



ELECTRICAL CODE AMENDMENTS

Ordinance No. 3931

PLANNING, NEIGHBORHOOD & TRANSPORTATION DEPARTMENT

The effective date of this ordinance shall be June 2, 2011.

PASSED AND ADOPTED BY THE Council of the City of Scottsdale, Maricopa County,

Arizona this 3rd day of May, 2011.

Section 31-47 – Amendments

(a) The ICC Electric Code – Administrative Provisions, 2006 Edition, adopted by Scottsdale Revised Code Section 31-46 is amended in the following respects:

- 1) Where reference is made to the "International Building Code," substitute "Scottsdale Revised Code, Chapter 31, Article III".
- 2) Where reference is made to the "International Residential Code," substitute "Scottsdale Revised Code, Chapter 31, Article III".
- 3) Where reference is made to the "International Fire Code," substitute "Scottsdale Revised Code, Chapter 36, Article II".
- 4) Where reference is made to any section of the "International Mechanical Code," substitute "Scottsdale Revised Code, Chapter 31, Article VI".

CHAPTER 1

Section 101.1 is amended to read :

Section 101.1 Title. These regulations shall be known as the Electrical Code of the City of Scottsdale and shall be cited as such and will be referred to herein as "this code".

Section 102.6 is amended to read :

Section 102.6 Referenced Codes and Standards. The codes and standards referenced in this code shall be those that are listed in Chapter 13, and in Scottsdale Revised Code Chapter 31, Article III, and such codes and standards shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes or standards, the provisions of this code shall apply.

CHAPTER 2

Section 201.3 is amended to read :

Section 201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in NFPA 70 or Scottsdale Revised Code Chapter 31, Article III, such terms shall have meanings ascribed to them as in those codes.

CHAPTER 3

Delete Section 301 and substitute the following :

Section 301 Electrical inspections shall be performed as set forth in Scottsdale Revised Code Chapter 31, Article III.

Delete Section 302 and substitute the following :

Section 302 Duties and Powers of the Building Official shall be as set forth in Scottsdale Revised Code Chapter 31, Article III.

Delete Section 303 and substitute the following :

Section 303 Certificate of occupancy shall be as set forth in Scottsdale Revised Code Chapter 31, Article III.

CHAPTER 4

Section 402.5 is amended to read :

Section 402.5 Time limitation of application. An application for a permit for any proposed work or operation shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been pursued in good faith or a permit has been issued; except that the code official is authorized to grant one or more extensions of time for additional periods not exceeding 180 days each. The extension shall be requested in writing and justifiable cause demonstrated.

Section 403.3 is amended to read :

Section 403.3 Extensions. The code official is authorized to grant, in writing, one or more extensions of the time period of a permit for periods of not more than 180 days each. Such extensions shall be requested by the permit holder in writing and justifiable cause demonstrated.

Delete Section 404.2 and substitute the following :

Section 404.2 Schedule of permit fees. Fees for each permit shall be paid as set forth in Scottsdale Revised Code Chapter 46, Article VII.

CHAPTER 5

Delete Section 504.3 and substitute the following :

Section 504.3 Retention of construction documents shall be as set forth in Scottsdale Revised Code Chapter 31, Article III.

CHAPTER 11

Delete Chapter 11 and substitute the following :

Chapter 11 Means of Appeal shall be as set forth in Scottsdale Revised Code Chapter 31, Article III.

Section 1201.1.1 Adoption is amended to read:

Electrical systems and equipment shall be designed and constructed in accordance with the International Residential Code as amended and adopted in Scottsdale Revised Code, Chapter 31, Article III or NFPA 70 as amended and adopted in Scottsdale Revised Code, Chapter 31, Article IV as applicable, except as otherwise provided in this code.

(b) The National Electric Code, 2005 Edition, adopted by Scottsdale Revised Code Section 31-46 is amended in the following respects:

ARTICLE 230, Section V Service Equipment - General is revised by adding 230-63 to read:

230-63. Location. All service equipment rated 1000 amperes or more located inside a building shall be enclosed within a room or space separated from the rest of the building by not less than one-hour fire-resistive occupancy separation.

ARTICLE 240, Section VII Circuit Breakers is revised to read:

240.86 Series Ratings.

Where a circuit breaker is used on a circuit having an available fault current higher than the marked interrupting rating by being connected on the load side of an acceptable overcurrent protective device having a higher rating, the circuit breaker shall meet the requirements specified in (A) or (B), (C) **and (D)**.

(D) Existing Buildings. In existing buildings where the tested combinations in (b) above are not marked, one of the following conditions shall apply.

(1) The end-use equipment manufacturer shall investigate the equipment for conformance with the product test standard and, where applicable, field mark the equipment with the recognized combinations of series rated devices. Any field markings applied shall comply with the requirements of the end-use equipment manufacturer and shall bear the name and/or trademark of the manufacturer.

(2) Where the combination of series rated devices are marked, but not all combinations are shown, the end-use equipment manufacturer shall investigate the equipment and, where applicable, field mark the equipment with the additional recognized combinations of series rated devices. Any field markings applied shall comply with the requirements of the end-use equipment manufacturer and shall bear the name and/or trademark of the manufacturer.

(3) Under electrical supervision, the combinations of series rated devices in the end-use equipment shall be permitted to be field evaluated for conformance with the manufacturer's requirements. The end-use equipment shall be field marked with the additional recognized combinations of series rated devices. The field markings applied shall be permanent, legible and visible, and bear the name of the engineer evaluating the system. The marking shall state

"The combinations of series rated devices was field evaluated by (*name of Arizona registered electrical engineer*) and determined to be safe for use and in accordance with the manufacturer's requirements."

ARTICLE 250 Section VI Equipment Grounding and Equipment Grounding Conductors is revised to read:

250-118. Types of Equipment Grounding Conductors

The equipment grounding conductor run with or enclosing the circuit conductors shall be one or more or a combination of the following:

- (4) Electrical metallic tubing with an individual equipment grounding conductor.
- (5) Listed flexible metal conduit with an individual equipment grounding conductor meeting all the following conditions:
 - a. The conduit is terminated in fittings listed for grounding.
 - b. The circuit conductors contained in the conduit are protected by overcurrent devices rated at 20 amperes or less.
 - c. The combined length of flexible metal conduit and flexible metallic tubing and liquidtight flexible metal conduit in the same ground return path does not exceed 1.8 m (6 ft).
 - d. Where used to connect equipment where flexibility is necessary after installation, an equipment grounding conductor shall be installed.
- (6) Listed liquidtight flexible metal conduit with an individual equipment grounding conductor meeting all the following conditions:
 - a. The conduit is terminated in fittings listed for grounding.
 - b. For metric designators 12 through 16 (trade sizes through ½), the circuit conductors contained in the conduit are protected by overcurrent devices rated at 20 amperes or less.
 - c. For metric designators 21 through 35 (trade sizes ¾ through 1¼), the circuit conductors contained in the conduit are protected by overcurrent devices rated not more than 60 amperes and there is no flexible metal conduit, flexible metallic tubing, or liquidtight flexible metal conduit in trade sizes metric designators 12 through 16 (trade sizes through ½) in the grounding path.
 - d. The combined length of flexible metal conduit and flexible metallic tubing and liquidtight flexible metal conduit in the same ground return path does not exceed 1.8 m (6 ft).
 - e. Where used to connect equipment where flexibility is necessary after installation, an equipment grounding conductor shall be installed.
- (7) Flexible metallic tubing with an individual equipment grounding conductor where the tubing is terminated in fittings listed for grounding and meeting the following conditions:
 - a. The circuit conductors contained in the tubing are protected by overcurrent devices rated at 20 amperes or less.
 - b. The combined length of flexible metal conduit and flexible metallic tubing and liquidtight flexible metal conduit in the same ground return path does not exceed 1.8 m (6 ft). Flexible metallic tubing with an individual equipment grounding conductor and where the tubing is terminated in fittings listed for grounding and meeting all the following conditions.

ARTICLE 310, Conductors for General Wiring is revised to read:

310-15(B)(6)

(6) 120/240-Volt, 3-Wire, Single-Phase Dwelling Services and Feeders.

For individual dwelling units of one family, two-family, and multifamily dwellings, conductors, as listed in Table 310.15(B)(6), shall be permitted as 120/240-volt and 120/208 volt, 3-wire, single-phase service-entrance conductors, service lateral conductors, and feeder conductors that serve as the main power feeder to each dwelling unit and are installed in raceway or cable with or without an equipment grounding conductor. For

application of this section, the main power feeder shall be the feeder(s) between the main disconnect and the lighting and appliance branch-circuit panelboards(s). The feeder conductors to a dwelling unit shall not be required to have an allowable ampacity rating greater than their service-entrance conductors. The grounded conductor shall be permitted to be smaller than the ungrounded conductors, provided the requirements of 215.2, 220.61, and 230.42 are met.

Table 310.15(B)(6) Conductor Types and Sizes for 120/240-Volt and 120/208-Volt, 3-Wire, Single-Phase Dwelling Services and Feeders. Conductor Types RHH, RHW, RHW-2, THHN, THHW, THW, THW-2, THWN, THWN-2, XHHW, XHHW-2, SE, USE, USE-2

Conductor (AWG or kcmil)		Service or Feeder Rating (Amperes)	
Copper	Aluminum or Copper-Clad Aluminum	$\leq 30^{\circ}\text{C} (86^{\circ}\text{F})$	$> 30^{\circ}\text{C} (86^{\circ}\text{F})$
4	2	100	----
3	1	110	----
2	1/0	125	<u>100</u>
1	2/0	150	<u>125</u>
1/0	3/0	175	<u>150</u>
2/0	4/0	200	<u>175</u>
3/0	250	225	<u>200</u>
4/0	300	250	<u>225</u>
250	350	300	<u>250</u>
350	500	350	<u>300</u>
400	600	400	<u>350</u>
500	750	----	<u>400</u>

**CAUTION - UTILITY COMPANY CONDUCTOR SIZE REQUIREMENTS MAY VARY.
CONSULT WITH SERVING UTILITY PRIOR TO INSTALLATION.**

ARTICLE 334, Nonmetallic-Sheathed Cable: Types NM, NMC, and NMS is revised to read:

334.10 Uses Permitted.

Type NM, Type NMC, and Type NMS cables shall be permitted to be used in the following:

- (1) One- and two-family dwellings.
- (2) Multifamily dwellings permitted to be of Types III, IV, and V construction except as prohibited in 334.12.

Delete (3) and (4)

334.12 Uses Not Permitted.

(A) Types NM, NMC, and NMS. Types NM, NMC, and NMS cables shall not be permitted as follows:

- (1) In any dwelling or structure not specifically permitted in 334.10(1), (2), or in any multifamily dwelling or other structure exceeding three floors above grade. For the purpose of this article, the first floor of a building shall be that floor that has 50 percent or more of the exterior wall surface area level with or above finished grade. One additional level that is the first level and not designed for human

- habitation and used only for vehicle parking, storage, or similar use shall be permitted.
- (2) Exposed in dropped or suspended ceilings in other than one- and two-family and multifamily dwellings
 - (3) As service-entrance cable
 - (4) In commercial garages having hazardous (classified) locations as defined in 511.3
 - (5) In theaters and similar locations, except where permitted in 518.4(B)
 - (6) In motion picture studios
 - (7) In storage battery rooms
 - (8) In hoistways or on elevators or escalators
 - (9) Embedded in poured cement, concrete, or aggregate
 - (10) In hazardous (classified) locations

(B) Types NM and NMS. Types NM and NMS cables shall not be used under the following conditions or in the following locations:

- (1) Where exposed to corrosive fumes or vapors
- (2) Where embedded in masonry, concrete, adobe, fill, or plaster
- (3) In a shallow chase in masonry, concrete, or adobe and covered with plaster, adobe, or similar finish
- (4) Where exposed or subject to excessive moisture or dampness

ARTICLE 358, Electrical Metallic Tubing: Type EMT is amended to read:

358.10 Uses Permitted.

(A) Exposed and Concealed. The use of EMT shall be permitted for both exposed and concealed work.

Delete (B)

(C) Wet Locations. All supports, bolts, straps, screws, and so forth shall be of corrosion-resistant materials or protected against corrosion by corrosion-resistant materials. Hot dipped galvanized is not considered an acceptable corrosion-resistant material by itself.

358.12 Uses Not Permitted.

EMT shall not be used under the following conditions:

- (1) Where, during installation or afterward, it will be subject to severe physical damage
- (2) Where protected from corrosion solely by enamel
- (3) In cinder concrete or cinder fill where subject to permanent moisture unless protected on all sides by a layer of noncinder concrete at least 50 mm (2 in.) thick or unless the tubing is at least 450 mm (18 in.) under the fill
- (4) In any hazardous (classified) location except as permitted by 502.10, 503.10, and 504.20
- (5) For the support of luminaires (fixtures) or other equipment except conduit bodies no larger than the largest trade size of the tubing
- (6) Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action.

Exception: *Aluminum fittings and enclosures shall be permitted to be used with steel EMT where not subject to severe corrosive influences.*

- (7) Installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences.

690.31(E) is amended by the following

690-31(E) Direct-Current Photovoltaic Source and Output Circuits Inside a Building.

Where direct current photovoltaic source or output circuits ~~of~~ to a utility-interactive inverter from a building-integrated or other photovoltaic system are run inside a building or structure, they shall be contained in metallic raceways or enclosures from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means. The disconnecting means shall comply with 690.14(A) through 690.14(D).

FPN: It has been discovered that the use of the word "of" is a typo in the 2005 and 2008 codes. The word "of" should be "to" and will be corrected in the 2011 NEC

Article 810 is amended by adding the following:

V. Public Safety Radio Amplification Systems

810-80. Radio Coverage. Except as otherwise provided, no person, firm, or organization shall maintain, own, erect or construct any building or structure which is used for commercial, multi-family, or institutional use or cause the same to be done which fails to support adequate radio coverage to public safety workers, including but not limited to police officers and firefighters. A certificate of occupancy shall not be issued for any building or structure which fails to comply with this requirement.

The frequency range necessary to support public safety radio communications shall be 806MHz to 824MHz and 851MHz to 869MHz, and readily adaptable to other public safety emergency radio frequencies in the 700MHz radio frequency band, specifically 769MHz to 775MHz and 799MHz to 805MHz. The public safety radio amplification system shall be capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC.

The minimum acceptable radio signal coverage shall include both a measurement of signal strength in decibel milliwatt (dBm) and a measurement in delivered audio quality (DAQ) that meet or exceed all of the following:–

(A) A minimum radio signal strength of -95 dBm in 95% of the area on each floor of the building when transmitting to and from the City of Scottsdale public safety communications systems.

(B) A minimum average delivered audio quality (DAQ) rating of three (3) for signal strength and intelligibility, as determined by City, in 95% of the area on each floor of the building when transmitting to and from the City of Scottsdale public safety communications systems.

(C) A 95% reliability factor.

(D) A 100% coverage level at the minimum levels set forth in 810-80(a) and 810-80(b) in all stairwells, stairways, and designated emergency personnel ingress and egress paths.

810-81. Signal Quality. The minimum acceptable DAQ ratings shall be met at all times. The signal strength and the intelligibility rating scales shall apply to all portable radio test locations on the property:

Signal strength:

- 0 - no detectable signal
- 1 - barely detectable
- 2 - detectable with difficulty
- 3 - detectable at all times
- 4 - strong signal, detectable at all times

Intelligibility:

- 0 - unintelligible
- 1 - intelligible with extreme difficulty (many repetitions required)
- 2 - intelligible with difficulty (repetition required)
- 3 - intelligible (repetition seldom required)
- 4 - intelligible at all times

An applicant shall provide to the building official sufficient evidence or proof showing compliance with this provision of the code before a certificate of occupancy is issued. The plans and specifications, and other data, filed by an applicant for a certificate of occupancy shall be reviewed by the building official or other qualified personnel.

810-82. Enhanced Amplification Systems. Amplification systems are allowed under Federal Communication Commission (FCC) Rules CFR Part 47, 90.219. Buildings and structures which cannot support the required minimum level of radio coverage shall be equipped with FCC certified amplification or booster systems that include either a radiating cable system or an internal distributed antenna system (DAS) with or without signal boosters in order to achieve the required minimum radio coverage:

(A) All active in-building coverage devices shall be FCC Part 90 Type Certified and capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC.

(B) All system components shall be 100% compatible with analog and digital modulation after installation without additional adjustments or modifications.

(C) The signal booster shall include filters to reject frequencies below and above the public safety bands by a minimum of 35dB.

(D) The maximum propagation delay (group delay) of any in-building signal booster shall not exceed 15 microseconds. The delay value includes the cumulative delays in signal boosters, coaxial cables, fiber optics, etc. used within the in-building system.

(E) Antenna-to-antenna isolation – the outside-to-inside antenna isolation (loss) shall be at least 16dB more than the highest gain reading of the boosted inside signal.

(F) Active system devices shall be encased in NEMA 4 dust/waterproof case and clearly labeled “City of Scottsdale Public Safety Radio.”

(G) If any part of the installed system or systems contains an electrically powered component, the system shall be capable of operating on an independent battery and/or

generator system for a minimum period of four (4) hours without external power input. The battery system shall be designed to automatically charge in the presence of an external power input.

810-83. Testing Procedures.

(A) Initial Tests. The building official shall require tests as evidence of compliance to be performed by a BDA equipment manufacturer certified technician or an FCC licensed technician. The building owner is responsible for all costs of performing these tests. The building owner shall submit the test results and documentation to the City's radio communications office (See Exhibit A). Upon review of the results for the signal strength tests, the City's radio communications engineer will schedule the final system acceptance test and will perform the DAQ tests using a portable radio unit.

To verify coverage for final system acceptance, the City's radio engineer or designated staff member will perform radio signal strength and intelligibility tests in locations throughout the building. The locations selected will be consistent with processes and procedures provided in the Telecommunications Industry Association's Telecommunications Systems Bulletin, TIA/TSB88-B, Chapter 8 and Annex E, and the test area as specified in 810-82(B).

(B) Testing Area. The coverage test must be performed after all windows, building cladding, and drywall have been installed on all floor levels. Each floor of the building shall be divided into a grid of approximately 40 equal areas. The tests shall be conducted using a City public safety portable radio with the tester verbally communicating through the City's radio communications system.

A spot located approximately in the center of a grid area will be selected for the test, then the radio will be keyed to verify two-way communications to and from the test location through the City's radio communications system. Once a spot is selected, prospecting for a better spot within the grid area will not be permitted. A maximum of two non-adjacent areas will be allowed to fail the test.

In the event that three (3) areas fail the test, in order to be statistically more reliable, the floor may be divided into 80 equal areas; a maximum of four (4) non-adjacent areas will be allowed to fail the test. If the floor area fails the 80 equal areas test the building owner shall be responsible for bringing the area into compliance before a re-test is conducted by a representative of the City's radio communications office.

The results of testing shall be documented and to a level of detail that demonstrates that the building or structure is in compliance with the coverage levels and signal quality standards set forth in section 810-80.

(C) Annual Tests. Upon providing five (5) days written notice to the property owner or the property owner's representative, the City's radio communications or public safety personnel shall have the right to enter onto the property and into buildings or structures, at times reasonable to conduct field testing of radio signal quality and coverage levels.

(D) Radio Signal Strength Test Equipment. Signal strength tests shall be conducted using a calibrated spectrum analyzer test set utilizing an omni-directional antenna with minimal gain. The resolution bandwidth shall be set to 10KHz.

(E) Delivered Audio Quality Test Set. DAQ tests will be performed using a Motorola XTS5000, or equivalent portable radio. All tests shall be performed with the radio unit antenna at a height of four (4) feet above the floor or ground.

(F) Buildings that Fail the Annual Radio Signal Strength and Coverage Test. Should an annual test fail to meet compliance, the owner or property manager shall bring the radio signal strength and coverage into compliance with the minimum levels within sixty (60) days of receiving the test results. Any person, corporation, association or enterprise who fails to bring the radio signal strength into compliance within the sixty (60) day timeframe is subject to provisions of Scottsdale Revised Code, Chapter 31, Article IV, Section 31-48.

(G) Additional Information. Direct questions about the processes and procedures for the initial and annual testing of public safety radio signal strength and quality to the City's radio communications office at 480 312-2264 or via email at radioengineer@scottsdaleaz.gov.

810-84. Uses Where Not Required. This section shall not apply to any single-family residence. The requirements of this section may be waived by the City's radio communications office for buildings which do not have below grade spaces or parking. In such cases, the building owner shall obtain a waiver of this radio amplification requirement from the City's radio communications engineering manager. The waiver shall be in writing and must be submitted to the City's building official prior to receiving a certificate of occupancy.

810-85. Applicability. The provisions of this ordinance shall apply to all buildings or structures, except as noted in section 810-83 of this ordinance, which are used for commercial, multi-family, or institutional use, regardless of a change in ownership or a transfer of ownership.

810-86. As-built Drawings. The owner of a building or structure shall provide the City's radio communications engineer a set of detailed plans (as-built drawings) of the amplification and/or signal booster system as installed and operating in their building or structure. The plans shall be printed on 24"x36" paper and include the location of electronic amplification and signal booster equipment, the manufacturer and model of the electronic equipment, the routes of all cabling between the electronic equipment and antennas, the location of all antennas, and all electrical circuits and components serving the amplification or signal booster system, and such additional information as requested by the City.

810-87. Modifications in Radio System. In the event that the City or other public safety organization modifies its radio communications equipment or frequencies in any way that impairs the ability of the City or other public safety organizations to communicate with an existing amplification or signal booster system installed, tested and approved in accordance with this ordinance, the City or public safety organization may participate in the reasonable costs associated with reestablishing reliable public safety radio communications with the affected building or structure.

(A) In the event that changes to the public safety radio frequencies are required by the FCC or when additional frequencies are made available by the FCC, all public safety radio amplification systems installed by the building owner, property owner or their agent after January 1, 2011, shall be modified, adjusted or expanded to amplify the new public safety radio frequencies. The building or property owner is responsible for any and all costs to properly modify, adjust or expand the amplification system. Prior approval of a

public safety radio coverage system on previous frequencies does not exempt this requirement.

810-88. Radio Signals Affected by New Building or Structure. In the event that a building or structure that is in conformance with the provisions of this ordinance is subsequently found to be out of conformance due to the construction of a nearby building or structure, the City or public safety organization may participate in paying the reasonable costs associated with reestablishing reliable public safety radio communications with the affected building or structure. In cases where the construction of a new building or structure causes an existing building or structure that was in conformance with section 810-10 to then be out of conformance, and both the existing building or structure and the newly constructed building or structure are owned by, or is located on land or real property that is owned by the same corporation, partnership, business entity or persons, then such owner shall be fully responsible for the costs of bringing the non-conforming building or structure in conformance to the requirements of section 810-80.

810-89. Building and Property Access to Install Antennas and Equipment. In cases where a newly constructed or modified building, or a newly constructed or modified structure is deemed to have caused a building or structure that was in conformance with the radio coverage levels to be out of conformance, the owner of the newly constructed building or structure and its property owner shall allow the City to install a public safety radio amplification system on or within its building, structure or property without compensation or reimbursement to building owner or to the property owner for rent, fees, payments or any financial encumbrance. The amplification system will be installed to bring the non-complying structure into compliance with the public safety radio signal coverage requirements.

810-90. Radio Frequency Communications Operations Restriction. The owner of a building, the owner of a structure and any occupant of the building or structure shall not install, operate, or allow the use of equipment, methodology or technology that interferes or is likely to interfere with the optimum effective use or operation of the City's fire, emergency or other communication equipment, methodology or technology (i.e., voice or other data carrying, receiving or transmitting equipment). If such interference should occur, the building owner or occupant shall immediately discontinue using the equipment, methodology or technology that causes the interference until corrective measures are taken to alter the communication equipment to eliminate such interference. Any such corrective measures shall be made at no cost to the City. Upon request from the City, the building owner or occupant shall give to the City Radio Communications Engineer a list of the radio frequencies in use at the building or property.

EXHIBIT A

**City of Scottsdale
BDA Installation RF Power Measurements**

Provide the following data for the downlink band.		
1.	Ambient Scottsdale downlink signal strength @ donor antenna =	(dBm)

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)
Provide the isolation measurement between the donor antenna and the indoor antenna system		(dB)

For questions about the processes and procedures for the initial testing of public safety radio signal strength and quality, contact the City of Scottsdale's radio communications office at 480 312-2264 or via email at radioengineer@scottsdaleaz.gov.