



Maximum Permissible Exposure

FCC ID: XBG-VNS-10WR2

APPLICANT: AVALUE TECHNOLOGY INCORPORATION

Application Type: Certification

Product: Panel PC

Model No.: VNS-10WR2

Series Model No. VNS-10WR2XXXXXXXXXX(where "X" may be any alphanumeric character, blank or "-")

Brand Name: AVALUE

FCC Rule Part(s): Part 2.1091 (Mobile)

IC Standard: RSS 102 (issue6)

Received Date: May 6, 2024

Reviewed By :

Paddy Chen

(Paddy Chen)

Approved By :

Chenz Ker

(Chenz Ker)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2405TW3102-U6	1.0	Original Report	2024-09-19	

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	Panel PC
Model No.	VNS-10WR2
Series Model No.	VNS-10WR2XXXXXXXXXX(where "X" may be any alphanumeric character, blank or "-")
Brand Name	AVALUE
Supports Radios Spec.	2.4G: 802.11b/g/n-20/n-40 5G: 802.11a/n-20/ac-20/n-40/ac-40/ac-80, Band 1~4 Bluetooth Dual Mode; V5.0
Wi-Fi Specification	802.11a/b/g/n/ac (2TX / 2RX)
Frequency Range	<u>2.4GHz:</u> For 802.11b/g/n-HT20: 2412 ~ 2462 MHz For 802.11n-HT40: 2422 ~ 2452 MHz <u>5GHz:</u> For 802.11a/n-HT20/ac-VHT-20: 5180~5320MHz, 5500~5700MHz, 5745~5825MHz For 802.11n-HT40/ ac-VHT40: 5190~5310MHz, 5510~5670MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5690MHz, 5775MHz
Modulation Type	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) BLE: GFSK (1Mbps / 2Mbps) 802.11b: DSSS, DBPSK, DQPSK, CCK 802.11g/n-20M/n-40M: OFDM, BPSK, QPSK, 16QAM, 64QAM 802.11a/n-20/ac-20/n-40/ac-40/ac-80: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)

Accessory	
Power Adapter	Brand: FSP Model No: FSP060-DHAN3 Input: AC 100-240V~1.8A, 50-60Hz Output: DC 12.0V, 5.0A 60.0W Cable Out: Non-shielding, 1.5m with Core*1

Note:

1. Model Difference: The difference of models only for marketing different, the other hardware was the same. (declared by the manufacturer)
2. The test was performed base on VNS-10WR2.

1.2. Antenna Description

No.	Manufacturer	Part No.	Antenna Type	Mode	Peak Gain
1	Compal	BCC-SID-PIFA-01R	PIFA	2.4GHz	1.13dBi
2	Compal	BCC-SID-PIFA-01R	PIFA	5GHz	2.11dBi

2. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

2.1. FCC Limits

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/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.4	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

Note : (1) f= Frequency in MHz , (2) * = Plane-wave equivalent power density

Calculation Formula:

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Under normal use condition, is at least 20cm away from the body of the user .

So, this device is classified as **Mobile Device**.

2.2. IC Limits

According to RSS 102 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 Table 4
LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

**Table 4: RF Field Strength Limits for Devices Used by the General Public
(Uncontrolled Environment)**

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}
<p>Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).</p>				

Calculation Formula:

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Under normal use condition, is at least 20cm away from the body of the user .

So, this device is classified as **Mobile Device**.

2.3. Test Result

Band (MHz)	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
BT	2402 ~ 2480	3.97	2.49	1.13	20	0.0006	1
BLE 5.0	2402 ~ 2480	3.72	2.36	1.13	20	0.0006	1
Wi-Fi 2.4G	2412 ~ 2462	17.91	61.80	1.13	20	0.0159	1
Wi-Fi 5G	5180 ~ 5825	14.80	30.20	2.11	20	0.0098	1

Conclusion :

$$CPD1/LPD1 + CPD2/LPD2 + \dots + CPDN/LPDN \leq 1$$

CPD : Calculation Power Density

LPD : Limit of Power Density

Mode	Power Density	Limit	Conclusion	Result (≤ 1)
BT	0.0006	1	0.0269	Pass
BLE 5.0	0.0006	1		
Wi-Fi 2.4G	0.0159	1		
Wi-Fi 5G	0.0098	1		

_____ The End _____