Test Report

FCC ID: GAO-SCHICO

Date of issue: Sept. 18, 2019

Report number:	MTi19070905-1E2
Sample description:	Feature Phone
Model(s):	Snap Chico
Applicant:	Collage Investments LLC.
Address:	6030 NW 99 Ave #414 Doral Florida United States
Date of test:	Aug. 13, 2019 to Sept. 10, 2019

Shenzhen Microtest Co., Ltd.
http://www.mtitest.com

Tel:(86-755)88850135 Fax: (86-755) 88850136 http://www.mtitest.com E-mail: mti@51mti.com
Address: No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China

Table of Contents

Test Result Certification

Applicant's name:	Collage Investments LLC.
Address:	6030 NW 99 Ave #414 Doral Florida United States
Manufacture's name:	Pingxiang Yibo Intelligent Technology Co., Ltd.
Address:	Electronic Information Industry Park, Pingxiang Economic and Technological Development Zone, Pingxiang City, Jiangxi Province
Product name:	Feature Phone
Trademark:	SMOOTH
Model name:	Snap Chico
Standards:	FCC Part 22 Subpart H FCC Part 24 Subpart E
Test procedure:	FCC Part 2 ANSI/TIA-603-E-2016 ANSI C63.26:2015 KDB 971168 D01 Power Meas License Digital Systems v03r01

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:	Demi Mu	Sept. 10, 2019
Reviewed by:	Blue Zheng	Sept. 18, 2019
Approved by:	Smith Chen	Sept. 18, 2019

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	Feature Phone
Trade name	SMOOTH
Model name:	Snap Chico
Difference in series models:	N/A
Frequency range:	GSM850: TX824.2MHz~848.8MHz /RX869.2MHz~893.8MHz; GSM1900:TX1850.2MHz~1909.8MHz/RX1930.2MHz~1989.8MHz;
Modulation type:	GMSK for GSM;
Power class:	
SIM card:	The Feature Phone has Two SIM Card socket
Antenna Type	PIFA Antenna
Antenna gain:	GSM 850 Gain: 0.5dBi GSM 1900 Gain: 1.5dBi
Hardware version	V1.0
Software version	V1.0
Power supply:	DC 3.7V from battery or DC 5V from adapter
Battery:	DC 3.7V 600mAh
Adapter information:	Model: Snap Chico Input: 100-240V 50/60Hz 0.2A Output: 5V-500mA

1.2 Test frequency channel

Frequency Band	Frequency	Channel	Frequency(MHz)
GSM 850	Low	128	824.2
	Middle	190	836.6
	High	251	848.8
GSM 1900	Low	512	1850.2
	Middle	661	1880
	High	810	1909.8

1.3 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement. The EUT is configured to transmit continuously (duty cycle > 98 %) at the maximum power control level.

1.4 Test conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15ºC~35ºC
- Humidity: 20%~75%
- Atmospheric pressure: 98kPa~101kPa

1.5 Testing site

Test Site	Shenzhen Microtest Co., Ltd.
Test Site Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

1.6 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
Adapter	Snap Chico	/	/	/

1.7 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, U=2xUc(y)

RF frequency	1 x 10-7
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	±1 degree
Humidity	± 5 %

2 Summary of Test Result

Item	FCC Part No.	Description of Test	Result
1	2.1046, 22.913(a); 24.232(c)	Maximum output power	Pass
2	2.1046, 22.913(d); 24.232(d)	Peak to average power radio(PAPR)	Pass
3	2.1046, 22.913(a); 24.232(c)	Transmitter Radiated Power (EIRP/ERP)	Pass
4	2.1049; 22.917(b); 24.238(b)	Occupied Bandwidth	Pass
5	2.1051; 22.917(a); 24.238(a)	Conducted spurious emissions	Pass
6	2.1051; 22.917(b); 24.238(b)	Spurious emissions at band edge	Pass
7	2.1053; 22.917(a); 24.238(a)	Radiated spurious emissions	Pass
8	2.1055; 22.355; 24.235	Frequency Stability	Pass

3 Test facilities and accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	FCC Registration No.: 448573

3.2 Environmental conditions

Temperature:	15ºC~35ºC
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, U=2xUc(y)

RF frequency	1 x 10-7
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	±1 degree
Humidity	± 5 %

3.4 Test software

Software Name	Manufacturer	Model	Version
GSM	Shenzhen JS tonscend co., ltd	JS1120-4	2.1.6
WCDMA	Shenzhen JS tonscend co., ltd	JS1120-2	2.1.5.10

4 List of test equipment

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI7	100314	2018/10/09	2019/10/08
MTI-E006	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-872	2018/10/15	2020/10/14
MTI-E014	amplifier	Hewlett-Packard	8447D	3113A06150	2018/10/09	2019/10/08
MTI-E036	Single path vehicle AMN(LISN)	Schwarzbeck	NNBM 8124	01175	2018/10/09	2019/10/08
MTI-E038	Low noise active vertical monopole antenna	Schwarzbeck	VAMP 9243	#565	2018/10/16	2019/10/15
MTI-E039	Biconical antenna	Schwarzbeck	BBA 9106	#164	2018/10/15	2019/10/14
MTI-E041	MXG Vector Signal Generator	Agilent	N5182A	MY49060455	2019/04/16	2020/04/15
MTI-E042	ESG Series Analog signal generator	Agilent	E4421B	GB40051240	2019/05/21	2020/05/20
MTI-E044	Thermometer clock humidity monitor	-	HTC-1	/	2019/04/17	2020/04/16
MTI-E062	Log Periodic Antenna	Schwarzbeck	VUSLP 9111B	#312	2018/04/11	2020/04/10
MTI-E063	Log Periodic Dipole Array Antenna	ETS-LINDGREN	3148B	00224524	2018/04/11	2020/04/10
MTI-E065	Amplifier	EMtrace	RP06A	00117	2019/04/29	2020/04/28
MTI-E066	Comprehensive test instrument	Rohde&schwarz	CMW500	149155	2019/04/16	2020/04/15
MTI-E071	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2018/10/25	2019/10/24
MTI-E076	EMI Test Receiver	Rohde&schwarz	ESIB26	100273	2019/04/16	2020/04/15
MTI-E078	Synthesized Sweeper	Agilent	83752A	3610A01957	2019/04/16	2020/04/15
MTI-E079	DC Power Supply	Agilent	E3632A	MY40027695	2019/04/16	2020/04/15
MTI-E093	Artificial mains network	3ctest	LISN J50	ES3911805	2019/04/16	2020/04/15
MTI-E096	Power amplifier	Space-Dtroniccs	EWLNA0118G-P40	1852001	2019/04/29	2020/04/28
MTI-E097	Current Probe	SOLAR ELECTRONICS CO.	9207-1	220095-1	2019/04/17	2020/04/16
MTI-E098	Loop Sensor	SOLAR ELECTRONICS CO.	7334-1	220095-2	2019/04/21	2020/04/20
Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).						

5 Test Result

5.1 Maximum output power and EIRP & ERP

5.1.1 Limit

For FCC 22.913: The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC 24.234: Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

5.1.2 Test method

For Conducted output power:

1.Use a universal radio communication tester, the output power of EUT was measured at the antenna terminal. The path loss was calibrated and entered as an offset into the test equipment.

2. The EUT was configured to transmit on maximum power by the radio communication tester.

3. Measured the peak and average powers.

For EIRP & ERP:

1.In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

2.The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$ERP/EIRP = P_{Meas} + GT - LC$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

dBd (ERP)=dBi (EIRP) -2.15 dB

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

5.1.3 Test Result

For Conducted output power:

Band	Channel	PCL	Power(dBm)	Limit(dBm)	Verdict
GSM850	128	5	32.22	38.5	PASS
GSM850	190	5	32.27	38.5	PASS
GSM850	251	5	32.50	38.5	PASS
GSM1900	512	0	30.04	33	PASS
GSM1900	661	0	29.65	33	PASS
GSM1900	810	0	29.51	33	PASS

For EIRP & ERP:

For GSM 850

Frequency (MHz)	Polarization	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)	Correction (dB)	ERP (dBm)	ERP (W)
824.2	H	33.48	0.39	0.5	2.15	31.44	1.3932
836.6	H	32.75	0.35	0.5	2.15	30.75	1.1885
848.8	H	33.46	0.32	0.5	2.15	31.49	1.4093
824.2	V	33.14	0.39	0.5	2.15	31.10	1.2882
836.6	V	33.62	0.35	0.5	2.15	31.62	1.4521
848.8	V	32.71	0.32	0.5	2.15	30.74	1.1858

For GSM 1900

Frequency (MHz)	Polarization	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)	EIRP (dBm)	EIRP (W)
1850.2	H	31.75	0.47	0.5	31.78	1.5066
1880	H	30.38	0.47	0.5	30.41	1.0990
1909.8	H	29.99	0.46	0.5	30.03	1.0069
1850.2	V	30.59	0.47	0.5	30.62	1.1535
1880	V	31.02	0.47	0.5	31.05	1.2735
1909.8	V	31.01	0.46	0.5	31.05	1.2735

Note: ERP = SG Level- Cable Loss + Antenna Gain – Correction
EIRP= SG Level- Cable Loss + Antenna Gain

5.2 Peak to average power ratio (PAPR)

5.2.1 Limit

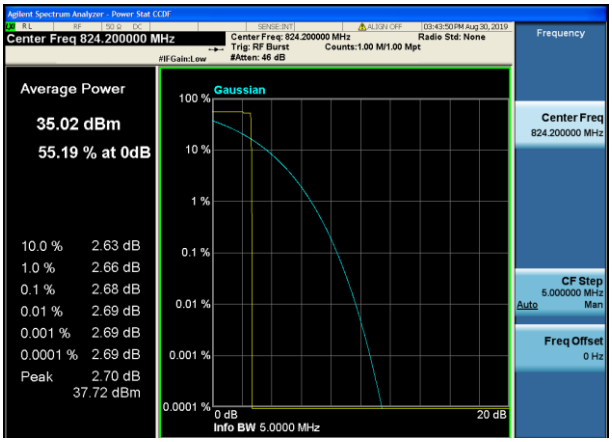
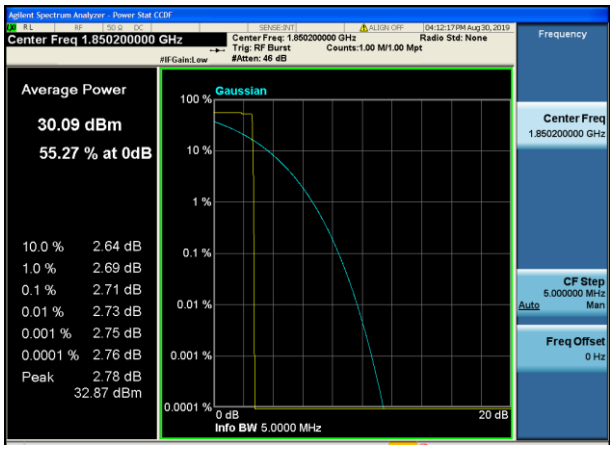
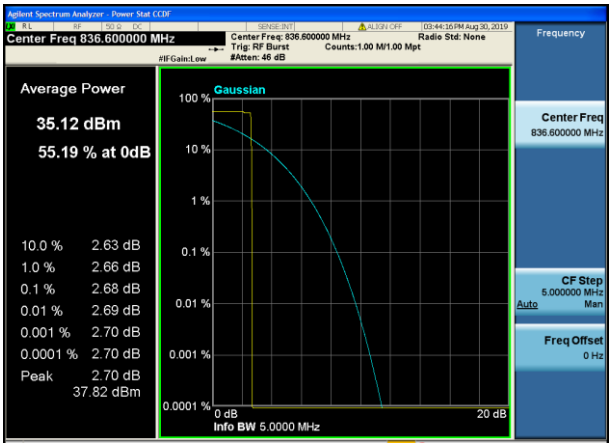
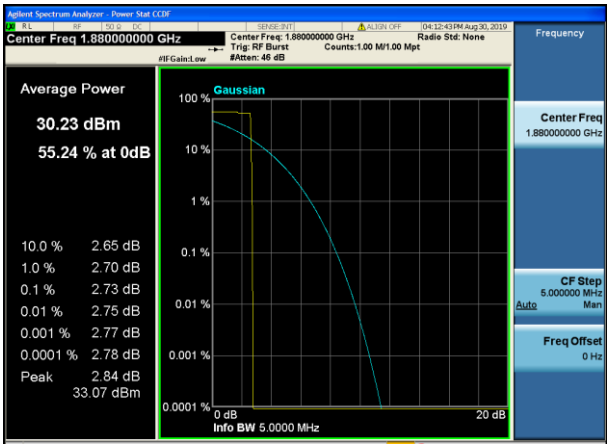
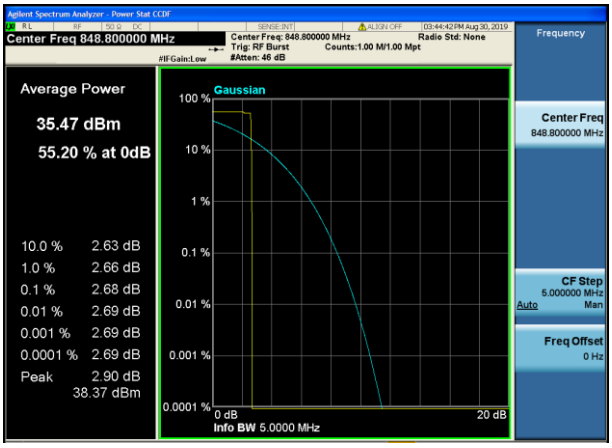
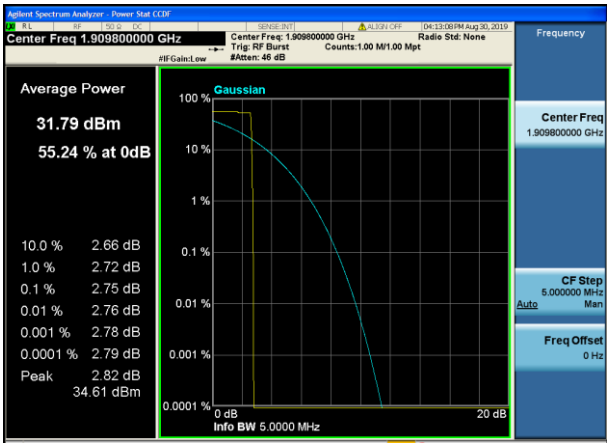
The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

5.2.2 Test method

The EUT was connected to Spectrum Analyzer and Base Station via power divider.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set the number of counts to a value that stabilizes the measured CCDF curve.
Set the measurement interval to 1 ms.
Record the maximum PAPR level associated with a probability of 0.1%.
a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
c) Set the number of counts to a value that stabilizes the measured CCDF curve;
d) Set the measurement interval as follows:
1) for continuous transmissions, set to 1 ms,
2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
e) Record the maximum PAPR level associated with a probability of 0.1%.

5.2.3 Test Result

Cellular Band						
Modes	GSM850			GSM1900		
Channel	128 (Low)	190 (Mid)	251 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	2.68	2.68	2.68	2.71	2.73	2.75

Test plot	
(GSM850)	(GSM1900)
Peak-to-Average Ratio on channel 128	Peak-to-Average Ratio on channel 512
	
Peak-to-Average Ratio on channel 190	Peak-to-Average Ratio on channel 661
	
Peak-to-Average Ratio on channel 251	Peak-to-Average Ratio on channel 810
	

Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.3 Occupied bandwidth

5.3.1 Test method

1. The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.

2. The resolution bandwidth of the Spectrum Analyzer is set to at least 1% of the occupied bandwidth.

3. The low, middle and the high channels are selected to perform tests respectively.

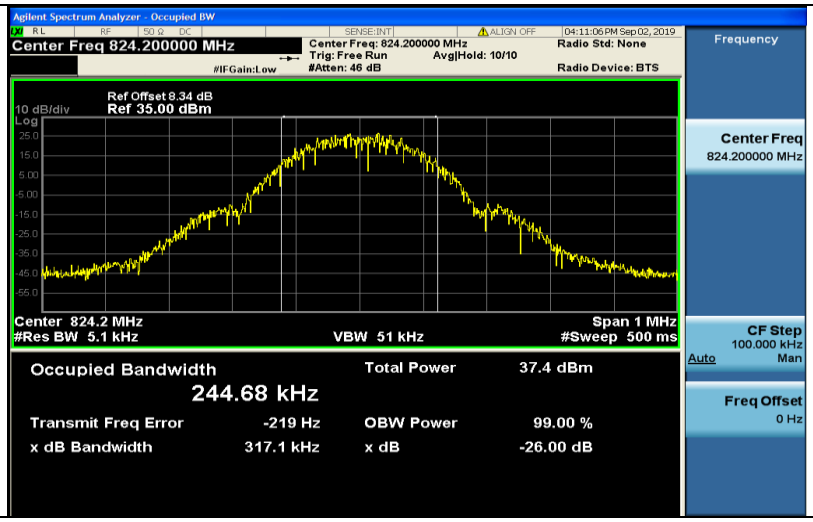
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 26dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.

5. Set the Spectrum Analyzer Occupied bandwidth function to measure the 99% occupied bandwidth.

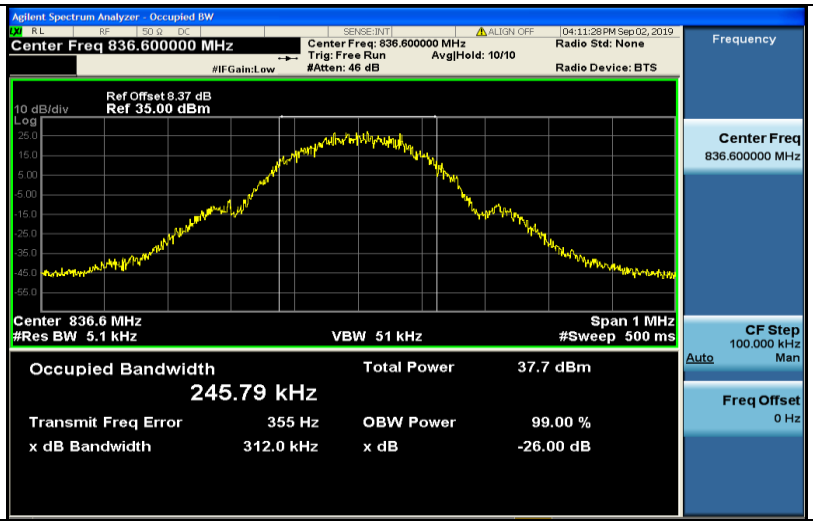
5.3.2 Test result

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GSM850	128	244.68	317.1	---	PASS
GSM850	190	245.79	312.0	---	PASS
GSM850	251	246.97	315.9	---	PASS
GSM1900	512	247.47	315.6	---	PASS
GSM1900	661	245.92	319.0	---	PASS
GSM1900	810	247.51	309.7	---	PASS

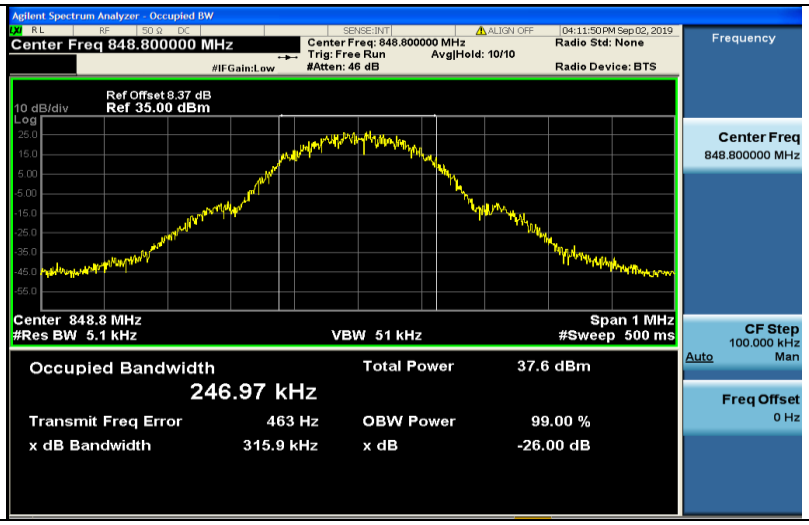
GSM850-128



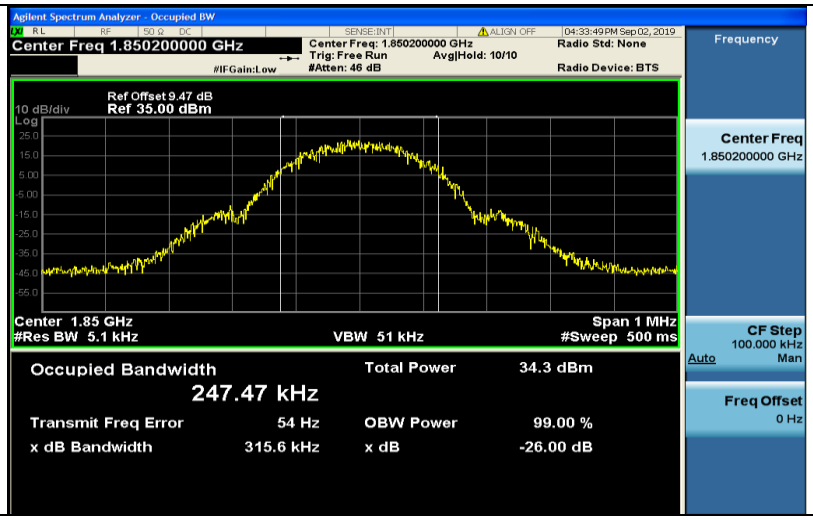
GSM850-190



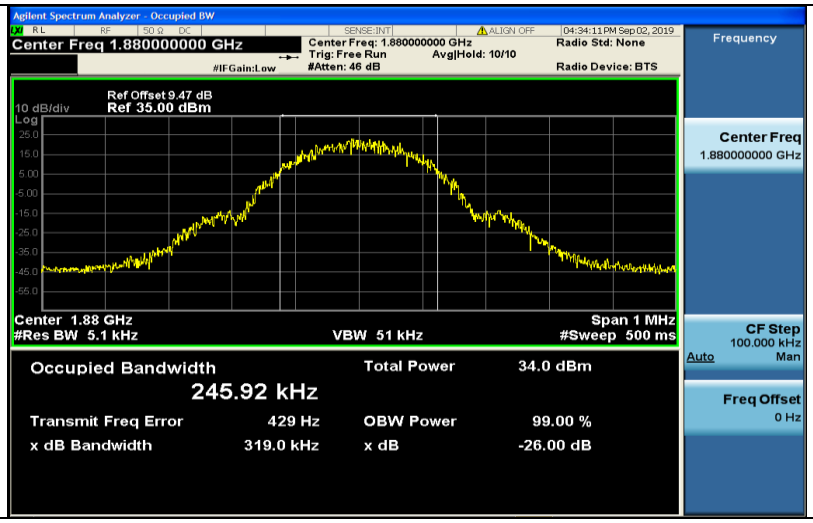
GSM850-251



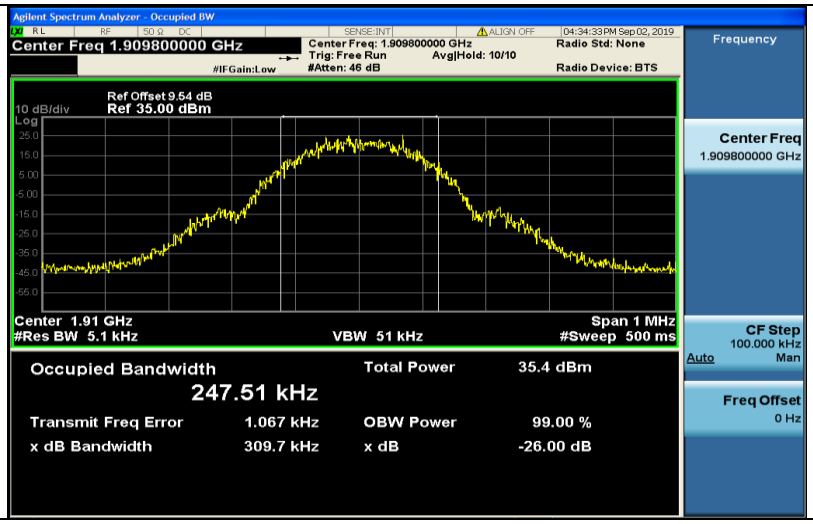
GSM1900-512



GSM1900-661



GSM1900-810



Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.4 Conducted spurious emissions

5.4.1 Limits

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10log (P) dB

5.4.2 Test method

1, The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.

2, Spectrum Setting:

Frequency bellow 1 GHz: RBW=100 kHz, VBW=300 kHz.

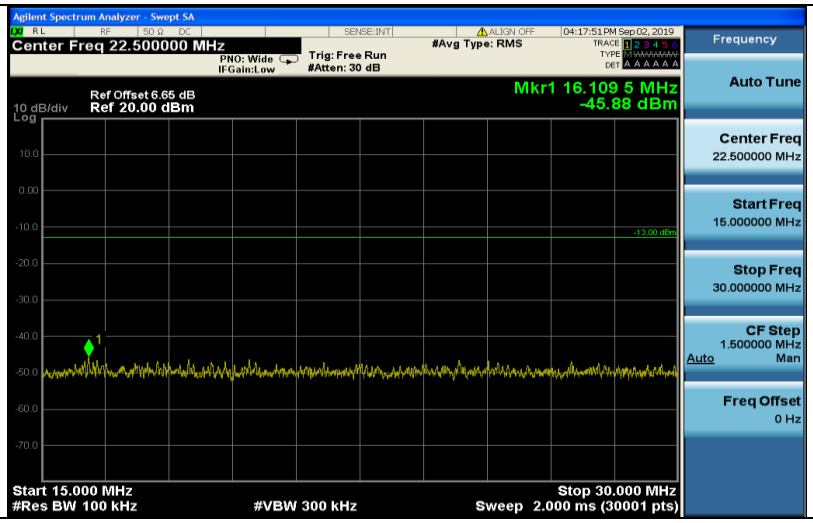
Frequency above 1 GHz: RBW=1 MHz, VBW=3 MHz.

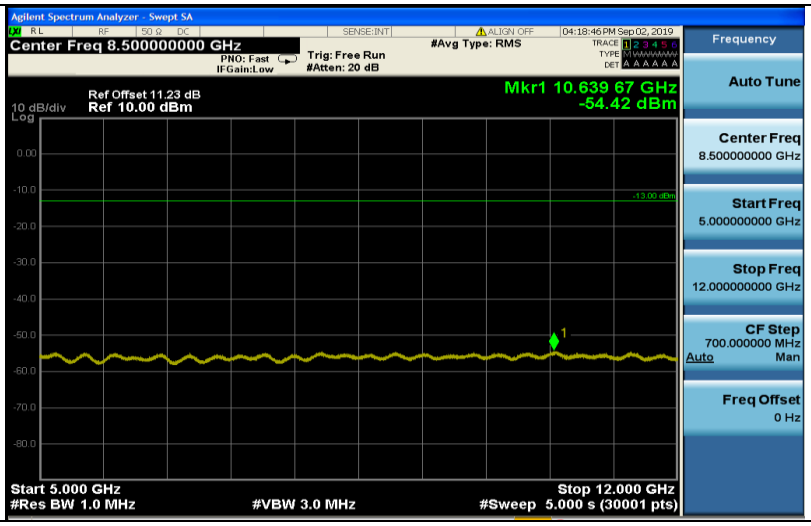
3, The low, middle and high channels of each band and mode's spurious emissions for 30 MHz to 10th Harmonic were measured by Spectrum analyser.

5.4.3 Test result

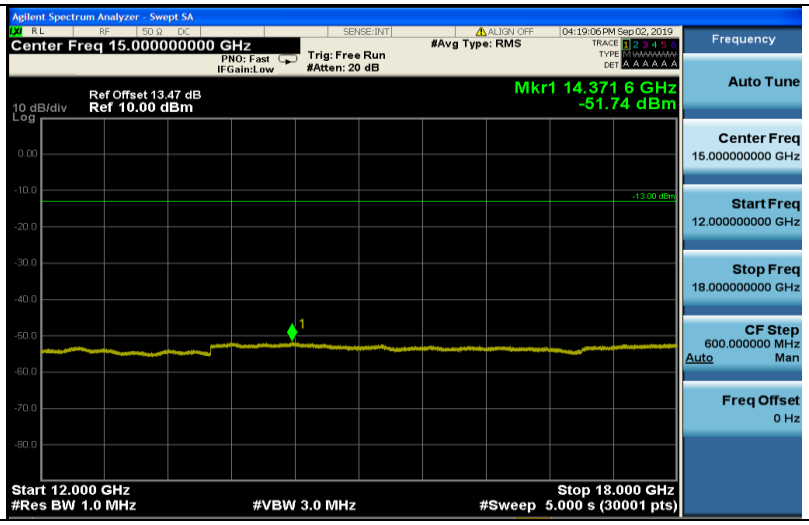
Band	Channel	Frequency Range(MHz)	Value(dBm)	Limit(dBm)	Verdict
GSM850	128	15~30	-45.88	-13	PASS
GSM850	128	1000~5000	-34.33	-13	PASS
GSM850	128	5000~12000	-54.42	-13	PASS
GSM850	128	12000~18000	-51.74	-13	PASS
GSM850	190	15~30	-46.37	-13	PASS
GSM850	190	1000~5000	-36.05	-13	PASS
GSM850	190	5000~12000	-54.44	-13	PASS
GSM850	190	12000~18000	-51.91	-13	PASS
GSM850	251	15~30	-46.58	-13	PASS
GSM850	251	1000~5000	-32.92	-13	PASS
GSM850	251	5000~12000	-54.44	-13	PASS
GSM850	251	12000~18000	-51.72	-13	PASS
GSM1900	512	30~1000	-30.23	-13	PASS
GSM1900	512	1000~5000	-36.06	-13	PASS
GSM1900	512	5000~12000	-54.35	-13	PASS
GSM1900	512	12000~18000	-51.74	-13	PASS
GSM1900	661	30~1000	-30.49	-13	PASS
GSM1900	661	1000~5000	-36.05	-13	PASS
GSM1900	661	5000~12000	-54.52	-13	PASS
GSM1900	661	12000~18000	-51.74	-13	PASS
GSM1900	810	30~1000	-31.11	-13	PASS
GSM1900	810	1000~5000	-36.03	-13	PASS
GSM1900	810	5000~12000	-54.26	-13	PASS
GSM1900	810	12000~18000	-51.85	-13	PASS

GSM850

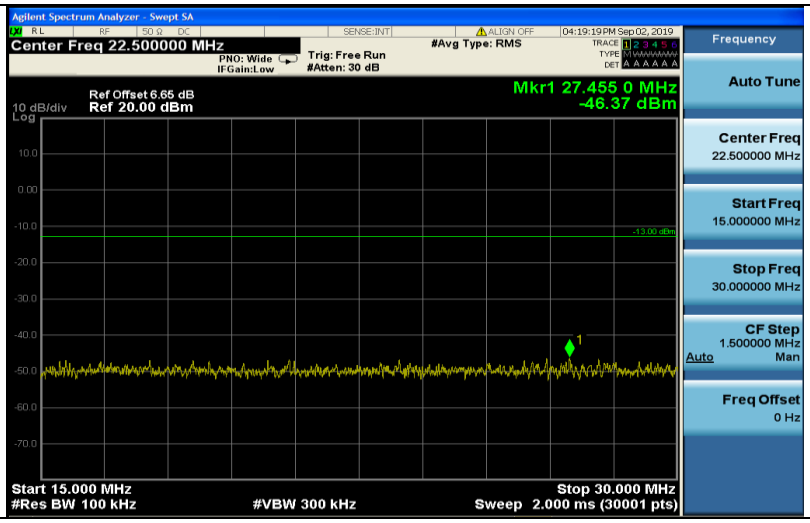
GSM850-128-15~30

GSM850-128-1000~5000

GSM850-128-5000~12000


GSM850-128-12000~18000

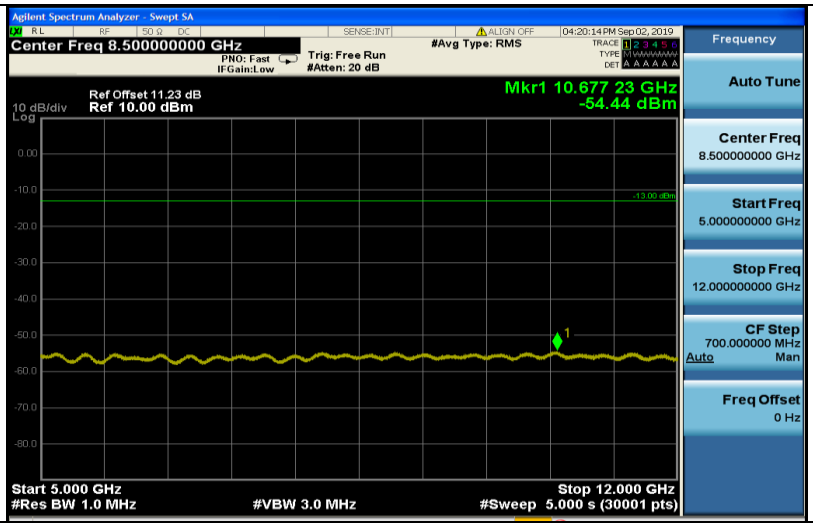


GSM850-190-15~30

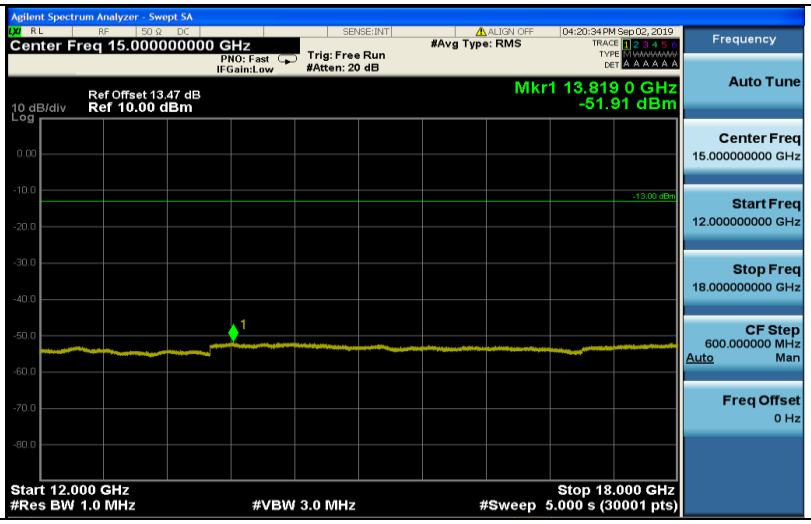


GSM850-190-1000~5000

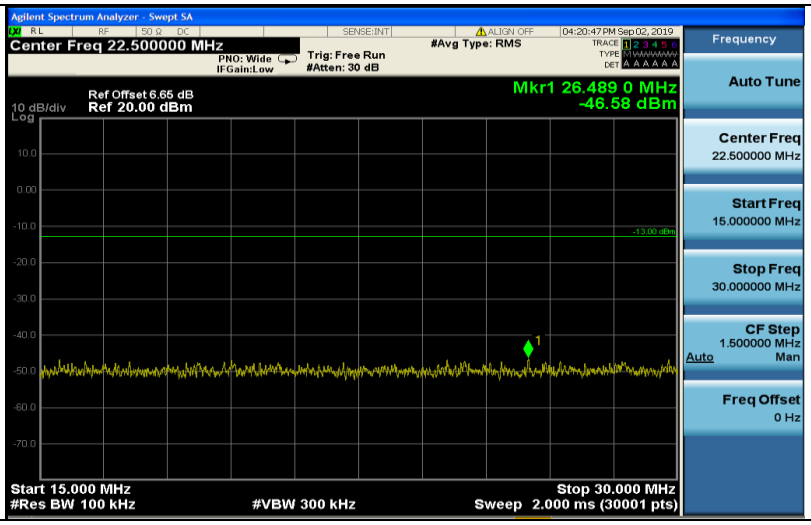
GSM850-190-5000~12000



GSM850-190-12000~18000

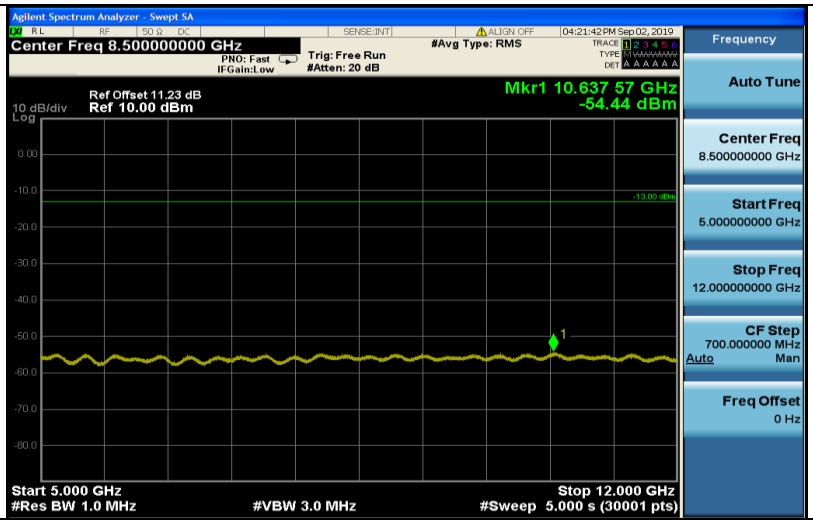


GSM850-251-15~30

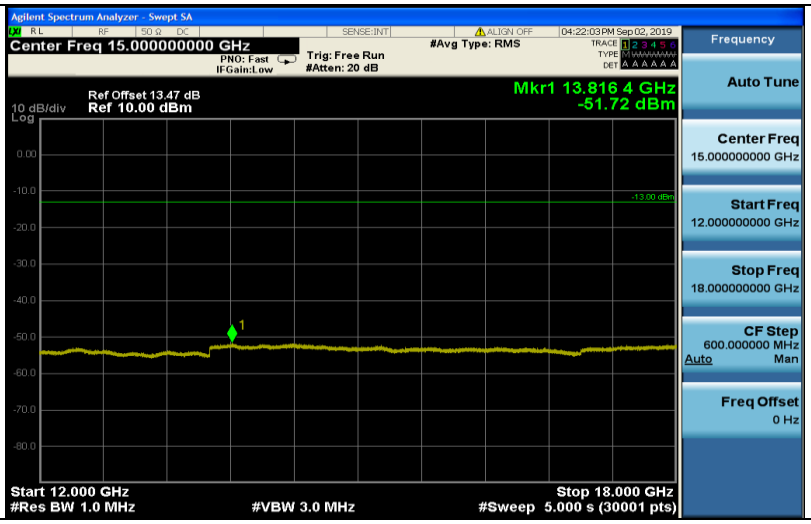


GSM850-251-1000~5000

GSM850-251-5000~12000

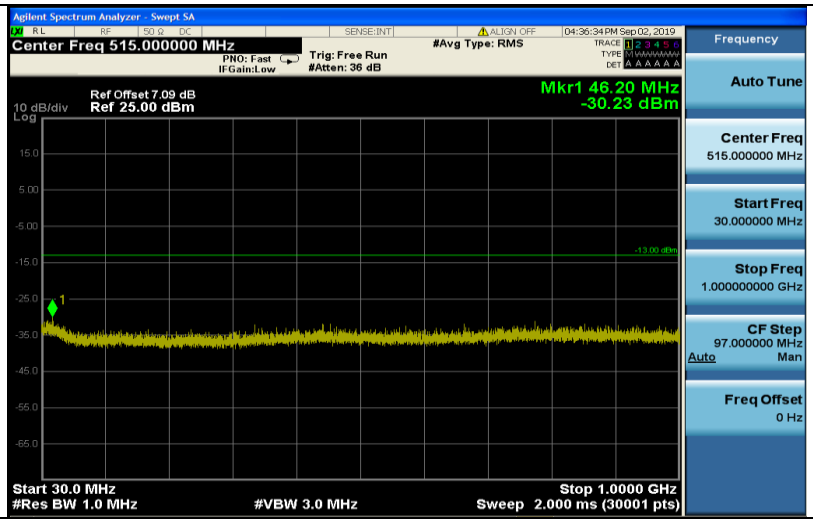


GSM850-251-12000~18000

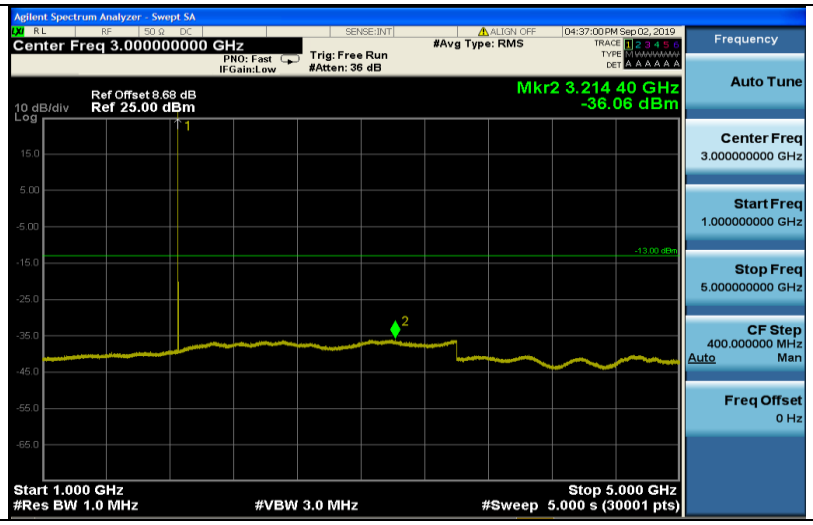


GSM1900

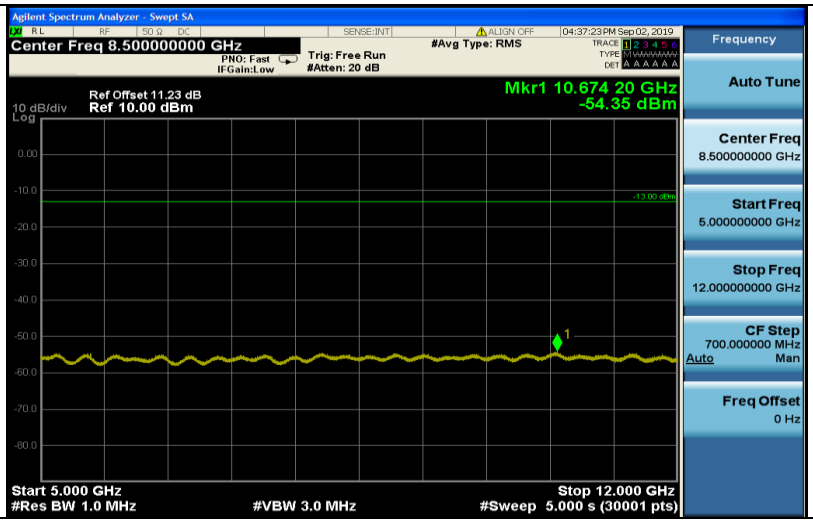
GSM1900-512-30~1000



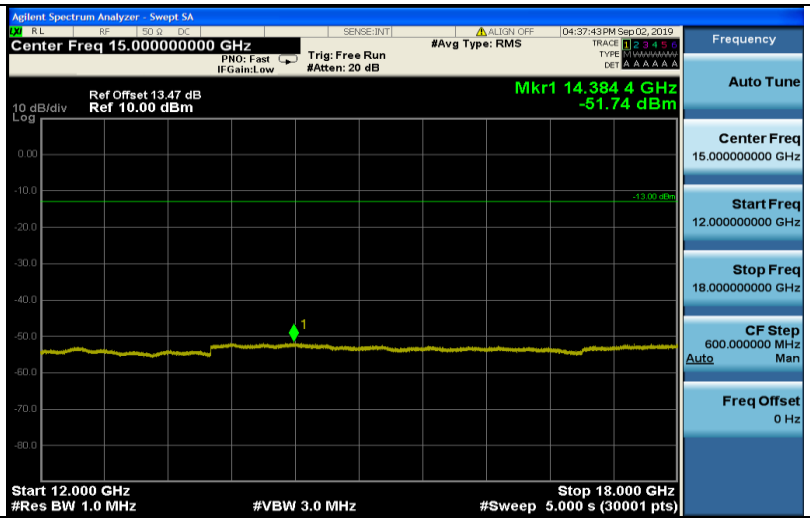
GSM1900-512-1000~5000



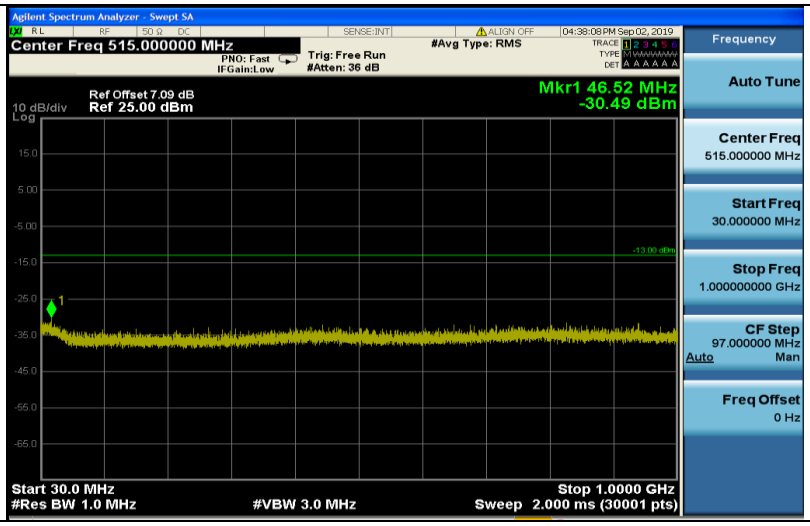
GSM1900-512-5000~12000



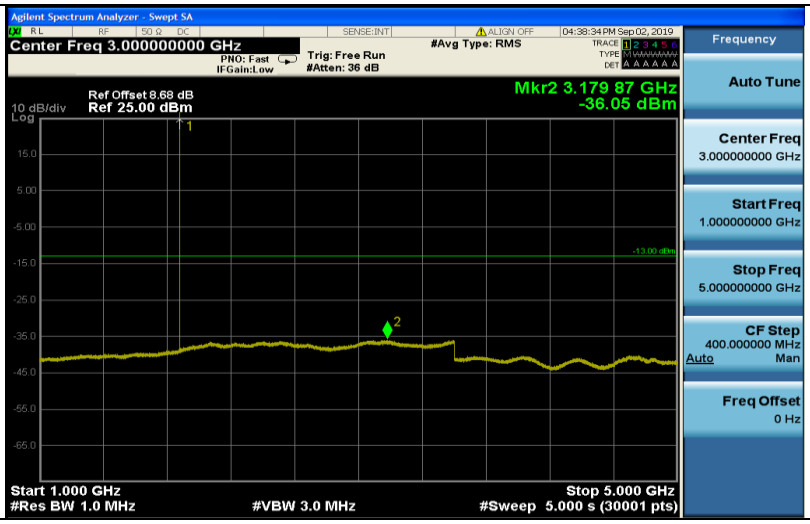
GSM1900-512-12000~18000



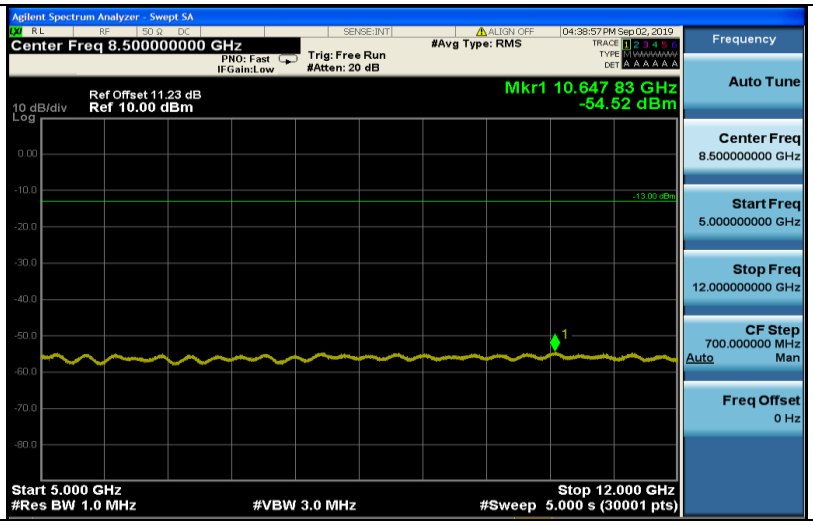
GSM1900-661-30~1000



GSM1900-661-1000~5000

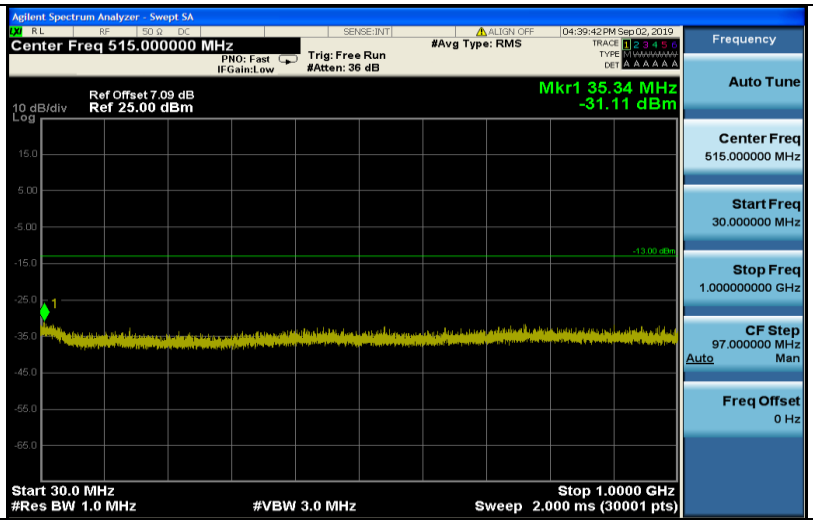


GSM1900-661-5000~12000



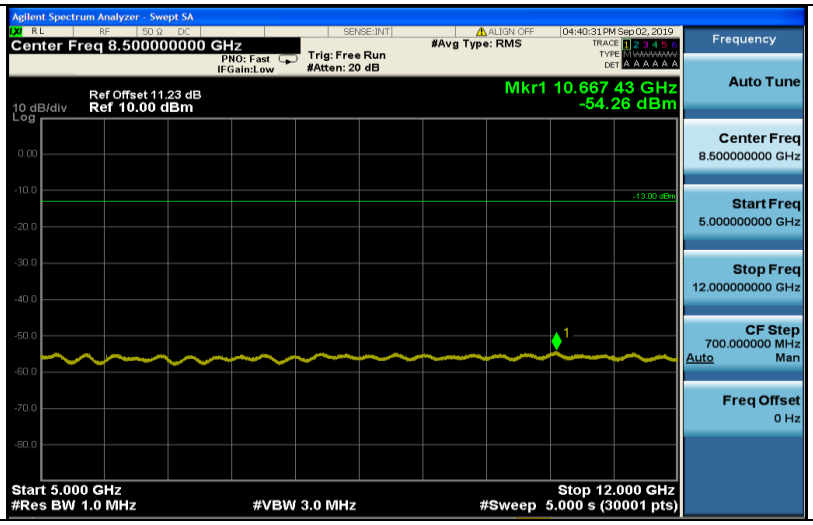
GSM1900-661-12000~18000

GSM1900-810-30~1000

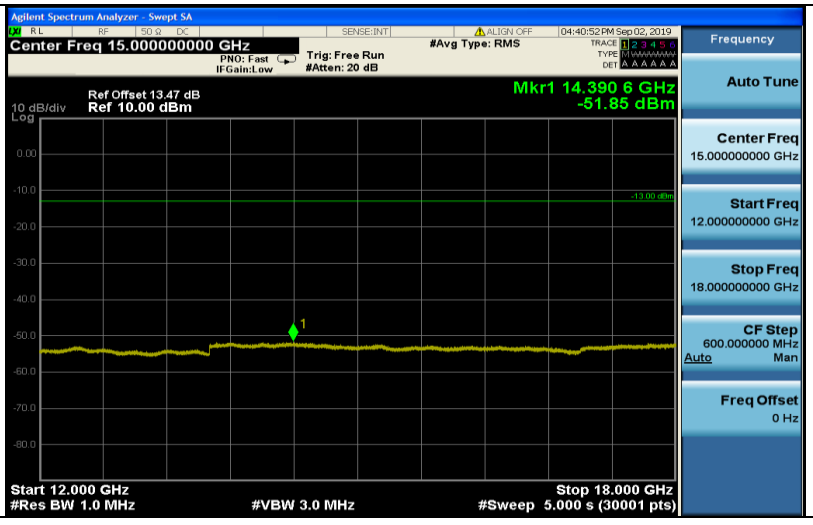


GSM1900-810-1000~5000

GSM1900-810-5000~12000



GSM1900-810-12000~18000



Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.5 Band edge

5.5.1 Limits

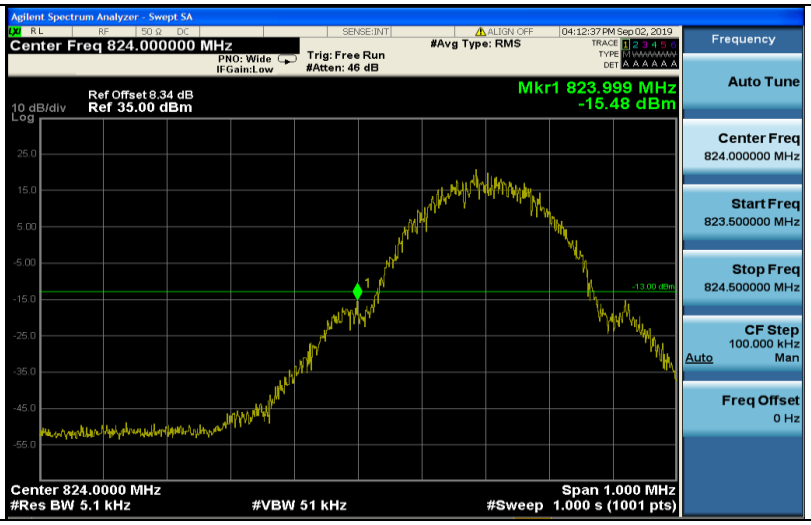
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10log (P) dB, for all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm

5.5.2 Test method

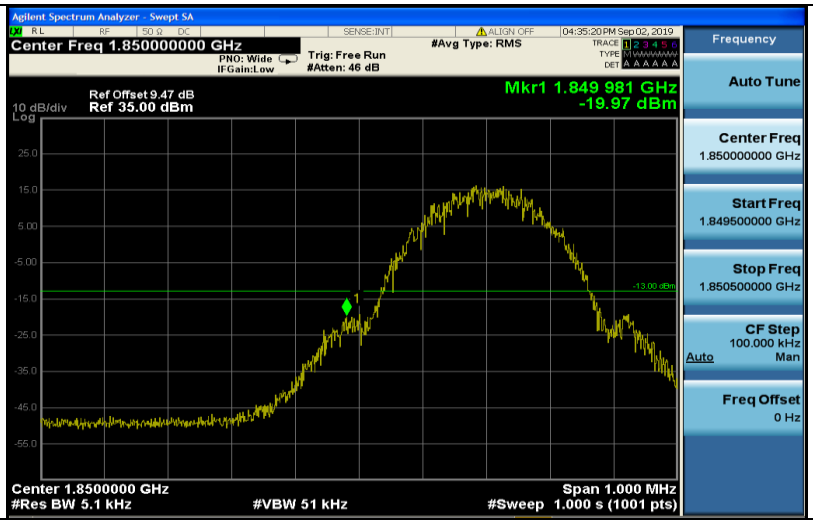
The testing follows FCC KDB 971168 D01v03r01 Section 6.0.
The EUT was connected to Spectrum Analyzer and Base Station via power divider.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
The band edges of low and high channels for the highest RF powers were measured.
The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
= P(W) - [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.

5.5.3 Test result

Band	Channel	Value(dBm)	Limit(dBm)	Verdict
GSM850	128	-15.48	-13	PASS
GSM850	251	-16.08	-13	PASS
GSM1900	512	-19.97	-13	PASS
GSM1900	810	-18.40	-13	PASS

GSM850-128

GSM850-251


GSM1900-512



GSM1900-810

Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.6 Radiated spurious emission

5.6.1 Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10log (P) dB

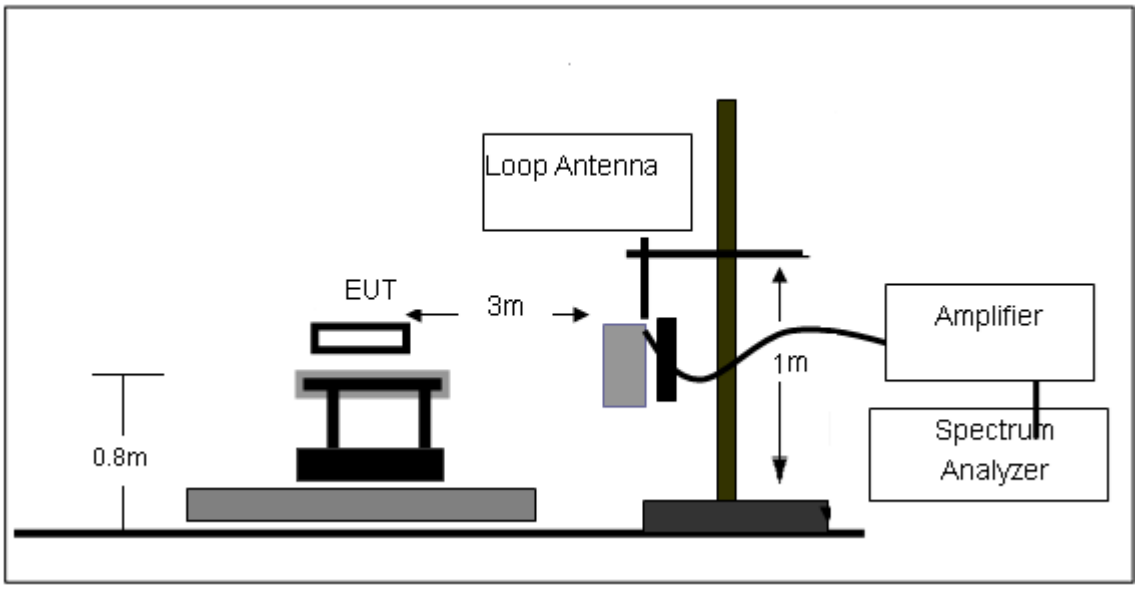
5.6.2 Test method

1. The test system setup as show in the block diagram above.
2. The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10th harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
3. During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. When found the maximum level of emissions from the EUT. 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.

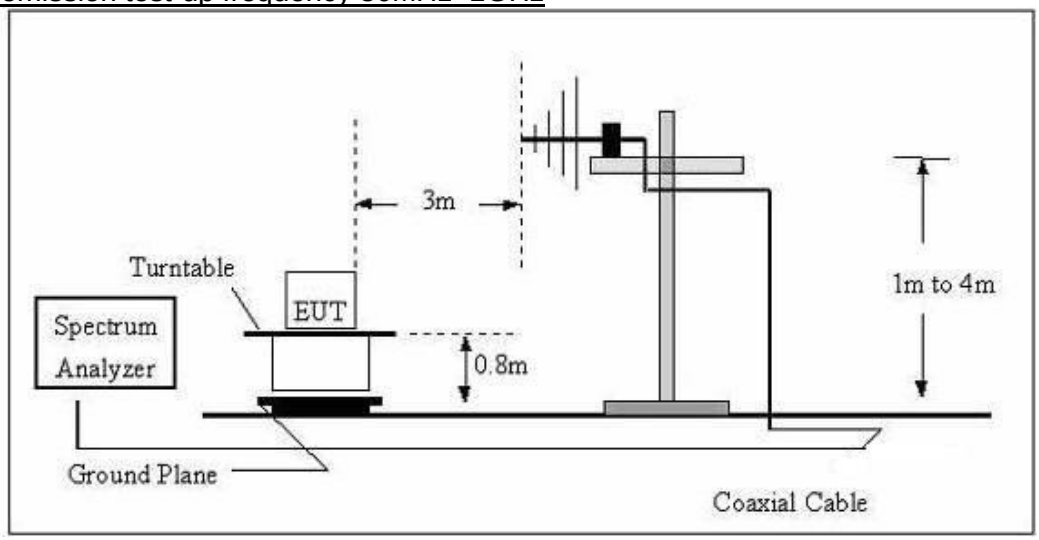
Spurious emissions in dB=10 log(TX power in Watts/0.001)-the absolute level
Spurious attenuation limit in dB=43+10 log(power out in Watts).

5.6.3 Test setup

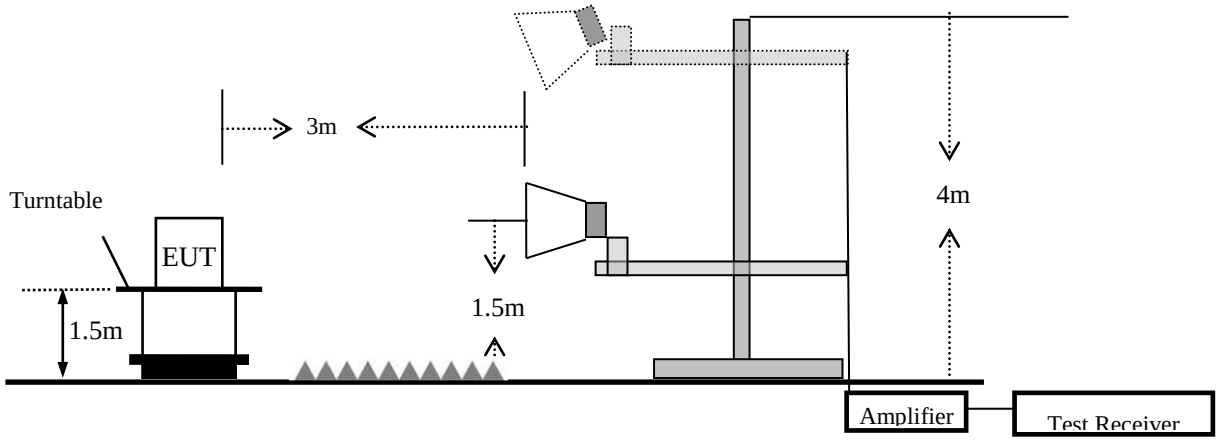
Radiated emission test-up frequency below 30MHz



Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.6.4 Test Result

Note: All the configuration was tested and only the worse case was reported

For GSM850(30MHz – 9GHz)

GSM850_ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1648.4	-41.61	5.98	3	9.11	-38.48	-13	-25.48	H
2472.6	-46.36	6.84	3	9.56	-43.64	-13	-30.64	H
1648.4	-37.03	5.98	3	9.11	-33.90	-13	-20.90	V
2472.6	-42.32	6.84	3	9.56	-39.60	-13	-26.60	V
GSM850_ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1673.2	-38.92	5.98	3	9.11	-35.79	-13	-22.79	H
2509.8	-42.31	6.84	3	9.56	-39.59	-13	-26.59	H
1673.2	-34.56	5.98	3	9.11	-31.43	-13	-18.43	V
2509.8	-37.84	6.84	3	9.56	-35.12	-13	-22.12	V
GSM850_ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1697.6	-45.58	5.98	3	9.11	-42.45	-13	-29.45	H
2546.4	-50.37	6.84	3	9.56	-47.65	-13	-34.65	H
1697.6	-41.03	5.98	3	9.11	-37.90	-13	-24.90	V
2546.4	-45.47	6.84	3	9.56	-42.75	-13	-29.75	V

GSM1900_ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3700.4	-43.24	5.26	3	9.88	-38.62	-13	-25.62	H
5550.6	-47.30	6.11	3	11.36	-42.05	-13	-29.05	H
3700.4	-44.79	5.26	3	9.88	-40.17	-13	-27.17	V
5550.6	-49.26	6.11	3	11.36	-44.01	-13	-31.01	V
GSM1900_ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3760	-39.95	5.32	3	10.03	-35.24	-13	-22.24	H
5640	-44.26	6.19	3	11.41	-39.04	-13	-26.04	H
3760	-43.54	5.32	3	10.03	-38.83	-13	-25.83	V
5640	-47.68	6.19	3	11.41	-42.46	-13	-29.46	V
GSM1900_ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3819.6	-46.82	5.36	3	9.62	-42.56	-13	-29.56	H
5729.4	-51.75	6.24	3	11.46	-46.53	-13	-33.53	H
3819.6	-49.28	5.36	3	9.62	-45.02	-13	-32.02	V
5729.4	-55.13	6.24	3	11.46	-49.91	-13	-36.91	V

5.7 Frequency stability

5.7.1 Limit

For FCC part 22.355: the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm for mobile ≤ 3W condition.

For FCC part 24.235: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.7.2 Test method

Test Procedures for Temperature Variation:

1, The EUT was set up in the thermal chamber and connected with the base station.
2, With power off, the temperature was decreased to -30℃ and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3, With power off, the temperature was raised in 10℃ set up to 50℃ and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
4, measure the carrier frequency error.

Test Procedures for Voltage Variation:

1, The EUT was placed in a temperature chamber at 25±5℃ and connected with the base station.
2, Reduce the primary supply voltage to the battery operating end point.
3, measure the carrier frequency error.

5.7.3 Test Result

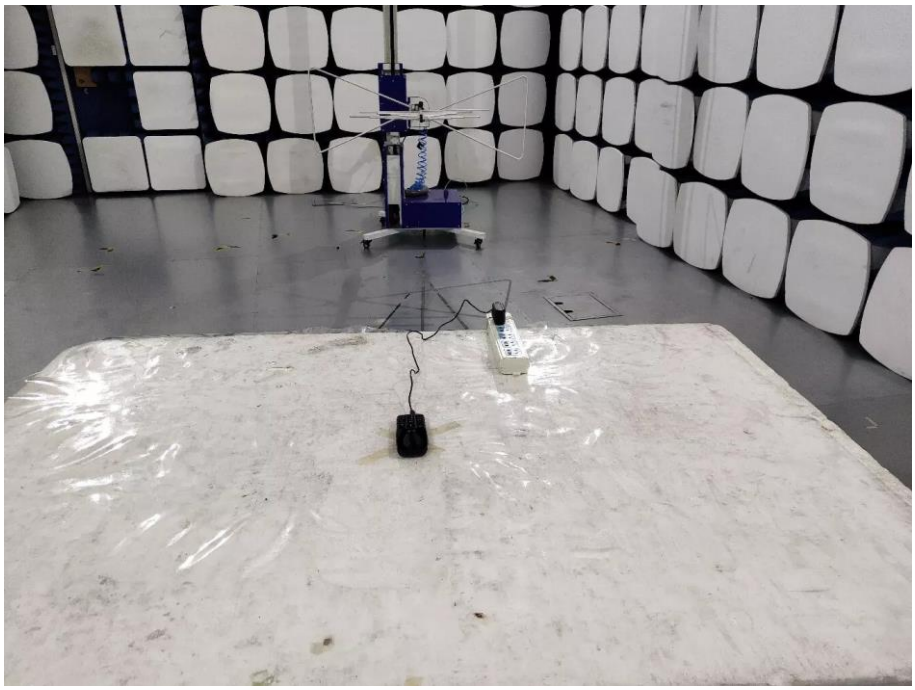
Voltage							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VL	TN	-22.99	-0.027891	±2.5	PASS
GSM850	128	VN	TN	-22.76	-0.027617	±2.5	PASS
GSM850	128	VH	TN	-25.25	-0.030633	±2.5	PASS
GSM850	190	VL	TN	-22.57	-0.026976	±2.5	PASS
GSM850	190	VN	TN	-22.63	-0.027053	±2.5	PASS
GSM850	190	VH	TN	-24.09	-0.028789	±2.5	PASS
GSM850	251	VL	TN	-24.15	-0.028452	±2.5	PASS
GSM850	251	VN	TN	-23.18	-0.027311	±2.5	PASS
GSM850	251	VH	TN	-23.08	-0.027196	±2.5	PASS
GSM1900	512	VL	TN	-27.18	-0.014693	within1850-1910	PASS
GSM1900	512	VN	TN	-28.93	-0.015635	within1850-1910	PASS
GSM1900	512	VH	TN	-25.34	-0.013698	within1850-1910	PASS
GSM1900	661	VL	TN	-22.92	-0.012193	within1850-1910	PASS
GSM1900	661	VN	TN	-29.48	-0.015679	within1850-1910	PASS
GSM1900	661	VH	TN	-29.41	-0.015645	within1850-1910	PASS
GSM1900	810	VL	TN	-38.32	-0.020067	within1850-1910	PASS
GSM1900	810	VN	TN	-38.45	-0.020134	within1850-1910	PASS
GSM1900	810	VH	TN	-41.07	-0.021504	within1850-1910	PASS

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VN	-30	-22.50	-0.027303	±2.5	PASS
GSM850	128	VN	-20	-23.67	-0.028713	±2.5	PASS
GSM850	128	VN	-10	-22.86	-0.027734	±2.5	PASS
GSM850	128	VN	0	-24.25	-0.029418	±2.5	PASS
GSM850	128	VN	10	-22.24	-0.026990	±2.5	PASS
GSM850	128	VN	20	-23.50	-0.028517	±2.5	PASS
GSM850	128	VN	30	-24.34	-0.029536	±2.5	PASS
GSM850	128	VN	40	-22.66	-0.027499	±2.5	PASS
GSM850	128	VN	50	-22.76	-0.027617	±2.5	PASS
GSM850	190	VN	-30	-21.99	-0.026281	±2.5	PASS
GSM850	190	VN	-20	-21.50	-0.025702	±2.5	PASS
GSM850	190	VN	-10	-25.02	-0.029909	±2.5	PASS
GSM850	190	VN	0	-22.60	-0.027014	±2.5	PASS
GSM850	190	VN	10	-23.54	-0.028133	±2.5	PASS
GSM850	190	VN	20	-21.70	-0.025934	±2.5	PASS
GSM850	190	VN	30	-24.41	-0.029175	±2.5	PASS
GSM850	190	VN	40	-25.80	-0.030835	±2.5	PASS
GSM850	190	VN	50	-22.79	-0.027246	±2.5	PASS
GSM850	251	VN	-30	-23.89	-0.028147	±2.5	PASS
GSM850	251	VN	-20	-23.05	-0.027158	±2.5	PASS
GSM850	251	VN	-10	-26.67	-0.031419	±2.5	PASS
GSM850	251	VN	0	-23.57	-0.027767	±2.5	PASS
GSM850	251	VN	10	-23.60	-0.027805	±2.5	PASS
GSM850	251	VN	20	-24.44	-0.028794	±2.5	PASS
GSM850	251	VN	30	-23.83	-0.028071	±2.5	PASS
GSM850	251	VN	40	-24.09	-0.028376	±2.5	PASS
GSM850	251	VN	50	-24.80	-0.029212	±2.5	PASS
GSM1900	512	VN	-30	-28.41	-0.015356	within1850-1910	PASS
GSM1900	512	VN	-20	-24.92	-0.013471	within1850-1910	PASS
GSM1900	512	VN	-10	-28.67	-0.015496	within1850-1910	PASS
GSM1900	512	VN	0	-28.73	-0.015530	within1850-1910	PASS
GSM1900	512	VN	10	-23.50	-0.012704	within1850-1910	PASS
GSM1900	512	VN	20	-25.73	-0.013908	within1850-1910	PASS
GSM1900	512	VN	30	-27.31	-0.014763	within1850-1910	PASS
GSM1900	512	VN	40	-28.73	-0.015530	within1850-1910	PASS
GSM1900	512	VN	50	-26.93	-0.014553	within1850-1910	PASS
GSM1900	661	VN	-30	-25.25	-0.013430	within1850-1910	PASS
GSM1900	661	VN	-20	-27.18	-0.014460	within1850-1910	PASS
GSM1900	661	VN	-10	-27.80	-0.014786	within1850-1910	PASS
GSM1900	661	VN	0	-25.18	-0.013395	within1850-1910	PASS
GSM1900	661	VN	10	-29.38	-0.015628	within1850-1910	PASS
GSM1900	661	VN	20	-27.22	-0.014477	within1850-1910	PASS
GSM1900	661	VN	30	-28.22	-0.015009	within1850-1910	PASS
GSM1900	661	VN	40	-25.57	-0.013601	within1850-1910	PASS
GSM1900	661	VN	50	-27.73	-0.014752	within1850-1910	PASS
GSM1900	810	VN	-30	-38.94	-0.020388	within1850-1910	PASS
GSM1900	810	VN	-20	-37.97	-0.019881	within1850-1910	PASS
GSM1900	810	VN	-10	-40.13	-0.021013	within1850-1910	PASS

GSM1900	810	VN	0	-39.26	-0.020557	within1850-1910	PASS
GSM1900	810	VN	10	-37.87	-0.019830	within1850-1910	PASS
GSM1900	810	VN	20	-38.84	-0.020337	within1850-1910	PASS
GSM1900	810	VN	30	-37.90	-0.019847	within1850-1910	PASS
GSM1900	810	VN	40	-38.13	-0.019965	within1850-1910	PASS
GSM1900	810	VN	50	-38.90	-0.020371	within1850-1910	PASS

Note:
1. Normal Voltage = 3.7V; Battery End Point (BEP) = 3.33V; Maximum Voltage =4.07V
2. All modes of EUT have been tested; only the data of worst case mode is reported.

Photographs of the Test Setup

Radiated emission



Photographs of the EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi19070905-1E1-1.

----END OF REPORT----