

## **CITY OF CATHEDRAL CITY PUBLIC SAFETY RADIO SYSTEM COVERAGE SPECIFICATIONS**

**1. Performance.** Specifications are provided to assist property owners in satisfying a delivered audio quality (DAQ) of three with a 90 percent reliability factor for emergency personnel using radio communication in their buildings and structures.

Property owners who can demonstrate full compliance with the reliability factor without adhering to all of the following specifications may be excused from all or part of these provisions.

Property owners who adhere to all of the specifications and fail to reach the reliability factor must employ all resources necessary to ensure full compliance.

Performance and compliance may be tested and verified annually as part of the Cathedral City Fire Department's Fire Inspection program.

**2. Signal strength, signal rejection, modulation compatibility, and delivered audio quality.** The following defines the minimum required level of radio signal strength:

- A minimum signal strength of (-95dBm) in 90 percent of the area of each floor of the building from the UHF 762-870 MHz Cathedral City Communications System is required.
- A minimum signal strength of (-95dBm) in 90 percent of the area of each floor of the building from the VHF 136-174 MHz Cathedral City Communications System is required.
- The frequency range shall support UHF from 762 - 870 MHz to accommodate the Cathedral City Communications System.
- The frequencies shall support for VHF from 136-174 MHz to accommodate the Cathedral City Communications System.
- A public safety radio amplification system shall include filters to reject frequencies below 762 MHz and frequencies above 870 MHz by a minimum of 35 dB.
- All system components must be 100 percent compatible with analog and digital modulations after installation without additional adjustments or modifications.

The systems must be capable of encompassing the frequencies stated herein and capable of future modifications to a frequency range subsequently established by the City of Cathedral City. If the system is not capable of modification to future frequencies, then a new system will need to be installed to accommodate the new frequency band.

- Active devices shall have a minimum of -50 dB 3rd order intermodulation protection.
- All active in-building coverage devices shall be FCC Part 90 Type Certified.
- UL listing is required for any AC operated power supplies.
- Active devices shall include a minimum of 12 hours of battery backup power.
- Any in-building coverage system shall be installed by a City approved, manufacturer-trained and certified installer.
- Delivered Audio Quality (DAQ) minimum is DAQ 3.

The delivered audio quality (DAQ) is defined below:

DAQ Delivered Audio Quality / Subjective Performance Description

DAQ 1 / Unusable, speech present but unreadable.

DAQ 2 / Understandable with considerable effort. Frequent repetition due to noise/distortion.

DAQ 3 / Speech understandable with slight effort. Occasional repetition required due to noise/distortion.

DAQ 3.5 / Speech understandable with repetition only rarely required. Some noise/distortion.

DAQ 4 / Speech easily understood. Occasional noise/distortion.

DAQ 4.5 / Speech easily understood. Infrequent noise/distortion.

DAQ 5 / Speech easily understood.

**3. Remedies to achieve compliance (acceptable amplification systems).** If needed to ensure compliance with the 90 percent reliability factor, the property owner must install each of the following:

- An in-building coverage system composed of a radiating cable system or an internal multiple antenna system with FCC-certified bi-directional 700/800 MHz and 136-174 MHz (as required to meet the two indicated VHF MHz frequencies) amplifier(s), distribution system, and subcomponents.
- Any active devices (e.g. signal booster(s)) must be encased in a NEMA 4 (or equivalent) dust/waterproof case and clearly labeled "City of Cathedral City Public Safety Radio."

- Multi-band pass filters as required.

In the event of a power outage, all electrical components must be equipped with independent auxiliary battery power or generators to function at full capacity for at least 12 hours.

Once a system is installed, a Spectrum Analyzer will be used to evaluate the system for harmful interference to the 700/800 MHz Cathedral City Communications System backbone during Acceptance Testing. After Acceptance Testing, the Fire Department may periodically test the system using a Spectrum Analyzer on an "as-needed" basis to determine if the system remains in compliance during the lifespan of the building. Any interference must be identified and removed before the system can be accepted.

**4. Applicable Federal Communications Commission rule compliance.** All active devices used to provide extended coverage must be FCC- certificated.

**A. Test standards. Design review and certification.**

1. Prior to issuance of a building permit, the applicant shall:

- Retain a certified technician who will review construction plans in order to ensure that such plans meet aforementioned radio communication criteria, and recommend, if needed, an in-building solution for reliable radio communication;
- Submit copies of plans certified with the signature of the technician to the Chief Building Official of the City of Cathedral City;

2. Prior to issuance of a Certificate of Occupancy, the applicant shall:

- Retain a certified technician who will test all areas of the building or structure, verify installation and operation of in-building solutions, if needed, and certify all of the findings stated herein on the date of inspection with his/her signature. A passing test is one that demonstrates DAQ 3 with a 90 percent reliability factor on each floor. Owners of buildings that fail to meet this standard will not be in compliance with this ordinance.
- The building owner must retain all records of initial and annual inspections and submit copies to the Chief Building Official of the City of Cathedral City.

**B. Acceptance testing procedure.** All testing must be scheduled at least 24 hours in advance of the desired test time. Acceptance Testing must be done on a weekday during the late evening/early morning hours, 10:00 P.M. until 6:00 A.M. In the event of a serious emergency, the Incident Commander may require that Acceptance Testing be stopped on the affected frequency or frequencies until the emergency has been terminated.

For purposes of testing, each floor of the building shall be divided into a grid of approximately 20 equal areas. Testing will be conducted from the center of each of the 20 equal grid areas. A maximum of two nonadjacent areas will be permitted to fail the test. The test shall be conducted using a portable radio talking through the 700/800 MHz and VHF frequencies. A spot located approximately in the center of each grid area will be selected for the testing. The radio will then be keyed to verify two-way communication to and from the outside of the building through the 700/800 MHz and 136-172 MHz Cathedral City Communications System. Once the spot has been selected, prospecting for a better spot within the grid area will not be permitted.

If a floor fails Acceptance Testing, the floor may be divided into 40 equal areas, and retested from the center of each of the 40 equal grid areas. During this test, a maximum of four nonadjacent areas will be permitted to fail the test.

All auxiliary power systems shall be tested under load for a period of one hour to verify that the system will operate properly in the event of a power outage. The testing technician reserves the discretion to determine whether or not the battery exhibits symptoms of failure. The certified technician will ultimately decide if the auxiliary system needs to be replaced or upgraded.

**C. Annual test procedure.** After a Certificate of Occupancy is issued, the Cathedral City Inspector or appointed agent may annually test the in-building system components to determine general functional operability. If noncompliance is found, an approved technician will reassess the improvement upon scheduling by the building owner.

**D. Every two years battery back-up systems shall be replaced per manufacturer's specifications.**

Batteries shall be marked in permanent marker with the date of replacement.

## **5. Additional equipment feature requirements.**

Active devices shall be alarmed. A phone line (plain old telephone service or POTS) will provide dial tone to an alarm device. The alarm device will be programmed to activate the buildings alarm system

The minimum alarms will indicate loss of AC failure and operational failure.

## **6. New building construction.**

All new building construction shall have a two-inch conduit installed between the first and bottom subterranean floor and said conduit shall extend along the center of the building to the roof. At each floor and the roof, an opening shall be made to afford easy access to the conduit from the ceiling. Access in either the form of

drop ceiling or conduit shall be made available along hallways and through firewalls. All subterranean parking garages shall have a similar conduit installation.

**7. Compliance with CCMC Section 511.1 General.**

All new buildings four stories in height or taller and all subterranean levels of parking structures or existing altered buildings over 20 percent shall meet the city Public Safety Radio System Coverage requirements as determined by the Fire Chief.