



**Montgomery County
Department of Permitting Services**

255 Rockville Pike, 2nd Floor
Rockville, MD 20850-4166
Phone: 311 in Montgomery County or (240)777-0311
www.montgomerycountymd.gov/dps



Emergency Responder Radio Coverage

In-Building Radio Signal Amplification System Standard

Document Type

Effective April 1, 2005, Montgomery County adopted regulations to require in-building radio signal amplification systems in certain buildings. The regulation was in the form of an amendment to the 2003 International Building Code.

These requirements have been maintained in the subsequent adoptions of the International Building Code. With the adoption of the 2015 International Building Code, the requirements for in-building radio signal amplification systems are found in Section 916 for Emergency Responder Radio Coverage. This section, as amended, reads as follows:

Section 916.1. Emergency responder radio coverage shall be assured in all new constructed below ground floors of a building, all floors in buildings greater than 25,000 ft² per floor, and to all floors of buildings greater than 3 stories in height. One- and two- family dwellings and townhouses are exempt from this requirement.

Section 916.2. Every floor area in a building or structure which cannot achieve the required level of emergency responder radio coverage as established by Montgomery County Department of Technology Services shall be provided with an in-building public safety radio enhancement system in accordance with the Montgomery County Fire Safety Code.

Section 916.3. Inspection and Testing. Emergency responder radio coverage and in-building public safety radio enhancement system must be tested and inspected by approved individuals. The results of the testing and inspection shall be certified to the code official prior to issuance of an occupancy permit.

Required Level of Signal Coverage:

The required level of signal coverage established by Montgomery County Department of Technology Services is:

- Signal measurement is required to be -95dbm or stronger at a given point;



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- Entire building is 95% or above covered (including all underground levels, basements, elevators, stairways, etc.) at 95% of the time;
- An in-building radio signal amplification system is required to provide coverage at Delivered Audio Quality (DAQ) 3.4 level or above. DAQ 3.4 is defined as “speech understandable without repetition. Some noise/distortion present.”;

Measurements shall be performed on frequencies listed in the Montgomery County 800 MHz Frequency Chart A.

Responsibilities:

In Building Coverage System

To amplify the signals inside a building or structure not meeting the above standard, an FCC type - accepted Bi-Directional Amplifier (BDA) with any of the following shall be installed in order to achieve the required radio coverage: a radiating cable system, a distributed antenna system, or a combination thereof.

Design

It is the building owner’s responsibility to obtain the services of a professional engineer to evaluate and test the required level of signal coverage in the building and to design and install (if required) the in-building radio signal amplification system. The in-building coverage design shall consider, but is not limited to, the following criteria: FCC limits on BDA output power, power per carrier, signal-to-noise ratio, RF filtering, adjacent band interference, intermodulation interference and distortion, uplink noise output, antenna locations, and proper cable size.

New Building Construction – System Installation

Installation will be in compliance with all state and local building codes, including the standards of the FCC, NFPA, NEC and TIA TSB-88-1-B. At a minimum, a two-inch diameter conduit/conduit sleeves will be provided vertically from the roof level to the lowest level of the structure. This conduit will provide a vertical path for cable to all levels and should pass through the BDA equipment room. At a minimum, a 20 amp AC circuit and building ground (at the BDA and outside antenna locations) is to be provided to power and ground the BDA. Two copies of complete formal BDA system reference drawings, including schematics, floor layouts with cable routing, and commissioning data are required to document the installed BDA system. The documents will be maintained by the building management and made available to the Fire Marshal or competent building inspectors on request.

Donor Antenna



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The BDA system must use an antenna that derives its signal from a Montgomery County 800 MHz antenna. The 800 MHz antennas are registered with the FCC, which provides physical locations. BDA/DAS Contractors are responsible to ensure where their antenna is directed.

UPS

The BDA system shall be provided with 12 hours of secondary power either by battery or by an onsite generator. If there is a generator onsite, the generator shall provide power to the BDA system.

System Design and Initial Test

System design and initial testing of the BDA system shall be performed by a qualified RF Systems Engineer with at least five years experience in the design, installation, and alignment of bi-directional amplifier systems.

Acceptance Test

Using the Montgomery County Control Channel, each floor shall be RF signal mapped utilizing a calibrated portable spectrum analyzer. Each floor shall be divided into equal grids of no more than 50 feet by 50 feet. Individual testing points shall be spaced no farther than 50 feet from each other.

Each grid shall meet the downlink signal requirement as stated above. A maximum of two nonadjacent areas will be allowed to fail on the same floor. Failure of any two adjacent grids is considered a failure for the entire floor. All talk testing must pass the DAQ 3.4 criterion stated above. Critical rooms, including, but not limited to, such areas as the Fire Command/Control Center, Fire Pump Room, Emergency Generator Room, stairwells with a standpipe, and other staging areas as identified by the Fire Marshal cannot fail coverage at all.

Annual Test

The building owner shall perform radio coverage testing annually to ensure that the in-building coverage system continues to meet the original acceptance test results and complies with applicable codes.

Field Testing

Public Safety personnel shall, with notice, have the right to enter onto the property to conduct field testing to be certain the required level of coverage is present.

Performance and Maintenance Responsibilities

The building owner is responsible for continued performance and maintenance of the in-building coverage system. In addition, the building owner is responsible for having the name of a contractor who can provide telephone support within 2 hours or recognition that the BDA system is not operating correctly or on-site service within 24 hours of recognition that the BDA system is not operating correctly.



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Costs

The building owner is responsible for all costs to provide the required in-building coverage system, its design, and infrastructure to support the in-building coverage system.

New Buildings Occupancy Certificates

Prior to issuance of an occupancy certificate, a registered Professional Engineer must certify that the building achieves the required level of radio coverage as established by DTS. This certificate must be presented to the Division of Building Construction Services upon request and must be presented in the form established herein.

Additional Information:

For questions regarding in-building signal amplification system standard or signal coverage, you may contact the Department of Technology Services Radio Communications Services Section via phone at 240-777-8000 or email at BDASstandardQuestions@montgomerycountymd.gov

Current Montgomery County 800 MHz Frequency Chart A

CHANNEL No.	Base Rx	Base Tx	CHANNEL TYPE
1	808.9375 MHz	853.9375 MHz	CONTROL CHANNEL
2	808.8875 MHz	853.8875 MHz	CONTROL CHANNEL
3	808.8625 MHz	853.8625 MHz	CONTROL CHANNEL
4	808.6875 MHz	853.6875 MHz	CONTROL CHANNEL
5	808.6375 MHz	853.6375 MHz	VOICE
6	808.6125 MHz	853.6125 MHz	VOICE
7	808.4375 MHz	853.4375 MHz	VOICE
8	808.3875 MHz	853.3875 MHz	VOICE
9	808.3625 MHz	853.3625 MHz	VOICE
10	808.2750 MHz	853.2750 MHz	VOICE
11	808.1625 MHz	853.1625 MHz	VOICE
12	808.1125 MHz	853.1125 MHz	VOICE
13	807.9125 MHz	852.9125 MHz	VOICE
14	807.8875 MHz	852.8875 MHz	VOICE
15	807.8375 MHz	852.8375 MHz	VOICE
16	806.6500MHz	851.6500MHz	VOICE
17	806.4875 MHz	851.4875 MHz	VOICE



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18	806.3375 MHz	851.3375 MHz	VOICE
19	806.2750 MHz	851.2750 MHz	VOICE
20	806.2125 MHz	851.2125 MHz	VOICE

Additional Resource for Testing

The Montgomery County Department of Technology Services (DTS), Radio Communication Services Section (RCS) is available to assist BDA/DAS contractors with testing their installed system to ensure correct coverage without interfering with Montgomery County Public Safety radio operations. Contact the RCS Section at 240-773-8000 or email Gerry Adcock, Radio Communications Manager, at Gerry.Adcock@MontgomeryCountyMD.gov. DTS is able to assist with testing, but will not provide a PE certification for the BDA/DAS installation.

CERTIFICATE OF RADIO COVERAGE COMPLIANCE

Project Name: _____

Project Address: _____

Building Permit Number (A/P): _____



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Design Professional Engineer of Record: _____

I have responsible charge and I certify that the building identified above was tested for radio coverage level(s) in accordance with the Montgomery County Department of Technology Services (DTS) standard. To the best of my information, knowledge and belief, the radio coverage levels for this project is in accordance with the specifications and is in compliance with DTS standards and regulations.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and I am a duly licensed professional engineer under the laws of the State of Maryland, License No. _____, Expiration Date: _____.

Respectfully submitted,

Signature and Seal of Design Professional Engineer of Record

Date