HX-CSX161A Built-in measurement antenna

HX-CSX161A is a four-system full-frequency built-in measurement antenna covering GPS, GLONASS, BDS and GALILEO, and it is compatible with 4G and BT working bands to meet the current demand for multi-system compatibility of measurement equipment. It can be widely used in geodetic surveying and mapping, marine surveying, channel surveying, dredging surveying, earthquake monitoring, bridge deformation monitoring, landslide monitoring, container operation at the dock, etc.

Perfect compatibility between systems

The GNSS antenna and 4G, BT antenna do compatible integration, easy to RTK machine manufacturers to integrate the design. And for each system antenna isolation between the depth of optimization, systematic solution has been plagued by RTK receiver electromagnetic compatibility problems, so that the RTK machine design work is simplified, the product is stable and reliable.

Key Features

- Support GNSS four system full band signal
- Support 4G, BT
- Strong anti-interference ability, can withstand harsh working environment
- Good electromagnetic compatibility, small antenna size, easy product integration

Highly stable phase center

The antenna part adopts multi-feed point design scheme to realize the coincidence of phase center and geometric center, which reduces the influence of antenna on measurement error to the minimum. 4G antenna group array design, and 4G antennas are distributed around GNSS antennas, with good symmetry structure, which well solves the influence of communication antennas on positioning antennas and ensures the consistency of phase center of positioning antennas.

Tracking in complex environments

The antenna unit has the characteristics of high gain and wide directional map beam to ensure that the antenna still has a strong signal reception effect at low elevation angles, ensuring that it can quickly lock on to the satellite and output GNSS navigation signal stably even in complex environments such as obscured trees and buildings.

High structural reliability

The communication antenna and GNSS positioning antenna substrate are molded in one piece by using self-researched microwave material, with lower loss, lighter weight, smaller antenna size, high precision, good consistency, and more stable and reliable electrical performance.

Strong anti-interference performance

Antenna LNA has excellent out-of-band rejection performance, which can suppress useless electromagnetic wave signals and avoid receiver interference by other wireless communication systems, effectively reducing the risk of system loss of lock, such as electromagnetic wave interference from power grids, communication base stations, radio stations, etc.

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Performance Parameters

Antenna Characteristics	
Frequency range	GPS L1/L2/L5/L-Band BDS B1/B2/B3 GLONASS L1/L2/L3 GALILEO E1/E6/E5a/E5b 4G、BT\WIFI
Impedance	50 Ohm
Polarization method	Right rotation Circular polarization
Antenna axis ratio	≤3dB
Horizontal plane coverage angle	360°
Output standing wave	≤2.0
Maximum gain	**GNSS :** 1164-1230&1525-1615MHz**:** 5.9dBi **BT/WIFI :** 2400-2480MHz：1.2dBi **2G/3G/4G :** 820-960MHz：-4.35dBi 1710-2690MHz：2.67dBi
Phase center height (using the lower surface of the PCB as a reference plane)	L2：13.1mm L1：12.7mm
Phase center error	±2mm
Low noise amplifier index	
Gain	40±2dB
Noise factor	≤2dB
Output standing wave	≤2.0
In-band flatness	±2dB
Operating Voltage	+3.3～+12VDC
Operating current	≤45mA
Differential transmission delay	≤5ns
Structural characteristics	
Antenna Size	Φ134.5*24.4mm
Joint form	GNSS：MCX-C-JW1.5 4G MAIN and DIV/BT/WIFI：IPEX with locking buckle
Working Environment	
Operating temperature	-40℃～+85℃
Storage temperature	-55℃～+85℃
Humidity	95% Non-condensing

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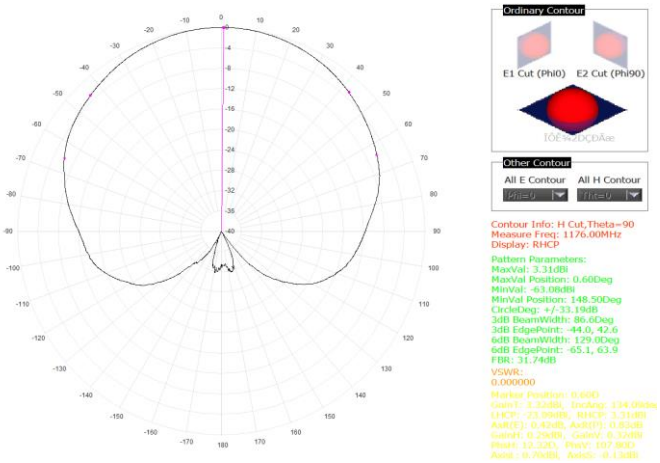
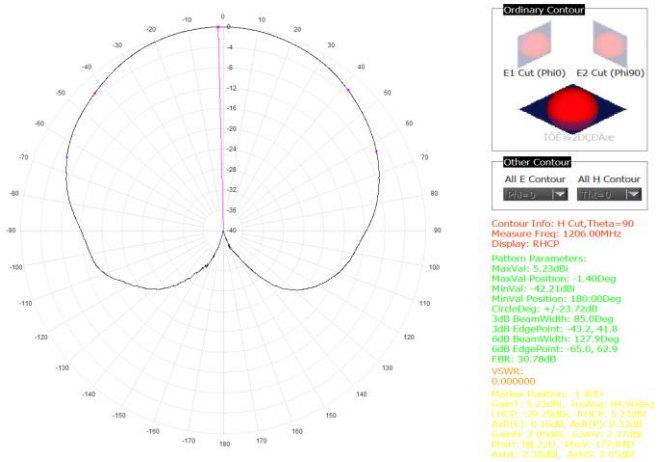
GNSS Antenna Performance

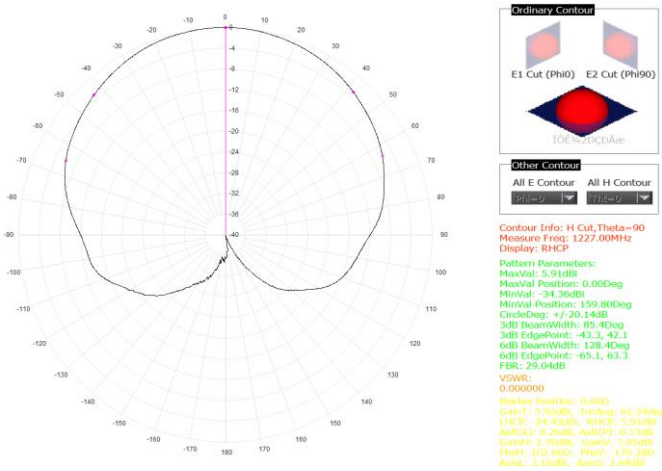
Frequency Points （MHz）	1176	1206	1227	1268	1542	1561	1575	1591
Maximum Gain （dBi）	3.31	5.23	5.91	5.14	4.55	5.61	5.79	5.92



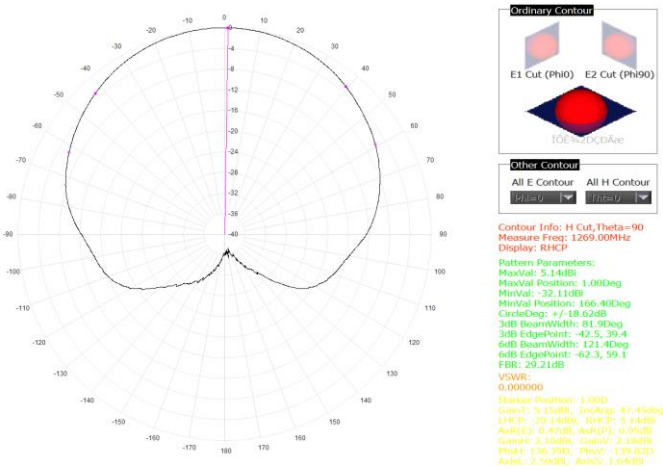
1176MHz Direction schematic



1206MHz Direction schematic

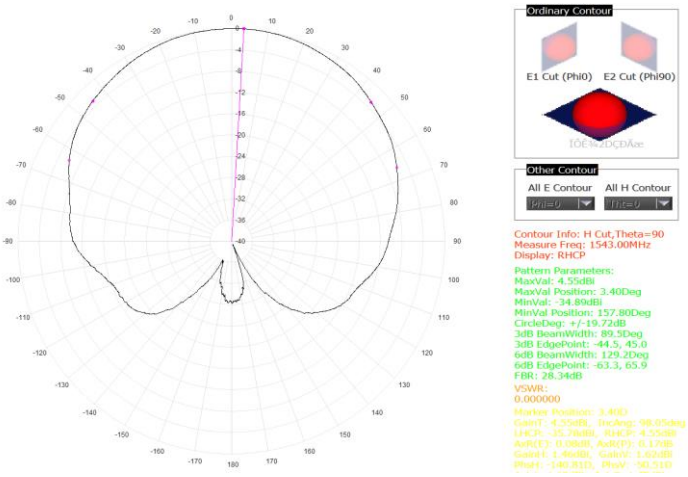


1227MHz Direction schematic

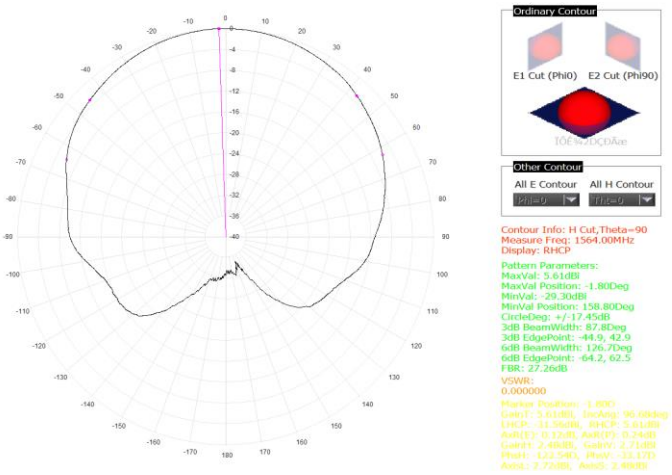


1268MHzDirection schematic

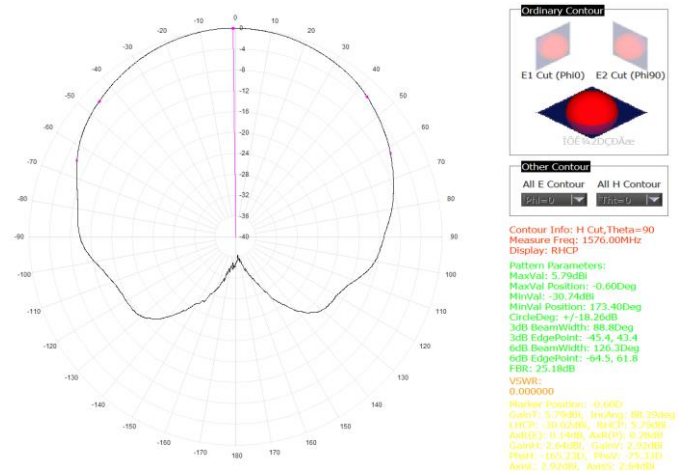
HX-CSX161A Built-in measurement antenna



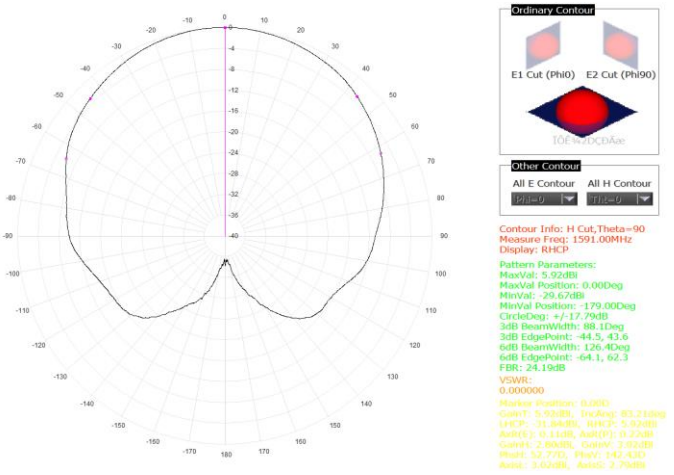
1542MHz Direction schematic



1565MHz Direction schematic



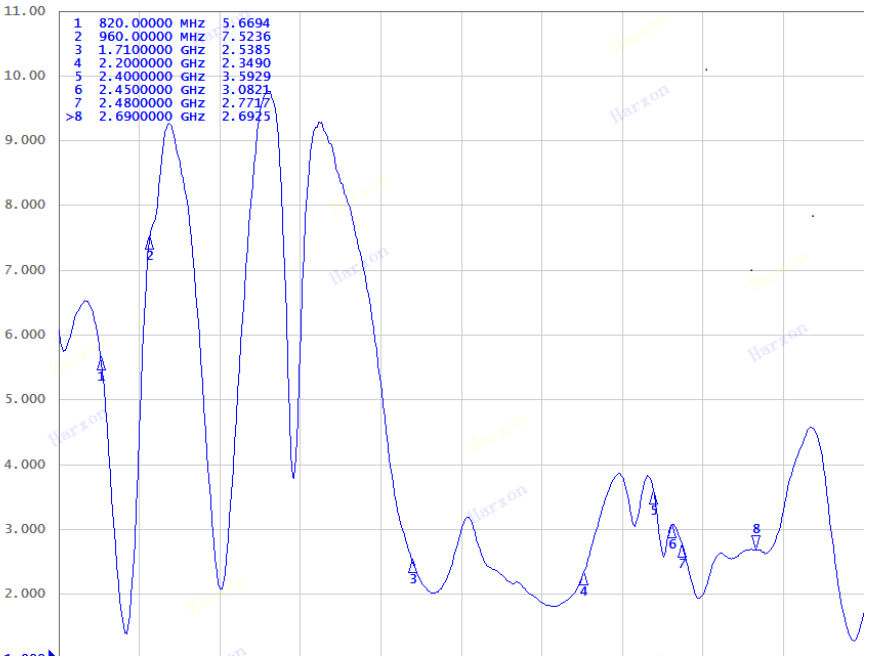
1575MHz Direction schematic



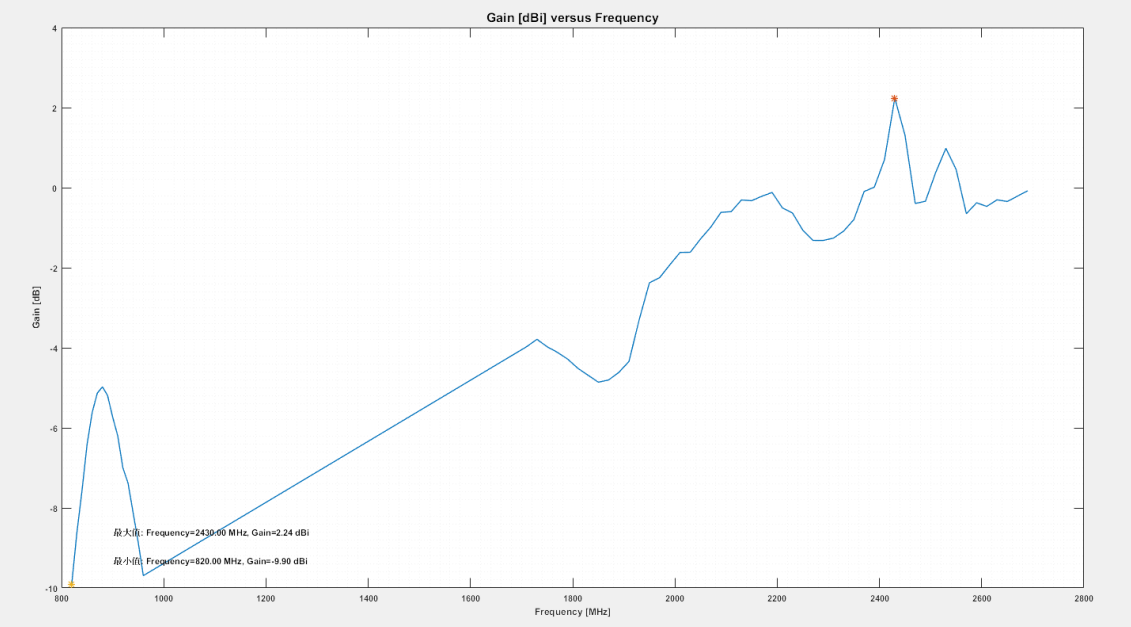
1591MHz Direction schematic

Network Antenna Performance

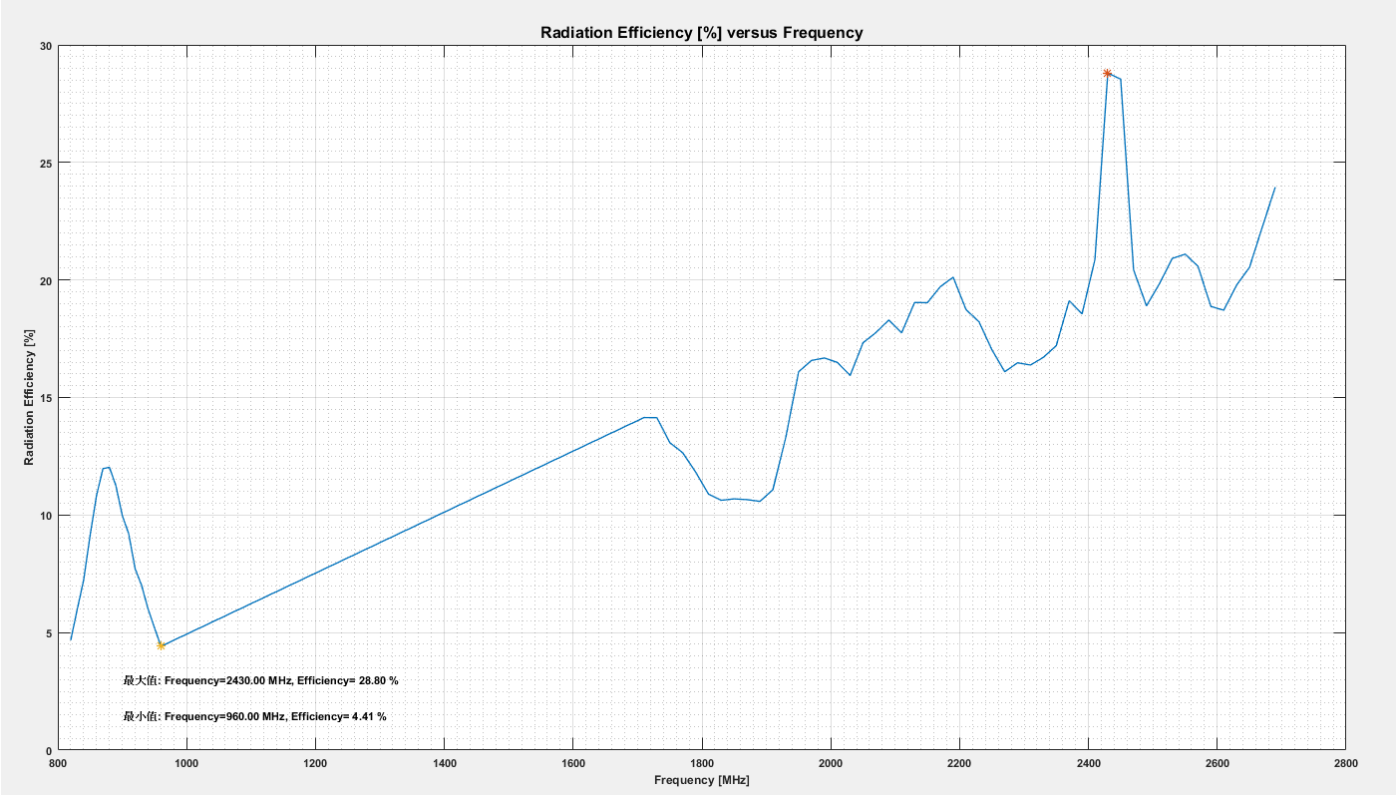
Frequency（MHz）	820	840	860	880	900	920	940	960		
Maximum Gain（dBi）	-6.23	-5.01	-4.56	-4.35	-4.95	-5.23	-6.25	-7.24		
Frequency（MHz）	1710	1790	1870	1950	2030	2110	2190	2270	2350	2430
Maximum Gain（dBi）	-4.38	-4.02	-4.35	-4.65	-3.77	-2.87	-1.80	-0.32	0.76	2.89
Frequency（MHz）	2510	2590	2670							
Maximum Gain（dBi）	0.88	1.42	0.33							
4G-MAIN Gain Table										



4G-MAIN Antenna VSWR

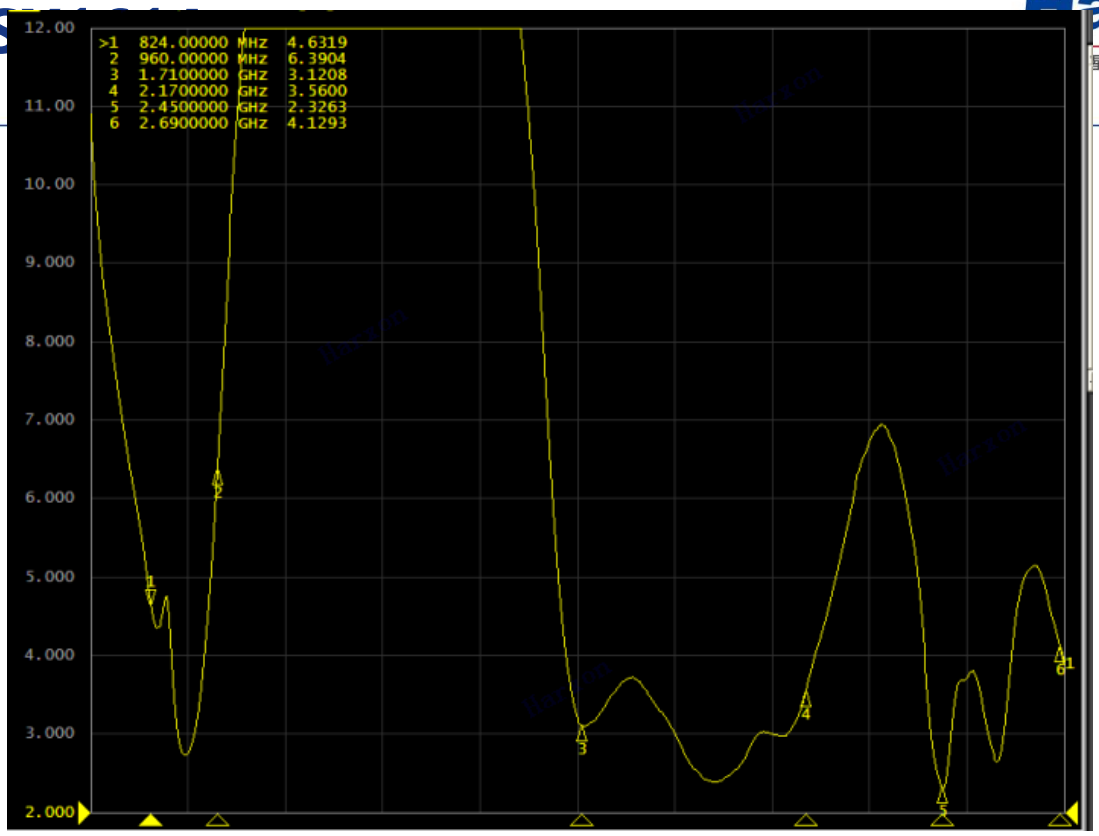


4G-MAIN Antenna Gain Curves

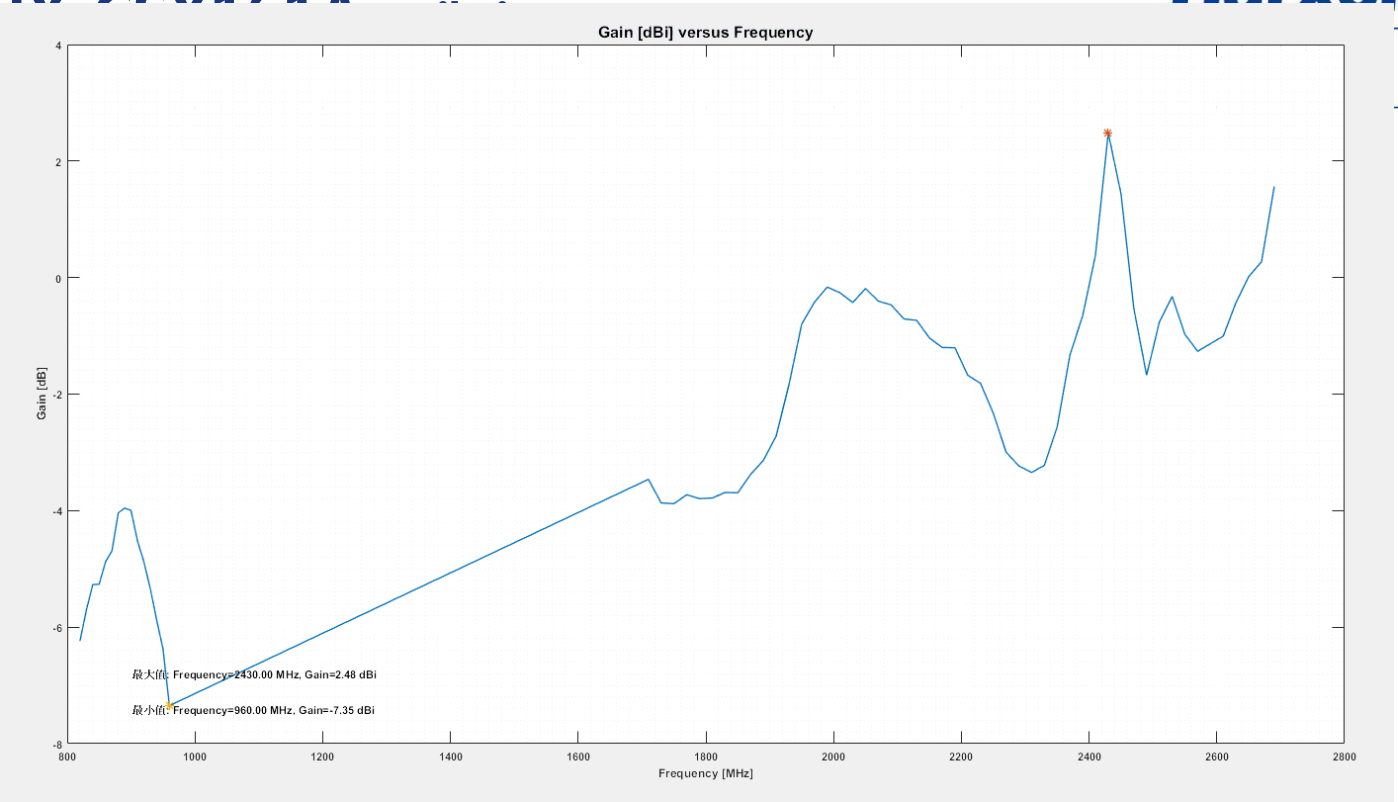


4G-MAIN Antenna efficiency graph

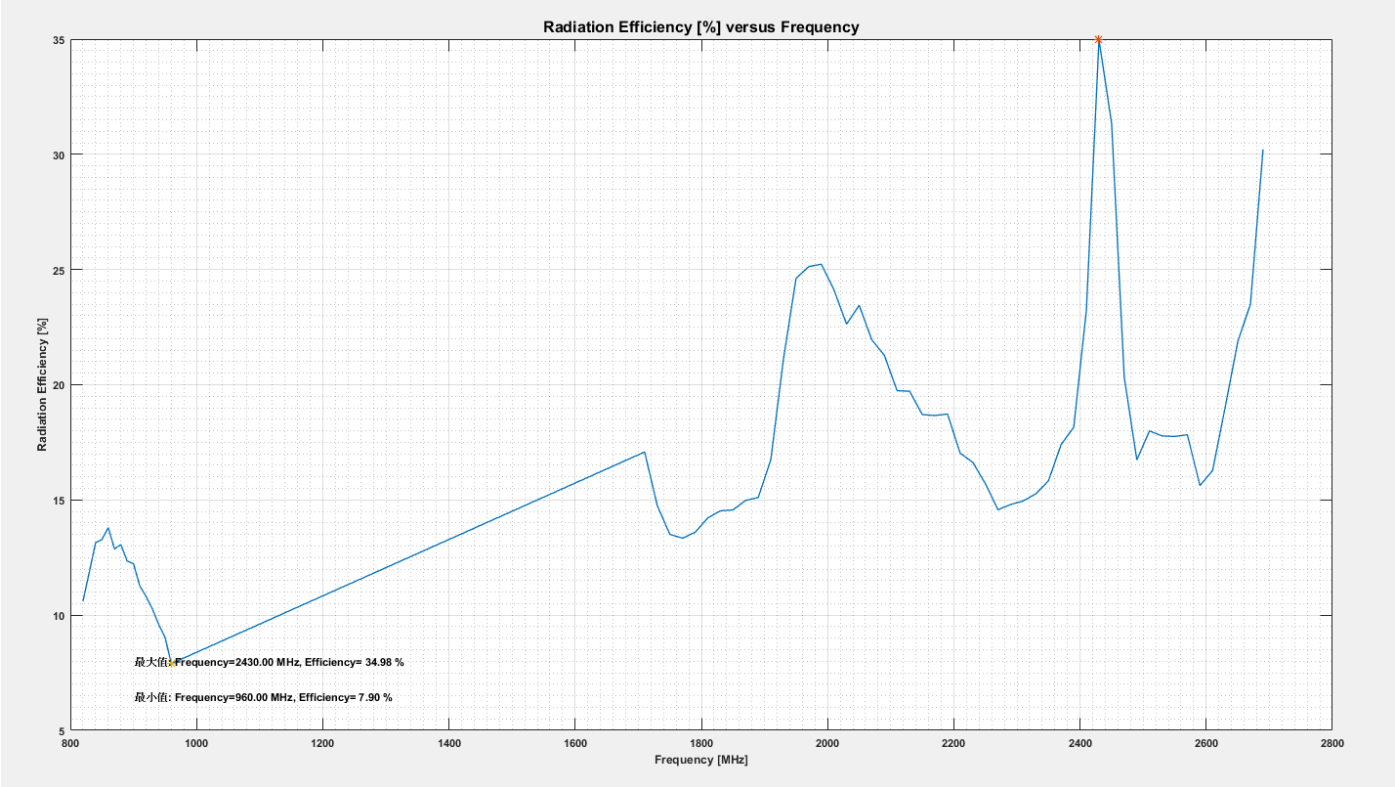
Frequency（MHz）	820	840	860	880	900	920	940	960		
Maximum Gain（dBi）	-6.56	-5.35	-4.87	-4.68	-4.85	-5.64	-6.85	-7.64		
Frequency（MHz）	1710	1790	1870	1950	2030	2110	2190	2270	2350	2430
Maximum Gain（dBi）	-4.74	-4.56	-4.84	-4.82	-3.84	-2.67	-1.82	-0.72	0.81	2.67
Frequency（MHz）	2510	2590	2670							
Maximum Gain（dBi）	0.54	1.64	0.74							
4G-DIV Gain Table										



4G-DIV Antenna VSWR

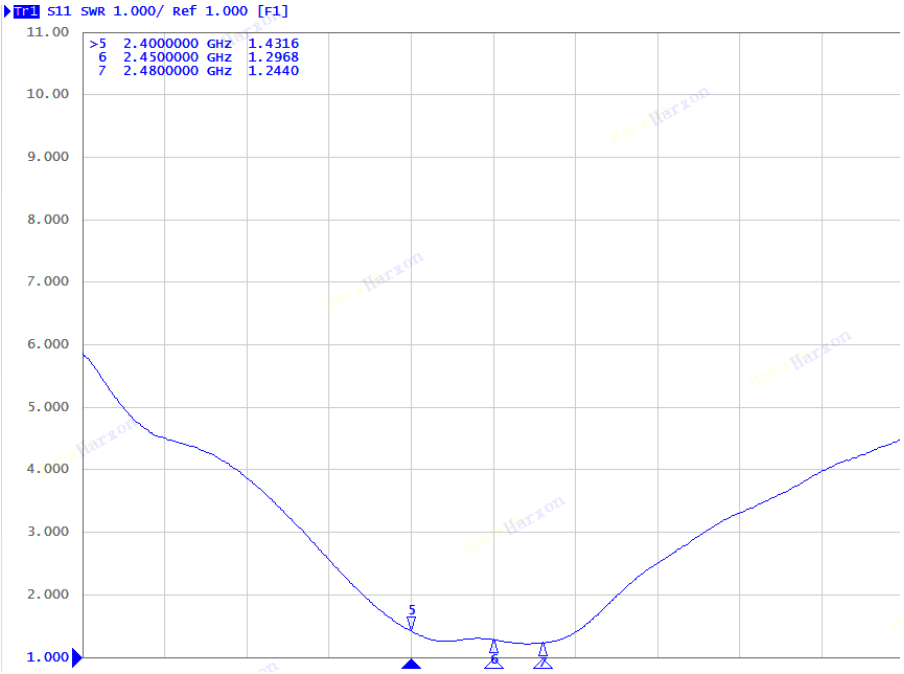


4G-DIV Antenna Gain Curves

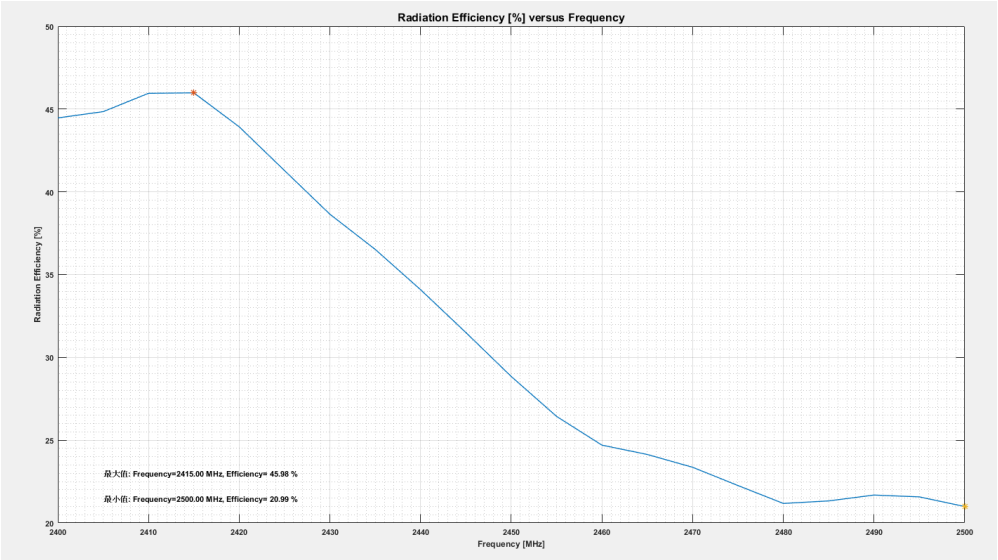


4G-DIV Antenna efficiency graph

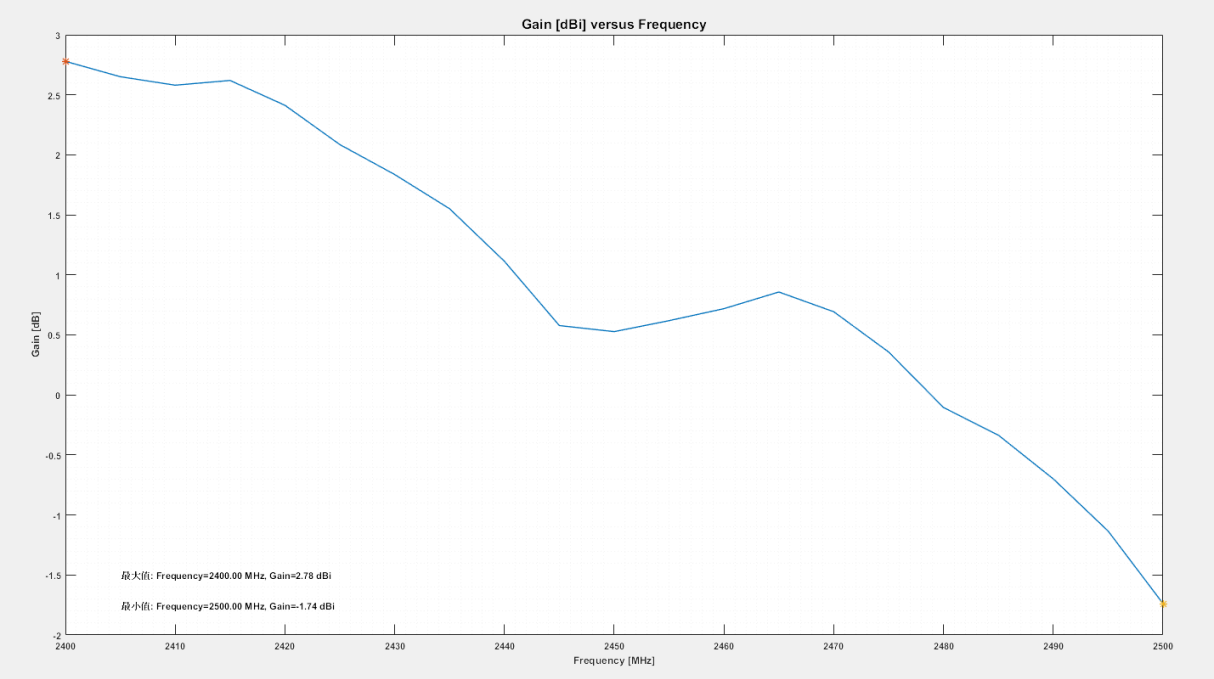
Bluetooth antenna performance



Bluetooth Antenna VSWR



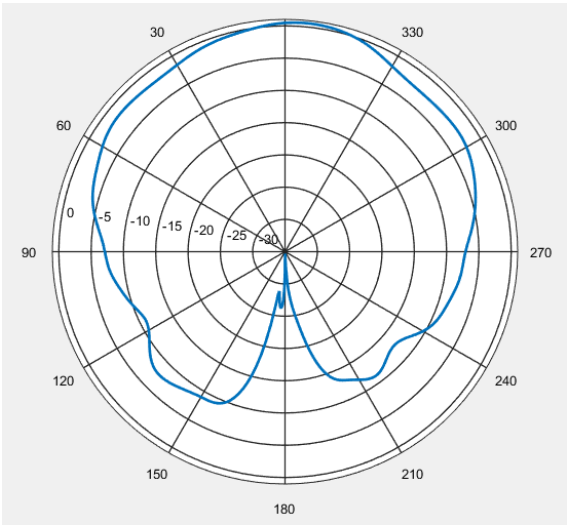
Bluetooth Antenna efficiency graph

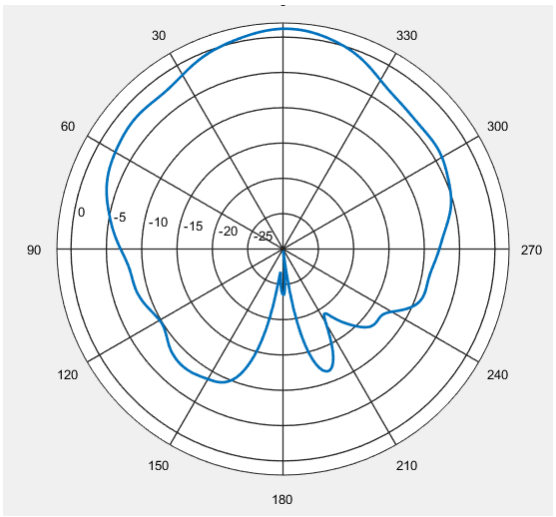


Bluetooth Antenna Gain Curves

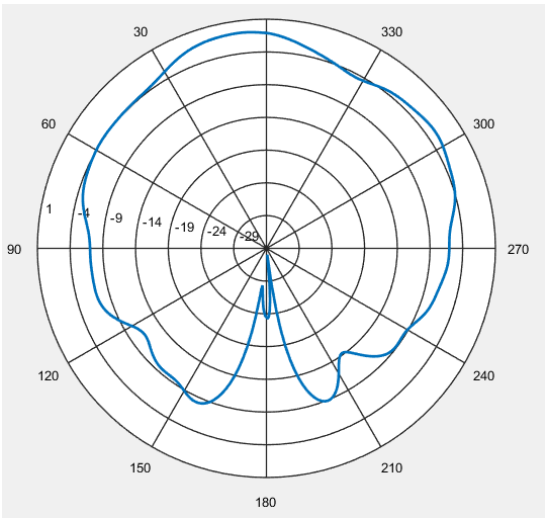
Bluetooth Antenna Gain Table

Frequency Points（MHz）	2400	2430	2450	2480
Maximum Gain (dBi)	0.6	1.2	0.5	0.1

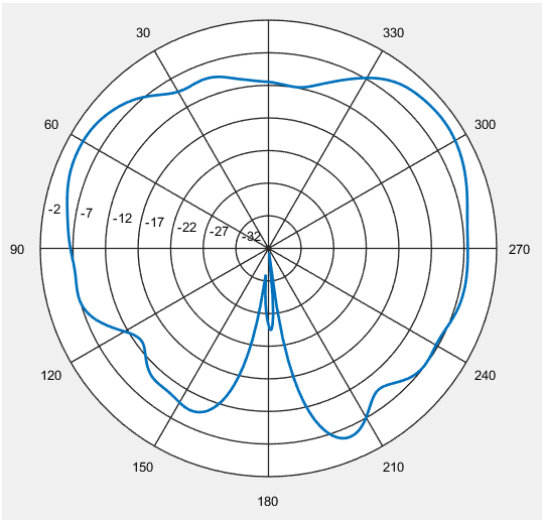




2400MHz Direction schematic



2430MHz Direction schematic



2450MHz Direction schematic

2480MHz Direction schematic

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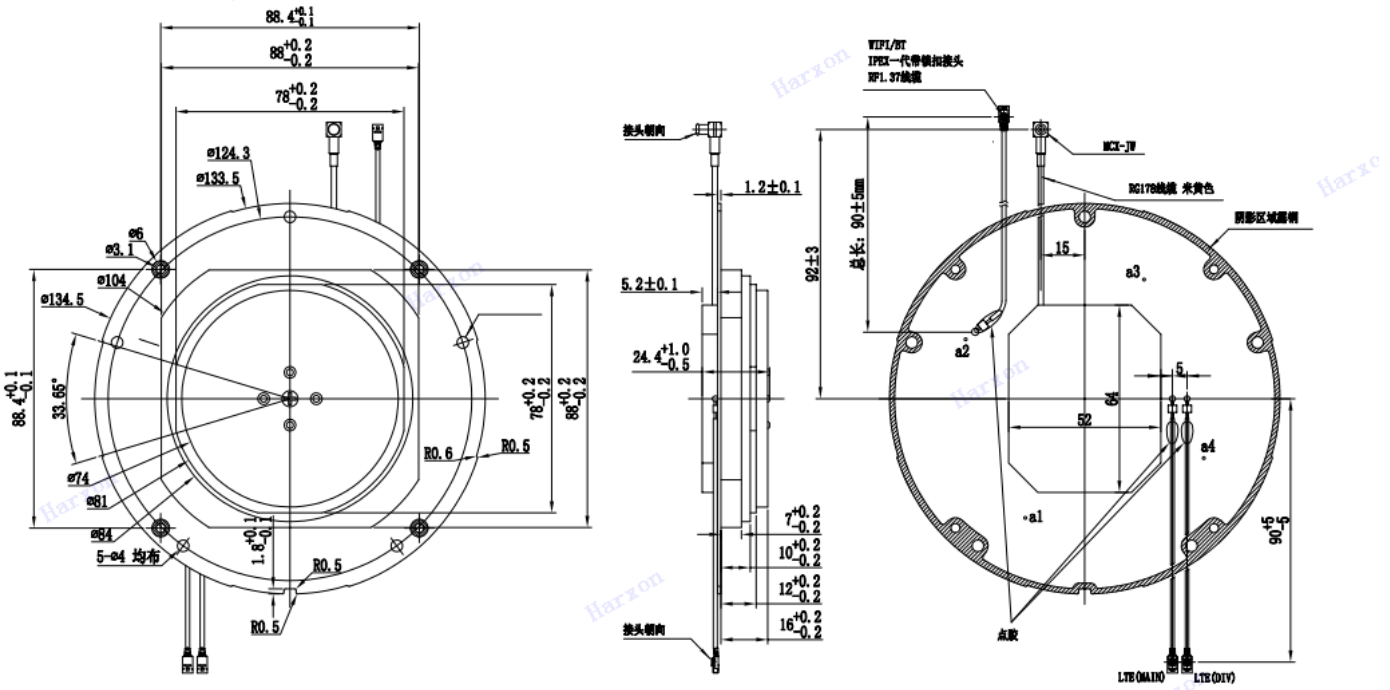
Three views of the product（Dimensional Tolerance ±0.3mm）



主视图　　侧视图　　底视图

Main View　　Side view　　Bottom view

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Product Tags

Label Size：15*30mm，The label content is shown below。

The form of the label content is shown below，The S/N code should be written according to the program file and the actual situation, the following figure is only an illustration。

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Document Status

Number	Code
HQB.01-GF-1853d	0454

Documentation/revision history				
Serial number	Chapter/ Article	Summary	Version number	Date of operation
1	/	Initial creation	a	2022-01-05
2	Product Tags	Label Change	b	2022-02-16
3	Three Views	Changing the location of the WiFi outgoing line	c	2023-04-17
4	Performance Parameters	Performance parameter change	d	2023-07-03
5				

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