

FCC

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
LTE Digital Mobile Handset

ISSUED TO
ZTE Corporation

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District,
Shenzhen, Guangdong, P.R. China



Tested by:

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Date

Jun 30, 2016

Approved by:

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Wei Yanquan
(Chief Engineer)

Date

Jun 30, 2016



Report No.: BL-SZ1660087-501

EUT Type: LTE Digital Mobile Handset

Model Name: ZTE Blade A511

Brand Name: ZTE

Test Standard: 47 CFR Part 2
47 CFR Part 22
47 CFR Part 24
47 CFR Part 27

FCC ID: SRQ-A511

Test Conclusion: Pass

Test Date: Jun. 7, 2016 ~ Jun. 30, 2016

Date of Issue: Jun. 30, 2016

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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Jun. 28, 2016</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Jun. 30, 2016</u>	<u>Revised the EIRP/ERP in Section A.1.</u>

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location 1	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Accreditation Certificate1	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p>
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	24 to 30 °C
Ambient Relative Humidity	44 to 55 %
Ambient Pressure	99 to 101 KPa

1.4 Announce

- (1) The test report reference to the report template version v1.1.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	ZTE Corporation
Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R. China

2.2 Manufacturer Information

Manufacturer	ZTE Corporation
Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R. China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Type	LTE Digital Mobile Handset
Model Name	ZTE Blade A511
Series Model Name	Blade A511
Description of Model name differentiation	The equipment model ZTE Blade A511 and Blade A511 are LTE Digital Mobile Handset, the electrical parameters and internal structure of circuit are same, only the model name is different.
Hardware Version	V1AMB_A
Software Version	A511_ChileMovistar_1.01
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A
Network and Wireless connectivity	2G Network GSM 850/1900 MHz, GPRS, EDGE 3G Network WCDMA Band II/V, HSDPA,HSUPA 4G Network FDD LTE Band 4/7/28 Bluetooth 3.0, Bluetooth 4.0, GPS, FM, GLONASS WIFI 802.11b, 802.11g, 802.11n20, 802.11n40
About the Product	The equipment is LTE Digital Mobile Handset, intended for used with information technology equipment.

2.5 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Frequency Bands	GSM/GPRS/EGPRS 850/1900 WCDMA/HSDPA/HSUPA Band 2/ 5 LTE FDD Band 4/ 7/ 28	
Modulation Type	GSM/GPRS	GMSK
	EGPRS	8PSK
	WCDMA	QPSK
	HSDPA /HSUPA	QPSK
		16QAM
	LTE	QPSK
16QAM		
TX Frequency Range	GSM/GPRS/EGPRS 850: 824 - 849 MHz GSM/GPRS/EGPRS 1900: 1850 - 1910 MHz WCDMA/HSDPA/HSUPA Band 2: 1850 -1910 MHz WCDMA/HSDPA/HSUPA Band 5: 824 - 849 MHz LTE FDD Band 4: 1710 - 1755 MHz LTE FDD Band 7: 2500 - 2570 MHz LTE FDD Band 28: 703- 748 MHz	
Rx Frequency Range	GSM/GPRS/EGPRS 850: 869 - 894 MHz GSM/GPRS/EGPRS 1900: 1930 - 1990 MHz WCDMA/HSDPA/HSUPA Band 2: 1930 - 1990 MHz WCDMA/HSDPA/HSUPA Band 5: 869 - 894 MHz LTE FDD Band 4: 2110 - 2155 MHz LTE FDD Band 7: 2620 - 2690 MHz LTE FDD Band 28: 758- 803 MHz	
Power Class	GSM/GPRS 850: 4 GSM/GPRS 1900: 1 EGPRS 850/1900: E2 WCDMA/HSDPA/HSUPA Band 2: 3 WCDMA/HSDPA/HSUPA Band 5: 3 LTE FDD Band 4: 3 LTE FDD Band 7: 3 LTE FDD Band 28: 3	
Multislot Class	GPRS/EGPRS: 12	
Antenna Type	PIFA Antenna	

Note 1: The EUT information are declared by manufacturer. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.6 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	ZTE
	Model No.	Li3822T43P3h786032
	Serial No.	N/A
	Capacitance	2200 mAh
	Rated Voltage	3.8 V
	Limited Voltage	4.35 V
Ancillary Equipment 2	Charge	
	Brand Name	ZTE
	Model No.	STC-A22O50I1000USBA-A
	Rated Input	100~240 V ~, 50~60 Hz, 300 mA
	Rated Output	5 V =, 1000 mA
Ancillary Equipment 3	USB Data Cable	
	Length (Approx)	1.2 m
Ancillary Equipment 4	Earphone	
	Length (Approx)	51 cm

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2 (10 - 1 - 15 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10 - 1 - 15 Edition)	Public Mobile Services
3	47 CFR Part 24 (10 - 1 - 15 Edition)	Personal Communications Services
4	47 CFR Part 27 (10 - 1 - 15 Edition)	Miscellaneous Wireless Communications Services
5	TIA/EIA 603.D-2010	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
6	KDB 971168 D01 v02r02	Measurement Guidance for Certification of Licensed Digital Transmitters

3.2 Test Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Conducted RF Output Power	2.1046	Reporting only (ANNEX A.1)	Pass
2	Effective (Isotropic) Radiated Power	2.1046; 22.913; 24.232; 27.50(d); 27.50(h)	ANNEX A.1	Pass
3	Peak to average ratio	2.0146; 24.232; 27.50(d)	ANNEX A.2	Pass
4	Occupied Bandwidth	2.1049; 22.917; 24.238; 27.53(h); 27.53(m)	ANNEX A.3	Pass
5	Frequency Stability	2.1055; 22.355; 24.235; 27.54	ANNEX A.4	Pass
6	Spurious Emission at Antenna Terminals	2.1051; 22.917; 24.238;27.53(h); 27.53(m)	ANNEX A.5	Pass
7	Band Edge	2.1051; 22.917; 24.238; 27.53(h); 27.53(m)	ANNEX A.6	Pass
8	Field Strength of Spurious Radiation	2.1053; 22.917; 24.238; 27.53(h) 27.53(m)	ANNEX A.7	Pass

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 and SZ16010163W05 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for the data of Band 28, EIRP and field Strength of Spurious Radiation. Compared with the old model, the new model increases the BAND 28 data, and this BAND's all tests items were be tested.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Working Voltage of The EUT	NV (Normal Voltage)	3.8 V
	LV (Low Voltage)	3.6 V
	HV (High Voltage)	4.35 V
Working Temperature of The EUT	LT (Low Temperature)	-10 °C
	HT (High Temperature)	45 °C

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2015.07.16	2016.07.15
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2015.10.15	2016.10.14
Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU 200	123666	2015.10.15	2016.10.14
Wireless Communications Test Set	ROHDE&SCHWARZ	CMW 500	151885	2015.07.16	2016.07.15
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2015.07.14	2016.07.13
Power Splitter	KMW	DCPD-LDC	1305003215	2015.07.01	2016.06.30
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2015.07.21	2015.07.20
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	IT6863A	60001401068 7210020	2015.07.16	2016.07.15
Temperature Chamber	ANGELANTIONI SCIENCE	SP20	1412	2015.08.07	2016.08.06
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2015.07.22	2017.07.21
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21
Test Antenna-Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2015.07.22	2017.07.21
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2015.02.28	2017.02.27
Shielded Enclosure	ChangNing	CN-130701	130703	--	--

4.3 Test Configurations

Test Items	Test Mode	Test Channel		
		LCH	MCH	HCH
E.R.P/E.I.R.P	GSM 850	v	v	v
	GSM 1900	v	v	v
	GPRS 850	v	v	v
	GPRS 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
	HSUPA Band 2	v	v	v
	HSUPA Band 5	v	v	v
	HSDPA Band 2	v	v	v
	HSDPA Band 5	v	v	v
Peak to Average Ratio	WCDMA Band 2	v	v	v
Occupied Bandwidth	GSM 850	v	v	v
	GSM 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Frequency Stability	GSM 850	v	v	v
	GSM 1900	v	v	v
	GPRS 850	v	v	v
	GPRS 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Spurious Emission at Antenna Terminals	GSM 850	v	v	v
	GSM 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Band Edge	GSM 850	v	--	v
	GSM 1900	v	--	v
	EGPRS 850	v	--	v
	EGPRS 1900	v	--	v
	WCDMA Band 2	v	--	v
	WCDMA Band 5	v	--	v
Field Strength of Spurious Radiation	GSM 850	v	v	v
	GSM 1900	v	v	v

Test Items	Test Mode	Test Channel		
		LCH	MCH	HCH
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v

Note 1: The mark "v" means that this configuration is chosen for testing.

LTE Band	Bandwidth (MHz)						Modulation		RB#			Test Channel		
	1.4	3	5	10	15	20	QPSK	16-QAM	1	Half	Full	LCH	MCH	HCH
E.R.P/E.I.R.P														
4	v	v	v	v	v	v	v	v	v	--	v	v	v	v
7	n	n	v	v	v	v	v	v	v	--	v	v	v	v
28	n	v	v	v	v	v	v	v	v	--	v	v	v	v
Peak to Average Ratio														
4	--	--	--	--	--	v	v	v	v	--	v	v	v	v
7	n	n	--	--	--	v	v	v	v	--	v	v	v	v
28	n	--	--	--	--	v	v	v	v	--	v	v	v	v
Occupied Bandwidth														
4	v	v	v	v	v	v	v	v	--	--	v	v	v	v
7	n	n	v	v	v	v	v	v	--	--	v	v	v	v
28	n	v	v	v	v	v	v	v	--	--	v	v	v	v
Frequency Stability														
4	--	--	--	v	--	--	v	v	--	--	v	--	v	--
7	n	n	--	v	--	--	v	v	--	--	v	--	v	--
28	n	--	--	v	--	--	v	v	--	--	v	--	v	--
Spurious Emission at Antenna Terminals														
4	v	v	v	v	v	v	v	v	v	--	--	v	v	v
7	n	n	v	v	v	v	v	v	v	--	--	v	v	v
28	n	v	v	v	v	v	v	v	v	--	--	v	v	v
Band Edge														
4	v	v	v	v	v	v	v	v	v	--	v	v	--	v
7	n	n	v	v	v	v	v	v	v	--	v	v	--	v
28	n	v	v	v	v	v	v	v	v	--	v	v	--	v
Field Strength of Spurious Radiation														
4	v	v	v	v	v	v	v	--	v	--	--	--	v	--
7	n	n	v	v	v	v	v	--	v	--	--	--	v	--
28	n	v	v	v	v	v	v	--	v	--	--	--	v	--

Note 1: The mark “v” means that this configuration is chosen for testing.

Note 2: The mark “n” means that this bandwidth is not supported.

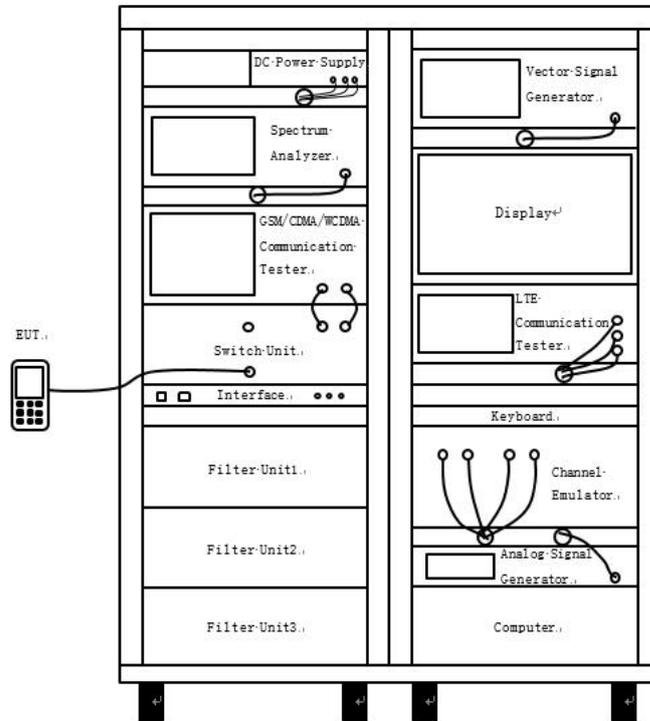
Test Mode	UL Channel	UL Channel No.	UL Frequency (MHz)
GSM/GPRS/EGPRS 850	LCH	128	824.2
	MCH	190	836.6
	HCH	251	848.8
GSM/GPRS/EGPRS 1900	LCH	512	1850.2
	MCH	661	1880.0
	HCH	810	1909.8
WCDMA Band 2	LCH	9262	1852.4
	MCH	9400	1880.0
	HCH	9538	1907.6
WCDMA Band 5	LCH	4132	826.4
	MCH	4182	836.4
	HCH	4233	846.6

Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
LTE Band 4	Low Range	1.4	19957	1710.7
		3	19965	1711.5
		5	19975	1712.5
		10	20000	1715
		15	20025	1717.5
		20	20050	1720
	Middle Range	1.4/3/5/10/15/20	20175	1732.5
	High Range	1.4	20393	1754.3
		3	20385	1753.5
		5	20375	1752.5
		10	20350	1750
		15	20325	1747.5
20		20300	1745	
LTE Band 7	Low Range	5	20775	2502.5
		10	20800	2505
		15	20825	2507.5
		20	20850	2510
	Middle Range	5/10/15/20	21100	2535
	High Range	5	21425	2567.5
		10	21400	2565
		15	21375	2562.5
20		21350	2560	
LTE Band 28	Low Range	3	27225	704.5
		5	27235	705.5
		10	27260	708
		15	27285	710.5
		20	27310	713
	Middle Range	3	27375	719.5

Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
		5	27385	720.5
		10	27410	723
		15	27435	725.5
		20	27460	728
	High Range	3	27645	746.5
		5	27635	745.5
		10	27610	743
		15	27585	740.5
		20	27560	738

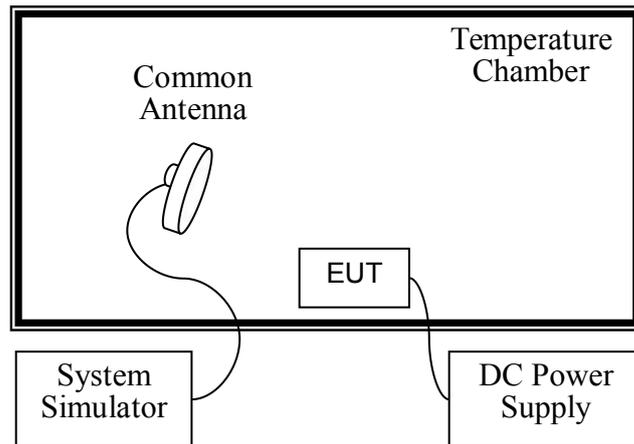
4.4 Test Setup

4.4.1 For Antenna Port Test



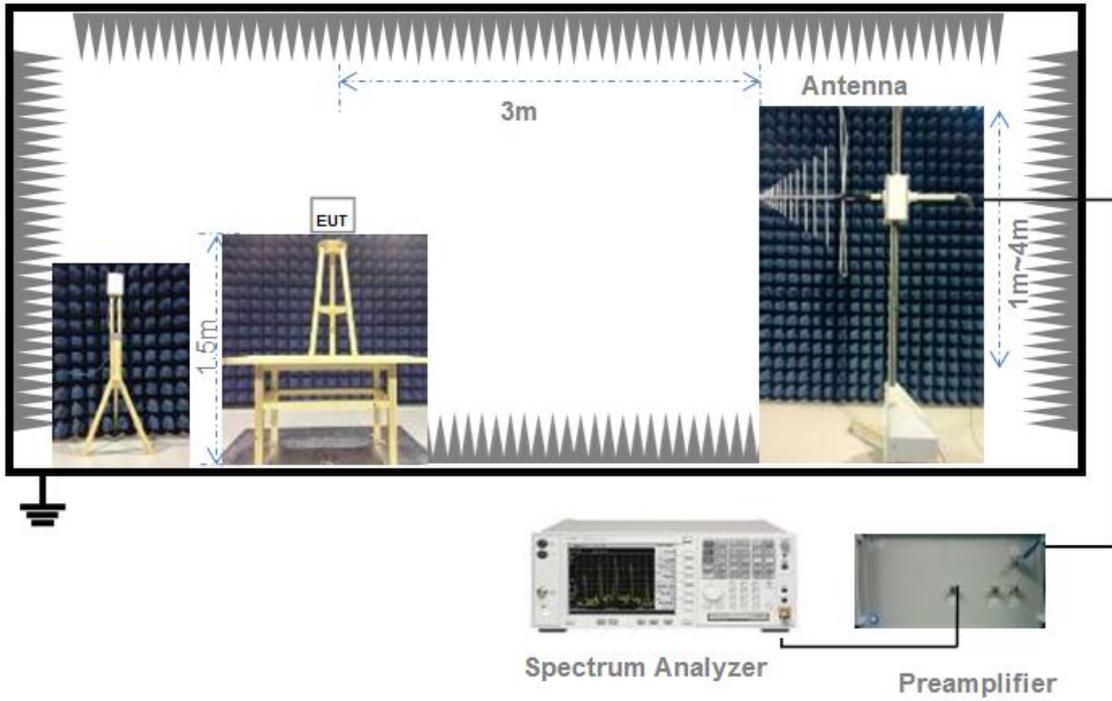
(Diagram 1)

4.4.2 For Frequency Stability Test



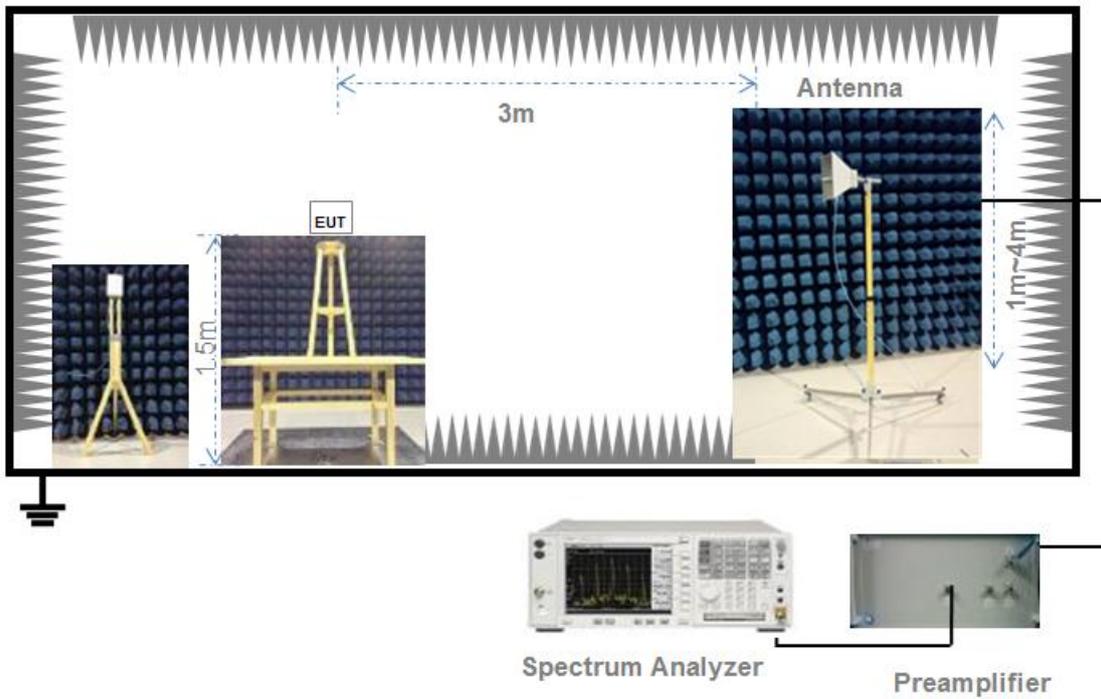
(Diagram 2)

4.4.3 For Radiated Test (30 MHz-1 GHz)



(Diagram 3)

4.4.4 For Radiated Test (Above 1 GHz)



(Diagram 4)

5 TEST ITEMS

5.1 Transmitter Radiated Power (EIRP/ERP)

5.1.1 Limit

FCC §2.1046(a) & 22.913 & 24.232 & 27.50(d) & 27.50(h)

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts, FCC section 24.232, Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

FCC section 27.50(d), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications, and FCC section 27.50(h) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

5.1.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT, Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

Note: Reference test setup 4.4.1 (Diagram 1)

Description of the Transmitter Radiated Power Measurement

In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

$$\text{dBd (ERP)} = \text{dBi} - 2.15$$

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

Note: Reference test setup 4.4.3 and 4.4.4 (Diagram 3, 4)

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Peak to average ratio

5.2.1 Limit

FCC § 2.1046 & 24.232 & 27.50(d)

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with 24.232 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

5.2.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

Test procedures:

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Set the measurement interval as follows:
 - 1) for continuous transmissions, set to 1 ms,
 - 2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.

e) Record the maximum PAPR level associated with a probability of 0.1%.

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPK. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Note: Reference test setup 4.4.1 (Diagram 1).

5.2.4 Test Result

Please refer to ANNEX A.2.

5.3 Occupied Bandwidth

5.3.1 Limit

FCC § 2.1049

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.

5.3.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The following procedure shall be used for measuring (99 %) power bandwidth

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.
- e) Set the detection mode to peak, and the trace mode to max hold..
- f) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99 % power bandwidth function, the trace data points are to be recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % power bandwidth is the difference between these two frequencies.
- h) The OBW shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Note: Reference test setup 4.4.1 (Diagram 1).

5.3.4 Test Result

Please refer to ANNEX A.3.

5.4 Frequency Stability

5.4.1 Limit

FCC § 2.1055 & 22.355 & 24.235 & 27.54

§ 22.355

Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Table C-1—Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

& 24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

& 27.54

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

The test conditions are:

- (a) The temperature is varied from -30°C to +50°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

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

1. The test is performed in a Temperature Chamber.
2. The EUT is configured as MS + DC Power Supply.

Note: Reference test setup 4.4.2 (Diagram 2).

5.4.4 Test Result

Please refer to ANNEX A.4.

5.5 Spurious Emission at Antenna Terminals

5.5.1 Limit

FCC §2.1051 & 22.917(a) & 24.238(a) & 27.53(h) & 27.53(m)

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 -13 dBm.

Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

FCC § 27.53(m)

For mobile digital stations, the attenuation factor shall be not less than:

- $40+10\log P$ dB (-10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.
- $43+10\log P$ dB (-13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,
- $55+10\log P$ dB (-25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB).

5.5.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note: Reference test setup 4.4.1 (Diagram 1).

5.5.4 Test Result

Please refer to ANNEX A.5.

5.6 Band Edge

5.6.1 Limit

FCC § 2.1051 & 22.917(b) & 24.238(b) & 27.53(h) & 27.53(m)

The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least $43+10\log(P)$ dB.

In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26 dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5.6.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The EUT, which is powered by the Battery, 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 50 Ohm; the path loss as the factor is calibrated to correct the reading.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The center of the spectrum analyzer was set to block edge frequency.

Note: Reference test setup 4.4.1 (Diagram 1).

5.6.4 Test Result

Please refer to ANNEX A.6.

5.7 Field Strength of Spurious Radiation

5.7.1 Limit

FCC § 2.1053 & 22.917 & 24.238 & 27.53(h) & 27.53(m)

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 -13 dBm.

FCC § 27.53(h)

(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

(2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:

(i) Operations in the 2180-2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200-2290 MHz band.

(ii) For operations in the 2000-2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}(P)$ dB.

(iii) For operations in the 1915-1920 MHz band, the power of any emission between 1930-1995 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}(P)$ dB.

(iv) For operations in the 1995-2000 MHz band, the power of any emission between 2005-2020 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}(P)$ dB.

FCC § 27.53(m)

For mobile digital stations, the attenuation factor shall be not less than:

- $40+10\log P$ dB (-10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.
- $43+10\log P$ dB (-13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,
- $55+10\log P$ dB (-25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB).

5.7.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to

the fundamental frequency of the transmitter.

3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth was set to 1 MHz.
5. The transmitter shall be switched on; the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole (824 ~ 849 MHz) or horn antenna (1 850 ~ 1 910 MHz) connected to a signal generator.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
14. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

Note: Reference test setup 4.4.3 and 4.4.4 (Diagram 3, 4).

5.7.4 Test Result

Please refer to ANNEX A.7.

ANNEX A TEST RESULTS

A.1 Transmitter Radiated Power (EIRP/ERP)

GSM Mode Test Data

Test Band	Channel	PCL	Measured ERP				Limit		Verdict
			SA Read Value (dBm)	Correction Factor(dB)	ERP (dBm)	ERP (W)	dBm	W	
GSM 850	128	5	-8.91	41.3	32.39	1.73	38.5	7	Pass
	190	5	-9.06	41.3	32.24	1.67			Pass
	251	5	-10.91	41.3	30.39	1.09			Pass
GPRS 850	128	5	-9.05	41.3	32.25	1.68	38.5	7	Pass
	190	5	-9.24	41.3	32.06	1.61			Pass
	251	5	-11.25	41.3	30.05	1.01			Pass
EGPRS 850	128	5	-12.01	41.3	29.29	0.85	38.5	7	Pass
	190	5	-12.40	41.3	28.90	0.78			Pass
	251	5	-13.98	41.3	27.32	0.54			Pass

Test Band	Channel	PCL	Measured ERP				Limit		Verdict
			SA Read Value (dBm)	Correction Factor(dB)	ERP (dBm)	ERP (W)	dBm	W	
GSM 1900	512	0	-14.82	41.7	26.88	0.49	33	2	Pass
	661	0	-13.10	41.7	28.60	0.72			Pass
	810	0	-12.21	41.7	29.49	0.89			Pass
GPRS 1900	512	0	-15.11	41.7	26.59	0.46	33	2	Pass
	661	0	-13.37	41.7	28.33	0.68			Pass
	810	0	-12.42	41.7	29.29	0.85			Pass
EGPRS 1900	512	0	-15.65	41.7	26.05	0.40	33	2	Pass
	661	0	-13.83	41.7	27.87	0.61			Pass
	810	0	-12.81	41.7	28.89	0.77			Pass

Note 1: For the GPRS and EGPRS mode, all the slots were tested and just the worst data were recorded in this table.

Note 2: ERP/EIRP = SA Read Value + Correction Factor

WCDMA Mode Test Data:

Test Band	Channel	Measured EIRP				Limit		Verdict
		SA Read Value (dBm)	Correction Factor(dB)	ERP (dBm)	ERP (W)	dBm	W	
WCDMA 850	9262	-16.89	41.3	24.41	0.28	38.5	7	Pass
	9400	-18.43	41.3	22.87	0.19			Pass
	9538	-19.88	41.3	21.42	0.14			Pass
HSDPA 850	9262	-17.9	41.3	23.40	0.22	38.5	7	Pass
	9400	-19.41	41.3	21.89	0.15			Pass
	9538	-20.84	41.3	20.46	0.11			Pass
HSUPA 850	9262	-17.88	41.3	23.42	0.22	38.5	7	Pass
	9400	-19.39	41.3	21.91	0.16			Pass
	9538	-20.91	41.3	20.39	0.11			Pass
HSPA +	9262	-17.92	41.3	23.38	0.22	38.5	7	Pass
	9400	-19.41	41.3	21.89	0.15			Pass
	9538	-20.86	41.3	20.44	0.11			Pass

Test Band	Channel	Measured EIRP				Limit		Verdict
		SA Read Value (dBm)	Correction Factor(dB)	ERP (dBm)	ERP (W)	dBm	W	
WCDMA 1900	4132	-20.13	41.7	21.57	0.14	33	2	Pass
	4182	-20.76	41.7	20.94	0.12			Pass
	4233	-20.84	41.7	20.86	0.12			Pass
HSDPA 1900	4132	-21.26	41.7	20.44	0.11	33	2	Pass
	4182	-21.78	41.7	19.92	0.10			Pass
	4233	-21.41	41.7	20.29	0.11			Pass
HSUPA 1900	4132	-21.28	41.7	20.42	0.11	33	2	Pass
	4182	-21.77	41.7	19.93	0.10			Pass
	4233	-21.91	41.7	19.79	0.10			Pass
HSPA +	4132	-21.22	41.7	20.48	0.11	33	2	Pass
	4182	-21.81	41.7	19.89	0.10			Pass
	4233	-21.89	41.7	19.81	0.10			Pass

Note 1: For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this table.

Note 2: ERP/EIRP = SA Read Value + Correction Factor

LTE Mode Test Data:

Band 4

Test Band	Test Model	Channel	Test RB (Size#Offset)	Measured EIRP				Limit		Verdict
				SA Read Value (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)	dBm	W	
1.4 MHz	QPSK	19957	RB1#0	-19.45	41.5	22.05	0.16	30	1	Pass
		20175	RB1#0	-19.58	41.5	21.92	0.16			Pass
		20393	RB1#0	-19.54	41.5	21.96	0.16			Pass
	QPSK	19957	RB6#0	-20.24	41.5	21.26	0.13	30	1	Pass
		20175	RB6#0	-20.38	41.5	21.12	0.13			Pass
		20393	RB6#0	-20.22	41.5	21.28	0.13			Pass
	16-QAM	19957	RB1#0	-19.76	41.5	21.74	0.15	30	1	Pass
		20175	RB1#0	-20.18	41.5	21.32	0.14			Pass
		20393	RB1#0	-19.24	41.5	22.26	0.17			Pass
	16-QAM	19957	RB6#0	-21.7	41.5	19.8	0.10	30	1	Pass
		20175	RB6#0	-21.05	41.5	20.45	0.11			Pass
		20393	RB6#0	-20.23	41.5	21.27	0.13			Pass
3 MHz	QPSK	19965	RB1#0	-19.52	41.5	21.98	0.16	30	1	Pass
		20175	RB1#0	-19.86	41.5	21.64	0.15			Pass
		20385	RB1#0	-18.72	41.5	22.78	0.19			Pass
	QPSK	19965	RB15#0	-21.64	41.5	19.86	0.10	30	1	Pass
		20175	RB15#0	-21.98	41.5	19.52	0.09			Pass
		20385	RB15#0	-20.86	41.5	20.64	0.12			Pass
	16-QAM	19965	RB1#0	-19.12	41.5	22.38	0.17	30	1	Pass
		20175	RB1#0	-18.91	41.5	22.59	0.18			Pass
		20385	RB1#0	-18.94	41.5	22.56	0.18			Pass
	16-QAM	19965	RB15#0	-21.35	41.5	20.15	0.10	30	1	Pass
		20175	RB15#0	-20.97	41.5	20.53	0.11			Pass
		20385	RB15#0	-20.54	41.5	20.96	0.14			Pass
5 MHz	QPSK	19975	RB1#0	-19.31	41.5	22.19	0.17	30	1	Pass
		20175	RB1#0	-19.65	41.5	21.85	0.15			Pass
		20375	RB1#0	-18.89	41.5	22.61	0.18			Pass
	QPSK	19975	RB25#0	-21.76	41.5	19.74	0.09	30	1	Pass
		20175	RB25#0	-22.12	41.5	19.38	0.09			Pass
		20375	RB25#0	-21.02	41.5	20.48	0.11			Pass
	16-QAM	19975	RB1#0	-18.92	41.5	22.58	0.18	30	1	Pass
		20175	RB1#0	-18.85	41.5	22.65	0.18			Pass
		20375	RB1#0	-18.43	41.5	23.07	0.20			Pass
	16-QAM	19975	RB25#0	-21.5	41.5	20.00	0.10	30	1	Pass
		20175	RB25#0	-21.1	41.5	20.40	0.11			Pass
		20375	RB25#0	-20.09	41.5	21.41	0.14			Pass

Test Band	Test Model	Channel	Test RB (Size#Offset)	Measured EIRP				Limit		Verdict
				SA Read Value (dBm)	Correction Factor(dB)	EIRP (dBm)	EIRP (W)	dBm	W	
10 MHz	QPSK	20000	RB1#0	-19.58	41.5	21.92	0.16	30	1	Pass
		20175	RB1#0	-19.85	41.5	21.65	0.15			Pass
		20350	RB1#0	-19.32	41.5	22.18	0.17			Pass
	QPSK	20000	RB50#0	-21.63	41.5	19.87	0.10	30	1	Pass
		20175	RB50#0	-21.94	41.5	19.56	0.09			Pass
		20350	RB50#0	-21.02	41.5	20.48	0.11			Pass
	16-QAM	20000	RB1#0	-19.09	41.5	22.41	0.17	30	1	Pass
		20175	RB1#0	-19.37	41.5	22.13	0.16			Pass
		20350	RB1#0	-18.11	41.5	23.39	0.22			Pass
16-QAM	20000	RB50#0	-22.32	41.5	19.18	0.08	30	1	Pass	
	20175	RB50#0	-20.07	41.5	21.43	0.14			Pass	
	20350	RB50#0	-21.08	41.5	20.42	0.11			Pass	
15 MHz	QPSK	20025	RB1#0	-19.38	41.5	22.12	0.16	30	1	Pass
		20175	RB1#0	-19.61	41.5	21.89	0.15			Pass
		20325	RB1#0	-19.43	41.5	22.07	0.16			Pass
	QPSK	20025	RB75#0	-22.35	41.5	19.15	0.08	30	1	Pass
		20175	RB75#0	-21.75	41.5	19.75	0.09			Pass
		20325	RB75#0	-21.99	41.5	19.51	0.09			Pass
	16-QAM	20025	RB1#0	-19.05	41.5	22.45	0.18	30	1	Pass
		20175	RB1#0	-19.06	41.5	22.44	0.18			Pass
		20325	RB1#0	-18.41	41.5	23.09	0.20			Pass
16-QAM	20025	RB75#0	-22.15	41.5	19.35	0.09	30	1	Pass	
	20175	RB75#0	-21.89	41.5	19.61	0.09			Pass	
	20325	RB75#0	-20.85	41.5	20.65	0.12			Pass	
20 MHz	QPSK	20050	RB1#0	-19.23	41.5	22.27	0.17	30	1	Pass
		20175	RB1#0	-19.47	41.5	22.03	0.16			Pass
		20300	RB1#0	-19.74	41.5	21.76	0.15			Pass
	QPSK	20050	RB100#0	-23.44	41.5	18.06	0.06	30	1	Pass
		20175	RB100#0	-23.7	41.5	17.8	0.06			Pass
		20300	RB100#0	-23.06	41.5	18.44	0.07			Pass
	16-QAM	20050	RB1#0	-19.08	41.5	22.42	0.17	30	1	Pass
		20175	RB1#0	-19.15	41.5	22.35	0.17			Pass
		20300	RB1#0	-18.44	41.5	23.06	0.20			Pass
16-QAM	20050	RB100#0	-23.23	41.5	18.27	0.07	30	1	Pass	
	20175	RB100#0	-22.88	41.5	18.62	0.07			Pass	
	20300	RB100#0	-21.99	41.5	19.51	0.09			Pass	

Band 7

Test Band	Test Model	Channel	Test RB (Size#Offset)	Measured EIRP				Limit		Verdict
				SA Read Value (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)	dBm	W	
5 MHz	QPSK	20775	RB1#0	-22.1	44.8	22.7	0.19	33	2	Pass
		21100	RB1#0	-24.07	44.8	20.73	0.12			Pass
		21425	RB1#0	-25.82	44.8	18.98	0.08			Pass
	QPSK	20775	RB25#0	-24.3	44.8	20.5	0.11	33	2	Pass
		21100	RB25#0	-26.41	44.8	18.39	0.07			Pass
		21425	RB25#0	-26.82	44.8	17.98	0.06			Pass
	16-QAM	20775	RB1#0	-22.42	44.8	22.38	0.17	33	2	Pass
		21100	RB1#0	-24.44	44.8	20.36	0.11			Pass
		21425	RB1#0	-26.14	44.8	18.66	0.07			Pass
	16-QAM	20775	RB25#0	-25.49	44.8	19.31	0.09	33	2	Pass
		21100	RB25#0	-25.68	44.8	19.12	0.08			Pass
		21425	RB25#0	-26.63	44.8	18.17	0.07			Pass
10 MHz	QPSK	20800	RB1#0	-22.42	44.8	22.38	0.17	33	2	Pass
		21100	RB1#0	-24.5	44.8	20.3	0.11			Pass
		21400	RB1#0	-25.77	44.8	19.03	0.08			Pass
	QPSK	20800	RB50#0	-24.43	44.8	20.37	0.11	33	2	Pass
		21100	RB50#0	-26.32	44.8	18.48	0.07			Pass
		21400	RB50#0	-25.94	44.8	18.86	0.08			Pass
	16-QAM	20800	RB1#0	-22.62	44.8	22.18	0.17	33	2	Pass
		21100	RB1#0	-24.59	44.8	20.21	0.10			Pass
		21400	RB1#0	-25.56	44.8	19.24	0.08			Pass
	16-QAM	20800	RB50#0	-25.55	44.8	19.25	0.08	33	2	Pass
		21100	RB50#0	-26.35	44.8	18.45	0.07			Pass
		21400	RB50#0	-26.09	44.8	18.71	0.07			Pass
15 MHz	QPSK	20825	RB1#0	-22.18	44.8	22.62	0.18	33	2	Pass
		21100	RB1#0	-24.27	44.8	20.53	0.11			Pass
		21375	RB1#0	-24.92	44.8	19.88	0.10			Pass
	QPSK	20825	RB75#0	-25.44	44.8	19.36	0.09	33	2	Pass
		21100	RB75#0	-25.21	44.8	19.59	0.09			Pass
		21375	RB75#0	-26.4	44.8	18.4	0.07			Pass
	16-QAM	20825	RB1#0	-23.05	44.8	21.75	0.15	33	2	Pass
		21100	RB1#0	-24.39	44.8	20.41	0.11			Pass
		21375	RB1#0	-25.05	44.8	19.75	0.09			Pass
	16-QAM	20825	RB75#0	-25.71	44.8	19.09	0.08	33	2	Pass
		21100	RB75#0	-26.23	44.8	18.57	0.07			Pass
		21375	RB75#0	-26.55	44.8	18.25	0.07			Pass
20 MHz	QPSK	20850	RB1#0	-22.12	44.8	22.68	0.19	33	2	Pass
		21100	RB1#0	-24.04	44.8	20.76	0.12			Pass

Test Band	Test Model	Channel	Test RB (Size#Offset)	Measured EIRP				Limit		Verdict	
				SA Read Value (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)	dBm	W		
	QPSK	21350	RB1#0	-24.2	44.8	20.6	0.11	33	2	Pass	
		20850	RB100#0	-24.21	44.8	20.59	0.11			Pass	
		21100	RB100#0	-25.12	44.8	19.68	0.09			Pass	
	16-QAM		21350	RB100#0	-25.84	44.8	18.96	0.08	33	2	Pass
			20850	RB1#0	-23.42	44.8	21.38	0.14			Pass
			21100	RB1#0	-24.62	44.8	20.18	0.10			Pass
	16-QAM		21350	RB1#0	-24.32	44.8	20.48	0.11	33	2	Pass
			20850	RB100#0	-23.79	44.8	21.01	0.13			Pass
			21100	RB100#0	-25.24	44.8	19.56	0.09			Pass
			21350	RB100#0	-26.07	44.8	18.73	0.07			Pass

Band 28

Test Band	Test Model	Channel	Test RB (Size#Offset)	Measured EIRP				Limit		Verdict	
				SA Read Value (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)	dBm	W		
3 MHz	QPSK	27225	RB1#0	-20.91	40.8	19.89	0.10	34.77	3	Pass	
		27375	RB1#0	-19.07	40.8	21.73	0.15			Pass	
		27645	RB1#0	-18.35	40.8	22.45	0.18			Pass	
	QPSK		27225	RB15#0	-22.68	40.8	18.12	0.06	34.77	3	Pass
			27375	RB15#0	-21.08	40.8	19.72	0.09			Pass
			27645	RB15#0	-20.41	40.8	20.39	0.11			Pass
	16-QAM		27225	RB1#0	-21.28	40.8	19.52	0.09	34.77	3	Pass
			27375	RB1#0	-19.28	40.8	21.52	0.14			Pass
			27645	RB1#0	-18.88	40.8	21.92	0.16			Pass
	16-QAM		27225	RB15#0	-21.09	40.8	19.71	0.09	34.77	3	Pass
			27375	RB15#0	-19.5	40.8	21.3	0.13			Pass
			27645	RB15#0	-18.88	40.8	21.92	0.16			Pass
5 MHz	QPSK	27235	RB1#0	-20.83	40.8	19.97	0.10	34.77	3	Pass	
		27385	RB1#0	-19.01	40.8	21.79	0.15			Pass	
		27635	RB1#0	-18.41	40.8	22.39	0.17			Pass	
	QPSK		27235	RB25#0	-22.49	40.8	18.31	0.07	34.77	3	Pass
			27385	RB25#0	-21.12	40.8	19.68	0.09			Pass
			27635	RB25#0	-20.43	40.8	20.37	0.11			Pass
	16-QAM		27235	RB1#0	-20.83	40.8	19.97	0.10	34.77	3	Pass
			27385	RB1#0	-19.2	40.8	21.6	0.14			Pass

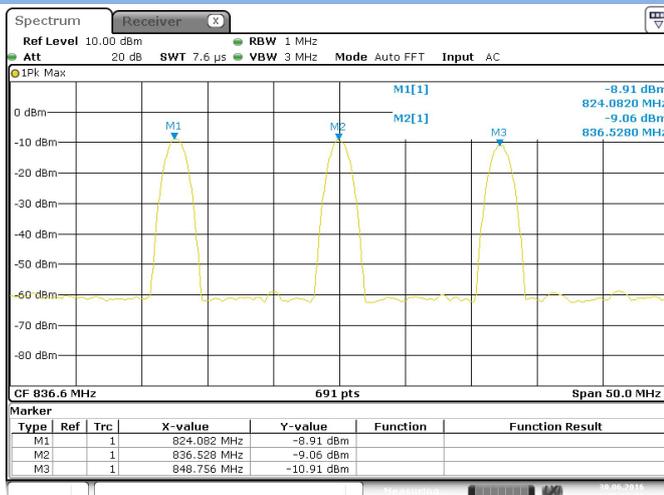
Test Band	Test Model	Channel	Test RB (Size#Offset)	Measured EIRP				Limit		Verdict
				SA Read Value (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)	dBm	W	
	16-Q AM	27635	RB1#0	-18.65	40.8	22.15	0.16	34.77	3	Pass
		27235	RB25#0	-20.95	40.8	19.85	0.10			Pass
		27385	RB25#0	-19.84	40.8	20.96	0.12			Pass
		27635	RB25#0	-19.35	40.8	21.45	0.14			Pass
10 MHz	QPSK	27260	RB1#0	-20.71	40.8	20.09	0.10	34.77	3	Pass
		27410	RB1#0	-18.88	40.8	21.92	0.16			Pass
		27610	RB1#0	-18.25	40.8	22.55	0.18			Pass
	QPSK	27260	RB50#0	-22.15	40.8	18.65	0.07	34.77	3	Pass
		27410	RB50#0	-20.93	40.8	19.87	0.10			Pass
		27610	RB50#0	-20.38	40.8	20.42	0.11			Pass
	16-Q AM	27260	RB1#0	-20.97	40.8	19.83	0.10	34.77	3	Pass
		27410	RB1#0	-19.45	40.8	21.35	0.14			Pass
		27610	RB1#0	-18.74	40.8	22.06	0.16			Pass
	16-Q AM	27260	RB50#0	-22.19	40.8	18.61	0.07	34.77	3	Pass
		27410	RB50#0	-20.86	40.8	19.94	0.10			Pass
		27610	RB50#0	-20.6	40.8	20.2	0.10			Pass
15 MHz	QPSK	27285	RB1#0	-20.79	40.8	20.01	0.10	34.77	3	Pass
		27435	RB1#0	-19.04	40.8	21.76	0.15			Pass
		27585	RB1#0	-18.32	40.8	22.48	0.18			Pass
	QPSK	27285	RB75#0	-20.73	40.8	20.07	0.10	34.77	3	Pass
		27435	RB75#0	-19.04	40.8	21.76	0.15			Pass
		27585	RB75#0	-18.32	40.8	22.48	0.18			Pass
	16-Q AM	27285	RB1#0	-20.89	40.8	19.91	0.10	34.77	3	Pass
		27435	RB1#0	-19.22	40.8	21.58	0.14			Pass
		27585	RB1#0	-18.76	40.8	22.04	0.16			Pass
	16-Q AM	27285	RB75#0	-23.79	40.8	17.01	0.05	34.77	3	Pass
		27435	RB75#0	-22.65	40.8	18.15	0.07			Pass
		27585	RB75#0	-22.58	40.8	18.22	0.07			Pass
20 MHz	QPSK	27310	RB1#0	-20.68	40.8	20.12	0.10	34.77	3	Pass
		27460	RB1#0	-19.04	40.8	21.76	0.15			Pass
		27560	RB1#0	-18.32	40.8	22.48	0.18			Pass
	QPSK	27310	RB100#0	-20.73	40.8	20.07	0.10	34.77	3	Pass
		27460	RB100#0	-19.04	40.8	21.76	0.15			Pass
		27560	RB100#0	-18.32	40.8	22.48	0.18			Pass
	16-Q AM	27310	RB1#0	-20.88	40.8	19.92	0.10	34.77	3	Pass
		27460	RB1#0	-19.21	40.8	21.59	0.14			Pass
		27560	RB1#0	-18.74	40.8	22.06	0.16			Pass
	16-Q	27310	RB100#0	-20.21	40.8	20.59	0.11	34.77	3	Pass

Test Band	Test Model	Channel	Test RB (Size#Offset)	Measured EIRP				Limit		Verdict
				SA Read Value (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)	dBm	W	
	AM	27460	RB100#0	-18.67	40.8	22.13	0.16			Pass
		27560	RB100#0	-16.91	40.8	23.89	0.24			Pass

Test plots

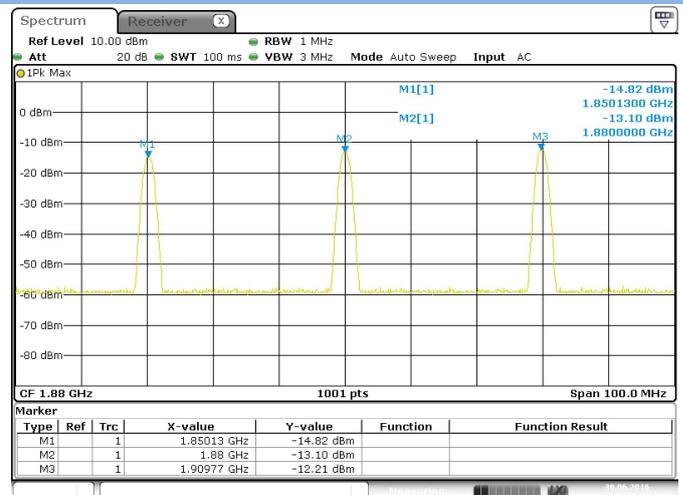
GSM

GSM 850 MHz



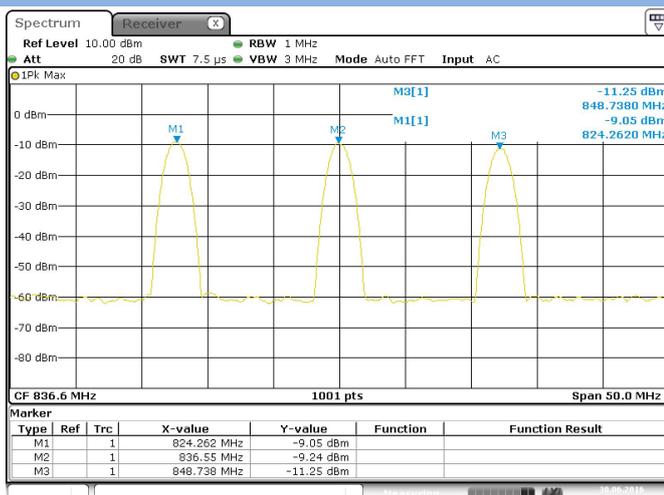
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GSM 1900 MHz



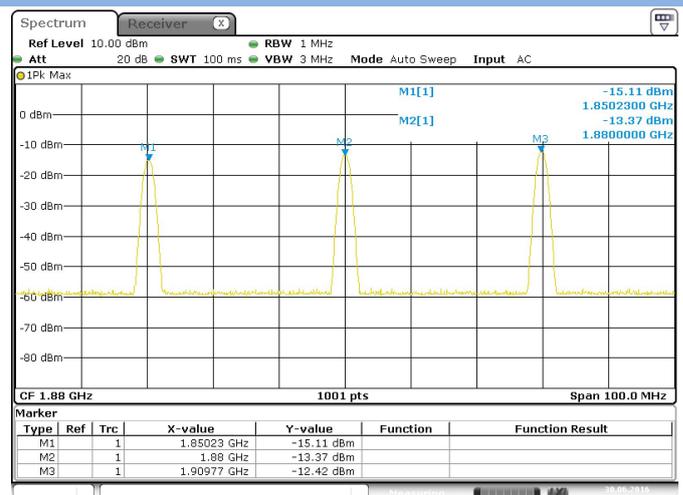
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GPRS 850 MHz



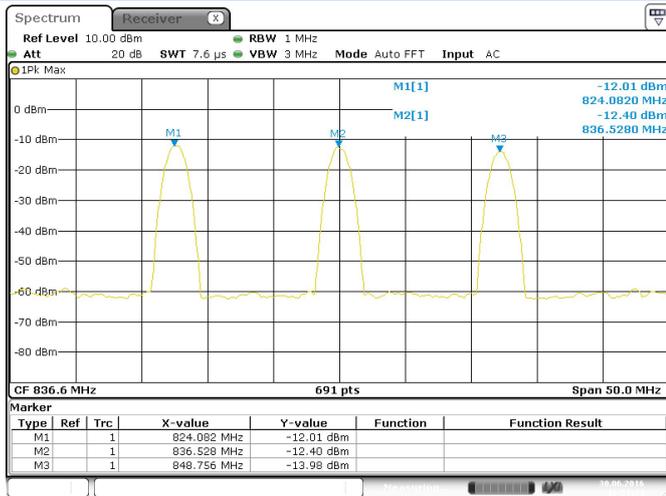
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GPRS 1900 MHz



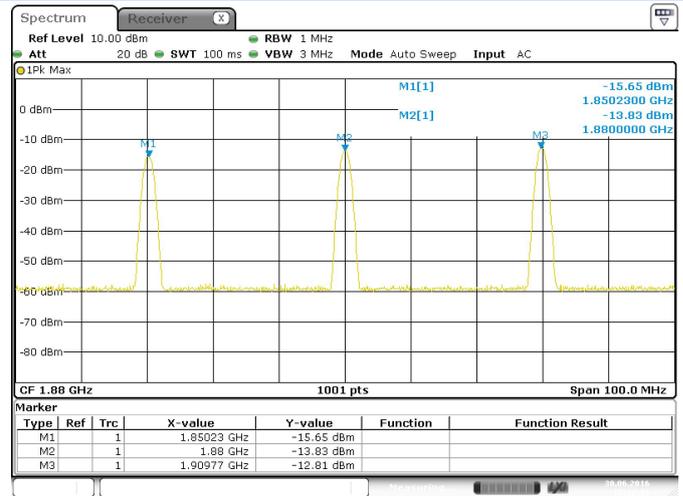
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EGPRS 850 MHz



Date: 30.JUN.2016 16:51:24

EGPRS 1900 MHz

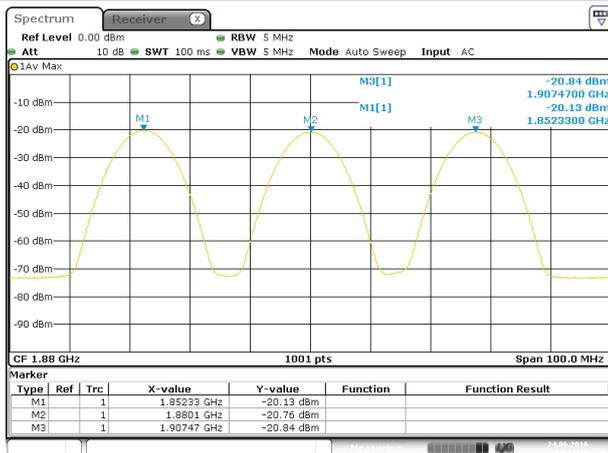


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WCDMA

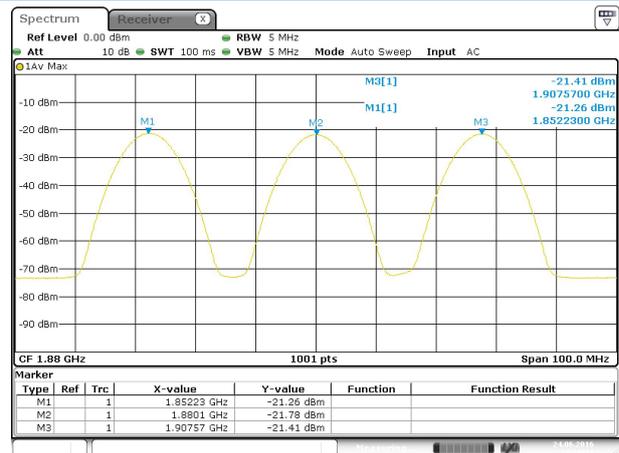
Band 2

WCDMA



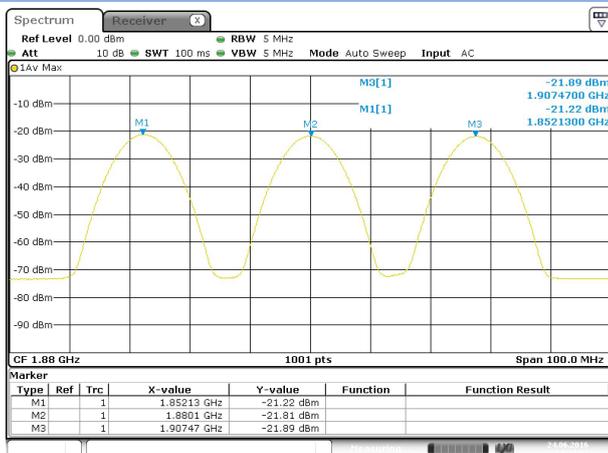
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HSDPA



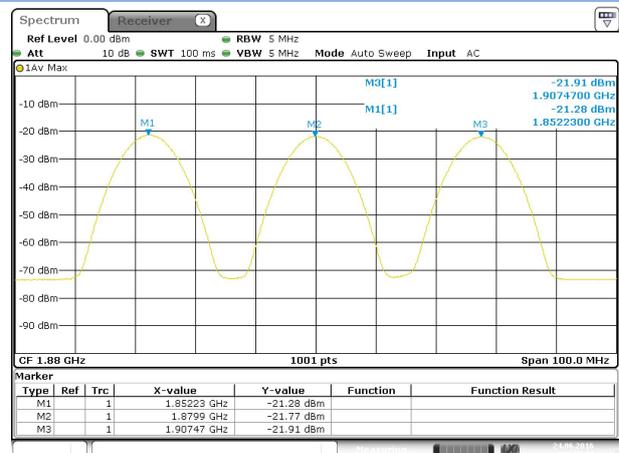
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HSPA +



Date: 24.JUN.2016 13:22:52

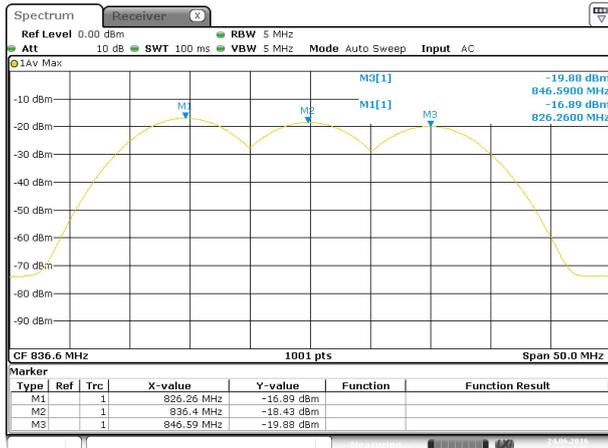
HSUPA



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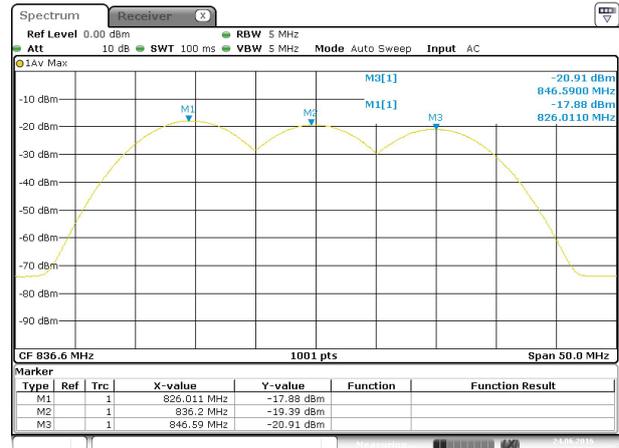
Band 5

WCDMA



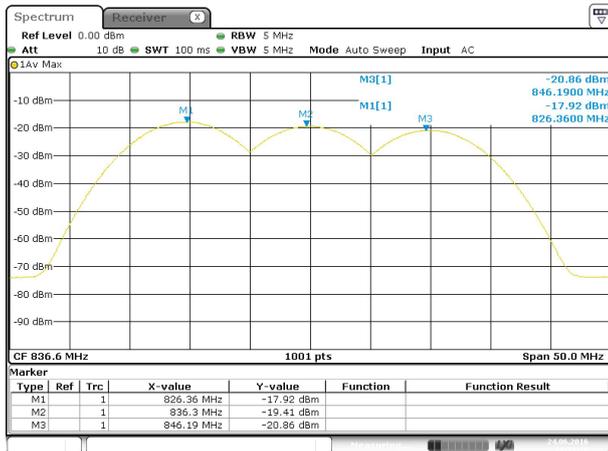
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HSDPA



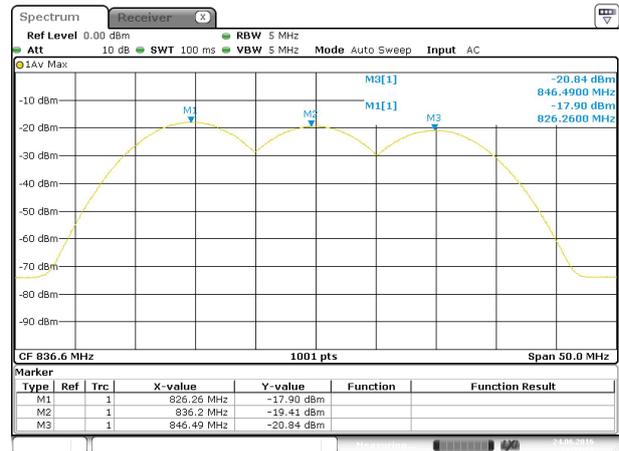
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HSPA +



Date: 24.JUN.2016 13:31:26

HSUPA



Date: 24.JUN.2016 13:32:23

Conducted output power

GSM Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's Conducted output power of the other Band please refer to section 2.1.3 of the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016).

WCDMA Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's Conducted output power of the other Band please refer to section 2.1.3 of the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016).

LTE Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's Conducted output power of the other Band please refer to section 2.1.3 of the report SZ16010163W05 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016).

Band 28

UL Channel	Bandwidth (MHz)	UL Modulation	UL RB Number	UL RB Position	Measured (dBm)
27225	3	QPSK	1	LOW	22.87
27225	3	QPSK	1	MID	22.97
27225	3	QPSK	1	HIGH	22.92
27225	3	QPSK	8	LOW	21.97
27225	3	QPSK	8	MID	21.99
27225	3	QPSK	8	HIGH	21.96
27225	3	QPSK	15	LOW	21.93
27225	3	Q16	1	LOW	21.75
27225	3	Q16	1	MID	21.78
27225	3	Q16	1	HIGH	21.74
27225	3	Q16	8	LOW	21.03
27225	3	Q16	8	MID	21.04
27225	3	Q16	8	HIGH	21.02
27225	3	Q16	15	LOW	20.93

UL Channel	Bandwidth (MHz)	UL Modulation	UL RB Number	UL RB Position	Measured (dBm)
27375	3	QPSK	1	LOW	23.03
27375	3	QPSK	1	MID	23.08
27375	3	QPSK	1	HIGH	23.04
27375	3	QPSK	8	LOW	22.07
27375	3	QPSK	8	MID	22.09
27375	3	QPSK	8	HIGH	22.07
27375	3	QPSK	15	LOW	22.02
27375	3	Q16	1	LOW	22.31
27375	3	Q16	1	MID	22.37
27375	3	Q16	1	HIGH	22.36
27375	3	Q16	8	LOW	21.12
27375	3	Q16	8	MID	21.13
27375	3	Q16	8	HIGH	21.11
27375	3	Q16	15	LOW	21.04
27645	3	QPSK	1	LOW	22.93
27645	3	QPSK	1	MID	22.96
27645	3	QPSK	1	HIGH	22.92
27645	3	QPSK	8	LOW	22.04
27645	3	QPSK	8	MID	22.03
27645	3	QPSK	8	HIGH	22.02
27645	3	QPSK	15	LOW	22.02
27645	3	Q16	1	LOW	21.94
27645	3	Q16	1	MID	21.91
27645	3	Q16	1	HIGH	21.84
27645	3	Q16	8	LOW	21.07
27645	3	Q16	8	MID	21.08
27645	3	Q16	8	HIGH	21.05
27645	3	Q16	15	LOW	20.97
27235	5	QPSK	1	LOW	23.08
27235	5	QPSK	1	MID	23.09
27235	5	QPSK	1	HIGH	23.03
27235	5	QPSK	12	LOW	21.98
27235	5	QPSK	12	MID	21.97
27235	5	QPSK	12	HIGH	21.94
27235	5	QPSK	25	LOW	21.93
27235	5	Q16	1	LOW	22.09
27235	5	Q16	1	MID	22.09
27235	5	Q16	1	HIGH	22.03
27235	5	Q16	12	LOW	21.02
27235	5	Q16	12	MID	20.99
27235	5	Q16	12	HIGH	20.96
27235	5	Q16	25	LOW	20.91

UL Channel	Bandwidth (MHz)	UL Modulation	UL RB Number	UL RB Position	Measured (dBm)
27385	5	QPSK	1	LOW	23.1
27385	5	QPSK	1	MID	23.12
27385	5	QPSK	1	HIGH	23.05
27385	5	QPSK	12	LOW	22.09
27385	5	QPSK	12	MID	22.09
27385	5	QPSK	12	HIGH	22.07
27385	5	QPSK	25	LOW	22.05
27385	5	Q16	1	LOW	22.52
27385	5	Q16	1	MID	22.57
27385	5	Q16	1	HIGH	22.52
27385	5	Q16	12	LOW	21.19
27385	5	Q16	12	MID	21.21
27385	5	Q16	12	HIGH	21.21
27385	5	Q16	25	LOW	21.09
27635	5	QPSK	1	LOW	23.08
27635	5	QPSK	1	MID	23.07
27635	5	QPSK	1	HIGH	23.01
27635	5	QPSK	12	LOW	22.04
27635	5	QPSK	12	MID	22.02
27635	5	QPSK	12	HIGH	22.02
27635	5	QPSK	25	LOW	21.98
27635	5	Q16	1	LOW	22.09
27635	5	Q16	1	MID	22.05
27635	5	Q16	1	HIGH	21.97
27635	5	Q16	12	LOW	21.13
27635	5	Q16	12	MID	21.1
27635	5	Q16	12	HIGH	21.08
27635	5	Q16	25	LOW	20.98
27260	10	QPSK	1	LOW	22.95
27260	10	QPSK	1	MID	23.03
27260	10	QPSK	1	HIGH	22.68
27260	10	QPSK	25	LOW	21.9
27260	10	QPSK	25	MID	21.92
27260	10	QPSK	25	HIGH	21.93
27260	10	QPSK	50	LOW	21.91
27260	10	Q16	1	LOW	21.83
27260	10	Q16	1	MID	21.86
27260	10	Q16	1	HIGH	21.63
27260	10	Q16	25	LOW	20.91
27260	10	Q16	25	MID	20.91
27260	10	Q16	25	HIGH	20.9
27260	10	Q16	50	LOW	20.89

UL Channel	Bandwidth (MHz)	UL Modulation	UL RB Number	UL RB Position	Measured (dBm)
27410	10	QPSK	1	LOW	23.11
27410	10	QPSK	1	MID	23.15
27410	10	QPSK	1	HIGH	23.11
27410	10	QPSK	25	LOW	22.04
27410	10	QPSK	25	MID	22.06
27410	10	QPSK	25	HIGH	22.04
27410	10	QPSK	50	LOW	22.04
27410	10	Q16	1	LOW	22.36
27410	10	Q16	1	MID	22.44
27410	10	Q16	1	HIGH	22.37
27410	10	Q16	25	LOW	21.04
27410	10	Q16	25	MID	21.04
27410	10	Q16	25	HIGH	21.04
27410	10	Q16	50	LOW	21.04
27610	10	QPSK	1	LOW	22.96
27610	10	QPSK	1	MID	23.01
27610	10	QPSK	1	HIGH	22.95
27610	10	QPSK	25	LOW	22.04
27610	10	QPSK	25	MID	22.01
27610	10	QPSK	25	HIGH	21.98
27610	10	QPSK	50	LOW	22.05
27610	10	Q16	1	LOW	22.11
27610	10	Q16	1	MID	22.05
27610	10	Q16	1	HIGH	21.88
27610	10	Q16	25	LOW	21.17
27610	10	Q16	25	MID	21.16
27610	10	Q16	25	HIGH	21.12
27610	10	Q16	50	LOW	21.12
27285	15	QPSK	1	LOW	23.01
27285	15	QPSK	1	MID	23.1
27285	15	QPSK	1	HIGH	22.83
27285	15	QPSK	36	LOW	22.06
27285	15	QPSK	36	MID	22.08
27285	15	QPSK	36	HIGH	22.11
27285	15	QPSK	75	LOW	22.1
27285	15	Q16	1	LOW	21.85
27285	15	Q16	1	MID	21.89
27285	15	Q16	1	HIGH	21.8
27285	15	Q16	36	LOW	20.98
27285	15	Q16	36	MID	20.99
27285	15	Q16	36	HIGH	21.03
27285	15	Q16	75	LOW	21.01

UL Channel	Bandwidth (MHz)	UL Modulation	UL RB Number	UL RB Position	Measured (dBm)
27435	15	QPSK	1	LOW	23.12
27435	15	QPSK	1	MID	23.16
27435	15	QPSK	1	HIGH	23.13
27435	15	QPSK	36	LOW	22.1
27435	15	QPSK	36	MID	22.11
27435	15	QPSK	36	HIGH	22.17
27435	15	QPSK	75	LOW	22.16
27435	15	Q16	1	LOW	22.39
27435	15	Q16	1	MID	22.42
27435	15	Q16	1	HIGH	22.31
27435	15	Q16	36	LOW	21.11
27435	15	Q16	36	MID	21.11
27435	15	Q16	36	HIGH	21.14
27435	15	Q16	75	LOW	21.1
27585	15	QPSK	1	LOW	23.11
27585	15	QPSK	1	MID	23.08
27585	15	QPSK	1	HIGH	23.1
27585	15	QPSK	36	LOW	22.06
27585	15	QPSK	36	MID	22.09
27585	15	QPSK	36	HIGH	22.11
27585	15	QPSK	75	LOW	22.13
27585	15	Q16	1	LOW	22.41
27585	15	Q16	1	MID	22.47
27585	15	Q16	1	HIGH	22.25
27585	15	Q16	36	LOW	21.05
27585	15	Q16	36	MID	21.06
27585	15	Q16	36	HIGH	21.03
27585	15	Q16	75	LOW	21.1
27310	20	QPSK	1	LOW	23.03
27310	20	QPSK	1	MID	23.14
27310	20	QPSK	1	HIGH	22.96
27310	20	QPSK	50	LOW	21.96
27310	20	QPSK	50	MID	22.01
27310	20	QPSK	50	HIGH	22.08
27310	20	QPSK	100	LOW	22
27310	20	Q16	1	LOW	22.45
27310	20	Q16	1	MID	22.54
27310	20	Q16	1	HIGH	22.47
27310	20	Q16	50	LOW	20.95
27310	20	Q16	50	MID	20.97
27310	20	Q16	50	HIGH	21.06
27310	20	Q16	100	LOW	21

UL Channel	Bandwidth (MHz)	UL Modulation	UL RB Number	UL RB Position	Measured (dBm)
27460	20	QPSK	1	LOW	23.1
27460	20	QPSK	1	MID	23.14
27460	20	QPSK	1	HIGH	22.97
27460	20	QPSK	50	LOW	22.09
27460	20	QPSK	50	MID	22.1
27460	20	QPSK	50	HIGH	22.07
27460	20	QPSK	100	LOW	22.05
27460	20	Q16	1	LOW	22.41
27460	20	Q16	1	MID	22.44
27460	20	Q16	1	HIGH	22.48
27460	20	Q16	50	LOW	21.12
27460	20	Q16	50	MID	21.09
27460	20	Q16	50	HIGH	21.12
27460	20	Q16	100	LOW	21.09
27560	20	QPSK	1	LOW	23.14
27560	20	QPSK	1	MID	23.06
27560	20	QPSK	1	HIGH	23.06
27560	20	QPSK	50	LOW	22.1
27560	20	QPSK	50	MID	22.07
27560	20	QPSK	50	HIGH	22.07
27560	20	QPSK	100	LOW	22.07
27560	20	Q16	1	LOW	22.41
27560	20	Q16	1	MID	22.5
27560	20	Q16	1	HIGH	22.29
27560	20	Q16	50	LOW	21.11
27560	20	Q16	50	MID	21.12
27560	20	Q16	50	HIGH	21.09
27560	20	Q16	100	LOW	21.11

A.2 Peak to Average Ratio

Note 1: For average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB. For GSM, GPRS and EGPRS, there are peak power to demonstrate compliance, PAR measurements are not required.

Note 2: Test plots of Band 28 please refer to the document “Annex No.: BL-SZ1660087-501 Data Part 1.pdf”.

WCDMA Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

LTE Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W05 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for the data of Band 28, EIRP and field Strength of Spurious Radiation.

Test Band	Test Bandwidth	Test Channel	Test Model	Test RB(Size#Off set)	Peak to Average ratio (dBm)	Limit (dBm)	Refer to Plot ^{Note 2}	Verdict
LTE Band 28	20 MHz	LCH	QPSK	RB1#0	3.65	13	1.1	Pass
				RB100#0	4.00	13	1.2	Pass
			16-QAM	RB1#0	4.52	13	1.3	Pass
				RB100#0	5.54	13	1.4	Pass
		MCH	QPSK	RB1#0	3.57	13	1.5	Pass
				RB100#0	4.17	13	1.6	Pass
			16-QAM	RB1#0	4.46	13	1.7	Pass
				RB100#0	5.77	13	1.8	Pass
		HCH	QPSK	RB1#0	3.59	13	1.9	Pass
				RB100#0	4.14	13	1.10	Pass
			16-QAM	RB1#0	4.61	13	1.11	Pass
				RB100#0	5.86	13	1.12	Pass

A.3 Occupied Bandwidth

Note 1: All mode were tested, but only the typical data were reported in this report.

Note 2: Test plots please refer to the document “Annex No.: BL-SZ1660087-501 Data Part 2.pdf”.

GSM Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and Strength of Spurious Radiation.

WCDMA Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

LTE Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W05 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for the data of Band 28, EIRP and field Strength of Spurious Radiation.

LTE Mode Test Data

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size# Offset)	Measured 99% Occupied Bandwidth (MHz)	Measured -26 dB Occupied Bandwidth (MHz)	Refer to Plot ^{Note 2}
Band 28	3 MHz	LCH	QPSK	RB15#0	2.73	3.03	1.1
			16-QAM	RB15#0	2.73	3.05	1.2
		MCH	QPSK	RB15#0	2.73	3.02	1.3
			16-QAM	RB15#0	2.72	3.02	1.4
		HCH	QPSK	RB15#0	2.73	3.03	1.5
			16-QAM	RB15#0	2.72	3.03	1.6
	5 MHz	LCH	QPSK	RB25#0	4.51	5.08	1.7
			16-QAM	RB25#0	4.5	5.05	1.8
		MCH	QPSK	RB25#0	4.51	5.08	1.9
			16-QAM	RB25#0	4.52	5.04	1.10

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size# Offset)	Measured 99% Occupied Bandwidth (MHz)	Measured -26 dB Occupied Bandwidth (MHz)	Refer to Plot ^{Note 2}
		HCH	QPSK	RB25#0	4.5	5.02	1.11
			16-QAM	RB25#0	4.51	5.06	1.12
	10 MHz	LCH	QPSK	RB50#0	8.93	9.72	1.13
			16-QAM	RB50#0	8.92	9.63	1.14
		MCH	QPSK	RB50#0	8.92	9.59	1.15
			16-QAM	RB50#0	8.92	9.61	1.16
		HCH	QPSK	RB50#0	8.91	9.64	1.17
			16-QAM	RB50#0	8.92	9.67	1.18
	15 MHz	LCH	QPSK	RB75#0	13.39	14.37	1.19
			16-QAM	RB75#0	13.38	14.36	1.20
		MCH	QPSK	RB75#0	13.37	14.27	1.21
			16-QAM	RB75#0	13.37	14.4	1.22
		HCH	QPSK	RB75#0	13.37	14.29	1.23
			16-QAM	RB75#0	13.37	14.38	1.24
	20 MHz	LCH	QPSK	RB100#0	17.83	18.92	1.25
			16-QAM	RB100#0	17.82	18.82	1.26
		MCH	QPSK	RB100#0	17.83	18.7	1.27
			16-QAM	RB100#0	17.84	18.84	1.28
		HCH	QPSK	RB100#0	17.84	18.93	1.29
			16-QAM	RB100#0	17.83	18.87	1.30

A.4 Frequency Stability

GSM Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

WCDMA Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

LTE Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W05 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for the data of Band 28, EIRP and field Strength of Spurious Radiation.

LTE Band 28 QPSK 10 MHz

Test Conditions		Frequency Deviation		Verdict
Power (VDC)	Temperature (°C)	MCH 723 MHz		
		Value (Hz)	Limits (Hz)	
3.8	-10	-7	±1807.5	Pass
	-5	8.55		
	0	-21.03		
	+5	5.38		
	+10	-22.73		
	+20	2.95		
	+30	1.37		
	+40	7.41		
3.6	+45	-17.42		
	+25	8.55		

LTE Band 28 16QAM 10 MHz

Test Conditions		Frequency Deviation		Verdict
Power (VDC)	Temperature (°C)	MCH 723 MHz		
		Value (Hz)	Limits (Hz)	
3.8	-10	2	±1807.5	Pass
	-5	2.35		
	0	3.82		
	+5	1.73		
	+10	-6.51		
	+20	1.46		
	+30	-5.99		
	+40	1.52		
3.6	+45	5.62		
	+25	-4.55		

A.5 Spurious Emission at Antenna Terminals

Note: Test plots please refer to the document “Annex No.: BL-SZ1660087-501 Data Part 3.pdf”.

GSM Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

WCDMA Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

LTE Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W05 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for the data of Band 28, EIRP and field Strength of Spurious Radiation.

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size#Offset)	Refer to Plot ^{Note}	Verdict
Band 28	3 MHz	LCH	QPSK	RB1#0	1.1	Pass
			16-QAM	RB1#0	1.2	Pass
		MCH	QPSK	RB1#0	1.3	Pass
			16-QAM	RB1#0	1.4	Pass
		HCH	QPSK	RB1#0	1.5	Pass
			16-QAM	RB1#0	1.6	Pass
	5 MHz	LCH	QPSK	RB1#0	1.7	Pass
			16-QAM	RB1#0	1.8	Pass
		MCH	QPSK	RB1#0	1.9	Pass
			16-QAM	RB1#0	1.10	Pass
		HCH	QPSK	RB1#0	1.11	Pass
			16-QAM	RB1#0	1.12	Pass

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size#Offset)	Refer to Plot ^{Note}	Verdict
	10 MHz	LCH	QPSK	RB1#0	1.13	Pass
			16-QAM	RB1#0	1.14	Pass
		MCH	QPSK	RB1#0	1.15	Pass
			16-QAM	RB1#0	1.16	Pass
		HCH	QPSK	RB1#0	1.17	Pass
			16-QAM	RB1#0	1.18	Pass
	15 MHz	LCH	QPSK	RB1#0	1.19	Pass
			16-QAM	RB1#0	1.20	Pass
		MCH	QPSK	RB1#0	1.21	Pass
			16-QAM	RB1#0	1.22	Pass
		HCH	QPSK	RB1#0	1.23	Pass
			16-QAM	RB1#0	1.24	Pass
	20 MHz	LCH	QPSK	RB1#0	1.25	Pass
			16-QAM	RB1#0	1.26	Pass
		MCH	QPSK	RB1#0	1.27	Pass
			16-QAM	RB1#0	1.28	Pass
		HCH	QPSK	RB1#0	1.29	Pass
			16-QAM	RB1#0	1.30	Pass

A.6 Band Edge

Note: Test plots please refer to the document “Annex No.: BL-SZ1660087-501 Data Part 4.pdf”.

GSM Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28), The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

WCDMA Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28). The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W04 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for EIRP and field Strength of Spurious Radiation.

LTE Test Data

Note: Based on the initial report (issued by SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd on Mar. 28, 2016), changed charger and main antenna (WWAN antenna, it supports the band including GSM 850/1900, WCDMA B2/5 and LTE B4/7/28). The other hardware circuit board and software are the same. So the EUT's all data please refer to the report SZ16010163W05 (issued by Shenzhen MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. On April 1, 2016) except for the data of Band 28, EIRP and field Strength of Spurious Radiation.

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size#Offset)	Refer to Plot ^{Note}	Verdict
Band 28	3 MHz	LCH	QPSK	RB1#0	1.1	Pass
				RB15#0	1.2	Pass
		16-QAM	RB1#0	1.3	Pass	
			RB15#0	1.4	Pass	
	HCH	QPSK	RB1#0	1.5	Pass	
			RB15#0	1.6	Pass	
		16-QAM	RB1#0	1.7	Pass	
			RB15#0	1.8	Pass	
	5 MHz	LCH	QPSK	RB1#0	1.9	Pass
				RB25#0	1.10	Pass
16-QAM			RB1#0	1.11	Pass	

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size#Offset)	Refer to Plot ^{Note}	Verdict
		HCH	QPSK	RB25#0	1.12	Pass
				RB1#0	1.13	Pass
			16-QAM	RB25#0	1.14	Pass
				RB1#0	1.15	Pass
				RB25#0	1.16	Pass
	10 MHz	LCH	QPSK	RB1#0	1.17	Pass
				RB50#0	1.18	Pass
			16-QAM	RB1#0	1.19	Pass
		RB50#0		1.20	Pass	
		HCH	QPSK	RB1#0	1.21	Pass
				RB50#0	1.22	Pass
	16-QAM		RB1#0	1.23	Pass	
		RB50#0	1.24	Pass		
	15 MHz	LCH	QPSK	RB1#0	1.25	Pass
				RB75#0	1.26	Pass
			16-QAM	RB1#0	1.27	Pass
		RB75#0		1.28	Pass	
		HCH	QPSK	RB1#0	1.29	Pass
				RB75#0	1.30	Pass
	16-QAM		RB1#0	1.31	Pass	
		RB75#0	1.32	Pass		
	20 MHz	LCH	QPSK	RB1#0	1.33	Pass
				RB100#0	1.34	Pass
16-QAM			RB1#0	1.35	Pass	
		RB100#0	1.36	Pass		
HCH		QPSK	RB1#0	1.37	Pass	
			RB100#0	1.38	Pass	
	16-QAM	RB1#0	1.39	Pass		
RB100#0		1.40	Pass			

A.7 Field Strength of Spurious Radiation

Note 1: GSM and EGPRS modes have been verified, only the worst data with different data bandwidth for LTE are shown here.

Note 2: The frequency of verdict which mark by "N/A" should be ignored because they are MS carrier frequency.

Note 3: Test plots please refer to the document "Annex No.: BL-SZ1660087-501 Data Part 5.pdf".

GSM and WCDMA Mode Test Verdict

Test Band	Test Channel	Refer to Plot ^{Note 3}	Verdict
GSM 850	LCH	1.1	Pass
		1.2	Pass
	MCH	1.3	Pass
		1.4	Pass
	HCH	1.5	Pass
		1.6	Pass
GSM 1900	LCH	1.7	Pass
		1.8	Pass
	MCH	1.9	Pass
		1.10	Pass
	HCH	1.11	Pass
		1.12	Pass
EGPRS 850	LCH	1.13	Pass
		1.14	Pass
	MCH	1.15	Pass
		1.16	Pass
	HCH	1.17	Pass
		1.18	Pass
EGPRS 1900	LCH	1.19	Pass
		1.20	Pass
	MCH	1.21	Pass
		1.22	Pass
	HCH	1.23	Pass
		1.24	Pass
WCDMA Band 2	LCH	2.1	Pass
		2.2	Pass
	MCH	2.3	Pass
		2.4	Pass
	HCH	2.5	Pass
		2.6	Pass
WCDMA Band 5	LCH	2.7	Pass
		2.8	Pass
	MCH	2.9	Pass
		2.10	Pass
	HCH	2.11	Pass

Test Band	Test Channel	Refer to Plot ^{Note 3}	Verdict
		2.12	Pass

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size#Offset)	Refer to Plot ^{Note 2}	Verdict
Band 4	1.4 MHz	MCH	QPSK	RB1#0	3.1	Pass
			16-QAM	RB1#0	3.2	Pass
	3 MHz	MCH	QPSK	RB1#0	3.3	Pass
			16-QAM	RB1#0	3.4	Pass
	5 MHz	MCH	QPSK	RB1#0	3.5	Pass
			16-QAM	RB1#0	3.6	Pass
	10 MHz	MCH	QPSK	RB1#0	3.7	Pass
			16-QAM	RB1#0	3.8	Pass
	15 MHz	MCH	QPSK	RB1#0	3.9	Pass
			16-QAM	RB1#0	3.10	Pass
	20 MHz	MCH	QPSK	RB1#0	3.11	Pass
			16-QAM	RB1#0	3.12	Pass
Band 7	5 MHz	MCH	QPSK	RB1#0	4.1	Pass
			16-QAM	RB1#0	4.2	Pass
	10 MHz	MCH	QPSK	RB1#0	4.3	Pass
			16-QAM	RB1#0	4.4	Pass
	15 MHz	MCH	QPSK	RB1#0	4.5	Pass
			16-QAM	RB1#0	4.6	Pass
20 MHz	MCH	QPSK	RB1#0	4.7	Pass	
		16-QAM	RB1#0	4.8	Pass	
Band 28	3 MHz	MCH	QPSK	RB1#0	5.1	Pass
			16-QAM	RB1#0	5.2	Pass
	5 MHz	MCH	QPSK	RB1#0	5.3	Pass
			16-QAM	RB1#0	5.4	Pass
	10 MHz	MCH	QPSK	RB1#0	5.5	Pass
			16-QAM	RB1#0	5.6	Pass
	15 MHz	MCH	QPSK	RB1#0	5.7	Pass
			16-QAM	RB1#0	5.8	Pass
	20 MHz	MCH	QPSK	RB1#0	5.9	Pass
			16-QAM	RB1#0	5.10	Pass

ANNEX B TEST SETUP PHOTOS

Please refer to the document "BL-SZ1660087-AR.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer to the document "BL-SZ1660087-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer to the document "BL-SZ1660087-AI.PDF".

-END OF REPORT--