
TEST REPORT FOR GSM TESTING

Report No.: SRTC2021-9004(F)-21110103(A)

Product Name: Mobile Phone

Product Model: HLTE235E

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

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

FCC ID: 2ADOBHLTE235E

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

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC). The test results relate only to individual items of the samples which have been tested. The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

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:	Hisense International Co., Ltd.
Address:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China

1.4 Manufacturer's details

Company:	Hisense Communications Co., Ltd.
Address:	218 Qianwangang Road, Qingdao Economic& Technological Development Zone, Qingdao, China

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2021-11-01
Testing Start Date:	2021-11-03
Testing End Date:	2021-11-30

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient:	25	40
Maximum Extreme:	50	---
Minimum Extreme:	-30	---

Normal Supply Voltage (V d.c.):	3.80
Maximum Extreme Supply Voltage (V d.c.):	4.35
Minimum Extreme Supply Voltage (V d.c.):	3.55

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: SH-KS235-GSM-V5 (LDS) loop antenna PCS1900: PIFA (FPC)
Antenna Gain:	GSM850: -1.04dBi/PCS1900: -0.58dBi ERP = EIRP(Power+Gain) – 2.15 (dB)
Power Supply:	Charger
Software Revision:	Hisense_HLTE235E_S03_01_01_MX05
Hardware Revision:	A563-MB-V1.2A
IMEI:	866850050002196

Note: The equipments have two supplies, are different on the supplier of memory / battery / Camera. These differences don't affect RF performance

Main Supply

Part Name	Model	Supplier(Brand)	Description
FLASH	E64GDSAA2ABE00	SCY	Separate memory
FLASH	KM110SA1064GxA-AAA00WT	Kimtigo	
FLASH	E32GCYNB1ABE00	SCY	Separate memory
FLASH	RS512M32LZ4D4ANP-75BT	RAYSON	
Battery	LPN385450	Shenzhen Aerospace Electronic Co., Ltd.	
Front camera	LH-CFKS235-5MFF-V1	Union Image	GC5035
The rear main camera	H9B13-KS230BA	Hunan Kingcome Optoelectronic Co., Ltd	HI1336
Rear Camera2	LH-CFKS235-5MBF-V1	Union Image	GC5035
Rear Camera3	LH-CFKS235-2MBF-V2	Union Image	GC02M1

Secondary Supply

Part Name	Model Name	supplier	Remark
FLASH	RS512M32LZ4D4ANP-75BT	RAYSON	Separate memory
FLASH	D4A16G32D2V-DC	SCY	
FLASH	KM110SA1032GXA-AAA00WT	Kimtigo	Separate memory
FLASH	D4A16G32D2V-DC	SCY	
Battery	LPN385450	Shenzhen Powercome Electronics Co., Ltd.	
Front camera	BM15640 V0	Luzhou Imaging Technology Co., Ltd	GC5035
The rear main camera	BM1A365 V4	Luzhou Imaging Technology Co., Ltd	GC13053
Rear Camera2	BM15634 V2	Luzhou Imaging Technology Co., Ltd	GC5035
Rear Camera3	BC12635 V0	Luzhou Imaging Technology Co., Ltd	GC02M1

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

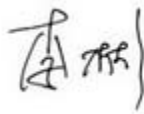
4 KEY TO NOTES AND RESULT CODES

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

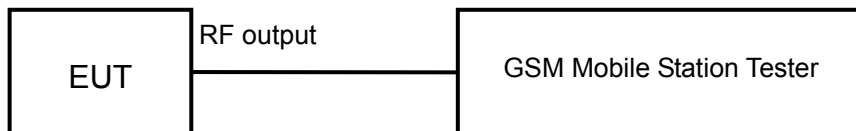
This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Mr. Liu Ce 	Issued date: 20211130

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:

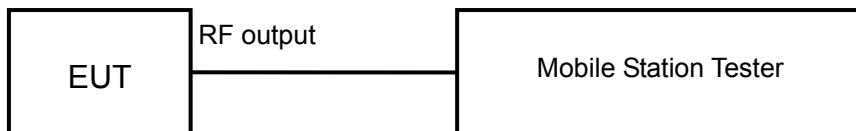
The test results are shown in Appendix A.

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:

$$\text{ERP/EIRP} = \text{PMeas} - \text{LC} + \text{GT}$$

Where:

ERP/EIRP = effective or equivalent 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

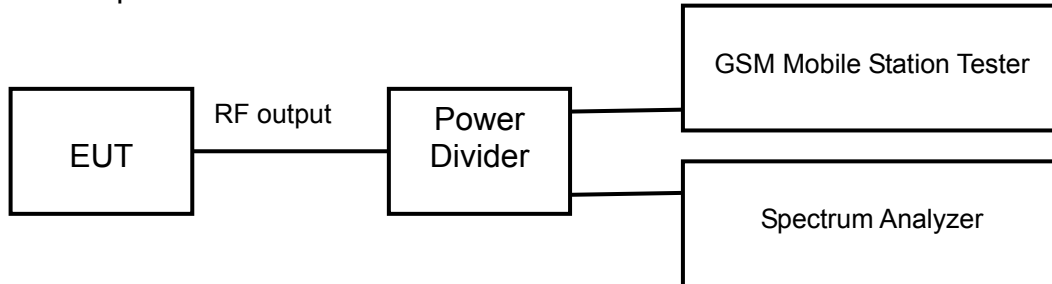
Test result:

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 $\geq 3 \times$ 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

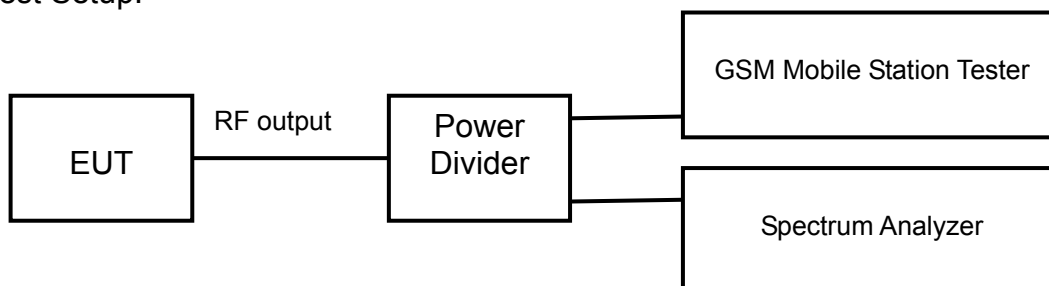
Test result:
The test results are shown in Appendix A.

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 $\geq 3 \times$ 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:

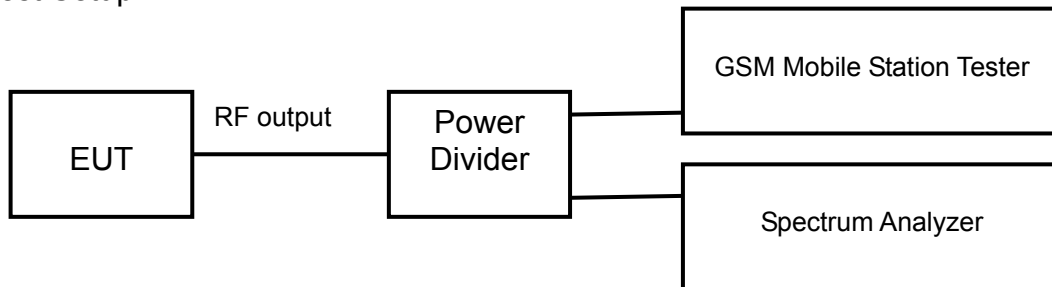
The test results are shown in Appendix A.

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 $\geq 3 \times$ 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 $43 + \log_{10}(P_{\text{[Watts]}})$, where P is the transmitter power in Watts.

Test result:

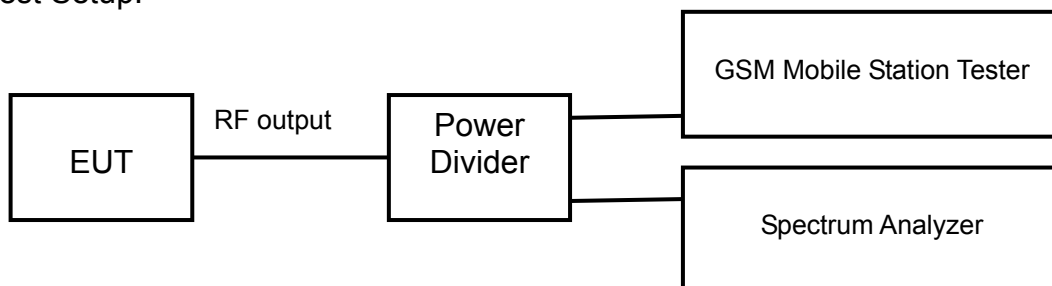
The test results are shown in Appendix A.

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 $\geq 2 \times \text{Span}/\text{RBW}$
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 $43 + \log_{10}(P_{\text{[Watts]}})$, where P is the transmitter power in Watts.

Test result:

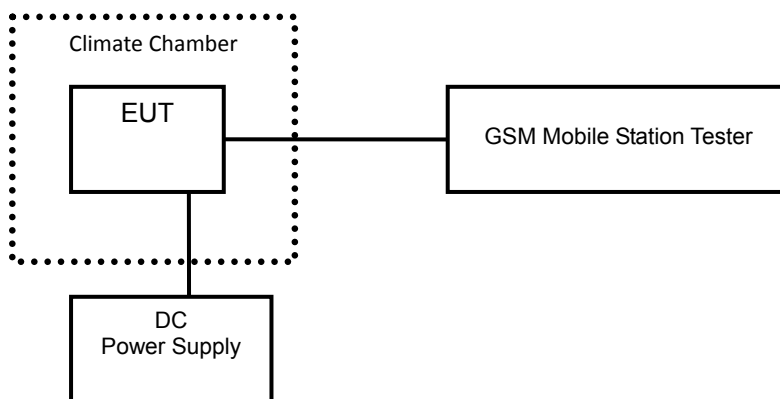
The test results are shown in Appendix A.

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 $\pm 0.00025\%$ (± 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:

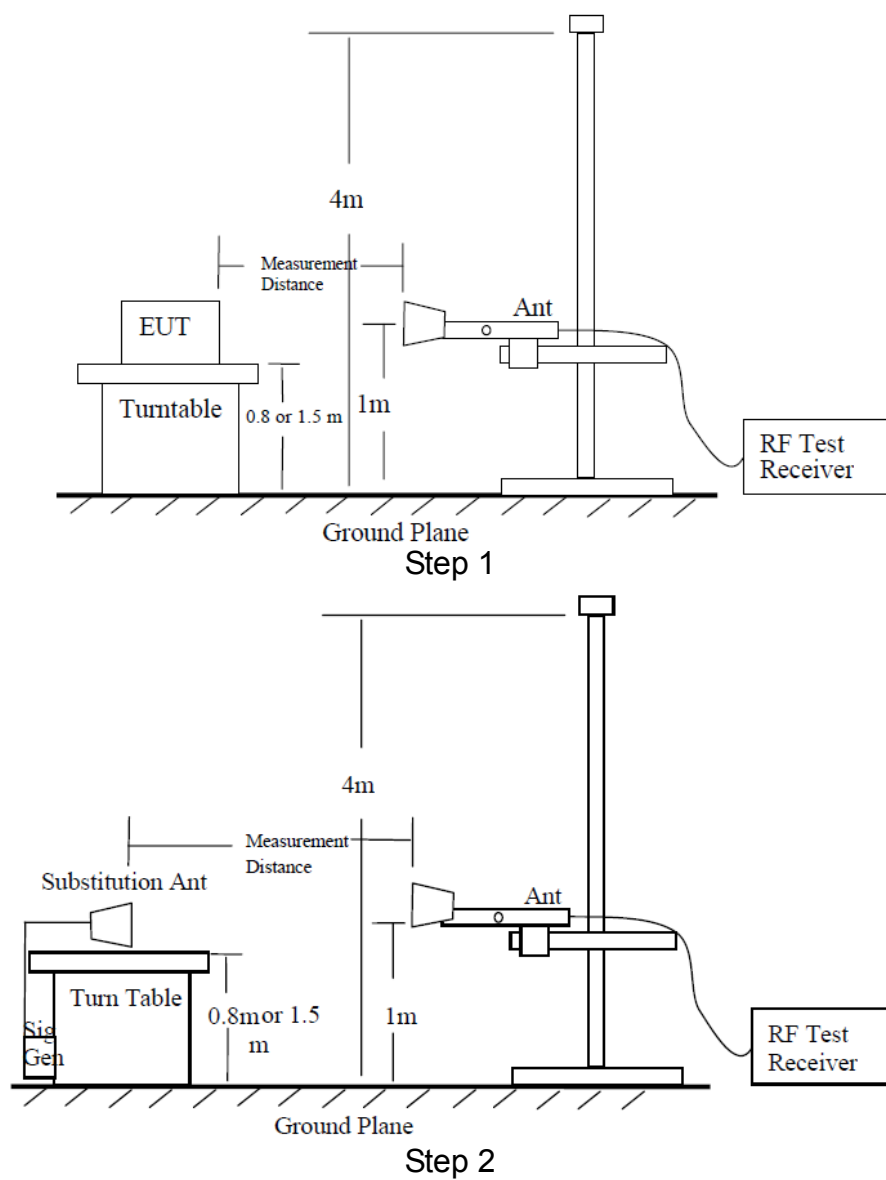
The test results are shown in Appendix A.

6.8 Radiated Spurious Emissions

Rule Part(s)

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

Test Setup:



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 ($f < 1\text{GHz}$)/1.5m ($f > 1\text{GHz}$) 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 ($f < 1\text{GHz}$)/1MHz ($f > 1\text{GHz}$). 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 (P_{mea}) 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 (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.

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 (P_{ca}) and the Substitution Antenna Gain (G_a).

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:

$$\text{Power (EIRP)} = P_{\text{mea}} + P_{\text{ca}} + G_a$$

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, $\text{ERP} = \text{EIRP} - 2.15 \text{ (dB)}$.

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.

$$P = P_{\text{mea}} + P_{\text{ca}} + G_a = (-20\text{dBm}) + (-30\text{dB}) + (11\text{dB}) = -39\text{dBm}$$

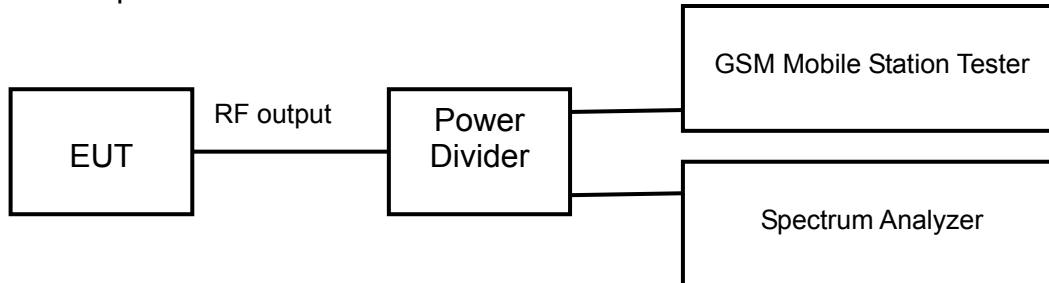
Note: We tested both horizontal and vertical polarization, but only the largest numerical polarity of the two polarities was recorded in the final report.

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

GSM850 Result:

1. RF Power Output

GSM850

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	32.16
848.8	251	32.24
836.4	189	32.63

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	4Down1Up	32.91
836.4	189		31.75
848.8	251		32.39
824.2	128	3Down2Up	30.94
836.4	189		29.76
848.8	251		30.34
824.2	128	2Down3Up	29.07
836.4	189		27.88
848.8	251		28.46
824.2	128	1Down4Up	26.97
836.4	189		25.79
848.8	251		26.37

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	4Down1Up	33.19
836.4	189		32.72
848.8	251		32.56
824.2	128	3Down2Up	31.25
836.4	189		30.76
848.8	251		30.57
824.2	128	2Down3Up	29.44
836.4	189		28.92
848.8	251		28.74
824.2	128	1Down4Up	27.40
836.4	189		26.92
848.8	251		26.75

2. Occupied Bandwidth

GSM850

GSM MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	246.02
836.4	189	241.68
848.8	251	248.91

GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	250.36
836.4	189	244.57
848.8	251	248.91

EGPRS (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	248.91
836.4	189	251.81
848.8	251	244.57

GSM850

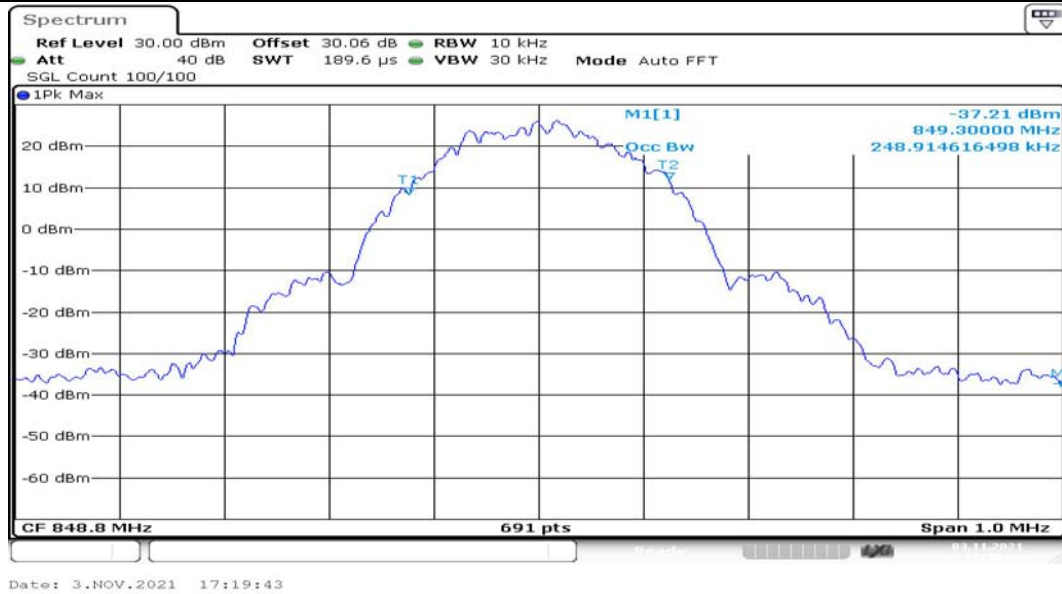
GSM MODE:



Channel 128

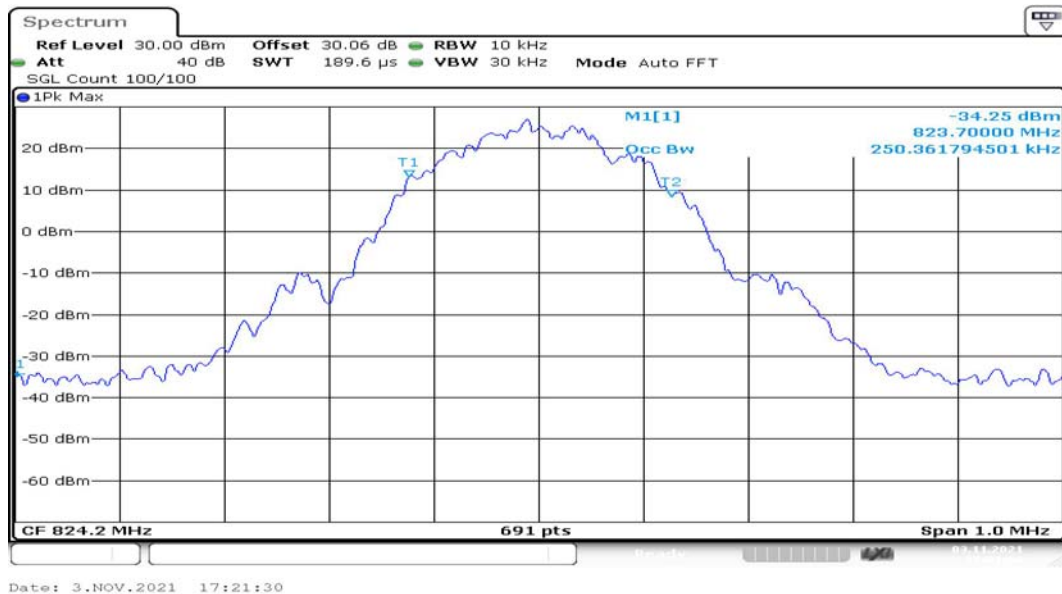


Channel 189



Channel 251

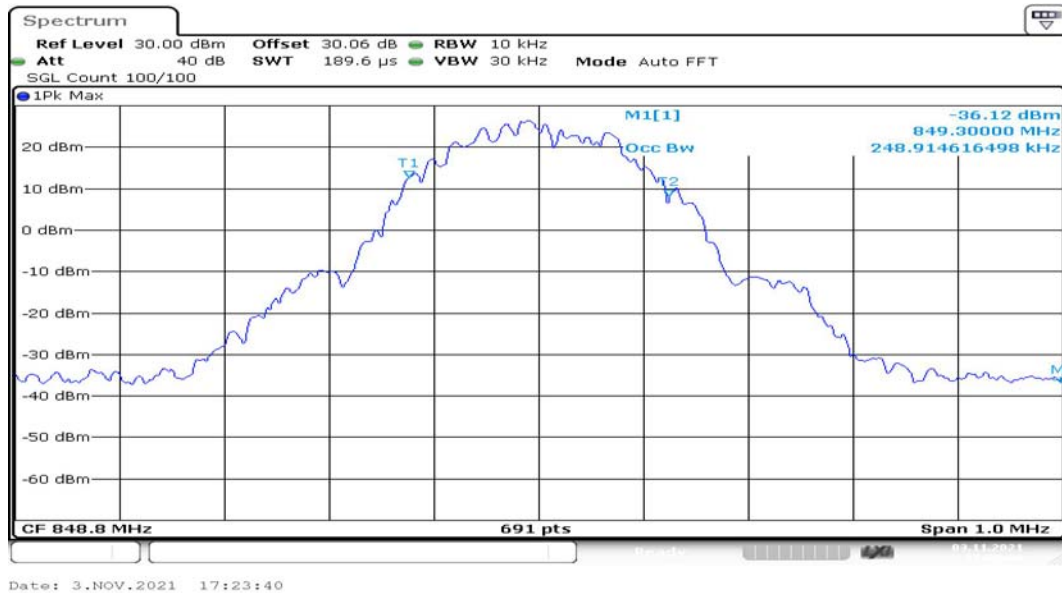
GPRS MODE:



Channel 128



Channel 189



Channel 251

EGPRS (8PSK) MODE:



Date: 3.NOV.2021 17:25:30

Channel 128



Date: 3.NOV.2021 17:26:45

Channel 189



Channel 251

3. Emission Bandwidth

GSM850

GSM MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
824.2	128	311.10
836.4	189	319.80
848.8	251	316.90

GPRS MODE:

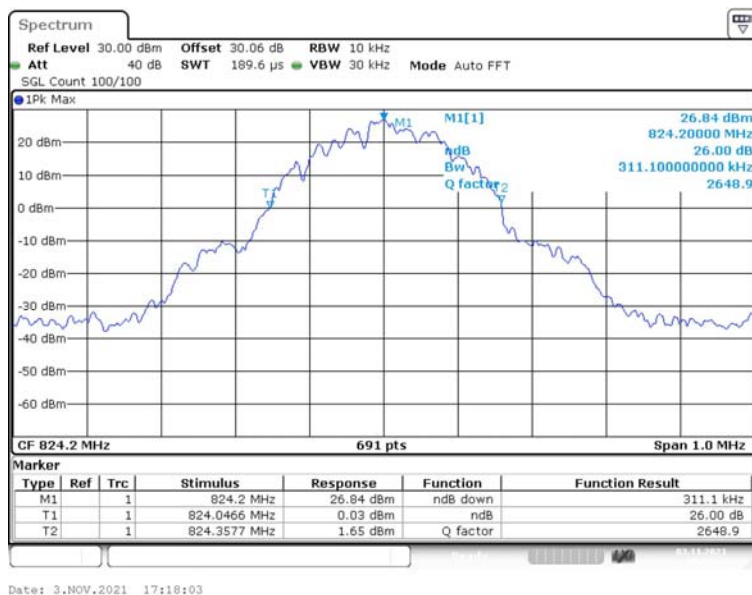
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
824.2	128	308.20
836.4	189	312.60
848.8	251	305.40

EGPRS (8PSK) MODE:

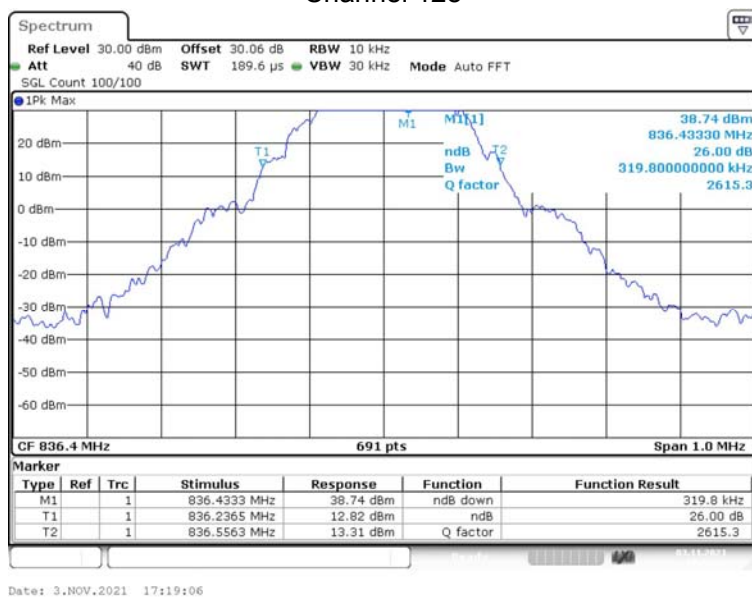
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
824.2	128	312.60
836.4	189	316.90
848.8	251	296.70

GSM850

GSM MODE:



Channel 128

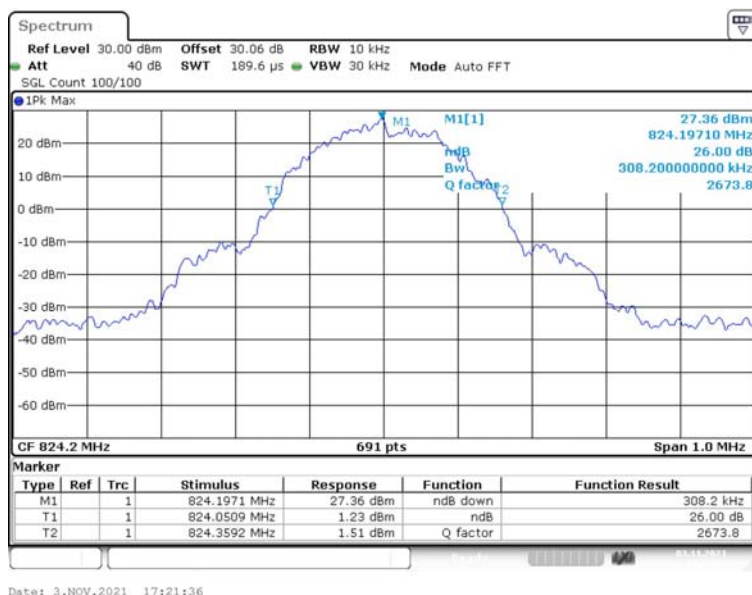


Channel 189

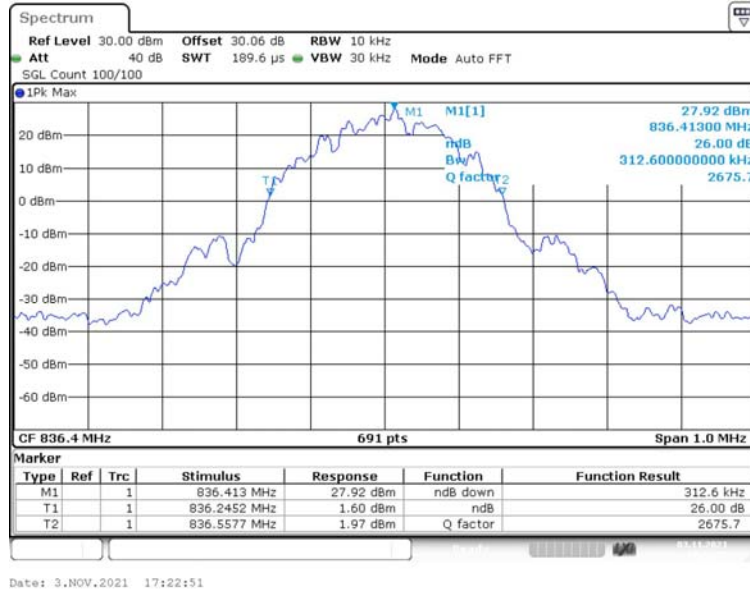


Channel 251

GPRS MODE:



Channel 128

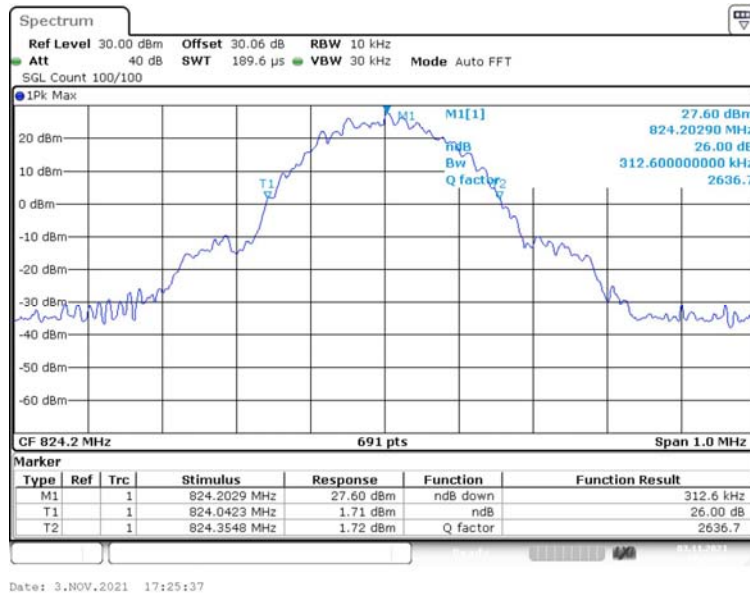


Channel 189

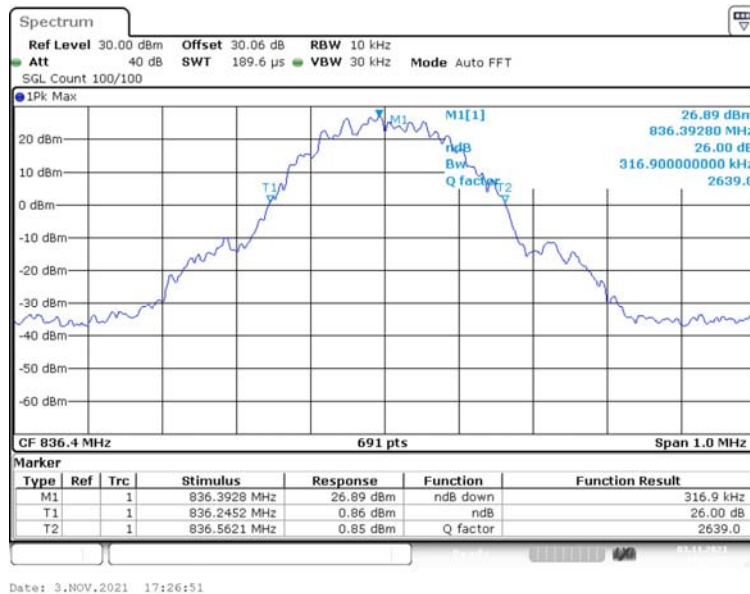


Channel 251

EGPRS (8PSK) MODE:



Channel 128



Channel 189

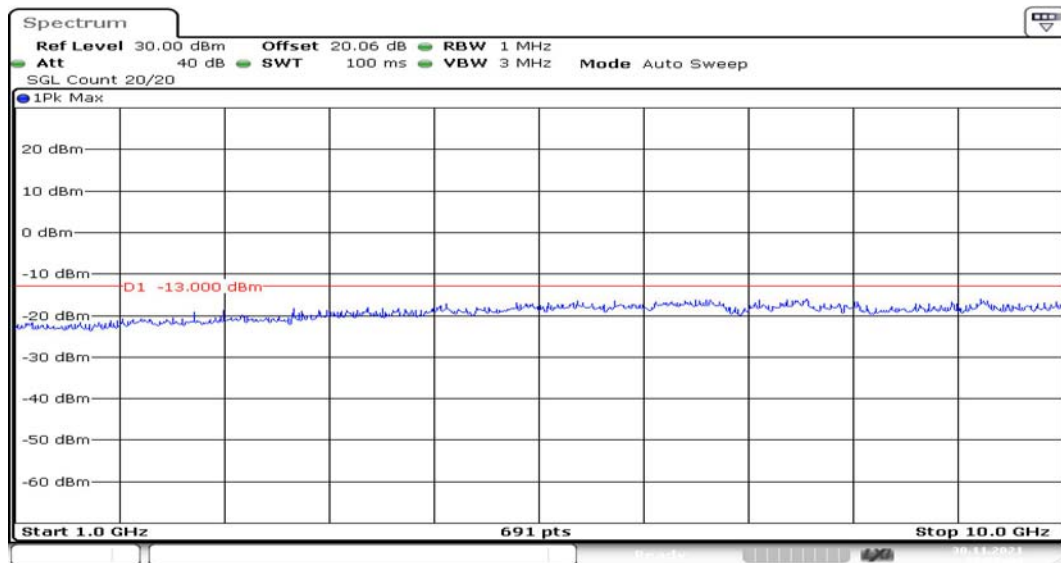


Channel 251

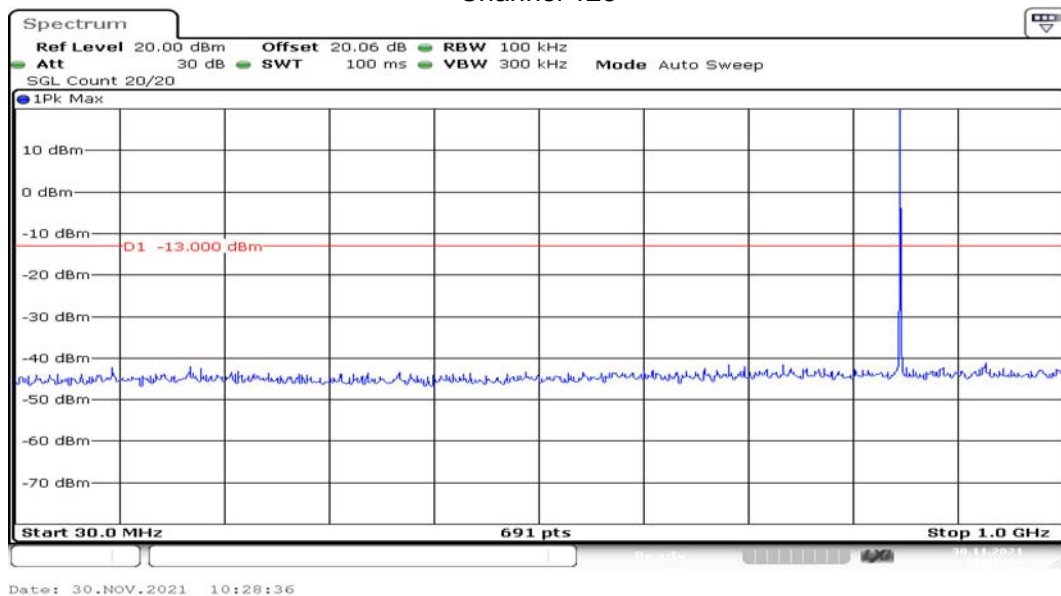
4. Spurious Emissions at antenna terminal

GSM850

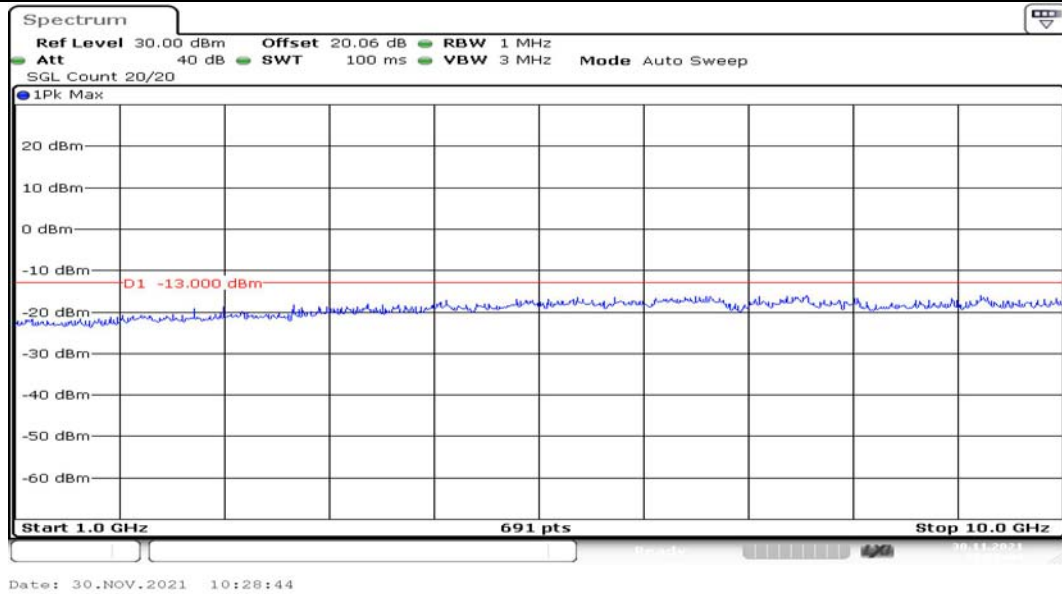
GSM MODE:



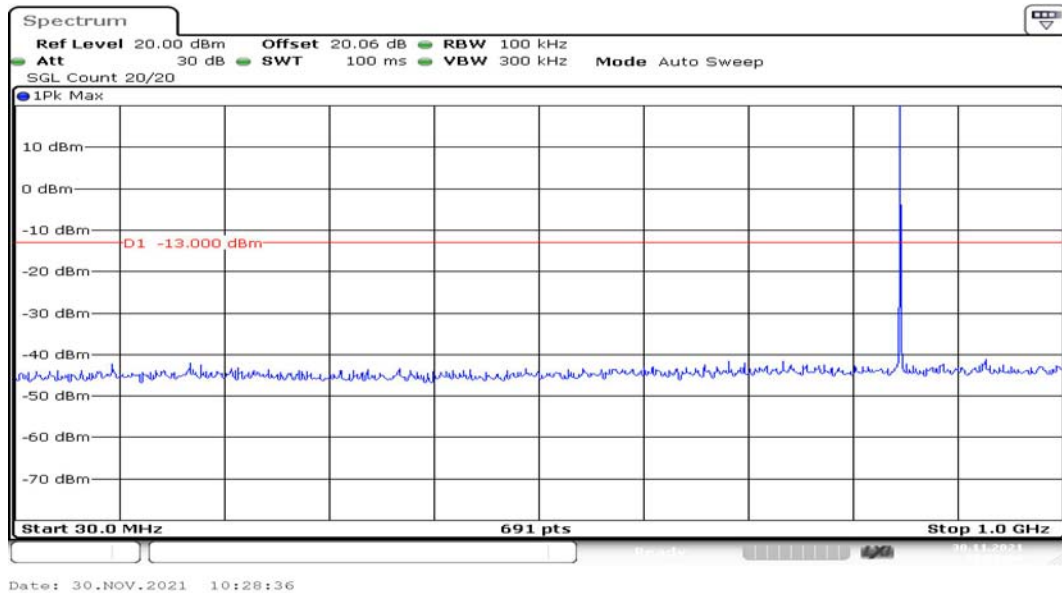
Channel 128



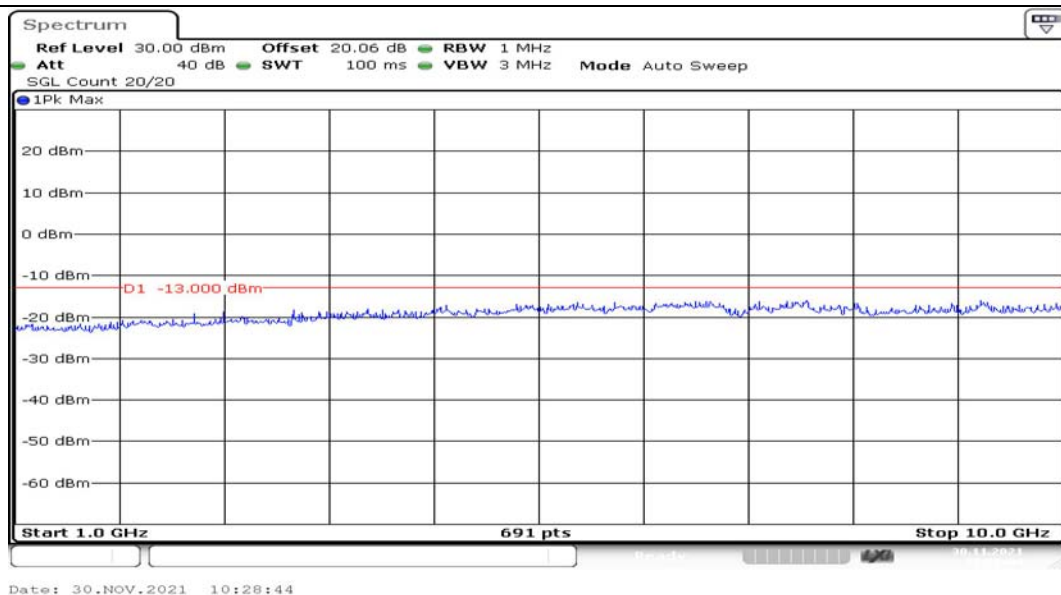
Channel 128



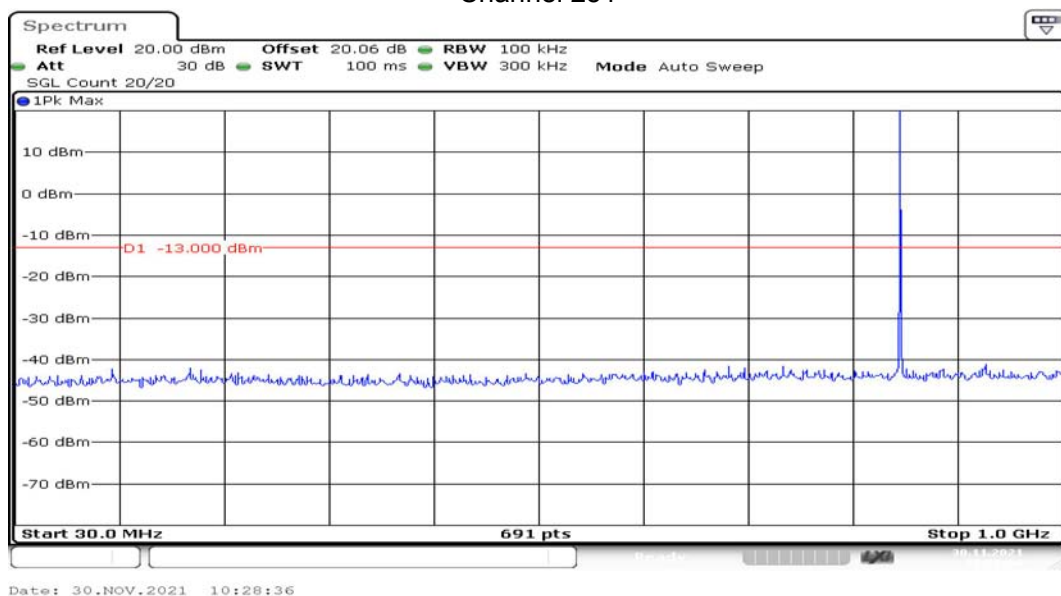
Channel 189



Channel 189

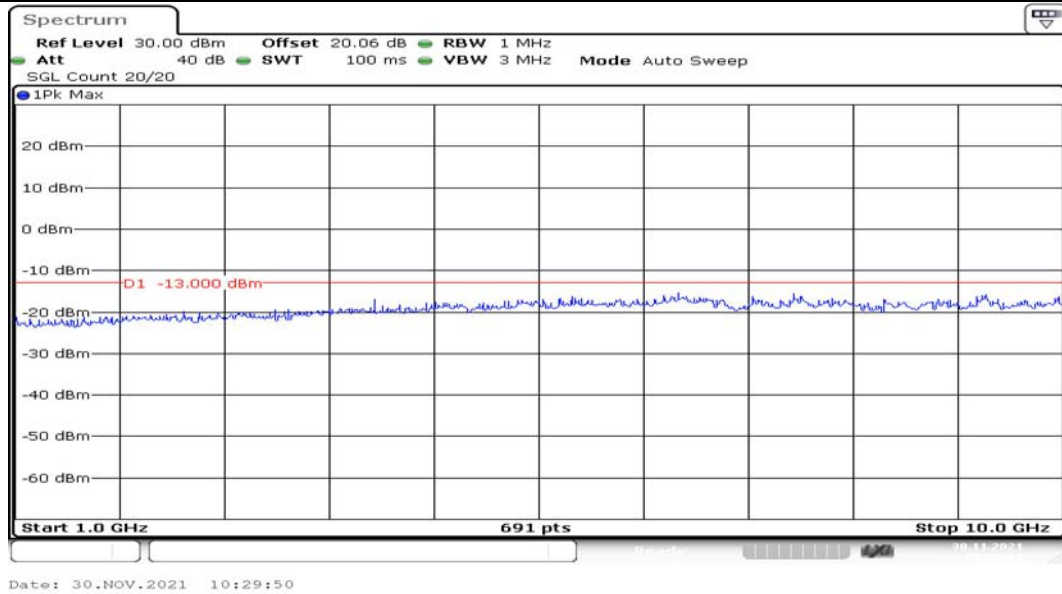


Channel 251

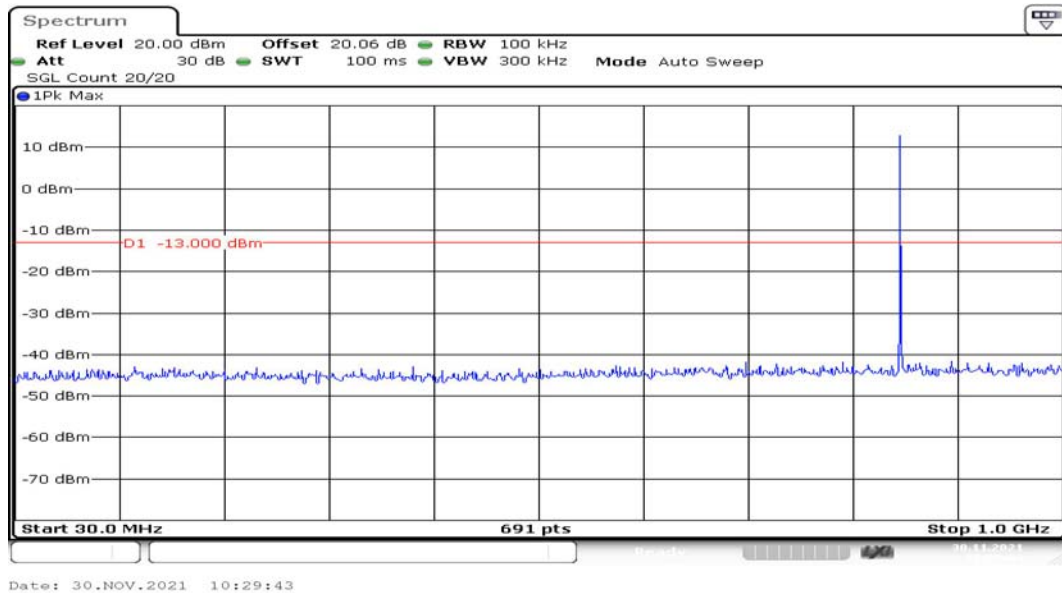


Channel 251

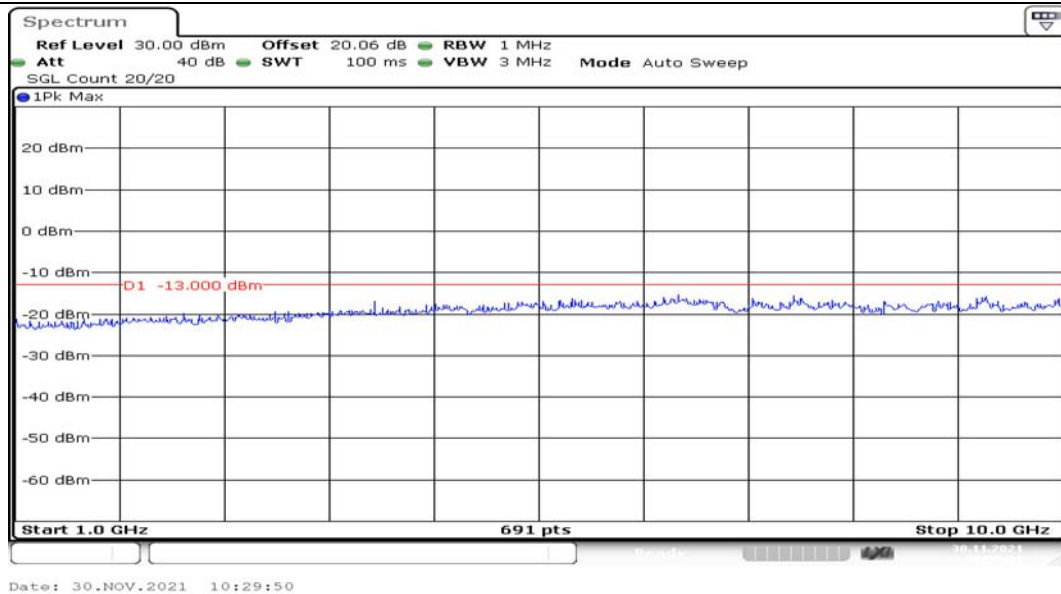
GPRS MODE:



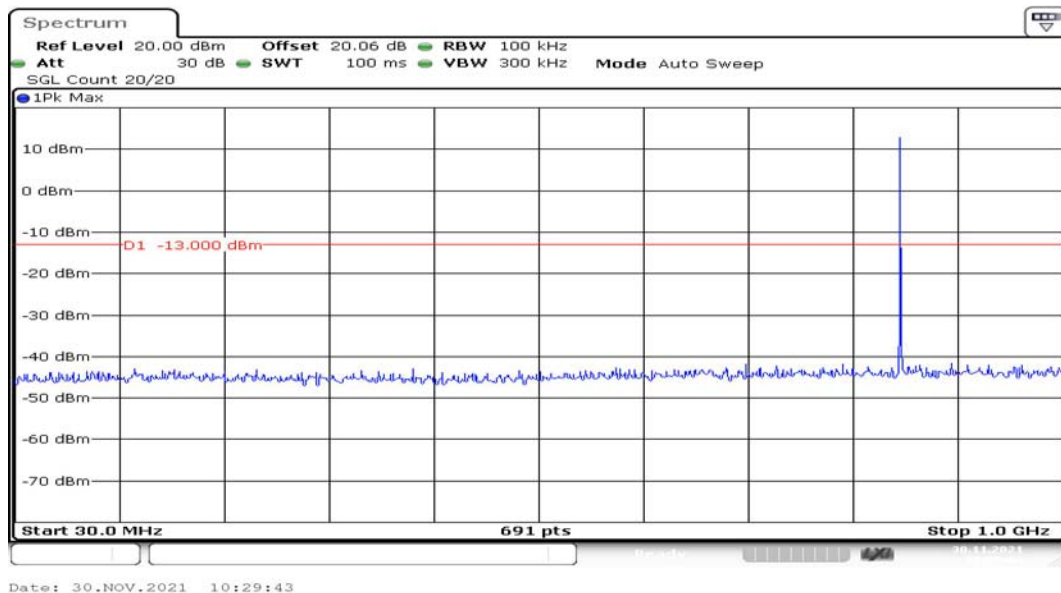
Channel 128



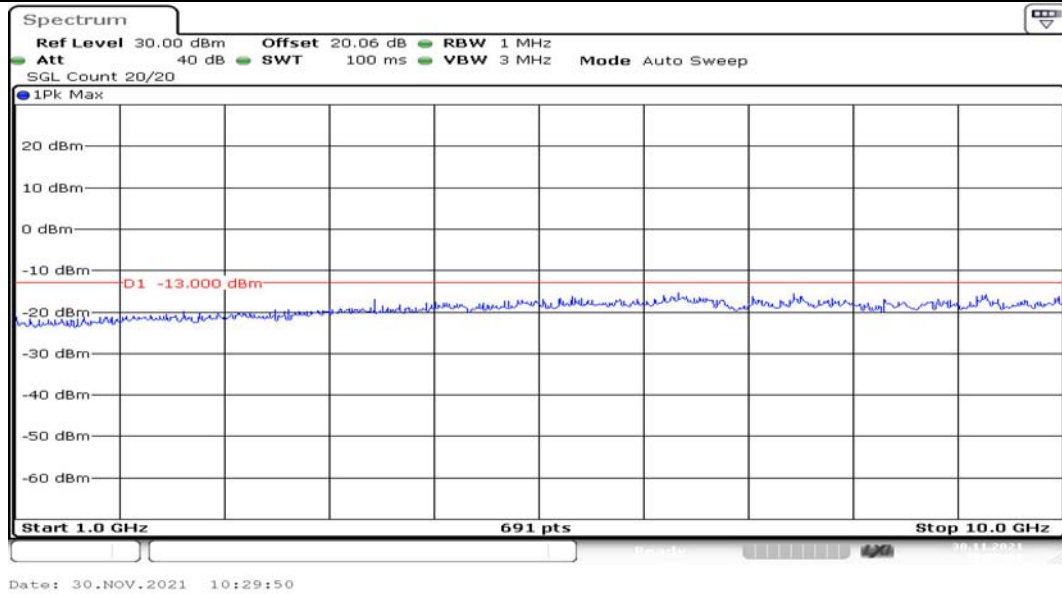
Channel 128



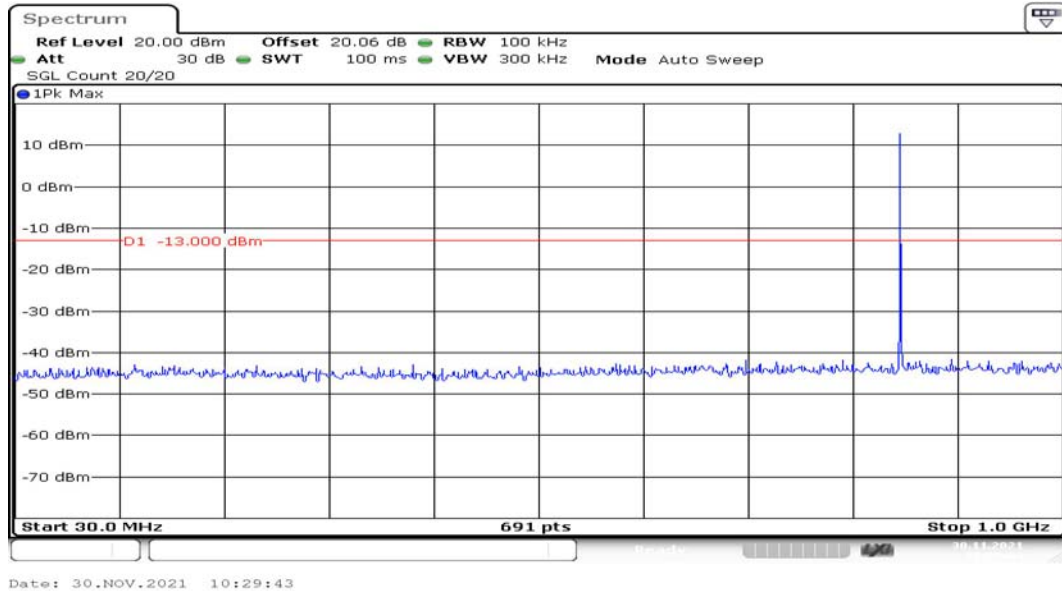
Channel 189



Channel 189

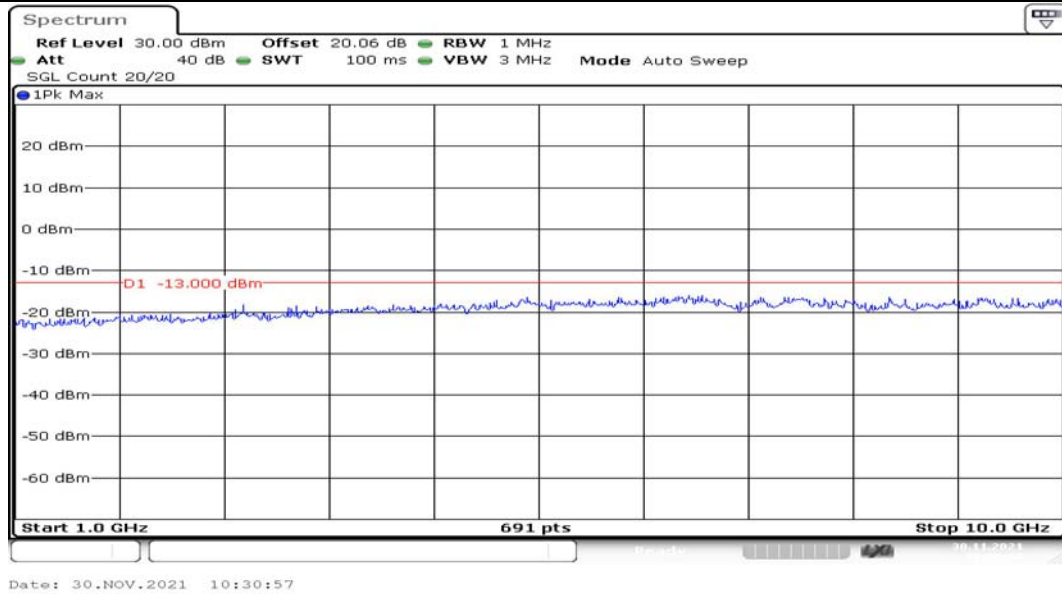


Channel 251

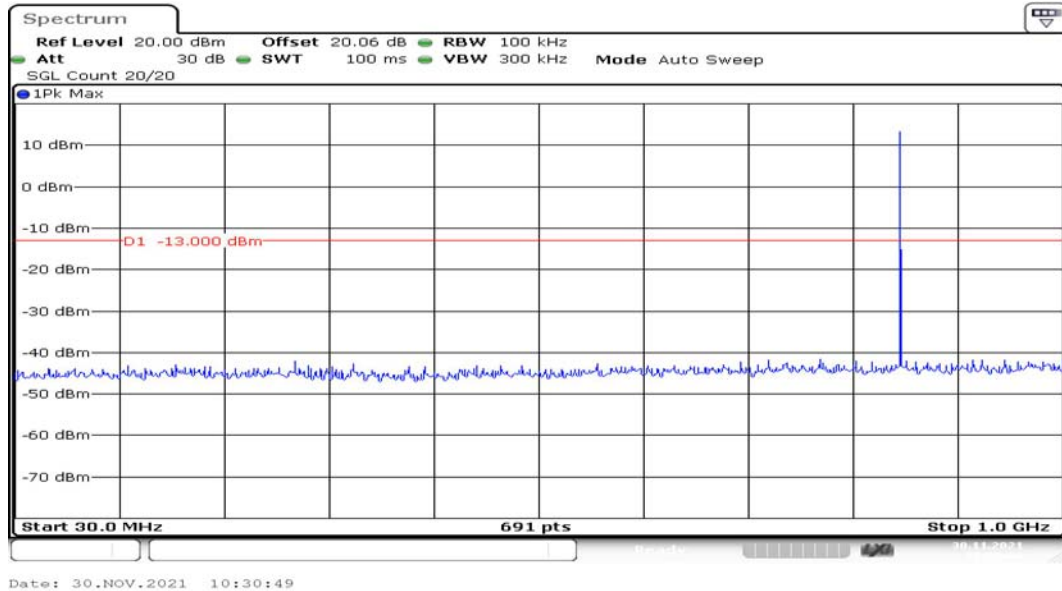


Channel 251

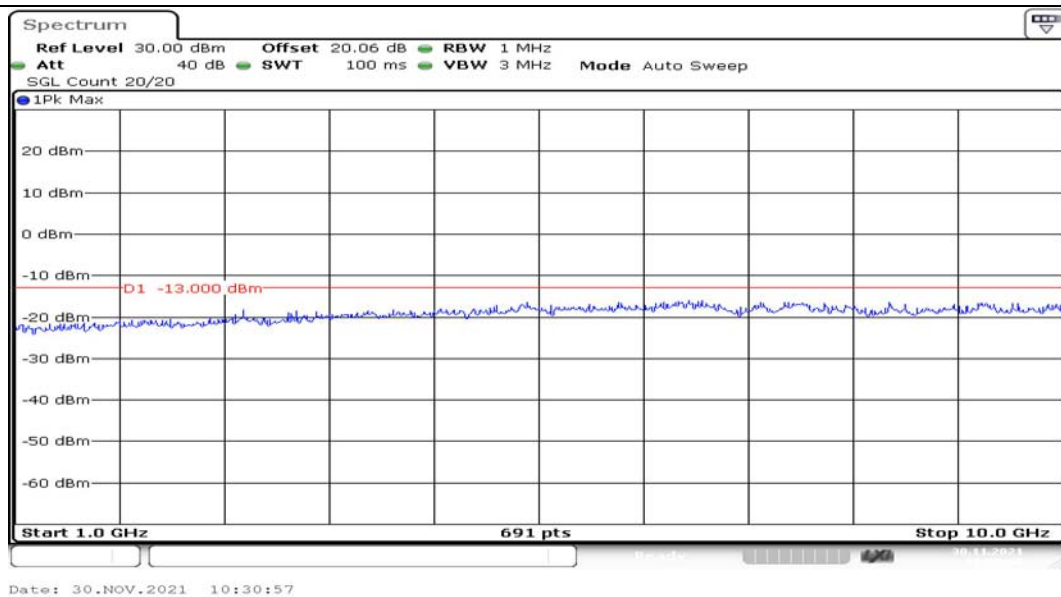
EGPRS (8PSK) MODE:



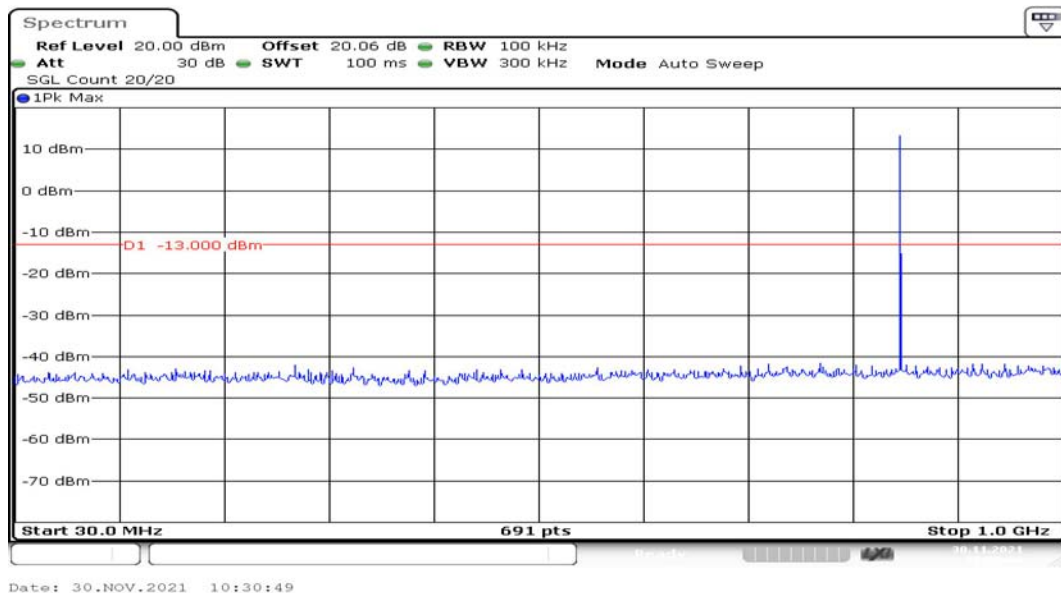
Channel 128



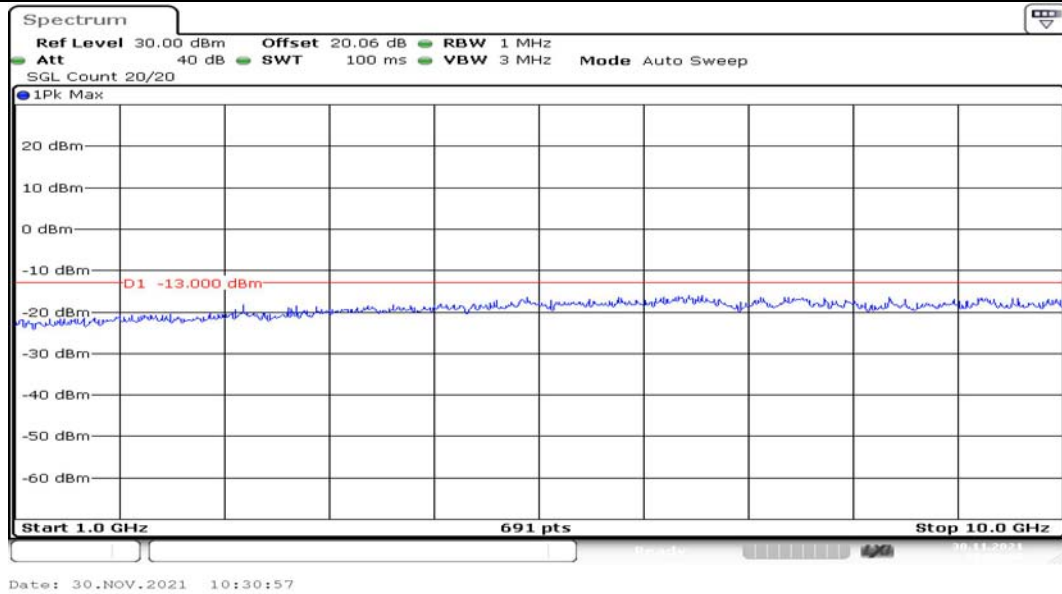
Channel 128



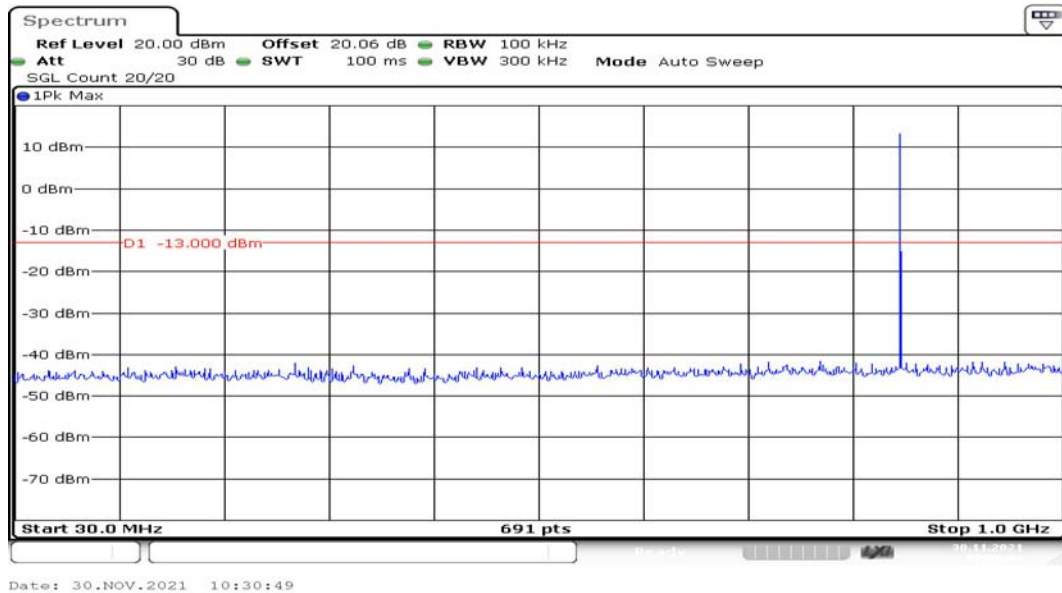
Channel 189



Channel 189



Channel 251

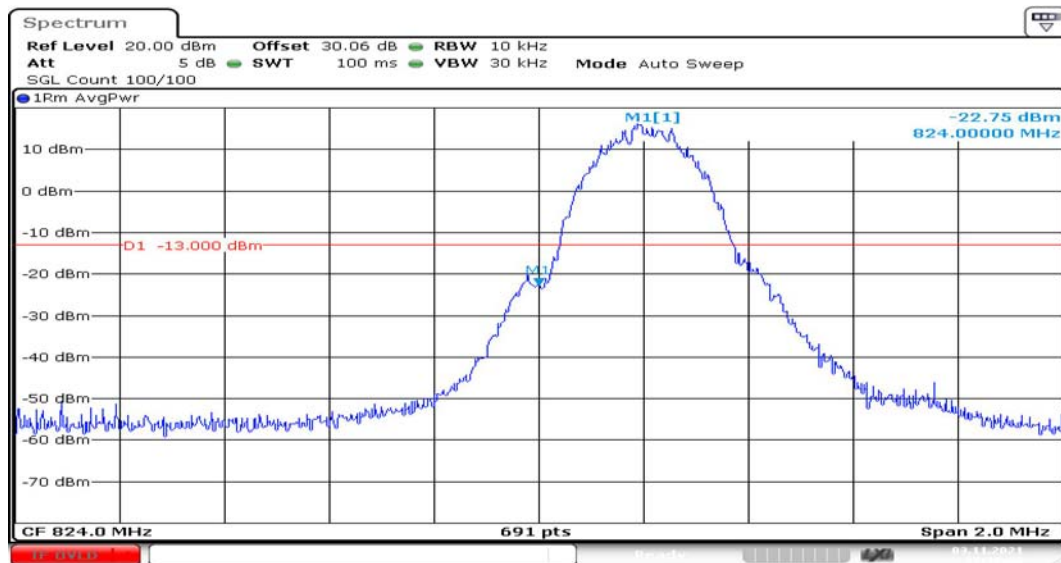


Channel 251

5. Band Edges Compliance

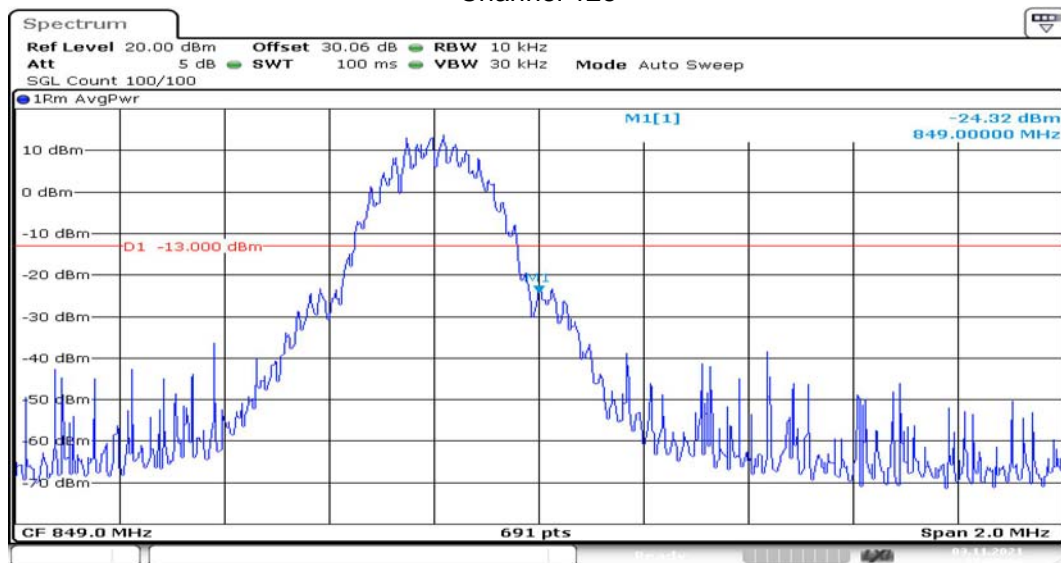
GSM850

GSM MODE:



Date: 3.NOV.2021 17:18:46

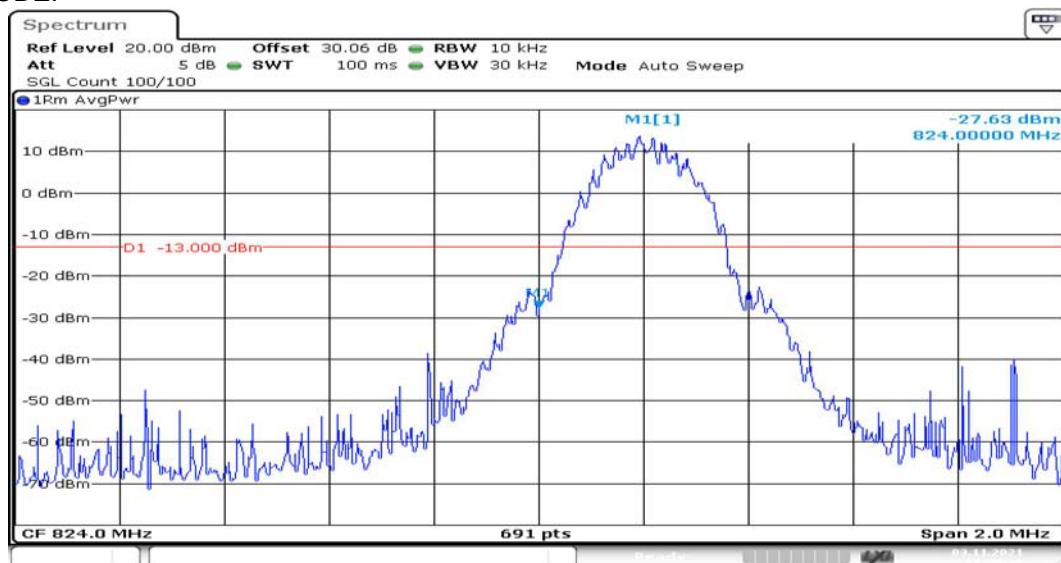
Channel 128



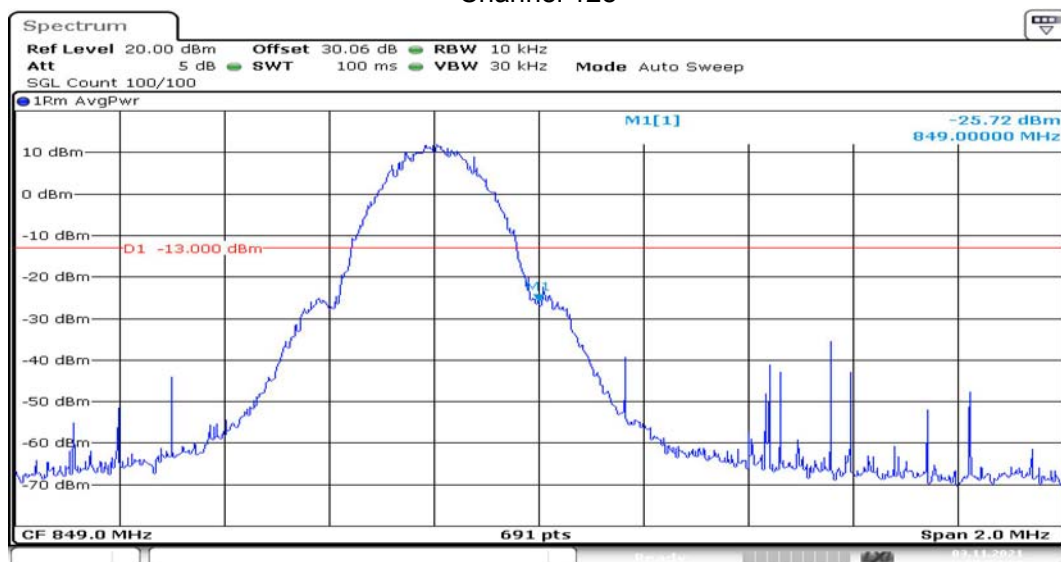
Date: 3.NOV.2021 17:20:33

Channel 251

GPRS MODE:

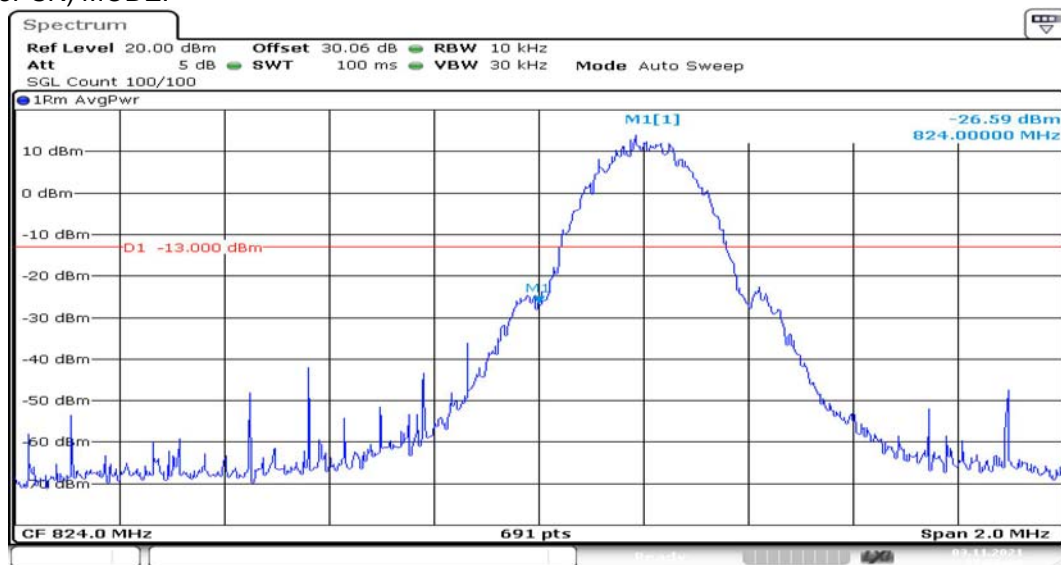


Channel 128

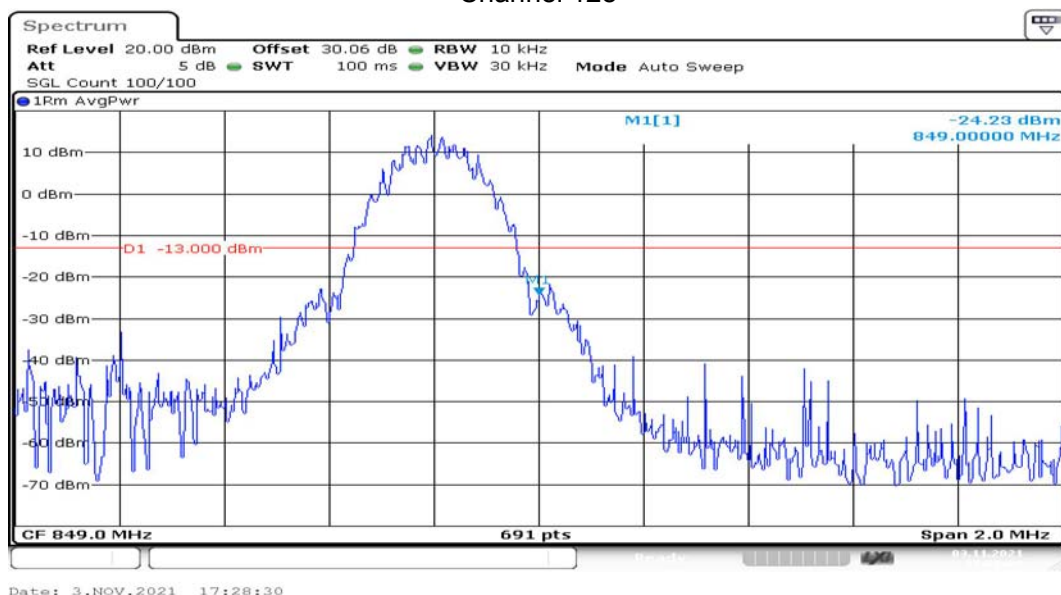


Channel 251

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
-30	-0.219	-0.021	0.006
-20	-0.284	-0.063	0.029
-10	-0.042	-0.067	0.010
0	-0.284	-0.062	0.051
+10	0.082	-0.064	0.017
+30	-0.288	-0.072	0.005
+40	-0.292	-0.062	-0.002
+50	-0.286	-0.070	0.002
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	-0.293	-0.047	0.152
HV	-0.225	-0.046	0.054

GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-30	0.003	0.002	-0.011
-20	0.008	0.024	0.004
-10	-0.002	0.007	-0.015
0	0.002	-0.001	-0.006
+10	0.002	0.000	-0.010
+30	0.080	0.113	0.010
+40	0.006	0.021	0.038
+50	0.001	0.072	-0.021
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	0.008	0.008	-0.012
HV	0.008	0.011	-0.005

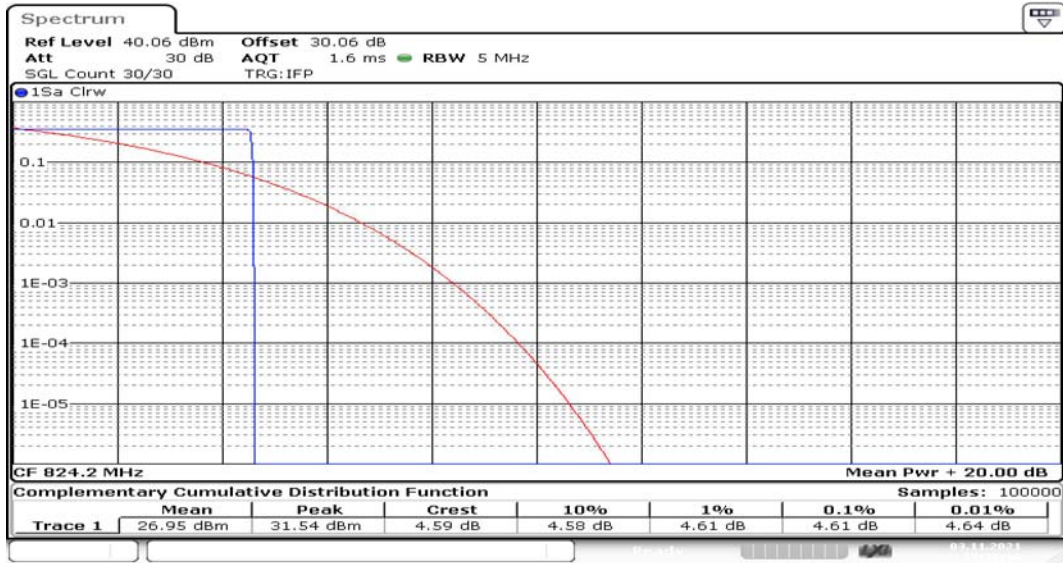
EGPRS (8PSK) MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-30	0.005	0.010	0.002
-20	0.022	0.000	-0.002
-10	0.020	0.002	-0.013
0	0.000	-0.004	-0.011
+10	0.000	-0.005	-0.010
+30	0.007	0.008	0.008
+40	0.022	0.017	0.010
+50	0.019	0.009	0.016
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	0.004	0.011	0.006
HV	0.001	0.008	-0.002

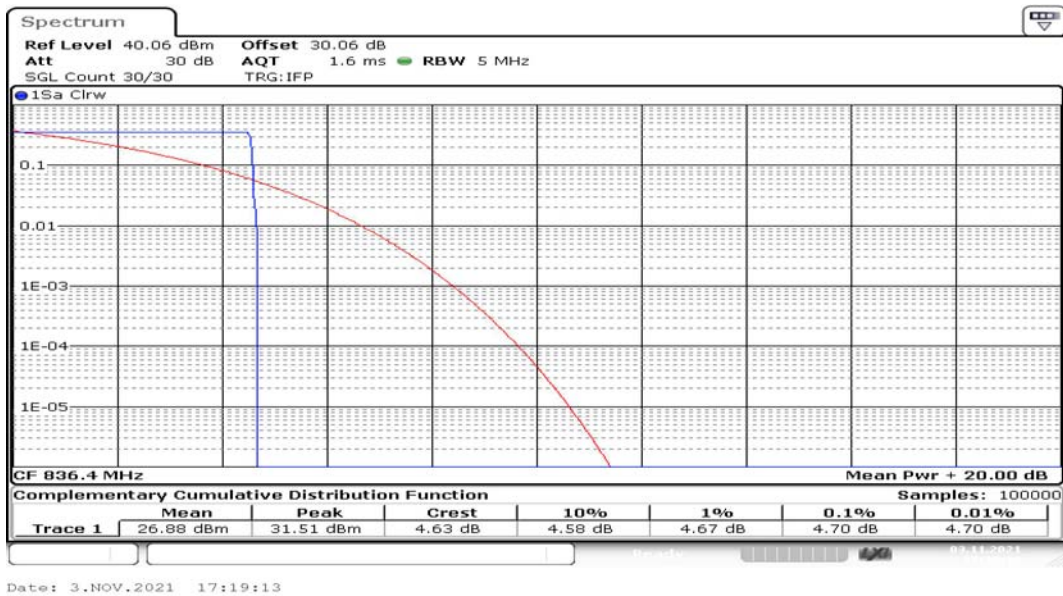
7. Peak-Average Ratio

GSM850

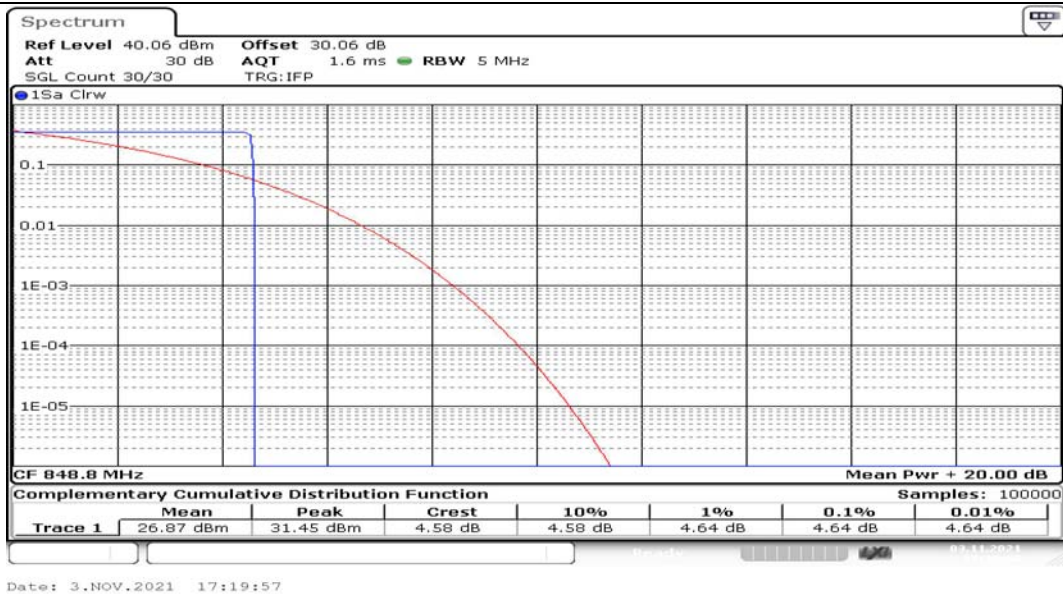
GSM MODE:



Channel 128

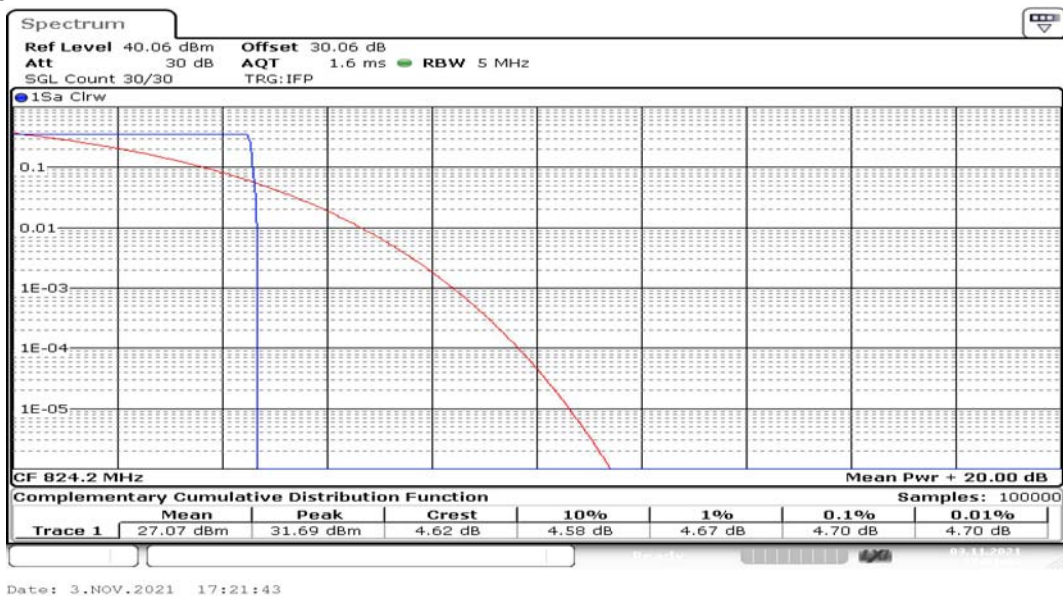


Channel 189

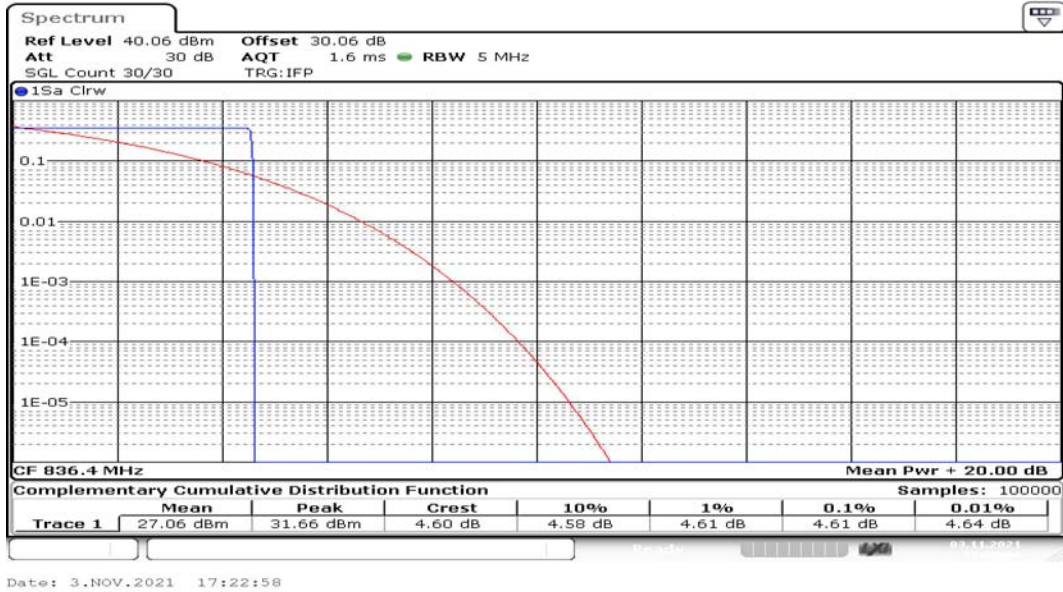


Channel 251

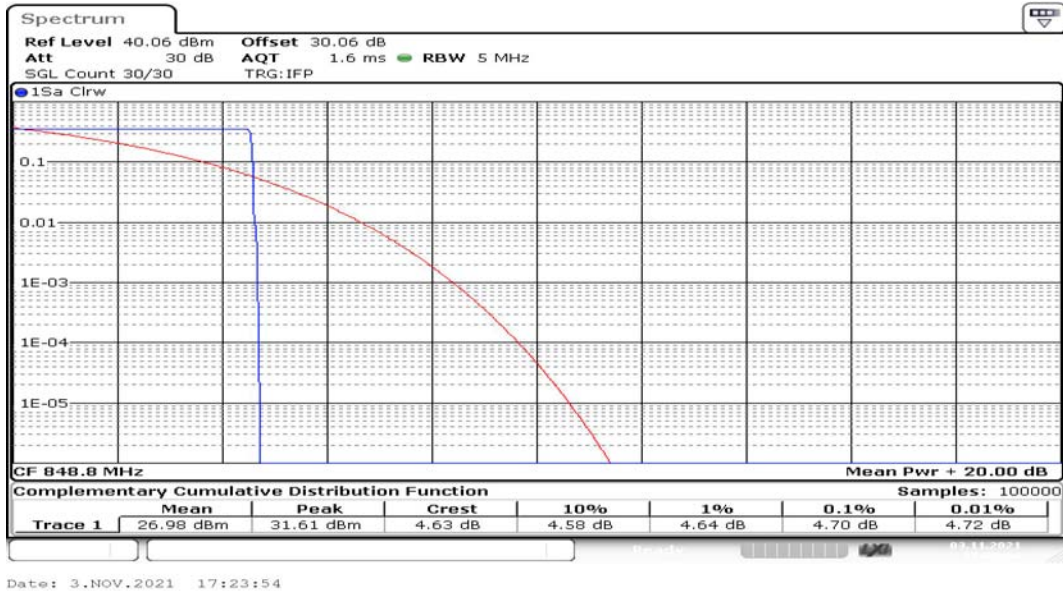
GPRS MODE:



Channel 128

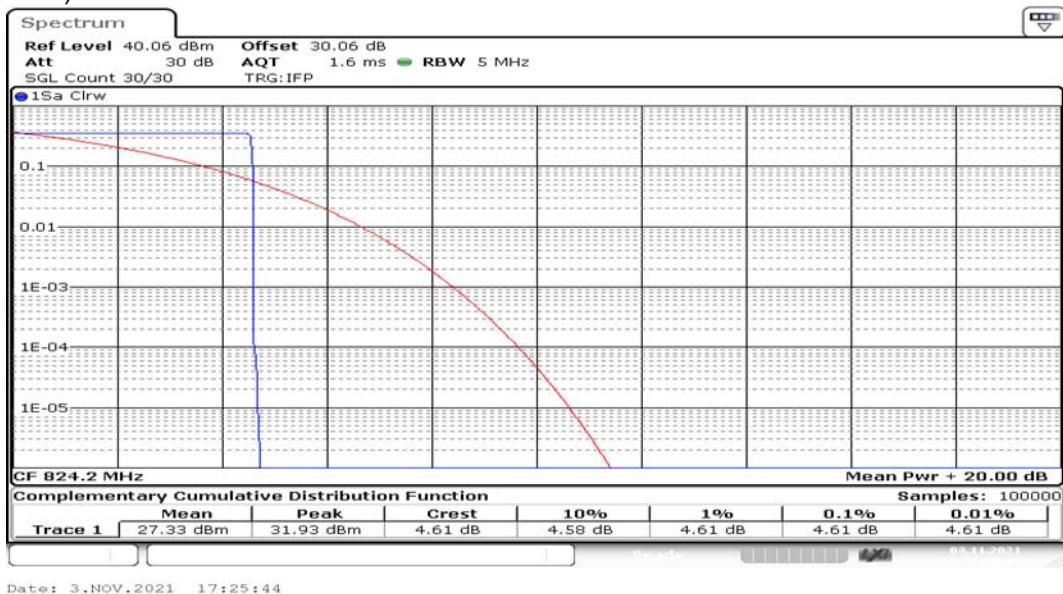


Channel 189

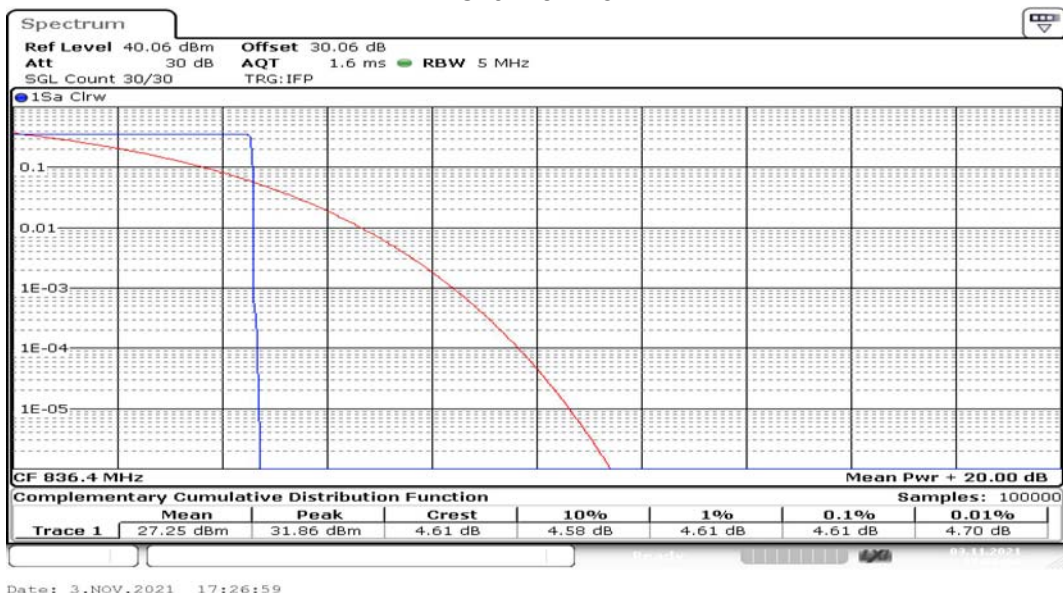


Channel 251

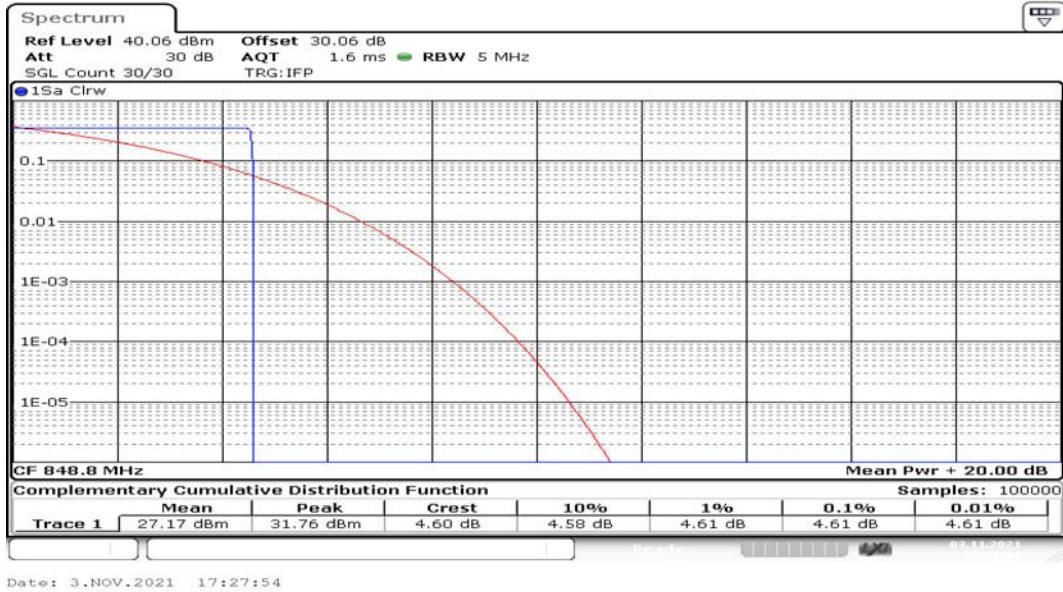
EGPRS (8PSK) MODE:



Channel 128



Channel 189



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	32.16	28.97	0.789
848.8	251	32.24	29.05	0.804
836.4	189	32.63	29.44	0.879

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	4Down1Up	32.91	29.72	0.938
836.4	189		31.75	28.56	0.718
848.8	251		32.39	29.20	0.832
824.2	128	3Down2Up	30.94	27.75	0.596
836.4	189		29.76	26.57	0.454
848.8	251		30.34	27.15	0.519
824.2	128	2Down3Up	29.07	25.88	0.387
836.4	189		27.88	24.69	0.294
848.8	251		28.46	25.27	0.337
824.2	128	1Down4Up	26.97	23.78	0.239
836.4	189		25.79	22.60	0.182
848.8	251		26.37	23.18	0.208

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	4Down1Up	33.19	30.00	1.000
836.4	189		32.72	29.53	0.897
848.8	251		32.56	29.37	0.865
824.2	128	3Down2Up	31.25	28.06	0.640
836.4	189		30.76	27.57	0.571
848.8	251		30.57	27.38	0.547
824.2	128	2Down3Up	29.44	26.25	0.422
836.4	189		28.92	25.73	0.374
848.8	251		28.74	25.55	0.359
824.2	128	1Down4Up	27.40	24.21	0.264
836.4	189		26.92	23.73	0.236
848.8	251		26.75	23.56	0.227

GSM900 Result

1. RF Power Output

PCS1900

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	31.31
1880	661	30.87
1909.8	810	31.27

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
1850.2	512	4Down1Up	31.76
1880	661		31.63
1909.8	810		32.07
1850.2	512	3Down2Up	29.50
1880	661		29.37
1909.8	810		29.66
1850.2	512	2Down3Up	27.95
1880	661		27.83
1909.8	810		28.11
1850.2	512	1Down4Up	25.85
1880	661		25.74
1909.8	810		25.97

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
1850.2	512	4Down1Up	30.78
1880	661		30.60
1909.8	810		31.06
1850.2	512	3Down2Up	29.60
1880	661		29.40
1909.8	810		29.74
1850.2	512	2Down3Up	28.14
1880	661		27.94
1909.8	810		28.26
1850.2	512	1Down4Up	26.18
1880	661		26.00
1909.8	810		26.27

2. Occupied Bandwidth

PCS1900

GSM MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	243.13
1880	661	247.47
1909.8	810	250.36

GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	247.47
1880	661	254.70
1909.8	810	250.36

EGPRS (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	250.36
1880	661	248.91
1909.8	810	240.23

PCS1900

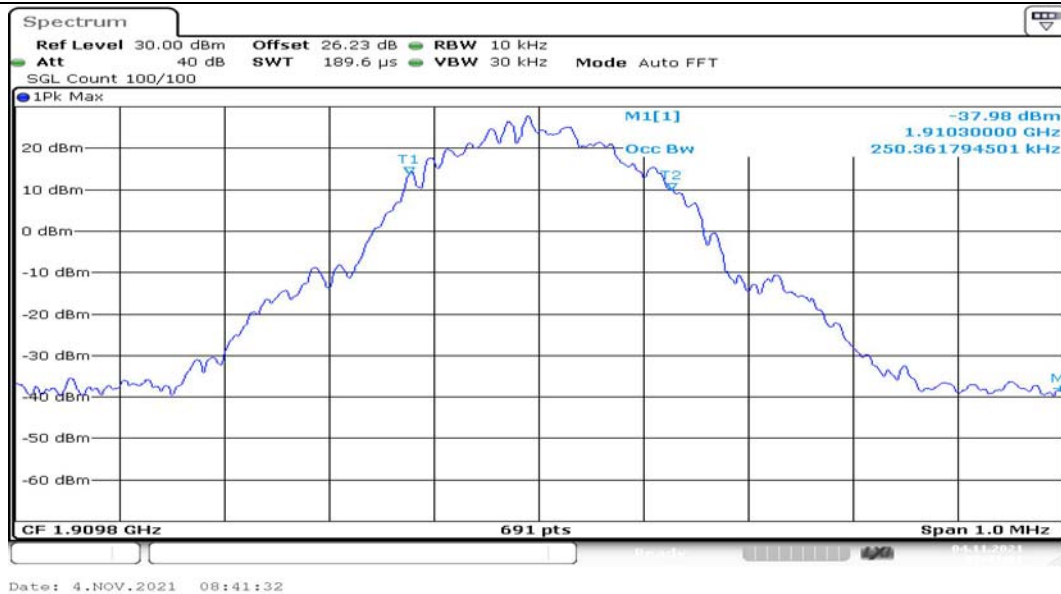
GSM MODE:



Channel 512



Channel 661

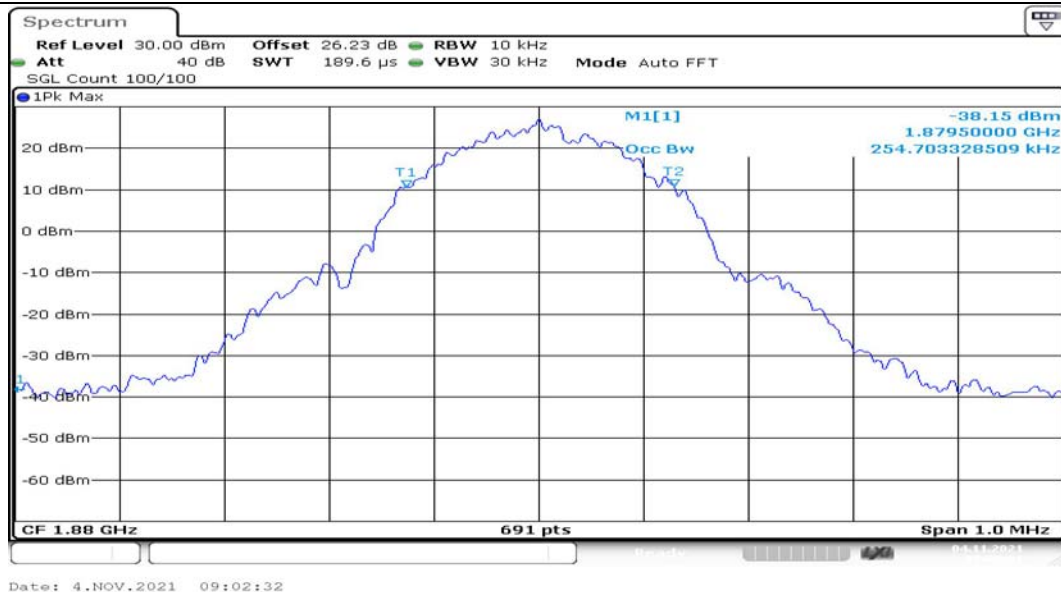


Channel 810

GPRS MODE:



Channel 512

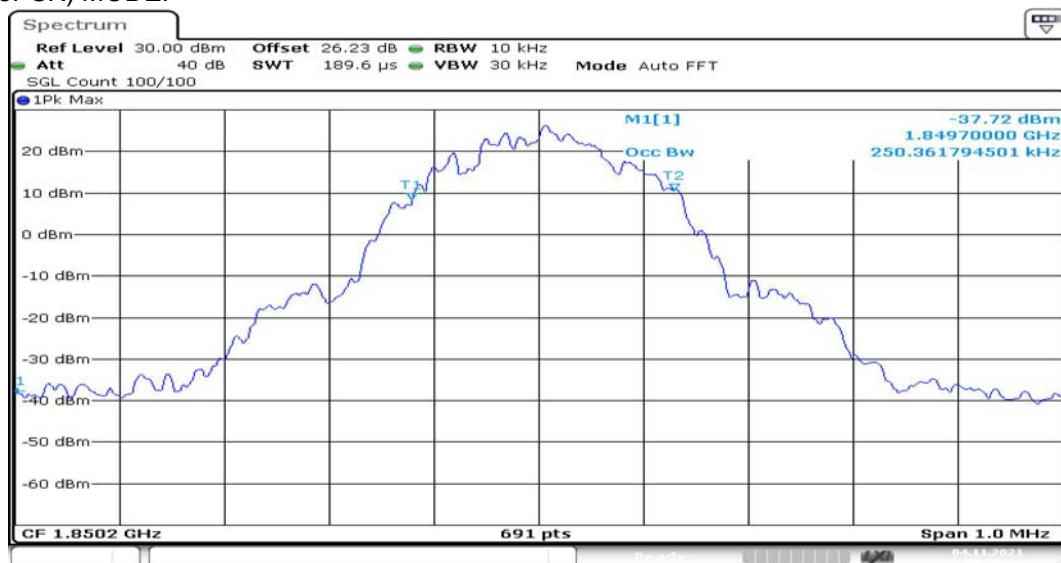


Channel 661



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	308.20
1880	661	315.50
1909.8	810	314.00

GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
1850.2	512	309.70
1880	661	305.40
1909.8	810	301.00

EGPRS (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
1850.2	512	309.70
1880	661	311.10
1909.8	810	311.10

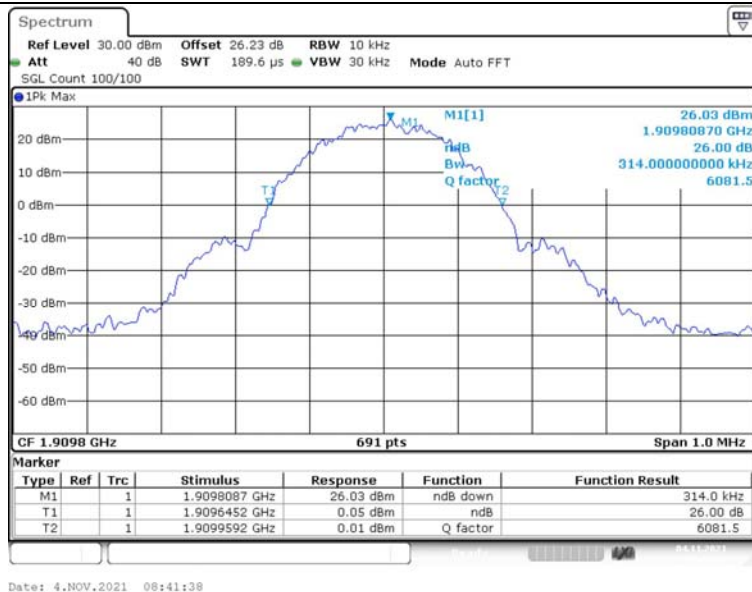
PCS1900
GSM MODE:



Channel 512



Channel 661



Channel 810

GPRS MODE:



Channel 512



Channel 661



Channel 810

EGPRS (8PSK) MODE:



Channel 512



Channel 661

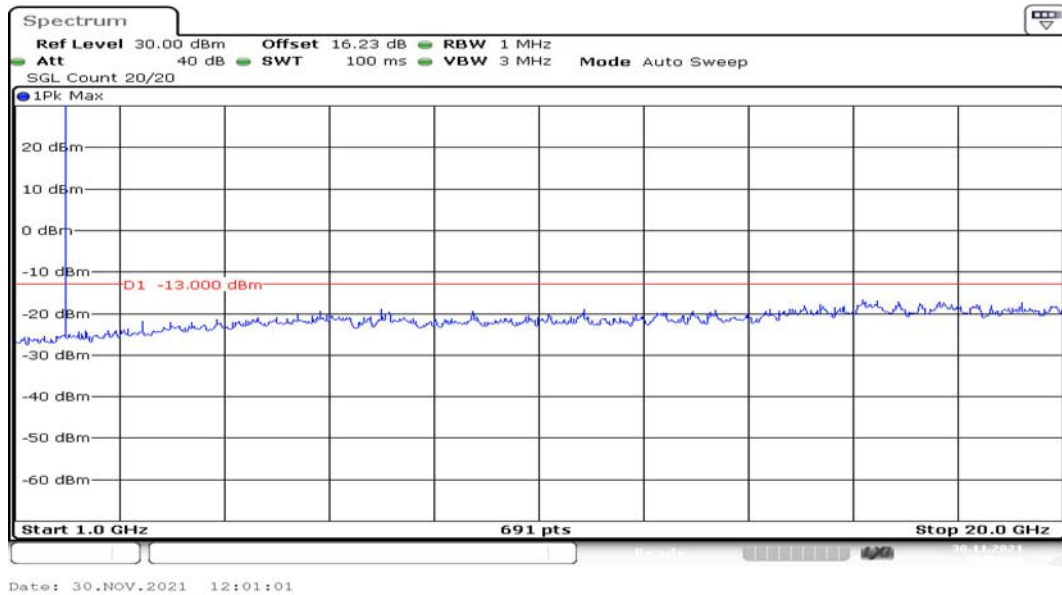


Channel 810

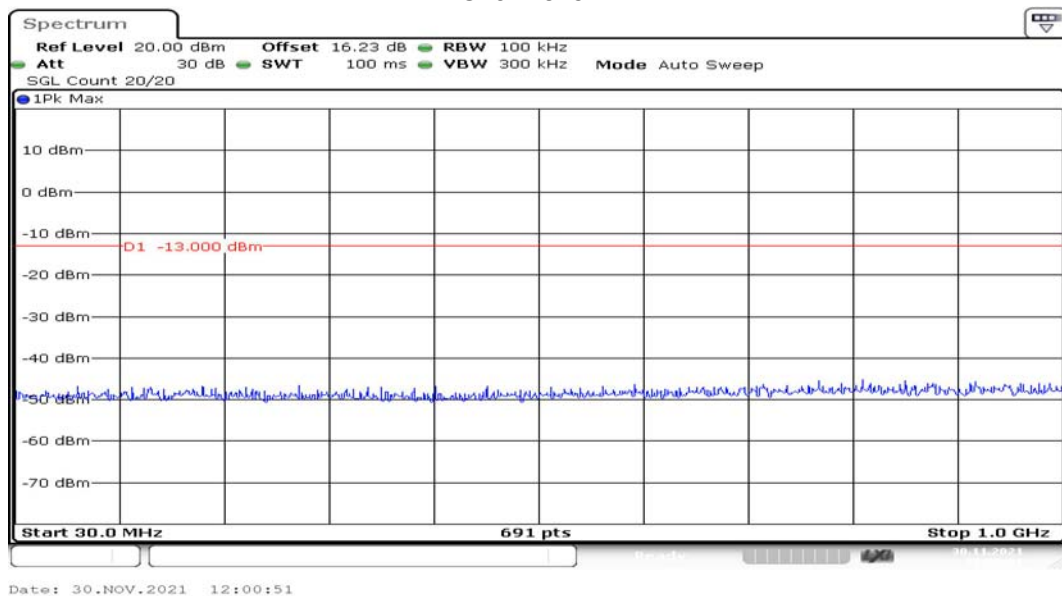
4. Spurious Emissions at antenna terminal

PCS1900

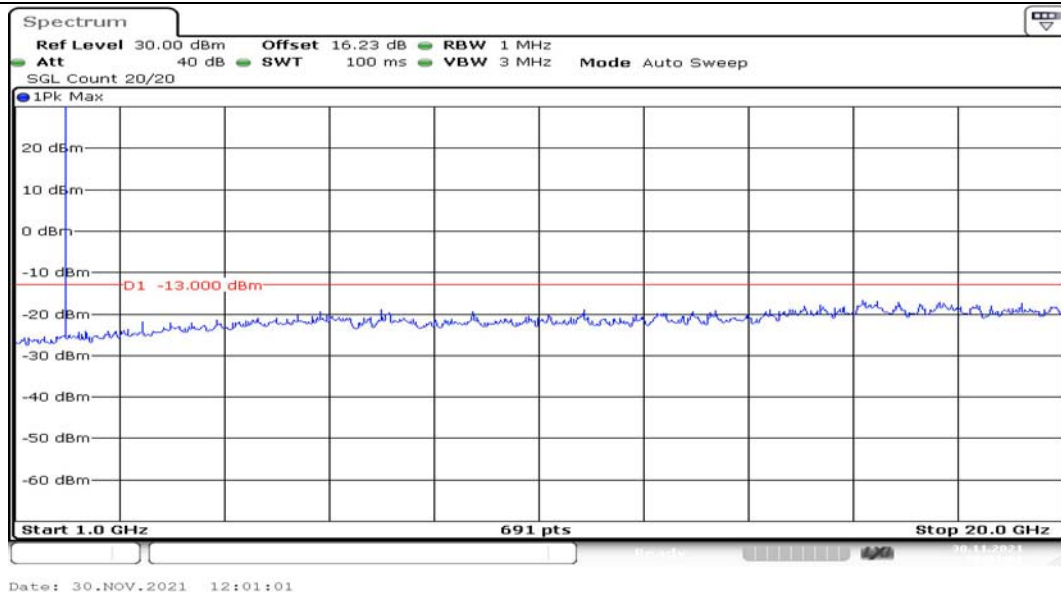
GSM MODE:



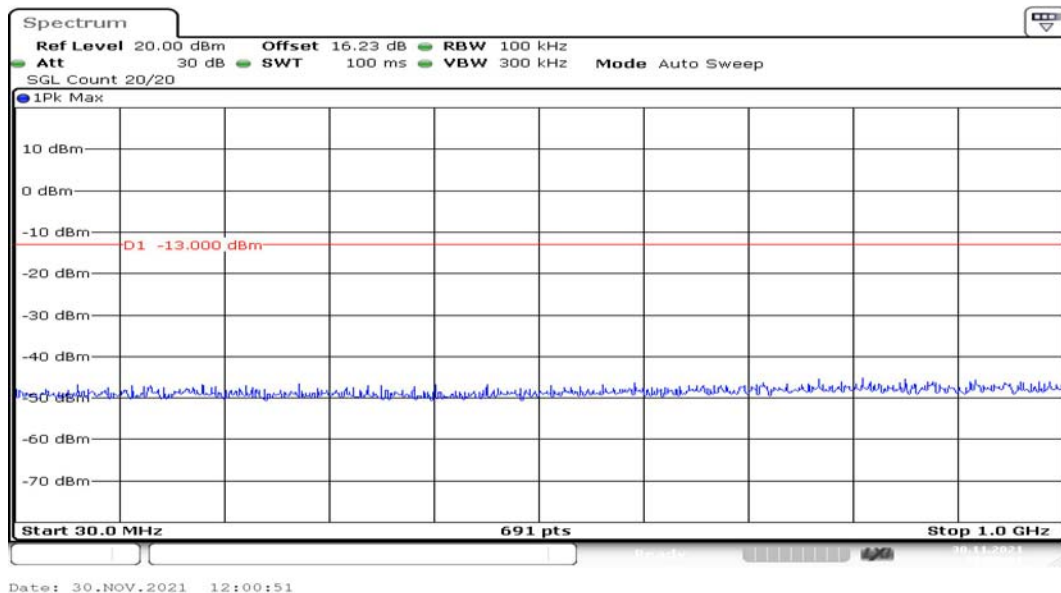
Channel 512



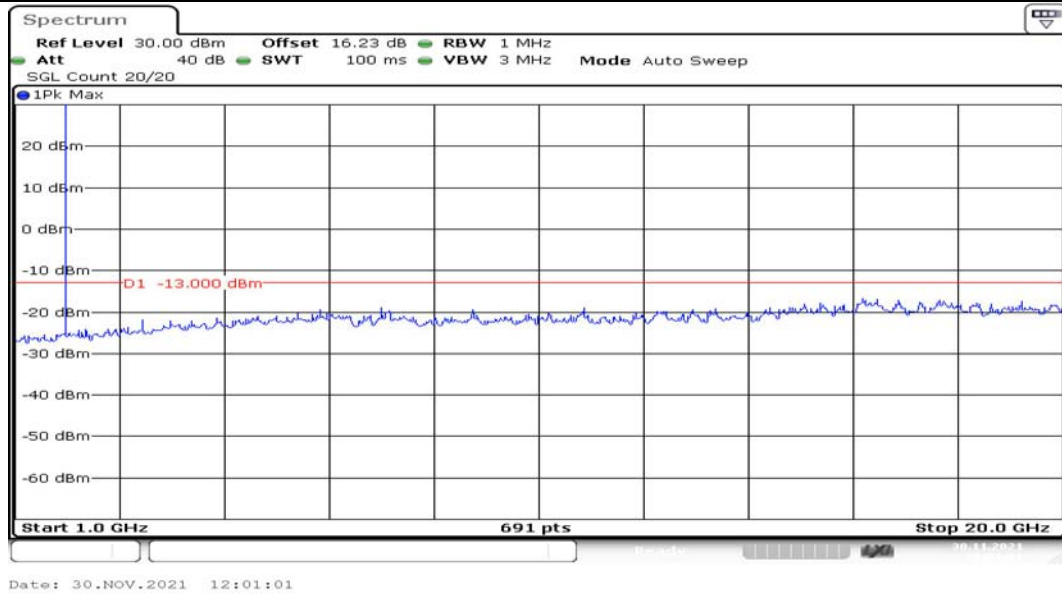
Channel 512



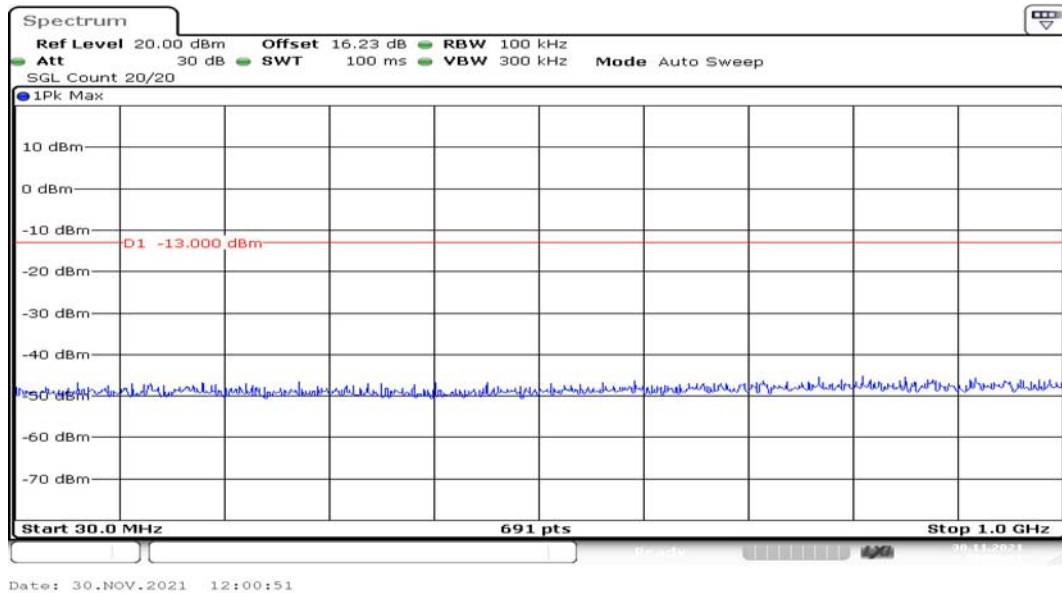
Channel 661



Channel 661

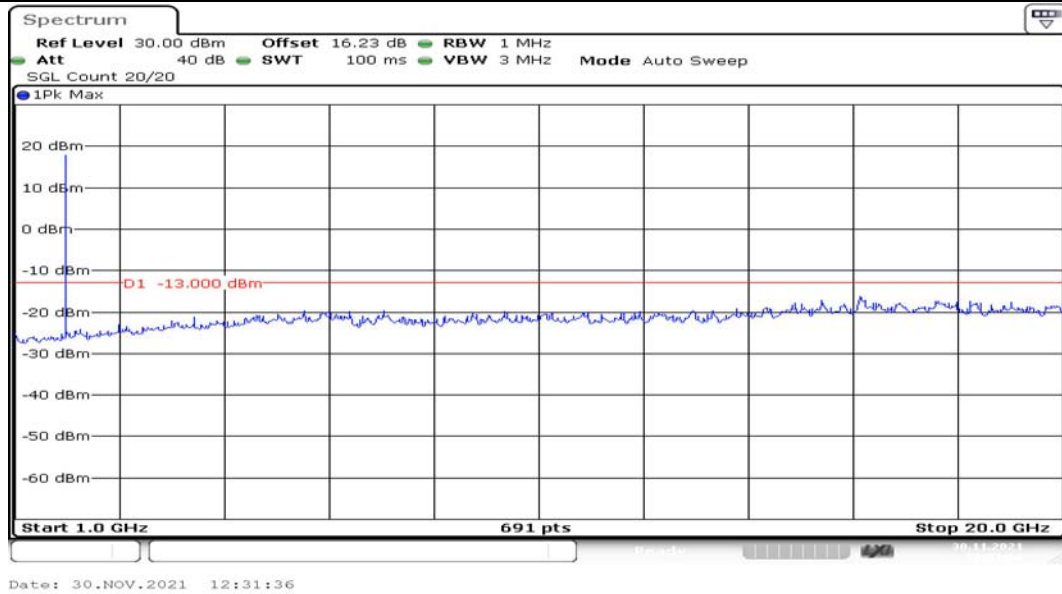


Channel 810

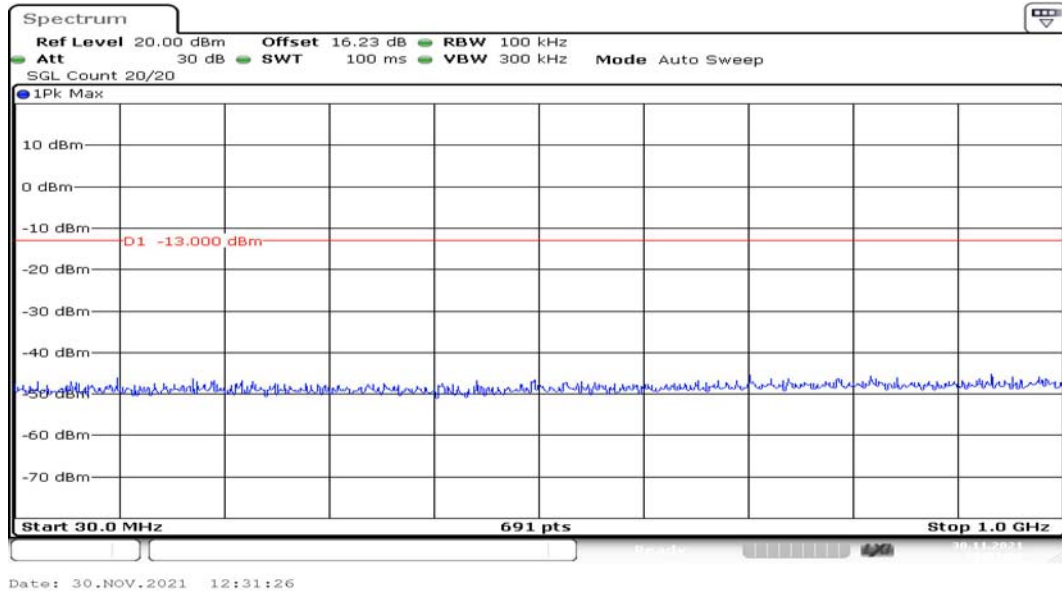


Channel 810

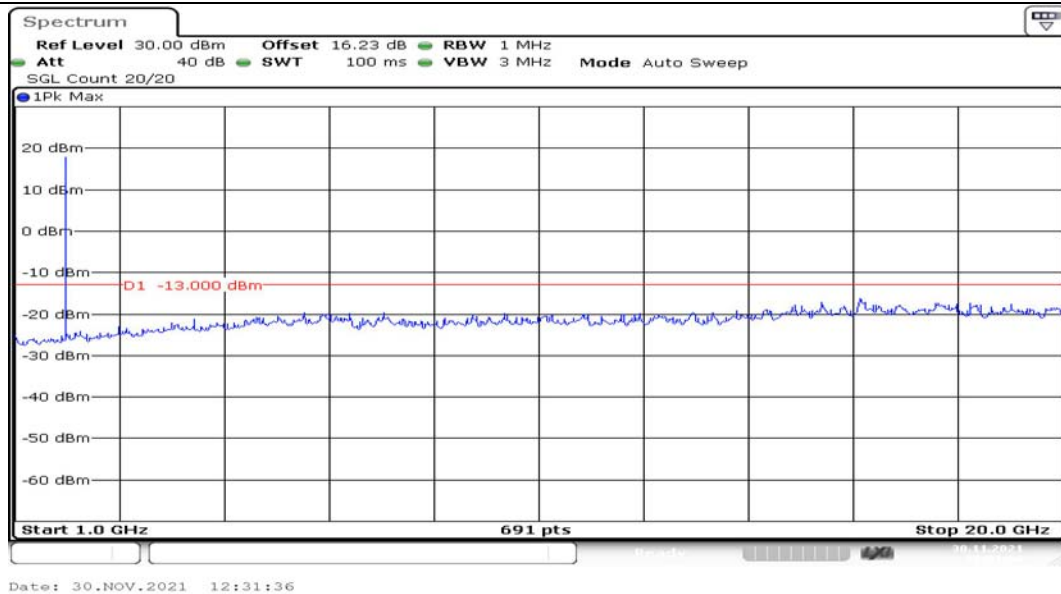
GPRS MODE:



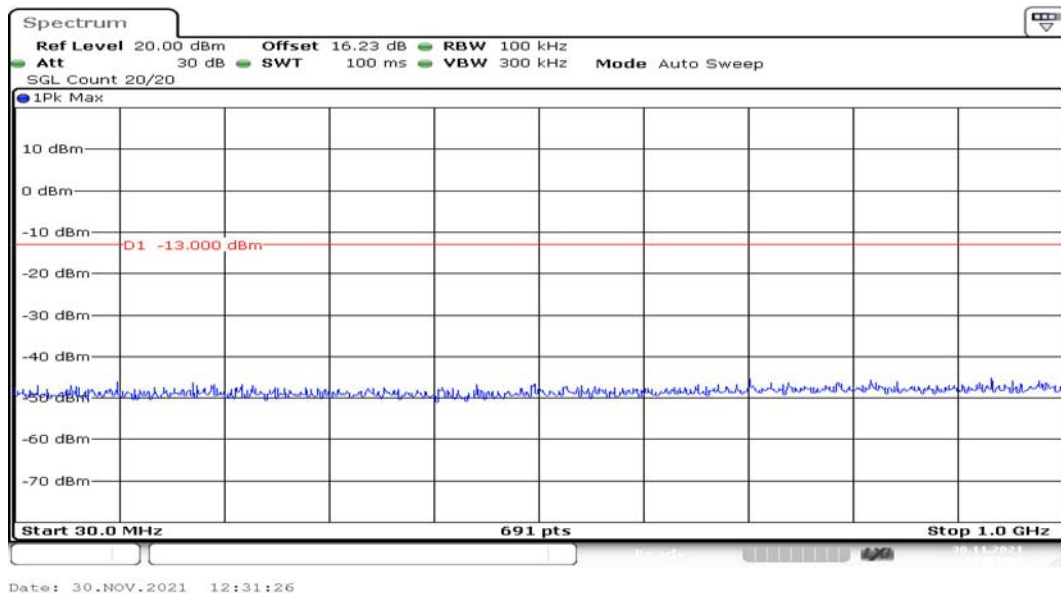
Channel 512



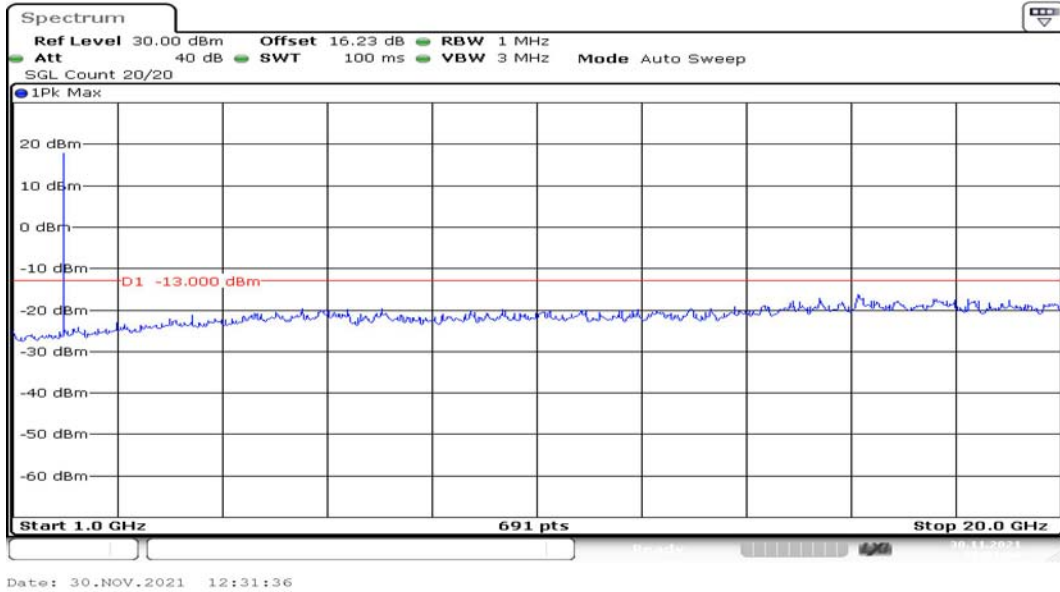
Channel 512



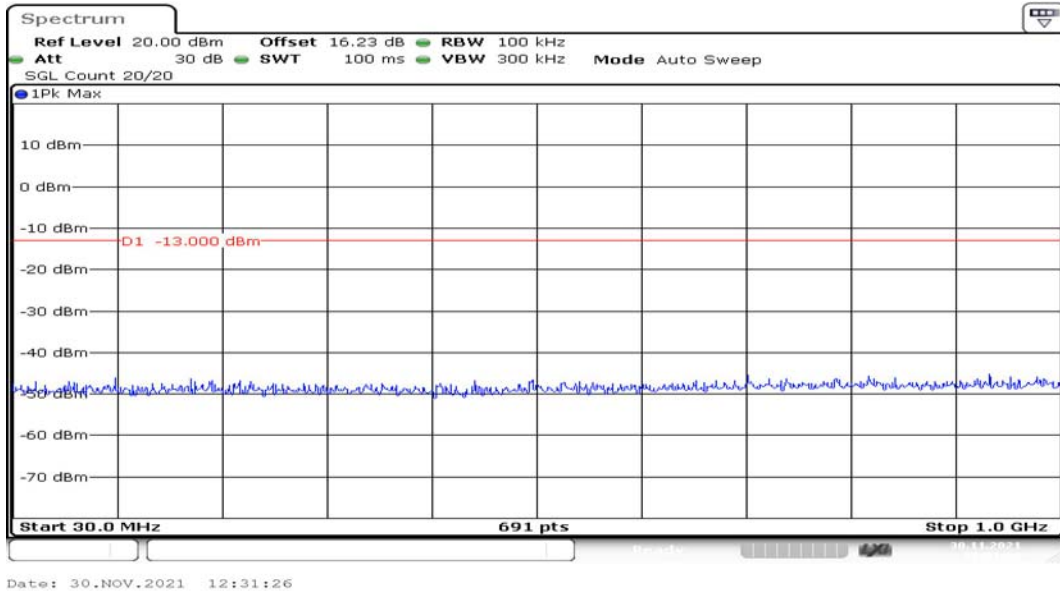
Channel 661



Channel 661

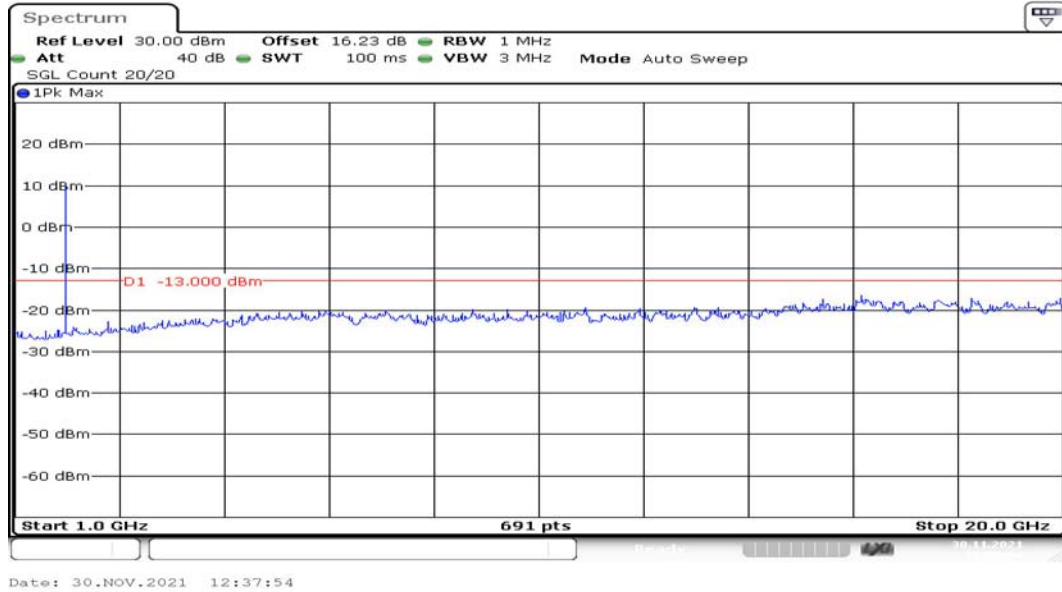


Channel 810

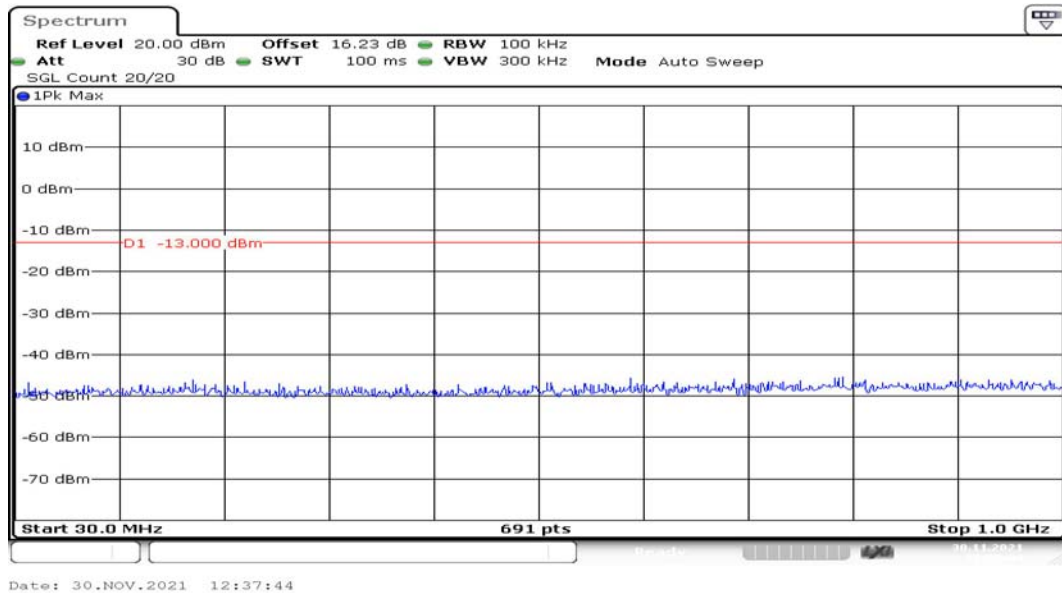


Channel 810

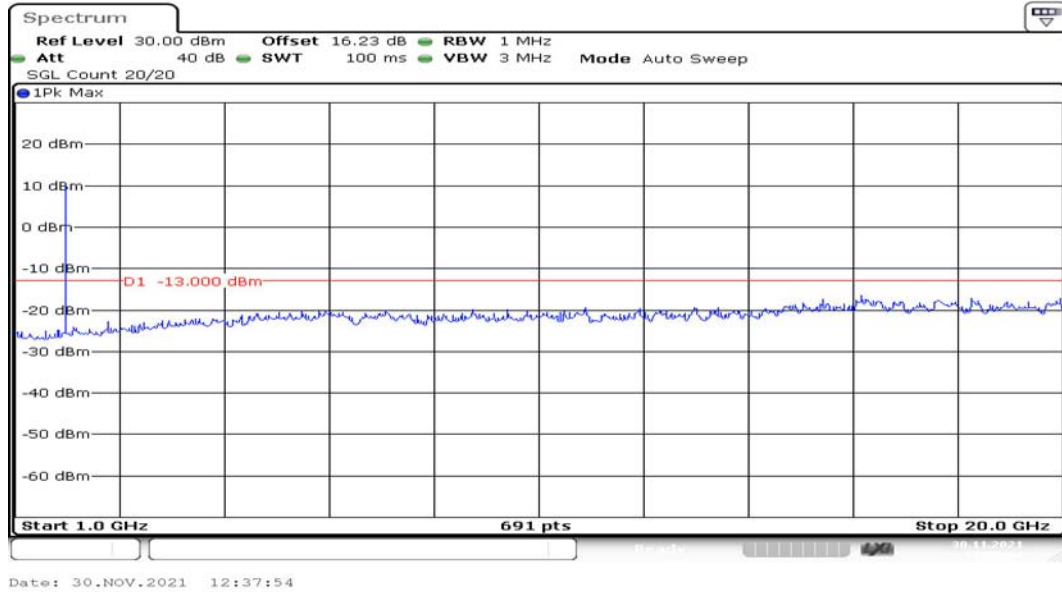
EGPRS (8PSK) MODE:



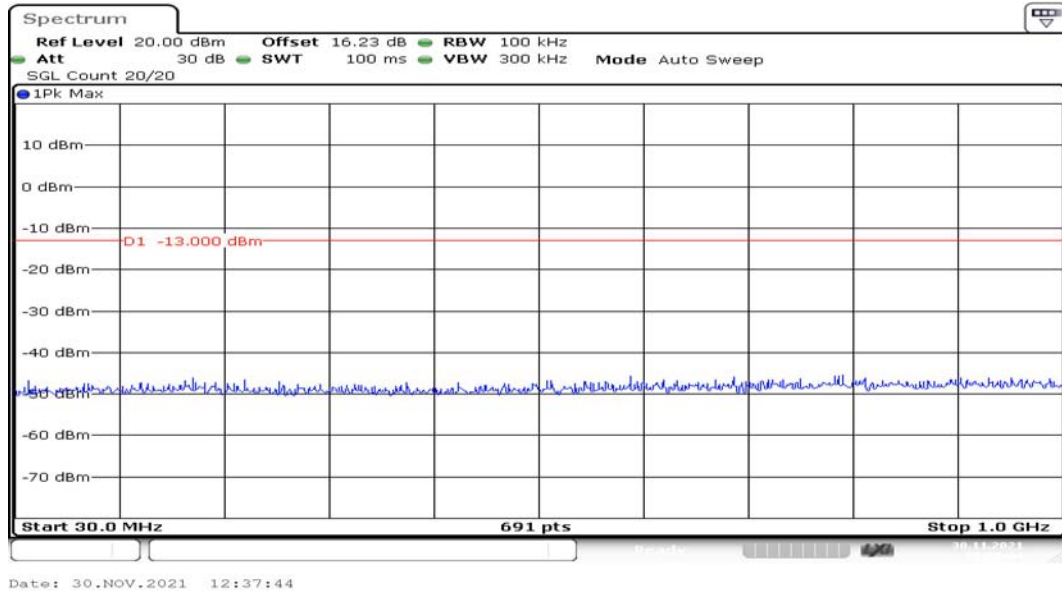
Channel 512



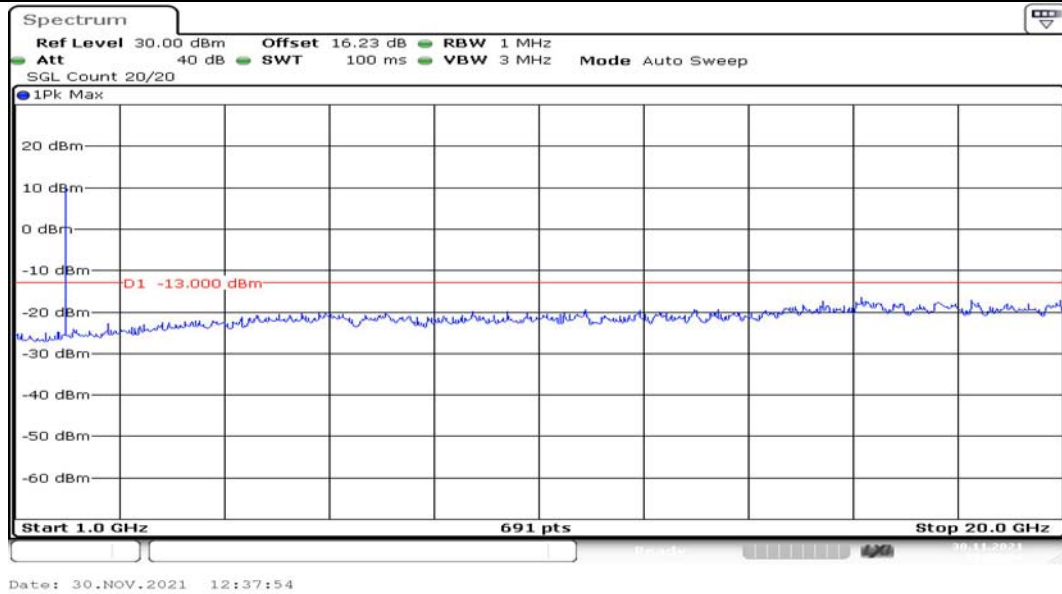
Channel 512



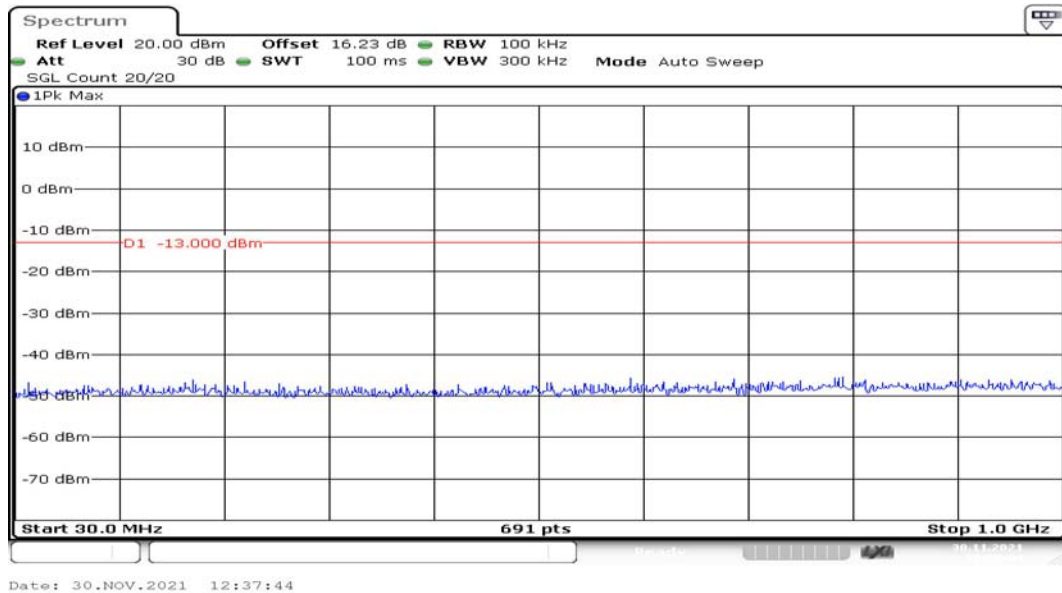
Channel 661



Channel 661



Channel 810

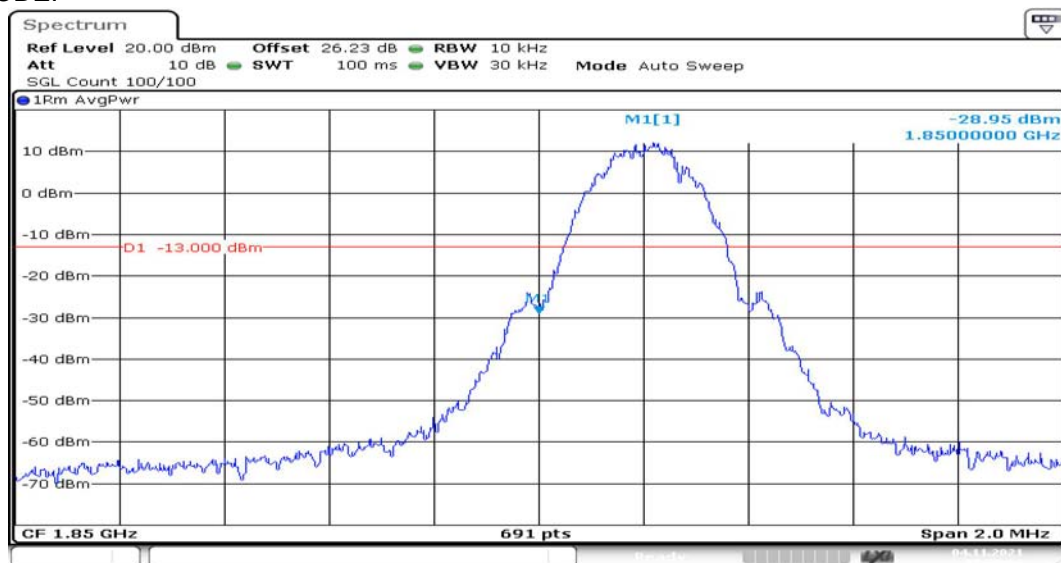


Channel 810

GSM MODE:

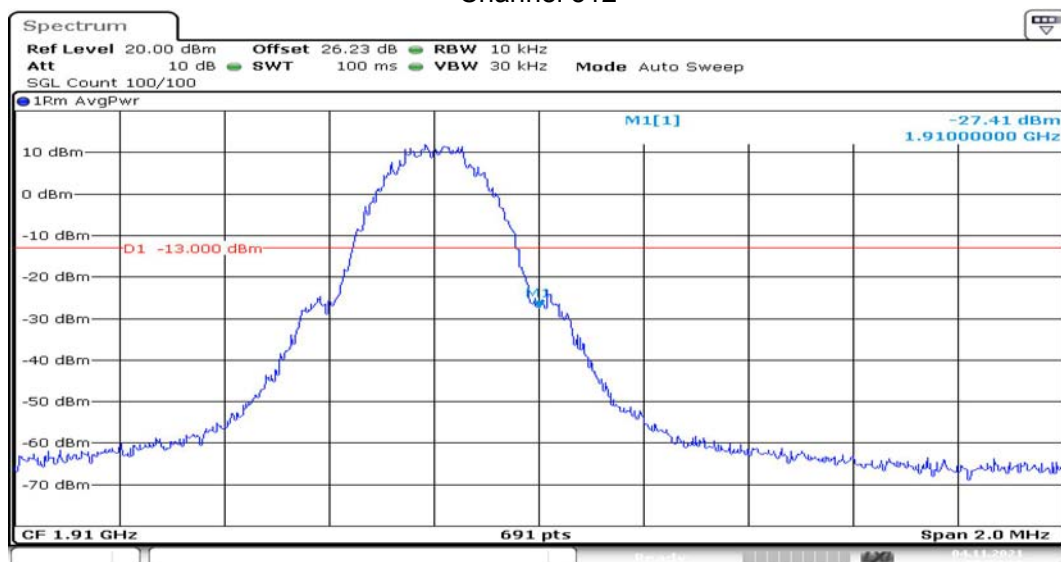
Channel 810

GPRS MODE:



Date: 4.NOV.2021 09:02:07

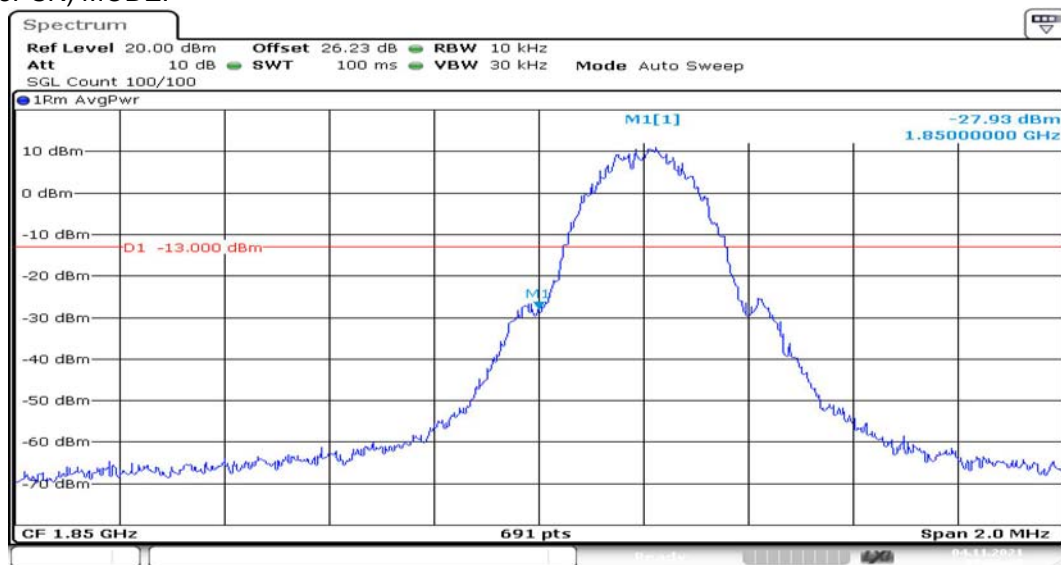
Channel 512



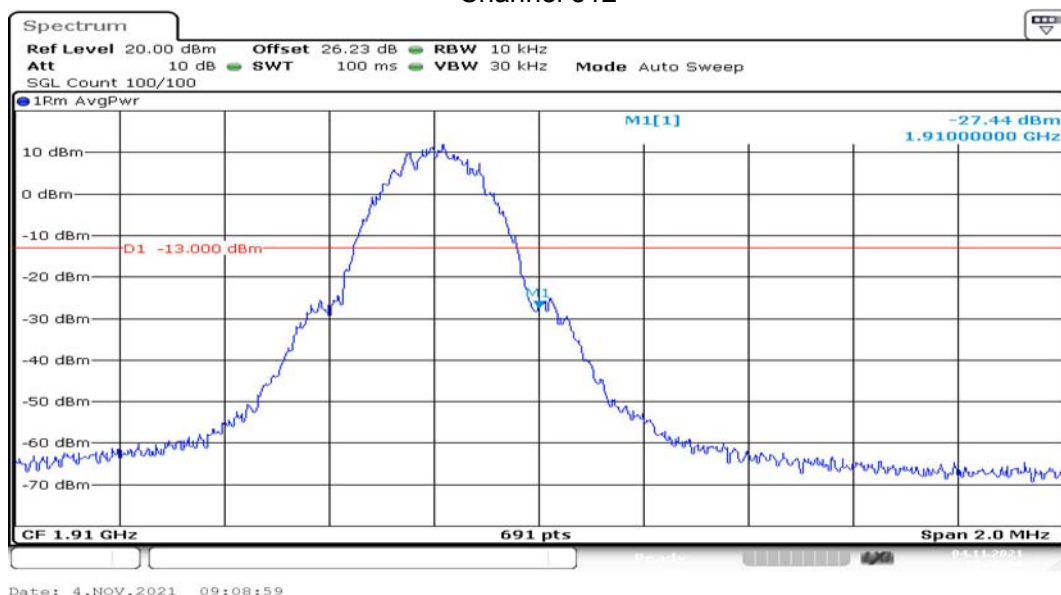
Date: 4.NOV.2021 09:04:19

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
-30	0.002	0.010	0.009
-20	-0.001	0.002	0.007
-10	0.005	-0.001	0.007
0	-0.001	0.006	0.008
+10	0.003	0.000	-0.001
+30	-0.001	-0.001	0.011
+40	-0.001	0.002	0.000
+50	-0.002	0.001	0.002
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	-0.004	0.001	0.015
HV	0.003	0.007	0.001

GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-30	-0.001	0.013	0.003
-20	0.000	-0.001	0.011
-10	0.001	-0.003	0.000
0	-0.003	-0.007	0.003
+10	0.007	0.004	-0.003
+30	0.022	-0.004	-0.001
+40	0.002	-0.005	0.000
+50	0.003	-0.008	-0.001
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	-0.005	0.007	0.006
HV	-0.002	-0.003	0.000

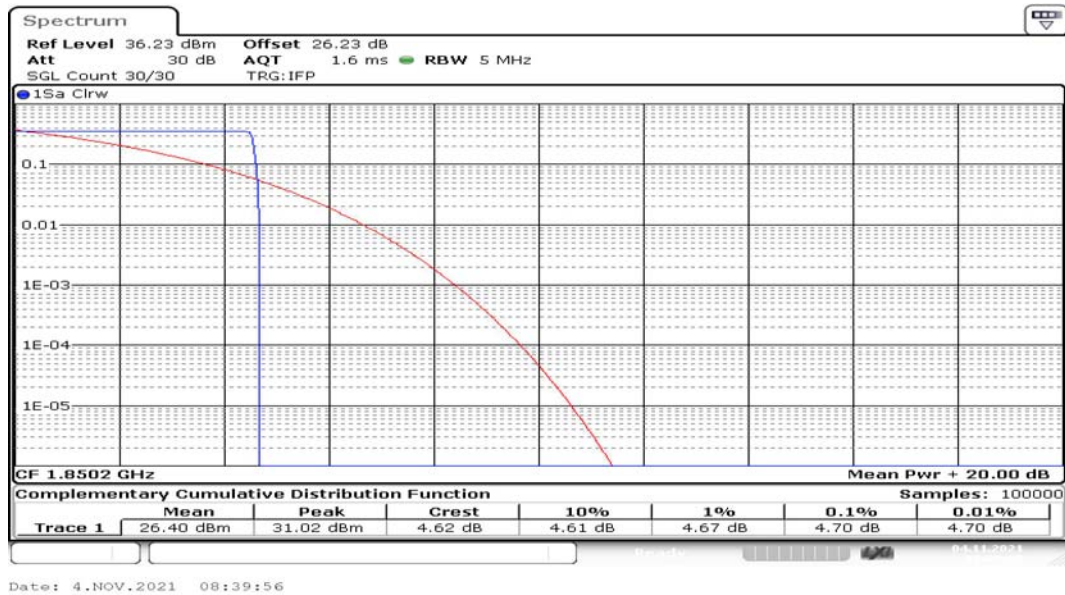
EGPRS (8PSK) MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-30	-0.002	0.002	0.013
-20	-0.003	-0.001	0.011
-10	0.007	0.011	0.011
0	0.003	-0.006	0.002
+10	0.004	-0.004	0.003
+30	0.007	-0.007	0.006
+40	0.000	0.001	0.006
+50	0.001	0.006	0.008
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	-0.001	-0.005	0.000
HV	-0.002	0.007	0.015

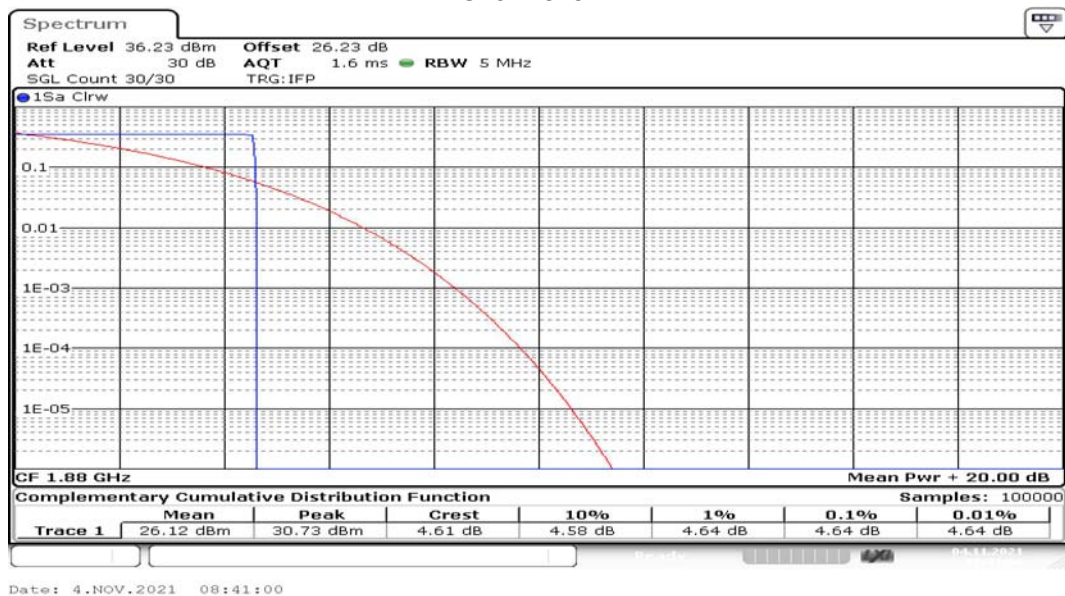
7. Peak-Average Ratio

PCS1900

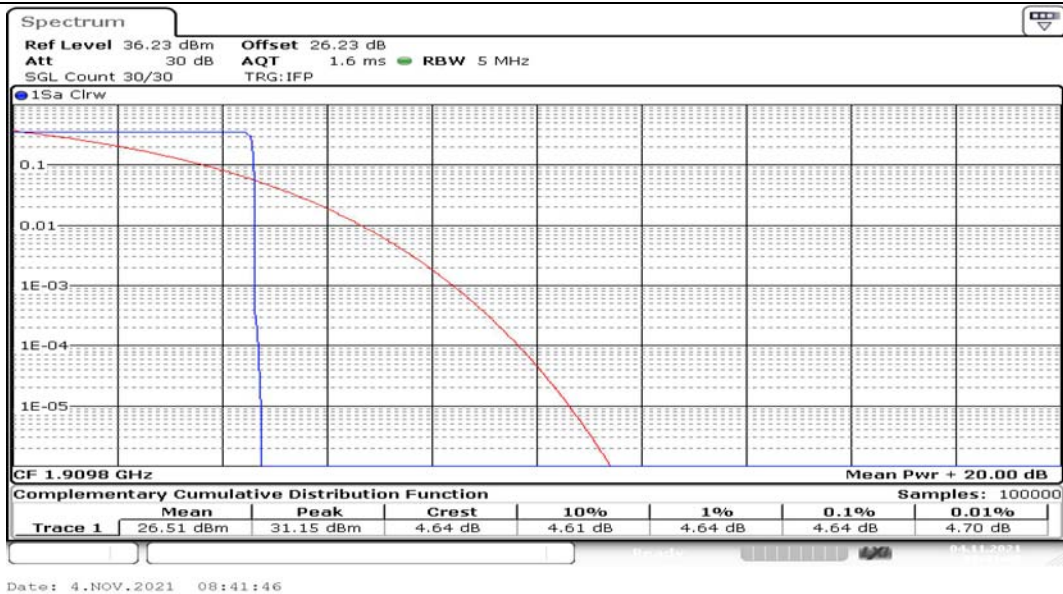
GSM MODE:



Channel 512

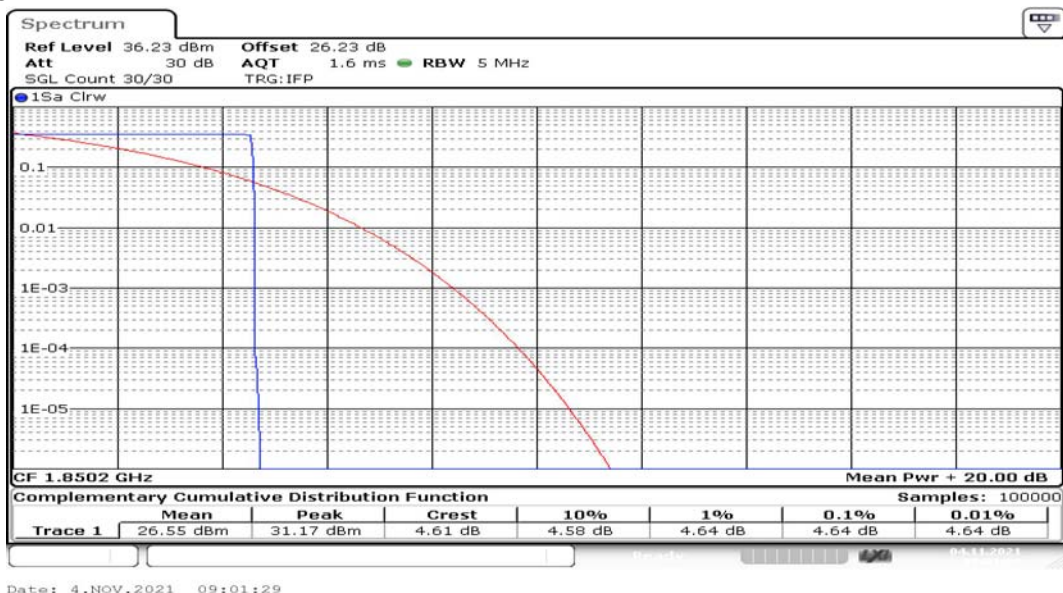


Channel 661

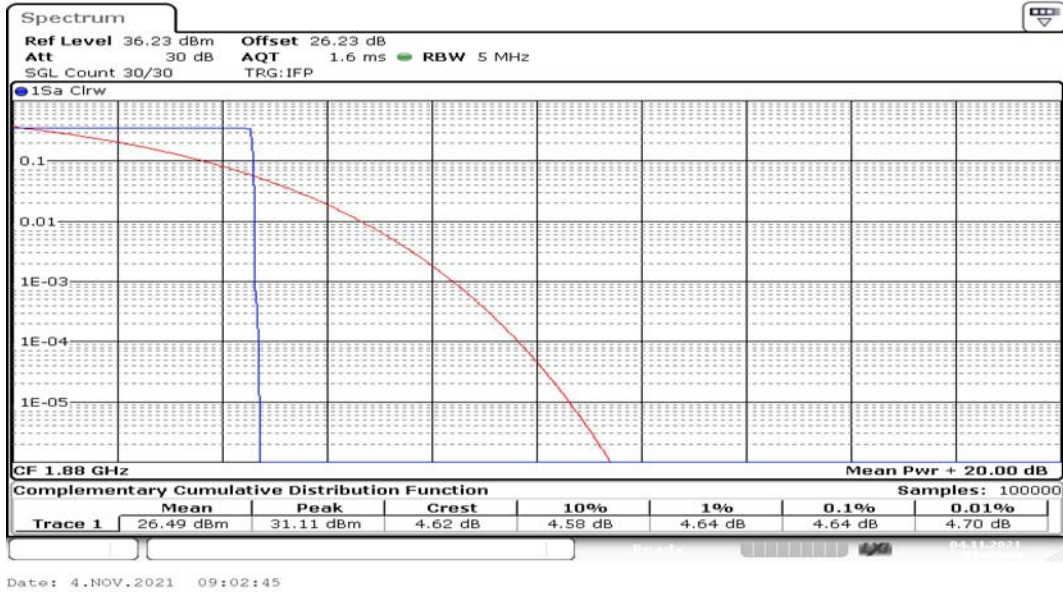


Channel 810

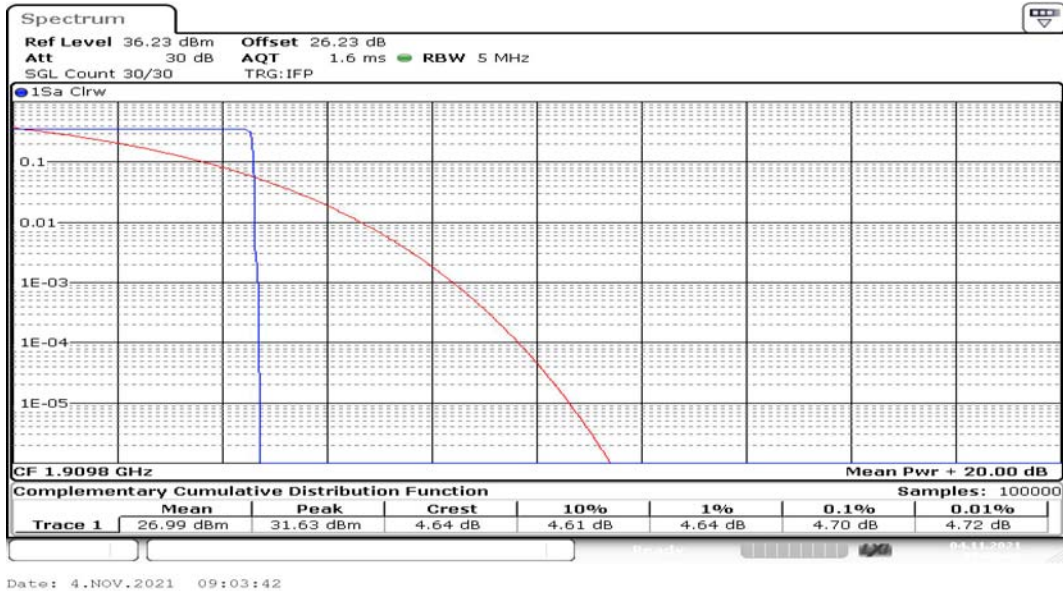
GPRS MODE:



Channel 512

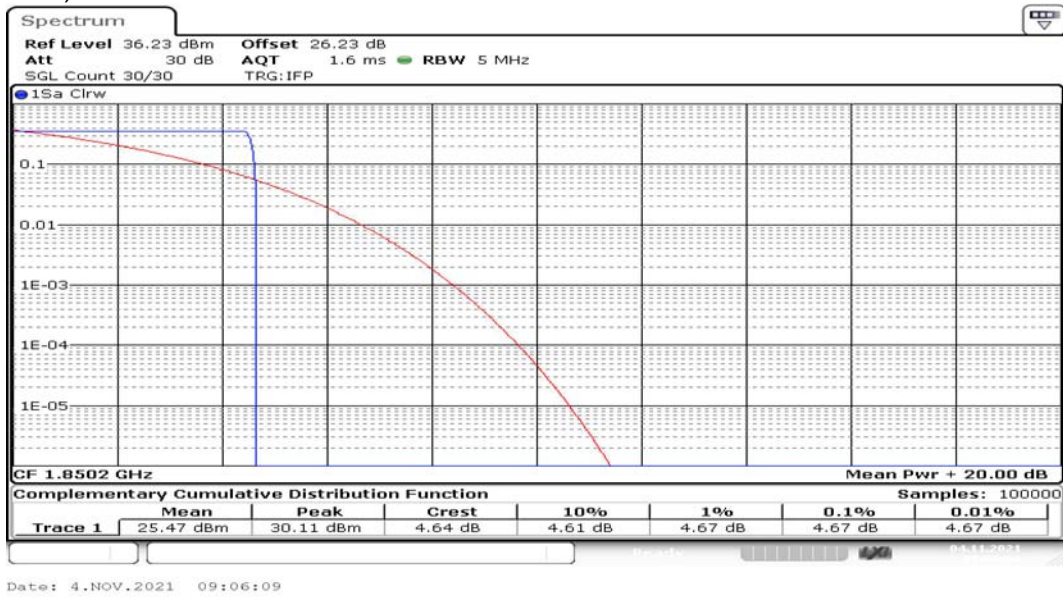


Channel 661

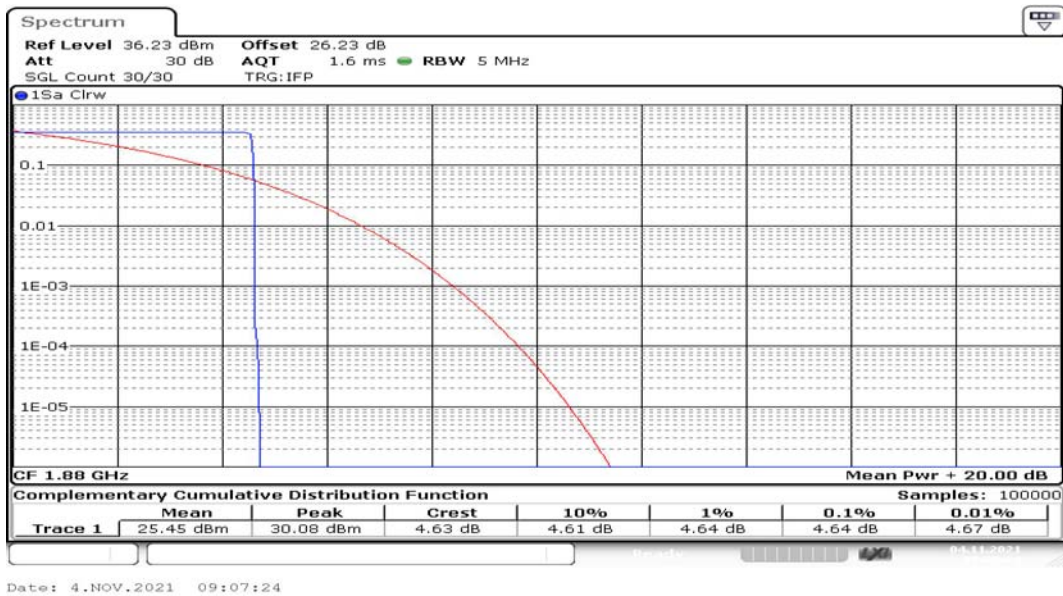


Channel 810

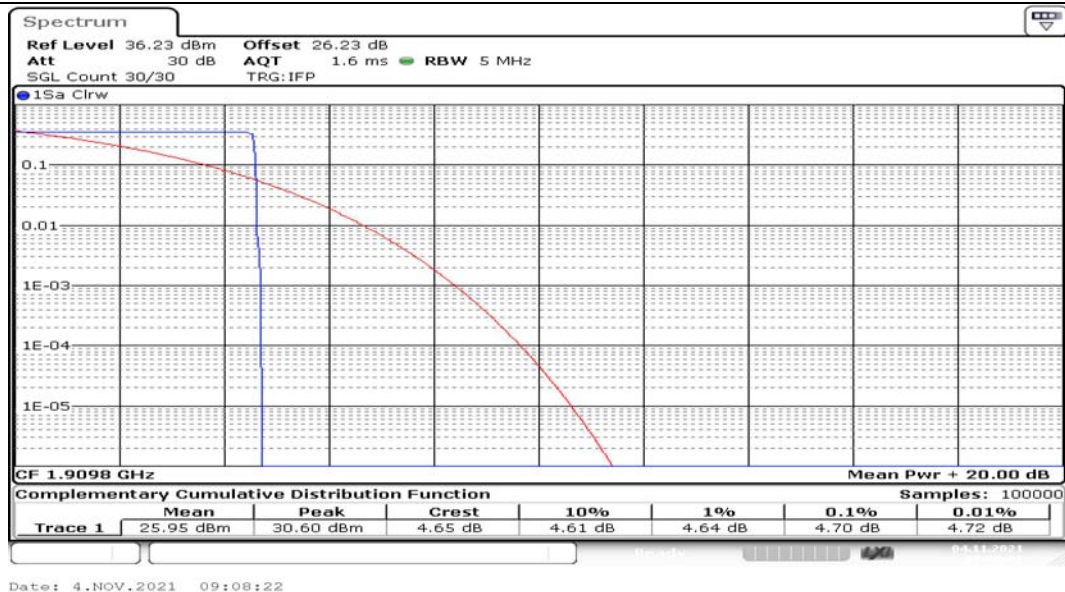
EGPRS (8PSK) MODE:



Channel 512



Channel 661



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	31.31	30.73	1.183
1880	661	30.87	30.29	1.069
1909.8	810	31.27	30.69	1.172

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
1850.2	512	4Down1Up	31.76	31.18	1.312
1880	661		31.63	31.05	1.274
1909.8	810		32.07	31.49	1.409
1850.2	512	3Down2Up	29.50	28.92	0.780
1880	661		29.37	28.79	0.757
1909.8	810		29.66	29.08	0.809
1850.2	512	2Down3Up	27.95	27.37	0.546
1880	661		27.83	27.25	0.531
1909.8	810		28.11	27.53	0.566
1850.2	512	1Down4Up	25.85	25.27	0.337
1880	661		25.74	25.16	0.328
1909.8	810		25.97	25.39	0.346

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
1850.2	512	4Down1Up	30.78	30.20	1.047
1880	661		30.60	30.02	1.005
1909.8	810		31.06	30.48	1.117
1850.2	512	3Down2Up	29.60	29.02	0.798
1880	661		29.40	28.82	0.762
1909.8	810		29.74	29.16	0.824
1850.2	512	2Down3Up	28.14	27.56	0.570
1880	661		27.94	27.36	0.545
1909.8	810		28.26	27.68	0.586
1850.2	512	1Down4Up	26.18	25.60	0.363
1880	661		26.00	25.42	0.348
1909.8	810		26.27	25.69	0.371

Secondary Supply

1. RF Power Output

GSM850

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	4Down1Up	32.26
836.4	189		32.94
848.8	251		32.47
824.2	128	3Down2Up	32.34
836.4	189		30.55
848.8	251		30.30
824.2	128	2Down3Up	30.71
836.4	189		28.82
848.8	251		29.10
824.2	128	1Down4Up	28.16
836.4	189		26.60
848.8	251		27.31

2. Occupied Bandwidth

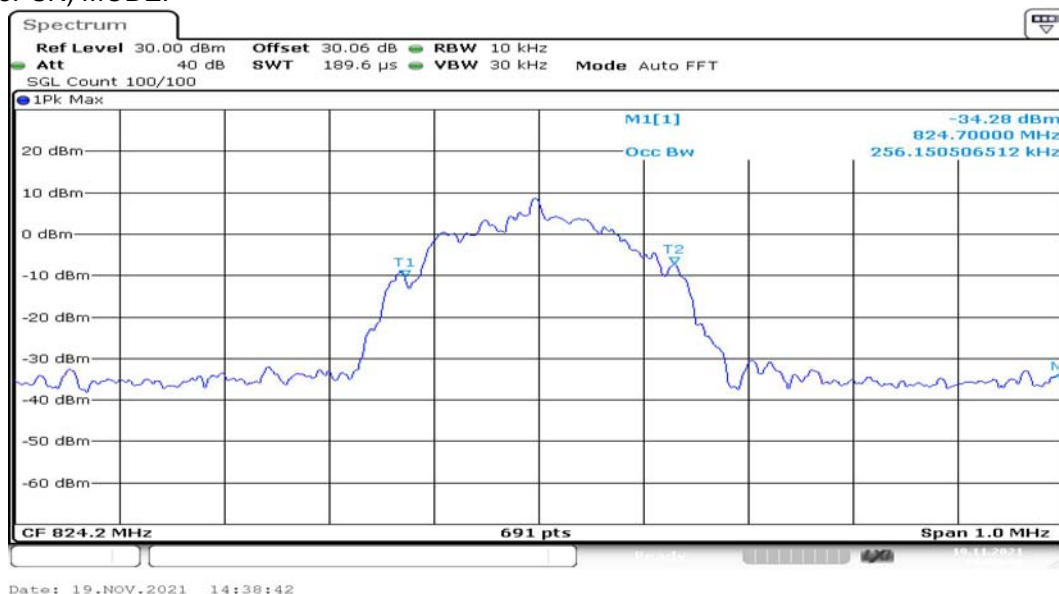
GSM850

EGPRS (8PSK) MODE:

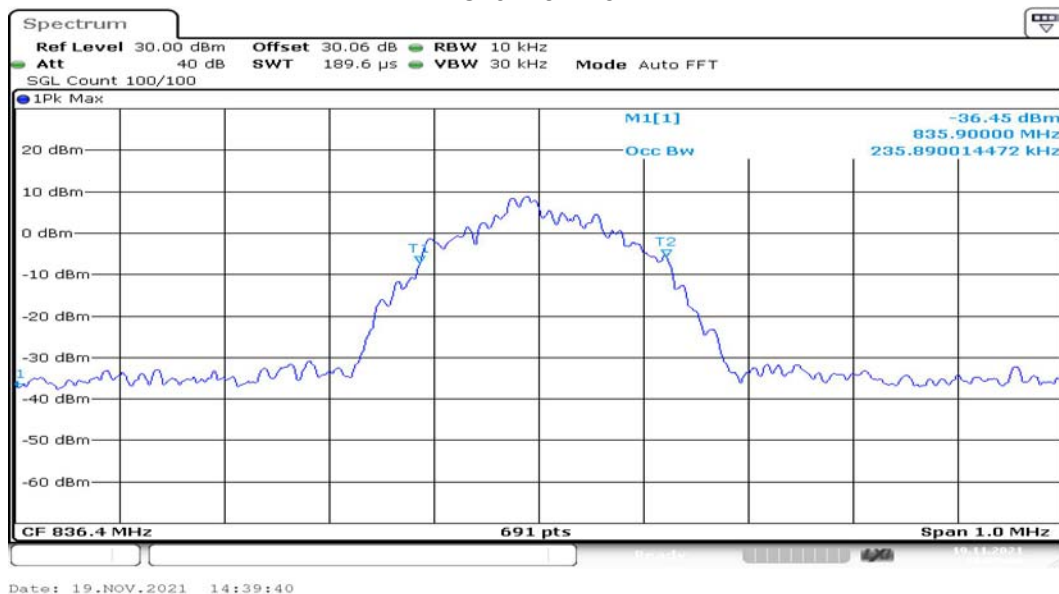
Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	256.15
836.4	189	235.89
848.8	251	248.91

GSM850

EGPRS (8PSK) MODE:



Channel 128



Channel 189



Date: 19.NOV.2021 14:40:18

Channel 251

3. Emission Bandwidth

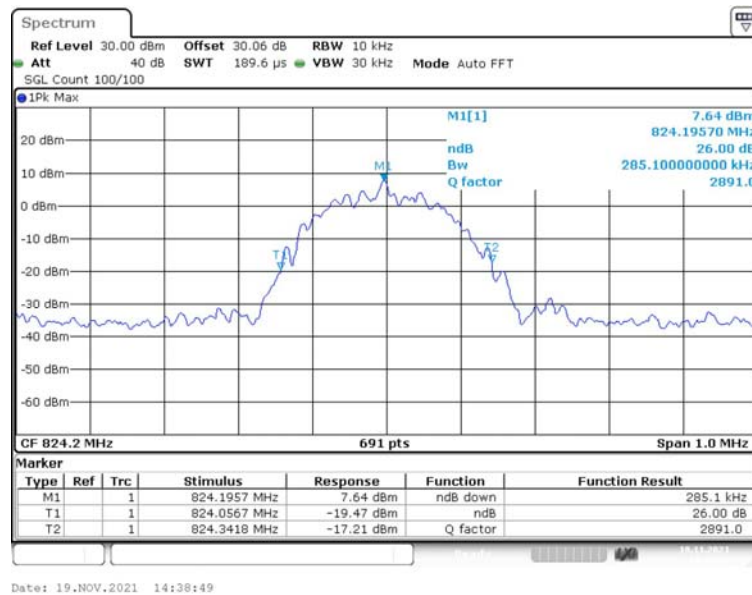
GSM850

EGPRS (8PSK) MODE:

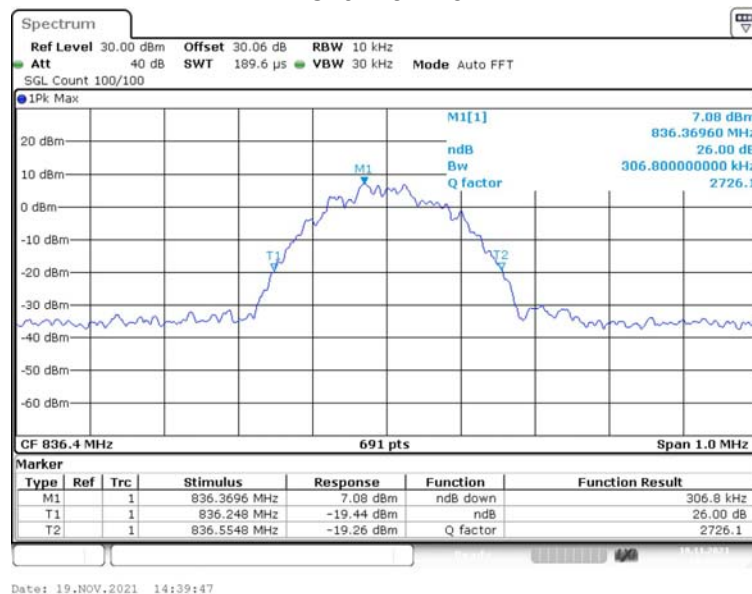
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power(kHz)
824.2	128	285.10
836.4	189	306.80
848.8	251	295.20

GSM850

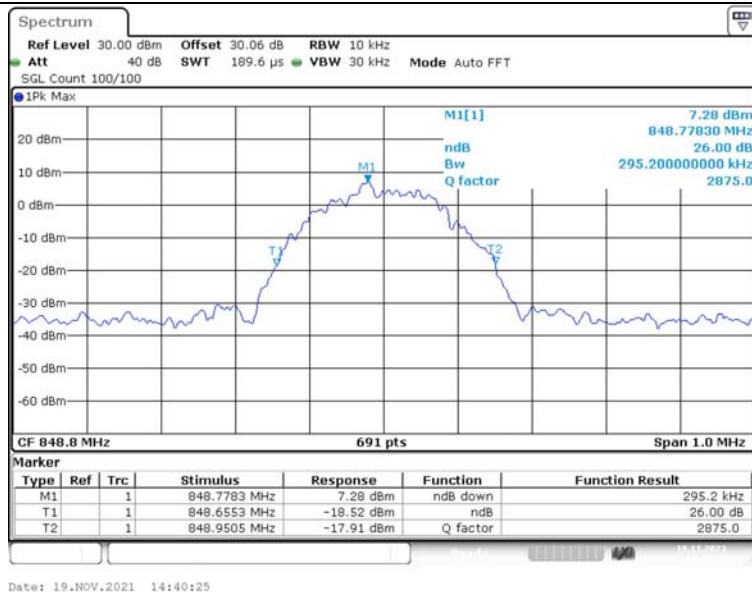
EGPRS (8PSK) MODE:



Channel 128



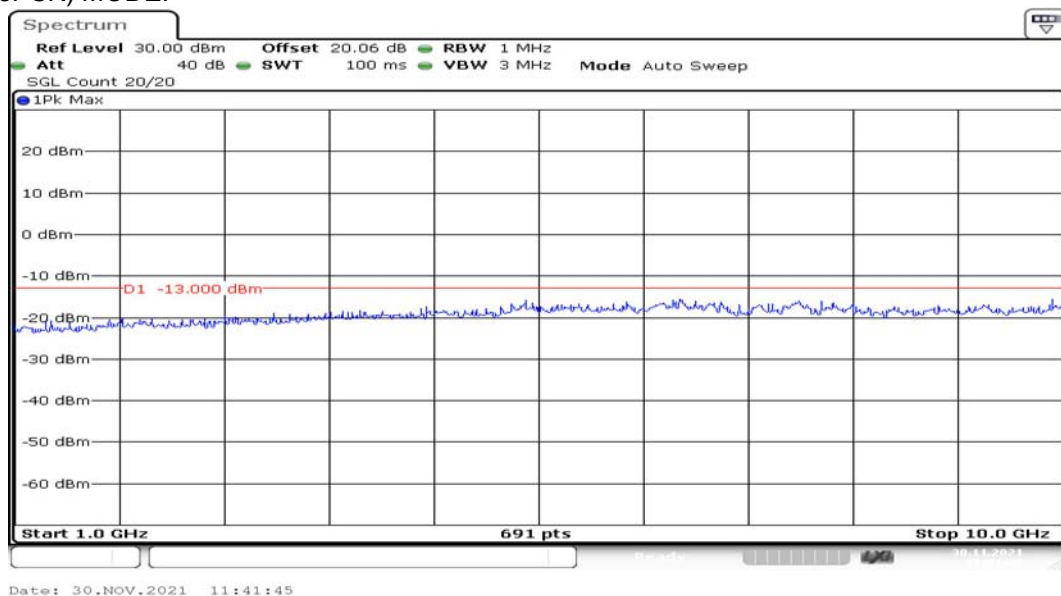
Channel 189



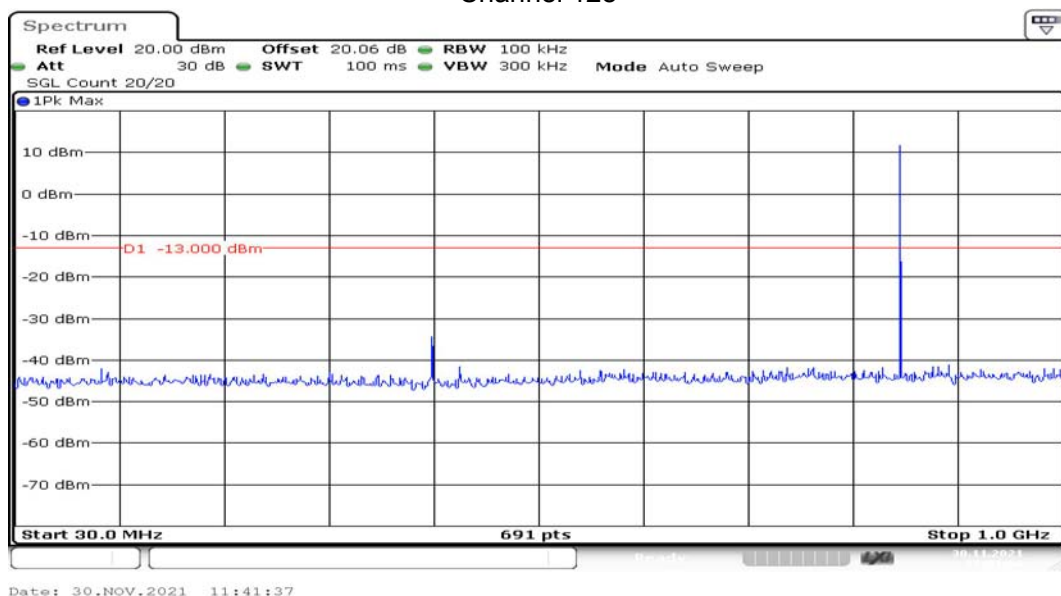
Channel 251

4. Spurious Emissions at antenna terminal GSM850

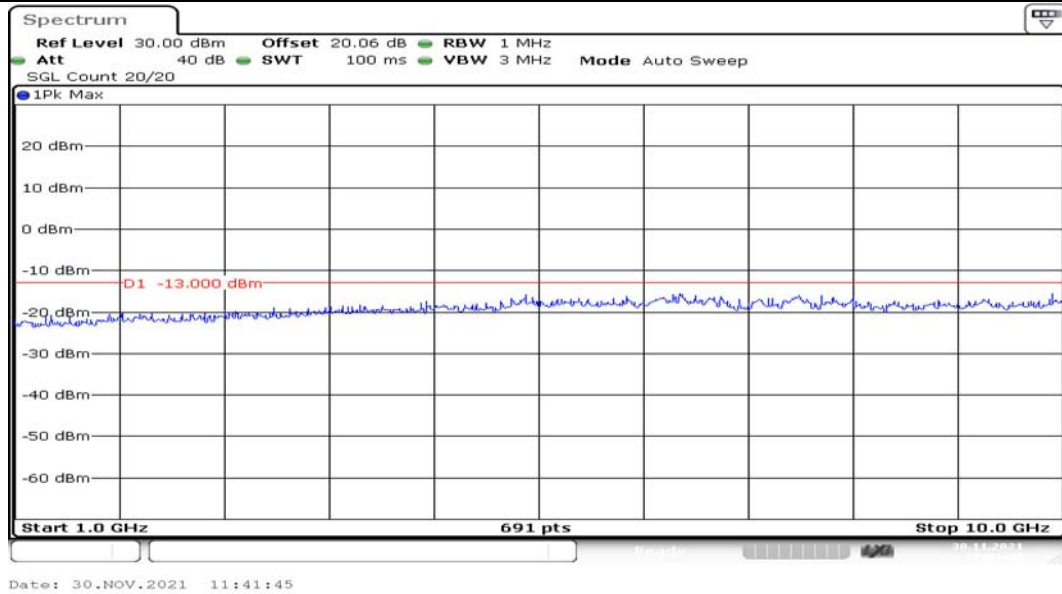
EGPRS (8PSK) MODE:



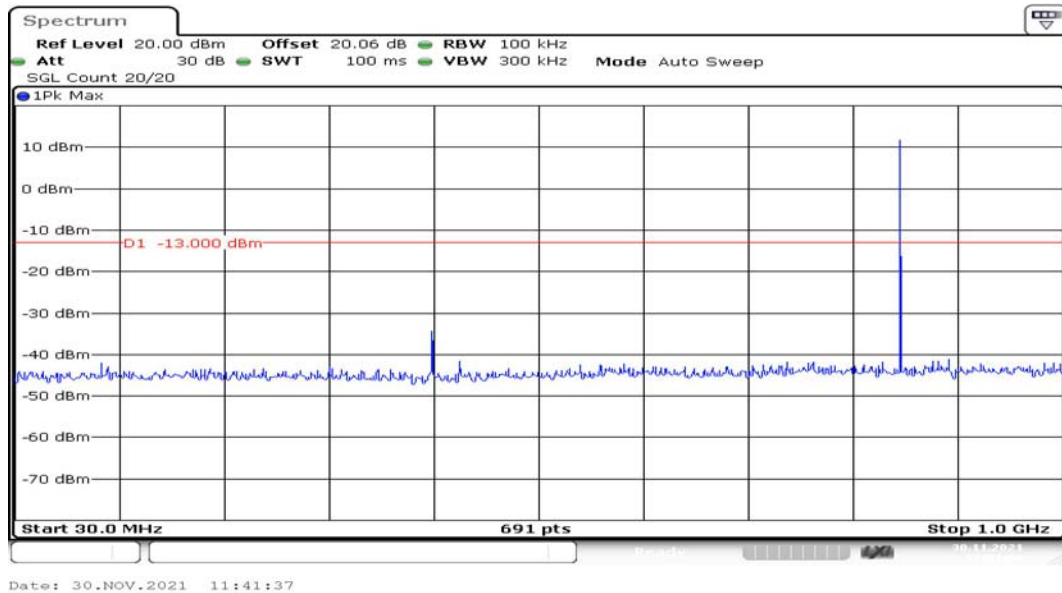
Channel 128



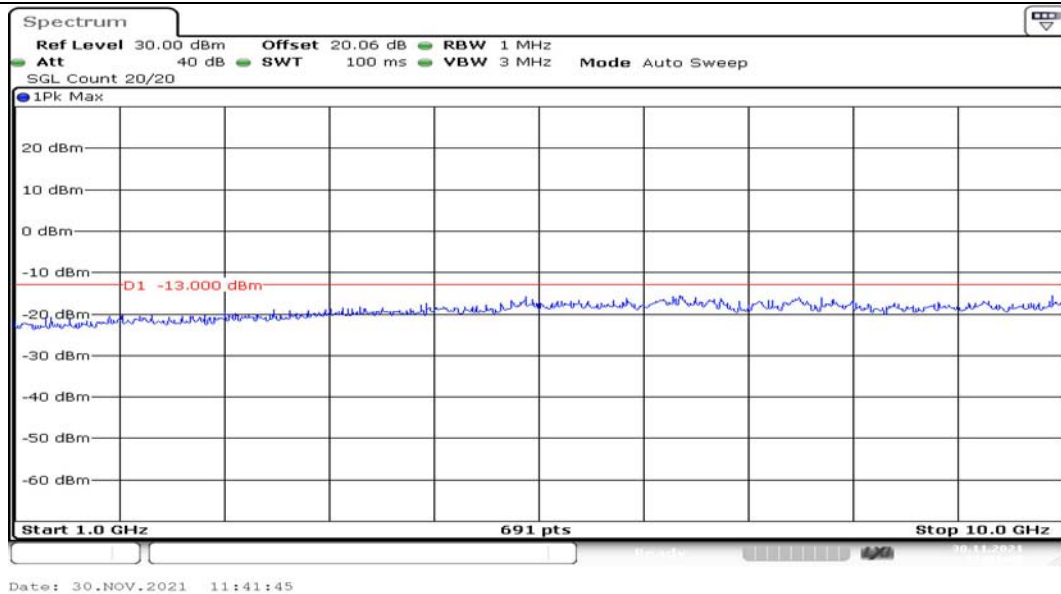
Channel 128



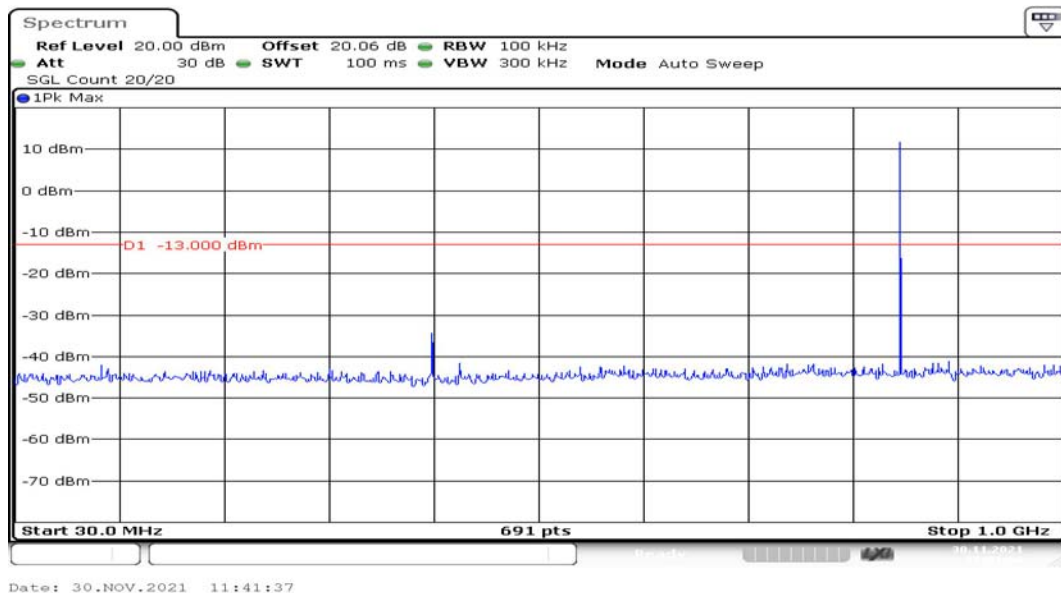
Channel 189



Channel 189



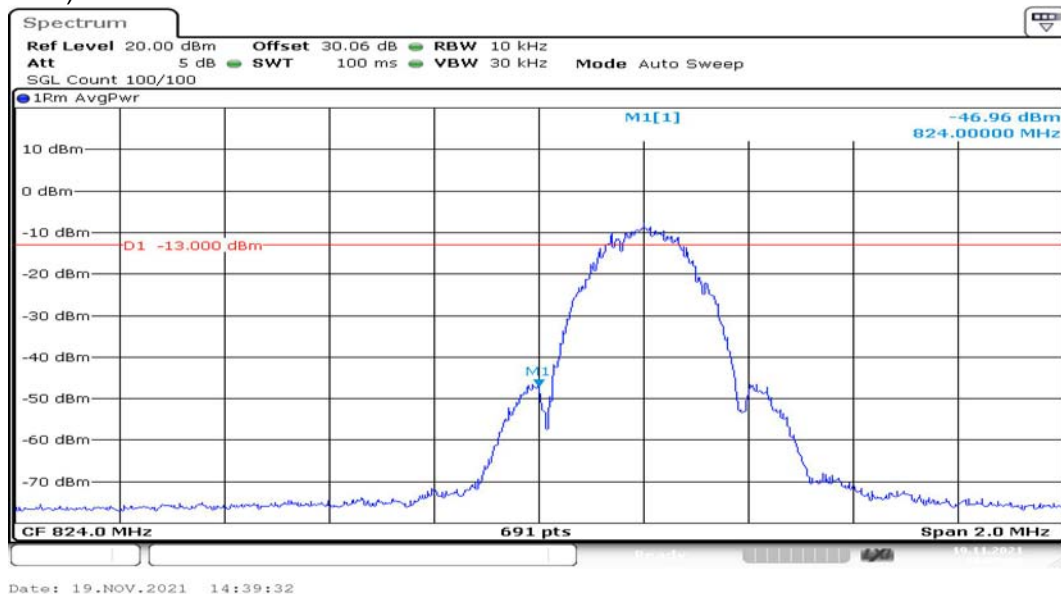
Channel 251



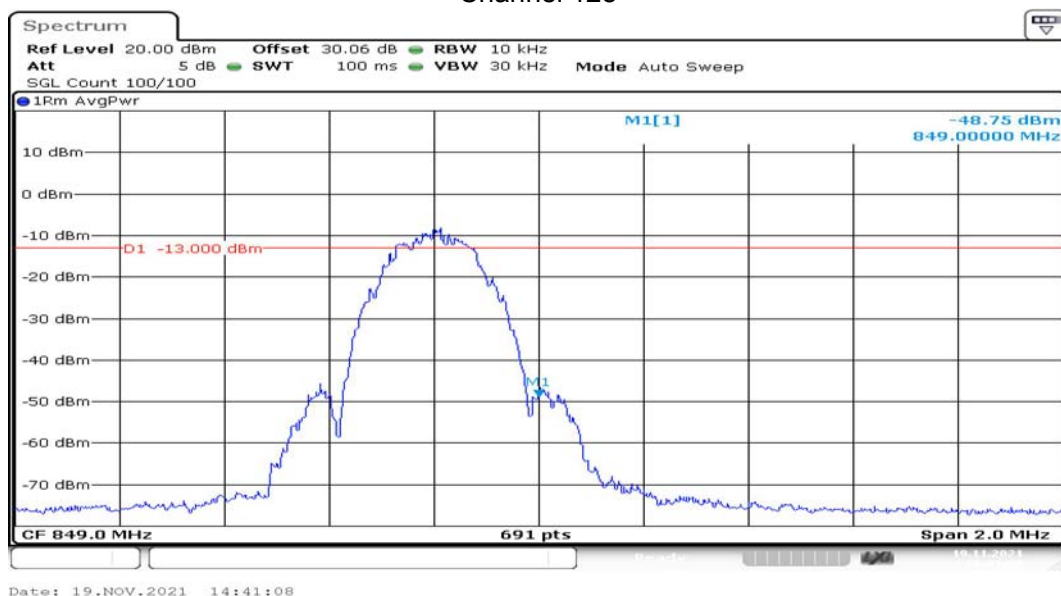
Channel 251

5. Band Edges Compliance GSM850

EGPRS (8PSK) MODE:



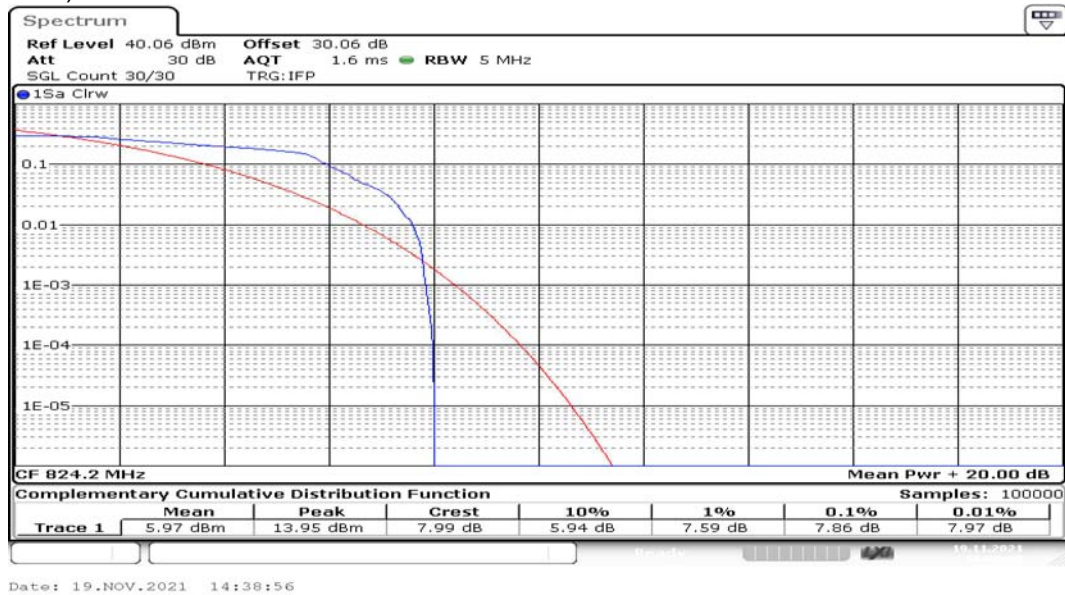
Channel 128



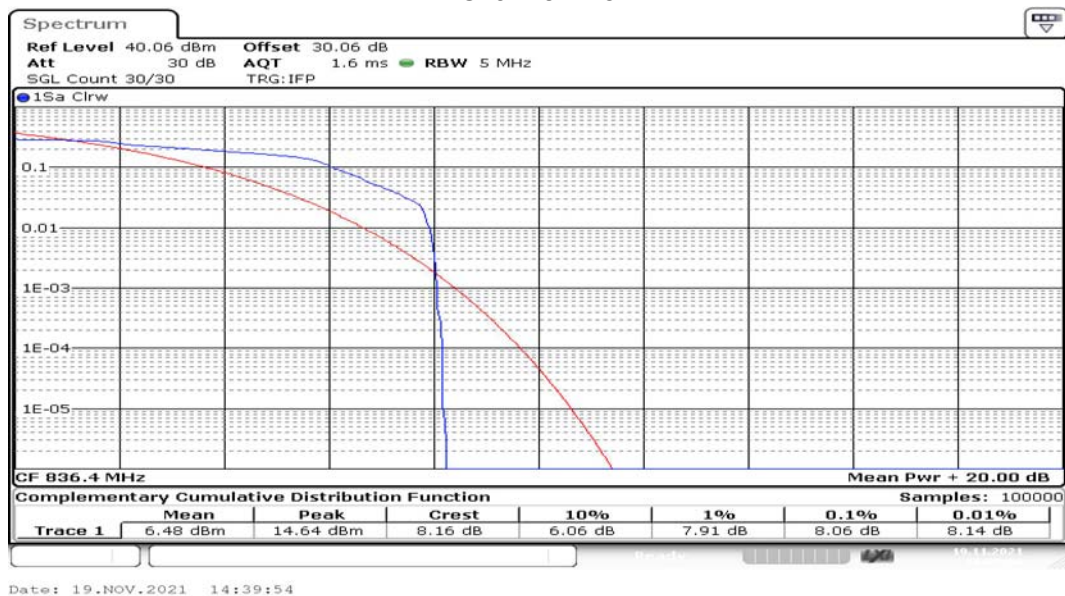
Channel 251

6. Peak-Average Ratio GSM850

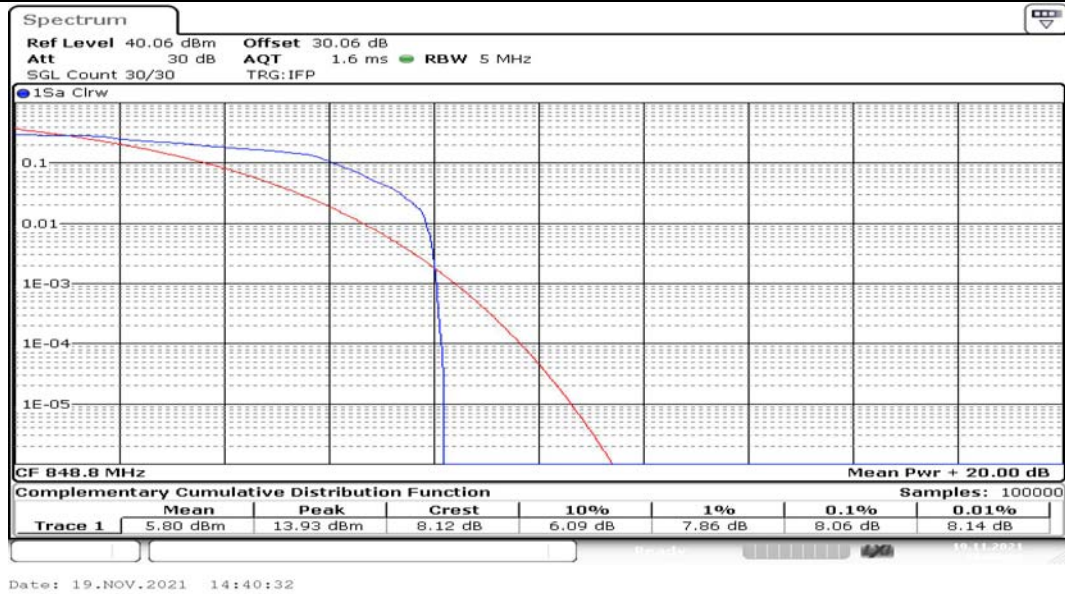
EGPRS (8PSK) MODE:



Channel 128



Channel 189



Channel 251

7. Effective Radiated Power and Effective Isotropic Radiated Power

GSM850

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	4Down1Up	32.26	29.07	0.807
836.4	189		32.94	29.75	0.944
848.8	251		32.47	29.28	0.847
824.2	128	3Down2Up	32.34	29.15	0.822
836.4	189		30.55	27.36	0.545
848.8	251		30.30	27.11	0.514
824.2	128	2Down3Up	30.71	27.52	0.565
836.4	189		28.82	25.63	0.366
848.8	251		29.10	25.91	0.390
824.2	128	1Down4Up	28.16	24.97	0.314
836.4	189		26.60	23.41	0.219
848.8	251		27.31	24.12	0.258

APPENDIX B – TEST DATA OF RADIATED EMISSION

Radiated Spurious Emissions

850 Test result:

GSM/GPRS MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1647.54	-52.03	-13	Vertical
1666.46	-52.02	-13	Vertical
2535.72	-43.65	-13	Vertical
2574.89	-43.47	-13	Vertical
8962.11	-39.69	-13	Vertical
9971.18	-35.77	-13	Vertical

EDGE (8PSK) MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1647.40	-52.58	-13	Vertical
1664.63	-51.29	-13	Vertical
2535.59	-43.93	-13	Vertical
2574.96	-43.27	-13	Horizontal
8964.56	-40.12	-13	Vertical
9968.73	-35.34	-13	Vertical

GSM/GPRS MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1650.44	-52.78	-13	Vertical
1667.35	-51.72	-13	Vertical
2532.31	-43.73	-13	Horizontal
2575.06	-43.55	-13	Vertical
8964.45	-39.59	-13	Vertical
9968.52	-35.77	-13	Vertical

EDGE (8PSK) MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.55	-52.80	-13	Vertical
1665.92	-51.78	-13	Vertical
2533.47	-43.65	-13	Vertical
2576.79	-43.49	-13	Vertical
8963.88	-40.08	-13	Horizontal
9967.91	-36.05	-13	Vertical

GSM/GPRS MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1650.65	-52.19	-13	Vertical
1665.88	-51.68	-13	Vertical
2534.01	-43.70	-13	Vertical
2574.40	-43.38	-13	Horizontal
8965.11	-40.10	-13	Vertical
9969.88	-36.14	-13	Vertical

EDGE (8PSK) MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1650.73	-52.00	-13	Vertical
1666.07	-51.49	-13	Horizontal
2533.27	-43.85	-13	Vertical
2576.33	-43.31	-13	Vertical
8964.15	-39.89	-13	Vertical
9968.58	-35.65	-13	Vertical

1900 Test result:

GSM/GPRS MODE Channel 512

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2452.97	-52.67	-13	Vertical
2780.99	-52.25	-13	Vertical
3727.81	-44.20	-13	Vertical
6677.79	-43.57	-13	Vertical
9964.01	-39.68	-13	Vertical
17821.37	-36.04	-13	Vertical

EDGE (8PSK) MODE Channel 512:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2454.06	-52.31	-13	Vertical
2778.73	-51.66	-13	Vertical
3727.65	-44.11	-13	Vertical
6677.47	-43.50	-13	Horizontal
9961.28	-40.11	-13	Vertical
17823.71	-35.63	-13	Vertical

GSM/GPRS MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2454.58	-53.20	-13	Vertical
2780.33	-51.45	-13	Vertical
3728.91	-43.43	-13	Vertical
6676.67	-43.76	-13	Vertical
9962.59	-40.28	-13	Horizontal
17824.23	-35.47	-13	Vertical

EDGE (8PSK) MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2453.55	-53.04	-13	Vertical
2781.74	-51.96	-13	Vertical
3729.59	-43.67	-13	Horizontal
6678.02	-43.35	-13	Vertical
9962.00	-39.60	-13	Vertical
17820.75	-35.22	-13	Vertical

GSM/GPRS MODE Channel 810:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2455.10	-52.83	-13	Vertical
2781.83	-51.98	-13	Vertical
3728.79	-43.96	-13	Horizontal
6676.72	-43.12	-13	Horizontal
9961.67	-39.79	-13	Vertical
17821.50	-36.00	-13	Vertical

EDGE (8PSK) MODE Channel 810:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2453.13	-53.01	-13	Vertical
2781.91	-52.16	-13	Vertical
3728.04	-43.58	-13	Vertical
6680.03	-43.69	-13	Vertical
9962.99	-39.72	-13	Horizontal
17823.54	-36.12	-13	Vertical

---End of Test Report---