FCC Part 22H & 24E
Measurement and Test Report

For

Giant Star Mobile Technology Co., Ltd

Room 23C1, Block B, ZhongYin Building, FuZhong one Road, Futian District, ShenZhen, China

FCC ID: 2AE7F-S5

FCC Rules:	FCC Part 22H, FCC Part 24E
Product Description:	Janus one
Tested Model:	s5
Report No.:	STR15068101I-1
Tested Date:	2015-06-10 to 2015-06-29
Issued Date:	2015-06-29
Tested By:	Lebron Wang / Engineer
Reviewed By:	Lahm Peng / EMC Manager
Approved & Authorized By:	Jandy so / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Giant Star Mobile Technology Co., Ltd
Address of applicant:	Room 23C1, Block B, ZhongYin Building, FuZhong one Road, Futian District, ShenZhen, China
Manufacturer:	Giant Star Mobile Technology Co., Ltd
Address of manufacturer:	Room 23C1, Block B, ZhongYin Building, FuZhong one Road, Futian District, ShenZhen, China

General Description of EUT	
Product Name:	Janus one
Brand Name:	GTstar
Model No.:	s5
Adding Model:	/
Hardware Version:	T5_main_V3.0
Software Version:	T5_main_V3.0_(C6)
IMEI:	864073010588814
Rated Voltage:	DC 3.7V Li-ion Battery
Battery:	1400mAh
The EUT is dual band GSM850/PCS1900 Janus one. The Janus one is intended for speech and Multimedia Message Service (MMS) transmission. It is equipped for GSM850 and GSM1900 and Bluetooth. For more information see the following datasheet	
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Support Networks:	GSM
Support Band:	GSM850/PCS1900,
Uplink Frequency:	GSM 850: 824~849MHz GSM 1900: 1850~1910MHz
Downlink Frequency:	GSM 850: 869~894MHz GSM 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.23dBm, GSM1900: 29.32dBm
Modulation:	GMSK
Type of Emission:	GSM850: 254KGXW, GSM1900: 257KGXW,
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: -1.3dBi, GSM1900: -1.7dBi
Device Category:	Portable Device

1.2 Test Standards

The following report is prepared on behalf of the Giant Star Mobile Technology Co., Ltd in accordance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E and FCC Part 27 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E and FCC Part 27 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603-C: 2004 and ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

CNAS Registration No.: L1659

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. Some measurement facilities used to collect the measurement data are located at Building 28/29, Shigudong, Xili Industrial Area, Xili Street, Nanshan District, Shenzhen, Guangdong, China

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GSM 1900	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
GSM 850	GSM	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	0.8	Unshielded	Without Core

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E10	LR-63C8R

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 1.1307, § 2.1093	RF Exposure	Compliant
§ 22.913 (a), § 24.232 (c) § 27.50 (d)	RF Output Power	Compliant
§ 22.917 (b), § 24.238 (b) § 27.53	Emission Bandwidth	Compliant
§ 22.917 (a), § 24.238 (a), § 27.53	Spurious Emissions at Antenna Terminal	Compliant
§ 22.917 (a), § 24.238 (a), § 27.53	Spurious Radiation Emissions	Compliant
§ 22.917 (a), § 24.238 (a), § 27.53	Out of Band Emissions	Compliant
§ 22.355, § 24.235, § 27.54	Frequency Stability	Compliant

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR report.

4. RF Output Power

4.1 Standard Applicable

According to §22.913(a)(2), The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

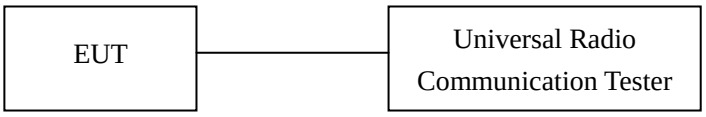
According to §24.232 (c), no any case may the peak output power of mobile or portable station transmitter exceed 2 Watt EIRP.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-05-28	2016-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2015-05-28	2016-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2015-05-28	2016-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2015-05-28	2016-05-27
Horn Antenna	ETS	3117	00086197	2015-05-28	2016-05-27
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2015-05-24	2016-05-23
Signal Generator	R&S	SMR20	100047	2015-05-24	2016-05-27

4.3 Test Procedure

Conducted output power test method:



Radiated power test method:

1.The setup of EUT is according with per TIA/EIA Standard 603C and ANSI C63.4-2009 measurement procedure.

2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.

4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

4.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

Radiated Power

ERP For GSM Mode GSM850

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	28.07	1.5	0	H	1.5	0	26.57	38.45
824.2	31.62	1.5	0	V	1.5	0	30.12	38.45
Middle Channel								
836.4	28.03	1.5	0	H	1.5	0	26.53	38.45
836.4	31.37	1.5	0	V	1.5	0	29.87	38.45
High Channel								
848.8	28.75	1.5	0	H	1.5	0	27.25	38.45
848.8	32.03	1.5	0	V	1.5	0	30.53	38.45

EIRP For GSM Mode PCS1900

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1850.2	32.16	1.5	0	H	1.9	7.7	22.56	33
1850.2	36.62	1.5	0	V	1.9	7.7	27.02	33
Middle Channel								
1880.0	33.12	1.5	0	H	1.9	7.7	23.52	33
1880.0	36.40	1.5	0	V	1.9	7.7	26.80	33
High Channel								
1909.8	31.70	1.5	0	H	1.9	7.7	22.10	33
1909.8	36.39	1.5	0	V	1.9	7.7	26.79	33

Max. Conducted Output Power

For Cellular Band (GSM850)

Test Mode	Channel	Frequency (MHz)	Output Power (dBm)	FCC Part 22.913 Limit (dBm)
GSM	Low Channel	824.2	32.23	38.45
	Middle Channel	836.6	32.16	38.45
	High Channel	848.8	32.15	38.45

For PCS Band (GSM1900)

Test Mode	Channel	Frequency (MHz)	Output Power (dBm)	FCC Part 24.232 Limit (dBm)
GSM	Low Channel	1850.2	29.32	33
	Middle Channel	1880.0	28.76	33
	High Channel	1909.8	28.31	33

5. Peak-to-average Radio (PAR) of Transmitter

5.1 Standard Applicable

According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

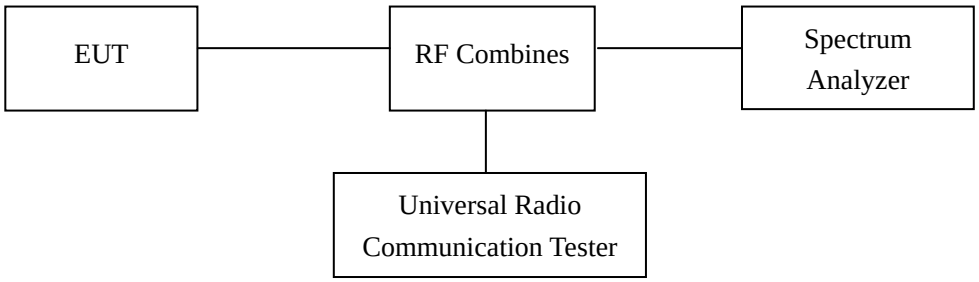
5.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B	US41192821	2015-05-28	2016-05-27
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	112012	2015-05-28	2016-05-27

5.3 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded.

Test Configuration for the emission bandwidth testing:



5.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results

For Cellular Band

Test Mode	Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	PAR (dB)	Limit (dB)
GSM	128	824.2	34.88	32.23	2.65	13
	190	836.4	34.14	32.16	1.98	13
	251	848.8	34.16	32.15	2.01	13

For PCS Band

Test Mode	Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	PAR	Limit
GSM	512	1850.2	31.90	29.32	2.58	13
	661	1880.0	31.16	28.76	2.40	13
	810	1909.8	31.02	28.31	2.71	13

6. Emission Bandwidth

6.1 Standard Applicable

According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §24.238(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

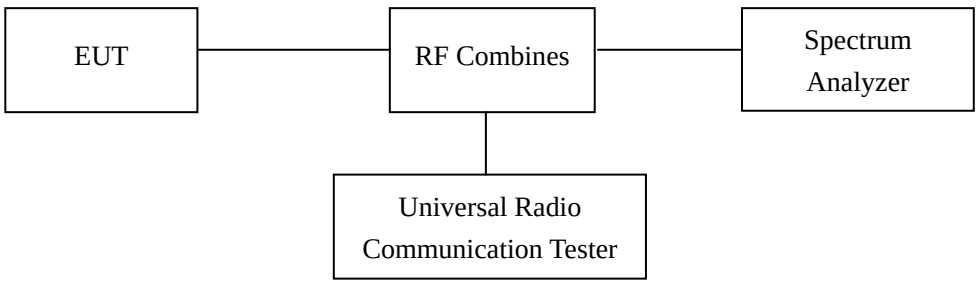
6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B	US41192821	2015-05-28	2016-05-27
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	112012	2015-05-28	2016-05-27

6.3 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



6.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

For Cellular Band

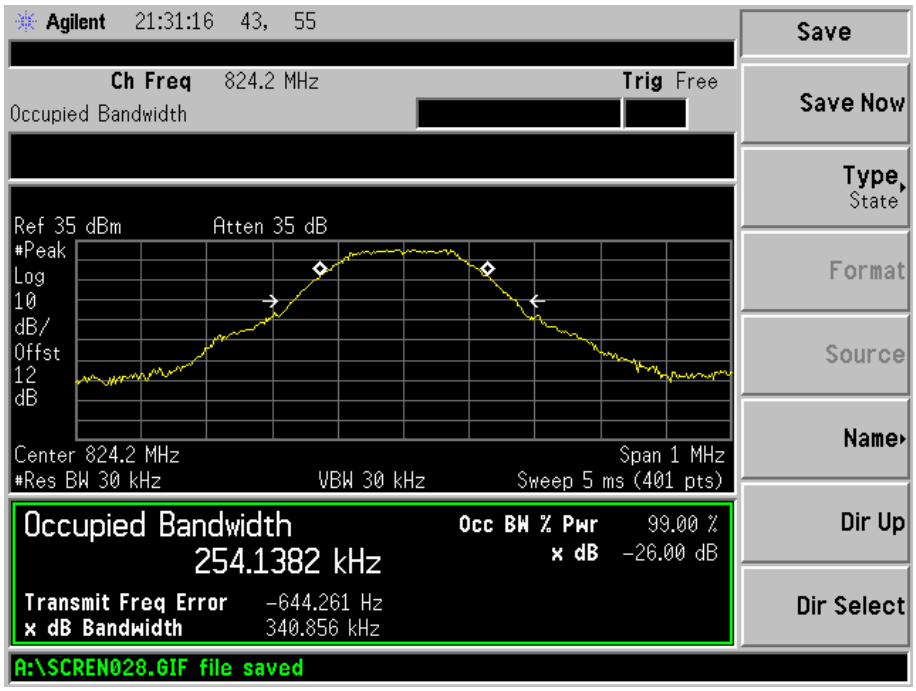
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	128	824.2	254.1382	340.856
	190	836.6	250.3227	336.693
	251	848.8	249.0922	335.494

For PCS Band

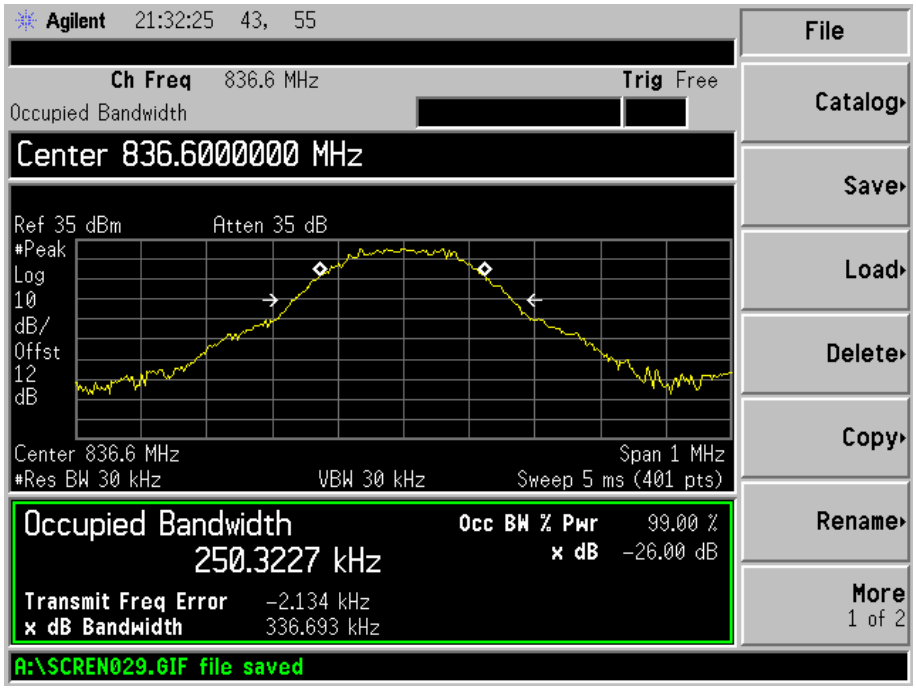
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	512	1850.2	257.3912	337.490
	661	1880.0	254.5394	331.698
	810	1909.8	256.8128	338.836

Please refer to the following test plots:

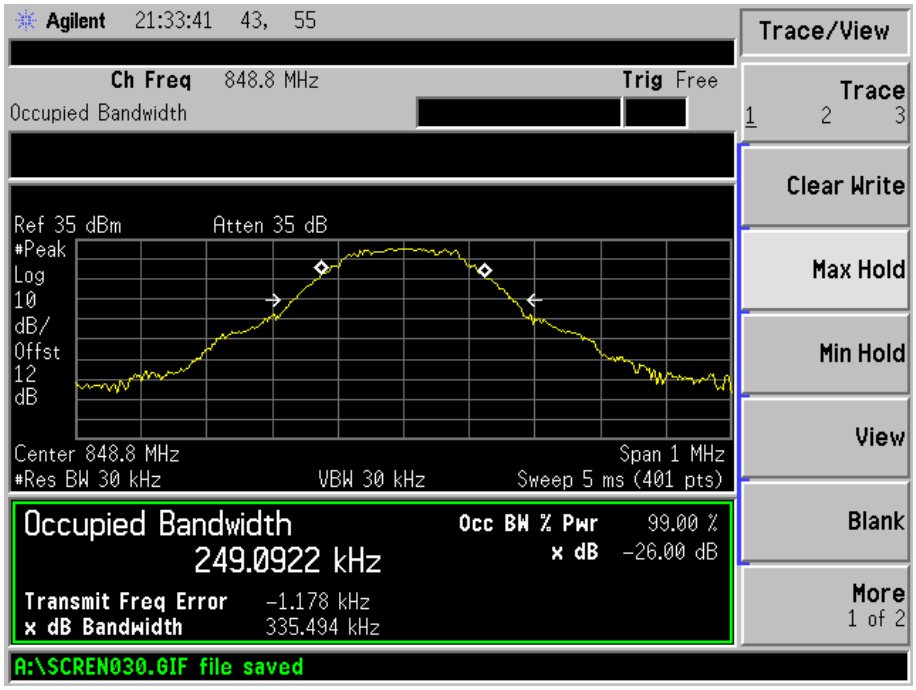
For Cellular Band
GSM Low Channel



GSM Middle Channel

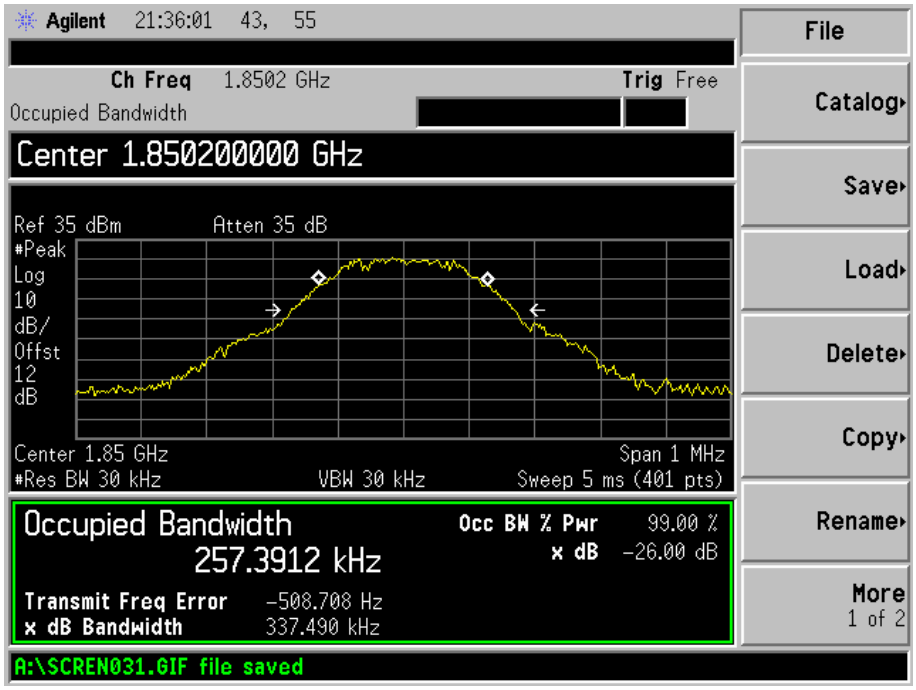


GSM High channel

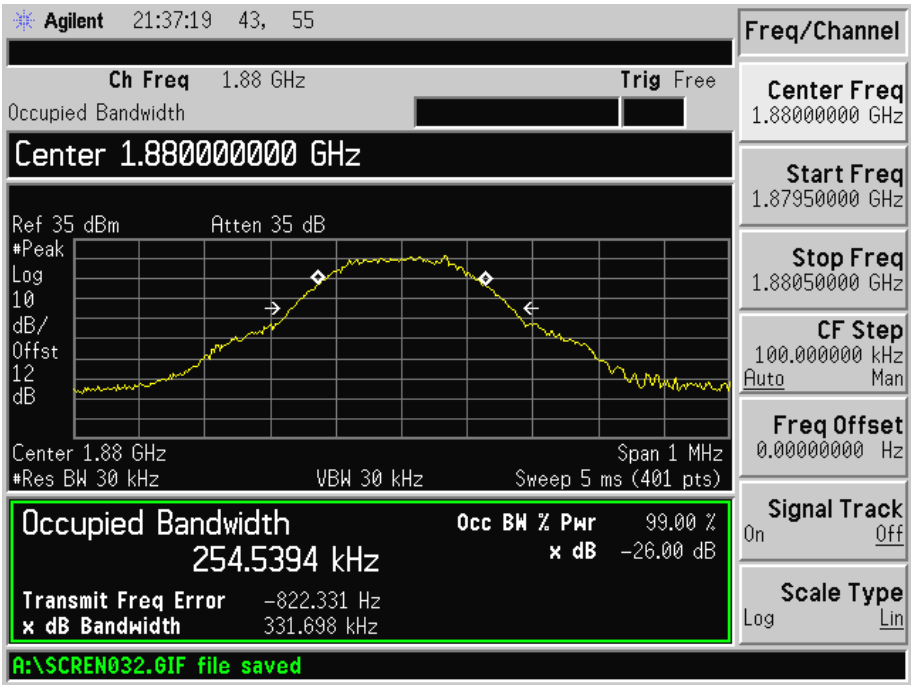


For PCS Band

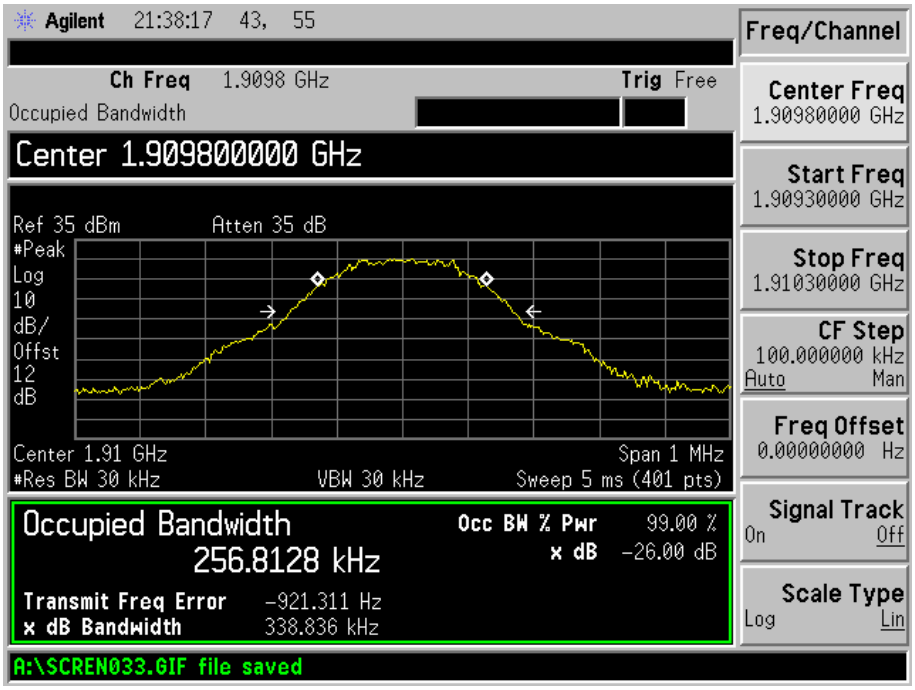
GSM Low Channel



GSM Middle Channel



GSM High channel



7. Out of Band Emissions at Antenna Terminal

7.1 Standard Applicable

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

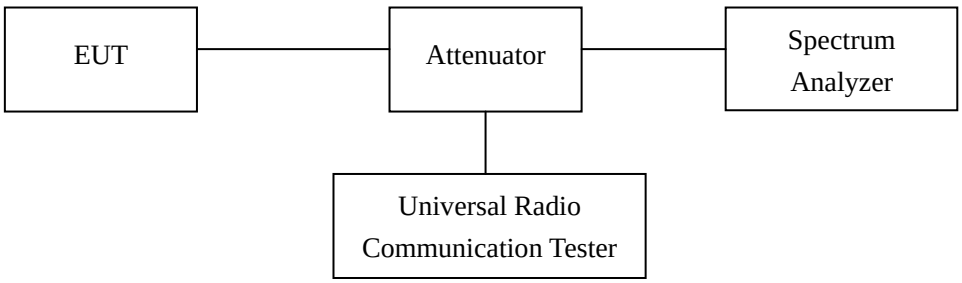
7.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B	US41192821	2015-05-28	2016-05-27
Rohde & Schwarz	Spectrum Analyzer	FSP	836079/035	2015-05-28	2016-05-27
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	112012	2015-05-28	2016-05-27

7.3 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10^{th} harmonic.

Test Configuration for the out of band emissions testing:

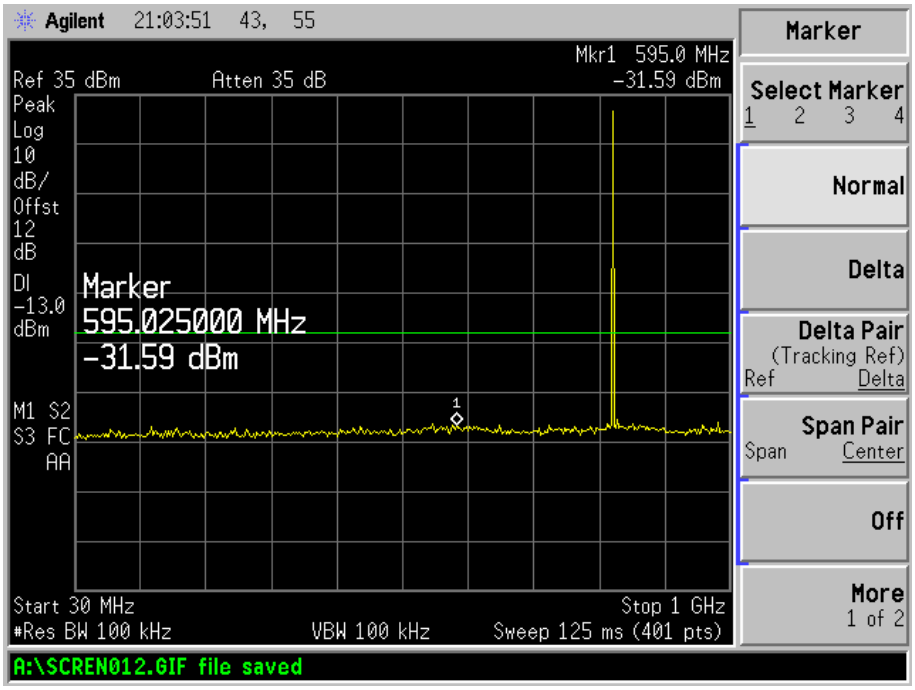


7.4 Environmental Conditions

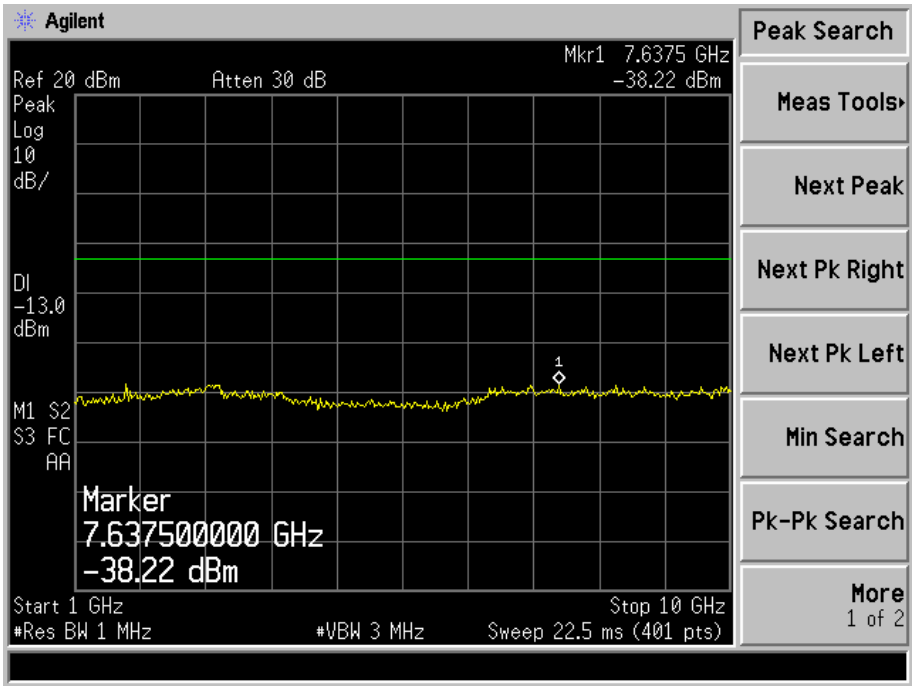
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

7.5 Summary of Test Results/Plots

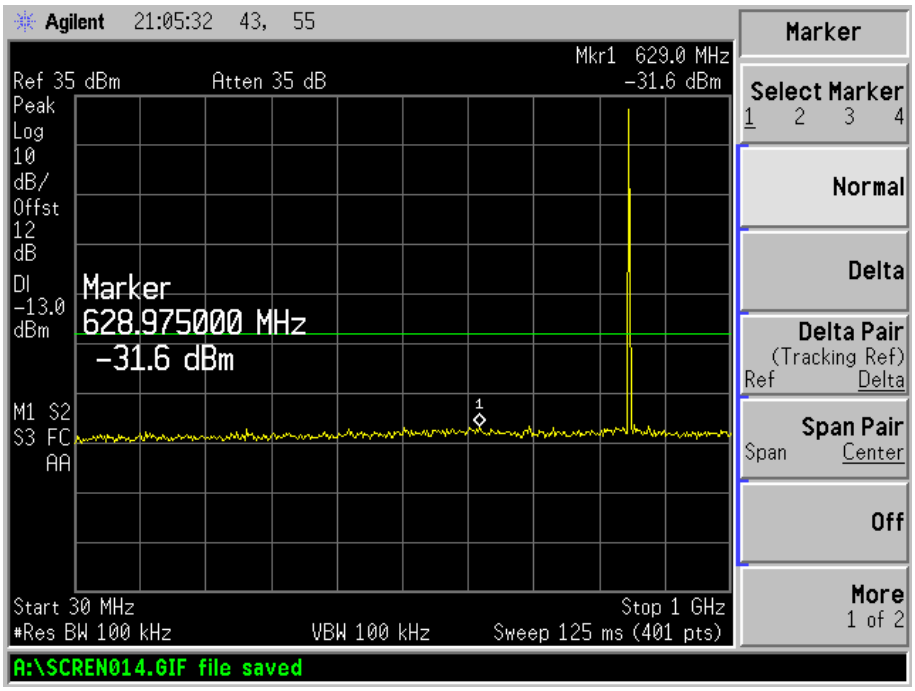
Please refer to the following test plots For Cellular Band
GSM Low Channel 30MHz to 1GHz



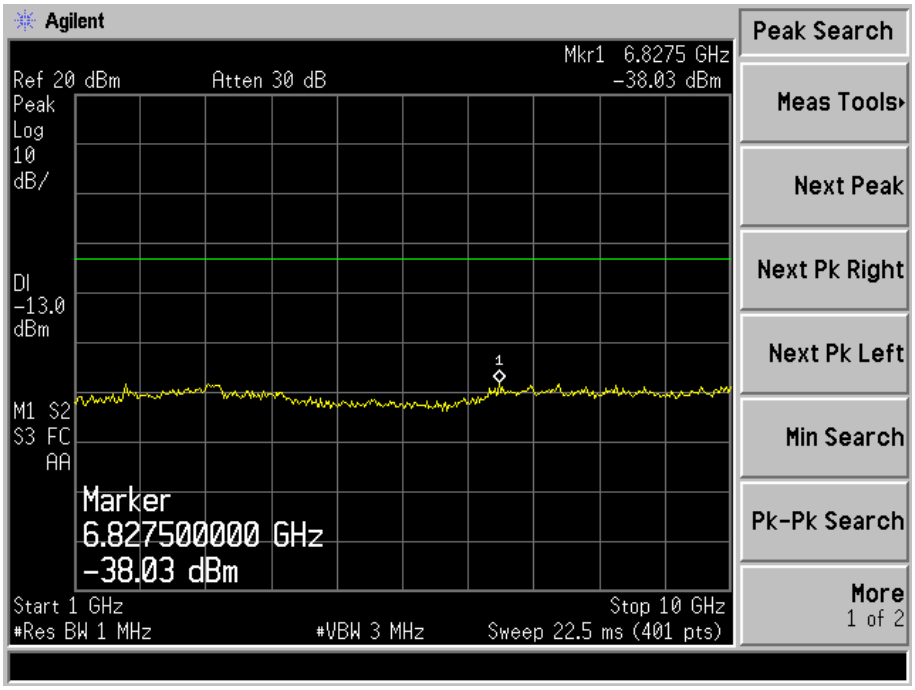
Above 1GHz



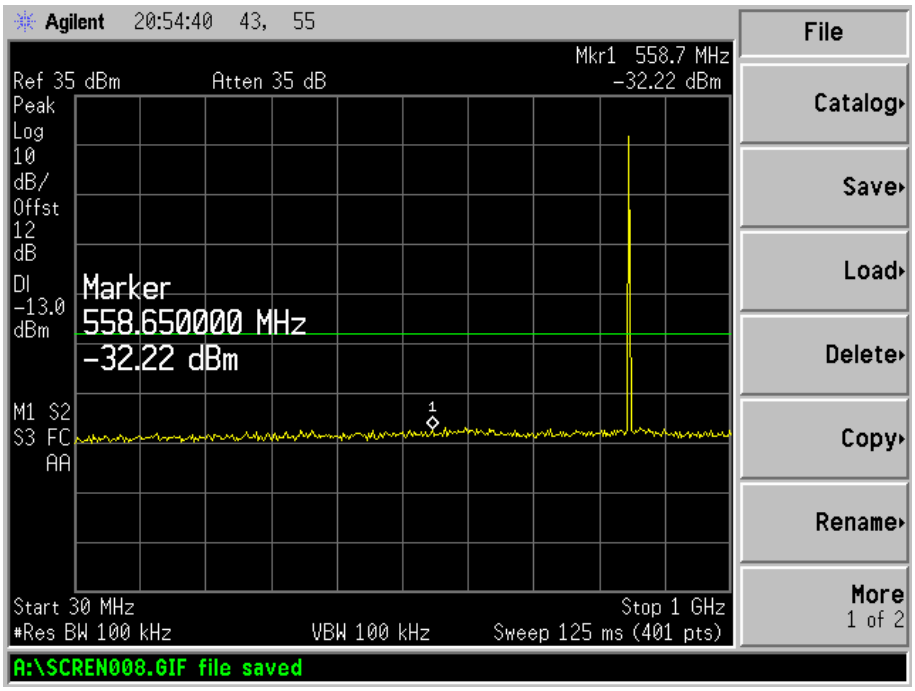
GSM Middle Channel
30MHz to 1GHz



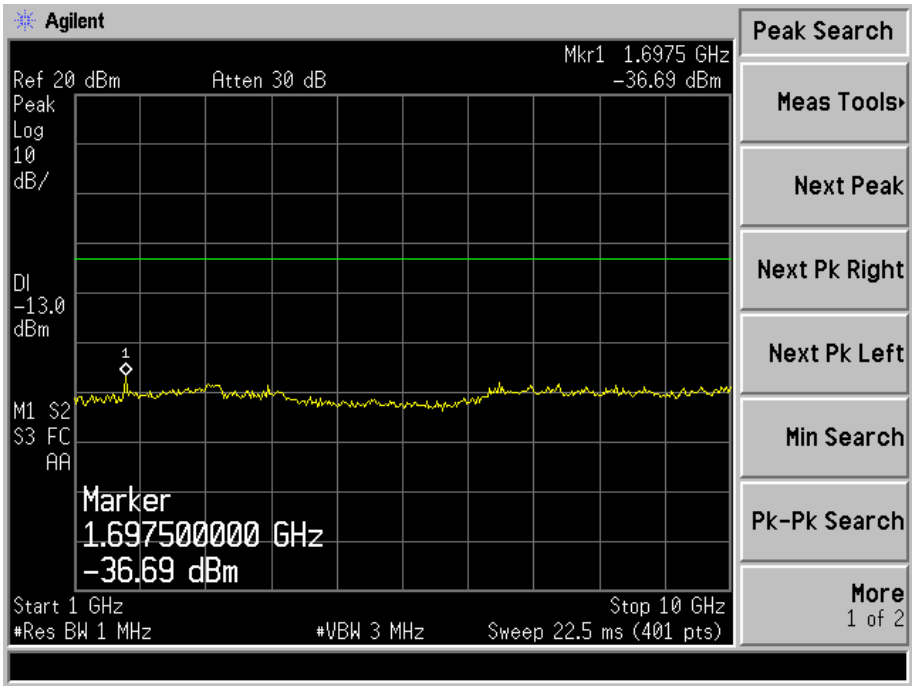
Above 1GHz



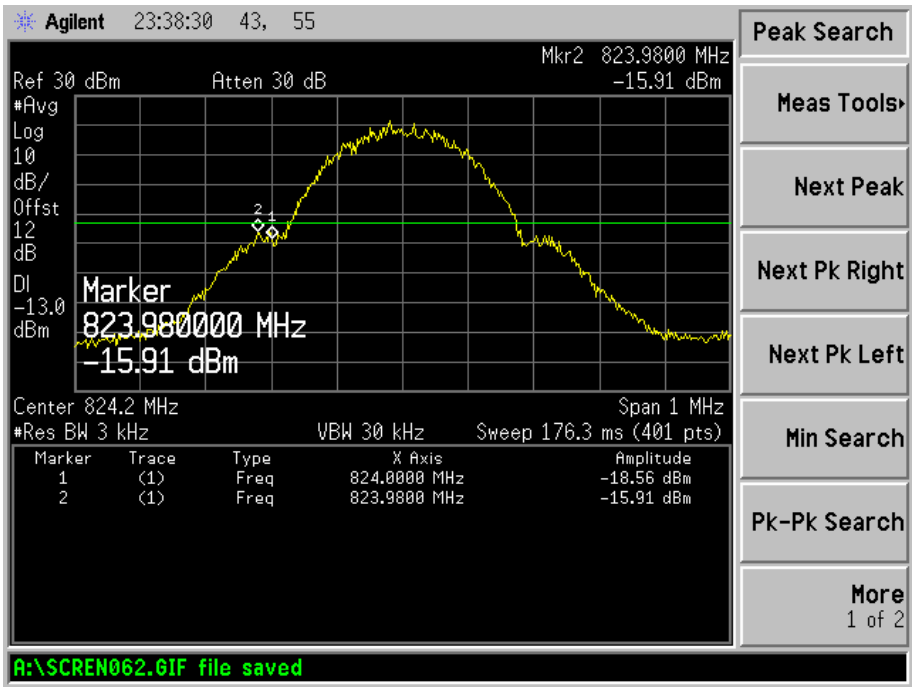
GSM High Channel
30MHz to 1GHz



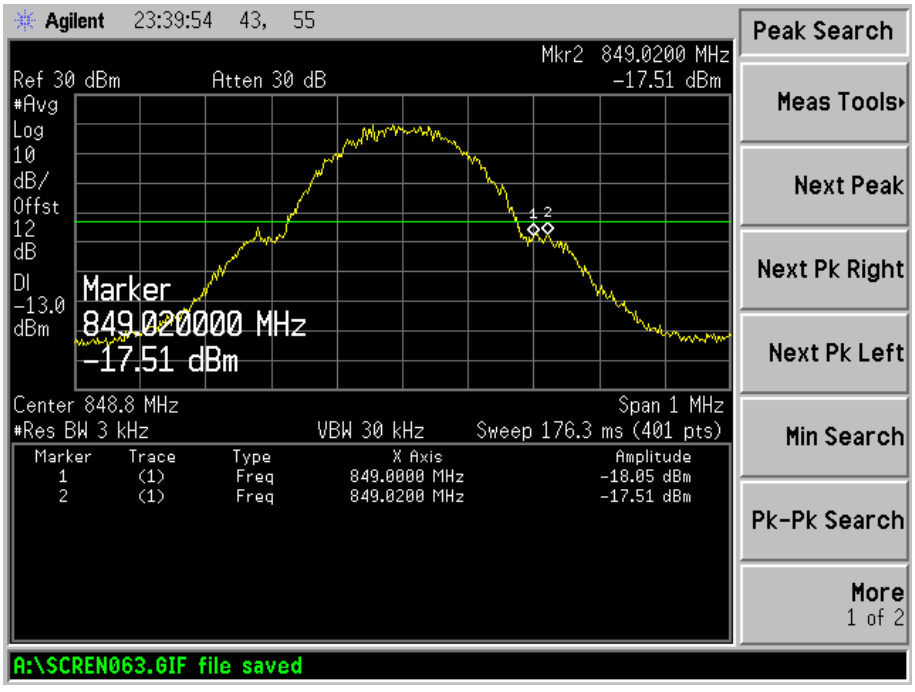
Above 1GHz



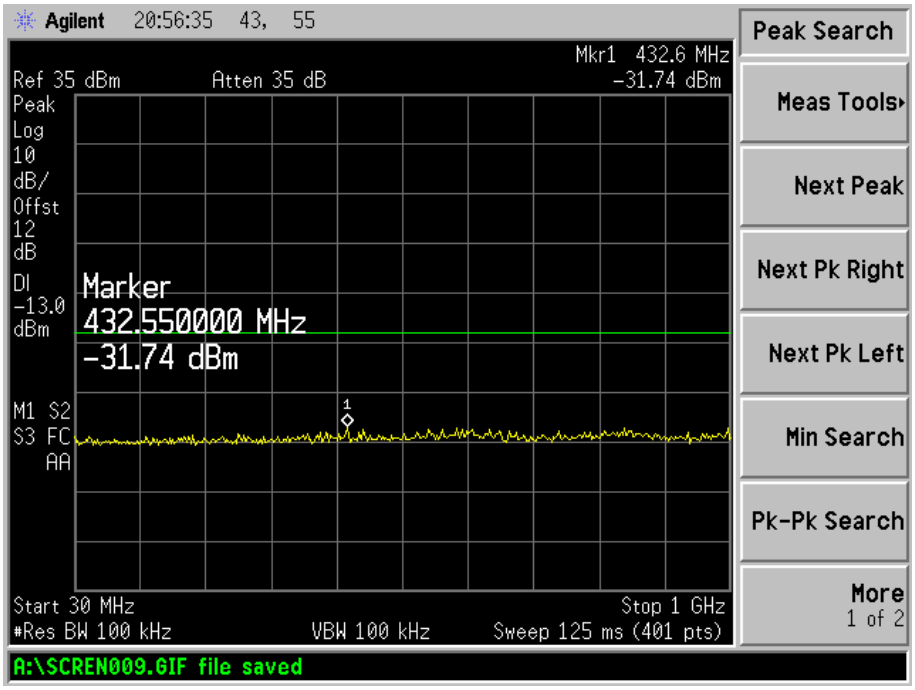
GSM Low Band Emission



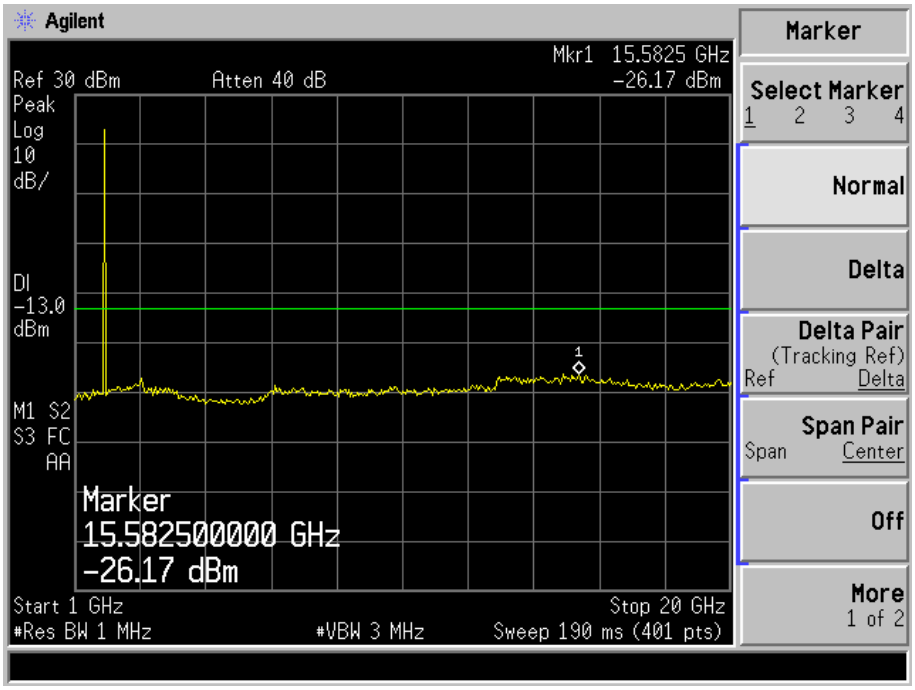
GSM High Band Emission



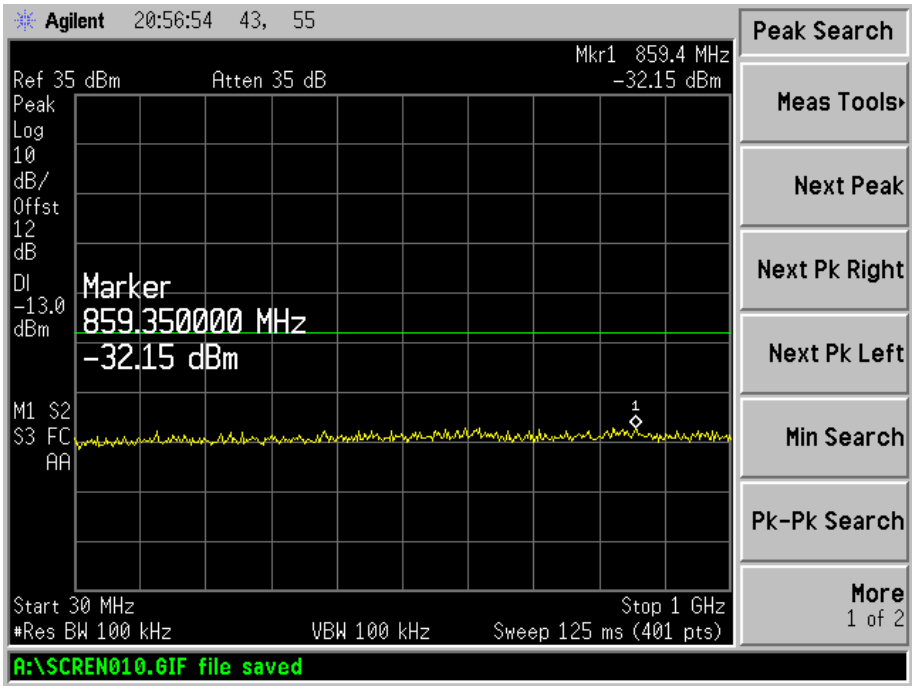
For PCS Band
GSM Low Channel
30MHz to 1GHz



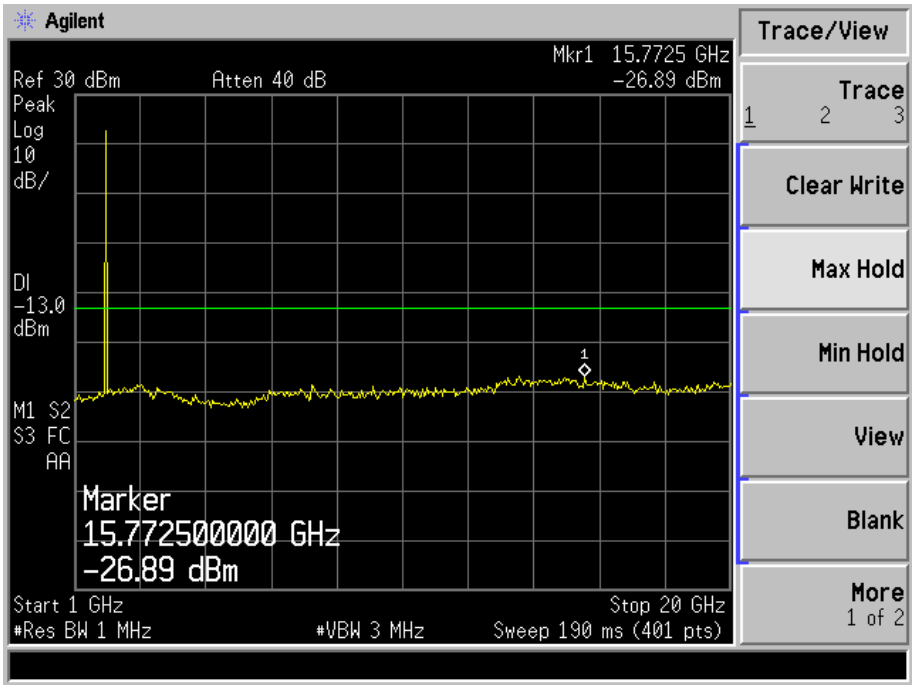
Above 1GHz



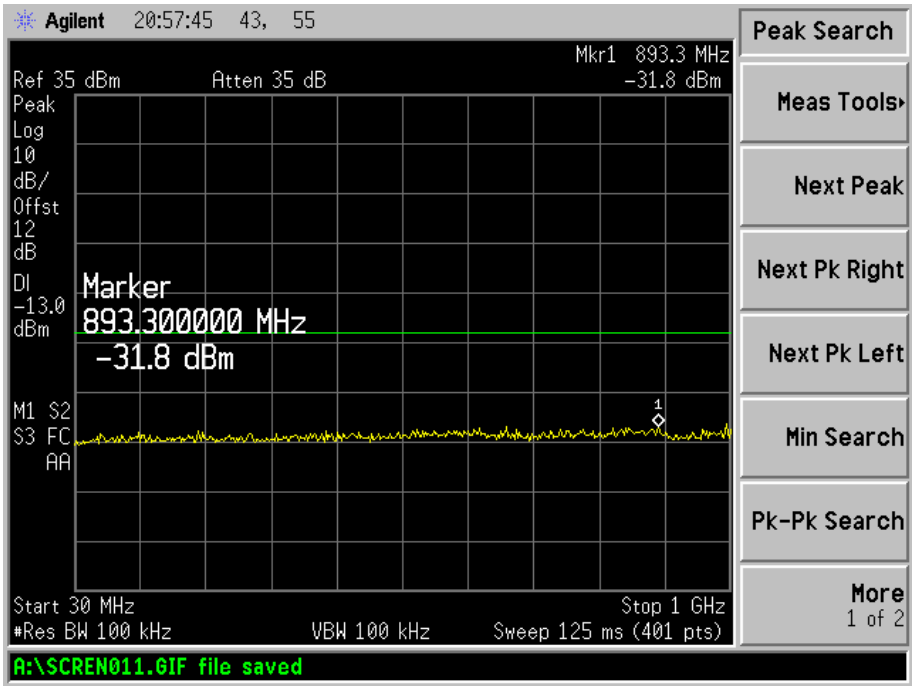
GSM Middle Channel
30MHz to 1GHz



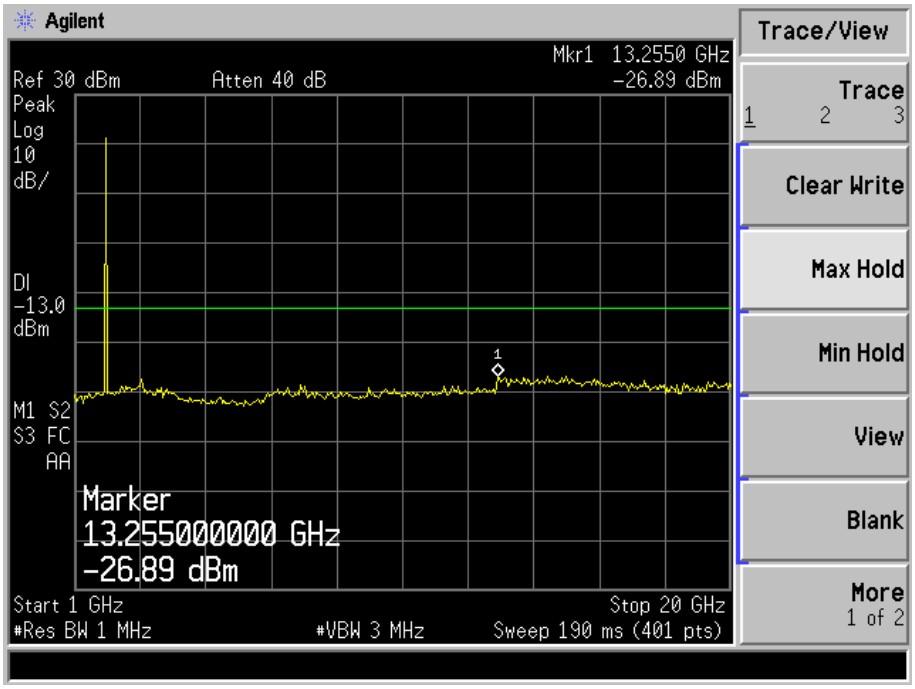
Above 1GHz



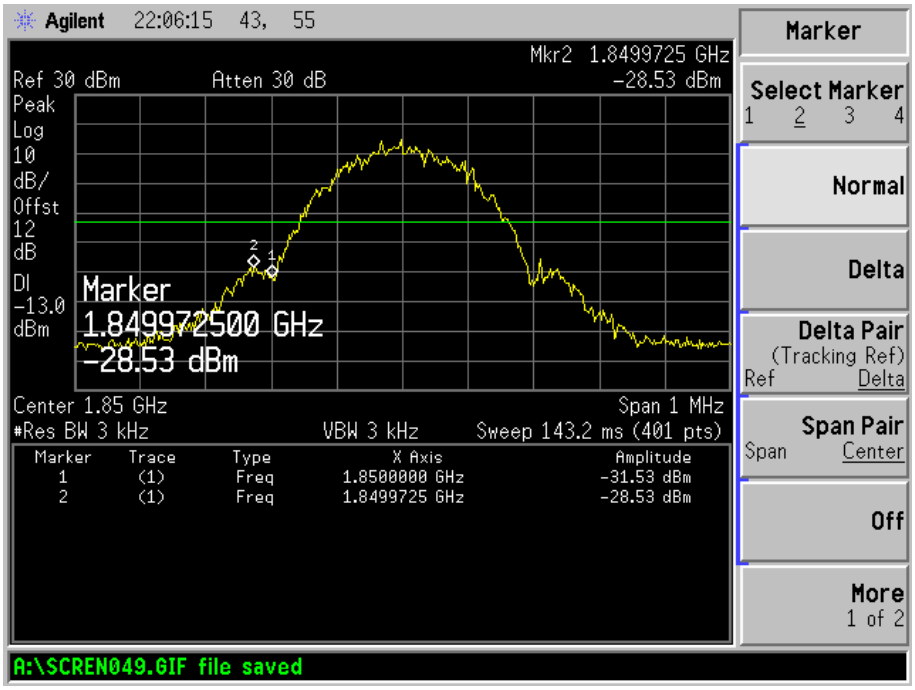
GSM High Channel
30MHz to 1GHz



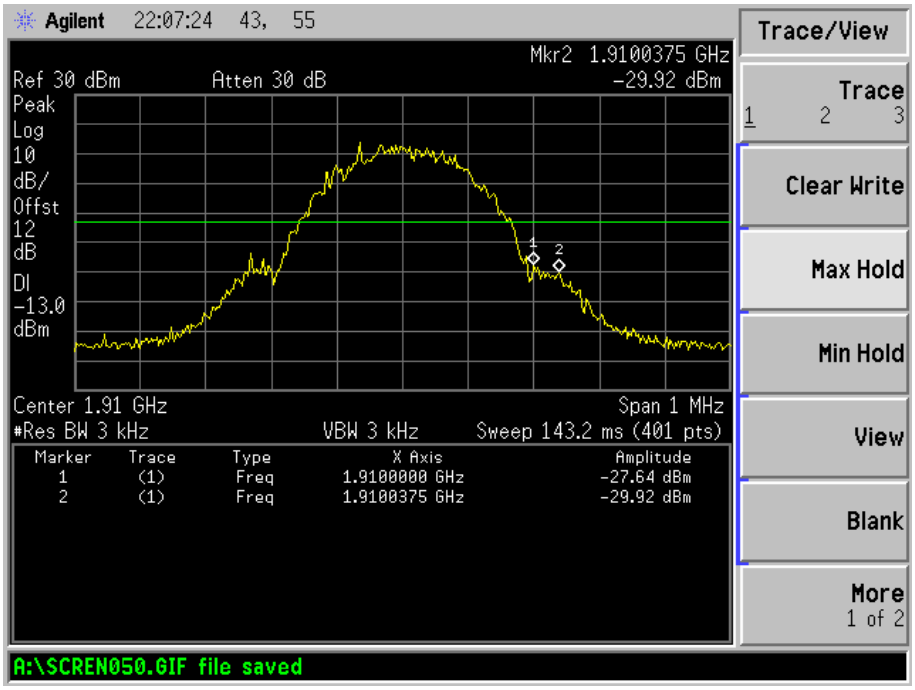
Above 1GHz



GSM Low Band Emission



GSM High Band Emission



8. Spurious Radiated Emissions

8.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±5.20 dB.

8.2 Standard Applicable

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

8.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2015-05-28	2016-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2015-05-28	2016-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2015-05-28	2016-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2015-05-28	2016-05-27
Horn Antenna	ETS	3117	00086197	2015-05-28	2016-05-27
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2015-05-24	2016-05-23
Signal Generator	R&S	SMR20	100047	2015-05-24	2016-05-27

8.4 Test Procedure

1. The setup of EUT is according with per TIA/EIA Standard 603C and ANSI C63.4-2009 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

8.5 Environmental Conditions

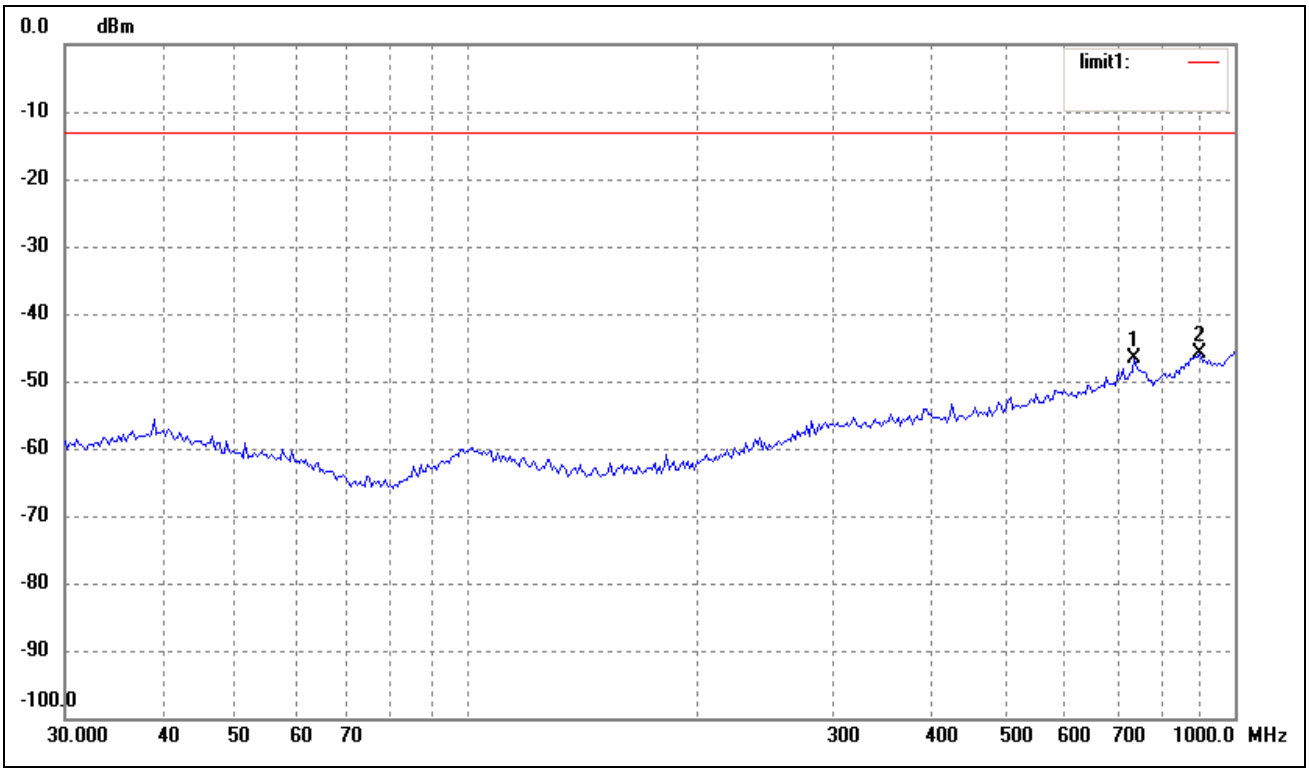
Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

8.6 Summary of Test Results/Plots

According to the data below, the FCC Part 22.917 and 24.238 standards, and had the worst margin of:

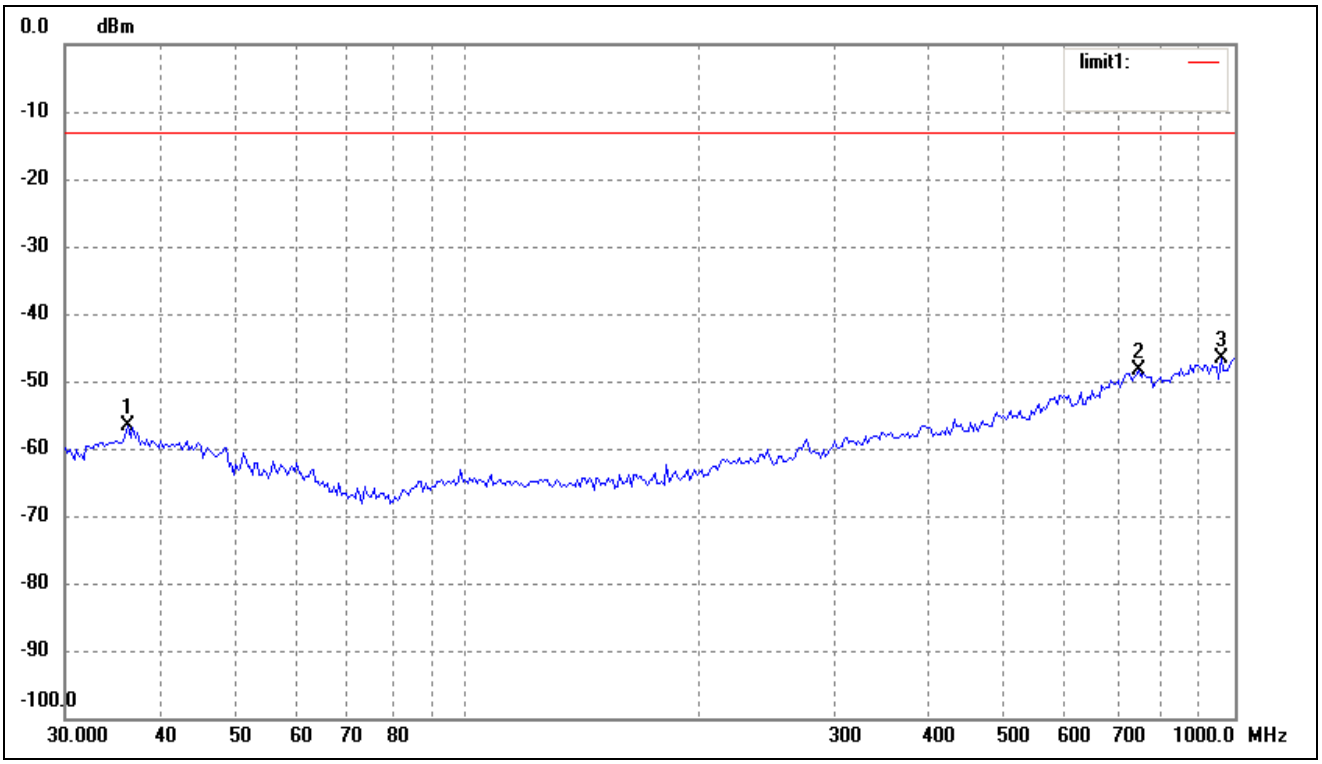
-27.14 at **945.4399 MHz** in the **Vertical** polarization for **9 kHz to 18 GHz.**

Spurious Emission From 30MHz to 1GHz
For Cellular Band_GSM Mode
Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	739.6604	-76.39	29.87	-46.52	-13.00	-33.52	ERP
2	900.1474	-77.00	31.18	-45.82	-13.00	-32.82	ERP

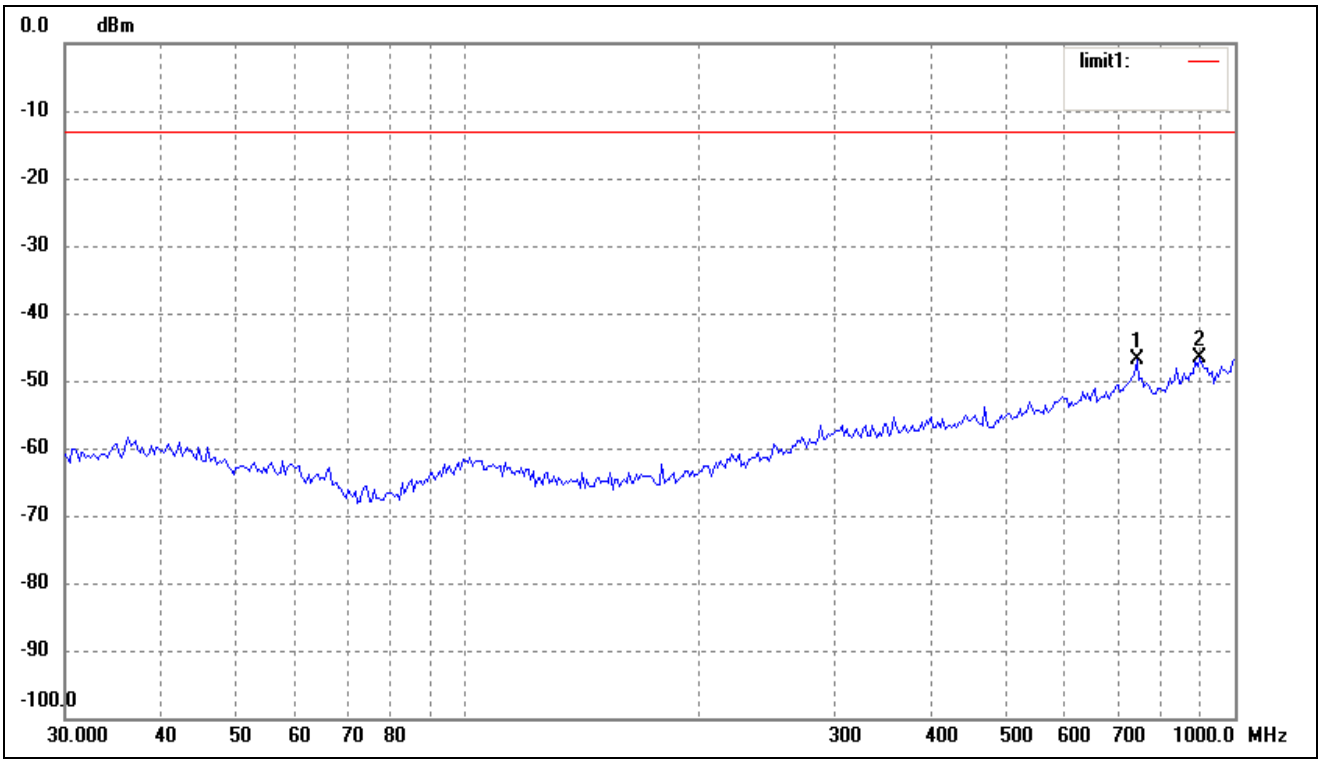
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	36.2541	-77.52	20.89	-56.63	-13.00	-43.63	ERP
2	750.1082	-77.94	29.58	-48.36	-13.00	-35.36	ERP
3	958.7943	-76.69	29.96	-46.73	-13.00	-33.73	ERP

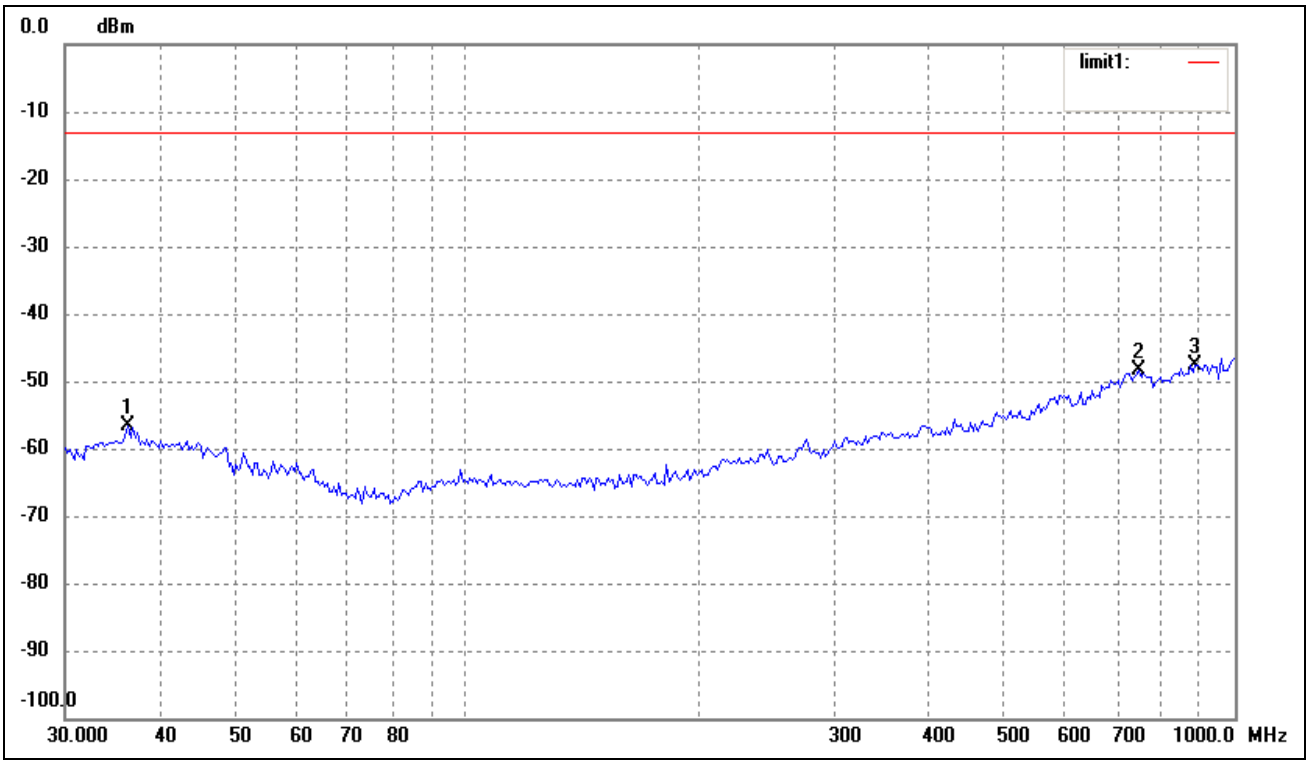
For PCS Band_GSM Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	744.8661	-76.59	29.74	-46.85	-13.00	-33.85	ERP
2	900.1474	-77.91	31.18	-46.73	-13.00	-33.73	ERP

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	36.2541	-77.52	20.89	-56.63	-13.00	-43.63	ERP
2	750.1082	-77.94	29.58	-48.36	-13.00	-35.36	ERP
3	887.6099	-78.51	30.95	-47.56	-13.00	-34.56	ERP

Spurious Emissions Above 1GHz

For Cellular Band_GSM Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (824.2MHz)						
1648.400	-56.55	-0.63	-57.18	-13.00	-44.18	H
2472.600	-59.27	15.78	-43.49	-13.00	-30.49	H
1648.400	-60.23	13.66	-46.57	-13.00	-33.57	V
2472.600	-60.77	15.78	-44.99	-13.00	-31.99	V
Middle Channel (836.6MHz)						
1673.200	-59.10	16.53	-42.57	-13.00	-29.57	H
2509.800	-59.39	15.98	-43.41	-13.00	-30.41	H
1673.200	-59.72	15.15	-44.57	-13.00	-31.57	V
2509.800	-60.03	15.78	-44.25	-13.00	-31.25	V
High Channel (848.8MHz)						
1697.600	-56.56	-0.63	-57.19	-13.00	-44.19	H
2546.400	-60.30	13.77	-46.53	-13.00	-33.53	H
1697.600	-56.96	-0.63	-57.59	-13.00	-44.59	V
2546.400	-59.45	10.18	-49.27	-13.00	-36.27	V

For PCS Band_GSM Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1850.2MHz)						
3700.400	-57.64	-0.75	-58.39	-13.00	-45.39	H
5550.600	-59.33	6.91	-52.42	-13.00	-39.42	H
3700.400	-59.37	10.27	-49.10	-13.00	-36.10	V
5550.600	-59.25	15.25	-44.00	-13.00	-31.00	V
Middle Channel (1880.0MHz)						
3760.000	-59.45	14.98	-44.47	-13.00	-31.47	H
5640.000	-59.97	17.02	-42.95	-13.00	-29.95	H
3760.000	-59.80	15.77	-44.03	-13.00	-31.03	V
5640.000	-59.29	16.34	-42.95	-13.00	-29.95	V
High Channel (1909.8MHz)						
3819.600	-57.88	9.92	-47.96	-13.00	-34.96	H
5729.400	-57.84	13.47	-44.37	-13.00	-31.37	H
3819.600	-60.70	16.97	-43.73	-13.00	-30.73	V
5729.400	-60.05	15.46	-44.59	-13.00	-31.59	V

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 10th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

9. Frequency Stability

9.1 Standard Applicable

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Cellular Band

Frequency range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

9.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B-ESA	US41192821	2015-05-28	2016-05-27
Rohde & Schwarz	Universal Radio Communication	CMU200	112012	2015-05-28	2016-05-27
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2015-05-28	2016-05-27

9.3 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	85-115% of declared nominal voltage
-30°C to +50°C	Normal

9.4 Environmental Conditions

Temperature:	20°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.5 Summary of Test Results/Plots

For Cellular Band GSM Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	46	0.0550
40	3.7	30	0.0359
30	3.7	21	0.0251
20	3.7	25	0.0299
10	3.7	32	0.0383
0	3.7	38	0.0454
-10	3.7	46	0.0550
-20	3.7	40	0.0478
-30	3.7	48	0.0574

For PCS Band GSM Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	-73	-0.0388
40	3.7	-69	-0.0367
30	3.7	-51	-0.0271
20	3.7	-67	-0.0356
10	3.7	-48	-0.0255
0	3.7	-37	-0.0197
-10	3.7	-43	-0.0229
-20	3.7	-57	-0.0303
-30	3.7	-53	-0.0282

So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): GSM 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	34	0.0406
	3.7	25	0.0299
	4.2	38	0.0454
Reference Frequency(Middle Channel): GSM 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	-72	-0.0383
	3.7	-67	-0.0356
	4.2	-70	-0.0372

******* END OF REPORT *******