



F	CC REPOR	RT
Report Reference No	TRE1606013301	R/C 90320
FCC ID:	2AAA6-S125	
Applicant's name:	SENWA MEXICO,S.A.DE	C.V
Address	Av. Javier Barros Sierra 5 SANTA FE DELEGACION MEXICO,DISTRITO FEDE	40,Torre I, Piso 5; COL. LOMAS DE N ALVARO OBREGON C.P. 01210 ERAL
Manufacturer	Senwa Mobile HK Itd	
Address	Room 910, International T Tsuen Wan, NT, HK	rade Centre 11-19 Sha Tsui Road,
Test item description	Mobile Phone	
Trade Mark	SENWA	
Model/Type reference:	S125	
Listed Model(s)	-	
Standard:	FCC Part 22: PUBLIC MC FCC Part 24: PERSONAI	DBILE SERVICES
Date of receipt of test sample	June 23, 2016	
Date of testing	June 24, 2016 – July 06, 2	2016
Date of issue	July 06, 2016	
Result:	Pass	
Compiled by ( position+printed name+signature):	File administrators Shayne	e Zhu
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( position+printed name+signature):	Manager Hans Hu	Mours Mu
Testing Laboratory Name: :	Shenzhen Huatongwei Ir	nternational Inspection Co., Ltd
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The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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# 1. TEST STANDARDS AND TEST DESCRIPTION

# 1.1. Test Standards

The tests were performed according to following standards:

FCC Part 22 (10-1-13 Edition): PRIVATE LAND MOBILE RADIO SERVICES.

FCC Part 24(10-1-13 Edition): PUBLIC MOBILE SERVICES

TIA/EIA 603 D June 2010: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

47 CFR FCC Part 15 Subpart B: - Unintentional Radiators

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

<u>971168 D01 Power Meas License Digital Systems v02r02:</u> provides a methodology for fully characterizing the fundamental power of wideband (> 1 MHz) digitally modulated RF signals acceptable to the FCC for demonstrating compliance for licensed transmitters.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

## 1.2. Test Description

Test Item	Section in CFR 47	Result	
	Part 2.1046		
RF Output Power	Part 22.913 (a)(2)	Pass	
	Part 24.232 (c)		
Modulation Characteristics	Part 2.1047	Pass	
	Part 2.1049		
99% & -26 dB Occupied Bandwidth	Part 22.917	Pass	
	Part 24.238		
	Part 2.1051		
Spurious Emissions at Antenna Terminal	Part 22.917 (a)	Pass	
	Part 24.238 (a)		
	Part 2.1053	Pass	
Field Strength of Spurious Radiation	Part 22.917 (a)		
	Part 24.238 (a)		
Out of hand amigaian, Band Edga	Part 22.917 (a)	Dooo	
Out of band emission, Band Edge	Part 24.238 (a)	F 855	
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass	
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass	
Peak-Average Ratio	Part 24.232 (d)	Pass	

Remark: The measurement uncertainty is not included in the test result.

# 2. <u>SUMMARY</u>

# 2.1. Client Information

Applicant:	SENWA MEXICO,S.A.DE C.V
Address:	Av. Javier Barros Sierra 540, Torre I, Piso 5; COL. LOMAS DE SANTA FE DELEGACION ALVARO OBREGON C.P. 01210MEXICO, DISTRITO FEDERAL
Manufacturer:	Senwa Mobile HK Itd
Address:	Room 910, International Trade Centre 11-19 Sha Tsui Road, Tsuen Wan, NT, HK

# 2.2. Product Description

Name of EUT	Mobile Phone
Trade Mark:	SENWA
Model No.:	S125
Listed Model(s):	-
IMEI :	359430070000365
Power supply:	DC 3.7V From internal battery
Adapter information:	Model: S125
	Input: 100-240Va.c.,50-60Hz,0.15A
	Output:5.0Vd.c.,500mA
2G:	
Support Network:	GSM, GPRS, EGPRS
Support Band:	GSM850, DCS1900
Modulation:	GSM/GPRS/EGPRS: GMSK
Transmit Frequency:	GSM850: 824.20MHz-848.80MHz
	PCS1900: 1850.20MHz-1909.80MHz
Receive Frequency:	GSM850: 869.20MHz-893.80MHz
	PCS1900: 1930.20MHz-1989.80MHz
GPRS Class:	12
EGPRS Class:	12
Antenna type:	Intergal Antenna
Antenna gain:	GSM850:-0.5dBi
	PCS1900: -0.5dBi
Hardware version:	F61_MB_V1.0_20160422
Software version:	SENWA_S125_Ver1.0

# Test Frequency:

GSM 850		PCS1900		
Channel Frequency (MHz)		Channel	Frequency (MHz)	
128 824.20		512	1850.20	
190 836.60		661	1880.00	
251 848.80		810	1909.80	

# 2.3. EUT operation mode

1. The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continous transmitting and receiving mode for testing.

# 2.4. EUT configuration

# The following peripheral devices and interface cables were connected during the measurement:

supplied by the manufacturer
supplied by the lab

$\cup$	- supplied by the lab	
	Length (m)	: /
	Shield	: /
	Detachable	: /
	Manufacturer	: /
	Model No.	: /

# 2.5. Modifications

No modifications were implemented to meet testing criteria.

# 3. TEST ENVIRONMENT

# 3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd. Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China Phone: 86-755-26748019 Fax: 86-755-26748089

# 3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Labo

ratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

### A2LA-Lab Cert. No. 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for tec hnical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional progra m requirements in the identified field of testing. Valid time is until December 31, 2016.

### FCC-Registration No.: 317478

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FC C is maintained in our files. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

### IC-Registration No.: 5377A&5377B

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

## ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Aust ralian C-Tick mark as a result of our A2LA accreditation.

## VCCI

The 3m Semi-

anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd.

has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.

Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. h as been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with R egistration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

### DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of D NV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Di rectives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-

ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the D NV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

### 3.3. Environmental conditions

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

Normal Temperature/Tnor:	15~35°C
lative Humidity	30~60 %
Air Pressure	950-1050 hPa

#### 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurement characteristics;Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth		(1)
Emission Mask		(1)
Modulation Characteristic		(1)
Transmitter Frequency Behavior		(1)

 This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

# 3.5. Equipments Used during the Test

Output Power(Conducted) & Occupied Bandwidth & Emission Bandwidth & Band Edge Compliance & Conducted Spurious Emission					
No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	UNIVERSAL RADIO COMMUNICATION	Rohde&Schwarz	CMU200	112012	2015/11/2
2	Spectrum Analyzer	Rohde&Schwarz	FSU26	201141	2015/11/2
3	Splitter	Mini-Circuit	ZAPD-4	400059	2015/11/2
		•		·	
Freque	ency Stability	_	_		
No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	UNIVERSAL RADIO COMMUNICATION	Rohde&Schwarz	CMU200	112012	2015/11/2
2	Spectrum Analyzer	Rohde&Schwarz	FSU26	201141	2015/11/2
3	Climate Chamber	ESPEC	EL-10KA	05107008	2015/11/2
4	Splitter	Mini-Circuit	ZAPD-4	400059	2015/11/2
Output	Power (Radiated) & Radia	ted Spurious Emissio	n		
No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	UNIVERSAL RADIO COMMUNICATION	Rohde&Schwarz	CMU200	112012	2015/11/2
2	Spectrum Analyzer	Rohde&Schwarz	FSU26	201141	2015/11/2
3	HORN ANTENNA	ShwarzBeck	9120D	1012	2015/11/2
4	HORN ANTENNA	ShwarzBeck	9120D	1011	2015/11/2
5	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2015/11/2
6	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2015/11/2
7	TURNTABLE	MATURO	TT2.0		N/A
8	ANTENNA MAST	MATURO	TAM-4.0-P		N/A
9	EMI Test Software	Audix	E3	N/A	N/A
10	EMI Test Receiver	Rohde&Schwarz	ESIB 26	100009	2015/11/2
11	RF Test Panel	Rohde&Schwarz	TS / RSP	335015/ 0017	2015/11/2
12	High pass filter	Compliance Direction systems	BSU-6	34202	2015/11/2
13	Splitter	Mini-Circuit	ZAPD-4	400059	2015/11/2
14	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2015/11/2
15	Horn Antenna	SCHWARZBECK	BBHA9170	25842	2015/11/2
16	Preamplifier	ShwarzBeck	BBV 9718	BBV 9718	2015/11/2
17	Broadband Preamplifier	ShwarzBeck	BBV743	9743-0079	2015/11/2
18	Signal Generator	Rohde&Schwarz	SMF100A	101932	2015/11/2
19	Amplifer	Compliance Direction systems	PAP1-4060	120	2015/11/2
20	TURNTABLE	ETS	2088	2149	2015/11/2
21	ANTENNA MAST	ETS	2075	2346	2015/11/2
22	HORN ANTENNA	Rohde&Schwarz	HF906	100068	2015/11/2

Rohde&Schwarz

HF906

100039

2015/11/2

The calibration interval was one year.

HORN ANTENNA

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# 4. TEST CONDITIONS AND RESULTS

# 4.1. Conducted Output Power

### **TEST CONFIGURATION**



Note: Measurement setup for testing on Antenna connector

### TEST PROCEDURE

- 1. The transmitter output port was connected to base station.
- 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
- 3. Set EUT at maximum power through base station.
- 4. Select lowest, middle, and highest channels for each band and different modulation.
- 5. Measure the maximum burst average power.

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EUT Mode	Channel	Frequency (MHz)	Power (dBm)
	128	824.2	32.40
GSM 850 (GMSK)	190	836.6	32.29
	251	848.8	32.03
	128	824.2	32.41
GPRS850 (GMSK 1Slot)	190	836.6	32.35
	251	848.8	32.12
	128	824.2	32.42
EGPR5850 (GMSK 1Slot)	190	836.6	32.20
	251	848.8	32.13
500/000	512	1850.2	28.58
PCS1900 (GMSK)	661	1880	28.00
	810	1909.8	27.52
	512	1850.2	28.86
GPRS1900 (GMSK 1Slot)	661	1880	28.20
	810	1909.8	27.56
	512	1850.2	28.78
EGPRS1900 (GMSK 1Slot)	661	1880	27.78
	810	1909.8	27.69

# 4.2. Occupy Bandwidth

# **TEST CONFIGURATION**



### TEST PROCEDURE

- 1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
- 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.
- 3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
	128	824.20	244.97	318.83
GSM 850 (GMSK)	190	836.60	246.23	321.06
(emerty	251	848.80	244.30	317.38
	128	824.20	243.56	320.27
GPRS850 (GMSK 1Slot)	190	836.60	242.80	317.81
	251	848.80	241.93	317.38
	128	824.20	242.17	318.83
(GMSK 1Slot)	190	836.60	242.03	320.27
	251	848.80	243.26	318.59
	512	1850.20	243.60	318.83
PCS1900 (GMSK)	661	1880.00	245.53	321.72
(emerty	810	1909.80	245.03	317.38
	512	1850.20	244.16	320.27
GPRS1900 (GMSK.1Slot)	661	1880.00	242.53	314.48
	810	1909.80	243.70	321.72
50550/000	512	1850.20	242.86	314.48
EGPRS1900 (GMSK 1Slot)	661	1880.00	243.83	321.72
	810	1909.80	244.20	321.71









# 4.3. Out of band emission at antenna terminals

### <u>LIMIT</u>

Part 24.238 and Part 22.917 specify that 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  $43 + 10 \log(P) dB$ .

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

#### **TEST CONFIGURATION**



### TEST PROCEDURE

- 1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
- 2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
- 3. For the out of band: Set the RBW= 1MHz, VBW = 3MHz, Start=30MHz, Stop= 10th harmonic.

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# 4.4. Band Edge compliance

### <u>LIMIT</u>

Part 24.238 and Part 22.917 specify that 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  $43 + 10 \log(P) dB$ .

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

### **TEST CONFIGURATION**



### TEST PROCEDURE

- 1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
- 2. For the bandedge: 2G:Set the RBW=3KHz, VBW = 10KHz, Sweep time= Auto

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GSM850								
Channel	Frequency	Measurement Results Limit						
Number	(MHz)	Frequency (MHz)	Values (dBm)	(dBm)	verdict			
128	824.20	823.99	-14.45	-13.00	Pass			
251	848.80	849.02	-15.78	-13.00	Pass			

	GPRS850									
Channel	Frequency	Measureme	Vardiat							
Number	(MHz)	Frequency (MHz)	Values (dBm)	(dBm)	verdici					
128	824.20	823.99	-15.44	-13.00	Pass					
251	848.80	849	-17.44	-13.00	Pass					

	EGPRS850									
Channel	Frequency	Measureme	nt Results							
Number	(MHz)	Frequency (MHz)	Values (dBm)	(dBm)	Verdict					
128	824.20	823.99	-14.58	-13.00	Pass					
251	848.80	849.02	-16.69	-13.00	Pass					

	PCS1900								
Channel	Frequency	Measurement Results		Limit					
Number	(MHz)	Frequency (MHz)	Values (dBm)	(dBm)	verdict				
512	1850.20	1850	-14.88	-13.00	Pass				
810	1909.80	1910	-16.35	-13.00	Pass				

GPRS1900								
Channel	Frequency	Measureme	ent Results Limit Vordic					
Number	(MHz)	Frequency (MHz)	Values (dBm)	(dBm)	Veruici			
512	1850.20	1850	-14.91	-13.00	Pass			
810	1909.80	1910	-16.79	-13.00	Pass			

EGPRS1900									
Channel	Frequency	Measureme	Vardiat						
Number	(MHz)	Frequency (MHz)	verdict						
512	1850.20	1850	-15.38	-13.00	Pass				
810	1909.80	1910	-17.18	-13.00	Pass				





# 4.5. Radiated Power Measurement

# LIMIT

GSM850: 7W ERP

PCS1900: 2W EIRP

# TEST CONFIGURATION



## TEST PROCEDURE

- EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
- 2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. 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.
- 3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz,, And the maximum value of the receiver should be recorded as (Pr).
- 4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver

reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

- 5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
- The measurement results are obtained as described below: Power(EIRP)=PMea- PAg - Pcl + Ga We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below: Power(EIRP)=PMea- Pcl + Ga
- This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
  ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST RESULTS

GSM:

Mode	Channel	Antenna Pol.	ERP	Limit (dBm)	Result
	100	V	26.45		
	120	Н	30.48		
C SM950	100	V	26.52	29.45	Dooo
G310050	190	Н	30.84	30.43	Fass
	251	V	26.45		
	201	Н	30.44		
	128	V	26.52		Pass
		Н	30.08	- 38.45	
GPRS850	190	V	25.75		
		Н	30.43		
	054	V	26.47		
	201	Н	30.48		
	128	V	26.52		
	120	Н	30.85		
EGPRS850	100	V	26.44	38.45	Pass
	190	Н	30.64		Pass
	251	V	26.58		
	251	Н	30.84		

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Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
	510	V	24.75		
	512	Н	27.86		
DCS1000	661	V	24.44	22.01	
PC31900	001	Н	27.05	33.01	Pass
	910	V	24.69		
	010	Н	27.68		
	510	V	23.52		Pass
	512	Н	26.47	- 33.01	
GPRS1900	661	V	23.85		
		Н	26.44		
	910	V	23.08		
	810	Н	26.95		
	510	V	23.45		
	512	Н	26.08		
	661	V	23.75	22.01	Pass
EGFK3 1900	001	Н	26.44	33.01	Pass
	810	V	23.86		
	810	Н	27.08	1	

# 4.6. Radiated Spurious Emssion

# <u>LIMIT</u>

-13dBm

# **TEST CONFIGURATION**



- EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
- 2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. 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.
- 3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
- 4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

- A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (PcI) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
- The measurement results are obtained as described below: Power(EIRP)=PMea- PAg - Pcl + Ga We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below: Power(EIRP)=PMea- Pcl + Ga
- 7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

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		GS	M850		
Channel	Frequency Spurious Emission		Limit (dDm)	Deput	
Channel	(MHz)	Polarization	Level (dBm)	el (dBm) 40.83	Result
	1648.40	Vertical	-40.83		
	2472.60	V	-43.28		
	3296.80	V	-47.67	-13.00	Pass
	4121.00	V	-48.55		
100	128 4945.20 V				
120	1648.40	Horizontal	-38.09		
	2472.60	Н	-43.72		Pass
	3296.80	Н	-50.42	-13.00	
	4121.00	Н	-50.78		
	4945.20	н			
	1673.20	Vertical	-40.74		
	2509.80	V	-42.48		
	3346.40	V	-46.48	-13.00	Pass
	4183.00	V	-48.25		
100	5019.60	V			
190	1673.20	Horizontal	-37.86		Pass
	2509.80	Н	-43.25		
	3346.40	Н	-49.43	-13.00	
	4183.00	Н	-50.25		
	5019.60	н		-13.00 -13.00 -13.00	
	1697.60	Vertical	-40.08		
	2546.40	V	-44.36		
	3395.20	V	-47.25	-13.00	Pass
	4244.00	V	-48.08		
251	5092.80	V			
201	1697.60	Horizontal	-37.86		
	2546.40	Н	-44.25	]	
	3395.20	Н	-51.02	-13.00	Pass
	4244.00	Н	-50.63		
	5092.80	Н			

Remark :

The emission behaviour belongs to narrowband spurious emission. 1.

2.

Remark"---" means that the emission level is too low to be measured The emission levels of below 1 GHz are very lower than the limit and not show in test report. 3.

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		PC	S1900		
	Frequency	Spurious	Emission		Dec. II
Channel	(MHz)	Polarization	Level (dBm)	Limit (dBm)	Result
	3700.40	Vertical	-30.58		
	5550.60	V	-27.61		
	7400.80	V	-50.74	-13.00	Pass
	9251.00	V	-50.46		
540	11101.20	V			
512	3700.40	Horizontal	-27.67		
	5550.60	Н	-27.86		
	7400.80	Н	-50.69	-13.00	Pass
	9251.00	Н	-49.84		
	11101.20	Н			
	3760.00	Vertical	-30.86		
	5640.00	V	-28.05		
	7520.00	V	-50.24	-13.00	Pass
	9400.00	V	-49.78		
661	11280.00	V			
001	3760.00	Horizontal	-28.25		Pass
	5640.00	Н	-27.49		
	7520.00	Н	-49.63	-13.00	
	9400.00	Н	-48.52		
	11280.00	Н			
	3819.60	Vertical	-30.24		
	5729.40	V	-27.58		
	7639.20	V	-51.02	-13.00	Pass
	9549.00	V	-50.25		
910	11458.80	V			
010	3819.60	Horizontal	-27.36		
	5729.40	Н	-28.25		
	7639.20	Н	-50.24	-13.00	Pass
	9549.00	Н	-48.76	]	
	11458.80	Н			

Remark :

1.

The emission behaviour belongs to narrowband spurious emission. Remark"----" means that the emission level is too low to be measured

2. 3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

# 4.7. Frequency stability V.S. Temperature measurement

### <u>LIMIT</u>

2.5ppm

### **TEST CONFIGURATION**



Note : Measurement setup for testing on Antenna connector

#### TEST PROCEDURE

- 1. The equipment under test was connected to an external DC power supply and input rated voltage.
- 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
- 3. The EUT was placed inside the temperature chamber.
- Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.
- 5. Turn EUT off and set the chamber temperature to  $-30^{\circ}$ C. After the temperature stabilized for approximately 30 minutes recorded the frequency.

6. Repeat step measure with  $10^{\circ}$ C increased per stage until the highest temperature of +50°C reached.

Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz								
Power supplied	Tomporaturo (°C)	Frequency error		Limit (ppm)	Pocult			
(Vdc)		Hz	ppm	Linit (ppn)	Result			
	-30	21	0.025					
	-20	24	0.029					
	-10	22	0.026					
	0	25	0.030					
3.70	10	28	0.033	2.5	Pass			
	20	30	0.036					
	30	27	0.032					
	40	31	0.037					
	50	32	0.038					
Refe	erence Frequency: PO	CS1900 Middle ch	annel=661 chann	el=1880MHz				
Power supplied	Tama anatana (°C)	Frequency error			Popult			
(Vdc)	Temperature (C)	Hz	ppm	Limit (ppm)	Result			
	-30	22	0.012					
	-20	24	0.013					
	-10	19	0.010					
	0	27	0.014					
3.70	10	34	0.018	2.5	Pass			
	20	43	0.023	1				
	30	32	0.017	-				
	40	29	0.015					
	50	24	0.013	1				

# 4.8. Frequency stability V.S. Voltage measurement

### <u>LIMIT</u>

2.5ppm

### **TEST CONFIGURATION**



Note : Measurement setup for testing on Antenna connector

### TEST PROCEDURE

- 1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.
- 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
- 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz								
	Power supplied	Frequer	ncy error	Limit (ppm)	Posult			
Temperature (C)	(Vdc)	Hz	ppm	Emir (ppm)	Result			
	4.20	24	0.029					
25	3.70	22	0.026	2.5	Pass			
	3.50	19	0.023					
Reference	Frequency: PCS190	00 (GSM link) Mid	dle channel=661 (	channel=1880Ml	Hz			
	Power supplied	Frequency error		Limit (ppm)	Pocult			
Temperature (C)	(Vdc)	Hz	ppm	Linii (ppin)	Result			
	4.20	25	0.013					
25	3.70	40	0.021	2.5	Pass			
	3.50	31	0.016					

# 4.9. Peak-Average Ratio

<u>LIMIT</u>

13dB

#### **TEST CONFIGURATION**



#### TEST PROCEDURE

According with KDB 971168

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve

5. The measurement interval was set depending on the type of signal analyzed. For continuous signals(>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the " on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

#### TEST RESULTS

#### Worst case GSM1900,

Band	Channel	Frequency(MHz)	PAR	Limit(dB)	Result
GSM1900	512	1850.2	7.72	13	Pass
	661	1880	7.57	13	Pass
	810	1909.8	7.68	13	Pass

# 5. Test Setup Photos of the EUT

Radiated emission:



# 6. External and Internal Photos of the EUT

# External photos of the EUT















- 1

# Internal photos of the EUT









.....End of Report.....