

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)

Report No.: RFBEIH-WTW-P23060517C-2

FCC ID: 2BBDG-CHPU-NS-A01

Product: Canopy Hub

Brand: CANOPY

Model No.: CHPU-NS-A01

Received Date: 2025/8/7

Test Date: 2025/8/12

Issued Date: 2025/9/5

Applicant: SNTNL LLC

Address: 1 American Road, Detroit, Michigan, United States

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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Test Location: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

FCC Registration / 198487 / TW2021

Designation Number:

Approved by:



, Date:

2025/9/5

Jeremy Lin / Project Engineer

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Prepared by : Annie Chang / Senior Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBEIH-WTW-P23060517C-2	Original release.	2025/9/5



1 Certificate

Product: Canopy Hub

Brand: CANOPY

Test Model: CHPU-NS-A01

Sample Status: Engineering sample

Applicant: SNTNL LLC

Test Date: 2025/8/12

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)

Measurement

procedure: ANSI C63.10-2020

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
Clause	Test Item	Result	Remark
15.407(a)(2)	26 dB Bandwidth	N/A	Refer to Note 2 below
15.407(a)(1) 15.407(a)(3)	RF Output Power	N/A	Refer to Note 2 below
15.407(a)(1) 15.407(a)(3)	Power Spectral Density	N/A	Refer to Note 2 below
15.407(e)	6 dB Bandwidth	N/A	Refer to Note 2 below
---	Occupied Bandwidth	N/A	Refer to Note 2 below
15.407(b)(9)	AC Power Conducted Emissions	N/A	Refer to Note 2 below
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -3.2 dB at 432.02 MHz
15.407(b) (1/10) 15.407(b) (4(i))/10)	Unwanted Emissions above 1 GHz	N/A	Refer to Note 2 below
15.203	Antenna Requirement	Pass	Antenna connector is ipex not a standard connector.

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. Test item: Unwanted Emissions below 1 GHz test was performed for this addendum. The others testing data refer to original test report.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (\pm)
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	2.55 dB
	30 MHz ~ 1 GHz	5.77 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Canopy Hub
Brand	CANOPY
Test Model	CHPU-NS-A01
Status of EUT	Engineering sample
Power Supply Rating	12.8Vdc from internal battery or 12-24Vdc from Car battery
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	Up to 72.2 Mbps
Operating Frequency	5.18 GHz ~ 5.24 GHz, 5.745 GHz ~ 5.825 GHz
Number of Channel	802.11a, 802.11n (HT20): 9

Note:

1. This report is prepared for FCC Class II permissive change. This report is issued as a supplementary report of original BV CPS report no. RFBEIH-WTW-P23060517A-2. The difference compared with original report is listing as below.

Difference

- ◆ Change power board
- ◆ Change OBD-II Power cable to 4.0m

2. According to above condition, therefore only the Unwanted Emissions below 1 GHz test item need to be performed. And all data were verified to meet the requirements.

3. The EUT uses following accessories.

Item	Specification
OBD-II Power cable	Shielded 4.0m
Camera cable	Shielded 3.0m

4. There are Bluetooth, WLAN (2.4 GHz & 5 GHz) and WWAN technologies used for the EUT.

5. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (5 GHz)	Bluetooth
2	WLAN (2.4 GHz)	Bluetooth
3	WWAN (LTE Band 12)	Bluetooth

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

6. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Gain (dBi)	Antenna Type	Connector Type
4.09	PIFA	ipex

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates SISO function:

Modulation Mode	5 GHz Band		TX & RX Configuration
	1TX	1RX	
802.11a			
802.11n (HT20)	1TX	1RX	

3.3 Channel List

FOR 5180 ~ 5240 MHz

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

FOR 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	<ol style="list-style-type: none"> EUT can be used in the following ways: XYZ 3-axis. Pre-scan in these ways and find the worst case as a representative test condition. For Unwanted Emission below/ above 1 GHz has Input 12V=5A/Input 24V-2.5A of power supply. Pre-scan these modes and find the worst case as a representative test condition.
Worst Case:	<ol style="list-style-type: none"> X/Y/Z Worst Condition: X Axis for Unwanted Emission above 1GHz and Unwanted Emission below 1GHz. For Unwanted Emission below/above 1 GHz Input 12V-5A is the worst case of power supply.

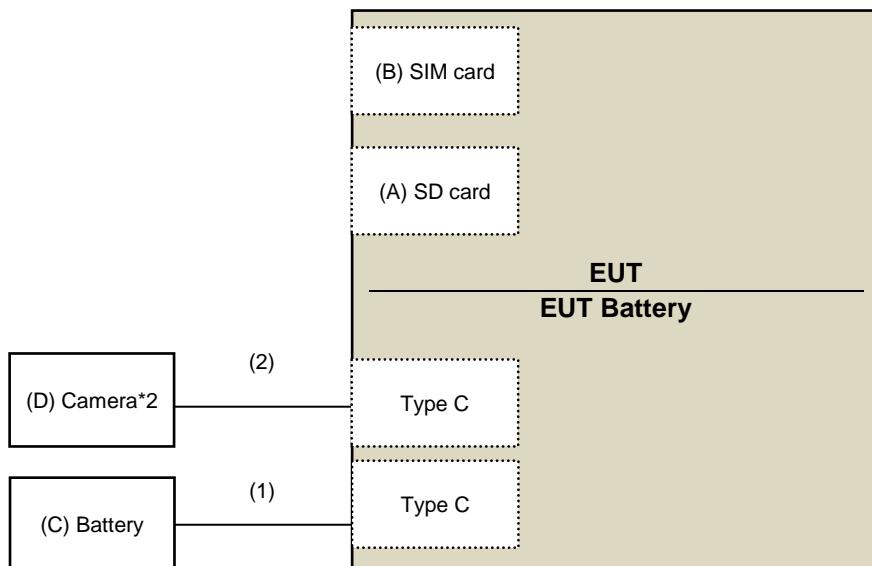
Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
Unwanted Emissions below 1 GHz	802.11n (HT20)	157	BPSK	MCS0

3.5 Test Program Used and Operation Descriptions

Controlling software (teraterm v4.80) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.6 Connection Diagram of EUT and Peripheral Devices



3.7 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	SD card	SanDisk	256G	N/A	N/A	Provided by Lab
B	SIM card	N/A	N/A	N/A	N/A	Provided by Lab
C	Battery	GS	GG20LH2	N/A	N/A	Provided by Lab
D	Camera*2	CANOPY	CSSU-TS-A01	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	Battery DC cable	1	4	N	0	Supplied by applicant
2	Type C cable	2	3	Y	0	Supplied by applicant

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	137	2024/10/9	2025/10/8
Coupling / Decoupling Network Schwarzbeck	CDNE-M2	00097	2025/5/28	2026/5/27
	CDNE-M3	00091	2025/3/20	2026/3/19
Loop Antenna TESEQ	HLA 6121	64095	2024/10/17	2025/10/16
MXE EMI Receiver Agilent	N9038A	MY50010158	2024/10/11	2025/10/10
Preamplifier Agilent	8447D	2944A11064	2025/2/14	2026/2/13
RF Coaxial Cable Pacific	8D-FB	Cable-CH6-02	2025/6/24	2026/6/23
Signal Analyzer R&S	FSV40	101544	2025/7/1	2026/6/30
Software BVADT	Radiated_V8.7.08	N/A	N/A	N/A
Tower ADT	AT100	0306	N/A	N/A
Turn Table ADT	TT100	0306	N/A	N/A

Notes:

1. The test was performed in Linkou 966 Chamber 6 (CH 6).
2. Tested Date: 2025/8/12

5 Limits of Test Items

5.1 Unwanted Emissions below 1 GHz

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Notes:

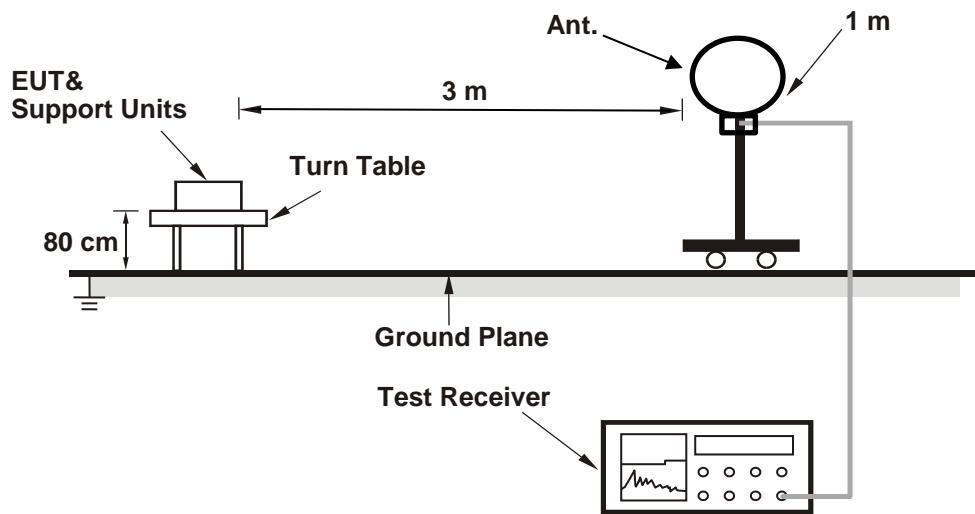
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

6 Test Arrangements

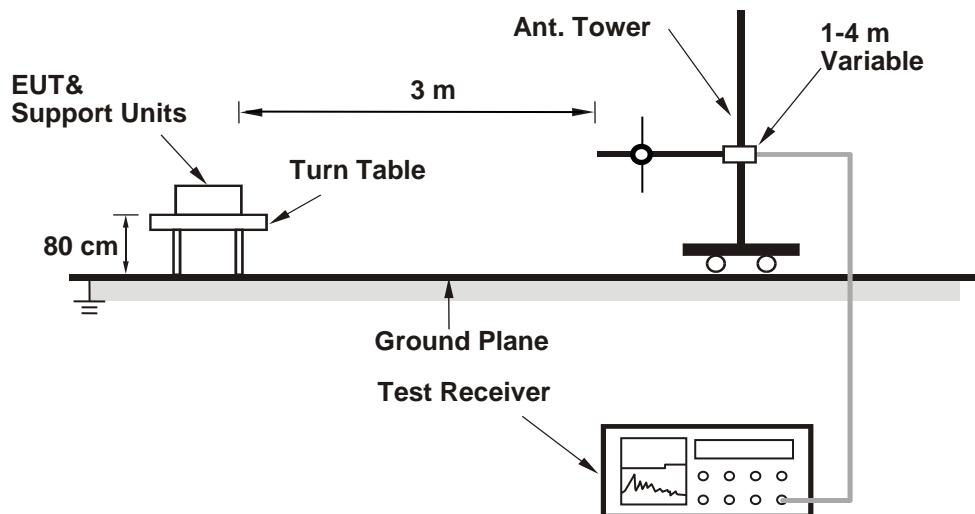
6.1 Unwanted Emissions below 1 GHz

6.1.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.1.2 Test Procedure

For Radiated emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

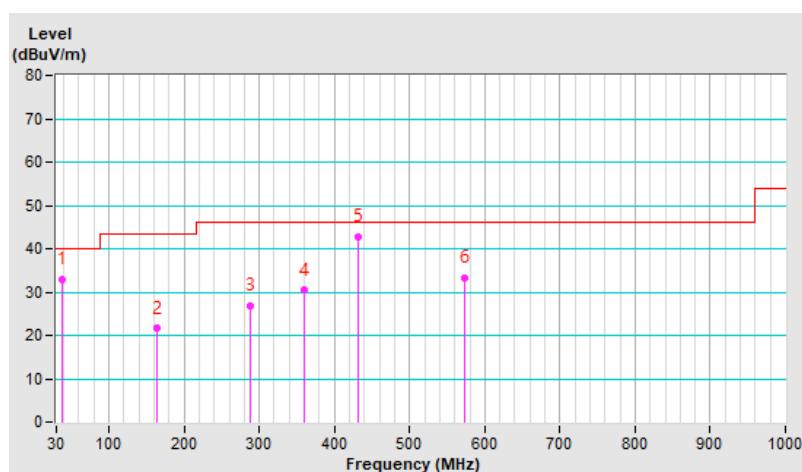
7.1 Unwanted Emissions below 1 GHz

RF Mode	802.11n (HT20)	Channel	CH 157 : 5785 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120 kHz, DET=Quasi-Peak
Input Power	12 Vdc	Environmental Conditions	25 °C, 75% RH
Tested By	Jed Wu		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.37	32.9 QP	40.0	-7.1	1.58 H	321	42.7	-9.8
2	164.39	21.6 QP	43.5	-21.9	1.64 H	60	29.6	-8.0
3	288.02	26.8 QP	46.0	-19.2	1.73 H	229	32.7	-5.9
4	359.99	30.4 QP	46.0	-15.6	1.92 H	75	34.9	-4.5
5	432.02	42.8 QP	46.0	-3.2	1.35 H	219	45.4	-2.6
6	572.67	33.2 QP	46.0	-12.8	1.02 H	100	32.9	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

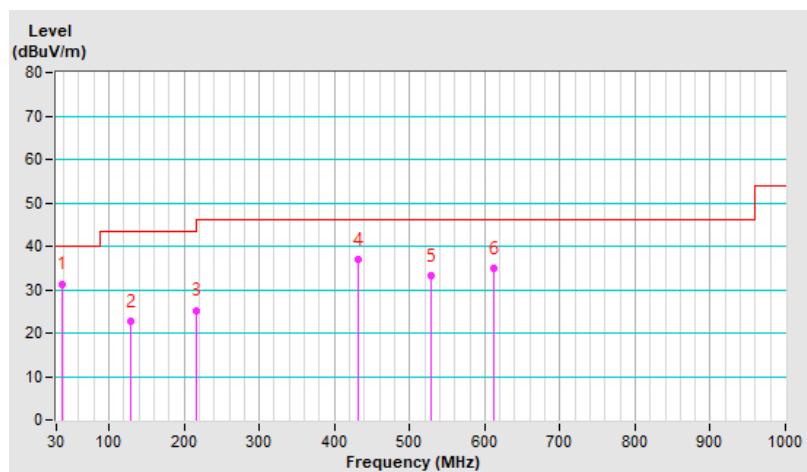


RF Mode	802.11n (HT20)	Channel	CH 157 : 5785 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120 kHz, DET=Quasi-Peak
Input Power	12 Vdc	Environmental Conditions	25 °C, 75% RH
Tested By	Jed Wu		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.13	31.3 QP	40.0	-8.7	1.04 V	236	41.2	-9.9
2	128.89	22.6 QP	43.5	-20.9	1.15 V	74	32.2	-9.6
3	216.05	25.1 QP	46.0	-20.9	1.27 V	192	35.1	-10.0
4	432.02	36.8 QP	46.0	-9.2	1.35 V	321	39.4	-2.6
5	528.00	33.1 QP	46.0	-12.9	1.65 V	176	34.1	-1.0
6	611.81	34.8 QP	46.0	-11.2	1.82 V	338	33.3	1.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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