

# Antenna Test Report

**Report No.: TEOT2212000623E4**  
**Test Plan: Non-compliance with ISO17025**

**Applicant Name: LEDGER SAS**  
**Manufacturer Name: LEDGER SAS**

**Product Name: LEDGER STAX**  
**Model Number: 2103**

**Measurements performed at**  
**SGS Taiwan Ltd.**  
**Hwaya District, Taiwan**

**Issued Date: January 06, 2023**

	Name	Date & Signature	Distribution
Prepared by:	Nandi Chen Sr. Engineer	<i>Nandi Chen</i> January 06, 2023	
Approved by:	Shawn Yen Supervisor	<i>Shawn Yen</i> January 06, 2023	

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# Measurement System Information

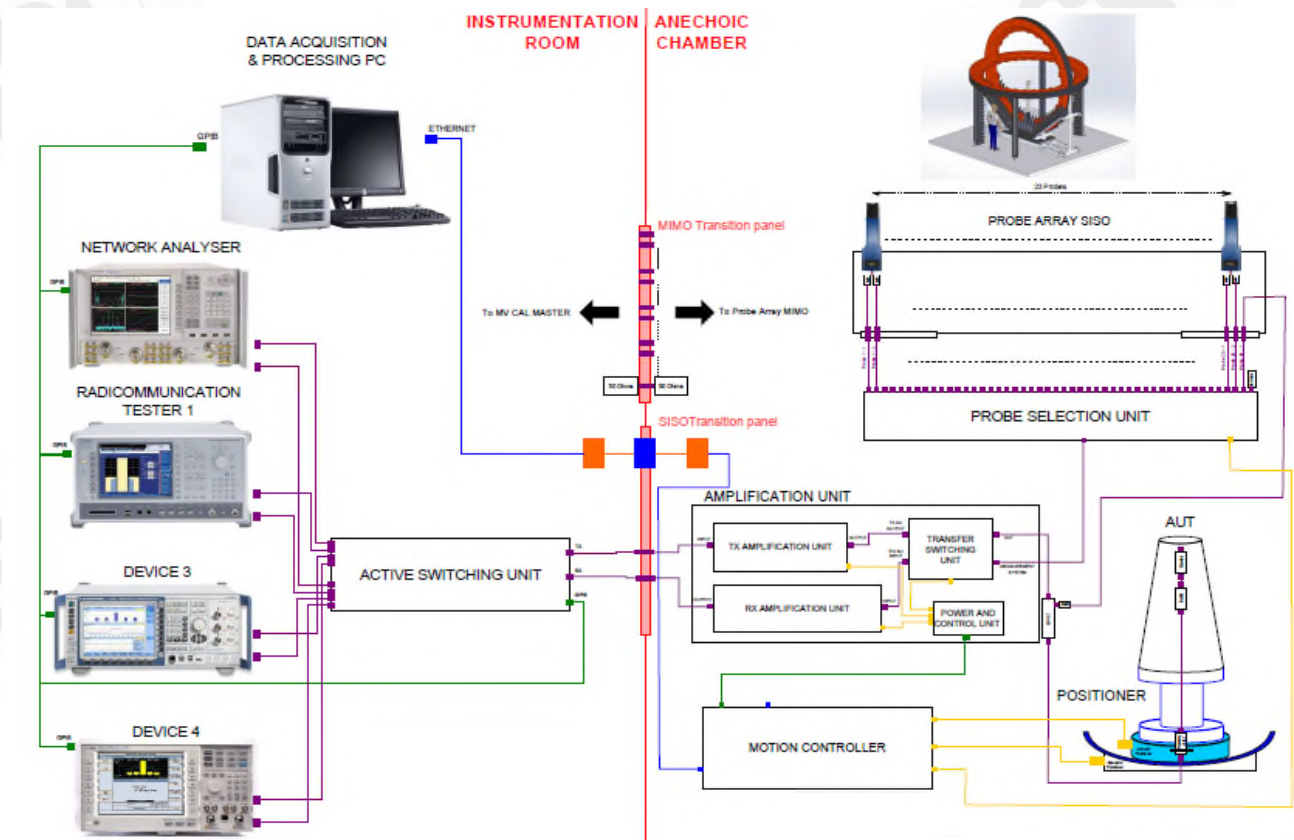
## General Information

### Testing Condition:

- Temperature: 22±3°C
- Humidity: <80%

### Measurement Facility:

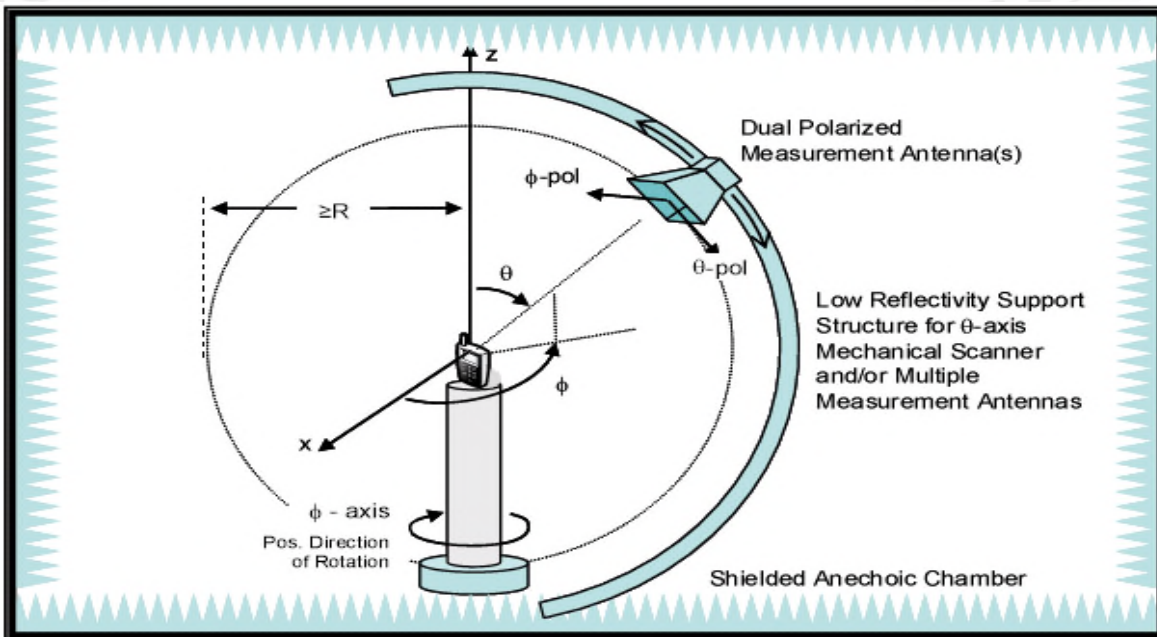
- Measurement Chamber: MVG 3D fully anechoic chamber and its measuring system (Stargate-24-L)
- Base Station Simulator: Anritsu MT8820C (or R&S CMU200)
- Network Analyzer: Agilent E5071C



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Measurements are performed in a MVG **Stargate-24-L** with the StarAct interface for a base station simulator. The **Stargate-24-L** has 23 probe antennas mounted with equal spacing on a circular arch. Electronic switching of the probe antennas provides outstanding measurement speed. The geometry of the setup, with only a Styrofoam column within 1.6 meters of the EUT, ensures minimum interference and low ripple on the measured radiation patterns. The DUT is placed on top of the pedestal, in the center of the system.

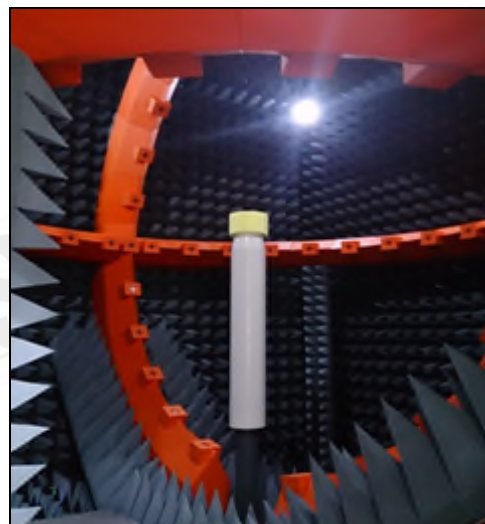
### Typical Setup for MVG Stargate-24-L:



### **Instruments View**



### **Inside View**



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### **Testing Laboratory: Identification of the Responsible Test Laboratory.**

- **OTA Laboratory:**  
**SGS Taiwan Ltd. Wireless Laboratory**  
 No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803.  
 Telephone: +886 2 2299 3279  
 Fax: +886 2 2298 0488  
 Internet: <http://www.tw.sgs.com>
  
- **Testing Location:**  
 No. 2, Keji 1<sup>st</sup> Rd., Hwaya Technology Park, Guishan District, Taoyuan City, Taiwan 33383.

### **Details of Applicant:**

<b>Applicant's name:</b>	<b>LEDGER SAS</b>
<b>Applicant's address:</b>	<b>1 rue du Mail, 75002 Paris, France</b>
<b>Contact person:</b>	<b>Arnaud Danree</b>
<b>Telephone:</b>	<b>N/A</b>
<b>Fax:</b>	<b>N/A</b>
<b>E-mail:</b>	<b>arnaud.danree@ledger.fr</b>

### **Details of Manufacturer:**

<b>Applicant's name:</b>	<b>LEDGER SAS</b>
<b>Applicant's address:</b>	<b>1 rue du Mail, 75002 Paris, France</b>
<b>Contact person:</b>	<b>Arnaud Danree</b>
<b>Telephone:</b>	<b>N/A</b>
<b>Fax:</b>	<b>N/A</b>
<b>E-mail:</b>	<b>arnaud.danree@ledger.fr</b>

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**Details of EUT:**

<b>Device Description:</b>	<b>LEDGER STAX</b>
<b>Device Manufacturer:</b>	<b>LEDGER SAS</b>
<b>Device Model:</b>	<b>2103</b>
<b>Hardware Version:</b>	<b>DVT</b>
<b>Software Version:</b>	<b>MCU : STM32WB35-NFC-dtm-ble-nfc-bridge-1_2.hex SE : 0.4.5</b>
<b>FCC ID:</b>	<b>2ASAL-2103</b>
<b>Frequency Range:</b>	<b>2400MHz ~ 2500MHz Step size: 10MHz</b>
<b>Antenna Type:</b>	<b>Internal</b>

**Duration of Tests:**

<b>Sample Receive Date:</b>	<b>2022-12-07</b>
<b>Test Starting Date:</b>	<b>2022-12-14</b>
<b>Test Ending Date:</b>	<b>2022-12-14</b>
<b>Report Issued Date:</b>	<b>2023-01-06</b>

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## List of Equipment

### Equipment Summary Sheet

Equipment Description	Manufacturer	Identification no.	Current calibration date	Next calibration date
Universal Radio Communication tester	Anritsu	MT8820C	2022/10/12	2023/10/11
Network Analyzer	Agilent	E5071C	2022/01/12	2023/01/11
Sleeve Dipole	MVG	SD740	2022/01/07	2025/01/06
Dual Ridge Horn	MVG	SH800	2022/11/25	2023/11/24
Stargate-24-L probe array	MVG	Stargate-24-L	2022/08/26	2023/08/25
Measurement software	MVG	SPM V1.9	N/A	N/A

## Antenna Gain and Efficiency

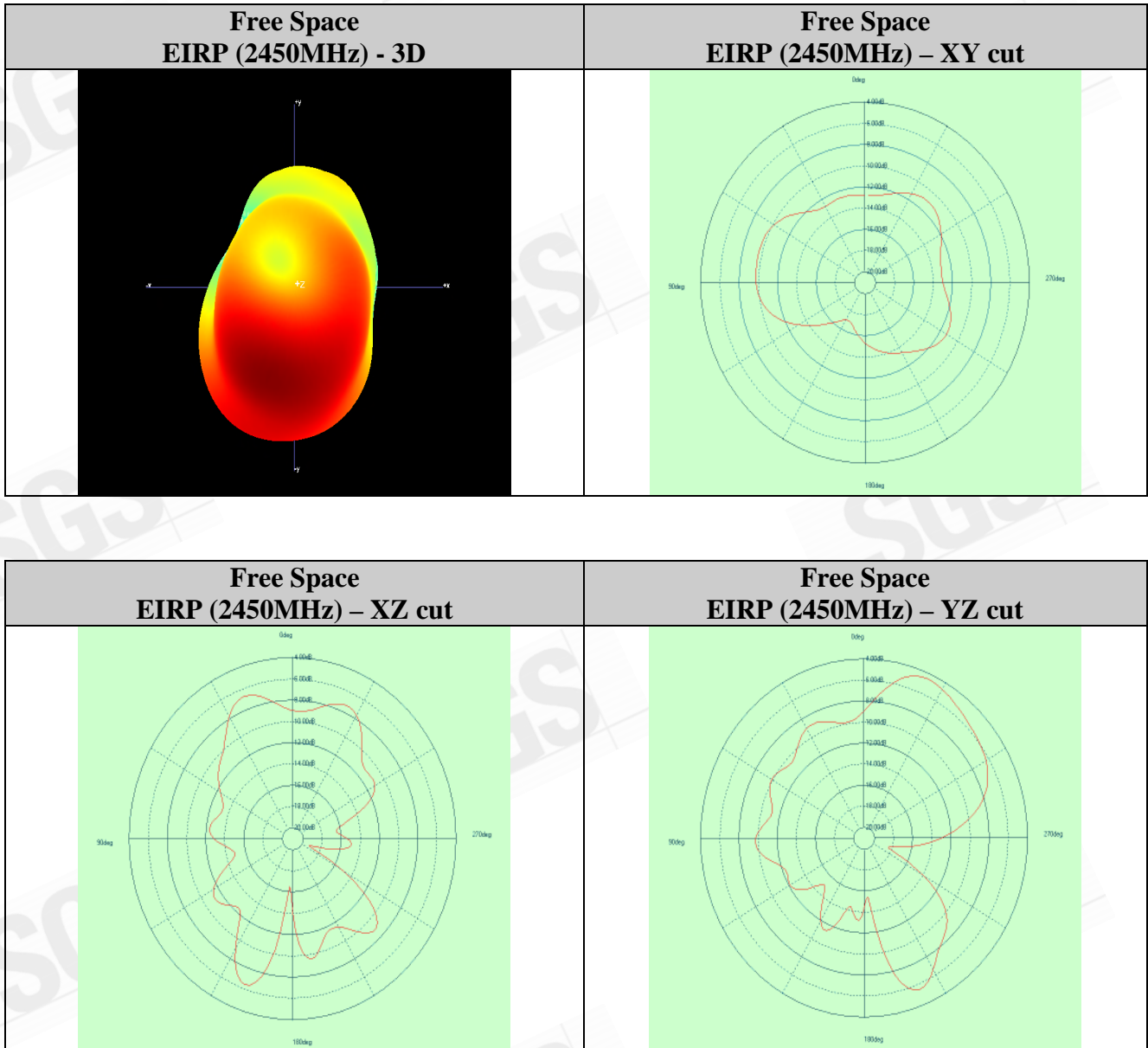
2103			
Freq(MHz)	Peak Gain. dBi	Efficiency	Average . dBi
2400.00	-4.04	9.72%	-10.12
2410.00	-3.89	10.18%	-9.92
2420.00	-3.71	10.84%	-9.65
2430.00	-3.77	10.92%	-9.62
2440.00	-4.06	10.23%	-9.90
2450.00	-4.37	9.54%	-10.20
2460.00	-4.55	9.27%	-10.33
2470.00	-4.87	8.79%	-10.56
2480.00	-5.17	8.29%	-10.82
2490.00	-5.66	7.50%	-11.25
2500.00	-5.86	7.04%	-11.53

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### Antenna 3D Plot Matrix

All plots in this section show the total EIRP ( $EIRP_{\theta} + EIRP_{\phi}$ ) with the +x-axis pointing right, +y-axis pointing up, and +z-axis pointing out of the page.



**End of Report**

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