Registration
No.788871

TEST REPORT FOR GSM TESTING

Report No.: SRTC2018-9004(F)-18062601(A)

Product Name: Mobile Phone

Product Model: Hisense F15

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

Specification: FCC Part 24E, Part 22H, Part 2 (2018)

FCC ID: 2ADOBF15

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30, Shixing Street, Shijingshan District,

Beijing, P.R.China

Tel: 86-10-57996183 Fax: 86-10-57996388

CONTENTS

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.

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
Contacted person:	Liu Jia
Tel:	+86 10 57996183
Fax:	+86 10 57996388
Email:	liujiaf@srtc.org.cn

1.3 Applicant's details

Company:	Hisense International Co., Ltd.
Address:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China
City:	Qingdao
Country or Region:	China
Contacted person:	Geng Ruifeng
Tel:	+86-532-80877742
Fax:	---
Email:	gengruifeng@hisense.com

1.4 Manufacturer's details

Company:	Hisense Communications Co., Ltd.
Address:	218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao, China
City:	Qingdao
Country or Region:	China
Contacted person:	Dai Qingtao
Tel:	+86-532-55753749
Fax:	---
Email:	daiqingtao@hisense.com

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2018-06-26
Testing Start Date:	2018-06-26
Testing End Date:	2018-08-16

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	30
Maximum Extreme	55	---
Minimum Extreme	-20	---

Normal Supply Voltage (V d.c.):	3.80
Maximum Extreme Supply Voltage (V d.c.):	4.35
Minimum Extreme Supply Voltage (V d.c.):	3.40

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
Rated Output Power	GSM850:33.0dBm PCS1900:30.0dBm
Modulation Type	GSM/GPRS:GMSK EDGE: GMSK(Uplink direction) 8PSK(Downlink direction)
Emission Designator	300KGXW/300KG7W
Duplex Mode	FDD
Duplex Spacing	GSM850:45MHz PCS1900:80MHz
Antenna Type	PIFA Antenna
Power Supply	Battery/AC adapter
HW Version	YK737_V0.2
SW Version	Hisense_F15_4G_10
IMEI	861854039418502

2.2 Support Equipment

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

Equipment	Charger
Manufacturer	Shenzhen Tianyin Electronics Co.,Ltd
Model Number	TPA-97050100UU
Serial Number	---

Equipment	Battery
Manufacturer	Guangdong Teamgiant New Energy Tech Co.,LTD
Model Number	LIW38210A
Serial Number	---

The products are different on the supplier of LCD/TP/Camera/Flash. There is no change in the RF module and antenna.

Main Supply

Part Name	Model Name	supplier
LCD	ST7701S	JIANGXI HOLITECH TECHNOLOGY CO., LTD
TP	FT6336U	Guizhou Yuye Opto-Electronic Co., Ltd
Camera	GC5025/GC8034	Shenzhen Chengxiangtong technology CO.,LTD
Flash	KMFN60012M-B214	SAMSUNG

Secondary Supply

Part Name	Model Name	supplier
LCD	ST7701S-G5	Shenzhen Digital Technology Co., LTD
TP	FT6336U	JIANGXI HOLITECH TECHNOLOGY CO., LTD
Camera	GC5025/GC8034	Shenzhen Union Image Co.,Ltd
Flash	08EMCP08-EL3DT227	KINGSTON

2.3 Summary table.

FCC Rule Part	Mode	Frequency Range(MHz)	Conducted (Average) (dBm)	Antenna Gain （dBi）	EIRP/ ERP (W)	Frequency Tolerance (ppm)	Emission Designator
22	GSM850	824.2-848.8	32.92	-0.90	0.968	0.018	249KGXW
22	EDGE850	824.2-848.8	32.91	-0.90	0.966	0.021	254KG7W
24	GSM1900	1850.2-1909.8	29.85	-1.00	0.767	0.015	246KGXW
24	EDGE1900	1850.2-1909.8	29.76	-1.00	0.752	0.034	253KG7W

3 REFERENCE SPECIFICATION

Specification	Version	Title
2.1046	2018	Measurements required: RF power output.
2.1049	2018	Measurements required: Occupied bandwidth.
2.1051	2018	Measurements required: Spurious emissions at antenna terminals.
2.1053	2018	Measurements required: Field strength of spurious radiation.
2.1055	2018	Measurements required: Frequency stability.
22.355	2018	Frequency tolerance.
22.913	2018	Effective radiated power limits.
22.917	2018	Emission limitations for cellular equipment.
24.232	2018	Power and antenna height limits.
24.235	2018	Frequency stability.
24.238	2018	Emission limitations for Broadband PCS equipment.
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

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.
N/T	Test case is not tested.
NTC	Nominal voltage, Normal Temperature
HV	High voltage, Normal Temperature
LV	Low voltage, Normal Temperature
HTHV	high voltage, High Temperature
LTHV	High voltage, Low Temperature
HTLV	Low voltage, High Temperature
LTLV	Low voltage, Low Temperature

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)/24.232(c)	Pass
3	Occupied Bandwidth	2.1049	Pass
4	Emission Bandwidth	22.917(b)/24.238(b)	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. He Dengshun	Issued date: 20180823

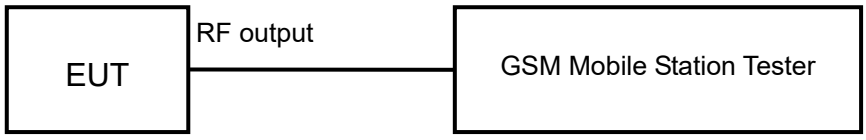
6 TEST RESULT

6.1 RF Power Output-FCC Part 2.1046

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



GSM850

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 No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits	≤33.0dBm

PCS1900
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 No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits	≤30.0dBm

Test result:

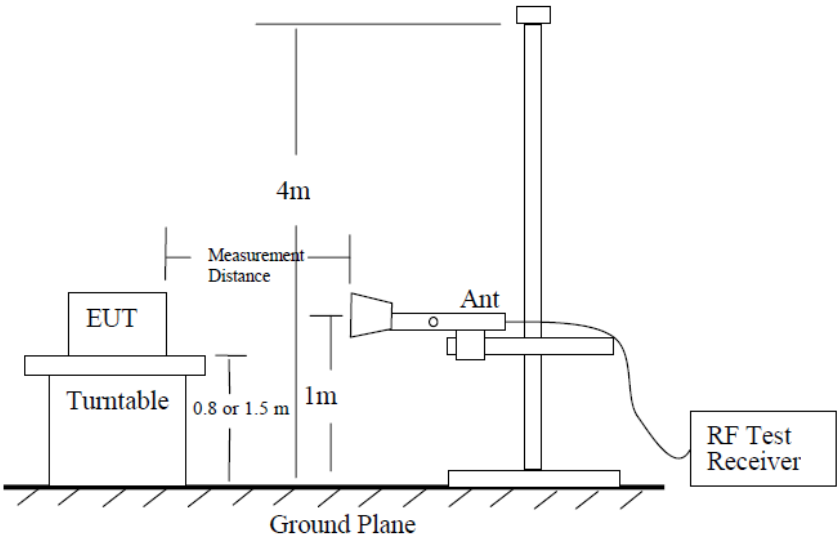
The test results are shown in Appendix A.

6.2 Effective Radiated Power-FCC Part 22.913(a)/Part 24.232(c)

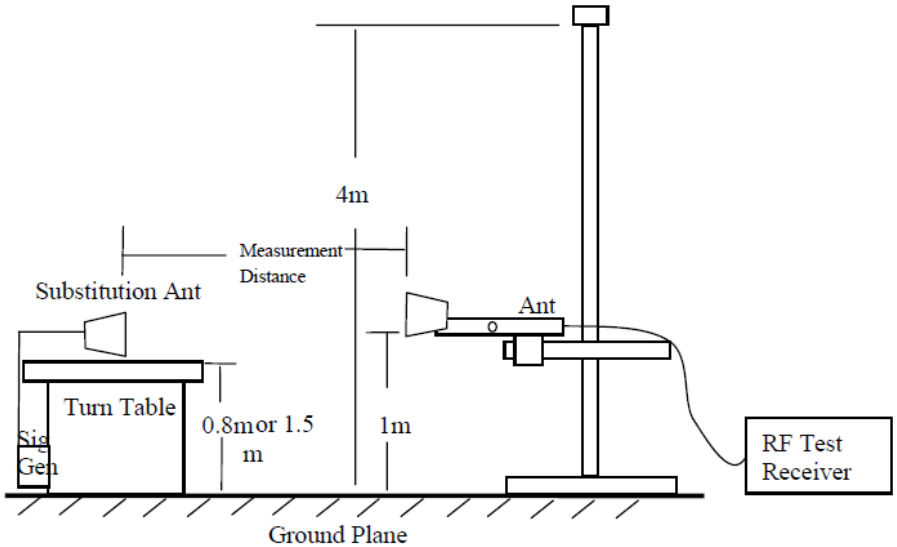
Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test setup:



Step 1



Step 2

GSM850

Test procedure:
The measurements procedures in TIA-603C-2004 are used.
Step 1:
The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meters 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 is 2.4m 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 3MHz.Then the height of receive antenna shall be moved from 1 to 4 meters, and 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. And the maximum value of the receiver should be recorded as (Pr).
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. To repeat the same procedure as step1 and the level of signal generator will be adjusted till the same power value on the spectrum analyzer or receiver. The ERP/EIRP of the EUT 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).
The measurement results are obtained as described below:
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).

The measurement will be done at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits:

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

PCS1900

Test procedure:
The measurements procedures in TIA-603C-2004 are used.

Step 1:
The measurement is carried out in the fully anechoic chamber. EUT was placed on a 2.4 meters 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 is 2.4m 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 3MHz.Then the height of receive antenna shall be moved from 1 to 4 meters, and 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. And the maximum value of the receiver should be recorded as (Pr).

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. To repeat the same procedure as step1 and the level of signal generator will be adjusted till the same power value on the spectrum analyzer or receiver. The ERP/EIRP of the EUT 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 (Pr). 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 (Ga).
The measurement results are obtained as described below:
Power (EIRP) = P_{mea}+ P_{ca}+ Ga

The measurement will be done at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)
Limits:

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

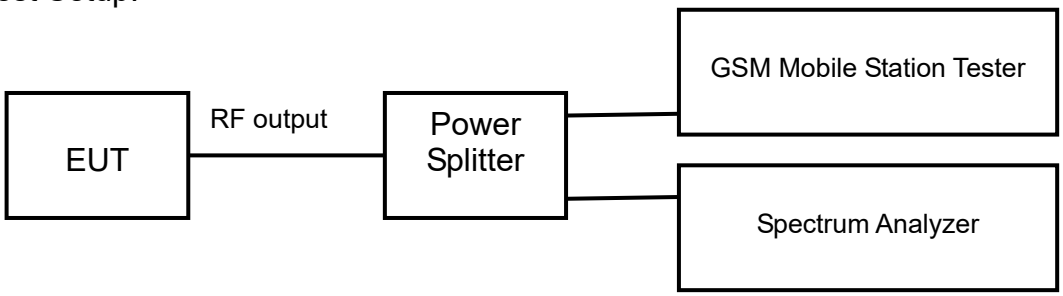
Test result:
The test results are shown in Appendix B.

6.3 Occupied Bandwidth-FCC Part 2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



GSM850

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. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer.
The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits: No specific occupied bandwidth requirements in part 2.1049

PCS1900

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. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of 99% power can be read on spectrum analyzer.
The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

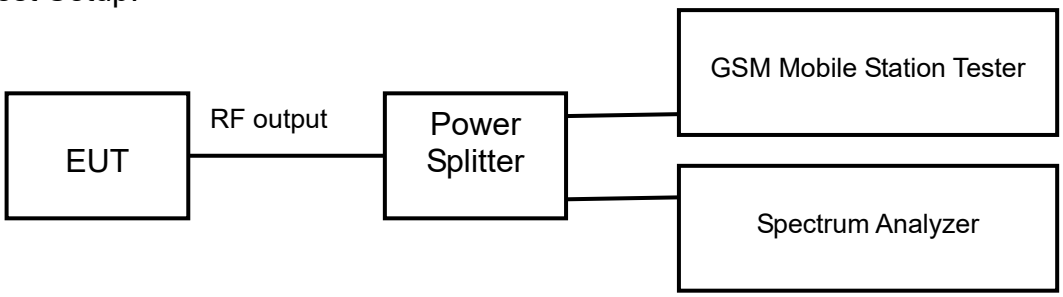
Limits: No specific occupied bandwidth requirements in part 2.1049
Test result:
The test results are shown in Appendix A.

6.4 Emission Bandwidth-FCC Part 22.917(b)/Part 24.238(b)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



GSM850

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. The emission bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of -26dB transmitter power can be read on spectrum analyzer.
The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band)

Limits: No specific emission bandwidth requirements in part 22.917(b)

PCS1900
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. The emission bandwidth is measured using spectrum analyzer. RBW is set to 3kHz on spectrum analyzer. The bandwidth of -26dB transmitter power can be read on spectrum analyzer.
The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band)

Limits: No specific emission bandwidth requirements in part 24.238(b)

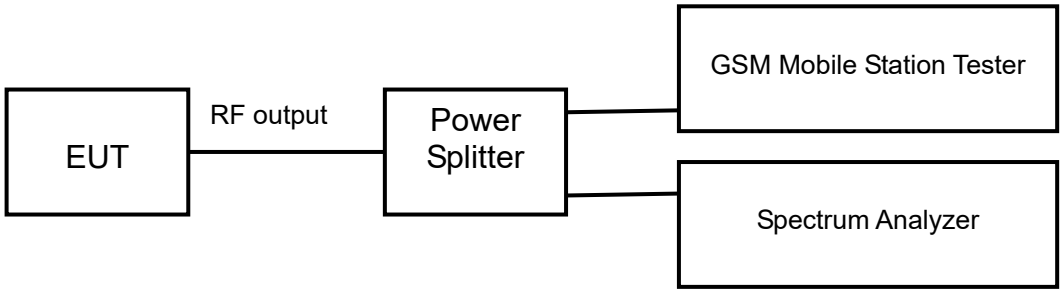
Test result:
The test results are shown in Appendix A.

6.5 Spurious Emissions at antenna terminal-FCC Part 2.1051/ 22.917(a) /Part 24.238(a)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



GSM850

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. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 9GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.
The measurement will be conducted at one channel No189 (middle channel of GSM850 band)

Limits	≤-13dBm

PCS1900

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. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer.
The measurement will be conducted at one channel No661 (middle channel of PCS1900 band)

Limits	≤-13dBm

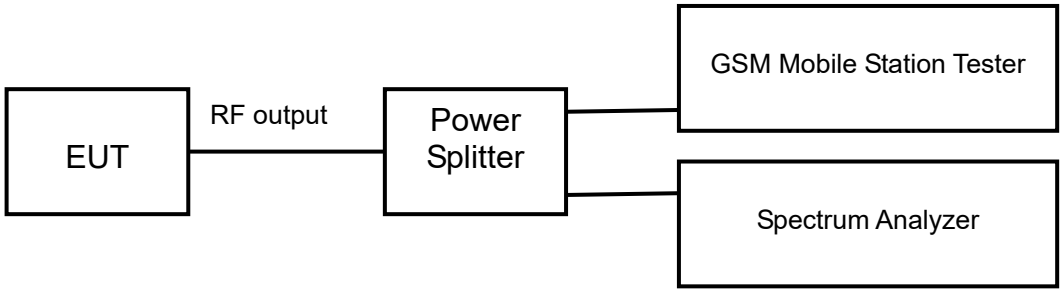
Test result:
The test results are shown in Appendix A.

6.6 Band Edges Compliance- FCC Part 2.1051/ 22.917(a) /Part 24.238(a)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



GSM850

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. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to at least 1% of the emission bandwidth on spectrum analyzer.
The measurement will be conducted at two channels No128 and No251 (Bottom and top channels of GSM850 band)

Limits	≤-13dBm

PCS1900

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. The measurement is carried out using a spectrum analyzer. The peak detector is used and RBW is set to at least 1% of the emission bandwidth on spectrum analyzer.
The measurement will be conducted at two channels No512 and No810 (Bottom and top channels of PCS1900 band)

Limits	≤-13dBm

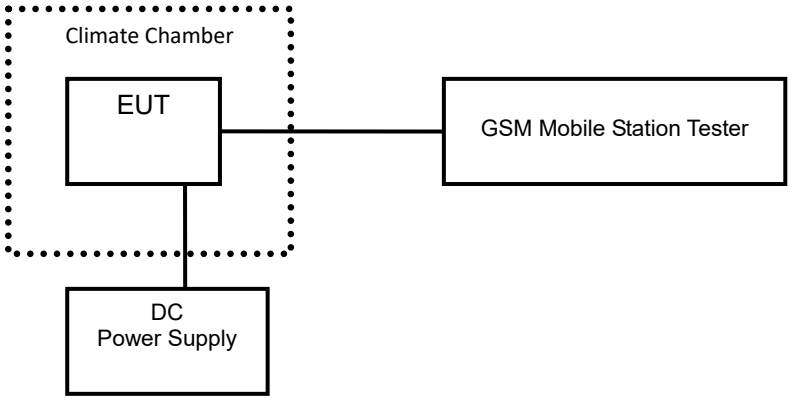
Test result:
The test results are shown in Appendix A.

6.7 Frequency Stability- FCC Part 2.1055/22.355 /Part 24.235

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test setup:



GSM850

Test Procedure:
A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50°C in 10°C step size, and also the DC power supply voltage to the EUT is varied from LV to HV. The measurement will be conducted at three channels No128, No189 and No251 (Bottom, middle and top channels of GSM850 band).

Limits: No specific frequency stability requirements in part 2.1055 and part 22.355.

PCS1900

Test Procedure:
A radio link shall be established between EUT and Tester. The tester will sample the transmitter RF output signal and measure its frequency. The temperature inside the climate chamber is varied from -30 to +50°C in 10°C step size, and also the DC power supply voltage to the EUT is varied from LV to HV. The measurement will be conducted at three channels No512, No661 and No810 (Bottom, middle and top channels of PCS1900 band).

Limits: No specific frequency stability requirements in part 2.1055 and part 24.235.

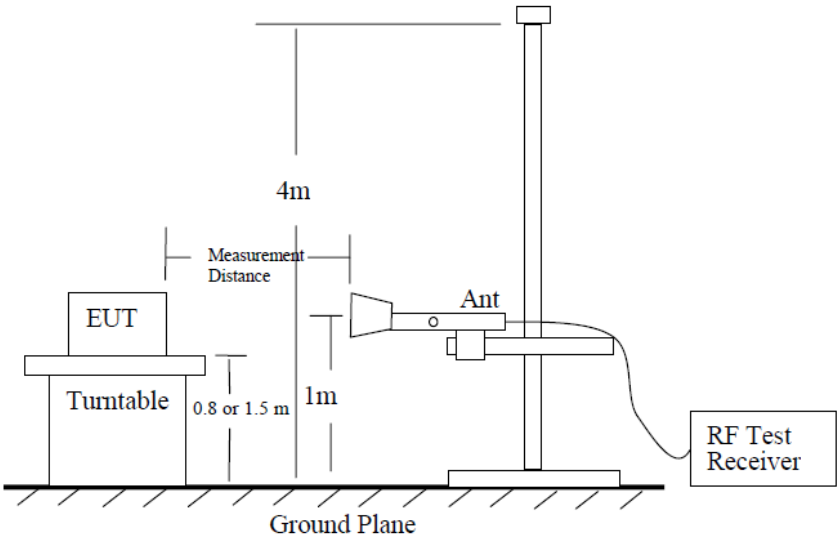
Test result:
The test results are shown in Appendix A.

6.8 Radiated Spurious Emissions-FCC Part2.1053/ 22.917(a)/Part 24.238(a)

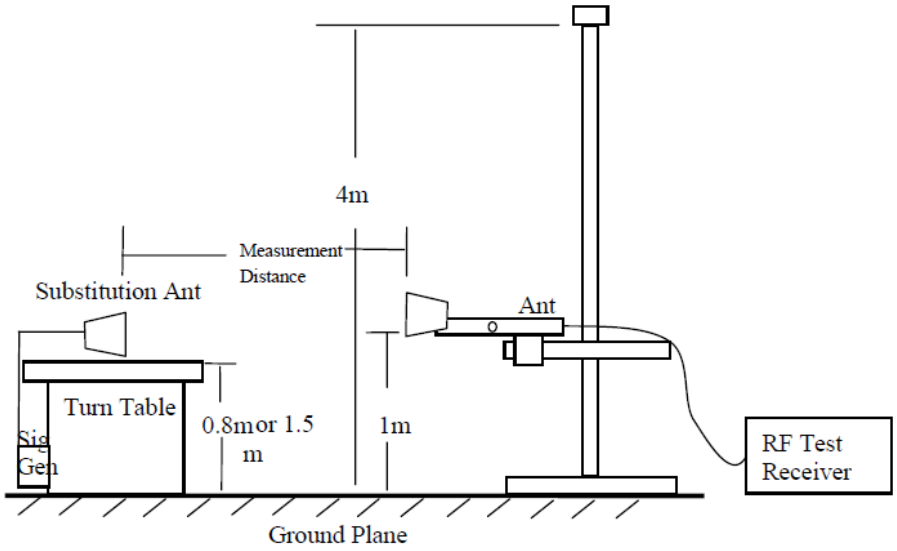
Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Step 1



Step 2

GSM850

Test procedure:
The measurements procedures in TIA-603C-2004 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 fully anechoic chamber. EUT was placed on a 2.4 meter high non-conductive table at a 3 meter 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 is 2.4m 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. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. 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 (P_{ca}) 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) = P_{mea}+ P_{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, 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.
$P=P_{mea}+P_{ca}+G_a=(-20dBm)+(-30dB)+(11dB)= -39dBm$

The measurement will be done at carrier frequencies that pertain to bottom (Channel 128), middle (Channel 189) and top (Channel 251) channels of the GSM 850 band.

PCS1900

Test procedure:
The measurements procedures in TIA-603C-2004 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 fully anechoic chamber. EUT was placed on a 2.4 meter high non-conductive table at a 3 meter 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 is 2.4m 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. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 20GHz (higher than the 10th harmonic of the carrier). The peak detector is used and RBW is set to 1MHz on spectrum analyzer. Then the antenna height and turn table rotation is adjusted till the maximum power value is founded on spectrum analyzer or receiver. 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 (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) = P_{mea}+ P_{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, 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.
$P=P_{mea}+P_{ca}+G_a$=(-20dBm)+(-30dB)+(11dB)= -39dBm

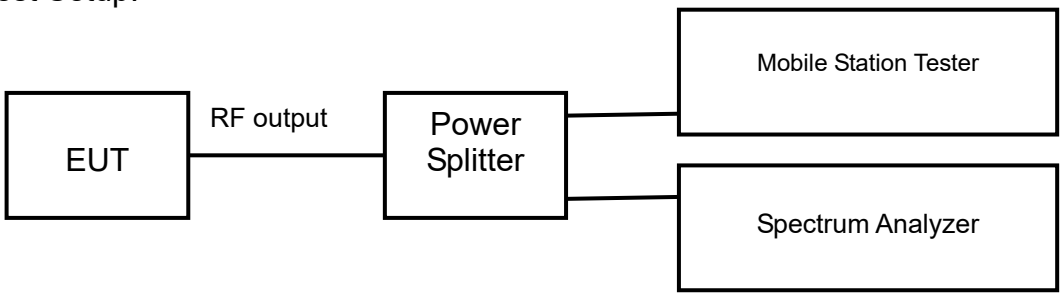
The measurement will be done at carrier frequencies that pertain to bottom (Channel 512), middle (Channel 661) and top (Channel 810) channels of PCS 1900 band.
Test result:
The test results are shown in Appendix B.

6.9 Peak-Average Ratio -FCC Part 24.232(d)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

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. The Peak-Average Ratio is measured using spectrum analyzer. RBW is set to 30kHz on spectrum analyzer. The Peak-Average Ratio can be read on spectrum analyzer.

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	
Occupied Bandwidth	3kHz	
Peak power output	0.67dB	
Band edge compliance	1.20dB	
Spurious emissions	30MHz～1GHz	2.83dB
	1GHz～12.75GHz	2.50dB
	12.75GHz～25GHz	2.75dB

8 TEST EQUIPMENTS

No.	Name/Model	Manufacturer	S/N	Calibration Date	Calibration Due Date
1	E5515C(8960) Mobile Station Tester	Agilent	MY50266302	2017.8.20	2018.8.19
2	N9020A Spectrum Analyzer	Agilent	MY48010771	2017.8.20	2018.8.19
3	DC Power Supply E3645A	Agilent	MY40000741	2018.3.01	2019.2.28
5	Temperature chamber SH241	ESPEC	92013758	2017.8.20	2018.8.19
6	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	---	---	---
7	Turn table Diameter:1m	HD	---	---	---
8	Antenna master FAC(MA4.0)	MATURO	---	---	---
9	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	2017.8.20	2018.8.19
10	HL562 Ultra log antenna	R&S	100016	2017.8.20	2018.8.19
11	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2017.8.20	2018.8.19
12	ESI 40 EMI test receiver	R&S	100015	2017.8.20	2018.8.19
13	Radio tester	CMU 200	114667	2017.8.20	2018.8.19

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

Please refer to the attachment.

APPENDIX B – TEST DATA OF RADIATED EMISSION

Please refer to the attachment.

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

RF Power Output-FCC Part2.1046

GSM850
ERP=Conducted Power+ Antenna Gain- Ga Antenna Gain
Antenna Gain=-0.9dBi
Ga Antenna Gain=2.15dB
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)	ERP (dBm)
824.2	128	32.92	29.86
836.4	189	32.77	29.71
848.8	251	32.80	29.74

EDGE MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)	ERP (dBm)
824.2	128	32.91	29.85
836.4	189	32.78	29.72
848.8	251	32.82	29.76

PCS1900

Antenna Gain=-1.0dBi
GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)	EIRP (dBm)
1850.2	512	29.85	28.85
1880.0	661	29.78	28.78
1909.8	810	29.81	28.81

EDGE MODE:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)	EIRP (dBm)
1850.2	512	29.67	28.67
1880.0	661	29.74	28.74
1909.8	810	29.76	28.76

Occupied Bandwidth-FCC Part2.1049

GSM850

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	246.66
836.4	189	247.90
848.8	251	248.58

EDGE (GMSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	241.78
836.4	189	253.54
848.8	251	252.75

PCS1900

GSM/GPRS MODE:

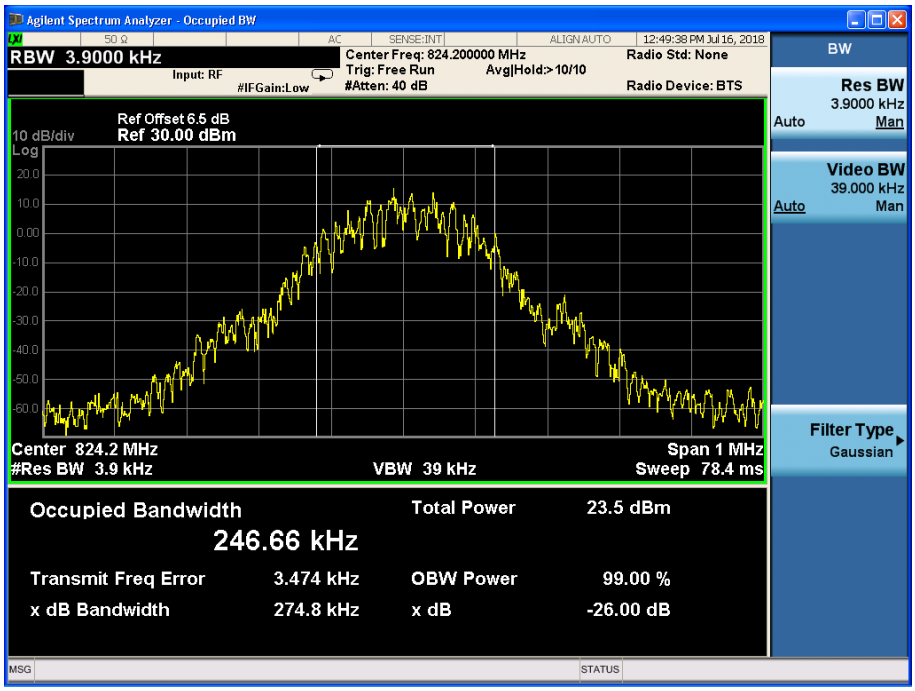
Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	242.02
1880.0	661	245.69
1909.8	810	243.52

EDGE (GMSK) MODE:

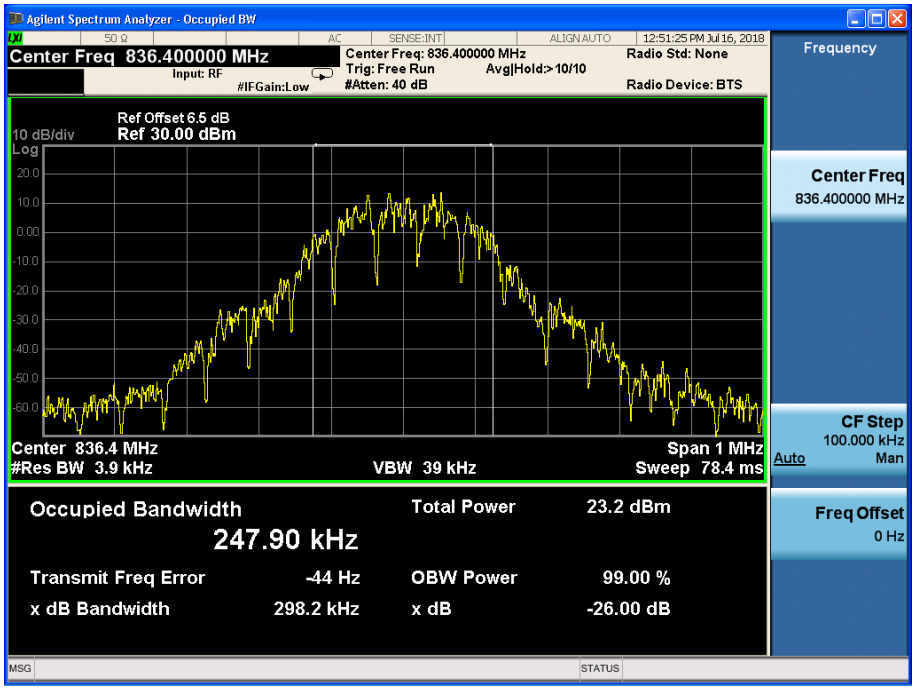
Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	245.27
1880.0	661	245.47
1909.8	810	253.03

GSM850

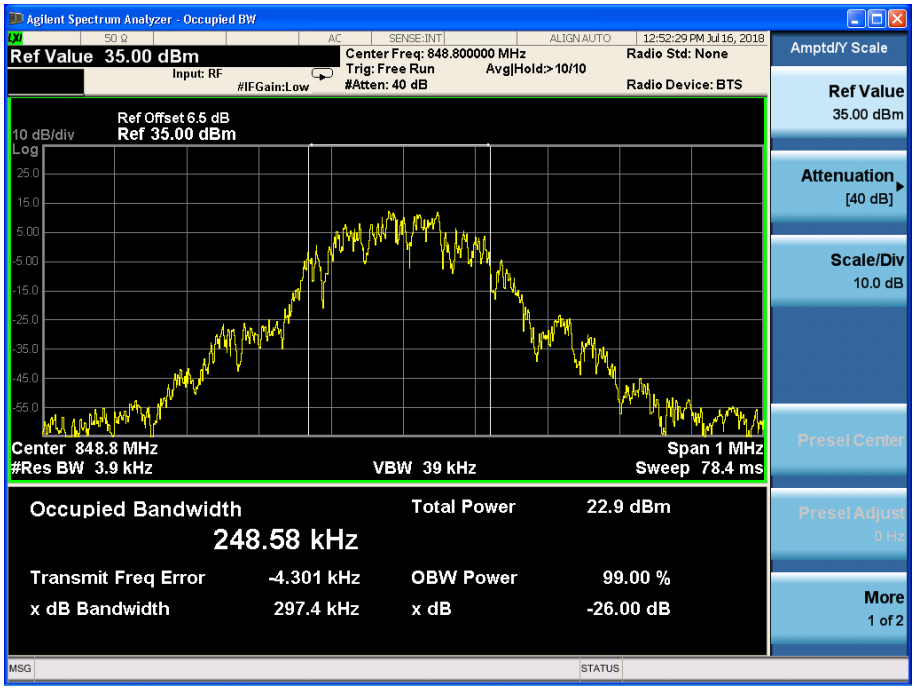
GSM/GPRS MODE:



Channel 128

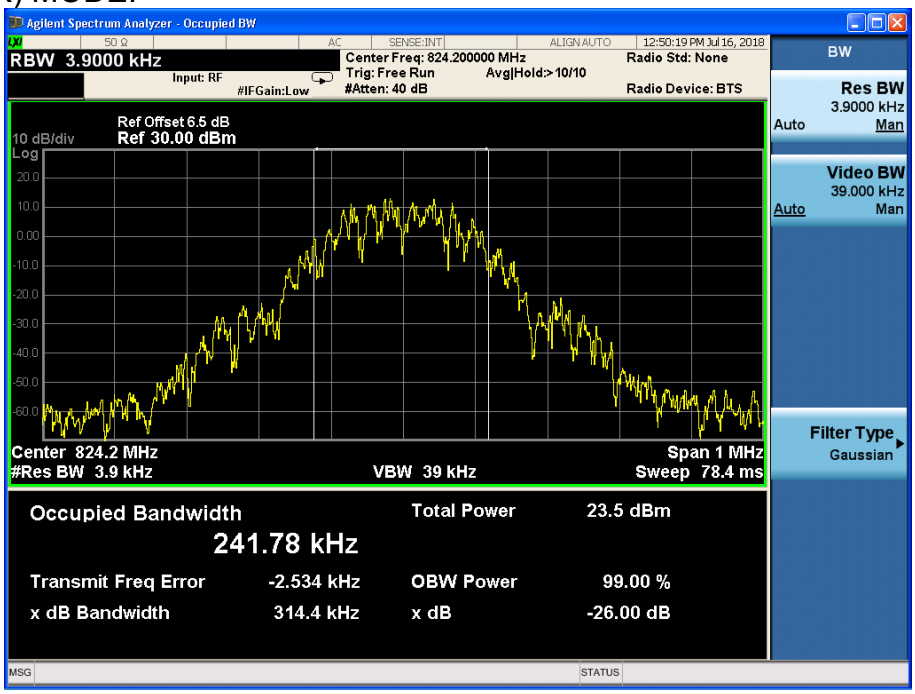


Channel 189

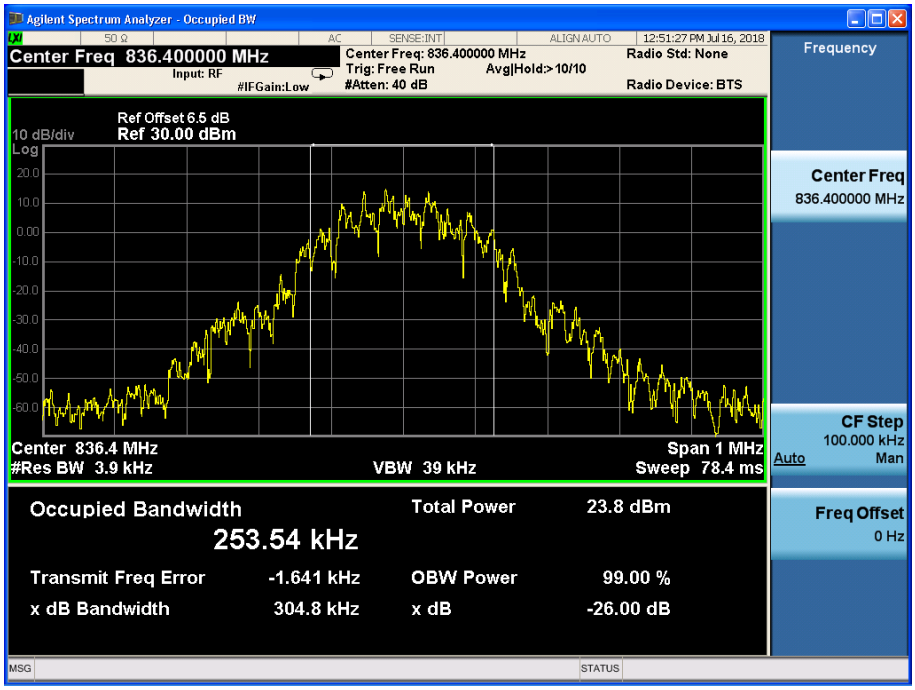


Channel 251

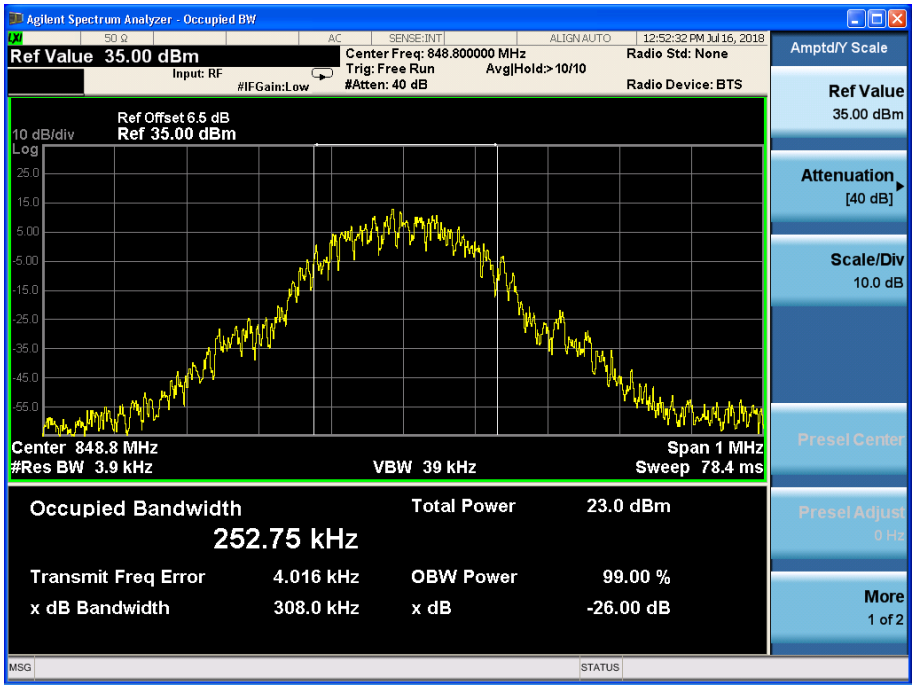
EDGE (GMSK) MODE:



Channel 128



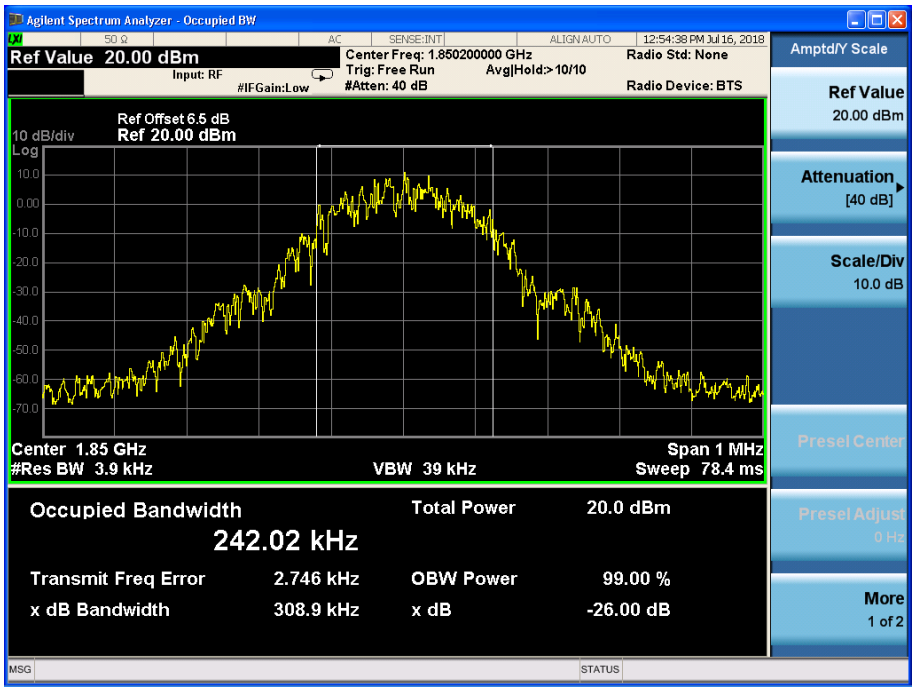
Channel 189



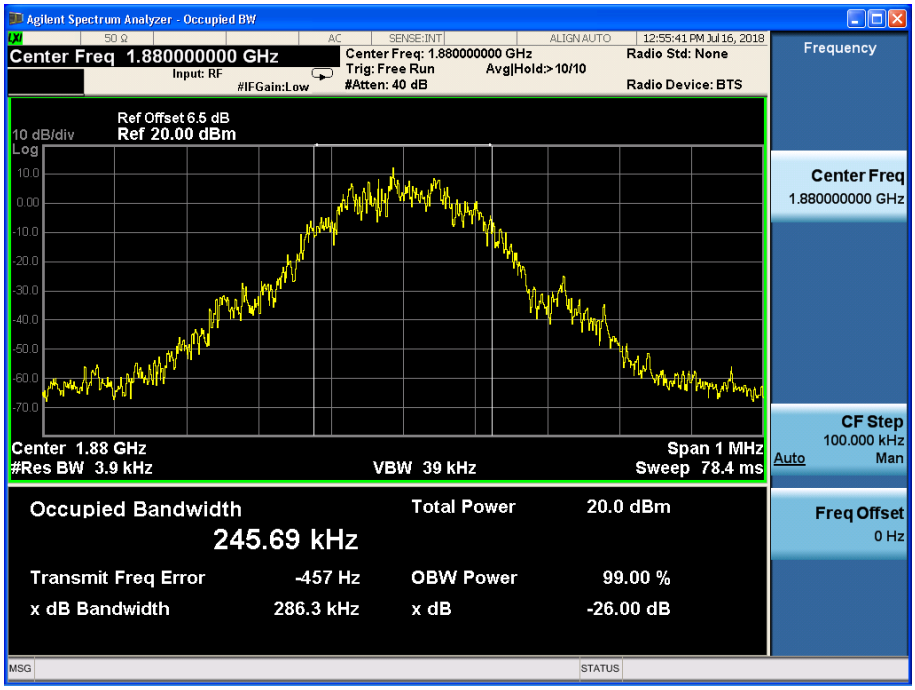
Channel 251

PCS1900

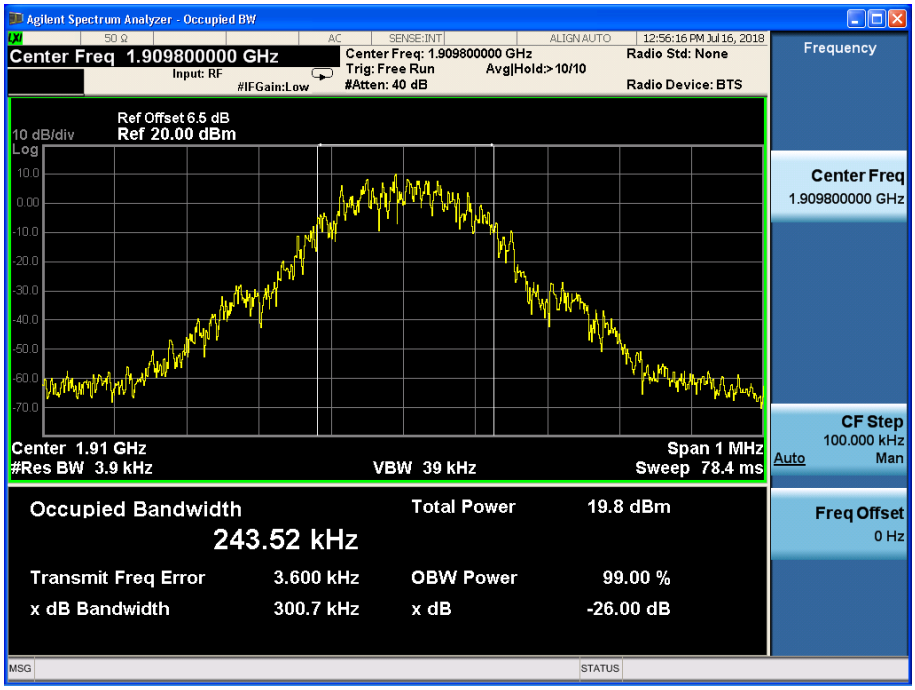
GSM/GPRS MODE:



Channel 512

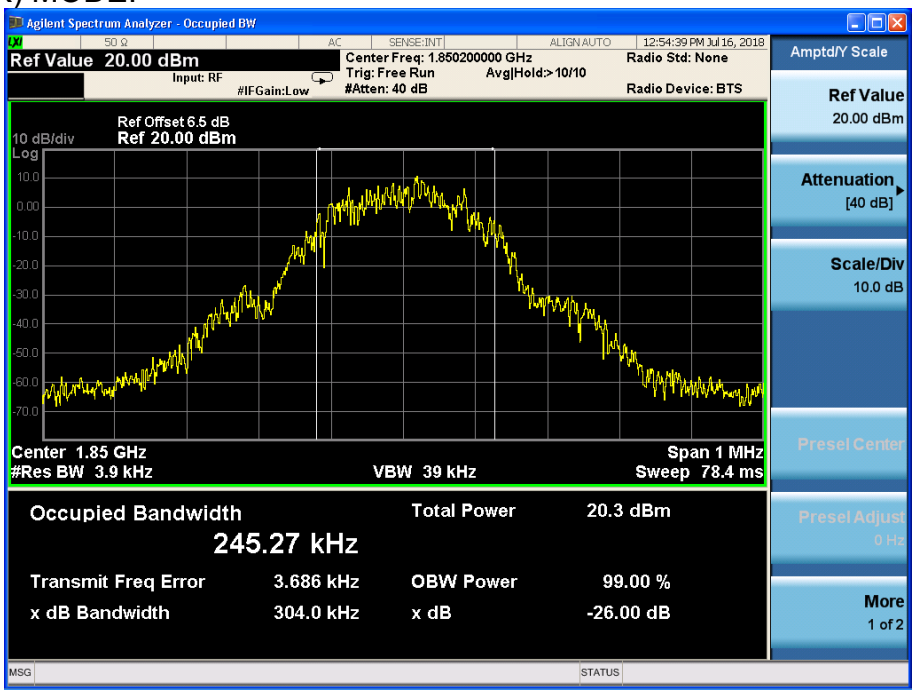


Channel 661

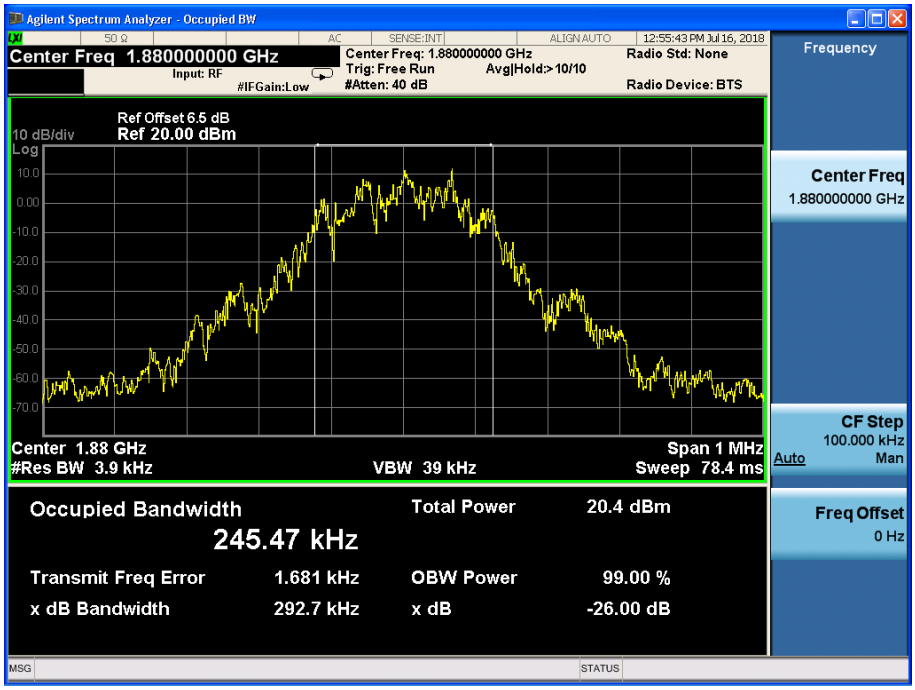


Channel 810

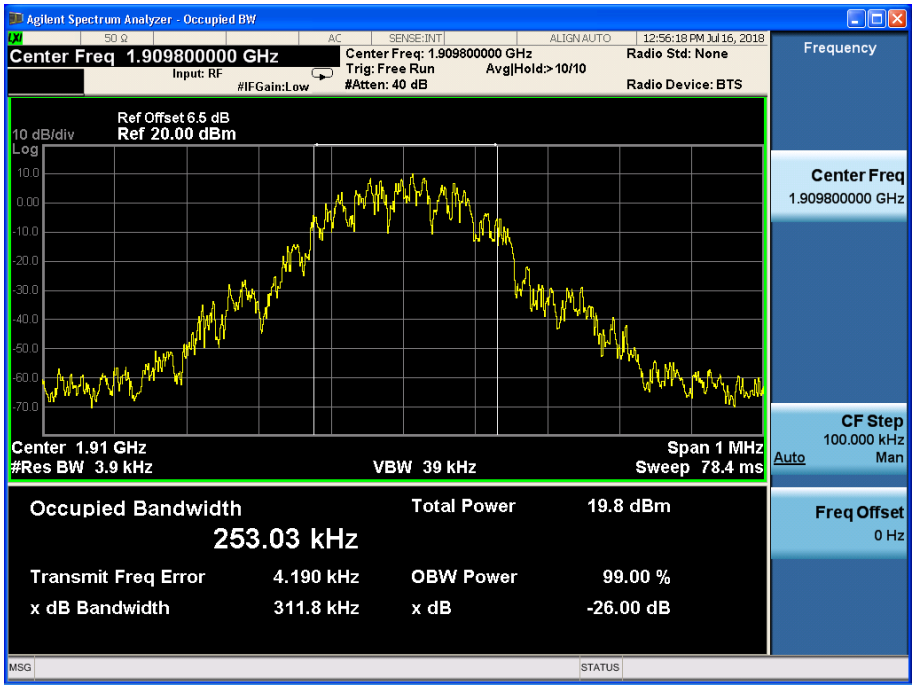
EDGE (GMSK) MODE:



Channel 512



Channel 661



Channel 810

Emission Bandwidth-FCC Part 22.917(b)/Part 24.238(b)

GSM850

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
824.2	128	310.2
836.4	189	313.3
848.8	251	312.4

EDGE (GMSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
824.2	128	304.6
836.4	189	308.3
848.8	251	312.6

PCS1900

GSM/GPRS MODE:

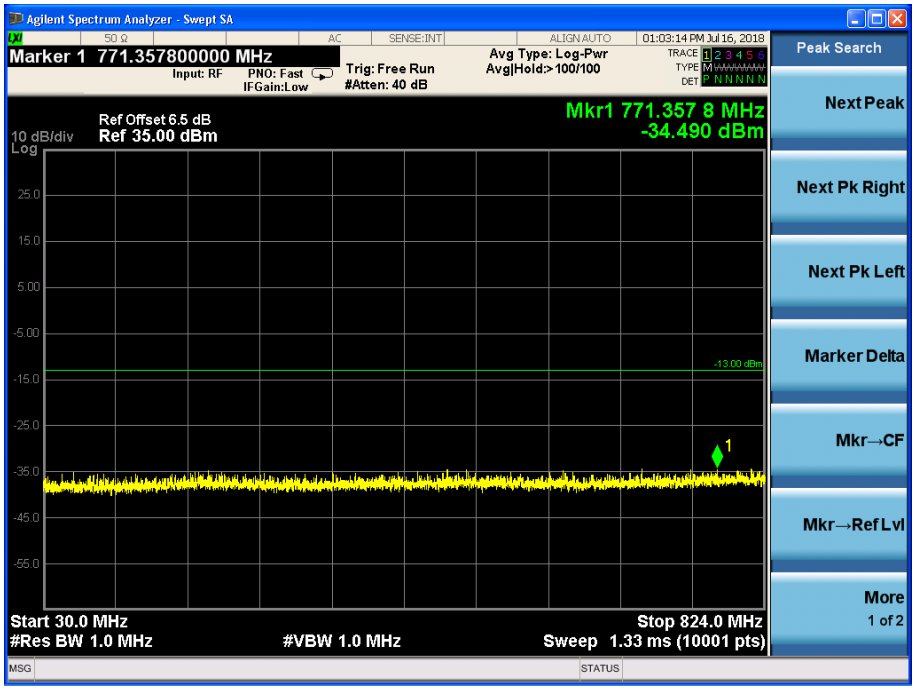
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
1850.2	512	307.8
1880.0	661	311.6
1909.8	810	319.6

EDGE (GMSK) MODE:

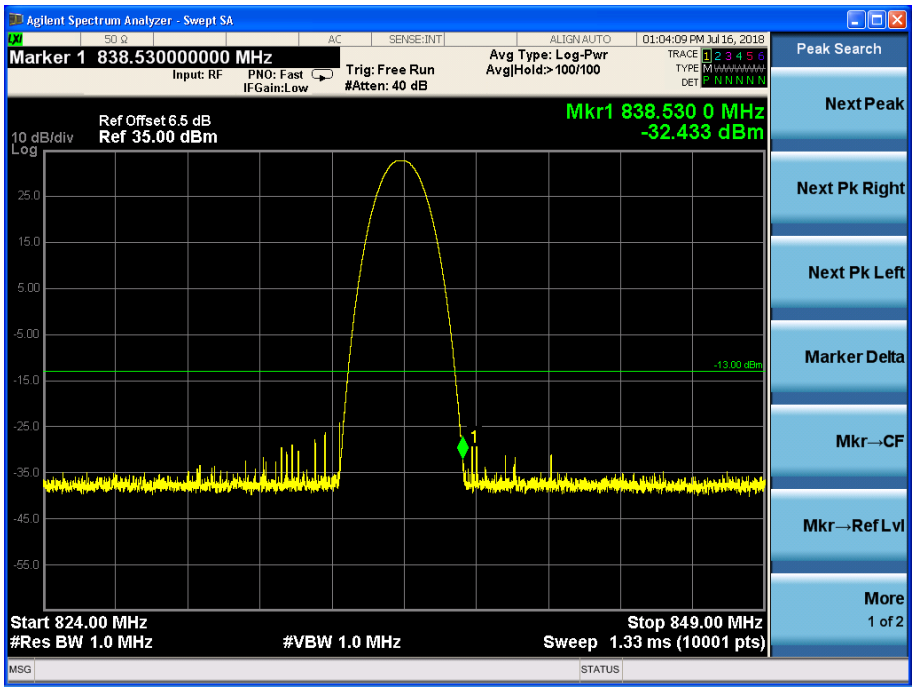
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
1850.2	512	311.6
1880.0	661	311.6
1909.8	810	309.1

Spurious Emissions at antenna terminal- FCC Part 2.1051/ 22.917(a) /Part 24.238(a)
GSM850

GSM/GPRS MODE:

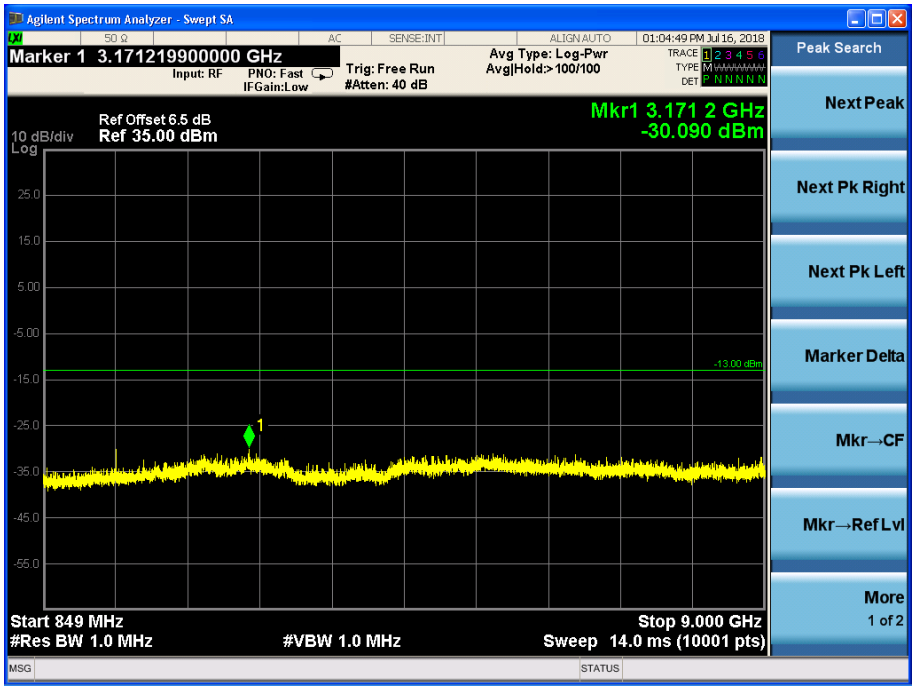


Channel 189, 30MHz~824MHz



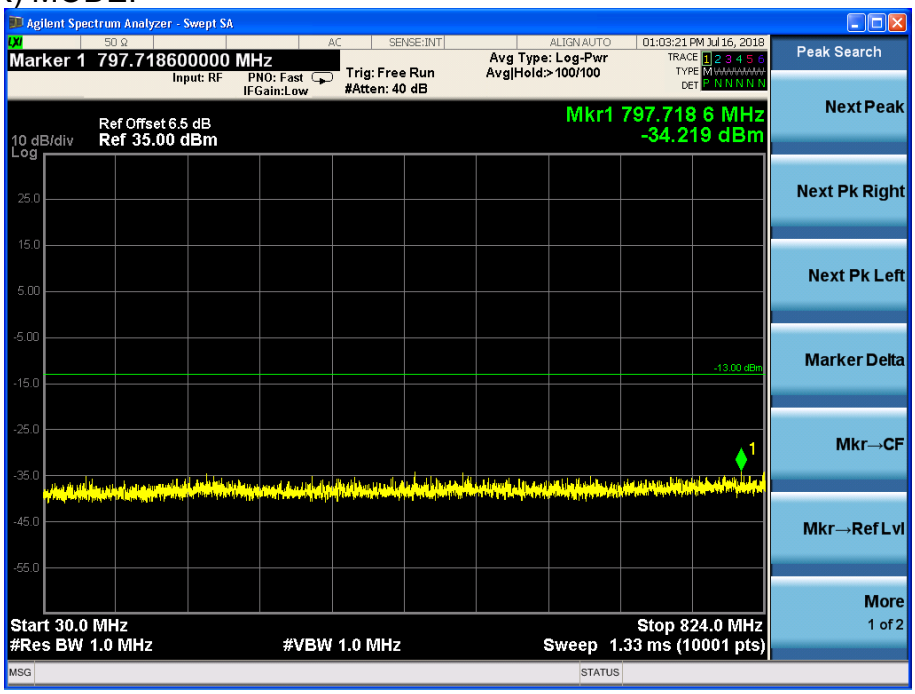
Channel 189, 824MHz~849MHz

Note: The signal beyond the limit is the signal transmitted by EUT.

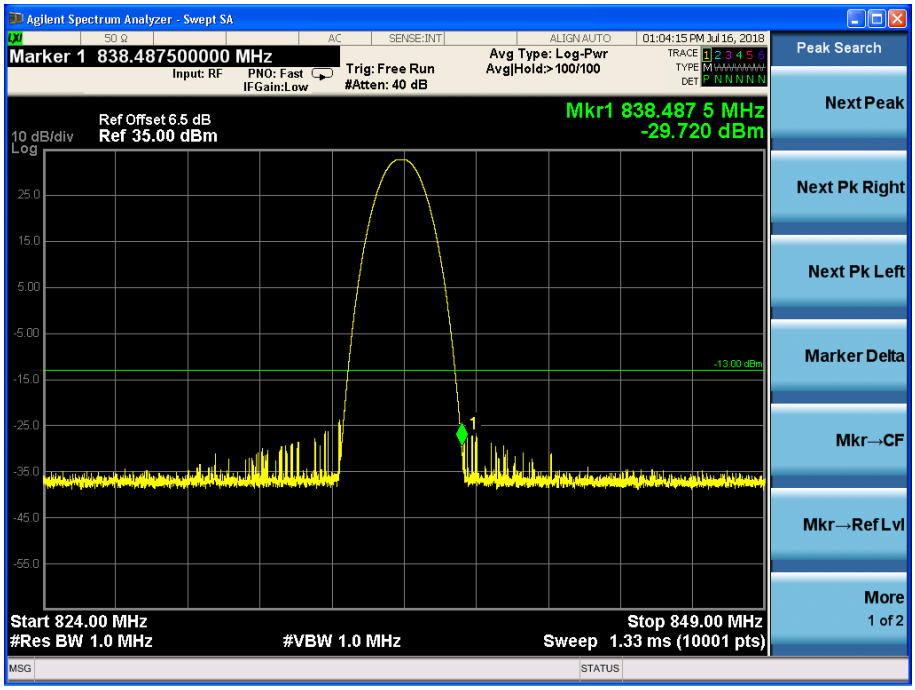


Channel 189, 849MHz~9GHz

EDGE (GMSK) MODE:

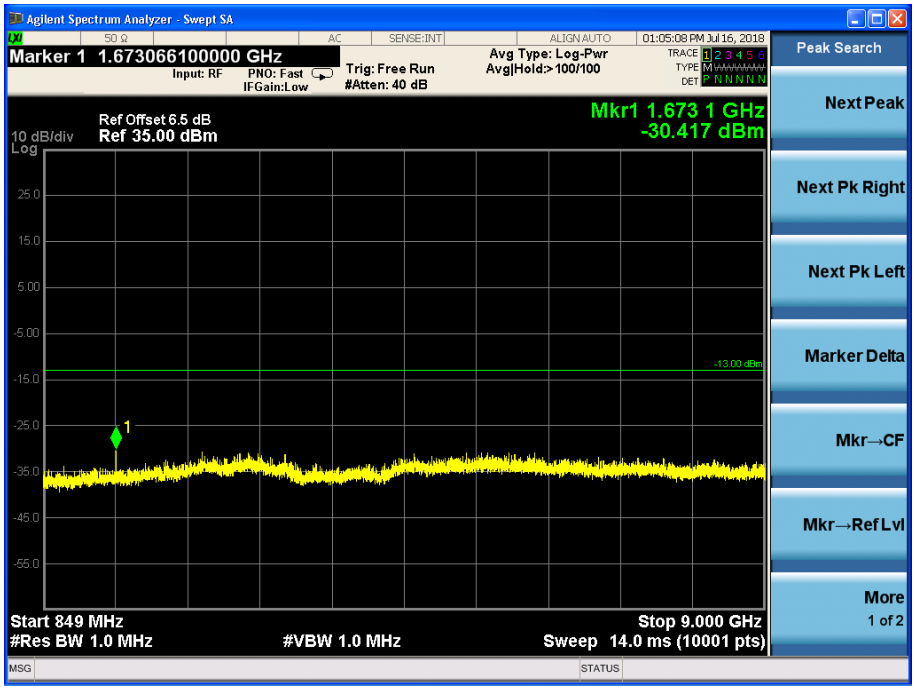


Channel 189, 30MHz~824MHz



Channel 189, 824MHz~849MHz

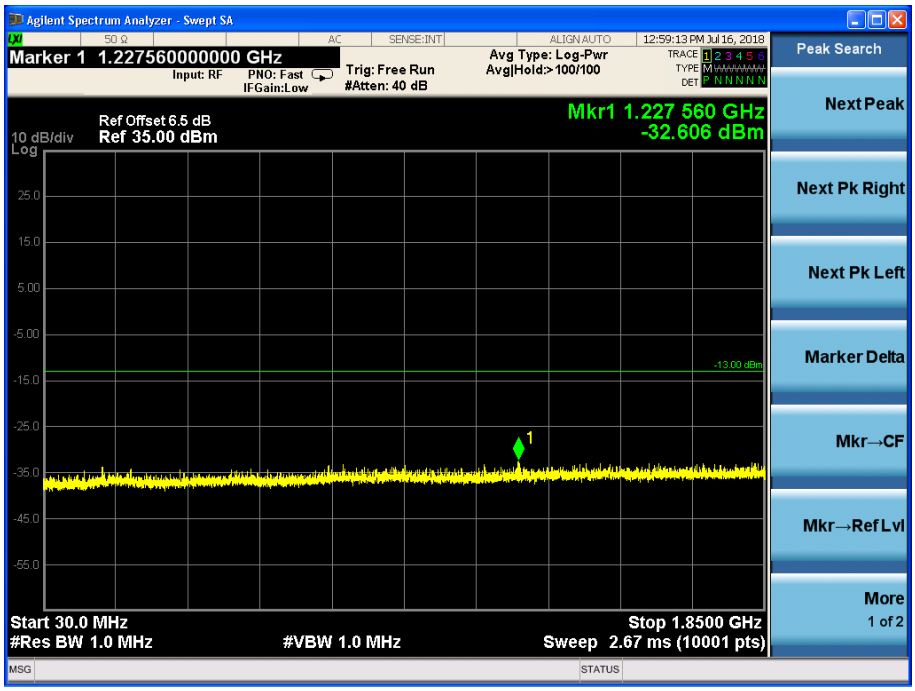
Note: The signal beyond the limit is the signal transmitted by EUT.



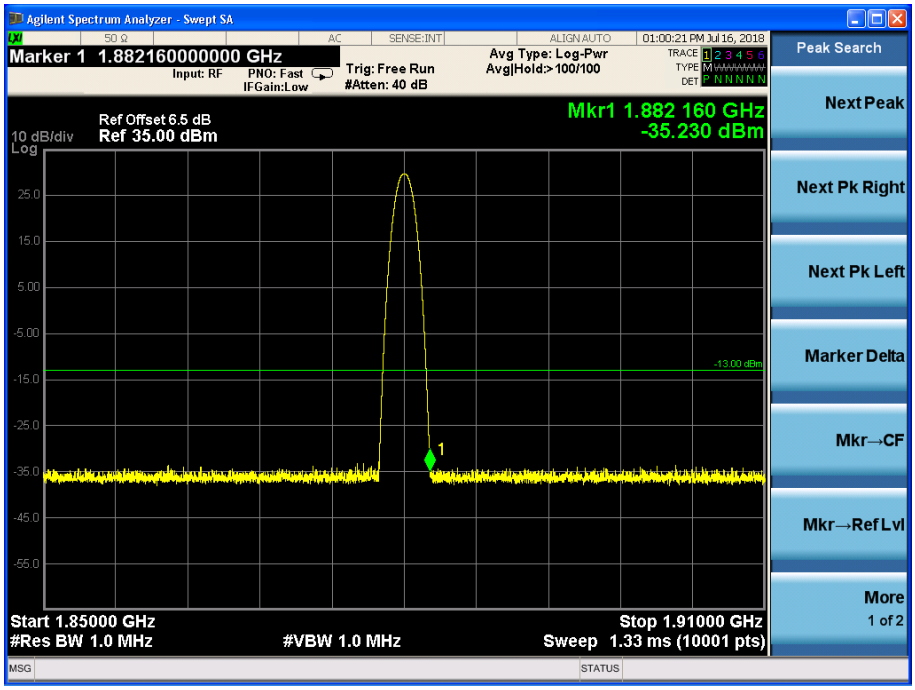
Channel 189, 849MHz~9GHz

PCS1900

GSM/GPRS MODE:

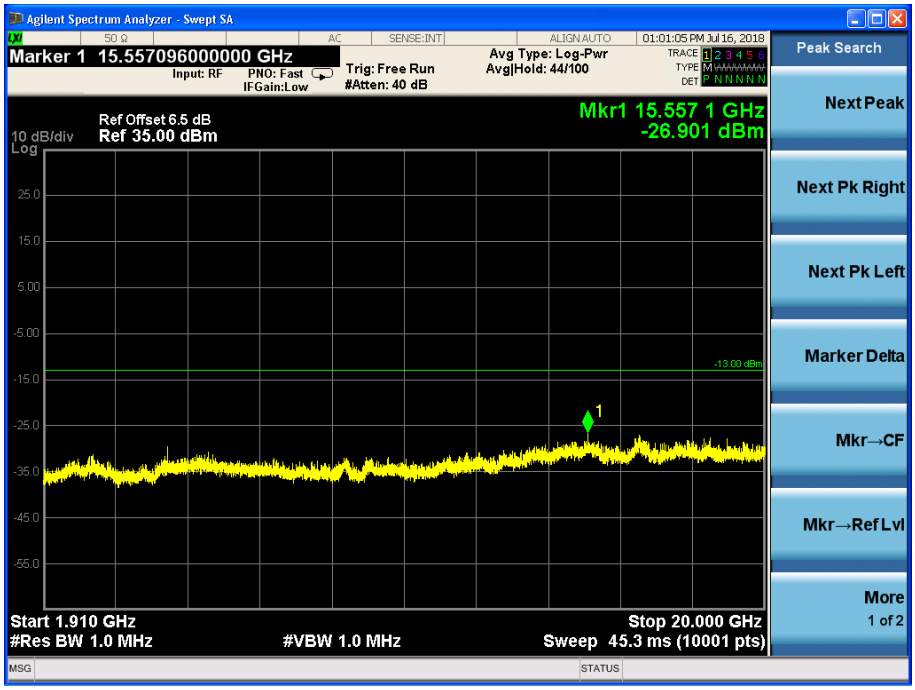


Channel 661, 30MHz~1850MHz



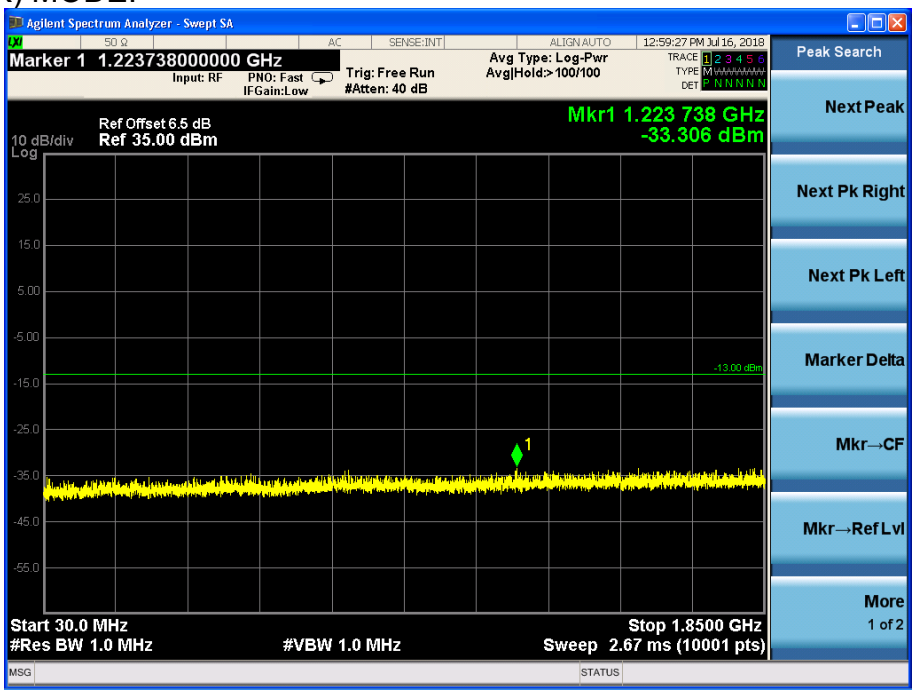
Channel 661, 1850MHz~1910MHz

Note: The signal beyond the limit is the signal transmitted by EUT.

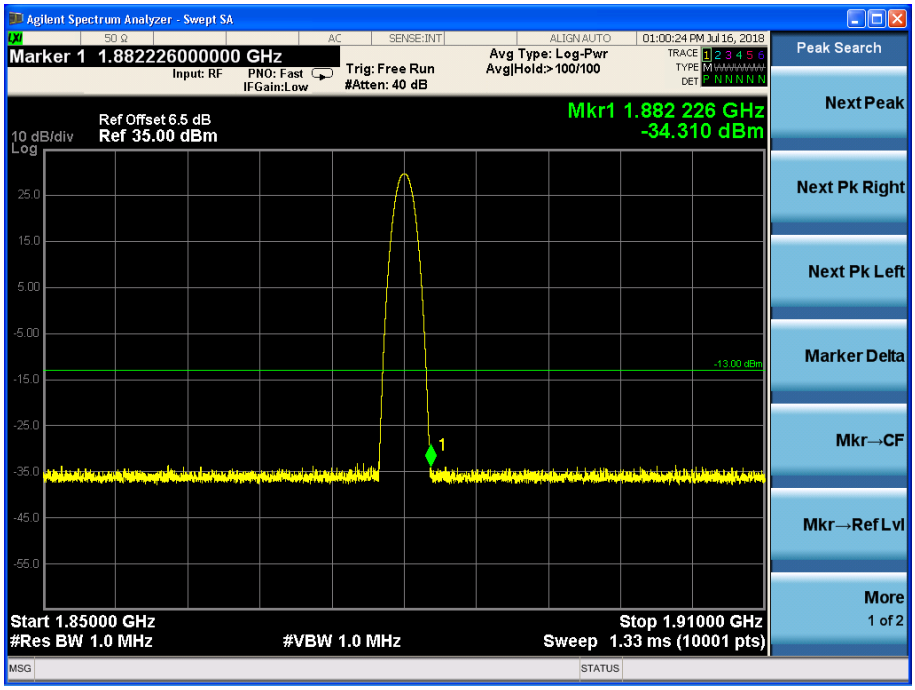


Channel 661, 1910MHz~20GHz

EDGE (GMSK) MODE:

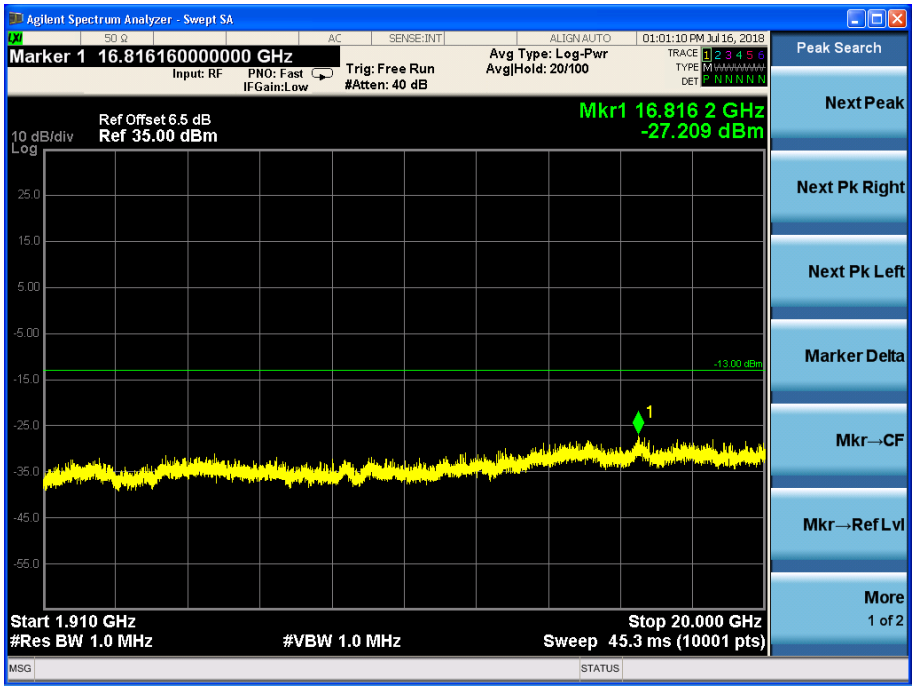


Channel 661, 30MHz~1850MHz



Channel 661, 1850MHz~1910MHz

Note: The signal beyond the limit is the signal transmitted by EUT.

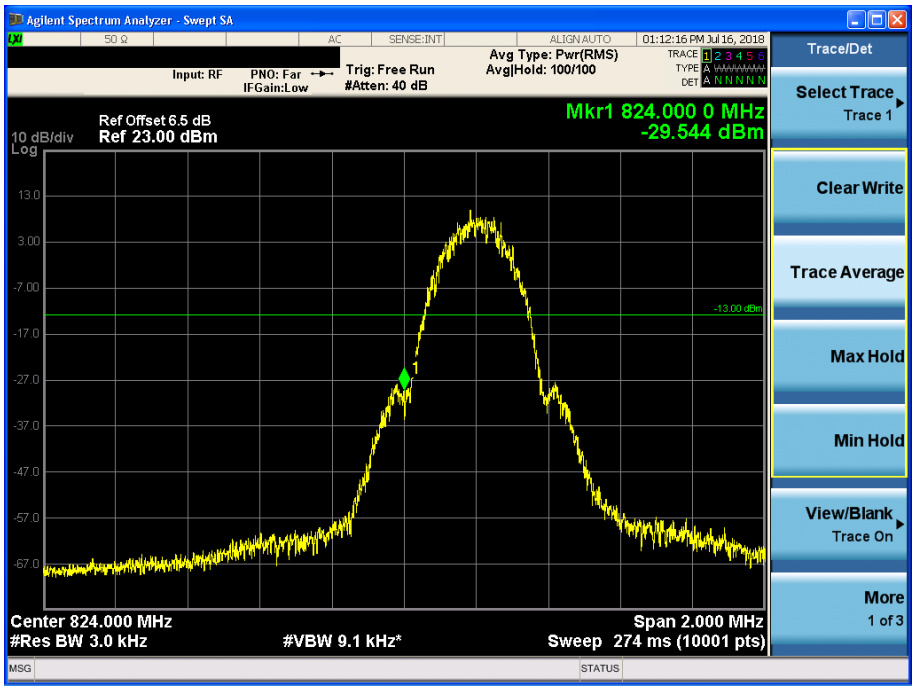


Channel 661, 1910MHz~20GHz

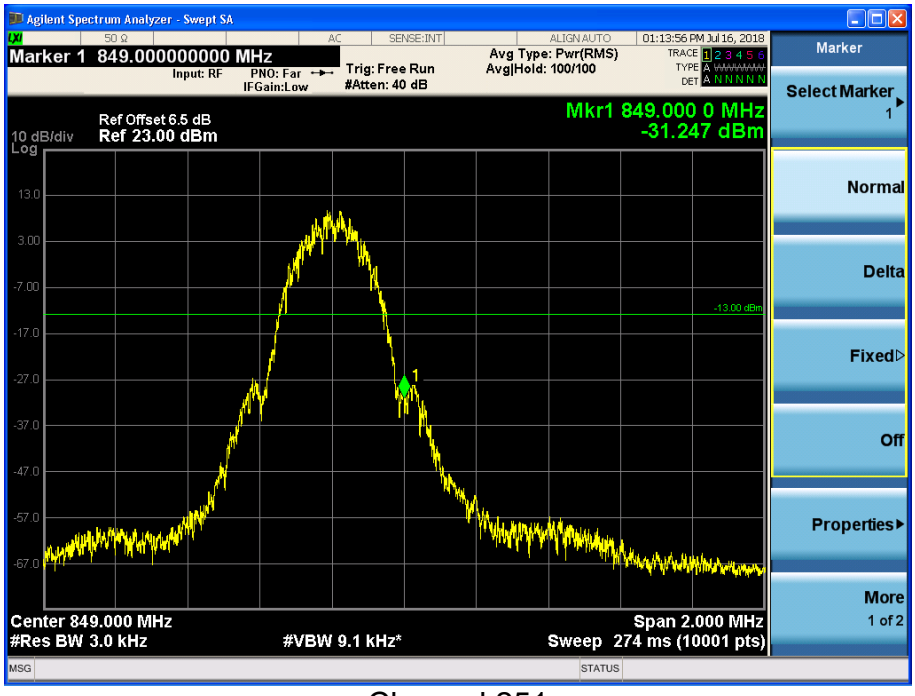
Band Edges Compliance- FCC Part 2.1051/ 22.917(a) /Part 24.238(a)

GSM850

GSM/GPRS MODE:

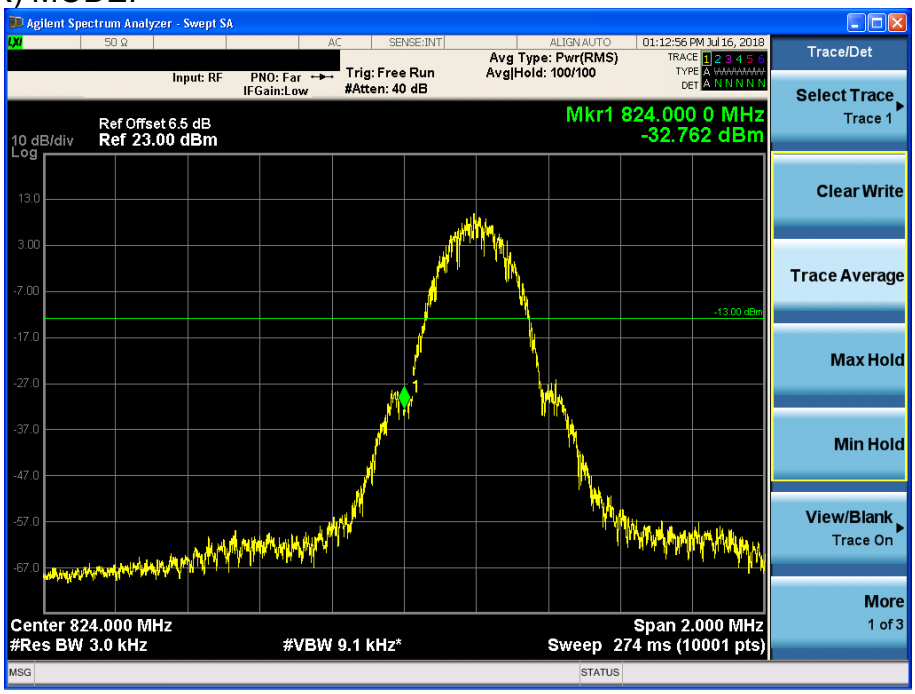


Channel 128

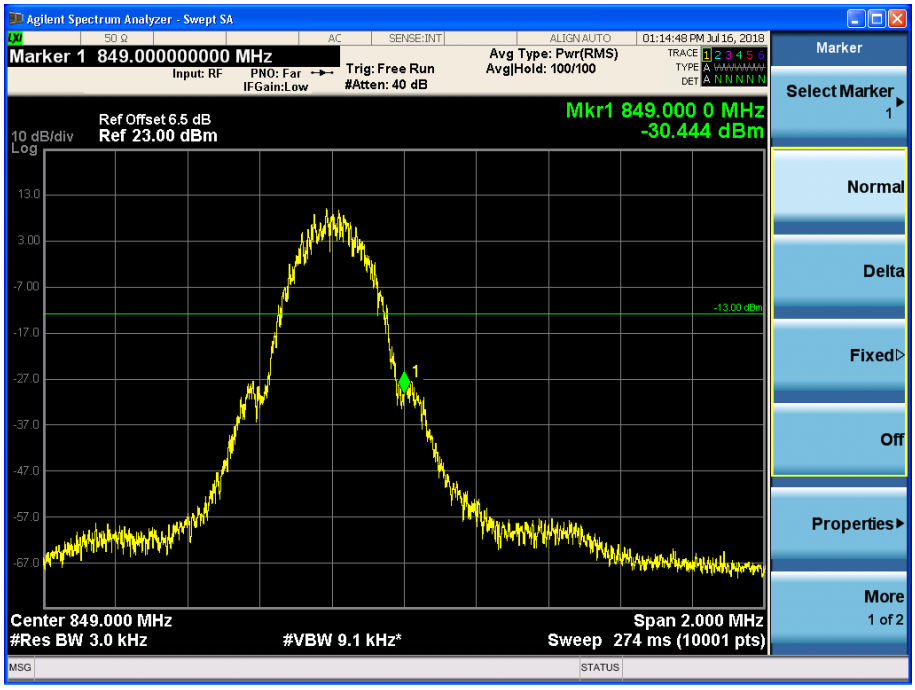


Channel 251

EDGE (GMSK) MODE:



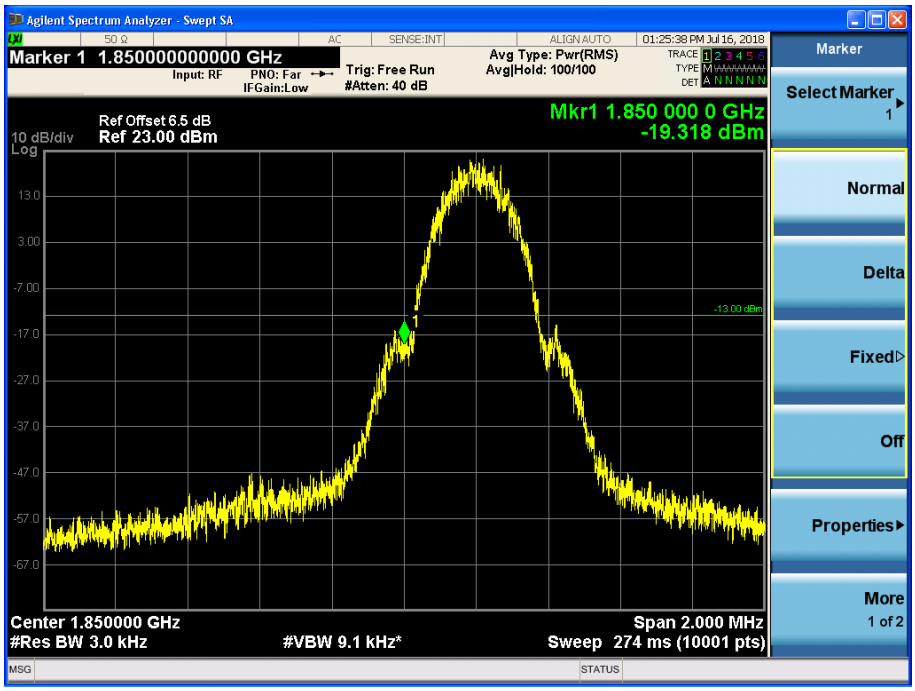
Channel 128



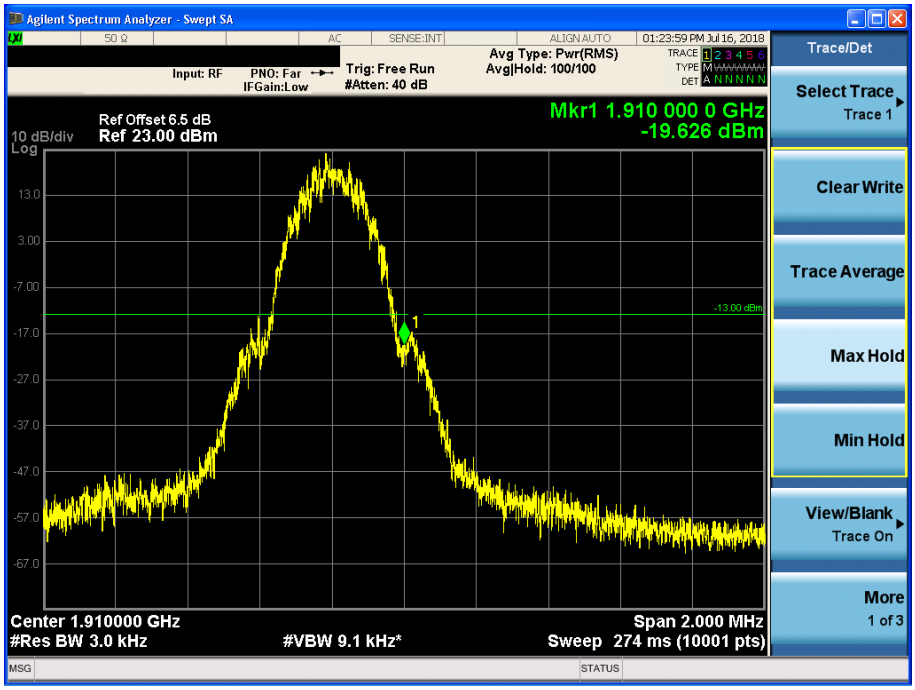
Channel 251

PCS1900

GSM/GPRS MODE:

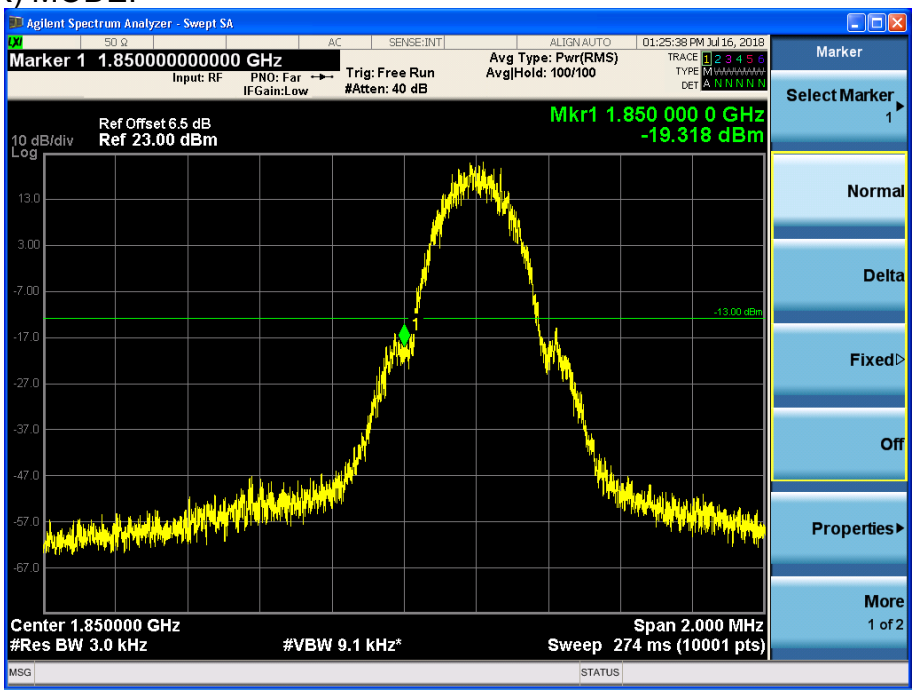


Channel 512

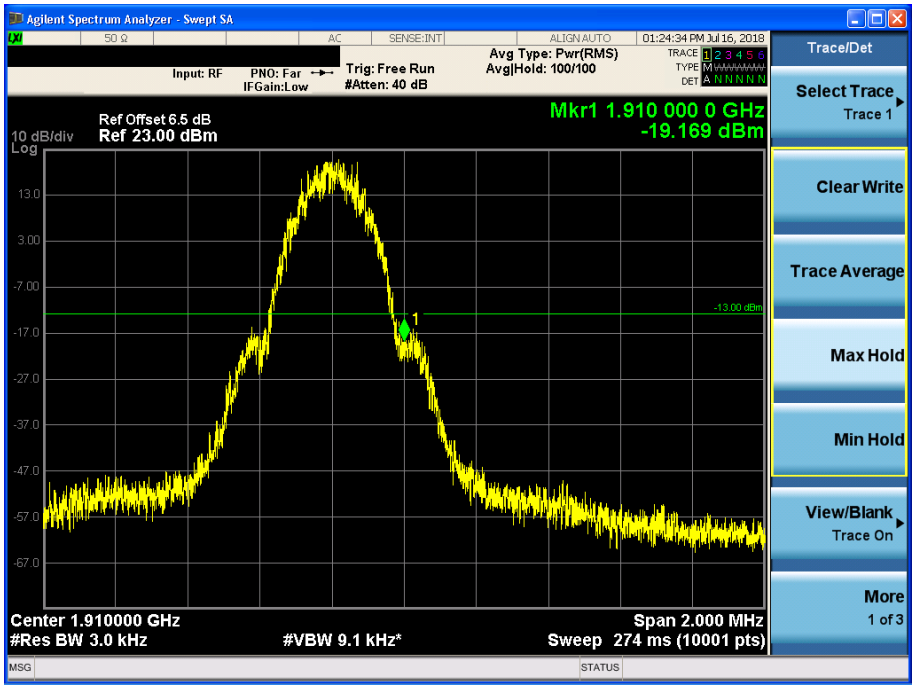


Channel 810

EDGE (GMSK) MODE:



Channel 512



Channel 810

Frequency Stability- FCC Part 2.1055/22.355 /Part 24.235

GSM850

GSM/GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-20	0.013	0.013	0.013
-10	0.010	0.012	0.015
0	0.007	0.011	0.013
+10	0.008	0.015	0.012
+20	0.011	0.018	0.012
+30	0.010	0.012	0.015
+40	0.014	0.023	0.011
+50	0.012	0.010	0.012
+55	0.012	0.010	0.012

Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	0.010	0.009	0.012
HV	0.013	0.009	0.011

EDGE (GMSK) MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-10	0.011	0.013	0.021
-20	0.010	0.012	0.015
0	0.007	0.011	0.013
+10	0.006	0.015	0.012
+20	0.009	0.012	0.009
+30	-0.010	0.012	0.015
+40	0.012	0.011	0.011
+50	0.012	-0.010	0.012
+55	0.012	0.010	0.012

Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	0.011	0.013	0.011
HV	0.012	0.016	0.013

PCS1900

GSM/GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-20	0.012	0.013	0.013
-10	0.010	0.012	0.015
0	0.012	0.011	0.013
+10	0.006	0.008	0.014
+20	0.009	0.012	0.009
+30	0.010	0.012	0.015
+40	0.015	0.011	0.011
+50	0.014	0.013	0.012
+55	0.012	0.010	0.012

Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	0.011	0.013	0.011
HV	0.013	0.009	0.012

EDGE (GMSK) MODE:

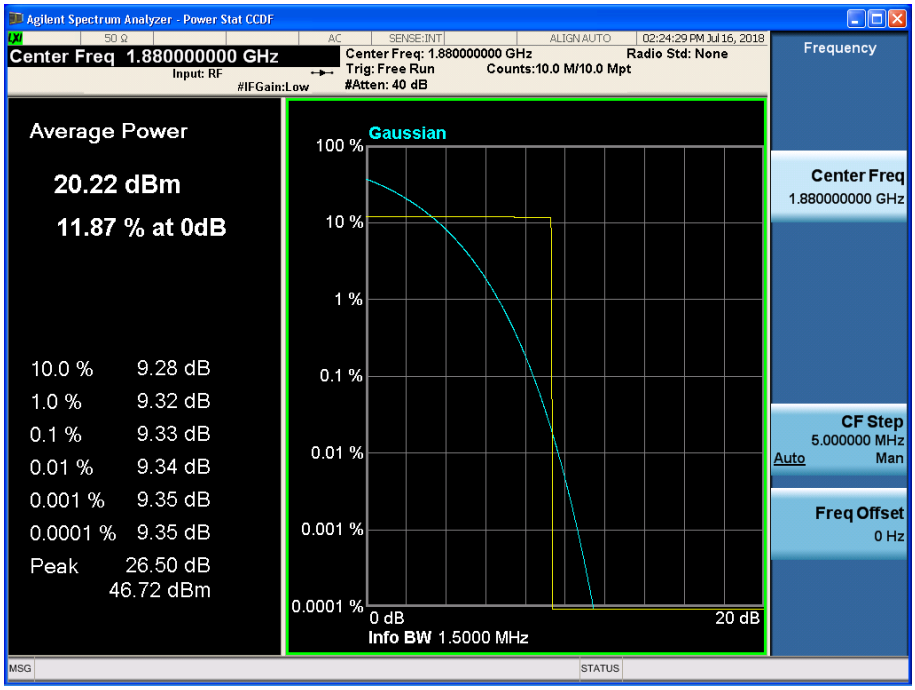
Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-20	-0.011	0.034	0.013
-10	0.010	0.012	0.015
0	0.007	-0.011	0.013
+10	0.006	0.015	0.027
+20	-0.009	0.013	-0.012
+30	0.010	0.012	0.015
+40	-0.012	-0.011	0.011
+50	0.012	0.017	0.012
+55	0.012	-0.010	0.012

Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	0.012	0.023	0.011
HV	0.017	0.026	0.021

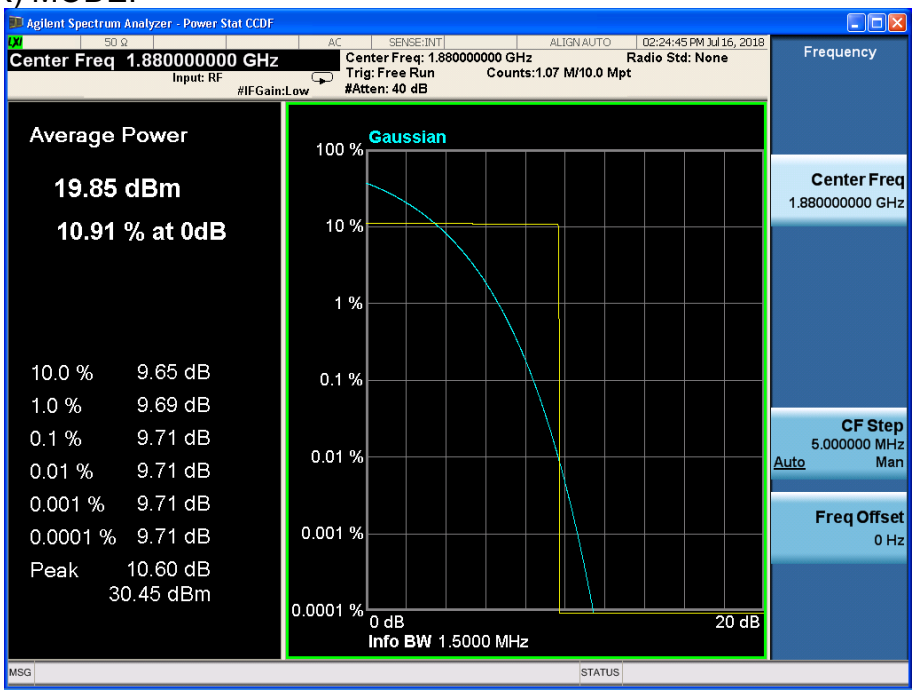
Peak-Average Ratio -FCC Part 24.232(d)

PCS1900

GSM/GPRS MODE:



EDGE (GMSK) MODE:



APPENDIX B – TEST DATA OF RADIATED EMISSION

GSM/GPRS MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.4	-49.10	-13	Vertical
2472.6	-46.61	-13	Vertical
3296.8	-39.99	-13	Vertical
1648.4	-39.53	-13	Horizontal
2472.6	-39.83	-13	Horizontal
3296.8	-39.04	-13	Horizontal

EDGE (GMSK) MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.4	-48.46	-13	Vertical
2472.6	-46.90	-13	Vertical
3296.8	-39.72	-13	Vertical
1648.4	-39.88	-13	Vertical
2472.6	-39.79	-13	Vertical
3296.8	-40.30	-13	Vertical

GSM/GPRS MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1673.2	-48.88	-13	Vertical
2509.8	-47.01	-13	Vertical
3346.4	-39.53	-13	Vertical
1673.2	-39.84	-13	Horizontal
2509.8	-39.95	-13	Horizontal
3346.4	-39.23	-13	Horizontal

EDGE (GMSK) MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1673.2	-49.04	-13	Vertical
2509.8	-46.52	-13	Vertical
3346.4	-39.67	-13	Vertical
1673.2	-39.57	-13	Horizontal
2509.8	-39.24	-13	Horizontal
3346.4	-39.06	-13	Horizontal

GSM/GPRS MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1697.6	-46.03	-13	Vertical
2546.4	-47.78	-13	Vertical
3395.2	-40.51	-13	Vertical
1697.6	-40.17	-13	Horizontal
2546.4	-41.16	-13	Horizontal
3395.2	-40.18	-13	Horizontal

EDGE (GMSK) MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1697.6	-47.21	-13	Vertical
2546.4	-48.71	-13	Vertical
3395.2	-40.39	-13	Vertical
1697.6	-41.08	-13	Horizontal
2546.4	-40.47	-13	Horizontal
3395.2	-40.66	-13	Horizontal

Test result:

GSM/GPRS MODE Channel 512

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
3700.4	-46.48	-13	Vertical
5550.6	-48.59	-13	Vertical
7400.8	-41.46	-13	Vertical
3700.4	-40.85	-13	Horizontal
5550.6	-41.73	-13	Horizontal
7400.8	-40.33	-13	Horizontal

EDGE (GMSK) MODE Channel 512:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
3700.4	-46.37	-13	Vertical
5550.6	-47.43	-13	Vertical
7400.8	-40.77	-13	Vertical
3700.4	-39.79	-13	Horizontal
5550.6	-40.75	-13	Horizontal
7400.8	-39.61	-13	Horizontal

GSM/GPRS MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
3760	-45.13	-13	Vertical
5640	-43.28	-13	Vertical
7520	-40.51	-13	Vertical
3760	-39.99	-13	Horizontal
5640	-40.47	-13	Horizontal
7520	-38.41	-13	Horizontal

EDGE (GMSK) MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
3760	-44.32	-13	Vertical
5640	-43.30	-13	Vertical
7520	-39.75	-13	Vertical
3760	-39.03	-13	Horizontal
5640	-40.61	-13	Horizontal
7520	-40.16	-13	Horizontal

GSM/GPRS MODE Channel 810:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
3819.6	-45.92	-13	Vertical
5729.4	-43.59	-13	Vertical
7639.2	-40.72	-13	Vertical
3819.6	-40.44	-13	Horizontal
5729.4	-41.16	-13	Horizontal
7639.2	-40.75	-13	Horizontal

EDGE (GMSK) MODE Channel 810:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
3819.6	-46.67	-13	Vertical
5729.4	-44.19	-13	Vertical
7639.2	-40.65	-13	Vertical
3819.6	-41.07	-13	Horizontal
5729.4	-41.45	-13	Horizontal
7639.2	-41.37	-13	Horizontal

---End of Test Report---