

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

FCC ID: 2BEHEQ85H

|                          |                                                                     |
|--------------------------|---------------------------------------------------------------------|
| Applicant:               | TCL OVERSEAS MARKETING LTD                                          |
| Address:                 | 5/F, Building 22E, 22 Science Park East Avenue HongKong             |
|                          | Science Park Shatin Hong Kong                                       |
|                          |                                                                     |
| Prepared By:             | EST Technology Co., Ltd.                                            |
|                          | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China |
| Tel: 86-769-83081888-808 |                                                                     |

|                 |                              |
|-----------------|------------------------------|
| Report Number:  | ESTE-R2405038                |
| Date of Test:   | Apr. 15, 2024~ May. 07, 2024 |
| Date of Report: | May. 11, 2024                |

## 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 <sup>2</sup> ) | Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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 <sup>2</sup> ) | Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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            |                                   |                                   | 1.0                                     | 30                                                                     |

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

## 1.2. MPE Calculation Method

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

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                  |
| $\pi/4$ -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 |

|                     |      |       |       |        |
|---------------------|------|-------|-------|--------|
| IEEE 802.11ac VHT80 | 5795 | ant 1 | 14.37 | 27.353 |
|                     |      | ant 2 | 14.4  | 27.542 |
|                     | 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 /cm²) | 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 <sup>2</sup> )<br>Antenna 0 | Power Density (S) (mW/cm <sup>2</sup> )<br>Antenna 1 | Power Density (S) (mW/cm <sup>2</sup> )<br>Total | Limited of Power Density (S) (mW/cm <sup>2</sup> ) | 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 <sup>2</sup> )<br>2.4G SRD | MAX Power Density (S) (mW/cm <sup>2</sup> )<br>Bluetooth | MAX Power Density (S) (mW/cm <sup>2</sup> )<br>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, can't both the 2.4 and 5 GHz bands operate simultaneously.

**End of Test Report**