1. RF Exposure Requirements

1.1 General Information

Client Information

Address of applicant:

Applicant: Shenzhen Qiyue Optronics Company Limited

Flat3, Tower 3, Excellence Meilin Center Plaza, Zhongkang Road 128,

Shangmeilin, Futian District, Shenzhen, China

Manufacturer: SHENZHEN QIYUE OPTRONICS COMPANY LIMITED BRANCH

A/B/C/D Building, Xitian Industrial Park, Dashuikeng Community,

Guanlan Street, Longhua New District, Shenzhen City, China

General Description of EUT:

Address of manufacturer:

Product Name: 32" LED HD TV

Trade Name ATYME

Model No.: 320AX6HD

Adding Model(s):

D32N115_20-A-TZ, XXXXXXXXXXXXXX(Where "X" can be any

alphanumeric of A-Z or 0-9 or blank or -, indicates different client)

Rated Voltage: AC120V/60Hz

Battery Capacity:

FCC ID: XOM-320AX6HD Equipment Type: Fixed device

Technical Characteristics of EUT:

Wi-Fi(5GHz)

Support Standards: 802.11a, 802.11n(HT20), 802.11n-HT40, 802.11ac-VHT20,

802.11ac-VHT40,802.11ac-VHT80

Frequency Range: 5180-5240MHz, 5745-5825MHz

5180-5240MHz: Antenna 1: 15.76dBm (Conducted)

Antenna 2: 15.61dBm (Conducted)

Max. RF Output Power: 5745-5825MHz: Antenna 1: 14.99dBm (Conducted)

Antenna 2: 14.95dBm (Conducted)

Type of Modulation: QPSK, 16QAM, 64QAM,256QAM

Type of Antenna: dipole antenna

5180-5240MHz:2.07dBi 5745-5825MHz:2.10dBi

Wi-Fi(2.4GHz)

Antenna Gain:

Support Standards: 802.11b, 802.11g, 802.11n

Frequency Range: 2412-2462MHz for 802.11b/g/n(HT20)

2422-2452MHz for 802.11n(HT40)

RF Output Power:

Antenna 1: 16.07dBm (Conducted)

Antenna 2: 15.40dBm (Conducted)

Type of Modulation: CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM

Quantity of Channels: 11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)

Channel Separation: 5MHz

Type of Antenna: dipole antenna

Antenna Gain: 2.57dBi

Bluetooth

Bluetooth Version: V5.1 (BR/EDR mode)

Frequency Range: 2402-2480MHz

RF Output Power: 6.94dBm (Conducted)
Data Rate: 1Mbps, 2Mbps, 3Mbps

Modulation: GFSK, π/4 DQPSK, 8DPSK

Quantity of Channels: 79
Channel Separation: 1MHz

Type of Antenna: dipole antenna

Antenna Gain: 2.80dBi

Bluetooth

Bluetooth Version: V5.1 (BLE mode)
Frequency Range: 2402-2480MHz

RF Output Power: 4.13dBm (Conducted)

Data Rate: 1Mbps
Modulation: GFSK
Quantity of Channels: 40
Channel Separation: 2MHz

Type of Antenna: dipole antenna

Antenna Gain: 2.80dBi

1.2 RF Exposure Exemption

According to §1.1307(b)(3) and KDB 447498 D04 Interim General RF Exposure Guidance v01, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Option A: FCC Rule Part 1.1307 (b)(3)(i)(A):The available maximum time-averaged power is no more than 1mW, regardless of separation distance.

Option B: FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 cm} (d/20 \text{ cm})^x & d \le 20 \text{ cm} \\ ERP_{20 cm} & 20 \text{ cm} < d \le 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,Cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz};$$

and

$$ERP_{20\ cm}\ (mW) = \begin{cases} 2040f & 0.3\ GHz \le f < 1.5\ GHz \\ 3060 & 1.5\ GHz \le f \le 6\ GHz \end{cases}$$

d = the separation distance (cm);

Option C: FCC Rule Part 1.1307 (b)(3)(i)(C): The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.

| Single RF Sources Subject to Routine Environmental Evaluation | | | | | |
|---|--------------------------------------|--|--|--|--|
| RF Source frequency (MHz) | Threshold ERP (watts) | | | | |
| 0.3-1.34 | 1,920 R ² | | | | |
| 1.34-30 | 3,450 R ² /f ² | | | | |
| 30-300 | 3.83 R ² | | | | |
| 300-1,500 | 0.0128 R ² f | | | | |
| 1,500-100,000 | 19.2R ² | | | | |

For Multiple RF sources: FCC Rule Part 1.1307(b)(3)(ii):

- (A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).
- (B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$

1.3 Calculated Result

| Radio Access Technology | Prediction Frequency | Output Power | Antenna Gain | Duty Cycle | Tune-Up Time-Averaged Power | ERP |
|-----------------------------|-------------------------|-----------------|-----------------|---------------|-----------------------------------|-------|
| | (MHz) | (dBm) | (dBi) | (%) | (dBm) | (dBm) |
| Bluetooth | 2402 | 6.94 | 2.80 | 100 | 7.00 | 7.65 |
| Wi-Fi(2.4GHz)_ Antenna 1 | 2412 | 16.07 | 2.57 | 100 | 17.00 | 17.42 |
| Wi-Fi(2.4GHz)_ Antenna 2 | 2412 | 15.40 | 2.57 | 100 | 16.00 | 16.42 |
| Wi-Fi(5GHz)_ Antenna 1 | 5180 | 15.76 | 2.07 | 100 | 16.00 | 15.92 |
| Wi-Fi(5GHz)_ Antenna 2 | 5180 | 15.61 | 2.07 | 100 | 16.00 | 15.92 |
| Wi-Fi(5GHz) Antenna 1 | 5745 | 14.99 | 2.10 | 100 | 15.00 | 14.95 |
| Wi-Fi(5GHz) Antenna 2 | 5745 | 14.95 | 2.10 | 100 | 15.00 | 14.95 |

| Frequency | Ontion | Min. Distance | Max. Power | | Exposure Limit | Dotio | Result |
|-----------|--------|---------------|------------|-------|----------------|-------|-----------|
| (MHz) | Option | (cm) | (dBm) | (mW) | (mW) | Ratio | Pass/Fail |
| 2402 | С | 20.00 | 7.65 | 5.82 | 768.00 | 0.01 | Pass |
| 2412 | С | 20.00 | 17.42 | 55.21 | 768.00 | 0.07 | Pass |
| 2412 | С | 20.00 | 16.42 | 43.85 | 768.00 | 0.06 | Pass |
| 5180 | С | 20.00 | 15.92 | 39.08 | 768.00 | 0.05 | Pass |
| 5180 | С | 20.00 | 15.92 | 39.08 | 768.00 | 0.05 | Pass |
| 5745 | С | 20.00 | 14.95 | 31.26 | 768.00 | 0.04 | Pass |

| 5745 C 20.00 14.95 31.26 768.00 0.04 Pas |
|--|
|--|

Note: 1. Time-Averaged Power=Output Power * Duty Cycle; ERP= Time-Averaged Power+ Antenna gain-2.15dB

- 2. Option A, B and C refers as clause 1.2.
- 3. For option B, Max (time-averaged power, effective radiated power (ERP)) converts to Max. Power. For option C, ERP converts to Max. Power;
- 4. For option B, P_{th} (mW) converts to Exposure Limit (mW); For option C, ERP (W) converts to Exposure Limit (mW).
 - 5. Ratio= Tune-Up ERP (mW)/ Exposure Limit (mW)

Mode for Simultaneous Multi-band Transmission:

| Radio Access | Ratio 1 | Ratio 2 | Dotio 2 | Simultaneous | Limit | Result |
|----------------|---------|---------|---------|--------------|-------|-----------|
| Technology | Ralio | Ralio 2 | Ratio 3 | Ratio | | Pass/Fail |
| BT + Antenna 1 | 0.01 | 0.07 | 0.06 | 0.14 | 1 | Door |
| +Antenna 2 | 0.01 | 0.07 | 0.06 | 0.14 | ' | Pass |

Result: Pass