

Safety Human Exposure

1.1 Radio Frequency Exposure Compliance

1.1.1 Electromagnetic Fields

RESULT:

Pass

Test Specification

Test item	:	Hybrid STB ZXV10 B866V2F, ZXV10 B866V2F1, ZXV10 B866V2Fi, ZXV10 B866V2FA, ZXV10 B866V2FB, ZXV10 B866V2K, ZXV10 B866V2K1, ZXV10 B860HF, ZXV10 B860V2F, ZXV10 B870V2F, ZXV10 B766V2
Identification / Type No.	:	
FCC ID	:	Q78-ZXV10905Y4A
Test standard	:	CFR47 FCC Part 2: Section 2.1091 CFR47 FCC Part 1: Section 1.1310 FCC KDB Publication 447498 v06 FCC KDB Publication 865664 D02 v01r02

➤ Product Classification

This device defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

Max 3.00 dBi for Bluetooth, Max 6.01 dBi for 2.4GHz Wi-Fi MIMO mode, Max 6.51 dBi for 5GHz Wi-Fi MIMO mode

➤ Radio Frequency Exposure Limit

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)
300-1,500	--	--	f/1500
1,500-100,000	--	--	1.0

➤ Radio Frequency Exposure Calculation Formula

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (in appropriate units, e.g. mW/cm²)
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
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

or:

$$S = \frac{EIRP}{4\pi R^2}$$

where: EIRP = equivalent (or effective) isotropically radiated power

a) EUT RF Exposure Evaluation standalone operations(worse case)

Mode	*Measured RF Output Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	FCC Limit (mW/cm ²)
Bluetooth	11.25	3.0	20	0.005	1.0
2.4G Wi-Fi	23.31	6.01	20	0.170	1.0
5G Wi-Fi	16.25	6.51	20	0.038	1.0

Note:

1. *Bluetooth RF Output Power: Refer to CN22TWVE 001
2. *2.4GHz Band RF Output Power: Refer to CN22TWVE 002
3. *5GHz Bands RF Output Power: Refer to CN22TWVE 003

b) Simultaneous transmission MPE:

Per KDB 447498 D01 v06, simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0 .

Simultaneous transmission Scenarios

No.	Simultaneous transmission Scenarios
1	Bluetooth + 2.4GHz Wi-Fi
2	Bluetooth + 5GHz Wi-Fi

1) For Bluetooth + 2.4GHz Wi-Fi:

The MPE ratio for Bluetooth can be calculated as follow:

=The power density at 20cm distance/MPE limit
 =0.005 mW/cm²

The MPE ratio for 2.4GHz Wi-Fi can be calculated as follow:

=The power density at 20cm distance/MPE limit
 =0.170 mW/cm²

The sum of the MPE ratios for all simultaneous transmitting antennas:

=0.005+0.170
 = 0.175<1.0

As the sum of MPE ratios for all simultaneous transmitting antennas is ≤ 1.0 , simultaneous transmission MPE test exclusion will be applied.

2) For Bluetooth + 5GHz Wi-Fi:

The MPE ratio for Bluetooth can be calculated as follow:

=The power density at 20cm distance/MPE limit
 =0.0027 mW/cm²
 =0.005

The MPE ratio for 5GHz Wi-Fi can be calculated as follow:

=The power density at 20cm distance/MPE limit
 =0.038 mW/cm²

The sum of the MPE ratios for all simultaneous transmitting antennas:

=0.005+0.038
 = 0.043<1.0

As the sum of MPE ratios for all simultaneous transmitting antennas is ≤ 1.0 , simultaneous transmission MPE test exclusion will be applied.

➤ **Conclusion**

Therefore the maximum calculations result of above are meet the requirement of Radio Frequency Exposure (MPE) limit.