

RF Exposure Evaluation Report

Report Reference No. :	MTEB24070286-H
FCC ID :	2A2RN-ACEVCEVL001
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Date of issue..... :	July 19,2024
Representative Laboratory Name :	Shenzhen Most Technology Service Co., Ltd.
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Applicant's name :	Xiamen Joint Tech. Co., Ltd
Address	Building #1, No.268 HouXiang Rd, Xinyang, Industrial Park, Haicang District, XIAMEN, Fujian, 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	Electric Vehicle AC Charger
Trade Mark	Joint
Model/Type reference..... :	JNT-EVL001/48AC/01C/BK/RF/WF
Listed Models	JNT-EVL001/XXAC/01C/YY/RF/ZZ (XXstands for Electric current;YYstands for colour,ZZ stands for communication mode)
Modulation Type	ASK
Operation Frequency..... :	13.56MHz
Hardware Version.....	V1.0
Software Version	V00.01.01
Rating	AC 240V/60Hz
Result..... :	PASS

TEST REPORT

Equipment under Test : Electric Vehicle AC Charger

Model /Type : JNT-EVL001/48AC/01C/BK/RF/WF

Listed Models : JNT-EVL001/XXAC/01C/YY/RF/ZZ (XXstands for Electric current:YYstands for colour,ZZ stands for communication mode)

Remark : Difference in Appearance colour and current.

Applicant : **Xiamen Joint Tech. Co., Ltd**

Address : Building #1, No.268 HouXiang Rd, Xinyang, Industrial Park, Haicang District, XIAMEN, Fujian, China.

Manufacturer : **Xiamen Joint Tech. Co., Ltd**

Address : Building #1, No.268 HouXiang Rd, Xinyang, Industrial Park, Haicang District, XIAMEN, Fujian, 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	2024-07-19	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)

For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C): 33

- 1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$
- 2) For test separation distances ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$
- 3) SAR measurement procedures are not established below 100 MHz.

When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any SAR test results below 100 MHz to be acceptable.³⁴

2.1.3 EUT RF Exposure

$EIRP = PT * GT = (E \times D)^2 / 30$

where:

PT = transmitter output power in watts,

GT = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, $10^{(dB\mu V/m)/20} / 10^6$,

D = measurement distance in meters (m)---3m,

So $PT = (E \times D)^2 / 30 / GT$

The worst case (refer to report **MTEB24070286-R**) is below:

Antenna polarization: Horizontal		
Frequency (MHz)	Level (dBuV/m)	Polarization
13.56	78.9	Peak

For 13.56MHz wireless:

Field strength=78.9dBuV/m

Ant gain:3dBi;so Ant numeric gain=2

$EIRP = PT * GT = (E \times D)^2 / 30 = (10^{(dB\mu V/m)/20} / 10^6 * 3)^2 / 30 = 0.000023$

So $PT = EIRP / GT = 0.000023W = 0.023mW$

So $(0.023mW / 5mm) * \sqrt{0.01356GHz} = 0.0005336$

exclusion=0.0005336 < 3.0 for 1-g SAR

So the SAR report is not required.

Contains FCCID: 2AC7Z-ESP32WROOM32U

the numeric gain (G) of the antenna with a gain specified in dB is determined by
 Numeric gain (G)=10^(antenna gain/10)

Band	Maximum Conducted Output Power		Antenna Gain (dBi)	Numeric gain (dB)
	(dBm)	(mW)		
Wi-Fi 2.4G	15.90	38.905	2.33	1.710
BT	2.79	1.901	2.33	1.710
Bluetooth (Low Energy)	1.08	1.282	2.33	1.710

RF Exposure Calculations:

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

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

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

Band	PG (mW)	Test Result (mW/cm ²)	Limit Value (mW/cm ²)	The MPE ratio
Wi-Fi 2.4G	66.527	0.0132	1.0	0.0132
BT	3.251	0.0006	1.0	0.0006
Bluetooth (Low Energy)	2.193	0.0004	1.0	0.0004
Note: R = 20 cm π = 3.1416 The MPE ratio = Mac Test Result ÷ Limit Value				

So the simultaneous transmitting antenna pairs as below:

$$\sum \text{of MPE ratios} = \text{WiFi 2.4G} + \text{BT} = 0.0132 + 0.0006 = 0.014 < 1$$

Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.

Simultaneous TX (NFC+2.4G+BT)

Mode	Power Density(mW/m ²)		Conclusion
	Results	Limit	
Simultaneous TX	0.0140	1.0	PASS

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Results (NFC+2.4G+BT) =0.0005336/3+0.0132/1+0.0006/1=0.0140

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