

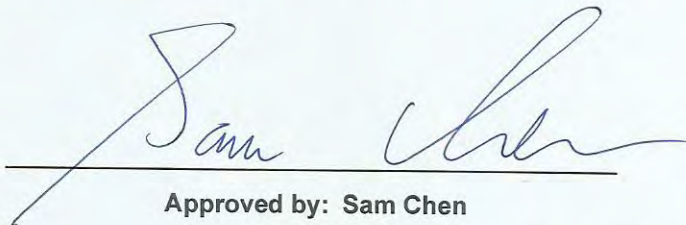


RADIO EXPOSURE TEST REPORT

FCC ID : 2ARXK-VHC25
Equipment : Wireless Edge Server
Brand Name : Veeahub
Model Name : VHC25,VHC20
Applicant : Veea Inc.
164 E 83rd Street, NEW YORK,United States, 10028
Manufacturer : Veea Inc.
164 E 83rd Street, NEW YORK,United States, 10028
Standard : 47 CFR Part 2.1091

The product was received on Aug. 09, 2021, and testing was started from Aug. 11, 2021 and completed on Sep. 18, 2021. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 EUT General Information	5
1.2 Antenna Information	6
1.3 Table for EUT Operation Information	8
1.4 Table for EUT support function	8
1.5 Accessories	8
1.6 Testing Location	8
2 Maximum Permissible Exposure	10
2.1 Limit of Maximum Permissible Exposure	10
2.2 MPE Calculation Method.....	10
2.3 Calculated Result and Limit.....	11
Photographs of EUT v01	



History of this test report

Report No.	Version	Description	Issued Date
FA172726	01	Initial issue of report	Jan. 13, 2022



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: **Sam Chen**

Report Producer: **Wendy Pan**



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: GFSK
IEEE802.15.4	2400-2483.5	2405-2480	O-QPSK



1.2 Antenna Information

Ant.	Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)
1	WNC	VHC25	PIFA	I-PEX	Note 1
2	WNC	VHC25	PIFA	I-PEX	
3	WNC	VHC25	PIFA	I-PEX	
4	WNC	VHC25	PIFA	I-PEX	

Note 1:

Ant.	Port					Gain (dBi)				
	WLAN 2.4GHz	WLAN 5GHz UNII-3	WLAN 5GHz UNII-1	Bluetooth BR/EDR	Bluetooth LE or IEEE802.15.4	WLAN 2.4GHz	WLAN 5GHz UNII-3	WLAN 5GHz UNII-1	Bluetooth BR/EDR	Bluetooth LE or IEEE802.15.4
1	-	-	2	1	-	-	-	3.6	2.3	-
2	1	2	-	-	-	2.2	3.3	-	-	-
3	-	-	1	-	1	-	-	3.5	-	1.9
4	2	1	-	-	-	1.8	3.4	-	-	-

Note 2: The above information was declared by manufacturer.

Note 3: Directional gain information



Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{i=1}^{N_{ANT}} \left\{ \sum_{k=1}^{N_{ANT}} g_{i,k} \right\}^2}{N_{ANT}} \right]$
BF	$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{i=1}^{N_{ANT}} \left\{ \sum_{k=1}^{N_{ANT}} g_{i,k} \right\}^2}{N_{ANT}} \right]$	$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{i=1}^{N_{ANT}} \left\{ \sum_{k=1}^{N_{ANT}} g_{i,k} \right\}^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{i=1}^{N_{ANT}} \left\{ \sum_{k=1}^{N_{ANT}} g_{i,k} \right\}^2}{N_{ANT}} \right]$$

$$Nss1(g1,1) = 10^{G1/20} ; Nss1(g1,2) = 10^{G2/20} ; Nss1(g1,3) = 10^{G3/20} ; Nss1(g1,4) = 10^{G4/20}$$

$$g_{j,k} = (Nss1(g1,1) + Nss1(g1,2) + Nss1(g1,3) + Nss1(g1,4))^2$$

$$DG = 10 \log[(Nss1(g1,1) + Nss1(g1,2) + Nss1(g1,3) + Nss1(g1,4))^2 / N_{ANT}] \Rightarrow 10$$

$$\log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / N_{ANT}]$$

Where ;

G1 = Ant 1 Gain ; G2 = Ant 2 Gain ; G3 = Ant 3 Gain ; G4 = Ant 4 Gain ;

2.4GHz DG = 5.01 dBi

5 GHz U-NII-1 DG = 6.56 dBi

5 GHz U-NII-3 DG = 6.36 dBi

For 2.4GHz:

For IEEE 802.11b/g/n/VHT/ax mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz UNII-1 / UNII-3:

For IEEE 802.11a/n/ac/ax mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

Bluetooth / IEEE802.15.4 (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.



1.3 Table for Multiple Listing

Model Name	Description
VHC25	All the model names are identical, the difference model names served as marketing strategy.
VHC20	

Note1: From the above models, model: VHC25 was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

1.4 Table for EUT Operation Information

Operation Mode	Description
1	WLAN 2.4GHz + 5GHz Low Band + 5GHz High Band + Bluetooth BR/EDR + IEEE 802.15.4
2	WLAN 2.4GHz + 5GHz Low Band + 5GHz High Band + Bluetooth BR/EDR + Bluetooth LE

Note: The above information was declared by manufacturer.

1.5 Table for EUT support function

Function
AP
Mesh

Note: The above information was declared by manufacturer.

1.6 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	Veea	VHC25-30A	Input: 100-240V~50/60Hz, 1.0A Max Output: 12V, 2.5A
Other			
RJ-45 cable*1: Non-shielded, 1.8m			

1.7 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
Test site Designation No. TW3787 with FCC.	
Conformity Assessment Body Identifier (CABID) TW3787 with ISED.	





2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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 Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	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: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 29 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;D1D	5.01	29.74	34.75	0.50	35.25	3.34965	29	0.31695	1.00000
2.4G;BT-BR	2.30	7.74	10.04	0.50	10.54	0.01132	29	0.00107	1.00000
2.4G;BT-LE	1.90	15.78	17.68	0.50	18.18	0.06577	29	0.00622	1.00000
802.15.4	1.90	15.03	16.93	0.50	17.43	0.05534	29	0.00524	1.00000
5.2G;D1D	6.56	28.12	34.68	0.50	35.18	3.29610	29	0.31189	1.00000
5.8G;D1D	6.36	28.47	34.83	0.50	35.33	3.41193	29	0.32285	1.00000

Simultaneous Transmission Analysis Mode:

WLAN 2.4GHz + 5GHz Low Band + 5GHz High Band + Bluetooth BR/EDR + IEEE 802.15.4

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	5.01	29.74	34.75	0.50	35.25	3.34965	29	0.31695	1.00000	0.31695
5.2G;D1D	6.56	28.12	34.68	0.50	35.18	3.29610	29	0.31189	1.00000	0.31189
5.8G;D1D	6.36	28.47	34.83	0.50	35.33	3.41193	29	0.32285	1.00000	0.32285
2.4G;BT-BR	2.30	7.74	10.04	0.50	10.54	0.01132	29	0.00107	1.00000	0.00107
802.15.4	1.90	15.03	16.93	0.50	17.43	0.05534	29	0.00524	1.00000	0.00524
									Sum Ratio	0.95800
									Ratio Limit	1

WLAN 2.4GHz + 5GHz Low Band + 5GHz High Band + Bluetooth BR/EDR + Bluetooth LE

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	5.01	29.74	34.75	0.50	35.25	3.34965	29	0.31695	1.00000	0.31695
5.2G;D1D	6.56	28.12	34.68	0.50	35.18	3.29610	29	0.31189	1.00000	0.31189
5.8G;D1D	6.36	28.47	34.83	0.50	35.33	3.41193	29	0.32285	1.00000	0.32285
2.4G;BT-BR	2.30	7.74	10.04	0.50	10.54	0.01132	29	0.00107	1.00000	0.00107
2.4G;BT-LE	1.90	15.78	17.68	0.50	18.18	0.06577	29	0.00622	1.00000	0.00622
									Sum Ratio	0.95898
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

————THE END————