

Test mode:	LTE Band 4(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3421.40	Vertical	-37.29	-13.00	Pass
5132.10	V	-39.14		
6842.80	V	-38.30		
8553.50	V	-43.58		
10264.20	V	---		
3421.40	Horizontal	-39.30	-13.00	Pass
5132.10	H	-42.10		
6842.80	H	-45.12		
8553.50	H	-46.03		
10264.20	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-37.00	-13.00	Pass
5197.50	V	-39.55		
6930.00	V	-37.78		
8662.50	V	-43.26		
10395.00	V	---		
3465.00	Horizontal	-38.74	-13.00	Pass
5197.50	H	-43.00		
6930.00	H	-44.55		
8662.50	H	-46.49		
10395.00	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3508.60	Vertical	-36.77	-13.00	Pass
5262.90	V	-39.51		
7017.20	V	-37.91		
8771.50	V	-43.48		
10525.80	V	---		
3508.60	Horizontal	-39.04	-13.00	Pass
5262.90	H	-42.47		
7017.20	H	-44.72		
8771.50	H	-45.95		
10525.80	H	---		

Remark:

1. The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
2. Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
3. The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 5(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1649.40	Vertical	-36.54	-13.00	Pass
2474.10	V	-39.37		
3298.80	V	-38.26		
4123.50	V	-43.59		
4948.20	V	---		
1649.40	Horizontal	-39.46	-13.00	Pass
2474.10	H	-42.19		
3298.80	H	-45.35		
4123.50	H	-46.22		
4948.20	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.00	Vertical	-36.93	-13.00	Pass
2509.50	V	-39.66		
3346.00	V	-37.77		
4182.50	V	-43.70		
5019.00	V	---		
1673.00	Horizontal	-39.20	-13.00	Pass
2509.50	H	-42.56		
3346.00	H	-44.51		
4182.50	H	-45.57		
5019.00	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1696.60	Vertical	-36.99	-13.00	Pass
2544.90	V	-38.95		
3393.20	V	-37.91		
4241.50	V	-43.67		
5089.80	V	---		
1696.60	Horizontal	-38.74	-13.00	Pass
2544.90	H	-42.37		
3393.20	H	-44.43		
4241.50	H	-46.40		
5089.80	H	---		

Remark :

1. The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
2. Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
3. The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 12(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5005.00	Vertical	-36.99	-25.00	Pass
7507.50	V	-39.86		
10010.00	V	-38.43		
12512.50	V	-43.57		
15015.00	V	---		
5005.00	Horizontal	-38.69	-25.00	Pass
7507.50	H	-42.52		
10010.00	H	-44.92		
12512.50	H	-45.59		
15015.00	H	---		
Test mode:	LTE Band 12(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5070.00	Vertical	-36.72	-25.00	Pass
7605.00	V	-38.95		
10140.00	V	-37.84		
12675.00	V	-43.53		
15210.00	V	---		
5070.00	Horizontal	-39.09	-25.00	Pass
7605.00	H	-42.22		
10140.00	H	-44.75		
12675.00	H	-46.18		
15210.00	H	---		
Test mode:	LTE Band 12(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5135.00	Vertical	-36.34	-25.00	Pass
7702.50	V	-39.87		
10270.00	V	-38.15		
12837.50	V	-43.63		
15405.00	V	---		
5135.00	Horizontal	-38.65	-25.00	Pass
7702.50	H	-42.15		
10270.00	H	-45.17		
12837.50	H	-45.95		
15405.00	H	---		

Remark :

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

16 QAM Mode:

Test mode:	LTE Band 2 (1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3701.40	Vertical	-36.91	-13.00	Pass
5552.10	V	-39.66		
7402.80	V	-38.20		
9253.50	V	-42.92		
11104.20	V	---		
3701.40	Horizontal	-39.44	-13.00	Pass
5552.10	H	-42.22		
7402.80	H	-45.30		
9253.50	H	-45.75		
11104.20	H	---		
Test mode:	LTE Band 2 (1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-36.37	-13.00	Pass
5640.00	V	-39.04		
7520.00	V	-37.62		
9400.00	V	-43.46		
11280.00	V	---		
3760.00	Horizontal	-39.41	-13.00	Pass
5640.00	H	-42.48		
7520.00	H	-45.17		
9400.00	H	-45.51		
11280.00	H	---		
Test mode:	LTE Band 2 (1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3818.60	Vertical	-37.14	-13.00	Pass
5727.90	V	-39.05		
7637.20	V	-37.90		
9546.50	V	-43.72		
11455.80	V	---		
3818.60	Horizontal	-39.12	-13.00	Pass
5727.90	H	-42.95		
7637.20	H	-45.03		
9546.50	H	-45.81		
11455.80	H	---		

Remark :

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 4(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3421.40	Vertical	-37.25	-13.00	Pass
5132.10	V	-39.62		
6842.80	V	-38.45		
8553.50	V	-43.73		
10264.20	V	---		
3421.40	Horizontal	-38.96	-13.00	Pass
5132.10	H	-42.70		
6842.80	H	-44.54		
8553.50	H	-45.62		
10264.20	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-36.42	-13.00	Pass
5197.50	V	-39.70		
6930.00	V	-38.40		
8662.50	V	-43.69		
10395.00	V	---		
3465.00	Horizontal	-38.66	-13.00	Pass
5197.50	H	-42.50		
6930.00	H	-45.01		
8662.50	H	-46.03		
10395.00	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3508.60	Vertical	-36.69	-13.00	Pass
5262.90	V	-38.97		
7017.20	V	-38.47		
8771.50	V	-43.02		
10525.80	V	---		
3508.60	Horizontal	-39.10	-13.00	Pass
5262.90	H	-42.81		
7017.20	H	-44.88		
8771.50	H	-46.39		
10525.80	H	---		

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 5(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1649.40	Vertical	-36.44	-13.00	Pass
2474.10	V	-39.71		
3298.80	V	-38.43		
4123.50	V	-43.13		
4948.20	V	---		
1649.40	Horizontal	-38.75	-13.00	Pass
2474.10	H	-42.68		
3298.80	H	-45.14		
4123.50	H	-45.94		
4948.20	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.00	Vertical	-37.06	-13.00	Pass
2509.50	V	-39.80		
3346.00	V	-37.59		
4182.50	V	-43.20		
5019.00	V	---		
1673.00	Horizontal	-39.45	-13.00	Pass
2509.50	H	-42.68		
3346.00	H	-45.19		
4182.50	H	-46.18		
5019.00	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1696.60	Vertical	-36.71	-13.00	Pass
2544.90	V	-39.16		
3393.20	V	-38.19		
4241.50	V	-43.72		
5089.80	V	---		
1696.60	Horizontal	-38.60	-13.00	Pass
2544.90	H	-42.71		
3393.20	H	-45.10		
4241.50	H	-46.45		
5089.80	H	---		

Remark :

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Test mode:	LTE Band 12 (1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3701.40	Vertical	-36.51	-13.00	Pass
5552.10	V	-39.84		
7402.80	V	-38.18		
9253.50	V	-43.19		
11104.20	V	---		
3701.40	Horizontal	-39.25	-13.00	Pass
5552.10	H	-42.91		
7402.80	H	-44.64		
9253.50	H	-45.82		
11104.20	H	---		
Test mode:	LTE Band 12 (1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-36.43	-13.00	Pass
5640.00	V	-39.16		
7520.00	V	-38.02		
9400.00	V	-43.40		
11280.00	V	---		
3760.00	Horizontal	-39.24	-13.00	Pass
5640.00	H	-42.20		
7520.00	H	-44.75		
9400.00	H	-45.61		
11280.00	H	---		
Test mode:	LTE Band 12 (1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3818.60	Vertical	-37.08	-13.00	Pass
5727.90	V	-39.16		
7637.20	V	-38.42		
9546.50	V	-43.70		
11455.80	V	---		
3818.60	Horizontal	-38.92	-13.00	Pass
5727.90	H	-42.43		
7637.20	H	-44.60		
9546.50	H	-45.60		
11455.80	H	---		

Remark :

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

4.10 Frequency stability V.S. Temperature measurement

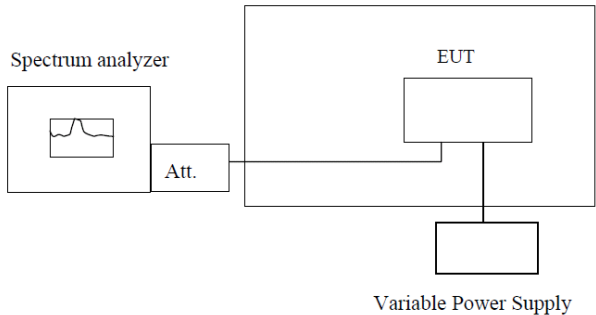
Test Requirement:	FCC Part2.1055(a)(1)(b)
Test Method:	ANSI C63.26:2015
Limit:	2.5ppm(Part 22) Within the authorized bands of operation(Part 24, Part 27)
Test setup:	Note : Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass
Remark:	If all frequencies stability are comply with the lower limit, then all results can be considered qualified

Measurement Data

Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5	-20	53	0.0283	Within the authorized bands	Pass
	-10	58	0.0307		
	0	68	0.0363		
	10	33	0.0176		
	20	30	0.0161		
	30	22	0.0118		
	40	34	0.0181		
	50	31	0.0166		
	60	32	0.0170		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5	-20	58	0.0333	2.5	Pass
	-10	59	0.0342		
	0	68	0.0393		
	10	30	0.0175		
	20	31	0.0178		
	30	22	0.0127		
	40	29	0.0170		
	50	33	0.0189		
	60	30	0.0176		
Reference Frequency: LTE Band 5 Middle channel=20175 channel=836.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5	-20	58	0.0692	2.5	Pass
	-10	61	0.0731		
	0	70	0.0838		
	10	31	0.0370		
	20	33	0.0389		
	30	20	0.0242		
	40	33	0.0399		
	50	35	0.0418		
	60	34	0.0410		

Reference Frequency: LTE Band 12 Middle channel=23095 channel=707.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5	-20	56	0.0788	2.5	Pass
	-10	59	0.0830		
	0	69	0.0971		
	10	34	0.0482		
	20	32	0.0450		
	30	20	0.0284		
	40	33	0.0466		
	50	33	0.0472		
	60	30	0.0428		

4.11 Frequency stability V.S. Voltage measurement

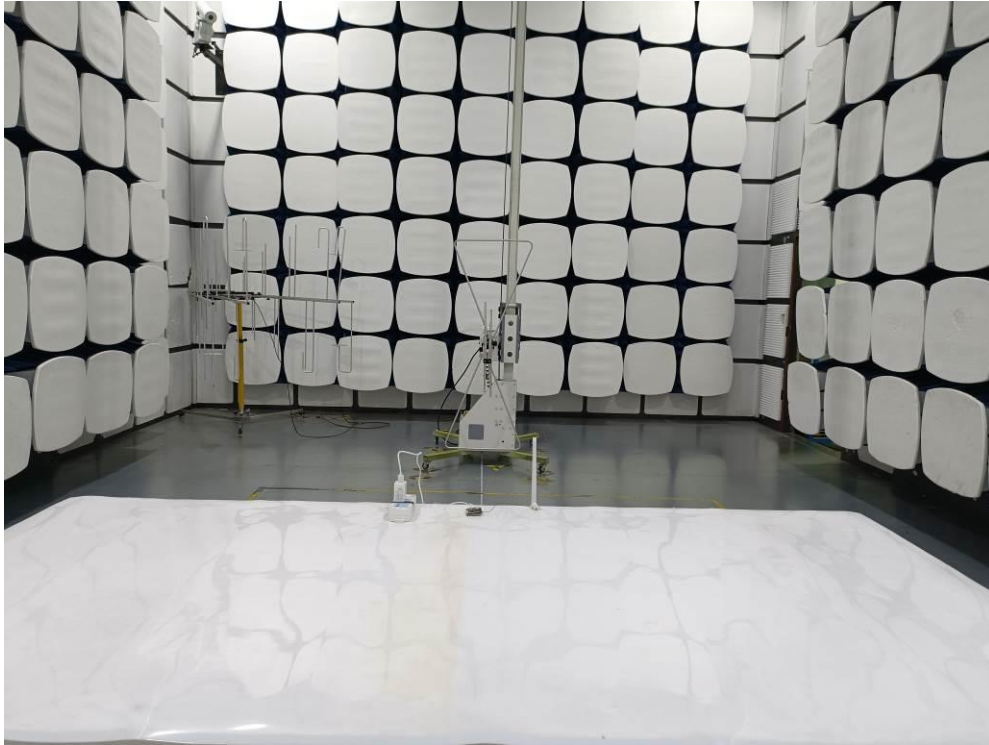
Test Requirement:	FCC Part2.1055(d)(1)(2)
Test Method:	ANSI C63.26:2015
Limit:	2.5ppm Band II & Band VII should be within authorized band.
Test setup:	Temperature Chamber  Variable Power Supply Note : Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 20°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass
Remark:	1. Manufacturer specified the battery operating end point voltage is 3.32VDC, max voltage is 4.37VDC. 2. If all frequencies stability are comply with the lower limit, then all results can be considered qualified

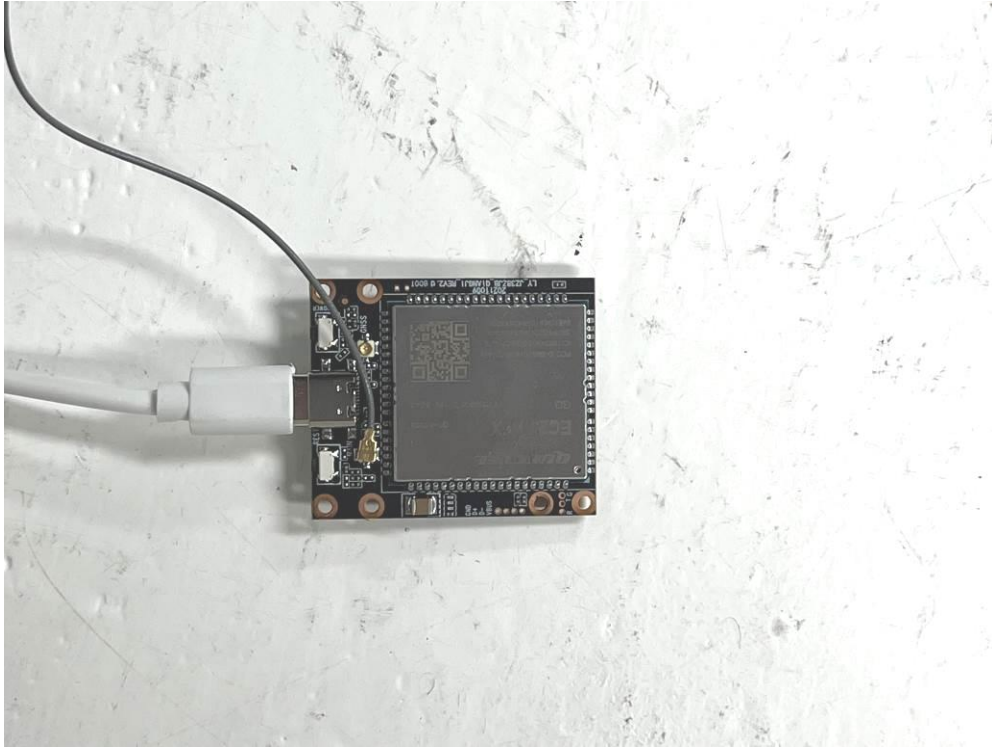
Measurement Data

Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.5	17	0.0089	within authorized band	Pass
	5.0	23	0.0122		
	5.5	22	0.0118		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.5	22	0.0127	2.5	Pass
	5.0	-23	-0.0134		
	5.5	22	0.0128		
Reference Frequency: LTE Band 5 Middle channel=20175 channel=836.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.5	21	0.0245	2.5	Pass
	5.0	17	0.0200		
	5.5	-4	-0.0049		
Reference Frequency: LTE Band 12 Middle channel=23095 channel=707.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.5	57	0.0802	within authorized band	Pass
	5.0	61	0.0862		
	5.5	67	0.0944		

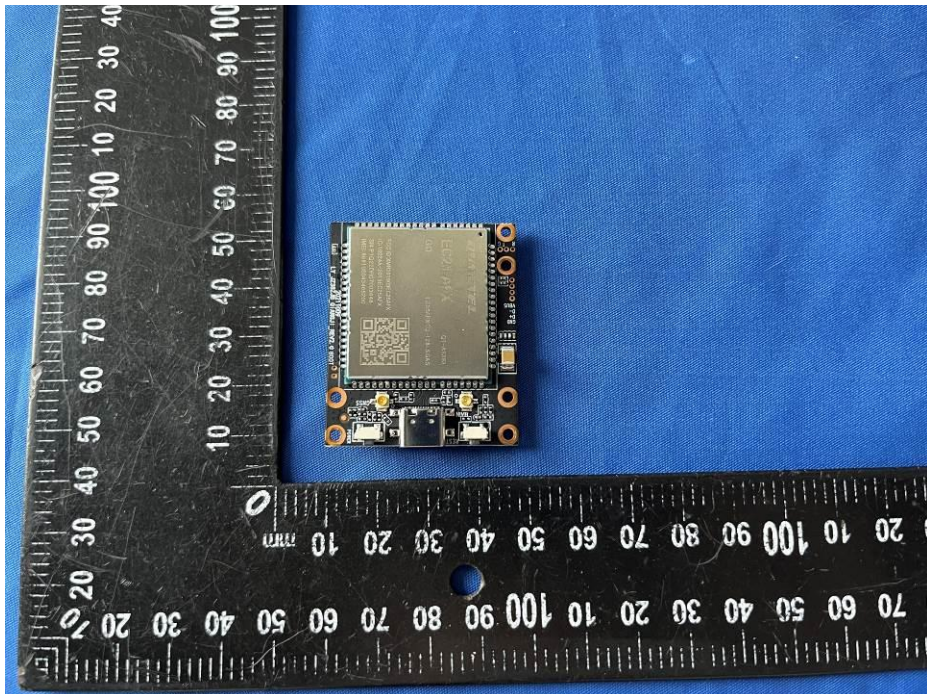
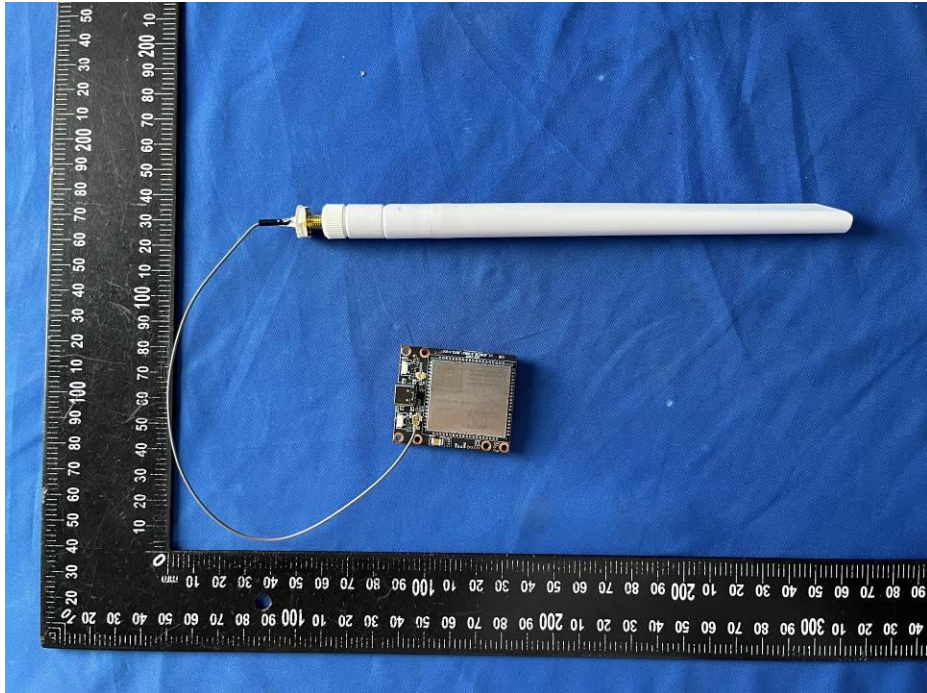
4.12 Test Setup Photo

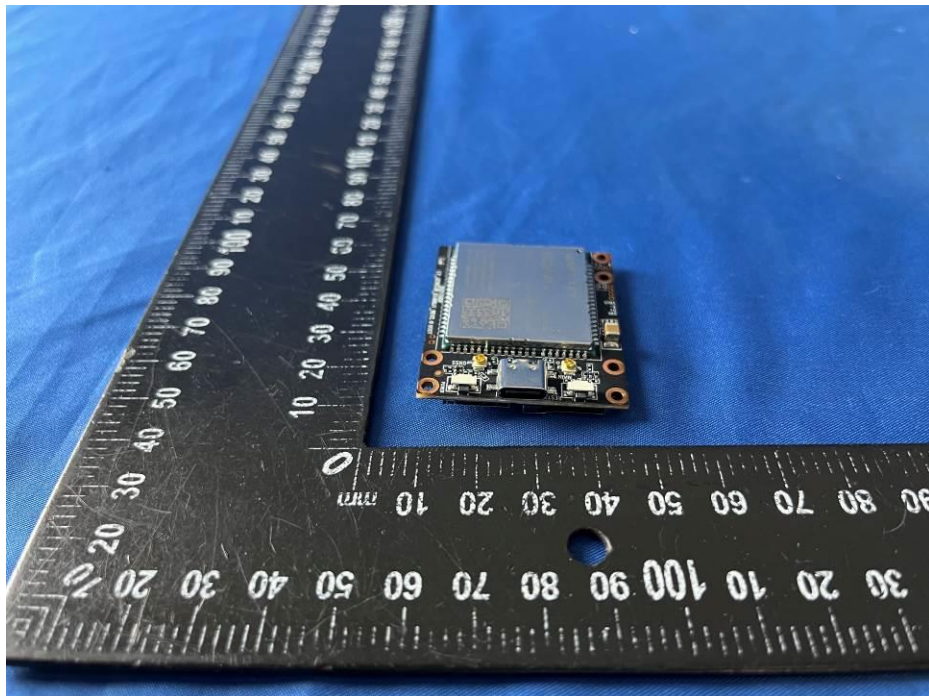
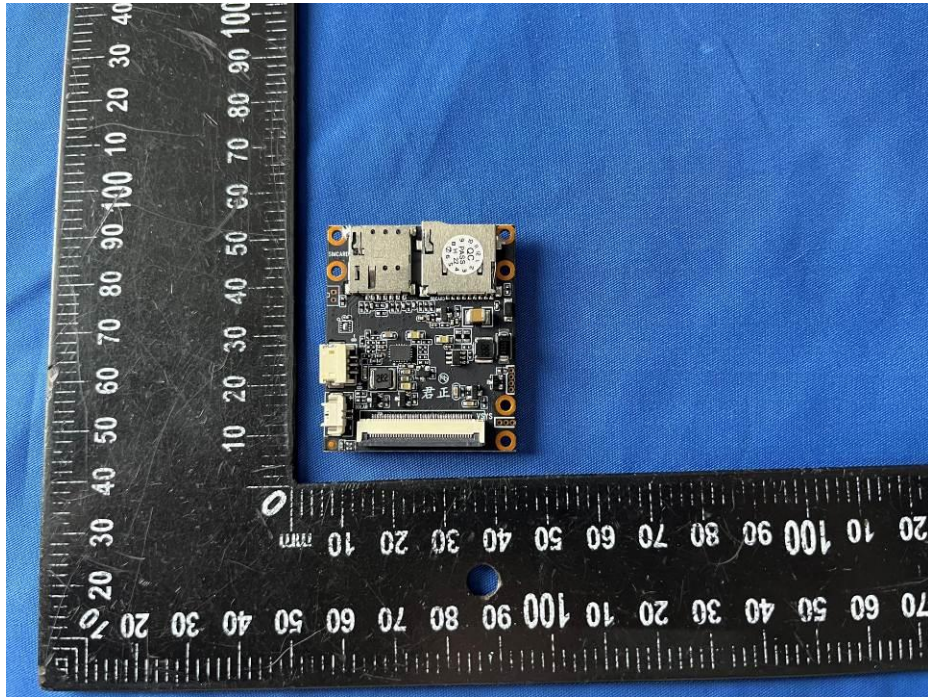
Radiated Emission

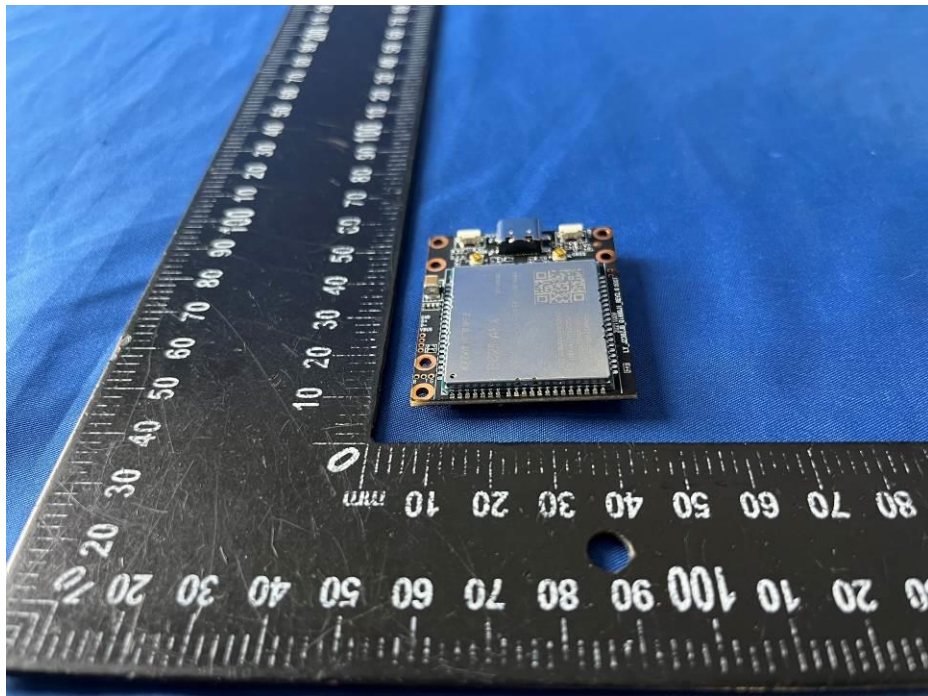
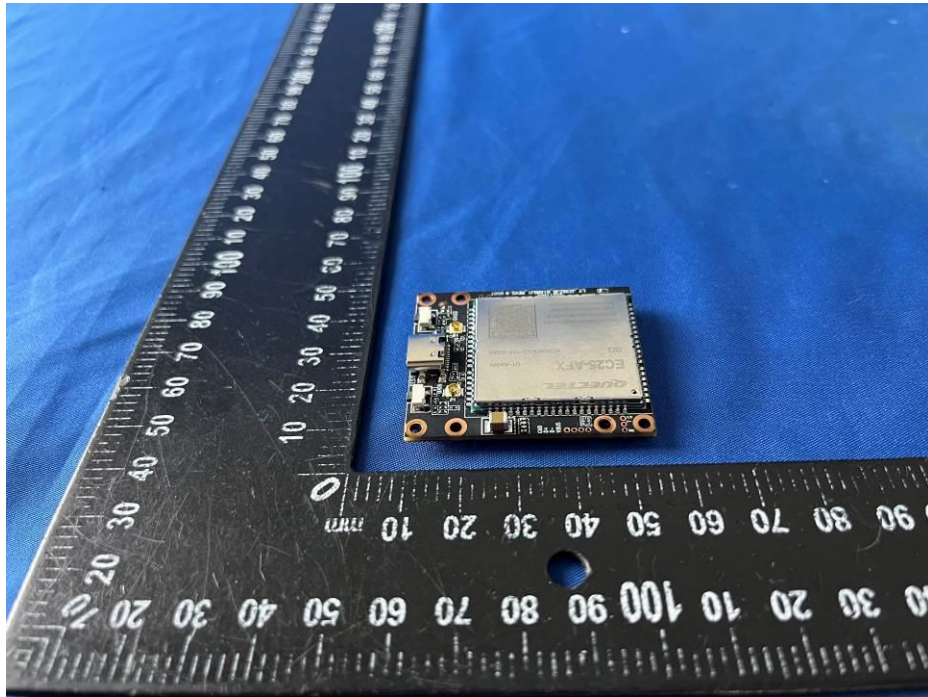


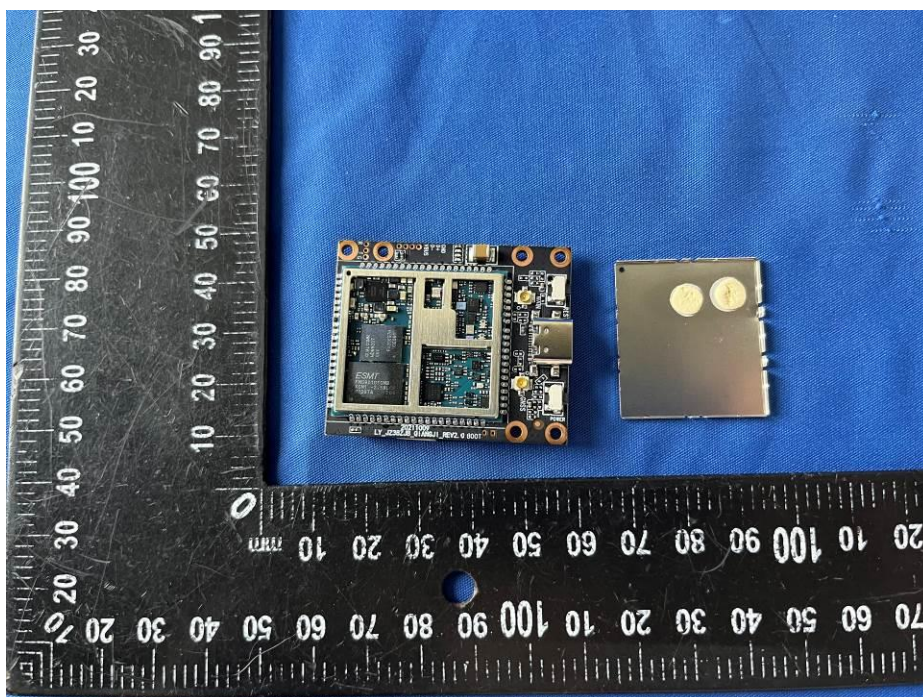


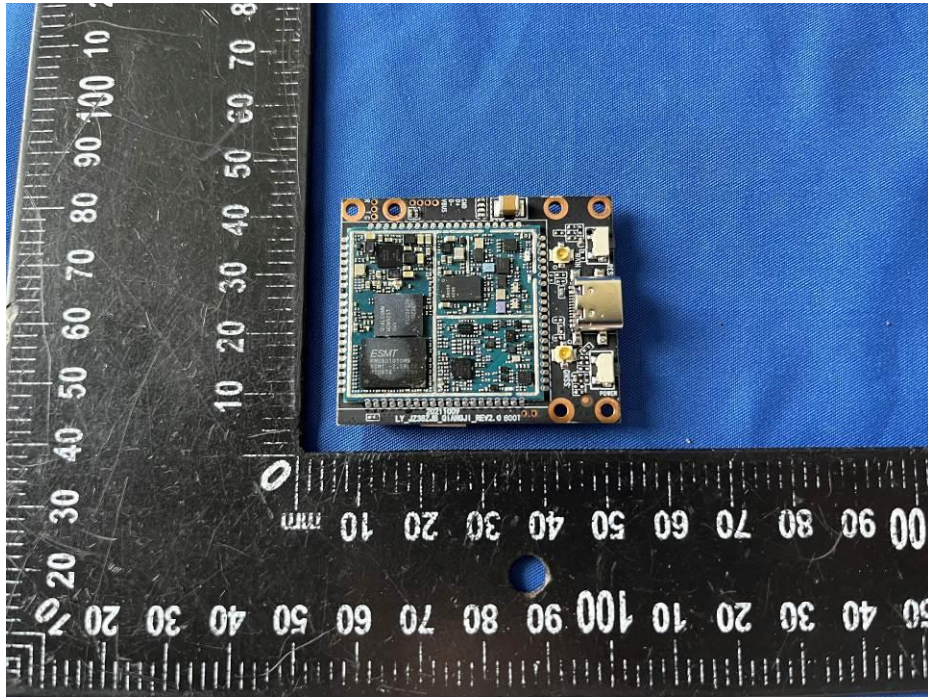
5 EUT Photo











-----END OF REPORT-----