

1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	KO-STAR DEVELOPMENT CO.,LTD
Address of applicant:	No.3, Yicun Industrial Area, Xikeng, Henggang Town, Longgang District, Shenzhen, China
Manufacturer:	SHENZHEN BASSWORLD TECHNOLOGY CO. , LTD
Address of manufacturer:	Floor 1~3, Plant No. 2, Junquan Street, Xikeng Community, Yuanshan Street, Longgang District, Shenzhen, Guangdong, China

General Description of EUT:

Product Name:	OWS Earbuds
Trade Name	/
Model No.:	K61
Adding Model(s):	MZX1050, MZX1050-BLK, MZX1050-WHT, MZX1050-GRY, K34, K41, K42, K44, K47, K48, K51, K52, K52B, K53, K55, K56, K57, K60, K62, K80, K90, KBL20, T6, T8, T10, T12, T13, T14, T15, T16, T17, T18, T19, T20, T22, T24, T26, T34, T35, T41, T42, T43, T45, T46, T47, T50, T50B, NB30, NB40, NB56, NB80, NBC80, NBC90, NBC90PRO, NBC55, KTX02 Ultra, KTX02, MS-510, M-250, NB-1097, NBC93PRO
Rated Voltage:	DC 5V
Battery Capacity:	Charging compartment: 3.7V 400mAh Headset: 3.7V 40mAh
Adapter Model:	/
FCC ID:	2ALHZK61
Equipment Type:	Portable device

Technical Characteristics of EUT:

Bluetooth

Bluetooth Version:	V5.3 (EDR mode)
Frequency Range:	2402-2480MHz
RF Output Power:	-1.70dBm (Conducted)
Data Rate:	1Mbps, 2Mbps
Modulation:	GFSK, $\pi/4$ DQPSK
Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	FPC Antenna
Antenna Gain:	Left: 2.69dBi Right: 3.65dBi

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:

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

Where

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

and

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

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	$19.2 R^2$

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	Output Power	Antenna Gain	Duty Cycle	Tune-Up Time-Averaged Power	ERP
	(MHz)	(dBm)	(dBi)	(%)	(dBm)	(dBm)
Bluetooth(Left)	2402	-1.70	2.69	100	-1.00	-0.46
Bluetooth(Right)	2402	-1.70	3.65	100	-1.00	0.50

Frequency (MHz)	Option	Min. Distance	Max. Power		Exposure Limit	Ratio	Result
		(cm)	(dBm)	(mW)	(mW)		Pass/Fail
2402	B	0.5	-0.46	0.90	2.788	0.32	Pass
2402	B	0.5	0.50	1.12	2.788	0.40	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
Bluetooth(Left)+ Bluetooth(Right)	0.32	0.40	0.72	1.0	Pass

Result: Pass