RF Exposure Evaluation

FCC ID: 2BAF8-MATESPROT10

1. Client Information

Applicant	:	Mates Lifestyle Products, INC
Address	:	4819 Emperor Blvd,Imperial Business Park Suite 400,Durham, NC 27703, USA.
Manufacturer	:	Dongguan Heng Da Rui Electronic Technology Co.,Ltd
Address	:	Room 401,Building 2,No 51, Dakeng Road, Humen Town, Dongguan, China

2. General Description of EUT

EUT Name	:	Wireless Earbuds	
Model(s) No.	:	Mates Pro T10, Mates Pro T20, Mates Pro T30, Mates Pro T40, Mates Pro T50, Mates Pro T60, Mates Pro T70, Mates Pro T80, Mates Pro T90, Mates Pro T100, Mates Smart S10, Mates Smart S20, Mates Smart S30, Mates Smart S40, Mates Smart S50, Mates Smart S60, Mates Smart S70, Mates Smart S80, Mates Smart S90, Mates Smart S100, Mates Sport X10, Mates Sport X20, Mates Sport X30, Mates Sport X40, Mates Sport X50, Mates Sport X60, Mates Sport X70, Mates Sport X80, Mates Sport X90, Mates Sport X100	
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is color or shape.	
Sample ID	:	RW-C-202302-0302-4-1# & RW-C-202302-0302-4-2#	
Product Description	:	Operation Frequency:	Bluetooth V5.3:2402MHz~2480MHz
		Number of Channel:	79 channels
		Antenna Gain:	2.5dBi Ceramic Chip Antenna
Power Supply (Earphone)		Input: DC 5V DC 3.7V 0.15Wh Li-ion battery	
Power Supply (Charger Box)		Input: 5V DC 3.7V 380mAh 1.406Wh Li-ion battery	
Software Version		V1.0	
Hardware Version		V1.0	
Remark: The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.			

Note: More test information about the EUT please refer the RF Test Report.

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The RF Exposure Evaluation for FCC:

SAR Test Exclusion Calculations

FCC: According to 447498 D04 Interim General RF Exposure Guidance v01.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{\text{th}}\ (\text{mW}) = \begin{cases} ERP_{20\ \text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ \text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ \text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Calculation:

Test separation: 5mm					
Bluetooth Mode (GFSK)					
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mW)**	**Limit P_{th}(mW)**
2.402	1.554	1±1	2	1.585	3
2.441	0.514	0±1	1	1.259	3
2.480	-0.494	0±1	1	1.259	3
Bluetooth Mode (π /4-DQPSK)					
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mw)**	**Limit P_{th}(mW)**
2.402	3.504	3±1	4	2.512	3
2.441	2.186	2±1	3	1.995	3
2.480	1.007	1±1	2	1.585	3
Bluetooth Mode (8-DPSK)					
2.402	3.866	3±1	4	2.512	3
2.441	2.801	2±1	3	1.995	3
2.480	1.559	1±1	2	1.585	3
The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 D04, No SAR is required.					

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