FCC 47 CFR MPE REPORT

Soundlab Technology Company Limited

Soundbar

Model Number: Klipsch Cinema 1200 Sound Bar

FCC ID: 2ATKO-BAR1200

Prepared for:	Soundlab Technology Company Limited
	No.101,202,Building 1, Microlab Industrial Park, No.2 Baozi South Road,
	Kengzi, Pingshan District, ShenZhen, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

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Maximum Permissible Exposure

1. Applicable Standards

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

1.1. Limits for Maximum Permissible Exposure (MPE)

(a) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-10000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-10000			1.o	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

1.2. MPE Calculation Method

$$E\ (V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd\ (W/m^2) = \frac{E^2}{377}$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

2. Conducted Power Result

Antenna 1

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
GFSK	2402	3.78	2.388	3±2	2.34	1.71
	2441	3.67	2.328	3±2	2.34	1.71
	2480	3.49	2.234	3±2	2.34	1.71
8-DPSK	2402	6.55	4.519	6±2	2.34	1.71
	2441	6.45	4.416	6±2	2.34	1.71
	2480	6.24	4.207	6±2	2.34	1.71
BLE(1M)	2402	3.81	2.404	3±2	2.34	1.71
	2440	3.71	2.350	3±2	2.34	1.71
	2480	3.52	2.249	3±2	2.34	1.71
BLE(2M)	2402	3.81	2.404	3±2	2.34	1.71
	2440	3.72	2.355	3±2	2.34	1.71
	2480	3.53	2.254	3±2	2.34	1.71
IEEE 802.11b	2412	15.77	37.757	15±2	2.34	1.71
	2437	15.55	35.892	15±2	2.34	1.71
	2462	15.14	32.659	15±2	2.34	1.71
IEEE 802.11g	2412	18.97	78.886	18±2	2.34	1.71
	2437	18.81	76.033	18±2	2.34	1.71
	2462	18.40	69.183	18±2	2.34	1.71
IEEE 802.11n HT20	2412	18.54	71.450	18±2	2.34	1.71
	2437	18.25	66.834	18±2	2.34	1.71
	2462	17.99	62.951	17±2	2.34	1.71
IEEE 802.11n HT40	2422	19.41	87.297	19±2	2.34	1.71
	2437	19.22	83.560	19±2	2.34	1.71
	2452	19.10	81.283	19±2	2.34	1.71
IEEE 802.11a	5180	10.26	10.617	10±2	3.28	2.13
	5200	10.14	10.328	10±2	3.28	2.13
	5240	11.22	13.243	11±2	3.28	2.13
	5260	11.57	14.355	11±2	3.28	2.13
	5300	11.64	14.588	11±2	3.28	2.13
	5320	11.68	14.723	11±2	3.28	2.13
	5500	15.60	36.308	15±2	3.28	2.13
	5580	15.13	32.584	15±2	3.28	2.13
	5700	12.93	19.634	12±2	3.28	2.13

	5745	10.40	10.965	10±2	3.28	2.13
	5785	11.27	13.397	11±2	3.28	2.13
	5825	10.71	11.776	10±2	3.28	2.13

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11n HT20	5180	10.32	10.765	10±2	3.28	2.13
	5200	10.20	10.471	10±2	3.28	2.13
	5240	11.27	13.397	11±2	3.28	2.13
	5260	11.63	14.555	11±2	3.28	2.13
	5300	11.68	14.723	11±2	3.28	2.13
	5320	11.74	14.928	11±2	3.28	2.13
	5500	15.65	36.728	15±2	3.28	2.13
	5580	15.19	33.037	15±2	3.28	2.13
	5700	13.02	20.045	13±2	3.28	2.13
	5745	10.60	11.482	10±2	3.28	2.13
	5785	11.45	13.964	11±2	3.28	2.13
	5825	10.90	12.303	10±2	3.28	2.13
IEEE 802.11ac VHT20	5180	10.85	12.162	10±2	3.28	2.13
	5200	10.75	11.885	10±2	3.28	2.13
	5240	11.69	14.757	11±2	3.28	2.13
	5260	12.03	15.959	12±2	3.28	2.13
	5300	12.01	15.885	12±2	3.28	2.13
	5320	12.06	16.069	12±2	3.28	2.13
	5500	15.71	37.239	15±2	3.28	2.13
	5580	15.19	33.037	15±2	3.28	2.13
	5700	13.17	20.749	13±2	3.28	2.13
	5745	10.84	12.134	10±2	3.28	2.13
	5785	11.70	14.791	11±2	3.28	2.13
	5825	11.11	12.912	11±2	3.28	2.13

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11n HT40	5190	10.16	10.375	10±2	3.28	2.13
	5230	11.02	12.647	11±2	3.28	2.13
	5270	11.55	14.289	11±2	3.28	2.13
	5310	11.73	14.894	11±2	3.28	2.13
	5510	15.44	34.995	15±2	3.28	2.13
	5670	12.42	17.458	12±2	3.28	2.13
	5755	10.67	11.668	10±2	3.28	2.13
	5795	11.46	13.996	11±2	3.28	2.13
IEEE 802.11ac VHT40	5190	10.32	10.765	10±2	3.28	2.13
	5230	11.17	13.092	11±2	3.28	2.13
	5270	11.69	14.757	11±2	3.28	2.13
	5310	11.85	15.311	11±2	3.28	2.13
	5510	15.53	35.727	15±2	3.28	2.13
	5670	12.49	17.742	12±2	3.28	2.13
	5755	10.79	11.995	10±2	3.28	2.13
	5795	11.57	14.355	11±2	3.28	2.13
IEEE 802.11ac VHT80	5210	10.78	11.967	10±2	3.28	2.13
	5290	11.82	15.205	11±2	3.28	2.13
	5530	15.62	36.475	15±2	3.28	2.13
	5775	11.60	14.454	11±2	3.28	2.13

Antenna 2

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
GFSK	2402	3.67	2.328	3±2	2.34	1.71
	2441	3.52	2.249	3±2	2.34	1.71
	2480	3.28	2.128	3±2	2.34	1.71
8-DPSK	2402	6.42	4.385	6±2	2.34	1.71
	2441	6.24	4.207	6±2	2.34	1.71
	2480	6.01	3.990	6±2	2.34	1.71
BLE(1M)	2402	3.24	2.109	3±2	2.34	1.71
	2440	3.09	2.037	3±2	2.34	1.71
	2480	2.88	1.941	3±2	2.34	1.71
BLE(2M)	2402	3.26	2.118	3±2	2.34	1.71
	2440	3.09	2.037	3±2	2.34	1.71
	2480	2.88	1.941	3±2	2.34	1.71
IEEE 802.11b	2412	15.65	36.728	15±2	2.34	1.71
	2437	15.26	33.574	15±2	2.34	1.71
	2462	14.80	30.200	14±2	2.34	1.71
IEEE 802.11g	2412	18.96	78.705	18±2	2.34	1.71
	2437	18.56	71.779	18±2	2.34	1.71
	2462	18.09	64.417	18±2	2.34	1.71
IEEE 802.11n HT20	2412	19.15	82.224	19±2	2.34	1.71
	2437	19.01	79.616	19±2	2.34	1.71
	2462	18.61	72.611	18±2	2.34	1.71
IEEE 802.11n HT40	2422	19.52	89.536	19±2	2.34	1.71
	2437	19.47	88.512	19±2	2.34	1.71
	2452	19.45	88.105	19±2	2.34	1.71
IEEE 802.11a	5180	10.13	10.304	10±2	3.28	2.13
	5200	10.03	10.069	10±2	3.28	2.13
	5240	11.11	12.912	11±2	3.28	2.13
	5260	11.48	14.060	11±2	3.28	2.13
	5300	11.54	14.256	11±2	3.28	2.13
	5320	11.60	14.454	11±2	3.28	2.13
	5500	15.53	35.727	15±2	3.28	2.13
	5580	15.61	36.392	15±2	3.28	2.13
	5700	12.85	19.275	12±2	3.28	2.13
	5745	10.40	10.965	10±2	3.28	2.13
	5785	10.39	10.940	10±2	3.28	2.13

	5825	10.71	11.776	10±2	3.28	2.13

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11n HT20	5180	10.29	10.691	10±2	3.28	2.13
	5200	10.17	10.399	10±2	3.28	2.13
	5240	11.24	13.305	11±2	3.28	2.13
	5260	11.60	14.454	11±2	3.28	2.13
	5300	11.67	14.689	11±2	3.28	2.13
	5320	11.72	14.859	11±2	3.28	2.13
	5500	15.62	36.475	15±2	3.28	2.13
	5580	15.17	32.885	15±2	3.28	2.13
	5700	13.00	19.953	13±2	3.28	2.13
	5745	10.59	11.455	10±2	3.28	2.13
	5785	11.43	13.900	11±2	3.28	2.13
	5825	10.89	12.274	10±2	3.28	2.13
IEEE 802.11ac VHT20	5180	10.65	11.614	10±2	3.28	2.13
	5200	10.50	11.220	10±2	3.28	2.13
	5240	11.53	14.223	11±2	3.28	2.13
	5260	11.87	15.382	11±2	3.28	2.13
	5300	11.91	15.524	11±2	3.28	2.13
	5320	11.97	15.740	11±2	3.28	2.13
	5500	15.65	36.728	15±2	3.28	2.13
	5580	15.10	32.359	15±2	3.28	2.13
	5700	13.10	20.417	13±2	3.28	2.13
	5745	10.79	11.995	10±2	3.28	2.13
	5785	11.63	14.555	11±2	3.28	2.13
	5825	11.09	12.853	11±2	3.28	2.13

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11n HT40	5190	10.18	10.423	10±2	3.28	2.13
	5230	11.03	12.677	11±2	3.28	2.13
	5270	11.55	14.289	11±2	3.28	2.13
	5310	11.74	14.928	11±2	3.28	2.13
	5510	15.44	34.995	15±2	3.28	2.13
	5670	12.42	17.458	12±2	3.28	2.13
	5755	10.68	11.695	10±2	3.28	2.13
	5795	11.46	13.996	11±2	3.28	2.13
IEEE 802.11ac VHT40	5190	10.32	10.765	10±2	3.28	2.13
	5230	11.16	13.062	11±2	3.28	2.13
	5270	11.69	14.757	11±2	3.28	2.13
	5310	11.85	15.311	11±2	3.28	2.13
	5510	15.52	35.645	15±2	3.28	2.13
	5670	12.48	17.701	12±2	3.28	2.13
	5755	10.76	11.912	10±2	3.28	2.13
	5795	11.55	14.289	11±2	3.28	2.13
IEEE 802.11ac VHT80	5210	10.77	11.940	10±2	3.28	2.13
	5290	11.81	15.171	11±2	3.28	2.13
	5530	15.61	36.392	15±2	3.28	2.13
	5775	11.59	14.421	11±2	3.28	2.13

3. Calculated Result and Limit

Antenna 1

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm^2)	Limited of Power Density (S) (mW/cm^2)	Test Result
		(dBi)	(Linear)			
2.4G Band						
GFSK	5	2.34	1.71	0.00108	1	Compiles
8-DPSK	8	2.34	1.71	0.00215	1	Compiles
BLE	5	2.34	1.71	0.00108	1	Compiles
IEEE 802.11b	17	2.34	1.71	0.01709	1	Compiles
IEEE 802.11g	20	2.34	1.71	0.03410	1	Compiles
IEEE 802.11n HT20	20	2.34	1.71	0.03410	1	Compiles
IEEE 802.11n HT40	21	2.34	1.71	0.04293	1	Compiles
5G Band						
IEEE 802.11a	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11n HT20	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11ac VHT20	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11n HT40	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11ac VHT40	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11ac VHT80	17	3.28	2.13	0.02122	1	Compiles

Antenna 2

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm^2)	Limited of Power Density (S) (mW/cm^2)	Test Result
		(dBi)	(Linear)			
2.4G Band						
GFSK	5	2.34	1.71	0.00108	1	Compiles
8-DPSK	8	2.34	1.71	0.00215	1	Compiles
BLE	5	2.34	1.71	0.00108	1	Compiles
IEEE 802.11b	17	2.34	1.71	0.01709	1	Compiles
IEEE 802.11g	20	2.34	1.71	0.03410	1	Compiles
IEEE 802.11n HT20	21	2.34	1.71	0.04293	1	Compiles
IEEE 802.11n HT40	21	2.34	1.71	0.04293	1	Compiles
5G Band						
IEEE 802.11a	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11n HT20	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11ac VHT20	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11n HT40	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11ac VHT40	17	3.28	2.13	0.02122	1	Compiles
IEEE 802.11ac VHT80	17	3.28	2.13	0.02122	1	Compiles

Note: 2.4 and 5GHz bands are share an antenna, Cann't both the 2.4 and 5 GHz bands operate simultaneously.

For 2.4G SRD

Ant gain=1.34dBi

Ant numeric gain= 1.361

Field strength = 66.60 dBuV/m@3m

$P=\{ [10^{(66.60/20)}/10^6 *3]^2/ (30*1.361) \}*1000mW = 0.001mW$

Pd= (30*0.001*1.361) / (377*20^2)=0.0000003< 1

End of Test Report