RF Exposure Evaluation Report

APPLICANT	:	**CHEP**
EQUIPMENT	:	**Asset Tracker**
BRAND NAME	:	**CHEP**
MODEL NAME	:	**Gen 4 Ultra Short**
FCC ID	:	**2APRD-GEN4SHORT**
STANDARD	:	**47 CFR Part 2.1091** **FCC KDB 447498 D01 v06**

The product evaluation date was started from Aug. 07, 2024 and completed on Aug. 07, 2024. We, Sporton International Inc. (Shenzhen), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

Approved by: Si Zhang

Sporton International Inc. (Shenzhen)

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People's Republic of China

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA470213	Rev. 01	Initial issue of report.	Sep. 06, 2024

1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	SAR01-SZ	CN1256	421272

Applicant	
Company Name	CHEP
Address	2901 Tasman Drive Suite 101 Santa Clara, CA 95054

Manufacturer	
Company Name	MINEWING VIET NAM ELECTRONICS CO., LTD
Address	Lot CN2, Yen Phong industrial park, Dong Phong commune and, Long Chau commune, Yen Phong District, Bac Ninh province, Vietnam

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Asset Tracker
Brand Name	CHEP
Model Name	Gen 4 Ultra Short
FCC ID	2APRD-GEN4SHORT
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz LTE Category M1: LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 25 : 1850 MHz ~ 1915 MHz LTE Band 26 : 814 MHz ~ 849 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 85: 698 MHz ~ 716 MHz NB-IOT Category NB2: LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 25 : 1850 MHz ~ 1915 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz LTE Band 85: 698 MHz ~ 716 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	GPRS/EGPRS LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 Bluetooth LE
Antenna Gain	GSM850 : 1.6 dBi GSM1900 : 3.5 dBi LTE Band 2 : 3.5 dBi LTE Band 4 : 3.5 dBi LTE Band 5 : 1.6 dBi LTE Band 12 : 0.4 dBi LTE Band 13 : 0.4 dBi LTE Band 25 : 3.5 dBi LTE Band 26 : 1.6 dBi LTE Band 66: 3.5 dBi LTE Band 71: 0.4 dBi LTE Band 85: 0.4 dBi WLAN2.4GHz: -2.5 dBi Bluetooth: 2.8 dBi
Antenna Type	WWAN: PIFA Antenna WLAN: PCB Antenna Bluetooth: Chip Antenna
HW Version	v14
SW Version	v10.00.0002
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Comments and Explanations:
1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.

3. Maximum RF average output tune up power among production units

<GSM>

Mode	Burst average power(dBm)	
	GSM 850	GSM 1900
GPRS (GMSK, 1 Tx slot)	34.50	31.00
GPRS (GMSK, 2 Tx slots)	34.00	30.00
GPRS (GMSK, 3 Tx slots)	33.00	29.00
GPRS (GMSK, 4 Tx slots)	31.00	27.00
EDGE (8PSK, 1 Tx slot)	28.00	27.00
EDGE (8PSK, 2 Tx slots)	27.00	26.00
EDGE (8PSK, 3 Tx slots)	26.00	24.00
EDGE (8PSK, 4 Tx slots)	25.00	23.00

<LTE>

Mode		Maximum Average power(dBm)
LTE_NB IOT	Band 2	21.50
	Band 4	21.50
	Band 5	21.50
	Band 12	21.50
	Band 13	21.50
	Band 25	21.50
	Band 66	21.50
	Band 71	21.50
	Band 85	21.50

Mode		Maximum Average power(dBm)
LTE_Cat M1	Band 2	21.50
	Band 4	21.50
	Band 5	21.50
	Band 12	21.50
	Band 13	21.50
	Band 25	21.50
	Band 26	21.50
	Band 66	21.50
	Band 85	21.00

<WLAN 2.4GHz >

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	16.00
	802.11g	15.00
	802.11n-HT20	12.00
	802.11n-HT40	12.00

< Bluetooth>

Mode	Maximum Average Power (dBm)
Bluetooth LE	-8.00

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

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

The following formula was used to calculate the Power Density:

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

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)
GPRS 850 (1 Tx slot)	824.0	1.60	34.50	36.100	4.074	512.861	0.102	0.549
GPRS 850 (2 Tx slots)	824.0	1.60	34.00	35.600	3.631	912.011	0.182	0.549
GPRS 850 (3 Tx slots)	824.0	1.60	33.00	34.600	2.884	1081.434	0.215	0.549
GPRS 850 (4 Tx slots)	824.0	1.60	31.00	33.600	2.291	1148.154	0.182	0.549
EGPRS 850 (1 Tx slot)	824.0	1.60	28.00	29.600	0.912	114.815	0.023	0.549
EGPRS 850 (2 Tx slots)	824.0	1.60	27.00	28.600	0.724	181.970	0.036	0.549
EGPRS 850 (3 Tx slots)	824.0	1.60	26.00	27.600	0.575	215.774	0.043	0.549
EGPRS 850 (4 Tx slots)	824.0	1.60	25.00	26.600	0.457	229.087	0.046	0.549
GPRS 1900 (1 Tx slot)	1850.0	3.50	31.00	34.500	2.818	354.813	0.071	1.000
GPRS 1900 (2 Tx slots)	1850.0	3.50	30.00	33.500	2.239	562.341	0.112	1.000
GPRS 1900 (3 Tx slots)	1850.0	3.50	29.00	32.500	1.778	666.807	0.133	1.000
GPRS 1900 (4 Tx slots)	1850.0	3.50	27.00	31.500	1.413	707.946	0.112	1.000
EGPRS 1900 (1 Tx slot)	1850.0	3.50	27.00	30.500	1.122	141.254	0.028	1.000
EGPRS 1900 (2 Tx slots)	1850.0	3.50	26.00	29.500	0.891	223.872	0.045	1.000
EGPRS 1900 (3 Tx slots)	1850.0	3.50	24.00	27.500	0.562	210.863	0.042	1.000
EGPRS 1900 (4 Tx slots)	1850.0	3.50	23.00	26.500	0.447	223.872	0.045	1.000
LTE Band 2	1850.0	3.50	21.50	25.000	0.316	316.228	0.063	1.000
LTE Band 4	1710.0	3.50	21.50	25.000	0.316	316.228	0.063	1.000
LTE Band 5	824.0	1.60	21.50	23.100	0.204	204.174	0.041	0.549
LTE Band 12	699.0	0.40	21.50	21.900	0.155	154.882	0.031	0.466
LTE Band 13	777.0	0.40	21.50	21.900	0.155	154.882	0.031	0.518
LTE Band 25	1850.0	3.50	21.50	25.000	0.316	316.228	0.063	1.000
LTE Band 26	814.0	1.60	21.50	23.100	0.204	204.174	0.041	0.543
LTE Band 66	1710.0	3.50	21.50	25.000	0.316	316.228	0.063	1.000
LTE Band 71	663.0	0.40	21.50	21.900	0.155	154.882	0.031	0.442
LTE Band 85	698.0	0.40	21.50	21.900	0.155	154.882	0.031	0.465
Bluetooth	2402.0	2.80	-8.00	-5.200	0.000	0.302	0.000	1.000
2.4GHz WLAN	2412.0	-2.50	16.00	13.500	0.022	22.387	0.004	1.000

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum RF output tune up power and the maximum antenna gain of all antennas among same frequency WWAN bands to perform MPE calculation conservatively.
3. According to the EUT characteristic, WWAN and WLAN 2.4GHz/Bluetooth can't transmit simultaneously.
4. According to the EUT characteristic, WLAN 2.4GHz and Bluetooth can't transmit simultaneously.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

------THE END------