

## Economic microwave links FH1G4 for fixed industrial radio networks

# Microwave transceiver FH1G4



- Transmission of voice or data per radio on several tens of km
- Use of the new European frequency bands 1.4 GHz
- Deployment of fixed multipoint radio networks to replace wired links
- Interconnection of PMR radio base stations to replace 450 MHz links
- Particularly reduced operating costs
- Omnidirectional or directional separate antennas

### Principal characteristics:

- Frequency bands: 1.375 GHz to 1.452 GHz
- Narrow channel spacing: 25 or 75 KHz
- Maximum carrier power: 10 W
- Great selectivity in reception
- Maximum data rate: 19.2 Kb/s in 25 KHz and 38.4 Kb/s in 75 KHz channel spacing
- Audio band-width: DC to 4 or 15 KHz in 25 or 75 KHz channel spacing
- Operates in half-duplex or full-duplex mode
- Loop mode for connection testing
- Remote parameters setting
- Possibility to backup the radio link using PSTN
- Remote copy of digital IO per radio

### Presentation:

The microwave transceivers FH1G4 make it possible to deploy private communication networks over long distances, up to 50 km per jump. They use the new open frequency band in Europe for the fixed connections, around 1.4 GHz.

They can transmit data, voice and images.

They represent a very economic solution compared to the recurring costs of the leased lines.

They have many options allowing to build point-to-point, point to multi-points or linear networks with multiple jumps for very wide covers.

### License:

The microwave transceivers FH1G4 use frequencies subjected to license which guarantee the continuity and the quality of the service. The fixed prices of license fee are particularly reduced and are independent of the distance between the transmission sites. When they replace leased lines, the amortization of the equipment is carried out in a few months.

Channel spacing	Annual license fee *
25 KHz	160 €
75 KHz	320 €

\* French prices in force on 2001/03/01, per jump up to 50 km

## Security:

### Transmission:

The data can be transmitted with several levels of security. According to the application requirements and installation of the microwave links, the following procedures are available by parameter setting:

- Error detection and removal (CRC)
- Error auto-correction (FEC)
- Data acknowledgement and retries in case of error (ARQ)

### PSTN for backup:

In the event of loss of the microwave link, the FH1G4 transceiver can automatically manage the restoration of the communication by the establishment of a PSTN call. This spare communication channel needs an external PSTN modem to be connected on one port of the transceiver.

This possibility is particularly interesting when the microwave links are intended to replace a leased line. It allows to preserve the advantages of the telephone line while avoiding the very high fixed costs of a leased line.

## Radio range:

Microwave links FH1G4 authorize connections with theoretical radio path assessments higher than 145 dB without taking into account the gain of the antennas. The 1.4 GHz frequency band allows the easy construction of directional antennas with strong gain. Between two high points, the transmission range can easily reach 50 to 100 km.

The radio connections in the 1.4 GHz band support some obstacles. They do not require that the antennas are perfectly in line of sight. The radio ranges can be extended using procedures of automatic routing and/or automatic repetition of the data packets.

## Data rate :

According to channel spacing used, it is possible to obtain data rates ranging between 1200 and 38.4 Kb/s. Thanks to their modular concept, microwave links FH1G4 can be modified, after delivery, to change the spacing between channels. This possibility makes it possible to face up to an increase of data traffic.

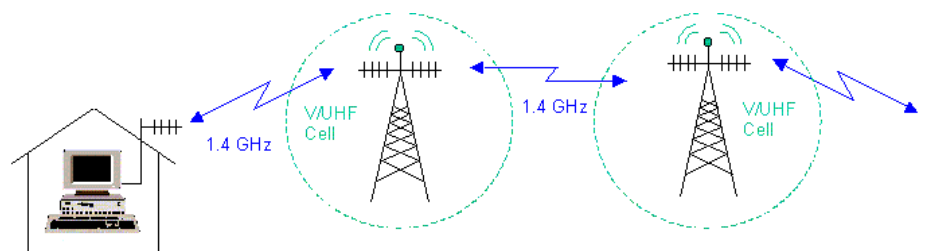
## Network architecture:

A large variety of networks can be deployed by using the possibilities of routing or repetition of the microwave links. Classic structures are: linear, star or mesh networks.

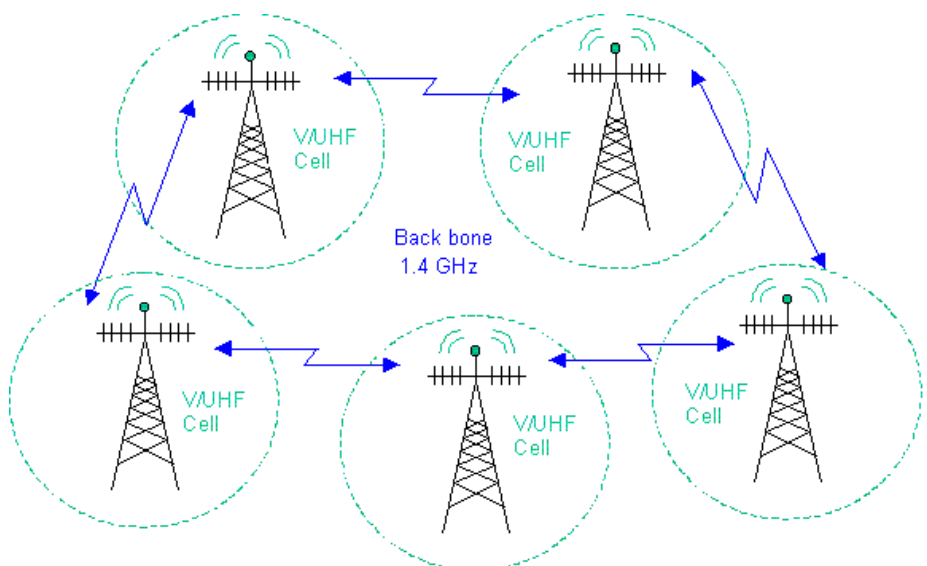
The very great spectral purity of FH1G4 product allows to install several microwave links in duplex mode on the same site of emission without causing disturbance from one branch of the network onto the others.

It is also possible to use microwave links FH1G4 to interconnect several Comatis radio modems operating on different frequency bands. In this case, the interfacing of the different network levels is done simply by connection of the communication ports. A routing function can automatically direct the data packets through the branches of the network.

### Interconnection of RF base stations



### Multi level radio data network



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## Support for the deployment:

After the analysis of your needs and the constraints of the radio network to deploy, our support service is at your disposal to find the best solution for your project.

In complement of the sale of our radio transmission products, we propose the following services to you: radio survey in external sites, specification of network architecture, support for the radio network commissioning, complementary development or integration to ensure a full compliance with the technical requirements, obtaining of the licenses of emission if needed...

## Main characteristics:

Frequency band	1375 to 1400 MHz, and 1427 to 1452 MHz
Range	Up to 50 km per jump according to installation of the antennas
Operation	Full duplex or half duplex
Date rate on the AIR	1200 – 19200 b/s with 25 KHz of channel spacing 9600 – 38.4 kb/s with 75 KHz of channel spacing
Data rate on communication ports	9.6 to 38.4 kb/s
Electrical interfaces	RS232, RS422 or RS485
Conformity to the standards	Radio : ETS 300 630, CEM : ETS 300 385 class B
ART Approval	n° 00 0134 PP0
Channel access method	CSMA or TDMA
Audio interface	4 wires, 0 dB, 600 Ohms
Protocol of command	Hayes, Modbus or transparent mode
Digital inputs/outputs	Remote copy of inputs/outputs, alarm ...
Options :	
Routing	Radio cover extension with automatic routing of the data
Network protection	Automatic backup of the radio link using PSTN modems
Network supervision	Self testing / remote loop testing
Remote maintenance	Local or distant indication of the error rate

## Technical specifications:

Modulations	FFSK, GMSK or FSK 4L	
Communication ports	2 asynchronous serial ports (V24)	Data rate: 9.6 to 38.4 kb/s
Primary connector	DB9 RS232	
Auxiliary connector	D25 RS422 or RS485	PTT input, RSSI output
Power supply	100 - 230 VAC or 12 Vdc	Backup using an external battery
Transmitter power	+33 dBm ( max. + 40 dBm )	Impedance: 50 ohms
Channel spacing	25 or 75 kHz	
Tx spurious radiations	<-95 dBc	
Receiver sensitivity	-110 / -105 dBm (25 / 75 kHz )	
Rx spurious radiations	<-95 dBc	
Data protection	CRC, FEC or acknowledgement/ retries (ARQ)	Choice by parameter setting
Parameter setting	Embedded setup menu	Local or remote setting per radio
Software upgrade	Downloading through serial port	Software stored in FLASH memory
Temperature Range	-20°C, +40°C	
Size	220 x 90 x 390 mm	W x H x P
Weight	approximately 4 kg	

*Non contractual information*

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