

FCC ID : 2ACWK792X

1. RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b).

Limits for Maximum Permissible Exposure (MPE).

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm²)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = Power density in mW/cm².

P_{out} =output power to antenna in mW.

G = Numeric gain of the antenna relative to isotropic antenna.

π =3.1416.

R = distance between observation point and center of the radiator in 20cm.

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the nd total.

power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

2. EUT TECHNICAL DESCRIPTION

Characteristics	Description
Product	WiFi 6 communication module
Model Number	ZK-7921, ZK-7921AU-TV, ZK-7921US, ZK-7921-M2AE, ZK-7921-DG, ZK-7921-DGX, ZK-7921-PC (Note: The only difference in models is the model's name, all other information is the same. The main test model applied for this report is ZK-7921)

Device Type	Bluetooth V5.2
Data Rate	1Mbps for GFSK modulation 2Mbps for pi/4-DQPSK modulation 3Mbps for 8DPSK modulation
Modulation:	GFSK, pi/4-DQPSK, 8DPSK
Operating Frequency Range(s)	2402-2480MHz
Number of Channels	79 channels
Antenna Type	PCB Antenna
Antenna Gain	ANT1: 4.2dBi , ANT2: 4.2dBi

Device Type	Bluetooth with BLE mode
Data Rate	1Mbps/2Mbps for GFSK modulation
Modulation	GFSK
Operating Frequency Range	2402-2480MHz
Number of Channels	40 Channels
Antenna Type	PCB Antenna
Antenna Gain	ANT1: 4.2dBi , ANT2: 4.2dBi

IEEE 802.11 WLAN Mode Supported	☒ 802.11b ☒ 802.11g ☒ 802.11n(20MHz channel bandwidth) ☒ 802.11n(40MHz channel bandwidth)
Modulation	DSSS with DBPSK/DQPSK/CCK for 802.11b OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n
Operating Frequency Range	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11b/g/n(HT40)
Number of Channels	11 channels for 802.11b/g/n(HT20) 7 Channels for 802.11n(HT40)
Antenna Type	PCB Antenna
Antenna Gain	Ant 1: 4.2dBi , ANT2: 4.2dBi

WLAN Supported	☒ 802.11a ☒ 802.11n(20MHz channel bandwidth) ☒ 802.11n(40MHz channel bandwidth) ☒ 802.11ac(20MHz channel bandwidth) ☒ 802.11ac(40MHz channel bandwidth) ☒ 802.11ac(80MHz channel bandwidth) ☒ 802.11ac(160MHz channel bandwidth) ☒ 802.11ax(20MHz channel bandwidth) ☒ 802.11ax(40MHz channel bandwidth) ☒ 802.11ax(80MHz channel bandwidth)
Data Rate	802.11a:54/48/36/24/18/12/9/6Mbps 802.11n:up to 600 Mbps 802.11ac/ax:up to 1.733Gbps
Modulation	☒ OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/n ☒ OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11ac/ax
Frequency Range	5150MHz-5250MHz Band
	☒ 5180-5240MHz for 802.11a ☒ 5180-5240MHz for 802.11n(HT20) ☒ 5190-5230MHz for 802.11n(HT40) ☒ 5180-5240MHz for 802.11ac(HT20) ☒ 5190-5230MHz for 802.11ac(HT40) ☒ 5210MHz for 802.11ac(HT80) ☒ 5250MHz for 802.11ac(HT160) ☒ 5180-5240MHz for 802.11ax(HT20) ☒ 5190-5230MHz for 802.11ax(HT40) ☒ 5210MHz for 802.11ax(HT80)
	5250MHz-5350MHz Band
	☒ 5260-5320MHz for 802.11a ☒ 5260-5320MHz for 802.11n(HT20) ☒ 5270-5310MHz for 802.11n(HT40) ☒ 5260-5320MHz for 802.11ac(HT20) ☒ 5270-5310MHz for 802.11ac(HT40) ☒ 5290MHz for 802.11ac(HT80) ☒ 5250MHz for 802.11ac(HT160)

	☒ 5260-5320MHz for 802.11ax(HT20) ☒ 5270-5310MHz for 802.11ax(HT40) ☒ 5290MHz for 802.11ax(HT80)	
	5470MHz-5725MHz Band	
	☒ 5500-5700MHz for 802.11a ☒ 5500-5700MHz for 802.11n(HT20) ☒ 5510-5670MHz for 802.11n(HT40) ☒ 5500-5700MHz for 802.11ac(HT20) ☒ 5510-5670MHz for 802.11ac(HT40) ☒ 5530-5610MHz for 802.11ac(HT80) ☒ 5570MHz for 802.11ac(HT160) ☒ 5500-5700MHz for 802.11ax(HT20) ☒ 5510-5670MHz for 802.11ax(HT40) ☒ 5530-5610MHz for 802.11ax(HT80)	
	☒ UNII-3 with 5725MHz-5850MHz Band	
	☒ 5745-5825MHz for 802.11a ☒ 5745-5825MHz for 802.11n(HT20) ☒ 5755-5795MHz for 802.11n(HT40) ☒ 5745-5825MHz for 802.11ac(HT20) ☒ 5755-5795MHz for 802.11ac(HT40) ☒ 5775MHz for 802.11ac(HT80) ☒ 5745-5825MHz for 802.11ax(HT20) ☒ 5755-5795MHz for 802.11ax(HT40) ☒ 5775MHz for 802.11ax(HT80)	
TPC Function	☐ Applicable	☒ Not Applicable
Antenna Type	PCB Antenna	
Antenna Gain	ANT1: 3.92dBi , ANT2: 3.92dBi	

3. Measurement Result

Mode	Max Conducted Power (dBm)	Antenna gain (dBi)	Antenna Gain Numeric	R (cm)	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
BT	4.85	4.2	2.630	20	0.0016	1
2.4G WIFI	19.6	4.2	2.630	20	0.0477	1
5G WIFI	15.84	3.92	2.466	20	0.0188	1

Note: All the modes are tested, only the worst data are described in the table.

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