5.3 Description of Support Units

The EUT has been tested independently.

5.4 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.
FCC Designation No.: CN1164

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Other Information Requested by the Customer

None.

5.8 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

6 Equipment List

Communication RF test system					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Spectrum Analyzer	Keysight	N9010A	MY54510339	12-28-2020	12-27-2021
Spectrum Analyzer	R&S	FSV40	101200	08-26-2021	08-25-2022
Signal Generator	Agilent	E4438C	MY45095744	12-28-2020	12-27-2021
Signal Generator	Keysight	E8257D	MY53401106	12-28-2020	12-27-2021
Communication test set	R&S	CMW200	111935	12-28-2020	12-27-2021
Communication test set	R&S	CMW500	152394	12-28-2020	12-27-2021
DC Power	Keysight	E3642A	MY56376035	12-28-2020	12-27-2021
RF control unit	JS Tonscend	JS0806-1	158060004	12-28-2020	12-27-2021
DC power Box	JS Tonscend	JS0806-4	158060007	---	---
high-low temperature test chamber	Dong Guang Qin Zhuo	LK-80GA	QZ20150611 879	12-28-2020	12-27-2021
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	06-23-2021	06-22-2022
Automatic test software	JS Tonscend	JS1120	2.6.9.0518	---	---
High-pass filter	Sinoscite	FL3CX03WG1 8NM12-0398-002	---	---	---
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	---	---
band rejection filter	Sinoscite	FL5CX01CA0 9CL12-0395-001	---	---	---
band rejection filter	Sinoscite	FL5CX01CA0 8CL12-0393-001	---	---	---
band rejection filter	Sinoscite	FL5CX02CA0 4CL12-0396-002	---	---	---
band rejection filter	Sinoscite	FL5CX02CA0 3CL12-0394-001	---	---	---

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	03-04-2021	03-03-2022
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-04-2021	03-03-2022
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-04-2021	03-03-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-28-2021	04-27-2024
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-15-2021	04-14-2024
Horn Antenna	ETS-LINDGREN	3117	57407	07-04-2021	07-03-2024
Preamplifier	EMCI	EMC184055 SE	980597	05-20-2021	05-19-2022
Preamplifier	EMCI	EMC001330	980563	04-15-2021	04-14-2022
Preamplifier	JS Tonscend	980380	EMC051845 SE	12-31-2020	12-30-2021
Communication test set	R&S	CMW500	102898	12-31-2020	12-30-2021
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-16-2021	04-15-2022
Fully Anechoic Chamber	TDK	FAC-3	---	01-09-2021	01-08-2024
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

7 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	PART 22	PART 22 – PUBLIC MOBILE SERVICES Subpart H – Cellular Radiotelephone Service
2	PART 24	PART 24 – PERSONAL COMMUNICATIONS SERVICES Subpart E – Broadband PCS
3	PART 2	Frequency allocations and radio treaty matters; general rules and regulations
4	TIA-603-E-2016	Land Mobile FM or PM -Communications Equipment -Measurement and Performance Standards
5	KDB971168 D01	KDB971168 D01 Power Meas License Digital Systems v03r01

Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part 2.1046(a)/Part 22.913(a)/ Part 24.232(c)	TIA-603-E-2016& KDB 971168 D01v03r01	Conducted output power	PASS	Appendix A
Part 24.232(d)	KDB 971168 D01v03r01	peak-to-average ratio	PASS	Appendix A
Part 2.1049(h)	Part 22.917(b)/ Part 24.238(b)/ Part 27.53(h) &KDB 971168 D01v03r01	99% &26dBOccupied Bandwidth	PASS	Appendix A
Part 2.1051/Part 22.917(a)/ Part 24.238(a)	Part 22.917(b)/ Part 24.238(b)/ Part 27.53(h) &KDB 971168 D01v03r01	Band Edge at antenna terminals	PASS	Appendix A
Part 2.1051/ Part 2.1057/ Part 22.917(a)(b)/ Part 24.238(a)(b)	TIA-603-E-2016& KDB 971168 D01v03r01	Spurious emissions at antenna terminals	PASS	Appendix A
Part 2.1055/ Part 22.355/ Part 24.235	TIA-603-E-2016& KDB 971168 D01v03r01	Frequency stability	PASS	Appendix A
Part 2.1053/ Part 2.1057/ Part 22.917(a)(b)/ Part 24.238(a)(b)	TIA-603-E-2016& KDB 971168 D01v03r01	Field strength of spurious radiation	PASS	Refer to section 8.8 for details
Part 2.1046(a)/Part 22.913(a)/ Part 24.232(c)	TIA-603-E-2016& KDB 971168 D01v03r01	Effective Radiated Power of Transmitter(ERP)	PASS	Appendix A

7.1 Conducted output power

Test Requirement:	Part 2.1046(a)
Test Method:	TIA-603-E-2016 Clause 2.2.1
Test Setup:	Refer to section 4 for details
Limit:	Mode: GSM/GPRS 850 / GSM/GPRS 1900 Frequency: 824 – 849MHz / 1850 – 1910MHz Limit: 38.45dBm（ERP） / 33.01dBm（EIRP）
Measurement Procedure:	The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.
Instruments Used:	Refer to section 6 for details
Test Results:	Refer to Appendix A

7.2 Peak-to-Average Ratio

Test Requirement:	Part 24.232(d)/Part 27.50(d)
Test Method:	KDB 971168 D01v03r01
Test Setup:	Refer to section 4 for details
Limit:	13dB
Measurement Procedure:	Use one of the procedures to measure the total peak power and record as PPk. Use one of the applicable procedures to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from: PAPR (dB) = PPk (dBm) - PAvg (dBm).
Instruments Used:	Refer to section 6 for details
Test Results:	Refer to Appendix A

7.3 99%&26dB Occupied Bandwidth

Test Requirement:	Part 2.1049(h)
Test Method:	Part 22.917(b)/Part 24.238(b)/Part 27.53(h)
Test Setup:	Refer to section 4 for details
Limit:	N/A
Measurement Procedure:	The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel, middle channel and high channel).the resolution bandwidth of the analyser is set to 100kHz or 1% of the emission bandwidth, the EUT emission bandwidth is measured as the width of the signal between two points, outside of which all emission are attenuated at least 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to peak or peak hold power.
Instruments Used:	Refer to section 6 for details
Test Results:	Refer to Appendix A

7.4 Band Edges Compliance

Test Requirement:	Part 2.1051
Test Method:	Part 22.917(b)/Part 24.238(b)/ Part 27.53(h)
Test Setup:	Refer to section 4 for details
Measurement Procedure:	The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel and high channel).in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points, outside of which all emission are attenuated at least 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to peak or peak hold power.
Limit:	

Operation Band	Frequency Range (MHz)	Limit
GSM/GPRS 850	Below 824 and above 849	Attenuated at least 43+10log(P)
GSM/GPRS 1900	Below 1850 and above 1910	Attenuated at least 43+10log(P)

Instruments Used:	Refer to section 6 for details
Test Results:	Refer to Appendix A