FCC TEST REPORT

FCC Part 22 /Part 24

Report Reference No.....:	**LCS200414095AEG**
FCC ID.....:	**2ATS6-M5**
Date of Issue.....:	**June 01, 2020**
Testing Laboratory Name.....:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
Applicant's name.....:	**Smartech,C.A..**
Address.....:	Manongo Avenue with Palma Real Street,C.C.Via Veneto,Milan Level,M32 Local,Valencia Carabobo Venezuela
Test specification.....**:**	
Standard.....:	**FCC Part 22: Public Mobile Services** **FCC Part 24: Personal Communication Services**
Test Report Form No .....:	LCSEMC-1.0
TRF Originator.....:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....:	Dated 2011-03

Test item description.....:	**Smartphone**
Trade Mark.....:	Win
Model/Type reference.....:	M5
Ratings.....:	Adapter parameter: Input: AC 100-240V, 50/60Hz, 0.3A Max Output: DC 5.0V/1A
Hardware version.....:	H301N-MB-V1
Software version .....:	/
Frequency.....	GSM 850MHz; PCS 1900MHz
Result.....:	**PASS**

Compiled by:	**Supervised by:**	**Approved by:**
Jack Liu / File administrators	Jin Wang / Technique principal	Gavin Liang/ Manager

TEST REPORT

Test Report No. : LCS200414095AEG	June 01, 2020 Date of issue

Equipment under Test	:	Smartphone
Model /Type	:	M5
Applicant	:	**Smartech,C.A..**
Address	:	Manongo Avenue with Palma Real Street,C.C.Via Veneto,Milan Level,M32 Local,Valencia Carabobo Venezuela
Manufacturer	:	**Shen Zhen Cheng Fong Digital-Tech Limited**
Address	:	Building A,WeiHua Industrial Area, Huaxing road, Dalang, Longhua, Shen Zhen, China
Factory	:	**Shen Zhen Cheng Fong Digital-Tech Limited**
Address	:	Building A,WeiHua Industrial Area, Huaxing road, Dalang, Longhua, Shen Zhen, China

Test Result:	**PASS**

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.

Revison History

Revision	Issue Date	Revisions	Revised By
000	June 01, 2020	Initial Issue	Gavin Liang

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 22 (10-1-16 Edition): Cellular Radiotelephone Service.
FCC Part 24(10-1-16 Edition): Broadband PCS.
ANSI/TIA-603-E-2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
47 CFR FCC Part 15 Subpart B: Unintentional Radiators.
FCC Part 2: Frequency Allocations And Radio Treaty Matters: General Rules And Regulations.
ANSI C63.4:2014: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	April 30, 2020
Testing commenced on	:	May 06, 2020
Testing concluded on	:	May 30, 2020

2.2 Product Description

The **Smartech,C.A..** 's Model: X or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

EUT	:	Smartphone
Test Model	:	M5
Power Supply	:	Adapter parameter: Input: AC 100-240V, 50/60Hz, 0.3A Max Output: DC 5.0V/1A
Hardware Version	:	H301N-MB-V1
Software Version	:	
2G	:	
Support Band	:	☒ GSM 900 (EU-Band) ☒ DCS 1800 (EU-Band) ☒ GSM 850 (U.S.-Band) ☒ PCS 1900 (U.S.-Band)
Release Version	:	R99
GPRS Class	:	Class 12
EGPRS Class	:	Class 12
Type Of Modulation	:	GMSK for GSM/GPRS; 8PSK for EGPRS
Antenna Description	:	PIFA Antenna; 1.0dBi (max.) For GSM 850; 1.2dBi (max.) For PCS 1900.
3G	:	
Support Band	:	☒ WCDMA Band II (U.S.-Band) ☒ WCDMA Band V (U.S.-Band) ☐ WCDMA Band IV (U.S.-Band) ☐ WCDMA Band I (EU-Band) ☒ WCDMA Band VIII (EU-Band)
Release Version	:	R8
Type Of Modulation	:	WCDMA: QPSK; HSDPA/HSUPA: QPSK
Antenna Description	:	PIFA Antenna; 1.2dBi (max.) For WCDMA Band II; 1.0dBi (max.) For WCDMA Band V
LTE	:	
Support Band	:	☒ E-UTRA Band 4(U.S.-Band)
LTE Release Version	:	R13
Type Of Modulation	:	QPSK/16QAM
Antenna Description	:	PIFA Antenna; 1.1dBi (max.) For E-UTRA Band 4.
Power Class	:	Class 3

Bluetooth	:	
Frequency Range	:	2402MHz ~ 2480MHz
Channel Number	:	79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)
Channel Spacing	:	1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)
Modulation Type	:	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)
Bluetooth Version	:	V4.0
Antenna Description	:	PIFA Antenna, 1.2dBi(Max.)
WIFI(2.4G Band)	:	
Frequency Range	:	2412MHz ~ 2462MHz
Channel Spacing	:	5MHz
Channel Number	:	11 Channel for 20MHz bandwidth(2412~2462MHz) 9 channels for 40MHz bandwidth(2422~2452MHz)
Modulation Type	:	802.11b: DSSS; 802.11g/n: OFDM
Antenna Description	:	PIFA Antenna, 1.2dBi(Max.)
WIFI(5.2G Band)	:	
Frequency Range	:	5180MHz ~ 5240MHz
Channel Number	:	4 channels for 20MHz bandwidth(5180-5240MHz) 2 channels for 40MHz bandwidth(5190~5230MHz) 1 channels for 80MHz bandwidth(5210MHz)
Modulation Type	:	802.11a/n/ac: OFDM (256QAM,64QAM, 16QAM, QPSK, BPSK)
SRD(5.8G Band)	:	
Frequency Range	:	5745MHz ~ 5825MHz
Channel Number	:	5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz)
Modulation Type	:	802.11a/n/ac: OFDM (256QAM,64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	PIFA Antenna, 1.2dBi(Max.)
GPS Receiver	:	
Receive Frequency	:	1575.42MHz
Channel Number	:	1
Antenna Description	:	PIFA Antenna,1.5dBi(Max.)
FM	:	
Frequency Range	:	87.5MHz~108MHz
Antenna Description	:	Intergral Antenna

2.3 Equipment under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.85V

Test frequency list

Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
	RX	Channel 128	Channel 190	Channel 251
		869.2 MHz	881.6 MHz	893.8 MHz
Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
GSM1900	TX	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz

2.4 Short description of the Equipment under Test (EUT)

2.4.1 General Description

Smartphone is subscriber equipment in theGSM/ WCDMA/ LTE system. GSM/GPRS/EGPRS frequency band is Band I/II//V/VIII.The HSPA/UMTS frequency band is Band II//V/VIII. LTE frequency band is band 4. The HSPA/UMTS frequency band II and Band V test data included in this report. The Smartphone implements such functions as RF signal receiving/transmitting,GSM/GPRS/EGPRS/ HSPA/UMTS/LTE protocol processing, video MMS service and etc. Externally it provides SIM card interface.

2.5 Internal Identification of AE used during the test

Manufacturer	Description	Model	Serial Number	Certificate
Smartech,C.A..	AC/DC Adapter	M5	---	---

2.6 Normal Accessory setting

Fully charged battery was used during the test.

2.7 EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2ATS6-M5** filing to comply with FCC Part 22 and Part 24 Rules.

2.9 Modifications

No modifications were implemented to meet testing criteria.

2.10 General Test Conditions/Configurations

2.10.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
GSM/TM1	GSM system, GSM,GMSK modulation
GSM/TM2	GSM system, GPRS, GMSK modulation
GSM/TM3	GSM system, EDGE, GMSK/8PSK modulation

Note:
1. As GSM and GPRS with the same emission designator, test result recorded in this report at the worst case GSM/TM1 only after exploratory scan.

2.10.2 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.15V
	VN	3.85V
	VH	4.43V

NOTE: VL=lower extreme test voltage VN=nominal voltage
VH=upper extreme test voltage TN=normal temperature

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen LCS Compliance Testing Laboratory Ltd

101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.4 (2014) and CISPR Publication 22.

3.2 Test Facility

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

FCC Registration Number. is 254912.
Industry Canada Registration Number. is 9642A.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001
NVLAP Registration Code is 600167-0

3.3 Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

3.4.1 Cellular Band (824-849MHz paired with 869-894MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §22.913	FCC: ERP ≤ 7W. ISED: ERP ≤ 11.5W.	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §22.917	≤-13dBm/1%*EBW, in 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	≤ -13dBm/100kHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	≤ -13dBm/100kHz.	Pass
Frequency Stability	§2.1055, §22.355	≤ ±2.5ppm.	Pass
Peak-Average Ratio	§22.913	IC:Limit≤13dB	Pass
Receiver Spurious Emissions	N/A	--	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

3.4.2 PCS Band (1850-1910MHz paired with 1930-1990MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	§2.1046, §24.232	EIRP ≤ 2W	Pass
Peak-Average Ratio	§2.1046, §24.232	≤13dB	Pass
Modulation Characteristics	§2.1047	Digital modulation	N/A
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	§2.1051, §24.238	≤ -13dBm/1%*EBW, In 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238	≤-13dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges.	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238	≤ -13dBm/1MHz.	Pass
Frequency Stability	§2.1055, §24.235	≤ ±2.5ppm.	Pass
Peak-Average Ratio	§24.232	IC:Limit≤13dB	Pass
Receiver Spurious Emissions	N/A	--	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

Remark: 1. The measurement uncertainty is not included in the test result.

3.5 Equipments Used during the Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Meter	R&S	NRVS	100444	2019-06-11	2020-06-10
2	Power Sensor	R&S	NRV-Z81	100458	2019-06-11	2020-06-10
3	Power Sensor	R&S	NRV-Z32	10057	2019-06-11	2020-06-10
4	Test Software	Tonscend	JS1120-2	/	N/A	N/A
5	RF Control Unit	Tonscend	JS0806-2	N/A	2019-06-11	2020-06-10
6	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2019-06-11	2020-06-10
7	DC Power Supply	Agilent	E3642A	N/A	2019-11-14	2020-11-13
8	Temperature &Humidity Chamber	GUANZHOU GOGNWEN	GDS-100	70932	2019-10-09	2020-10-08
9	EMI Test Software	AUDIX	E3	/	N/A	N/A
10	3m Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2019-06-12	2020-06-11
11	Positioning Controller	MF	MF-7082	N/A	2019-06-12	2020-06-11
12	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2019-07-25	2020-07-24
13	By-log Antenna	SCHWARZBECK	VULB9163	5094	2019-06-16	2020-06-15
14	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2019-07-25	2020-07-24
15	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1924	2019-06-12	2020-06-11
16	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2019-07-01	2020-06-30
17	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2019-09-19	2020-09-18
18	Broadband Preamplifier	SCHWARZBECK	BBV 9719	9719-025	2019-09-19	2020-09-18
19	EMI Test Receiver	R&S	ESR 7	101181	2019-06-12	2020-06-11
20	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2019-11-14	2020-11-13
21	AMPLIFIER	QuieTek	QTK	CHM/0809065	2019-07-01	2020-06-30
22	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-12	2020-06-11
23	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2019-06-12	2020-06-11
24	6dB Attenuator	/	100W/6dB	1172040	2019-06-11	2020-06-10
25	3dB Attenuator	/	2N-3dB	/	2019-06-11	2020-06-10
26	EMI Test Receiver	R&S	ESPI	101840	2019-06-11	2020-06-10
27	Artificial Mains	R&S	ENV216	101288	2019-06-12	2020-06-11
28	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2019-06-11	2020-06-10
29	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10
Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO., LTD.						

3.6 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 ETSI TR 100 028 " Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics" and is documented in the Shenzhen LCS Compliance Testing Laboratory 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 LCS Compliance Testing Laboratory Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.10 dB	(1)
Radiated Emission	1~18GHz	3.80 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	1.63 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occuiped Bandwidth	9KHz~40GHz	-	(1)

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

4 TEST CONDITIONS AND RESULTS

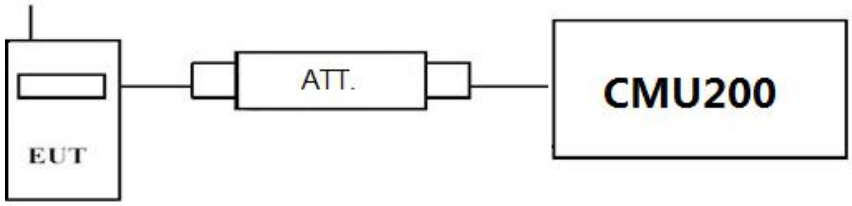
4.1 Output Power

TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMU200) to ensure max power transmission and proper modulation. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

4.1.1 Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a CMU200 by an Att.
c) EUT Communicate with CMU200 then selects a channel for testing.
d) Add a correction factor to the display CMU200, and then test.

TEST RESULTS

GSM 850		Burst Average Conducted power (dBm)		
		Channel/Frequency(MHz)		
		128/824.2	190/836.6	251/848.8
GSM		32.16	32.36	32.14
GPRS (GMSK)	1TX slot	32.51	32.12	32.17
	2TX slot	30.12	30.85	31.45
	3TX slot	29.63	29.53	29.31
	4TX slot	28.23	28.42	28.52
EDGE (8PSK)	1TX slot	26.35	26.63	26.52
	2TX slot	24.56	25.55	25.52
	3TX slot	23.53	22.43	23.12
	4TX slot	21.54	21.52	21.63

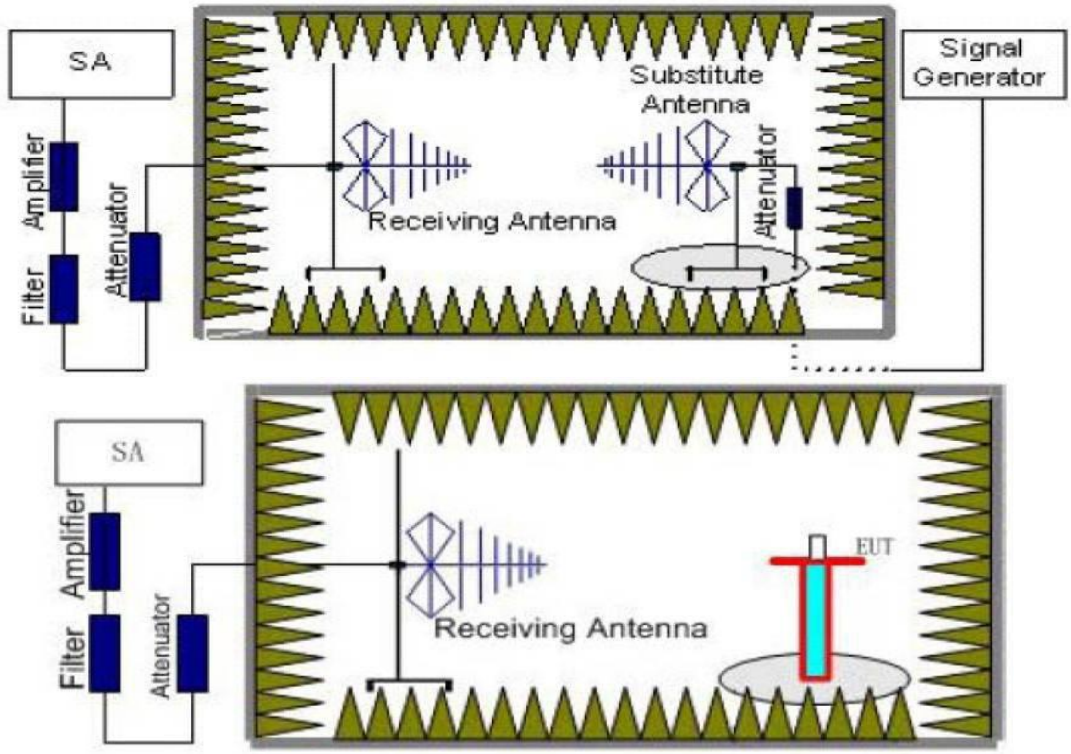
GSM 1900		Burst Average Conducted power (dBm)		
		Channel/Frequency(MHz)		
		512/1850.2	661/1880	810/1909.8
GSM		29.64	29.56	29.89
GPRS (GMSK)	1TX slot	29.23	29.54	29.13
	2TX slot	27.42	27.53	27.64
	3TX slot	26.23	26.75	26.21
	4TX slot	25.31	25.43	25.51
EDGE (8PSK)	1TX slot	25.46	25.32	25.32
	2TX slot	24.55	23.61	24.57
	3TX slot	22.53	22.52	22.63
	4TX slot	21.63	21.42	21.53

4.1.2 Radiated Output Power

TEST DESCRIPTION

This is the test for the maximum radiated power from the EUT.
Per rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(e) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."
Per rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 1.50 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 1.50 m. 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, And the maximum value of the receiver should be recorded as (P_r).
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 (P_{Mea}) 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 (P_r). The power of signal source (P_{Mea}) 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 (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST LIMIT

According to 22.913(a), 24.232(c) , the ERP should be not exceed following table limits:

GSM850(GPRS850,EDGE850)		
Function	Power Step	Burst Peak ERP (dBm)
GSM	5	FCC: ≤38.45dBm (7W)
GPRS	3	FCC: ≤38.45dBm (7W)
EDGE	8	FCC: ≤38.45dBm (7W)

PCS1900(GPRS1900,EDGE1900)		
Function	Power Step	Burst Peak EIRP (dBm)
GSM	0	≤33.01dBm (2W)
GPRS	3	≤33.01dBm (2W)
EDGE	2	≤33.01dBm (2W)

TEST RESULTS

Remark:

1. *We were tested all Configuration refer 3GPP TS151 010.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
3. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*
4. *Margin = Emission Level - Limit*
5. *We test the H direction and V direction recorded worst case.*

GSM/TM1/GSM850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Burst Average ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-15.66	3.45	8.45	2.15	33.79	20.98	38.45	-17.47	V
836.60	-16.61	3.49	8.45	2.15	33.85	20.05	38.45	-18.40	V
848.80	-17.03	3.55	8.36	2.15	33.88	19.51	38.45	-18.94	V

GSM/TM3/EDGE850

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	Burst Average ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.20	-15.71	3.45	8.45	2.15	33.79	20.93	38.45	-17.52	V
836.60	-16.70	3.49	8.45	2.15	33.85	19.96	38.45	-18.49	V
848.80	-17.11	3.55	8.36	2.15	33.88	19.43	38.45	-19.02	V

GSM/TM1/GSM1900

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.20	-17.58	4.03	8.38	35.51	22.28	33.01	-10.73	V
1880.00	-16.67	4.08	8.33	35.56	23.14	33.01	-9.87	V
1909.80	-17.67	4.14	8.26	35.63	22.08	33.01	-10.93	V

GSM/TM3/EDGE1900

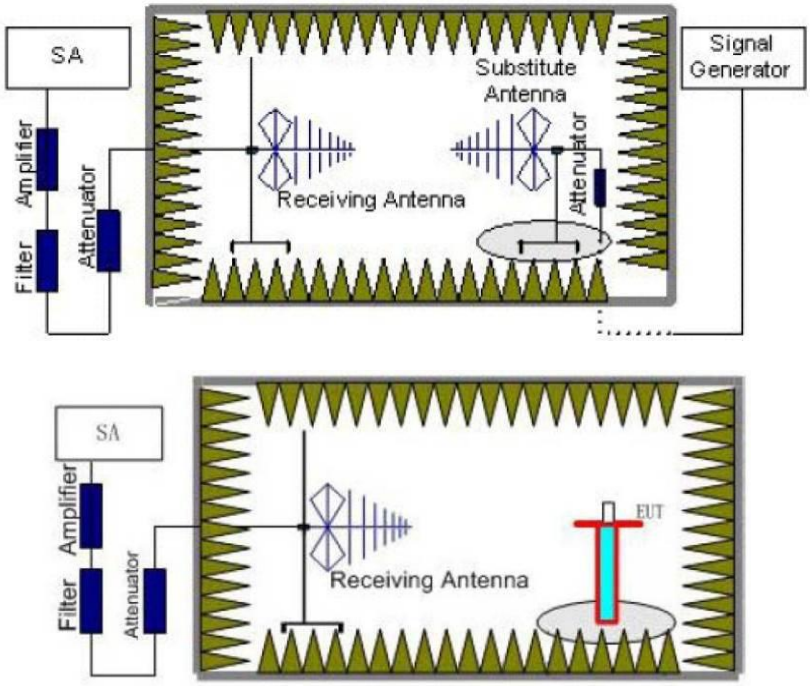
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.20	-17.55	4.03	8.38	35.51	22.31	33.01	-10.70	V
1880.00	-16.64	4.08	8.33	35.56	23.17	33.01	-9.84	V
1909.80	-17.81	4.14	8.26	35.63	21.94	33.01	-11.07	V

4.2 Radiated Spurious Emssion

TEST APPLICABLE

According to the TIA/EIA 603D:2010 and FCC Part 2.1033 test method, The Receiver or Spectrum was scanned from lowest frequency frequency generated within the equipment to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238, Part 22.917, RSS-132 §5.5 and RSS-133 §6.5. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 1.50 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 1.50 m. 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, And the maximum value of the receiver should be recorded as (P_r).
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 (P_{Mea}) 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 (P_r). The power of signal source (P_{Mea}) 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 (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
8. In order to make sure test results more clearly,we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
TM1/GSM 850	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
TM1/GSM 1900	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

TEST LIMITS

According to 24.238 and 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.

Frequency	Channel	Frequency Range	Verdict
TM1/GSM 850	Low	9KHz -10GHz	PASS
	Middle	9KHz -10GHz	PASS
	High	9KHz -10GHz	PASS
TM1/GSM 1900	Low	9KHz -20GHz	PASS
	Middle	9KHz -20GHz	PASS
	High	9KHz -20GHz	PASS

TEST RESULTS

Remark:
1. *We were tested all refer 3GPP TS151 010.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB) +G_a(dBi)*
3. *We were not recorded other points as values lower than limits.*
4. *Margin = EIRP - Limit*

GSM/TM1/GSM850_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1648.40	-45.80	4.29	3.00	6.98	-43.11	-13.00	-30.11	H
2472.60	-41.98	3.86	3.00	8.56	-37.28	-13.00	-24.28	H
1648.40	-43.50	4.29	3.00	6.98	-40.81	-13.00	-27.81	V
2472.60	-45.80	4.29	3.00	6.98	-43.11	-13.00	-30.11	V

GSM/TM1/GSM850_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.20	-45.81	3.90	3.00	8.58	-41.13	-13.00	-28.13	H
2509.80	-46.81	4.32	3.00	6.80	-44.33	-13.00	-31.33	H
1673.20	-42.61	3.90	3.00	8.58	-37.93	-13.00	-24.93	V
2509.80	-44.58	4.32	3.00	6.80	-42.10	-13.00	-29.10	V

GSM/TM1/GSM850_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.60	-47.74	3.91	3.00	9.06	-42.59	-13.00	-29.59	H
2546.40	-45.85	4.32	3.00	6.65	-43.52	-13.00	-30.52	H
1697.60	-44.26	3.91	3.00	9.06	-39.11	-13.00	-26.11	V
2546.40	-44.97	4.32	3.00	6.65	-42.64	-13.00	-29.64	V

GSM/TM3/GSM850_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1648.40	-46.07	4.29	3.00	6.98	-43.38	-13.00	-30.38	H
2472.60	-41.74	3.86	3.00	8.56	-37.04	-13.00	-24.04	H
1648.40	-43.68	4.29	3.00	6.98	-40.99	-13.00	-27.99	V
2472.60	-46.07	4.29	3.00	6.98	-43.38	-13.00	-30.38	V

GSM/TM3/GSM850_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.20	-45.99	3.90	3.00	8.58	-41.31	-13.00	-28.31	H
2509.80	-46.48	4.32	3.00	6.80	-44.00	-13.00	-31.00	H
1673.20	-42.71	3.90	3.00	8.58	-38.03	-13.00	-25.03	V
2509.80	-44.56	4.32	3.00	6.80	-42.08	-13.00	-29.08	V

GSM/TM3/GSM850_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.60	-47.64	3.91	3.00	9.06	-42.49	-13.00	-29.49	H
2546.40	-45.94	4.32	3.00	6.65	-43.61	-13.00	-30.61	H
1697.60	-44.34	3.91	3.00	9.06	-39.19	-13.00	-26.19	V
2546.40	-45.29	4.32	3.00	6.65	-42.96	-13.00	-29.96	V

GSM/TM1/GSM1900_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3700.40	-42.52	5.26	3.00	9.88	-37.90	-13.00	-24.90	H
5550.60	-48.24	6.11	3.00	11.36	-42.99	-13.00	-29.99	H
3700.40	-44.70	5.26	3.00	9.88	-40.08	-13.00	-27.08	V
5550.60	-50.20	6.11	3.00	11.36	-44.95	-13.00	-31.95	V

GSM/TM1/GSM1900_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-44.18	5.32	3.00	10.03	-39.47	-13.00	-26.47	H
5640.00	-50.01	6.19	3.00	11.41	-44.79	-13.00	-31.79	H
3760.00	-45.08	5.32	3.00	10.03	-40.37	-13.00	-27.37	V
5640.00	-51.00	6.19	3.00	11.41	-45.78	-13.00	-32.78	V

GSM/TM1/GSM1900_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3819.60	-45.55	5.36	3.00	9.62	-41.29	-13.00	-28.29	H
5729.40	-50.89	6.24	3.00	11.46	-45.67	-13.00	-32.67	H
3819.60	-46.61	5.36	3.00	9.62	-42.35	-13.00	-29.35	V
5729.40	-51.50	6.24	3.00	11.46	-46.28	-13.00	-33.28	V

GSM/TM3/GSM1900_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3700.40	-42.75	5.26	3.00	9.88	-38.13	-13.00	-25.13	H
5550.60	-48.21	6.11	3.00	11.36	-42.96	-13.00	-29.96	H
3700.40	-45.00	5.26	3.00	9.88	-40.38	-13.00	-27.38	V
5550.60	-50.12	6.11	3.00	11.36	-44.87	-13.00	-31.87	V

GSM/TM3/GSM1900_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-44.52	5.32	3.00	10.03	-39.81	-13.00	-26.81	H
5640.00	-50.00	6.19	3.00	11.41	-44.78	-13.00	-31.78	H
3760.00	-45.10	5.32	3.00	10.03	-40.39	-13.00	-27.39	V
5640.00	-50.93	6.19	3.00	11.41	-45.71	-13.00	-32.71	V

GSM/TM3/GSM1900_ High Channel

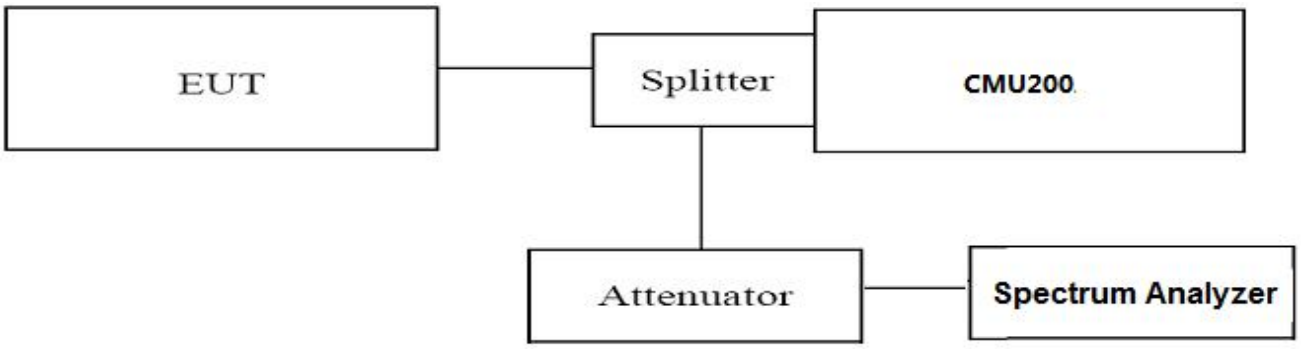
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3819.60	-45.46	5.36	3.00	9.62	-41.20	-13.00	-28.20	H
5729.40	-50.73	6.24	3.00	11.46	-45.51	-13.00	-32.51	H
3819.60	-46.61	5.36	3.00	9.62	-42.35	-13.00	-29.35	V
5729.40	-51.42	6.24	3.00	11.46	-46.20	-13.00	-33.20	V

4.3 Occupied Bandwidth and Emission Bandwidth

TEST APPLICABLE

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. The table below lists the measured 99% Bandwidth
and -26dBc Bandwidth.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. The Occupied bandwidth and Emission Bandwidth were measured with Spectrum AnalyzerN9020A;
3. Set RBW=5.1KHz,VBW=51KHz,Span=1MHz,SWT=Auto;
4. Set SPA Max hold and View, Set 99% Occupied Bandwidth/ Set -26dBc Occupied Bandwidth
5. These measurements were done at 3 frequencies, 1850.20 MHz, 1880.00 MHz and 1909.80 MHz for PCS1900 band; 824.20MHz, 836.60 MHz and 848.80 MHz for GSM850 band. (Low, middle and high of operational frequency range).

TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Occupied Bandwidth (99% BW) (KHz)	Emission Bandwidth (-26 dBc BW) (KHz)	Verdict
GSM/TM1 /GSM850	128	824.2	250.3	315	PASS
	190	836.6	246.7	313	PASS
	251	848.8	243.6	311	PASS
GSM/TM3 /EDGE850	128	824.2	253.6	316	PASS
	190	836.6	251.2	322	PASS
	251	848.8	255.6	317	PASS
GSM/TM1 /GSM1900	512	1850.2	242.6	308	PASS
	661	1880.0	245.1	314	PASS
	810	1909.8	246.8	313	PASS
GSM/TM3 /EDGE1900	512	1850.2	250.9	316	PASS
	661	1880.0	247.4	313	PASS
	810	1909.8	254.7	315	PASS

Remark:
1. *Test results including cable loss;*
2. *Please refer to following plots;*