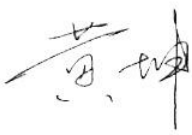
TEST REPORT

Applicant:	GMSTEK, LLC
EUT Description:	X-1 Cloud Connect
Model:	X-1 Cloud Connect v3.0
Brand:	X-1FBO
FCC ID:	2BE49-X1CCAV2024030
Standards:	FCC 47 CFR Part 2.1091
Date of Receipt:	2024/04/25
Date of Issue:	2024/10/22

TOWE. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

the results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. without written approval of TOWE, the test report shall not be reproduced except in full.



Huangkun
Approved By:

ChenChengfu
Reviewed By:

Revision History

Rev.	Issue Date	Description	Revised by
01	2024/10/22	Original	ChenChengfu

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1 General Description

1.1 Lab Information

1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014
Tel.: +86-755-27212361
Contact Email: info@towewireless.com

1.1.2 Test Facility / Accreditations

A2LA (Certificate Number: 7088.01)
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

FCC Designation No.: CN1353
Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized as an accredited testing laboratory. Designation Number: CN1353.

ISED CAB identifier: CN0152
Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.
CAB identifier: CN0152
Company Number: 31000

1.2 Client Information

1.2.1 Applicant

Applicant:	GMSTEK, LLC
Address:	18001 OLD CUTLER RD STE 472 PALMETTO BAY, FL 33157-6437 UNITED STATES OF AMERICA

1.2.2 Manufacturer

Manufacturer:	GMSTEK, LLC
Address:	18001 OLD CUTLER RD STE 472 PALMETTO BAY, FL 33157-6437 UNITED STATES OF AMERICA

1.3 Product Information

EUT Description:	X-1 Cloud Connect			
Model:	X-1 Cloud Connect v3.0			
Brand:	X-1FBO			
Hardware Version:	3.0.2.15			
Software Version:	3.0.2.2406			
Antenna Type:	☐ External, ☒ Integrated			
Antenna gain:	GSM 850:	-0.6 dBi	PCS 1900:	-0.1 dBi
	Cat M1 Band 2:	-0.1 dBi	Cat M1 Band 4:	-0.1 dBi
	Cat M1 Band 5:	-0.6 dBi	Cat M1 Band 12:	-0.3 dBi
	Cat M1 Band 13:	-0.3 dBi	Cat M1 Band 25:	-0.1 dBi
	Cat M1 Band 26:	-0.6 dBi	Cat M1 Band 66:	-0.1 dBi
	Cat M1 Band 85:	-2.8 dBi		
	NB-IoT Band 2:	-0.1 dBi	NB-IoT Band 4:	-0.1 dBi
	NB-IoT Band 5:	-0.6 dBi	NB-IoT Band 12:	-0.3 dBi
	NB-IoT Band 13:	-0.3 dBi	NB-IoT Band 25:	-0.1 dBi
	NB-IoT Band 66:	-0.1 dBi	NB-IoT Band 71:	-2.8 dBi
	NB-IoT Band 85:	-2.8 dBi		
	BLE:	-2.5 dBi	Wi-Fi 2.4G:	-2.5 dBi
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user manual for more detailed description.				

2 Maximum Permissible RF Exposure

2.1 RF Exposure Limit Introduction

§1.1310 the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b).

(1) Table 1 to § 1.1310(e)(1)sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fi elds.

Table 1 to § 1.1310(e)(1) - Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strengtl (A/m)	Power density (mW/cm)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3~3.0	614	1.63	*(100)	≤6
3.0~30	1842/f	4.89/f	*(900/f^2)	<6
30~300	61.4	0.163	1.0	<6
300~1500			f/300	<6
1500~100000			5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
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
1500~100000			1.0	<30

Note: f = frequency in MHz. * = Plane-wave equivalent power density.

(2) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. The phrase *fully aware* in the context of applying these exposure limits means that an exposed person has received written and/or verbal information fully explaining the potential for RF exposure resulting from his or her employment. With the exception of transient persons, this phrase also means that an exposed person has received appropriate training regarding work practices relating to controlling or mitigating his or her exposure. In situations when an untrained person is transient through a location where occupational/controlled limits apply, he or she must be made aware of the potential for exposure and be supervised by trained personnel pursuant to § 1.1307(b)(2) of this part where use of time averaging is required to ensure compliance with the general population exposure limit. The phrase exercise control means that an exposed person is allowed and also knows how to reduce or avoid exposure by administrative or engineering work practices, such as use of personal protective equipment or time averaging of exposure.

(3) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure. For example, RF sources intended for consumer use shall be subject to the limits for general population/uncontrolled exposure in this section.

The MPE was calculated at **20cm** to show compliance with the power density limit.

2.2 Equations

Power Density is given by:

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

Where:
S = Power density in mW/cm^2
EIRP= Equivalent isotropic Radiated power in mW
R = Distance from transmitting antenna in cm

Power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by 10.

Distance:

$$R=\sqrt{\frac{EIRP}{4\pi S}}$$

Where:
S = Power density in mW/cm^2
EIRP= Equivalent isotropic Radiated power in mW
R = Distance from transmitting antenna in cm

EIRP:

$$EIRP = P+G$$

Where:
EIRP = Equivalent isotropic Radiated power in Mw
P = Output power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)

Source-Based Duty Cycle:
Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.
Source-based time-averaged EIRP = (DC / 100)* EIRP
Where:
DC = Duty Cycle in %, as applicable
EIRP= Equivalent isotropic Radiated power in mW

MIMO and collocated transmitters (identical limit for all transmitters):
For multiple chain devices, and collocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the PG (in linear units) of each transmitter.
Total EIRP = (EIRP 1) + (EIRP 2) + … + (EIRP n)

MIMO and collocated transmitters:
For multiple collocated transmitters operating simultaneously in frequency bands where different limit apply:
The power density at the specified separation distance is calculated for each transmitter chain or transmitter.
The fraction of the exposure limit is calculated for each chain or transmitter as
Power density of chain or transmitter / limit applicable to the chain or transmitter.
The fractions are summed.
Compliance is established if the sum of the fractions is less than or equal to one.

3 RF Exposure Results

3.1 Standalone Exposure Calculations

For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
The manufacturing configures output power so that the maximum power, after accounting for manufacturing tolerances, will never exceed the maximum power level measured.
The antenna gain in the tables below is the maximum antenna gain among various channels within the specified band.

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	EIRP/ERP (dBm)	EIRP/ERP Limit (dBm)	EIRP/ERP (mW)	Power Density at R=20cm (mW/cm2)	Limit (mW/cm2)	Results
GSM 850	824.2	-0.60	25.97	23.22	38.45	25.2930	0.0044	0.5495	Pass
PCS 1900	1850.2	-0.10	22.97	22.87	33.01	23.3346	0.0045	1.0000	Pass
Cat M1 Band 2	1850.7	-0.10	22.00	21.90	33.01	154.8817	0.0301	1.0000	Pass
Cat M1 Band 4	1710.7	-0.10	22.00	21.90	30.00	154.8817	0.0301	1.0000	Pass
Cat M1 Band 5	824.7	-0.60	22.00	19.25	38.45	84.1395	0.0146	0.5498	Pass
Cat M1 Band 12	699.7	-0.30	22.00	19.55	34.77	90.1571	0.0167	0.4665	Pass
Cat M1 Band 13	779.50	-0.30	22.00	19.55	34.77	90.1571	0.0167	0.5197	Pass
Cat M1 Band 25	1850.7	-0.10	22.00	21.90	33.01	154.8817	0.0301	1.0000	Pass
Cat M1 Band 26 (814~824)	814.7	-0.60	22.00	19.25	50.00	84.1395	0.0146	0.5431	Pass
Cat M1 Band 26 (824~849)	824.7	-0.60	22.00	19.25	38.45	84.1395	0.0146	0.5498	Pass
Cat M1 Band 66	1710.7	-0.10	22.00	21.90	30.00	154.8817	0.0301	1.0000	Pass
Cat M1 Band 85	700.5	-2.80	22.00	17.05	34.77	50.6991	0.0053	0.4670	Pass
NB-IoT Band 2	1850.1	-0.10	22.00	21.90	33.01	154.8817	0.0301	1.0000	Pass
NB-IoT Band 4	1710.1	-0.10	22.00	21.90	30.00	154.8817	0.0301	1.0000	Pass
NB-IoT Band 5	824.1	-0.60	22.00	19.25	38.45	84.1395	0.0146	0.5494	Pass
NB-IoT Band 12	699.1	-0.30	22.00	19.55	34.77	90.1571	0.0167	0.4661	Pass
NB-IoT Band 13	777.1	-0.30	22.00	19.55	34.77	90.1571	0.0167	0.5181	Pass
NB-IoT Band 25	1850.1	-0.10	22.00	21.90	33.01	154.8817	0.0301	1.0000	Pass
NB-IoT Band 66	1710.1	-0.10	22.00	21.90	30.00	154.8817	0.0301	1.0000	Pass
NB-IoT Band 71	663.1	-2.80	22.00	17.05	34.77	50.6991	0.0053	0.4421	Pass
NB-IoT Band 85	698.1	-2.80	22.00	17.05	34.77	50.6991	0.0053	0.4654	Pass
BLE	2402	-2.5	7.50	5.00	30.00	3.1623	0.0004	1.0000	Pass
2.4GWIFI	2412	-2.5	23.50	21.00	30.00	125.8925	0.0141	1.0000	Pass

Remark:
1. GSM Operating Band: Frame-average power=Burst power+ Division Factors (-9.19).
2. "Maximum Power" comes from the largest "Tune-up" provided by the customer.

3.2 Multiple Sources Exposure Calculations

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	WWAN + WLAN 2.4GHz
2	WWAN + BLE

TER (Total exposure ratio) = Power Density (mW/cm^2) / Limt (mW/cm^2)

Operating Band	Frequency (MHz)	Power Density at R=20cm (mW/cm2)	Limit (mW/cm2)	TER
GSM 850	824.2	0.0044	0.5495	0.0080
PCS 1900	1850.2	0.0045	1.0000	0.0045
Cat M1 Band 2	1850.7	0.0301	1.0000	0.0301
Cat M1 Band 4	1710.7	0.0301	1.0000	0.0301
Cat M1 Band 5	824.7	0.0146	0.5498	0.0265
Cat M1 Band 12	699.7	0.0167	0.4665	0.0359
Cat M1 Band 13	779.50	0.0167	0.5197	0.0322
Cat M1 Band 25	1850.7	0.0301	1.0000	0.0301
Cat M1 Band 26 (814~824)	814.7	0.0146	0.5431	0.0268
Cat M1 Band 26 (824~849)	824.7	0.0146	0.5498	0.0265
Cat M1 Band 66	1710.7	0.0301	1.0000	0.0301
Cat M1 Band 85	700.5	0.0053	0.4670	0.0113
NB-IoT Band 2	1850.1	0.0301	1.0000	0.0301
NB-IoT Band 4	1710.1	0.0301	1.0000	0.0301
NB-IoT Band 5	824.1	0.0146	0.5494	0.0265
NB-IoT Band 12	699.1	0.0167	0.4661	0.0359
NB-IoT Band 13	777.1	0.0167	0.5181	0.0323
NB-IoT Band 25	1850.1	0.0301	1.0000	0.0301
NB-IoT Band 66	1710.1	0.0301	1.0000	0.0301
NB-IoT Band 71	663.1	0.0053	0.4421	0.0120
NB-IoT Band 85	698.1	0.0053	0.4654	0.0114
BLE	2402	0.0004	1.0000	0.0004
2.4GWIFI	2412	0.0141	1.0000	0.0141

The worst-case combination:

Combination	TER	Total TER	Limit	Conclusion
NB-IoT/Cat M1 Band 12	0.0359	0.0500	<1	PASS
WLAN 2.4GHz	0.0141			

~The End~