FCC 47 CFR MPE REPORT

TCL OVERSEAS MARKETING LTD

Wireless free sound speaker with Dolby Atmos FlexConnect

Model Number: Z100

Additional Model: Z101, Z110, Z111, Z100K, Z101K, Z1********, Z100-METAL, Z100-GOLDEN, Z100-GREEN, Z100-GLD, Z100-GRN, Z100-MTL, Z101-METAL, Z101-GOLDEN, Z101-GREEN, Z101-GLD, Z101-GRN, Z101-MTL, Z100-S, Z100-A, Z100-J, Z100-JN, Z100-B, Z100-C, Z1********-RS,
(*can be any numerica number "0~9" or alphebtical number "A~Z" or Blank)

FCC ID: 2BEHEZ100

Applicant:	TCL OVERSEAS MARKETING LTD
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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)	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	10.45	11.092
	2441	10.05	10.116
	2480	10.18	10.423
π/4-DQPSK	2402	12.54	17.947
	2441	12.37	17.258
	2480	12.51	17.824
8-DPSK	2402	13.1	20.417
	2441	12.74	18.793
	2480	13.06	20.230
BLE 1M	2402	6.96	4.9659
	2440	6.76	4.7424
	2480	6.65	4.6238
BLE 2M	2402	7.1	5.1286
	2440	6.82	4.8084
	2480	6.58	4.5499
IEEE 802.11b	2412	15.94	39.264
	2437	15.62	36.475
	2462	13.37	21.727
IEEE 802.11g	2412	21.37	137.088
	2437	20.81	120.504
	2462	17.99	62.951
IEEE 802.11n HT20	2412	17.47	55.847
	2437	16.12	40.926
	2462	14.66	29.242
IEEE 802.11n HT40	2422	18.32	67.920
	2437	18	63.096
	2452	13.28	21.281
IEEE 802.11a	5180	14.2	26.303
	5200	13.9	24.547
	5240	14.64	29.107
	5260	10.38	10.914
	5300	10	10.000
	5320	9.6	9.120
	5500	9.32	8.551

	5580	10.32	10.765
	5700	10.75	11.885
	5745	8.57	7.194
	5785	8.77	7.534
	5825	7.65	5.821
IEEE 802.11n HT20	5180	13.95	24.831
	5200	13.7	23.442
	5240	14.43	27.733
	5260	12.19	16.558
	5300	11.68	14.723
	5320	11.34	13.614
	5500	11.39	13.772
	5580	12.33	17.100
	5700	12.66	18.450
	5745	8.4	6.918
	5785	8.5	7.079
	5825	7.33	5.408
IEEE 802.11ac VHT20	5180	13.83	24.155
	5200	13.65	23.174
	5240	14.47	27.990
	5260	12.19	16.558
	5300	11.73	14.894
	5320	11.25	13.335
	5500	11.42	13.868
	5580	12.27	16.866
	5700	12.63	18.323
	5745	8.52	7.112
	5785	8.5	7.079
	5825	7.4	5.495
IEEE 802.11n HT40	5190	14.15	26.002
	5230	15.17	32.885
	5270	12.66	18.450
	5310	11.3	13.490
	5510	11.33	13.583
	5590	12.28	16.904
	5670	12.64	18.365
	5755	8.09	6.442
	5795	8.68	7.379
	5190	14.03	25.293

IEEE 802.11ac VHT40	5230	14.43	27.733
	5270	12.2	16.596
	5310	11.51	14.158
	5510	11.81	15.171
	5590	12.51	17.824
	5670	12.01	15.885
	5755	9.22	8.356
	5795	8.11	6.471
IEEE 802.11ac VHT80	5210	13.36	21.677
	5290	11.76	14.997
	5530	11.47	14.028
	5610	11.65	14.622
	5775	8.56	7.178

3. Calculated Result and Limit

Mode	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	10.45	10±1	11	2.26	1.683	0.00421	1	Complies
π/4-DQPSK	12.54	12±1	13	2.26	1.683	0.00668	1	Complies
8-DPSK	13.1	13±1	14	2.26	1.683	0.00841	1	Complies
BLE 1M	6.96	6±1	7	2.26	1.683	0.00168	1	Complies
BLE 2M	7.1	7±1	8	2.26	1.683	0.00211	1	Complies
IEEE 802.11b	15.94	15±1	16	2.46	1.762	0.01395	1	Complies
IEEE 802.11g	21.37	21±1	22	2.46	1.762	0.05556	1	Complies
IEEE 802.11n HT20	17.47	17±1	18	2.46	1.762	0.02212	1	Complies
IEEE 802.11n HT40	18.32	18±1	19	2.46	1.762	0.02784	1	Complies
5G Band								
IEEE 802.11a	14.64	14±1	15	1.75	1.496	0.00941	1	Complies
IEEE 802.11n HT20	14.43	14±1	15	1.75	1.496	0.00941	1	Complies
IEEE802.11acVHT20	14.47	14±1	15	1.75	1.496	0.00941	1	Complies
IEEE 802.11n HT40	15.17	15±1	16	1.75	1.496	0.01185	1	Complies
IEEE802.11acVHT40	14.43	14±1	15	1.75	1.496	0.00941	1	Complies
IEEE802.11acVHT80	13.36	13±1	14	1.75	1.496	0.00748	1	Complies

BT+WIFI

MAX Power Density (S) (mW/cm^2) Bluetooth	MAX Power Density (S) (mW/cm^2) Wi-Fi	Total Ratio	Limit Ratio	Test Result
0.0084	0.00556	0.06396	1	Complies

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

End of Test Report