

RADIO TEST REPORT

For

Zhongshan Yatai Electric Appliances Co., Ltd.

CAYMAN

Test Model: 50736

Additional Model NO.: 50738, 50739, 50742, 50743, 50737

Prepared for	: Zhongshan Yatai Electric Appliances Co., Ltd.
Address	: No.4 Xinlong St.Nanlong Industrial Park, SanXiang Town, ZhongShan City, 528463, GuangDong, China
Prepared by	: Shenzhen AOCE Electronic Technology Service Co., Ltd
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Date of receipt of test sample	: March 11, 2025
Number of tested samples	: 1
Serial number	: Prototype
Date of Test	: March 11, 2025~April 2, 2025
Date of Report	: April 2, 2025

RADIO TEST REPORT
ETSI EN 303 413 V1.2.1 (2021-04)

Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) receivers;
 Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 MHz to 1 610 MHz frequency
 bands; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Report Reference No. : **AOC250324120E**

Date of Issue : April 2, 2025

Testing Laboratory Name..... : **Shenzhen AOCE Electronic Technology Service Co., Ltd**

Address : Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu
 Industrial Park, Fuhai Street, Baoan District, Shenzhen,
 Guangdong, China

Testing Location/ Procedure..... : Full application of Harmonised standards ☒
 Partial application of Harmonised standards ☐
 Other standard testing method ☐

Applicant's Name : **Zhongshan Yatai Electric Appliances Co., Ltd.**

Address : No.4 Xinlong St.Nanlong Industrial Park, SanXiang Town,
 ZhongShan City, 528463, GuangDong, China

Test Specification

Standard : ETSI EN 303 413 V1.2.1 (2021-04)

Test Report Form No. : AOCEMC-1.0

TRF Originator : Shenzhen AOCE Electronic Technology Service Co., Ltd

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Test Item Description. : **CAYMAN**

Trade Mark : HASWING

Test Model : 50736

Ratings : DC 12-36V, 60A Max

Result : **Positive**

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Bill Hu/ File administrator

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Joey Liu/Technique principal

Approved by:

Murry Yu

Murry Yu/ Manager

RADIO -- TEST REPORT**Test Report No. : AOC250324120E**April 2, 2025
Date of issue

Test Model..... : 50736

EUT..... : CAYMAN

Applicant..... : Zhongshan Yatai Electric Appliances Co., Ltd.Address..... : No.4 Xinlong St.Nanlong Industrial Park, SanXiang Town,
ZhongShan City, 528463, GuangDong, China

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Telephone..... : /

Fax..... : /

Test Result**Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

TABLE OF CONTENTS

Test Report Description	Page
1. GENERAL INFORMATION.....	5
1.1. PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	5
1.2. OBJECTIVE	5
1.3. RELATED SUBMITTAL(S)/GRANT(S)	5
1.4. TEST METHODOLOGY	5
1.5. HOST SYSTEM CONFIGURATION LIST AND DETAILS.....	5
1.6. EXTERNAL I/O.....	5
1.7. LIST OF MEASURING EQUIPMENT	6
1.9. MEASUREMENT UNCERTAINTY	7
1.10. DESCRIPTION OF TEST MODES.....	7
2. SYSTEM TEST CONFIGURATION.....	8
2.1. JUSTIFICATION.....	8
2.2. EUT EXERCISE SOFTWARE	8
2.3. SPECIAL ACCESSORIES	8
2.4. BLOCK DIAGRAM/SCHEMATICS	8
2.5. EQUIPMENT MODIFICATIONS.....	8
2.6. CONFIGURATION OF TEST SETUP.....	8
3. SUMMARY OF TEST RESULTS.....	9
4. GUE ADJACENT FREQUENCY BAND SELECTIVITY PERFORMANCE.....	10
4.1. DEFINITION AND LIMIT.....	10
4.2. TEST PROCEDURE.....	10
4.3. TEST RESULT.....	11
5. RECEIVER SPURIOUS EMISSIONS.....	12
5.1. DEFINITION AND LIMIT.....	12
5.2. TEST PROCEDURE.....	12
5.3. TEST RESULT.....	12

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT : CAYMAN
Test Model : 50736
Hardware Version : /
Software Version : /
GPS Receiver :
Receive Frequency : 1575.42MHz
Channel Number : 1
Antenna Description : Internal Antenna,

1.2. Objective

This Type approval report is prepared on behalf of **Zhongshan Yatai Electric Appliances Co., Ltd.** in accordance with ETSI EN 303 413 V1.2.1 (2021-04), Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) receivers; Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 MHz to 1 610 MHz frequency bands; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

The objective is to determine compliance with ETSI EN 303 413 V1.2.1 (2021-04).

1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 303 413 V1.2.1 (2021-04).

1.5. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
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1.6. External I/O

I/O Port Description	Quantity	Cable
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1.7. List Of Measuring Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	X-series USB Peak and Average Power Sensor Aglient	Agilent	U2021XA	MY54080022	2024-10-26	2025-10-25
2	4 CH. Simultaneous Sampling 14 Bits 2MS/s	Agilent	U2531A	MY54080016	2024-10-26	2025-10-25
3	Test Software	Ascentest	AT890-SW	20160630	N/A	N/A
4	RF Control Unit	Ascentest	AT890-RFB	N/A	2024-10-26	2025-10-25
5	ESA-E SERIES SPECTRUM ANALYZER	Agilent	E4407B	MY41440754	2024-10-26	2025-10-25
6	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2024-10-26	2025-10-25
7	SPECTRUM ANALYZER	R&S	FSP	100503	2024-10-26	2025-10-25
8	MXG Vector Signal Generator	Agilent	N5182A	MY47071151	2024-10-26	2025-10-25
9	ESG VECTOR SIGNAL GENERATOR	Agilent	E4438C	MY42081396	2024-10-26	2025-10-25
10	PSG Analog Signal Generator	Agilent	E8257D	MY4520521	2024-10-26	2025-10-25
11	Universal Radio Communication Tester	R&S	CMU 200	105788	2024-10-26	2025-10-25
12	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-10-26	2025-10-25
13	RF Control Unit	Tonscend	JS0806-1	N/A	2024-10-26	2025-10-25
14	DC Power Supply	Agilent	E3642A	N/A	2024-10-26	2025-10-25
15	LTE Test Software	Tonscend	JS1120-1	N/A	N/A	N/A
16	Temperature & Humidity Chamber	GUANGZHOU GOGNWEN	GDS-100	70932	2024-10-26	2025-10-25
17	DC Source	CHROMA	62012P-80-60	34782951	2024-10-26	2025-10-25
18	RF Filter	Micro-Tronics	BRC50718	S/N-017	2024-10-26	2025-10-25
19	RF Filter	Micro-Tronics	BRC50719	S/N-011	2024-10-26	2025-10-25
20	RF Filter	Micro-Tronics	BRC50720	S/N-011	2024-10-26	2025-10-25
21	RF Filter	Micro-Tronics	BRC50721	S/N-013	2024-10-26	2025-10-25
22	RF Filter	Micro-Tronics	BRM50702	S/N-195	2024-10-26	2025-10-25
23	Splitter/Combiner	Micro-Tronics	PS2-15	CB11-20	2024-10-26	2025-10-25
24	Splitter/Combiner	Micro-Tronics	CB11-20	N/A	2024-10-26	2025-10-25
25	Attenuator	Micro-Tronics	PAS-8-10	S/N23466	2024-10-26	2025-10-25
26	Exposure Level Tester	Narda	ELT-400	N-0713	2024-10-26	2025-10-25
27	B-Field Probe	Narda	ELT-400	M-1154	2024-10-26	2025-10-25
28	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2024-10-26	2025-10-25
29	Positioning Controller	MF	MF-7082	/	2024-10-26	2025-10-25
30	EMI Test Software	AUDIX	E3	N/A	2024-10-26	2025-10-25
31	EMI Test Receiver	R&S	ESR 7	101181	2024-10-26	2025-10-25
32	AMPLIFIER	QuieTek	QTK-A2525G	CHM10809065	2024-10-26	2025-10-25
33	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2024-10-26	2025-10-25
34	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2024-10-26	2025-10-25
35	Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1925	2024-10-26	2025-10-25
36	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2024-10-26	2025-10-25
37	Broadband Preamplifier	SCHWARZBECK	BBV 9719	9719-025	2024-10-26	2025-10-25
38	RF Cable-R03m	Jye Bao	RG142	CB021	2024-10-26	2025-10-25
39	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2024-10-26	2025-10-25

1.9. Measurement Uncertainty

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	0.01ppm	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2℃	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

1.10. Description Of Test Modes

The EUT has been tested under operating condition.

The EUT is designed as a GPS receiver.

This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in Y position.

2. SYSTEM TEST CONFIGURATION

2.1. Justification

The system was configured for testing in engineering mode.

2.2. EUT Exercise Software

N/A.

2.3. Special Accessories

N/A.

2.4. Block Diagram/Schematics

Please refer to the related document.

2.5. Equipment Modifications

Shenzhen AOCE Electronic Technology Service Co., Ltd has not done any modification on the EUT.

2.6. Configuration of Test Setup

Please refer to the test setup photo.

3. SUMMARY OF TEST RESULTS

RULES ETSI EN 303 413 V1.2.1 (2021-04)	DESCRIPTION OF TEST	RESULT
§ 4.2.1	GUE adjacent frequency band selectivity performance	Compliant
§ 4.2.2	Spurious emissions	Compliant

Note: “N/A” means this test item is not applicable.

4. GUE ADJACENT FREQUENCY BAND SELECTIVITY PERFORMANCE

4.1. Definition and Limit

GUE adjacent frequency band selectivity is the ability of the GUE to achieve the specified performance in the presence of noise produced by signals operating in accordance with the allocation table of the ITU Radio Regulations [i.16] in frequency bands adjacent or near-adjacent to the relevant RNSS band.

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Comments
1 518 to 1 525	1 524	-65	MSS (space-to-Earth) band
1 525 to 1 549	1 548	-95	MSS (space-to-Earth) band
1 549 to 1 559	1 554	-105	MSS (space-to-Earth) band
1 559 to 1 610	GUE RNSS band under test		
1 610 to 1 626	1 615	-105	MSS (Earth-to-space) band
1 626 to 1 640	1 627	-85	MSS (Earth-to-space) band

4.2. Test Procedure

- 1) Configure the GNSS signal generator to simulate those GNSS and GNSS signals declared as supported by the GUE, with power levels and other details.
- 2) With the adjacent frequency signal switched off, the EUT shall be given sufficient time to acquire all simulated satellites from the declared GNSS system(s).
- 3) Record the baseline C/N0 value(s) reported by the EUT. Sufficient filtering shall be used to obtain a stable value. C/N0 may be averaged across all the satellites in view for each GNSS constellation. However, C/N0 shall not be averaged across satellite signals in different GNSS constellations. For a multi-GNSS EUT, there shall be a separate C/N0 value recorded for each GNSS constellation and each GNSS signal supported.
- 4) The adjacent frequency signal generator shall be configured to generate the signal, at the first test point centre frequency and signal power level.
- 5) The adjacent frequency signal shall be switched on, and the EUT's C/N0 value(s) recorded as in step 3) to measure the degradation with respect to the baseline value(s) recorded in step 3).
- 6) Test point Pass/Fail Criteria: If the C/N0 degradation from step 5) does not exceed the value in equation 4-1, then this test point is set to "pass". If the C/N0 degradation exceeds the value in equation 4-1, then this test point is set to "fail." For a multi-GNSS and multi-signal EUT, there shall be a separate pass/fail determination for each GNSS and for each GNSS signal supported. If the C/N0 degradation exceeds the value for any supported GNSS or supported GNSS signal, then this test point is set to "fail".
- 7) Step 1) through step 6) shall be repeated for all test point centre frequencies (and associated signal power level)

4.3. Test Result

Environmental Conditions

Temperature/ Humidity:	22.3° C/ 52.1%	ATM Pressure:	100.9 kPa
Test Mode:	Receiving	Operator:	Lili Chen

Frequency Band(MHz)	Test Point Center Frequency(MHz)	Adjacent frequency signal power level(dBm)	Test Result(dB)	Limit(dB) (Δ C/N0)
1559~1610	1575.42	-105	0.86	≤ 1

5. Receiver Spurious Emissions

5.1. Definition and Limit

Receiver spurious emissions are emissions at any frequency when the GUE is in receive-only operating mode.

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 8,3 GHz	-47 dBm	1 MHz

5.2. Test Procedure

Please refer to ETSI EN 303 413 V1.2.1 (2021-04) clause 5.5.2 for measurement method.

5.3. Test Result

Environmental Conditions

Temperature/ Humidity:	22.3° C/ 52.1%	ATM Pressure:	100.9 kPa
Test Mode:	Receiving	Operator:	Lili Chen

Test Result For Receiving Mode(Detecting Frequency Range: 30MHz~1GHz)				
Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Polarity (H/V)
62.86	-83.34	-57.00	-26.34	V
912.08	-74.82	-57.00	-17.82	V
162.73	-83.84	-57.00	-26.84	H
924.77	-75.78	-57.00	-18.78	H
Test Result For Receiving Mode(Detecting Frequency Range: Above 1GHz)				
Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Polarity (H/V)
1714.08	-70.72	-47.00	-13.72	V
3564.53	-63.88	-47.00	-6.88	H
2020.83	-65.67	-47.00	-8.67	H
3563.01	-61.53	-47.00	-4.53	V

Notes:

1. Measuring frequencies from 25MHz~10th harmonic or 26.5GHz (which is less)
2. The emissions that at least 20dB below the official limit are not reported.

-----THE END OF REPORT-----