FCC 47 CFR MPE REPORT

TCL OVERSEAS MARKETING LTD

7.1.4 Channel Dolby Atmos Sound Bar with Wireless Subwoofer and Satellite Speakers

Model Number: Q85H

Additional Model: Q80H, Q88H, Q89H, Q85HE, Q85HK, Q8*****, Q85H-S, Q80H-S, Q88H-S, Q89H-S, Q85H-J, Q80H-J, Q88H-J, Q89H-J, Q85H-CA, Q80H-CA, Q88H-CA, Q89H-CA, R70C, R75C, R78C, R70D, R75D, R78D, R7***
(*can be any numerica number"0~9" or alphebtical number "A~Z")

FCC ID: 2BEHEQ85H

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)	Antenna	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	ant 1	7.43	5.534
	2441	ant 1	7.23	5.284
	2480	ant 1	7.2	5.248
π/4-DQPSK	2402	ant 1	9.84	9.638
	2441	ant 1	9.7	9.333
	2480	ant 1	9.49	8.892
8-DPSK	2402	ant 1	10.19	10.447
	2441	ant 1	10.09	10.209
	2480	ant 1	9.82	9.594
BLE 1M	2402	ant 1	2.77	1.892
	2440	ant 1	2.62	1.828
	2480	ant 1	2.39	1.734
BLE 2M	2402	ant 1	2.88	1.941
	2440	ant 1	2.53	1.791
	2480	ant 1	2.59	1.816
2.4G SRD-GFSK	2406	ant 1	7.19	5.236
	2442	ant 1	6.39	4.355
	2474	ant 1	6.44	4.406
IEEE 802.11b	2412	ant 1	18.9	77.625
		ant 2	19.18	82.794
	2437	ant 1	19.12	81.658
		ant 2	19.1	81.283
	2462	ant 1	18.75	74.989
		ant 2	18.87	77.090
IEEE 802.11g	2412	ant 1	22.5	177.828
		ant 2	23.84	242.103
	2437	ant 1	22.9	194.984
		ant 2	23.48	222.844
	2462	ant 1	22.71	186.638
		ant 2	22.87	193.642
IEEE 802.11n HT20	2412	ant 1	22.47	176.604
		ant 2	22.94	196.789
	2437	ant 1	22.4	173.780
		ant 2	22.56	180.302

	2462	ant 1	22.05	160.325
		ant 2	22.49	177.419
IEEE 802.11n HT40	2422	ant 1	22.61	182.390
		ant 2	22.9	194.984
	2437	ant 1	22.76	188.799
		ant 2	23.06	202.302
	2452	ant 1	22.62	182.810
		ant 2	22.91	195.434
IEEE 802.11a	5180	ant 1	14.7	29.512
		ant 2	14.04	25.351
	5200	ant 1	14.41	27.606
		ant 2	13.91	24.604
	5240	ant 1	14.56	28.576
		ant 2	13.92	24.660
	5260	ant 1	14.42	27.669
		ant 2	13.88	24.434
	5300	ant 1	14.19	26.242
		ant 2	13.85	24.266
	5320	ant 1	14.05	25.410
		ant 2	13.69	23.388
	5500	ant 1	14.26	26.669
		ant 2	13.7	23.442
	5580	ant 1	14.14	25.942
		ant 2	13.67	23.281
	5700	ant 1	14.54	28.445
		ant 2	14.32	27.040
	5745	ant 1	14.6	28.840
		ant 2	14.19	26.242
	5785	ant 1	14.13	25.882
		ant 2	13.93	24.717
	5825	ant 1	13.96	24.889
		ant 2	14.03	25.293
IEEE 802.11n20	5180	ant 1	14.46	27.925
		ant 2	14	25.119
	5200	ant 1	14.16	26.062
		ant 2	13.72	23.550
	5240	ant 1	14.52	28.314
		ant 2	13.9	24.547

	5260	ant 1	14.06	25.468
		ant 2	13.63	23.067
	5300	ant 1	13.94	24.774
		ant 2	13.7	23.442
	5320	ant 1	13.83	24.155
		ant 2	13.61	22.961
	5500	ant 1	13.88	24.434
		ant 2	13.63	23.067
	5580	ant 1	14.13	25.882
		ant 2	13.59	22.856
	5700	ant 1	16.63	46.026
		ant 2	14.26	26.669
	5745	ant 1	14.4	27.542
		ant 2	14.39	27.479
	5785	ant 1	14.04	25.351
		ant 2	13.89	24.491
	5825	ant 1	13.95	24.831
		ant 2	14.25	26.607
IEEE 802.11ac VHT20	5180	ant 1	14.64	29.107
		ant 2	13.9	24.547
	5200	ant 1	14.31	26.977
		ant 2	13.97	24.946
	5240	ant 1	14.38	27.416
		ant 2	13.92	24.660
	5260	ant 1	14.21	26.363
		ant 2	13.86	24.322
	5300	ant 1	14.02	25.235
		ant 2	13.77	23.823
	5320	ant 1	13.84	24.210
		ant 2	13.71	23.496
	5500	ant 1	13.92	24.660
		ant 2	13.62	23.014
	5580	ant 1	13.91	24.604
		ant 2	13.59	22.856
	5700	ant 1	14.49	28.119
		ant 2	14.31	26.977
	5745	ant 1	14.27	26.730
		ant 2	14.22	26.424

	5785	ant 1	13.87	24.378
		ant 2	13.75	23.714
	5825	ant 1	13.84	24.210
		ant 2	14	25.119
IEEE 802.11n HT40	5190	ant 1	14.84	30.479
		ant 2	14.46	27.925
	5230	ant 1	14.69	29.444
		ant 2	14.23	26.485
	5270	ant 1	14.59	28.774
		ant 2	13.98	25.003
	5310	ant 1	14.08	25.586
		ant 2	13.93	24.717
	5510	ant 1	14.02	25.235
		ant 2	13.77	23.823
	5550	ant 1	14.56	28.576
		ant 2	13.9	24.547
	5670	ant 1	14.63	29.040
		ant 2	14.39	27.479
	5755	ant 1	14.63	29.040
		ant 2	14.52	28.314
	5795	ant 1	14.3	26.915
		ant 2	14.34	27.164
IEEE 802.11ac VHT40	5190	ant 1	14.63	29.040
		ant 2	14.17	26.122
	5230	ant 1	14.61	28.907
		ant 2	14.06	25.468
	5270	ant 1	14.45	27.861
		ant 2	13.86	24.322
	5310	ant 1	13.94	24.774
		ant 2	14.68	29.376
	5510	ant 1	14	25.119
		ant 2	13.68	23.335
	5590	ant 1	14.17	26.122
		ant 2	13.71	23.496
	5670	ant 1	15.7	37.154
		ant 2	14.34	27.164
	5755	ant 1	14.67	29.309
		ant 2	15.32	34.041

	5795	ant 1	14.37	27.353
		ant 2	14.4	27.542
IEEE 802.11ac VHT80	5210	ant 1	12.58	18.113
		ant 2	12.04	15.996
	5290	ant 1	12.44	17.539
		ant 2	12.03	15.959
	5530	ant 1	12.44	17.539
		ant 2	11.95	15.668
	5610	ant 1	12.12	16.293
		ant 2	11.67	14.689
	5775	ant 1	12.49	17.742
		ant 2	12.34	17.140

3. Calculated Result and Limit

SISO

The Worst Mode	Antenna	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW /cm2)	Limited of Power Density (S) (mW /cm^2)	Test Result
					(dBi)	(Linear)			
2.4G Band									
GFSK	ant 1	7.43	7±1	8	2.4	1.738	0.0022	1	Complies
π/4-DQPSK	ant 1	9.84	9±1	10	2.4	1.738	0.0035	1	Complies
8-DPSK	ant 1	10.19	10±1	11	2.4	1.738	0.0044	1	Complies
BLE	ant 1	2.88	2 ±1	3	2.4	1.738	0.0007	1	Complies
2.4G SRD	ant 1	7.19	7±1	8	2.4	1.738	0.0022	1	Complies
IEEE 802.11b	ant 1	19.12	19±1	20	2.4	1.738	0.0346	1	Complies
	ant 2	19.18	19±1	20	2.3	1.698	0.0338	1	Complies
IEEE 802.11g	ant 1	22.90	22±1	23	2.4	1.738	0.0690	1	Complies
	ant 2	23.84	23±1	24	2.3	1.698	0.0849	1	Complies
IEEE 802.11n HT20	ant 1	22.47	22±1	23	2.4	1.738	0.0690	1	Complies
	ant 2	22.94	22±1	23	2.3	1.698	0.0674	1	Complies
IEEE 802.11n HT40	ant 1	22.76	22±1	23	2.4	1.738	0.0690	1	Complies
	ant 2	23.06	23±1	24	2.3	1.698	0.0849	1	Complies
5G Band									
IEEE 802.11a	ant 1	14.7	14±1	15	4.4	2.754	0.0173	1	Complies
	ant 2	14.32	14±1	15	4.1	2.570	0.0162	1	Complies
IEEE 802.11n HT20	ant 1	16.63	16±1	17	4.4	2.754	0.0275	1	Complies
	ant 2	14.39	14±1	15	4.1	2.570	0.0162	1	Complies
IEEE802.11ac VHT20	ant 1	14.64	14±1	15	4.4	2.754	0.0173	1	Complies
	ant 2	14.31	14±1	15	4.1	2.570	0.0162	1	Complies
IEEE 802.11n HT40	ant 1	14.84	14±1	15	4.4	2.754	0.0173	1	Complies
	ant 2	14.52	14±1	15	4.1	2.570	0.0162	1	Complies
IEEE 802.11ac VHT40	ant 1	15.7	15±1	16	4.4	2.754	0.0218	1	Complies
	ant 2	15.32	15±1	16	4.1	2.570	0.0204	1	Complies
IEEE 802.11ac VHT80	ant 1	12.58	12±1	13	4.4	2.754	0.0109	1	Complies
	ant 2	12.34	12±1	13	4.1	2.570	0.0102	1	Complies

MIMO

Mode	Power Density (S) (mW /cm^2) Antenna 0	Power Density (S) (mW /cm^2) Antenna 1	Power Density (S) (mW /cm^2) Total	Limited of Power Density (S) (mW /cm^2)	Test Result
2.4G Band					
IEEE 802.11n HT20	0.0690	0.0674	0.1364	1	Complies
IEEE 802.11n HT40	0.0690	0.0849	0.1538	1	Complies
5G Band					
IEEE 802.11n HT20	0.0275	0.0162	0.0436	1	Complies
IEEE 802.11ac VHT20	0.0173	0.0162	0.0335	1	Complies
IEEE 802.11n HT40	0.0173	0.0162	0.0335	1	Complies
IEEE 802.11ac VHT40	0.0218	0.0204	0.0422	1	Complies
IEEE 802.11ac VHT80	0.0109	0.0102	0.0211	1	Complies

2.4G SRD+BT+WIFI

MAX Power Density (S) (mW/cm^2) 2.4G SRD	MAX Power Density (S) (mW/cm^2) Bluetooth	MAX Power Density (S) (mW/cm^2) WiFi	Total Ratio	Limit Ratio	Test Result
0.0022	0.0044	0.1538	0.1604	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