TEST REPORT FOR GSM TESTING

Report No.: PBJ-NQN2411050112RF01

Product Name: Smart Phone

Brand Name: SHARP

Applicant: SHARP CORPORATION

Manufacturer: SHARP CORPORATION

Specification: FCC Part 24E, Part 22H, Part 2 (2023)

FCC ID: APYHRO00333

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Simon Wang Date: Sep. 14, 2024	Luke Lu Date: Sep. 14, 2024

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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 BV 7Layers Communications Technology (Shenzhen) Co., Ltd. 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:	BV 7Layers Communications Technology (Shenzhen) Co., Ltd
Address:	Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District Shenzhen, Guangdong, People's Republic of China
City:	Shenzhen
Country or Region:	P.R.China
Tel:	+86 755 8869 6566
Fax:	+86 755 8869 6577
Email:	customerservice.sw@bureauveritas.com
Designation Number:	CN1171
Registration number:	525120

1.3 Applicant's details

Company:	SHARP CORPORATION
Address:	1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan
City:	Osaka
Country or Region:	Japan
Contacted person:	Mr. Taihei Ohtsuka

1.4 Manufacturer's details

Company:	SHARP CORPORATION
Address:	1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan
City:	Osaka
Country or Region:	Japan
Contacted person:	Mr. Taihei Ohtsuka

1.5 Test Environment

Date of Receipt of test sample:	2024/8/12
Testing Start Date:	2024/8/13
Testing End Date:	2024/9/14

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40
Maximum Extreme	55	---
Minimum Extreme	-10	---

Normal Supply Voltage (V d.c.):	4.0
Maximum Extreme Supply Voltage (V d.c.):	4.3
Minimum Extreme Supply Voltage (V d.c.):	3.7

2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1Final Equipment Build Status

Frequency Range:	GSM850: Tx:824~849MHz Rx:869~894MHz PCS1900: Tx:1850~1910MHz Rx:1930~1990MHz
Modulation Type:	GSM/GPRS:GMSK
Duplex Mode:	FDD
Duplex Spacing:	GSM850:45MHz PCS1900:80MHz
Antenna Type:	PIFA
Antenna Gain:	GSM850: ANT3:-4.1dBi PCS1900: ANT2: -0.9dBi ERP = EIRP(Power+Gain) – 2.15 (dB)
Power Supply:	Battery/DC supply
Software Revision:	A718G
Hardware Revision:	DVT
IMEI:	Conducted: 004401231827789 Radiated: 004401231829678

2.2 Support Equipment

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

Equipment:	Li-Ion
Manufacturer:	ATL
Model Number:	UBATIA321AFN2

3 REFERENCE SPECIFICATION

Specification	Version	Title
FCC Part2	2023	Frequency allocations and radio treaty matters; general rules and regulations
FCC Part22	2023	Public mobile services
FCC Part24	2023	Personal communications services
ANSI C63.26	2015	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	Test Lab
1	RF Power Output	2.1046	Pass	A
2	Effective Radiated Power and Effective Isotropic Radiated Power	22.913(a)(5)/24.232(c)	Pass	A
3	Occupied Bandwidth	2.1049	Pass	A
4	Emission Bandwidth	2.1049	Pass	A
5	Spurious Emissions at antenna terminals	2.1051/22.917(a)/24.238(a)	Pass	A
6	Band Edges Compliance	2.1051/22.917(a)/24.238(a)	Pass	A
7	Frequency Stability	2.1055/22.355/24.235	Pass	A
8	Peak-Average Ratio	24.232(d)	Pass	A
9	Radiated Spurious Emissions	2.1053/22.917(a)/24.238(a)	Pass	A

Lab A:
BV 7Layers Communications Technology (Shenzhen) Co. Ltd
Lab Address:
Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District
Shenzhen, Guangdong, People's Republic of China
Accredited Test Lab Cert 3939.01

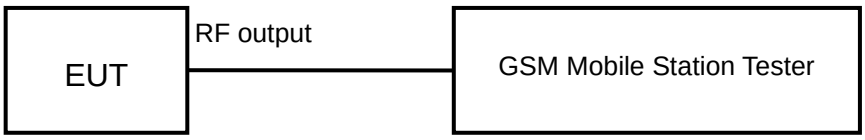
The FCC Site Registration No. is 525120; The Designation No. is CN1171.

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)

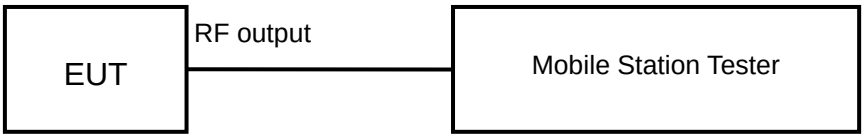
Limits: No specific conduct power requirements in part 2.1046.

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

Limits for PCS1900:

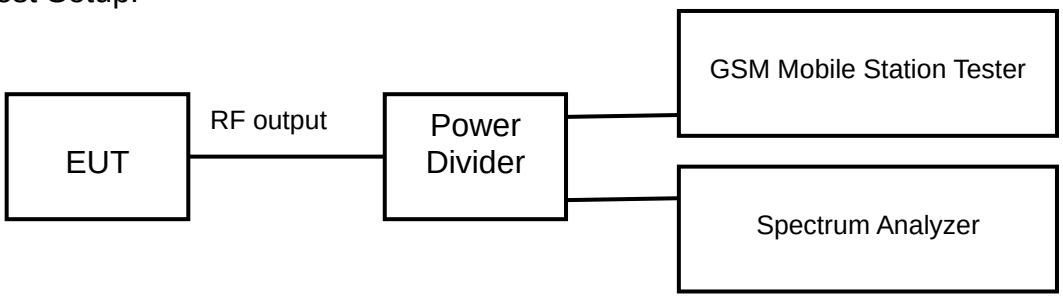
Operation Mode	Power Step	E.I.R.P. (dBm)
GSM	0	≤33
GPRS	3	≤33

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

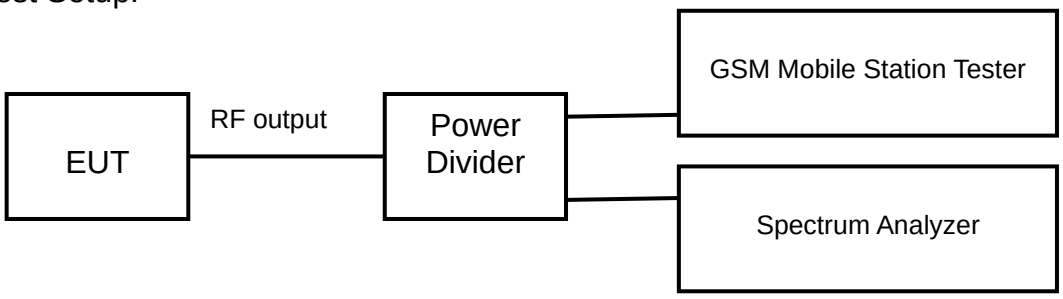
Limits: No specific occupied bandwidth requirements in part 2.1049

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

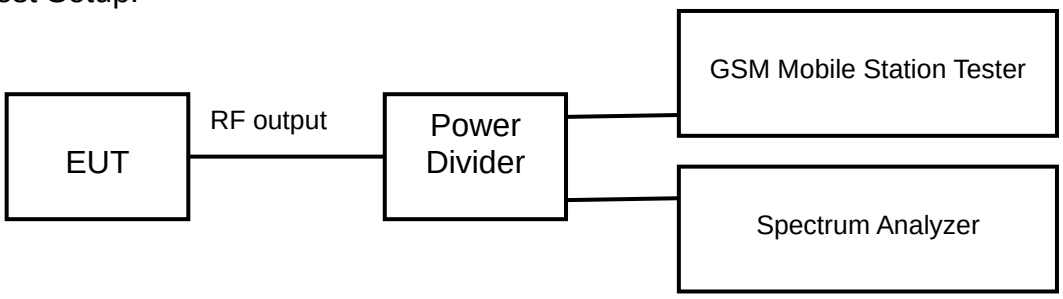
Limits: No specific occupied bandwidth requirements in part 2.1049

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

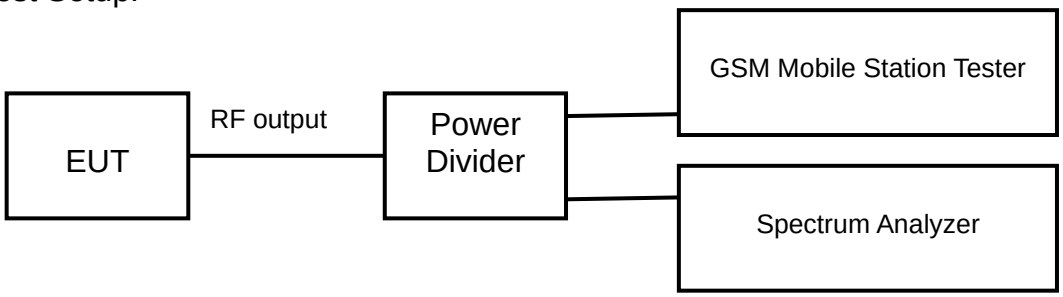
Limits:
The minimum permissible attenuation level of any spurious emission is $43+\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

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

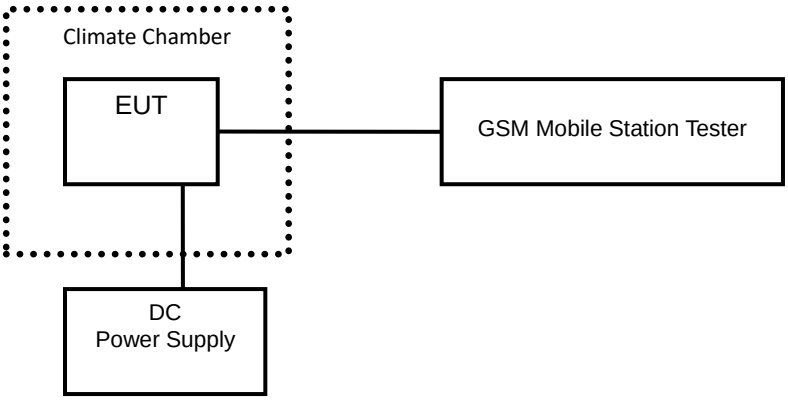
Limit: The minimum permissible attenuation level of any spurious emission is $43+\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

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.

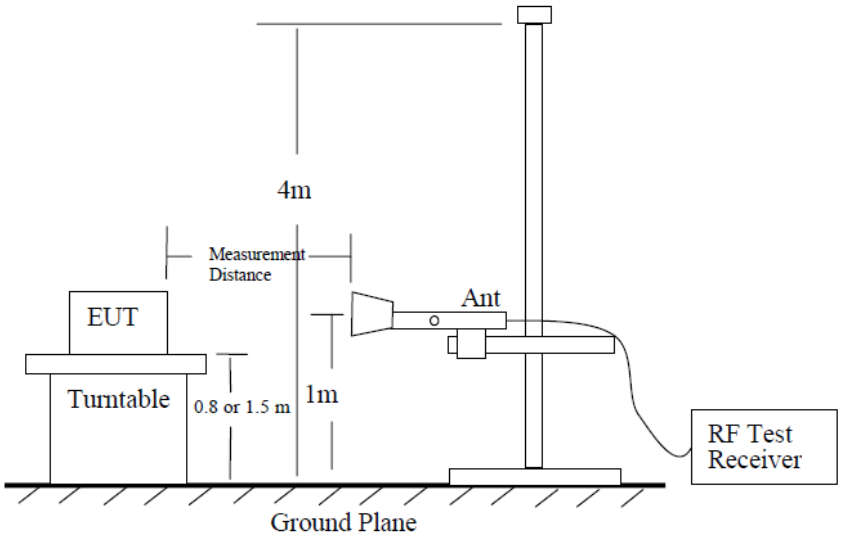
Limits: For Part 22, the frequency stability of the transmitter shall be maintained within±0.00025% (±2.5 ppm) of the center frequency. For Part 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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

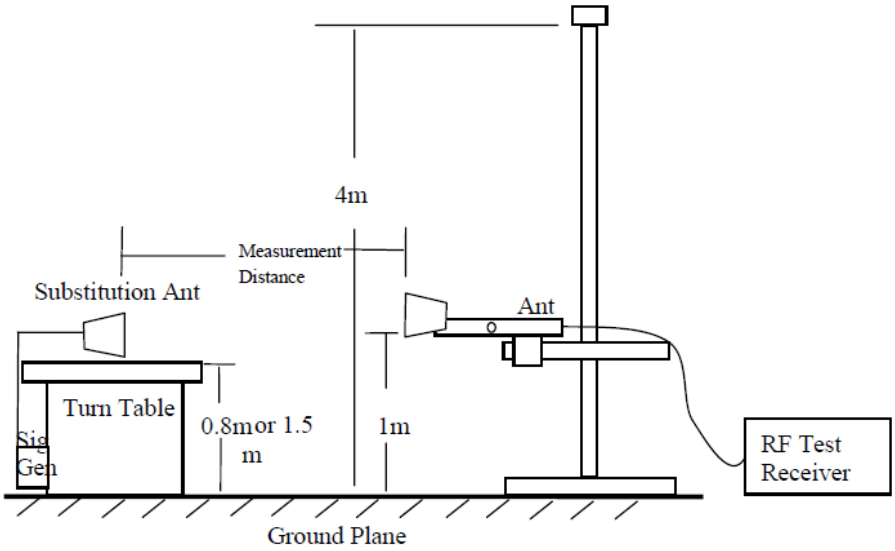
6.8 Radiated Spurious Emissions

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.

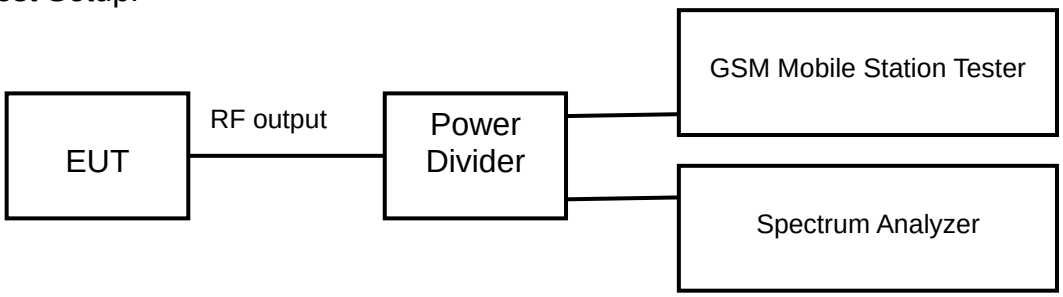
Test result:

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

Note 1: According to the test specification limit (The test results fully compliance with the test standard limit requirements)

Note 2: According to test specification limits plus uncertainties (The test results exceed the standard limit requirements and meet the standard requirements after adding the system uncertainty)

Note 3: Test operation mode is Note 1

8 TEST EQUIPMENTS

No.	Name/Model	Manufacturer	S/N	Calibration Date	Calibration Due Date
1	Mobile Station Tester / MT8820C	Anritsu	6201300660	2024.06.21	2025.06.20
2	Radio Communication Station / CMW500	R&S	161702	2024.06.21	2025.06.20
3	Spectrum Analyzer / FSV40	R&S	101065	2024.06.21	2025.06.20
4	Spectrum Analyzer / N9020A	Agilent	MY48010771	2024.03.06	2025.03.05
5	Power Divider / XQY-PS2-1/40-KE	XQY	202304170017	2024.06.21	2025.06.20
6	Switching box/CBOX-FULL	TSTPASS	SN5308466	2024.07.21	2025.07.20
7	DC Power Supply / E3645A	Agilent	MY40000741	2024.03.06	2025.03.05
8	Temperature chamber / SH241	ESPEC	92013758	2024.06.21	2025.06.20
9	Fully-Anechoic Chamber / 12.65m×8.03m×7.50m	FRANKONIA	-----	-----	-----
10	Semi-Anechoic/Chamber / 23.18m×16.88m×9.60m	FRANKONIA	---	-----	-----
11	Turn table Diameter:1m	FRANKONIA	-----	-----	-----
12	Turn table Diameter:5m	FRANKONIA	-----	-----	-----
13	Antenna master FAC(MA4.0)	MATURO	-----	-----	-----
14	Antenna master SAC(MA4.0)	MATURO	-----	-----	-----
15	Shielding room / 9.080m×5.255m×3.525m	FRANKONIA	-----	-----	-----
16	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100512	2024.06.21	2025.06.20
17	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100513	2024.06.21	2025.06.20
18	Ultra log antenna / HL562	R&S	100016	2024.06.21	2025.06.20
19	Receive antenna /3160-09	SCHWARZ-BECK	002058-002	2024.06.21	2025.06.20
20	EMI test receiver / ESI 40	R&S	100015	2024.06.21	2025.06.20
21	EMI test receiver / ESCS30	R&S	100029	2024.06.21	2025.06.20
22	Receive antenna / HL562	R&S	100167	2024.06.21	2025.06.20
23	AMN / ENV216	R&S	3560.6550.12	2024.06.21	2025.06.20
24	FCC auto test system / RT9100L-2	Radiosky	V1.05	/	/
25	EMI test software / EMC32	R&S	V10.20.01	/	/

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

GSM850

1 RF Power Output

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	32.57
836.6	190	32.83
848.8	251	32.81

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	1Down4Up	27.49
836.6	190	1Down4Up	27.74
848.8	251	1Down4Up	27.55
824.2	128	2Down3Up	28.39
836.6	190	2Down3Up	28.75
848.8	251	2Down3Up	28.58
824.2	128	3Down2Up	30.18
836.6	190	3Down2Up	30.62
848.8	251	3Down2Up	30.48
824.2	128	4Down1Up	32.56
836.6	190	4Down1Up	32.93
848.8	251	4Down1Up	32.88

2 Occupied Bandwidth

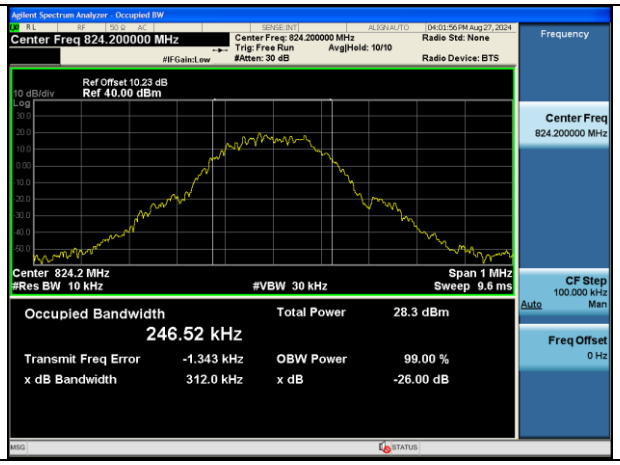
GSM MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	246.52
836.6	190	243.35
848.8	251	244.72

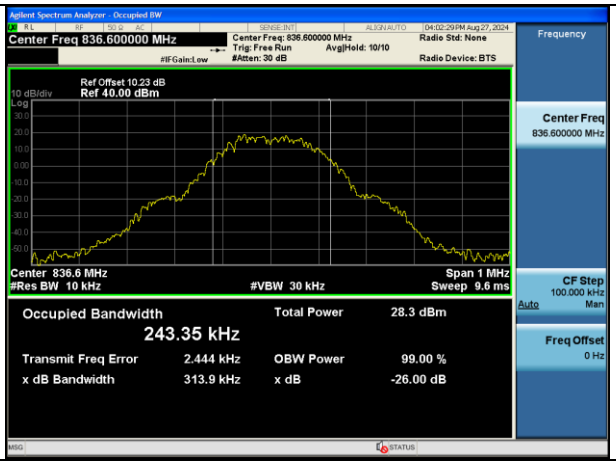
GPRS MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	243.98
836.6	190	245.06
848.8	251	247.13

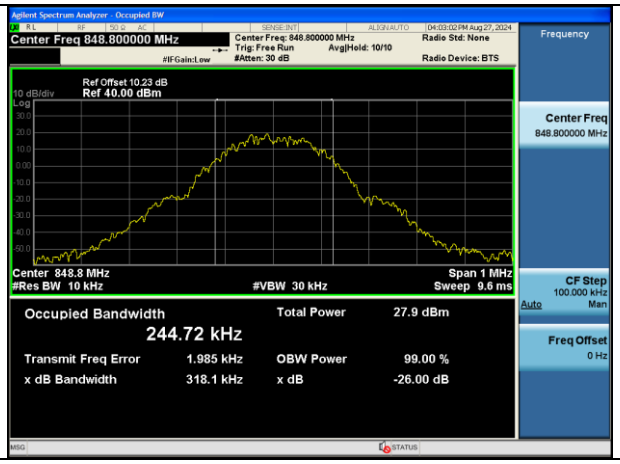
GSM MODE



Channel 128

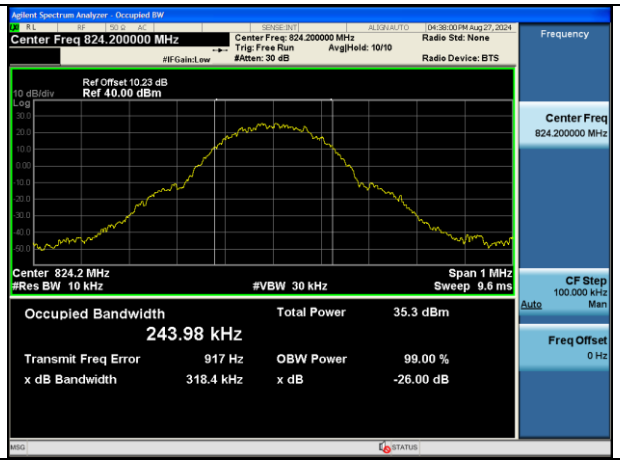


Channel 190

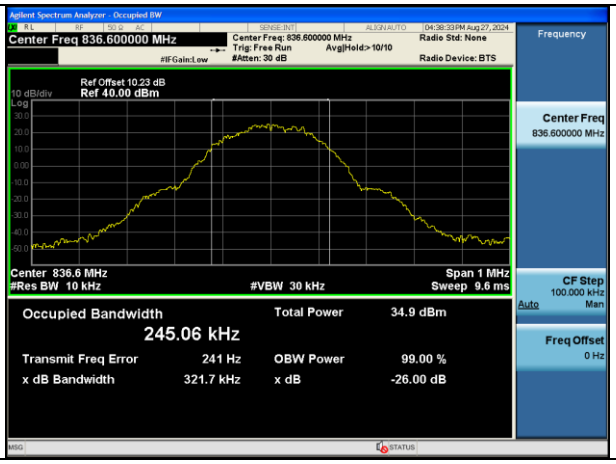


Channel 251

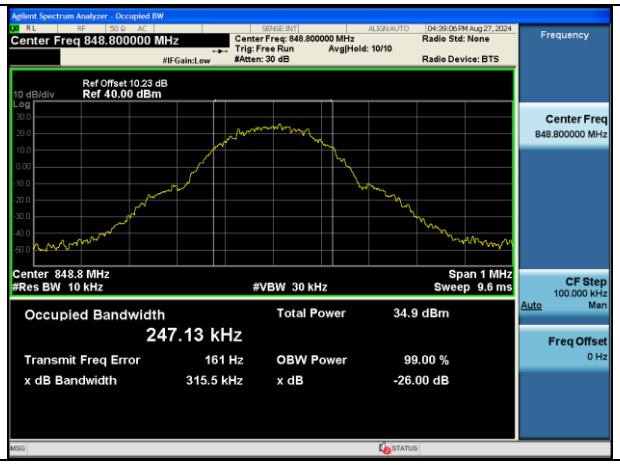
GPRS MODE



Channel 128



Channel 190



Channel 251

3 Emission Bandwidth

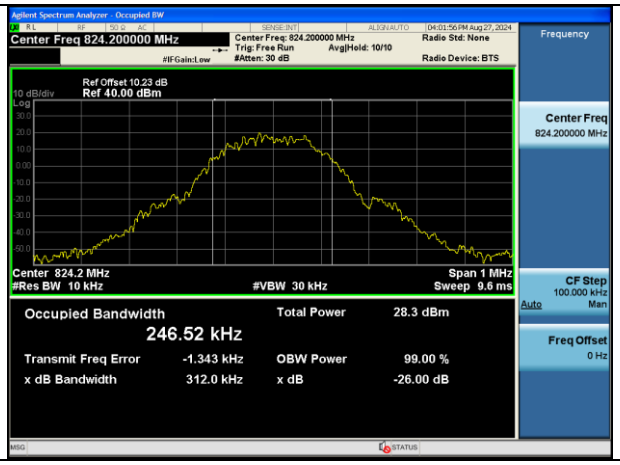
GSM MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
824.2	128	311.95
836.6	190	313.89
848.8	251	318.07

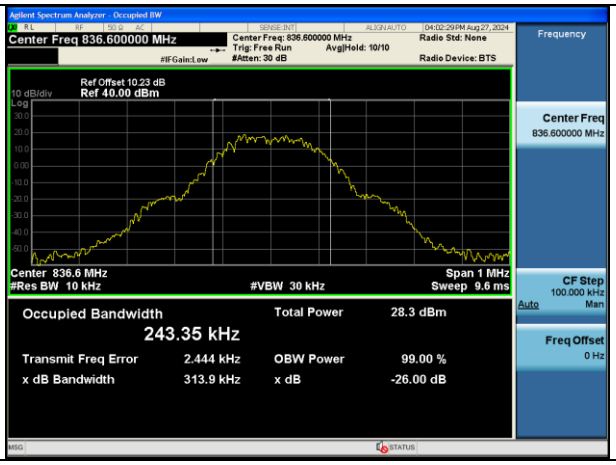
GPRS MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
824.2	128	318.39
836.6	190	321.73
848.8	251	315.49

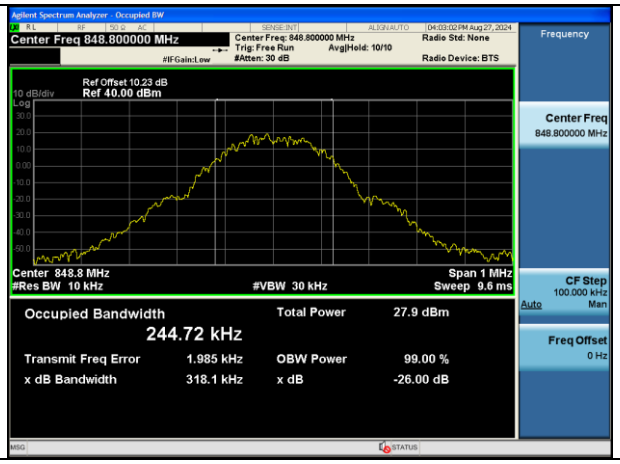
GSM MODE



Channel 128

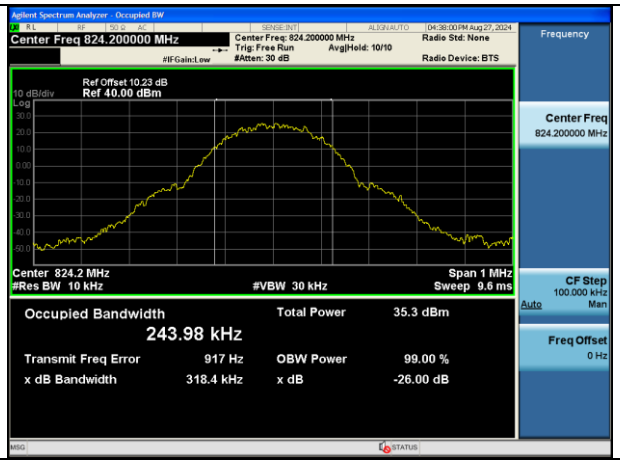


Channel 190

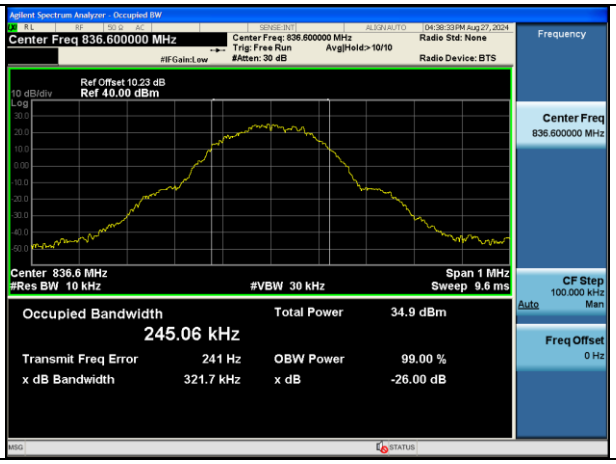


Channel 251

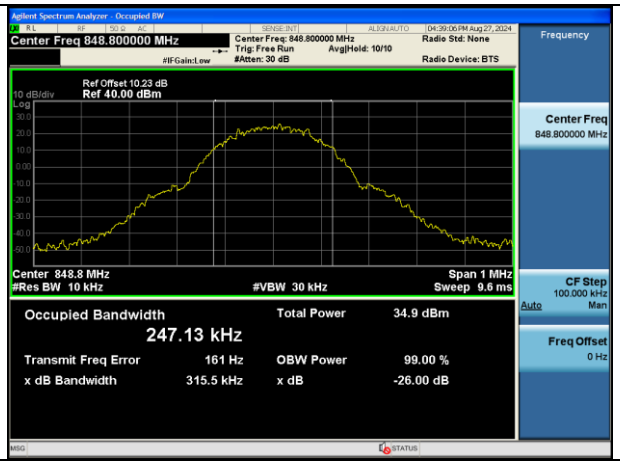
GPRS MODE



Channel 128



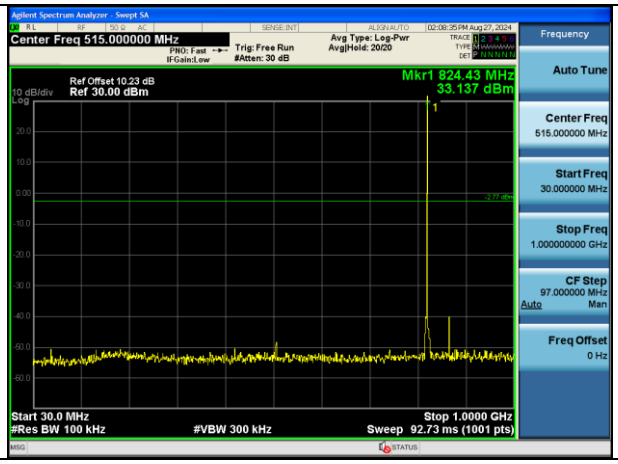
Channel 190



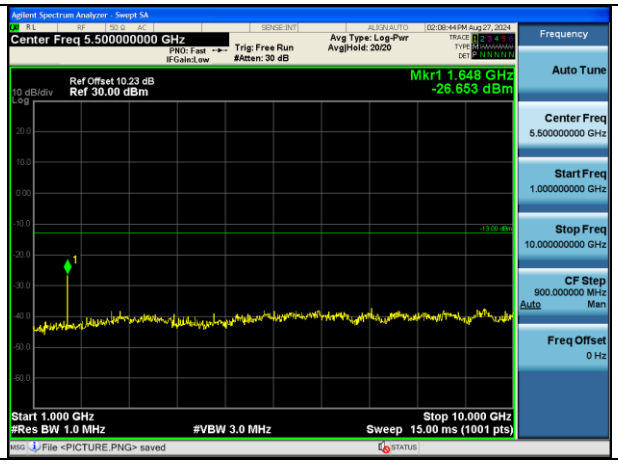
Channel 251

4 Spurious Emissions at antenna terminal

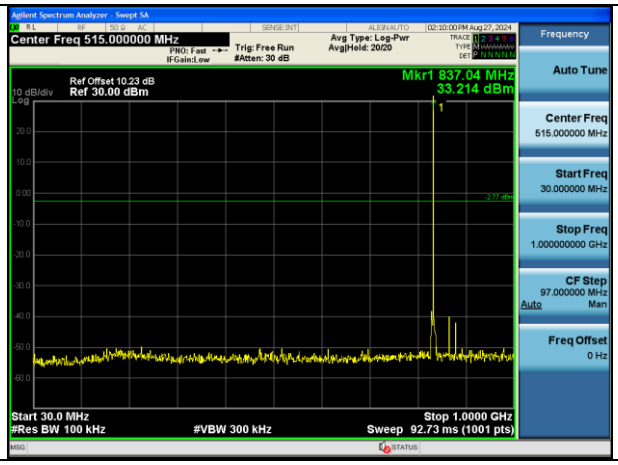
GSM MODE



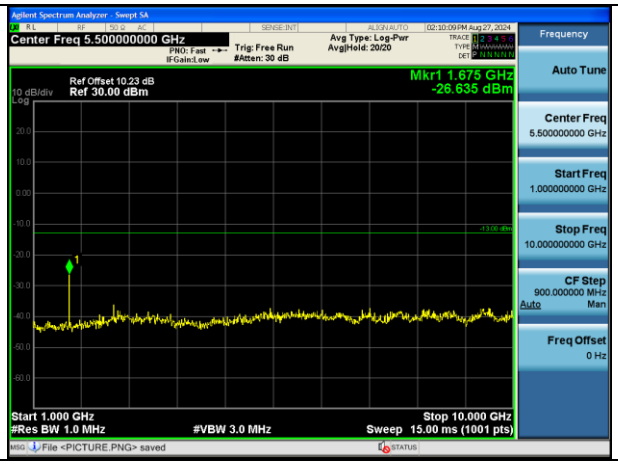
Channel 128



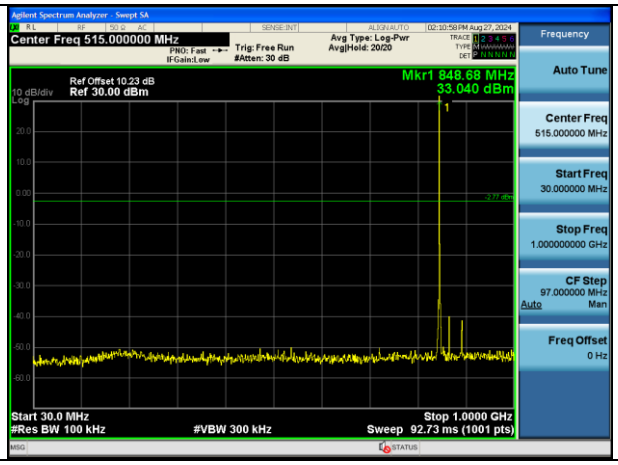
Channel 128



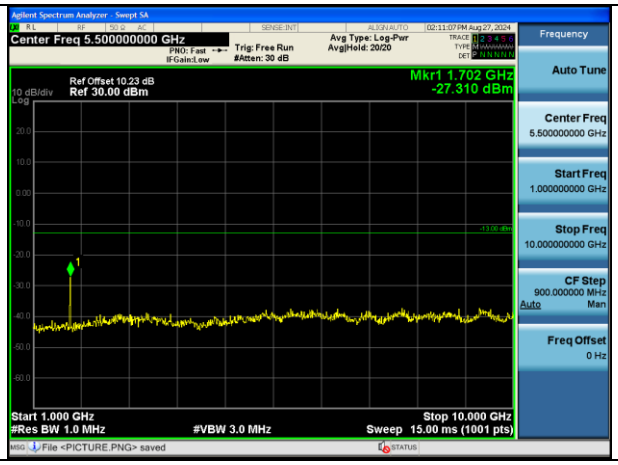
Channel 190



Channel 190

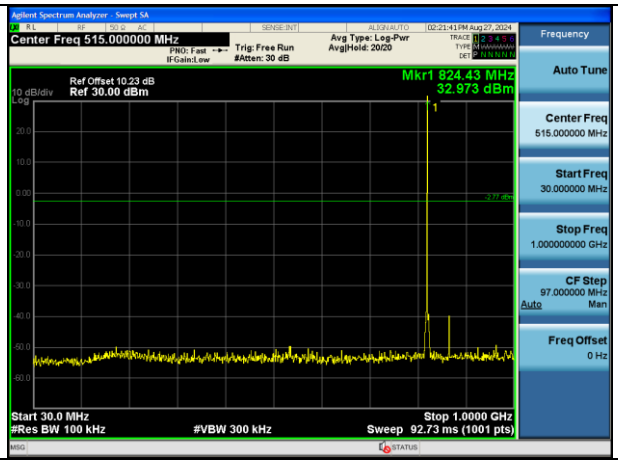


Channel 251



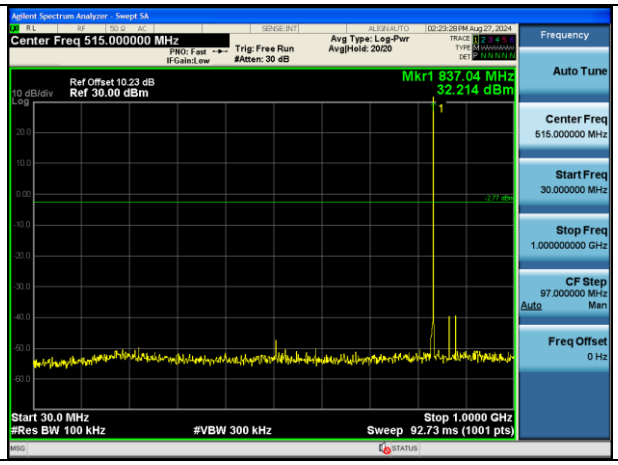
Channel 251

GPRS MODE

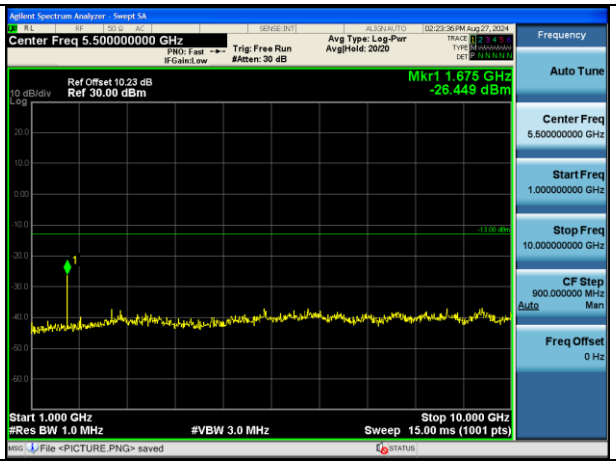


Channel 128

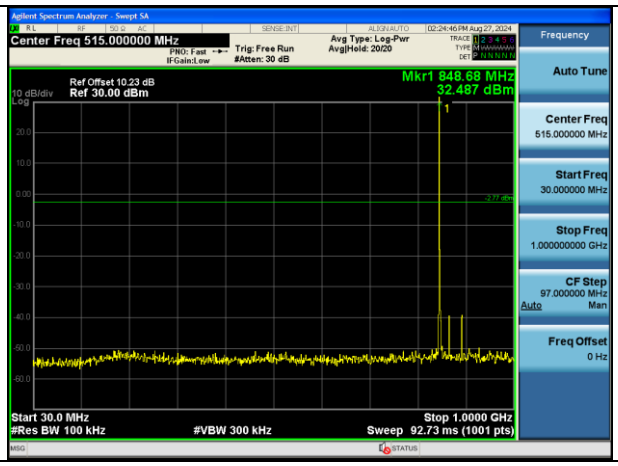
Channel 128



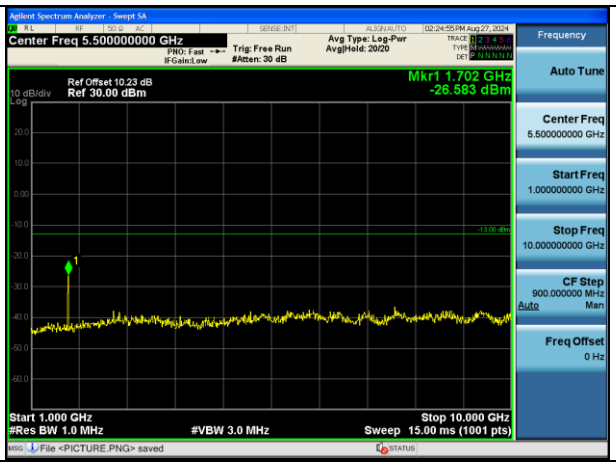
Channel 190



Channel 190



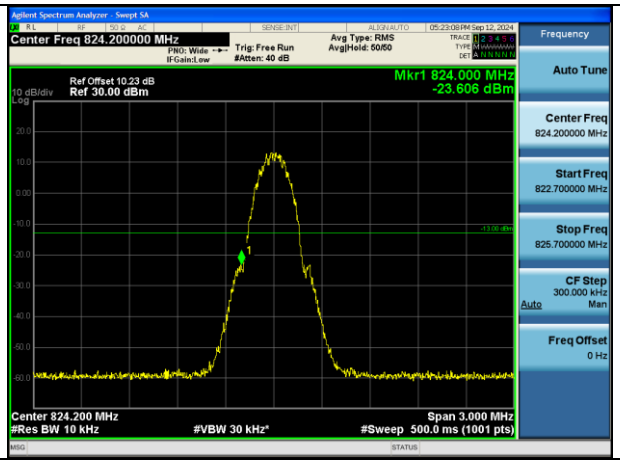
Channel 251



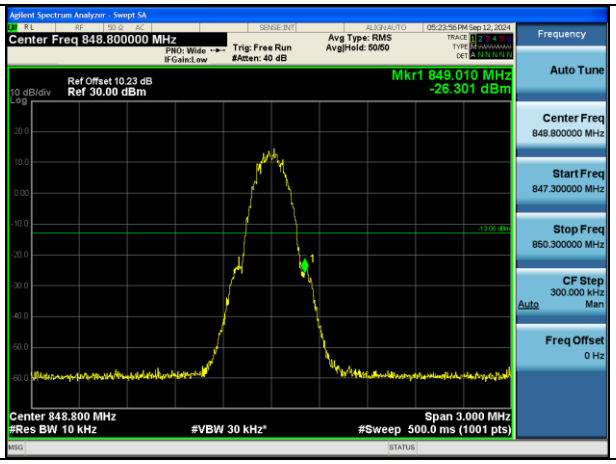
Channel 251

5 Band Edges Compliance

GSM MODE

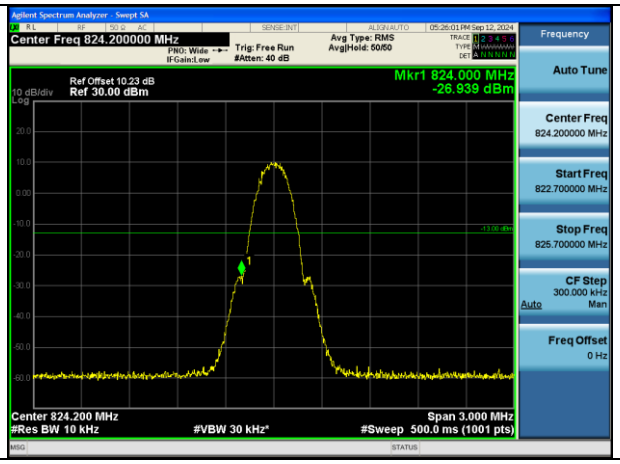


Channel 128

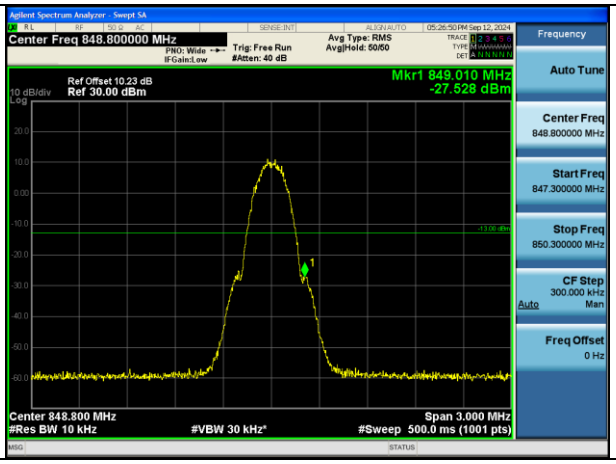


Channel 251

GPRS MODE



Channel 128



Channel 251

6 Frequency Stability

Test Mode: GSM MODE

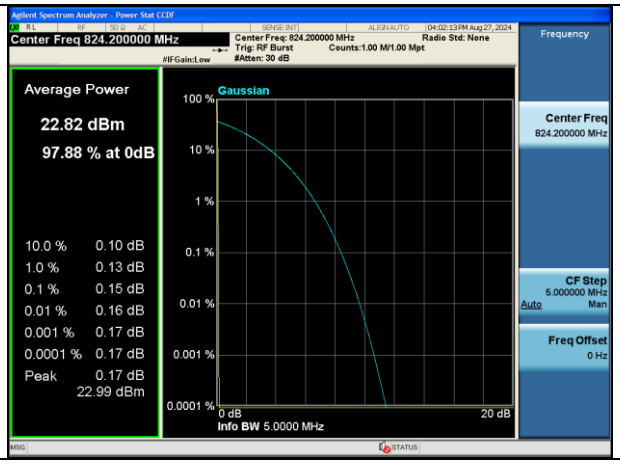
Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 190	Channel 251
-10	0.009	0.007	0.007
-0	0.009	0.010	0.012
+10	0.008	0.010	0.013
+20	0.010	0.013	0.014
+30	0.012	0.008	0.015
+40	0.015	0.011	0.015
+55	0.019	0.003	0.010
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 190	Channel 251
LV	0.010	0.010	0.013
HV	0.018	0.018	0.018

Test Mode: GPRS MODE

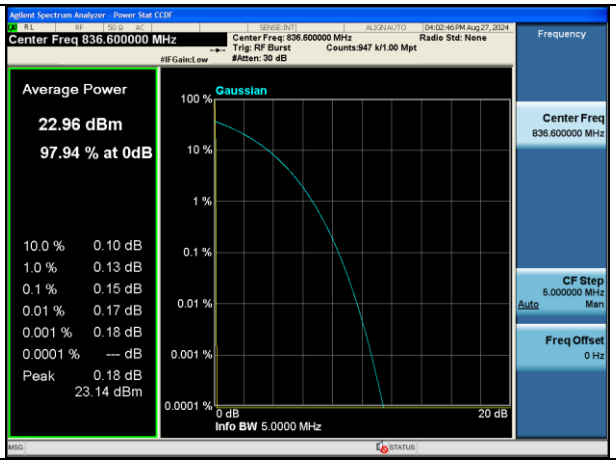
Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 190	Channel 251
-10	0.026	0.027	0.028
-0	0.027	0.026	0.027
+10	0.027	0.027	0.027
+20	0.027	0.026	0.026
+30	0.027	0.028	0.026
+40	0.027	0.028	0.027
+55	0.027	0.028	0.027
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 190	Channel 251
LV	0.027	0.027	0.026
HV	0.026	0.027	0.026

7 Peak-Average Ratio

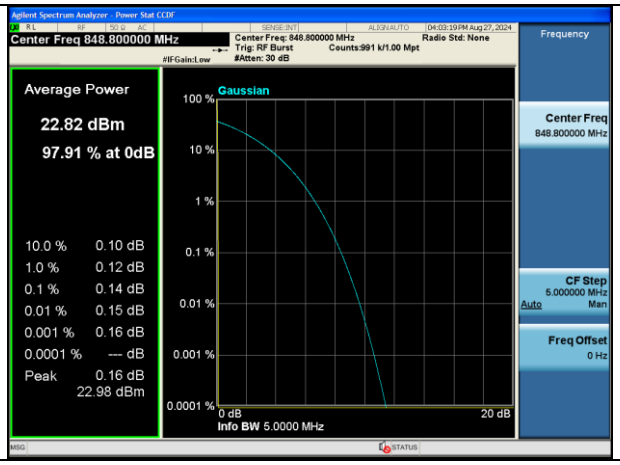
GSM MODE



Channel 128

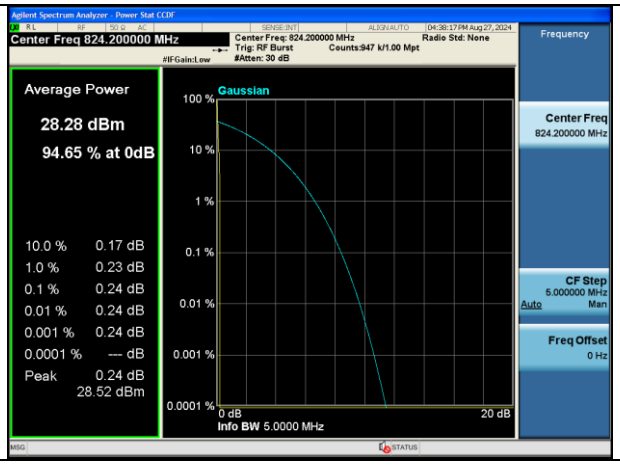


Channel 190

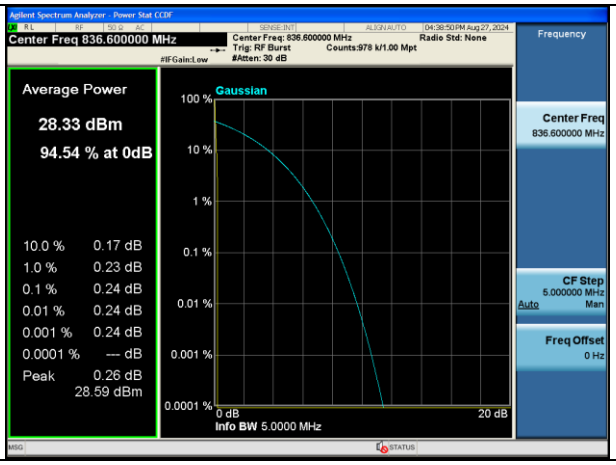


Channel 251

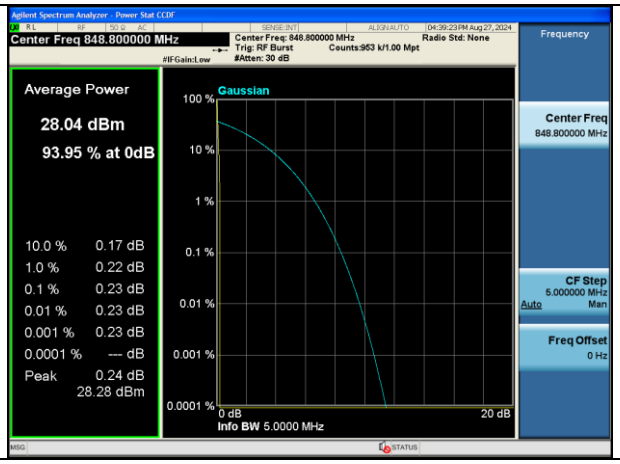
GPRS MODE



Channel 128



Channel 190

 Agilent Spectrum Analyzer - Power Stat CCDF Center Freq 848.800000 MHz Center Freq: 848.800000 MHz Trig: RF Burst #Atten: 30 dB Counts:953 k/1.00 Mpt Radio Std: None Frequency Average Power 28.04 dBm 93.95 % at 0dB 10.0 % 0.17 dB 1.0 % 0.22 dB 0.1 % 0.23 dB 0.01 % 0.23 dB 0.001 % 0.23 dB 0.0001 % --- dB Peak 0.24 dB 28.28 dBm Gaussian 100 % 10 % 1 % 0.1 % 0.01 % 0.001 % 0.0001 % 0 dB 20 dB Info BW 5.0000 MHz Center Freq 848.800000 MHz CF Step 5.000000 MHz Auto Man Freq Offset 0 Hz	
Channel 251	

8 Effective Radiated Power and Effective Isotropic Radiated Power

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	32.57	26.72	0.470
836.6	190	32.83	26.98	0.499
848.8	251	32.81	26.96	0.497

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
824.2	128	1Down4Up	27.49	21.64	0.146
836.6	190	1Down4Up	27.74	21.89	0.155
848.8	251	1Down4Up	27.55	21.70	0.148
824.2	128	2Down3Up	28.39	22.54	0.179
836.6	190	2Down3Up	28.75	22.90	0.195
848.8	251	2Down3Up	28.58	22.73	0.187
824.2	128	3Down2Up	30.18	24.33	0.271
836.6	190	3Down2Up	30.62	24.77	0.300
848.8	251	3Down2Up	30.48	24.63	0.290
824.2	128	4Down1Up	32.56	26.71	0.469
836.6	190	4Down1Up	32.93	27.08	0.511
848.8	251	4Down1Up	32.88	27.03	0.505

PCS1900

1 RF Power Output

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	29.32
1880	661	29.33
1909.8	810	29.33

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
1850.2	512	1Down4Up	29.11
1880	661	1Down4Up	29.08
1909.8	810	1Down4Up	29.10
1850.2	512	2Down3Up	27.44
1880	661	2Down3Up	27.50
1909.8	810	2Down3Up	27.37
1850.2	512	3Down2Up	26.09
1880	661	3Down2Up	25.71
1909.8	810	3Down2Up	25.98
1850.2	512	4Down1Up	25.28
1880	661	4Down1Up	25.33
1909.8	810	4Down1Up	25.02

2 Occupied Bandwidth

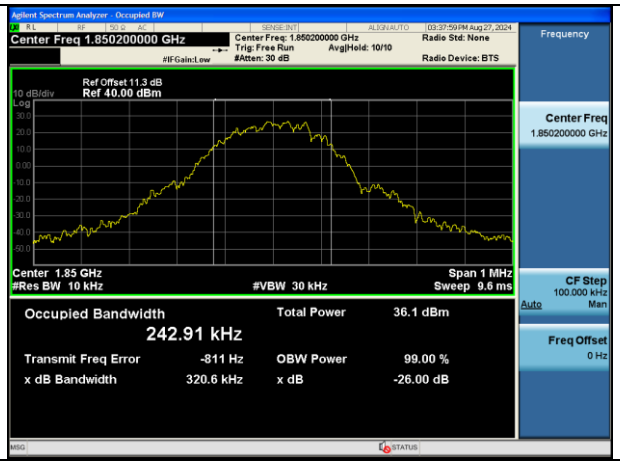
GSM MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	242.91
1880	661	237.36
1909.8	810	240.69

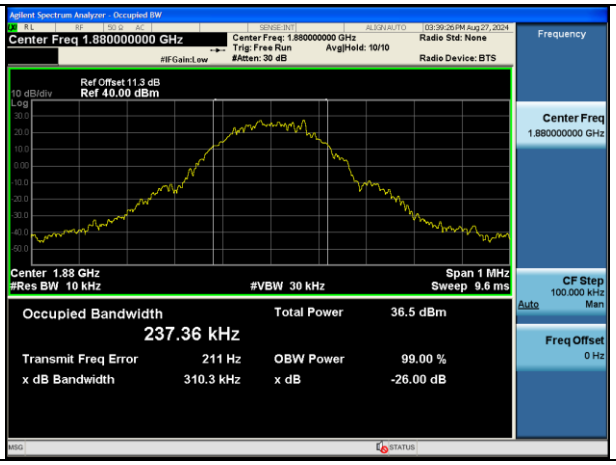
GPRS MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	235.74
1880	661	241.94
1909.8	810	250.31

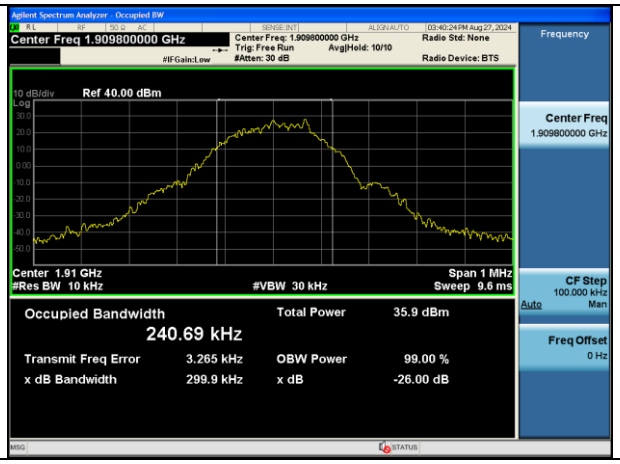
GSM MODE



Channel 512

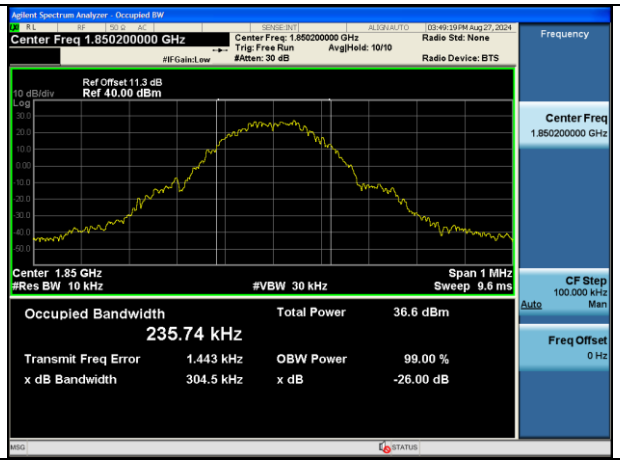


Channel 661

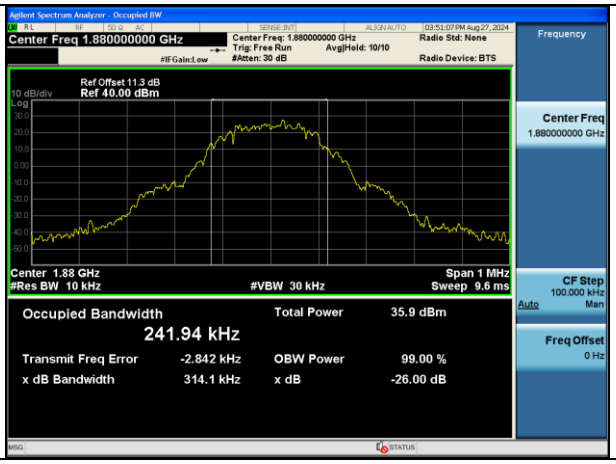


Channel 810

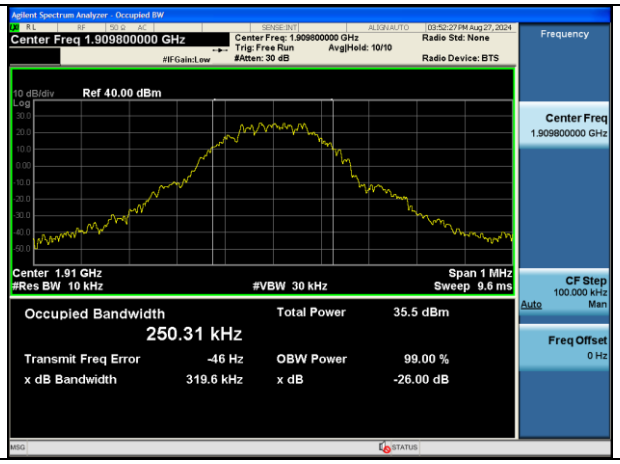
GPRS MODE



Channel 512



Channel 661



Channel 810

3 Emission Bandwidth

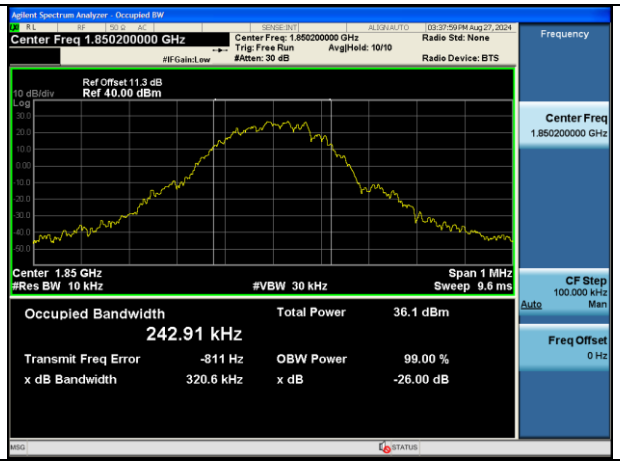
GSM MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
1850.2	512	320.65
1880	661	310.31
1909.8	810	299.93

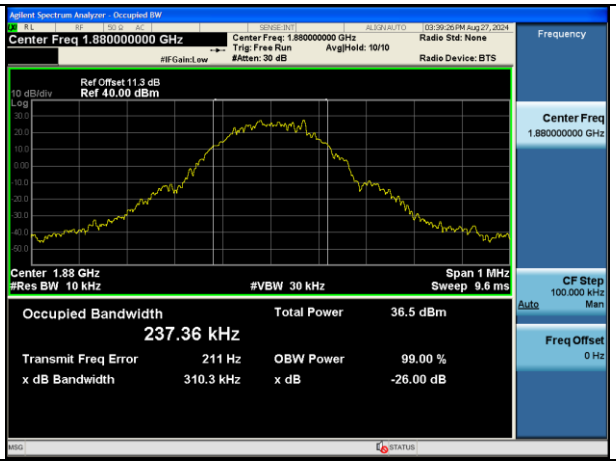
GPRS MODE

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB (kHz)
1850.2	512	304.51
1880	661	314.12
1909.8	810	319.62

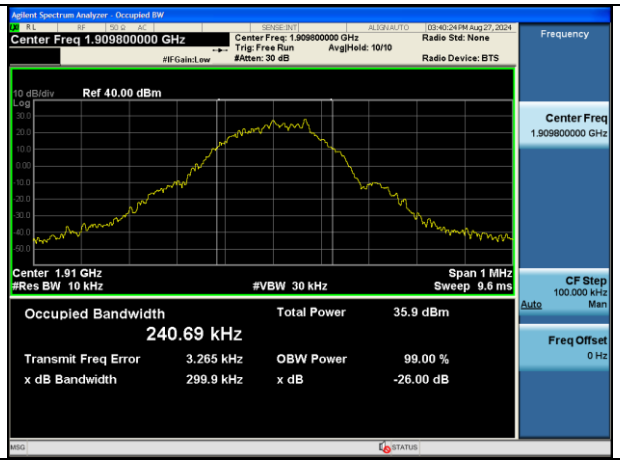
GSM MODE



Channel 512

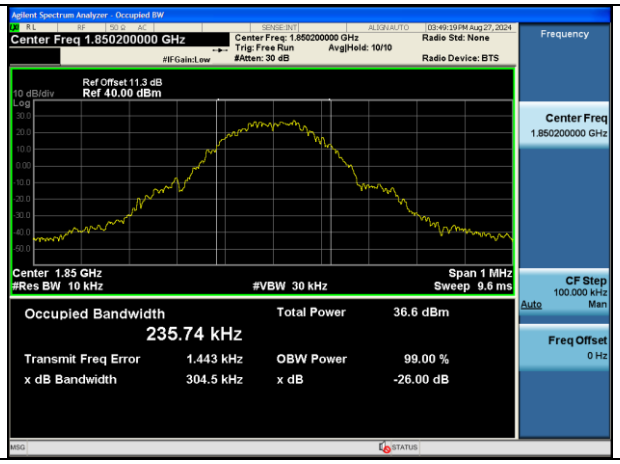


Channel 661

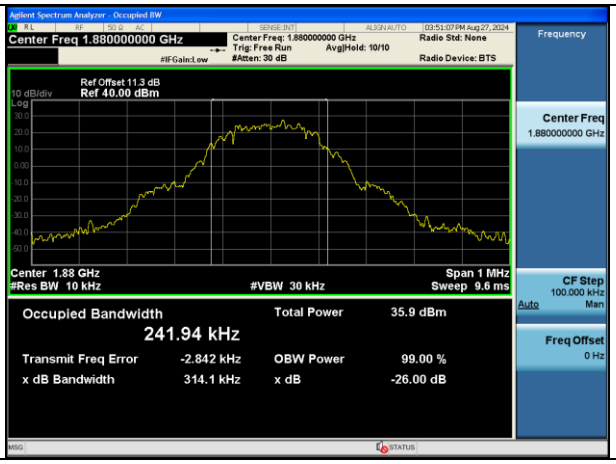


Channel 810

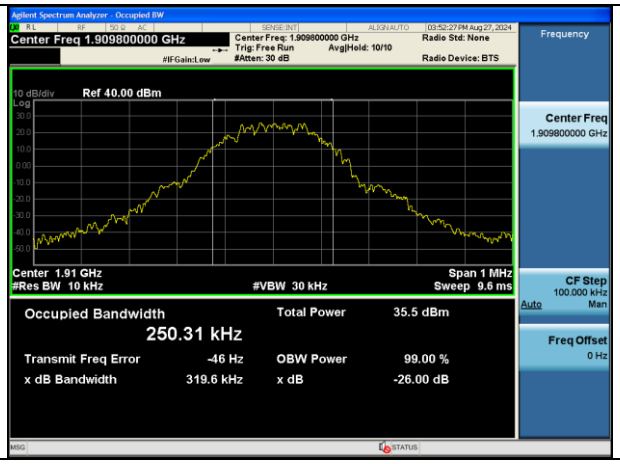
GPRS MODE



Channel 512



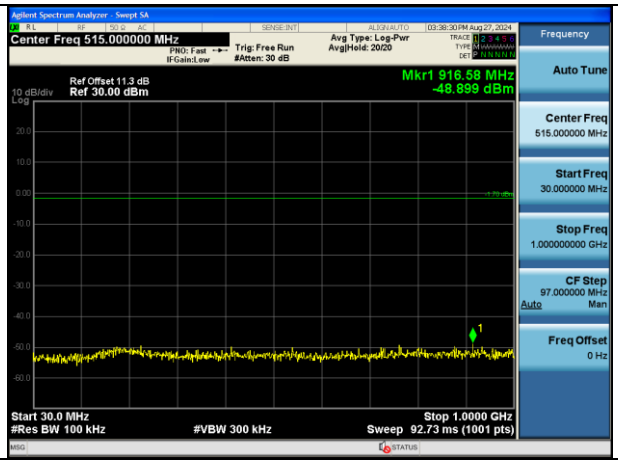
Channel 661



Channel 810

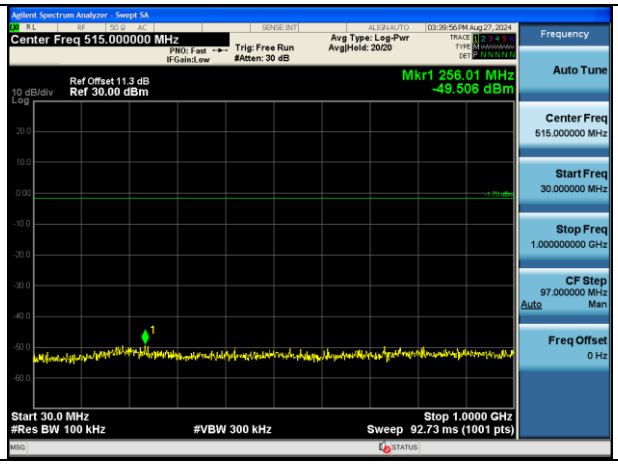
4 Spurious Emissions at antenna terminal

GSM MODE

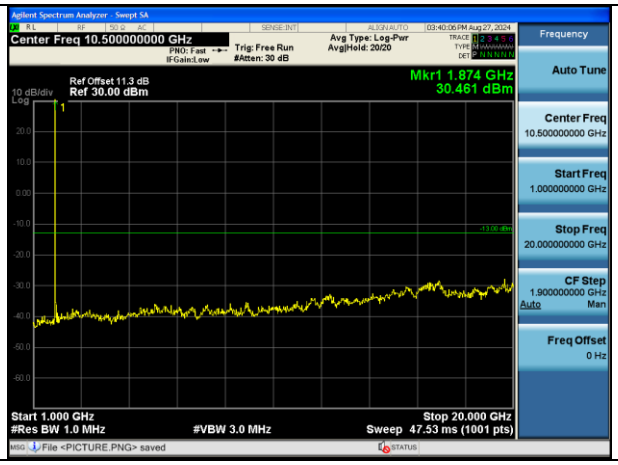


Channel 512

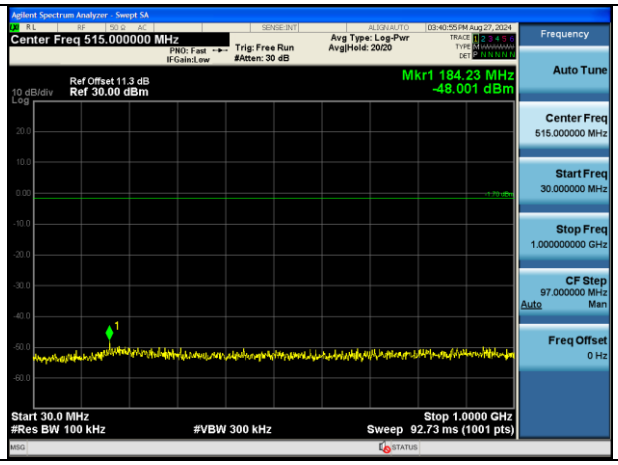
Channel 512



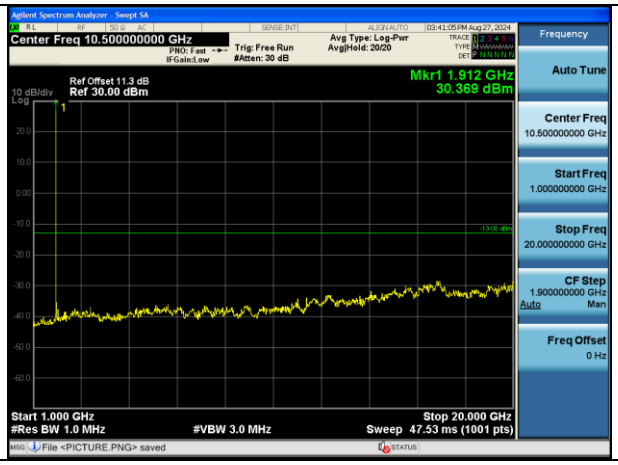
Channel 661



Channel 661

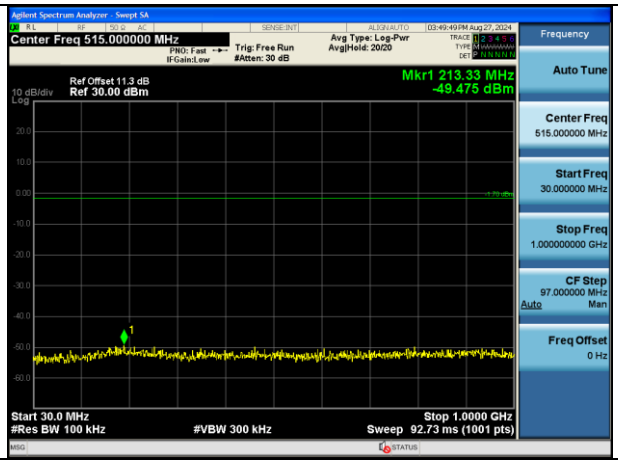


Channel 810

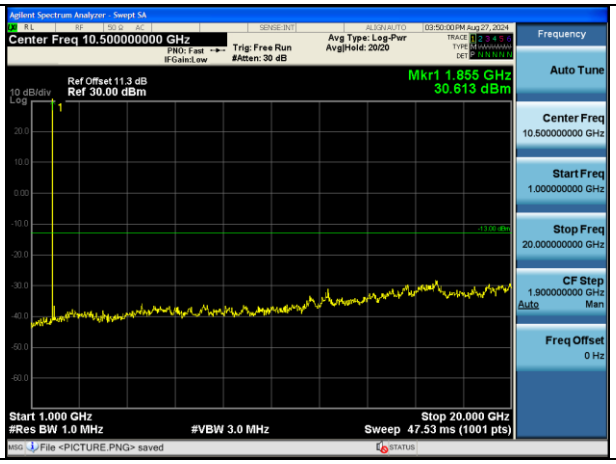


Channel 810

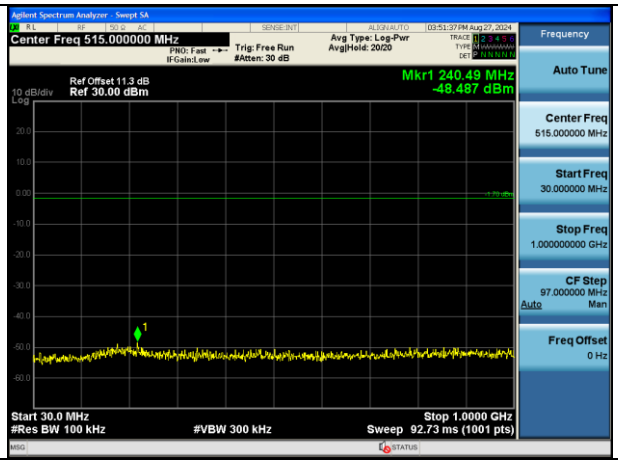
GPRS MODE



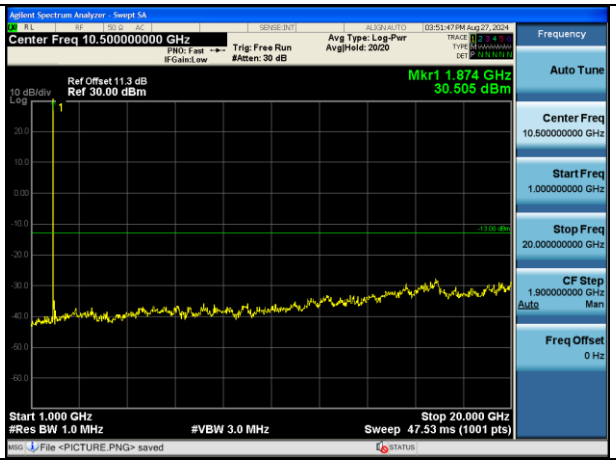
Channel 512



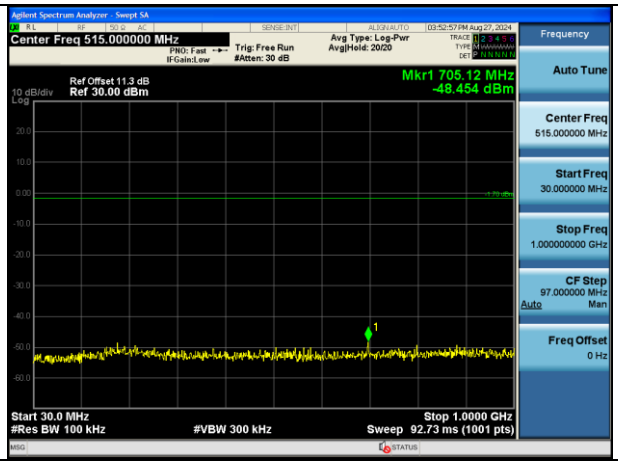
Channel 512



Channel 661



Channel 661

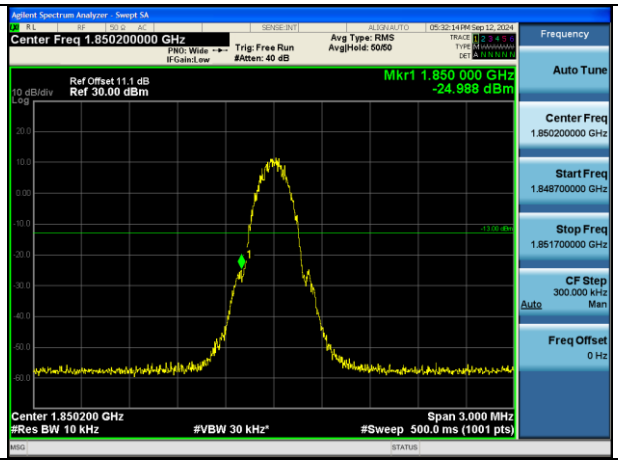


Channel 810

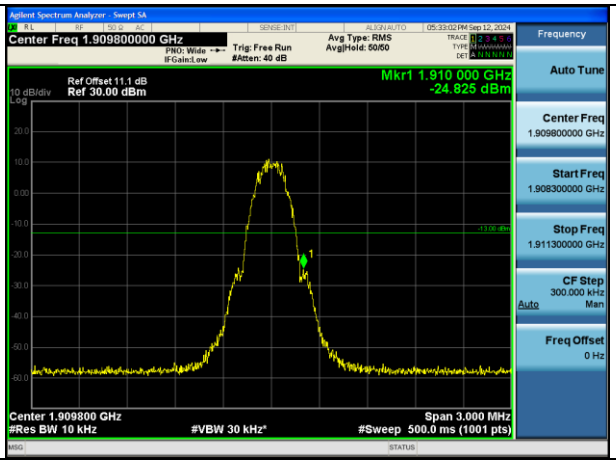
Channel 810

5 Band Edges Compliance

GSM MODE

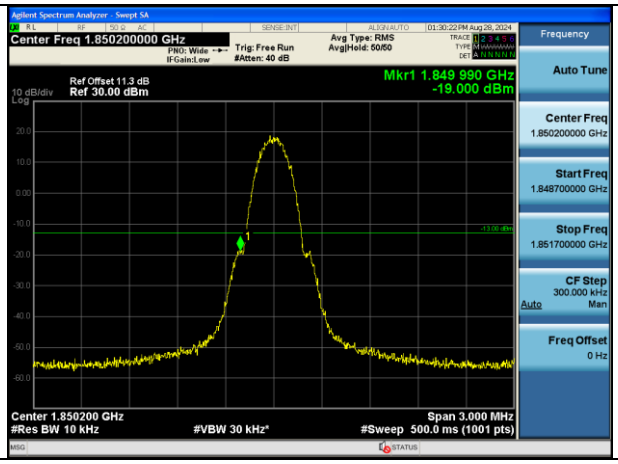


Channel 512

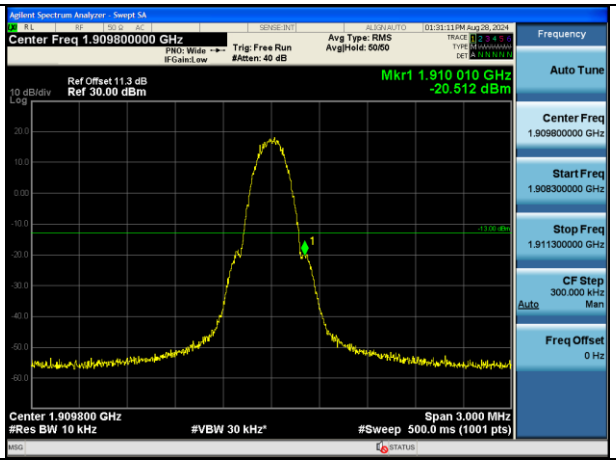


Channel 810

GPRS MODE



Channel 512



Channel 810

6 Frequency Stability

Test Mode: GSM MODE

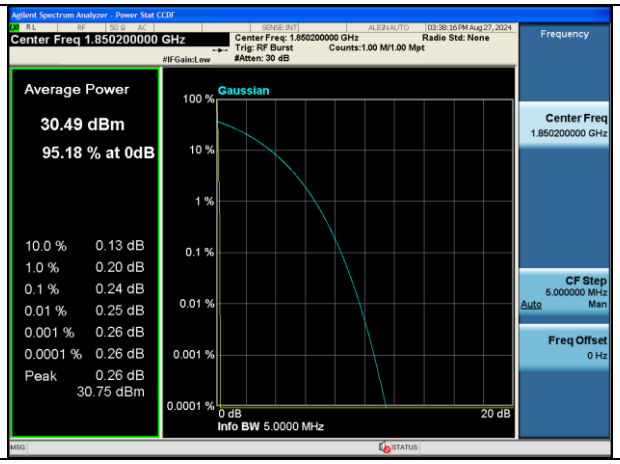
Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-10	0.002	0.003	0.002
0	0.003	0.004	0.004
+10	0.003	0.007	0.002
+20	0.004	0.005	0.004
+30	0.003	0.003	0.004
+40	0.005	0.004	0.006
+55	0.004	0.006	0.007
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	0.001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

Test Mode: GPRS MODE

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-10	0.009	0.009	0.008
0	0.008	0.009	0.008
+10	0.009	0.010	0.009
+20	0.008	0.010	0.009
+30	0.009	0.011	0.009
+40	0.009	0.010	0.009
+55	0.009	0.009	0.009
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	0.009	0.009	0.010
HV	0.009	0.011	0.010

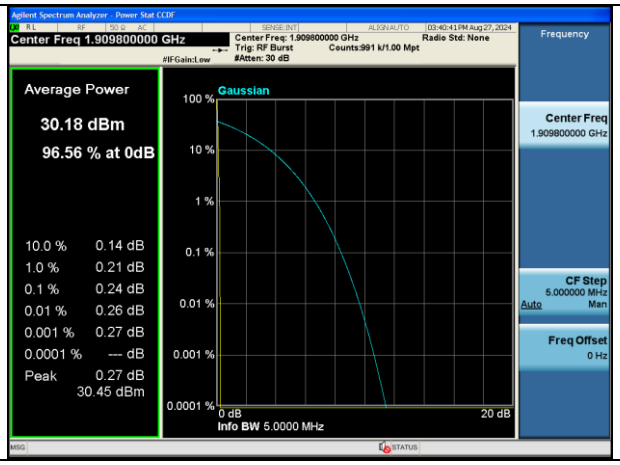
7 Peak-Average Ratio

GSM MODE



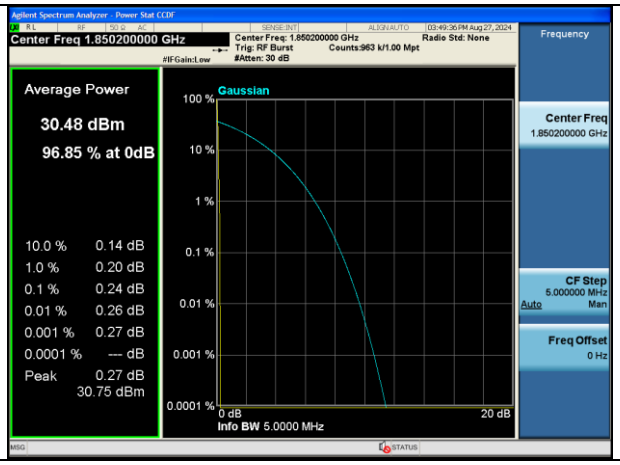
Channel 512

Channel 661

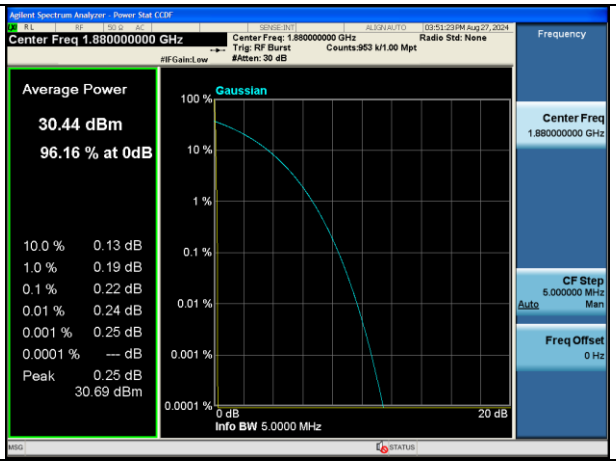


Channel 810

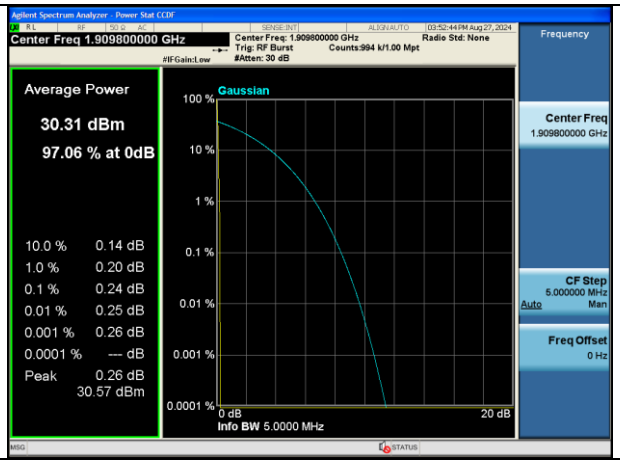
GPRS MODE



Channel 512



Channel 661



Channel 810

8 Effective Radiated Power and Effective Isotropic Radiated Power

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
1850.2	512	29.32	28.42	0.695
1880	661	29.33	28.43	0.697
1909.8	810	29.33	28.43	0.697

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	Conducted Power (dBm)	ERP/EIRP (dBm)	ERP/EIRP (W)
1850.2	512	1Down4Up	29.11	28.21	0.662
1880	661	1Down4Up	29.08	28.18	0.658
1909.8	810	1Down4Up	29.10	28.20	0.661
1850.2	512	2Down3Up	27.44	26.54	0.451
1880	661	2Down3Up	27.50	26.60	0.457
1909.8	810	2Down3Up	27.37	26.47	0.444
1850.2	512	3Down2Up	26.09	25.19	0.330
1880	661	3Down2Up	25.71	24.81	0.303
1909.8	810	3Down2Up	25.98	25.08	0.322
1850.2	512	4Down1Up	25.28	24.38	0.274
1880	661	4Down1Up	25.33	24.43	0.277
1909.8	810	4Down1Up	25.02	24.12	0.258

APPENDIX B – TEST DATA OF RADIATED EMISSION

Radiated Spurious Emissions

Note1：The worst channel results are reflected in the report.

Note2: The scanned graph represents the maximum of both horizontal and vertical polarizations and is not a single horizontal or vertical polarization scan.

Note3: The worst antenna results are reflected in the report.

Note3: As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to therequirements of ANSI C63.4 is an alternative to the substitution measurement method, and therefore, no test plot will show

Note4: The measurement range is to the tenth harmonic of the highest fundamental frequency

850 Test result

ANT3:

GSM/GPRS MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1014.40	-54.93	-13.00	Vertical
1505.80	-55.54	-13.00	Vertical
2410.60	-57.79	-13.00	Vertical
3471.00	-54.33	-13.00	Vertical
3522.00	-54.11	-13.00	Vertical
3597.00	-54.57	-13.00	Vertical

1900 Test result

ANT2:

GSM/GPRS MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1176.00	-69.07	-13.00	Vertical
1496.00	-65.87	-13.00	Vertical
2390.00	-67.46	-13.00	Vertical
3478.00	-63.94	-13.00	Vertical
3540.00	-63.32	-13.00	Vertical
3599.00	-64.92	-13.00	Vertical

---End of Test Report---