

# NARROW BAND NETWORKING RADIO WAVEFORM





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A new networking waveform, 5199 Narrow Band Networking Radio Waveform (NBNR) is developed and implemented on ASELSAN's 9661/9651 Software Defined Radio (SDR) Family in order to meet requirements of Command & Control Systems including high data rate, reliability, security, flexibility and IP data communication with real-time support.

5199 NBNR is designed by taking the requirements of new generation Command & Control Systems into consideration. With NBNR, it is aimed not only to meet the requirement of operating on narrow frequency band but also to decrease the number of radios used for simultaneous voice and data communications, to transfer/route data traffic between two different radio networks –without the assistance of an additional equipment-, to meet the data rate and prioritization requirements, to provide the information security and to take necessary precautions against electronic warfare as well.

5199 NBNR comes with advanced frequency hopping feature that ensures interruption free communications under challenging electronic warfare conditions. It also provides simultaneous voice and data communication services to the users. Thus, the number of radios required to perform voice and data communications is reduced by merging the voice and data networks with one single radio.

5199 NBNR supports multiple voice groups within a single radio net and thus allows efficient use of the limited spectrum by allowing merging multiple hierarchical user groups into a narrow band single physical radio net.

The transfer/routing of data traffic between two separate radio networks is achieved by 9661/9651 SDR's without the assistance of an external equipment. Thus, communication security is enhanced by end-to-end encryption and delay through the networks is reduced.

Additionally, IP-based prioritization service (QoS) is provided by 5199 NBNR in order to meet the timing requirements of typical traffic types that are observed on Command&Control Systems.

## Main Features

- Operating frequency: 30-512 MHz, occupying 25 kHz channel bandwidth
- Simultaneous voice and data communications
- Data traffic routing between radio networks
- Full IP-based communication
- Mobility support
- Multicast and Broadcast communication
- Prioritization and pre-emption
- User data rate up to 16 kbps on narrow band when using single frequency per slot per radio net (valid for frequency hopping radio nets as well)
- Multiplicative increase of the user data rate when multiple frequencies are used per slot per radio net (valid for frequency hopping radio nets as well)
- Adaptive Modulation and coding

## Security Features

- End-to-end encryption
- Frequency hopping
- Authentication
- Strong Integrity Check
- FEC coding

