In-Building Radio Communication Requirements

Planning & Development Department
District of Lake Country
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Reliable in-building radio communications are considered life-safety critical systems, as they enable effective coordination and safety of emergency responders during fire and other emergency incidents. The in-building radio system must be designed to support emergency operations within the building in accordance with the requirements of the Regional District of Central Okanagan (RDCO) Regional Radio Network and the Lake Country Fire Department. The system shall include:

- A primary dedicated radio frequency for tactical operations within the building, and
- A secondary emergency backup channel for firefighter emergency use (e.g., "Mayday" situations).

1.0 IN-BUILDING RADIO COMMUNICATIONS REQUIREMENTS

A simplex frequency (Digital ERDM) shall be identified for each building that requires a two-way radio communication system.

2.0 DEFINITION OF RELIABLE TWO-WAY RADIO COMMUNICATIONS

Reliable two-way radio communications as defined below shall be achieved between personnel inside the building communicating over the assigned channel with personnel outside the building.

All two-way radio communications in both directions shall meet a Delivered Audio Quality (DAQ) 3.4 defined as "speech understandable with repetition rarely, some noise or distortion may be present" per Telecommunications Industry Association TSB 88 standards in all locations and under the operating conditions specified in Table 1.

DAQ 3.4 has been measured by the U.S. Department of Commerce, National Telecommunications and Information Administration to be approximately equivalent to a received signal level of -95 dBm in the absence of other signals that may affect the receiver.

2.1 Certified and Design Signal Strength Thresholds

Following the complete construction of the building interior including all exterior and interior walls and all doors and windows installed minimum certified signal strength of -95 dBm shall be obtained in all floor areas as per Table 1. The design threshold for all floor areas as per Table 1 should be -85 dBm to allow a margin of not less than 10 dB of signal fade and or changes to incoming signal strength.

2.2 Description of Interior Building Coverage Requirements

Reliable two-way radio communications shall be achieved in the following areas and locations inside the building:

Floor Area for Reliable Communications as per E-Comm 911		
Location		**Floor Area for Reliable Two-Way Radio Communications**
1.	Public access hallways, elevator lobbies	95% of each area on each floor
2.	Living areas	95% of each enclosed area within each living area
3.	Parking garage	95% of all areas on each level
4.	Common rooms, recreation rooms and recreation areas such as pools, hot tubs, gyms	95 % of each enclosed area and each open area
5.	Foyers, lobbies, atriums and enclosed entranceways.	95% of each enclosed area and each open area
6.	Stairwells	100 % of all areas within each stairwell
7.	Elevators	100% inside closed elevators
8.	Designated refuge areas (shelter- in-place and protected areas)	100 % of each enclosed area and each open area
9.	Mechanical and electrical rooms	100% of all areas within each room
10.	Storage areas including hazardous materials storage (paints, solvents, cleaning supplies, etc.)	100% of each enclosed area and each open area
11.	Fire command centres, alarm panel locations	100% of each enclosed area and at each location in open areas.
12.	Commercial parking garages	95% of all areas on each level
13.	Individual offices and open office areas	95% of each enclosed area and each open area
14.	Warehouse, manufacturing, and fabricating plant areas, enclosed rooms, and open areas	95% of each enclosed area and each open area
15.	Retail malls, individual retail stores, open mall areas	95% of each shop, each enclosed area and each open area
16.	Locations, and areas not listed above will be at the discretion of the Fire Chief	

Note: The building interior shall be completely constructed with all exterior and interior walls, doors and windows installed.

2.3 Procedures to Verify and Maintain Compliance

The Fire Chief, or designate, shall have ultimate authority to accept or reject the reliability of the radio communications inside the building, and the test reports submitted by the building owner.

- The initial acceptance tests and measurements to verify and maintain the two-way voice communications system comply with this bylaw shall be made at the sole expense of the Owner.

- Qualifications of Testing Personnel and Test (Measurement) Equipment Tests shall be performed by or under the direct supervision of a professional engineer registered in the Province of British Columbia and qualified in radio communications. Test reports shall bear the seal of the engineer.

- Portable radios used shall be of a size and type as designated as acceptable by Lake Country Fire Department or such replacement radio as may be in use by Lake Country Fire Department. Signal strength measurements shall be made using appropriate instrumentation acceptable to Fire Chief. Radios and measurement equipment shall have been tested for conformance to design specifications within twelve months prior to the conduct of Amplification System acceptance tests or re-tests.

- Lake Country Fire Department may conduct an operational test of the two-way voice communications systems. This test, if conducted, is solely to confirm the use and function of the two-way radio communication system and shall not be considered as any form of approval or acceptance of the two-way radio communications system.

3.0 USE OF TECHNOLOGY

Reliable in-building radio communications are considered life-safety critical systems, on par with fire alarms, emergency power, and smoke control systems, as they enable effective emergency responder coordination during fire and other incidents.

3.1 General

The design and installation of any in-building public safety communications systems, including Distributed Antenna Systems (DAS), bidirectional amplifiers (BDAs), radiating cable, passive reflectors, and antenna systems, shall meet recognized industry standards and best practices. At a minimum, all wiring and components must comply with CAN/ULC-S139 Fire Test for Evaluation of Integrity of Electrical Cables**,** which ensures circuit survivability under fire and hose stream exposure.

The technology shall meet and as applicable be approved for the intended application in accordance with ISED Canada standards and specifications CPC-2-1-05 "Zone Enhancers" and RSS131 "Zone Enhancers for the Land Mobile Service".

All system design and installation shall meet all applicable municipal, provincial, and federal codes and regulations.

Lake Country Fire Department acknowledges that the Motorola MOTOTRBO SLR 1000 VHF single frequency repeater used in extended range direct mode, or other industry standard manufacturer’s public safety VHF single frequency repeater is expected to meet the technical requirements of the Regional District of Central Okanagan (RDCO) Regional Radio Network and the Lake Country Fire Department Lake Country Fire Department’s operational requirements.

All technology shall use an electrical power source that shall not be disabled or disrupted if the primary Fortis BC power source fails or is interrupted. Backup electrical power in the event of Fortis BC power failure or interruption must be provided by a self-contained backup battery power source that shall maintain full electrical power capabilities for all technology for a minimum of 4 hours during continuous in-building emergency radio communications.

The use of any in-building radio coverage enhancement technology shall not result in spurious radiation (RF leakage) outside the building except via dedicated, intentional antennas or other intentional radiators required for the in-building coverage enhancement technologies.

Any spurious or leakage radiation outside the building shall not result in any degradation of the performance of any radio communications used by Lake Country Fire Department or any other emergency responders in the area.

All active amplification systems must be licensed by Innovation, Science & Economic Development Canada (ISED), and comply with the applicable standard radio systems plan.

- The owner of an active amplification system must renew all licenses annually and pay the cost of licenses.

- Any equipment used in an amplification system must be selected only from the ISED radio equipment list as described on the Government of Canada website. The equipment must meet the requirements of Lake Country bylaws.

- If the in-building radio communications system fails to provide adequate coverage because of any technological change to the municipal fire services radio system, the in-building radio communications system shall be upgraded at the sole expense of the Owner, to maintain in-building radio communications system coverage as originally designed.

3.2 As-Built Drawings and Specifications

As built drawings shall be provided for any technology that is added to the building design or structure specifically to improve the in-building radio communications coverage.

The drawings shall detail the specific technology make and model numbers, interconnections and schematic or block diagrams of the interconnected technology.

For more information:

- Contact the Planning & Development Department at building@lakecountry.bc.ca or call 250-766-6675.

- Contact Lake Country Fire Department at fireadmin@lakecountry.bc.ca or call (250)-766-2327

Please note: Bulletins are prepared to provide convenient information for customers and should not be considered a replacement for reviewing the bylaw or associated legal documents. If there is any contradiction between this guide and relevant municipal bylaws and/or applicable codes, please refer to the bylaws and/or codes for legal authority.

	Zone Enhancer Authorization **Application Form** Version 1.0 - June 2023
Date of Application (MM/DD/YYYY)	
Building Project Name	
Comissioning Date (MM/DD/YYY)	
Contractor Details	
Company Name	
Contact Name	
Contact Email	
Contact Phone	
ISED Licence	
ISED Licence Number: (or)	
ISED Licence Application Date (MM/DD/YYY)	
Site Details	
Site Address	
Latitude (Decimal)	
Longitude (Decimal)	
Building Elevation (m)	
Building Height (m)	
Design Details	
Total Donor Line Losses (dB)	
Donor Antenna	
Model	
Azimuth (degrees)	
Height (m) above ground level	
Gain (dBd)	
Half-Power Beamwidth (degrees)	
Front-to-Back Ratio (dB)	
Repeater	
Model	
Industry Canada Certification	
Type (Chanellised / Wideband / TRBO Repeater)	
Transmit Power (W)	
Indoor Antennas	
Model	
Comments	

	Coverage Enhancement System **Commissioning Report** Version 1.0 - June 2023
Building Project Name	
Comissioning Date (MM/DD/YYY)	
Site Address	
Test Information	
Test Channel Frequency	
Contractor / Tester Information	
Contact Name	
Contact Email	
Contact Phone	
I hereby give assurance that: Assurance of Professional Field Review and Compliance by Signature I have reviewed the Coverage Enhancement System Commissioning report for the installation at the above noted *Site Name* at the described Site Address, and The testing and results of the commissioning comply with Lake Country Enhancement System Bylaw Requirements.	Signature:
ISED Licence	
ISED Licence Number:	
System Measurements	
Measured Isolation (dB)	
Equipment Downlink Gain Setting (dB)	
Equipment Uplink Gain Setting (dB)	
Uplink Noise ERP (dBm)	
Donor Line Return Loss (dB)	
Wideband or Channelized	
Final Heat Map	
Heatmap Attached Y/N	
Comments	