1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	Shenzhen Shine Industrial Co., Ltd.
Address of applicant:	2-3/F, Bldg 5, 1st Industrial Zone, Changzhen Community, Yutang town,Guangming District, Shenzhen, Guangdong, China
Manufacturer:	Shenzhen Shine Industrial Co., Ltd.
Address of manufacturer:	2-3/F, Bldg 5, 1st Industrial Zone, Changzhen Community, Yutang town,Guangming District, Shenzhen, Guangdong, China

General Description of EUT:

Product Name:	Smart Body Fat Scale
Trade Name	/
Model No.:	VT702S
Adding Model(s):	HB902S, VT701S, VT7011S, VT7012S, VT7013S, VT7015S, VT7016S, VT7017S, VT7018S, VT7019S, VT7021S, VT7022S, VT7023S, VT7025S, VT7026S, VT7027S, VT7028S, VT7029S, VT716S, VT7161S, VT7162S, VT7163S, VT7165S, VT7166S, VT7167S, VT7168S, VT7169S, VT717S, VT7171S, VT7172S, VT7173S, VT7175S, VT7176S, VT7177S, VT7178S, VT7179S, VT719S, VT7191S, VT7192S, VT7193S, VT7195S, VT7196S, VT7197S, VT7198S, VT7199S, VT729S, VT7291S, VT7292S, VT7293S, VT7295S, VT7296S, VT7297S, VT7298S, VT7299S, HB9021S, HB9022S, HB9023S, HB9025S, HB9026S, HB9027S, HB9028S, HB9029S, HB909S, HB9091S, HB9092S, HB9093S, HB9095S, HB9096S, HB9097S, HB9098S, HB9099S, HB920S, HB9201S, HB9202S, HB9203S, HB9205S, HB9206S, HB9207S, HB9208S, HB9209S
Rated Voltage:	DC 4.5V
Power Adapter:	/
FCC ID:	2A2DS-HB902S
Equipment Type:	Mobile device

Technical Characteristics of EUT:

Bluetooth

Bluetooth Version:	V5.0 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	0.67dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	2.6dBi

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:

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

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 λ/2π, where λ 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^2
1.34-30	3,450 R^2/f^2
30-300	3.83 R^2
300-1,500	0.0128 R^2f
1,500-100,000	19.2R^2

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.

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

1.3 Calculated Result

Radio Access Technology	Prediction Frequency (MHz)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Tune-Up Time-Averaged Power (dBm)	ERP (dBm)
Bluetooth	2402	0.67	2.6	100	1.00	1.45

Frequency (MHz)	Option	Min. Distance (cm)	Max. Power (dBm)	Max. Power (mW)	Exposure Limit (mW)	Ratio	Result Pass/Fail
2402	B	0.5	1.45	1.40	2.788	0.50	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 Technology	Ratio 1	Ratio 2	Simultaneous Ratio	Limit	Result Pass/Fail
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Result: Pass