

RF Exposure Evaluation Report

Report Reference No...... : **MTEB24100203-H**

FCC ID..... : **2BLOK-ATOMSND001**

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Representative Laboratory Name.: **Shenzhen Most Technology Service Co., Ltd.**

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Applicant's name..... : **ATOMOS Global PTY Ltd**

Address..... : Level 6, 700 Swanston Street Carlton VIC 3053 Australia

Test specification/ Standard..... : **47 CFR Part 1.1307;47 CFR Part 1.1310**
KDB447498D01 General RF Exposure Guidance v06

TRF Originator..... : Shenzhen Most Technology Service Co., Ltd.

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Test item description..... : Sun Dragon

Trade Mark..... : N/A

Model/Type reference..... : ATOMSND001

Listed Models : ATOMSND002

Modulation Type..... : b: DSSS ; g/n: OFDM
GFSK, $\pi/4$ DQPSK, 8DPSK

Operation Frequency..... : From 2412MHz~2462MHz
2402MHz to 2480MHz

Hardware Version..... : 0.3

Software Version..... : 1.0.2

Rating..... : DC 36V by Adapter

Result..... : **PASS**

1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2024.10.23	Initial Issue	Alisa Luo

2. SAR Evaluation

2.1 RF Exposure Compliance Requirement

2.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

2.1.2 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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/f ²)	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/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

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$ Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.1.3 EUT RF Exposure**BLE**

GFSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402 MHz)	0.814	0.814 ± 1	1.814
Middle(2440MHz)	1.441	1.441 ± 1	2.441
Highest(2480MHz)	2.456	2.456 ± 1	3.456

BLE

Worst case: GFSK						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest(2480MHz)	3.456	2.22	4.20	0.00116	1.0	Pass

Note: 1) Refer to report MTEB24100203-R for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (2.22 \cdot 2.63) / (4 \cdot 3.1416 \cdot 20^2) = 0.00116$

Note: 3) EUT's Bluetooth module is more than 20cm away from the human body.

WIFI 2.4G

802.11b			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	16.47	16.47 ± 1	17.47
Middle(2437MHz)	16.66	16.66 ± 1	17.66
Highest(2462MHz)	16.39	16.39 ± 1	17.39

802.11g			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	17.16	17.16 ± 1	18.16
Middle(2437MHz)	16.85	16.85 ± 1	17.85
Highest(2462MHz)	17.17	17.17 ± 1	18.17

802.11n(H20)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2412MHz)	16.36	16.36 ± 1	17.36
Middle(2437MHz)	15.88	15.88 ± 1	16.88
Highest(2462MHz)	16.21	16.21 ± 1	17.21

802.11n(H40)			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2422MHz)	15.99	15.99 ± 1	16.99
Middle(2437MHz)	15.83	15.83 ± 1	16.83
Highest(2452MHz)	15.90	15.90 ± 1	16.9

WIFI 2.4G

Worst case: 802.11g						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest(2462MHz)	18.17	65.61	4.20	0.03433	1.0	Pass

Note: 1) Refer to report MTEB24100203-R2 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (65.61 \cdot 2.63) / (4 \cdot \pi \cdot 20^2) = 0.03433$

Note: 3) EUT's Bluetooth module is more than 20cm away from the human body.

BT classic

GFSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	0.964	0.964 ± 1	1.964
Middle(2441MHz)	1.535	1.535 ± 1	2.535
Highest(2480MHz)	2.607	2.607 ± 1	3.607

π /4DQPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	-0.089	-0.089 ± 1	0.911
Middle(2441MHz)	0.582	0.582 ± 1	1.582
Highest(2480MHz)	1.801	1.801 ± 1	2.801

8DPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	0.341	0.341 ± 1	1.341
Middle(2441MHz)	1.012	1.012 ± 1	2.012
Highest(2480MHz)	2.184	2.184 ± 1	3.184

Worst case: GFSK						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest(2480MHz)	3.607	2.29	4.20	0.0012	1.0	Pass

Note: 1) Refer to report MTEB24100203-R1 for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (2.29 \cdot 2.63) / (4 \cdot 3.1416 \cdot 20^2) = 0.0012$

Note: 3) EUT's Bluetooth module is more than 20cm away from the human body.

.....**THE END OF REPORT**.....

