1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	ZHUHAI LTECH TECHNOLOGY CO., LTD
Address of applicant:	15th Build, No.3, Pingdong 6th Road, Nanping Technical Industrial Park, Zhuhai, China
Manufacturer:	ZHUHAI LTECH TECHNOLOGY CO., LTD
Address of manufacturer:	15th Build, No.3, Pingdong 6th Road, Nanping Technical Industrial Park, Zhuhai, China

General Description of EUT:

Product Name:	LED Driver
Trade Name	/
Model No.:	SE-40-300-1050-W2B
Adding Model(s):	SE-40-300-1050-W1B, SE-30-200-800-W2B, SE-30-200-800-W1B
Rated Voltage:	AC 120V
FCC ID:	2AYCY-SE403001050
Equipment Type:	Mobile device

Technical Characteristics of EUT:

Bluetooth

Bluetooth Version:	V5.0 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	4.211dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	2dBi

NFC

Support Standards:	NFC
Frequency Range:	13.56MHz
Max. Field Strength:	56.76dBuV/m (at 3m)
Antenna Type:	Coil Antenna

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:

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

Where

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

and

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

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 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 $R^2 f$
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	4.211	2	100	5.00	4.85
NFC	13.56	-38.5	0	/	-38.00	-40.65

Frequency (MHz)	Option	Min. Distance (cm)	Max. Power (dBm)	Max. Power (mW)	Exposure Limit (mW)	Ratio	Result Pass/Fail
2402	C	20	4.85	3.05	768.00	0.01	Pass
13.56	B	20	-38.00	0.00	27.66	0.01	Pass

*Note: 1. a. Time-Averaged Power=Output Power * Duty Cycle;*
ERP= Time-Averaged Power+ Antenna gain-2.15dB;
b. EIRP= E-104.8+20logD; Output Power=EIRP- Antenna Gain;
ERP=EIRP-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
Bluetooth + NFC	0.01	0.01	0.02	1	Pass

Result: Pass