Antenna Test Report

Report No.: TEOT2207000369EO

Applicant Name: Trek Bicycle Corporation
Manufacturer Name: Trek Bicycle Corporation

Product Name: Bicycle Light
Model Number: 5298295

Measurements performed at
SGS Taiwan Ltd.
NeiHu District, Taiwan

Issued Date: August 05, 2022

	Name	Date & Signature
Prepared by:	Ian Pan Engineer	Ian Pan August 05, 2022
Approved by:	Eason Chou Supervisor	Eason Chou August 05, 2022

Distribution

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Revision Version

Report Number	Revision	Date	Memo
TEOT2207000369EO	00	2022/08/05	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

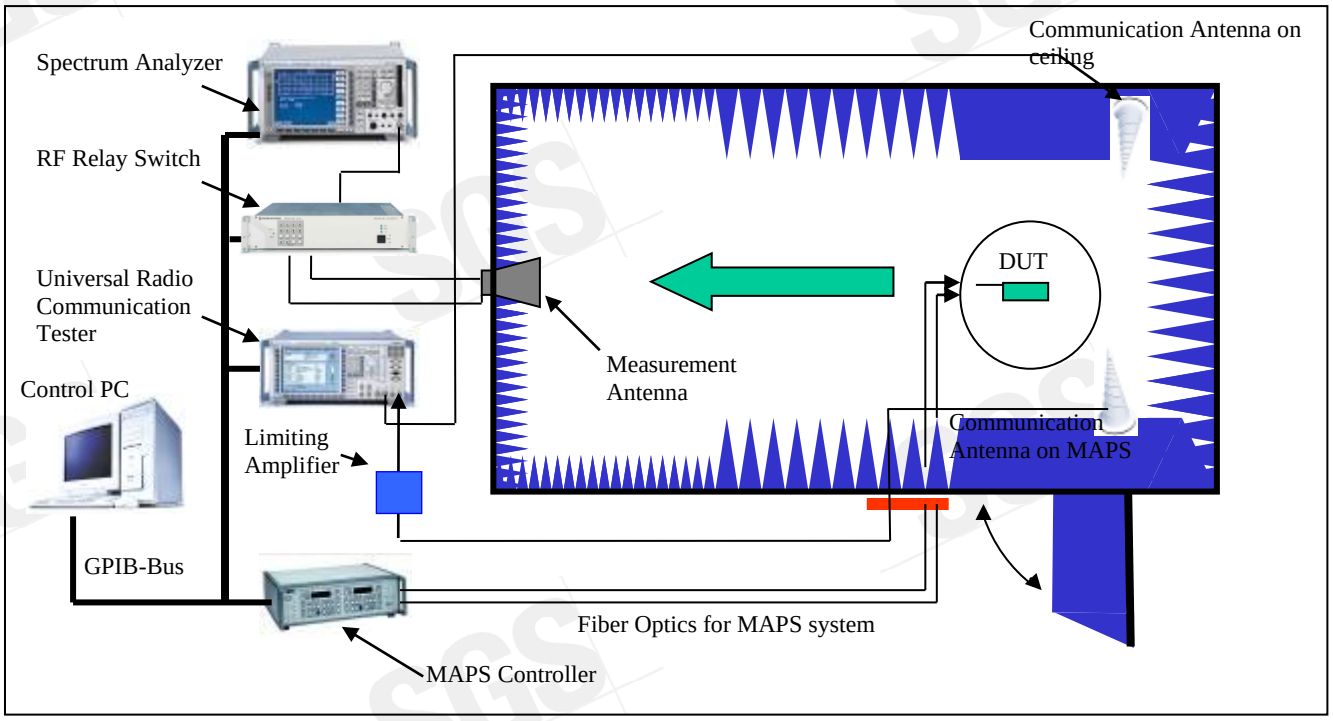
General Information

Testing Condition:

- Temperature: 25±3˚C
- Humidity: <80%

Measurement Facility:

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



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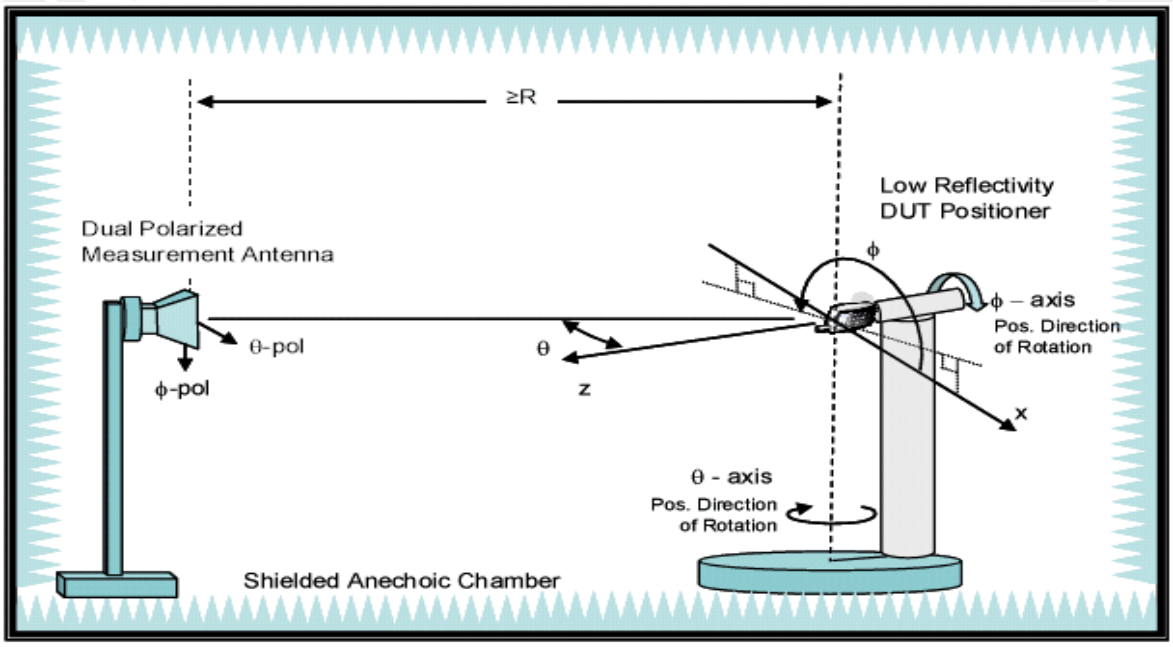
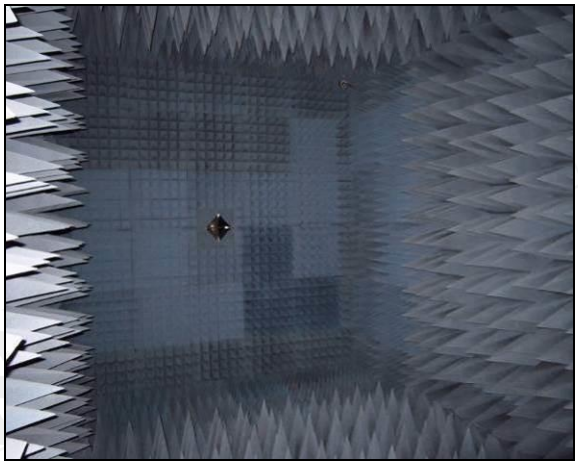
Measurements are performed in an ETS-Lindgren **AMS-8500** 3D fully anechoic test system. The test system includes a high-performance RF-shielded, rectangular anechoic chamber, a Multi-Axis Positioning System (MAPS), and *EMQuest™EMQ-100* data acquisition and analysis software. The geometry of the setup 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. 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:**
  1F, No. 8, Alley 15, Lane 120, Sec. 1, NeiHu Road, NeiHu District, Taipei City 114, Taiwan 11446.

Details of Applicant:

Applicant's name:	**Trek Bicycle Corporation**
Applicant's address:	**801 West Madison Street, Waterloo, WI 53594, USA**
Contact person:	**Jeff Jambois**
Telephone:	**+1-920-478-2191**
Fax:	**N/A**
E-mail:	**Jeff_Jambois@trekbikes.com**

Details of Manufacturer:

Manufacturer's name:	**Trek Bicycle Corporation**
Manufacturer's address:	**801 West Madison Street, Waterloo, WI 53594, USA**
Contact person:	**Jeff Jambois**
Telephone:	**+1-920-478-2191**
Fax:	**N/A**
E-mail:	**Jeff_Jambois@trekbikes.com**

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Details of EUT:

Device Description:	**Bicycle Light**
Device Manufacturer:	**Trek Bicycle Corporation**
Device Model:	**5298295**
Hardware Version:	**N/A**
Software Version:	**N/A**
Frequency Range:	**2400MHz ~ 2500MHz** **Step size: 10MHz**
Antenna Type:	**Embedded Antenna**

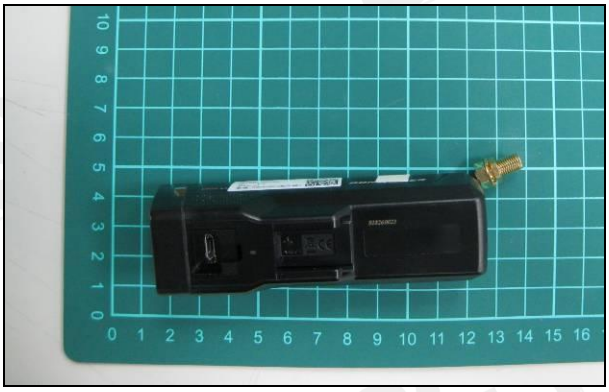
Duration of Tests:

Sample Receive Date:	**2022-07-06**
Test Starting Date:	**2022-08-01**
Test Ending Date:	**2022-08-01**
Report Issued Date:	**2022-08-05**

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
Network analyzer	Agilent	E5071C	2022/02/21	2023/02/20
Measurement software	ETS-Lindgren	EMQuest 1.14	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	3164-10	N/A	N/A

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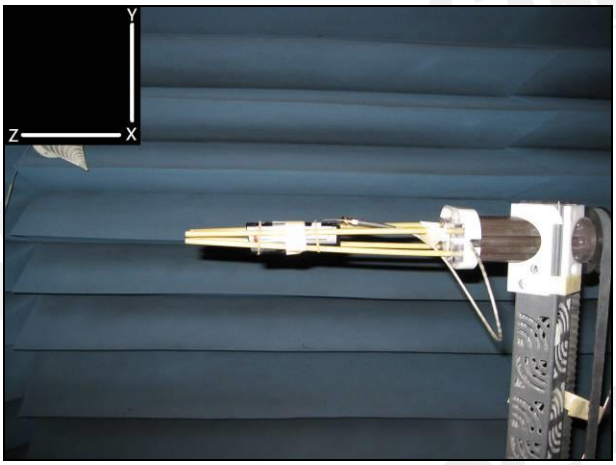
Member of SGS Group

Antenna Gain and Efficiency

Test Result											
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
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	0.00	0.00
Tot. Rad. Pwr. (dBm)	**-5.36**	**-5.12**	**-4.93**	**-4.82**	**-4.78**	**-4.91**	**-5.08**	**-5.29**	**-5.48**	**-5.65**	**-5.75**
Peak EIRP (dBm)	-0.97	-0.63	-0.32	-0.09	-0.01	-0.13	-0.27	-0.47	-0.68	-0.85	-0.98
Directivity (dBi)	4.39	4.50	4.61	4.73	4.77	4.78	4.81	4.81	4.81	4.79	4.77
Efficiency (dB)	-5.36	-5.12	-4.93	-4.82	-4.78	-4.91	-5.08	-5.29	-5.48	-5.65	-5.75
Efficiency (%)	**29.08**	**30.75**	**32.13**	**32.93**	**33.28**	**32.28**	**31.07**	**29.61**	**28.29**	**27.24**	**26.62**
Gain (dBi)	-0.97	-0.63	-0.32	-0.09	-0.01	-0.13	-0.27	-0.47	-0.68	-0.85	-0.98
NHPRP ±Pi/4 (dBm)	-7.56	-7.33	-7.15	-7.06	-7.02	-7.16	-7.32	-7.53	-7.73	-7.90	-8.02
NHPRP ±Pi/6 (dBm)	-9.33	-9.12	-8.95	-8.87	-8.84	-8.98	-9.13	-9.33	-9.52	-9.69	-9.80
NHPRP ±Pi/8 (dBm)	-10.44	-10.24	-10.08	-10.01	-10.00	-10.14	-10.30	-10.50	-10.69	-10.86	-10.98
Upper Hem. PRP (dBm)	-7.41	-7.12	-6.90	-6.76	-6.68	-6.78	-6.92	-7.11	-7.29	-7.44	-7.52
Lower Hem. PRP (dBm)	-9.61	-9.45	-9.31	-9.27	-9.28	-9.47	-9.68	-9.94	-10.17	-10.36	-10.49

Test Setup

Free Space



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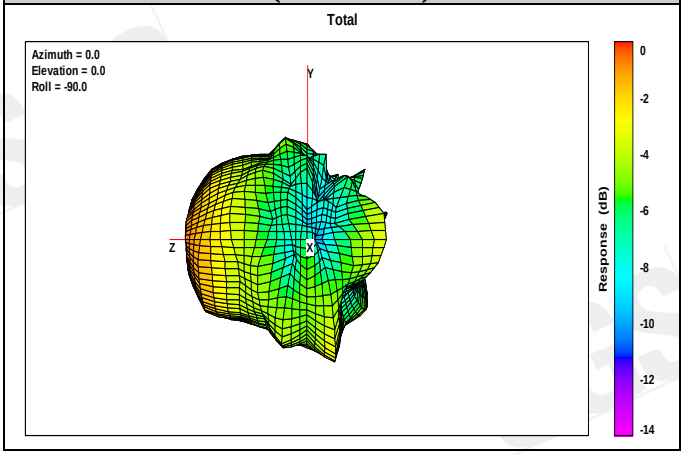
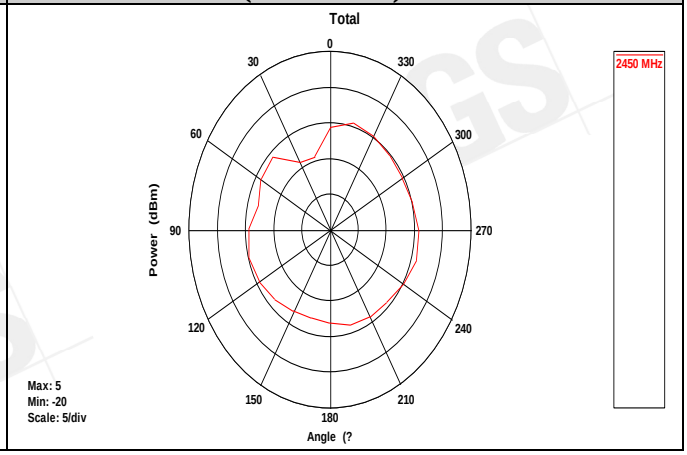
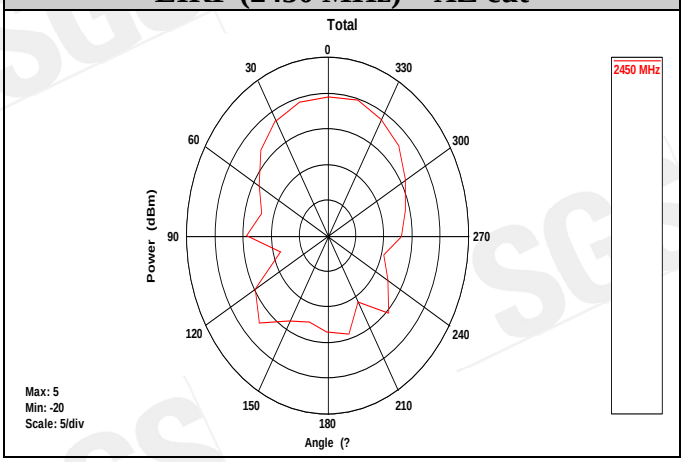
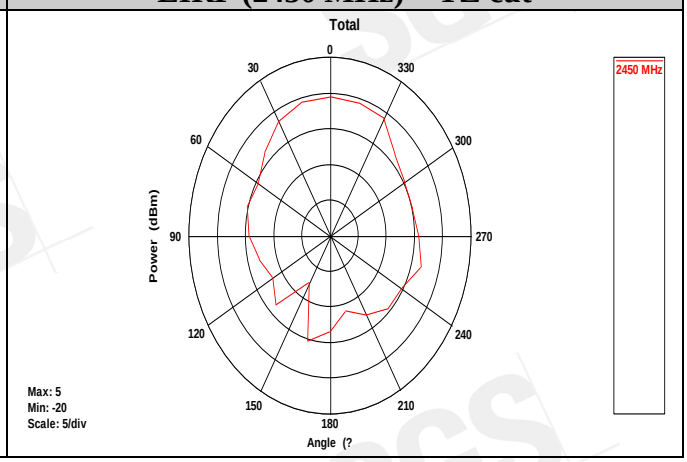
Antenna 3D Plot Matrix

All plots in this section show the total EIRP (EIRPθ + EIRPφ) with the +x-axis pointing out of the page, +y-axis pointing top of the page, and +z-axis pointing left of the page.

Free Space EIRP (2450 MHz) - 3D	Free Space EIRP (2450 MHz) – XY cut
	

Free Space EIRP (2450 MHz) – XZ cut	Free Space EIRP (2450 MHz) – YZ cut
	

End of Report

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