

# Testing Report

Customer Name: TOPDON TECHNOLOGY Co., Ltd.

Product Name: Onboard Bluetooth antenna

Sample Model: T-Darts

Reference Standard: *GB/T 9410-2008; ANSI/IEEE Std149-1979*

Issue Date: 2023.4.21

Engineer: Jackson	Date: 2023.4.21
Auditor: Eason	Date: 2023.4.21
Approver: Janson	Date: 2023.4.21



### Version

Version No.	Date	Description	Formulate	Approval
A0	2023.4.21	For the first time, formulate	Jackson	Eason

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# 1. General Information

## 1.1 General information of testing institutions

<b>Name</b>	Shenzhen RFI-LAB Communication Technology Co., Ltd.
<b>Address</b>	10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ
<b>Tel</b>	
<b>E-mail</b>	
<b>Equipment</b>	All the equipment used in the report is fixed in Zone B, West Side of 1/F, Building 1, Tingwei Industrial Park, No.6 Liufang Road, Bao 'an District, Shenzhen

## 1.2 Testing principle



### 1.3 Test equipment

Equipment	Model No.	Serial No.	Manufacturer	Calibration date	Next calibration date
OTA Test System	RayZone-5000	RFI-LAB-RF-D00	GTS	2023.3.14	2025.3.13
Network Analyzer	E5071C	RFI-LAB-RF-D01	KEYSIGHT	2022.5.13	2023.5.12

### 1.4 Test environment

Temperature	23.9°C
Humidity	59%RH
Pressure	100.14kPa

### 1.5 Statement

- (1) The test results in the report are only applicable to the tested samples and the tested samples work under the environment described in the report.
- (2) Only Shenzhen RFI-LAB Communication Technology Co., Ltd. have the right to modify the report, and the modification information shall be annotated in the revision form.
- (3) Any objection to this report shall be raised within 30 days after formal confirmation of the report.
- (4) This report is invalid if there is any evidence that the sample information provided is falsified.
- (5) The report is invalid without the signature of the auditor and approver.

## 2. Sample Information

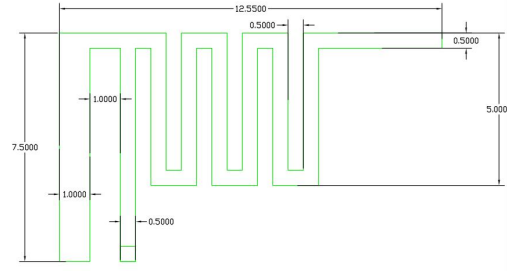
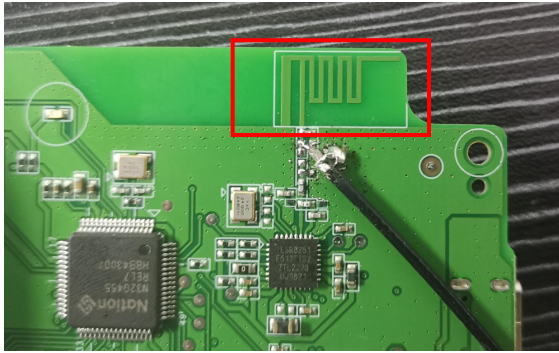
### 2.1 Client information

<b>Name</b>	TOPDON TECHNOLOGY Co., Ltd.
<b>Address</b>	Unit 2005 20/F, No.3040 Xinghai Avenue, Qianhai Shima Tower, Qianhai Shenzhen-Hong Kong Cooperation Zone, Shenzhen, P.R.China
<b>Contacts</b>	/
<b>Tel</b>	/
<b>E-mail</b>	/
<b>Manufacturer</b>	TOPDON TECHNOLOGY Co., Ltd.

### 2.2 Description of EUT(S)

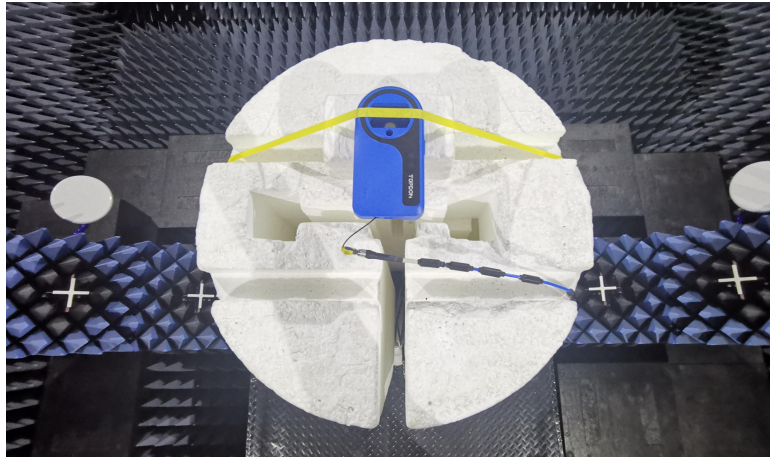
<b>Product Name</b>	Onboard Bluetooth antenna
<b>Sample Model</b>	T-Darts
<b>Antenna Size</b>	/
<b>Serial No.</b>	/
<b>Antenna Type</b>	PCB Antenna
<b>Test Item</b>	VSWR; Antenna gain; Efficiency; Radiation pattern
<b>Frequency Range</b>	2400-2500MHz
<b>Received Date</b>	2023.4.21
<b>Test Date</b>	2023.4.21
<b>Remark</b>	The length of the RF cable is 90mm

### 2.3 EUT appearance

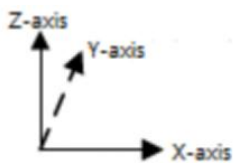
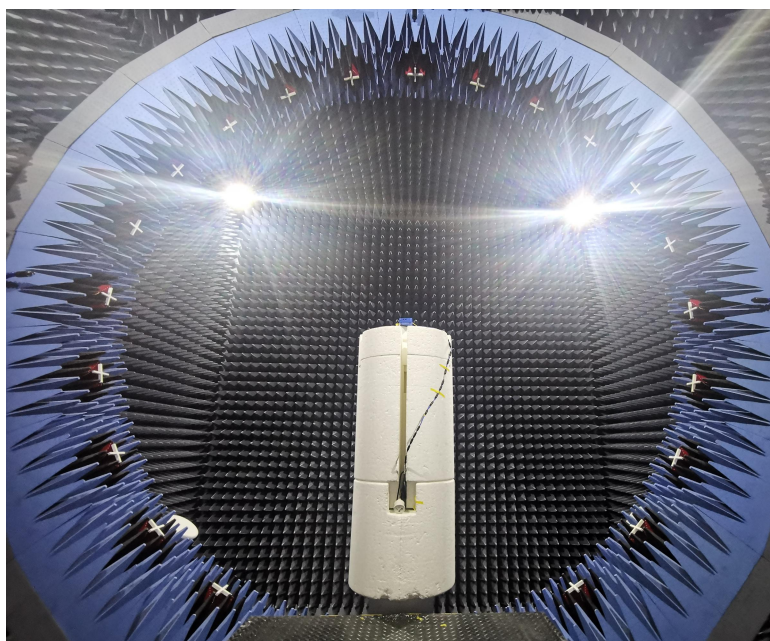


### 2.4 EUT setup photo of free space OTA testing

Planform



Front view



## 3. Test Results

### 3.1 Test standard

Name	Parameter	Method	Standard no.
Mobile communication antenna	Antenna gain	Generic specification for antennas used in the mobile communications	GB/T 9410-2008
	Radiation pattern		
	VSWR		
Antenna	Radiation efficiency	IEEE Standard Test Procedures for Antennas	ANSI/IEEE Std 149-1979
	Gain and directivity		

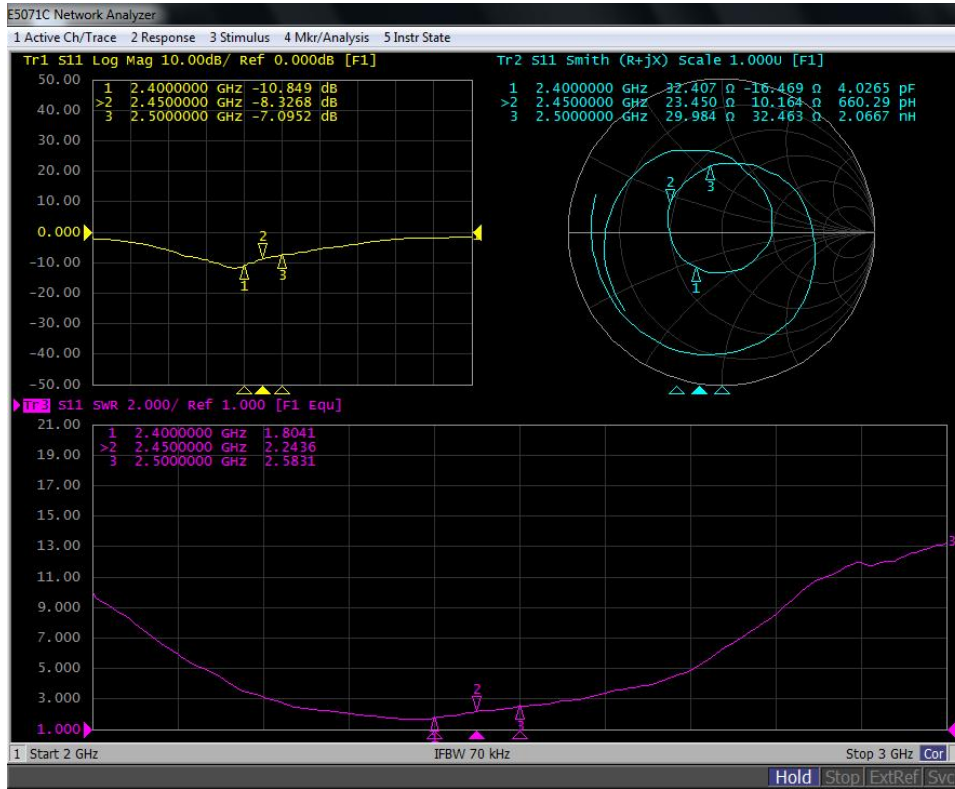
### 3.2 Test uncertainty

The uncertainty was calculated on the basis of the GUM published by ISO, using the inclusion factor of  $K=2$  and the 95% confidence level to express the extended uncertainty.

Item	Uncertainty
VSWR	$\pm 0.3$
Antenna gain	$\pm 1\text{dB}$
Radiation efficiency	$\pm 10\%$

### 3.3 Test data

#### 3.3.1 VSWR parameters



#### 3.3.2 VSWR data

Frequency/MHz	2400	2450	2500
VSWR	1.8041	2.2436	2.5831

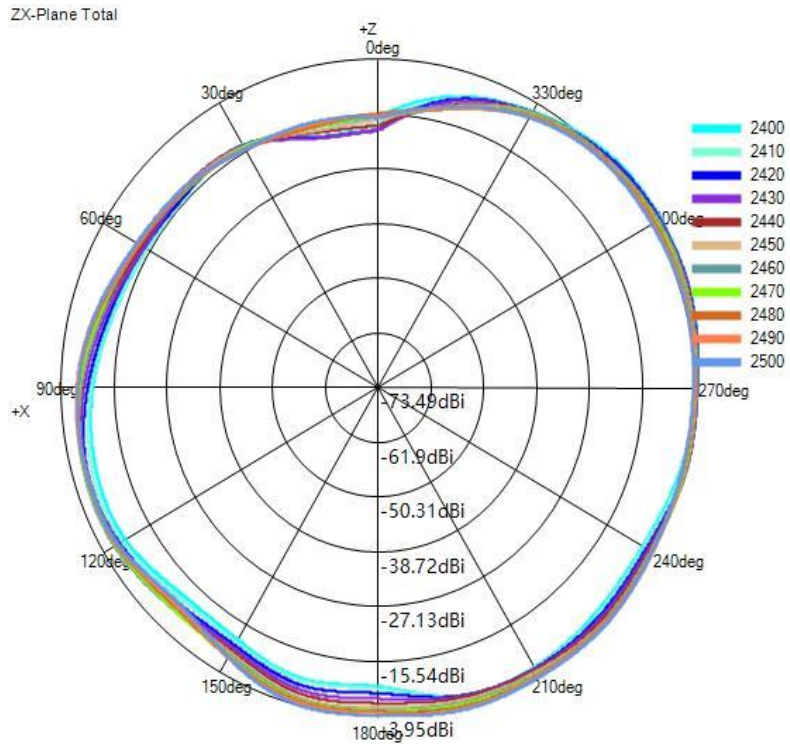
#### 3.3.3 Typical free space efficiency and gain

Frequency/MHz	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain/dBi	-0.46	-0.53	-0.36	-0.32	-0.14	0.20	0.28	0.25	0.20	0.25	0.28
Efficiency/%	29.21	29.70	31.42	32.54	33.95	36.23	37.04	37.21	37.31	37.58	37.91

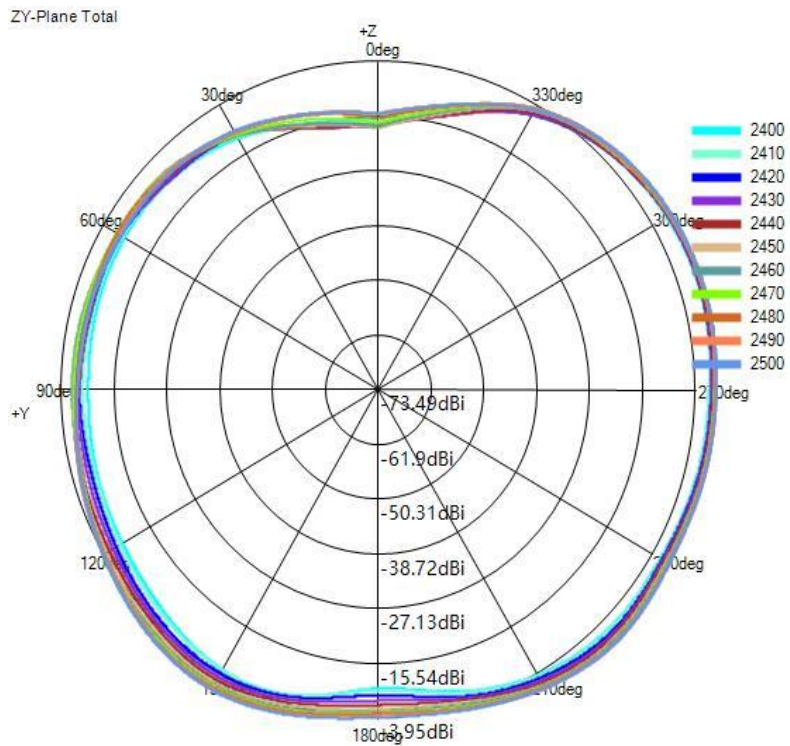


### 3.3.4 Typical free space radiation pattern

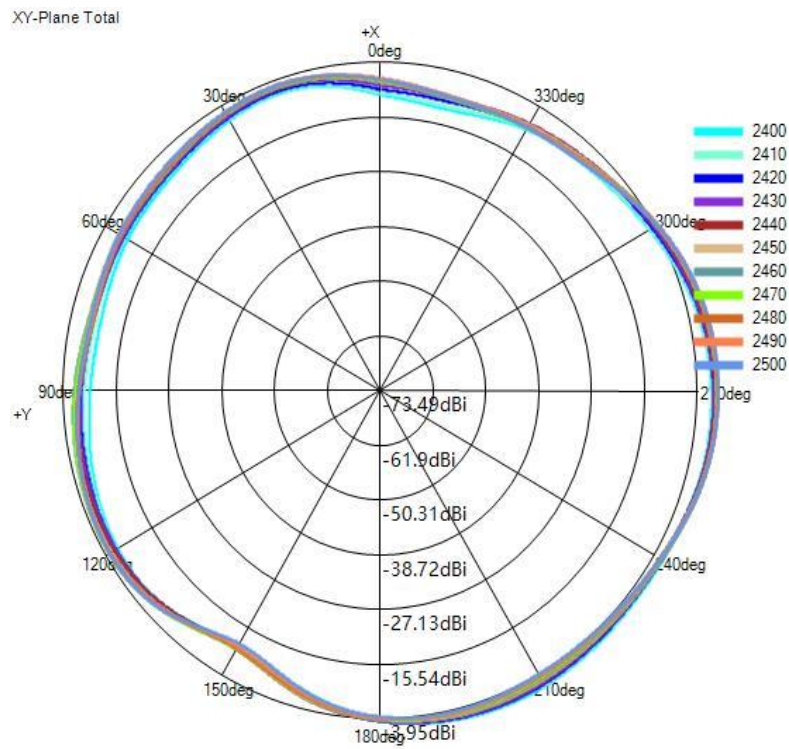
(1) X-Z Plane(unit:dBi):



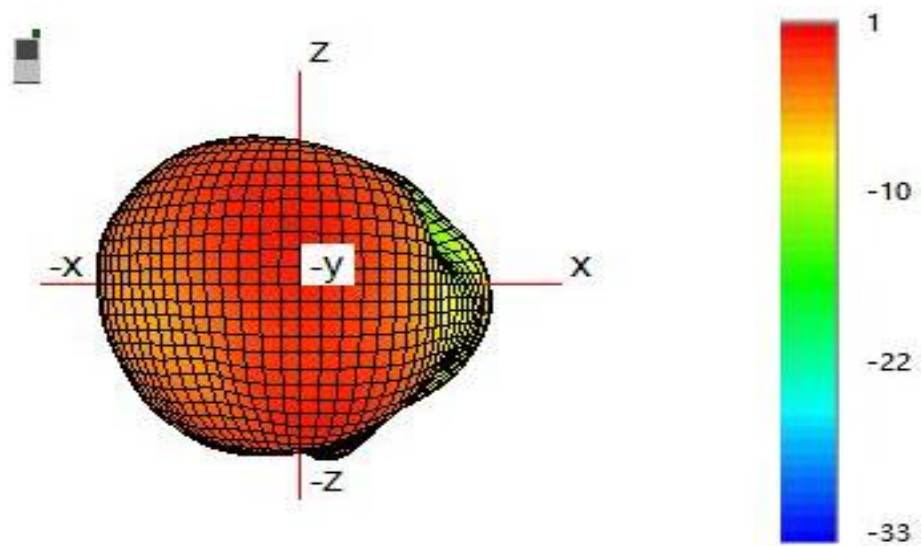
(2) Y-Z Plane(unit:dBi):



(3) X-Y Plane(unit:dBi):



(4) Typical Free Space 3D Radiation Pattern at 2.5GHz(unit:dBi):



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End

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