



Report No.: RZA2009-1265_24



Part 24

TEST REPORT

Product Name GSM/GPRS Mobile Phone

Model W003


FCC ID XUT-W003

Client Shenzhen Hongjiayuan Communication Technology CO.,LTD.

TA Technology (Shanghai) Co., Ltd.



GENERAL SUMMARY

Product Name	GSM/GPRS Mobile Phone	Model	W003
FCC ID	XUT-W003	Report No.	RZA2009-1265_24
Client	Shenzhen Hongjiayuan Communication Technology CO.,LTD.		
Manufacturer	Shenzhen Hongjiayuan Communication Technology CO.,LTD.		
Reference Standard(s)	<p>FCC Part 2 Frequency allocations and radio treaty matters; general rules and regulation. (V10.1.06)</p> <p>FCC Part 24 Personal Communications Services.(V10.1.06)</p> <p>ANSI/TIA-603-C Land mobile FM or PM Communications Equipment Measurements and Performance Standards.(2004)</p>		
Conclusion	<p>This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards.</p> <p>General Judgment: Pass</p> <div style="text-align: right;">  (Stamp) Date of issue: November 13th, 2009 </div>		
Comment	The test result only responds to the measured sample.		

Approved by 杨伟中
Yang Weizhong

Revised by 徐凯
Xu Kai

Performed by 刘伟
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1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. This report only refers to the item that has undergone the test.

This report standalone dose not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

1.2. Testing laboratory

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1.3. Applicant Information

Company: Shenzhen Hongjiayuan Communication Technology CO.,LTD.
Address: Room 2406,Block A of Electronic Science and Technology Building,No.2070,Shennan
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City: Shenzhen
Postal Code: /
Country: P.R. China
Contact: Cong Chen
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Fax: +86 755 33366565

1.4. Manufacturer Information

Company: Shenzhen Hongjiayuan Communication Technology CO.,LTD.
Address: Room 2406,Block A of Electronic Science and Technology Building,No.2070,Shennan
Zhong Road,Futian District,Shenzhen City,Guangdong Province,China
City: Shenzhen
Postal Code: /
Country: P.R. China
Telephone: +86 755 33366555
Fax: +86 755 33366565

1.5. Information of EUT

General information

Device type:	Portable device		
Name of EUT:	GSM/GPRS Mobile Phone		
Device operating configurations:			
IMEI or SN:	350039800024311		
Operating mode(s):	GSM1900: (tested)		
Test modulation:	GMSK		
E.I.R.P	27.01 dBm		
Rated Output Power:	GSM1900: 30dBm		
GPRS multi-slot class:	12		
Antenna type:	Internal antenna		
Power supply:	Battery or Charger (AC adaptor)		
Rated Power Supply Voltage:	3.7V		
Extreme Voltage:	Minimum: 3.5V Maximum: 4.2V		
Extreme Temperature:	Lowest: -10°C Highest: +55°C		
Operating frequency range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
Hardware version:	E709_V1.1		
Software version:	E709_JJF1.01.0		

Auxiliary equipment details

AE1: Battery

Model: W003

Manufacture: Shenzhen Hongjiayuan Communication Technology CO.,LTD.

IMEI or SN: /

AE2: Travel Adapter

Model: HY-SW0500500X

Manufacture: Shenzhen HanYuXun Electronics CO.,LTD.

IMEI or SN: /

Equipment Under Test (EUT) is GSM Digital Mobile Telephone with integrated antenna. It consists of mobile phone, battery and adaptor (see ANNEX A.1) and the detail about these is in chapter 1.5 in this report. The EUT supports GSM1900 band in this report.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from October 23, 2009 to November 9, 2009.

2. Test Information

2.1. Summary of test results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	22.913(a)(2)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	22.917	PASS
5	Frequency Stability	2.1055 / 22.355	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
7	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS

2.2. RF Power Output

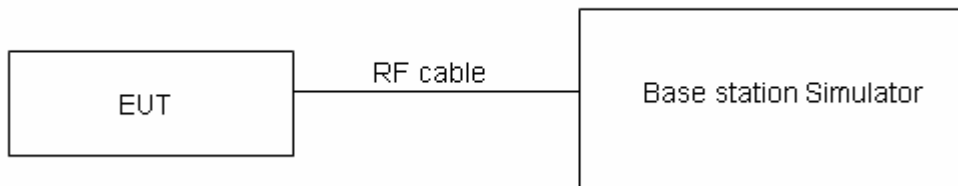
Ambient condition

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation. These measurements have been tested at following channels: 512,661,810 for GSM 1900 band.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

No specific RF power output requirements in part 2.1046.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$. $U = 0.4$ dB.

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Test Results

GSM 1900

Channel	Frequency (MHz)	RF Output Power (dBm)
512	1850.2	28.94
661	1880.0	29.11
810	1909.8	28.84

GSM 1900 GPRS

Channel	Frequency (MHz)	UL-timeslot(s)	RF Output Power (dBm)
512	1850.2	1	28.96
		2	28.89
		3	28.82
		4	28.74
661	1880.0	1	29.12
		2	29.07
		3	28.96
		4	28.84
810	1909.8	1	28.86
		2	28.76
		3	28.65
		4	28.48

2.3. Effective Isotropic Radiated Power**Ambient condition**

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

Methods of Measurement

Test procedure:

The measurement was done according to TIA/EIA 603C.

Step 1:

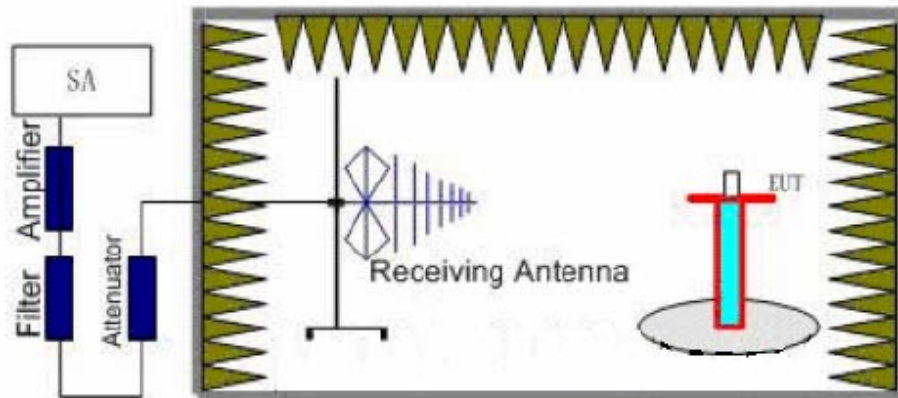
The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 0.8 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and 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 while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.

Step 2:

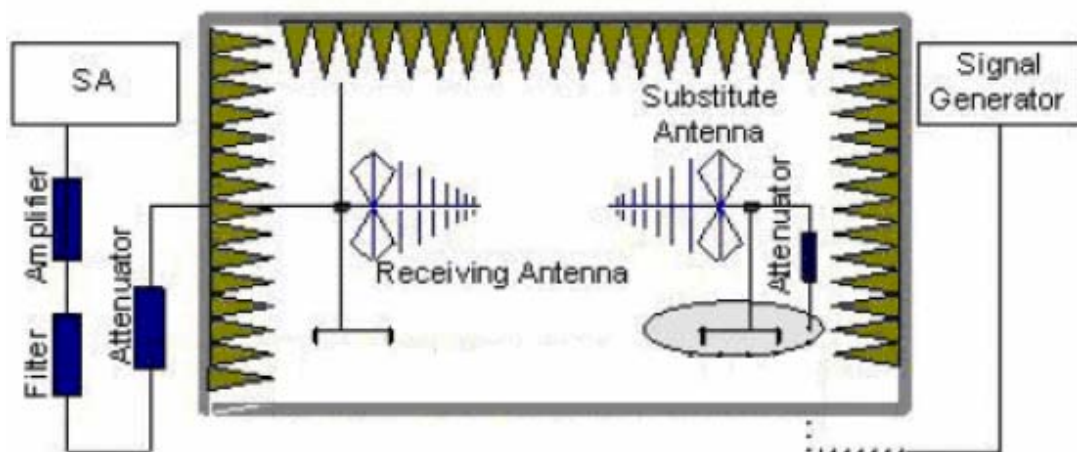
A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a known power S.G. applied through a Tx cable. Then the maximum Analyzer reading is recorded while the antenna was moving up and down. The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

The correction factor (in dB)=S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading – 2.15. Then the EUT's E.R.P. was calculated with the correction factor, E.R.P. = LVL + Correction factor. The measurement will be conducted at three channels No.512, No.661 and No.810 of GSM 1900.

Test Setup



Step 1



Step 2

Limits

Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts EIRP. Peak power" and Rule Part 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage".

GSM 1900(EIRP)	$\leq 2 \text{ W}$ (33 dBm)
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$. $U = 1.19 \text{ dB}$

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Test Results

GSM 1900

Channel	Frequency (MHz)	LVL (EUT)	S.G	Gain (dBi)	Gain (dBd)	Cable Loss	LVL (dbm)	Correction Factor (dBm)	ERP (dBm)
512	1850.2	-17.97	0	13.97	11.82	0.5	-31.31	42.63	24.66
661	1880.0	-14.63	0	14.44	12.29	0.5	-30.25	40.59	25.96
810	1909.8	-14.02	0	14.88	12.73	0.5	-28.80	41.03	27.01

2.4. Occupied Bandwidth

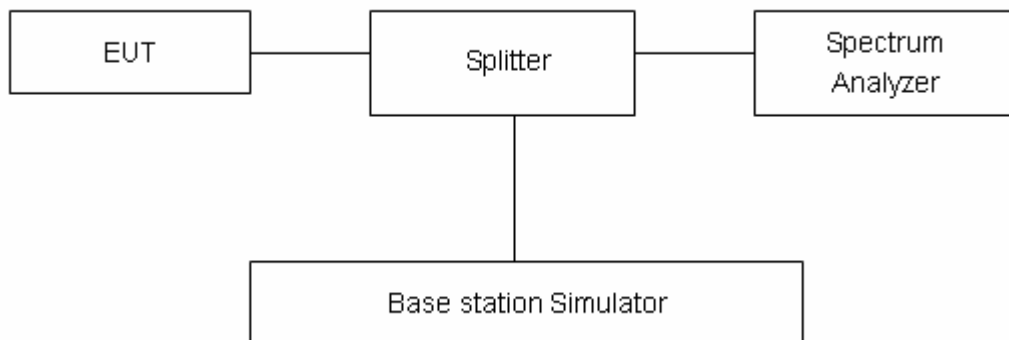
Ambient condition

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 30 kHz on spectrum analyzer. 99% power and -26dBC occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

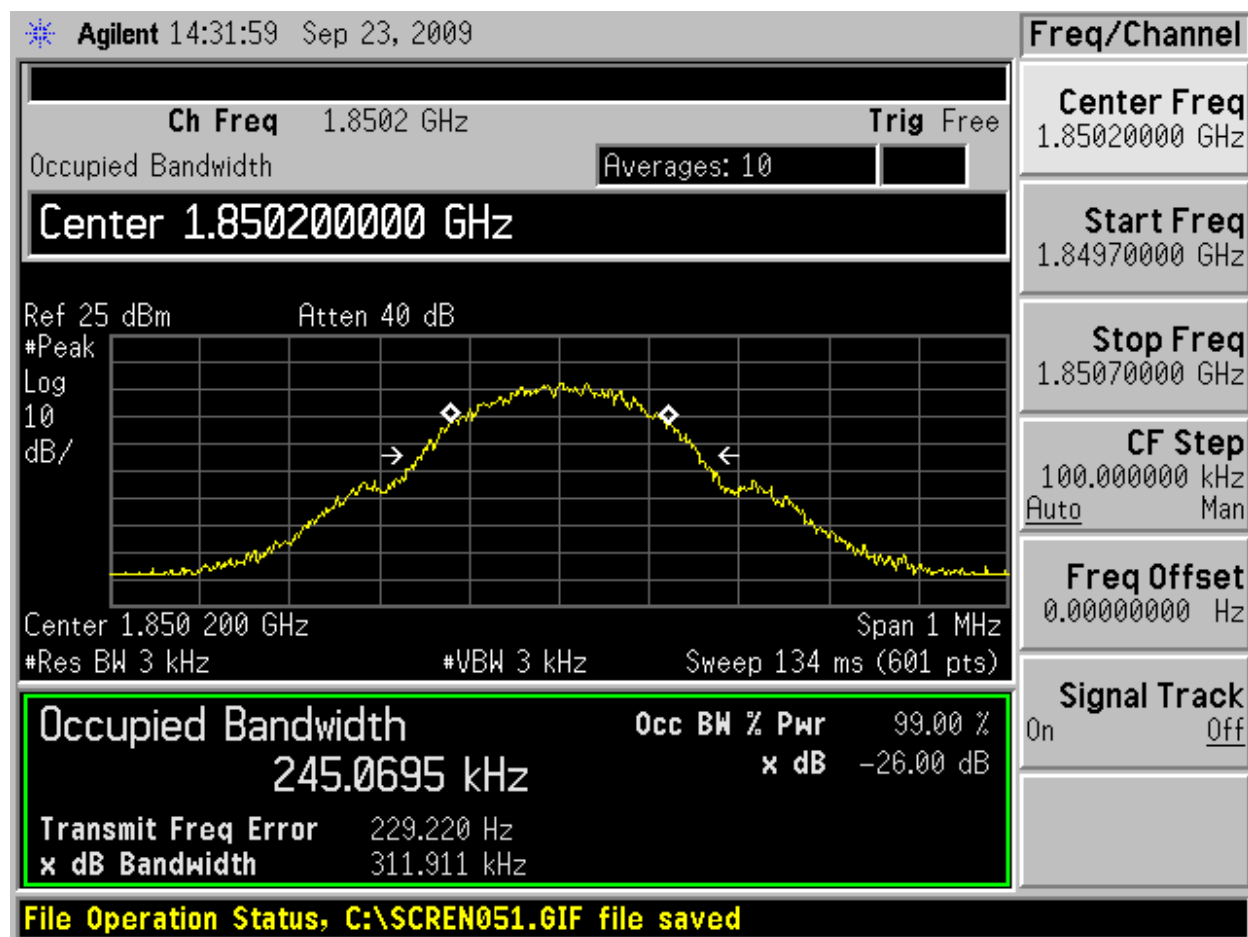
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$. $U = 624\text{Hz}$.

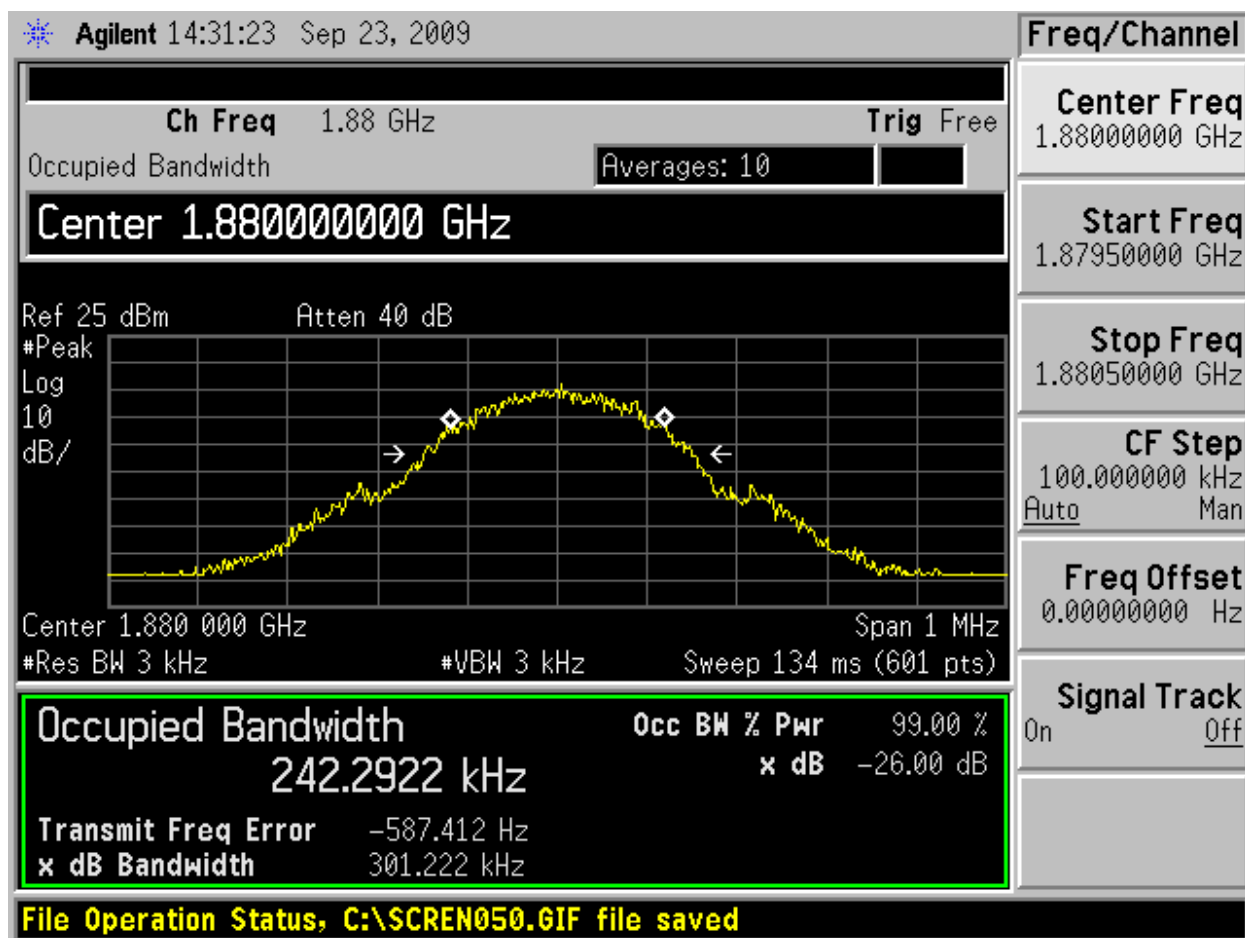
Test Result

GSM 1900

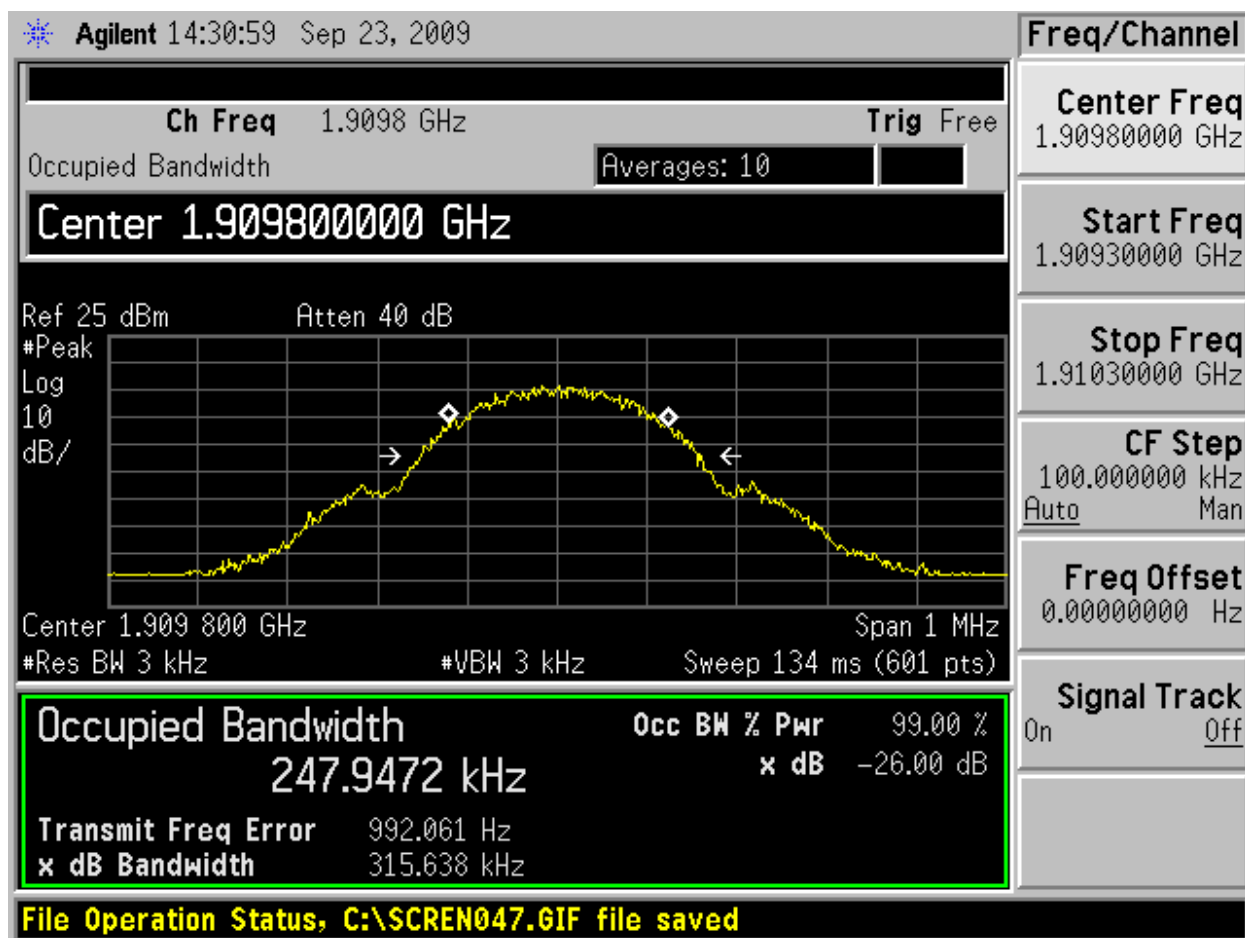
Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
512	1850.2	245.0695	311.911
661	1880.0	242.2922	301.222
810	1909.8	247.9472	315.638



GSM1900 CH512 Occupied Bandwidth



GSM 1900 CH661 Occupied Bandwidth



GSM 1900 CH810 Occupied Bandwidth

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Test Report

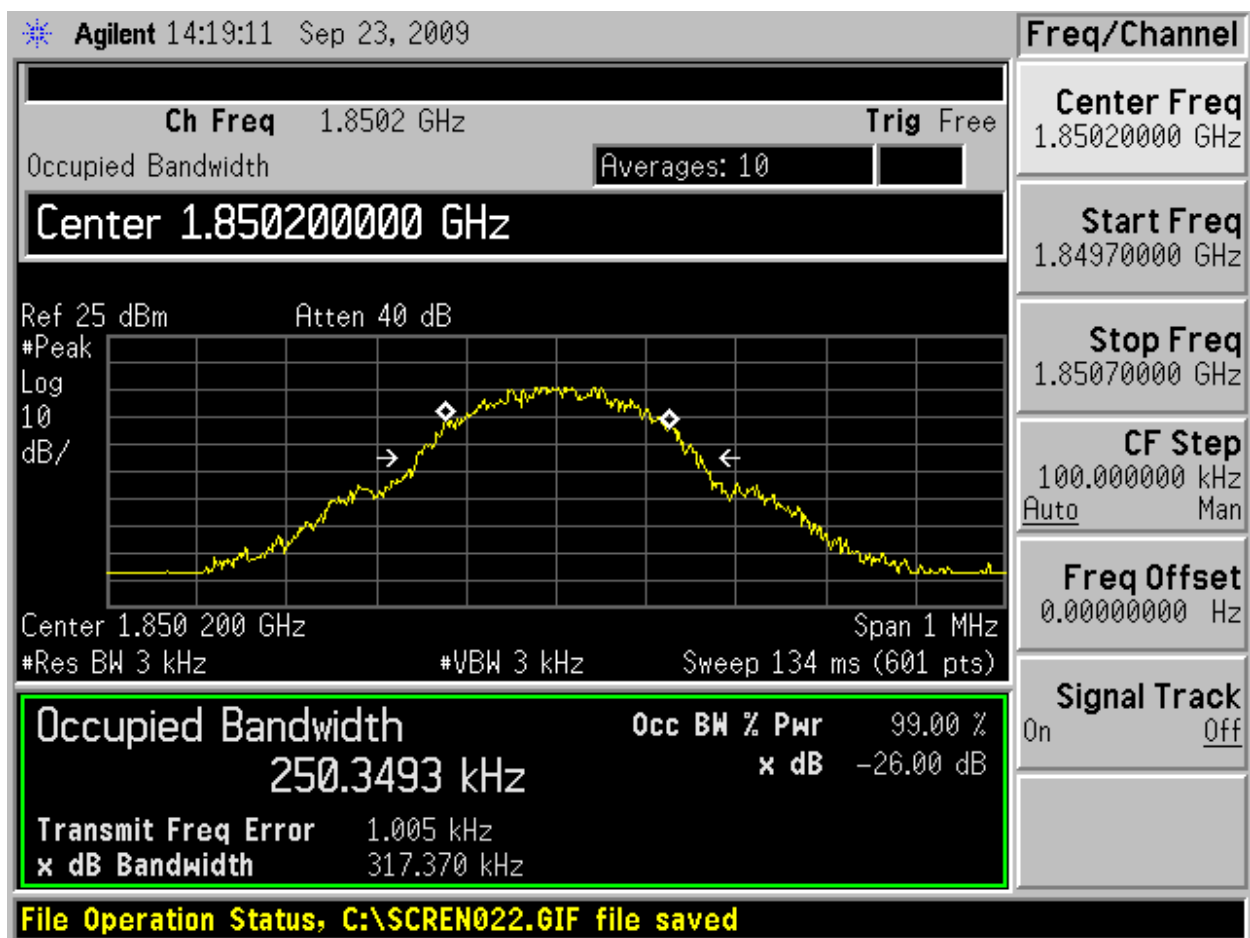
Registration Num:428261

Report No.: RZA2009-1265_24

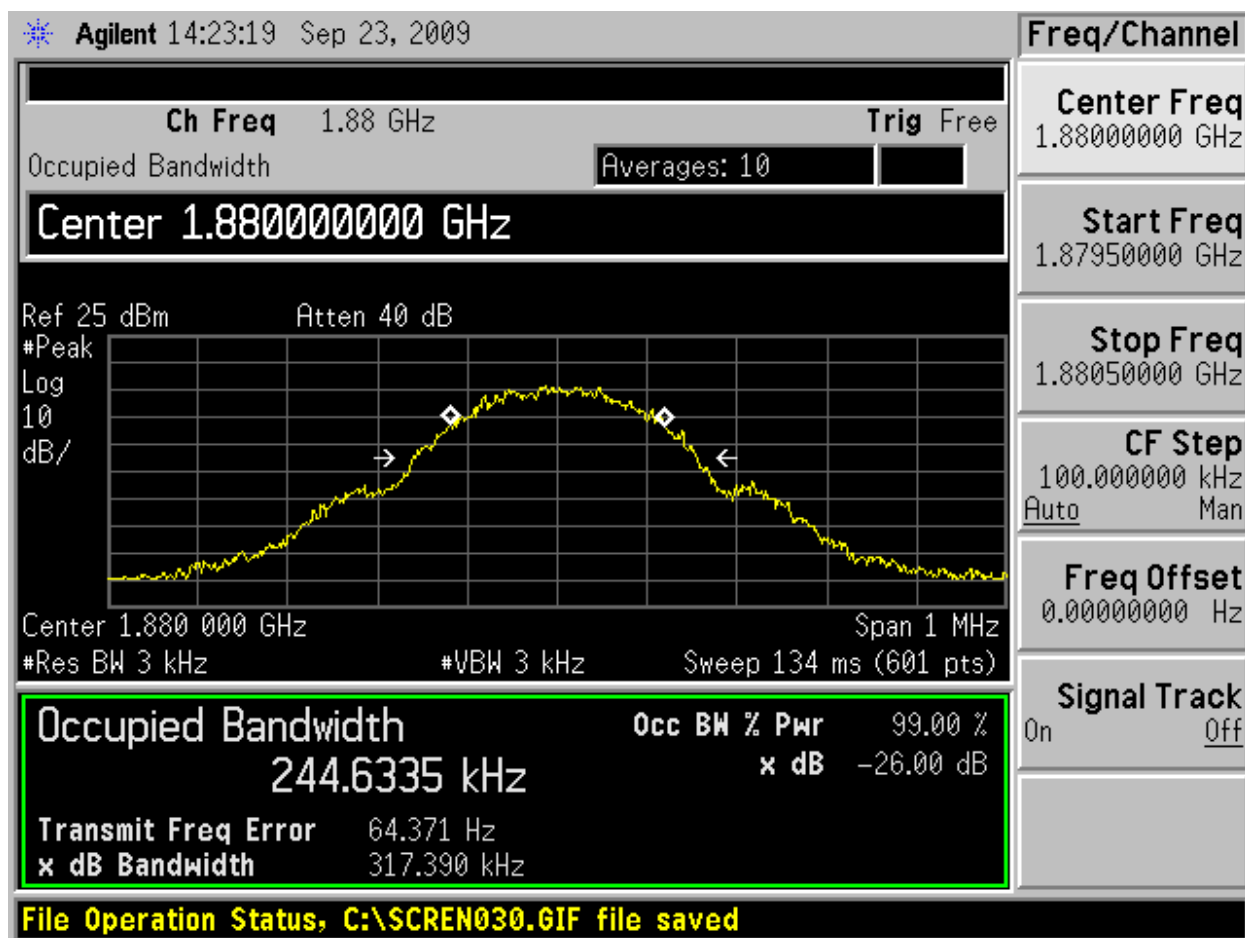
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GSM 1900 GPRS

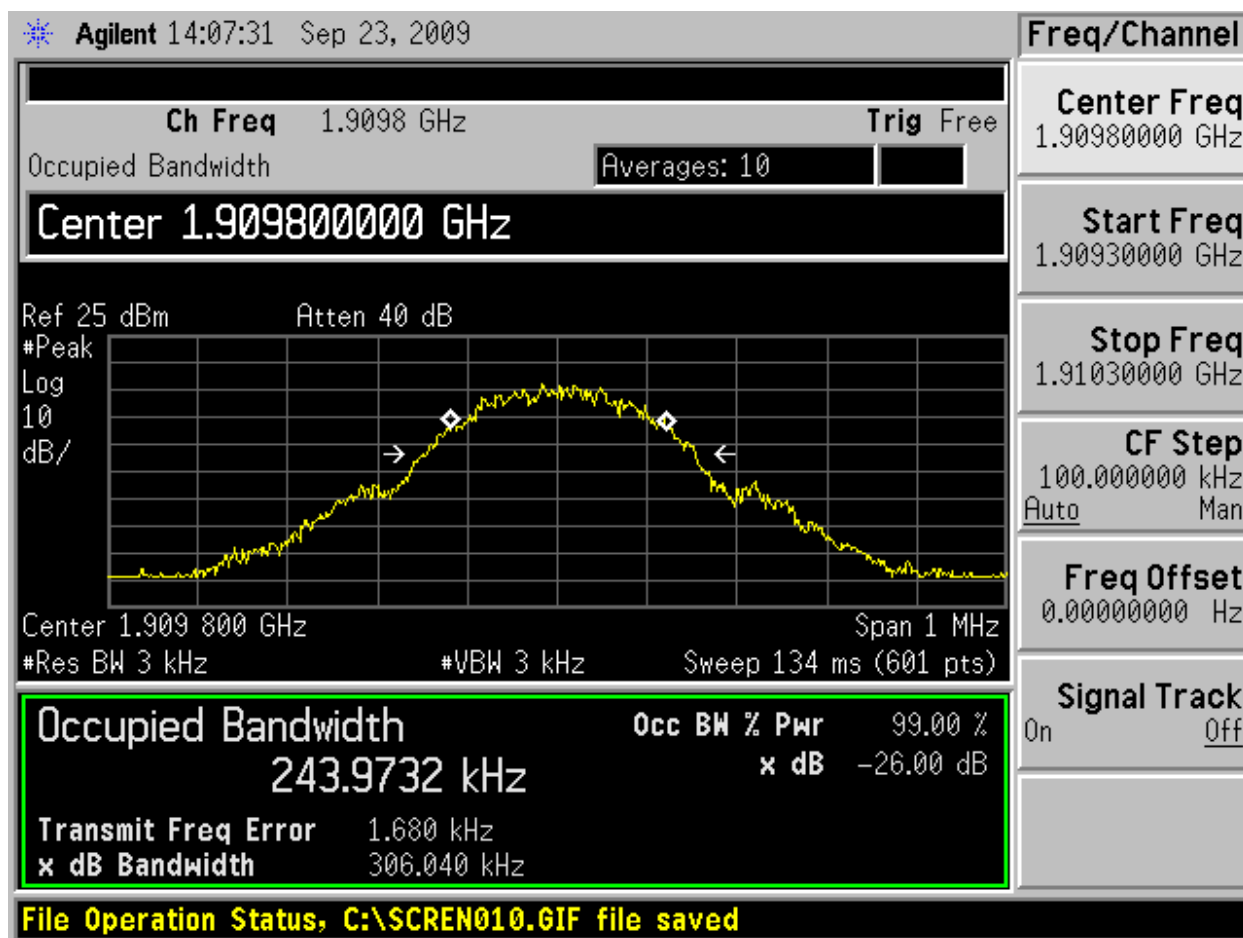
Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
512	1850.2	250.3493	317.370
661	1880.0	244.6335	317.390
810	1909.8	243.9732	306.040



GSM1900 GPRS CH512 Occupied Bandwidth



GSM 1900 GPRS CH661 Occupied Bandwidth



GSM 1900 GPRS CH810 Occupied Bandwidth

2.5. Band Edge Compliance

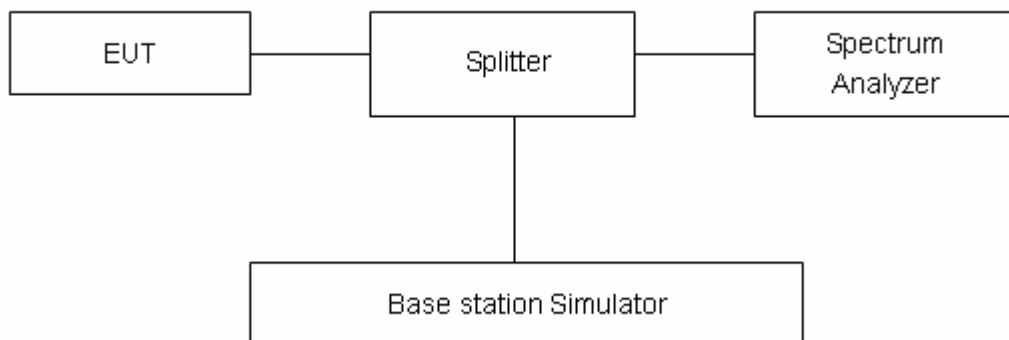
Ambient condition

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 3kHz on spectrum analyzer. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

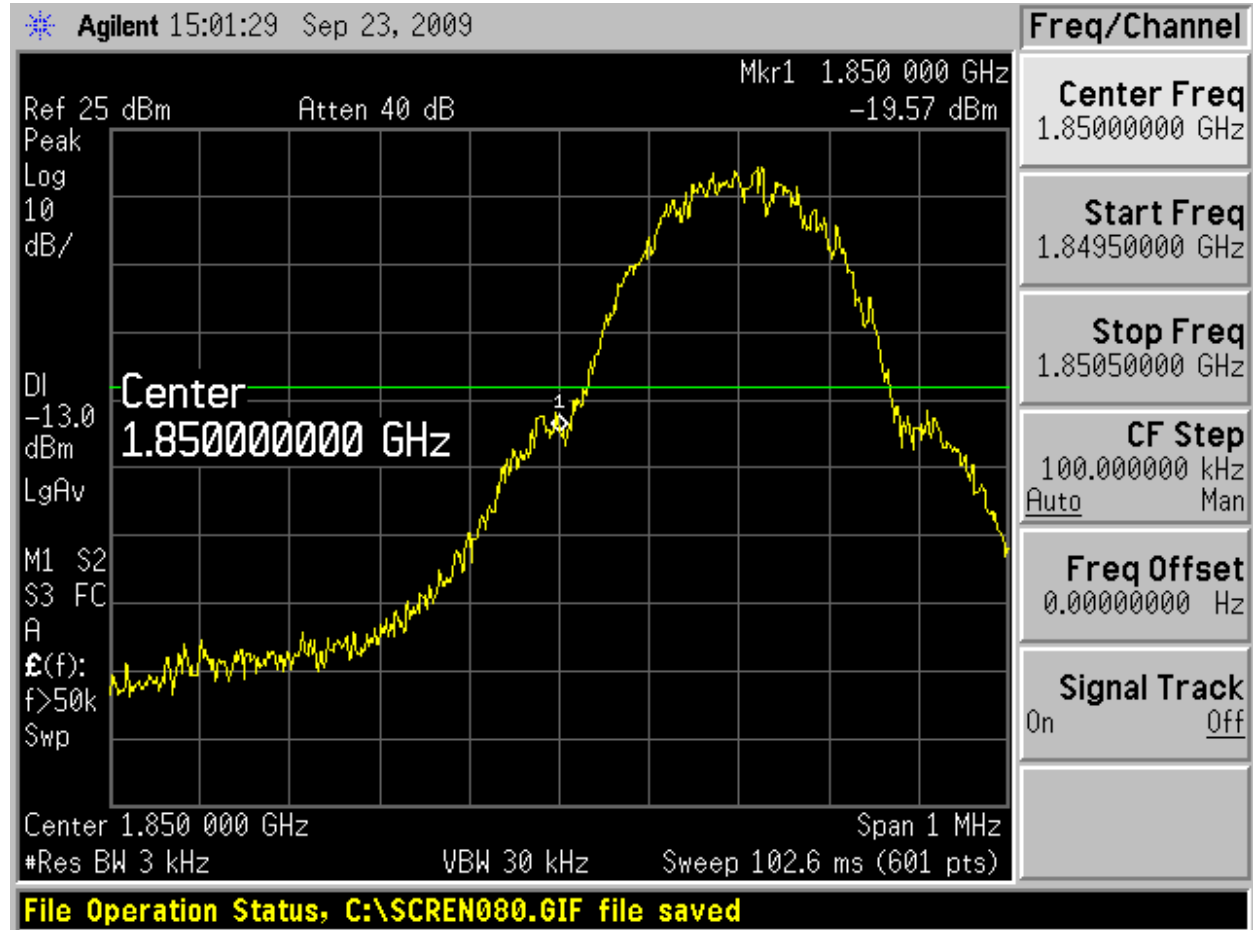
Limit	-13 dBm
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Measurement Uncertainty

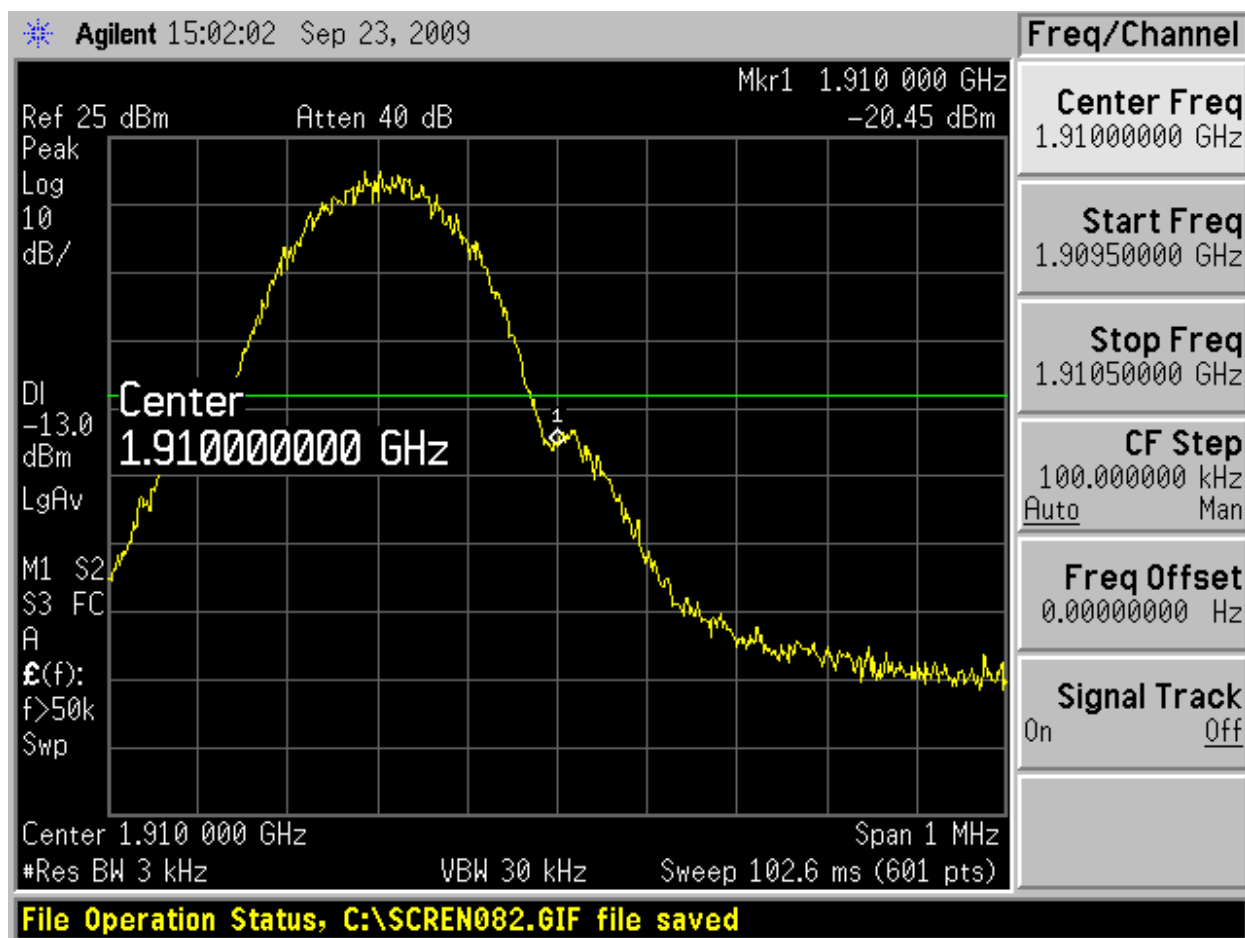
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U=0.684\text{dB}$.

Test Result

GSM 1900

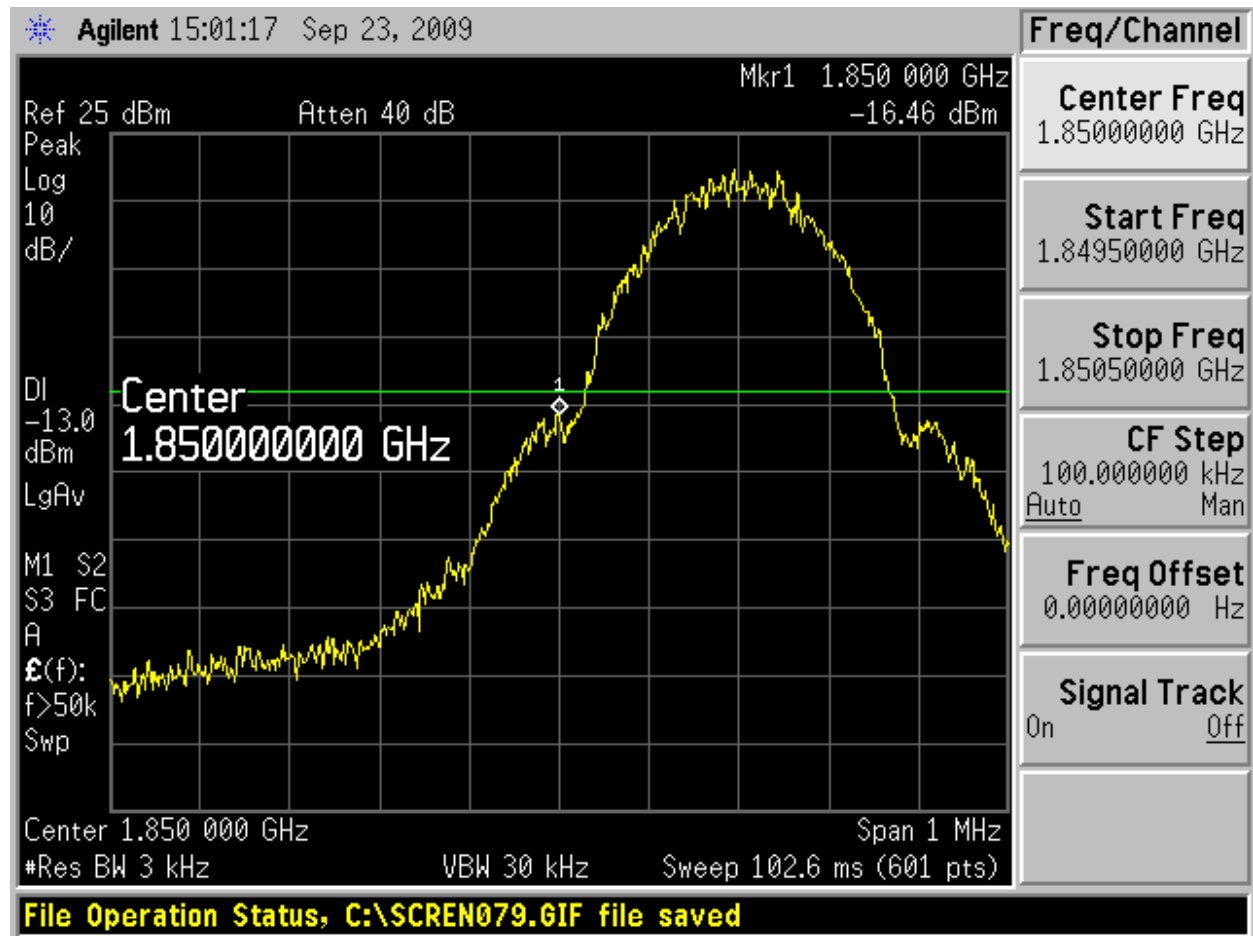


GSM 1900 512 Channel

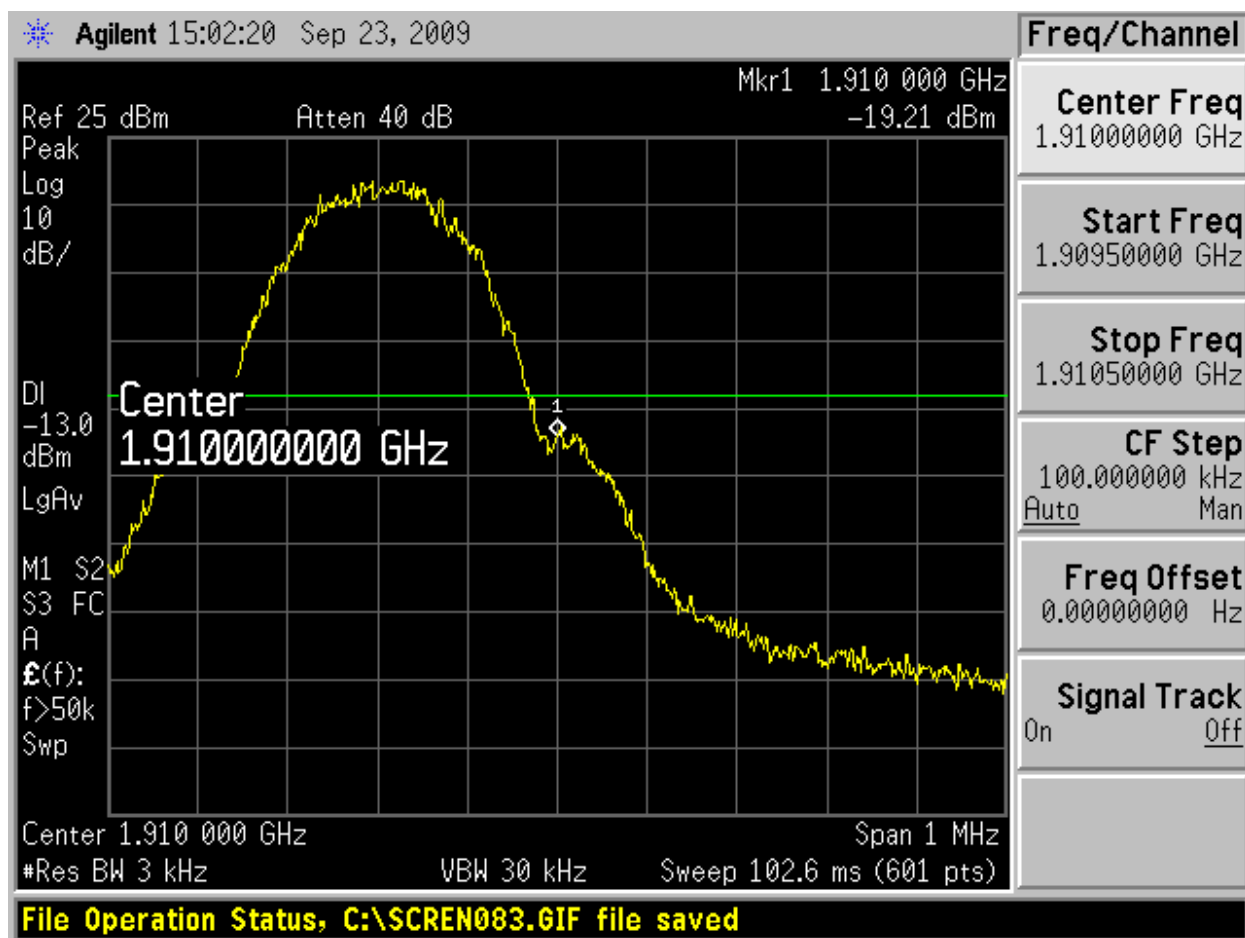


GSM1900 810 Channel

GSM 1900 GPRS



GSM 1900 GPRS 512 Channel



GSM1900 GPRS 810 Channel

2.6. Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

Method of Measurement

1. Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -20°C to +50°C in 10°C step size,

(1) With all power removed, the temperature was decreased to -20°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -20°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

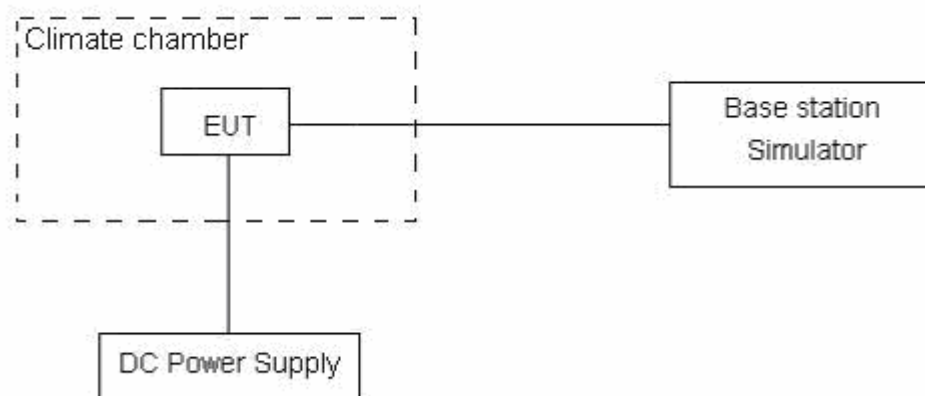
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.5 V and 4.2 V, with a nominal voltage of 3.7V.

Test setup



Limits

According to the JTC standard, the frequency stability of the carrier shall be accurate to within 2.5 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235 Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Limits	≤ 2.5 ppm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3$. $U = 0.01$ ppm.

Test Result

Temperature (° C)	Test Results (ppm) / 3.7 V Power supply
	Channel 661
-20	0.02
-10	-0.02
0	0.02
10	0.02
20	-0.02
30	0.02
40	-0.02
50	0.01

Voltage (V)	Test Results(ppm) / 20° C
	Channel 661
4.2	-0.02
3.5	-0.02

2.7. Spurious Emissions at Antenna Terminals

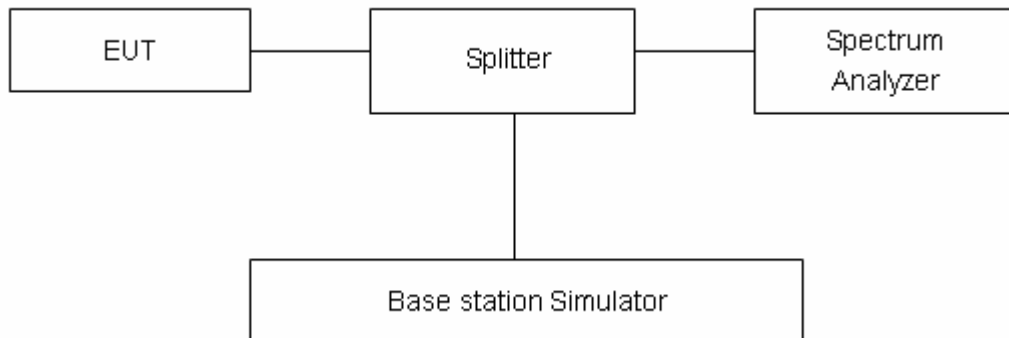
Ambient condition

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used and RBW is set to 1MHz on spectrum analyzer.

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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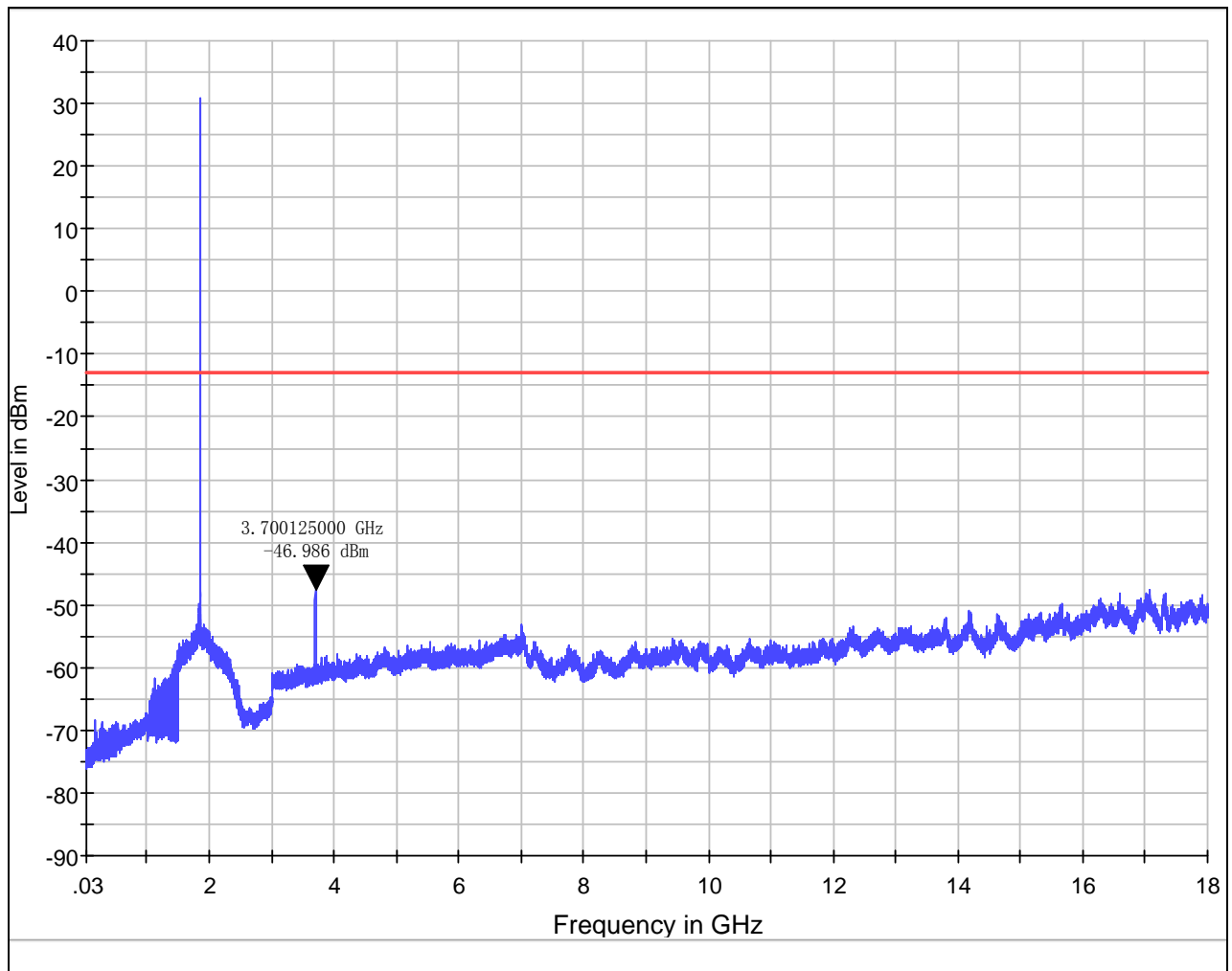
Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-12.75GHz	1.407 dB

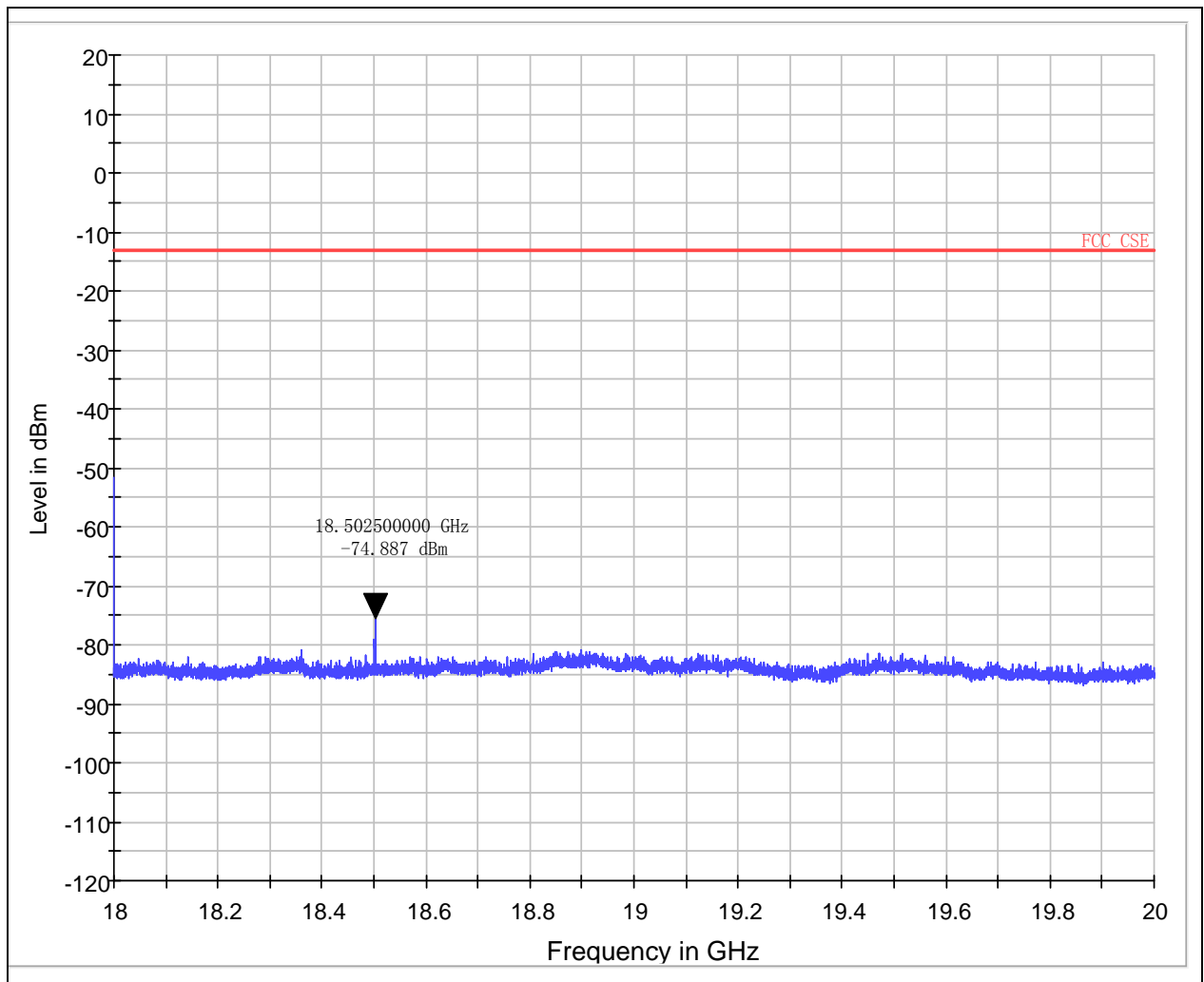
Test Result

GSM 1900 CH512



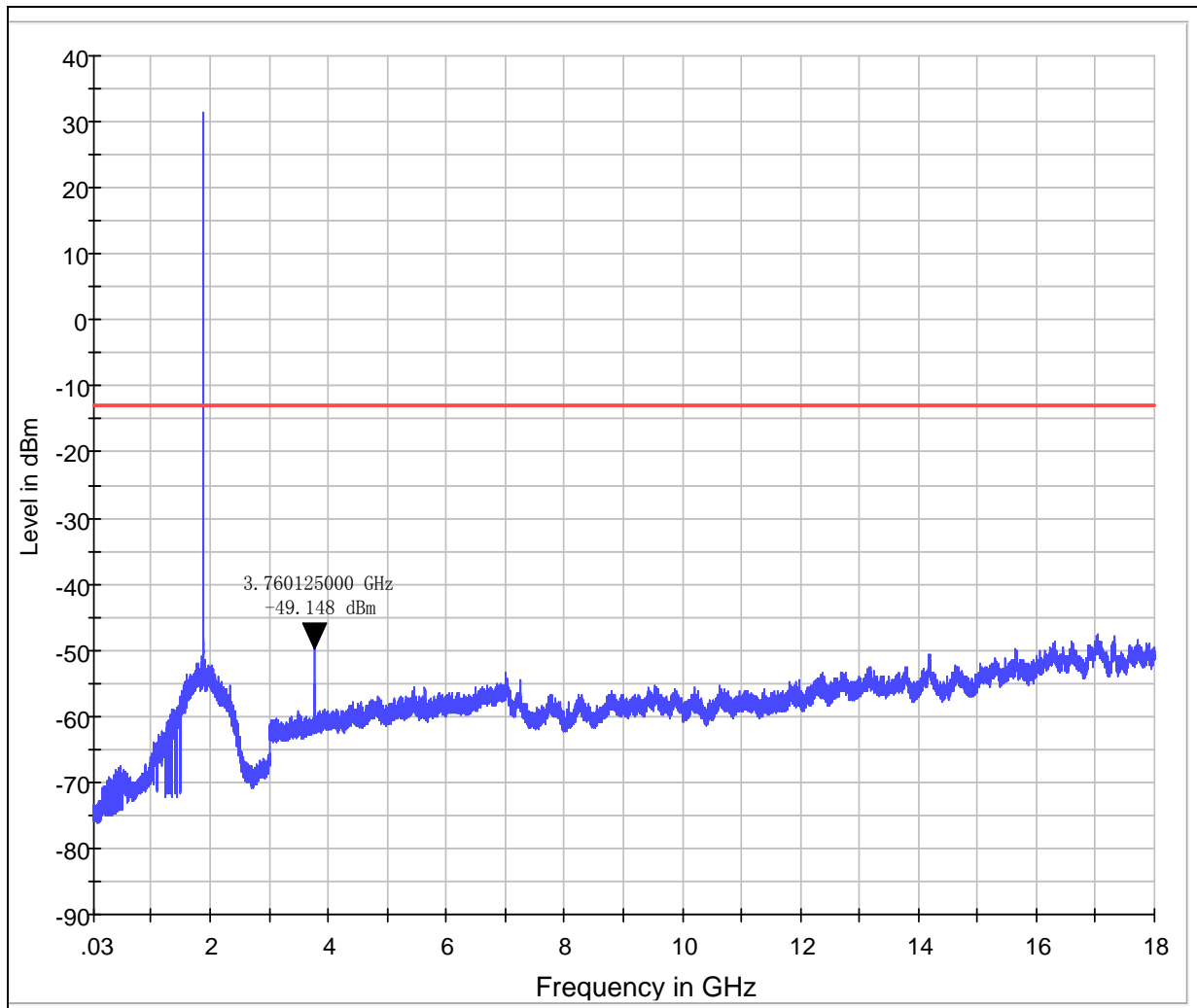
Note: The signal beyond the limit is carrier.

GSM 1900 512 Channel 30MHz~18GHz



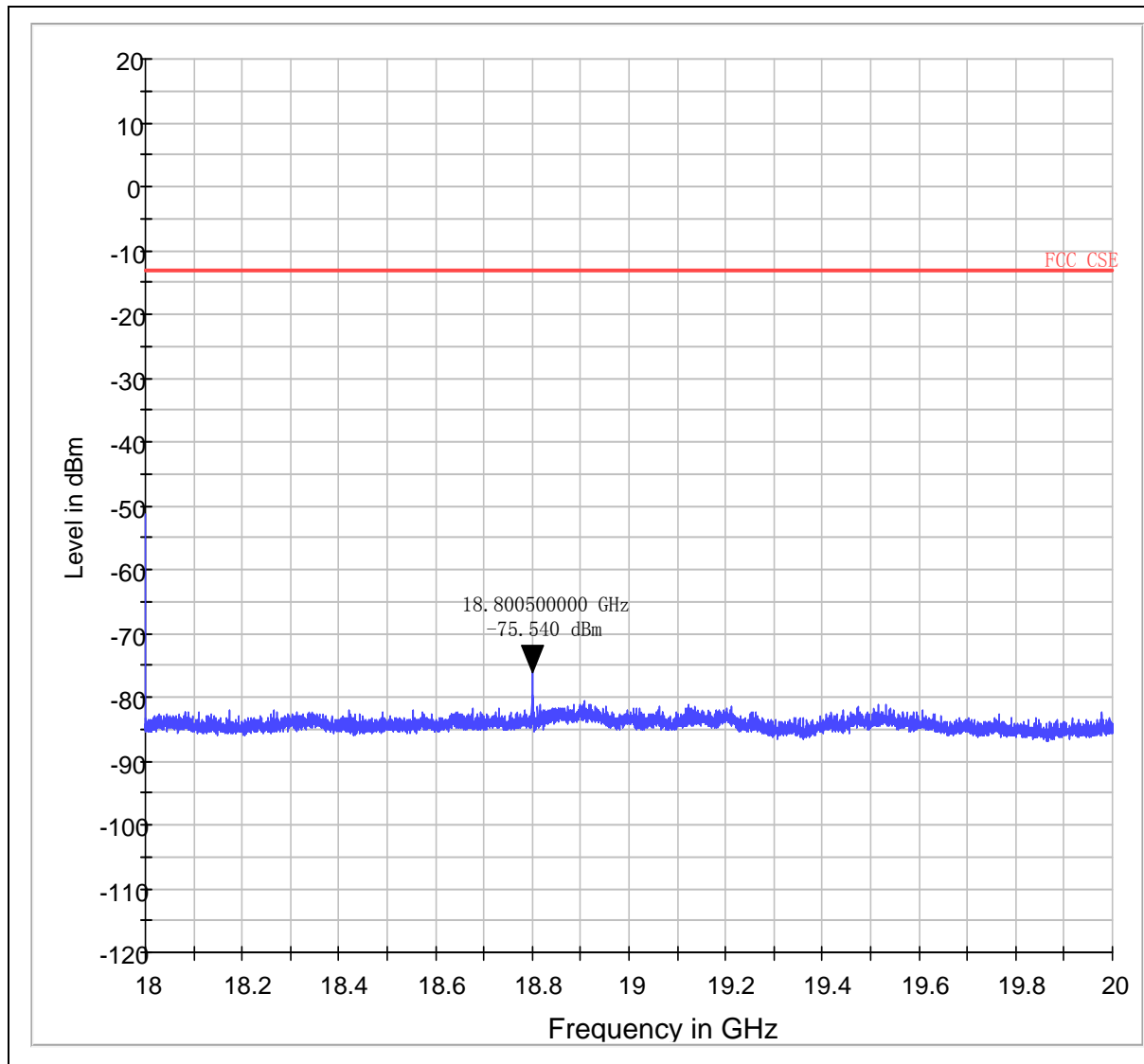
GSM 1900 512 Channel 18GHz ~20GHz

GSM 1900 CH661



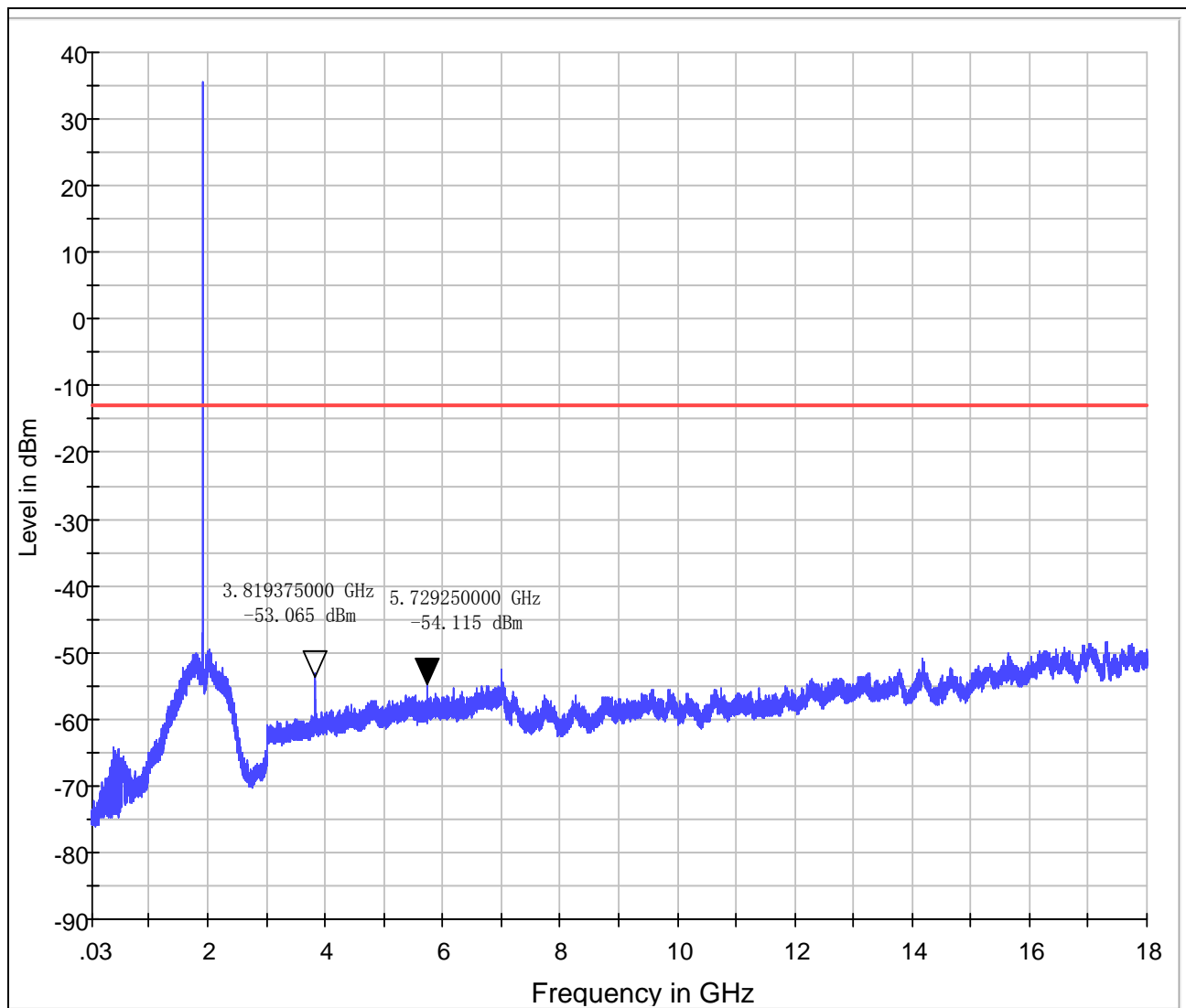
Note: The signal beyond the limit is carrier.

GSM 1900 661 Channel 30MHz~18GHz



GSM 1900 661 Channel 18GHz ~20GHz

GSM 1900 CH810



Note: The signal beyond the limit is carrier.

GSM 1900 810 Channel 30MHz~18GHz

[illegible]

2.1. Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

Method of Measurement

The measurements procedures in TIA -603C are used.

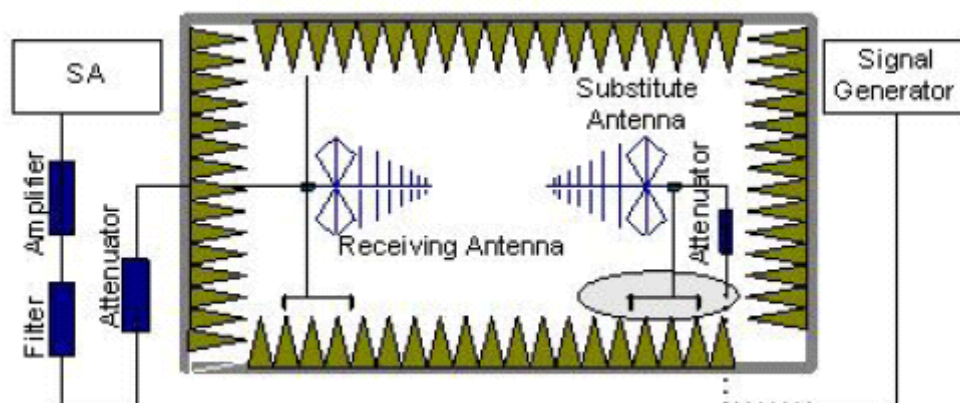
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The measurement will be conducted at three channels 512,661,810 of GSM1900.

The procedure of Radiates Spurious Emission is as follows:

1. Pre-calibration

In an fully anechoic chamber, A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted at a 3 meter test distance from the receive antenna. An RF signal source is connected to the dipole with a Tx cable that has been constructed to not interfere with radiation pattern of the antenna. A known (measured) power (P_{in}) is applied to input of dipole, and the power received (P_r) is recorded from the spectrum analyzer.

"Reference Path loss" is established as $P_{in} - P_r - \text{Tx cable loss} + \text{Substitution antenna gain}$.



2. EUT Test

EUT was placed on a 1.5 meter high non – conductive table at a 3 meter test distance from the receive antenna. The height of receiving antenna is 1.5 m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the table and adjusting the receiving antenna polarization. The measurement is carried out using a spectrum analyzer .The radiated emission measurements of all non-harmonic and harmonic of the transmit frequency from 30MHz to the 10th harmonic were measured with peak detector and 1MHz bandwidth. 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. If the harmonic could not be detected above the noise floor, the ambient level was recorded.

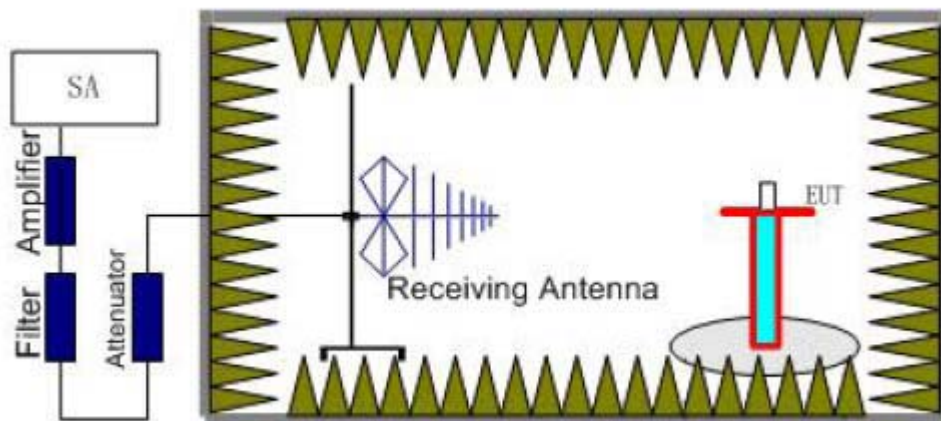
The level of the spurious emissions can be calculated through the level of the signal generator,

cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

Calculation procedure:

$RSE = Rx \text{ (dBm)} + \text{Reference Path loss}$

Rx: reading of the receiver



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

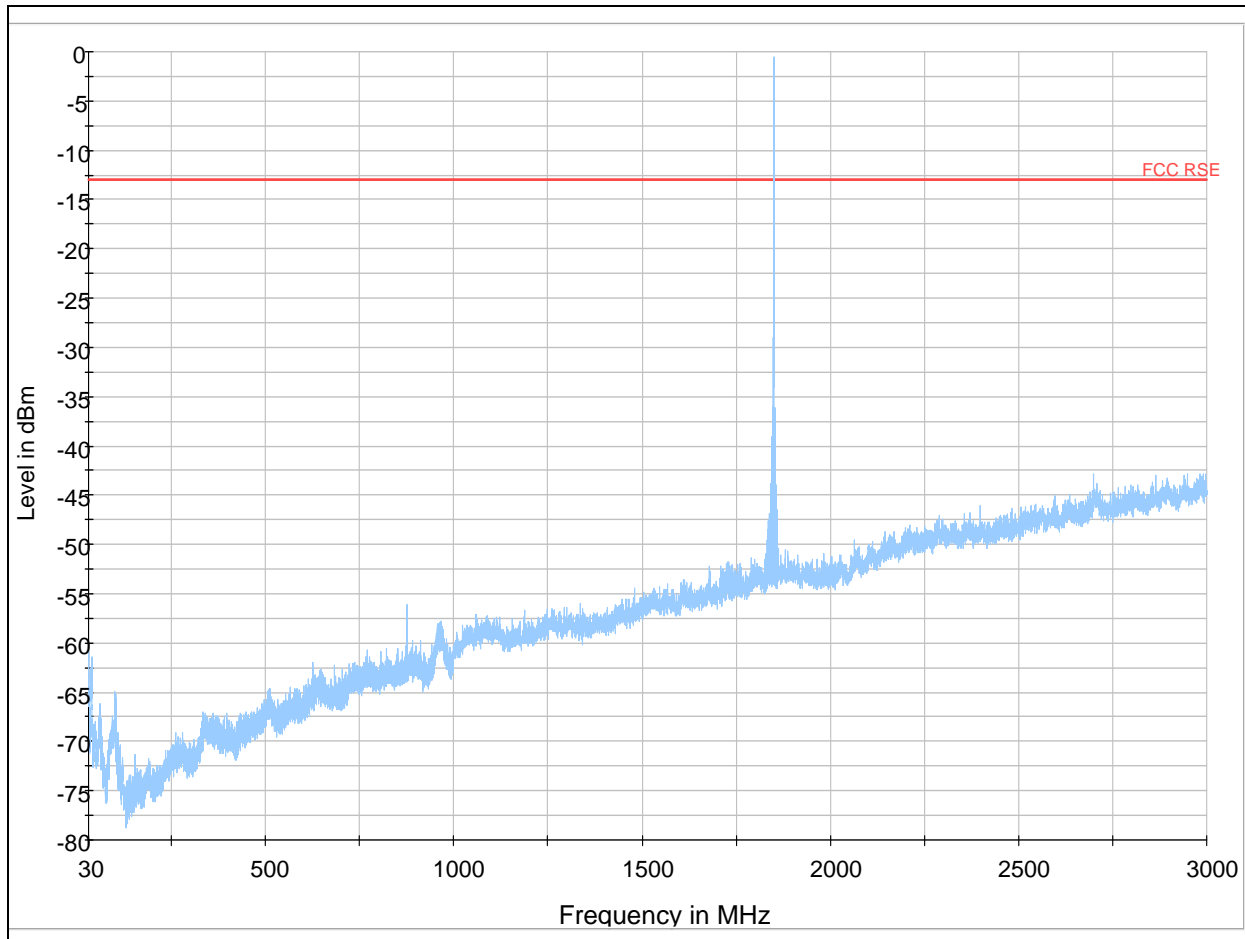
Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 3.16$ dB.

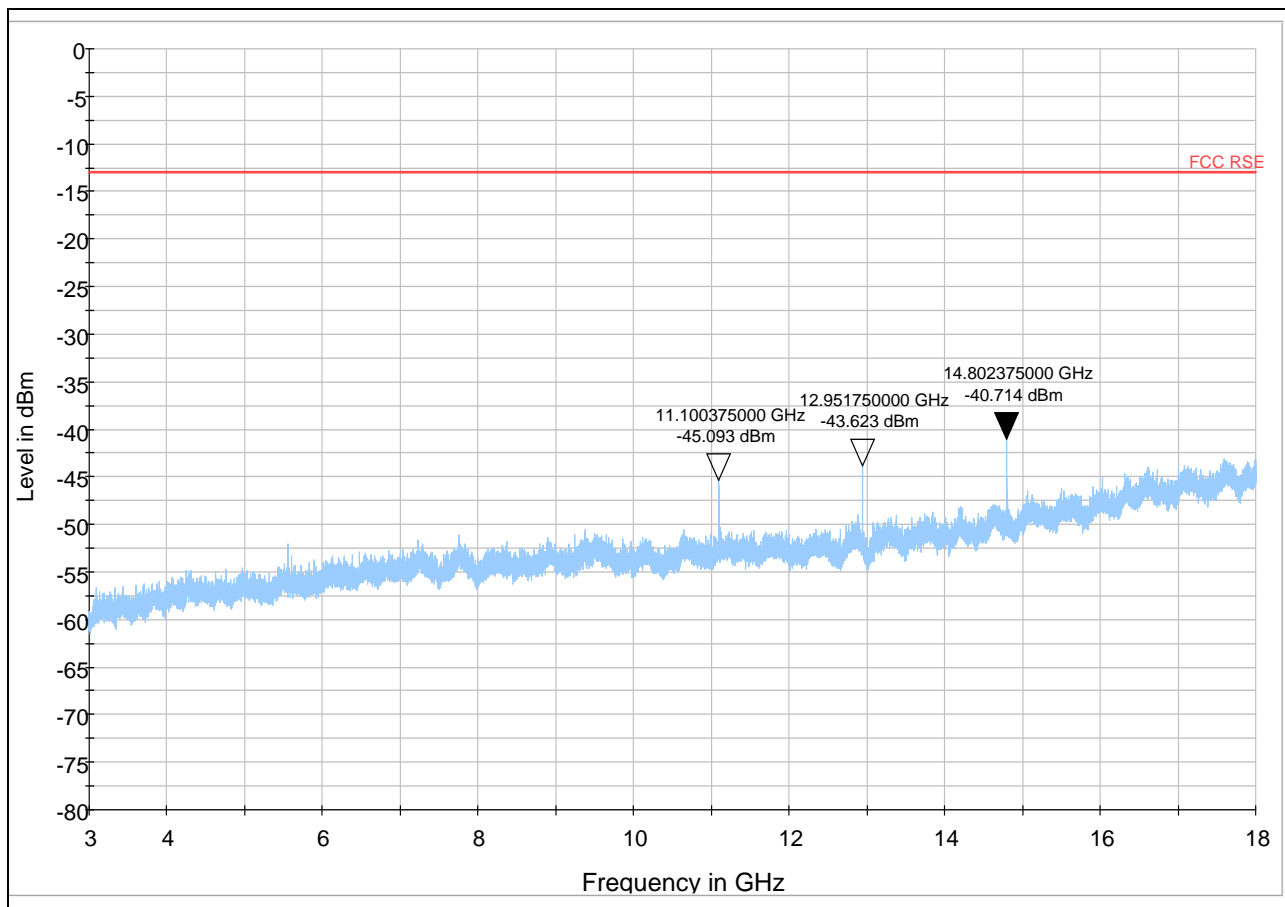
Test Result

GSM 1900 CH512

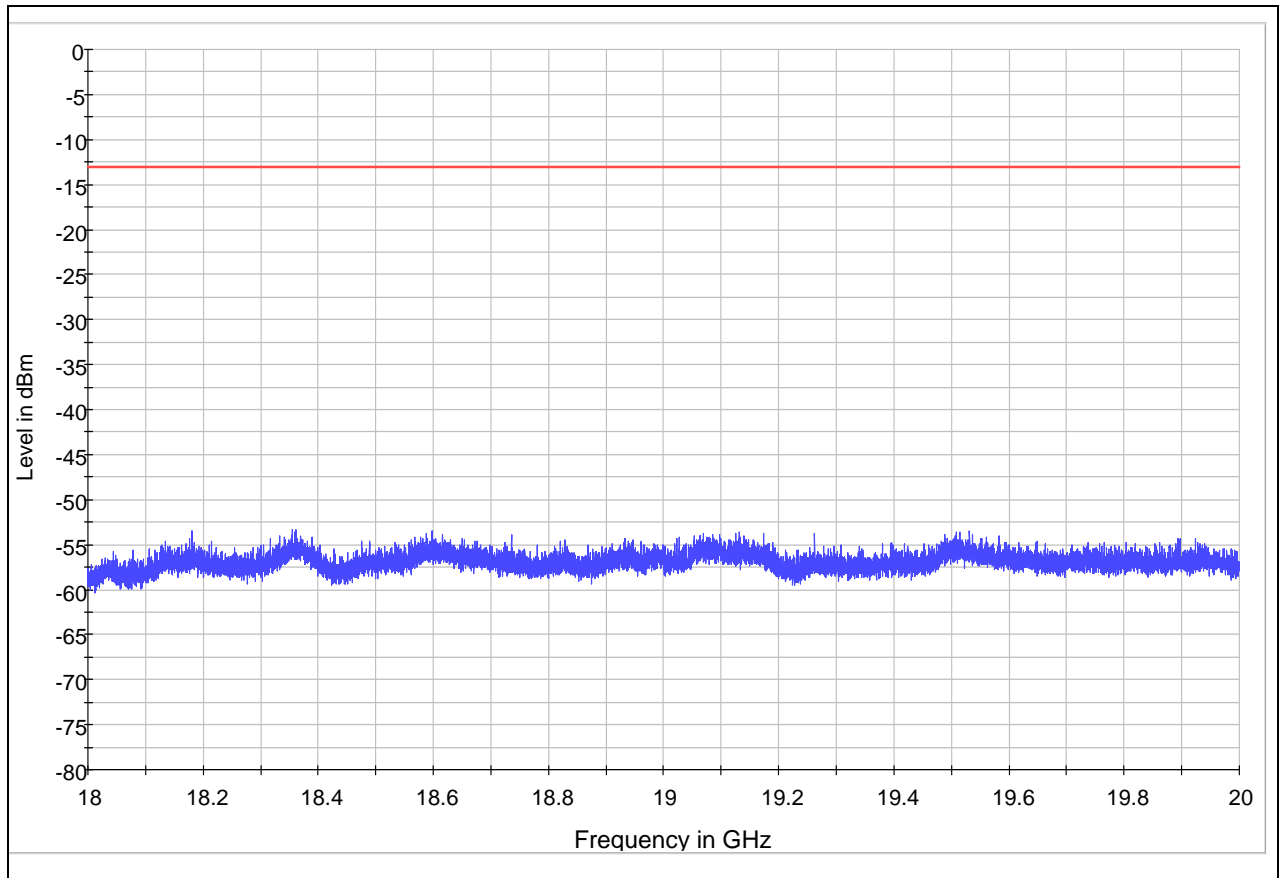


Note: The signal beyond the limit is carrier.

GSM 1900 512 Channel 30MHz~3GHz



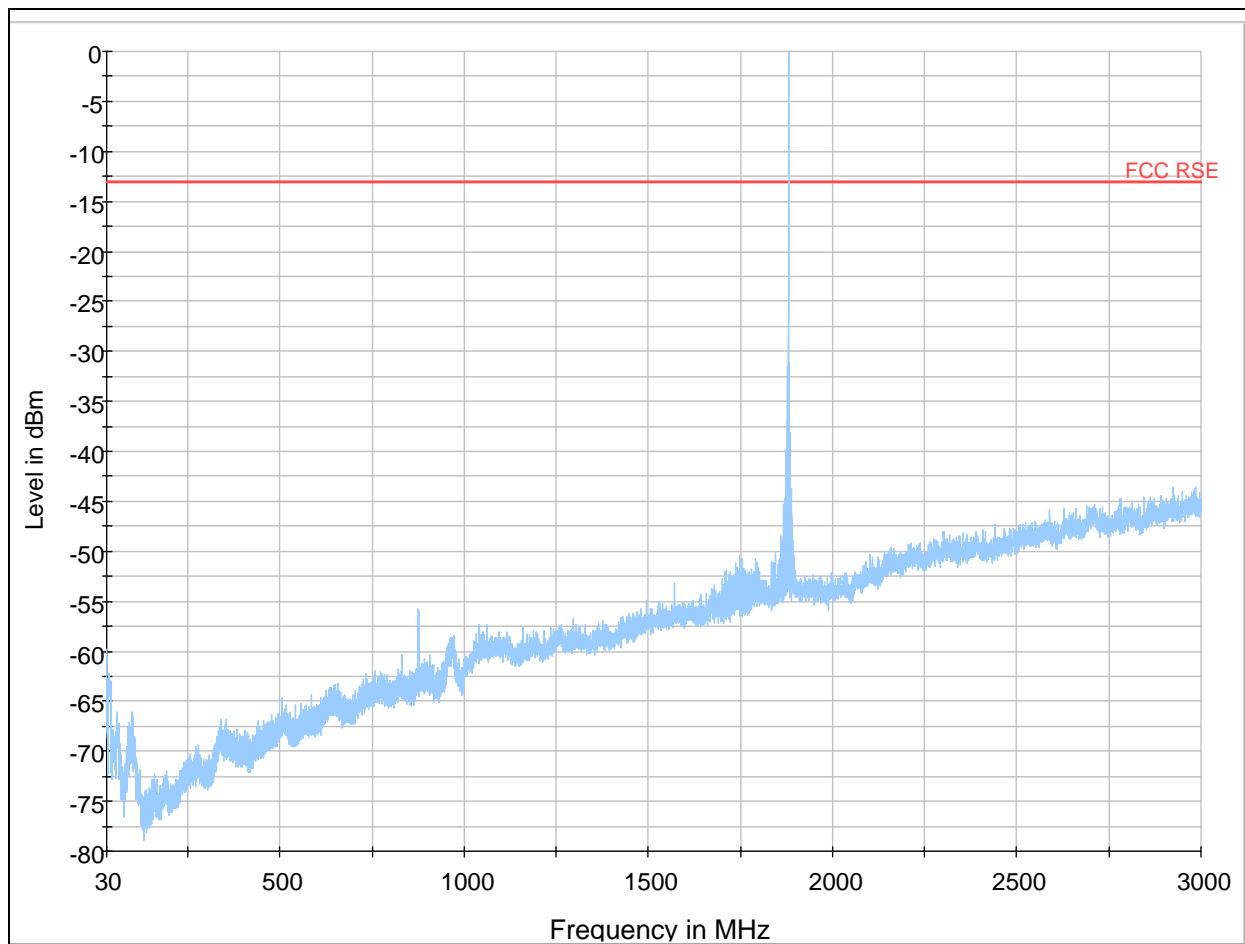
GSM 1900 512 Channel 3GHz ~18GHz



GSM 1900 512 Channel 18GHz ~20GHz

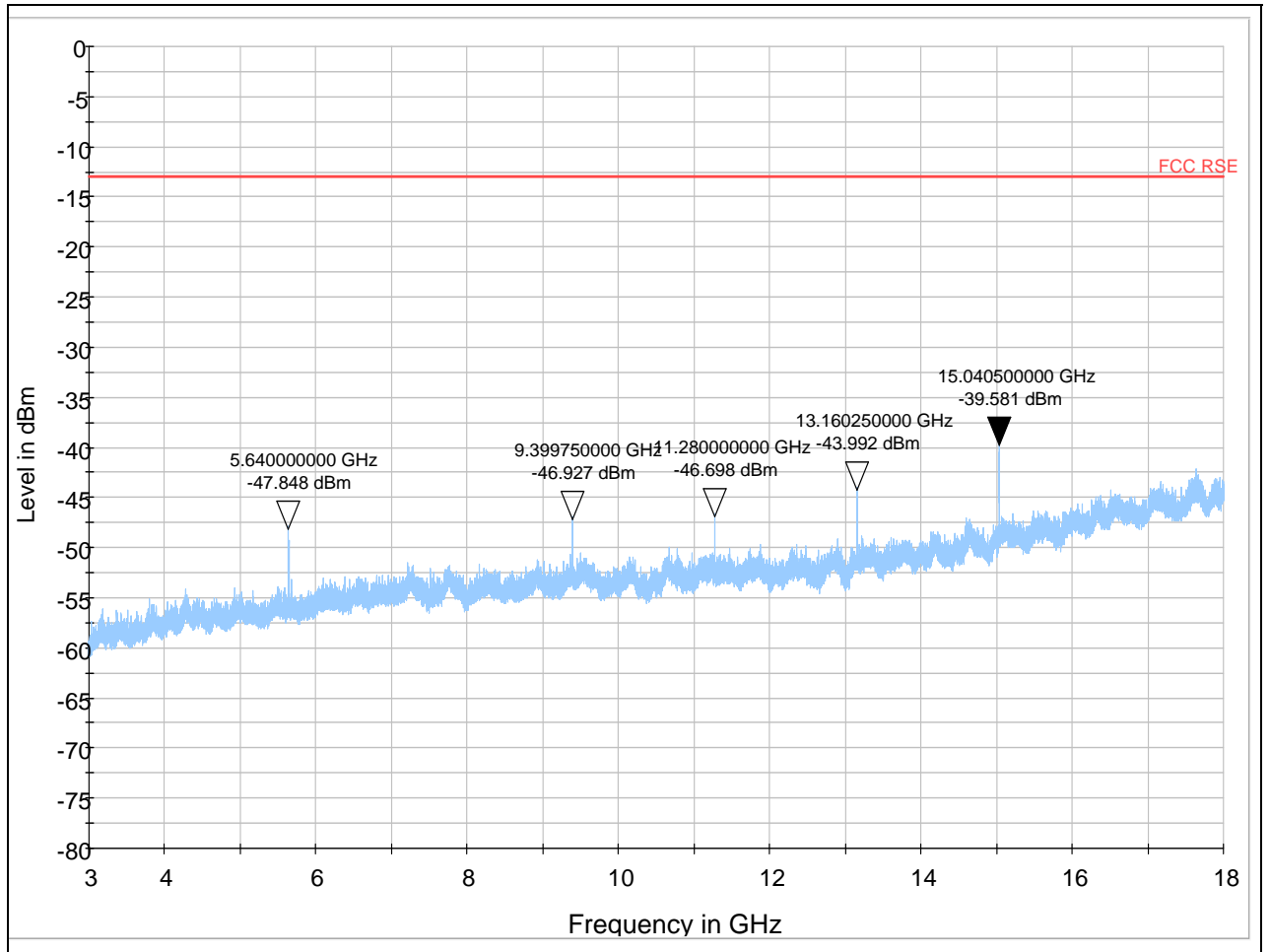
Harmonic	TX ch.512 Frequency (MHz)	Level (dBm)	Limit (dBm)	Turntable Azimuth(degree)	Margin (dB)
6	11100.375	-45.093	-13	180	32.093
7	12951.750	-43.623	-13	270	30.623
8	14802.375	-40.714	-13	180	27.714

GSM 1900 CH661

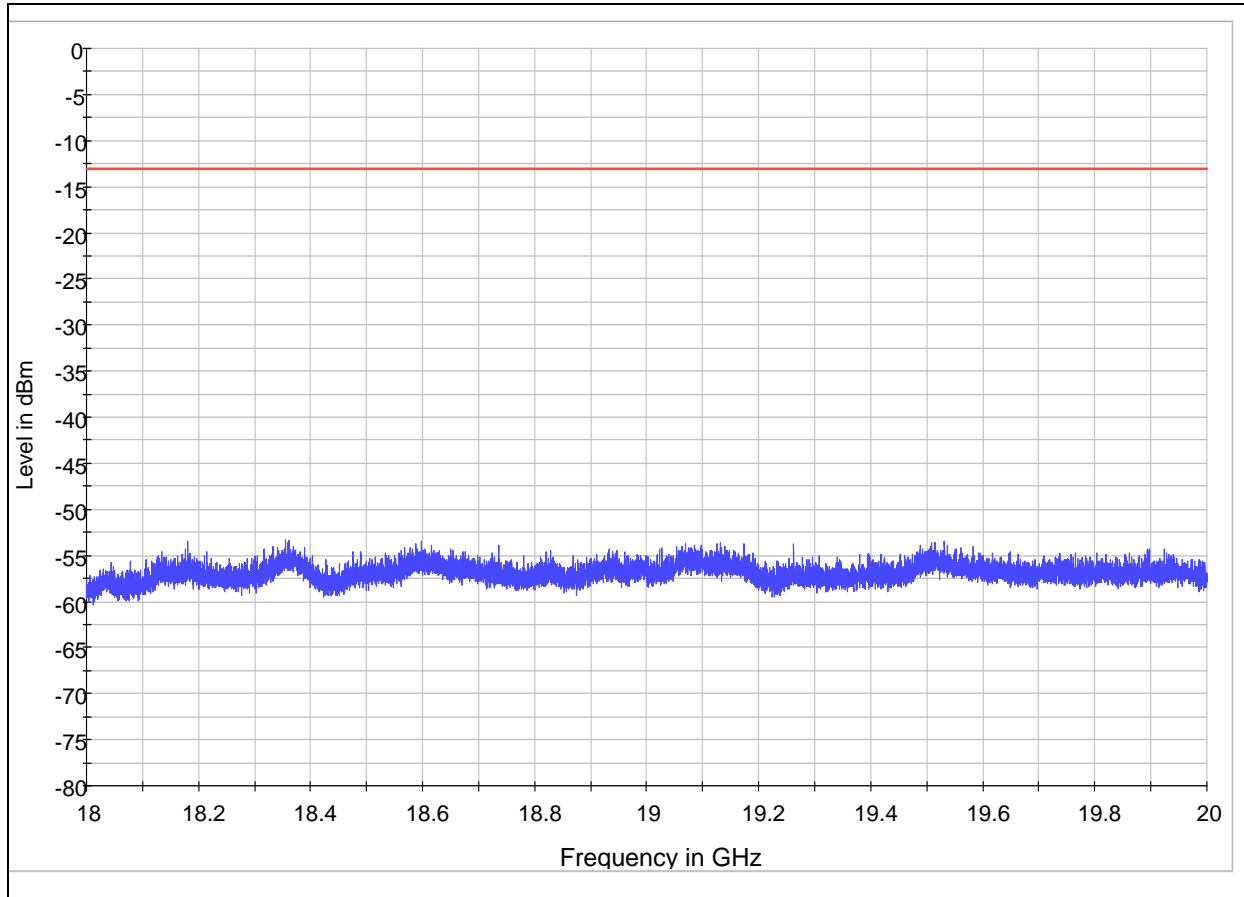


Note: The signal beyond the limit is carrier.

GSM 1900 661 Channel 30MHz~3GHz



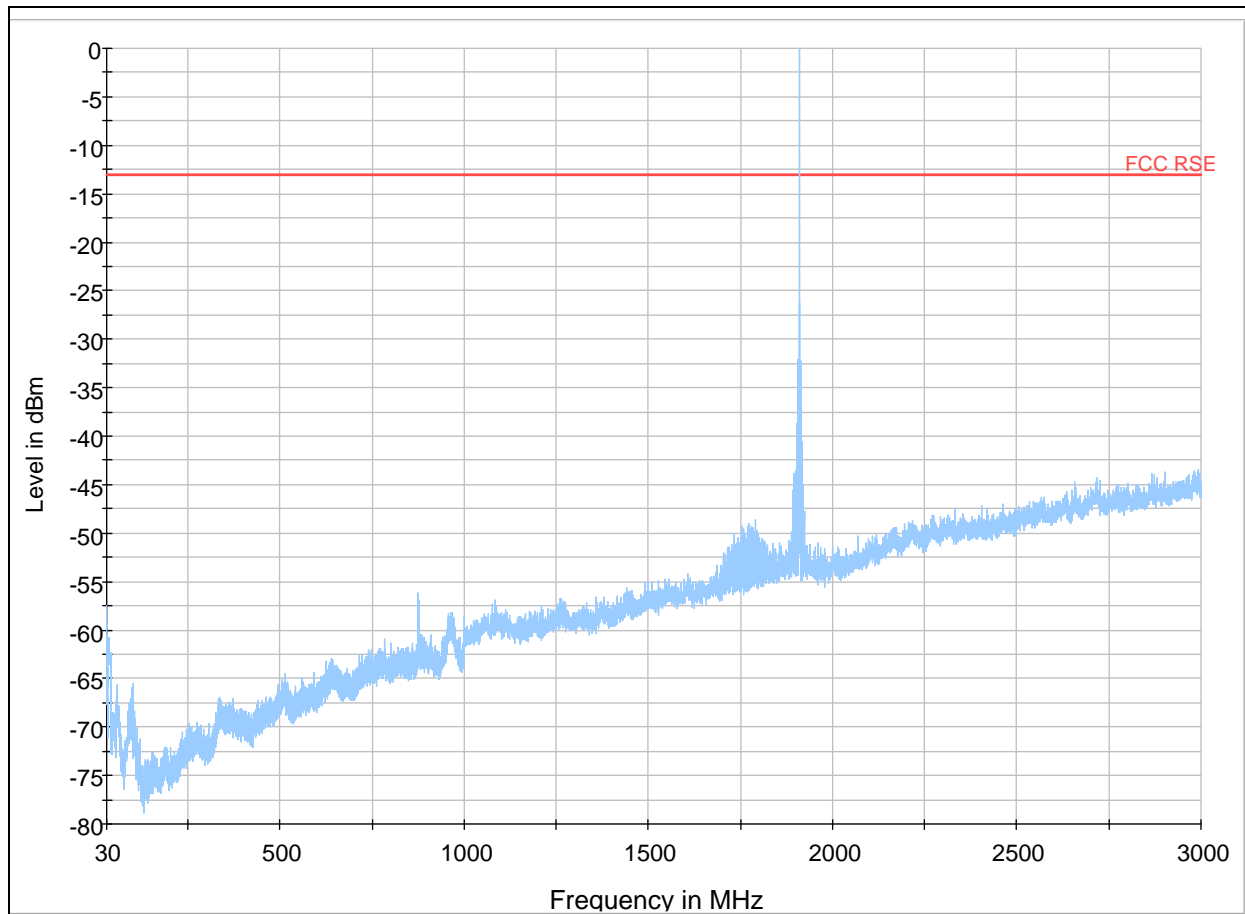
GSM 1900 661 Channel 3GHz ~18GHz



GSM 1900 661 Channel 18GHz ~20GHz

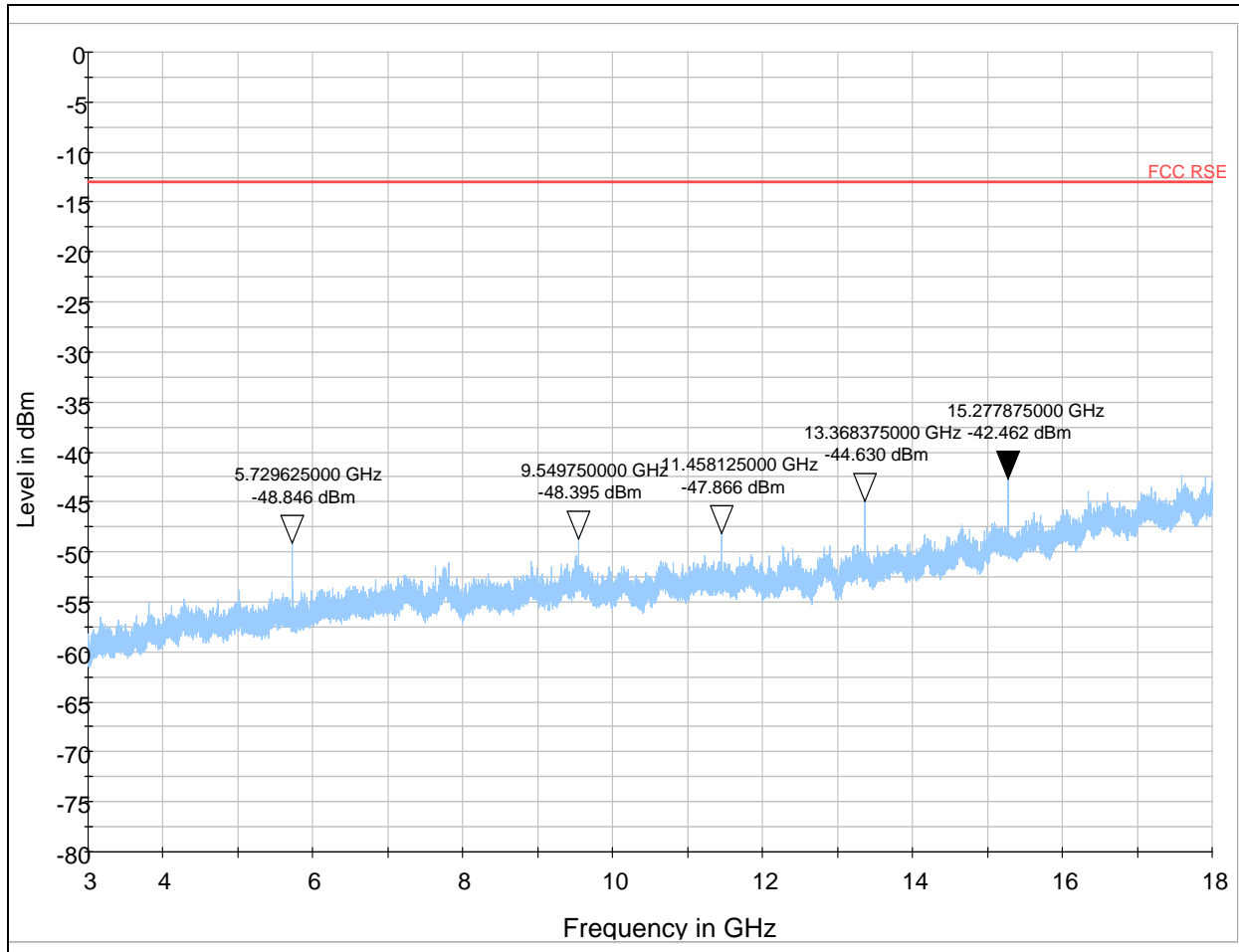
Harmonic	TX ch.661 Frequency (MHz)	Level (dBm)	Limit (dBm)	Turntable Azimuth(degree)	Margin (dB)
3	5640	-47.848	-13	135	34.848
5	9399.75	-46.927	-13	180	33.927
6	11280	-46.698	-13	180	33.698
7	13160.25	-43.992	-13	135	30.992
8	15040.50	-39.581	-13	180	26.581

GSM 1900 CH810

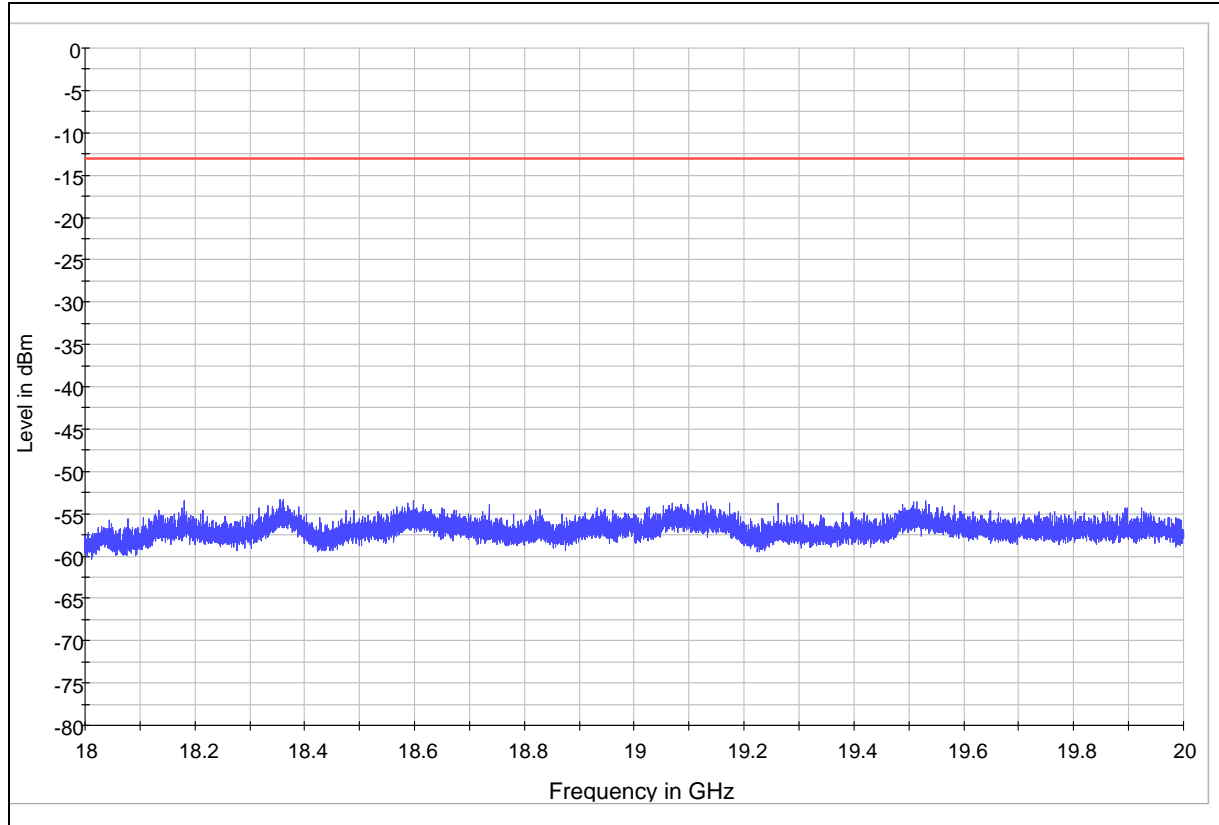


Note: The signal beyond the limit is carrier.

GSM 1900 810 Channel 30MHz~3GHz



GSM 1900 810 Channel 3GHz ~18GHz



GSM 1900 810 Channel 18GHz ~20GHz

Harmonic	TX ch.810 Frequency (MHz)	Level (dBm)	Limit (dBm)	Turntable Azimuth(degree)	Margin (dB)
3	5729.625	-48.846	-13	270	35.846
5	9549.75	-48.395	-13	180	35.395
6	11458.125	-47.866	-13	270	34.866
7	13368.375	-44.630	-13	90	31.630
8	15277.875	-42.462	-13	180	29.462

TA Technology (Shanghai) Co., Ltd.

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3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	Base Station Simulator	CMU200	R&S	118133	2009-06-02	One year
02	Base Station Simulator	E5515C	Agilent	GB46490218	2008-09-14	One year
03	Signal Analyzer	FSV	R&S	100815	2009-06-29	One year
04	Signal generator	SMR27	R&S	1606.6000.02	2009-06-29	One year
05	Spectrum Analyzer	E4445A	Agilent	MY46181166	2009-06-08	One year
06	EMI Test Receiver	ESCI	R&S	100948	2009-07-02	One year
07	Trilog Antenna	VULB 9163	SCHWARZB ECK	9163-391	2009-05-14	One year
08	Horn Antenna	HF907	R&S	100126	2009-05-20	One year
09	Biconical Antenna	VUBA 9117	SCHWARZB ECK	9117-225	2009-05-14	One year
10	Quad-Ridge Horn Antenna	3164-03	ETS-Lindgren	1064	2009-05-20	One year
11	Power Splitter	11667A	Agilent	52960	NA	NA
12	DC Power Supply	GPS-3030D	GM	E877677	NA	NA
13	Climatic Chamber	ESS-SDH401	YIN HE	2006001	2009-02-23	One year
14	Semi-Anechoic Chamber	9.6*6.7*6.6m	ETS-Lindgren	NA	NA	NA
15	OTA Fully-Anechoic Chamber	7.4*3.6*3.6m	ETS-Lindgren	3658	NA	NA
16	EMI test software	ES-K1	R&S	NA	NA	NA
17	OTA test software	EMQuest	ETS-Lindgren	NA	NA	NA

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

ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance



Picture 1 EUT and Auxiliary

A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup