



**CITY OF CHANDLER
EMERGENCY RESPONDER RADIO COMMUNICATIONS
(ERRC)
INFORMATION PACKET**



The documents in this packet are designed to assist in the process of required testing, evaluation, and mitigation of in-building public safety radio coverage as required by both the International Fire Code and City of Chandler codes. The documents within provide information for general contractors, property owners, and testing and design vendors as they coordinate within the processes. These processes apply to all structures that meet the criteria defined in the following documents. Please review and feel free to reach out with any questions. These are step by step processes and it is understood that they take time, require financial investment, and installation process within both new and existing structures.

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**CITY OF CHANDLER
EMERGENCY RESPONDER RADIO COMMUNICATIONS (ERRC)
INSPECTION AND SYSTEM INSTALLATION PROCESS**



OVERVIEW

This section defines the basic process required for inspection of buildings regarding providing adequate public safety radio system coverage for Police and Fire responders as required per international and City of Chandler fire codes. The safety of first responders as well as the citizens we serve depends upon reliable radio coverage inside structures within the City of Chandler. ***The City of Chandler does not provide either testing or system installation services, these are provided by qualified vendors, a list of which is provided in this packet along with relevant technical specifications for the chosen vendor to utilize in the testing and design/installation of an in-building enhancement system if needed.*** All testing and installation of systems, if required, are the responsibility of the property owner. Note not every structure will require enhancement.

INITIAL TESTING

All structures that meet the criteria for testing (as defined in International Fire Code, section 510 and associated City of Chandler code amendments) are required to have an initial test performed to determine if enhancement will be needed. This consists of a vendor provided walk through of the building utilizing specialized signal measurement equipment to produce a report that indicates a pass or fail of the building's internal public safety signal levels. This test is submitted to the Police Radio Communications Analyst and Fire Marshal for review. If the test passes, the building will be approved with no further action needed. The requirements and technical details for this testing and review are provided in the "**REQUIRED INITIAL TESTING PROCESS**" section of the **CITY OF CHANDLER TECHNICAL INFORMATION** document included in this packet.

IF A SYSTEM IS REQUIRED

In the case of failing initial testing, the property owner must engage a qualified vendor to design and install an ERRC system. There are several steps that must be taken as this process proceeds. The requirements and technical details for this testing and review are provided in the "**ERRC SYSTEM INSTALLATION PROCESS**" section of the **CITY OF CHANDLER TECHNICAL INFORMATION** document included in this packet.

It is our desire to support property owners and vendors throughout this process for a successful outcome. Please feel free to reach out with any questions or concerns.

Sincerely,

Ron Parks

A handwritten signature in black ink that reads 'Ron Parks'.

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**CITY OF CHANDLER
EMERGENCY RESPONDER RADIO COMMUNICATIONS (ERRC)
CITY OF CHANDLER TECHNICAL INFORMATION**



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1 - OVERVIEW

The Chandler Police and Fire Department radio communication subscribers operate on the 700 MHz Regional Wireless Cooperative (RWC) system (<http://www.rwcaz.org/>). This is a MOTOROLA SmartZone™ Astro® 25 digital trunked system operating at 9600 baud. The Chandler Public Safety subscribers utilize Phase II TDMA modulation on the network.

The RWC operates this multi-zone system throughout the Maricopa County region and includes multiple simulcast areas. The City of Chandler operates in the Simulcast C area of the system. Simulcast C operates fully within the 700 MHz public safety spectrum.

In-building coverage enhancements must be designed to support 700 MHz public safety band operations in both Phase I FDMA and Phase II TDMA. Note CLASS A BDA systems are required on all new installations, CLASS B is no longer allowed for new installs.

2 - APPLICABLE CODES

The City of Chandler has adopted the *2021 International Fire Code (IFC), section 510*, as the applicable code for in-building enhancement testing, system installation, and system verification (see attachments).

City of Chandler amendments to the 2021 IFC:

ORDINANCE NO. 4994

Adopted February 24, 2022: Effective July 1, 2022

Chapter 28 - FIRE PREVENTION

28-17. - Emergency responder radio communication.

Section 510.1 and 510.4.1.2 of the code are hereby amended to read as follows:

510.1 Emergency responder radio communications. Buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. The requirements of this Section 510 shall apply to all buildings and structures located in the City that satisfy any of the following characteristics:

1. Buildings or structures that are more than three (3) stories above ground level;
2. Buildings or structures totaling forty-five thousand (45,000) square feet or more on any single floor;
3. Buildings or structures that include a basement or other subterranean space totaling two hundred fifty (250) square feet or more; or

4. Buildings or structures that the fire code official has determined to have been constructed in a manner or with materials likely to limit the ability of emergency response personnel to effectively use radio communication while within that building or structure.

Exception. The requirements set forth in this Section 510.1 shall not apply to the following:

1. U occupancies and R3 occupancies that are single family detached residences.
2. Buildings and structures utilizing only wood framing; and
3. Buildings and structures that are less than thirty-five (35) feet above ground level and do not utilize any metal framing or metal roofing.

510.4.1.2 Minimum signal strength out of the building.

In keeping with applicable engineering practice specific to the architecture of the regional digital radio communications network, standardized Delivered Audio Quality (DAQ) measurements are specified to verify acceptable levels of signal strength exiting the building. Minimum signal strength out of the building must meet the requirements of the RWC (Regional Wireless Cooperative) working group.

3 - BUILDING AND/OR ENHANCEMENT SYSTEM TESTING, REPORTING, AND APPROVALS

REQUIRED INITIAL TESTING PROCESS

- It is required that an initial test be completed by a qualified vendor (see section 4 - VENDOR QUALIFICATIONS below) utilizing the specifications listed below and submitted as indicated.
- Test results shall be submitted to the Fire Marshal and Police Department Radio Communications Analyst at completion of first dry wall inspection.
- Test results must minimally include:
 - Point of contact information and physical address of the building location.
 - Point of contact information and physical address for the vendor providing the testing.
 - Make and model of the test equipment utilized to conduct the testing.
 - Gridded floor plan for each floor of the structure with numbered grids, minimum 20 grids per floor.
 - Gridded test result report of measured signal levels, overlaid on floorplan for each floor of the building indicating the dBm signal level for each grid of the currently active RWC Simulcast C Control Channel (see below).
 - Results must be submitted via email to aaron.huckstep@chandleraz.gov and ron.parks@chandleraz.gov
 - These results will be reviewed.

In the case of a passing initial test, an approval will be issued, and no further action will be needed.

In the case of a failing initial test, indicating the need for an ERRC system installation, the following processes must be followed. There are several steps that must be taken in the order shown as these processes proceed. Note these processes engage both City of Chandler personnel and the Regional Wireless Cooperative (RWC) which provides the radio network that our public safety radios operate on.

ERRC SYSTEM INSTALLATION PROCESS

- It is required that ERRC system design and installation be completed by a qualified vendor (see section **4 - VENDOR QUALIFICATIONS** below).
- At this time the following must be notified of the contact information for the qualified vendor of choice: ron.parks@chandleraz.gov, aaron.huckstep@chandleraz.gov, and stuart.snow@phoenix.gov. *The RWC Radio Amplification System Rebroadcast Authorization Application*, a fillable electronic document, will be returned to begin the process.

- ERRC vendor provides the following in order to receive approval to begin the installation process:
 - Detailed design specifications for the proposed system including:
 - Completed first page of the *RWC Radio Amplification System Rebroadcast Authorization Application* as provided when the vendor was identified as above. (See section 8 - **FCC REGULATIONS REGARDING AUTHORITY TO OPERATE SIGNAL BOOSTERS** section below.)
 - Full specifications sheet(s) for the BDA/DAS system being proposed.
 - Location of the BDA/DAS system head end within the structure.
 - Specifications for all antennas, splitters, combiners, other relevant components including the donor antenna.
 - Distribution layout with antenna locations for all proposed antenna locations within the structure.
 - Backup power system specifications.
 - Fire Alarm Control Panel (FACP) connectivity specifications.
 - This information must be provided to ron.parks@chandleraz.gov, aaron.huckstep@chandleraz.gov, and stuart.snow@phoenix.gov.
 - Installation and any activation of the system may not commence until the City of Chandler and the Regional Wireless Cooperative have reviewed the above submitted items and issued approval to start installation.
 - The RWC will identify and provide the proper donor tower site location information.
 - Vendor must provide notice to the City of Chandler and the Regional Wireless Cooperative prior to activating the system for testing purposes.

ERRC SYSTEM INSPECTION AND APPROVAL

- Once system installation is complete, an onsite inspection will be scheduled with the ERRC installation vendor, City of Chandler technical staff, and RWC technical staff to verify and perform required network signal adjustments.
- When this inspection is complete and approved by the RWC, a final post-test must be performed with the same requirements as the initial testing to verify system performance.
- These test results must be provided to ron.parks@chandleraz.gov and aaron.huckstep@chandleraz.gov for review.
- If the post test passes, approval will be issued along with a full approval packet including all specifications and test results returned to the Fire Marshal, RWC, ERRC vendor, and other relevant parties.
- The ERRC system shall be installed and approved via this process prior to a Certificate of Occupancy being issued.

4 - VENDOR QUALIFICATIONS

Verification testing for in-building public safety communications, installation of enhancements if necessary, and validation of installed enhancements is the responsibility of the property owner and must be contracted with a qualified communications system vendor. The vendor must meet the qualifications referenced in the 2021 IFC section 510.5.3. *Minimum qualifications of personnel* (see section 7 - **IFC SECTION 510**)

5 - SYSTEM FREQUENCIES

The full list of Simulcast C frequencies is available from the FCC web site under the call sign WQSH547. The FCC General Menu Reports web link for call sign query is: http://fjallfoss.fcc.gov/General_Menu_Reports/

The control frequency required for in-building testing will be one of the following (whichever one is emitting the control channel data stream at the time of testing, all frequencies in MHz):

WQSH547 - SIMULCAST C – CONTROL CHANNELS

770.10625 - 772.10625 - 770.35625 - 772.35625

6 - TOWER LOCATIONS

Simulcast C utilizes a six-tower system as indicated in the table below, the appropriate donor site will be determined, and the location supplied by RWC personnel at the time of supplying the ERRC system design specifications and other required documentation.

CALLSIGN	LOCATION	LATITUDE	LONGITUDE	STREET ADDRESS	CITY
WQSH547	HAMILTON	33-17-34.9 N	111-49-55.6 W	911 S. HAMILTON	CHANDLER
WQSH547	TEMPE PD SOUTH	33-20-27.2 N	111-57-10.5 W	8201 S. HARDY DR	TEMPE
WQSH547	CHANDLER FIRE TRAINING	33-15-11.4 N	111-53-17.1 W	3550 S DOBSON RD	CHANDLER
WQSH547	TEMPE FIRE TRAINING	33-25-24.3 N	111-54-59.1 W	1342 E. UNIVERSITY	TEMPE
WQSH547	DPS SOUTH MOUNTAIN	33-19-57.2 N	112-04-00.5 W	SITE #13, MT SUPPOA	PHOENIX
WQWW222	CITY OF MARICOPA	33-03-55.7 N	112-03-39.4 W	45695 WEST EDISON ROAD	MARICOPA

7 - IFC SECTION 510

2021 IFC SECTION 510 - EMERGENCY RESPONDER RADIO COVERAGE

The International Code Council (ICC) offers the ability to view this fire code section for no fee at the following link:

https://codes.iccsafe.org/content/IFC2021P1/chapter-5-fire-service-features#IFC2021P1_Pt03_Ch05_Sec510

8 - FCC REGULATIONS REGARDING AUTHORITY TO OPERATE SIGNAL BOOSTERS

Per Federal Communications Commission (FCC) regulations the operator (the installation vendor and/or property owner) of an ERRC system must secure the permission of the FCC licensee (the City of Phoenix) in order to rebroadcast their frequencies within a structure. This is accomplished via the Regional Wireless Cooperative Radio Amplification System **Rebroadcast Authorization Application** that will be provided and must be returned as part of the ERRC system design prior to installation. FCC section 90.219 (b) is included below:

Federal Communications Commission § 90.219 (b)

(b) *Authority to operate.* PLMRS licensees for stations operating on assigned channels higher than 150 MHz may operate signal boosters, limited to the service band for which they are authorized, as needed anywhere within the PLMRS stations' service contour, but may not extend the stations' service contour.

(1) PLMRS licensees may also consent to operation of signal boosters by non-licensees (such as a building owner or a signal booster installation contractor) within their service contour and across their applicable frequencies but must maintain a reasonable level of control over these operations in order to resolve interference problems.

(i) Non-licensees seeking to operate signal boosters must obtain the express consent of the licensee(s) of the frequencies for which the device or system is intended to amplify. The consent must be maintained in a recordable format that can be presented to an FCC representative or other relevant licensee investigating interference.



**CITY OF CHANDLER
EMERGENCY RESPONDER RADIO COMMUNICATIONS
(ERRC)
ERRC TESTING AND INSTALLATION COMPANIES**



The following have provided ERRC testing and system services in the City of Chandler:


- US Mobile Communications - 602-228-7176
- Engineering Wireless Solutions - 480-968-6000
- Alcacell - 623-824-6355
- Wireless Signal Solutions - 480-219-5957
- Day Wireless Systems - 866-393-0005
- Durham Communications - 480-981-8875
- E2 Optics - 866-973-1507
- Motorola Solutions - 602-353-5500

VENDOR QUALIFICATIONS

Verification testing for in-building public safety communications, installation of enhancements if necessary, and validation of installed enhancements is the responsibility of the property owner and must be contracted with a qualified communications system vendor. The vendor must meet the qualifications referenced in the 2021 International Fire Code (IFC) section 510.5.3. *Minimum qualifications of personnel.*

The 2021 IFC section 510 is available for viewing at:

https://codes.iccsafe.org/content/IFC2021P1/chapter-5-fire-service-features#IFC2021P1_Pt03_Ch05_Sec510

<p style="text-align: center;">REGIONAL WIRELESS COOPERATIVE POLICIES AND PROCEDURES</p>	 <p style="text-align: center;">Regional Wireless Cooperative</p>
	<p>No. O-12.12</p>
<p>Subject: Emergency Responder Radio Coverage Systems Policy</p>	<p>Effective Date 05/24/2012 Rev: 11/19/2020 04/10/2019</p>

1.0 Purpose

- 1.1. The purpose of this policy is to provide standards for the deployment of Emergency Responder Radio Coverage Systems (ERRCS) to improve radio signal coverage inside of buildings and underground spaces on the Regional Wireless Cooperative (RWC) network.

2.0 Owner

- 2.1. RWC Operations Working Group (OWG).

3.0 Applies To

- 3.1. Any entity installing an ERRCS within the RWC service area and on the radio frequencies licensed from the Federal Communications Commission (FCC) by RWC Member(s).

4.0 Background

- 4.1. An ERRCS is used to enhance radio signals within buildings, structures or other locations where signals would otherwise be inadequate.
- 4.2. An improperly installed or maintained ERRCS can cause interference or degrade radio performance putting first responder safety at risk.
- 4.3. FCC 47 CFR Part 90.219 Use of Signal Boosters and 47 CFR Part 2 FCC Certification Requirements govern use and certification of radio amplification systems.
- 4.4. An ERRCS may include Bi-Directional Amplifiers (BDA), Distributed Antenna Systems (DAS) or other active devices designed to amplify radio signals.

5.0 Policy Statement

- 5.1. Entities desiring to operate an ERRCS on RWC Member-licensed frequencies and within the service area of the RWC network must obtain written consent and approval from the licensee per FCC 47 CFR 90.219 (b)(1)(ii).
 - 5.1.1. A Rebroadcast Authorization Form must be submitted prior to any ERRCS installation. This form can be found at rwcaz.org.
- 5.2. RWC network licensed frequencies are managed by the RWC Administrative Manager.
- 5.3. Enhancement of the RWC VHF Fire Hazard Zone network will not be allowed.

6.0 Supporting Rules

- 6.1. Documents required by the RWC for review when applying for Re-Broadcast Authorization:
 - 6.1.1. Complete ERRCS design including site floorplan with antenna and equipment locations and a riser block diagram showing all floors.
 - 6.1.2. Itemized list of system components including manufacturer make and model numbers.
 - 6.1.3. Baseline pre-treatment signal level testing documentation based on RWC donor site and channel data.
- 6.2. As of the date of this policy, Class A amplifiers (see FCC 47 CFR 90.219 (a)) must be used for any ERRCS installed to operate on the RWC 700 MHz P25 network.
 - 6.2.1. Existing Class B amplifiers must continue to be maintained on an annual basis. If an existing Class B amplifier fails it must be replaced with a Class A amplifier.
- 6.3. ERRCS installation contractors must follow the Authority Having Jurisdiction (AHJ) fire code pertaining to ERRCS installations.
- 6.4. Installation of an ERRCS must follow National Fire Protection Association and/or National Electrical Code jurisdictional standards.
- 6.5. ERRCS owner or installation contractor must submit required documents including the RWC Rebroadcast Authorization form. Required forms and documents can be found at rwcaz.org.
 - 6.5.1. Installation of any ERRCS will not be allowed until the required documents are submitted and approved by the RWC. Once approved, the RWC will provide frequencies and subsite location to use.
- 6.6. The RWC does not require entities to maintain any minimum coverage requirements within buildings or structures.

7.0 Responsibilities

- 7.1. Prior to being energized the system design must be provided to the RWC.
- 7.2. ERRCS RF energy for the uplink is extremely important. Contractor must contact the RWC to arrange the testing process required for energizing an ERRCS.
- 7.3. Once the ERRCS is energized, detailed measurements of signal strength of all areas enhanced must be provided.

- 7.4. New and existing radio amplification systems (signal booster), must be registered with the FCC (<https://signalboosters.fcc.gov/signal-boosters/>).
- 7.5. In the event of interference or malfunction of an ERRCS, the entity responsible for its installation and/or operation shall discontinue operation of the system until it is repaired or interference has been eliminated.
 - 7.5.1. The RWC will work with an offending entity to resolve problems due to interference, pursuant to CFR 90.173(b).
 - 7.5.2. The RWC will de-energize any ERRCS that is causing interference and cannot be resolved immediately.

8.0 Conditions for Exemption or Waiver

- 8.1. As provided in the Waiver or Exception Policy.

9.0 Applicable Policies and/or Procedures

- 9.1. As listed at www.rwcaz.org.