

EMERGENCY RESPONDER RADIO COVERAGE PERMIT

GENERAL INFORMATION

Emergency responders need reliable communications wherever they work, including inside buildings. Certain buildings are required to be provided with radio amplification systems designed to provide radio coverage in areas of the buildings where signal strength does not meet minimum criteria due to building construction features and/or location.

The purpose of this handout is to assist the public in complying with detailed permit submittal requirements. It is NOT a complete list of permit or code requirements and should NOT be used as a substitute for applicable laws and regulations. It is the responsibility of the owner/design professional to review the submittal for completeness and applicability to other codes. Only complete applications can be accepted by the City for review.

SUBMITTAL REQUIREMENTS

Staff recommends that Applicants gather all of the below-listed items before logging onto the City's permit portal to submit a permit because each of the listed items is required to be submitted when you apply for your permit. Please pay attention to the format each of the listed items is required to be in because staff will reject submittals that are not correctly formatted.

If you are not sure what a submittal item is, or what the required format means, it is important for you to communicate with the City before you attempt to submit a permit. The City would much rather discuss your submittal and have you provide the correct items than have you upload submittals that we have to reject.

Next to the name of each of the below-listed submittal items are notes regarding the type of PDF document and the required name of the document. The City uses an electronic plan review system that necessitates these standards.

Additional information regarding the required format for all submittal items can be downloaded from the City's Permit Portal by clicking [HERE](#) and once on this page downloading the handouts named *Electronic Document Submittal Requirements* and *Pre-Submittal Reminders for Applicants*.

ITEMS REQUIRED TO BE SUBMITTED

SITE PLAN (*NATIVE PDF NAMED SITE PLAN*)

The site plan must be drawn to-scale, contain a north arrow, be no less than 11-inch by 17-inches in size, and be uploaded in 'landscape' orientation versus a horizontal position. At a minimum the site plan must include:

- All property lines
- The outline of all structures on the project site
- All site features, such as parking lots, landscape areas, slopes in excess of 15%, dumpster enclosures, etc
- All roads abutting the site
- All fire access lanes
- Include a view of the subject building and surrounding property that clearly indicates the location and orientation of any outdoor antennas associated with the proposed systems
- Clear indication on the plans where the control amplifiers are to be located and protected

CONSTRUCTION PLANS *(NATIVE OR MIN. 300 DPI SCANNED PDF NAMED CONSTRUCTION PLANS)*

The construction plan must be drawn to-scale, contain a north arrow, be no less than 11-inch by 17-inches in size, and be uploaded in 'landscape' orientation versus a horizontal position. At a minimum these plans must include:

- Complete floor plans with the site name, address and elevation name or floor number on each plan sheet
- Details showing how the cable will be protected against damage if located in vertical risers or low areas in the building. The preferred method is to install them in conduit. Show the location of the wire risers in the building and note where the cable is located to keep it from being damaged.
- At least one building elevation showing the location of any outdoor antennas associated with the proposed system. Include the height of the antenna centerline above the building, and orientation and location of all external grounding connections. The outdoor antenna shall be directional and show which site it is pointed to
- Details showing where the control amplifiers are to be located and protected
- A plan view of each interior floor where indoor antenna systems are proposed that includes: antenna numbers, coax routes and the locations of any other system components, including splitters, couplers, filter, amplifiers, etc. All components shall be named or labeled for reference in power budget calculations tables. Overlay approximated coverage radii indicating a -95 dBm down link (base to mobile) signal strength around each proposed indoor coverage antenna. Include the results of any previous coverage testing per grid, if available
- Identification of the backup power source
- One or more sheets showing each floor divided into 40 equal squares for testing or a minimum of 20 x 20 squares, except for isolated areas

EQUIPMENT SPECIFICATIONS *(NATIVE OR MIN. 300 DPI SCANNED PDF NAMED EQUIPMENT SPECIFICATIONS)*

A copy of the manufacturer specification sheets of all systems components, including:

- Amplifiers
- Antennas
- Coax, couplers, splitters, combiners or any other passive components proposed
- Pass bank curves for the uplink and downlink portions for the NPSPAC bank for any amplifiers not previously included. Amplifiers may not amplify portions of other licensed services, including the upper portion of the Specialized Mobile Licensee band or Cellular A or B bands
- Backup battery and charging system (if utilized) or generator specifications

AMBIENT SIGNAL LEVEL MEASUREMENTS *(NATIVE OR MIN. 300 DPI SCANNED PDF NAMED SIGNAL LEVEL MEASUREMENTS)*

For all proposed systems utilizing broadband amplification schemes, including bidirectional amplifiers (BDAs), ambient signal level measurements for nearby carriers in the adjacent SMR and cellular bands must be provided. This will ensure the amplifier will not be overdriven and create harmful interface as defined in 47 CFR, Parts 22 and 90.

The following measurements shall be gathered with a calibrated spectrum analyzer utilizing an omni directional antenna with minimal gain.

- A maximum amplitude plot ("Max Hold") of signal strength (dBm) vs. frequency (MHz), between 863 Mhz and 880 MHz. Perform measurement for at least 10 minutes during the hours of 7a.m. to 7 p.m., Monday through Friday.
- Resolution Bandwidth shall be 10 KHz.
- Place markers on any carrier measured over -55 dBm to readily identify signal strength and frequency.
- No more than three markers are required.

RF POWER BUDGET CALCULATIONS (NATIVE OR MIN. 300 DPI SCANNED PDF NAMED RF POWER CALCULATIONS)

A. Provide the following data for the downlink bank (866-869 MHz)

1. Ambient EPSCA downlink signal strength @ donor antenna = _____ (dB)
2. Donor antenna gain + _____ (dB)
3. Donor antenna cable system loss - _____ (dB)
4. **Total donor antenna system gain = _____ (dB)**
5. Downlink signal level at input to amplifier = _____ (dBm)
6. Amplifier gain + _____ (dB)
7. Amplifier multi-carrier derating, if any - _____ (dB)
8. **Amplifier output per channel at amplifier output = _____ (dBm)**
9. Amplifier maximum composite output power = _____ (dBm)
10. Maximum power available per channel (assume 8 channels active) = _____ (dBm)
11. Indicate amplifier derating if #8 is greater than #10 _____ (dBm)

B. Provide the following data for all indoor coverage antennas:

Antenna #	Cable Length (ft)	Cable Loss per ft (dB)	Total Cable Loss (dB)	Splitter, Coupler and Combiner Losses (dB)	Antenna Make and Model	Antenna Gain (dB)	System Gain (dB)	Antenna Input Power (dBm)	Effective Radiated Power (dBm)
1									
2									
3									

C. Provide the following uplink (821-824 MHz) calculation for the antenna with the smallest system gain (i.e., worst case amplification)

Antenna #	Distance to -95 dBm contour (ft)	Coupling Loss (db) Constant	Free Space + Clutter Loss (dB)	Total Uplink Path Loss (db)	Average Portable ERP Constant (dBm)	Rx Power @ Antenna (dBm)	Donor Antenna System Gain (from above)	Uplink Effective Radiated Power, Worst Case (dBm)
		-10			35			

APPLICATION FEES

Application fees will be calculated by the City once your application is deemed complete.