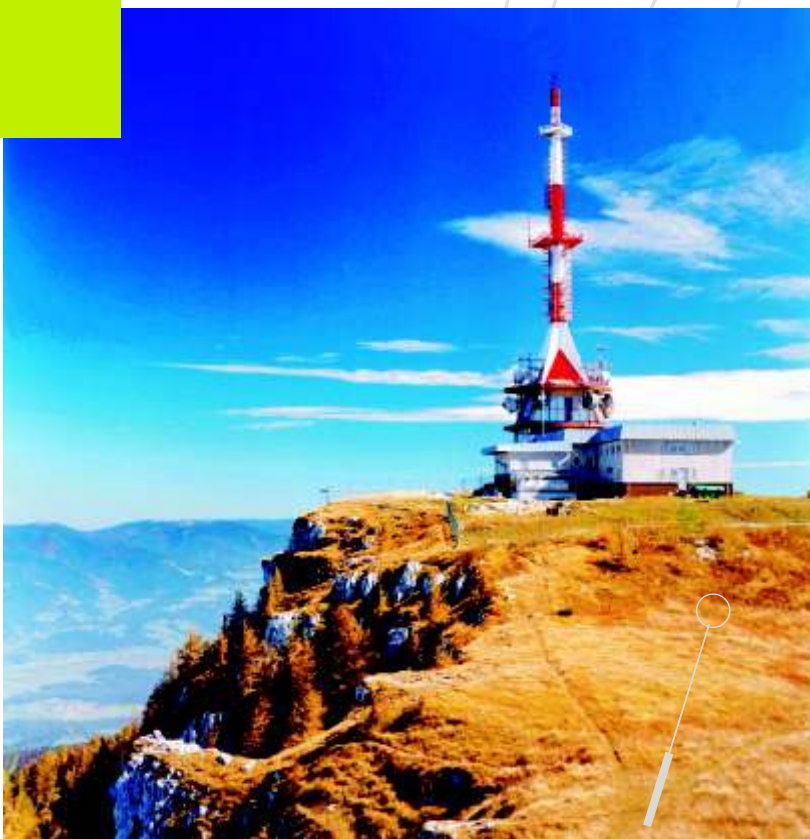


SparkWave

The new generation of
medium and low capacity
radio-relay systems



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



The SparkWave Family Description

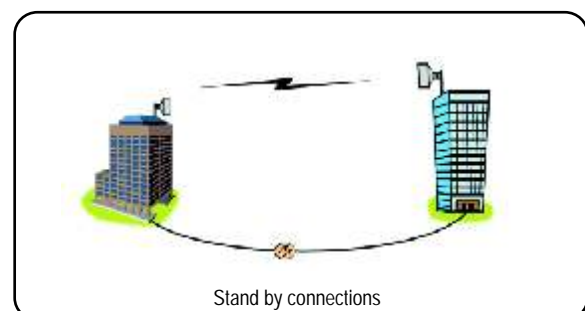
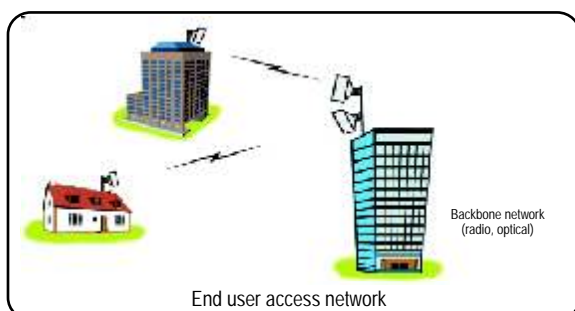
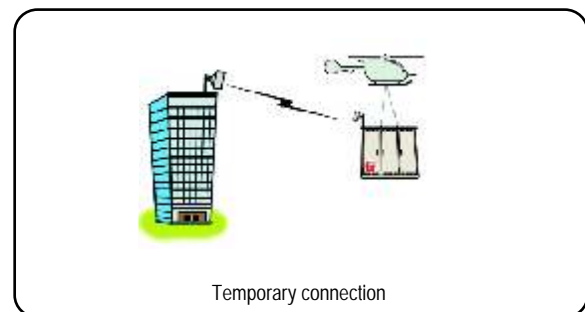
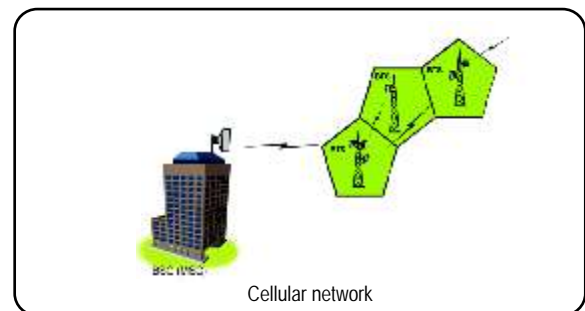
In comparison with other transmission media, radio-relay systems have certain advantages. Essentially, radio devices enable quick set up of a connection between two locations, whereas a fixed network is unavailable or has too small a transmission capacity. For example, radio-relay systems can be used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

Applications

Due to different frequency ranges and transmission capacities, the SparkWave 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, for example) and higher frequency ranges are intended for short-range transmission links—up to a few tens of kilometers. The selection of frequency range is also influenced by climatic conditions of the link location (rainy, dryly), path configuration (sea, mountains) and often 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.

The Most Convenient SparkWave Applications Are:

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



Advantages of the SparkWave Family Are:

State of the art technology

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

Modular structure

The modular structure gives the family flexibility and, consequently, a cost effective solution to customer needs.

Possibility of applying an active repeater

The AR 18/23 active repeater produced by Iskra Transmission 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.

Compatibility with the SparkView network element management system

The SparkWave family is directly compatible with the SparkView management system with all the advantages that can be offered by this system. There is no need for additional hardware to achieve this compatibility.

System Configuration

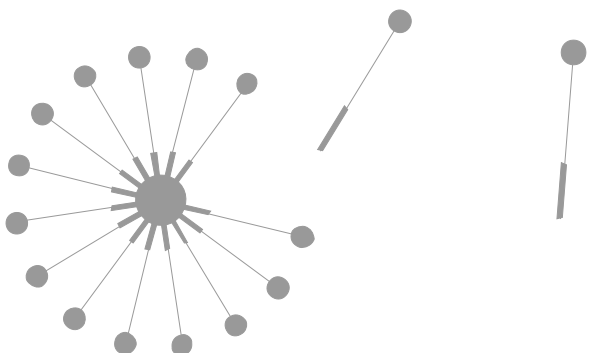
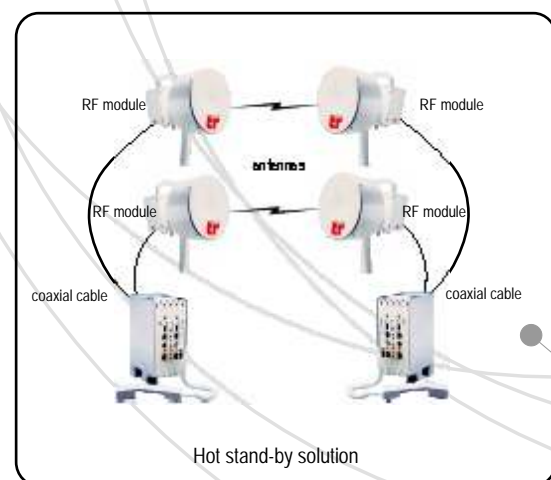
Non-protected System

The basic system configuration is 1+0 without protection. In this case, a radio link has two single devices. The transmission path must meet the line of sight (LOS) condition. The link is not protected against equipment failure. The exception is when ring configuration or medium diversity systems are applied. Due to the very high MTBF, this configuration can meet almost all the availability requirements for access networks.

Stand-by Systems

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. In this case, all the parts of devices are doubled. Double antennas can be avoided by a power divider or by using a dual polarization antenna. Space or frequency diversity systems are used when transmission quality could be degraded due to multi-path propagation (fading).

In all configurations, switching between the two receivers is without any loss of information (hitless).



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 no LOS between two stations. The second application is in the case of a very long transmission path, when the receiving level is too low to achieve adequate fade margin. It can be used in all cases where application of a passive repeater is not possible due to inconvenient angles, the large surface of repeater or is simply too great an expense.

Main active repeater features:

- ✱ Low cost equipment
- ✱ 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 panel application
- ✱ Angles between antennas can vary from a few degrees to up to 180 degrees
- ✱ Signal amplification enables long distance connection much greater than those achieved by passive repeater

Supervision and Management

Network Element Management System SparkWiev enables network elements to be managed in accordance with international standards. Nodes and service channels for telecommunication management network are built into the devices.

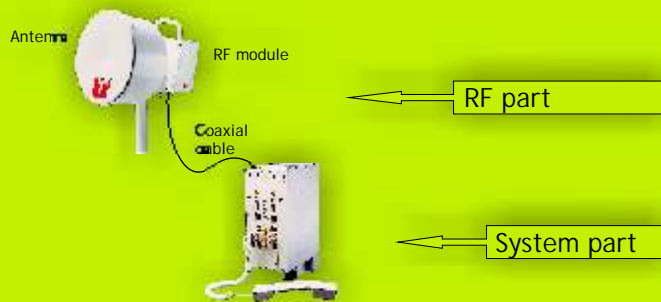


Integrated management

ACRONYMS USED

ACRONYM	EXPRESSION
EOW	Engineering Order Wire
FD	Frequency Diversity
HSB	Hot Stand-By
ITU	International Telecommunication Union
LAN	Local Area Network
LOS	Line of Sight
MTEF	Mean Time Between Failures
PABX	Private Automatic Branch Exchange
QAM	Quadrature Amplitude Modulation
SD	Space Diversity
TK, TC	Telecommunication
VSEP	Vertical System Equipment Practice

Description of the Device



The SparkWave system can be divided into the system and the RF parts. Both are connected with a coaxial cable. The system part is independent from frequency ranges, while the RF part is independent from transmission capacity.

The System Part is mounted indoors and enables:

- ✱ QAM modulation and demodulation of intermediate frequency signal
- ✱ Time multiplexing of baseband (2x2, 4x2, 16x2 Mb/s) and service channels
- ✱ Local and remote supervision by the Network Element Management System
- ✱ Protection switching in the case of 1+1

The RF part 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. In this case, a short flexible waveguide will be used for the connection. Radio devices operating in the frequency band of 7/8 GHz have another possibility of indoor installation of the RF module next to the system part. In that case, the RF module will be connected to antenna by an elliptical waveguide.

The system part and the RF part are connected together over a single coaxial cable. Five different signals are transmitted in both directions: transmitted and receiving intermediate frequency signals, supplying 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 7	ITU-R Rec. F.385-6
SparkWave 8	ITU-R Rec. F.386-6
SparkWave 15	ERC/Rec. 12-07
SparkWave 18	ERC/Rec. 12-03 ITU-R Rec. F.595-3
SparkWave 23	ERC/Rec. 13-02
SparkWave 38	ERC/Rec. 12-01

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



VSEP



19" subrack



Microwave unit

The Main Features of the SparkWave Family Are:

- * Frequency ranges of 7, 8, 15, 18, 23 and 38 GHz
- * Transmission capacity of 2x2, 4x2, 8, 16x2 in 34 Mbit/s
- * The microwave part is independent from the transmission capacity and the system part is independent from the frequency range
- * Analog and digital service channels
- * Auxiliary 2 Mbit/s channel (at 34 and 16x2 Mbit/s transmission capacity)

Advantages

- * Compact mechanical construction and a very high level of integration
- * Easy and quick installation
- * High MTBF value (measured value is more than 160 000 hours for 1+0 configuration)
- * Low power consumption
- * Software adjustment of transmitted power and frequency
- * Effective Network Element Management System SparkView



The subject can be changed without notice.



Iskra

Iskra Transmission

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