TEST REPORT

Applicant:	Queclink Wireless Solutions Co., Ltd.
Address:	No.30, Lane 500, Xinlong Road, Minhang District, Shanghai, China
Equipment Type:	Intelligent 4G Dash Camera with Full Featured Telematics
Model Name:	CV200XNA
Brand Name:	QUECLINK
FCC ID:	YQD-CV200XNA
Test Standard:	47 CFR Part 2 (Others refer to chapter 3.1)
Sample Receipt Date:	Aug. 01, 2023
Test Date:	Aug. 08, 2023 - Aug. 11, 2023
Date of Issue:	Aug. 31, 2023

ISSUED BY:

Kunshan Balun Communications Technology Co., Ltd.

Tested by: Yang Wenting **Checked by:** Ye Feng **Approved by:** Luo Biao (General Manager)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Aug. 31, 2023	Initial Issue

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Kunshan Balun Communications Technology Co., Ltd.
Address	Room 101, Building 5, No. 1689, Zizhu Road, Yushan, Kunshan,Jiangsu, China

1.2 Test Location

Name	Kunshan Balun Communications Technology Co., Ltd.
Location	Room 101, Building 5, No. 1689, Zizhu Road, Yushan, Kunshan, Jiangsu, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as an accredited testing laboratory. The designation number is CN1352.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Queclink Wireless Solutions Co., Ltd.
Address	No.30, Lane 500, Xinlong Road, Minhang District, Shanghai, China

2.2 Manufacturer Information

Manufacturer	Queclink Wireless Solutions Co., Ltd.
Address	No.30, Lane 500, Xinlong Road, Minhang District, Shanghai, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Intelligent 4G Dash Camera with Full Featured Telematics
Model Name Under Test	CV200XNA
Series Model Name	N/A
Description of Model name differentiation	N/A
Sample No.	SC-EC2360729-S02
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	120 mm(L) x 60 mm(W) x 70 mm(H)
Weight (Approx.)	220.0 g

2.5 Technical Information

Note: The information provided by the applicant, except for The Max RF Output Power (EIRP/ERP).

All Network and Wireless connectivity for EUT	3G Network WCDMA/HSDPA/HSUPA/DC-HSDPA/HSPA+ Band 2/4/5 4G Network FDD LTE Band 2/4/5/7/12/13/14/17/25/26/66/71 TDD LTE Band 41 Bluetooth (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40), 5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80), U-NII-1/2A/2C/3, 5.8G SRD, GPS, GLONASS, BDS
About the Product	The equipment is Intelligent 4G Dash Camera with Full Featured Telematics, intended for used with information technology equipment.

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

Operating Bands	3G Network WCDMA/HSDPA/HSUPA/DC-HSDPA/HSPA+ Band 2/4/5 4G Network FDD LTE Band 2/4/5/7/12/13/14/17/25/26/66/71 TDD LTE Band 41	
Modulation Type	WCDMA	QPSK
	HSDPA /HSUPA	QPSK
		16QAM
	LTE	QPSK
		16QAM
Antenna Type	FPC Antenna	
Antenna Gain	WCDMA/HSDPA/HSUPA Band 2: -2.2 dBi WCDMA/HSDPA/HSUPA Band 4: -2.2 dBi WCDMA/HSDPA/HSUPA Band 5: -3.7 dBi FDD LTE Band 2: -2.2 dBi FDD LTE Band 4: -2.2 dBi FDD LTE Band 5: -3.7 dBi FDD LTE Band 7: -2.7 dBi FDD LTE Band 12: -3.7dBi FDD LTE Band 13: -3.7 dBi FDD LTE Band 14: -3.7dBi FDD LTE Band 17: -3.7 dBi FDD LTE Band 25: -2.2 dBi FDD LTE Band 26: -3.7 dBi FDD LTE Band 66: -2.2 dBi FDD LTE Band 71: -4.2 dBi FDD LTE Band 41: -2.7 dBi	
The Max RF Output Power (EIRP/ERP)	WCDMA/HSDPA/HSUPA Band 2: 22.07 dBm WCDMA/HSDPA/HSUPA Band 4: 21.26 dBm	

	WCDMA/HSDPA/HSUPA Band 5: 19.17 dBm FDD LTE Band 2: 22.28 dBm FDD LTE Band 4: 21.11 dBm FDD LTE Band 5: 19.39 dBm FDD LTE Band 7: 20.34 dBm FDD LTE Band 12: 19.26 dBm FDD LTE Band 13: 20.11 dBm FDD LTE Band 14: 19.62 dBm FDD LTE Band 17: 19.19 dBm FDD LTE Band 25: 22.00 dBm FDD LTE Band 26 (part22): 19.72 dBm FDD LTE Band 26 (part90): 19.44 dBm TDD LTE Band 66: 21.61 dBm TDD LTE Band 71: 19.76 dBm FDD LTE Band 41: 20.11 dBm

Band	Power Class		Tx Frequency Range	Rx Frequency Range
	GMSK	GMSK		
WCDMA B2	3		1850 MHz ~ 1910 MHz	1930 MHz ~ 1990 MHz
WCDMA B4	3		1710 MHz ~ 1755 MHz	2110 MHz ~ 2155 MHz
WCDMA B5	3		824 MHz ~ 849 MHz	869 MHz ~ 894 MHz
LTE B2	3		1850 MHz ~ 1910 MHz	1930 MHz ~ 1990 MHz
LTE B4	3		1710 MHz ~ 1755 MHz	2110 MHz ~ 2155 MHz
LTE B5	3		824 MHz ~ 849 MHz	869 MHz ~ 894 MHz
LTE B7	3		2500 MHz ~ 2570 MHz	2620 MHz ~ 2690 MHz
LTE B12	3		699 MHz ~ 716 MHz	729 MHz ~ 746 MHz
LTE B13	3		777 MHz ~ 787 MHz	746 MHz ~ 756 MHz
LTE B14	3		788 MHz ~ 798 MHz	758 MHz ~ 768 MHz
LTE B17	3		704 MHz ~ 716 MHz	734 MHz ~ 746 MHz
LTE B25	3		1850 MHz ~ 1915 MHz	1930 MHz ~ 1995 MHz
LTE B26	3		814 MHz ~ 849 MHz	859 MHz ~ 894 MHz
LTE B66	3		1710 MHz ~ 1780 MHz	2110 MHz ~ 2180 MHz
LTE B71	3		663 MHz ~ 698 MHz	617 MHz ~ 652 MHz
LTE B41	3		2496 MHz ~ 2690 MHz	2496 MHz ~ 2690 MHz

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 Subpart H	Cellular Radiotelephone Service
3	47 CFR Part 24 Subpart E	Broadband PCS
4	47 CFR Part 27	Miscellaneous Wireless Communications Services
5	47 CFR Part 90 Subpart S	Regulations Governing Licensing and Use of Frequencies in the 806-824, 851-869, 896-901, and 935-940 MHz Bands
6	47 CFR Part 90 Subpart R	Regulations Governing Licensing and Use of Frequencies in the 758-775 and 788-805 MHz Bands
7	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
8	KDB 971168 D01 v03	Measurement Guidance for Certification of Licensed Digital Transmitters

3.2 Test Verdict

No.	Test Description	FCC Part No.	Test Result	Test 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 90.635(b) 90.542(a)	ANNEX A.1	Pass
3	Peak to Average Radio	2.1046 24.232(d) 27.50	ANNEX A.2	Pass
4	Occupied Bandwidth	2.1049 22.917 24.238 27.53 90.209	ANNEX A.3	Pass
5	Frequency Stability	2.1055 22.355 24.235 27.54 90.213	ANNEX A.4	Pass
6	Spurious Emission at Antenna Terminals	2.1051 22.917 24.238 27.53 90.691 90.543	ANNEX A.5	Pass
7	Band Edge	2.1051 22.917 24.238 27.53 90.691 90.543	ANNEX A.6	Pass
8	Field Strength of Spurious Radiation	2.1053 22.917 24.238 27.53 90.691 90.543	ANNEX A.7	Pass
Note 1: Compared with the EUT of test report No. DDT-B21122007-1E01 (FCC ID:				

No.	Test Description	FCC Part No.	Test Result	Test Verdict
XMR2019SC600NA), the EUT of this report the RF module installed is electronically and mechanically identical, Therefore, only the two test cases, which include Effective (Isotropic) Radiated Power and Field Strength of Spurious Radiation were retested in this report. The other test cases in this report please refer to test report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.				

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity		20% to 75%
Atmospheric Pressure		98 kPa to 102 kPa
Test Voltage of the EUT	NV (Normal Voltage)	DC 12.0 V
	LV (Low Voltage)	DC 8.0 V
	HV (High Voltage)	DC 32.0 V
Test Temperature of the EUT	NT (Normal Temperature)	15 °C to 35 °C
	LT (Low Temperature)	-30 °C
	HT (High Temperature)	+50 °C

4.2 Test Equipment and Test Software List

Description	Manufacturer	Model	Device Number	Software /Firmware Version	Cal. Date	Cal. Due
BL410 2G/3G/4G RF Test System						
Wideband Radio Communication Tester	R&S	CMW 500	BK-EMC-L064	V3.7.110	2023.04.10	2024.04.09
Spectrum Analyzer	Agilent	E4440A	BK-EMC-L027	A.11.21	2022.11.02	2023.11.01
Spectrum Analyzer	Keysight	N9020A	BK-EMC-L066	A.17.05	2022.11.02	2023.11.01
Temperature Chamber	ESPEC	ECT	BK-EMC-L068	NA	2022.11.03	2023.11.02
DC Power Supply	ITECH	IT6863A	BK-EMC-L113	NA	2022.10.19	2023.10.18
Vector Signal Generator	Agilent	E4438C	BK-EMC-L028	C.05.76	2022.11.02	2023.11.01
Analog Signal Generator	Keysight	N5173B	BK-EMC-L074	B.01.90	2022.11.02	2023.11.01
Test Software	BALUN	BL410R	N/A	V2.1.1.488	N/A	N/A
Radiated Test System						
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	BK-EMC-L008	NA	2021.12.30	2024.12.29
Test Antenna-Horn	Schwarzbeck	BBHA 9120D	BK-EMC-L044	NA	2022.10.08	2025.10.07

Description	Manufacturer	Model	Device Number	Software /Firmware Version	Cal. Date	Cal. Due
Anechoic Chamber	YIHENG	9m*6m*6 m	BK-EMC-L001	NA	2022.07.22	2025.07.21
EMI Receiver	KEYSIGHT	N9038A	BK-EMC-L127	A.21.06	2023.02.04	2024.02.03
Wideband Radio Communication Tester	R&S	CMW 500	BK-EMC-L094	V3.7.172	2023.03.09	2024.03.08
Test Software	BALUN	BL410-E	N/A	V21.919	N/A	N/A

4.4 Test Configurations

Test Items	Test Mode	Test Channel		
		LCH	MCH	HCH
Effective (Isotropic) Radiated Power Test Items	WCDMA Band 2	v	v	v
	WCDMA Band 4	v	v	v
	WCDMA Band 5	v	v	v
	HSDPA Band 2	v	v	v
	HSDPA Band 4	v	v	v
	HSDPA Band 5	v	v	v
	HSUPA Band 2	v	v	v
	HSUPA Band 4	v	v	v
	HSUPA Band 5	v	v	v
Peak to Average Ratio	WCDMA Band 2	v	v	v
	WCDMA Band 4	v	v	v
	WCDMA Band 5	v	v	v
Occupied Bandwidth	WCDMA Band 2	v	v	v
	WCDMA Band 4	v	v	v
	WCDMA Band 5	v	v	v
Frequency Stability	WCDMA Band 2	v	v	v
	WCDMA Band 4	v	v	v
	WCDMA Band 5	v	v	v
Spurious Emission at Antenna Terminals	WCDMA Band 2	v	v	v
	WCDMA Band 4	v	v	v
	WCDMA Band 5	v	v	v
Band Edge	WCDMA Band 2	v	--	v
	WCDMA Band 4	v	--	v
	WCDMA Band 5	v	--	v
Field Strength of Spurious Radiation	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.				

Test Mode	UL Channel	UL Channel No.	UL Frequency (MHz)
WCDMA Band 2	Low Channel	9262	1852.4
	Middle Channel	9400	1880.0
	High Channel	9538	1907.6
WCDMA Band 4	Low Channel	1312	1712.4
	Middle Channel	1412	1732.4
	High Channel	1513	1752.6
WCDMA Band 5	Low Channel	4132	826.4
	Middle Channel	4182	836.4
	High Channel	4233	846.6

LTE Band	Bandwidth (MHz)						Modulation Type		RB#			Test Channel		
	1.4	3	5	10	15	20	QPSK	16-QAM	1	Half	Full	LCH	MCH	HCH
Effective (Isotropic) Radiated Power														
2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
5	v	v	v	v	n	n	v	v	v	v	v	v	v	v
7	n	n	v	v	v	v	v	v	v	v	v	v	v	v
12	v	v	v	v	n	n	v	v	v	v	v	v	v	v
13	n	n	v	v	n	n	v	v	v	v	v	v	v	v
14	n	n	v	v	n	n	v	v	v	v	v	v	v	v
17	n	n	v	v	n	n	v	v	v	v	v	v	v	v
25	v	v	v	v	v	v	v	v	v	v	v	v	v	v
26(Part22)	v	v	v	v	v	n	v	v	v	v	v	v	v	v
26(Part90)	v	v	v	v	--	n	v	v	v	v	v	v	v	v
41	n	n	v	v	v	v	v	v	v	v	v	v	v	v
66	v	v	v	v	v	v	v	v	v	v	v	v	v	v
71	n	n	v	v	v	v	v	v	v	v	v	v	v	v
Peak to Average Ratio														
2	--	--	--	--	--	v	v	v	v	--	v	v	v	v
4	--	--	--	--	--	v	v	v	v	--	v	v	v	v
5	--	--	--	v	n	n	v	v	v	--	v	v	v	v
7	n	n	--	--	--	v	v	v	v	--	v	v	v	v
12	--	--	--	v	n	n	v	v	v	--	v	v	v	v
13	n	n	--	v	n	n	v	v	v	--	v	v	v	v
14	n	n	--	v	n	n	v	v	v	--	v	v	v	v
17	n	n	--	v	n	n	v	v	v	--	v	v	v	v
25	--	--	--	--	--	v	v	v	v	--	v	v	v	v
26(Part22)	--	--	--	--	v	n	v	v	v	--	v	v	v	v
26(Part90)	--	--	--	v	--	n	v	v	v	--	v	--	v	--
38	n	n	--	--	--	v	v	v	v	--	v	v	v	v
41	n	n	--	--	--	v	v	v	v	--	v	v	v	v
66	--	--	--	--	--	v	v	v	v	--	v	v	v	v
71	n	n	--	--	--	v	v	v	v	--	v	v	v	v
Occupied Bandwidth														
2	v	v	v	v	v	v	v	v	--	--	v	v	v	v
4	v	v	v	v	v	v	v	v	--	--	v	v	v	v
5	v	v	v	v	n	n	v	v	--	--	v	v	v	v
7	n	n	v	v	v	v	v	v	--	--	v	v	v	v
12	v	v	v	v	n	n	v	v	--	--	v	v	v	v
13	n	n	v	v	n	n	v	v	--	--	v	v	v	v

LTE Band	Bandwidth (MHz)						Modulation Type		RB#			Test Channel		
	1.4	3	5	10	15	20	QPSK	16-QAM	1	Half	Full	LCH	MCH	HCH
14	n	n	v	v	n	n	v	v	--	--	v	v	v	v
17	n	n	v	v	n	n	v	v	--	--	v	v	v	v
25	v	v	v	v	v	v	v	v	--	--	v	v	v	v
26(Part22)	v	v	v	v	v	n	v	v	--	--	v	v	v	v
26(Part90)	v	v	v	v	--	n	v	v	--	--	v	v	v	v
41	n	n	v	v	v	v	v	v	--	--	v	v	v	v
66	v	v	v	v	v	v	v	v	--	--	v	v	v	v
71	n	n	v	v	v	v	v	v	--	--	v	v	v	v
Frequency Stability														
2	--	--	--	v	--	--	v	v	--	--	v	--	v	--
4	--	--	--	v	--	--	v	v	--	--	v	--	v	--
5	--	--	--	v	n	n	v	v	--	--	v	--	v	--
7	n	n	--	v	--	--	v	v	--	--	v	--	v	--
12	--	--	--	v	n	n	v	v	--	--	v	--	v	--
13	n	n	--	v	n	n	v	v	--	--	v	--	v	--
14	n	n	--	v	n	n	v	v	--	--	v	--	v	--
17	n	n	--	v	n	n	v	v	--	--	v	--	v	--
25	--	--	--	v	--	--	v	v	--	--	v	--	v	--
26(Part22)	--	--	--	v	--	n	v	v	--	--	v	--	v	--
26(Part90)	--	--	--	v	--	n	v	v	--	--	v	--	v	--
41	n	n	--	v	--	--	v	v	--	--	v	--	v	--
66	--	--	--	v	--	--	v	v	--	--	v	--	v	--
71	n	n	--	v	--	--	v	v	--	--	v	--	v	--
Spurious Emission at Antenna Terminals														
2	v	v	v	v	v	v	v	v	v	--	--	v	v	v
4	v	v	v	v	v	v	v	v	v	--	--	v	v	v
5	v	v	v	v	n	n	v	v	v	--	--	v	v	v
7	n	n	v	v	v	v	v	v	v	--	--	v	v	v
12	v	v	v	v	n	n	v	v	v	--	--	v	v	v
13	v	v	v	v	n	n	v	v	v	--	--	v	v	v
14	v	v	v	v	n	n	v	v	v	--	--	v	v	v
17	n	n	v	v	n	n	v	v	v	--	--	v	v	v
25	v	v	v	v	v	v	v	v	v	--	--	v	v	v
26(Part22)	v	v	v	v	v	n	v	v	v	--	--	v	v	v
26(Part90)	v	v	v	v	--	n	v	v	v	--	--	v	v	v
41	n	n	v	v	v	v	v	v	v	--	--	v	v	v
66	v	v	v	v	v	v	v	v	v	--	--	v	v	v
71	n	n	v	v	v	v	v	v	v	--	--	v	v	v
Band Edge														

LTE Band	Bandwidth (MHz)						Modulation Type		RB#			Test Channel		
	1.4	3	5	10	15	20	QPSK	16-QAM	1	Half	Full	LCH	MCH	HCH
2	v	v	v	v	v	v	v	v	v	--	v	v	--	v
4	v	v	v	v	v	v	v	v	v	--	v	v	--	v
5	v	v	v	v	n	n	v	v	v	--	v	v	--	v
7	n	n	v	v	v	v	v	v	v	--	v	v	--	v
12	v	v	v	v	n	n	v	v	v	--	v	v	--	v
13	n	n	v	v	n	n	v	v	v	--	v	v	--	v
14	n	n	v	v	n	n	v	v	v	--	v	v	--	v
17	n	n	v	v	n	n	v	v	v	--	v	v	--	v
25	v	v	v	v	v	v	v	v	v	--	v	v	--	v
26(Part22)	v	v	v	v	v	n	v	v	v	--	v	v	--	v
26(Part90)	v	v	v	v	--	n	v	v	v	--	v	v	--	v
41	n	n	v	v	v	v	v	v	v	--	v	v	--	v
66	v	v	v	v	v	v	v	v	v	--	v	v	--	v
71	n	n	v	v	v	v	v	v	v	--	v	v	--	v
Field Strength of Spurious Radiation														
2	v	v	v	v	v	v	v	--	v	--	--	--	v	--
4	v	v	v	v	v	v	v	--	v	--	--	--	v	--
5	v	v	v	v	n	n	v	--	v	--	--	--	v	--
7	n	n	v	v	v	v	v	--	v	--	--	--	v	--
12	v	v	v	v	n	n	v	--	v	--	--	--	v	--
13	n	n	v	v	n	n	v	--	v	--	--	--	v	--
14	n	n	v	v	n	n	v	--	v	--	--	--	v	--
17	n	n	v	v	n	n	v	--	v	--	--	--	v	--
26(Part22)	v	v	v	v	v	n	v	--	v	--	--	--	v	--
26(Part90)	v	v	v	v	--	n	v	--	v	--	--	--	v	--
41	n	n	v	v	v	v	v	--	v	--	--	--	v	--
66	v	v	v	v	v	v	v	--	v	--	--	--	v	--
71	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	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
LTE Band 2	Low Range	1.4	18607	1850.7
		3	18615	1851.5
		5	18625	1852.5
		10	18650	1855
		15	18675	1857.5
		20	18700	1860
	Middle Range	1.4/3/5/10/15/20	18900	1880
	High Range	1.4	19193	1909.3
		3	19185	1908.5
		5	19175	1907.5
		10	19150	1905
		15	19125	1902.5
		20	19100	1900
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 5	Low Range	1.4	20407	824.7
		3	20415	825.5
		5	20425	826.5
		10	20450	829
	Middle Range	1.4/3/5/10	20525	836.5
	High Range	1.4	20643	848.3
		3	20635	847.5
		5	20625	846.5
		10	20600	844
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

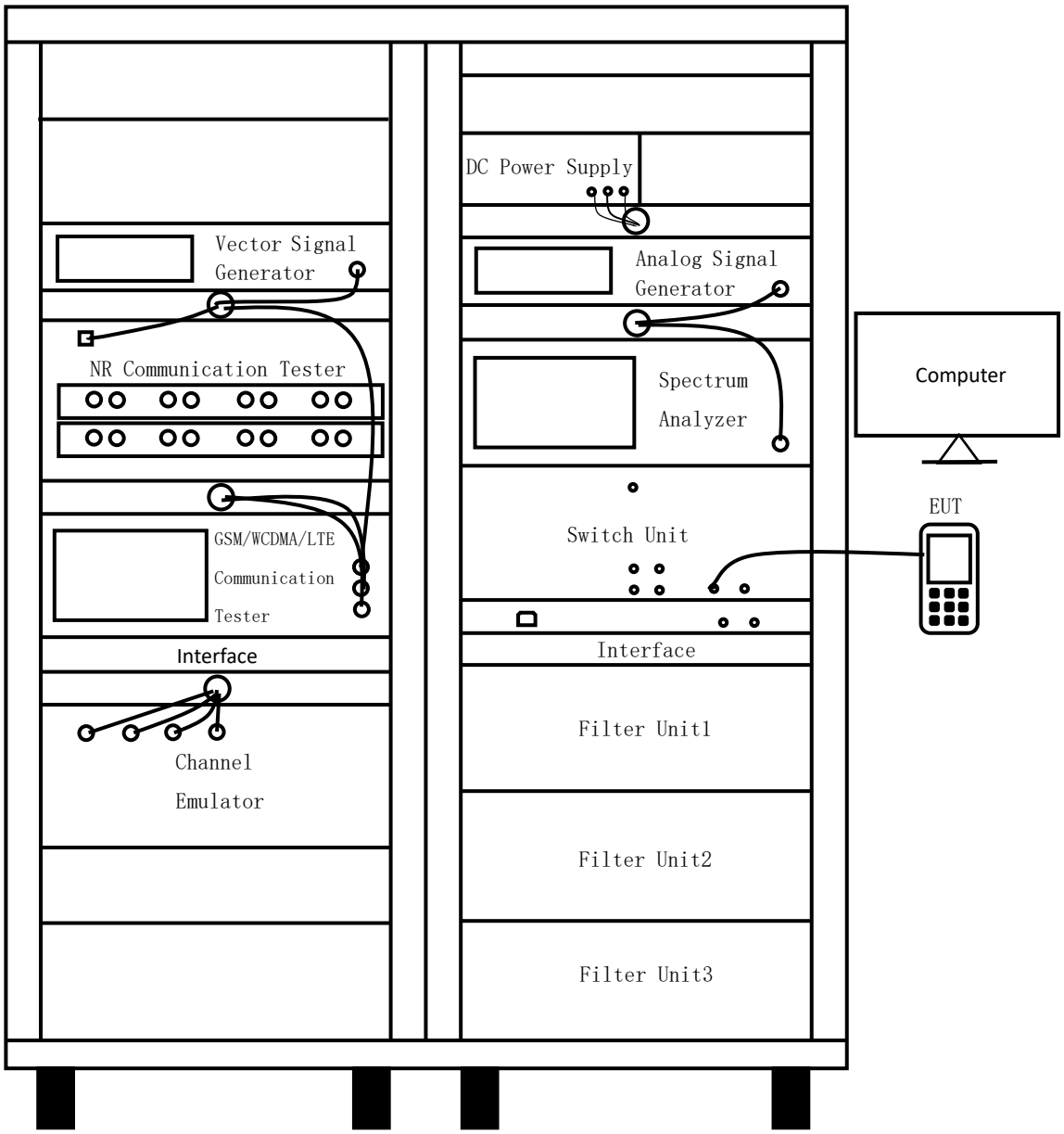
Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
	High Range	5	21425	2567.5
		10	21400	2565
		15	21375	2562.5
		20	21350	2560
LTE Band 12	Low Range	1.4	23017	699.7
		3	23025	700.5
		5	23035	701.5
		10	23060	704
	Middle Range	1.4/3/5/10	23095	707.5
	High Range	1.4	23173	715.3
		3	23165	714.5
		5	23155	713.5
		10	23130	711
LTE Band 13	Low Range	5	23205	779.5
		10	23230	782
	Middle Range	5/10	23230	782
	High Range	5	23255	784.5
		10	23230	782
LTE Band 14	Low Range	5	23305	790.5
		10	23330	793
	Middle Range	5/10	23330	793
	High Range	5	23355	795.5
		10	23330	793
LTE Band 17	Low Range	5	23755	706.5
		10	23780	709
	Middle Range	5/10	23790	710
	High Range	5	23825	713.5
		10	23800	711
LTE Band 25	Low Range	1.4	26047	1850.7
		3	26055	1851.5
		5	26065	1852.5
		10	26090	1855
		15	26115	1857.5
		20	26140	1860
	Middle Range	1.4/3/5/10/15/20	26365	1882,5
	High Range	1.4	26683	1914.3
		3	26675	1913.5
		5	26665	1912.5
		10	26640	1910
		15	26615	1907.5
		20	26590	1905

Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
LTE Band 26 (Part22)	Low Range	1.4	26797	824.7
		3	26805	825.5
		5	26815	826.5
		10	26840	829
		15	26865	831.5
	Middle Range	1.4/3/5/10/15	26915	836.5
	High Range	1.4	27033	848.3
		3	27025	847.5
		5	27015	846.5
		10	26990	844
		15	26965	841.5
LTE Band 26 (Part90)	Low Range	1.4	26697	814.7
		3	26705	815.5
		5	26715	816.5
		10	---	---
	Middle Range	1.4/3/5/10	26740	819
	High Range	1.4	26783	823.3
		3	26775	822.5
		5	26765	821.5
		10	---	---
LTE Band 41	Low Range	5	39675	2498.5
		10	39700	2501
		15	39725	2503.5
		20	39750	2506
	Middle Range	5/10/15/20	40620	2593
	High Range	5	41565	2687.5
		10	41540	2685
		15	41515	2682.5
		20	41490	2680
LTE Band 66	Low Range	1.4	131979	1710.7
		3	131987	1711.5
		5	131997	1712.5
		10	132022	1715
		15	132047	1717.5
		20	132072	1720
	Middle Range	1.4/3/5/10/15/20	132322	1745
	High Range	1.4	132665	1779.3
		3	132657	1778.5
		5	132647	1777.5
		10	132622	1775
		15	132597	1772.5

Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
		20	132572	1770
LTE Band 71	Low Range	5	133147	665.5
		10	133172	668
		15	133197	670.5
		20	133222	673
	Middle Range	5/10/15/20	133297	680.5
	High Range	5	133322	683
		10	133447	695.5
		15	133422	693
		20	133397	690.5

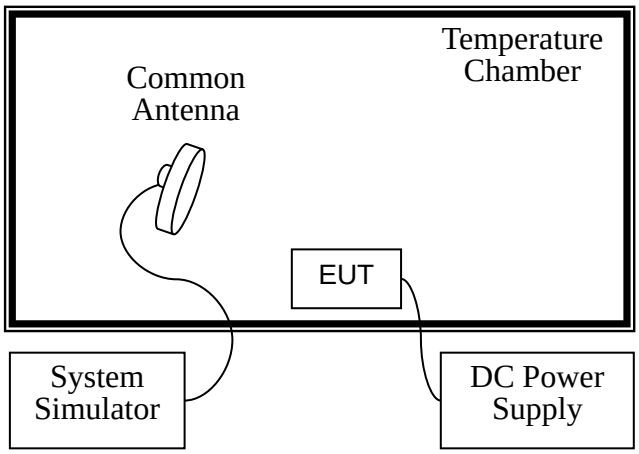
4.5 Test Setup

4.5.1 For Antenna Port Test



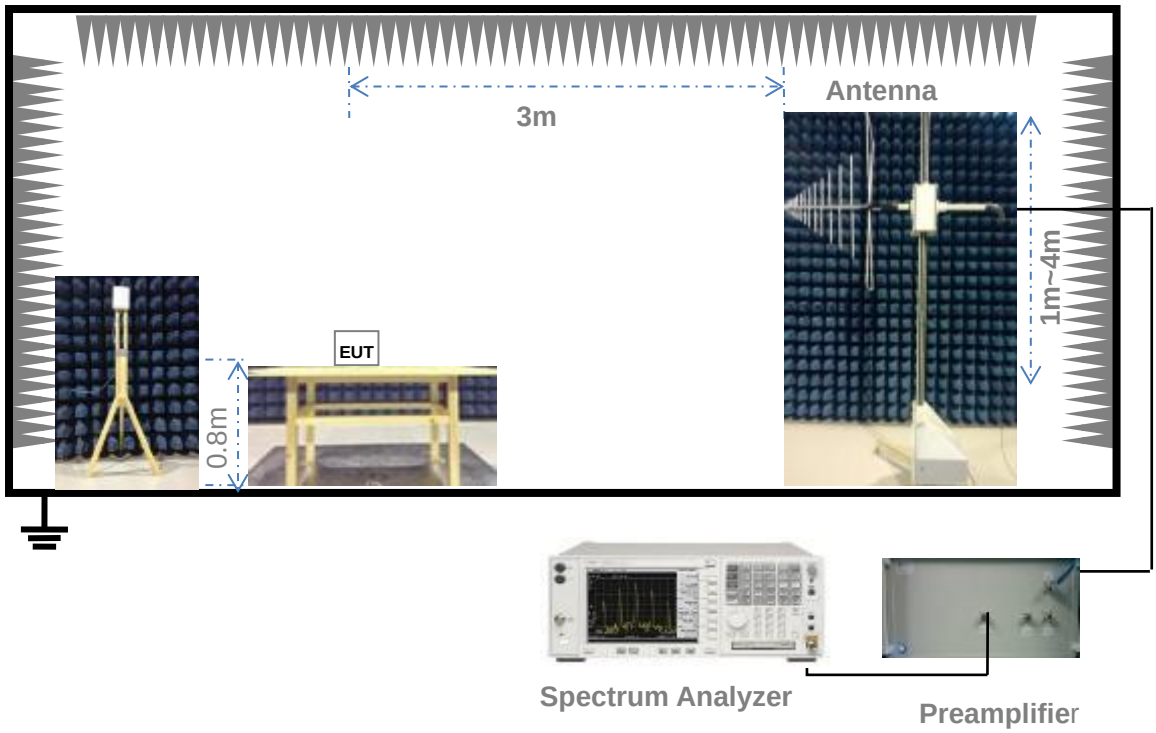
(Diagram 1)

4.5.2 For Frequency Stability Test



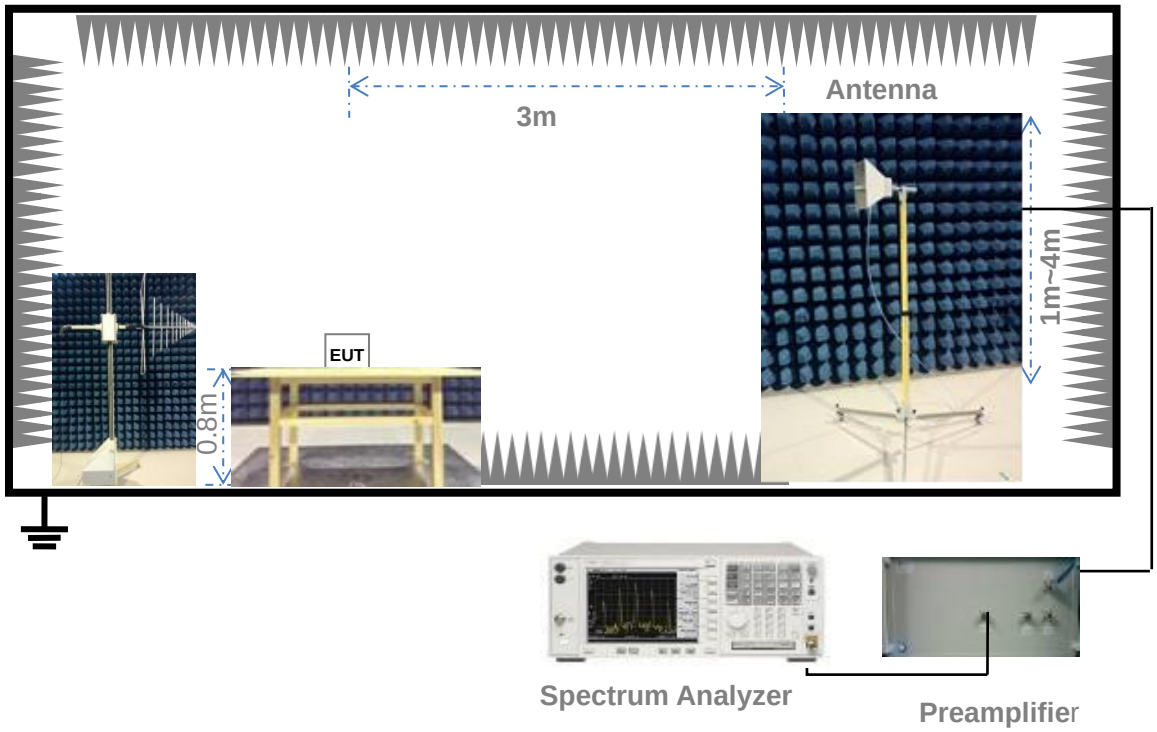
(Diagram 2)

4.5.3 For Radiated Test (30 MHz ~ 1 GHz)



(Diagram 3)

4.5.4 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 & 22.913(a) & 24.232(c) & 27.50(a) & 27.50(b) & 27.50(c) & 27.50(d) & 27.50(h) & 27.50(j) & 27.50(k) & 90.635(b) & 90.542(a)

According to FCC section 22.913(a) (5), the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC section 24.232(c), 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(a) (3), for mobile and portable stations transmitting in the 2305-2315MHz band or the 2350-2360MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards.

FCC section 27.50(b) (10), 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) (10), portable stations (hand-held devices) in the 600MHz uplink band and the 698-746MHz band, and fixed and mobile stations in the 600MHz uplink band are limited to 3 watts ERP.

FCC section 27.50(d) (4), 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.

(7) 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) (2), 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.

FCC section 27.50(j) (3), for mobile, and portable (hand-held) stations operating in the 3700-3980 MHz band are limited to 1 watt EIRP.

FCC section 27.50(k) (3), Mobile devices are limited to 1Watt (30 dBm) EIRP in the 3450-3550 MHz band.

According to FCC section 90.635(b), the maximum output power of the transmitter for mobile stations is 100 watts (20dBW).

According to FCC section 90.542(a) (7), portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

5.1.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description is used for conducted test, and the section 4.4.3 and 4.4.4 (Diagram 3, 4) test setup description is used for radiated 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 is used to establish communication with the EUT, and its parameters are 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.

The relevant equation for determining the conducted measured value is:

Conducted Output Power Value (dBm) = Measured Value (dBm) + Path Loss (dB)

where:
Conducted Output Power Value = final conducted measured value in the conducted power test, in dBm;
Measured Value = measured conducted power received by spectrum analyzer or power meter, in dBm;
Path Loss = signal attenuation in the connecting cable between the transmitter and spectrum analyzer or power meter, including external cable loss, in dB;

During the test, the data of Path Loss (dB) is added in the spectrum analyzer or power meter, so Measured Value (dBm) is the final values which contains the data of Path Loss (dB).

For example:

In the conducted output power test, when measured value for GSM850 is 24.7 dBm, and path loss is 8.5 dB, then final conducted output power value is:

Conducted Output Power Value (dBm) = 24.7 dBm + 8.5 dB = 33.2 dBm

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).

Final measurement calculation as below:

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);
P_{Meas} = 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.

For example:
In the EIRP test, when P_{Meas} value for GSM1900 is 30.2 dBm, LC is 0.6 dB, and GT is -3.4 dB, then final EIRP value is:
EIRP for GSM1900 = 30.2 dBm - 3.4 dBi - 0.6 dB = 26.2 dBm

The relevant equation for determining the ERP/EIRP from the radiated RF output power is:
ERP/EIRP (dBm) = SA Read Value (dBm) + Correction Factor (dB)

where:
ERP/EIRP = effective or equivalent radiated power, in dBm;
SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm;
Correction Factor = total correction factor including cable loss, in dB;

During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB).

For example:

In the ERP test, when SA read value for GSM850 is 21dBm, and correction factor is 8dB, then final ERP value for GSM850 is:

ERP (dBm) = 21dBm + 8dB = 29dBm

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) & 27.50(j) & 27.50(k)

In addition, when the transmitter power is measured in terms of average value, 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.

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) (5) & 27.50(j) & 27.50(k), 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 is 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.

According to KDB 971168 D01, there is 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).

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 is 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 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.

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 & 90.213

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.

FCC § 90.213

The frequency stability shall not depart from the reference frequency in excess of ±2.5ppm for mobile stations.

5.4.2 Test Setup

The section 4.4.2 (Diagram 2) test setup description is used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

1. The EUT is placed in a temperature chamber.

2. The temperature is set to 25°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured.

3. The temperature is increased by not more than 10 degrees, allowed to stabilize and soak, and then repeat the frequency error measurement.

4. Repeat procedure 3 until +50°C and -30°C is reached.

5. Change supply voltage, and repeat measurement until extreme voltage is reached.

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(a) & 27.53(c) & 27.53(f) & 27.53(g) & 27.53(h) & 27.53(l) & 27.53(m) & 27.53(n) & 90.691 & 90.543

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(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(a) (4)

For mobile and portable stations operating in the 2305-2315MHz and 2350-2360MHz bands:

(1)By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320MHz and on all frequencies between 2345 and 2360MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324MHz and on all frequencies between 2341 and 2345MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328MHz and on all frequencies between 2337 and 2341MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337MHz.

(2)By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292MHz, and 70 + 10 log (P) dB below 2288MHz.

(3)By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365MHz, and not less than 70 + 10 log (P) dB above 2365MHz.

FCC § 27.53(c)

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the 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, in accordance with the following:

(1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 76 + 10 log

(P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC § 27.53(f)

For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to - 70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

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) (1)

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(l) (2)

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

FCC § 27.53(m) (4)

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.

FCC § 27.53(n) (2)

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

FCC § 90.691

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + 10 $Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

FCC § 90.543

(e) For operations in the 758–768 MHz and the 788–798 MHz bands, the power of any emission outside the 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, in accordance with the following:

(1) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775–788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) For operations in the 758–775 MHz and 788–805 MHz bands, all emissions including harmonics in the band 1559– 1610 MHz shall be limited to -70 dBW/ MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

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 blocks 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.

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 is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power.

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

4. Spurious emissions are 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 are at least 401, referring to following formula.

Sweep point number = Span/RBW

VBW=3*RBW

Detector Mode=mean or average power

5. Record the frequencies and levels of spurious emissions.

5.5.4 Test Result

Please refer to ANNEX A.5.

5.6 Band Edge

5.6.1 Limit

FCC § 2.1051 & 22.917(a) & 24.238(a) & 27.53(a) & 27.53(c) & 27.53(g) & 27.53(h) & 27.53(l) & 27.53(m) & 27.53(n) & 90.691 & 90.543

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(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(a) (4)

For mobile and portable stations operating in the 2305-2315MHz and 2350-2360MHz bands:

(1)By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320MHz and on all frequencies between 2345 and 2360MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324MHz and on all frequencies between 2341 and 2345MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328MHz and on all frequencies between 2337 and 2341MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337MHz.

(2)By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292MHz, and 70 + 10 log (P) dB below 2288MHz.

(3)By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365MHz, and not less than 70 + 10 log (P) dB above 2365MHz.

FCC § 27.53(c)

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the 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, in accordance with the following:

(1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated

outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

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) (1)

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(l) (2)

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

FCC § 27.53(m) (4)

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.

FCC § 27.53(n) (2)

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

FCC § 90.691

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + 10 $Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

FCC § 90.543

(e) For operations in the 758–768 MHz and the 788–798 MHz bands, the power of any emission outside the 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, in accordance with the following:

(1) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775–788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

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 is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power.

3. The RF output of the transmitter is 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 are tested with 1%*cBW (RBW), and sweep point number referred to following formula.

Sweep point number = 2*Span/RBW

VBW=3RBW

6. Record the frequencies and levels of spurious emissions.

For mobile and portable stations, on all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance. By using a 10 kHz bandwidth on the spectrum analyzer.

10*log(10 kHz / 6.25 kHz) = 2.04 dB
Limit Line = -35 dBm + 2.04 dB = -32.96dBm

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(a) & 27.53(c) & 27.53(f) & 27.53(g) & 27.53(h) & 27.53(l) & 27.53(m) & 27.53(n) & 90.691& 90.543

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(a) (4)

For mobile and portable stations operating in the 2305-2315MHz and 2350-2360MHz bands:

(1)By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320MHz and on all frequencies between 2345 and 2360MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324MHz and on all frequencies between 2341 and 2345MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328MHz and on all frequencies between 2337 and 2341MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337MHz.

(2)By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292MHz, and 70 + 10 log (P) dB below 2288MHz.

(3)By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365MHz, and not less than 70 + 10 log (P) dB above 2365MHz.

FCC § 27.53(c)

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the 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, in accordance with the following:

(1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the

band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the

band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of

measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth

of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC § 27.53(f)

For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to - 70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

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) (1)

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(l) (2)

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

FCC § 27.53(m) (4)

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.

FCC § 27.53(n) (2)

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

FCC § 90.691

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + 10 $Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

FCC § 90.543

(e) For operations in the 758–768 MHz and the 788–798 MHz bands, the power of any emission outside the 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, in accordance with the following:

(1) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775–788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) For operations in the 758–775 MHz and 788–805 MHz bands, all emissions including harmonics in the

band 1559– 1610 MHz shall be limited to -70 dBW/ MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

5.7.2 Test Setup

The section 4.4.3 and 4.4.4 (Diagram 3, 4) 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.

Final measurement calculation as below:

The relevant equation for determining the ERP/EIRP from the radiated RF output power is:

ERP/EIRP (dBm) = SA Read Value (dBm) + Correction Factor (dB)

where:
ERP/EIRP = effective or equivalent radiated power, in dBm;
SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm;
Correction Factor = total correction factor including cable loss, in dB;

During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB).

For example:

In the ERP test, when SA read value for GSM850 is 21dBm, and correction factor is 8dB, then final ERP value for GSM850 is:

ERP (dBm) = 21dBm + 8dB = 29dBm

5.7.4 Test Result

Please refer to ANNEX A.7.

ANNEX A TEST RESULTS

A.1 Transmitter Radiated Power (EIRP/ERP)

Note 1: The test configuration refers to report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) (which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022) using the maximum output power configuration.

WCDMA Mode Test Data

Test Band	Test Channel	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
WCDMA Band 2	LCH	22.07	0.16	2.00	Pass
	MCH	21.44	0.14	2.00	Pass
	HCH	20.78	0.12	2.00	Pass

Test Band	Test Channel	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
WCDMA Band 4	LCH	20.95	0.12	1.00	Pass
	MCH	21.16	0.13	1.00	Pass
	HCH	21.26	0.13	1.00	Pass

Test Band	Test Channel	ERP (dBm)	ERP (W)	Limit (W)	Verdict
WCDMA Band 5	LCH	19.10	0.08	7.00	Pass
	MCH	19.17	0.08	7.00	Pass
	HCH	19.09	0.08	7.00	Pass

Note 1: ERP/EIRP = SA Read Value + Correction Factor

where:

ERP/EIRP = effective or equivalent radiated power, in dBm;

SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm;

Correction Factor = total correction factor including cable loss, in dB;

ERP = EIRP – 2.15; where ERP and EIRP are expressed in consistent units.

HSDPA Conducted Output Power

Note: HSDPA Conducted Output Power please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

HSUPA Conducted Output Power

Note: HSUPA Conducted Output Power please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

LTE Mode Conducted RF Output Power

Note: LTE Mode Conducted RF Output Power please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

LTE Mode Test Data

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND2								
1.4 MHz	QPSK	19193	1909.3	RB3#0	21.93	0.16	2.00	Pass
	16-QAM	19193	1909.3	RB3#1	21.22	0.13	2.00	Pass
3 MHz	QPSK	19185	1908.5	RB1#8	22.10	0.16	2.00	Pass
	16-QAM	18615	1851.5	RB1#0	21.06	0.13	2.00	Pass
5 MHz	QPSK	19175	1907.5	RB1#12	22.23	0.17	2.00	Pass
	16-QAM	19175	1907.5	RB1#12	21.38	0.14	2.00	Pass
10 MHz	QPSK	18650	1855	RB1#24	22.28	0.17	2.00	Pass
	16-QAM	19150	1905	RB1#49	21.12	0.13	2.00	Pass
15 MHz	QPSK	19125	1902.5	RB1#0	22.12	0.16	2.00	Pass
	16-QAM	19125	1902.5	RB1#74	21.00	0.13	2.00	Pass
20 MHz	QPSK	19100	1900	RB1#0	21.86	0.15	2.00	Pass
	16-QAM	18900	1880	RB1#99	21.35	0.14	2.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND4								
1.4 MHz	QPSK	19957	1710.7	RB1#2	21.11	0.13	1.00	Pass
	16-QAM	19957	1710.7	RB1#2	20.21	0.10	1.00	Pass
3 MHz	QPSK	19965	1711.5	RB1#0	21.01	0.13	1.00	Pass
	16-QAM	19965	1711.5	RB1#0	20.20	0.10	1.00	Pass
5 MHz	QPSK	19975	1712.5	RB1#12	21.05	0.13	1.00	Pass
	16-QAM	20175	1732.5	RB1#12	20.43	0.11	1.00	Pass
10 MHz	QPSK	20000	1715	RB1#24	21.09	0.13	1.00	Pass
	16-QAM	20000	1715	RB1#0	20.49	0.11	1.00	Pass
15 MHz	QPSK	20175	1732.5	RB1#0	20.87	0.12	1.00	Pass
	16-QAM	20025	1717.5	RB1#0	20.31	0.11	1.00	Pass
20 MHz	QPSK	20175	1732.5	RB1#49	20.91	0.12	1.00	Pass
	16-QAM	20175	1732.5	RB1#99	20.33	0.11	1.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND5								
1.4 MHz	QPSK	20643	848.3	RB1#2	18.99	0.08	7.00	Pass
	16-QAM	20525	836.5	RB1#0	18.47	0.07	7.00	Pass
3 MHz	QPSK	20635	847.5	RB1#0	19.15	0.08	7.00	Pass
	16-QAM	20635	847.5	RB1#0	18.53	0.07	7.00	Pass
5 MHz	QPSK	20625	846.5	RB1#0	19.20	0.08	7.00	Pass
	16-QAM	20625	846.5	RB1#0	18.74	0.07	7.00	Pass
10 MHz	QPSK	20600	844	RB1#0	19.39	0.09	7.00	Pass
	16-QAM	20600	844	RB1#49	18.73	0.07	7.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND7								
5 MHz	QPSK	20775	2502.5	RB1#12	20.12	0.10	1.00	Pass
	16-QAM	20775	2502.5	RB1#24	19.30	0.09	1.00	Pass
10 MHz	QPSK	20800	2505	RB1#24	20.34	0.11	1.00	Pass
	16-QAM	20800	2505	RB1#0	19.59	0.09	1.00	Pass
15 MHz	QPSK	20825	2507.5	RB1#0	20.10	0.10	1.00	Pass
	16-QAM	20825	2507.5	RB1#0	19.63	0.09	1.00	Pass
20 MHz	QPSK	20850	2510	RB1#0	20.17	0.10	1.00	Pass
	16-QAM	20850	2510	RB1#0	19.70	0.09	1.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND12								
1.4 MHz	QPSK	23173	715.3	RB1#2	19.23	0.08	3.00	Pass
	16-QAM	23173	715.3	RB1#2	18.50	0.07	3.00	Pass
3 MHz	QPSK	23165	714.5	RB1#14	19.26	0.08	3.00	Pass
	16-QAM	23165	714.5	RB1#8	18.52	0.07	3.00	Pass
5 MHz	QPSK	23155	713.5	RB1#0	19.18	0.08	3.00	Pass
	16-QAM	23155	713.5	RB1#0	18.56	0.07	3.00	Pass
10 MHz	QPSK	23130	711	RB1#24	19.23	0.08	3.00	Pass
	16-QAM	23060	704	RB1#0	18.68	0.07	3.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND13								
5 MHz	QPSK	23230	782	RB1#0	20.11	0.10	3.00	Pass
	16-QAM	23255	784.5	RB1#12	19.59	0.09	3.00	Pass
10 MHz	QPSK	23230	782	RB1#49	19.47	0.09	3.00	Pass
	16-QAM	23230	782	RB1#0	18.52	0.07	3.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND14								
5 MHz	QPSK	23305	790.5	RB1#12	19.38	0.09	3.00	Pass
	16-QAM	23305	790.5	RB1#0	18.94	0.08	3.00	Pass
10 MHz	QPSK	23330	793	RB1#0	19.62	0.09	3.00	Pass
	16-QAM	23330	793	RB1#0	18.61	0.07	3.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND17								
5 MHz	QPSK	23790	710	RB1#12	19.13	0.08	3.00	Pass
	16-QAM	23755	706.5	RB1#0	18.63	0.07	3.00	Pass
10 MHz	QPSK	23780	709	RB1#0	19.19	0.08	3.00	Pass
	16-QAM	23780	709	RB1#0	18.92	0.08	3.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND25								
1.4 MHz	QPSK	26047	1850.7	RB3#1	21.97	0.16	2.00	Pass
	16-QAM	26047	1850.7	RB1#2	21.08	0.13	2.00	Pass
3 MHz	QPSK	26675	1913.5	RB1#0	22.00	0.16	2.00	Pass
	16-QAM	26055	1851.5	RB1#8	20.97	0.13	2.00	Pass
5 MHz	QPSK	26665	1912.5	RB1#0	21.96	0.16	2.00	Pass
	16-QAM	26365	1882,5	RB1#0	21.18	0.13	2.00	Pass
10 MHz	QPSK	26090	1855	RB1#24	21.89	0.15	2.00	Pass
	16-QAM	26090	1855	RB1#0	20.87	0.12	2.00	Pass
15 MHz	QPSK	26615	1907.5	RB1#0	21.72	0.15	2.00	Pass
	16-QAM	26615	1907.5	RB1#0	20.47	0.11	2.00	Pass
20 MHz	QPSK	26590	1905	RB1#0	21.66	0.15	2.00	Pass
	16-QAM	26590	1905	RB1#0	21.11	0.13	2.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND26(Part22)								
1.4 MHz	QPSK	27033	848.3	RB1#0	19.53	0.09	7.00	Pass
	16-QAM	26915	836.50	RB1#0	18.80	0.08	7.00	Pass
3 MHz	QPSK	27025	847.5	RB1#8	19.46	0.09	7.00	Pass
	16-QAM	27025	847.5	RB1#14	18.70	0.07	7.00	Pass
5 MHz	QPSK	27015	846.5	RB1#12	19.44	0.09	7.00	Pass
	16-QAM	27015	846.5	RB1#0	18.96	0.08	7.00	Pass
10 MHz	QPSK	26915	836.50	RB1#24	19.56	0.09	7.00	Pass
	16-QAM	26990	844	RB1#49	19.06	0.08	7.00	Pass
15 MHz	QPSK	26915	836.50	RB1#38	19.72	0.09	7.00	Pass
	16-QAM	26965	841.5	RB1#0	19.25	0.08	7.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND26 (Part90)								
1.4 MHz	QPSK	26697	814.7	RB3#1	19.25	0.08	100.00	Pass
	16-QAM	26697	814.7	RB1#2	18.36	0.07	100.00	Pass
3 MHz	QPSK	26705	815.5	RB1#0	19.18	0.08	100.00	Pass
	16-QAM	26705	815.5	RB1#14	18.32	0.07	100.00	Pass
5 MHz	QPSK	26715	816.5	RB1#12	19.17	0.08	100.00	Pass
	16-QAM	26715	816.5	RB1#12	18.56	0.07	100.00	Pass
10 MHz	QPSK	26740	819	RB1#24	19.44	0.09	100.00	Pass
	16-QAM	26740	819	RB1#0	18.67	0.07	100.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND41								
5 MHz	QPSK	39675	2498.5	RB1#12	19.98	0.10	2.00	Pass
	16-QAM	39675	2498.5	RB1#12	19.40	0.09	2.00	Pass
10 MHz	QPSK	39700	2501	RB1#24	20.11	0.10	2.00	Pass
	16-QAM	39700	2501	RB1#0	19.46	0.09	2.00	Pass
15 MHz	QPSK	41515	2682.5	RB1#38	19.92	0.10	2.00	Pass
	16-QAM	40620	2593	RB1#38	19.32	0.09	2.00	Pass
20 MHz	QPSK	39750	2506	RB1#49	19.86	0.10	2.00	Pass
	16-QAM	39750	2506	RB1#49	19.25	0.08	2.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND66								
1.4 MHz	QPSK	131979	1710.7	RB1#2	21.61	0.14	1.00	Pass
	16-QAM	131979	1710.7	RB3#1	20.62	0.12	1.00	Pass
3 MHz	QPSK	131987	1711.5	RB1#8	21.50	0.14	1.00	Pass
	16-QAM	131987	1711.5	RB1#0	20.50	0.11	1.00	Pass
5 MHz	QPSK	131997	1712.5	RB1#12	21.52	0.14	1.00	Pass
	16-QAM	131997	1712.5	RB1#12	20.60	0.11	1.00	Pass
10 MHz	QPSK	132022	1715	RB1#24	21.10	0.13	1.00	Pass
	16-QAM	132322	1745	RB1#49	20.11	0.10	1.00	Pass
15 MHz	QPSK	132047	1717.5	RB1#38	21.59	0.14	1.00	Pass
	16-QAM	132047	1717.5	RB1#0	20.95	0.12	1.00	Pass
20 MHz	QPSK	132072	1720	RB1#49	21.08	0.13	1.00	Pass
	16-QAM	132572	1720	1RB1#99	20.63	0.12	1.00	Pass

Test Bandwidth	Modulation	Test Channel	Frequency (MHz)	Test RB (Size#Offset)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND71								
5 MHz	QPSK	133147	665.5	RB1#24	19.07	0.08	3.00	Pass
	16-QAM	133297	680.5	RB1#24	18.45	0.07	3.00	Pass
10 MHz	QPSK	133172	668	RB1#24	19.76	0.09	3.00	Pass
	16-QAM	133297	680.5	RB1#0	18.95	0.08	3.00	Pass
15 MHz	QPSK	133197	670.5	RB1#38	18.94	0.08	3.00	Pass
	16-QAM	133297	680.5	RB1#0	18.18	0.07	3.00	Pass
20 MHz	QPSK	133372	688	RB1#49	18.90	0.08	3.00	Pass
	16-QAM	133372	688	RB1#0	18.40	0.07	3.00	Pass

A.2 Peak to Average Ratio

Note: The Peak to Average Ratio please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

A.3 Occupied Bandwidth

Note: The Occupied Bandwidth please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

A.4 Frequency Stability

Note: The Frequency Stability please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

A.5 Spurious Emission at Antenna Terminals

Note: The Spurious Emission at Antenna Terminals please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

A.6 Band Edge

Note: The Band Edge please refer to the Report No. DDT-B21122007-1E01 (FCC ID: XMR2019SC600NA) which issued by TianJin Dongdian Testing Service Co.,Ltd. on Jan. 10, 2022.) Chapters 1.1 through 1.9.

A.7 Field Strength of Spurious Radiation

Note 1: All modes have been tested, and only the worst case data are shown here.

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

Note 3: Test plots please refer to the document “Annex No.: BL-EC2370017-501 Data Part 1.pdf”.

GSM and WCDMA Mode Test Verdict

Test Band	Test Channel	Refer to Plot[Note3]	Verdict
WCDMA Band 2	LCH	15.1	Pass
	MCH	15.2	Pass
	HCH	15.3	Pass
WCDMA Band 4	LCH	16.1	Pass
	MCH	16.2	Pass
	HCH	16.3	Pass
WCDMA Band 5	LCH	17.1	Pass
	MCH	17.2	Pass
	HCH	17.3	Pass

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB (Size#Offset)	Refer to Plot[Note3]	Verdict
Band 2	1.4 MHz	MCH	QPSK	RB1#0	1.1	Pass
	3 MHz	MCH	QPSK	RB1#0	1.2	Pass
	5 MHz	MCH	QPSK	RB1#0	1.3	Pass
	10 MHz	MCH	QPSK	RB1#0	1.4	Pass
	15 MHz	MCH	QPSK	RB1#0	1.5	Pass
	20 MHz	MCH	QPSK	RB1#0	1.6	Pass
Band 4	1.4 MHz	MCH	QPSK	RB1#0	2.1	Pass
	3 MHz	MCH	QPSK	RB1#0	2.2	Pass
	5 MHz	MCH	QPSK	RB1#0	2.3	Pass
	10 MHz	MCH	QPSK	RB1#0	2.4	Pass
	15 MHz	MCH	QPSK	RB1#0	2.5	Pass
	20 MHz	MCH	QPSK	RB1#0	2.6	Pass
Band 5	1.4 MHz	MCH	QPSK	RB1#0	3.1	Pass
	3 MHz	MCH	QPSK	RB1#0	3.2	Pass
	5 MHz	MCH	QPSK	RB1#0	3.3	Pass
	10 MHz	MCH	QPSK	RB1#0	3.4	Pass
Band 7	5 MHz	MCH	QPSK	RB1#0	4.1	Pass
	10 MHz	MCH	QPSK	RB1#0	4.2	Pass
	15 MHz	MCH	QPSK	RB1#0	4.3	Pass
	20 MHz	MCH	QPSK	RB1#0	4.4	Pass
Band 12	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
Band 13	5 MHz	MCH	QPSK	RB1#0	6.1	Pass
	10 MHz	MCH	QPSK	RB1#0	6.2	Pass
Band 14	5 MHz	MCH	QPSK	RB1#0	7.1	Pass
	10 MHz	MCH	QPSK	RB1#0	7.2	Pass
Band 17	5 MHz	MCH	QPSK	RB1#0	8.1	Pass
	10 MHz	MCH	QPSK	RB1#0	8.2	Pass
Band 25	1.4 MHz	MCH	QPSK	RB1#0	9.1	Pass
	3 MHz	MCH	QPSK	RB1#0	9.2	Pass
	5 MHz	MCH	QPSK	RB1#0	9.3	Pass
	10 MHz	MCH	QPSK	RB1#0	9.4	Pass
	15 MHz	MCH	QPSK	RB1#0	9.5	Pass
	20 MHz	MCH	QPSK	RB1#0	9.6	Pass
Band 26 (Part90)	1.4 MHz	MCH	QPSK	RB1#0	10.1	Pass
	3 MHz	MCH	QPSK	RB1#0	10.2	Pass
	5 MHz	MCH	QPSK	RB1#0	10.3	Pass

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB (Size#Offset)	Refer to Plot[Note3]	Verdict
	10 MHz	MCH	QPSK	RB1#0	10.4	Pass
Band 26 (Part22)	1.4 MHz	MCH	QPSK	RB1#0	11.1	Pass
	3 MHz	MCH	QPSK	RB1#0	11.2	Pass
	5 MHz	MCH	QPSK	RB1#0	11.3	Pass
	10 MHz	MCH	QPSK	RB1#0	11.4	Pass
	15 MHz	MCH	QPSK	RB1#0	11.5	Pass
Band 41	5 MHz	MCH	QPSK	RB1#0	14.1	Pass
	10 MHz	MCH	QPSK	RB1#0	14.2	Pass
	15 MHz	MCH	QPSK	RB1#0	14.3	Pass
	20 MHz	MCH	QPSK	RB1#0	14.4	Pass
Band 66	1.4 MHz	MCH	QPSK	RB1#0	12.1	Pass
	3 MHz	MCH	QPSK	RB1#0	12.2	Pass
	5 MHz	MCH	QPSK	RB1#0	12.3	Pass
	10 MHz	MCH	QPSK	RB1#0	12.4	Pass
	15 MHz	MCH	QPSK	RB1#0	12.5	Pass
	20 MHz	MCH	QPSK	RB1#0	12.6	Pass
Band 71	5 MHz	MCH	QPSK	RB1#0	13.1	Pass
	10 MHz	MCH	QPSK	RB1#0	13.2	Pass
	15 MHz	MCH	QPSK	RB1#0	13.3	Pass
	20 MHz	MCH	QPSK	RB1#0	13.4	Pass

ANNEX B TEST SETUP PHOTOS

Please refer to the document “BL-EC2370017-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer to the document “BL-EC2370017-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer to the document “BL-EC2370017-AI.PDF”.

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