

TEST REPORT

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Report Number: SZ1231225-78191E-RF-00
FCC ID: 2BEZN-AL03GB00

Test Standard (s)

FCC PART 27; FCC PART 22H; FCC PART 24E

Sample Description

Product Type: AlterLock Gen3
Model No.: AL03GB
Multiple Model(s) No.: N/A
Trade Mark: 
Date Received: 2024/01/25
Report Date: 2024/03/13

Test Result:	Pass▲
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Black Chen

Black Chen
RF Engineer

Approved By:

Nancy Wang

Nancy Wang
RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ1231225-78191E-RF-00	Original Report	2024/03/13

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	AlterLock Gen3
Tested Model	AL03GB
Multiple Model(s)	N/A
Frequency Range	LTE Cat-M1: Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) Band 4: 1710-1755MHz(TX); 2110-2155MHz(RX) Band 5: 824-849MHz(TX); 869-894MHz(RX) Band 12: 699-716MHz(TX); 729-746MHz(RX)
Modulation Technique	LTE Cat-M1: QPSK, 16QAM
Antenna Specification#	Band 2: 2.59dBi; Band 4: 2.5dBi; Band 5: -1.72dBi; Band 12:-3.17dBi (provided by the applicant)
Voltage Range	DC 5V from USB port or DC 3.8V from battery
Sample serial number	2FQQ-6 for Radiated Emissions Test 2FQQ-1 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Normal/Extreme Condition [#]	L.V.: Low Voltage 3.45V _{DC} N.V.: Normal Voltage 3.8V _{DC} H.V.: High Voltage 4.35V _{DC}
Adapter Information	N/A

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part24-Subpart E, and Subpart 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 - Miscellaneous Wireless Communications Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in
Licensed Radio Services
KDB 971168 D01: Power Meas License Digital Systems v03r01

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		0.72 dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.75 dB(k=2, 95% level of confidence)
RF Frequency		213.55 Hz(k=2, 95% level of confidence)
Radiated Emissions	30MHz~200MHz (Horizontal)	4.48dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	4.55dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.05dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.35dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.44dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.16dB(k=2, 95% level of confidence)
Temperature		±1°C
Humidity		±1%
Supply voltages		±0.4%

Note: 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.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

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. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

Frequency Band	Bandwidth (MHz)	Test Frequency (MHz)		
		Low	Middle	High
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	704.0	707.5	711.0

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No exercise software was used.

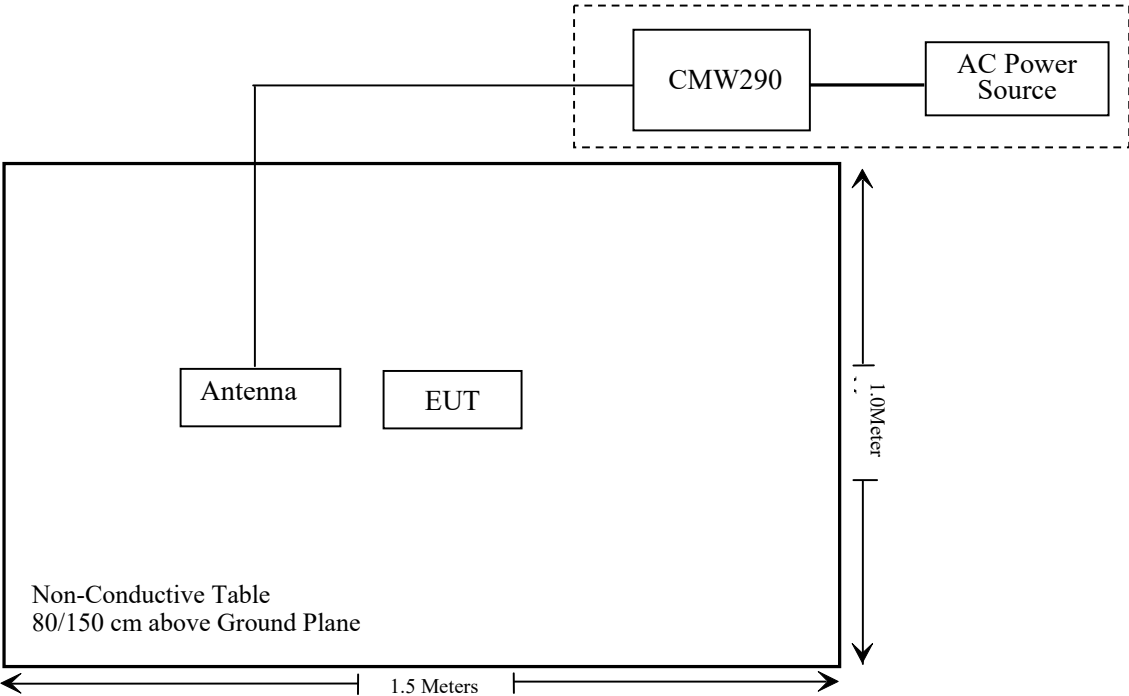
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Functional Radio Communication Tester	CMW290	101742

Support Cable Description

Cable Description	Length (m)	From / Port	To
Unshielded Detachable AC cable	1.2	AC Power	CMW290

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 ,§2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§2.1046; § 22.913 (a) (d); § 24.232 (c) (d); §27.50 (c) (d);	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliant
§ 2.1051; §22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a); § 24.238 (a); §27.53 (g) (h)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2023/02/08	2024/02/07
Sonoma instrument	Pre-amplifier	310 N	186238	2023/06/08	2024/06/07
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2024/07/19
Unknown	Cable	Chamber Cable 1	F-03-EM236	2023/08/03	2024/08/02
Unknown	Cable	Chamber Cable 4	EC-007	2023/08/03	2024/08/02
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2023/04/18	2024/04/17
COM-POWER	Pre-amplifier	PA-122	181919	2023/06/29	2024/06/28
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2024/07/25
A.H.System	Horn Antenna	SAS-200/571	135	2021/07/14	2024/07/13
Unknown	RF Cable	KMSE	0735	2023/10/08	2024/10/07
Unknown	RF Cable	UFA147	219661	2023/10/08	2024/10/07
Unknown	RF Cable	XH750A-N	J-10M	2023/10/08	2024/10/07
Agilent	Signal Generator	N5183A	MY50140588	2023/12/18	2024/12/17
A.H.System	Pre-amplifier	PAM-1840VH	190	2023/08/03	2024/08/02
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
Electro-Mechanics Co	Horn Antenna	3116	2026	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2023/08/03	2024/08/02
Agilent	Signal Generator	N5183A	MY50140588	2023/12/18	2024/12/17

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200982	2023/12/18	2024/12/17
BACL	Temperature & Humidity Chamber	BTH-150-40	30145	2023/02/08	2024/02/07
Rohde & Schwarz	Functional Radio Communication Tester	CMW290	101742	2023/06/08	2024/06/07
instek	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2023/06/08	2024/06/07
WEINSCHEL	3dB Attenuator	Unknown	F-03-EM220	2023/07/04	2024/07/03
WEINSCHEL	Power Splitter	1515	RH386	2023/07/04	2024/07/03
Micro-Tronics	RF Cable	8082135	W1113	2023/07/04	2024/07/03

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b) & 2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Result**For worst case:**

Mode	Frequency (MHz)	Antenna Gain [#]		Tune up conducted power [#]		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	2.45	1.76	1.0	1.26	20	0.0004	1
LTE Band 2	1850-1910	2.59	1.82	21.0	125.89	20	0.045	1
LTE Band 4	1710-1755	2.5	1.78	21.0	125.89	20	0.045	1
LTE Band 5	824-849	-1.72	0.67	21.5	141.25	20	0.019	0.549
LTE Band 12	699-716	-3.17	0.48	21.0	125.89	20	0.012	0.466

Note: The tune-up power and antenna gain was declared by the applicant.

Simultaneous transmitting consideration (worst case):

The ratio= $MPE_{BLE}/limit_{BLE} + MPE_{LTE\ Band\ 2}/limit_{LTE\ Band\ 2} = 0.0004/1 + 0.045/1 = 0.045 < 1.0$

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

FCC§2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H,24E&27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) (d) & § 24.232 (c) (d); §27.50 (c) (d) - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §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.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

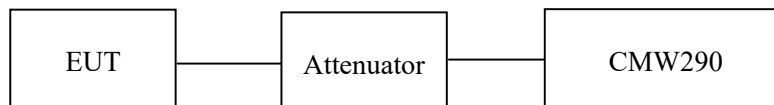
According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to 27.50(d), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Test Procedure

Conducted method: ANSI C63.26-2015 Section 5.2

The RF output of the transmitter was connected to the CMW290 through sufficient attenuation.



Test Data

Environmental Conditions

Temperature:	25.8 °C
Relative Humidity:	57 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang on 2024-02-01.

Test Result: Compliant

LTE Band**Band 2**

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	19.68	22.51	33
	0		RB6#0	19.06		
	0	Middle	RB1#0	19.62		
	0		RB6#0	19.71		
	0	Highest	RB1#5	19.63		
	0		RB6#0	19.92		
1.4MHz 16QAM	0	Lowest	RB1#0	19.81	22.4	33
	0		RB5#0	19.67		
	0	Middle	RB1#0	19.33		
	0		RB5#0	19.08		
	0	Highest	RB1#5	19.35		
	0		RB5#0	18.95		
3MHz QPSK	0	Lowest	RB1#0	20.02	22.82	33
	0		RB6#0	20.16		
	0	Middle	RB1#0	19.23		
	0		RB6#0	20.23		
	1	Highest	RB1#5	19.14		
	0		RB6#0	19.24		
3MHz 16QAM	0	Lowest	RB1#0	20.23	22.93	33
	0		RB5#0	19.69		
	0	Middle	RB1#0	19.34		
	0		RB5#0	19.75		
	1	Highest	RB1#5	20.08		
	0		RB5#0	20.34		
5MHz QPSK	3	Lowest	RB1#0	19.91	22.87	33
	0		RB6#0	20.15		
	0	Middle	RB1#0	20.28		
	0		RB6#0	19.5		
	0	Highest	RB1#5	19.99		
	0		RB6#0	19.01		
5MHz 16QAM	3	Lowest	RB1#0	19.81	22.49	33
	0		RB5#0	19.77		
	0	Middle	RB1#0	19.46		
	0		RB5#0	18.65		
	0	Highest	RB1#5	19.9		
	0		RB5#0	19.79		
10MHz QPSK	3	Lowest	RB1#0	19.87	22.75	33
	0		RB4#0	20.16		
	0	Middle	RB1#0	19.6		

	0	Highest	RB4#0	20.15		
	4		RB1#5	19.39		
	7		RB4#2	20.03		
10MHz 16QAM	3	Lowest	RB1#0	19.74	22.89	33
	0		RB4#0	19.16		
	0	Middle	RB1#0	20.3		
	0		RB4#0	19.8		
	4	Highest	RB1#5	19.74		
	7		RB4#2	19.17		
15MHz QPSK	3	Lowest	RB1#0	19.41	22.82	33
	0		RB6#0	19.89		
	0	Middle	RB1#0	20.23		
	0		RB6#0	19.35		
	8	Highest	RB1#5	19.71		
	11		RB6#0	19.76		
15MHz 16QAM	3	Lowest	RB1#0	19.27	22.88	33
	0		RB5#0	19.97		
	0	Middle	RB1#0	19.11		
	0		RB5#0	19.4		
	8	Highest	RB1#5	19.18		
	11		RB5#0	20.29		
20MHz QPSK	3	Lowest	RB1#0	19.82	22.59	33
	0		RB6#0	19.45		
	0	Middle	RB1#0	19.86		
	0		RB6#0	20		
	12	Highest	RB1#5	19.46		
	15		RB6#0	19.91		
20MHz 16QAM	3	Lowest	RB1#0	19.36	22.15	33
	0		RB5#0	18.97		
	0	Middle	RB1#0	19.12		
	0		RB5#0	19.42		
	12	Highest	RB1#5	19.53		
	15		RB5#0	19.56		

Note: EIRP=Conducted Power(dBm) - Lc(dB) + G_T(dBi), Lc=0dB

Band 4

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	19.64	23.08	30
	0		RB6#0	19.25		
	0	Middle	RB1#0	19.65		
	0		RB6#0	19.83		
	0	Highest	RB1#5	20.58		
	0		RB6#0	20.49		
1.4MHz 16QAM	0	Lowest	RB1#0	19.88	22.41	30
	0		RB5#0	19.91		
	0	Middle	RB1#0	19.77		
	0		RB5#0	19.63		
	0	Highest	RB1#5	19.69		
	0		RB5#0	19.8		
3MHz QPSK	0	Lowest	RB1#0	19.44	22.96	30
	0		RB6#0	19.65		
	0	Middle	RB1#0	20.16		
	0		RB6#0	20.03		
	1	Highest	RB1#5	19.86		
	0		RB6#0	20.46		
3MHz 16QAM	0	Lowest	RB1#0	19.76	23.13	30
	0		RB5#0	19.98		
	0	Middle	RB1#0	20.63		
	0		RB5#0	19.59		
	1	Highest	RB1#5	19.28		
	0		RB5#0	20.27		
5MHz QPSK	3	Lowest	RB1#0	20.55	23.13	30
	0		RB6#0	20.63		
	0	Middle	RB1#0	19.83		
	0		RB6#0	20.04		
	0	Highest	RB1#5	19.83		
	0		RB6#0	19.42		
5MHz 16QAM	3	Lowest	RB1#0	19.75	22.98	30
	0		RB5#0	20.31		
	0	Middle	RB1#0	19.31		
	0		RB5#0	20.48		
	0	Highest	RB1#5	20.36		
	0		RB5#0	19.69		
10MHz QPSK	3	Lowest	RB1#0	20.23	22.83	30
	0		RB4#0	20.17		
	0	Middle	RB1#0	19.61		
	0		RB4#0	20.33		
	4	Highest	RB1#5	20.01		

	7		RB4#2	19.73		
10MHz 16QAM	3	Lowest	RB1#0	19.95	22.96	30
	0		RB4#0	20.2		
	0	Middle	RB1#0	20.46		
	0		RB4#0	19.24		
	4	Highest	RB1#5	20.13		
	7		RB4#2	19.77		
15MHz QPSK	3	Lowest	RB1#0	20.75	23.25	30
	0		RB6#0	19.42		
	0	Middle	RB1#0	19.71		
	0		RB6#0	20.01		
	8	Highest	RB1#5	19.66		
	11		RB6#0	20.3		
15MHz 16QAM	3	Lowest	RB1#0	19.47	23.21	30
	0		RB5#0	19.6		
	0	Middle	RB1#0	20.31		
	0		RB5#0	20.71		
	8	Highest	RB1#5	19.94		
	11		RB5#0	19.8		
20MHz QPSK	3	Lowest	RB1#0	19.63	22.51	30
	0		RB6#0	19.82		
	0	Middle	RB1#0	19.98		
	0		RB6#0	19.74		
	12	Highest	RB1#5	20.01		
	15		RB6#0	19.88		
20MHz 16QAM	3	Lowest	RB1#0	19.94	22.54	30
	0		RB5#0	19.45		
	0	Middle	RB1#0	20.04		
	0		RB5#0	19.39		
	12	Highest	RB1#5	19.09		
	15		RB5#0	19.48		
Note: EIRP=Conducted Power(dBm) - LC(dB) + GT(dBi) , Lc=0dB						

Band 5

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum ERP (dBm)	ERP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	20.32	16.9	38.45
	0		RB6#0	20.02		
	0	Middle	RB1#0	20.77		
	0		RB6#0	20.11		
	0	Highest	RB1#5	20.02		
	0		RB6#0	20.51		
1.4MHz 16QAM	0	Lowest	RB1#0	20.12	16.71	38.45
	0		RB5#0	19.74		
	0	Middle	RB1#0	19.87		
	0		RB5#0	20.58		
	0	Highest	RB1#5	20.24		
	0		RB5#0	19.75		
3MHz QPSK	0	Lowest	RB1#0	20.69	17.15	38.45
	0		RB6#0	20.3		
	0	Middle	RB1#0	21.02		
	0		RB6#0	20.61		
	1	Highest	RB1#5	20.3		
	0		RB6#0	20.32		
3MHz 16QAM	0	Lowest	RB1#0	20.01	16.92	38.45
	0		RB5#0	20.04		
	0	Middle	RB1#0	20.41		
	0		RB5#0	20.28		
	1	Highest	RB1#5	20.04		
	0		RB5#0	20.79		
5MHz QPSK	3	Lowest	RB1#0	20.08	16.57	38.45
	0		RB6#0	20.06		
	0	Middle	RB1#0	19.72		
	0		RB6#0	20.44		
	0	Highest	RB1#5	19.82		
	0		RB6#0	20.43		
5MHz 16QAM	3	Lowest	RB1#0	20.25	16.89	38.45
	0		RB5#0	20.15		
	0	Middle	RB1#0	20.76		
	0		RB5#0	20.75		
	0	Highest	RB1#5	20.28		
	0		RB5#0	20.13		
10MHz QPSK	3	Lowest	RB1#0	20.54	16.67	38.45
	0		RB4#0	20.15		
	0	Middle	RB1#0	20.2		
	0		RB4#0	20.28		
	4	Highest	RB1#5	20.37		
	7		RB4#2	20.35		

10MHz 16QAM	3	Lowest	RB1#0	20.21	16.5	38.45
	0		RB4#0	20.01		
	0	Middle	RB1#0	20.13		
	0		RB4#0	19.78		
	4	Highest	RB1#5	20.14		
	7		RB4#2	20.37		
Note: ERP= Conducted Power(dBm) - LC(dB) + GT(dBd) GT(dBd)=GT(dBi)-2.15 Lc=0dB						

Band 12

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum ERP (dBm)	ERP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	20.25	14.98	34.77
	0		RB6#0	20.19		
	0	Middle	RB1#0	20.30		
	0		RB6#0	20.05		
	0	Highest	RB1#5	20.24		
	0		RB6#0	19.60		
1.4MHz 16QAM	0	Lowest	RB1#0	20.03	14.82	34.77
	0		RB5#0	20.12		
	0	Middle	RB1#0	20.08		
	0		RB5#0	20.14		
	0	Highest	RB1#5	19.86		
	0		RB5#0	19.74		
3MHz QPSK	0	Lowest	RB1#0	19.73	15.15	34.77
	0		RB6#0	20.36		
	0	Middle	RB1#0	19.41		
	0		RB6#0	20.47		
	1	Highest	RB1#5	19.36		
	0		RB6#0	20.42		
3MHz 16QAM	0	Lowest	RB1#0	20.35	15.29	34.77
	0		RB5#0	19.87		
	0	Middle	RB1#0	20.08		
	0		RB5#0	20.30		
	1	Highest	RB1#5	19.66		
	0		RB5#0	20.61		
5MHz QPSK	3	Lowest	RB1#0	20.28	15.28	34.77
	0		RB6#0	20.50		
	0	Middle	RB1#0	20.30		
	0		RB6#0	20.60		
	0	Highest	RB1#5	19.97		
	0		RB6#0	19.39		
5MHz 16QAM	3	Lowest	RB1#0	20.03	14.83	34.77
	0		RB5#0	20.15		
	0	Middle	RB1#0	19.80		
	0		RB5#0	20.07		
	0	Highest	RB1#5	19.96		
	0		RB5#0	19.75		
10MHz QPSK	3	Lowest	RB1#0	20.14	14.97	34.77
	0		RB4#0	19.42		
	0	Middle	RB1#0	19.97		
	0		RB4#0	20.07		
	4	Highest	RB1#5	19.95		
	7		RB4#2	20.29		

10MHz 16QAM	3	Lowest	RB1#0	20.04	14.86	34.77
	0		RB4#0	19.95		
	0	Middle	RB1#0	20.06		
	0		RB4#0	20.18		
	4	Highest	RB1#5	20.12		
	7		RB4#2	19.97		

Note:

ERP= Conducted Power(dBm) - LC(dB) + GT(dBd)

GT(dBd)=GT(dBi)-2.15

Lc=0dB

Peak-to-average ratio (PAR)**LTE Band:** *(pre-scan all bandwidth, the worst case as below)***LTE Band 2 20MHz Bandwidth**

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	Peak-to-average Power Ratio(PAR)			Limit (dB)
			Peak (dbm)	Avg (dbm)	PAR (db)	
20MHz QPSK	Lowest	RB1#0	24.53	19.88	4.65	13
		RB6#0	24.43	20.01	4.42	13
20MHz 16QAM		RB1#0	24.60	19.87	4.73	13
		RB5#0	24.76	20.24	4.52	13
20MHz QPSK	Middle	RB1#0	24.38	19.98	4.4	13
		RB6#0	24.49	19.93	4.56	13
20MHz 16QAM		RB1#0	24.51	19.83	4.68	13
		RB5#0	24.84	20.18	4.66	13
20MHz QPSK	Highest	RB1#0	24.27	19.97	4.3	13
		RB6#0	24.53	19.81	4.72	13
20MHz 16QAM		RB1#0	24.17	20.04	4.13	13
		RB5#0	24.89	20.01	4.88	13

LTE Band 4 20MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	Peak-to-average Power Ratio(PAR)			Limit (dB)
			Peak (dbm)	Avg (dbm)	PAR (db)	
20MHz QPSK	Lowest	RB1#0	25.2	20.26	4.94	13
		RB6#0	25.52	20.19	5.33	13
20MHz 16QAM		RB1#0	25.02	20.38	4.64	13
		RB5#0	25.31	20.41	4.9	13
20MHz QPSK	Middle	RB1#0	25.12	20.49	4.63	13
		RB6#0	25.16	20.37	4.79	13
20MHz 16QAM		RB1#0	25.53	20.49	5.04	13
		RB5#0	25.28	20.77	4.51	13
20MHz QPSK	Highest	RB1#0	25.19	20.46	4.73	13
		RB6#0	25.52	20.37	5.15	13
20MHz 16QAM		RB1#0	25.32	20.58	4.74	13
		RB5#0	25.11	20.41	4.7	13

LTE Band 5 10MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	Peak-to-average Power Ratio(PAR)			Limit (dB)
			Peak (dbm)	Avg (dbm)	PAR (db)	
10MHz QPSK	Lowest	RB1#0	25.22	21.17	4.05	13
		RB6#0	25.64	21.1	4.54	13
10MHz 16QAM		RB1#0	25.73	20.9	4.83	13
		RB5#0	25.46	21.21	4.25	13
10MHz QPSK	Middle	RB1#0	25.7	20.95	4.75	13
		RB6#0	25.54	21.01	4.53	13
10MHz 16QAM		RB1#0	25.49	21.02	4.47	13
		RB5#0	25.71	20.82	4.89	13
10MHz QPSK	Highest	RB1#0	25.64	21.02	4.62	13
		RB6#0	25.5	20.76	4.74	13
10MHz 16QAM		RB1#0	25.77	21.17	4.6	13
		RB5#0	25.22	20.81	4.41	13

LTE Band 12 10MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	Peak-to-average Power Ratio(PAR)			Limit (dB)
			Peak (dbm)	Avg (dbm)	PAR (db)	
10MHz QPSK	Lowest	RB1#0	25.27	20.69	4.58	13
		RB6#0	25.11	20.61	4.5	13
10MHz 16QAM		RB1#0	25.29	20.47	4.82	13
		RB5#0	25.3	20.43	4.87	13
10MHz QPSK	Middle	RB1#0	25.11	20.18	4.93	13
		RB6#0	25.39	20.7	4.69	13
10MHz 16QAM		RB1#0	25.11	20.52	4.59	13
		RB5#0	24.91	20.25	4.66	13
10MHz QPSK	Highest	RB1#0	25.15	20.31	4.84	13
		RB6#0	25.05	20.48	4.57	13
10MHz 16QAM		RB1#0	25.44	20.32	5.12	13
		RB5#0	25.45	20.25	5.2	13

FCC §2.1049, §22.917, §22.905 & §24.238&§27.53 - OCCUPIED BANDWIDTH

Applicable Standard

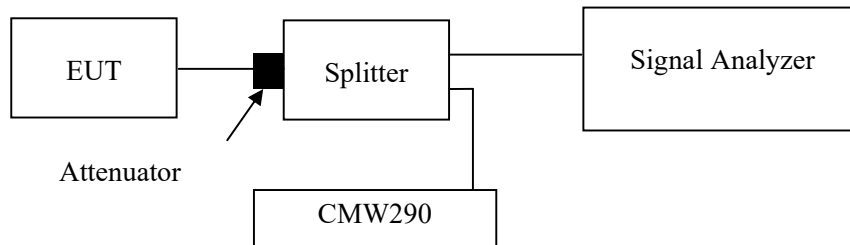
FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

ANSI C63.26-2015 Section 5.4.4

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	25.8~27.3 °C
Relative Humidity:	50~57 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-01-26 to 2024-02-01.

EUT operation mode: Transmitting

Test Result: Compliant

Please refer to the following tables and plots.

LTE Band**Band 2**

Operation Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
	Middle channel	Middle Channel
1.4MHz QPSK	1.106	1.306
1.4MHz 16QAM	0.942	1.219
3MHz QPSK	1.115	1.369
3MHz 16QAM	0.942	1.158
5MHz QPSK	1.122	1.369
5MHz 16QAM	0.929	1.145
10MHz QPSK	1.09	1.369
10MHz 16QAM	0.929	1.177
15MHz QPSK	1.106	1.292
15MHz 16QAM	0.962	1.196
20MHz QPSK	1.154	1.36
20MHz 16QAM	0.962	1.215

Band 4

Operation Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
	Middle channel	Middle Channel
1.4MHz QPSK	1.101	1.292
1.4MHz 16QAM	0.942	1.159
3MHz QPSK	1.101	1.284
3MHz 16QAM	0.936	1.239
5MHz QPSK	1.105	1.368
5MHz 16QAM	0.93	1.134
10MHz QPSK	1.11	1.291
10MHz 16QAM	0.93	1.189
15MHz QPSK	1.125	1.358
15MHz 16QAM	0.93	1.169
20MHz QPSK	1.1	1.279
20MHz 16QAM	0.94	1.162

Band 5

Operation Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
	Middle channel	Middle Channel
1.4MHz QPSK	1.101	1.343
1.4MHz 16QAM	0.93	1.13
3MHz QPSK	1.098	1.386
3MHz 16QAM	0.933	1.124
5MHz QPSK	1.1	1.352
5MHz 16QAM	0.925	1.134
10MHz QPSK	1.09	1.309
10MHz 16QAM	0.93	1.143

Band 12

Operation Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
	Middle channel	Middle Channel
1.4MHz QPSK	1.098	1.362
1.4MHz 16QAM	0.933	1.144
3MHz QPSK	1.101	1.332
3MHz 16QAM	0.93	1.141
5MHz QPSK	1.1	1.315
5MHz 16QAM	0.93	1.198
10MHz QPSK	1.1	1.312
10MHz 16QAM	0.94	1.204

The test plots of LTE band please refer to the Appendix A.

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

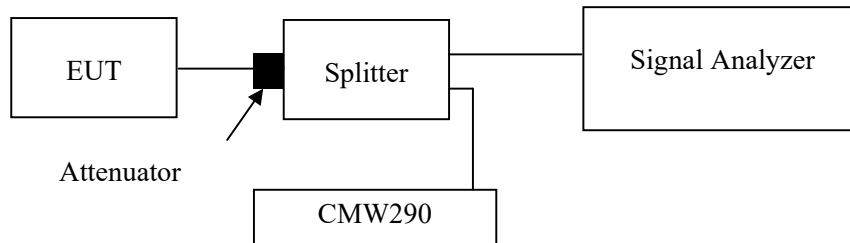
FCC §2.1051, §22.917(a) & §24.238(a) & §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

ANSI C63.26-2015 Section 5.7

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Note: the worst path loss (cable loss and splitter inset loss) among the test frequency range was added into plots.

Test Data

Environmental Conditions

Temperature:	25.8~27.3 °C
Relative Humidity:	50~57 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-01-31 to 2024-02-01.

EUT operation mode: Transmitting

Test result: Compliant

Please refer to the Appendix B.

FCC § 2.1053; § 22.917 (a); § 24.238 (a); §27.53 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917(a)& § 24.238(a) & § 27.53.

Test Procedure

ANSI/TIA-603-E-2016 Section 2.2.12
KDB 671168 D01 v03r01 Section 6.2

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	56 %
ATM Pressure:	101 kPa

The testing was performed by Warren Huang on 2024-01-27 for below 1GHz and Zenos Qiao on 2024-01-31 for above 1GHz.

EUT operation mode: Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axis of orientation was recorded)

LTE Bands: (pre-scan QPSK & 16QAM with all bandwidths, 1RB size, the worst case as below)

Frequency (MHz)	Receiver Reading (dBμV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
Band 2								
Test frequency range: 30MHz-20GHz								
QPSK, 1.4MHz, Low Channel								
340.9	42.47	H	-64.4	0.98	0.0	-65.38	-13	52.38
230.0	38.95	V	-68.9	0.90	0.0	-69.80	-13	56.80
3701.40	67.36	H	-38.0	1.30	11.00	-28.30	-13	15.30
3701.40	67.75	V	-37.5	1.30	11.00	-27.80	-13	14.80
5552.10	60.26	H	-42.2	1.70	10.90	-33.00	-13	20.00
5552.10	59.13	V	-43.4	1.70	10.90	-34.20	-13	21.20
QPSK, 1.4MHz, Middle Channel								
340.9	42.56	H	-64.3	0.98	0.0	-65.28	-13	52.28
230.0	39.14	V	-68.7	0.90	0.0	-69.60	-13	56.60
3760.00	65.06	H	-40.1	1.30	10.70	-30.70	-13	17.70
3760.00	64.08	V	-41.0	1.30	10.70	-31.60	-13	18.60
5640.00	58.23	H	-44.2	1.70	10.90	-35.00	-13	22.00
5640.00	59.29	V	-43.3	1.70	10.90	-34.10	-13	21.10
QPSK, 1.4MHz, High Channel								
340.9	42.94	H	-64.0	0.98	0.0	-64.98	-13	51.98
230.0	39.66	V	-68.2	0.90	0.0	-69.10	-13	56.10
3818.60	63.84	H	-41.3	1.30	10.70	-31.90	-13	18.90
3818.60	62.28	V	-42.8	1.30	10.70	-33.40	-13	20.40
5727.90	56.08	H	-46.1	1.70	11.10	-36.70	-13	23.70
5727.90	55.16	V	-47.2	1.70	11.10	-37.80	-13	24.80
Band 4								
Test frequency range: 30MHz-20GHz								
QPSK, 1.4MHz, Low Channel								
340.9	42.63	H	-64.3	0.98	0.0	-65.28	-13	52.28
230.0	39.26	V	-68.6	0.90	0.0	-69.50	-13	56.50
3421.40	65.94	H	-40.0	1.30	9.90	-31.40	-13	18.40
3421.40	64.05	V	-41.6	1.30	9.90	-33.00	-13	20.00
5132.10	61.17	H	-42.0	1.50	9.60	-33.90	-13	20.90
5132.10	62.12	V	-40.5	1.50	9.60	-32.40	-13	19.40
QPSK, 1.4MHz, Middle Channel								
340.9	42.87	H	-64.0	0.98	0.0	-64.98	-13	51.98
230.0	40.11	V	-67.7	0.90	0.0	-68.60	-13	55.60
3465.00	67.93	H	-38.0	1.30	10.50	-28.80	-13	15.80
3465.00	66.47	V	-39.2	1.30	10.50	-30.00	-13	17.00
5197.50	65.58	H	-37.5	1.60	9.70	-29.40	-13	16.40
5197.50	64.05	V	-38.6	1.60	9.70	-30.50	-13	17.50

QPSK, 1.4MHz, High Channel								
340.9	43.05	H	-63.9	0.98	0.0	-64.88	-13	51.88
230.0	40.31	V	-67.5	0.90	0.0	-68.40	-13	55.40
3508.60	66.39	H	-39.6	1.30	10.50	-30.40	-13	17.40
3508.60	65.26	V	-40.4	1.30	10.50	-31.20	-13	18.20
5262.90	63.41	H	-39.5	1.60	10.00	-31.10	-13	18.10
5262.90	63.82	V	-38.9	1.60	10.00	-30.50	-13	17.50
Band 5								
Test frequency range: 30MHz-10GHz								
QPSK, 1.4MHz, Low Channel								
340.9	43.20	H	-63.7	0.98	0.0	-64.68	-13	51.68
230.0	40.64	V	-67.2	0.90	0.0	-68.10	-13	55.10
1649.40	50.61	H	-57.0	0.90	8.60	-49.30	-13	36.30
1649.40	49.17	V	-59.0	0.90	8.60	-51.30	-13	38.30
2474.10	68.00	H	-39.4	1.10	8.80	-31.70	-13	18.70
2474.10	67.02	V	-40.1	1.10	8.80	-32.40	-13	19.40
3298.80	48.02	H	-58.0	1.30	8.80	-50.50	-13	37.50
3298.80	47.59	V	-58.1	1.30	8.80	-50.60	-13	37.60
QPSK, 1.4MHz, Middle Channel								
340.9	43.45	H	-63.5	0.98	0.0	-64.48	-13	51.48
230.0	40.82	V	-67.0	0.90	0.0	-67.90	-13	54.90
1673.00	50.61	H	-57.0	0.90	8.60	-49.30	-13	36.30
1673.00	49.09	V	-59.1	0.90	8.60	-51.40	-13	38.40
2509.50	52.34	H	-55.0	1.10	8.80	-47.30	-13	34.30
2509.50	52.38	V	-54.7	1.10	8.80	-47.00	-13	34.00
3346.00	46.79	H	-59.2	1.30	8.80	-51.70	-13	38.70
3346.00	46.52	V	-59.2	1.30	8.80	-51.70	-13	38.70
QPSK, 1.4MHz, High Channel								
340.9	43.68	H	-63.2	0.98	0.0	-64.18	-13	51.18
230.0	40.95	V	-66.9	0.90	0.0	-67.80	-13	54.80
1696.60	51.57	H	-56.0	0.90	8.60	-48.30	-13	35.30
1696.60	50.26	V	-57.9	0.90	8.60	-50.20	-13	37.20
2544.90	52.87	H	-54.5	1.10	8.80	-46.80	-13	33.80
2544.90	51.72	V	-55.4	1.10	8.80	-47.70	-13	34.70
3393.20	47.56	H	-58.4	1.30	9.90	-49.80	-13	36.80
3393.20	46.82	V	-58.8	1.30	9.90	-50.20	-13	37.20
Band 12								
Test frequency range: 30MHz-10GHz								
QPSK, 1.4MHz, Low Channel								
340.9	42.63	H	-64.3	0.98	0.0	-65.28	-13	52.28
230.0	40.48	V	-67.3	0.90	0.0	-68.20	-13	55.20
1399.40	58.59	H	-49.1	0.80	7.90	-42.00	-13	29.00
1399.40	57.71	V	-50.7	0.80	7.90	-43.60	-13	30.60
2099.10	56.61	H	-50.7	1.00	8.30	-43.40	-13	30.40
2099.10	55.68	V	-52.1	1.00	8.30	-44.80	-13	31.80

2798.80	49.24	H	-57.3	1.20	9.20	-49.30	-13	36.30
2798.80	48.35	V	-58.0	1.20	9.20	-50.00	-13	37.00
QPSK, 1.4MHz, Middle Channel								
340.9	43.78	H	-63.1	0.98	0.0	-64.08	-13	51.08
230.0	41.60	V	-66.2	0.90	0.0	-67.10	-13	54.10
1415.00	60.26	H	-47.4	0.80	7.90	-40.30	-13	27.30
1415.00	59.17	V	-49.2	0.80	7.90	-42.10	-13	29.10
2122.50	54.71	H	-52.6	1.00	8.30	-45.30	-13	32.30
2122.50	53.34	V	-54.5	1.00	8.30	-47.20	-13	34.20
2830.00	48.02	H	-58.5	1.20	9.20	-50.50	-13	37.50
2830.00	47.51	V	-58.8	1.20	9.20	-50.80	-13	37.80
QPSK, 1.4MHz, High Channel								
340.9	43.86	H	-63.0	0.98	0.0	-63.98	-13	50.98
230.0	41.72	V	-66.1	0.90	0.0	-67.00	-13	54.00
1430.60	59.27	H	-48.4	0.80	7.90	-41.30	-13	28.30
1430.60	58.61	V	-49.8	0.80	7.90	-42.70	-13	29.70
2145.90	55.94	H	-51.4	1.00	8.30	-44.10	-13	31.10
2145.90	54.18	V	-53.6	1.00	8.30	-46.30	-13	33.30
2861.20	48.54	H	-57.8	1.20	9.00	-50.00	-13	37.00
2861.20	47.63	V	-58.4	1.20	9.00	-50.60	-13	37.60

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: Substituted Level - Cable loss+ Antenna Gain

Margin = Limit -Absolute Level

FCC§ 22.917 (a); § 24.238 (a); §27.53 (g) (h) - BAND EDGES

Applicable Standard

According to § 22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

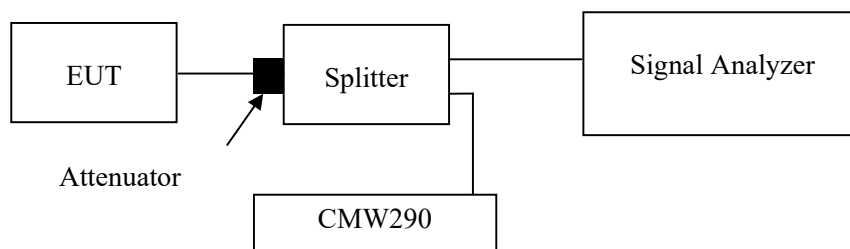
According to FCC §27.53 (g) (h), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Procedure

ANSI C63.26-2015 Section 5.7

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

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



Test Data**Environmental Conditions**

Temperature:	25.8~27.3 °C
Relative Humidity:	50~57 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-01-27 to 2024-03-13.

EUT operation mode: Transmitting (Worst case)

Test Result: Compliant

Please refer to the Appendix C.

FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY**Applicable Standard**

FCC § 2.1055, §22.355, §24.235&§27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

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

According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

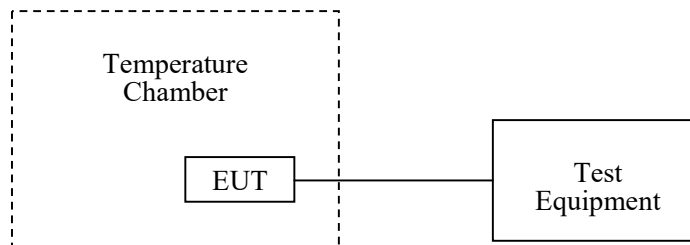
Test Procedure

ANSI C63.26-2015 Section 5.6

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data

Environmental Conditions

Temperature:	25.8 °C
Relative Humidity:	57 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang on 2024-02-01.

EUT operation mode: Transmitting

Test Result: Compliant

Please refer to the following tables.

LTE**Band 2**

Test Mode:	1.4M QPSK	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1851.280	1850.000	1908.860	1910.000
	-20	3.8	1850.840	1850.000	1909.020	1910.000
	-10	3.8	1850.590	1850.000	1908.050	1910.000
	0	3.8	1850.970	1850.000	1909.130	1910.000
	10	3.8	1850.400	1850.000	1909.060	1910.000
	20	3.8	1851.360	1850.000	1908.940	1910.000
	30	3.8	1850.590	1850.000	1908.740	1910.000
	40	3.8	1851.080	1850.000	1909.290	1910.000
	50	3.8	1851.750	1850.000	1908.260	1910.000
Frequency Stability vs. Voltage	20	3.45	1850.300	1850.000	1909.210	1910.000
	20	4.35	1851.060	1850.000	1908.850	1910.000
Test Mode:	1.4M 16QAM	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1851.280	1850.000	1909.210	1910.000
	-20	3.8	1850.630	1850.000	1909.470	1910.000
	-10	3.8	1851.010	1850.000	1909.540	1910.000
	0	3.8	1851.070	1850.000	1908.850	1910.000
	10	3.8	1850.420	1850.000	1908.620	1910.000
	20	3.8	1850.620	1850.000	1908.330	1910.000
	30	3.8	1851.280	1850.000	1908.770	1910.000
	40	3.8	1851.720	1850.000	1908.580	1910.000
	50	3.8	1851.250	1850.000	1908.620	1910.000
Frequency Stability vs. Voltage	20	3.45	1851.170	1850.000	1908.560	1910.000
	20	4.35	1850.090	1850.000	1909.240	1910.000

Band 4

Test Mode:	1.4M QPSK	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1711.400	1710.00	1754.330	1755
	-20	3.8	1711.640	1710.00	1754.140	1755
	-10	3.8	1711.490	1710.00	1754.180	1755
	0	3.8	1710.540	1710.00	1754.270	1755
	10	3.8	1711.030	1710.00	1753.420	1755
	20	3.8	1711.540	1710.00	1754.460	1755
	30	3.8	1710.790	1710.00	1754.320	1755
	40	3.8	1710.570	1710.00	1753.860	1755
	50	3.8	1711.700	1710.00	1754.200	1755
Frequency Stability vs. Voltage	20	3.45	1710.980	1710.00	1754.550	1755
	20	4.35	1711.270	1710.00	1754.130	1755
Test Mode:	1.4M 16QAM	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (VDC)	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1711.330	1710.00	1753.820	1755
	-20	3.8	1711.660	1710.00	1753.910	1755
	-10	3.8	1710.640	1710.00	1753.390	1755
	0	3.8	1710.870	1710.00	1753.850	1755
	10	3.8	1711.100	1710.00	1753.510	1755
	20	3.8	1710.980	1710.00	1754.870	1755
	30	3.8	1710.580	1710.00	1753.980	1755
	40	3.8	1710.280	1710.00	1753.740	1755
	50	3.8	1710.720	1710.00	1753.710	1755
Frequency Stability vs. Voltage	20	3.45	1710.430	1710.00	1754.160	1755
	20	4.35	1710.330	1710.00	1753.960	1755

Band 5

Test Modulation:	10 MHz QPSK		Test Channel:	836.5	MHz
Test Item	Temperature (°C)	Voltage (V _{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.8	32.4	0.039	2.5
	-20	3.8	29.8	0.036	2.5
	-10	3.8	24.5	0.029	2.5
	0	3.8	29.7	0.036	2.5
	10	3.8	36.8	0.044	2.5
	20	3.8	28	0.033	2.5
	30	3.8	28.2	0.034	2.5
	40	3.8	20.6	0.025	2.5
	50	3.8	23	0.027	2.5
Frequency Stability vs. Voltage	20	3.45	29.6	0.035	2.5
	20	4.35	25.3	0.030	2.5
Test Modulation:	10 MHz 16QAM		Test Channel:	836.5	MHz
Test Item	Temperature (°C)	Voltage (V _{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.8	28.2	0.034	2.5
	-20	3.8	22.9	0.027	2.5
	-10	3.8	25.9	0.031	2.5
	0	3.8	23.2	0.028	2.5
	10	3.8	28.4	0.034	2.5
	20	3.8	22.4	0.027	2.5
	30	3.8	22.3	0.027	2.5
	40	3.8	20	0.024	2.5
	50	3.8	22.1	0.026	2.5
Frequency Stability vs. Voltage	20	3.45	21.2	0.025	2.5
	20	4.35	26	0.031	2.5

Band 12

Test Mode:	1.4M QPSK	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.930	699.00	715.000	716.00
	-20	3.8	699.750	699.00	714.320	716.00
	-10	3.8	700.340	699.00	715.040	716.00
	0	3.8	700.870	699.00	715.230	716.00
	10	3.8	700.260	699.00	714.230	716.00
	20	3.8	700.190	699.00	714.200	716.00
	30	3.8	699.790	699.00	714.870	716.00
	40	3.8	699.690	699.00	714.660	716.00
	50	3.8	700.310	699.00	715.200	716.00
Frequency Stability vs. Voltage	20	3.45	700.200	699.00	715.010	716.00
	20	4.35	699.980	699.00	714.700	716.00
Test Mode:	1.4M 16QAM	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	700.220	699.00	714.620	716.00
	-20	3.8	699.180	699.00	714.900	716.00
	-10	3.8	700.940	699.00	715.420	716.00
	0	3.8	699.520	699.00	715.480	716.00
	10	3.8	700.210	699.00	715.330	716.00
	20	3.8	700.000	699.00	714.930	716.00
	30	3.8	699.760	699.00	714.840	716.00
	40	3.8	699.880	699.00	714.450	716.00
	50	3.8	700.440	699.00	715.250	716.00
Frequency Stability vs. Voltage	20	3.45	700.810	699.00	714.240	716.00
	20	4.35	700.280	699.00	715.470	716.00

EUT PHOTOGRAPHS

Please refer to the attachment SZ1231225-78191E-RF External photo and SZ1231225-78191E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment SZ1231225-78191E-RF Test Setup photo.

******* END OF REPORT *******