

GNSSRK-M-RDV

- Full GNSS Band Repeater Kit
- Installation and User Guide



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Document Number 1148

Rev 003

2023-06-12

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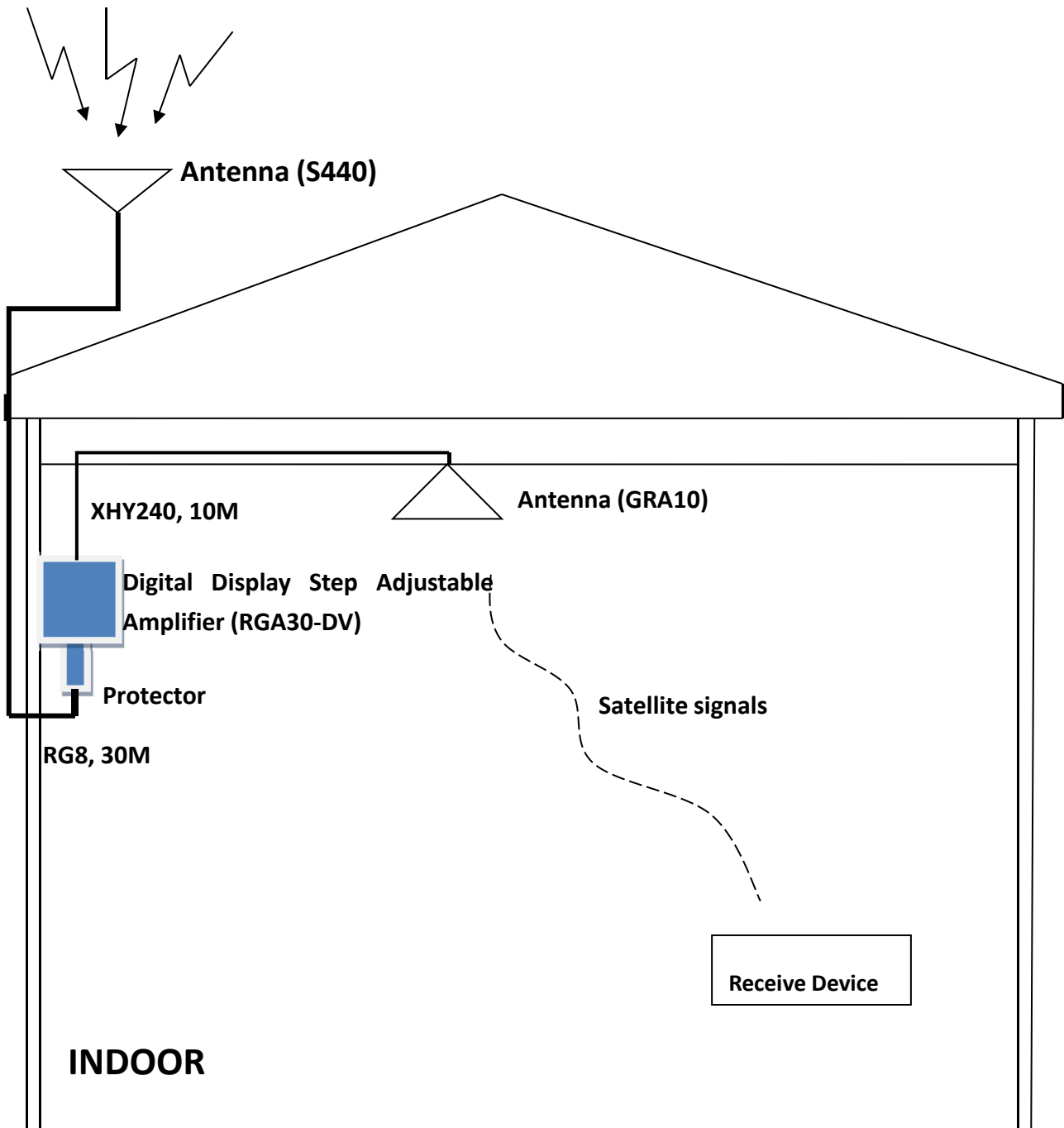
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GNSSRK-M-RDV

- ✧ **System signal:** GPS/GLONASS/Beidou/Galileo/IRNSS/QZSS/SBAS/NAVIC
- ✧ **Frequency range of the antenna:**1556~1623MHz and 1164~1288 MHz;
- ✧ **Frequency range of the amplifier:**1164~1616 MHz;
- ✧ **Gain digital display adjustable in steps**
- ✧ **Digital gain adjustment: 0-30dB, LED digital display;**
- ✧ **Serial command control;**
- ✧ **Input and output port power setting;**
- ✧ **This is single point solution, covers 5-20 meters at radius(by increasing the amplifier according to methods and under field conditions ,building height and other certain conditions reach a radius of 20 meters).**

Satellite signals



1. Receiving antenna S440 mounted on the roof;
 2. Cable assembly RG8 fixed along the out wall, one terminator connects S440, the another to protector at the appropriate place. In some special environment, select PE or PVC material plastic pipe to protect the cable assembly is quite sensible;
 3. Lightning arrester and digital stepper amplifier fixed to the ceiling or table top of the room;
 4. Cable assembly XHY240 is fixed along the ceiling of the operating place;
 5. Antenna GRA10 be fixed on the ceiling .
- According to the actual environment, you can adjust positions of some parts, which can make you the adjust, change and overhaul more easily.

Quality Commitment

All products have been strictly inspected, all are qualified products.

We promise one-year guaranty and 5-year available.

Under warranty, products gone wrong which be identified not be human factor, can be replaced free or repaired. Freight be charged by GEMS.

Return Policy

Our product and its packaging have LOGO and Serial-number, you should not tear up them, as we will depend on them to deal with the return product.

Service phone: 86-755-29644311 or email to: sales@gemsnav.com.

1. Description

GNSSRK-M-RDV is a repeater operates by receiving GPS L1&L2&L5, GLONASS L1&L2, Beidou2 B1, B2, B3, Galileo E1, E2, E5a, E5b satellite signals with an antenna located outside the building and re-radiating the signals into the indoor area or covered space where satellite signal cannot reach.

GNSSRK-M-RDV is a single system multi-frequency multi-system satellite signal transponder, i.e., a transmitting antenna that relays satellite signals.

If users need to expand on this system, multi-system receiving antenna and transmitting antenna can be used to support multi-system multi-band satellite signal reception and forwarding, to achieve the purpose of indoor satellite signal coverage.

2. Typical Application

✧ For testing

For testing the cell- phone, PND, car navigators, tracker, survey products, etc.

✧ For the purpose of GNSS signal covering

Car parks, lab, aviation manufacturing hangar, trade shows, Emergency-, safety vehicles, public transportation etc.

3. Standard Configurations

✧ Amplifier: RGA30-DV ,1 ea;

✧ Receiving Antenna: S440,1 ea;

✧ Cable Assembly: RG8,30M, 1ea;

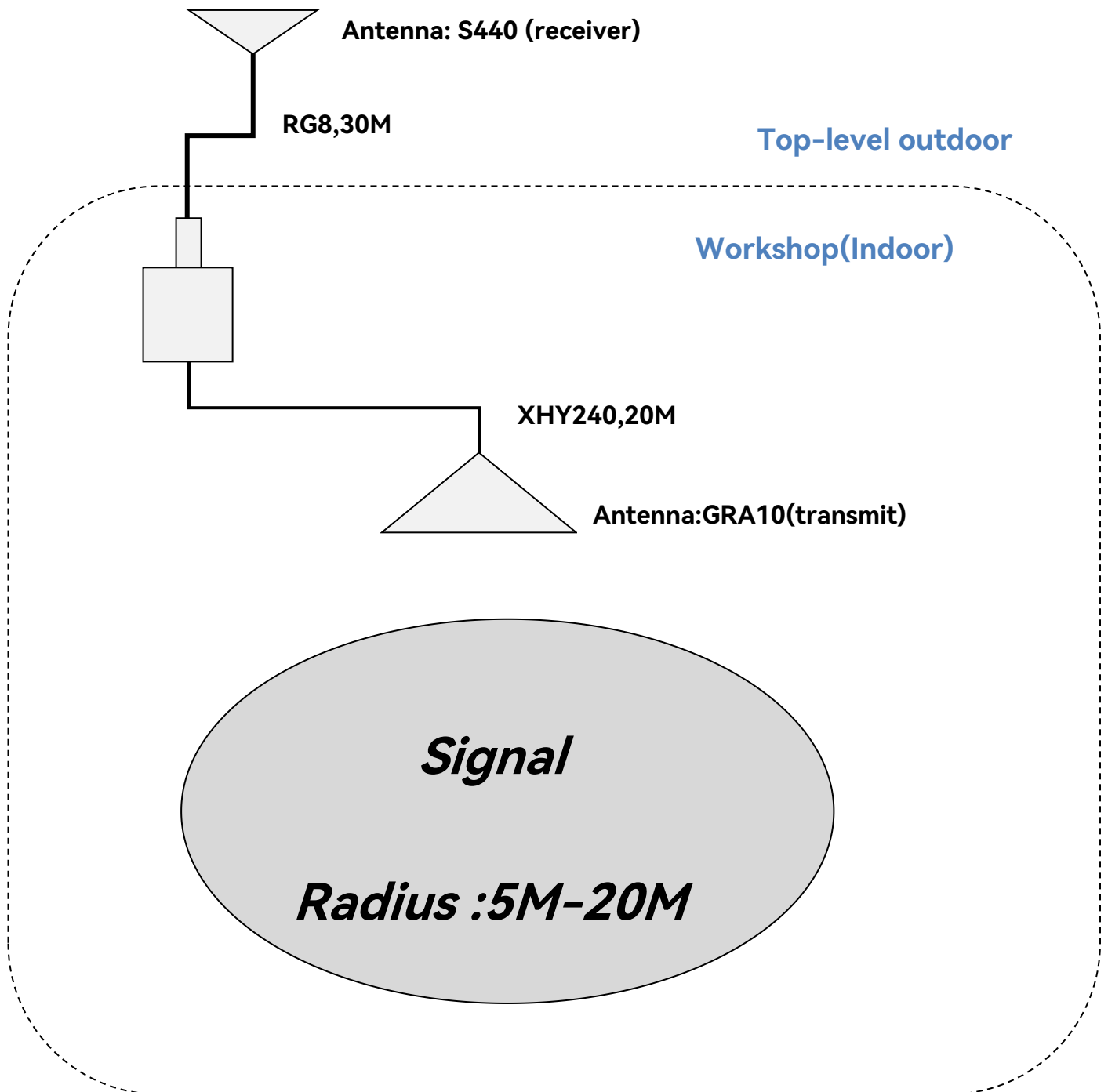
✧ Cable Assembly: XHY240,10M,1 ea;

✧ Sending Antenna: GRA10,1 ea;

✧ Ligting-protector: 1 ea;

The cable components can be selected according to the customers' environment and can communicate with our technicians.

4. Topological (Under standard configuration)



5. Kits include

5.1 Digital Display Step Adjustable Amplifier RGA30-DV

5.1.1 Function:

Used to adjust system gain, 0-30 dB adjustable, you can control when needed. The input and output can be set to energize 5V DC or not energized.

The system power supply voltage is 220V.

①and②are RGA30-DV input and output.

③For power control switch. System power-on when allocated to upward, opposite, system stops working.

④ For the gain adjustment button, you can adjust the gain size, you can adjust the controller gain increase or decrease. (Through the GAIN button to adjust. UP to the big, down to small.)

⑤For the input and output power state setting, IN for the input, Out for the output, PDC that power, BDC that does not power.

⑥For the digital display, showing the current gain value of the amplifier, and the voltage of the input and output ports.



5.1.2 Specification

Electrical Specifications, Operating Temperature -40 to 85°c

Parameter	Conditions	Min	Typ	Max	Units
Freq. Range	In- Output ports, 50Ω	1164		1616	MHz
In &Out Imped	In, all output ports		50		Ω
Gain 1207MHz 1227MHz 1561MHz 1575MHz 1609MHz	In- Output ports -45dBm Input Level		0~30		dB
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1	0~30	(0~30)+1	
		(0~30)-1.5	0~30	(0~30)+1.5	
Input SWR				2.0:1	-
Output SWR				2.0:1	-
Noise Figure				3	dB
Gain Flatness				3	dB
Phase Balance				1.0	deg
Group Delay Flatness				1	ns
Current	Pass DC, No Powered configuration, DC input on Out Port			250	mA
Max RF Input	Max RF input without damage			0	dBm

5.2 Antenna

5.2.1 Roof Antenna S440



Full GNSS Band: GPS/GLONASS/Beidou/Galileo/IRNSS/QZSS/SBAS/NAVIC

- ✧ GPS:L1,L2,L5;
- ✧ Glonass:G1,G2;
- ✧ Galileo:E1,E2,E5a,E5b;
- ✧ Beidou2:B1,B2,B3;
- ✧ IRNSS/QZSS/SBAS/NAVIC;

Electrical parameter:

Frequency [MHz]	1555~1623/1164~1288
Impedance	50Ω
Gain [dBi]	40±2(LNA included)
Polarization	right-hand circular polarized (RHCP)
Axial ratio [dB]	≤3
Elevation Coverage	360°
Input (VSWR)	≤2.0
Antenna element gain	5.5dBi

Low Noise Amplifier: Specifications:

Frequency [MHz]	1556~1623/1164~1288
Gain (dB)	40±2
Flatness in bandwidth (dB)	±2 dB
Noise Figure (dB)	≤2 dB
Output (VSWR)	≤2.0
Input (VSWR)	≤2.0
DC Voltage	DC 3.3—12V
DC Current	DC ≤45mA
Differential transmission delay	5ns

Mechanical characteristic:

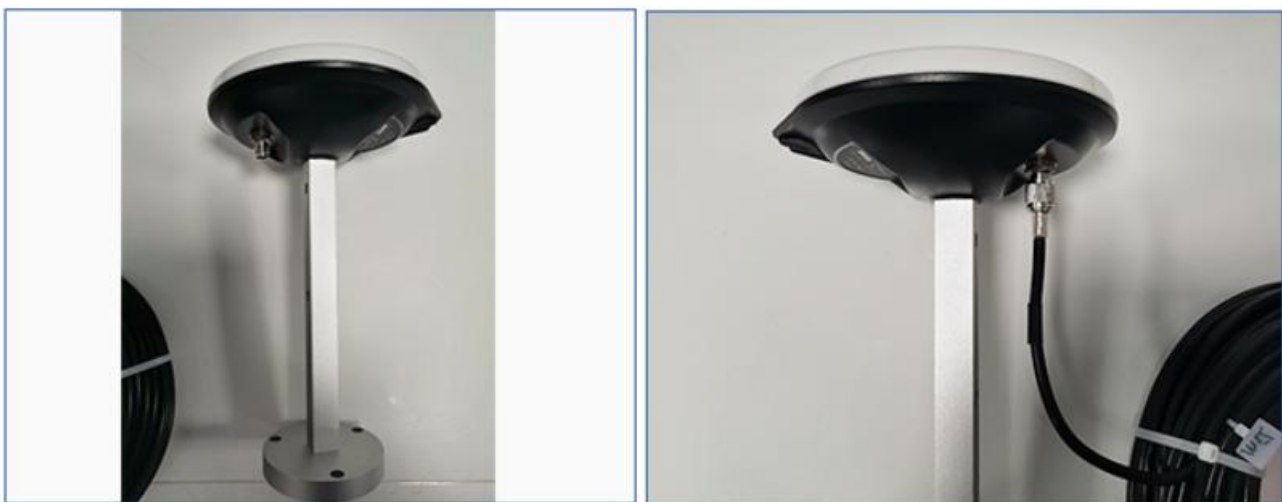
Size [mm]	Ø165×68.8
Connecting	TNC-C-K
Operation Temperature [°C]	-40~+85
Reposition Temperature [°C]	-55~+85
Humidity [%]	95% non-condensin

5.2.2 GNSS antenna S440 installation

(1) Antenna spacing: >5M; transmitting and receiving antennas cannot be placed upside down except as specified in the manual.

(2) the antenna should be in the lightning arrester protection

(3) Antenna waterproof specification:



① The feeder joints need to be wound with waterproof self-adhesive tape, starting with the lower part of the joint connection and filling the low-lying part with the tape.

② Stretch the self-adhesive tape to twice its length during the winding process, and use 60cm long waterproof tape for each connector, requiring three layers of winding. The winding direction should be the same as the tightening direction of the feeder head to avoid loosening of the feeder head during the winding process.

③ layer by layer winding, and then reverse the direction of winding layer by layer, the upper layer covers the next layer of about one-third, so as to prevent rainwater leakage, and finally reverse the direction of winding layer by layer, winding a total of three layers, layer by layer winding waterproof tape, winding process do not cut off the tape. Tape winding length to exceed the feed head about 20 mm.



④ Installed antenna feeder joints, GPS antenna feeder joints, and other independent exposed cable joints, should be strictly in accordance with the "1 + 3 + 3" treatment (1 layer of insulation tape + 3 layers of waterproof tape + 3 layers of insulation tape wrapping) waterproof.

⑤ can also increase the clinker tube to cover the cable part, placing the cable joint part of the water.

4) Waterproof bend

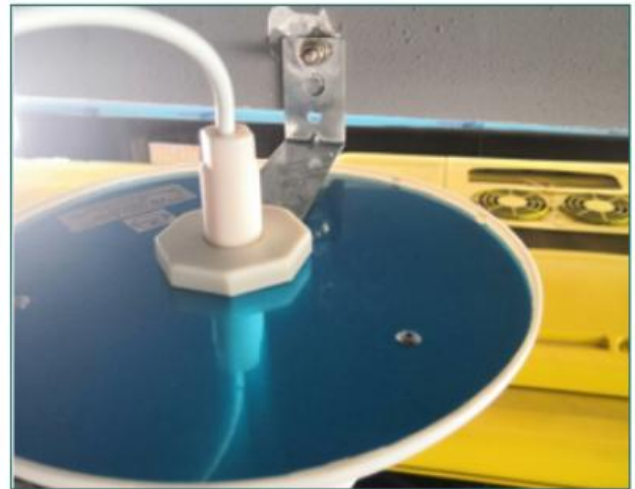
① feeder line from outdoor into the room, if the feeder line is higher than the lower edge of the feeder window, must be made at the outdoor feeder window - waterproof bend, the lowest point of each feeder line after waterproof bend must be lower than the lower edge of the feeder window 10 cm

② If the feeder line is lower than the lower edge of the feeder window before entering the room, it is not necessary to make a waterproof bend.

5.3 Transmitting antenna GRA10

Fixing the antenna GRA10

Fix the antenna to the ceiling, or to a concrete beam; usually in the center of the area where GPS signal coverage is required;



This product factory with fixed bracket, you can refer to the diagram to fix

Electrical parameters:

Frequency [GHz]	1.15-1.7
Input impedance	50Ω
Polarization method	Vertical polarization
Horizontal coverage angle	360°
Output standing wave (VSWR)	≤1.45
Maximum power	50W

Mechanical parameters:

Lightning protection	DC Grounding
Input Interface	NK/SMAK
Size	Φ186X85mm
Antenna cover material	ABS, UV protection
Antenna Color	white
Operating temperature	-40~+60°C
Ultimate temperature	-55~+70°C



Function: Transmit full-band GNSS satellite signal

Gain(dB):3dBic,passive

Connector:N/SMA(Female)

5.4 Cable Assembly

5.4.1 RG8



RG8,30M is usually used for connecting Receiver antenna S440 and lightning-protector. You can calculate the length according to your actual environment, also 60m or 90 be selected.

The connectors are N Male-N Male.

The attenuation of this cable assembly is about 0.18dB/m.

Thus, you can assess the system, or contact with our sales to select proper configuration.

5.4.2 XHY240



The cable assembly, XHY240 20M, is the cable that connects the digital stepper amplifier RGA30-DV to the antenna GRA10.

The attenuation of this cable assembly is about 0.32dB/M.

5.4.3 Select Connector

Connectors are industrial standard component, below are selectable:



SMA Connectors (Male - Female)



BNC Connectors
(Male & Female)



N Connectors (Male - Female)



TNC Connectors (Male & Female)

6 Frequency Reference Table

Global/Compass Navigation Satellite Systems(GNSS/CNSS)	5				2				6/3			6			1																	
Frequency (MHz)	1164	1176	1188	1192	1207	1215	1219	1227	1239	1245	1252	1259	1266	1268	1278	1290	1535	1540	1545	1550	1558	1558	1561	1563	1575	1587	1592	1602	1609	1616	2491	
GPS(USA) L1,L2,L2C,L5	L5+/-12				L2/L2C+/-12											L6+/-5							L1+/-12									
Glonass(Russia) G1,G2										G2+/-7																						
Galileo(Europian) L1,E1,E2,E5(E5a,E5b),E6	E5+/-15		E5a+/-12		E5b+/-12							E6+/-12		L6+/-5					E2				L1+/-17		E1							
Compass (Beidou 2,China)			B2+/-10									B3+/-10							B1+/-2													
Beidou 1 (China, Tx(LHCP)/Rx(RHCP))																														L	S	
IRNSS (India)		L5+/-15																					L1+/-12							S+/-15		
OmniStar																O+/-14---->																

7 Typical faults and solutions

GNSS repeater GNSSRK-M-RDV fault location and remove:

First: To determine whether the RGA30-DV power supply connected, through the RGA30-DV digital display can be observed to lose whether there is voltage output, such as digital display shows a voltage of about 5V, indicating normal power supply, RGA30-DV work properly. Otherwise, check the power outlet for good contact.

Second: If the digital stepper is adjustable, the input port of the amplifier has a voltage of 5V, you need to check whether the fixing is steady between GRA10 and the cable.

Third: If the below two step were ok, please check the outdoor antenna S440 .You can, check the voltage between axis of the cable connector and the outer shielding layer to make sure it's 5V.If no voltage, the circuit has fault, please contact our technical support. If 5V,the antenna S440 can be suspected.(In fact, this case hasn't appear in our engineering projects.

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