

FCC Test Report

Report No.: 2405T48460EC

Applicant: Shenzhen Omni Intelligent Technology Co., Ltd.

Address: 11th Floor, Building 31, Phase III, Lianchuang Technology Park,
Nanwan street, Longgang District, Shenzhen, China

Product Name: Sharing Scooter IOT

Product Model: M151-IOT

Multiple Models: N/A

Trade Mark: N/A

FCC ID: 2AI2O-M151IOT

Standards: FCC CFR Title 47 Part 2, 22H, 24E, 27

Test Date: 2024-06-10 to 2024-06-25

Test Result: Complied

Issue Date: 2024-06-26

Reviewed by:

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Revision History

Version No.	Issued Date	Description
00	2024-06-26	Original

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1 General Information

1.1 Client Information

Applicant:	Shenzhen Omni Intelligent Technology Co., Ltd.
Address:	11th Floor, Building 31, Phase III, Lianchuang Technology Park, Nanwan street, Longgang District, Shenzhen, China
Manufacturer:	Shenzhen Omni Intelligent Technology Co., Ltd.
Address:	11th Floor, Building 31, Phase III, Lianchuang Technology Park, Nanwan street, Longgang District, Shenzhen, China

1.2 Product Description of EUT

The EUT is an Sharing Scooter IOT that contains BLE and LTE radios, this report covers the full testing of the LTE radio.

Sample Serial number	2MC4-2 for RE test, 2MC4-3 for RF test conducted test (assigned by WATC)				
Sample Received Date	2024-06-03				
Sample Status	Good Condition				
Frequency Range	Band	TX Frequency (MHz)	RX Frequency (MHz)	Max. Conducted Power (dBm)	Antenna Gain [#] (dBi)
Maximum Conducted Power	LTE B2	1850-1910	1930-1990	20.98	-1.15
Antenna Gain	LTE B4	1710-1755	2110-2155	20.99	-0.73
	LTE B5	824-849	869-894	20.94	-0.77
	LTE B12	699-716	729-746	21.00	-0.83
	LTE B13	777-787	746-756	21.05	-0.89
Modulation Technology	QPSK, 16QAM				
Power Supply	Power by DC 3.7V built-in battery or DC 24V-72V				
UE category	LTE Cat-M1				
Adapter Information	N/A				
Modification	Sample No Modification by the test lab				

1.3 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart C, Equipment Class: DTS, FCC ID: 2AI2O-M151IOT

1.4 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Emissions, Radiated	Below 30MHz	±2.78dB
	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Emissions, Conducted		1.75dB
Conducted Power		0.74dB
Frequency Error		150Hz
Bandwidth		0.34%
Note 1: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. Note 2: The Decision Rule is based on simple acceptance with ISO Guide 98-4:2012 Clause 8.2 (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)		

1.5 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: ga@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.6 Test Methodology

FCC CFR Title 47 Part 2, 22H, 24E, 27

ANSI C63.26-2015

FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

FCC KDB 971168 D02 Misc Rev Approv License Devices v02r02

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

2 Description of Measurement

2.1 Test Frequency of Low/Middle/High Channels

Band	Bandwidth (MHz)	Low Channel (MHz)	Middle Channel (MHz)	High Channel (MHz)
LTE B2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE B4	1.4	1710.7	1732.5	1754.3
	3	1711.5	1732.5	1753.5
	5	1712.5	1732.5	1752.5
	10	1715	1732.5	1750
	15	1717.5	1732.5	1747.5
	20	1720	1732.5	1745
LTE B5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE B12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704	707.5	711
LTE B13	5	779.5	782	784.5
	10	/	782	/

2.2 Test Configuration for LTE bands

Test Items	Band	Bandwidth (MHz)						Modulation		RB#			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
RF Output Power ERP/EIRP	2	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	4	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	5	√	√	√	√	-	-	√	√	√	√	√	√	√	√
	12	√	√	√	√	-	-	√	√	√	√	√	√	√	√
	13	-	-	√	√	-	-	√	√	√	√	√	√	√	√
Peak-to-Average Ratio	2				√			√	√	√		√	√	√	√
	4				√			√	√	√		√	√	√	√

	5				√	-	-	√	√	√		√	√	√	√
	12				√	-	-	√	√	√		√	√	√	√
	13	-	-		√	-	-	√	√	√		√	√	√	√
26dB and 99% Bandwidth	2	√	√	√	√	√	√	√	√			√	√	√	√
	4	√	√	√	√	√	√	√	√			√	√	√	√
	5	√	√	√	√	-	-	√	√			√	√	√	√
	12	√	√	√	√	-	-	√	√			√	√	√	√
	13	-	-	√	√	-	-	√	√			√	√	√	√
Band Edge	2	√	√	√	√	√	√	√	√	√		√	√		√
	4	√	√	√	√	√	√	√	√	√		√	√		√
	5	√	√	√	√	-	-	√	√	√		√	√		√
	12	√	√	√	√	-	-	√	√	√		√	√		√
	13	-	-	√	√	-	-	√	√	√		√	√		√
Conducted Spurious Emission	2	√	√	√	√	√	√	√		√			√	√	√
	4	√	√	√	√	√	√	√		√			√	√	√
	5	√	√	√	√	-	-	√		√			√	√	√
	12	√	√	√	√	-	-	√		√			√	√	√
	13	-	-	√	√	-	-	√		√			√	√	√
Frequency Stability	2	√						√	√			√	√		√
	4	√						√	√			√	√		√
	5				√	-	-	√	√			√		√	
	12	√				-	-	√	√			√	√		√
	13	-	-	√		-	-	√	√			√	√		√
Radiated Spurious Emission	2	√						√		√			√	√	√
	4	√						√		√			√	√	√
	5	√				-	-	√		√			√	√	√
	12	√				-	-	√		√			√	√	√
	13	-	-	√		-	-	√		√			√	√	√

Note:

1. "√" means the configuration was chosen for testing
2. "-" means the not support the bandwidth

Worst-Case Configuration:

For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report

For radiated emissions, measurement was investigated from 30MHz to 10 times of fundamental, the worst case bandwidth, RB size and modulation test data was recorded.

2.3 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
unknown	DC Power Supply	unknown	unknown
ROHDE& SCHWARZ	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	116218
unknown	Antenna	unknown	unknown

2.4 Interconnecting Cables

Manufacturer	Description	Length	From	To
unknown	DC Cable	1.8m	DC Power Supply	EUT
unknown	RF Cable	3.0m	CMW500	Antenna

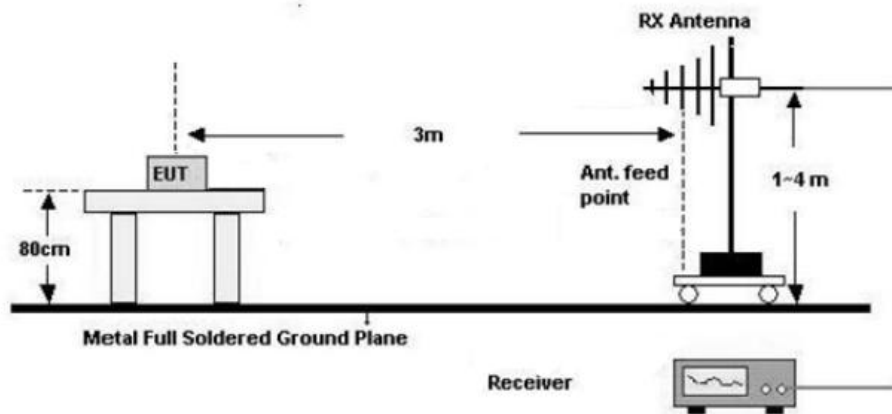
2.5 Block Diagram of Connection between EUT and AE



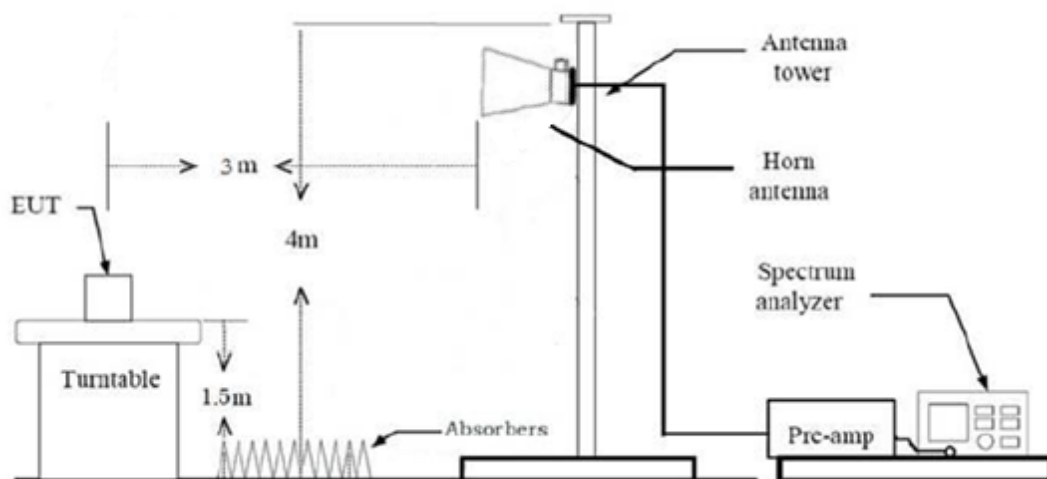
2.6 Test Setup

1) Radiated emission measurement:

30MHz-1GHz (3m SAC)

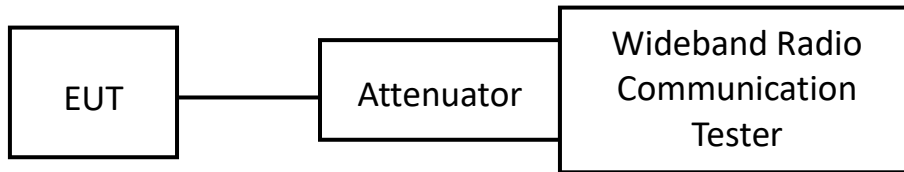


Above 1GHz (3m FAC)

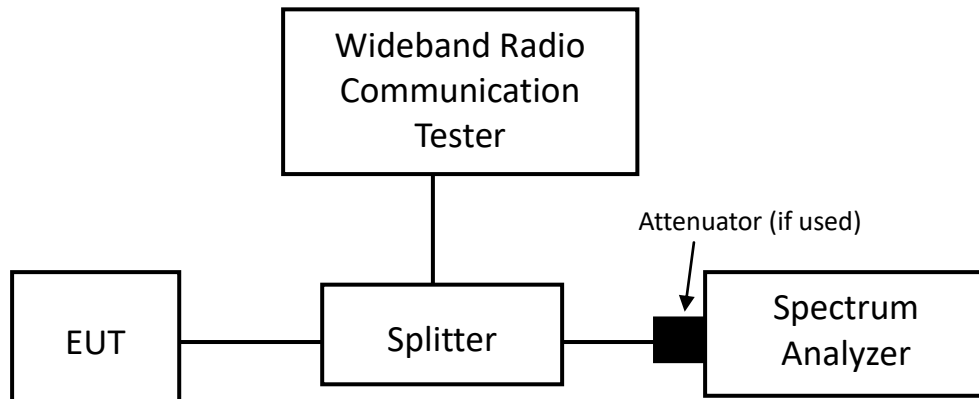


2) RF Conducted Test

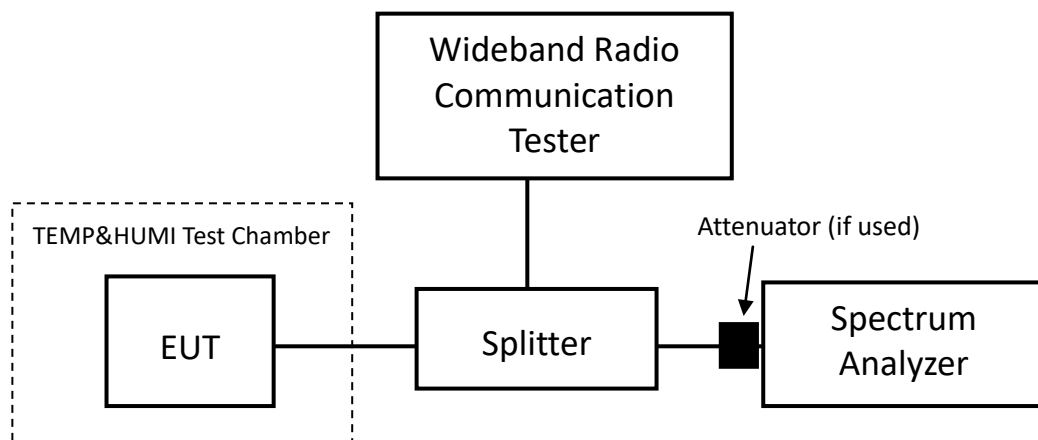
For RF Output Power test



For Bandwidth/Band edge/ PAR/Conducted spurious emissions Test



For Frequency Stability test



2.7 Test Procedure

Radiated Emission Procedure:

a) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

b) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

RF Conducted Test:

1. The antenna port of EUT was connected to the RF port of the test equipment (Wideband Radio Communication Tester or Spectrum analyzer) through Attenuator and RF cable.
2. The cable assembly insertion loss of 7dB (including 6.0 dB Splitter, 1.0 dB cable) was entered as an offset in the power meter. Note: Actual cable loss was unavailable at the time of testing, therefore a loss of 1.0dB was assumed as worst case. This was later verified to be true by laboratory. (if the RF cable provided by client, the cable loss declared by client)
3. The EUT is keeping in continuous transmission mode and tested in all modulation modes.

2.8 Measurement Method

Description of Test	Measurement Method
RF Output Power	ANSI C63.26-2015 section 5.2
ERP/EIRP	ANSI C63.26-2015 section 5.2.5.5
Peak-to-Average Ratio	ANSI C63.26-2015 section 5.2.3.4
26dB and 99% Bandwidth	ANSI C63.26-2015 section 5.4
Band Edge	ANSI C63.26-2015 section 5.7.3
Conducted Spurious Emissions	ANSI C63.26-2015 section 5.7.4
Frequency Stability	ANSI C63.26-2015 section 5.6
Radiated Spurious Emissions	ANSI C63.26-2015 section 5.5.4

2.9 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2023/7/3	2024/7/2
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2023/7/12	2024/7/11
COM-POWER	preamplifier	PAM-118A	18040152	2023/8/21	2024/8/20
COM-POWER	Amplifier	PAM-840A	461306	2023/8/8	2024/8/7
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2024/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2024/7/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2024/7/9
N/A	Coaxial Cable	N/A	NO.9	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.10	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.11	2023/8/8	2024/8/7
Audix	Test Software	E3	191218 V9	/	/
RF Conducted Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSU-26	200680/026	2023/7/12	2024/7/11
BACL	TEMP&HUMI Test Chamber	BTH-150	30022	2023/7/12	2024/7/11
HP	Power Splitter	11667A	1610A	2023/7/26	2024/7/25
FLUKE	Digital Multimeter	15B+	N/A	2023/7/12	2024/7/11
ROHDE& SCHWARZ	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	116218	2023/9/12	2024/9/11

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

FCC Rules	Description of Test	Result
FCC§2.1046; § 22.913; § 24.232; §27.50	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Compliance
FCC§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	26dB and 99% Bandwidth	Compliance
FCC§ 2.1051; § 22.917; § 24.238; §27.53	Conducted Spurious Emissions	Compliance
FCC§ 22.917; § 24.238; §27.53	Out of band emission, Band Edge	Compliance
FCC§ 2.1055; § 22.355; § 24.235; §27.54	Frequency stability	Compliance
FCC§ 2.1053; § 22.917; § 24.238; §27.53	Radiated Spurious Emissions	Compliance

3.2 Limit

Test items	Limit																																
RF Output Power	FCC §22.913: (a)(5) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7watts. (d) Power measurement. Measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to average ratio (PAR) of the transmission must not exceed 13 dB. Power measurements for base transmitters and repeaters must be made in accordance with either of the following: (1) A Commission-approved average power technique (see FCC Laboratory's Knowledge Database); or (2) For purposes of this section, peak transmit power must be measured over an 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.																																
Unwanted Emissions (Out of band emission and spurious)	FCC §22.917: (a) Out of band emissions. 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. (b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows: (1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). 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. (2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz																																
Frequency stability	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><caption>Table C-1—Frequency Tolerance for Transmitters in the Public Mobile Services</caption><tr><th>Frequency range (MHz)</th><th>Base, fixed (ppm)</th><th>Mobile >3 watts (ppm)</th><th>Mobile ≤3 watts (ppm)</th></tr><tr><td>25 to 50</td><td>20.0</td><td>20.0</td><td>50.0</td></tr><tr><td>50 to 450</td><td>5.0</td><td>5.0</td><td>50.0</td></tr><tr><td>450 to 512</td><td>2.5</td><td>5.0</td><td>5.0</td></tr><tr><td>821 to 896</td><td>1.5</td><td>2.5</td><td>2.5</td></tr><tr><td>928 to 929</td><td>5.0</td><td>n/a</td><td>n/a</td></tr><tr><td>929 to 960</td><td>1.5</td><td>n/a</td><td>n/a</td></tr><tr><td>2110 to 2220</td><td>10.0</td><td>n/a</td><td>n/a</td></tr></table>	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
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																														

Test items	Limit
RF Output Power	FCC §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. (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 paragraph (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.
Unwanted Emissions (Out of band emission and spurious)	FCC §24.238: The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service. (a) Out of band emissions. 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. (b) Measurement procedure. Compliance with these rules 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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. (c) Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC. (d) Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.
Frequency stability	FCC §24.235: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test items	Limit
RF Output Power	FCC §27.50: (a)(3) Mobile and portable stations. (i) For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz 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 or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2315 MHz and 2350-2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2315 MHz band. Power averaging shall not include intervals in which the transmitter is off. (ii) Mobile and portable stations are not permitted to transmit in the 2315-2320 MHz and 2345-2350 MHz bands. (iii) Automatic transmit power control. Mobile and portable stations transmitting in the 2305-2315 MHz band or in the 2350-2360 MHz band must employ automatic transmit power control when operating so the stations operate with the minimum power necessary for successful communications. (iv) Prohibition on external vehicle-mounted antennas. The use of external vehicle-mounted antennas for mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band is prohibited. (b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP. (c)(10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP. (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. (h) The following power limits shall apply in the BRS and EBS: (2) 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.

Unwanted Emissions (Out of band emission and spurious)	FCC §27.53: (a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts: (4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands: (i) By a factor of not less than: $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log (P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log (P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than $67 + 10 \log (P)$ dB on all frequencies between 2328 and 2337 MHz; (ii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2300 and 2305 MHz, $55 + 10 \log (P)$ dB on all frequencies between 2296 and 2300 MHz, $61 + 10 \log (P)$ dB on all frequencies between 2292 and 2296 MHz, $67 + 10 \log (P)$ dB on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log (P)$ dB below 2288 MHz; (iii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2360 and 2365 MHz, and not less than $70 + 10 \log (P)$ dB above 2365 MHz. (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.
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	(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. (g) For operations in the 600 MHz band and the 698-746 MHz 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 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed. (h) AWS emission limits (1) <i>General protection levels.</i> 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. (m)(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.
Frequency stability	FCC §27.54: The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

3.3 RF Conducted Test Data

Test Date:	2024-06-10~2024-06-25	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.1~26.1°C; Relative Humidity:49~59%; ATM Pressure: 100.4~100.8kPa		

3.3.1 RF Output Power&ERP/EIRP

LTE Band 2

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	20.90	20.78	20.89	19.75	19.63	19.74
		RB1#3	20.87	20.79	20.83	19.72	19.64	19.68
		RB1#5	20.82	20.85	20.91	19.67	19.70	19.76
		RB3#0	19.98	19.71	20.04	18.83	18.56	18.89
		RB3#3	20.06	19.86	19.90	18.91	18.71	18.75
		RB6#0	18.82	18.53	18.67	17.67	17.38	17.52
	16QAM	RB1#0	19.84	19.38	19.68	18.69	18.23	18.53
		RB1#3	19.75	19.21	19.44	18.60	18.06	18.29
		RB1#5	19.67	19.44	19.62	18.52	18.29	18.47
		RB3#0	19.48	19.08	19.24	18.33	17.93	18.09
		RB3#3	19.30	19.11	19.27	18.15	17.96	18.12
		RB5#0	18.64	18.32	18.81	17.49	17.17	17.66
3.0	QPSK	RB1#1	20.79	20.45	20.88	19.64	19.30	19.73
		RB1#4	20.63	20.50	20.77	19.48	19.35	19.62
		RB1#6	20.82	20.72	20.55	19.67	19.57	19.40
		RB3#1	19.73	19.84	19.80	18.58	18.69	18.65
		RB3#4	19.93	19.64	20.08	18.78	18.49	18.93
		RB6#1	18.64	18.32	18.40	17.49	17.17	17.25
	16QAM	RB1#1	19.58	19.12	19.61	18.43	17.97	18.46
		RB1#4	19.54	19.09	19.68	18.39	17.94	18.53
		RB1#6	19.61	19.21	19.71	18.46	18.06	18.56
		RB3#1	19.28	19.01	19.34	18.13	17.86	18.19
		RB3#4	19.22	19.04	19.38	18.07	17.89	18.23
		RB5#1	18.92	18.24	18.82	17.77	17.09	17.67
5.0	QPSK	RB1#0	20.83	20.42	20.93	19.68	19.27	19.78
		RB1#3	20.54	20.35	20.80	19.39	19.20	19.65
		RB1#5	20.90	20.52	20.63	19.75	19.37	19.48

		RB3#0	19.73	19.42	19.64	18.58	18.27	18.49
		RB3#3	19.80	19.52	19.64	18.65	18.37	18.49
		RB6#0	19.42	19.05	19.37	18.27	17.90	18.22
	16QAM	RB1#0	20.72	20.38	20.65	19.57	19.23	19.50
		RB1#3	20.69	20.15	20.64	19.54	19.00	19.49
		RB1#5	20.86	20.30	20.61	19.71	19.15	19.46
		RB3#0	19.72	19.24	19.56	18.57	18.09	18.41
		RB3#3	19.83	19.37	19.66	18.68	18.22	18.51
		RB5#0	19.24	18.92	19.12	18.09	17.77	17.97
10.0	QPSK	RB1#1	20.76	20.56	20.98	19.61	19.41	19.83
		RB1#4	20.50	20.14	20.59	19.35	18.99	19.44
		RB1#6	20.48	20.04	20.64	19.33	18.89	19.49
		RB3#1	20.52	20.46	20.70	19.37	19.31	19.55
		RB3#4	20.36	20.21	20.48	19.21	19.06	19.33
		RB6#1	20.54	20.27	20.33	19.39	19.12	19.18
	16QAM	RB1#1	20.94	20.45	20.73	19.79	19.30	19.58
		RB1#4	20.40	20.10	20.37	19.25	18.95	19.22
		RB1#6	20.51	20.38	20.67	19.36	19.23	19.52
		RB3#1	20.74	20.25	20.88	19.59	19.10	19.73
		RB3#4	20.45	20.21	20.13	19.30	19.06	18.98
		RB5#1	20.39	20.13	20.46	19.24	18.98	19.31
15.0	QPSK	RB1#1	20.86	20.66	20.94	19.71	19.51	19.79
		RB1#4	20.61	20.24	20.59	19.46	19.09	19.44
		RB1#6	20.37	19.94	20.65	19.22	18.79	19.50
		RB3#1	20.53	20.35	20.70	19.38	19.20	19.55
		RB3#4	20.27	20.12	20.47	19.12	18.97	19.32
		RB6#1	20.53	20.18	20.24	19.38	19.03	19.09
	16QAM	RB1#1	20.85	20.36	20.84	19.70	19.21	19.69
		RB1#4	20.30	20.09	20.36	19.15	18.94	19.21
		RB1#6	20.40	20.49	20.58	19.25	19.34	19.43
		RB3#1	20.64	20.35	20.98	19.49	19.20	19.83
		RB3#4	20.44	20.30	20.24	19.29	19.15	19.09
		RB5#1	20.40	20.02	20.57	19.25	18.87	19.42
20.0	QPSK	RB1#2	20.85	20.67	20.98	19.70	19.52	19.83
		RB1#4	20.60	20.13	20.58	19.45	18.98	19.43
		RB1#7	20.48	20.14	20.74	19.33	18.99	19.59
		RB3#2	20.43	20.46	20.80	19.28	19.31	19.65
		RB3#5	20.47	20.31	20.47	19.32	19.16	19.32
		RB6#2	20.45	20.37	20.22	19.30	19.22	19.07
	16QAM	RB1#2	20.82	20.44	20.63	19.67	19.29	19.48

		RB1#5	20.51	20.11	20.26	19.36	18.96	19.11
		RB1#7	20.50	20.28	20.67	19.35	19.13	19.52
		RB3#2	20.75	20.24	20.87	19.60	19.09	19.72
		RB3#5	20.46	20.12	20.22	19.31	18.97	19.07
		RB5#2	20.38	20.14	20.46	19.23	18.99	19.31
Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB) For Band2: Antenna Gain = -1.15dBi Cable Loss=0dB*(provided by the applicant) Limit: EIRP≤33dBm								

LTE Band 4

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	20.99	20.89	20.79	20.26	20.16	20.06
		RB1#3	20.86	20.68	20.82	20.13	19.95	20.09
		RB1#5	20.91	20.85	20.90	20.18	20.12	20.17
		RB3#0	20.09	19.61	19.95	19.36	18.88	19.22
		RB3#3	19.97	19.87	20.01	19.24	19.14	19.28
		RB6#0	18.71	18.62	18.56	17.98	17.89	17.83
	16QAM	RB1#0	19.74	19.48	19.79	19.01	18.75	19.06
		RB1#3	19.66	19.11	19.35	18.93	18.38	18.62
		RB1#5	19.77	19.54	19.51	19.04	18.81	18.78
		RB3#0	19.58	19.18	19.23	18.85	18.45	18.50
		RB3#3	19.21	19.11	19.37	18.48	18.38	18.64
		RB5#0	18.53	18.21	18.91	17.80	17.48	18.18
3.0	QPSK	RB1#1	20.90	20.54	20.99	20.17	19.81	20.26
		RB1#4	20.52	20.60	20.67	19.79	19.87	19.94
		RB1#6	20.81	20.61	20.54	20.08	19.88	19.81
		RB3#1	19.62	19.74	19.90	18.89	19.01	19.17
		RB3#4	19.94	19.75	19.98	19.21	19.02	19.25
		RB6#1	18.53	18.22	18.31	17.80	17.49	17.58
	16QAM	RB1#1	19.48	19.21	19.62	18.75	18.48	18.89
		RB1#4	19.43	19.10	19.57	18.70	18.37	18.84
		RB1#6	19.52	19.21	19.81	18.79	18.48	19.08
		RB3#1	19.17	19.10	19.23	18.44	18.37	18.50
		RB3#4	19.11	19.14	19.39	18.38	18.41	18.66
		RB5#1	19.01	18.14	18.73	18.28	17.41	18.00

5.0	QPSK	RB1#0	20.74	20.51	20.85	20.01	19.78	20.12
		RB1#3	20.43	20.46	20.90	19.70	19.73	20.17
		RB1#5	20.80	20.51	20.53	20.07	19.78	19.80
		RB3#0	19.74	19.31	19.75	19.01	18.58	19.02
		RB3#3	19.81	19.42	19.55	19.08	18.69	18.82
		RB6#0	19.33	19.06	19.27	18.60	18.33	18.54
	16QAM	RB1#0	20.71	20.28	20.64	19.98	19.55	19.91
		RB1#3	20.79	20.14	20.65	20.06	19.41	19.92
		RB1#5	20.97	20.31	20.51	20.24	19.58	19.78
		RB3#0	19.81	19.35	19.55	19.08	18.62	18.82
		RB3#3	19.73	19.36	19.65	19.00	18.63	18.92
		RB5#0	19.15	19.03	19.01	18.42	18.30	18.28
10.0	QPSK	RB1#1	20.77	20.47	20.99	20.04	19.74	20.26
		RB1#4	20.61	20.25	20.59	19.88	19.52	19.86
		RB1#6	20.39	20.15	20.74	19.66	19.42	20.01
		RB3#1	20.42	20.56	20.59	19.69	19.83	19.86
		RB3#4	20.36	20.30	20.37	19.63	19.57	19.64
		RB6#1	20.44	20.18	20.32	19.71	19.45	19.59
	16QAM	RB1#1	20.84	20.34	20.82	20.11	19.61	20.09
		RB1#4	20.41	19.99	20.47	19.68	19.26	19.74
		RB1#6	20.62	20.48	20.67	19.89	19.75	19.94
		RB3#1	20.64	20.34	20.97	19.91	19.61	20.24
		RB3#4	20.56	20.22	20.22	19.83	19.49	19.49
		RB5#1	20.39	20.14	20.47	19.66	19.41	19.74
15.0	QPSK	RB1#1	20.85	20.75	20.93	20.12	20.02	20.20
		RB1#4	20.70	20.13	20.58	19.97	19.40	19.85
		RB1#6	20.26	19.95	20.64	19.53	19.22	19.91
		RB3#1	20.43	20.45	20.71	19.70	19.72	19.98
		RB3#4	20.28	20.02	20.46	19.55	19.29	19.73
		RB6#1	20.44	20.08	20.23	19.71	19.35	19.50
	16QAM	RB1#1	20.76	20.37	20.84	20.03	19.64	20.11
		RB1#4	20.29	20.09	20.37	19.56	19.36	19.64
		RB1#6	20.40	20.60	20.67	19.67	19.87	19.94
		RB3#1	20.64	20.36	20.51	19.91	19.63	19.78
		RB3#4	20.55	20.40	20.25	19.82	19.67	19.52
		RB5#1	20.49	20.03	20.47	19.76	19.30	19.74
20.0	QPSK	RB1#2	20.84	20.66	20.89	20.11	19.93	20.16
		RB1#4	20.60	20.03	20.59	19.87	19.30	19.86
		RB1#7	20.58	20.03	20.85	19.85	19.30	20.12
		RB3#2	20.33	20.36	20.91	19.60	19.63	20.18

		RB3#5	20.37	20.21	20.36	19.64	19.48	19.63
		RB6#2	20.55	20.46	20.31	19.82	19.73	19.58
	16QAM	RB1#2	20.72	20.53	20.53	19.99	19.80	19.80
		RB1#5	20.52	20.21	20.27	19.79	19.48	19.54
		RB1#7	20.60	20.38	20.56	19.87	19.65	19.83
		RB3#2	20.86	20.13	20.76	20.13	19.40	20.03
		RB3#5	20.46	20.03	20.12	19.73	19.30	19.39
		RB5#2	20.37	20.03	20.45	19.64	19.30	19.72
Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB) For Band4: Antenna Gain = -0.73dBi Cable Loss=0dB*(provided by the applicant) Limit: EIRP≤30dBm								

LTE Band 5

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	20.31	20.51	20.37	17.39	17.59	17.45
		RB1#3	20.22	20.36	20.52	17.30	17.44	17.60
		RB1#5	20.42	20.48	20.49	17.50	17.56	17.57
		RB3#0	20.20	19.62	19.95	17.28	16.70	17.03
		RB3#3	20.08	19.78	19.91	17.16	16.86	16.99
		RB6#0	18.72	18.51	18.56	15.80	15.59	15.64
	16QAM	RB1#0	19.73	19.58	19.89	16.81	16.66	16.97
		RB1#3	19.77	19.00	19.36	16.85	16.08	16.44
		RB1#5	19.76	19.55	19.52	16.84	16.63	16.60
		RB3#0	19.47	19.17	19.23	16.55	16.25	16.31
		RB3#3	19.12	19.22	19.26	16.20	16.30	16.34
		RB5#0	18.43	18.21	19.02	15.51	15.29	16.10
3.0	QPSK	RB1#1	20.90	20.63	20.88	17.98	17.71	17.96
		RB1#4	20.51	20.50	20.67	17.59	17.58	17.75
		RB1#6	20.70	20.62	20.63	17.78	17.70	17.71
		RB3#1	19.63	19.64	19.99	16.71	16.72	17.07
		RB3#4	19.94	19.86	19.99	17.02	16.94	17.07
		RB6#1	18.63	18.32	18.4	15.71	15.40	15.48
	16QAM	RB1#1	19.48	19.30	19.72	16.56	16.38	16.80
		RB1#4	19.42	19.11	19.67	16.50	16.19	16.75
		RB1#6	19.51	19.20	19.82	16.59	16.28	16.90

		RB3#1	19.07	19.20	19.12	16.15	16.28	16.20
		RB3#4	19.12	19.25	19.49	16.20	16.33	16.57
		RB5#1	18.91	18.15	18.84	15.99	15.23	15.92
5.0	QPSK	RB1#0	20.74	20.61	20.85	17.82	17.69	17.93
		RB1#3	20.54	20.46	20.89	17.62	17.54	17.97
		RB1#5	20.89	20.50	20.63	17.97	17.58	17.71
		RB3#0	19.73	19.4	19.74	16.81	16.48	16.82
		RB3#3	19.92	19.42	19.66	17.00	16.50	16.74
		RB6#0	19.32	18.96	19.36	16.40	16.04	16.44
	16QAM	RB1#0	20.81	20.38	20.55	17.89	17.46	17.63
		RB1#3	20.80	20.15	20.76	17.88	17.23	17.84
		RB1#5	20.86	20.30	20.4	17.94	17.38	17.48
		RB3#0	19.92	19.36	19.64	17.00	16.44	16.72
		RB3#3	19.84	19.27	19.55	16.92	16.35	16.63
		RB5#0	19.25	18.94	18.92	16.33	16.02	16.00
10.0	QPSK	RB1#1	20.67	20.38	20.9	17.75	17.46	17.98
		RB1#4	20.50	20.14	20.49	17.58	17.22	17.57
		RB1#6	20.28	20.14	20.83	17.36	17.22	17.91
		RB3#1	20.42	20.56	20.5	17.50	17.64	17.58
		RB3#4	20.26	20.29	20.37	17.34	17.37	17.45
		RB6#1	20.55	20.29	20.33	17.63	17.37	17.41
	16QAM	RB1#1	20.94	20.24	20.83	18.02	17.32	17.91
		RB1#4	20.40	19.88	20.47	17.48	16.96	17.55
		RB1#6	20.53	20.58	20.66	17.61	17.66	17.74
		RB3#1	20.55	20.35	20.87	17.63	17.43	17.95
		RB3#4	20.65	20.31	20.33	17.73	17.39	17.41
		RB5#1	20.39	20.24	20.46	17.47	17.32	17.54

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)

For Band5: Antenna Gain = -0.77dBi = -2.92dBd (0dBd=2.15dBi)

Cable Loss=0dB* (provided by the applicant)

Limit: ERP≤38.45dBm

LTE Band 12

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	20.98	20.99	20.88	18.00	18.01	17.90
		RB1#3	20.75	20.77	20.73	17.77	17.79	17.75
		RB1#5	20.84	20.76	20.92	17.86	17.78	17.94
		RB3#0	19.99	19.70	19.95	17.01	16.72	16.97
		RB3#3	19.87	19.88	20.01	16.89	16.90	17.03
		RB6#0	18.82	18.51	18.55	15.84	15.53	15.57
	16QAM	RB1#0	19.63	19.58	19.69	16.65	16.60	16.71
		RB1#3	19.57	19.00	19.25	16.59	16.02	16.27
		RB1#5	19.68	19.54	19.6	16.70	16.56	16.62
		RB3#0	19.59	19.29	19.13	16.61	16.31	16.15
		RB3#3	19.22	19.21	19.27	16.24	16.23	16.29
		RB5#0	18.52	18.31	18.9	15.54	15.33	15.92
3.0	QPSK	RB1#1	20.89	20.65	20.99	17.91	17.67	18.01
		RB1#4	20.63	20.60	20.57	17.65	17.62	17.59
		RB1#6	20.71	20.70	20.64	17.73	17.72	17.66
		RB3#1	19.61	19.63	19.8	16.63	16.65	16.82
		RB3#4	20.04	19.86	20.07	17.06	16.88	17.09
		RB6#1	18.43	18.32	18.22	15.45	15.34	15.24
	16QAM	RB1#1	19.59	19.20	19.62	16.61	16.22	16.64
		RB1#4	19.42	19.01	19.58	16.44	16.03	16.60
		RB1#6	19.63	19.11	19.92	16.65	16.13	16.94
		RB3#1	19.17	19.01	19.22	16.19	16.03	16.24
		RB3#4	19.21	19.24	19.38	16.23	16.26	16.40
		RB5#1	18.92	18.04	18.64	15.94	15.06	15.66
5.0	QPSK	RB1#0	20.65	20.61	20.94	17.67	17.63	17.96
		RB1#3	20.53	20.55	21.00	17.55	17.57	18.02
		RB1#5	20.81	20.42	20.43	17.83	17.44	17.45
		RB3#0	19.83	19.40	19.76	16.85	16.42	16.78
		RB3#3	19.81	19.32	19.66	16.83	16.34	16.68
		RB6#0	19.34	19.06	19.37	16.36	16.08	16.39
	16QAM	RB1#0	20.72	20.18	20.64	17.74	17.20	17.66
		RB1#3	20.89	20.04	20.75	17.91	17.06	17.77
		RB1#5	20.97	20.32	20.42	17.99	17.34	17.44
		RB3#0	19.72	19.35	19.64	16.74	16.37	16.66
		RB3#3	19.74	19.45	19.76	16.76	16.47	16.78

		RB5#0	19.04	18.92	18.91	16.06	15.94	15.93
10.0	QPSK	RB1#1	20.66	20.58	20.89	17.68	17.60	17.91
		RB1#4	20.71	20.24	20.49	17.73	17.26	17.51
		RB1#6	20.28	20.16	20.73	17.30	17.18	17.75
		RB3#1	20.42	20.46	20.69	17.44	17.48	17.71
		RB3#4	20.46	20.20	20.38	17.48	17.22	17.40
		RB6#1	20.44	20.09	20.43	17.46	17.11	17.45
	16QAM	RB1#1	20.94	20.34	20.72	17.96	17.36	17.74
		RB1#4	20.42	20.10	20.38	17.44	17.12	17.40
		RB1#6	20.52	20.47	20.57	17.54	17.49	17.59
		RB3#1	20.63	20.24	20.87	17.65	17.26	17.89
		RB3#4	20.55	20.23	20.11	17.57	17.25	17.13
		RB5#1	20.38	20.24	20.47	17.40	17.26	17.49
Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB) For Band12: Antenna Gain = -0.83dBi = -2.98dBd (0dBd=2.15dBi) Cable Loss=0dB* (provided by the applicant) Limit: ERP≤34.77dBm								

LTE Band 13:

Bandwidth h (MHz)	Modulation n	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	20.56	20.60	21.05	17.52	17.56	18.01
		RB1#3	20.54	20.55	20.90	17.50	17.51	17.86
		RB1#5	20.81	20.53	20.54	17.77	17.49	17.50
		RB3#0	19.73	19.50	19.65	16.69	16.46	16.61
		RB3#3	19.92	19.21	19.57	16.88	16.17	16.53
		RB6#0	19.44	19.16	19.27	16.40	16.12	16.23
	16QAM	RB1#0	20.81	20.08	20.73	17.77	17.04	17.69
		RB1#3	20.79	20.03	20.65	17.75	16.99	17.61
		RB1#5	20.87	20.21	20.53	17.83	17.17	17.49
		RB3#0	19.61	19.24	19.63	16.57	16.20	16.59
		RB3#3	19.73	19.54	19.85	16.69	16.50	16.81
		RB5#0	18.93	18.82	18.80	15.89	15.78	15.76
10.0	QPSK	RB1#1	/	20.69	/	/	17.65	/
		RB1#4	/	20.33	/	/	17.29	/
		RB1#6	/	20.27	/	/	17.23	/
		RB3#1	/	20.37	/	/	17.33	/
		RB3#4	/	20.30	/	/	17.26	/
		RB6#1	/	20.19	/	/	17.15	/
	16QAM	RB1#1	/	20.24	/	/	17.20	/
		RB1#4	/	20.11	/	/	17.07	/
		RB1#6	/	20.58	/	/	17.54	/
		RB3#1	/	20.13	/	/	17.09	/
		RB3#4	/	20.14	/	/	17.10	/
		RB5#1	/	20.25	/	/	17.21	/
Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB) For Band 13: Antenna Gain = -0.89dBi = -3.04dBd (0dBd=2.15dBi) Cable Loss=0dB* (provided by the applicant) Limit: ERP≤34.77dBm								

3.3.2 Peak-to-average ratio (PAR)

LTE Band 2 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	9.23	9.39	10.26	13	Pass
QPSK (6RB Size)	6.38	8.33	6.92	13	Pass
16QAM (1RB Size)	7.85	6.28	5.22	13	Pass
16QAM (5RB Size)	7.85	8.14	9.17	13	Pass

LTE Band 4 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.97	5.13	5.83	13	Pass
QPSK (6RB Size)	5.71	7.88	8.75	13	Pass
16QAM (1RB Size)	6.41	7.28	7.15	13	Pass
16QAM (5RB Size)	6.83	8.69	7.05	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	8.21	4.46	5.77	13	Pass
QPSK (6RB Size)	5.58	7.18	5.22	13	Pass
16QAM (1RB Size)	9.17	7.66	6.79	13	Pass
16QAM (5RB Size)	5.80	5.38	9.46	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.47	6.83	8.91	13	Pass
QPSK (6RB Size)	8.40	8.69	8.40	13	Pass
16QAM (1RB Size)	8.04	8.14	8.65	13	Pass
16QAM (5RB Size)	7.24	8.11	7.85	13	Pass

LTE Band 13 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	/	8.78	/	13	Pass
QPSK (6RB Size)	/	6.67	/	13	Pass
16QAM (1RB Size)	/	4.90	/	13	Pass
16QAM (5RB Size)	/	7.85	/	13	Pass

3.3.3 26dB and 99% Bandwidth

LTE Band 2:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.111	1.313	1.099	1.296	1.094	1.284
	16QAM	0.937	1.144	0.937	1.139	0.942	1.228
3 MHz	QPSK	1.106	1.288	1.116	1.298	1.116	1.310
	16QAM	0.942	1.154	0.948	1.142	0.948	1.154
5 MHz	QPSK	1.120	1.332	1.120	1.333	1.120	1.325
	16QAM	0.960	1.143	0.960	1.188	0.940	1.164
10 MHz	QPSK	1.120	1.314	1.120	1.327	1.120	1.314
	16QAM	0.960	1.177	0.960	1.247	0.960	1.154
15 MHz	QPSK	1.080	1.348	1.140	1.394	1.080	1.298
	16QAM	0.960	1.204	0.960	1.202	1.020	1.154
20 MHz	QPSK	1.120	1.282	1.200	1.410	1.120	1.282
	16QAM	1.040	1.202	1.040	1.282	0.960	1.218

LTE Band 4:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.098	1.284	1.104	1.320	1.098	1.284
	16QAM	0.942	1.224	0.942	1.140	0.942	1.224
3 MHz	QPSK	1.116	1.308	1.116	1.320	1.092	1.296
	16QAM	0.948	1.152	0.948	1.152	0.948	1.248
5 MHz	QPSK	1.100	1.340	1.120	1.320	1.100	1.320
	16QAM	0.940	1.140	0.960	1.180	0.940	1.140
10 MHz	QPSK	1.120	1.320	1.120	1.320	1.120	1.320
	16QAM	0.960	1.200	0.960	1.160	0.960	1.120
15 MHz	QPSK	1.080	1.320	1.140	1.440	1.140	1.380
	16QAM	0.900	1.140	0.960	1.200	0.960	1.200
20 MHz	QPSK	1.200	1.360	1.120	1.360	1.120	1.360
	16QAM	0.960	1.200	1.040	1.200	0.960	1.200

LTE Band 5:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.099	1.282	1.113	1.316	1.106	1.307
	16QAM	0.945	1.238	0.938	1.142	0.931	1.140
3 MHz	QPSK	1.116	1.308	1.116	1.300	1.104	1.288
	16QAM	0.948	1.143	0.936	1.144	0.948	1.250
5 MHz	QPSK	1.120	1.310	1.120	1.314	1.100	1.330
	16QAM	0.960	1.202	0.960	1.174	0.940	1.164
10 MHz	QPSK	1.120	1.332	1.120	1.319	1.120	1.327
	16QAM	0.960	1.236	0.960	1.223	0.960	1.158

LTE Band 12:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.098	1.302	1.092	1.296	1.098	1.284
	16QAM	0.930	1.134	0.942	1.140	0.936	1.224
3 MHz	QPSK	1.116	1.344	1.116	1.320	1.092	1.284
	16QAM	0.936	1.152	0.948	1.152	0.948	1.224
5 MHz	QPSK	1.080	1.320	1.120	1.320	1.100	1.320
	16QAM	0.940	1.140	0.960	1.180	0.960	1.140
10 MHz	QPSK	1.120	1.360	1.120	1.320	1.080	1.320
	16QAM	0.960	1.120	0.960	1.200	0.960	1.160

LTE Band 13:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	1.100	1.320	1.120	1.320	1.120	1.300
	16QAM	0.940	1.180	0.940	1.140	0.940	1.160
10 MHz	QPSK	/	/	1.120	1.400	/	/
	16QAM	/	/	0.960	1.160	/	/

Note: Test Plots of 26dB and 99% bandwidth please refer Appendix A

3.3.4 Conducted Spurious Emissions

Band	Result	Limit	Verdict
LTE B2	Refer test plot	Refer test plot	Pass
LTE B4	Refer test plot	Refer test plot	Pass
LTE B5	Refer test plot	Refer test plot	Pass
LTE B12	Refer test plot	Refer test plot	Pass
LTE B13	Refer test plot	Refer test plot	Pass

Note: Test Plots of Conducted Spurious Emissions please refer Appendix B

3.3.5 Out of band emission, Band Edge

Band	Result	Limit	Verdict
LTE B2	Refer test plot	Refer test plot	Pass
LTE B4	Refer test plot	Refer test plot	Pass
LTE B5	Refer test plot	Refer test plot	Pass
LTE B12	Refer test plot	Refer test plot	Pass
LTE B13	Refer test plot	Refer test plot	Pass

Note: Test Plots of Band Edge please refer Appendix C

3.3.6 FREQUENCY STABILITY

QPSK:

Band 2:

1.4 MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.70	1850.150	1850	1909.853	1910
-20		1850.143	1850	1909.843	1910
-10		1850.176	1850	1909.840	1910
0		1850.181	1850	1909.852	1910
10		1850.139	1850	1909.838	1910
20		1850.145	1850	1909.844	1910
30		1850.164	1850	1909.862	1910
40		1850.153	1850	1909.851	1910
50		1850.142	1850	1909.849	1910
20	3.15	1850.160	1850	1909.832	1910
	4.26	1850.171	1850	1909.859	1910

Band 4:

1.4 MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.70	1710.184	1710	1754.820	1755
-20		1710.189	1710	1754.833	1755
-10		1710.179	1710	1754.830	1755
0		1710.140	1710	1754.811	1755
10		1710.158	1710	1754.809	1755
20		1710.148	1710	1754.846	1755
30		1710.174	1710	1754.810	1755
40		1710.170	1710	1754.821	1755
50		1710.181	1710	1754.820	1755
20	3.15	1710.169	1710	1754.843	1755
	4.26	1710.151	1710	1754.830	1755

Band 5:

10.0 MHz Middle Channel, $f_o = 836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.70	-1.64	-0.002	2.5
-20		-2.12	-0.003	2.5
-10		-1.99	-0.002	2.5
0		-2.68	-0.003	2.5
10		-2.32	-0.003	2.5
20		-1.87	-0.002	2.5
30		-1.93	-0.002	2.5
40		-2.05	-0.002	2.5
50		-2.04	-0.002	2.5
20	3.15	-1.78	-0.002	2.5
	4.26	-1.67	-0.002	2.5

Band 12:

1.4 MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V_{DC})	F_L (MHz)	F_H (MHz)	F_L Limit (MHz)	F_H Limit (MHz)
-30	3.70	699.133	699	715.839	716
-20		699.154	699	715.851	716
-10		699.175	699	715.848	716
0		699.133	699	715.826	716
10		699.142	699	715.855	716
20		699.154	699	715.846	716
30		699.159	699	715.824	716
40		699.120	699	715.860	716
50		699.162	699	715.872	716
20	3.15	699.129	699	715.844	716
	4.26	699.136	699	715.827	716

Band 13:

5MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.70	777.249	777	786.751	787
-20		777.257	777	786.749	787
-10		777.230	777	786.771	787
0		777.261	777	786.735	787
10		777.239	777	786.740	787
20		777.240	777	786.760	787
30		777.272	777	786.759	787
40		777.260	777	786.726	787
50		777.251	777	786.768	787
20	3.15	777.223	777	786.715	787
	4.26	777.258	777	786.723	787

16QAM:

Band 2:

1.4 MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.70	1850.179	1850	1909.656	1910
-20		1850.164	1850	1909.646	1910
-10		1850.131	1850	1909.658	1910
0		1850.149	1850	1909.657	1910
10		1850.150	1850	1909.646	1910
20		1850.139	1850	1909.681	1910
30		1850.140	1850	1909.657	1910
40		1850.173	1850	1909.647	1910
50		1850.152	1850	1909.646	1910
20	3.15	1850.169	1850	1909.648	1910
	4.26	1850.171	1850	1909.646	1910

Band 4:

1.4 MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.70	1710.172	1710	1754.880	1755
-20		1710.132	1710	1754.854	1755
-10		1710.161	1710	1754.845	1755
0		1710.170	1710	1754.836	1755
10		1710.189	1710	1754.829	1755
20		1710.136	1710	1754.858	1755
30		1710.134	1710	1754.864	1755
40		1710.190	1710	1754.872	1755
50		1710.158	1710	1754.828	1755
20	3.15	1710.176	1710	1754.811	1755
	4.26	1710.183	1710	1754.825	1755

Band 5:

10.0 MHz Middle Channel, f ₀ =836.5MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.70	-3.42	-0.004	2.5
-20		-2.31	-0.003	2.5
-10		-2.62	-0.003	2.5
0		-1.99	-0.002	2.5
10		-2.09	-0.002	2.5
20		-2.64	-0.003	2.5
30		-2.71	-0.003	2.5
40		-2.62	-0.003	2.5
50		-2.57	-0.003	2.5
20	3.15	-2.91	-0.003	2.5
	4.26	-2.82	-0.003	2.5

Band 12:

10MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.70	699.117	699	715.859	716
-20		699.129	699	715.878	716
-10		699.155	699	715.849	716
0		699.151	699	715.881	716
10		699.171	699	715.853	716
20		699.142	699	715.852	716
30		699.136	699	715.862	716
40		699.121	699	715.873	716
50		699.146	699	715.865	716
20	3.15	699.162	699	715.892	716
	4.26	699.172	699	715.844	716

Band 13:

5MHz Test Channel: Lowest for Lower Edge, Highest for Upper Edge					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.70	777.258	777	786.770	787
-20		777.236	777	786.749	787
-10		777.211	777	786.797	787
0		777.243	777	786.782	787
10		777.200	777	786.759	787
20		777.220	777	786.760	787
30		777.204	777	786.735	787
40		777.258	777	786.782	787
50		777.229	777	786.735	787
20	3.15	777.256	777	786.706	787
	4.26	777.272	777	786.734	787

3.4 Radiated Spurious emission Test Data

Test Date:	2024-06-11	Test By:	Bard Huang
Environment condition:	Temperature: 23°C; Relative Humidity:65%; ATM Pressure: 100.2kPa		

Frequency (MHz)	Reading level (dBμV)	Polar (H/V)	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	EIRP CF	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)	Remark
LTE Band 2 (30MHz-20GHz)									
Low Channel(1850.7MHz)									
3701.400	59.60	horizontal	-2.57	57.03	-95.2	-38.17	-13	-25.17	Peak
3701.400	58.25	vertical	-2.57	55.68	-95.2	-39.52	-13	-26.52	Peak
Middle Channel(1880MHz)									
3760.000	61.38	horizontal	-2.69	58.69	-95.2	-36.51	-13	-23.51	Peak
3760.000	61.16	vertical	-2.69	58.47	-95.2	-36.73	-13	-23.73	Peak
High Channel(1909.3MHz)									
3818.600	66.15	horizontal	-2.78	63.37	-95.2	-31.83	-13	-18.83	Peak
3818.600	63.95	vertical	-2.78	61.17	-95.2	-34.03	-13	-21.03	Peak
LTE Band 4 (30MHz-20GHz)									
Low Channel(1710.7MHz)									
3421.400	58.50	horizontal	-2.63	55.87	-95.2	-39.33	-13	-26.33	Peak
3421.400	59.19	vertical	-2.63	56.56	-95.2	-38.64	-13	-25.64	Peak
Middle Channel(1732.5MHz)									
3465.000	58.05	horizontal	-2.68	55.37	-95.2	-39.83	-13	-26.83	Peak
3465.000	62.21	vertical	-2.68	59.53	-95.2	-35.67	-13	-22.67	Peak
High Channel(1754.3MHz)									
3508.600	66.75	horizontal	-2.71	64.04	-95.2	-31.16	-13	-18.16	Peak
3508.600	64.82	vertical	-2.71	62.11	-95.2	-33.09	-13	-20.09	Peak
LTE Band 5 (30MHz-10GHz)									
Low Channel(824.7MHz)									
1649.400	65.91	horizontal	-3.32	62.59	-95.2	-32.61	-13	-19.61	Peak
1649.400	62.56	vertical	-3.32	59.24	-95.2	-35.96	-13	-22.96	Peak
Middle Channel(836.5MHz)									
1673.000	62.76	horizontal	-3.19	59.57	-95.2	-35.63	-13	-22.63	Peak

1673.000	63.67	vertical	-3.19	60.48	-95.2	-34.72	-13	-21.72	Peak
High Channel(848.3MHz)									
1696.600	68.15	horizontal	-3.07	65.08	-95.2	-30.12	-13	-17.12	Peak
1696.600	66.57	vertical	-3.07	63.5	-95.2	-31.7	-13	-18.7	Peak
LTE Band 12 (30MHz-10GHz)									
Low Channel(699.7MHz)									
1399.400	65.09	horizontal	-4.66	60.43	-95.2	-34.77	-13	-21.77	Peak
1399.400	61.34	vertical	-4.66	56.68	-95.2	-38.52	-13	-25.52	Peak
Middle Channel(707.5MHz)									
1415.000	48.29	horizontal	-4.58	43.71	-95.2	-51.49	-13	-38.49	Peak
1415.000	49.12	vertical	-4.58	44.54	-95.2	-50.66	-13	-37.66	Peak
High Channel(715.3MHz)									
1430.600	48.09	horizontal	-4.51	43.58	-95.2	-51.62	-13	-38.62	Peak
1430.600	48.34	vertical	-4.51	43.83	-95.2	-51.37	-13	-38.37	Peak
LTE Band 13 (30MHz-10GHz)									
Low Channel(779.5MHz)									
1559.000	58.29	horizontal	-3.99	54.3	-95.2	-40.9	-40	-0.9	Peak
1559.000	56.09	vertical	-3.99	52.1	-95.2	-43.1	-40	-3.1	Peak
Middle Channel(782MHz)									
1564.000	57.93	horizontal	-3.96	53.97	-95.2	-41.23	-40	-1.23	Peak
1564.000	55.31	vertical	-3.96	51.35	-95.2	-43.85	-40	-3.85	Peak
High Channel(784.5MHz)									
1569.000	58.36	horizontal	-3.92	54.44	-95.2	-40.76	-40	-0.76	Peak
1569.000	55.73	vertical	-3.92	51.81	-95.2	-43.39	-40	-3.39	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Result – Limit

According to ANSI C63.26-2.15 section 5.2.7:

$EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.

Test was performed on 3meters distance, so

Result = Corrected Amplitude + $20\log(3) - 104.8$

= Corrected Amplitude - 95.2

The emission levels of other frequencies that were lower than the limit 20dB, not show in test report.

4 Test Setup Photo

Please refer to the attachment 2405T48460EC Test Setup photo.

5 E.U.T Photo

Please refer to the attachment 2405T48460E External photo and 2405T48460E Internal photo.

---End of Report---