



RADIO FREQUENCY SYSTEMS

BASE STATION ANTENNAS NAR SELECTION GUIDE

Edition 4 / 5.2023





CUTTING SITE
COMPLEXITY
with no compromises

RADIO FREQUENCY SYSTEMS

TABLE OF CONTENTS

| | |
|---|--------------------|
| INTRODUCTION | 2 |
| MULTI-BAND Support 2G, 3G, 4G and 5G frequencies in single, space-efficient antenna | 4 |
| SINGLE-BAND Add a single frequency or technology to a site | 6 |
| STANDALONE TDD & HYBRID TDD/FDD Add a TDD layer to support 5G and TDD LTE | 8 |
| TAILORED BEAMWIDTH ANTENNAS (SPECIAL BEAM) Customize coverage for the most unique requirements and applications | 10 |
| SMALL-SIZE ANTENNAS Increase capacity and coverage in dense urban environments | 12 |
| APPLICATION-SPECIFIC ANTENNAS Support broadcast, public safety and other specialized applications | 14 |
| ACCESSORIES Complete your end-to-end solution | 16 |
| TESTING AND QUALITY ASSURANCE Learn how we ensure long-term reliability and quality | 20 |


CUT SITE COMPLEXITY WITH NO COMPROMISES

Today, there are many base station antennas to choose from, but it's increasingly difficult to find **antennas that combine all of the characteristics needed:**

- High performance
- Low weight
- Low windload
- Compact size
- Low visual impact
- Cost effective


Some antennas address one or two issues, but with considerable compromises in other areas.

RFS base station antennas are engineered from the ground-up to **resolve the toughest physical and architectural challenges and to simplify sites with no compromises to performance.**



Design agility gives you
exactly what you need

OPTIMIZE...EVERYTHING



Our broad portfolio of base station antennas supports network technologies from 2G to 5G as well as emerging 8T8R and 64T64R technologies. We offer:

- **Multi-band antennas** that provide the ultimate in space efficiency and flexibility.
- **Single-band antennas** that make it easy to add a new frequency or technology to a site.
- **Standalone TDD and hybrid TDD/FDD antennas** that make it easy to add a TDD layer to support 5G and TDD LTE.
- **Tailored beamwidth antennas** for the most unique coverage requirements and applications.
- **Small-size antennas** that increase capacity and coverage in dense urban environments.
- **Application-specific antennas** for broadcast, public safety and other specialized applications.

LEVERAGE OUR INNOVATIONS TO PROTECT YOUR INVESTMENTS

Our innovations in antenna design and our commitment to reliable, long-term antenna performance help our customers maximize return on investment and lower total cost of ownership:

- Our **building block approach to antenna design** means we can combine frequencies and network technologies — including 5G — in a single, compact antenna with no compromises to spectrum efficiency, throughput or performance.
- We can adapt our antenna designs to **meet any requirements**, no matter how complex or challenging.
- Our exhaustive efforts to identify and minimize PIM sources mean our base station antenna systems **deliver reliable operation and stable PIM performance that won't fade**, even under adverse conditions, for many years.

MULTI-BAND ANTENNAS THAT PROVIDE THE ULTIMATE
IN SPACE EFFICIENCY AND FLEXIBILITY



With RFS multiband base station antennas, you can support multiple frequencies and multiple technologies in a single, compact antenna that reduces space requirements, site complexity, wind loading, and total cost of ownership.

You have complete flexibility to combine 2G, 3G, 4G and 5G frequencies as needed in antennas that provide up to 12 RF ports. With this future-ready approach, you can meet today’s requirements and ensure you’re ready to support new frequencies when they’re available without the time, cost, space and effort required to add antennas.

IDEAL FOR

- **FDD and TDD** applications that don’t require beam forming
- **Site-sharing** applications
- **MIMO** applications
- Strategic, **future-ready** deployments

SUPPORT MULTIPLE FREQUENCIES &
TECHNOLOGIES IN A SINGLE ANTENNA

THE RFS ADVANTAGE

- **Building-block approach** to antenna design leverages field-proven components to meet specific frequency and technology requirements without the delays that usually accompany custom-built solutions.
- Support for **all sub-6 GHz frequency bands**, including C band, and up to four frequencies in a single antenna increases flexibility and futureproofs deployments.
- Superior isolation, gain, cross-polarization discrimination, front-to-back ratio and PIM performance **minimize interference and ensure high performance** in every frequency band.
- Upper sidelobe suppression **maximizes throughput**.
- A separate remote electrical tilt (RET) motor for each band **increases positioning precision**.
- **Market-leading windloading** increases antenna stability and reliability.

PORTFOLIO OVERVIEW

| Antenna Model Number | HxWxD (mm) | Ports | Type | f1 MHz | f2 MHz | f3 MHz | f4 MHz | f5 MHz | f6 MHz | | Gain(dBi) < 1 GHz | Gain(dBi) 1-3GHz | Gain(dBi) > 3 GHz | HBW typ. @3dB [deg] | Connectors | Tilt Range [deg] | RET Position | Wt. W/O Mounting (Kg) |
|---------------------------------------|--------------|-------|-------|-----------|-----------|-----------|-----------|-----------|-----------|--|----------------------|---------------------|----------------------|------------------------|------------|---------------------|-----------------|--------------------------|
| APXVBL15B_43-C-I20 | 1495x350x200 | 4 | Panel | 698-960 | 1710-2690 | | | | | | 14.5 | 16.6 | | 65 | 4.3-10 | 2-15 / 2-11 | Internal | 16.0 |
| APXVAR18_43-C-NA20 | 1726x405x228 | 4 | Panel | 617-746 | 1695-2200 | | | | | | 15.0 | 18.9 | | 65 | 4.3-10 | 5-19 / 2-12 | Semi-External | 22.0 |
| APXVBL15B_43-C-I20 | 1495x350x200 | 6 | Panel | 698-960 | 1710-2690 | 1710-2690 | | | | | 14.1 | 17.0 | | 65 | 4.3-10 | 2-15 / 2-11 | Internal | 19.0 |
| APXVARR15_43-C-NA20 | 1524x500x216 | 6 | Panel | 617-746 | 1695-2200 | 1695-2200 | | | | | 14.7 | 19.1 | | 65 | 4.3-10 | 5-20 / 2-12 / 2-12 | Semi-External | 31.1 |
| APXVAALL12N_43-U-A20 | 1219x499x215 | 8 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | | | | 12.8 | 16.8 | | 65 | 4.3-10 | 2-12 | Semi-External | 30.0 |
| PH-LYY15-N0 | 1498x450x145 | 8 | Panel | 1710-2690 | 1710-2690 | 3300-3800 | 3300-3800 | | | | | 17.6 | 18.0 | 65 | 4.3-10 | 2-12 | Internal | 21.0 |
| APXVAALL18_43-U-NA20 | 1829x609x215 | 8 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | | | | 15.0 | 18.4 | | 65 | 4.3-10 | 2-12 | Semi-External | 42.0 |
| APXVAALL24_43-U-NA20 | 2436x609x215 | 8 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | | | | 16.2 | 18.9 | | 65 | 4.3-10 | 2-12 | Semi-External | 55.7 |
| APXVAA4L18_43-U-NA20 | 1829x609x215 | 12 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | 1695-2690 | 1695-2690 | | 14.7 | 19.1 | | 65 | 4.3-10 | 2-12 | Semi-External | 48.0 |
| APXVAA4L24_43-U-NA20 | 2436x609x215 | 12 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | 1695-2690 | 1695-2690 | | 16.0 | 19.9 | | 65 | 4.3-10 | 2-12 | Semi-External | 65.0 |
| APXVAA4L18N_43-U-NA20 | 1829x499x215 | 12 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | 1695-2690 | 1695-2690 | | 14.7 | 19.1 | | 65 | 4.3-10 | 2-12 | Semi-External | 31.0 |
| APXVAA4L24N_43-U-NA20 | 2436x499x215 | 12 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | 1695-2690 | 1695-2690 | | 16.0 | 19.9 | | 65 | 4.3-10 | 2-12 | Semi-External | 37.0 |
| Under Development* | | | | | | | | | | | | | | | | | | |
| PH-LYY15-N1 | 1498x450x145 | 8 | Panel | 1710-2690 | 1710-2690 | 3300-4200 | 3300-4200 | | | | | 17.6 | 18.0 | 65 | 4.3-10 | 2-12 | Internal | 21.0 |
| APXVAALL18M-U-J20 | 1829x499x215 | 8 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | | | | 15.0 | 18.4 | | 65 | 4.3-10 | 2-12 | Semi-External | 28.0 |
| APXVAALL24M-U-J20 | 2436x499x215 | 8 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | | | | 16.2 | 18.9 | | 65 | 4.3-10 | 2-12 | Semi-External | 34.0 |
| APXVAA4L12N_43-U-A20 | 1219x499x215 | 12 | Panel | 617-894 | 617-894 | 1695-2690 | 1695-2690 | 1695-2690 | 1695-2690 | | 12.8 | 16.8 | | 65 | 4.3-10 | 2-12 | Semi-External | 25.0 |

*Check availability dates with your RFS Sales representative



SINGLE-BAND ANTENNAS THAT MAKE IT EASY TO ADD A NEW FREQUENCY OR TECHNOLOGY TO A SITE



With RFS single-band base station antennas, it’s easy to introduce a new frequency or technology to a site. You don’t have to replace existing antennas and you’re not forced to combine technologies in cases where it doesn’t make sense from a strategic, business or technical perspective.

You can deploy a frequency and technology-specific antenna with up to 8 ports that meets your exact requirements. At the same time, you can leverage our antennas’ excellent performance characteristics to ensure high-quality communications and features such as field-adjustable remote electrical tilt (RET) to fine-tune coverage.

IDEAL FOR

- **FDD and TDD applications** that don’t require beam forming
- **Increasing LTE capacity** in low-band and high-band frequencies such as 600 MHz, 700 MHz, 800 MHz, PCS, AWS, WCS, BRS, CBRS, and soon C-Band

PORTFOLIO OVERVIEW

| Antenna Model Number | HxWxD (mm) | Ports | Type | f1 MHz | f2 MHz | f3 MHz | f3 MHz | Gain(dBi) < 1 GHz | Gain(dBi) 1-3 GHz | Gain(dBi) > 3 GHz | HBW typ. @3dB [deg] | Polarization | Connectors | Tilt Type | Tilt Range [deg] | RET Position | Wt. W/O Mounting [Kg] |
|--------------------------------------|------------------|-------|-------|-----------|-----------|-----------|-----------|----------------------|----------------------|----------------------|------------------------|--------------|------------|-----------|---------------------|-----------------|--------------------------|
| APXV18-206516S-C-A20 | 1349x169x80 | 2 | Panel | 1710-2200 | | | | | 18.4 | | 65 | X-Pol | 7-16 | VET | 0-10 | External | 12.4 |
| APXVA13X_43-C-A20 | 1380x303x202 | 2 | Panel | 617-894 | | | | 14.1 | | | 65 | X-Pol | 4.3-10 | VET | 5-18 | External | 12.1 |
| APXVL14B_43-C-I20 | 1391x175x110 | 2 | Panel | 1710-2700 | | | | | 17.5 | | 65 | X-Pol | 4.3-10 | VET | 2-12 | External | 11.5 |
| APXVB15B_43-C-I20 | 1495x320x140 | 2 | Panel | 698-960 | | | | 14.7 | | | 65 | X-Pol | 4.3-10 | VET | 2-15 | Internal | 15.5 |
| APXV18-206517S-C-A20 | 1953x169x80 | 2 | Panel | 1710-2200 | | | | | 18.8 | | 65 | X-Pol | 7-16 | VET | 0-10 | External | 14.9 |
| APXVB20B_43-C-I20 | 1980x320x140 | 2 | Panel | 698-960 | | | | 16.0 | | | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 19.0 |
| APXVB26B_43-C-I20 | 2550x320x140 | 2 | Panel | 698-960 | | | | 17.1 | | | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 29.0 |
| PH-YY10-N0 | 1000x180x115 | 4 | Panel | 3300-3800 | 3300-3800 | | | | | 17.1 | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 6.4 |
| APXVLL13P_43-C-A20 | 1390x288x118 | 4 | Panel | 1695-2690 | 1695-2690 | | | | 18.4 | | 65 | X-Pol | 4.3-10 | VET | 0-12 | External | 13.4 |
| APXVLL15B_43-C-I20 | 1498x320x123 | 4 | Panel | 1710-2690 | 1710-2690 | | | | | | | | | | | | |
| APXVAA18X_43-U-A20 | 1829x609x215 | 4 | Panel | 617-894 | 617-894 | | | 15.2 | | | 65 | X-Pol | 4.3-10 | VET | 2-12 | External | 34.0 |
| APXVLL19P_43-C-A20 | 1925x288x118 | 4 | Panel | 1695-2690 | 1695-2690 | | | | 19.5 | | 65 | X-Pol | 4.3-10 | VET | 2-12 | External | 19.0 |
| APXVAA24X_43-U-A20 | 2436x609x215 | 4 | Panel | 617-894 | 617-894 | | | 16.3 | | | 65 | X-Pol | 4.3-10 | VET | 2-12 | External | 43.7 |
| APXVBB26B_43-C-I20 | 2690x499x199 | 4 | Panel | 698-960 | 698-960 | | | 16.5 | | | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 38.0 |
| APXVLLL15B_43-C-I20 | 1485 x 428 x 145 | 6 | Panel | 1710-2690 | 1710-2690 | 1710-2690 | | | 18.1 | | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 22.0 |
| APXVLLL15B2_43-C-I20 | 1485 x 499 x 199 | 8 | Panel | 1710-2690 | 1710-2690 | 1710-2690 | 1710-2690 | | 17.7 | | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 24.0 |
| Under Development* | | | | | | | | | | | | | | | | | |
| PH-YY10-N1 | 1000x180x115 | 4 | Panel | 3300-4200 | 3300-4200 | | | | | 17.1 | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 6.4 |

*Check availability dates with your RFS Technologies Sales representative



LEVERAGE OUR ANTENNAS EXCELLENT PERFORMANCE FEATURES

THE RFS ADVANTAGE

- **Extra-slim designs** simplify zoning and approvals and reduce space requirements.
- **Support for all sub-4.2 GHz frequency bands** increases flexibility and futureproofs deployments.
- **Excellent front-to-back ratio** reduces interference from neighboring cells.
- **Excellent upper sidelobe suppression** enables applications that require high tilt levels.
- **Low PIM** minimizes system down-time, increases quality and reduces the number of dropped calls.
- **Market-leading windloading** increases antenna stability and reliability.
- **Upper sidelobe suppression** maximizes throughput.
- **A separate remote electrical tilt (RET) motor for each band** increases positioning precision.
- **Market-leading windloading** increases antenna stability and reliability.
- **Upper sidelobe suppression** maximizes throughput.



STANDALONE TDD AND HYBRID
TDD/FDD ANTENNAS

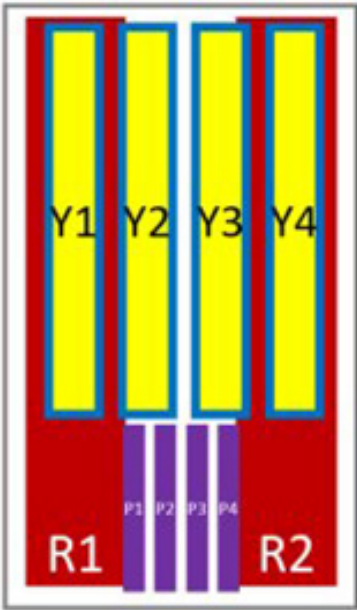


With RFS TDD and hybrid TDD/FDD base station antennas, you can easily and efficiently add a TDD layer to your network to support critical network technologies, such as 5G and TDD LTE, with minimal impact at sites.

For maximum flexibility, we offer **three approaches** to TDD antennas:

- Deploy a **standalone TDD antenna** that’s only 1.2 meter (3 ft) tall.
- Combine passive **TDD and FDD technologies** antenna in a single antenna with an optimized footprint.
- Deploy an RFS passive FDD antenna today, then **seamlessly add active TDD technology** when the time is right with no impact on antenna footprint or performance.

MAKE IT EASY TO ADD A TDD LAYER TO
SUPPORT 5G AND TDD LTE



- IDEAL FOR**
- Introducing TDD technologies, such as **5G or LTE** for fixed wireless access
 - Introducing TDD applications that require **beamforming**
 - **Infrastructure-sharing** between TDD and FDD services
 - **Space-constrained** TDD deployments
 - Applications in the **2.5/2.6 GHz** band and the **3.3 GHz to 4.2 GHz** CBRS/C band

- THE RFS ADVANTAGE**
- Widely deployed TDD antennas are proven to **deliver high performance** in the field for many years.
 - **Patented, interleaved architecture** for combining TDD and FDD technologies optimizes the performance of both technologies.
 - Innovative, **modular antenna** platforms enable active and passive technologies to be combined in a single antenna.

PORTFOLIO OVERVIEW

| Antenna Model Number | HxWxD (mm) | Ports | Type | f1 MHz | f2 MHz | f3 MHz | f4 MHz | f5 MHz | f6 MHz | f7 MHz | f8 MHz | Gain(dBi) <1 GHz | Gain(dBi) 1-3 GHz | Gain(dBi) > 3 GHz | HBW typ. @3dB [deg] | Polarization | Connectors | Tilt Type | Tilt Range [deg] | RET Position | Wt. W/O Mounting [Kg] |
|--------------------------|--------------|-------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|---------------------|----------------------|----------------------|------------------------|--------------|-------------|-----------|---------------------|-----------------|--------------------------|
| APXV9TY10AB_43-C-I2Q | 1050x288x118 | 8 | Beamformer | 3300-3800 | 3300-3800 | 3300-3800 | 3300-3800 | | | | | | | 15.0 | 90 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 11.0 |
| APXV9TY10AEB_43-C-I2Q | 1050x288x118 | 8 | Beamformer | 3300-4200 | 3300-4200 | 3300-4200 | 3300-4200 | | | | | | | 15.0 | 90 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 11 |
| APXV9TM13_43-C-I2Q | 1395x320x160 | 8 | Beamformer | 2496-2690 | 2496-2690 | 2496-2690 | 2496-2690 | | | | | | 16.5 | | 90 | X-Pol | 4.3-10 | VET | 0-9 | Internal | 25.0 |
| APXV9TM13_CL-C-I2Q | 1395x320x160 | 8 | Beamformer | 2496-2690 | 2496-2690 | 2496-2690 | 2496-2690 | | | | | | 16.5 | | 90 | X-Pol | MLOC | VET | 0-9 | Internal | 24.0 |
| APXV9TM14-C-I2Q | 1430x320x160 | 8 | Beamformer | 2496-2690 | 2496-2690 | 2496-2690 | 2496-2690 | | | | | | 18.0 / 23.5 | | 65 | X-Pol | 4.1-9.5 | VET | 0-6 | Internal | 28.9 |
| APXVB4LY14AEB_43MQ-C-120 | 1390x429x199 | 18 | Hybrid/TDD | 698-960 | 1710-2690 | 1710-2690 | 1710-2690 | 1710-2690 | 3300-4200 | 3300-4200 | 3300-4200 x2 | 14.5 | 14.5 | 15.0 | 65 / 80 | X-Pol | 4.3-10 & MQ | VET | 2-14 / 2-12 / 2-12 | Internal | 27.0 |
| Under Development* | | | | | | | | | | | | | | | | | | | | | |
| APXVAALL9TY24_43-U-I20 | 2436x499x215 | 16 | Hybrid/TDD | 617-896 | 617-896 | 1710-2690 | 1710-2690 | 3300-4200 | 3300-4200 | 3300-4200 | 3300-4200 | 15.5 | 17.5 | 15.5 | 65/90 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 50.0 |
| APXVAA4L9TY24_43-U-I20 | 2436x499x215 | 20 | Hybrid/TDD | 617-896 | 617-896 | 1710-2690 | 1710-2690 | 1710-2690 | 1710-2690 | 3300-4200 | 3300-4200x3 | 15.5 | 17.5 | 15.5 | 65/90 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 53.0 |

*Check availability dates with your RFS Sales representative



TAILORED BEAMWIDTH ANTENNAS
(SPECIAL BEAM)



With RFS tailored beamwidth base station antennas, you can meet unique, location-specific coverage requirements for any application. Our comprehensive portfolio includes:

- **Narrow-beam** antennas with 30° to 45° horizontal beamwidth
- **Dual-beam** (split beam) antennas with 2 consistent-width horizontal beams
- **Wide-beam** antennas with 90° horizontal beamwidth
- Deploy an RFS passive FDD antenna today, then **seamlessly add active TDD technology** when the time is right with no impact on antenna footprint or performance.

FOR THE MOST UNIQUE COVERAGE
REQUIREMENTS AND APPLICATIONS

IDEAL FOR

- Focusing coverage on **high-density crowds in contained locations**, such as stadiums and town squares
- Focusing coverage on specific regions of **dense urban areas or specific stretches of highways**
- Dividing 3-sector sites into 6-sector sites to **increase capacity**
- Expanding coverage in **rural areas** where capacity is less of a concern

THE RFS ADVANTAGE

- **One-stop-shopping** for base station antennas with any beamwidth, for any application, saves time, effort and money.
- Tailored beamwidth antennas **covering all sub-6 GHz bands** increases flexibility and futureproofs deployments.
- **Market-leading windloading** increases antenna stability and reliability.
- A **continuously growing portfolio** of base station antennas with tailored beamwidths supports the most specific requirements.


PORTFOLIO OVERVIEW

| Antenna Model Number | HxWxD (mm) | Ports | Type | f1 MHz | f2 MHz | f3 MHz | | Gain(dBi) < 1 GHz | Gain(dBi) 1-3 GHz | Gain(dBi) > 3 GHz | HBW typ. @3dB [deg] | Polarization | Connectors | Tilt Type | Tilt Range [deg] | RET Position | Wt. W/O Mounting [Kg] |
|--------------------------------------|--------------|-------|-------------|-----------|-----------|-----------|--|----------------------|----------------------|----------------------|------------------------|--------------|------------|-----------|---------------------|-----------------|--------------------------|
| APXV18-203219-C-A20 | 1375x288x118 | 2 | Narrow Beam | 1710-2200 | | | | | 21.0 | | 32 | X-Pol | 7-16 | VET | 0-10 | External | 20.0 |
| APXV3B26B_43-C-I20 | 2800x640x230 | 2 | Narrow Beam | 698-960 | | | | 19.2 | | | 32 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 31.0 |
| APXV3RR13-C-A20 | 1375x576x118 | 4 | Narrow beam | 1710-2200 | 1710-2200 | | | | 21.0 | | 33 | X-Pol | 7-16 | VET | 0-10 | External | 31.8 |
| APXV3LL15B_43-C-I20 | 1498x499x199 | 4 | Narrow beam | 1710-2690 | 1710-2690 | | | | 21.0 | | 33 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 26 |
| APXV3BLL20B_43-C-I20 | 2080x565x145 | 6 | Narrow Beam | 698-960 | 1710-2690 | 1710-2690 | | 18.3 | 17.5 | | 32 | X-Pol | 4.3-10 | VET | 2-12 | External | 39.0 |
| APXV18-209014-C-A20 | 1349x169x80 | 2 | Wide Beam | 1710-2170 | | | | | 16.5 | | 90 | X-Pol | 7-16 | VET | 0-10 | External | 11.3 |
| APXV18-209015-C-A20 | 1850x169x80 | 2 | Wide Beam | 1710-2170 | | | | | 17.9 | | 90 | X-Pol | 7-16 | VET | 0-10 | External | 14.3 |
| APXV9RR13-C-A20 | 1349x356x80 | 4 | Wide Beam | 1710-2170 | 1710-2170 | | | | 16.5 | | 90 | X-Pol | 7-16 | VET | 0-9 | External | 23.0 |



SMALL-SIZE ANTENNAS

INCREASE CAPACITY AND COVERAGE
IN DENSE URBAN ENVIRONMENTS



With RFS small-size base station antennas, you can optimize coverage and capacity in 2G, 3G, 4G and 5G networks in dense urban environments. We offer antennas ranging in size from 27 cm to 70 cm (1 ft to 3 ft) to support the most space-constrained deployments.

Our lightweight and **versatile small cell base station antennas** can be used in neutral-host networks and shared-infrastructure deployments to keep costs down and address property owners’ concerns about the aesthetics of large numbers of antennas.



IDEAL FOR

- Improving coverage and capacity at **high-traffic locations** such as urban streets and town squares, airports, office buildings, campuses, stadiums, convention centers, hotels and transit systems
- Shared-infrastructure** deployments
- MIMO** deployments

THE RFS ADVANTAGE

- Support for **all sub-6 GHz frequency bands**, including C band, CBRS and LAA spectrum, futureproofs deployments.
- Support up to **8 frequency bands** and varying numbers of ports in a single antenna, increases flexibility.
- Best-in-class performance** ensures high-quality communications.
- Broadband panel and omnidirectional antenna designs support **any deployment in any location**.
- Lightweight designs reduce antenna footprint and simplify installation.

PORTFOLIO OVERVIEW

| Antenna Model Number | HxWxD (mm) | Ports | Type | f1 MHz | f2 MHz | f3 MHz | f4 MHz | f5 MHz | f6 MHz | f7 MHz | | Gain(dBi) < 1 GHz | Gain(dBi) 1-3 GHz | Gain(dBi) > 3 GHz | HBW typ. @3dB [deg] | Polarization | Connectors | Tilt Type | Tilt Range [deg] | RET Position | Wt. W/O Mounting [Kg] |
|-----------------------------------|-------------|-------|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|-------------------|-------------------|-------------------|---------------------|--------------|------------|-----------|-----------------------|---------------|-----------------------|
| APXL03S-CT3 | 270x158x100 | 2 | Panel | 1710-2690 | | | | | | | | | 11.0 | | 65 | X-Pol | 7-16 | FET | T3 | N/A | 1.9 |
| APXVL08B_43-C-I2Q | 800x160x115 | 2 | Panel | 1710-2690 | | | | | | | | | 15.8 | | 65 | X-Pol | 4.3-10 | VET | 2-12 | Internal | 5.1 |
| APXVLL06-C-A20 | 609x288x118 | 4 | Panel | 1695-2690 | 1695-2690 | | | | | | | | 15.3 | | 65 | X-Pol | 7-16 | VET | 5-18 | Semi-External | 13.0 |
| APXVBL06-C-A20 | 609x340x200 | 6 | Panel | 694-960 | 1695-2690 | 1695-2690 | | | | | | 10.0 | 14.0 | | 65 | X-Pol | 7-16 | VET | 5 / 5-18 | Semi-External | 11.0 |
| APXVBL09-C-A20 | 980x350x200 | 6 | Panel | 698-960 | 1710-2690 | 1710-2690 | | | | | | 12.6 | 15.7 | | 65 | X-Pol | 4.3-10 | VET | 2-15 / 2-12 | Internal | 16.0 |
| SP-LLYYZ06-FQ | 609x283x181 | 10 | Panel | 1695-2690 | 1695-2690 | 3300-4200 | 3300-4200 | 5150-5925 | | | | | 14.0 | 10.6 | 65 | X-Pol | 4.3-10 | FET | 5 / 5 / 0 | N/A | 5.2 |
| P-BBLLYYZ06-01 | 609x340x200 | 14 | Panel | 694-960 | 694-960 | 1695-2690 | 1695-2690 | 3300-4200 | 3300-4200 | 5150-5925 | | 7.5 | 14.0 | 10.6 | 65 | X-Pol | 4.3-10 | FET | T0 | N/A | 7.0 |
| AOXVBL06_43-A-A20 | 564x380x380 | 6 | Omni | 698-960 | 1695-2690 | 1695-2690 | | | | | | 6.4 | 9.7 | | 360 | X-Pol | 4.3-10 | VET | 0 / 5-18 in high band | External | 19.0 |
| SQ-LLYYZ06-FQ | 609x332x332 | 10 | Omni | 1695-2690 | 1695-2690 | 3300-4200 | 3300-4200 | 5150-5925 | | | | | 10.1 | 6.9 | 360 | X-Pol | 4.3-10 | FET | 5 / 5 / 0 | N/A | 11.0 |
| O-BBLLYYZ06-01 | 609x355x355 | 14 | Omni | 694-960 | 694-960 | 1695-2690 | 1695-2690 | 3300-4200 | 3300-4200 | 5150-5925 | | 3.8 | 10.1 | 6.9 | 360 | X-Pol | 4.3-10 | FET | T0 | N/A | 11.3 |



APPLICATION-SPECIFIC ANTENNAS
FOR SPECIALIZED APPLICATIONS

With RFS application-specific base station antennas, you can support frequency bands, such as UHF and VHF, which are used in the broadcast industry, as well as industry radio standards, such as Terrestrial Trunked Radio (TETRA).

You can also extend coverage to rural areas and support applications that require a customized antenna configuration, such as tri-sector antennas that combine multiple antennas within a single cylindrical shroud. With our broad antenna portfolio, we can provide antennas for even the most unique and niche applications.

IDEAL FOR

- **UHF and VHF** broadcast applications
- **Public safety** radio applications in the 700 MHz band
- **TETRA radio** applications
- **Camouflaged**, tri-sector antenna applications
- **Rural** coverage
- **Highway** coverage

THE RFS ADVANTAGE

- **One-stop-shopping** for base station antennas for broadcast, radio and cellular applications saves time, effort and money.
- **Antennas that are field-proven** in numerous deployments increase reliability.
- **Market-leading windloading** increases antenna stability and reliability.

Field-proven
antennas in numerous
deployments

APPLICATION-SPECIFIC ANTENNAS
PORTFOLIO OVERVIEW

| Model Number | Description | Frequency MHz | HBW deg | Gain dBi (dBd) | Length m (ft) | Tilt deg |
|------------------------------------|------------------------------------|---------------|----------------|----------------|---------------|----------|
| Omnidirectional Fiberglass Antenna | | | | | | |
| BA1010-1 | Omnidirectional Fiberglass Antenna | 146-164 | 360° | 2.1 (0) | 1.43 (4.7) | 0° |
| BA1010-2 | Omnidirectional Fiberglass Antenna | 154-174 | 360° | 2.1 (0) | 1.4 (4.6) | 0° |
| BA1010-4 | Omnidirectional Fiberglass Antenna | 114-125 | 360° | 2.1 (0) | 1.86 (6.1) | 0° |
| BA1012-0 | Omnidirectional Fiberglass Antenna | 118-174 | 360° | 2.1 (0) | 1.43 (4.7) | 0° |
| BA1012-1 | Omnidirectional Fiberglass Antenna | 144-162 | 360° | 2.1 (0) | 1.34 (4.4) | 0° |
| BA1012-2 | Omnidirectional Fiberglass Antenna | 154-174 | 360° | 2.1 (0) | 1.13 (3.7) | 0° |
| BA1312-0 | Omnidirectional Fiberglass Antenna | 118-174 | 360° | 5.1 (3) | 2.68 (8.8) | 0° |
| BA1312-1 | Omnidirectional Fiberglass Antenna | 149-156 | 360° | 5.1 (3) | 2.62 (8.6) | 0° |
| BA1312-2 | Omnidirectional Fiberglass Antenna | 156-163 | 360° | 5.1 (3) | 2.62 (8.6) | 0° |
| BA1312-3 | Omnidirectional Fiberglass Antenna | 163-171 | 360° | 5.1 (3) | 2.62 (8.6) | 0° |
| BA6012-0 | Omnidirectional Fiberglass Antenna | 406-512 | 360° | 2.1 (0) | 1.13 (3.7) | 0° |
| BA6012-1 | Omnidirectional Fiberglass Antenna | 449-471 | 360° | 2.1 (0) | 0.82 (2.7) | 0° |
| BA6110-1 | Omnidirectional Fiberglass Antenna | 400-470 | 360° | 2.1 (0) | 1.01 (3.3) | 0° |
| BA6110-2 | Omnidirectional Fiberglass Antenna | 450-512 | 360° | 2.1 (0) | 0.94 (3.1) | 0° |
| BA6110-3 | Omnidirectional Fiberglass Antenna | 380-440 | 360° | 2.1 (0) | 1.01 (3.3) | 0° |
| BA6312-0 | Omnidirectional Fiberglass Antenna | 406-512 | 360° | 5.1 (3) | 1.43 (4.7) | 0° |
| BA6312-1 | Omnidirectional Fiberglass Antenna | 449-467 | 360° | 5.1 (3) | 1.34 (4.4) | 0° |
| BA6312-5 | Omnidirectional Fiberglass Antenna | 380-400 | 360° | 5.1 (3) | 1.34 (4.4) | 0° |
| BA6312-6 | Omnidirectional Fiberglass Antenna | 410-430 | 360° | 5.1 (3) | 1.34 (4.4) | 0° |
| Penetrator™ Antennas | | | | | | |
| BMR10-A-B1 | Penetrator | 806-869 | 220° | 14.4 (12.3) | 3.96 (13) | 0,75 |
| BMR10-B-B1 | Penetrator | 806-869 | 140° | 16.1 (14) | 3.96 (13) | 0,75 |
| BMR10-D-B1 | Penetrator | 806-869 | 120° | 16.4 (14.3) | 3.96 (13) | 0,75 |
| BMR10-H-B1 | Penetrator | 806-869 | Bi-directional | 15.5 (13.4) | 3.96 (13) | 0,75 |
| BMR10-O-B1 | Fiberglass Omni Penetrator | 806-869 | 360° | 12.1 (10) | 3.96 (13) | 0,75 |
| BMR12-A-B1 | Penetrator | 806-869 | 220° | 16.4 (14.3) | 6.1 (20) | 0,75 |
| BMR12-B-B1 | Penetrator | 806-869 | 140° | 18.1 (16) | 6.1 (20) | 0,75 |
| BMR12-D-B1 | Penetrator | 806-869 | 120° | 18.4 (16.3) | 6.1 (20) | 0,75 |
| BMR12-H-B1 | Penetrator | 806-869 | Bi-directional | 17.5 (15.4) | 6.1 (20) | 0,75 |
| BMR12-O-B1 | Fiberglass Omni Penetrator | 806-869 | 360° | 14.1 (12) | 6.1 (20) | 0,75 |
| BMR6-A-B1 | Penetrator | 806-869 | 220° | 10.4 (8.3) | 1.68 (5.5) | 0 |
| BMR6-B-B1 | Penetrator | 806-869 | 140° | 12.1 (10) | 1.68 (5.5) | 0 |
| BMR6-D-B1 | Penetrator | 806-869 | 120° | 12.4 (10.3) | 1.68 (5.5) | 0 |
| BMR6-H-B1 | Penetrator | 806-869 | Bi-directional | 11.5 (9.4) | 1.68 (5.5) | 0 |
| BMR6-O-B1 | Fiberglass Omni Penetrator | 806-869 | 360° | 8.1 (6) | 1.68 (5.5) | 0 |
| BMR8-A-B1 | Penetrator | 806-869 | 220° | 12.4 (10.3) | 2.44 (8) | 0,75 |
| BMR8-B-B1 | Penetrator | 806-869 | 140° | 14.1 (12) | 2.44 (8) | 0,75 |
| BMR8-D-B1 | Penetrator | 806-869 | 120° | 14.4 (12.3) | 2.44 (8) | 0,75 |
| BMR8-H-B1 | Penetrator | 806-869 | Bi-directional | 13.5 (11.4) | 2.44 (8) | 0,75 |
| BMR8-O-B1 | Fiberglass Omni Penetrator | 806-869 | 360° | 10.1 (8) | 2.44 (8) | 0,75 |
| BPS10-A-B1 | Penetrator | 746-806 | 220° | 14.4 (12.3) | 4.26 (14) | 0,75 |
| BPS10-B-B1 | Penetrator | 746-806 | 140° | 16.1 (14) | 4.26 (14) | 0,8 |
| BPS10-D-B1 | Penetrator | 746-806 | 120° | 16.4 (14.3) | 4.26 (14) | 0,8 |
| BPS10-H-B1 | Penetrator | 746-806 | Bi-directional | 15.5 (13.4) | 4.26 (14) | 0,8 |
| BPS10-O-B1 | Fiberglass Omni Penetrator | 746-806 | 360° | 12.1 (10) | 4.26 (14) | 0,8 |



ACCESSORIES TO COMPLETE YOUR END-TO-END SOLUTION

RFS offers a complete portfolio of accessories to support base station antenna deployments in any location, for any application.

UNIVERSAL MOUNTING SYSTEM SIMPLIFIES DEPLOYMENTS

Almost all of our base station antennas use the same, **flexible mounting system** to enable faster, easier deployments and lower training requirements. Our universal mounting system:



- Allows convenient, **one-handed adjustments**
- **Withstands winds** up to 240 km/h (149 mph)
- Supports **mechanical downtilt** of 0° to 10°
- Provides a 60 mm to 120 mm (2.4 in to 4.7 in diameter) pipe for **optional wall mounting**

Additional options for tilt and azimuth adjustments of +/- 30°, multi-sector deployments, and pipe diameters of 30 mm to 60 mm (1.2 in to 2.4 in) are also available.

AISG CABLES AND ADDITIONAL ACCESSORIES

We offer a **wide range of Antenna Interface Standards Group (AISG) cables** in various lengths, and can customize cable lengths if needed. Our cables are AISG 2.0-compliant and meet the AISG 3.0 implementation requirements. To support end-to-end installations, we also offer:

- **Protocol adaptors** for RET systems
- **Sensors and GPS solutions** to monitor antenna movements on all three axes



REMOTE ELECTRICAL TILT SYSTEMS FOR ANY REQUIREMENTS

For **maximum flexibility**, you can choose the optimal remote electrical tilt (RET) technology for each antenna deployment. We offer a variety of RET systems to meet your requirements for:

- Fixed electrical tilt
- External RET
- Internal RET
- Field-replaceable RET
- Single RET mode
- Multiple RET mode
- Virtual single RET mode
- Site sharing



All of our RET systems **support a wide tilt range for all frequency bands** and provide superior pattern performance across the complete electrical downtilt range. An optional integrated bias tee **combines DC current and RF signals onto a single transmission path** in the antenna to reduce cabling and component requirements.

You can also manually adjust electrical downtilt in the field using a standard 5 mm allen (hex) key when required.

ACCESSORIES PORTFOLIO OVERVIEW

| Model Number | Description |
|----------------------|--|
| Mounting hardware | |
| APM40-2 | Standard down tilt mount, mast diameter 60-120mm |
| APM40-5E | Heavy duty down tilt mount, mast diameter 60-120mm |
| APM40-6 | Light duty down tilt mount, mast diameter 60-120mm |
| APM40-6C | Light duty down tilt mount, mast diameter 60-120mm |
| APM40-8 | Canister mount |
| APM40-E2 | Scissor option |
| APM40-E3 | Azimuth option |
| APM40-E4 | Bracket interface for APM40 |
| APM40-E6 | Adaptation for mast 30-60mm |
| APM40-E9 | Bracket interface for APM40 |
| APM40-E9T | Bracket interface for APM40 |
| APM40-E10 | Bracket interface for APM40 |
| APM40-E10T | Bracket interface for APM40 |
| APM50-1 | Mounting kit 50-115mm |
| APM50-2 | Mounting kit 50-115mm |
| APM50-3 | Mounting kit 50-115mm |
| APM50-4 | Mounting kit 50-115mm |
| APM50-5 | Mounting kit 50-115mm |
| APM50-6 | Mounting kit 50-115mm |
| APM50-7 | Mounting kit 50-115mm |
| APM50-B1 | Mounting kit 50-110mm |
| APM50-H1 | Mounting kit 50-125mm |
| APM50-H2 | Mounting kit 50-125mm |
| Antenna Control Unit | |
| ACU-A20-S | Antenna Control Unit, SRET, AISG 2.0 |
| ACU-A20-SR | Antenna Control Unit, SRET, AISG 2.0 |
| ACU-I20-B1 | Antenna Control Unit, SRET, AISG 2.0 |
| ACU-I20-B2 | Antenna Control Unit, MRET 1 to 2, AISG 2.0 |
| ACU-I20-B3 | Antenna Control Unit, MRET 1 to 3, AISG 2.0 |
| ACU-X20 | Antenna Control Unit, Site-Sharing, MRET 1 to 2, AISG 2.0 |
| Protocol Adapter | |
| PA-USB/485-2 | Protocol Adapter, USB connection, AISG compatible + CA015-2 cord - North America |
| Other Components | |
| 395 | Lightning arrestor |
| 593 | Lightning arrestor |
| B1HD | Bracket angle MTG (heavy duty) |
| B1-TS | Assy, penetrator top support |

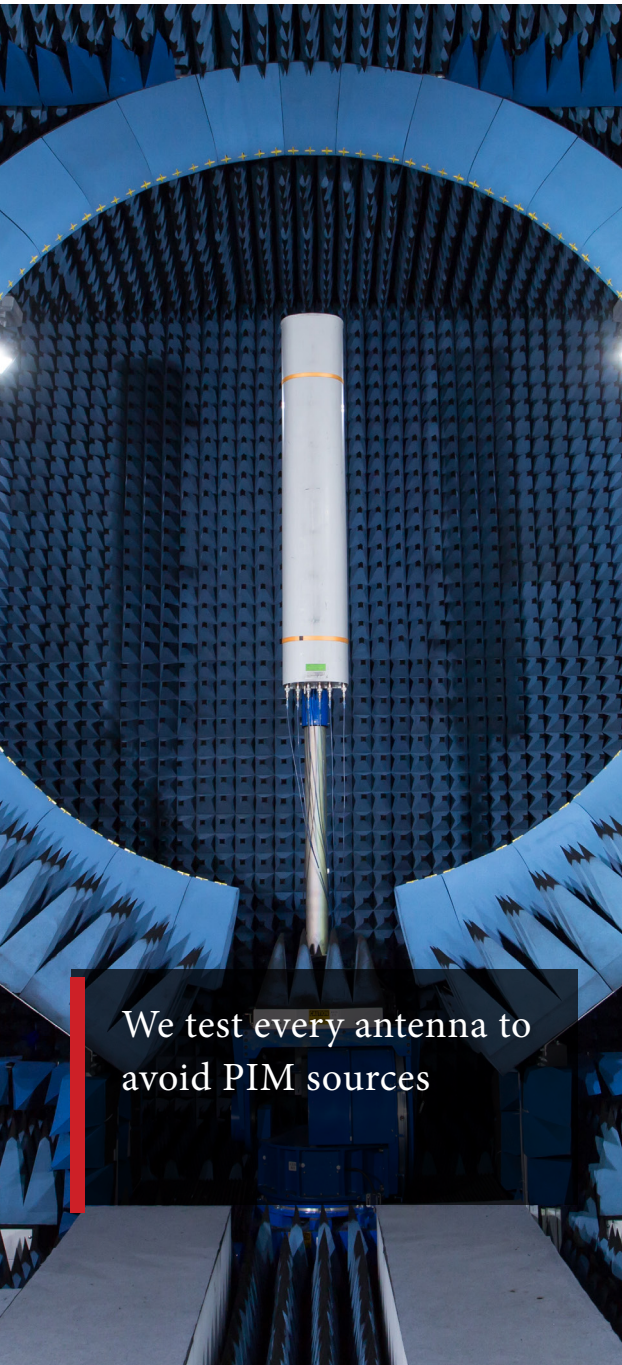
ACCESSORIES PORTFOLIO OVERVIEW

| Model Number | Description |
|--------------|---|
| AISG Cables | |
| CA002-7 | 20cm outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA003-7 | 30cm outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA005-7 | 50cm outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA010-7 | 1m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA020-7 | 2m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA030-7 | 3m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA040-7 | 4m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA050-7 | 5m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA060-7 | 6m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA070-7 | 7m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA080-7 | 8m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA090-7 | 9m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA100-7 | 10m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA150-7 | 15m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA200-7 | 20m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA250-7 | 25m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA300-7 | 30m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA350-7 | 35m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA400-7 | 40m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA450-7 | 45m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA500-7 | 50m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA600-7 | 60m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA700-7 | 70m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA800-7 | 80m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA900-7 | 90m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA1000-7 | 100m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA1150-7 | 115m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA1500-7 | 150m outdoor, AISG 1.1 & 2.0 cable between TMA, ACU, BT, connectors male / female |
| CA010-6 | CA010-6 AISG signal / power cable M&M 1m |
| CA030-6 | CA030-6 AISG signal / power cable M&M 3m |

resolve the
TOUGHEST PHYSICAL
AND ARCHITECTURAL
challenges



TESTING AND QUALITY ASSURANCE



We test every antenna to avoid PIM sources

Every RFS base station antenna undergoes **rigorous testing and validation** to ensure it provides the highest possible for performance throughout its lifetime.

We have **ISO9001** and **ISO14001** accredited manufacturing facilities worldwide.

All RFS antennas comply with the **BASTA standards** recommended by the Next Generation Mobile Network (NGMN) Alliance for base station antennas. BASTA values are available for all RFS antennas upon request.

TESTING FACILITIES IN THE UNITED STATES, FRANCE AND CHINA

We have outdoor testing facilities in Lannion, France.

We also have indoor testing facilities in Shanghai, China, Meriden, CT USA, and Lannion, with **advanced technology** for near and far-field test ranges to recreate the wide variety of outdoor conditions.

Our base station antennas undergo **100% production testing** on:

- VSWR
- Isolation
- PIM

We welcome our customers for benchmarking testing at any of our facilities.



ADHERENCE TO KEY INDUSTRY SPECIFICATIONS

Our base station antennas adhere to the **ETSI 300 019-2 series** specifications:

- **Operation:** EN 300 019-2-4: Class T4-1 E: Non-Weather Protected Locations – Extended
- **Storage:** EN 300 019-2-1: Class T1.2: Weather Protected Locations – not temperature controlled
- **Transportation:** EN 300 019-2-2: Class T2.2: Careful Transportation Class T2.3: Public Transportation
- **Environmental:** EN 300 019-1-4 Class 4.1 E: Non-Weather Protected Locations – Extended

To ensure **reliable performance in harsh conditions** for many years, our antennas also adhere to the following environmental specifications:



- **Temperature:** IEC 600-68-2-14 Test Nb
- **Dry heat:** IEC 600-68-2-2 Test Bb
- **Cold:** IEC 600-68-2-1 Test Ab
- **Humidity:** IEC 600-68-2-78 Test Cab
- **Rain:** IEC 600-68-2-18 Test Rb
- **Salt mist:** ISO 9227:2006
- **Sinusoidal vibration:** IEC 600-68-2-6
- **Shock and bump:** IEC 600-68-2-29
- **Free fall:** IEC 600-68-2-31
- **UV:** ISO 4892-2A

Finally, we apply additional system reliability stress tests, including:

- Windload testing
- Highly accelerated life tests (HALT)
- Climatic chamber testing
- Mean operations between failure (MOBF)
- End-of-life testing across each product's specified temperature range





RADIO FREQUENCY SYSTEMS