



FCC Test Report

FCC ID: 2BBGL-T12

Applicant: Shenzhenshi huazhirui keji Co. LTD

Address: Room 2301B16, Building A, Xinghe Century, No. 3069, Caitian Road, Gangsha Community, Futian Street, Futian District, Shenzhen

Manufacturer: Shenzhenshi huazhirui keji Co. LTD

Address: Room 2301B16, Building A, Xinghe Century, No. 3069, Caitian Road, Gangsha Community, Futian Street, Futian District, Shenzhen

EUT: GPS TRACKER

Trade Mark: N/A

Model Number: T12, TK200, TK201, TK202A, TK202B, TK203, TK205, TK206, TK208, TK209, TK300, TK306, TK600, TK800b, TK800C, TK900, GT02, GT02D, TK100, TK110, GT06, TK102b, TK103A, TK103b, ST901, PG03, CJ720, MV720

Date of Receipt: May. 22, 2023

Test Date: May. 22, 2023 - Jun. 06, 2023

Date of Report: Jun. 06, 2023

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

Applicable Standards: FCC CFR Title 47 Part22 Subpart H
FCC CFR Title 47 Part24 Subpart E
ANSI/ TIA/ EIA-603-D-2010
FCC KDB 971168 D01 Power Meas. License Digital Systems v02v02
ANSI C63.26:2015

Test Result: Pass

Report Number: DL-20230526020E

Prepared (Test Engineer): Pxing Huang

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

**TABLE OF CONTENTS**

Test Report Declaration	Page
1. TEST SUMMARY	3
2. GENERAL PRODUCT INFORMATION	4
2.1. Description of Device (EUT)	4
2.2. Product Function	5
2.3. Independent Operation Modes	5
3. TEST SITES	5
3.1. Test Facilities	5
3.2. Measurement Uncertainty	5
3.3. List of Test and Measurement Instruments	6
4. TEST SET-UP	7
4.1. Principle of Configuration Selection	7
4.2. Block Diagram of Test Set-up	7
4.3. Test Environment	7
5. EMISSION TEST RESULTS	8
5.1. Conducted RF Output Power	8
5.2. -26dB and 99% Occupied Bandwidth	9
5.3. Peak to Average Ratio	10
5.4. Frequency Stability	11
5.5. Conducted Spurious Emissions	14
5.6. Conducted Out of Band Emissions	15
5.7. Transmitter Radiated Power (EIRP/ERP)	16
5.8. Radiated Out of Band Emissions	18
6. PHOTOGRAPHS OF TEST SET-UP	22
7. PHOTOGRAPHS OF THE EUT	23

**1. TEST SUMMARY**

Test Items	Test Requirement	Result
Conducted RF Output Power	2.1046	PASS
Peak to Average Ratio	2.1055,22.355 24.235	PASS
99% & -26 dB Occupied Bandwidth	2.1049, 22.917 24.238,	PASS
Frequency Stability	2.1055, 22.355 24.235	PASS
Conducted Out of Band Emissions	2.1051,2.1057 22.917, 24.238	PASS
Band Edge	2.1051,2.1057 22.917, 24.238	PASS
Transmitter Radiated Power (EIPR/ERP)	22.913, 24.232	PASS
Radiated Out of Band Emissions	2.1053,2.1057 22.917, 24.238	PASS



2. GENERAL PRODUCT INFORMATION

2.1. Description of Device (EUT)

Product Name:	GPS TRACKER
Trademark	N/A
Model No.:	V5 V5N, V5P, V6
Test Model:	V5
Model Difference	The product's different for model number and appearance color.
Operation Frequency:	GSM 850: Tx: 824.20 - 848.80MHz; Rx: 869.20 - 893.80MHz GSM 900: Tx: 880.00 - 915.00MHz; Rx: 925.00 - 960.00MHz GSM 1800: Tx: 1710.00-1785.00MHz; Rx: 1805.00 - 1880.00MHz GSM1900: Tx: 1850.20 - 1909.80MHz; Rx: 1930.20 - 1989.80MHz
Modulation technology:	GSM Mode with GMSK Modulation
Antenna Type:	External Antenna
Antenna gain:	GSM850: 1dBi GSM1900:1dBi
Power supply:	DC 12-24V 0.5A
Hardware Version	HV10
Software Version	SV10

Note:

- 1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.The EUT's all information provided by client.



2.2. Product Function

Refer to Technical Construction Form and User Manual.

2.3. Independent Operation Modes

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
GSM	GSM/GPRS/EGPRS	GSM/GPRS/EGPRS

Test Channel(MHz)			
Band	Low	Middle	High
GSM850	824.20	836.60	848.80
GSM1900	1850.20	1880.00	1909.80

Note: we pretest all voltage, only the DC 24V was worst mode, and the data show in the report.

3. TEST SITES

3.1. Test Facilities

Site Description

Name of Firm : Shenzhen DL Testing Technology Co., Ltd.

Site Location : 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

3.2. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



3.3. List of Test and Measurement Instruments

3.3.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
843 Shielded Room	ChengYu	843 Room	843	Sep. 20, 2022	Sep. 19, 2025
EMI Receiver	R&S	ESR	101421	Nov. 05, 2022	Nov. 04, 2023
LISN	R&S	ENV216	102417	Nov. 05, 2022	Nov. 04, 2023
843 Cable 1#	ChengYu	CE Cable	001	Nov. 05, 2022	Nov. 04, 2023
843 Cable 1#	FUJIKURA	843C1#	001	Nov. 05, 2022	Nov. 04, 2023

3.3.2. For radiated test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 05, 2022	Nov. 04, 2023
Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 05, 2022	Nov. 04, 2023
Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 05, 2022	Nov. 04, 2023
Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 05, 2022	Nov. 04, 2023
Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 05, 2022	Nov. 04, 2023
Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 05, 2022	Nov. 04, 2023
Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 05, 2022	Nov. 04, 2023
Amplifier(18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 05, 2022	Nov. 04, 2023
Loop Antenna(9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 05, 2022	Nov. 04, 2023
RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 05, 2022	Nov. 04, 2023
RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 05, 2022	Nov. 04, 2023
Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 05, 2022	Nov. 04, 2023
Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 05, 2022	Nov. 04, 2023
Signal Analyzer	Agilent	N9020A	MY55370280	Nov. 05, 2022	Nov. 04, 2023
Test Receiver	R&S	ESU 40	100376	Nov. 05, 2022	Nov. 04, 2023
D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 05, 2022	Nov. 04, 2023
Signal Amplifier	DAZE	ZN3380B	11235	Nov. 05, 2022	Nov. 04, 2023
High Pass filter	KANGMAI	WHKX1.0/1.5G-10SS	40	Nov. 05, 2022	Nov. 04, 2023
Filter	COM-MW	ZBSF-C836.5-25-X	BCTC042	Nov. 05, 2022	Nov. 04, 2023
Filter	COM-MW	ZBSF-C1747.5-75-X2	BCTC045	Nov. 05, 2022	Nov. 04, 2023
Filter	COM-MW	ZBSF-C1880-60-X2	BCTC047	Nov. 05, 2022	Nov. 04, 2023
Splitter	Agilent	11435B	1125162	Nov. 05, 2022	Nov. 04, 2023

RF CONDUCTED TEST

System Simulator	Agilent	E5515C	GB43130252	Nov. 05, 2022	Nov. 04, 2023
Spectrum Analyzer	Agilent	N9020A	MY45108040	Nov. 05, 2022	Nov. 04, 2023
DC Power Supply	LongWei	PS-305D	010965682	Nov. 05, 2022	Nov. 04, 2023
Constant temperature and humidity box	GF	GTH-800-40-2P	MAA9906-012	Nov. 05, 2022	Nov. 04, 2023
Universal radio communication tester	R&S	CMW500	115295	Nov. 05, 2022	Nov. 04, 2023



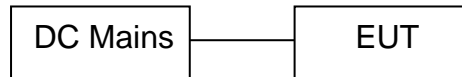
4. TEST SET-UP

4.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



4.3. Test Environment:

Ambient conditions in the test laboratory:

Items	Actual
Temperature (°C)	21~23
Humidity (%RH)	50~65



5. EMISSION TEST RESULTS

5.1. Conducted RF Output Power

5.1.1. Limit

According to FCC section 2.1046(a), FCC part22.913(a), FCC part22.50(a) and FCC part 24.232(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

5.1.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.

5.1.3. Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

Pass, the table and plot please see annex.

The conducted power tables are as follows:

Average Conducted Power(dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency	824.20	836.60	848.80	1850.20	1880.00	1909.80
GSM	32.26	32.45	32.67	29.23	29.38	29.86
GPRS (GMSK, 1 TX slot)	32.24	32.44	32.64	29.21	29.37	29.84
GPRS (GMSK, 2 TX slot)	29.48	29.68	29.88	28.42	28.61	29.07
GPRS (GMSK, 3 TX slot)	28.49	28.69	28.89	26.44	26.62	27.08
GPRS (GMSK, 4 TX slot)	27.37	27.58	27.78	25.33	25.51	26.08
EGPRS(GMSK, 1 TX slot)	32.20	32.40	32.60	29.14	29.33	29.80
EGPRS(GMSK, 2 TX slot)	31.47	31.67	31.87	28.40	28.59	29.05
EGPRS(GMSK, 3 TX slot)	29.46	29.66	29.86	26.39	26.57	27.03
EGPRS(GMSK, 4 TX slot)	27.38	27.59	27.79	24.34	24.52	24.98
EGPRS (8PSK, 1 TX slot)	26.79	27.00	27.18	24.52	24.77	25.13
EGPRS (8PSK, 2 TX slot)	25.42	25.73	26.04	23.31	23.52	23.85
EGPRS (8PSK, 3 TX slot)	23.26	23.55	23.74	22.06	22.19	22.46
EGPRS (8PSK, 4 TX slot)	22.32	22.48	22.70	21.15	21.22	21.54



5.2. -26dB and 99% Occupied Bandwidth

5.2.1. Limit

According to FCC section 2.1049 and FCC part22.99 and FCC part24.131, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth,

5.2.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.

5.2.3. Test Result

Pass, the table and plot please see annex.

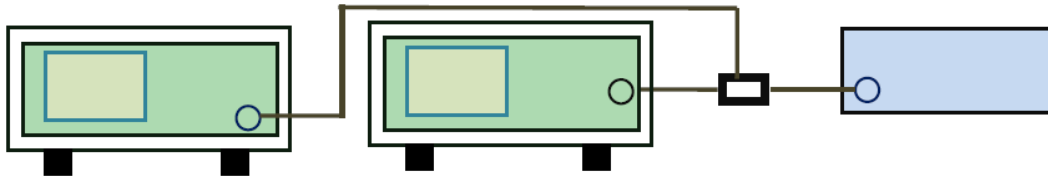


5.3. Peak to Average Ratio

5.3.1. Limit

According to FCC section 22.99, 24.131 the peak to average ratio(PAR) of the transmission may not exceed 13dB.

5.3.2. Test Setup



5.3.3. Test Procedure

According with KDB 971168 v02r02

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

5.3.4. Test Result

Pass, the table and plot please see annex.



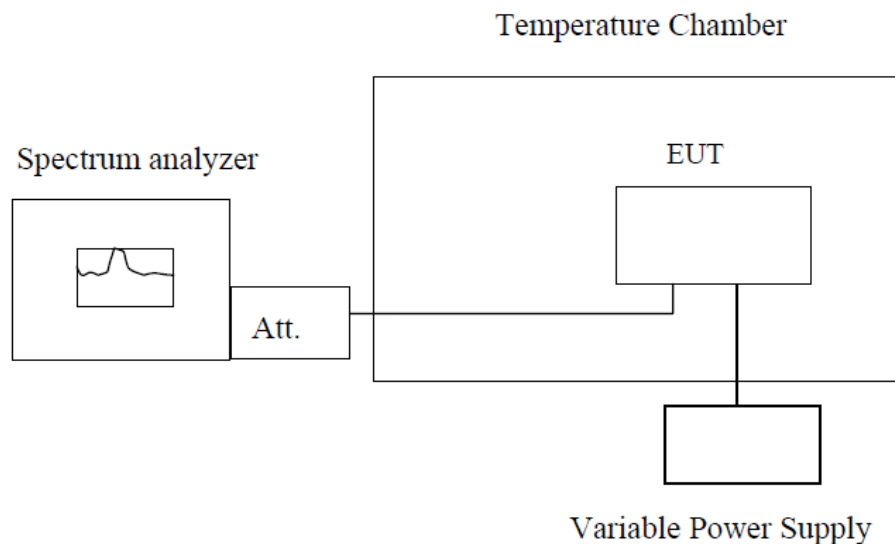
5.4. Frequency Stability

5.4.1. Limit

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -40°C to $+80^{\circ}\text{C}$ at intervals of not more than 10°C .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

5.4.2. Test Setup



Note : Measurement setup for testing on Antenna connector

The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber.

The EUT is commanded by the System Simulator (SS) to operate at the maximum output power

5.4.3. Test Result

The nominal, highest and lowest extreme voltages are separately 3.7VDC, 4.25VDC and 3.34VDC

which are specified by the applicant; the normal temperature here used is 25°C . The frequency

deviation limit of 850MHz band is $\pm 2.5\text{ppm}$, and 1900MHz is $\pm 1\text{ppm}$

For LTE mode, only test the max bandwidth.

The table and plot please see annex.



Test Conditions			Frequency Deviation			Result
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm	Limit	
GSM850 Middle channel 836.0MHz	24.0	-40	42	0.0502	±2.5	PASS
	24.0	-30	56	0.0669		
	24.0	-20	67	0.0801		
	24.0	-10	34	0.0406		
	24.0	0	112	0.1339		
	24.0	10	23	0.0275		
	24.0	20	45	0.0538		
	24.0	30	66	0.0789		
	24.0	40	54	0.0646		
	24.0	50	21	0.0251		
	24.0	60	34	0.0406		
	24.0	70	43	0.0514		
	24.0	80	78	0.0932		
	26.4	25	126	0.1506		
	24.0	25	32	0.0383		
	21.6	25	76	0.0909		
EGPRS850 Middle channel 836.0MHz	24.0	-40	65	0.0777	±2.5	PASS
	24.0	-30	32	0.0383		
	24.0	-20	76	0.0909		
	24.0	-10	89	0.1064		
	24.0	0	23	0.0275		
	24.0	10	46	0.0550		
	24.0	20	75	0.0897		
	24.0	30	22	0.0263		
	24.0	40	78	0.0932		
	24.0	50	32	0.0383		
	24.0	60	78	0.0932		
	24.0	70	21	0.0251		
	24.0	80	89	0.1064		
	26.4	25	119	0.1423		
	24.0	25	32	0.0383		
	21.6	25	98	0.1172		



Test Conditions			Frequency Deviation			Result
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm	Limit	
GSM1900 Middle channel 1880.0MHz	24.0	-40	67	0.0356	±2.5	PASS
	24.0	-30	56	0.0298		
	24.0	-20	65	0.0346		
	24.0	-10	78	0.0415		
	24.0	0	98	0.0521		
	24.0	10	86	0.0457		
	24.0	20	66	0.0351		
	24.0	30	82	0.0436		
	24.0	40	69	0.0367		
	24.0	50	73	0.0388		
	24.0	60	77	0.0410		
	24.0	70	89	0.0473		
	24.0	80	112	0.0596		
	26.4	25	121	0.0644		
	24.0	25	77	0.0410		
	21.6	25	89	0.0473		
EGPRS1900 Middle channel 1880.0MHz	24.0	-40	56	0.0298	±2.5	PASS
	24.0	-30	78	0.0415		
	24.0	-20	23	0.0122		
	24.0	-10	87	0.0463		
	24.0	0	32	0.0170		
	24.0	10	51	0.0271		
	24.0	20	43	0.0229		
	24.0	30	57	0.0303		
	24.0	40	88	0.0468		
	24.0	50	54	0.0287		
	24.0	60	63	0.0335		
	24.0	70	57	0.0303		
	24.0	80	34	0.0181		
	26.4	25	132	0.0702		
	24.0	25	78	0.0415		
	21.6	25	99	0.0527		

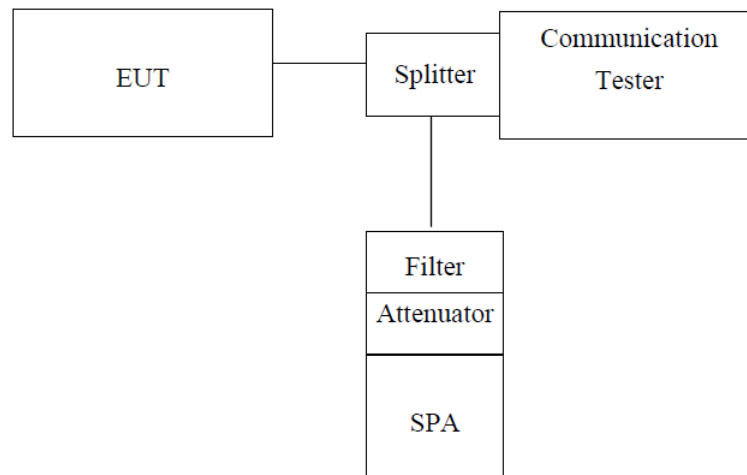


5.5. Conducted Spurious Emissions

5.5.1. Limit

According to FCC section 22.917(a) and FCC section 24.238(a), 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. This calculated to be -13dBm.

5.5.2. Test Setup



Note: Measurement setup for testing on Antenna connector

5.5.3. Measurement Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 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.

For the out of band: Set the RBW, VBW = 100KHz, Start=30MHz, Stop= 10th harmonic.

Limit = -13dBm

5.5.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

For LTE mode, the plot only show the min and max bandwidth's data.

Pass, the table and plot please see annex.

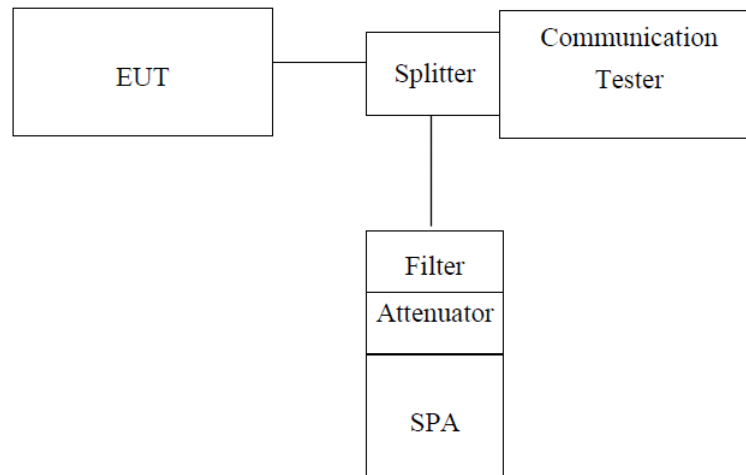


5.6. Conducted Out of Band Emissions

5.6.1. Limit

According to FCC section 22.917(b) and FCC section 24.238(b), in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

5.6.2. Test Setup



Note: Measurement setup for testing on Antenna connector

5.6.3. Measurement Procedure

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer and the System Simulator with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the System Simulator to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the System Simulator.

RBW is set to 3kHz,VBW is set to 10kHz for GSM 850, GSM 1900

RBW is set to 51kHz,VBW is set to 160kHz for WCDMA Band 5, WCDMA Band 2

RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 2, LTE Band 4,LTE Band 5 (1.4MHz),

RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 2, LTE Band 4,LTE Band 5 (3MHz),

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 2, LTE Band 4,LTE Band 5 (5MHz),

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 2, LTE Band 4,LTE Band 5 (10MHz),

RBW is set to 150 kHz, VBW is set to 510 kHz for LTE Band 2, LTE Band 4 (15MHz).

RBW is set to 200 kHz, VBW is set to 620 kHz for LTE Band 2, LTE Band 4 (20MHz)

RBW is set to 50 kHz, VBW is set to 200 kHz for LTE Band 7 (5MHz).

RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 7 (10MHz).

RBW is set to 200 kHz, VBW is set to 1MHz for LTE Band 7 (15MHz/20MHz)

5.6.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

Pass, the table and plot please see annex.



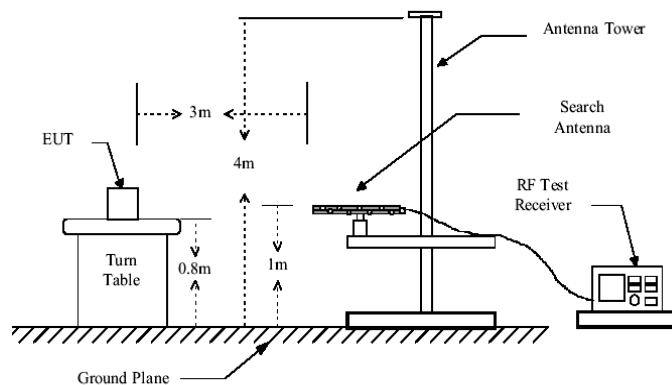
5.7. Transmitter Radiated Power (EIRP/ERP)

5.7.1. Limit

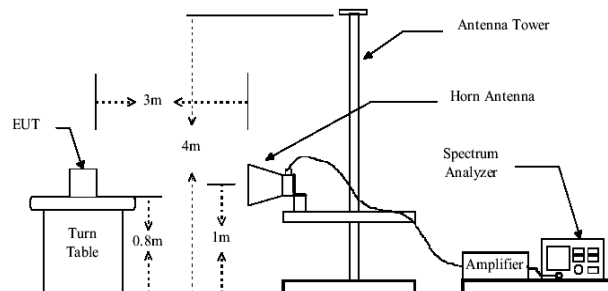
According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.

5.7.2. Test Setup

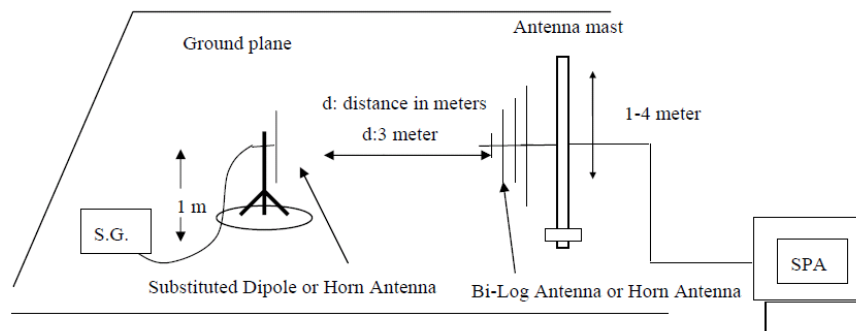
Below 1GHz



Above 1GHz



Substituted method:



5.7.3. Measurement Procedure

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. all test in Full-Anechoic Chamber.



During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

5.7.4. Test Result

Pass, the table and plot please see annex.

EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)	Result
GSM 850	Lowest	V	15.22	19.33	2.52	32.03	38.45	Pass
		H	15.08	19.33	2.52	31.89		
	Middle	V	15.04	19.50	2.60	31.94	38.45	Pass
		H	15.17	19.50	2.60	32.07		
	Highest	V	15.22	19.94	2.71	32.45	38.45	Pass
		H	15.15	19.94	2.71	32.38		
EGPRS8 50	Lowest	V	15.02	19.33	2.52	31.83	38.45	Pass
		H	15.11	19.33	2.52	31.92		
	Middle	V	15.07	19.50	2.60	31.97	38.45	Pass
		H	15.12	19.50	2.60	32.02		
	Highest	V	15.18	19.94	2.71	32.41	38.45	Pass
		H	15.11	19.94	2.71	32.34		
EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Result
GSM1900	Lowest	V	16.35	15.68	1.65	30.38	33.00	Pass
		H	16.29	15.68	1.65	30.32		
	Middle	V	16.31	15.70	1.67	30.34	33.00	Pass
		H	16.20	15.70	1.67	30.23		
	Highest	V	15.98	15.70	1.71	29.97	33.00	Pass
		H	16.28	15.70	1.71	30.27		
EGPRS1 900	Lowest	V	16.24	15.68	1.65	30.27	33.00	Pass
		H	16.18	15.68	1.65	30.21		
	Middle	V	16.21	15.70	1.67	30.24	33.00	Pass
		H	16.19	15.70	1.67	30.22		
	Highest	V	16.08	15.70	1.71	30.07	33.00	Pass
		H	16.12	15.70	1.71	30.11		



5.8. Radiated Out of Band Emissions

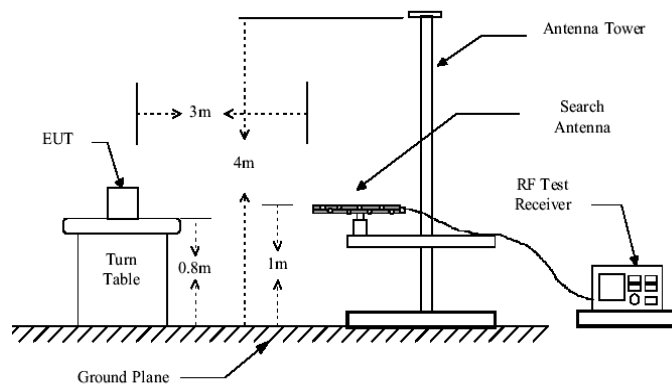
5.8.1. Limit

According to FCC section 22.917(a) and section 24.238(a), 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. This calculated to be -13dBm.

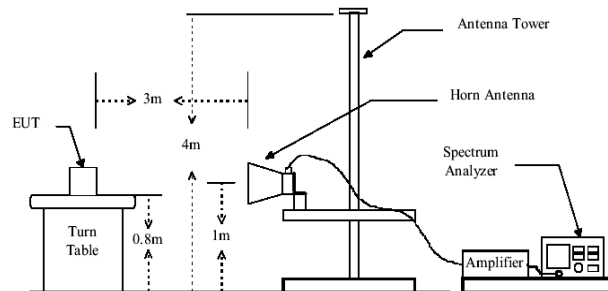
The spurious emission with frequency band 1900 according to FCC section 2.1057.

5.8.2. Test Setup

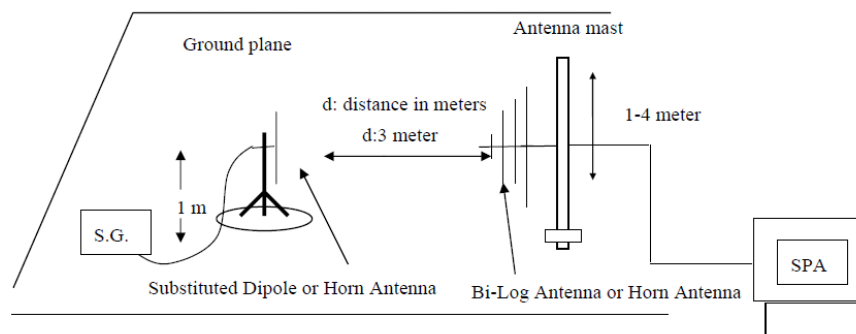
Below 1GHz



Above 1GHz



Substituted method:





5.8.3. Measurement Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. all test in Full-Anechoic Chamber.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$EIRP \text{ (Level)} = S.G. \text{ output (dBm)} + \text{Antenna Gain(dBi)} - \text{Cable Loss (dB)}$

Note: Measurement Uncertainty: $\pm 3.6 \text{ dB}$.

The data show only the worst results, and the other results are very low and not shown in the report.

5.8.4. Test Result



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
GSM850 Lowest	87.53	Vertical	-75.04	3.35	0.38	-72.07	-13	PASS
	1648.40	Vertical	-45.93	7.76	3.75	-41.92		
	2472.60	Vertical	-47.04	9.84	4.94	-42.14		
	3296.80	Vertical	-39.51	10.21	5.32	-34.62		
	4121.00	Vertical	-42.87	11.36	6.02	-37.53		
	4945.20	Vertical	-44.40	14.52	6.68	-36.56		
GSM850 Middle	88.46	Vertical	-75.04	3.35	0.38	-72.07	-13	PASS
	1673.20	Vertical	-47.24	7.76	3.75	-43.23		
	2509.80	Vertical	-46.84	9.84	4.94	-41.94		
	3346.40	Vertical	-42.48	10.21	5.32	-37.59		
	4183.00	Vertical	-41.89	11.36	6.02	-36.55		
	5019.60	Vertical	-45.83	14.52	6.68	-37.99		
GSM850 Highest	88.65	Vertical	-75.00	3.35	0.38	-72.03	-13	PASS
	1697.60	Vertical	-46.84	7.79	3.53	-42.58		
	2546.40	Vertical	-41.34	9.88	5.02	-36.48		
	3395.20	Vertical	-37.56	10.25	5.54	-32.85		
	4244.00	Vertical	-44.37	11.38	6.16	-39.15		
	5092.80	Vertical	-46.79	14.56	6.72	-38.95		

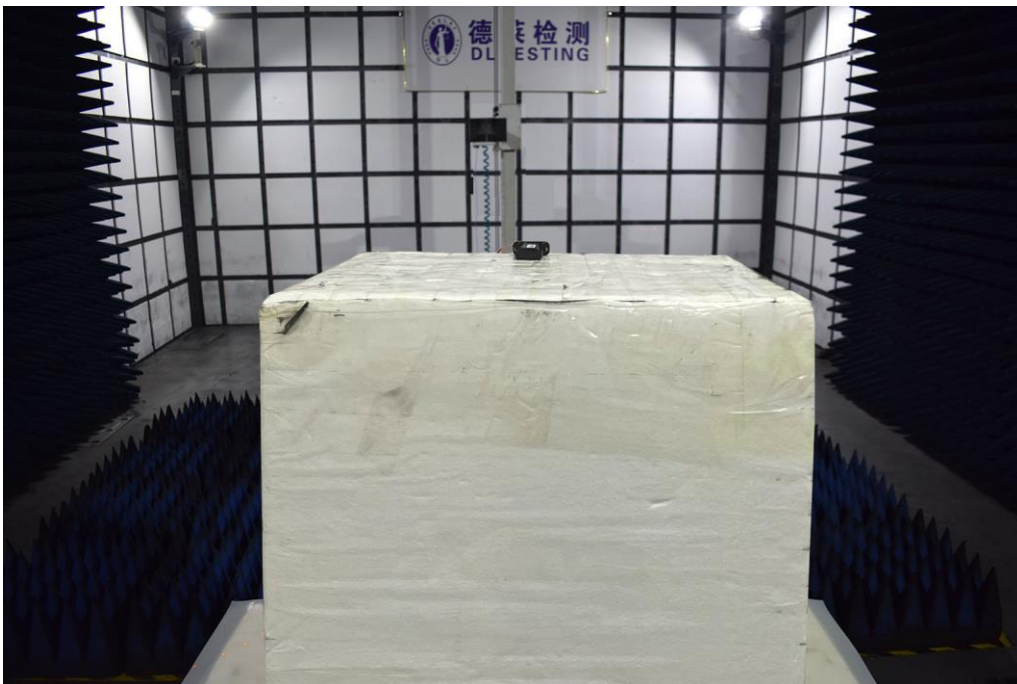
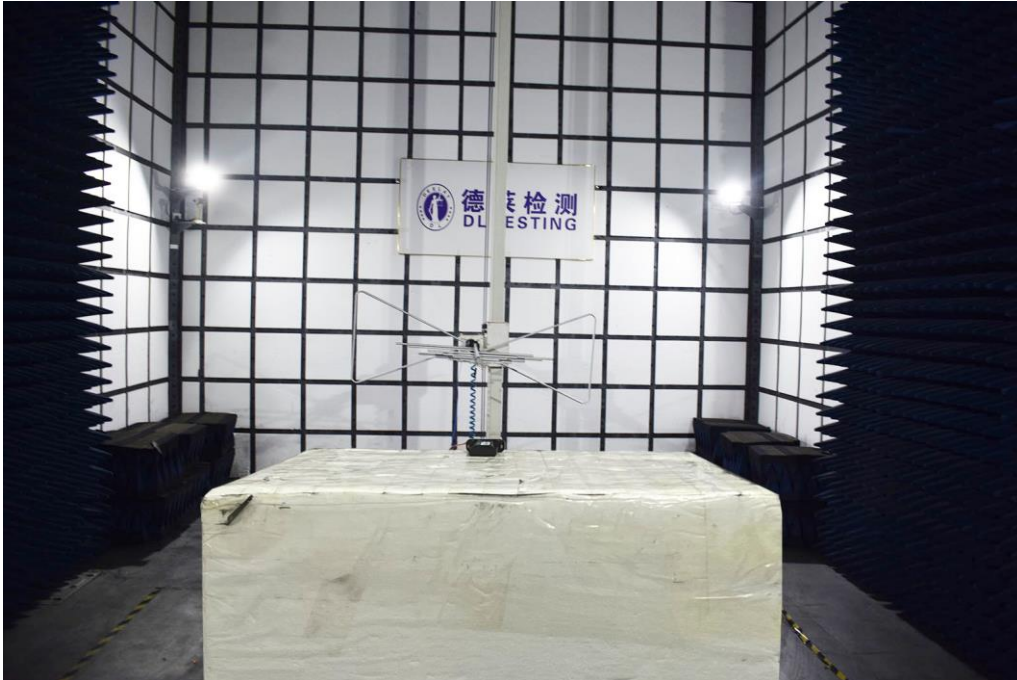


Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
GSM1900 Lowest	87.54	Vertical	-74.61	3.35	0.38	-71.64	-13	PASS
	3700.40	Vertical	-45.67	7.76	3.75	-41.66		
	5550.60	Vertical	-46.77	9.84	4.94	-41.87		
	7400.80	Vertical	-39.29	10.21	5.32	-34.40		
	9251.00	Vertical	-42.63	11.36	6.02	-37.29		
	11101.20	Vertical	-44.15	14.52	6.68	-36.31		
GSM1900 Middle	88.70	Vertical	-74.61	3.35	0.38	-71.64	-13	PASS
	3760.00	Vertical	-46.98	7.76	3.75	-42.97		
	5640.00	Vertical	-46.58	9.84	4.94	-41.68		
	7520.00	Vertical	-42.24	10.21	5.32	-37.35		
	9400.00	Vertical	-41.66	11.36	6.02	-36.32		
	11280.00	Vertical	-45.57	14.52	6.68	-37.73		
GSM1900 Highest	88.76	Vertical	-74.57	3.35	0.38	-71.60	-13	PASS
	3819.60	Vertical	-46.58	7.79	3.53	-42.32		
	5729.40	Vertical	-41.09	9.88	5.02	-36.23		
	7639.20	Vertical	-37.33	10.25	5.54	-32.62		
	9549.00	Vertical	-44.12	11.38	6.16	-38.90		
	11458.80	Vertical	-46.53	14.56	6.72	-38.69		



6. PHOTOGRAPHS OF TEST SET-UP

Radiated Measurement Photos





7. PHOTOGRAPHS OF THE EUT





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