

OEM GNSS Antenna HX-CSX409A

HX-CSX409A is an embedded full frequency GNSS antenna covering GPS, GLONASS, BDS, GALILEO, and QZSS. It is also compatible with 4G, WiFi and Bluetooth, meeting the demand for multi-system compatibility in current survey devices. It can be widely used in various applications such as geodetic surveying, marine surveying, channel surveying, dredging surveying, seismic monitoring, bridge deformation monitoring, landslide monitoring, and port container operations.

HIGHLY INTEGRATED ANTENNA FOR EASY INTEGRATION

HX-CSX409A integrates GNSS antenna and 4G antenna into one compact enclosure, greatly simplifying RTK integration. Deep optimization has been carried out for the isolation between antennas of various systems, systematically addressing the electromagnetic compatibility issues that have long troubled RTK receivers.

STABLE PHASE CENTER FOR ROBUST POSITIONING PERFORMANCE

It features multi-point feeding capability, guaranteeing a reliable phase center for millimeter positioning accuracy.

Key Features

- Supports GPS, GLONASS, BDS, Galileo, QZSS
- Supports 4G, BT/WiFi
- Anti-electromagnetic interference, tracking in complex environments
- Powerful system compatibility, easy for machine integration

TRACKING IN COMPLEX ENVIRONMENTS

This antenna exhibits superior high gain performance with ultralow signal loss, ensuring reliable satellite signal tracking. It also delivers wide beam width that covers wide frequencies with high marginal gain. These features guarantee robust signal availability even in low elevation, making the antenna a perfect option for complex environments with blockage, such as forests and buildings.

RELIABLE STRUCTURE FOR STABLE PERFORMANCE

This antenna uses air dielectric and low-loss microwave board materials. The overall weight is reduced, the structure is more robust, and the electrical performance becomes more stable and reliable.

STRONG ANTI-INTERFERENCE PERFORMANCE

The advanced LNA (Low Noise Amplifier) excels in improved signal filtering and out-of-band rejection, perfectly restraining unwanted electromagnetic interferences. With strong multi-path reduction capacity for strong anti-interference performance, consistent and reliable GNSS signals can be achieved even under complicated environments such as power grids, communication base stations and broadcast stations.

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Specifications

PERFORMANCE	
Signal Received	GPS L1/L2/L5 BDS B1/B2/B3 GLONASS L1/L2/L3 GALILEO E1/E5a/E5b/E6 QZSS L1/L2/L5/L6 IRNSS L5 SBAS L1/L5 4G、BT、WIFI L-Band
Nominal Impedance	50 Ω
Polarization	RHCP
Axial Ratio	$\leq 3\text{dB}$
Azimuth Coverage	360°
Output VSWR	≤ 2.0
Peak Gain	GNSS:5.7dBi 4G:4.7dBi WIFI: 4.2dBi BT: 3.7dBi
Phase Center Deviation	$\pm 2\text{mm}$
LOW NOISE AMPLIFIER	

LNA Gain	L2 : 34 $\pm$ 2dB L1 : 32 $\pm$ 2dB
Noise Figure	$\leq 2\text{dB}$
VSWR	≤ 2.0
Passband Ripple	$\pm 2\text{dB}$
Operation Voltage	+3.3 ~ +12VDC
Operation Current	$\leq 45\text{mA}$
Group Delay Ripple	$\leq 5\text{ns}$
MECHANICAL	
Dimensions	$\Phi 116 \times H20.3\text{mm}$
Weight	$\leq 220\text{g}$
Connector	GNSS:MCX-JW 4G&BT&WIFI:IPEX-J LORA: MCX-K&SMP-J
ENVIRONMENTAL	
Operating Temperature	-40°C ~ +85°C
Storage Temperature	-55°C ~ +85°C
Humidity	95% non-condensing

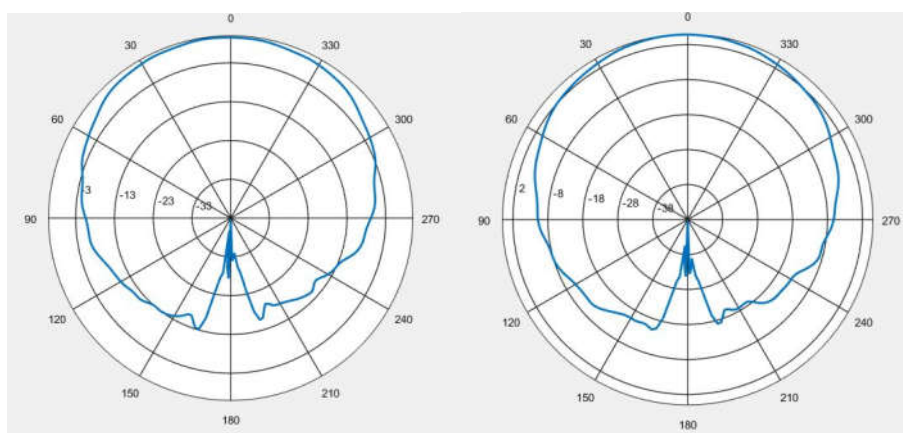
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GNSS Antenna Performance

L2		
Frequency (MHz)	Gain (dBi)	AR (dB)
1160	3.1	1.9
1165	3.3	1.9
1170	3.4	1.8
1175	3.6	1.8
1180	3.7	1.8
1185	4.0	1.8
1190	4.1	1.8
1195	4.4	1.8
1200	4.5	1.8
1205	4.7	1.7
1210	4.8	1.7
1215	4.8	1.6
1220	4.9	1.6
1225	4.9	1.5
1230	5.0	1.5
1235	5.0	1.4
1240	4.8	1.3
1245	4.7	1.2
1250	4.6	1.1
1255	4.5	1.0
1260	4.4	0.9
1265	4.0	0.9
1270	3.9	0.8
1275	3.8	0.8
1280	3.8	0.8

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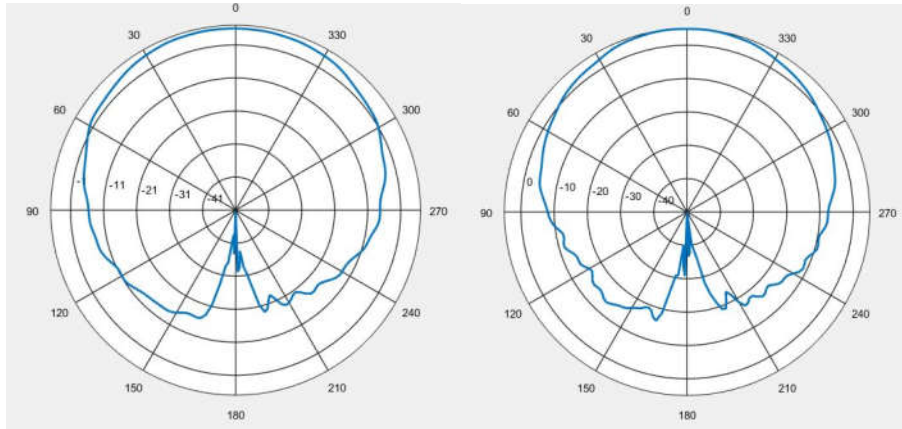
L1		
Frequency (MHz)	Gain (dBi)	AR (dB)
1535	4.7	0.6
1540	4.7	0.6
1545	4.9	0.6
1550	5.1	0.6
1555	5.1	0.6
1560	4.9	0.6
1565	5.0	0.6
1570	5.2	0.6
1575	5.4	0.6
1580	5.4	0.5
1585	5.3	0.5
1590	5.3	0.5
1595	5.5	0.4
1600	5.7	0.4
1605	5.6	0.3
1610	5.4	0.3



1175MHz

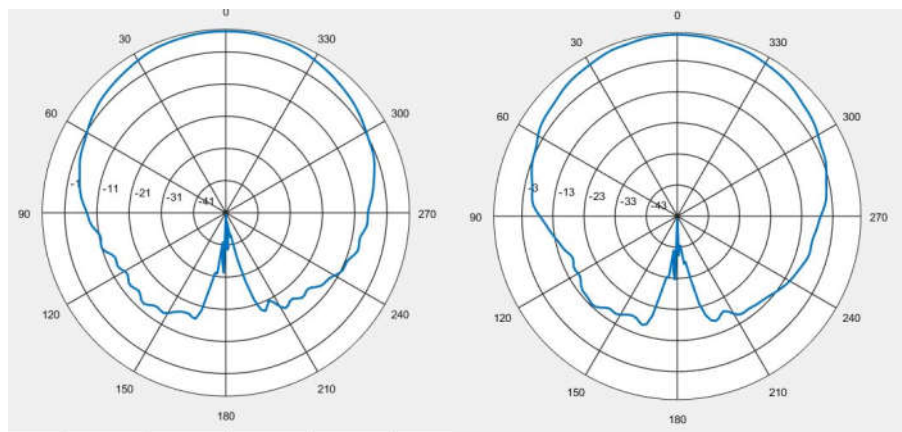
1225MHz

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1265MHz

1560MHz



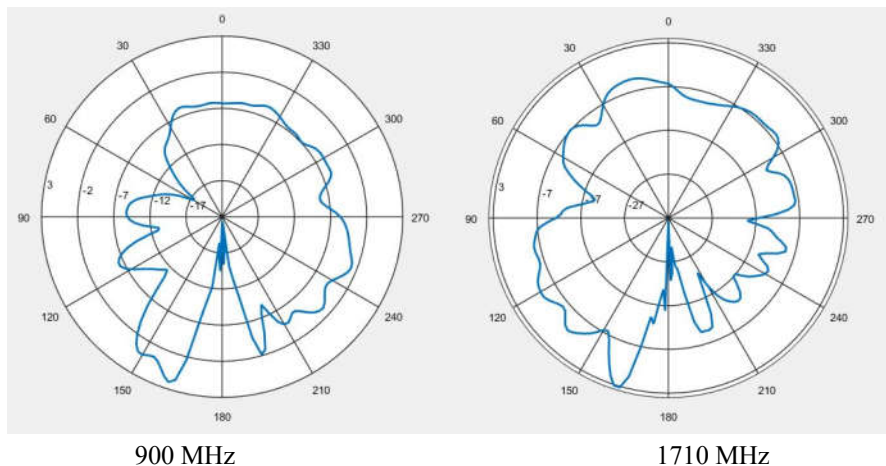
1575MHz

1610MHz

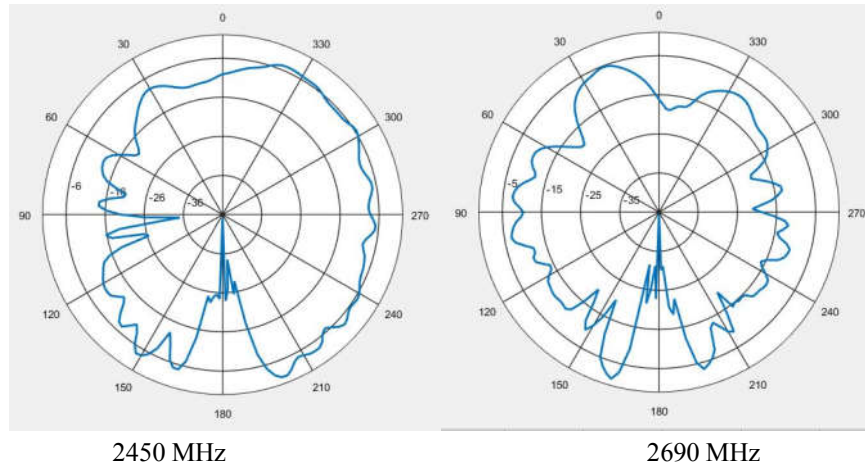
4G Antenna Performance

4G-1 Antenna Performance

Frequency (MHz)	820	830	840	850	860	870	880	890	900	910	920
Gain(dBi)	-1.6	-0.7	0.5	1.4	2.0	2.1	2.6	2.9	2.9	2.1	0.7
Efficiency(%)	23.4	28.8	34.9	40.3	45.9	49.0	51.1	49.3	47.3	42.4	39.4
Frequency (MHz)	930	940	950	960	1710	1730	1750	1770	1790	1810	1830
Gain(dBi)	-1.4	-2.8	-3.5	-4.2	4.7	4.7	4.2	3.4	2.2	0.7	-0.2
Efficiency(%)	33.9	22.9	18.2	15.0	35.6	44.8	50.3	48.6	43.0	35.2	31.3
Frequency (MHz)	1850	1870	1890	1910	1930	1950	1970	1990	2010	2030	2050
Gain(dBi)	-0.4	-1.0	-2.8	-5.5	-4.3	-0.6	1.1	2.0	-0.1	-2.1	-0.3
Efficiency(%)	28.7	26.1	16.1	7.8	13.2	29.5	42.3	48.6	30.4	18.9	24.3
Frequency (MHz)	2070	2090	2110	2130	2150	2170	2190	2210	2230	2250	2270
Gain(dBi)	-0.7	-2.3	-2.2	-1.0	0.6	1.2	0.9	2.0	1.5	0.9	0.5
Efficiency(%)	22.6	18.2	16.9	18.5	26.9	33.5	32.3	46.0	43.4	23.9	16.1
Frequency (MHz)	2290	2310	2330	2350	2370	2390	2410	2430	2450	2470	2490
Gain(dBi)	-0.4	-0.1	0.4	1.4	1.9	1.2	0.3	0.6	1.1	1.0	1.0
Efficiency(%)	13.9	17.3	31.8	45.0	44.2	35.4	28.5	27.4	32.2	32.0	27.4
Frequency (MHz)	2510	2530	2550	2570	2590	2610	2630	2650	2670	2690	
Gain(dBi)	1.1	1.0	0.4	-1.9	-4.6	-4.5	-3.3	-1.9	-0.4	1.2	
Efficiency(%)	24.1	22.8	21.6	16.8	12.7	11.4	10.1	10.4	12.6	16.7	



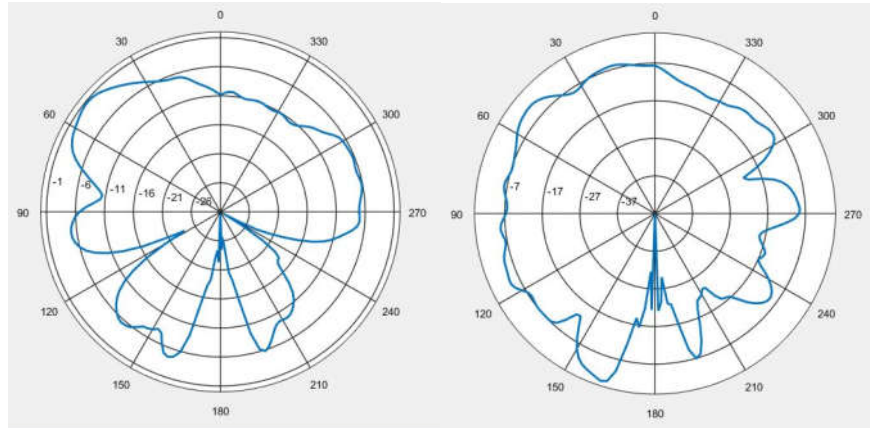
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4G-2 Antenna Performance

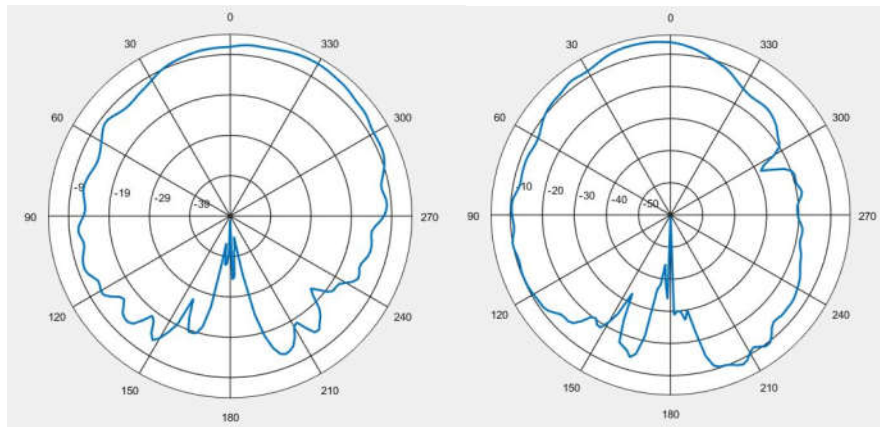
Frequency (MHz)	820	830	840	850	860	870	880	890	900	910	920
Gain(dBi)	-3.4	-2.5	-1.3	0.1	1.4	3.0	4.2	4.9	4.9	4.5	3.5
Efficiency(%)	13.6	17.0	21.0	26.2	33.0	41.4	49.0	53.4	52.6	47.1	39.8
Frequency (MHz)	930	940	950	960	1710	1730	1750	1770	1790	1810	1830
Gain(dBi)	1.5	-0.6	-1.6	-2.0	3.4	3.6	3.3	3.1	3.1	2.6	2.5
Efficiency(%)	30.5	24.7	22.3	18.6	42.7	49.0	49.7	49.7	47.4	42.7	41.3
Frequency (MHz)	1850	1870	1890	1910	1930	1950	1970	1990	2010	2030	2050
Gain(dBi)	2.2	1.7	0.9	0.1	-0.7	-1.1	-1.3	-0.9	-1.9	-2.9	-2.9
Efficiency(%)	39.9	40.0	34.4	24.4	22.8	29.6	21.6	16.8	10.9	8.5	10.7
Frequency (MHz)	2070	2090	2110	2130	2150	2170	2190	2210	2230	2250	2270
Gain(dBi)	-2.8	-2.5	-3.1	-2.7	-0.2	1.4	-1.7	0.5	2.0	0.5	-0.7
Efficiency(%)	16.2	12.0	8.3	7.8	12.2	16.8	17.2	35.2	45.8	31.5	22.7
Frequency (MHz)	2290	2310	2330	2350	2370	2390	2410	2430	2450	2470	2490
Gain(dBi)	-1.0	0.7	1.7	0.9	-1.1	-2.1	-3.2	-3.7	-3.9	-3.8	-3.7
Efficiency(%)	20.5	23.2	26.7	24.7	20.0	16.0	13.2	11.9	11.5	12.9	12.8
Frequency (MHz)	2510	2530	2550	2570	2590	2610	2630	2650	2670	2690	
Gain(dBi)	-4.5	-5.1	-4.6	-2.2	-1.5	-0.7	-1.9	-3.5	-4.4	-4.1	
Efficiency(%)	10.5	9.7	12.3	17.3	17.9	17.5	12.9	10.0	10.0	12.5	

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900 MHz

1710 MHz



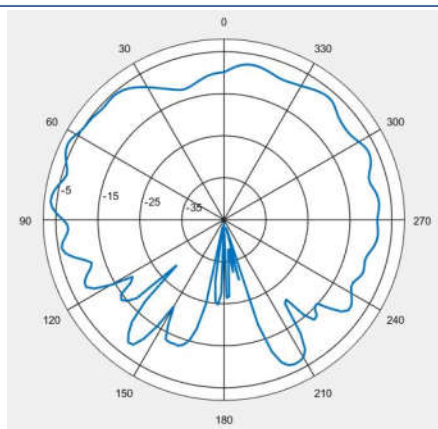
960 MHz

1710 MHz

BT/WIFI Antenna Performance

BT								
Frequency (MHz)	2410	2415	2420	2425	2430	2435	2440	2445
Gain(dBi)	0.4	0.8	1.0	1.3	1.5	1.8	1.9	1.9
Efficiency(%)	31.1	33.9	35.8	38.1	40.5	43.4	45.8	47.0
Frequency (MHz)	2450	2455	2460	2465	2470	2475	2480	
Gain(dBi)	2.3	2.9	3.3	3.6	3.7	3.7	3.7	
Efficiency(%)	47.9	49.0	49.4	50.0	49.9	50.1	49.4	

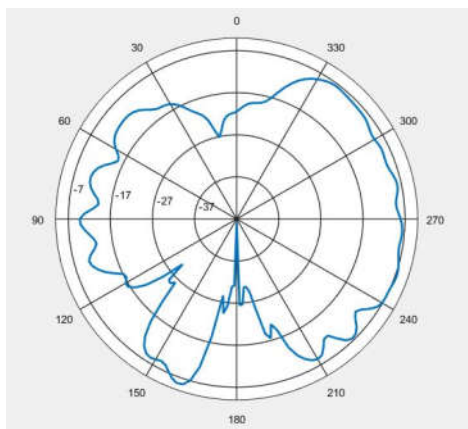
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2450MH

WiFi								
Frequency (MHz)	2410	2415	2420	2425	2430	2435	2440	2445
Gain(dBi)	0.4	0.8	1.0	1.4	1.6	1.6	1.6	1.2
Efficiency(%)	28.6	30.8	32.7	35.2	37.5	39.8	41.2	40.3
Frequency (MHz)	2450	2455	2460	2465	2470	2475	2480	
Gain(dBi)	0.6	0.2	-0.2	-0.5	-1.0	-1.0	-1.1	
Efficiency(%)	37.6	35.2	33.5	32.0	29.7	28.1	26.7	
Frequency (MHz)	5140	5160	5180	5200	5220	5240	5260	5280
Gain(dBi)	4.2	4.0	4.0	3.9	4.0	4.2	4.0	3.9
Efficiency(%)	63.1	63.5	61.7	59.4	59.6	61.9	61.0	60.1
Frequency (MHz)	5300	5320	5340	5360	5380	5400	5420	5440
Gain(dBi)	3.5	3.0	3.0	3.1	3.2	3.2	2.8	2.1
Efficiency(%)	56.6	50.5	49.6	52.0	53.4	52.9	48.6	44.4
Frequency (MHz)	5460	5480	5500	5520	5540	5560	5580	5600
Gain(dBi)	1.9	2.2	2.1	2.1	2.0	1.9	2.0	2.3
Efficiency(%)	44.8	47.6	45.0	43.6	40.2	37.6	37.6	40.5
Frequency (MHz)	5620	5640	5660	5680	5700	5720	5740	5760
Gain(dBi)	2.1	1.9	1.4	1.0	1.3	1.5	1.5	1.5
Efficiency(%)	39.5	37.7	35.3	32.2	33.9	35.6	36.7	36.4
Frequency (MHz)	5780	5800	5820	5840	5860			
Gain(dBi)	1.5	1.4	1.4	1.5	1.3			
Efficiency(%)	35.2	34.2	34.5	35.1	34.3			

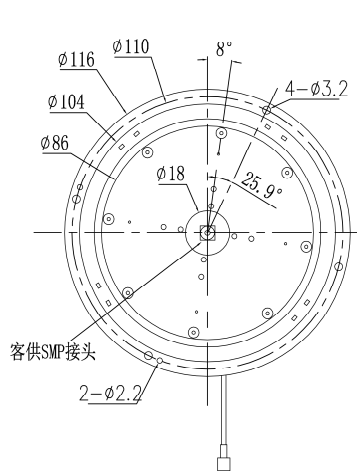
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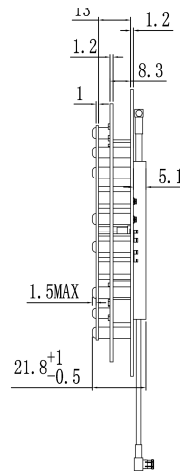
2450MH

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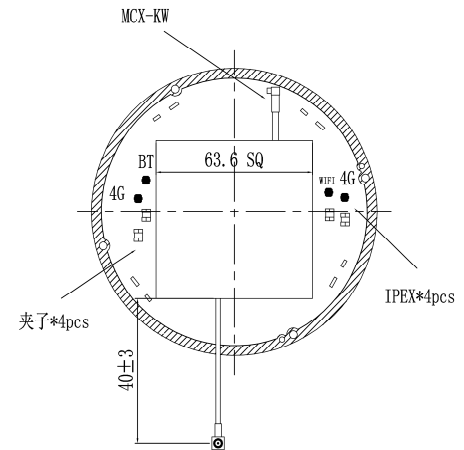
Structure& Phase Center Drawing (mm) (Undeclared Tolerance:±0.3mm)



正视图



侧视图



后视图

Label

Label size: 15*30mm, the content of the label is shown as below.

Survey Antenna Products

Model:HX-CSX409A

S/N:C22019000168

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