



RF Exposure Evaluation Declaration

FCC ID: 2AHXJ-M2008
Applicant: Mopeka Products, LLC
Application Type: Certification
Product: SENSOR
Model No.: M2008
Brand Name: Vertrax
FCC Classification: Digital Transmission System (DTS)
Test Procedure(s): KDB 447498 D01v06
Test Date: August 12, 2020

Reviewed By:

Kevin Guo

(Kevin Guo)

Approved By:

Robin Wu

(Robin Wu)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2003RSU050-U2	Rev. 01	Initial Report	08-12-2020	Valid

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General Information

Applicant:	Mopeka Products, LLC
Applicant Address:	686 Floral Circle New Braunfels, TX 78130 United States
Manufacturer:	Hangzhou Jinmai Technologies Co., Ltd.
Manufacturer Address:	4F, Bldg 1, No.8 Jianghui RD, Binjiang Dist., China, 310052
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is an FCC accredited testing laboratory (MRT Designation No. CN1166) on the FCC website.
- MRT facility is an ISED recognized testing laboratory (MRT Reg. No. CN0001) on the ISED website.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the A2LA under the A2LA Program (Cert. No. 3628.01) and CNAS under the CNAS Program (Cert. No. L10551) in EMC, Safety, Radio, Telecommunications and SAR testing.

1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	SENSOR
Model No.:	M2008
Brand Name:	vertrax
LoRa Specification:	902.5 – 927.5MHz
Bluetooth Version:	Bluetooth-LE
EUT Identification No.:	20200422Sample#02

2.2. Product Specification Subjective to this Report

Bluetooth-LE	
Bluetooth Frequency:	2402 ~ 2480MHz
Channel Bandwidth:	2MHz
Type of modulation:	GFSK
Data Rate:	1Mbps
Antenna type:	PCB Antenna
Antenna Gain:	3dBi
LoRa Transceiver	
Operating Frequency:	902.5 ~927.5MHz
Type of modulation:	LoRa
Antenna Gain:	2.15dBi

Note: Bluetooth-LE and LoRa can transmit simultaneously, but LoRa is defined as a low power technology on this device, so it's not assessed in this report.

3. RF Exposure Evaluation

3.1. Limits

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in Note 1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

MHz	30	35	40	45	50	mm
150	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Note: The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})]^*$$

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

3.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 20°C and 75% RH.

3.3. Test Result of RF Exposure Evaluation

Product	SENSOR
Test Item	RF Exposure Evaluation

Output Power into Antenna:

Test Mode	Frequency Band (MHz)	Maximum Output Power (dBm)	Maximum Output Power (mW)	SAR Test Exclusion Threshold (mW)
Bluetooth	2402 ~ 2480	-0.53	0.8851	10

Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances < 50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} * \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Based on the maximum conducted power of Bluetooth and the antenna to use separation distance, Bluetooth SAR was not required.

$$[(0.8851\text{mW}/5) * \sqrt{2.402}] = 0.2743 < 3.0$$

The Max $P_d = 0.2743 < 3.0$

Note: When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

————— The End —————

Appendix A – EUT Photograph

Refer to “ 2003RSU050-UE” file.