

Test Report



測試報告

號碼(No.): AWAN251204

日期(Date): 4-DEC-2025

頁數(Page): 1 of 9

連騰科技股份有限公司(ADVANCED WIRELESS & ANTENNA INC.)

樣品類型 (Sample type) 姿態航向參考系統(AHRS)

樣品型號 (Style/Item No.) AGM-610

測試期間 (Testing Period) 3-DEC-2025 to 4- DEC-2025

測試需求 (Testing Request) 對AGM-610模組於靜態與動態條件下的姿態角穩定性與精度表現，包括一小時靜態及十五分鐘動態航向角60度來回、翻滾角/俯仰角30度來回旋轉條件下的量測。測試將評估模組在不同操作環境中的精度與穩定性，並驗證其是否符合資料手冊中所列的姿態角度偏移規範。

(The performance of the AGM-610 module was evaluated under both static and dynamic conditions to assess its attitude angle stability and accuracy. The test included a one-hour static measurement and a dynamic test in which the yaw axis was rotated back and forth within $\pm 60^\circ$, while the roll and pitch axes were rotated back and forth within $\pm 30^\circ$. The purpose of the test was to evaluate the module's precision and stability under different operating conditions and to verify whether its performance complies with the attitude angle deviation specifications stated in the datasheet.)

測試結果 (Test Results) 請參閱下一頁(Please refer to following pages.)

結 論 (Conclusion) AGM-610模組在靜態與動態測試條件下的性能評估結果顯示，其在姿態角度偏移、精度與穩定性方面表現良好，並完全符合資料手冊中所列的技術規範。

(The performance evaluation of the AGM-610 module under static and dynamic test conditions shows that it performs well in terms of attitude angle drift, accuracy, and stability, fully complying with the technical specifications listed in the datasheet.)



Signed for and on behalf
of ADVANCED WIRELESS &
ANTENNA INC.

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測試環境與條件(Test Environment and Conditions)

項目 (Item)	條件 (Condition)
溫度 (Temperature)	25°C
電壓 (Voltage)	5V
通訊 (Communication)	USB
輸出資料率 (ODR - Output Data Rate)	200Hz

測試標的 (Test Objects)

模組型態 (Module Type)	樣品廠商 (Sample brand)	樣品型號 (Sample Model)	數量 (Quantity)
九軸 (陀螺儀、加速度、磁力計) 9-Axis(Gyroscope, Accelerometer, Magnetometer)	AWAN	AGM-610	1

樣品圖片 (Sample Image)



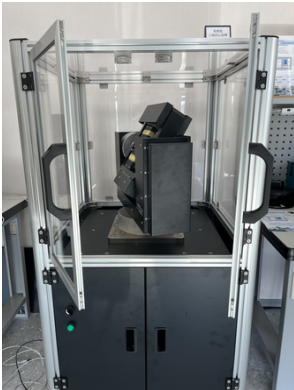
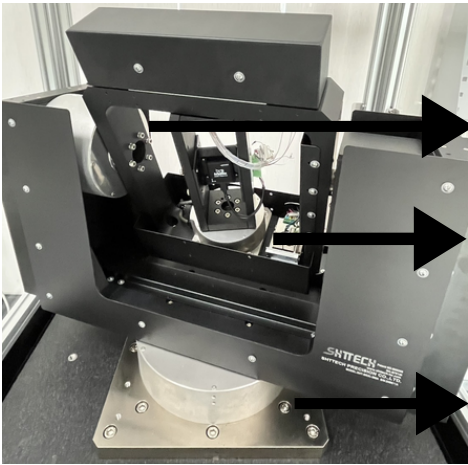
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測試設備(Test Equipment)

項目	圖片
三軸旋轉台 三軸可獨立旋轉，也可同時旋轉，分別應用於後續的測試項目。 (Three-Axis Rotary Table Capable of independent or simultaneous rotation, the three axes are used for various subsequent testing applications.)	上治具前  上治具後 
A01影響航向角的變化。A02影響翻滾角的變化，A03影響俯仰角的變化。 (A01 influences the variation of the yaw angle. A02 influences the variation of the roll angle. A03 influences the variation of the pitch angle.)	 A02 A03 A01

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測試結果(Test Results) 功能測試(Functional Testing)

項目 (Item)	檢測內容 (Test Description)	檢測結果 (Test Results)
功能完整性檢查 (Functionality Verification)	確保所有設計功能正常運行，包括數據傳輸和資料抓取。 (All designed functions operate normally, including data transmission and acquisition.)	基本測試正常 (Basic test passed)
燒錄測試 (Programming Test)	確保MCU可正常燒錄與使用 (MCU is programmable and functional).	燒錄成功 (Programming Successful)
通訊檢查 (Communication Check)	檢測UART、RS485及CAN通訊是否正常運作，數據傳輸穩定 (Check UART, RS485, and CAN communication for stable operation and data transmission)	全部通訊都正常 (All communications are functioning normally)
校正測試 (Calibration Test)	在測試環境中，使用LM方法和橢球擬合技術對加速度計、陀螺儀和磁力計進行校正。 (Perform calibration of the accelerometer, gyroscope, and magnetometer using the LM method and ellipsoid fitting technique in the test environment.)	數據經校正後穩定且準確。 (Data is stable and accurate after calibration.)

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測試結果(Test Results)

電性測試(Electrical Testing)

項目 (Item)	檢測內容 (Test Description)	檢測結果 (Test Results)
功耗測試 (Power Consumption Test)	在正常功能下測量模組功耗。 (Measure module power consumption under normal operation).	約0.319W(5.02V/63.6mA)。 (Approximately 0.319W(5.02V/63.6mA))
逆偏保護測試 (Reverse Polarity Protection Test)	測試逆偏保護功能，確保在電源極性接反的情況下，模組不受損害，並在恢復正確極性後能正常運作。 (Test reverse polarity protection to ensure the module is not damaged when the power polarity is reversed and functions normally after restoring correct polarity).	逆接5V後恢復正接，模組正常運作。 (After applying 5V reverse polarity and restoring correct connection, the module operated normally.)
MCU 測試 (MCU Test)	針對MCU進行全面測試，包括Flash檢測、GPIO檢查及程式運行，確保其性能和穩定性符合要求。 (Comprehensive testing of the MCU, including flash testing, GPIO checks, and program execution, to ensure performance and stability meet requirements.)	MCU測試皆正常。 (MCU tests all passed.)
RS485 晶片測試 (RS485 Chip Test)	針對 RS485 晶片進行最高波特率下的傳輸穩定性測試。 (Test the RS485 chip for transmission stability at the highest baud rate.)	RS485晶片傳輸測試正常。 (The RS485 chip transmission test passed.)
CAN 晶片測試 (CAN Chip Test)	針對 CAN 晶片進行最高波特率下的傳輸穩定性測試。 (Test the CAN chip for transmission stability at the highest baud rate.)	CAN晶片傳輸測試正常。 (The CAN chip transmission test passed.)
綜合測試 (Integration Test)	在實際應用場景中進行綜合測試，檢查整個系統的協同工作性能。 (Conduct a comprehensive test in real-world scenarios to verify the overall system's coordinated performance.)	基本測試正常。 (Basic test passed.)
壽命測試 (Endurance Test)	長時間運行測試，檢查系統的可靠性和穩定性。 (Long-term operation test to assess system reliability and stability.)	連續執行六天測試，期間功能皆正常。 (Test ran continuously for six days with all functions operating normally.)

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姿態角性能測試結果 (Attitude Angle Performance Test Result)

測試項目 (Test Item)	測試方法 (Method)	結果 (Result)			
		翻滾角 (Roll)	俯仰角 (Pitch)	航向角 (Yaw)	航向角實驗結果圖 (Yaw Angle Test Result Diagram)
靜態測試 (Static Performance Test)	進行一小時靜態測試，觀察並記錄三軸姿態角的偏差。 (Conduct a one-hour static test to observe and record drift in the three-axis attitude angles).	0.02°	0.003°	0.04°	AGM-610(開機指北)航向角實驗結果圖 The diagram shows a line graph with the Y-axis ranging from -1 to 1 and the X-axis representing various data points. The data points are listed on the right side of the graph: 24284, 48567, 72850, 97133, 121416, 145699, 169982, 194265, 218548, 242831, 267114, 291397, 315680, 339963, 364246, 388529, 412812, 437095, 461378, 485661, 509944, 534227, 558510, 582793, 607076, 631359, 655642, 679925. The line is relatively flat, indicating stable performance.
資料表規格 (Datasheet Specifications)		0.5°	0.5°	0.5°	

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姿態角性能測試結果 (Attitude Angle Performance Test Result)

測試項目 (Test Item)	測試方法 (Method)	A01轉速 (A01 Rotation Speed)	A02、 A03轉速 (A02、 A03 Rotation Speed)	結果 (Result)			
				翻滾角 (Roll)	俯仰角 (Pitch)	航向角 (Yaw)	實驗結果圖 (Test Result Diagram)
三軸動態測試 (Three-Axis Dynamic Test)	使用電動旋轉 平台旋轉 A01、A02和 A03共15分 鐘，改變AGM- 610的三軸姿 態角，記錄三 軸姿態角的偏 差。 (The deviation of the three- axis attitude angles of the AGM-610 was recorded by rotating samples A01, A02, and A03 on a motorized rotary stage for a duration of 15 minutes to alter their spatial orientation.)	60°/s	30°/s	0.01°	0.05°	2.2°	AGM-610(開機指北) 三軸運動翻滾角 部分圖 AGM-610(開機指北) 三軸運動俯仰角 部分圖 AGM-610(開機指北) 三軸運動航向角 部分圖
資料表規格 (Datasheet Specificatio ns)		-	-	0.4°	0.4°	1.0°	-

備註(Note):

1.“-” = Not Regulated(無規格值)

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靜態測試流程圖 / Static Performance Test Flowchart

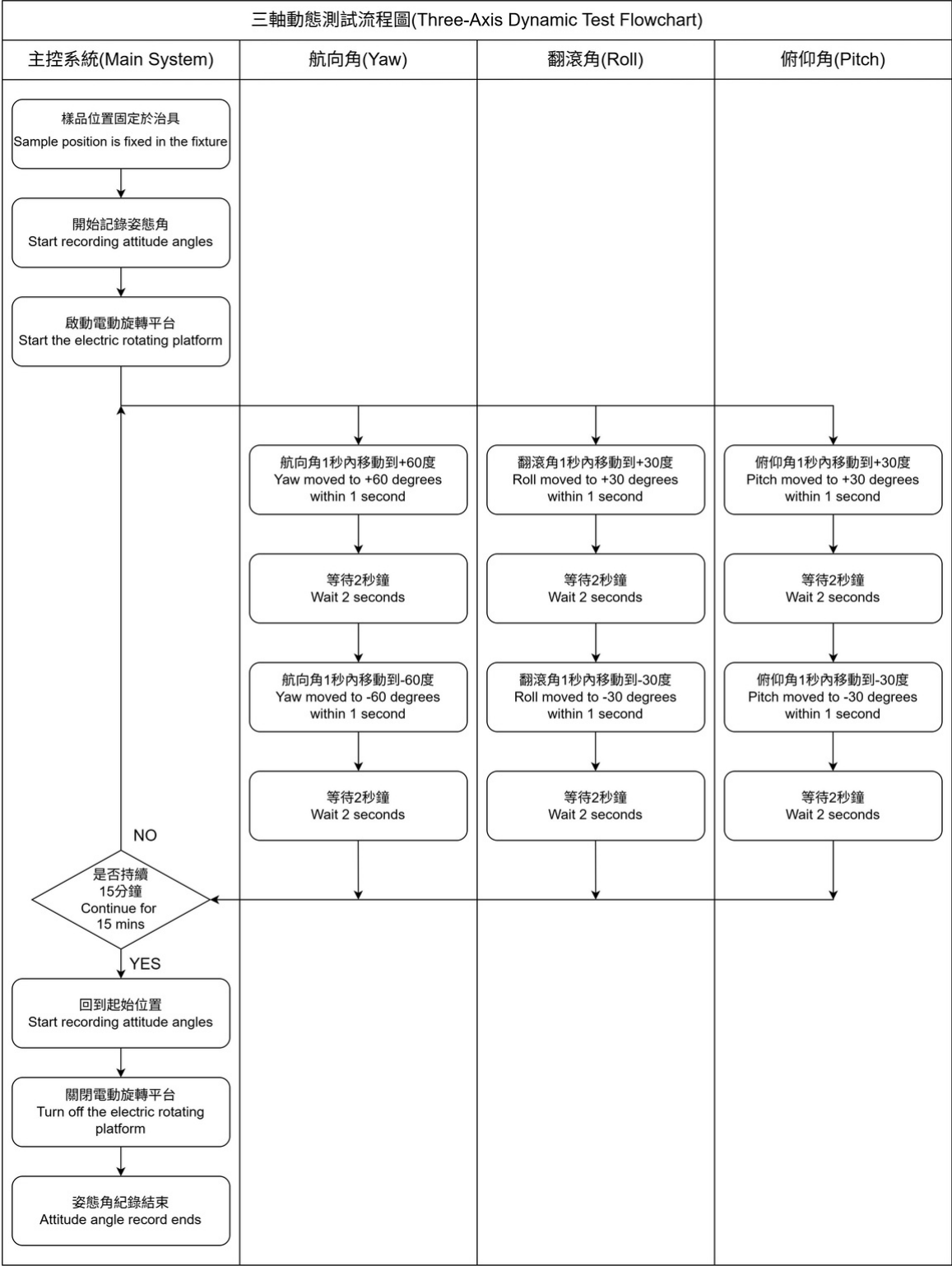


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三軸動態測試流程圖 (Three-Axis Dynamic Test Flowchart)



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