

Test Report for FCC & ISED

Report Number		ESTRGC2310-004		
Applicant	Company name	DAVOLINK Inc.		
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	Contact person	Lee Yong Hwa.		
Product	Product name	Wireless Access Gateway		
	Model No.	DVW-642	Manufacturer	DAVOLINK Inc.
	Serial No.	NONE	Country of origin	KOREA
Test date	01-Aug-23 ~ 28-Sep-23		Date of issue	30-Sep-23
FCC ID			RZEDVW-642	
ISED ID			8081A-DVW642	
Testing location		140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea		
Standard		RSS-102		
MRA Registration number		KR0019		
Tested by	Senior Engineer H.G. Lee		(Signature)	
Reviewed by	Engineering Manager K.I. Hong		(Signature)	
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable			
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test report is not related to KOLAS accreditation - Software version:1627 - Hardware version:V0.4				

RF Exposure Measurement

1. Introduction

The maximum Gain measured in Fully Anechoic Chamber

IC Safety Code 6 (2018), RSS-102 Section 2.2.2: To ensure compliance with the basic restrictions outlined in Section 2.1, at frequencies between 10 MHz and 300 GHz, the reference levels for electric- and magnetic-field strength and power density must be complied with.

2. Classification

MODE: WLAN

The antenna of the product, under normal use condition, is at least 20 cm away from the body of the user. Warning statement for keeping 20 cm separation distance and the prohibition of operating next to a person has been printed on the user's manual. So, this product is classified as the Mobile Device.

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

Frequency Range (MHz)	Electric Field Strength (V/m)(RMS)	Magnetic Field Strength(A/m)(RMS)	Power Density (W/m ²)	Reference Period (minutes)
0.003 – 10 ²¹	83	90	–	Instantaneous*
0.1–10	–	0.73/ f	–	6**
1.1–10	87/ f ^{0.5}	–	–	6**
10 – 20	27.46	0.0728	2.0	6
20 – 48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48 – 300	22.06	0.05852	1.291	6
300 – 6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619f ^{0.6834}	6
6000 – 15000	61.4	0.613	10	6
15000 – 150000	61.4	0.613	10	616000/ f ^{1.2}
150000 – 300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

TABLE 6: Reference Levels for Electric Field Strength, Magnetic Field Strength and Power Density in Controlled Environments

Frequency Range (MHz)	Electric Field Strength (V/m)(RMS)	Magnetic Field Strength(A/m)	Power Density (W/m ²)	Reference Period (minutes)
0.003 – 10 ²³	170	180	–	Instantaneous*
0.1–10	–	1.6/ f	–	6**
1.1–10	193/ f ^{0.5}	–	–	6**
10 – 20	61.4	0.163	10.0	6
20 – 48	129.8/ f ^{0.25}	0.3444/ f ^{0.25}	44.72/ f ^{0.5}	6
48 – 300	49.33	0.1309	6.455	6
300 – 6000	15.6 f ^{0.25}	0.04138 f ^{0.25}	0.6455f ^{0.5}	6
6000 – 15000	137	0.364	50	6
15000 – 150000	137	0.364	50	616000/ f ^{1.2}
150000 – 300000	0.354 f ^{0.5}	9.4 x 10 ⁻⁴ f ^{0.5}	3.33 x 10 ⁻⁴ f	616000/ f ^{1.2}
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

4. Friis Formula

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$

The maximum Gain measured in Fully Anechoic Chamber

WLAN 2.4G ant0 : 5.96 dBi or 3.944 (nemerical)

WLAN 2.4G ant1 : 5.93 dBi or 3.917 (nemerical)

WLAN 5G ant0: 6.86 dBi or 4.852 (nemerical)

WLAN 5G ant1 : 6.43 dBi or 4.395 (nemerical)

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

MODE: WLAN

P_d is the limit of MPE, $1\text{mW}/\text{cm}^2$. If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

The software provided by Manufacturer enabled the EUT to transmit with max power at lowest, middle and highest channel individually.

5. Test Results

5.1 The maximum Gain measured in Fully Anechoic Chamber

Band	antenna gain (dBi)	nemeric
WLAN 2.4GHz ant0	5.96 dBi	3.944 (numeric)
WLAN 2.4GHz ant1	5.93 dBi	3.917 (numeric)
WLAN 5GHz ant0	6.86 dBi	4.852 (numeric)
WLAN 5GHz ant1	6.43 dBi	4.395 (numeric)

5.2 Output Power into Antenna & Power Density (1mW/cm²) :

$$S = ((P1 * G 1) + (P2 * G 2)) / (4 * \pi * r^2)$$

Where

P1 = 16.48 mW (M axim um average output power) *1)

P2= 98.17 mW (M axim um average output power) *2)

G1= 3.944 Numerical Antenna gain; equal to 5.96 dBi *1)

G2= 4.852 Numerical Antenna gain; equal to 6.86 dBi *2)

r= 20 cm

For: Type1VY (WLAN 2.4G and WLAN 5G) S=0.10754 mW/cm²

Even taking into account the tolerance, this device can be satisfied w ith the limits

*1) WLAN 2.4G value

*2) WLAN 5 GHz value, A ntenna gain=Directional gain

This calculation was made to show that the EUT complies with the limit in simultaneous transmitting of WLAN 2.4GHz and WLAN 5GHz .