



Signal Acquisition

This guide was developed to help American Forces Network customers who desire to receive AFN programming where access to a military installation cable distribution system is not available. It answers frequently-asked questions and provides a broad explanation of AFN signal distribution and reception issues to help you tune in AFN programming. You can also download the AFN channel guide and 9865H decoder troubleshooting guide on our website.

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Satellites carrying AFN programming

The American Forces Network uses seven satellites to distribute programming around the world. Your location determines which satellite you can 'see,' the size of satellite dish you need, and the type and kind of low noise blocker (LNB) you will need to acquire a signal.

Direct to Home (DTH) Satellites

Intelsat 18 (Will be terminated 23 June 2024)

Location: 180°

Band: C-band

Transponder: North Hemi (NHCL)

Area: Northern and Western Pacific

Koreasat 5A

Location: 113° East

Band: Ku-band

Transponder: NEAsia

Area: Japan, Korea & Philippines

Eutelsat 9B

Location: 9° East

Band: Ku-band

Transponder: Wide Beam

Area: Europe and Western Asia

Direct to Sailor (DTS) Satellites

Intelsat 35e

Location: 34° West

Band: C-band

Area: Atlantic Ocean Region

Transponder: Global

Intelsat 906

Location: 64° East

Band: C-band

Transponder: Global

Area: Indian Ocean Region

NSS 9

Location: 177° West

Band: C-band

Transponder: Global

Area: Pacific Ocean Region

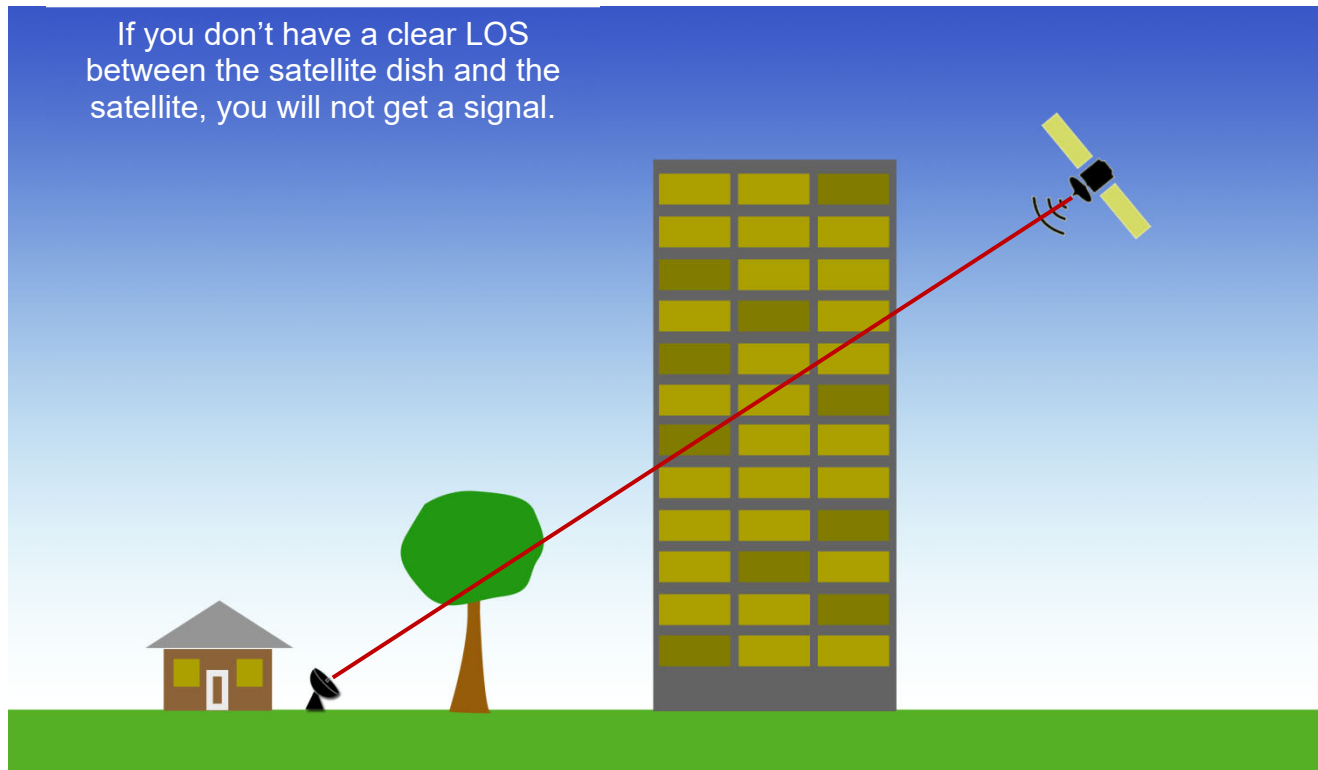
Note: *Because of the unique signal compression used on the DTS service you can use a 1.5 meter satellite dish at most locations to acquire a quality signal.*

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Getting service, step by step

The first step in seeing whether or not you can get service is to determine if you can see the satellites that carry AFN programming. You must live in an area where you have an unobstructed line of sight (LOS) between where you place or can place the satellite dish and the azimuth (left and right) and elevation (up and down) between the dish and the satellite. If there are large trees, buildings or other terrain obstructions in the line of sight you will not be able to get a quality signal.

Before you sign a rental agreement we recommend you check with the housing office and any potential landlord to see if the landlord will allow you to place a satellite dish on their property. If you can, determine the azimuth and elevation by following the steps on pages 10 through 12. There are several smartphone apps available that can help you determine the azimuth and elevation of any potential satellite dish location. We recommend you only buy or lease the equipment needed to get AFN after you've determined you can receive it where you live.



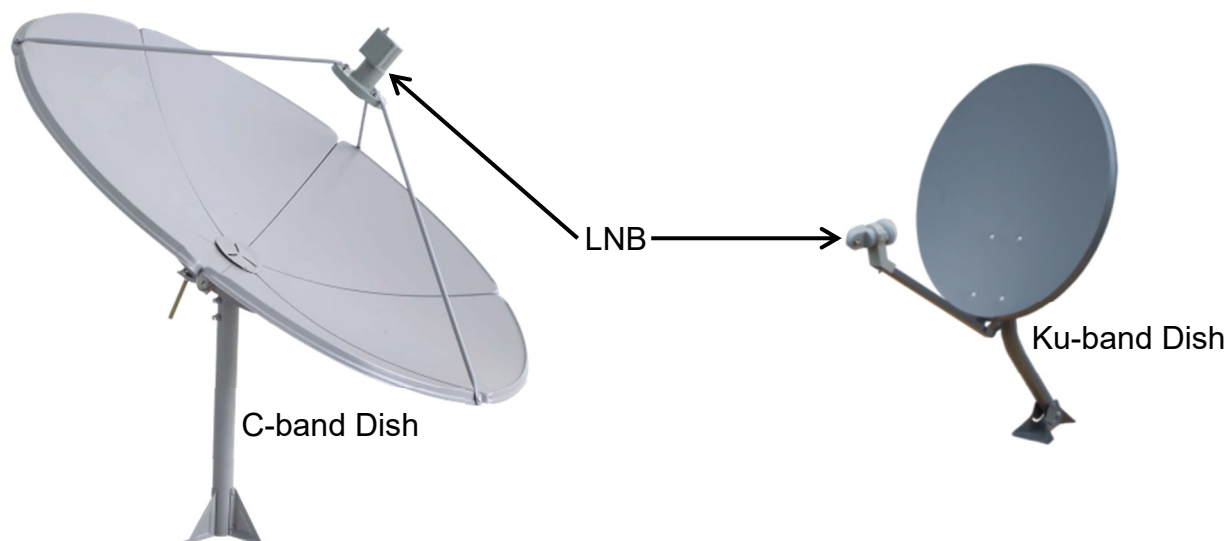
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Satellite Dish Characteristics

The C-band or Ku-band satellite signal transmission and your location in the satellite footprint are the primary factors that determine the size of a satellite dish you need to acquire a signal. The higher power of Ku-band transmissions allow you to use a smaller satellite dish to obtain a quality signal. This is how American companies like DirecTV® send content to their subscribers. The lower power of a C-band transmission requires a larger dish to get a good signal. Remember a 1.5 meter dish should work to get DTS service at most locations due to the signal compression characteristics of that service.

AFN recommends round satellite dishes with a solid reflective surface. Having a slightly larger dish than required also offers better signal stability to counter a phenomenon called ‘rain fade,’ which may occur during periods of heavy rain and snow or very dense cloud cover.

The LNB technical specifications vary depending upon the satellite you’re trying to lock to and the transponder and band used. Signal acquisition will not happen if you have an LNB that doesn’t meet the technical specifications for the signal you’re trying to acquire. Determining the minimum size dish needed and LNB requirements are covered later in this guide.

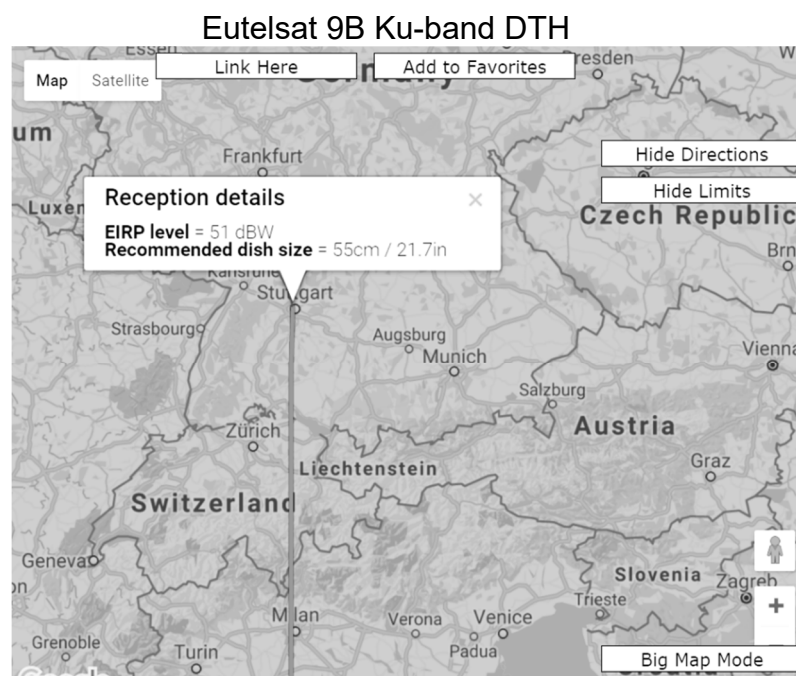


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C-band and Ku-band Satellite Dish Size Comparison

Your physical location directly impacts the size of satellite dish and type of LNB you'll need to get a quality signal and the type of programming service you can acquire. The higher-frequency Ku-band transmission requires a smaller satellite dish, think DirecTV®, while the lower-frequency C-band transmission requires a larger dish to achieve a quality signal.

The difference in satellite dish size requirements for a C-band and Ku-band signal are shown in the example below. A person in Stuttgart, Germany, would need a nearly ten-foot diameter dish to bring down the C-band DTH signal off of the SES-5 satellite, where the same person would only need a 22-inch dish to get the Ku-band DTH service off of the Eutelsat 9B satellite.

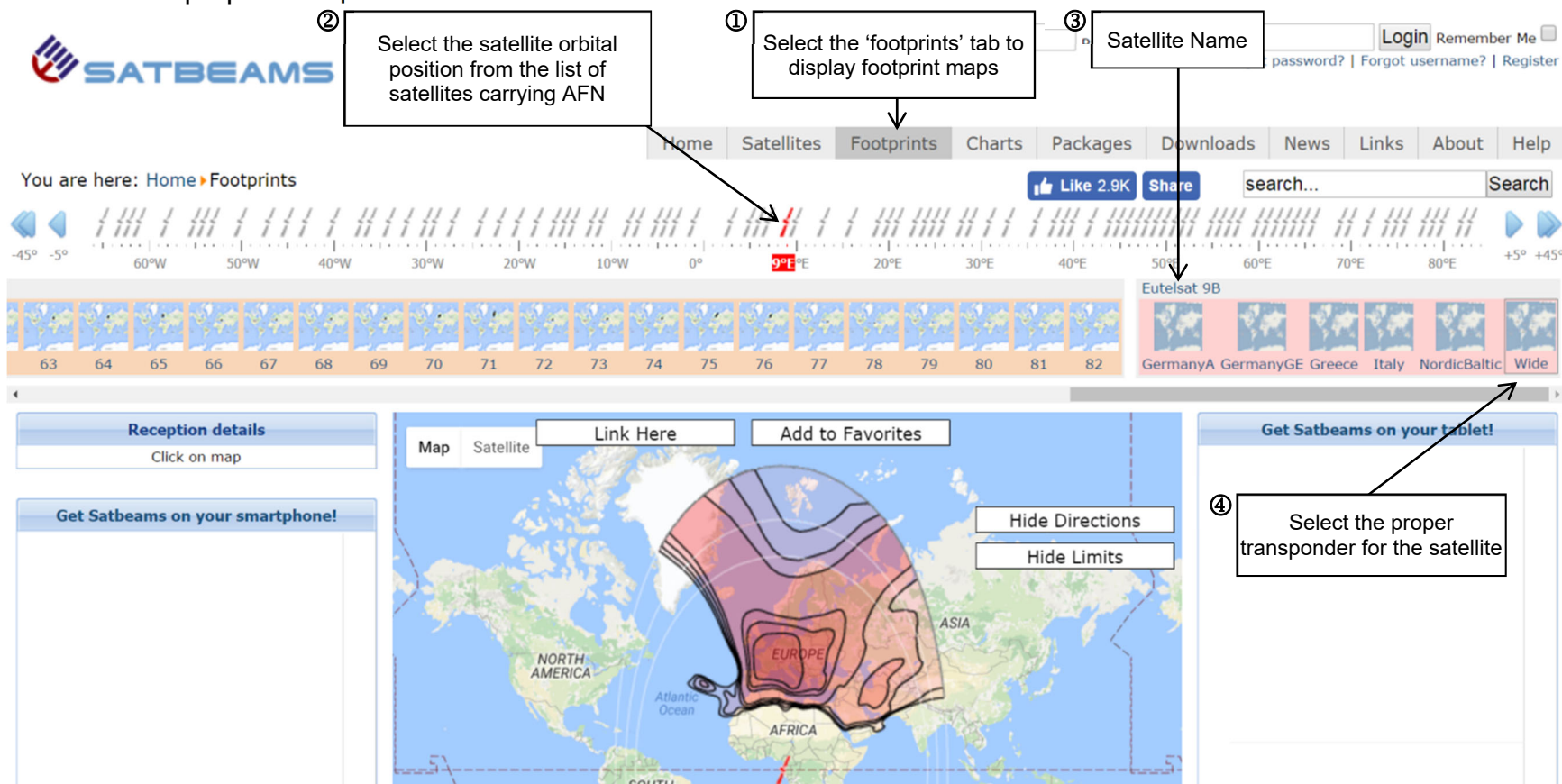


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Determining Satellite Dish Size

Check the information on page three to determine which satellite footprint you're in and which transponder AFN uses on that satellite to deliver programming. In the example below you are seeing the "Wide" beam, Ku-band transponder footprint on the Eutelsat 9B satellite on www.satbeams.com.

- ① From the main page select 'footprints.'
- ② Select the orbital position of the satellite.
- ③ Using the scroll bar under the mini footprint maps, scroll to the correct satellite.
- ④ Select the proper transponder.



The screenshot shows the Satbeams website interface. At the top, the Satbeams logo is on the left. A navigation bar contains links: Home, Satellites, Footprints, Charts, Packages, Downloads, News, Links, About, and Help. Below the navigation bar, a horizontal scroll bar displays a series of satellite footprint maps. A callout box labeled ② points to this scroll bar, stating: "Select the satellite orbital position from the list of satellites carrying AFN". Another callout box labeled ① points to the "Footprints" tab in the navigation bar, stating: "Select the 'footprints' tab to display footprint maps". A third callout box labeled ③ points to the "Eutelsat 9B" satellite selection, stating: "Satellite Name". Below the satellite selection, a row of transponder options is shown: GermanyA, GermanyGE, Greece, Italy, NordicBaltic, and Wide. A callout box labeled ④ points to the "Wide" transponder, stating: "Select the proper transponder for the satellite". The main content area features a large map of Europe and Africa with a satellite footprint overlay. To the left of the map are sections for "Reception details" and "Get Satbeams on your smartphone!". To the right of the map are buttons for "Link Here", "Add to Favorites", "Hide Directions", and "Hide Limits". At the bottom right, there is a section titled "Get Satbeams on your tablet!".

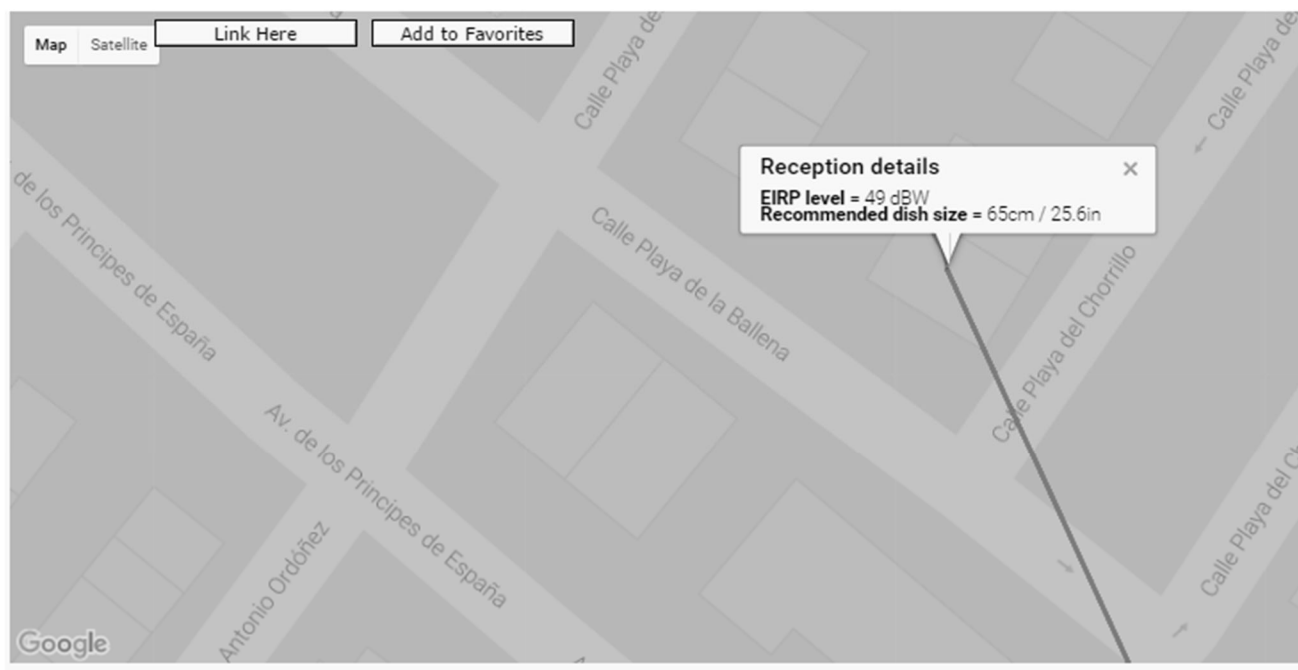
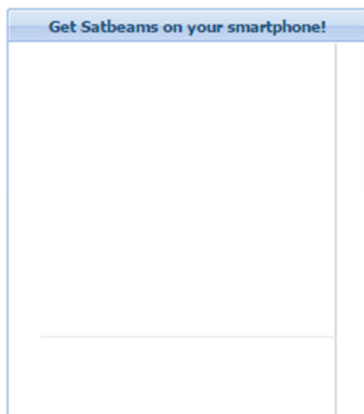
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Determining Satellite Dish Size

This example demonstrates steps necessary to determine the satellite dish size and other pertinent information for a person living off base near Rota Naval Station in Spain. In this example we are using the Eutelsat 9B Ku-band satellite footprint as this is a satellite delivering AFN content to this location. The identified steps work for all locations.

Once you have selected the proper satellite and transponder on www.satbeams.com, zoom in on the map and left click the mouse on your location. A 'reception details' dialog box appears on the map and displays the recommend dish size. Another 'reception details' box on the left side of the screen provides additional information.

Reception details	
9°E — Eutelsat 9B (E9B, EDRS-A)	
Ku-band Wide beam	
Distance to satellite:	37464.8km
Location:	36.63°N 6.38°W
Elevation angle:	44.5°
LNB Tilt (skew):	19.6°
True azimuth:	155.2°
Next Sun azimuth match at:	10:44:02 (GMT)
	06:44:02 (PC time)



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Determining Satellite Dish Size

Now that you know the recommended satellite dish size, use www.dishpointer.com to get the elevation, true and magnetic azimuth and the LNB Skew specifications.

Satellite Finder / Dish Alignment Calculator with Google Maps

Your location: e.g. streetname, zip code, (lat, lon):
rota, spain Go!

Most Popular Satellites in

1. 119W DIRECTV 7S | ECHOSTAR 14 | ECHOSTAR 7
2. 110W DIRECTV 5 (TEMPO 1) | ECHOSTAR 10 | ECHOSTAR 11
3. 97W GALAXY 19 (G-19)
4. 61.5W ECHOSTAR 12 (RAINBOW 1) | ECHOSTAR 16 | ECHOSTAR 3
5. 91W GALAXY 17 (G-17)

All Satellites | Motorized Systems | Multi-LNB Setups:
9E EUTELSAT 9A | EUTELSAT KA-SAT 9A

Map Satellite

Options
☐ show obstacle (line of sight checker)

3 Select the green pin and move it to your location.

4 Record the Dish Setup Data

Your Location	Satellite Data	Dish Setup Data
Latitude: 36.6288° Longitude: -6.3761°	Name: 9E EUTELSAT 9A EUTELSAT KA-SAT 9A Distance: 37451km	Elevation: 44.5° Azimuth (true): 155.3° Azimuth (magn.): 157.0° LNB Skew [?]: -19.6°

- ① Entering your city and country will position the map to the center of the city and speed up the process of finding your location.
- ② The pull-down menu lists the satellites by their orbital location above the earth's longitudinal lines. Check the satellite positions on the chart on page three to verify the location of the satellite you wish to find. **NOTE:** dishpointer.com uses Eutelsat 9A and 9B interchangeably.
- ③ Click on the green pin and drag it to your location. You can zoom in and out of the map by using the +/- in the lower right-hand corner or the mouse roller wheel.
- ④ The dish setup data will help you properly align your satellite dish to achieve a quality signal. Mouse over the four data elements to display a pop-up box of additional information.

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Definitions

C-band: Satellite transmission that uses lower downlink frequencies between 3.74 and 4.2GHz. The lower frequencies that C-band uses perform better under adverse weather conditions than Ku-band frequencies.

Decoder: A component or box that is used to decrypt encrypted satellite signals. All AFN programming is encrypted to limit access only to the authorized audience.

DTH: The Direct to Home service that provides eight television and 18 audio services.

DTS: The Direct to Sailor service that provides three television and three audio services.

Feedhorn: A part of a satellite dish system which gathers the reflected signal from the dish and focuses it toward the LNB.

Ku-band: Satellite transmission that uses higher downlink frequencies ranging from 11.7 to 12.7GHz

LNB: A low-noise block downconverter is the receiving device mounted on satellite dishes used for satellite TV reception, which collects the radio waves from the dish. There are three types of LNBs: circular polarization, linear polarization and universal. Direct to Home Ku-band customers should use a universal Ku-band LNB. DTS C-band customers should use a circular polarization LNB.

LNB Skew: The required rotational angle needed to match the horizontal and vertical position of the orbiting satellite.

Rain Fade: The degradation of a satellite signal caused by atmospheric conditions like heavy rain, snow or thick cloud cover.

Satellite Transponder: Satellite transponders are like TV channels, you have to be tuned to the right transponder to see the content you want.

Unstable Signal: An unstable signal error occurs when the satellite signal reaching the dish is not strong enough to achieve a quality signal. The cause off this error is typically weather related during periods of heavy rain, snow or thick cloud cover.

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Helpful Links

Adjusting the elevation and azimuth of a satellite dish: <http://www.sat.drossel-services.de/method.php?lg=EN>

How does satellite TV work? <http://www.tech-faq.com/satellite-tv.html>

Find the satellite dish size you need at www.satbeams.com

Finding the dish elevation, azimuth and LNB Skew: www.dishpointer.com

Dish alignment calculator using Google Maps: <http://www.geosats.com/lookangle.html>

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