RF Exposure Evaluation Declaration

FCC ID:	N73-AP60-BLE
Applicant:	Mine Site Technologies Pty Ltd
Application Type:	Certification
Product:	AXON BLE
Model No.:	A-AP60-200
Brand Name:	MINE SITE TECHNOLOGIES
FCC Classification:	Digital Transmission System (DTS)
Test Procedure(s):	KDB 447498 D01v06
Test Date:	July 20, 2020

Reviewed By: (Kevin Guo)

Approved By: (Robin Wu)

Revision History

Report No.	Version	Description	Issue Date	Note
2006RSU024-U2	Rev. 01	Initial Report	07-20-2020	Valid

CONTENTS

General Information

Applicant:	Mine Site Technologies Pty Ltd
Applicant Address:	113 Wicks Road, North Ryde, New South Wales, 2113, Australia
Manufacturer:	Mine Site Technologies China Co. Ltd.
Manufacturer Address:	4th Floor, Building 1, No. 1413 Moganshan Road, Hangzhou, Zhejiang Province, 310011, China
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 a FCC registered (MRT Designation No. CN1166) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **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 American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.**

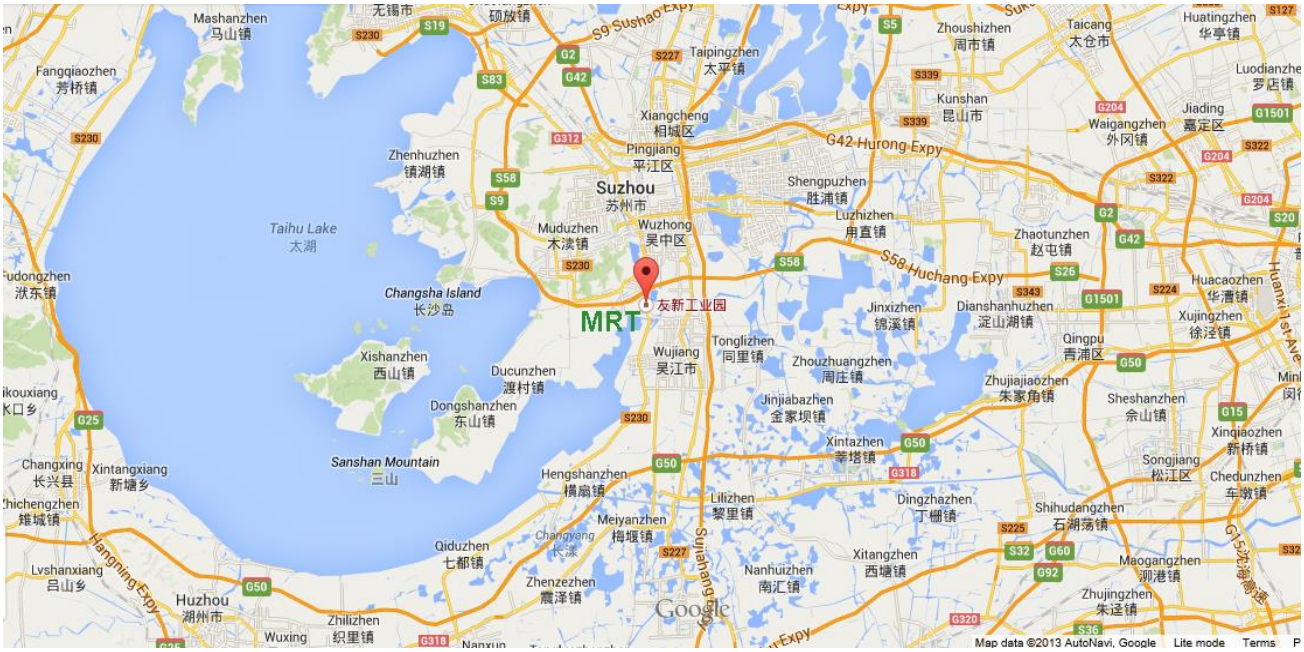
1. INTRODUCTION

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:	AXON BLE
Model No.:	A-AP60-200
Brand Name:	MINE SITE TECHNOLOGIES
Bluetooth Version:	V5.0 (BLE only)
Working Voltage:	DC 3.3V
EUT Identification No.:	20200611Sample#02

2.2. Product Specification Subjective to this Report

Bluetooth Frequency:	2402 ~ 2480MHz
Channel Bandwidth:	2MHz
Type of modulation:	GFSK
Data Rate:	1Mbps

2.3. Working Frequencies for this report

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz
03	2408 MHz	04	2410 MHz	05	2412 MHz
06	2414 MHz	07	2416 MHz	08	2418 MHz
09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz
15	2432 MHz	16	2434 MHz	17	2436 MHz
18	2438 MHz	19	2440 MHz	20	2442 MHz
21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz
27	2456 MHz	28	2458 MHz	29	2460 MHz
30	2462 MHz	31	2464 MHz	32	2466 MHz
33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz
39	2480 MHz	--	--	--	--

2.4. Description of Available Antennas

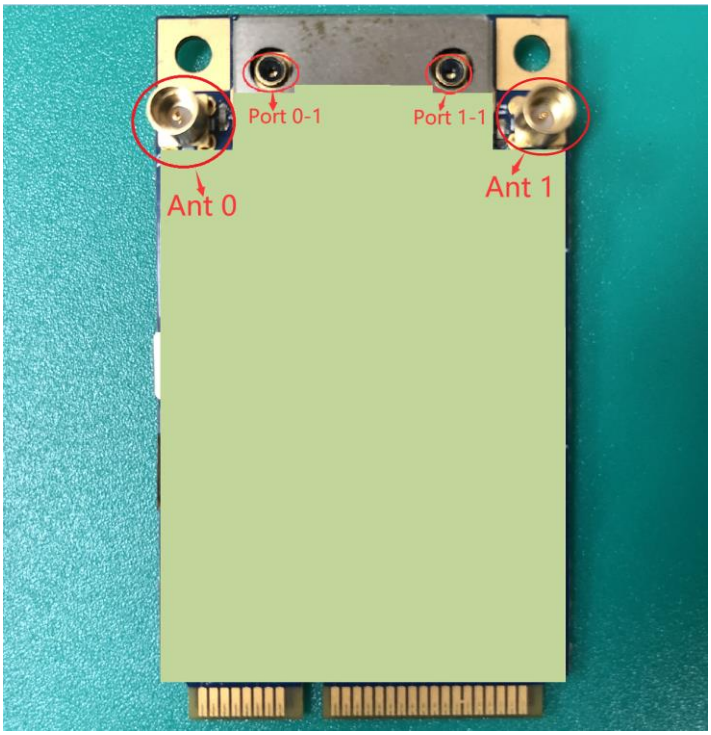
Antenna Type	Model No.	Manufacturer	Frequency Band (MHz)	T_X Paths	Ant 0 Gain (dBi)	Ant 1 Gain (dBi)
Omni Antenna	ANT795-4MX	SIEMENS	2402 ~ 2480	2	2.5	2.5

Note 1: Module supports SISO only, and ant 0 and ant 1 have symmetric Tx paths.

Note 2: All messages as above are declared by manufacturer.

2.5. Description of Antenna RF Port

Antenna RF Port		
Software Control Port	Bluetooth-LE RF Port	
	Ant 0 (port 0-1)	Ant 1 (port 1-1)



Note: port 0-1 and Ant 1 are in the same transmit path, but port 0-1 is only used for calibration and test, and will never be as an antenna connector. Port 1-1 and Ant 1 have the same principle.

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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *

[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(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	AXON BLE
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	6.09	4.0644	10

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

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

Based on the maximum conducted power of Bluetooth and the antenna to use separation distance, Bluetooth SAR was not required.
[(4.0644mW/5)* √2.402] = 1.2598 < 3.0

The Max P_d = 1.2598 < 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 “ 2006RSU024-UE” file.