

# AirHarmony

Providing rural communities with the power of communications



**Intelligent 2G & 4G Base Station**  
*with integrated wireless backhaul and relay*



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# Providing rural communities with the power of communications



Operators have always struggled to develop a business case for delivering ubiquitous coverage in isolated rural communities, with traditional Macro Base Stations requiring significant infrastructure. Furthermore, the cost in providing backhaul to 2G and 4G base stations has meant that any service is limited, and cannot support data.

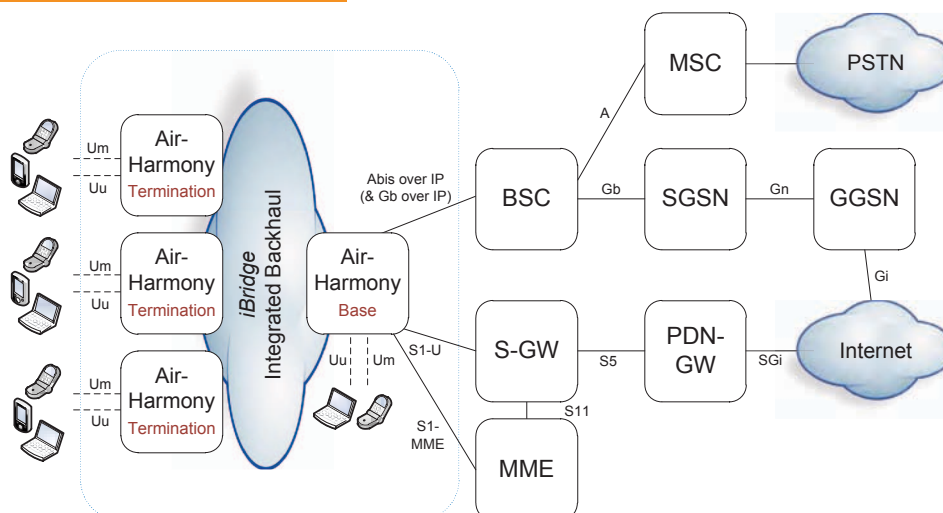
AirHarmony provides a revolutionary new approach to deploying a network, enabling operators to economically deliver 2G voice and 4G data services in hard to reach rural locations, especially in regions with low average revenue per user (ARPU).

Unlike conventional base stations, AirHarmony is a compact all-in-one base station with self-backhaul capability using Airspan's iBridge technology. AirHarmony delivers 2G & 4G voice and data services using the widely deployed and proven nanoGSM technology from ip.access, and Airspan's field proven software defined radio (SDR) technology.

AirHarmony is a highly flexible solution that can incorporate additional radio interface technologies, such as 3G, through remote software upgrade.

A unique feature of AirHarmony is its inbuilt backhaul technology that supports low latency, high capacity, non-line-of-sight, point-to-multi-point operation with relay-named iBridge. This groundbreaking architecture enables carriers to create sustainable service footprints with minimized CAPEX and OPEX profiles. Another key feature is the low power consumption of less than 200 W per sector. In many regions, a base station can be solar powered.

## Architecture Diagram



## GSM & GPRS ACCESS

2G Cellular services are provided using technology from ip.access.

AirHarmony uses the standard GSM and GPRS air interface to deliver voice, SMS messaging and data to 2G and 3G handsets.

AirHarmony supports a secure Abis over IP interface to the Base Station Controller (BSC), requiring low bandwidth and providing high tolerance to latency.

Each AirHarmony sector supports a single TRX which can support up to 14 simultaneous voice calls using dynamic AMR with half rate. For high traffic locations, where even greater capacity is needed, multiple AirHarmony sectors can be deployed.

## 4G ACCESS

AirHarmony is based on Airspan's Software Defined Radio (SDR) technology, and provides a fully featured LTE air interface which is compliant with the 3GPP standards and interoperable with commercial UE devices.

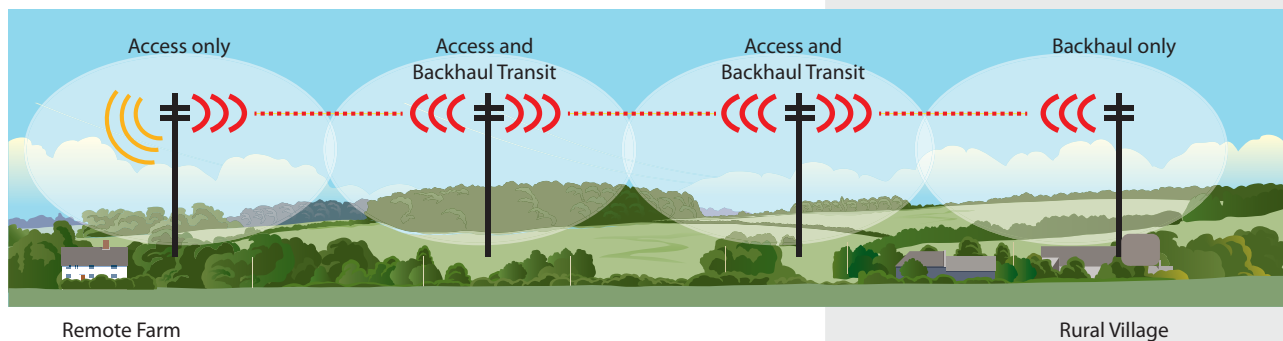
## INTEGRATED WIRELESS BACKHAUL

AirHarmony uniquely provides an integrated wireless backhaul solution using Airspan's iBridge technology. iBridge is a self-configuring, self-connecting point-to-multipoint backhaul solution, which automatically extends the reach of the network from existing Points of Interconnect (POI). iBridge supports multi-hop relay connections, providing GSM & WiMAX coverage from each node in addition to the iBridge backhaul functionality.

## ALL-IN-ONE SOLUTION

*AirHarmony consists of a single self-contained unit, removing the need for a conventional equipment rack. The only external equipment required is the power supply.*

*AirHarmony is a rugged, all-outdoor product, which is capable of withstanding a wide temperature range, and is fully IP66 compliant.*



## PLUG AND PLAY

AirHarmony supports automated configuration from the management system, simplifying the installation of each base station. This automation, coupled with the self-connecting iBridge backhaul results in a true plug and play solution, allowing service to be rapidly deployed in rural communities.

## REDUCED CAPEX / OPEX

AirHarmony is a compact all-outdoor 2G + 4G base station, which can be installed without conventional indoor infrastructure and associated power and air-conditioning systems.

The integration of wireless backhaul reduces the equipment installed per site, as separate backhaul infrastructure is not required. This in turn reduces spares holding and inventories.

The iBridge backhaul supports self-healing, allowing the network to automatically recover in the event of failure. This increases overall service availability and customer satisfaction.

The LTE radio interface supports Self Optimizing and Self Configuration techniques to minimize OPEX across the network. Self-configuration techniques include Automatic Neighbor Relation (ANR) to allow neighbor cells to be automatically configured.

## FLEXIBLE ARCHITECTURE

The iBridge network can support different topologies as new elements are added to the network, enabling a highly flexible and versatile deployment. Each AirHarmony node can adopt both 2G & 4G access and backhaul functionality, automatically changing backhaul role from termination to relay to ensure a dynamic self-adapting architecture.

iBridge supports self-optimization of backhaul links, ensuring interference between iBridge nodes is minimized and delivering end-to-end QoS across the network.



# GSM SPECIFICATIONS

## Um RADIO INTERFACE

Transmit Frequencies:	925-960 MHz
Channel Spacing:	200 kHz
Max Output Power:	+40 dBm
Min Output Power:	+16 dBm
Output Power Control:	12 steps
Channel Spacing:	200 kHz
Performance:	GSM 05:05 (TBC)
Receive Gain:	26 steps

## SYSTEM SERVICES

### Security

Air Interface – A5/1, A5/3

Abis over IP Interface:

- Signalling and management – TLS/AES
- Voice – secure RFP/AES
- GPRS – secure RTP/AES

### System Features

Channel assignment and classmark

Directed retry based on load, power and cell priority

Handover

Abis link performance monitoring

## USER SERVICES

### Teleservices

Telephony

Short Message Service MT/PP

Short Message Service MO/PP

SABP interface or Short Message Service CB single message for user cell description

### Speech Format Support

GSM FR and EFR

Full and half rate dynamic AMR based on QoS and load

### Circuit Switched Data

- Single slot BS20 at up to 9.6 kb/s
- BS21-26, plus BS61, BS81

### GPRS Support

Coding schemes 1-4

Multi-slot class 10

Dynamic PDCH for optimising mix of service for voice/data

GPRS Coding schemes CS1-4

E-GPRS Modulation and coding schemes MCS1-9

Link adaptation

E-GPRS incremental redundancy and dynamic window size

# LTE SPECIFICATIONS

## RADIO INTERFACE

Version:	Release 8/9 (10 in future)
Operational Frequency Bands:	2.3 GHz 2.6 GHz 3.5 GHz 800 MHz 700 MHz
Duplex:	FDD & TDD
Max Channel BW:	10 MHz (20 MHz in future)
Max Transmit Power:	2 x +36 dBm
MCS Support:	QPSK, 16-QAM, 64-QAM
Synchronization:	GPS & IEEE1588

## KEY FEATURES

### Advanced Antenna Techniques

- 2 x 2 MIMO
- SU-MIMO
- MU-MIMO

### System Features

- Inter-RAT Mobility
- RAN Sharing
- Automatic Neighbor Relation (ANR)
- Inter-cell Interference Coordination


# iBridge SPECIFICATIONS

## iBridge RADIO INTERFACE

Operational Frequency Bands:	400-3600 MHz 3600-3800 MHz (future)
Duplex:	TDD
Max Channel BW:	10 MHz
Max Output Power:	2 x +27 dBm
MCS Support:	Up to 256-QAM rate 5/6
Switched Antenna Gain:	11 dBi
MIMO Matrix:	2 x 2 or 4 x 4

# PHYSICAL SPECIFICATIONS

Dimensions:	273 x 240 x 1080 mm
Weight:	20 kg
Power Consumption:	<200 Watts
Operating Temperature Range:	40°C to +50°C



For more information about Airspan, its products and solutions, please visit our web site:

[www.airspan.com](http://www.airspan.com)

or email:

[sales@airspan.com](mailto:sales@airspan.com)

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## About Airspan

With over 500 customers in over 100 countries and as a top vendor for carrier-class broadband wireless solutions, Airspan is recognized as a leader and pioneer in 4G and broadband wireless technologies.

Providing an expansive product portfolio, Airspan offers customers the widest selection of 4G products in the industry with an unsurpassed level of technology to benefit their business case. Airspan has solutions spanning the 700 MHz to 6 GHz frequency bands.

Contact Airspan today!

