

**RALEIGH-DURHAM INTERNATIONAL AIRPORT**  
**RF SYSTEMS ANTENNA/RADIO FREQUENCY POLICY**

EFFECTIVE JUNE 1, 2002

The Raleigh-Durham Airport Authority has established the following policy, as amended, for the operation of RF systems at the Raleigh-Durham International Airport. If any part of this policy is determined to be in conflict with Federal or State law, or is otherwise held to be invalid, the remaining and unaffected provisions of this policy shall continue in full force and effect.

These provisions for RF systems remain subject to review and change when the need arises and whenever improvements can be made.

Amended this, the first day of August 2003.



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Chairman, Raleigh-Durham Airport Authority

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- RF Site Application
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## **Definitions**

The definitions below are intended to clarify terms used in this Policy.

### **Airport**

The Raleigh-Durham International Airport.

### **Airport Network**

The Authority's shared-use, wireless distributed antenna network developed in the terminal buildings, other public buildings and structures, and other areas of the Airport.

### **Authority (Raleigh-Durham Airport Authority)**

A municipal corporation chartered by the General Assembly of North Carolina and existing by virtue of Chapter 168, Public-Local laws of 1939, as amended. The term Authority as used in this Policy is further defined to mean Authority personnel and/or any management / consulting firm(s) designated by the Authority to implement this Policy on its behalf.

### **CDMA (code division multiple access)**

A spread spectrum air interface technology used in some digital cellular, personal communications services and other wireless networks.

### **Commercial RF Systems**

FCC licensed and unlicensed RF systems provided by WSP's, WLAN and W-Internet and all other wireless providers of service to end users on the Airport.

### **ESMR (enhanced specialized mobile radio)**

Digital SMR networks, usually referring to Nextel Communications Inc., which provides dispatch, voice, messaging and data services.

### **Exclusively Leased Space**

The building or ground space leased to a tenant or sub-tenant of the Authority for its sole uses.

### **FCC**

Federal Communications Commission.

### **GSM (Global System for Mobile Communications)**

The pan-European digital cellular system standard (developed by a committee of European telecommunications administrators, operators, and manufacturers), now deployed worldwide at 900 MHz and gaining popularity at 1800 and 1900 MHz. Defines a radio interface based on 8-user time division multiple access (TDMA) with 200-kHz channel spacing and advanced features. Formerly called Groupe Speciale Mobile.

### **Independent Network**

A wireless network in operation at the Airport developed by a User or WSP.

### **Interference**

Interference is not based solely on degradation of the radio frequency performance of

existing systems. Interference will normally be based upon the requirements embodied in the FCC's Rules and on the voice quality standards for long distance telephone lines contained in the Bell System Practices. These standards provide a consistent and well-defined means of evaluating the degradation of the audio quality over a voice channel, whether it is a wire channel or a radio channel.

### **Maximum Permitted Exposure**

Maximum RF signal exposure level as defined by the FCC.

### **Non-Exclusively Leased Space**

Building or ground space used in common by Airport users.

### **Operational RF Systems**

Operational RF systems including all noncommercial radio frequency (RF) voice and data systems, both licensed and unlicensed, which are installed on the Airport and used by the Airport, government agencies or tenants of the Airport for the safe and efficient operation of the Airport.

### **Policy**

This RF Systems Antenna/Radio Frequency Policy.

### **Radio Frequency Distribution System (RFDS)**

Any nonexclusive multiple access RF system provided to WSP's used to distribute RF uplink and downlink signals underground, within buildings, parking structures, or the shadow of buildings or other difficult to cover areas of the Airport or underlay systems within "hot spots" requiring additional capacity.

### **RF Systems**

RF Systems includes Operational and Commercial RF Systems and equipment, and are defined as the following:

- a. Traditional public safety and industrial two-way radio, including airline "air to ground" and "ground to ground" systems and other Operational RF systems.
- b. Trunked wide area two-way radio, 800 MHz system, such as (Authority/County/Airport Public Safety).
- c. Fixed base station or control system providing commercial services offered by cellular companies, SMR (Specialized Mobile Radio) and ESMR (Enhanced Specialized Mobile Radio) providers and PCS (Personal Communications System) providers, paging systems providers and mobile data providers.
- d. Data transmission for specialized purposes on Authority owned and operated radio systems using frequencies assigned to the Authority.
- e. Data transmission services provided by commercial vendors such as Ricochet and Cellnet.

### **TDMA (time division multiple access)**

A digital air interface technology used in cellular, PCS and ESMR networks.

### **Trunked**

Spectrum-efficient technology that establishes a queue to handle demand for voice or data channels.

**Users**

Owners, operators, WSP's, Airport tenants and users of Commercial and Operational RF Systems.

**Wireless Internet**

An RF-based service that provides access Internet e-mail and/or the World Wide Web.

**Wireless LAN (local area network)**

Local area network using wireless transmissions, such as radio or infrared instead of phone lines or fiber-optic cable to connect data devices.

**WSP (Wireless Service Provider)**

FCC Licensed commercial wireless service provider including Cellular, PCS, ESMR (Nextel) (CMRS), Paging, Mobile Data and other companies providing services to the end user on the Airport.

**VHF (very high frequency)**

Referring to radio channels in the 30 to 300 MHz band.

## **Raleigh-Durham International Airport RF Systems Antenna/Radio Frequency Policy**

The Raleigh-Durham Airport Authority (Authority) is responsible for the management and operation of the Raleigh-Durham International Airport (Airport). The Authority has established this RF Systems Antenna/Radio Frequency Policy (Policy), which shall be effective June 1, 2002 and which shall be subject to revision from time to time. The policy provides guidelines to owners, operators, Airport tenants and users (Users) of proposed Commercial and Operational RF Systems and equipment (RF Systems) within the Airport. This Policy applies to all Users of the Airport within property under the management of the Authority. This Policy pertains to design, construction, installation, location, operation, repair and maintenance of all components of RF Systems.

### **Access to the Airport**

1. The Authority may use a management / consulting firm to administer this Policy. Therefore, the term Authority as used in this Policy is further defined to mean Authority personnel and/or any management / consulting firm(s) designated by the Authority to implement this Policy on its behalf.
2. The Authority will develop a shared-use, wireless distributed antenna network in the terminal buildings, future public buildings and structures, and other areas of the Airport. A User that applies to develop a wireless RF System at the Airport must use the Authority's shared-use infrastructure (Airport Network) where those systems are available or will be developed by the Authority.
3. The Airport Network is more specifically defined in the attached RF System Approval Guidelines and Drawing, which define where the Authority will provide Airport Network and the general conditions when a User or WSP must utilize the Airport Network or may develop Independent Facilities. Each User is responsible for providing at its expense any and all additional equipment necessary to interface with the Airport Network and/or may be necessary to deliver its service.
4. A User approved to develop Independent Facilities remain subject to this Policy. Approval to develop such systems may be subject to restrictions and/or stipulations indicating when such Independent Facilities must become a part of the Airport Network.
5. In addition to the operating conditions defined in this Policy, the right for any WSP to operate at the Airport will be subject to the financial terms and agreements developed between the WSP and Authority.

## Use of the Airport to Develop RF Systems

Use of the Airport to develop RF Systems shall be subject to the following requirements.

1. Any use of the Airport for fixed RF Systems for the transmission of radio frequency signals shall be subject to prior written approval by the Authority. All parties interested in utilizing the Airport Network or Independent Facilities for the transmission radio frequency communication signals shall complete an RF System Site Application as described below. All approved applications shall be valid for a minimum period of one (1) year, but not longer than a maximum period of ten (10) years.
2. The RF System Site Application shall be in a form and substance as described in "Procedures for Adding New or Modifying Fixed RF Systems."
3. The Authority shall review all RF System Site Applications. The Authority reserves the right to reject any RF System Site Application it feels to be in violation of the Policy, or not in the best interest of the Airport. The Authority may request additional information and a formal detailed proposal from any applicant.
4. The Authority reserves the right to designate available space and facilities for the location of the RF Systems for the RFDS and to require multiple users to co-location of RF Systems on the Airport where practicable. This may include, but not be limited to, equipment rooms, equipment closets, cable distribution systems, antennas and antenna structures.
5. All materials and equipment used for the transmission and/or reception of radio communication signals located at the Airport shall be properly identified utilizing labels provided which include the following information:
  - a. Visible identification attached which show the User's corporate identity, the User's name, address, call sign, frequency and telephone number of person and organization responsible for maintenance work.
6. Any RF System commercial transmission and/or reception of radio communication signals located on the Airport, which has not been specifically approved by the Authority, or cannot be identified, may be subject to immediate removal without notice; notification will be given to User, if possible.

If the User of an unauthorized operational RF Systems is unknown, the RF Systems shall be tagged with a label providing the following information:

- a. A statement declaring the RF Systems as not being in compliance with the Authority Policy.
- b. A request for the User of said RF Systems to identify itself to the Authority.
- c. Notification for the removal of said RF Systems within 30 days of tagged date.

7. Unauthorized RF Systems, which have not been removed by User, shall be removed at the direction of the Authority and the cost of such removal shall be the responsibility of User.
8. The Authority reserves the right to charge any User for the implementation, operation and/or use of RF Systems on the Airport including, but not limited to, lease space, the use of cable facilities, utilities, access fees, site application fees, user fees and/or management contract fees.
9. All RF Systems installations shall comply with Airport architectural standards and requirements and shall require written approval by the Authority prior to the deployment of said equipment.
10. Rooftop structures shall comply with all Airport, federal, state and municipal laws and requirements including, but not limited to, antenna height, antenna location, and methodology for the attachment of antennas to building structures.
11. All construction, installation, maintenance, alteration, upgrade, repair, replacement, use and removal of radio communication equipment for RF Systems shall be at the User's sole cost, expense and liability.
12. The installation, maintenance and operation of RF Systems shall be in accordance with manufacturer specifications.
13. All RF Systems to be used for the operation of User's business at the Airport will be maintained in excellent, safe running condition and will be kept in a neat and clean manner at all times. Upon written objection from the Authority to User concerning the unauthorized or improper operation of RF Systems or the unsafe and unclean condition of the RF Systems, User will immediately remedy the cause of the objection.

The standard of maintenance, repair and appearance of the RF Systems will be consistent with the highest standards set by the Authority. Upon written objection from the Authority to User concerning the condition of the RF Systems or the conduct of User's employees while performing maintenance, repair or replacement of the RF Systems, User will immediately remedy the cause of the objection.

14. Users of RF Systems shall not change transmitters, frequencies, effective radiated power (ERP), or antennas without the prior written approval of the Authority, which will not be unreasonably withheld. No removal, alteration, reconstruction, upgrade or additional construction of the RF Systems will be performed without the prior written approval of the Authority, which will not be unreasonably withheld.
15. Users shall adhere to all Airport Rules and Regulations, Federal Statutes, North

Carolina Statutes, County Ordinances and/or other such governmental regulations, whether municipal, state or federal including, but not limited to, environmental laws and security regulations, and shall immediately, upon request, verify compliance to any such requirements. The RF System provider shall be responsible for all signs, enclosures and other safeguards necessary to prevent all persons from exceeding the Maximum Permitted Exposure (MPE) to RF signals, including all FCC and OSHA standards and requirements.

16. User will pay all federal, state and municipal taxes, licenses and fees, including personal property taxes, assessed on or any portion attributable to the operation of the RF Systems.
17. User shall utilize the RF Systems for its sole use and any rights granted hereunder cannot be transferred, assigned or sublet to any other party without written consent from the Authority.
18. The location, elevation, installation, maintenance and/or operation of RF Systems must not interfere with operations conducted or equipment operated by the Federal Aviation Administration.
19. Lease or license documents will contain language that requires the User to cease any interference to existing users within 24 hours of notification by the Authority, or face the penalty of having to shut down the RF Systems until such interference is corrected.
20. In the case of a dispute regarding the cause or resolution of specific interference problems, an independent third party who is competent to evaluate the potential causes of the interference and the measures required for its resolution may evaluate the interference complaint.

### **Procedures for Adding New or Modifying Fixed RF Systems**

1. Users who propose to add channels to existing RF Systems, to change the configuration of existing RF Systems, or to construct new RF Systems at the Airport must file a formal RF System Site Application with the Authority.
2. Applicants must provide at a minimum all of the information identified on the RF System Site Application (attached).

# Raleigh-Durham International Airport RF System Site Application

NOTE: This RF System Site Application (Application) is part of the RF Systems Antenna/Radio Frequency Policy (Policy). All capitalized terms shall have the same meaning as defined in the RF Systems Antenna/Radio Frequency Policy.

All applications that propose to construct new RF Systems, to add channels to existing RF Systems, or to change the configuration of existing RF Systems at Raleigh-Durham International Airport must provide the following information for Raleigh-Durham Airport Authority (Authority) review and approval. The Authority may require applicant to submit supplemental information prior to consideration of its application.

## **Frequency Band and Specific Frequencies**

The applicant must specify the frequency band or bands within which the RF Systems will operate, as well as the specific Transmit and Receive frequencies to be used.

## **Power**

The applicant must specify either the actual transmitter output power that will be used, or the transmitter power (if any) and effective radiated power specified in its FCC license for the proposed RF Systems.

## **Transmission Line and Antenna Information**

The applicant must specify the type and length of transmission line to be used and the type of connectors that will be used. The transmission line can be specified as a specific manufacturer's type number, or generically (e.g. "1/2 inch solid outer conductor foam dielectric line"). Antenna type (omnidirectional or directional), manufacturer and model number and gain relative to a dipole should be specified for both transmitting and receiving antennas. Directional antennas should include the orientation of the pattern maximum lobe.

## **Modulation/Multiple Access Method**

The applicant must specify the type of modulation used in the RF Systems (e.g. AM, SSB, FM, ACSSB, CDMA, TDMA, etc.). For digital modulation techniques, such as TDMA and CDMA, the channel bandwidth occupied by the RF Systems should also be specified.

## **Coverage Requirements**

The application must contain a general description of the coverage area required for the RF Systems to distinguish between systems, which require wide area coverage over much of the Airport, and systems that require coverage only in limited areas, such as in the immediate vicinity of the concourses.

The applicant must include requirements for “underground” coverage, if any, so that the addition of the proposed RF Systems to the RFDS can be evaluated.

### **Proposed TX/RX Sites**

The application must include a description of the site or sites requested for transmitting and receiving antennas. In cases where specific antenna mounting locations are available at a site (e.g. on a tower at the antenna farm or on the roof of a building), the specific mounting location and methods will be specified by the Authority, based on the results the interference study performed on the applicant’s RF Systems.

### **Description of Methods to be used to Comply with Airport Technical Standards**

The applicant shall describe isolators, filters, and other additional equipment to be installed to assure compliance with the Authority’s installation and technical standards. Applicants that propose to operate on the Airport Network or to connect to the Airport Network must assure that such RF Systems are technologically compatible with the Airport Network and will not adversely affect the operation and performance of the Airport Network.

### **Assuring Compliance with Site Standards**

Each application shall be reviewed to assure that it complies with Airport radio system installation and site standards.

### **Co-Site Interference Study To Assure Lack Of Interference From New Users**

New RF Systems, or changes to existing RF Systems (such as physical reconfiguration or the addition of new channels) will be evaluated to determine their potential to cause interference to existing systems at Airport. The scope of this analysis will vary, depending upon the type and complexity of the new RF Systems being installed. The installation of a new simplex VHF air-to-ground system would be relatively simple to evaluate, while the installation of a new multi-channel trunked system would be more involved.

### **Testing and Inspection**

New or changed RF Systems will be inspected by an Airport representative after installation to assure that they comply with installation and technical standards, and tested to demonstrate proper operation of filters and other protective devices installed in the RF Systems. Again, the scale of work required for the testing of protective devices will vary with the size and complexity of the RF Systems, and connect charges may be adjusted to reflect this. The Authority may require each applicant to have a MPE analysis performed to evaluate the environment at the time they join the system. The cost of such an analysis will be borne by the applicant. The Authority has the right and may direct applicant(s) to install at its expense signs, enclosures and other safeguards as necessary in order to meet FCC and OSHA requirements.

# Raleigh-Durham International Airport RF System Approval Guidelines

NOTE: These RF System Approval Guidelines (Guidelines) is part of the RF Systems Antenna/Radio Frequency Policy (Policy). All capitalized terms shall have the same meaning as defined in the RF Systems Antenna/Radio Frequency Policy.

A User that proposes to construct new RF Systems or to modify existing RF Systems at Raleigh-Durham International Airport (Airport) must submit a RF System Site Application to the Raleigh-Durham Airport Authority (Authority) for review and approval. RF Systems may be developed as an extension of the Airport Network or as an Independent Network. The approval to develop or amend RF Systems will be contingent upon several factors including technical requirements of the proposed or amended RF System, impact on existing or planned RF Systems, and type and location of the proposed RF System.

These Guidelines defines conditions under which a User may be permitted to develop RF Systems at the Airport in the Public Buildings, Private Buildings, Private Buildings with Ramp Access or Public Uses and Multi-Tenant Buildings on the Airport based upon the type and location of the proposed RF System. These Guidelines do not address the technical elements of the Site Application review process. A RF Coverage Area Drawing is attached. The Authority will develop a shared-use, in-building wireless network in the terminal buildings, future public buildings and structures, and other areas of the Airport. A User that applies to develop a wireless RF System at the Airport must use the Authority's shared-use infrastructure (Airport Network) where available or anticipated to be developed by the Authority.

## Public Buildings

A Public Building is defined to mean any building owned by the Authority in which services are provided to the general public. Public Buildings include all terminal buildings, parking structures, Administrative Offices of the Authority and the Authority Operations Center.

The Airport Network will be developed in the Non-Exclusively Leased Spaces of all Public Buildings. A User or WSP seeking to develop Commercial RF Systems must develop the systems to be a part of the Airport Network. A User may develop an Operational RF System as an Independent Network in its Exclusively Leased Spaces provided that the RF signal does not extend beyond the boundary of its Exclusively Leased Spaces. Any expense incurred to plan and/or implement a Commercial or Operational RF System shall be the responsibility of the User, including any cost incurred to connect to the Airport Network.

## **Private Buildings**

A Private Building is defined to mean any building owned by the Authority or an Airport tenant that is used exclusively to serve the operational needs of the occupant. Private Buildings include office buildings, FAA facilities and some aircraft hangars. Authority and Airport tenant-owned buildings are generally included in the category unless such facilities have direct access to aircraft ramps or are used to serve the general public.

The Airport Network is not planned for Private Buildings. A User seeking to develop an Operational RF System must develop the system as an Independent Network. Commercial RF Systems may not be developed in Private Buildings. Any expense incurred to plan and/or implement an Operational RF System shall be the responsibility of the User.

## **Private Buildings with Ramp Access or Public Uses**

A Private Building with Ramp Access or Public Uses is defined to mean any building owned by either the Authority or an Airport tenant that provides direct access to an aircraft ramp or any building where the occupant uses the facility to serve the general public in addition to its operational needs. Private Buildings with Ramp Access or Public Uses generally include air cargo facilities, Fixed-Base Operator facilities, and rental car facilities.

The Airport Network is not planned for buildings in this category. A User may generally develop an Operational RF System as an Independent Network. Approval of an Independent Network will be contingent upon at least the following two criteria, though other criteria may exist based on the nature of the specific facility and request. First, a User seeking to develop Commercial RF Systems must develop the system to be a part of the Airport Network, which will be extended to the facility if a Commercial RF System is approved. Second, a RF System that proposes to extend beyond the Exclusively Leased Space to an aircraft ramp may require the User to develop the system to be a part of the Airport Network. This second criterion is intended to address the potential for Interference that may occur when Independent Networks are extended to aircraft ramp areas.

A User may develop an Operational RF System as an Independent Network in its Exclusively Leased Space provided that the RF signal does not extend beyond the boundary of the space. Any expense incurred to plan and/or implement a Commercial or Operational RF System shall be the responsibility of the User or WSP including any cost incurred to connect to the Airport Network.

## **Multi-Tenant Buildings**

A Multi-Tenant Building is defined to be any building owned by the Authority or an Airport tenant that is used exclusively to serve the operational needs of its occupant(s), and is leased to and/or houses the offices of multiple tenants. Such Multi-Tenant Buildings generally include the South Cargo buildings and the executive hangar building.

The Airport Network is not planned for buildings in this category. A User may generally develop an Operational RF System as an Independent Network. Approval of an Independent Network will be contingent upon the future development of RF Systems by other occupants of the building. Upon the request of other tenants in the building to develop RF Systems, a User operating an approved Independent RF System may be required to modify its RF System to be a part of the Airport Network. This criterion is intended to address the potential for Interference that may occur when multiple Independent Networks exist.

Commercial RF Systems may not be developed in Multi-Tenant Buildings. Any expense incurred to plan and/or implement an Operational RF System shall be the responsibility of the User.

## **Summary**

This RF Coverage Area Plan is subject to revision from time to time by the Authority. A building coverage category is assigned based on the current occupancy and type of use. Changes in the occupancy or type of use for a building may necessitate reclassification of the RF coverage category of the building. RF signals generated in a Private Building that emanate beyond the boundaries of the occupant's Exclusively Leased Space may necessitate the reclassification of the RF coverage category for that Private Building.



**RF Category Requirements**

- 1) Building coverage category is assigned based on the current occupancy and type of use. Changes in the occupancy or type of use for a building may necessitate reclassification of the RF coverage category.
- 2) RF signal generated in a private building, as defined, that emanates outside the exclusively leased space may necessitate reclassification of the RF coverage category for that private building.



**RF Categories**

- Multi-tenant Bldg
- Private
- Private w/ Ramp Operation or Public Uses
- Public Buildings

**RF SYSTEMS ANTENNA/RADIO FREQUENCY POLICY**

RF SYSTEMS APPROVAL GUIDELINES

RALEIGH-DURHAM INTERNATIONAL AIRPORT

AUGUST 01, 2003

