FCC 47 CFR MPE REPORT

Acer Incorporated

Halo Smart Speaker

Model Number: HSP3100G

FCC ID: HLZSP3100

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Report Number:	ESTE-R2011151
Date of Test:	Nov. 04~Nov. 16, 2020
Date of Report:	Nov. 18, 2020

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)
IEEE 802.11a	5600	11.65	14.622	11±1	3.4	2.19
	5620	11.71	14.825	11±1	3.4	2.19
	5640	11.66	14.655	11±1	3.4	2.19
IEEE 802.11n HT20	5600	10.87	12.218	10±1	3.4	2.19
	5620	10.89	12.274	10±1	3.4	2.19
	5640	10.88	12.246	10±1	3.4	2.19
IEEE 802.11ac VHT20	5600	11.93	15.596	11±1	3.4	2.19
	5620	11.89	15.453	11±1	3.4	2.19
	5640	11.75	14.962	11±1	3.4	2.19
IEEE 802.11n HT40	5590	11.52	14.191	11±1	3.4	2.19
	5630	11.85	15.311	11±1	3.4	2.19
IEEE 802.11ac VHT40	5590	11.84	15.276	11±1	3.4	2.19
	5630	11.97	15.740	11±1	3.4	2.19
IEEE 802.11ac VHT80	5610	12.02	15.922	12±1	3.4	2.19

Antenna 2

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11a	5600	11.69	14.757	11±1	2.8	1.91
	5620	11.76	14.997	11±1	2.8	1.91
	5640	11.85	15.311	11±1	2.8	1.91
IEEE 802.11n HT20	5600	10.75	11.885	10±1	2.8	1.91
	5620	10.81	12.050	10±1	2.8	1.91
	5640	10.92	12.359	10±1	2.8	1.91
IEEE 802.11ac VHT20	5600	11.97	15.740	11±1	2.8	1.91
	5620	11.88	15.417	11±1	2.8	1.91
	5640	11.67	14.689	11±1	2.8	1.91
IEEE 802.11n HT40	5590	11.47	14.028	11±1	2.8	1.91
	5630	11.79	15.101	11±1	2.8	1.91
IEEE 802.11ac VHT40	5590	11.76	14.997	11±1	2.8	1.91
	5630	11.86	15.346	11±1	2.8	1.91
IEEE 802.11ac VHT80	5610	11.99	15.812	11±1	2.8	1.91

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)			
5G Band						
IEEE 802.11a	12	3.4	2.19	0.00690	1	Compiles
IEEE 802.11n HT20	11	3.4	2.19	0.00548	1	Compiles
IEEE 802.11ac VHT20	12	3.4	2.19	0.00690	1	Compiles
IEEE 802.11n HT40	12	3.4	2.19	0.00690	1	Compiles
IEEE 802.11ac VHT40	12	3.4	2.19	0.00690	1	Compiles
IEEE 802.11ac VHT80	13	3.4	2.19	0.00868	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)			
5G Band						
IEEE 802.11a	12	2.8	1.91	0.00601	1	Compiles
IEEE 802.11n HT20	11	2.8	1.91	0.00477	1	Compiles
IEEE 802.11ac VHT20	12	2.8	1.91	0.00601	1	Compiles
IEEE 802.11n HT40	12	2.8	1.91	0.00601	1	Compiles
IEEE 802.11ac VHT40	12	2.8	1.91	0.00601	1	Compiles
IEEE 802.11ac VHT80	12	2.8	1.91	0.00601	1	Compiles

Antenna 1+2

Mode	Power Density (S) (mW/cm^2) Antenna 1	Power Density (S) (mW/cm^2) Antenna 2	Power Density (S) (mW/cm^2) Total	Limited of Power Density (S) (mW/cm^2)	Test Result
5G Band					
IEEE 802.11n HT20	0.00548	0.00477	0.01025	1	Compiles
IEEE 802.11ac VHT20	0.00690	0.00601	0.01291	1	Compiles
IEEE 802.11n HT40	0.00690	0.00601	0.01291	1	Compiles
IEEE 802.11ac VHT40	0.00690	0.00601	0.01291	1	Compiles
IEEE 802.11ac VHT80	0.00868	0.00601	0.01469	1	Compiles

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

End of Test Report