



Polarization Characterization of a Radio Telescope using Satellite Signal

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Abstract

Polarization plays an important role in radio communication systems. The vertical and horizontal form of polarization can be obtained from linear polarisation. In circular polarised wave electric field has a constant magnitude and rotates 360 degrees with each complete cycle in a plane perpendicular to the direction of the wave. The circular polarisation can be righthand circular, clockwise or left hand circular anticlockwise depending upon direction of rotation. The ground wave propagation is better for linear polarisation and being used for medium wave broadcast. For long distance communication horizontal polarisation is used due to slight advantage of ionosphere. Circular polarisation used for satellite communications, GPS, WLAN as there are some advantages in terms of propagation.

The GMRT uses 45 meter diameter parabolic dish antennas and receives dual polarization signal at the receiver system and uses linear feeds. Four antenna feeds are mounted on rotating turret and are placed at focus of the parabolic reflector antenna. Engineering tests have been carried out to confirm the Vertical and horizontal polarisation. This paper presents the measurement results of polarisation characterisation and RF isolation measurement obtained using satellite signals for band 2,3 and 5. This method uses parabolic dish reflector surface. The second method used for polarisation characterisations by use of RHCP and LHCP helical antenna. In this direct radiation method using helical antenna does not use reflector surface of the dish and signals are directly received by the feed.

References

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