

RF EXPOSURE REPORT

Equipment Under Test	Bluetooth Audio
Modle Name	ARA-5090WF-E
Variant Model Name	-
FCC ID	2ARFV-ARA5090WFE
IC Number	24404-ARA5090WFE
Applicant	WORLDPLUS ELECTRONICS CO.,LTD
Manufacturer	WORLDPLUS ELECTRONICS CO.,LTD
Date of Test(s)	2020. 06. 05 ~ 2020. 06. 26
Date of Issue	2020. 06. 26

In the configuration tested, the EUT complied with the standards specified above.

Issue to	Issue by
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RF EXPOSURE

1. Regulation

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissible Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm ²]	Averaging Time [minute]
Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*(100)	30
1.34 ~ 30	824/f	2.19/f	*(180/f ²)	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1	30

f=frequency in MHz, *= plane-wave equivalent power density

MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad (\Rightarrow R = \sqrt{PG/4\pi S})$$

S = power density [mW/cm²]

P = Power input to antenna [mW]

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 [cm]

2. RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

MPE Calculations : Bluetooth BDR

- Frequency Range : 2 402 MHz ~ 2 480 MHz
- Measured RF Output Power (Peak) : 2.27 dBm
- Target Power & Tolerance 1.00 dBm & $\pm$ 1.50 dB
(Maximum : 2.50 dBm & Minimum : -0.50 dBm)
- Maximum Peak Antenna Gain : 0.50 dBi
- Maximum Output Power for the Calculation : 2.50 dBm

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the
The MPE calculation for this exposure is shown below.

- EIRP = P + G = <u>2.50</u> dBm + <u>0.50</u> dBi = <u>3.00</u> dBm = <u>2.00</u> mW	- NOTE P : Max tuneup Power (dBm) G : Maximum Peak Antenna Gain (dBi)
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Power Density at the specific separation

- S = EIRP / (4 X R ² π) = <u>2.00</u> / (4 X 20 ² X π) = <u>0.000 397</u> mW/cm ²	- NOTE S : Maximum Power Density (mW/cm ²) EIRP : Equivalent Isotropic Radiated Power (mW) R : Distance to the center of the radiation of the antenna (<u>20</u> cm)
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RF Exposure Compliance Issue

Therefore, EUT is not required the SAR Evaluation.

MPE Calculations : Bluetooth EDR

- Frequency Range : 2 402 MHz ~ 2 480 MHz
- Measured RF Output Power (Peak) : 4.83 dBm
- Target Power & Tolerance 3.50 dBm & $\pm$ 1.50 dB
(Maximum : 5.00 dBm & Minimum : 2.00 dBm)
- Maximum Peak Antenna Gain : 0.50 dBi
- Maximum Output Power for the Calculation : 5.00 dBm

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the
The MPE calculation for this exposure is shown below.

- EIRP = P + G = <u>5.00</u> dBm + <u>0.50</u> dBi = <u>5.50</u> dBm = <u>3.55</u> mW	- NOTE P : Max tuneup Power (dBm) G : Maximum Peak Antenna Gain (dBi)
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Power Density at the specific separation

- S = EIRP / (4 X R ² π) = <u>3.55</u> / (4 X 20 ² X π) = <u>0.000 706</u> mW/cm ²	- NOTE S : Maximum Power Density (mW/cm ²) EIRP : Equivalent Isotropic Radiated Power (mW) R : Distance to the center of the radiation of the antenna (<u>20</u> cm)
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RF Exposure Compliance Issue

Therefore, EUT is not required the SAR Evaluation.