

RF Exposure Evaluation Report

Report Reference No......: **MTEB25050291-H**

FCC ID.....: **2BNRZ-ZBR2**

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Applicant's name.....: **Xiamen Akubela Innovation Technology Co., Ltd.**

Address.....: 9/F, No.56 Guanri Road, Software Park II, Xiamen 361009, China

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.....: 2 Gang Switch Module

Trade Mark.....: akubela

Model/Type reference.....: ZBMD-C1-R2

Listed Models: N/A

Modulation Type.....: O-QPSK

Operation Frequency.....: From 2405MHz ~ 2480MHz

Hardware Version.....: V0.95

Software Version.....: 90.1.1.28

Rating.....: AC 100-250V 50/60Hz or DC 24V

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

TEST REPORT

Equipment under Test : 2 Gang Switch Module

Model /Type : ZBMD-C1-R2

Listed Models : N/A

Remark : N/A

Applicant : Xiamen Akubela Innovation Technology Co., Ltd.

Address : 9/F, No.56 Guanri Road, Software Park II , Xiamen 361009, China

Manufacturer : Xiamen Akubela Innovation Technology Co., Ltd.

Address : 9/F, No.56 Guanri Road, Software Park II , Xiamen 361009, China

Test Result:	PASS
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2025.05.30	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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$ 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

Zigbee

O-QPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2405 MHz)	-5.025	-5.025 ± 1	-4.025
Middle(2440MHz)	-4.202	-4.202 ± 1	-3.202
Highest(2480MHz)	-3.747	-3.747 ± 1	-2.747

Worst case: O-QPSK						
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)	-2.747	0.531	3.4	0.00015	1.0	Pass

Note: 1) Refer to report MTEB25050291-R for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (0.531 \cdot 1.48) / (4 \cdot 3.1416 \cdot 20^2) = 0.00015$

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

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