1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	SHENZHEN QIYUE OPTRONICS COMPANY LIMITED
Address of applicant:	Flat3,Tower 3, Excellence Meilin Center Plaza, Zhongkang Road 128, Shangmeilin, Futian District, Shenzhen , China
Manufacturer:	SHENZHEN QIYUE OPTRONICS COMPANY LIMITED BRANCH
Address of manufacturer:	A/B/C/D Building, Xitian Industrial Park, Dashuikeng Community,Guanlan Street, Longhua New District, Shenzhen City, China

General Description of EUT:

Product Name:	55'' SMART 4K UHDTV
Trade Name	RCA, PROSCAN, RCA SCENIUM, TECHNICOLOR, SYLVANIA, RCASMARTVIRTUOSO
Model No.:	RWOSQU5526
Adding Model(s):	Q55S218-U-A-I, RWOSQU55XX, XXXXXXXX55XXXXXXXX(Where "X"can be any alphanumeric of A-Z or 0-9 or blank or -, indicates different client)
Rated Voltage:	AC120V/60Hz
FCC ID:	XOM-PWOSQU5526
Equipment Type:	Mobile Device

Technical Characteristics of EUT:	
Bluetooth	
Bluetooth Version:	V5.0 (BR/EDR/LE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	8.30dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, π/4 DQPSK, 8DPSK
Quantity of Channels:	79/40
Channel Separation:	1MHz/2MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	2dBi
Wi-Fi(2.4GHz)	
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: 15.18dBm (Conducted) Antenna 2: 15.00dBm (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:	Integral Antenna
Antenna Gain:	2dBi
Wi-Fi(5GHz)	
Support Standards:	802.11a, 802.11n(HT20), 802.11n-HT40, 802.11ac-VHT80
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	5150-5250MHz: Antenna 1: 13.55dBm (Conducted) Antenna 2: 12.77dBm (Conducted) 5725-5850MHz: Antenna 1: 13.43dBm (Conducted) Antenna 2: 13.41dBm (Conducted)
Type of Modulation:	BPSK, QPSK,16QAM,64QAM, 256QAM
Type of Antenna:	Integral Antenna
Antenna Gain:	5150-5250MHz Antenna 1 & 2: 1.93dBi 5725-5850MHz Antenna 1 & 2: 1.73 dBi

1.2 Standard Applicable

According to §1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, 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.

(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
1500-100000	/	/	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
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

For Bluetooth:

Maximum Tune-Up output power: 9.0 (dBm)

Maximum peak output power at antenna input terminal: 7.94 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2412 (MHz)

Antenna gain:2.0(dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0025 (mw/cm^2)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For Wi-Fi (2.4GHz) Antenna 1:

Maximum Tune-Up output power: 16.0 (dBm)

Maximum peak output power at antenna input terminal: 39.81(mW)

Prediction distance: >20(cm)

Prediction frequency: 2462 (MHz)

Antenna gain: 2.0(dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0125 (mw/cm^2)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For Wi-Fi (2.4GHz) Antenna 2:
Maximum Tune-Up output power: 15.0 (dBm)
Maximum peak output power at antenna input terminal: 31.62 (mW)
Prediction distance: >20(cm)
Prediction frequency: 2412 (MHz)
Antenna gain: 2.0(dBi)
Directional gain (numeric gain): 1.58
The worst case is power density at prediction frequency at 20cm: 0.0099 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For Wi-Fi (5GHz) Antenna 1:
Maximum Tune-Up output power: 14.0 (dBm)
Maximum peak output power at antenna input terminal: 25.12 (mW)
Prediction distance: >20(cm)
Prediction frequency: 5240 (MHz)
Antenna gain: 1.93 (dBi)
Directional gain (numeric gain): 1.56
The worst case is power density at prediction frequency at 20cm: 0.0078 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For Wi-Fi (5GHz) Antenna 2:
Maximum Tune-Up output power: 14.0 (dBm)
Maximum peak output power at antenna input terminal: 25.12 (mW)
Prediction distance: >20(cm)
Prediction frequency: 5785 (MHz)
Antenna gain: 1.73 (dBi)
Directional gain (numeric gain): 1.49
The worst case is power density at prediction frequency at 20cm: 0.0074 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

Mode for Simultaneous Multi-band Transmission
The worst case is **Bluetooth** + **Wi-Fi (2.4GHz) Antenna 1 + Wi-Fi (2.4GHz) Antenna 2**
Evaluation Result: 0.0025/1+ 0.0125/1+ 0.0099/1=0.0249
Limit: 1

Result: Pass