

Test Report



測試報告

號碼(No.): AWAN260107

日期(Date): 07-Jan-2026

頁數(Page): 1 of 10

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-810

測試期間 (Testing Period) 06- Jan -2026 to 07- Jan -2026

測試需求 (Testing Request) 對 AGM-810 模組於靜態與動態條件下的姿態角穩定性與精度表現進行評估，包括一小時靜態及十五分鐘動態的量測。測試將分析模組在不同操作環境中的姿態角精度與穩定性，並驗證其是否符合資料手冊中所列之姿態角度偏移規範。此外，亦將評估其慣性導航能力，以確認模組在 GPS 訊號中斷或不可用的情況下，仍能透過慣性感測資料進行航位推估，短時間維持基本的位置與姿態資訊。
(The performance of the AGM-810 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 fifteen-minute dynamic measurement. 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. In addition, the inertial navigation capability will be assessed to confirm that, in the event of GPS signal interruption or unavailability, the module can continue to estimate navigation states using inertial sensor data, thereby maintaining basic position and attitude information for a short period.)

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

結論 (Conclusion) AGM-810 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、精度與穩定性方面均表現良好，並完全符合資料手冊中所列之技術規範。此外，測試結果顯示，GPS 訊號中斷或不可用的情況下，仍可透過慣性感測資料進行航位推估，短時間維持基本的位置與姿態資訊。
(The performance evaluation of the AGM-810 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. In addition, the test results show that, in the event of GPS signal interruption or unavailability, the module is able to estimate navigation states using inertial sensor data, thereby maintaining basic position and attitude information for a short period.)

**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)	UART / CAN / SPI / I2C
輸出資料率 (ODR - Output Data Rate)	50Hz

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), 慣性導航 9-Axis(Gyroscope, Accelerometer, Magnetometer), Inertial navigation system	AWAN	AGM-810	1

樣品圖片 (Sample Image)

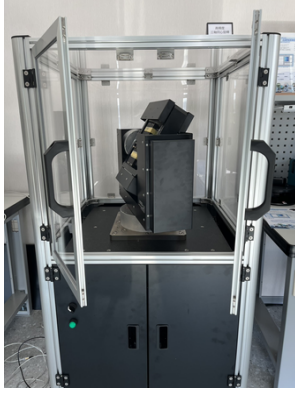
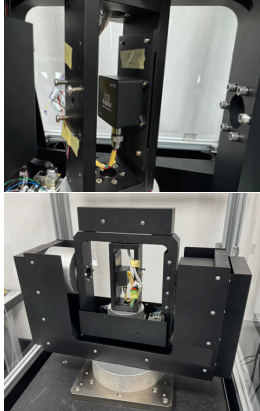


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測試設備(Test Equipment)

項目	圖片
<p>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.)</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>上治具前</p>  </div> <div style="text-align: center;"> <p>上治具後</p>  </div> </div>
<p>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.)</p>	

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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、SPI、I2C及CAN通訊是否正常運作，數據傳輸穩定 (Check UART, SPI, I2C 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0.694W(5.08V/136.5mA)。 (Approximately 0.694W(5.08V/136.5mA))
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.)
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.)

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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).	0.007°	0.005°	0.1°	
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 Rotatio n Speed)	A02、 A03轉 速 (A02、 A03 Rotati on Speed)	結果 (Result)			實驗結果圖 (Test Result Diagram)
				翻滾角 (Roll)	俯仰角 (Pitch)	航向角 (Yaw)	
雙軸動態測試 (Dual-Axis Dynamic Test)	使用電動旋轉 平台旋轉A01 和A03共15分 鐘，改變AGM- 810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-810 was recorded by rotating samples A01 and A03 on a motorized rotary stage for a duration of 15 minutes to alter their spatial orientation.)	90°/s	45°/s	0.08°	0.04°	0.78°	<p>AGM-810 動態運動翻滾角 部分圖</p> <p>AGM-810 動態運動俯仰角 部分圖</p> <p>AGM-810 動態運動航向角 部分圖</p>
資料表規格 (Datasheet Specificatio ns)		-	-	0.4°	0.4°	0.8°	-

備註(Note):

1. "-" = Not Regulated(無規格值)

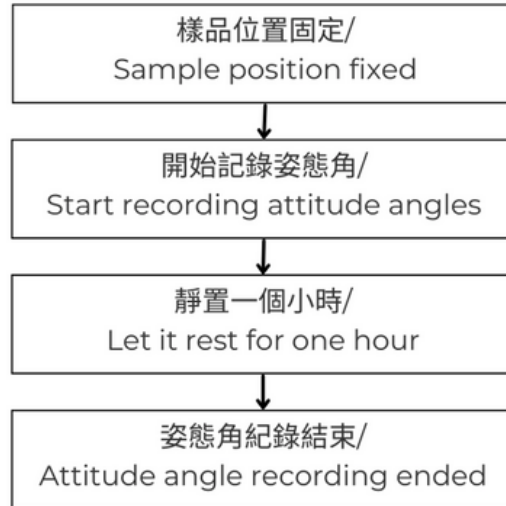
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靜態測試流程圖 / Static Performance Test Flowchart

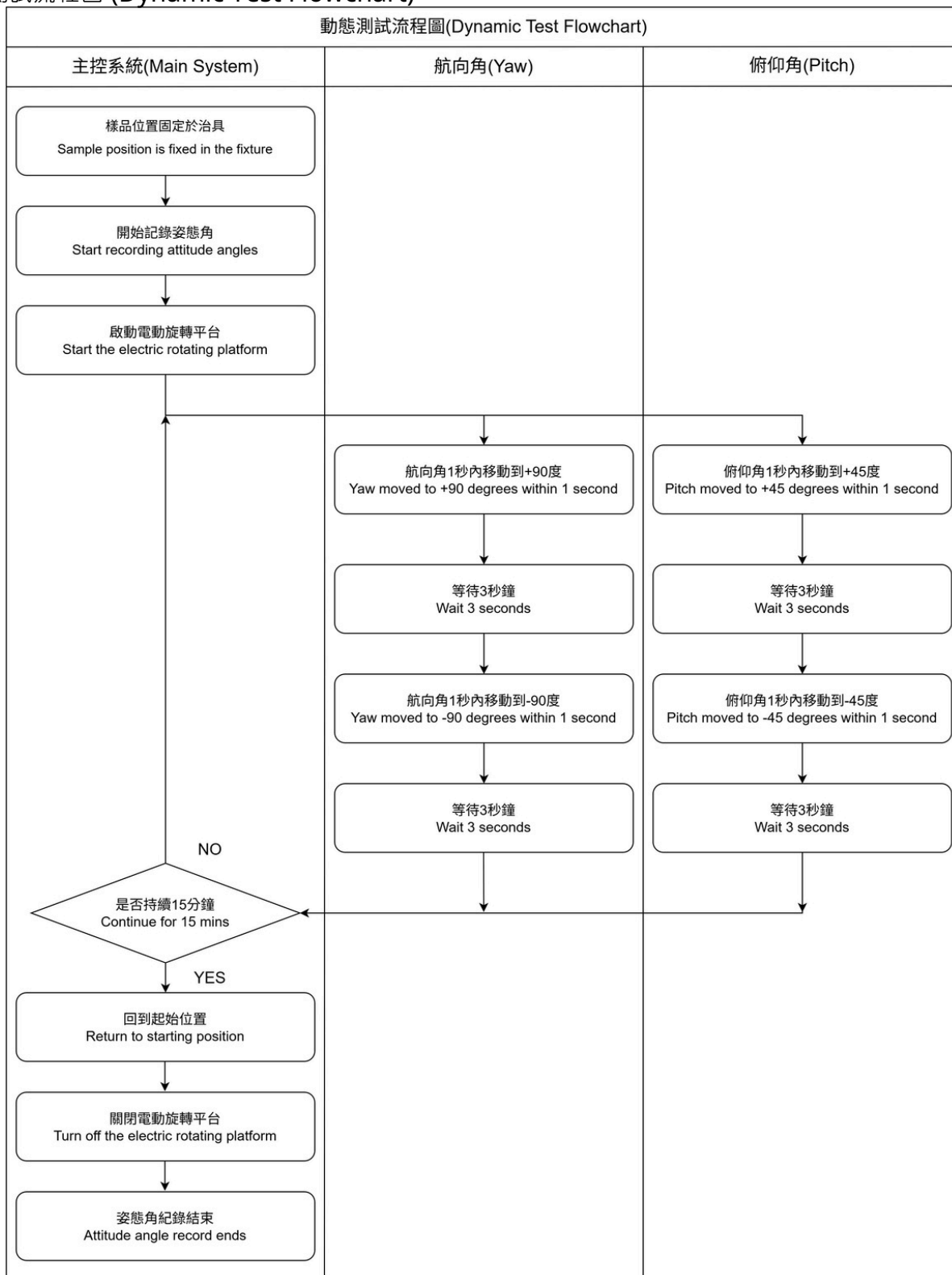


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動態測試流程圖 (Dynamic Test Flowchart)



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慣性導航測試 (Inertial Navigation System Test)

測試場景/路線條件
Test scenario/
Route conditions

路線類型：都市道路 / 高速公路 / 隧道

路線時間：30 分鐘

速度範圍：低速 (30-40 km/h) 、一般行車 (70-80 km/h)

Route Type: Urban roads / highways / tunnels

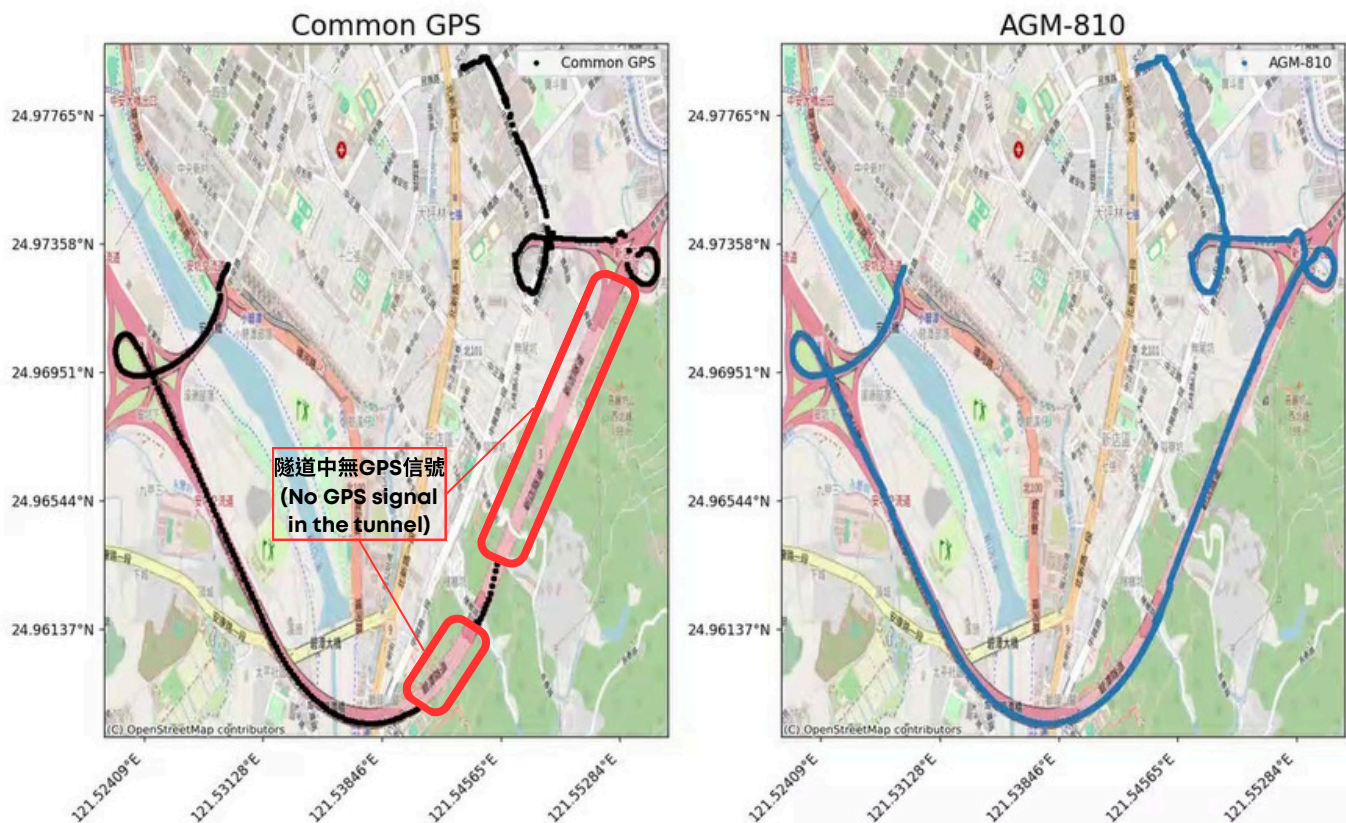
Route Duration: 30 minutes

Speed Range: Low speed (30-40 km/h), normal driving conditions (70-80 km/h)

測試結果
(Results)

測試結果顯示，當載具進入隧道環境導致 GPS 訊號中斷時，一般 GPS 定位輸出出現明顯的資料中斷與航跡不連續現象。AGM-810 模組在 GPS 訊號不可用期間，仍能透過內建慣性感測器進行慣性推算，短時間內可持續輸出穩定的航向資訊。

The test results show that when the vehicle enters a tunnel environment and the GPS signal is interrupted, conventional GPS positioning exhibits clear data loss and discontinuities in the recorded trajectory. In contrast, during periods when the GPS signal is unavailable, the AGM-810 module is able to perform inertial dead reckoning using its built-in inertial sensors, continuously providing stable heading information for a short period.



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