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

Report No.:	BL-SZ1760126-501
EUT Name:	LTE Digital Mobile Handset
Model Name:	BGH Joy A20
Brand Name:	ZTE
Test Standard:	47 CFR Part 2 (10-1-16 Edition) 47 CFR Part 22 (10-1-16 Edition) 47 CFR Part 24 (10-1-16 Edition) 47 CFR Part 27 (10-1-16 Edition)
FCC ID:	SRQ-A210
Test Conclusion:	Pass
Test Date:	Jun. 09, 2017 ~ Jun. 13, 2017
Date of Issue:	Jun. 16, 2017

Tested by: Heng Aiping
Heng Aiping
(Engineer)
Date Jun. 16, 2017

Approved by:
Wei Yanquan
(Chief Engineer)
Date Jun. 16, 2017

Block B, 1st FL,Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100, FAX: +86-755-61824271
Email: info@baluntek.com
www.baluntek.com

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jun. 16, 2017	Initial Issue

TABLE OF CONTENTS

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	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. 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.
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	20 to 35 °C
Ambient Relative Humidity	30 to 60 %
Ambient Pressure	98 to 102KPa

1.4 Announce

(1) The test report reference to the report template version v3.3.

(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 Name	LTE Digital Mobile Handset
Model Name	BGH Joy A20
Series Model Name	BGH Joy A20, ZTE Blade A210
Description of Model name differentiation	The equipment model BGH Joy A20 and ZTE Blade A210 are the LTE Digital Mobile Handset model, the electrical parameters and internal structure of circuit are same, only the model name is different.
Hardware Version	BGH_JOY_A20_V1AMB_B
Software Version	BGH_Joy_A20_ARMovistar_1.01
Dimensions (Approx.)	134.8*67.5*10.15 mm
Weight (Approx.)	150 g
Network and Wireless connectivity	GSM/GPRS/EGPRS 850/ 1900; WCDMA/HSDPA/HSUPA Band 2/ 4/ 5; LTE FDD Band 4/ 7; Bluetooth, GPS, FM, GLONASS, WIFI
About the Product	The equipment is LTE Digital Mobile Handset, intended for used with information technology equipment.

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	ZTE
	Model No.	Li3822T43P3h675053
	Serial No.	N/A
	Capacitance	2200 mAh
	Rated Voltage	3.8 V
	Extreme Voltage	4.35 V
Ancillary Equipment 2	Charger	
	Brand Name	ZTE
	Model No.	STC-A22O50I1000USBA-A
	Rated Input	100-240 V~, 300 mA, 50/60 Hz
	Rated Output	5 V⎓, 1 A
Ancillary Equipment 3	USB Cable	
	Length(Approx.)	700 mm
Ancillary Equipment 4	Earphone	
	Length(Approx.)	1.2 m

2.6 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/ 4/ 5 LTE FDD Band 4/ 7	
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 4: 1710 - 1755 MHz WCDMA/HSDPA/HSUPA Band 5: 824 - 849 MHz LTE FDD Band 4: 1710 - 1755 MHz LTE FDD Band 7: 2500 - 2570 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 4: 2110 - 2155 MHz WCDMA/HSDPA/HSUPA Band 5: 869 - 894 MHz LTE FDD Band 4: 2110 - 2155 MHz	

	LTE FDD Band 7: 2620 - 2690 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 4: 3 WCDMA/HSDPA/HSUPA Band 5: 3 LTE FDD Band 4: 3 LTE FDD Band 7: 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.

Note 2: Because of the EUT (Test sample in this report) is based on the test sample (Test report No. is BL-SZ1650193-501, and it issued by Shenzhen BALUN Technology Co., Ltd. on Jun. 16, 2016) to reduce the test band, and change the main antenna. The other hardware circuit and software all the same. So just Transmitter Radiated Power (EIRP/ERP) and Field Strength of Spurious Radiation were retested in this report. The other test items please refer to BL-SZ1650193-501 which issued by Shenzhen BALUN Technology Co., Ltd. on Jun. 16, 2016.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2 (10‑1‑16 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10‑1‑16 Edition)	Public Mobile Services
3	47 CFR Part 24 (10‑1‑16 Edition)	Personal Communications Services
4	47 CFR Part 27 (10‑1‑16 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(b) 27.50(c) 27.50(d) 27.50(h)	ANNEX A.1	Pass
3	Peak to average radio	2.1046 24.232(d) 27.50(d)	ANNEX A.2	Pass
4	Occupied Bandwidth	2.1049 22.917 24.238	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(c) 27.53(g) 27.53(h) 27.53(m)	ANNEX A.5	Pass
7	Band Edge	2.1051 22.917 24.238 27.53(c) 27.53(g) 27.53(h) 27.53(m)	ANNEX A.6	Pass
8	Field Strength of Spurious Radiation	2.1053 22.917 24.238 27.53(c) 27.53(g) 27.53(h) 27.53(m)	ANNEX A.7	Pass

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Test Voltage of The EUT	NV (Normal Voltage)	3.8 V
	LV (Low Voltage)	3.6 V
	HV (High Voltage)	4.35 V
Test 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	2016.07.13	2017.07.12
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2016.11.08	2017.11.07
Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU 200	123666	2016.11.08	2017.11.07
Wireless Communications Test Set	ROHDE&SCHWARZ	CMW 500	102318	2016.07.13	2017.07.12
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2016.07.13	2017.07.12
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	IT6863A	600014010687210020	2016.07.13	2017.07.12
Temperature Chamber	ANGELANTIONI SCIENCE	SP20	1412	2016.07.13	2017.07.12
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	2017.02.21	2019.02.20
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 4	v	v	v
	WCDMA Band 5	v	v	v
	HSUPA Band 2	v	v	v
	HSUPA Band 4	v	v	v
	HSUPA Band 5	v	v	v
	HSDPA Band 2	v	v	v
	HSDPA Band 4	v	v	v
	HSDPA Band 5	v	v	v
Peak to Average Ratio	WCDMA Band 2	v	v	v
	WCDMA Band 4	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 4	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 4	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 4	v	v	v
	WCDMA Band 5	v	v	v
Band Edge	GSM 850	v	--	v

Test Items	Test Mode	Test Channel		
		LCH	MCH	HCH
	GSM 1900	v	--	v
	EGPRS 850	v	--	v
	EGPRS 1900	v	--	v
	WCDMA Band 2	v	--	v
	WCDMA Band 4	v	--	v
	WCDMA Band 5	v	--	v
Field Strength of Spurious Radiation	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 4	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	v
7	n	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
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
Frequency Stability														
4	--	--	--	v	--	--	v	v	--	--	v	--	v	--
7	n	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
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
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	--

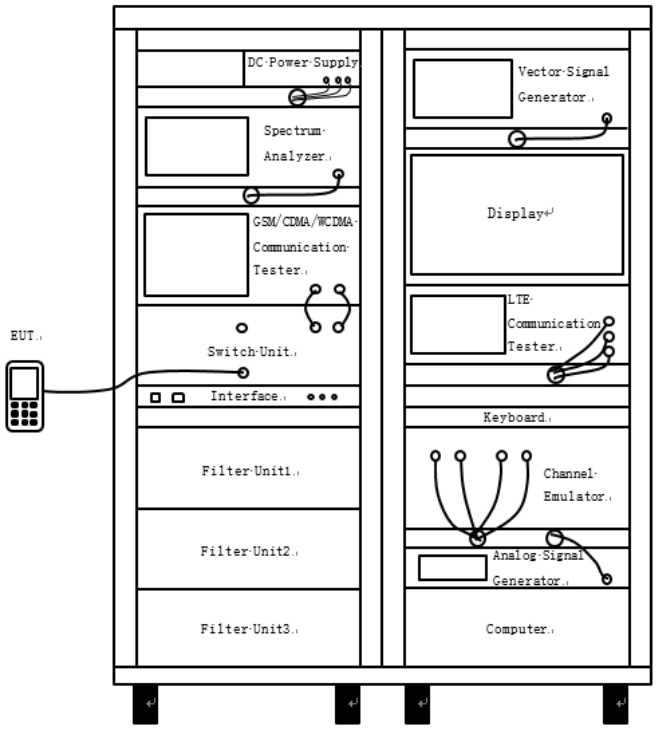
Note 1: The mark “v” means that this configuration is chosen for testing.
Note 2: The mark “n” means that this bandwidth is not supported.

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 4	LCH	1312	1712.4
	MCH	1412	1732.4
	HCH	1513	1752.6
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
	Mid 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
	Mid Range	5/10/15/20	21100	2535
	High Range	5	21425	2567.5
		10	21400	2565
		15	21375	2562.5
		20	21350	2560

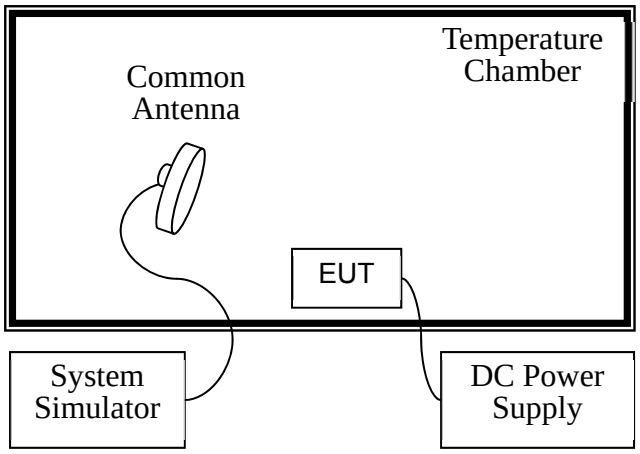
4.4 Test Setup

4.4.1 For Antenna Port Test



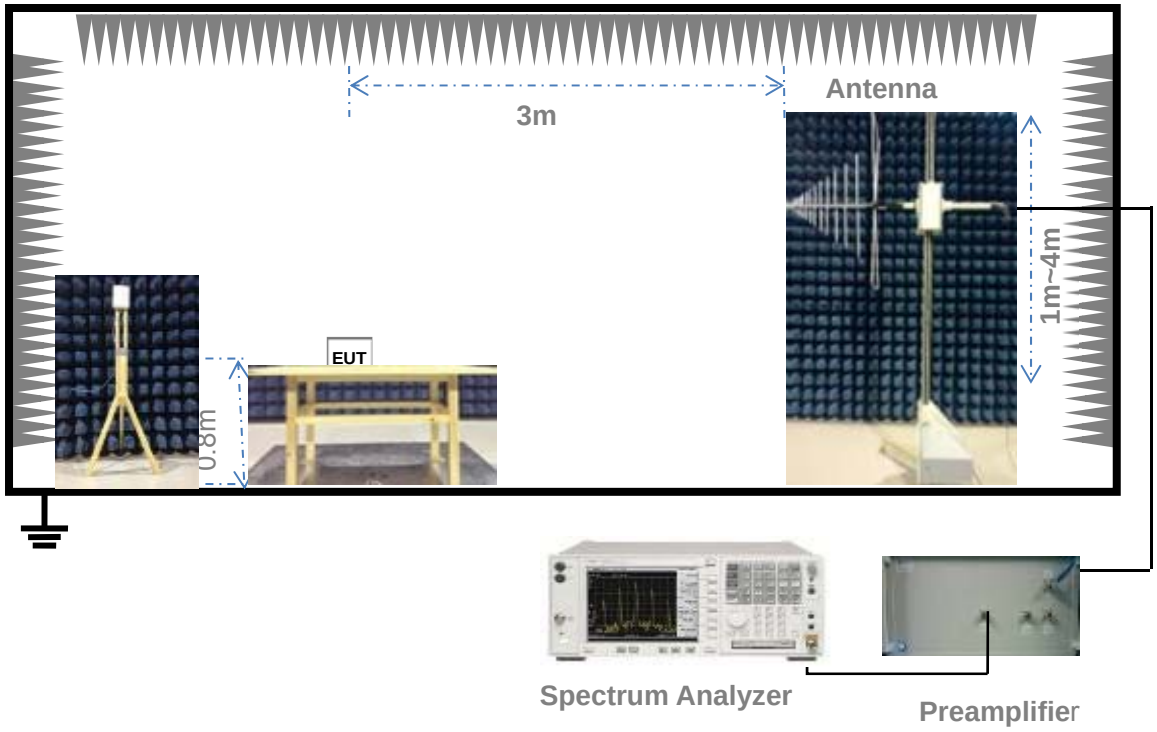
(Diagram 1)

4.4.2 For Frequency Stability Test



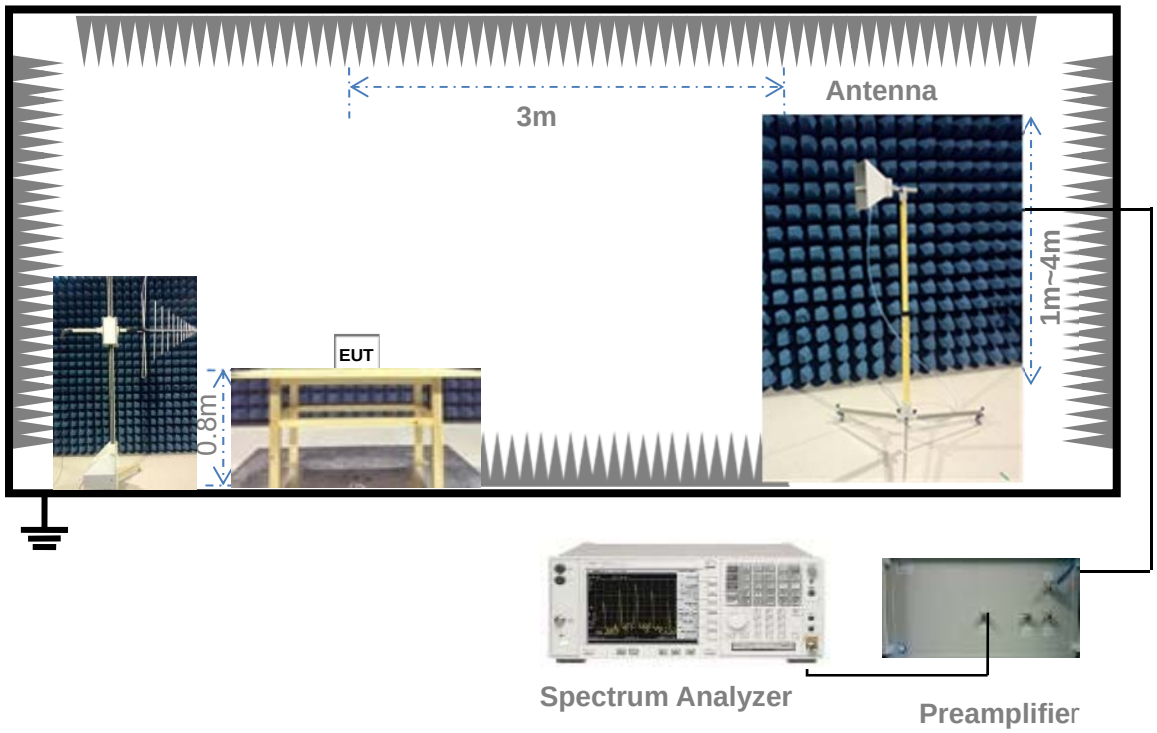
(Diagram 2)

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(b) & 27.50(c) & 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.

According to 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.

According to FCC section 27.50(b), portable stations (hand-held devices) transmitting in the 746-757MHz, 776-788MHz, and 805-806MHz bands are limited to 3 watts ERP.

FCC section 27.50(c), portable stations (hand-held devices) in the 698-746MHz band are limited to 3 watts ERP.

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.

Fixed, mobile, and portable (hand-held) stations operating in the 2000-2020 MHz band are limited to 2 watts EIRP.

And FCC section 27.50(h), for 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

The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. 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:

ERP/EIRP = P_{Meas} + GT − LC

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas}, 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);

dBd (ERP)=dBi (EIRP) -2.15 dB

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(d) & 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.

According to FCC section 24.232(d), 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.

For FCC section 24.232(e), 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.

According to FCC section 27.50(d), in measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

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.

CCDF procedure for PAPR:

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ 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%.

Alternate procedure for PAPR:

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

PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (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.

Many of the individual rule parts specify a relative OBW in lieu of the 99% OBW. In such cases, the OBW is defined as the width of the signal between two points, one below the carrier center frequency and on above the carrier center frequency, outside of which all emissions are attenuated by at least X dB below the transmitter power, where the value of X is typically specified as 26.

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 anticipated 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 10log (OBW / RBW) below the reference level.

d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.

e) For -26 dB OBW, the dynamic range of the spectrum analyzer at the selected RBW shall be at least 10dB below the target “-X dB down” requirement, e.g. -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be 36dB below the reference value.

f) Set the detection mode to peak, and the trace mode to max hold.

g) For 99% OBW, use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

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) For -26 dB OBW, determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace(this is the reference value).

Determine the “-X dB down amplitude” as equal to (reference value -X). Alternatively, this calculation can be performed by the analyzer by using the marker-delta function.

Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below “-X dB down amplitude” determined in step g). If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.

i) 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).

j) Change variable modulations, coding, or channel bandwidth settings, then repeat above test procedures.

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

FCC § 2.1055

The frequency stability shall be measured with variation of ambient temperature as follows:

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

(2) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10°C through the range.

The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating and point which shall be specified by the manufacture.

(3) 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.

FCC § 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

FCC § 24.235

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

FCC § 27.54

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

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(c) & 27.53(g) & 27.53(h) & 27.53(m)

FCC § 22.917(a) & 24.238(a)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P) dB. This is calculated to be -13 dBm.

FCC § 27.53(c)

For operations in the 746-758MHz band and the 776-788MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated outside the band below the transmitter power (P) by at least 43+10*log(P) dB.

FCC § 27.53(g)

For operations in the 600MHz band and the 698-746MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43+10*log(P) dB.

FCC § 27.53(h)

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 (BRS and EBS stations), the attenuation factor shall be not less than:

• 40+10logP dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.

• 43+10logP dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,

• 55+10logP 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.

1. The EUT is coupled to the system simulator and spectrum analyzer; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2. CMW500 was used to establish communication with the EUT, Its parameters were set to force the EUT transmitting at maximum output power.

3. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

4. Spurious emissions were tested with 0.001MHz RBW for frequency less than 150kHz, 0.01MHz RBW for frequency less than 30MHz, 0.1MHz RBW for frequency less than 1GHz, and 1MHz RBW for frequency above 1GHz. And sweep point number were at least 401, refering to following formula.

Sweep point number = Span/RBW

VBW=3RBW

Detector Mode=mean or average power

5. Record the frequencies and levels of spurious emissions.

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 & 24.238 & 27.53(c) & 27.53(g) & 27.53(h) & 27.53(m)

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 emissions are attenuated at least 26 dB below the transmitter power.

FCC § 22.917 & 24.238

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 is calculated to be -13 dBm.

FCC § 27.53(c)

For operations in the 746-758MHz band and the 776-788MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated outside the band below the transmitter power (P) by at least 43+10*log(P) dB.

FCC § 27.53(g)

For operations in the 600MHz band and the 698-746MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43+10*log(P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC § 27.53(h)

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 (BRS and EBS stations), the attenuation factor shall be not less than:

• 40+10logP dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.

• 43+10logP dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,

• 55+10logP 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).

In addition, the attenuation factor shall not be less that 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 EUT is coupled to the system simulator and spectrum analyzer; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2. CMW500 was used to establish communication with the EUT, and its parameters were set to force the EUT transmitting at maximum output power.

3. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient Attenuation.

4. The center of the spectrum analyzer was set to block edge frequency.

5. Band edge were tested with 1% cBW RBW, and sweep point number refered to following formula.

Sweep point number = 2*Span/RBW

VBW=3RBW

6. Record the frequencies and levels of spurious emissions.

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(a) & 24.238(a) & 27.53(c) & 27.53(g) & 27.53(h) & 27.53(m)

FCC § 22.917(a) & 24.238(a)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P) dB. This is calculated to be -13 dBm.

FCC § 27.53(c)

For operations in the 746-758MHz band and the 776-788MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated outside the band below the transmitter power (P) by at least 43+10*log(P) dB.

FCC § 27.53(g)

For operations in the 600MHz band and the 698-746MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43+10*log(P) dB.

FCC § 27.53(h)

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.

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 log10(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 log10(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 log10(P) dB.

FCC § 27.53(m)

For mobile digital stations (BRS and EBS stations), the attenuation factor shall be not less than:

• 40+10logP dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.

• 43+10logP dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,

• 55+10logP 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 received, 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 (W)	Verdict
			ERP (dBm)	ERP (W)		
GSM 850	128	5	27.902	0.62	7	Pass
	190	5	27.843	0.61		Pass
	251	5	30.874	1.22		Pass
GPRS 850	128	5	29.034	0.80		Pass
	190	5	28.745	0.75		Pass
	251	5	31.821	1.52		Pass
EGPRS 850	128	5	26.749	0.47		Pass
	190	5	25.195	0.33		Pass
	251	5	28.282	0.67		Pass

Test Band	Channel	PCL	Measured EIRP		Limit (W)	Verdict
			EIRP (dBm)	EIRP (W)		
GSM 1900	512	0	29.651	0.92	2	Pass
	661	0	30.282	1.07		Pass
	810	0	30.444	1.11		Pass
GPRS 1900	512	0	31.030	1.27		Pass
	661	0	31.476	1.40		Pass
	810	0	30.421	1.10		Pass
EGPRS 1900	512	0	29.074	0.81		Pass
	661	0	29.698	0.93		Pass
	810	0	29.888	0.97		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 (W)	Verdict
		EIRP (dBm)	EIRP (W)		
WCDMA B2	9262	23.316	0.21	2	Pass
	9400	23.199	0.21		Pass
	9538	23.520	0.22		Pass
HSDPA B2	9262	22.669	0.18		Pass
	9400	22.617	0.18		Pass
	9538	22.425	0.17		Pass
HSUPA B2	9262	22.548	0.18		Pass
	9400	21.681	0.15		Pass
	9538	22.705	0.19		Pass

Test Band	Channel	Measured EIRP		Limit (W)	Verdict
		EIRP (dBm)	EIRP (W)		
WCDMA B4	1312	23.958	0.25	1	Pass
	1412	24.098	0.26		Pass
	1513	23.378	0.22		Pass
HSDPA B4	1312	23.663	0.23		Pass
	1412	22.699	0.19		Pass
	1513	22.846	0.19		Pass
HSUPA B4	1312	22.487	0.18		Pass
	1412	22.758	0.19		Pass
	1513	22.440	0.18		Pass

Test Band	Channel	Measured ERP		Limit (W)	Verdict
		ERP (dBm)	ERP (W)		
WCDMA B5	4132	19.767	0.09	7	Pass
	4182	19.789	0.10		Pass
	4233	20.981	0.13		Pass
HSDPA B5	4132	19.887	0.10		Pass
	4182	20.106	0.10		Pass
	4233	20.002	0.10		Pass
HSUPA B5	4132	20.008	0.10		Pass
	4182	19.882	0.10		Pass
	4233	19.639	0.09		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:

Test BW	Test Channel	Test Model	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND4							
1.4 MHz	LCH	QPSK	RB1#0	23.001	0.20	1.00	Pass
			RB6#0	23.010	0.20	1.00	Pass
		16-QAM	RB1#0	22.879	0.19	1.00	Pass
			RB6#0	22.196	0.17	1.00	Pass
	MCH	QPSK	RB1#0	23.453	0.22	1.00	Pass
			RB6#0	22.389	0.17	1.00	Pass
		16-QAM	RB1#0	22.175	0.17	1.00	Pass
			RB6#0	21.958	0.16	1.00	Pass
	HCH	QPSK	RB1#0	23.649	0.23	1.00	Pass
			RB6#0	22.710	0.19	1.00	Pass
		16-QAM	RB1#0	22.762	0.19	1.00	Pass
			RB6#0	21.962	0.16	1.00	Pass
3 MHz	LCH	QPSK	RB1#0	23.089	0.20	1.00	Pass
			RB15#0	22.659	0.18	1.00	Pass
		16-QAM	RB1#0	22.698	0.19	1.00	Pass
			RB15#0	22.106	0.16	1.00	Pass
	MCH	QPSK	RB1#0	22.897	0.19	1.00	Pass
			RB15#0	22.719	0.19	1.00	Pass
		16-QAM	RB1#0	23.021	0.20	1.00	Pass
			RB15#0	22.164	0.16	1.00	Pass
	HCH	QPSK	RB1#0	22.362	0.17	1.00	Pass
			RB15#0	22.341	0.17	1.00	Pass
		16-QAM	RB1#0	21.849	0.15	1.00	Pass
			RB15#0	21.501	0.14	1.00	Pass
5 MHz	LCH	QPSK	RB1#0	23.712	0.24	1.00	Pass
			RB25#0	23.010	0.20	1.00	Pass
		16-QAM	RB1#0	22.775	0.19	1.00	Pass
			RB25#0	22.143	0.16	1.00	Pass
	MCH	QPSK	RB1#0	23.138	0.21	1.00	Pass
			RB25#0	22.899	0.19	1.00	Pass
		16-QAM	RB1#0	23.281	0.21	1.00	Pass
			RB25#0	22.046	0.16	1.00	Pass
	HCH	QPSK	RB1#0	23.468	0.22	1.00	Pass
			RB25#0	22.825	0.19	1.00	Pass
		16-QAM	RB1#0	22.944	0.20	1.00	Pass
			RB25#0	21.848	0.15	1.00	Pass
10 MHz	LCH	QPSK	RB1#0	23.446	0.22	1.00	Pass
			RB50#0	22.629	0.18	1.00	Pass
		16-QAM	RB1#0	22.694	0.19	1.00	Pass
			RB50#0	22.113	0.16	1.00	Pass

Test BW	Test Channel	Test Model	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND4							
	MCH	QPSK	RB1#0	22.926	0.20	1.00	Pass
			RB50#0	22.586	0.18	1.00	Pass
		16-QAM	RB1#0	23.017	0.20	1.00	Pass
			RB50#0	21.717	0.15	1.00	Pass
	HCH	QPSK	RB1#0	23.096	0.20	1.00	Pass
			RB50#0	22.625	0.18	1.00	Pass
		16-QAM	RB1#0	22.275	0.17	1.00	Pass
			RB50#0	22.013	0.16	1.00	Pass
15 MHz	LCH	QPSK	RB1#0	23.898	0.25	1.00	Pass
			RB75#0	23.168	0.21	1.00	Pass
		16-QAM	RB1#0	22.050	0.16	1.00	Pass
			RB75#0	21.811	0.15	1.00	Pass
	MCH	QPSK	RB1#0	24.161	0.26	1.00	Pass
			RB75#0	22.972	0.20	1.00	Pass
		16-QAM	RB1#0	22.099	0.16	1.00	Pass
			RB75#0	22.147	0.16	1.00	Pass
	HCH	QPSK	RB1#0	22.677	0.19	1.00	Pass
			RB75#0	23.062	0.20	1.00	Pass
		16-QAM	RB1#0	22.217	0.17	1.00	Pass
			RB75#0	21.905	0.16	1.00	Pass
20 MHz	LCH	QPSK	RB1#0	23.230	0.21	1.00	Pass
			RB100#0	22.110	0.16	1.00	Pass
		16-QAM	RB1#0	23.525	0.23	1.00	Pass
			RB100#0	21.207	0.13	1.00	Pass
	MCH	QPSK	RB1#0	23.554	0.23	1.00	Pass
			RB100#0	22.808	0.19	1.00	Pass
		16-QAM	RB1#0	23.497	0.22	1.00	Pass
			RB100#0	22.019	0.16	1.00	Pass
	HCH	QPSK	RB1#0	22.920	0.20	1.00	Pass
			RB100#0	22.736	0.19	1.00	Pass
		16-QAM	RB1#0	22.788	0.19	1.00	Pass
			RB100#0	22.051	0.16	1.00	Pass

Test BW	Test Channel	Test Model	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND7							
5 MHz	LCH	QPSK	RB1#0	17.113	0.05	2.00	Pass
			RB25#0	15.453	0.04	2.00	Pass
		16-QAM	RB1#0	19.576	0.09	2.00	Pass
			RB25#0	18.505	0.07	2.00	Pass
	MCH	QPSK	RB1#0	20.186	0.10	2.00	Pass
			RB25#0	18.863	0.08	2.00	Pass
		16-QAM	RB1#0	18.813	0.08	2.00	Pass
			RB25#0	17.988	0.06	2.00	Pass
	HCH	QPSK	RB1#0	15.264	0.03	2.00	Pass
			RB25#0	15.400	0.03	2.00	Pass
		16-QAM	RB1#0	18.863	0.08	2.00	Pass
			RB25#0	18.135	0.07	2.00	Pass
10 MHz	LCH	QPSK	RB1#0	19.667	0.09	2.00	Pass
			RB50#0	15.577	0.04	2.00	Pass
		16-QAM	RB1#0	18.697	0.07	2.00	Pass
			RB50#0	18.234	0.07	2.00	Pass
	MCH	QPSK	RB1#0	19.270	0.08	2.00	Pass
			RB50#0	18.867	0.08	2.00	Pass
		16-QAM	RB1#0	18.482	0.07	2.00	Pass
			RB50#0	17.513	0.06	2.00	Pass
	HCH	QPSK	RB1#0	19.154	0.08	2.00	Pass
			RB50#0	11.962	0.02	2.00	Pass
		16-QAM	RB1#0	18.657	0.07	2.00	Pass
			RB50#0	17.443	0.06	2.00	Pass
15 MHz	LCH	QPSK	RB1#0	20.035	0.10	2.00	Pass
			RB75#0	18.828	0.08	2.00	Pass
		16-QAM	RB1#0	18.989	0.08	2.00	Pass
			RB75#0	18.417	0.07	2.00	Pass
	MCH	QPSK	RB1#0	19.218	0.08	2.00	Pass
			RB75#0	19.101	0.08	2.00	Pass
		16-QAM	RB1#0	16.781	0.05	2.00	Pass
			RB75#0	18.470	0.07	2.00	Pass
	HCH	QPSK	RB1#0	19.242	0.08	2.00	Pass
			RB75#0	18.906	0.08	2.00	Pass
		16-QAM	RB1#0	18.391	0.07	2.00	Pass
			RB75#0	18.646	0.07	2.00	Pass
20 MHz	LCH	QPSK	RB1#0	20.066	0.10	2.00	Pass
			RB100#0	18.660	0.07	2.00	Pass
		16-QAM	RB1#0	19.233	0.08	2.00	Pass
			RB100#0	18.346	0.07	2.00	Pass
	MCH	QPSK	RB1#0	19.179	0.08	2.00	Pass

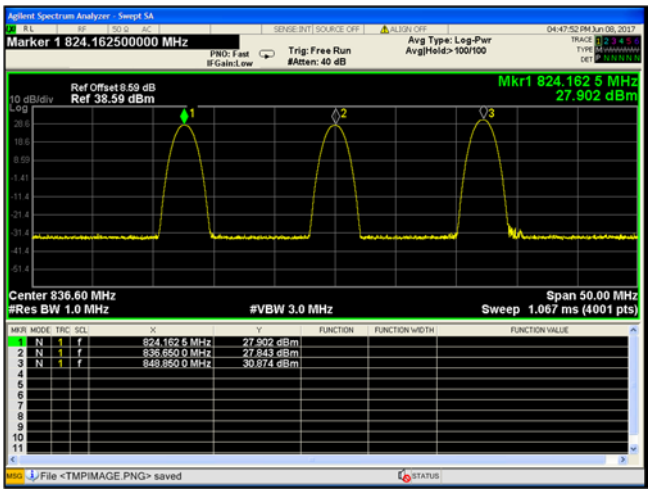
Test BW	Test Channel	Test Model	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND7							
			RB100#0	18.767	0.08	2.00	Pass
		16-QAM	RB1#0	18.452	0.07	2.00	Pass
			RB100#0	18.127	0.06	2.00	Pass
	HCH	QPSK	RB1#0	19.649	0.09	2.00	Pass
			RB100#0	18.811	0.08	2.00	Pass
		16-QAM	RB1#0	19.759	0.09	2.00	Pass
			RB100#0	18.636	0.07	2.00	Pass

Test Plots

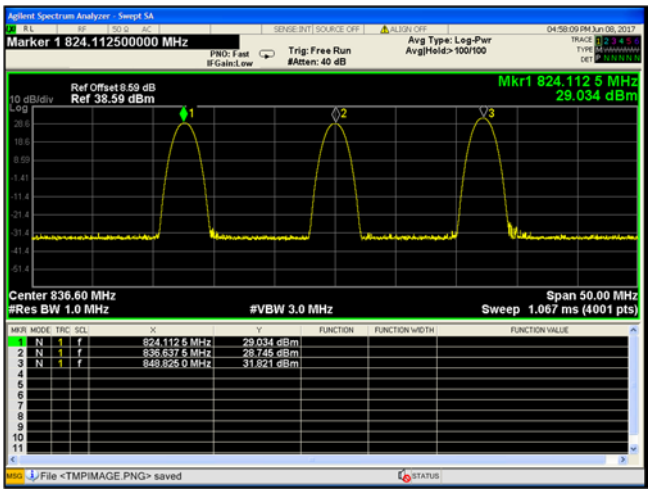
GSM Mode:

GSM 850：

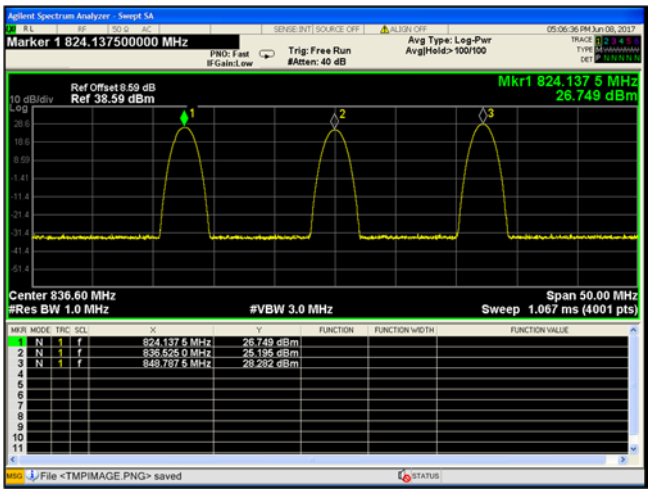
GSM 850



GPRS 850

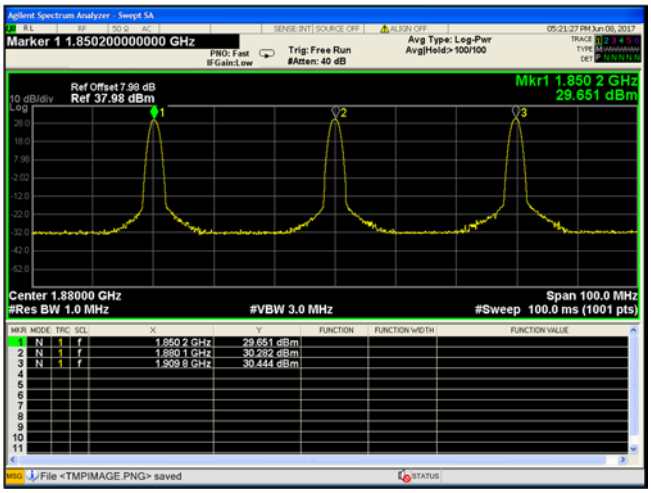


EGPRS 850

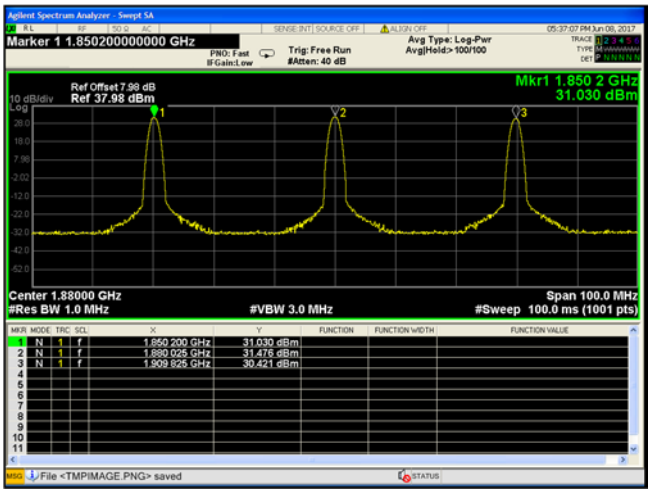


GSM 1900：

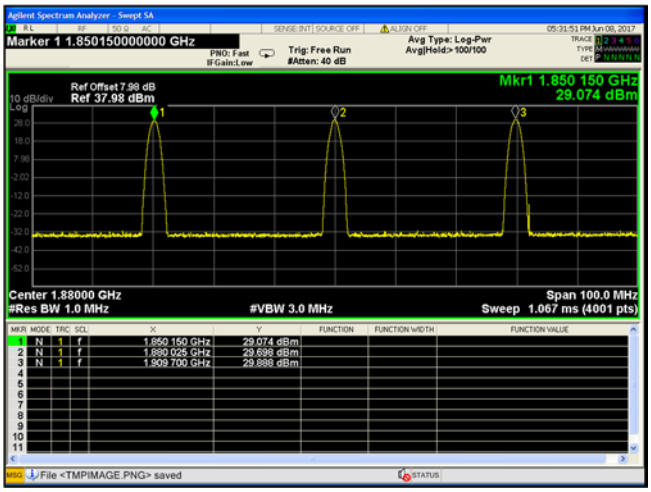
GSM 1900



GPRS 1900



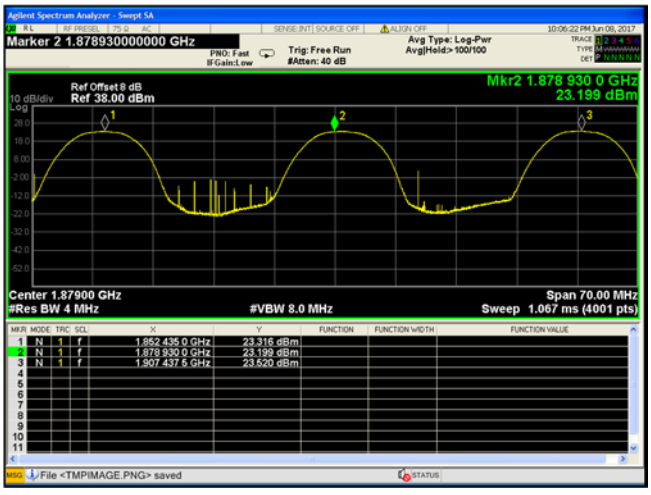
EGPRS 1900



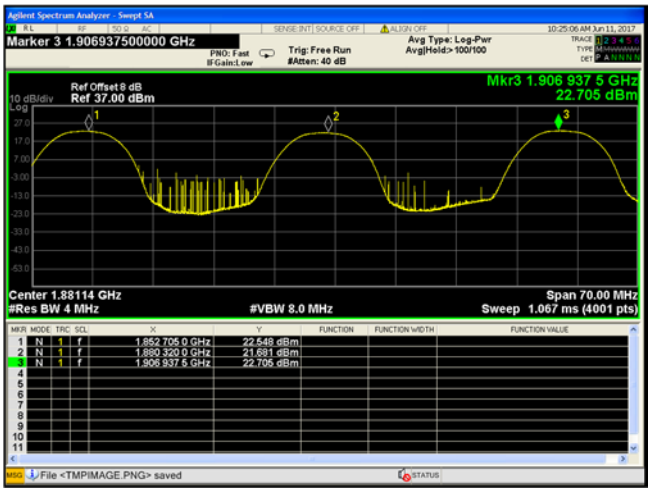
WCDMA Mode:

B2：

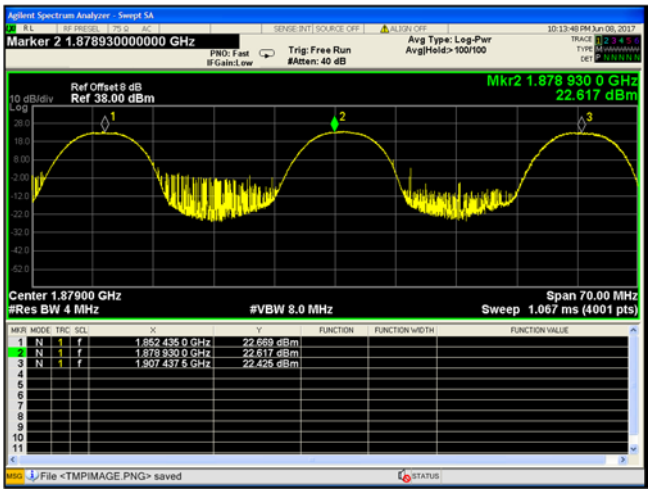
WCDMA B2



HSUPA B2

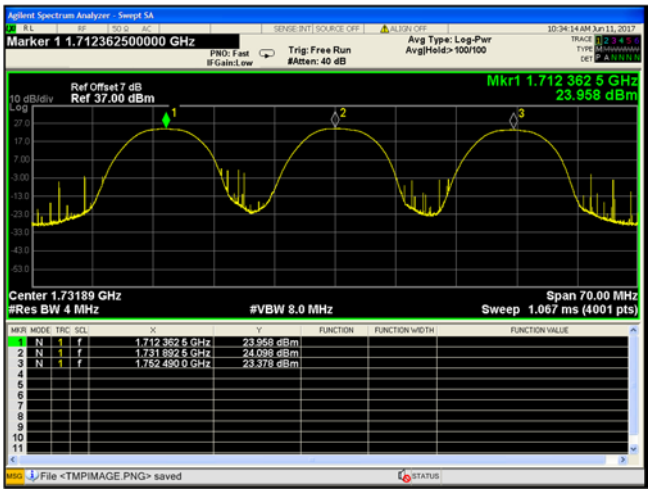


HSDPA B2

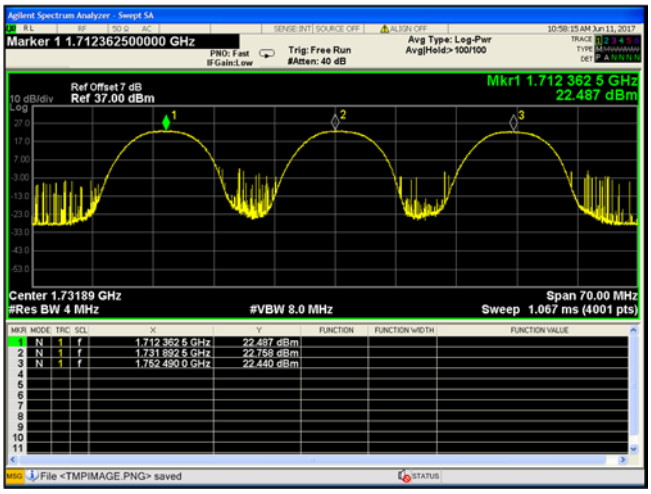


B4：

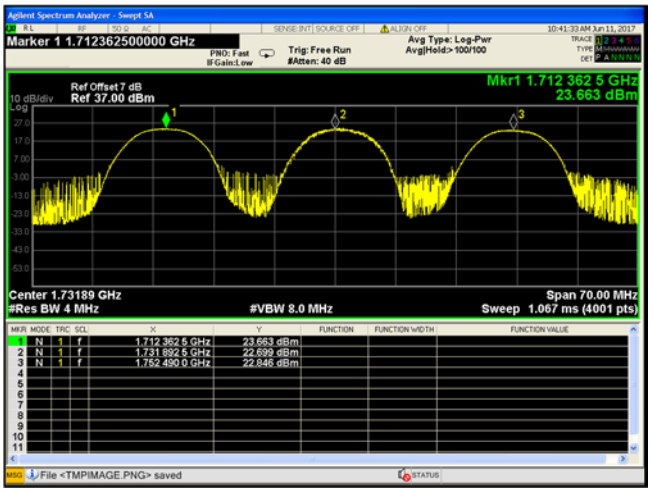
WCDMA B4



HSUPA B4

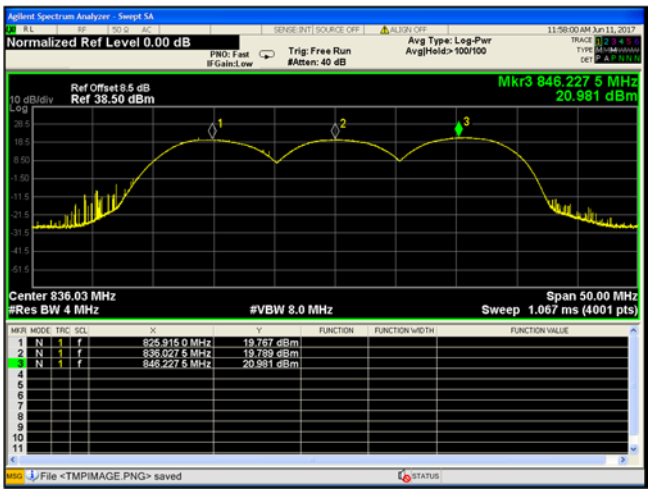


HSDPA B4

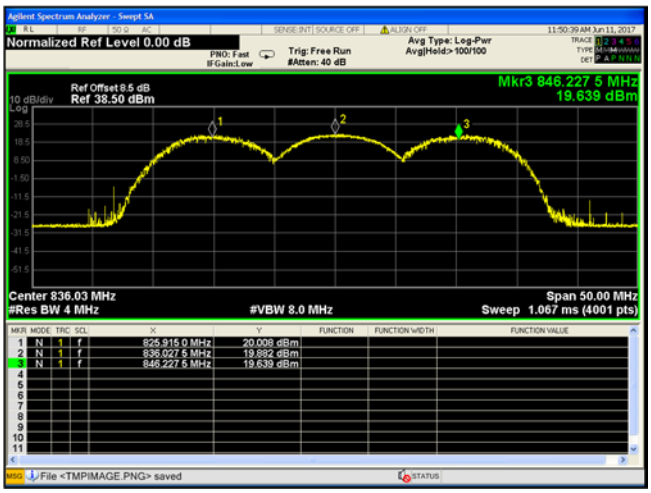


B5：

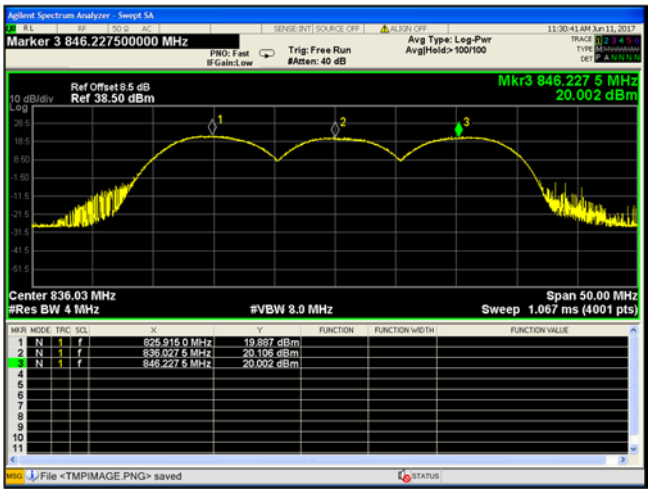
WCDMA B5



HSUPA B5



HSDPA B5



A.2 Peak to Average Ratio

The Peak to Average Ratio please refer to the BL-SZ1650193-501 which issued by Shenzhen BALUN Technology Co., Ltd. on Jun. 16, 2016, **Section A.2 Peak to Average Ratio**

A.3 Occupied Bandwidth

The Occupied Bandwidth please refer to the BL-SZ1650193-501 which issued by Shenzhen BALUN Technology Co., Ltd. on Jun. 16, 2016, **Section A.3 Occupied Bandwidth**

A.4 Frequency Stability

The Frequency Stability please refer to the BL-SZ1650193-501 which issued by Shenzhen BALUN Technology Co., Ltd. on Jun. 16, 2016**, Section A.4 Frequency Stability**

A.5 Spurious Emission at Antenna Terminals

The Spurious Emission at Antenna Terminals please refer to the BL-SZ1650193-501 which issued by Shenzhen BALUN Technology Co., Ltd. on Jun. 16, 2016, **Section A.5 Spurious Emission at Antenna Terminals**

A.6 Band Edge

The Band Edge please refer to the BL-SZ1650193-501 which issued by Shenzhen BALUN Technology Co., Ltd. on Jun. 16, 2016, **Section A.6 Band Edge**

A.7 Field Strength of Spurious Radiation

Note 1: GSM and EGPRS modes have been verified, only the worst data with different transmit 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-SZ1760126-501 Data Part 1.pdf”.

GSM and WCDMA Mode Test Verdict

Test Band	Test Channel	Refer to Plot[Note3]	Verdict
GSM 850	LCH	1.1	Pass
	MCH	1.2	Pass
	HCH	1.3	Pass
EGPRS 850	LCH	1.4	Pass
	MCH	1.5	Pass
	HCH	1.6	Pass
GSM 1900	LCH	1.7	Pass
	MCH	1.8	Pass
	HCH	1.9	Pass
EGPRS 1900	LCH	1.10	Pass
	MCH	1.11	Pass
	HCH	1.12	Pass
WCDMA Band 2	LCH	2.1	Pass
	MCH	2.2	Pass
	HCH	2.3	Pass
WCDMA Band 4	LCH	3.1	Pass
	MCH	3.2	Pass
	HCH	3.3	Pass
WCDMA Band 5	LCH	4.1	Pass
	MCH	4.2	Pass
	HCH	4.3	Pass

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB(Size#Offset)	Refer to Plot[Note3]	Verdict
Band 4	1.4 MHz	MCH	QPSK	RB1#0	5.1	Pass
	3 MHz	MCH	QPSK	RB1#0	5.2	Pass
	5 MHz	MCH	QPSK	RB1#0	5.3	Pass
	10 MHz	MCH	QPSK	RB1#0	5.4	Pass
	15 MHz	MCH	QPSK	RB1#0	5.5	Pass
	20 MHz	MCH	QPSK	RB1#0	5.6	Pass
Band 7	5 MHz	MCH	QPSK	RB1#0	6.1	Pass
	10 MHz	MCH	QPSK	RB1#0	6.2	Pass
	15 MHz	MCH	QPSK	RB1#0	6.3	Pass
	20 MHz	MCH	QPSK	RB1#0	6.4	Pass

ANNEX B TEST SETUP PHOTOS

Please refer to the document “BL-SZ1760126-AR.PDF”.
The conducted test photo please refer to BL-SZ1650193-AR.

ANNEX C EUT EXTERNAL PHOTOS

Please refer to the document “BL-SZ1760126-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer to the document “BL-SZ1760126-AI.PDF”.

-END OF REPORT--