

Product Specification

2.4G Dipole ant

EXTERNAL Fixed ANTENNA

Confidential

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

Antenna Approval sheet

	External Fixed Antenna
Product Name	2.4GHz band
Part No.	TE-2402TO-C3
Customer code	
Customer	Eta Electronics
Provider	

APPROVAL	Classification	DIRECTOR	EXAMINATION	APPROVAL
	RF			
	MECHANICAL			
APPROVAL	Classification	DIRECTOR	EXAMINATION	APPROVAL
	RF			
	MECHANICAL			



Eta Electronics	Description 2.4Ghz ANT Product Specification		
	Specification No. Dipole	Customer.	Rev. 1.0 Date Jun 01 . 2025

Table of Contents

1 .Approval Sheet Check List	4
2.Revision List	5
3.Specification.....	6
3-1 General Standard	6
3-2 Electrical Standard	6
3-3 Mechanical Standard	6
4 Test Procedure & Measurement	7
4-1 External Test.....	7
4-2Electrical Feature Inspection.....	7
4-2-1 <i>Materials</i>	7
<i>Inspection</i>	7
4-3 .Radiation Pattern	9
4-3-1 <i>Chamber Materials (KTM Korea)</i>	9
4-3-2 <i>Inspection</i>	9
5 .Packing, Shipping, Handling	11
5-1.Exterior Option.....	11
5-2 .Packing.....	11
6.Antenna PHOTO.....	12
7. QUALITY STANDARD AND TEST METHOND	13
8 Electrical data.....	15
8-1 V.S.W.R	15
8-2 Radiation Pattern 3D Data	17

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

2.Revision List

No	Date	Before change	After change	Reason	Rev
1	2017-11-20			DATA	1.0
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

3.Specification

3-1 General Standard

General Specification	
Model name	2.4G Dipole
Antenna type	External Fixed Antenna

3-2 Electrical Standard

Electrical Specification	
Frequency range	2400~2485 MHz
V.S.W.R	3.0:1.
Gain(dBi) MAX	4.01dBi
Radiation pattern	Omni-Directional
Polarization	Vertical
Max Power(W)	2W Max.
Impedance	50ohms

3-3 Mechanical Standard

Mechanical Specification	
Connector type	RP-SMA Male & IPEX CABLE 150mm
Material	CU
Color	BALCK Type
Resin	TPEE , PC
Temperature range	-30℃ ~ 80℃
Weight	9,4 ± 2g
Bending	NO

3-4 Operating Conditions

Specification	
Operating Environment	Temperature : -30~70℃ Humidity : ~85% RH
Storage Environment	Temperature : -20~60℃ Humidity : ~65% RH

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

4 Test Procedure & Measurement

4-1 External Test

To check the unity Antenna’s exterior, size, connector and etc. with the exterior indicated

4-2Electrical Feature Inspection

4-2-1 Materials

Equipment	Model	Quantity	Standard
Network Analyzer	E5071C equipment with the equivalent	1EA	·Freq. Range : 9KHz ~ 8.5GHz · Accuracy : <5ppm ·Dynamic Range : 105dB · Trace at ±200dB · Resolution : 1Hz · Impedance : 50Ω
Adaptor		1EA	· N(F)-SMA(M)
Calibration Kit	HP85033D	1Set	· DC ~ 8.5GHz (SMA-Type)

Inspection

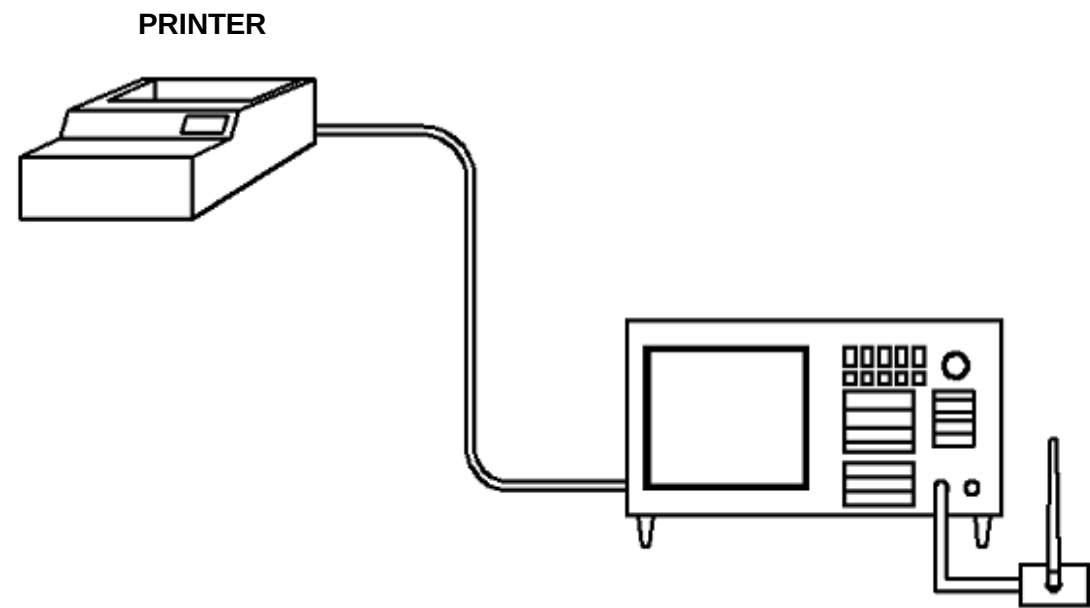


Figure 1. (Network Analyzer) Electrical Characteristic Measurement

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

4-2-2 Inspection

가. Equipment Setting and Calibration

㉠ Equipment Setting

㉡ Bandwidth: 2400~2500MHz

㉢ Source Power: 0dBm,

㉣ Calibration

Using N-Type CalKit Applying O.S.L. Method, Calibrate Port number 1.

㉤ S₁₁Calibration: Open Port #1, Calibrate after connecting the Load short.

㉥ Calibration Check

㉦ Connect Load to Port #1 to check S₁₁'s V.S.W.R is less than 1.02:1

㉧ Connect Load to Port #1 to check S₂₁ is less than -80.0dB.

If not Satisfied with the Result, Repeat Procedure ㉣ Calibration.

나. Inspection Method and Contents

Item	Inspection Method	Standard
V.S.W.R	Connect ANT to the Positioner and Measure the S ₁₁ within Operating Band, as Shown above on Figure 1.	2.0:1 Max.
Impedance	Connect ANT to the Positioner and Measure the S ₁₁ VALUE that's on Smith Chart within the Operating Band, as shown above on Figure w.	50Ω

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

4-3 .Radiation Pattern

4-3-1 Chamber Materials (KTM Korea)

Name of the Equipment	Model	Quantity	Standard
Far Field Chamber	KTM	1EA	· Freq. Range: 400MHz~8.5GHz · Measurement Speed : Radiation Pattern Cuts: Real Time Full sphere far-field : <600 sec · Measurement Accuracy : Dynamic Range: 70 dB Cross-polar isolation < -45 dB · Gain Accuracy : MTG 1 - 6GHz < ±0.75dB
Adaptor		1EA	· SMA(M)-SMA(F)
Computer		1EA	· Data for Measurement

4-3-2 Inspection

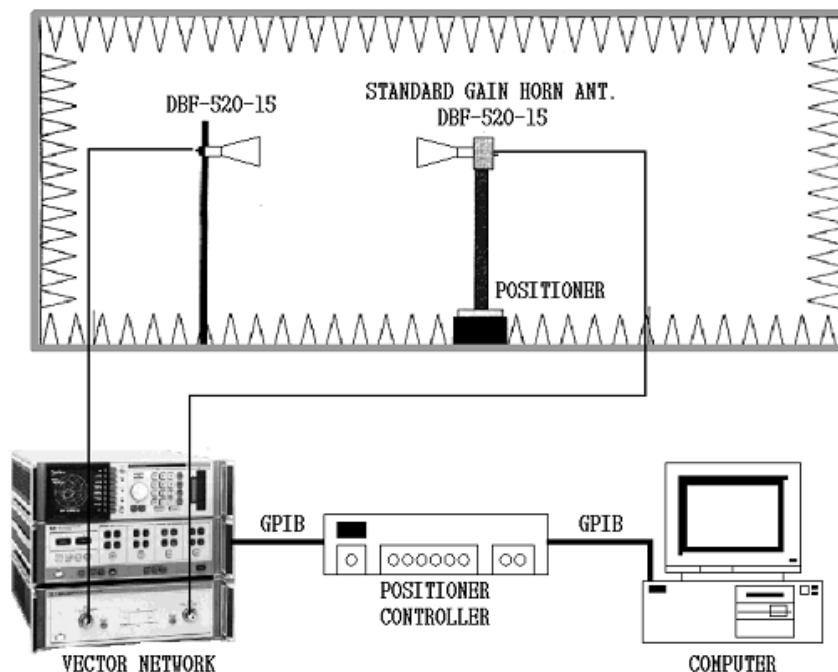
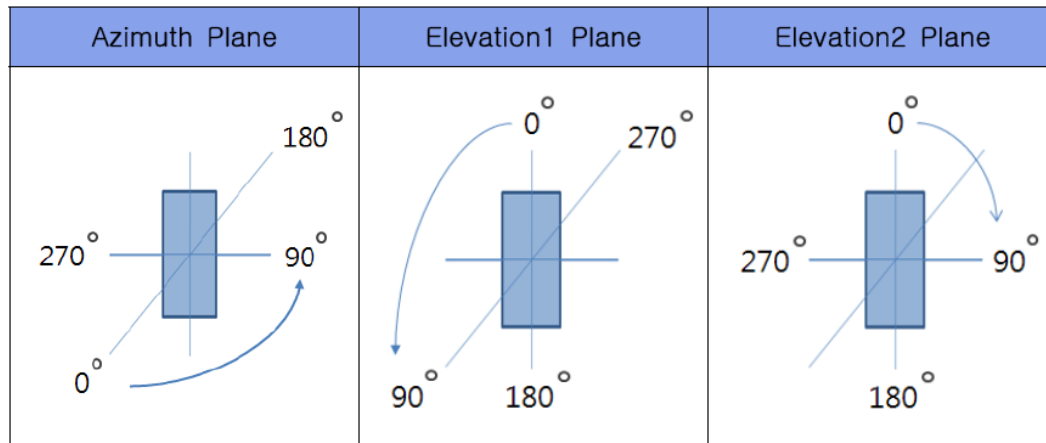


Figure2. Radiation Patten Test Construction

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025



A. Equipment Setting and Measurement

㊦Network Analyzer Setting

㊦Calibrate Chamber System for Gain Measurement using KTM. At the Same Time set up Software Program fir Chamber System Control.

– Test Frequency Setting : 2.4GHz Band

㊦Change Over from a TX to the RX on Target Positioner.

㊦Start a Software Program for Chamber System Control & Measuring.

㊦Measurement Data.

B. Inspection Method and Contents

Item	Inspection Method	Standard
Radiation Pattern	Connect ANT' to the Positioner and measure the Radiation Pattern within the Far Field Chamber, as shown above, on Figure 2.	Normal: dBi

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

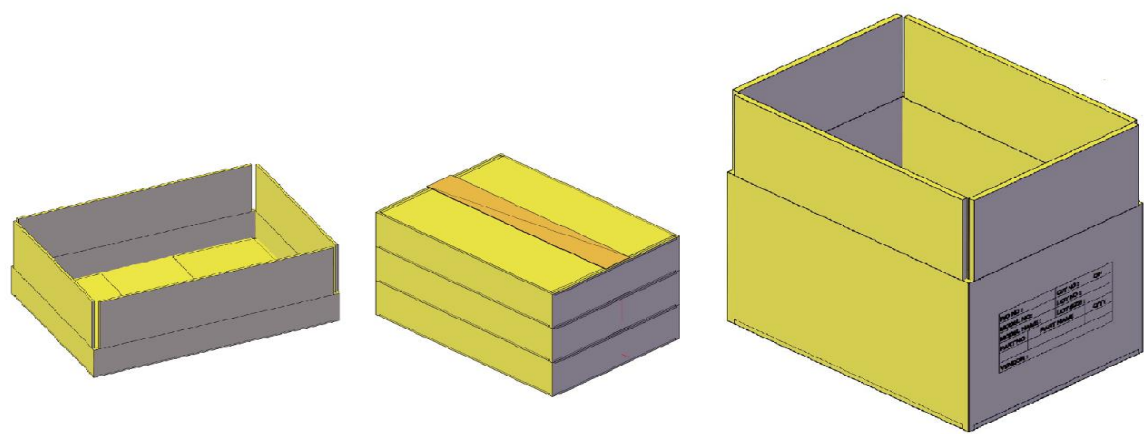
5 .Packing, Shipping, Handling

5-1.Exterior Option

- 1) Both ordering enterprise and producer’s names should be indicated.
- 2) Name, Serial number and quantity of the Model should be indicated.

5-2 .Packing

manufacturer



Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

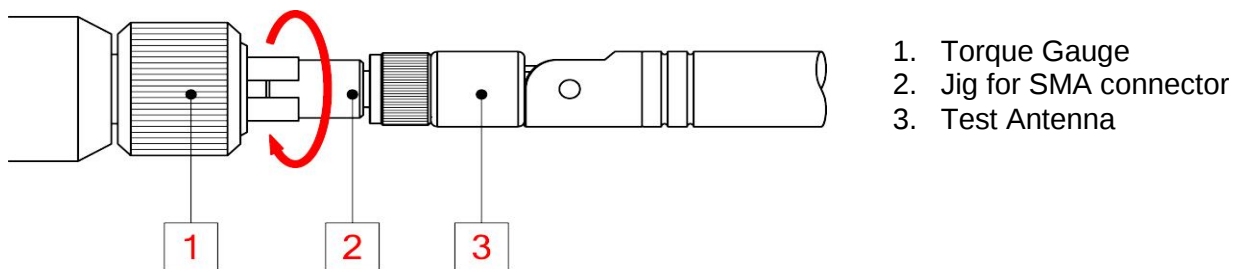
6.Antenna PHOTO



Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

7. QUALITY STANDARD AND TEST METHOND

7-1 Torque



350~750g/cm AT ALL DIRECTION

7-2 Flatness of body

7-3 Gap between holder and connector

7-4 White dot and pollutions

≤ 0.3mm , 5 EA

7-5 Burr and scratch

Antenna doesn't have burr or scratch on following conditions.

- Verification method : Should verify by naked eyes at distance with 30Cm and 300Lux

7-7 Appearance and dimensions

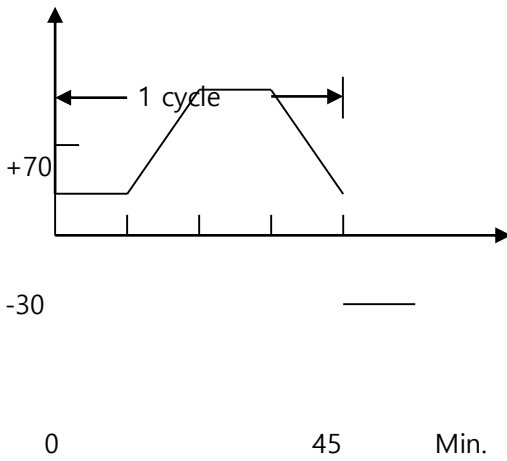
DRAWING

7-8 Color

Reference color chip

Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

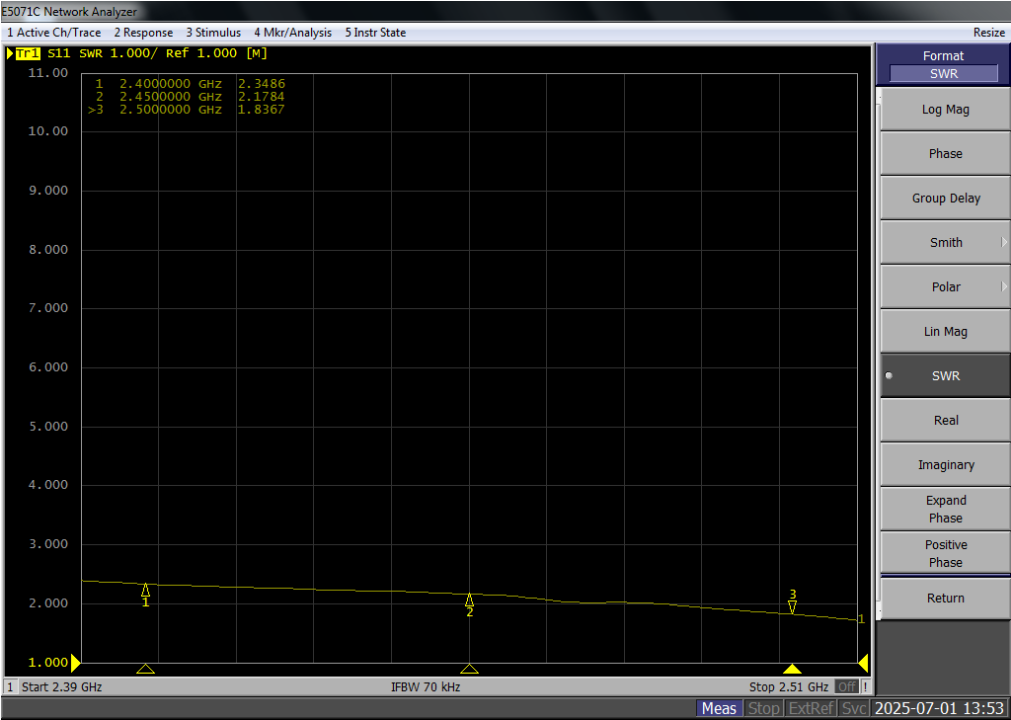
7-10 Reliability Test

NO	Items	Specifications	
9-1	LOW TEMP EXPOSURE TEST	TEMPERATURE : -30°C TIME : 48 HOURS	AFTER 2HOURS EXPOSURE IN ORDINARY FROM TEST , ANTENNAS SHALL BE APPROVED AS SPECIFIED IN ITEM 5 AND 6
9-2	HIGHTEMP EXPOSURE TEST	TEMPERATURE : 70°C TIME : 48 HOURS	
9-3	HUMIDITY EXPOSURE TEST	TEMPERATURE : 60°C±2°C HUMIDITY : 85%RH TIME : 48 HOURS	
9-4	THERMAL SHOCK	Temperature(°C)  045Min. Test cycle : 10cycles	
9-5	DROP TEST	SET THE MOTOR ON THE HEAVY BLOCK ABOUT 100g WEIGHT (INCLUDE THE NOTOR) AND DROP THE MOTOR ON THE CONCRETE FLOOR. HEIGHT : 1.5m DIRCCTION : ±X , ±Y , ±Z TIMES : THREE DROPS PER PLANE FOR A TOTAL OF 5 DROPS.	

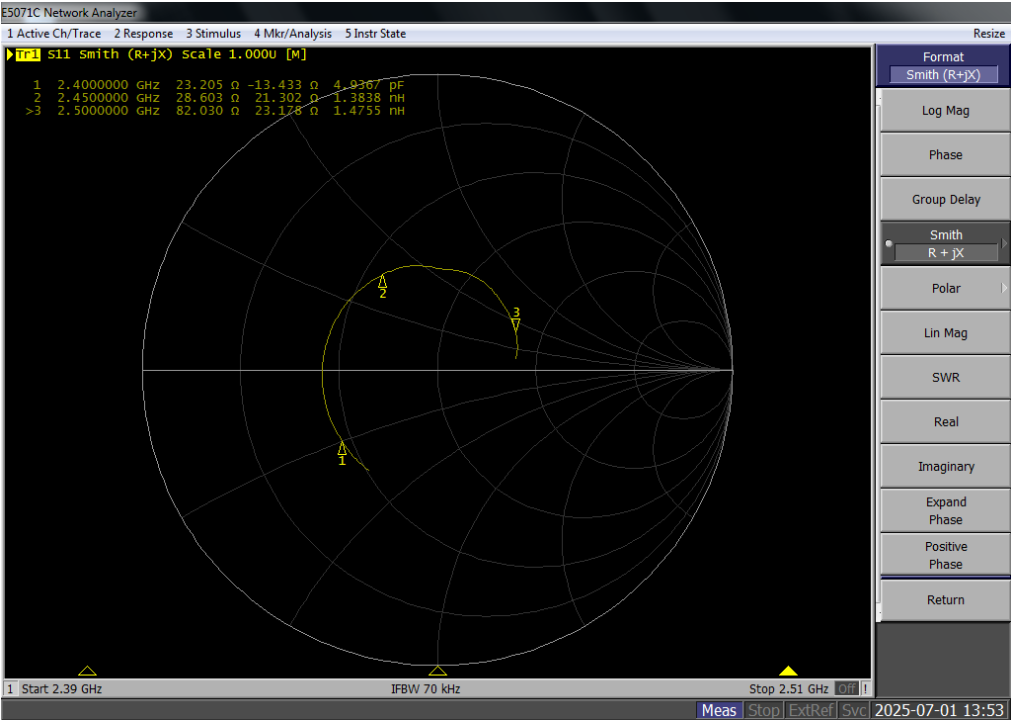
Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

8 Electrical data

8-1 V.S.W.R

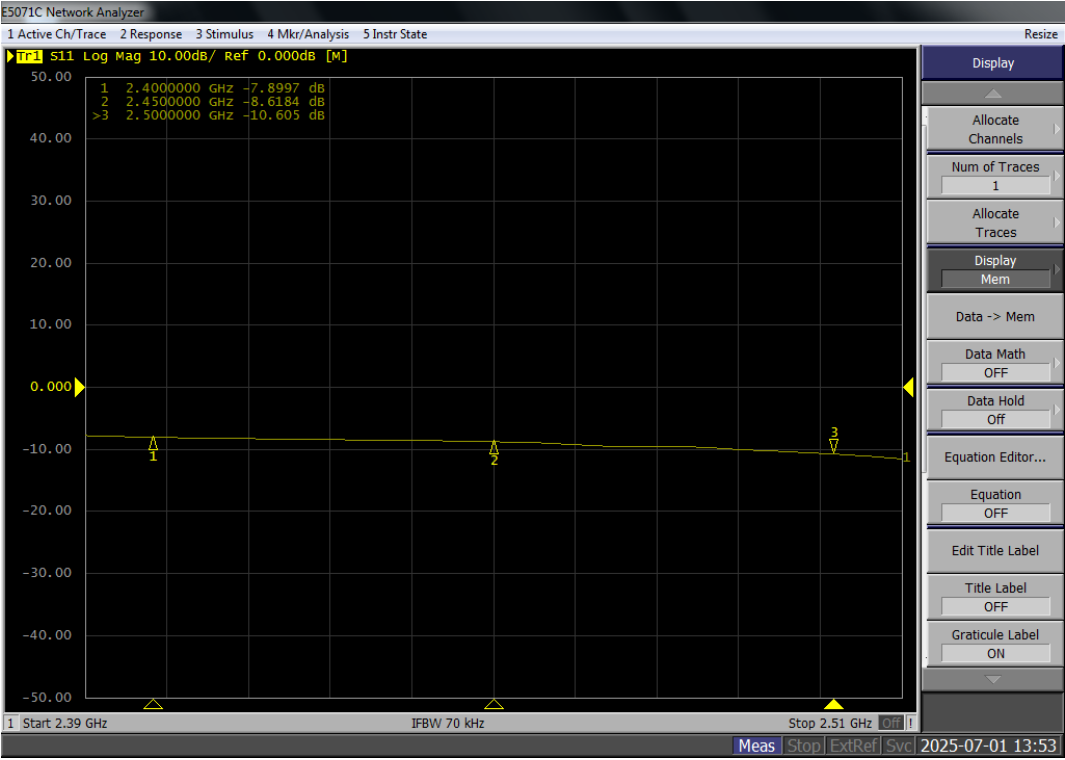


Smith Chart



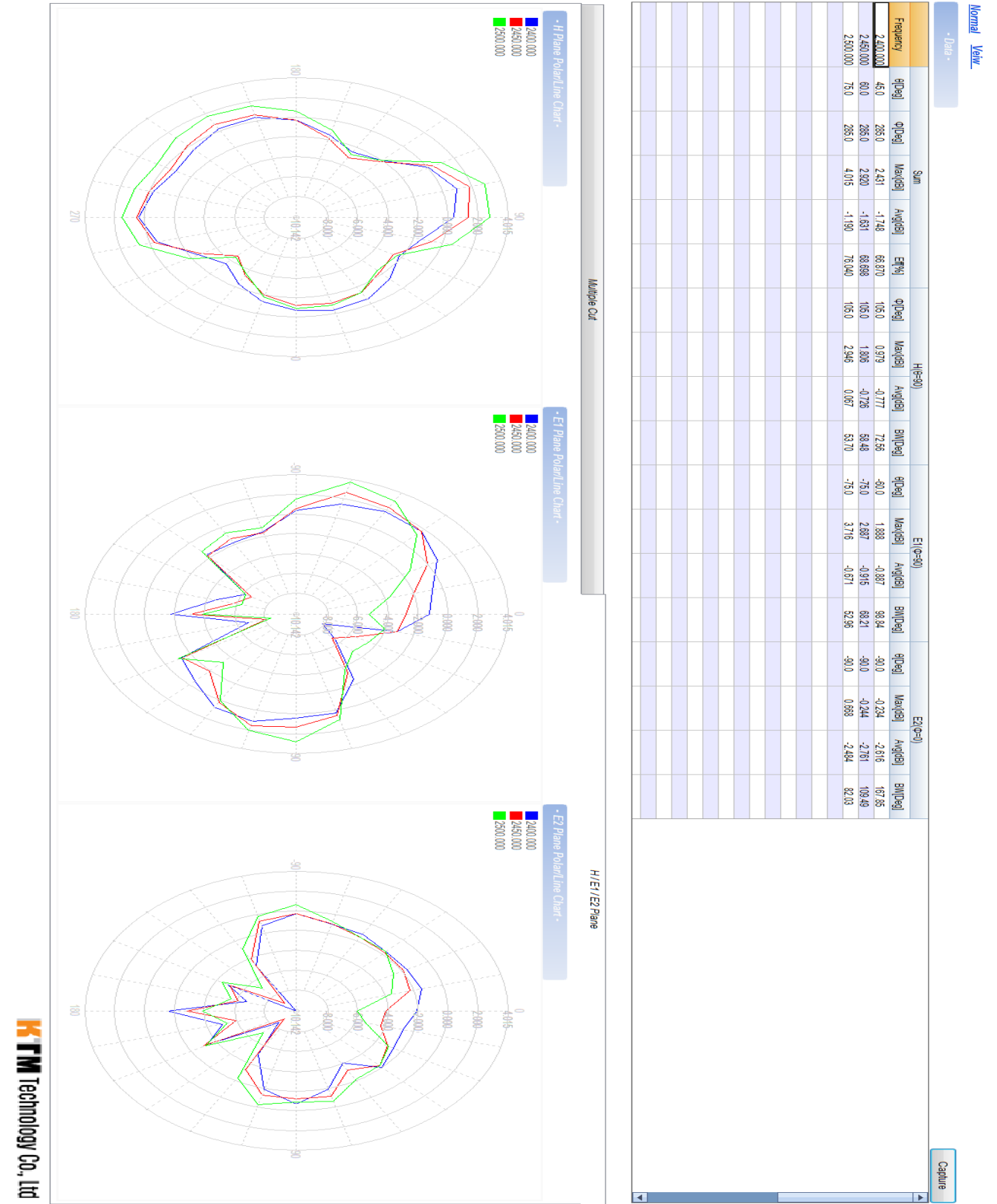
Eta Electronics	Description 2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

Return Loss



Eta Electronics	Description2.4Ghz ANT Product Specification			
	Specification No. Dipole	Customer.	Rev. 1.0	Date Jun 01 . 2025

8-2 Radiation Pattern 3D Data

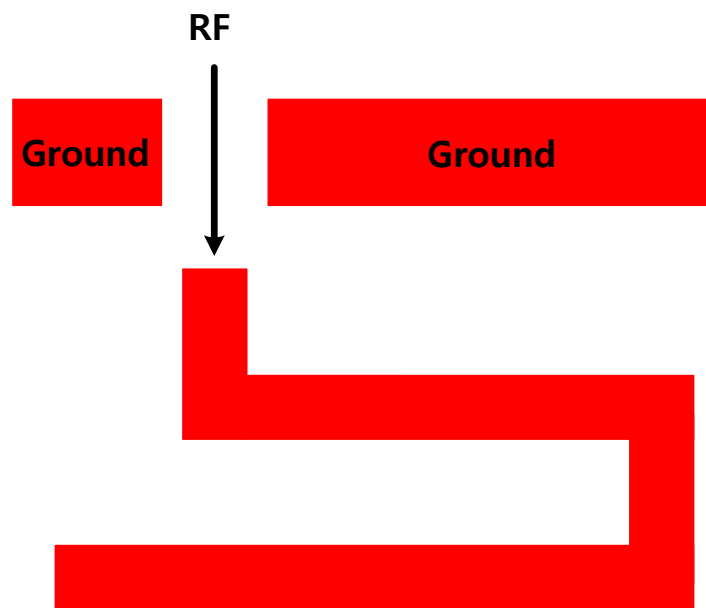


Antenna specifications

1. Electrical Characteristics Description

Antenna Type	Pattern Antenna (PCB antenna)
Frequency Range	2400MHz ~ 2480MHz
Antenna Gain / Direction	-2.36dBi / non-directional
Manufacturer	Etaelec Inc.

2. Shape

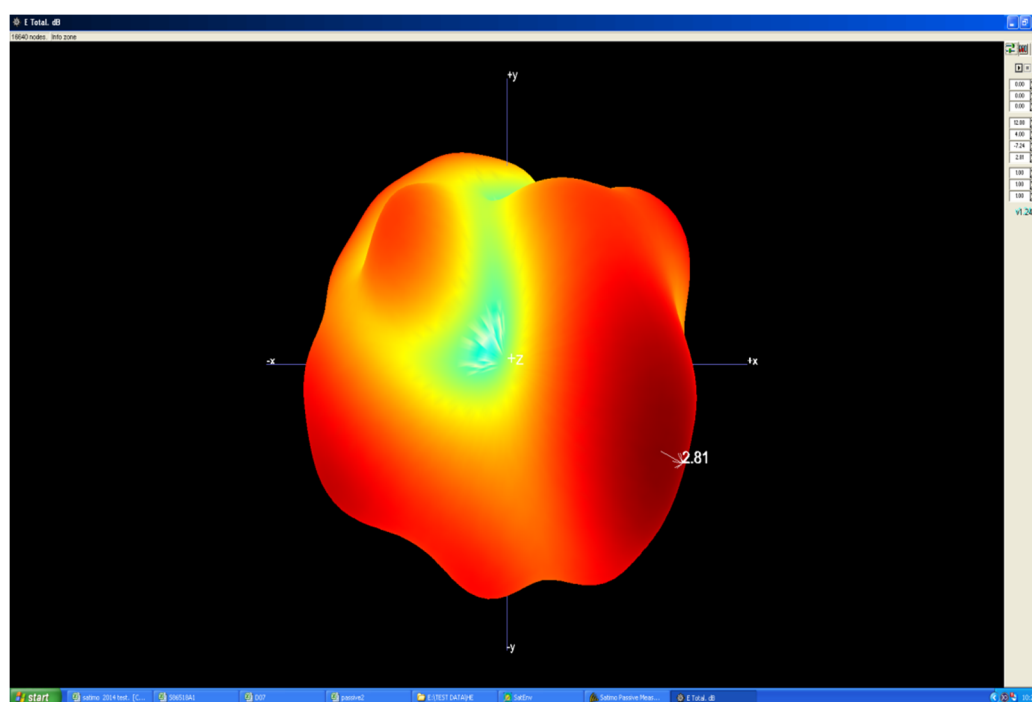


3. Emission efficiency and gain

Frequency	Efficiency	Gain
2400	55%	-2.63
2410	55%	-2.58
2420	58%	-2.39

2430	58%	-2.37
2440	56%	-2.54
2450	56%	-2.50
2460	58%	-2.36
2470	56%	-2.49
2480	54%	-2.65
2490	55%	-2.62
2500	54%	-2.67

4. Radiation diagram



5. S11 test result

