



PIMA COUNTY WIRELESS INTEGRATED NETWORK
PUTTING PIMA COUNTY IN A BETTER STATE OF COMMUNICATION



By adopted policy of the Chief Building Official on September 22, 2010, the following standard shall be implemented as outlined bellow.

Pima County Building Radio Coverage Standard

- A. **Building radio coverage required.** No person shall maintain, own, erect, or construct a building or structure or any part thereof, or cause the same to be done, which fails to support adequate radio coverage for emergency responders, including but not limited to firefighters and police officers.
- Exceptions:
1. Single family residential buildings.
 2. Buildings constructed primarily of wood frame without below grade storage or parking areas.
 3. Buildings thirty-five (35) feet or less in height as measured per the building code (below grade storage or parking areas are not exempt from these requirements).
 4. Buildings constructed and in use prior to the implementation of this section unless undergoing a change of use or alteration.
- B. **Design signal strength.** A minimum inbound signal strength of -100 dBm shall be received by the Pima County Wireless Integrated Network (PCWIN) 800 MHz Radio System when transmitted from 95% of all areas of the building and 99% in elevators (measured at the primary recall floor), stair shafts and Fire Command Centers. A minimum outbound signal strength of -95 dBm shall be available in all areas of the building and 99% in elevators (measured at the primary recall floor), stair shafts and Fire Command Centers when transmitted from the closest PCWIN 800 MHz Radio System. The inability to achieve these levels shall require an in-building signal boosting system.
- C. **Frequency range.** The supported frequency range shall be 806 MHz to 824 MHz and 851 MHz to 869 MHz and such other frequencies as determined by the PCWIN operator in all areas of the building.
- D. **Required amplification systems.** Buildings and structures which cannot support the required level of radio coverage shall be equipped with a radiating cable system and/or a distributed antenna system (DAS) with FCC certified signal boosters (aka bi-directional amplifiers), or systems otherwise approved by PCWIN in order to achieve the required adequate radio coverage. In-building system installation and components shall comply with all applicable regulation, including Federal Communications Rules (47 CFR 90.219).
- E. **Emergency power.** The active components of the installed system or systems shall be capable of operating on an independent battery system for a period of at least twelve (12) hours without external power input.
- F. **Signal booster requirements.** Signal boosters shall meet the following requirements as well as any other requirements determined by PCWIN:
1. All signal booster components shall be contained within one NEMA4 type water proof cabinet (permanent external filters and attachments are not permitted).
 2. The battery system shall be contained within a separate NEMA4 type water proof cabinet.

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3. The system shall include automatic alarming of malfunctions of the signal booster and battery system. Alarm shall be transmitted to PCWIN by means including but not limited to: automatic standard telephone dial-up circuit, TCP/IP network circuit, and RS232 interface.
 4. FCC Certification is required prior to installation (pending FCC certification is not acceptable).
 5. All signal boosters must be compatible with both analog and digital communications simultaneously at the time of installation. PCWIN shall provide the maximum acceptable propagation delay.
 6. Only equipment pre-approved by PCWIN may be used.
- G. **Additional frequencies and change of frequencies.** The building owner shall be required to modify or expand the public safety in-building system at his or her expense in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC. This is an advisory statement that the building owner should select equipment and distribution components that are capable of such changes. Prior approval of an in-building system on previous frequencies does not preempt this section.
- H. **Approval prior to installation.** No amplification system capable of operating on frequencies licensed to PCWIN by the FCC shall be installed without prior coordination and approval from PCWIN per FCC requirements.
- I. **Testing and proof of compliance.** Each owner shall submit the following test reports to PCWIN:
1. In-building coverage acceptance testing prior to occupancy of any newly constructed building.
 2. Testing whenever structural changes occur including additions to buildings that would materially change the original field performance tests.
 3. Annual testing.
 4. Testing when repairs or alterations are made to amplification systems. The performance test shall demonstrate that adequate radio coverage is available in all required areas of the building.
- J. **Acceptance test procedure.** Required in-building radio systems shall be tested to ensure that two-way coverage on each floor of the building is as per Section B.
1. Each floor of the building shall be divided into a grid of approximately 20 equal areas. A maximum of two nonadjacent areas shall be allowed to fail the test.
 2. In the event that three of the areas fail the test, the floor may be divided into 40 equal areas. A maximum of four nonadjacent areas shall be allowed to fail the test. After the 40-area test, and if the system continues to fail, it shall be the building owner's responsibility to have the system altered to meet the coverage requirement.
 3. The test shall be conducted using a calibrated portable radio of the latest brand and model used by PCWIN, talking through the agency's radio communications system. A test location approximately in the center of each grid area shall be selected for the test. The radio shall be enabled to verify two-way communications to and from the outside of the building through PCWIN's radio communications system. Upon selection of the test location, prospecting for a better spot within the grid area shall not be permitted.
 4. The gain values of all amplifiers shall be measured and results shall be kept on file with the building owner so that the measurements can be verified each year during the annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.
 5. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to insure spurious oscillations are not being generated by the subject signal booster due to coupling (lack of sufficient isolation) between the input and output antenna systems. This test shall be conducted at time of installation and at subsequent annual inspections.

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- K. **Annual tests.** Required in-building radio systems shall have all active system components including signal boosters, power supplies and backup batteries tested a minimum of once every 12 months. Signal boosters shall be tested to ensure that the gain is the same as it was upon initial installation and acceptance. Backup batteries and power supplies shall be tested under load of a period of one hour to verify proper operation. If within the one hour test period the battery exhibits symptoms of failure, the test shall be extended for additional one hour periods until the integrity of the battery can be determined. All other active components shall be checked to determine that they are operating within the manufacturers specifications for the intended purpose.
- L. **First responder testing.** Police and Fire Personnel shall at any time have the right to enter onto the property to conduct field-testing in order to ensure that the required level of radio coverage is present.
- M. **Minimum qualifications of personnel.** The minimum qualifications of the system designer and lead installation personnel shall include:
- a. A valid FCC issued general radio operators license.
 - b. Certification of in-building system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.
- Exception:
PCWIN may waive requirements upon successful demonstration of adequate skill and experience.
- N. **Contact information for PCWIN.**
Email: PCWIN@Pima.gov
Phone: 520-243-7200