LAB N° 1356 L

Applicant:	CUSTOM S.p.A Via Berettine 2/B – 43010 Fontevivo – Parma - Italy Phone: 0521 680111
Trademark:	CUSTOM®
Test item:	Printer MP RANGER USB TH FI BLACK IT
Identification / Type No.:	**MP350**
FCC ID	**OAH-5040120**
Order content:	Photo EUT and test setup according to the following standard:
Test specification:	**FCC Part 15, Subpart C (15.247)**
Date of receipt:	22/02/2022
Internal storage No.:	A003216149-003
Testing period:	From 30/03/2022 to 20/04/2022
Place of testing:	TÜV Rheinland Italia S.r.l. Via E. Mattei, 3 20005 Pogliano Milanese – Milano – Italy
Testing laboratory:	TÜV Rheinland Italia S.r.l. Via E. Mattei, 3 20005 Pogliano Milanese – Milano – Italy
Test result:	**PASS**

Tested by:	Francesco Lombardi	**Authorized by:**	Giovanni Molteni
Date: 16/09/2022	(Laboratory Technician)	**Date:** 16/09/2022	(Laboratory Manager)
Position	Sachverständige(r)/Expert	**Position**	Sachverständige(r)/Expert

Condition of the test item at delivery: *Test item complete and undamaged*

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TRI is not responsible for the sampling phase.

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1. General description of test item(s)

Description	Printer MP RANGER USB TH FI BLACK IT
Model	MP350
Serial number	ESB1026121280071
Part number	911MM010100P33
Manufacturer	CUSTOM S.p.A
Country of manufacturer	Italy
Trademark	CUSTOM®
Power supply	DC Power
Supply voltage	Internal Battery (Technology: Lithium-ion)
Battery model name	INR18650-2S1P
Battery voltage-capacity	7.2V 2.6Ah 18.72Wh
Battery cycle	750
Battery life (print)	720 minutes x 300 tickets
Manufacturer (Battery)	Shenzhen Hypercell Co.,LTD
Equipment type	Intentional radiator
Hardware version	St145-c

Software version	1.22
Dimensions	149(L) x 53(H) x 122(P) mm
Weight	475gr (with battery included)
Printing width	76.2 mm and 80 mm
Operating temperature	From -10°C to +50°C
Operating humidity (RH)	Form 10% to 95%
EUT standing	Portable
Test sample obtaining:	☒ Sampling by customer ☐ Sampling by TÜV Rheinland Group ☐ others:

2. Equipment using during test

Equipment under test

No.	Product type	Manufacturer	Model	Comments
1	Printer MP RANGER USB TH FI BLACK IT	CUSTOM S.p.A.	MP350	---

Auxiliary Equipment / Peripherals

Nr.	Product type	Manufacturer	Model	Comments
1	Laboratory PC	DELL	---	- used to enable wireless communication (Bluetooth Low Energy, Bluetooth Enhanced Data Rate & Wi-Fi) on EUT, via software Printerset.
				- used ESP_RF_test_tool_v1.1.0, for setting the radio module in the following radio communications: BLE, BT EDR & Wi-Fi
2	Cradle 1 slot P-Ranger	CUSTOM S.p.A	---	- used to charge battery
3	Switching power adapter	CUSTOM S.p.A	POWER SUPPLY FOR CRADLE 4 SLOTS P-RANGER	- use to power supply cradle

Input/Output ports

No.	Name	Type	Cable length	Cable shielded	Comments
1	Enclosure port	Plastic	---	---	closed by snaps
2	AC power port	---	---	---	port not present
3	DC power port	Internal battery	---	---	Battery model: INR18650-2S1P
4	Signal control port	---			port not present
5	Wired network port	---			port not present

EUT modification

None

3. Radio module identification (Bluetooth Low Energy)

BLE module & Antenna technical data	
Module manufacturer	ESPRESSIF
Radio type	Transceiver
Chip radio	ESP32-PICO-D4
Type of equipment	☐ stand-alone equipment ☒ combined equipment ☐ multi-radio equipment
ETS Category	Bluetooth Low Energy
Bluetooth Channel / Frequency	2402 - 2480MHz
Number of channels	40
Channel bandwidth	1MHz
Channel separation	2MHz
Modulation type	☐ Frequency hopping (FHSS) equipment (Bluetooth classic) ☒ Wideband data transmission (non-FHSS equipment) (BLE)
Modulation	GFSK
Sensitivity	-97 dBm
Transmit operating mode	☒ single antenna ☐ multiple antennas, no beamforming ☐ multiple antennas, with beamforming
With regard adaptivity, the type of equipment	☐ non-adaptive equipment ☐ adaptive equipment ☒ Equipment that can operate in both an adaptive and non-adaptive mode;

Spectrum access mechanism	☐ LBT (Listen Before Talk) Technique ☐ DAA (Detect And Avoid) Technique ☒ Duty cycle
Environmental equipment	☒ Test only in normal conditions ☐ Test in normal conditions and extreme conditions
Equipment that support a geo-location capability	☐ Yes ☒ No

4. Channel list Bluetooth Low Energy

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

5. Radio module identification (Bluetooth Basic Rate / Enhanced Data Rate)

Bluetooth Basic Rate / Enhanced Data Rate module & Antenna technical data	
Module manufacturer	ESPRESSIF
Radio type	Transceiver
Chip radio	ESP32-PICO-D4
Type of equipment	☐ stand-alone equipment ☒ combined equipment ☐ multi-radio equipment
ETS Category	Bluetooth - BR & EDR
Bluetooth Channel / Frequency	2402 - 2480MHz
Number of channels	79
Channel bandwidth	1MHz
Channel separation	1MHz
Modulation type	☒ Frequency hopping (FHSS) equipment (Bluetooth classic) ☐ Wideband data transmission (non-FHSS equipment) (BLE)
Sensitivity	-97 dBm
Transmit operating mode	☒ single antenna ☐ multiple antennas, no beamforming ☐ multiple antennas, with beamforming
With regard adaptivity, the type of equipment	☐ non-adaptive equipment ☐ adaptive equipment ☒ Equipment that can operate in both an adaptive and non-adaptive mode;

Spectrum access mechanism	☐ LBT (Listen Before Talk) Technique ☐ DAA (Detect And Avoid) Technique ☒ Duty cycle
Environmental equipment	☒ Test only in normal conditions ☐ Test in normal conditions and extreme conditions
Equipment that support a geo-location capability	☐ Yes ☒ No

6. Channel list Bluetooth Basic Rate / Enhanced Data Rate

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

7. Radio module identification (Wi-Fi)

Wi-Fi module & Antenna technical data	
Module manufacturer	ESPRESSIF
Radio type	Transceiver
Chip radio	ESP32-PICO-D4
Type of equipment	☐ stand-alone equipment ☒ combined equipment ☐ multi-radio equipment
Protocols	802.11 b/g/n (802.11n up to 150 Mbps)
Frequency range	2400 – 2500GHz
Channel bandwidth	22MHz
Channel separation	5MHz
Number of channel	11
Modulation type	☐ Frequency hopping (FHSS) equipment ☒ Wideband data transmission (non-FHSS equipment) (DSS, CCK, OFDM, HT20, HT40, MCS32)
Sensitivity	DSSS, 1 Mbps -98dBm CCK, 11 Mbps -91dBm OFDM, 6 Mbps -93dBm OFDM, 54 Mbps -75dBm HT20, MCS0 -93dBm HT20, MCS7 -73dBm HT40, MCS0 -90dBm HT40, MCS7 -70dBm MCS32 -89dBm
Transmit operating mode	☒ single antenna ☐ multiple antennas, no beamforming ☐ multiple antennas, with beamforming

With regard adaptivity, the type of equipment	☐ non-adaptive equipment ☐ adaptive equipment ☒ Equipment that can operate in both an adaptive and non-adaptive mode;
Spectrum access mechanism	☐ LBT (Listen Before Talk) Technique ☐ DAA (Detect And Avoid) Technique ☒ Duty cycle
Environmental equipment	☒ Test only in normal conditions ☐ Test in normal conditions and extreme conditions
Equipment that support a geo-location capability	☐ Yes ☒ No

8. Channel list Wi-Fi

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		

Antenna	Description:	AMCA31-2R450G-S1F-T3
	Peak Gain:	0.5 dBi
	Type:	☐ External antenna ☒ Dedicated antenna ☐ Integral antenna
	Frequency	2450 MHz
	Impedance	50 Ω
	Manufacturer	ABRACON LLC

Antenna	Description:	Chip-Antenna WE-MCA
	Peak Gain:	0.5 dBi
	Type:	☐ External antenna ☒ Dedicated antenna ☐ Integral antenna
	Frequency	2400 - 2500 MHz
	Impedance	50 Ω
	Manufacturer	WÜRTH ELEKTRONIK

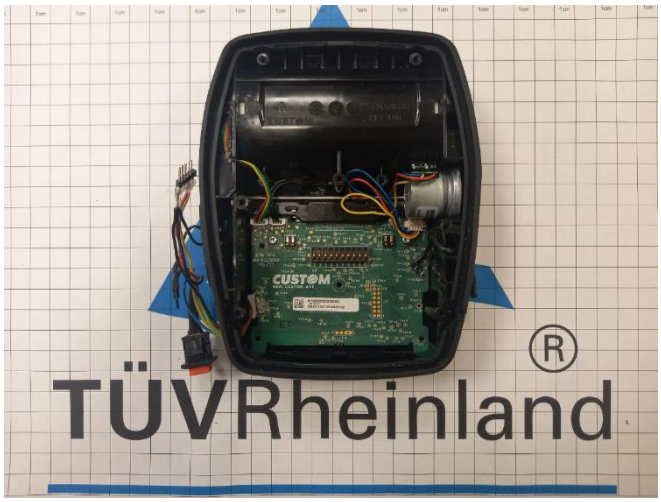
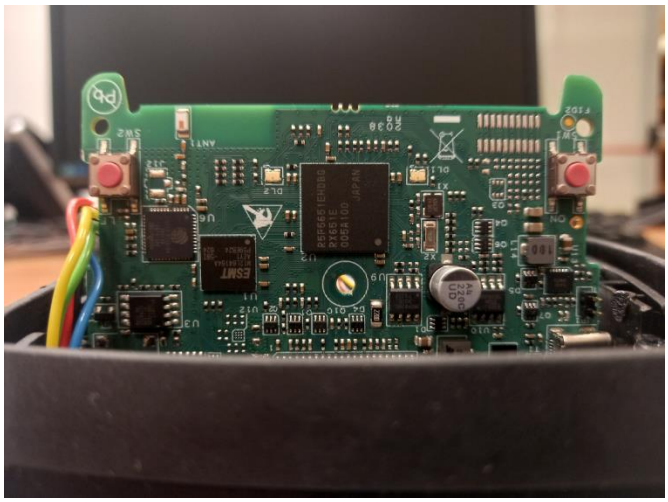
Note: The test has been performed with Antenna AMCA31-2R450G-S1F-T3, manufacturer Abracon.

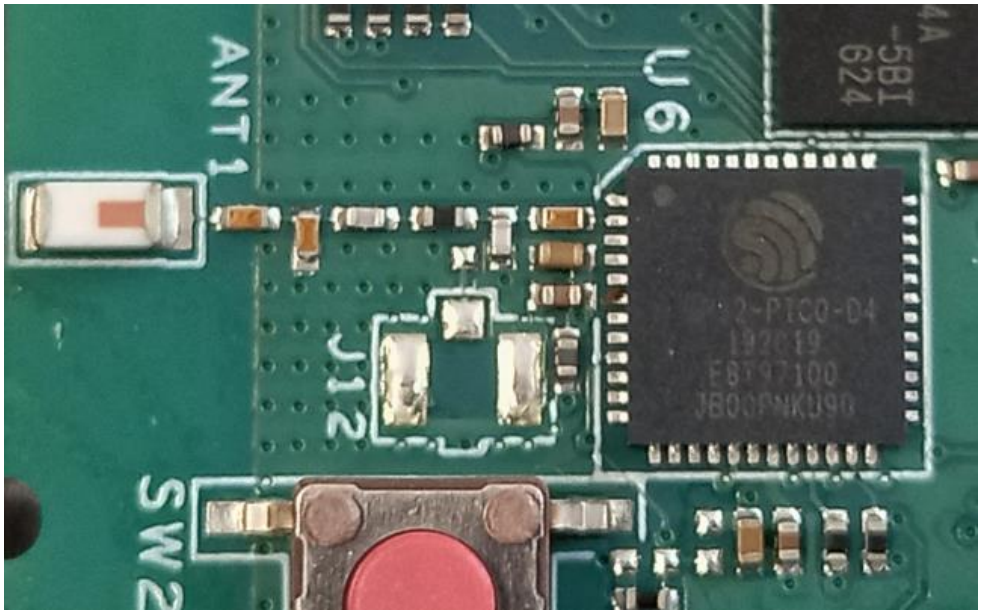
9. Change history

Test report number	List of revisions	Date
IT22O6EX 002	First edition	16/09/2022

10. EUT identification (internal photos)

Battery model: INR18650-2S1P	
Picture 1	Picture 2

Printer model MP350	
Picture 1	Picture 2
	
Picture 3	Picture 4

Chip radio: ESP32-PICO-D4 Antenna: AMCA31-2R450G-S1F-T3
Picture 1


11. Label EUT identification

Picture 1

--- END OF TEST REPORT ---