

Maximum Permissible Exposure Evaluation

FCC ID: 2AZTZ-ELFS2

1. Client Information

Applicant	:	Kontech Electronics Co., Ltd.
Address	:	2nd Floor No.2 building, Detai Technology Industrial Park, Huarong Road, Longhua district, Shenzhen 518109, China
Manufacturer	:	Kontech Smart Display (Guangdong) Co., Ltd.
Address	:	6F-7F No.1 building, Fushun Technology Park, Shatian town, Huizhou, Guangdong China 516269

2. General Description of EUT

EUT Name	:	2.0 Channel Outdoor Soundbar	
Models No.	:	ELF S2, ELF #* (# stands for letters A-Z; * stands for numbers 0-9)	
Model Difference	:	All PCB boards and circuit diagrams are the same, the only difference is that size and color.	
Product Description	:	Operation Frequency:	Bluetooth V4.2:2402MHz~2480MHz
		Number of Channel:	79 channels
		RF Output Power:	-4.484dBm
		Antenna Gain:	1.1dBi PCB Antenna
Power Rating	:	Input: 100-240V~, 50/60Hz, 40W	
Software Version	:	----	
Hardware Version	:	----	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.	

MPE Calculations

1. Antenna Gain:

PCB Antenna: 1.1dBi.

2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna

4. Test Result:

Worst Maximum MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
GFSK	1	2402	-5.773	-6±1	-5	1.1	20	0.00008
		2441	-5.595	-6±1	-5	1.1	20	0.00008
		2480	-5.649	-6±1	-5	1.1	20	0.00008
Pi/4-DQPSK	1	2402	-4.651	-5±1	-4	1.1	20	0.00010
		2441	-4.484	-4±1	-3	1.1	20	0.00013
		2480	-4.595	-5±1	-4	1.1	20	0.00010
Note: (1) N _{TX} = Number of Transmit Antennas (2) RF Output power specifies that Maximum Conducted Peak Output Power.								

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/ cm ²)
300-1,500	F/1500
1,500-100,000	1.0

For 2.4G:2409.5~2468 MHz

MPE limit S: 1mW/ cm²

The MPE is calculated as $0.00013 \text{ mW} / \text{cm}^2 < \text{limit } 1 \text{mW} / \text{cm}^2$. So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

Note

For a more detailed features description, please refer to the RF Test Report.

6. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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