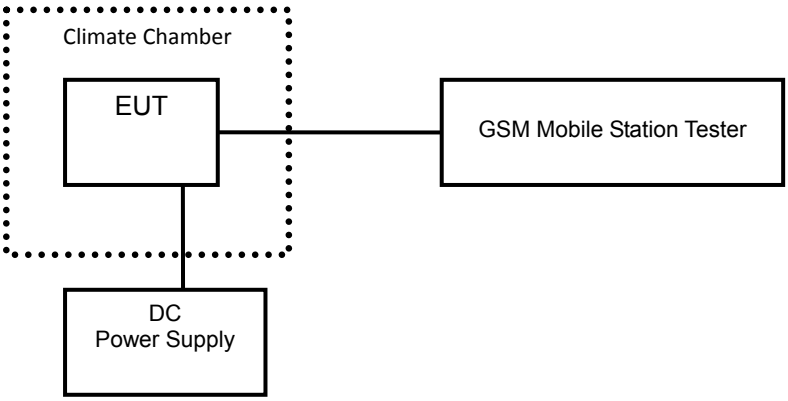
Limit: The minimum permissible attenuation level of any spurious emission is $43+\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test result:
The test results are shown in Appendix A.

6.7 Frequency Stability

Rule Part(s)
FCC Part 2.1055/22.355 /Part 24.235

Test setup:



Test Procedure:
ANSI/TIA-603-E-2016

Test Settings
1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C (The temperature range can be declared by the manufacturer). A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

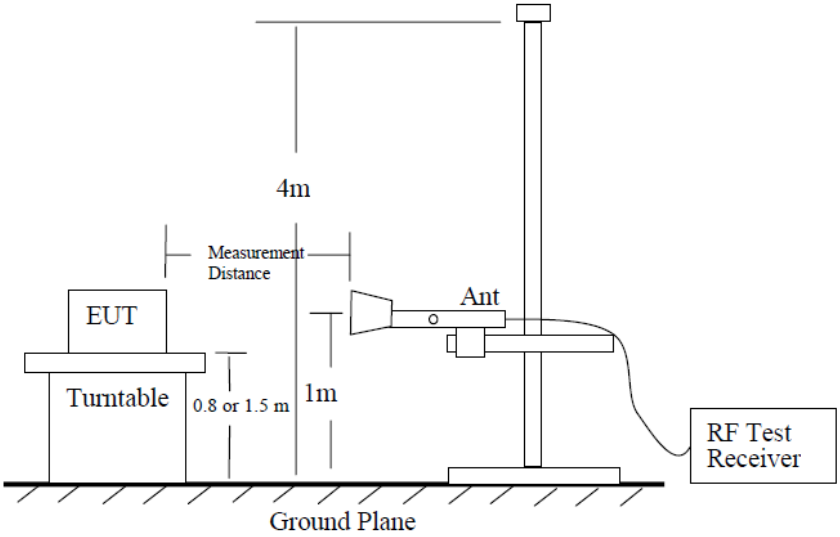
Limits: For Part 22, the frequency stability of the transmitter shall be maintained within±0.00025% (±2.5 ppm) of the center frequency. For Part 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test result:
The test results are shown in Appendix A.

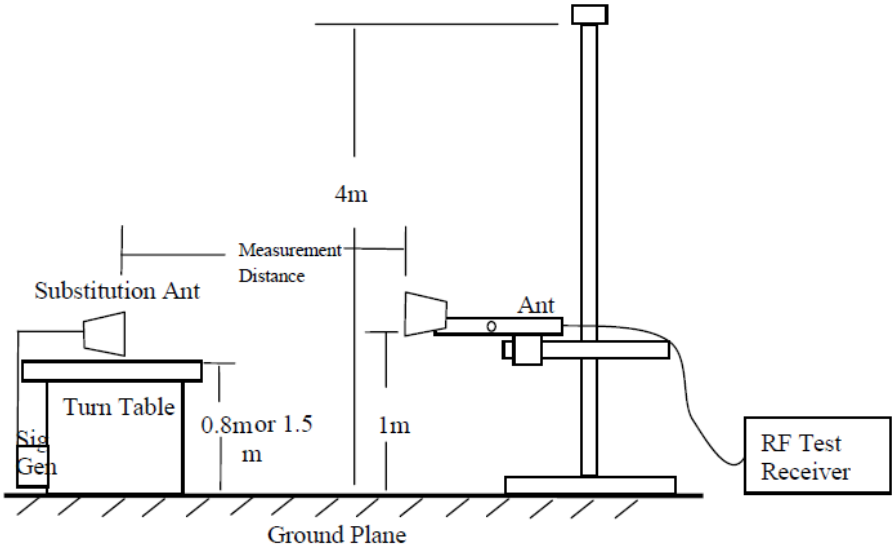
6.8 Radiated Spurious Emissions

Rule Part(s)
FCC Part2.1053/ 22.917(a)/Part 24.238(a)

Test Setup:



Step 1



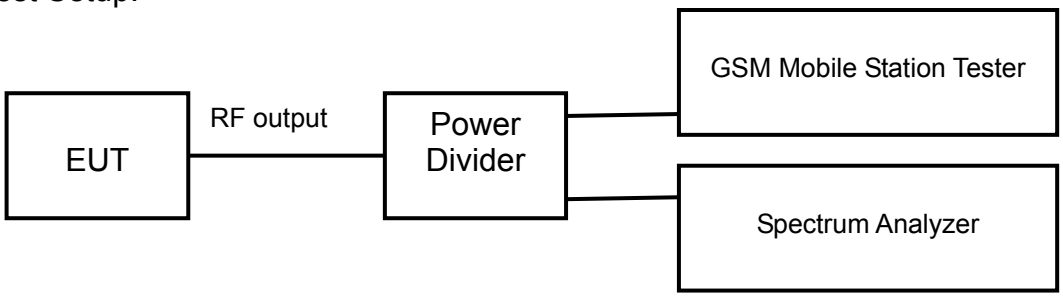
Step 2

Test procedure:
The measurements procedures in TIA-603-E-2016 are used.
The spectrum was scanned from 30MHz to the 10th harmonic of the highest frequency generated within the equipment.
Step 1:
The measurement is carried out in the chamber. EUT was placed on a 0.8m (f<1GHz)/ 1.5m (f>1GHz) high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna from 1m to 4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 100 kHz (f<1GHz)/1MHz (f>1GHz). The antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value on spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 10th harmonic of the carrier. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.
Step 2:
A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
A power (Pmea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (Pmea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
A “reference path loss” should be calculated after test. The attenuation of “reference path loss” is the cable loss between the Signal Source with the Substitution Antenna (Pca) and the Substitution Antenna Gain (Ga).
Calculation procedure:
The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.
The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:
Power (EIRP) = Pmea+ Pca + Ga
This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).
Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.
P=Pmea+Pca+Ga=(-20dBm)+(-30dB)+(11dB)= -39dBm
Note: We tested both horizontal and vertical polarization, but only the largest numerical polarity of the two polarities was recorded in the final report.
Test result:
The test results are shown in Appendix B.

6.9 Peak-Average Ratio

Rule Part(s)
FCC Part 24.232(d)

Test Setup:



Test procedure:
KDB 971168 D01 v03r01 – Section 5.7.1

Test settings:
1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Limits: the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test result:
The test results are shown in Appendix A

7 MEASUREMENT UNCERTAINTIES

Items	Uncertainty	
RF Power Output	0.6 dB	
Effective Radiated Power and Effective Isotropic Radiated Power	0.6 dB	
Occupied Bandwidth	3kHz	
Emission Bandwidth	3kHz	
Peak-Average Ratio	0.8dB	
Frequency Stability	48Hz	
Band Edges Compliance	1.2dB	
Spurious Emissions at antenna terminal	9kHz~2GHz	1.2dB
	2G~3.6GHz	1.4dB
	3.6G~8GHz	2.2dB
	8G~12.75GHz	2.7dB
Radiated Emission Measurement	30MHz～200MHz	4.88dB
	200MHz～1GHz	4.87dB
	1GHz～18GHz	4.58dB
	18GHz~40GHz	4.35dB

8 TEST EQUIPMENTS

No.	Name/Model	Manufacturer	S/N	Calibration Date	Calibration Due Date
1	Mobile Station Tester / MT8820C	Anritsu	6201300660	2021.06.21	2022.06.20
2	Radio Communication Station / CMW500	R&S	161702	2021.06.21	2022.06.20
3	Spectrum Analyzer / FSV40	R&S	101065	2021.06.21	2022.06.20
4	Spectrum Analyzer / N9020A	Agilent	MY48010771	2021.05.18	2022.05.17
5	Power Divider / 11667A	HP	19632	2021.06.21	2022.06.20
6	DC Power Supply / E3645A	Agilent	MY40000741	2021.04.22	2022.04.21
7	Temperature chamber / SH241	ESPEC	92013758	2021.06.21	2022.06.20
8	Fully-Anechoic Chamber / 12.65m×8.03m×7.50m	FRANKONIA	-----	-----	-----
9	Semi-Anechoic/Chamber / 23.18m×16.88m×9.60m	FRANKONIA	---	-----	-----
10	Turn table Diameter:1m	FRANKONIA	-----	-----	-----
11	Turn table Diameter:5m	FRANKONIA	-----	-----	-----
12	Antenna master FAC(MA4.0)	MATURO	-----	-----	-----
13	Antenna master SAC(MA4.0)	MATURO	-----	-----	-----
14	Shielding room / 9.080m×5.255m×3.525m	FRANKONIA	-----	-----	-----
15	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100512	2021.06.21	2022.06.20
16	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100513	2021.06.21	2022.06.20
17	Ultra log antenna / HL562	R&S	100016	2021.06.21	2022.06.20
18	Receive antenna /3160-09	SCHWARZ-BECK	002058-002	2021.06.21	2022.06.20
19	EMI test receiver / ESI 40	R&S	100015	2021.06.21	2022.06.20
20	EMI test receiver / ESCS30	R&S	100029	2021.06.21	2022.06.20
21	Receive antenna / HL562	R&S	100167	2021.06.21	2022.06.20
22	AMN / ENV216	R&S	3560.6550.12	2021.06.21	2022.06.20

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

1. RF Power Output

GSM850

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	31.35
836.4	189	31.44
848.8	251	31.60

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	4Down1Up	31.37
836.4	189		31.47
848.8	251		31.63
824.2	128	3Down2Up	29.48
836.4	189		29.34
848.8	251		29.30
824.2	128	2Down3Up	27.51
836.4	189		27.42
848.8	251		27.38
824.2	128	1Down4Up	25.28
836.4	189		25.19
848.8	251		25.19

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	4Down1Up	31.52
836.4	189		31.62
848.8	251		31.76
824.2	128	3Down2Up	29.69
836.4	189		29.57
848.8	251		29.50
824.2	128	2Down3Up	27.81
836.4	189		27.71
848.8	251		27.66
824.2	128	1Down4Up	25.72
836.4	189		25.62
848.8	251		25.59

2. Occupied Bandwidth

GSM850

GSM MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	241.68
836.4	189	248.91
848.8	251	248.91

GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	248.91
836.4	189	240.23
848.8	251	253.26

EGPRS (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	243.13
836.4	189	237.34
848.8	251	250.36

GSM850

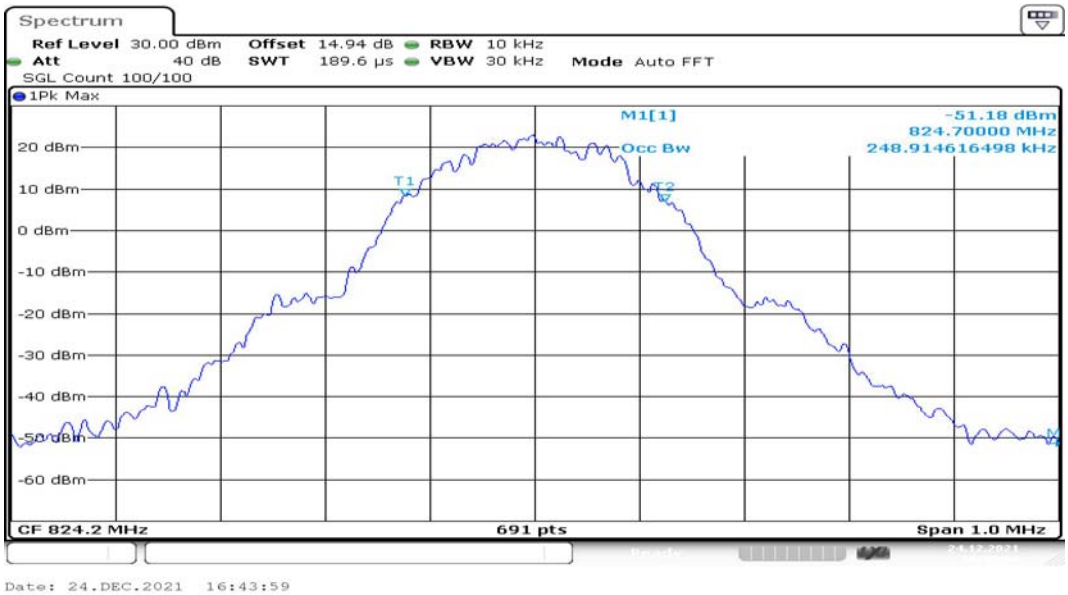
GSM MODE:

Channel 128

Channel 189

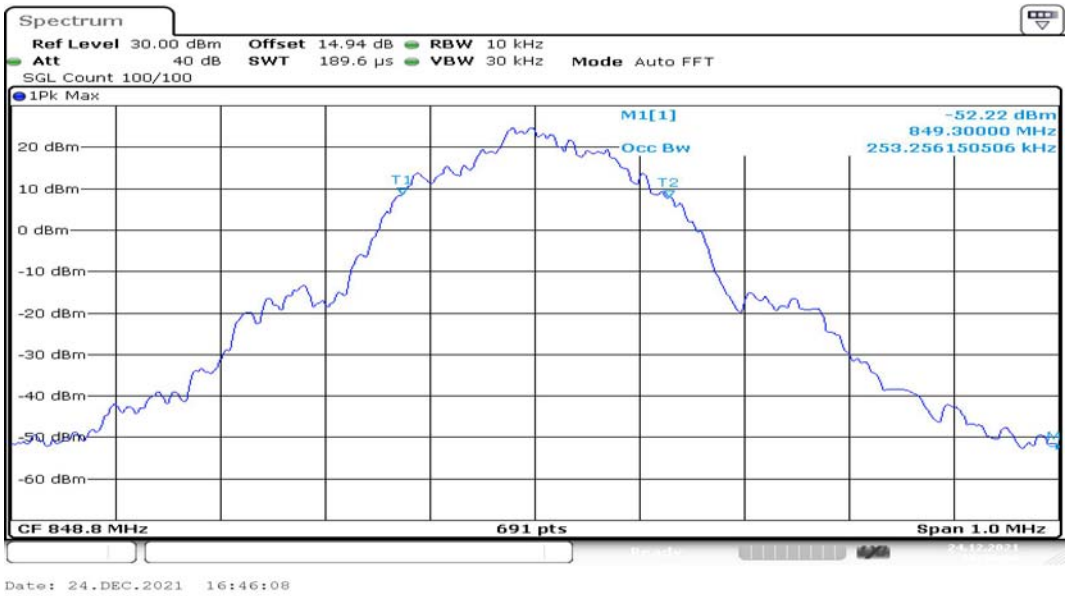
Channel 251

GPRS MODE:



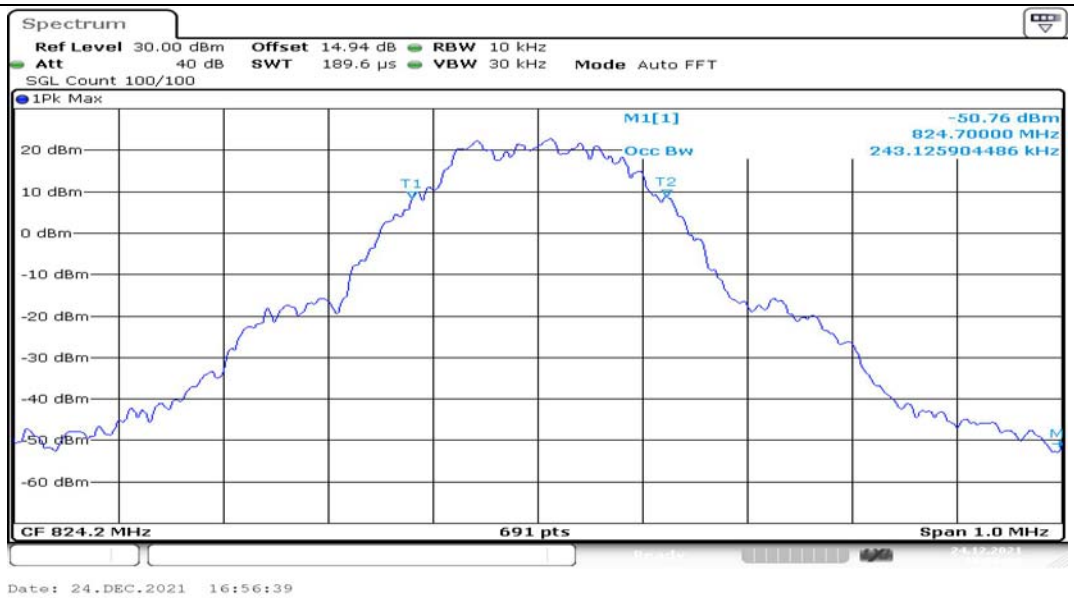
Channel 128

Channel 189

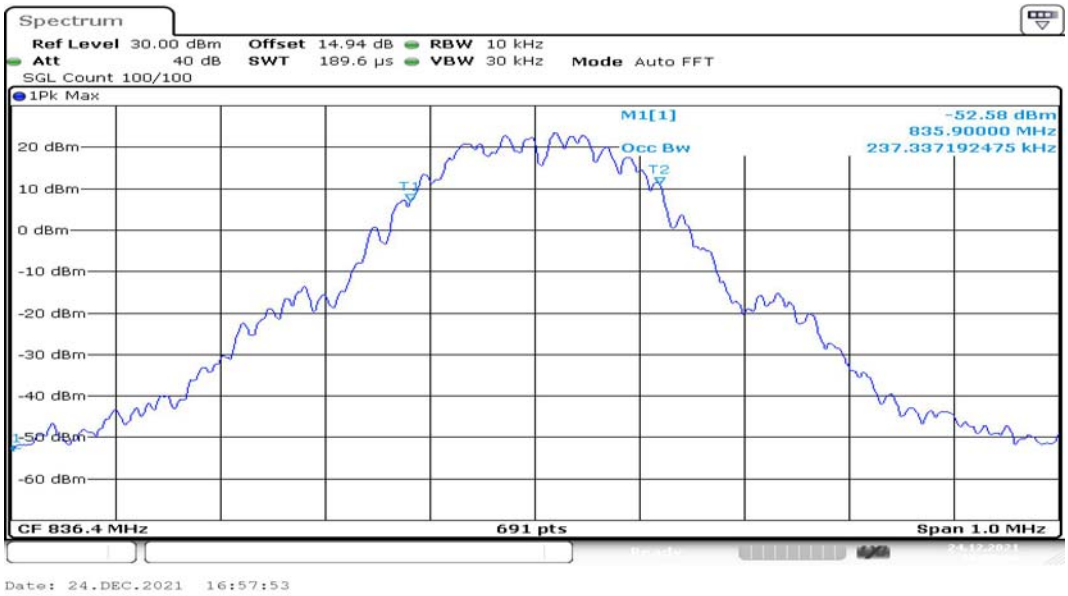


Channel 251

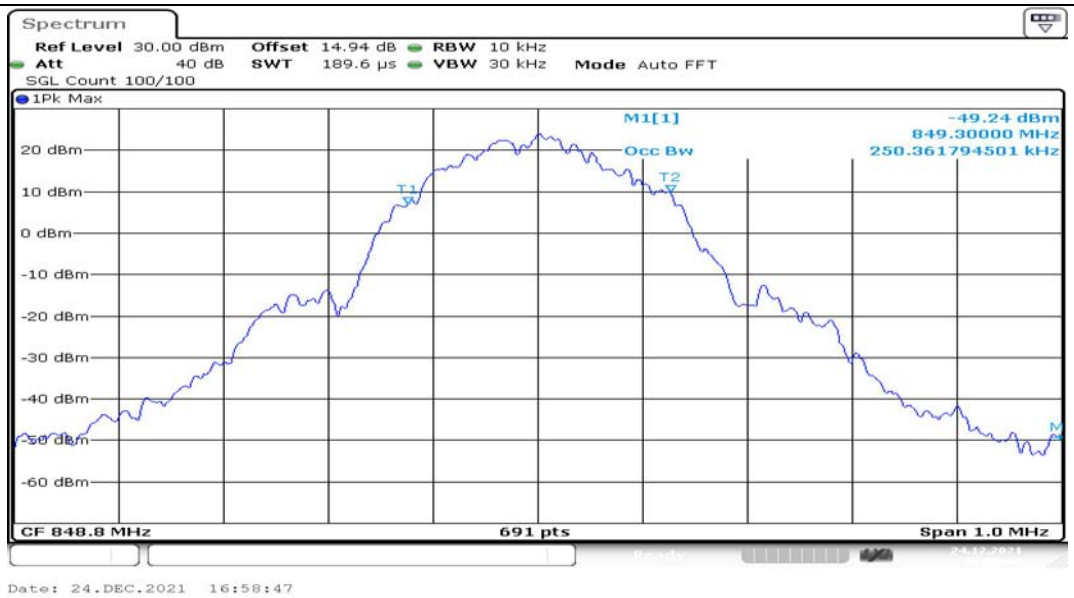
EGPRS (8PSK) MODE:



Channel 128



Channel 189


Spectrum
Ref Level 30.00 dBm Offset 14.94 dB RBW 10 kHz
Att 40 dB SWT 189.6 µs VBW 30 kHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1] -49.24 dBm
849.30000 MHz
Occ Bw 250.361794501 kHz
T1
T2
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 848.8 MHz
691 pts
Span 1.0 MHz
Date: 24.DEC.2021 16:58:47

Channel 251

3. Emission Bandwidth

GSM850

GSM MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
824.2	128	319.80
836.4	189	311.10
848.8	251	309.70

GPRS MODE:

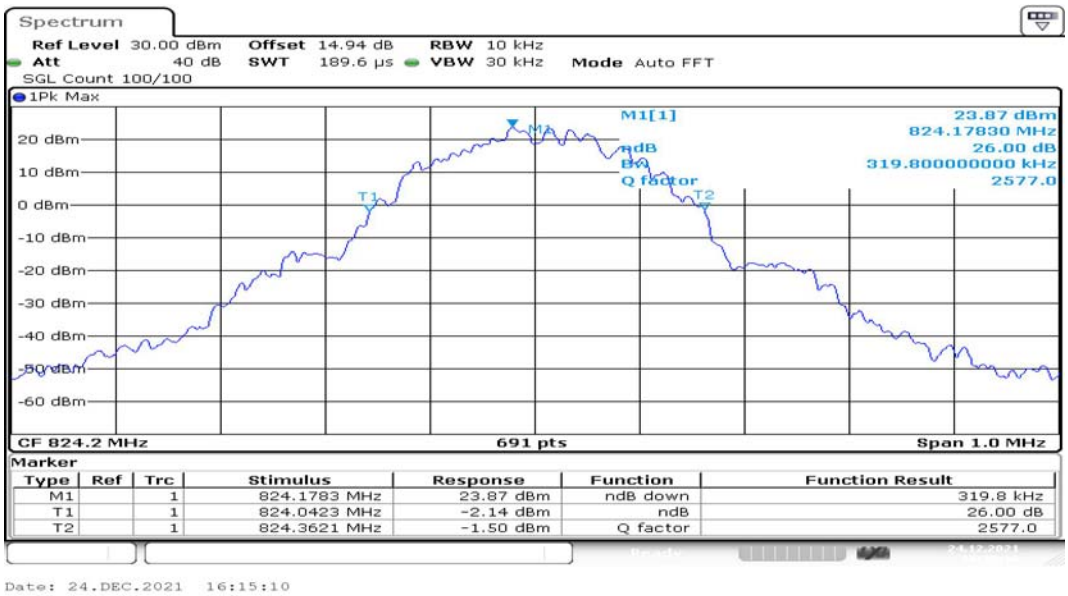
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
824.2	128	319.80
836.4	189	315.50
848.8	251	316.90

EGPRS (8PSK) MODE:

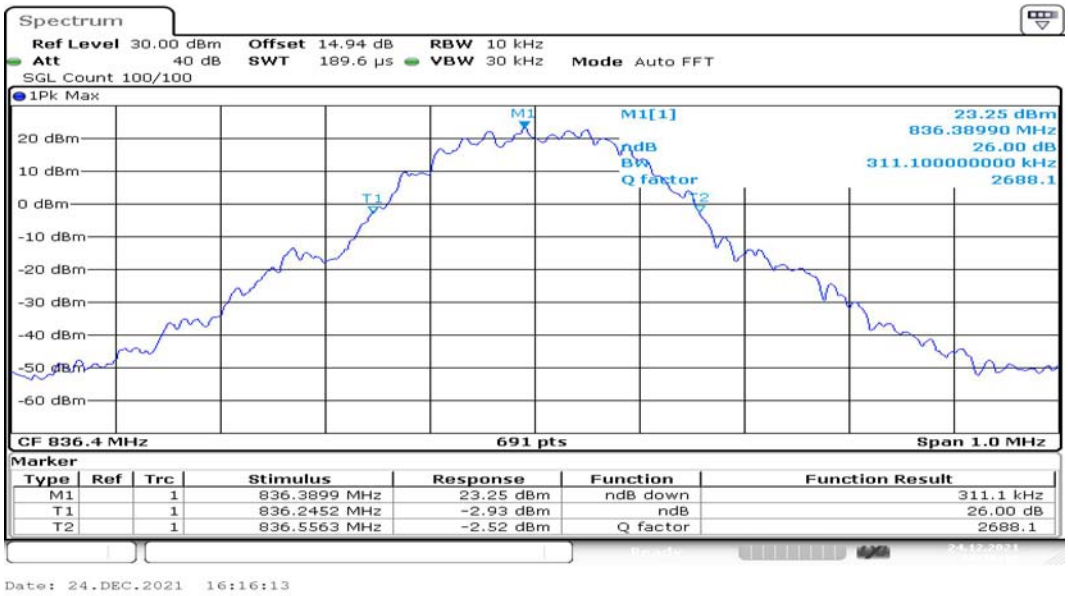
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
824.2	128	314.00
836.4	189	311.10
848.8	251	306.80

GSM850

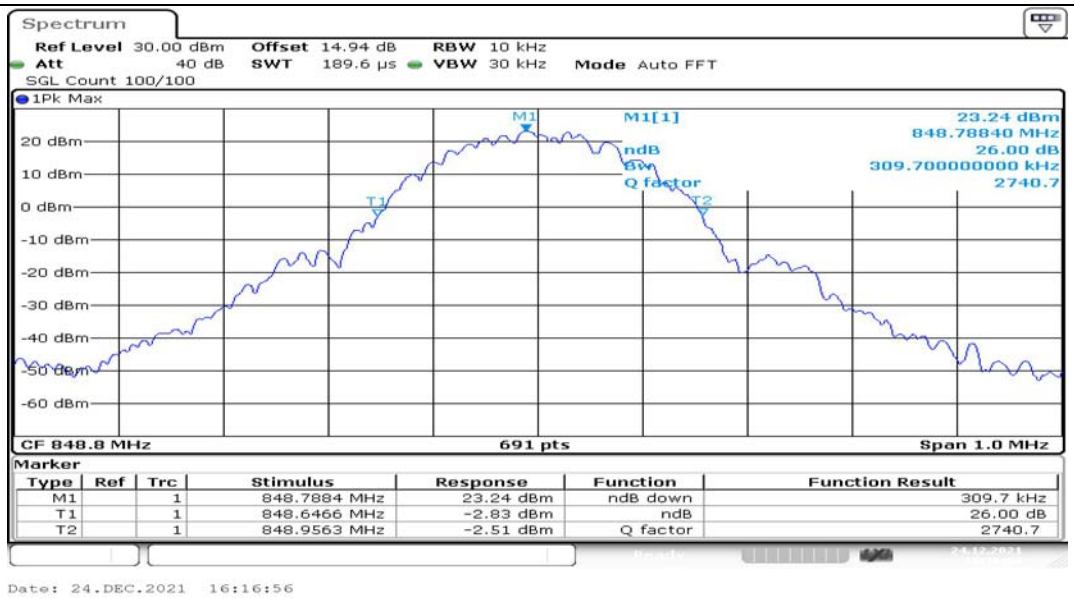
GSM MODE:



Channel 128

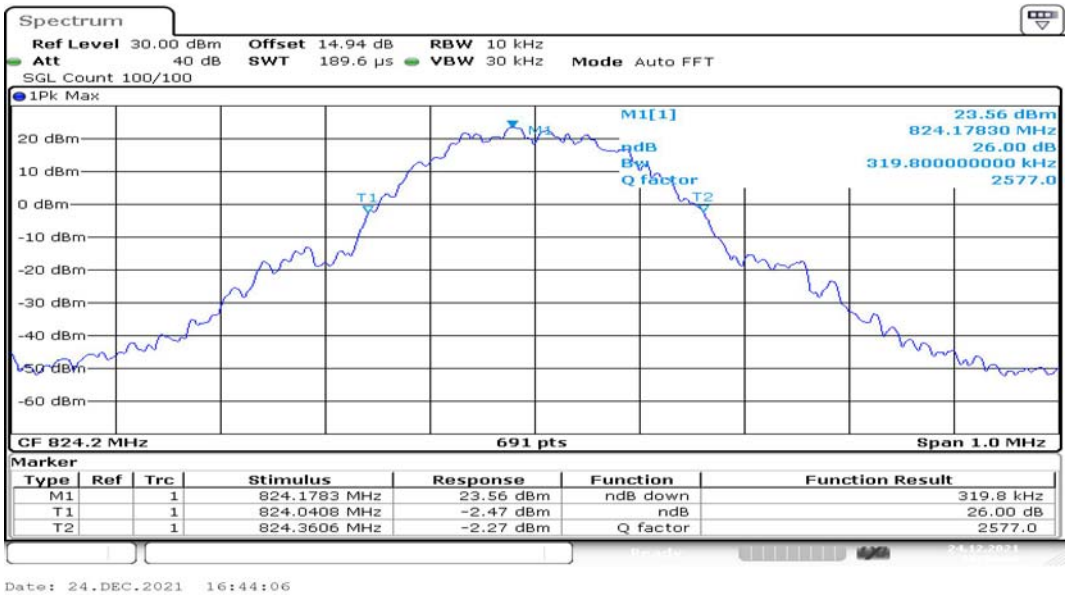


Channel 189

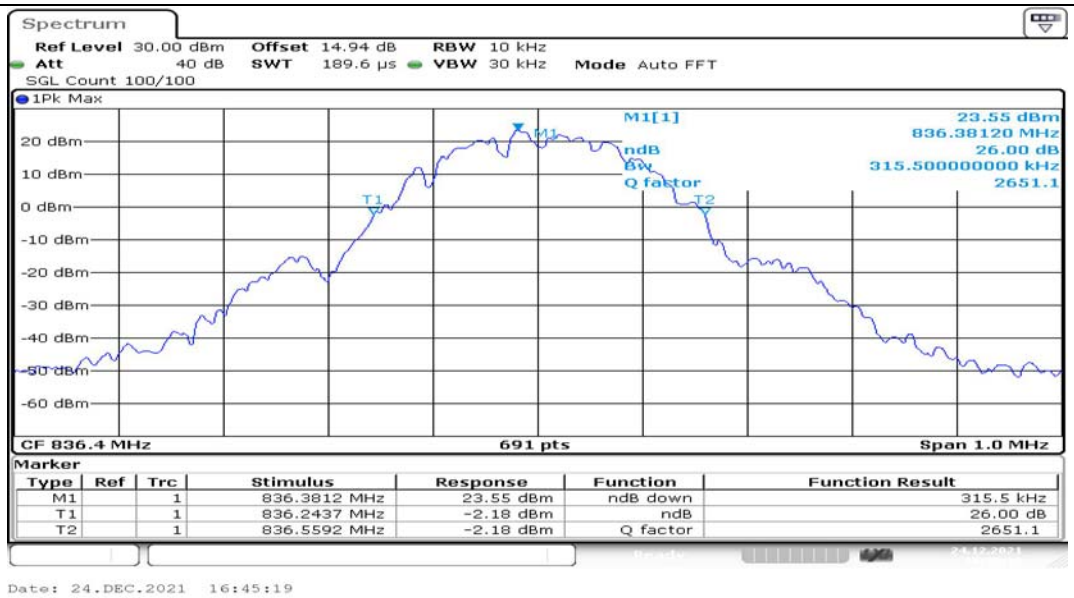


Channel 251

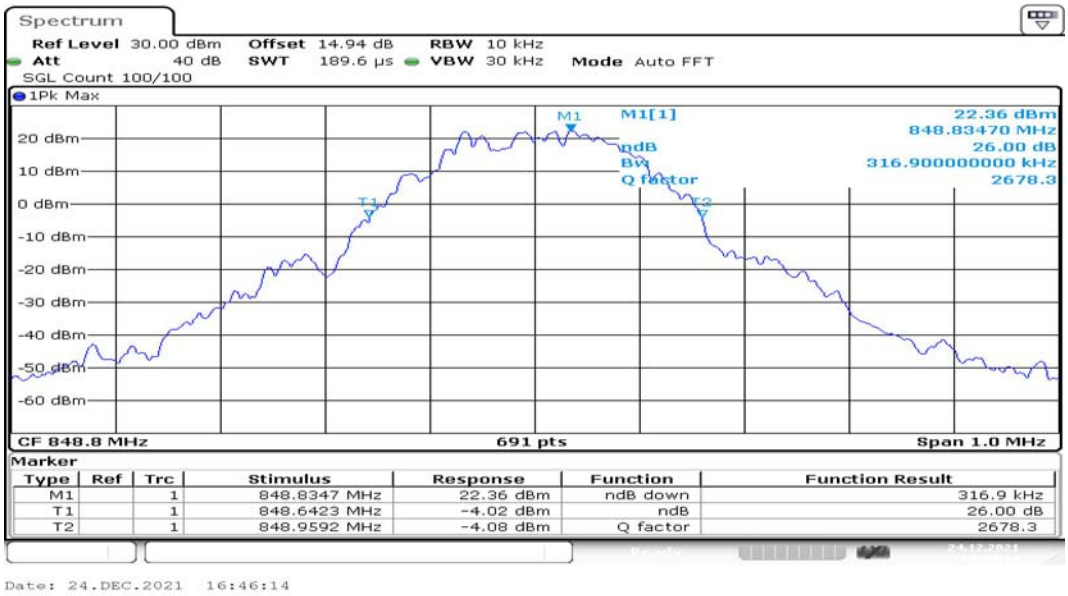
GPRS MODE:



Channel 128

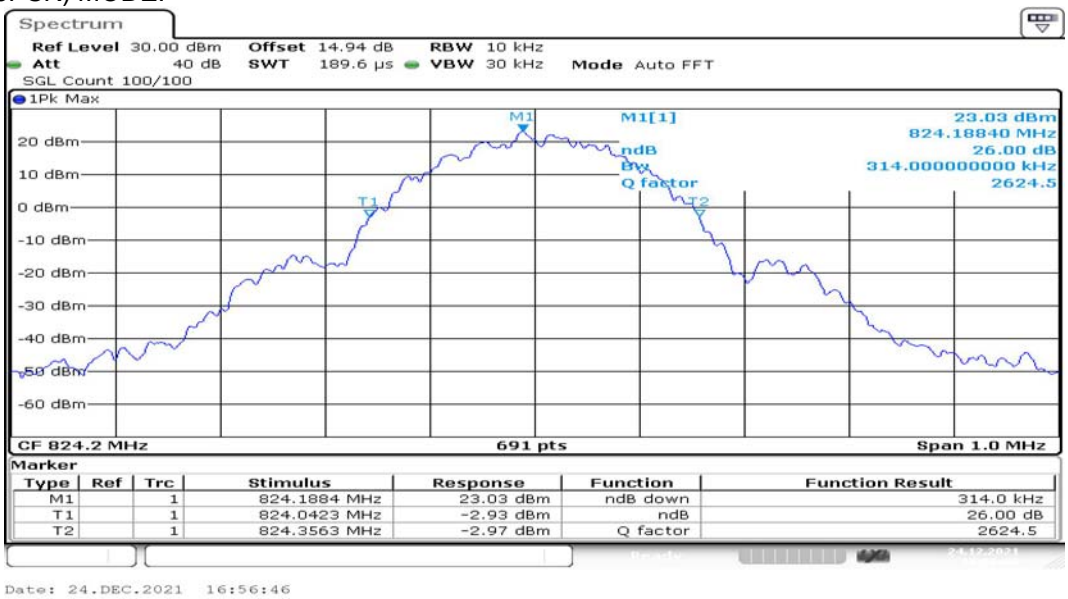


Channel 189

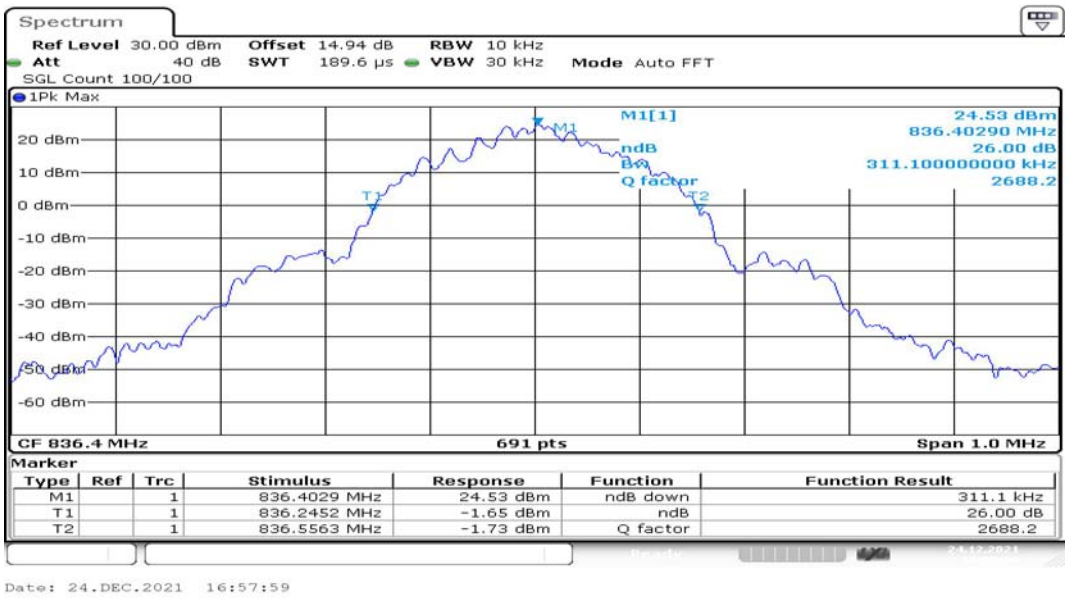


Channel 251

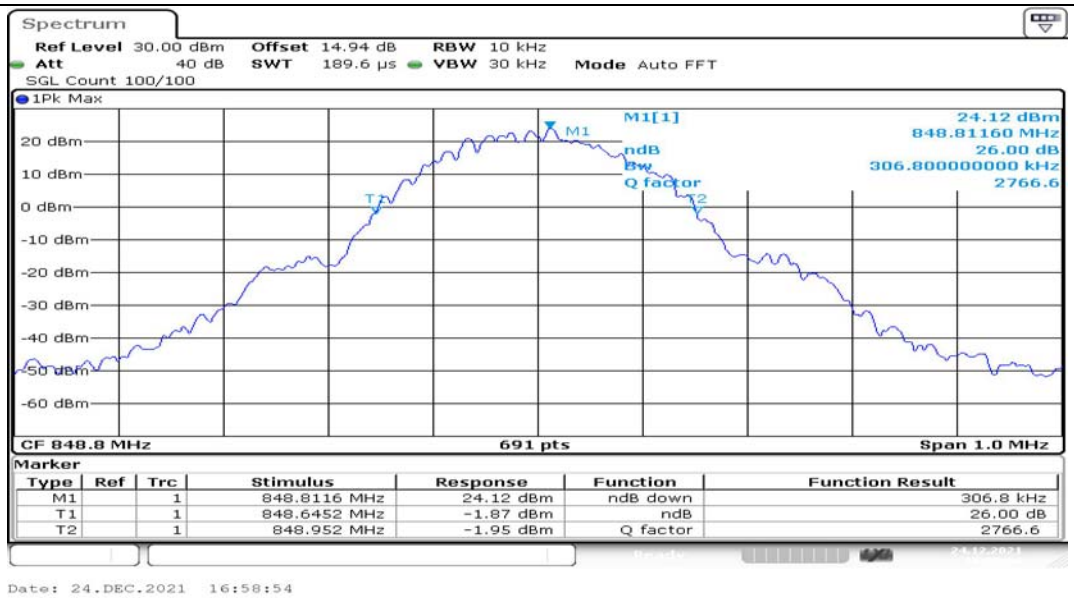
EGPRS (8PSK) MODE:



Channel 128



Channel 189

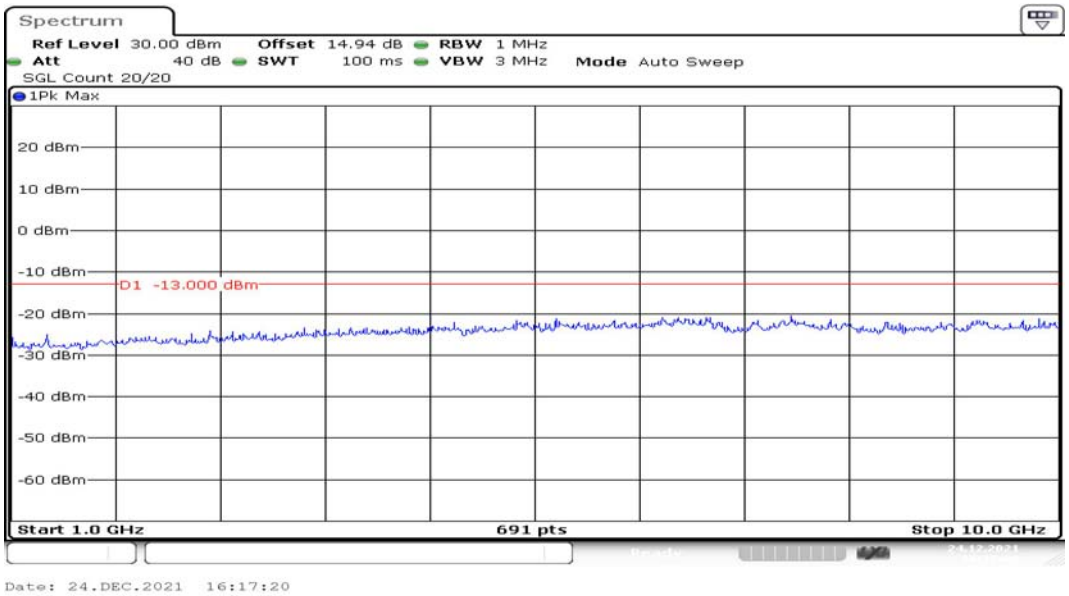

Spectrum
Ref Level 30.00 dBm Offset 14.94 dB RBW 10 kHz
Att 40 dB SWT 189.6 µs VBW 30 kHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1] 24.12 dBm
848.81160 MHz
ndB 26.00 dB
Bw 306.800000000 kHz
Q factor 2766.6
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 848.8 MHz
691 pts
Span 1.0 MHz
Marker
Type Ref Trc Stimulus Response Function Function Result
M1 1 848.8116 MHz 24.12 dBm ndB down 306.8 kHz
T1 1 848.6452 MHz -1.87 dBm ndB 26.00 dB
T2 1 848.952 MHz -1.95 dBm Q factor 2766.6
Date: 24.DEC.2021 16:58:54

Channel 251

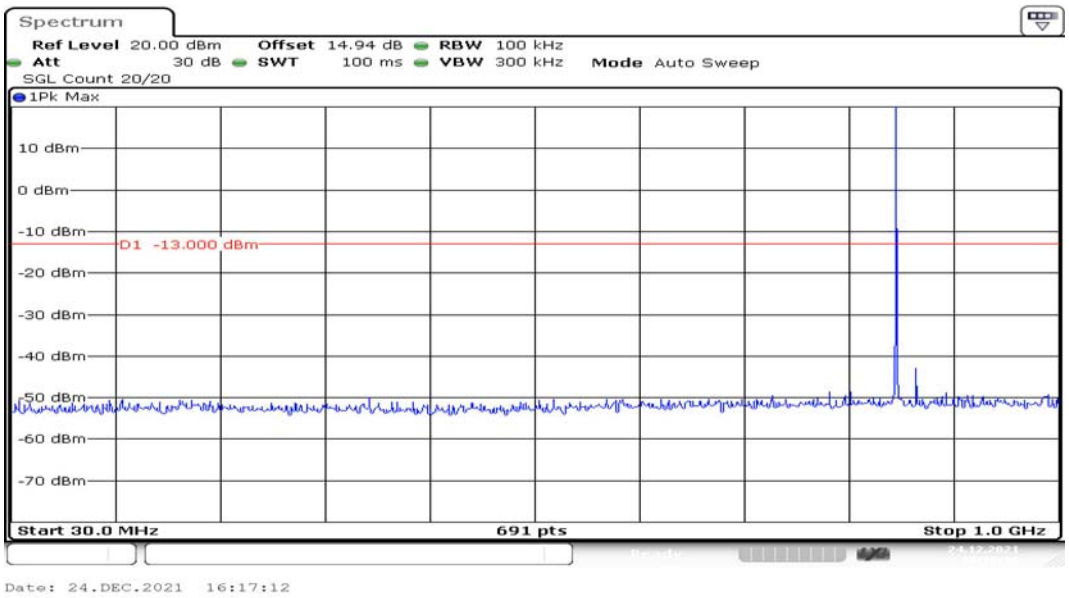
4. Spurious Emissions at antenna terminal

GSM850

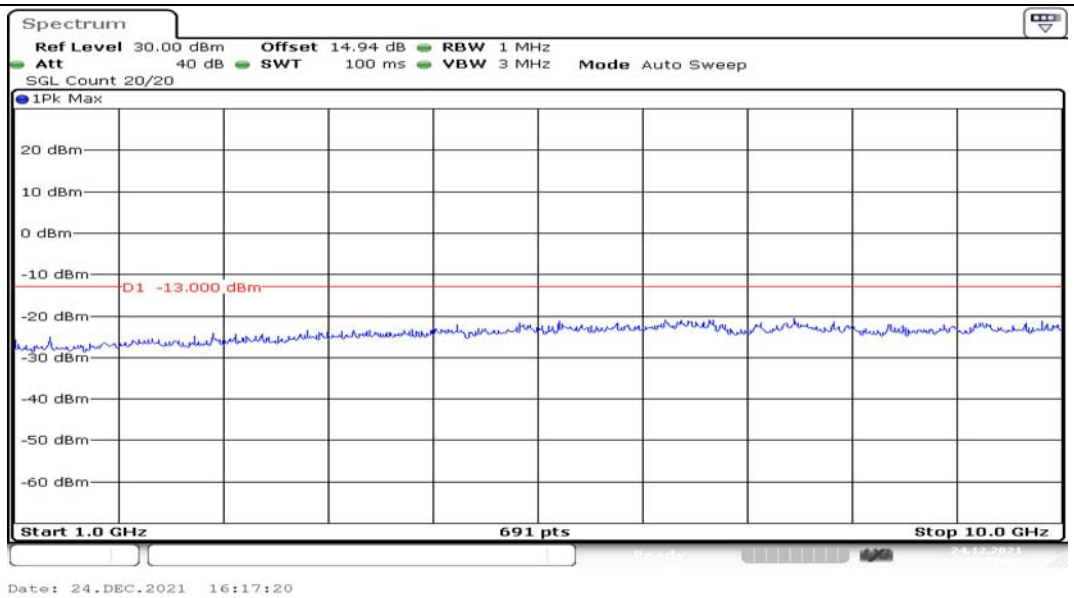
GSM MODE:



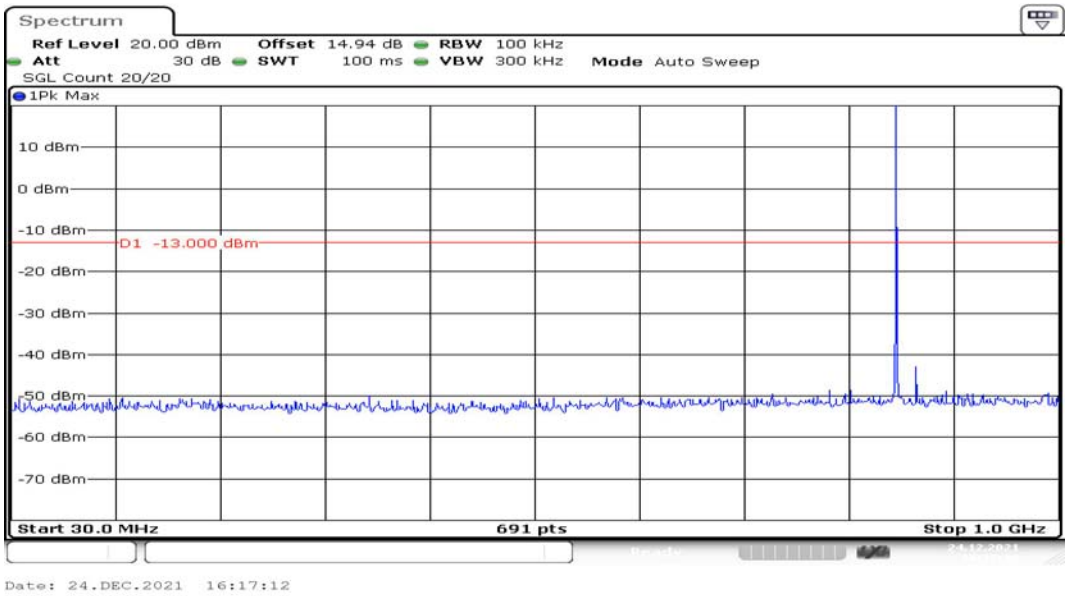
Channel 128



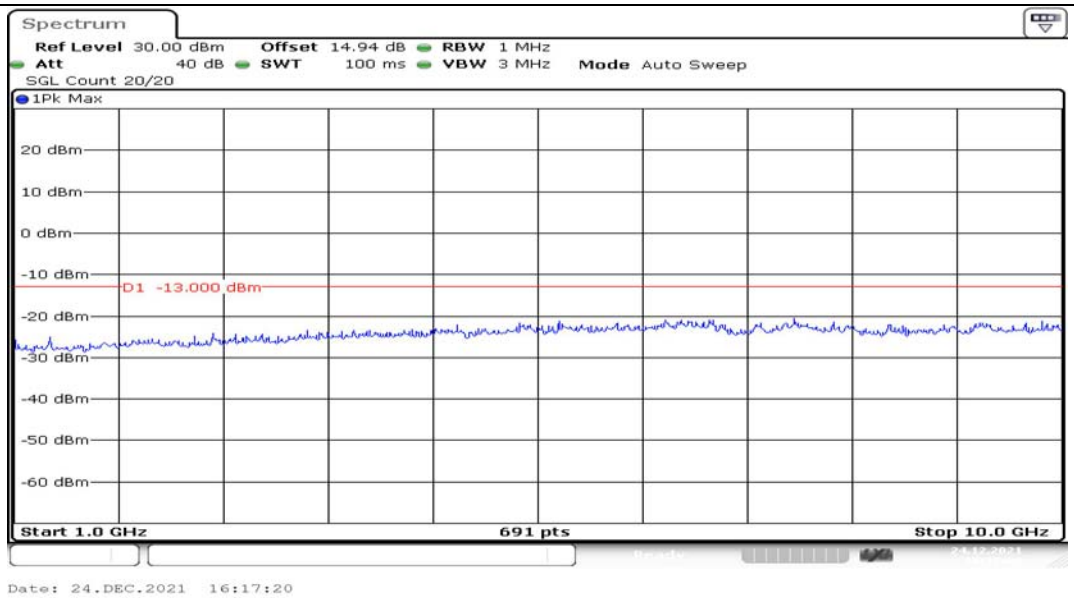
Channel 128



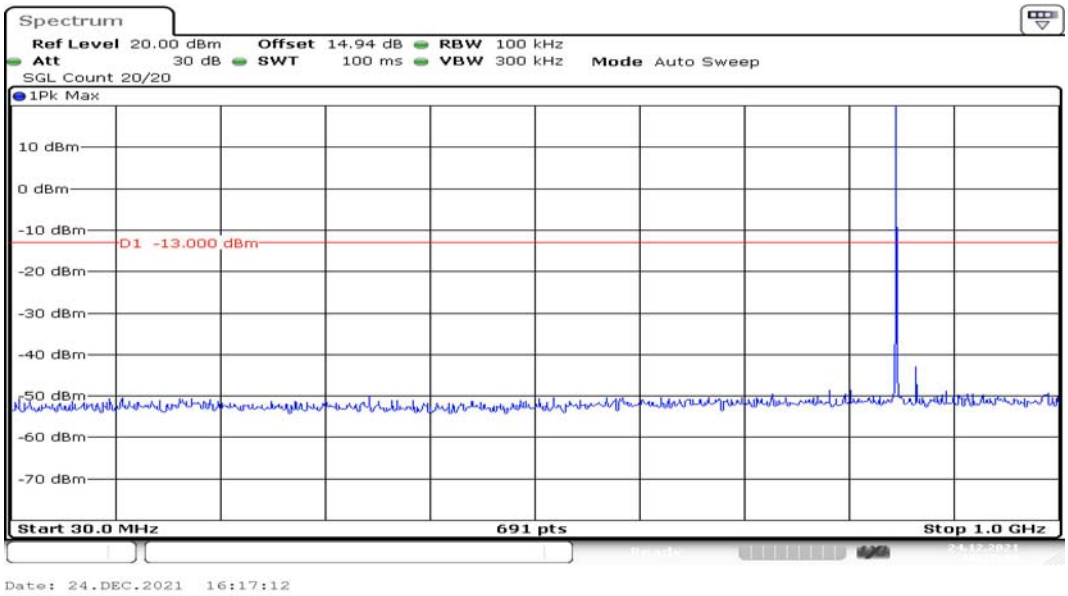
Channel 189



Channel 189

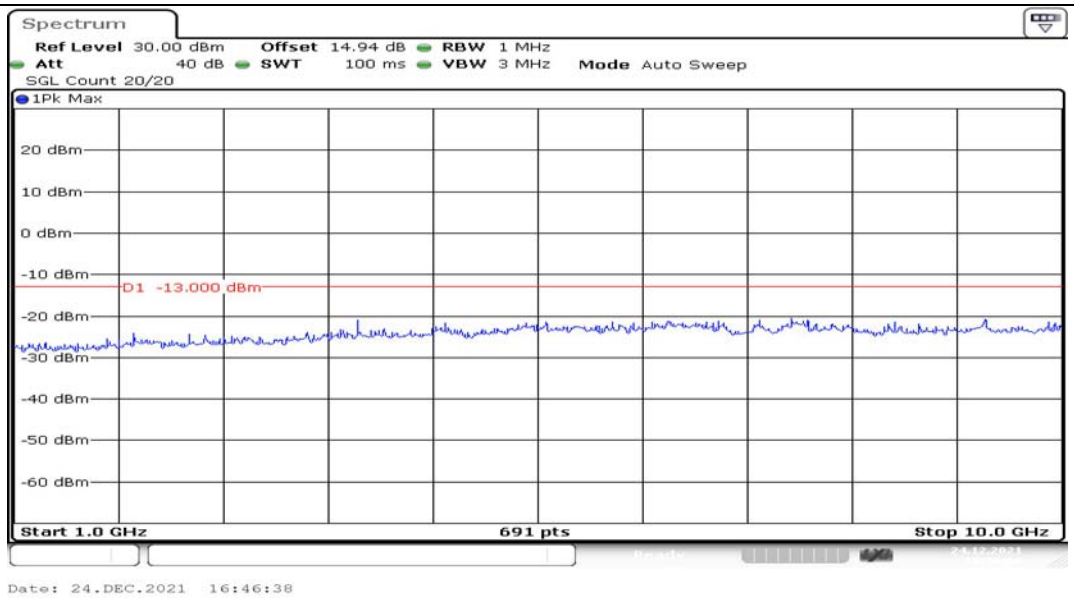


Channel 251

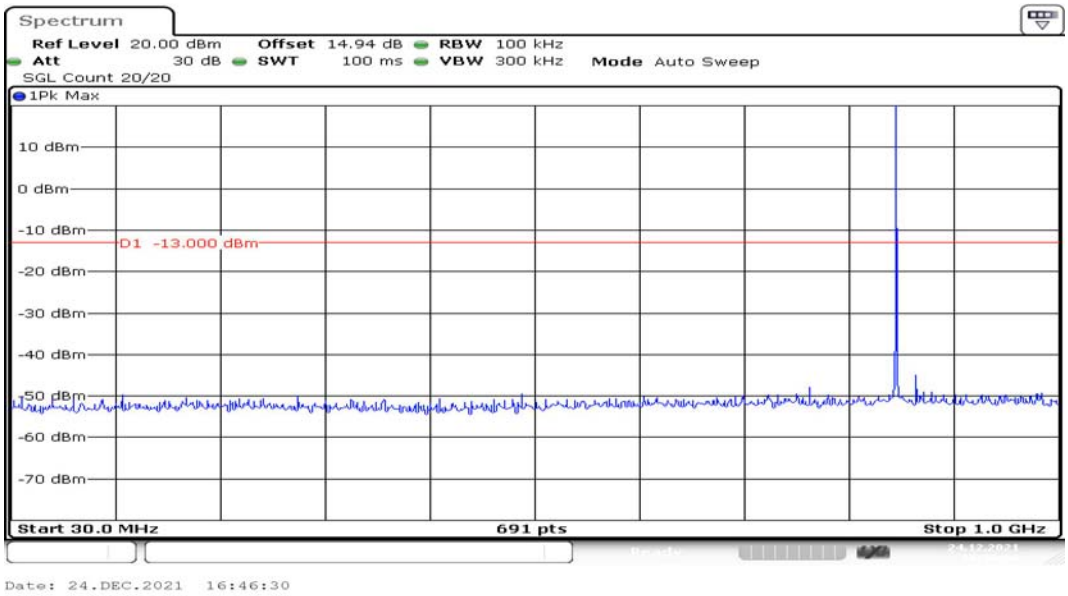


Channel 251

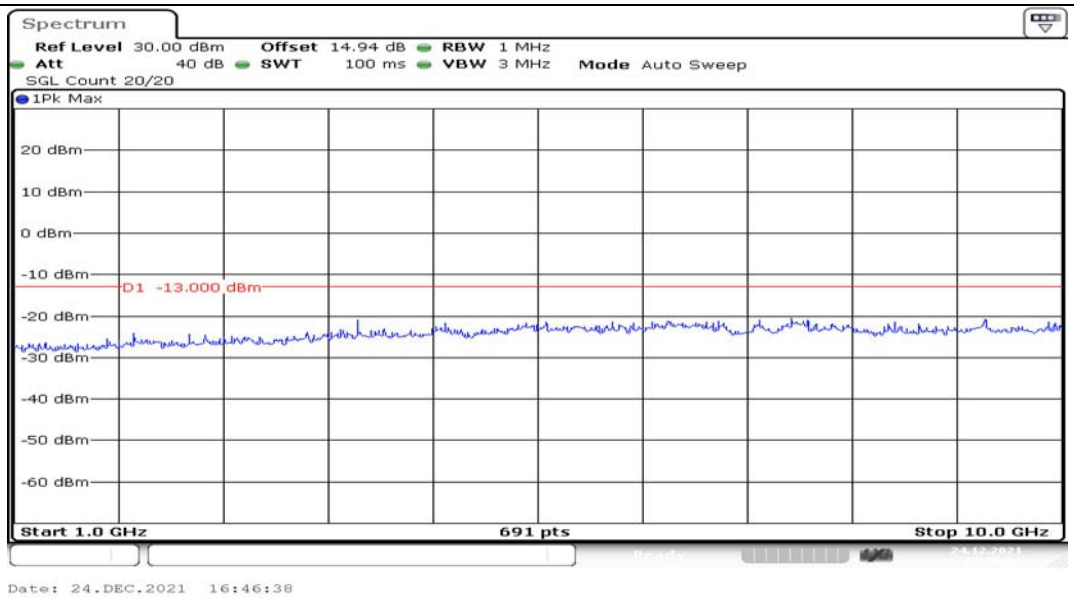
GPRS MODE:



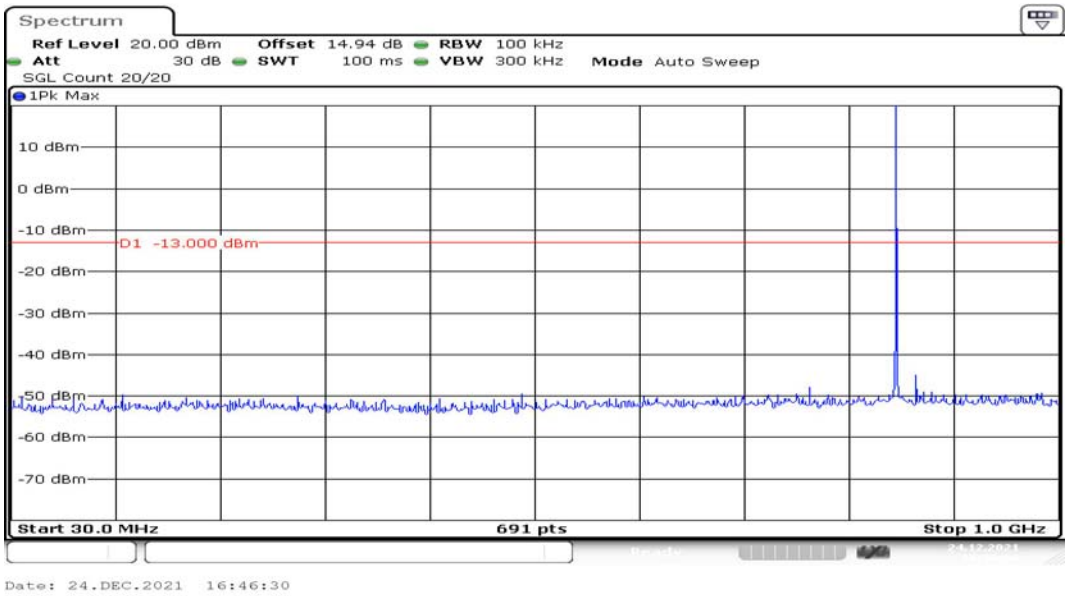
Channel 128



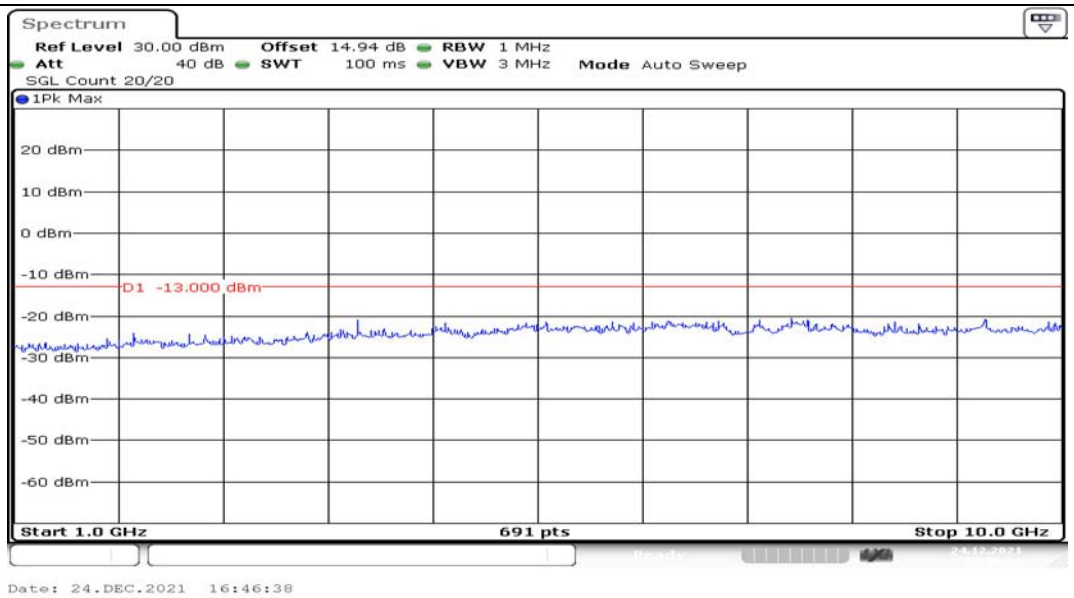
Channel 128



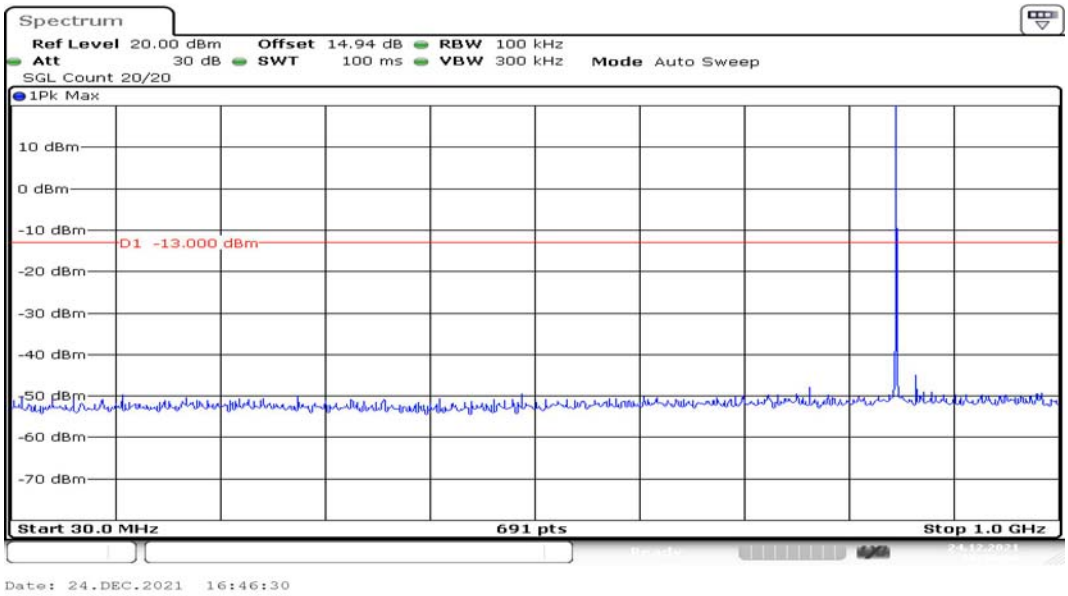
Channel 189



Channel 189

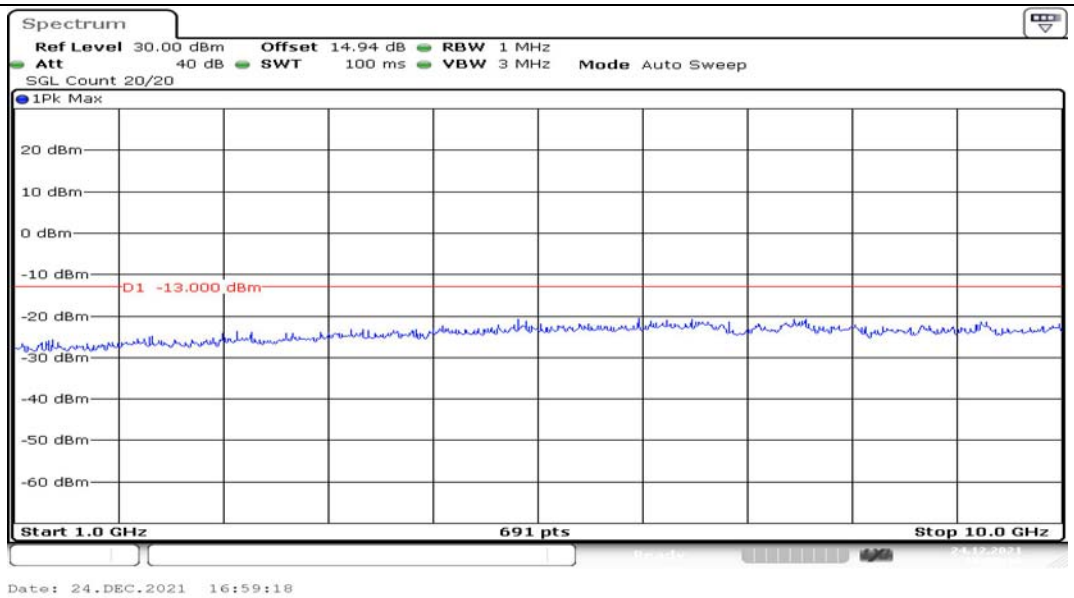


Channel 251

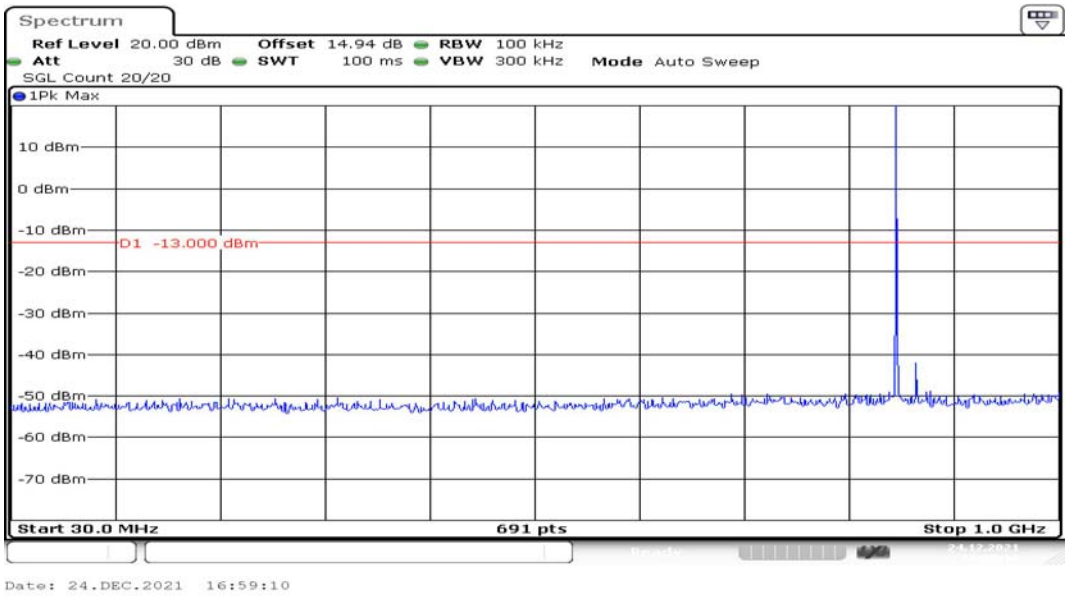


Channel 251

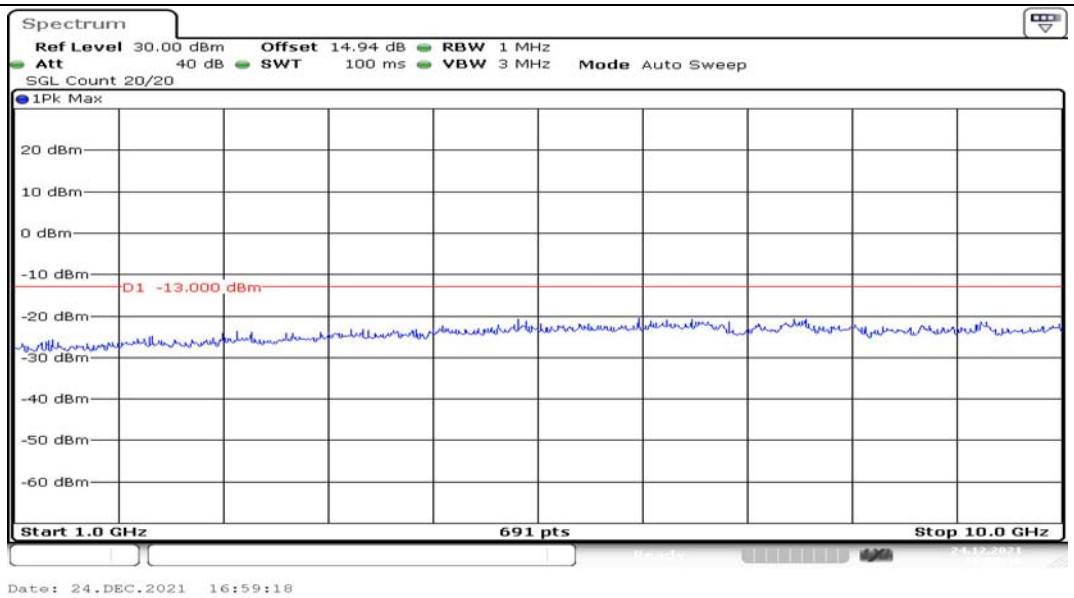
EGPRS (8PSK) MODE:



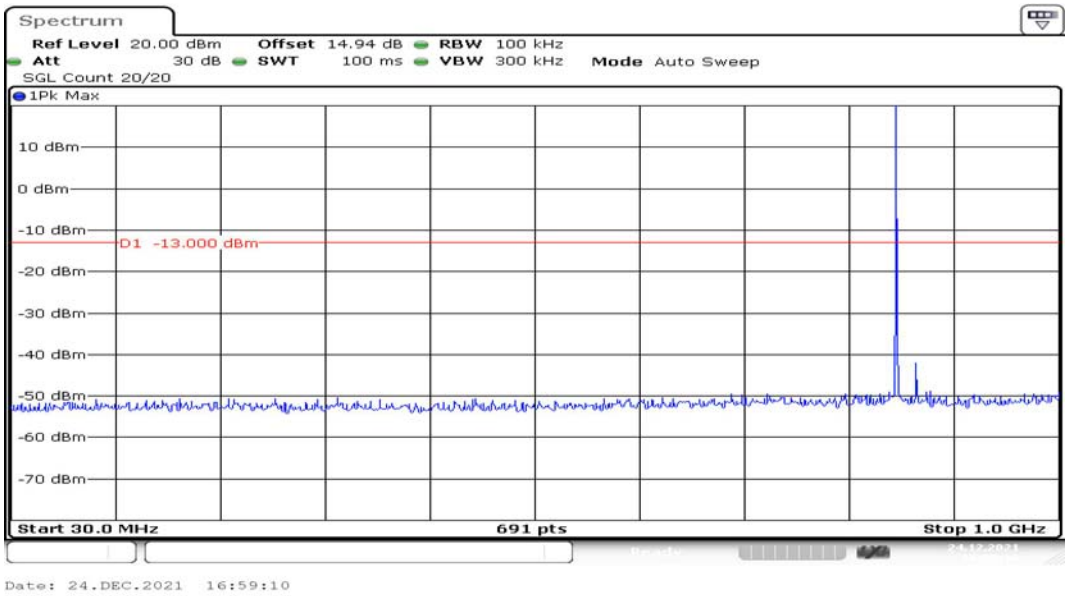
Channel 128



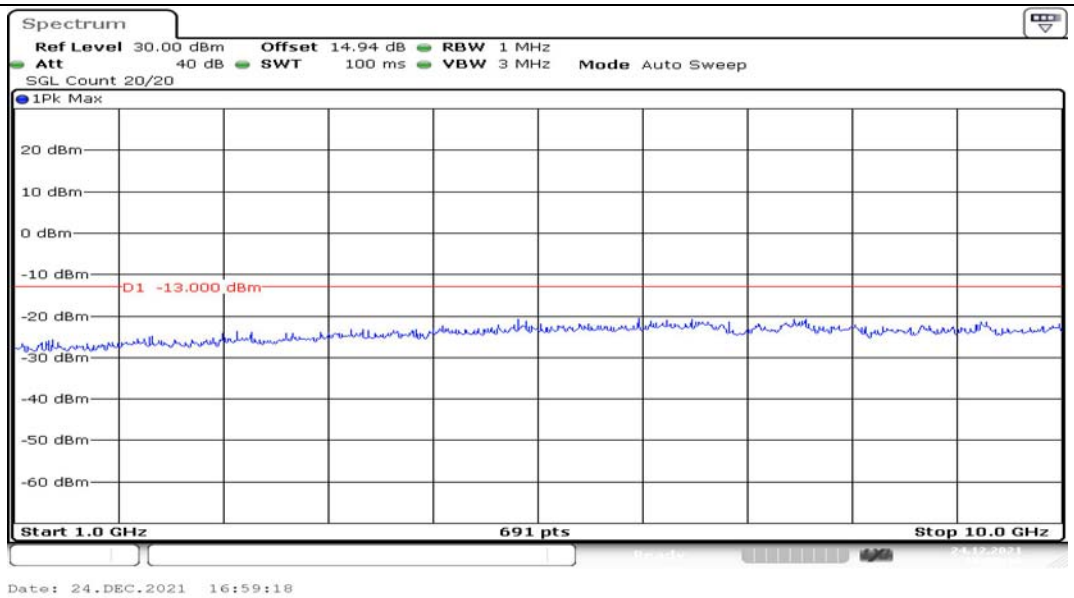
Channel 128



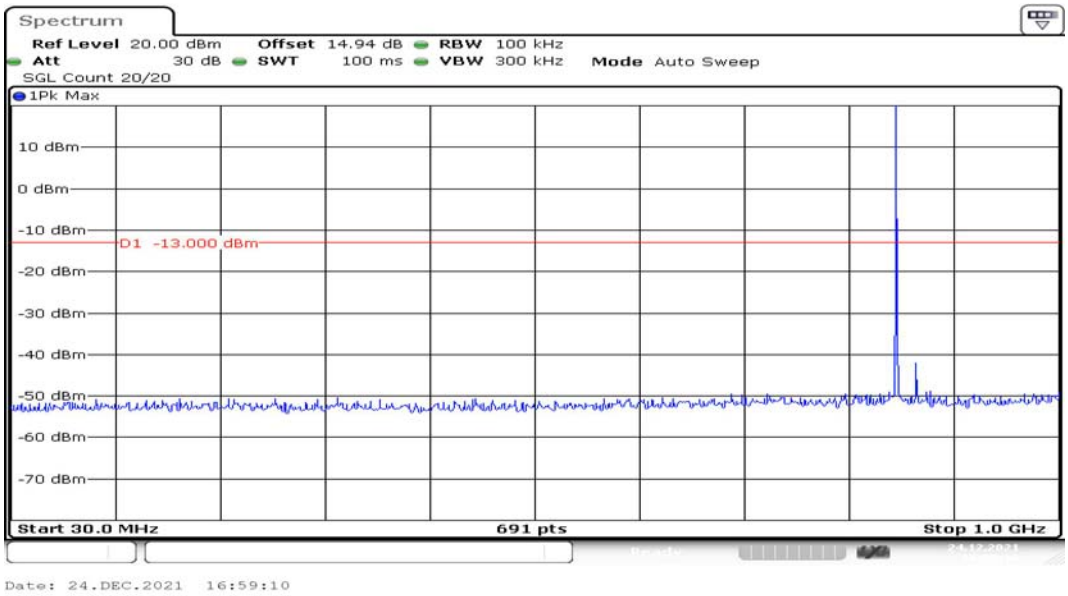
Channel 189



Channel 189



Channel 251

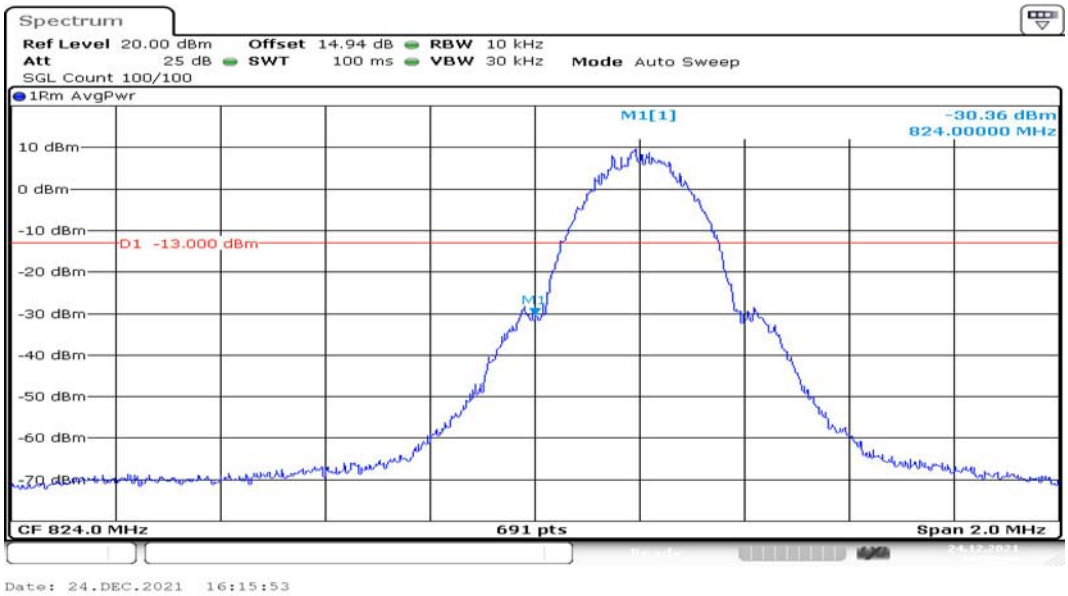


Channel 251

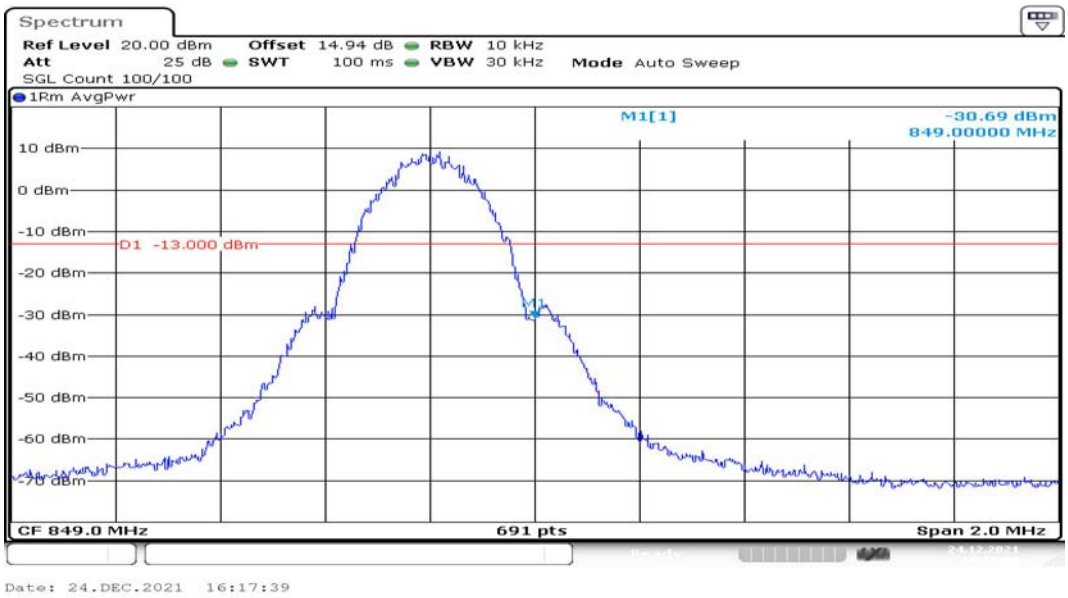
5. Band Edges Compliance

GSM850

GSM MODE:

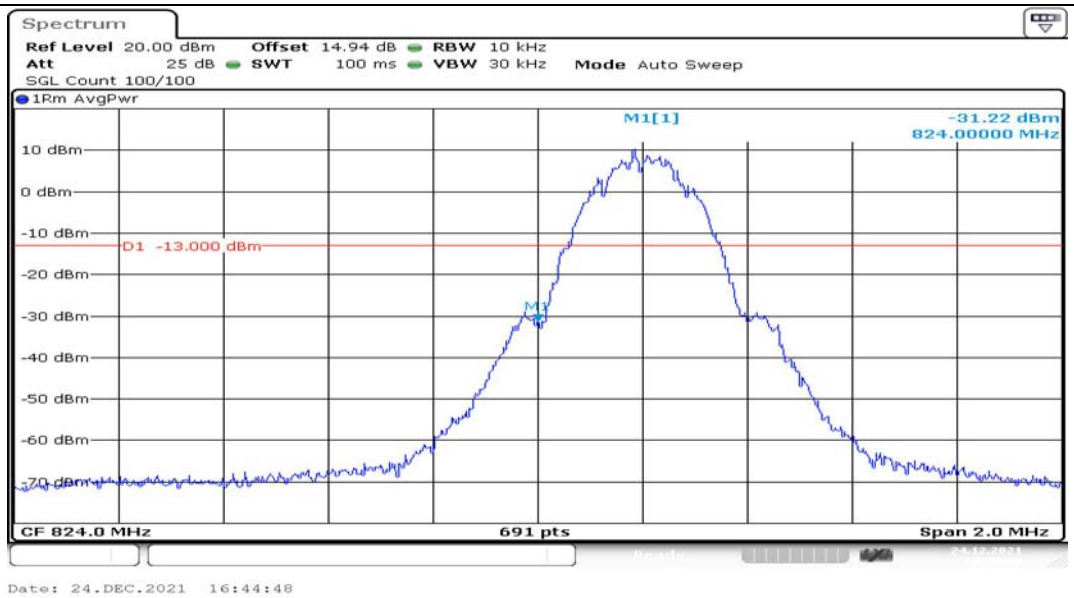


Channel 128

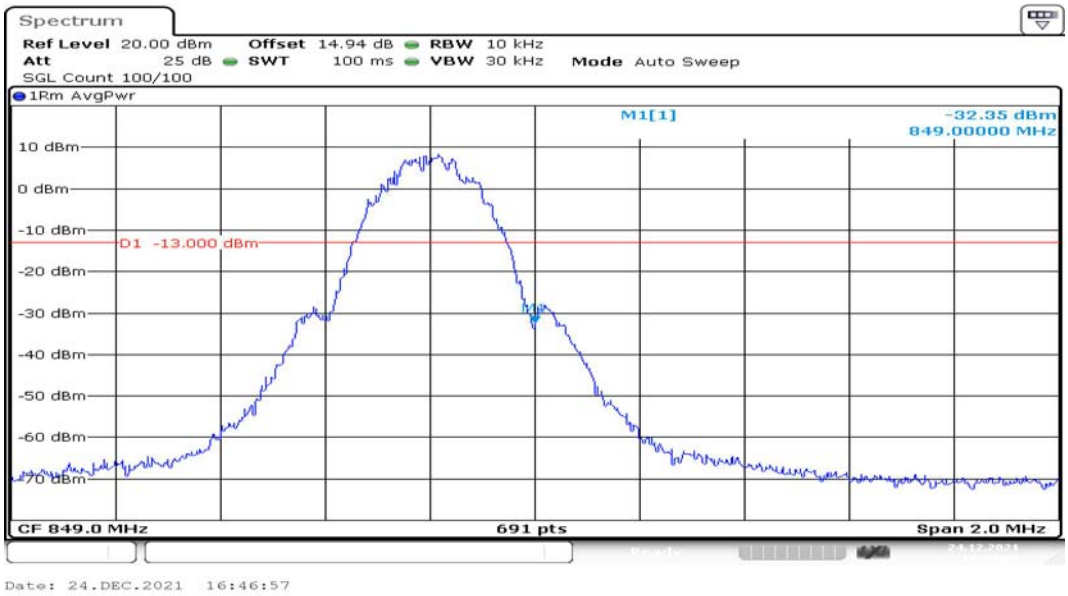


Channel 251

GPRS MODE:

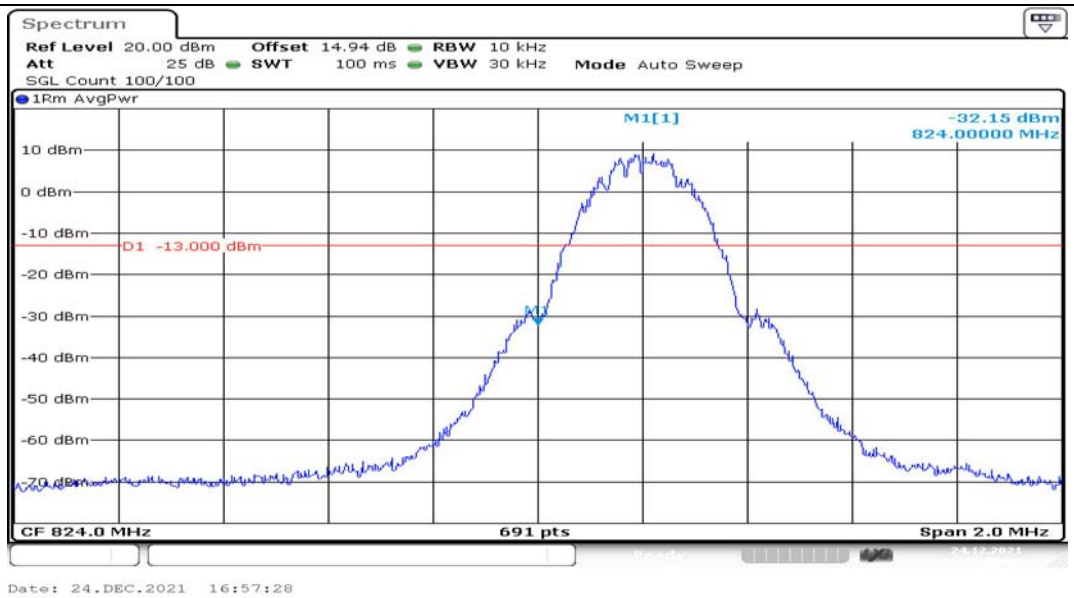


Channel 128

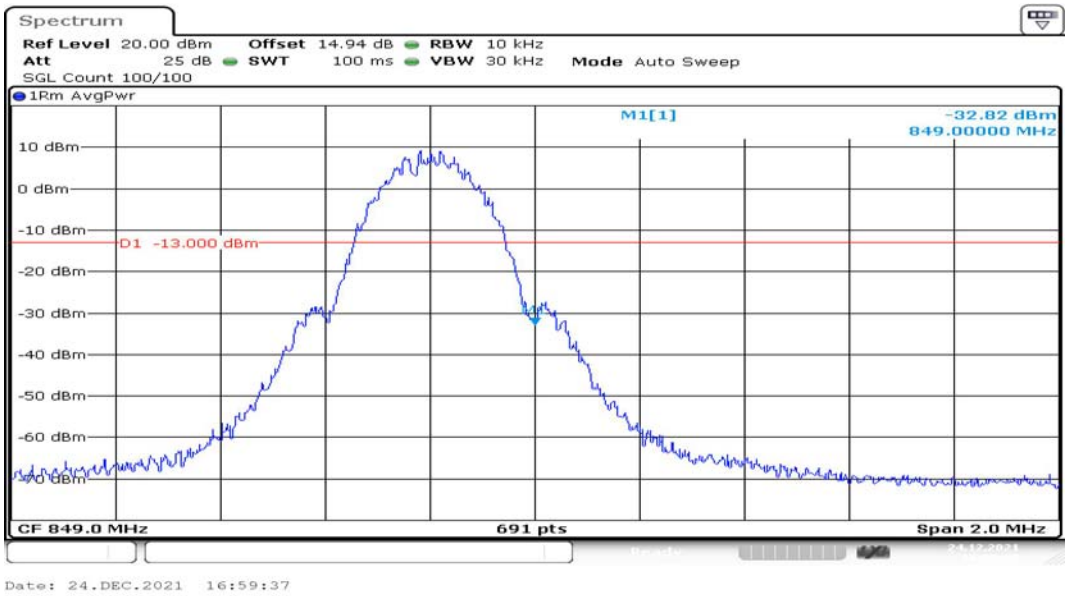


Channel 251

EGPRS (8PSK) MODE:



Channel 128



Channel 251

6. Frequency Stability

GSM850

GSM MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-20	0.007	-0.008	0.000
-10	-0.001	0.002	0.000
0	-0.005	0.015	-0.007
+10	-0.001	0.001	0.002
+30	0.005	0.006	0.009
+40	-0.011	0.006	-0.008
+55	0.015	0.025	0.001
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	-0.005	0.008	0.001
HV	0.016	0.006	0.007

GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-20	-0.006	-0.023	0.006
-10	-0.012	-0.001	-0.002
0	-0.010	-0.009	-0.001
+10	0.000	-0.015	0.003
+30	0.008	-0.006	0.009
+40	0.006	-0.017	0.015
+55	-0.012	-0.016	0.004
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	-0.008	-0.016	-0.004
HV	-0.012	-0.019	-0.001

EGPRS (8PSK) MODE:

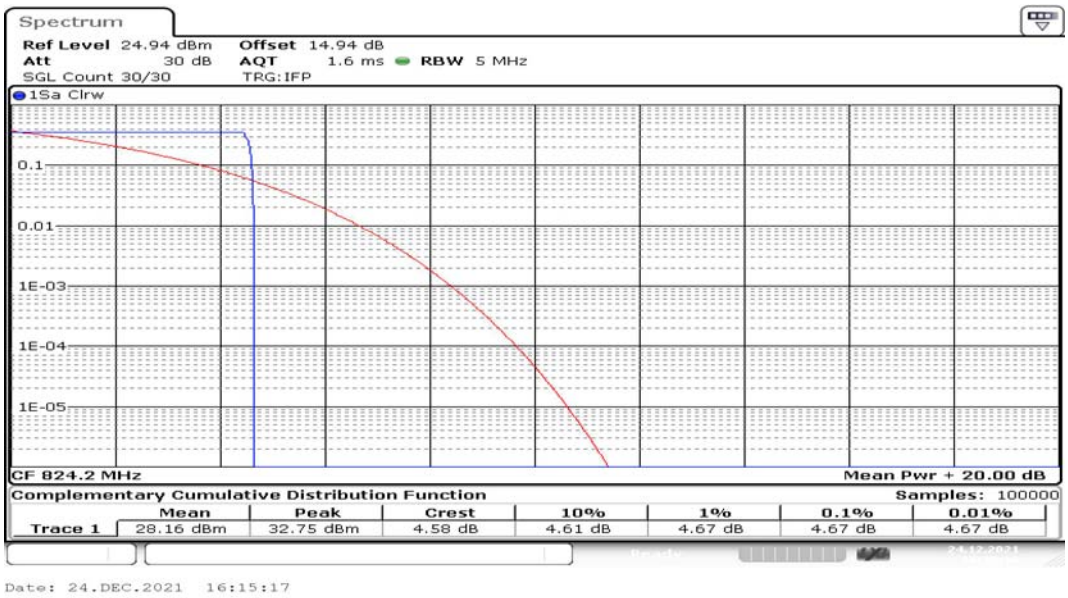
Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-20	0.019	0.008	0.009
-10	-0.007	-0.020	-0.009
0	-0.011	-0.022	-0.012
+10	-0.006	-0.006	-0.006
+30	0.013	0.001	0.004
+40	-0.003	-0.006	0.001
+55	0.004	0.005	0.006
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251

LV	0.001	-0.005	-0.001
HV	0.013	0.013	0.011

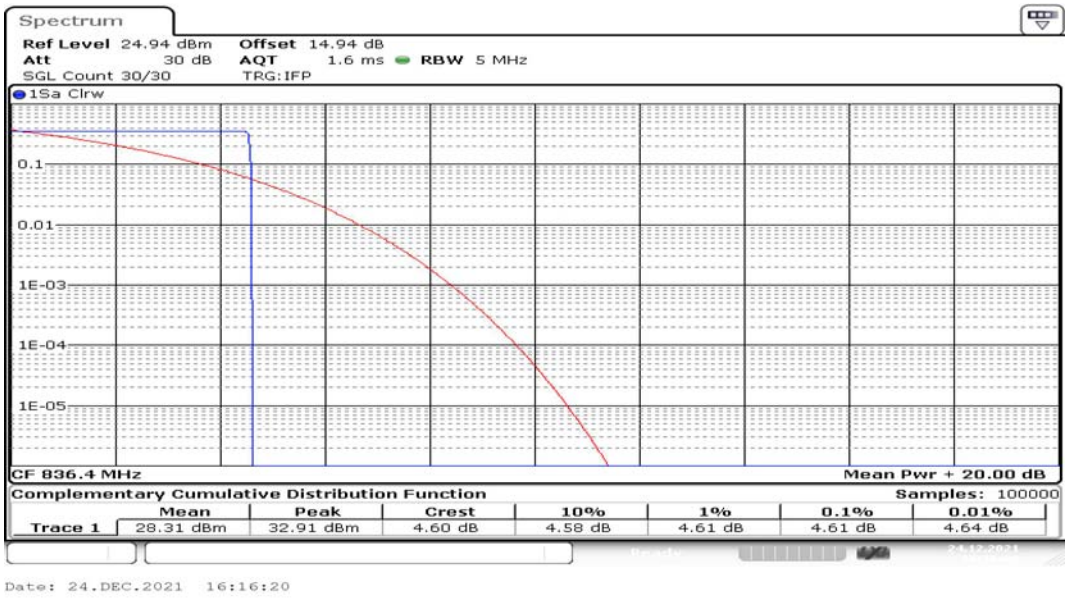
7. Peak-Average Ratio

GSM850

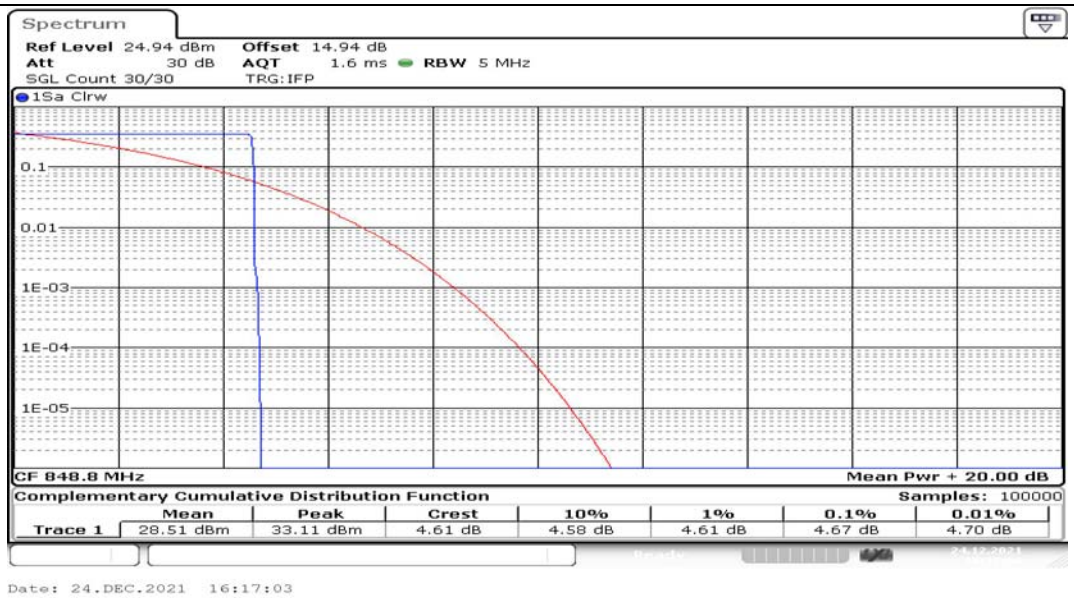
GSM MODE:



Channel 128

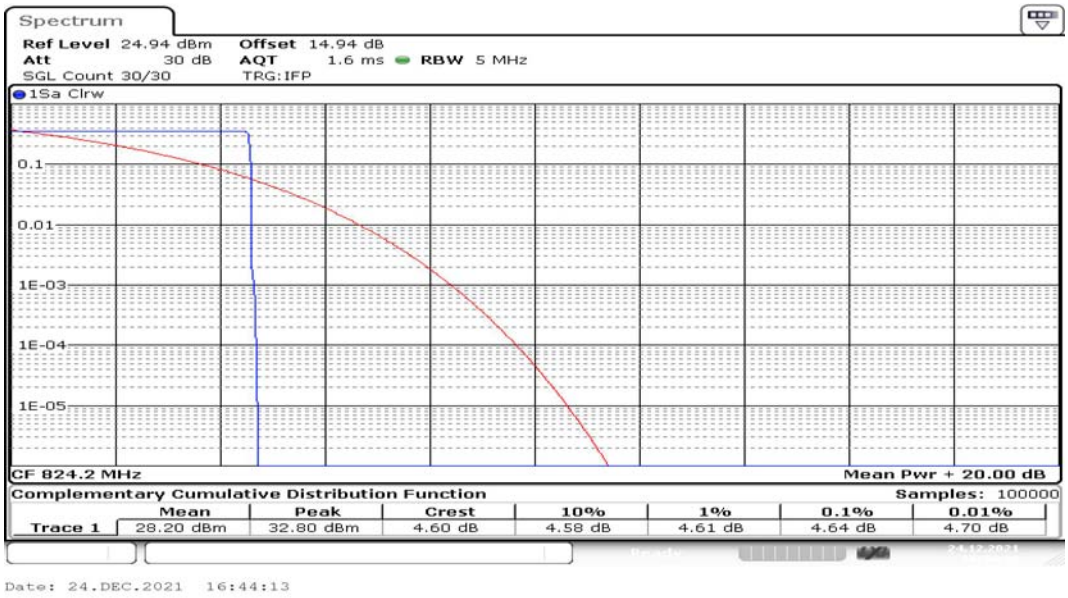


Channel 189

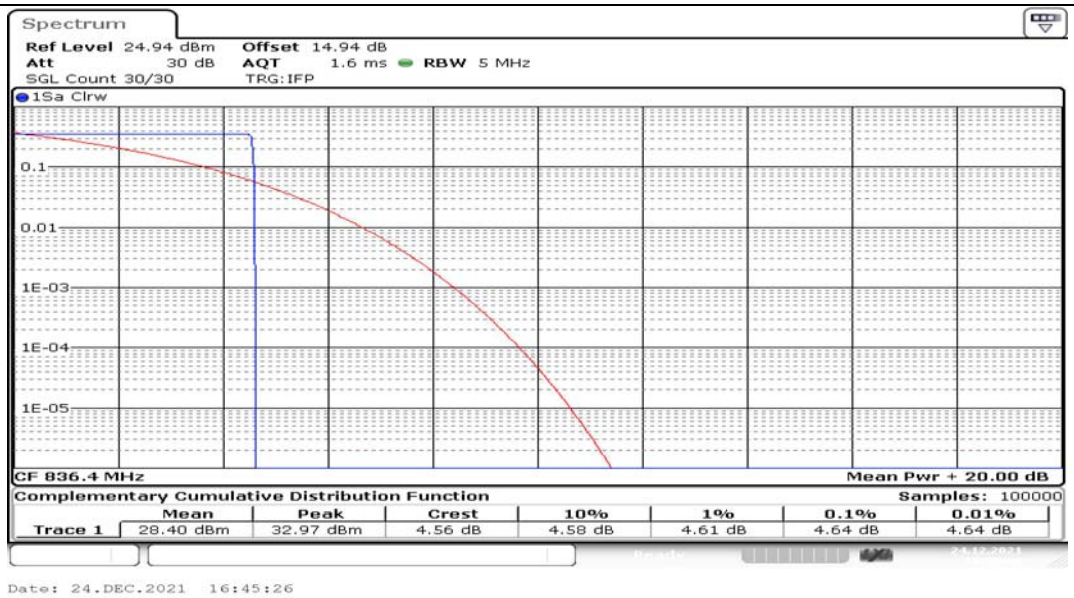


Channel 251

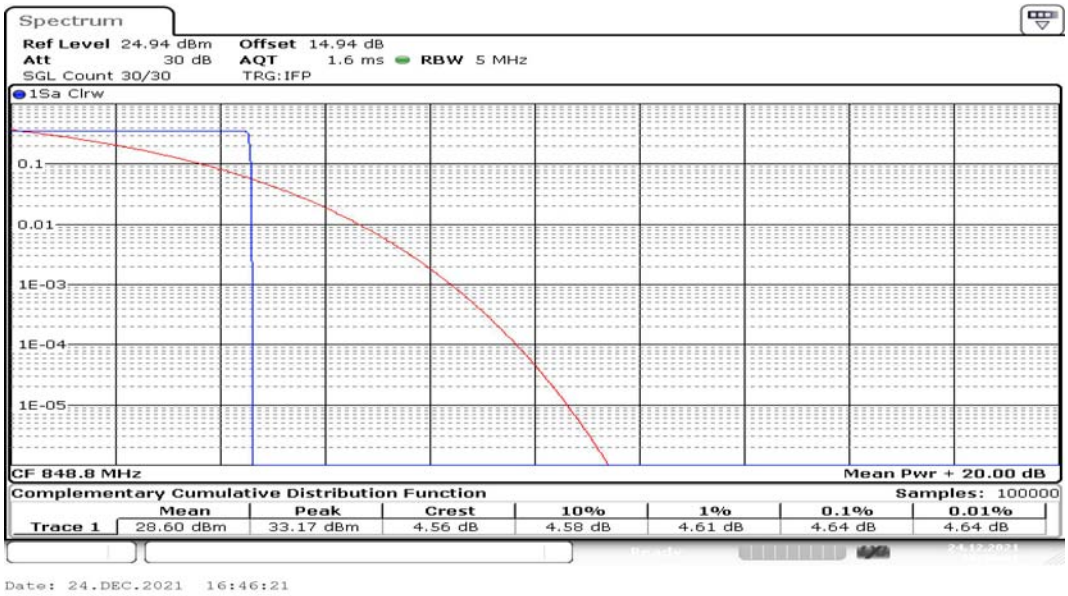
GPRS MODE:



Channel 128

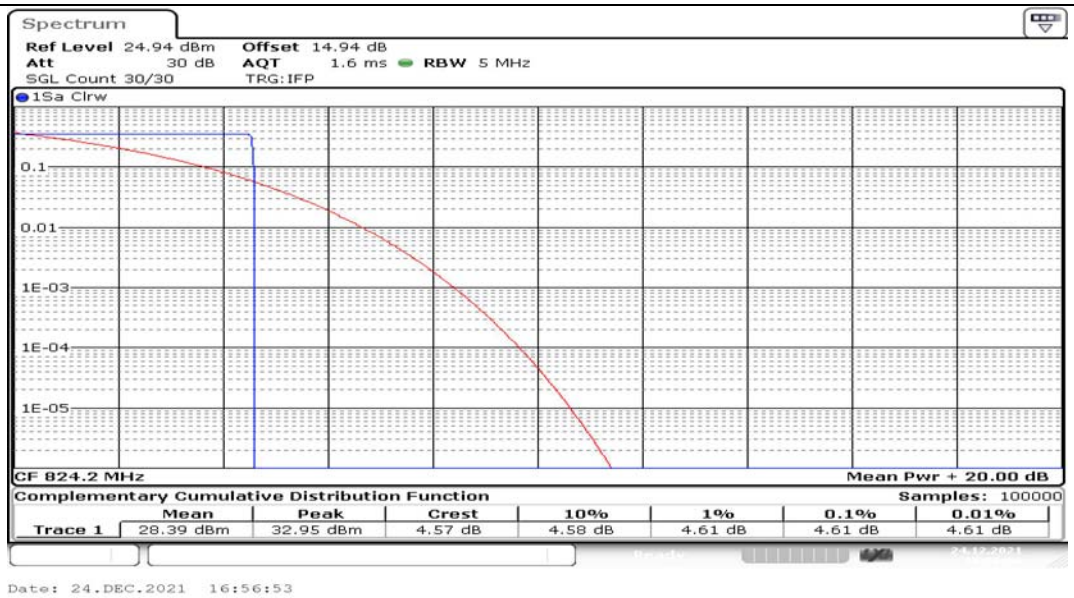


Channel 189

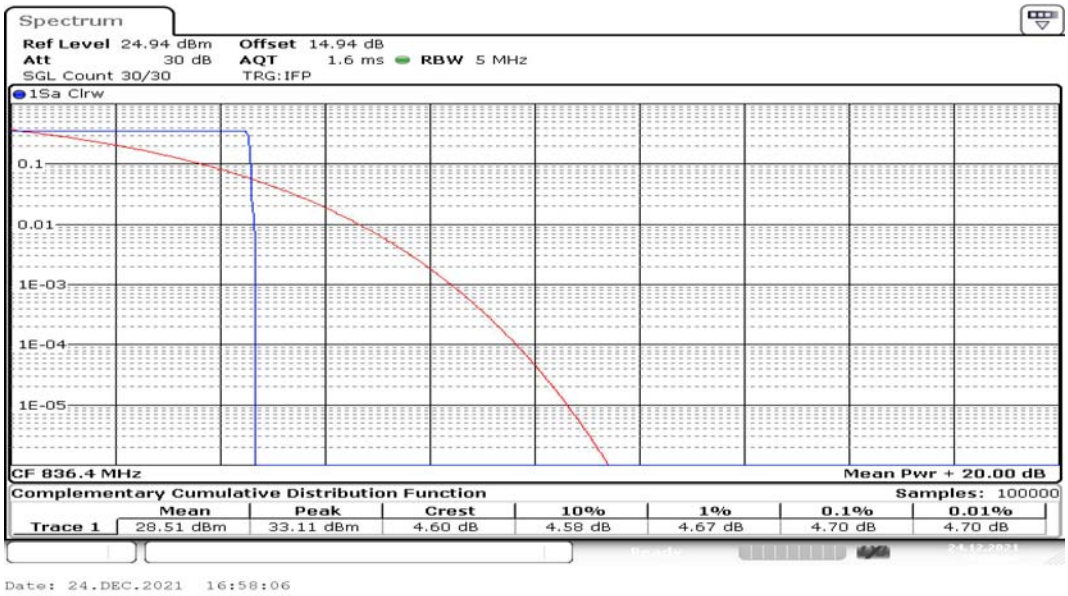


Channel 251

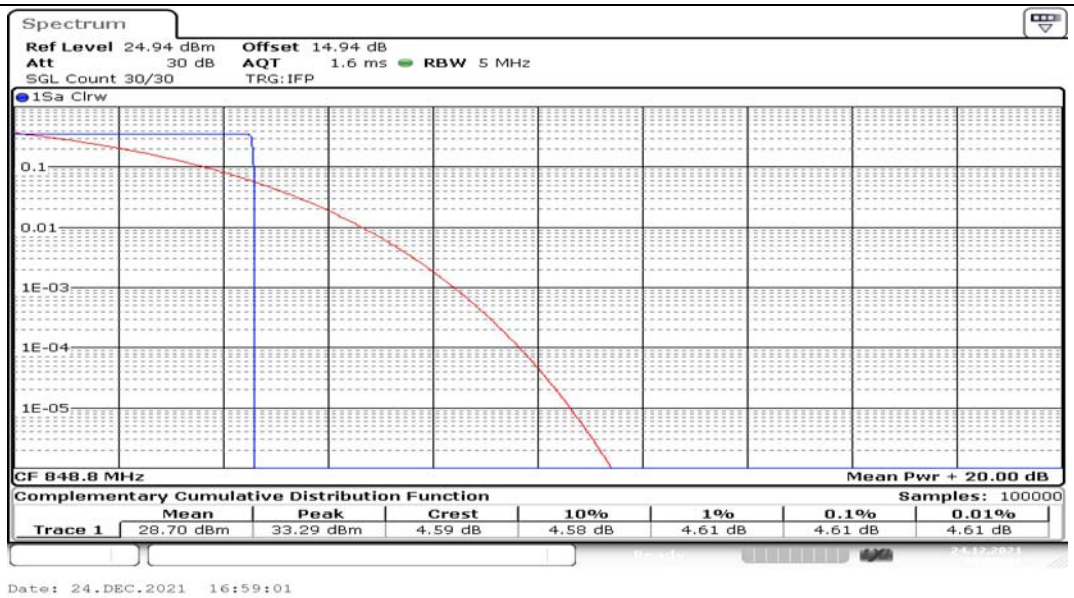
EGPRS (8PSK) MODE:



Channel 128



Channel 189


Spectrum
Ref Level 24.94 dBm Offset 14.94 dB
Att 30 dB AQT 1.6 ms RBW 5 MHz
SGL Count 30/30 TRG:IFP
1Sa Clrw
0.1
0.01
1E-03
1E-04
1E-05
CF 848.8 MHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 100000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 28.70 dBm 33.29 dBm 4.59 dB 4.58 dB 4.61 dB 4.61 dB 4.61 dB
Date: 24.DEC.2021 16:59:01

Channel 251

8. Effective Radiated Power and Effective Isotropic Radiated Power

GSM850

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	31.35	26.70	0.468
836.4	189	31.44	26.79	0.478
848.8	251	31.60	26.95	0.495

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	4Down1Up	31.37	26.72	0.470
836.4	189		31.47	26.82	0.481
848.8	251		31.63	26.98	0.499
824.2	128	3Down2Up	29.48	24.83	0.304
836.4	189		29.34	24.69	0.294
848.8	251		29.30	24.65	0.292
824.2	128	2Down3Up	27.51	22.86	0.193
836.4	189		27.42	22.77	0.189
848.8	251		27.38	22.73	0.187
824.2	128	1Down4Up	25.28	20.63	0.116
836.4	189		25.19	20.54	0.113
848.8	251		25.19	20.54	0.113

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	4Down1Up	31.52	26.87	0.486
836.4	189		31.62	26.97	0.498
848.8	251		31.76	27.11	0.514
824.2	128	3Down2Up	29.69	25.04	0.319
836.4	189		29.57	24.92	0.310
848.8	251		29.50	24.85	0.305
824.2	128	2Down3Up	27.81	23.16	0.207
836.4	189		27.71	23.06	0.202
848.8	251		27.66	23.01	0.200
824.2	128	1Down4Up	25.72	21.07	0.128
836.4	189		25.62	20.97	0.125
848.8	251		25.59	20.94	0.124

GSM900 Result

1. RF Power Output

PCS1900

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	28.53
1880	661	28.30
1909.8	810	28.34

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
1850.2	512	4Down1Up	28.53
1880	661		28.30
1909.8	810		28.33
1850.2	512	3Down2Up	26.57
1880	661		26.17
1909.8	810		26.17
1850.2	512	2Down3Up	25.03
1880	661		24.62
1909.8	810		24.60
1850.2	512	1Down4Up	22.98
1880	661		22.58
1909.8	810		22.54

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
1850.2	512	4Down1Up	28.64
1880	661		28.51
1909.8	810		28.66
1850.2	512	3Down2Up	26.73
1880	661		26.43
1909.8	810		26.56
1850.2	512	2Down3Up	25.26
1880	661		24.94
1909.8	810		25.04
1850.2	512	1Down4Up	23.34
1880	661		23.00
1909.8	810		23.07

2. Occupied Bandwidth

PCS1900

GSM MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	241.68
1880	661	247.47
1909.8	810	250.36

GPRS MODE:

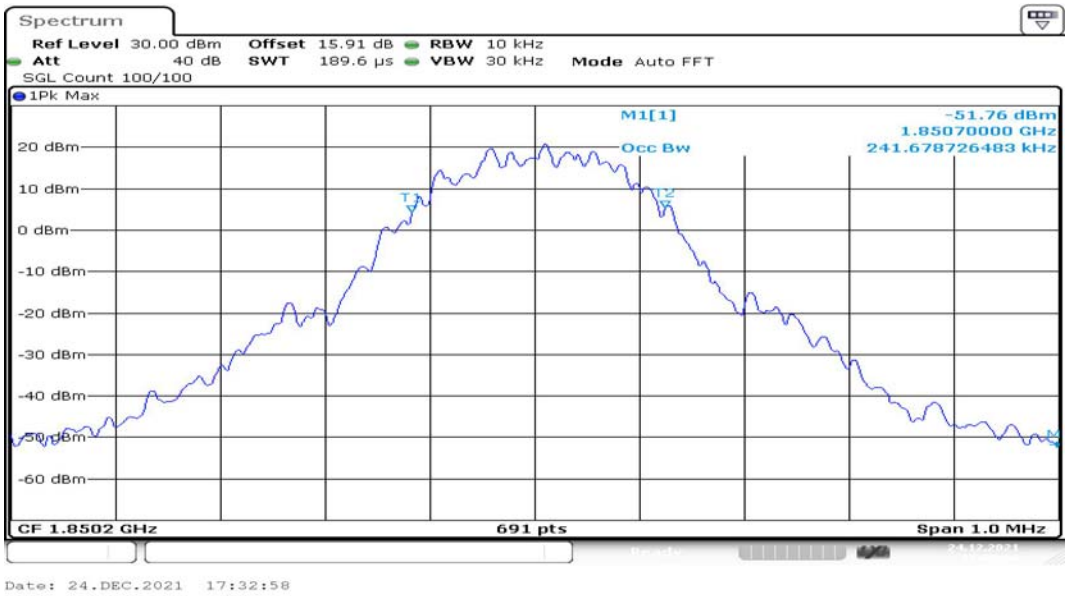
Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	246.02
1880	661	247.47
1909.8	810	246.02

EGPRS (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	248.91
1880	661	237.34
1909.8	810	253.26

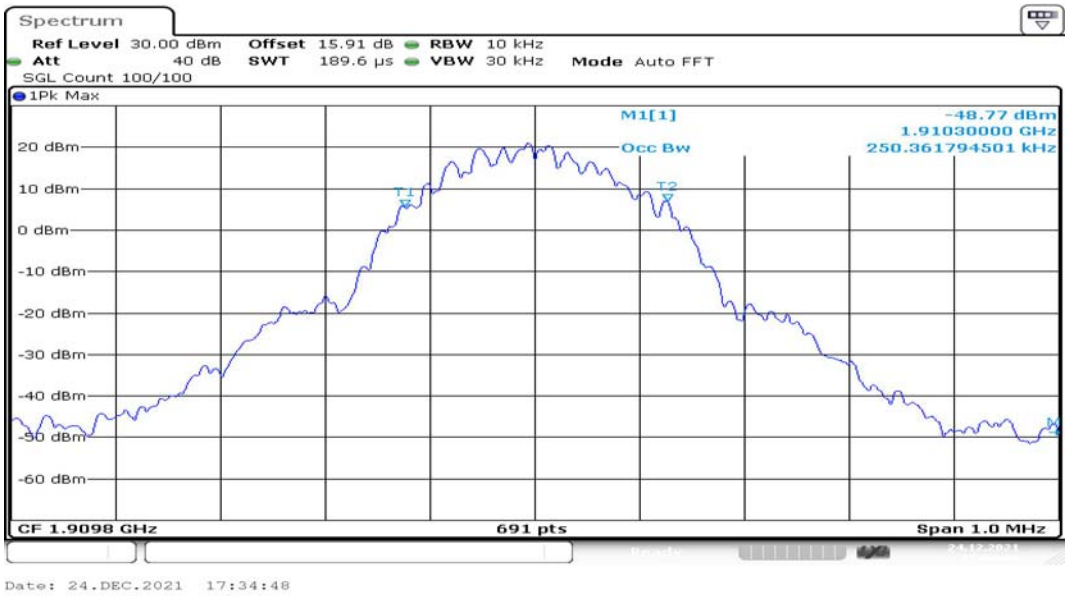
PCS1900

GSM MODE:



Channel 512

Channel 661



Channel 810

GPRS MODE:

Channel 512

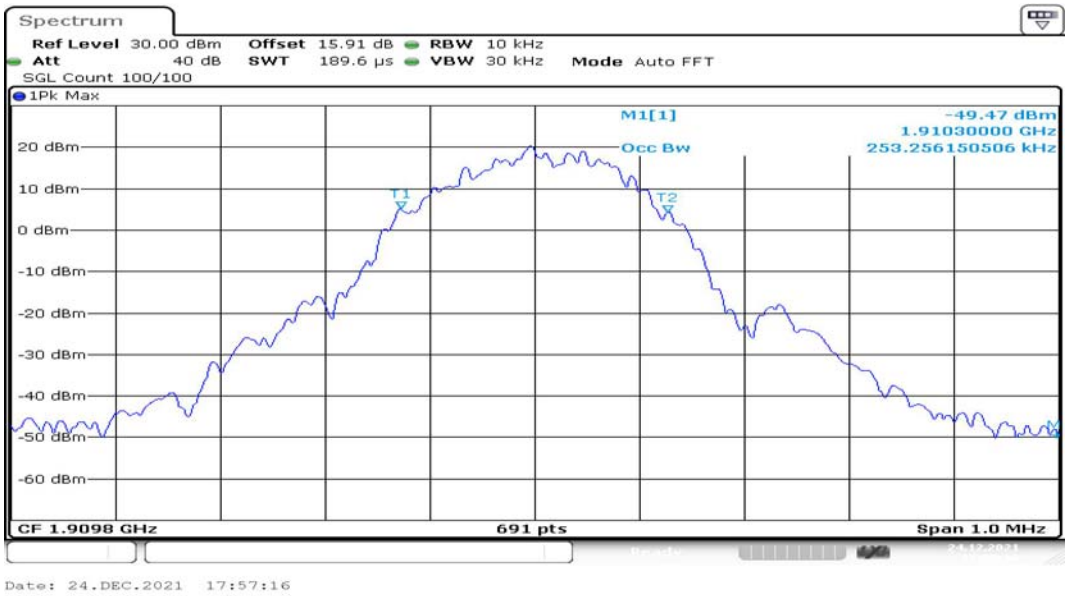
Channel 661

Channel 810

EGPRS (8PSK) MODE:

Channel 512

Channel 661



Channel 810

3. Emission Bandwidth

PCS1900

GSM MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
1850.2	512	309.70
1880	661	305.40
1909.8	810	315.50

GPRS MODE:

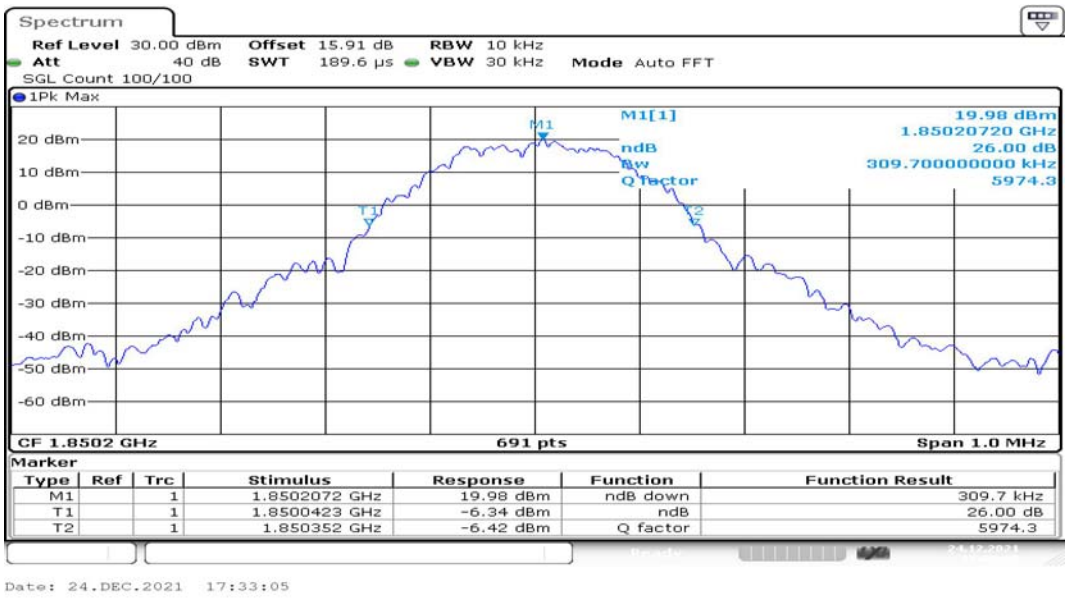
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
1850.2	512	290.90
1880	661	319.80
1909.8	810	311.10

EGPRS (8PSK) MODE:

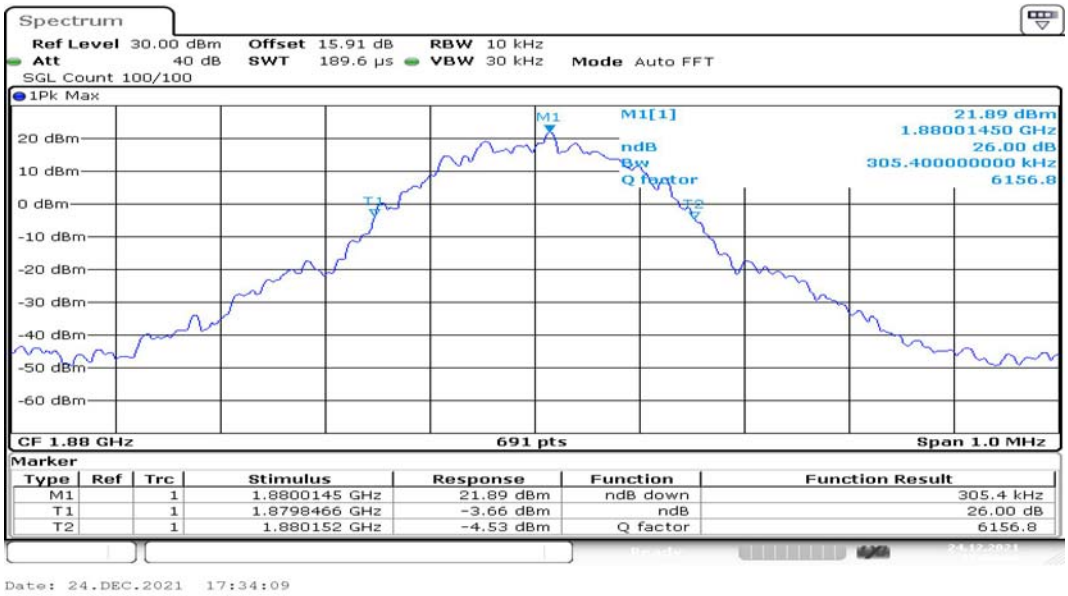
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
1850.2	512	308.20
1880	661	311.10
1909.8	810	315.50

PCS1900

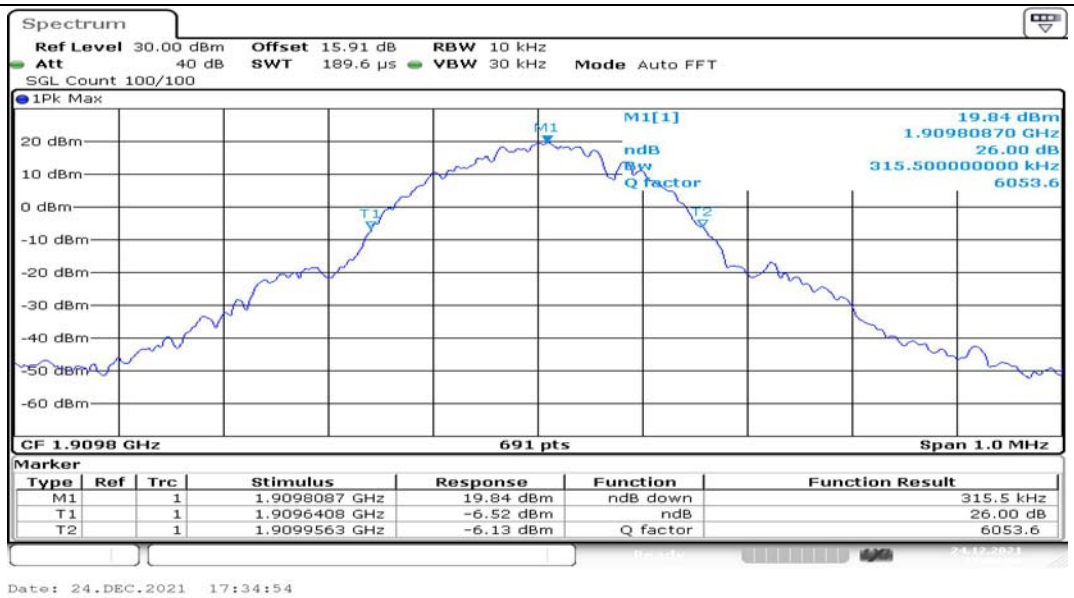
GSM MODE:



Channel 512

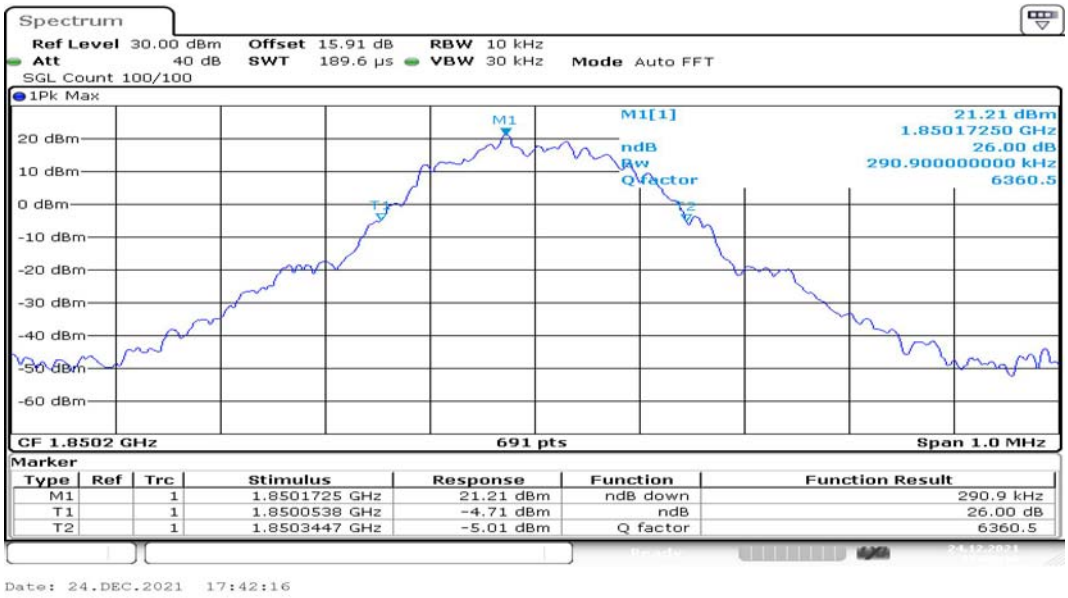


Channel 661

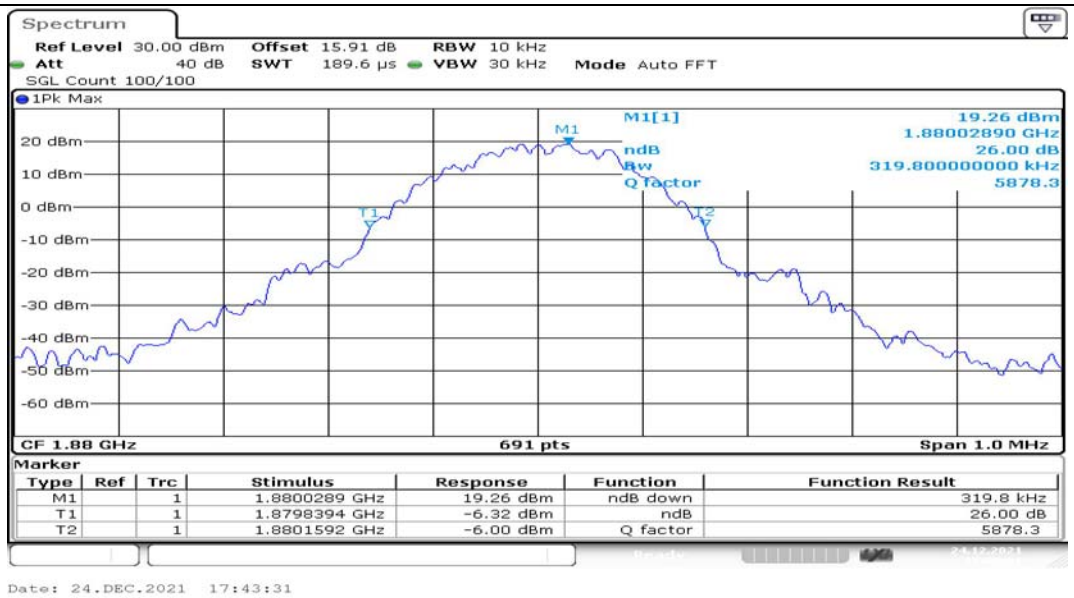


Channel 810

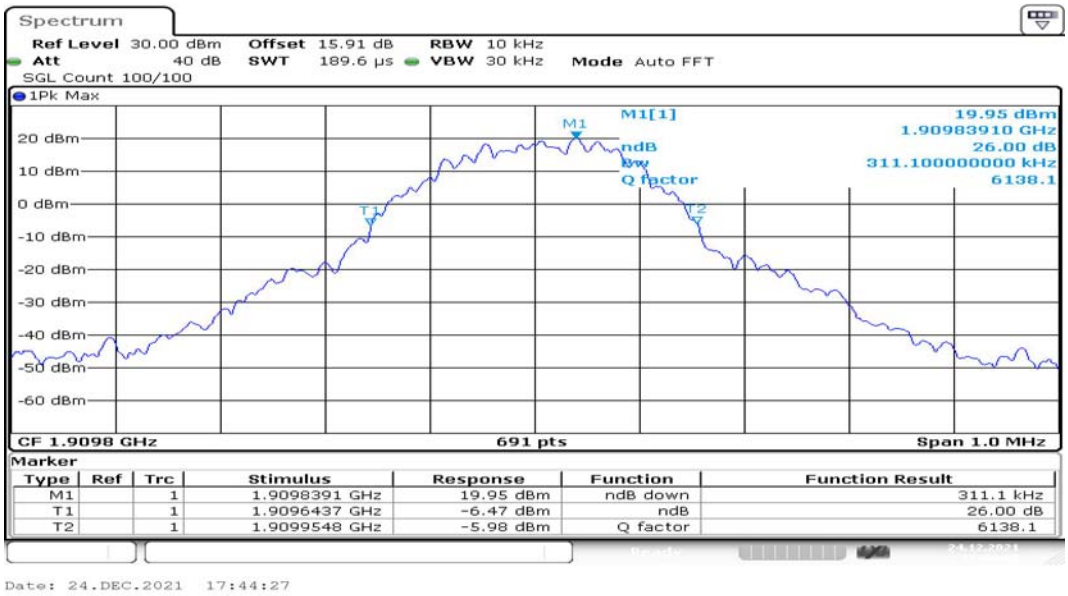
GPRS MODE:



Channel 512

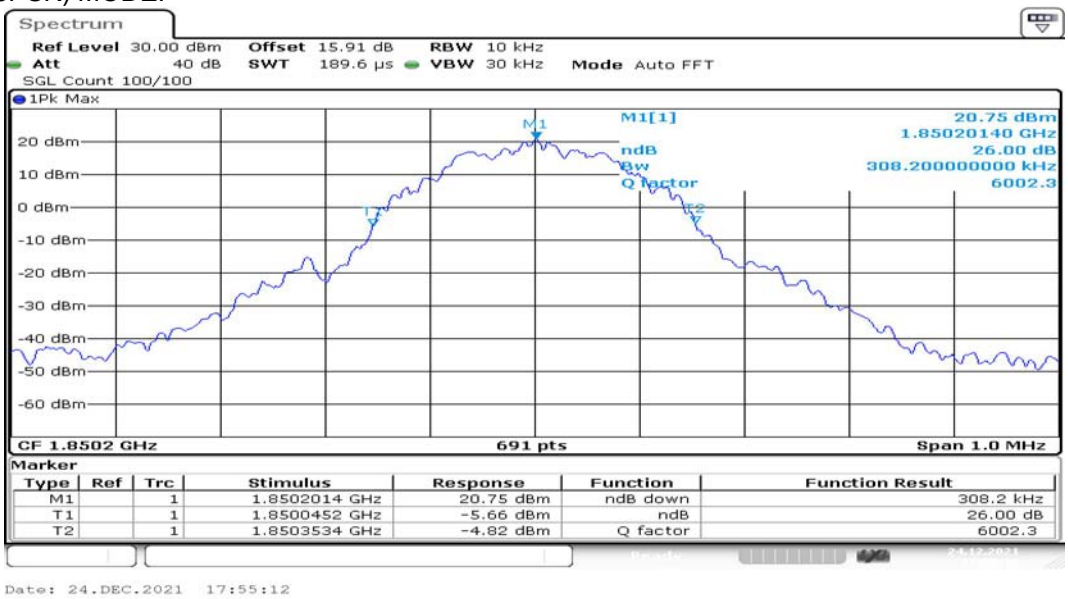


Channel 661

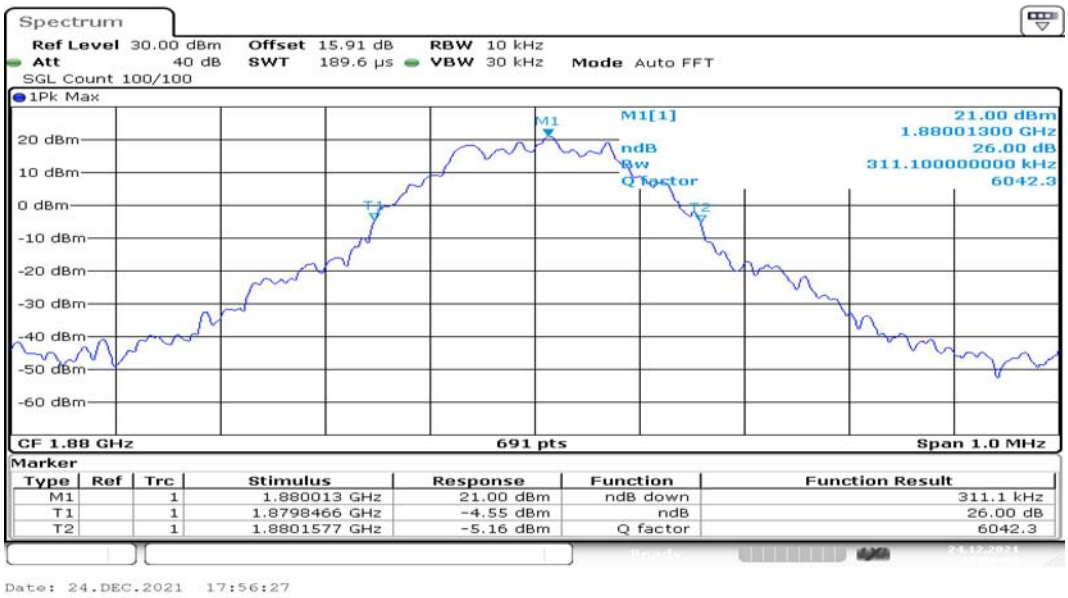


Channel 810

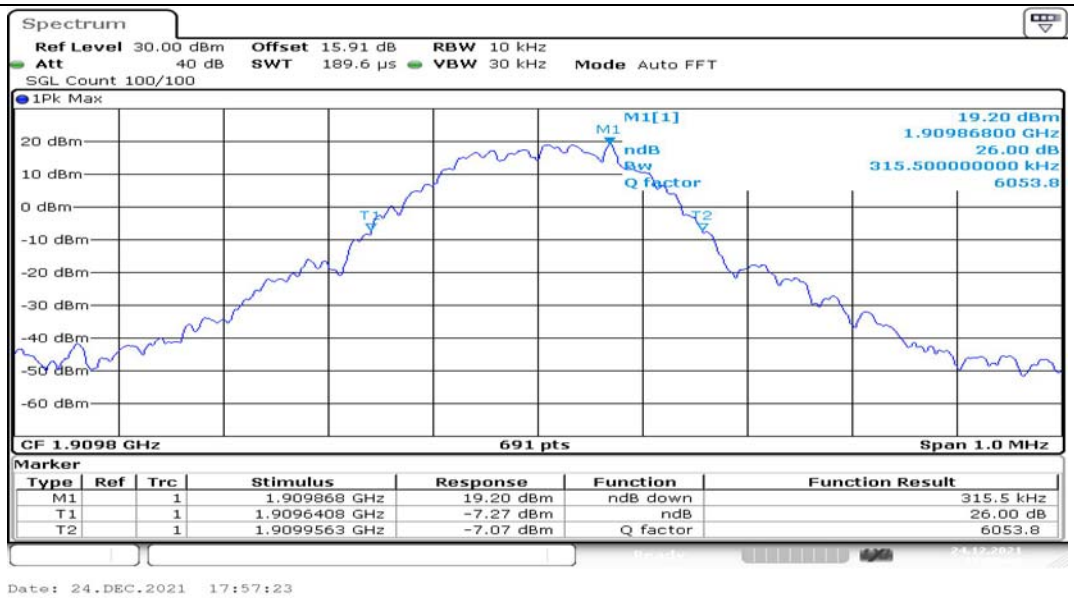
EGPRS (8PSK) MODE:



Channel 512



Channel 661

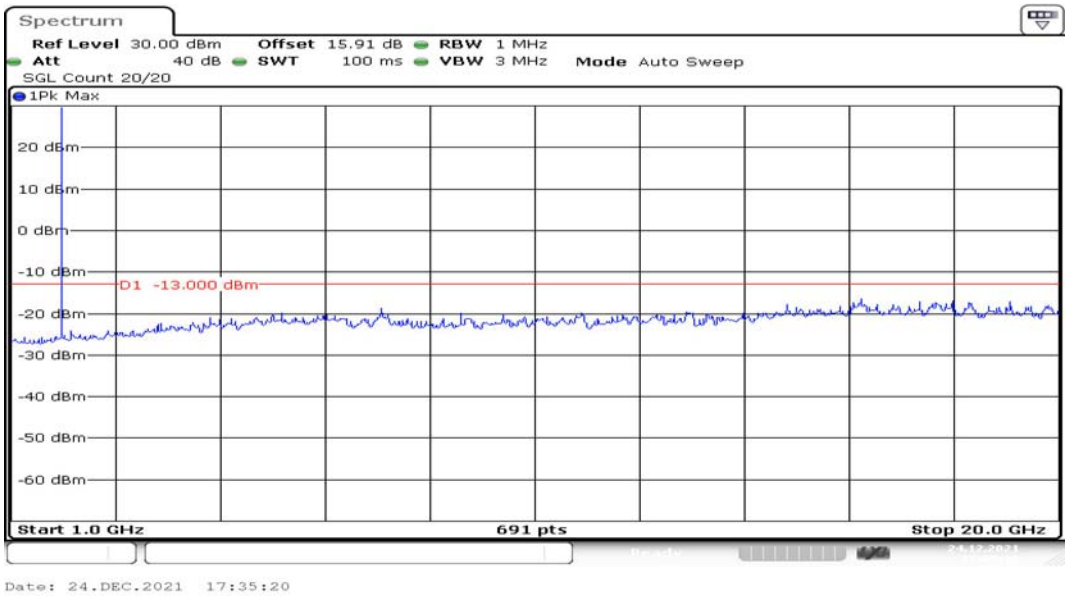

Spectrum
Ref Level 30.00 dBm Offset 15.91 dB RBW 10 kHz
Att 40 dB SWT 189.6 µs VBW 30 kHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1] 19.20 dBm
1.90986800 GHz
ndB 26.00 dB
Bw 315.500000000 kHz
Q factor 6053.8
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 1.9098 GHz
691 pts
Span 1.0 MHz
Marker
Type Ref Trc Stimulus Response Function Function Result
M1 1 1.909868 GHz 19.20 dBm ndB down 315.5 kHz
T1 1 1.9096408 GHz -7.27 dBm ndB 26.00 dB
T2 1 1.9099563 GHz -7.07 dBm Q factor 6053.8
Date: 24.DEC.2021 17:57:23

Channel 810

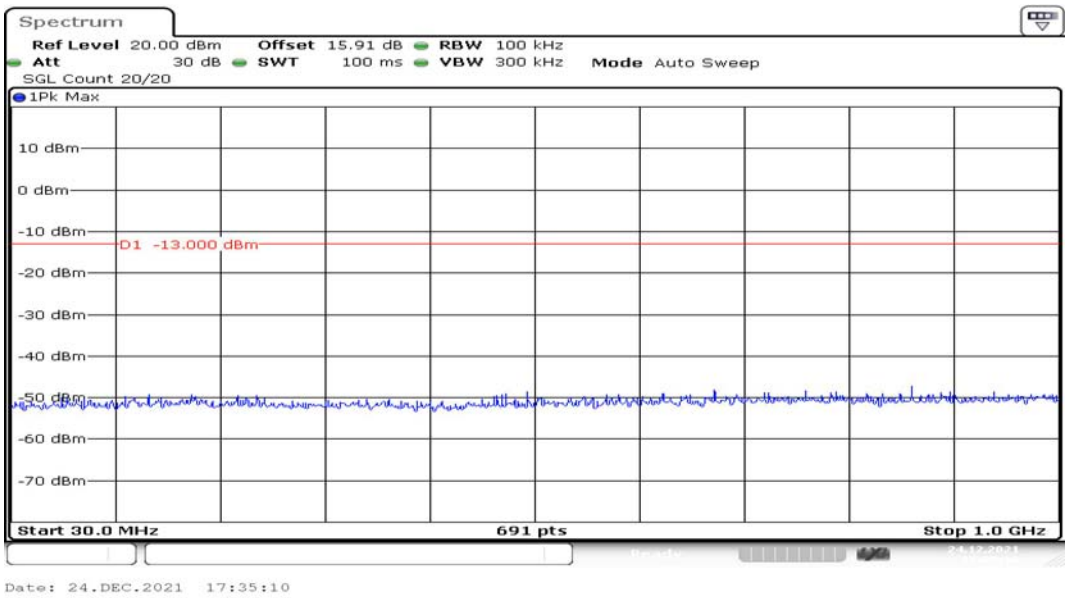
4. Spurious Emissions at antenna terminal

PCS1900

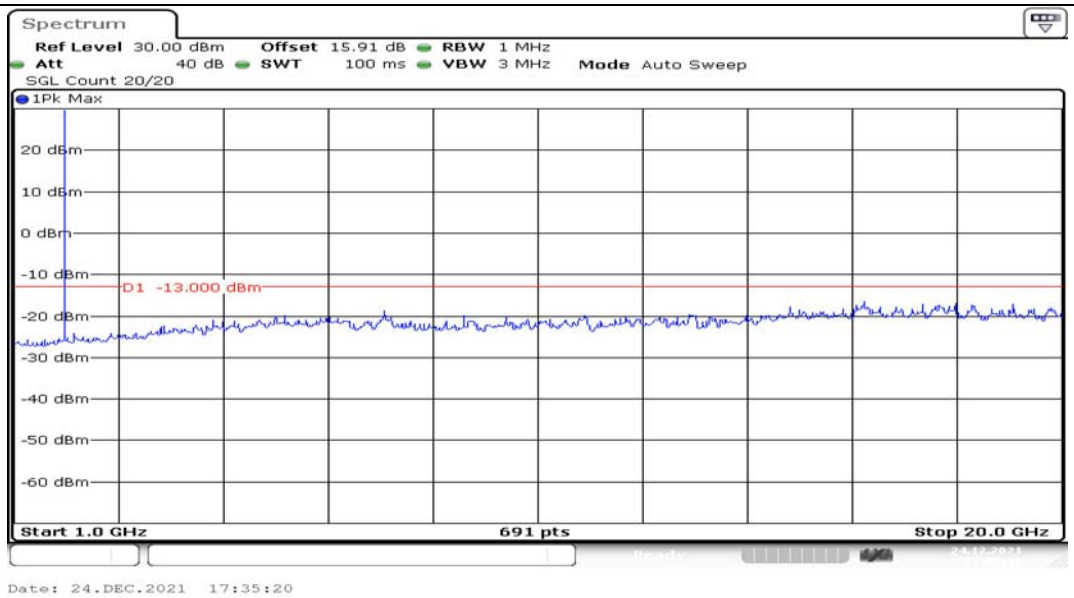
GSM MODE:



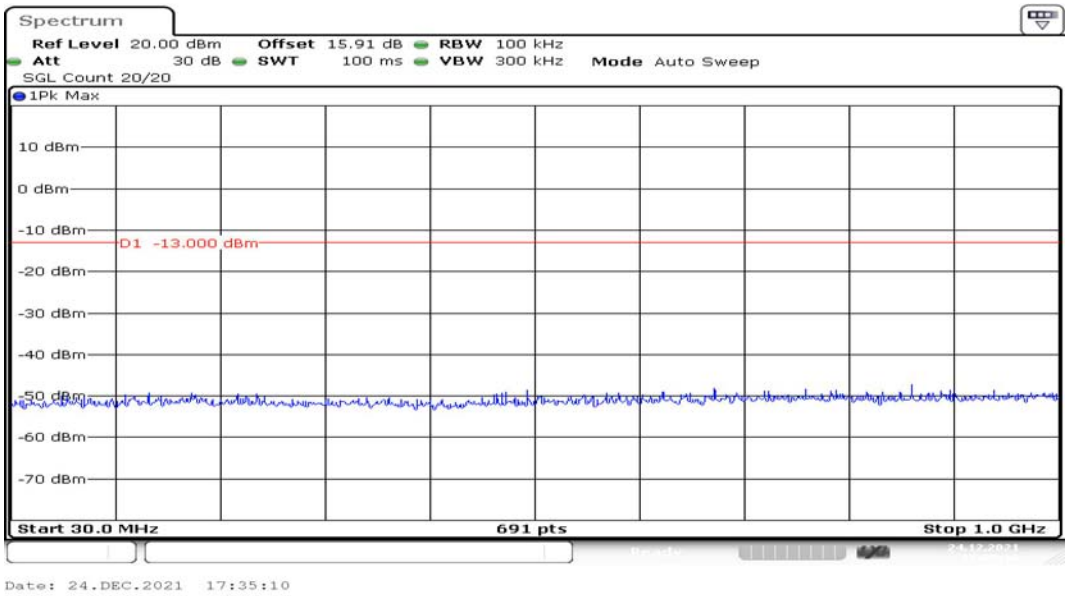
Channel 512



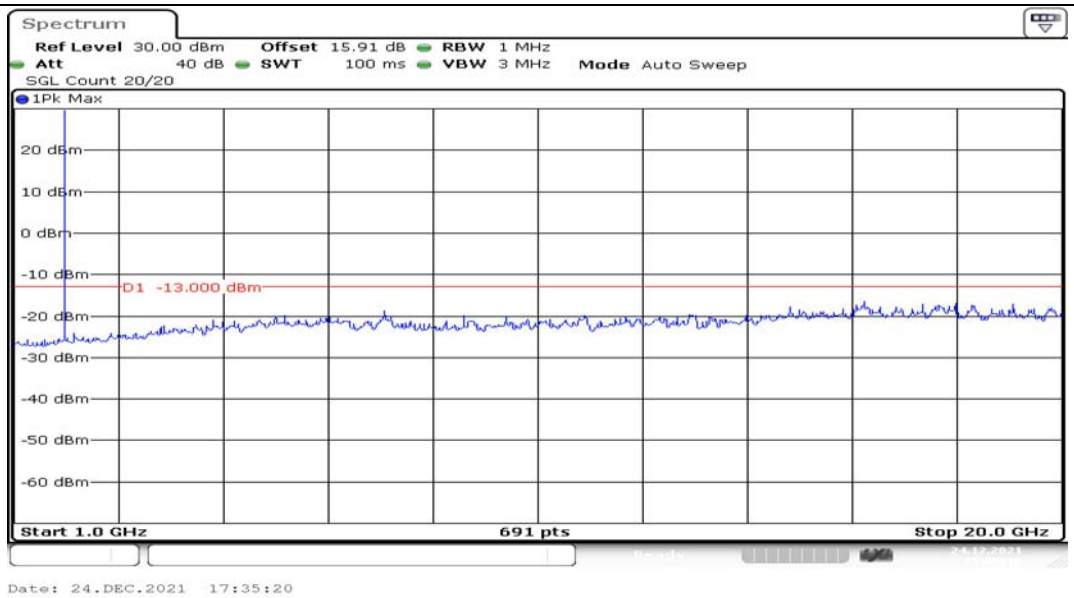
Channel 512



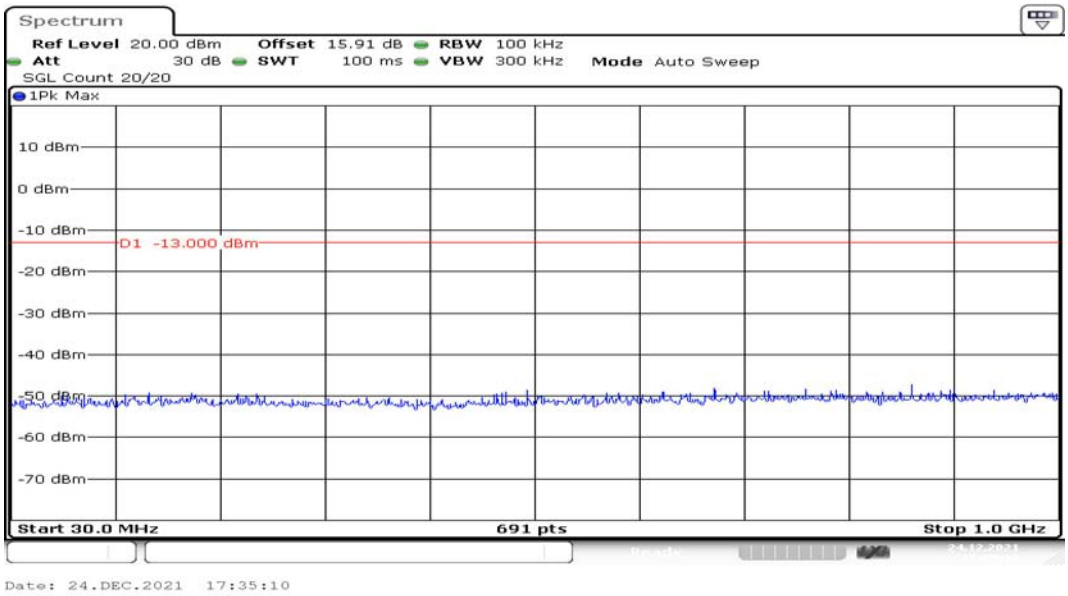
Channel 661



Channel 661

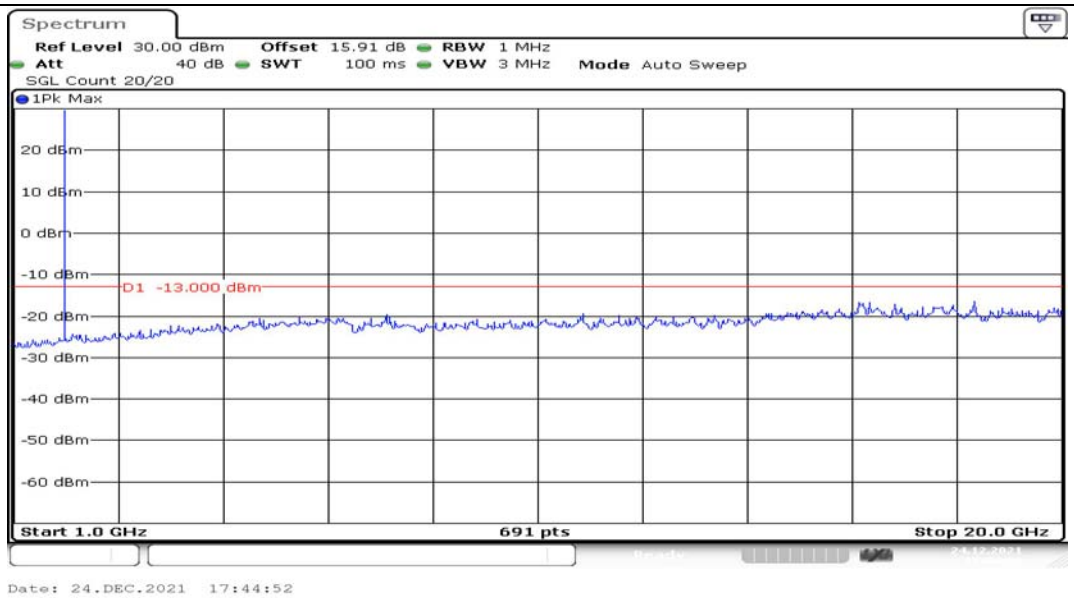


Channel 810

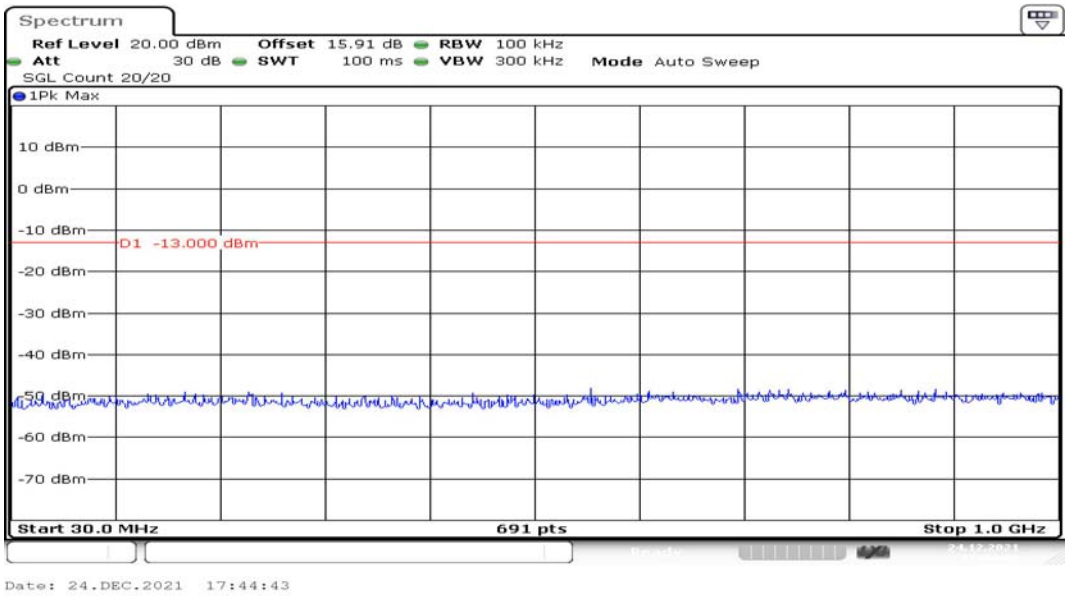


Channel 810

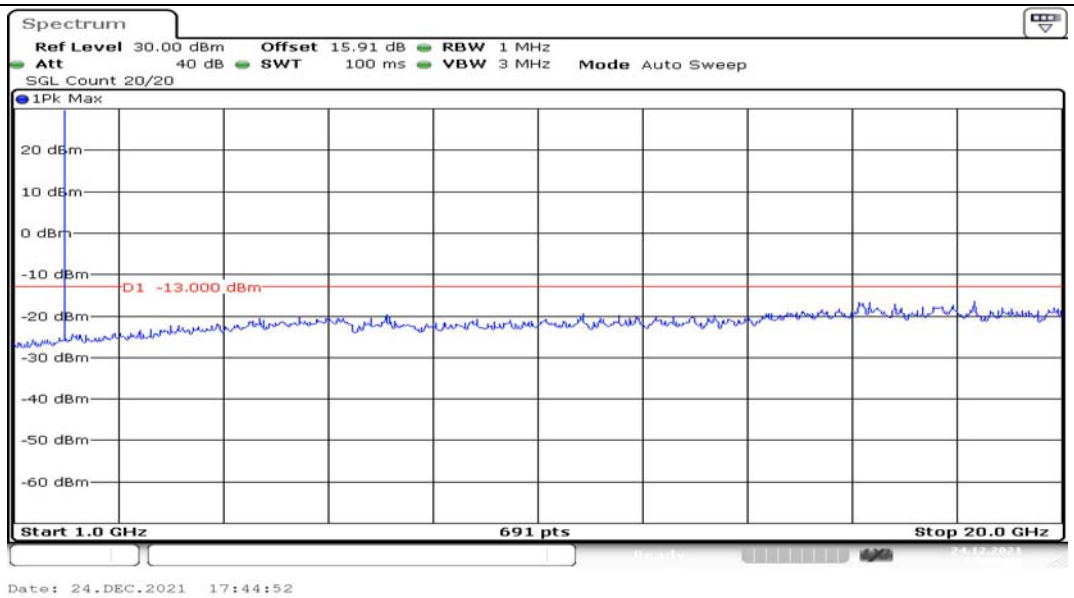
GPRS MODE:



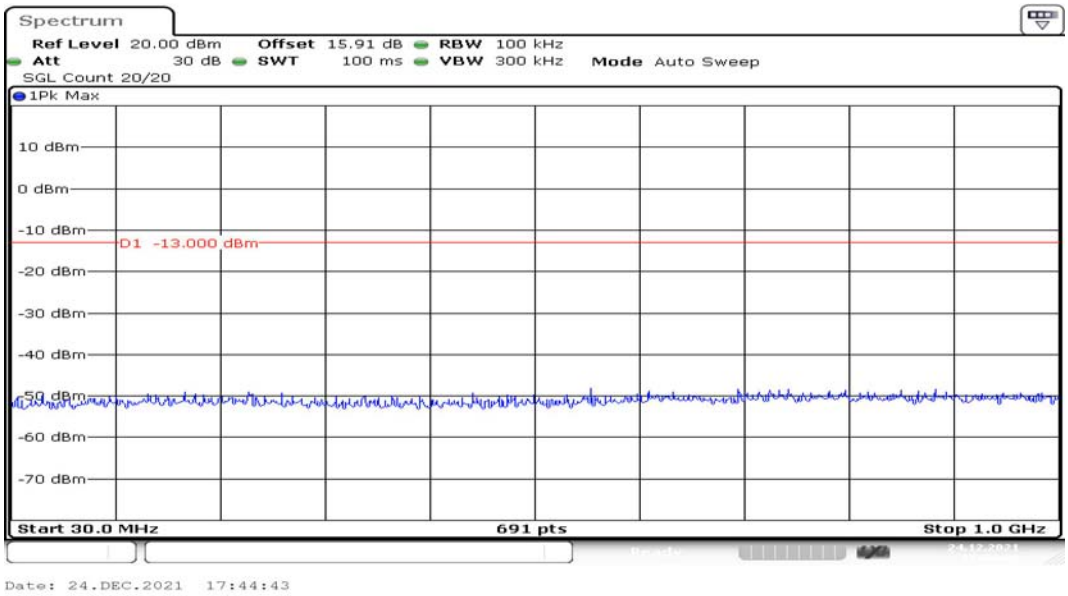
Channel 512



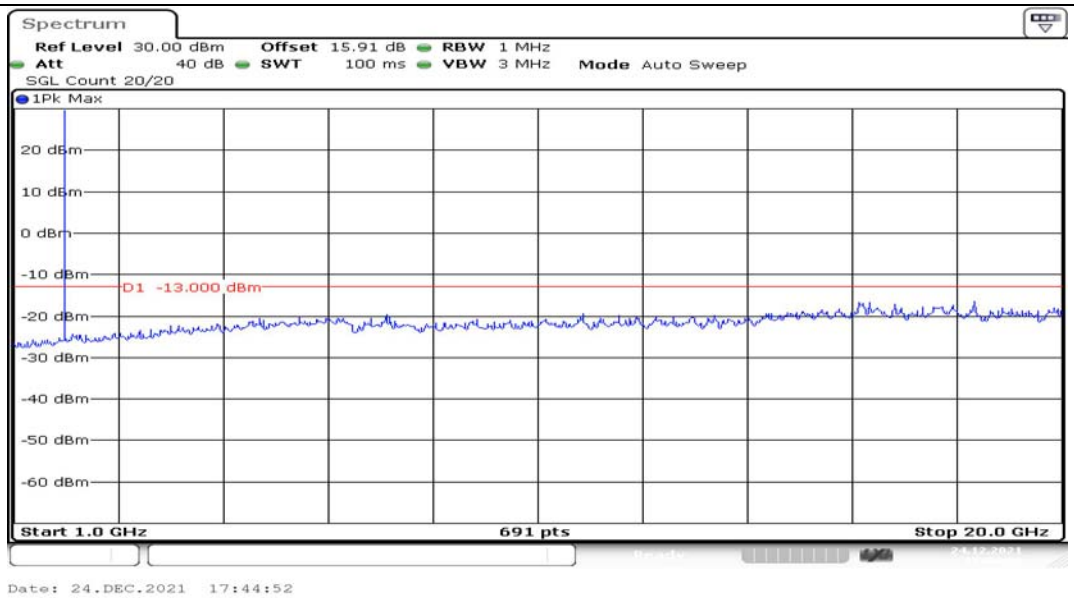
Channel 512



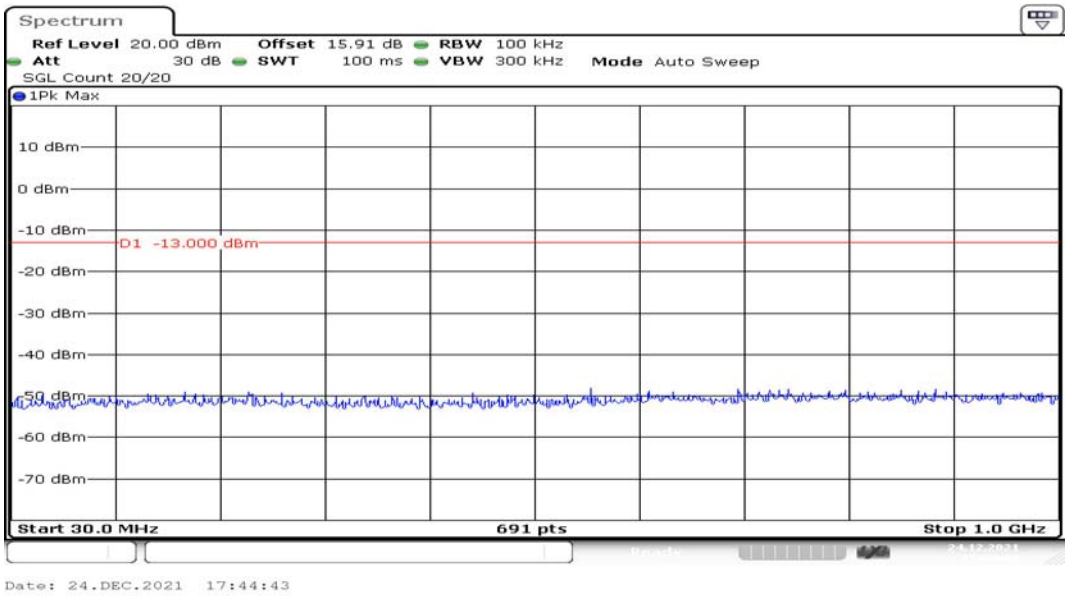
Channel 661



Channel 661

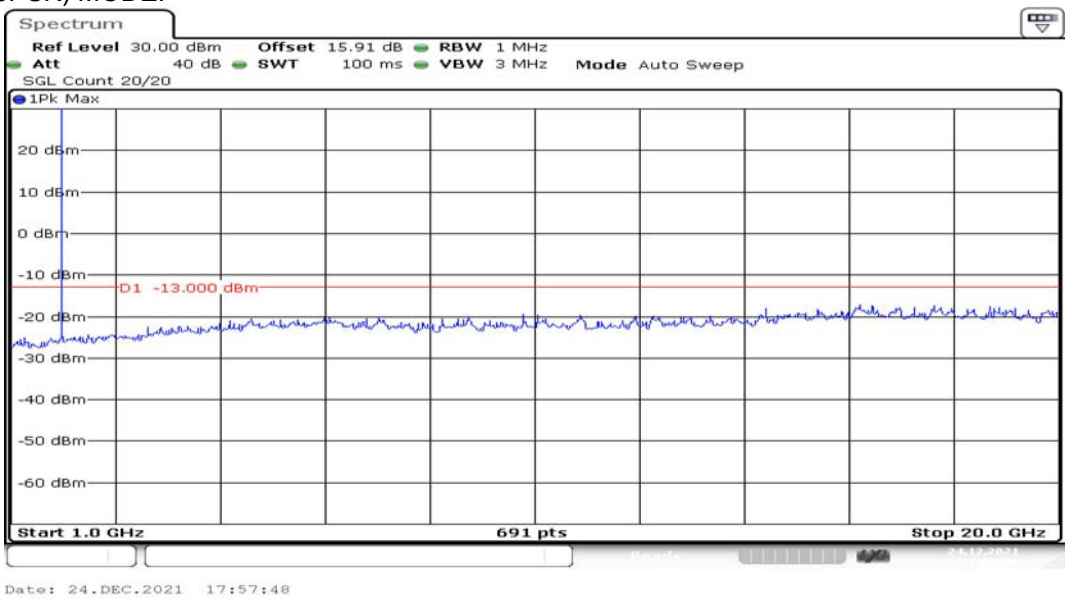


Channel 810

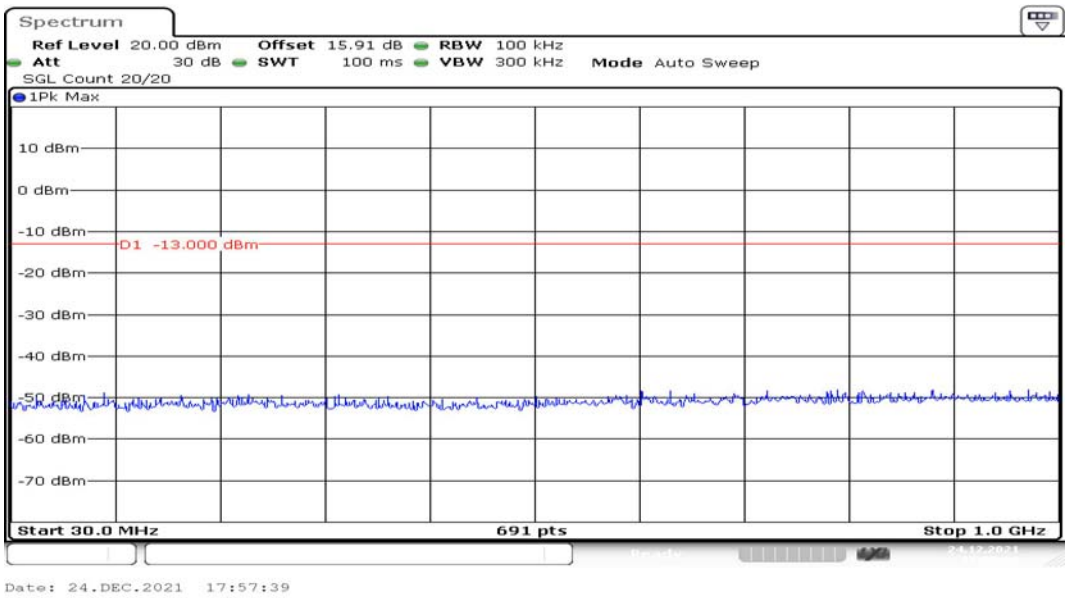


Channel 810

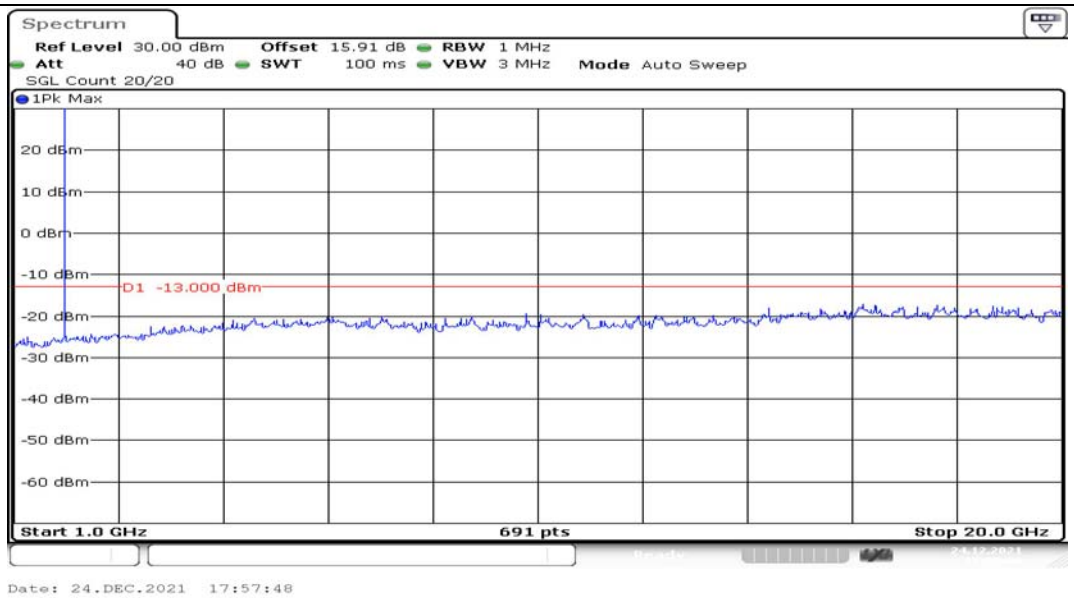
EGPRS (8PSK) MODE:



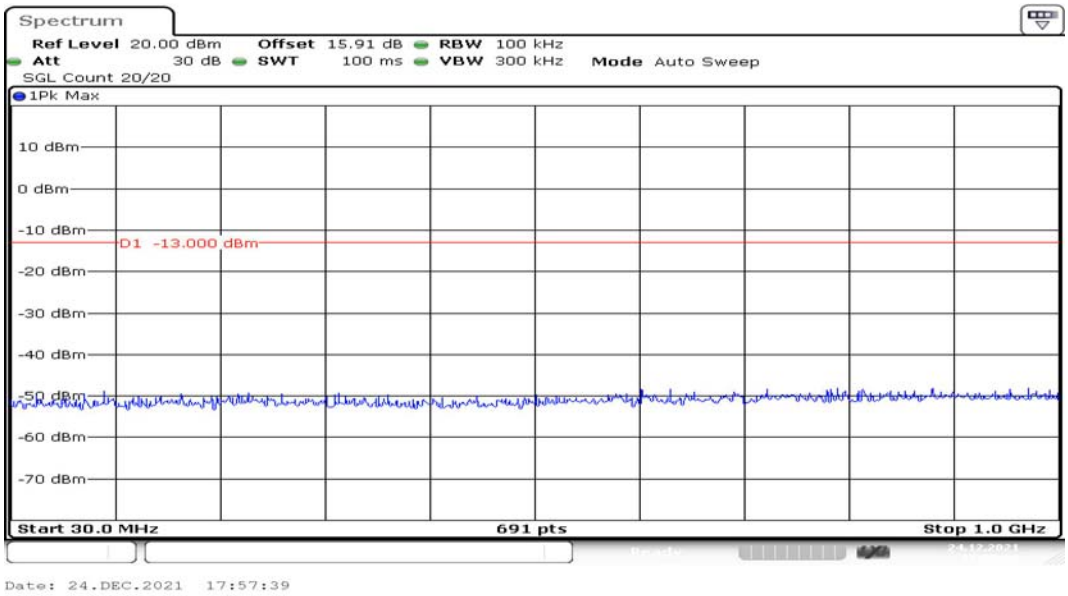
Channel 512



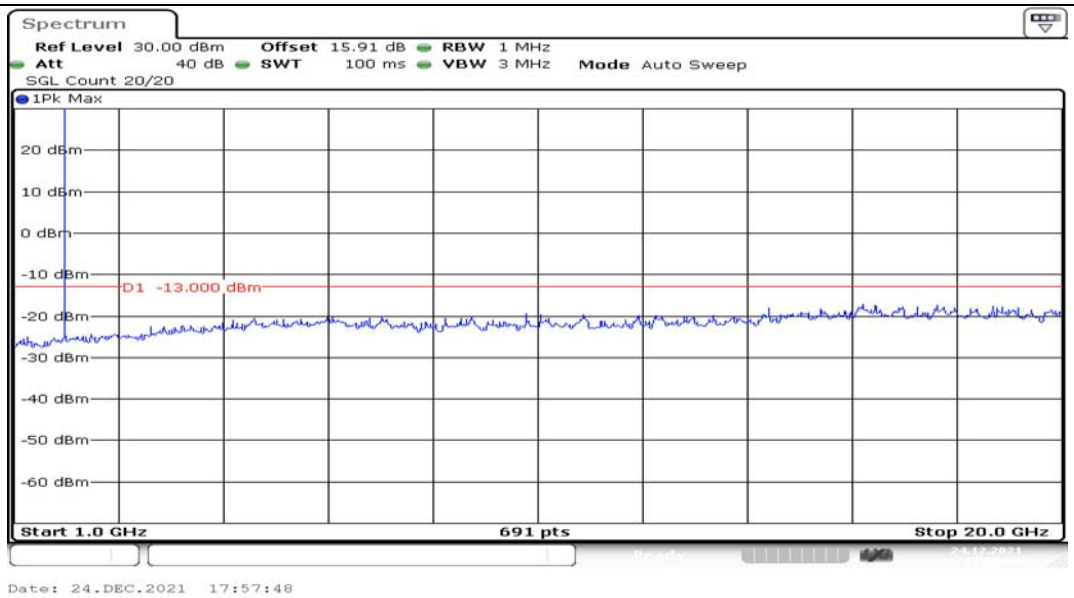
Channel 512



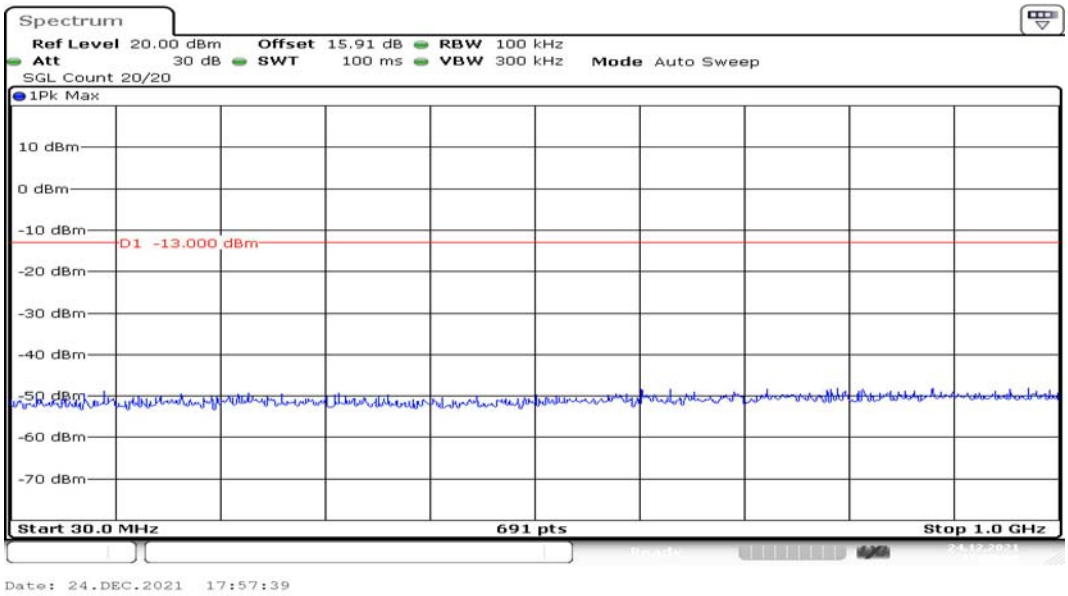
Channel 661



Channel 661



Channel 810

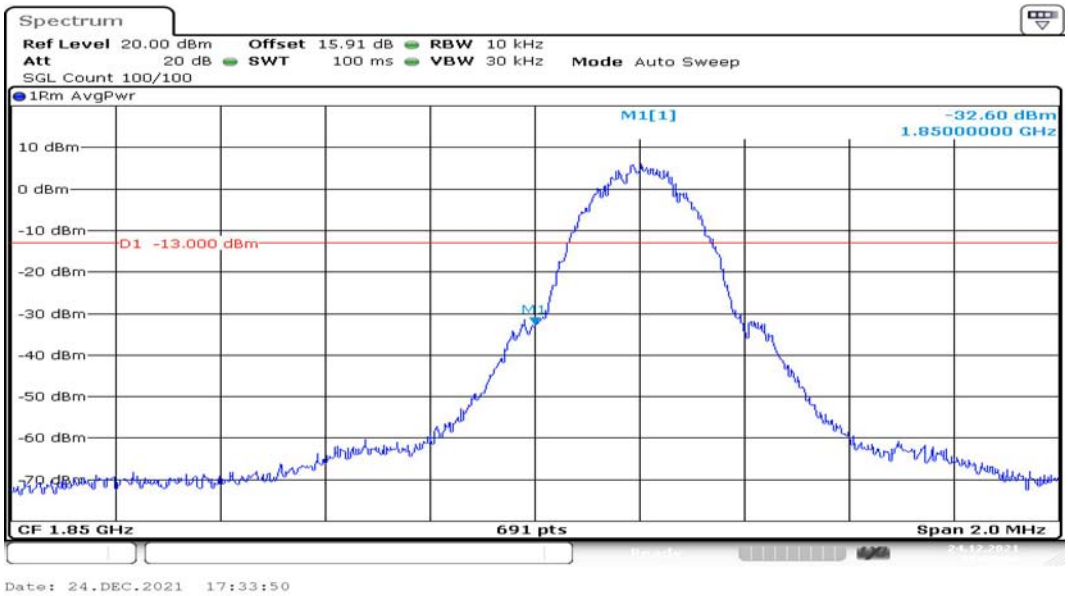


Channel 810

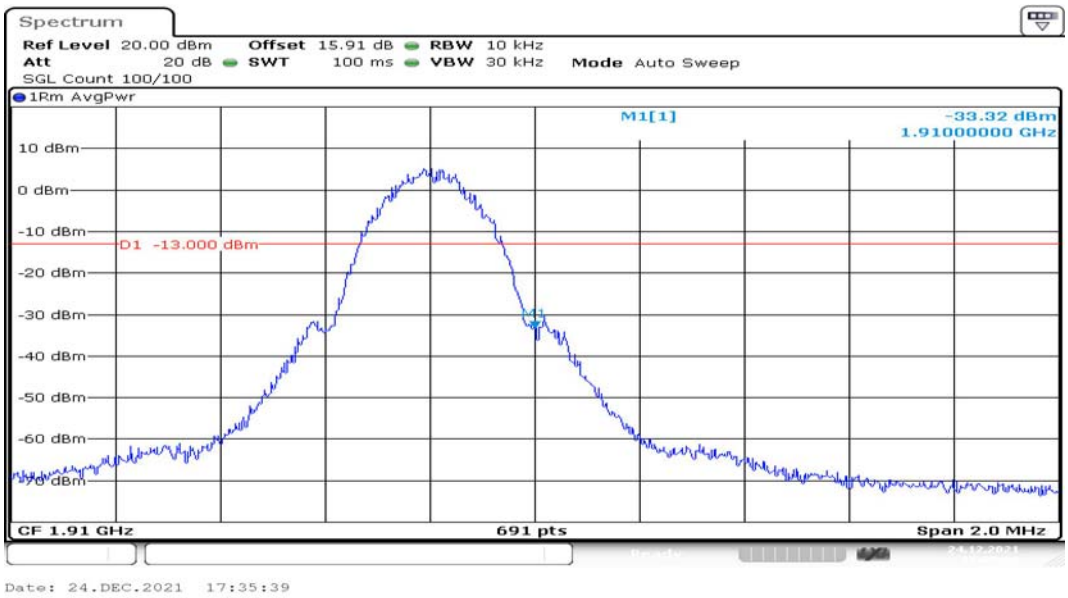
5. Band Edges Compliance

PCS1900

GSM MODE:

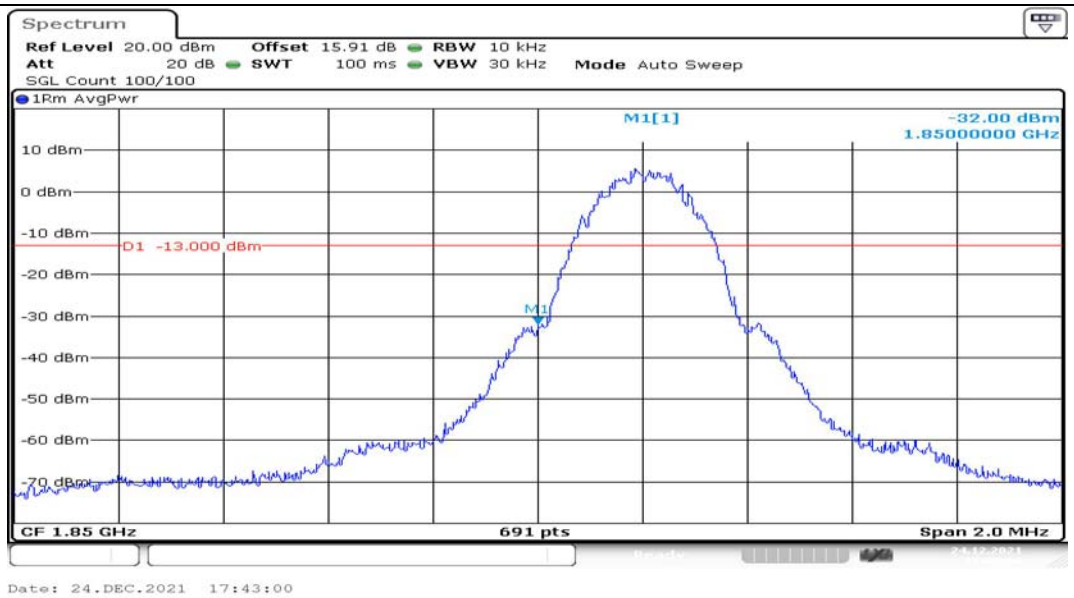


Channel 512

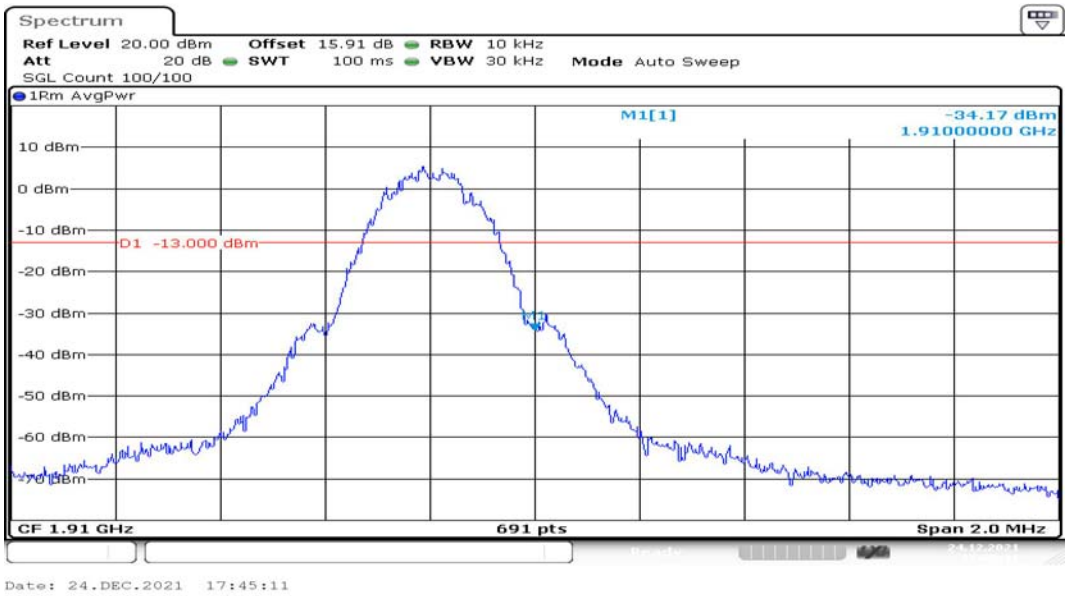


Channel 810

GPRS MODE:

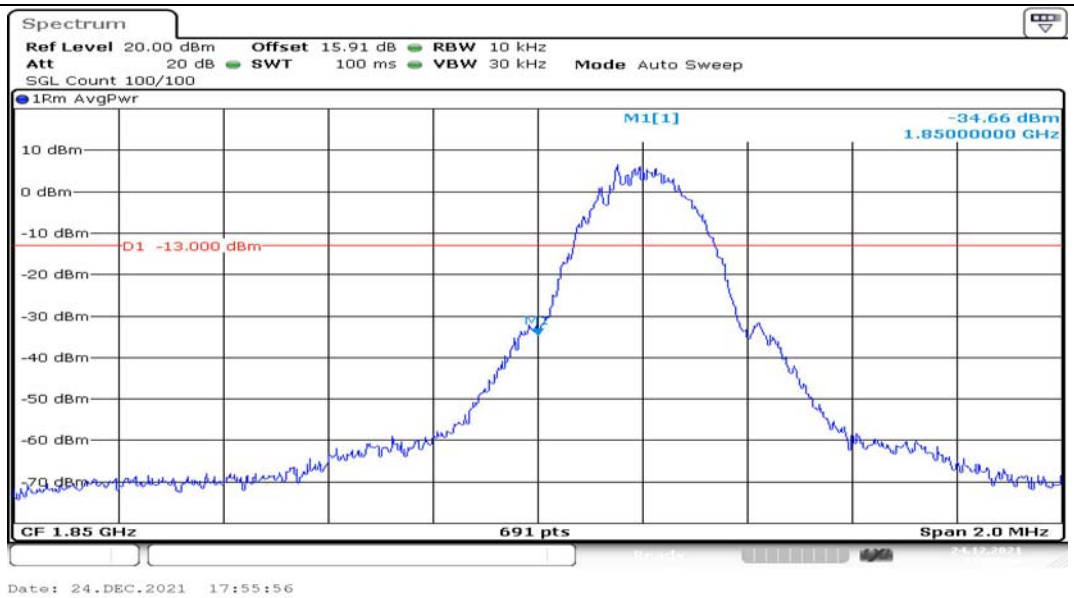


Channel 512

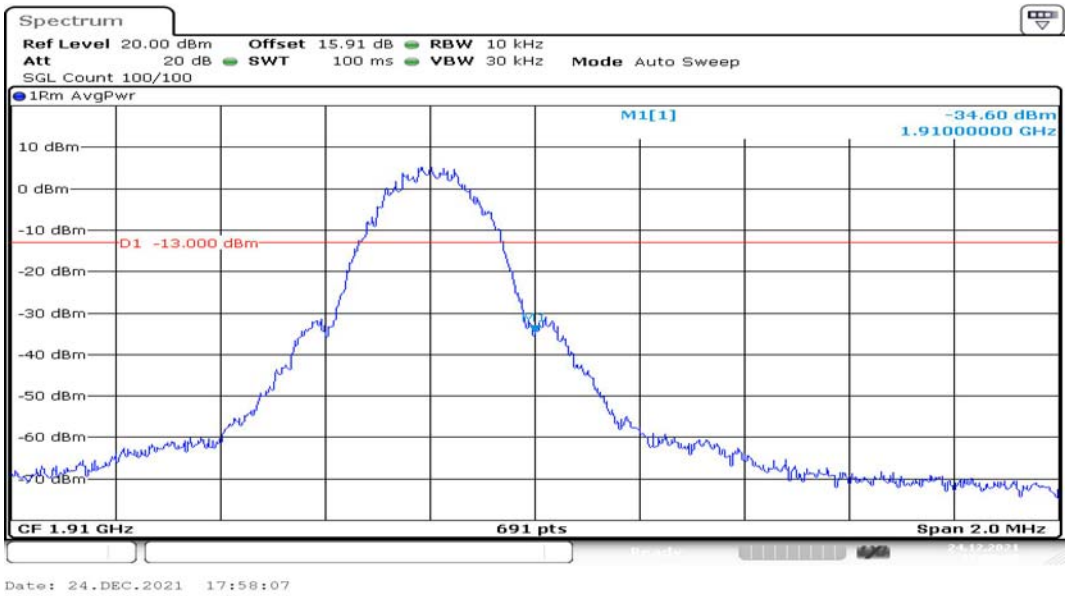


Channel 810

EGPRS (8PSK) MODE:



Channel 512



Channel 810

6. Frequency Stability

PCS1900

GSM MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-20	0.006	-0.003	0.004
-10	0.011	0.011	0.007
0	0.002	0.007	-0.001
+10	0.009	0.008	-0.003
+30	0.015	0.003	0.003
+40	-0.002	0.000	0.001
+55	0.011	0.013	0.010
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	0.006	0.001	-0.006
HV	0.001	-0.003	0.007

GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-20	-0.003	0.007	0.002
-10	0.004	0.003	0.002
0	0.008	0.006	0.001
+10	0.000	0.007	0.004
+30	0.015	0.015	0.009
+40	0.001	0.018	0.008
+55	0.057	0.016	0.010
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	-0.008	0.005	0.006
HV	-0.004	0.008	0.004

EGPRS (8PSK) MODE:

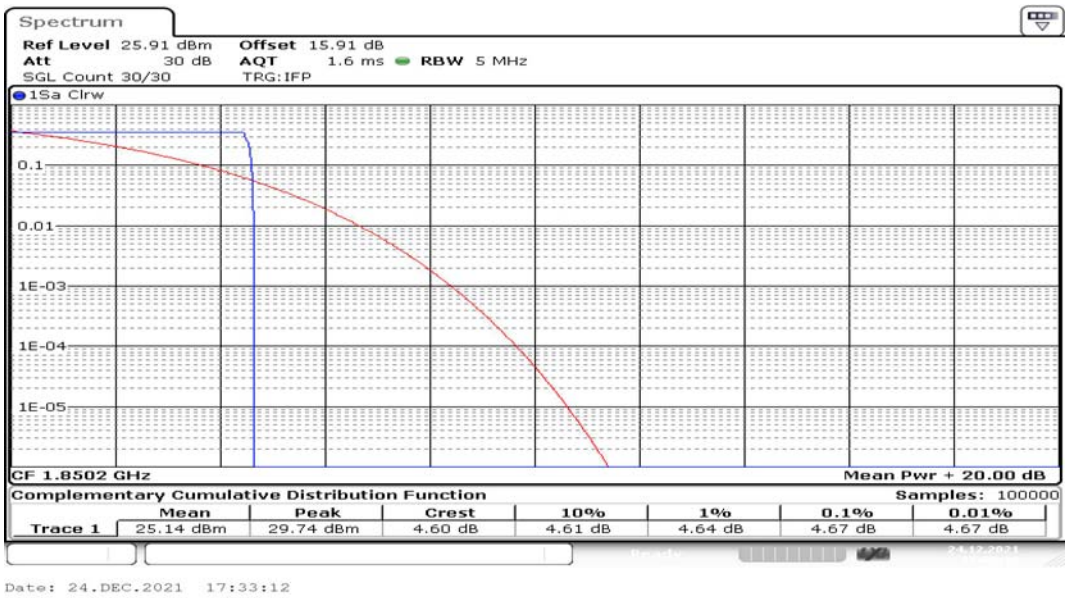
Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-20	0.006	0.009	-0.004
-10	0.004	0.001	0.001
0	0.005	0.003	-0.007
+10	0.004	0.000	-0.002
+30	0.000	0.007	0.009
+40	-0.001	0.001	-0.003
+55	0.001	0.001	-0.003
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810

LV	-0.001	0.001	-0.007
HV	-0.001	0.003	-0.003

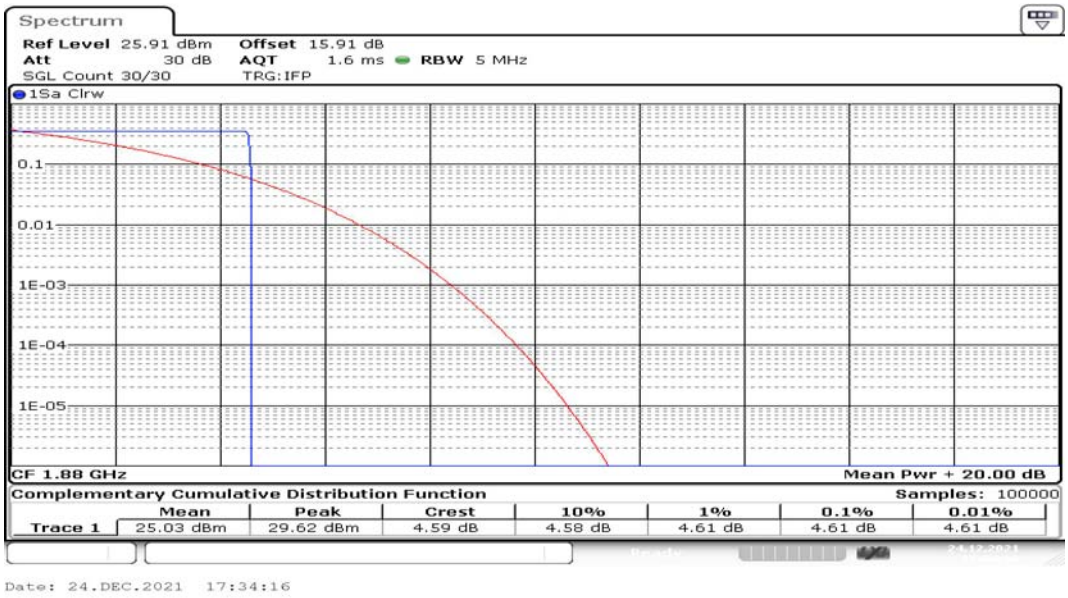
7. Peak-Average Ratio

PCS1900

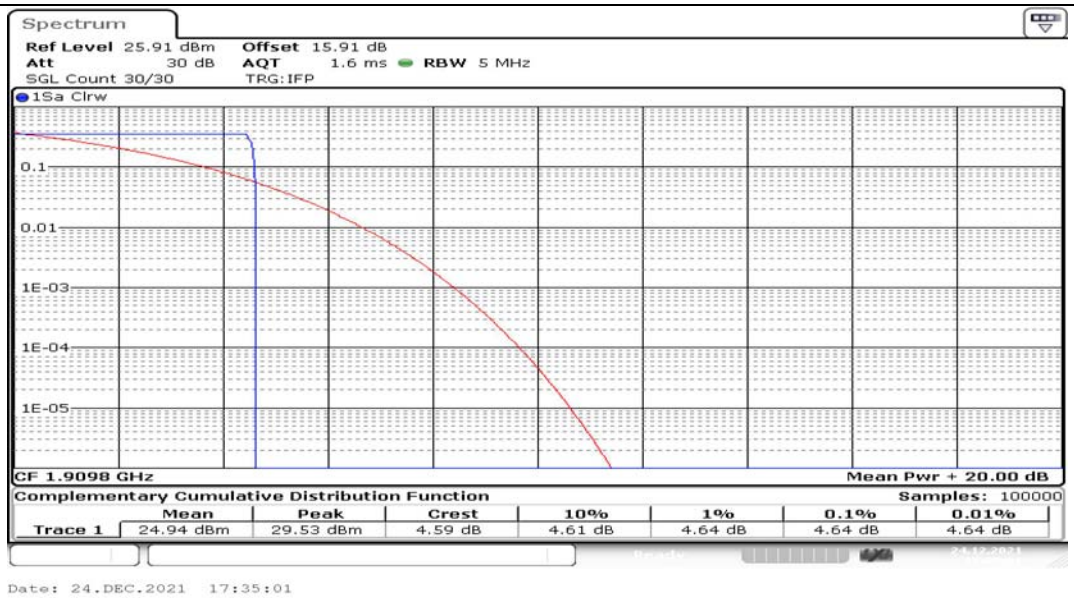
GSM MODE:



Channel 512

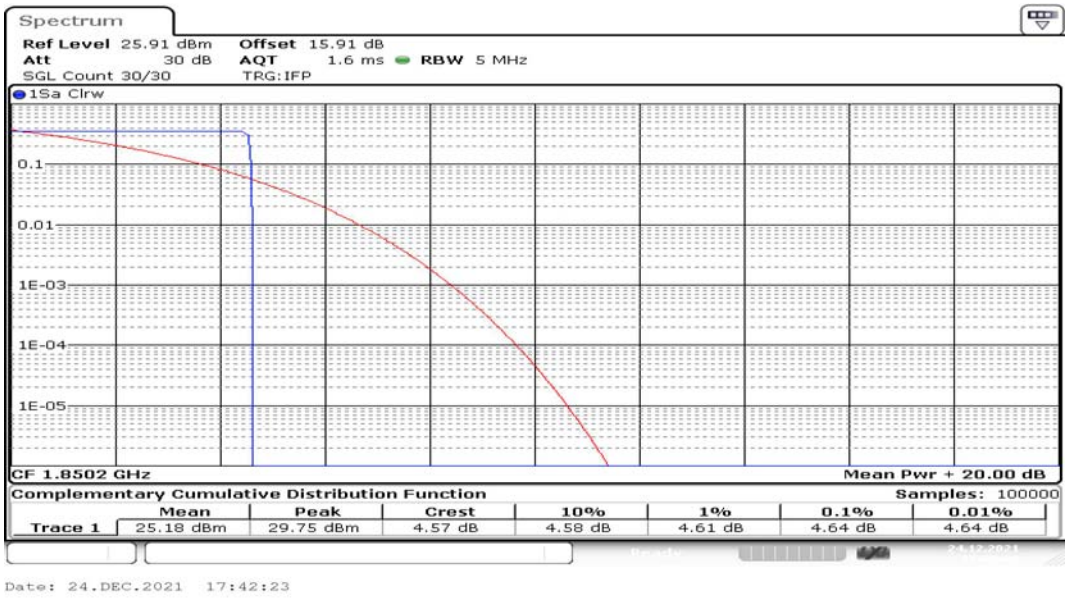


Channel 661

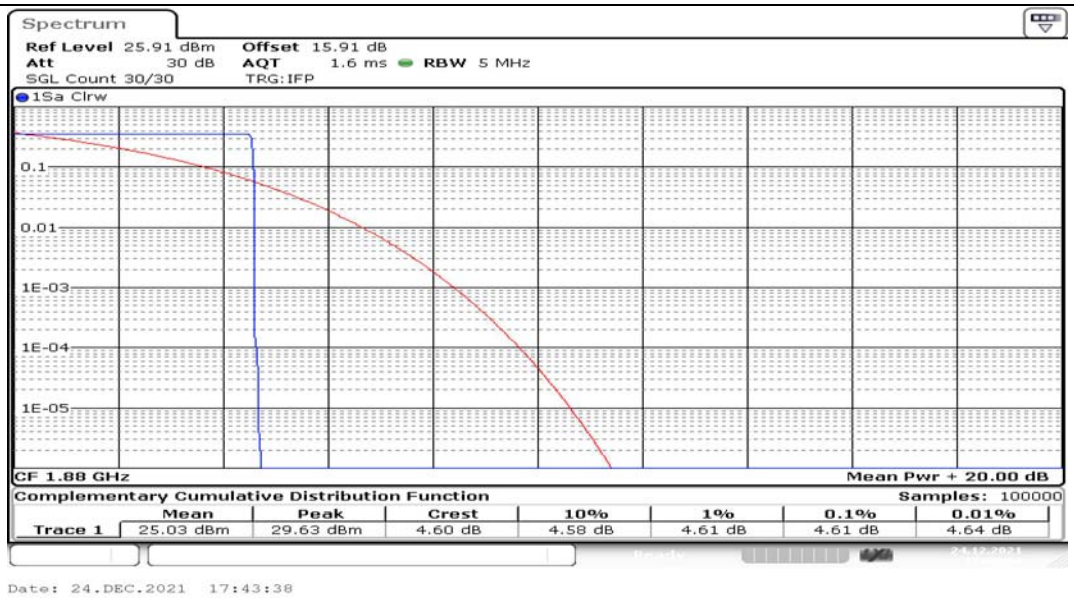


Channel 810

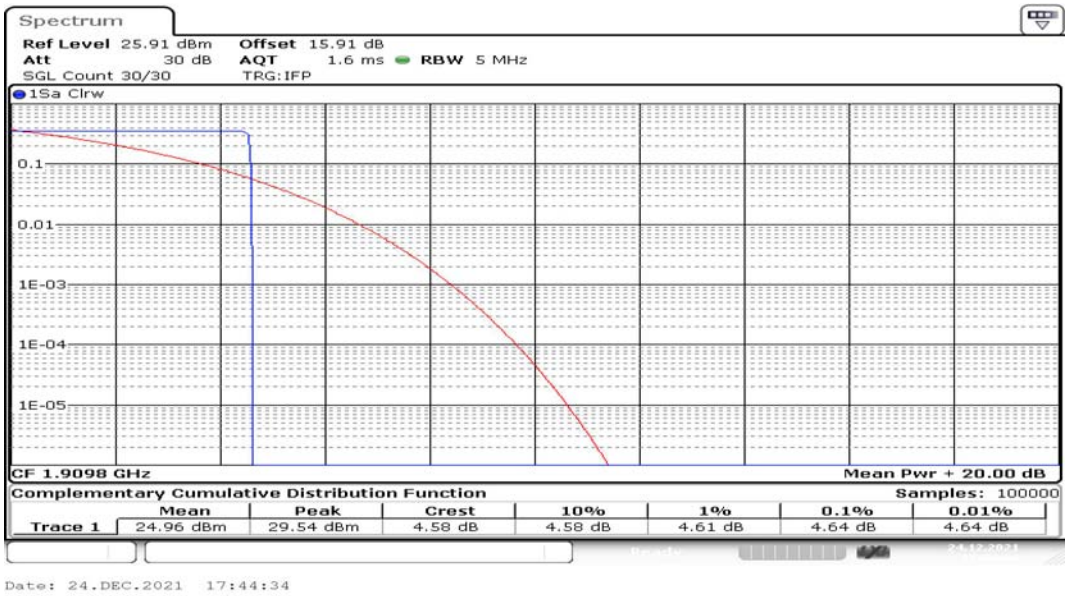
GPRS MODE:



Channel 512

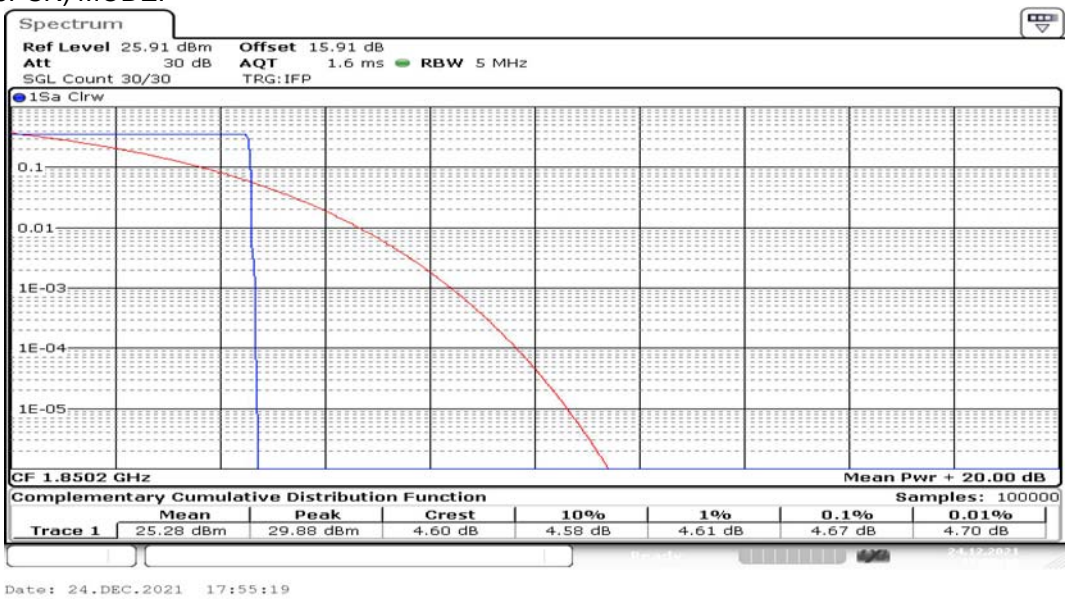


Channel 661

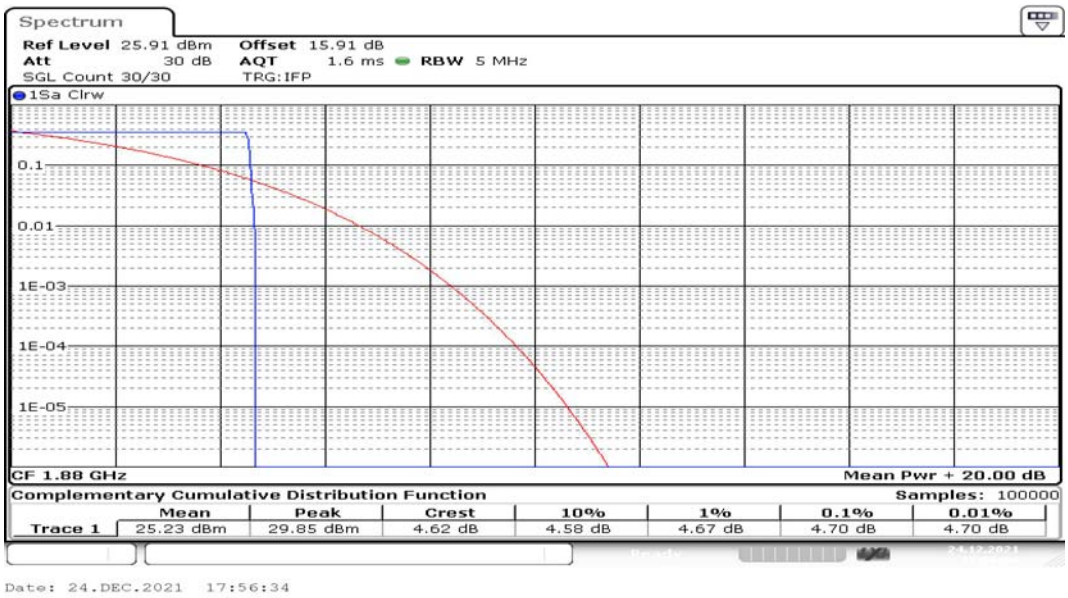


Channel 810

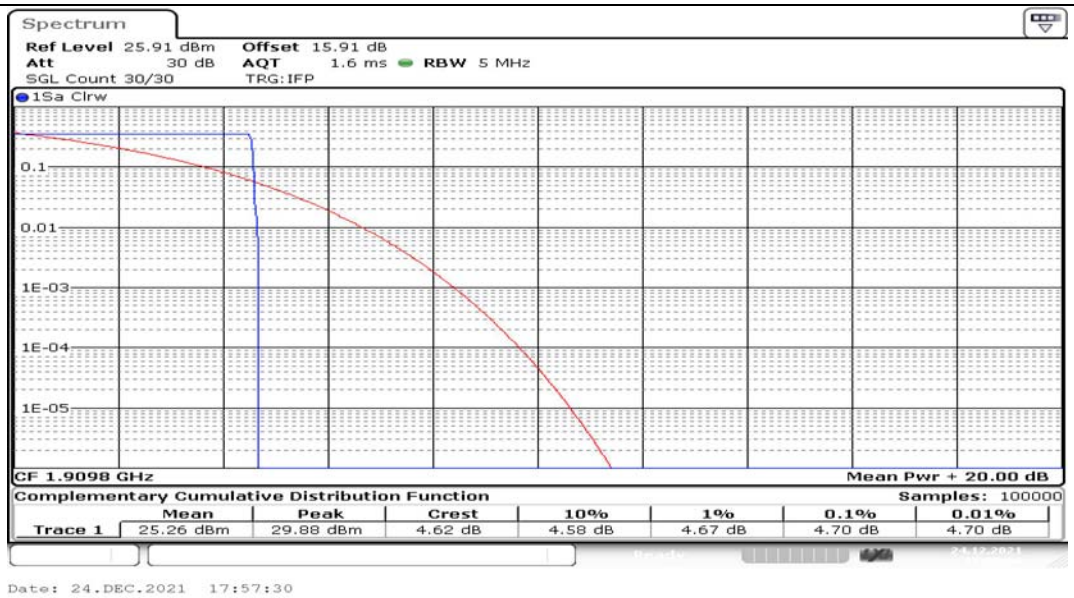
EGPRS (8PSK) MODE:



Channel 512



Channel 661


Spectrum
Ref Level 25.91 dBm Offset 15.91 dB
Att 30 dB AQT 1.6 ms RBW 5 MHz
SGL Count 30/30 TRG:IFP
1Sa Clrw
0.1
0.01
1E-03
1E-04
1E-05
CF 1.9098 GHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 100000
Mean Peak Crest 10% 1% 0.1% 0.01%
Trace 1 25.26 dBm 29.88 dBm 4.62 dB 4.58 dB 4.67 dB 4.70 dB 4.70 dB
Date: 24.DEC.2021 17:57:30

Channel 810

8. Effective Radiated Power and Effective Isotropic Radiated Power

PCS1900

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
1850.2	512	28.53	27.13	0.516
1880	661	28.30	26.90	0.490
1909.8	810	28.34	26.94	0.494

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
1850.2	512	4Down1Up	28.53	27.13	0.516
1880	661		28.30	26.90	0.490
1909.8	810		28.33	26.93	0.493
1850.2	512	3Down2Up	26.57	25.17	0.329
1880	661		26.17	24.77	0.300
1909.8	810		26.17	24.77	0.300
1850.2	512	2Down3Up	25.03	23.63	0.231
1880	661		24.62	23.22	0.210
1909.8	810		24.60	23.20	0.209
1850.2	512	1Down4Up	22.98	21.58	0.144
1880	661		22.58	21.18	0.131
1909.8	810		22.54	21.14	0.130

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
1850.2	512	4Down1Up	28.64	27.24	0.530
1880	661		28.51	27.11	0.514
1909.8	810		28.66	27.26	0.532
1850.2	512	3Down2Up	26.73	25.33	0.341
1880	661		26.43	25.03	0.318
1909.8	810		26.56	25.16	0.328
1850.2	512	2Down3Up	25.26	23.86	0.243
1880	661		24.94	23.54	0.226
1909.8	810		25.04	23.64	0.231
1850.2	512	1Down4Up	23.34	21.94	0.156
1880	661		23.00	21.60	0.145
1909.8	810		23.07	21.67	0.147

APPENDIX B – TEST DATA OF RADIATED EMISSION

Radiated Spurious Emissions

850 Test result:

Test result:
GSM/GPRS MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1646.50	-53.34	-13	Vertical
1665.06	-51.76	-13	Vertical
2535.92	-43.85	-13	Vertical
2578.08	-44.09	-13	Vertical
8962.48	-39.26	-13	Vertical
9971.83	-36.41	-13	Vertical

EDGE (8PSK) MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1649.03	-52.89	-13	Vertical
1667.89	-50.86	-13	Vertical
2535.33	-44.06	-13	Vertical
2576.45	-44.59	-13	Vertical
8963.17	-39.93	-13	Vertical
9970.57	-35.98	-13	Vertical

GSM/GPRS MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1649.91	-53.21	-13	Vertical
1666.11	-51.40	-13	Vertical
2536.28	-43.84	-13	Vertical
2575.64	-44.43	-13	Vertical
8962.50	-39.60	-13	Vertical
9973.08	-36.04	-13	Vertical

EDGE (8PSK) MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1649.29	-52.88	-13	Vertical
1665.85	-51.24	-13	Vertical
2536.04	-44.30	-13	Vertical
2575.74	-43.81	-13	Vertical
8962.80	-39.33	-13	Vertical
9971.20	-36.62	-13	Vertical

GSM/GPRS MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.86	-52.95	-13	Vertical
1666.67	-51.62	-13	Vertical
2534.01	-44.26	-13	Vertical
2575.42	-43.96	-13	Vertical
8960.93	-39.37	-13	Vertical
9972.50	-36.77	-13	Vertical

EDGE (8PSK) MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1650.04	-53.49	-13	Vertical
1667.89	-51.70	-13	Vertical
2535.35	-44.40	-13	Vertical
2576.71	-43.98	-13	Vertical
8961.88	-39.66	-13	Vertical
9973.36	-36.02	-13	Vertical

1900:

Test result:

GSM/GPRS MODE Channel 512

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2457.83	-48.56	-13	Vertical
2780.03	-47.18	-13	Vertical
3728.13	-40.47	-13	Vertical
6675.49	-39.86	-13	Vertical
9960.08	-36.80	-13	Vertical
17820.78	-33.67	-13	Vertical

EDGE (8PSK) MODE Channel 512:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2459.56	-48.49	-13	Vertical
2782.00	-47.78	-13	Vertical
3725.07	-41.08	-13	Vertical
6675.85	-39.60	-13	Vertical
9962.07	-37.32	-13	Vertical
17821.68	-34.32	-13	Vertical

GSM/GPRS MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2458.59	-48.54	-13	Vertical

2780.83	-47.16	-13	Vertical
3728.27	-40.77	-13	Vertical
6675.45	-39.28	-13	Vertical
9960.76	-37.65	-13	Vertical
17822.19	-33.47	-13	Vertical

EDGE (8PSK) MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2460.85	-48.66	-13	Vertical
2780.36	-47.87	-13	Vertical
3728.09	-41.00	-13	Vertical
6677.79	-39.99	-13	Vertical
9961.72	-37.41	-13	Vertical
17819.93	-33.80	-13	Vertical

GSM/GPRS MODE Channel 810:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2459.45	-49.09	-13	Vertical
2779.48	-47.77	-13	Vertical
3725.67	-40.78	-13	Vertical
6677.28	-40.07	-13	Vertical
9959.67	-37.05	-13	Vertical
17820.97	-34.24	-13	Vertical

EDGE (8PSK) MODE Channel 810:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2460.75	-49.45	-13	Vertical
2778.50	-47.14	-13	Vertical
3727.43	-41.05	-13	Vertical
6676.81	-39.15	-13	Vertical
9962.53	-37.70	-13	Vertical
17820.87	-33.77	-13	Vertical

---End of Test Report---