

# TEST REPORT

EUT Description	Convertible PC
Brand Name	HP
Model Name	TPN-W155
FCC ID	B94-TNW155GP2KV
ISED ID	21374-FM350GL
Date of Test Start/End	2022-05-20 / 2022-05-23
Features	IEEE802.11a/b/g/n/ac/ax

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Test Report identification	220425-01.TR02
Revision Control	Rev. 03 This test report replaces any previous versions of this test report (see Section 2)

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## 2. Document Revision History

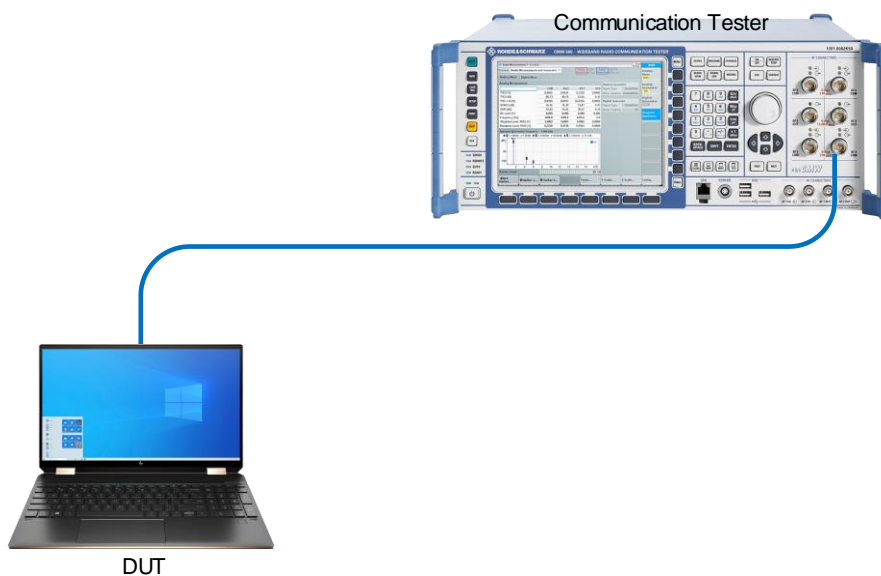
Revision #	Date	Modified by	Revision Details
Rev.00	2022-05-25	Tanguy MATHIEU	First Issue
Rev.01	2022-05-30	Tanguy MATHIEU	Band information added in section 6
Rev.02	2022-07-29	Cheiel IN	ISED ID added Test Report Identification updated
Rev.03	2022-08-05	Cheiel IN	Addition of not-on-table/on-table states power verification

## 3. Test Setup

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

- The DUT which FM350-GL cellular module is installed inside convertible PC from HP model TPN-W155.
- 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 FM350-GL antenna port to the Call Box.

*Figure.1 – Validation using conducted power measurement test setup.*



#### 4. Test Sample

Sample	ID #	Description	Model	Serial #	Note
#1	220425-01.S05	Convertible PC	TPN-W155	ABC2020045	-

#### 5. 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.1.3.

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
144-000	Communication Tester	CMW500	169123	Rohde & Schwartz	2021-05-18	2023-05-18

#### 6. Test Results

##### 6.1. Tx Power Table Assignment

Device Status	Device Mode	Lid Angle	LCD Direction	Radio Power control definition LTE Band 7 (dBm)		Power Measured LTE Band 7 (dBm)		
				Antenna 5	Antenna 8	Antenna 5	Antenna 8	
Not on Table	Lid Closed	0° - 29°	-	Standby	Standby	Standby	Standby	
	Notebook	30° - 129°	0°	19.5	24.0	19.2	23.6	
	Stand	200° - 339°	0°	16.0	24.0	15.4	23.8	
	Tent	200° - 339°	180°	16.0	18.5	15.2	18.1	
	Tablet	130° - 199°	0°	16.0	18.5	15.4	18.1	
			200° - 339°	90°; 270°	16.0	18.5	15.3	18.3
			340° - 360°	0°	16.0	18.5	15.4	18.0
Book	30° - 200°	90°; 270°	16.0	18.5	15.2	18.4		
On Table	Lid Closed	0° - 29°	-	Standby	Standby	Standby	Standby	
	Notebook	30° - 129°	0°	24.0	24.0	23.6	23.8	
	Stand	200° - 339°	0°	24.0	24.0	23.6	23.8	
	Tent	200° - 339°	180°	24.0	24.0	23.6	23.8	
	Tablet	130° - 199°	0°	24.0	24.0	23.6	23.8	
			200° - 339°	90°; 270°	24.0	24.0	23.6	23.8
			340° - 360°	0°	24.0	24.0	23.6	23.8
Book	30° - 200°	90°; 270°	24.0	24.0	23.6	23.8		

## 6.2. Not-on-table/on-table states power verification

Device mode	Cycle	Device Status	Power Mode	Cumulative Time (s)	Target power (dBm)	Measured power (dBm)	Target power (dBm)	Measured power (dBm)
					LTE7 Ant5		LTE7 Ant8	
Notebook	Cycle 1	On Table (motion)	Reduced	20	19.5	19.2	24.0	23.6
		On Table (static)	Full	50	24.0	23.6	24.0	23.8
		Not On Table (motion)	Reduced	80	19.5	19.2	24.0	23.6
	Cycle 2	On Table (motion)	Reduced	100	19.5	19.2	24.0	23.6
		On Table (static)	Full	130	24.0	23.6	24.0	23.8
		Not On Table (motion)	Reduced	160	19.5	19.2	24.0	23.6
Tablet mode	Cycle 1	On Table (motion)	Reduced	20	16.0	15.4	18.5	18.1
		On Table (static)	Full	50	24.0	23.6	24.0	23.8
		Not On Table (motion)	Reduced	80	16.0	15.4	18.5	18.1
	Cycle 2	On Table (motion)	Reduced	100	16.0	15.4	18.0	18.1
		On Table (static)	Full	130	24.0	23.6	24.0	23.8
		Not On Table (motion)	Reduced	160	16.0	15.4	18.0	18.1

## 6.3. Trigger lid angle detection and power verification

The lid is rotating from 0 to 360. The screen is vertical, LCD direction is 0 degree.

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)		Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8			Antenna 5	Antenna 8
Lid close	0	15.3	18.5	Tablet	190	15.4	18.1
	10	15.3	18.5		200	15.4	18.1
	20	15.3	18.5		201	15.4	18.1
	30	15.3	18.5		202	15.4	18.1
	31	15.3	18.5		203	15.4	18.1
	32	15.3	18.5		204	15.4	18.1
	33	15.3	18.5		205	15.4	23.8
	34	15.3	18.5		206	15.4	23.8
	35	15.3	18.5		207	15.4	23.8
Notebook	36	19.2	23.6	Stand	208	15.4	23.8
	37	19.2	23.6		209	15.4	23.8
	38	19.2	23.6		210	15.4	23.8
	39	19.2	23.6		220	15.4	23.8
	40	19.2	23.6		230	15.4	23.8
	50	19.2	23.6		240	15.4	23.8
	60	19.2	23.6		250	15.4	23.8
	70	19.2	23.6		260	15.4	23.8
	80	19.2	23.6		270	15.4	23.8
	90	19.2	23.6		280	15.4	23.8
	100	19.2	23.6		290	15.4	23.8
110	19.2	23.6	300	15.4	23.8		

	120	19.2	23.6
	130	19.2	23.6
	131	19.2	23.6
	132	19.2	23.6
	133	19.2	23.6
	134	19.2	23.6
	135	19.2	23.6
Tablet	136	15.4	18.1
	137	15.4	18.1
	138	15.4	18.1
	139	15.4	18.1
	140	15.4	18.1
	150	15.4	18.1
	160	15.4	18.1
	170	15.4	18.1
	180	15.4	18.1

	310	15.4	23.8
	320	15.4	23.8
	330	15.4	23.8
	340	15.4	23.8
	341	15.4	23.8
	342	15.4	23.8
	343	15.4	23.8
	344	15.4	23.8
	345	15.4	23.8
	Tablet	346	15.4
347		15.4	18.0
348		15.4	18.0
349		15.4	18.0
350		15.4	18.0
360		15.4	18.0

The lid is rotating from 360 degrees to 0 degree. The screen is vertical, LCD direction to 0 degree.

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Tablet	360	15.4	18.0
	350	15.4	18.0
	340	15.4	18.0
	339	15.4	18.0
	338	15.4	18.0
	337	15.4	18.0
	336	15.4	18.0
Stand	335	15.4	23.8
	334	15.4	23.8
	333	15.4	23.8
	332	15.4	23.8
	331	15.4	23.8
	330	15.4	23.8
	320	15.4	23.8
	310	15.4	23.8
	300	15.4	23.8
	290	15.4	23.8
	280	15.4	23.8
	270	15.4	23.8
	260	15.4	23.8
250	15.4	23.8	
240	15.4	23.8	

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Tablet	170	15.4	18.1
	160	15.4	18.1
	150	15.4	18.1
	140	15.4	18.1
	130	15.4	18.1
	120	15.4	18.1
	119	15.4	18.1
	118	15.4	18.1
	117	15.4	18.1
	116	15.4	18.1
Notebook	115	19.2	23.6
	114	19.2	23.6
	113	19.2	23.6
	112	19.2	23.6
	111	19.2	23.6
	110	19.2	23.6
	100	19.2	23.6
	90	19.2	23.6
	80	19.2	23.6
	70	19.2	23.6
	60	19.2	23.6
	50	19.2	23.6
	40	19.2	23.6

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	230	15.4	23.8
	220	15.4	23.8
	210	15.4	23.8
	200	15.4	23.8
	197	15.4	23.8
	196	15.4	23.8
	195	15.4	23.8
	194	15.4	23.8
	193	15.4	23.8
	Tablet	192	15.4
191		15.4	18.1
190		15.4	18.1
189		15.4	18.1
188		15.4	18.1
180		15.4	18.1

	30	19.2	23.6
	24	19.2	23.6
	23	19.2	23.6
	22	19.2	23.6
	21	19.2	23.6
	20	19.2	23.6
	Lid close	19	15.3
18		15.3	18.5
17		15.3	18.5
16		15.3	18.5
15		15.3	18.5
10		15.3	18.5
	0	15.3	18.5

The lid is rotating from 0 to 360 degrees. The screen is vertical, LCD direction to 90 degrees.

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Lid close	0	15.0	18.1
	10	15.0	18.1
	20	15.0	18.1
	25	15.0	18.1
	26	15.0	18.1
	27	15.0	18.1
	28	15.0	18.1
	29	15.0	18.1
	30	15.0	18.1
	31	15.2	18.4
Book	32	15.2	18.4
	33	15.2	18.4
	34	15.2	18.4
	35	15.2	18.4
	40	15.2	18.4
	50	15.2	18.4
	60	15.2	18.4
	70	15.2	18.4
	80	15.2	18.4
	90	15.2	18.4
	100	15.2	18.4
	110	15.2	18.4
	120	15.2	18.4
	130	15.2	18.4
	140	15.2	18.4
	150	15.2	18.4
	160	15.2	18.4
	170	15.2	18.4
180	15.2	18.4	

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Book	190	15.2	18.4
	200	15.2	18.4
	210	15.2	18.4
	220	15.2	18.4
	230	15.2	18.4
	240	15.2	18.4
	250	15.2	18.4
	260	15.2	18.4
	270	15.2	18.4
	280	15.2	18.4
	290	15.2	18.4
	300	15.2	18.4
	310	15.2	18.4
	320	15.2	18.4
	330	15.2	18.4
	340	15.2	18.4
	341	15.2	18.4
	342	15.2	18.4
	343	15.2	18.4
	344	15.2	18.4
Tablet	345	15.3	18.3
	346	15.3	18.3
	347	15.3	18.3
	348	15.3	18.3
	349	15.3	18.3
	350	15.3	18.3
360	15.3	18.3	



The lid is rotating from 360 to 0 degree. The screen is vertical, LCD direction to 90 or 270 degrees.

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Tablet	360	15.3	18.3
	350	15.3	18.3
	340	15.3	18.3
	338	15.3	18.3
	337	15.3	18.3
	336	15.3	18.3
	335	15.3	18.3
	334	15.3	18.3
Book	333	15.2	18.4
	332	15.2	18.4
	331	15.2	18.4
	330	15.2	18.4
	329	15.2	18.4
	320	15.2	18.4
	310	15.2	18.4
	300	15.2	18.4
	290	15.2	18.4
	280	15.2	18.4
	270	15.2	18.4
	260	15.2	18.4
	250	15.2	18.4
	240	15.2	18.4
	230	15.2	18.4
	220	15.2	18.4
	210	15.2	18.4
	200	15.2	18.4
	190	15.2	18.4
	180	15.2	18.4

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Book	170	15.2	18.4
	160	15.2	18.4
	150	15.2	18.4
	140	15.2	18.4
	130	15.2	18.4
	120	15.2	18.4
	110	15.2	18.4
	100	15.2	18.4
	90	15.2	18.4
	80	15.2	18.4
	70	15.2	18.4
	60	15.2	18.4
	50	15.2	18.4
	40	15.2	18.4
	30	15.2	18.4
	26	15.2	18.4
	25	15.2	18.4
	24	15.2	18.4
	23	15.2	18.4
	22	15.2	18.4
Lid close	21	15.0	18.1
	20	15.0	18.1
	19	15.0	18.1
	18	15.0	18.1
	17	15.0	18.1
	10	15.0	18.1
	0	15.0	18.1

The lid is rotating from 360 degrees to 180 degrees. The screen is vertical, LCD direction to 180 degrees.

Note: The LCD direction switch to 0 degrees for low angle.

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Tablet	360	15.1	18.5
	350	15.1	18.5
	340	15.1	18.5
	338	15.1	18.5
	337	15.1	18.5
	336	15.1	18.5
	335	15.1	18.5
Tent	334	15.1	18.5
	333	15.2	18.1
	332	15.2	18.1
	331	15.2	18.1
	330	15.2	18.1
	329	15.2	18.1
	320	15.2	18.1
	310	15.2	18.1
	300	15.2	18.1
	290	15.2	18.1
	280	15.2	18.1
	270	15.2	18.1
	260	15.2	18.1
	250	15.2	18.1
	240	15.2	18.1
	230	15.2	18.1
	220	15.2	18.1
	210	15.2	18.1
	200	15.2	18.1
	199	15.2	18.1
198	15.2	18.1	
197	15.2	18.1	
196	15.2	18.1	
195	15.2	18.1	
Tablet (LCD direction is 0 degree)	194	15.3	18.3
	193	15.3	18.3
	192	15.3	18.3
	191	15.3	18.3
	190	15.3	18.3
	180	15.3	18.3

The lid is rotating from 180 degrees to 360 degrees. The screen is vertical, LCD direction to 180 degrees.

Note: The LCD direction switch to 0 degrees for low angle.

Mode	Angle (degrees)	Power measured LTE Band 7 (dBm)	
		Antenna 5	Antenna 8
Tablet (LCD direction is 0 degree)	180	15.3	18.3
	190	15.3	18.3
	200	15.3	18.3
	201	15.3	18.3
	202	15.3	18.3
	203	15.3	18.3
	204	15.3	18.3
	205	15.3	18.3
Tent	206	15.2	18.1
	207	15.2	18.1
	208	15.2	18.1
	209	15.2	18.1
	210	15.2	18.1
	211	15.2	18.1
	220	15.2	18.1
	230	15.2	18.1
	240	15.2	18.1
	250	15.2	18.1
	260	15.2	18.1
	270	15.2	18.1
	280	15.2	18.1
	290	15.2	18.1
	300	15.2	18.1
	310	15.2	18.1
	320	15.2	18.1
	330	15.2	18.1
340	15.2	18.1	
Tablet	341	15.2	18.1
	342	15.2	18.1
	343	15.2	18.1
	344	15.2	18.1
	345	15.2	18.1
	346	15.1	18.5
Tablet	347	15.1	18.5
	348	15.1	18.5
	349	15.1	18.5
	350	15.1	18.5
	360	15.1	18.5

## 7. Conclusion

The G-Sensor mechanism of HP TPN-W155 is tested. All user cases are compliant.