SAR evaluation

Product Name	:	Soundbar System / Karaoke Sound Bar
FCC ID	:	ESX-SK210X
Test Standard	:	KDB447498D04 General RF Exposure Guidance v01

According to 447498 D04 Interim General RF Exposure Guidance v01

Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

$$P_{\text{th}}\ (\text{mW}) = \begin{cases} ERP_{20\ \text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ \text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \quad \text{(B.2)}$$

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).

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

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\ \text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \quad \text{(B.1)}$$

Calculated Result and Limit (WORSE CASE IS AS BELOW)

BT

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm²)	Test Result
3.96dBi(2.489)	-0.495	0.892 (pi/4DQPSK 2442)	3060	Compiles

ERP=-0.495+3.96-2.15=1.354mW

BLE

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm²)	Test Result
3.96dBi(2.489)	-0.351	0.922 (2442)	3060	Compiles

ERP=-0.351+3.96-2.15=1.399 mW

2.4G

Directional antennaGain (Numeric)	Field strength (dBμV/m)	Power (mW)	Limit (mW/cm²)	Test Result
5.41dBi(3.475)	81.65	0.0439 (2480)	3060	Compiles

ERP=0.0439x0.6095=0.0268 mW

Contact module

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm²)	Test Result
3.9dBi(2.455)	2.1	1.622 (2405.35)	3060	Compiles

ERP=2.10+3.9-2.15=2.427mW

$$\sum_{i=1}^{a}\frac{P_i}{P_{\mathrm{th},i}}$$ =0.892/3060+0.922/3060+0.0439/3060+1.622/3060=0.001137222<1

$$\sum_{j=1}^{b}\frac{ERP_j}{ERP_{\mathrm{th},j}}$$ =(1.354+1.399+0.0268+2.427)/3060 =0.001701569<1