# 1. RF Exposure Requirements

### 1.1 General Information

**Client Information** 

Applicant: OMA FITNESS EQUIPMENT CO., LTD.

No.93 Tai An Road South, Yang'e village, Lunjiao Town, Shunde,

Foshan City, Guangdong, China

Manufacturer: OMA FITNESS EQUIPMENT CO., LTD.

No.93 Tai An Road South, Yang'e village, Lunjiao Town, Shunde, Address of manufacturer:

Foshan City, Guangdong, China

**General Description of EUT:** 

Product Name: Stairmill

Trade Name /

Model No.: LT04TB

Adding Model(s): LT04EB, LT02EB, LT02TB

Rated Voltage: AC120V

Power Adapter: /

FCC ID: 2BDTT-LT04 Equipment Type: Fixed device

**Technical Characteristics of EUT:** 

Bluetooth (BLE mode)

Bluetooth Version: V5.0 (BLE mode) Frequency Range: 2402-2480MHz

RF Output Power:

2Mbps: 2.98dBm (Conducted)

Data Rate: 1Mbps, 2Mbps

Modulation: GFSK
Quantity of Channels: 40
Channel Separation: 2MHz

Type of Antenna: External Antenna

Antenna Gain: 1.42dBi

Bluetooth (BR/EDR mode)

Bluetooth Version: V5.0 (BR/EDR mode)
Frequency Range: 2402-2480MHz

RF Output Power: 10.50dBm (Conducted)

Data Rate: 1Mbps, 2Mbps, 3Mbps

Modulation: GFSK, π/4 DQPSK, 8DPSK

Quantity of Channels: 79
Channel Separation: 1MHz

Type of Antenna: External Antenna

Antenna Gain: 1.42dBi

Wi-Fi (2.4G)

Support Standards: 802.11b, 802.11g, 802.11n, 802.11ax

2412-2462MHz for 802.11b/g/n/ax(HT/HE20)

Frequency Range:

2422-2452MHz for 802.11n/ax(HT/HE40)

RF Output Power: 19.74dBm (Conducted)

Type of Modulation: CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM

Quantity of Channels: 11 for 802.11b/g/n/ax(HT/HE20); 7 for 802.11n/ax(HT/HE40)

Channel Separation: 5MHz

Type of Antenna: External Antenna

Antenna Gain: 1.42dBi

Wi-Fi (5G)

802.11a, 802.11n(HT20), 802.11n-HT40,802.11ac-VHT20/40

Support Standards: 802.11ax-HE20/40

Frequency Range: 5180-5240MHz, 5745-5825MHz

Max. RF Output Power: 19.15dBm (Conducted)
Type of Modulation: QPSK, 16QAM, 64QAM

Type of Antenna: External Antenna

Antenna Gain: 2.17dBi

# 1.2 RF Exposure Exemption

According to §1.1307(b)(3) and KDB 447498 D04 Interim General RF Exposure Guidance v01, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

**Option A:** FCC Rule Part 1.1307 (b)(3)(i)(A):The available maximum time-averaged power is no more than 1mW, regardless of separation distance.

**Option B:** FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold  $P_{th}$  (mW) described in the following formula.  $P_{th}$  is given by:

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

Where

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

and

$$ERP_{20\;cm}\;(\text{mW}) = \begin{cases} 2040f & 0.3\;\text{GHz} \le f < 1.5\;\text{GHz} \\ \\ 3060 & 1.5\;\text{GHz} \le f \le 6\;\text{GHz} \end{cases}$$

d = the separation distance (cm);

**Option C:** FCC Rule Part 1.1307 (b)(3)(i)(C): The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters.

Single RF Sources Subject to Routine Environmental Evaluation					
RF Source frequency (MHz)	Threshold ERP (watts)				
0.3-1.34	1,920 R <sup>2</sup>				
1.34-30	3,450 R <sup>2</sup> /f <sup>2</sup>				
30-300	3.83 R <sup>2</sup>				
300-1,500	0.0128 R <sup>2</sup> f				
1,500-100,000	19.2R <sup>2</sup>				

#### For Multiple RF sources: FCC Rule Part 1.1307(b)(3)(ii):

- (A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).
- (B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

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

## 1.3 Calculated Result

Radio	Prediction	Output	Antenna	Duty	Tune-Up	ERP	
Access	Frequency	Power	Gain	Cycle	Time-Averaged Power		
Technology	(MHz)	(dBm)	(dBi)	(%)	(dBm)	(dBm)	
Bluetooth	2402	10.50	1.42	100	11.00	10.27	
Wi-Fi	2412	19.74	1.42	100	20.00	19.27	
Wi-Fi	5180	15.31	2.17	92.69	15.00	15.02	
Wi-Fi	5745	19.15	2.17	14.38	11.00	11.02	

Frequency	Option	Min. Distance	Max. Power		Exposure Limit	Dotio	Result
(MHz)		(cm)	(dBm)	(mW)	(mW)	Ratio	Pass/Fail
2402	С	20.00	10.27	10.64	768.00	0.01	Pass
2412	С	20.00	19.27	84.53	768.00	0.11	Pass
5180	С	20.00	15.02	31.77	768.00	0.04	Pass
5745	С	20.00	11.02	12.65	768.00	0.02	Pass

Note: 1. Time-Averaged Power=Output Power \* Duty Cycle; ERP= Time-Averaged Power+ Antenna gain-2.15dB

- 2. Option A, B and C refers as clause 1.2.
- 3. For option B, Max (time-averaged power, effective radiated power (ERP)) converts to Max. Power. For option C, ERP converts to Max. Power;
- 4. For option B,  $P_{th}$  (mW) converts to Exposure Limit (mW); For option C, ERP (W) converts to Exposure Limit (mW).
  - 5. Ratio= Tune-Up ERP (mW)/ Exposure Limit (mW)

#### **Mode for Simultaneous Multi-band Transmission:**

Radio Access	Ratio 1	Ratio 2	Simultaneous	Limit	Result
Technology	ratio i		Ratio		Pass/Fail

Note: BT and Wi-Fi can't transmit at the same time.

Result: Pass