

Medium and low capacity radio-relay systems



Digital radio-relay system,
intended for the operation in
the 7, 8, 13, 15, 18, 23 and 38
GHz frequency bands

SPARKWAVE
digital microwave radio



The SparkWave DRL -GA Family Description

In comparison with other transmission media, radio-relay systems have certain advantages. Essentially, radio devices enable quick set up of a connection between two locations, where a fixed network is unavailable or has too small transmission capacity. Radio-relay systems can be used for backbone links of large systems corporations, redundant links for the main route protection, for the temporary connections, base station connection of cellular mobile network or for the access network. SparkWave DRL-GA can be applied anywhere, where quick installation, flexible and cost effective solution of telecommunication problem is needed.

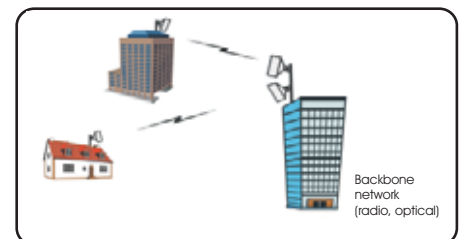
Applications

Due to different frequency ranges and transmission capacities, the SparkWave DRL-GA family has a wide range of applications. Principally, the lower frequency ranges are more convenient for long distance transmissions (backbone links of lengths up to 80 km) and higher frequency ranges are intended for short-range transmission links.

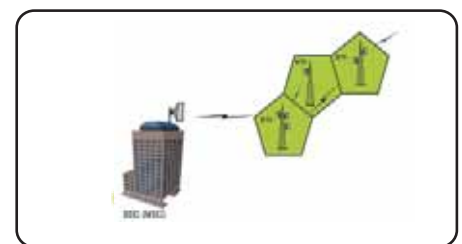
The selection of frequency range is influenced by climatic conditions of the link location (rainy zone), terrain configuration (flat terrain, mountains) and regulated by local regulation. Quality and availability of links, required to comply with ITU-R recommendations, can be achieved with simple 1+0 configuration or 1+1 configuration: hot stand-by, frequency and (or) space diversity.

SparkWave DRL-GA applications are:

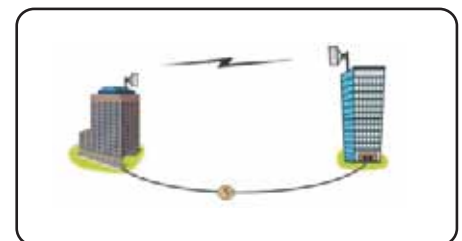
- Creation of main and redundant transmission paths in public telecommunications network and in large corporations (railways, oil-gas distribution companies, telecommunications along highways, government and private organizations)
- Base station connections for GSM operators
- Connections in dedicated networks (interconnection between PABX, LAN and WAN network)
- Urgent and temporary connections that must be set up in the shortest possible time (political, cultural and sport events, natural disasters etc.)
- Quickly growing networks, especially core and access networks for new internet/data service providers



End user access network



Cellular network



Redundant connections

Advantages of the SparkWave DRL-GA Family:

Technology

The advanced technological solutions of microwave and baseband units enable achievement of top technical performance and very high reliability of operation.

Possibility of applying an active repeater

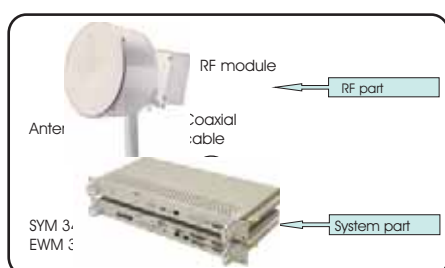
The AR 18/23 active repeater produced by Iskra Sistemi provides additional applicability of radio systems. The active repeater is applied where long distance transmission is needed and/or in cases where two radio stations are not within line of sight and in remote areas where no power supply is available.

Compatibility with the SparkView network element management system

The SparkWave DRL-GA family is directly compatible with the SparkView management system.



Description of the Device



The SparkWave DRL-GA system can be divided into the system part (IDU) and the RF parts (ODU). Both are interconnected with one single coaxial cable. The system part is independent from frequency ranges, while the RF part is independent from transmission capacity.

The System Part (IDU) is indoor mounted and enables:

- 4 QAM modulation and demodulation of intermediate frequency signal
- Time multiplexing of baseband (2x2, 4x2, 8, 16x2+2, 34+2 Mbit/s) and service channels
- Mapping and demapping of Ethernet signals
- Local and remote supervision by the SparkView network element management system
- Protection switching in the configuration 1+1

The RF part (ODU) contains an antenna and an RF module. Both are bound together to a compact mechanical block.

Another possibility is separate fastening of the antenna and RF module to the antenna mast. By a short flexible waveguide will be used for the connection.

Radio devices operating in the frequency band of 7/8 GHz have optional possibility of all indoor installation of the RF module next to the system part. In that case, the RF module will be connected to antenna by waveguide.

Five different signals are transmitted in both directions: transmitted and receiving intermediate frequency signals, supply voltage for RF module and bi-directional internal communication. The maximum length of the cable is dependent on insertion loss and should not exceed 27 dB at 1.5 GHz

NAME OF DEVICE	FREQUENCY BAND
SparkWave DRL 7GA	ITU-R Rec. F.385-6
SparkWave DRL 8GA	ITU-R Rec. F.386-6
SparkWave DRL 13GA	ITU-R Rec. 497-6
	ERC/Rec. 12-02E
SparkWave DRL 15GA	ERC/Rec. 12-07
SparkWave DRL 18GA	ERC/Rec. 12-03
	ITU-R Rec. F.595-3
SparkWave DRL 23GA	ERC/Rec. 13-02
SparkWave DRL 38GA	ITU-R Rec. F.749-2
	ERC/Rec. 13-01E

There are two different types of mechanical construction of the system part (IDU): VSEP and 19" subrack.



SYM34 - 19 subrack



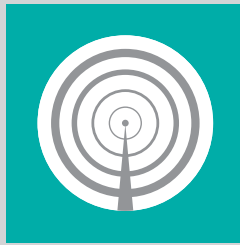
EYM34 - 19 subrack



VSEP subrack



Microwave block



System Configuration

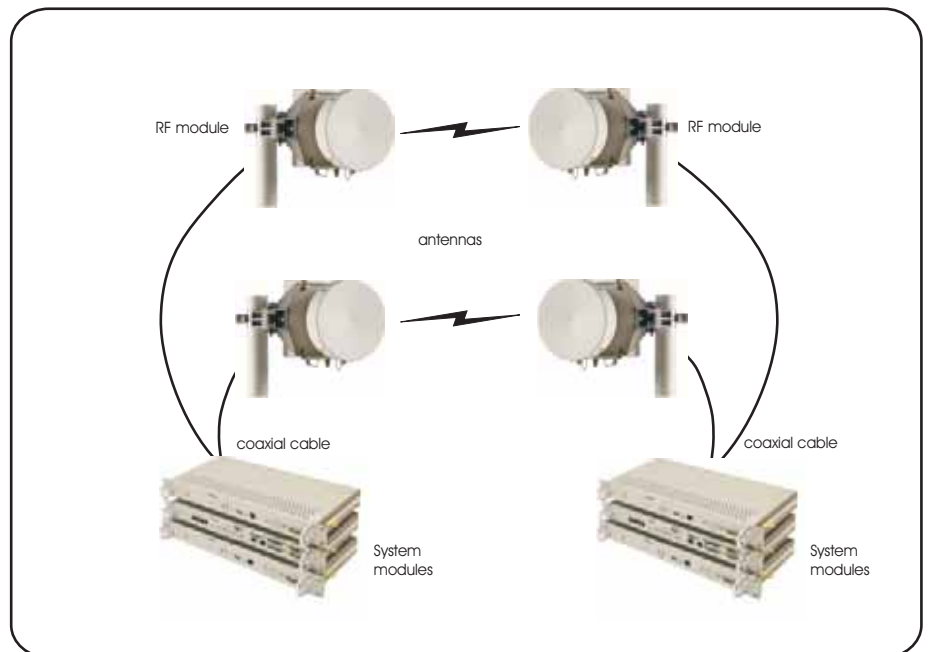
Non-protected System (1 + 0)

The transmission path must meet the line of sight (LOS) condition. The link is not protected against equipment failure. Due to the very high MTBF (> 170.000 h), this configuration can meet almost all the availability requirements for access networks.

Protected System (1 + 1)

In cases where very high transmission availability and quality is required, more protection configurations are available. The simplest one is a hot stand-by configuration. Vital parts (IDU and ODU) are doubled. Space or frequency diversity systems are used when transmission quality could be degraded due to multi-path propagation (fading) big distance or availability required.

In frequency diversity configurations, switching between the two receivers is hitless.



Hot stand-by solution



AR 18/23G Active Repeater

The AR 18/23 G Active Repeater operates in the frequency bands of 18 and 23 GHz. It can be applied when there is NON LINE of SIGHT between two stations. It can be used in all cases where application of a passive repeater is not possible, due to inconvenient angles, too large surface or high building costs.

Main active repeater features:

- Low cost solution
- Easy and quick installation
- There are no ecological problems, which could appear in the case where passive repeaters are overly exposed on visible and sensitive points
- Low power consumption possibility of solar power supply < 1-2W
- Angles between antennas can vary from a few degrees up to 180 degrees
- Signal amplification enables long distance connection much greater than those achieved by passive repeater



SparkView NEMS

Supervision and Management

Network Element Management System SparkView enables network elements to be managed in accordance with international standards.

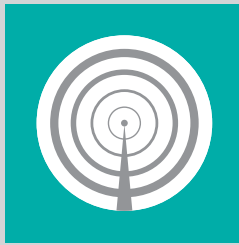
Nodes and service channels for telecommunication management network are built into the devices.

Stand Alone or Client/Server configuration is possible.

Modular concept enables easy way to integrate SparkView into the higher level TMN.



SparkView management



The Main Features of the SparkWave DRL-GA Family

- Frequency bands 7, 8, 13, 15, 18, 23 and 38 GHz
- Transmission capacity of 2x2, 4x2, 8, 16x2+2 and 34+2 Mb/s
- 4x10/100 Ethernet interface over 34 Mb/s + 2 Mb/s wazside channel + DSC
- The RF module (ODU) is independent from the system (IDU) and the system part (IDU) is independent from the RF module (ODU)
- Analog and digital service channels available
- Auxiliary 2 Mbit/s channel (at 34, 16x2 Mbit/s and 4x Ethernet transmission capacity)

Advantages

- Compact mechanical construction and a very high level of integration
- Easy and quick installation
- High MTBF value (170,000 hours in 1+0 configuration)
- Low power consumption
- Effective SparkView network management system
- ATPC (Automatic Transmitter Power Control)

Acronym Expression

ATPC	Automatic Transmitter Power Control
EOW	Engineering Order Wire
FD	Frequency Diversity
HSB	Hot Stand-BY
ITU	International Telecommunication Union
LAN	Local Area Network
LOS	Line of Sight
MTBF	Mean Time Between Failures
PABX	Private Automatic Branch Exchange
QAM	Quadrature Amplitude Modulation
SD	Space Diversity
TK, TC	Telecommunications
VSEP	Vertical System Equipment Practic
NLOS	Non Line of Sight
IDO	Indoor Unit
ODU	Outdoor Unit