

# TEST REPORT

REPORT NUMBER: B06GE5086-FCC-EMC

ON

**Type of Equipment:** DUAL-GSM, DUAL-WORKING SMART PHONE  
**Type of Designation:** CoolPAD™ 728G2  
**Manufacturer:** Yulong Computer Telecommunication Scientific  
(Shenzhen) Co., Ltd

ACCORDING TO

FCC CFR Part 2, FREQUENCY ALLOCATIONS AND RADIO  
TREATY MATTERS; GENERAL RULES AND REGULATIONS;  
e-CFR, March 23, 2006

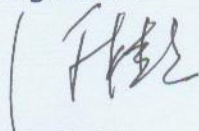
PART 24, PERSONAL COMMUNICATIONS SERVICES (Oct 1, 97  
Edition)

China Telecommunication Technology Labs.

Month date, year

07 - 17, 2006

Signature



He Guili  
Director

**FCC ID:** R38YL728G2

**Report Date:** 2006-7-17

**Test Firm Name:** China Telecommunication Technology Labs

**Registration Number:** 840587

#### Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2 and 24. The sample tested was found to comply with the requirements defined in the applied rules.

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## 1 General Information

### 1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2 and 24.

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

The following deviation from, additions to, or exclusions from the test specifications have been made. See Annex C.

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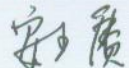
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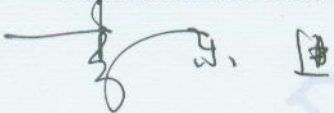


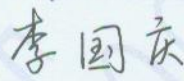
FCC Parts 2 and 24  
Equipment: CoolPAD™ 728G2

REPORT NO.: B06GE5086-FCC-EMC

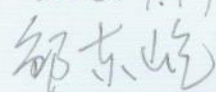
## 1.2 Testers

Name: An Shaogeng  
Position: Engineer  
Department: Department of EMC test  
Signature: 

Name: Li Dongjin  
Position: Engineer  
Department: Department of EMC test  
Signature: 

Name: Li Guoqing  
Position: Engineer  
Department: Department of EMC test  
Signature: 

Technical responsibility for area of testing:

Name: Zou Dongyi  
Position: Manager  
Department: Department of EMC test  
Date: 2006.7.17  
Signature: 

## 1.3 Testing Laboratory information

### 1.3.1 Location

Name: China Telecommunication Technology Labs.  
Address: No. 11, Yue Tan Nan Jie, Xi Cheng District  
BEIJING  
P. R. CHINA, 100083  
Tel: +86 10 68094053  
Fax: +86 10 68094055  
Email: [emc@chinattl.com](mailto:emc@chinattl.com)

### 1.3.2 Details of accreditation status

Accredited by: China National Accreditation for Laboratory (CNAL)  
Registration number: CNAL Registration No.L0570  
Standard: ISO/IEC 17025

### 1.3.3 Test location, where different from section 1.3.1

Name: -----  
Street: -----  
City: -----  
Country: -----  
Telephone: -----  
Fax: -----  
Postcode: -----

## 1.4 Details of applicant or manufacturer

### 1.4.1 Applicant

Name: Yulong Computer Telecommunication Scientific  
(Shenzhen) Co., Ltd

Address: 8/F B. High Tech Plaza, TianAn Cyberpark,  
Chengongmiao, Shenzhen

Country: P. R. China

Telephone: 86-755-83301199

Fax: 86-755-83439004

Contact: Wang Dexin

Telephone: 86-13316991861

Email: [wangdexin@yulong.com](mailto:wangdexin@yulong.com)

### 1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name: --

Address: --

City: --

Country: --

## 2 Test Item

### 2.1 General Information

Manufacturer: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

Name: DUAL-GSM, DUAL-WORKING SMART PHONE

Model Number: CoolPAD™ 728G2

Serial Number: 352021005599766

Production Status: Production

Receipt date of test item: 2006-06-28

### 2.2 Outline of EUT

EUT is a DUAL-GSM, DUAL-WORKING SMART PHONE. It supports GSM and GPRS mode, with the frequency range of 1 850 MHz to 1 910 MHz for GSM/GPRS band 1900. Its modulation type is GMSK.

### 2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

### 2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	Mobile phone	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd	CoolPAD™ 728G2	352021005599766	None
B	Adaptor	XIXING - Switching Power Supply, Transformer and Electromagnetic Counter	XKD-C2000NH S5.0-12	--	None
C	Battery	TCL Hyper-power Batteries INC.	CPLD-10 (Li-Ion)	728G2T06 2100051	None



## Cables:

Item	Cable Type	Manufacturer	Length	Shield	Quantity	Remarks
1	DC cable on Adapter	Unknown	1.80m	No	1	None

## 2.5 Other Information

## (a) Multi-slot Class of GPRS

The multi-slot class of the GPRS mode is class 10 with 5 active timeslots.

## (b) Emission Designator

The emission designator is 250KGXW.

## (c) About Power Source

Items	Relative Information
Adaptor	Input: 100-240V AC, 50/60Hz, 0.5A Max Output: 5V DC, 0.2A
Battery	DC 3.7V 1100mAh

(4) The EUT is a dual-working business collaboration smart phone, configured with two identical dual-GSM modules, i.e., GSM 1 module with the antenna located in the bottom end of the mobile phone and GSM 2 module with the antenna located in the top end. When one of the two modules is in the communication state, the other module can be in the state of idle or calling. Considering the two modules are identical, all tests reported were carried on the GSM 2 module.

### 3 Summary of Test Results

A brief summary of the tests carried out is shown as following.

Specification Clause	Name of Test	Result
GSM mode:		
2.1051, 24.238	Radiated Spurious Emission (GSM mode)	Pass
2.1046,24.232	Radiated RF Power Output (GSM mode)	Pass
2.1049, 24.238(b)	Occupied Bandwidth (GSM mode)	*Note 1
2.1055, 24.235	Frequency Stability over Temperature Variation (GSM mode)	Pass
2.1055, 24.235	Frequency Stability over Voltage Variation (GSM mode)	Pass
GPRS mode:		
2.1051, 24.238	Radiated Spurious Emission (GPRS mode)	Pass
2.1046,24.232	Radiated RF Power Output (GPRS mode)	Pass
2.1049, 24.238(b)	Occupied Bandwidth (GPRS mode)	*Note 1
2.1055, 24.235	Frequency Stability over Temperature Variation (GPRS mode)	Pass
2.1055, 24.235	Frequency Stability over Voltage Variation (GPRS mode)	Pass
Note 1: No applicable performance criteria. Note 2: The Power Output Conducted is not tested since the antenna of the EUT is internal integrated and is not removable or can't readily access to the connection point.		

## 4 Test Results

### 4.1 Radiated Spurious Emission

Specifications:	2.1051, 24.238						
Date of Tests	2006.07.06 for GSM and 2006.07.13 for GPRS						
Test conditions:	Ambient Temperature: 15℃-35℃ Relative Humidity: 30%-60% Air pressure: 86-106kPa						
Operation Mode	TX on, channel 661						
Test Results:	Pass						
Test equipment Used:							
Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal Date	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2006-01-05	2007-01-04	Normal
7330	Ultra Broadband Antenna	R/S	HL562	100013	2006-07-25	2007-07-24	Normal
7330	Double-Ridged Horn Antenna	R/S	HF906	100037	2006-01-15	2007-01-14	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m ×6.3m	--	2004-11-18	2007-11-17	Normal
7330	Universal Radio Communications Tester	R&S	CMU200	100233	2006-02-24	2007-02-23	Normal

#### Limit Level Construction:

According to Part 24.238 (a), i.e., Out of band emissions. 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  $43 + 10 \log(P)$  dB, so the limit level is:  
 $P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$

#### Limits for Radiated spurious emissions(UE)

Frequency range	Limit Level /Resolution Bandwidth
30 MHz to 20000 MHz	-13dBm/1MHz

#### Test Setup:

The EUT was placed in an anechoic chamber, see figure SP. The CMU 200 was used to set the TX channel and power level and modulate the TX signal with different bit patterns. The test was done using an automated test system, where all test equipments were controlled by a computer.

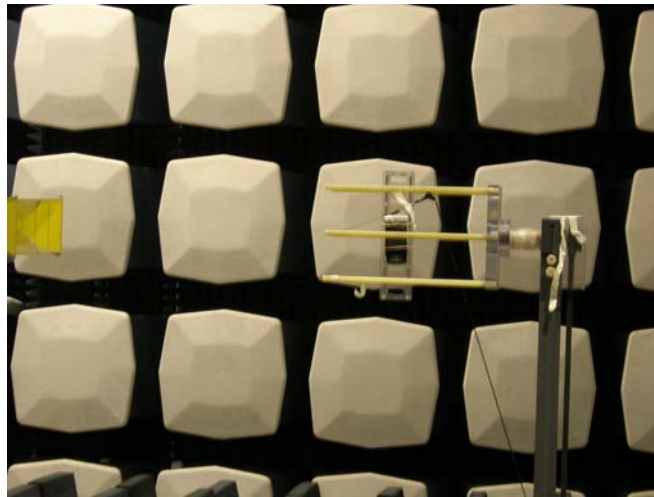


Figure SP

### Test Method:

1 The maximum spurious emissions were searched by turning the azimuth of the turntable, shifting the polarization of the measuring antenna and changing the pose of the EUT.

2 Levels of EUT's transmitter harmonics and suspicious signals were recorded.

3 The recorded levels were corrected in the automated test system with the correction factors given by a substitution calibration made before the measurement. The calibration was made separately for vertical and horizontal polarization and the system uses different correction factors depending on the measuring antenna polarization.

4 The corrected values of radiated spurious emissions indicated as EIRP are reported.

### Note:

1 A fully charged battery was used during the test.

2 The investigated ARFCN are 661 (1880.0 MHz), which are the middle channel of PCS 1900 MHz band.

3 The investigated frequency range is 30 MHz ~ 20 GHz, including out of band emission and band-edge emission measurements.

**Test Results for GSM mode:**

Out of band emission			
Frequency [MHz]	SPU emission [dBm]	EUT pose [H/V]	Antenna Polarization [H/V]
3.74248497	-54.60	V	V
4.999599198	-51.82	V	V
5.643486974	-49.71	V	V
11.407815631	-37.69	V	V
13.799398798	-34.72	V	V
3.742484970	-42.42	H	V
5.643486974	-48.99	H	V
7.513827655	-42.87	H	V
11.407815631	-39.05	H	V
1.91000000	-37.34	V	H
3.74248497	-36.83	V	H
5.643486974	-34.19	V	H
3.74248497	-42.15	H	H
4.999599198	-52.29	H	H
5.643486974	-33.06	H	H
7.513827655	-45.44	H	H
Band-edge emission			
EUT Channel	Level [dBm]		
661	-15.39		

**Test Results for GPRS mode:**

Out of band emission			
Frequency [MHz]	SPU emission [dBm]	EUT pose [H/V]	Antenna Polarization [H/V]
11.407815631	-38.11	V	V
13.799398798	-34.66	V	V
3.74248497	-47.66	H	V
11.407815631	-39.35	H	V
4.999599198	-50.71	H	H
11.407815631	-39.21	H	H
4.999599198	-52.65	H	H
Band-edge emission			
EUT Channel	Level [dBm]		
661	-14.36		



## 4.2 Radiated RF Power Output

Specifications:	2.1046,24.232						
Date of Tests	2006.07.06 for GSM and 2006.07.13 for GPRS						
Test conditions:	Ambient Temperature: 15℃-35℃ Relative Humidity: 30%-60% Air pressure: 86-106kPa						
Operation Mode	TX on, channel 512, 661 and 810						
Test Results:	Pass						
Test equipment Used:							
Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal Date	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2006-01-05	2007-01-04	Normal
7330	Ultra Broadband Antenna	R/S	HL562	100013	2006-07-25	2007-07-24	Normal
7330	Double-Ridged Horn Antenna	R/S	HF906	100037	2006-01-15	2007-01-14	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2004-11-18	2007-11-17	Normal
7330	Universal Radio Communications Tester	R&S	CMU200	100233	2006-02-24	2007-02-23	Normal

### Limit Level Construction:

Radiated RF Power Output:

According to Part 24.232(b), i.e., Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications, so the limit level is 2 W or 33 dBm.

### Limits for Radiated RF Power Output

Frequency range	Limit Level (EIRP)/Resolution Bandwidth
TX channel	33dBm/1MHz

### Test Setup:

The EUT was set in an anechoic chamber, see Figure P. In the corner of the chamber there is a communication antenna, which is connected to the CMU 200 located outside the chamber. The test was done using an automated test system, where all test equipments are controlled by a computer.

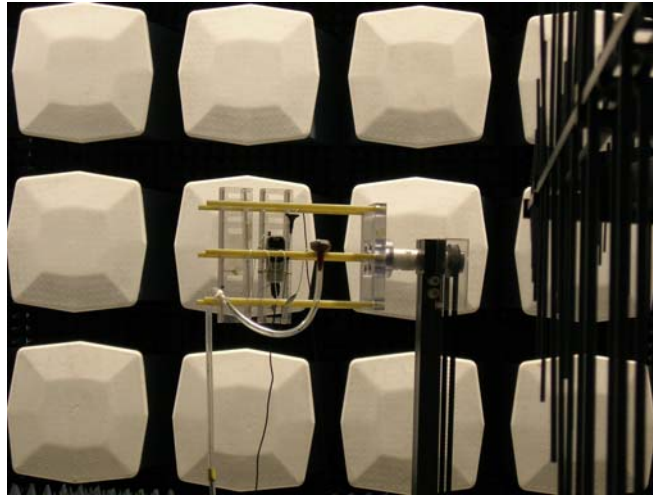


Figure P

**Test Method**

1 The maximum power was searched by turning the azimuth of the turntable, shifting the polarization of the measuring antenna and changing the pose of the EUT.

2 The measured levels are EIRP values corrected in the automated test system with the correction factors given by a substitution calibration made before the measurement. The calibration is made separately for vertical and horizontal polarization and the system uses different correction factors depending on the measuring antenna polarization.

**Note:**

1 A fully charged battery was used during the test.

2 For PCS 1900 MHz band, the ARFCN 512 (1850.2 MHz), 661 (1880.0 MHz) and 810 (1909.8 MHz) are investigated, which are the lowest, middle and highest channel.

**EIRP Value for PCS 1900 band mode:**

ARFCN	Frequency [MHz]	EIRP [dBm]
512	1850.10	29.00
661	1879.92	27.82
810	1909.74	28.67

**EIRP Value for GPRS 1900 band mode:**

ARFCN	Frequency [MHz]	EIRP [dBm]
512	1850.10	30.85
661	1879.92	29.30
810	1909.74	27.71

### 4.3 Occupied bandwidth

Specifications:	2.1049,22.917(b),24.238(b)						
Date of Test	2006.07.07 for GSM and 2006.07.14 for GPRS						
Test conditions:	Ambient Temperature: 15℃-35℃ Relative Humidity: 30%-60% Air pressure: 86-106kPa						
Operation Mode	TX on, channel 512, 661 and 810						
Test Results:	Pass						
Test equipment Used:							
Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal Date	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2006-01-05	2007-01-04	Normal
7330	Ultra Broadband Antenna	R/S	HL562	100013	2006-07-25	2007-07-24	Normal
7330	Double-Ridged Horn Antenna	R/S	HF906	100037	2006-01-15	2007-01-14	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2004-11-18	2007-11-17	Normal
7330	Universal Radio Communications Tester	R&S	CMU200	100233	2006-02-24	2007-02-23	Normal

#### Test Setup

The situation under which maximum EIRP values were found in the measurement of the radiated RF power output was used to determine the 99% occupied bandwidth. The CMU 200 was used to set the TX channel, power level and modulation.

#### Test Method

The 99% occupied bandwidth is calculated from the spectrum analyzer. Markers in the spectrum analyzer are then placed between the calculated frequencies to show the calculated 99% power band, see screenshots.

#### Note:

- 1 A fully charged battery was used during the test.
- 2 The ARFCN 512, 661 and 810 for PCS 1900 MHz band were investigated.

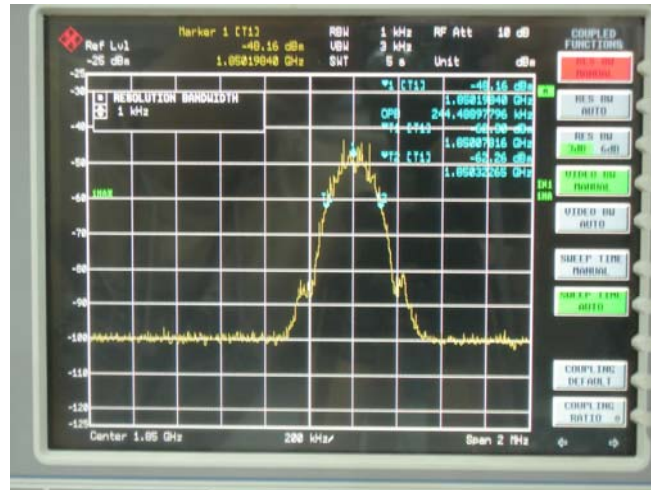
#### 4.3.1 Results for GSM mode:

EUT channel	99% occupied bandwidth [kHz]
512	244.489
661	248.497
810	240.481

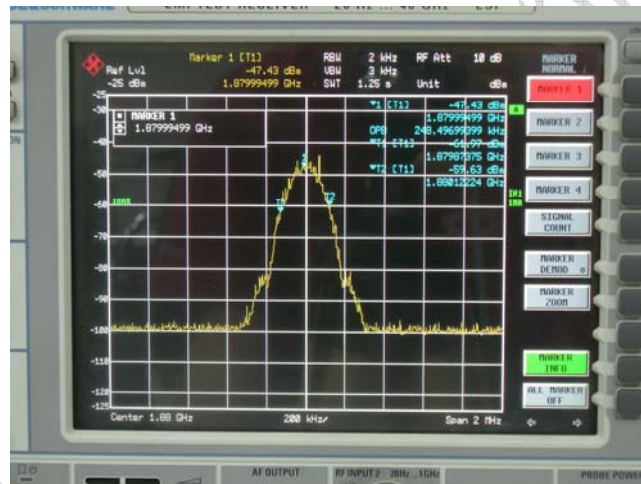
FCC Parts 2 and 24  
Equipment: CoolPAD™ 728G2

REPORT NO.: B06GE5086-FCC-EMC

Screenshots:



Screenshot 1 Channel 512



Screenshot 2 Channel 661



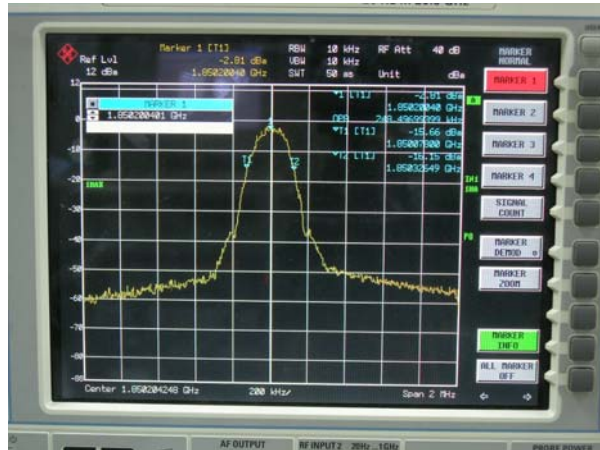
Screenshot 3 Channel 810



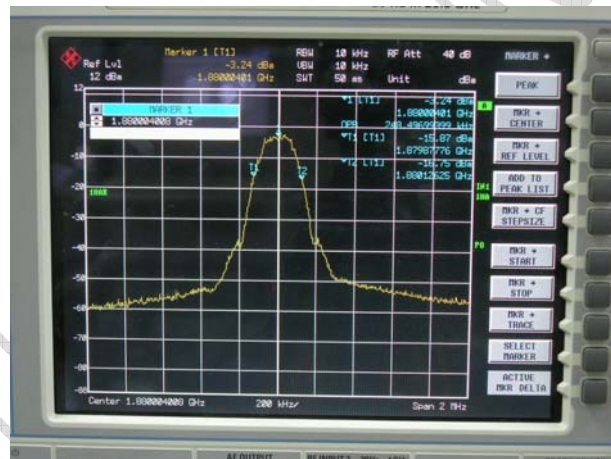
#### 4.3.2 Results for GPRS mode:

EUT channel	99% occupied bandwidth [kHz]
512	248.497
661	248.497
810	248.489

Screenshots:



Screenshot 4 Channel 512



Screenshot 5 Channel 661



Screenshot 6 Channel 810



#### 4.4 Frequency Stability over Temperature Variation

Specifications:	2.1055,22.355,24.235						
Date of Test	2006.07.07 for GSM and 2006.07.14 for GPRS						
Test conditions:	Ambient Temperature: -30℃-50℃ Relative Humidity: 30%-60% Air pressure: 86-106kPa						
Operation Mode	TX on, channel 661						
Test Results:	Pass						
Test equipment Used:							
Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal Date	Cal Due	State
7330	Universal Radio Communication s Tester	R&S	CMU200	100233	2006-02-24	2007-02-23	Normal
561	Temperature Chamber	Terchy Environmental Technology LTD.	MHU-800S R	84121202	2005-05-06	2007-05-05	Normal
7353-2	DC power	Agilent.	66319B	MY43000149	2006-03-04	2007-03-03	Normal
Limit							
Frequency deviation [ppm]		±2.5					

#### Test Setup

The EUT was placed in a temperature chamber, demonstrated as figure T. The CMU 200 was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX. A dummy battery powered by a DC power supply is used to provide a constant power source.

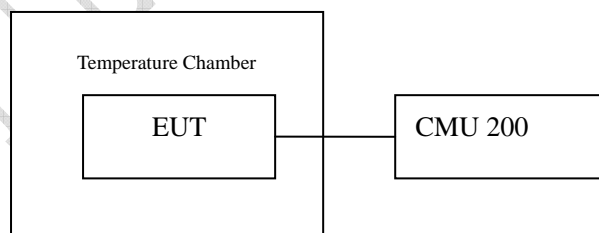


Figure T: setup for measurement of frequency stability over temperature variation

#### Test Method

1. The EUT was turned off and placed in the temperature chamber.
2. The temperature of the chamber was set to -30℃ and allowed to stabilize.
3. The EUT temperature was allowed to stabilize for 45 minutes.
4. The EUT was turned on and set to transmit with CMU 200.
5. The maximum transmit frequency deviation during one minute period was

measured by CMU 200.

6. The steps 3-5 were repeated for -20°C, -10°C, 0°C, 10°C, 20°C, 30°C, 40°C and 50°C.

#### 4.4.1 Test results for GSM mode

The frequency deviation from the centre frequency over temperature variation is showed as table T1 for channel 661.

Table T1: frequency deviation from the centre frequency over temperature variation for channel 661

Temperature[°C]	Deviation[Hz]	Deviation[ppm]	Remarks
-30	72	0.04	Pass
-20	73	0.04	Pass
-10	77	0.04	Pass
0	76	0.04	Pass
10	79	0.04	Pass
20	85	0.05	Pass
30	78	0.04	Pass
40	74	0.04	Pass
50	90	0.05	Pass

#### 4.4.2 Test results for GPRS mode

The frequency deviation from the centre frequency over temperature variation is showed as table T2 for channel 661.

Table T2: frequency deviation from the centre frequency over temperature variation for channel 661

Temperature[°C]	Deviation[Hz]	Deviation[ppm]	Remarks
-30	52	0.03	Pass
-20	53	0.03	Pass
-10	57	0.03	Pass
0	69	0.04	Pass
10	71	0.04	Pass
20	64	0.03	Pass
30	67	0.04	Pass
40	65	0.03	Pass
50	72	0.04	Pass

#### 4.5 Frequency Stability over Voltage Variation

Specifications:	2.1055,22.355,24.235						
Date of Test	2006.07.07 for GSM 2006.07.14 for GPRS						
Test conditions:	Ambient Temperature: 15℃-35℃ Relative Humidity: 30%-60% Air pressure: 86-106kPa						
Operation Mode	TX on, channel 661						
Test Results:	Pass						
Test equipment Used:							
Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal Date	Cal Due	State
7330	Universal Radio Communication s Tester	R&S	CMU200	100233	2006-02-24	2007-02-23	Normal
7353-2	DC power	Agilent.	66319B	MY43000149	2006-03-04	2007-03-03	Normal
Limit							
Frequency deviation [ppm]	±2.5						

#### Test Setup

The EUT was placed in a shielding chamber and powered by an adjustable DC power supply, demonstrated as figure V. The CMU 200 was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX.

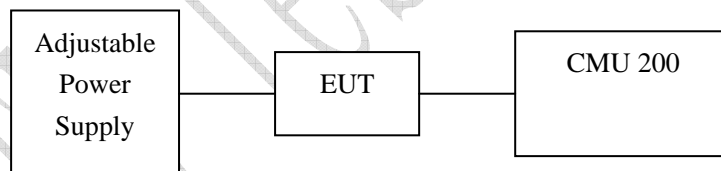


Figure V: test setup for measurement of frequency stability over voltage variation

#### Test Method

The EUT battery was replaced with an adjustable DC power supply. The frequency stability measured at nominal voltage and at the cut-off point.

#### Test Results for GSM mode:

The frequency deviation from the centre frequency over voltage variation is showed as table V1 for channel 661.

Table V1: frequency deviation from the centre frequency over temperature variation for channel 661

Level	Voltage[V]	Deviation[Hz]	Deviation[ppm]	Remarks
Nominal	3.7	84	0.04	Pass
Cut-off point	3.4	90	0.05	Pass

**Test Results for GPRS mode:**

The frequency deviation from the centre frequency over voltage variation is showed as table V2 for channel 661.

Table V2: frequency deviation from the centre frequency over temperature variation for 661

Level	Voltage[V]	Deviation[Hz]	Deviation[ppm]	Remarks
Nominal	3.7	64	0.03	Pass
Cut-off point	3.4	87	0.05	Pass

## Annex A External Photos



Picture 1 Front view of the handset



Picture 2 Back view of the handset



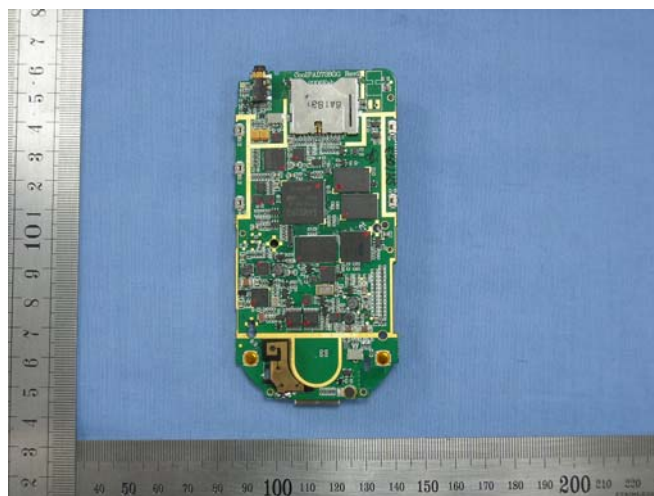


Picture 3 Side view of the adaptor



Picture 4 Front view of the adaptor

## Annex B Internal Photos



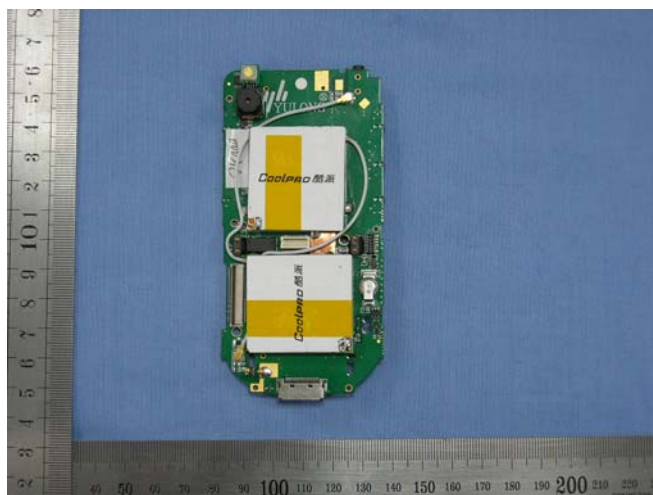
Picture 5 Front view of the internal structure



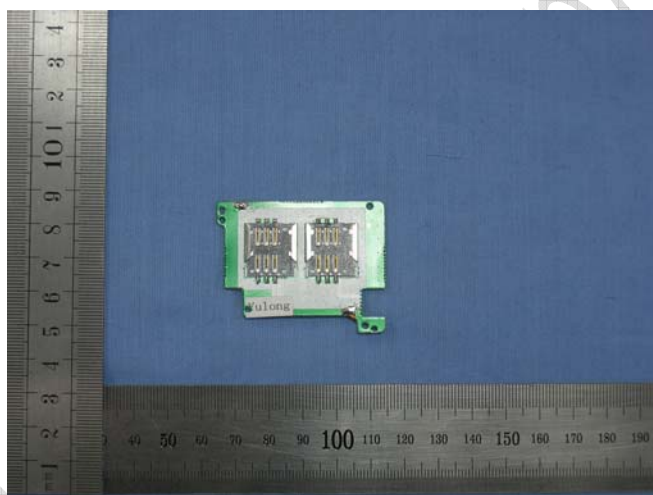
Picture 6 Front view of the internal structure (LCD)



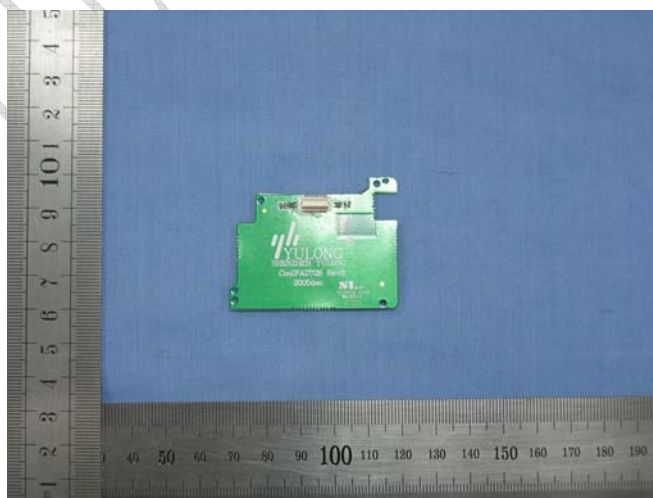
Picture 7 Back view of the internal structure,  
with SIM card slots



Picture 8 Back view of the internal structure,  
without SIM card slots



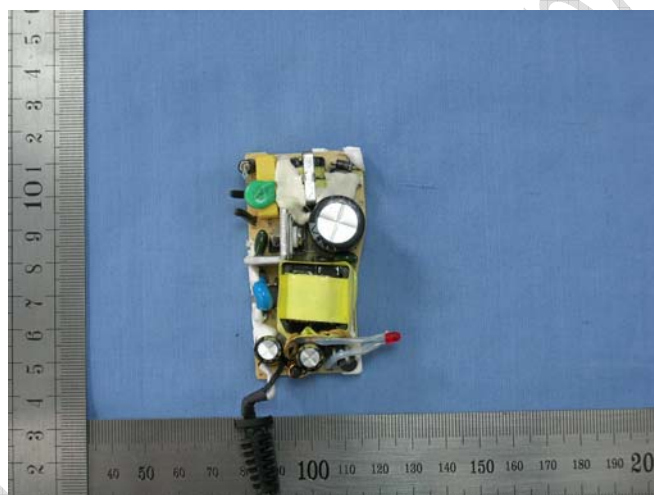
Picture 9 Back view of the internal structure, SIM card slots



Picture 10 Back view of the internal structure,  
back of SIM card slots



Picture 11 back of battery



Picture 12 front view of adaptor internal structure



Picture 13 back view of adaptor internal structure

## ANNEX C Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

———— The End of this Report ————

Test Report