



## SGS North America, Inc. Test Report

Report No.: 208535  
SGS BOSS No.: 5103196

Date: November 15, 2023

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Manufacturer's Name: OTODATA

The following sample(s) was/were submitted and identified by/on-behalf of the client as a mobile terminal device.

Product Name	TM5240 Tank Monitor
Model Name	MZ03AD
Description	The TM5240 Tank Monitor is a battery-operated Wireless Remote Tank Level Monitor
Board S/N	LX97323
Testing Start Date	10/10/2022
Testing End Date	10/10/2022
Test(s) Requested	Passive Antenna Performance

Signed for and on behalf of SGS North America, Inc.

Sergio Garcia  
Senior Engineer

Fred Jeong  
OTA Lab Manager

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## **General Conditions of Service for North America**

### **1. General**

(a) Unless otherwise agreed in writing or except where they are at variance with (i) the regulations governing services performed on behalf of governments, government bodies or any other public entity or (ii) the mandatory provisions of local law, all offers or services and all resulting contractual relationship(s) between any of the affiliated companies of SGS North America Inc. or any of their agents (each a "Company") and Client (the "Contractual Relationship(s)") shall be governed by these general conditions of service (hereinafter the "General Conditions").

(b) The Company may perform services for persons or entities (private, public or governmental) issuing instructions (hereinafter, the "Client").

© Unless the Company receives prior written instructions to the contrary from Client, no other party is entitled to give instructions, particularly on the scope of the services or the delivery of reports or certificates resulting therefrom (the "Reports of Findings"). Client hereby irrevocably authorize the Company to deliver Reports of Findings to a third party where so instructed by Client or, at its discretion, where it implicitly follows from circumstances, trade custom, usage or practice.

### **2. Provision of Services**

(a) The Company will provide services using reasonable care and skill and in accordance with Client's specific instructions as confirmed by the Company or, in the absence of such instructions:

(1) the terms of any standard order form or standard specification sheet of the Company; and/or

(2) any relevant trade custom, usage or practice; and/or

(3) such methods as the Company shall consider appropriate on technical, operational and/or financial grounds.

(b) Information stated in Reports of Findings is derived from the results of inspection or testing procedures carried out in accordance with the instructions of Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.

© Reports of Findings issued further to the testing of samples contain the Company's opinion on those samples only and do not express any opinion upon the lot from which the samples were drawn.

(d) Should Client request that the Company witness any third party intervention, Client agrees that the Company's sole responsibility is to be present at the time of the third party's intervention and to forward the results, or confirm the occurrence, of the intervention. Client agrees that the Company is not responsible for the condition or calibration of apparatus, instruments and measuring devices used, the analysis methods applied, the qualifications, actions or omissions of third party personnel or the analysis results.

© Reports of Findings issued by the Company will reflect the facts as recorded by it at the time of its intervention only and within the limits of the instructions received or, in the absence of such instructions, within the limits of the alternative parameters applied as provided for in clause 2(a). The Company is under no obligation to refer to, or report upon, any facts or circumstances which are outside the specific instructions received or alternative parameters applied.

(f) The Company may delegate the performance of all or part of the services to an agent or subcontractor and Client authorizes Company to disclose all information necessary for such performance to the agent or subcontractor.

(g) Should Company receive documents reflecting engagements contracted between Client and third parties or third party documents, such as copies of sale contracts, letters of credit, bills of lading, etc., they are considered to be for information only, and do not extend or restrict the scope of the services or the obligations accepted by the Company.

(h) Client acknowledges that the Company, by providing the services, neither takes the place of Client or any third party, nor releases them from any of their obligations, nor otherwise assumes, abridges, abrogates or undertakes to discharge any duty of Client to any third party or that of any third party to Client.

(i) All samples shall be retained for a maximum of 3 months or such other shorter time period as the nature of the sample permits and then returned to Client or otherwise disposed of at the Company's discretion after which time Company shall cease to have any responsibility for such samples. Storage of samples for more than 3 months shall incur a storage charge payable by Client. Client will be billed a handling and freight fee if samples are returned. Special disposal charges will be billed to Client if incurred.

### **3. Obligations of Client**

The Client will:

(a) ensure that sufficient information, instructions and documents are given in due time (and, in any event not later than 48 hours prior to the desired intervention) to enable the required services to be performed;

(b) procure all necessary access for the Company's representatives to the premises where the services are to be performed and take all necessary steps to eliminate or remedy any obstacles to, or interruptions in, the performance of the services;

© supply, if required, any special equipment and personnel necessary for the performance of the services;

(d) ensure that all necessary measures are taken for safety and security of working conditions, sites and installations during the performance of services and will not rely, in this respect, on the Company's advice whether required or not;

© inform Company in advance of any known hazards or dangers, actual or potential, associated with any order or samples or testing including, for example, presence or risk of radiation, toxic or noxious or explosive elements or materials, environmental pollution or poisons;

(f) fully exercise all its rights and discharge all its liabilities under any relevant sales or other contract with a third party and at law.

### **4. Fees and Payment**

(a) Fees not established between the Company and Client at the time the order is placed or a contract is negotiated shall be at the Company's standard rates (which are subject to change) and all applicable taxes shall be payable by Client.

(b) Unless a shorter period is established in the invoice, Client will promptly pay not later than 30 days from the relevant invoice date or within such other period as may be established by the Company in the invoice (the "Due Date") all fees due to the Company

failing which interest will become due at a rate of 1.5% per month (or such other rate as may be established in the invoice) from the Due Date up to and including the date payment is actually received.

© Client shall not be entitled to retain or defer payment of any sums due to the Company on account of any dispute, counter claim or set off which it may allege against the Company.

(d) Company may elect to bring action for the collection of unpaid fees in any court having competent jurisdiction.

© Client shall pay all of the Company's collection costs, including attorney's fees and related costs.

(f) In the event any unforeseen problems or expenses arise in the course of carrying out the services the Company shall authorize to inform Client and shall be entitled to charge additional fees to cover extra time and cost necessarily incurred to complete the services.

(g) If the Company is unable to perform all or part of the services for any cause whatsoever outside the Company's control including failure by Client to comply with any of its obligations provided for in clause 3 above the Company shall nevertheless be entitled to payment of:

(1) the amount of all non-refundable expenses incurred by the Company; and

(2) a proportion of the agreed fee equal to the proportion of the services actually carried out.

## **5. Suspension or Termination of Services**

The Company shall be entitled to immediately and without liability either suspend or terminate provision of the services in the event of:

(a) failure by the Client to comply with any of its obligations hereunder and such failure is not remedied within 10 days that notice of such failure has been notified to Client; or

(b) any suspension of payment, arrangement with creditors, bankruptcy, insolvency, receivership or cessation of business by Client.

## **6. Liability and Indemnification**

(a) Limitation of Liability:

(1) The Company is neither an insurer nor a guarantor and disclaims all liability in such capacity. Clients seeking a guarantee against loss or damage should obtain appropriate insurance.

(2) Reports of Findings are issued on the basis of information, documents and/or samples provided by, or on behalf of, Client and solely for the benefit of Client who is responsible for acting as it sees fit on the basis of such Reports of Findings. Neither the Company nor any of its officers, employees, agents or subcontractors shall be liable to Client nor any third party for any actions taken or not taken on the basis of such Reports of Findings nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to the Company.

(3) The Company shall not be liable for any delayed, partial or total non-performance of the services arising directly or indirectly from any event outside the Company's control including failure by Client to comply with any of its obligations hereunder.

(4) The liability of the Company in respect of any claim for loss, damage or expense of any nature and howsoever arising shall in no circumstances exceed a total aggregate sum equal to 10 times the amount of the fee paid in respect of the specific service which gives rise to such claim or US\$20,000 (or its equivalent in local currency), whichever is the lesser.

(5) The Company shall have no liability for any indirect or consequential loss including without limitation loss of profits, loss of business, loss of opportunity, loss of goodwill and cost of product recall. It shall further have no liability for any loss, damage or expense arising from the claims of any third party (including, without limitation, product liability claims) that may be incurred by the Client.

(6) In the event of any claim, Client must give written notice to the Company within 30 days of discovery of the facts alleged to justify such claim and, in any case, the Company shall be discharged from all liability for all claims for loss, damage or expense unless suit is brought within one year from:

(i) the date of performance by the Company of the service which gives rise to the claim; or

(ii) the date when the service should have been completed in the event of any alleged non-performance.

(b) Indemnification: Client shall guarantee, hold harmless and indemnify the Company and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any third party for loss, damage or expense of whatsoever nature including all legal expenses and related costs and howsoever arising relating to the performance, purported performance or non-performance, of any services.

## **7. Miscellaneous**

(a) If any one or more provisions of these General Conditions are found to be illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

(b) During the course of providing the services and for a period of one year thereafter Client shall not directly or indirectly entice, encourage or make any offer to Company's employees to leave their employment with the Company.

© Use of the Company's corporate name or registered marks for advertising purposes is not permitted without the Company's prior written authorization.

## **8. Governing Law, Jurisdiction and Dispute Resolution**

Unless specifically agreed otherwise, all disputes arising out of or in connection with Contractual Relationship(s) hereunder shall be governed by the substantive laws of the State of New Jersey exclusive of any rules with respect to conflicts of laws and be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said rules. The arbitration shall take place in Hackensack, New Jersey and be conducted in the English language.



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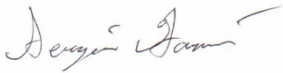

**OTODATA**

**MZ03AD**


**S/N : LX97323**

**2,400 MHz ~ 2,482 MHz**

**SGS North America, Inc.**  
**12310 World Trade Drive, Suite 106/107,**  
**San Diego, 92128**  
**(858) 683-8034**  
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	Name	Date
Prepared by:	Sergio Garcia SGS North America, Inc. Test Engineer	11/15/2023
Signature:		
Approved by:	Fred Jeong SGS North America, Inc. Lab Manager	11/15/2023
Signature:		


Report No.	Revision	Date	Description
208535	1.0	11/15/2023	Initial Release

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## 1) Measurement System Information

### 1.1 General Information

ETS-Lindgren's AMS-8923 Antenna Measurement System includes a custom Multi-Antenna Array Ring. This ring houses a system of dual-polarized antennas. Together, these antennas support testing between 600 MHz and 6 GHz. An integrated laser alignment system assists with DUT positioning. With a switch control box integrated on the ring, the test system provides fast switching between antennas for high speed testing. Its centralized system configuration supports easy maintenance and superior reliability.

#### 1.1.1 Testing Condition

- Temperature :  $(23 \pm 5) ^\circ\text{C}$
- Relative humidity :  $< 60\% \text{ R.H.}$

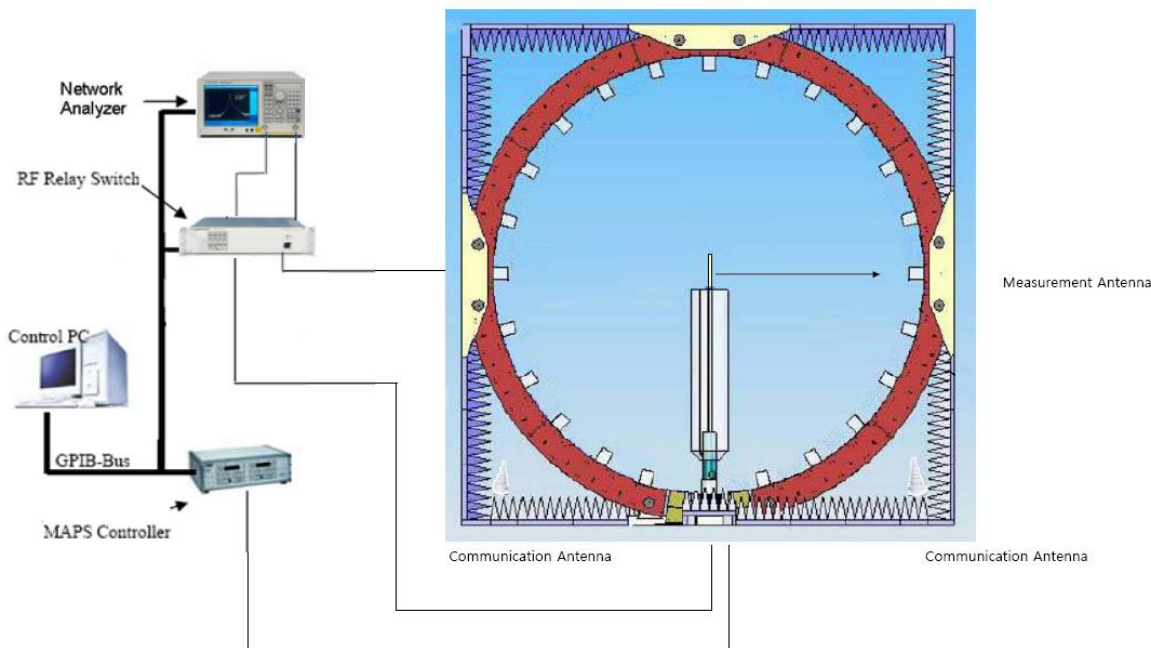
#### 1.1.2 Measurement Facility

Measurement Chamber : ETS-Lindgren 3D fully anechoic chamber and its measuring system (AMS-8923)

Measurement Distance : 1950 mm

Anechoic Chamber size : 4877 mm x 4877 mm x 4877 mm


Network Analyzer : Keysight E5071C



Measurements are performed in a ETS-Lindgren AMS-8923 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™ data acquisition and analysis software. The geometry of the setup is specified below for reference.

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## 1.2 List of Equipment

Equipment Description	Manufacturer / Model	Serial no.	Calibration due date
Network Analyzer	Keysight / E5071C	MY46418102	2024.06.20
EMCenter	ETS-Lindgren	116860	N/A
Humidity Recorder	Practical Design THUM	T-6703-1444-A	2024.12.21
EMQuest	ETS-Lindgren	1381A	N/A

## 2) Report Affirmation

The results in this report relate only to the items tested and referenced by SGS North America, Inc.

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### 3) Summation Test Report

Point Values	Peak EIRP (dBm)	Efficiency (dB)	Efficiency (%)	Gain (dBi)	Boresight Phi (°)	Boresight Th. (°)
Frequency (MHz)						
2400	1.76751	-3.23059	47.5271	1.76751	15	-150
2402	1.73321	-3.22041	47.6386	1.73321	15	-150
2404	1.50996	-3.43674	45.3237	1.50996	15	-150
2406	1.59776	-3.30288	46.7425	1.59776	15	-150
2408	1.8835	-3.13427	48.593	1.8835	15	-150
2410	1.63733	-3.23585	47.4695	1.63733	15	-150
2412	1.76891	-3.16723	48.2256	1.76891	15	-150
2414	1.65685	-3.28007	46.9887	1.65685	15	-150
2416	1.87144	-3.07862	49.2196	1.87144	15	-150
2418	1.63981	-3.26643	47.1365	1.63981	15	-150
2420	1.62004	-3.16382	48.2634	1.62004	15	-150
2422	1.88696	-3.0642	49.3832	1.88696	15	-150
2424	1.7176	-3.17019	48.1927	1.7176	15	-150
2426	1.73398	-3.14947	48.4232	1.73398	15	-150
2428	1.29202	-3.47318	44.9451	1.29202	15	-150
2430	1.55641	-3.19614	47.9055	1.55641	15	-150
2432	1.7532	-3.17262	48.1657	1.7532	15	-150
2434	1.52472	-3.26417	47.161	1.52472	15	-150
2436	1.39171	-3.41494	45.5518	1.39171	15	-150
2438	1.11649	-3.57656	43.8879	1.11649	15	-150
2440	1.54916	-3.25508	47.2598	1.54916	15	-150
2442	1.40976	-3.42669	45.4288	1.40976	15	-150
2444	1.2428	-3.48828	44.7891	1.2428	15	-150
2446	1.16558	-3.65866	43.0659	1.16558	15	-150
2448	1.2074	-3.58052	43.8478	1.2074	15	-150
2450	1.3415	-3.52362	44.4261	1.3415	15	-150
2452	1.062	-3.70498	42.6091	1.062	15	-150
2454	1.24864	-3.55691	44.0869	1.24864	15	-150
2456	1.28444	-3.62333	43.4177	1.28444	15	-150
2458	1.31904	-3.53627	44.2969	1.31904	15	-150

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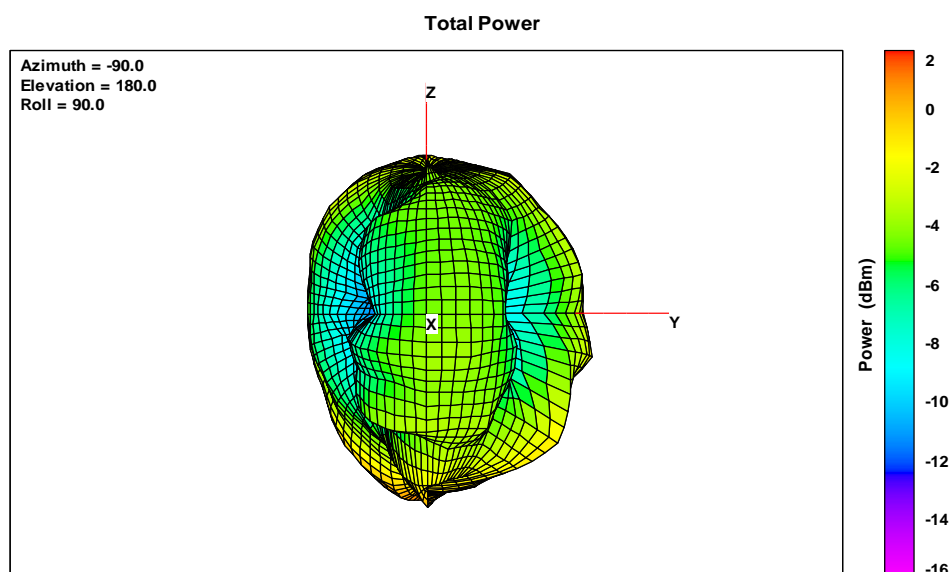
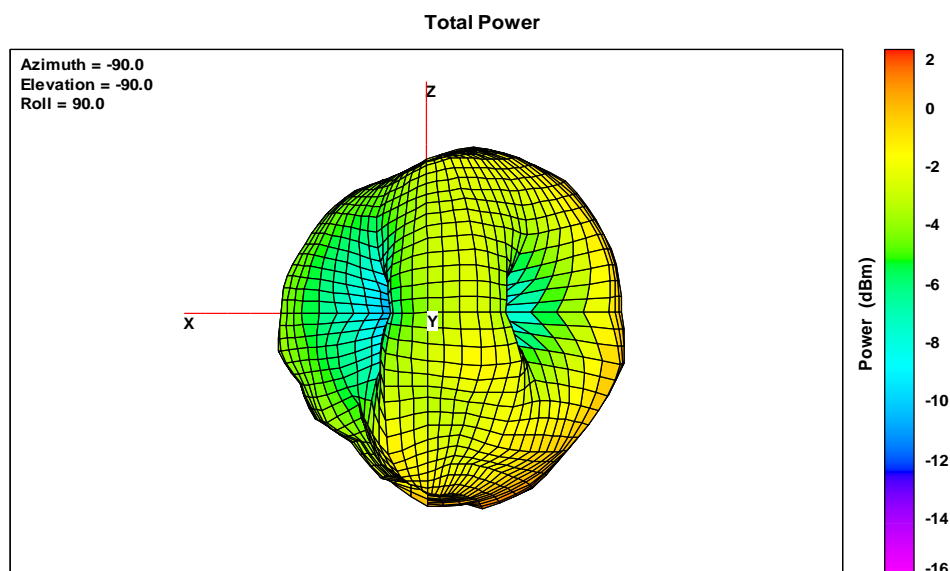
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2460	1.11879	-3.71405	42.5202	1.11879	15	-150
2462	1.10853	-3.63449	43.3063	1.10853	15	-150
2464	1.47637	-3.43769	45.3139	1.47637	15	-150
2466	1.42994	-3.48502	44.8227	1.42994	15	-165
2468	1.31574	-3.52111	44.4518	1.31574	15	-150
2470	1.1971	-3.69614	42.6959	1.1971	15	-165
2472	1.54603	-3.35052	46.2325	1.54603	0	-165
2474	1.74828	-3.32725	46.481	1.74828	0	-165
2476	1.68999	-3.33768	46.3694	1.68999	15	-165
2478	1.56361	-3.37713	45.9501	1.56361	15	-165
2480	1.76979	-3.3824	45.8944	1.76979	15	-165
2482	1.98303	-3.13346	48.602	1.98303	15	-165

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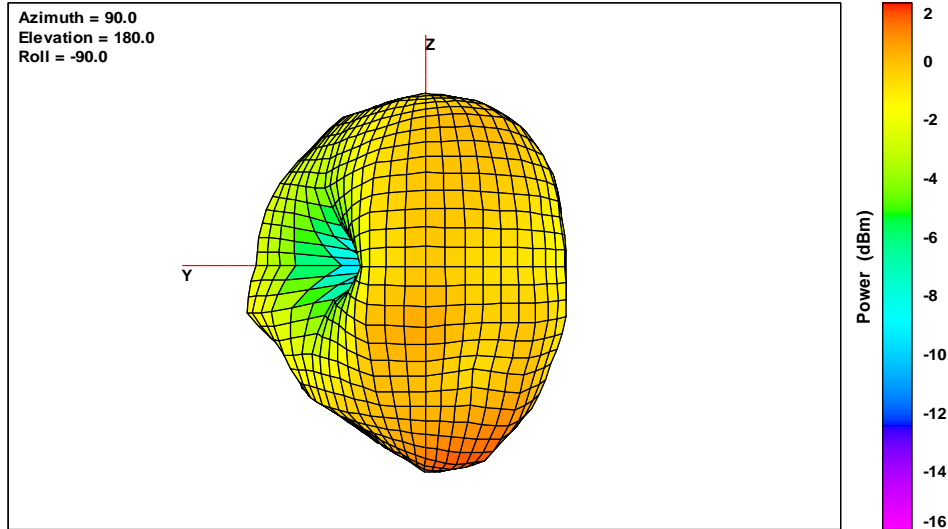
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## 4) Summation EIRP Test Report 3D Plot Matrix

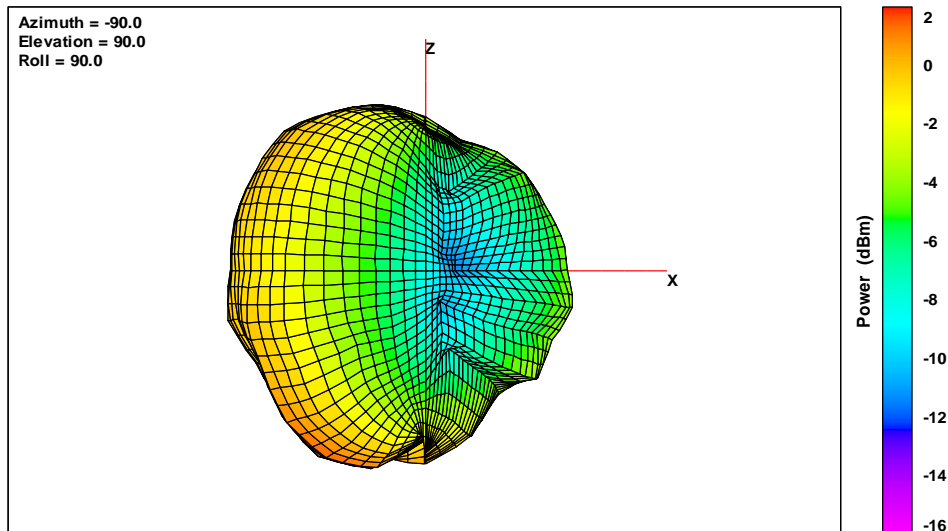


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Total Power



Total Power



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## 5) Device Setup Configuration

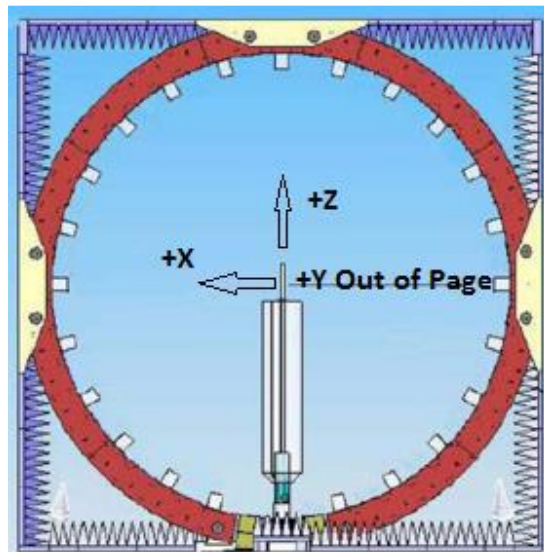
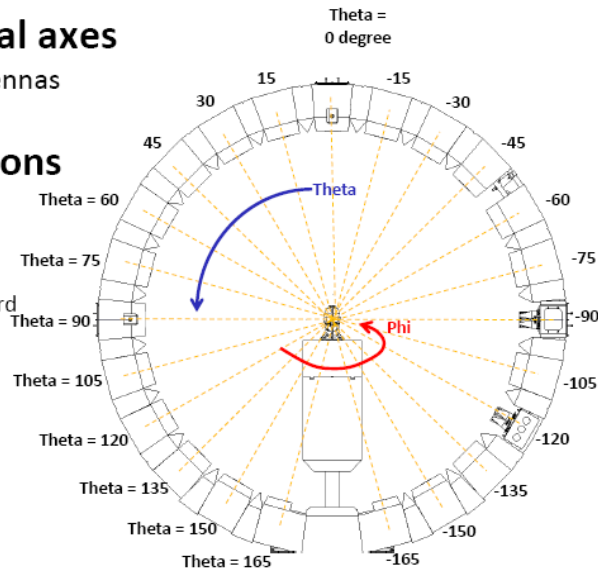
### 5.1 Test Setup – Chamber Coordinate System

#### Locate the two rotational axes


- Theta – the ring, multiple antennas
- Phi – the turntable

#### Define X, Y and Z directions

- X → Theta = 90 degree
- Y → Theta rotational axis
  - Use right-hand-rule
  - Then, theta axis is coming outward
- Z → Theta = 0 degree
  - Or phi rotational axis



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