Maximum Permissible Exposure Evaluation

FCC ID: 2APRB-WNVR-BTWN8V2

1. Client Information

Applicant	:	Guangzhou Juan Intelligent Tech Joint Stock Co.,Ltd
Address	:	No.2 Plant, west side of Shanxi village, Dashi street, Panyu District, Guangzhou City, China
Manufacturer	:	Guangzhou Juan Intelligent Tech Joint Stock Co.,Ltd
Address	:	No.2 Plant, west side of Shanxi village, Dashi street, Panyu District, Guangzhou City, China

2. General Description of EUT

EUT Name	:	Wireless Network Video Recorder	
Models No.	:	WNVR-BTWN8-1-V2, WNVR-BTWN8, WNVR-BTWN8-1, WNVR-BTWN8-1-CN4, WNVR-BTWN8-2-CN4, BTWN8 4L1, BTWN8-8L1, WNVR-BTWN8-1 -WA-CN4, CL -BT8WN-14L, CL -BT8WN-18L, WNVR-BTWN8-V2, WNVR-BTWN8-1-V3, CL-BT8WN-13L, WNVR-BTWN8-1-WA-V2-CN4, WNVR-BTWN8-WA-V2-CN4, WNVR-BTWN8-V2-CN4, WNVR-BTWN8-2-WA-V2-CN4, BTWN8-4L1, BTWN8-8L1, WNP2L-1041-V2, CL-BT8WN-13L, BTWN81L-2-3-B, BTWN81L-2-6-B	
Model Different	:	All PCB boards and circuit diagrams are the same, the only difference is that different customer names are different.	
Product Description	:	Operation Frequency:	Bluetooth 5.0:2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n (HT40):2422MHz~2452MHz
		Number of Channel:	Bluetooth 5.0(BLE): 40 channels 802.11b/g/n(HT20):11 Channels 802.11n (HT40):7 Channels
Power Rating	:	For Adapter: Input: 100-240V~ 50/60Hz 1.5A Max Output:12V⎓, 2A	
Software Version	:	WNVR-BTWN8-10_20210827	
Hardware Version	:	MC6630_V140_NVR0408	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	the MPE report used the EUT (20210407-13-2#).	

MPE Calculations for WIFI

1. **Antenna Gain:**
   PCB Antenna:5dBi.

2. **EUT Operation Condition:**
   Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. **Exposure Evaluation:**
   Equation from page 18 of OET Bulletin 65, Edition 97-01
   $S=(PG)/4\pi R^2$
   Where
   S: power density
   P: power input to the antenna
   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

4. **Antenna Information**

WNVR-BTWN8-1-V2, WNVR-BTWN8, WNVR-BTWN8-1, WNVR-BTWN8-1-CN4, WNVR-BTWN8-2-CN4, BTWN8 4L1, BTWN8-8L1, WNVR-BTWN8-1 -WA-CN4, CL -BT8WN-14L, CL -BT8WN-18L, WNVR-BTWN8-V2, WNVR-BTWN8-1-V3, CL-BT8WN-13L, WNVR-BTWN8-1-WA-V2-CN4, WNVR-BTWN8-WA-V2-CN4, WNVR-BTWN8-V2-CN4, WNVR-BTWN8-2-WA-V2-CN4, BTWN8-4L1, BTWN8-8L1, WNP2L-1041-V2, CL-BT8WN-13L, BTWN81L-2-3-B, BTWN81L-2-6-B can only use antennas certificated as follows provided by manufacturer

Internal Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain
Antenna 1	External Antenna	2400 MHz – 2500 MHz	0dBi
Antenna 2	External Antenna	2400 MHz – 2500 MHz	0dBi

5. **RF Output Power**
   2.4G WiFi

Test Mode	Channel	Frequency (MHz)	Measured Peak Output Power (dBm)		
			Antenna 1	Antenna 2	Sum
IEEE 802.11b	1	2412	13.83	15.55	/
	6	2437	13.38	15.16	/
	11	2462	12.95	14.97	/
IEEE 802.11g	1	2412	11.47	13.32	/
	6	2437	11.19	13.00	/
	11	2462	10.82	12.81	/
IEEE 802.11n HT20	1	2412	11.05	12.82	15.00
	6	2437	10.91	12.71	14.9
	11	2462	10.68	12.50	14.7
IEEE 802.11n HT40	3	2422	10.05	11.86	14.1
	6	2437	9.67	11.51	13.7
	9	2452	9.32	11.20	13.4

BLE

Test Mode	Channel	Frequency (MHz)	Measured Peak Output Power (dBm)
			Antenna 1
GFSK(1Mbps)	00	2402	5.549
	20	2442	5.455
	39	2480	5.073
GFSK(2Mbps)	00	2402	5.618
	20	2442	5.47
	39	2480	5.076

6. Manufacturing Tolerance

2.4GWLAN (Antenna 1)

IEEE 802.11b			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	14.0	13.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11g			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	11.0	11.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT20			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	11.0	11.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT40			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	10.0	10.0	10.0
Tolerance ±(dB)	1.0	1.0	1.0

2.4GWLAN (Antenna 2)

IEEE 802.11b			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	16.0	15.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11g			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	15.0	13.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT20			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	13.0	13.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT40			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	12.0	12.0	12.0
Tolerance ±(dB)	1.0	1.0	1.0

BLE (Antenna 1)

GFSK(1Mbps)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	6.0	5.0	5.0
Tolerance ±(dB)	1.0	1.0	1.0

GFSK(2Mbps)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	6.0	5.0	5.0
Tolerance ±(dB)	1.0	1.0	1.0

7. Measurement Results

2.4G WiFi

Antenna 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW					
IEEE 802.11b	15.00	31.623	0	1.0000	100%	0.0016	1.0000
IEEE 802.11g	12.00	15.849	0	1.0000	100%	0.0063	1.0000
IEEE 802.11n HT20	11.00	12.589	0	1.0000	100%	0.0040	1.0000
IEEE 802.11n HT40	11.00	12.589	0	1.0000	100%	0.0016	1.0000

Antenna 2

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW					
IEEE 802.11b	17.00	50.119	0	1.0000	100%	0.0025	1.0000
IEEE 802.11g	16.00	39.811	0	1.0000	100%	0.0100	1.0000
IEEE 802.11n HT20	14.00	25.119	0	1.0000	100%	0.0050	1.0000
IEEE 802.11n HT40	13.00	19.953	0	1.0000	100%	0.0025	1.0000

BLE

Antenna 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW					
GFSK(1Mbps)	7.00	5.012	0	1.0000	100%	0.0016	1.0000

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW					
GFSK(2Mbps)	7.00	5.012	0	1.0000	100%	0.0016	1.0000

8. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/cm^2)
300-1,500	**F/1500**
1,500-100,000	**1.0**

9. Summary simultaneous transmission results

The sample supports 3 antennas for 2.4G WLAN and BT. The 2.4G WLAN and BT can transmit simultaneous.

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\sum$ of MPE ratios $\leqslant$ 1.0

Antenna 1 and Antenna 2 for 2.4GWLAN

Antenna 0 for BT

Modulation Type	MPE BT Ant 0 (mW/cm2)	MPE WIFI Ant 1 (mW/cm2)	MPE WIFI Ant 2 (mW/cm2)	∑MPE ratios	Limit	Results
BT+WIFI	0.0025	0.0063	0.0100	0.0188	1.0	PASS

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

Note

For a more detailed features description, please refer to the RF Test Report.

10. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

-----END OF REPORT-----