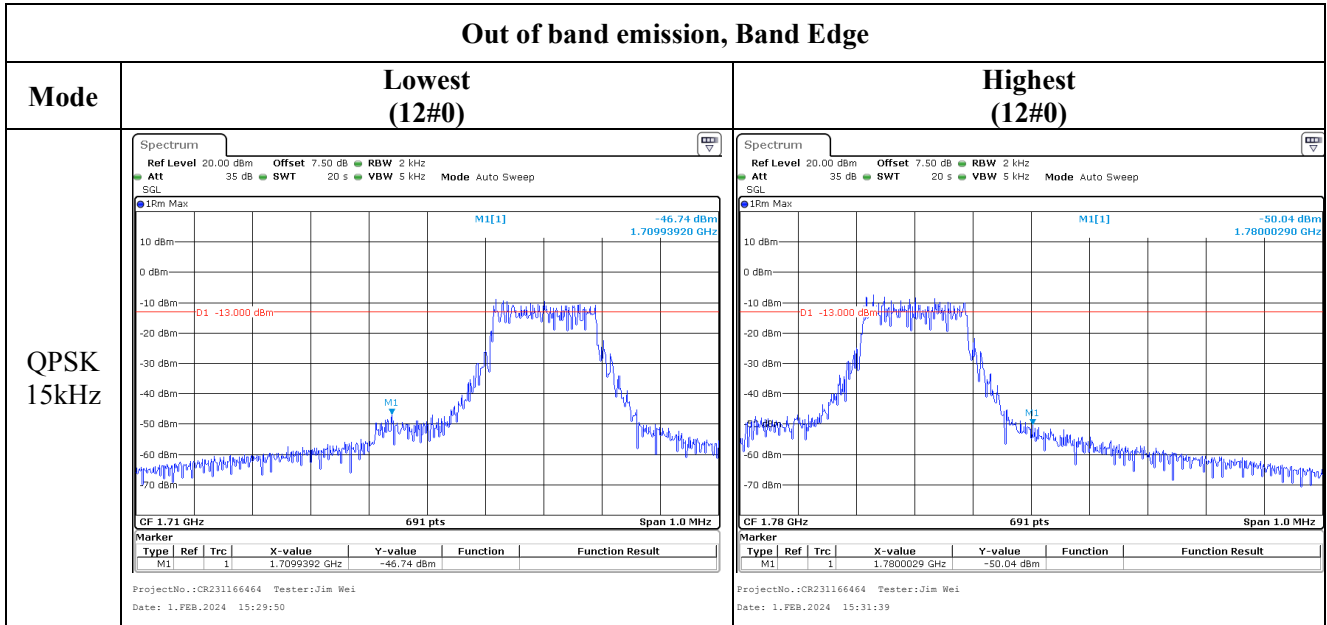


Out of band emission, Band Edge

Mode	Lowest (1#0)	Highest (1#11)
BPSK 15kHz	<p>ProjectNo.:CR231166464 Tester:One Luo Date: 23.DEC.2023 13:47:25</p>	<p>ProjectNo.:CR231166464 Tester:One Luo Date: 23.DEC.2023 13:53:06</p>
QPSK 15kHz	<p>ProjectNo.:CR231166464 Tester:One Luo Date: 23.DEC.2023 13:48:58</p>	<p>ProjectNo.:CR231166464 Tester:One Luo Date: 23.DEC.2023 13:54:44</p>

Out of band emission, Band Edge



4.6 Radiated Spurious Emissions

Serial Number:	2DHS-1	Test Date:	2023/12/26
Test Site:	966-1, 966-2	Test Mode:	Transmitting
Tester:	Carl Xue, Mack Huang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	24.3~25.5	Relative Humidity: (%)	42~58	ATM Pressure: (kPa)	101.9
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-6	2023/9/18	2026/9/17
R&S	EMI Test Receiver	ESR3	102724	2023/3/31	2024/3/30
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2023/7/16	2024/7/15
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2023/7/16	2024/7/15
Sonoma	Amplifier	310N	186165	2023/7/16	2024/7/15
EMCO	Adjustable Dipole Antenna	3121C	9109-756	N/A	N/A
MICRO-COAX	Coaxial Cable	UFA210B-0-0720- 300300	99G1448	2023/7/16	2024/7/15
Agilent	Signal Generator	E8247C	MY43321352	2023/11/17	2024/11/16
AH	Double Ridge Guide Horn Antenna	SAS-571	1394	2023/2/22	2026/2/21
R&S	Spectrum Analyzer	FSV40	101591	2023/3/31	2024/3/30
MICRO-COAX	Coaxial Cable	UFA210A-1-1200- 70U300	217423-008	2023/8/6	2024/8/5
MICRO-COAX	Coaxial Cable	UFA210A-1-2362- 300300	235780-001	2023/8/6	2024/8/5
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2023/11/8	2024/11/7
AH	Double Ridge Guide Horn Antenna	SAS-571	1396	2021/10/18	2024/10/17
MICRO-COAX	Coaxial Cable	UFA210B-0-0720- 300300	99G1448	2023/7/16	2024/7/15
PASTERNAK	Horn Antenna	PE9852/2F-20	112002	2021/2/5	2024/2/4
PASTERNAK	Horn Antenna	PE9852/2F-20	112001	2021/2/5	2024/2/4
Quinstar	Preamplifier	QLW-18405536-JO	15964001005	2023/9/15	2024/9/14
PASTERNAK	Horn Antenna	PE9850/2F-20	072001	2021/2/5	2024/2/4
PASTERNAK	Horn Antenna	PE9850/2F-20	072002	2021/2/5	2024/2/4
MICRO-COAX	Coaxial Cable	UFB142A-1-2362- 200200	235772-001	2023/8/6	2024/8/5

* **Statement of Traceability:** China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

Please refer to the below table and plots.

After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

LTE Bands:

(The Worst modulation and bandwidth was below)

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, 3.75kHz, RB1#0, Frequency: 1850.2 MHz								
800.18	H	58.98	-43.34	0.00	0.58	-43.92	-13.00	30.92
800.18	V	57.08	-41.66	0.00	0.58	-42.24	-13.00	29.24
3700.400	H	50.39	-46.93	10.60	1.25	-37.58	-13.00	24.58
3700.400	V	55.72	-41.58	10.60	1.25	-32.23	-13.00	19.23
5550.600	H	39.55	-53.71	11.44	1.49	-43.76	-13.00	30.76
5550.600	V	50.92	-42.18	11.44	1.49	-32.23	-13.00	19.23
QPSK, 3.75kHz, RB1#0, Frequency: 1880 MHz								
800.18	H	58.91	-43.41	0.00	0.58	-43.99	-13.00	30.99
800.18	V	57.04	-41.70	0.00	0.58	-42.28	-13.00	29.28
3760.000	H	50.10	-46.31	10.66	1.24	-36.89	-13.00	23.89
3760.000	V	56.69	-39.60	10.66	1.24	-30.18	-13.00	17.18
5640.000	H	41.59	-51.86	11.33	1.54	-42.07	-13.00	29.07
5640.000	V	51.98	-41.35	11.33	1.54	-31.56	-13.00	18.56
QPSK, 3.75kHz, RB1#0, Frequency: 1909.8 MHz								
400.54	H	57.48	-51.72	0.00	0.40	-52.12	-13.00	39.12
800.18	V	56.78	-41.96	0.00	0.58	-42.54	-13.00	29.54
3819.600	H	52.26	-43.60	10.72	1.29	-34.17	-13.00	21.17
3819.600	V	62.94	-32.78	10.72	1.29	-23.35	-13.00	10.35
5729.400	H	48.16	-45.32	11.22	1.59	-35.69	-13.00	22.69
5729.400	V	58.77	-34.59	11.22	1.59	-24.96	-13.00	11.96

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, 3.75kHz,RB1#0,Frequency:1710.2 MHz								
400.54	H	57.83	-51.37	0.00	0.40	-51.77	-13.00	38.77
400.54	V	56.10	-50.09	0.00	0.40	-50.49	-13.00	37.49
3420.400	H	48.77	-48.99	10.37	1.17	-39.79	-13.00	26.79
3420.400	V	49.69	-48.04	10.37	1.17	-38.84	-13.00	25.84
5130.600	H	39.51	-54.05	11.28	1.48	-44.25	-13.00	31.25
5130.600	V	39.50	-53.95	11.28	1.48	-44.15	-13.00	31.15
QPSK, 3.75kHz,RB1#0,Frequency:1732.5 MHz								
800.18	H	58.67	-43.65	0.00	0.58	-44.23	-13.00	31.23
800.18	V	56.88	-41.86	0.00	0.58	-42.44	-13.00	29.44
3465.000	H	49.27	-48.54	10.39	1.15	-39.30	-13.00	26.30
3465.000	V	52.71	-45.06	10.39	1.15	-35.82	-13.00	22.82
5197.500	H	40.66	-53.47	11.32	1.44	-43.59	-13.00	30.59
5197.500	V	40.65	-53.33	11.32	1.44	-43.45	-13.00	30.45
QPSK, 3.75kHz,RB1#0,Frequency:1754.8 MHz								
800.18	H	59.60	-42.72	0.00	0.58	-43.30	-13.00	30.30
800.18	V	56.87	-41.87	0.00	0.58	-42.45	-13.00	29.45
3509.600	H	49.74	-48.08	10.41	1.19	-38.86	-13.00	25.86
3509.600	V	51.68	-46.07	10.41	1.19	-36.85	-13.00	23.85
5264.400	H	38.90	-54.79	11.36	1.47	-44.90	-13.00	31.90
5264.400	V	38.81	-54.65	11.36	1.47	-44.76	-13.00	31.76

LTE Band 5(30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, 3.75kHz,RB1#0,Frequency: 824.2 MHz								
400.54	H	57.32	-51.88	0.00	0.40	-52.28	-13.00	39.28
400.54	V	55.78	-50.41	0.00	0.40	-50.81	-13.00	37.81
1648.400	H	38.71	-65.62	8.68	0.80	-57.74	-13.00	44.74
1648.400	V	44.70	-59.71	8.68	0.80	-51.83	-13.00	38.83
2472.600	H	42.36	-58.42	9.38	1.00	-50.04	-13.00	37.04
2472.600	V	47.41	-53.32	9.38	1.00	-44.94	-13.00	31.94
3296.800	H	37.96	-58.72	10.32	1.15	-49.55	-13.00	36.55
3296.800	V	37.72	-58.72	10.32	1.15	-49.55	-13.00	36.55
QPSK, 3.75kHz,RB1#0, Frequency: 836.5 MHz								
400.54	H	57.53	-51.67	0.00	0.40	-52.07	-13.00	39.07
400.54	V	55.75	-50.44	0.00	0.40	-50.84	-13.00	37.84
1673.000	H	39.14	-65.17	8.71	0.85	-57.31	-13.00	44.31
1673.000	V	46.21	-58.20	8.71	0.85	-50.34	-13.00	37.34
2509.500	H	42.44	-58.17	9.42	1.01	-49.76	-13.00	36.76
2509.500	V	48.76	-51.86	9.42	1.01	-43.45	-13.00	30.45
3346.000	H	38.97	-58.19	10.34	1.16	-49.01	-13.00	36.01
3346.000	V	38.61	-58.41	10.34	1.16	-49.23	-13.00	36.23
QPSK, 3.75kHz,RB1#0,Frequency: 848.8 MHz								
400.54	H	58.10	-51.10	0.00	0.40	-51.50	-13.00	38.50
400.54	V	56.60	-49.59	0.00	0.40	-49.99	-13.00	36.99
1697.600	H	40.95	-63.34	8.74	0.90	-55.50	-13.00	42.50
1697.600	V	45.07	-59.35	8.74	0.90	-51.51	-13.00	38.51
2546.400	H	38.49	-61.84	9.47	1.01	-53.38	-13.00	40.38
2546.400	V	46.05	-54.23	9.47	1.01	-45.77	-13.00	32.77
3395.200	H	39.70	-57.99	10.36	1.19	-48.82	-13.00	35.82
3395.200	V	39.99	-57.67	10.36	1.19	-48.50	-13.00	35.50

LTE Band 12 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, 3.75kHz, RB1#0, Frequency: 699.2 MHz								
800.18	H	59.29	-43.03	0.00	0.58	-43.61	-13.00	30.61
800.18	V	56.73	-42.01	0.00	0.58	-42.59	-13.00	29.59
1398.400	H	44.08	-59.61	8.22	0.71	-52.10	-13.00	39.10
1398.400	V	55.97	-47.77	8.22	0.71	-40.26	-13.00	27.26
2097.600	H	41.68	-60.21	9.16	0.91	-51.96	-13.00	38.96
2097.600	V	45.60	-56.22	9.16	0.91	-47.97	-13.00	34.97
2796.800	H	38.72	-61.21	9.87	1.04	-52.38	-13.00	39.38
2796.800	V	39.36	-60.44	9.87	1.04	-51.61	-13.00	38.61
QPSK, 3.75kHz, RB1#0, Frequency: 707.5 MHz								
800.18	H	59.90	-42.42	0.00	0.58	-43.00	-13.00	30.00
800.18	V	56.89	-41.85	0.00	0.58	-42.43	-13.00	29.43
1415.000	H	49.93	-53.74	8.26	0.72	-46.20	-13.00	33.20
1415.000	V	57.78	-45.94	8.26	0.72	-38.40	-13.00	25.40
2122.500	H	41.30	-60.69	9.17	0.92	-52.44	-13.00	39.44
2122.500	V	47.02	-54.95	9.17	0.92	-46.70	-13.00	33.70
2830.000	H	38.48	-61.32	9.93	1.06	-52.45	-13.00	39.45
2830.000	V	38.66	-61.07	9.93	1.06	-52.20	-13.00	39.20
QPSK, 3.75kHz, RB1#0, Frequency: 715.8 MHz								
800.18	H	58.89	-43.43	0.00	0.58	-44.01	-13.00	31.01
800.18	V	56.27	-42.47	0.00	0.58	-43.05	-13.00	30.05
1431.600	H	45.30	-58.32	8.31	0.74	-50.75	-13.00	37.75
1431.600	V	54.16	-49.52	8.31	0.74	-41.95	-13.00	28.95
2147.400	H	42.66	-59.44	9.19	0.93	-51.18	-13.00	38.18
2147.400	V	47.25	-54.87	9.19	0.93	-46.61	-13.00	33.61
2863.200	H	41.52	-58.13	9.98	1.07	-49.22	-13.00	36.22
2863.200	V	38.36	-61.30	9.98	1.07	-52.39	-13.00	39.39

LTE Band 66 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, 3.75kHz,RB1#0, Frequency: 1710.2MHz								
800.18	H	58.10	-44.22	0.00	0.58	-44.80	-13.00	31.80
800.18	V	56.80	-41.94	0.00	0.58	-42.52	-13.00	29.52
3420.400	H	48.00	-49.76	10.37	1.17	-40.56	-13.00	27.56
3420.400	V	50.76	-46.97	10.37	1.17	-37.77	-13.00	24.77
5130.600	H	39.63	-53.93	11.28	1.48	-44.13	-13.00	31.13
5130.600	V	39.30	-54.15	11.28	1.48	-44.35	-13.00	31.35
6840.800	H	41.17	-50.29	11.23	1.87	-40.93	-13.00	27.93
6840.800	V	40.90	-50.40	11.23	1.87	-41.04	-13.00	28.04
QPSK, 3.75kHz,RB1#0, Frequency:1745 MHz								
800.18	H	58.89	-43.43	0.00	0.58	-44.01	-13.00	31.01
800.18	V	57.07	-41.67	0.00	0.58	-42.25	-13.00	29.25
3490.000	H	49.28	-48.56	10.40	1.17	-39.33	-13.00	26.33
3490.000	V	53.33	-44.45	10.40	1.17	-35.22	-13.00	22.22
5235.000	H	39.64	-54.26	11.34	1.46	-44.38	-13.00	31.38
5235.000	V	38.98	-54.73	11.34	1.46	-44.85	-13.00	31.85
6980.000	H	40.84	-50.02	11.20	1.90	-40.72	-13.00	27.72
6980.000	V	41.27	-49.44	11.20	1.90	-40.14	-13.00	27.14
QPSK, 3.75kHz,RB1#0, Frequency: 1779.8 MHz								
800.18	H	58.60	-43.72	0.00	0.58	-44.30	-13.00	31.30
800.18	V	56.94	-41.80	0.00	0.58	-42.38	-13.00	29.38
3559.600	H	49.53	-48.14	10.46	1.22	-38.90	-13.00	25.90
3559.600	V	51.97	-45.59	10.46	1.22	-36.35	-13.00	23.35
5339.400	H	38.98	-54.49	11.40	1.47	-44.56	-13.00	31.56
5339.400	V	38.65	-54.69	11.40	1.47	-44.76	-13.00	31.76
7119.200	H	39.25	-50.21	11.13	1.94	-41.02	-13.00	28.02
7119.200	V	39.71	-49.72	11.13	1.94	-40.53	-13.00	27.53

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

5. RF EXPOSURE EVALUATION

5.1 §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

5.1.1 Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) 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;

According to §1.1310 and §2.1091 RF exposure is calculated.

5.1.2 Calculation formula:

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = 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);

5.1.3 Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
NB-IoT B2	1850-1910	6.1	4.07	21	125.89	20.00	0.1021	1.0
NB-IoT B4	1710-1755	6.1	4.07	21	125.89	20.00	0.1021	1.0
NB-IoT B5	824-849	3	2.00	21	125.89	20.00	0.0500	0.55
NB-IoT B12	699-716	3	2.00	21	125.89	20.00	0.0500	0.47
NB-IoT B66	1710-1780	6.1	4.07	21	125.89	20.00	0.1021	1.0

Note: The Conducted output power including Tune-up Tolerance was provided by manufacturer.

Result: The device meet FCC MPE at 20 cm distance

6. EUT PHOTOGRAPHS

Please refer to the attachment CR231166464-EXP EUT EXTERNAL PHOTOGRAPHS and CR231166464-INP EUT INTERNAL PHOTOGRAPHS

7. TEST SETUP PHOTOGRAPHS

Please refer to the attachment CR231166464-00A-TSP TEST SETUP PHOTOGRAPHS.

==== END OF REPORT =====