

## Antenna Test Report

Report No.: EO/2016/90002

**Applicant Name: TYSON BIORESEARCH, INC.**  
**Manufacturer Name: TYSON BIORESEARCH, INC.**

**Product Name: Antenna**  
**Model Number: on board**

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

**Issued Date: December 20, 2016**

	Name	Date & Signature	Distribution
Prepared by:	Eason Chou Asst. Supervisor	<i>Eason Chou</i> December 20, 2016	
Approved by:	Nick Hsu Tech. Manager	<i>Nick Hsu</i> December 20, 2016	

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**Revision Version**

Report Number	Revision	Date	Memo
EO/2016/90002	00	2016/12/20	Initial creation of test report

**This test report contains a reference to the previous version test report that it replaces.**

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## Measurement System Information

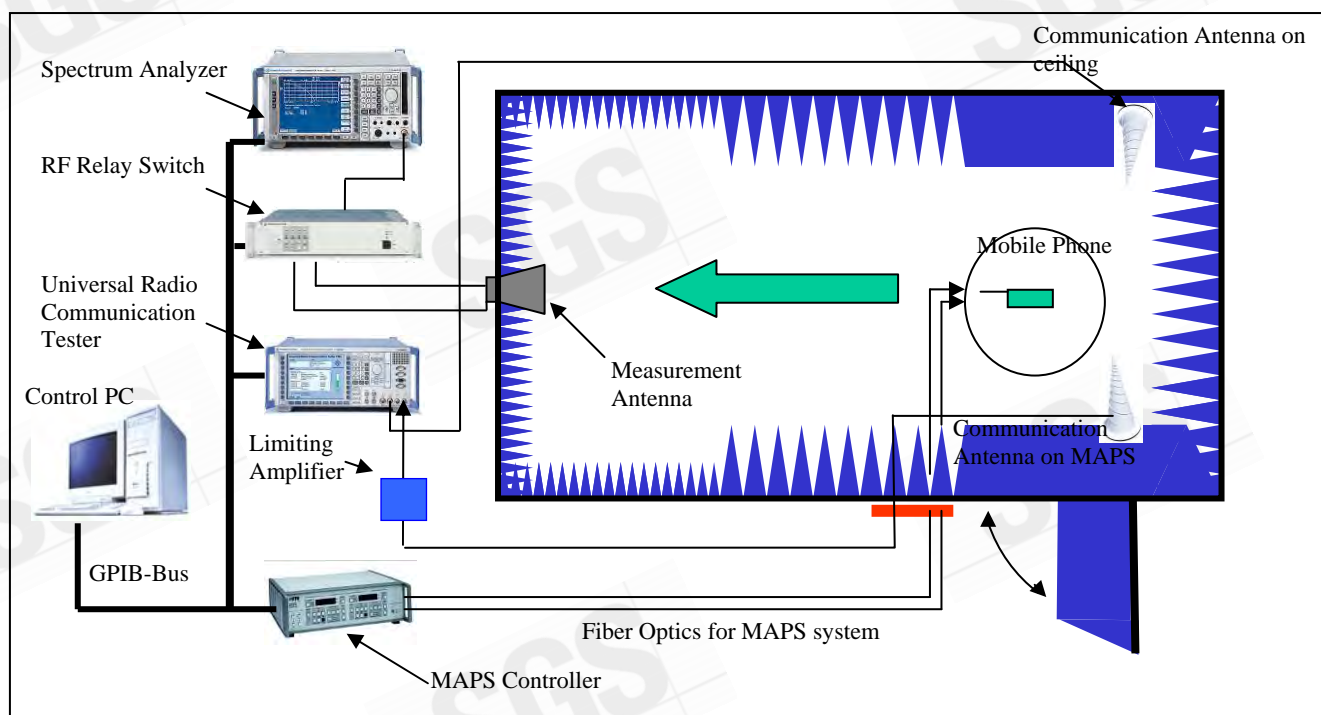
### General Information

#### Testing Condition:

- Temperature:  $25 \pm 3^{\circ}\text{C}$
- Humidity:  $< 80\%$

#### Measurement Facility:

- Measurement Chamber: ETS-Lindgren 3D fully anechoic chamber and its measuring system (AMS-8500)
- Base Station Simulator: Agilent E5515C (or R&S CMU200)
- ETS-Lindgren EMCO-2090 Auxiliary Ports RF Relay Switches
- Spectrum Analyzer: Agilent N9010A
- Network Analyzer: Agilent E5071C



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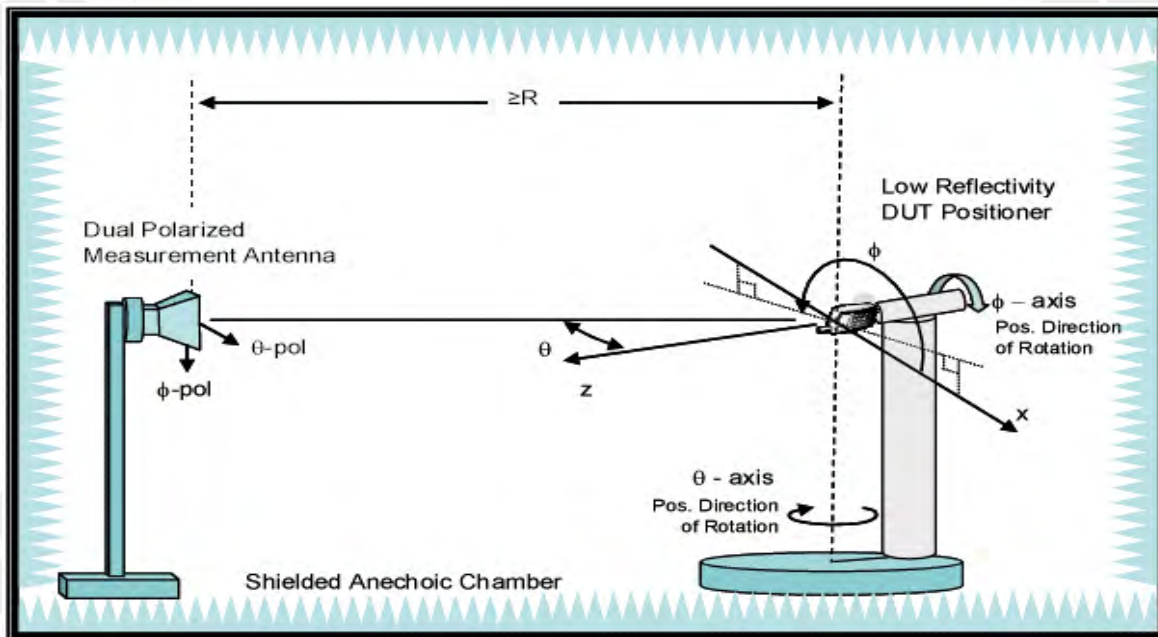
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Measurements are performed in a ETS-Lindgren **AMS-8500** 3D fully anechoic test system. The test system includes a high-performance RF-shielded, rectangular anechoic chamber, a Multi-Axis Positioning System (MAPS), and *EMQuest™* *EMQ-100* data acquisition and analysis software. The geometry of the setup is specified below for reference.

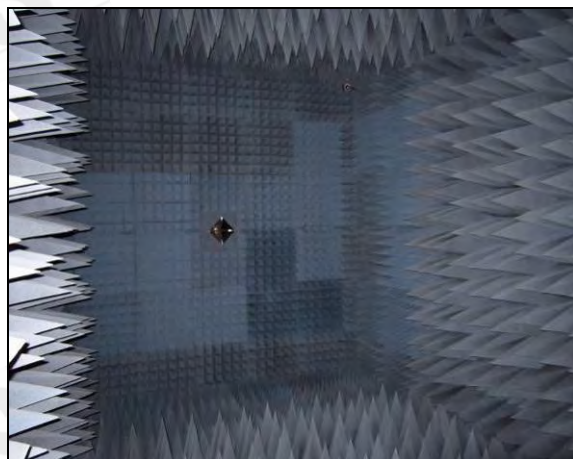
### Typical Setup for ETS-Lindgren AMS-8500:



### Instruments View



### Inside View



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

- **OTA Laboratory:**  
**SGS Taiwan Ltd. Electronics & Communication 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.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803.

**Details of Applicant:**

<b>Applicant's name:</b>	<b>TYSON BIORESEARCH, INC.</b>
<b>Applicant's address:</b>	<b>5F., No. 16、18、20、22, Ke E. Road III, Chu-Nan Township, Miaoli County, Taiwan, R.O.C.</b>
<b>Contact person:</b>	<b>Ivy chen</b>
<b>Telephone:</b>	<b>037-585988</b>
<b>Fax:</b>	<b>037-585996</b>
<b>E-mail:</b>	<b><a href="mailto:ivy.chen@tysonbio.com">ivy.chen@tysonbio.com</a></b>

**Details of Manufacturer:**

<b>Manufacturer's name:</b>	<b>TYSON BIORESEARCH, INC.</b>
<b>Manufacturer's address:</b>	<b>5F., No. 16、18、20、22, Ke E. Road III, Chu-Nan Township, Miaoli County, Taiwan, R.O.C.</b>
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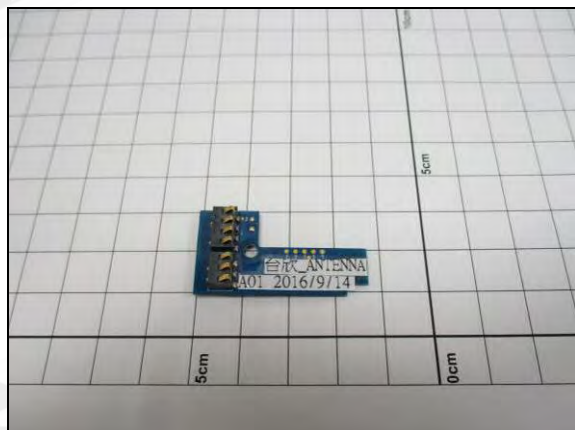
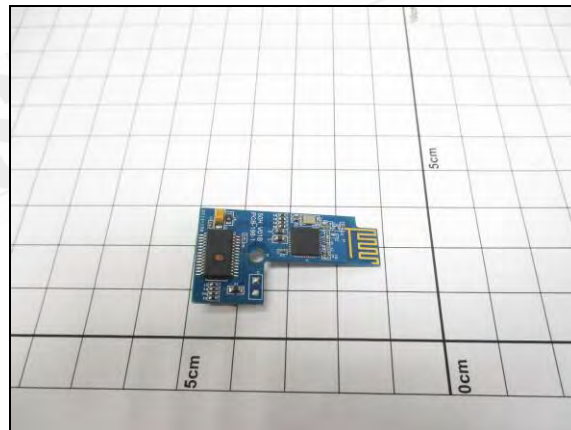
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**Details of EUT:**

<b>Device Description:</b>	<b>Antenna</b>
<b>Device Manufacturer:</b>	<b>TYSON BIORESEARCH, INC.</b>
<b>Device Model:</b>	<b>on board</b>
<b>Hardware Version:</b>	<b>50H_V01B</b>
<b>Software Version:</b>	<b>vB0.xx</b>
<b>Frequency Range:</b>	<b>2400MHz ~ 2480MHz</b> <b>Step size: 10MHz</b>
<b>Antenna Type:</b>	<b>Internal antenna</b>

**Duration of Tests:**

<b>Sample Receive Date:</b>	<b>2016-09-14</b>
<b>Test Starting Date:</b>	<b>2016-09-19</b>
<b>Test Ending Date:</b>	<b>2016-09-20</b>
<b>Report Issued Date:</b>	<b>2016-12-20</b>

**Photographs of EUT:****Front View****Back View**

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## List of Equipment

## Equipment Summary Sheet

Equipment Description	Manufacturer	Identification no.	Current calibration date	Next calibration date
Base station	Agilent	E5515C	2016/4/1	2017/3/31
Spectrum analyzer	Agilent	N9010A	2015/12/7	2016/12/6
Network analyzer	Agilent	E5071C	2015/12/8	2016/12/7
Measurement software	ETS-Lindgren	EMQuest 1.09	N/A	N/A
Multi axis positioning system(MAPSTM)	ETS-Lindgren	EMCO 2115	N/A	N/A
Multi axis positioning system(MAPSTM)	ETS-Lindgren	EMCO 2110	N/A	N/A
MAPSTM controller	ETS-Lindgren	EMCO 2090	N/A	N/A
Horn antenna	ETS-Lindgren	3164-04	N/A	N/A

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## Antenna Gain and Efficiency

Test Results									
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480
Point Values									
Ant. Port Input Pwr. (dBm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot. Rad. Pwr. (dBm)	-6.11	-6.10	-6.04	-6.07	-5.99	-5.92	-5.72	-5.39	-5.12
Peak EIRP (dBm)	-0.59	-0.49	-0.43	-0.59	-0.64	-0.64	-0.17	0.32	0.72
Directivity (dBi)	5.52	5.61	5.61	5.48	5.35	5.28	5.55	5.70	5.84
Efficiency (dB)	-6.11	-6.10	-6.04	-6.07	-5.99	-5.92	-5.72	-5.39	-5.12
Efficiency (%)	24.48	24.56	24.91	24.70	25.16	25.57	26.78	28.94	30.78
Gain (dBi)	-0.59	-0.49	-0.43	-0.59	-0.64	-0.64	-0.17	0.32	0.72
NHPRP $\pm\pi/4$ (dBm)	-7.31	-7.35	-7.35	-7.44	-7.42	-7.41	-7.26	-6.97	-6.74
NHPRP $\pm\pi/6$ (dBm)	-8.58	-8.65	-8.68	-8.81	-8.82	-8.85	-8.73	-8.47	-8.25
NHPRP $\pm\pi/8$ (dBm)	-9.44	-9.53	-9.57	-9.71	-9.75	-9.79	-9.70	-9.46	-9.27
Upper Hem. PRP (dBm)	-9.73	-9.81	-9.88	-10.05	-10.12	-10.17	-10.07	-9.79	-9.53
Lower Hem. PRP (dBm)	-8.59	-8.50	-8.35	-8.29	-8.12	-7.97	-7.71	-7.34	-7.07

## Test Setup



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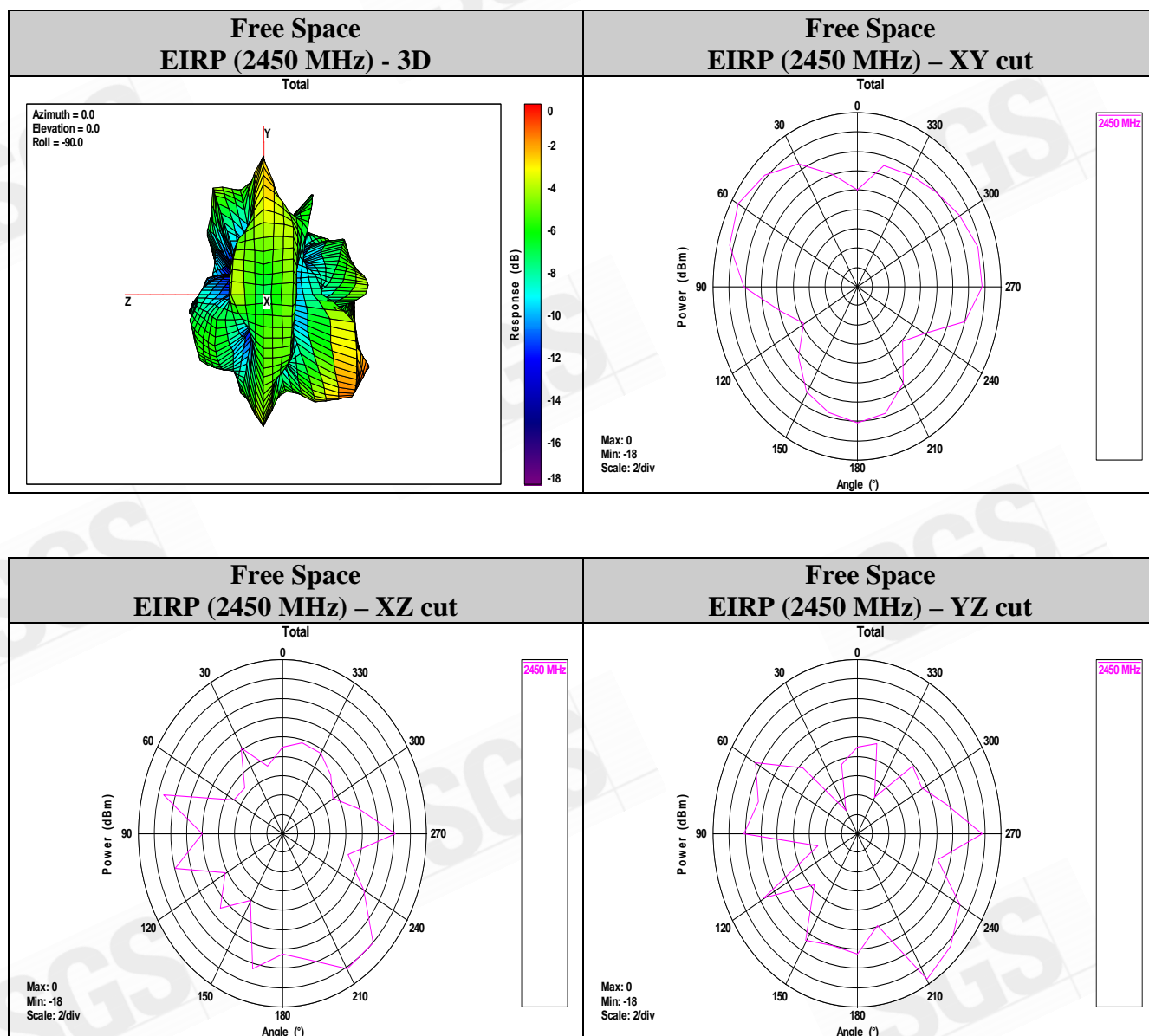
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## Antenna 3D Plot Matrix

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



## End of Report

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