

RADIO FREQUENCY EXPOSURE EVALUATION

General Information

Applicant : Savant Technologies LLC, dba GE Lighting, a Savant company
EUT Description : Wifi and Bluetooth module
Model No. : LBEE5QD1ZM
Radio Tech : BLE 5.0, Bluetooth(FHSS), IEEE 802.11 a/b/g/n/ac.

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

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);

RF Exposure evaluation:

Mode	Frequency	Max output power	Ant. Gain	Max E.I.R.P		P _{th}	Ratio
	GHz	dBm	dBi	dBm	mW	mW	numeric
BLE	2.4	5.78	4	9.78	9.51	3060	0.0031
BT	2.4	5.79	4	9.79	9.53	3060	0.0031
802.11b	2.4	18.56	4	22.56	180.30	3060	0.0589
802.11g	2.4	18.76	4	22.76	188.80	3060	0.0617
802.11n	2.4	17.89	4	21.89	154.53	3060	0.0505
802.11a	5	16.96	4	20.96	124.74	3060	0.0408
802.11n20	5	15.98	4	19.98	99.54	3060	0.0325
802.11n40	5	15.99	4	19.99	99.77	3060	0.0326
802.11ac80	5	15.65	4	19.65	92.26	3060	0.0302
Sum of Ratio (for Simultaneous Transmissions SAR Analysis)							0.3134

Note1: For this EUT, and the separation distance is 20 cm.

Note2: The Ratio = [Calculated EIRP(mW)]/[Limit(mW)].

Note3: The Conducted output power and Maximum EIRP both no greater than the threshold P_{th} and the sum of ratio was less than 1, that meets the exemption, the RF exposure evaluation is not required.

Note4: Maximum EIRP (dBm)=Output Power (dBm)+ Antenna Gain (dBi).

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