FCC 47 CFR MPE REPORT

Klipsch Group, Inc.

Soundbar

Model Number: Flexus CORE 300

FCC ID: STI-XCORE300

Applicant:	Klipsch Group, Inc.
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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) = $\frac{\sqrt{30 \times P \times G}}{d}$ 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

Mode	Frequency (MHz)	Antenna	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	ant 1	6.66	4.634
	2441	ant 1	7.15	5.188
	2480	ant 1	8.45	6.998
π/4-DQPSK	2402	ant 1	8.23	6.653
	2441	ant 1	7.89	6.152
	2480	ant 1	9.78	9.506
8-DPSK	2402	ant 1	8.74	7.482
	2441	ant 1	8.33	6.808
	2480	ant 1	10.24	10.568
BLE 1M	2402	ant 1	6.50	4.467
	2440	ant 1	6.71	4.688
	2480	ant 1	8.09	6.442
BLE 2M	2402	ant 1	6.92	4.920
	2440	ant 1	7.09	5.117
	2480	ant 1	8.58	7.211
IEEE 802.11b	2412	ant 1	17.87	61.235
		ant 2	17.16	52.000
	2437	ant 1	21.43	138.995
		ant 2	21.09	128.529
	2462	ant 1	21.82	152.055
		ant 2	21.38	137.404
IEEE 802.11g	2412	ant 1	22.63	183.231
		ant 2	24.58	287.078
	2437	ant 1	26.51	447.713
		ant 2	28.31	677.642
	2462	ant 1	26.57	453.942
		ant 2	28.06	639.735
IEEE 802.11n HT20	2412	ant 1	24.58	287.078
		ant 2	22.01	158.855
	2437	ant 1	26.38	434.510
		ant 2	24.14	259.418
	2462	ant 1	26.78	476.431
		ant 2	24.76	299.226

IEEE 802.11ax HE20	2412	ant 1	24.92	310.456
		ant 2	24.22	264.241
	2437	ant 1	25.85	384.592
		ant 2	26.24	420.727
	2462	ant 1	23.82	240.991
		ant 2	24.09	256.448
IEEE 802.11a	5180	ant 1	14.21	26.363
		ant 2	14.86	30.620
	5200	ant 1	14.44	27.797
		ant 2	15.00	31.623
	5240	ant 1	15.57	36.058
		ant 2	15.10	32.359
	5260	ant 1	12.48	17.701
		ant 2	11.46	13.996
	5300	ant 1	12.79	19.011
		ant 2	11.04	12.706
	5320	ant 1	12.85	19.275
		ant 2	10.42	11.015
	5500	ant 1	13.46	22.182
		ant 2	12.90	19.498
	5580	ant 1	12.85	19.275
		ant 2	13.25	21.135
	5700	ant 1	13.80	23.988
		ant 2	13.58	22.803
	5745	ant 1	13.67	23.281
		ant 2	13.37	21.727
	5785	ant 1	13.37	21.727
		ant 2	13.17	20.749
	5825	ant 1	13.61	22.961
		ant 2	13.37	21.727
IEEE 802.11n20	5180	ant 1	13.01	19.999
		ant 2	13.47	22.233
	5200	ant 1	13.01	19.999
		ant 2	13.74	23.659
	5240	ant 1	14.01	25.177
		ant 2	13.69	23.388
	5260	ant 1	11.71	14.825
		ant 2	11.13	12.972

	5300	ant 1	12.27	16.866
		ant 2	10.56	11.376
	5320	ant 1	12.17	16.482
		ant 2	9.89	9.750
	5500	ant 1	12.15	16.406
		ant 2	11.33	13.583
	5580	ant 1	12.43	17.498
		ant 2	12.74	18.793
	5700	ant 1	13.38	21.777
		ant 2	13.08	20.324
	5745	ant 1	13.47	22.233
		ant 2	13.12	20.512
	5785	ant 1	13.10	20.417
		ant 2	12.86	19.320
	5825	ant 1	13.24	21.086
		ant 2	13.04	20.137
IEEE 802.11ac VHT20	5180	ant 1	12.87	19.364
		ant 2	13.54	22.594
	5200	ant 1	12.91	19.543
		ant 2	13.66	23.227
	5240	ant 1	13.93	24.717
		ant 2	13.77	23.823
	5260	ant 1	9.95	9.886
		ant 2	9.19	8.299
	5300	ant 1	10.35	10.839
		ant 2	8.84	7.656
	5320	ant 1	10.44	11.066
		ant 2	8.16	6.546
	5500	ant 1	10.75	11.885
		ant 2	10.54	11.324
	5580	ant 1	11.27	13.397
		ant 2	11.86	15.346
	5700	ant 1	12.30	16.982
		ant 2	11.95	15.668
	5745	ant 1	12.40	17.378
		ant 2	12.04	15.996
	5785	ant 1	11.99	15.812
		ant 2	11.89	15.453

	5825	ant 1	12.29	16.943
		ant 2	12.08	16.144
IEEE 802.11ax HE20	5180	ant 1	13.10	20.417
		ant 2	13.53	22.542
	5200	ant 1	13.11	20.464
		ant 2	13.71	23.496
	5240	ant 1	13.68	23.335
		ant 2	13.76	23.768
	5260	ant 1	12.34	17.140
		ant 2	10.32	10.765
	5300	ant 1	11.72	14.859
		ant 2	9.79	9.528
	5320	ant 1	11.62	14.521
		ant 2	9.12	8.166
	5500	ant 1	11.18	13.122
		ant 2	10.60	11.482
	5580	ant 1	11.60	14.454
		ant 2	11.41	13.836
	5700	ant 1	12.49	17.742
		ant 2	12.04	15.996
	5745	ant 1	14.89	30.832
		ant 2	14.38	27.416
	5785	ant 1	12.26	16.827
		ant 2	11.96	15.704
	5825	ant 1	12.30	16.982
		ant 2	11.96	15.704
IEEE 802.11n HT40	5190	ant 1	14.96	31.333
		ant 2	15.47	35.237
	5230	ant 1	15.98	39.628
		ant 2	15.44	34.995
	5270	ant 1	13.03	20.091
		ant 2	11.50	14.125
	5310	ant 1	13.15	20.654
		ant 2	10.72	11.803
	5510	ant 1	12.72	18.707
		ant 2	12.04	15.996
	5550	ant 1	12.55	17.989
		ant 2	12.59	18.155

	5670	ant 1	13.86	24.322
		ant 2	13.56	22.699
	5755	ant 1	14.02	25.235
		ant 2	13.48	22.284
	5795	ant 1	13.78	23.878
		ant 2	13.48	22.284
IEEE 802.11ac VHT40	5190	ant 1	16.59	45.604
		ant 2	15.26	33.574
	5230	ant 1	15.88	38.726
		ant 2	15.61	36.392
	5270	ant 1	12.98	19.861
		ant 2	11.60	14.454
	5310	ant 1	13.14	20.606
		ant 2	10.71	11.776
	5510	ant 1	12.60	18.197
		ant 2	12.12	16.293
	5550	ant 1	12.62	18.281
		ant 2	12.45	17.579
	5670	ant 1	13.79	23.933
		ant 2	13.43	22.029
	5755	ant 1	14.00	25.119
		ant 2	13.49	22.336
	5795	ant 1	13.74	23.659
		ant 2	13.49	22.336
IEEE 802.11ax HE40	5190	ant 1	15.26	33.574
		ant 2	15.46	35.156
	5230	ant 1	16.10	40.738
		ant 2	15.45	35.075
	5270	ant 1	13.35	21.627
		ant 2	11.60	14.454
	5310	ant 1	13.33	21.528
		ant 2	10.80	12.023
	5510	ant 1	12.95	19.724
		ant 2	12.15	16.406
	5550	ant 1	12.83	19.187
		ant 2	12.73	18.750
	5670	ant 1	14.04	25.351
		ant 2	13.54	22.594

	5755	ant 1	14.12	25.823
		ant 2	13.53	22.542
	5795	ant 1	14.05	25.410
		ant 2	13.71	23.496
IEEE 802.11ac VHT80	5210	ant 1	14.96	31.333
		ant 2	15.07	32.137
	5290	ant 1	13.84	24.210
		ant 2	11.97	15.740
	5530	ant 1	12.42	17.458
		ant 2	12.54	17.947
	5610	ant 1	12.32	17.061
		ant 2	12.82	19.143
	5775	ant 1	13.54	22.594
		ant 2	12.99	19.907
IEEE 802.11ax HE80	5210	ant 1	14.63	29.040
		ant 2	15.04	31.915
	5290	ant 1	14.25	26.607
		ant 2	12.41	17.418
	5530	ant 1	12.77	18.923
		ant 2	12.98	19.861
	5610	ant 1	12.84	19.231
		ant 2	12.68	18.535
	5775	ant 1	13.88	24.434
		ant 2	13.37	21.727

3. Calculated Result and Limit

SISO

Mode	Ant	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW /cm2)	Limited of Power Density (S) (mW /cm2)	Test Result
					(dBi)	(Linear)			
2.4G Band									
GFSK	ant 1	8.45	8±1	9	3.19	2.084	0.0033	1	Complies
π/4-DQPSK	ant 1	9.78	9±1	10	3.19	2.084	0.0041	1	Complies
8-DPSK	ant 1	10.24	10±1	11	3.19	2.084	0.0052	1	Complies
BLE	ant 1	8.58	8±1	9	3.19	2.084	0.0033	1	Complies
IEEE 802.11b	ant 1	21.82	21±1	22	3.19	2.084	0.0657	1	Complies
	ant 2	21.38	21±1	22	3.24	2.109	0.0665	1	Complies
IEEE 802.11g	ant 1	26.57	26±1	27	3.19	2.084	0.2078	1	Complies
	ant 2	28.31	28±1	29	3.24	2.109	0.3332	1	Complies
IEEE 802.11n HT20	ant 1	26.78	26±1	27	3.19	2.084	0.2078	1	Complies
	ant 2	24.76	24±1	25	3.24	2.109	0.1327	1	Complies
IEEE 802.11ax HE20	ant 1	25.85	25±1	26	3.19	2.084	0.1651	1	Complies
	ant 2	26.24	26±1	27	3.24	2.109	0.2102	1	Complies
5G Band									
IEEE 802.11a	ant 1	15.57	15±1	16	3.38	2.178	0.0172	1	Complies
	ant 2	15.10	15±1	16	3.41	2.193	0.0174	1	Complies
IEEE 802.11n HT20	ant 1	14.01	14±1	15	3.38	2.178	0.0137	1	Complies
	ant 2	13.74	13±1	14	3.41	2.193	0.0110	1	Complies
IEEE 802.11ac VHT20	ant 1	13.93	13±1	14	3.38	2.178	0.0109	1	Complies
	ant 2	13.77	13±1	14	3.41	2.193	0.0110	1	Complies
IEEE 802.11ax HE20	ant 1	14.89	14±1	15	3.38	2.178	0.0137	1	Complies
	ant 2	14.38	14±1	15	3.41	2.193	0.0138	1	Complies
IEEE 802.11n HT40	ant 1	15.98	15±1	16	3.38	2.178	0.0172	1	Complies
	ant 2	15.47	15±1	16	3.41	2.193	0.0174	1	Complies
IEEE 802.11ac VHT40	ant 1	16.59	16±1	17	3.38	2.178	0.0217	1	Complies
	ant 2	15.61	15±1	16	3.41	2.193	0.0174	1	Complies
IEEE 802.11ax HE40	ant 1	16.10	16±1	17	3.38	2.178	0.0217	1	Complies
	ant 2	15.46	15±1	16	3.41	2.193	0.0174	1	Complies

IEEE 802.11ac VHT80	ant 1	14.96	14±1	15	3.38	2.178	0.0137	1	Complies
	ant 2	15.07	15±1	16	3.41	2.193	0.0174	1	Complies
IEEE 802.11ax HE80	ant 1	14.63	14±1	15	3.38	2.178	0.0137	1	Complies
	ant 2	15.04	15±1	16	3.41	2.193	0.0174	1	Complies

MIMO

Mode	Power Density (S) (mW/cm^2) Ant 1	Power Density (S) (mW/cm^2) Ant 2	Power Density (S) (mW/cm^2) Total	Limited of Power Density (S) (mW/cm^2)	Test Result
2.4G Band					
IEEE 802.11n HT20	0.2078	0.1327	0.3405	1	Complies
IEEE 802.11ax HE20	0.1651	0.2102	0.3753	1	Complies
5G Band					
IEEE 802.11n HT20	0.0137	0.0110	0.0247	1	Complies
IEEE 802.11ac VHT20	0.0109	0.0110	0.0219	1	Complies
IEEE 802.11ax HE20	0.0137	0.0138	0.0275	1	Complies
IEEE 802.11n HT40	0.0172	0.0174	0.0346	1	Complies
IEEE 802.11ac VHT40	0.0217	0.0174	0.0391	1	Complies
IEEE 802.11ax HE40	0.0217	0.0174	0.0391	1	Complies
IEEE 802.11ac VHT80	0.0137	0.0174	0.0311	1	Complies
IEEE 802.11ax HE80	0.0137	0.0174	0.0311	1	Complies

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