
TEST REPORT FOR GSM TESTING

Report No.: SRTC2020-9004(F)-20041302(A)

Product Name: Smartphone

Product Model: HLTE103E

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

Specification: FCC Part 24E, Part 22H, Part 2 (2019)

FCC ID: 2ADOBHLTE103E

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	2
1.1 NOTES OF THE TEST REPORT	2
1.2 INFORMATION ABOUT THE TESTING LABORATORY	2
1.3 APPLICANT'S DETAILS	2
1.4 MANUFACTURER'S DETAILS	2
1.5 TEST ENVIRONMENT	3
2 DESCRIPTION OF THE DEVICE UNDER TEST	4
2.1 FINAL EQUIPMENT BUILD STATUS	4
2.2 SUPPORT EQUIPMENT	6
2.3 SUMMARY TABLE	6
3 REFERENCE SPECIFICATION	7
4 KEY TO NOTES AND RESULT CODES	7
5 RESULT SUMMARY	8
6 TEST RESULT	9
6.1 RF POWER OUTPUT	9
6.2 EFFECTIVE RADIATED POWER	10
6.3 OCCUPIED BANDWIDTH	12
6.4 EMISSION BANDWIDTH	13
6.5 SPURIOUS EMISSIONS AT ANTENNA TERMINAL	14
6.6 BAND EDGES COMPLIANCE	15
6.7 FREQUENCY STABILITY	16
6.8 RADIATED SPURIOUS EMISSIONS	17
6.9 PEAK-AVERAGE RATIO	19
7 MEASUREMENT UNCERTAINTIES	20
8 TEST EQUIPMENTS	21
APPENDIX A – TEST DATA OF CONDUCTED EMISSION	22
APPENDIX B – TEST DATA OF RADIATED EMISSION	44

1. GENERAL INFORMATION

1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC). The test results relate only to individual items of the samples which have been tested.

The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, P.R.China
City:	Beijing
Country or Region:	P.R.China
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:	Deng Tingting
Tel:	+86-532-55753708
Fax:	---
Email:	dengtingting@hisense.com

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2020-04-13
Testing Start Date:	2020-04-13
Testing End Date:	2020-04-24

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

Normal Supply Voltage (V d.c.):	3.8
Maximum Extreme Supply Voltage (V d.c.):	3.5
Minimum Extreme Supply Voltage (V d.c.):	4.35

2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Frequency Range	GSM850: Tx:824~849MHz Rx:869~894MHz PCS1900: Tx:1850~1910MHz Rx:1930~1990MHz
Modulation Type	GPRS:GMSK EDGE: GMSK/8PSK
Emission Designator	300KGXW/300KG7W
Duplex Mode	FDD
Duplex Spacing	GSM850:45MHz PCS1900:80MHz
Antenna Type	Fixed Internal Antenna
Antenna Gain	GSM850: -1.0dBi/PCS1900: -0.83dBi
Power Supply	Battery/Charger
Hardware Version	FS273--MB-V2.1
Software Version	Hisense_HLTE103E_20_S01_01_02_MX05
IMEI	868468040001265

Note: The equipments have two supplies, are different on the supplier of Camear, LCD, Battery, Memory and color. These differences don't affect RF performance.

Main Supply

Part Name	Model	Supplier(Brand)	Description
Camera	BC15314 V0	LUZHOU Chengxiangtong technology CO.,LTD	Front CAM
Camera	BM1A300 V0		
CTP	Y140071B2-R	Dongguan Yuye Communication Technology CO.,ted	
LCD	Y88448	Shenzhen Digital Technology Co.,Ltd	
Battery	LIW380245	SHENZHEN UTILITY POWER SOURCE CO.,LTD	
Memory	KMQE60013M-B318	SAMSUNG	

Secondary Supply

Part Name	Model Name	Supplier(Brand)	Description
Camera	ST-CFKS103A-FF-V1.0	Shenzhen Union Image Co.,Ltd	Front CAM
Camera	ST-CFKS103A-13MBA-V1.0	Shenzhen Union Image Co.,Ltd	
CTP	YX57042TSBA00	Shengzhen AGS Optronics Tech(ShenZhen) , co.,	
LCD	FPC-K1398A-01	SHENZHEN KINGDOM SCIENCE & TECHNOLOGY CO.,LTD	
Battery	LIW380245	ShenzhenAerospaceElectronicCo.,Ltd.	
Memory	KMQE10013M-B318	SAMSUNG	

2.2 Support Equipment

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

Equipment	Battery 1
Manufacturer	Shenzhen Utility Power Source Co.,Ltd.
Model Number	KS103

Equipment	Battery 2
Manufacturer	ShenzhenAerospaceElectronic Co.,Ltd.
Model Number	KS103

Equipment	Charger
Manufacturer	Shenzhen Tianyin Electronics Co.,Ltd.
Model Number	TPA-97050100UW01

Equipment	Headset
Manufacturer	Dongguan Keling Electronic Technology Co., Ltd.
Model Number	KS103

2.3 Summary table.

FCC Rule Part	Mode	Frequency Range (MHz)	ERP/ EIRP (dBm)	ERP/ EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
22H	GSM850	824.2-848.8	34.12	2.582	0.097	250KGXW
22H	EDGE850	824.2-848.8	27.72	0.592	0.083	248KG7W
24E	GSM1900	1850.2-1909.8	32.31	1.702	0.089	252KGXW
24E	EDGE1900	1850.2-1909.8	29.27	0.845	-0.052	247KG7W

3 REFERENCE SPECIFICATION

Specification	Version	Title
FCC Part2	2019	Frequency allocations and radio treaty matters; general rules and regulations
FCC Part22	2019	Public mobile services
FCC Part24	2019	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

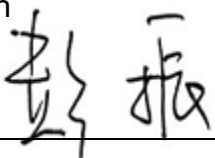
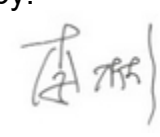
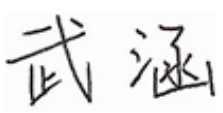
4 KEY TO NOTES AND RESULT CODES

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
1	RF Power Output	2.1046	Pass
2	Effective Radiated Power and Effective Isotropic Radiated Power	22.913(a)(5)/24.232(c)	Pass
3	Occupied Bandwidth	2.1049	Pass
4	Emission Bandwidth	2.1049	Pass
5	Spurious Emissions at antenna terminals	2.1051/22.917(a)/24.238(a)	Pass
6	Band Edges Compliance	2.1051/22.917(a)/24.238(a)	Pass
7	Frequency Stability	2.1055/22.355/24.235	Pass
8	Radiated Spurious Emissions	2.1053/22.917(a)/24.238(a)	Pass
9	Peak-Average Ratio	24.232(d)	Pass

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Miss.Wu Han 	Issued date: 20200506

6 TEST RESULT

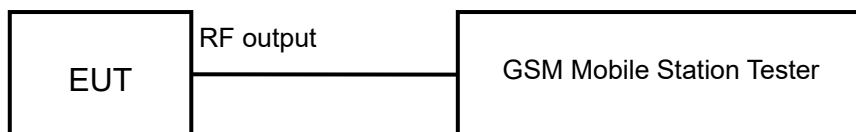
6.1 RF Power Output

Rule Part(s)
FCC Part 2.1046

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. 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

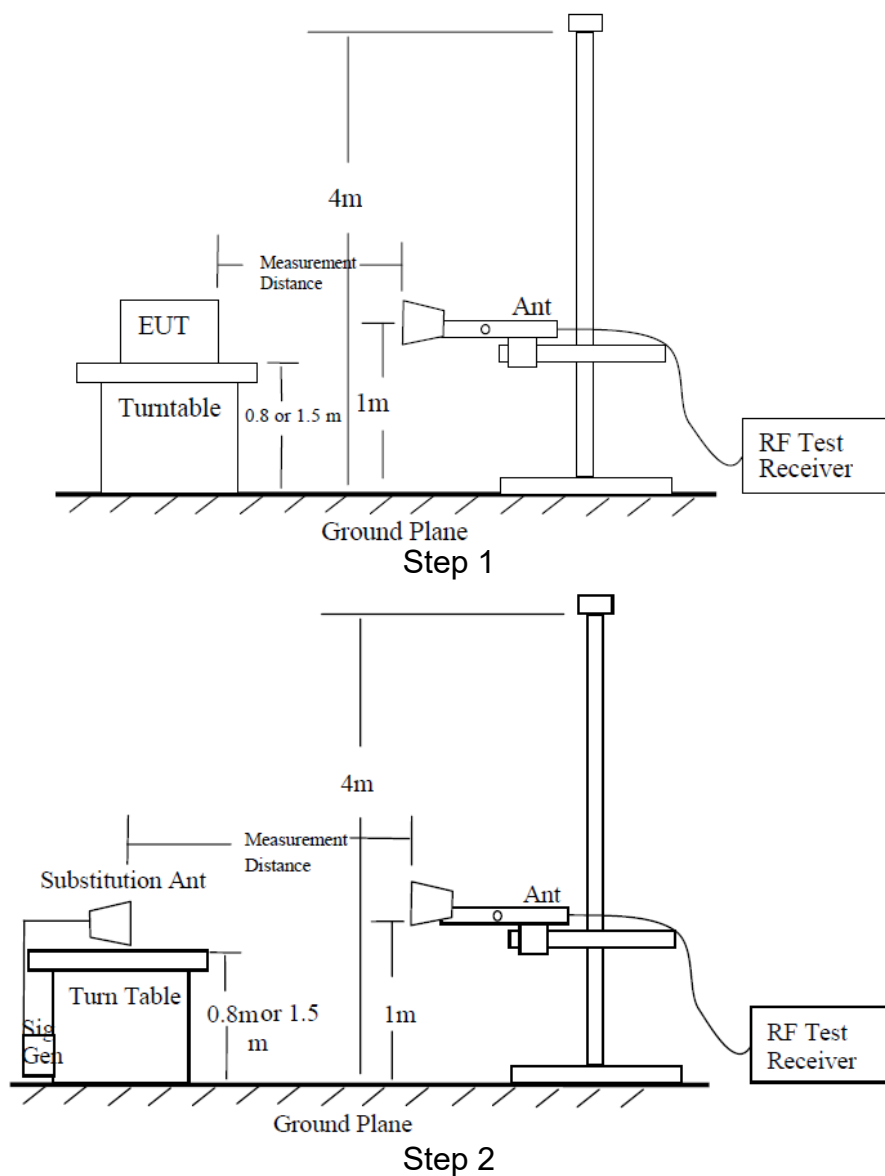
Rule Part(s)

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

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test setup:



Test procedure:

The measurements procedures in TIA-603-E-2016 are used.

Step 1:

The measurement is carried out in the chamber. EUT was placed on a 0.8m ($f < 1\text{GHz}$)/1.5m ($f > 1\text{GHz}$) high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna from 1m to 4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 100KHz($f < 1\text{GHz}$)/1MHz ($f > 1\text{GHz}$). The antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value on spectrum analyzer or receiver. 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.

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).

Limits for GSM850:

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

Limits for PCS1900:

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

Test result:

The test results are shown in Appendix B.

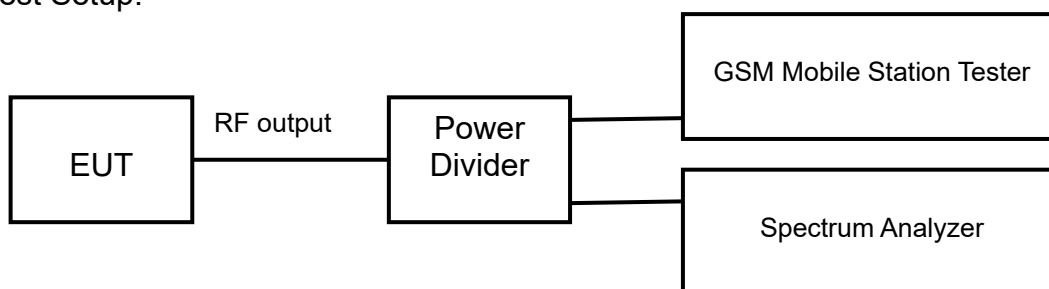
6.3 Occupied Bandwidth

Rule Part(s)
Part 2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 – Section 4.2

Test Settings

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

Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

The test results are shown in Appendix A.

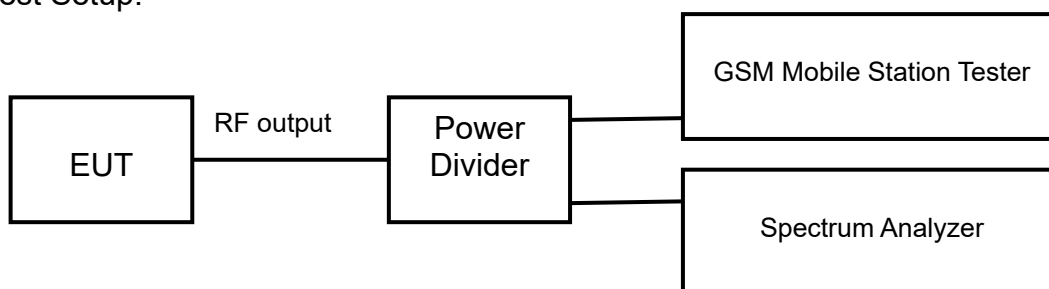
6.4 Emission Bandwidth-

Rule Part(s)
Part 2.1049

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 – Section 4.2

Test Settings

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

Limits: No specific occupied bandwidth requirements in part 2.1049

Test result:

The test results are shown in Appendix A.

6.5 Spurious Emissions at antenna terminal

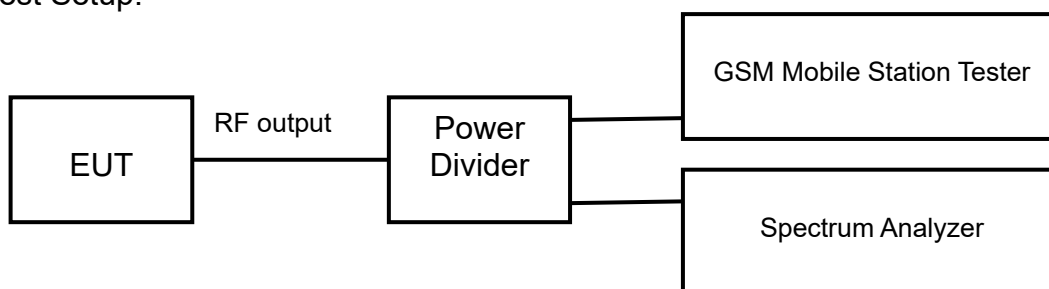
Rule Part(s)

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

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

Limits:

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

Test result:

The test results are shown in Appendix A.

6.6 Band Edges Compliance

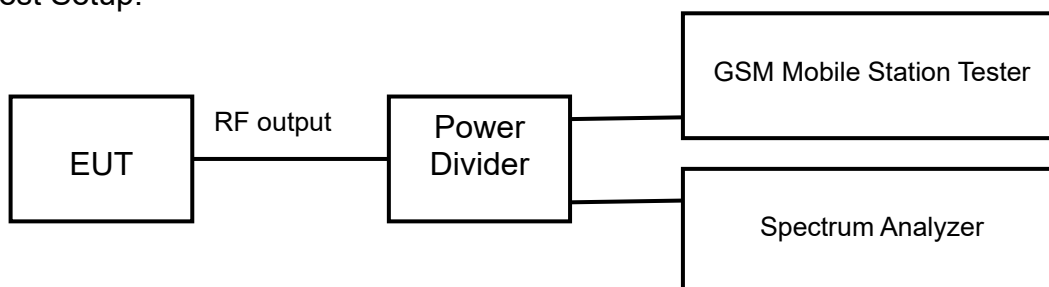
Rule Part (s)

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

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

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

Test result:

The test results are shown in Appendix A.

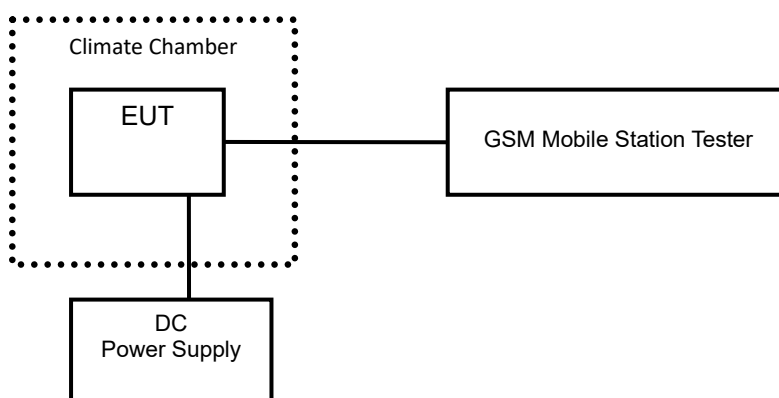
6.7 Frequency Stability

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

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test setup:



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

Test Settings

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

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

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

6.8 Radiated Spurious Emissions

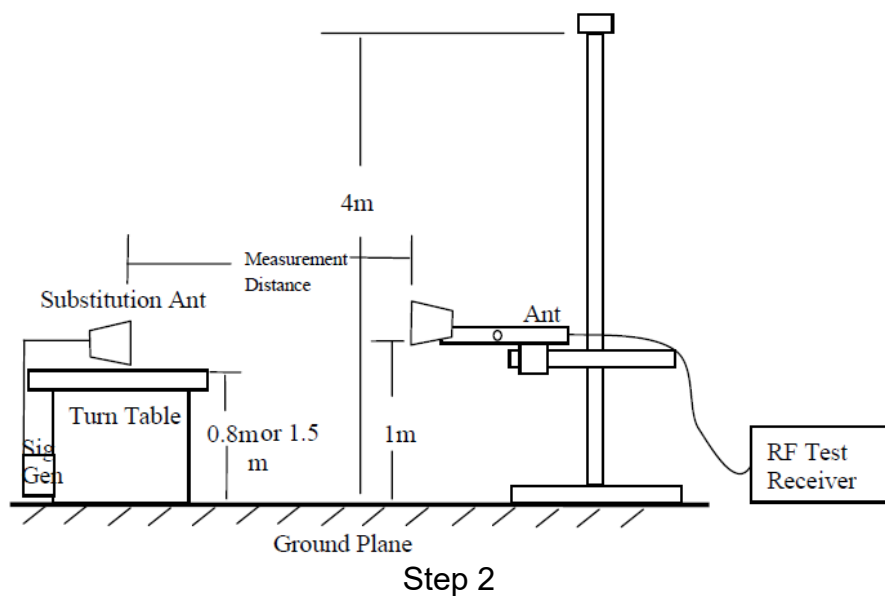
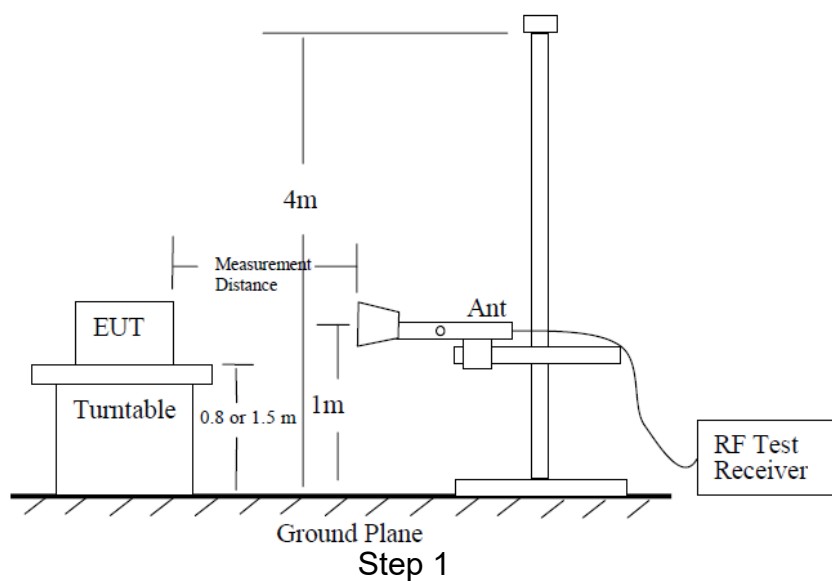
Rule Part(s)

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

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

Test Setup:



Test procedure:

The measurements procedures in TIA-603-E-2016 are used.

The spectrum was scanned from 30MHz to the 10th harmonic of the highest frequency generated within the equipment.

Step 1:

The measurement is carried out in the chamber. EUT was placed on a 0.8m ($f < 1\text{GHz}$)/1.5m ($f > 1\text{GHz}$) high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna from 1m to 4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 100 kHz ($f < 1\text{GHz}$)/1MHz ($f > 1\text{GHz}$). The antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum power value on spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 10th harmonic of the carrier. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

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

A "reference path loss" should be calculated after test. The attenuation of "reference path loss" is the cable loss between the Signal Source with the Substitution Antenna (P_{ca}) and the Substitution Antenna Gain (G_a).

Calculation procedure:

The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:

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

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

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

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

Test result:

The test results are shown in Appendix B.

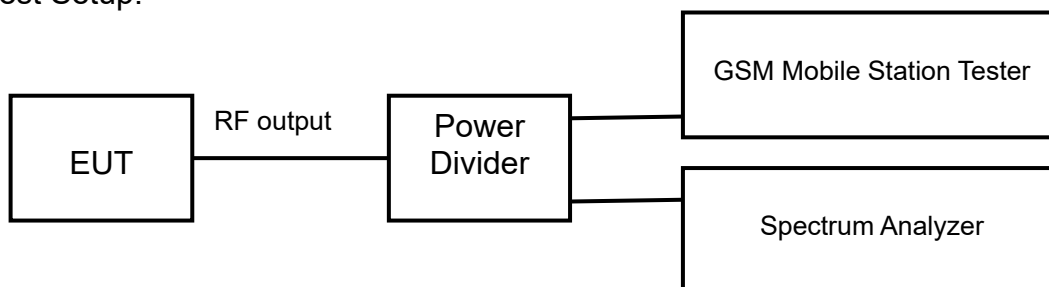
6.9 Peak-Average Ratio

Rule Part(s)
FCC Part 24.232(d)

Ambient condition:

Temperature	Relative humidity	Pressure
25°C	30%	101.9kPa

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	
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	2019.08.20	2020.08.19
2	N9020A Spectrum Analyzer	Agilent	MY48010771	2019.08.20	2020.08.19
3	6007 Power Divider	Weinschel	6007-GJ-1	2019.08.20	2020.08.19
4	DC Power Supply E3645A	Agilent	MY40000741	2020.03.01	2021.02.28
5	Temperature chamber SH241	ESPEC	92013758	2019.08.20	2020.08.19
6	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	----	----	----
7	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	---	----	----
8	Turn table Diameter: 1m	FRANKONIA	----	----	----
9	Turn table Diameter: 5m	FRANKONIA	----	----	----
10	Antenna master FAC(MA4.0)	MATURO	----	----	----
11	Antenna master SAC(MA4.0)	MATURO	----	----	----
12	9.080m×5.255m×3.525m Shielding room	FRANKONIA	----	----	----
13	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	2019.08.20	2020.08.19
14	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100513	2019.08.20	2020.08.19
15	HL562 Ultra log antenna	R&S	100016	2019.08.20	2020.08.19
16	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2019.08.20	2020.08.19
17	ESI 40 EMI test receiver	R&S	100015	2019.08.20	2020.08.19
18	ESCS30 EMI test receiver	R&S	100029	2019.08.20	2020.08.19
19	HL562 Receive antenna	R&S	100167	2019.08.20	2020.08.19
20	ENV216 AMN	R&S	3560.6550.12	2019.08.20	2020.08.19

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

RF Power Output

GSM850

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
824.2	128	32.98
836.4	189	33.03
848.8	251	33.00

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	4Downlink1uplink	33.04
836.4	189		32.98
848.8	251		33.01
824.2	128	3Downlink2uplink	31.07
836.4	189		30.99
848.8	251		31.04
824.2	128	2Downlink3uplink	28.84
836.4	189		28.80
848.8	251		28.82
824.2	128	1Downlink4uplink	26.61
836.4	189		26.55
848.8	251		26.57

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
824.2	128	8DPSK 4Downlink1uplink	26.59
836.4	189		26.79
848.8	251		26.36
824.2	128	8DPSK 3Downlink2uplink	24.48
836.4	189		24.54
848.8	251		23.79
824.2	128	8DPSK 2Downlink3uplink	21.85
836.4	189		21.47
848.8	251		21.25
824.2	128	8DPSK 1Downlink4uplink	19.74
836.4	189		19.64
848.8	251		19.58

PCS1900

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1850.2	512	29.82
1880.0	661	29.75
1909.8	810	29.84

GPRS Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
1850.2	512	4Downlink1uplink	29.82
1880.0	661		29.75
1909.8	810		29.84
1850.2	512	3Downlink2uplink	28.24
1880.0	661		28.03
1909.8	810		27.86
1850.2	512	2Downlink3uplink	26.22
1880.0	661		25.97
1909.8	810		25.80
1850.2	512	1Downlink4uplink	24.19
1880.0	661		23.94
1909.8	810		23.77

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)
1850.2	512	8DPSK 4Downlink1uplink	25.77
1880.0	661		26.68
1909.8	810		25.73
1850.2	512	8DPSK 3Downlink2uplink	24.08
1880.0	661		25.02
1909.8	810		24.13
1850.2	512	8DPSK 2Downlink3uplink	21.65
1880.0	661		22.38
1909.8	810		22.05
1850.2	512	8DPSK 1Downlink4uplink	20.24
1880.0	661		20.17
1909.8	810		19.58

Occupied Bandwidth

GSM850

GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	249.75
836.4	189	244.77
848.8	251	245.62

EDGE (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
824.2	128	247.12
836.4	189	248.01
848.8	251	240.21

PCS1900

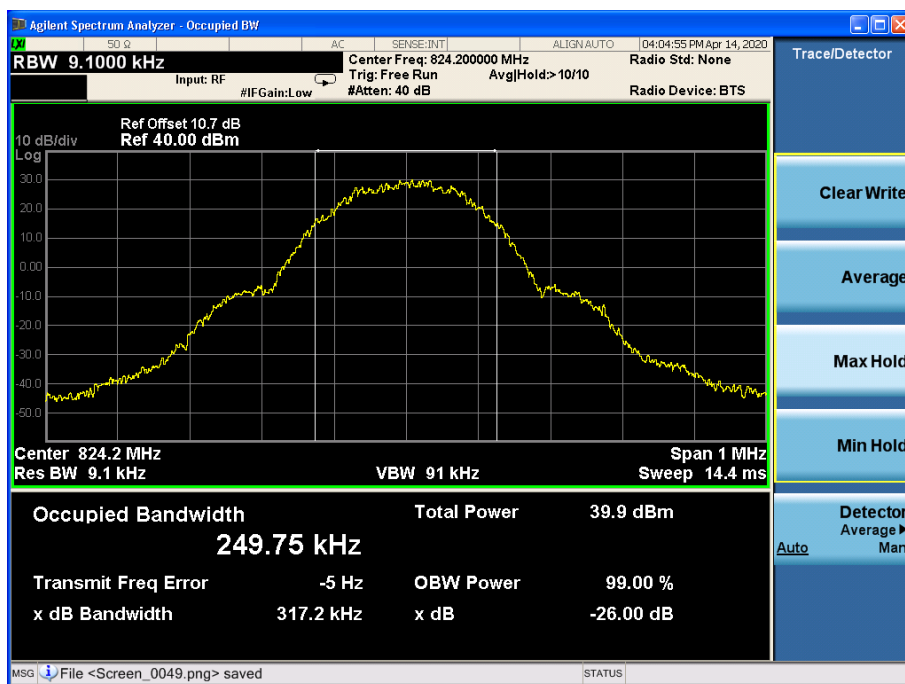
GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	251.96
1880.0	661	248.96
1909.8	810	247.84

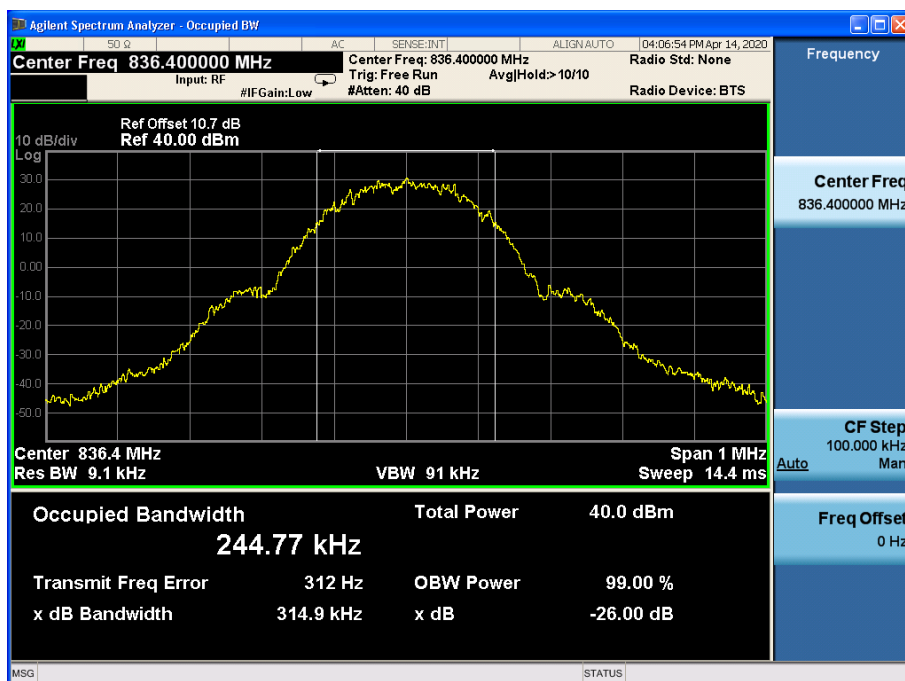
EDGE (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of 99% Power (kHz)
1850.2	512	237.11
1880.0	661	247.25
1909.8	810	246.02

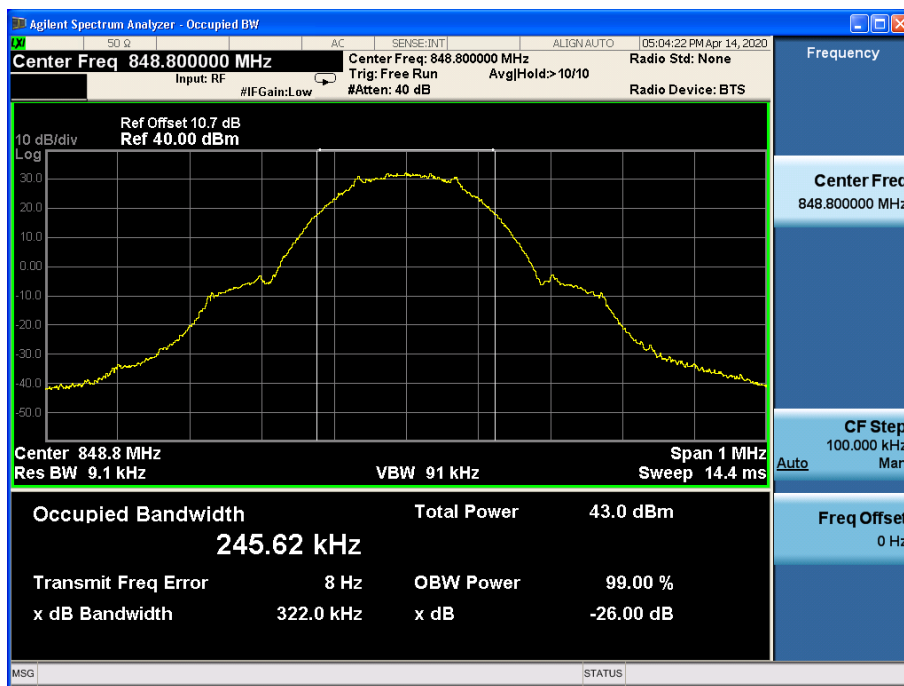
GPRS MODE:



Channel 128

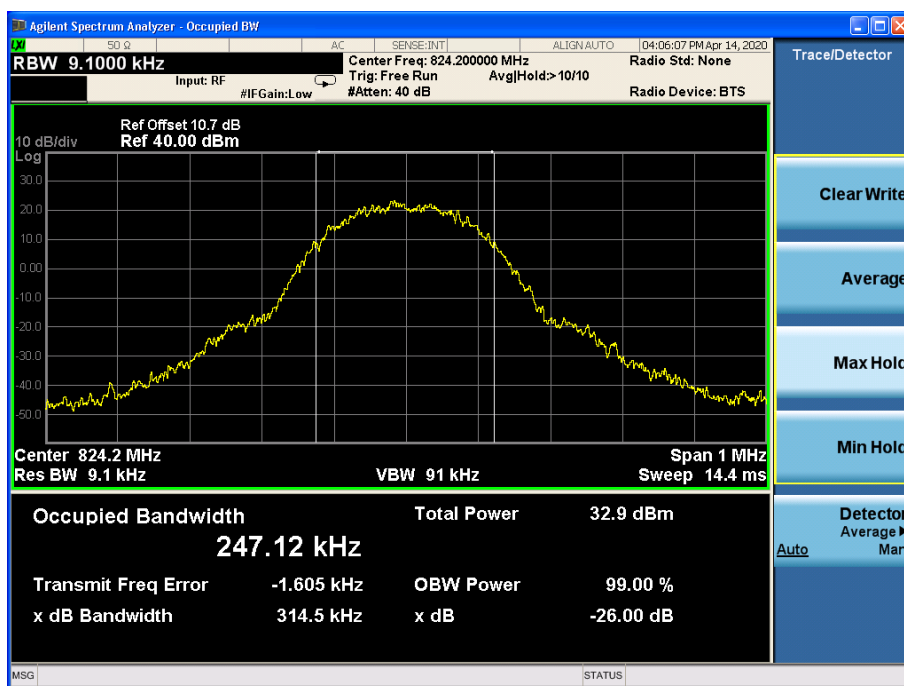


Channel 189

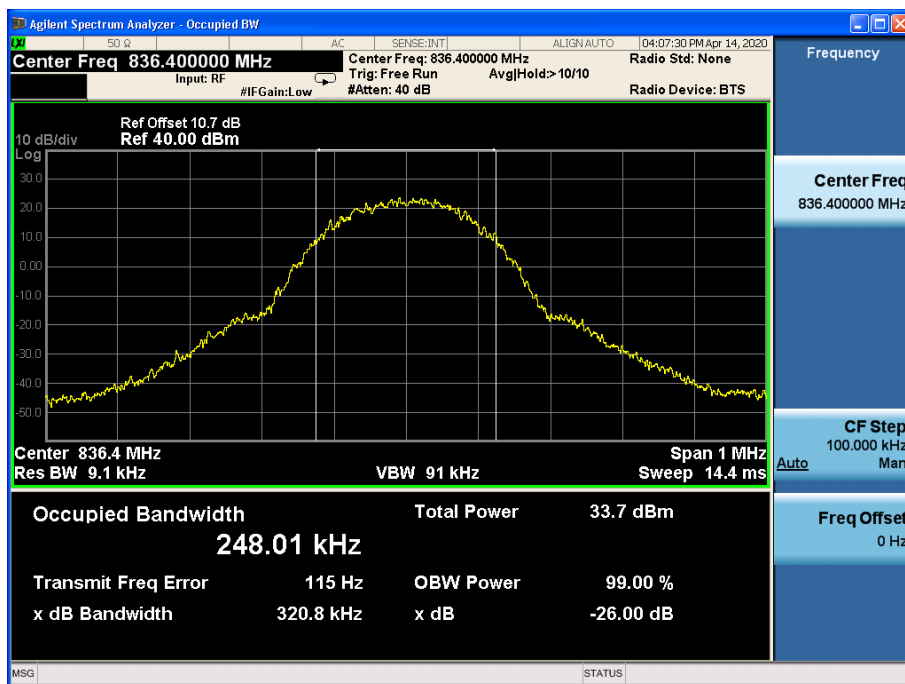


Channel 251

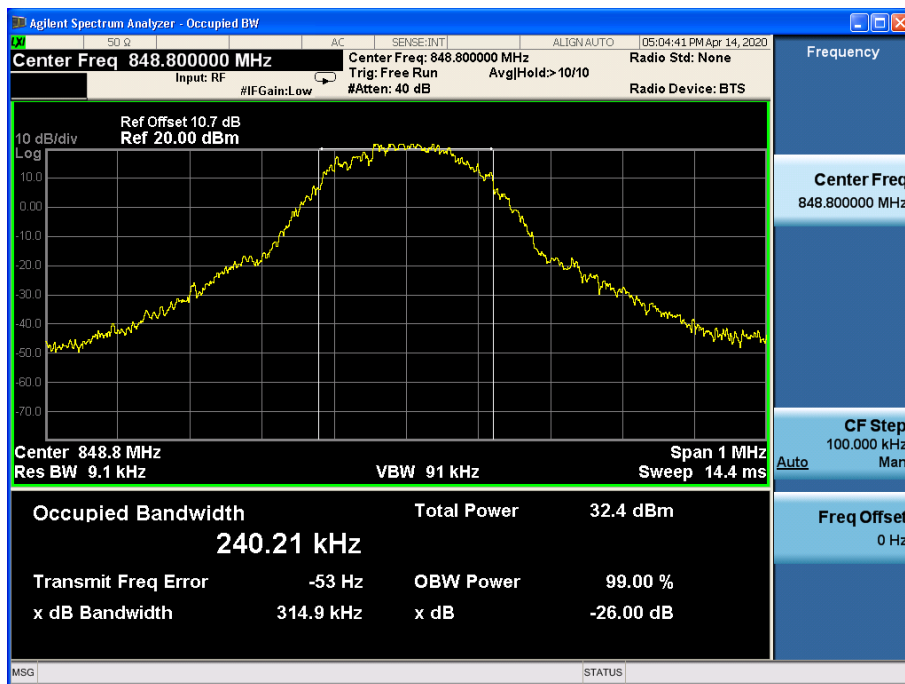
EDGE (8PSK) MODE:



Channel 128



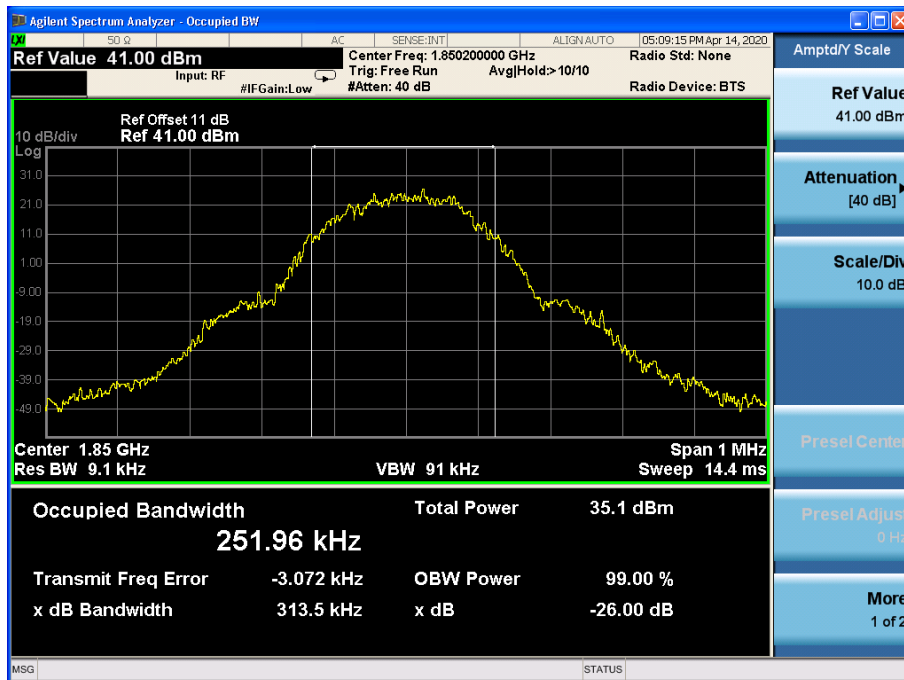
Channel 189



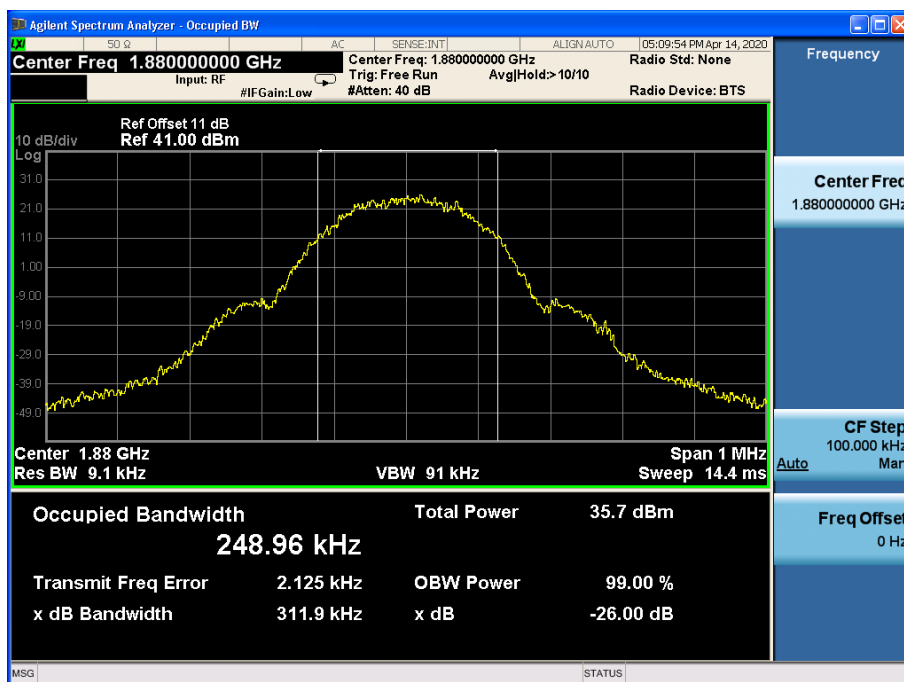
Channel 251

PCS1900

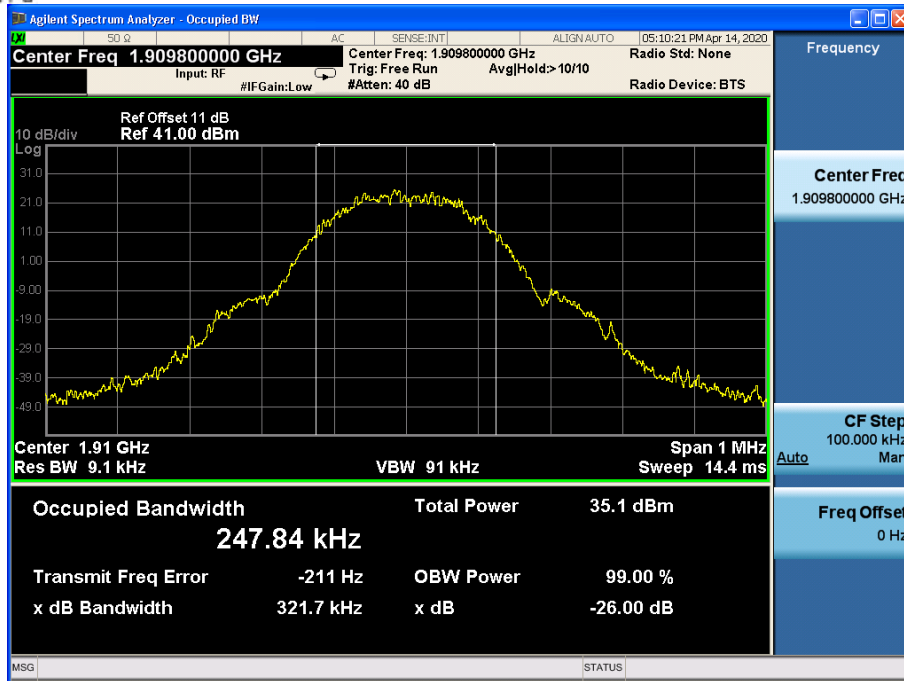
GPRS MODE:



Channel 512

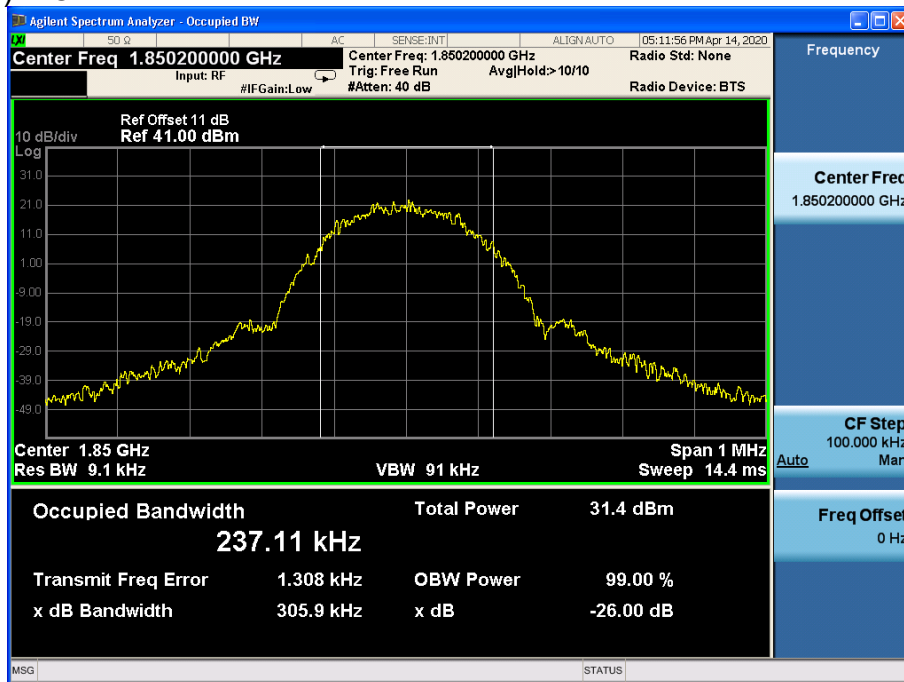


Channel 661

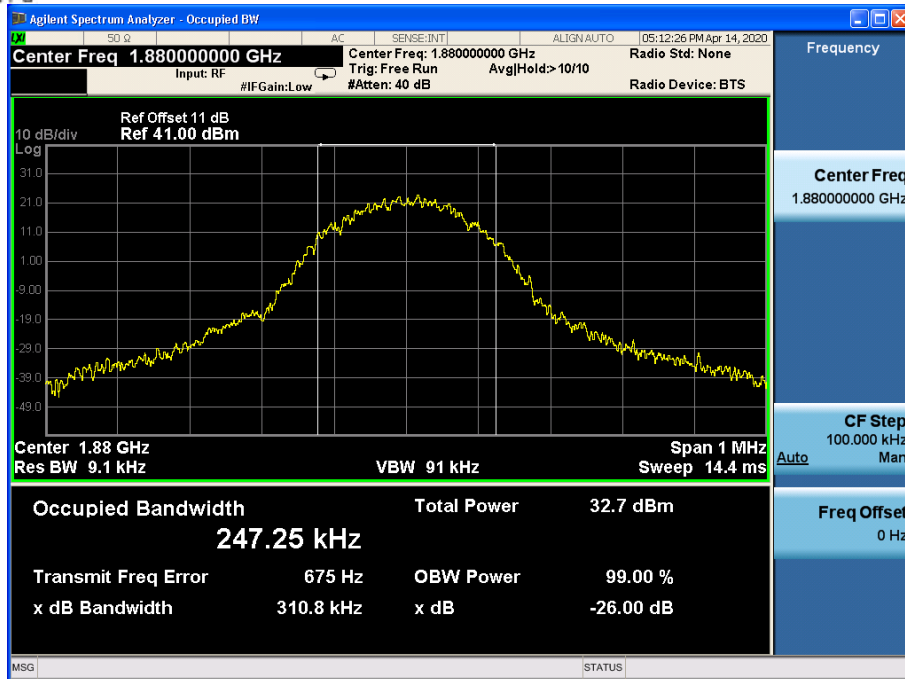


Channel 810

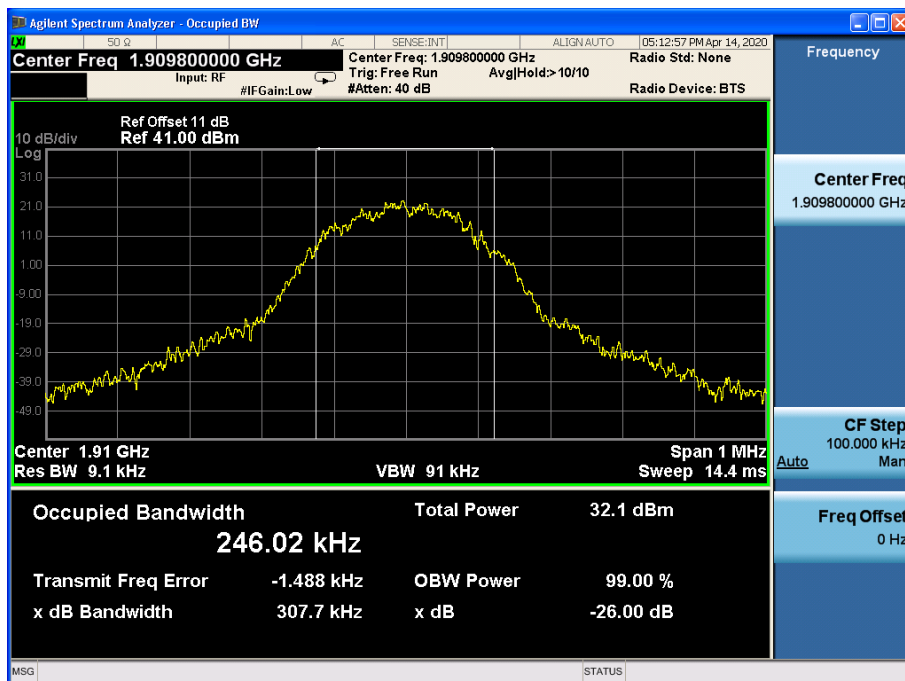
EDGE (8PSK) MODE:



Channel 512



Channel 661



Channel 810

Emission Bandwidth

GSM850

GSM/GPRS MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
824.2	128	317.2
836.4	189	314.9
848.8	251	322.0

EDGE (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
824.2	128	314.5
836.4	189	320.8
848.8	251	314.9

PCS1900

GSM/GPRS MODE:

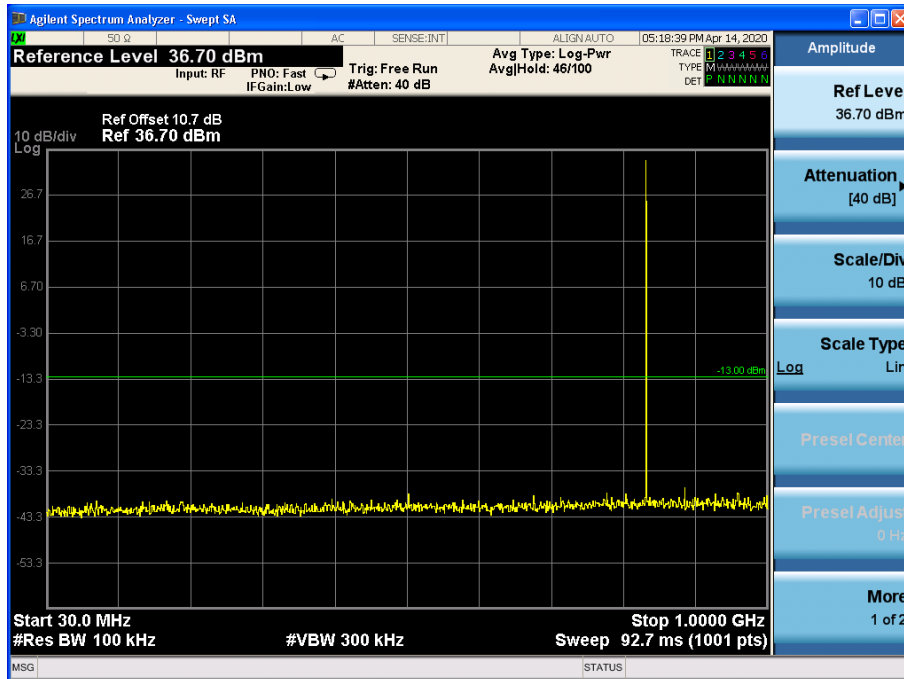
Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
1850.2	512	313.5
1880.0	661	311.9
1909.8	810	321.7

EDGE (8PSK) MODE:

Carrier frequency (MHz)	Channel No.	Bandwidth of -26dB transmitter power (kHz)
1850.2	512	305.9
1880.0	661	310.8
1909.8	810	307.7

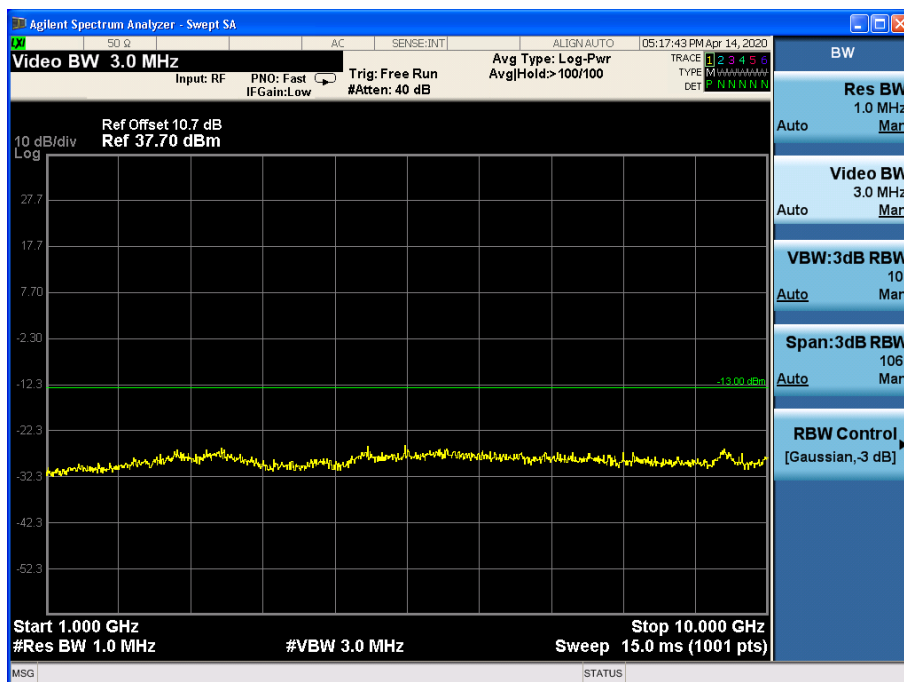
Spurious Emissions at antenna terminal GSM850

GPRS MODE:



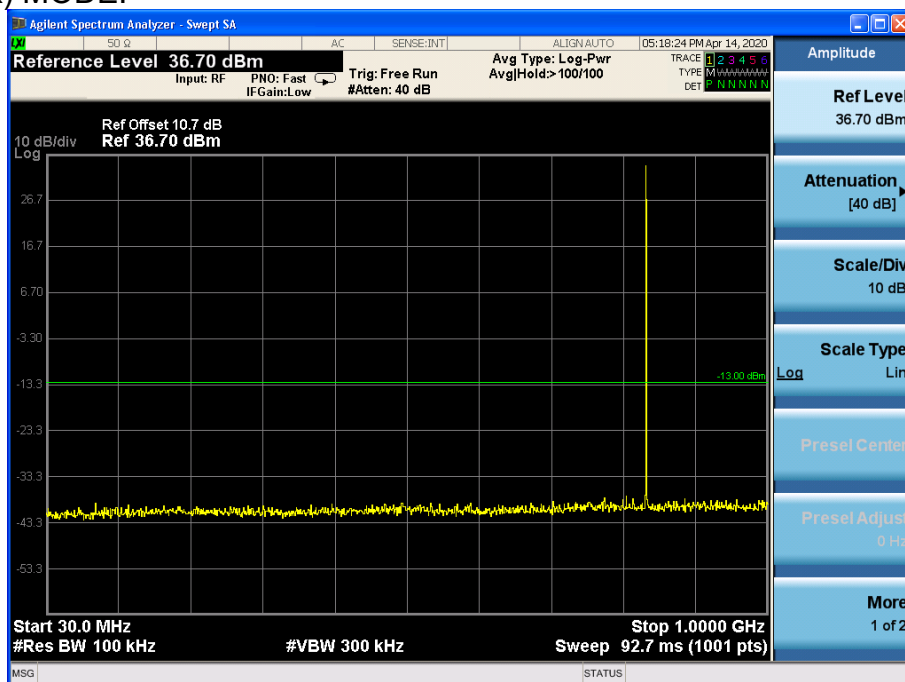
Channel 189, 30MHz~1GHz

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



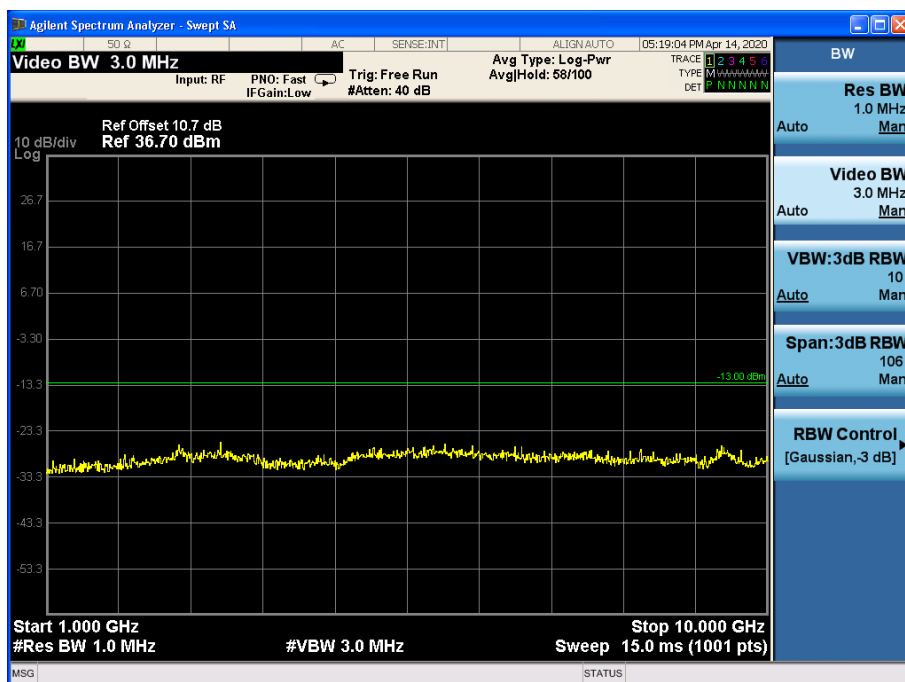
Channel 189, 1GHz~10GHz

EDGE (8PSK) MODE:



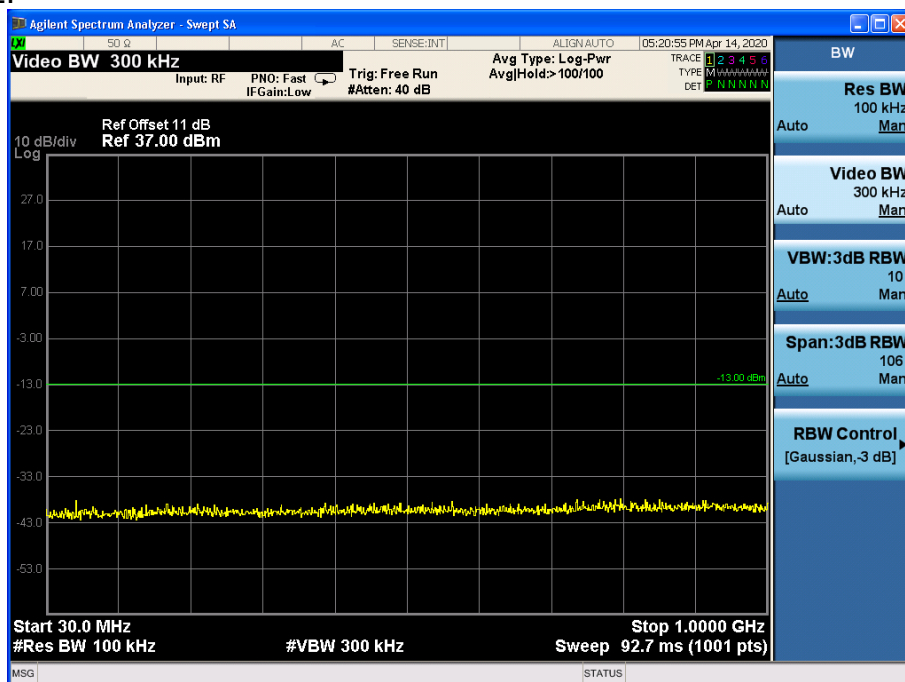
Channel 189, 30MHz~1GHz

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

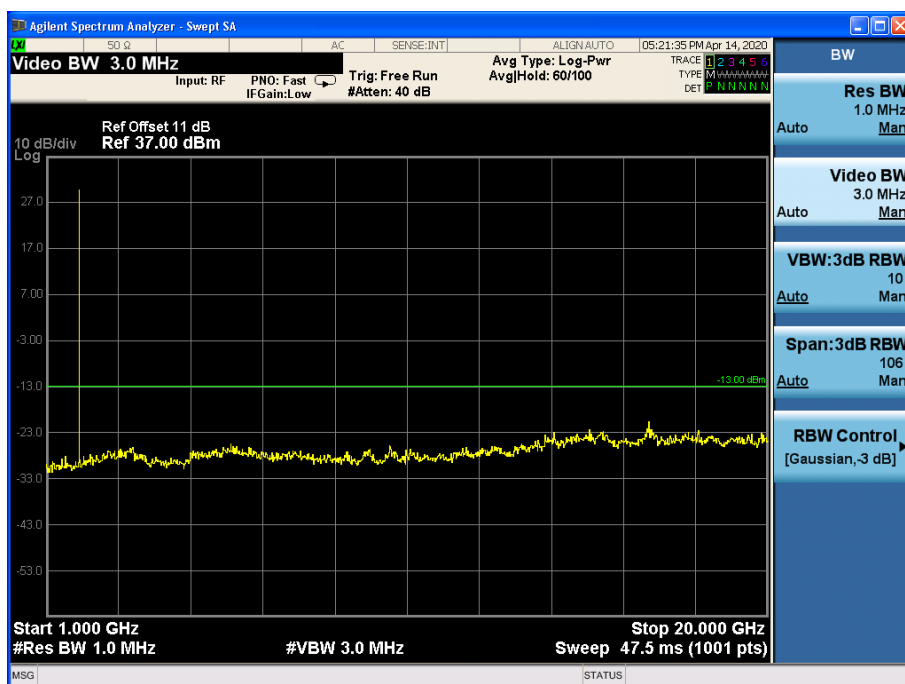


Channel 189, 1GHz~10GHz

GPRS MODE:



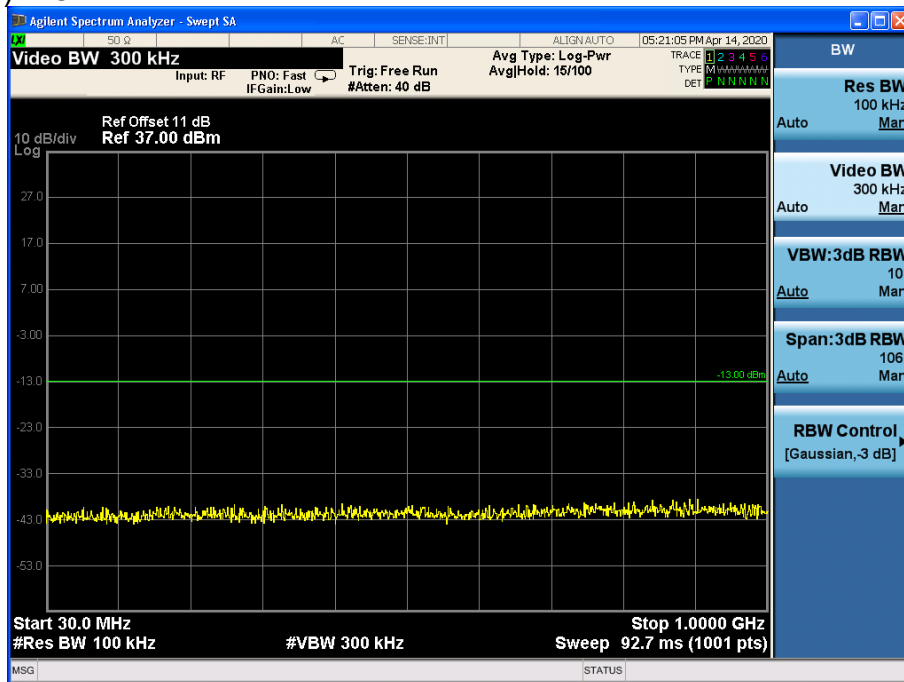
Channel 661, 30MHz~1GHz



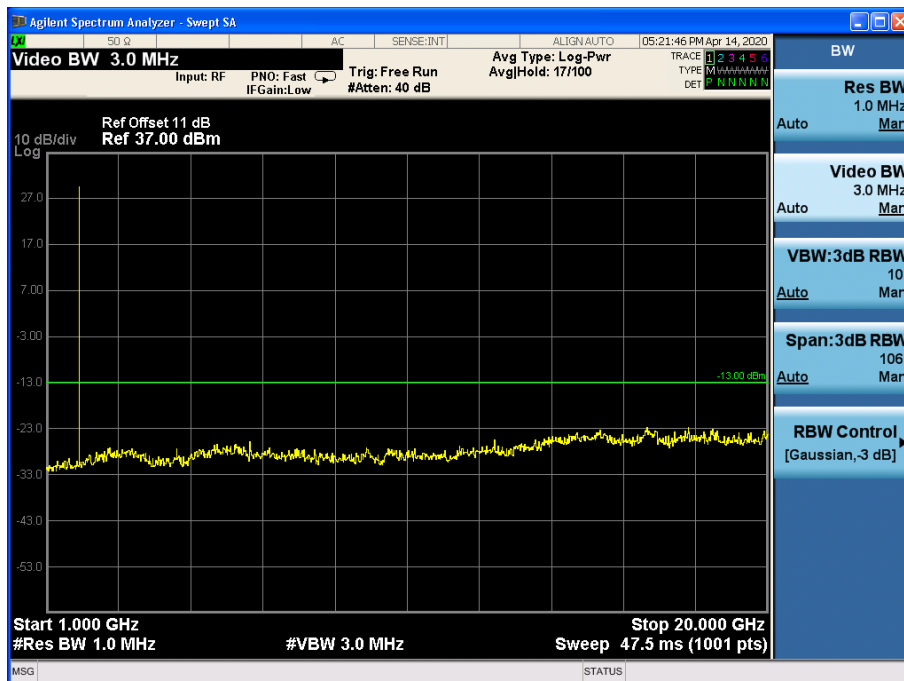
Channel 661, 1GHz~20GHz

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

EDGE (8PSK) MODE:



Channel 661, 30MHz~1GHz



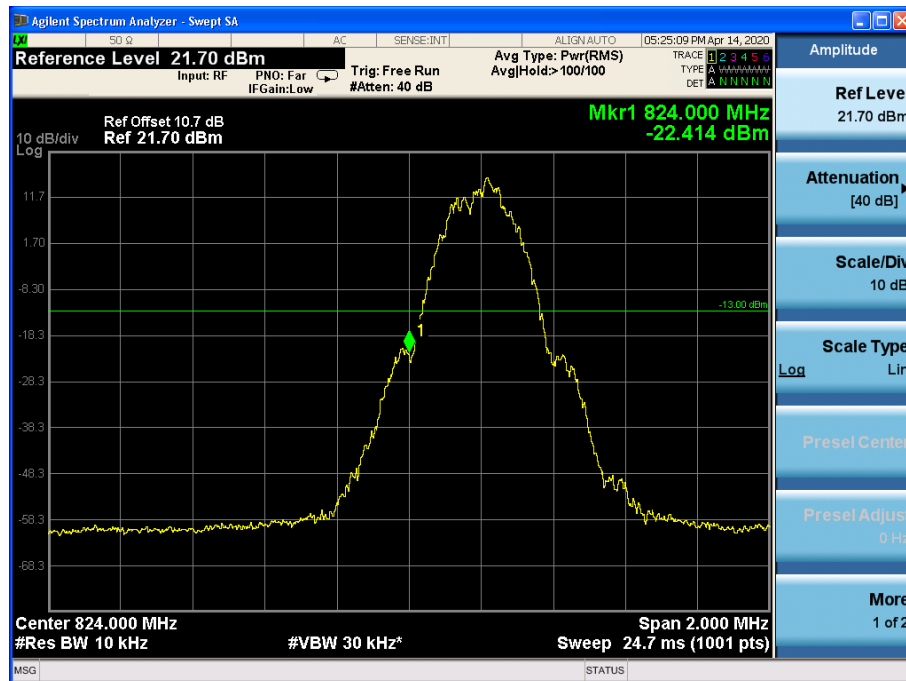
Channel 661, 1GHz~20GHz

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

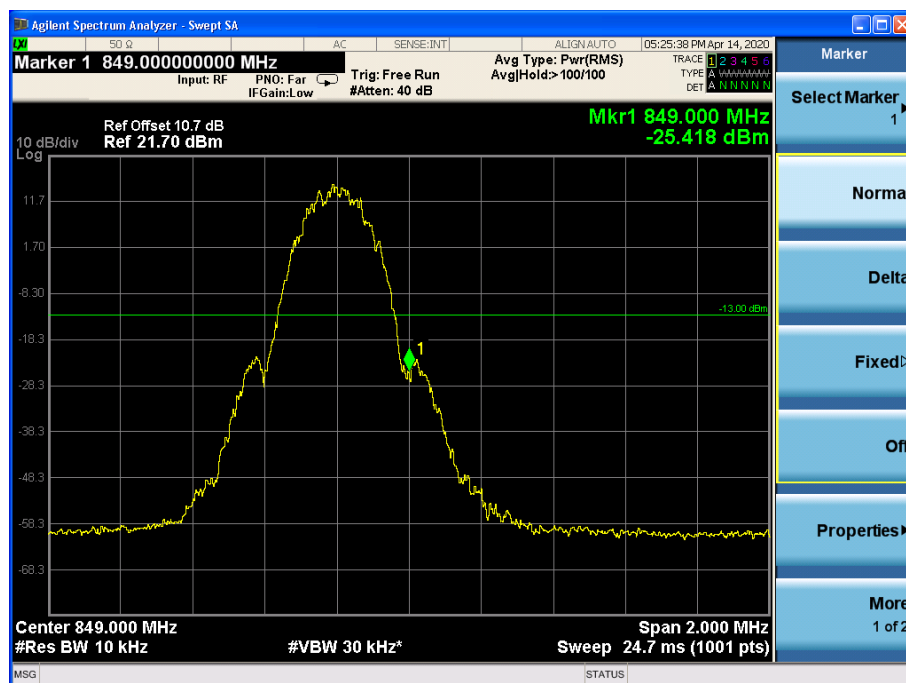
Band Edges Compliance

GSM850

GPRS MODE:

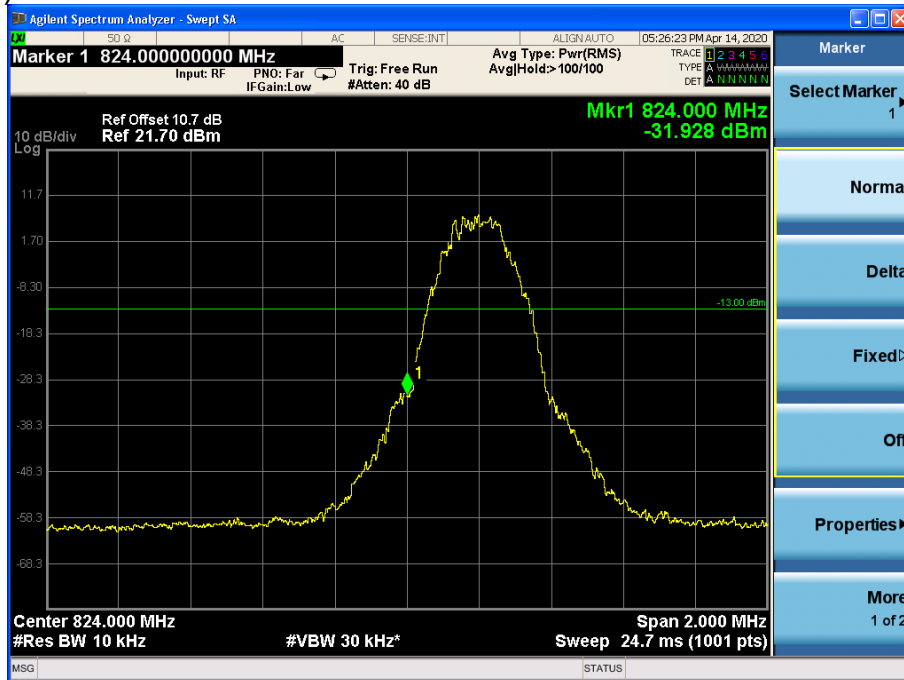


Channel 128

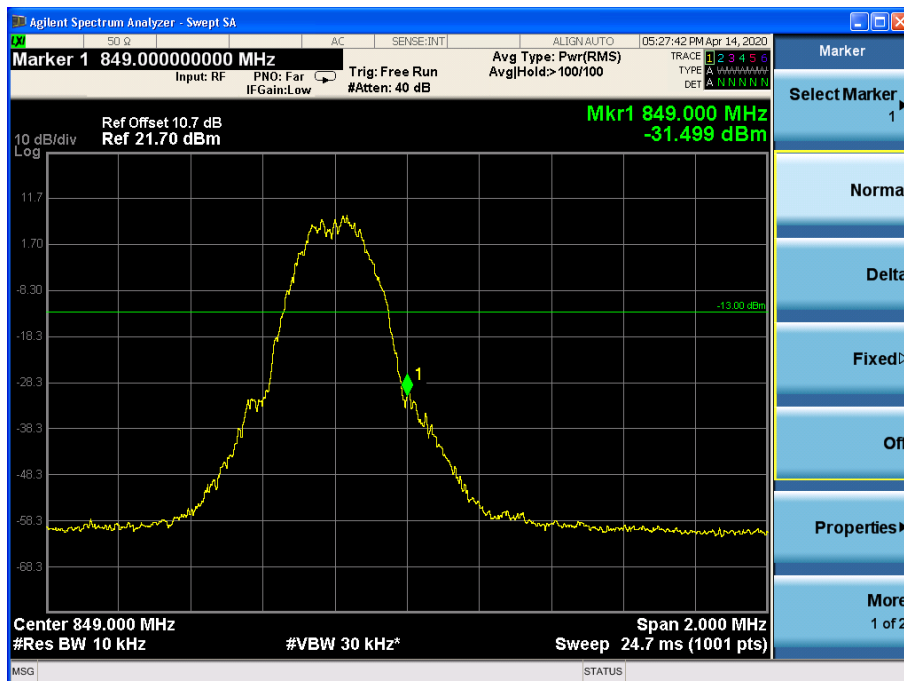


Channel 251

EDGE (8PSK) MODE:

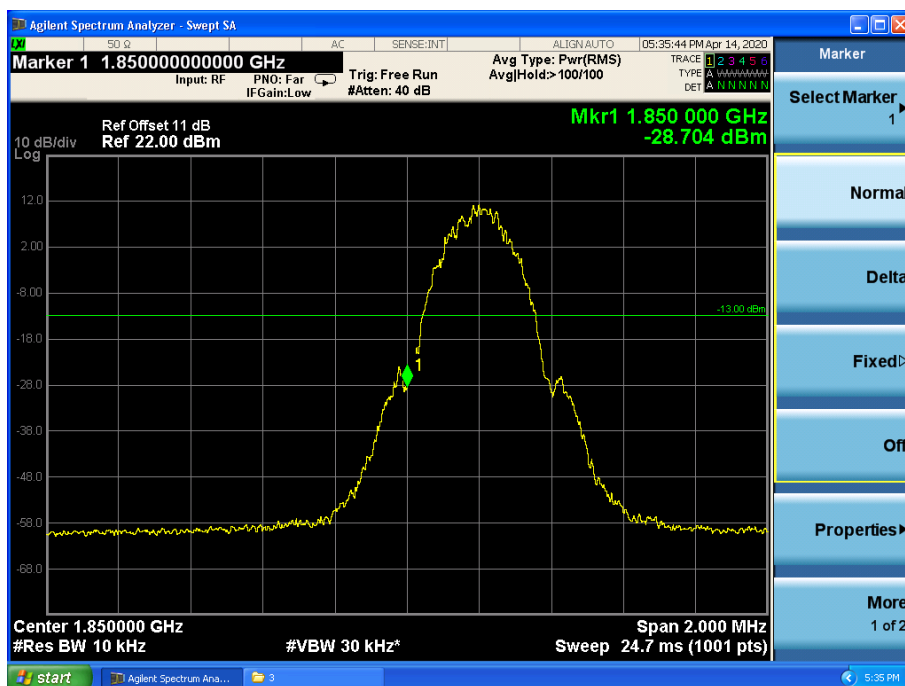


Channel 128

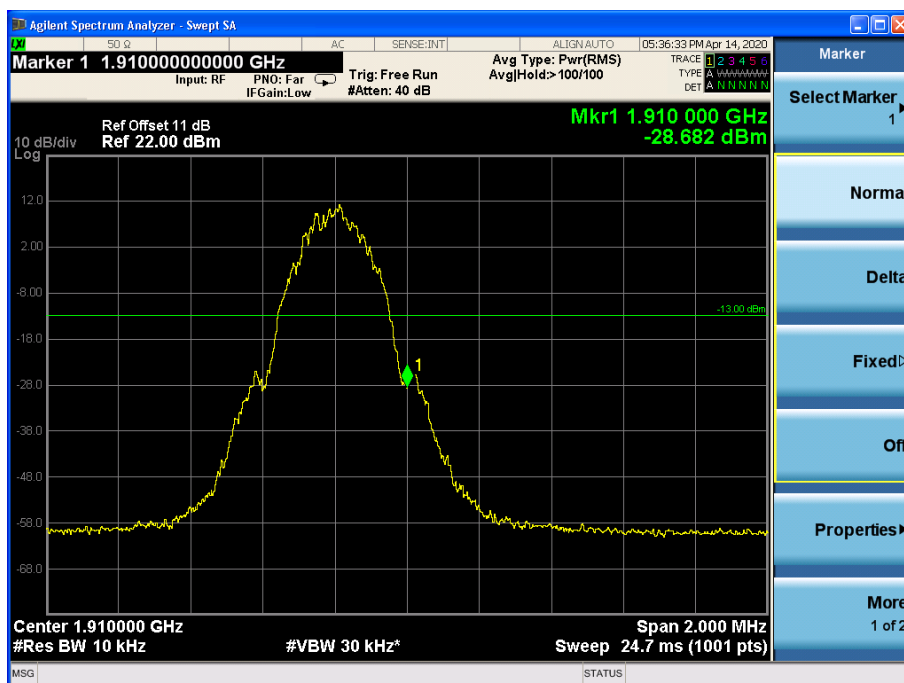


Channel 251

GPRS MODE:

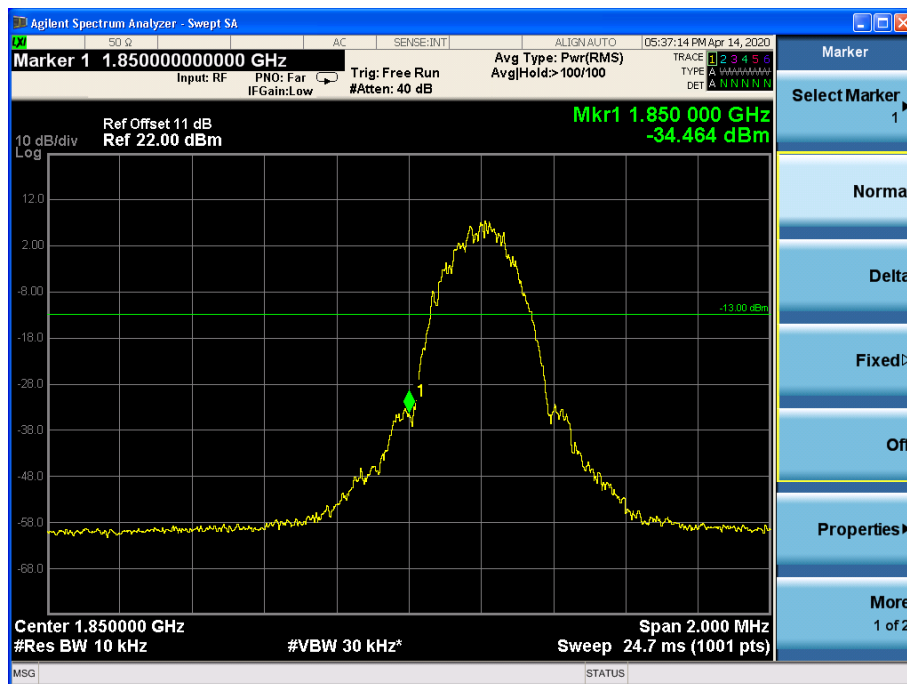


Channel 512

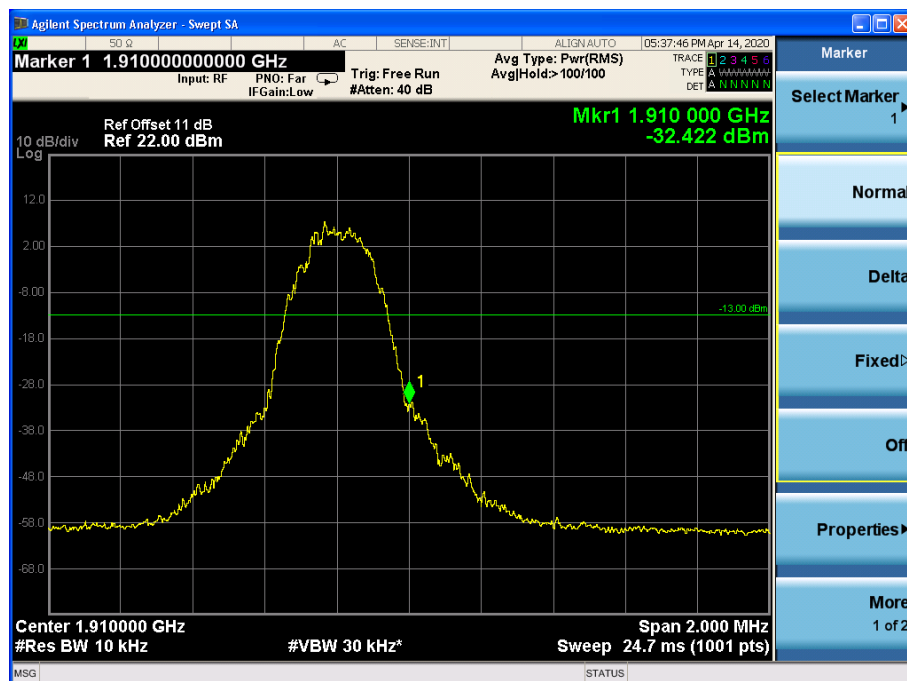


Channel 810

EDGE (8PSK) MODE:



Channel 512



Channel 810

Frequency Stability

GSM850

GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-30	0.023	0.043	0.002
-20	0.018	0.043	-0.038
-10	0.035	-0.007	0.009
0	0.001	-0.024	0.043
+10	0.024	0.029	0.097
+20	0.000	0.000	0.000
+30	-0.013	0.083	0.063
+40	0.046	0.040	-0.032
+50	0.067	0.034	-0.008
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	0.036	0.005	0.039
HV	-0.009	-0.014	0.038

EDGE (8PSK) MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 128	Channel 189	Channel 251
-30	0.002	-0.003	-0.032
-20	0.034	0.039	0.039
-10	-0.008	-0.034	0.031
0	0.002	0.030	0.083
+10	0.013	0.081	-0.054
+20	0.000	0.000	0.000
+30	0.023	0.041	-0.080
+40	-0.001	-0.031	-0.032
+50	0.023	-0.030	0.020
Voltage	Test Result (ppm)@NT		
	Channel 128	Channel 189	Channel 251
LV	0.011	-0.005	-0.028
HV	0.016	0.019	0.015

PCS1900

GPRS MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-20	0.011	-0.008	-0.066
-10	0.025	0.035	0.042
0	-0.035	-0.040	0.017
+10	0.002	0.089	-0.040
+20	0.000	0.000	0.000
+30	0.025	0.054	-0.021
+40	-0.055	-0.087	-0.044
+50	0.050	0.019	0.014
+55	0.055	0.046	0.030
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	-0.002	0.029	-0.029
HV	0.005	-0.007	0.015

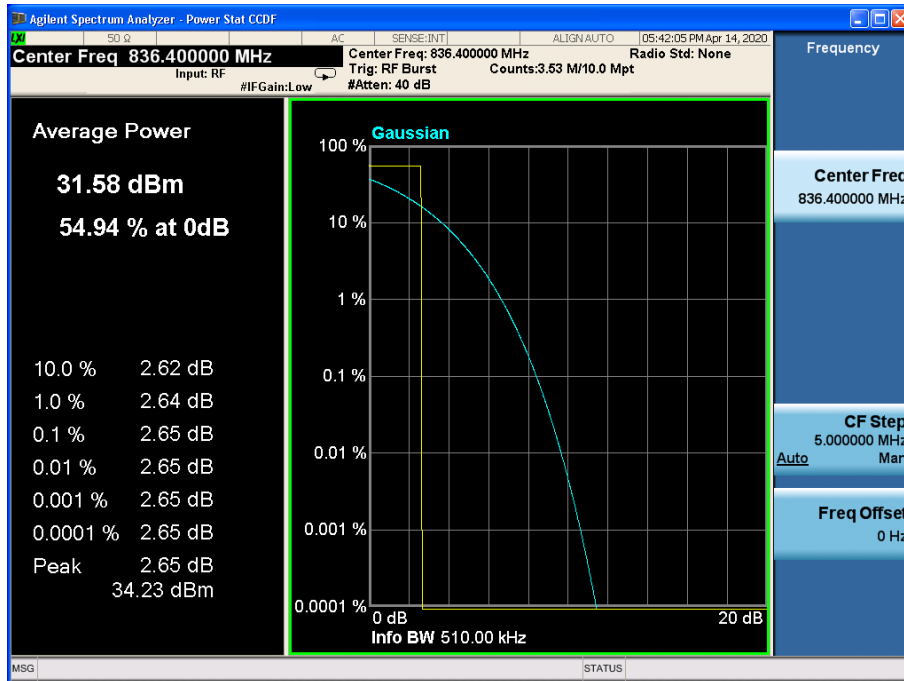
EDGE (8PSK) MODE:

Temperature(°C)	Test Result (ppm)@NV		
	Channel 512	Channel 661	Channel 810
-20	0.018	0.005	-0.013
-10	-0.012	-0.035	-0.003
0	-0.004	0.040	-0.052
+10	0.025	0.045	0.014
+20	0.000	0.000	0.000
+30	-0.022	0.031	0.051
+40	-0.008	-0.046	0.019
+50	-0.035	-0.012	0.021
+55	-0.044	-0.042	-0.027
Voltage	Test Result (ppm)@NT		
	Channel 512	Channel 661	Channel 810
LV	0.033	0.008	-0.027
HV	-0.008	-0.006	-0.014

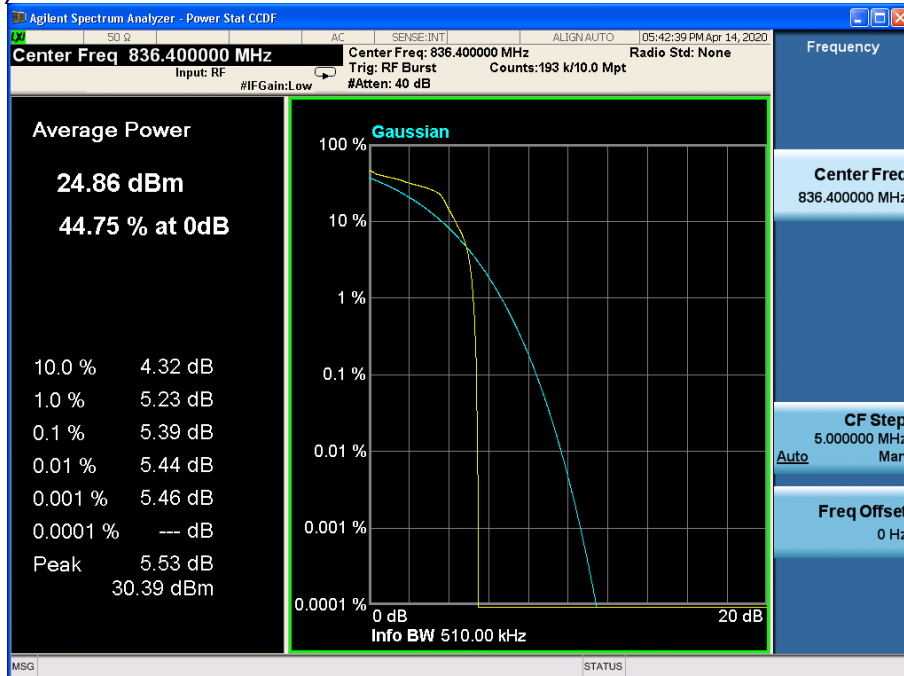
Peak-Average Ratio

GSM850

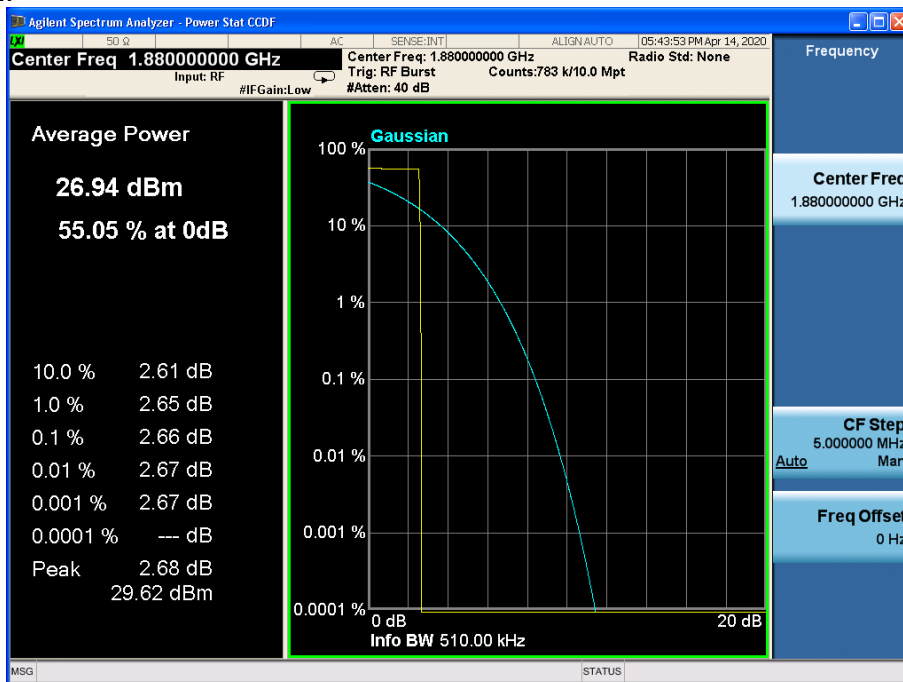
GPRS MODE:



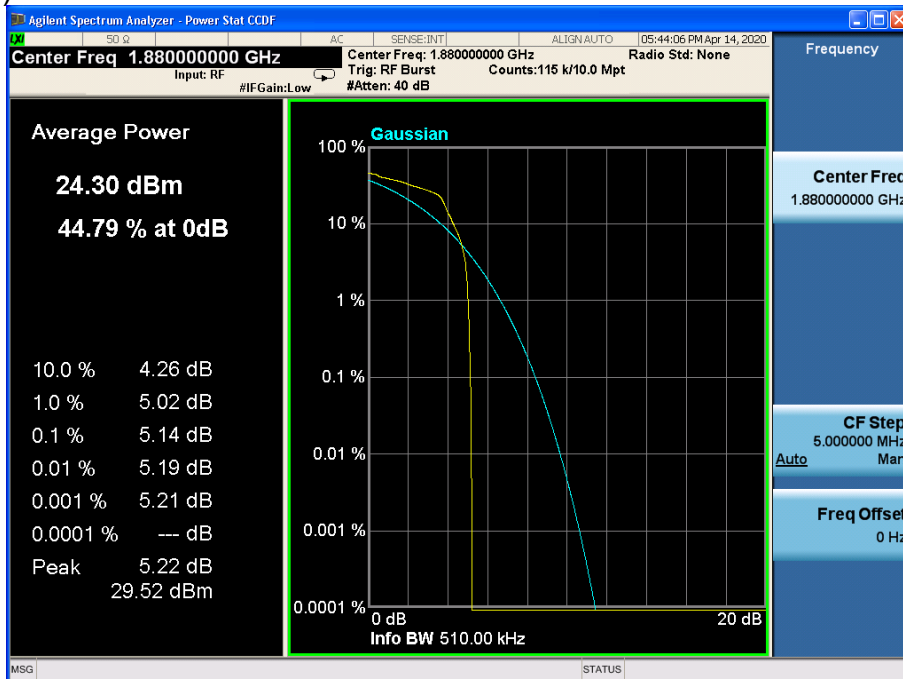
EDGE (8PSK) MODE:



PCS1900
GPRS MODE:



EDGE (8PSK) MODE:



APPENDIX B – TEST DATA OF RADIATED EMISSION

GSM/GPRS MODE: Main supply

Frequency (MHz)	Power step	Peak ERP (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
824.2	5	34.22	-3.4	8.3	2.15	31.47	Vertical
836.6	5	33.60	-3.4	8.3	2.15	30.85	Vertical
848.8	5	33.71	-3.4	8.3	2.15	30.96	Vertical

GSM/GPRS MODE: Second supply

Frequency (MHz)	Power step	Peak ERP (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
824.2	5	34.13	-3.4	8.3	2.15	31.38	Vertical
836.6	5	33.23	-3.4	8.3	2.15	30.48	Vertical
848.8	5	33.63	-3.4	8.3	2.15	30.88	Vertical

According to the test result of GSM/GPRS MODE, the Main supply transmission mode is selected for testing.

850 Test result:

The measurement results are obtained as described below:

Peak ERP = Pmea + Pca Cable loss+ Ga Antenna Gain- Correction

Sample calculation: (34.22 dBm) = (31.47 dBm) + (-3.4 dB) + (8.3 dB)- (2.15 dB), the corresponding frequency is 824.2MHz.

Frequency (MHz)	Power step	Peak ERP (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
824.2	5	34.22	-3.4	8.3	2.15	31.47	Vertical

GSM/GPRS MODE:

Frequency (MHz)	Power step	Peak ERP (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
824.2	5	34.22	-3.4	8.3	2.15	31.47	Vertical
836.6	5	33.60	-3.4	8.3	2.15	30.85	Vertical

848.8	5	33.71	-3.4	8.3	2.15	30.96	Vertical
-------	---	-------	------	-----	------	-------	----------

EDGE MODE:

Frequency (MHz)	Power step	Peak ERP (dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
824.2	5	27.25	-3.4	8.3	2.15	24.50	Vertical
836.6	5	27.72	-3.4	8.3	2.15	24.97	Vertical
848.8	5	27.30	-3.4	8.3	2.15	24.55	Vertical

Test result:

GSM/GPRS MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1646.86	-52.65	-13	Vertical
1665.15	-50.94	-13	Vertical
2534.46	-44.08	-13	Vertical
2578.40	-44.48	-13	Vertical
8964.04	-39.64	-13	Vertical
9971.36	-36.44	-13	Vertical

EDGE (8PSK) MODE Channel 128:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1647.55	-52.95	-13	Vertical
1665.13	-51.15	-13	Vertical
2535.09	-44.28	-13	Vertical
2577.40	-44.13	-13	Vertical
8964.28	-40.01	-13	Vertical
9971.01	-36.36	-13	Vertical

GSM/GPRS MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1650.46	-53.25	-13	Vertical
1666.79	-51.21	-13	Vertical
2533.56	-44.02	-13	Vertical
2579.05	-43.73	-13	Vertical
8963.57	-39.75	-13	Vertical
9970.90	-36.58	-13	Vertical

EDGE (8PSK) MODE Channel 189:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1647.67	-52.69	-13	Vertical
1666.46	-51.50	-13	Vertical
2533.04	-44.61	-13	Vertical
2579.04	-43.87	-13	Vertical
8960.75	-39.75	-13	Vertical
9971.59	-35.93	-13	Vertical

GSM/GPRS MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1649.02	-52.77	-13	Vertical
1667.03	-51.76	-13	Vertical
2532.64	-44.77	-13	Vertical
2576.12	-44.26	-13	Vertical
8962.79	-39.36	-13	Vertical
9971.24	-36.10	-13	Vertical

EDGE (8PSK) MODE Channel 251:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1647.15	-52.90	-13	Vertical
1665.90	-51.13	-13	Vertical
2534.34	-44.79	-13	Vertical
2576.47	-44.48	-13	Vertical
8963.24	-39.15	-13	Vertical
9971.78	-36.54	-13	Vertical

1900 Test result:

Frequency (MHz)	Power step	Peak EIRP(dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Polarization
1850.2	0	31.85	-3.8	8.6	27.05	Vertical
1880.0	0	32.31	-3.8	8.6	27.51	Vertical
1909.8	0	32.03	-3.8	8.6	27.23	Vertical

GSM/GPRS MODE:

EDGE MODE:

Frequency (MHz)	Power step	Peak EIRP(dBm)	Pca Cable loss(dB)	Ga Antenna Gain (dB)	Pmea (dBm)	Polarization
1850.2	0	28.49	-3.8	8.6	23.69	Vertical
1880.0	0	29.27	-3.8	8.6	24.47	Vertical
1909.8	0	28.41	-3.8	8.6	23.61	Vertical

Test result:

GSM/GPRS MODE Channel 512

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2460.87	-45.22	-13	Vertical
2779.57	-44.28	-13	Vertical
3727.83	-36.99	-13	Vertical
6676.99	-36.33	-13	Vertical
9961.89	-34.49	-13	Vertical
17824.73	-31.53	-13	Vertical

EDGE (8PSK) MODE Channel 512:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2458.33	-45.44	-13	Vertical
2777.69	-44.55	-13	Vertical
3726.49	-37.67	-13	Vertical
6677.70	-36.43	-13	Vertical
9959.31	-34.52	-13	Vertical
17824.20	-31.91	-13	Horizontal

GSM/GPRS MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2462.08	-45.37	-13	Vertical
2777.50	-44.93	-13	Vertical
3726.20	-36.81	-13	Vertical
6679.22	-36.16	-13	Vertical
9962.39	-34.96	-13	Vertical
17823.98	-32.37	-13	Vertical

EDGE (8PSK) MODE Channel 661:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2461.58	-45.36	-13	Vertical
2778.02	-44.79	-13	Vertical
3727.06	-36.87	-13	Vertical
6676.87	-36.49	-13	Vertical
9962.52	-34.88	-13	Vertical
17822.92	-32.23	-13	Vertical

GSM/GPRS MODE Channel 810:

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2462.15	-44.78	-13	Vertical
2778.44	-44.50	-13	Vertical
3725.74	-36.89	-13	Vertical
6678.02	-36.45	-13	Vertical
9960.34	-35.14	-13	Vertical
17823.33	-31.55	-13	Vertical

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
2459.79	-45.48	-13	Vertical
2777.36	-44.49	-13	Vertical
3724.98	-37.15	-13	Vertical
6677.74	-36.32	-13	Vertical
9961.59	-35.42	-13	Vertical
17825.30	-31.87	-13	Vertical

EDGE (8PSK) MODE Channel 810:

---End of Test Report---