

1 Test Sample Description:

Product Name: SoundFlow Audio Broadcasting System

Model#: SAT-1

Functional Description: The SAT-1 SoundFlow Audio Broadcasting System is a Bluetooth Low Energy (BLE) audio broadcasting device designed to transmit audio over Bluetooth Auracast or Unicast.

Power supply: 5VDC USB

Transmitter Category: Fixed (Fixed RF source is one that is physically secured at one location, even temporarily, and is not able to be easily moved to another location while radiating.)

Mobile (A transmitting device designed to be used in non-fixed locations such that a separation distance greater than 20 centimeters is normally maintained between the RF source's radiating structure(s) and the body of the user and/or bystander.)

Radio BT:

Frequency Range: 2402 – 2480 MHz

Mode of operation: DTS (BLE)

Antenna Description: P/N: SR4W030, Polarization: Linear, Peak Gain: 2.6(dBi typ. Free space)

Reference Standards

§ 1.1310: Radiofrequency radiation exposure limits.

§ 2.1093: Radiofrequency radiation exposure evaluation: portable devices.

§ 2.1091: Radiofrequency radiation exposure evaluation: mobile devices.

§ 1.1307(b) (3) (i) (b): For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b) (2) of this section)

KDB 447498 D01 General RF Exposure Guidance v06

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2 RF Exposure Limits:

AATMOD1 evaluated for RF radiation exposure according to the provisions of FCC §2.1091, MPE guidelines identified in FCC §1.1310 and FCC KDB 447498:2015.

TABLE 1 TO §1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1500-100,000			5	<6
(ii) 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/1500	<30
1,500-100,000			1.0	<30

Where f = frequency in MHz. * = Plane-wave equivalent power density.

3 Transmitters output power (EIRP):

EIRP calculated using corrected antenna port conducted output power plus the associated antenna gain for BLE radio. The table below shows the EIRP value for BLE in maximum transmission mode. Duty cycle correction factor added for BLE radio. The worst case value is highlighted below.

Radio/Mode	Frequency (MHz)	Corrected Conducted RF Output (dBm)	Max. antenna gain (dBi)	EIRP (dBm)	EIRP (mW)	Measured Power Density (mw/cm ²)	Limit Power Density (mw/cm ²)
BLE _(1Mbps)	2402	6.65	2.6	9.83	8.42	0.0017	1
	2440	6.30		9.55	7.8	0.00155	1
	2480	5.81		8.41	7.0	0.0014	1
Radio/Mode	Frequency (MHz)	Corrected Conducted RF Output (dBm)	Max. antenna gain (dBi)	EIRP (dBm)	EIRP (mW)	Measured Power Density (mw/cm ²)	Limit Power Density (mw/cm ²)
BLE _(2Mbps)	2402	6.62	2.6	9.73	8.36	0.0017	1
	2440	6.25		8.85	7.7	0.00153	1
	2480	5.77		8.37	6.9	0.0014	1

3.1 Calculation Procedure

The procedure used to determine the RF power density was based upon a calculation for determining compliance with the MPE requirements.

The power generated by the transmitters used in this product was initially measured by a spectrum analyzer and the powers were recorded. Through use of the Friis transmission formula and knowledge of the maximum antenna gain to be used, the power density level is calculated at a distance of 20cm.

Friis Transmission Formula

Friis transmission formula: $\text{Power Density} = (\text{Pout} \cdot G) / (4\pi r^2)$

$\text{Power Density} = (\text{EIRP}) / (4\pi r^2)$

Where,

$\text{Pd} = \text{Power Density (mW/cm}^2\text{)}$ $\pi = 3.1416$

$\text{EIRP} = [\text{Output power to antenna} + \text{antenna Gain (dBi)}] \text{ mW}$

$r = \text{distance between observation point and center of the radiator (20 cm)}$

4 Conclusion:

Worse Measured Power Density (mw/cm ²)	Distance (cm)	Limit Power Density (mw/cm ²)	Result
0.0019	20	1	Compliant