



RF Exposure Evaluation Declaration

FCC ID: 2AD2MM1A

APPLICANT: TGI Technology Pte Ltd

Application Type: Certification

Product: PORTABLE BLUETOOTH SPEAKER

Model No.: M1, M2-MI10, M2-MI30, M3, M4, M5, M6

Brand Name: UB+

FCC Classification: FCC Part 15 Spread Spectrum Transmitter(DSS)
Digital Transmission System (DTS)

Test Procedure(s): KDB 447498 D01v06

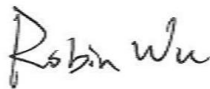
Test Date: February 19, 2019

Reviewed By:



(Kevin Guo)

Approved By:



(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
1901WSU007-U3	Rev. 01	Initial report	04-24-2019	Valid

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§2.1033 General Information

Applicant:	TGI Technology Pte Ltd
Applicant Address:	140 Paya Lebar Road #06-25 AZ @ Paya Lebar Singapore 409015
Manufacturer:	TGI Technology Pte Ltd
Manufacturer Address:	140 Paya Lebar Road #06-25 AZ @ Paya Lebar Singapore 409015
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
Test Device Serial No.:	N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering

Test Facility / Accreditations

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

- MRT facility is a FCC registered (MRT Reg. No. 893164) 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 Industry Canada 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:	PORTABLE BLUETOOTH SPEAKER
Model No.:	M1, M2-MI10, M2-MI30, M3, M4, M5, M6
Brand Name:	UB+
Bluetooth Specification:	BR/EDR/LE 1Mbps

2.2. Model Differences

Model	Shape	Size	Speaker	PCBA	Battery	LED
M1	Spherosome	D200mm	5"+1" *2, 25W+25W+5W*2, 4Ω	Same	11.1V, 2.2Ah	Same
M2-MI10	Spherosome	D360mm	(6.5"+1") *2, (40W+10W)*2, 2Ω	Same	14.8V, 2.2Ah	Same
M2-MI30	Spherosome	D360mm	8"+1.5" *2, 10W+30W+10W*2, 2.5Ω	Same	14.8V, 2.2Ah	Same
M3	Strip	L250mm H180mm W60mm	(3.5"+1") *2, (20W+5W)*2, 3Ω	Same	7.4V, 2.2Ah	Same
M4	Strip	L1000m m H120mm W60mm	(3.5"+1.5") *2, (40W+10W)*2, 3Ω	Same	14.8V, 2.2Ah	Same
M5	Spherosome	D250mm	5.25", 25W, 2Ω	Same	7.4V, 2.2Ah	Same
M6	Spherosome	D300mm	6.5", 25W, 2Ω	Same	11.1V, 2.2Ah	Same

Note: According to the description as above table, we select two models (**M2-MI10** and **M4**) for test.

2.3. Product Specification Subjective to this Standard

Operating Frequency:	2402~2480MHz
Channel Number:	Bluetooth BR+EDR: 79 Bluetooth LE(1Mbps): 40
Type of modulation:	GFSK, Pi/4 DQPSK, 8DPSK
Data Rate:	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK)
Antenna Type:	PCB Antenna
Antenna Gain:	0 dBi

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	PORTABLE BLUETOOTH SPEAKER
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0 dBi for Bluetooth in logarithm scale.

Output Power into Antenna:

Test Mode	Frequency Band (MHz)	Maximum output power to antenna (dBm)	Maximum output power to antenna (mW)	SAR Test Exclusion Threshold (mW)
Bluetooth	2402 ~ 2480	8.01	6.32	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;

$$[(6.32\text{mW}/5) * \sqrt{2.480}] = 0.4772 < 3.0$$

The Max $P_d = 1.9905 < 3.0$

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

3.4. FINAL CONCLUSION

The device is excluded for SAR test and complies with the FCC exposure requirements since the maximum conducted peak output power is lower than the SAR test exclusion thresholds.

The End