



Nokia FlexiHopper Microwave Radios – fast set up of transmission links

Nokia FlexiHopper Microwave Radios allow transmission links to be established rapidly. These versatile radios can be set up quickly and easily to meet a variety of transmission needs, bringing cost savings and helping rapid network roll out.

Operating in the 13, 15, 18, 23, 26 and 38 GHz frequency bands, Nokia FlexiHopper Microwave Radios can be used for many communication needs providing connections e.g. in cellular, fixed and dedicated networks.

The Nokia FlexiHopper Microwave Radio comprises an outdoor unit and an indoor unit, which can be selected from four different models. In the Nokia MetroSite and Nokia UltraSite solution the indoor unit (FC RRI or FXC RRI) is fully integrated in the base station. The radio and BTS is connected using a single Nokia Flexbus cable allowing fast and simple installation. Nokia FlexiHopper radios can also be easily deployed from existing Nokia Talk-family Base station sites with the BTS integrated RRIC indoor unit. This offers a cost effective way to maximise the usage of existing sites. Another option is to use the modular FIU 19 indoor unit which provides general telecommunications interfaces and mounts to a standard 19" rack.

A totally new level of flexibility
Nokia FlexiHopper Microwave Radios bring a new level of versatility when both network capacity and coverage are required.

All the features below can be used to tailor and reconfigure the transmission for fast and low cost roll out and expansion, even when last minute changes are unavoidable.

- Four different indoor unit types.
- A single indoor unit can support multiple Nokia FlexiHoppers and/or Nokia MetroHoppers.
- Nokia Flexbus interconnections between units – Nokia Flexbus is also used for carrying connections between separate indoor units via a single cable.
- Radio and software controlled cross connection integrated.
- Software programmable transmission capacity.

Fast and easy to install
Lightweight and compact size of the Nokia FlexiHopper Microwave Radio simplify site acquisition and installation. In many cases, Nokia FlexiHopper can be installed in locations unsuitable for other transmission methods. Valuable space on the site is saved and complicated cabling avoided, as one indoor unit is capable of supporting several outdoor units. Indoor units are simply plugged into

position in other Nokia equipment environment and Nokia Flexbus cable used to connect the units together.

Access you can rely on
Nokia FlexiHopper Microwave Radios help improve your network's availability by offering superior transmission reliability. A variety of advanced features are used to achieve an availability better than any leased line solution. These include:

- Adaptive level control with quality measure (ALCQ) adjusts power to maintain transmission quality regardless of the weather.



- Forward error correction improves radio performance in demanding conditions.
- Automatic fading margin measurement during commissioning.
- Several protection methods: hot standby, frequency and space diversity.
- High Mean Time Between Failure ratio. At 32 years, the Nokia FlexiHopper Microwave Radio has one of the highest MTBF figures available.

When combined with Nokia's network reliability features, such as loop protection, you can achieve virtually error free transmission in even the most demanding conditions.

Main benefits

- Nokia Flexbus single cable interconnections together with integrated software controlled cross connections provide revolutionary easy and flexible site configurations.
- Four different indoor units, either

fully Nokia BTS integrated or 19", for all transmission requirements.

- Common indoor unit platform for both Nokia FlexiHopper and Nokia MetroHopper radios.
- One indoor unit supports multiple outdoor units – saves equipment and installation costs and reduces space requirements.
- Versatile design with a single platform for all frequencies.
- Compact and easy to install outdoor unit with integrated low profile antennas speed up roll out.

Technical Specifications of Nokia FlexiHopper Radio / Outdoor Unit

General	13	15	18	23	26	38
Frequency range (GHz)	12.76 – 13.24	14.51 – 15.34	17.71 – 19.69	21.23 – 23.60	24.55 – 26.45	37.05 – 39.44
Transmission capacity	2 x 2, 4 x 2, 8 x 2 or 16 x 2 Mbit/s (Software programmable)					
Modulation	$\pi/4$ DQPSK					
Channel spacing (MHz)	3.5/7.0/14.0/28.0		5/7.5/13.75/27.5		3.5/7.0/14.0/28.0	
Power consumption	max 25 W					
Operational temperature	-45 to +50 °C					
Weight and dimensions	5.5 kg		4.6 kg		4.0 kg	
	230 x 210 x 210		230 x 210 x 165		230 x 210 x 120	
Antenna type	Integrated low profile antenna with vertical/horizontal polarisation					
Antenna gain (dBi)	35.5 – 45.0	32.0 – 46.2	34.4 – 48.2	35.5 – 49.5	36.9 – 46.9	39.6 – 44.3
Transmitter	<i>Typical values in dBm</i>					
Output power	20 dBm		18 dBm		16 dBm	
Power adjustment range	25 dB					

Receiver Threshold level at antenna port

Capacity (Mbit/s)	Typical values in dBm BER 10-3 / BER 10-6		
2 x 2	-92/-89	-91/-88	-88/-85
4 x 2	-89/-86	-88/-85	-88/-85
8 x 2	-86/-83	-85/-82	-85/-82
16 x 2	-83/-80	-82/-79	-82/-79

Technical Specifications of Indoor Units

Base Station Integrated Indoor Unit	Integration into	Number of Outdoor Units
FC RRI	Nokia MetroSite and Nokia UltraSite base stations	1
FXC RRI	Nokia MetroSite and Nokia UltraSite base stations and Nokia MetroHub transmission node	1 – 2
RRIC	Nokia Intratalk BTS and Nokia Citytalk BTS	1 – 2
19" Indoor Unit FIU19	<i>Integration into</i> Standard 19" rack and Nokia Extratalk cabinet	<i>Number of Outdoor Units*</i> 1 – 3
<i>Main Channels</i>		
Electrical interface	4 – 16 x 2 Mbit/s, ITU-T G.703, 75 ohm SMB or 120 ohm TQ	
Auxiliary data channels (plug-in-unit)	EIA-232 or ITU-T V.11: max. 9600 bit/s ITU-T V.11 or ITU-T G.703: max. 64 kbit/s Four programmable I/O interfaces	
Weight and dimensions	2.45 kg, 2/3 U x 440 x 300	
Power consumption	max 17 W	

*Nokia FlexiHoppers and Nokia MetroHoppers can be mixed and one Nokia FlexiHopper can be protected