

RADIO FREQUENCY EXPOSURE EVALATION

General Information

Applicant : SUPRA Foto-Elektronik-Vertriebs-GmbH
EUT Description : Bauhn KMA-1 Karaoke Microphone Assortment (BKS-30)
Model No. : BKS-30 Black, BKS-30 Pink
Radio Tech : Bluetooth(LE)
Modulation : GFSK
Frequency : 2402MHz-2480MHz

Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.
Site Location : 3F, Building 34, No. 680 Guiping Rd.,
Caohejing, Hi-Tech Park, Shanghai 200233, China
NVLAP, Lab Code : 200371-0
FCC Designation Number : CN5027
Test Firm Registration Number: 954668

Results

The EUT is operated as one portable device, and it is compliant with the RF Exposure Exemption.

Producer : Huimin Yan
HUIMIN YAN / Assistant
 For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

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Authorized Signature(s) Jarey Lu
JAREY LU / Deputy Assistant Manager

Evaluation Method

KDB 447498 D04 Interim General RF Exposure Guidance v01

Applicable Standard:

KDB 447498 D04 v01:

Section 2.1.3: SAR-Based Exemption.

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions. Accordingly, a RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold. This exemption threshold was derived based on general population 1-g SAR requirements and is detailed in Appendix C.

FCC CFR 47 §1.1307(b)(3)(i)(B):

A single RF source is exempt if 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. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). 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);

*KDB 412172 D01 Determining ERP and EIRP v01r01:**Section 1.1. For Field Strength Approach(linear terms):*

$$\text{eirp} = p_t \times g_t = (E \times d)^2 / 30$$

where p_t = transmitter output power in watts, g_t = numeric gain of the transmitting antenna (unitless), E = electric field strength in V/m, d = measurement distance in meters (m).

$$\text{erp} = \text{eirp} / 1.64 = (E \times d)^2 / (30 \times 1.64)$$

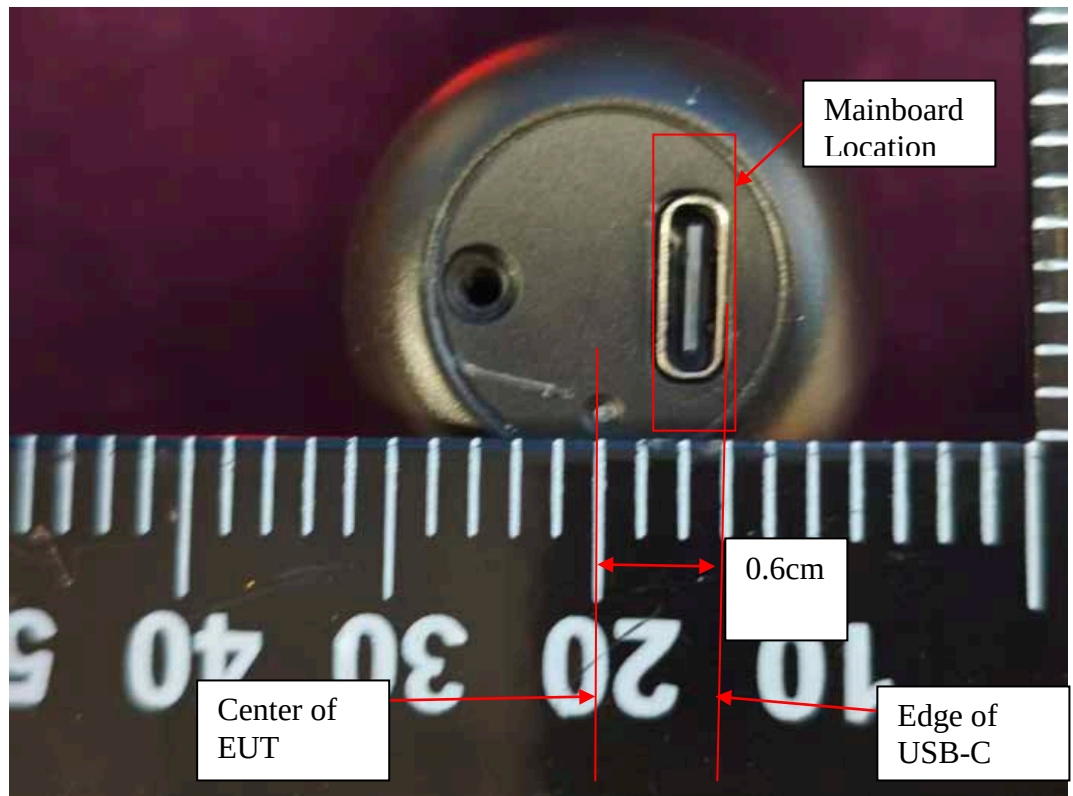
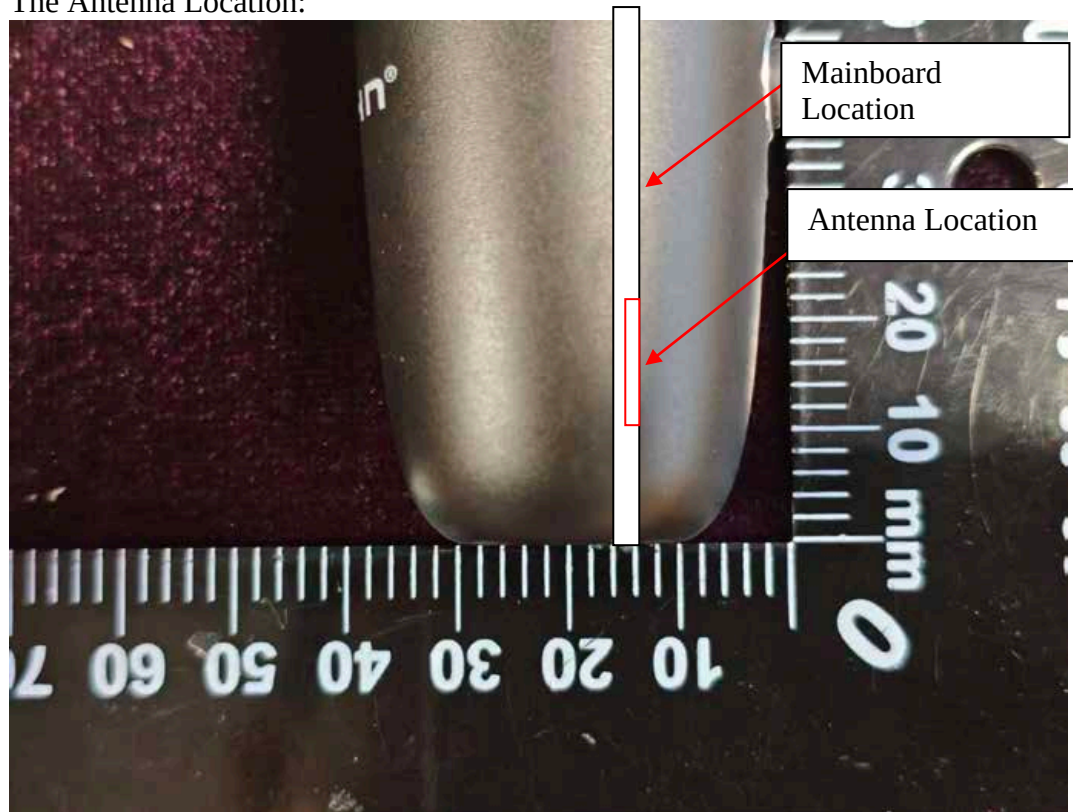
where all terms are as previously defined.

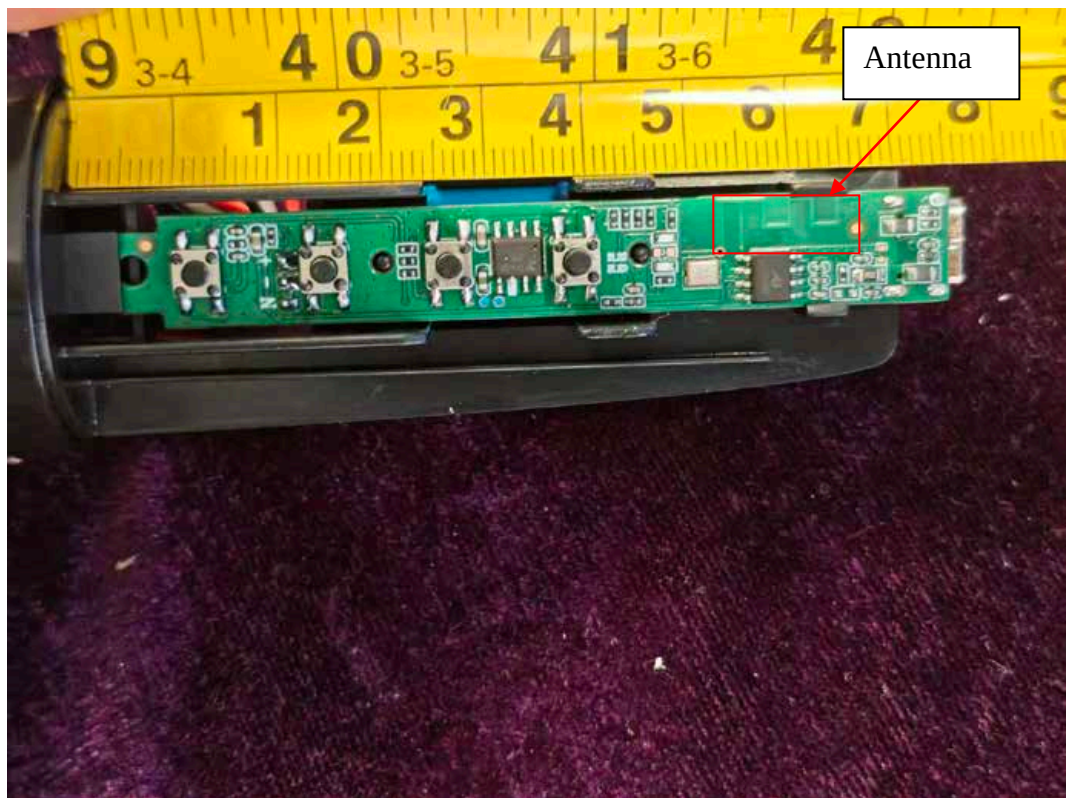
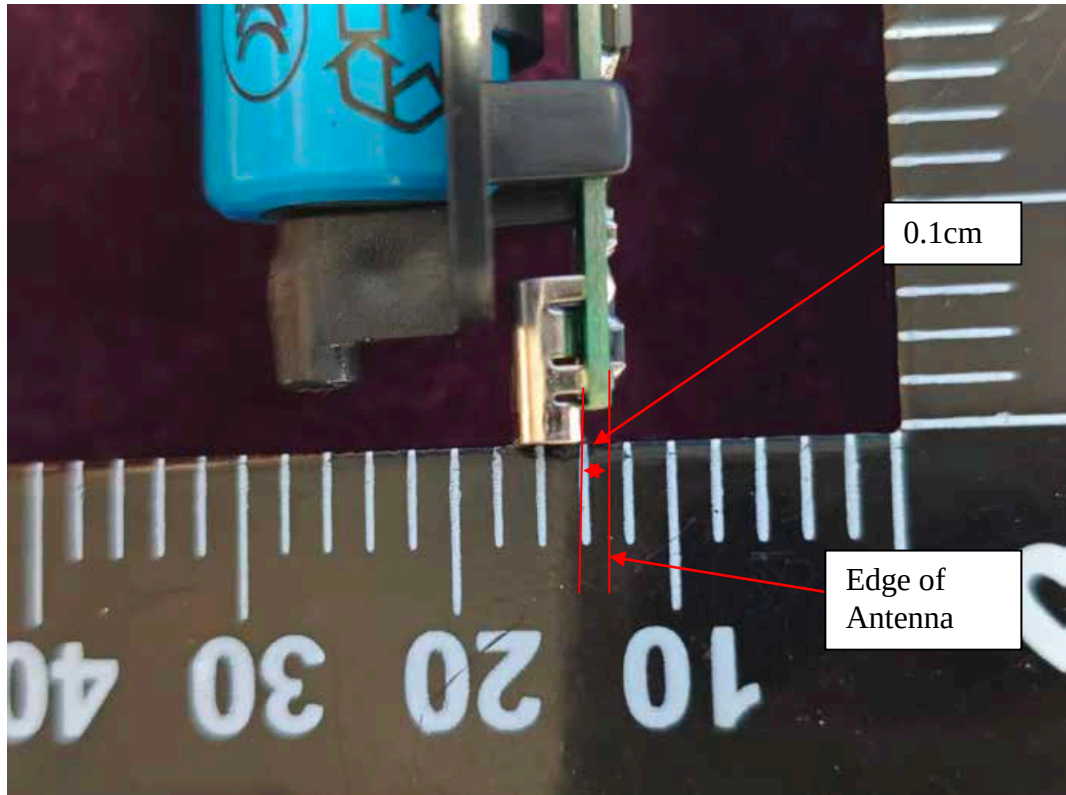
Section 1.3 Relationship Between ERP and EIRP:

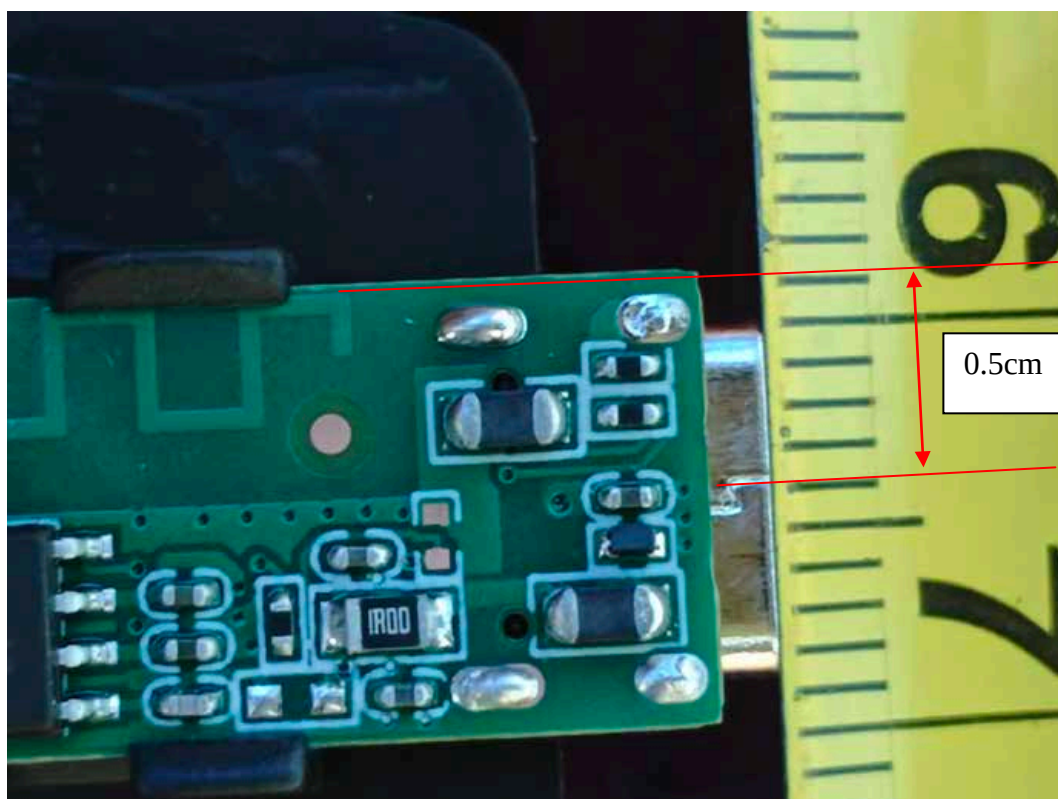
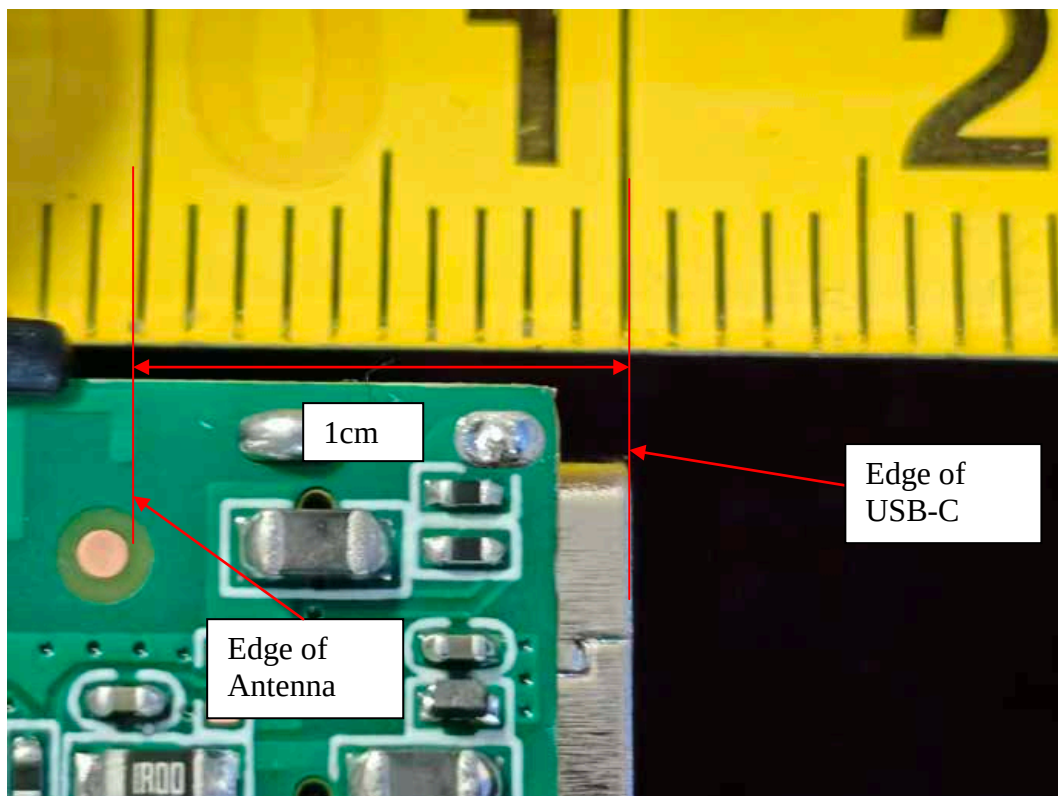
$$\text{ERP} = \text{EIRP} - 2.15 \text{ dB.}$$

Separation Distance:

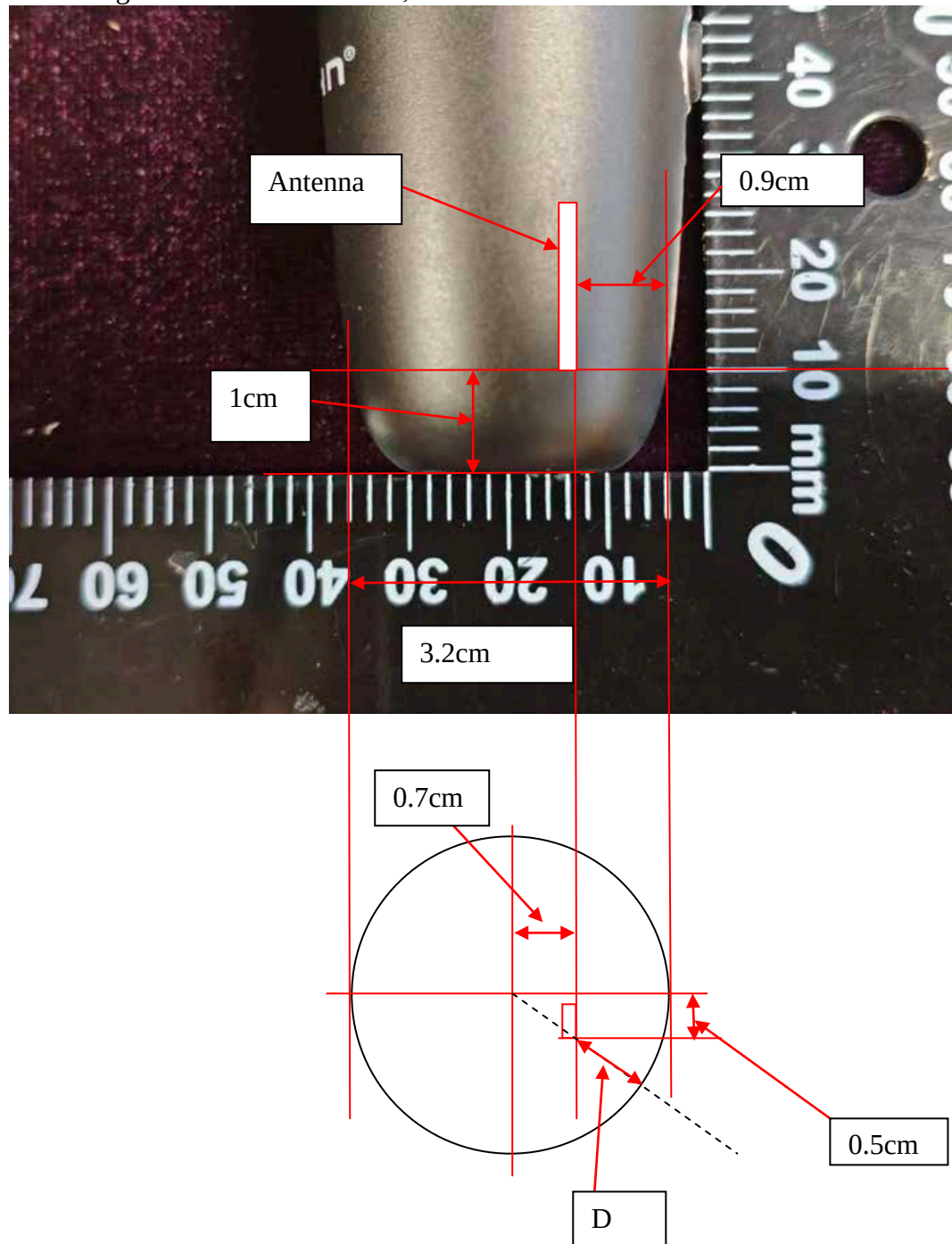
The Antenna Location:







According to the dimension above, it Antenna must be located as below:



where, $D = 3.2/2 - (0.7^2 + 0.5^2)^{1/2} \text{ cm} \approx 0.7 \text{ cm}$

So, The minimum separation distance between Antenna and surface of EUT was 0.7cm.

RF Exposure evaluation:

Mode	Frequency	Output Power		Antenna Gain	Maximum E.R.P		Threshold P_{th}	Verdict
	(MHz)	(dBm)	(mW)	(dBi)	(dBm)	(mW)	(mW)	
BLE	2480	-0.013	0.997	1.7	-0.463	0.899	5.2	Compliant

Note1: For this EUT which operated as portable device, the separation distance is 0.7 cm.

Note2: The Conducted output power and Maximum ERP both no greater than the threshold P_{th} , that meets the exemption, the RF exposure evaluation is not required.

Note3: Maximum ERP (dBm) = Output Power (dBm) + Antenna Gain (dBi) – 2.15, that according to KDB 412172 D01 v01r01.

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