

APPROVAL SHEET

To Our Valued Customer :

Model	CM724
Customer Part Number	
Product	2.4G-FPC-Antenna
Part Number	F1-000006
Issued Date	2024-5-30

CUSTOMER

QUALITY DEPT	ENGINEER R&D DEPT	APPROVED

Fbetter

WRITTEN BY	ENGINEER R&D DEPT	APPROVED
chen sha li	Tan zhi yang	Ye xiao yu

Index

一、	Cover	1
二、	Index	2
三、	Antenna Introduction	3
四、	Test Data	4-5
五、	Antenna definition and practical formulas	6-7
六、	Test Equipment & Conditions	8-9
七、	Product Drawine	10
八、	TEE PACKING WAY	11

Part No. CM724

WLAN / BT / Zigbee / Tunable Embedded FPC Antenna

2.4 GHz

Supports: Wi-Fi applications, Agriculture, Bluetooth, Zigbee, WLAN, Smart Home, Healthcare, Digital Signage



BT antennas deliver on the key needs of device designers for higher functionality and performance in smaller/thinner designs. These innovative antennas provide compelling advantages for a 2.4 GHz

Real-World Performance and Implementation

Antennas may look alike on the outside, but the important difference is inside. Other antennas may contain simple PIFA or monopole designs that interact with their surroundings, complicating layout or changing performance with use position. These antennas utilize patented Isolated Magnetic IPAF (IMD) technology to deliver a unique size and performance combination.

FPC Wi-Fi Tunable Embedded Antenna with Cable

2.4 GHz;

The CM724 is offered in many standard cable lengths ranging from 40 mm up to 500 mm. Ordering part number guide is located at end of document for selection ease.

Electrical Specifications

Frequency (GHz)	2400-2480
Peak Gain	2.38 dBi
Average Efficiency	60%
VSWR Match	<2
Feed Point Impedance	50 ohms unbalanced
Polarization	Linear
Power Handling	2.0 Watt CW

KEY BENEFITS

AVX antenna

technology provides superior RF field containment, resulting in less interaction with surrounding components

Quicker Time-to-Market By optimizing antenna

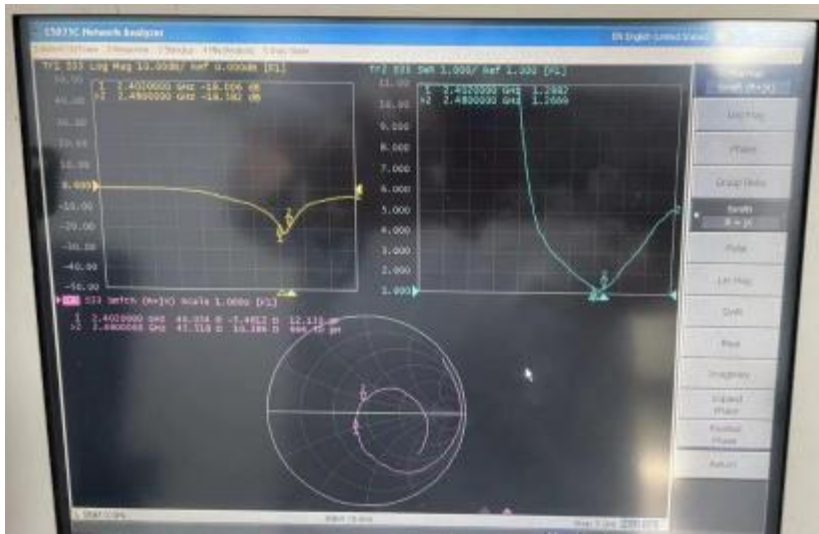
size, performance and emissions. customer and regulatory specifications are more easily met.

Environmental Compliance Products are the latest RoHS version compliant.

Mechanical Specifications

Ordering Part #	FPC
Dimensions (mm)	17.4*11.4*0.2mm
Cable/Connector (mm)	
Packaging	PE bags

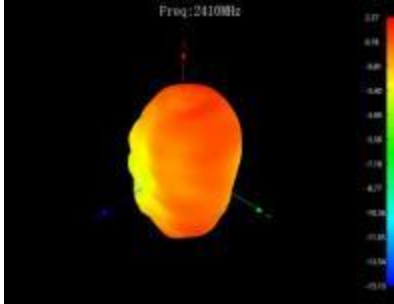
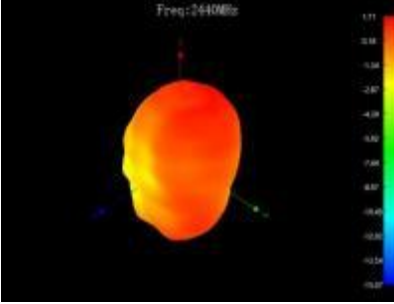
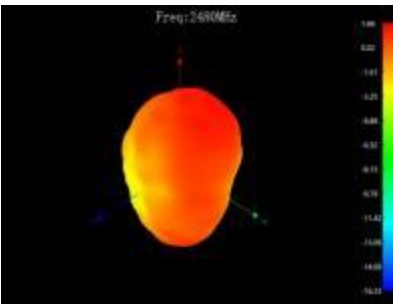
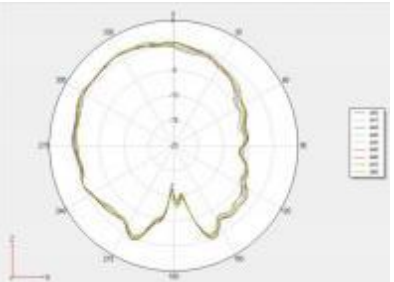
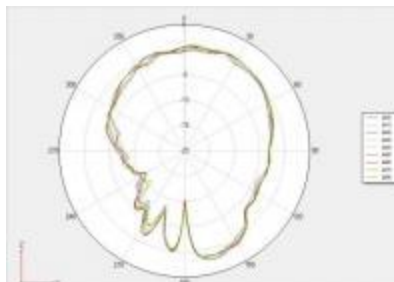
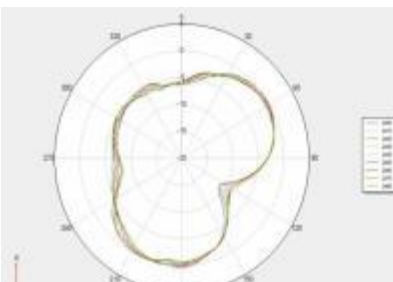
VSWR, Efficiency and Peak Gain Plots



Efficiency&Gain

Frequency/Mhz	Efficiency / %	MaxGain/dBi
2400	60.59	2.38
2410	60.67	2.37
2420	60.81	2.22
2430	60.67	1.94
2440	60.95	1.71
2450	60.05	1.5
2460	60.25	1.52
2470	60.01	1.44
2480	60.67	1.66

The measured antenna radiation direction map is @ 2400,2440 and 2480 MHz

Channel (MHz) 2400 ZX-Plane Total	Channel (MHz) 2440 ZX-Plane Total	Channel (MHz) 2480 ZX-Plane Total
		
Phi 02D	Phi 90 2D	Theta 90 2D
		

Antenna Definitions and Useful Formulas

VSWR – Voltage Standing Wave Ratio. VSWR is a unitless ratio that describes the power reflected from the

antenna back to the radio. A lower VSWR value indicates better antenna performance at a given frequency.

VSWR is easily derived from Return Loss.

$$VSWR = \frac{10^{\frac{Return\ Loss}{20}} + 1}{10^{\frac{Return\ Loss}{20}} - 1}$$

Return Loss– Return loss represents the loss in power at the antenna due to reflected signals, measured in

decibels. A lower return loss value indicates better antenna performance at a given frequency. Return Loss

is easily derived from VSWR.

$$Return\ Loss = -20 \log_{10} \left[\frac{VSWR - 1}{VSWR + 1} \right]$$

Efficiency (η) – The total power radiated from an antenna divided by the input power at the feed point of the antenna as a percentage.

Total Radiated Efficiency– (TRE) The total efficiency of an antenna solution comprising the radiation

efficiency of the antenna and the transmitted (forward) efficiency from the transmitter.

$$TRE = \eta \cdot \left(1 - \left(\frac{VSWR - 1}{VSWR + 1} \right)^2 \right)$$

Gain – The ratio of an antenna's efficiency in a given direction (G) to the power produced by a theoretical

lossless (100% efficient) isotropic antenna. The gain of an antenna is almost always expressed in decibels.

$$G_{db} = 10 \log_{10}(G)$$

$$G_{dBi} = G_{db} - 2.51dB$$

Peak Gain– The highest antenna gain across all directions for a given frequency range. A directional

antenna will have a very high peak gain compared to average gain.

Average Gain– The average gain across all directions for a given frequency range.

Maximum Power– The maximum signal power which may be applied to an antenna feed point, typically

measured in watts (W).

Reflected Power– A portion of the forward power reflected back toward the amplifier due to a mismatch at

the antenna port.

$$\left(\frac{VSWR - 1}{VSWR + 1} \right)^2$$

decibel (dB)- A logarithmic unit of measure of the power of an electrical signal.

decibel isotropic (dBi)- A comparative measure in decibels between an antenna under test and an isotropic radiator.

decibel relative to a dipole (dBd)- A comparative measure in decibels between an antenna under test and an ideal half-wave dipole.

Dipole - An ideal dipole comprises a straight electrical conductor measuring $1/2$ wavelength from end to end connected at the center to a feed point for the radio.

Isotropic Radiator- A theoretical antenna which radiates energy equally in all directions as a perfect sphere.

Omnidirectional - Term describing an antenna radiation pattern that is uniform in all directions. An

isotropic antenna is the theoretical perfect omnidirectional antenna. An ideal dipole antenna has a donut

shaped radiation pattern and other practical antenna implementations will have less perfect but generally

omnidirectional radiation patterns which are typically plotted on three axes.

Antenna RL measured on a 1.5 mm thick plate of Polycarbonate FIGURES (EXAMPLE)

Measurement Method of V. S. W. R

Test Equipment & Conditions

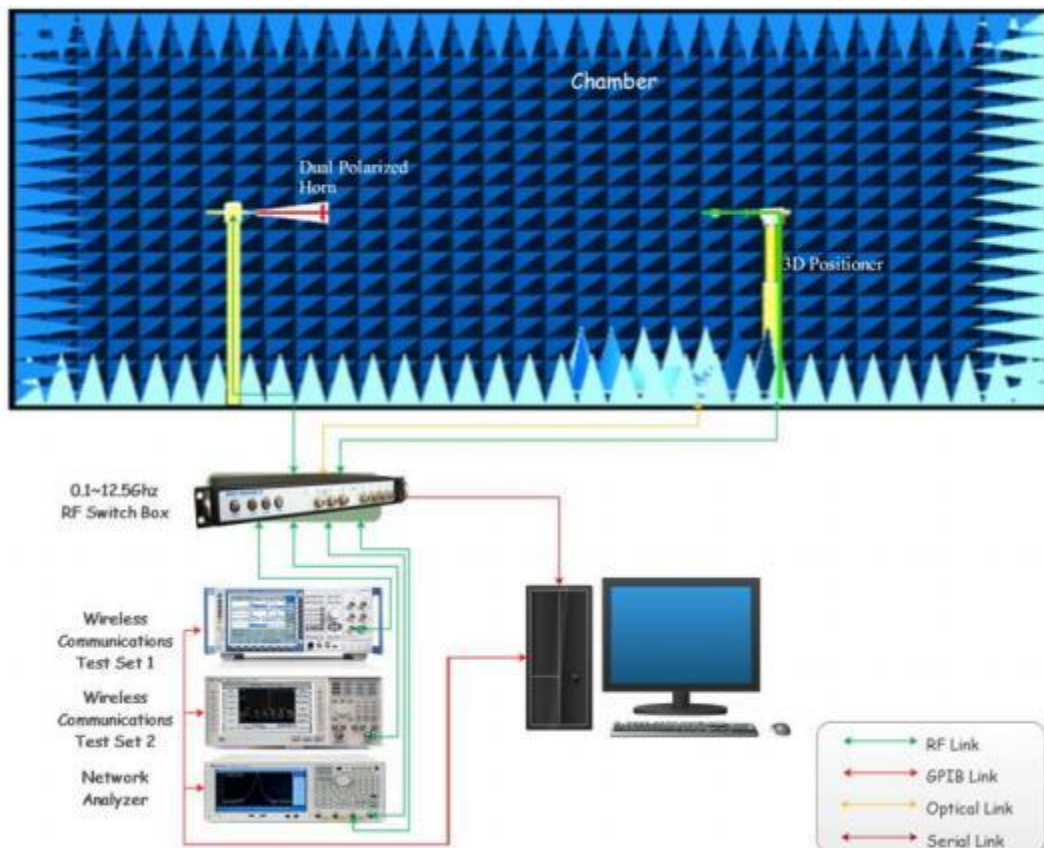
1. Network Analyzers :

Agilent 5071C

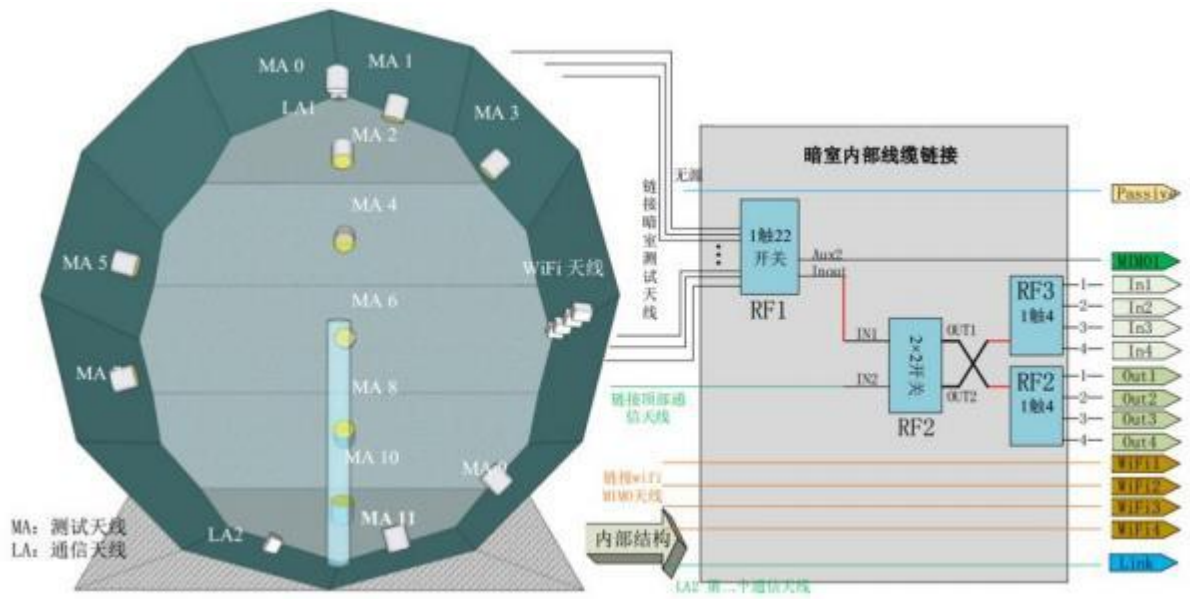
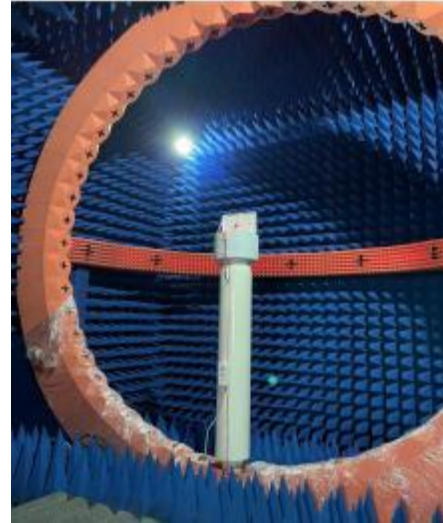
2. Communications Test Set:

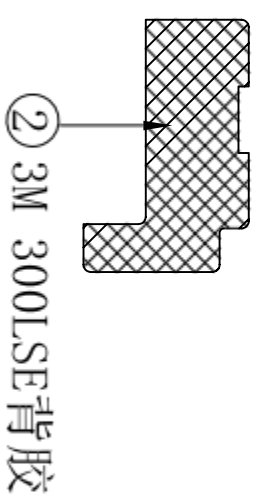
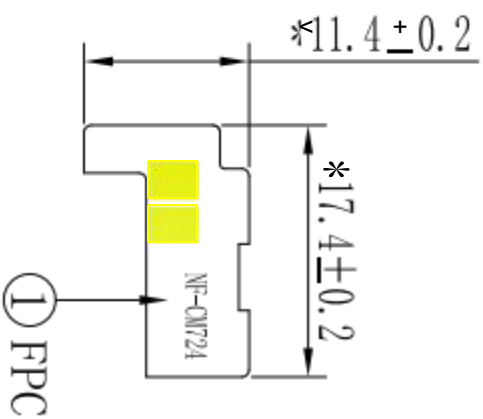
Agilent 8960




3. 3D Chamber Test System




Test the darkroom





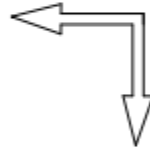
- NOTE:
- Standard * is the key dimension, Dimensions not marked with tolerance shall be tested according to ± 0.15 .
 - Refer to drawing without dimension; Other dimensions are subject to actual matching.
 - The material is electrolytic copper+PI, and the overall thickness is less than 0.07mm.
 -  The R outing area,  The gold-plating,
 -  The 3M300LSE gum
 - The surface must not have oxidation, notches, foreign objects, dirty spots, misalignment, or other phenomena.
 - accord with ROHS.

①							
②	3M Gum	3M 300LSE	transparent	1			
③	FPC	PI+Electrolytic copper	black	1			
NO	Name	Material	Colour	Amount	Remark		

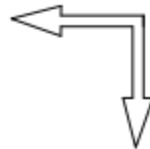
	Third angle system	Project	CM724	Date	2024-05-23		
	Tolerance standards	Part Name	Antenna	M D	MR GU		
	10以下	±0.10		Part NO	F1-000006		
	10~20	±0.12		work art	Electrogold		
	20~40	±0.15		40以上	±0.20	∇	0.02
Do not measure the drawings		Scale	1:1	unit	mm	Rea	R1

Product packaging specification

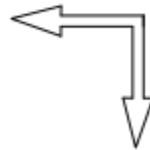
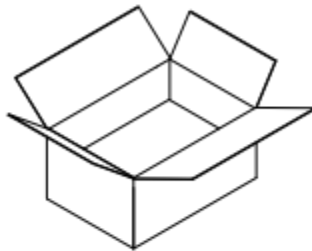
一: Antenna products



二: Put them in PE bags, quantity is packed in (50 100pcs)
, Subject to the actual situation



三: Put the antenna in the carton



四: Seal the box and paste the production label and RoHS label on the outer box(actual situation shall prevail)

