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SPECIFICATION FOR APPROVAL

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CUSTOMER PART NO.	SUPPLIER PART NO	SPECIFICATIONS
0D21-1400-0126	CW-NZ-0148	WIFI antenna, dual band-2.4/5G-black 1.13 Double tin cable, IPEX MHF1, cable length 140mm, stamping parts: 40×8.4×7.5mm
CUSTOMER	SUPPLIER	
Tongnuo Ezhou Electronics Co., Ltd	Suzhou Cowin Antenna Electronics Co., Ltd.	

NOTE:

1. Compliance with customer requirements
2. RoHS compliance
3. Stamp the company seal
4. All components must not contain harmful substances prohibited by ROHS
5. Any change in specification — particularly involving raw materials, tooling (molds), place of manufacture, labels, screen printing (artwork), or any other production-related engineering change — must receive prior written approval from Tongnuo (TN) before implementation.
6. Any engineering change to a component must be documented with a revision history. If applicable, the supplier must provide Tongnuo (TN) with an inventory report and management plan for any existing stock of the old/replaced material.

ADD:

TEL:0512-57382973 **FAX:0512-57382973**

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Supplier Countersignature

R&D	Quality	Engineer
Tian Wei	LiShaoqin	GeZhipeng
RELEASED DATE	VERSION	Approval
2024/06/19	1	Terry

Customer Countersignature

DATE	R&D	Approval

Revision History

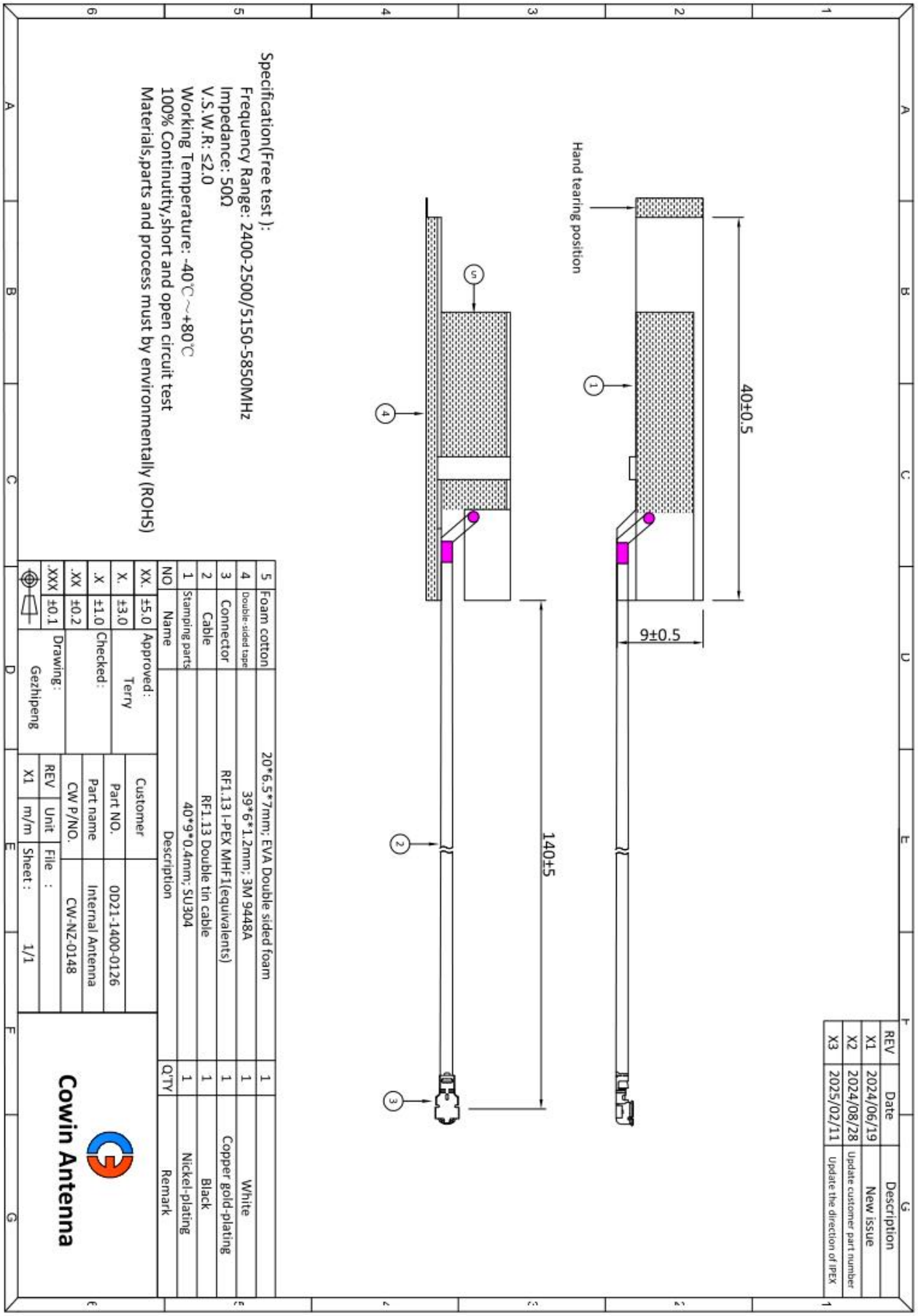
Edition	Date	Description	PREPARED	APPROVAL
1	2024-06-19	New issue	Ge zhipeng	Terry
2	2024-08-28	Update customer part number	Ge zhipeng	Terry
3	2025-02-12	Update the direction of IPEX	Ge zhipeng	Terry

Catalog

SPECIFICATIONS： WIFI antenna, dual band-2.4/5G-black 1.13 Double tin cable, IPEX MHF1, cable length 140mm, stamping parts: 40×8.4×7.5mm

Total Pages：17

4. Product drawing

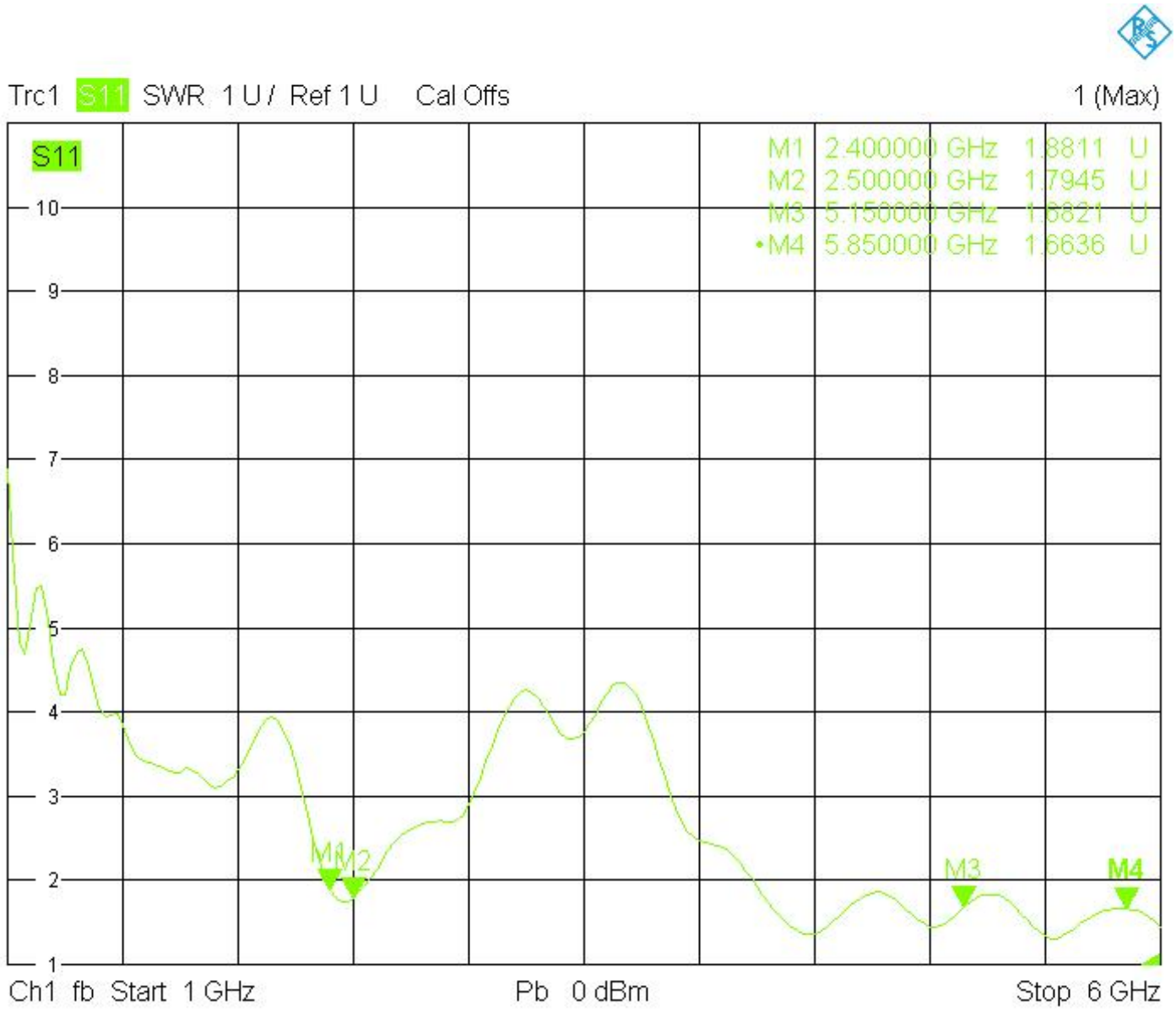


5. Performance parameter table

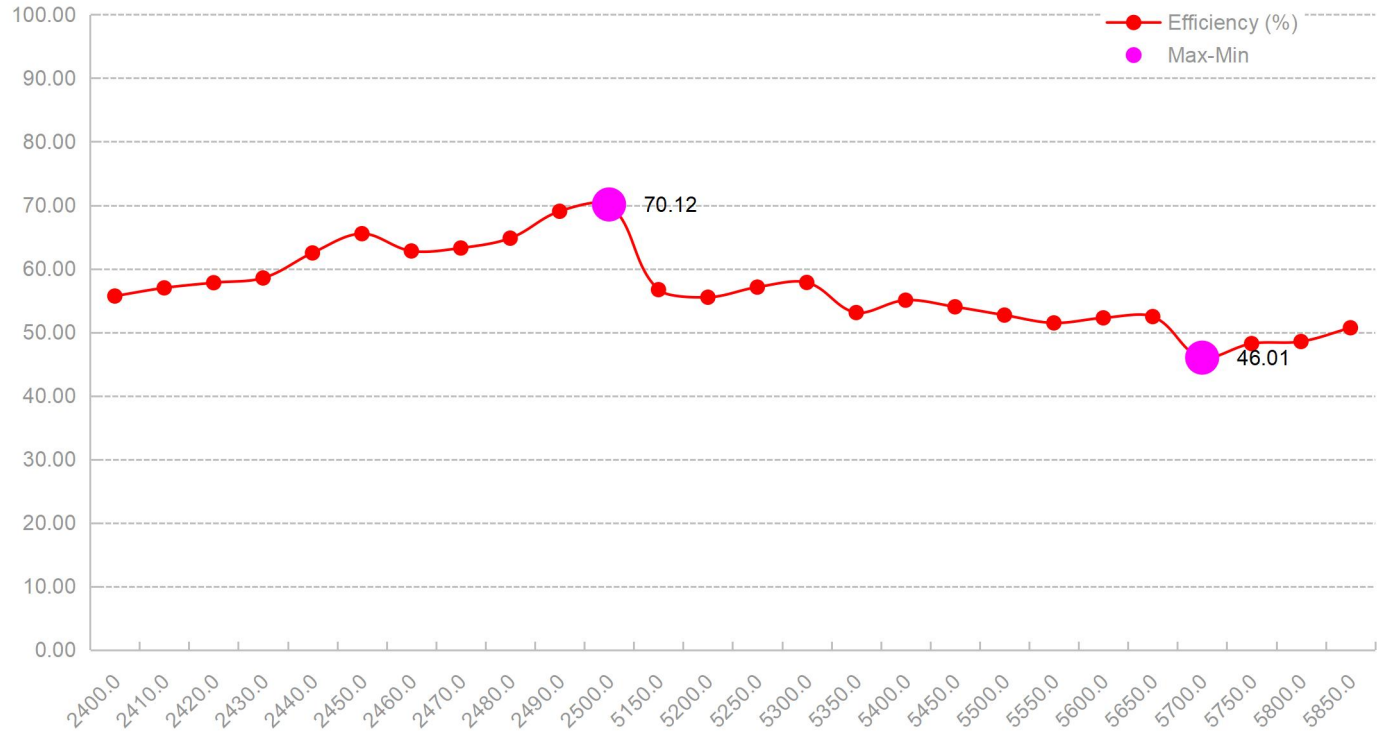
Sample photo		
		
A.Electrical Characteristics		
Frequency	2.4G-2.5G	5.15G-5.85G
V.S.W.R	≤2.0	
Peak Gain	4.01dBI	3.31 dBI
Impedance	50 Ohm	
Radiation	Omni-directional	
Polarization	Linear	
Admitted Power	<10W	
B.Material & Mechanical Characteristics		
Internal structure	SU304	
External structure	N/A	
Cable Type	RF 1.13 Black	
Connector Type	IPEX MHF1	
C.Environmental Characteristics		
Operation Temperature	- 40 ˚C ~ + 80 ˚C	
Storage Temperature	- 40 ˚C ~ + 80 ˚C	
Antenna Storage life	10 year	

6. Electrical performance test

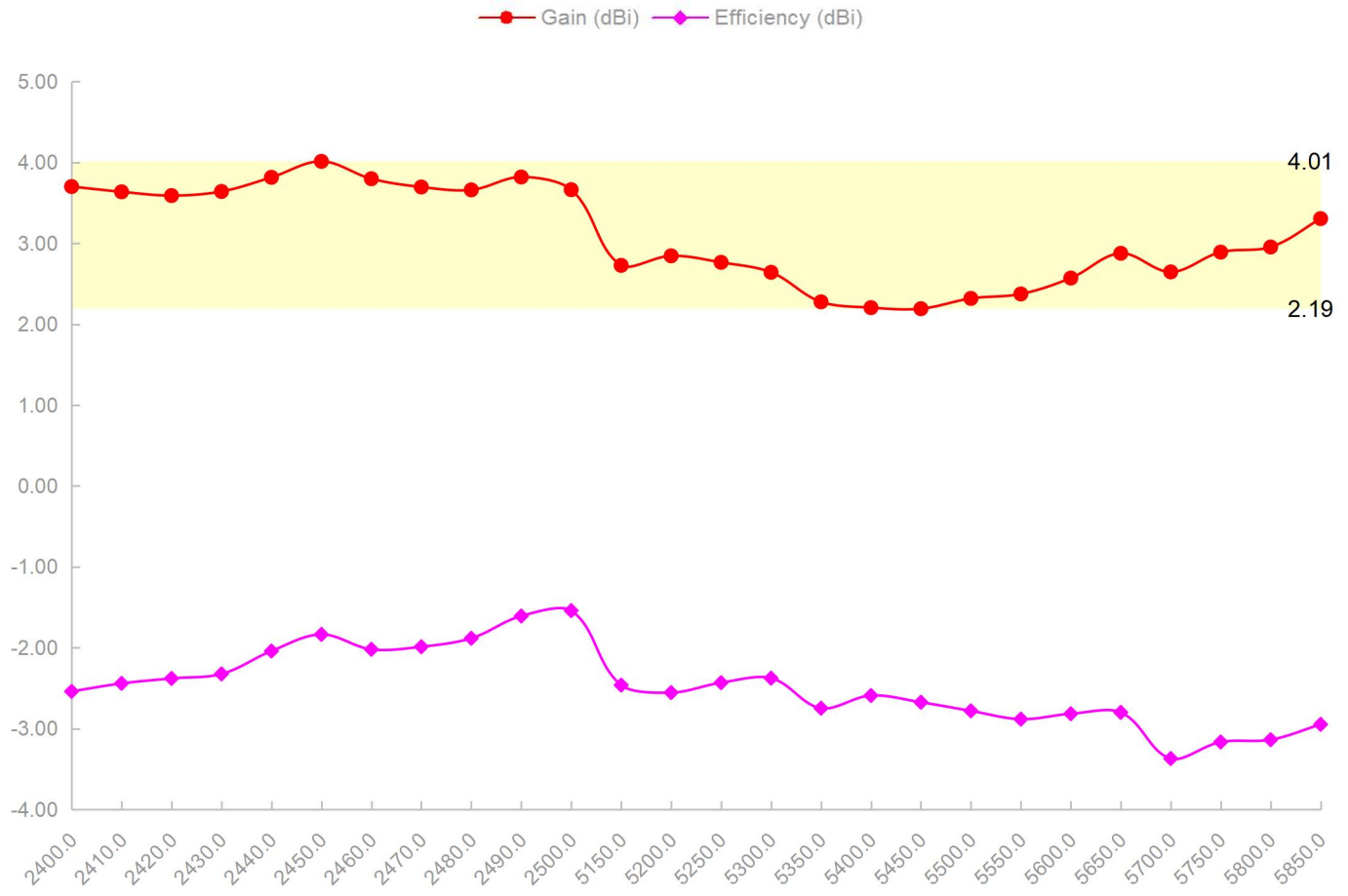
6.1 VSWR



6.2 Efficiency



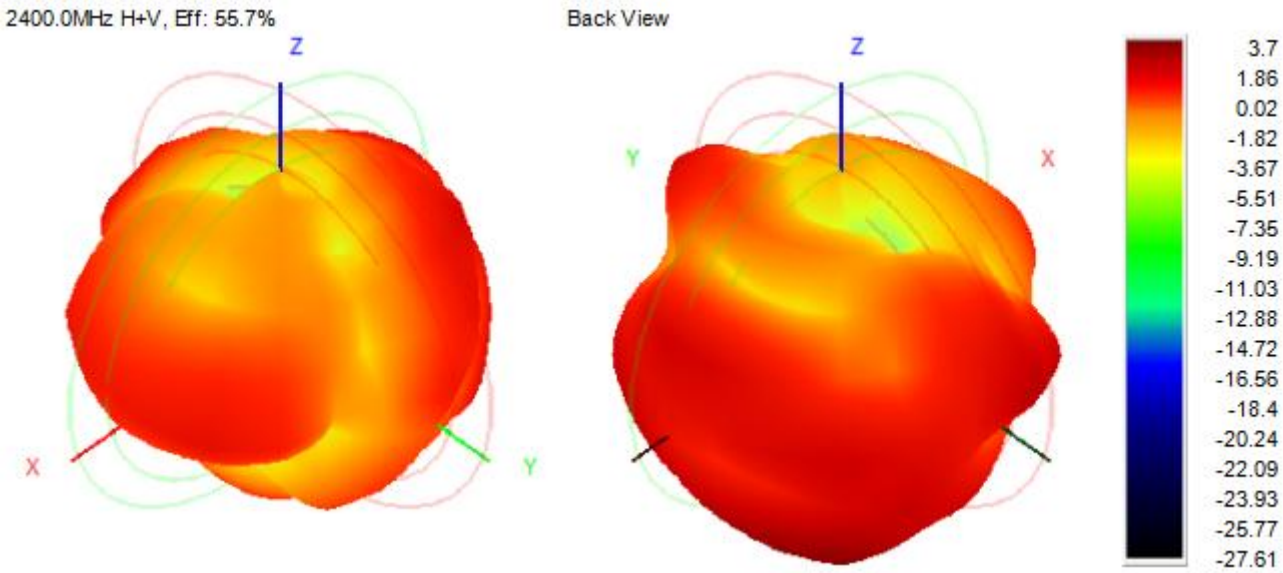
6.3 Peak gain

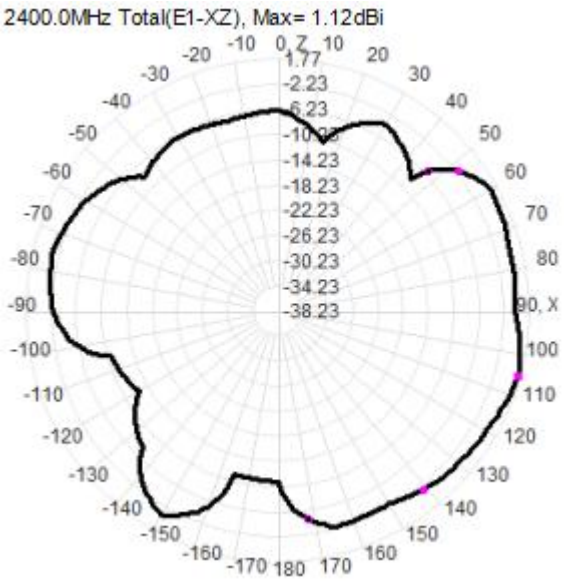


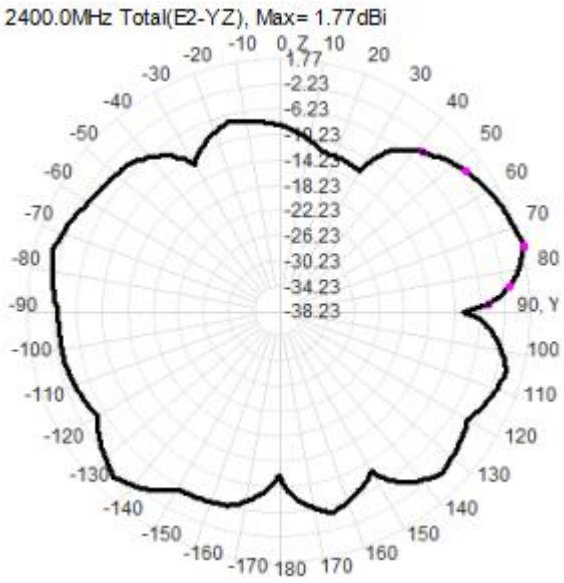
6.4 Data summary

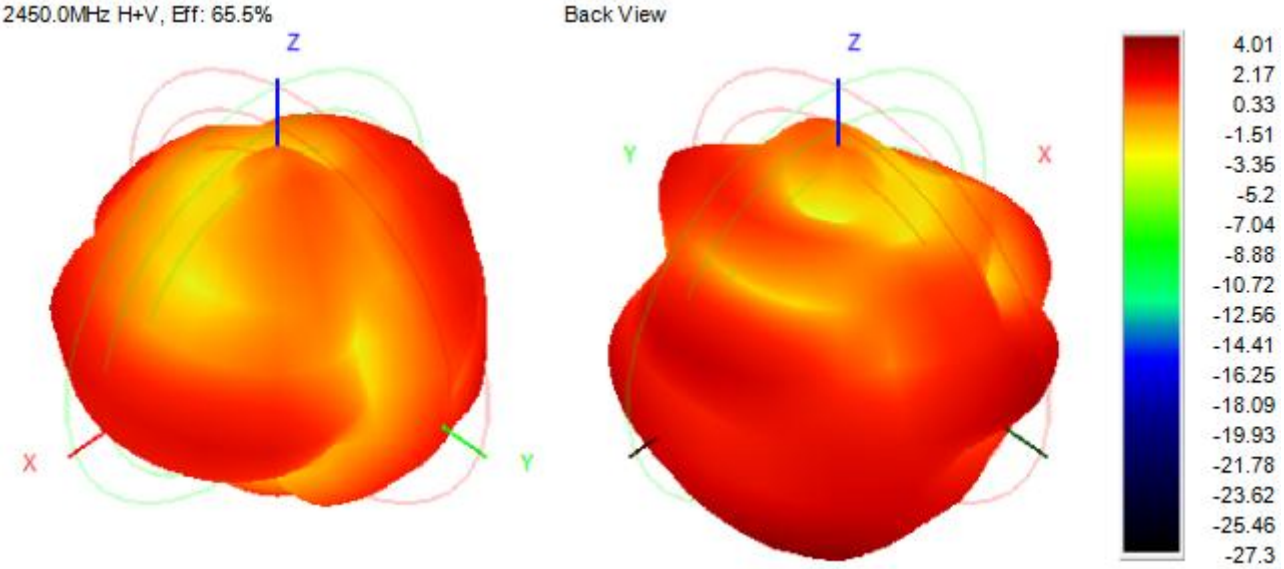
Frequency MHz	Gain dBi	Efficiency %
2400.0	3.70	55.71
2410.0	3.64	56.99
2420.0	3.59	57.81
2430.0	3.64	58.55
2440.0	3.82	62.49
2450.0	4.01	65.52
2460.0	3.80	62.80
2470.0	3.70	63.26
2480.0	3.66	64.81
2490.0	3.82	69.04
2500.0	3.66	70.12
5150.0	2.73	56.71
5200.0	2.85	55.52
5250.0	2.77	57.11
5300.0	2.64	57.85
5350.0	2.28	53.11
5400.0	2.21	55.06
5450.0	2.19	54.01
5500.0	2.32	52.71
5550.0	2.37	51.48
5600.0	2.57	52.27
5650.0	2.88	52.48
5700.0	2.65	46.01
5750.0	2.89	48.23
5800.0	2.96	48.55
5850.0	3.31	50.71

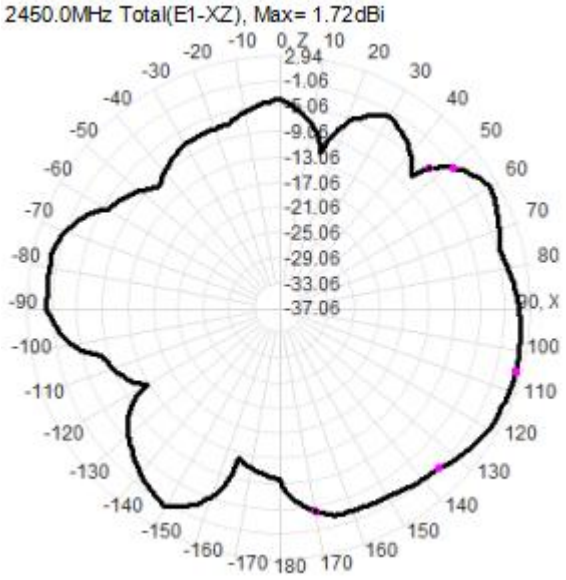
6.5 3D&2D Radiation Patterns

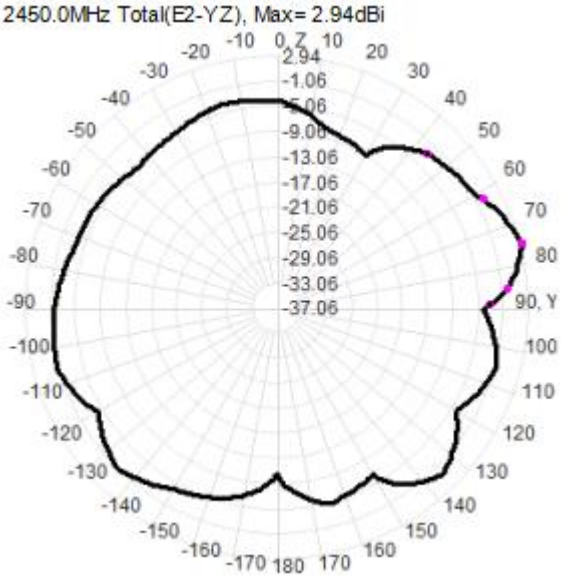


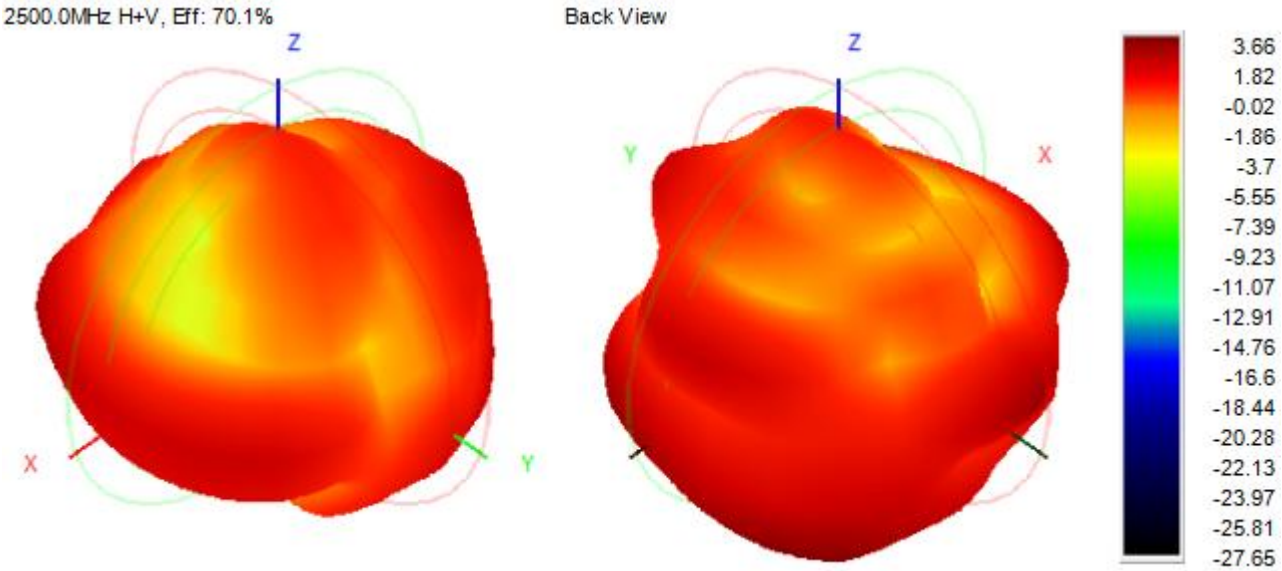


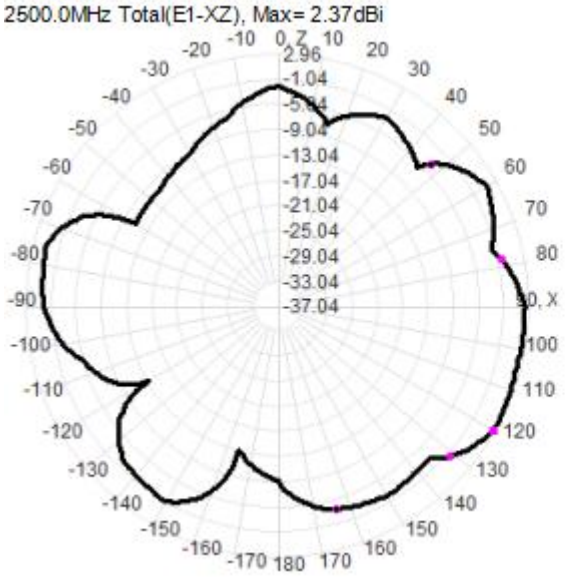


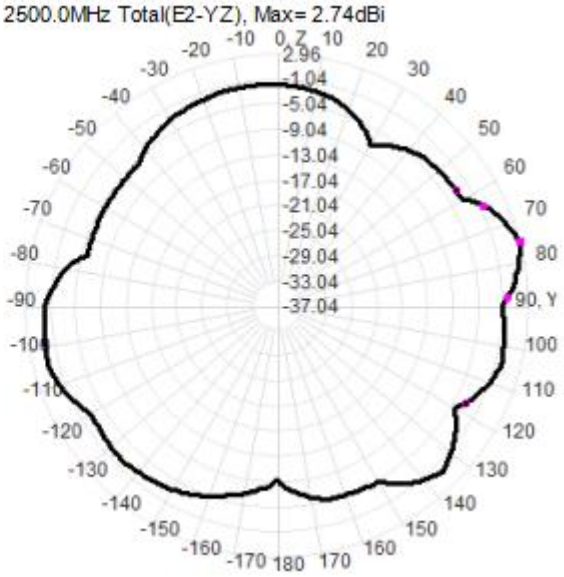

2450.0MHz H+V, Eff: 65.5%
Z
X
Y
Back View
Z
Y
X
4.01
2.17
0.33
-1.51
-3.35
-5.2
-7.04
-8.88
-10.72
-12.56
-14.41
-16.25
-18.09
-19.93
-21.78
-23.62
-25.46
-27.3

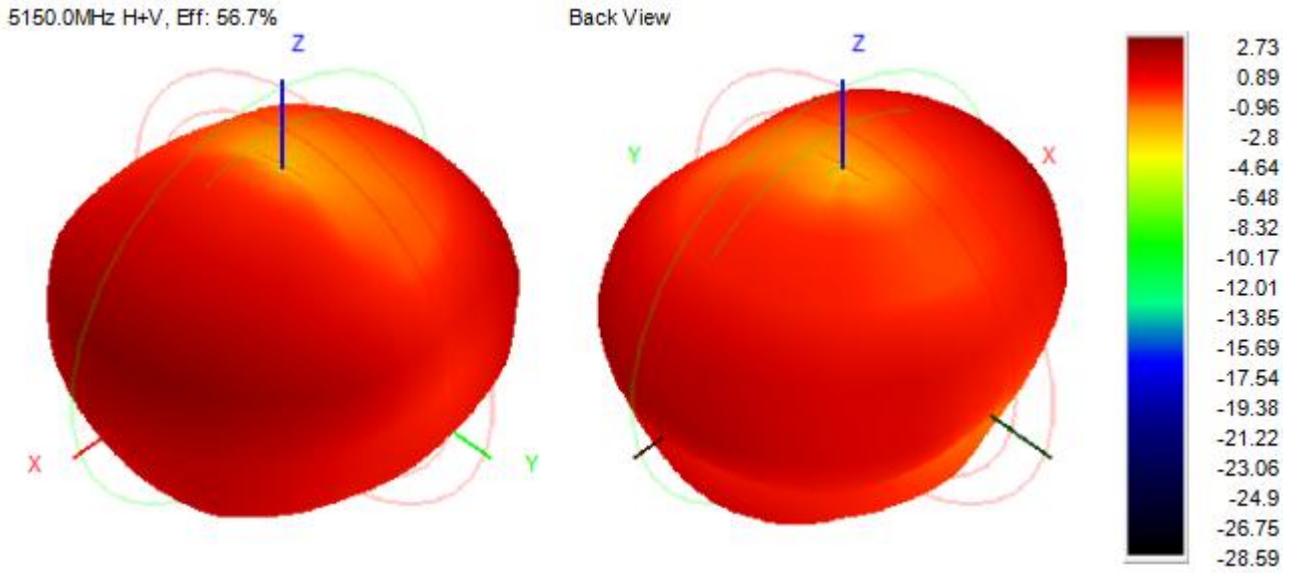

2450.0MHz Total(E1-XZ), Max= 1.72dBi
2.94
-1.06
-5.06
-9.06
-13.06
-17.06
-21.06
-25.06
-29.06
-33.06
-37.06
0, Z
90, X

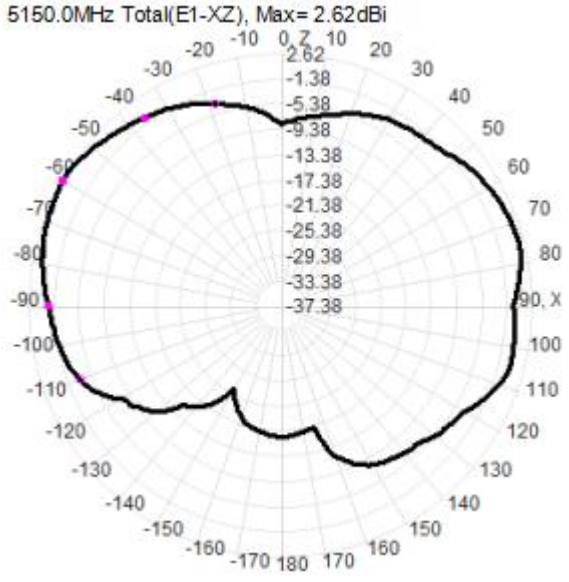

2450.0MHz Total(E2-YZ), Max= 2.94dBi
2.94
-1.06
-5.06
-9.06
-13.06
-17.06
-21.06
-25.06
-29.06
-33.06
-37.06
0, Z
90, Y

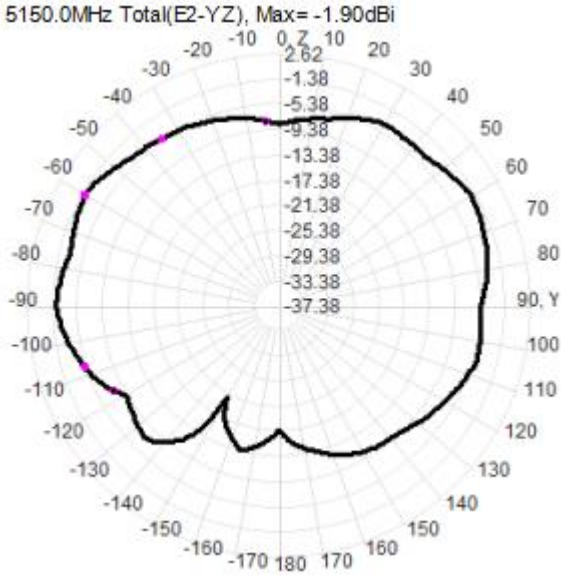

2500.0MHz H+V, Eff: 70.1%
Z
X
Y
Back View
Z
Y
X
3.66
1.82
-0.02
-1.86
-3.7
-5.55
-7.39
-9.23
-11.07
-12.91
-14.76
-16.6
-18.44
-20.28
-22.13
-23.97
-25.81
-27.65

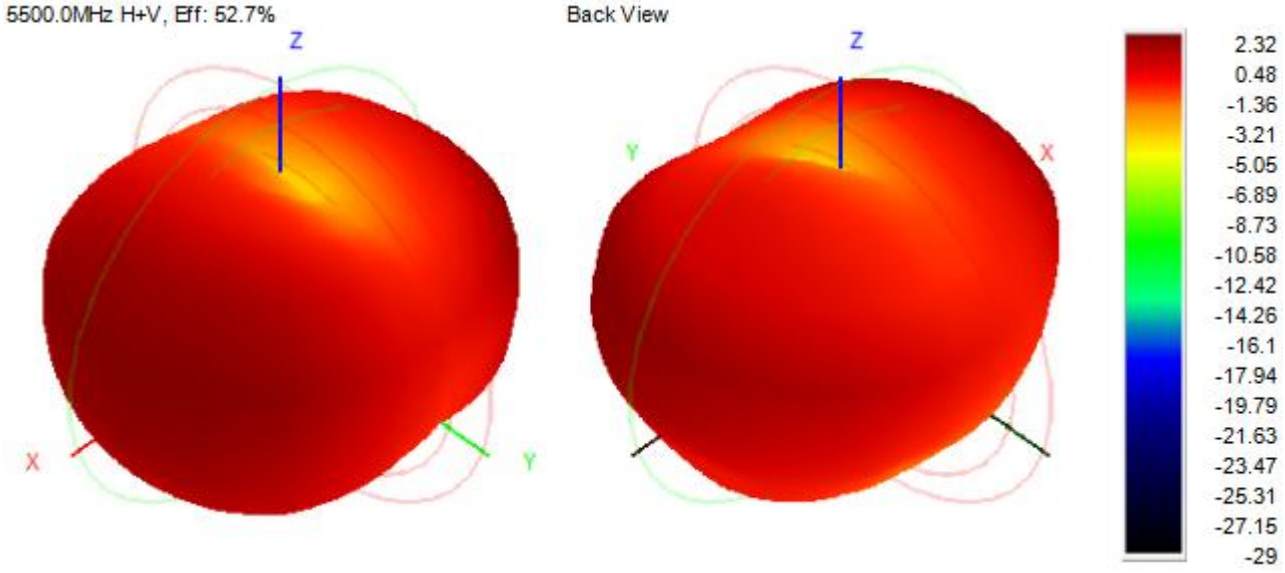

2500.0MHz Total(E1-XZ), Max= 2.37dBi
2.96
-1.04
-5.04
-9.04
-13.04
-17.04
-21.04
-25.04
-29.04
-33.04
-37.04
90, X

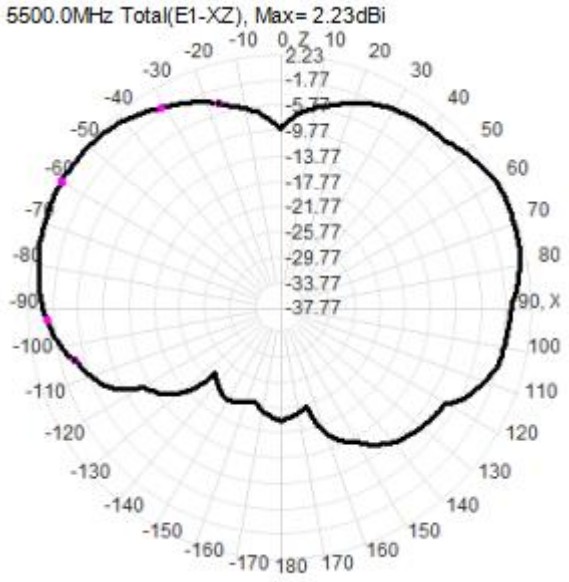

2500.0MHz Total(E2-YZ), Max= 2.74dBi
2.96
-1.04
-5.04
-9.04
-13.04
-17.04
-21.04
-25.04
-29.04
-33.04
-37.04
90, Y

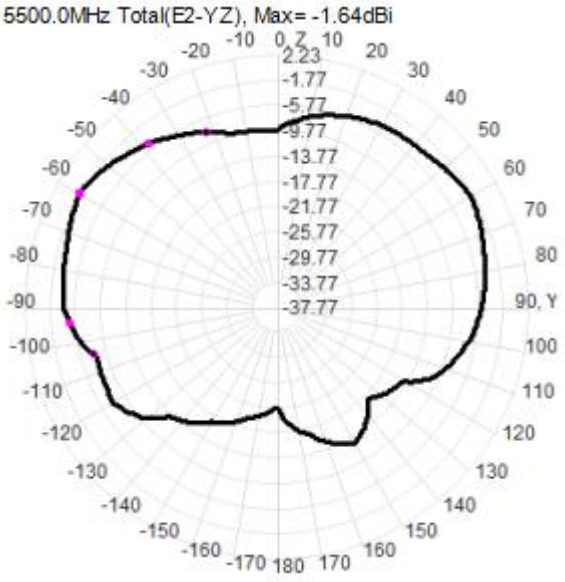

5150.0MHz H+V, Eff: 56.7%
Z
X
Y
Back View
Z
Y
X
2.73
0.89
-0.96
-2.8
-4.64
-6.48
-8.32
-10.17
-12.01
-13.85
-15.69
-17.54
-19.38
-21.22
-23.06
-24.9
-26.75
-28.59

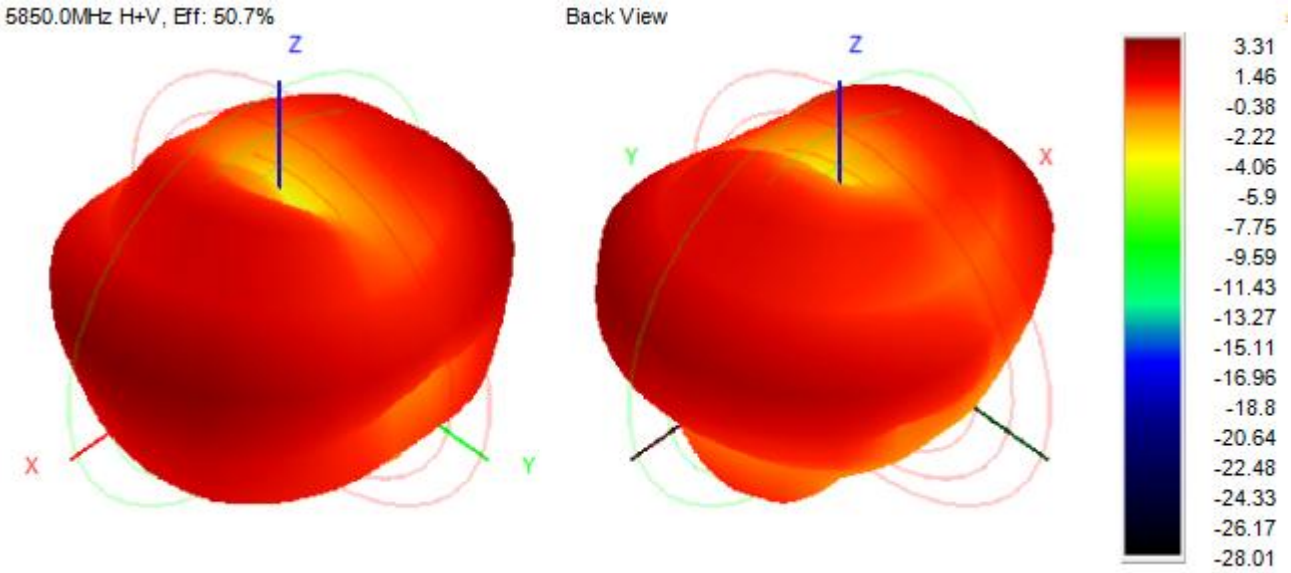

5150.0MHz Total(E1-XZ), Max= 2.62dBi
2.62
-1.38
-5.38
-9.38
-13.38
-17.38
-21.38
-25.38
-29.38
-33.38
-37.38
90, X

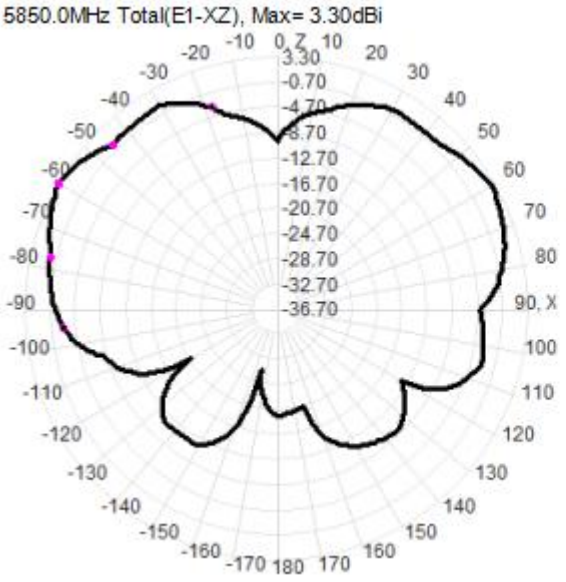

5150.0MHz Total(E2-YZ), Max= -1.90dBi
2.62
-1.38
-5.38
-9.38
-13.38
-17.38
-21.38
-25.38
-29.38
-33.38
-37.38
90, Y

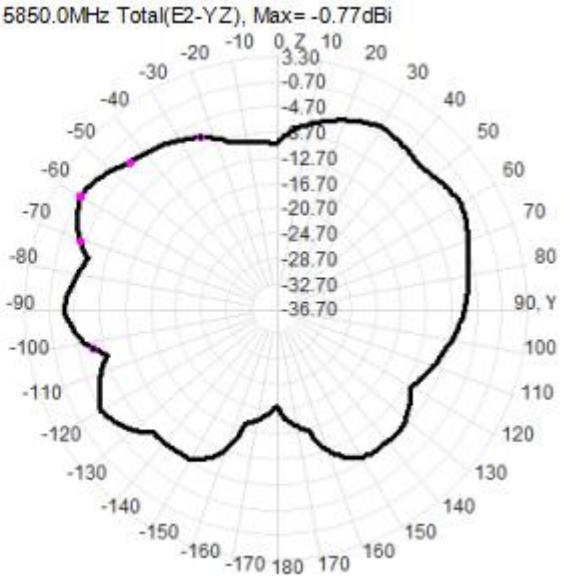

5500.0MHz H+V, Eff: 52.7%
Z
X
Y
Back View
Z
Y
X
2.32
0.48
-1.36
-3.21
-5.05
-6.89
-8.73
-10.58
-12.42
-14.26
-16.1
-17.94
-19.79
-21.63
-23.47
-25.31
-27.15
-29


5500.0MHz Total(E1-XZ), Max= 2.23dBi
2.23
-1.77
-5.77
-9.77
-13.77
-17.77
-21.77
-25.77
-29.77
-33.77
-37.77
90, X


5500.0MHz Total(E2-YZ), Max= -1.64dBi
2.23
-1.77
-5.77
-9.77
-13.77
-17.77
-21.77
-25.77
-29.77
-33.77
-37.77
90, Y


5850.0MHz H+V, Eff: 50.7%
Z
X
Y
Back View
Z
Y
X
3.31
1.46
-0.38
-2.22
-4.06
-5.9
-7.75
-9.59
-11.43
-13.27
-15.11
-16.96
-18.8
-20.64
-22.48
-24.33
-26.17
-28.01


5850.0MHz Total(E1-XZ), Max= 3.30dBi
3.30
-0.70
-4.70
-8.70
-12.70
-16.70
-20.70
-24.70
-28.70
-32.70
-36.70
90, X


5850.0MHz Total(E2-YZ), Max= -0.77dBi
3.30
-0.70
-4.70
-8.70
-12.70
-16.70
-20.70
-24.70
-28.70
-32.70
-36.70
90, Y

7. Characteristic and reliability test

Test Items		Test Condition and Procedure	Requirements	Result
A1	V.S.W.R.	Set DUT on Network Analyzer; make individual calibration to test	Directive DUT specification	PASS
A2	Insertion Loss	Set DUT on Network Analyzer; make individual calibration to test	Directive DUT specification	N/A
A3	Antenna Gain	Set DUT on Antenna Chamber; make individual calibration to test	Directive DUT specification	PASS
A4	Voltage Breakdown	Test voltage should be applied between insulated portions, or between ground as specified.	Max Voltage ≥ 500 V or directive material	N/A
A5	Insulation Resistance	Set Voltage: 500 ± 50V; between the insulated portions, or between ground as specified.	Resistance ≥500 M ohm or directive material specification	N/A
A6	Contact Resistance	Air Temp: 26°C; measured with test equipment	Directive material specification	N/A
B1	Vibration	GB / T2423.48-2008 Amplitude: 0.03 inch 1.5mm; Freq: 20 to 80 to 20Hz 3 directions; 2 hours for each direction	1. No Visual Damage 2. Frequency Tol. ≤5%	PASS
B2	Random Drop	GB / T2423.8-1995 Single ： Height: 1.0 Meter; 3 directions; 1 time for each direction	1. No parts separated 、 fracture 2. Frequency Tol. ≤5%	PASS
		Packing ： Height: 0.76 Meter; 1 corner, 3 edges, 6 surface		PASS
		Antenna+Machine:Height: 0.76 Meter; 1 corner, 3edges, 6 surface		N/A
B3	Solderability	GB / T2423.28-2005 Temp: 260 ±5 °C;Duration: 5 seconds	Tin evenly on full	PASS
B4	Pull Test	Holding with individual specification; force applied to axis of terminal	1. Directive DUT specification 2. Frequency Tol. ≤5%	PASS

B5	Torque Test	Holding with individual specification; applied clockwise and counterclockwise to the axis of terminal	1. Directive DUT specification 2. Frequency Tol. ≤5%	N/A
B6	Dimension	Inspection of dimension, color, material, package,surface proces	Directive DUT specification	PASS
C1	Waterproof	With Reference to IEC 60529 // IP Code Definition	Directive DUT specification	N/A
C2	Salt Spray	GB / T 2423.17-2008 Temp: 35°C; RH: ≥95%; NaCl solution: ≥5%;Time: 24H	1. No Visual Damage 2. Frequency Tol. ≤5%	PASS
C3	Temperature and Humidity Chamber	GB / T 2423.3-2006 Temp: 80°C / 12 H; -40°C / 12H RH: ≥90%; Time:24H	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol. ≤5%	PASS
C4	Thermal Shock	GB / T 2423.22 - 2008 - 40°C 30 minutes to + 80°C 30 minutes ； Cycles:24	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol. ≤5%	PASS
C5	Aging test	GB /T 2423.2 - 2008 Temp: 80°C; Time: 24 hours	1. No Visual Damage 2. Frequency Tol. ≤5%	PASS
C6	High Temp	Temp. 270± 10° C ； Times ： 120 seconds	1. No Visual Damage 2. Frequency Tol. ≤5%	N/A
D1	ROHS	With Reference to IEC 62321:2008 with flow chart	Directive RoHS 2011/65/EU	PASS
D2	PFOS	With Reference to USA EPA 3550C:1996 by LC/MS	Directive RoHS 2006/122/EC	PASS

8. Material composition and ROHS test

Item	Material name	Material	ROHS test results						Number	Date
			CD	PD	Hg	CRVI	PBBs	PBDEs		
1	CABLE	FEP	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.		
		PTFE	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.		
		Tinned copper		N.D.	N.D.	N.D.	N.D.	N.D.		
2	Stainless steel parts	SU304	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.		
		Nickel	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.		
3	IPEX	Copper	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.		
		Gold	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.		
		PTFE	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.		

According to the test report, fill in the content of six prohibited substances including lead, cadmium, mercury, hexavalent chromium, PBBs and PBDEs

The total content of lead, cadmium, mercury and hexavalent chromium in packaging materials shall not exceed 100ppm, and the allowable concentration of cadmium is 5ppm

According to the exemption clause of RoHS directive 2011 / 65 / EU, the content of lead in alloy elements in steel is 0.35%, the content of aluminum is 0.4%, and the content of lead in copper alloy is 4%