



Report No.: RZA2010-0701\_24



# Part 24

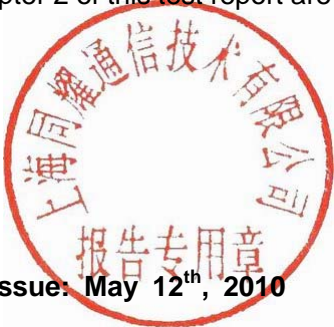
# TEST REPORT

Product Name	GSM/GPRS Dual Band Mobile Phone
FCC ID	YCNA330
Model	Lenovo A330
Applicant	Lenovo Mobile Communication Technology Ltd.

**TA Technology (Shanghai) Co., Ltd.**



## GENERAL SUMMARY

<b>Product Name</b>	GSM/GPRS Dual Band Mobile Phone	<b>Model</b>	Lenovo A330
<b>FCC ID</b>	YCNA330	<b>Report No.</b>	RZA2010-0701_24
<b>Client</b>	Lenovo Mobile Communication Technology Ltd.		
<b>Manufacturer</b>	Lenovo Mobile Communication Technology Ltd.		
<b>Reference Standard(s)</b>	<p><b>FCC Part 2</b>      Frequency allocations and radio treaty matters; general rules and regulation. (December 17, 2009)</p> <p><b>FCC Part 24</b>    Personal Communications Services. (December 17, 2009)</p> <p><b>ANSI/TIA-603-C</b>   Land mobile FM or PM Communications Equipment Measurements and Performance Standards.(2004)</p>		
<b>Conclusion</b>	<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: <b>Pass</b></p> <div style="text-align: right;">  <p>(Stamp) Date of issue: May 12<sup>th</sup>, 2010</p> </div>		
<b>Comment</b>	The test result only responds to the measured sample.		

Approved by 杨伟中  
Yang Weizhong

Revised by 徐凯  
Xu Kai

Performed by 杜如蔚  
Du Ruwei

## TABLE OF CONTENT

1. General Information .....	4
1.1. Notes of the test report .....	4
1.2. Testing laboratory .....	4
1.3. Applicant Information .....	5
1.4. Manufacturer Information .....	5
1.5. Information of EUT .....	6
1.6. Test Date .....	7
2. Test Information .....	8
2.1. Summary of test results .....	8
2.2. RF Power Output .....	9
2.3. Effective Isotropic Radiated Power .....	11
2.4. Occupied Bandwidth .....	14
2.5. Band Edge Compliance .....	19
2.6. Frequency Stability .....	22
2.7. Spurious Emissions at Antenna Terminals .....	24
2.1. Radiates Spurious Emission .....	29
3. Main Test Instruments .....	37
ANNEX A: EUT Appearance and Test Setup .....	38
A.1 EUT Appearance .....	38
A.2 Test Setup .....	39

# TA Technology (Shanghai) Co., Ltd. Test Report

Registration Num:428261

Report No.: RZA2010-0701\_24

Page 4 of 39

---

## 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

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
Country: P. R. China  
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**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

**Registration Num:428261**

Report No.: RZA2010-0701\_24

Page 5 of 39

---

**1.3. Applicant Information**

Company: Lenovo Mobile Communication Technology Ltd.  
Address: No.999,Qishan North 2nd Road,Information&Optoelectronics Park,Torch Hi-tech Indu  
City: Xiamen  
Postal Code: /  
Country: P.R. China  
Contact: Qiu shouyu  
Telephone: 86-0592-2166651  
Fax: 86-0592-2169999-6651

**1.4. Manufacturer Information**

Company: Lenovo Mobile Communication Technology Ltd.  
Address: No.999,Qishan North 2nd Road,Information&Optoelectronics Park,Torch Hi-tech Indu  
City: Xiamen  
Postal Code: /  
Country: P.R. China  
Telephone: 86-0592-2166651  
Fax: 86-0592-2169999-6651

**1.5. Information of EUT**

**General information**

Device type:	Portable device		
Name of EUT:	GSM/GPRS Dual Band Mobile Phone		
Device operating configurations:			
IMEI or SN:	910040160000597/910040160000946		
Operating mode(s):	GSM1900: ( tested )		
GPRS multislots class :	10		
Antenna type:	internal antenna		
Rated Power Supply Voltage:	3.8V		
Extreme Voltage:	Minimum: 3.4V    Maximum: 4.2V		
Extreme Temperature:	Lowest: -30°C    Highest: +55°C		
Operating frequency range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
Hardware version:	V1.0		
Software version:	A330_VE_S001_100424		

**TA Technology (Shanghai) Co., Ltd.**  
**Test Report**

Registration Num:428261

Report No.: RZA2010-0701\_24

Page 7 of 39

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**Auxiliary equipment details**

**AE1: Battery**

Model: HBL801  
Manufacture: ZHUHAISUNDA TECHNOLOGY CO.,LTD  
IMEI or SN: /

**AE2: Travel Adaptor**

Model: ZT-668-01B2K  
Manufacture: SHENZHEN ZHONGTIAN ELECTRONIC CO.,LTD  
IMEI or SN: /

Equipment Under Test (EUT) is GSM/GPRS Dual Band Mobile Phone with internal antenna. 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 May 5, 2010 to May 12, 2010.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Registration Num:428261

Report No.: RZA2010-0701\_24

Page 8 of 39

## 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	24.232	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	24.238	PASS
5	Frequency Stability	2.1055 / 24.235	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 24.238	PASS
7	Radiates Spurious Emission	2.1053 / 24.238	PASS



## 2.2. RF Power Output

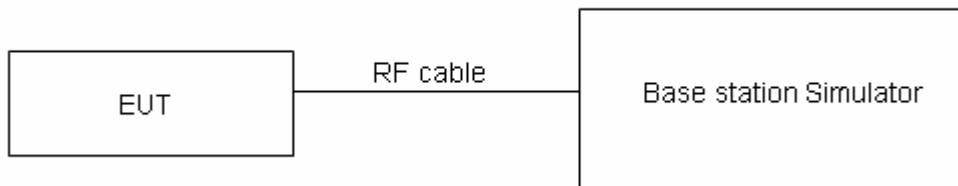
### Ambient condition

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.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Registration Num:428261

Report No.: RZA2010-0701\_24

Page 10 of 39

### Test Results

#### GSM 1900

Channel	Frequency(MHz)	RF Output Power (dBm)
512	1850.2	29.09
661	1880.0	29.26
810	1909.8	29.93

#### GSM 1900 GPRS

Channel	Frequency(MHz)	RF Output Power (dBm)	
		1 down 1 up	1 down 2 up
512	1850.2	29.09	27.01
661	1880.0	29.26	27.16
810	1909.8	29.93	27.89

**2.3. Effective Isotropic Radiated Power**

**Ambient condition**

Temperature	Relative humidity	Pressure
24°C	50%	101.5kPa

**Methods of Measurement**

The measurement procedures in TIA- 603C are used.

The radiated power was measured using ETS-LINDGREN OTA Chamber in “Peak” mode.

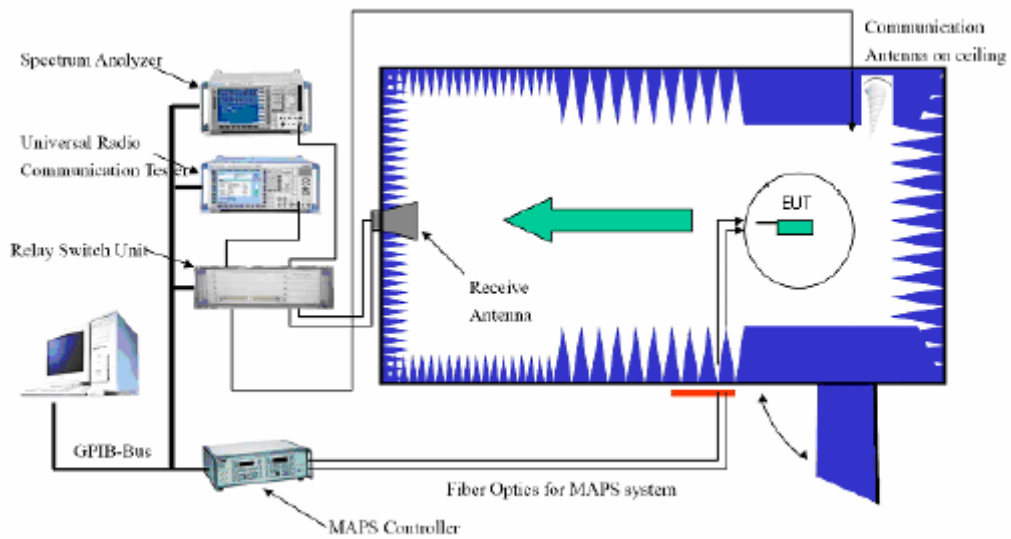
1. In an fully anechoic chamber, a sleeve dipole antenna for the frequency band of interest is placed on the reference centre of the turntable at a 5 meters test distance from the test receive antenna. An RF signal source is connected to the dipole with a Tx cable that has been constructed to not interfere 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.
2. The EUT substituted for the dipole at the reference centre of the chamber. A radio link shall be established between EUT and the Base Station Simulator. The EUT is controlled to ensure at its maximum power level and proper modulation.
3. A scan is performed to obtain the radiation pattern. A peak detector is used while RBW and VBW are both set to 3MHz. From these measurements, the maximum radiated power ( $P_{er}$ ) was recorded from the spectrum analyzer from the 360 degrees rotation of the turntable and in both horizontally and vertically polarized orientations of the test antenna.

The Reference Path loss =  $P_{in} - P_r - \text{Tx cable loss} + \text{Substitution antenna gain}$

$EIRP = P_{er} + \text{Path loss}$

4. The measurement will be conducted at three channels No.512, No.661 and No.810 (Bottom, middle and top channels of GSM 1900).

**Test Setup**



**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".

Limit (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  $k = 2$ .  $U = 1.19\text{ dB}$

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Registration Num:428261

Report No.: RZA2010-0701\_24

Page 13of 39

### Test Results

GSM 1900

Channel	Frequency (MHz)	LVL (EUT)	S.G	Gain (dBi)	Cable Loss	Pr (dBm)	Correction Factor (dBm)	EIRP (dBm)
512	1850.2	-28.1	0	1.91	14.7	-67.38	54.59	26.49
661	1880.0	-27.59	0	1.94	14.72	-68.49	55.71	28.12
810	1909.8	-26.92	0	1.90	14.77	-70.05	57.18	30.26

GSM 1900 GPRS(1down 1up)

Channel	Frequency (MHz)	LVL (EUT)	S.G	Gain (dBi)	Cable Loss	Pr (dBm)	Correction Factor (dBm)	EIRP (dBm)
512	1850.2	-27.82	0	1.91	14.7	-67.38	54.59	26.77
661	1880.0	-27.27	0	1.94	14.72	-68.49	55.71	28.44
810	1909.8	-26.63	0	1.90	14.77	-70.05	57.18	30.55

**2.4. Occupied Bandwidth**

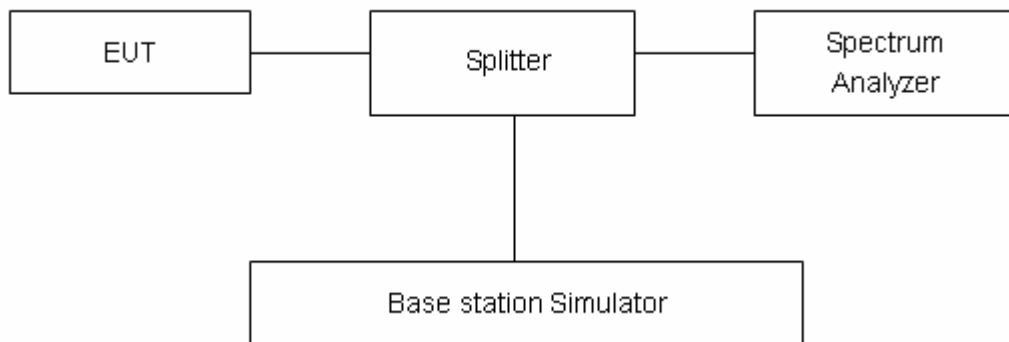
**Ambient condition**

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 3 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.

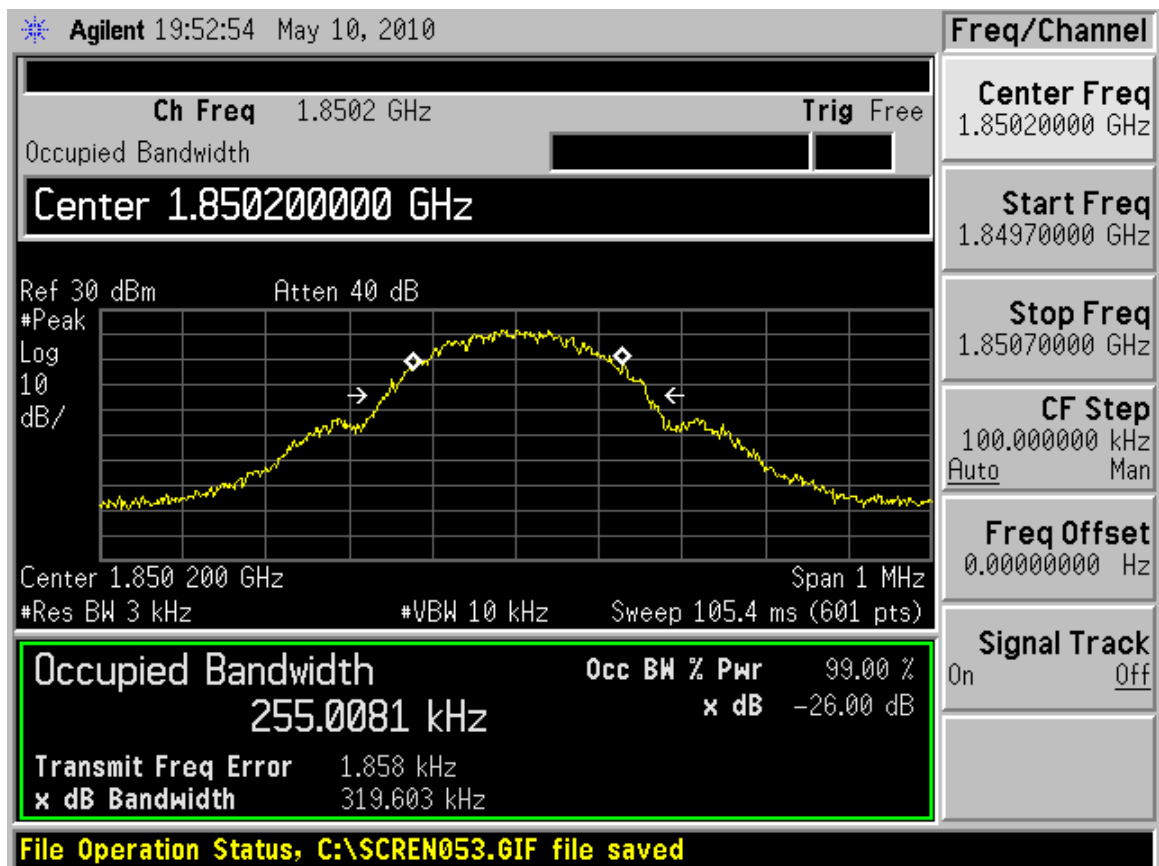
**Measurement Uncertainty**

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	255.01	319.60
661	1880.0	248.55	314.76
810	1909.8	243.01	302.82



GSM1900 CH512 Occupied Bandwidth

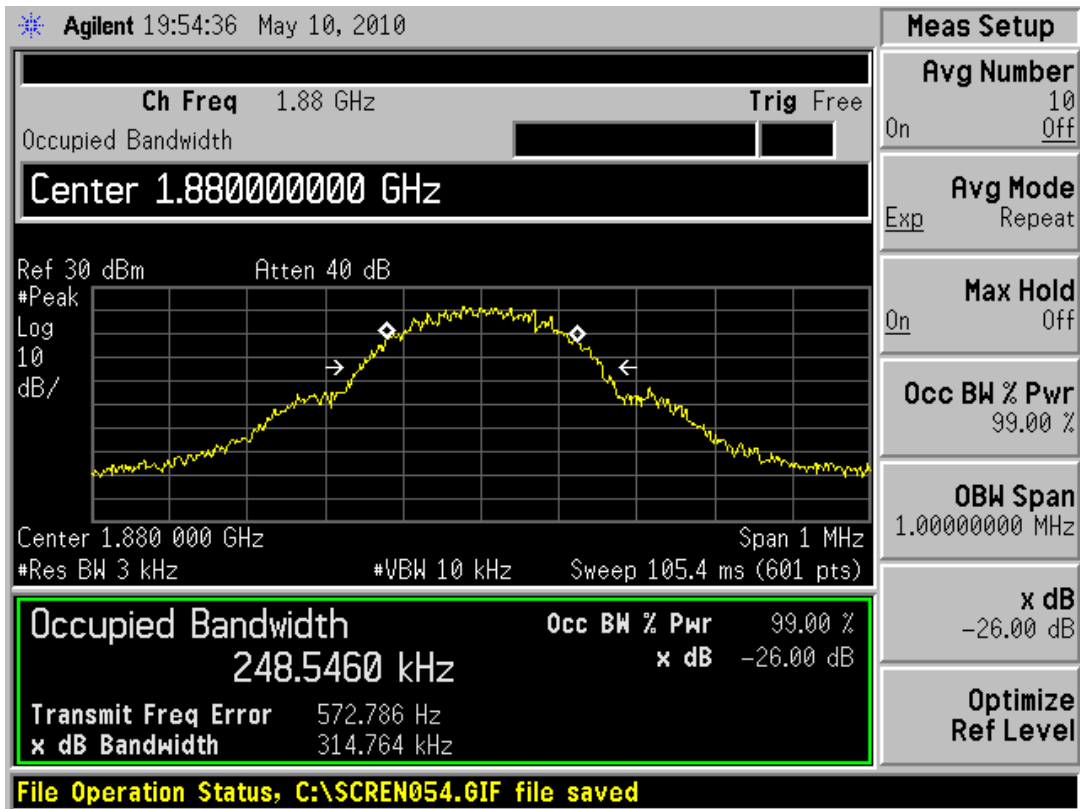
# TA Technology (Shanghai) Co., Ltd.

## Test Report

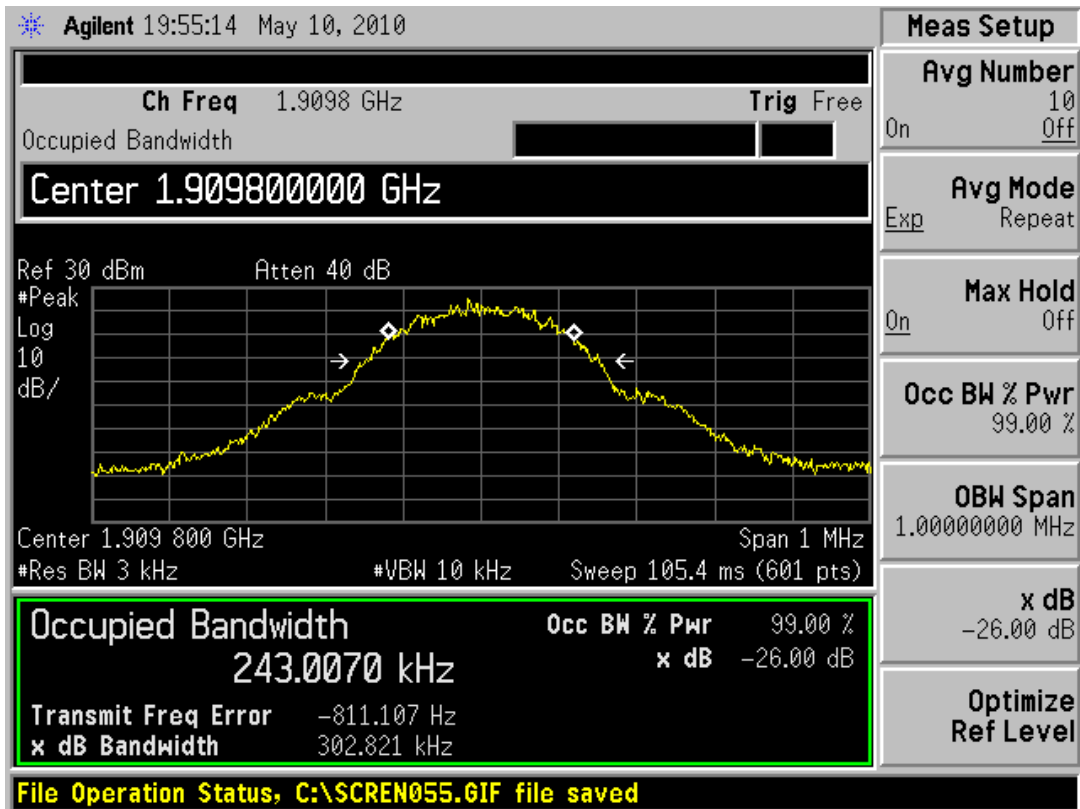
Registration Num:428261

Report No.: RZA2010-0701\_24

Page 16 of 39



GSM 1900 CH661 Occupied Bandwidth



GSM 1900 CH810 Occupied Bandwidth



# TA Technology (Shanghai) Co., Ltd.

## Test Report

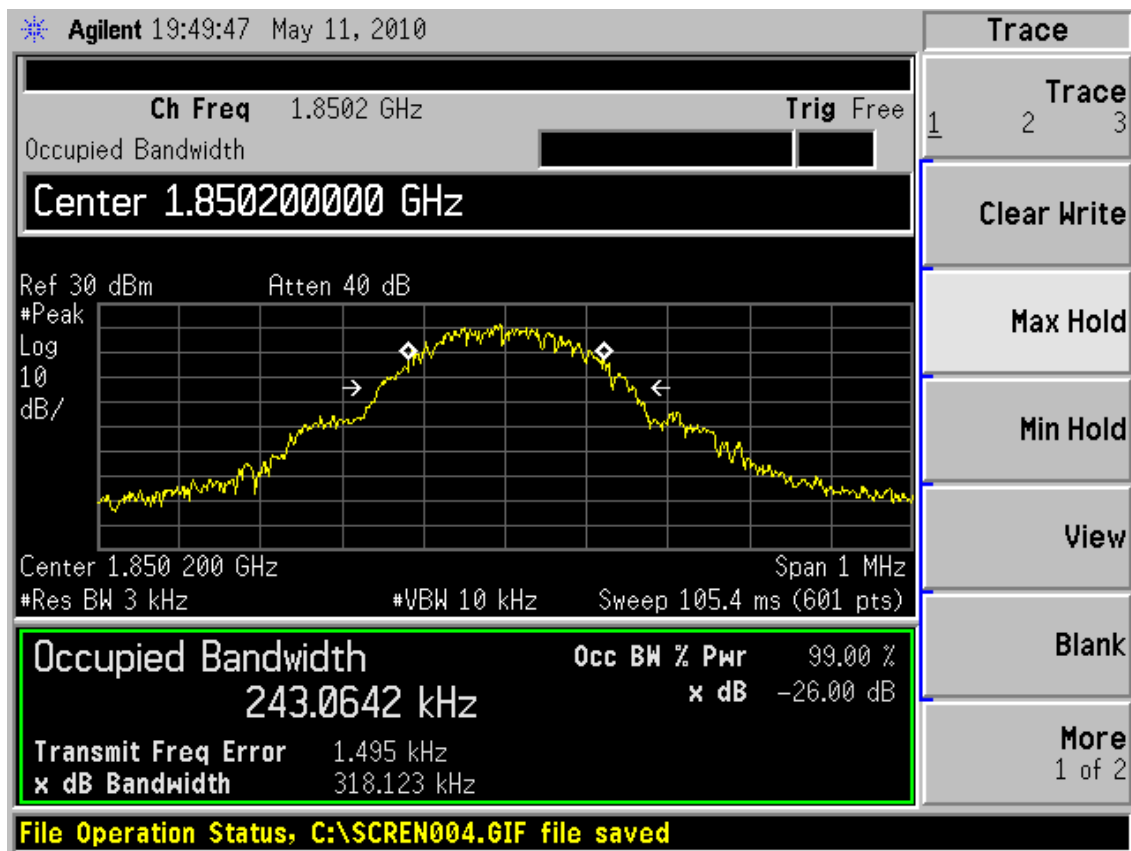
Registration Num:428261

Report No.: RZA2010-0701\_24

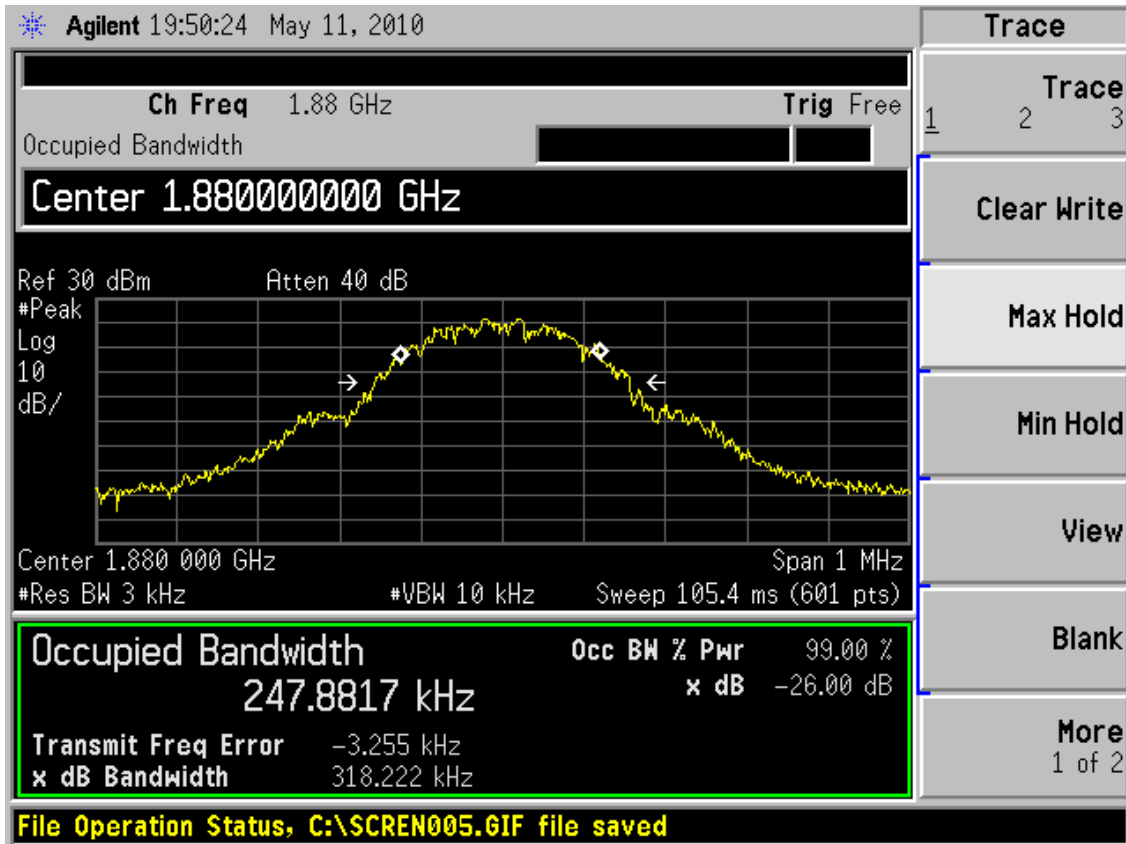
Page 17 of 39

GSM 1900 GPRS

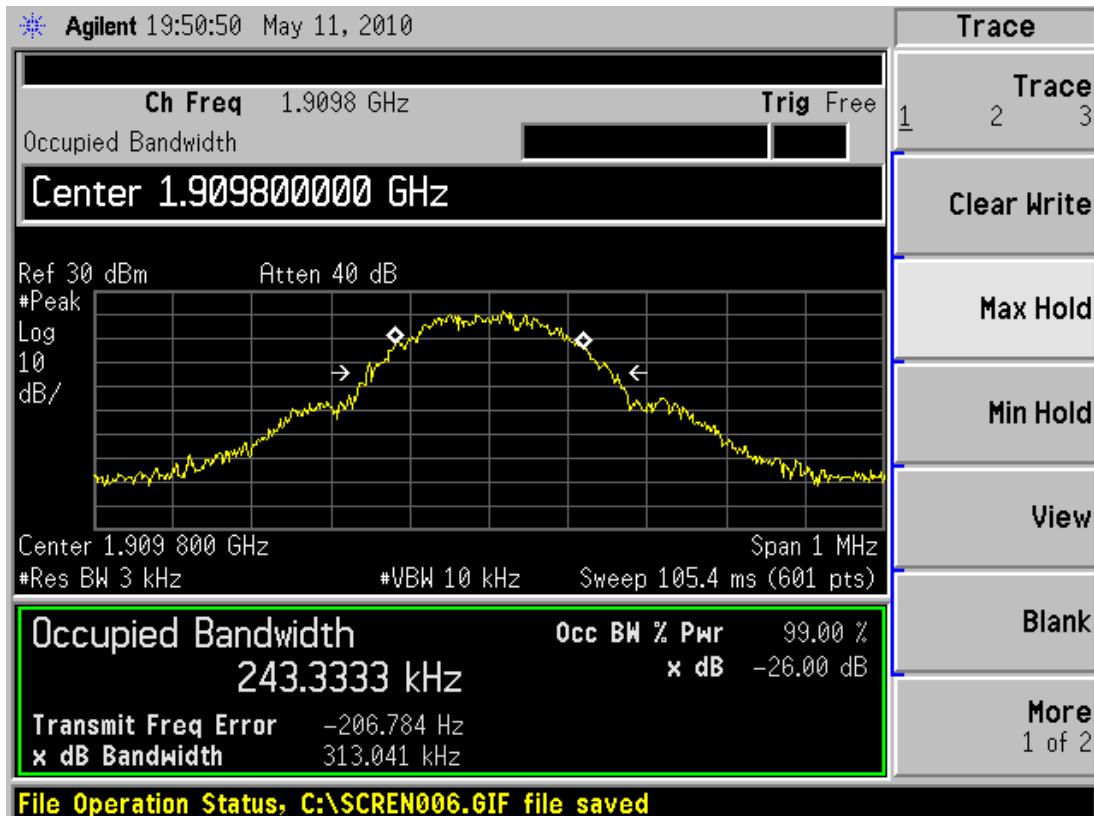
Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
512	1850.2	243.06	318.12
661	1880.0	247.88	318.22
810	1909.8	243.33	313.04



GSM1900 CH512 GPRS Occupied Bandwidth



GSM1900 CH661 GPRS Occupied Bandwidth



GSM1900 CH810 GPRS Occupied Bandwidth

**2.5. Band Edge Compliance**

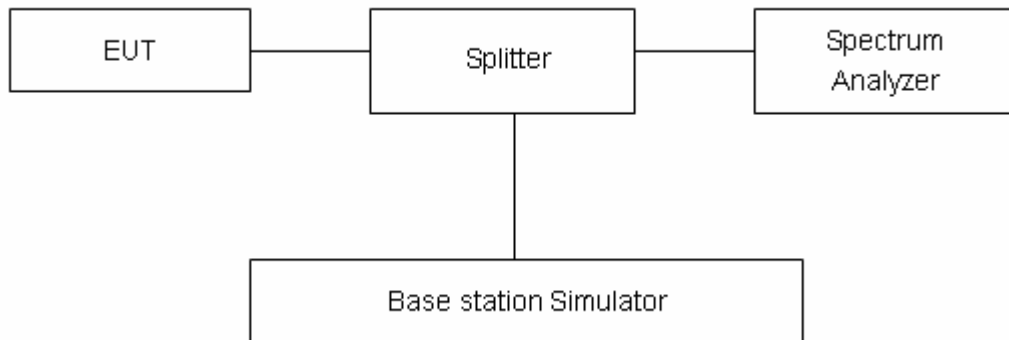
**Ambient condition**

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 Average 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.”

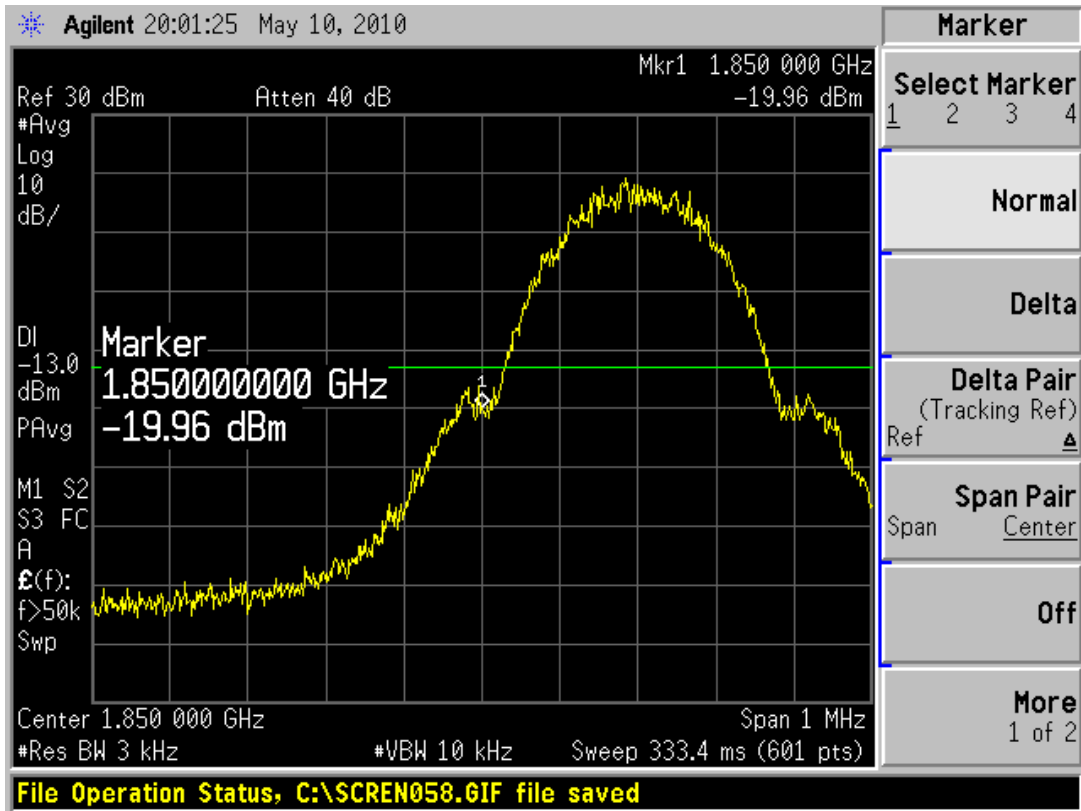
Limit	-13 dBm
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**Measurement Uncertainty**

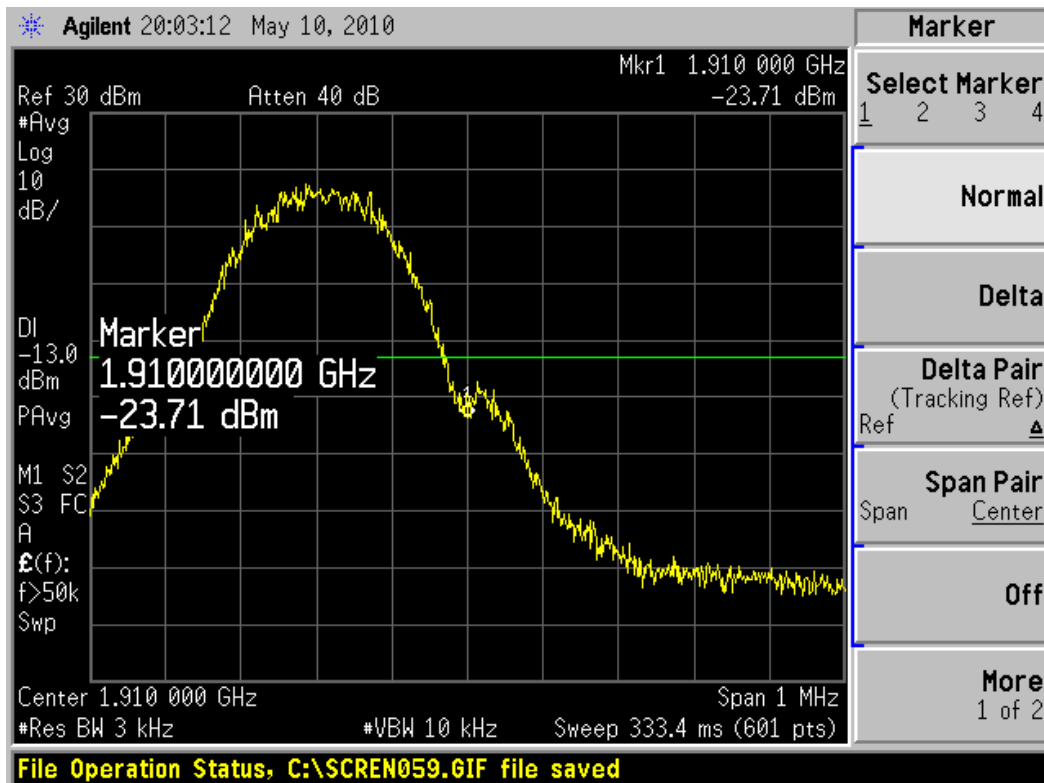
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .  $U=0.684$ dB.

Test Result

GSM 1900



GSM 1900 512 Channel



GSM1900 810 Channel

# TA Technology (Shanghai) Co., Ltd.

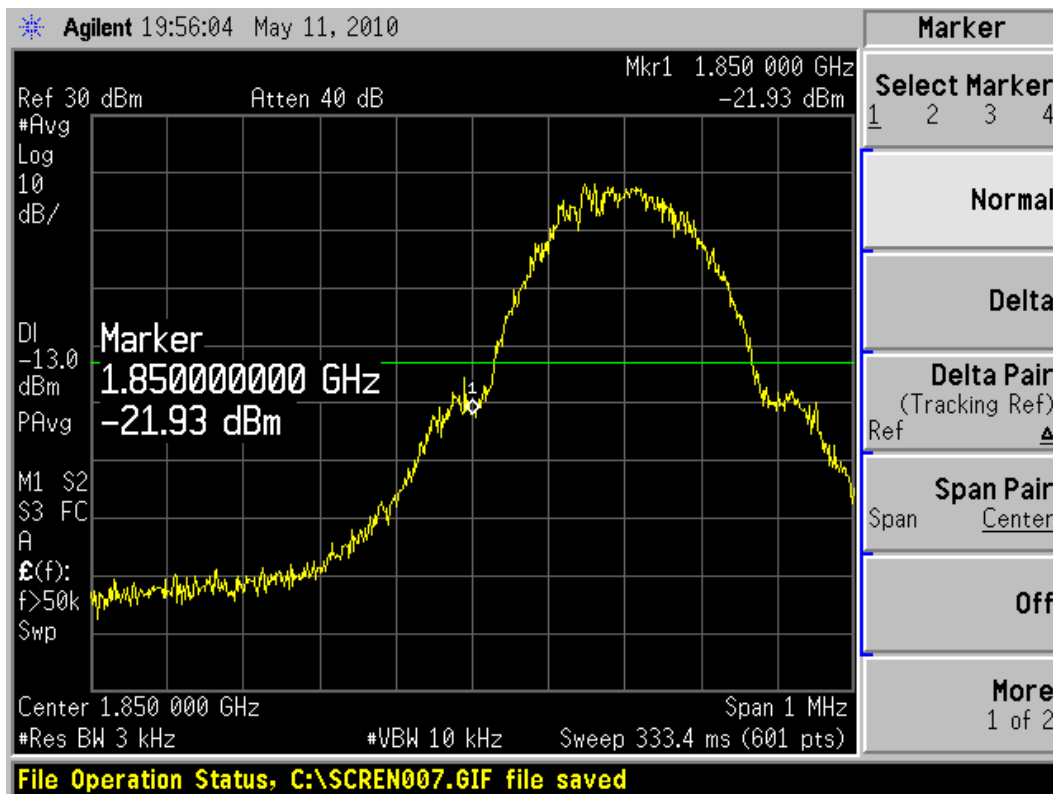
## Test Report

Registration Num:428261

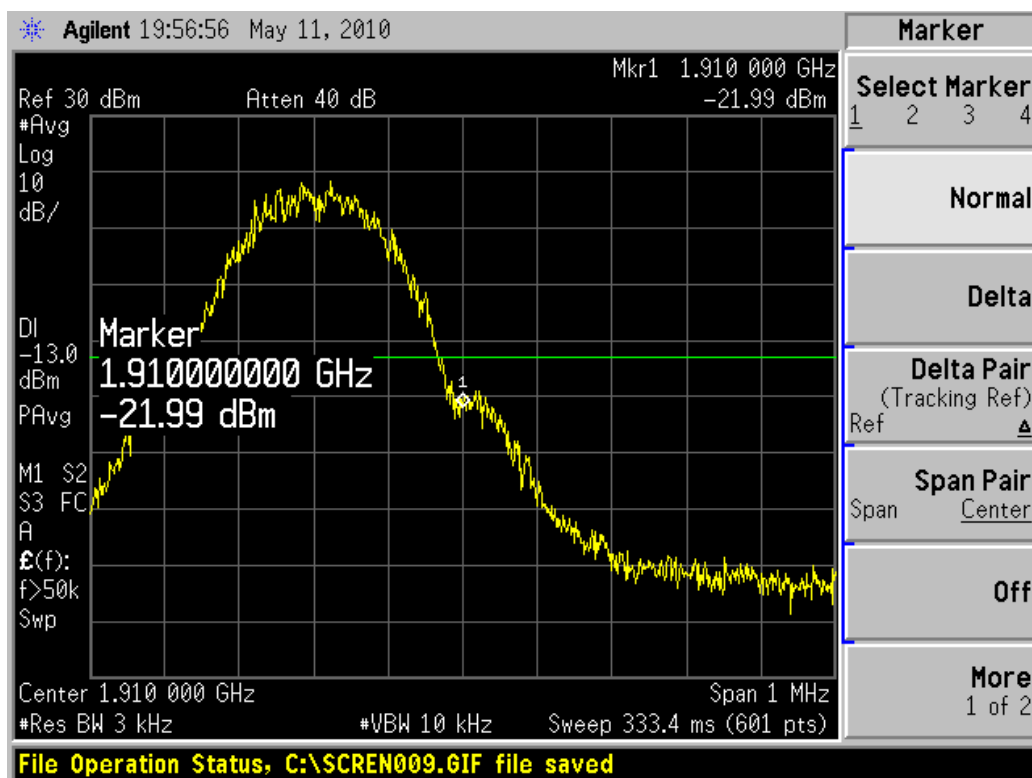
Report No.: RZA2010-0701\_24

Page 21 of 39

GSM 1900 GPRS



GSM 1900 GPRS 512 Channel



GSM 1900 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 -30°C to +50°C in 10°C step size,  
 (1) With all power removed, the temperature was decreased to -30°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 -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

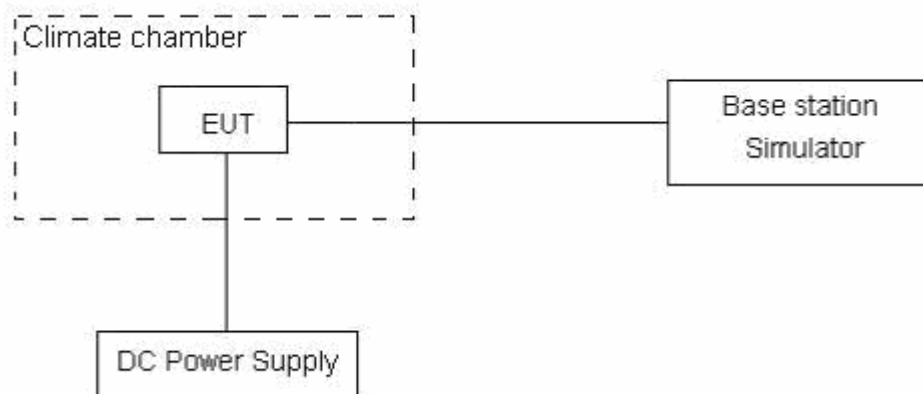
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.4 V and 4.2 V, with a nominal voltage of 3.8V.

**Test setup**



**Limits**

No specific frequency stability requirements in part 24.235

**Measurement Uncertainty**

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

**Test Result**

Temperature (° C)	Test Results (ppm) / 3.8 V Power supply
	GSM 1900 Channel 661
-30	0.049
-20	0.047
-10	0.048
0	0.036
10	0.039
20	-0.031
30	0.036
40	0.037
50	0.029

Voltage (V)	Test Results(ppm) / 20° C
	Channel 661
3.4	0.017
3.8	-0.031
4.2	0.029

**2.7. Spurious Emissions at Antenna Terminals**

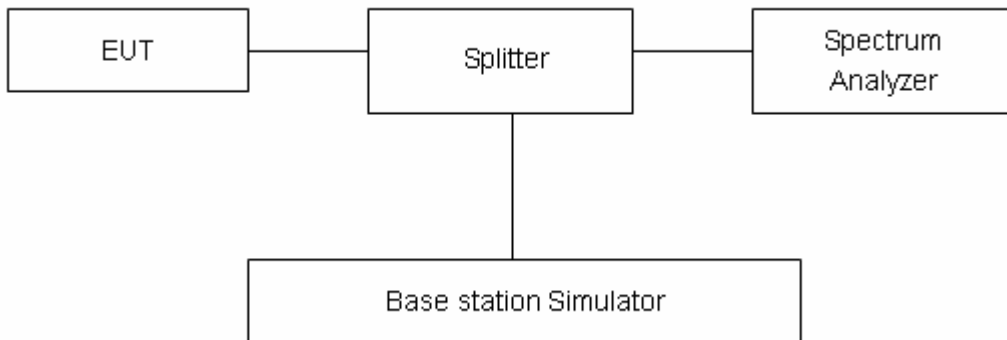
**Ambient condition**

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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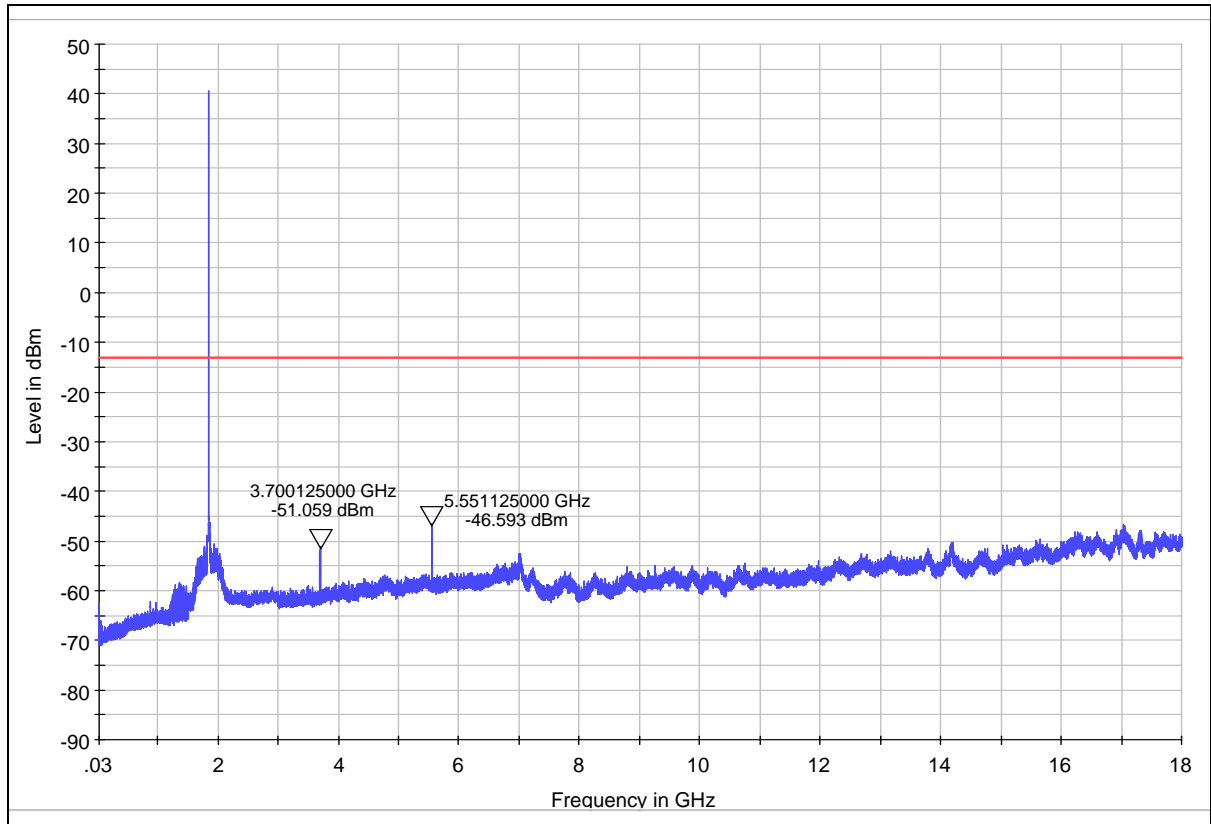
**Measurement Uncertainty**

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

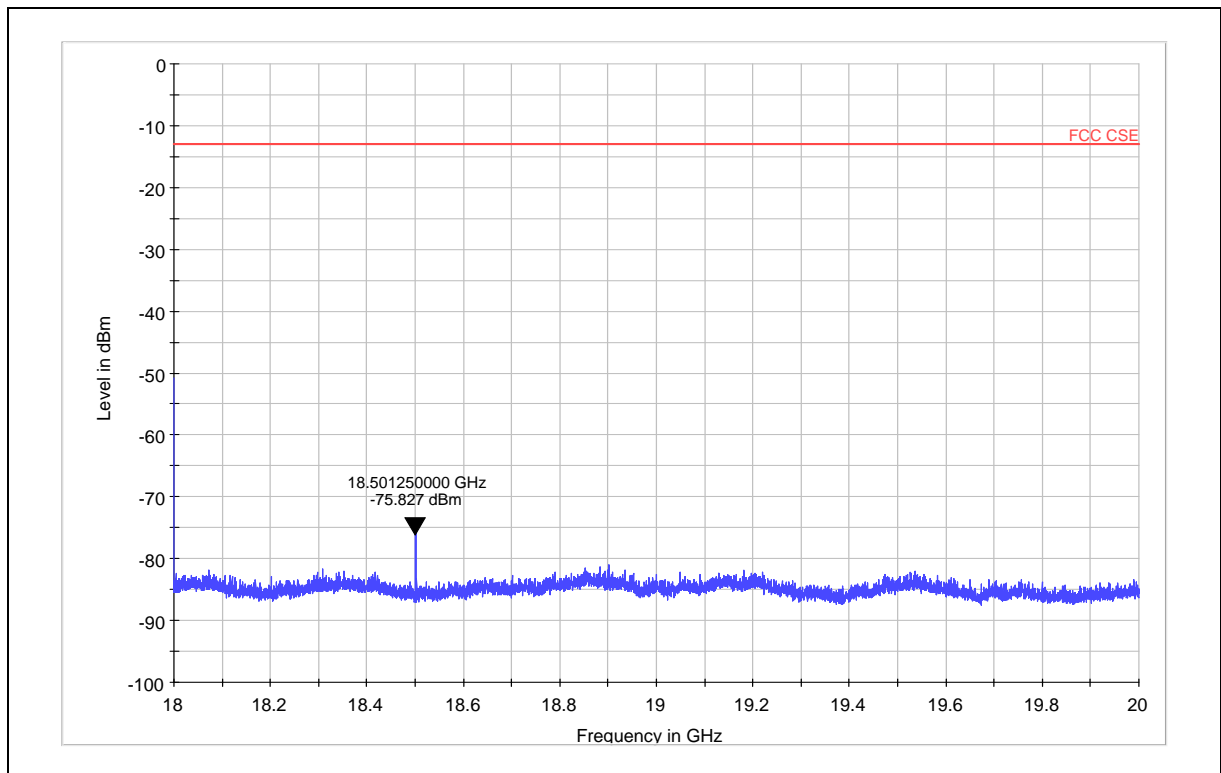
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-12.75GHz	1.407 dB



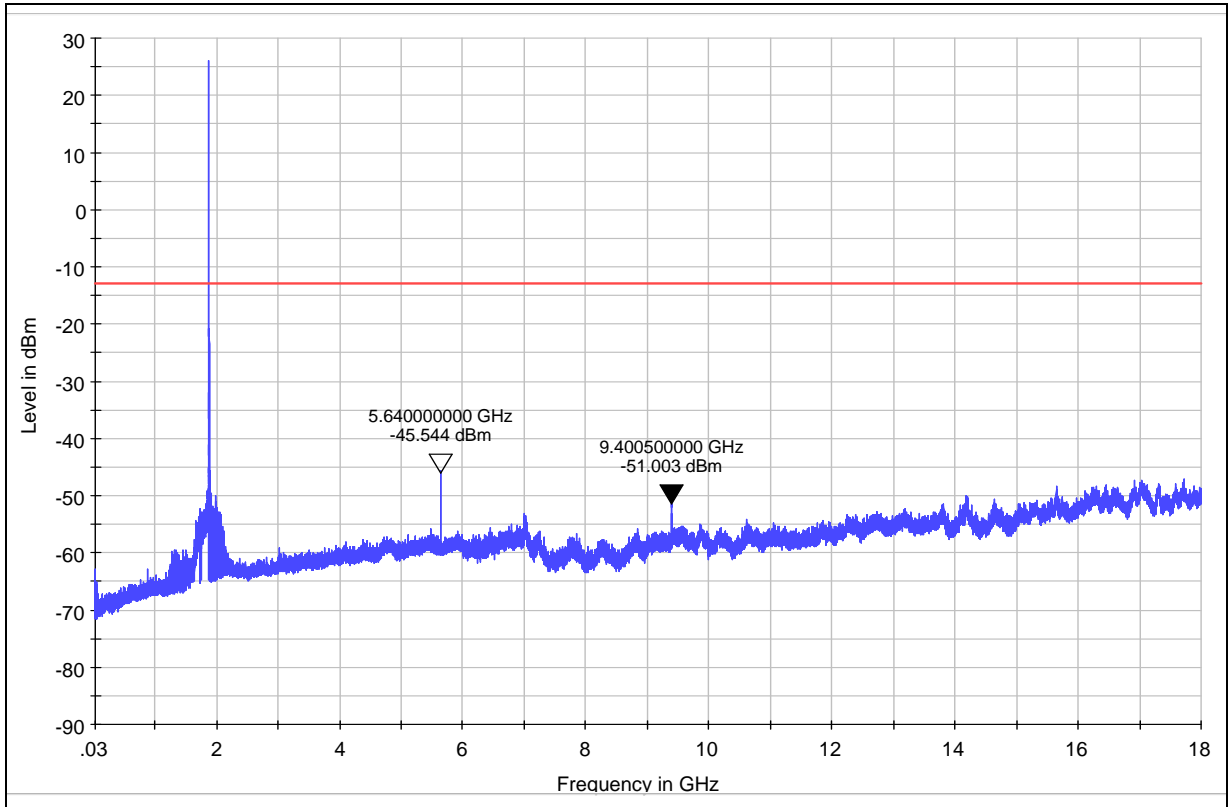
Test Result



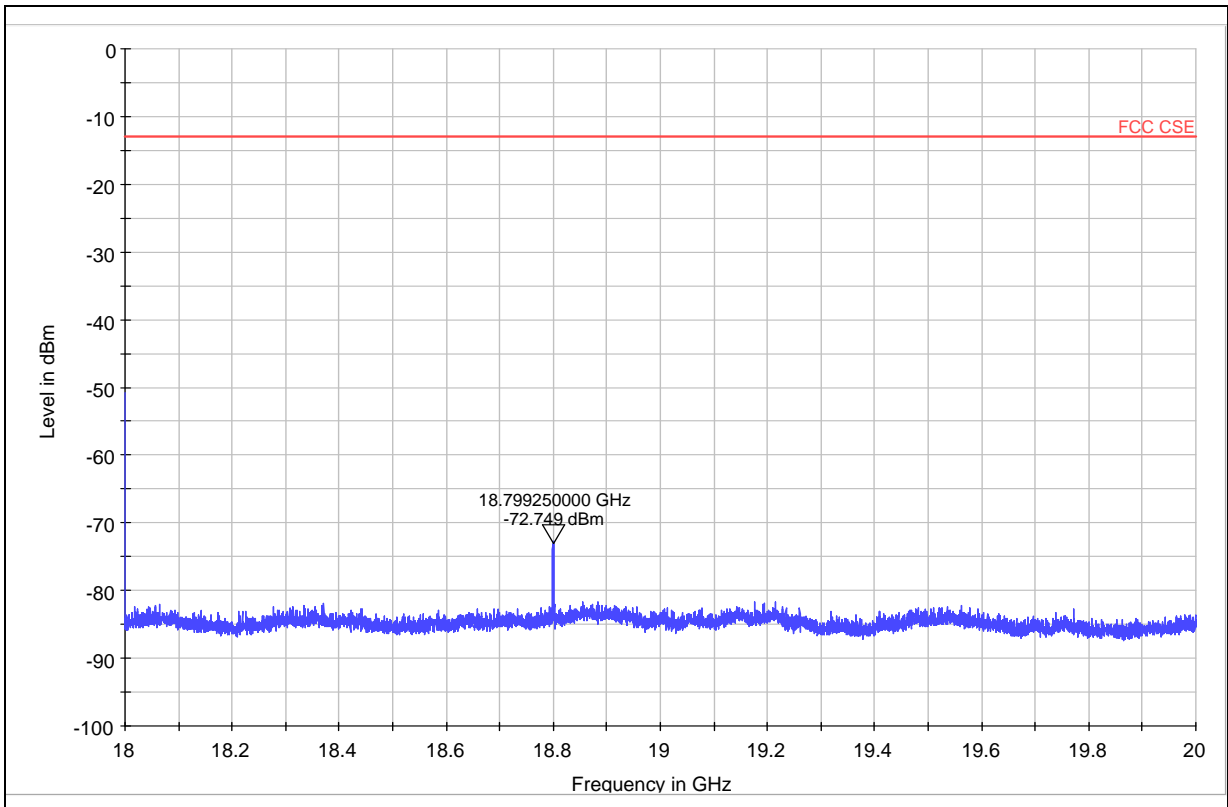
Note: The signal beyond the limit is carrier.  
GSM 1900 512 Channel 30MHz~18GHz



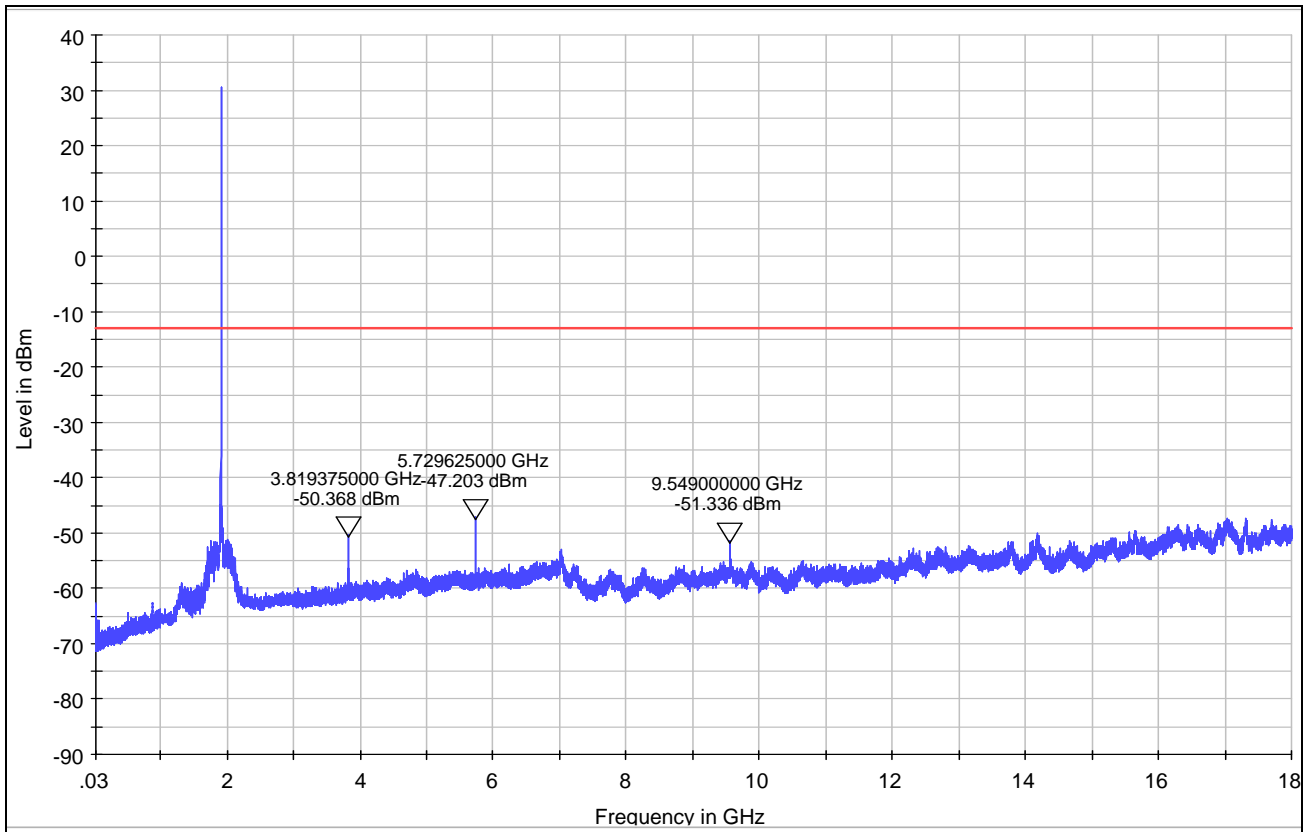
GSM 1900 512 Channel 18GHz~20GHz



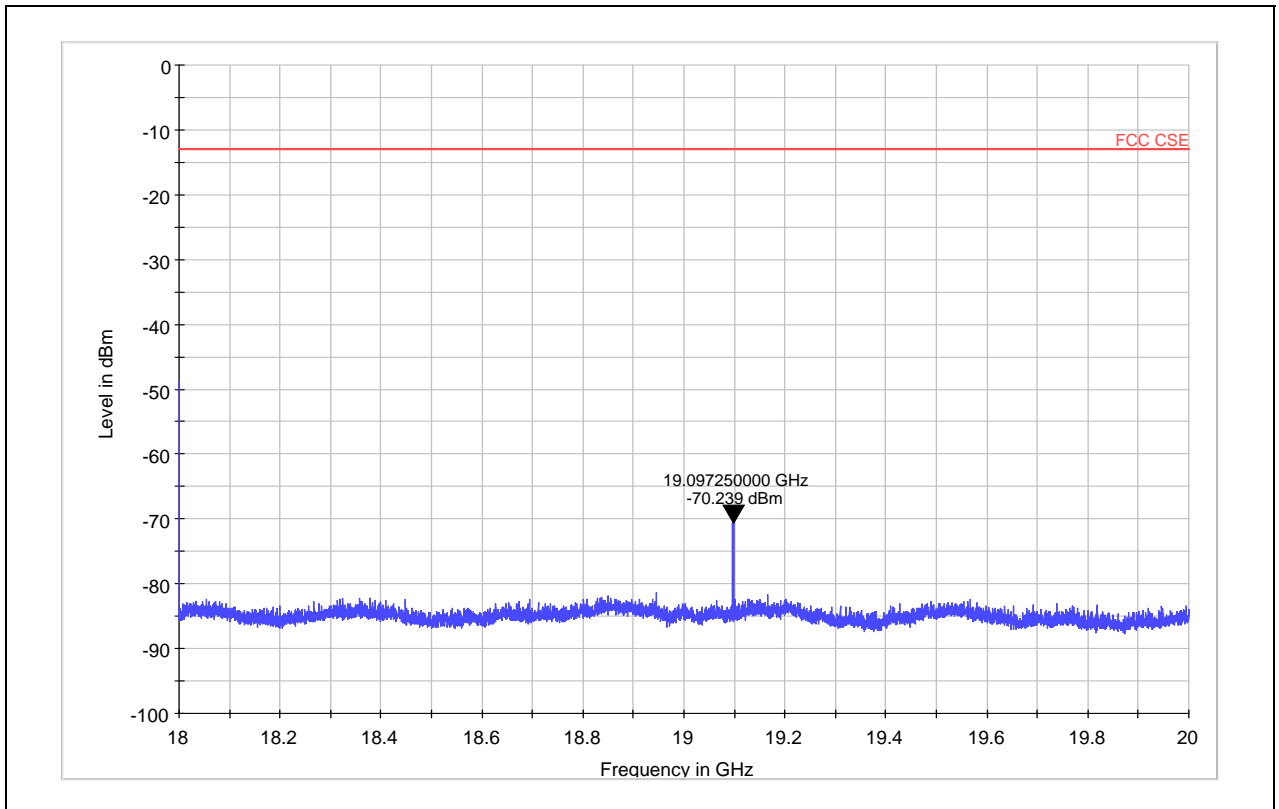
Note: The signal beyond the limit is carrier.  
GSM 1900 CH661 Channel 30MHz~18GHz



GSM 1900 CH661 Channel 18GHz~20GHz



Note: The signal beyond the limit is carrier.  
GSM 1900 810 Channel 30MHz~18GHz



GSM 1900 810 Channel 18GHz~20GHz

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Registration Num:428261

Report No.: RZA2010-0701\_24

Page 28 of 39

Harmonic	TX ch.512 Frequency (MHz)	Level (dBm)	TX ch.661 Frequency (MHz)	Level (dBm)	TX ch.810 Frequency (MHz)	Level (dBm)
2	3700.125	-51.059	3760.10	nf	3819.375	-50.368
3	5551.125	-46.593	5640	-45.544	5729.625	-47.203
4	7400.8	nf	7520	nf	7639.2	nf
5	9251.0	nf	9400.5	-51.003	9549.0	-51.336
6	11101.2	nf	11280	nf	11458.8	nf
7	12951.4	nf	13160	nf	13368.6	nf
8	14801.6	nf	15040	nf	15278.4	nf
9	1651.8	nf	16920	nf	17188.2	nf
10	18501.25	-75.827	18799.25	-72.749	19097.25	-70.239

nf: noise floor

## 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.

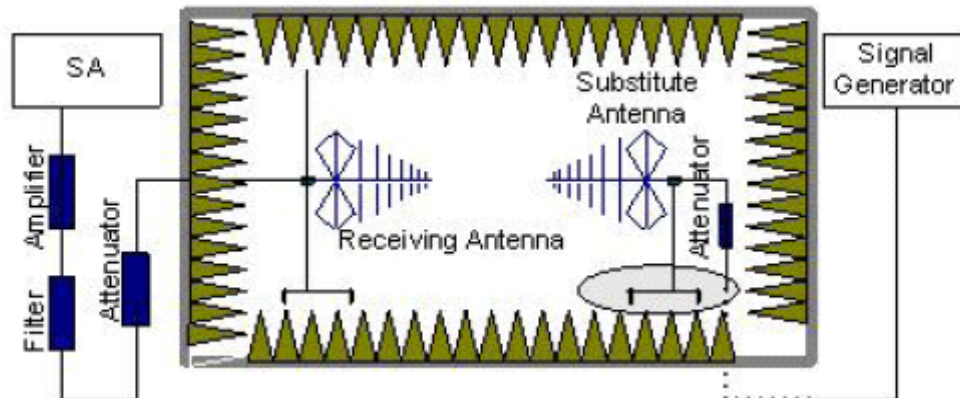
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The measurement will be conducted at channels 512,661,810 of GSM1900.

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.

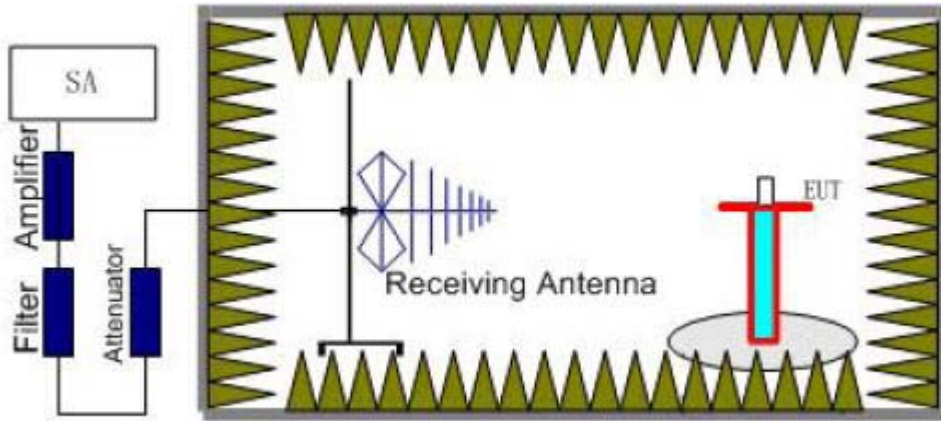
The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or

receiver.

Calculation procedure:

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

Rx: reading of the receiver



**Limits**

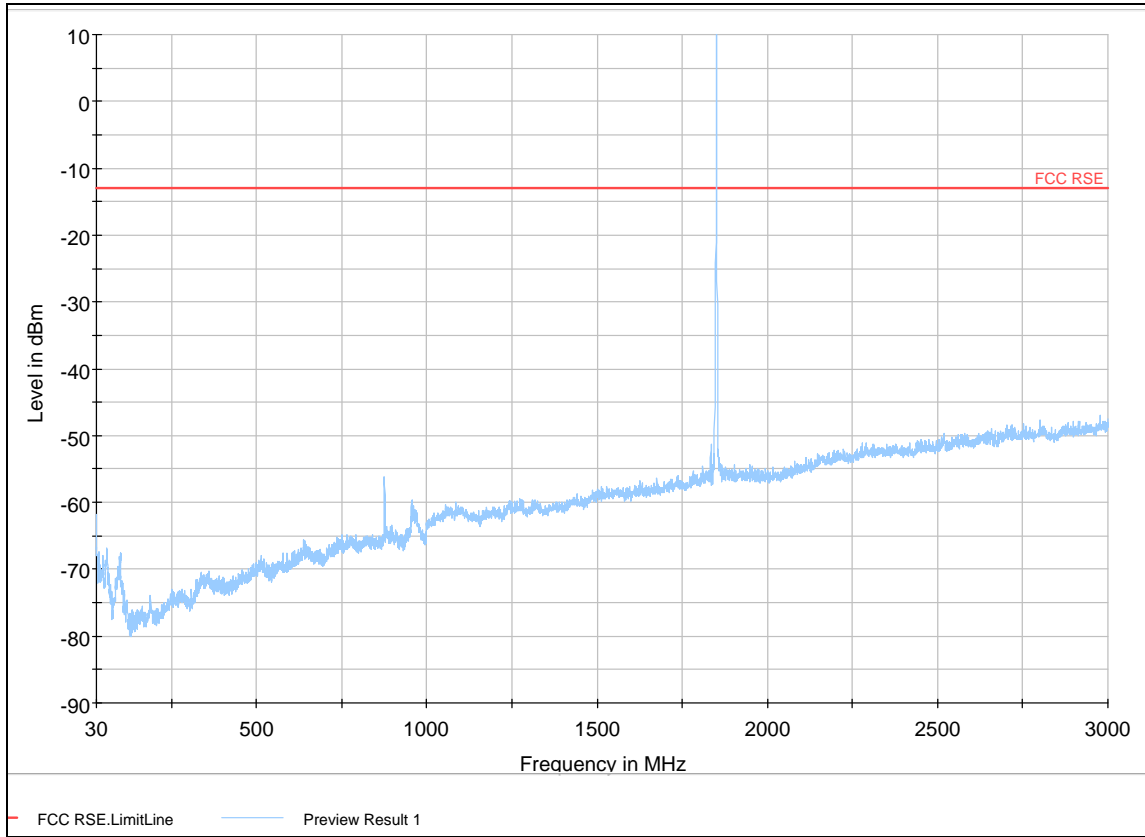
Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10} (P)$  dB.”

Limit	-13 dBm
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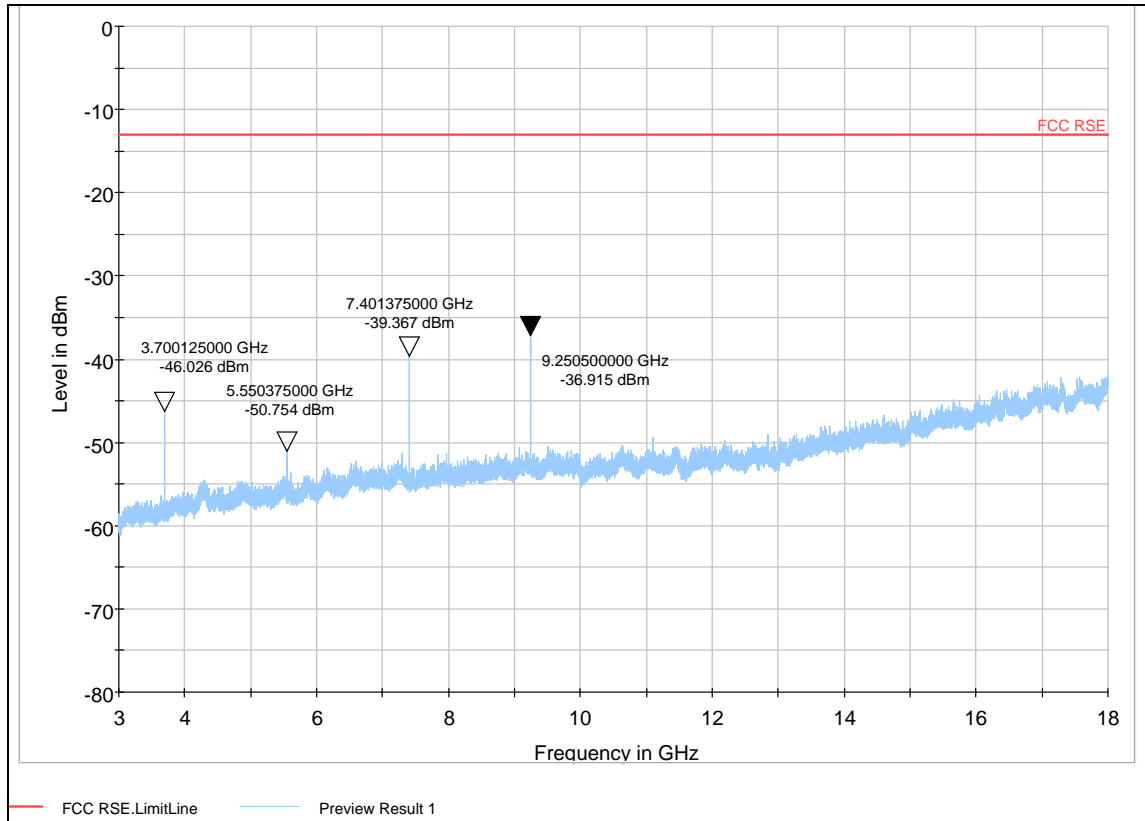
**Measurement Uncertainty**

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.

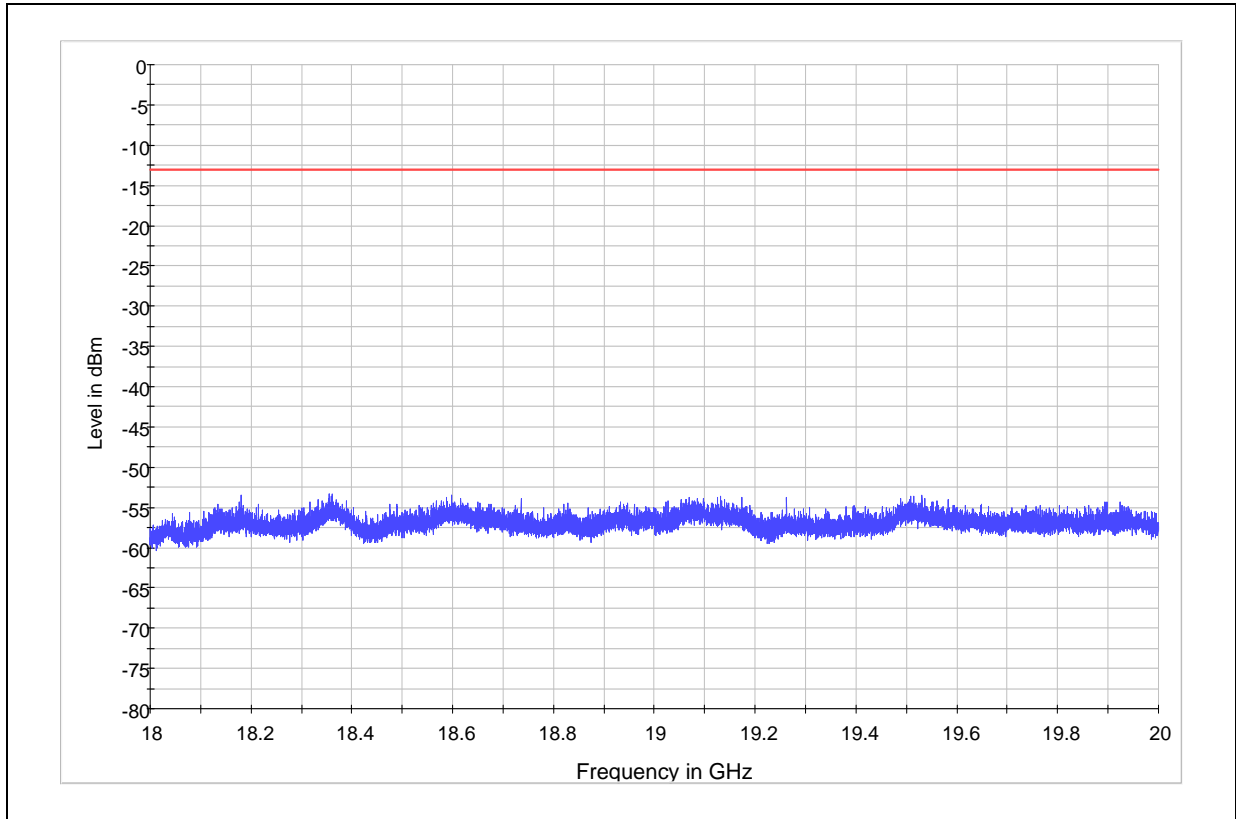
Test Result



Note: The signal beyond the limit is carrier.  
GSM 1900 CH512 Channel 30MHz~3GHz



GSM 1900 CH512 Channel 3GHz ~18GHz

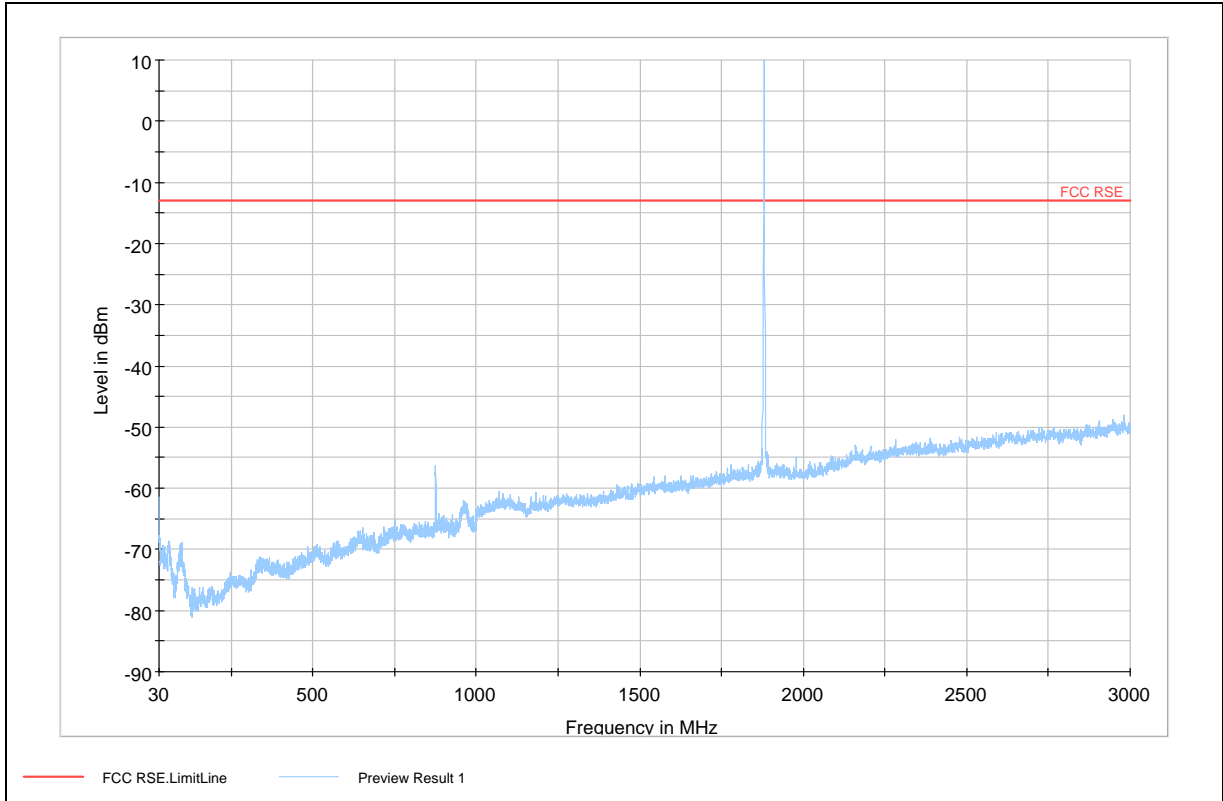


GSM 1900 CH512 Channel 18GHz ~20GHz

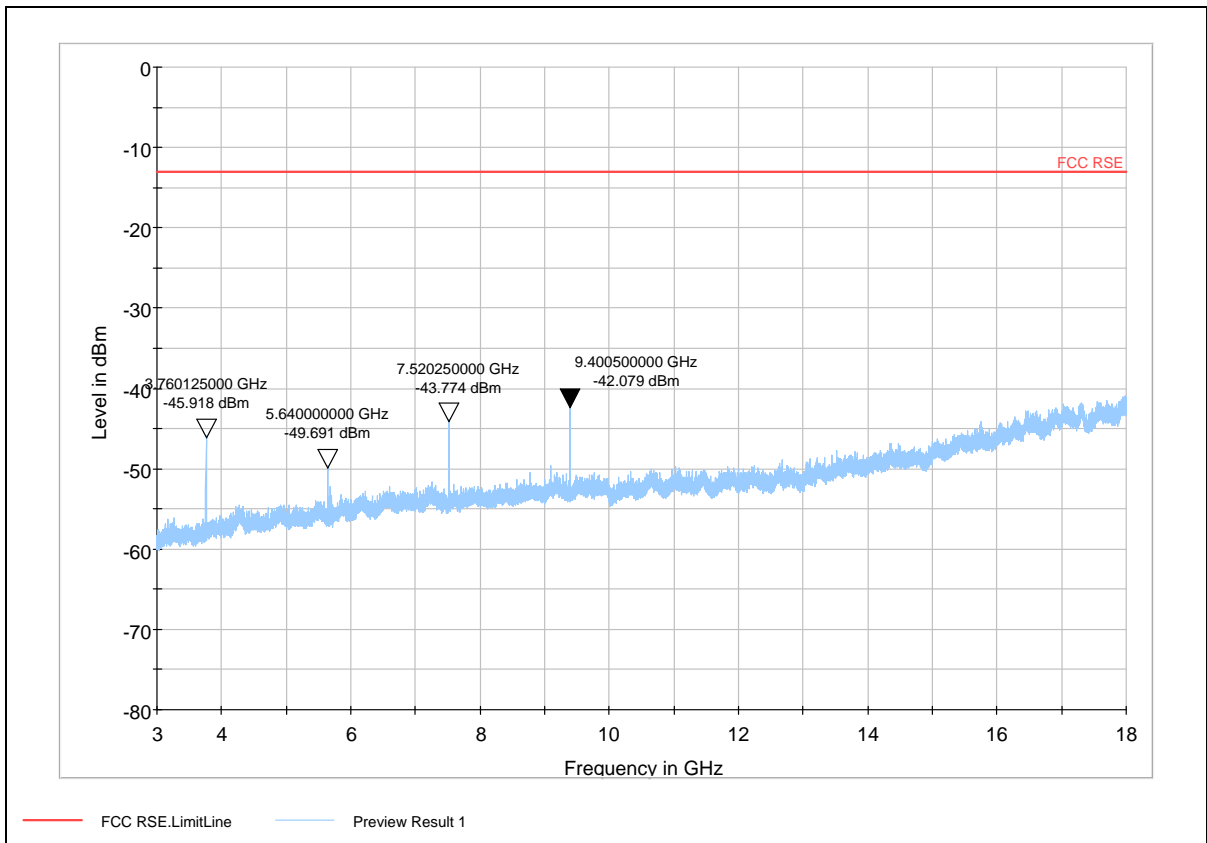
Harmonic	TX ch.512 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	3700.125	-46.026	-13
3	5550.375	-50.754	-13
4	7401.375	-39.367	-13
5	9250.5	-36.915	-13
6	11101.2	Nf	-13
7	12951.4	Nf	-13
8	14801.6	Nf	-13
9	16651.8	Nf	-13
10	18502	Nf	-13

Nf: noise floor

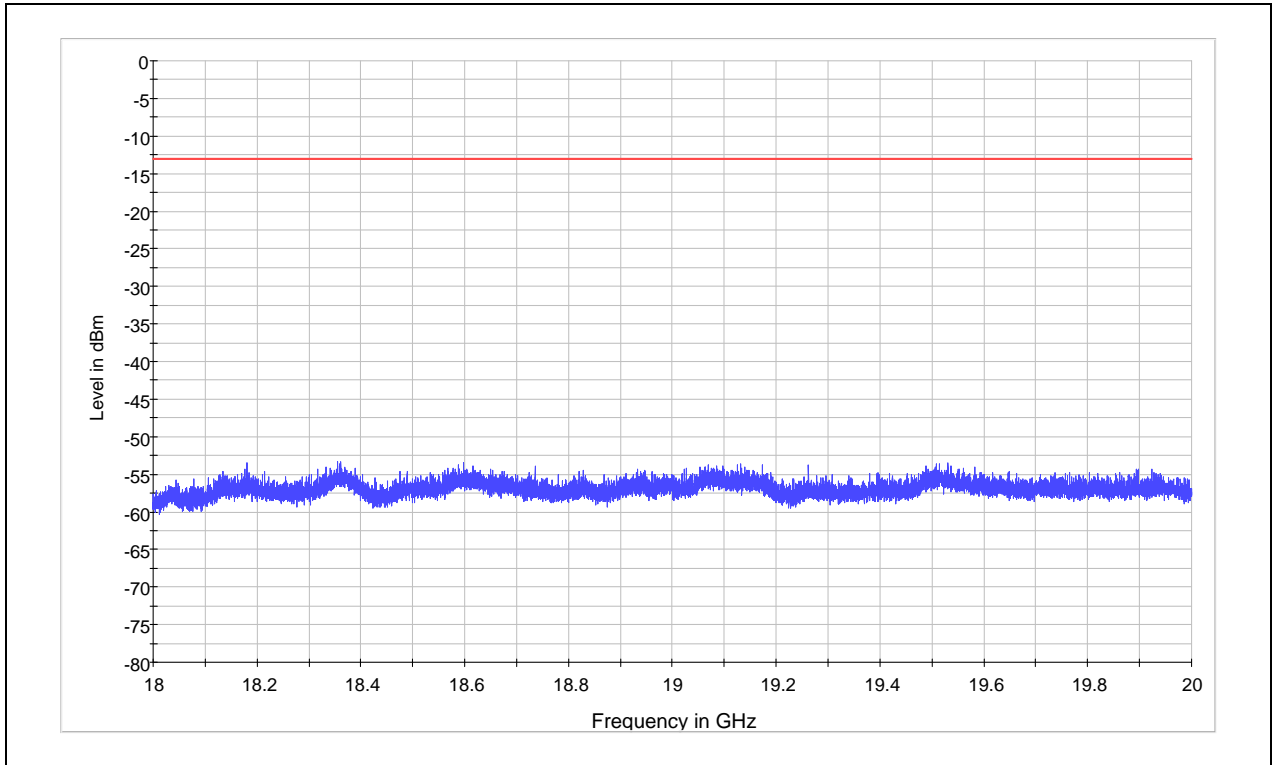




Note: The signal beyond the limit is carrier.  
GSM 1900 CH661 Channel 30MHz~3GHz

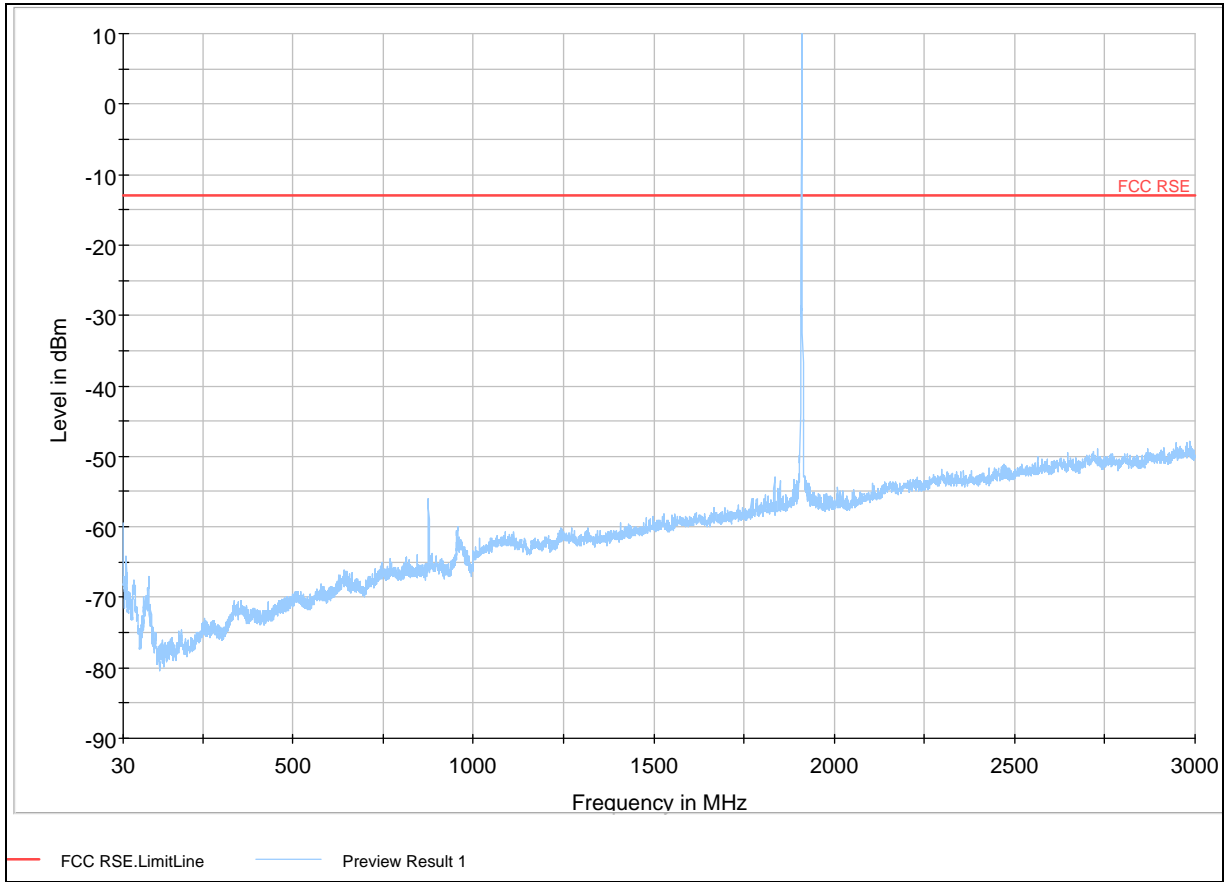


GSM 1900 CH661 Channel 3GHz ~18GHz

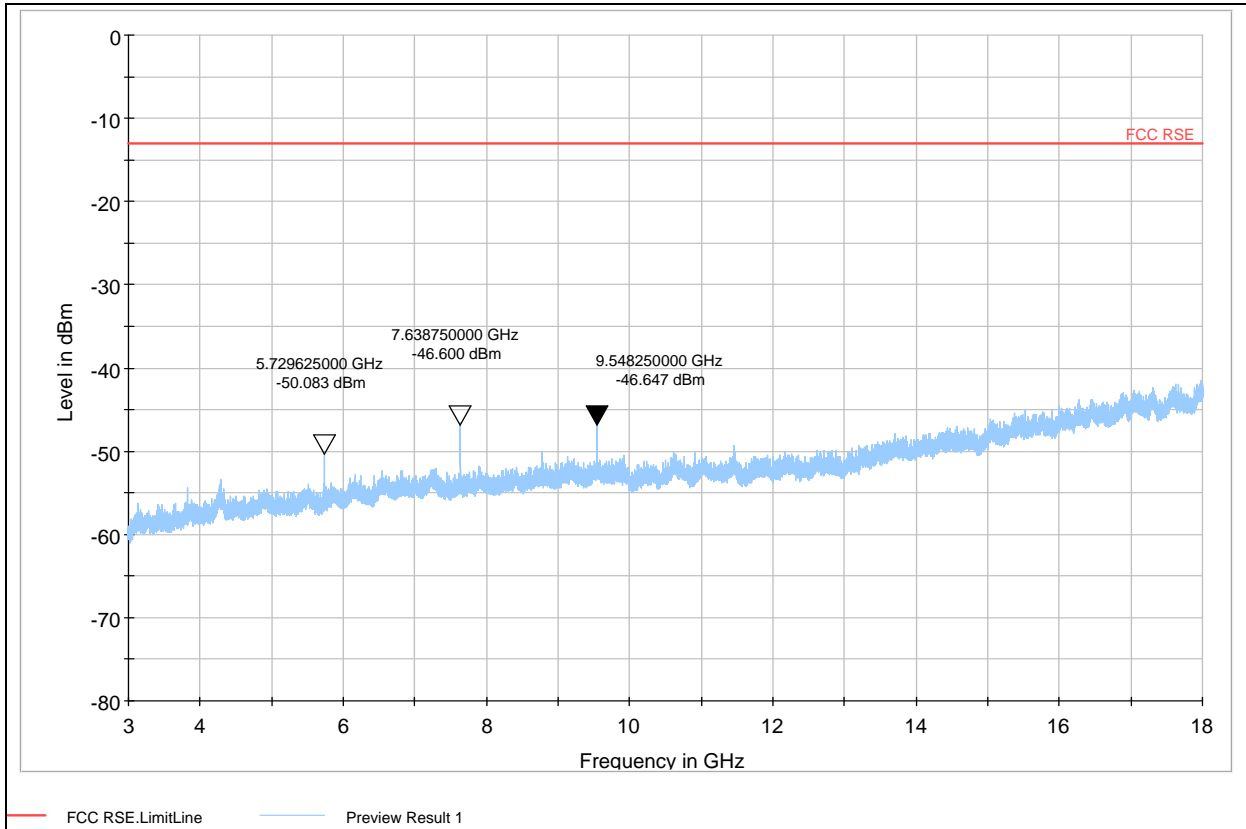


GSM 1900 CH661 Channel 18GHz ~20GHz

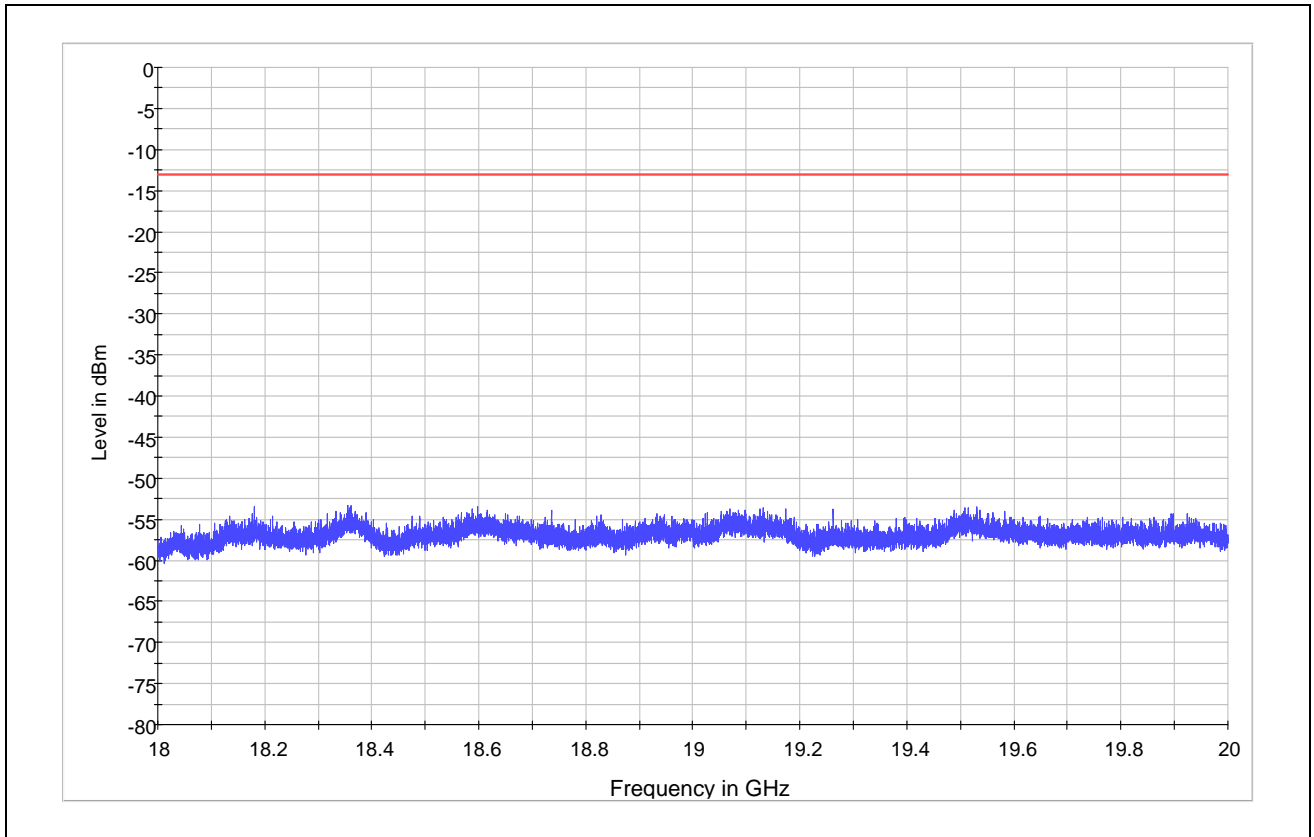
Harmonic	TX ch.661 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	3760.125	-45.918	-13
3	5640.00	-49.691	-13
4	7520.25	-43.774	-13
5	9400.5	-42.079	-13
6	11280	Nf	-13
7	13160	Nf	-13
8	15040	Nf	-13
9	16920	Nf	-13
10	18800	Nf	-13
Nf: noise floor			



Note: The signal beyond the limit is carrier.  
GSM 1900 CH810 Channel 30MHz~3GHz



GSM 1900 CH810 Channel 3GHz ~18GHz



GSM 1900 CH810 Channel 18GHz ~20GHz

Harmonic	TX ch.810 Frequency (MHz)	Level (dBm)	Limit (dBm)
2	3819.6	Nf	-13
3	5729.625	-50.083	-13
4	7638.75	-46.6	-13
5	9548.25	-46.647	-13
6	11458.8	Nf	-13
7	13368.6	Nf	-13
8	15278.4	Nf	-13
9	17188.2	Nf	-13
10	19098	Nf	-13

Nf: noise floor

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Registration Num:428261

Report No.: RZA2010-0701\_24

Page 37 of 39

### 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	MY48360957	2009-12-04	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	2009-07-02	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	2010-02-22	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

## A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup