



FCC PART 15B TEST REPORT

No. 24T04Z102024-019

for

HMD Global Oy

Product Type: Locator

Model Name: TA-1698

FCC ID: 2AJOTTA-1698

with

Hardware Version: V0.21

Software Version: TA1698.GLO_001

Issued Date: 2024-11-11

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z102024-019	Rev.0	1 st edition	2024-11-11

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. TEST LABORATORY	4
1.1. TESTING LOCATION	4
1.2. TESTING ENVIRONMENT	4
1.3. PROJECT DATA	4
1.4. SIGNATURE	4
2. CLIENT INFORMATION	5
2.1. APPLICANT INFORMATION	5
2.2. MANUFACTURER INFORMATION	5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	6
3.1. ABOUT EUT	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	6
3.4. EUT SET-UPS	6
4. REFERENCE DOCUMENTS	7
4.1. REFERENCE DOCUMENTS FOR TESTING	7
5. SUMMARY OF TEST RESULTS	8
6. TEST EQUIPMENTS UTILIZED	9
7. MEASUREMENT UNCERTAINTY	10
ANNEX A: MEASUREMENT RESULTS	11

1. Test Laboratory

1.1. Testing Location

CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2024-10-15

Testing End Date: 2024-10-29

1.4. Signature



An Hui

(Prepared this test report)



Zhang Ying

(Reviewed this test report)



Zhang Xia

(Approved this test report)

2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Locator
Model Name	TA-1698
FCC ID:	2AJOTTA-1698

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, CAICT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	TA1698000000199	V0.21	TA1698.GLO_001

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	Manufacturer
AE1	Battery	Horizon008	SHENZHEN UTILITY ENERGY CO., LTD.
AE2	Cable	800040	CHANGZHOU DOWELL ELECTRONICS CO.,LTD
AE3	Charger	/	Not in box

*AE ID: is used to identify the test sample in the lab internally.

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1+ AE1 + AE2 + AE3	Charge

Note:

Equipment Under Test (EUT) is a model of Locator.
The EUT supports BLE and NB-Iot.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2023
ANSI C63.4	American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

Note: The test methods have no deviation with standards.

5. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	CTTL(huayuan North Road)
2	Conducted Emission	15.107(a)	B.2	P	CTTL(huayuan North Road)

6. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	LISN	ENV216	101200	R&S	2025-06-16	1 year
2	Test Receiver	ESCI	100344	R&S	2025-05-01	1 year
3	Test Receiver	ESW44	103023	R&S	2025-07-06	1 year
4	EMI Antenna	VULB9163	01222	R&S	2025-08-30	1 year
5	EMI Antenna	3115	00167250	R&S	2025-05-11	1 year
6	Universal Radio Communication Tester	CMW500	168471	R&S	2024-11-01	1 Year

Test software information		
Test Item	Software	Version
Radiated Emission	EMC32	V11.50.00
Conducted Emission	EMC32	V8.53.0

Semi-anechoic chamber utilized did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 10 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 6GHz

Shielded room utilized did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz—1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

7. Measurement Uncertainty

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

Location 1: CTTL(huayuan North Road)

Test item	Frequency ranges	Measurement uncertainty
Radiated Emission	30MHz-1GHz	4.72dB($k=2$)
	1GHz-18GHz	4.84dB($k=2$)
Conducted Emission	150kHz-30MHz	AC Power Line: 3.08dB($k=2$)

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission

Reference

FCC: CFR Part 15.109(a).

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator (USB/WPT mode of MS and charging mode of MS) at distances of 3 meters is tested. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3/10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

A.1.2 EUT Operating Mode

The MS is operating in the USB mode, WPT mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode, and is connected to the other device for charging in OTG mode and is connected to a charger in the case of charging mode.

The EUT was tested while operating in licensed band Rx mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in section 3.4, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

The model of the PC is M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

The EUT was tested while operating in licensed band Rx mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in section 3.4, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

A.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit ($\mu\text{V/m}$)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance. 10 meters' limit is got by converting.

A.1.4 Test Condition

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/3MHz	15	Peak, Average

A.1.5 Measurement Results

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss". It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + G_A + G_{\text{PL}}$$

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 4.84 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2485.460	34.8	-38.9	27.8	45.858	54.0	19.2	V
13750.000	40.6	-30.6	40.6	30.582	54.0	13.4	H
14096.460	40.2	-30.3	40.9	29.606	54.0	13.8	H
16704.940	42.2	-28.1	40.4	29.860	54.0	11.8	H
17400.920	44.1	-27.5	42.0	29.639	54.0	9.9	H
17941.520	44.9	-27.0	42.3	29.591	54.0	9.1	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2485.800	44.6	-38.9	27.8	55.7	74.0	29.4	V
13765.640	51.3	-30.5	40.6	41.2	74.0	22.7	H
14605.440	50.7	-29.1	40.1	39.6	74.0	23.3	H
16662.440	52.8	-28.1	40.4	40.5	74.0	21.2	H
17463.820	54.6	-27.7	42.0	40.3	74.0	19.4	H
17958.860	55.9	-27.0	42.3	40.6	74.0	18.1	H

Measurement results for Set.1:

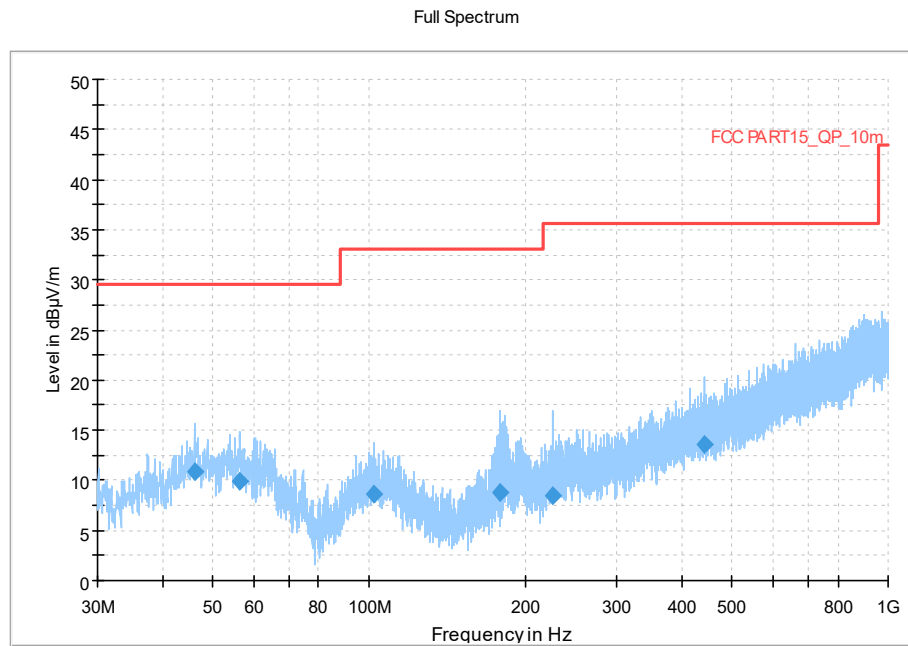


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
46.101900	10.80	29.54	18.74	120.000	208.0	V	135.0
56.432500	9.91	29.54	19.63	120.000	125.0	V	315.0
102.022500	8.68	33.06	24.38	120.000	125.0	H	165.0
179.380000	8.71	33.06	24.35	120.000	104.0	V	61.0
225.697500	8.42	35.56	27.14	120.000	101.0	V	225.0
443.220000	13.60	35.56	21.96	120.000	297.0	V	120.0

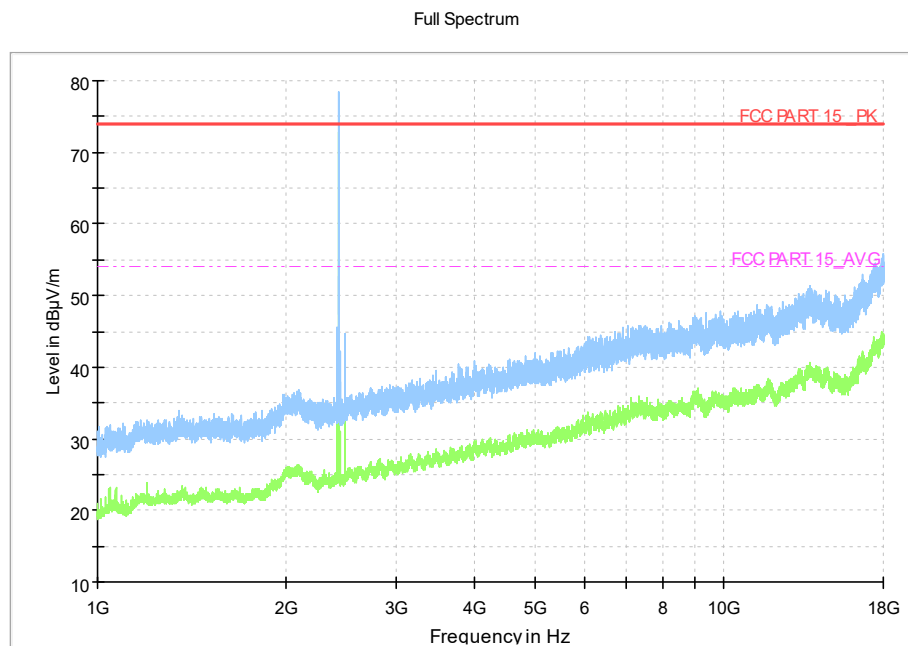


Fig A.2 Radiated Emission from 1GHz to 18GHz

Note: the spike over the limit is coming from the traffic carrier(BLE).

A.2 Conducted Emission

Reference

FCC: CFR Part 15.107(a).

A.2.1 Method of measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 7.3.

A.2.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency		

A.2.4 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

A.2.5 Measurement Results

Measurement uncertainty: $U = 3.08 \text{ dB}$, $k=2$.

Charging Mode, Set.1:

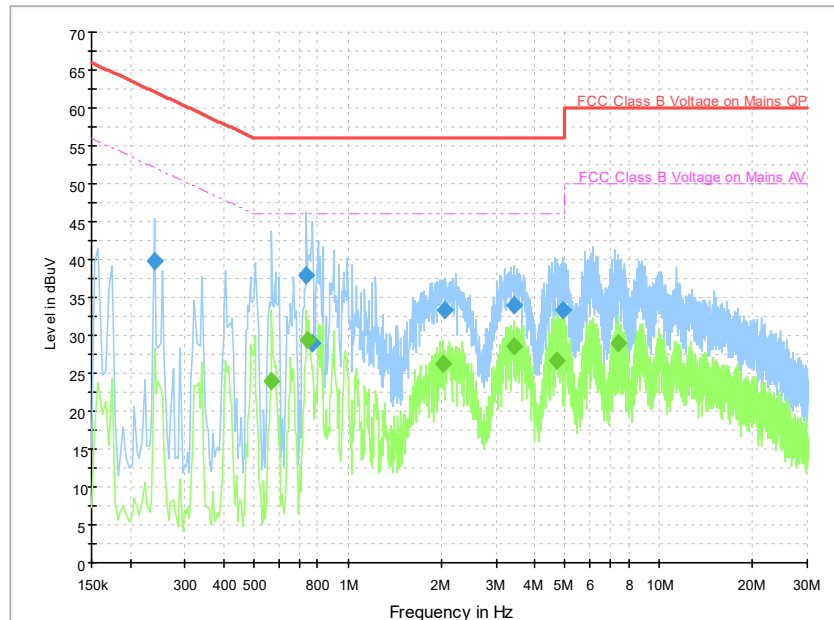


Fig A.3 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.238000	39.9	2000.0	9.000	On	L1	19.9	22.3	62.2	
0.734000	37.8	2000.0	9.000	On	N	19.8	18.2	56.0	
0.770000	29.0	2000.0	9.000	On	L1	19.9	27.0	56.0	
2.042000	33.3	2000.0	9.000	On	N	19.6	22.7	56.0	
3.414000	34.0	2000.0	9.000	On	N	19.6	22.0	56.0	
4.930000	33.3	2000.0	9.000	On	N	19.6	22.7	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.570000	24.0	2000.0	9.000	On	L1	20.0	22.0	46.0	
0.746000	29.4	2000.0	9.000	On	N	19.8	16.6	46.0	
2.022000	26.3	2000.0	9.000	On	N	19.6	19.7	46.0	
3.426000	28.6	2000.0	9.000	On	N	19.6	17.4	46.0	
4.682000	26.7	2000.0	9.000	On	L1	19.8	19.3	46.0	
7.366000	29.0	2000.0	9.000	On	L1	19.9	21.0	50.0	

END OF REPORT