

TEST REPORT

EUT Description	Convertible PC
Brand Name	HP
Model Name	TPN-W156
FCC ID	PD9AX211NG
ISED ID	1000M-AX211NG
Date of Test Start/End	2023-11-15 / 2023-11-15
Features	IEEE 802.11a/b/g/n/ac/ax

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Test Report identification	231026-01.TR01
Revision Control	Rev. 00 This test report replaces any previous versions of this test report (see Section 7)

The test results relate only to the samples tested.

Reviewed by _____

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1. Standards, reference documents and applicable test methods

- a. KDB 388624 D02 Pre-Approval Guidance List v18, PRE-APPROVAL GUIDANCE LIST
- b. FCC Presentations TCB Workshop November 2019, RF exposure procedures.

2. General conditions, competences and guarantees

- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	20.4°C ± 2.5°C
Humidity	53% ± 5%

4. Test Sample

Sample	ID #	Description	Model	Serial #	Note
#1	231026-01.S06	Convertible PC	TPN-W156	2023090710121	-

5. EUT Features

The herein information is provided by the customer.

Intel WRF Lab declines any responsibility for the accuracy of the stated customer provided information, especially if it has any impact on the correctness of test results presented in this report.

Brand Name	HP
Model Name	TPN-W156
Prototype / Production	Pre - Production
Host Identification	Convertible PC

6. Remarks and comments

1. The test report is validation of the G sensor functionality.

7. Test Results summary

7.1. WLAN Tx Power Table Summary

Device Mode	Lid Angle range	LCD Direction	2.4GHz-CH6 802.11b				5GHz-CH120 802.11a			
			Target Power (dBm)		Measured Power (dBm)		Target Power (dBm)		Measured Power (dBm)	
			Antenna Aux (1)	Antenna Main (2)	Antenna Aux (1)	Antenna Main (2)	Antenna Aux (1)	Antenna Main (2)	Antenna Aux (1)	Antenna Main (2)
Lid Close	0° ≤ - <30°	-	Standby	Standby	Standby	Standby	Standby	Standby	Standby	Standby
Laptop	30° < - ≤200°	-	20.5	20.5	19.7	19.9	20.5	20.5	19.8	20.0
Tablet	200° < - ≤360°	-	17.5	17.5	16.6	16.8	15.5	15.5	15.3	14.9

8. Document Revision History

Revision #	Modified by	Revision Details
Rev.00	Cheiel In	-

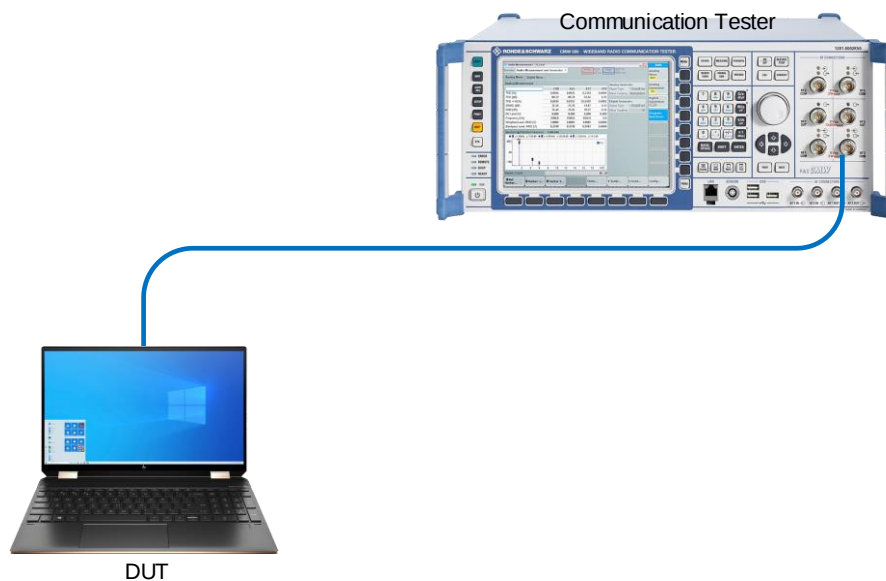
Annex A. Test & System description

A.1 Test setup

The conducted power measurement test setup is described in the following and illustrated in Figure 1.

- The DUT is Convertible PC from *HP* model *TPN-W156*. An *AX211NGW* connectivity module is installed inside
- A control PC is used to configure the call box as an access point to manage the uplink and downlink data traffic.
- Uplink signal power is measured with the Call Box.
- Path loss in the power measurement setup from the wireless module antenna port to the Call Box.

Figure.1 – Power measurement test setup.



A.2 Procedure

The following additional guidance applies only to convertible laptops whose screen rotates around one axis, from 0 degrees to 180 degrees, in a clamshell style, i.e., from closed mode to open mode, to “tent” mode, and finally, to tablet mode. This process must be followed to determine the lid angle where a power reduction occurs, by taking power measurements at each step, as indicated in the step listed here below:

1. From the lid in closed mode (0 degrees), open the screen in 10-degree steps until laptop mode is obtained
2. Lower the screen by 5 degrees increments to verify that the “closed mode” is triggered
3. From the position of the previous step, open the screen in 1-degree increments until laptop mode is triggered again
4. Continue opening the screen in 1-degree increments until at least 5 degrees past where “laptop mode” was obtained, then continue opening the screen in 10-degree steps until the device switches to tablet mode
5. Reverse the previous procedure to go from tablet mode back down to closed mode

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A.3 Test Equipment List

Equipment and accessories used for the conducted power measurement test setup are listed below. The Test Platform (DUT), test setup and associated equipment are shown in A.1.

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
125-000	Communication Tester	CMW500	129337	Rohde & Schwartz	2023-04-20	2025-04-20
022-003 022-004	RF path (RF cable + Adapters)	-	-	-	RF path loss was verified before usage	

Annex B. Test Results

B.1 Trigger lid angle detection and power verification 2.4GHz

B.1.1 LCD direction 0°

The lid is rotating from 0 to 360. The system base is horizontal, LCD direction is 0 degree for notebook mode

Mode	Angle (degree)	Measured power 2.4GHz-Ch6(dBm)	
		Aux(1)	Main(2)
Lid close	0	Standby	Standby
	10	Standby	Standby
	20	Standby	Standby
Laptop	30	19.7	19.9
Lid close	25	Standby	Standby
	26	Standby	Standby
	27	Standby	Standby
	28	Standby	Standby
	29	Standby	Standby
Laptop	30	19.7	19.9
	31	19.7	19.9
	32	19.7	19.9
	33	19.7	19.9
	34	19.7	19.9
	35	19.7	19.9
	40	19.7	19.9
	50	19.7	19.9
	60	19.7	19.9
	70	19.7	19.9
	80	19.7	19.9
	90	19.7	19.9
	100	19.7	19.9
	110	19.7	19.9
	120	19.7	19.9
	130	19.7	19.9
	140	19.7	19.9
	150	19.7	19.9
	160	19.7	19.9
	170	19.7	19.9
	180	19.7	19.9
	190	19.7	19.9
	200	19.7	19.9

Mode	Angle (degree)	Measured power 2.4GHz-Ch6(dBm)	
		Aux(1)	Main(2)
Tablet	210	16.6	16.8
	205	16.6	16.8
Laptop	200	19.7	19.9
	201	19.7	19.9
	202	19.7	19.9
	203	19.7	19.9
	204	19.7	19.9
Tablet	205	16.6	16.8
	206	16.6	16.8
	207	16.6	16.8
	208	16.6	16.8
	209	16.6	16.8
	210	16.6	16.8
	220	16.6	16.8
	230	16.6	16.8
	240	16.6	16.8
	250	16.6	16.8
	260	16.6	16.8
	270	16.6	16.8
	280	16.6	16.8
	290	16.6	16.8
	300	16.6	16.8
	310	16.6	16.8
	320	16.6	16.8
	330	16.6	16.8
	340	16.6	16.8
	350	16.6	16.8
	360	16.6	16.8

The lid is rotating from 360 to 0. The system base is horizontal, LCD direction is 0 degree for notebook mode.

Mode	Angle	Measured power	
	(degree)	2.4GHz-Ch6(dBm)	
		Aux(1)	Main(2)
Tablet	360	16.6	16.8
	350	16.6	16.8
	340	16.6	16.8
	340	16.6	16.8
	330	16.6	16.8
	320	16.6	16.8
	310	16.6	16.8
	300	16.6	16.8
	290	16.6	16.8
	280	16.6	16.8
	270	16.6	16.8
	260	16.6	16.8
	250	16.6	16.8
	240	16.6	16.8
	230	16.6	16.8
	220	16.6	16.8
	210	16.6	16.8
	200	16.6	16.8
	190	19.7	19.9
	195	19.7	19.9
Laptop	200	16.6	16.8
Tablet	199	16.6	16.8
	198	16.6	16.8
	197	16.6	16.8
	196	16.6	16.8
Laptop	195	19.7	19.9
	194	19.7	19.9
	193	19.7	19.9
	192	19.7	19.9
	191	19.7	19.9
	190	19.7	19.9
	180	19.7	19.9

Mode	Angle	Measured power	
	(degree)	2.4GHz-Ch6(dBm)	
		Aux(1)	Main(2)
Laptop	170	19.7	19.9
	160	19.7	19.9
	150	19.7	19.9
	140	19.7	19.9
	130	19.7	19.9
	120	19.7	19.9
	110	19.7	19.9
	100	19.7	19.9
	90	19.7	19.9
	80	19.7	19.9
	70	19.7	19.9
	60	19.7	19.9
	50	19.7	19.9
	40	19.7	19.9
	30	19.7	19.9
	20	Standby	Standby
	25	Standby	Standby
	30	19.7	19.9
	29	Standby	Standby
	28	Standby	Standby
	27	Standby	Standby
Lid close	26	Standby	Standby
	25	Standby	Standby
	20	Standby	Standby
	10	Standby	Standby
	0	Standby	Standby

B.2 Trigger lid angle detection and power verification 5GHz

B.2.1 LCD direction 0°

The lid is rotating from 0 to 360. The system base is horizontal, LCD direction is 0 degree for notebook mode

Mode	Angle (degree)	Measured power 5GHz-Ch120(dBm)	
		Aux(1)	Main(2)
Lid close	0	Standby	Standby
	10	Standby	Standby
	20	Standby	Standby
Laptop	30	19.8	20.0
Lid close	25	Standby	Standby
	26	Standby	Standby
	27	Standby	Standby
	28	Standby	Standby
Laptop	29	Standby	Standby
	30	19.8	20.0
	31	19.8	20.0
	32	19.8	20.0
	33	19.8	20.0
	34	19.8	20.0
	35	19.8	20.0
	40	19.8	20.0
	50	19.8	20.0
	60	19.8	20.0
	70	19.8	20.0
	80	19.8	20.0
	90	19.8	20.0
	100	19.8	20.0
	110	19.8	20.0
	120	19.8	20.0
	130	19.8	20.0
	140	19.8	20.0
	150	19.8	20.0
	160	19.8	20.0
	170	19.8	20.0
	180	19.8	20.0
	190	19.8	20.0
	200	19.8	20.0

Mode	Angle (degree)	Measured power 5GHz-Ch120(dBm)	
		Aux(1)	Main(2)
Tablet	210	15.3	14.9
	205	15.3	14.9
Laptop	200	19.8	20.0
	201	19.8	20.0
	202	19.8	20.0
	203	19.8	20.0
	204	19.8	20.0
Tablet	205	15.3	14.9
	206	15.3	14.9
	207	15.3	14.9
	208	15.3	14.9
	209	15.3	14.9
	210	15.3	14.9
	220	15.3	14.9
	230	15.3	14.9
	240	15.3	14.9
	250	15.3	14.9
	260	15.3	14.9
	270	15.3	14.9
	280	15.3	14.9
	290	15.3	14.9
	300	15.3	14.9
	310	15.3	14.9
	320	15.3	14.9
	330	15.3	14.9
	340	15.3	14.9
	350	15.3	14.9
	360	15.3	14.9

The lid is rotating from 360 to 0. The system base is horizontal, LCD direction is 0 degree for notebook mode.

Mode	Angle	Measured power	
	(degree)	5GHz-Ch120(dBm)	
		Aux(1)	Main(2)
Tablet	360	15.3	14.9
	350	15.3	14.9
	340	15.3	14.9
	340	15.3	14.9
	330	15.3	14.9
	320	15.3	14.9
	310	15.3	14.9
	300	15.3	14.9
	290	15.3	14.9
	280	15.3	14.9
	270	15.3	14.9
	260	15.3	14.9
	250	15.3	14.9
	240	15.3	14.9
	230	15.3	14.9
	220	15.3	14.9
	210	15.3	14.9
	200	15.3	14.9
	190	19.8	20.0
	195	19.8	20.0
Laptop	200	15.3	14.9
Tablet	199	15.3	14.9
	198	15.3	14.9
	197	15.3	14.9
	196	15.3	14.9
	195	19.8	20.0
Laptop	194	19.8	20.0
	193	19.8	20.0
	192	19.8	20.0
	191	19.8	20.0
	190	19.8	20.0
	180	19.8	20.0

Mode	Angle	Measured power	
	(degree)	5GHz-Ch120(dBm)	
		Aux(1)	Main(2)
Laptop	170	19.8	20.0
	160	19.8	20.0
	150	19.8	20.0
	140	19.8	20.0
	130	19.8	20.0
	120	19.8	20.0
	110	19.8	20.0
	100	19.8	20.0
	90	19.8	20.0
	80	19.8	20.0
	70	19.8	20.0
	60	19.8	20.0
	50	19.8	20.0
	40	19.8	20.0
	30	19.8	20.0
	20	Standby	Standby
	25	Standby	Standby
	30	19.8	20.0
Lid close	29	Standby	Standby
	28	Standby	Standby
	27	Standby	Standby
	26	Standby	Standby
	25	Standby	Standby
	20	Standby	Standby
	10	Standby	Standby
	0	Standby	Standby