

Maximum Permissible Exposure Evaluation

FCC ID: 2BA YP-APE700

1. Client Information

Applicant	:	Yantai Zhuoxing Electronics Co.,Ltd.
Address	:	Building 6, Yeda Technology Park, No.300 Changjiang Road, YEDA, Yantai, Shandong Province, China
Manufacturer	:	Yantai Zhuoxing Electronics Co.,Ltd.
Address	:	Building 6, Yeda Technology Park, No.300 Changjiang Road, YEDA, Yantai, Shandong Province, China

2. General Description of EUT

EUT Name	:	Wireless receiving and calling system
Model(s) No.	:	APE700, SC-R10, APE6600, APE6800, APE6900, APE9300, APE9500, APE1200, APE1300, APE2000, APE2300, SC-R15, APE8000, SC-T180, SC-T190, SC-R16, APE8800, SC-R50, APE6100, APE6700, SC-R60, SC-R70, SC-R80, APE560, APE830, APE510, APE100, APE160, APE310, APE320, APE330, APE350, APE520, APE80, APE130, APE150, APE500, APE950, APE930, APE730, APE750, APE630, SC-R19, SC-R18, APE590, APE170, APE180, APE210, APE220, APE230
Model Difference	:	All these models are identical in the same PCB layout and electrical circuit, the only difference is that Appearance color.
Product Description	:	Operation Frequency: 433.92 MHz Antenna Gain: -5.42dBi PCB Antenna
Power Supply	:	DC 3.0V by button cell
Software Version	:	V1.0
Hardware Version	:	V11

Remark: The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.

Note: More test information about the EUT please refer the RF Test Report.

The RF Exposure Evaluation for FCC:

SAR Test Exclusion Calculations

FCC: According to 447498 D04 Interim General RF Exposure Guidance v01.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

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

where

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

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Calculations

1. Antenna Gain:

PCB Antenna: -5.42dBi.

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:

$$E = EIRP - 20\log D + 104.8$$

where:

E = electric field strength in $\text{dB}\mu\text{V}/\text{m}$,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = \text{E} - 104.8 + 20\log D = 73.44 - 104.8 + 20\log 3 = -21.82 \text{ dBm}$$

Frequency (MHz)	Measured Power (dBm)	Tune up Tolerance \pm (dB)	Output power (Max. Turn-up Procedure) (mW)	Limit (mW)
433.92	-21.82	-21 \pm 1	0.010	22

Note: At separation distance of ≤ 5 mm

5. 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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