Air4G
Innovative. Compact. All-outdoor.

Integrated LTE and 4G WiMAX multi-platform base station exceeding the extremes in cost-efficiency
Air4G

A 4G network revolution in a compact, efficient package
Airspan Networks is addressing a growing demand for 4G connectivity worldwide. The use of mobile broadband services is accelerating at exceptional rates with increased applications such as gaming, social networking and video for mobile devices. 4G, namely LTE and WiMAX, enables users to carry the same user experience they have at home or in the office while they are on-the-go.

4G connectivity means that a user can enjoy bandwidth intensive applications while on the move. This works due to the network support for handoffs and roaming. Airspan solutions maintain a connection while the user moves across cell borders, essentially handing off the service from one base station to the next.

Air4G operates in the 700, 800 MHz, 1.4, 1.8, 2.3-2.7, 3.3-3.8, and 4.9-6.425 GHz bands. Air4G has variants with two transmitters and four receivers as well as variants with four transmitters and four receivers. Air4G has TDD and FDD variants.

The unique form factor of Air4G secures the investment of the operator and minimizes the OPEX and CAPEX, while offering capabilities such as MIMO and advanced Frequency Domain Scheduling. These capabilities enable higher throughput, range, and capacity with more efficient use of the spectrum.

Air4G is interoperable with end devices of all form factors, based on all leading chips. It is also interoperable with various core network solutions.
4G CONNECTIVITY – CHOOSE YOUR FLAVORS

Air4G is able to operate both LTE and WiMAX platforms at the same time. This means that a migration from one technology to the other is possible. Since immediately switching all the devices on a network to LTE is unrealistic, operators can now count on a single base station deployment that can support both WiMAX and LTE devices at the same time allowing for a gradual migration to LTE with uninterrupted customer service. Air4G allows the operator to benefit from the best of both worlds. VPNs and other VLAN-based services can be operated over WiMAX, while at the same time Air4G can serve advanced mobile LTE end devices.

INNOVATIVE RADIO TECHNOLOGY

Air4G employs software defined radio (SDR) technology, together with two transmit paths and four receive paths, antennas and GPS receiver all in a highly integrated, physically small, light, all outdoor package. Air4G is optimized for the 700, 800 MHz, 1.4 1.8, 2.3, 2.5, 3.3-3.8, and 4.9-6.425 GHz Mobile WiMAX/LTE bands. The product has been designed to address market needs by supporting the current and future air interfaces thanks to its SDR technology.

When running mobile WiMAX, Air4G supports 3, 3.5, 5, 7 and 10 MHz channel sizes. However, the product is capable of supporting 2x7 and 2x10 MHz (using dual PHY/MAC) channels doubling the capacity of the sector. When running LTE, Air4G supports all LTE channel sizes starting at 1.4 MHz and going up to 20 MHz. Air4G can also run WiMAX and LTE at the same time. A possible migration from WiMAX to LTE may start with Air4G supporting one or two WiMAX channels of 10 MHz, then moving to one 10 MHz channel running WiMAX and another 10 MHz channel running LTE and finally running 20 MHz LTE, at a point where the operator does not need to serve any WiMAX end devices. Air4G roadmap includes support in four (4) transmitters and four (4) receivers as well as FDD.

ALL-OUTDOOR, ALL-IN-ONE

Traditional split indoor-outdoor architecture base stations which support multiple sectors are being replaced by new, lower CAPEX and OPEX, compact base stations. Air4G is such a product. Its all-outdoor, compact structure yields a lower power consuming, greener solution that is environmentally friendly.

Air4G is a highly integrated compact, yet powerful, base station with all-in-one packaging of RF and base-band components. It is available as an all outdoor solution for LTE and Mobile WiMAX applications to minimize physical footprint and operator OPEX. It saves the need for an air conditioned shelter (which is required in other architectures such as split indoor/outdoor architectures).

Air4G complements Pico Base Stations like AirSynergy (and naturally has much higher Tx power and much better link budget). Thanks to the efficient power amplifier technology employed in its RF implementation, Air4G supplies dual 40dBm (10W) transmitters in 2.X GHz and dual 37 dBm (5W) transmitters in 3.X GHz band.
FLEXIBLE ARCHITECTURE

Air4G has been conceived for deployment in 1-sector configuration or in 3-sector configuration, which is optimum for LTE and Mobile WiMAX deployments. Air4G incorporates an Ethernet switch which enables the traffic from 3 sectors to be aggregated for backhaul and network interfacing. The switch has copper and Fiber Giga Ethernet interfaces towards the backhaul or backbone.

Air4G has an embedded radio, and in addition has CPRI interfaces allowing the use of external Remote Radio Heads (RRH). The use of CPRI is relevant only when operating as an LTE eNodeB.

COST-EFFECTIVE

Air4G supports a pay-as-you-grow deployment plan. An operator can begin with a single unit and add base stations as needed. With flexible options, Air4G supports LTE and WiMAX 16e and has a migration path to LTE-Advanced.

Providing high power and consuming less power perfectly positions Air4G to save operating expenses and cut costs while maximizing revenue potentials. Its compact size allows for easy, quick and flexible installation anywhere needed – not just on traditional communications towers.

When needed, Air4G can be used in a stand-alone mode where there is no need for a core network, providing an ideal cost-effective solution for fixed applications, while standing ready for an easy upgrade to a fully mobile network when the operator is ready.

Air4G has a rich interoperable device offering with core networks and third-party end user devices including various indoor and outdoor CPEs, as well as USB dongles from various manufacturers. Air4G has a proven high level of integration with various core elements from Cisco (formerly Starent), Tellabs, Aricent, Amdocs (Bridgewater), WiTECH, Aradial, Free Radius, and others. Air4G also has a unique powerful standalone mode where no ASN gateway is required.

Air4G is managed via Airspan’s SNMP simple, intuitive, web-based EMS called Netspan.
# LTE SPECIFICATIONS

## RADIO INTERFACE
- **3GPP Version:** Release 8/9 (10 in future)
- **Operational Frequency Bands:**
  - 700 MHz
  - 800 MHz
  - 1.4 GHz
  - 1.8 GHz
  - 2.3–2.4 GHz
  - 2.496–2.7 GHz
  - 3.3–3.8 GHz
  - 5.15–6.425 GHz
  - Including E-UTRA operating bands #7, 17, 38, 40 and 41
- **Duplex:** FDD & TDD
- **Channel BW:**
  - 1.4 MHz, 3 MHz, 5 MHz, 10 MHz,
  - 15 MHz, 20 MHz
- **Max Transmit Power:** 2 x +40 dBm,
- **MCS Support:** Up to 64-QAM at rate 5/6
- **Synchronization:** GPS, IEEE1588 & Glonass

## KEY FEATURES
- **Advanced Antenna Techniques**
  - 2 x 2 MIMO
  - SU-MIMO
  - MU-MIMO
  - Four (4) receivers
- **System Features**
  - Inter-RAT Mobility
  - RAN Sharing
  - Automatic Neighbor Relation (ANR)
  - Inter-cell Interference Coordination
  - Triple sector support with RRH
  - IP and Ethernet CS
  - Standalone mode

# WiMAX SPECIFICATIONS

## RADIO INTERFACE
- **Operational Frequency Bands:**
  - 700 MHz
  - 800 MHz
  - 1.8 GHz
  - 2.3–2.4 GHz
  - 2.496–2.7 GHz
  - 3.3–3.8 GHz
  - 5.15–6.425 GHz
- **Duplex:** TDD
- **Channel BW:**
  - 3.5 MHz, 5 MHz, 7 MHz, 10 MHz,
  - 2 x 7 MHz, 2 x 10 MHz
- **Max Transmit Power:** 2 x +40 dBm
- **MCS Support:** Up to 64-QAM at rate 5/6
- **Synchronization:** GPS & IEEE1588

## KEY FEATURES
- **MIMO Matrix A and B**
- **Dual MACPHY**
- **Four (4) receivers**
- **IP and Ethernet CS (including VLAN tagging/untagging)**
- **VoiceMAXe support**
- **Fractional Frequency Reuse (FFR)**
- **Standalone mode**
- **Profile C (working with ASN GW)**
- **Extended range up to 52 km / 32 mi**
PHYSICAL SPECIFICATIONS

Antenna Configurations: Quad Port and Dual Slant antennas
65 and 90 degree sector antennas
Omni antennas
Antennas with Manual Electric Tilt (MET)

Dimensions:
- Air4G 2Tx4Rx: 52.7 x 34.7 x 17.0 cm / 20.7 x 13.7 x 6.7 in.
- Air4G 4Tx4Rx: 60 x 40 x 20 cm / 23.6 x 15.7 x 7.9 in.

Weight (Typical):
- Air4G: 17 kg / 37.5 lb

Power Consumption (Typical):
- Air4G: 200 Watts

Operating Temperature Range: -40°C to 55°C / -40°F to 131°F

IP Rating: IP66

Integrated LTE and 4G WiMAX multi-platform base station exceeding the extremes in cost-efficiency
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.

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Airspan Networks is addressing a growing demand for LTE connectivity worldwide. The use of mobile broadband services is accelerating at exceptional rates with increased applications such as gaming, social networking and video for mobile devices. LTE enables users to carry the same user experience they have at home or in the office while they are on-the-go.

4G LTE connectivity means that a user can enjoy bandwidth intensive applications while on the move. This is made possible thanks to the network support for handovers and roaming. Airspan solutions maintain a connection while the user moves across cell borders, essentially handing off the service from one eNodeB to the next.

Air4G eNodeB operates in a wide frequency range, from 700 MHz up to 3.8 GHz, including LTE bands 1, 2, 3, 7, 9, 12, 17, 20, 38, 40, 41, 42, and 43, supporting all channel sizes, from 1.4MHz up to 20MHz. Air4G has variants with two transmitters and two or four receivers, supporting both FDD and TDD.

The unique form factor of Air4G secures the investment of the operator and minimizes the OPEX and CAPEX. While offering capabilities such as MIMO and advanced Frequency Domain Scheduling. These capabilities enable higher throughput, range, and capacity with more efficient use of the spectrum.

Air4G is interoperable with numerous end user devices of all form factors, based on all leading chipset manufacturers. It is also interoperable with various core network solutions.
ALL-OUTDOOR, ALL-IN-ONE

Traditional split indoor-outdoor architecture eNodeBs which support multiple sectors are being replaced by new, lower CAPEX and OPEX, compact eNodeBs. Air4G is such a product. Its all-outdoor, compact structure yields a lower power consuming, greener solution that is environmentally friendly.

Air4G is a highly integrated compact, yet powerful, eNodeB with all-in-one packaging of RF and base-band components. It is available as an all outdoor solution to minimize physical footprint and operator OPEX. It saves the need for an air conditioned shelter (which is required in other architectures such as split indoor/outdoor architectures).

Air4G complements Pico cells such as Airspan’s AirSynergy product line (and naturally has much higher Tx power and much better link budget). Thanks to the efficient power amplifier technology employed in its RF implementation, Air4G implements dual 40dBm (10W) transmitters in 2.X GHz spectrum and dual 37 dBm (5W) transmitters in 3.X GHz spectrum.

INNOVATIVE RADIO TECHNOLOGY

Air4G employs software defined radio (SDR) technology, together with two transmit paths and two or four receive paths, antennas and GPS receiver all in a highly integrated, physically small and light, all outdoor package. Air4G is optimized for working across the entire 700 MHz to 3.8 GHz spectrum, maintaining its high performance regardless of the chosen LTE band, and has been designed to address the markets needs by supporting the current and future air interfaces thanks to its SDR technology.

FLEXIBLE ARCHITECTURE

Air4G has been conceived for deployment in a 1-sector configuration or in a 3-sector configuration, which is the optimum configuration for LTE deployments. Air4G design also incorporates an Ethernet switch which enables the traffic from 3 sectors to be aggregated for backhaul and network interfacing. The switch has Copper and Fiber Giga Ethernet interfaces towards the backhaul or backbone.

RELEASE 10 LTE-ADVANCED

Air4G provides the outdoor Micro layer of a Heterogeneous LTE-Advanced network deployment (HetNet). Advanced Release 10 feature sets include support for Self-Optimizing Networks (SON) and eICIC which enables N=1 frequency re-use with the Umbrella Macro cell.
EASE OF DEPLOYMENT WITH AirSON

Air4G is designed to integrate with standardized LTE Access SON solutions. AirSON, Airspan’s SON solution, is layered and consists of both Integrated eNodeB distributed SON technology, as well as a standardized SON interface for network based centralized SON.

The eNodeBs self-configure, self-connect, and self-optimize. In addition, unlike conventional mobile network planning and design, expansion of the coverage area can be optimized and adapted depending on the local need.

COST-EFFECTIVE

Air4G supports a pay-as-you-grow deployment plan. An operator can begin with a single unit and add eNodeBs as needed. With flexible options, Air4G supports 3GPP LTE Release 9 with a seamless upgrade path to LTE-Advanced and beyond.

Providing high power and consuming less power perfectly positions Air4G to save operating expenses and cut costs while maximizing revenue potentials. Its compact size allows for easy, quick and flexible installation anywhere needed – not just on traditional communications towers.

Coupled with Airspan’s AirCore EPC-in-a-Box, a revolutionary 1RU complete EPC solution, Air4G provides an ideal cost effective solution for smaller-sized deployments, easily scalable to a full blown network. Air4G has a rich interoperable device offering with core networks and third-party end user devices including multiple handsets, indoor and outdoor UEs, as well as USB dongles from various manufacturers. Air4G has a proven high level of integration with various core elements from Tier-1 EPC vendors, as well as standalone billing platforms.

Air4G is managed via Airspan’s simple, intuitive, web-based EMS called Netspan.
## LTE SPECIFICATIONS

### RADIO INTERFACE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>3GPP Version:</td>
<td>Release 9 (upgradeable to Release10 and beyond)</td>
</tr>
<tr>
<td>Operational Frequency Bands:</td>
<td>1, 2, 3, 7, 9, 12, 17, 20, 38, 40, 41, 42 and 43</td>
</tr>
<tr>
<td>Duplex:</td>
<td>FDD &amp; TDD</td>
</tr>
<tr>
<td>Channel BW:</td>
<td>1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz</td>
</tr>
<tr>
<td>Max Transmit Power:</td>
<td>2 x 40 dBm</td>
</tr>
<tr>
<td>MCS Support:</td>
<td>Up to MCS28 (64-QAM at 0.89 rate)</td>
</tr>
<tr>
<td>Synchronization:</td>
<td>GPS/Glonass &amp; IEEE1588-2008</td>
</tr>
</tbody>
</table>

### KEY FEATURES

#### Advanced Antenna Techniques
- 2 x 2 MIMO
- SU-MIMO
- MU-MIMO

#### System Features
- Self Optimized Networks
- Plug-and-Play Auto Configuration
- Inter-RAT Mobility
- RAN Sharing
- Automatic Neighbor Relation (ANR)
- Inter-cell Interference Coordination
- Voice over LTE (VoLTE)
- IPSec
### PHYSICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antenna Configurations:</strong></td>
<td>Quad Port and Dual Slant antennas</td>
</tr>
<tr>
<td></td>
<td>65 and 90 degree sector antennas</td>
</tr>
<tr>
<td></td>
<td>Omni antennas</td>
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<tr>
<td></td>
<td>Antennas with Manual Electric Tilt (MET)</td>
</tr>
<tr>
<td><strong>Dimensions (L x W x D):</strong></td>
<td>41 x 35 x 15.5 cm / 16 x 13.8 x 6.1 in.</td>
</tr>
<tr>
<td><strong>Weight (Typical):</strong></td>
<td>17 kg / 37.5 lb</td>
</tr>
<tr>
<td><strong>Power Consumption (Typical):</strong></td>
<td>250 Watts (frequency dependent)</td>
</tr>
<tr>
<td><strong>Operating Temperature Range:</strong></td>
<td>-40°C to 55°C / -40°F to 131°F</td>
</tr>
<tr>
<td><strong>IP Rating:</strong></td>
<td>IP66</td>
</tr>
</tbody>
</table>

*Integrated LTE multi-platform eNodeB exceeding the extremes in cost-efficiency*
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.

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- Indonesia
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- Sri Lanka
- Dubai

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www.airspan.com

or email:

sales@airspan.com

Headquarters

777 Yamato Road, Suite 310
Boca Raton, Florida 33431
USA
AirHarmony 1000
High Capacity Outdoor LTE-Advanced Micro Base Station

Multi-Function, Compact and Versatile
Redefining the economics of LTE-Advanced Heterogeneous Deployment
Compact and versatile
4G LTE Micro Base Station
RELEASE 10 LTE-ADVANCED
AirHarmony 1000 provides the outdoor Micro layer of a Heterogeneous LTE-Advanced network deployment (HetNet). Advanced Release 10 feature sets include support for SON and advanced interference mitigation techniques which enables N=1 frequency re-use with the Umbrella Macro cell. The cooperative QoS over the Backhaul interface ensures the Quality of Experience (QoE) from the Micro eNodeB matches the experience from the Macro cell.

THE POWER OF HETNETS
As operators struggle to cope with growing customer demand for higher throughput, they are discovering that layering small base stations into a macro cell coverage area, enables a significant increase in network capacity by filling in coverage gaps and addressing actual traffic distribution where demand is highest. AirHarmony 1000 is ideal for these networks, delivering high data rates where needed most, whether at the macro cell edge or closer to the user base, maximizing coverage and customer satisfaction.

BROADBAND ACCESS
AirHarmony 1000 supports 3GPP LTE Broadband access technologies; Airspan’s 3GPP LTE implementation is compliant with the 3GPP standards and has interoperable S1 and X2 interfaces and supports commercial GCF tested UE devices, including SmartPhones, Dongles and Tablet computers.

AirHarmony 1000 uses a unique combination of Software Defined Radio (SDR) and System-on-a-Chip (SoC) technologies to enable it to support a range of air interfaces simultaneously.

INTERGRATED BACKHAUL
AirHarmony also supports tight integration with iBridge, Airspan’s small cell backhaul product. AirHarmony plus iBridge creates a single install process for LTE Access and Backhaul, and enables our “Just add Power” plug and play deployment method saving deployment CAPEX and OPEX.

ALL-IN-ONE SOLUTION
AirHarmony 1000 consists of a single self-contained unit, removing the need for an equipment rack or any indoor equipment. Units are powered from a compact power supply unit based on AC or -48V DC power sources.
**SUSTAINABLE DEPLOYMENT**

AirHarmony 1000 Micro Cells can be installed on traditional tower sites, or on existing street furniture (lamp posts or utility poles) which are either OPEX free, or have nominal on-going expenses, thus avoiding the recurring costs associated with a traditional Macro site acquisition. Front mount antenna can be painted to blend with the environment and fit the pole color. AirHarmony 1000 also requires a fraction of the power of a Macro base station, further reducing the OPEX, and allowing renewable energy sources, such as solar panels, to be used.

**PLUG AND PLAY**

AirHarmony 1000 supports automated configuration from the management system, simplifying the installation of each base station. Full plug-and-play functionality, out-of-box to fully operational, within 20 minutes.

**REDUCED CAPEX / OPEX**

AirHarmony 1000 is a compact all-outdoor 3GPP LTE Micro 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.

**RADIO PLANNING with SON**

AirHarmony 1000 is designed to integrate with standardized LTE Access SON solutions. Airspan’s SON solution is layered and consists of both integrated eNodeB SON technology and a standardized SON interface for centralized SON.

The products self-configure, self-connect, and self-optimize. In addition, unlike conventional mobile network planning and design, expansion of the coverage area can be optimized and adapted depending on the local need.
PHYSICAL SPECIFICATIONS

Antenna Configurations: SBA – Dynamic antenna beam
Front mount X-Polar
External antenna X-Polar

Data Interface: Fiber Optic or Copper via SFP

Weight: 11 kg / 24 lb

Power Consumption: 150 Watts

Operating Temperature Range: -40°C to +55°C / -40°F to +130°F

IP Rating: IP66

3GPP LTE-Advanced ACCESS SPECIFICATIONS

RADIO INTERFACE

Version: Release 10 Feature Sets
(SW upgradeable for 3GPP R11, R12 and beyond)

Operational Frequency Bands:
- Band 40 (2.3-2.4 GHz)
- Band 41 (2.6GHz)
- Band 42 (3.5GHz)
- Band 28 (700MHz)

Duplex: TDD, FDD Channel BW:
Up to 20 MHz

Max Transmit Power: +37 dBm per Tx channel

MCS Support: Up to 64-QAM

Synchronization: GNSSS (GPS) & IEEE1588 PTPv2

KEY FEATURES

Advanced Antenna Techniques
- 2 x 2 MIMO: SM and TxD
- SU-MIMO
- MU-MIMO

System Features
- Inter-RAT Mobility
- RAN Sharing
- Automatic Neighbor Relation (ANR)
- eICIC, ABS and CRE
- Embedded SON
About Airspan

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Headquarters
777 Yamato Road, Suite 310
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USA
AirSynergy 2000
Outdoor LTE-Advanced Pico Base Station optimized for street-level deployments, hot-spots and coverage in-fill

Multi-Function, Compact and Versatile
Redefining the economics of LTE-Advanced HetNet Deployment
Mobile Carriers are currently experiencing an unprecedented growth in mobile data traffic, which today’s 3G and 4G LTE networks are struggling to satisfy.

As part of a heterogeneous network, Pico Base Stations are located closer to the end user, providing much higher aggregate data rates.

The issue with most Pico Base Stations is the difficulty in connecting them with the rest of the network. AirSynergy solves this problem by combining a 4G Pico Base Station with an integrated, high capacity, self-connecting wireless backhaul.

AirSynergy is Airspan’s groundbreaking Pico base station using Software Defined Radio (SDR) technology, providing both data access and wireless backhaul from the same unit. AirSynergy is an all-in-one compact Pico Base Station which supports a wide range of radio interfaces including 4G LTE and WiMAX technologies.

The integration of backhaul and access technologies is an industry first, and redefines the way in which networks can be constructed.

This technique enables AirSynergy to be deployed on street furniture (e.g. lamp posts), with connections automatically established through neighboring nodes to establish a backhaul connection with the network.

A key feature of the AirSynergy technology is the ability to self-configure, self-connect, self-heal and self-optimize when deployed as a network of elements. At the same time AirSynergy provides guaranteed levels of service with Quality of Service (QoS) characteristics in line with the requirements of the access interface.

Network Architecture Diagram
RELEASE 10 LTE-ADVANCED
AirSynergy 2000 provides the outdoor Pico layer of a Heterogeneous LTE-Advanced network deployment (HetNet). Advanced Release 10 feature sets include support for SON and eICIC which enables N=1 frequency re-use with the Umbrella Macro cell. The cooperative QoS over the Backhaul interface ensures the Quality of Experience (QoE) from the Pico eNodeB matches the experience from the Macro cell.

THE POWER OF HETNETS
As operators struggle to cope with growing customer demand for higher throughput, they are discovering that layering small base stations into a macro cell coverage area, enables a significant increase in network capacity by filling in coverage gaps and addressing actual traffic distribution where demand is highest. AirSynergy 2000 is ideal for these networks, delivering high data rates where needed most, whether at the macro cell edge or closer to the user base, maximizing coverage and customer satisfaction.

BROADBAND ACCESS
AirSynergy 2000 supports either 3GPP LTE or IEEE Broadband access technologies in combination with Airspan’s intelligent IEEE wireless backhaul technology, known as iBridge. AirSynergy supports both IEEE 802.11 and IEEE 802.16 radio interfaces and provides both local and wide-area broadband services. Airspan’s 3GPP LTE implementation is compliant with the 3GPP standards and has interoperable S1 and X2 interfaces and supports commercial GCF tested UE devices, including SmartPhones, Dongles and Tablet computers.

AirSynergy uses a unique combination of Software Defined Radio (SDR) and System-on-a-Chip (SoC) technologies to enable it to support a range of air interfaces simultaneously.

INTEGRATED WIRELESS BACKHAUL
AirSynergy 2000 uniquely provides an integrated wireless backhaul solution using Airspan’s iBridge IEEE P802.16r 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 backhaul for either LTE or IEEE access interfaces.

SUSTAINABLE DEPLOYMENT
AirSynergy 2000 Pico Cells can be installed on existing street poles (lamp posts or utility poles) which are either OPEX free, or have nominal on-going expenses, thus avoiding the recurring costs associated with a traditional Macro site acquisition. AirSynergy also requires a fraction of the power of a Macro base station, further reducing the OPEX, and allowing renewable energy sources, such as solar panels, to be used.

ALL-IN-ONE SOLUTION
AirSynergy consists of a single self-contained unit, removing the need for an equipment rack or any indoor equipment. Units are powered from a compact power supply unit based on AC or -48V DC power sources.
PLUG AND PLAY
AirSynergy 2000 supports automated configuration from the management system, simplifying the installation of each base station. Airspan’s unique self-aligning Antenna technology cuts installation time. The AirSynergy is automatically configured using the advanced plug and play capabilities. The full setup and commissioning parameters are retrieved from the remote management system.

REDUCED CAPEX / OPEX
AirSynergy 2000 is a compact all-outdoor 3GPP LTE Pico 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.

AirSON and AirSymphony
AirSON is using a Distributed architecture, embedded in each of Airspan’s small cells, thus scaling with the network. Airspan small cells empowered by AirSON, minimize the operational complexity associated with a large-scale LTE network, offering an extensive set of algorithms designed to simplify every aspect of a small cell deployment.

In addition, AirSynergy can also become part of a Virtual RAN through the use of Airspan’s real-time V-RAN AirSymphony platform. AirSymphony enables advanced coordination over networks of Airspan eNodeBs driving up capacity and coverage. The AirSymphony solution eliminates interference and delivers superior end-to-end Quality of Service (QoS) and Quality of Experience (QoE), with minimal spectrum consumption.

RADIO PLANNING with SON
AirSynergy is designed to integrate with standardized LTE Access SON solutions. AirSynergy SON is layered and consists of both Integrated eNodeB SON technology, based on Qualcomm’s UltraSON™ and a standardized SON interface (which support TR. 69) for network based SON. When deployed using iBridge backhaul AirSynergy also integrates Backhaul SON into the LTE SON Framework. This allows a network to be optimized for both LTE access and Backhaul simultaneously without the need for extensive, formal planning.

The products self-configure, self-connect, and self-optimize. In addition, unlike conventional mobile network planning and design, expansion of the coverage area can be optimized and adapted depending on the local need.
# 3GPP LTE-Advanced ACCESS SPECIFICATIONS

## RADIO INTERFACE

<table>
<thead>
<tr>
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<th>Release 8,9 and 10 Feature Sets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Version</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Operational Frequency Bands:** | Band 7 and 41 (2.6 GHz)  
Band 12, 13, 14 and 17 (700 MHz)  
Band 20 (800 MHz)  
Band 40 (2.3-2.4 GHz)  
Band 42 and 43 (3.4-3.8 GHz)  
Band 3 (1.7-1.8 GHz)  
Band 44 (700 MHz)  
Band 4 (1.7-2.1 GHz*)  
Band 25 (1.9 GHz*)  
Band 5 (850 MHz*)  
Band 1 (1.9-2.1 GHz*) |
| **Duplex:**    | FDD & TDD                                                                                        |
| **Max Channel BW:** | 20 MHz                                                                                 |
| **Max Transmit Power:** | +30-33 dBm per Tx                                                                      |
| **MCS Support:** | Up to 64-QAM                                                                                 |
| **Synchronization:** | GNSS(GPS) & IEEE1588 PTPv2                                                               |

## KEY FEATURES

### Advanced Antenna Techniques
- 2 x 2 MIMO: SM and TxD
- SU-MIMO
- MU-MIMO

### System Features
- Inter-RAT Mobility
- RAN Sharing
- Automatic Neighbor Relation (ANR)
- eICIC, ABS and CRE
- Embedded SON

## iBridge BACKHAUL SPECIFICATIONS

### iBridge RADIO INTERFACE

<table>
<thead>
<tr>
<th></th>
<th>Various (between 400 MHz and 6 GHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational Frequency Bands:</strong></td>
<td>TDD</td>
</tr>
<tr>
<td><strong>Duplex:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Interface:</strong></td>
<td>Layer 2 Ethernet or internal</td>
</tr>
<tr>
<td><strong>MIMO Streams:</strong></td>
<td>OFDMA (2 x 2), 802.11 (3 x 3 or 4 x 4)</td>
</tr>
<tr>
<td><strong>MIMO Modes:</strong></td>
<td>Downlink and Uplink, Spatial Multiplexing &amp; STC</td>
</tr>
<tr>
<td><strong>IEEE Standard:</strong></td>
<td>802.11 and/or 802.16 (both in Augmentation mode)</td>
</tr>
<tr>
<td><strong>Max Channel BW:</strong></td>
<td>10, 20, 40 and 80 MHz (160 MHz*)</td>
</tr>
<tr>
<td><strong>Max Output Power:</strong></td>
<td>Up to +30dBm per Tx</td>
</tr>
<tr>
<td><strong>MCS Support:</strong></td>
<td>Up to 256-QAM rate 5/6</td>
</tr>
</tbody>
</table>

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

www.airspan.com

or email:

sales@airspan.com

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- Australia
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- Indonesia
- Israel
- Japan
- Philippines
- Sri Lanka
- Dubai

About Airspan

With over 1000 customers in over 100 countries and as a top vendor for carrier-class LTE RAN access and backhaul solutions, Airspan is recognized as a leader and pioneer in LTE and OFDMA technologies.

Providing an expansive product portfolio, Airspan offers customers the widest selection of LTE 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!

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USA
AirVelocity
Indoor LTE-Advanced Base Station

Multi-Function, High Performance and Economic
Extending LTE-Advanced Public Access to Indoor
The world’s highest performance LTE-Advanced Small Cell
RELEASE 10 LTE-ADVANCED
AirVelocity is a revolutionary indoor, high performance, high power, LTE-Advanced small cell, designed to bring Public Access LTE networks to indoor spaces like enterprises, large public spaces and stadiums. AirVelocity has advanced Release 10 feature sets that include support for SON and eICIC which enables N=1 frequency re-use with outdoor Macro and Pico cells. AirVelocity can be deployed using enterprise broadband connections or with an optional integrated LTE UE Relay wireless backhaul solution that has cooperative QoS to ensure the Quality of Experience (QoE) inside of the enterprise matches the QoE on the outdoor Macro cell network.

THE POWER OF INDOOR HETNETS
4th generation mobile cellular networks have different problems than previous 2G and 3G networks. 4G LTE mobile networks are full of hotspots where large numbers of users make demands for mobile data that Macro-only networks are failing to provide. AirVelocity is designed to solve this “Hotspot” issue by bringing cost effective LTE-Advanced Public Access into the enterprise and large public spaces.

LTE-ADVANCED ACCESS
AirVelocity supports standardised 3GPP LTE access technologies and is interoperable with a large number of third-party vendor equipment. It has interoperable S1 and X2 interfaces, and fully supports commercial GCF tested UE devices, including SmartPhones, Dongles and Tablets.

OPTIONAL LTE RELAY BACKHAUL
AirVelocity uniquely provides a solution for the delivery of “trusted” high capacity wireless backhaul to the enterprise using Airspan’s iBridge UE Relay backhaul technology. iBridge UE Relay is a 3GPP Relay solution that works with existing Release 8/9 Macro infrastructure. It is a self-connecting point-to-multipoint backhaul solution, which automatically extends the reach of the Macro RAN backhaul network from existing Macro cell sites or other Points of Interconnect (POI). AirVelocity UE Relay also provide high quality synchronization assisting the integrated GPS received with A-GPS measurement from the LTE Macro network. This ensures that both frequency re-use and handover works seamlessly with the Macro LTE-Advanced network.

ECONOMIC DEPLOYMENT
The high performance and high power LTE-Advanced radio interface of AirVelocity means that in most cases a single unit can provide coverage for a large building or even multiple buildings in a campus. AirVelocity provides public access LTE services to greater 100 users per eNodeB and networks or clusters of AirVelocity eNodes can deliver LTE capacity and coverage to the most densely populated deployment scenario.

SIMPLE AND FAST TO DEPLOY
AirVelocity when combined with the optional UE Relay iBridge wireless backhaul provides a “one-stop” solution for extending LTE and LTE-Advanced Public Access services into a large enterprise using the deployment of just one simple compact unit.
PLUG AND PLAY

AirVelocity wall mounted small cell(s) can be installed quickly into large enterprises, either as a single node or as a cluster of nodes. When deployed in clusters, the nodes are networked together using Gigabit Ethernet links, or Fiber interfaces using the integrated SFP. The AirVelocity can be deployed using an integrated isotropic omni antenna, or with separate antennas via 2 RF connectors.

REDUCING THE COST OF DELIVERING Mbit/s

The deployment of an AirVelocity Enterprise Femto cell with optional backhaul can massively reduce the cost of delivering Public Access broadband mobile data to the Enterprise. The location of a high performance Femto cell inside of the enterprise not only improves the Quality of Experience, by enabling fast downloads and better coverage, it simultaneously deloads the outdoor Macro cell network, improving the overall network quality for all users. Perhaps even more significant is that the cost for each Mbit/s delivered to users within the Enterprise drops dramatically, which permits carriers to create innovative pricing tariffs and generous data consumption allowances.

FLEXIBLE ARCHITECTURE

AirVelocity, can be combined with AirSynergy and AirHarmony to support the holistic deployment of LTE-Advanced HetNets. By deploying combinations of both Indoor and Outdoor small cell topologies, carriers can create optimal small cell networks that solve both coverage and capacity shortfalls in the Macro cell network.

Through the use of Airspan’s real-time AirSON, centralised AirMAC ensures continual self-optimization ensuring interference between is minimized and delivering end-to-end QoS and QoE across the network with minimal spectrum consumption.

AirSON

AirVelocity is designed to integrate with both standardized centralised LTE Access SON solutions and Airspan integrated or distributed AirSON. AirSON is layered and consists of both Integrated eNodeB SON technology, compatible with on Qualcomm’s UltraSON™ and standardized SON interfaces (including support TR.69). When deployed using iBridge UE Relay AirVelocity also integrates with Backhaul SON into the LTE SON Framework. This allows a network to be optimized for both LTE access and Backhaul simultaneously without the need for extensive, formal planning.

The products self-configure, self-connect, and self-optimize. In addition, unlike conventional mobile network planning and design, expansion of the coverage area can be optimized and adapted depending on the local need.
Addressing unprecedented mobile data traffic growth

Mobile Carriers are currently experiencing an unprecedented growth in mobile data traffic, which today’s 3G and 4G LTE networks are struggling to satisfy.

As part of a heterogeneous network, Public Access Enterprise Femto cells are a key tool for locating the eNodeB closer to the end user, providing much higher aggregate data rates and better coverage.

The issue with most Public Access Enterprise Femtos is the difficulty in connecting them with the rest of the Macro network. AirVelocity solves this problem by combining a 4G LTE-Advanced eNodeB Station with an optional, high capacity, self-connecting wireless backhaul.

AirVelocity contains Airspan’s ground breaking LTE-Advanced Software Defined Radio (SDR) is implemented within a state-of-the-art System on a Chip technology providing both data access and backhaul from the same architecture. AirVelocity is a high compact all-in-one eNodeB which supports a wide range of radio interfaces including 4G LTE-Advanced.

A holistic solution for both Public Access and high capacity backhaul is an industry first, and redefines the way in which LTE-Advanced can be delivered into the Enterprise.

This architecture enables AirVelocity cells to be deployed quickly into the Enterprise by delivering both high capacity backhaul and synchronization, essential for integration with the Macro cell network.

In addition to LTE-Advanced Public Access, AirVelocity also provides IEEE 802.11n/ac Public Hotspot 2.0 services which are tightly coupled with the LTE interface and share the same hardware based SIM authentication methods used on today’s Smartphones and Tablets. When combined with novel network selection and discovery (ANDSF) features the result is a revolution in the way a carrier can provide services to today’s enterprise.
## Carrier Wi-Fi Access Specifications

**Local-Area Radio Interface: 802.11n and 802.11ac**

- **Operational Frequency Bands:** 2.4 GHz and 5 GHz
- **Duplex:** TDD
- **MIMO:** 2x2 (option for 3x3 or 4x4)
- **Max Channel BW:** 20, 40, 80 and 160 MHz
- **Max Transmit Power:** +24dBm per Tx
- **MCS Support:** Up to 256-QAM rate 5/6

**eNode/BS Configurations:**
- Single and Dual RF Carriers
- Users Supported:
  - 32, 64 or 128 Active UEs
  - LTE plus 802.11ac
  - LTE plus UE Relay

**Antenna Configurations:**
- Integrated X-Polar Directional - 8dBi
- Site Configurations:
  - LTE Access (with or without Carrier Wi-Fi)
  - 330 x 141 x 64 mm / 13 x 5.5 x 2.5 in.
  - 1.5 kg (200g for mounting bracket)
- **Power Consumption:** <35 Watts
- **Operating Temperature Range:** -5°C to +40°C
- **IP Rating:** IP40

**Interfaces:**
- **Connector Type:** RJ45 or Fiber SFP
- **Interface Speed:** 100 or 1000 BaseT
- **PoE Out:** Optional - product variant
- **Power:**
  - 12V DC (10-14V DC), optional AC/DC converter
  - EN 301 489-1 V1.9.2
  - EN 301 489-4 V1.4.1

## Key Features

- **IEEE 802.11**
- Multi-stream MIMO
- Dual Band Operation
- Multiple SSID / BSSID
- Hotspot 2.0 (IEEE 802.11u)
- Virtual “LTE UE” mode
- ANDSF with LTE SmartPhones

## eNodeB Physical Specifications

**eNode/BS Configurations:**
- Single and Dual RF Carriers
- Users Supported:
  - 32, 64 or 128 Active UEs
  - LTE plus 802.11ac
  - LTE plus UE Relay

**Antenna Configurations:**
- Integrated X-Polar Directional - 8dBi
- Site Configurations:
  - LTE Access (with or without Carrier Wi-Fi)
  - 330 x 141 x 64 mm / 13 x 5.5 x 2.5 in.
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- **Connector Type:** RJ45 or Fiber SFP
- **Interface Speed:** 100 or 1000 BaseT
- **PoE Out:** Optional - product variant
- **Power:**
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  - EN 301 489-1 V1.9.2
  - EN 301 489-4 V1.4.1
### LTE-Advanced ACCESS SPECIFICATIONS

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<th>RADIO INTERFACE</th>
<th>KEY FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Version:</strong></td>
<td><strong>Advanced Antenna Techniques</strong></td>
</tr>
<tr>
<td><strong>Operational Frequency Bands:</strong></td>
<td>- 2 x 2 MIMO: SM and TxD</td>
</tr>
<tr>
<td>Release 9, 10, 11 and 12</td>
<td>- SU-MIMO</td>
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<tr>
<td>Band 7 and 41 (2.6 GHz)</td>
<td>- MU-MIMO</td>
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<td>Band 20 (800 MHz)</td>
<td><strong>System Features</strong></td>
</tr>
<tr>
<td>Band 42 and 43 (3.4-3.8 GHz)</td>
<td>- Inter-RAT Mobility</td>
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<td>Band 3 (1.7-1.8 GHz)</td>
<td>- RAN Sharing</td>
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<td>Band 4 (1.7-2.1 GHz*)</td>
<td>- Automatic Neighbor Relation (ANR)</td>
</tr>
<tr>
<td>Band 25 (1.9 GHz*)</td>
<td>- Automatic PCI</td>
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<tr>
<td>Band 1 (1.9-2.1 GHz*)</td>
<td>- eICIC, ABS and CRE</td>
</tr>
<tr>
<td>Duplex:</td>
<td>- Embedded SON</td>
</tr>
<tr>
<td>FDD &amp; TDD</td>
<td><strong>iBridge LTE UE RELAY SPECIFICATIONS</strong></td>
</tr>
<tr>
<td>Max Channel BW:</td>
<td><strong>iBridge LTE UE RELAY RADIO INTERFACE</strong></td>
</tr>
<tr>
<td>20 MHz</td>
<td><strong>Operational Frequency Bands:</strong></td>
</tr>
<tr>
<td>+26 dBm per Tx</td>
<td>Various 3GPP (between 450 MHz and 3.5 GHz)</td>
</tr>
<tr>
<td>MCS Support:</td>
<td>Duplex:</td>
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<tr>
<td>Up to 64-QAM DL/UL</td>
<td>FDD or TDD</td>
</tr>
<tr>
<td>GNSS (GPS) &amp; IEEE1588 PTPv2</td>
<td>Interface:</td>
</tr>
<tr>
<td><strong>Synchronization:</strong></td>
<td>Internal connectivity between UE Relay and eNodeB S1</td>
</tr>
<tr>
<td></td>
<td><strong>MIMO Streams:</strong></td>
</tr>
<tr>
<td></td>
<td>2 Rx on Downlink, 1 Tx on uplink</td>
</tr>
<tr>
<td></td>
<td><strong>MIMO Modes:</strong></td>
</tr>
<tr>
<td></td>
<td>Downlink and Uplink, Spatial Multiplexing &amp; STC</td>
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<td></td>
<td><strong>IEEE Standard:</strong></td>
</tr>
<tr>
<td></td>
<td>Supports Carrier Aggregation</td>
</tr>
<tr>
<td></td>
<td><strong>Max Channel BW:</strong></td>
</tr>
<tr>
<td></td>
<td>10, 20, 2x20 and 3x20 MHz (60 MHz*)</td>
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<tr>
<td></td>
<td><strong>Max Output Power:</strong></td>
</tr>
<tr>
<td></td>
<td>Up to +23dBm per Tx</td>
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<tr>
<td></td>
<td><strong>MCS Support:</strong></td>
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<tr>
<td></td>
<td>Up to 64-QAM</td>
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*In Roadmap*
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